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• *1: These numbers are prescribed by SAE J2012.

• *2: When the fail-safe operation occurs, the MIL illuminates.

• *3: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

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• *1: These numbers are prescribed by SAE J2012.

• *2: When the fail-safe operation occurs, the MIL illuminates.

• *3: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

PRECAUTIONS

Precautions for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT **BELT PRE-TENSIONER**" ECS005VV

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 and SB section of this Service Manual. AT

WARNING:

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

Precautions for On Board Diagnostic (OBD) System of A/T and Engine

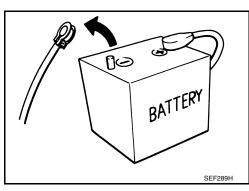
The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

- Be sure to turn the ignition switch "OFF" and disconnect the negative battery 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 EGR system or fuel injection system, etc.
- Κ Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM and ECM before returning the vehicle to the customer.

Precautions

Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the TCM. Because battery voltage is applied to TCM even if ignition switch is turned off.



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ECS005VX

 When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).

Make sure that there are not any bends or breaks on TCM pin terminal, when connecting pin connectors.

Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly

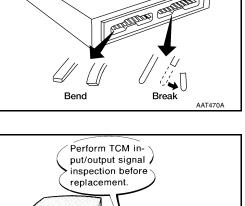
After performing each TROUBLE DIAGNOSIS, perform "DTC (Diagnostic Trouble Code) CONFIRMATION PROCE-DURE". The DTC should not be displayed in the "DTC CONFIRMA

The DTC should not be displayed in the "DTC CONFIRMA-TION PROCEDURE" if the repair is completed.

- Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.

or not. See page AT-109 .

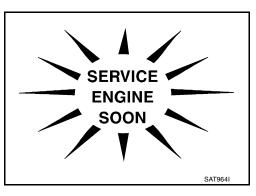
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transaxle.
- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should be replaced any time the transaxle is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- Replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to <u>AT-11</u>, <u>"ATF COOLER SERVICE"</u>.
- After overhaul, refill the transaxle with new ATF.
- When the A/T drain plug is removed, only some of the fluid is drained. Old A/T fluid will remain in torque converter and ATF cooling system.
 Always follow the procedures under "Changing A/T Fluid" in the MA section when changing A/T fluid.
 Refer to MA-31, "Changing A/T Fluid".



OLD ONE

1000 000

MEF040DA



Service Notice or Precautions	А
The TCM has an electronic Fail-Safe (limp home mode). This allows the vehicle to be driven even if a major electrical input/output device circuit is damaged.	
Under Fail-Safe, the vehicle always runs in third gear, even with a shift lever position of "1", "2" or "D". The cus- tomer may complain of sluggish or poor acceleration.	В
When the ignition key is turned "ON" following Fail-Safe operation, O/D OFF indicator lamp blinks for about 8 seconds. [For "TCM Self-diagnostic Procedure (No Tools)", refer to <u>AT-51, "TCM Self-diagnostic Procedure</u>]	AT
(<u>No Tools)</u> ".] The blinking of the O/D OFF indicator lamp for about 8 seconds will appear only once and be cleared. The	
customer may resume normal driving conditions. Always follow the "Work Flow". Refer to <u>AT-60, "Work Flow"</u> . The SELF-DIAGNOSIS results will be as follows:	D
• The first SELF-DIAGNOSIS will indicate damage to the vehicle speed sensor or the revolution sensor.	
• During the next SELF-DIAGNOSIS, performed after checking the sensor, no damages will be indicated.	Е
TORQUE CONVERTER SERVICE	
The torque converter should be replaced under any of the following conditions:	F
External leaks in the hub weld area.	
Converter hub is scored or damaged.	
Converter pilot is broken, damaged or fits poorly into crankshaft.	G
Steel particles are found after flushing the cooler and cooler lines.	
Pump is damaged or steel particles are found in the converter.	
• Vehicle has TCC shudder and/or no TCC apply. Replace only after all hydraulic and electrical diagnoses have been made. (Converter clutch material may be glazed.)	Н
 Converter is contaminated with engine coolant containing antifreeze. 	
Internal failure of stator roller clutch.	
 Heavy clutch debris due to overheating (blue converter). 	
• Steel particles or clutch lining material found in fluid filter or on magnet when no internal parts in unit are worn or damaged — indicates that lining material came from converter.	J
The torque converter should not be replaced if:	
• The fluid has an odor, is discolored, and there is no evidence of metal or clutch facing particles.	K
The threads in one or more of the converter bolt holes are damaged.	
• Transaxle failure did not display evidence of damaged or worn internal parts, steel particles or clutch plate lining material in unit and inside the fluid filter.	L
 Vehicle has been exposed to high mileage (only). The exception may be where the torque converter clutch dampener plate lining has seen excess wear by vehicles operated in heavy and/or constant traffic, such as taxi, delivery or police use. 	
ATF COOLER SERVICE	Μ
Replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Replace radiator lower tank (which includes ATF cooler) with a new one and flush cooler line using cleaning solvent and compressed air. Refer to <u>CO-13, "RADIATOR"</u> .	
OBD-II SELF-DIAGNOSIS	
• A/T self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the O/D OFF indicator or the malfunction indicator lamp (MIL). Refer to the table on <u>AT-54, "Judgement of Self-diagnosis Code"</u> for the indicator used to display each self-diagnostic result.	

- The self-diagnostic results indicated by the MIL are automatically stored in the ECM and TCM memories. Always perform the procedure "HOW TO ERASE DTC" on page <u>AT-40</u> to complete the repair and avoid unnecessary blinking of the MIL.
- The following self-diagnostic items can be detected using ECM self-diagnostic results mode* only when the O/D OFF indicator lamp does not indicate any malfunctions.
- PNP switch

*: For details of OBD-II, refer to <u>EC-58, "ON BOARD DIAGNOSTIC (OBD) SYSTEM"</u> [QG18DE (ULEV)] or <u>EC-630, "ON BOARD DIAGNOSTIC (OBD) SYSTEM"</u> [QG18DE (SULEV)].

 Certain systems and components, especially those related to OBD, may use a new style slidelocking type harness connector.
 For description and how to disconnect, refer to <u>PG-47, "HARNESS CONNECTOR (SLIDE-LOCKING</u> <u>TYPE)"</u>.

Wiring Diagrams and Trouble Diagnosis

ECS005VZ

When you read wiring diagrams, refer to the following:

- <u>GI-13, "How to Read Wiring Diagrams"</u>.
- PG-2, "POWER SUPPLY ROUTING".

When you perform trouble diagnosis, refer to the following:

- GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES".
- GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident".

		PFP:0000
Decial Service Tools	ffer from those of special service tools illustrated here.	ECS005V
Fool number Kent-Moore No.) Fool name	Description	
J34301-C) Dil pressure gauge set I (J34301-1) Dil pressure gauge 2 (J34301-2) Hoses (2) Hoses (2) Hose	AATB96	essure
60° Adapter 6 (J34301-15) Square socket		
KV31103000 J38982) Drift	a b 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	25000.) n) dia.
	V NT105	
GT35325000 —) Drift	a C C C C C C C C C C C C C	03000.) in)
<v38107700 J39027)</v38107700 	• Measuring turn sembly	ng torque of final drive as-
Preload adapter	and differential	rance between side gear case with washer ential side bearing adjusting
	NT087	
(V31103200 J34285-A and J34285-87) Clutch spring compressor	Removing and ins a: 320 mm (12.60 b: 174 mm (6.85	

[RE4F03B]

Tool number		
(Kent-Moore No.) Tool name		Description
ST23540000 (J25689-A) Pin punch	a	Removing and installing parking rod plate, manual plate and differential pinion mate shaft retaining pins a: 2.3 mm (0.091 in) dia. b: 4 mm (0.16 in) dia.
	NT442	
KV32101000 (J25689-A) Pin punch	a	Installing throttle lever and manual shaft re- taining pins a: 4 mm (0.16 in) dia.
ST25710000 (—) Pin punch	NT410	Aligning groove of manual shaft and hole of transmission case a: 2 mm (0.08 in) dia.
	NT410	
ST3306S001 (J22888-D) Differential side bearing puller set 1 ST33051001 (J22888-D) Puller 2 ST33061000 (J8107-2) Adapter		Removing differential side bearing inner race a: 39 mm (1.54 in) dia. b: 29.5 mm (1.161 in) dia. c: 130 mm (5.12 in) d: 135 mm (5.31 in) e: 120 mm (4.72 in)
KV381054S0 (J34286) Puller	a NT414	 Removing idler gear bearing outer race Removing differential side oil seals Removing differential side bearing outer race Removing needle bearing from bearing retainer a: 250 mm (9.84 in) b: 160 mm (6.30 in)
ST27180001 (J25726-B) Puller	c NT424	• Removing idler gear a: 100 mm (3.94 in) b: 110 mm (4.33 in) c: M8 x 1.25P
ST30031000 (J22912-O1) Puller	A B NT411	Removing reduction gear bearing inner race a: 90 mm (3.54 in) dia. b: 50 mm (1.97 in) dia.

AT-14

Tool number (Kent-Moore No.) Tool name		Description
ST35272000 (J26092) Drift		 Installing reduction gear bearing inner race Installing idler gear bearing inner race a: 72 mm (2.83 in) dia. b: 35.5 mm (1.398 in) dia.
ST37830000 —) Drift	NT426	Installing idler gear bearing outer race a: 62 mm (2.44 in) dia. b: 39 mm (1.54 in) dia.
ST35321000	NT427	Installing output shaft bearing
(—) Drift	b total a NT073	a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia.
ST30633000 —) Drift		Installing differential side bearing outer race a: 67 mm (2.64 in) dia. b: 49 mm (1.93 in) dia.
ST35271000 J26091)	NT073	Installing idler gear
Drift	a b MT115	a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia.
ST33400001 J26082)	N1115	 Installing oil pump housing oil seal a: 60 mm (2.36 in) dia.
Drift		b: 47 mm (1.85 in) dia.
KV38105710	NT115	Measuring clearance between side gear
(—)	2	and differential case
	NT087	

[RE4F03B]

Commercial Service Tools

ECS005W1

Tool name		Description
Puller	0	 Removing idler gear bearing inner race Removing and installing band servo pistor
		snap ring
	(†)	
	NT077	
Drift		Removing idler gear bearing inner race a: 34 mm (1.34 in) dia.
	a	
	1 -	
	NT109	
Drift		Installing differential left side bearing a: 86 mm (3.39 in) dia.
		b: 80 mm (3.15 in) dia.
	b () based	
	a	
	NT115	
Drift		Installing differential right side bearing a: 46 mm (1.81 in) dia.
		b: 40 mm (1.57 in) dia.
	T b T (())) Address	
	a	
	NT115	

[RE4F03B]







В

AT

D

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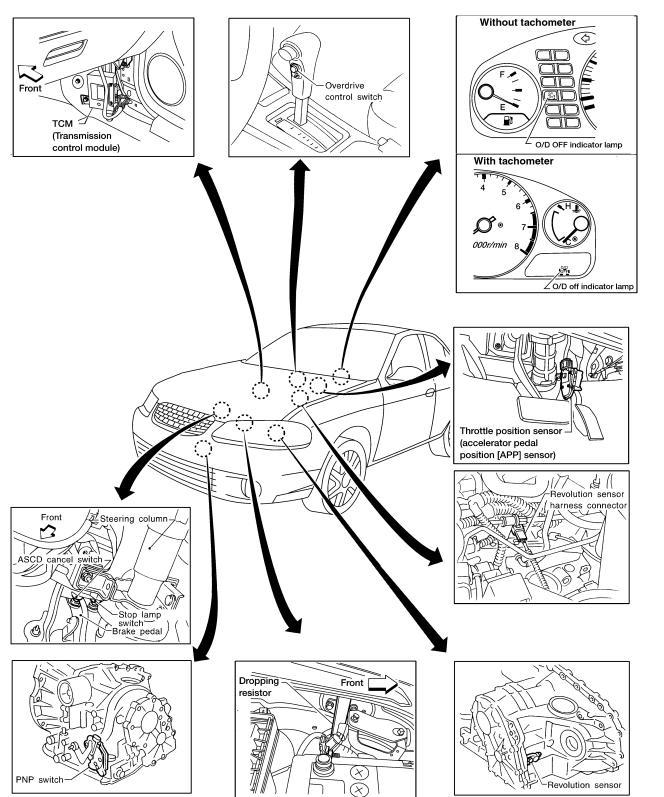
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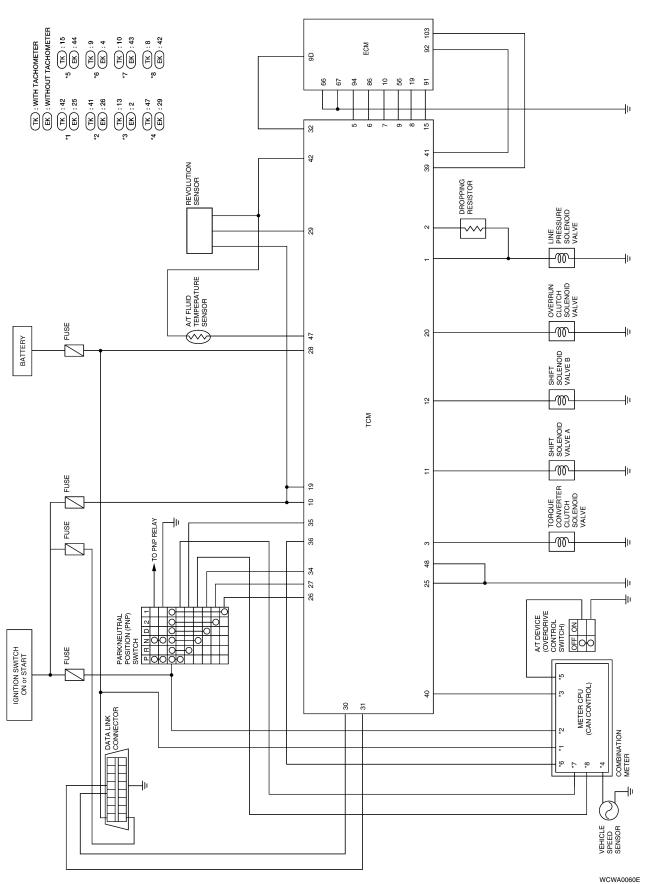
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ECS005W2



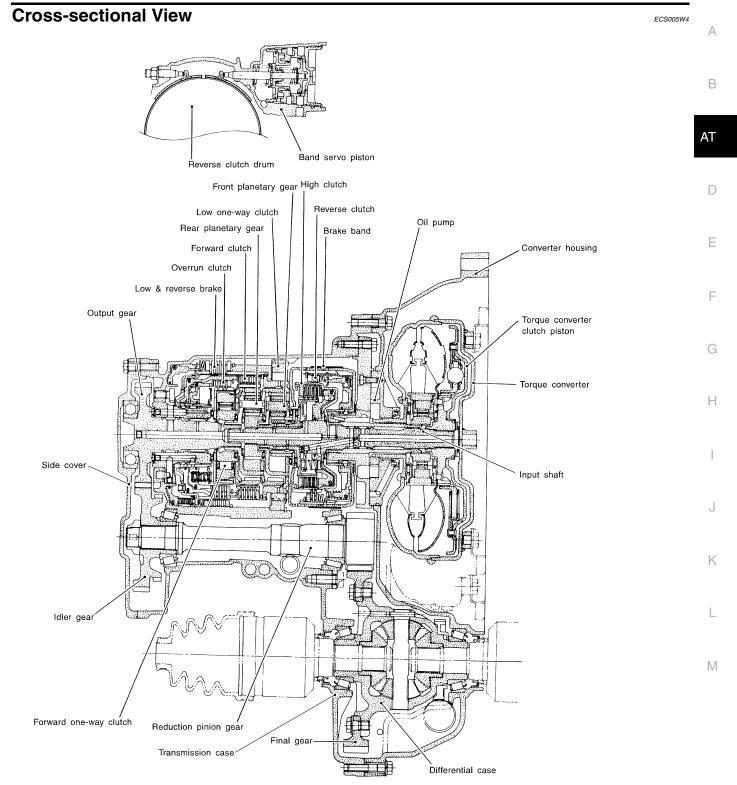
Circuit Diagram

ECS005W3



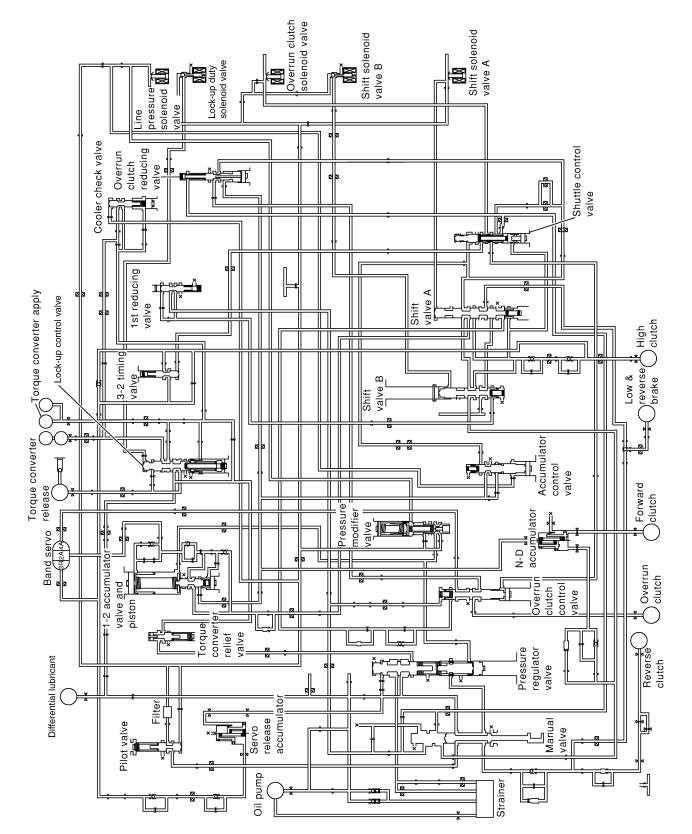
AT-18

[RE4F03B]



SAT842J

Hydraulic Control Circuit

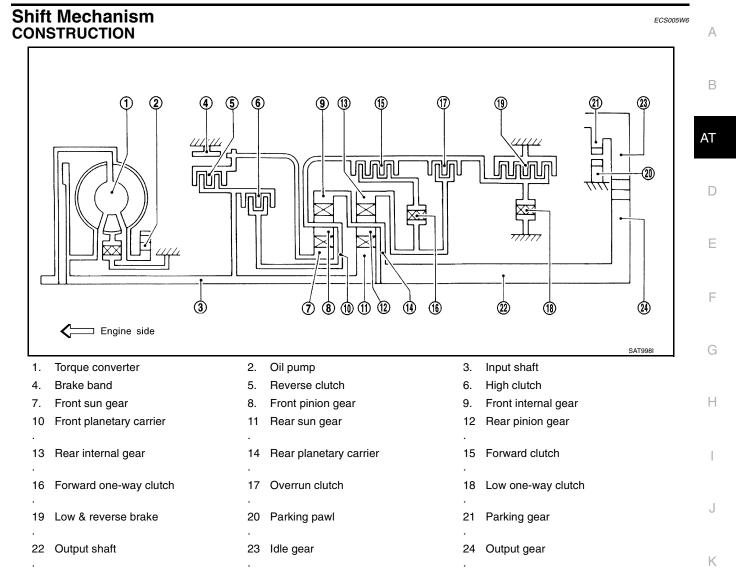


ECS005W5

[RE4F03B]

WAT408

[RE4F03B]



FUNCTION OF CLUTCH AND BRAKE

Clutch and brake components	Abbr.	Function	
5 Reverse clutch	R/C	To transmit input power to front sun gear 7.	
6 High clutch	H/C	To transmit input power to front planetary carrier 10 .	
15 Forward clutch	F/C	To connect front planetary carrier 10 with forward one-way clutch 16.	
17 Overrun clutch	O/C	To connect front planetary carrier 10 with rear internal gear 13 .	
4 Brake band	B/B	To lock front sun gear 7.	
16 Forward one-way clutch	F/O.C	When forward clutch 15 is engaged, to stop rear internal gear 13 from rotating in opposite direction against engine revolution.	
18 Low one-way clutch	L/O.C	To stop front planetary carrier 10 from rotating in opposite direction against engine revolution.	
19 Low & reverse brake	L & R/B	To lock front planetary carrier 10.	

CLUTCH AND BAND CHART

		_		For-	Over-		Band serve)	Forward	Low	Low &		
Shift position		Reverse clutch 5	High clutch 6	High ward rui clutch clutch clut	run clutch 17	2nd apply	3rd release	4th apply	one-way clutch 16	one- way clutch 18	reverse brake 19	Lock- up	Remarks
	Ρ												PARK POSITION
	R	0									0		REVERSE POSITION
	N												NEUTRAL POSITION
	1st			0	*1 D				В	В			Automatic
D	2nd			0	*1 A	0			В				shift
*4	3rd		0	0	*1 A	*2 C	С		В			*1 0	$1 \Leftrightarrow 2 \Leftrightarrow 3 \Leftrightarrow$
	4th		0	С		*3 C	С	0				0	4
	1st			0	0	*2 C			В	В			Automatic
2	2nd			0	0	0			В				shift $1 \Leftrightarrow 2 \Leftarrow 3$
	3rd			0	0	*2 C			В				
	1st			0	0				В		0		Locks (held stationary) in 1st speed
1	2nd			0	0	0			В				
	3rd			0	0	*2 C			В				$1 \leftarrow 2 \leftarrow 3$

• *1: Operates when overdrive control switch is set in "OFF" position.

• *2: Oil pressure is applied to both 2nd "apply" side and 3rd "release" side of band servo piston. However, brake band does not contract because oil pressure area on the "release" side is greater than that on the "apply" side.

• *3: Oil pressure is applied to 4th "apply" side in condition *2 above, and brake band contracts.

• *4: A/T will not shift to 4th when overdrive control switch is set in "OFF" position.

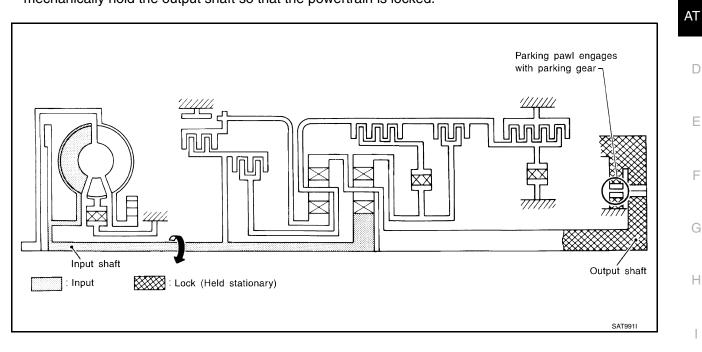
• O: Operates.

- A: Operates when throttle opening is less than 3/16, activating engine brake.
- B: Operates during "progressive" acceleration.
- C: Operates but does not affect power transmission.
- D: Operates when throttle opening is less than 3/16, but does not affect engine brake.

POWER TRANSMISSION "N" and "P" Positions

"N" position Power from the input shaft is not transmitted to the output shaft because the clutches do not operate.

"P" position Similar to the "N" position, the clutches do not operate. The parking pawl engages with the parking gear to mechanically hold the output shaft so that the powertrain is locked.



А

В

D

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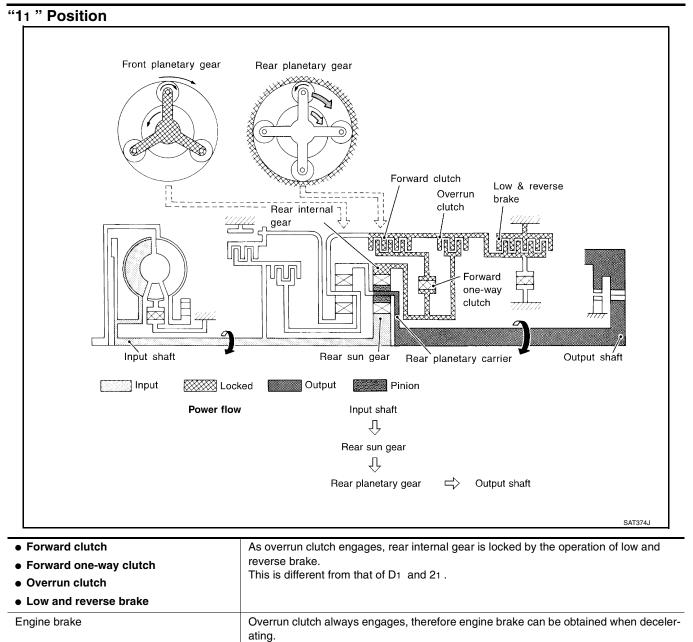
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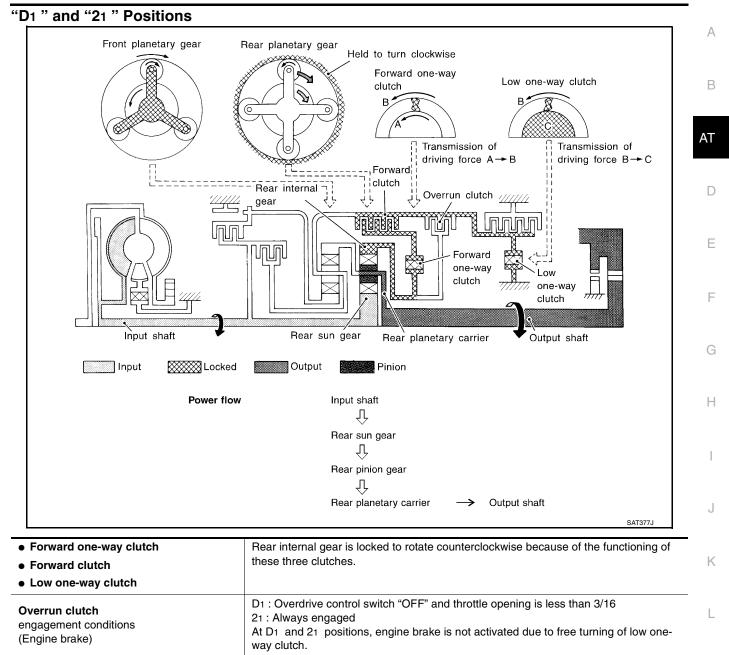
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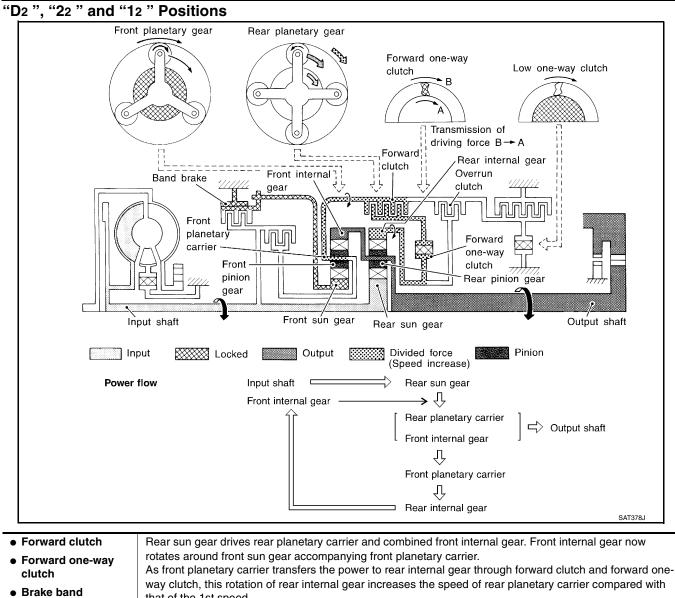
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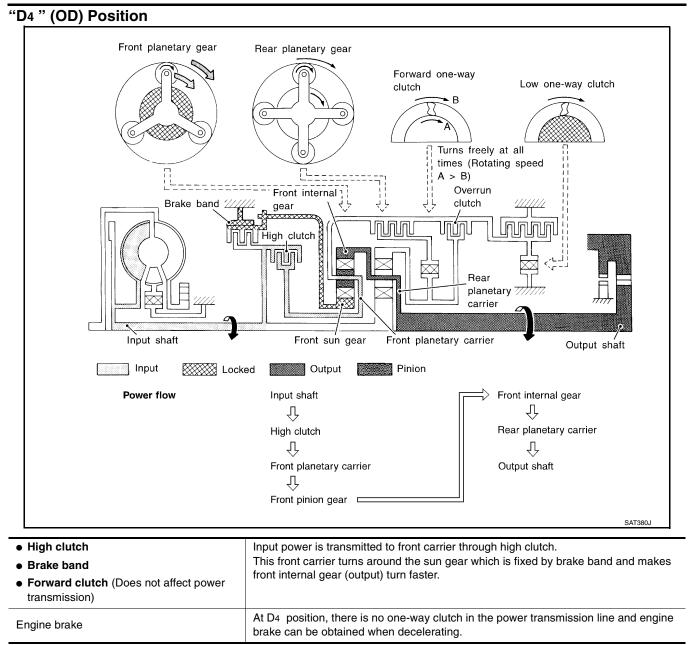




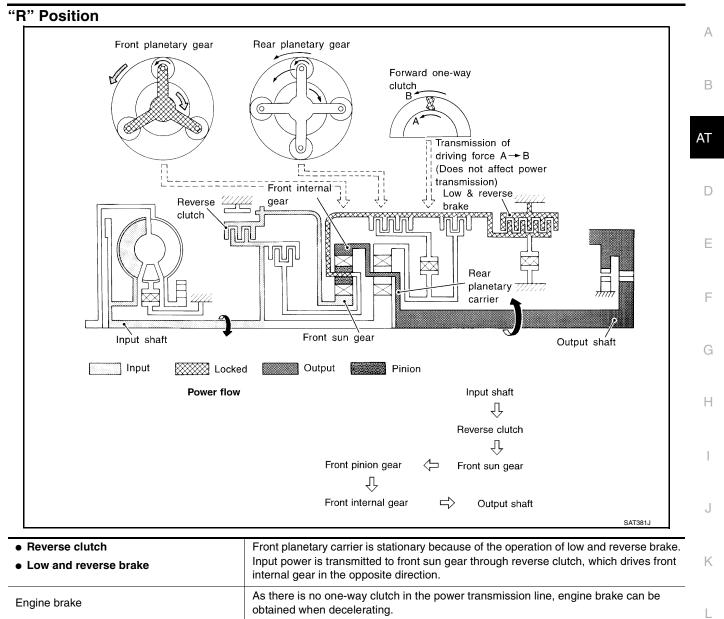
• Brake band	that of the 1st speed.
Overrun clutch	D2 : Overdrive control switch "OFF" and throttle opening is less than 3/16
engagement conditions	22 and 12 : Always engaged

"D3 " "23 " and "13 " Positions А Front planetary gear Rear planetary gear Forward one-way Low one-way clutch clutch В 6 Forward Transmission of AT driving force B-+A clutch Overrun Front internal 7 clutch ۲Ļ gear D - High Unin ՄՈրդո clutch Forward JUN one-wav Ε clutch Rear planetary carrier, F Input shaft Front planetary carrier Output shaft 🔄 Input Externation Locked Output Pinion Input shaft Power flow High clutch Н Front planetary carrier Rear sun gear Forward clutch Forward one-way clutch ᆪ Rear internal gear Р २४ J Rear planetary carrier 🖒 Output shaft SAT379J • High clutch Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch. Κ • Forward clutch This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to Forward one-way turn at the same speed. clutch L D3 : Overdrive control switch "OFF" and throttle opening is less than 3/16 **Overrun clutch** engagement conditions 23 and 13 : Always engaged

Μ



[RE4F03B]



Μ

[RE4F03B]

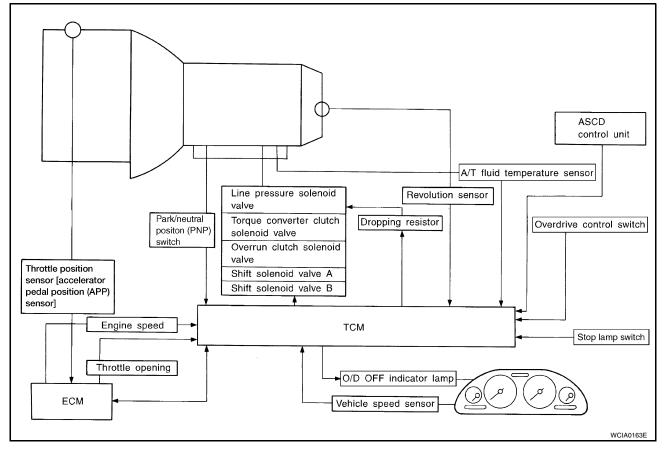
Control System OUTLINE

ECS005W7

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

SWITCHES & SENSORS	ТСМ	ACTUATORS
Park/neutral position (PNP) switch Throttle position sensor [acceler- ator pedal position (APP) sensor] Engine speed signal A/T fluid temperature sensor Revolution sensor Vehicle speed sensor Overdrive control switch ASCD control unit Stop lamp switch Turbine revolution sensor	Shift control Line pressure solenoid Lock-up control Overrun clutch control Timing control Fail-safe control Self-diagnosis CONSULT-II communication line control	Shift solenoid valve A Shift solenoid valve B Overrun clutch solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve O/D OFF indicator lamp

CONTROL SYSTEM



ECS006H7

А

TCM FUNCTION

The function of the TCM is to:

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

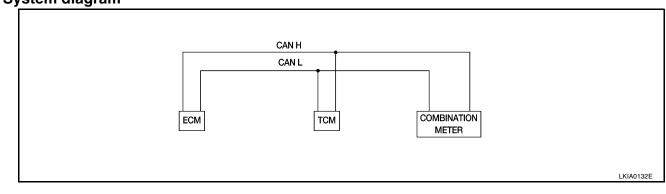
INPUT/OUTPUT SIGNAL OF TCM

	Sensors, switches and solenoid valves	Function	
	PNP switch	Detects select lever position and sends a signal to TCM.	
	Throttle position sensor [accelerator pedal position (APP) sensor]	Detects accelerator pedal position and requested throttle opening and sends a signal to TCM.	
	Engine speed signal	From ECM.	
	A/T fluid temperature sensor	Detects transmission fluid temperature and sends a signal to TCM.	
	Revolution sensor	Detects output shaft rpm and sends a signal to TCM.	
Input	Vehicle speed sensor	Used as an auxiliary vehicle speed sensor. Sends a signal when revolution sensor (installed on transmission) malfunctions.	
	Overdrive control switch	Sends a signal, which prohibits a shift to "D4 " (overdrive) position, to the TCM.	
	ASCD control unit	Sends the cruise signal and "D4" (overdrive) cancellation signal from ASCD control unit to TCM.	
	Stop lamp switch	Releases lock-up system when depressing pedal in lock-up condition.	
	Shift solenoid valve A/B	Selects shifting point suited to driving conditions in relation to a signal sent from TCM.	
	Line pressure solenoid valve	Regulates (or decreases) line pressure suited to driving conditions in relation to a signal sent from TCM.	
Output	Torque converter clutch solenoid valve	Regulates (or decreases) lock-up pressure suited to driving conditions in rela- tion to a signal sent from TCM.	
	Overrun clutch solenoid valve	Controls an "engine brake" effect suited to driving conditions in relation to a signal sent from TCM.	
	O/D OFF indicator lamp	Shows TCM faults, when A/T control components malfunction.	

CAN Communication SYSTEM DESCRIPTION

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

CAN COMMUNICATION UNIT System diagram



[RE4F03B]

Input/output signal chart

			ransmit R: Re
Signals	ECM	TCM	Combinatio Meter
Accelerator pedal position signal	Т	R	
Output shaft revolution signal	R	Т	
A/T self-diagnosis signal	R	Т	
Closed throttle position signal	Т	R	
Wide open throttle position signal	Т	R	
Stop lamp switch signal		R	Т
Overdrive control switch signal		R	Т
O/D OFF indicator signal		Т	R
Engine speed signal	Т		R
Engine coolant temperature signal	Т		R
Vehicle speed signal	R		Т
Fuel level sensor signal	R		Т
Malfunction indicator lamp signal	Т		R
ASCD SET lamp signal	Т		R
ASCD CRUISE lamp signal	Т		R

Control Mechanism LINE PRESSURE CONTROL

TCM has various line pressure control characteristics to match the driving conditions.

An ON-OFF duty signal is sent to the line pressure solenoid valve based on TCM characteristics. Hydraulic pressure on the clutch and brake is electronically controlled through the line pressure solenoid valve to accommodate engine torgue. This results in smooth shift operation.

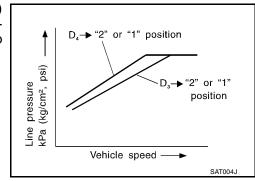
Normal Control

The line pressure to throttle opening characteristics is set for suitable clutch operation.

(interpretendence) (inter

Back-up Control (Engine brake)

If the selector lever is shifted to "2" position while driving in D4 (OD) or D₃, great driving force is applied to the clutch inside the transmission. Clutch operating pressure (line pressure) must be increased to deal with this driving force.

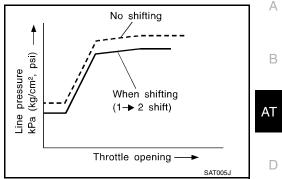


ECS005W8

E

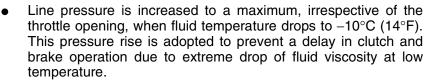
During Shift Change

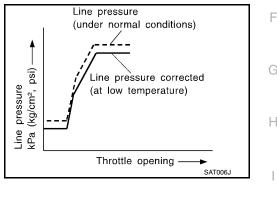
The line pressure is temporarily reduced corresponding to a change in engine torque when shifting gears (that is, when the shift solenoid valve is switched for clutch operation) to reduce shifting shock.

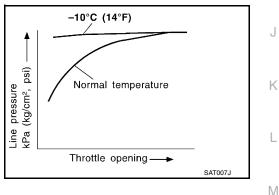


At Low Fluid Temperature

- Fluid viscosity and frictional characteristics of the clutch facing change with fluid temperature. Clutch
 engaging or band-contacting pressure is compensated for, according to fluid temperature, to stabilize
 shifting quality.
- The line pressure is reduced below 60°C (140°F) to prevent shifting shock due to low viscosity of automatic transmission fluid when temperature is low.





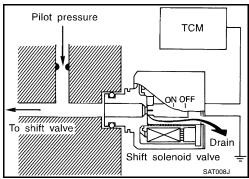


SHIFT CONTROL

The shift is regulated entirely by electronic control to accommodate vehicle speed and varying engine operations. This is accomplished by electrical signals transmitted by the revolution sensor and throttle position sensor [accelerator pedal position (APP) sensor]. This results in improved acceleration performance and fuel economy.

Control of Shift Solenoid Valves A and B

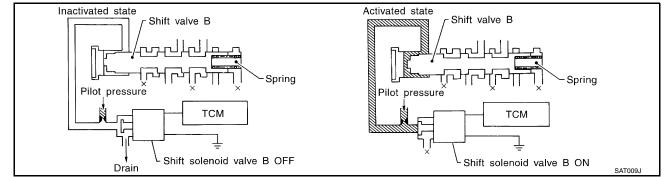
The TCM activates shift solenoid valves A and B according to signals from the throttle position sensor [accelerator pedal position (APP) sensor] and revolution sensor to select the optimum gear position on the basis of the shift schedule memorized in the TCM. The shift solenoid valve performs simple ON-OFF operation. When set to "ON", the drain circuit closes and pilot pressure is applied to the shift valve.



Relation Between Shift Solenoid Valves A and B and Gear Positions

Shift solenoid valve			Gear position		
	D1 , 21 , 11	D2 , 22 , 12	Dз	D4 (OD)	N-P
A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	ON (Closed)
В	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)

Control of Shift Valves A and B



Pilot pressure generated by the operation of shift solenoid valves A and B is applied to the end face of shift valves A and B.

The drawing above shows the operation of shift valve B. When the shift solenoid valve is "ON", pilot pressure applied to the end face of the shift valve overcomes spring force, moving the valve upward.

LOCK-UP CONTROL

The torque converter clutch piston in the torque converter is locked to eliminate torque converter slip to increase power transmission efficiency. The solenoid valve is controlled by an ON-OFF duty signal sent from the TCM. The signal is converted to an oil pressure signal which controls the torque converter clutch piston.

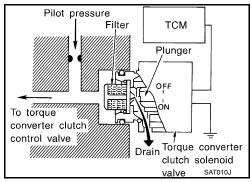
Conditions for Lock-up Operation

When vehicle is driven in 3rd and 4th gear position, vehicle speed and throttle opening are detected. If the detected values fall within the lock-up zone memorized in the TCM, lock-up is performed.

Overdrive control switch	ON	OFF	
Selector lever	"D" position		
Gear position	D4	D3	
Vehicle speed sensor	More than set value		
Throttle position sensor [accelerator pedal position (APP) sensor]	Less than set opening		
A/T fluid temperature sensor	More than 40°C (104°F)		

Torque Converter Clutch Solenoid Valve Control

The torque converter clutch solenoid valve is controlled by the TCM. The plunger closes the drain circuit during the "OFF" period, and opens the circuit during the "ON" period. If the percentage of OFF-time increases in one cycle, the pilot pressure drain time is reduced and pilot pressure remains high.



[RE4F03B]

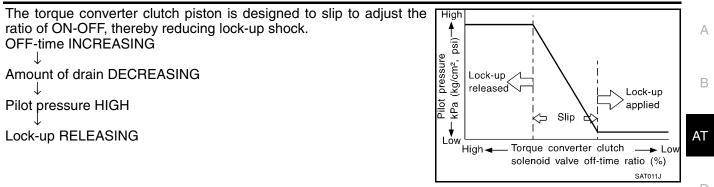
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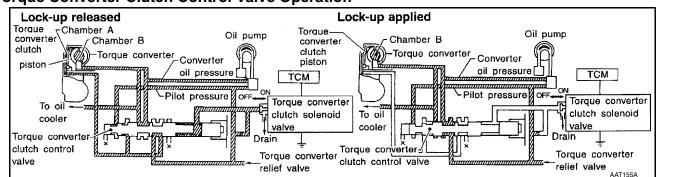
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Torque Converter Clutch Control Valve Operation



Lock-up released

The OFF-duration of the torque converter clutch solenoid valve is long, and pilot pressure is high. The pilot pressure pushes the end face of the torque converter clutch control valve in combination with spring force to move the valve to the left. As a result, converter pressure is applied to chamber A (torque converter clutch piston release side). Accordingly, the torque converter clutch piston remains unlocked.

Lock-up applied

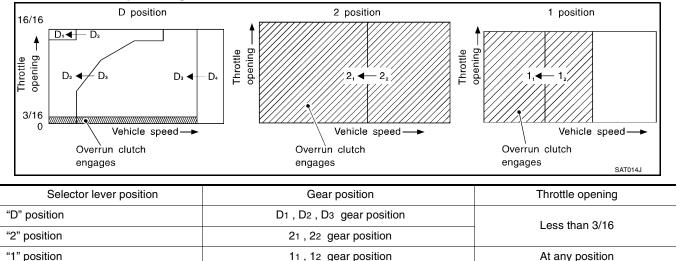
When the OFF-duration of the torque converter clutch solenoid valve is short, pilot pressure drains and becomes low. Accordingly, the control valve moves to the right by the pilot pressure of the other circuit and converter pressure. As a result, converter pressure is applied to chamber B, keeping the torque converter clutch piston applied.

Also smooth lock-up is provided by transient application and release of the lock-up.

OVERRUN CLUTCH CONTROL (ENGINE BRAKE CONTROL)

Forward one-way clutch is used to reduce shifting shocks in downshifting operations. This clutch transmits engine torque to the wheels. However, drive force from the wheels is not transmitted to the engine because the one-way clutch rotates idle. This means the engine brake is not effective. The overrun clutch operates when the engine brake is needed.

Overrun Clutch Operating Conditions

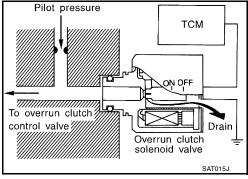


Overrun Clutch Solenoid Valve Control

The overrun clutch solenoid valve is operated by an ON-OFF signal transmitted by the TCM to provide overrun clutch control (engine brake control).

When this solenoid valve is "ON", the pilot pressure drain port closes. When it is "OFF", the drain port opens.

During the solenoid valve "ON", pilot pressure is applied to the end face of the overrun clutch control valve.

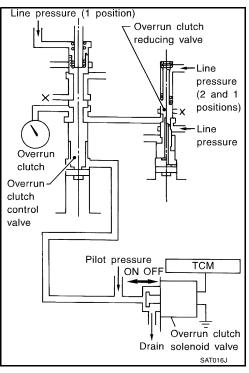


Overrun Clutch Control Valve Operation

When the solenoid valve is "ON", pilot pressure is applied to the overrun clutch control valve. This pushes up the overrun clutch control valve. The line pressure is then shut off so that the clutch does not engage.

When the solenoid valve is "OFF", pilot pressure is not generated. At this point, the overrun clutch control valve moves downward by spring force. As a result, overrun clutch operation pressure is provided by the overrun clutch reducing valve. This causes the overrun clutch to engage.

In the 1 position, the overrun clutch control valve remains pushed down so that the overrun clutch is engaged at all times.



Control Valve FUNCTION OF CONTROL VALVES

ECS005W9

Valve name	Function
Pressure regulator valve, plug and sleeve	Regulates oil discharged from the oil pump to provide optimum line pressure for all driving condi- tions.
Pressure modifier valve and sleeve	Used as a signal supplementary valve to the pressure regulator valve. Regulates pressure-modi- fier pressure (signal pressure) which controls optimum line pressure for all driving conditions.
Pilot valve	Regulates line pressure to maintain a constant pilot pressure level which controls lock-up mecha- nism, overrun clutch, shift timing.
Accumulator control valve	Regulates accumulator back-pressure to pressure suited to driving conditions.
Manual valve	Directs line pressure to oil circuits corresponding to select positions. Hydraulic pressure drains when the shift lever is in Neutral.
Shift valve A	Simultaneously switches four oil circuits using output pressure of shift solenoid valve A to meet driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st \rightarrow 2nd \rightarrow 3rd \rightarrow 4th gears/4th \rightarrow 3rd \rightarrow 2nd \rightarrow 1st gears) in combination with shift valve B.
Shift valve B	Simultaneously switches three oil circuits using output pressure of shift solenoid valve B in relation to driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st \rightarrow 2nd \rightarrow 3rd \rightarrow 4th gears/4th \rightarrow 3rd \rightarrow 2nd \rightarrow 1st gears) in combination with shift valve A.

AT-36

OVERALL SYSTEM

[RE4F03B]

Valve name	Function	
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with appli- cation of the brake band in D4 . (Interlocking occurs if the overrun clutch engages during D4 .)	- A
1st reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when down-shifting from the "1" position 12 to 11.	В
Overrun clutch reducing valve	Reduces oil pressure directed to the overrun clutch and prevents engine-brake shock. In "1" and "2" positions, line pressure acts on the overrun clutch reducing valve to increase the pressure-regulating point, with resultant engine brake capability.	AT
Torque converter relief valve	Prevents an excessive rise in torque converter pressure.	·
Torque converter clutch control valve, plug and sleeve	Activates or inactivates the lock-up function. Also provides smooth lock-up through transient application and release of the lock-up system.	D
1-2 accumulator valve and piston	Dampens the shock encountered when 2nd gear band servo contracts, and provides smooth shifting.	
3-2 timing valve	Switches oil pressure with 3-2 timing valve according to throttle opening.	E
Shuttle control valve	Reduces shock when down-shifting from 3rd to 2nd and regulates overrun clutch.	•
Cooler check valve	Regulates oil pressure which causes lock-up when driving at low speeds.	

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Introduction

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

The first is the emission-related on board diagnostic system (OBD-II) performed by the TCM in combination with the ECM. The malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory but not the TCM memory.

The second is the TCM original self-diagnosis indicated by the O/D OFF indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For detail, refer to <u>AT-43, "SELF-DIAGNOSTIC RESULT TEST MODE"</u>.

OBD-II Function for A/T System

The ECM provides emission-related on board diagnostic (OBD-II) functions for the A/T system. One function is to receive a signal from the TCM used with OBD-related parts of the A/T system. The signal is sent to the ECM when a malfunction occurs in the corresponding OBD-related part. The other function is to indicate a diagnostic result by means of the MIL (malfunction indicator lamp) on the instrument panel. Sensors, switches and solenoid valves are used as sensing elements.

The MIL automatically illuminates in One or Two Trip Detection Logic when a malfunction is sensed in relation to A/T system parts.

One or Two Trip Detection Logic of OBD-II ONE TRIP DETECTION LOGIC

If a malfunction is sensed during the first test drive, the MIL will illuminate and the malfunction will be stored in the ECM memory as a DTC. The TCM is not provided with such a memory function.

TWO TRIP DETECTION LOGIC

When a malfunction is sensed during the first test drive, it is stored in the ECM memory as a 1st trip DTC (diagnostic trouble code) or 1st trip freeze frame data. At this point, the MIL will not illuminate. — First Trip If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MIL will illuminate. — Second Trip

A/T-related parts for which the MIL illuminates during the first or second test drive are listed below.

Items	Μ	IL
nems	One trip detection	Two trip detection
Shift solenoid valve A — DTC: P0750	Х	
Shift solenoid valve B — DTC: P0755	Х	
Throttle position sensor [accelerator pedal position (APP) sensor] or switch — DTC: P1705	Х	
Except above		Х

The "trip" in the "One or Two Trip Detection Logic" means a driving mode in which self-diagnosis is performed during vehicle operation.

OBD-II Diagnostic Trouble Code (DTC) HOW TO READ DTC AND 1ST TRIP DTC

DTC and 1st trip DTC can be read by the following methods.

(with CONSULT-II or GST) CONSULT-II or GST (Generic Scan Tool) Examples: P0705, P0710, P0720, P0725, etc.

These DTCs are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

- 1st trip DTC No. is the same as DTC No.
- Output of the diagnostic trouble code indicates that the indicated circuit has a malfunction. However, in case of the Mode II and GST they do not indicate whether the malfunction is still occurring or occurred in the past and returned to normal.

CONSULT-II can identify them as shown below. Therefore, using CONSULT-II (if available) is recommended.

[RE4F03B]

PFP:00000

ECS005WA

ECS005WD

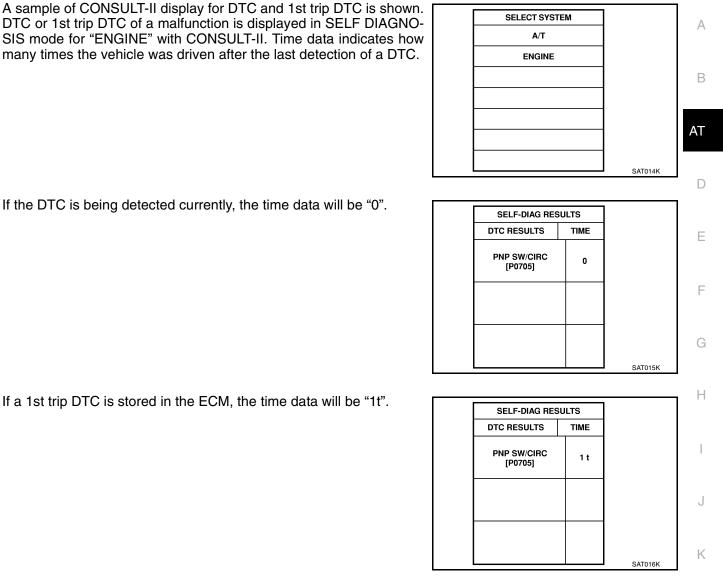
ECS005WC

ECS005WB

[RE4F03B]

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If the DTC is being detected currently, the time data will be "0".

Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM has a memory function, which stores the driving condition such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed and vehicle speed at the moment the ECM detects a malfunction.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data, and the data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For detail, refer to EC-62, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA" [QG18DE (ULEV Model) or EC-634, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA" (SULEV Model)]. Only one set of freeze frame data (either 1st trip freeze frame data of freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority		Items			
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175			
2		Except the above items (Includes A/T related items)			
3	1st trip freeze frame da	ata			

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased.

HOW TO ERASE DTC

The diagnostic trouble code can be erased by CONSULT-II, GST or ECM DIAGNOSTIC TEST MODE as follows.

- If the battery terminal is disconnected, the diagnostic trouble code will be lost within 24 hours.
- When you erase the DTC, using CONSULT-II or GST is easier and quicker than switching the mode selector on the ECM.

The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to OBD-II. For details, refer to <u>EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFOR-MATION"</u> [QG18DE (ULEV)] or <u>EC-642, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMA-TION"</u> [QG18DE (SULEV)].

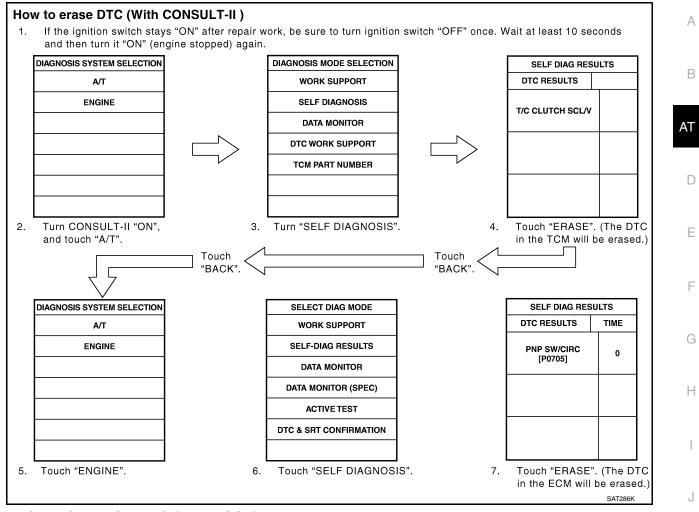
- Diagnostic trouble codes (DTC)
- 1st trip diagnostic trouble codes (1st trip DTC)
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values
- (B) HOW TO ERASE DTC (WITH CONSULT-II)
- If a DTC is displayed for both ECM and TCM, it needs to be erased for both ECM and TCM.
- 1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
- 2. Turn CONSULT-II "ON" and touch "A/T".
- 3. Touch "SELF DIAGNOSIS".
- 4. Touch "ERASE". (The DTC in the TCM will be erased.) Then touch "BACK" twice.
- 5. Touch "ENGINE".
- 6. Touch "SELF DIAGNOSIS".
- 7. Touch "ERASE". (The DTC in the ECM will be erased.)

[RE4F03B]

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HOW TO ERASE DTC (WITH GST)

- 1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 5 seconds and then turn it "ON" (engine stopped) again.
- 2. Perform TCM Self-diagnostic Procedure. Refer to <u>AT-51, "TCM Self-diagnostic Procedure (No Tools)"</u>. (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
- 3. Select Mode 4 with Generic Scan Tool (GST). For details, refer to <u>EC-71, "How to Erase DTC (With GST)"</u> [QG18DE (ULEV)] or <u>EC-643, "How to Erase DTC (With GST)"</u> [QG18DE (SULEV)].

B HOW TO ERASE DTC (NO TOOLS)

- 1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 5 seconds and then turn it "ON" (engine stopped) again.
- Perform TCM Self-diagnostic Procedure. Refer to <u>AT-51, "TCM Self-diagnostic Procedure (No Tools)"</u>. (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
- 3. Perform OBD-II Self-diagnostic Procedure. Refer to AT-51, "TCM Self-diagnostic Procedure (No Tools)".

Malfunction Indicator Lamp (MIL)

- 1. The malfunction indicator lamp will light up when the ignition switch is turned ON without the engine running. This is for checking the lamp.
 - If the malfunction indicator lamp does not light up, refer to DI-27, "WARNING LAMPS" . (Or see MIL & CONSULT-II in EC section. Refer to EC-72, "Malfunction Indicator Lamp (MIL)" [QG18DE (ULEV)] or EC-644, "Malfunction Indicator Lamp (MIL)" [QG18DE (SULEV)], and EC-113, "CONSULT-II Function" [QG18DE (ULEV)] or EC-685, "CONSULT-II Function" [QG18DE (SULEV)].



2. When the engine is started, the malfunction indicator lamp should go off. If the lamp remains on, the on board diagnostic system has detected an emission-related (OBD-II) mal-

function. For detail, refer to EC-59, "Emission-related Diagnostic Information" [QG18DE (ULEV)] or EC-631, "Emission-related Diagnostic Information" [QG18DE (SULEV)].

CONSULT-II

ECS005WF

After performing "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" (AT-42, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)"), place check marks for results on the "DIAGNOSTIC WORKSHEET", (AT-57, "DIAGNOSTIC WORKSHEET"). Reference pages are provided following the items.

NOTICE:

1. The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).

Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.

- Shift schedule (which implies gear position) displayed on CONSULT-II and that indicated in Service Man-2. ual may differ slightly. This occurs because of the following reasons:
- Actual shift schedule has more or less tolerance or allowance,
- Shift schedule indicated in Service Manual refers to the point where shifts start, and
- Gear position displayed on CONSULT-II indicates the point where shifts are completed.
- 3. Shift solenoid valve "A" or "B" is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).
- 4. Additional CONSULT-II information can be found in the Operation Manual supplied with the CONSULT-II unit.

SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)

Turn on CONSULT-II and touch "ENGINE" for OBD-II detected items or touch "A/T" for TCM self-diagnosis. If A/T is not displayed, check TCM power supply and ground circuit. Refer to AT-112, "TROUBLE DIAGNOSIS FOR POWER SUPPLY" . If result is NG, refer to PG-2, "POWER SUPPLY ROUTING" .

SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K

[RE4F03B]

Touch "SELF DIAG RESULTS". 2. REAL-TIME DIAG Display shows malfunction experienced since the last erasing А ENG SPEED SIG operation. CONSULT-II performs "REAL TIME DIAG". Also, any malfunction detected while in this mode will be dis-В played at real time. AT SAT987J

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SELF-DIAGNOSTIC RESULT TEST MODE

Detected items			TCM self-diagnosis	OBD-II (DTC)	
(Screen terms for CO DIAGNOSIS" test mo "A/T"		Malfunction is detected when	Available by O/D OFF	Available by malfunc-	
PNP switch circuit		• TCM does not receive the correct		50705	
—	PNP SW/CIRC	voltage signal (based on the gear position) from the switch.	—	P0705	
Revolution sensor		• TCM does not receive the proper			
VHCL SPEED SEN·A/T	VEH SPD SEN/CIR AT	voltage signal from the sensor.	Х	P0720	
Vehicle speed sensor	(Meter)	• TCM does not receive the proper			
VHCL SPEED SEN·MTR		voltage signal from the sensor.	Х	—	
A/T 1st gear function		• A/T cannot be shifted to the 1st			
A/T 1ST GR FNCTN	A/T 1ST GR FNCTN	gear position even if electrical cir- cuit is good.	—	P0731*1	
A/T 2nd gear function		• A/T cannot be shifted to the 2nd			
A/T 2ND GR FNCTN	A/T 2ND GR FNCTN	gear position even if electrical cir- cuit is good.	_	P0732*1	
A/T 3rd gear function		 A/T cannot be shifted to the 3rd gear position even if electrical cir- 		P0733*1	
A/T 3RD GR FNCTN	A/T 3RD GR FNCTN	cuit is good.	—	F 07 55 T	
A/T 4th gear function		• A/T cannot be shifted to the 4th		D0704*4	
A/T 4TH GR FNCTN		gear position even if electrical cir- cuit is good.	_	P0734*1	
A/T TCC S/V function		 A/T cannot perform lock-up even if electrical circuit is good. 			
A/T TCC S/V FNCTN	A/T TCC S/V FNCTN		—	P0744*1	
Shift solenoid valve A		TCM detects an improper voltage			
SHIFT SOLENOID/V A	SFT SOL A/CIRC	drop when it tries to operate the solenoid valve.	Х	P0750	
Shift solenoid valve B		• TCM detects an improper voltage			
SHIFT SOLENOID/V B	SFT SOL B/CIRC	drop when it tries to operate the solenoid valve.	Х	P0755	
Overrun clutch solenoid valve		• TCM detects an improper voltage			
OVERRUN CLUTCH S/V	O/R CLUCH SOL/ CIRC	drop when it tries to operate the solenoid valve.	Х	P1760	
T/C clutch solenoid va	alve	• TCM detects an improper voltage			
T/C CLUTCH SOL/V	TCC SOLENOID/ CIRC	drop when it tries to operate the solenoid valve.	Х	P0740	

[RE4F03B]

Detected items			TCM self-diagnosis	OBD-II (DTC)
(Screen terms for CO DIAGNOSIS" test mo			Available by O/D OFF	SERVICE ENGINE SOON
"A/T"	"ENGINE"	Malfunction is detected when	可能 indicator lamp or "A/T" on CONSULT-II	Available by malfunc- tion indicator lamp *2, "ENGINE" on CON- SULT-II or GST
Line pressure solenoid valve		• TCM detects an improper voltage		
LINE PRESSURE S/ V	L/PRESS SOL/CIRC	drop when it tries to operate the solenoid valve.	Х	P0745
Throttle position sens switch	or, Throttle position	• TCM receives an excessively low or high voltage from the sensor.	x	P1705
THROTTLE POSI SEN	TP SEN/CIRC A/T		^	F 1705
Engine speed signal		• TCM does not receive the proper	х	P0725
ENGINE SPEED SIG		voltage signal from the ECM.	~	F 0723
A/T fluid temperature	sensor	• TCM receives an excessively low		
BATT/FLUID TEMP SEN	ATF TEMP SEN/ CIRC	or high voltage from the sensor.	Х	P0710
TCM (RAM)		• TCM memory (RAM) is malfunc-		
CONTROL UNIT (RAM)	_	tioning.	_	
TCM (ROM)		• TCM memory (ROM) is malfunc-		
CONTROL UNIT (ROM)	—	tioning.	_	_
TCM (EEP ROM)		• TCM memory (EEP ROM) is mal-		
CONT UNIT (EEP ROM)	_	functioning.	_	_
Initial start		• This is not a malfunction message		
INITIAL START	_	(Whenever shutting off a power supply to the TCM, this message appears on the screen.)	х	
No failure (NO SELF DIAGNOS CATED FURTHER TE REQUIRED**)		 No failure has been detected. 	x	x

X: Applicable

-: Not applicable

*1: These malfunctions cannot be displayed by MIL FRANCE *2: Refer to <u>EC-72, "Malfunction Indicator Lamp (MIL)"</u> [QG18DE (ULEV)] or <u>EC-644, "Malfunction Indicator Lamp (MIL)"</u> [QG18DE (SULEV)].

[RE4F03B]

DATA MONITOR MODE (A/T)

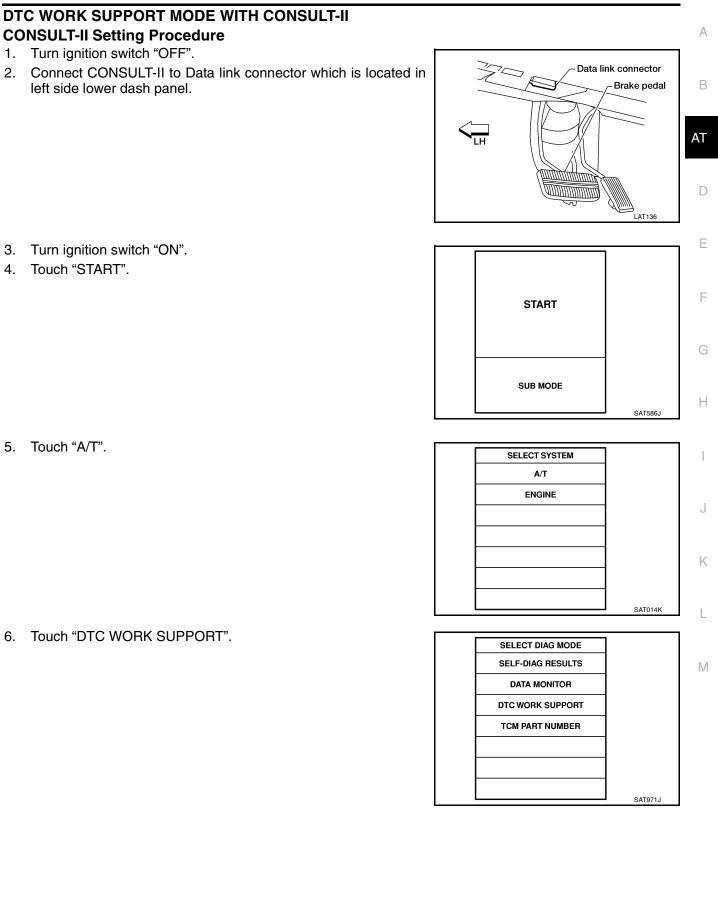
		Monit	or item		
Item	Display	TCM input sig- nals	Main sig- nals	Description	Remarks
Vehicle speed sensor 1 (A/ T) (Revolution sensor)	VHCL/S SE·A/T [km/h] or [mph]	х	_	 Vehicle speed computed from signal of revolution sensor is displayed. 	When racing engine in "N" or "P" position with vehicle stationary, CONSULT-II data may not indicate 0 km/ h (0 mph).
Vehicle speed sensor 2 (Meter)	VHCL/S SE·MTR [km/h] or [mph]	х	_	 Vehicle speed computed from signal of vehicle speed sensor is dis- played. 	Vehicle speed display may not be accurate under approx. 10 km/h (6 mph). It may not indicate 0 km/h (0 mph) when vehicle is sta- tionary.
Throttle position sensor [accelerator pedal position (APP) sensor]	THRTL POS SEN [V]	х		• Throttle position sensor [accelerator pedal posi- tion (APP) sensor] sig- nal voltage is displayed.	
A/T fluid temperature sen- sor	FLUID TEMP SE [V]	х	_	 A/T fluid temperature sensor signal voltage is displayed. Signal voltage lowers as 	
Battery voltage	BATTERY VOLT [V]	х		fluid temperature rises. • Source voltage of TCM is displayed.	
Engine speed	ENGINE SPEED [rpm]	х	x	• Engine speed, computed from engine speed signal, is displayed.	Engine speed display may not be accurate under approx. 800 rpm. It may not indicate 0 rpm even when engine is not running.
Overdrive control switch	OVERDRIVE SW [ON/OFF]	х	_	 ON/OFF state computed from signal of overdrive control SW is displayed. 	
PN position switch	PN POSI SW [ON/OFF]	х	_	 ON/OFF state computed from signal of PN position SW is displayed. 	
R position switch	R POSITION SW [ON/OFF]	х	_	 ON/OFF state computed from signal of R position SW is displayed. 	
D position switch	D POSITION SW [ON/OFF]	х	_	 ON/OFF state computed from signal of D position SW is displayed. 	
2 position switch	2 POSITION SW [ON/OFF]	х	_	 ON/OFF status, com- puted from signal of 2 position SW, is displayed. 	
1 position switch	1 POSITION SW [ON/OFF]	х	_	 ON/OFF status, com- puted from signal of 1 position SW, is displayed. 	
ASCD cruise signal	ASCD CRUISE [ON/OFF]	x	_	 Status of ASCD cruise signal is displayed. ON Cruising state OFF Normal running state 	 This is displayed even when no ASCD is mounted.

[RE4F03B]

		Monit	or item		
Item	Display	TCM input sig- nals	Main sig- nals	Description	Remarks
ASCD OD cut signal	ASCD OD CUT [ON/OFF]	x		 Status of ASCD OD release signal is dis- played. ON OD released OFF OD not released 	 This is displayed even when no ASCD is mounted.
Kickdown switch	KICKDOWN SW [ON/OFF]	х	_	 ON/OFF status, com- puted from signal of kick- down SW, is displayed. 	• This is displayed even when no kickdown switch is equipped.
Gear position	GEAR	_	х	 Gear position data used for computation by TCM, is displayed. 	
Selector lever position	SLCT LVR POSI	_	Х	• Selector lever position data, used for computa- tion by TCM, is displayed.	• A specific value used for control is displayed if fail- safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	_	х	• Vehicle speed data, used for computation by TCM, is displayed.	
Stop lamp switch	BRAKE SW [ON/OFF]	x		 ON/OFF status are displayed. ON: Brake pedal is depressed. OFF: Brake pedal is released. 	
Throttle position	THROTTLE POSI [/8]		х	• Throttle position data, used for computation by TCM, is displayed.	 A specific value used for control is displayed if fail- safe is activated due to error.
Line pressure duty	LINE PRES DTY [%]	_	х	 Control value of line pres- sure solenoid valve, com- puted by TCM from each input signal, is displayed. 	
Torque converter clutch solenoid valve duty	TCC S/V DUTY [%]	_	х	 Control value of torque converter clutch solenoid valve, computed by TCM from each input signal, is displayed. 	
Shift solenoid valve A	SHIFT S/V A [ON/OFF]	_	х	 Control value of shift solenoid valve A, com- puted by TCM from each input signal, is displayed. 	Control value of solenoid is displayed even if solenoid circuit is disconnected. The "OFF" signal is dis-
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	_	х	 Control value of shift solenoid valve B, com- puted by TCM from each input signal, is displayed. 	played if solenoid circuit is shorted.
Overrun clutch solenoid valve	OVERRUN/C S/ V [ON/OFF]	_	x	 Control value of overrun clutch solenoid valve computed by TCM from each input signal is dis- played. 	
Self-diagnosis display lamp (O/D OFF indicator lamp)	SELF-D DP LMP [ON/OFF]	_	х	 Control status of O/D OFF indicator lamp is dis- played. 	

X: Applicable

-: Not applicable



7. Touch select item menu (1ST, 2ND, etc.).

8. Touch "START".

- 9. Perform driving test according to "DTC CONFIRMATION PRO-CEDURE" in "TROUBLE DIAGNOSIS FOR DTC".

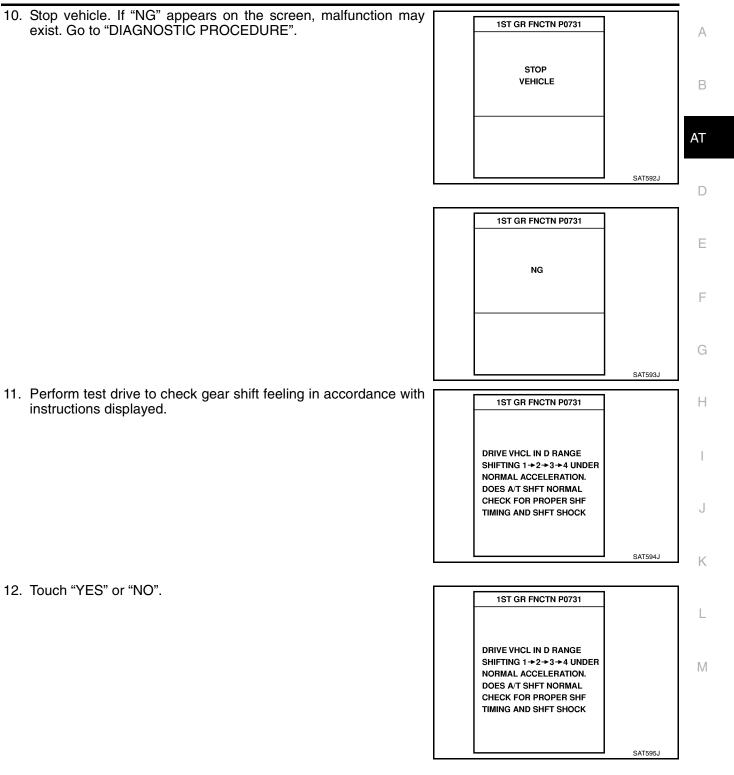
• When testing conditions are satisfied, CONSULT-II screen changes from "OUT OF CONDITION" to "TESTING".

SELECT WORK ITEM	
1ST GR FNCTN P0731	
2ND GR FNCTN P0732	
3RD GR FNCTN P0733	
4TH GRFNCTN P0734	
TCC S/V FNCTN P0744	
	SAT018K

1ST GR FNCTN P0731	
THIS SUPPORT FUNCTION IS FOR DTC P0731. SEE THE SERVICE MANUAL ABOUT THE OPERATING CON- DITION FOR THIS DIAGNOSIS.	
	0.47500.1

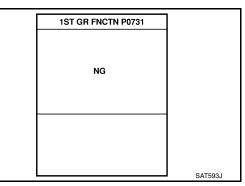
1ST GR FNCT	N P0731	
OUT OF CON	OUT OF CONDTION	
MONITO	R	
GEAR	GEAR XXX	
VEHICLE SPEED	XXXkm/h	
THROTTLE POSI	THROTTLE POSI XXX	
TCC S/V DUTY XXX %		SAT019K

TESTING MONITOR GEAR XXX VEHICLE SPEED XXXkm/h THROTTLE POSI XXX	1ST GR FNCTN F	P0731	
GEAR XXX VEHICLE SPEED XXXkm/h	TESTING		
VEHICLE SPEED XXXkm/h	MONITOR		
	GEAR	ххх	
THROTTLE POSI XXX	VEHICLE SPEED	XXXkm/h	
	THROTTLE POSI	HROTTLE POSI XXX	
TCC S/V DUTY XXX %	TCC S/V DUTY	XXX %	SAT591J



13. CONSULT-II procedure ended.

1ST GR FNCTN P0731	
ок	



If "NG" appears on the screen, a malfunction may exist. Go to "DIAGNOSTIC PROCEDURE".

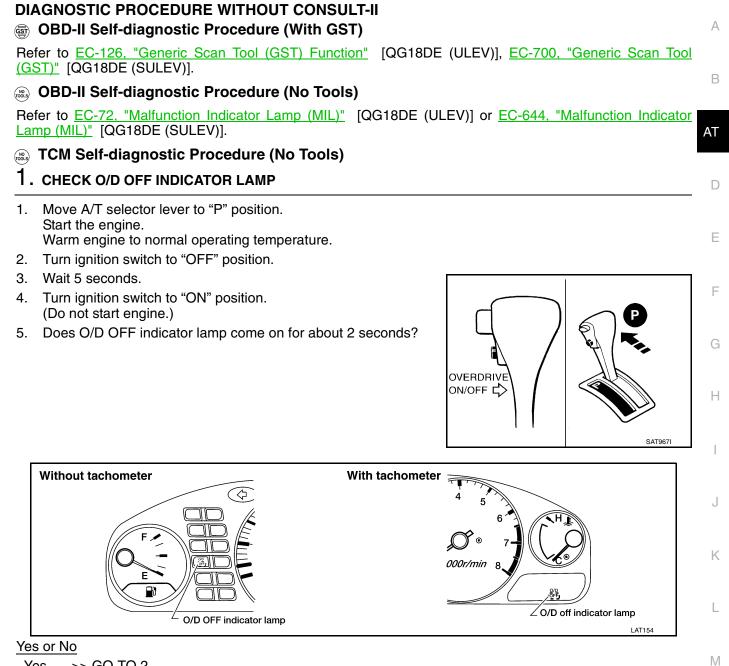
DTC WORK SUPPORT MODE

DTC work support item	Description	Check items (Possible cause)
1ST GR FNCTN P0731	 Following items for "A/T 1st gear function (P0731)" can be confirmed. Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	 Shift solenoid valve A Shift solenoid valve B Each clutch Hydraulic control circuit
2ND GR FNCTN P0732	 Following items for "A/T 2nd gear function (P0732)" can be confirmed. Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	 Shift solenoid valve B Each clutch Hydraulic control circuit
3RD GR FNCTN P0733	 Following items for "A/T 3rd gear function (P0733)" can be confirmed. Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	 Shift solenoid valve A Each clutch Hydraulic control circuit
4TH GR FNCTN P0734	 Following items for "A/T 4th gear function (P0734)" can be confirmed. Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	 Shift solenoid valve A Shift solenoid valve B Line pressure solenoid valve Each clutch Hydraulic control circuit
TCC S/V FNCTN P0744	 Following items for "A/T TCC S/V function (lock-up) (P0744)" can be confirmed. Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	 Torque converter clutch sole- noid valve Each clutch Hydraulic control circuit

[RE4F03B]

SAT596J

[RE4F03B]



Yes >> GO TO 2.

>> GO TO AT-220, "1. O/D OFF Indicator Lamp Does Not Come On" . No

2. JUDGEMENT PROCEDURE STEP 1

- 1. Turn ignition switch to "OFF" position.
- 2. Turn ignition switch to "ACC" position.
- 3. Move A/T selector lever from "P" to "D" position.
- 4. Turn ignition switch to "ON" position. (Do not start engine.)
- 5. Depress and hold overdrive control switch (the O/D OFF indicator lamp will be "ON") until directed to release the switch.

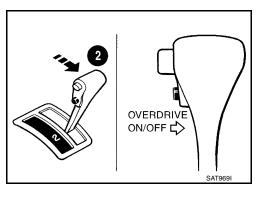
If O/D OFF indicator lamp does not come on, go to <u>AT-249</u>, "21. TCM Self-diagnosis Does Not Activate <u>{Park/neutral Position (PNP)</u>, <u>Overdrive Control and Throttle Position Sensor [Accelerator Pedal Position (APP) Sensor] Switches Circuit Checks}</u>"

- 6. Turn ignition switch to "OFF" position.
- Turn ignition switch to "ON" position. (Do not start engine.)
- 8. Release the overdrive control switch (the O/D OFF indicator lamp will be "OFF").
- 9. Wait 2 seconds.
- 10. Move A/T selector lever to "2" position.
- 11. Depress and release the overdrive control switch (the O/D OFF indicator lamp will be "ON").



12. Depress and hold the overdrive control switch (the O/D OFF indicator lamp will be "OFF") until directed to release the switch.

>> GO TO 3.



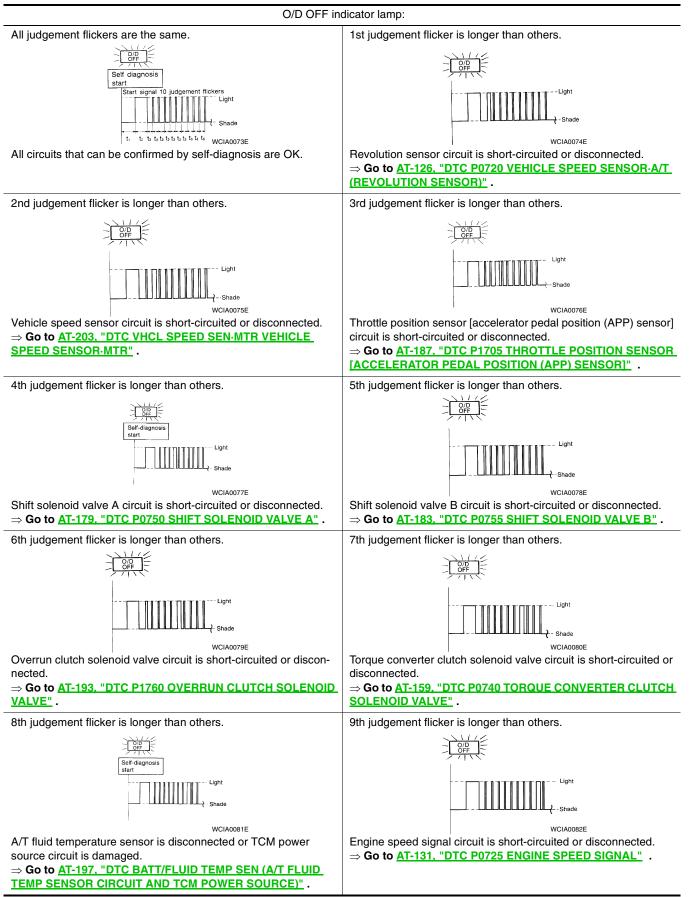
[RE4F03B]

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3. JUDGEMENT PROCEDURE STEP 2 А Move A/T selector lever to "1" position. 1. 2. Release the overdrive control switch. В 3. Depress and release the overdrive control switch (the O/D OFF indicator lamp will be "ON"). 4. Depress and release the overdrive control switch (the O/D OFF indicator lamp will be "OFF"). Depress and hold the overdrive control switch (the O/D OFF 5. AT indicator lamp will be "ON") until directed to release the switch. D OVERDRIVE ON/OFF Ε SAT970 F 6. Depress accelerator pedal fully and release. 7. Release the overdrive control switch (the O/D OFF indicator Accelerator pedal lamp will begin to flash "ON" and "OFF"). >> GO TO 4. Н Depress Release SAT981F J 4. CHECK SELF-DIAGNOSIS CODE Check O/D OFF indicator lamp. Refer to AT-54, "Judgement of Self-diagnosis Code" . Κ Without tachometer With tachometer \Diamond L 000r/min Μ ∠O/D off indicator lamp O/D OFF indicator lamp

>> DIAGNOSIS END

Judgement of Self-diagnosis Code

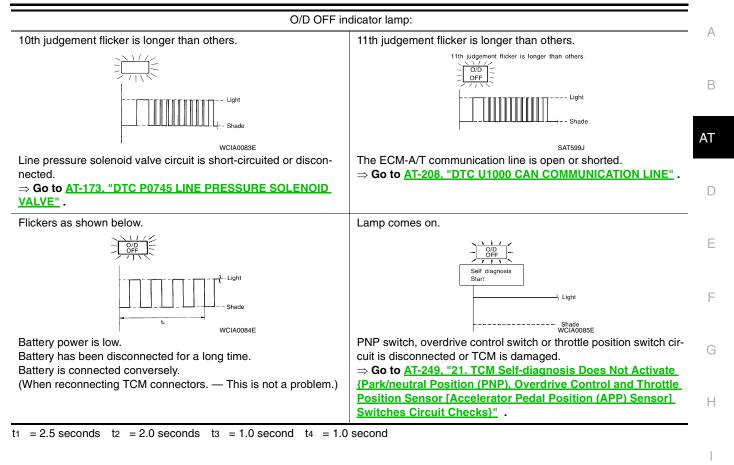


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TROUBLE DIAGNOSIS — INTRODUCTION

Introduction

The TCM receives a signal from the vehicle speed sensor, throttle position sensor [accelerator pedal position (APP) sensor] or PNP switch and provides shift control or lock-up control via A/T solenoid valves.

The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the OBD-related parts of the A/T system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.

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

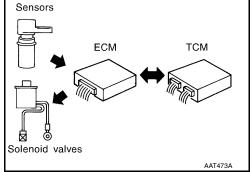
It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

A visual check only may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow". Refer to <u>AT-60, "Work Flow"</u>.

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 problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" like the example (AT-58, "Diagnostic Worksheet") should be used.

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

Also check related Service bulletins for information.

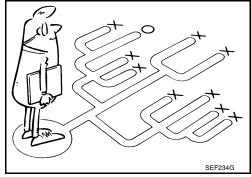


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DIAGNOSTIC WORKSHEET А Information from Customer **KEY POINTS** WHAT Vehicle & A/T model В WHEN..... Date, Frequencies WHERE..... Road conditions HOW..... Operating conditions, Symptoms AT Customer name MR/MS Model & Year VIN Trans. model Engine Mileage D Incident Date Manuf. Date In Service Date Frequency □ Continuous □ Intermittent (times a day) Symptoms □ Vehicle does not move. (□ Any position □ Particular position) Ε \Box No up-shift (\Box 1st \rightarrow 2nd \Box 2nd \rightarrow 3rd \Box 3rd \rightarrow O/D) □ No down-shift (□ O/D \rightarrow 3rd □ 3rd \rightarrow 2nd □ 2nd \rightarrow 1st) F Lockup malfunction □ Shift point too high or too low. $\label{eq:shift shock or slip} (\Box \ \mathsf{N} \to \mathsf{D} \ \Box \ \mathsf{Lockup} \ \Box \ \mathsf{Any drive position})$ Noise or vibration No kickdown Н No pattern select Others) (1 O/D OFF indicator lamp Blinks for about 8 seconds. Continuously lit Not lit Malfunction indicator lamp (MIL) Continuously lit Not lit

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Diagnostic Worksheet

1. Read the "FAIL-SAFE" and listen to customer complaints. AT-11, "FAIL-SAFE" <u>AT-63, "A/T</u> 2. CHECK A/T FLUID Fluid Check" Leakage (Follow specified procedure) Fluid condition Fluid level З. Perform STALL TEST and LINE PRESSURE TEST. AT-63, "Stall Test", AT-67, Stall test — Mark possible damaged components/others. "Line Pres-Torque converter one-way clutch Low & reverse brake sure Test" Reverse clutch Low one-way clutch Forward clutch Engine Overrun clutch Line pressure is low Forward one-way clutch Clutches and brakes except high clutch and brake band are OK Line Pressure test — Suspected parts: 4. □ Perform all ROAD TEST and mark required procedures. AT-68, "Road Test" 4-1. Check before engine is started. AT-70, "1. CHECK SELF-DIAGNOSTIC PROCEDURE — Mark detected items. **BEFORE** □ PNP switch, AT-115, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . ENGINE IS A/T fluid temperature sensor, AT-120, "DTC P0710 A/T FLUID TEMPERATURE SENSOR STARTED" CIRCUIT" . □ Vehicle speed sensor A/T (Revolution sensor), AT-126, "DTC P0720 VEHICLE SPEED SENSOR A/T (REVOLUTION SENSOR)" . □ Engine speed signal, <u>AT-131, "DTC P0725 ENGINE SPEED SIGNAL"</u>. Torque converter clutch solenoid valve, . Line pressure solenoid valve, AT-173, "DTC P0745 LINE PRESSURE SOLENOID VALVE" Shift solenoid valve A, AT-179, "DTC P0750 SHIFT SOLENOID VALVE A" . Shift solenoid valve B, AT-183, "DTC P0755 SHIFT SOLENOID VALVE B" Throttle position sensor [accelerator pedal position (APP) sensor], AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]" . Overrun clutch solenoid valve, AT-193, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" . PNP, overdrive control and throttle position sensor [accelerator pedal position (APP) sensor], AT-249, "21. TCM Self-diagnosis Does Not Activate {Park/neutral Position (PNP), Overdrive Control and Throttle Position Sensor [Accelerator Pedal Position (APP) Sensor] Switches Circuit Checks}" . □ A/T fluid temperature sensor and TCM power source, <u>AT-197, "DTC BATT/FLUID TEMP</u> SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" . □ Vehicle speed sensor·MTR, AT-203, "DTC VHCL SPEED SEN·MTR VEHICLE SPEED SENSOR MTR" . Control unit (RAM), control unit (ROM), AT-211, "DTC CONTROL UNIT (RAM), CON-TROL UNIT (ROM)" . Control unit (EEP ROM), AT-213, "DTC CONTROL UNIT (EEP ROM)" . Battery Others 4-2. Check at idle AT-71, "2. CHECK AT □ 1. O/D OFF Indicator Lamp Does Not Come On, AT-220, "1. O/D OFF Indicator Lamp Does Not IDLE" Come On" . 2. Engine Cannot Be Started In "P" And "N" Position, AT-222, "2. Engine Cannot Be Started In "P" and "N" Position" . 3. In "P" Position, Vehicle Moves Forward Or Backward When Pushed, AT-223, "3. In "P" Position, Vehicle Moves Forward Or Backward When Pushed" . 4. In "N" Position, Vehicle Moves, AT-224, "4. In "N" Position, Vehicle Moves" . □ 5. Large Shock. "N" \rightarrow "R" Position, <u>AT-225, "5. Large Shock. "N" \rightarrow "R" Position".</u> G. Vehicle Does Not Creep Backward In "R" Position, AT-226, "6. Vehicle Does Not Creep Backward In "R" Position" . □ 7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position, AT-228, "7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position" .

4.	4-3	Cruise test	<u>AT-73, "3.</u>	
(cont'd)	(cont'd)	Part-1	<u>CRUISE</u> <u>TEST"</u>	A
		□ 8. Vehicle Cannot Be Started From D1, <u>AT-230</u> , "8. Vehicle Cannot Be Started From D1". □ 9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2, <u>AT-233</u> , "9. A/T Does Not <u>Shift: D1 → D2 Or Does Not Kickdown: D4 → D2</u> ". □ 10. A/T Does Not Shift: D2 → D3, <u>AT-235</u> , "10. A/T Does Not Shift: D2 → D3". □ 11. A/T Does Not Shift: D3 → D4, <u>AT-237</u> , "11. A/T Does Not Shift: D3 → D4". □ 12. A/T Does Not Perform Lock-up, <u>AT-239</u> , "12. A/T Does Not Perform Lock-up". □ 13. A/T Does Not Hold Lock-up Condition, <u>AT-240</u> , "13. A/T Does Not Hold Lock-up Condition". □ 14. Lock-up Is Not Released, <u>AT-242</u> , "14. Lock-up Is Not Released". □ 15. Engine Speed Does Not Return To Idle (Light Braking D4 → D3), <u>AT-243</u> , "15. Engine <u>Speed Does Not Return To Idle (Light Braking D4 → D3)</u> ".	AT-77. "Cruise Test — Part 1"	E
		Part-2	<u>AT-80,</u>	L
		□ 16. Vehicle Does Not Start From D1 , <u>AT-244</u> , "16. Vehicle Does Not Start From D1". □ 9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , <u>AT-233</u> , "9. A/T Does Not <u>Shift: D1 → D2 Or Does Not Kickdown: D4 → D2</u> ". □ 10. A/T Does Not Shift: D2 → D3 , <u>AT-235</u> , "10. A/T Does Not Shift: D2 → D3". □ 11. A/T Does Not Shift: D3 → D4 , <u>AT-237</u> , "11. A/T Does Not Shift: D3 → D4".	<u>"Cruise Test</u> <u>— Part 2"</u>	E
4.	4-3 .	Part-3	<u>AT-82,</u>	F
(cont'd)	(cont'd)	□ 17. A/T Does Not Shift: D4 →D3 When Overdrive Control Switch "ON" → "OFF", <u>AT-246</u> , "17. <u>A/T Does Not Shift: D4 → D3</u> , <u>When Overdrive Control Switch "ON" → "OFF"</u> . □ 15. Engine Speed Does Not Return To Idle (Engine Brake In D3), <u>AT-243</u> , "15. Engine Speed <u>Does Not Return To Idle (Light Braking D4 → D3)</u> ".	" <u>Cruise Test</u> — Part 3"	G
		 □ 18. A/T Does Not Shift: D3 →22 , When Selector Lever "D" → "2" Position, <u>AT-247, "18. A/T Does Not Shift: D3 → 22 , When Selector Lever "D" → "2" Position"</u>. □ 15. Engine Speed Does Not Return To Idle (Light Braking D4 → D2), <u>AT-243, "15. Engine Speed Does Not Return To Idle (Light Braking D4 → D3)</u>. □ 19. A/T Does Not Shift: 22 →11 , When Selector Lever "2" → "1" Position, <u>AT-248, "19. A/T</u> 		ŀ
		Does Not Shift: 22 → 11, When Selector Lever "2" → "1" Position". □ 20. Vehicle Does Not Decelerate By Engine Brake, <u>AT-249, "20. Vehicle Does Not Decelerate</u> <u>By Engine Brake</u> ". □ SELF-DIAGNOSTIC PROCEDURE — Mark detected items.		I
		 PNP switch, <u>AT-115, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"</u>. A/T fluid temperature sensor, <u>AT-120, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"</u>. 		,
		 Vehicle speed sensor·A/T (Revolution sensor), <u>AT-126, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"</u>. Engine speed signal, <u>AT-131, "DTC P0725 ENGINE SPEED SIGNAL"</u>. Torque converter clutch solenoid valve, <u>AT-159, "DTC P0740 TORQUE CONVERTER</u>. 		ŀ
		CLUTCH SOLENOID VALVE" . CLUTCH SOLENOID VALVE" . Line pressure solenoid valve, <u>AT-173, "DTC P0745 LINE PRESSURE SOLENOID</u> VALVE" .		l
		 Shift solenoid valve A, <u>AT-179, "DTC P0750 SHIFT SOLENOID VALVE A"</u>. Shift solenoid valve B, <u>AT-183, "DTC P0755 SHIFT SOLENOID VALVE B"</u>. Throttle position sensor [accelerator pedal position (APP) sensor], <u>AT-187, "DTC P1705</u> <u>THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]</u>". Overrun clutch solenoid valve, <u>AT-193, "DTC P1760 OVERRUN CLUTCH SOLENOID</u> VALVE". 		N
		 PNP, overdrive control and throttle position sensor [accelerator pedal position (APP) sensor], AT-249, "21. TCM Self-diagnosis Does Not Activate {Park/neutral Position (PNP). Overdrive Control and Throttle Position Sensor [Accelerator Pedal Position (APP) Sensor]. Switches Circuit Checks}" A/T fluid temperature sensor and TCM power source, AT-197, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)". 		
		 Vehicle speed sensor MTR, <u>AT-203, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"</u>. Control unit (RAM), control unit (ROM), <u>AT-211, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)"</u>. Control unit (EEP ROM), <u>AT-213, "DTC CONTROL UNIT (EEP ROM)"</u>. Battery Others 		

[RE4F03B]

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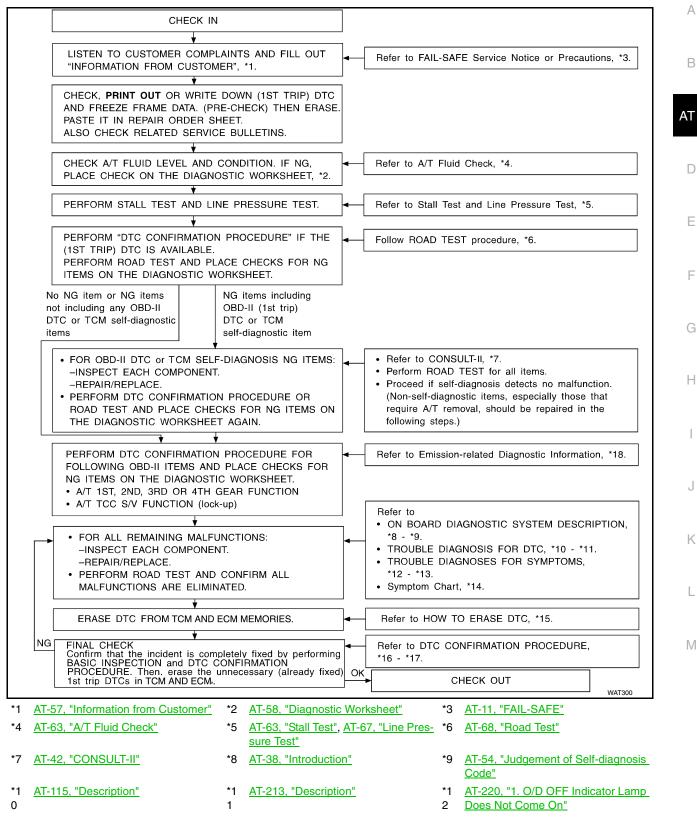
5.	□ For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.	AT-43. "SELF-DIAG- NOSTIC RESULT TEST MODE"
6.	Perform all ROAD TEST and re-mark required procedures.	<u>AT-68, "Road</u> <u>Test"</u>
7.	□ Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items. Refer to <u>EC-124, "DTC & SRT CONFIRMATION MODE"</u> [QG18DE (ULEV)] or <u>EC-697, "DTC & SRT CON-</u> <u>FIRMATION MODE"</u> [QG18DE (SULEV)].	EC section
	 DTC (P0731), <u>AT-135</u>, "DTC P0731 A/T 1ST GEAR FUNCTION". DTC (P0732), <u>AT-140</u>, "DTC P0732 A/T 2ND GEAR FUNCTION". DTC (P0733), <u>AT-145</u>, "DTC P0733 A/T 3RD GEAR FUNCTION". DTC (P0734), <u>AT-150</u>, "DTC P0734 A/T 4TH GEAR FUNCTION". DTC (P0744), <u>AT-163</u>, "DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)". 	
8.	 Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.) 	AT-43, "SELF-DIAG- NOSTIC RESULT TEST MODE" AT-84, "Symptom Chart"
9.	□ Erase DTC from TCM and ECM memories.	AT-40, "HOW TO ERASE DTC"

Work Flow HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

A good understanding of the malfunction conditions can make troubleshooting faster and more accurate. In general, each customer feels differently about a problem. It is important to fully understand the symptoms or conditions for a customer complaint.

Make good use of the two sheets provided, "Information from Customer" (<u>AT-57, "Information from Customer"</u>) and "Diagnostic Worksheet" (<u>AT-58, "Diagnostic Worksheet"</u>), to perform the best troubleshooting possible.

WORK FLOW CHART



[RE4F03B]

[QG18DE (SULEV)].

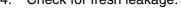
*1 3	AT-249, "21. TCM Self-diagnosis Does Not Activate {Park/neutral Position (PNP), Overdrive Control and Throttle Position Sensor [Accel- erator Pedal Position (APP) Sensor] Switches Circuit Checks}"	*1 4	AT-84, "Symptom Chart"	*1 5	<u>AT-40. "HOW TO ERASE DTC"</u>
*1 6	AT-115. "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE"	*1 7	AT-213. "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE"	*1 8	EC-59. "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS" [QG18DE (ULEV)] or EC- 631. "EMISSION-RELATED DIAG- NOSTIC INFORMATION ITEMS"

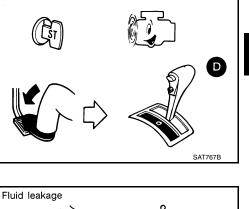
TROUBLE DIAGNOSIS — BASIC INSPECTION

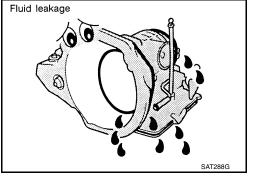
A/T Fluid Check FLUID LEAKAGE CHECK

- 1. Clean area suspected of leaking, for example, mating surface of converter housing and transmission case.
- 2. Start engine, apply foot brake, place selector lever in "D" position and wait a few minutes.
- 3. Stop engine.

4. Check for fresh leakage.







FLUID CONDITION CHECK

Fluid color	Suspected problem
Dark or black with burned odor	Wear of frictional material
Milky pink	Water contamination — Road water entering through filler tube or breather
Varnished fluid, light to dark brown and tacky	Oxidation — Over or under filling, — Overheating



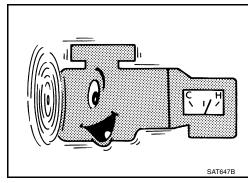
FLUID LEVEL CHECK

Refer to MA-30, "Checking A/T Fluid" .

Stall Test STALL TEST PROCEDURE

- 1. Check A/T fluid and engine oil levels. If necessary, add.
- 2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

ATF operating tempera- : 50 - 80°C (122 - 176°F) ture



[RE4F03B]

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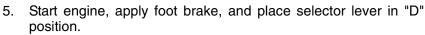
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- 3. Set parking brake and block wheels.
- 4. Install a tachometer where it can be seen by driver during test.
 It is good practice to mark the point of specified engine
 - rpm on indicator.



- 6. Accelerate to wide open throttle gradually while applying foot brake.
- 7. Quickly note the engine stall revolution and immediately release throttle.
 - During test, never hold throttle wide open for more than 5 seconds.

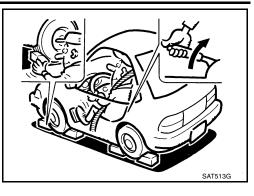
Stall revolution QG18DE

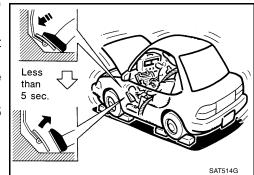
: 2,350 - 2,800 rpm

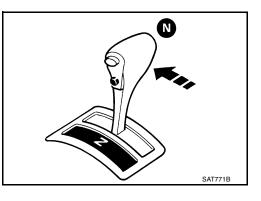
- 8. Move selector lever to "N" position.
- 9. Cool off ATF.

• Run engine at idle for at least one minute.

10. Repeat steps 5 through 9 with selector lever in "2", "1" and "R" positions.







JUDGEMENT OF STALL TEST

The test result and possible damaged components relating to each result are shown in the illustrations that follow.

In order to pinpoint the possible damaged components, follow the "Work Flow" shown in <u>AT-60, "Work Flow"</u>. **NOTE:**

Stall revolution is too high in "D", "2" or "1" position:

- Slippage occurs in 1st gear but not in 2nd and 3rd gears..... Low one-way clutch slippage
- Slippage occurs in the following gears:

1st through 3rd gears in "D" position and engine brake functions with overdrive control switch set to "OFF".

1st and 2nd gears in "2" position and engine brake functions with accelerator pedal released (fully closed throttle)...... Forward clutch or forward one-way clutch slippage

Stall revolution is too high in R position:

- Engine brake does not function in "1" position..... Low & reverse brake slippage
- Engine brake functions in "1" position..... Reverse clutch slippage

Stall revolution within specifications:

• Vehicle does not achieve speed of more than 80 km/h (50 MPH)..... One-way clutch seizure in torque converter housing

CAUTION:

Be careful since automatic fluid temperature increases abnormally.

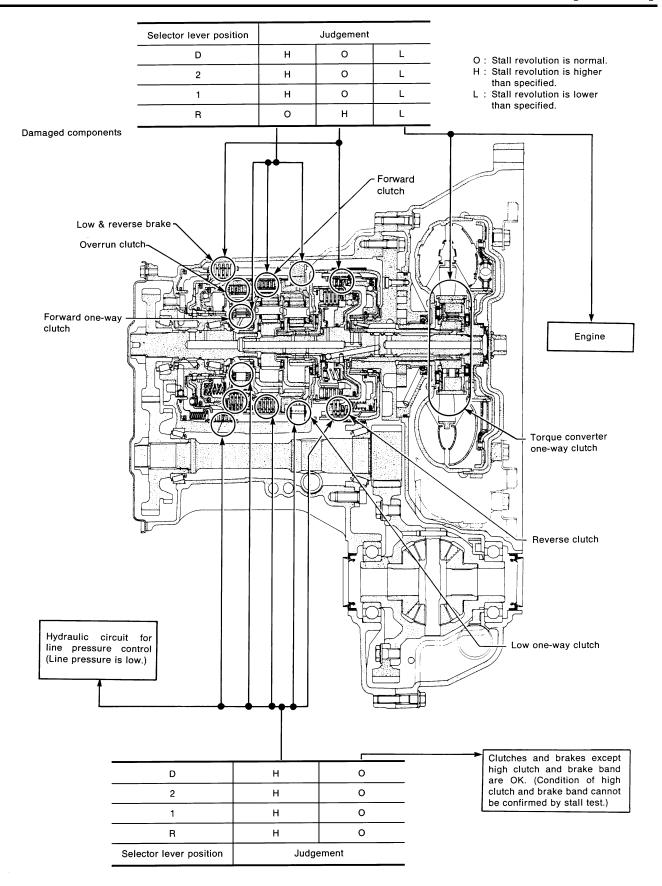
• Slippage occurs in 3rd and 4th gears in "D" position..... High clutch slippage

AT-64

[DE/E03B]

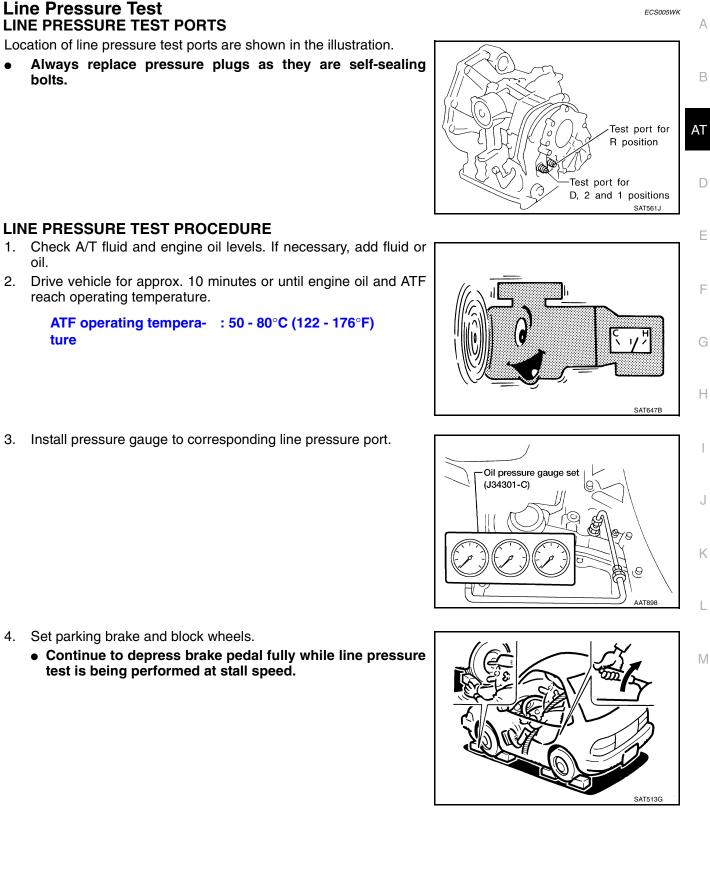
	[RE4FU3B]	
•	Slippage occurs in 2nd and 4th gear in "D" position Brake band slippage	i.
•	Engine brake does not function in 2nd and 3rd gears in "D" position, 2nd gear in "2" position, and 1st gear in "1" position with overdrive control switch set to "OFF" Overrun clutch slippage	A
	all revolution less than specifications:	В
•	Poor acceleration during starts One-way clutch slippage in torque converter	D
		AT
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[RE4F03B]



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[RE4F03B]



Line Pressure Test LINE PRESSURE TEST PORTS

reach operating temperature.

oil.

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2.

3.

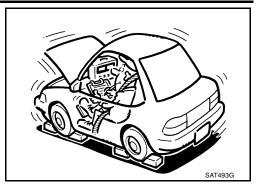
Location of line pressure test ports are shown in the illustration.

Always replace pressure plugs as they are self-sealing bolts.

[RE4F03B]

- 5. Start engine and measure line pressure at idle and stall speed.
 - When measuring line pressure at stall speed, follow the stall test procedure.

Refer to AT-67, "Line Pressure Test" .



JUDGEMENT OF LINE PRESSURE TEST

Judgement		Suspected parts	
At idle	Line pressure is low in all positions. Line pressure is low in particular position. Line pressure is high.	 Oil pump wear Control piston damage Pressure regulator valve or plug sticking Spring for pressure regulator valve damaged Fluid pressure leakage between oil strainer and pressure regulator valve Clogged strainer Fluid pressure leakage between manual valve and particular clutch For example, line pressure is: Low in "R" and "1" positions, but Normal in "D" and "2" positions. Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to AT-22, "CLUTCH AND BAND CHART". Maladjustment of throttle position sensor [accelerator pedal position (APP) sensor] 	
		 A/T fluid temperature sensor damaged Line pressure solenoid valve sticking Short circuit of line pressure solenoid valve circuit Pressure modifier valve sticking Pressure regulator valve or plug sticking Open in dropping resistor circuit 	
At stall speed	Line pressure is low.	 Maladjustment of throttle position sensor [accelerator pedal position (APP) sensor] Line pressure solenoid valve sticking Short circuit of line pressure solenoid valve circuit Pressure regulator valve or plug sticking Pressure modifier valve sticking Pilot valve sticking 	

Road Test DESCRIPTION

- The purpose of the test is to determine overall performance of the transmission and analyze causes of problems.
- The road test consists of the following three parts:
- 1. Check before engine is started
- 2. Check at idle

ROAD TEST PROCEDURE
1. Check before engine is started.
$\overline{\Box}$
2. Check at idle.
$\overline{\mathbb{Q}}$
3. Cruise test.
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[RE4F03B]

- 3. Cruise test
- Before road test, familiarize yourself with all test procedures and items to check.
- Conduct tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test. Refer to <u>AT-38</u>, "<u>ON BOARD DIAGNOSTIC SYSTEM</u> <u>DESCRIPTION</u>" and <u>AT-215</u>, "<u>TROUBLE DIAGNOSES FOR</u> <u>SYMPTOMS</u>".



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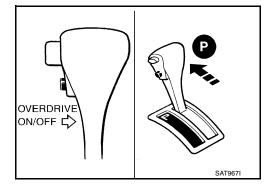
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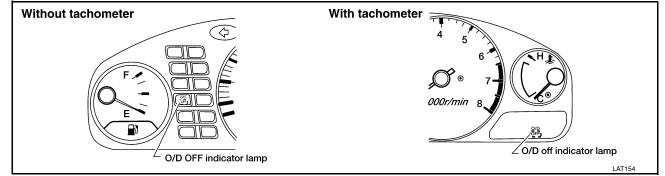
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1. CHECK BEFORE ENGINE IS STARTED

1. CHECK O/D OFF INDICATOR LAMP

- 1. Park vehicle on flat surface.
- 2. Move A/T selector lever to "P" position.
- 3. Turn ignition switch to "OFF" position. Wait at least 5 seconds.
- 4. Turn ignition switch to "ON" position. (Do not start engine.)
- 5. Does O/D OFF indicator lamp come on for about 2 seconds?



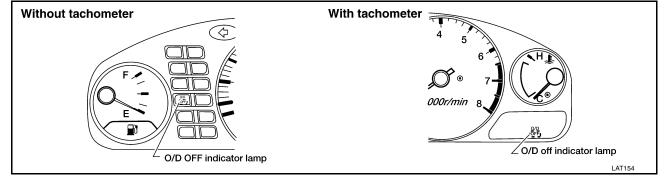


Yes or No

- Yes >> GO TO 2.
- No >> Stop ROAD TEST. Go to AT-220, "1. O/D OFF Indicator Lamp Does Not Come On".

2. CHECK O/D OFF INDICATOR LAMP

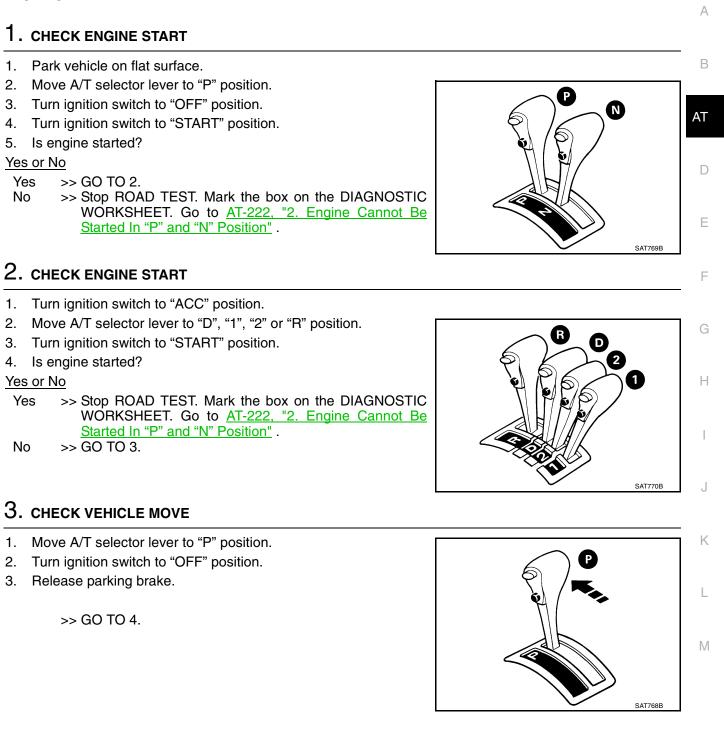
Does O/D OFF indicator lamp flicker for about 8 seconds?



Yes or No

- Yes >> TCM is in fail-safe mode. Perform self-diagnosis and check NG items on the <u>AT-58, "Diagnostic Worksheet"</u>. Refer to <u>AT-51, "TCM Self-diagnostic Procedure (No Tools)"</u>.
- No >> 1. Turn ignition switch to "OFF" position.
 - 2. Perform self-diagnosis and note NG items. Refer to <u>AT-51, "TCM Self-diagnostic Procedure (No Tools)"</u>.
 - 3. Go to AT-71, "2. CHECK AT IDLE" .

2. CHECK AT IDLE

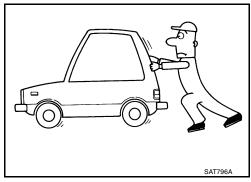


4. CHECK VEHICLE MOVE

- 1. Push vehicle forward or backward.
- 2. Does vehicle move when it is pushed forward or backward?
- 3. Apply parking brake.

Yes or No

- Yes >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-223, "3. In "P" Position, Vehicle Moves Forward Or Backward When Pushed" . Continue ROAD TEST.
- No >> GO TO 5.

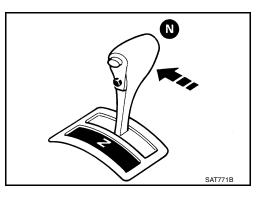


5. CHECK VEHICLE MOVE

- 1. Start engine.
- 2. Move A/T selector lever to "N" position.
- 3. Release parking brake.
- 4. Does vehicle move forward or backward?

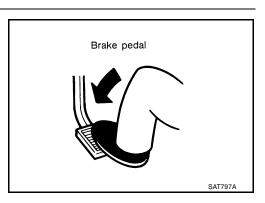
Yes or No

Yes >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to <u>AT-224, "4. In "N" Position, Vehicle Moves"</u> . Continue ROAD TEST. No >> GO TO 6.



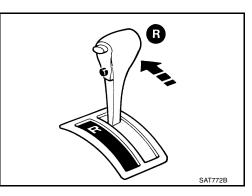
6. снеск знігт зноск

1. Apply foot brake.



- 2. Move A/T selector lever to "R" position.
- 3. Is there large shock when changing from "N" to "R" position? Yes or No
- Yes >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to <u>AT-225, "5. Large Shock. "N" \rightarrow "R" Position"</u>. Continue ROAD TEST.

No >> GO TO 7.

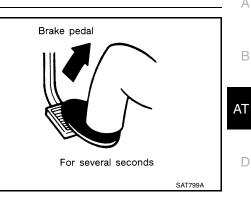


7. CHECK VEHICLE MOVE

- 1. Release foot brake for several seconds.
- 2. Does vehicle creep backward when foot brake is released?

Yes or No

- >> GO TO 8. Yes
- No >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-226, "6. Vehicle Does Not Creep Backward In "R" Position" . Continue ROAD TEST.

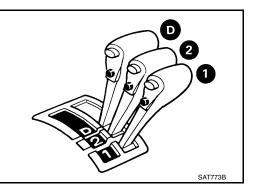


8. CHECK VEHICLE MOVE

- Move A/T selector lever to "D", "2" and "1" positions and check if 1. vehicle creeps forward.
- 2. Does vehicle creep forward in all three positions?

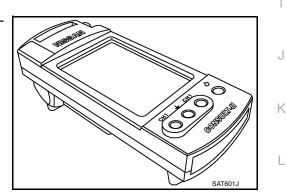
Yes or No

- >> Go to AT-73, "3. CRUISE TEST" Yes
- >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to No AT-228, "7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position" . Continue ROAD TEST.



3. CRUISE TEST

Check all items listed in Parts 1 through 3 of Diagnostic Worksheet.

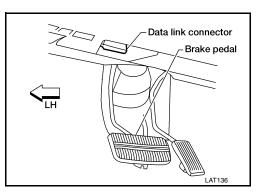


(P) With CONSULT-II

- Using CONSULT-II, conduct a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per Shift Schedule.

CONSULT-II Setting Procedure

- Turn ignition switch "OFF". 1.
- 2. Connect CONSULT-II to Data link connector which is located in left side lower dash panel.



[RE4F03B]

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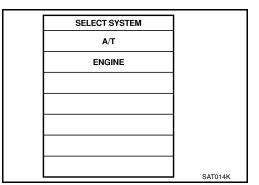
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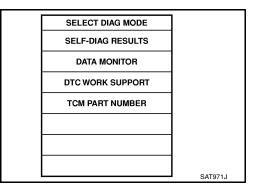
[RE4F03B]

- 3. Turn ignition switch "ON".
- 4. Touch "START".

5. Touch "A/T".

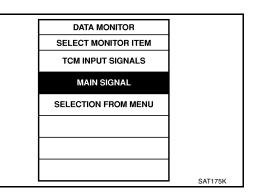
START	
SUB MODE	SAT586J





6. Touch "DATA MONITOR".

- 7. Touch "MAIN SIGNALS" or "TCM INPUT SIGNALS".
- 8. See "Numerical Display", "Barchart Display" or "Line Graph Display".



[RE4F03B]

- 9. Touch "SETTING" to recording condition ("AUTO TRIG" or "MANU TRIG") and touch "BACK".
- 10. Touch "START".

11. When performing cruise test, touch "RECORD".

12. After finishing cruise test part 1, touch "STOP".

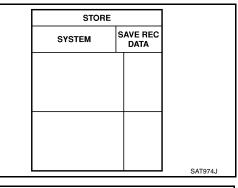
13. Touch "STORE" and touch "BACK".

SET RECORDING C	ONDITION	1	
AUTO TRI	G		A
MANUTRI	G		
TRIGGER PC	DINT		В
«	×		
0% 20% 40% 60% Recording Sp			AТ
MIN	MAX		AT
«			
/64 /32 /16 /8 /4	/2 FULL		
		SAT973J	
			D
DATA MONIT	OR		
MONITOR	NO DTC		F
ENGINE SPEED	XX rpm		
GEAR	XXX		
SLCT LVR POSI	N/P		
EHICLE SPEED X			F
THROTTLE POSI	XXX		
LINE PRES DTY	XX%		
TCC S/V DUTY	XX%		
SHIFT S/V A	xx		G
SHIFT S/V B	XX		G
		SAT134K	
DATA MONIT	OR		Н
Recording Data X%	DETECTED		
	(XX rpm		
GEAR	ххх		
SLCT LVR POSI	N/P		
	XX km/h		
THROTTLE POSI	XXX		1
LINE PRES DTY	XX%		J
TCC S/V DUTY	XX%		
SHIFT S/V A	XX		
SHIFT S/V B	хх		V
		SAT135K	Ň
REAL-TIME D	DIAG		_
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			B. 4
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[RE4F03B]



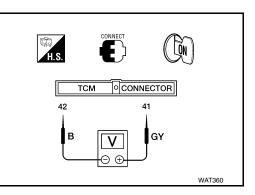
Trigger	VHCL S/SEN A/T	VHCL S/SEN MTR	THRTL POSI SEN	
	km/h	km/h	v	
				SAT975J

14. Touch "DISPLAY".

- 15. Touch "PRINT".
- 16. Check the monitor data printed out.
- 17. Continue cruise test part 2 and 3.

Without CONSULT-II

• Throttle position sensor can be checked by voltage across terminals 41 and 42 of TCM.



Cruise Test — Part 1

1. CHECK STARTING GEAR (D1) POSITION

1. Drive vehicle for approx. 10 minutes to warm engine oil and ATF up to operating temperature.

ATF operating tempera- : 50 - 80°C (122 - 176°F) ture

- 2. Park vehicle on flat surface.
- 3. Set overdrive control switch to "ON" position.
- 4. Move A/T selector lever to "P" position.
- 5. Start engine.

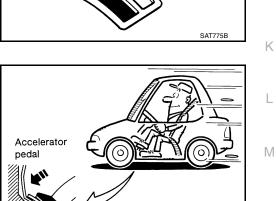
6. Move A/T selector lever to "D" position.

- 7. Accelerate vehicle by constantly depressing accelerator pedal halfway.
- 8. Does vehicle start from D1 ?

\mathbb{B} Read gear position.

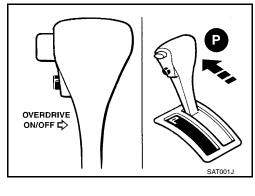
Yes or No

- Yes >> GO TO 2.
- No >> Go to <u>AT-230, "8. Vehicle Cannot Be Started From D1"</u> Continue ROAD TEST.



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Half-way



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[RE4F03B]

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2. CHECK SHIFT UP (D1 TO D2)

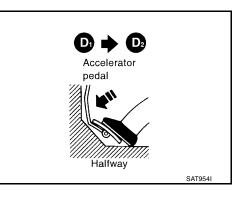
Does A/T shift from D1 to D2 at the specified speed?

Bread gear position, throttle opening and vehicle speed.

```
: Refer to AT-385, "Shift
Specified speed when
shifting from D1 to D2
                         Schedule".
```

Yes or No

- Yes >> GO TO 3.
- No >> Go to AT-233, "9. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D4 \rightarrow D2^{"}$. Continue ROAD TEST.



3. CHECK SHIFT UP (D2 TO D3)

Does A/T shift from D2 to D3 at the specified speed?

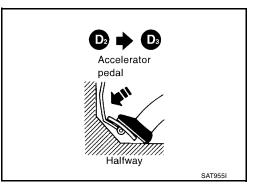
B Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D2 to D3	: Refer to <u>AT-385, "Shift</u> <u>Schedule"</u> .
<u>es or No</u>	

Ye

Yes >> GO TO 4.

>> Go to AT-235, "10. A/T Does Not Shift: $D_2 \rightarrow D_3$ " . Con-No tinue ROAD TEST.



4. CHECK SHIFT UP (D3 TO D4)

Does A/T shift from D₃ to D₄ at the specified speed?

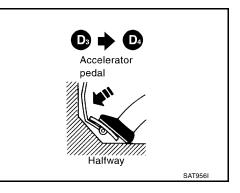
(B) Read gear position, throttle position and vehicle speed.



Yes or No

Yes >> GO TO 5.

>> Go to AT-237, "11. A/T Does Not Shift: $D_3 \rightarrow D4$ ". Con-No tinue ROAD TEST.



[RE4F03B]

5. CHECK LOCK-UP (D4 TO D4 L/U)	Δ
Does A/T perform lock-up at the specified speed?	omes 94%.
Specified speed when lock-up occurs: Refer to AT-385, "Shift Schedule"	
Yes or No	Accelerator AT
Yes >> GO TO 6. No >> Go to <u>AT-239, "12. A/T Does Not Perform Lock-up"</u> . Continue ROAD TEST.	
	Halfway E
6. CHECK HOLD LOCK-UP	
Does A/T hold lock-up condition for more than 30 seconds? Yes or No	F
Yes >> GO TO 7. No >> Go to <u>AT-240, "13. A/T Does Not Hold Lock-up Condition</u> "	G
7. CHECK SHIFT DOWN (D4 L/U TO D4)	Н
1. Release accelerator pedal.	
 Is lock-up released when accelerator pedal is released? <u>Yes or No</u> 	
Yes >> GO TO 8. No >> Go to <u>AT-242, "14. Lock-up Is Not Released"</u> . Continue	Accelerator Brake pedal pedal
ROAD TEST.	Released Lightly applied
	SAT958I
 CHECK SHIFT DOWN (D4 TO D3) Decelerate vehicle by applying foot brake lightly. 	
 Decelerate vehicle by applying loot brake lightly. Does engine speed return to idle smoothly when A/T is shifted from the state of the	om D4 to D3 ?
 Read gear position and engine speed. <u>Yes or No</u> Yes >> 1. Stop vehicle. 2. Go to<u>AT-80, "Cruise Test — Part 2"</u>. 	Accelerator pedal
No >> Go to <u>AT-243, "15. Engine Speed Does Not Return To</u> <u>Idle (Light Braking $D_4 \rightarrow D_3$)"</u> . Continue ROAD TEST.	

AT-79

Released

Lightly applied

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[RE4F03B]

Cruise Test — Part 2

1. CHECK STARTING GEAR (D1) POSITION

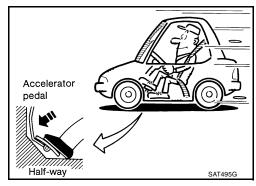
- 1. Confirm overdrive control switch is in "ON" position.
- 2. Confirm A/T selector lever is in "D" position.
- 3. Accelerate vehicle by half throttle again.
- 4. Does vehicle start from D1 ?

B Read gear position.

Yes or No

Yes >> GO TO 2.

No >> Go to <u>AT-244, "16. Vehicle Does Not Start From D1"</u>. Continue ROAD TEST.



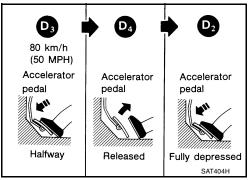
2. CHECK SHIFT UP AND SHIFT DOWN (D3 TO D4 TO D2)

- 1. Accelerate vehicle to 80 km/h (50 MPH) as shown in illustration.
- 2. Release accelerator pedal and then quickly depress it fully.
- 3. Does A/T shift from D4 to D2 as soon as accelerator pedal is depressed fully?

B Read gear position and throttle position.

Yes or No

- Yes >> GO TO 3.
- No >> Go to <u>AT-233, "9. A/T Does Not Shift: D1 \rightarrow D2 Or Does Not Kickdown: D4 \rightarrow D2" . Continue ROAD TEST.</u>

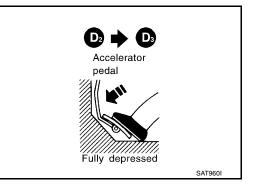


3. CHECK SHIFT UP (D2 TO D3)

Does A/T shift from D2 to D3 at the specified speed?

B Read gear position, throttle position and vehicle speed.

	Specified speed when shifting from D2 to D3	: Refer to <u>AT-385, "Shift</u> <u>Schedule"</u> .
Yes or	· No	
Yes No	>> GO TO 4. >> Go to <u>AT-235, "10. A/</u> tinue ROAD TEST.	T Does Not Shift: $D_2 \rightarrow D_3$ " . Con-



AT-81

[RE4F03B]

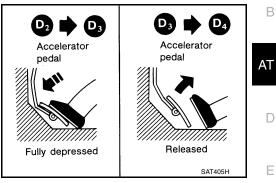
4. CHECK SHIFT UP (D3 TO D4) AND ENGINE BRAKE

Release accelerator pedal after shifting from D₂ to D₃. Does A/T shift from D₃ to D₄ and does vehicle decelerate by engine brake?

(B) Read gear position, throttle position and vehicle speed.

Yes or No

- Yes >> 1. Stop vehicle.
 - 2. Go to AT-82, "Cruise Test Part 3" .
- No >> Go to <u>AT-237</u>, "<u>11</u>. <u>A/T Does Not Shift: D3 \rightarrow D4</u>". Continue ROAD TEST.



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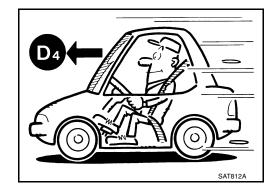
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Cruise Test — Part 3

1. VEHICLE SPEED D4 POSITION

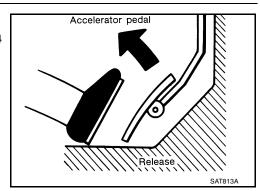
- 1. Confirm overdrive control switch is in "ON" position.
- 2. Confirm selector lever is in "D" position.
- 3. Accelerate vehicle using half-throttle to D4 .

>> GO TO 2.



2. CHECK SHIFT DOWN (D4 TO D3)

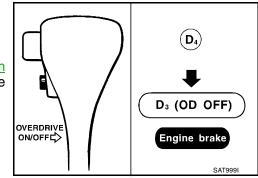
- 1. Release accelerator pedal.
- 2. Set overdrive control switch to "OFF" position while driving in D4
- 3. Does A/T shift from D4 to D3 (O/D OFF)?



Read gear position and vehicle speed.

Yes or No

- Yes >> GO TO 3.
- No >> Go to <u>AT-246, "17. A/T Does Not Shift: D4 \rightarrow D3 , When</u> <u>Overdrive Control Switch "ON" \rightarrow "OFF"</u>. Continue ROAD TEST.

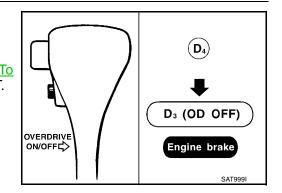


3. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

Yes >> GO TO 4. No >> Go to <u>AT-243, "15. Engine Speed Does Not Return To</u> <u>Idle (Light Braking D4 \rightarrow D3.)"</u>. Continue ROAD TEST.



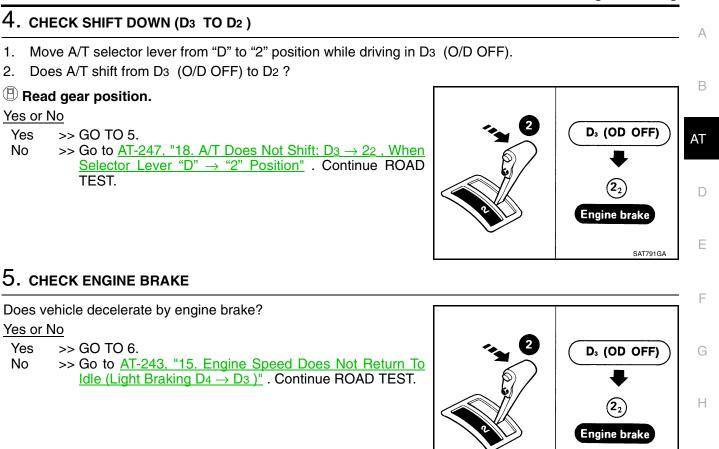
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6. CHECK SHIFT DOWN

- 1. Move A/T selector lever from "2" to "1" position while driving in 22.
- 2. Does A/T shift from 22 to 11 position?

Bread gear position.

Yes or No

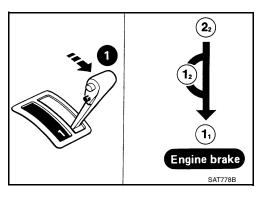
Yes

No

Yes

No

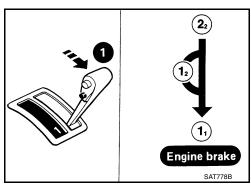
Yes >> GO TO 7. >> Go to AT-248, "19. A/T Does Not Shift: $22 \rightarrow 11$, When No Selector Lever "2" \rightarrow "1" Position" . Continue ROAD TEST.



7. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake? Yes or No

- Yes >> 1. Stop vehicle.
 - 2. Perform self-diagnosis. Refer to AT-51, "TCM Selfdiagnostic Procedure (No Tools)".
- >> Go to AT-249, "20. Vehicle Does Not Decelerate By No Engine Brake" . Continue ROAD TEST.



Symptom Chart

Numbers are arranged in order of inspection. Perform inspections starting with number one and work up.

				Reference Page
Items	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)
Not Used	Engine cannot start in "P" and "N" positions.		1. Ignition switch and starter	PG-2. "POWER SUP- PLY ROUTING" and SC-9. "STARTING SYS- TEM"
	AT-222, "2. Engine Cannot Be Started In "P" and "N"	ON vehicle	2. Control cable adjustment	AT-262, "Control Cable Adjustment"
	Position"		3. PNP switch adjustment	AT-262, "Park/Neutral Position (PNP) Switch Adjustment"
	Engine starts in position other than "N" and "P" posi-		1. Control cable adjustment	AT-262, "Control Cable Adjustment"
	tions. <u>AT-222, "2. Engine Cannot</u> <u>Be Started In "P" and "N"</u> <u>Position"</u>	ON vehicle	2. PNP switch adjustment	AT-262, "Park/Neutral Position (PNP) Switch Adjustment"
	Of Transaxle noise in "P" and "N" positions.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
			2. Line pressure test	AT-67, "Line Pressure Test"
			3. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"
			4. Vehicle speed sensor A/T (Revolution sensor) and vehi- cle speed sensor MTR	AT-126. "DTC P0720 VEHICLE SPEED SEN- SOR-A/T (REVOLU- TION SENSOR)", AT- 203, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SEN- SOR-MTR"
		OFF vehicle	5. Oil pump	AT-292, "Components"
			6. Torque converter	AT-272, "Disassembly"

PFP:00000

				Reference Page	٥
Items	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)	A
	Vehicle moves when changing into "P" position,	ON vehicle	1. Control cable adjustment	AT-262, "Control Cable Adjustment"	В
Not Used	or parking gear does not disengage when shifted out of "P" position. <u>AT-223, "3. In "P" Position,</u> <u>Vehicle Moves Forward Or</u> <u>Backward When Pushed"</u>	OFF vehicle	2. Parking components	<u>AT-267, "Components"</u>	AT
		ON vehicle	1. Control cable adjustment	AT-262, "Control Cable Adjustment"	D
	Vehicle moves in "N" posi- tion.		2. Forward clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"	E
	AT-224, "4. In "N" Position, Vehicle Moves"	OFF vehicle	3. Reverse clutch	AT-313. "REVERSE CLUTCH"	F
			4. Overrun clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"	
	Vehicle will not run in "R" position (but runs in "D", "2" and "1" positions). Clutch slips. Very poor acceleration.	ON vehicle	1. Control cable adjustment	AT-262, "Control Cable Adjustment"	G
			2. Stall test	AT-63, "Stall Test"	Н
			3. Line pressure test	AT-67, "Line Pressure Test"	11
			4. Line pressure solenoid valve	AT-173. "DTC P0745 LINE PRESSURE SOLENOID VALVE"	I
			5. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"	J
Slips/Will Not Engage		OFF vehicle	6. Reverse clutch	AT-313, "REVERSE CLUTCH"	
	AT-226, "6. Vehicle Does Not Creep Backward In "R" Position"		7. High clutch	AT-318, "HIGH CLUTCH"	K
			8. Forward clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"	L
			9. Overrun clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"	Μ
			10. Low & reverse brake	AT-332, "LOW & REVERSE BRAKE"	

Items Symptom Condition Diagnostic Item OG 18DE (SULEV) OG 18DE (ULEV) OF 1000 AT-63: "FLUID LEVEL Check" DE Check" Not Used Vehicle braked when shift- ing into "R" position. ON vehicle 1. Control valve assembly AT-372, "CONTROL Valve ASSEMBLY" AT-312, "HICH CLUTCH" AT-312, "HICH CLUTCH" CLUTCH AT-348, "Components" Not Used OFF vehicle 5. High clutch AT-324, "CONWARD CLUTCH" CLUTCH AND OVER- BUNCLUTCH" CLUTCH AND OVER- BUNCLUTCH CLUTCH AND OVER- BUNCLUTCH Soeed/ Ignition I'die Soeed/ Ignition EC-43, "Idie Soeed/ Ignition I'die Soeed/ Ignition Soeed/ Ignition I'die Soeed/ Ignition EC-43, "Idie Soeed/ Ignition EC-43, "Idie Soeed/ Ignition EC-43, "Idie Soeed/ Ignition EC-43, "Idie Soeed/ Ignition EC-43, "Idie Soeed/ Ignition E					Defenses Deve
Not Used Vehicle braked when shifting into "R" position. 1. Fluid level AT-53. "FLUID LEVEL OHEOK" (ULEV) (0		Reference Page
Not Used Vehicle braked when shift- ing into "R" position. ON vehicle I. Fruid level CHECK: 3. Line pressure solenoid valve AI-157. "Line Pressure SOLENDO WALVE: AI-157. "Line Pressure SOLENDO WALVE: AI-173. "DTC P0745. LINE PRESSURE SOLENDO WALVE: 4. Control valve assembly AI-128."HIGH CLUTCH AI-138."HIGH CLUTCH 5. High clutch AI-318."HIGH CLUTCH 6. Brake band AI-324."COMWARD CLUTCH 7. Forward clutch AI-324."COMWARD CLUTCH 8. Overrun clutch AI-324."COMWARD CLUTCH 8. Overrun clutch AI-324."COMWARD CLUTCH 9. Overrun clutch AI-324."COMWARD CLUTCH 1. Engine idling rpm AI-31."DTC P170." The TILE POSITION SENSORI (ACCLERA TOR PEDAL POS. TION (APP) SENSOR] 9. Shift Shock Sharp shock in shifting from "N" to "D" position. 0N vehicle 3. Line pressure test AI-67."Line Pressure Test 4. ATT fluid temperature sen- sor AI-131."DTC P170.A/ THE DESURE 5. Engine speed signal AI-131."DTC P275. AI-131."DTC P275. 4. LINE PRESSURE AI-131."DTC P275.	Items	Symptom	Condition	Diagnostic Item	
Not Used Vehicle braked when shift- ing into "R" position. ON vehicle Ime pressure solenoid valve AT-173. DTC P0745. SOLENOID VALVE: SOLENOID VALVE: 4. Control valve assembly AT-237. "CONTROL. MALVE ASSEMBLY" AT-316. "HGH CLUTCH" 5. High clutch AT-316. "HGH CLUTCH" AT-348. "Components" AT-324. "FORWARD. 0FF vehicle 7. Forward clutch AT-324. "CORWARD. CLUTCH AND OVER- RUNCLUTCH" 8. Overrun clutch AT-324. "CORWARD. CLUTCH AND OVER- RUNCLUTCH" AT-324. "CORWARD. CLUTCH AND OVER- RUNCLUTCH" 8. Overrun clutch AT-324. "CORWARD. CLUTCH AND OVER- RUNCLUTCH B. Overrun clutch AT-324. "CORWARD. CLUTCH AND OVER- RUNCLUTCH B. Overrun clutch AT-324. "CORWARD. CLUTCH AND OVER- RUNCLUTCH B. Overrun clutch 1. Engine idling rpm "Iming/ Line Ratio. Adjust. Mature. DR Edu. Second/ CLUTCH AND OVER- BUNCLUTCH Batio. Adjust. Mature. CON vehicle 3. Line pressure test AT-187. "DTC P0710.A' THEOTTLE POSITION SENSORI (ACCELERA. TOR PEDAL POSI- TOR PED				1. Fluid level	
Not Used Vehicle braked when shift- ing into "R" position. 3. Line pressure solenoid valve ALTIOL DITIONS valve Not Used Vehicle braked when shift- ing into "R" position. 4. Control valve assembly AT-237. "CONTROL. ValVE ASSEMBLY" 5. High clutch AT-318. "HiGH CLUTCH" 6. Brake band AT-348. "Components" 7. Forward clutch AT-324. "FORWARD CLUTCH AND OVER- RUNCLUTCH" 8. Overrun clutch AT-324. "FORWARD CLUTCH AND OVER- RUNCLUTCH" 8. Overrun clutch AT-324. "FORWARD CLUTCH AND OVER- RUNCLUTCH" 8. Overrun clutch CLUTCH AND OVER- RUNCLUTCH" 1. Engine idling rpm 'dle Speed/ logistion logistion adjust ment' 9. Nehicle ON vehicle 9. Nehicle 3. Line pressure test 4. AT-187. 'DTC P0710.AI TFLUT POSITION TION (APP) sensor] 9. Line pressure test AT-67. "Line Pressure Test" 4. ATT fluid temperature sen- sor AT-137. "DTC P0710.AI TFLUT DTC P0725 </td <td></td> <td></td> <td></td> <td>2. Line pressure test</td> <td></td>				2. Line pressure test	
Not Used Vehicle braked when shifting into "R" position. 4. Control vave assembly VALVE ASSEMBLY: Shift Shock Sharp shock in shifting from "N" to "D" position. 5. High clutch AT-318, "HIGH CLUTCH" 6. Brake band AT-348, "Components" AT-324, "FORWARD CLUTCH" 8. Overrun clutch AT-324, "FORWARD OVER-RUN CLUTCH" AT-324, "FORWARD OVER-RUN CLUTCH" 8. Overrun clutch AT-324, "FORWARD OVER-RUN CLUTCH" Speed/Log over the state over	Not Used		ON vehicle	-	LINE PRESSURE
Shift Shock Sharp shock in shifting from "N" to "D" position. ON vehicle 5. High clutch AT-318. "HIGH CLUTCH" CLUTCH AND OVER- RUN CLUTCH AND OVER- RUN CLUTCH" 8. Overrun clutch AT-324. "CORWARD CLUTCH" AT-324. "CORWARD CLUTCH" 8. Overrun clutch CLUTCH AND OVER- RUN CLUTCH" AT-324. "CORWARD CLUTCH" 8. Overrun clutch CLUTCH AND OVER- RUN CLUTCH" AT-324. "CORWARD CLUTCH" 8. Overrun clutch CLUTCH AND OVER- RUN CLUTCH" Tide 8. Overrun clutch CLUTCH AND OVER- RUN CLUTCH Tide 8. Overrun clutch CLUTCH AND OVER- RUN CLUTCH" Tide 8. Overrun clutch CLUTCH AND OVER- RUN CLUTCH Tide 9. Chronit position sensor (ACPP) sensor] Timing/dia Mixture. ToB PEDAL POSI- TION APP) SENSORT AT-187. "DTC P1705. THAOTTLE POSITION SENSOR TOB PEDAL POSI- TION APP) SENSORT 9. Line pressure test AT-120. "DTC P0710 A/ TFLUID TEMPERA- TURE SENSOR CIR- CUT" AT-131. "DTC P0725. ENGINE SPEED SIG- NAL" 9. Line pressure solenoid unter AT-131. "DTC P0725. ENGINE SPEED SIG- NAL"		Vehicle braked when shift-		4. Control valve assembly	
Shift Shock Sharp shock in shifting from "N" to "D" position. OFF vehicle 7. Forward clutch AT-324, "FORWARD, CLUTCH" 8. Overrun clutch AT-324, "FORWARD, CLUTCH" CLUTCH AND OVER- RUN CLUTCH" 8. Overrun clutch AT-324, "FORWARD, CLUTCH" 8. Overrun clutch CLUTCH AND OVER- RUN CLUTCH" 8. Overrun clutch CLUTCH AND OVER- RUN CLUTCH" 9. Overrun clutch CLUTCH AND OVER- RUN CLUTCH" 1. Engine idling rpm EC-615, "Idle Speed/ Speed/ Speed/ Idmition, Iming/ Idle Mix- ment" 2. Throttle position sensor [accelerator pedal position (APP) sensor] AT-187, "DTC P1705, IHROTTLE POSITION SENSOR IACCELERA- TOR PEDAL POSI- TION (APP) SENSOR] 3. Line pressure test AT-167, "Line Pressure Test" 4. A/T fluid temperature sen- sor AT-120, "DTC P0710 A/ TFLUID TEMPERA- TURE SENSOR CIR- CUIT" 5. Engine speed signal AT-131, "DTC P0725, ENGINE SPEED SIG- NAL" 4. Line pressure solenoid AT-131, "DTC P0725, ENGINE SPEED SIG- NAL"		ing into "R" position.		5. High clutch	
Shift Shock Sharp shock in shifting from "N" to "D" position. ON vehicle 7. Forward clutch CLUTCH AND OVER- RUN CLUTCH" 8. Overrun clutch AT-324. "FORWARD CLUTCH AND OVER- RUN CLUTCH" AT-324. "FORWARD CLUTCH AND OVER- RUN CLUTCH" 8. Overrun clutch EC-615. "Idle Speed/ Ignition. Timing/ Idle Mix- ture Ratio. Adjust: ment" EC-615. "Idle Speed/ Ignition. Timing/ Idle Mix- ture Ratio. Adjust: ment" 9. No vehicle 1. Engine idling rpm EC-615. "Idle Speed/ Ignition. Timing/ Idle Mix- ture Ratio. Adjust: ment" EC-615. "Idle Speed/ Ignition. Timing/ Ignition. Timing/ Ignition. Timing/ Ignition. 9. Shift Shock Sharp shock in shifting from "N" to "D" position. ON vehicle 3. Line pressure test AT-187. "DTC PO755. TION (APP) SENSOR I AT-120. "DTC PO710 A/ T FLUID TEMPERA- TOR PEDAL POSI- TION (APP) SENSOR I CUIT" 9. Line pressure solenoid where AT-131. "DTC PO725. ENGINE SPEED SIG- NAL" AT-173. "DTC PO745. LINE PRESSURE.				6. Brake band	AT-348, "Components"
Shift Shock Sharp shock in shifting from "N" to "D" position. ON vehicle A.T fluid temperature sensor sor sor sor sor sor sor sor sor sor			OFF vehicle	7. Forward clutch	CLUTCH AND OVER-
Shift Shock Sharp shock in shifting from "N" to "D" position. ON vehicle 1. Engine idling rpm Interpretation of the second of the secon				8. Overrun clutch	CLUTCH AND OVER-
Shift ShockSharp shock in shifting from "N" to "D" position.ON vehicle2.Throttle position sensor [accelerator pedal position (APP) sensor]THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"Shift ShockSharp shock in shifting from "N" to "D" position.ON vehicle3. Line pressure testAT-67, "Line Pressure Test"4. A/T fluid temperature sen- sorAT-120, "DTC PO710 A/ T FLUID TEMPERA- TURE SENSOR CIR- CUIT"AT-131, "DTC PO725 ENGINE SPEED SIG- NAL"6. Line pressure solenoidAT-173, "DTC PO745 LINE PRESSURE			ON vehicle	1. Engine idling rpm	"Idle"IdleSpeed/Speed/IgnitionIgnitionTiming/Timing/IdleIdle Mix-Mixtureture RatioRatioAdjust-Adjust-
Shift Shock Sharp shock in shifting from "N" to "D" position. ON vehicle 3. Life pressure test Image: Test" 4. A/T fluid temperature sensor AT-120, "DTC P0710 A/ T FLUID TEMPERA- TURE SENSOR CIR- CUIT" 5. Engine speed signal AT-131, "DTC P0725 ENGINE SPEED SIG- NAL" 6. Line pressure solenoid AT-173, "DTC P0745 LINE PRESSURE				[accelerator pedal position	THROTTLE POSITION SENSOR [ACCELERA-
from "N" to "D" position. 4. A/T fluid temperature sensor AT-120, DTC P0710 A/ T FLUID TEMPERA- TURE SENSOR CIR- CUIT" 5. Engine speed signal AT-131, "DTC P0725 ENGINE SPEED SIG- NAL" 6. Line pressure solenoid AT-173, "DTC P0745 LINE PRESSURE				3. Line pressure test	
5. Engine speed signal ENGINE SPEED SIG- NAL" 6. Line pressure solenoid LINE PRESSURE	Shift Shock				TURE SENSOR CIR-
b. Life pressure solenoid LINE PRESSURE				5. Engine speed signal	ENGINE SPEED SIG-
					LINE PRESSURE
7. Control valve assembly AT-297, "CONTROL VALVE ASSEMBLY"				7. Control valve assembly	
8. Accumulator N-D AT-297, "Components"				8. Accumulator N-D	AT-297, "Components"
OFF vehicle 9. Forward clutch AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"			OFF vehicle	9. Forward clutch	CLUTCH AND OVER-

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				Reference Page
Items	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)
	Vehicle will not run in "D" and "2" positions (but runs	ON vehicle	1. Control cable adjustment	AT-262, "Control Cable Adjustment"
	in "1" and "R" positions).	OFF vehicle	2. Low one-way clutch	AT-267, "Components"
			1. Fluid level	AT-63. "FLUID LEVEL CHECK"
			2. Stall test	AT-63, "Stall Test"
Slips/Will Not Engage	ON v Vehicle will not run in "D", "1", "2" positions (but runs in "R" position). Clutch slips. Very poor accelera- tion.	ON vehicle	3. Line pressure test	AT-67, "Line Pressure Test"
			4. Line pressure solenoid valve	AT-173. "DTC P0745 LINE PRESSURE SOLENOID VALVE"
			5. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"
			6. Accumulator N-D	AT-297, "Components"
			7. Reverse clutch	AT-313, "REVERSE CLUTCH"
			8. High clutch	AT-318, "HIGH CLUTCH"
		OFF vehicle	9. Forward clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"
			10. Forward one-way clutch	AT-337, "Components"
			11. Low one-way clutch	AT-267, "Components"

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Items	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)
			1. Fluid level	AT-63, "FLUID LEVEL CHECK"
Slips/Will Not Engage			2. Control cable adjustment	AT-262, "Control Cable Adjustment"
			3. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"
			4. Line pressure test	AT-67, "Line Pressure Test"
			5. Line pressure solenoid valve	AT-173. "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		ON vehicle	6. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"
			7. Accumulator N-D	AT-297, "Components"
	-		8. Shift solenoid valve A	AT-179, "DTC P0750 SHIFT SOLENOID VALVE A"
	somewhat in starting.		9. Shift solenoid valve B	AT-183. "DTC P0755 SHIFT SOLENOID VALVE B"
			10. Overrun clutch solenoid	AT-193, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
			11. Torque converter clutch solenoid valve	AT-159. "DTC P0740 TORQUE CON- VERTER CLUTCH SOLENOID VALVE"
		OFF vehicle	12. Forward clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"
			13. Reverse clutch	AT-313, "REVERSE CLUTCH"
			14. Low & reverse brake	AT-332, "LOW & REVERSE BRAKE"
			15. Oil pump	<u>AT-292, "OIL PUMP"</u>
			16. Torque converter	AT-267, "Components"
Not Used	Excessive creep.	ON vehicle	1. Engine idling rpm	EC-615.EC-43."Idle"IdleSpeed/Speed/IgnitionIgnitionTiming/Timing/IdleIdle Mix-Mixtureture RatioRatioAdjust-Adjust-
				<u>ment"</u> <u>ment</u>

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Items	Symptom	Condition	Diagnostic Item	QG18DE (SULEV)	QG18DE (ULEV)	A	
			1. Fluid level		UID LEVEL ECK"	В	
Slips/Will Not Engage	No creep at all. AT-226, "6. Vehicle Does	ON vehicle	2. Line pressure test		ne Pressure est"		
	Not Creep Backward In "R" Position", AT-228, "7. Vehi-		3. Control valve assembly		CONTROL SSEMBLY"	AT	
	cle Does Not Creep For- ward In "D", "2" Or "1" Position"	OFF vehicle	4. Forward clutch	CLUTCH A	FORWARD AND OVER- LUTCH"	D	
			5. Oil pump	AT-292, "OIL PUMP"			
			6. Torque converter	AT-267, "Components"		E	
	from "D1 " to "D2 ".	ON vehicle	1. Control cable adjustment	AT-262. "Control Cable Adjustment"			
			2. Shift solenoid valve A	SHIFT S	DTC P0750 OLENOID VE A"	F	
			3. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"		G	
			ON vehicle	4. Vehicle speed sensor A/T	VEHICLE S SOR·A/T	DTC P0720 SPEED SEN- (REVOLU- ISOR)", AT-	Н
			(Revolution sensor) and vehi- cle speed sensor·MTR	<u>203, "D</u> <u>SPEED</u> <u>VEHICLE S</u>	<u>SEN·MTR</u> SPEED SEN- MTR"	I	
			5. Throttle position sensor [accelerator pedal position (APP) sensor]	THROTTLI SENSOR [/ TOR PEI	DTC P1705 E POSITION ACCELERA- DAL POSI-) SENSOR]"	J	
		OFF vehicle	6. Brake band	<u>AT-348, "C</u>	omponents"		

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Items	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)
			1. Control cable adjustment	AT-262, "Control Cable Adjustment"
			2. Shift solenoid valve B	AT-183, "DTC P0755 SHIFT SOLENOID VALVE B"
No Up Shift			3. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"
	Failure to change gear from "D2 " to "D3 ".	ON vehicle	4. Vehicle speed sensor A/T (Revolution sensor) and vehi- cle speed sensor MTR	AT-126, "DTC P0720 VEHICLE SPEED SEN- SOR·A/T (REVOLU- TION SENSOR)", AT- 203, "DTC VHCL SPEED SEN·MTR VEHICLE SPEED SEN- SOR·MTR"
			5. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"
		OFF vehicle	6. High clutch	<u>AT-318, "HIGH</u> <u>CLUTCH"</u>
			7. Brake band	AT-348, "Components"

Reference Page А Items Symptom Condition **Diagnostic Item** QG18DE QG18DE (SULEV) (ULEV) AT-262, "Park/Neutral В 1. PNP switch adjustment Position (PNP) Switch Adjustment" AT-249, "21. TCM Self-AT diagnosis Does Not Activate {Park/neutral Position (PNP), Overdrive Control and Throt-2. Overdrive control switch D tle Position Sensor [Accelerator Pedal Position (APP) Sensor] Switches Circuit Ε Checks}" AT-179, "DTC P0750 3. Shift solenoid valve A SHIFT SOLENOID F VALVE A" **ON** vehicle Failure to change gear AT-126, "DTC P0720 No Up Shift from "D3 " to "D4 ". VEHICLE SPEED SEN-SOR-A/T (REVOLU-G 4. Vehicle speed sensor A/T TION SENSOR)", AT-(Revolution sensor) and vehi-203, "DTC VHCL cle speed sensor·MTR SPEED SEN-MTR Н VEHICLE SPEED SEN-SOR·MTR" AT-120, "DTC P0710 A/ 5. A/T fluid temperature sen-T FLUID TEMPERA-**TURE SENSOR CIR**sor CUIT" AT-187, "DTC P1705 6. Throttle position sensor THROTTLE POSITION [accelerator pedal position SENSOR [ACCELERA-(APP) sensor] TOR PEDAL POSI-TION (APP) SENSOR]" Κ **OFF** vehicle 7. Brake band AT-348, "Components"

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Items	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)
	Too high a gear change		1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"
Improper Shift Timing	point from "D1" to "D2", from "D2" to "D3", from "D3" to "D4". AT-233, "9. A/T Does Not Shift: D1 \rightarrow D2 Or Does Not Kickdown: D4 \rightarrow D2", AT- 235, "10. A/T Does Not Shift: D2 \rightarrow D3", AT-237,	ON vehicle	2. Vehicle speed sensor A/T (Revolution sensor) and vehi- cle speed sensor MTR	AT-203, "DTC VHCL SPEED SEN:MTR VEHICLE SPEED SEN- SOR:MTR" or AT-126, "DTC P0720 VEHICLE SPEED SENSOR:A/T (REVOLUTION SEN- SOR)"
	<u>"11. A/T Does Not Shift: D3</u> \rightarrow D4"		3. Shift solenoid valve A	AT-179, "DTC P0750 SHIFT SOLENOID VALVE A"
			4. Shift solenoid valve B	AT-183. "DTC P0755 SHIFT SOLENOID VALVE B"
	Gear change directly from "D1 " to "D3 " occurs.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
			2. Accumulator servo release	AT-297, "Components"
		OFF vehicle	3. Brake band	AT-348, "Components"
	Engine stops when shifting		1. Engine idling rpm	EC-615.EC-43."Idle"IdleSpeed/Speed/IgnitionIgnitionTiming/Timing/IdleIdle Mix-Mixtureture RatioRatioAdjust-Adjust-ment"ment"
Not Used	lever into "R", "D", "2" and "1".	ON vehicle	2. Fluid level	AT-63, "FLUID LEVEL CHECK"
			3. Torque converter clutch solenoid valve	AT-159. "DTC P0740 TORQUE CON- VERTER CLUTCH SOLENOID VALVE"
			4. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"
		OFF vehicle	5. Torque converter	AT-267, "Components"

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Reference Page Items Symptom Condition **Diagnostic Item** QG18DE QG18DE (SULEV) (ULEV) AT-187, "DTC P1705 1. Throttle position sensor THROTTLE POSITION [accelerator pedal position SENSOR [ACCELERA-(APP) sensor] TOR PEDAL POSI-TION (APP) SENSOR]" AT AT-67, "Line Pressure 2. Line pressure test Test" **ON** vehicle Too sharp a shock in AT-297, "Components" 3. Accumulator servo release Shift Shock change from "D1 " to "D2 ". AT-297, "CONTROL 4. Control valve assembly VALVE ASSEMBLY" AT-120, "DTC P0710 A/ 5. A/T fluid temperature sen-**T FLUID TEMPERA-TURE SENSOR CIR**sor CUIT" **OFF** vehicle 6. Brake band AT-348, "Components" AT-187, "DTC P1705 1. Throttle position sensor THROTTLE POSITION [accelerator pedal position **SENSOR** [ACCELERA-(APP) sensor] TOR PEDAL POSI-TION (APP) SENSOR]" AT-67, "Line Pressure 2. Line pressure test Test" **ON** vehicle AT-297, "CONTROL Too sharp a shock in 3. Control valve assembly Shift Shock VALVE ASSEMBLY" change from "D2" to "D3". AT-120, "DTC P0710 A/ 4. A/T fluid temperature sen-T FLUID TEMPERA-**TURE SENSOR CIR**sor CUIT" AT-318, "HIGH 5. High clutch CLUTCH" **OFF** vehicle 6. Brake band AT-348, "Components" AT-187, "DTC P1705 1. Throttle position sensor THROTTLE POSITION [accelerator pedal position **SENSOR** [ACCELERA-(APP) sensor] TOR PEDAL POSI-TION (APP) SENSOR]" AT-67, "Line Pressure 2. Line pressure test Test" **ON** vehicle AT-297, "CONTROL 3. Control valve assembly VALVE ASSEMBLY" Too sharp a shock in Shift Shock change from "D3 " to "D4 ". AT-120, "DTC P0710 A/ 4. A/T fluid temperature sen-T FLUID TEMPERA-**TURE SENSOR CIR**sor CUIT" 5. Brake band AT-348, "Components" 6. Forward one-way clutch AT-324, "Components" OFF vehicle AT-324, "FORWARD 7. Overrun clutch **CLUTCH AND OVER-**RUN CLUTCH"

				Reference Page
Items	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)
			1. Fluid level	AT-63, "FLUID LEVEL CHECK"
	Almost no shock or	ON vehicle	2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"
	clutches slipping in change from "D1 " to "D2 ".		3. Line pressure test	AT-67, "Line Pressure Test"
			4. Accumulator servo release	AT-297, "Components"
			5. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"
		OFF vehicle	6. Brake band	AT-348, "Components"
Slips/Will Not Engage			1. Fluid level	AT-63, "FLUID LEVEL CHECK"
	Almost no shock or slipping in change from "D2 " to "D3 ".	ON vehicle	2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"
			3. Line pressure test	AT-67, "Line Pressure Test"
			4. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"
		OFF vehicle	5. High clutch	AT-318. "HIGH CLUTCH"
			6. Brake band	AT-348, "Components"
			1. Fluid level	AT-63, "FLUID LEVEL CHECK"
Slips/Will Not	Almost no shock or slipping in change from "D3 " to "D4	ON vehicle	2.Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"
Engage	"		3. Line pressure test	AT-67, "Line Pressure Test"
			4. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"
		OFF vehicle	5. Brake band	AT-348, "Components"

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				Referer	nce Page
Items	Symptom	Condition	Diagnostic Item	QG18DE (SULEV)	QG18DE (ULEV)
		ON vehicle	1. Fluid level		UID LEVEL ECK"
			2. Reverse clutch		REVERSE TCH"
	Vehicle braked by gear change from "D1 " to "D2 ".	OFF vehicle	3. Low & reverse brake		<u>"LOW &</u> E BRAKE"
			4. High clutch		<u>, "HIGH</u> TCH"
			5. Low one-way clutch	<u>AT-267, "C</u>	omponents"
Not Used	Vehicle braked by gear change from "D2 " to "D3 ".	ON vehicle	1. Fluid level		UID LEVEL ECK"
		OFF vehicle	2. Brake band	<u>AT-348, "C</u>	omponents"
		ON vehicle	1. Fluid level		UID LEVEL ECK"
	Vehicle braked by gear change from "D3 " to "D4 ".		2. Overrun clutch	CLUTCH A	ORWARD ND OVER- LUTCH"
		OFF vehicle	3. Forward one-way clutch	<u>AT-337, "C</u>	omponents"
			4. Reverse clutch	-	REVERSE

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				Reference Page			
Items	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)			
			1. Fluid level	AT-63, "FLUID LEVEL <u>CHECK"</u>			
			2. PNP switch adjustment	AT-262, "Park/Neutral Position (PNP) Switch Adjustment"			
	Maximum speed not attained. Acceleration poor.	ON vehicle	3. Overdrive control switch	AT-249, "21. TCM Self- diagnosis Does Not Activate {Park/neutral Position (PNP), Over- drive Control and Throt- tle Position Sensor [Accelerator Pedal Posi- tion (APP) Sensor] Switches Circuit Checks}"			
			4. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"			
Not Used						5. Vehicle speed sensor · A/T (revolution sensor) and vehicle speed sensor · MTR	AT-126, "DTC P0720 VEHICLE SPEED SEN- SOR A/T (REVOLU- TION SENSOR)"
			6. Shift solenoid valve A	AT-179. "DTC P0750 SHIFT SOLENOID VALVE A"			
			7. Shift solenoid valve B	AT-183. "DTC P0755 SHIFT SOLENOID VALVE B"			
			8. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"			
			9. Reverse clutch	AT-313, "REVERSE <u>CLUTCH"</u>			
			10. High clutch	<u>AT-318, "HIGH</u> <u>CLUTCH"</u>			
		OFF vehicle	11. Brake band	AT-348, "Components"			
			12. Low & reverse brake	AT-332, "LOW & REVERSE BRAKE"			
			13. Oil pump	<u>AT-292, "OIL PUMP"</u>			
			14. Torque converter	AT-267, "Components"			

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Items	Symptom	Condition	Diagnostic Item	Reference Page QG18DE QG18DE (SULEV) (ULEV)	A
			1. Fluid level	(SULEV) (ULEV) AT-63, "FLUID LEVEL CHECK"	В
			2.Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"	AT
		ON vehicle	3. Overrun clutch solenoid valve	AT-193, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"	D
	Failure to change gear from "D4 " to "D3 ".		4. Shift solenoid valve A	AT-179, "DTC P0750 SHIFT SOLENOID VALVE A"	E
			5. Line pressure solenoid valve	AT-173. "DTC P0745 LINE PRESSURE SOLENOID VALVE"	F
			6. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"	G
		OFF vehicle	7. Brake band	AT-348, "Components"	
No Down Shift			8. Overrun clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"	Н
			1. Fluid level	AT-63, "FLUID LEVEL <u>CHECK"</u>	I
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"	J
	Failure to change gear from "D3 " to "D2 " or from	ON vehicle	3. Shift solenoid valve A	AT-179, "DTC P0750 SHIFT SOLENOID VALVE A"	K
	"D4 " to "D2 ".		4. Shift solenoid valve B	AT-183, "DTC P0755 SHIFT SOLENOID VALVE B"	L
			5. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"	M
		OFF vehicle	6. High clutch	AT-318, "HIGH CLUTCH"	141
			7. Brake band	AT-348, "Components"	

				Reference	Page
Items	Symptom	Condition	Diagnostic Item	QG18DE	QG18DE (ULEV)
			1. Fluid level	AT-63, "FLUII CHECI	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC THROTTLE P SENSOR [ACC TOR PEDAL TION (APP) S	OSITION CELERA- _ POSI-
No Down	Failure to change gear from "D2 " to "D1 " or from	ON vehicle	3. Shift solenoid valve A	AT-179, "DTO SHIFT SOL VALVE	<u>ENOID</u>
Shift	"D3 " to "D1 ".		4. Shift solenoid valve B	AT-183, "DTO SHIFT SOL VALVE	ENOID
			5. Control valve assembly	AT-297, "CO VALVE ASSE	
			6. Low one-way clutch	<u>AT-267, "Com</u>	ponents"
		OFF vehicle	7. High clutch	<u>AT-318, "HIGH</u> <u>CLUTCH"</u>	
			8. Brake band	AT-348, "Com	ponents"
	Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC THROTTLE P SENSOR [ACC TOR PEDAL TION (APP) S	<u>OSITION</u> CELERA- _ POSI-
Shift Shock			2. Line pressure test	AT-67, "Line F Test"	
			3. Overrun clutch solenoid valve	AT-193, "DTO OVERRUN O SOLENOID	CLUTCH
			4. Control valve assembly	<u>AT-297, "CO</u> VALVE ASSE	
	Too high a change point from "D4" to "D3", from "D3 " to "D2", from "D2" to "D1 ".	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC THROTTLE P SENSOR [ACC TOR PEDAL TION (APP) S	<u>OSITION</u> CELERA- _ POSI-
Improper Shift Timing			2. Vehicle speed sensor A/T (Revolution sensor) and vehi- cle speed sensor MTR	AT-126, "DTC VEHICLE SPE SOR-A/T (RE TION SENSC 203, "DTC SPEED SEI VEHICLE SPE SOR-MT	ED SEN- EVOLU- DR)", AT- VHCL N-MTR ED SEN-

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Items	Symptom	Condition	Diagnostic Item	Reference Page QG18DE QG18 (SULEV) (ULE	
			1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P170 THROTTLE POSITI SENSOR [ACCELE] TOR PEDAL POS TION (APP) SENSO	<u>05</u> <u>ON</u> B RA-
	Kickdown does not operate when depressing pedal in "D4 " within kickdown vehi- cle speed.	ON vehicle	2. Revolution sensor and vehi- cle speed sensor	AT-126, "DTC P072 VEHICLE SPEED S SOR·A/T (REVOLU TION SENSOR)", A 203, "DTC VHCL SPEED SEN·MTF VEHICLE SPEED S SOR·MTR"	20 EN- J- AT- D
			3. Shift solenoid valve A	AT-179, "DTC P07 SHIFT SOLENOII VALVE A"	
ImproperShift			4. Shift solenoid valve B	AT-183. "DTC P07! SHIFT SOLENOII VALVE B"	
Timing	Kickdown operates or engine overruns when depressing pedal in "D4" beyond kickdown vehicle speed limit.	ON vehicle	1. Vehicle speed sensor·A/T (Revolution sensor) and vehi- cle speed sensor·MTR	AT-126, "DTC P07/ VEHICLE SPEED S SOR·A/T (REVOLU TION SENSOR)", A 203, "DTC VHCL SPEED SEN·MTF VEHICLE SPEED S SOR·MTR"	<u>EN-</u> J- ⊢ <u>\T-</u> ⊢
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P170 THROTTLE POSITI SENSOR [ACCELE] TOR PEDAL POS TION (APP) SENSO	<u>ON</u> RA- J L-
			3. Shift solenoid valve A	AT-179, "DTC P079 SHIFT SOLENOII VALVE A"	
			4. Shift solenoid valve B	AT-183, "DTC P07 SHIFT SOLENOII VALVE B"	

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Items	Symptom	Condition	Diagnostic Item	QG18DE (SULEV)	QG18DE (ULEV)	
			1. Fluid level		UID LEVEL ECK"	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	THROTTLE SENSOR [/ TOR PED	DTC P1705 POSITION ACCELERA- DAL POSI-) SENSOR]"	
		ON vehicle	3. Line pressure test		<u>e Pressure</u> est"	
	Races extremely fast or slips in changing from "D4" to "D3" when depressing pedal.		4. Line pressure solenoid valve	LINE PR	DTC P0745 ESSURE ID VALVE"	
			5. Shift solenoid valve A	SHIFT S	<u>DTC P0750</u> OLENOID /E A"	
			6. Control valve assembly		CONTROL SSEMBLY"	
		OFF vehicle	7. Brake band	<u>AT-348, "C</u>	omponents"	
			8. Forward clutch	CLUTCH A	ORWARD ND OVER- LUTCH"	
Slips/Will No		ON vehicle	1. Fluid level		UID LEVEL ECK"	
Engage	·		2. Throttle position sensor [accelerator pedal position (APP) sensor]	THROTTLE SENSOR [/ TOR PEL	DTC P1705 POSITION ACCELERA- DAL POSI-) SENSOR]"	
			3. Line pressure test		<u>e Pressure</u> est"	
	Races extremely fast or		4. Line pressure solenoid valve	LINE PR	DTC P0745 ESSURE ID VALVE"	
	slips in changing from "D4" to "D2" when depressing pedal.		5. Shift solenoid valve A	SHIFT S	DTC P0750 OLENOID /E A"	
			6. Shift solenoid valve B	SHIFT S	<u>OTC P0755</u> OLENOID /E B"	
			7. Control valve assembly		CONTROL SSEMBLY"	
			8. Brake band	<u>AT-348, "C</u>	omponents"	
		OFF vehicle	9. High clutch		<u>, "HIGH_</u> TCH <u>"</u>	
			10. Forward clutch	CLUTCH A	ORWARD ND OVER- LUTCH"	

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Reference Page Items Symptom Condition **Diagnostic Item** QG18DE QG18DE (SULEV) (ULEV) AT-63, "FLUID LEVEL 1. Fluid level CHECK" AT-187, "DTC P1705 THROTTLE POSITION 2. Throttle position sensor [accelerator pedal position AT SENSOR [ACCELERA-(APP) sensor] TOR PEDAL POSI-TION (APP) SENSOR]" AT-67, "Line Pressure 3. Line pressure test Test" **ON** vehicle Races extremely fast or AT-173, "DTC P0745 slips in changing from "D3" 4. Line pressure solenoid LINE PRESSURE to "D2" when depressing valve SOLENOID VALVE" pedal. AT-297, "CONTROL 5. Control valve assembly VALVE ASSEMBLY" AT-183, "DTC P0755 6. Shift solenoid valve B SHIFT SOLENOID VALVE B" 7. Brake band AT-348, "Components" **OFF** vehicle AT-318, "HIGH 8. High clutch <u>CLUTCH"</u> AT-63, "FLUID LEVEL 1. Fluid level CHECK" Slips/Will Not AT-187, "DTC P1705 Engage 2. Throttle position sensor THROTTLE POSITION [accelerator pedal position **SENSOR** [ACCELERA-(APP) sensor] TOR PEDAL POSI-TION (APP) SENSOR]" AT-67, "Line Pressure 3. Line pressure test Test" AT-173, "DTC P0745 **ON** vehicle 4. Line pressure solenoid LINE PRESSURE valve SOLENOID VALVE Races extremely fast or slips in changing from "D4 " AT-179, "DTC P0750 or "D3 " to "D1 " when 5. Shift solenoid valve A SHIFT SOLENOID depressing pedal. VALVE A" AT-183, "DTC P0755 6. Shift solenoid valve B SHIFT SOLENOID VALVE B" AT-297, "CONTROL 7. Control valve assembly VALVE ASSEMBLY" AT-324, "FORWARD 8. Forward clutch **CLUTCH AND OVER-**RUN CLUTCH" **OFF** vehicle 9. Forward one-way clutch AT-337, "Components" 10. Low one-way clutch AT-267, "Components"

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Items	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)
			1. Fluid level	AT-63, "FLUID LEVEL CHECK"
			2. Control cable adjustment	AT-262, "Control Cable Adjustment"
		ON vehicle	3. Line pressure test	AT-67, "Line Pressure <u>Test"</u>
Slips/Will Not	Vehicle will not run in any		4. Line pressure solenoid valve	AT-173. "DTC P0745 LINE PRESSURE SOLENOID VALVE"
Engage	position.		5. Oil pump	AT-292, "OIL PUMP"
			6. High clutch	<u>AT-318, "HIGH</u> <u>CLUTCH"</u>
			7. Brake band	AT-348, "Components"
		OFF vehicle	8. Low & reverse brake	AT-332, "LOW & REVERSE BRAKE"
			9. Torque converter	AT-267, "Components"
			10. Parking components	AT-267, "Components"
Not Used	Transmission noise in "D", "2", "1" and "R" positions.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL <u>CHECK"</u>
	2, i and n positions.	OFF vehicle	2. Torque converter	AT-267, "Components"
	Failure to change from "D3 " to "22 " when changing lever into "2" position. <u>AT-247, "18. A/T Does Not</u> Shift: D3 \rightarrow 22, When		1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"
No Down Shift		OFF vehicle	2. Shift solenoid valve B	AT-183, "DTC P0755 SHIFT SOLENOID VALVE B"
	Selector Lever "D" \rightarrow "2" Position"		3. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"
			4. Control cable adjustment	AT-262, "Control Cable Adjustment"
			5. Brake band	AT-348, "Components"
Improper Shift Timing	Gear change from "22" to	ON vehicle	1. PNP switch adjustment	AT-262, "Park/Neutral Position (PNP) Switch Adjustment"
	"23 " in "2" position.		2. Control cable adjustment	AT-262, "Control Cable Adjustment"

				Reference Page	
Items	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)	A
			1. PNP switch adjustment	AT-262, "Park/Neutral Position (PNP) Switch Adjustment"	В
	Engine broke doop not		2. Control cable adjustment	AT-262, "Control Cable Adjustment"	AT
Not Used	Engine brake does not operate in "1" position. <u>AT-248. "19. A/T Does Not</u> <u>Shift: $22 \rightarrow 11$. When</u> <u>Selector Lever "2" \rightarrow "1" <u>Position</u>"</u>	ON vehicle	3. Vehicle speed sensor A/T (Revolution sensor) and vehi- cle speed sensor MTR	AT-126. "DTC P0720 VEHICLE SPEED SEN- SOR-A/T (REVOLU- TION SENSOR)", AT- 203, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SEN- SOR-MTR"	D
			4. Control valve assembly	AT-297. "CONTROL VALVE ASSEMBLY"	F
	Engine brake does not operate in "1" position.	ON vehicle	5. Overrun clutch solenoid valve	AT-193, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"	
Not Used AT-2 Shift Sele	AT-248, "19. A/T Does Not Shift: $22 \rightarrow 11$, When Selector Lever "2" \rightarrow "1"	OFF vehicle	6. Overrun clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"	G
	Position"		7. Low & reverse brake	AT-332, "LOW & REVERSE BRAKE"	Н
Improper Shift Timing	Gear change from "11 " to "12 " in "1" position.	ON vehicle	1. PNP switch adjustment	AT-262, "Park/Neutral Position (PNP) Switch Adjustment"	I
Timing			2. Control cable adjustment	AT-262, "Control Cable Adjustment"	J
		ON vehicle	1. Vehicle speed sensor A/T (Revolution sensor) and vehi- cle speed sensor MTR	AT-126. "DTC P0720 VEHICLE SPEED SEN- SOR-A/T (REVOLU- TION SENSOR)", AT- 203. "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SEN- SOR-MTR"	K
No Down Shift	Does not change from "12 " to "11 " in "1" position.		2. Shift solenoid valve A	AT-179, "DTC P0750 SHIFT SOLENOID VALVE A"	M
			3. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"	
			4. Low one-way clutch	AT-267, "Components"	
		OFF vehicle	5. Brake band	AT-348, "Components"	
			6. Low & reverse brake	AT-332. "LOW & REVERSE BRAKE"	
Chift Charle	Large shock changing from	ON vehicle	1. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"	
Shift Shock	"12" to "11" in "1" position.	OFF vehicle	2. Low & reverse brake	AT-332, "LOW & REVERSE BRAKE"	

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I	tems	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)
				1. Fluid level	AT-63, "FLUID LEVEL CHECK"
	Not used	Transaxle overheats.		2. Engine idling rpm	EC-615, "IdleEC-43, "IdleSpeed/ IgnitionSpeed/IgnitionIgnitionTiming/ Idle Mix- ture RatioMixtureAdjust- ment"Adjust-
			ON vehicle	3. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"
				4. Line pressure test	AT-67, "Line Pressure Test"
Not u				5. Line pressure solenoid valve	AT-173, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
				6. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"
				7. Oil pump	AT-292, "OIL PUMP"
				8. Reverse clutch	AT-313, "REVERSE CLUTCH"
				9. High clutch	<u>AT-318, "HIGH</u> <u>CLUTCH"</u>
				10. Brake band	AT-348, "Components"
			OFF vehicle	11. Forward clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"
				12. Overrun clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"
				13. Low & reverse brake	AT-332, "LOW & REVERSE BRAKE"
				14. Torque converter	AT-267, "Components"

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Items	Symptom	Condition	Diagnostic Item		erence Page	
items				QG18DE (SULEV)	QG18DE (ULEV)	
	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"		В
		OFF vehicle	2. Reverse clutch	AT-313, "REVERSE CLUTCH"		
			3. High clutch	AT-318, "HIGH CLUTCH"		AT
			4. Brake band	AT-348, "Components"		
Not Used			5. Forward clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"		D
			6. Overrun clutch	AT-324. "FORWARD CLUTCH AND OVER- RUN CLUTCH"		E
			7. Low & reverse brake	AT-332. "LOW & REVERSE BRAKE"		F
	Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"		G
		OFF vehicle	2. Torque converter	<u>AT-267, "C</u>	67, "Components"	
			3. Oil pump	AT-292, "OIL PUMP" AT-313, "REVERSE CLUTCH"		
			4. Reverse clutch			H
			5. High clutch	AT-318, "HIGH CLUTCH"		
			6. Brake band	AT-348, "Components"		
			7. Forward clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"		J
			8. Overrun clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"		K
			9. Low & reverse brake	AT-332, "LOW & REVERSE BRAKE"		L

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Items	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)	
No Lockup Engagement/ TCC Inopera- tive		ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"	
			2. Vehicle speed sensor A/T (Revolution sensor) and vehi- cle speed sensor MTR	AT-126, "DTC P0720 <u>VEHICLE SPEED SEN-</u> <u>SOR·A/T (REVOLU-</u> <u>TION SENSOR)", AT-</u> <u>203, "DTC VHCL</u> <u>SPEED SEN·MTR</u> <u>VEHICLE SPEED SEN-</u> <u>SOR·MTR"</u>	
			3. Engine speed signal	AT-131, "DTC P0725 ENGINE SPEED SIG- NAL"	
			4. A/T fluid temperature sen- sor	AT-120, "DTC P0710 A/ T FLUID TEMPERA- TURE SENSOR CIR- CUIT"	
			5. Line pressure test	AT-67, "Line Pressure <u>Test"</u>	
			6. Torque converter clutch solenoid valve	AT-159, "DTC P0740 TORQUE CON- VERTER CLUTCH SOLENOID VALVE"	
			7. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	8. Torque converter	AT-267, "Components"	

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Items	Symptom	Condition	Diagnostic Item	Reference Page QG18DE QG18DE (SULEV) (ULEV)	А
	Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"	AT
			3. Line pressure test	AT-67, "Line Pressure Test"	
			4. Torque converter clutch solenoid valve	AT-159, "DTC P0740 TORQUE CON- VERTER CLUTCH SOLENOID VALVE"	E
			5. Line pressure solenoid valve	AT-173, "DTC P0745 LINE PRESSURE SOLENOID VALVE"	F
No Lockup			6. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"	
Engagement/ TCC Inopera-		OFF vehicle	7. Torque converter	AT-267, "Components"	
tive	Lock-up point is extremely high or low.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"	H
			2. Vehicle speed sensor A/T (Revolution sensor) and vehi- cle speed sensor MTR	AT-126. "DTC P0720 VEHICLE SPEED SEN- SOR-A/T (REVOLU- TION SENSOR)", AT- 203. "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SEN- SOR-MTR"	
			3. Torque converter clutch solenoid valve	AT-159. "DTC P0740 TORQUE CON- VERTER CLUTCH SOLENOID VALVE"	L
			4. Control valve assembly	AT-297. "CONTROL VALVE ASSEMBLY"	M

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	Items	Symptom	Condition	Diagnostic Item	QG18DE QG18DE (SULEV) (ULEV)	
	No Up Shift	Shift A/T does not shift to "D4 " when driving with overdrive control switch "ON".	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-187, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERA- TOR PEDAL POSI- TION (APP) SENSOR]"	
				2. PNP switch adjustment	AT-262, "Park/Neutral Position (PNP) Switch Adjustment"	
				3. Overdrive control switch	AT-249, "21. TCM Self- diagnosis Does Not Activate {Park/neutral Position (PNP), Over- drive Control and Throt- tle Position Sensor [Accelerator Pedal Posi- tion (APP) Sensor] Switches Circuit Checks}"	
N				4. Vehicle speed sensor A/T (Revolution sensor) and vehi- cle speed sensor MTR	AT-126, "DTC P0720 VEHICLE SPEED SEN- SOR·A/T (REVOLU- TION SENSOR)", AT- 203, "DTC VHCL SPEED SEN·MTR VEHICLE SPEED SEN- SOR·MTR"	
				5. Shift solenoid valve A	<u>AT-179, "DTC P0750</u> <u>SHIFT SOLENOID</u> <u>VALVE A"</u>	
				6. Overrun clutch solenoid valve	AT-193, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"	
				7. Control valve assembly	AT-297, "CONTROL VALVE ASSEMBLY"	
				8. A/T fluid temperature sen- sor	AT-120. "DTC P0710 A/ T FLUID TEMPERA- TURE SENSOR CIR- CUIT"	
				9. Line pressure test	AT-67, "Line Pressure <u>Test"</u>	
			OFF vehicle	10. Brake band	AT-348, "Components"	
				11. Overrun clutch	AT-324, "FORWARD CLUTCH AND OVER- RUN CLUTCH"	

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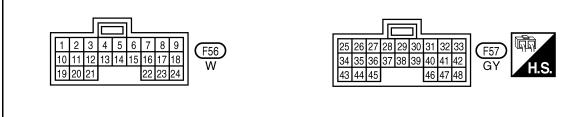
WAT158

TCM Terminals and Reference Value PREPARATION

Measure voltage between each terminal and terminal 25 or 48 • by following "TCM INSPECTION TABLE".

0 AT പ Terminal F (25) or (48) Ð Θ SAT216J

TCM HARNESS CONNECTOR TERMINAL LAYOUT



TCM INSPECTION TABLE

(Data are reference values.)

Termi- nal No.	Wire color	Item	Condition		Judgement stan- dard (Approx.)
1	R/W	Line pressure	\sim	When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
I	U/ 10	solenoid valve	((Con))	When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve	لا م	When releasing accelerator pedal after warming up engine.	4 - 14V
۷	Γ/D	(with dropping resistor)	A	When depressing accelerator pedal fully after warming up engine.	0V
				When A/T performs lock-up.	8 - 15V
3	Y/G	Torque converter clutch solenoid valve		When A/T does not perform lock-up.	0V
5	L	CAN-H	â	_	—
6	Y	CAN-L	((50N))	_	—
				When turning ignition switch to "ON".	Battery voltage
10	BR/R	Power source		When turning ignition switch to "OFF".	ov

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Termi- nal No.	Wire color	Item		Condition	Judgement stan- dard (Approx.)
	L/W	Shift solenoid		When shift solenoid valve A oper- ates. (When driving in "D1 " or "D4 ".)	Battery voltage
11	L/VV	valve A		When shift solenoid valve A does not operate. (When driving in "D2" or "D3".)	οv
12	L/Y	Shift solenoid valve B	<u> - 2020-</u> 2	When shift solenoid valve B oper- ates. (When driving in "D1" or "D2".) When shift solenoid valve B does not	Battery voltage
				operate. (When driving in "D3 " or "D4 ".)	0V
			(P)	When turning ignition switch to "ON".	Battery voltage
19	PU	OBD-II		When turning ignition switch to "OFF".	οV
20	L/B	Overrun clutch		When overrun clutch solenoid valve operates.	Battery voltage
20	ЦD	solenoid valve	COMPOL	When overrun clutch solenoid valve does not operate.	0V
25	В	Ground			0V
26	BR/Y	PNP switch "1"		When setting selector lever to "1" position.	Battery voltage
		position		When setting selector lever to other positions.	0V
27	B/R	PNP switch "2"		When setting selector lever to "2" position.	Battery voltage
	Dirt	position		When setting selector lever to other positions.	0V
			(CON)	When turning ignition switch to "OFF".	Battery voltage
28	R/B	Power source (Memory back-up)	or COFF	When turning ignition switch to "ON".	Battery voltage
29	W	Revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 CAUTION: Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	150Hz
				When vehicle parks.	Under 1.3V or over 4.5V

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

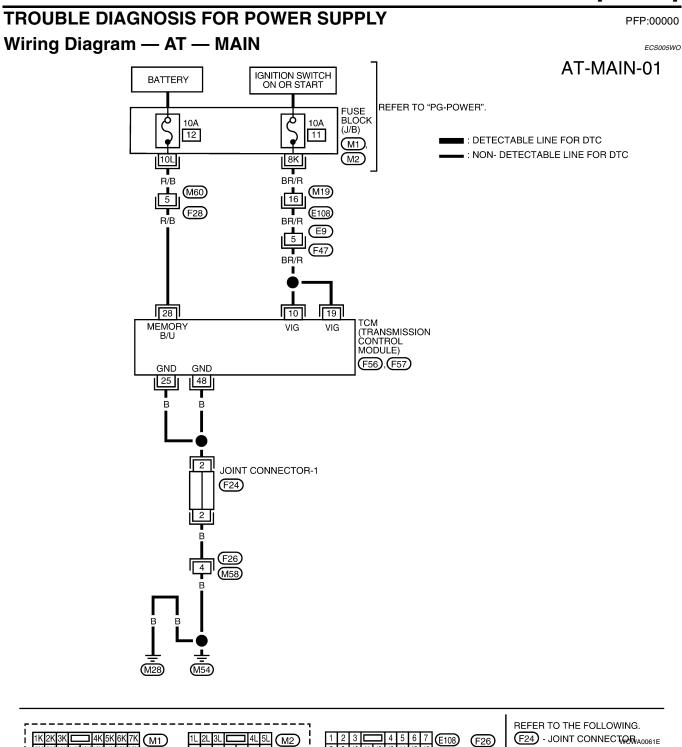
Termi- nal No.	Wire color	ltem		Condition	Judgement stan- dard (Approx.)	
30 **	G/B	Data link connec- tor		_	_	
31 **	GY/L	Data link connec- tor		_	_	
32	R	Throttle position sensor		When turning ignition switch to "ON".	4.5 - 5.5V	A
02		(Power source)		When turning ignition switch to "OFF".	0V	_
34	W/G	PNP switch "D"	(CON)	When setting selector lever to "D" position.	Battery voltage	
34	w/G	position		When setting selector lever to other positions.	٥V	
		PNP switch "R"	A	When setting selector lever to "R" position.	Battery voltage	
35	G/Y	position		When setting selector lever to other positions.	ov	
		PNP switch "N" or		When setting selector lever to "N" or "P" position.	Battery voltage	
36	LG	"P" position		When setting selector lever to other positions.	0V	•
39 *	L/OR	Engine speed sig- nal		Refer to <u>EC-105, "ECM INSPEC-</u> <u>TION TABLE"</u> [QG18DE (ULEV)] or <u>EC-677, "ECM INSPECTION</u> <u>TABLE"</u> [QG18DE (SULEV)].		
40	PU/R	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 1V and more than 4.5V	
41 *	GY	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5 - 0.7V Fully-open throt- tle: 4V	
42	B/W	Throttle position sensor (Ground)		_	0V	
47	BR	A/T fluid tempera-	R	When ATF temperature is 20°C (68°F).	1.5V	_
47	חט	ture sensor		When ATF temperature is 80°C (176°F).	0.5V	
48	В	Ground		—	0V	•

* : This terminal is connected to the ECM.

** : These terminals are connected to the Data link connector.

TROUBLE DIAGNOSIS FOR POWER SUPPLY

[RE4F03B]



TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
10	BB/B	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
10	Dn/n	FOWER SOURCE	WHEN TURNING IGNITION SWITCH TO "OFF"	0V
19	DD /D	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
19	BR/R	FOWER SOURCE	WHEN TURNING IGNITION SWITCH TO "OFF"	0V
25	В	GROUND	-	0C
28			WHEN TURNING IGNITION SWITCH TO "OFF"	BATTERY VOLTAGE
20	N/D	BACKUP)	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
48	В	GROUND		ov

AT-112

TROUBLE DIAGNOSIS FOR POWER SUPPLY

Diagnostic Procedure

1.

2.

OK

NG

1.

2.

OK

NG

OK

NG

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1. CHECK TCM POWER SOURCE STEP 1

[RE4F03B]



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Turn ignition switch to ON position. (Do not start engine.) Check voltage between TCM terminals 10, 19, 28 and ground. CONNECTOR TCM 10, 19, 28 Voltage: **Battery voltage** Æ SAT611J OK or NG >> GO TO 2. >> GO TO 3. 2. CHECK TCM POWER SOURCE STEP 2 Turn ignition switch to OFF position. Check voltage between TCM terminal 28 and ground. CONNECTOR тсм 28 Voltage: R/B **Battery voltage** V Ð -Θ LAT253 OK or NG >> GO TO 4. >> GO TO 3. **3. DETECT MALFUNCTIONING ITEM** Check the following items: Harness for short or open between ignition switch and TCM terminals 10, 19 and 28 (Main harness) Fuse Ignition switch Refer to PG-2, "POWER SUPPLY ROUTING" . OK or NG >> GO TO 4. >> Repair or replace damaged parts.

AT-113

4. CHECK TCM GROUND CIRCUIT

- 1. Turn ignition switch to OFF position.
- 2. Disconnect TCM harness connector.
- 3. Check continuity between TCM terminals 25, 48 and ground. Refer to <u>AT-112, "Wiring Diagram AT MAIN"</u>.

Continuity should exist.

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

OK or NG

OK >> INSPECTION END

NG >> Repair open circuit or short to ground or short to power in harness connectors.

DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

Description

- The PNP switch assembly includes a transmission range switch.
- The transmission range switch detects the selector lever position and sends a signal to the TCM.

PNP switch

SELECT SYSTEM

A/T

FNGINE

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)	
: PNP SW/CIRC : P0705	TCM does not receive the correct voltage signal from the switch based on the gear position.	 Harness or connectors (The PNP switch circuit is open or shorted.) PNP switch 	

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

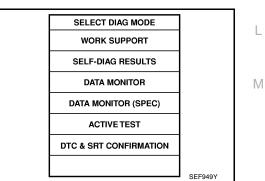
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

- (\square) With CONSULT-II
- Turn ignition switch "ON". 1.
- 2. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 3. Start engine and maintain the following conditions for at least 5 consecutive seconds. VHCL SPEED SE: 10 km/h (6 MPH) or more THRTL POS SEN: More than 1.3V Selector lever: D position (OD "ON" or "OFF")

With GST

Follow the procedure "With CONSULT-II".



PFP:32006

[RE4F03B]

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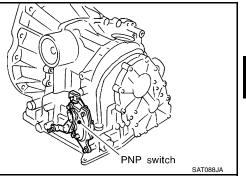
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DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

Wiring Diagram -- AT — PNP/SW ECS005WR IGNITION SWITCH ON OR START AT-PNP/SW-01 REFER TO "PG POWER". FUSE BLOCK (J/B) ■ : DETECTABLE LINE FOR DTC م م 10A 10A • : NON-DETECTABLE LINE FOR DTC (M1) 12 30 TK : WITH TACHOMETER (M2) 1K 10L EK: WITHOUT TACHOMETER (M59) R/B (F27) G/OR + TO SC-START r G/OR r-3 PARK/NEUTRAL POSITION (PNP) SWITCH Р (F49) 2 R Ν D Г R/B 7 8 9 6 5 4 2 *****5 *4 Т COMBI-BR/Y W/L W/G B/R NATION METER G в B 📥 TO SC-START (M29), UNIFIED METER CONTROL UNIT (WITH ODO/TRIP METER) (M30) *1 *****2 *3 LĠ Ŵ/L G 6 (M60 1 (F28 w. LG M59 : 42 TK) 3 ΤО EK : 25 • 4 LT-BACK/L (F27) : 8 (TK) : 41 w/G B/R BR/Y LG 26 EK): 42 EK : 26 34 27 35 36 TK : 10 TCM (TRANSMISSION CONTROL MODULE) R-SW N/P-SW D-SW 2-SW 1-SW *3 EK : 43 (F57) 1L 2L 3L _____ 4L 5L 6L 7L 8L 9L 10L 11L 12L 4K 5K 6K 7K 1K 2K (M1) (M2) 11K 12K 13K 8k 14K 15K 16K W W 3 4 5 6 🗖 7 8 9 10 11 (EK) W 1 2 3 4 5 6 7 25 26 27 28 29 30 31 32 33 (F27) 2 (TK) (M29 (EK) (M30) 12 13 14 15 16 17 18 19 20 21 22 23 24 8 9 10 11 12 13 14 15 16 34 35 36 37 38 39 40 41 42 43 44 BR BB BR , 28 29 30 31 32 33 34 35 (TK) (M30) 38 39 40 41 42 43 44 45 46 47 48 W 28 29 30 31 32 33

[RE4F03B]

37 38 39 40 41 42

46 47 48

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43 44 45

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1 2 3 4 5 6

12 13 14 15 16 17 18 19 20

7 8

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DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

[RE4F03B]

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ECS005WS

TCM TERMIN	ALS AND REFE	RENCE VALUE MEASURED BET	WEEN EACH TERMINAL AND GRO	UND	_
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	
26	BB/Y	PNP SWITCH "1" POSITION	WHEN SETTING SELECTOR LEVER TO "1" POSITION	BATTERY VOLTAGE	_
20	י אם	FINE SWITCH T FOSHION	WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	٥V	
27	B/R	PNP SWITCH "2" POSITION	WHEN SETTING SELECTOR LEVER TO "2" POSITION	BATTERY VOLTAGE	A
21	D/N	FINE SWITCH 2 FOSTION	WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	٥V	
34	W/G	PNP SWITCH "D" POSITION	WHEN SETTING SELECTOR LEVER TO "D" POSITION	BATTERY VOLTAGE	
54	W/G	FINE SWITCH D FOSHION	WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	٥V	
35	G/Y	PNP SWITCH "B" POSITION	WHEN SETTING SELECTOR LEVER TO "R" POSITION	BATTERY VOLTAGE	_
55	G/T	The switch in rosmon	WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	٥V	_
36	LG	PNP SWITCH "N" OR "P"	WHEN SETTING SELECTOR LEVER TO "N" OR "P" POSITION	BATTERY VOLTAGE	_
50	LG	POSITION	WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	0V	_

Diagnostic Procedure

1. CHECK PNP SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

- 1. Turn ignition switch to "ON" position. (Do not start engine.)
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.

3.	Read out "P/N", "R", "D", "2" and "1" position switches moving sele Check the signal of the selector lever position is indicated prop-	ector lever to each	oosition.		K
		DATA MON	ITOR		
~ ~ ~	erly.	MONITORING			
OK Oł	o <u>r NG</u> K	PN POSI SW	OFF		L
NC		R POSITION SW	OFF		
	 PNP switch Refer toAT-119, "Component Inspection". 	D POSITION SW	OFF		M
	 Harness for short or open between ignition switch and PNP switch (Main harness) 	2 POSITION SW 1 POSITION SW	ON OFF		
	 Harness for short or open between PNP switch and TCM (Main harness) 			SAT701J	

 Ignition switch and fuse Refer to <u>PG-2, "POWER SUPPLY ROUTING"</u>.

2. CHECK PNP SWITCH CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

- 1. Turn ignition switch to "ON" position. (Do not start engine.)
- 2. Check voltage between TCM terminals 26, 27, 34, 35, 36 and ground while moving selector lever through each position.

Lever position	Terminal No.				
	36	35	34	27	26
P, N	В	0	0	0	0
R	0	В	0	0	0
D	0	0	В	0	0
2	0	0	0	В	0
1	0	0	0	0	В

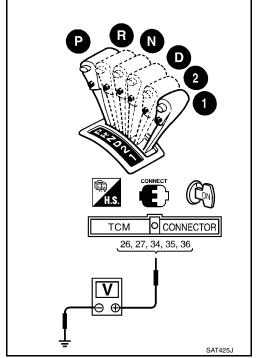
Voltage

- В
- 0

: Battery voltage : 0V

OK or NG

- OK >> GO TO 3.
- NG >> Check the following items:
 - PNP switch Refer to <u>AT-119, "Component Inspection"</u>.
 - Harness for short or open between ignition switch and PNP switch (Main harness)
 - Harness for short or open between PNP switch and TCM (Main harness)
 - Ignition switch and fuse Refer to <u>PG-2, "POWER SUPPLY ROUTING"</u>.



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Perform <u>AT-115, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE"</u>. OK or NG

OK >> INSPECTION END

NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

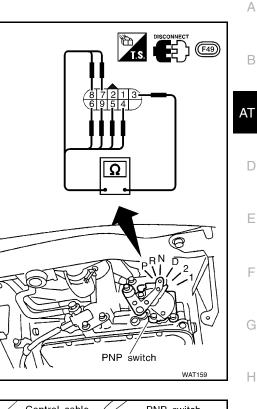
Component Inspection PARK/NEUTRAL POSITION SWITCH

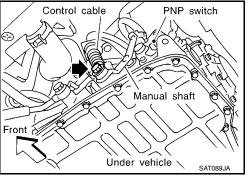
1. Check continuity between terminals 1 and 2 and between terminals 3 and 4, 5, 6, 7, 8, 9 while moving manual shaft through each position.

Lever position	Termi	nal No.
Р	3 — 7	1 — 2
R	3 — 8	
Ν	3 — 9	1 — 2
D	3 — 6	
2	3 — 5	
1	3-4	

- 2. If NG, check again with control cable disconnected from manual shaft of A/T assembly. Refer to step 1.
- 3. If OK on step 2, adjust control cable. Refer to AT-262, "Control Cable Adjustment" .
- 4. If NG on step 2, remove PNP switch from A/T and check continuity of PNP switch terminals. Refer to step 1.
- 5. If OK on step 4, adjust PNP switch. Refer to AT-262, "Park/Neutral Position (PNP) Switch Adjustment" .
- 6. If NG on step 4, replace PNP switch.

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DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

Description

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

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approx.)		
A/T fluid temperature sensor	Cold [20°C (68°F)]	1.5V	2.5 kΩ	
	↓	↓	↓	
	Hot [80°C (176°F)]	0.5V	0.3 kΩ	

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)	
: ATF TEMP SEN/CIRC : P0710	TCM receives an excessively low or high voltage from the sensor.	 Harness or connectors (The sensor circuit is open or shorted.) A/T fluid temperature sensor 	

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

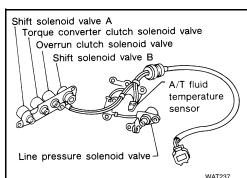
NOTE:

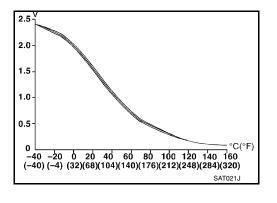
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

	A/T	
	ENGINE	
		SAT014K
1		SATUTAR

SELECT SYSTEM





[RE4F03B]

PFP:31940

ECS005WU

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

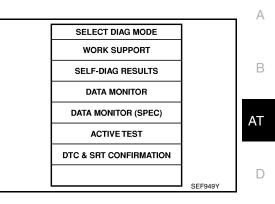
[RE4F03B]

With CONSULT-II

- 1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- Start engine and maintain the following conditions for at least 10 minutes (Total). (It is not necessary to maintain continuously.) CMPS·RPM (REF): 450 rpm or more VHCL SPEED SE: 10 km/h (6 MPH) or more THRTL POS SEN: More than 1.2V Selector lever: D position (OD "ON")

(Carlow With GST)

Follow the procedure "With CONSULT-II".





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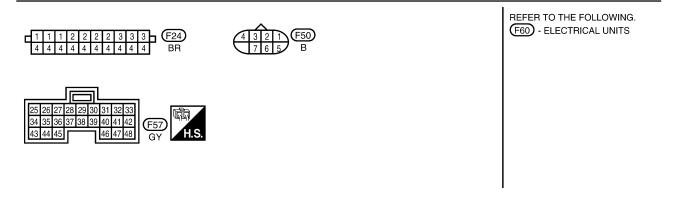
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[RE4F03B]

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT Wiring Diagram — AT — FTS ECS005WV AT-FTS-01 A/T FLUID TEMPERATURE SENSOR -■ : DETECTABLE LINE FOR DTC • : NON-DETECTABLE LINE FOR DTC W в TERMINAL CORD ASSEMBLY (F50) B/W в/w 4 JOINT CONNECTOR-1 (F24) 4 B/W в/w BR B/W 67 47 42 TCM (TRANSMISSION CONTROL MODULE) ECM GND SENS GND-A OIL TEMP (F60) SENS



(F57)

WCWA0059E

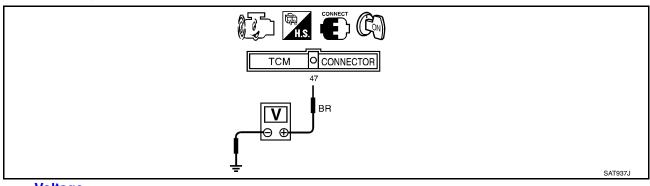
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

RMINAL	AND REFERENCE	ITEM	CONDITION	DATA (DC)
42	B/W			0V
42	D/VV	SENSOR (GROUND)		-
47	BR	A/T FLUID TEMPERATUR SENSOR	E WHEN ATF FLUID TEMPERATURE IS 20°C (68°F) WHEN ATF FLUID TEMPERATURE IS 80°C (176°F)	1.5V 0.5V
			WHEN AIF FLOID TEMPERATORE IS 60 C (170 F)	0.5V
gnos	tic Proced	lure		ECS005W
INSPE	CTION STAR	Т		
ou hav	e CONSULT-	?		
or No				
s >>	- GO TO 2.			
>>	• GO TO 3.			
CHEC	K INPUT SIGN	NAL OF A/T FLUID TE	MPERATURE SENSOR (WITH CONSULT-II)	
Vith CO	DNSULT-II			
Start e	ngine.	SIGNALS" in "DATA M	ONITOR" mode for "A/T" with CONSULT-II.	
Start e Select	ngine. "TCM INPUT		ONITOR" mode for "A/T" with CONSULT-II.	
Start e Select	ngine. "TCM INPUT	SIGNALS" in "DATA M of "FLUID TEMP SE".		
Start e Select	ngine. "TCM INPUT	f "FLUID TEMP SE".	DATA MONITOR	
Start e Select	ngine. "TCM INPUT	of "FLUID TEMP SE".	DATA MONITOR IONITORING	
Start e Select	ngine. "TCM INPUT	of "FLUID TEMP SE".	DATA MONITOR IONITORING EL/S SE-A/T XXX km/h	
Start e Select	ngine. "TCM INPUT	of "FLUID TEMP SE".	DATA MONITOR IONITORING	
Start e Select	ngine. "TCM INPUT	of "FLUID TEMP SE".	DATA MONITOR IONITORING EL/S SE-A/T XXX km/h	
Start e Select	ngine. "TCM INPUT	of "FLUID TEMP SE".	DATA MONITOR IONITORING L/S SE-A/T XXX km/h L/S SE-MTR XXX km/h	
Start e Select	ngine. "TCM INPUT	of "FLUID TEMP SE".	DATA MONITOR IONITORING EL/S SE-A/T XXX km/h EL/S SE-MTR XXX km/h TL POS SEN XXX V	
Start e Select	ngine. "TCM INPUT	of "FLUID TEMP SE".	DATA MONITOR IONITORING EL/S SE-A/T XXX km/h EL/S SE-MTR XXX km/h ITL POS SEN XXX V ID TEMP SE XXX V	SATE14J
Start e Select Read o	ngine. "TCM INPUT out the value o	of "FLUID TEMP SE".	DATA MONITOR IONITORING EL/S SE-A/T XXX km/h EL/S SE-MTR XXX km/h ITL POS SEN XXX V ID TEMP SE XXX V	SAT614J
Start e Select Read o	ngine. "TCM INPUT out the value o	of "FLUID TEMP SE".	DATA MONITOR MONITORING EL/S SE-A/T XXX km/h EL/S SE-MTR XXX km/h ITL POS SEN XXX V ID TEMP SE XXX V TERY VOLT XXX V	SAT614J
Start e Select Read o Vol Col	ngine. "TCM INPUT out the value o	of "FLUID TEMP SE". N VHC VHC THR FLU BAT S)] → : Approxima	DATA MONITOR IONITORING EL/S SE-A/T XXX km/h EL/S SE-MTR XXX km/h ITL POS SEN XXX V ID TEMP SE XXX V	SAT614J
Start e Select Read o Vol Col Hot	ngine. "TCM INPUT out the value o tage d [20°C (68°F	of "FLUID TEMP SE". N VHC VHC THR FLU BAT S)] → : Approxima	DATA MONITOR MONITORING EL/S SE-A/T XXX km/h EL/S SE-MTR XXX km/h ITL POS SEN XXX V ID TEMP SE XXX V TERY VOLT XXX V	SAT614J
Start e Select Read o Vol Col Hot Or NG	ngine. "TCM INPUT out the value o tage d [20°C (68°F : [80°C (176°F	of "FLUID TEMP SE". N VHC VHC THR FLU BAT S)] → : Approxima	DATA MONITOR MONITORING EL/S SE-A/T XXX km/h EL/S SE-MTR XXX km/h ITL POS SEN XXX V ID TEMP SE XXX V TERY VOLT XXX V	SAT614J
Start e Select Read o Vol Col Hot Or NG	ngine. "TCM INPUT out the value of tage d [20°C (68°F : [80°C (176°F > GO TO 4.	of "FLUID TEMP SE". N VHC VHC THR FLU BAT S)] → : Approxima	DATA MONITOR MONITORING EL/S SE-A/T XXX km/h EL/S SE-MTR XXX km/h ITL POS SEN XXX V ID TEMP SE XXX V TERY VOLT XXX V	SAT614J
Start e Select Read o Vol Col Hot Dr NG	ngine. "TCM INPUT out the value o tage d [20°C (68°F : [80°C (176°F	of "FLUID TEMP SE". N VHC VHC THR FLU BAT S)] → : Approxima	DATA MONITOR MONITORING EL/S SE-A/T XXX km/h EL/S SE-MTR XXX km/h ITL POS SEN XXX V ID TEMP SE XXX V TERY VOLT XXX V	SAT614J

3. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (WITHOUT CONSULT-II)

Without CONSULT-II

- 1. Start engine.
- 2. Check voltage between TCM terminal 47 and ground while warming up A/T.



Voltage Cold [20°C (68°F)] → Hot [80°C (176°F)]

: Approximately 1.5V \rightarrow 0.5V

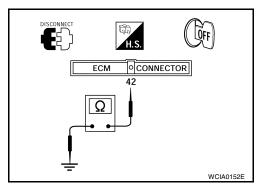
- 3. Turn ignition switch to "OFF" position.
- 4. Disconnect TCM harness connector.
- 5. Check continuity between TCM harness connector F57 terminal 42 (B/W) and ground.

Continuity should exist.

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

OK or NG

OK >> GO TO 4. NG >> GO TO 5.



4. снеск отс

Perform AT-120, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" .

OK or NG

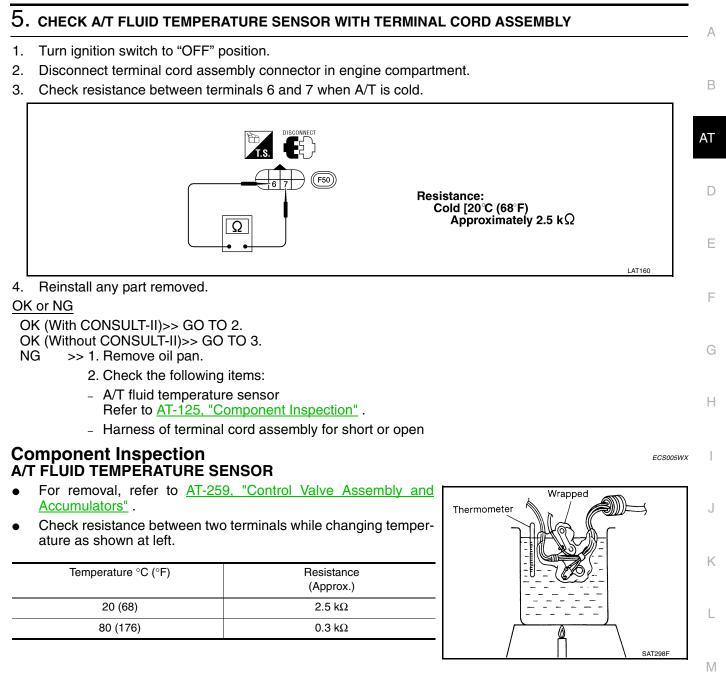
OK >> INSPECTION END NG >> 1. Perform TCM inp

>> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[RE4F03B]



DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR) [RE4F03B]

DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

Description

The revolution sensor detects the revolution of the idler gear parking pawl lock gear and emits a pulse signal. The pulse signal is sent to the TCM which converts it into vehicle speed.

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)
(I) : VEH SPD SEN/CIR AT	TCM does not receive the proper voltage	 Harness or connectors (The sensor circuit is open or shorted.)
I P0720	signal from the sensor.	Revolution sensor

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE **CAUTION:**

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

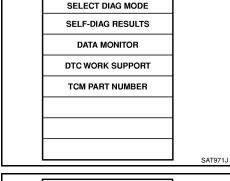
NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

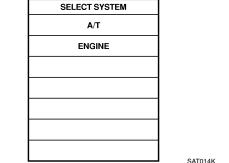
After the repair, perform the following procedure to confirm the malfunction is eliminated.

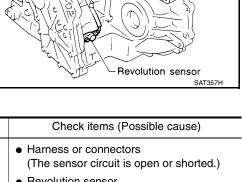
- With CONSULT-II
- Turn ignition switch "ON" and select "DATA MONITOR" mode for 1. "A/T" with CONSULT-II.
- 2. Drive vehicle and check for an increase of "VHCL/S SE-MTR" value increase. If the check result is NG, go to AT-126, "DIAGNOSTIC TROU-BLE CODE (DTC) CONFIRMATION PROCEDURE" . If the check result is OK, go to following step.
- Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II. 3
- Start engine and maintain the following conditions for at least 5 4. consecutive seconds.

VHCL SPEED SE: 30 km/h (19 MPH) or more THRTL POS SEN: More than 1.2V Selector lever: D position (OD "ON") Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test. If the check result is NG, go to AT-129, "Diagnostic Procedure" .



SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K





PFP:32702 ECS005WY

DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) [RE4F03B]

AT-127

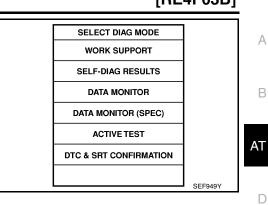
If the check result is OK, go to following step.

5. Maintain the following conditions for at least 5 consecutive seconds.

CMPS·RPM (REF): 3,500 rpm or more THRTL POS SEN: More than 1.2V Selector lever: D position (OD "ON") Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

(G) With GST

Follow the procedure "With CONSULT-II".



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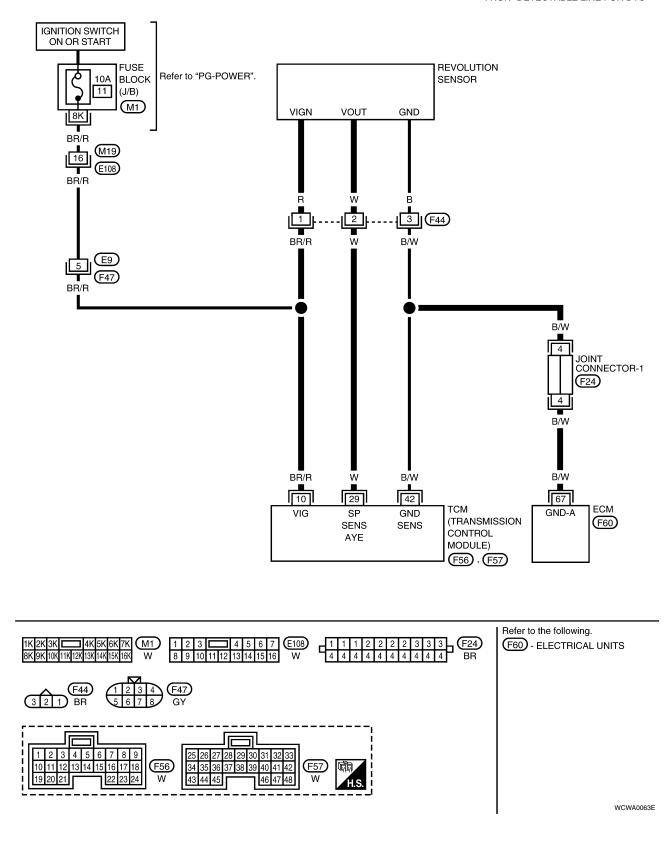
DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) [RE4F03B]

Wiring Diagram — AT — VSSA/T

ECS005WZ

AT-VSSA/T-01

: DETECTABLE LINE FOR DTC
 : NON- DETECTABLE LINE FOR DTC



DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) [RE4F03B]

TERMINALS	TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND						
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	А		
10	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE			
10	DIVIT	I OWEN SOONOE	WHEN TURNING IGNITION SWITCH TO "OFF"	0V	D		
29	W	REVOLUTION SENSOR	WHEN MOVING AT 20 KM/H (12 MPH). USE CONSULT-II PULSE FREQUENCY MEASURING FUNCTION	150 Hz	В		
42	B/W	THROTTLE POSITION SENSOR (GROUND)		٥V	AT		

Diagnostic Procedure

ECS005X0

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1. CHECK INPUT SIGNAL (WITH CONSULT-II)

With CONSULT-II

- 1. Start engine.
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3. Read out the value of "VHCL/S SE·A/T" while driving. Check the value changes according to driving speed.

	DATA MONITOR			
	MONITORING			
v	/HCL/S SE-A/T	XXX km/h		
v	/HCL/S SE-MTR	XXX km/h		
т	HRTL POS SEN	xxx v		
F	LUID TEMP SE	xxx v		
E	BATTERY VOLT	xxx v		
				SAT614

OK or NG

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

2. CHECK REVOLUTION SENSOR (WITH CONSULT-II)

With CONSULT-II

1. Start engine.

Condition	Judgement standard (Approx.)	
When moving at 20 km/h (12 MPH, use the CONSULT-II pulse frequency measuring function. *1 CAUTION: Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	150 Hz	
When vehicle is not moving	Under 1.3V or over 4.5V	

 Check harness for short or open between TCM, ECM and revolution sensor. Refer to <u>AT-128</u>, "Wiring Diagram — AT — VSSA/T".

- Check harness for short or open between ignition switch and revolution sensor.

OK or NG

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

3. снеск отс

Perform AT-126, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> INSPECTION END

NG >> GO TO 4.

4. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

DTC P0725 ENGINE SPEED SIGNAL

DTC P0725 ENGINE SPEED SIGNAL

Description

The engine speed signal is sent from the ECM to the TCM.

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when	Check item (Possible cause)	
	TCM does not receive the proper voltage	 Harness or connectors 	A
· P0725	signal from ECM.	(The sensor circuit is open or shorted.)	

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

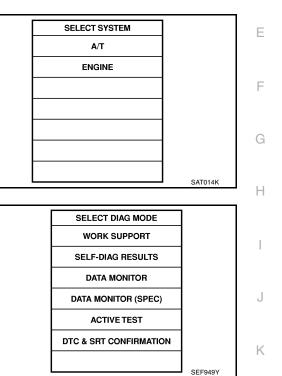
After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

- 1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- Start engine and maintain the following conditions for at least 10 consecutive seconds.
 VHCL SPEED SE: 10 km/h (6 MPH) or more THRTL POS SEN: More than 1.2V Selector lever: D position (OD "ON")

With GST

Follow the procedure "With CONSULT-II".





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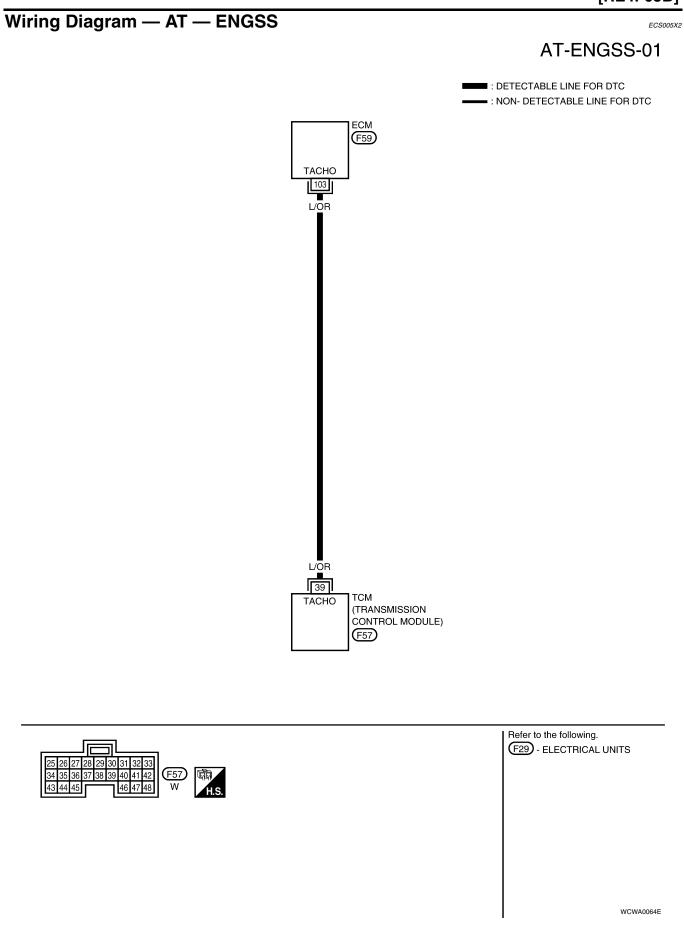
[RE4F03B]

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DTC P0725 ENGINE SPEED SIGNAL

[RE4F03B]



DTC P0725 ENGINE SPEED SIGNAL

[RE4F03B]

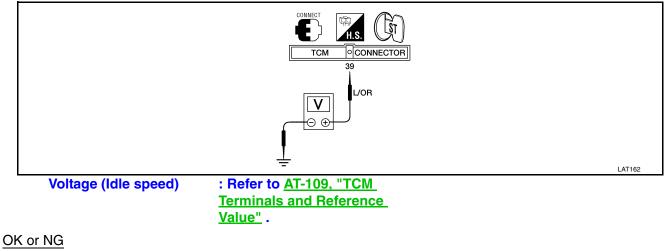
TERMINALS	AND REFERENC	E VALUE MEASURED BETWEE	N EACH TERMINAL				
TERMINAL	WIRE COLOR	ITEM	CONDIT	ION	DATA	(DC)	А
39	L/OR	ENGINE SPEED SIGNAL	REFER TO ECM T	ABLE	-	_	-
Diagnos	tic Proced	ure				ECS005X3	³ B
1. СНЕСИ	C DTC WITH E	СМ					
Perform dia	anostic test m	ode II (self-diagnostic resul	ts) for engine co	ntrol. Check	ignition signal	circuit condi-	AT
tion.	.g		,				
OK or NG							D
	CONSULT-II)>						
		II)>> GO TO 3. on signal circuit for engine	e control Refer	to EC-38	"INPUT/OUTP	UT SIGNAL	_
	CHART" [C	QG18DE (ULEV)] or <u>EC-</u>					
	(SULEV)].						
2. снеси	(INPUT SIGN	AL (WITH CONSULT-II)					F
With CC	NSULT-II						-
1. Start er							G
	•	SIGNALS" in "DATA MONIT	OR" mode for "A	T" with CO	NSULT-II		0.
		f "ENGINE SPEED".					
		changes according to thrott	le position.		DATA MONITOR	7	Н
OK or NG				MON		-	
••••	GO TO 4.			ENGINE	E SPEED XXX rpm	-	
NG >>	Check the fol	•		TURBIN	IE REV XXX rpm		
		r short or open between TC	M and ECM		•		
	 Resistor ar Refer to 	nd ignition coil <u>EC-38, "SYSTEM [</u>	DESCRIPTION"		RIVE SW ON		J
	[QG18DE	(ULEV) or EC-610, "SYST		PN POS	SI SW OFF		
	<u>TION"</u> [QC	G18DE (SULEV)].		R POSI	TION SW OFF		
						SAT645J	K

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3. CHECK INPUT SIGNAL (WITHOUT CONSULT-II)

Without CONSULT-II

- 1. Start engine.
- 2. Check voltage between TCM terminal 39 and ground.



- OK >> GO TO 4.
- NG >> Check the following items:
 - Harness for short or open between TCM and ECM
 - Resistor and ignition coil Refer to <u>EC-38, "SYSTEM DESCRIPTION"</u> [QG18DE (ULEV)] or <u>EC-610, "SYSTEM</u> <u>DESCRIPTION"</u> [QG18DE (SULEV)].

4. снеск отс

Perform AT-131, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> INSPECTION END

NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

DTC P0731 A/T 1ST GEAR FUNCTION

Description

- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into first gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position	1	2	3	4	'
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	•
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)	.

ON BOARD DIAGNOSTIC LOGIC

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:

Torque converter slip ratio = $A \times C/B$

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is higher than the position (1st) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.

This malfunction will be caused when either shift solenoid valve A is stuck open or shift solenoid valve B is stuck open.

Gear position supposed by TCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve A stuck open	2*	2	3	3
In case of gear position with shift solenoid valve B stuck open	4*	3	3	4

*: P0731 is detected.

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)	
🖲 : A/T 1ST GR FNCTN		Shift solenoid valve A	
(1) : P0731	A/T cannot be shifted to the 1st gear posi-	 Shift solenoid valve B 	K
	tion even if electrical circuit is good.	Each clutch	
		 Hydraulic control circuit 	

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

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

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

TESTING CONDITION:

Always drive vehicle on a level road to improve the accuracy of test.

SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K

PFP:31940

ECS005X4

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After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

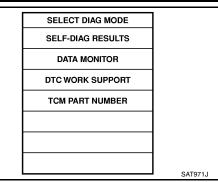
- 1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- Make sure that output voltage of A/T fluid temperature sensor is within the range below.
 FLUID TEMP SEN: 0.4 - 1.5V

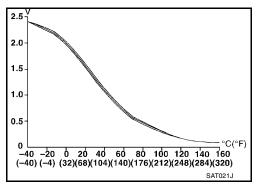
If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).

- 3. Select "1ST GR FNCTN P0731" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
- 4. Accelerate vehicle to 20 to 25 km/h (12 to 16 MPH) under the following condition and release the accelerator pedal completely.

THROTTLE POSI: Less than 1.0/8 (at all times during step 4) Selector lever: D position (OD "ON")

- Check that "GEAR" shows "2" after releasing pedal.
- Depress accelerator pedal to WOT (more than 7.0/8 of "THROT-TLE POSI") quickly from a speed of 20 to 25 km/h (12 to 16 MPH) until "TESTING" changes to "STOP VEHICLE" or "COM-PLETED". (It will take approximately 3 seconds.)





If the check result NG appears on CONSULT-II screen, go to <u>AT-138, "Diagnostic Procedure"</u>. If "STOP VEHICLE" appears on CONSULT-II screen, go to the following step.

- Check that "GEAR" shows "1" when depressing accelerator pedal to WOT.
- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAGNOSIS" for "ENGINE". In case a 1st trip DTC other than P0731 is shown, refer to applicable "TROUBLE DIAG-NOSIS FOR DTC".
- 6. Stop vehicle.
- 7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

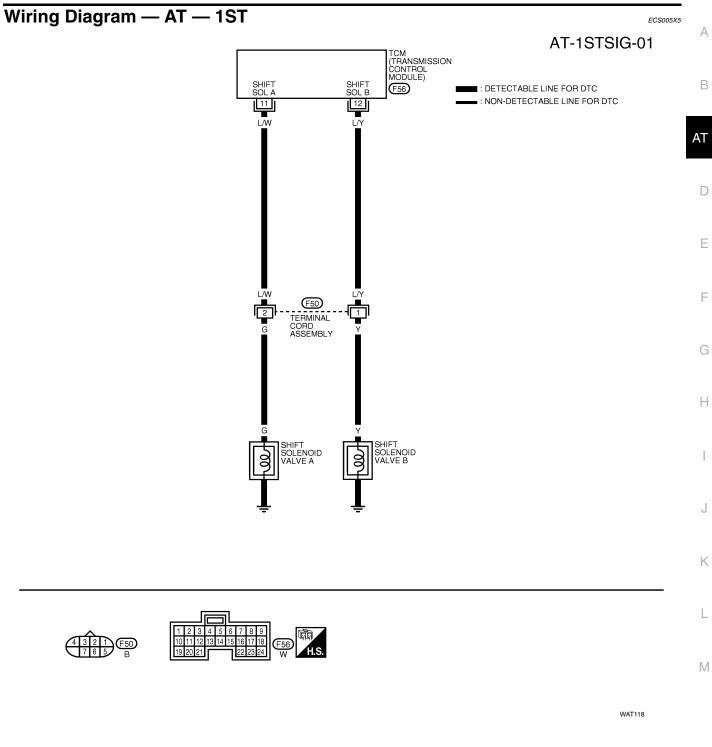
Vehicle condition	Gear on actual transmission shift pattern when screen is changed to $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$
No malfunction exists	$1 \rightarrow 2 \rightarrow 3 \rightarrow 4$
Malfunction for P0731	$2 \rightarrow 2 \rightarrow 3 \rightarrow 3$
exists.	$4 \rightarrow 3 \rightarrow 3 \rightarrow 4$

 Make sure that "OK" is displayed. (If "NG" is displayed, refer to "Diagnostic Procedure".) Refer to <u>AT-138, "Diagnostic Procedure"</u>. Refer to <u>AT-385, "Shift Schedule"</u>.

With GST

Follow the procedure "With CONSULT-II".

[RE4F03B]



TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	L/W	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A OPERATES	BATTERY VOLTAGE
	L/ VV	L/W SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATE	0V
12	12 L/Y SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE	
		SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	0V

Diagnostic Procedure

ECS005X6

[RE4F03B]

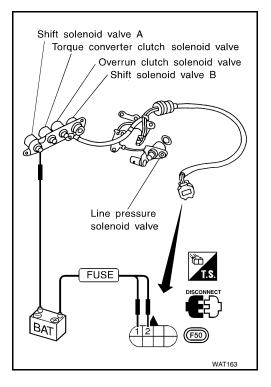
1. CHECK SHIFT SOLENOID VALVE

- 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" .
- 2. Check shift solenoid valve operation.
- Shift solenoid valve A
- Shift solenoid valve B

Refer to AT-139, "Component Inspection" .

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace shift solenoid valve assembly.

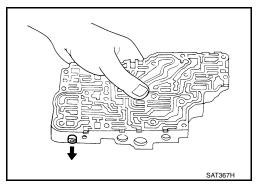


2. CHECK CONTROL VALVE

- 1. Disassemble control valve assembly. Refer to AT-298, "Disassembly" .
- 2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

- OK >> GO TO 3.
- NG >> Repair control valve assembly.



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Perform AT-135, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

- OK >> INSPECTION END
- NG >> Check transaxle internal components (clutch, brake, etc.).

AT-138

Component Inspection SHIFT SOLENOID VALVE A AND B

Refer to AT-259, "Control Valve Assembly and Accumulators" .

Resistance Check

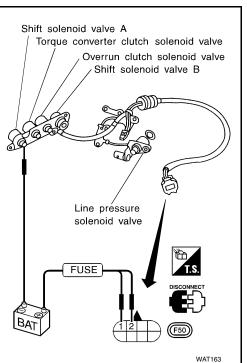
Check resistance between two terminals.

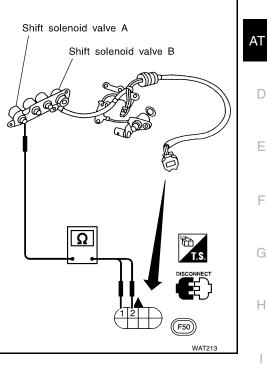
Solenoid valve	Termi	Resistance (Approx.)	
Shift solenoid valve A	2	Ground	20 - 30Ω
Shift solenoid valve B	1	Ground	5 - 20Ω

Shift solenoid valve B Ω (F50) WAT213

Operation Check

Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.





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DTC P0732 A/T 2ND GEAR FUNCTION

Description

- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into second gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

ON BOARD DIAGNOSTIC LOGIC

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:

Torque converter slip ratio = $A \times C/B$

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is higher than the position (2nd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.

This malfunction will be caused when shift solenoid valve B is stuck open.

Gear position supposed by TCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve B stuck open	4	3*	3	4

*: P0732 is detected.

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)	
: A/T 2ND GR FNCTN : P0732	A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	Shift solenoid valve BEach clutchHydraulic control circuit	

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

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

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

TESTING CONDITION:

Always drive vehicle on a level road to improve the accuracy of test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

- 1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- Make sure that output voltage of A/T fluid temperature sensor is within the range below.
 FLUID TEMP SEN: 0.4 - 1.5V

SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K
SELECT DIAG MODE	
SELF-DIAG RESULTS	
DATA MONITOR	
DTC WORK SUPPORT	
TCM PART NUMBER	

[RE4F03B]

[RE4F03B]

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If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).

3. Select "2ND GR FNCTN P0732" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".

4. Accelerate vehicle to 50 to 55 km/h (31 to 34 MPH) under the following condition and release the accelerator pedal completely.

THROTTLE POSI: Less than 1.0/8 (at all times during step 4) Selector lever: D position (OD "ON")

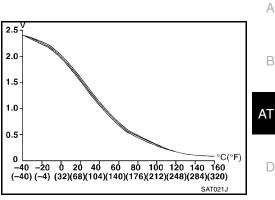
- Check that "GEAR" shows "3" or "4" after releasing pedal.
- 5. Depress accelerator pedal to WOT (more than 7.0/8 of "THROT-TLE POSI") quickly from a speed of 50 to 55 km/h (31 to 34 MPH) until "TESTING" changes to "STOP VEHICLE" or "COM-PLETED". (It will take approximately 3 seconds.) If the check result NG appears on CONSULT-II screen, go to AT-143, "Diagnostic Procedure". If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.
 Check that "GEAR" shows "2" when depressing accelerator pedal to WOT.
- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAGNOSIS" for "ENGINE". In case a 1st trip DTC other than P0732 is shown, refer to applicable "TROUBLE DIAG-NOSIS FOR DTC".
- 6. Stop vehicle.
- 7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$
No malfunction exists	$1 \rightarrow 2 \rightarrow 3 \rightarrow 4$
Malfunction for P0732 exists.	$4 \rightarrow 3 \rightarrow 3 \rightarrow 4$

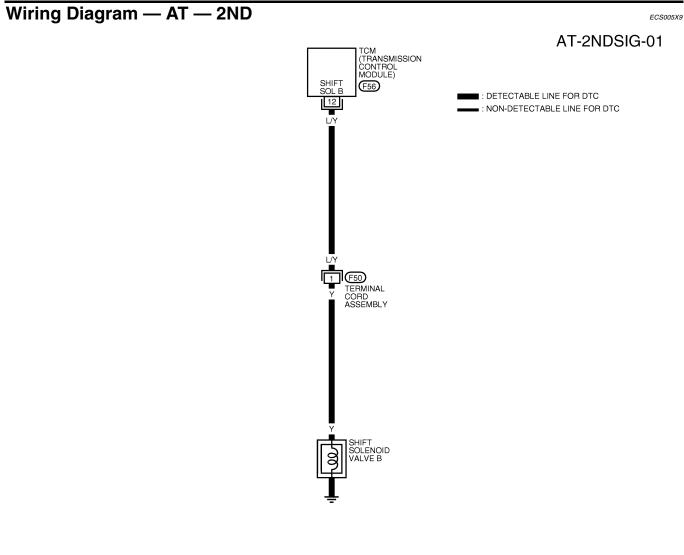
 Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".) Refer to <u>AT-143, "Diagnostic Procedure"</u>. Refer to <u>AT-385, "Shift Schedule"</u>.

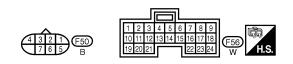
With GST

Follow the procedure "With CONSULT-II".



[RE4F03B]





WAT119

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
12 L		SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	0V

Diagnostic Procedure

[RE4F03B]



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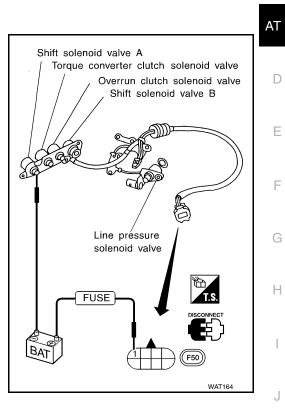
1. CHECK SHIFT SOLENOID VALVE

- 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" .
- Check shift solenoid valve operation.
 Shift solenoid valve B

Refer to AT-144, "Component Inspection" .

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace shift solenoid valve assembly.

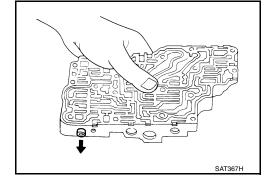


2. CHECK CONTROL VALVE

- 1. Disassemble control valve assembly. Refer to AT-298, "Disassembly" .
- 2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

- OK >> GO TO 3.
- NG >> Repair control valve assembly.



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Perform AT-140, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

- OK >> INSPECTION END
- NG >> Check transaxle internal components (clutch, brake, etc.).

AT-143

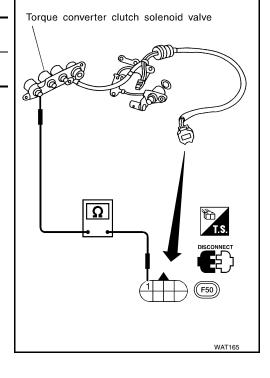
Component Inspection SHIFT SOLENOID VALVE B

• Refer to AT-259, "Control Valve Assembly and Accumulators".

Resistance Check

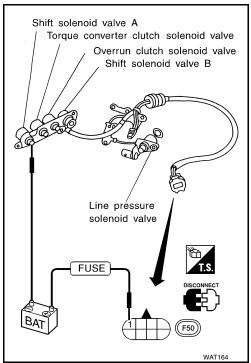
• Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)	
Shift solenoid valve B	1	Ground	5 - 20Ω	



Operation Check

• Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



ECS005XB

DTC P0733 A/T 3RD GEAR FUNCTION

DTC P0733 A/T 3RD GEAR FUNCTION

Description

- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into third gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning servo piston or brake band, etc.

Gear position	1	2	3	4	
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)	

ON BOARD DIAGNOSTIC LOGIC

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:

Torque converter slip ratio = $A \times C/B$

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is higher than the position (3rd) supposed by TCM, the slip ratio will be more than ormal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.

This malfunction will be caused when shift solenoid valve A is stuck closed.

Gear position supposed by TCM		2	3	4	ŀ
In case of gear position with no malfunctions	1	2	3	4	
In case of gear position with shift solenoid valve A stuck closed	1	1	4*	4	

*: P0733 is detected.

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)	
E A/T 3RD GR FNCTN	A/T connet be chifted to the Ord sport pasi	Shift solenoid valve A	
	A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	 Each clutch 	
(9) : P0733		Hydraulic control circuit	k

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

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

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

TESTING CONDITION:

Always drive vehicle on a level road to improve the accuracy of test.

		1
SELECT SYSTEM		L
A/T		
ENGINE		Ν
	SAT014K	

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DTC P0733 A/T 3RD GEAR FUNCTION

After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

- 1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- Make sure that output voltage of A/T fluid temperature sensor is within the range below.
 FLUID TEMP SEN: 0.4 - 1.5V

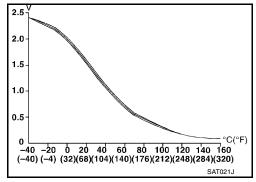
If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).

- 3. Select "3RD GR FNCTN P0733" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
- 4. Accelerate vehicle to 70 to 85 km/h (43 to 53 MPH) under the following condition and release the accelerator pedal completely.

THROTTLE POSI: Less than 1.0/8 (at all times during step 4) Selector lever: D position (OD "ON")

- Check that "GEAR" shows "4" after releasing pedal.
- 5. Depress accelerator pedal steadily with 3.5/8 4.5/8 of "THROT-TLE POSI" from a speed of 70 to 85 km/h (43 to 53 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.) If the check result NG appears on CONSULT-II screen, go to <u>AT-148</u>

SELECT DIAG MODE SELF-DIAG RESULTS DATA MONITOR DTC WORK SUPPORT TCM PART NUMBER



If the check result NG appears on CONSULT-II screen, go to <u>AT-148, "Diagnostic Procedure"</u>. If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.

- Check that "GEAR" shows "3" when depressing accelerator pedal with 3.5/8 4.5/8 of "THROTTLE POSI".
- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAGNOSIS" for "ENGINE". In case a 1st trip DTC other than P0733 is shown, refer to applicable "TROUBLE DIAG-NOSIS FOR DTC".
- 6. Stop vehicle.
- 7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$
No malfunction exists.	$1 \rightarrow 2 \rightarrow 3 \rightarrow 4$
Malfunction for P0733 exists.	$1 \rightarrow 1 \rightarrow 4 \rightarrow 4$

 Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".) Refer to <u>AT-148, "Diagnostic Procedure"</u>. Refer to <u>AT-385, "Shift Schedule"</u>.

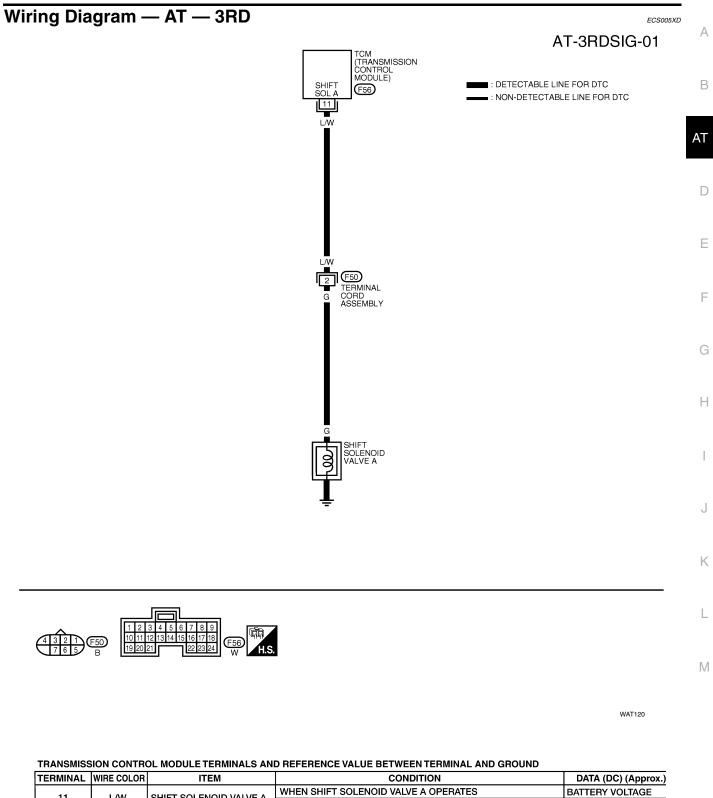
With GST

Follow the procedure "With CONSULT-II".

[RE4F03B]

DTC P0733 A/T 3RD GEAR FUNCTION

[RE4F03B]



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WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATE

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SHIFT SOLENOID VALVE A

Diagnostic Procedure

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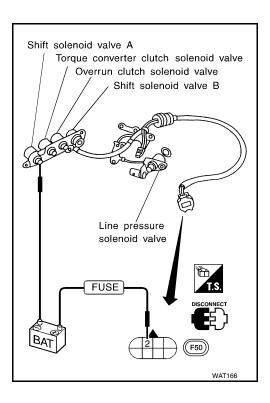
[RE4F03B]

1. CHECK SHIFT SOLENOID VALVE

- 1. Remove control valve assembly. Refer to <u>AT-259, "REMOVAL"</u>.
- 2. Check shift solenoid valve operation.
- Shift solenoid valve A Refer to "Component Inspection".

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace shift solenoid valve assembly.

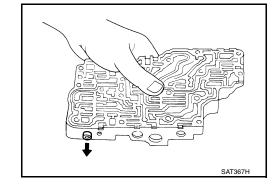


2. CHECK CONTROL VALVE

- 1. Disassemble control valve assembly. Refer to AT-298, "Disassembly" .
- 2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

- OK >> GO TO 3.
- NG >> Repair control valve assembly.



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Perform AT-145, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

- OK >> INSPECTION END
- NG >> Check transaxle internal components (clutch, brake, etc.).

AT-148

Component Inspection SHIFT SOLENOID VALVE A

• Refer to <u>AT-259, "REMOVAL"</u>.

Resistance Check

Operation Check

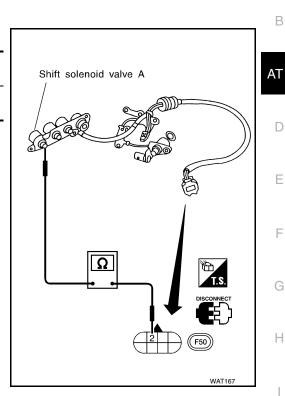
• Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)	
Shift solenoid valve A	2	Ground	20 - 30Ω	

Check solenoid valve by listening for its operating sound while

applying battery voltage to the terminal and ground.

Shift solenoid valve A Torque converter clutch solenoid valve Overrun clutch solenoid valve B Shift solenoid valve B Line pressure solenoid valve FUSE 2 (50)



[RE4F03B]

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WAT166

DTC P0734 A/T 4TH GEAR FUNCTION

Description

- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or when the line pressure is low. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approx.)
Line pressure solenoid valve duty	Small throttle opening (Low line pressure) ↓ Large throttle opening (High line pressure)	24% ↓ 95%

ON BOARD DIAGNOSTIC LOGIC

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:

Torque converter slip ratio = A x C/B

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction. This malfunction will be caused when shift solenoid valve B is stuck closed.

Gear position supposed by TCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve B stuck closed	1	2	2	1*

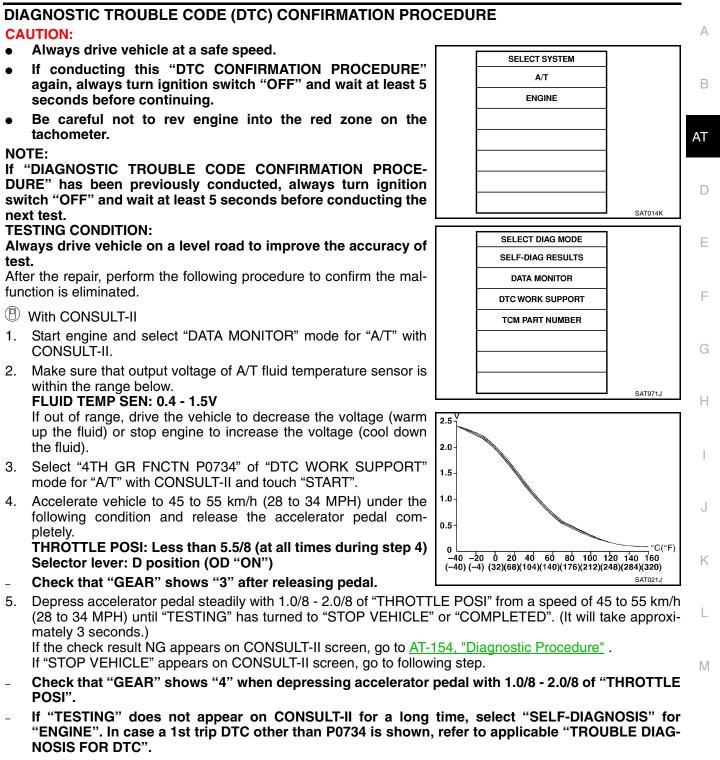
*: P0734 is detected.

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)
: A/T 4TH GR FNCTN : P0734	A/T cannot be shifted to the 4th gear posi- tion even if electrical circuit is good.	 Shift solenoid valve A Shift solenoid valve B Line pressure solenoid valve Each clutch Hydraulic control circuit

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[RE4F03B]

[RE4F03B]



- 6. Stop vehicle.
- 7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to $1 \to 2 \to 3 \to 4$
No malfunction exists	$1 \rightarrow 2 \rightarrow 3 \rightarrow 4$
Malfunction for P0734 exists.	$1 \rightarrow 2 \rightarrow 2 \rightarrow 1$

 Make sure that "OK" is displayed. (If "NG" is displayed, refer to "Diagnostic Procedure".) Refer to <u>AT-154, "Diagnostic Procedure"</u>. Refer to AT-385, "Shift Schedule". With GST Follow the procedure "With CONSULT-II".

[RE4F03B]

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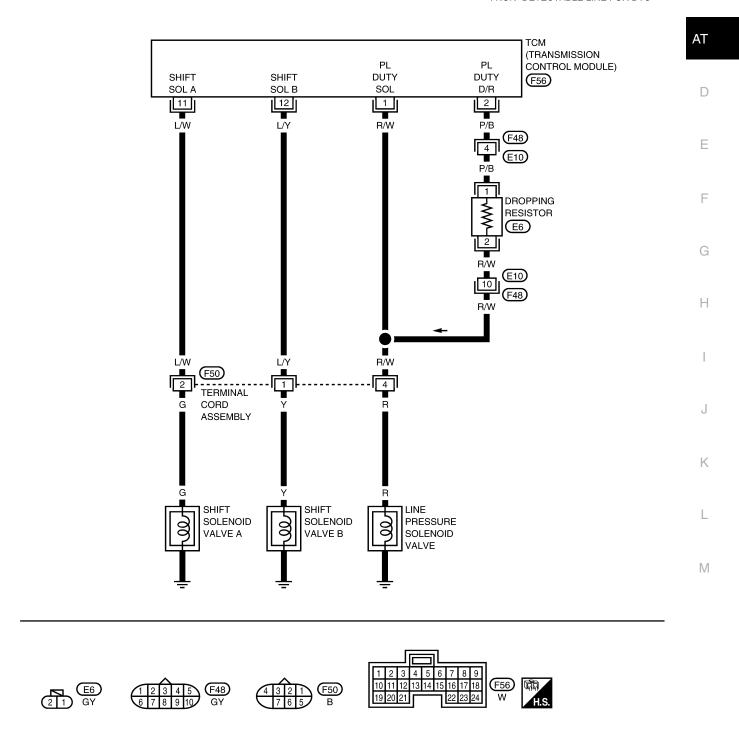
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Wiring Diagram — AT — 4TH

AT-4THSIG-01

DETECTABLE LINE FOR DTC
 NON- DETECTABLE LINE FOR DTC



WCWA0065E

[RE4F03B]

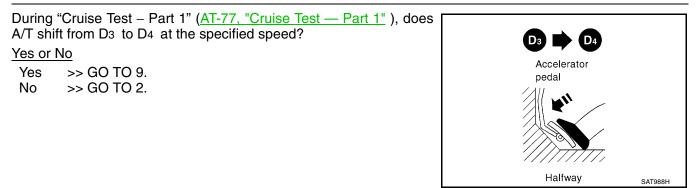
TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL					
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	
_	B/W/	R/W LINE PRESSURE SOLENOID VALVE	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	1.5 - 2.5V	
I	11/ 00		WHEN DEPRESSING ACCELERATOR PEDAL (ENGINE WARM)	0V	
2 P/B	P/B	LINE PRESSURE SOLENOID P/B VALVE (WITH DROPPING RESISTOR)	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	5 - 14V	
			WHEN DEPRESSING ACCELERATOR PEDAL (ENGINE WARM)	0.5V OR LESS	
11	L/W	1.00/	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A OPER- ATES	BATTERY VOLTAGE
	L) VV		WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATES	0V	
12	L/Y SHIFT SOLENOID VALV		WHEN SHIFT SOLENOID VALVE B OPER- ATES	BATTERY VOLTAGE	
			WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATES	oV	

Diagnostic Procedure

ECS005XI

LAT236

1. CHECK SHIFT UP (D₃ TO D₄)



2. CHECK LINE PRESSURE

Perform line pressure test. Refer to <u>AT-67, "Line Pressure Test"</u>.

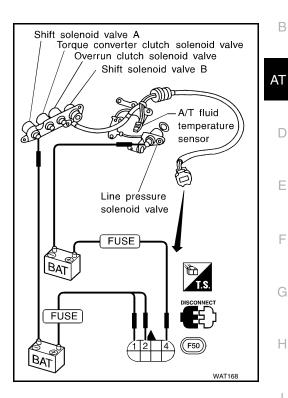
Engine speed rpm	Line pressure k	Pa (kg/cm², psi)
Lingine speed ipin	D, 2 and 1 positions	R position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,167 (11.9, 169)	1,816 (18.5, 263)

OK or NG

OK >> GO TO 3. NG >> GO TO 6.

3. CHECK SOLENOID VALVES

- 1. Remove control valve assembly. Refer to <u>AT-259, "REMOVAL"</u>.
- 2. Refer to AT-158, "SOLENOID VALVES".
- OK or NG
- OK >> GO TO 4.
- NG >> Replace solenoid valve assembly.

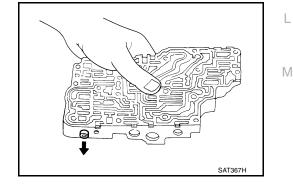


4. CHECK CONTROL VALVE

- 1. Disassemble control valve assembly. Refer to <u>AT-298, "Disassembly"</u>.
- 2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

- OK >> GO TO 5.
- NG >> Repair control valve.



5. CHECK SHIFT UP (D3 TO D4)

Does A/T shift from D₃ to D₄ at the specified speed?

OK or NG

- OK >> GO TO 9.
- NG >> Check transaxle internal components (clutch, brake, etc.).

[RE4F03B]

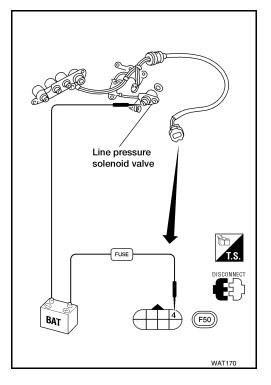
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AT-155

6. CHECK LINE PRESSURE SOLENOID VALVE

- 1. Remove control valve assembly. Refer to <u>AT-259, "REMOVAL"</u>.
- 2. Refer to AT-158, "Component Inspection" .
- OK or NG
- OK >> GO TO 7.
- NG >> Replace solenoid valve assembly.

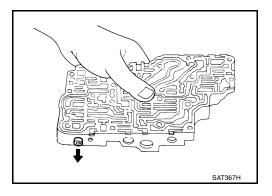


7. CHECK CONTROL VALVE

- 1. Disassemble control valve assembly. Refer to <u>AT-298, "Disassembly"</u>.
- 2. Check line pressure circuit valves for sticking.
- Pressure regulator valve
- Pilot valve
- Pressure modifier valve

OK or NG

- OK >> GO TO 8.
- NG >> Repair control valve.



8. CHECK SHIFT UP (D3 TO D4)

Does A/T shift from D₃ to D₄ at the specified speed? Yes or No

- Yes >> GO TO 9.
- No >> Check transaxle internal components (clutch, brake, etc.).

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9. c	HECK DTC	А
Perfor	rm AT-151, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .	/ (
OK or		В
OK NG	>> INSPECTION END >> Perform "Cruise Test — Part 1" (<u>AT-77, "Cruise Test — Part 1"</u>) again and return to the start point	D
	of this test group.	AT
		D
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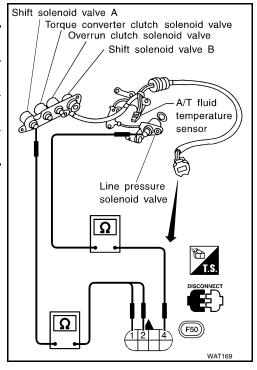
Component Inspection SOLENOID VALVES

• Refer to <u>AT-259, "REMOVAL"</u>.

Resistance Check

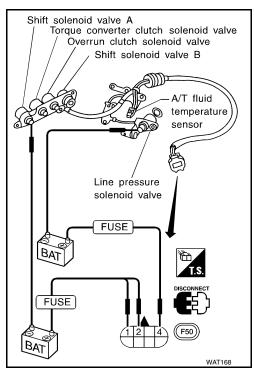
• Check resistance between two terminals.

Solenoid valve	Termi	nal No.	Resistance (Approx.)
Shift solenoid valve A	2		20 - 30Ω
Shift solenoid valve B	1	Ground	5 - 20Ω
Line pressure solenoid valve	4		2.5 - 5Ω



Operation Check

 Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



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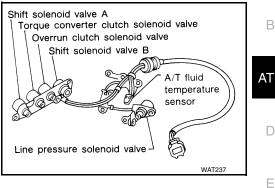
DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Description

The torque converter clutch solenoid valve is activated, with the gear in "D4", by the TCM in response to signals sent from the vehicle speed sensor and throttle position sensor [accelerator pedal position (APP) sensor]s. Lock-up piston operation will then be controlled.

Lock-up operation, however, is prohibited when A/T fluid temperature is too low.

When the accelerator pedal is depressed (less than 2/8) in lock-up condition, the engine speed should not change abruptly. If there is a big jump in engine speed, there is no lock-up.



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approx.)	F
Torque converter clutch solenoid valve duty	Lock-up "OFF" ↓	4% ↓	-
, 	Lock-up "ON"	94%	G

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)
(I) : TCC SOLENOID/CIRC	TCM detects an improper voltage drop	 Harness or connectors (The solenoid circuit is open or shorted.)
· P0740	when it tries to operate the solenoid valve.	 T/C clutch solenoid valve

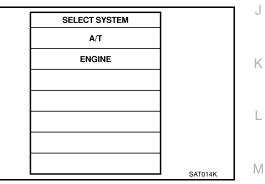
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

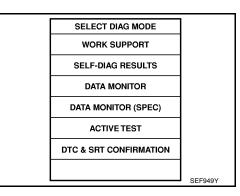
1. Turn ignition switch "ON".



2. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II and wait at least 1 second.

With GST

Follow the procedure "With CONSULT-II".

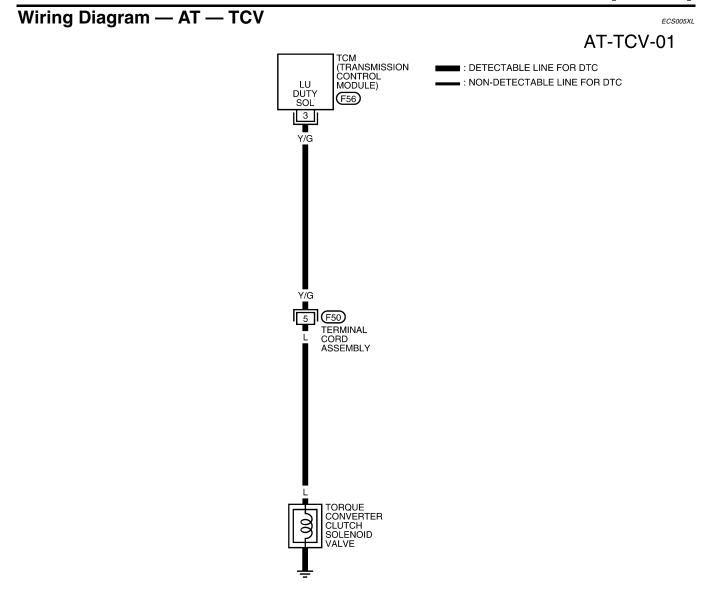


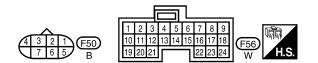
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DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE [RE4F03B]





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DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

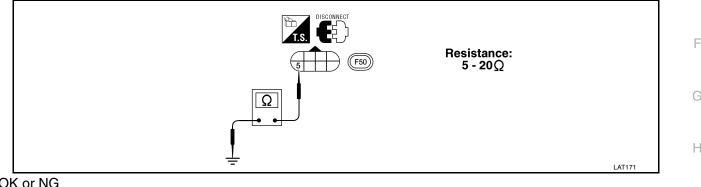
[RE4F03B]

TCM TERMIN	ALS AND REFE	RENCE VALUE MEASURED BET	WEEN EACH TERMINAL AND GRO	UND	_
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	Α
3	Y/G	TORQUE CONVERTER	WHEN A/T PERFORMS LOCK- UP	8 - 15V	-
	na	CLUTCH SOLENOID VALVE	WHEN A/T DOES NOT PER- FORM LOCK-UP	٥V	В

Diagnostic Procedure

1. CHECK VALVE RESISTANCE

- Turn ignition switch to "OFF" position. 1.
- 2. Disconnect terminal cord assembly connector in engine compartment.
- Check resistance between terminal 5 and ground. З.



OK or NG

OK >> GO TO 2.

- NG >> 1. Remove oil pan. Refer to AT-259, "REMOVAL".
 - 2. Check the following items:
 - Torque converter clutch solenoid valve Refer to AT-162, "TORQUE CONVERTER CLUTCH SOLENOID VALVE" .
 - Harness of terminal cord assembly for short or open

2. CHECK POWER SOURCE CIRCUIT

- 1. Turn ignition switch to "OFF" position.
- 2. Disconnect TCM harness connector F56.
- 3. Check continuity between terminal cord assembly F50 terminal 5 (Y/G) and TCM harness connector terminal 3 (Y/G).

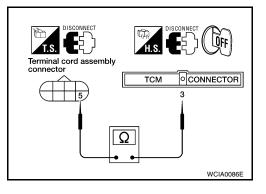
Continuity should exist.

- If OK, check harness for short to ground and short to power.
- Reinstall any part removed.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



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Perform AT-159, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

OK >> INSPECTION END

>> 1. Perform TCM input/output signal inspection. NG

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

AT-161

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DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

[RE4F03B]

Component Inspection TORQUE CONVERTER CLUTCH SOLENOID VALVE

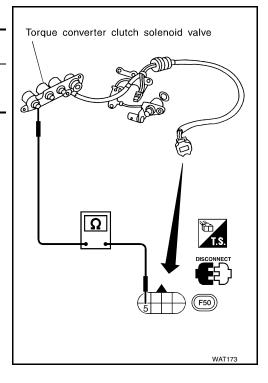
ECS005XN

• Refer to <u>AT-259, "REMOVAL"</u>.

Resistance Check

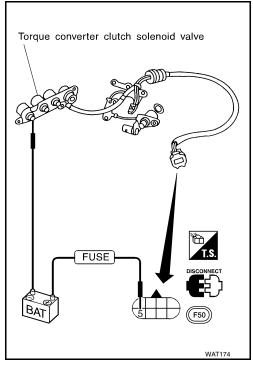
• Check resistance between two terminals.

Solenoid valve	Termi	nal No.	Resistance (Approx.)
Torque converter clutch solenoid valve	5	Ground	5 - 20Ω



Operation Check

• Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

Description

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis
 B malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or the torque converter clutch does not lock up as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approx.)	Е
Torque converter clutch solenoid valve duty	Lock-up "OFF" ↓ Lock-up "ON"	4% ↓ 94%	_

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[RE4F03B]

PFP:31940

ECS005XO

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[RE4F03B]

ON BOARD DIAGNOSTIC LOGIC

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:

Torque converter slip ratio = A x C/B

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction. This malfunction will be caused when shift solenoid valve B is stuck closed.

Gear position supposed by TCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve B stuck closed	1	2	2	1*

*: P0744 is detected.

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)
(I) : A/T TCC S/V FNCTN		• Torque converter clutch solenoid valve
	A/T cannot perform lock-up even if electri-	 Line pressure solenoid valve
EP0744	cal circuit is good.	Each clutch
		 Hydraulic control circuit

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

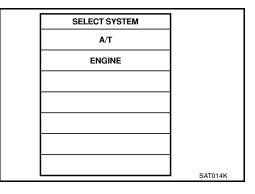
With CONSULT-II

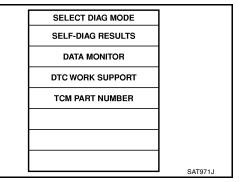
- 1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SEN: 0.4 - 1.5V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).

3. Select "TCC S/V FNCTN P0744" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".



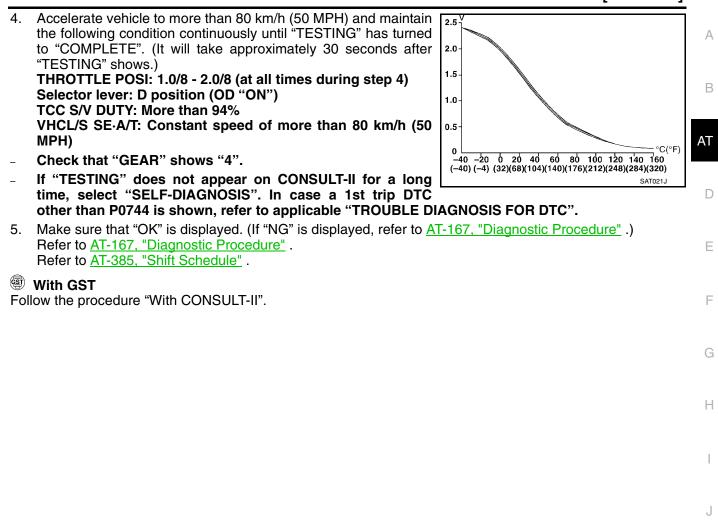


[RE4F03B]

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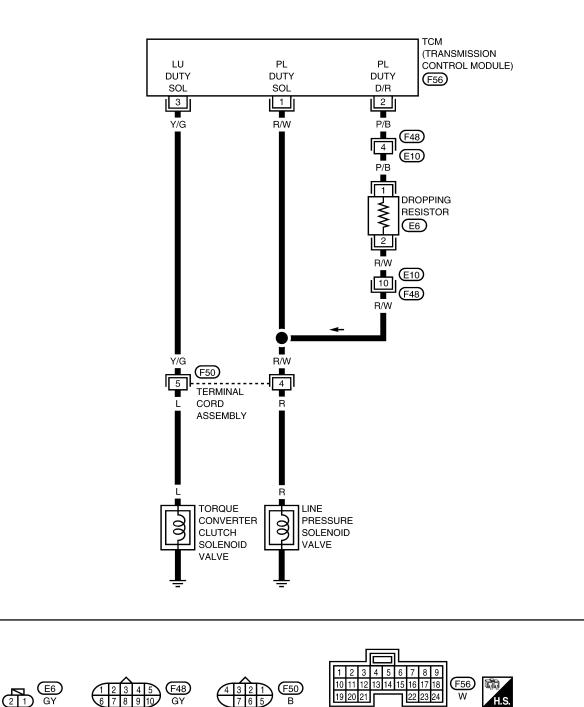
[RE4F03B]

Wiring Diagram — AT — TCCSIG

ECS005XP

AT-TCCSIG-01

DETECTABLE LINE FOR DTC
 NON- DETECTABLE LINE FOR DTC



WCWA0067E

[RE4F03B]

TCM TERMIN	ALS AND REFER	RENCE VALUE MEASURED BET	WEEN EACH TERMINAL AND GROU	JND	
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	A
1	B/W	LINE PRESSURE SOLENOID	WHEN RELEASING ACCELERA- TOR PEDAL (ENGINE WARM)	1.5 - 2.5V	
·	1000	VALVE	WHEN DEPRESSING ACCELER- ATOR PEDAL (ENGINE WARM)	0.5V OR LESS	В
2	P/B	LINE PRESSURE SOLENOID VALVE (WITH DROPPING	WHEN RELEASING ACCELERA- TOR PEDAL (ENGINE WARM)	5 - 14V	AT
2	170	RESISTOR)	WHEN DEPRESSING ACCELER- ATOR PEDAL (ENGINE WARM)	0.5V OR LESS	
3	Y/G	TORQUE CONVERTER	WHEN A/T PERFORMS LOCK- UP	8 - 14V	D
	1/6	CLUTCH SOLENOID VALVE	WHEN A/T DOES NOT PER- FORM LOCK-UP	0V	E

Diagnostic Procedure

ECS005XQ

SAT988H

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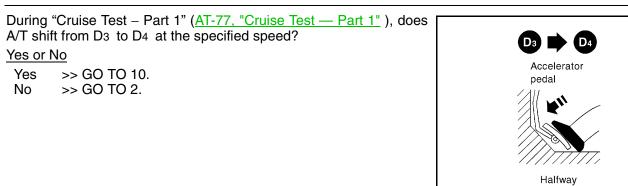
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1. CHECK SHIFT UP (D₃ TO D₄)



2. CHECK LINE PRESSURE

Perform line pressure test. Refer to <u>AT-67, "Line Pressure Test"</u>.

Engine speed rpm D, 2 and 1 positions R position Idle 500 (5.1, 73) 778 (7.9, 113) Stall 1 167 (11.9, 169) 1 816 (18.5, 263)	D, 2 and 1 positions R position			Pa (kg/cm², psi)	
			D, 2 and 1 positions	R position	
Stall 1 167 (11 9 169) 1 816 (18 5 263)	Stall 1,167 (11.9, 169) 1,816 (18.5, 263)	Idle	500 (5.1, 73)	778 (7.9, 113)	
		Stall	1,167 (11.9, 169)	1,816 (18.5, 263)	

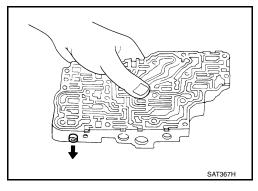
OK >> GO TO 3. NG >> GO TO 6.

3. CHECK CONTROL VALVE

- 1. Disassemble control valve assembly. Refer to <u>AT-298, "Disassembly"</u>.
- 2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

- OK >> GO TO 4.
- NG >> Repair control valve.



4. CHECK SHIFT UP (D3 TO D4)

Does A/T shift from D3 to D4 at the specified speed?

Yes or No

- Yes >> GO TO 5.
- No >> Check transaxle internal components (clutch, brake, etc.).

5. снеск отс

Perform AT-164, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

- OK >> INSPECTION END
- NG >> GO TO 10. Check lock-up condition.

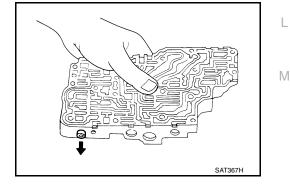
[RE4F03B]

6. CHECK LINE PRESSURE SOLENOID VALVE А 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" . Check line pressure solenoid valve operation. В 2. Refer to AT-177, "Component Inspection" OK or NG AT OK >> GO TO 7. NG >> Replace solenoid valve assembly. D Ε Line préssure solenoid valve F FUSE G Н F50) WAT175 7. CHECK CONTROL VALVE 1. Disassemble control valve assembly. J Refer to AT-298, "Disassembly" .

- 2. Check line pressure circuit valves for sticking.
- Pressure regulator valve _
- Pilot valve
- Pressure modifier valve

OK or NG

- OK >> GO TO 8.
- NG >> Repair control valve.



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8. CHECK SHIFT UP (D3 TO D4)

Does A/T shift from D3 to D4 at the specified speed?

Yes or No

- Yes >> GO TO 9.
- >> Check transaxle internal components (clutch, brake, etc.). No

9. CHECK DTC

Perform AT-164, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE".

OK or NG

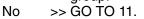
- OK >> INSPECTION END
- NG >> GO TO 10. Check for proper lock-up.

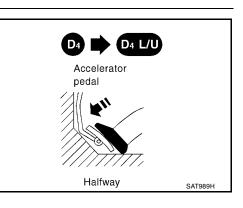
10. CHECK LOCK-UP CONDITION

During "Cruise Test - Part 1" (AT-77, "Cruise Test - Part 1"), does A/T perform lock-up at the specified speed?

Yes or No

>> Perform "Cruise Test - Part 1" (AT-77, "Cruise Test -Yes Part 1") again and return to the start point of this test group.



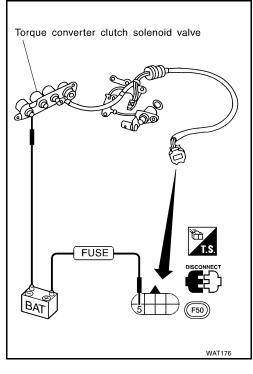


11. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE

- 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" .
- 2. Check torque converter clutch solenoid valve operation. Refer to AT-162, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"

OK or NG

- OK >> GO TO 12.
- NG >> Replace solenoid valve assembly.



[RE4F03B]

12. CHECK CONTROL VALVE	Δ
 Disassemble control valve assembly. Refer to <u>AT-298, "Disassembly"</u>. Check control valves for sticking. Torque converter clutch control valve 	В
Torque converter clutch relief valve OK or NG	AT
OK >> GO TO 13. NG >> Repair control valve.	D
	Е
13. CHECK LOCK-UP CONDITION	F
Does A/T perform lock-up at the specified speed? <u>Yes or No</u> Yes >> GO TO 14.	G
No >> Check transaxle internal components (clutch, brake, etc.).	Н
14. снеск дтс	
Perform <u>AT-164, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE"</u> . OK or NG	
OK >> INSPECTION END NG >> Perform "Cruise Test — Part 1" (<u>AT-77, "Cruise Test — Part 1"</u>) again and return to the start point of this test group.	J
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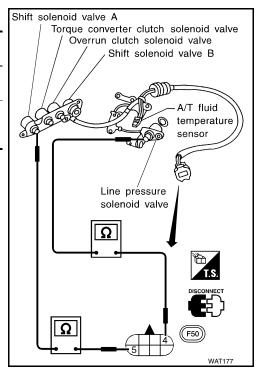
Component Inspection SOLENOID VALVES

• Refer to <u>AT-259, "REMOVAL"</u>.

Resistance Check

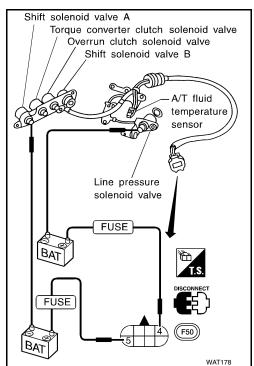
• Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Line pressure solenoid valve	4		2.5 - 5Ω
Torque converter clutch solenoid valve	5	Ground	5 - 20Ω



Operation Check

• Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



Description

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

The line pressure duty cycle value is not consistent when the closed throttle position switch is "ON". To confirm the line pressure duty cycle at low pressure, the accelerator (throttle) should be open until the closed throttle position switch is "OFF".

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approx.)	F
Line pressure solenoid valve duty	Small throttle opening (Low line pressure) ↓ Large throttle opening (High line pressure)	24% ↓ 95%	G

NOTE:

The line pressure duty cycle value is not consistent when the closed throttle position switch is "ON". To confirm the line pressure duty cycle at low pressure, the accelerator (throttle) should be open until the closed throttle position switch is "OFF".

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)	
(I) : L/PRESS SOL/CIRC	TCM detects an improper voltage drop	 Harness or connectors (The solenoid circuit is open or shorted.) 	
E P0745	when it tries to operate the solenoid valve.	Line pressure solenoid valve	,

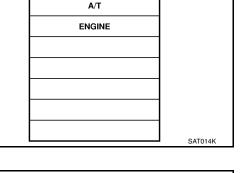
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.

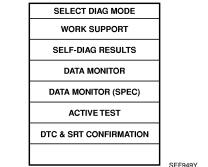


SELECT SYSTEM

2. Depress accelerator pedal completely and wait at least 5 seconds.

With GST

Follow the procedure "With CONSULT-II".



PFP:31940

[RE4F03B]

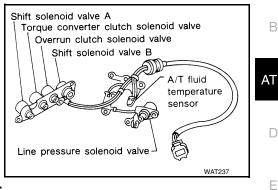
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AT-173

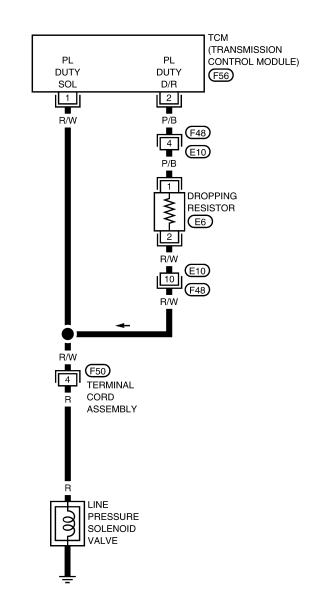
[RE4F03B]

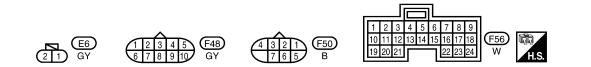
Wiring Diagram — AT — LPSV

ECS005XT

AT-LPSV-01

: DETECTABLE LINE FOR DTC
 : NON- DETECTABLE LINE FOR DTC





WCWA0068E

[RE4F03B]

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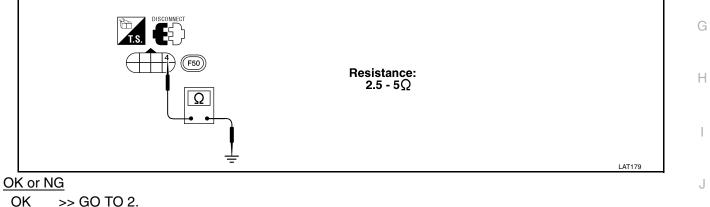
ECS005XU

TERMINALS	TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL						
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	А		
1 R/	LINE PRESSURE		R/W	LINE PRESSURE	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	1.5 - 3.0V	
	I	SOLENOID VALVE		WHEN DEPRESSING ACCELERATOR PEDAL (ENGINE WARM)	0.5V OR LESS	В	
2	P/B	LINE PRESSURE SOLENOID VALVE (WITH DROPPING	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	5 - 14v	AT		
2	170	RESISTOR)	WHEN DEPRESSING ACCELERATOR PEDAL (ENGINE WARM)	0.5V OR LESS			

Diagnostic Procedure

1. CHECK VALVE RESISTANCE

- 1. Turn ignition switch to "OFF" position.
- 2. Disconnect terminal cord assembly connector in engine compartment.
- 3. Check resistance between terminal 4 and ground.

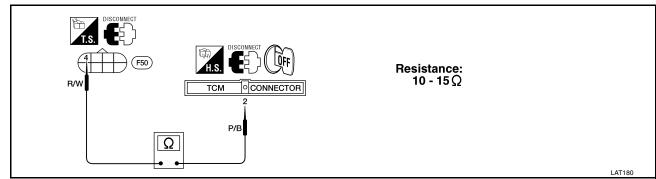


OK	>> GO TO 2.	
NG	>> 1. Remove control valve assembly. Refer to <u>AT-259, "REMOVAL"</u> .	
	2. Check the following items:	K
	 Line pressure solenoid valve Refer to <u>AT-177, "Component Inspection"</u>. 	
	 Harness of terminal cord assembly for short or open 	L

AT-175

2. CHECK POWER SOURCE CIRCUIT

- 1. Turn ignition switch to "OFF" position.
- 2. Disconnect TCM harness connector.
- 3. Check resistance between terminal 4 and TCM harness connector terminal 2.

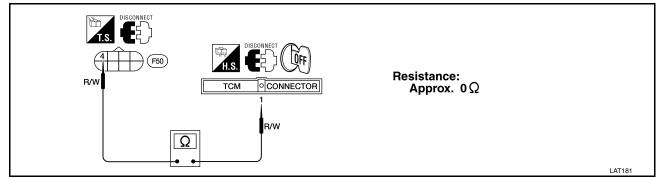


OK or NG

- OK >> GO TO 3.
- NG >> Check the following items:
 - Dropping resistor
 - Refer to AT-178, "DROPPING RESISTOR" .
 - Harness for short or open between TCM terminal 2 and terminal cord assembly (Main harness)

3. CHECK POWER SOURCE CIRCUIT

- 1. Turn ignition switch to "OFF" position.
- 2. Check resistance between terminal 4 and TCM harness connector terminal 1.



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

3. Reinstall any part removed.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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Perform AT-173, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

- OK >> INSPECTION END
- NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

AT-176

Component Inspection LINE PRESSURE SOLENOID VALVE

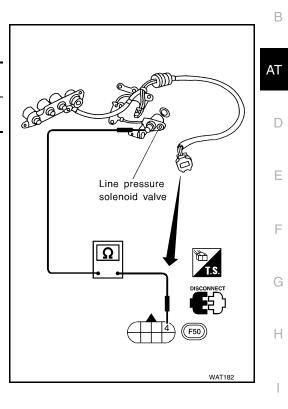
• Refer to <u>AT-259, "REMOVAL"</u>.

Resistance Check

•

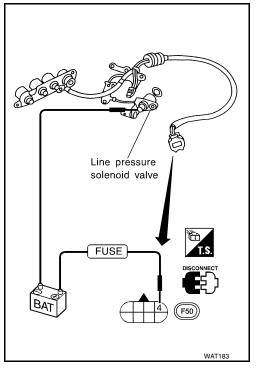
Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Line pressure solenoid valve	4	Ground	2.5 - 5Ω



Operation Check

 Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



[RE4F03B]

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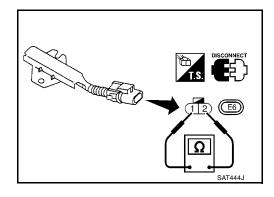
[RE4F03B]

DROPPING RESISTOR

• Check resistance between two terminals.

Resistance

: 10 - 15Ω



DTC P0750 SHIFT SOLENOID VALVE A

Description

Shift solenoid valves A and B are turned "ON" or "OFF" by the TCM in response to signals sent from the PNP switch, vehicle speed sensor and throttle position sensor [accelerator pedal position (APP) sensor]. Gears will then be shifted to the optimum position.

1

ON (Closed)

ON (Closed)

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)
(I) : SFT SOL A/CIRC	TCM detects an improper voltage drop	 Harness or connectors (The solenoid circuit is open or shorted.)
E P0750	when it tries to operate the solenoid valve.	Shift solenoid valve A

2

OFF (Open)

ON (Closed)

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

Gear position

Shift solenoid valve A

Shift solenoid valve B

Always drive vehicle at a safe speed.

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

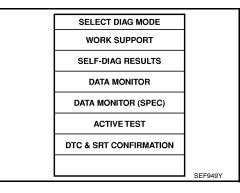
With CONSULT-II

- Turn ignition switch "ON" and select "DATA MONITOR" mode for 1. "ENGINE" with CONSULT-II.
- 2. Start engine.
- Drive vehicle in D position and allow the transmission to shift "1" 3. \rightarrow "2" ("GEAR").

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Follow the procedure "With CONSULT-II".

SELECT SYSTEM]	J
A/T		
ENGINE		K
		L
	1	M
	SAT014K	





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ON (Closed)

OFF (Open)

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ECS005XW

Shift solenoid valve A Torque converter clutch solenoid valve Overrun clutch solenoid valve Shift solenoid valve B AT A/T fluid temperature sensor Line pressure solenoid valve WAT237

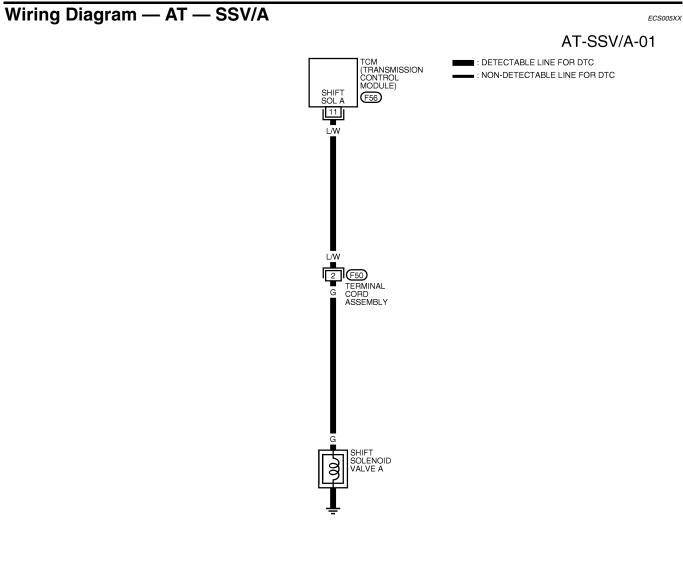
3

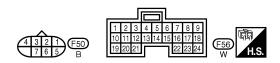
OFF (Open)

OFF (Open)

DTC P0750 SHIFT SOLENOID VALVE A

[RE4F03B]





WAT125

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	11 L/W SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A OPERATES	BATTERY VOLTAGE	
1 ''		SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATE	0V

DTC P0750 SHIFT SOLENOID VALVE A

Diagnostic Procedure

[RE4F03B]

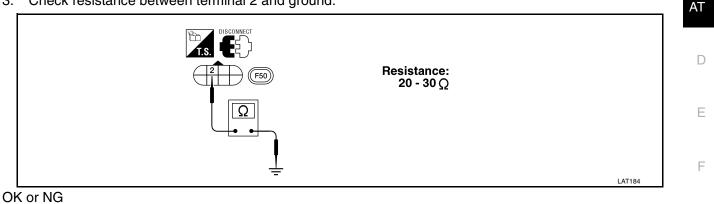


В

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1. CHECK VALVE RESISTANCE

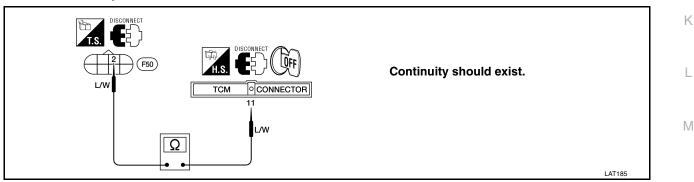
- Turn ignition switch to "OFF" position. 1.
- Disconnect terminal cord assembly connector in engine compartment. 2.
- 3. Check resistance between terminal 2 and ground.



- OK >> GO TO 2.
- NG >> 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" .
 - 2. Check the following items:
 - Shift solenoid valve A
 - Refer to AT-182, "Component Inspection".
 - Harness of terminal cord assembly for short or open

2. CHECK POWER SOURCE CIRCUIT

- Turn ignition switch to "OFF" position. 1.
- 2. Disconnect TCM harness connector.
- З. Check continuity between terminal 2 and TCM harness connector terminal 11.



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

4. Reinstall any part removed.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK DTC

Perform AT-179, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

- OK >> INSPECTION END
- NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

AT-181

DTC P0750 SHIFT SOLENOID VALVE A

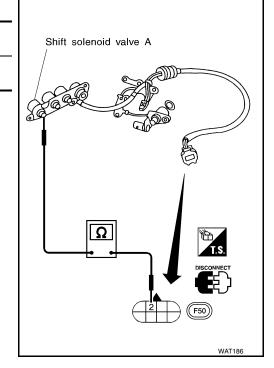
Component Inspection SHIFT SOLENOID VALVE A

• Refer to AT-182, "Component Inspection" .

Resistance Check

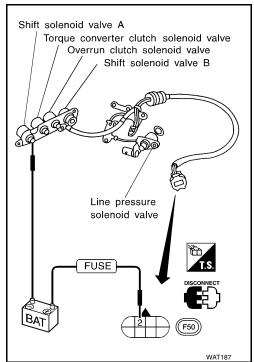
• Check resistance between two terminals.

Solenoid valve	Termi	nal No.	Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω



Operation Check

• Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



ECS005XZ

DTC P0755 SHIFT SOLENOID VALVE B

Description

Shift solenoid valves A and B are turned "ON" or "OFF" by the TCM in response to signals sent from the PNP switch, vehicle speed and throttle position sensors. Gears will then be shifted to the optimum position.

2 3 4 Gear position 1 Shift solenoid valve A ON (Closed) OFF (Open) OFF (Open) ON (Closed) Shift solenoid valve B ON (Closed) ON (Closed) OFF (Open) OFF (Open)

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)
: SFT SOL B/CIRC : P0755	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	 Harness or connectors (The solenoid circuit is open or shorted.) Shift solenoid valve B

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

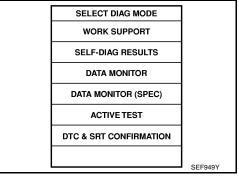
SELECT SYSTEM		J
A/T		
ENGINE		K
		L
		М
	SAT014K	101

With CONSULT-II

- Turn ignition switch "ON" and select "DATA MONITOR" mode for 1 "ENGINE" with CONSULT-II.
- 2. Start engine.
- 3. Drive vehicle in D position and allow the transmission to shift 1 \rightarrow 2 \rightarrow 3 ("GEAR").

With GST

Follow the procedure "With CONSULT-II".



PFP:31940

[RE4F03B]



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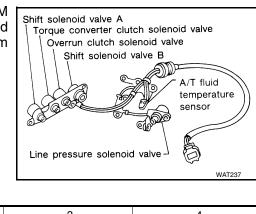
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AT-183

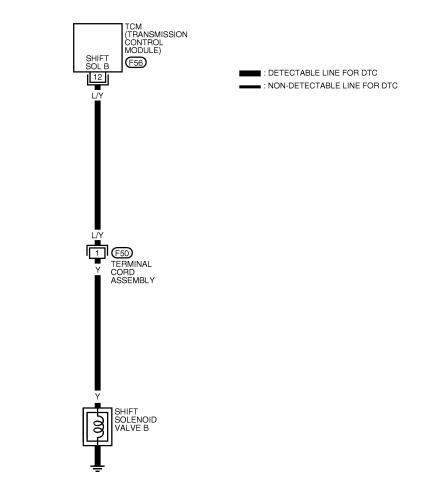
DTC P0755 SHIFT SOLENOID VALVE B

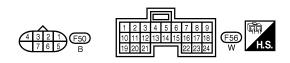
[RE4F03B]

Wiring Diagram — AT — SSV/B

ECS005Y1

AT-SSV/B-01





WAT126

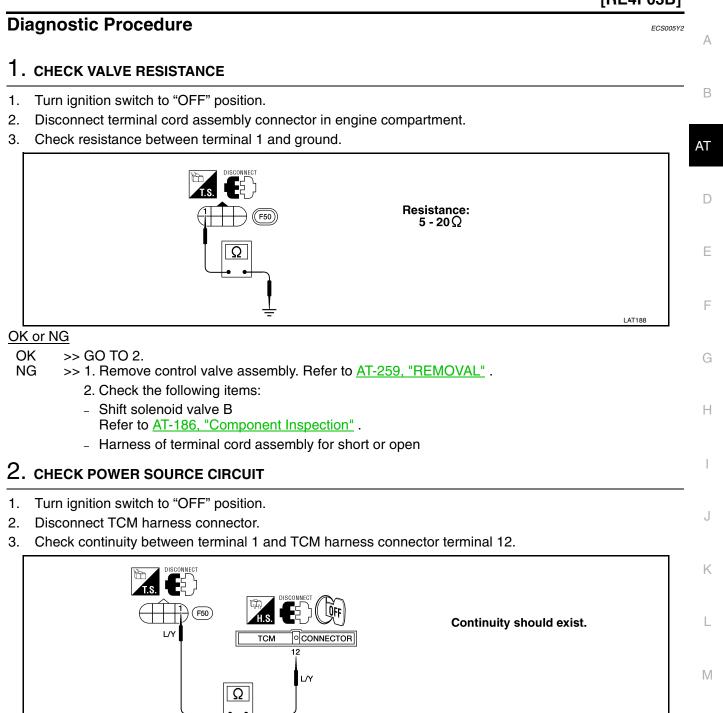
TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
10		SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	0V

DTC P0755 SHIFT SOLENOID VALVE B

[RE4F03B]

LAT189



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

4. Reinstall any part removed.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. снеск отс

Perform AT-183, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

- OK >> INSPECTION END
- NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

AT-185

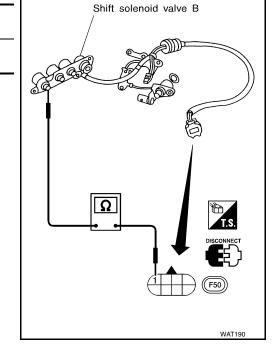
Component Inspection SHIFT SOLENOID VALVE B

• Refer to <u>AT-259, "REMOVAL"</u>.

Resistance Check

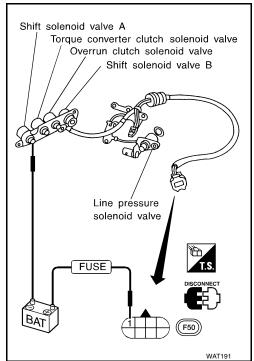
• Check resistance between two terminals.

Solenoid valve	Termi	nal No.	Resistance (Approx.)
Shift solenoid valve B	1	Ground	5 - 20Ω



Operation Check

• Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



[RE4F03B]

[RE4F03B]

DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Description

ECS006GS

The throttle position sensor [accelerator pedal position (APP) sensor] is part of the system that controls throttle position. This system also uses an electric throttle control actuator which consists of a throttle control motor and throttle position sensors. Accelerator pedal position signal is sent to the ECM.

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification	_
Throttle position sensor	Fully-closed throttle	Approximately 0.5V	D
[accelerator pedal position (APP) sensor]	Fully-open throttle	Approximately 4V	_

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On Board Diagnosis Logic

Diagnostic trouble code TP SEN/CIRC A/T with CONSULT-II or P1705 without CONSULT-II is detected when TCM receives an excessively low or high voltage from the ECM.

Possible Cause

Check the following items.

Harness or connectors (The sensor circuit is open or shorted.)

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

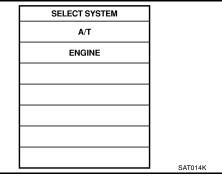
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

Turn ignition switch ON and select "DATA MONITOR" mode for 1 "A/T" with CONSULT-II.

Accelerator pedal condition	THRTL POS SEN	CLOSED THL/SW	W/O THRL/P·SW
Fully released	Less than 4.7V	ON	OFF
Partially depressed	0.1 - 4.6V	OFF	OFF
Fully depressed	1.9 - 4.6V	OFF	ON



If the check result is NG, go to AT-191, "Diagnostic Procedure" If the check result is OK, go to following step.

- 2. Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- З. Start engine and maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.

VHCL SPEED SE: 10 km/h (6 MPH) or more THRTL POS SEN: Approximately 3V or less Selector lever: D position (O/D ON)

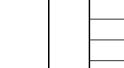
If the check result is NG, go to AT-191, "Diagnostic Procedure" . If the check result is OK, go to following step.

- DATA MONITOR DTC WORK SUPPORT TCM PART NUMBER SAT971
- Maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal com-4. pletely.

VHCL SPEED SE: 10 km/h (6 MPH) or more Accelerator pedal: Wide open throttle Selector lever: D position (O/D ON)

SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K
	- 3A1014K

ENGINE	
	SAT014
	0,1101
SELECT DIAG MODE	
SELF-DIAG BESULTS	



[RE4F03B]

ECS006GT

ECS006GU

ECS006GV

[RE4F03B]

SELECT DIAG MODE	
WORK SUPPORT	
SELF-DIAG RESULTS	
DATA MONITOR	
DATA MONITOR (SPEC)	
ACTIVE TEST	
DTC & SRT CONFIRMATION	
	FF0 (0)/
ş	EF949Y

WITH GST

Follow the procedure "With CONSULT-II".

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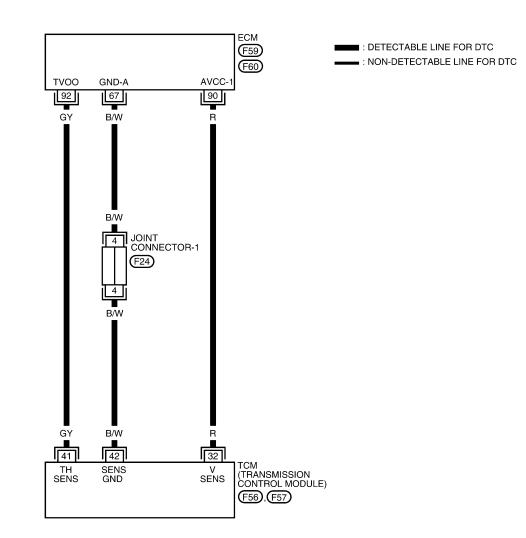
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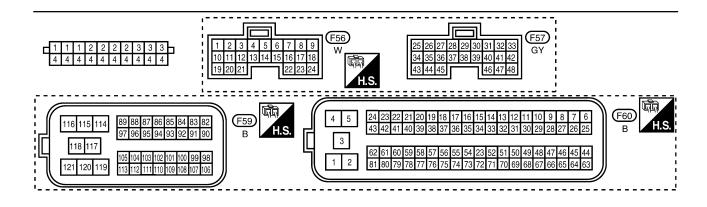
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[RE4F03B]

Wiring Diagram — AT — TPS







WCWA0069E

[RE4F03B]

TERMINALS	AND REFERENC	E VALUE MEASURED BETWEE	N EACH TERMINAL AND 25 OR 48	(TCM GROUND)	
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	A
32	В	SENSOR POWER	IGNITION SWITCH ON	4.5 - 5.5V	
52	п	SENSON FOWEN	IGNITION SWITCH OFF	0V	
41	GY	THROTTLE POSITION SEN- SOR [ACCELERATOR PEDAL	IGNITION ON AND ACCELERA- TOR PEDAL IS DEPRESSED	FULLY CLOSED THROTTLE: 0.5V	В
41	G	POSITION (APP) SENSOR]	SLOWLY AFTER WARMING UP	WIDE OPEN THROTTLE: 4.0V	AT
42	B/W	SENSOR GROUND	_	—	

Diagnostic Procedure

ECS006GX

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1. СНЕСК DTC WITH ECM

 Check P code with CONSULT-II "ENGINE". Turn ignition switch ON and select "SELF DIAGNOSTIC RESULTS" mode for "ENGINE" with CONSULT-II.

Refer to <u>EC-72, "Malfunction Indicator Lamp (MIL)"</u> [QG18DE (ULEV)] or <u>EC-644, "Malfunction Indicator Lamp (MIL)"</u> [QG18DE (SULEV)].

OK or NG

OK (with CONSULT-II)>>GO TO 2.

OK (without CONSULT-II)>>GO TO 3.

NG >> Check throttle position sensor [accelerator pedal position (APP) sensor] circuit for engine control. Refer to <u>EC-260, "DTC P0222, P0223 TP SENSOR"</u> [QG18DE (ULEV)] or <u>EC-808, "DTC P0222, P0223 TP SENSOR"</u> [QG18DE (SULEV)] and <u>EC-501, "DTC P2122, P2123 APP SENSOR"</u> [QG18DE (ULEV)] or <u>EC-1113, "DTC P2122, P2123 APP SENSOR"</u> [QG18DE (SULEV)].

2. CHECK INPUT SIGNAL (WITH CONSULT-II)

With CONSULT-II

- 1. Turn ignition switch to ON position. (Do not start engine.)
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3. Read out the value of "THRTL POS SEN".

DATA MONITOR	
MONITORING	
VHCL/S SE-A/T XXX km/h	
VHCL/S SE-MTR XXX km/h	
THRTL POS SEN XXX V	
FLUID TEMP SE XXX V	
BATTERY VOLT XXX V	
s	SAT614J

Voltage:

Fully-closed throttle

Fully-open throttle

:Approximately 0.5V :Approximately 4V

OK or NG

OK >> GO TO 4.

NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor [accelerator pedal position (APP) sensor] circuit. (Main harness)

[RE4F03B]

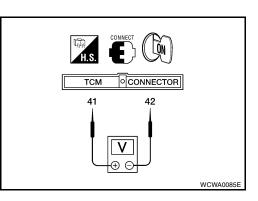
3. CHECK INPUT SIGNAL (WITHOUT CONSULT-II)

Without CONSULT-II

- 1. Turn ignition switch to ON position. (Do not start engine.)
- 2. Check voltage between TCM terminals 41 (GY) and 42 (B/W) while accelerator pedal is depressed slowly.

Voltage:

Fully-closed throttle valve	:Approximately 0.5V
Fully-open throttle valve	:Approximately 4V
(Voltage rises gradually in tion.)	n response to throttle posi-



OK or NG

OK >> GO TO 4.

NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor [accelerator pedal position (APP) sensor] circuit. (Main harness)

4. CHECK TCM INSPECTION

- 1. Perform TCM input/output signal inspection.
- 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

Description

The overrun clutch solenoid valve is activated by the TCM in response to signals sent from the inhibitor switch, overdrive control switch, vehicle speed and throttle position sensors. The overrun clutch operation will then be controlled.

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)
: O/R CLTCH SOL/CIRC : P1760	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	 Harness or connectors (The solenoid circuit is open or shorted.) Overrun clutch solenoid valve

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

TESTING CONDITION:

Always drive vehicle on a level road to improve accuracy of test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

- 1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 2. Start engine.
- 3. Accelerate vehicle to a speed of more than 10 km/h (6 MPH) with "D" position (OD "ON").
- 4. Release accelerator pedal completely with "D" position (OD "OFF").

With GST

Follow the procedure "With CONSULT-II".

SELECT SYSTEM]
A/T	
ENGINE	
	1
	1
	1
	SAT014K

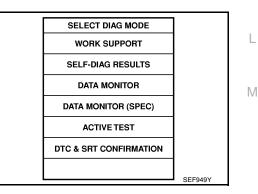
Shift solenoid valve A

Torque converter clutch solenoid valve

Overrun clutch solenoid valve

Shift solenoid valve B

Line pressure solenoid valve



A/T fluid temperature sensor



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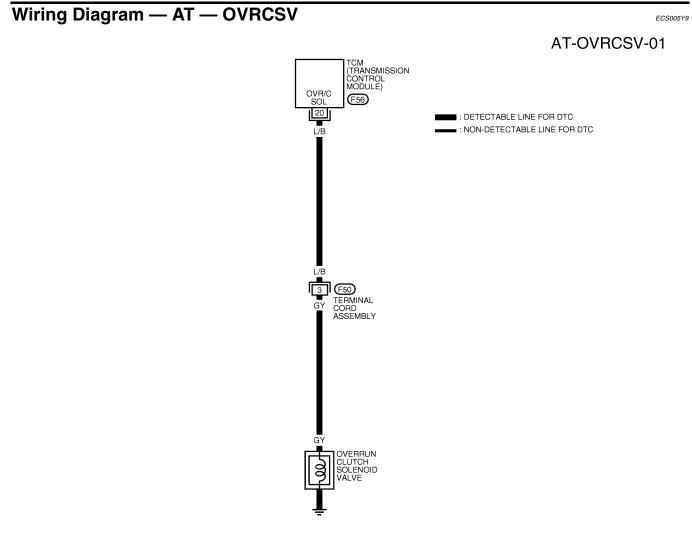
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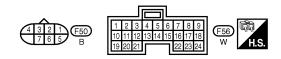
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WAT237

[RE4F03B]





WAT128

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.
20	L/B	OVERRUN CLUTCH	WHEN OVERRUN CLUTCH SOLENOID VALVE OPERATES	BATTERY VOLTAGE
20		SOLENOID VALVE	WHEN OVERRUN CLUTCH SOLENOID VALVE DOES NOT OPERATE	0V

[RE4F03B]

Diagnostic Procedure ECS005YA А **1. CHECK VALVE RESISTANCE** В Turn ignition switch to "OFF" position. 1. Disconnect terminal cord assembly connector in engine compartment. 2. 3. Check resistance between terminal 3 and ground. AT **Resistance:** 20 - 30 () Ω Ε F LAT195 OK or NG OK >> GO TO 2. NG >> 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" . 2. Check the following items: - Overrun clutch solenoid valve Н Refer to AT-196, "Component Inspection". - Harness of terminal cord assembly for short or open 2. CHECK POWER SOURCE CIRCUIT Turn ignition switch to "OFF" position. 1. 2. Disconnect TCM harness connector. З. Check continuity between terminal 3 and TCM harness connector terminal 20. Κ -) (F50) L Continuity should exist. L/B тсм CONNECTOR 20 M L/B Ω LAT196 If OK, check harness for short to ground and short to power.

- 4. Reinstall any part removed.
- OK or NG
- OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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Perform AT-193, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

- OK >> INSPECTION END
- NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

AT-195

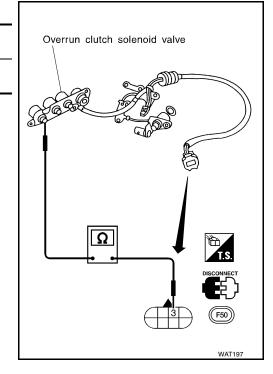
Component Inspection OVERRUN CLUTCH SOLENOID VALVE

• Refer to AT-196, "Component Inspection" .

Resistance Check

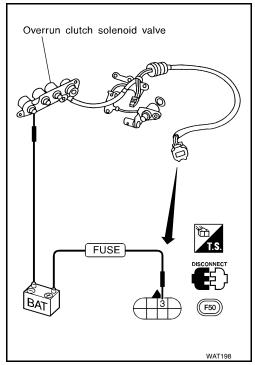
• Check resistance between two terminals.

Solenoid valve	Termi	nal No.	Resistance (Approx.)
Overrun clutch solenoid valve	3	Ground	20 - 30Ω



Operation Check

 Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



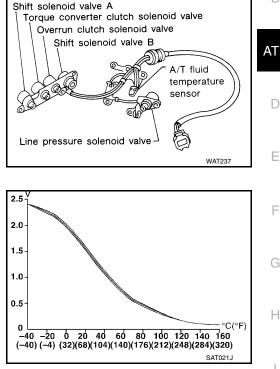
ECS005YB

[RE4F03B]

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM **POWER SOURCE)**

Description

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



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition		ication prox.)	_ 0
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ	K

ON BOARD DIAGNOSIS LOGIC

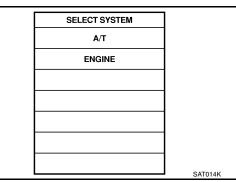
Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)	
 BATT/FLUID TEMP SEN Sth judgement flicker 	TCM receives an excessively low or high voltage from the sensor.	 Harness or connectors (The sensor circuit is open or shorted.) A/T fluid temperature sensor 	Μ

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

- Start engine. 1.
- Select "DATA MONITOR" mode for "A/T" with CONSULT-II. 2.
- Drive vehicle under the following conditions: 3. Selector lever in "D", vehicle speed higher than 20 km/h (12 MPH).
- **Without CONSULT-II**
- Start engine. 1.



PFP:31940

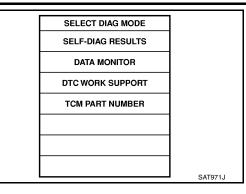
ECS005YC

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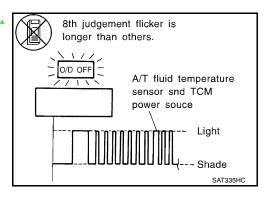
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[RE4F03B]

 Drive vehicle under the following conditions: Selector lever in "D", vehicle speed higher than 20 km/h (12 MPH).



3. Perform self-diagnosis. Refer to TCM Self-diagnostic Procedure (No Tools), <u>AT-51.</u> <u>"TCM Self-diagnostic Procedure (No Tools)"</u>.



Wiring Diagram — AT — BA/FTS ECS005YD А AT-BA/FTS-01 IGNITION SWITCH ON OR START BATTERY FUSE В BLOCK (J/B) Q Q REFER TO "PG-POWER". 10A 10A 12 11 (M1) : DETECTABLE LINE FOR DTC 10L 8K (M2) : NON-DETECTABLE LINE FOR DTC AT Т Т R/B BR/R A/T FLUID TEMPERATURE SENSOR D w в Ε TERMINAL CORD M19 ASSEMBLY 16 6 (F50) (E108) Т BR/R BR в/w F R/B (M60) (F28) R/B (E9) L⁵ (F47) B/W BR/R JOINT CONNECTOR-1 4 Н (F24) в/w J B/W BR/R BR/R BR в/w R/B 58 28 42 47 19 10 TCM (TRANSMISSION CONTROL ECM OIL TEMP SENS GND SENS MEMORY GND-A V IG V IG (F22) B/U Κ MODULE) F56 , F57

REFER TO THE FOLLOWING. □ 4K 5K 6K 7K M1 2K13K14K15K 6K W 6L 7L 8L 9L 10L 11L 12L □4L5L M2

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 3
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 1K 2K 3K (F60) - ELECTRICAL UNITS E108 8K 9K 10K 11K 12K 13K 14K 15K 16K W w 1 **2** 2 3 4 5 6 F28 W F47 GY (F24) 3 4 3 2 (F50) (1)8 765. Δ 4 4 4 4 4 4 4 4 4 BR 3 4 5 6 7 8 9 27 28 29 30 31 1 2 32 33 12 13 14 15 16 17 18 34 40 41 42 10 11 37 38 39 (F56 (F57 43

WCWA0070E

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[RE4F03B]

TERMINALS	AND REFEREN	CE VALUE MEASURED BETW	EEN EACH TERMINAL AND GROUND	
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
10	Brin	I OWEN BOOMBE	WHEN TURNING IGNITION SWITCH TO "OFF"	0V
19	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
19	Dn/n	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "OFF"	0V
28	R/B	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "OFF"	BATTERY VOLTAGE
20	n/D	(MEMORY BACK UP)	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
42	B/W	GROUND (A/T FLUID TEMPERATURE SENSOR)	_	0V
47	BR	A/T FLUID TEMPERATURE	WHEN ATF TEMPERATURE IS 20°C (68°F)	APPROX. 1.5V
47	Ъп	SENSOR	WHEN ATF TEMPERATURE IS 80°C (176°F)	APPROX. 0.5V

Diagnostic Procedure

ECS005YE

1. CHECK TCM POWER SOURCE

- 1. Turn ignition switch to "ON" position. (Do not start engine.)
- 2. Check voltage between TCM terminals 10, 19, 28 and ground.

Voltage

: Battery voltage

- 3. Turn ignition switch to "OFF" position.
- 4. Check voltage between TCM terminal 28 and ground.

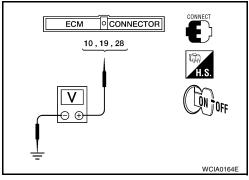
: Battery voltage

OK or NG

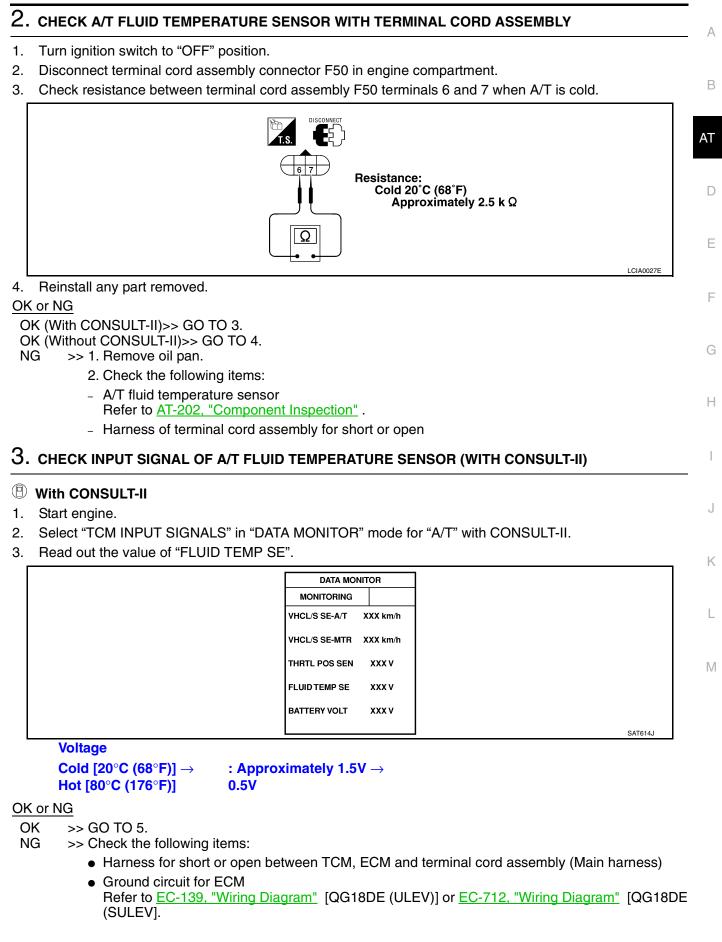
OK >> GO TO 2.

Voltage

- NG >> Check the following items:
 - Harness for short or open between ignition switch and TCM (Main harness)
 - Harness for short or open between battery and TCM (Main harness)
 - Ignition switch and fuse Refer to <u>PG-2, "POWER SUPPLY ROUTING"</u>.



[RE4F03B]



AT-201

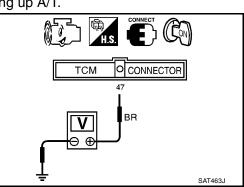
[RE4F03B]

4. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (WITHOUT CONSULT-II)

Without CONSULT-II

- 1. Start engine.
- 2. Check voltage between TCM terminal 47 and ground while warming up A/T.

- 3. Turn ignition switch to "OFF" position.
- 4. Disconnect TCM harness connector.

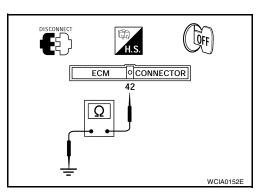


5. Check resistance between terminal 42 (B/W) and ground.

Continuity should exist.

OK or NG

- OK >> GO TO 5.
- NG >> Check the following items:
 - Harness for short or open between TCM, ECM and terminal cord assembly (Main harness)
 - Ground circuit for ECM Refer to <u>EC-139</u>, "Wiring Diagram" [QG18DE (ULEV)] or<u>EC-712, "Wiring Diagram"</u> [QG18DE (SULEV)].



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Perform AT-197, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

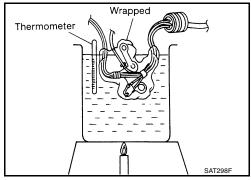
OK >> INSPECTION END

- NG >> 1. Perform TCM input/output signal inspection.
 - 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection A/T FLUID TEMPERATURE SENSOR

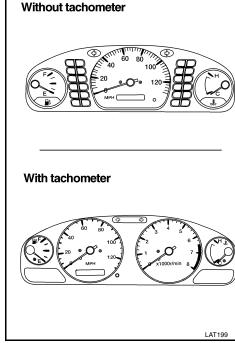
- Refer to <u>AT-259, "REMOVAL"</u>.
- Check resistance between two terminals while changing temperature as shown.

Temperature °C (°F)	Resistance (approx.)
20 (68)	2.5 kΩ
80 (176)	0.3 kΩ



Description

The vehicle speed sensor MTR is built into the speedometer assembly. The sensor functions as an auxiliary device to the revolution sensor when it is malfunctioning. The TCM will then use a signal sent from the vehicle speed sensor MTR.



ON BOARD DIAGNOSIS LOGIC

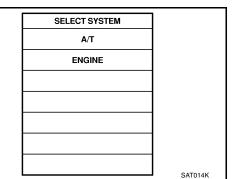
Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)
(I): VHCL SPEED SEN-MTR	TCM does not receive the proper voltage	 Harness or connectors (The sensor circuit is open or shorted.)
🕲 : 2nd judgement flicker	signal from the sensor.	Vehicle speed sensor

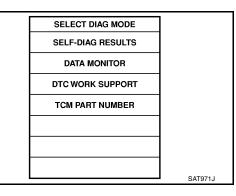
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE CAUTION:

- Always drive vehicle at a safe speed.
- If conducting this "DTC CONFIRMATION PROCEDURE" again, always turn ignition switch "OFF" and wait at least 5 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

- With CONSULT-II
- 1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- Start engine and accelerate vehicle from 0 to 25 km/h (0 to 16 MPH).
- Without CONSULT-II
- 1. Start engine.
- Drive vehicle under the following conditions: Selector lever in "D" and vehicle speed higher than 25 km/h (16 MPH).





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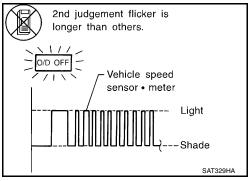
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3. Perform self-diagnosis. Refer to "TCM Self-diagnostic Procedure (No Tools)", <u>AT-51.</u> <u>"TCM Self-diagnostic Procedure (No Tools)"</u>.



[RE4F03B] Wiring Diagram — AT — VSSMTR ECS005YH А IGNITION SWITCH ON OR START BATTERY AT-VSSMTR-01 FUSE BLOCK (J/B) В Q Ò 10A REFER TO "PG-POWER". 10A 12 30 ■ : DETECTABLE LINE FOR DTC (M1) : NON-DETECTABLE LINE FOR DTC 10L (M2) 1K ΤΚ : WITH TACHOMETER AT Т R/В : WITHOUT TACHOMETER EK D *1 *2 COMBINATION METER : 42 тк` M29 , M30 * : 25 Ε EK тк) : 41 *2 UNIFIED METER CONTROL UNIT (WITH ODO/TRIP METER) ЕК 🕻 : 26 F тк 🕻 : 47 *3 : 29 EK *****3 ТΚ : 13 *4 R/Y Т EK : 2 PU/R (M58) (M60) 3 (F26) (F28) Н R/Y PU/R VEHICLE SPEED SENSOR \sim (F43) 2 B/Y PŪ/R 40 Κ TCM (TRANSMISSION CONTROL MODULE) SP B/Y SENS (F34) (F57) L Μ 4K5K6K7K M1 1L 2L 1K 2K 3K 3L (M29) (M29) 6L 7L 8L 9L 10L 11L 12L 12K 13K 14K 15K 16K 8K 9K 10K 11K W EK TK W BR (M30) M30 30 31 32 33 EK 25 26 27 28 29 🖻 25 26 27 28 29 30 **-**31 32 33 34 TK 36 37 38 39 40 41 42 43 44 45 46 47 48 34 35 36 37 38 39 40 41 42 43 44 BR N 12 **F**43 1 2 3 🗖 □ 4 5 6 7 (F26 1 10 2 F28 26 27 28 29 30 31 32 33 (F57) Ŵ 8 9 10 11 12 13 14 15 16 GY 3 4 W 5 6 GΥ 39 40 41 42 37 38 GY HS 43 44 45 46 47 48

AT-205

[RE4F03B]

TERMINALS	AND REFEREN	CE VALUE MEASURED BETW	VEEN EACH TERMINAL	
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
40	PU/R	VEHICLE SPEED SENSOR	WHEN MOVING VEHICLE AT 2 TO 3 KM/H (1 TO 2 MPH) FOR 1 m (3ft) OR MORE	VOLTAGE VARIES FROM GREATER THAN 1V TO LESS THAN 4.5 V

Diagnostic Procedure

ECS005YI

1. CHECK INPUT SIGNAL

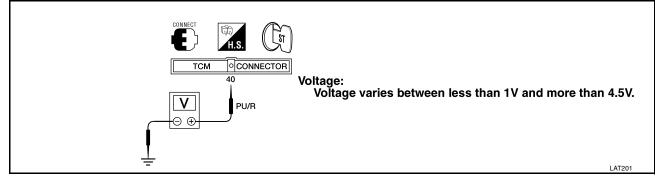
With CONSULT-II

- 1. Start engine.
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3. Read out the value of "VHCL/S SE·MTR" while driving. Check the value changes according to driving speed.

A		
		TOD
DA		ЮК
MONITO	RING	
VHCL/S SE	A/T X	XXX km/h
VHCL/S SE	MTR X	XXX km/h
THRTL POS	SEN	xxx v
FLUIDTEM	' SE	xxx v
BATTERY V	OLT	xxx v

Without CONSULT-II

- 1. Start engine.
- Check voltage between TCM terminal 40 and ground while driving at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.



OK or NG

OK >> GO TO 2.

- NG >> Check the following items:
 - Vehicle speed sensor and ground circuit for vehicle speed sensor Refer to <u>DI-26, "VEHICLE SPEED SENSOR SIGNAL CHECK"</u>.
 - Harness for short or open between TCM and vehicle speed sensor (Main harness)

[RE4F03B]

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Perforr	m AT-203, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE"	
OK or NG		
OK NG	>> INSPECTION END>> 1. Perform TCM input/output signal inspection.	
NG	 If NG, recheck TCM pin terminals for damage or loose connection with harness connector. 	

DTC U1000 CAN COMMUNICATION LINE

Description

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

On Board Diagnosis Logic

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "CAN COMM CIRCUIT" with CONSULT-II or U1000 without CONSULT-II is detected when TCM cannot communicate to other control unit.

Possible Cause

Harness or connectors (CAN communication line is open or shorted.)

DTC Confirmation Procedure

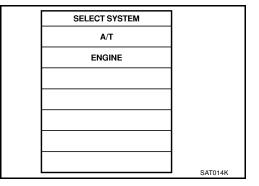
NOTE:

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

After the repair, perform the following procedure to confirm the malfunction is eliminated.

(I) WITH CONSULT-II

- Turn ignition switch to ON position. (Do not start engine.) 1.
- 2. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 3. Start engine and wait for at least 6 seconds.
- If DTC is detected, go to AT-210, "Diagnostic Procedure". 4.



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Follow the procedure "WITH CONSULT-II".

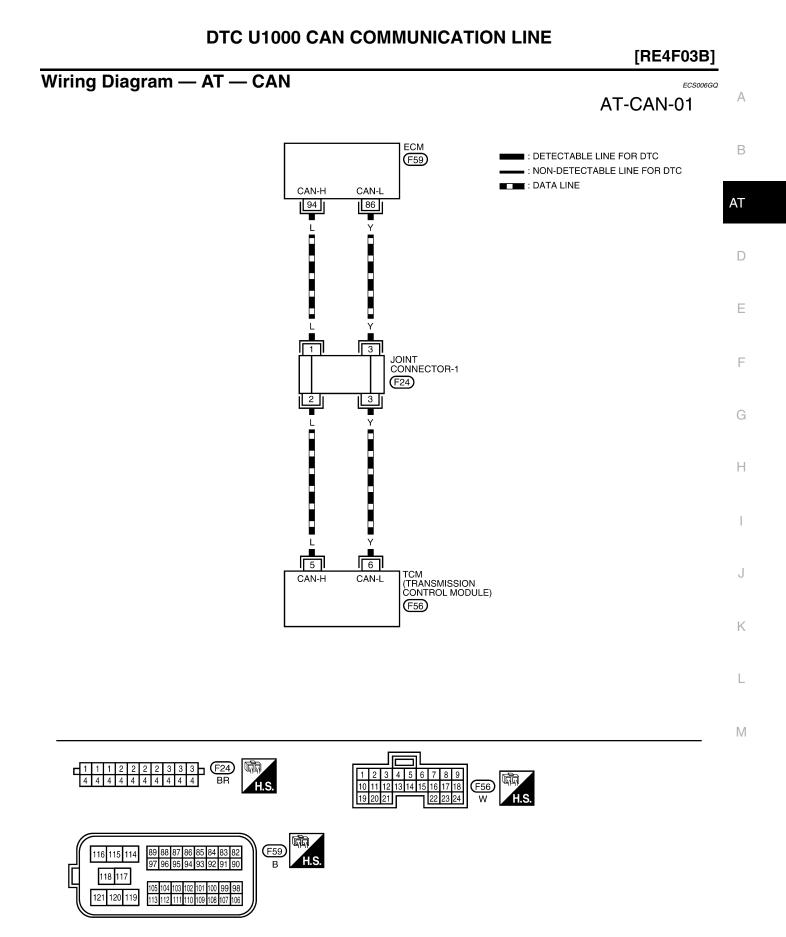
PFP:23710 ECS006GM

[RE4F03B]

ECS006GN

ECS006GO

ECS006GP



WCWA0072E

Diagnostic Procedure

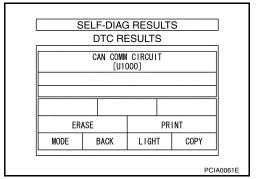
(I) With CONSULT-II

1. CHECK CAN COMMUNICATION CIRCUIT

- 1. 2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3. The "CAN COMM CIRCUIT" is detected.

Yes or No

- Yes >> Print out CONSULT-II screen, GO TO 2.
- >> INSPECTION END. No



2. CHECK CAN COMMUNICATION SIGNALS

- (With CONSULT-II
- 1. Turn ignition switch to ON position. (Do not start engine.)
- 2. Select "CAN COMM SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.

>> Print out CONSULT-II screen, go to AT-31, "CAN Communication" .

CAN COMMUNICATION SIGNALS

Normal conditions	Abnormal conditions (examples)	
CAN COMM : OK	CAN COMM : OK	
CAN CIRC 1 : OK	CAN CIRC 1 : UNKWN	
CAN CIRC 2 : OK	CAN CIRC 2 : UNKWN	
CAN CIRC 3 : OK	CAN CIRC 3 : UNKWN	
CAN CIRC 4 : OK	CAN CIRC 4 : UNKWN	
CAN CIRC 5 : UNKWN	CAN CIRC 5 : UNKWN	
CAN CIRC 6 : UNKWN	CAN CIRC 6 : UNKWN	

ECS006GR

DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)

Description

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T.

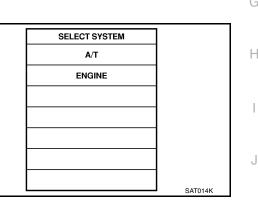
ON BOARD DIAGNOSIS LOGIC

Diagnostic Trouble Code No.	Malfunction is detected when	Check Item (Possible Cause)
(I) : CONTROL UNIT (RAM), CONTROL UNIT (ROM)	TCM memory (RAM) or (ROM) is malfunc- tioning.	• ТСМ

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE NOTE:

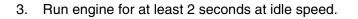
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

- With CONSULT-II
- Turn ignition switch "ON" and select "DATA MONITOR" mode for 1. A/T with CONSULT-II.
- 2. Start engine.



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SELECT DIAG MODE		
SELF-DIAG RESULTS		
DATA MONITOR		L
DTC WORK SUPPORT		
TCM PART NUMBER		M
	SAT971J	

Diagnostic Procedure

1. INSPECTION START (WITH CONSULT-II)

With CONSULT-II

- 1. Turn ignition switch "ON" and select "SELF DIAGNOSIS" mode for A/T with CONSULT-II.
- 2. Touch "ERASE".

>> GO TO 2.

PFP:31036

SAT574J

ECS005YJ

[RE4F03B]

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Perform AT-211, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

>> GO TO 3.

3. CHECK DTC AGAIN

Is the "CONTROL UNIT (RAM)" or "CONTROL UNIT (ROM)" displayed again?

Yes or No

- Yes >> Replace TCM.
- No >> INSPECTION END

DTC CONTROL UNIT (EEP ROM)

Description

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T.

ON BOARD DIAGNOSIS LOGIC

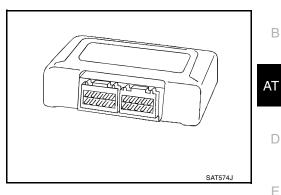
Diagnostic trouble code	Malfunction is detected when	Check item (Possible cause)
(E) : CONT UNIT (EEP ROM)	TCM memory (EEP ROM) is malfunction- ing.	• TCM

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

- With CONSULT-II
- Turn ignition switch "ON" and select "DATA MONITOR" mode for 1. A/T with CONSULT-II.
- 2. Start engine.
- 3. Run engine for at least 2 seconds at idle speed.

Κ SELECT DIAG MODE SELF-DIAG RESULTS DATA MONITOR L DTC WORK SUPPORT TCM PART NUMBER Μ SAT971J



SELECT SYSTEM

A/T

ENGINE

[RE4F03B]

PFP:31036

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Diagnostic Procedure

[RE4F03B]

ECS005YM

1. СНЕСК DTC

(I) With CONSULT-II

- 1. Turn ignition switch "ON" and select "SELF DIAGNOSIS" mode for A/T with CONSULT-II.
- 2. Move selector lever to "R" position.
- 3. Depress accelerator pedal (Full throttle position).
- 4. Touch "ERASE".
- 5. Turn ignition switch "OFF" position for 10 seconds.

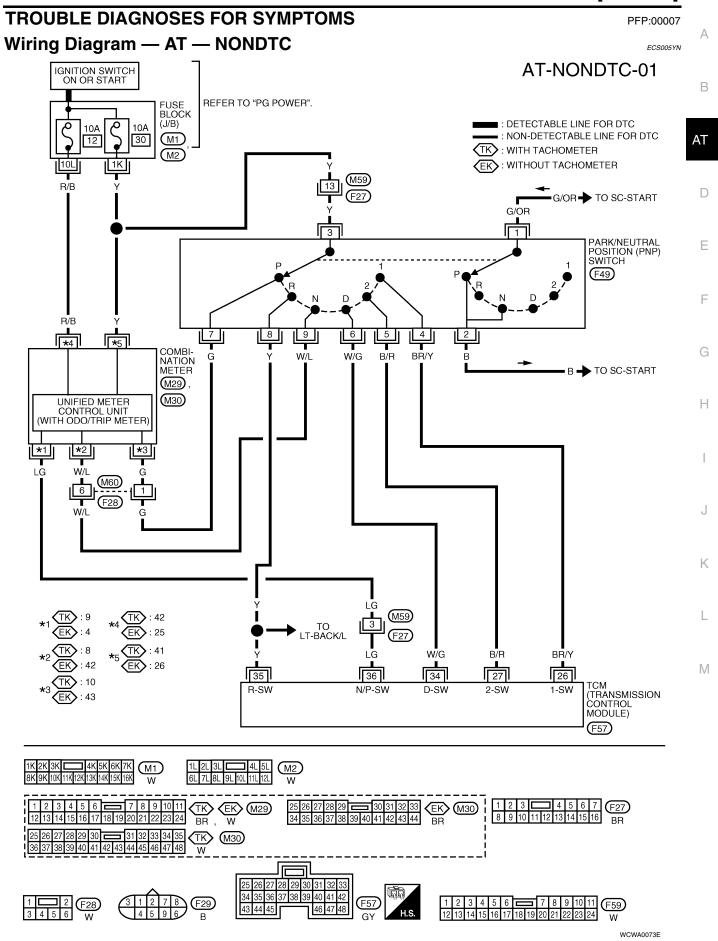
Perform AT-213, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

Is the "CONT UNIT (EEP ROM)" displayed again?

- Yes >> Replace TCM.
- No >> INSPECTION END

TROUBLE DIAGNOSES FOR SYMPTOMS

[RE4F03B]

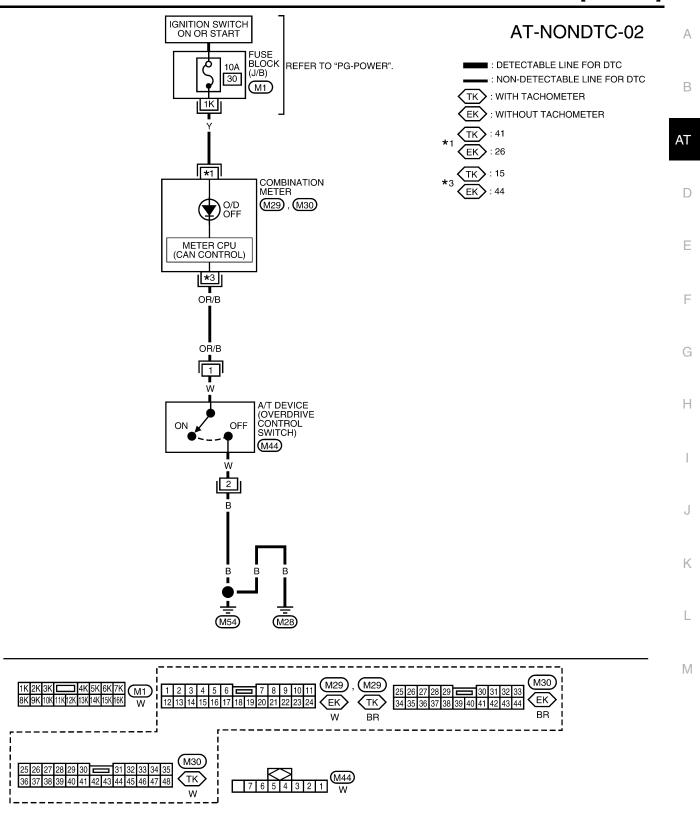


TROUBLE DIAGNOSES FOR SYMPTOMS

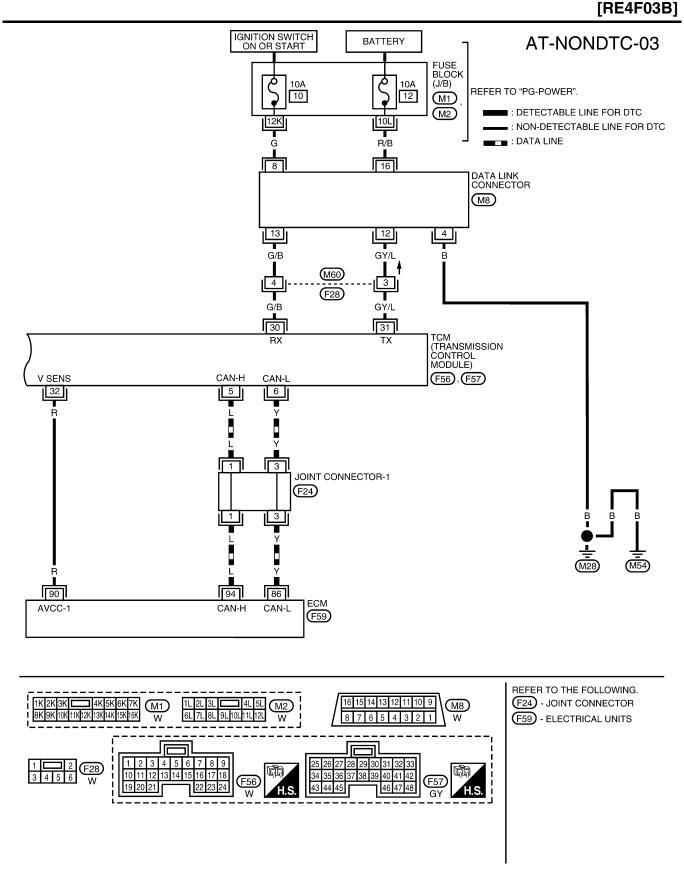
[RE4F03B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
26	BR/Y	PNP SWITCH "1" POSITION	WHEN SETTING SELECTOR LEVER TO "1" POSITION	BATTERY VOLTAGE
20			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	٥V
27	B/R	PNP SWITCH "2" POSITION	WHEN SETTING SELECTOR LEVER TO "2" POSITION	BATTERY VOLTAGE
21			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	٥V
34	W/G	G PNP SWITCH "D" POSITION	WHEN SETTING SELECTOR LEVER TO "D" POSITION	BATTERY VOLTAGE
54			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	٥V
35	G/Y	G/Y PNP SWITCH "R" POSITION	WHEN SETTING SELECTOR LEVER TO "R" POSITION	BATTERY VOLTAGE
35			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	٥V
36	IG	LG PNP SWITCH "N" OR "P" POSITION	WHEN SETTING SELECTOR LEVER TO "N" OR "P" POSITION	BATTERY VOLTAGE
30			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	٥V

[RE4F03B]



WCWA0074E



TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND

AT-218

WCWA0075E

[RE4F03B]

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	٨
5	L	CAN-H	<u> </u>	—	A
6	Y	CAN-L	_	—	
30	G/B	DATA LINK CONNECTOR (RX)	_	—	В
31	GY/L	DATA LINK CONNECTOR (TX)		_	
32	P		IGNITION SWITCH ON	APPROX. 4.5 - 5.5V	
	п	SENSON FOWER	IGNITION SWITCH OFF	APPROX. 0V	AT
	5 6 30 31	5 L 6 Y 30 G/B 31 GY/L	5LCAN-H6YCAN-L30G/BDATA LINK CONNECTOR (RX)31GY/LDATA LINK CONNECTOR (TX)	5 L CAN-H 6 Y CAN-L 30 G/B DATA LINK CONNECTOR (RX) 31 GY/L DATA LINK CONNECTOR (TX) 32 R SENSOR POWER	5LCAN-H——6YCAN-L——30G/BDATA LINK CONNECTOR (RX)——31GY/LDATA LINK CONNECTOR (TX)——32RSENSOR POWERIGNITION SWITCH ONAPPROX. 4.5 - 5.5V

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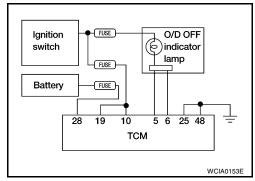
AT-219

[RE4F03B]

1. O/D OFF Indicator Lamp Does Not Come On

SYMPTOM:

O/D OFF indicator lamp does not come on for about 2 seconds when turning ignition switch to "ON".



1. CHECK TCM POWER SOURCE

- 1. Turn ignition switch to "ON" position. (Do not start engine.)
- 2. Check voltage between TCM terminals 10, 19, 28 and ground.

Voltage

: Battery voltage

- 3. Turn ignition switch to "OFF" position.
- 4. Check voltage between TCM terminal 28 and ground.

Voltage

: Battery voltage

OK or NG

OK >> GO TO 2.

NG >> Check the following items:

- Harness for short or open between ignition switch and TCM (Main harness). Refer to <u>AT-112, "Wiring Diagram — AT — MAIN"</u>.
- Harness for short or open between battery and TCM (Main harness) Refer to <u>AT-112, "Wiring</u> <u>Diagram — AT — MAIN"</u>.
- Ignition switch and fuse. Refer to PG-2, "POWER SUPPLY ROUTING" .

2. CHECK TCM GROUND CIRCUIT

- 1. Turn ignition switch to "OFF" position.
- 2. Disconnect TCM harness connector.
- 3. Check continuity between TCM terminals 25, 48 and ground.

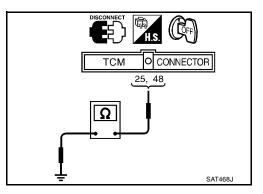
Continuity should

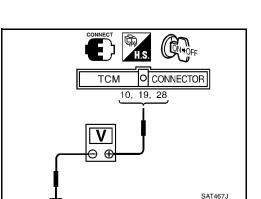
exist. If OK, check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors. Refer to <u>AT-112, "Wiring Dia-</u> <u>gram — AT — MAIN"</u>.





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[RE4F03B]

3. CHECK SELF-DIAGNOSIS RESULTS	А
 With CONSULT-II Does "SELECTION FORM MENU" in "DATA MONITOR" show damage to O/D OFF indicator lamp (SELF D DP LMP) signal circuit? No Tools Execute the self-diagnosis. Is a malfunction in the CAN communication indicated in the results? 	В
YES or NO YES >> Check the CAN communication line. Refer to AT-208, "DTC U1000 CAN COMMUNICATION LINE". NO >> GO TO 4.	AT D
4. CHECK O/D OFF INDICATOR LAMP CIRCUIT	
 Turn ignition switch to "OFF" position. Check the combination meter. Refer to <u>DI-8, "Combination Meter"</u> 	Ε
OK or NG OK >> GO TO 5.	F
NG >> Replace the combination meter. 5. CHECK SYMPTOM	G
Check again. OK or NG	Н
 OK >> INSPECTION END NG >> 1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector. 	I
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2. Engine Cannot Be Started In "P" and "N" Position

SYMPTOM:

- Engine cannot be started with selector lever in "P" or "N" position.
- Engine can be started with selector lever in "D", "2", "1" or "R" position.

1. CHECK PNP SWITCH CIRCUIT

With CONSULT-II

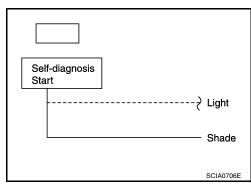
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit?

Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to <u>AT-115, "DTC P0705</u> <u>PARK/NEUTRAL POSITION (PNP) SWITCH"</u>.
- No >> GO TO 2.



2. CHECK PNP SWITCH INSPECTION

Check for short or open of PNP switch harness connector terminals 1 and 2. Refer to <u>AT-117, "Diagnostic Procedure"</u>.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace PNP switch.

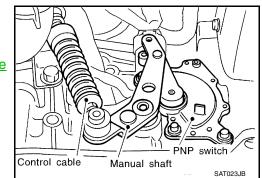
3. CHECK CONTROL CABLE

Check control cable. Refer to AT-262, "Control Cable Adjustment"

OK or NG

OK >> GO TO 4.

NG >> Adjust control cable. Refer to <u>AT-262, "Control Cable</u> <u>Adjustment"</u>.



4. CHECK STARTING SYSTEM

Check starting system. Refer to <u>SC-9, "STARTING SYSTEM"</u>.

OK or NG

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

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[RE4F03B]

3. In "P" Position, Vehicle Moves Forward Or Backward When Pushed

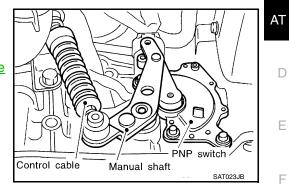
SYMPTOM:

Vehicle moves when it is pushed forward or backward with selector lever in "P" position.

1. CHECK CONTROL CABLE

Check control cable. Refer to <u>AT-262, "Control Cable Adjustment"</u> <u>OK or NG</u>

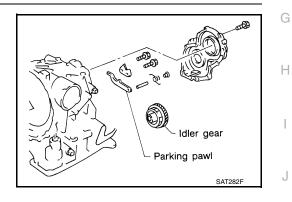
- OK >> GO TO 2.
- NG >> Adjust control cable. Refer to <u>AT-262, "Control Cable</u> <u>Adjustment"</u>.



2. CHECK PARKING COMPONENTS

Check parking components. Refer to $\underline{\text{AT-267, "Components"}}$. OK or NG

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



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4. In "N" Position, Vehicle Moves

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[RE4F03B]

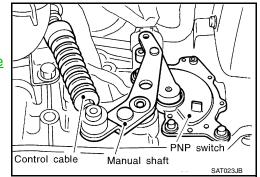
SYMPTOM:

Vehicle moves forward or backward when selecting "N" position.

1. CHECK CONTROL CABLE

Check control cable. Refer to <u>AT-262, "Control Cable Adjustment"</u>. <u>OK or NG</u>

- OK >> GO TO 2.
- NG >> Adjust control cable. Refer to <u>AT-262</u>, "Control Cable <u>Adjustment</u>".



2. CHECK A/T FLUID LEVEL

Check A/T fluid level again. <u>OK or NG</u> OK >> GO TO 3. NG >> Refill ATF.



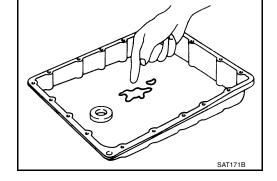
3. CHECK A/T FLUID CONDITION

- 1. Remove oil pan.
- 2. Check A/T fluid condition.

OK or NG

OK >> GO TO 4.

- NG >> 1. Disassemble A/T.
 - 2. Check the following items:
 - Forward clutch assembly
 - Overrun clutch assembly
 - Reverse clutch assembly



4. снеск зумртом

Check again.

OK or NG

OK >> INSPECTION END

- NG >> 1. Perform TCM input/output signal inspection.
 - 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

5. Large Shock. "N" \rightarrow "R" Position

SYMPTOM:

There is large shock when changing from "N" to "R" position.

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to A/T fluid temperature sensor, line pressure solenoid valve or throttle position sensor [accelerator pedal position (APP) sensor] circuit?

Yes or No

Yes >> Check damaged circuit. Refer to AT-120, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT", AT-173, "DTC P0745 LINE PRESSURE SOLENOID VALVE" or AT-187, "DTC P1705 THROTTLE POSI-TION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]" .

>> GO TO 2. No

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in "D" position. Refer to AT-67, "Line Pressure Test" . OK or NG Н OK >> GO TO 3. NG >> 1. Remove control valve assembly. Refer to AT-259, "REMOVAL". 2. Check the following items: - Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter) SAT4946 Line pressure solenoid valve - Oil pump assembly Κ З. снеск сумртом Check again. L OK or NG OK >> INSPECTION END

NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

[RE4F03B]

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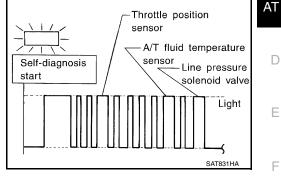
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[RE4F03B]

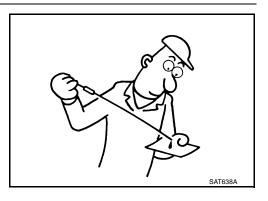
6. Vehicle Does Not Creep Backward In "R" Position

SYMPTOM:

Vehicle does not creep backward when selecting "R" position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again. <u>OK or NG</u> OK >> GO TO 2. NG >> Refill ATF.



2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in "R" position. Refer to $\underline{\text{AT-67, "Line Pressure Test"}}$.

OK or NG

- OK >> GO TO 3. NG >> 1. Remove
 - >> 1. Remove control valve assembly. Refer to <u>AT-259</u>, <u>"REMOVAL"</u>.
 - 2. Check the following items:
 - Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
 - Line pressure solenoid valve
 - 3. Disassemble A/T.
 - 4. Check the following item:
 - Oil pump assembly

3. CHECK STALL TEST

Check stall revolution with selector lever in "1" and "R" positions. OK or NG $\,$

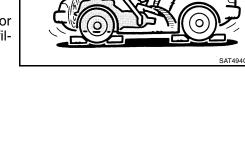
OK >> GO TO 4.

OK in "1" position, NG in "R" position>>1.Disassemble A/T.

- 2. Check the following items:
- Reverse clutch assembly

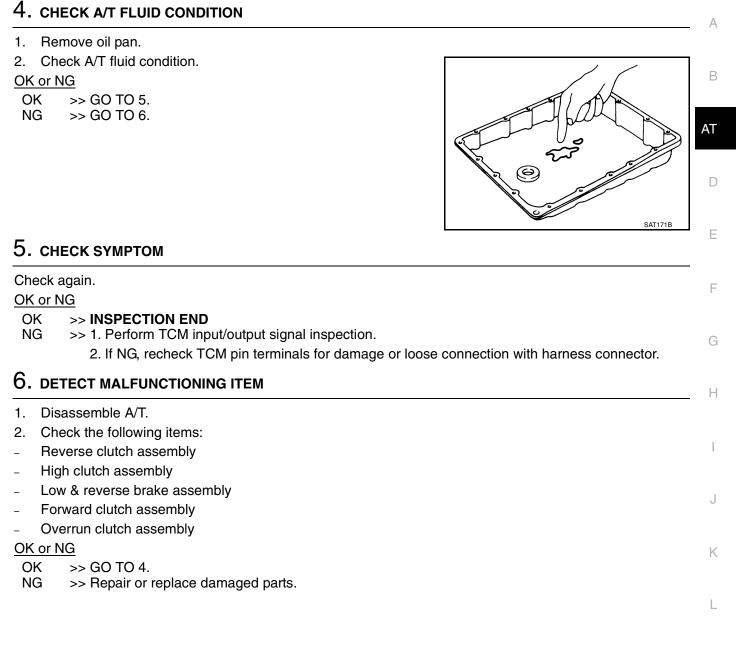
NG in both "1" and "R" positions>> GO TO 6.





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[RE4F03B]

SAT4940

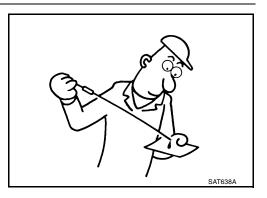
7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position

SYMPTOM:

Vehicle does not creep forward when selecting "D", "2" or "1" position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again. <u>OK or NG</u> OK >> GO TO 2. NG >> Refill ATF.



2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in "D" position. Refer to $\underline{\text{AT-67, "Line Pressure Test"}}$.

OK or NG

- OK >> GO TO 3. NG >> 1. Remove
 - >> 1. Remove control valve assembly. Refer to <u>AT-259</u>, <u>"REMOVAL"</u>.
 - 2. Check the following items:
 - Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
 - Line pressure solenoid valve
 - 3. Disassemble A/T.
 - 4. Check the following item:
 - Oil pump assembly

3. CHECK STALL TEST

Check stall revolution with selector lever in "D" position. Refer to <u>AT-63, "Stall Test"</u>.

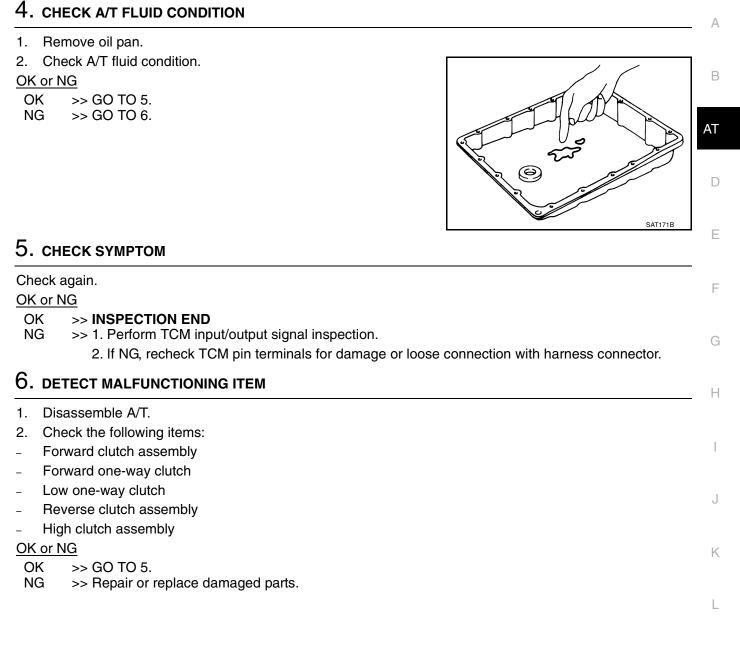
OK or NG

OK >> GO TO 4. NG >> GO TO 6.



ECS005YU

[RE4F03B]



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8. Vehicle Cannot Be Started From D1

[RE4F03B] ECS005YV

SYMPTOM:

Vehicle cannot be started from D1 on Cruise Test — Part 1.

СНЕСК SYMPTOM

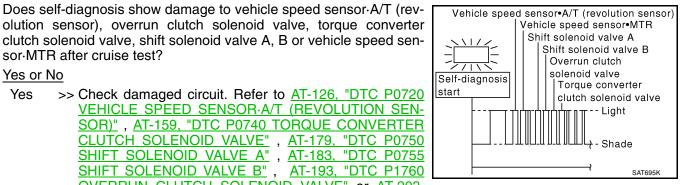
Is "6. Vehicle Does Not Creep Backward In R Position" OK?

Yes or No

Yes >> GO TO 2.

No >> Go to AT-226, "6. Vehicle Does Not Creep Backward In "R" Position" .

2. CHECK SELF-DIAGNOSTIC RESULTS



clutch solenoid valve, shift solenoid valve A, B or vehicle speed sensor·MTR after cruise test? Yes or No

Yes >> Check damaged circuit. Refer to AT-126, "DTC P0720 VEHICLE SPEED SENSOR A/T (REVOLUTION SEN-SOR)", AT-159, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE", AT-179, "DTC P0750 SHIFT SOLENOID VALVE A", AT-183, "DTC P0755 SHIFT SOLENOID VALVE B", AT-193, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" or AT-203, "DTC VHCL SPEED SEN·MTR VEHICLE SPEED SENSOR·MTR" .

No >> GO TO 3.

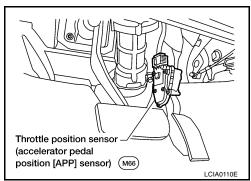
3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-187, "DTC P0122, P0123 TP SENSOR" QG18DE (ULEV)] or EC-808, "DTC P0222, P0223 TP SENSOR" [QG18DE (SULEV)].

OK or NG

OK >> GO TO 4.

>> Repair or replace throttle position sensor [accelerator NG pedal position (APP) sensor].



4. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in "D" position. Refer to AT-67, "Line Pressure Test" .

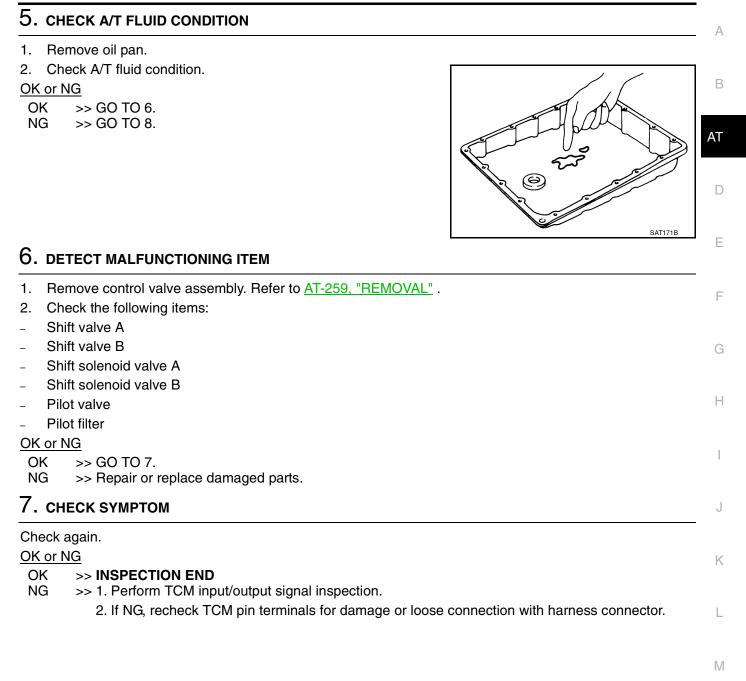
OK or NG

OK >> GO TO 5. NG >> GO TO 8.





[RE4F03B]



8. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" .
- 2. Check the following items:
- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter
- 3. Disassemble A/T.
- 4. Check the following items:
- High clutch assembly
- Torque converter
- Oil pump assembly
- Reverse clutch assembly
- Low and reverse brake assembly

- OK >> GO TO 7.
- NG >> Repair or replace damaged parts.

[RE4F03B]

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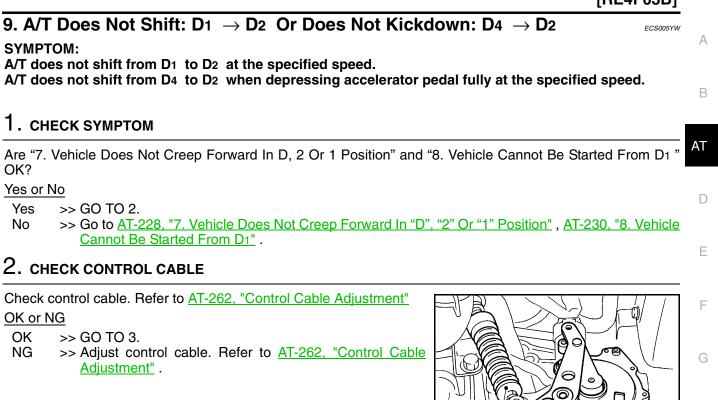
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3. CHECK VEHICLE SPEED SENSOR A/T AND CHECK VEHICLE SPEED SENSOR MTR CIRCUIT

Check vehicle speed sensor A/T (revolution sensor) and vehicle speed sensor MTR circuit. Refer to <u>AT-126</u>, <u>"DTC P0720 VEHICLE SPEED SENSOR A/T (REVOLUTION SENSOR)"</u>, <u>AT-203</u>, "DTC VHCL SPEED <u>SEN-MTR VEHICLE SPEED SENSOR MTR</u>.

Control cable

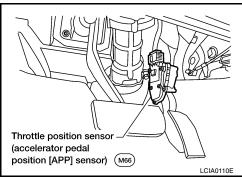
OK or NG

OK >> GO TO 4.

NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to <u>EC-187, "DTC P0122, P0123 TP SENSOR"</u> [QG18DE (ULEV)] or <u>EC-756, "DTC P0122, P0123 TP SENSOR"</u> [QG18DE (SULEV)]. <u>OK or NG</u> OK >> GO TO 5. NG >> Repair or replace throttle position sensor [accelerator pedal position (APP) sensor].



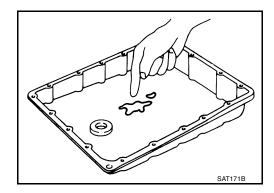
Manual shaft

5. CHECK A/T FLUID CONDITION

- 1. Remove oil pan.
- 2. Check A/T fluid condition.

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 8.



6. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve. Refer to AT-259, "REMOVAL" .
- 2. Check the following items:
- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

- OK >> GO TO 7.
- NG >> Repair or replace damaged parts.

7. снеск сумртом

Check again.

OK or NG

OK >> INSPECTION END

NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

8. DETECT MALFUNCTIONING ITEM

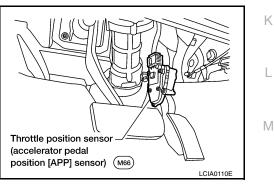
- 1. Remove control valve. Refer to AT-259, "REMOVAL" .
- 2. Check the following items:
- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter
- 3. Disassemble A/T.
- 4. Check the following items:
- Servo piston assembly
- Brake band

- OK >> GO TO 7.
- NG >> Repair or replace damaged parts.

[RE4F03B] 10. A/T Does Not Shift: D2 \rightarrow D3 ECS005YX А SYMPTOM: A/T does not shift from D2 to D3 at the specified speed. В СНЕСК SYMPTOM Are "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position" and "8. Vehicle Cannot Be Started From D1" AT OK? Yes or No Yes >> GO TO 2. >> Go to AT-228, "7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position", AT-230, "8. Vehicle No Cannot Be Started From D1". 2. CHECK PNP SWITCH CIRCUIT Ε With CONSULT-II Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit? F **Without CONSULT-II** Does self-diagnosis show damage to PNP switch circuit? Yes or No Yes >> Check PNP switch circuit. Refer to AT-115, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . Self-diagnosis >> GO TO 3. Start No Н - Light Shade SCIA0706E 3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR] Check throttle position sensor [accelerator pedal position (APP) sen-Κ

sor]. Refer to <u>EC-756, "DTC P0122, P0123 TP SENSOR"</u> [QG18DE (ULEV)] or <u>EC-187, "DTC P0122, P0123 TP SENSOR"</u> [QG18DE (SULEV)].

- OK >> GO TO 4.
- NG >> Repair or replace throttle position sensor [accelerator pedal position (APP) sensor].

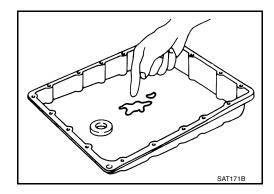


4. CHECK A/T FLUID CONDITION

- 1. Remove oil pan.
- 2. Check A/T fluid condition.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 7.



5. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" .
- 2. Check the following items:
- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 6.

NG >> Repair or replace damaged parts.

6. снеск зумртом

Check again.

OK or NG

OK >> INSPECTION END

NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

7. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" .
- 2. Check the following items:
- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter
- 3. Disassemble A/T.
- 4. Check the following items:
- Servo piston assembly
- High clutch assembly
- Brake band

- OK >> GO TO 6.
- NG >> Repair or replace damaged parts.

[RE4F03B] 11. A/T Does Not Shift: D₃ \rightarrow D₄ ECS005YY А SYMPTOM: A/T does not shift from D₃ to D₄ at the specified speed. A/T must be warm before D₃ to D₄ shift will occur. СНЕСК SYMPTOM AT Are "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position" and "8. Vehicle Cannot Be Started From D1 " OK? Yes or No D Yes >> GO TO 2. >> Go to AT-228, "7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position", AT-230, "8. Vehicle No Cannot Be Started From D1" . Е 2. CHECK SELF-DIAGNOSTIC RESULTS F (I) With CONSULT-II Does self-diagnosis, after cruise test, show damage to any of the fol-Vehicle speed sensor•A/T lowing circuits? (revolution sensor) Vehicle speed sensor•MTR PNP switch Shift solenoid valve A Self-diagnosis Overdrive control switch Shift solenoid valve B A/T fluid temperature start A/T fluid temperature sensor sensor Н - Light Vehicle speed sensor A/T (revolution sensor) Shift solenoid valve A or B Shade Vehicle speed sensor-MTR Yes or No Light SAT833HB Yes >> Check damaged circuit. Refer to AT-115, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH", AT-120, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT", AT-126, "DTC P0720 VEHICLE SPEED SENSOR A/T (REVOLUTION SENSOR)", AT-179, "DTC P0750 SHIFT SOLENOID VALVE A", AT-183, "DTC P0755 SHIFT SOLENOID VALVE B", AT-203, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SEN-Κ SOR·MTR". No >> GO TO 3. 3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR] L Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-187, "DTC P0122, P0123 TP SENSOR" [QG18DE Μ (ULEV)] or EC-756, "DTC P0122, P0123 TP SENSOR" [QG18DE (SULEV)]. OK or NG OK >> GO TO 4. NG >> Repair or replace throttle position sensor [accelerator pedal position (APP) sensor]. Throttle position sensor (accelerator pedal

position [APP] sensor) (M66)

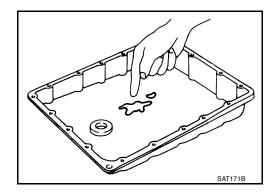
LCIA0110E

4. CHECK A/T FLUID CONDITION

- 1. Remove oil pan.
- 2. Check A/T fluid condition.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 7.



5. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" .
- 2. Check the following items:
- Shift valve A
- Overrun clutch control valve
- Shift solenoid valve A
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 6. NG >> Repair or replace damaged parts.

6. снеск сумртом

Check again.

OK or NG

OK >> INSPECTION END

NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

7. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" .
- 2. Check the following items:
- Shift valve A
- Overrun clutch control valve
- Shift solenoid valve A
- Pilot valve
- Pilot filter
- 3. Disassemble A/T.
- 4. Check the following items:
- Servo piston assembly
- Brake band

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace damaged parts.

AT-238

12. A/T Does Not Perform Lock-up

SYMPTOM:

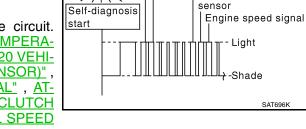
A/T does not perform lock-up at the specified speed.

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to A/T fluid temperature sensor, vehicle speed sensor A/T (revolution sensor), engine speed signal, torque converter clutch solenoid valve, or vehicle speed sensor MTR circuit after cruise test?

Yes or No

Yes >> Check torgue converter clutch solenoid valve circuit. Refer to AT-120, "DTC P0710 A/T FLUID TEMPERA-TURE SENSOR CIRCUIT", AT-126, "DTC P0720 VEHI-CLE SPEED SENSOR A/T (REVOLUTION SENSOR)", AT-131, "DTC P0725 ENGINE SPEED SIGNAL", AT-159, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE", and AT-203, "DTC VHCL SPEED SEN·MTR VEHICLE SPEED SENSOR·MTR" .



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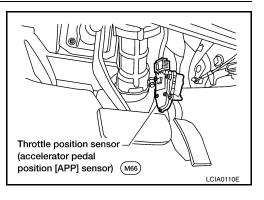
No >> GO TO 2.

2. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-187, "DTC P0122, P0123 TP SENSOR" [QG18DE (ULEV)] or EC-756, "DTC P0122, P0123 TP SENSOR" [QG18DE (SULEV)].

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace throttle position sensor [accelerator pedal position (APP) sensor].



Vehicle speed sensor•A/T (revolution sensor)

Vehicle speed sensor•MTR

Torque converter clutch solenoid valve

A/T fluid temperature

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3. DETECT MALFUNCTIONING ITEM

- Remove control valve. Refer to AT-259, "REMOVAL" . 1.
- Check the following items:
- Torgue converter clutch control valve
- Torque converter relief valve
- Pilot valve
- Pilot filter
- Remove A/T. 3
- Check torque converter. 4.

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace damaged parts.

CHECK SYMPTOM

Check again.

OK or NG

OK >> INSPECTION END

NG >> 1. Perform TCM input/output signal inspection.

If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

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13. A/T Does Not Hold Lock-up Condition

SYMPTOM:

A/T does not hold lock-up condition for more than 30 seconds.

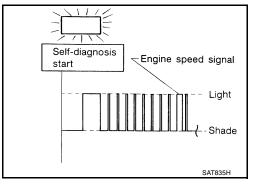
1. CHECK DIAGNOSTIC RESULTS

Does self-diagnosis show damage to engine speed signal circuit after cruise test?

Yes or No

Yes >> Check engine speed signal circuit. Refer to <u>AT-131,</u> <u>"DTC P0725 ENGINE SPEED SIGNAL"</u>.

No >> GO TO 2.

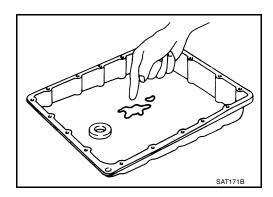


2. CHECK A/T FLUID CONDITION

- 1. Remove oil pan.
- 2. Check A/T fluid condition.

OK or NG

OK >> GO TO 3. NG >> GO TO 5.



3. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" .
- 2. Check the following items:
- Torque converter clutch control valve
- Pilot valve
- Pilot filter

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace damaged parts.

4. СНЕСК ЗҮМРТОМ

Check again.

OK or NG

- OK >> INSPECTION END
- NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

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5. DETECT MALFUNCTIONING ITEM	A
1. Remove control valve assembly. Refer to AT-259, "REMOVAL".	
2. Check the following items:	
 Torque converter clutch control valve 	В
- Pilot valve	
– Pilot filter	AT
3. Disassemble A/T.	
Check torque converter and oil pump assembly.	
OK or NG	D
OK >> GO TO 4.	
NG >> Repair or replace damaged parts.	_
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14. Lock-up Is Not Released

SYMPTOM:

Lock-up is not released when accelerator pedal is released.

1. CHECK THROTTLE POSITION SWITCH CIRCUIT

With CONSULT-II

Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to closed throttle position switch circuit?

Without CONSULT-II

Does self-diagnosis show damage to closed throttle position switch circuit?

Yes or No

Yes >> Check closed throttle position switch circuit. Refer to <u>AT-115, "DTC P0705 PARK/NEUTRAL POSITION (PNP)</u> <u>SWITCH"</u>.

No >> GO TO 2.



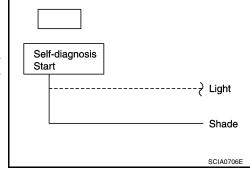
Check again.

OK or NG

OK >> INSPECTION END

NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.



[RE4F03B]

15. Engine Speed Does Not Return To Idle (Light Braking D4 \rightarrow D3)

SYMPTOM:

[RE4F03B]

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Engine speed does not smoothly return to idle when A/T shifts from D4 to D3. Vehicle does not decelerate by engine brake when turning overdrive control switch OFF. Vehicle does not decelerate by engine brake when shifting A/T from "D" to "2" position. AT 1. CHECK SELF-DIAGNOSTIC RESULTS Does self-diagnosis show damage to overrun clutch solenoid valve 111 circuit after cruise test? Yes or No Self-diagnosis Yes >> Check overrun clutch solenoid valve circuit. Refer to ATstart 193, "DTC P1760 OVERRUN CLUTCH SOLENOID Overrun clutch Ε solenoid valve VALVE". Light No >> GO TO 2. F Shade SAT836H 2. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR] Check throttle position sensor [accelerator pedal position (APP) sen-Н sor]. Refer to EC-187, "DTC P0122, P0123 TP SENSOR" [QG18DE (ULEV)] or EC-756, "DTC P0122, P0123 TP SENSOR" [QG18DE (SULEV)]. OK or NG OK >> GO TO 3. NG >> Repair or replace throttle position sensor [accelerator pedal position (APP) sensor]. Throttle position sensor (accelerator pedal position [APP] sensor) (M66) LCIA0110E K 3. CHECK A/T FLUID CONDITION 1. Remove oil pan. L 2. Check A/T fluid condition. OK or NG Μ OK >> GO TO 4. NG >> GO TO 6.

4. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-259, "REMOVAL" .
- 2. Check the following items:
- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

5. снеск сумртом

Check again.

OK or NG

OK >> INSPECTION END

NG >> 1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

6. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-259, "REMOVAL".
- 2. Check the following items:
- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve
- 3. Disassemble A/T.
- 4. Check the following items:
- Overrun clutch assembly

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

16. Vehicle Does Not Start From D1

SYMPTOM:

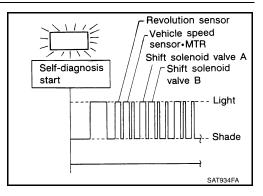
Vehicle does not start from D1 on Cruise test — Part 2.

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to vehicle speed sensor A/T (revolution sensor), shift solenoid valve A, B or vehicle speed sensor MTR after cruise test?

Yes or No

Yes >> Check damaged circuit. Refer to <u>AT-126, "DTC P0720</u> VEHICLE SPEED SENSOR:A/T (REVOLUTION SEN-SOR)", <u>AT-179, "DTC P0750 SHIFT SOLENOID VALVE</u> <u>A", AT-183, "DTC P0755 SHIFT SOLENOID VALVE B",</u> <u>AT-203, "DTC VHCL SPEED SEN:MTR VEHICLE</u> <u>SPEED SENSOR:MTR"</u>.



No >> GO TO 2.

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2. ci	НЕСК ЅҮМРТОМ	A
Check	cagain.	
OK or	NG	
OK NG	>> Go to <u>AT-230, "8. Vehicle Cannot Be Started From D1</u> ". > 1. Perform TCM input/output signal inspection.	В
	2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.	AT
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17. A/T Does Not Shift: D4 \rightarrow D3 , When Overdrive Control Switch "ON" \rightarrow "OFF"

SYMPTOM:

A/T does not shift from D4 to D3 when changing overdrive control switch to "OFF" position.

1. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II

Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to overdrive control switch circuit?

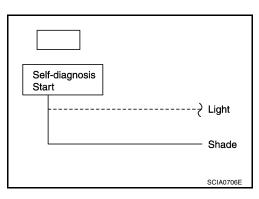
Without CONSULT-II

Does self-diagnosis show damage to overdrive control switch circuit?

Yes or No

Yes >> Check overdrive control switch circuit. Refer to <u>AT-249</u>, <u>"21. TCM Self-diagnosis Does Not Activate {Park/neutral Position (PNP), Overdrive Control and Throttle Position Sensor [Accelerator Pedal Position (APP) Sensor] Switches Circuit Checks}"</u>.

No >> Go to AT-235, "10. A/T Does Not Shift: $D_2 \rightarrow D_3$ ".



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18. A/T Does Not Shift: D3 \rightarrow 22 , When Selector Lever "D" \rightarrow "2" Position	ECS005Z5	
SYMPTOM: A/T does not shift from D ₃ to 22 when changing selector lever from "D" to "2" position.		A
4		В

1. CHECK PNP SWITCH CIRCUIT

(I) With CONSULT-II

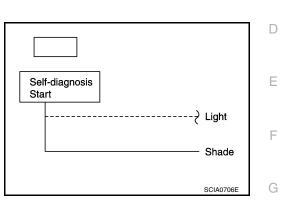
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit?

Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to <u>AT-115, "DTC P0705</u> <u>PARK/NEUTRAL POSITION (PNP) SWITCH"</u>
- No >> Go to <u>AT-233</u>, "9. <u>A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does</u> <u>Not Kickdown: $D_4 \rightarrow D_2$ "</u>.



[RE4F03B]

19. A/T Does Not Shift: 22 \rightarrow 11 , When Selector Lever "2" \rightarrow "1" Position ECSODE

SYMPTOM:

A/T does not shift from 22 to 11 when changing selector lever from "2" to "1" position.

1. CHECK PNP SWITCH CIRCUIT

With CONSULT-II

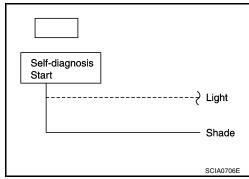
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit?

Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to <u>AT-115, "DTC P0705</u> <u>PARK/NEUTRAL POSITION (PNP) SWITCH"</u>
- No >> GO TO 2.



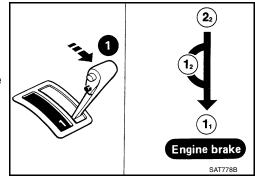
2. снеск сумртом

Check again.

OK or NG

OK >> INSPECTION END

- NG >> 1. Perform TCM input/output signal inspection.
 - 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.



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20. Vehicle Does Not Decelerate By Engine Brake SYMPTOM:

Vehicle does not decelerate by engine brake when shifting from 22 (12) to 11.

1. снеск зумртом

Is "6. Vehicle Does Not Creep Backward In R Position" OK?

Yes or No

Yes >> Go to AT-243, "15. Engine Speed Does Not Return To Idle (Light Braking $D4 \rightarrow D3$)".

No >> Go to AT-226, "6. Vehicle Does Not Creep Backward In "R" Position".

21. TCM Self-diagnosis Does Not Activate {Park/neutral Position (PNP), Overdrive Control and Throttle Position Sensor [Accelerator Pedal Position (APP) Sensor] Switches Circuit Checks}

SYMPTOM:

O/D OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

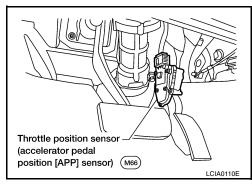
DESCRIPTION

Park/neutral position (PNP) switch
 The park/neutral (PNP) switch assembly includes a transmission range switch. The transmission range switch detects the selector lever position and sends a signal to the TCM.

 Overdrive control switch Detects the overdrive control switch position (ON or OFF) and sends a signal to the TCM.

Throttle position sensor [accelerator pedal position (APP) sensor]

The throttle position sensor [accelerator pedal position (APP) sensor] is part of the system that controls the throttle position. This system also uses an electric throttle control actuator, which consists of a throttle control motor and throttle position sensors. Accelerator pedal position signal is sent to the ECM.



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Overdrive control switch

PNP switch

DIAGNOSTIC PROCEDURE

NOTE:

The diagnostic procedure includes inspections for the overdrive control switch circuits.

1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

- Turn ignition switch to ON position. (Do not start engine.)
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- Read out P/N, R, D, 2 and 1 position switches moving selector lever to each position. Check that the signal of the selector lever position is indicated properly.

OK or NG

OK >> GO TO 2.

NG >> Check the following items:

- PNP switch (Refer to <u>AT-115, "DTC P0705 PARK/</u> <u>NEUTRAL POSITION (PNP) SWITCH"</u>
- Harness for short or open between ignition switch and PNP switch
- Harness for short or open between PNP switch and TCM

DATA MON		
MONITORING		
PN POSI SW	OFF	
R POSITION SW	OFF	
D POSITION SW	OFF	
2 POSITION SW	ON	
1 POSITION SW	OFF	
		SAT701J

2. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

- 1. Turn ignition switch to ON position. (Do not start engine.)
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- Read out "OVERDRIVE SW". Check the signal of the overdrive control switch is indicated properly. (Overdrive control switch "ON" displayed on CONSULT-II means overdrive "OFF".)

OK or NG

- OK >> GO TO 3.
- NG >> Check the following items:
 - Overdrive control switch (Refer to <u>AT-251, "Overdrive</u> <u>Control Switch"</u>
 - Harness for short or open between TCM and overdrive control switch
 - Harness of ground for overdrive control switch for short or open

DATA MOI	DATA MONITOR	
MONITORING		
ENGINE SPEED	XXX rpm	
TURBINE REV	XXX rpm	
OVERDRIVE SW	ON	
PN POSI SW	OFF	
R POSITION SW	OFF	
		SAT645J

3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

 Perform throttle position sensor [accelerator pedal position (APP) sensor] inspection. Refer to <u>AT-187,</u> <u>"DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"</u>.

- OK >> GO TO 4.
- NG >> Repair or replace damaged parts.

[RE4F03B]

4. CHECK TCM INSPECTION

1. Perform AT-250, "DIAGNOSTIC PROCEDURE"

OK or NG

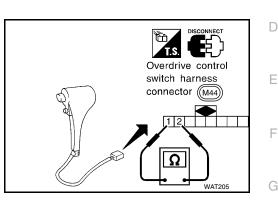
- OK >> INSPECTION END. NG
 - >> Perform TCM input/output signal inspection.
 - If NG, recheck TCM pin terminals for damage or loose connections with harness connector.

COMPONENT INSPECTION

Overdrive Control Switch

Check continuity between terminals 1 and 2.

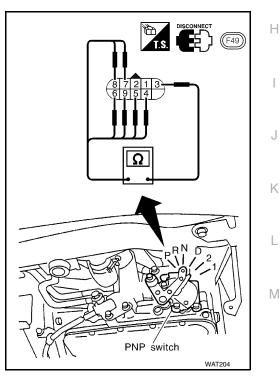
Switch position	Continuity
RELEASED	No
DEPRESSED	Yes



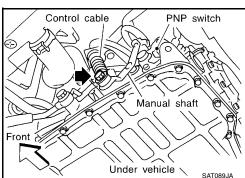
PNP Switch

1. Check continuity between terminals 1 and 2 and between terminals 3 and 4, 5, 6, 7, 8, 9 while moving manual shaft through each position.

Lever position	Terminal No.	
Р	3 — 7	1-2
R	3 — 8	
Ν	3 — 9	1-2
D	3 — 6	
2	3 — 5	
1	3 — 4	



- 2. If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step 1.
- 3. If OK on step 2, adjust manual control cable. Refer to AT-262, "Control Cable Adjustment"
- 4. If NG on step 2, remove PNP switch from A/T and check continuity of PNP switch terminals. Refer to step 1.
- 5. If OK on step 4, adjust PNP switch. Refer to AT-262, "Park/Neutral Position (PNP) Switch Adjustment".
- 6. If NG on step 4, replace PNP switch.



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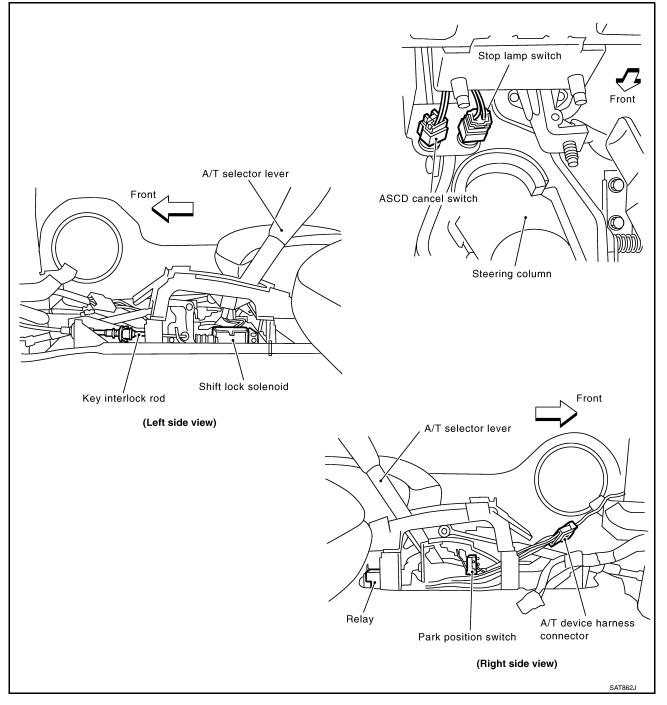
A/T SHIFT LOCK SYSTEM

A/T SHIFT LOCK SYSTEM

Description

- The mechanical key interlock mechanism also operates as a shift lock: With the key switch turned to ON, the selector lever cannot be shifted from "P" (parking) to any other position unless the brake pedal is depressed. With the key removed, the selector lever cannot be shifted from "P" to any other position. The key cannot be removed unless the selector lever is placed in "P".
- The shift lock and key interlock mechanisms are controlled by the ON-OFF operation of the shift lock solenoid and by the operation of the rotator and slider located inside the key cylinder.

Shift Lock System Electrical Parts Location



[RE4F03B]

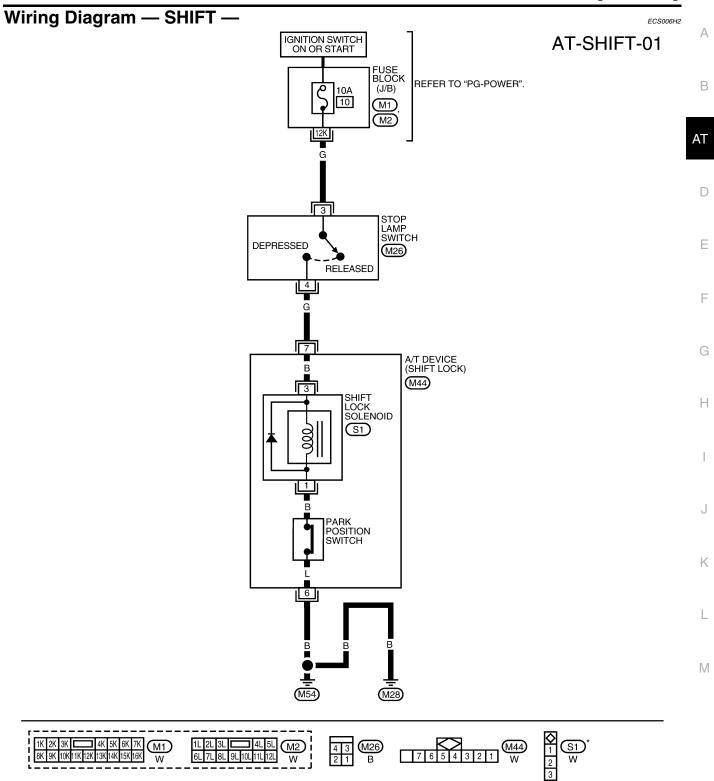
PFP:34950

ECS006H0

ECS006H1

A/T SHIFT LOCK SYSTEM

[RE4F03B]



*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

Diagnostic Procedure

ECS006H3

SYMPTOM 1:

- Selector lever cannot be moved from "P" position with key in ON position and brake pedal applied.
- Selector lever can be moved from "P" position with key in ON position and brake pedal released.
- Selector lever can be moved from "P" position when key is removed from key cylinder.

SYMPTOM 2:

Ignition key cannot be removed when selector lever is set to "P" position. It can be removed when selector lever is set to any position except "P".

1. CHECK KEY INTERLOCK CABLE

Check key interlock cable for damage.

OK or NG

OK >> GO TO 2.

NG >> Repair key interlock cable. Refer to <u>AT-640, "Components"</u>.

2. CHECK SELECTOR LEVER POSITION

Check selector lever position for damage.

OK or NG

OK >> GO TO 3.

NG >> Check selector lever. Refer to <u>AT-645</u>, "Control Cable Adjustment".

3. CHECK POWER SOURCE

Turn ignition switch to "OFF" position. (Do not start engine.)

• Check voltage between A/T device harness connector M44 terminal 7 (G) and ground.

Voltage:

Brake pedal depressed:Battery voltageBrake pedal released:0V

OK or NG

OK >> GO TO 5. NG >> GO TO 4.

H.S. CONNECT	
A/T device harness	
 SCIA1166E 	

A/T SHIFT LOCK SYSTEM

[RE4F03B]

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4. DETECT MALFUNCTIONING ITEM

Check the following items.

- 1. Harness for open or short between fuse block (J/B) connector M1 terminal 12K and stop lamp switch harness connector M26 terminal 3.
- 2. Harness for open or short stop lamp switch harness connector M26 terminal 4 and A/T device harness connector M44 terminal 7 (G).
- 3. 10A fuse [10, located in the fuse block (J/B)].

M26 terminals 3 (G) and 4 (G).	
Condition	Continuity
When brake pedal is depressed	Yes
When brake pedal is released	No

4. Check continuity between stop lamp switch harness connector

Check stop lamp switch after adjusting brake pedal —refer to <u>BR-12, "STOP LAMP SWITCH AND ASCD CANCEL SWITCH</u> <u>CLEARANCE"</u>

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

5. CHECK GROUND CIRCUIT

- 1. Turn ignition switch to "OFF" position.
- 2. Disconnect A/T device harness connector.
- 3. Check continuity between A/T device harness M44 terminal 6 (B) and ground.

Continuity should exist

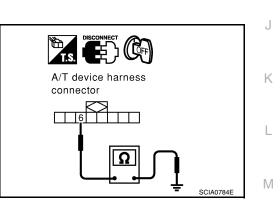
Continuity should exist.

If OK, check harness for short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit in harness.



Tts. Disconnect Tts. EE Stop lamp switch

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6. CHECK PARK POSITION SWITCH

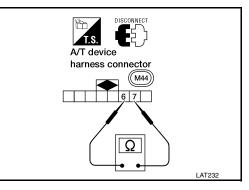
Check continuity between A/T device harness conector M44 terminals 6 (B) and 7 (G).

Brake pedal	Operation sound
Depressed	No
Released	Yes

OK or NG

OK >> GO TO 7.

NG >> Replace park position switch.



7. CHECK SHIFT LOCK SOLENOID

- 1. Connect A/T device harness connector.
- 2. Turn ignition switch to "ON" position.
- 3. Check operation sound.

Condition	Brake pedal	Operation sound
When ignition switch is turned to "ON" position and selector lever is in the "P" position.	Depressed	Yes
	Released	No

OK or NG

OK >> GO TO 8.

NG >> Replace shift lock solenoid.

8. CHECK SHIFT LOCK OPERATION

- 1. Reconnect shift lock harness connector.
- 2. Turn ignition switch from "OFF" to "ON" position. (Do not start engine.)
- 3. Recheck shift lock operation.

OK or NG

OK >> INSPECTION END

NG >> GO TO .9

9. CHECK A/T DEVICE INSPECTION

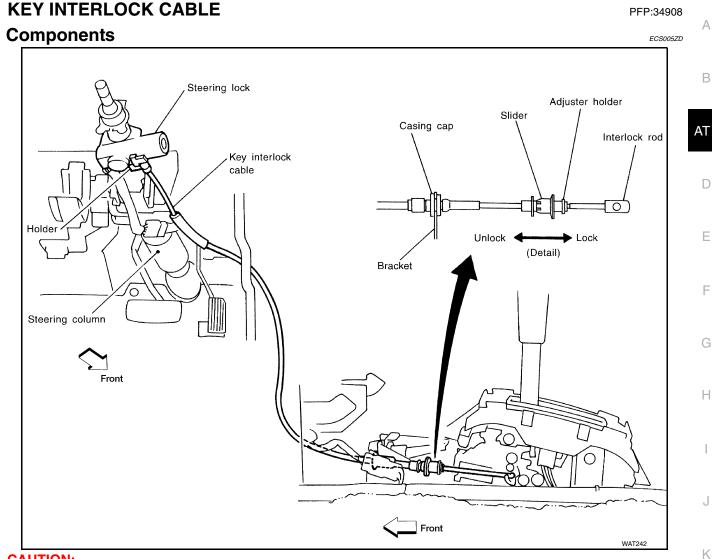
- 1. Perform A/T device input/output signal inspection test.
- 2. If NG, recheck harness connector connection.

OK or NG

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

KEY INTERLOCK CABLE

[RE4F03B]

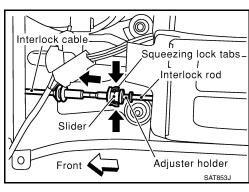


CAUTION:

- Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.
- After installing key interlock cable to control device, make sure that casing cap and bracket are firmly secured in their positions.

Removal

1. Unlock slider by squeezing lock tabs on slider from adjuster holder and remove interlock rod from cable.



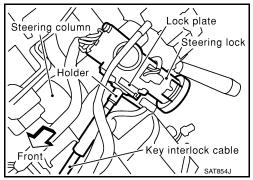
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KEY INTERLOCK CABLE

[RE4F03B]

2. Remove lock plate from steering lock assembly and remove key interlock cable.

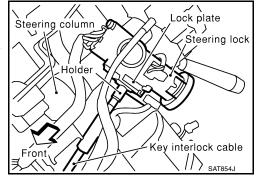


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Installation

5.

- Turn ignition key to lock position. 1.
- Set A/T selector lever to "P" position. 2.
- 3. Set key interlock cable to steering lock assembly and install lock plate.
- 4. Clamp cable to steering column and attach to control cable with band.

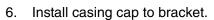


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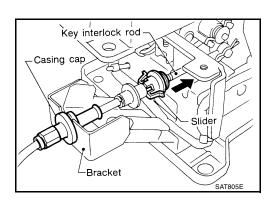
SAT804E

Insert interlock rod into adjuster holder.





7. Move slider in order to connect adjuster holder to interlock rod.



Adjust holder

ON-VEHICLE SERVICE

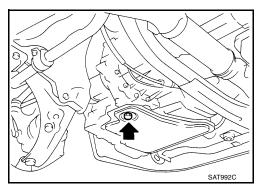
ON-VEHICLE SERVICE

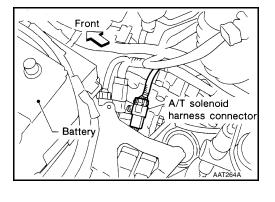
Control Valve Assembly and Accumulators REMOVAL

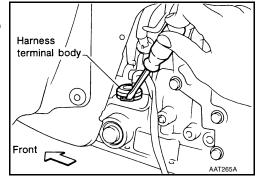
- 1. Drain ATF from transaxle.
- 2. Remove oil pan and gasket.
 - Always replace oil pan bolts as they are self-sealing bolts.

3. Disconnect A/T solenoid valve harness connector.

- 4. Remove stopper ring from A/T solenoid harness terminal body.
- 5. Remove A/T solenoid harness by pushing terminal body into transmission case.









[RE4F03B]

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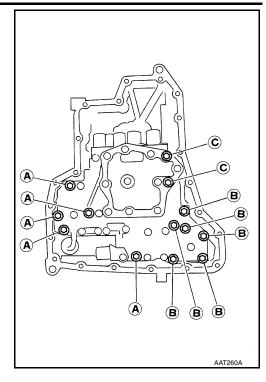
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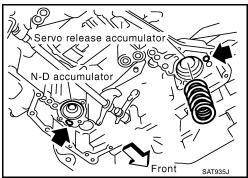
6. Remove control valve assembly mounting bolts A, B and C.



Bolt length, number and location:

Bolt symbol	А	В	С
Bolt length "l"	40.0 mm (1.575 in)	33.0 mm (1.299 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2

- Be careful not to drop manual valve and servo release accumulator return springs.
- 7. Disassemble and inspect control valve assembly if necessary. Refer to AT-297, "Components" .
- 8. Remove servo release and N-D accumulators by applying compressed air if necessary.
 - Hold each piston with a clean, lint-free towel.



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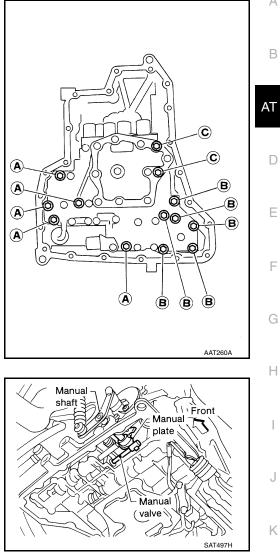
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INSTALLATION

- Tighten mounting bolts A, B and C to specification.
 - : 7 9 N·m (0.7 0.9 kg-m, 61 78 in-lb) V



- Set manual shaft in Neutral position, then align manual plate with groove in manual valve.
- After installing control valve assembly to transmission case, make sure that selector lever can be moved to all positions.

Control Cable Adjustment

Move selector lever from the "P" position to the "1" position. You should be able to feel the detents in each position. If the detents cannot be felt or if the pointer indicating the position is improperly aligned, the control cable needs adjustment.

- Place selector lever in "P" position. 1.
- 2. Loosen control cable lock nut and place manual shaft in "P" position.
- 3. Push control cable, by specified force, in the direction of the arrow shown in the illustration.

Specified force : 9.8 N (1.0 kg, 2.2 lb)

- Release control cable in the opposite direction of the arrow for 4. 1.0 mm (0.039 in).
- 5. Tighten control cable lock nut by hand.
- Tighten control cable lock nut. 6.

[C] : 11.8 - 14.7 N⋅m (1.20 - 1.50 kg-m, 8.7 - 10.8 ft-lb)

- Move selector lever from "P" to "1" position again. Make sure 7. that selector lever moves smoothly.
- Apply grease to contacting areas of selector lever and control 8. cable. Install any part removed.

Park/Neutral Position (PNP) Switch Adjustment

Insert the pin straight into the manual shaft adjustment hole.

Remove control cable end from manual shaft. 1.

4. Use a 4 mm (0.157 in) pin for this adjustment.

- Set manual shaft in "N" position. 2.
- Loosen PNP switch fixing bolts. 3.

hole in PNP switch.

Tighten PNP switch fixing bolts.

Reinstall any part removed.

а.

b.

5.

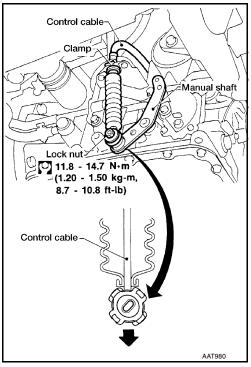
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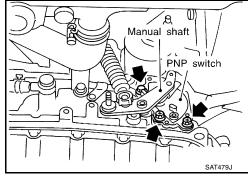
Inspection".

8.

9.



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- Adjustment holes Rotate PNP switch until the pin can also be inserted straight into 6. Remove pin from adjustment hole after adjusting PNP switch. Adjust control cable. Refer to AT-262, "Control Cable Adjust-Manual shaft = PNP switch SAT480. Check continuity of PNP switch. Refer to AT-119, "Component

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[RE4F03B]

ON-VEHICLE SERVICE

[RE4F03B]

Differential Side Oil Seal Replacement ECS005ZJ А 1. Remove drive shaft assemblies using Tool. Refer to FAX-14, "Removal" . Remove oil seals. 2. В AT KV381054S0 (J34286) D SAT905D 3. Install oil seals using Tool. Ε • Apply ATF to oil seal surface before installing. 7 F Drift ()KV31103000 (J38982) and ST35325000 ((Converter housing side) Ľ AAT976 Н • Install oil seals so that dimensions "A" and "B" are within Transmission case side Converter housing side specifications. в Unit: mm (in) Oil seal А В 5.5 - 6.5 (0.217 - 0.256) -0.5 to 0.5 (-0.020 to 0.020) 4. Reinstall any part removed. Oil seal Κ А WAT141 **Revolution Sensor Replacement** L ECS005ZK 1. Disconnect revolution sensor harness connector. 2. Remove harness bracket from A/T. Μ 3. Remove revolution sensor from A/T. Revolution sensor 4. Reinstall any part removed. Always use new sealing parts. Front SAT

REMOVAL AND INSTALLATION

Removal

CAUTION:

Before separating transaxle from engine, remove the crankshaft position sensor (OBD) from transaxle. Be careful not to damage sensor.

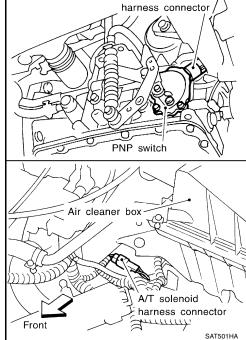
- 1. Remove battery and bracket.
- 2. Remove air duct between throttle body and air cleaner.
- 3. Disconnect terminal cord assembly, PNP switch harness connector and revolution sensor harness connector.

- 4. Drain ATF from transaxle.
- 5. Disconnect control cable from transaxle.
- 6. Disconnect oil cooler hoses.
- 7. Remove drive shafts. Refer to FAX-14, "Removal" .
- 8. Remove the intake manifold support bracket. Refer to <u>EM-12</u>, <u>"Removal and Installation"</u>.
- 9. Remove starter motor from transaxle.

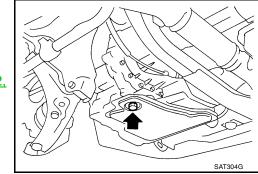
Tighten bolts to specified torque.

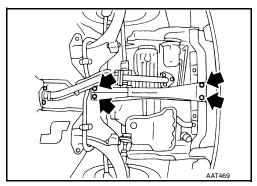
C : 33.3 - 46.1 N·m (3.4 - 4.7 kg-m, 25 - 34 ft-lb)

- 10. Remove upper bolts fixing transaxle to engine.
- 11. Support transaxle with a jack.
- 12. Remove center member.
 - Tighten center member fixing bolts to specified torque, Refer to <u>EM-66</u>, "INSTALLATION".



PNP switch





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REMOVAL AND INSTALLATION

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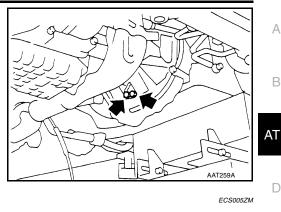
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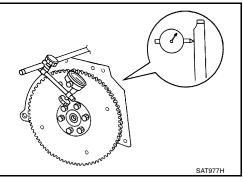
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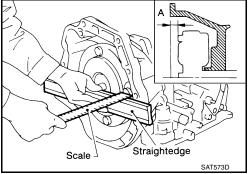
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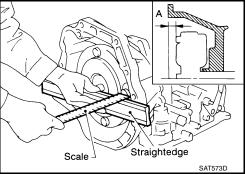
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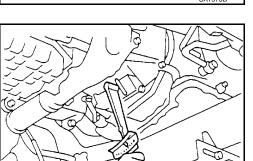
AAT266

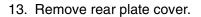












- 14. Remove torgue converter bolts. Rotate crankshaft to gain access to securing bolts.
- 15. Remove rear transaxle to engine bracket. Refer to EM-64, "REMOVAL".
- 16. Support engine with a jack.
- 17. Remove rear transaxle mount. Refer to EM-63.
- 18. Remove lower bolts fixing transaxle to engine.
- 19. Lower transaxle while supporting it with a jack.

Installation

1. Check drive plate runout.

CAUTION:

Do not allow any magnetic materials to contact the ring gear teeth.

Maximum allowable runout

:EM-77, "Flywheel Runout" .

- If this runout is out of allowance, replace drive plate with ring gear.
- 2. When connecting torque converter to transaxle, measure distance "A" to be certain that they are correctly assembled.

Distance "A"

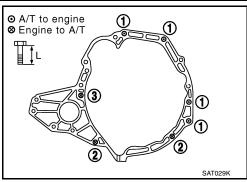
: 21.1 mm (0.831 in)

- 3. Install torque converter to drive plate.
 - With converter installed, rotate crankshaft several turns to check that transaxle rotates freely without binding.

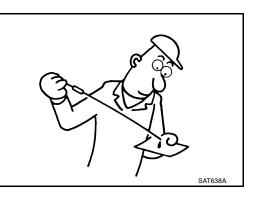
REMOVAL AND INSTALLATION

[RE4F03B]

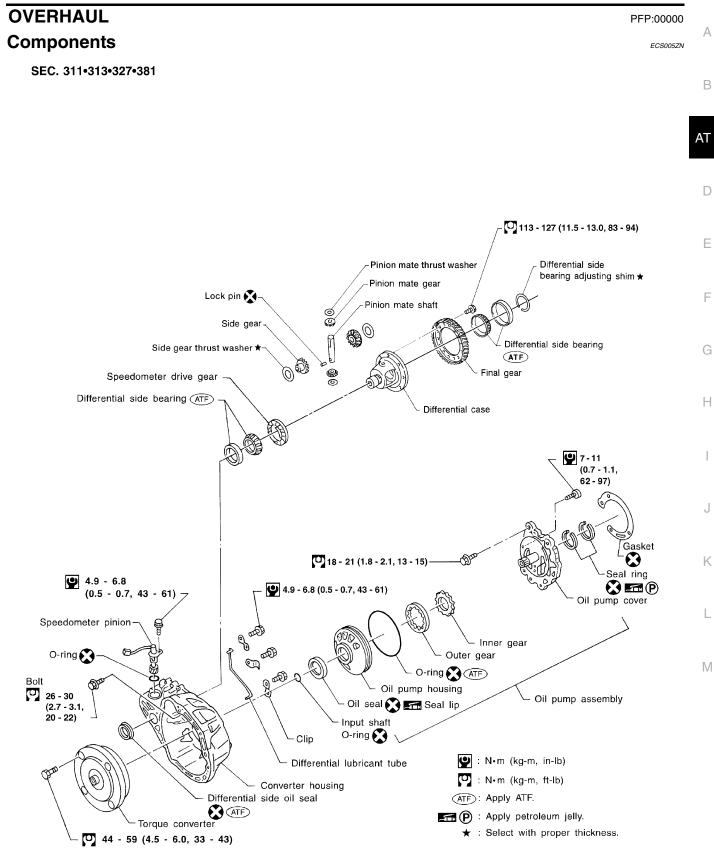
4. Tighten bolts	fixing transaxle.	
Bolt No.	Tightening torque N⋅m (kg-m, ft-lb)	Bolt length "I " mm (in)
1	30 - 40 (3.1 - 4.1, 23 - 29)	50 (1.97)
2	16 - 20 (1.6 - 2.1, 12 - 15)	25 (0.98)
3	31 - 40 (3.1 - 4.1, 23 - 29)	30 (1.18)



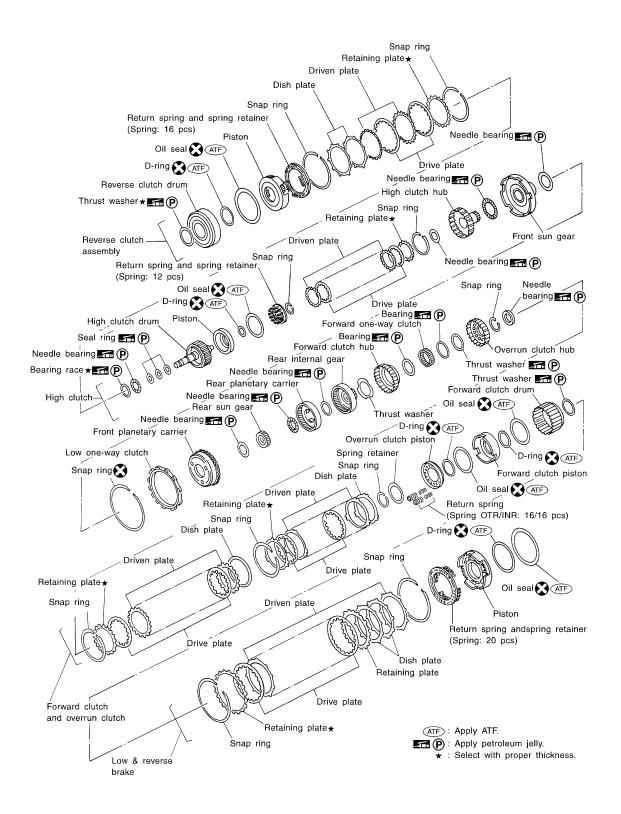
- 5. Reinstall any part removed.
- 6. Adjust control cable. Refer to <u>AT-262, "Control Cable Adjust-ment"</u>.
- 7. Check continuity of PNP switch. Refer to <u>AT-119, "PARK/NEU-TRAL POSITION SWITCH"</u>.
- 8. Refill transaxle with ATF and check fluid level.
- 9. Move selector lever through all positions to be sure that transaxle operates correctly. With parking brake applied, idle engine. Move selector lever through "N" to "D", to "2", to "1" and "R" positions. A slight shock should be felt through the hand gripping the selector each time the transaxle is shifted.
- 10. Perform road test. Refer to AT-68, "Road Test" .



[RE4F03B]



SEC. 315



WCIA0218E

AT-268

[RE4F03B]

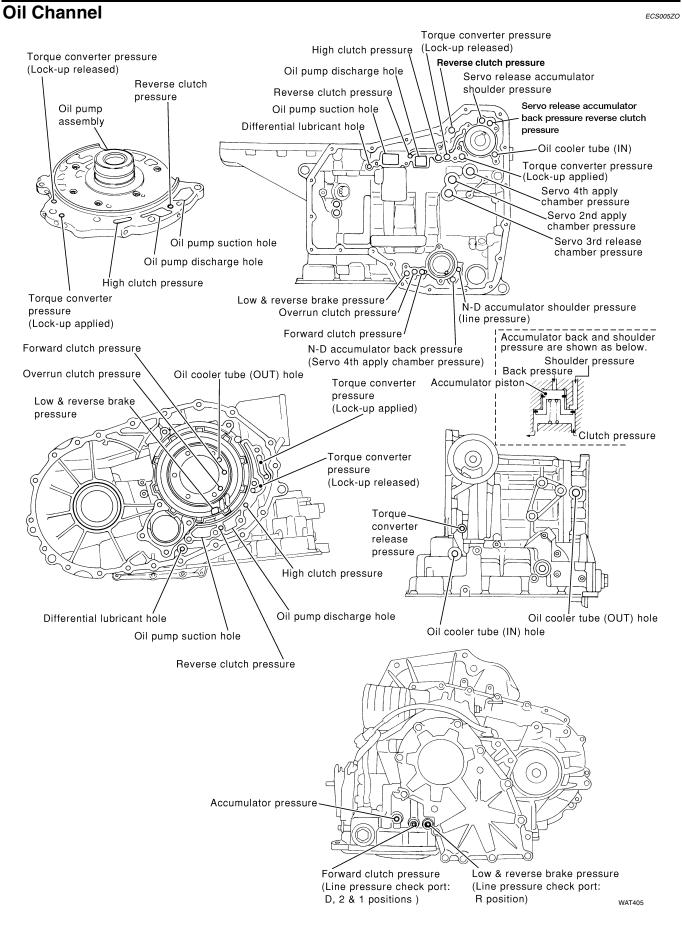
SEC. 310•315•317•319



WCIA0219E

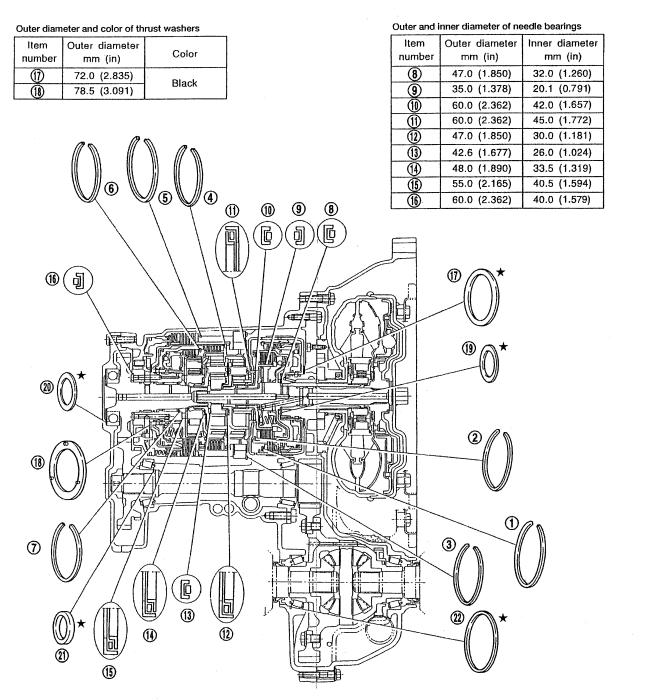
OVERHAUL

[RE4F03B]



AT-270

Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings



AT-271

★ : Select proper thickness.

Outer and inner diameter of bearing race and adjusting shims

ltem number	Outer diameter mm (in)	Inner diameter mm (in)
(19)	48.0 (1.890)	33.0 (1.299)
20	72.0 (2.835)	61.0 (2.402)
(21)	34.5 (1.358)	26.1 (1.028)
(22)	68.0 (2.677)	60.0 (2.362)

Outer diameter of snap rings

ltem number	Outer diameter mm (in)
1	142.0 (5.59)
2	113.0 (4.45)
3	162.4 (6.39)
4	135.4 (5.33)
(5)	162.3 (6.39)
6	126.0 (4.96)
\bigcirc	40.5 (1.594)

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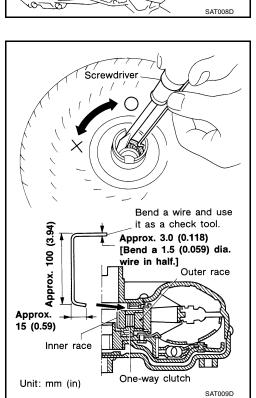
Μ

Disassembly

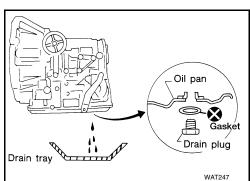
1. Drain ATF through drain plug.

2. Remove torque converter.

- 3. Check torque converter one-way clutch using check tool as shown.
- Insert check tool into the groove of bearing support built into a. one-way clutch outer race.
- While fixing bearing support with check tool, rotate one-way b. clutch spline using flat-bladed screwdriver.
- Check to make sure the inner race rotates clockwise only. If not, c. replace torque converter assembly.



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OVERHAUL

Oil

charging pipe

Control cable

O-rinc

Washer

[RE4F03B]

A

Oil cooler tube

switch

SAT023JB

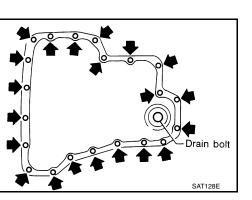
SAT586H

Washer

4. Remove oil charging pipe and oil cooler tube.

- 5. Set manual shaft to "P" position.
- Remove PNP switch. 6.

- 7. Remove oil pan and oil pan gasket.
 - Always replace oil pan bolts as they are self-sealing bolts.
- 8. Check foreign materials in oil pan to help determine cause of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and may inhibit pump pressure.
 - If frictional material is detected, replace radiator after repair of A/T. Refer to CO-13, "Removal and Installation" .
- 9. Remove control valve assembly according to the following procedures.



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Manual shaft

AT-273

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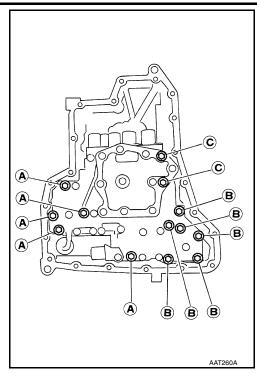
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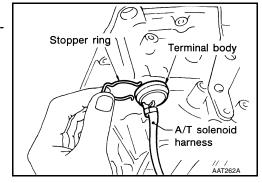
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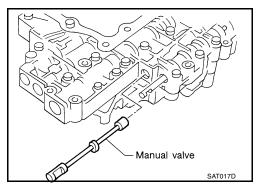
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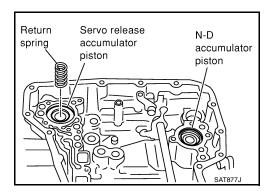
OVERHAUL







11. Remove return spring from servo release accumulator piston.



b. Remove stopper ring from terminal body.

a.

c. Push terminal body into transmission case and draw out solenoid harness.

10. Remove manual valve from control valve assembly as a precaution.

- 12. Remove servo release accumulator piston with compressed air.
- 13. Remove O-rings from servo release accumulator piston.

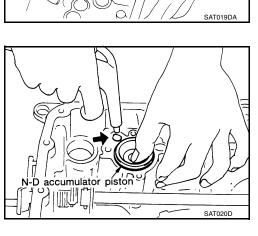
- 14. Remove N-D accumulator piston and return spring with compressed air.
- 15. Remove O-rings from N-D accumulator piston.

- 16. Check accumulator pistons and contact surface of transmission case for damage.
- 17. Check accumulator return springs for damage and free length.

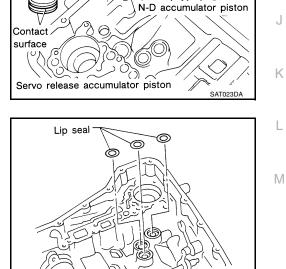
: Refer to AT-393, "RETURN SPRING" Return springs

Remove lip seals from band servo oil port.

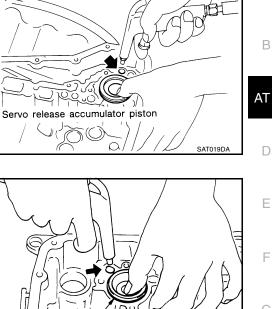
19. Remove converter housing according to the following procedures.



Contact surface



SAT129E



[RE4F03B]

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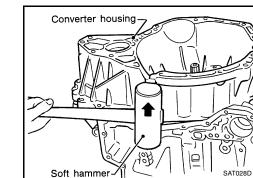
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a. Remove converter housing mounting bolts A and B.

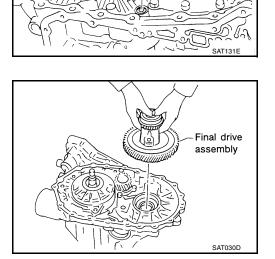
b. Remove converter housing.

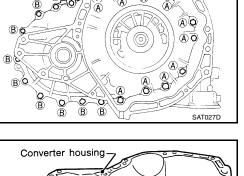
c. Remove O-ring from differential oil port.

20. Remove final drive assembly from transmission case.



O-ring





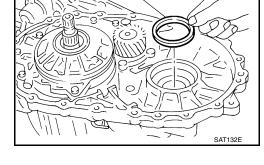
[RE4F03B]

21. Remove differential side bearing outer race from transmission case using Tool.

22. Remove differential side bearing adjusting shim from transmission case.

23. Remove differential side bearing outer race from converter housing using Tool.

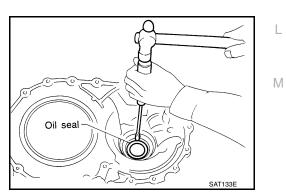
- 24. Remove oil seal from converter housing using a screwdriver.
 - Be careful not to damage case.

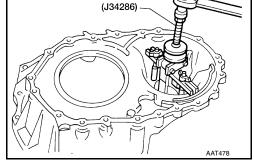


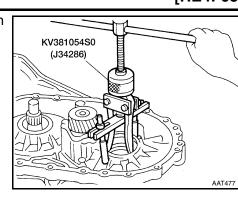
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Adjusting shim

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[RE4F03B]

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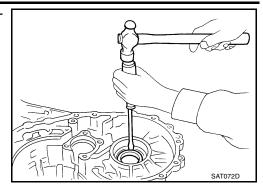
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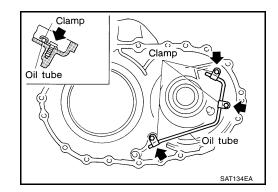
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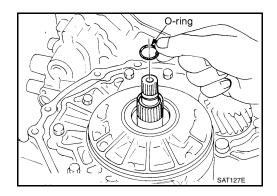
OVERHAUL

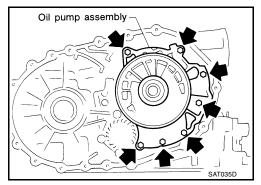
[RE4F03B]

25. Remove side oil seal from transmission case using a screwdriver.









26. Remove oil tube from converter housing.

- 27. Remove oil pump according to the following procedures.
- a. Remove O-ring from input shaft.

Remove oil pump assembly from transmission case.

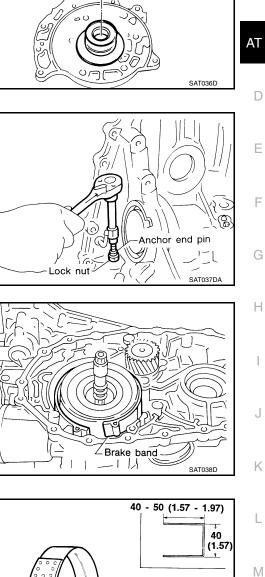
OVERHAUL

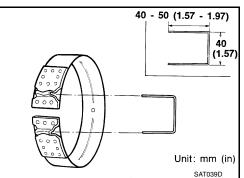
c. Remove thrust washer and bearing race from oil pump assembly.

- 28. Remove brake band according to the following procedures.
- a. Loosen lock nut, then back off anchor end pin.
 - Do not reuse anchor end pin.

b. Remove brake band from transmission case.

• To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing the brake band, always secure it with a clip as shown. Leave the clip in position after removing the brake band.





[RE4F03B]

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- Bearing race

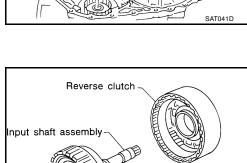
Thrust washer

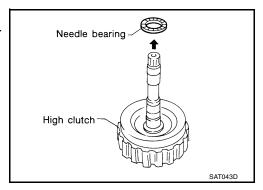
Check brake band facing for damage, cracks, wear or burns. c.

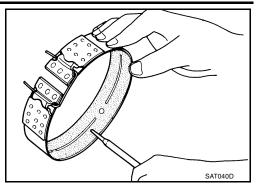
29. Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures.

- Remove input shaft assembly (high clutch) with reverse clutch. a.
- Remove input shaft assembly (high clutch) from reverse clutch. b.

- c. Remove needle bearing from high clutch drum.
- d. Check input shaft assembly and needle bearing for damage or wear.

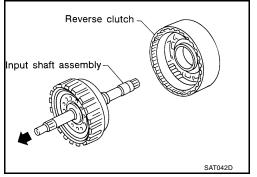






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Input shaft assembly

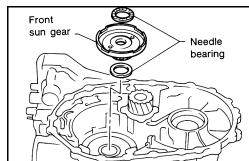


- 30. Remove high clutch hub and needle bearing from transmission case.
- 31. Check high clutch hub and needle bearing for damage or wear.

- 32. Remove front sun gear and needle bearings from transmission case.
- 33. Check front sun gear and needle bearings for damage or wear.

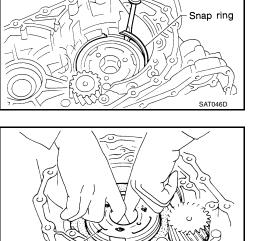
- 34. Remove front planetary carrier assembly and low one-way clutch according to the following procedures.
- a. Remove snap ring using a screwdriver.
 - Do not expand snap ring excessively.

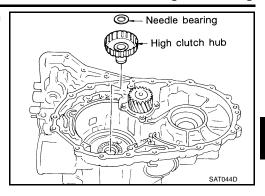
b. Remove front planetary carrier with low one-way clutch.



Screwdriver

Front planetary carrier





[RE4F03B]

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Low one-way clutch SAT047D

SAT579D

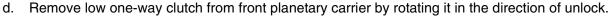
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[RE4F03B]

SAT048D

c. Check that low one-way clutch rotates in the direction of the arrow and locks in the opposite direction.



e. Remove needle bearing from front planetary carrier.

- f. Check front planetary carrier, low one-way clutch and needle bearing for damage or wear.
- g. Check clearance between pinion washer and planetary carrier using feeler gauge.

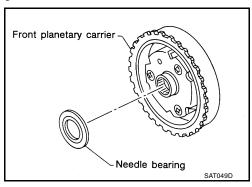
 Standard clearance
 : 0.15 - 0.70 mm (0.0059 - 0.0276 in)

 Allowable limit
 : 0.80 mm (0.0315 in)

Replace front planetary carrier if the clearance exceeds allowable limit.

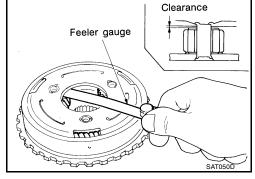
35. Remove rear planetary carrier assembly and rear sun gear according to the following procedures.

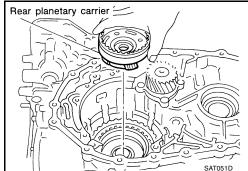
a. Remove rear planetary carrier assembly from transmission case.



Unlock

Low one-way clutch





OVERHAUL

[RE4F03B]

b. Remove rear sun gear from rear planetary carrier.

c. Remove needle bearings from rear planetary carrier assembly.

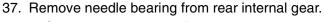
- d. Check rear planetary carrier, rear sun gear and needle bearings for damage or wear.
- e. Check clearance between pinion washer and rear planetary carrier using feeler gauge.

 Standard clearance
 : 0.15 - 0.70 mm (0.0059 - 0.0276 in)

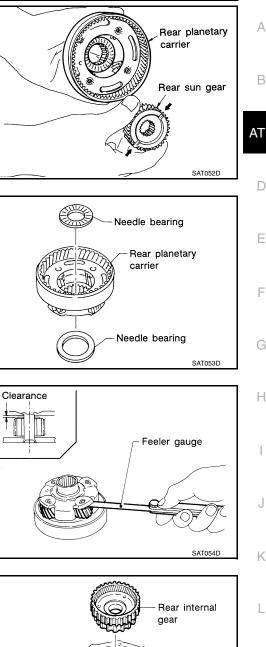
 Allowable limit
 : 0.80 mm (0.0315 in)

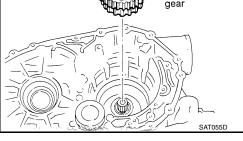
Replace rear planetary carrier if the clearance exceeds allowable limit.

36. Remove rear internal gear from transmission case.

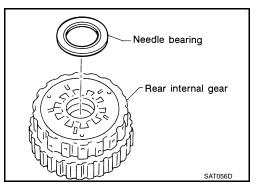


• Check needle bearing for damage or wear.





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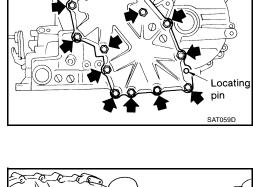
38. Remove forward clutch assembly from transmission case.

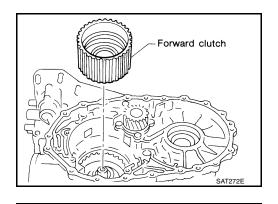
39. Remove thrust washer from transmission case.

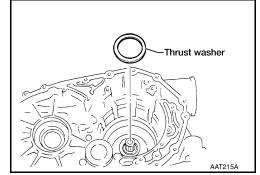
40. Remove output shaft assembly according to the following procedures.

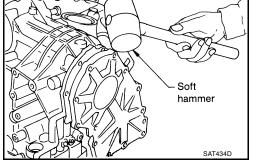
- a. Remove side cover bolts.
- b. Remove side cover by lightly tapping it with a soft hammer.

• Be careful not to drop output shaft assembly. It might come out when removing side cover.









[RE4F03B]

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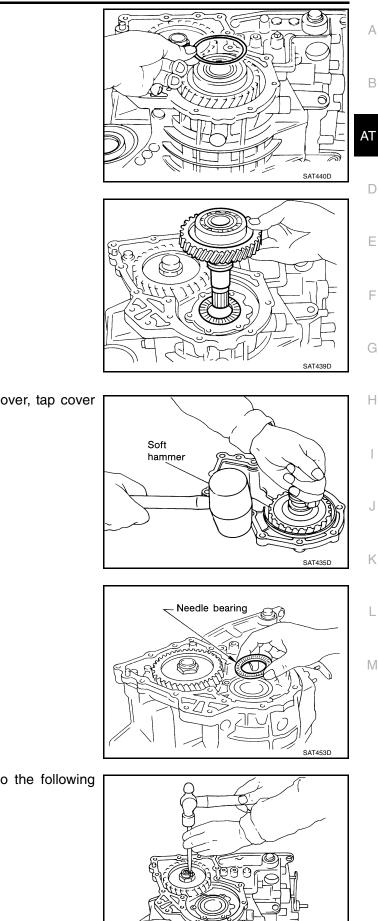
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Remove output shaft assembly. d.

Remove adjusting shim.

c.

• If output shaft assembly came off with side cover, tap cover with a soft hammer to separate.

Remove needle bearing. e.

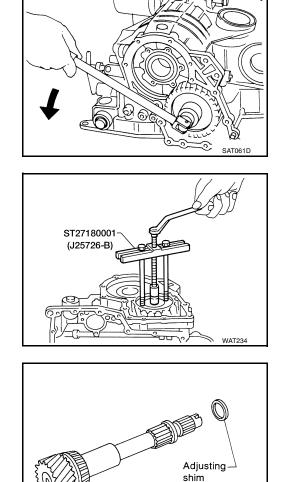
41. Disassemble reduction pinion gear according to the following procedures.

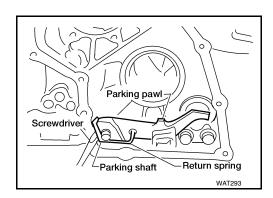
- a. Set manual shaft to position "P" to fix idler gear.
- b. Unlock idler gear lock nut using a pin punch.
- c. Remove idler gear lock nut.
 - Do not reuse idler gear lock nut.

d. Remove idler gear with puller using Tool.

- e. Remove reduction pinion gear.
- f. Remove adjusting shim from reduction pinion gear.

42. Remove return spring from parking shaft using a screwdriver.



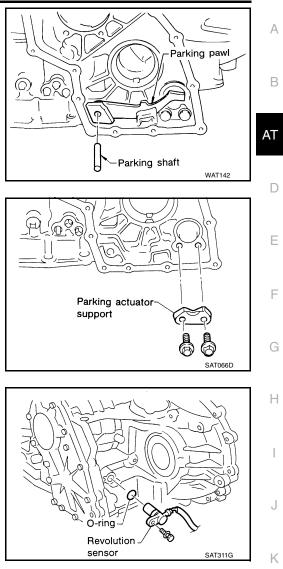


SAT310G

- 43. Draw out parking shaft and remove parking pawl from transmission case.
- 44. Check parking pawl and shaft for damage or wear.

- 45. Remove parking actuator support from transmission case.
 - Check parking actuator support for damage or wear.

46. Remove revolution sensor from transmission case.



[RE4F03B]

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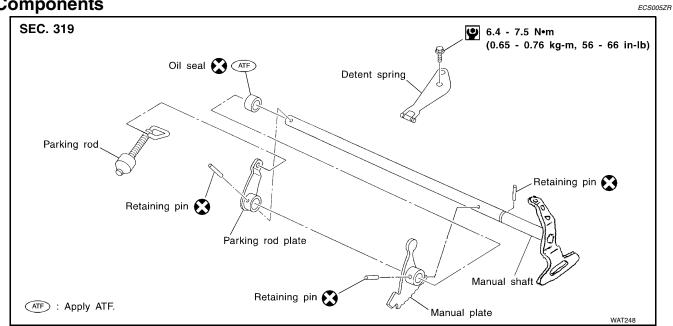
MANUAL SHAFT

MANUAL SHAFT

PFP:31920

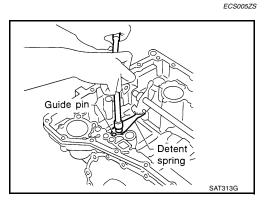
[RE4F03B]

Components

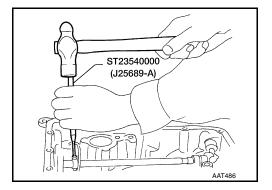


Removal

1. Remove detent spring from transmission case.



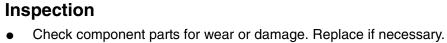
2. Drive out manual plate retaining pin using Tool.



- MANUAL SHAFT
- 3. Drive and pull out parking rod plate retaining pin using Tool.
- 4. Remove parking rod plate from manual shaft.
- 5. Draw out parking rod from transmission case.

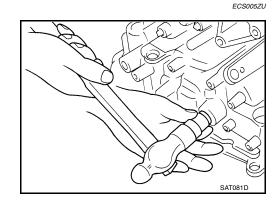
6. Pull out manual shaft retaining pin.

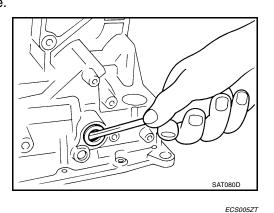
- 7. Remove manual shaft and manual plate from transmission case.
- 8. Remove manual shaft oil seal.

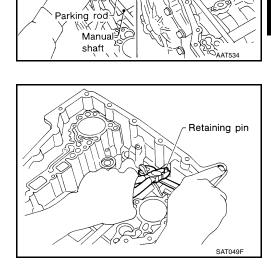


Installation

- 1. Install manual shaft oil seal using a suitable tool.
 - Apply ATF to outer surface of oil seal.







Parking rod

plate

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MANUAL SHAFT

[RE4F03B]

Manual shaft

Manual plate

- AT-290

- 3. Align groove of manual shaft and hole of transmission case.
- 4. Install manual shaft retaining pin using Tool.

Install parking rod to parking rod plate.

Set parking rod assembly onto manual shaft.

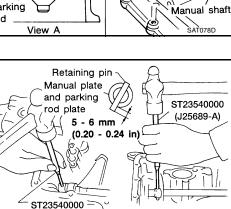
Install manual shaft and manual plate.

2.

5.

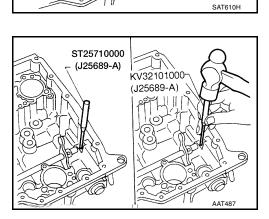
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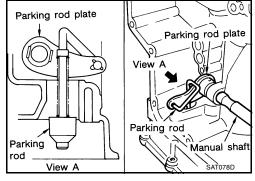
- 7. Drive in manual plate retaining pin and parking rod plate retaining pin using Tool.



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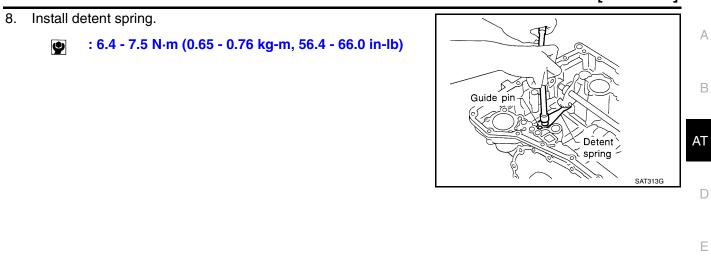
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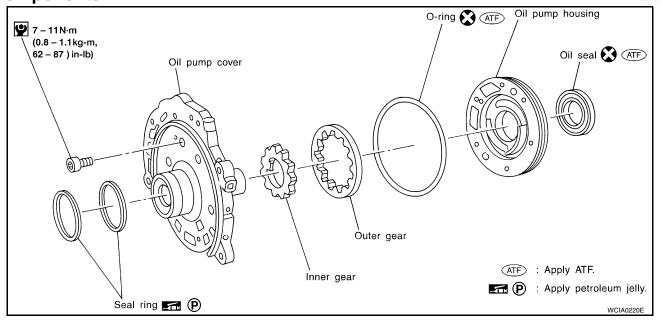
AT-291

PFP:15010



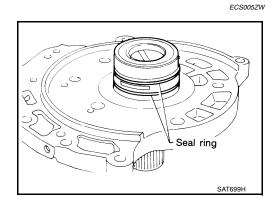
OIL PUMP

ECS005ZV

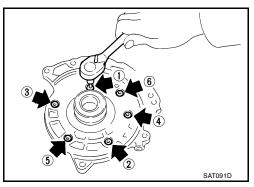


Disassembly

1. Remove seal rings.



2. Loosen bolts in numerical order and remove oil pump cover.



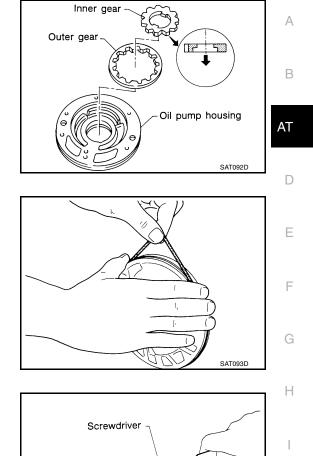
3. Remove inner and outer gear from oil pump housing.

4. Remove O-ring from oil pump housing.

5. Remove oil pump housing oil seal.



• Check for wear or damage.



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ECS005ZX

SIDE CLEARANCES

 Measure side clearance of inner and outer gears in at least four places around each outside edge. Maximum measured values should be within specified range.

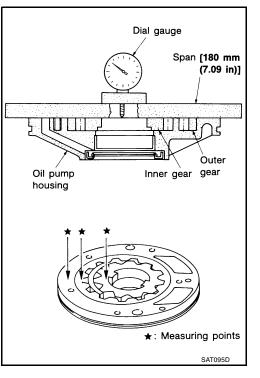
Standard clearance : 0.02 - 0.04 mm (0.0008 - 0.0016 in)

• If clearance is less than standard, select inner and outer gear as a set so that clearance is within specifications.

Inner and outer gear

: Refer to <u>AT-294, "SIDE</u> <u>CLEARANCES"</u>.

 If clearance is more than standard, replace whole oil pump assembly except oil pump cover.



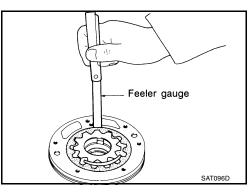
• Measure clearance between outer gear and oil pump housing.

Standard clearance : 0.08 - 0.15 mm (0.0031 - 0.0059 in)

Allowable limit

: 0.15 mm (0.0059 in)

 If not within allowable limit, replace whole oil pump assembly except oil pump cover.



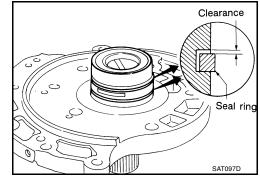
SIDE RING CLEARANCE

- Install new seal rings onto oil pump cover.
- Measure clearance between seal ring and ring groove.

 Standard clearance
 : 0.1 - 0.25 mm (0.0039 - 0.0098 in)

 Allowable limit
 : 0.25 mm (0.0098 in)

• If not within allowable limit, replace oil pump cover assembly.



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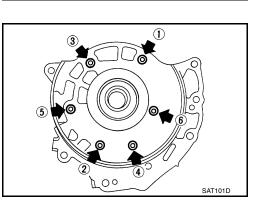


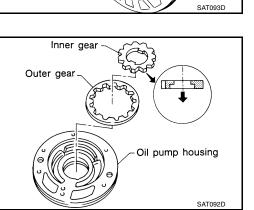
1. Install oil seal on oil pump housing using Tool.

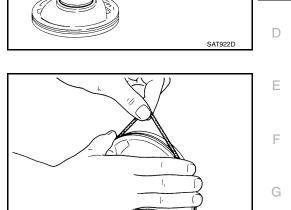
- 2. Install O-ring on oil pump housing.
 - Apply ATF to O-ring.

- 3. Install inner and outer gears on oil pump housing.
 - Take care with the direction of the inner gear.

- 4. Install oil pump cover on oil pump housing.
- a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.
- b. Tighten bolts in numerical order.







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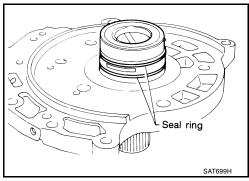
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- 5. Install new seal rings carefully after packing ring groove with petroleum jelly.
 - Do not spread gap of seal ring excessively while installing. It may deform the ring.



CONTROL VALVE ASSEMBLY

[RE4F03B]

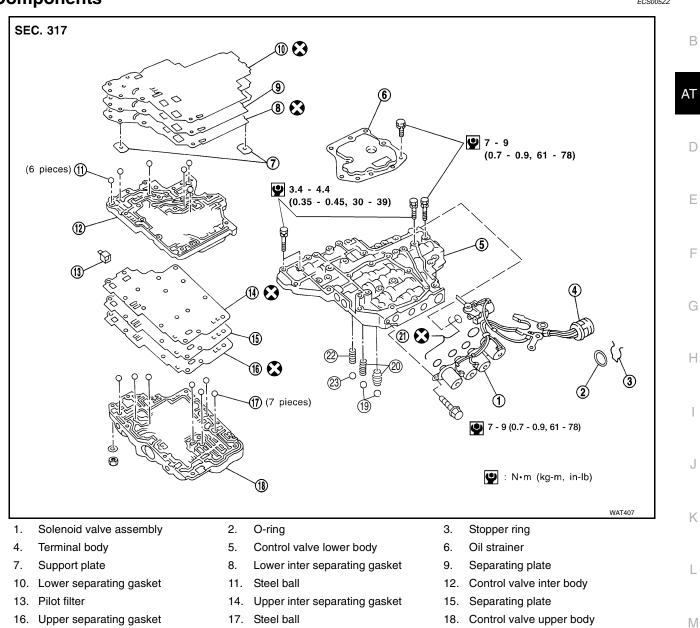


Components





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- 19. Check ball
- 22. T/C pressure holding spring
- Steel ball 17.
- Oil cooler relief valve spring 20.

21. O-ring

23. Check ball

AT-297

Disassembly

[RE4F03B]

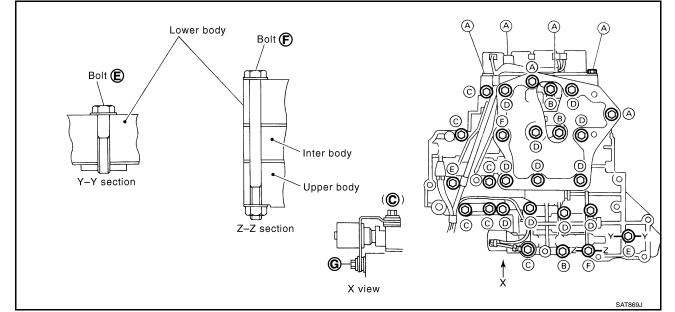
ECS00600

• Disassemble upper, inter and lower bodies.

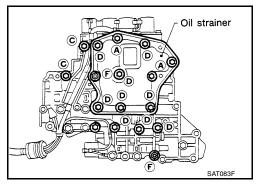
Bolt length, number and location:

Bolt symbol	А	В	С	D	E	F	G
Bolt length "l"	13.5 mm (0.531 in)	58.0 mm (2.283 in)	40.0 mm (1.575 in)	66.0 mm (2.598 in)	33.0 mm (1.299 in)	78.0 mm (3.071 in)	18.0 mm (0.709 in)
Number of bolts	6	3	6	11	2	2	1

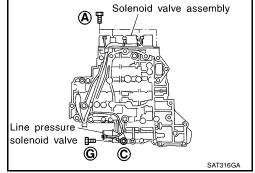
F: Reamer bolt with nut



1. Remove bolts A, D and F, and remove oil strainer from control valve assembly.



- 2. Remove solenoid valve assembly and line pressure solenoid valve from control valve assembly.
 - Be careful not to lose the line pressure solenoid valve spring.

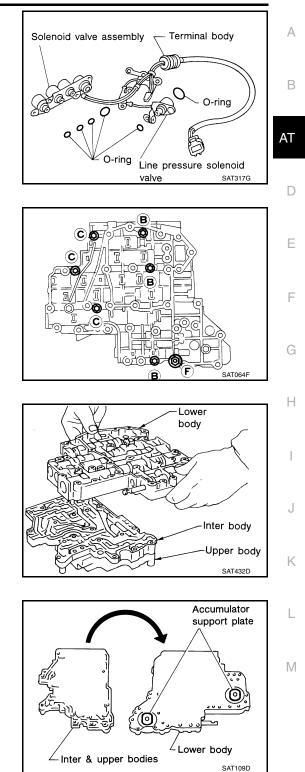


3. Remove O-rings from solenoid valves and terminal body.

4. Place upper body face down, and remove bolts B, C and F.

5. Remove lower body from inter body.

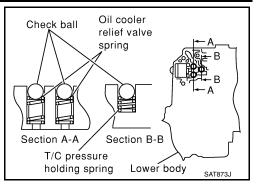
6. Turn over lower body, and accumulator support plates.

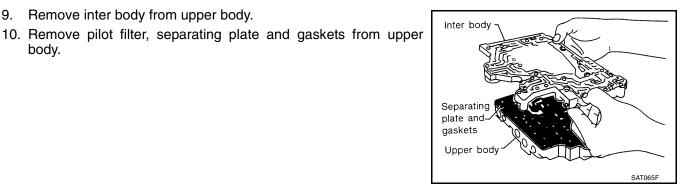


[RE4F03B]

[RE4F03B]

- 7. Remove bolts E, separating plate and separating gaskets from lower body.
- Remove check balls, oil cooler relief valve springs and T/C pres-8. sure holding spring from lower body.
 - Be careful not to lose steel balls and relief valve springs.



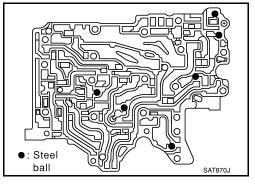


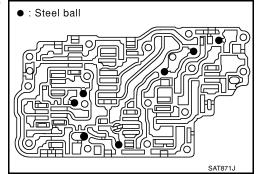
- 11. Check to see that steel balls are properly positioned in inter body and then remove them.
 - Be careful not to lose steel balls.

9. Remove inter body from upper body.

body.

- 12. Check to see that steel balls are properly positioned in upper body and then remove them.
 - Be careful not to lose steel balls.





Inspection LOWER AND UPPER BODIES

Check to see that retainer plates are properly positioned in lower body.

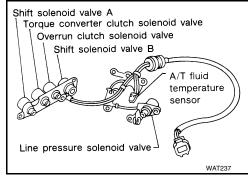
Check to see that retainer plates are properly positioned in upper body.

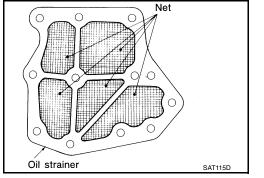
OIL STRAINER

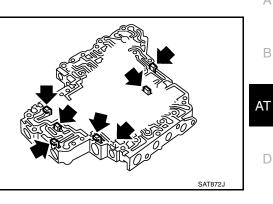
Check wire netting of oil strainer for damage.

SHIFT SOLENOID VALVES A AND B, LINE PRESSURE SOLENOID VALVE, TORQUE CON-VERTER CLUTCH SOLENOID VALVE AND OVERRUN CLUTCH SOLENOID VALVE

Refer to AT-182, "SHIFT SOLENOID VALVE A", AT-186, "SHIFT SOLENOID VALVE B", AT-177, "LINE PRESSURE SOLENOID VALVE", AT-177, "LINE PRESSURE SOLENOID VALVE" and AT-196, "OVERRUN CLUTCH SOLENOID VALVE"







[RE4F03B]

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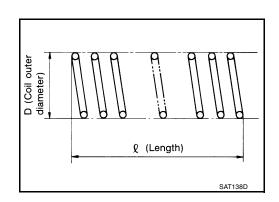
SAT871J

OIL COOLER RELIEF VALVE SPRING

- Check springs for damage or deformation.
- Measure free length and outer diameter.

Inspection standard

: Refer to AT-388, "Clutch and Brake Return Springs"



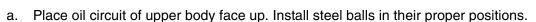
• : Steel ball

Assembly

1. Install upper, inter and lower body.

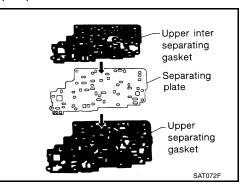
• Always use new gaskets.

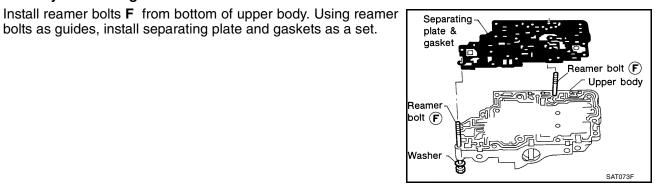
c.



Install upper separating gasket, upper inter separating gasket b. and upper separating plate in order shown in illustration.

bolts as guides, install separating plate and gaskets as a set.





[RE4F03B]

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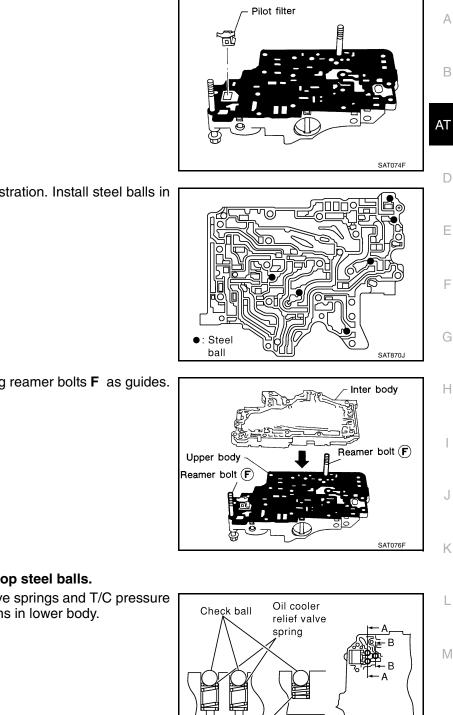
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Section B-B

Lower body

SAT873J



Section A-A

T/C préssure

holding spring

Place inter body as shown in the illustration. Install steel balls in e. their proper positions.

d.

Install pilot filter.

f. Install inter body on upper body using reamer bolts **F** as guides.

- Be careful not to dislocate or drop steel balls.
- Install steel balls, oil cooler relief valve springs and T/C pressure g. holding spring in their proper positions in lower body.

[RE4F03B]

Support plate

Separating

Inter and upper bodies

AAT536

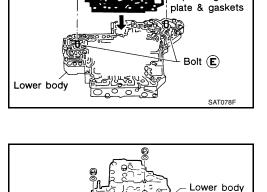
h. Install lower separating gasket, inter separating gasket and lower separating plate in order shown in the illustration.

i. Install bolts **E** from bottom of lower body. Using bolts **E** as guides, install separating plate and gaskets as a set.

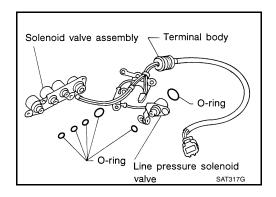
- j. Install support plates on lower body.
- k. Install lower body on inter body using reamer bolts **F** as guides and tighten reamer bolts **F** slightly.

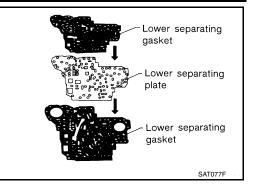
- 2. Install O-rings to solenoid valves and terminal body.
 - Apply ATF to O-rings.
- 3. Install and tighten bolts.



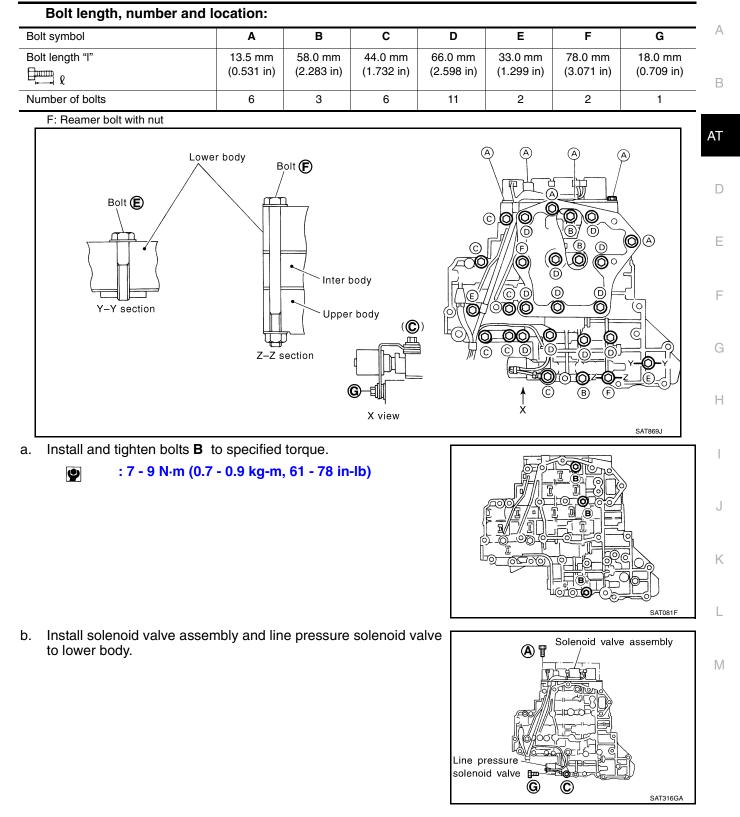


Reamer bolt F



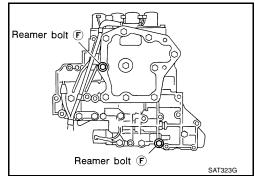


[RE4F03B]



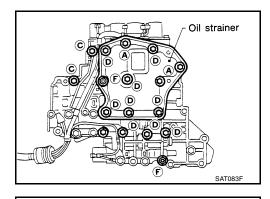
[RE4F03B]

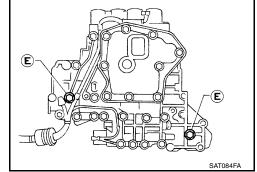
c. Remove reamer bolts **F** and set oil strainer on control valve assembly.



- d. Reinstall reamer bolts F from lower body side.
- e. Tighten bolts A , C , D and F to specified torque.

. 7 - 9 N⋅m (0.7 - 0.9 kg-m, 61 - 78 in-lb)





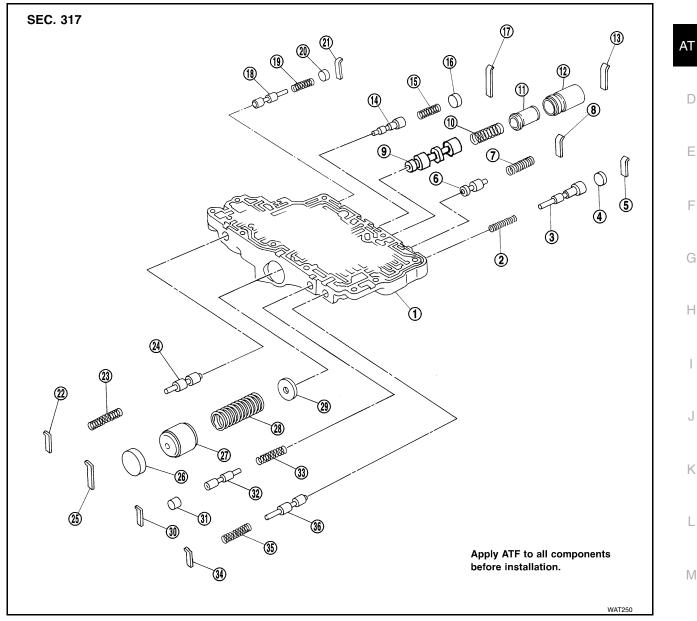
f. Tighten bolts E to specified torque.

● : 3.4 - 4.4 N·m (0.35 - 0.45 kg-m, 30.4 - 39.1 in-lb)

CONTROL VALVE UPPER BODY

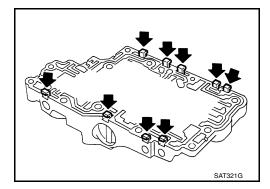
Components

Numbers preceding valve springs correspond with those shown in <u>AT-386, "CONTROL VALVE AND PLUG RETURN SPRINGS"</u>.



Disassembly

- 1. Remove valves at retainer plates.
 - Do not use a magnetic "hand".



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[RE4F03B]

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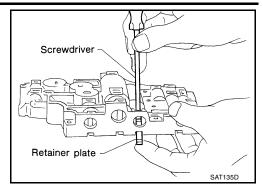
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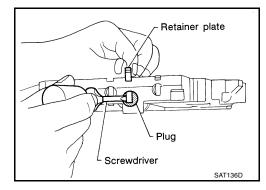
ECS00604

CONTROL VALVE UPPER BODY

[RE4F03B]

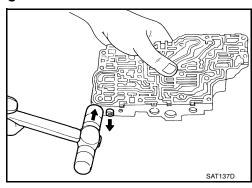
a. Use a screwdriver to remove retainer plates.





Remove retainer plates while holding spring, plugs or sleeves.

- Remove plugs slowly to prevent internal parts from jumping out.
- c. Place mating surface of valve body face down, and remove internal parts.
 - If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.
 - Be careful not to drop or damage valves and sleeves.



Inspection VALVE SPRING

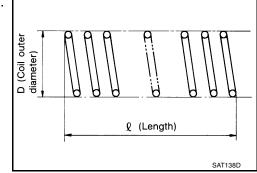
b.

• Measure free length and outer diameter of each valve spring. Also check for damage or deformation.

Inspection standard

: Refer to <u>AT-386, "CON-</u> <u>TROL VALVE AND PLUG</u> <u>RETURN SPRINGS"</u>.

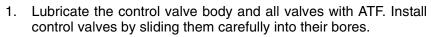
Replace valve springs if deformed or fatigued.



CONTROL VALVES

• Check sliding surfaces of valves, sleeves and plugs.

ECS00605



Lay control valve body down when installing valves. Do not

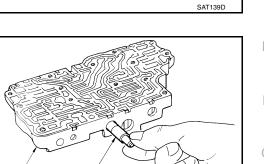
stand the control valve body upright.

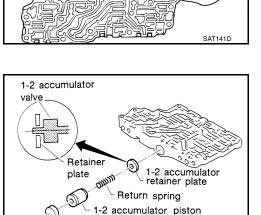
- Be careful not to scratch or damage valve body.
- Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.

1-2 ACCUMULATOR VALVE

Assembly

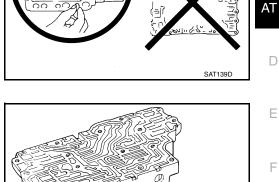
- Install 1-2 accumulator valve. Align 1-2 accumulator retainer plate from opposite side of control valve body.
- Install return spring, 1-2 accumulator piston and plug.

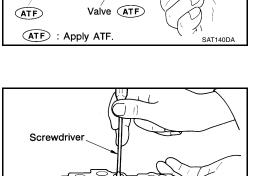




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Plug Retainer plate





[RE4F03B]

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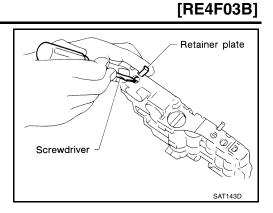
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1. Install retainer plates.

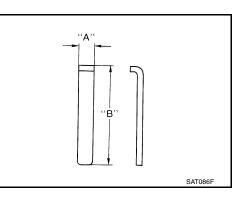
• Install retainer plate while pushing plug or return spring.



RETAINER PLATE (FOR CONTROL VALVE UPPER BODY)

Refer to AT-307, "CONTROL VALVE UPPER BODY" .

			Unit: mm (in)	
Name of valve and piston	No.	Width A	Length B	
Pilot valve	22		21.5 (0.846)	
1-2 accumulator valve	17	•	40.5 (1.594)	
1-2 accumulator piston	25			
1st reducing valve	30		21.5 (0.846)	
Overrun clutch reducing valve	5	6.0 (0.236)	24.0 (0.945)	
Torque converter relief valve	8		21.5 (0.846)	
Torque converter clutch control valve	13	* •	28.0 (1.102)	
3-2 timing valve	34		21.5 (0.846)	
Cooler check valve	21		24.0 (0.945)	



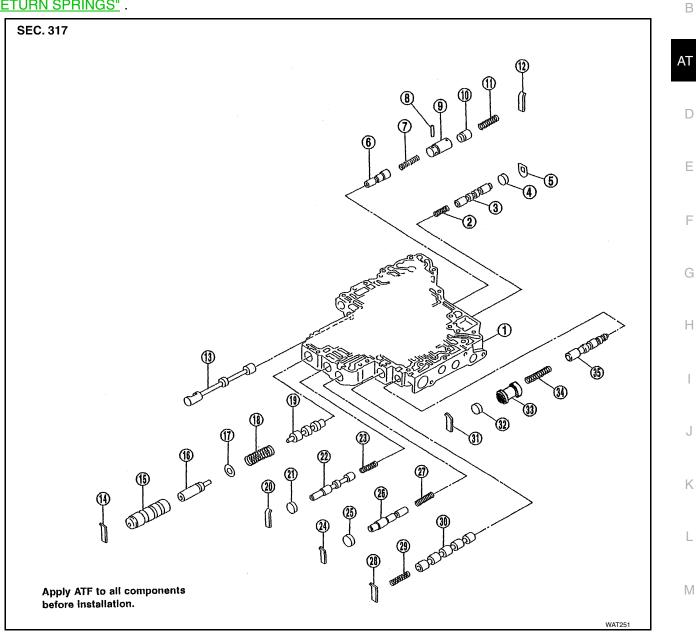
• Install proper retainer plates.

CONTROL VALVE LOWER BODY

CONTROL VALVE LOWER BODY

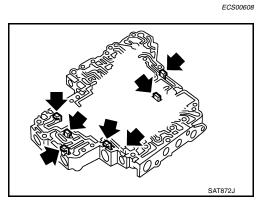
Components

Numbers preceding valve springs correspond with those shown in <u>AT-386, "CONTROL VALVE AND PLUG</u> <u>RETURN SPRINGS"</u>.



Disassembly

Remove valves at retainer plate. For removal procedures, refer to <u>AT-311, "Disassembly"</u>.



[RE4F03B]

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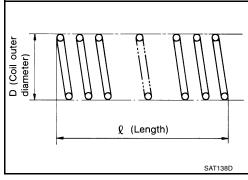
Inspection VALVE SPRINGS

• Check each valve spring for damage or deformation. Also measure free length and outer diameter.

Inspection standard

: Refer to <u>AT-386, "CON-</u> <u>TROL VALVE AND PLUG</u> <u>RETURN SPRINGS"</u>.

• Replace valve springs if deformed or fatigued.

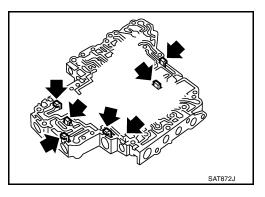


CONTROL VALVES

• Check sliding surfaces of control valves, sleeves and plugs for damage.

Assembly

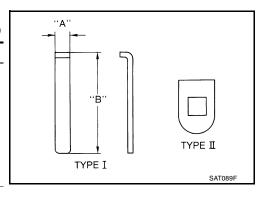
Install control valves.
 For installation procedures, refer to <u>AT-312, "Assembly"</u>.



RETAINER PLATE (FOR CONTROL VALVE LOWER BODY)

Refer to AT-311, "CONTROL VALVE LOWER BODY" .

			Uni	it: mm (in)
Name of control valve	No.	Width A	Length B	Туре
Pressure regulator valve	14			
Accumulator control valve	24			
Shift valve A	28	6.0 (0.236) 28.0 (1.102)		
Overrun clutch control valve	20			
Pressure modifier valve	12			
Shuttle control valve	31			
Shift valve B	5	—	_	II



• Install proper retainer plates.



[RE4F03B]

ECS0060A

REVERSE CLUTCH

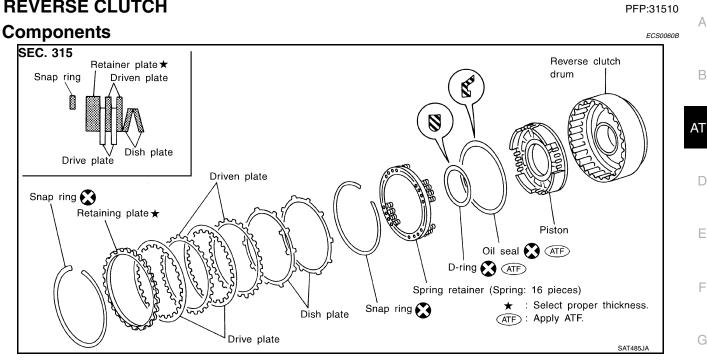
REVERSE CLUTCH

[RE4F03B]

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Disassembly

Remove snap ring.

plates.

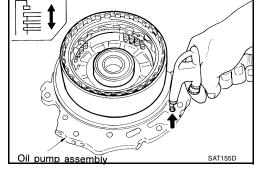
3.

- Check operation of reverse clutch. 1.
- Install seal ring onto drum support of oil pump cover and install a. reverse clutch assembly. Apply compressed air to oil hole.

Remove drive plates, driven plates, retaining plate, and dish

- Check to see that retaining plate moves to snap ring. b.
- If retaining plate does not contact snap ring: C.
 - D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.

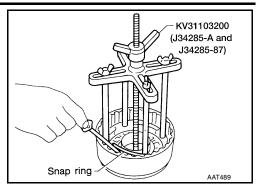
Do not expand snap ring excessively.



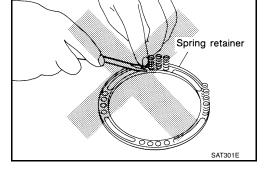
L Snap ring Μ Screwdriver SAT156D

AT-313

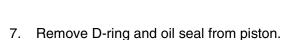
- 4. Set Tool on spring retainer and remove snap ring from reverse clutch drum while compressing return springs.
 - Set Tool directly above springs.
 - Do not expand snap ring excessively.

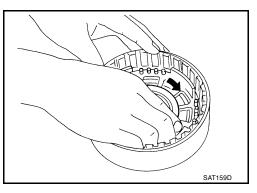


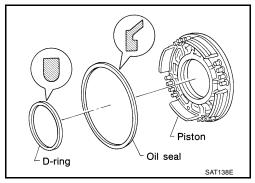
- 5. Remove spring retainer and return springs.
 - Do not remove return springs from spring retainer.



6. Remove piston from reverse clutch drum by turning it.







ECS0060D

Inspection REVERSE CLUTCH SNAP RING, SPRING RETAINER AND RETURN SPRINGS

- Check for deformation, fatigue or damage.
- Replace if necessary.
- When replacing spring retainer and return springs, replace them as a set.

REVERSE CLUTCH

[RE4F03B]

REVERSE CLUTCH DRIVE PLATES

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate Standard value Wear limit

: 2.0 mm (0.079 in) : 1.8 mm (0.071 in)

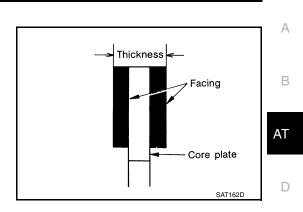
If not within wear limit, replace.

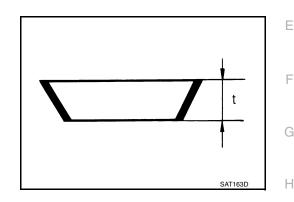
REVERSE CLUTCH DISH PLATES

- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate : 2.8 mm (0.110 in) "t"

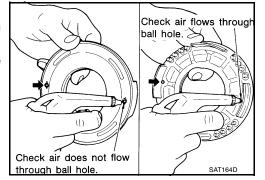
• If deformed or fatigued, replace.





REVERSE CLUTCH PISTON

- Make sure check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure that there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure air leaks past ball.



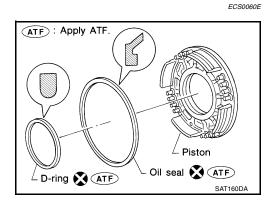
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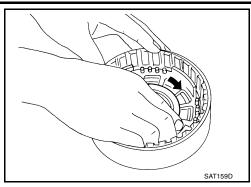
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Assembly

- 1. Install D-ring and oil seal on piston.
 - Take care with the direction of the oil seal.
 - Apply ATF to both parts.



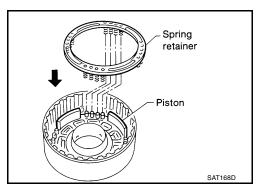
- 2. Install piston assembly by turning it slowly.
 - Apply ATF to inner surface of drum.



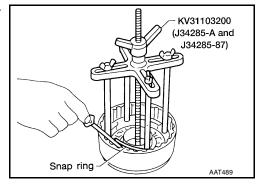
3. Install return springs and spring retainer on piston.

Return spring

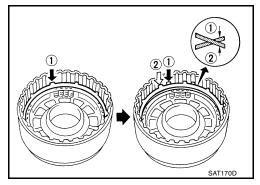
: Refer to <u>AT-388, "Clutch</u> and Brake Return Springs" .



- 4. Set Tool on spring retainer and install snap ring while compressing return springs.
 - Set Tool directly above return springs.



- 5. Install drive plates, driven plates, retaining plate and dish plates.
 - Do not align the projections of any two dish plates.
 - Take care with the order and direction of plates.



REVERSE CLUTCH

[RE4F03B]

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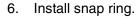
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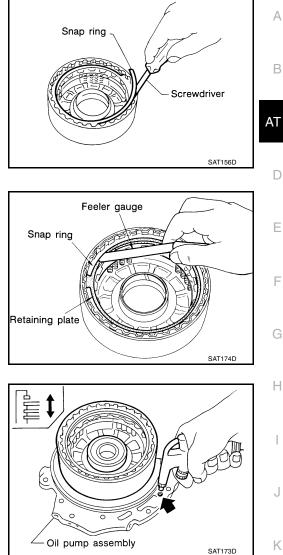
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• Do not expand snap ring excessively.



Measure clearance between retaining plate and snap ring. If not 7. within allowable limit, select proper retaining plate.

> **Specified clearance** Standard **Allowable limit Retaining plate**

: 0.5 - 0.8 mm (0.020 - 0.031 in) : 1.2 mm (0.047 in) : Refer to AT-386, "REVERSE CLUTCH"

8. Check operation of reverse clutch. Refer to AT-313, "Components" .



L

HIGH CLUTCH

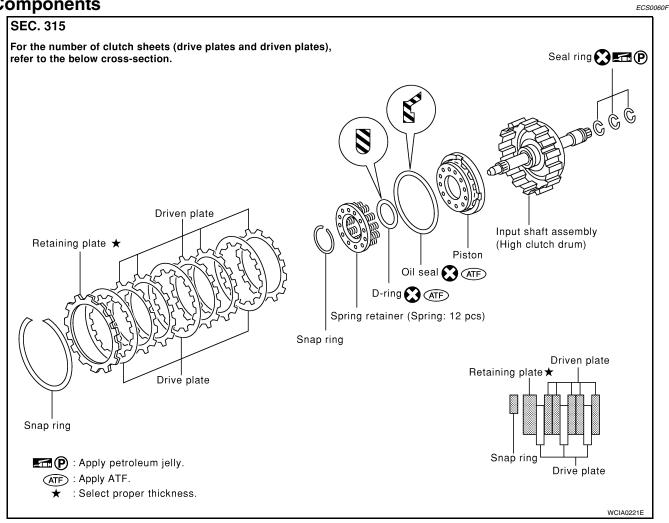
[RE4F03B]

PFP:31410



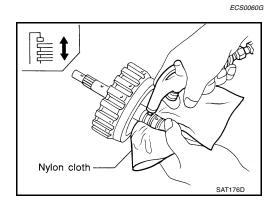
HIGH CLUTCH







- Check operation of high clutch. 1.
- Apply compressed air to oil hole of input shaft. a.
 - Stop up a hole on opposite side of input shaft.
- b. Check to see that retaining plate moves to snap ring.
- If retaining plate does not contact snap ring: C.
 - D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.



HIGH CLUTCH

[RE4F03B]

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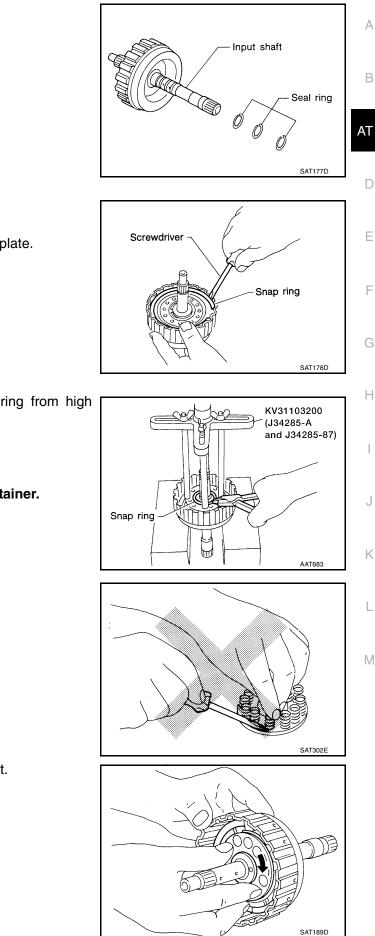
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3. Remove snap ring.

2.

• Do not expand snap ring excessively.

Remove seal rings from input shaft.

4. Remove drive plates, driven plates and retaining plate.

- 5. Set Tool on spring retainer and remove snap ring from high clutch drum while compressing return springs.
 - Set Tool directly above springs.
 - Do not expand snap ring excessively.
- 6. Remove spring retainer and return springs.
 - Do not remove return spring from spring retainer.

Remove piston from high clutch drum by turning it. 7.

Piston

SAT139

8. Remove D-ring and oil seal from piston.



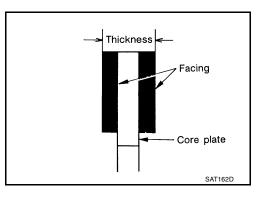
- Check for deformation, fatigue or damage.
- Replace if necessary.
- When replacing spring retainer and return springs, replace them as a set.

HIGH CLUTCH DRIVE PLATES

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plateStandard value: 2.0 mm (0.079 in)Wear limit: 1.8 mm (0.071 in)

If not within wear limit, replace.



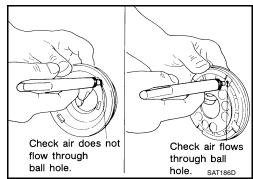
A

Oil seal

D-ring

HIGH CLUTCH PISTON

- Make sure check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure air leaks past ball.



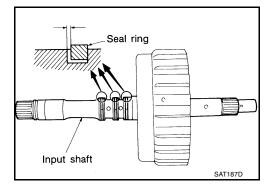
SEAL RING CLEARANCE

- Install new seal rings onto input shaft.
- Measure clearance between seal ring and ring groove.

Standard clearance : 0.08 - 0.23 mm (0.0031 - 0.0091 in)

Allowable limit : 0.23 mm (0.0091 in)

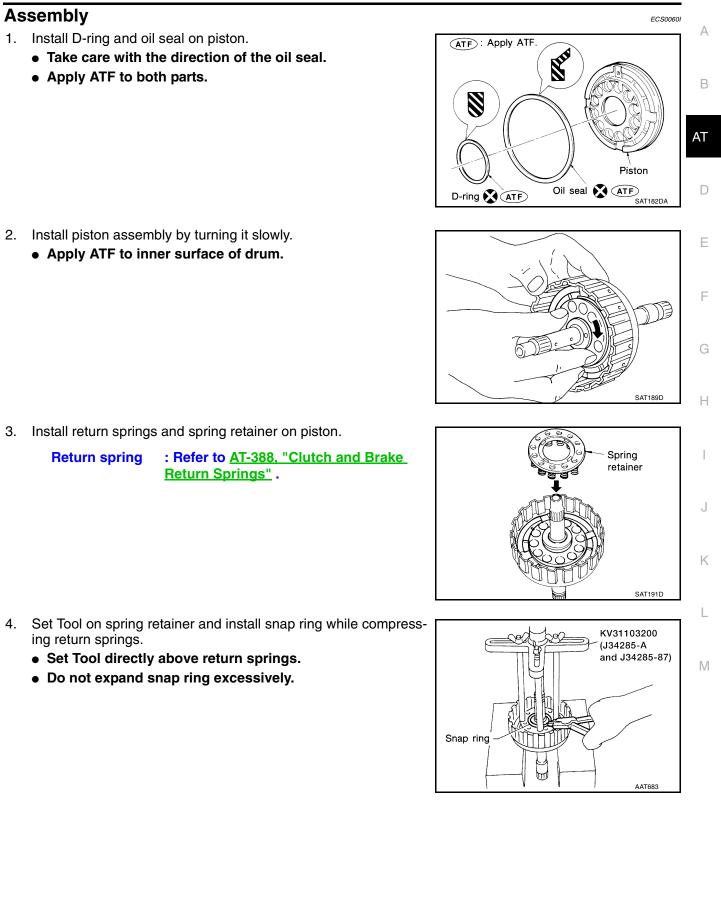
• If not within wear limit, replace input shaft assembly.



ECS0060H

HIGH CLUTCH

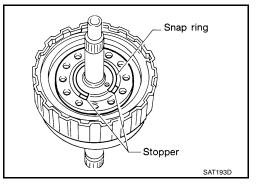
[RE4F03B]

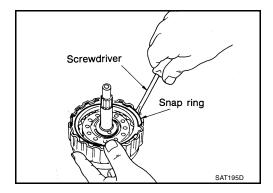


HIGH CLUTCH

[RE4F03B]

• Do not align snap ring gap with spring retainer stopper.





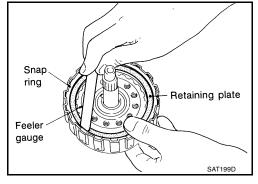
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

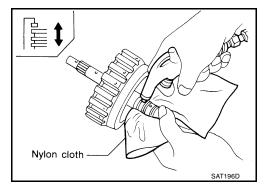
5. Install drive plates, driven plates and retaining plate. Take care with the order and direction of plates.

• Do not expand snap ring excessively.

6. Install snap ring.

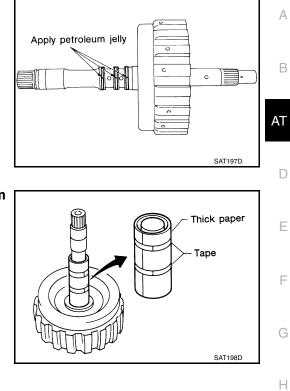
Specified clearance	
Standard	: 1.4 - 1.8 mm (0.055 - 0.071 in)
Allowable limit	: 2.4 mm (0.094 in)
Retaining plate	: Refer to <u>AT-387, "HIGH</u> <u>CLUTCH"</u> .





8. Check operation of high clutch. Refer to <u>AT-318, "HIGH CLUTCH"</u>.

- 9. Install seal rings to input shaft.
 - Apply petroleum jelly to seal rings.



• Roll paper around seal rings to prevent seal rings from spreading.



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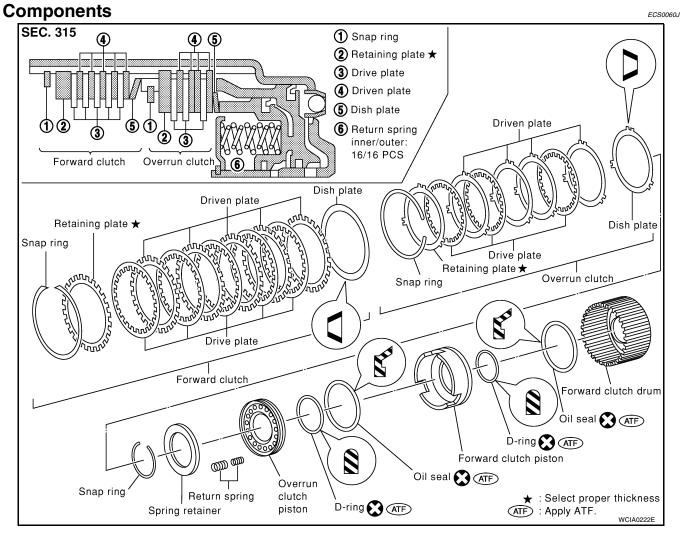
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AT-323

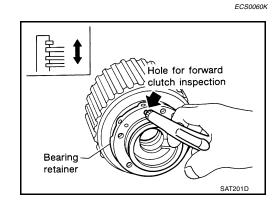
FORWARD CLUTCH AND OVERRUN CLUTCH

[RE4F03B]



Disassembly

1. Check operation of forward clutch and overrun clutch.



- a. Install bearing retainer on forward clutch drum.
- b. Apply compressed air to oil hole of forward clutch drum.
- c. Check to see that retaining plate moves to snap ring.

[RE4F03B]

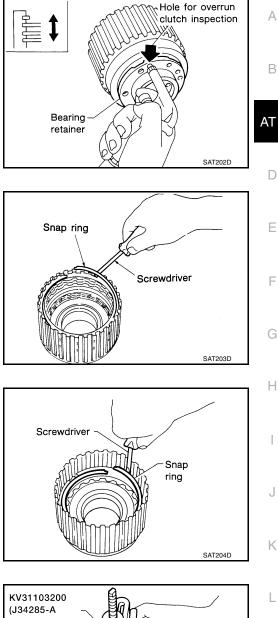
- d. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Oil seal might be damaged.

2. Remove snap ring for forward clutch.

plate for forward clutch.

• Do not expand snap ring excessively.

• Fluid might be leaking past piston check ball.



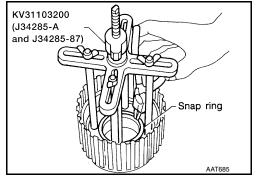
Do not expand snap ring excessively.
 Bemove drive plates driven plates rota

4. Remove snap ring for overrun clutch.

5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.

3. Remove drive plates, driven plates, retaining plate and dish

- 6. Set Tool on spring retainer and remove snap ring from forward clutch drum while compressing return springs.
 - Set Tool directly above return springs.
 - Do not expand snap ring excessively.
- 7. Remove spring retainer and return springs.

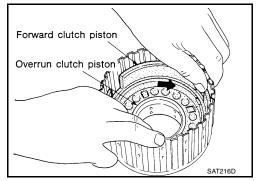


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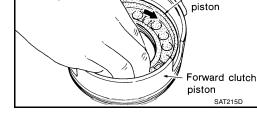
[RE4F03B]

Overrun clutch

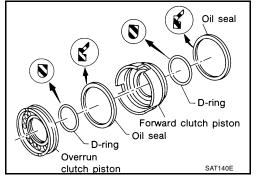
8. Remove forward clutch piston with overrun clutch piston from forward clutch drum by turning it.



9. Remove overrun clutch piston from forward clutch piston by turning it.



10. Remove D-rings and oil seals from forward clutch piston and overrun clutch piston.



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Inspection SNAP RINGS AND SPRING RETAINER

• Check for deformation, fatigue or damage.

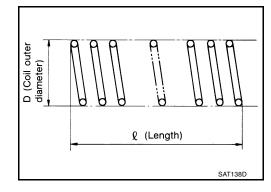
FORWARD CLUTCH AND OVERRUN CLUTCH RETURN SPRINGS

- Check for deformation or damage.
- Measure free length and outer diameter.

Inspection standard

: Refer to AT-388, "Clutch and Brake Return Springs" .

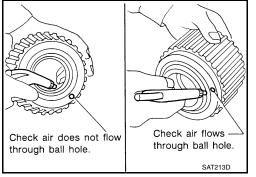
• Replace if deformed or fatigued.



[RE4F03B]

FORWARD CLUTCH AND OVERRUN CLUTCH DRIVE PLATES А Check facing for burns, cracks or damage. Measure thickness of facing. Thickness Thickness of drive plate В Facing **Forward clutch** Standard value : 1.8 mm (0.071 in) AT Wear limit : 1.6 mm (0.063 in) Core plate **Overrun clutch** Standard value : 1.6 mm (0.063 in) D SAT162D Wear limit : 1.4 mm (0.055 in) If not within wear limit, replace. Ε FORWARD CLUTCH AND OVERRUN CLUTCH DISH PLATES Check for deformation or damage. Measure thickness of dish plate. F Thickness of dish plate "t" **Forward clutch** : 2.5 mm (0.098 in) t **Overrun clutch** : 2.15 mm (0.0846 in) If deformed or fatigued, replace. Н SAT163D FORWARD CLUTCH DRUM Make sure check balls are not fixed. Apply compressed air to check ball oil hole from outside of forward clutch drum. Make sure air leaks past ball.

• Apply compressed air to oil hole from inside of forward clutch drum. Make sure there is no air leakage.



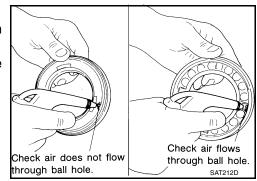
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OVERRUN CLUTCH PISTON

- Make sure check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side. Make sure air leaks past ball.

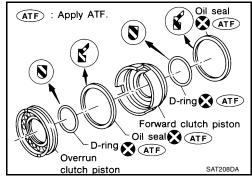


Assembly

2.

- 1. Install D-rings and oil seals on forward clutch piston and overrun clutch piston.
 - Take care with direction of oil seal.
 - Apply ATF to both parts.

while turning it slowly.



Install overrun clutch piston assembly on forward clutch piston Overrun clutch piston Forward clutch piston SAT215D

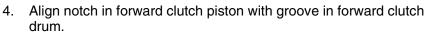
Forward clutch piston

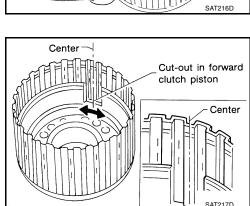
Overrun clutch piston

3. Install forward clutch piston assembly on forward clutch drum while turning it slowly.

• Apply ATF to inner surface of forward clutch piston.

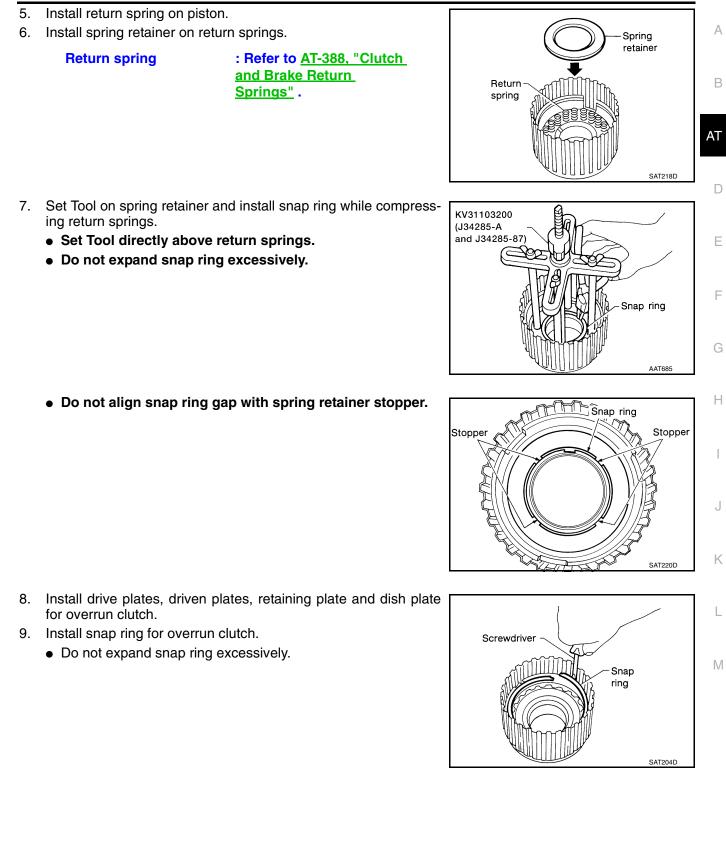
• Apply ATF to inner surface of drum.





[RE4F03B]

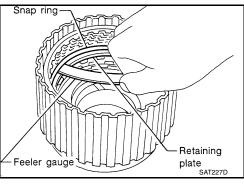
[RE4F03B]



[RE4F03B]

10. Measure clearance between overrun clutch retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

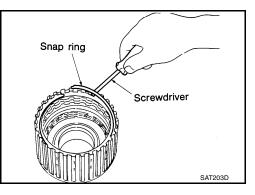
Specified clearanceStandard: 1.0 - 1.4 mm (0.039 - 0.055 in)Allowable limit: 2.0 mm (0.079 in)Overrun clutch retain-
ing plate: Refer to AT-387, "OVERRUN
CLUTCH".



11. Install drive plates, driven plates, retaining plate and dish plate for forward clutch.

Take care with the order and direction of plates.

- 12. Install snap ring for forward clutch.
 - Do not expand snap ring excessively.

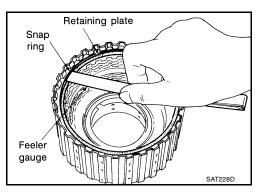


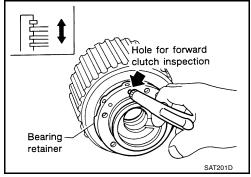
13. Measure clearance between forward clutch retaining plate and snap ring.

If not within allowable limit, select proper retaining plate.

Specified clearance	
Standard	: 0.45 - 0.85 mm (0.0177 - 0.0335 in)
Allowable limit	: 1.85 mm (0.0728 in)
Forward clutch retaining plate	: Refer to <u>AT-387, "FORWARD</u> <u>CLUTCH"</u>

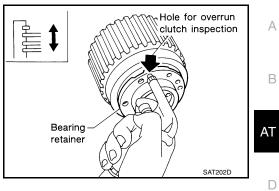
14. Check operation of forward clutch. Refer to <u>AT-324, "FORWARD CLUTCH AND OVERRUN</u> <u>CLUTCH"</u>.





[RE4F03B]

15. Check operation of overrun clutch. Refer to <u>AT-324, "FORWARD CLUTCH AND OVERRUN</u> <u>CLUTCH"</u>.





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LOW & REVERSE BRAKE

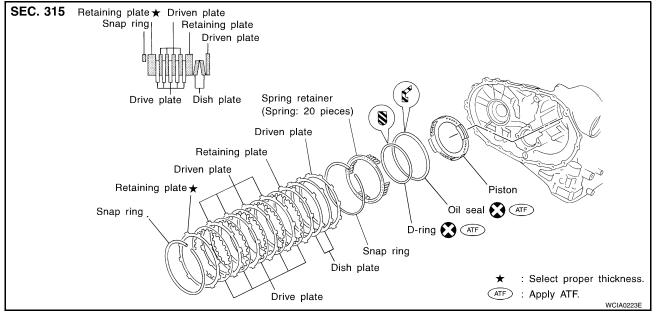
[RE4F03B]

LOW & REVERSE BRAKE

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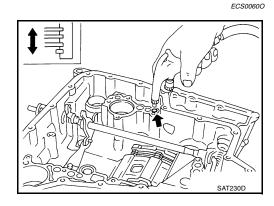
ECS0060N

Components



Disassembly

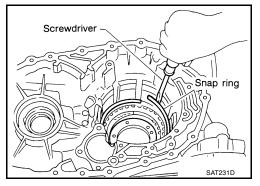
- 1. Check operation of low & reverse brake.
- a. Apply compressed air to oil hole of transmission case.
- b. Check to see that retaining plate moves to snap ring.
- c. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.



- 2. Stand transmission case.
- 3. Remove snap ring.

• Do not expand snap ring excessively.

4. Remove drive plates, driven plates, retaining plate from transmission case.



[RE4F03B]

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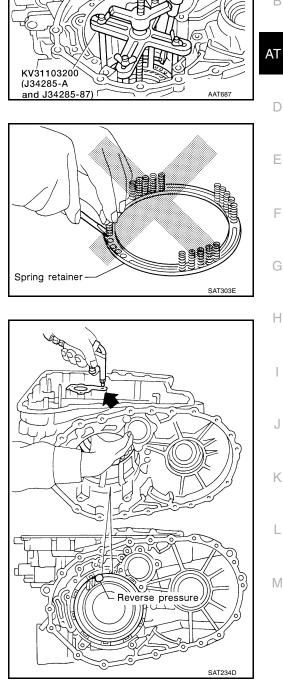
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- 5. Set Tool on spring retainer and remove snap ring while compressing return springs.
 - Set Tool directly above return springs.
 - Do not expand snap ring excessively.
- 6. Remove spring retainer and return springs.
 - Do not remove return springs from spring retainer.

- 7. Apply compressed air to oil hole of transmission case while holding piston.
- Remove piston from transmission case by turning it. 8.



LOW & REVERSE BRAKE

9. Remove D-ring and oil seal from piston.

B D-ring SAT767

Inspection LOW & REVERSE CLUTCH SNAP RING, SPRING RETAINER AND RETURN SPRINGS

ECS0060F

[RE4F03B]

- Check for deformation, fatigue or damage.
- Replace if necessary.
- When replacing spring retainer and return springs, replace them as a set.

LOW & REVERSE BRAKE DRIVE PLATES

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate	
Standard value	: 2.0 mm (0.079 in)
Wear limit	: 1.8 mm (0.071 in)

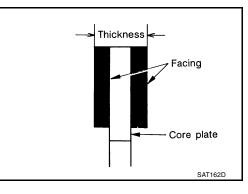
• Take care with the direction of the oil seal.

• If not within wear limit, replace.

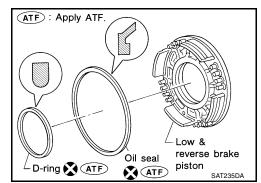
1. Install D-ring and oil seal on piston.

• Apply ATF to both parts.

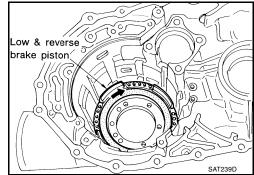
Assembly



ECS0060Q



- 2. Stand transmission case.
- 3. Install piston assembly on transmission case while turning it slowly.
 - Apply ATF to inner surface of transmission case.



4. Install return springs and spring retainer on piston.

Return spring

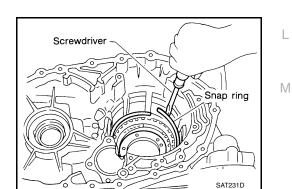
7. Install snap ring.

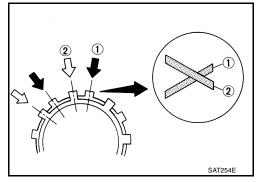
:Refer to AT-388, "Clutch and Brake Return Springs".

- 5. Install snap ring while compressing return springs.
 - Set Tool directly above return springs.

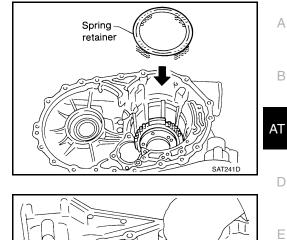
• Do not expand snap ring excessively.

- 6. Install drive plates, driven plates, retaining plates and dished plates.
 - Do not align the projections on the two dished plates.
 - Make sure to put the plates in the correct order and direction.





KV31103200 (J34285-A and J34285-87)



[RE4F03B]

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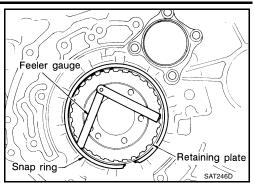
LOW & REVERSE BRAKE

[RE4F03B]

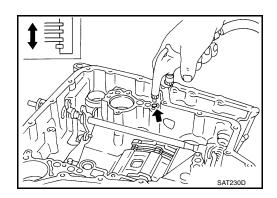
8. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate (front side).

Specified clearance Standard Allowable limit Retaining plate

: 1.4 - 1.8 mm (0.055 - 0.071 in) : 2.8 mm (0.110 in) : Refer to <u>AT-387, "LOW &</u> <u>REVERSE BRAKE"</u> .



9. Check operation of low and reverse brake. Refer to <u>AT-332, "LOW & REVERSE BRAKE"</u>.



REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB

[RE4F03B]

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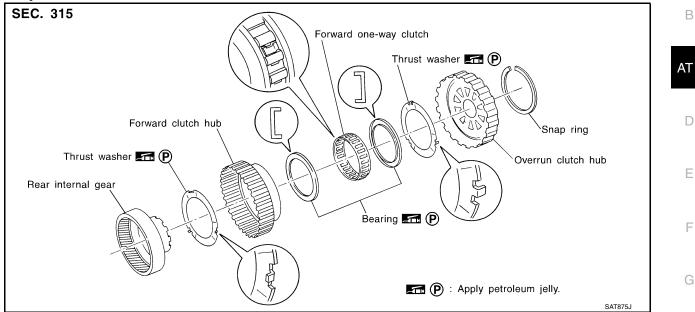
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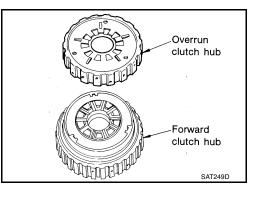
REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB PFP:31450

Components

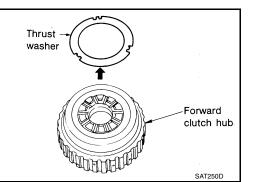


Disassembly

- 1. Remove snap ring from overrun clutch hub.
- 2. Remove overrun clutch hub from forward clutch hub.



3. Remove thrust washer from forward clutch hub.



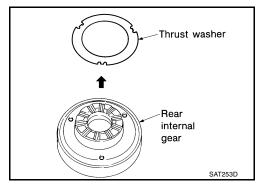
REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB [RE4F03B]

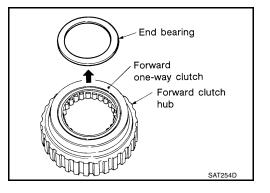
4. Remove forward clutch hub from rear internal gear.

Forward clutch hub Rear internal gear SAT251D

End bearing

 Rear internal
 gear





5. Remove end bearing from rear internal gear.

6. Remove thrust washer from rear internal gear.

7. Remove end bearing from forward one-way clutch.

REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB [RE4F03B]

8. Remove one-way clutch from forward clutch hub.

Forward one-way clutch

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Overrun clutch hub

SAT256D

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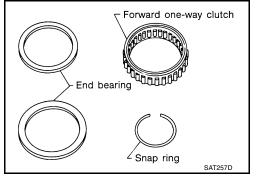
В

Inspection REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB

• Check rubbing surfaces for wear or damage.



- Check snap ring and end bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.

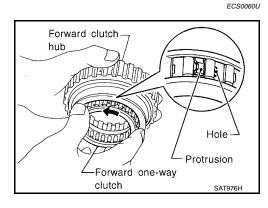


Rear internal gear

Forward F

Assembly

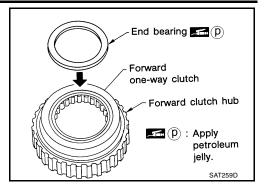
- 1. Install forward one-way clutch on forward clutch.
 - Take care with the direction of forward one-way clutch.

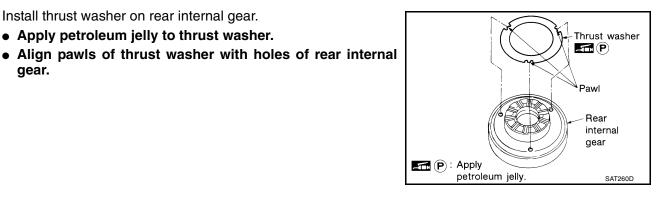


REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB

[RE4F03B]

- 2. Install end bearing on forward one-way clutch.
 - Apply petroleum jelly to end bearing.





End bearing **(p**)

> Rear internal gear

> > SAT261D

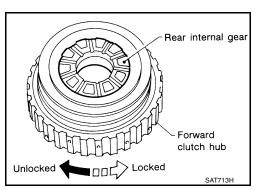
4. Install end bearing on rear internal gear. • Apply petroleum jelly to end bearing.

3. Install thrust washer on rear internal gear.

gear.

• Apply petroleum jelly to thrust washer.

- 5. Install forward clutch hub on rear internal gear.
 - Check operation of forward one-way clutch. Hold rear internal gear and turn forward clutch hub. Check forward clutch hub for correct locking and unlockina directions.
 - If not as shown in illustration, check installation direction of forward one-way clutch.



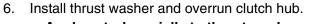
🚘 (p): Apply petroleum jelly

REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB

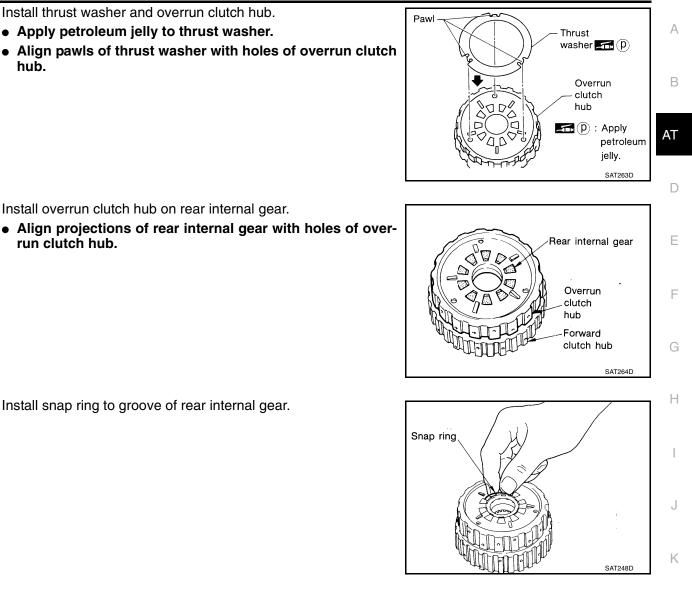
[RE4F03B]

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- Apply petroleum jelly to thrust washer.
 - Align pawls of thrust washer with holes of overrun clutch hub.



7. Install overrun clutch hub on rear internal gear.

run clutch hub.

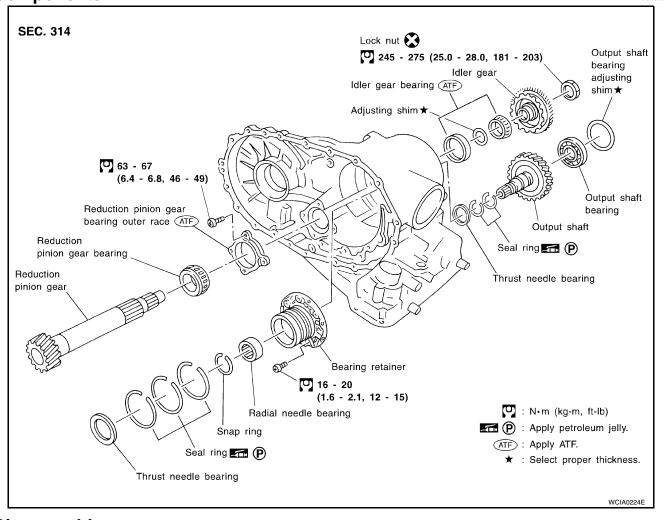
Install snap ring to groove of rear internal gear. 8.

[RE4F03B]

OUTPUT SHAFT, IDLER GEAR, REDUCTION PINION GEAR AND BEARING RETAINER PFP:31480

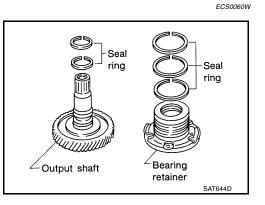
Components

ECS0060V



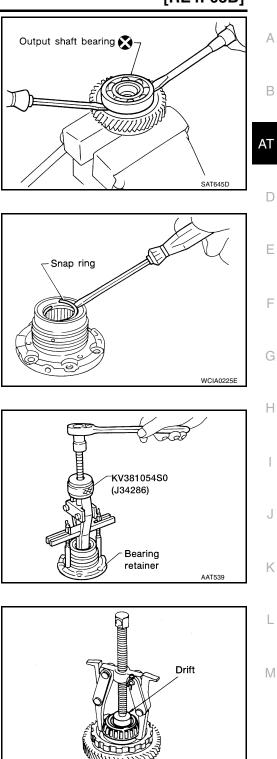
Disassembly

1. Remove seal rings from output shaft and bearing retainer.



[RE4F03B]

- 2. Remove output shaft bearing with screwdrivers.
 - Always replace bearing with a new one when removed.
 - Do not damage output shaft.



SAT648D

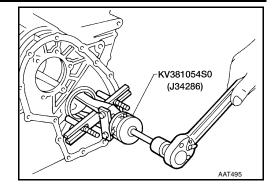
- 3. Remove snap ring from bearing retainer.
 - Do not expand snap ring excessively.

4. Remove needle bearing from bearing retainer.

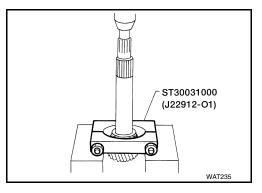
5. Remove idler gear bearing inner race from idler gear.

[RE4F03B]

6. Remove idler gear bearing outer race from transmission case.



7. Press out reduction pinion gear bearing from reduction pinion gear.



8. Remove reduction pinion gear bearing outer race from transmission case.



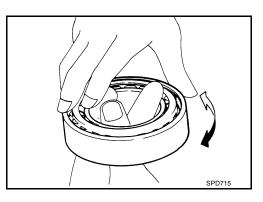
ECS0060X

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Check shafts for cracks, wear or bending.Check gears for wear, chips and cracks.

BEARING

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- When replacing taper roller bearing, replace outer and inner race as a set.



SEAL RING CLEARANCE

- Install new seal rings to output shaft.
- Measure clearance between seal ring and ring groove of output shaft.

Standard clearance : 0.10 - 0.25 mm (0.0039 - 0.0098 in) Allowable limit : 0.25 mm (0.0098 in)

- If not within allowable limit, replace output shaft.
- Install new seal rings to bearing retainer.
- Measure clearance between seal ring and ring groove of bearing retainer.

Standard clearance : 0.10 - 0.25 mm (0.0039 - 0.0098 in) **Allowable limit** : 0.25 mm (0.0098 in)

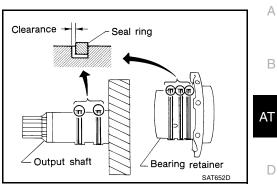
If not within allowable limit, replace bearing retainer.

Assembly

2.

case.

Press reduction pinion gear bearing on reduction pinion gear. 1.



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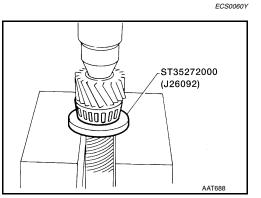
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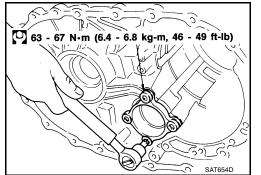
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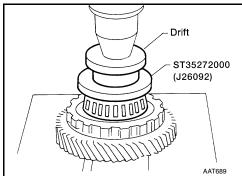
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Press idler gear bearing inner race on idler gear. 3.

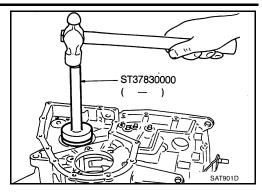


Install reduction pinion gear bearing outer race on transmission

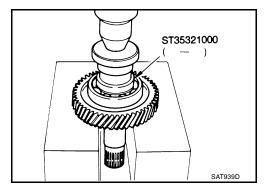


[RE4F03B]

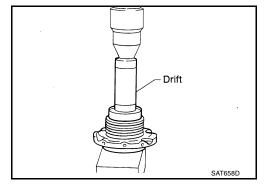
4. Install idler gear bearing outer race on transmission case.

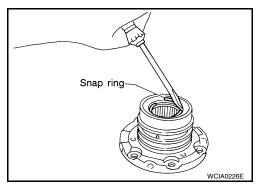


5. Press output shaft bearing on output shaft.



6. Press needle bearing on bearing retainer.





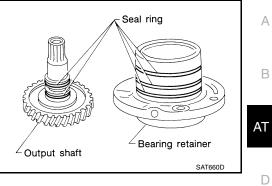
7. Install snap ring to bearing retainer.

[RE4F03B]

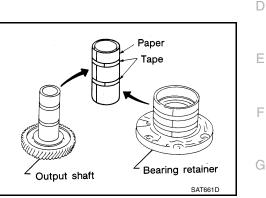
8. After packing ring grooves with petroleum jelly, carefully install new seal rings on output shaft and bearing retainer.

NOTE:

Do not align gaps in seal rings.



• Roll paper around seal rings to prevent seal rings from spreading.



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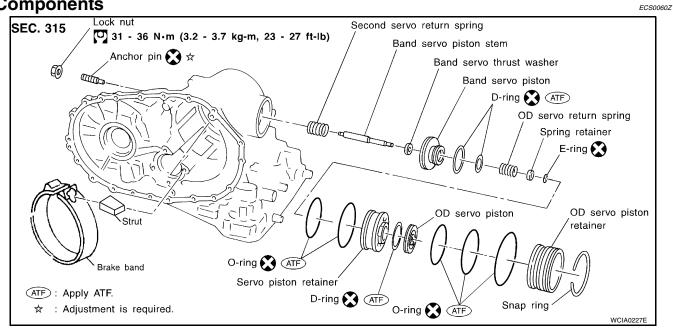
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BAND SERVO PISTON ASSEMBLY

PFP:31615

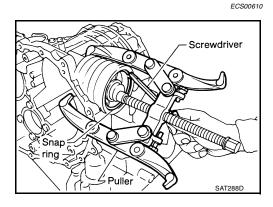
[RE4F03B]

Components

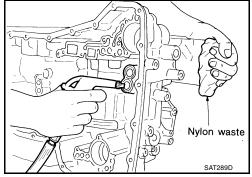


Disassembly

1. Remove band servo piston snap ring.



- 2. Apply compressed air to oil hole in transmission case to remove OD servo piston retainer and band servo piston assembly.
 - Hold band servo piston assembly with a rag or nylon waste.

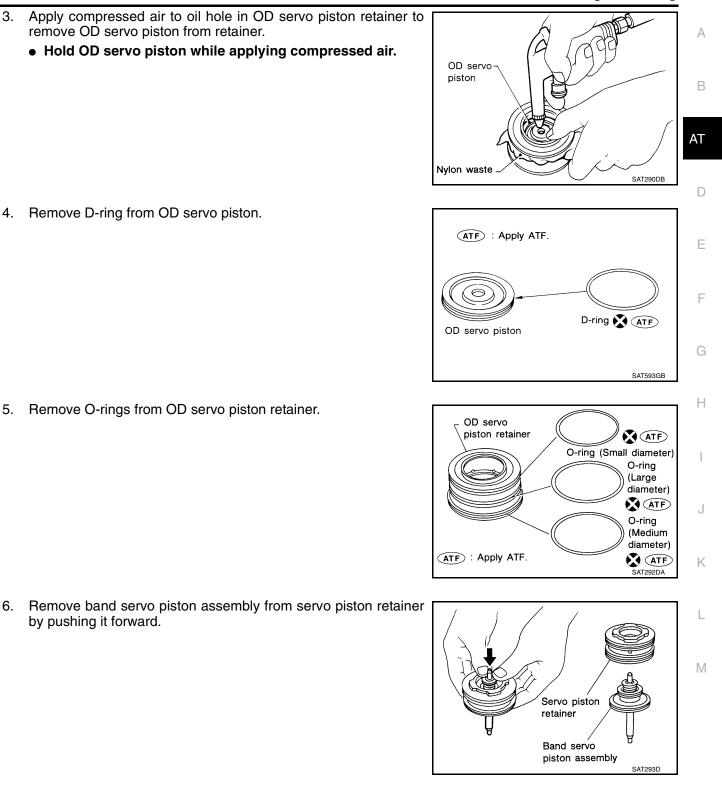


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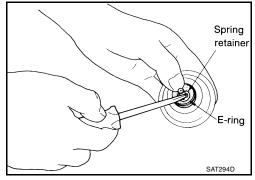
[RE4F03B]



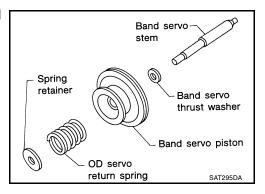
AT-349

[RE4F03B]

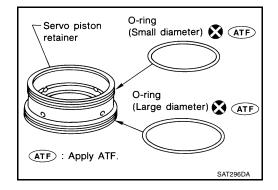
7. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.



8. Remove OD servo return spring, band servo thrust washer and band servo piston stem from band servo piston.



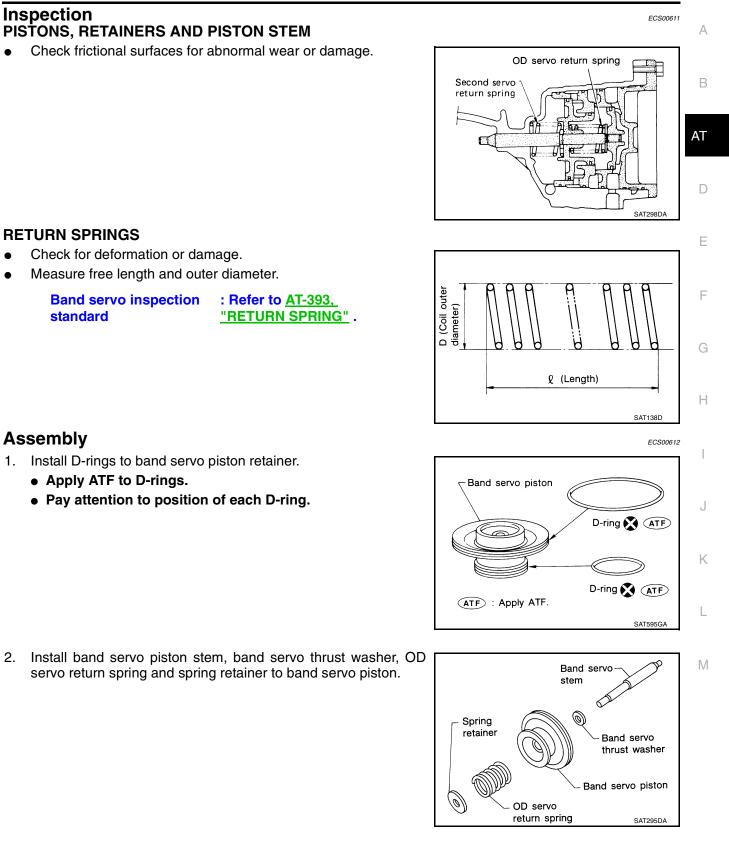
9. Remove O-rings from servo piston retainer.



Band servo piston D-ring () (ATF) D-ring () (ATF) D-ring () (ATF) (ATF) : Apply ATF.

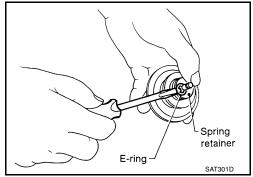
10. Remove D-rings from band servo piston.

[RE4F03B]



[RE4F03B]

3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.



O-ring

O-ring

(Small diameter) 🕅 ATF

(Large diameter) 🔊 (ATF)

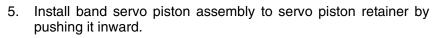
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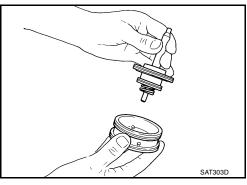
Servo piston

ATF : Apply ATF.

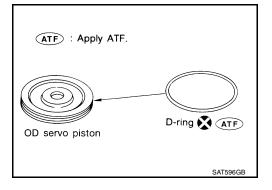
retainer

- 4. Install O-rings to servo piston retainer.
 - Apply ATF to O-rings.
 - Pay attention to the positions of the O-rings.





- 6. Install D-ring to OD servo piston.
 - Apply ATF to D-ring.



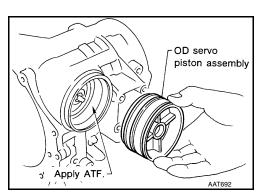
[RE4F03B]

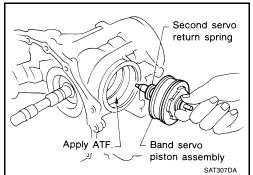
- 7. Install O-rings to OD servo piston retainer.
 - Apply ATF to O-rings.
 - Pay attention to the positions of the O-rings.

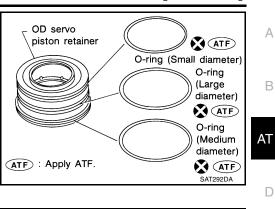
Install OD servo piston to OD servo piston retainer. 8.

- 9. Install band servo piston assembly and 2nd servo return spring to transmission case.
 - Apply ATF to O-ring of band servo piston and transmission case.

- 10. Install OD servo piston assembly to transmission case.
 - Apply ATF to O-ring of band servo piston and transmission case.







OD servo piston retainer

> OD servo piston

> > SAT306DA

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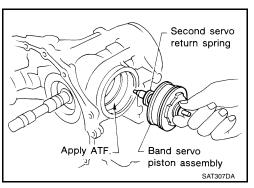
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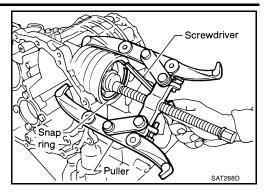
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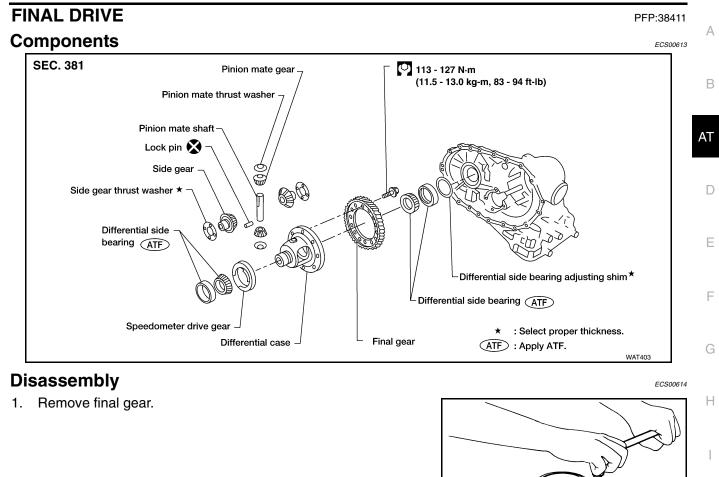
[RE4F03B]

11. Install band servo piston snap ring to transmission case.

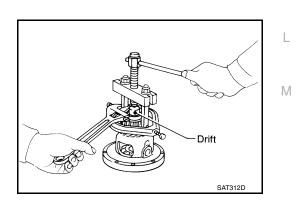


FINAL DRIVE

[RE4F03B]



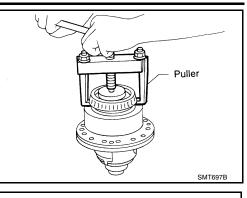
2. Press out differential side bearings.

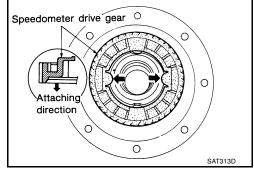


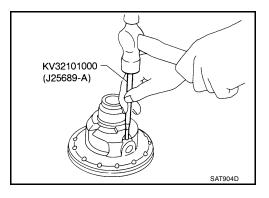
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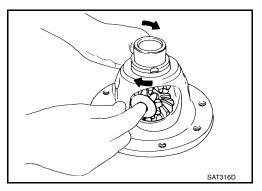
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3. Remove speedometer drive gear.

4. Drive out pinion mate shaft lock pin.

- 5. Draw out pinion mate shaft from differential case.
- 6. Remove pinion mate gears and side gears.

FINAL DRIVE

Inspection GEAR, WASHER, SHAFT AND CASE

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.

BEARINGS

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- When replacing taper roller bearing, replace outer and inner race as a set.

Assembly

- 1. Install side gear and thrust washers in differential case.
- 2. Install pinion mate gears and thrust washers in differential case while rotating them.

tion. Always measure indicator deflection on both side gears.

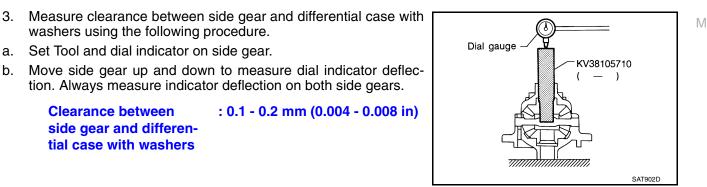
- When inserting, be careful not to damage pinion mate gear washers.
- Apply ATF to any parts.

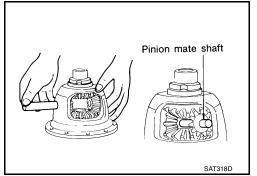
washers using the following procedure.

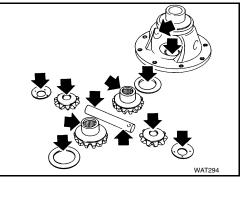
a. Set Tool and dial indicator on side gear.

Clearance between

side gear and differential case with washers







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[RE4F03B]

ECS00615

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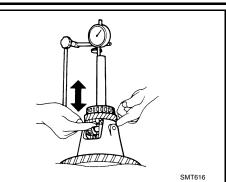
AT

[RE4F03B]

c. If not within specification adjust clearance by changing thickness of side gear thrust washers.

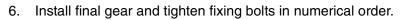
Side gear thrust washer

: Refer to <u>AT-389, "DIF-</u> <u>FERENTIAL SIDE GEAR</u> <u>THRUST WASHERS"</u>.

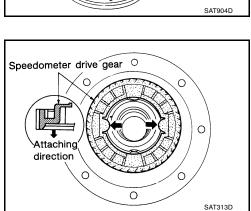


- 4. Install lock pin.
 - Make sure that lock pin is flush with case.

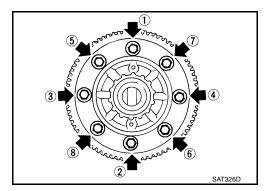
- 5. Install speedometer drive gear on differential case.
 - Align the projection of speedometer drive gear with the groove of differential case.



◯ : 113 - 127 N⋅m (11.5 - 13.0 kg-m, 83 - 94 ft-lb)

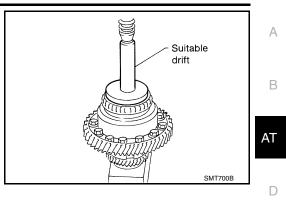


KV32101000 (J25689-A)



[RE4F03B]

7. Press on differential side bearings.



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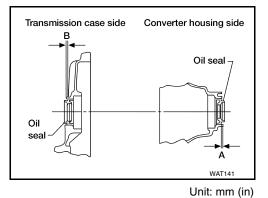
ASSEMBLY

ASSEMBLY Assembly (1)

1. Install revolution sensor onto transmission case. Always use new sealing parts.

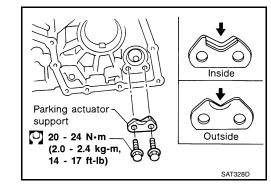
2. Install differential side oil seals on transmission case and converter housing, so that "A" and "B" are within specifications.

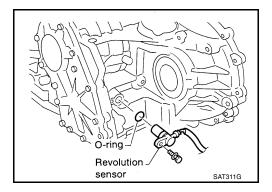
Drift (Converter housing side) KV31103000 (J38982) and ST35325000 (—) AAT695



A	В
5.5 - 6.5 (0.217 - 0.256)	-0.5 to 0.5 (-0.020 to 0.020)

Install parking actuator support to transmission case.
Pay attention to direction of parking actuator support.





Drift

[RE4F03B]

PFP:00000

ECS00617

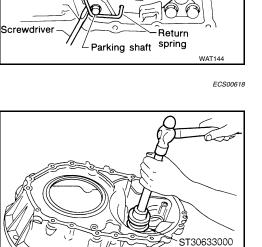
4. Install parking pawl on transmission case and fix it with parking shaft.

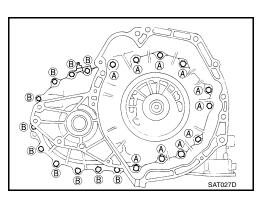
5. Install return spring.

Adjustment (1) DIFFERENTIAL SIDE BEARING PRELOAD

- 1. Install differential side bearing outer race without adjusting shim on transmission case.
- 2. Install differential side bearing outer race on converter housing.

- 3. Place final drive assembly on transmission case.
- 4. Install transmission case on converter housing. Tighten transmission case fixing bolts **A** and **B** to the specified torque.





А

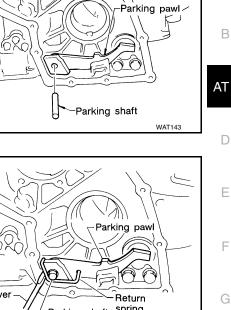
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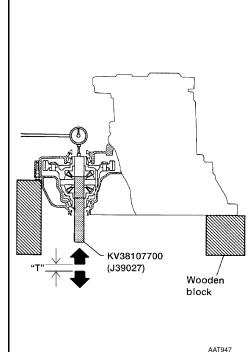


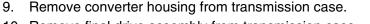
- 5. Attach dial indicator on differential case at transmission case side.
- 6. Insert Tool into differential side gear from converter housing.
- 7. Move Tool up and down and measure dial indicator deflection.

Differential side : 0.04 - 0.09 mm (0.0016 - 0.0035 in) bearing preload "T"

8. Select proper thickness of differential side bearing adjusting shim(s) using SDS table as a guide.

Differential side bearing adjusting shim : Refer to <u>AT-389, "DIF-</u> FERENTIAL SIDE BEAR-ING ADJUSTING SHIMS" .

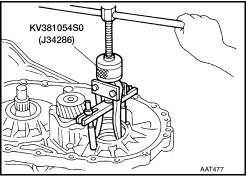


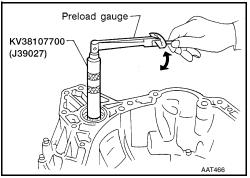


- 10. Remove final drive assembly from transmission case.
- 11. Remove differential side bearing outer race from transmission case.
- 12. Reinstall differential side bearing outer race and shim(s) selected from SDS table on transmission case.
- 13. Reinstall converter housing on transmission case and tighten transmission case fixing bolts to the specified torque.
- 14. Insert Tool into differential case and measure turning torque of final drive assembly.
 - Turn final drive assembly in both directions several times to seat bearing rollers correctly.

Turning torque of
final drive assembly: 0.49 - 1.08 N·m (5.0 - 11.0 kg-cm,
4.3 - 9.5 in-lb)(New bearing)

- When old bearing is used again, turning torque will be slightly less than the above.
- Make sure torque is within the specified range.





REDUCTION PINION GEAR BEARING PRELOAD

- Be sure to remove final drive assembly before doing this procedure.
- Using caliper and straightedge, calculate a dimension "T" (adjuster shim thickness) using the following formula. Adjust the inspection standard for preload (rotating slide torque) as shown below.

 Inspection standard
 :0.1 - 0.69 N·m (1.1 - 7.0 kg-cm,

 for preload
 0.95 - 6.08 in-lb)

- 1. Remove transmission case and final drive assembly from converter housing.
- 2. Select proper thickness of reduction pinion gear bearing adjusting shim using the following procedures.
- a. Place reduction pinion gear on transmission case as shown.

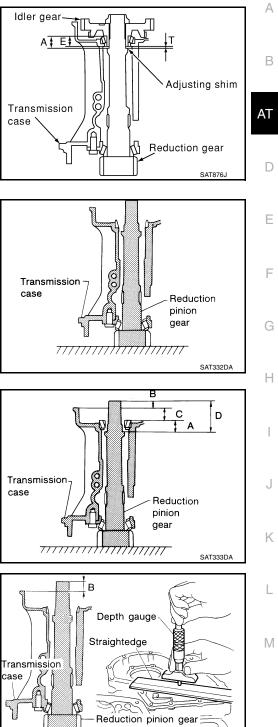


c. Measure dimensions "B", "C" and "D" and calculate dimension "A".

T = A - E

: Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.

- Measure dimension "B" between the end of reduction pinion gear and the surface of transmission case.
- Measure dimension "B" in at least two places.



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[RE4F03B]

SAT336DA

• Measure dimension "C" between the surface of idler gear bearing inner race and the surface of transmission case.

ASSEMBLY

• Measure dimension "C" in at least two places.

- Measure dimension "D" between the end of reduction pinion gear and the adjusting shim mating surface of reduction pinion gear.
- Measure dimension "D" in at least two places.
- Calculate dimension "A".

$\mathbf{A} = \mathbf{D} - (\mathbf{B} + \mathbf{C})$

d. Measure dimension "E" between the end of idler gear and the idler gear bearing inner race mating surface of idler gear.

• Measure dimension "E" in at least two places.

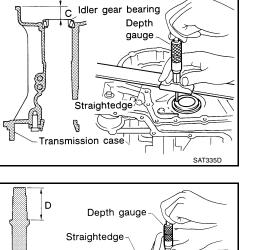
e. Calculate "T" and select proper thickness of reduction pinion gear bearing adjusting shim using SDS table as a guide.

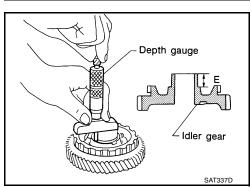
T = A – E – 0.05 mm (0.0020 in)*

Reduction pinion gear bearing adjusting shim

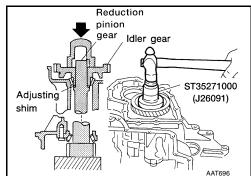
: Refer to <u>AT-391.</u> <u>"REDUCTION PINION</u> <u>GEAR BEARING ADJUST-</u> ING SHIMS".

- *: Bearing preload
- 3. Install reduction pinion gear and reduction pinion gear bearing adjusting shim selected in step 2-e on transmission case using Tool.
- 4. Press idler gear bearing inner race on idler gear.
- 5. Press idler gear on reduction pinion gear.
 - Press idler gear so that idler gear can be locked by parking pawl.





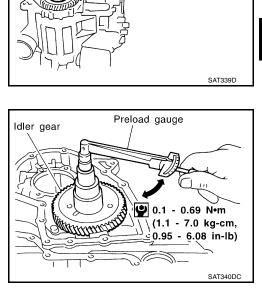
Reduction pinion gear



- 6. Tighten idler gear lock nut to the specified torque.
 - Lock idler gear with parking pawl when tightening lock nut.

- 7. Measure turning torque of reduction pinion gear.
 - When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.

Turning torque of : 0.1 - 0.69 N·m (1.1 - 7.0 kg-cm, reduction pinion 0.95 - 6.08 in-lb) gear



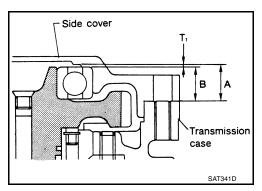
245 - 275 N·m

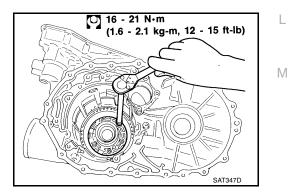
(25 - 28 kg-m, 181 - 203 ft-lb)

OUTPUT SHAFT END PLAY

1. Install bearing retainer for output shaft.

- Measure clearance between side cover and the end of the output shaft bearing.
- Select proper thickness of adjusting shim so that clearance is within specifications.





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2. Install output shaft thrust needle bearing on bearing retainer.

З. Install output shaft on transmission case.

- 4. Measure dimensions "I1" and "I2" at side cover and then calculate dimension "A".
 - Measure dimension "l1" and "l2" in at least two places "A": Distance between transmission case fitting surface and adjusting shim mating surface

 $A = I_1 - I_2$ 2

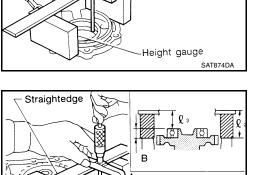
Measure dimensions "I2" and "I3" and then calculate dimension 5. "B".

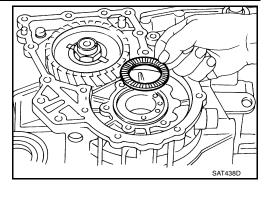
Measure "l2" and "l3" in at least two places. "B": Distance between the end of output shaft bearing outer race and the side cover fitting surface of transmission case

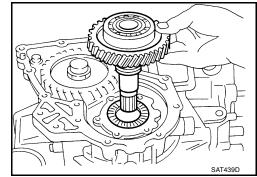
B = |2| - |3|2

: Height of gauge

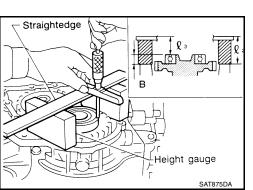
: Height of gauge







Straightedge



[RE4F03B]

E

6. Select proper thickness of adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications.

> Output shaft end play (A – B) : 0 - 0.5 mm (0 - 0.020 in) Output shaft end play adjust- : Refer to AT-392, "OUTing shim PUT SHAFT END PLAY **ADJUSTING SHIMS**".

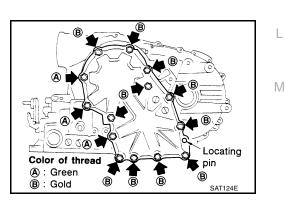
- Install adjusting shim on output shaft bearing. 7.
- Apply locking sealant (Loctite 5/8 or equivalent) to transmission 8. case as shown in illustration.

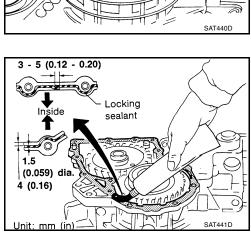
- 9. Install side cover on transmission case.
 - Apply locking sealant to the mating surface of transmission case.

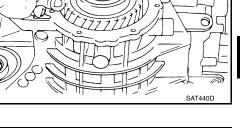
10. Tighten side cover fixing bolts to specified torque.

: 26 - 30 N·m (2.7 - 3.1 kg-m, 20 - 22 ft-lb) 0

- Do not mix bolts A and B.
- Always replace bolts A as they are self-sealing bolts.







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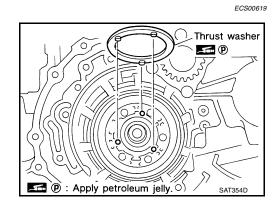
SAT442D

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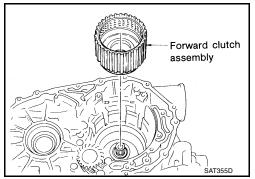
[RE4F03B]

Assembly (2)

- 1. Remove paper rolled around bearing retainer.
- 2. Install thrust washer on bearing retainer.
 - Apply petroleum jelly to thrust washer.



- 3. Install forward clutch assembly.
 - Align teeth of low & reverse brake drive plates before installing.
 - Make sure that bearing retainer seal rings are not spread.



- P : Apply petroleum jelly.
 - P: Apply petroleum jelly.
 SAT356D

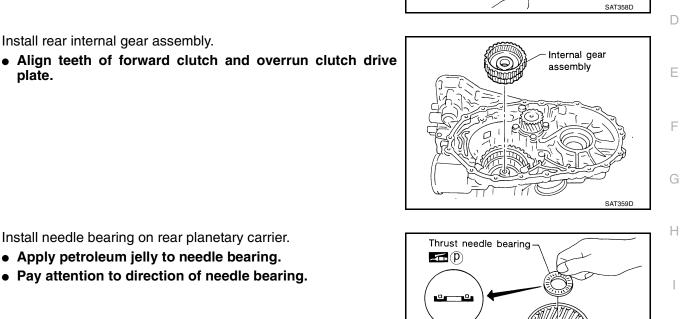
4. Install thrust needle bearing on bearing retainer.

• Apply petroleum jelly to thrust bearing.

• Pay attention to direction of thrust needle bearing.

- 5. Install thrust needle bearing on rear internal gear.
 Apply petroleum jelly to thrust needle bearing.
 - Pay attention to direction of thrust needle bearing.

- 6. Hold forward clutch hub and turn overrun clutch hub. Check overrun clutch hub for directions of lock and unlock.
 - If not as shown in illustration, check installed direction of forward one-way clutch.



Rear planetary carrier

P: Apply petroleum jelly.

8. Install needle bearing on rear planetary carrier.

7. Install rear internal gear assembly.

plate.

- Apply petroleum jelly to needle bearing.
- Pay attention to direction of needle bearing.

- 9. Install rear sun gear on rear planetary carrier.
 - Pay attention to direction of rear sun gear.

[RE4F03B]

Forward

clutch hub

Overrun clutch hub

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Rear planetary carrier

Rear sun gear

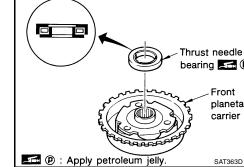
SAT052D

10. Install rear planetary carrier on transmission case.

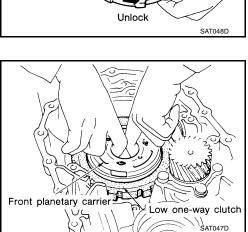
- 11. Install thrust needle bearing on front planetary carrier.
 - Apply petroleum jelly to thrust needle bearing.
 - Pay attention to direction of thrust needle bearing.

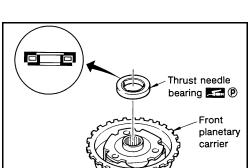
- 12. Install low one-way clutch to front planetary carrier by turning it in the direction of the arrow as shown.
- 13. While holding front planetary carrier, turn low one-way clutch. Check low one-way clutch for correct directions of lock and unlock.

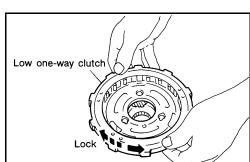
14. Install front planetary carrier assembly on transmission case.



Rear planetary gear 2









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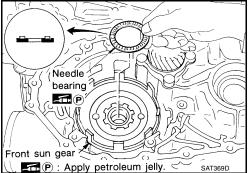
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- 15. Install snap ring with screwdriver.
 - Forward clutch and bearings must be correctly installed for snap ring to fit groove of transmission case.
- Screwdriver Snap ring AT SAT046D Thrust needle bearing 🌆 🕑 Front sun gear P: Apply petroleum jelly. SAT367D Front sun gear SAT368D



- 16. Install needle bearing on front sun gear.
 - Apply petroleum jelly to needle bearing.
 - Pay attention to direction of needle bearing.

17. Install front sun gear on front planetary carrier.

- 18. Install needle bearing on front sun gear.
 - Apply petroleum jelly to needle bearing.
 - Pay attention to direction of needle bearing.

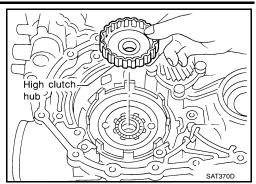
19. Install high clutch hub on front sun gear.

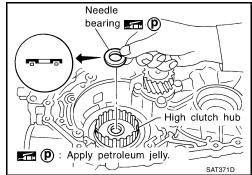
20. Install needle bearing on high clutch hub.

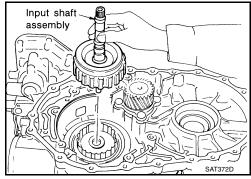
21. Remove paper rolled around input shaft.

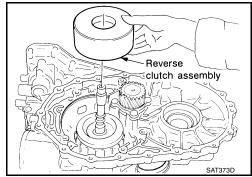
22. Install input shaft assembly.

• Apply petroleum jelly to needle bearing. • Pay attention to direction of needle bearing.







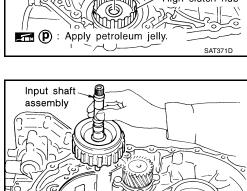


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Adjustment (2)

When any parts listed below are replaced, adjust total end play and reverse clutch end play.

	_
•	
•	•
•	•
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23. Install reverse clutch assembly.

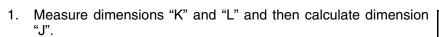
• Align teeth of reverse clutch drive plates before installing.

• Align teeth of high clutch drive plates before installing.

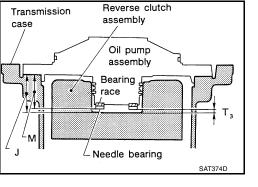
Part name	Total end play	Reverse clutch end play
Rear sun gear	•	•
Front planetary carrier	•	•
Front sun gear	•	•
High clutch hub	•	•
High clutch drum	•	•
Oil pump cover	•	•
Reverse clutch drum	—	•

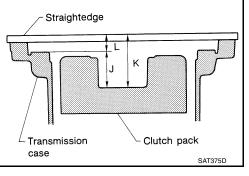
TOTAL END PLAY

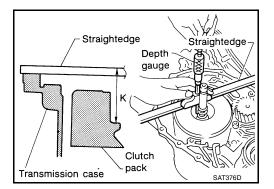
- Measure clearance between reverse clutch drum and needle bearing for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



a. Measure dimension "K".







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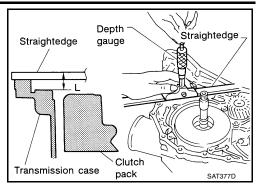
b. Measure dimension "L".

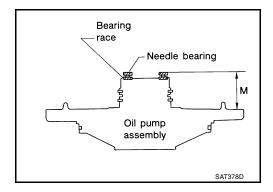
- c. Calculate dimension "J".
 "J": Distance between oil pump fitting surface of transmission case and needle bearing mating surface of high clutch
 - J = K L

Measure dimension "M".

drum

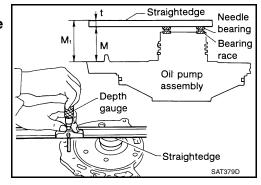
2.





- a. Place bearing race and needle bearing on oil pump assembly.
- b. Measure dimension "M".

"M": Distance between transmission case fitting surface and needle bearing on oil pump cover "M1 ": Indication of gauge



c. Measure thickness of straightedge "t".

M = M1 - t

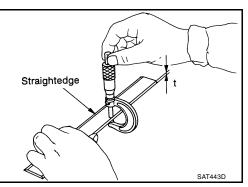
3. Adjust total end play "T₃".

```
T<sub>3</sub> = J – M
Total end play "T<sub>3</sub> : 0.25 - 0.55 mm (0.0098 - 0.0217 in)
"
```

• Select proper thickness of bearing race so that total end play is within specifications.

Bearing races

: Refer to <u>AT-393, "BEAR-</u> ING RACE FOR ADJUST-ING TOTAL END PLAY"



[RE4F03B]

REVERSE CLUTCH END PLAY

- Measure clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specifications.

1. Measure dimensions "O" and "P" and then calculate dimension "N".

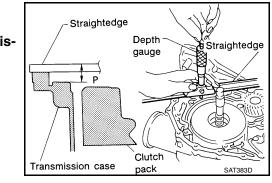
a. Place thrust washer on reverse clutch drum.

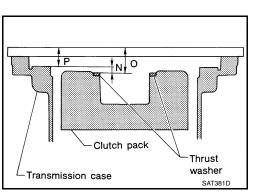
d. Calculate dimension "N". "N": Distance between oil pump fitting surface of transmis-

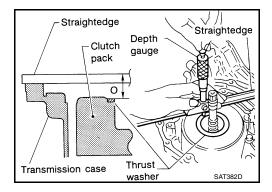
sion case and thrust washer on reverse clutch drum

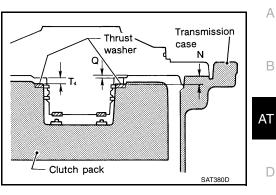
 $\mathbf{N} = \mathbf{O} - \mathbf{P}$

b. Measure dimension "O".c. Measure dimension "P".









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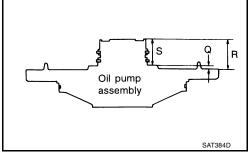
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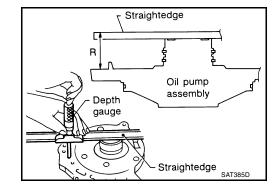
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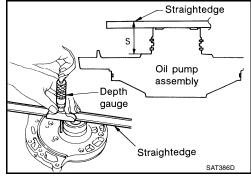
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2. Measure dimensions "R" and "S" and then calculate dimension "Q".

ASSEMBLY







a. Measure dimension "R".

- b. Measure dimension "S".
- c. Calculate dimension "Q". "Q": Distance between trai

"Q": Distance between transmission case fitting surface and thrust washer mating surface

Q = R - S

3. Adjust reverse clutch end play "T4 ".

T4 = N - Q

Reverse clutch end : 0.65 - 1.00 mm (0.0256 - 0.0394 play in)

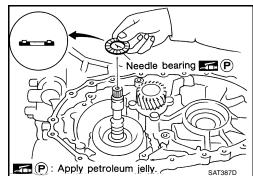
• Select proper thickness of thrust washer so that reverse clutch end play is within specifications.

Thrust washer

: Refer to <u>AT-393,</u> <u>"THRUST WASHERS FOR</u> <u>ADJUSTING REVERSE</u> CLUTCH END PLAY"

Assembly (3)

- 1. Remove reverse clutch assembly and install needle bearing on high clutch assembly.
 - Pay attention to direction of needle bearing.
- 2. Install reverse clutch assembly.



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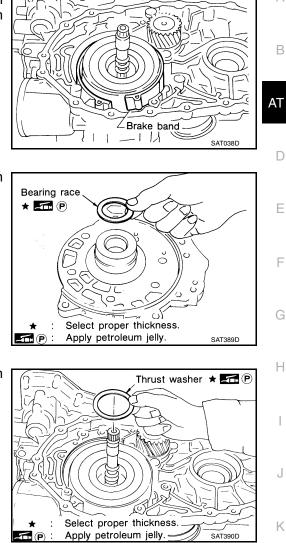
- 3. Install anchor end pin and lock nut on transmission case.
- Place brake band on outside of reverse clutch drum. Tighten 4. anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.

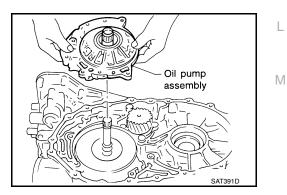
- 5. Place bearing race selected in total end play adjustment step on oil pump cover.
 - Apply petroleum jelly to bearing race.

- 6. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.
 - Apply petroleum jelly to thrust washer.

7. Install oil pump assembly on transmission case.







[RE4F03B]

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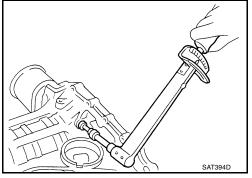
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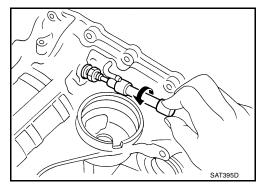
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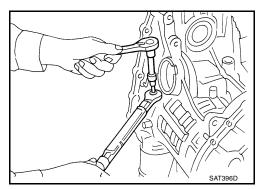
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SAT034D

- Tighten oil pump fixing bolts to specified torque. : 18 - 21 N·m (1.8 - 2.1 kg-m, 13 - 15 ft-lb) : 3.9 - 5.9 N·m (0.4 - 0.6 kg-m, 35 - 52 inlb)
 - O-ring 🔀







9. Install O-ring to input shaft.

8.

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• Apply ATF to O-ring.

- 10. Adjust brake band.
- Tighten anchor end pin to specified torque. a.

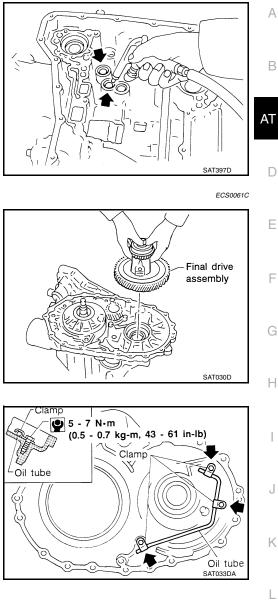
Anchor end pin

b. Back off anchor end pin two and a half turns.

While holding anchor end pin, tighten lock nut. c.

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11. Apply compressed air to oil holes of transmission case and check operation of brake band.



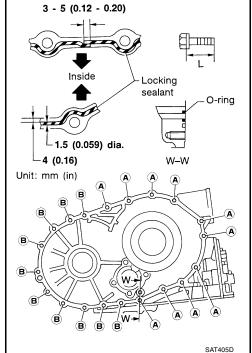
Assembly (4)

1. Install final drive assembly on transmission case.

2. Install oil tube on converter housing.

- 3. Install O-ring on differential oil port of transmission case.
- 4. Install converter housing on transmission case.
 - Apply locking sealant to mating surface of converter housing.

Bolt	Length mm (in)
A	32.8 (1.291)
В	40 (1.57)



Install accumulator piston. 5.

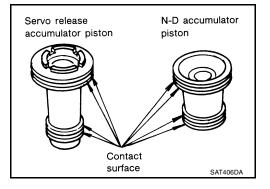
b. Install O-rings on accumulator piston.

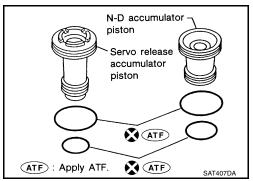
Accumulator piston O-

• Apply ATF to O-rings.

rings

Check contact surface of accumulator piston for damage. a.





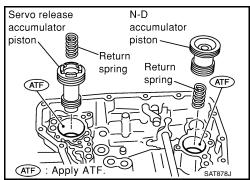
- c. Install accumulator pistons and return springs on transmission case.
 - Apply ATF to inner surface of transmission case. •

Return springs

: Refer to AT-393, "RETURN SPRING" .

: Refer to AT-393, "O-

RING".



[RE4F03B]

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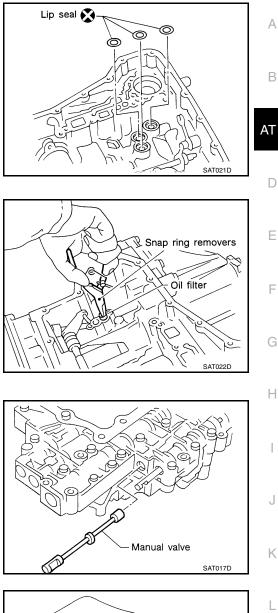
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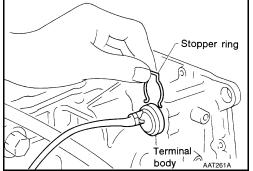
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6. Install lip seals for band servo oil holes on transmission case.



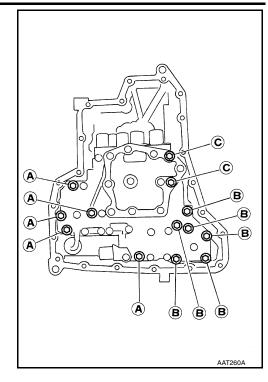
- Apply petroleum jelly to lip seals.
- 7. Install control valve assembly.
- a. Insert manual valve into control valve assembly.
 - Apply ATF to manual valve.

- b. Pass solenoid harness through transmission case and install terminal body on transmission case by pushing it.
- Install stopper ring to terminal body. c.



- d. Tighten bolts A, B and C.
 - Ŷ

: 7 - 9 N⋅m (0.7 - 0.9 kg-m, 61 - 78 in-lb)

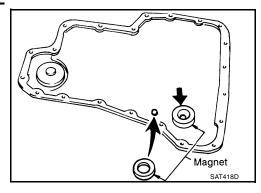


Bolt length, number and location

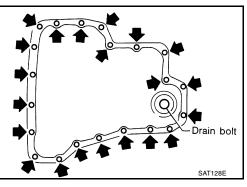
Bolt symbol	Α	В	С
Bolt length "l"	40.0 mm (1.575 in)	33.0 mm (1.299 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2

8. Install oil pan.

a. Attach magnet to oil pan.



- b. Install new oil pan gasket on transmission case.
- c. Install oil pan on transmission case.
 - Always replace oil pan bolts as they are self-sealing bolts.
 - Tighten the bolts in a criss-cross pattern to prevent dislocation of gasket.
- d. Tighten drain plug to specified torque.



ASSEMBLY

[RE4F03B]

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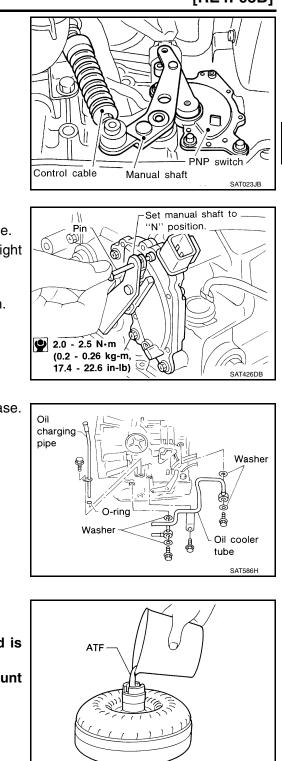
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- 9. Install PNP switch.
- a. Set manual shaft in "P" position.
- b. Temporarily install PNP switch on manual shaft.
- c. Move selector lever to "N" position.

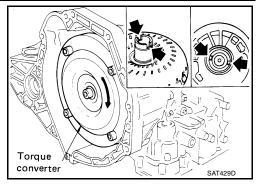
- d. Use a 4 mm (0.157 in) pin for this adjustment.
 - 1. Insert the pin straight into the manual shaft adjustment hole.
 - 2. Rotate PNP switch until the pin can also be inserted straight into hole in PNP switch.
- e. Tighten PNP switch fixing bolts.
- f. Remove pin from adjustment hole after adjusting PNP switch.
- 10. Install oil charging pipe and oil cooler tube to transmission case.

- 11. Install torque converter.
- a. Pour ATF into torque converter.
 - Approximately 1 liter (1-1/8 US qt, 7/8 lmp qt) of fluid is required for a new torque converter.
 - When reusing old torque converter, add the same amount of fluid as was drained.

ASSEMBLY

[RE4F03B]

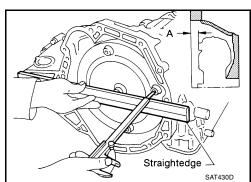
b. Install torque converter while aligning notches of torque converter with notches of oil pump.



c. Measure distance "A" to check that torque converter is in proper position.

Distance "A"

: 21.1 mm (0.831 in)



[RE4F03B]

PFP:00030

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ECS0061E

SERVICE DATA AND SPECIFICATIONS (SDS) **General Specifications**

General Specifications	5	ECS0061D	
Engine		QG18DE	
Automatic transaxle model		RE4F03B	В
Automatic transaxle assembly	Model code number	3AX60	
	1st	2.861	AT
	2nd	1.562	
Transaxle gear ratio	3rd	1.000	
Tansaxie gear failo	4th	0.698	D
	Reverse	2.230	
	Final drive	3.827	F
Recommended fluid		Nissan Matic "D" (Continental U.S. and Alaska) or Genu- ine Nissan Automatic Transmission Fluid (Canada)*1	
Fluid capacity		7.0I (7-3/8 US qt, 6-1/8 Imp qt)	F

*1: Refer to MA-13, "Fluids and Lubricants" .

Shift Schedule **VEHICLE SPEED WHEN SHIFTING GEARS** QG18DE (Calif. CA Model)

Throttle position	Shift pat-			Vehicl	e speed km/h	(MPH)		
	tern	$D1 \rightarrow D2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D4 \rightarrow D3$	$D_3 \rightarrow D_2$	$D2 \rightarrow D1$	$12 \rightarrow 11$
Full throttle	Comfort	54 - 62 (34 - 39)	103 - 111 (64 - 69)	163 - 171 (101 - 106)	159 - 167 (99 - 104)	93 - 101 (58 - 63)	41 - 49 (25 - 30)	54 - 62 (34 - 39)
Half throttle	Comfort	32 - 40 (20 - 25)	60 - 68 (37 - 42)	124 - 132 (77 - 82)	70 - 78 (43 - 48)	35 - 43 (22 - 27)	25 - 33 (16 - 21)	54 - 62 (34 - 39)

QG18DE (Except Calif. CA Model)

Throttle position Shift pa				Vehicl	e speed km/h	(MPH)			
Thome position	tern	$D1 \rightarrow D2$	$D_2 \rightarrow D_3$	$D3 \rightarrow D4$	$D4 \rightarrow D3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$	$12 \rightarrow 11$	
Full throttle	Comfort	52 - 60 (32 - 37)	100 - 108 (62 - 67)	158 - 166 (98 - 103)	154 - 162 (96 - 101)	70 - 98 (56 - 61)	41 - 49 (25 - 30)	52 - 60 (32 - 37)	
Half throttle	Comfort	31 - 39 (19 - 24)	58 - 66 (36 - 41)	119 - 127 (74 - 79)	68 - 76 (42 - 47)	34 - 42 (21 - 26)	24 - 32 (15 - 20)	52 - 60 (32 - 37)	

VEHICLE SPEED WHEN PERFORMING LOCK-UP QG18DE (Calif. CA Model)

Throttle opening	OD switch	Shift pattern	Vehicle speed km/h (MPH) Lock-up ON Lock-up OFF	
Thome opening	OD Switch	onni patterni		
2/8	ON (D4)	Comfort	97 - 105 (60 - 65)	63 - 71 (39 - 44)
	OFF (D3)	Comfort	86 - 94 (53 - 58)	83 - 91 (52 - 57)

QG18DE (Except Calif. CA Model)

Throttle opening	OD switch	Shift pattern	Vehicle speed km/h (MPH) Lock-up ON Lock-up OFF	
Throttle opening	OD Switch	Shin patient		
2/8	ON (D4)	Comfort	94 - 102 (58 - 63)	61 - 69 (38 - 43)
	OFF (D3)	Comfort	86 - 94 (53 - 58)	83 - 91 (52 - 57)

Stall Revolution

Engine model	Stall revolution rpm
QG18DE	2,350 - 2,800

Μ

ECS0061F

Line Pressure

[RE4F03B]

ECS0061G

Engine speed		Line pressure k	Pa (kg/cm ² , psi)	
rpm	R position	D position	2 position	1 position
Idle	778 (7.9, 113)	500 (5.1, 73)	500 (5.1, 73)	500 (5.1, 73)
Stall	1,816 (18.5, 263)	1,167 (11.9, 169)	1,167 (11.9, 169)	1,167 (11.9, 169)

Control Valves CONTROL VALVE AND PLUG RETURN SPRINGS

ECS0061H

ECS00611

Unit: mm (in)

	No	Parts	Part No.*	Free length	Outer diameter
	35	3-2 timing valve spring	31736-01X00	23.29 (0.917)	6.65 (0.2618)
	19	Cooler check valve spring	31742-3AX05	28.04 (1.1039)	7.15 (0.2815)
Upper body	23	Pilot valve spring	31742-3AX03	38.98 (1.5346)	8.9 (0.350)
Refer to	15	1-2 accumulator valve spring	31742-3AX00	20.5 (0.807)	6.95 (0.2736)
<u>AT-307,</u> <u>"CON-</u>	28	1-2 accumulator piston spring	31742-3AX09	55.66 (2.1913)	19.5 (0.7677)
TROL	33	1st reducing valve spring	31742-80X05	27.0 (1.063)	7.0 (0.276)
<u>VALVE</u> UPPER	2	Overrun clutch reducing valve spring	31742-80X06	37.5 (1.476)	7.0 (0.276)
BODY".	7	Torque converter relief valve spring	31742-3AX04	33.3 (1.3110)	9.0 (0.354)
	10	Torque converter clutch control valve spring	31742-3AX02	53.01 (2.0870)	6.5 (0.256)
	34	Shuttle control valve spring	31762-41X04	51.0 (2.0079)	5.65 (0.2224)
	18	Pressure regulator valve spring	31742-80X13	45.0 (1.772)	15.0 (0.591)
Lower body	23	Overrun clutch control valve spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
Refer to	27	Accumulator control valve spring	31742-80X02	22.0 (0.866)	6.5 (0.256)
<u>AT-311,</u> "CON-	29	Shift valve A spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
TROL VALVE	2	Shift valve B spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	11	Pressure modifier valve spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
LOWER BODY" .	7	Pressure modifier valve spring	31742-80X16	32.0 (1.260)	6.9 (0.272)
	—	Oil cooler relief valve spring	31872-31X00	17.02 (0.6701)	8.0 (0.315)
	—	T/C pressure spring	31742-3AX11	9.0 (0.354)	7.3 (0.287)

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

Clutch, Brake and Brake Band REVERSE CLUTCH

Number of drive plates Number of driven plates

2	
2	
2.0 (0.079)	

Drive plate thickness mm (in)	Standard	2.0 (0.0)79)
	Allowable limit	1.8 (0.0	071)
Clearance mm (in)	Standard	0.5 - 0.8 (0.02	20 - 0.031)
Clearance mm (in)	Allowable limit	1.2 (0.047)	
		Thickness mm (in)	Part number*
Thickness of retaining plates		4.4 (0.173)	31537-31X00
		4.6 (0.181)	31537-31X01
		4.8 (0.189)	31537-31X02
		5.0 (0.197)	31537-31X03
		5.2 (0.205)	31537-31X04

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

[RE4F03B]

Number of drive plates			3	
Number of driven plates			5	
Number of unvertiplates	Standard		-	
Drive plate thickness mm (in)		2.0 (0		
Allowable limit		1.8 (0	· · · · · · · · · · · · · · · · · · ·	
Clearance mm (in)		1.4 - 1.8 (0.		
	Allowable limit	2.4 (0	•	
Thickness of retaining plates		Thickness mm (in) 4.8 (0.189) 5.0 (0.197) 5.2 (0.205) 5.4 (0.213) 5.6 (0.220) 5.8 (0.228) 6.0 (0.236)	Part number* 31537-32X05 31537-32X06 31537-32X07 31537-32X08 31537-32X09 31537-32X10 31537-32X11	
*: Always check with the Parts D	epartment for the latest parts	information.		
FORWARD CLUTCH				
Number of drive plates		Į	5	
Number of driven plates			5	
Drive plate thickness mm (in)	Standard	1.8 (0	1.8 (0.071)	
	Allowable limit	1.6 (0	1.6 (0.063)	
Clearance mm (in)	Standard	0.45 - 0.85 (0.	0177 - 0.0335)	
	Allowable limit	1.85 (0	0.0728)	
		Thickness mm (in)	Part number*	
Thickness of retaining plate		3.6 (0.142) 3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173) 4.6 (0.181)	31537-31X60 31537-31X61 31537-31X62 31537-31X63 31537-31X64 31537-31X65	
*: Always check with the Parts D	epartment for the latest parts	information.		
OVERRUN CLUTCH				
Number of drive plates			3	
Number of driven plates			1	
Drive plate thickness mm (in)	Standard	1.6 (0		
- ··· • P···· • ··· · (···)	Allowable limit	1.4 (0	0.055)	
Clearance mm (in)	Standard		1.0 - 1.4 (0.039 - 0.055)	
	Allowable limit	2.0 (0	0.079)	
		Thickness mm (in)	Part number*	
Thickness of retaining plate		3.6 (0.142) 3.8 (0.150) 4.0 (0.157)	31567-31X79 31567-31X80 31567-31X81	

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

LOW & REVERSE BRAKE

Number of drive plates	5
Number of driven plates	4 + 1

[RE4F03B]

Drive plate thickness mm (in)	(in) Standard	2.0 (0.	.079)
Drive plate thickness mm (in) Allowable limit	Allowable limit	1.8 (0.	.071)
	Standard	1.4 - 1.8 (0.055 - 0.071)	
Clearance mm (in) Allowable limit		2.8 (0.	.110)
		Thickness mm (in)	Part number*
Thickness of retaining plate		3.6 (0.142)	31667-31X16
		3.8 (0.150)	31667-31X17
		4.0 (0.157)	31667-31X18
		4.2 (0.165)	31667-31X19
		4.4 (0.173)	31667-31X20
		4.6 (0.181)	31667-31X21

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

BRAKE BAND

Anchor end pin tightening torque	3.5 - 5.9 N-m (0.35 - 0.6 kg-m, 31 - 52 in-lb)
Number of returning revolutions for anchor end pin	2.5±0.125
Lock nut tightening torque	31 - 36 N-m (3.2 - 3.7 kg-m, 23 - 27 ft-lb)

Clutch and Brake Return Springs

Unit: mm (in)

ECS0061J

Parts		Free length	Outer diameter	Part number*
	Outer (16 pcs)	26.6 (1.047)	10.6 (0.417)	31505-31X02
Forward clutch (Overrun clutch)	Inner (16 pcs)	26.3 (1.035)	7.7 (0.303)	31505-31X03
Reverse clutch (16 pcs)		18.6 (0.732)	8.0 (0.315)	31505-31X00
High clutch (12 pcs)		19.7 (0.776)	11.1 (0.437)	31505-31X01
Low reverse brake (20 pcs)		25.1 (0.988)	7.6 (0.299)	31505-31X04

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

Oil Pump

ECS0061K

Oil pump side clearance mm (in)	il pump side clearance mm (in)		0.02 - 0.04 (0.0008 - 0.0016)		
		Inner gea	Inner gear		
		Thickness mm (in)	Part number*		
		9.99 - 10.00 (0.3933 - 0.3937)	31346-31X00		
		9.98 - 9.99 (0.3929 - 0.3933)	31346-31X01		
		9.97 - 9.98 (0.3925 - 0.3929)	31346-31X02		
hickness of inner gears and outer gears		Outer gea	ar		
		Thickness mm (in)	Part number*		
		9.99 - 10.00 (0.3933 - 0.3937)	31347-31X00		
		9.98 - 9.99 (0.3929 - 0.3933)	31347-31X01		
		9.97 - 9.98 (0.3925 - 0.3929)	31347-31X02		
Clearance between oil pump	Standard	0.08 - 0.15 (0.003	1 - 0.0059)		
ousing and outer gear mm (in) Allowable limit	0.15 (0.005	0.15 (0.0059)			
Oil pump cover seal ring clear-	Standard	0.1 - 0.25 (0.0039	- 0.0098)		
ance mm (in)	Allowable limit	0.25 (0.009	98)		

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

Input Shaft

ECS0061L Unit: mm (in)

Input shaft seal ring clearance	Standard	0.08 - 0.23 (0.0031 - 0.0091)
input shart sear ning clearance	Allowable limit	0.23 (0.0091)

[RE4F03B]

		Unit: mm (ir
Clearance between planetary carrier and	Standard	0.15 - 0.70 (0.0059 - 0.0276)
pinion washer	Allowable limit	0.80 (0.0315)
Final Drive DIFFERENTIAL SIDE GEAR CL	EARANCE	ECS0061
Clearance between side gear and differenti		0.1 - 0.2 mm (0.004 - 0.008 in)
DIFFERENTIAL SIDE GEAR TH	RUST WASHERS	
Thickness mm (in)		Part number*
0.75 - 0.80 (0.0295 - 0.03	315)	38424-D2111
0.80 - 0.85 (0.0315 - 0.03		38424-D2112
0.85 - 0.90 (0.0335 - 0.03		38424-D2113
0.90 - 0.95 (0.0354 - 0.03	374)	38424-D2114
0.95 - 1.00 (0.0374 - 0.03	394)	38424-D2115
BEARING PRELOAD		
Differential side bearing preload "T"		0.04 - 0.09 mm (0.0016 - 0.0035 in)
Differential side bearing preload "T"	0.	0.04 - 0.09 mm (0.0016 - 0.0035 in) 49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb)
Differential side bearing preload "T" TURNING TORQUE		
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly		
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb)
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number*
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in) 0.40 (0.0157)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number* 31499-21X07
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in) 0.40 (0.0157) 0.44 (0.0173)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number* 31499-21X07 31499-21X08
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in) 0.40 (0.0157) 0.44 (0.0173) 0.48 (0.0189)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number* 31499-21X07 31499-21X08 31499-21X09
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in) 0.40 (0.0157) 0.44 (0.0173) 0.48 (0.0189) 0.52 (0.0205)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number* 31499-21X07 31499-21X08 31499-21X09 31499-21X10
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in) 0.40 (0.0157) 0.44 (0.0173) 0.48 (0.0189) 0.52 (0.0205) 0.56 (0.0220)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number* 31499-21X07 31499-21X08 31499-21X09 31499-21X10 31499-21X10 31499-21X11 31499-21X12 31499-21X13
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in) 0.40 (0.0157) 0.44 (0.0173) 0.48 (0.0189) 0.52 (0.0205) 0.56 (0.0220) 0.60 (0.0236)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number* 31499-21X07 31499-21X08 31499-21X09 31499-21X10 31499-21X10 31499-21X11 31499-21X12
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in) 0.40 (0.0157) 0.44 (0.0173) 0.48 (0.0189) 0.52 (0.0205) 0.56 (0.0220) 0.60 (0.0236) 0.64 (0.0252)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number* 31499-21X07 31499-21X08 31499-21X09 31499-21X10 31499-21X10 31499-21X11 31499-21X12 31499-21X13
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in) 0.40 (0.0157) 0.44 (0.0173) 0.48 (0.0189) 0.52 (0.0205) 0.56 (0.0220) 0.60 (0.0236) 0.64 (0.0252) 0.68 (0.0268) 0.72 (0.0283) 0.76 (0.0299)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number* 31499-21X07 31499-21X08 31499-21X09 31499-21X10 31499-21X10 31499-21X12 31499-21X12 31499-21X13 31499-21X13 31499-21X14 31499-21X15 31499-21X16
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in) 0.40 (0.0157) 0.44 (0.0173) 0.48 (0.0189) 0.52 (0.0205) 0.56 (0.0220) 0.60 (0.0236) 0.64 (0.0252) 0.68 (0.0268) 0.72 (0.0283)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number* 31499-21X07 31499-21X08 31499-21X09 31499-21X10 31499-21X10 31499-21X12 31499-21X12 31499-21X12 31499-21X13 31499-21X14 31499-21X15
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in) 0.40 (0.0157) 0.44 (0.0173) 0.48 (0.0189) 0.52 (0.0205) 0.56 (0.0220) 0.60 (0.0236) 0.64 (0.0252) 0.68 (0.0268) 0.72 (0.0283) 0.76 (0.0299)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number* 31499-21X07 31499-21X08 31499-21X09 31499-21X10 31499-21X10 31499-21X12 31499-21X12 31499-21X13 31499-21X13 31499-21X14 31499-21X15 31499-21X16 31499-21X17 31499-21X18
TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in) 0.40 (0.0157) 0.44 (0.0173) 0.48 (0.0189) 0.52 (0.0205) 0.56 (0.0220) 0.60 (0.0236) 0.64 (0.0252) 0.68 (0.0268) 0.72 (0.0283) 0.76 (0.0299) 0.80 (0.0315)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number* 31499-21X07 31499-21X08 31499-21X09 31499-21X10 31499-21X10 31499-21X12 31499-21X12 31499-21X12 31499-21X13 31499-21X14 31499-21X15 31499-21X16 31499-21X17
Differential side bearing preload "T" TURNING TORQUE Turning torque of final drive assembly DIFFERENTIAL SIDE BEARING Thickness mm (in) 0.40 (0.0157) 0.44 (0.0173) 0.48 (0.0189) 0.52 (0.0205) 0.56 (0.0220) 0.60 (0.0236) 0.64 (0.0252) 0.68 (0.0268) 0.72 (0.0283) 0.76 (0.0299) 0.80 (0.0315) 0.84 (0.0331)		49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb) Part number* 31499-21X07 31499-21X08 31499-21X09 31499-21X10 31499-21X10 31499-21X12 31499-21X12 31499-21X13 31499-21X13 31499-21X14 31499-21X15 31499-21X16 31499-21X17 31499-21X18

SERVICE DATA AND SPECIFICATIONS (SDS)

TABLE FOR SELECTING DIFFERENTIAL SIDE BEARING ADJUSTING SHIMS

Unit: mm (in)

Dial indicator deflection	Suitable shim(s)
0.31 - 0.35 (0.0122 - 0.0138)	0.40 (0.0157)
0.35 - 0.39 (0.0138 - 0.0154)	0.44 (0.0173)
0.39 - 0.43 (0.0154 - 0.0169)	0.48 (0.0189)
0.43 - 0.47 (0.0169 - 0.0185)	0.52 (0.0205)
0.47 - 0.51 (0.0185 - 0.0201)	0.56 (0.0220)
0.51 - 0.55 (0.0201 - 0.0217)	0.60 (0.0236)
0.55 - 0.59 (0.0217 - 0.0232)	0.64 (0.0252)
0.59 - 0.63 (0.0232 - 0.0248)	0.68 (0.0268)
0.63 - 0.67 (0.0248 - 0.0264)	0.72 (0.0283)
0.67 - 0.71 (0.0264 - 0.0280)	0.76 (0.0299)
0.71 - 0.75 (0.0280 - 0.0295)	0.80 (0.0315)
0.75 - 0.79 (0.0295 - 0.0311)	0.84 (0.0331)
0.79 - 0.83 (0.0311 - 0.0327)	0.88 (0.0346)
0.83 - 0.87 (0.0327 - 0.0343)	0.92 (0.0362)
0.87 - 0.91 (0.0343 - 0.0358)	0.48 (0.0189) + 0.48 (0.0189)
0.91 - 0.95 (0.0358 - 0.0374)	0.48 (0.0189) + 0.52 (0.0205)
0.95 - 0.99 (0.0374 - 0.0390)	0.52 (0.0205) + 0.52 (0.0205)
0.99 - 1.03 (0.0390 - 0.0406)	0.52 (0.0205) + 0.56 (0.0220)
1.03 - 1.07 (0.0406 - 0.0421)	0.56 (0.0220) + 0.56 (0.0220)
1.07 - 1.11 (0.0421 - 0.0437)	0.56 (0.0220) + 0.60 (0.0236)
1.11 - 1.15 (0.0437 - 0.0453)	0.60 (0.0236) + 0.60 (0.0236)
1.15 - 1.19 (0.0453 - 0.0469)	0.60 (0.0236) + 0.64 (0.0252)
1.19 - 1.23 (0.0469 - 0.0484)	0.64 (0.0252) + 0.64 (0.0252)
1.23 - 1.27 (0.0484 - 0.0500)	0.64 (0.0252) + 0.68 (0.0268)
1.27 - 1.31 (0.0500 - 0.0516)	0.68 (0.0268) + 0.68 (0.0268)
1.31 - 1.35 (0.0516 - 0.0531)	0.68 (0.0268) + 0.72 (0.0283)
1.35 - 1.39 (0.0531 - 0.0547)	1.44 (0.0567)
1.39 - 1.43 (0.0547 - 0.0563)	0.72 (0.0283) + 0.76 (0.0299)
1.43 - 1.47 (0.0563 - 0.0579)	0.76 (0.0299) + 0.76 (0.0299)
1.47 - 1.51 (0.0579 - 0.0594)	0.76 (0.0299) + 0.80 (0.0315)
1.51 - 1.55 (0.0594 - 0.0610)	0.80 (0.0315) + 0.80 (0.0315)
1.55 - 1.59 (0.0610 - 0.0626)	0.80 (0.0315) + 0.84 (0.0331)
1.59 - 1.63 (0.0626 - 0.0642)	0.84 (0.0331) + 0.84 (0.0331)
1.63 - 1.67 (0.0642 - 0.0657)	0.84 (0.0331) + 0.88 (0.0346)
1.67 - 1.71 (0.0657 - 0.0673)	0.88 (0.0346) + 0.88 (0.0346)
1.71 - 1.75 (0.0673 - 0.0689)	0.88 (0.0346) + 0.92 (0.0362)
1.75 - 1.79 (0.0689 - 0.0705)	0.92 (0.0362) + 0.92 (0.0362)
1.79 - 1.83 (0.0705 - 0.0720)	0.92 (0.0362) + 0.96 (0.0378)
1.83 - 1.87 (0.0720 - 0.0736)	0.96 (0.0378) + 0.96 (0.0378)
1.87 - 1.91 (0.0736 - 0.0752)	0.52 (0.0205) + 1.44 (0.0567)
1.91 - 1.95 (0.0752 - 0.0768)	0.56 (0.0220) + 1.44 (0.0567)

BEARING PRELOAD

20000070

Reduction pinion gear bearing preload 0.05 mm (0.0020 in) **TURNING TORQUE**

Turning torque of reduction	pinion gear
-----------------------------	-------------

0.1 - 0.69 N-m (1.1 - 7.0 kg-cm, 0.95 - 6.08 in-lb)

SERVICE DATA AND SPECIFICATIONS (SDS)

REDUCTION PINION GEAR BEARING ADJUSTING SHIMS

Thickness mm (in)	Part number*	
1.74 (0.0685)	31438-31X16	
1.78 (0.0701)	31438-31X17	
1.82 (0.0717)	31438-31X18	
1.86 (0.0732)	31438-31X19	
1.90 (0.0748)	31438-31X20	-
1.92 (0.0756)	31439-31X60	
1.94 (0.0764)	31438-31X21	
1.96 (0.0772)	31439-31X61	
1.98 (0.0780)	31438-31X22	
2.00 (0.0787)	31439-31X62	
2.02 (0.0795)	31438-31X23	
2.04 (0.0803)	31439-31X63	
2.06 (0.0811)	31438-31X24	
2.08 (0.0819)	31439-31X64	
2.10 (0.0827)	31438-31X60	
2.12 (0.0835)	31439-31X65	
2.14 (0.0843)	31438-31X61	
2.16 (0.0850)	31439-31X66	
2.18 (0.0858)	31438-31X62	
2.20 (0.0866)	31439-31X67	
2.22 (0.0874)	31438-31X63	
2.24 (0.0882)	31439-31X68	
2.26 (0.0890)	31438-31X64	
2.28 (0.0898)	31439-31X69	
2.30 (0.0906)	31438-31X65	
2.34 (0.0921)	31438-31X66	
2.38 (0.0937)	31438-31X67	
2.42 (0.0953)	31438-31X68	
2.46 (0.0969)	31438-31X69	
2.50 (0.0984)	31438-31X70	
2.54 (0.1000)	31438-31X71	
2.58 (0.1016)	31438-31X72	
2.62 (0.1031)	31438-31X73	
2.66 (0.1047)	31438-31X74	

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

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[RE4F03B]

TABLE FOR SELECTING REDUCTION PINION GEAR BEARING ADJUSTING SHIM

Unit: mm (in)

Dimension "T"	Suitable shim(s)
1.77 - 1.81 (0.0697 - 0.0713)	1.74 (0.0685)
1.81 - 1.85 (0.0713 - 0.0728)	1.78 (0.0701)
1.85 - 1.89 (0.0728 - 0.0744)	1.82 (0.0717)
1.89 - 1.93 (0.0744 - 0.0760)	1.86 (0.0732)
1.93 - 1.96 (0.0760 - 0.0772)	1.90 (0.0748)
1.96 - 1.98 (0.0772 - 0.0780)	1.92 (0.0756)
1.98 - 2.00 (0.0780 - 0.0787)	1.94 (0.0764)
2.00 - 2.02 (0.0787 - 0.0795)	1.96 (0.0772)
2.02 - 2.04 (0.0795 - 0.0803)	1.98 (0.0780)
2.04 - 2.06 (0.0803 - 0.0811)	2.00 (0.0787)
2.06 - 2.08 (0.0811 - 0.0819)	2.02 (0.0795)
2.08 - 2.10 (0.0819 - 0.0827)	2.04 (0.0803)
2.10 - 2.12 (0.0827 - 0.0835)	2.06 (0.0811)
2.12 - 2.14 (0.0835 - 0.0843)	2.08 (0.0819)
2.14 - 2.16 (0.0843 - 0.0850)	2.10 (0.0827)
2.16 - 2.18 (0.0850 - 0.0858)	2.12 (0.0835)
2.18 - 2.20 (0.0858 - 0.0866)	2.14 (0.0843)
2.20 - 2.22 (0.0866 - 0.0874)	2.16 (0.0850)
2.22 - 2.24 (0.0874 - 0.0888)	2.18 (0.0858)
2.24 - 2.26 (0.0882 - 0.0890)	2.20 (0.0866)
2.26 - 2.28 (0.0890 - 0.0898)	2.22 (0.0874)
2.28 - 2.30 (0.0898 - 0.0906)	2.24 (0.0882)
2.30 - 2.32 (0.0906 - 0.0913)	2.26 (0.0890)
2.32 - 2.34 (0.0913 - 0.0921)	2.28 (0.0898)
2.34 - 2.37 (0.0921 - 0.0933)	2.30 (0.0906)
2.37 - 2.41 (0.0933 - 0.0949)	2.34 (0.0921)
2.41 - 2.45 (0.0949 - 0.0965)	2.38 (0.0937)
2.45 - 2.49 (0.0965 - 0.0980)	2.42 (0.0953)
2.49 - 2.53 (0.0980 - 0.0996)	2.46 (0.0969)
2.53 - 2.57 (0.0996 - 0.1012)	2.50 (0.0984)
2.57 - 2.61 (0.1012 - 0.1028)	2.54 (0.1000)
2.61 - 2.65 (0.1028 - 0.1043)	2.58 (0.1016)
2.65 - 2.69 (0.1043 - 0.1059)	2.62 (0.1031)
2.69 - 2.73 (0.1059 - 0.1075)	2.66 (0.1047)

Output Shaft SEAL RING CLEARANCE

0.10 - 0.25 (0.0039 - 0.0098) Standard Output shaft seal ring clearance Allowable limit 0.25 (0.0098)

END PLAY

Output shaft end play

OUTPUT SHAFT END PLAY ADJUSTING SHIMS

Thickness mm (in)	Part number*
0.56 (0.0220)	31438-31X46
0.96 (0.0378)	31438-31X47
1.36 (0.0535)	31438-31X48

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

Bearing Retainer SEAL RING CLEARANCE

ECS0061Q

Unit: mm (in)

Bearing retainer seal ring clearance	Standard	0.10 - 0.25 (0.0039 - 0.0098)	
Bearing retainer searning clearance	Allowable limit	0.25 (0.0098)	

ECS0061P

Unit: mm (in)

0 - 0.5 mm (0 - 0.020 in)

Total End Play

Total end play "T3 "

0.25 - 0.55 mm (0.0098 - 0.0217 in)

BEARING RACE FOR ADJUSTING TOTAL END PLAY

BEARING RACE FOR	ADJUSTING TO	TAL END	PLAY				E
Thick	ness mm (in)			Part n	umber*		
0.	6 (0.024)			31435	-31X01		
0.	8 (0.031)			31435	-31X02		AT
1.	0 (0.039)			31435	-31X03		
1.	2 (0.047)			31435	-31X04		
1.	4 (0.055)			31435	-31X05		
	6 (0.063)	31435-31X06			[
	8 (0.071)	31435-31X07					
	0 (0.079)			31435	-31X08		
*: Always check with the Parts		st parts inforn	nation.				ŀ
Reverse Clutch Er	nd Play					ECS0061S	
Reverse clutch end play "T4 '	3			0.65 - 1.00 mm (0).0256 - 0.	0394 in)	F
THRUST WASHERS I	OR ADJUSTING			H END PLAY			
Thick	ness mm (in)			Part n	umber*		(
	5 (0.0256)	31508-31X10					
	0 (0.0315)	31508-31X10 31508-31X11					
	05 (0.0374)	31508-31X12					
	0 (0.0433)	31508-31X12			ŀ		
1.2	25 (0.0492)	31508-31X14					
1.4	0 (0.0551)	31508-31X15					
*: Always check with the Parts	Department for the late	st parts inforn	nation.				
Accumulator O-RING						ECS0061T	
0-ning						Unit: mm (in)	,
Accumulator	Diameter (Small)	Part	number*	Diameter (La	rge)	Part number*	
Servo release accumulator	26.9 (1.059)	3152	26-41X03	44.2 (1.740))	31526-41X02	ŀ
N-D accumulator	34.6 (1.362)	31526-31X08 39.4 (1.551)		31672-21X00			
*: Always check with the Parts	Department for the late	st parts inforn	nation.				
RETURN SPRING							
						Unit: mm (in)	
Accumula	ator	Free	length	Outer diamete	er	Part number*	N
Servo release accumulator s	pring	52.5 ((2.067)	20.1 (0.791)		31605-80X00	
N-D accumulator spring		45.0 (1.772)		27.6 (1.087)		31605-33X01	

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

Band Servo RETURN SPRING

			Unit: mm (in)
Return spring	Free length	Outer diameter	Part number*
2nd servo return spring	32.5 (1.280)	25.9 (1.020)	31605-31X20
OD servo return spring	38.52 (1.5165)	22.0 (0.866)	31605-31X21

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

Removal and Installation

ECS0061V Unit: mm (in)

Distance between end of converter housing and torque converter 21.1 (0.831)

AT-393

[RE4F03B]

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ECS0061U

[RE4F03B]

Shift Solenoid Valves			ECS0061
Gear	Solenoid A	Sole	noid B
1st	ON	(ON
2nd	OFF	ON	
3rd	OFF	C)FF
4th	ON	C)FF
Solenoid Valve			ECS006
Solenoid valve	Resistance (Approx.)	Termina	al number
Shift solenoid A	20 - 30Ω		2
Shift solenoid B	5 - 20Ω		1
Ovr. clutch sol.	20 - 30Ω		3
Line pres. sol.	2.5 - 5Ω	4	
T/conv. clutch sol.	5 - 20Ω	5	
VT Fluid Temperature Sens	or		ECS006
Monitor Item	Condition		ification prox.)
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ
	\downarrow	\downarrow	2.5 kΩ ↓ 0.3 kΩ
Revolution Sensor	\downarrow	↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ ECS006
	Hot [80°C (176°F)]	\downarrow	$2.5 \text{ k}\Omega$ \downarrow $0.3 \text{ k}\Omega$ ecsood
Revolution Sensor Condition When moving at 20 km/h (12 MPH), use the Co suring function. *1 CAUTION: Connect the diagnosis data link cable to the	Hot [80°C (176°F)]	↓ 0.5V Judgement st	2.5 kΩ ↓ 0.3 kΩ ECS006 andard
Revolution Sensor Condition When moving at 20 km/h (12 MPH), use the Co suring function. *1 CAUTION: Connect the diagnosis data link cable to the *1: A circuit tester cannot be used to test this it	Hot [80°C (176°F)]	↓ 0.5V Judgement st Approximately	2.5 kΩ ↓ 0.3 kΩ ECS006 andard

TROUBLE DIAGNOSIS - INDEX

DTC

CONSULT-II

GST*1

P1705

P0720

U1000

TROUBLE DIAGNOSIS - INDEX Alphabetical & P No. Index for DTC

Items

(CONSULT-II screen terms)

ALPHABETICAL INDEX FOR DTC

TP SEN/CIRC A/T*2

VEH SPD SEN/CIR AT*3

CAN COMM CIRCUIT

A/T 1ST GR FNCTN	P0731	<u>AT-510</u>
A/T 2ND GR FNCTN	P0732	<u>AT-515</u>
A/T 3RD GR FNCTN	P0733	<u>AT-520</u>
A/T 4TH GR FNCTN	P0734	<u>AT-525</u>
A/T TCC S/V FNCTN	P0744	<u>AT-537</u>
ATF TEMP SEN/CIRC	P0710	<u>AT-495</u>
ENGINE SPEED SIG	P0725	<u>AT-506</u>
L/PRESS SOL/CIRC	P0745	<u>AT-545</u>
O/R CLTCH SOL/CIRC	P1760	<u>AT-566</u>
PNP SW/CIRC	P0705	<u>AT-489</u>
SFT SOL A/CIRC*2	P0750	<u>AT-551</u>
SFT SOL B/CIRC*2	P0755	<u>AT-556</u>
TCC SOLENOID/CIRC	P0740	<u>AT-532</u>
		1

*1: These numbers are prescribed by SAE J2012.

*2: When the fail-safe operation occurs, the MIL illuminates.

*3: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

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PFP:00000

[RE4F04B]

Reference page

AT-561

<u>AT-501</u>

<u>AT-588</u>

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TROUBLE DIAGNOSIS - INDEX

P NO. INDEX FOR DTC

DTC	ltems	
CONSULT-II GST*1	(CONSULT-II screen terms)	Reference page
P0705	PNP SW/CIRC	<u>AT-489</u>
P0710	ATF TEMP SEN/CIRC	<u>AT-495</u>
P0720	VEH SPD SEN/CIR AT*3	<u>AT-501</u>
P0725	ENGINE SPEED SIG	<u>AT-506</u>
P0731	A/T 1ST GR FNCTN	<u>AT-510</u>
P0732	A/T 2ND GR FNCTN	<u>AT-515</u>
P0733	A/T 3RD GR FNCTN	<u>AT-520</u>
P0734	A/T 4TH GR FNCTN	<u>AT-525</u>
P0740	TCC SOLENOID/CIRC	<u>AT-532</u>
P0744	A/T TCC S/V FNCTN	<u>AT-537</u>
P0745	L/PRESS SOL/CIRC	<u>AT-545</u>
P0750	SFT SOL A/CIRC*2	<u>AT-551</u>
P0755	SFT SOL B/CIRC*2	<u>AT-556</u>
P1705	TP SEN/CIRC A/T*2	<u>AT-561</u>
P1760	O/R CLTCH SOL/CIRC	<u>AT-566</u>
U1000	CAN COMM CIRCUIT	<u>AT-588</u>

*1: These numbers are prescribed by SAE J2012.

*2: When the fail-safe operation occurs, the MIL illuminates.

*3: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

PRECAUTIONS

PRECAUTIONS

PFP:00001

[RE4F04B]

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

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

WARNING:

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

Precautions for On Board Diagnostic (OBD) System of A/T and Engine

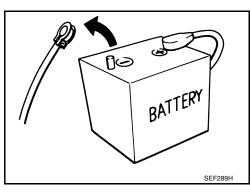
The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

- Be sure to turn the ignition switch OFF and disconnect the negative battery 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 EGR system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM or ECM before returning the vehicle to the customer.

Precautions

 Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the TCM, because battery voltage is applied to TCM even if ignition switch is turned off.



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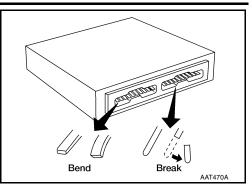
ECS00624

ECS00623

[RE4F04B]

 When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).

Make sure that there are not any bends or breaks on TCM pin terminal, when connecting pin connectors.



Perform TCM in-

put/output signal /

inspection before replacement.

OLD ONE

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MEF040DA

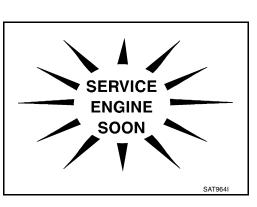
 Before replacing TCM, perform TCM input/output signal inspection and verify whether TCM functions properly or not. Refer to <u>AT-419</u>, "INPUT/OUTPUT SIGNAL OF TCM".

 After performing each TROUBLE DIAGNOSIS, perform "DTC (Diagnostic Trouble Code) CONFIRMATION PROCE-DURE".

The DTC should not be displayed in the "DTC CONFIRMA-TION PROCEDURE" if the repair is completed.

- Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transaxle.
- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should be replaced any time the transaxle is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- Replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to <u>AT-399</u>, <u>"ATF COOLER SERVICE"</u>.
- After overhaul, refill the transaxle with new ATF.
- When the A/T drain plug is removed, only some of the fluid is drained. Old A/T fluid will remain in torque converter and ATF cooling system.

Always follow the procedures when changing A/T fluid. Refer to MA-31, "Changing A/T Fluid" .



AT-398

PRECAUTIONS

[RE4F04B]

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Service Notice or Precautions	
The TCM has an electronic Fail-Safe (limp home mode). This allows the vehicle to be driven even if a major electrical input/output device circuit is damaged.	
Under Fail-Safe, the vehicle always runs in third gear, even with a shift lever position of 1, 2 or D. The customer may complain of sluggish or poor acceleration.	
When the ignition key is turned ON following Fail-Safe operation, O/D OFF indicator lamp blinks for about 8 seconds. [Or, refer to <u>AT-440</u> , " <u>TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS</u>)"]. The blinking of the O/D OFF indicator lamp for about 8 seconds will appear only once and be cleared. The successful results are presented driving conditions.	/
customer may resume normal driving conditions. Always follow the "Work Flow". Refer to <u>AT-448, "Work Flow"</u> . The SELF-DIAGNOSIS results will be as follows:	
• The first SELF-DIAGNOSIS will indicate damage to the vehicle speed sensor or the revolution sensor.	
• During the next SELF-DIAGNOSIS, performed after checking the sensor, no damages will be indicated.	
TORQUE CONVERTER SERVICE	
The torque converter should be replaced under any of the following conditions:	
External leaks in the hub weld area.	
Converter hub is scored or damaged.	
Converter pilot is broken, damaged or fits poorly into crankshaft.	
Steel particles are found after flushing the cooler and cooler lines.	
 Pump is damaged or steel particles are found in the converter. 	
• Vehicle has TCC shudder and/or no TCC apply. Replace only after all hydraulic and electrical diagnoses have been made. (Converter clutch material may be glazed.)	
 Converter is contaminated with engine coolant containing antifreeze. 	
Internal failure of stator roller clutch.	
 Heavy clutch debris due to overheating (blue converter). 	
 Steel particles or clutch lining material found in fluid filter or on magnet when no internal parts in unit are worn or damaged — indicates that lining material came from converter. The torgue converter should not be replaced if: 	
• The fluid has an odor, is discolored, and there is no evidence of metal or clutch facing particles.	
The threads in one or more of the converter bolt holes are damaged.	
• Transaxle failure did not display evidence of damaged or worn internal parts, steel particles or clutch plate lining material in unit and inside the fluid filter.	
• Vehicle has been exposed to high mileage (only). The exception may be where the torque converter clutch dampener plate lining has seen excess wear by vehicles operated in heavy and/or constant traffic, such as taxi, delivery or police use.	
ATF COOLER SERVICE	
If A/T fluid contains frictional material (clutches, bands, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of A/T. Refer to $\underline{CO-30}$, "RADIATOR".	
OBD-II SELF-DIAGNOSIS	
• A/T self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the O/D OFF indicator or the malfunction indicator lamp (MIL). Refer to the table on <u>AT-432</u> for the indicator used to display each self-diagnostic result.	
• The self-diagnostic results indicated by the MIL are automatically stored in both the ECM and TCM memories.	

Always perform the procedure "HOW TO ERASE DTC" on <u>AT-429</u> to complete the repair and avoid unnecessary blinking of the MIL.

- The following self-diagnostic items can be detected using ECM self-diagnostic results mode* only when the O/D OFF indicator lamp does not indicate any malfunctions.
- park/neutral position (PNP) switch
 *: For details of OBD-II, refer to <u>EC-1244, "ON BOARD DIAGNOSTIC (OBD) SYSTEM"</u>.
- Certain systems and components, especially those related to OBD, may use a new style slidelocking type harness connector.

ECS00626

For description and how to disconnect, refer to GI-23, "How to Check Terminal" .

Wiring Diagrams and Trouble Diagnosis

When you read wiring diagrams, refer to the following:

- GI-13, "How to Read Wiring Diagrams"
- PG-2, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"

[RE4F04B]

pecial Service Tools		ECSOC
	s may differ from those of special service too	bls illustrated here.
ool number Kent-Moore No.) ool name		Description
(V381054S0	Č.	Removing differential side oil seals
J34286) Puller		 Removing differential side bearing outer race
		• Removing idler gear bearing outer race
		a: 250 mm (9.84 in) b: 160 mm (6.30 in)
3T33400001 J26082)	1 NT414	 Installing differential side oil seal F04B and F04W (RH side)
Drift		 Installing oil seal on oil pump housing
		a: 60 mm (2.36 in) dia.
	ab	b: 47 mm (1.85 in) dia.
J34301-C)	- NT086	Measuring line pressure
Dil pressure gauge set		
(J34301-1) Dil pressure gauge		
2 (J34301-2)		
loses s (J34298)		
Adapter		
(J34282-2)		
Adapter 5 (790-301-1230-A)	AAT896	
0° Adapter		
6 (J34301-15) Square socket		
ST27180001		Removing idler gear
J25726-A)		a: 100 mm (3.94 in)
Puller		b: 110 mm (4.33 in) c: M8 x 1.25P
	b	
	c U NT424	
ST23540000 J25689-A)		 Removing and installing parking rod plate and manual plate pins
Pin punch		a: 2.3 mm (0.091 in) dia.
	a	b: 4 mm (0.16 in) día.
ST25710000	NT442	Aligning groove of manual shaft and hale of
J25689-A)		 Aligning groove of manual shaft and hole of transmission case
Pin punch	a	a: 2 mm (0.08 in) dia.
	NT410	

AT-401

[RE4F04B]

Tool number (Kent-Moore No.) Tool name		Description
KV32101000 (J25689-A) Pin punch	a	 Removing and installing manual shaft retaining pin Removing and installing pinion mate shaft lock pin a: 4 mm (0.16 in) dia.
	NT410	
KV31102400 (J34285 and J34285-87) Clutch spring compressor	a b b b c N423	 Removing and installing clutch return springs Installing low and reverse brake piston a: 320 mm (12.60 in) b: 174 mm (6.85 in)
KV40100630 (J26092) Drift	a b c c t t t t t t t t t t t t t t t t t	 Installing reduction gear bearing inner race Installing idler gear bearing inner race a: 67.5 mm (2.657 in) dia. b: 44 mm (1.73 in) dia. c: 38.5 mm (1.516 in) dia.
ST30720000 (J25405 and J34331) Bearing installer	ab	 Installing idler gear bearing outer race a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.
ST35321000	NT115	Installing output shaft bearing
(—) Drift	b a NT073	a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia.
(J34291-A) Shim setting gauge set	ALL BREED BREED NTIOL	 Selecting oil pump cover bearing race and oil pump thrust washer Selecting side gear thrust washer
ST33230000 (J25805-01) Drift		 Installing differential side bearing inner race (RH side) a: 51 mm (2.01 in) dia. b: 28.5 mm (1.122 in) dia.
	NT084	

AT-402

[RE4F04B]

Tool number (Kent-Moore No.) Tool name		Description
(J34290) Shim selecting tool set		 Selecting differential side bearing adjusting shim
ST3306S001 (J22888-D) Differential side bearing puller set 1 ST33051001 (J22888-D) Puller 2 ST33061000 (J8107-2) Adapter	d e e e e e e e a AMT153	 Removing differential side bearing inner race a: 38 mm (1.50 in) dia. b: 28.5 mm (1.122 in) dia. c: 130 mm (5.12 in) d: 135 mm (5.31 in) e: 100 mm (3.94 in)
ST3127S000 (J25765-A) Preload gauge 1 GG91030000 (J25765-A)		Checking differential side bearing preload
Torque wrench 2 HT62940000 (—) Socket adapter 3 HT62900000 (—) Socket adapter	2	
ST35271000 (J26091) Drift		 Installing idler gear a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia.
(J39713) Preload adapter	NT115	 Selecting differential side bearing adjusting shim Checking differential side bearing preload
J45816 E20 TORX socket	NT087	Removing flex plate bolts on vehicles equipped with QR25DE engines

[RE4F04B]

Commercial Service Tools		ECS00
Tool name		Description
Puller		Removing idler gear bearing inner race
	NT077	 Removing and installing band servo piston snap ring
Puller	N10/7	Removing reduction gear bearing inner
	a b b c c c c c c c c c c c c c c c c c	race a: 60 mm (2.36 in) dia. b: 35 mm (1.38 in) dia.
Drift	NT411	 Installing needle bearing on bearing retain-
		er a: 36 mm (1.42 in) dia.
	a NT083	
Drift		Removing needle bearing from bearing re- tainer
		a: 33.5 mm (1.319 in) dia.
	a	
	NT083	
Drift		Installing differential side bearing outer race (RH side)
		a: 75 mm (2.95 in) dia.
	a	
	NT083	

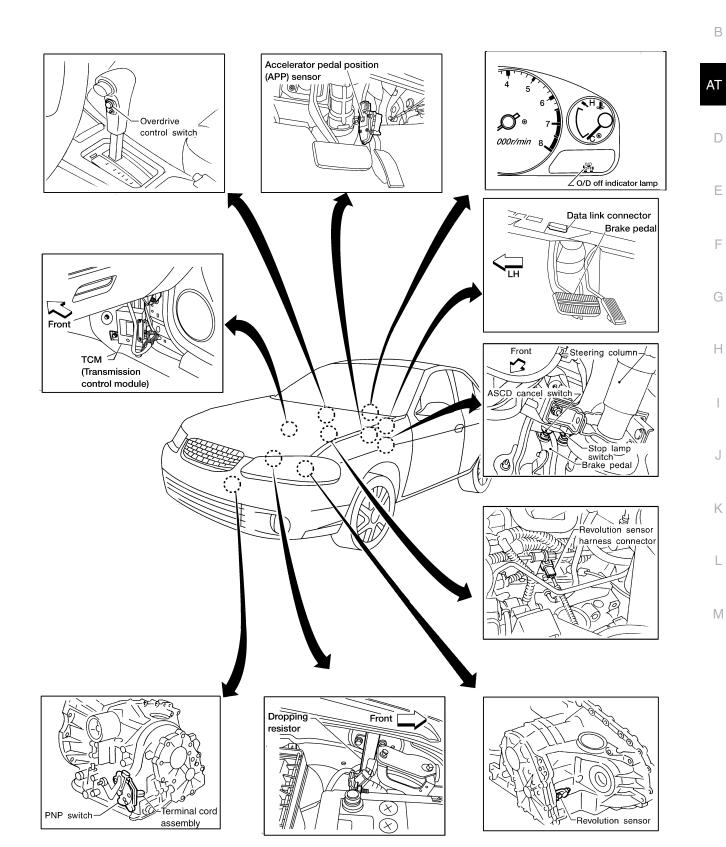
[RE4F04B]

OVERALL SYSTEM A/T Electrical Parts Location

PFP:00000

ECS00629

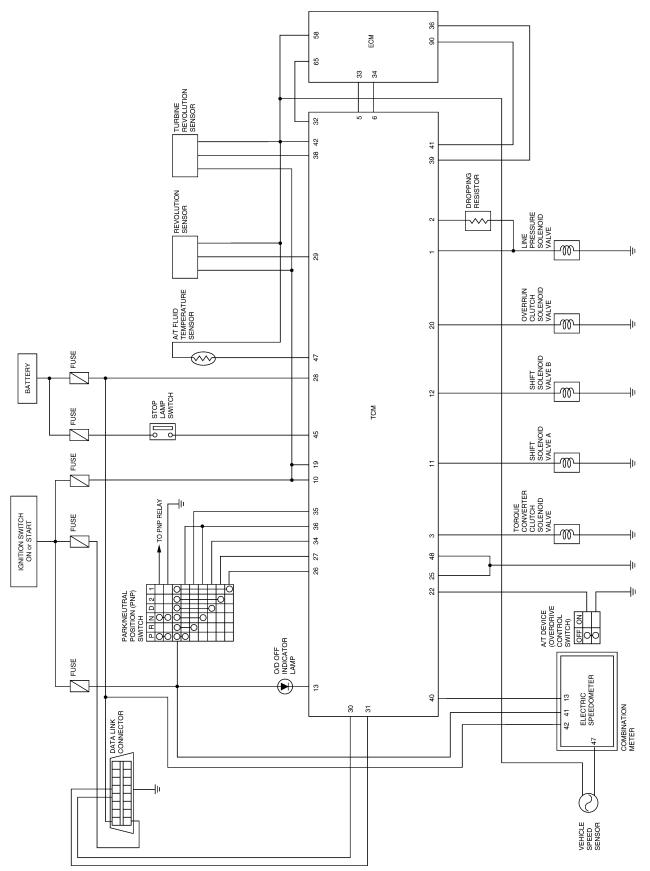
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AT-405

Circuit Diagram

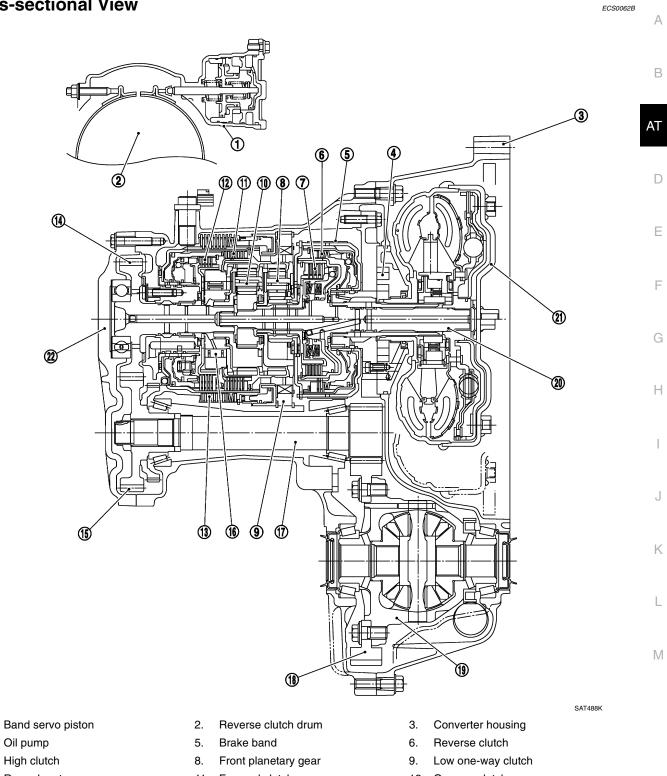
[RE4F04B]



WCWA0005E

Cross-sectional View

[RE4F04B]



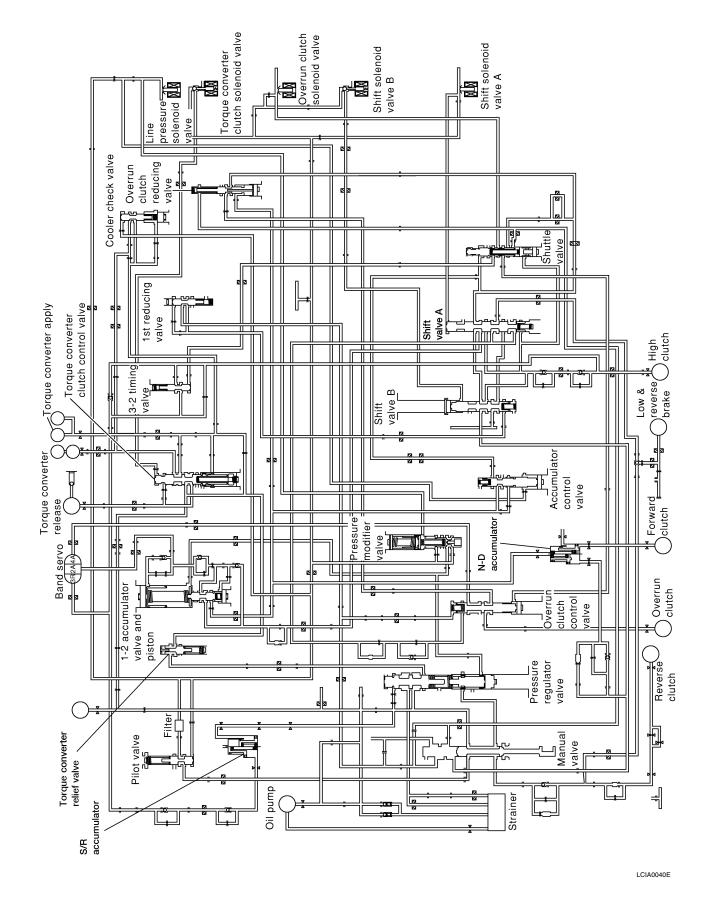
- 10. Rear planetary gear
- 13. Low & reverse brake
- 16. Forward one-way clutch
- Differential case 19.
- 22. Side cover

1. 4.

7.

- 11. Forward clutch
- Output gear 14.
- 17. Pinion reduction gear
- 20. Input shaft

- 12. Overrun clutch
- 15. Idler gear
- 18. Final gear
- 21. Torque converter

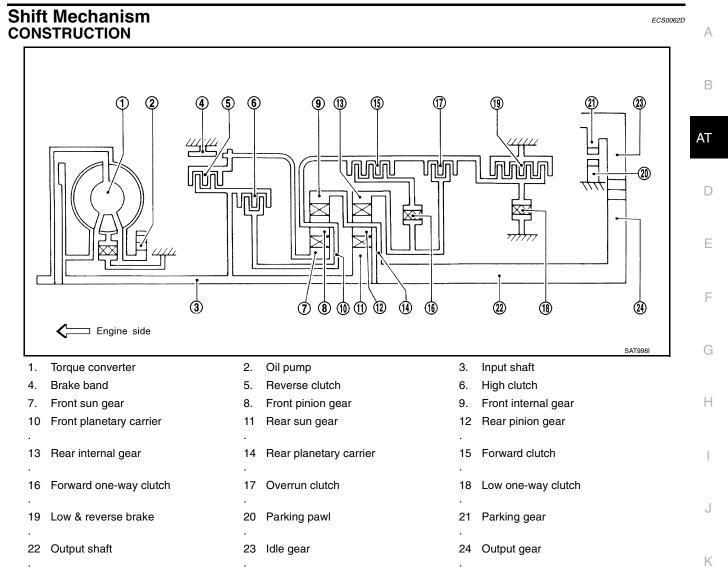


Hydraulic Control Circuit

ECS0062C

[RE4F04B]

[RE4F04B]



FUNCTION OF CLUTCH AND BRAKE

Clutch and brake components	Abbr.	Function	
Reverse clutch 5	R/C	To transmit input power to front sun gear 7.	
High clutch 6	H/C	To transmit input power to front planetary carrier 10.	
Forward clutch 15	F/C	To connect front planetary carrier 10 with forward one-way clu 16 .	
Overrun clutch 17	O/C	To connect front planetary carrier 10 with rear internal gear 1	
Brake band 4	B/B	To lock front sun gear 7 .	
Forward one-way clutch 16	F/O.C	When forward clutch 15 is engaged, to stop rear internal gear from rotating in opposite direction against engine revolution.	
Low one-way clutch 18	L/O.C	To stop front planetary carrier 10 from rotating in opposite direction against engine revolution.	
Low & reverse brake 19	L & R/B	To lock front planetary carrier 10 .	

CLUTCH AND BAND CHART

				_	•		Band serv	0	For-	Low			
Shift p	oosition	Reverse clutch 5	High clutch 6	For- ward clutch 15	Over- run clutch 17	2nd apply	3rd release	4th apply	one-	one- way clutch 18	Low & reverse brake 19	Lock- up Remarks	
	Р												PARK POSITION
	R	0									0		REVERSE POSITION
I	N												NEUTRAL POSITION
	1st			0	*1 D				В	В			Automatic shift
D*4	2nd			0	*1 A	0			В				
D 4	3rd		0	0	*1 A	*2 C	С		В			*4 O	$1 \Leftrightarrow 2 \Leftrightarrow 3$ $\Leftrightarrow 4$
	4th		0	С		*3 C	С	0	В			0	⇔ 4
	1st			0	0				В	В			Automatic
2	2nd			0	0	0			В				shift
	3rd			0	0				В				$1 \Leftrightarrow 2 \Leftarrow 3$
	1st			0	0				В		0		Locks (held
1	2nd			0	0	0			В				stationary) in 1st
·	3rd			0	0	*2 C			В				speed $1 \leftarrow 2 \leftarrow 3$

*1: Operates when overdrive control switch is set in OFF position.

*2: Oil pressure is applied to both 2nd "apply" side and 3rd "release" side of band servo piston. However, brake band does not contract because oil pressure area on the "release" side is greater than that on the "apply" side.

*3: Oil pressure is applied to 4th "apply" side in condition *2 above, and brake band contracts.

*4: A/T will not shift to 4th when overdrive control switch is set in OFF position.

O: Operates

A: Operates when throttle opening is less than 3/16, activating engine brake.

B: Operates during "progressive" acceleration.

C: Operates but does not affect power transmission.

D: Operates when throttle opening is less than 3/16, but does not affect engine brake.

[RE4F04B]

POWER TRANSMISSION

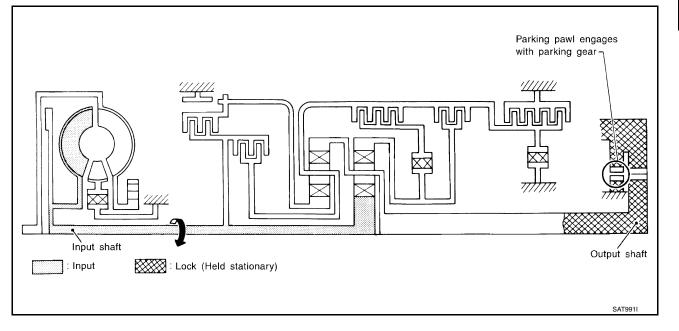
P and N Positions

P position Similar to the N position, the clutches do not operate. The parking pawl engages with the parking gear to mechanically hold the output shaft so that the powertrain is locked.

• N position

•

Power from the input shaft is not transmitted to the output shaft because the clutches do not operate.



A

В

AT

D

Ε

F

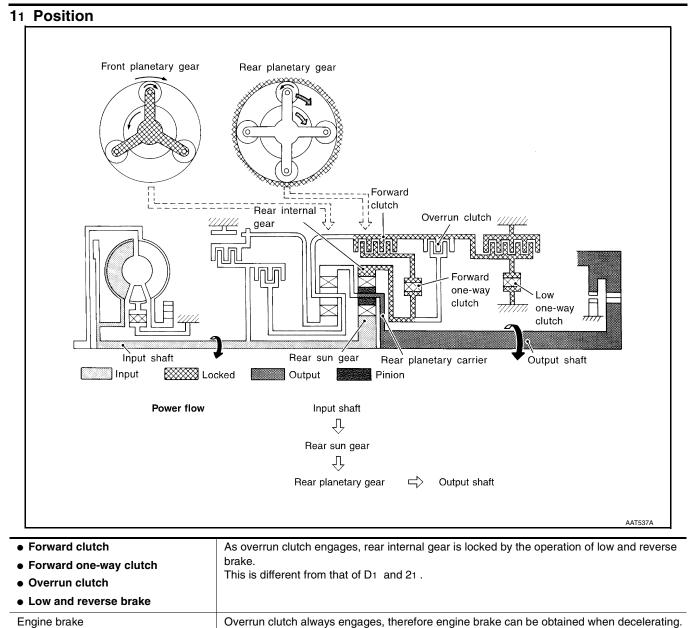
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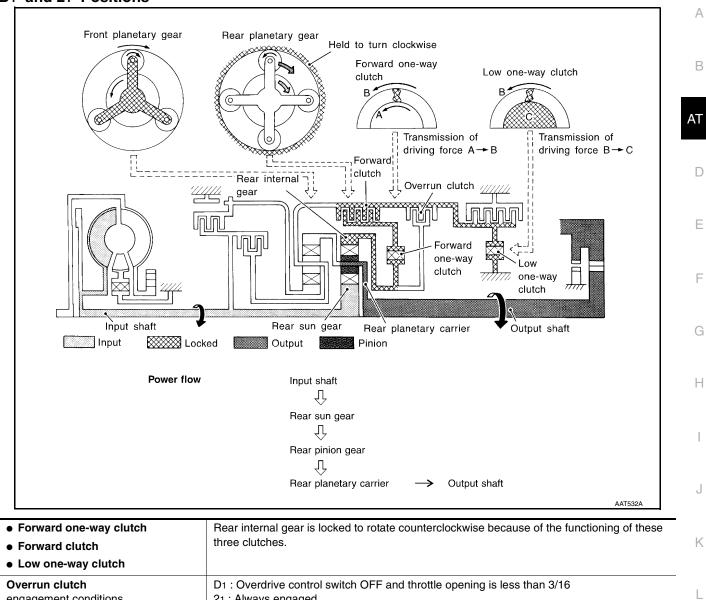


D1 and 21 Positions

engagement conditions

(Engine brake)



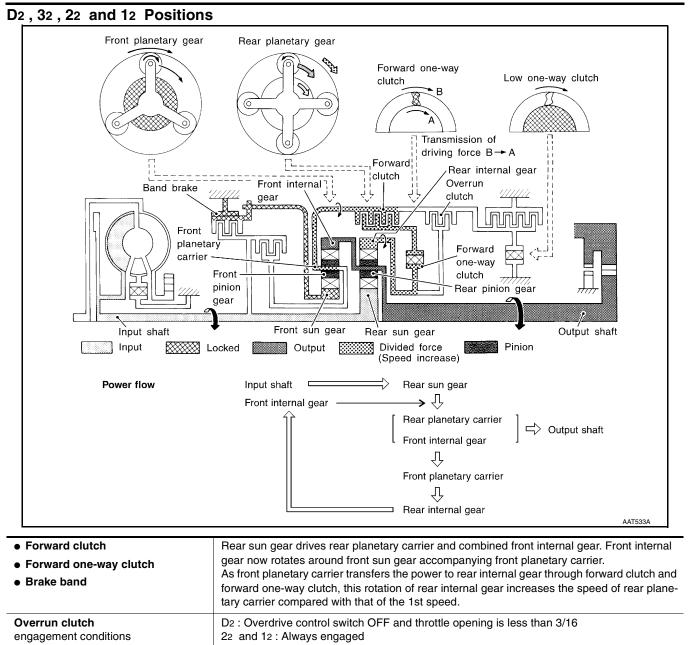


At D1 and 21 positions, engine brake is not activated due to free turning of low one-way

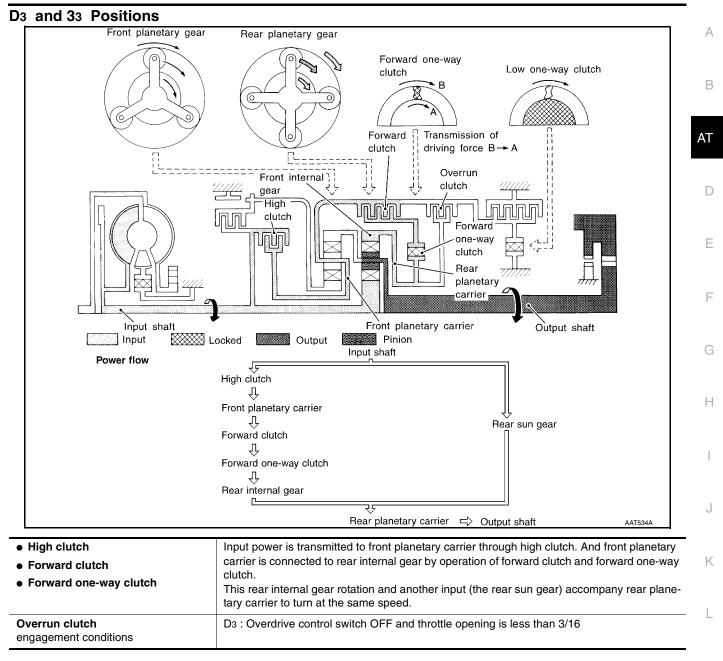
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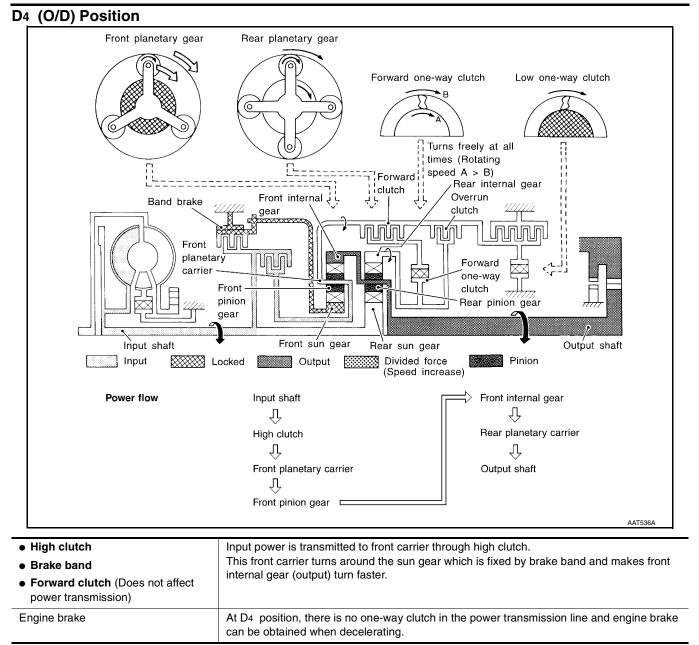
21 : Always engaged

clutch.

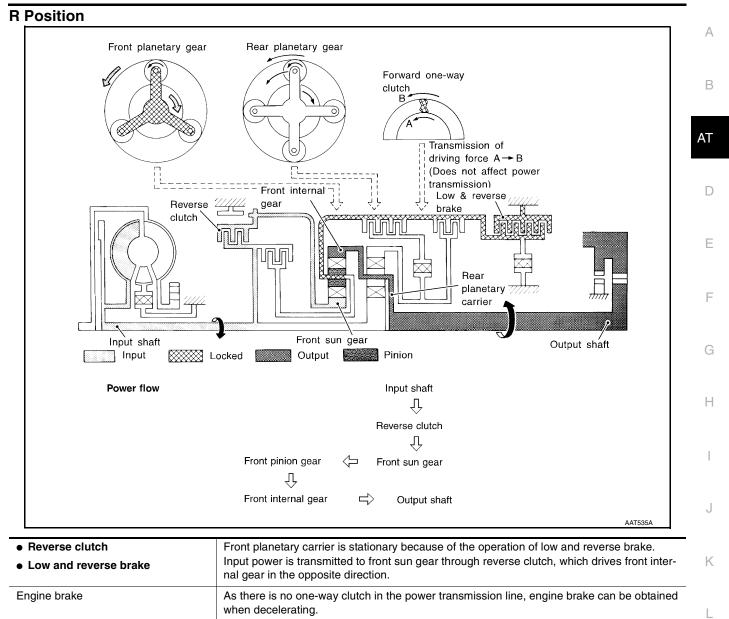


[RE4F04B]





[RE4F04B]



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[RE4F04B]

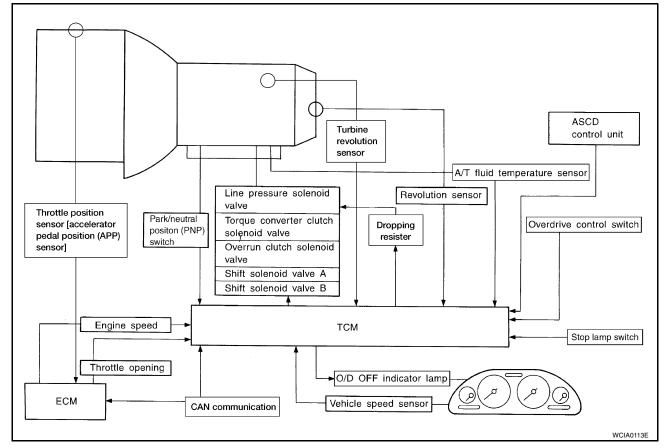
Control System OUTLINE

ECS0062E

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

SENSORS	ТСМ	ACTUATORS
Park/neutral position (PNP) switch Throttle position sensor [acceler- ator pedal position (APP) sensor] Engine speed signal A/T fluid temperature sensor Revolution sensor Vehicle speed sensor Overdrive control switch ASCD control unit Stop lamp switch Turbine revolution sensor	Shift control Line pressure control Lock-up control Overrun clutch control Timing control Fail-safe control Self-diagnosis CONSULT-II communication line control	 Shift solenoid valve A Shift solenoid valve B Overrun clutch solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve O/D OFF indicator lamp

CONTROL SYSTEM



TCM FUNCTION

The function of the TCM is to:

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

INPUT/OUTPUT SIGNAL OF TCM

	Sensors and solenoid valves	Function
	Park/neutral position (PNP) switch	Detects select lever position and sends a signal to TCM.
	Throttle position sensor [accelerator pedal position (APP) sensor]	Detects accelerator pedal position and requested throttle opening and sends a signal to TCM.
	Engine speed signal	Receives signal from ECM and controls lock-up control solenoid valve.
	A/T fluid temperature sensor	Detects transmission fluid temperature and sends a signal to TCM.
	Revolution sensor	Detects output shaft rpm and sends a signal to TCM.
Input	Vehicle speed sensor	Used as an auxiliary vehicle speed sensor. Sends a signal which is used if revolution sensor (installed on transmission) malfunctions.
	Overdrive control switch	Sends a signal to the TCM which prohibits a shift to D4 (overdrive) position.
	ASCD control unit	Sends the cruise signal and D4 (overdrive) cancellation signal from ASCD control unit to TCM.
	Stop lamp switch	Send the lock-up release signal to the TCM at time of D4 (lock-up).
	CAN communication	Control units are connected to two communication lines (CAN H and CAN L) allowing a high rate of information transmission.
	Shift solenoid valve A/B	Selects shifting point suited to driving conditions in relation to a signal sent from TCM.
	Line pressure solenoid valve	Regulates line pressure suited to driving conditions in relation to a signal sent from TCM.
Output	Torque converter clutch solenoid valve	Regulates lock-up pressure suited to driving conditions in relation to a signal sent from TCM.
	Overrun clutch solenoid valve	Controls an "engine brake" effect suited to driving conditions in relation to a signal sent from TCM.
	O/D OFF indicator lamp	Shows TCM faults, when A/T control components malfunction.
	CAN communication	Control units are connected to two communication lines (CAN H and CAN L) allowing a high rate of information transmission.

CAN Communication SYSTEM DESCRIPTION

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

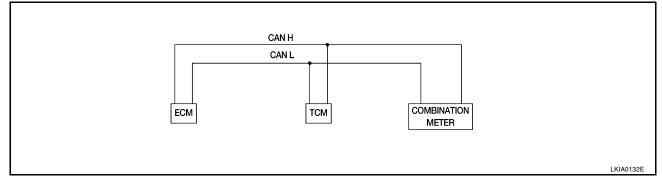
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CAN COMMUNICATION UNIT System diagram



Input/output signal chart

		T: Transmit R: Receive
Signals	ECM	ТСМ
Accelerator pedal position signal	Т	R
Output shaft revolution signal	R	Т
A/T self-diagnosis signal	R	Т
Wide open throttle position signal	Т	R
Overdrive cancel signal	Т	R

е

Control Mechanism LINE PRESSURE CONTROL

TCM has various line pressure control characteristics to meet the driving conditions. An ON-OFF duty signal is sent to the line pressure solenoid valve based on TCM characteristics. Hydraulic pressure on the clutch and brake is electronically controlled through the line pressure solenoid valve to accommodate engine torque. This results in smooth shift operation.

Normal Control

The line pressure to throttle opening characteristics is set for suitable clutch operation.

Back-up Control (Engine brake)

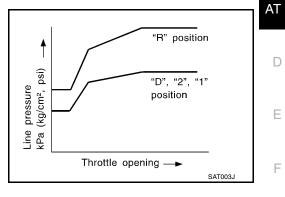
If the selector lever is shifted to 2 position while driving in D4 (O/D) or D₃, great driving force is applied to the clutch inside the transmission. Clutch operating pressure (line pressure) must be increased to deal with this driving force.

During Shift Change

The line pressure is temporarily reduced corresponding to a change in engine torque when shifting gears (that is, when the shift solenoid valve is switched for clutch operation) to reduce shifting shock.

At Low Fluid Temperature

Fluid viscosity and frictional characteristics of the clutch facing change with fluid temperature. Clutch
engaging or band-contacting pressure is compensated for, according to fluid temperature, to stabilize
shifting quality.



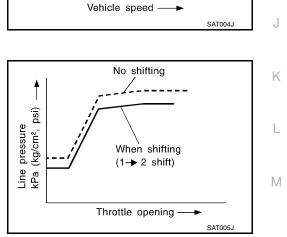
"2" or "1" position

D.->

(kg/cm², psi)

pressure

Line kPa



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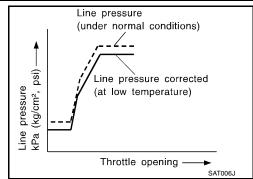
"2" or "1"

position

[RE4F04B]

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The line pressure is reduced below 60°C (140°F) to prevent shifting shock due to low viscosity of automatic transmission fluid when temperature is low.



Line pressure is increased to a maximum irrespective of the -10°C (14°F) throttle opening when fluid temperature drops to -10°C (14°F). This pressure rise is adopted to prevent a delay in clutch and brake operation due to extreme drop of fluid viscosity at low psi) Normal temperature e pressure (kg/cm², p Line kPa (

SHIFT CONTROL

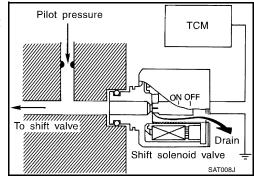
temperature.

The shift is regulated entirely by electronic control to accommodate vehicle speed and varying engine operations. This is accomplished by electrical signals transmitted by the revolution sensor and the ECM (throttle opening). This results in improved acceleration performance and fuel economy.

Control of Shift Solenoid Valves A and B

The TCM activates shift solenoid valves A and B according to signals from the ECM (throttle opening) and revolution sensor to select the optimum gear position on the basis of the shift schedule memorized in the TCM.

The shift solenoid valve performs simple ON-OFF operation. When set to ON, the drain circuit closes and pilot pressure is applied to the shift valve.



[RE4F04B]

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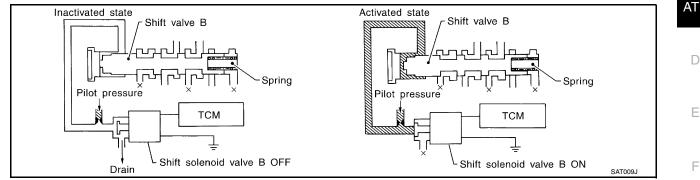
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Relation between shift solenoid valves A and B and gear positions

Shift solenoid valve	Gear position						
Shint Solehold Valve	D1 , 21 , 11	D2 , 22 , 12	Dз	D4 (O/D)	N-P		
A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	ON (Closed)	В	
В	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	-	

Control of Shift Valves A and B



Pilot pressure generated by the operation of shift solenoid valves A and B is applied to the end face of shift valves A and B.

The drawing above shows the operation of shift valve B. When the shift solenoid valve is ON, pilot pressure applied to the end face of the shift valve overcomes spring force, moving the valve upward.

LOCK-UP CONTROL

The torque converter clutch piston in the torque converter is locked to eliminate torque converter slip to increase power transmission efficiency. The solenoid valve is controlled by an ON-OFF duty signal sent from the TCM. The signal is converted to an oil pressure signal which controls the lock-up piston.

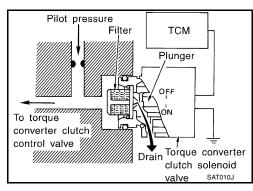
Conditions for Lock-up Operation

When vehicle is driven in 3rd and 4th gear position, vehicle speed and throttle opening are detected. If the detected values fall within the lock-up zone memorized in the TCM, lock-up occurs.

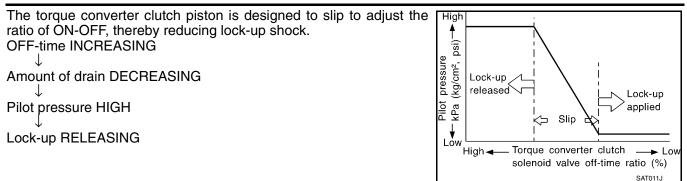
Overdrive control switch	ON	OFF	
Selector lever	D position		
Gear position	D4 D3		
Vehicle speed sensor	More than set value		
ECM (throttle opening)	Less than set opening		
A/T fluid temperature sensor	More than 40°C (104°F)		

Torque Converter Clutch Solenoid Valve Control

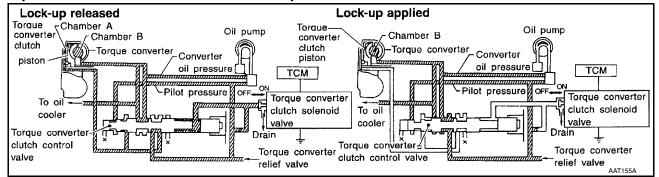
The torque converter clutch solenoid valve is controlled by the TCM. The plunger closes the drain circuit during the OFF period, and opens the circuit during the ON period. If the percentage of OFF-time increases in one cycle, the pilot pressure drain time is reduced and pilot pressure remains high.



[RE4F04B]



Torque Converter Clutch Control Valve Operation



Lock-up released

The OFF-duration of the torque converter clutch solenoid valve is long, and pilot pressure is high. The pilot pressure pushes the end face of the torque converter clutch control valve in combination with spring force to move the valve to the left. As a result, converter pressure is applied to chamber A (torque converter clutch piston release side). Accordingly, the torque converter clutch piston remains unlocked.

Lock-up applied

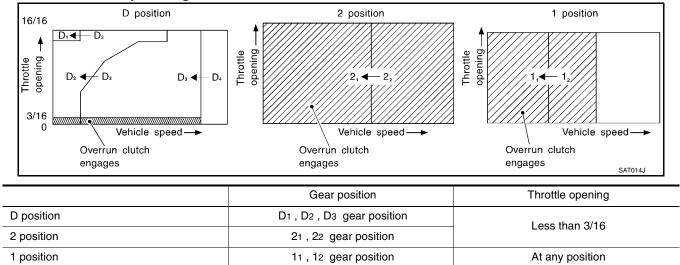
When the OFF-duration of the torque converter clutch solenoid valve is short, pilot pressure drains and becomes low. Accordingly, the control valve moves to the right by the pilot pressure of the other circuit and converter pressure. As a result, converter pressure is applied to chamber B, keeping the torque converter clutch piston applied.

Also smooth lock-up is provided by transient application and release of the lock-up.

OVERRUN CLUTCH CONTROL (ENGINE BRAKE CONTROL)

Forward one-way clutch is used to reduce shifting shocks in downshifting operations. This clutch transmits engine torque to the wheels. However, drive force from the wheels is not transmitted to the engine because the one-way clutch rotates idle. This means the engine brake is not effective. The overrun clutch operates when the engine brake is needed.

Overrun Clutch Operating Conditions





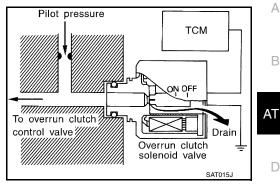
[RE4F04B]

Overrun Clutch Solenoid Valve Control

The overrun clutch solenoid valve is operated by an ON-OFF signal transmitted by the TCM to provide overrun clutch control (engine brake control).

When this solenoid valve is ON, the pilot pressure drain port closes. When it is OFF, the drain port opens.

During the solenoid valve ON pilot pressure is applied to the end face of the overrun clutch control valve.

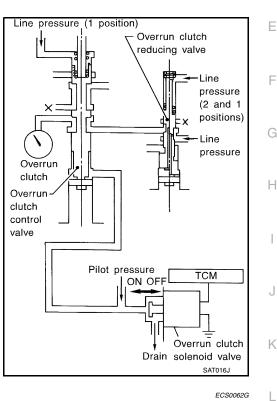


Overrun Clutch Control Valve Operation

When the solenoid valve is ON, pilot pressure is applied to the overrun clutch control valve. This pushes up the overrun clutch control valve. The line pressure is then shut off so that the clutch does not engage.

When the solenoid valve is OFF, pilot pressure is not generated. At this point, the overrun clutch control valve moves downward by spring force. As a result, overrun clutch operation pressure is provided by the overrun clutch reducing valve. This causes the overrun clutch to engage.

In the 1 position, the overrun clutch control valve remains pushed down so that the overrun clutch is engaged at all times.



Control Valve FUNCTION OF CONTROL VALVES

Valve name	Function	
Pressure regulator valve, plug and sleeve plug	Regulates oil discharged from the oil pump to provide optimum line pressure for all driv- ing conditions.	
Pressure modifier valve and sleeve	Used as a signal supplementary valve to the pressure regulator valve. Regulates pres- sure-modifier pressure (signal pressure) which controls optimum line pressure for all driving conditions.	
Pilot valve	Regulates line pressure to maintain a constant pilot pressure level which controls lock-up mechanism, overrun clutch, shift timing.	
Accumulator control valve	Regulates accumulator back-pressure to pressure suited to driving conditions.	
Manual valve	Directs line pressure to oil circuits corresponding to select positions. Hydraulic pressure drains when the shift lever is in Neutral.	
Shift valve A	Simultaneously switches three oil circuits using output pressure of shift solenoid valve A to meet driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st \rightarrow 2nd \rightarrow 3rd \rightarrow 4th gears/4th \rightarrow 3rd \rightarrow 2nd \rightarrow 1st gears) in combination with shift valve B.	

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Valve name	Function
Shift valve B	Simultaneously switches two oil circuits using output pressure of shift solenoid valve B in relation to driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st \rightarrow 2nd \rightarrow 3rd \rightarrow 4th gears/4th \rightarrow 3rd \rightarrow 2nd \rightarrow 1st gears) in combination with shift valve A.
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with application of the brake band in D4 . (Interlocking occurs if the overrun clutch engages during D4 .)
"1" reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when down-shift- ing from the 1 position 12 to 11.
Overrun clutch reducing valve	Reduces oil pressure directed to the overrun clutch and prevents engine-brake shock. In 1 and 2 positions, line pressure acts on the overrun clutch reducing valve to increase the pressure-regulating point, with resultant engine brake capability.
Torque converter relief valve	Prevents an excessive rise in torque converter pressure.
Torque converter clutch control valve, plug and sleeve	Activates or inactivates the lock-up function. Also provides smooth lock-up through transient application and release of the lock-up system.
1-2 accumulator valve and piston	Dampens the shock encountered when 2nd gear band servo contracts, and provides smooth shifting.
3-2 timing valve	Switches the pace that oil pressure is released depending on vehicle speed; maximizes the high clutch release timing, and allows for soft down shifting.
Shuttle valve	Determines if the overrun clutch solenoid valve should control the 3-2 timing valve or the overrun clutch control valve and switches between the two.
Cooler check valve	At low speeds and with a small load when little heat is generated, saves the volume of cooler flow, and stores the oil pressure for lock up.

stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For details, refer to AT-427, "OBD-II Function for A/T System" .

OBD-II Function for A/T System

The ECM provides emission-related on board diagnostic (OBD-II) functions for the A/T system. One function is to receive a signal from the TCM used with OBD-related parts of the A/T system. The signal is sent to the ECM when a malfunction occurs in the corresponding OBD-related part. The other function is to indicate a diagnostic result by means of the MIL (malfunction indicator lamp) on the instrument panel. Sensors, switches and solenoid valves are used as sensing elements.

The MIL automatically illuminates in One or Two Trip Detection Logic when a malfunction is sensed in relation to A/T system parts.

One or Two Trip Detection Logic of OBD-II ONE TRIP DETECTION LOGIC

If a malfunction is sensed during the first test drive, the MIL will illuminate and the malfunction will be stored in the ECM memory as a DTC. The TCM is not provided with such a memory function.

TWO TRIP DETECTION LOGIC

When a malfunction is sensed during the first test drive, it is stored in the ECM memory as a 1st trip DTC (diagnostic trouble code) or 1st trip freeze frame data. At this point, the MIL will not illuminate. — First Trip If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MIL will illuminate. — Second Trip

A/T-related parts for which the MIL illuminates during the first or second test drive are listed below.

literee	MIL		J
Items	One trip detection	Two trip detection	
Shift solenoid valve A — DTC: P0750	X		
Shift solenoid valve B — DTC: P0755	X		
Throttle position sensor [accelerator pedal position (APP) sensor] — DTC: P1705	X		
Except above		Х	

The "trip" in the "One or Two Trip Detection Logic" means a driving mode in which self-diagnosis is performed during vehicle operation.

OBD-II Diagnostic Trouble Code (DTC) HOW TO READ DTC AND 1ST TRIP DTC

DTC and 1st trip DTC can be read by the following methods.

(¹) With CONSULT-II or ¹ GST) CONSULT-II or GST (Generic Scan Tool) Examples: P0705, P0710, P0720, P0725, etc.

These DTCs are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

- 1st trip DTC No. is the same as DTC No.
- Output of the diagnostic trouble code indicates that the indicated circuit has a malfunction. How-. ever, in case of the Mode II and GST they do not indicate whether the malfunction is still occurring or occurred in the past and returned to normal.

CONSULT-II can identify them as shown below. Therefore, using CONSULT-II (if available) is recommended.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Introduction

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

The first is the emission-related on board diagnostic system (OBD-II) performed by the TCM (transmission control module) in combination with the ECM. The malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory but not the TCM memory.

The second is the TCM original self-diagnosis indicated by the O/D OFF indicator lamp. The malfunction is AT

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[RE4F04B]

A sample of CONSULT-II display for DTC and 1st trip DTC is shown in the following page. DTC or 1st trip DTC of a malfunction is displayed in "SELF DIAGNOSIS" mode for "ENGINE" with CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K

If the DTC is being detected currently, the time data will be "0".

SELF-DIAG RES		
DTC RESULTS	TIME	
PNP SW/CIRC [P0705]	0	
		SAT015K

If a 1st trip DTC is stored in the ECM, the time data will be "1t".

SELF-DIAG RES		
DTC RESULTS	TIME	
PNP SW/CIRC [P0705]	1t	
	1	SAT016K

Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM has a memory function, which stores the driving condition such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed and vehicle speed at the moment the ECM detects a malfunction.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data, and the data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For detail, refer to EC-1248, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA".

Only one set of freeze frame data (either 1st trip freeze frame data of freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items		
1	Freeze frame data	ta Misfire — DTC: P0300 - P0306 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175	
2	-	Except the above items (Includes A/T related items)	
3	1st trip freeze frame data		

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased.

AT-428

HOW TO ERASE DTC The diagnostic trouble code can be erased by CONSULT-II, GST or ECM DIAGNOSTIC TEST MODE as А described in the following. If the battery terminal is disconnected, the diagnostic trouble code will be lost within 24 hours. В When you erase the DTC, using CONSULT-II or GST is easier and guicker than switching the mode selector on the ECM. The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC AT related to OBD-II. For details, refer to EC-1245, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS". **Diagnostic trouble codes (DTC)** D 1st trip diagnostic trouble codes (1st trip DTC) Freeze frame data 1st trip freeze frame data Ε System readiness test (SRT) codes **Test values** (I) HOW TO ERASE DTC (WITH CONSULT-II) F If a DTC is displayed for both ECM and TCM, it needs to be erased for both ECM and TCM. . If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 1. G seconds and then turn it ON (engine stopped) again. Turn CONSULT-II "ON" and touch "A/T". 2.

3. Touch "SELF-DIAG RESULTS".

4. Touch "ERASE". (The DTC in the TCM will be erased.) Then touch "BACK" twice.

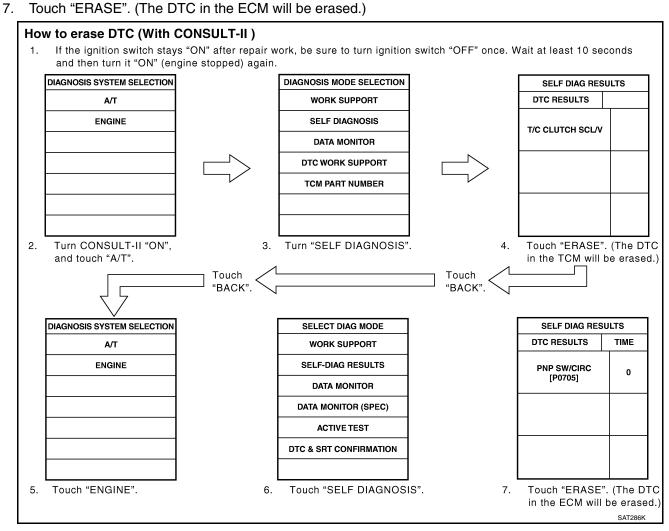
- 5. Touch "ENGINE".
- 6. Touch "SELF DIAGNOSIS".

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[RE4F04B]



HOW TO ERASE DTC (WITH GST)

- 1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
- Perform TCM self-diagnostic procedure. Refer to <u>AT-440, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)"</u>. (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
- 3. Select Mode 4 with Generic Scan Tool (GST). For details, refer to <u>EC-1258, "How to Erase DTC (With GST)"</u>.

B HOW TO ERASE DTC (NO TOOLS)

- 1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
- Perform TCM self-diagnostic procedure. Refer to <u>AT-440, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)"</u>. (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
- Perform OBD-II self-diagnostic procedure. Refer to <u>AT-439</u>, "<u>OBD-II SELF-DIAGNOSTIC PROCEDURE</u> (<u>NO TOOLS</u>)". (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)

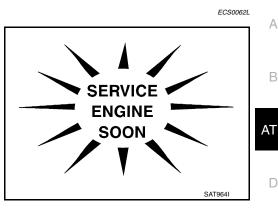
Malfunction Indicator Lamp (MIL)

- 1. The malfunction indicator lamp will light up when the ignition switch is turned ON without the engine running. This is for checking the lamp.
 - If the malfunction indicator lamp does not light up, refer to <u>DI-</u> <u>27, "WARNING LAMPS"</u>.
 (Or app AT 421, "Malfunction Indicator Lamp (MIL)".)

(Or see AT-431, "Malfunction Indicator Lamp (MIL)" .)

 When the engine is started, the malfunction indicator lamp should go off.
 If the lamp remains on, the on board diagnostic system has

detected an emission-related (OBD-II) malfunction. For details, refer to <u>AT-427, "ON BOARD DIAGNOSTIC SYSTEM</u> <u>DESCRIPTION"</u>.



CONSULT-II

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After performing <u>AT-431, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)"</u>, place check marks for results on the <u>AT-445, "DIAGNOSTIC WORKSHEET"</u>. Reference pages are provided following the items. **NOTICE:**

1. The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).

Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.

- 2. Shift schedule (which implies gear position) displayed on CONSULT-II and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:
- Actual shift schedule has more or less tolerance or allowance,
- Shift schedule indicated in Service Manual refers to the point where shifts start, and
- Gear position displayed on CONSULT-II indicates the point where shifts are completed.
- 3. Shift solenoid valve "A" or "B" is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).
- 4. Additional CONSULT-II information can be found in the Operation Manual supplied with the CONSULT-II unit.

SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)

 Turn on CONSULT-II and touch "ENGINE" for OBD-II detected items or touch "A/T" for TCM self-diagnosis. If A/T is not displayed, check TCM power supply and ground circuit. Refer to <u>AT-486, "TROUBLE DIAGNOSIS FOR POWER</u> <u>SUPPLY"</u>. If result is NG, refer to <u>PG-2, "POWER SUPPLY</u> <u>ROUTING"</u>.

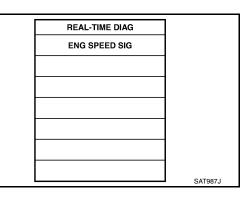
SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K

2. Touch "SELF DIAGNOSIS".

Display shows malfunction experienced since the last erasing operation.

CONSULT-II performs "Real Time Diagnosis".

Also, any malfunction detected while in this mode will be displayed at real time.



[RE4F04B]

[RE4F04B]

SELF-DIAGNOSTIC RESULT TEST MODE

Detected items			TCM self-diagnosis	OBD-II (DTC)	
(Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when	Available by O/D OFF indicator lamp or "A/T"	Available by malfunc tion indicator lamp*2 "ENGINE" on CON-	
"A/T"	"ENGINE"		on CONSULT-II	SULT-II or GST	
Park/neutral position (PNP) switch circuit		• TCM does not receive the correct		D 0705	
—	PNP SW/CIRC	voltage signal (based on the gear position) from the switch.	—	P0705	
Revolution sensor				P0720	
VHCL SPEED SEN-A/T	VEH SPD SEN/ CIR AT	 TCM does not receive the proper voltage signal from the sensor. 	Х		
Vehicle speed sensor (N	leter)	• TCM does not receive the proper			
VHCL SPEED SEN·MTR	—	voltage signal from the sensor.	Х	—	
A/T 1st gear function		• A/T cannot be shifted to the 1st			
A/T 1ST GR FNCTN	A/T 1ST GR FNCTN	gear position even if electrical cir- cuit is good.	—	P0731*1	
A/T 2nd gear function		• A/T cannot be shifted to the 2nd			
A/T 2ND GR FNCTN	A/T 2ND GR FNCTN	gear position even if electrical cir- cuit is good.	—	P0732*1	
A/T 3rd gear function	1	• A/T cannot be shifted to the 3rd		P0733*1	
A/T 3RD GR FNCTN	A/T 3RD GR FNCTN	gear position even if electrical cir- cuit is good.			
A/T 4th gear function		• A/T cannot be shifted to the 4th			
A/T 4TH GR FNCTN	A/T 4TH GR FNCTN	gear position even if electrical cir- cuit is good.	—	P0734*1	
A/T TCC S/V function (lock-up)		• A/T cannot perform lock-up even if			
A/T TCC S/V FNCTN	A/T TCC S/V FNCTN	electrical circuit is good.	—	P0744*1	
Shift solenoid valve A		• TCM detects an improper voltage	v	D OZEO	
SHIFT SOLENOID/V A	SFT SOL A/CIRC	drop when it tries to operate the solenoid valve.	Х	P0750	
Shift solenoid valve B	I	• TCM detects an improper voltage	X		
SHIFT SOLENOID/V B	SFT SOL B/CIRC	drop when it tries to operate the solenoid valve.	X	P0755	
Overrun clutch solenoid	valve	• TCM detects an improper voltage			
OVERRUN CLUTCH S/ V	O/R CLUCH SOL/ CIRC	drop when it tries to operate the solenoid valve.	Х	P1760	
T/C clutch solenoid valve	9	• TCM detects an improper voltage	х	P0740	
T/C CLUTCH SOL/V	TCC SOLENOID/ CIRC	drop when it tries to operate the solenoid valve.			
Line pressure solenoid valve		• TCM detects an improper voltage			
LINE PRESSURE S/V	L/PRESS SOL/ CIRC	drop when it tries to operate the solenoid valve.	Х	P0745	
Throttle position sensor [accelerator pedal position (APP) sensor] signal		TCM receives an excessively low ar bigb voltage from this sensor	Х	P1705	
THROTTLE POSI SEN TP/SEN/CIRC A/T		or high voltage from this sensor.			
Engine speed signal		• TCM does not receive the proper	х	P0725	
ENGINE SPEED SIG		voltage signal from the ECM.	~		

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		TCM self-diagnosis	OBD-II (DTC)	i.
	Malfunction is detected when	Available by O/D OFF indicator lamp or "A/T"	Available by malfunc- tion indicator lamp*2,	-
"ENGINE"		on CONSULT-II	"ENGINE" on CON- SULT-II or GST	
nsor	• TCM reactives an excessively low			
ATF TEMP SEN/ CIRC	or high voltage from the sensor.	Х	P0710	A
	• The ECM-A/T communication line	v	111000	
—	is open or shorted.	^	01000	
or	• TCM does not receive the proper	v	D0710	-
	voltage signal from the sensor.	^	P0710	
_	tioning	_	_	
1				
_	tioning	_	_	
	• TCM momony (EEP POM) is mal			(
_	functioning.	_	_	
	• This is not a malfunction message			
_	(Whenever shutting off a power supply to the TCM, this message appears on the screen.)	х		
	 No failure has been detected. 	X	Х	
	nsor ATF TEMP SEN/	Malfunction is detected when "ENGINE" nsor ATF TEMP SEN/ CIRC The ECM-A/T communication line is open or shorted. TCM does not receive the proper voltage signal from the sensor. TCM memory (RAM) is malfunc- tioning TCM memory (ROM) is malfunc- tioning TCM memory (EEP ROM) is mal- functioning. TCM memory (EEP ROM) is mal- functioning. This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)	SULT-II, "SELF Malfunction is detected when Available by O/D OFF indicator lamp or "A/T" on CONSULT-II nsor TCM receives an excessively low or high voltage from the sensor. X	SULT-II, "SELF Malfunction is detected when Available by OD OFF indicator lamp or "A/T" on CONSULT-II Available by malfunction indicator lamp'2, "ENGINE" on CON-SULT-II or GST Imsor • TCM receives an excessively low or high voltage from the sensor. X P0710 Imsor • TCM receives an excessively low or high voltage from the sensor. X P0710 Imsor • TCM receives an excessively low or high voltage from the sensor. X U1000 Imsor • TCM does not receive the proper voltage signal from the sensor. X P0710 Imsor • TCM memory (RAM) is malfunctioning — — Imsor • TCM memory (RAM) is malfunctioning — — Imsor • TCM memory (ROM) is malfunctioning — — Imsor • TCM memory (EEP ROM) is malfunctioning. — — Imsor • TCM memory (EEP ROM) is malfunctioning. — — Imsor • TCM memory (EEP ROM) is malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.) X —

X: Applicable

-: Not applicable

*1: These malfunctions cannot be displayed by MIL ^{SERVICE} if another malfunction is assigned to MIL.
 *2: Refer to <u>EC-1259</u>, "<u>Malfunction Indicator Lamp (MIL)</u>".

DATA MONITOR MODE (A/T)

		Monite	Monitor item			
Item	Display	TCM Input signals	Main signals	Description	Remarks	M
Vehicle speed sensor 1 (A/T) (Revolution sensor)	VHCL/S SE·A/T [km/h] or [mph]	x	_	 Vehicle speed computed from signal of revolution sensor is displayed. 	When racing engine in N or P with vehicle stationary, CONSULT-II data may not indicate 0 km/h (0 mph).	
Vehicle speed sensor 2 (Meter)	VHCL/S SE·MTR [km/h] or [mph]	x		 Vehicle speed computed from signal of vehicle speed sensor is dis- played. 	Vehicle speed display may not be accurate under approx. 10 km/h (6 mph). It may not indicate 0 km/h (0 mph) when vehicle is sta- tionary.	
Throttle position sensor [accelerator pedal position (APP) sensor]	THRTL POS SEN [V]	х	_	 Throttle position sensor signal voltage is dis- played. 		

		Monitor item			
Item	Display	TCM Input signals	Main signals	Description	Remarks
A/T fluid temperature sen- sor	FLUID TEMP SE [V]	x	_	 A/T fluid temperature sensor signal voltage is displayed. Signal voltage lowers as 	
				fluid temperature rises.	
Battery voltage	BATTERY VOLT [V]	х		 Source voltage of TCM is displayed. 	
Engine speed	ENGINE SPEED [rpm]	х	x	 Engine speed, computed from engine speed signal, is displayed. 	Engine speed display may not be accurate under approx. 800 rpm. It may not indicate 0 rpm even when engine is not running.
Turbine revolution sensor	TURBINE REV	х	_	• Checks changing speed then performs oil pres- sure control and torque down control.	
Overdrive control switch	OVERDRIVE SW [ON/OFF]	х	_	 ON/OFF state computed from signal of overdrive control SW is displayed. 	
PN position (PNP) switch	PN POSI SW [ON/OFF]	х	_	• ON/OFF state computed from signal of PN position SW is displayed.	
R position switch	R POSITION SW [ON/OFF]	х	_	 ON/OFF state computed from signal of R position SW is displayed. 	
D position switch	D POSITION SW [ON/OFF]	х		 ON/OFF state computed from signal of D position SW is displayed. 	
2 position switch	2 POSITION SW [ON/OFF]	х	_	 ON/OFF status, com- puted from signal of 2 position SW, is displayed. 	
1 position switch	1 POSITION SW [ON/OFF]	х		• ON/OFF status, com- puted from signal of 1 position SW, is displayed.	
ASCD cruise signal	ASCD·CRUISE [ON/OFF]	х	_	 Status of ASCD cruise signal is displayed. ON Cruising state OFF Normal running state 	 This is displayed even when no ASCD is mounted.
ASCD OD cut signal	ASCD-OD CUT [ON/OFF]	х	_	 Status of ASCD OD release signal is dis- played. ON OD released OFF OD not released 	 This is displayed even when no ASCD is mounted.
Kickdown switch	KICKDOWN SW [ON/OFF]	х	_	 ON/OFF status, com- puted from signal of kick- down SW, is displayed. 	• This is displayed even when no kickdown switch is equipped.
Gear position	GEAR	_	x	• Gear position data used for computation by TCM, is displayed.	
Selector lever position	SLCT LVR POSI		x	• Selector lever position data, used for computa- tion by TCM, is displayed.	• A specific value used for control is displayed if fail- safe is activated due to error.

[RE4F04B]

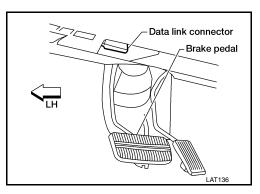
		Monite	or item		
Item	Display	TCM Input signals	Main signals	Description	Remarks
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	_	х	 Vehicle speed data, used for computation by TCM, is displayed. 	
Throttle position sensor [accelerator pedal position (APP) sensor]	THROTTLE POSI [/8]	_	x	 Throttle position data, used for computation by TCM, is displayed. 	• A specific value used for control is displayed if fail-safe is activated due to error.
Stop lamp switch	BRAKE SW [ON/OFF]	x		 ON/OFF status is displayed. ON Brake pedal is depressed. OFF Brake pedal is released. 	
Line pressure duty	LINE PRES DTY [%]	_	х	 Control value of line pres- sure solenoid valve, com- puted by TCM from each input signal, is displayed. 	
Torque converter clutch solenoid valve duty	TCC S/V DUTY [%]	_	x	• Control value of torque converter clutch solenoid valve, computed by TCM from each input signal, is displayed.	
Shift solenoid valve A	SHIFT S/V A [ON/OFF]	_	х	 Control value of shift sole- noid valve A, computed by TCM from each input signal, is displayed. 	Control value of solenoid is displayed even if solenoid circuit is disconnected. The OFF signal is displayed
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	_	х	• Control value of shift sole- noid valve B, computed by TCM from each input signal, is displayed.	if solenoid circuit is shorted.
Overrun clutch solenoid valve	OVERRUN/C S/ V [ON/OFF]	_	x	 Control value of overrun clutch solenoid valve computed by TCM from each input signal is dis- played. 	
Self-diagnosis display lamp (O/D OFF indicator lamp)	SELF-D DP LMP [ON/OFF]	_	х	Control status of O/D OFF indicator lamp is dis- played.	

X: Applicable

-: Not applicable

DTC WORK SUPPORT MODE WITH CONSULT-II CONSULT-II Setting Procedure

- 1. Turn ignition switch OFF.
- 2. Connect CONSULT-II to data link connector, which is located in left side dash panel.



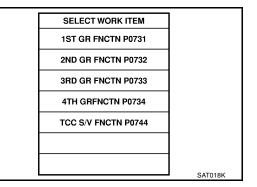
[RE4F04B]

- 3. Turn ignition switch ON.
- 4. Touch "START".

START	
SUB MODE	SAT586J

SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K

	1
SELECT DIAG MODE	
SELF-DIAG RESULTS	
DATA MONITOR	
DTC WORK SUPPORT	
TCM PART NUMBER	
	SAT971J



5. Touch "A/T".

6. Touch "DTC WORK SUPPORT".

7. Touch select item menu (1ST, 2ND, etc.).

[RE4F04B]

8.	Touch "START".	1ST GR FNCTN P0731
		THIS SUPPORT FUNCTION IS FOR DTC P0731. SEE THE SERVICE MANUAL
		ABOUT THE OPERATING CON- DITION FOR THIS DIAGNOSIS.
		l l l l l l l l l l l l l l l l l l l
		SAT589J
9.	Perform driving test according to "DTC CONFIRMATION PRO-	
	CEDURE" in "TROUBLE DIAGNOSIS FOR DTC".	1ST GR FNCTN P0731
		OUT OF CONDTION
		MONITOR
		GEAR XXX
		VEHICLE SPEED XXXkm/h
		THROTTLE POSI XXX TCC S/V DUTY XXX %
		SAT019K
•	When testing conditions are satisfied, CONSULT-II screen	
•	changes from "OUT OF CONDITION" to "TESTING".	1ST GR FNCTN P0731
		TESTING
		MONITOR
		GEAR XXX
		VEHICLE SPEED XXXkm/h
		THROTTLE POSI XXX
		TCC S/V DUTY XXX % SAT591J
10	Stop vahiala If "NC" appears on the across molfunction may	
10.	Stop vehicle. If "NG" appears on the screen, malfunction may exist. Go to "DIAGNOSTIC PROCEDURE".	1ST GR FNCTN P0731
		STOP VEHICLE
		VEHICLE

AT-437

[RE4F04B]

	1ST GR FNCTN P0731
	NG
	SAT593J
eling in accordance with	1ST GR FNCTN P0731
	DRIVE VHCL IN D RANGE SHIFTING 1→2→3→4 UNDER NORMAL ACCELERATION. DOES A/T SHFT NORMAL CHECK FOR PROPER SHF TIMING AND SHFT SHOCK
	SAT594J

1ST GR FNCTN P0731	
DRIVE VHCL IN D RANGE	
SHIFTING 1→2→3→4 UNDER NORMAL ACCELERATION.	
DOES A/T SHFT NORMAL CHECK FOR PROPER SHF	
TIMING AND SHFT SHOCK	
	SAT595 I

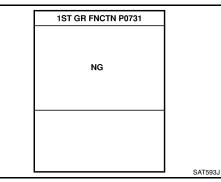
1ST GR FNCTN P0731	
ок	
	SAT596J

11. Perform test drive to check gear shift feeling in accordance with instructions displayed.

12. Touch "YES" or "NO".

13. CONSULT-II procedure ended.

[RE4F04B]



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If "NG" appears on the screen, a malfunction may exist. Go to "DIAGNOSTIC PROCEDURE".

DTC WORK SUPPORT MODE

DTC work support item	Description	Check item
1ST GR FNCTN P0731	 Following items for "A/T 1st gear function (P0731)" can be confirmed. Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	 Shift solenoid valve A Shift solenoid valve B Each clutch Hydraulic control circuit
2ND GR FNCTN P0732	 Following items for "A/T 2nd gear function (P0732)" can be confirmed. Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	 Shift solenoid valve B Each clutch Hydraulic control circuit
3RD GR FNCTN P0733	 Following items for "A/T 3rd gear function (P0733)" can be confirmed. Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	 Shift solenoid valve A Each clutch Hydraulic control circuit
4TH GR FNCTN P0734	 Following items for "A/T 4th gear function (P0734)" can be confirmed. Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	 Shift solenoid valve A Shift solenoid valve B Line pressure solenoid valve Each clutch Hydraulic control circuit
TCC S/V FNCTN P0744	 Following items for "A/T TCC S/V function (lock-up) (P0744)" can be confirmed. Self-diagnosis status (whether the diagnosis is being conducted or not) Self-diagnosis result (OK or NG) 	 Torque converter clutch sole- noid valve Each clutch Hydraulic control circuit

Diagnostic Procedure Without CONSULT-II OBD-II SELF-DIAGNOSTIC PROCEDURE (WITH GST)

Refer to EC-1313, "Generic Scan Tool (GST) Function"

OBD-II SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

Refer to EC-1259, "Malfunction Indicator Lamp (MIL)" .

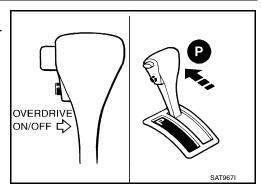
ECS0062N

[RE4F04B]

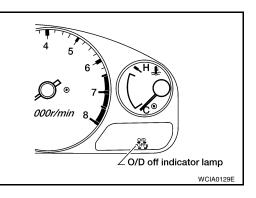
(m) TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

1. CHECK O/D OFF INDICATOR LAMP

- Move selector lever to P position. Start engine and warm it up to normal engine operating temperature.
- 2. Turn ignition switch to OFF position.
- 3. Wait 5 seconds.
- 4. Turn ignition switch to ON position. (Do not start engine.)



5. Does O/D OFF indicator lamp come on for about 2 seconds?



Yes or No

- Yes >> GO TO 2.
- No >> Stop procedure. Perform <u>AT-600, "1. O/D OFF Indicator Lamp Does Not Come On"</u> before proceeding.

2. JUDGEMENT PROCEDURE STEP 1

- 1. Turn ignition switch to OFF position.
- 2. Turn ignition switch to ACC position.
- 3. Move selector lever from P to D position.
- 4. Turn ignition switch to ON position. (Do not start engine.)
- AT Depress and hold overdrive control switch in OFF position (the O/D OFF indicator lamp will be ON) until 5. directed to release the switch. (If O/D OFF indicator lamp does not come on, refer to "Steps 3 and 4" in AT-600, "1. O/D OFF Indicator Lamp Does Not Come On").
- 6. Turn ignition switch to OFF position.
- 7. Turn ignition switch to ON position (Do not start engine.)
- 8. Release the overdrive control switch (the O/D OFF indicator lamp will be OFF).
- 9. Wait 2 seconds.
- 10. Move selector lever to 2 position.
- 11. Depress and release overdrive control switch in ON position until next step is completed (the O/D OFF indicator lamp will be ON).
- 12. Depress and hold the overdrive control switch (the O/D OFF indicator lamp will be OFF) until directed to release the switch.
 - >> GO TO 3.

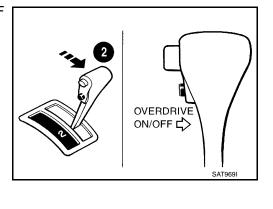


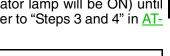
- 1. Move selector lever to 1 position.
- Release the overdrive control switch.
- 3. Depress and release the overdrive control switch (the O/D OFF indicator lamp will be ON).
- Depress and release the overdrive control switch (the O/D OFF indicator lamp will be OFF). 4.
- 5. Depress and hold the overdrive control switch (the O/D OFF indicator lamp will be ON) until directed to release the switch.
- 6. Depress accelerator pedal fully and release it.
- 7. Release the overdrive control switch (the O/D OFF indicator lamp will begin to flash ON and OFF).

>> GO TO 4.



OVERDRIVE ON/OFF





[RE4F04B]

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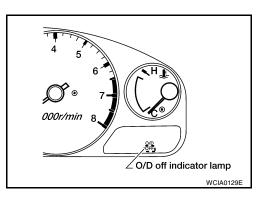
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4. CHECK SELF-DIAGNOSTIC CODE

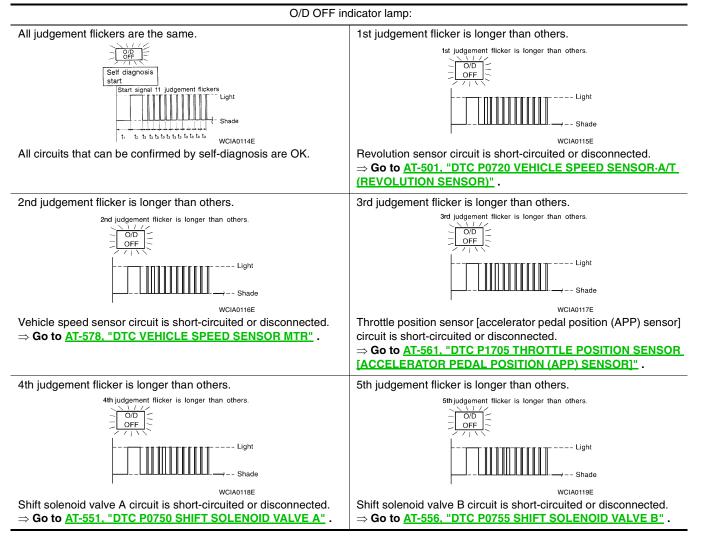
Check O/D OFF indicator lamp.

Refer to AT-442, "JUDGEMENT OF SELF-DIAGNOSIS CODE" .

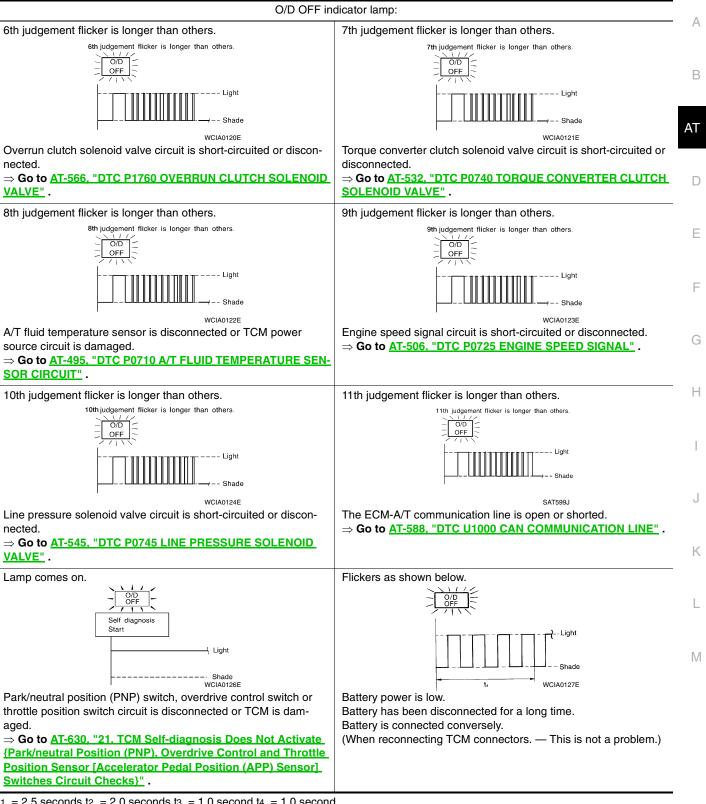


>> DIAGNOSIS END

JUDGEMENT OF SELF-DIAGNOSIS CODE



[RE4F04B



 $t_1 = 2.5$ seconds $t_2 = 2.0$ seconds $t_3 = 1.0$ second $t_4 = 1.0$ second

TROUBLE DIAGNOSIS - INTRODUCTION

Introduction

The TCM receives a signal from the vehicle speed sensor, ECM (throttle opening) or park/neutral position (PNP) switch and provides shift control or lock-up control via A/T solenoid valves.

The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the OBD-related parts of the A/T system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.

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

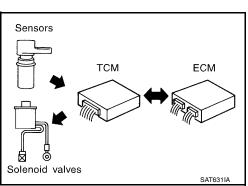
It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

A visual check only, may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow". Refer to <u>AT-448</u>, "Work Flow"

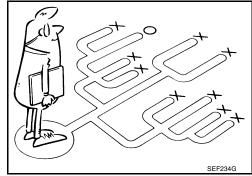
Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "DIAGNOSTIC WORKSHEET" like the example referenced at <u>AT-445</u> should be used.

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

Also check related Service bulletins for information.









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[RE4F04B]

DIAGNOSTIC WORKSHE	ET		
Information from Custon	ner		A
KEY POINTS WHAT Vehicle & A/T m WHEN Date, Frequence WHERE Road conditions HOW Operating cond	sies S		В
Customer name MR/MS	Model & Year	VIN	AT
Trans. model	Engine	Mileage	
Incident Date	Manuf. Date	In Service Date	
Frequency	□ Continuous □ Intermittent (times a day)	U
Symptoms	□ Vehicle does not move. (□ Any position □ Particular position)		
	\Box No up-shift (\Box 1st \rightarrow 2nd \Box	□ 2nd \rightarrow 3rd \Box 3rd \rightarrow O/D)	E
	\Box No down-shift (\Box O/D \rightarrow 3rd	$\Box 3rd \rightarrow 2nd \Box 2nd \rightarrow 1st)$	
	Lockup malfunction		
	□ Shift point too high or too low.		
	$\label{eq:shift shock or slip} \mbox{ (\square N$ \rightarrow D $)}$	Lockup Any drive position)	
	Noise or vibration		G
	No kickdown		
	□ No pattern select		
	□ Others ()	H
O/D OFF indicator lamp	Blinks for about 8 seconds.		
	Continuously lit	🗅 Not lit	
Malfunction indicator lamp (MIL)	Continuously lit	🗅 Not lit	

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1.	🗆 R	Read the Fail-safe and listen to customer complaints.			
2.		HECK A/T FLUID		<u>AT-450</u>	
-		 Leakage (Follow specified procedure) Fluid condition Fluid level 			
3.	ΠP	erform STALL TEST and PRESSURE TEST.		<u>AT-450, AT-</u>	
-		□ Stall test — Mark possible damaged components/others.		<u>454</u>	
		 Reverse clutch Forward clutch Overrun clutch Forward one-way clutch Cl 	w & reverse brake w one-way clutch ngine ne pressure is low utches and brakes except high clutch and e band are OK	-	
		Pressure test — Suspected parts:			
•		erform all ROAD TEST and mark required procedures.		<u>AT-455</u>	
	4- 1.			<u>AT-457</u>	
		 Park/neutral position (PNP) switch, <u>AT-489</u>. A/T fluid temperature sensor, <u>AT-571</u>. Vehicle speed sensor.A/T (Revolution sensor), <u>AT-507</u> Engine speed signal, <u>AT-506</u>. Turbine revolution sensor, <u>AT-583</u>. Torque converter clutch solenoid valve, <u>AT-532</u>. Line pressure solenoid valve, <u>AT-545</u>. Shift solenoid valve A, <u>AT-551</u>. Shift solenoid valve B, <u>AT-556</u>. Throttle position sensor [accelerator pedal position (A Overrun clutch solenoid valve, <u>AT-566</u>. Park/neutral position (PNP), overdrive control and throt tion (APP) sensor] circuit checks, <u>AT-630</u>. A/T fluid temperature sensor and TCM power source, Vehicle speed sensor.MTR, <u>AT-578</u>. A/T communication line, <u>AT-588</u>. Control unit (RAM), Control unit (ROM), <u>AT-591</u>. Battery Others 	PP) sensor, <u>AT-561</u> . ottle position sensor [accelerator pedal posi-		

[RE4F04B]

4		<u>AT-457</u>	-
2	□ 1. O/D OFF Indicator Lamp Does Not Come On, <u>AT-600</u> .		A
	□ 2. Engine Cannot Be Started In P and N Position, <u>AT-602</u> .		
	 3. In P Position, Vehicle Moves Forward or Backward When Pushed, <u>AT-603</u>. 4. In N Position, Vehicle Moves, <u>AT-603</u>. 		
	\Box 5. Large Shock. N \rightarrow R Position, AT-605.		В
	□ 6. Vehicle Does Not Creep Backward In R Position, <u>AT-607</u> .		
	The image is a structure of		AT
4		<u>AT-460</u>	
3	Part-1	<u>AT-463</u>	
	□ 8. Vehicle Cannot Be Started From D1 , <u>AT-612</u> .		D
	□ 9. A/T Does Not Shift: D1 \rightarrow D2 or Does Not Kickdown: D4 \rightarrow D2, <u>AT-615</u> . □ 10. A/T Does Not Shift: D2 \rightarrow D3, AT-617.		
	□ 11. A/T Does Not Shift: D3 \rightarrow D4, <u>AT-620</u> .		
	□ 12. A/T Does Not Perform Lock-up, <u>AT-622</u> .		Ε
	 13. A/T Does Not Hold Lock-up Condition, <u>AT-623</u>. 14. Lock-up Is Not Released, <u>AT-624</u>. 		
	□ 15. Engine Speed Does Not Return To Idle (Light Braking D4 \rightarrow D3), <u>AT-625</u> .		
	Part-2	AT-466	F
	□ 16. Vehicle Does Not Start From D1, AT-627.		
	□ 9. A/T Does Not Shift: D1 \rightarrow D2 or Does Not Kickdown: D4 \rightarrow D2, <u>AT-615</u> .		
	□ 10. A/T Does Not Shift: D ₂ \rightarrow D ₃ , <u>AT-617</u> .		C
	□ 11. A/T Does Not Shift: D ₃ \rightarrow D4 , <u>AT-620</u> .		
	Part-3	<u>AT-468</u>	F
	□ 17. A/T Does Not Shift: D4 \rightarrow D3 When Overdrive Control Switch ON \rightarrow OFF, <u>AT-628</u> .		1
	□ 15. Engine Speed Does Not Return To Idle (Engine Brake In D ₃), <u>AT-625</u> . □ 18. A/T Does Not Shift: D ₃ \rightarrow 22, When Selector Lever D \rightarrow 2 Position, <u>AT-628</u> .		
	□ 15. Engine Speed Does Not Return To Idle (Engine Brake In 22), <u>AT-625</u> .		
	□ 19. A/T Does Not Shift: 22 \rightarrow 11, When Selector Lever 2 \rightarrow 1 Position, <u>AT-629</u> .		
	 20. Vehicle Does Not Decelerate By Engine Brake, <u>AT-630</u>. SELF-DIAGNOSTIC PROCEDURE — Mark detected items. 		
	□ Park/neutral position (PNP) switch, AT-489 .		U
	\Box A/T fluid temperature sensor, <u>AT-495</u> .		
	□ Vehicle speed sensor A/T (Revolution sensor), <u>AT-501</u> .		
	 Engine speed signal, <u>AT-506</u>. Turbine revolution sensor, <u>AT-583</u>. 		ŀ
	\Box Torgue converter clutch solenoid valve, <u>AT-532</u> .		
I	□ Line pressure solenoid valve, <u>AT-545</u> .		
	□ Shift solenoid valve A, <u>AT-551</u> .		l
	 Shift solenoid valve B, <u>AT-556</u>. Throttle position sensor [accelerator pedal position (APP) sensor], <u>AT-561</u>. 		
	Overrun clutch solenoid valve, <u>AT-566</u> .		
	□ Park/neutral position (PNP), overdrive control and throttle position sensor [accelerator pedal position (APP) sensor] circuit checks, <u>AT-630</u> .		N
	\Box A/T fluid temperature sensor and TCM power source, <u>AT-486</u> .		
	□ Vehicle speed sensor MTR, <u>AT-578</u> .		
	□ A/T communication line, <u>AT-588</u> .		
	□ Control unit (RAM), Control unit (ROM), <u>AT-591</u> . □ Control unit (EEP ROM), <u>AT-593</u> .		
	□ Battery		
	For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.	<u>AT-642</u>	
	Perform all ROAD TEST and re-mark required procedures.	<u>AT-455</u>	
	Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items. efer to <u>EC-1245</u> , "Emission-related Diagnostic Information".	<u>EC-1245</u>	
	DTC (P0731) A/T 1st gear function, AT-510.		
	DTC (P0732) A/T 2nd gear function, <u>AT-515</u> .		
	DTC (P0733) A/T 3rd gear function, AT-520.		
	□ DTC (P0734) A/T 4th gear function, <u>AT-525</u> .		

AT-447

[RE4F04B]

8.	Derform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts.	<u>AT-431</u>
	Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible	<u>AT-439</u>
	symptoms and the component inspection orders.)	
9.	Erase DTC from TCM and ECM memories.	<u>AT-429</u>

ECS0062P

Work Flow HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

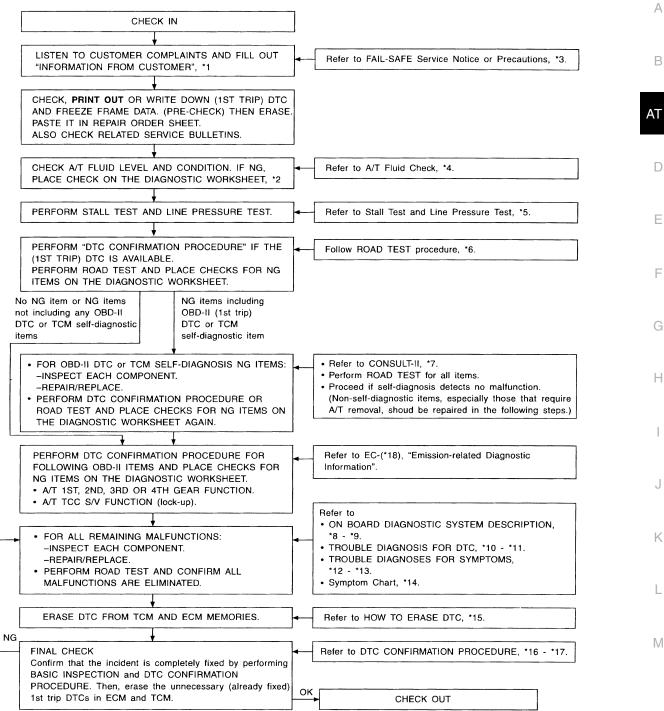
A good understanding of the malfunction conditions can make troubleshooting faster and more accurate. In general, each customer feels differently about a problem. It is important to fully understand the symptoms or conditions for a customer complaint.

Make good use of the two sheets provided, <u>AT-445</u>, "Information from Customer" and <u>AT-446</u>, "Diagnostic <u>Worksheet"</u>, to perform the best troubleshooting possible.

[RE4F04B]

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WORK FLOW CHART



*1:	<u>AT-445</u>	*2:	<u>AT-446</u>	*3:	<u>AT-399</u>
*4:	<u>AT-450</u>	*5:	<u>AT-450, AT-454</u>	*6:	<u>AT-455</u>
*7:	<u>AT-431</u>	*8:	<u>AT-427</u>	*9:	<u>AT-444</u>
*10:	<u>AT-489</u>	*11:	<u>AT-595</u>	*12:	<u>AT-595</u>
*13:	<u>AT-635</u>	*14:	<u>AT-471</u>	*15:	<u>AT-429</u>
*16:	<u>AT-489</u>	*17:	<u>AT-591</u>	*18:	<u>EC-1245</u>

AT-449

TROUBLE DIAGNOSIS - BASIC INSPECTION

A/T Fluid Check FLUID LEAKAGE CHECK

- Clean area suspected of leaking. For example, mating surface 1. of converter housing and transmission case.
- 2. Start engine, apply foot brake, place selector lever in D position and wait a few minutes.
- 3. Stop engine.

4. Check for fresh leakage.



Fluid color	Suspected problem
Dark or black with burned odor	Wear of frictional material
Milky pink	Water contamination — Road water entering through filler tube or breather
Varnished fluid, light to dark brown and tacky	Oxidation — Over or under filling, — Overheating

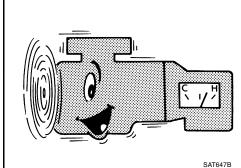


Refer to MA-30, "Checking A/T Fluid" .

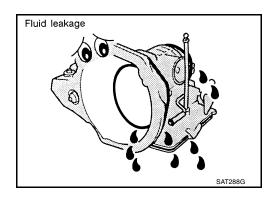
Stall Test STALL TEST PROCEDURE

- 1. Check A/T fluid and engine oil levels. If necessary, add fluid and oil.
- 2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

ATF operating temperature :50 - 80°C (122 - 176°F)



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[RE4F04B]

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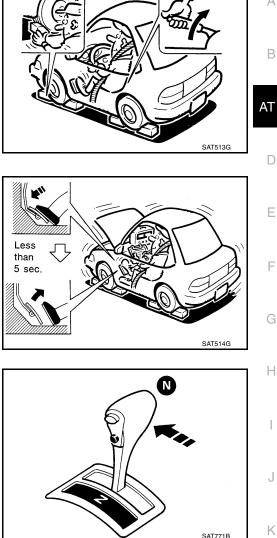
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- Set parking brake and block wheels. З.
- 4. Install a tachometer where it can be seen by driver during test. It is good practice to mark the point of specified engine rpm on indicator.

- 5. Start engine, apply foot brake, and place selector lever in D position.
- 6. Accelerate to wide open throttle gradually while applying foot brake.
- 7. Quickly note the engine stall revolution and immediately release throttle.
 - During test, never hold throttle wide open for more than 5 seconds.

Stall revolution :2,350 - 2,800 rpm

- 8. Move selector lever to N position.
- 9. Cool off ATF.
 - Run engine at idle for at least one minute.
- 10. Repeat steps 5 through 9 with selector lever in 2, 1 and R positions.



JUDGEMENT OF STALL TEST

The test result and possible damaged components relating to each result are shown in the illustrations on next page.

In order to pinpoint the possible damaged components, follow the procedure shown in AT-449, "WORK FLOW <u>CHART"</u>.

NOTE:

Stall revolution is too high in D, 2 or 1 position:

- Slippage occurs in 1st gear but not in 2nd and 3rd gears. Low one-way clutch slippage
- Slippage occurs in the following gears: 1st through 3rd gears in D position and engine brake functions with overdrive control switch set to OFF. 1st and 2nd gears in 2 position and engine brake functions with accelerator pedal released (fully closed throttle). Forward clutch or forward one-way clutch slippage

Stall revolution is too high in R position:

- Engine brake does not function in 1 position. Low & reverse brake slippage •
- Engine brake functions in 1 position. Reverse clutch slippage

Stall revolution within specifications:

Vehicle does not achieve speed of more than 80 km/h (50 MPH). One-way clutch seizure in torque converter housing

CAUTION:

Be careful since automatic fluid temperature increases abnormally.

Slippage occurs in 3rd and 4th gears in D position. High clutch slippage

AT-451

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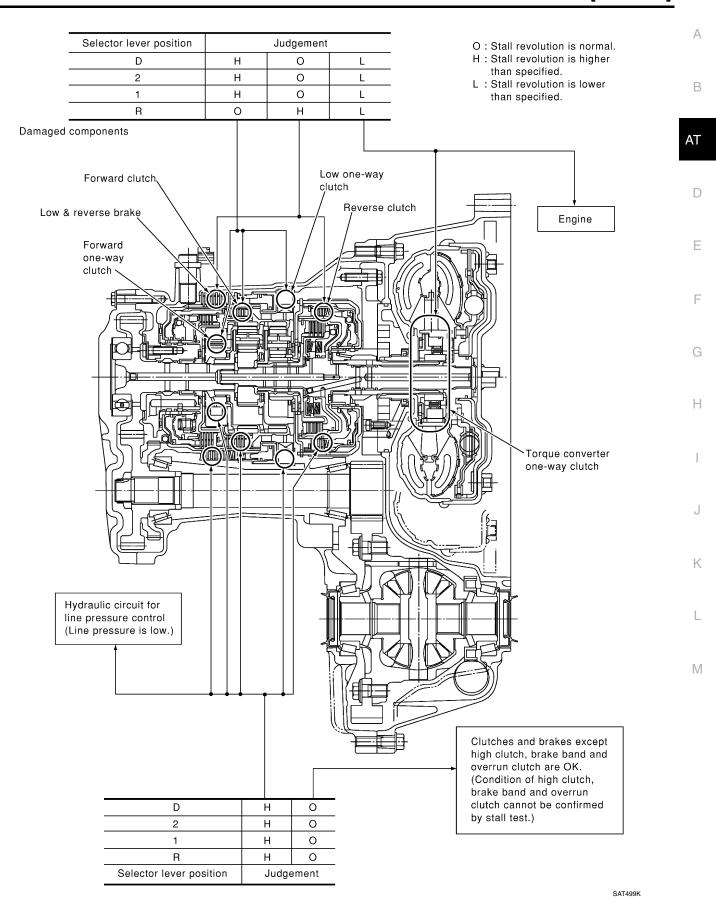
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- Slippage occurs in 2nd and 4th gear in D position. Brake band slippage
- Engine brake does not function in 2nd and 3rd gears in D position, 2nd gear in 2 position, and 1st gear in 1 position with overdrive control switch set to OFF. Overrun clutch slippage

Stall revolution less than specifications:

• Poor acceleration during starts. One-way clutch seizure in torque converter

[RE4F04B]



AT-453

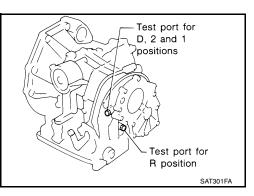
[RE4F04B]

ECS0062S

Line Pressure Test LINE PRESSURE TEST PORTS

Location of line pressure test ports are shown in the illustration.

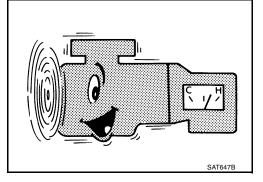
• Always replace pressure plugs as they are self-sealing bolts.



LINE PRESSURE TEST PROCEDURE

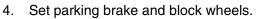
- 1. Check A/T fluid and engine oil levels. If necessary, add fluid and oil.
- 2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

ATF operating temperature :50 - 80°C (122 -176°F)

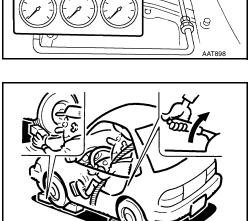


Oil pressure gauge (J34301-C)

3. Install pressure gauge to corresponding line pressure port.



• Continue to depress brake pedal fully while line pressure test is being performed at stall speed.



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[RE4F04B]

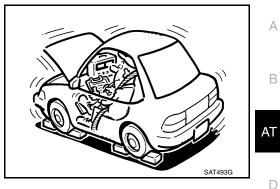
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- 5. Start engine and measure line pressure at idle and stall speed.
 - When measuring line pressure at stall speed, follow the stall test procedure.

AT-454, "Line Pressure : Refer to SDS, AT-751, Test" "Line Pressure"



JUDGEMENT OF LINE PRESSURE TEST

	Judgement	Suspected parts	
	Line pressure is low in all positions.	Oil pump wear	
		Control piston damage	
		 Pressure regulator valve or plug sticking 	
		 Spring for pressure regulator valve damaged 	
		 Fluid pressure leakage between oil strainer and pres- sure regulator valve 	
		Clogged strainer	
	Line pressure is low in particular position.	• Fluid pressure leakage between manual valve and par- ticular clutch	
At idle		 For example, line pressure is: Low in R and 1 positions, but Normal in D and 2 positions. 	
		Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to <u>AT-410, "CLUTCH AND BAND CHART"</u> .	
	Line pressure is high.	• A/T fluid temperature sensor damaged	
		 Line pressure solenoid valve sticking 	
		Short circuit of line pressure solenoid valve circuit	
		 Pressure modifier valve sticking 	
		 Pressure regulator valve or plug sticking 	
		Open in dropping resistor circuit	
	Line pressure is low.	Line pressure solenoid valve sticking	
		• Short circuit of line pressure solenoid valve circuit	
At stall speed		• Pressure regulator valve or plug sticking	
		• Pressure modifier valve sticking	
		 Pilot valve sticking 	

Road Test DESCRIPTION

ECS0062T

- The purpose of the test is to determine overall performance of A/ **BOAD TEST PRO** T and analyze causes of problems.
- The road test consists of the following three parts: •
- 1. Check before engine is started
- 2. Check at idle
- 3. Cruise test

OAD	TEST	PROC	FDI	JRF

1. Check before engine is started.
$\overline{\bigcirc}$
2. Check at idle.
$\overline{\nabla}$
3. Cruise test.
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AT-455

- Before road test, familiarize yourself with all test procedures and items to check.
- Conduct tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test. Refer to <u>AT-427</u>, "<u>ON BOARD DIAGNOSTIC SYSTEM</u> <u>DESCRIPTION</u>" and <u>AT-595</u>, "<u>TROUBLE DIAGNOSIS FOR</u> <u>SYMPTOMS</u>".



1. CHECK BEFORE ENGINE IS STARTED

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[RE4F04B]

1. CHECK O/D OFF INDICATOR LAMP

- 1. Park vehicle on flat surface.
- 2. Move selector lever to P position.
- 3. Turn ignition switch to OFF position. Wait at least 5 seconds.
- 4. Turn ignition switch to ON position. (Do not start engine.)
- 5. Does O/D OFF indicator lamp come on for about 2 seconds?

Yes or No

Yes >> GO TO 2.

No >> Stop ROAD TEST. Go to <u>AT-600, "1. O/D OFF Indicator</u> Lamp Does Not Come On".

2. CHECK O/D OFF INDICATOR LAMP

Does O/D OFF indicator lamp flicker for about 8 seconds? Yes or No

- Yes >> TCM is in fail-safe mode. Perform self-diagnosis and check NG items on the DIAGNOSTIC WORKSHEET, <u>AT-446</u>. Refer to <u>AT-440, "TCM SELF-DIAGNOSTIC</u> <u>PROCEDURE (NO TOOLS)"</u>.
- No >> 1. Turn ignition switch to OFF position.
 - 2. Perform self-diagnosis and note NG items. Refer to <u>AT-440, "TCM SELF-DIAGNOSTIC PROCE-</u> <u>DURE (NO TOOLS)"</u>.
 - 3. Go to AT-457, "2. CHECK AT IDLE" .

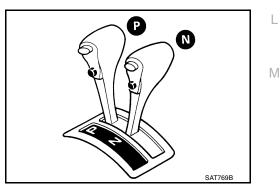
2. CHECK AT IDLE

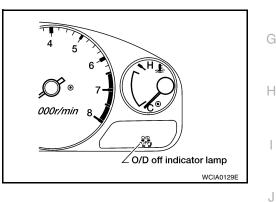
1. CHECK ENGINE START

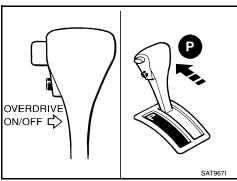
- 1. Park vehicle on flat surface.
- 2. Move selector lever to P position.
- 3. Turn ignition switch to OFF position.
- 4. Turn ignition switch to START position.
- 5. Is engine started?

Yes or No

- Yes >> Stop ROAD TEST.
- No >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-602, "2. Engine Cannot Be Started In P and N Position".





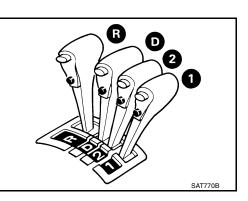


2. CHECK ENGINE START

- 1. Turn ignition switch to ACC position.
- 2. Move selector lever to D, 1, 2 or R position.
- 3. Turn ignition switch to START position.
- 4. Is engine started?

Yes or No

- Yes >> Stop ROAD TEST. Mark the box on the DIAGNOSTIC WORKSHEET. Go to <u>AT-602</u>, "2. Engine Cannot Be <u>Started In P and N Position"</u>.
- No >> GO TO 3.



3. CHECK VEHICLE MOVE

- 1. Move selector lever to P position.
- 2. Turn ignition switch to OFF position.
- 3. Release parking brake.



- 4. Push vehicle forward or backward.
- 5. Does vehicle move when it is pushed forward or backward?
- 6. Apply parking brake.

Yes or No

Yes >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-603, "3. In P Position, Vehicle Moves Forward or Backward When Pushed" . Continue ROAD TEST. No >> GO TO 4.

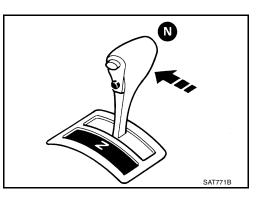


4. CHECK VEHICLE MOVE

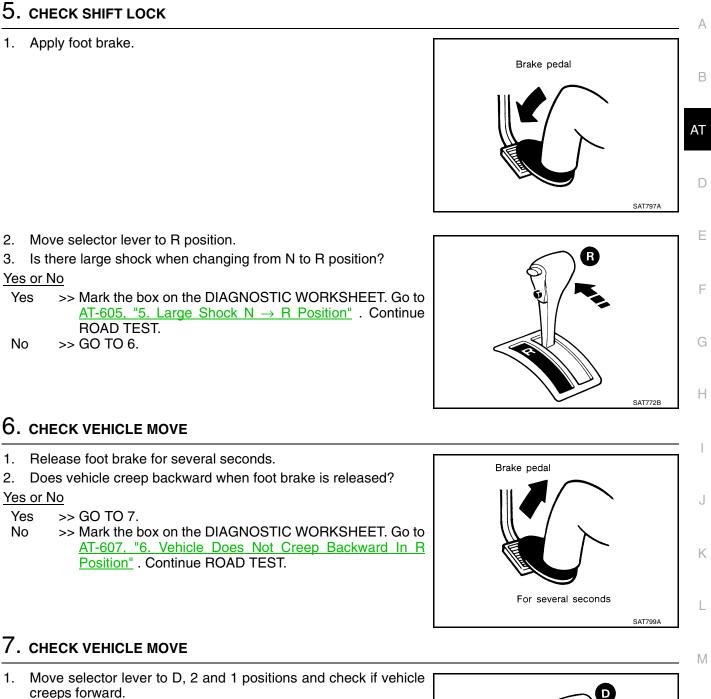
- 1. Start engine.
- 2. Move selector lever to N position.
- 3. Release parking brake.
- 4. Does vehicle move forward or backward?

Yes or No

- Yes >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-603, "4. In N Position, Vehicle Moves" . Continue ROAD TEST.
- No >> GO TO 5.



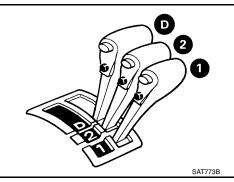
[RE4F04B]



2. Does vehicle creep forward in all three positions?

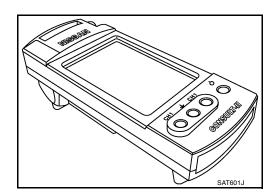
Yes or No

- Yes >> Go to AT-460, "3. CRUISE TEST" .
- No >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-610, "7. Vehicle Does Not Creep Forward in D, 2 or 1 Position" . Continue ROAD TEST.



3. CRUISE TEST

• Check all items listed in Parts 1 through 3.

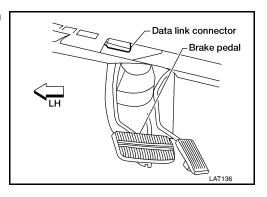


With CONSULT-II

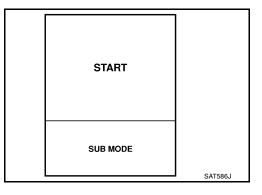
- Using CONSULT-II, conduct a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per Shift Schedule. Refer to <u>AT-750,</u> <u>"Shift Schedule"</u>

CONSULT-II Setting Procedure

- 1. Turn ignition switch OFF.
- 2. Connect CONSULT-II to data link connector, which is located in left side dash panel.
- 3. Turn ignition switch ON.

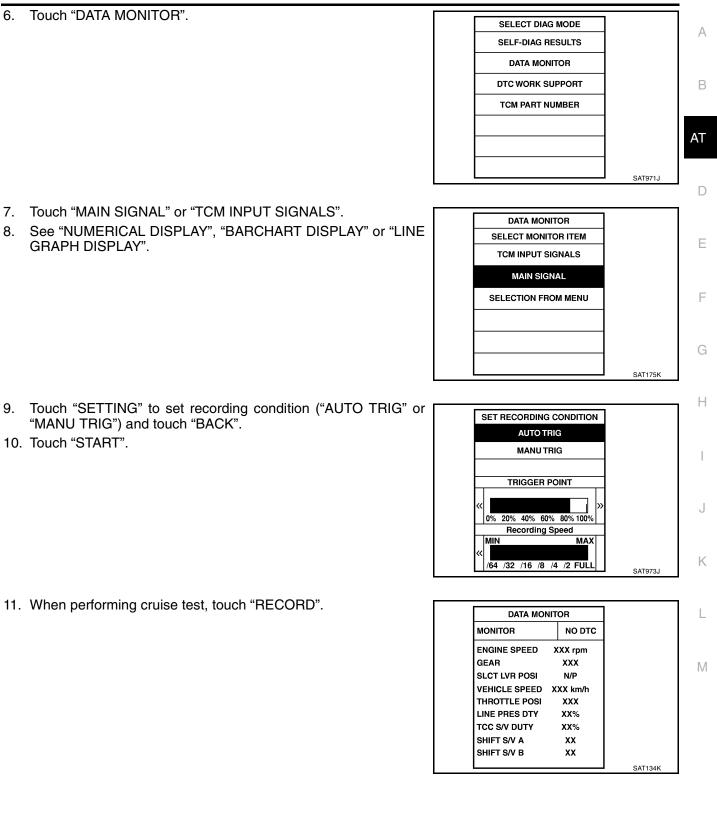


4. Touch "START".



	1
SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K

5. Touch "A/T".



12. After finishing cruise test part 1, touch "STOP".

DATA MC	NITOR
Recording Data	X% DTC DETECTED
ENGINE SPEED	XXX rpm
GEAR	XXX
SLCT LVR POSI	N/P
VEHICLE SPEED	XXX km/h
THROTTLE POSI	XXX
LINE PRES DTY	XX%
TCC S/V DUTY	XX%
SHIFT S/V A	XX
SHIFT S/V B	XX

13.	Touch	"STORE"	and touch	"BACK".
-----	-------	---------	-----------	---------

REAL-TIME DIAG	
ENG SPEED SIG	
	SAT987J

Trigger	VHCL S/SEN A/T	VHCL S/SEN MTR	THRTL POSI SEN	
	km/h	km/h	v	
H				
				SAT975J

- 14. Touch "DISPLAY".
- 15. Touch "PRINT".
- 16. Check the monitor data printed out.
- 17. Continue cruise test part 2 and 3.

Cruise Test — Part 1

1. CHECK STARTING GEAR (D1) POSITION

Drive vehicle for approx. 10 minutes to warm engine oil and ATF up to operating temperature. 1.

ATF operating tempera-:50 - 80°C (122 - 176°F) ture

- 2. Park vehicle on flat surface.
- 3. Set overdrive control switch to ON position.
- 4. Move selector lever to P position.

Move selector lever to D position.

5. Start engine.

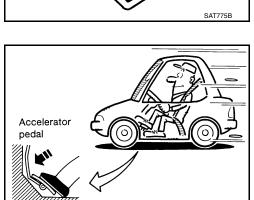
- 7. Accelerate vehicle by constantly depressing accelerator pedal half-way.
- 8. Does vehicle start from D1?

\mathbb{B} Read gear position.

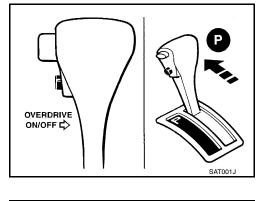
Yes or No

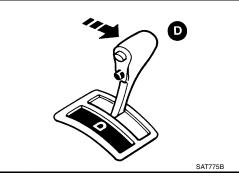
6.

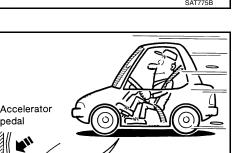
- Yes >> GO TO 2.
- >> Go to AT-612, "8. Vehicle Cannot Be Started From D1" No Continue ROAD TEST.



Half-way







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[RE4F04B]

2. CHECK SHIFT UP (D1 TO D2)

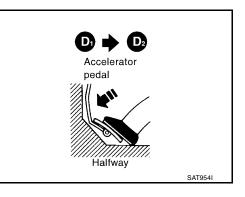
Does A/T shift from D1 to D2 at the specified speed?

Bread gear position, throttle opening and vehicle speed.

```
:Refer to AT-750, "Shift
Specified speed when
shifting from D1 to D2
                         Schedule".
```

Yes or No

- Yes >> GO TO 3.
- No >> Go to AT-615, "9. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D4 \rightarrow D2^{"}$. Continue ROAD TEST.



3. CHECK SHIFT UP (D2 TO D3)

Does A/T shift from D2 to D3 at the specified speed?

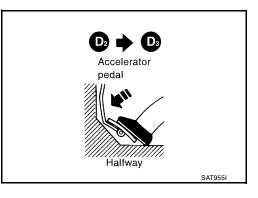
B Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D2 to D3	:Refer to <u>AT-750, "Shift</u> <u>Schedule"</u> .
<u>es or No</u>	

Ye

Yes

>> Go to AT-617, "10. A/T Does Not Shift: $D_2 \rightarrow D_3$ " . Con-No tinue ROAD TEST.



4. CHECK SHIFT UP (D3 TO D4)

Does A/T shift from D₃ to D₄ at the specified speed?

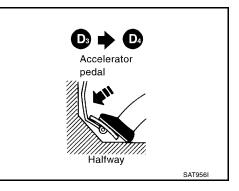
B Read gear position, throttle opening and vehicle speed.



Yes or No

Yes >> GO TO 5.

>> Go to AT-620, "11. A/T Does Not Shift: $D_3 \rightarrow D4$ ". Con-No tinue ROAD TEST.



Does A/T perform lock-up at the specified speed?	noo 049/
Read vehicle speed, throttle opening when lock-up duty become Constituted speed when a spectrum of the AT 750 lichift	nes 94%.
Specified speed when:Refer to AT-750, "Shiftlock-up occursSchedule"	
Yes or No	Accelerator
Yes >> GO TO 6.	pedal
No >> Go to AT-622, "12. A/T Does Not Perform Lock-up" .	
Continue ROAD TEST.	
	Halfway
L	SAT957I
O. CHECK HOLD LOCK-UP	
Does A/T hold lock-up condition for more than 30 seconds?	
fes or No	
Yes >> GO TO 7.	
No >> Go to AT-623, "13. A/T Does Not Hold Lock-up Condition"	
7. CHECK SHIFT DOWN (D4 L/U TO D4)	
· · · · · · · · · · · · · · · · · · ·	
 Release accelerator pedal. Is lock-up released when accelerator pedal is released? 	
Yes or No	
Yes >> GO TO 8.	Accelerator Brake pedal pedal
No >> Go to AT-624, "14. Lock-up Is Not Released" . Continue	
ROAD TEST.	
	Released Lightly applied
	SAT958I
B. CHECK SHIFT DOWN (D4 TO D3)	
1. Decelerate vehicle by applying foot brake lightly.	
Does engine speed return to idle smoothly when A/T is shifted from D4 to D3 ?	
Read gear position and engine speed.	Accelerator Brake pedal pedal
Yes or No	
Yes >> 1. Stop vehicle.	Ĩ → / II × I
2. Go to AT-466, "Cruise Test — Part 2"	
No >> Go to AT-625, "15. Engine Speed Does Not Return To	
Idle (Light Braking $D_4 \rightarrow D_3$)". Continue ROAD TEST.	Released Lightly applied

Cruise Test — Part 2

1. CHECK STARTING GEAR (D1) POSITION

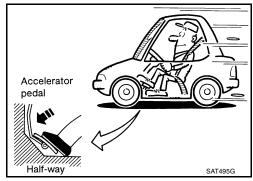
- 1. Confirm overdrive control switch is in ON position.
- 2. Confirm selector lever is in D position.
- 3. Accelerate vehicle by half throttle again.
- 4. Does vehicle start from D1 ?

B Read gear position.

Yes or No

Yes >> GO TO 2.

No >> Go to <u>AT-627, "16. Vehicle Does Not Start From D1"</u>. Continue ROAD TEST.



2. CHECK SHIFT UP AND SHIFT DOWN (D3 TO D4 TO D2)

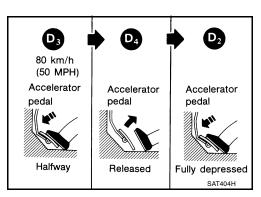
- 1. Accelerate vehicle to 80 km/h (50 MPH) as shown in illustration.
- 2. Release accelerator pedal and then quickly depress it fully.
- 3. Does A/T shift from D4 to D2 as soon as accelerator pedal is depressed fully?

B Read gear position and throttle opening.

Yes or No

Yes >> GO TO 3.

No >> Go to <u>AT-615</u>, "9. <u>A/T Does Not Shift: D1</u> \rightarrow <u>D2 or Does</u> <u>Not Kickdown: D4 \rightarrow D2"</u>. Continue ROAD TEST.



3. CHECK SHIFT UP (D2 TO D3)

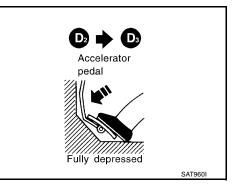
Does A/T shift from D2 to D3 at the specified speed?

B Read gear position, throttle opening and vehicle speed.

Specified speed when
shifting from D2 to D3:Refer to AT-750, "Shift
Schedule".

Yes or No

- Yes >> GO TO 4.
- No \Rightarrow So to <u>AT-617, "10. A/T Does Not Shift: D2 \rightarrow D3"</u>. Continue ROAD TEST.



[RE4F04B]

4. CHECK SHIFT UP (D3 TO D4) AND ENGINE BRAKE

Release accelerator pedal after shifting from D₂ to D₃. Does A/T shift from D₃ to D₄ and does vehicle decelerate by engine brake?

B Read gear position, throttle opening and vehicle speed.

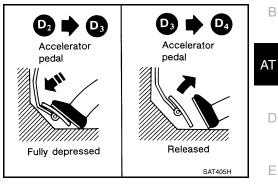
Yes or No

Yes

>> 1. Stop vehicle.

2. Go to AT-468, "Cruise Test - Part 3".

No >> Go to <u>AT-620, "11. A/T Does Not Shift: $D_3 \rightarrow D4$ "</u>. Continue ROAD TEST.



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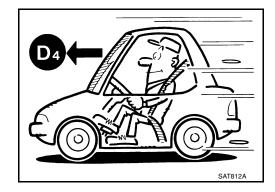
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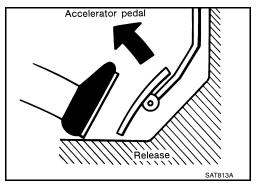
Cruise Test — Part 3

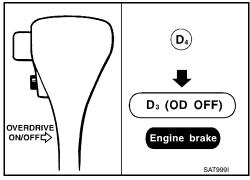
1. VEHICLE SPEED (D4) POSITION

- 1. Confirm overdrive control switch is in ON position.
- 2. Confirm selector lever is in D position.
- 3. Accelerate vehicle using half-throttle to D4 .



- 4. Release accelerator pedal.
- 5. Set overdrive control switch to OFF position while driving in D4 .
- 6. Does A/T shift from D4 to D3 (O/D OFF)?
 - B Read gear position and vehicle speed.





Yes or No

Yes >> GO TO 2.

No >> Go to <u>AT-628, "17. A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch ON \rightarrow OFF". Continue ROAD TEST.</u>

TROUBLE DIAGNOSIS - BASIC INSPECTION

[RE4F04B]

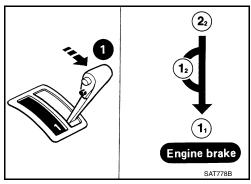
2. CHECK ENGINE BRAKE А Does vehicle decelerate by engine brake? Yes or No (\mathbf{D}_4) В Yes >> GO TO 3. >> Go to AT-625, "15. Engine Speed Does Not Return To No Idle (Light Braking $D4 \rightarrow D3$)". Continue ROAD TEST. AT D₃ (OD OFF) OVERDRIVE ON/OFFC Engine brake D SAT999I 3. Check shift down (D₃ to D₂) Ε 1. Move selector lever from D to 2 position while driving in D₃ (O/D OFF). 2. Does A/T shift from D3 (O/D OFF) to 22? F Read gear position. Yes or No D₃ (OD OFF) Yes >> GO TO 4. G >> Go to AT-628, "18. A/T Does Not Shift: $D_3 \rightarrow 2_2$, When No <u>Selector Lever D \rightarrow 2 Position["]</u>. Continue ROAD TEST. Н Engine brake SAT791GA 4. CHECK ENGINE BRAKE J Does vehicle decelerate by engine brake? Yes or No Yes >> GO TO 5. Κ D₃ (OD OFF) >> Go to AT-625, "15. Engine Speed Does Not Return To No Idle (Light Braking $D4 \rightarrow D3$)". Continue ROAD TEST. L Engine brake Μ SAT791GA 5. CHECK SHIFT DOWN (22 TO 11) 1. Move selector lever from 2 to 1 position while driving in 22.

2. Does A/T shift from 22 to 11 position?

Image: Provide the second s

Yes or No

Yes	>> GO TO 6.
No	>> Go to AT-629, "19. A/T Does Not Shift: $22 \rightarrow 11$, When
	Selector Lever 2 \rightarrow 1 Position". Continue ROAD TEST.



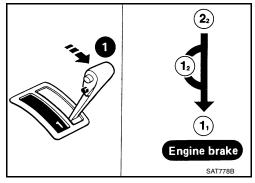
[RE4F04B]

6. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> 1. Stop vehicle.
 - 2. Perform self-diagnosis. Refer to <u>AT-440, "TCM SELF-</u> <u>DIAGNOSTIC PROCEDURE (NO TOOLS)"</u>
- No >> Go to <u>AT-630, "20. Vehicle Does Not Decelerate By</u> <u>Engine Brake"</u>. Continue ROAD TEST.



TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

Symptom Chart

Numbers are arranged in order of inspection.

Items	Symptom	Condition	Diagnostic Item	Reference Page
			1. Throttle position sensor {accelerator pedal position (APP) sensor]	<u>AT-561</u>
			2. Vehicle speed sensor A/T (Revolution sensor) and vehicle speed sensor MTR	<u>AT-501,</u> <u>AT-578</u>
	Towney o only other	ON vehicle	3. Engine speed signal	<u>AT-506</u>
	Torque converter is not locked up.		4. A/T fluid temperature sensor	<u>AT-571</u>
			5. Line pressure test	<u>AT-454</u>
			6. Torque converter clutch solenoid valve	<u>AT-532</u>
			7. Control valve assembly	<u>AT-642</u>
		OFF vehicle	8. Torque converter	<u>AT-655</u>
			1. Fluid level	<u>AT-450</u>
No Lock-up Engagement/ TCC Inoperative			2. Throttle position sensor {accelerator pedal position (APP) sensor]	<u>AT-561</u>
	Torque converter clutch piston slip.	ON vehicle	3. Line pressure test	<u>AT-454</u>
			4. Torque converter clutch solenoid valve	<u>AT-532</u>
			5. Line pressure solenoid valve	<u>AT-545</u>
			6. Control valve assembly	<u>AT-642</u>
		OFF vehicle	7. Torque converter	<u>AT-655</u>
	Lock-up point is extremely high or low.		1. Throttle position sensor {accelerator pedal position (APP) sensor]	<u>AT-561</u>
			2. Vehicle speed sensor A/T (Revolution sensor) and vehicle speed sensor MTR	<u>AT-501,</u> <u>AT-578</u>
			3. Torque converter clutch solenoid valve	<u>AT-532</u>
			4. Control valve assembly	<u>AT-642</u>
			1. Engine idling rpm	EC-1228
			2. Throttle position sensor {accelerator pedal position (APP) sensor]	<u>AT-561</u>
			3. Line pressure test	<u>AT-454</u>
	Sharp shock in	ON vehicle	4. A/T fluid temperature sensor	<u>AT-571</u>
Shift Shock	shifting from N to D position.		5. Engine speed signal	<u>AT-506</u>
	- poonon		6. Line pressure solenoid valve	<u>AT-545</u>
			7. Control valve assembly	<u>AT-642</u>
			8. Accumulator N-D	<u>AT-655</u>
		OFF vehicle	9. Forward clutch	<u>AT-700</u>

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[RE4F04B]

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Items	Symptom	Condition	Diagnostic Item	Reference Page
			1. Throttle position sensor [accelerator pedal position (APP) sensor]	<u>AT-561</u>
	Too sharp a		2. Line pressure test	<u>AT-454</u>
	shock in change	ON vehicle	3. Accumulator servo release	<u>AT-655</u>
	from D1 to D2.		4. Control valve assembly	<u>AT-642</u>
			5. A/T fluid temperature sensor	<u>AT-571</u>
		OFF vehicle	6. Brake band	<u>AT-655</u>
			1. Throttle position sensor [accelerator pedal position (APP) sensor]	<u>AT-561</u>
	Too sharp a	ON vehicle	2. Line pressure test	<u>AT-454</u>
	shock in change		3. Control valve assembly	<u>AT-642</u>
	from D2 to D3.		4. A/T fluid temperature sensor	<u>AT-495</u>
		OFF vehicle	5. High clutch	<u>AT-695</u>
			6. Brake band	<u>AT-655</u>
Shift Shock	Too sharp a shock in change from D3 to D4 .	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	<u>AT-561</u>
			2. Line pressure test	<u>AT-454</u>
			3. Control valve assembly	<u>AT-642</u>
			4. A/T fluid temperature sensor	<u>AT-495</u>
			5. Brake band	<u>AT-655</u>
		OFF vehicle	6. Overrun clutch	<u>AT-700</u>
			7. Forward one-way clutch	<u>AT-655</u> ###############
	Gear change shock felt during		1. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1239
	deceleration by	ON vehicle	2. Line pressure test	<u>AT-454</u>
	releasing acceler-		3. Overrun clutch solenoid valve	<u>AT-566</u>
	ator pedal.		4. Control valve assembly	<u>AT-642</u>
	Large shock	ON vehicle	1. Control valve assembly	<u>AT-642</u>
	changing from 12 to 11 in 1 posi- tion.	ON vehicle	2. Low & reverse brake	<u>AT-706</u>

Items	Symptom	Condition	Diagnostic Item	Reference Page	_
	Too high a gear		1. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1239	
	change point from D1 to D2, from	ON vehicle	2. Vehicle speed sensor A/T (Revolution sensor) and vehicle speed sensor MTR	<u>AT-501</u> , <u>AT-578</u>	_
	D2 to D3 , from D3 to D4 .		3. Shift solenoid valve A	<u>AT-551</u>	_
			4. Shift solenoid valve B	<u>AT-556</u>	A
	Gear change	ON vehicle	1. Fluid level	<u>AT-450</u>	
	directly from D1	On vehicle	2. Accumulator servo release	<u>AT-655</u>	_
Improper Shift	to D3 occurs.	OFF vehicle	3. Brake band	<u>AT-655</u>	
Timing	Too high a change point from		1. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1239	_
	D4 to D3 , from D3 to D2 , from D2 to D1 .	ON vehicle	2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	<u>AT-501</u> , <u>AT-578</u>	
	Kickdown does not operate when depressing pedal in D4 within kick- down vehicle speed.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1239	
			2. Vehicle speed sensor A/T (Revolution sensor) and vehicle speed sensor MTR	<u>AT-501</u> , <u>AT-578</u>	
			3. Shift solenoid valve A	<u>AT-551</u>	(
	speeu.		4. Shift solenoid valve B	<u>AT-556</u>	
	Kickdown oper- ates or engine		1. Vehicle speed sensor A/T (Revolution sensor) and vehicle speed sensor MTR	<u>AT-501, AT-578</u>	
	overruns when depressing pedal	ON vehicle	2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1239	_
	in D4 beyond kickdown vehicle		3. Shift solenoid valve A	<u>AT-551</u>	_
Improper Shift	speed limit.		4. Shift solenoid valve B	<u>AT-556</u>	
Timing	Gear change from 22 to 23 in 2 position.	ON vehicle	1. Park/neutral position (PNP) switch adjust- ment	<u>AT-644</u>	_
	Gear change from 11 to 12 in 1	ON vehicle	1. Park/neutral position (PNP) switch adjust- ment	<u>AT-644</u>	
	position.		2. Control cable adjustment	AT-645	_

[RE4F04B]

Items	Symptom	Condition	Diagnostic Item	Reference Page
			1. Fluid level	<u>AT-450</u>
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	<u>EC-1239</u>
	Eciluro to chongo	ON vehicle	3. Overrun clutch solenoid valve	<u>AT-566</u>
	Failure to change gear from D4 to		4. Shift solenoid valve A	<u>AT-551</u>
	D3 .		5. Line pressure solenoid valve	<u>AT-545</u>
			6. Control valve assembly	<u>AT-642</u>
			7. Low & reverse brake	<u>AT-706</u>
		OFF vehicle	8. Overrun clutch	<u>AT-700</u>
			1. Fluid level	<u>AT-450</u>
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1239
	Failure to change gear from D3 to	ON vehicle	3. Shift solenoid valve A	<u>AT-551</u>
No Down Shift	D2 or from D4 to		4. Shift solenoid valve B	<u>AT-556</u>
	D2 .		5. Control valve assembly	<u>AT-642</u>
		OFF	6. High clutch	<u>AT-695</u>
		OFF vehicle	7. Brake band	<u>AT-655</u>
	Failure to change gear from D2 to D1 or from D3 to D1.		1. Fluid level	<u>AT-450</u>
		ON vehicle	2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	<u>EC-1239</u>
			3. Shift solenoid valve A	<u>AT-551</u>
			4. Shift solenoid valve B	<u>AT-556</u>
		OFF vehicle	5. Control valve assembly	<u>AT-642</u>
			6. Low one-way clutch	<u>AT-655</u>
			7. High clutch	<u>AT-695</u>
			8. Brake band	<u>AT-655</u>
	Failure to change from D3 to 22	ON vehicle	1. Park/neutral position (PNP) switch adjust- ment	<u>AT-644</u>
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	<u>EC-1239</u>
			3. Overrun clutch solenoid valve	<u>AT-566</u>
	when changing		4. Shift solenoid valve B	<u>AT-556</u>
	lever into 2 posi- tion.		5. Shift solenoid valve A	<u>AT-551</u>
	<u>AT-628</u>		6. Control valve assembly	<u>AT-642</u>
			7. Control cable adjustment	<u>AT-645</u>
le Deurs Chiff			8. Brake band	<u>AT-655</u>
No Down Shift		OFF vehicle	9. Overrun clutch	<u>AT-700</u>
			1. Park/neutral position (PNP) switch adjust- ment	<u>AT-644</u>
		ON vehicle	2. Vehicle speed sensor A/T (Revolution sensor) and vehicle speed sensor MTR	<u>AT-501, AT-578</u>
	Does not change from 12 to 11 in 1		3. Shift solenoid valve A	<u>AT-551</u>
	position.		4. Control valve assembly	<u>AT-642</u>
			5. Overrun clutch solenoid valve	<u>AT-566</u>
			6. Overrun clutch	<u>AT-700</u>
		OFF vehicle	7. Low & reverse brake	<u>AT-706</u>

AT-474

Items	Symptom	Condition	Diagnostic Item	Reference Page	_
			1. Park/neutral position (PNP) switch adjust- ment	<u>AT-644</u>	- A
			2. Control cable adjustment	<u>AT-645</u>	
	Failure to change	ON vehicle	3. Shift solenoid valve A	<u>AT-551</u>	_ B
	gear from D1 to D2.		4. Control valve assembly	<u>AT-642</u>	_
			5. Vehicle speed sensor A/T (Revolution sensor) and vehicle speed sensor MTR	<u>AT-501</u> , <u>AT-578</u>	AT
		OFF vehicle	6. Brake band	<u>AT-655</u>	_
No Up Shift			1. Park/neutral position (PNP) switch adjust- ment	<u>AT-644</u>	D
			2. Control cable adjustment	<u>AT-645</u>	
	Failure to change	ON vehicle	3. Shift solenoid valve B	<u>AT-556</u>	E
	gear from D2 to		4. Control valve assembly	<u>AT-642</u>	
	D3 .		5. Vehicle speed sensor A/T (Revolution sensor) and vehicle speed sensor MTR	<u>AT-501</u> , <u>AT-578</u>	F
		OFF vehicle	6. High clutch	<u>AT-695</u>	_
			7. Brake band	<u>AT-655</u>	G
		ON vehicle	1. Park/neutral position (PNP) switch adjust- ment	<u>AT-644</u>	_ 0
			2. Control cable adjustment	<u>AT-645</u>	Η
	Failure to change		3. Shift solenoid valve A	AT-551	
	gear from D3 to D4.		4. Vehicle speed sensor A/T (Revolution sensor) and vehicle speed sensor MTR	<u>AT-501</u> , <u>AT-578</u>	
			5. A/T fluid temperature sensor	<u>AT-571</u>	_
		OFF vehicle	6. Brake band	<u>AT-655</u>	
			1. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1239	J
No Up Shift			2. Park/neutral position (PNP) switch adjust- ment	<u>AT-644</u>	K
	A/T does not shift		3. Vehicle speed sensor A/T (Revolution sensor) and vehicle speed sensor MTR	<u>AT-501</u> , <u>AT-578</u>	
	to D4 when driv-	ON vehicle	4. Shift solenoid valve A	<u>AT-551</u>	- L
	ing with over- drive control		5. Overrun clutch solenoid valve	<u>AT-566</u>	
	switch ON.		6. Control valve assembly	<u>AT-642</u>	M
			7. A/T fluid temperature sensor	<u>AT-571</u>	
			8. Line pressure solenoid valve	<u>AT-545</u>	
		OFF vehicle	9. Brake band	<u>AT-655</u>	
		OFF venicie	10. Overrun clutch	<u>AT-700</u>	

Items	Symptom	Condition	Diagnostic Item	Reference Page
			1. Control cable adjustment	<u>AT-645</u>
		ON vehicle	2. Line pressure test	<u>AT-454</u>
	Vehicle will not run in R position	ON Vehicle	3. Line pressure solenoid valve	<u>AT-545</u>
	(but runs in D, 2		4. Control valve assembly	<u>AT-642</u>
	and 1 positions). Clutch slips.		5. Reverse clutch	<u>AT-692</u>
	Very poor accel-		6. High clutch AT-695	<u>AT-695</u>
Slips/Will Not Engage	eration. AT-607	OFF vehicle	7. Forward clutch	<u>AT-700</u>
	<u></u>		8. Overrun clutch	<u>AT-700</u>
			9. Low & reverse brake	<u>AT-706</u>
	Vehicle will not	ON vehicle	1. Control cable adjustment	<u>AT-645</u>
	run in D and 2 positions (but runs in 1 and R positions).	OFF vehicle	2. Low one-way clutch	<u>AT-655</u>

Items	Symptom	Condition	Diagnostic Item	Reference Page	
			1. Fluid level	<u>AT-450</u>	
			2. Line pressure test	<u>AT-454</u>	
	Vehicle will not	ON vehicle	3. Line pressure solenoid valve	<u>AT-545</u>	
	run in D, 1, 2		4. Control valve assembly	<u>AT-642</u>	_
	positions (but runs in R posi-		5. Accumulator N-D	<u>AT-655</u>	
	tion). Clutch slips.		6. Reverse clutch	<u>AT-692</u>	-
	Very poor accel- eration.		7. High clutch	<u>AT-695</u>	_
	<u>AT-610</u>	OFF vehicle	8. Forward clutch	<u>AT-700</u>	_
			9. Forward one-way clutch	<u>AT-655</u>	_
			10. Low one-way clutch	<u>AT-655</u>	_
			1. Fluid level	<u>AT-450</u>	_
			2. Control cable adjustment	<u>AT-645</u>	_
			3. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1239	_
		ON vehicle	4. Line pressure test	<u>AT-454</u>	_
	Olutabaa ar		5. Line pressure solenoid valve	<u>AT-545</u>	_
	Clutches or brakes slip some- what in starting.		6. Control valve assembly	<u>AT-642</u>	
ips/Will Not			7. Accumulator N-D	<u>AT-655</u>	
ngage		OFF vehicle	8. Forward clutch	<u>AT-700</u>	
			9. Reverse clutch	<u>AT-692</u>	
			10. Low & reverse brake	<u>AT-706</u>	
			11. Oil pump	<u>AT-673</u>	
			12. Torque converter	<u>AT-655</u>	
			1. Fluid level	<u>AT-450</u>	
		ON vehicle	2. Line pressure test	<u>AT-454</u>	_
	No creep at all.		3. Control valve assembly	<u>AT-642</u>	_
	<u>AT-607</u> , <u>AT-610</u>		4. Forward clutch	<u>AT-700</u>	-
		OFF vehicle	5. Oil pump	<u>AT-673</u>	_
			6. Torque converter	<u>AT-655</u>	_
			1. Fluid level	<u>AT-450</u>	_
	Almost no shock		2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	<u>EC-1239</u>	
	or clutches slip-	ON vehicle	3. Line pressure test	<u>AT-454</u>	_
	ping in change from D1 to D2.		4. Accumulator servo release	<u>AT-655</u>	
			5. Control valve assembly	<u>AT-642</u>	
		OFF vehicle	6. Brake band	<u>AT-655</u>	

Items	Symptom	Condition	Diagnostic Item	Reference Page
			1. Fluid level	<u>AT-450</u>
	Almost no shock or slipping in change from D2	ON vehicle	2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	<u>EC-1239</u>
			3. Line pressure test	<u>AT-454</u>
	to D3 .		4. Control valve assembly	<u>AT-642</u>
		OFF vehicle	5. High clutch	<u>AT-695</u>
		OFF venicie	6. Forward clutch	<u>AT-700</u>
			1. Fluid level	<u>AT-450</u>
	Almost no shock	ON vehicle	2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	<u>EC-1239</u>
	or slipping in		3. Line pressure test	<u>AT-454</u>
	change from D3 to D4.		4. Control valve assembly	<u>AT-642</u>
			5. High clutch	<u>AT-695</u>
		OFF vehicle	6. Brake band	<u>AT-655</u>
			1. Fluid level	<u>AT-450</u>
	Races extremely		2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	<u>EC-1239</u>
	fast or slips in	ON vehicle	3. Line pressure test	<u>AT-454</u>
	changing from D4 to D3 when depressing pedal.	OFF vehicle	4. Line pressure solenoid valve	<u>AT-545</u>
			5. Control valve assembly	<u>AT-642</u>
Slips/Will Not			6. High clutch	<u>AT-695</u>
Engage			7. Forward clutch	<u>AT-700</u>
	Races extremely fast or slips in changing from D4 to D2 when		1. Fluid level	<u>AT-450</u>
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	<u>EC-1239</u>
		ON vehicle	3. Line pressure test	<u>AT-454</u>
			4. Line pressure solenoid valve	<u>AT-545</u>
			5. Shift solenoid valve A	<u>AT-551</u>
	depressing pedal.		6. Control valve assembly	<u>AT-642</u>
		OFF vehicle	7. Brake band	<u>AT-655</u>
		OFF venicie	8. Forward clutch	<u>AT-700</u>
			1. Fluid level	<u>AT-450</u>
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	<u>EC-1239</u>
	Races extremely	ON vehicle	3. Line pressure test	<u>AT-454</u>
	fast or slips in		4. Line pressure solenoid valve	<u>AT-545</u>
	changing from D3 to D2 when		5. Control valve assembly	<u>AT-642</u>
	depressing pedal.		6. A/T fluid temperature sensor	<u>AT-571</u>
			7. Brake band	<u>AT-655</u>
		OFF vehicle	8. Forward clutch	<u>AT-700</u>
			9. High clutch	<u>AT-695</u>

Items	Symptom	Condition	Diagnostic Item	Reference Page	
			1. Fluid level	<u>AT-450</u>	- A
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1239	_ B
	Races extremely fast or slips in	ON vehicle	3. Line pressure test	<u>AT-454</u>	_ D
	changing from D4		4. Line pressure solenoid valve	<u>AT-545</u>	
	or D3 to D1 when depressing pedal.		5. Control valve assembly	<u>AT-642</u>	AT
	depressing pedai.		6. Forward clutch	<u>AT-700</u>	
		OFF vehicle	7. Forward one-way clutch	<u>AT-655</u>	_
			8. Low one-way clutch	<u>AT-655</u>	— D
Slips/Will Not			1. Fluid level	<u>AT-450</u>	
Engage		ON vehicle	2. Control cable adjustment	<u>AT-645</u>	E
		ON Venicie	3. Line pressure test	<u>AT-454</u>	_
			4. Line pressure solenoid valve	<u>AT-545</u>	_
	Vehicle will not		5. Oil pump	<u>AT-673</u>	F
	run in any posi- tion.		6. High clutch	<u>AT-695</u>	
		OFF vehicle	7. Brake band	<u>AT-655</u>	G
			8. Low & reverse brake	<u>AT-706</u>	
			9. Torque converter	<u>AT-655</u>	
			10. Parking components	<u>AT-670</u>	ŀ
	Engine cannot be started in P and N positions. <u>AT-602</u>	ON vehicle	1. Ignition switch and starter	PG-2, SC-9	
			2. Control cable adjustment	<u>AT-645</u>	_
			3. Park/neutral position (PNP) switch adjust- ment	<u>AT-644</u>	_
	Engine starts in	ON vehicle	1. Control cable adjustment	<u>AT-645</u>	
	positions other than P and N. <u>AT-602</u>		2. Park/neutral position (PNP) switch adjust- ment	<u>AT-644</u>	_
			1. Fluid level	<u>AT-450</u>	K
			2. Line pressure test	<u>AT-454</u>	_
	Transaxle noise	ON vehicle	3. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	<u>EC-1239</u>	L
NOT USED	in P and N posi- tions.		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	<u>AT-501</u> , <u>AT-578</u>	_
			5. Engine speed signal	<u>AT-506</u>	- IV
			6. Oil pump	<u>AT-673</u>	
		OFF vehicle	7. Torque converter	<u>AT-655</u>	
	Vehicle moves when changing into P position or parking gear does	ON vehicle	1. Control cable adjustment	<u>AT-645</u>	
	not disengage when shifted out of P position. <u>AT-603</u>	OFF vehicle	2. Parking components	<u>AT-670</u>	_

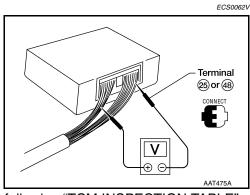
Items	Symptom	Condition	Diagnostic Item	Reference Page
	Vehicle runs in N	ON vehicle	1. Control cable adjustment	<u>AT-645</u>
	position. <u>AT-603</u>		2. Forward clutch	<u>AT-700</u>
		OFF vehicle	3. Reverse clutch	<u>AT-692</u>
			4. Overrun clutch	<u>AT-700</u>
			1. Fluid level	<u>AT-450</u>
			2. Control cable adjustment	<u>AT-645</u>
		ON vehicle	3. Line pressure test	<u>AT-454</u>
	Vehicle braked		4. Line pressure solenoid valve	<u>AT-545</u>
	when shifting into		5. Control valve assembly	<u>AT-642</u>
	R position.		6. High clutch	<u>AT-695</u>
		OFF vehicle	7. Brake band	<u>AT-655</u>
		OFF vehicle	8. Forward clutch	<u>AT-700</u>
			9. Overrun clutch	<u>AT-700</u>
	Excessive creep.	ON vehicle	1. Engine idling rpm	EC-1228
NOT USED	Engine stops	ON vehicle	1. Engine idling rpm	EC-1228
	when shifting		2. Torque converter clutch solenoid valve	<u>AT-532</u>
	lever into R, D, 2 and 1.		3. Control valve assembly	<u>AT-642</u>
	and T.	OFF vehicle	4. Torque converter	<u>AT-655</u>
		ON vehicle	1. Fluid level	<u>AT-450</u>
	Vehicle braked by		2. Reverse clutch	<u>AT-692</u>
	gear change from	OFF vehicle	3. Low & reverse brake	<u>AT-706</u>
	D1 to D2.	OFF vehicle	4. High clutch	<u>AT-695</u>
			5. Low one-way clutch	<u>AT-655</u>
	Vehicle braked by	ON vehicle	1. Fluid level	<u>AT-450</u>
	gear change from D2 to D3.	OFF vehicle	2. Brake band	<u>AT-655</u>
		ON vehicle	1. Fluid level	<u>AT-450</u>
	Vehicle braked by		2. Overrun clutch	<u>AT-700</u>
	gear change from D3 to D4 .	OFF vehicle	3. Forward one-way clutch	<u>AT-655</u>
			4. Reverse clutch	<u>AT-692</u>

Items	Symptom	Condition	Diagnostic Item	Reference Page	_
-			1. Fluid level	<u>AT-450</u>	- A
			2. Park/neutral position (PNP) switch adjust- ment	<u>AT-644</u>	B
		ON vehicle	3. Shift solenoid valve A	<u>AT-551</u>	D
			4. Shift solenoid valve B	<u>AT-556</u>	
	Maximum speed not attained.		5. Control valve assembly	<u>AT-642</u>	AT
	Acceleration		6. Reverse clutch	<u>AT-692</u>	
	poor.		7. High clutch	<u>AT-695</u>	_
		OFF vehicle	8. Brake band	<u>AT-655</u>	D
		OFF vehicle	9. Low & reverse brake	<u>AT-706</u>	
			10. Oil pump	<u>AT-673</u>	E
			11. Torque converter	<u>AT-655</u>	
	Transaxle noise	ON vehicle	1. Fluid level	<u>AT-450</u>	
	in D, 2, 1 and R positions.	ON vehicle	2. Torque converter	<u>AT-655</u>	F
			1. Park/neutral position (PNP) switch adjust- ment	<u>AT-644</u>	G
			2. Control cable adjustment	<u>AT-645</u>	0.
	Engine brake does not operate in "1" position. <u>AT-630</u>	ON vehicle	3. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	<u>EC-1239</u>	H
NOT USED			4. Vehicle speed sensor A/T (Revolution sensor) and vehicle speed sensor MTR	<u>AT-501,</u> <u>AT-578</u>	_
			5. Shift solenoid valve A	<u>AT-551</u>	
			6. Control valve assembly	<u>AT-642</u>	_
			7. Overrun clutch solenoid valve	<u>AT-566</u>	_
		OFF vehicle	8. Overrun clutch	<u>AT-700</u>	J
			9. Low & reverse brake	<u>AT-706</u>	
			1. Fluid level	<u>AT-450</u>	K
		ON vehicle	2. Engine idling rpm	<u>EC-1228</u>	
			3. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	<u>EC-1239</u>	L
			4. Line pressure test	<u>AT-454</u>	
			5. Line pressure solenoid valve	<u>AT-545</u>	1.4
			6. Control valve assembly	<u>AT-642</u>	M
	Transaxle over- heats.		7. Oil pump	<u>AT-673</u>	
	1150.0		8. Reverse clutch	<u>AT-692</u>	·
			9. High clutch	<u>AT-695</u>	_
		OFF vehicle	10. Brake band	<u>AT-655</u>	_
			11. Forward clutch	<u>AT-700</u>	-
			12. Overrun clutch	<u>AT-700</u>	
			13. Low & reverse brake	<u>AT-706</u>	
			14. Torque converter	<u>AT-655</u>	_

[RE4F04B]

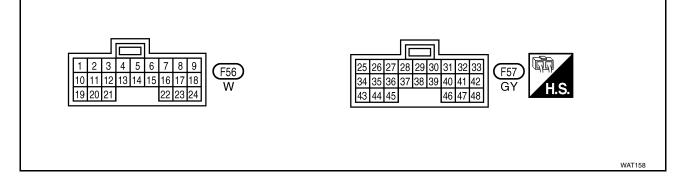
Items	Symptom	Condition	Diagnostic Item	Reference Page
		ON vehicle	1. Fluid level	<u>AT-450</u>
	ATF shoots out during operation.		2. Reverse clutch	<u>AT-692</u>
		OFF vehicle	3. High clutch	<u>AT-695</u>
	White smoke emitted from		4. Brake band	<u>AT-655</u>
	exhaust pipe dur-		5. Forward clutch	<u>AT-700</u>
	ing operation.		6. Overrun clutch	<u>AT-700</u>
			7. Low & reverse brake	<u>AT-706</u>
		ON vehicle	1. Fluid level	<u>AT-450</u>
	Offensive smell at		2. Torque converter	<u>AT-655</u>
			3. Oil pump	<u>AT-673</u>
NOT USED			4. Reverse clutch	<u>AT-692</u>
	fluid charging	OFF vehicle	5. High clutch	<u>AT-695</u>
	pipe.	OFF vehicle	6. Brake band	<u>AT-655</u>
			7. Forward clutch	<u>AT-700</u>
			8. Overrun clutch	<u>AT-700</u>
			9. Low & reverse brake	<u>AT-706</u>
			1. Fluid level	<u>AT-450</u>
	Engine is stopped		2. Torque converter clutch solenoid valve	<u>AT-532</u>
	at R, D, 2 and 1	ON vehicle	3. Shift solenoid valve B	<u>AT-556</u>
	positions.		4. Shift solenoid valve A	<u>AT-551</u>
			5. Control valve assembly	<u>AT-642</u>

TCM Terminals and Reference Value PREPARATION



• Measure voltage between each terminal and terminal 25 or 48 by following "TCM INSPECTION TABLE".

TCM HARNESS CONNECTOR TERMINAL LAYOUT



[RE4F04B]

А

TCM INSPECTION TABLE

(Data are reference values.)

Termi- nal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	R/W	Line pressure		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
I	U/ M	solenoid valve		When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	4 - 14V
۷	F/D	(with dropping resistor)		When depressing accelerator pedal fully after warming up engine.	0V
3	GY/R	Torque converter clutch solenoid		When A/T performs lock-up.	8 - 15V
		valve		When A/T does not perform lock-up.	0V
5*	L	CAN-H	_	_	
6*	Y	CAN-L	—	_	
10	BR/R	Power source	CON	When turning ignition switch to ON.	Battery voltage
10	Bront		COFF	When turning ignition switch to OFF.	οv
11	1.00/	Shift solenoid		When shift solenoid valve A operates. (When driving in D1 or D4 .)	Battery voltage
11	L/W	valve A		When shift solenoid valve A does not operate. (When driving in D2 or D3 .)	0V
12	L/Y	Shift solenoid	<u> </u>	When shift solenoid valve B operates. (When driving in D1 or D2 .)	Battery voltage
12	L/ I	valve B		When shift solenoid valve B does not operate. (When driving in D3 or D4 .)	0V
13	G/R	O/D OFF		When setting overdrive control switch in OFF position.	0V
10	G/H	indicator lamp		When setting overdrive control switch in ON position.	Battery voltage
19	BB/R	Power source	CON	With ignition switch ON.	Battery voltage
19	Dn/n	- Fower source	COFF	With ignition switch OFF.	ov
20	L/B	Overrun clutch	R.B	When overrun clutch solenoid valve operates.	Battery voltage
20	L/D	solenoid valve	COMO -	When overrun clutch solenoid valve does not operate.	0V
			(CON)	When setting overdrive control switch in ON position.	Battery voltage
22	OR/B	Overdrive control switch		When setting overdrive control switch in OFF position.	٥V
25	В	Ground			

Termi- nal No.	Wire color	Item		Condition	Judgement standard (Approx.)
26	OR	PNP switch 1 position	(CON)	When setting selector lever to 1 position.	Battery voltage
		position		When setting selector lever to other positions.	0V
27	L	PNP switch 2		When setting selector lever to 2 position.	Battery voltage
			Ner	When setting selector lever to other positions.	0V
28	R/B	Power source	COFF	With ignition switch OFF.	Battery voltage
20	n/b	(Memory back-up)	CON	With ignition switch ON.	Battery voltage
29	W	Revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring func- tion.*1 CAUTION: Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	450 Hz
				When vehicle is parked.	Under 1.3V or over 4.5V
30**	G/B	Data link connec- tor (RX)		_	_
31**	GY/L	Data link connec- tor (TX)		_	
32	R	Sensor power	CON	Ignition switch ON.	4.5 - 5.5V
			COFF	Ignition switch OFF.	οv
34	W/G	PNP switch D		When setting selector lever to D position.	Battery voltage
		position	(P)	When setting selector lever to other positions.	0V
35	G/W	PNP switch R		When setting selector lever to R position.	Battery voltage
		position	৵ ৲িি	When setting selector lever to other positions.	0V
36	BR/W	PNP switch P or N position	K	When setting selector lever to P or N position.	Battery voltage
		position		When setting selector lever to other positions.	0V
38	G	Turbine revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring func- tion.*1 CAUTION: Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	240 Hz
				When vehicle is parked.	Under 1.3V or over 4.5V

[RE4F04B]

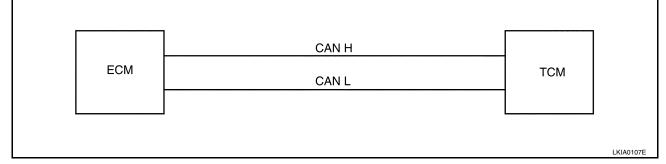
Termi- nal No.	Wire color	Item	Condition		Judgement standard (Approx.)	A
39	L/OR	Engine speed signal		Refer to <u>EC-1292. "ECM INSPECTION TABLE"</u>		В
			R			AT
40	PU/R	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 1V and more than 4.5V	D
41	S/B	Throttle position sensor [accelera- tor pedal position (APP) sensor]	(CON)	When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V	E
42	В	Sensor ground	_	—	_	
45	R/G	Stop lamp switch		With brake pedal depressed	Battery voltage	G
				With brake pedal released	0V	
47	BR	A/T fluid tempera-		When ATF temperature is 20°C (68°F).	1.5V	
47	DN	ture sensor		When ATF temperature is 80°C (176°F).	0.5V	H
48	В	Ground	_	_		-

*: These terminals are connected to the ECM.

**: These terminals are connected to the Data link connector.

System Description

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



INPUT/OUTPUT SIGNAL CHART

		T: Transmit R: Receive
Signals	ECM	ТСМ
Accelerator pedal position signal	Т	R
Output shaft revolution signal	R	Т
A/T self-diagnosis signal	R	Т

ECS0062W

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Κ

L

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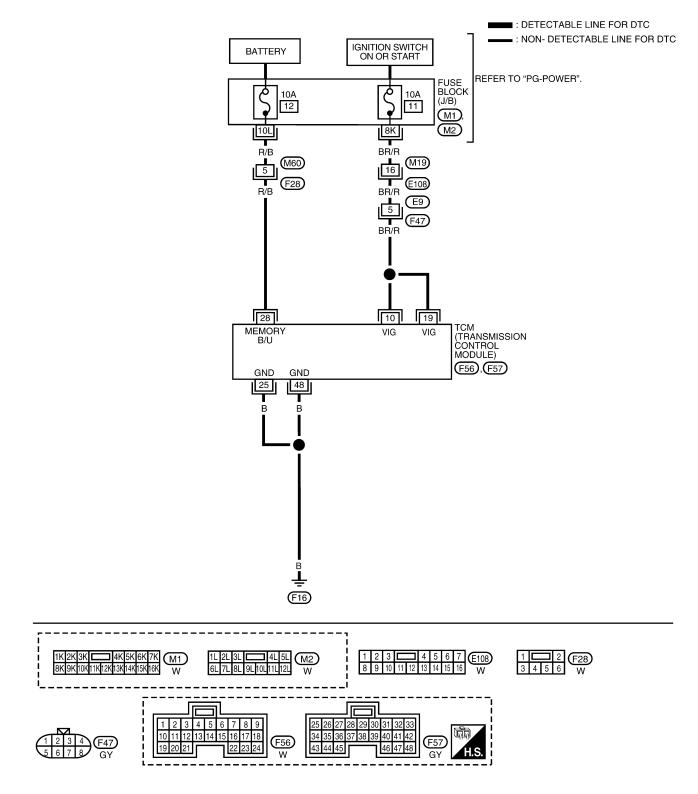
[RE4F04B]

TROUBLE DIAGNOSIS FOR POWER SUPPLY Wiring Diagram — AT — MAIN

PFP:00000

ECS0062X

AT-MAIN-01



AT-486

TROUBLE DIAGNOSIS FOR POWER SUPPLY

[RE4F04B]

TCM TERMIN	ALS AND REFE	RENCE VALUE MEASURED BE	ETWEEN EACH TERMINAL AND 2	5 OR 48 (TCM GROUND)	
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	
10	BR/R	POWER SOURCE	IGNITION ON	BATTERY VOLTAGE	
10	Dn/n	POWER SOURCE	IGNITION OFF	APPROX. 0V	
19	BR/R	POWER SOURCE	IGNITION ON	BATTERY VOLTAGE	
19	BR/R	POWER SOURCE	IGNITION OFF	APPROX. 0V	
25	В	GROUND	_	-	A
28	D/D	POWER SOURCE	IGNITION ON	BATTERY VOLTAGE	
28	R/B	(MEMORY BACKUP)	IGNITION OFF	BATTERY VOLTAGE	
48	В	GROUND		_	

Diagnostic Procedure

ECS0062Y

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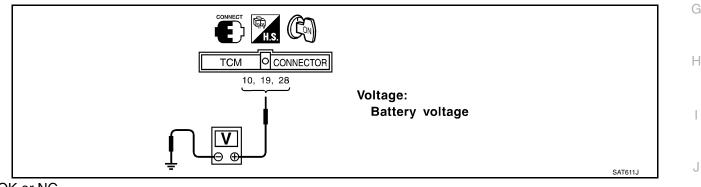
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1. CHECK TCM POWER SOURCE STEP 1

- 1. Turn ignition switch to ON position. (Do not start engine.)
- 2. Check voltage between TCM terminals 10 (BR/R), 19 (BR/R), 28 (R/B) and ground.

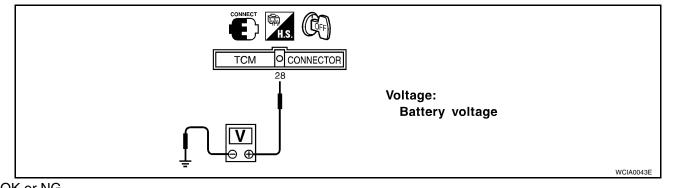


OK or NG

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

2. CHECK TCM POWER SOURCE STEP 2

- 1. Turn ignition switch to OFF position.
- 2. Check voltage between TCM terminal 28 (R/B) and ground.



OK or NG

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

3. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and TCM terminals 10, 19 and 28 (Main harness)
- Fuse
- Ignition switch Refer to <u>PG-2</u>, "POWER SUPPLY ROUTING".

OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK TCM GROUND CIRCUIT

- 1. Turn ignition switch to OFF position.
- 2. Disconnect TCM harness connector.
- 3. Check continuity between TCM terminals 25, 48 and ground. Refer to <u>AT-486, "Wiring Diagram AT MAIN"</u>.

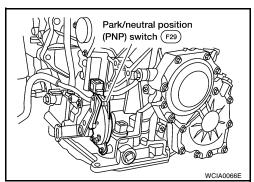
Continuity should exist.

OK or NG

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

Description

- The park/neutral position (PNP) switch includes a transmission range switch.
- The transmission range switch detects the selector lever position and sends a signal to the TCM.



ECS0062Z

PFP:32006

[RE4F04B]

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ECS00630

ECS00631

ECS00632

On Board Diagnosis Logic

Diagnostic trouble code PNP SW/CIRC with CONSULT-II or P0705 without CONSULT-II is detected when TCM does not receive the correct voltage signal from the switch based on the gear position.

Possible Cause

Check the following items.

- Harness or connectors (The park/neutral position (PNP) switch circuit is open or shorted.)
- Park/neutral position (PNP) switch

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

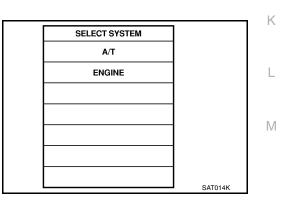
NOTE:

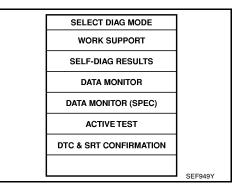
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON.



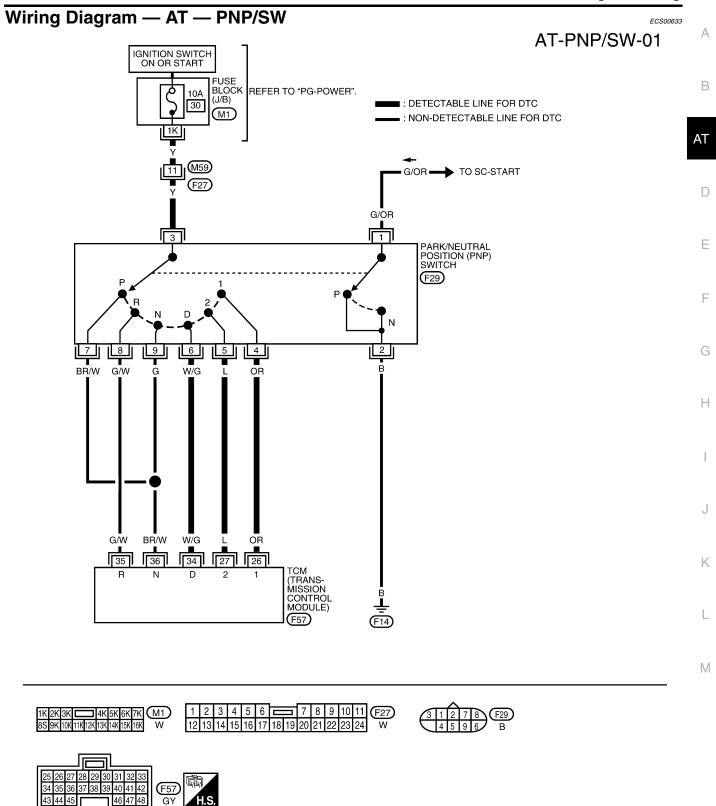


 Start engine and maintain the following conditions for at least 5 consecutive seconds. VHCL SPEED SE: 10 km/h (6 MPH) or more THRTL POS SEN: More than 1.3V Selector lever: D position (O/D ON or OFF)

WITH GST

Follow the procedure "With CONSULT-II".

[RE4F04B]



WCWA0077E

[RE4F04B]

TCM TERMIN	ALS AND REFEF	RENCE VALUE MEASURED BET	WEEN EACH TERMINAL AND 25 OF	R 48 (TCM GROUND)	
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	
26	OR	PNP SWITCH 1 POSITION	IGNITION ON AND SELECTOR LEVER IN 1 POSITION	BATTERY VOLTAGE	
20	on		IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V	
27	I	PNP SWITCH	IGNITION ON AND SELECTOR LEVER IN 2 POSITION	BATTERY VOLTAGE	
21	L 2 POS	L	2 POSITION	IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V
34	W/G	V/G PNP SWITCH D POSITION	IGNITION ON AND SELECTOR LEVER IN D POSITION	BATTERY VOLTAGE	
04	Wa		IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V	
35	G/W	PNP SWITCH	IGNITION ON AND SELECTOR LEVER IN R POSITION	BATTERY VOLTAGE	
33	35 G/W	R POSITION	IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V	
	PNP SWITCH	IGNITION ON AND SELECTOR LEVER IN P OR N POSITION	BATTERY VOLTAGE		
36	BR/W	P OR N POSITION	IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V	

Diagnostic Procedure

ECS00634

1. INSPECTION START

Do you have CONSULT-II? <u>Yes or No</u> Yes >> GO TO 2. No >> GO TO 6.

2. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

- 1. Turn ignition switch to ON position. (Do not start engine.)
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- Read out P, R, N, D, 2 and 1 position switches moving selector lever to each position. Check that the signal of the selector lever position is indicated properly.

OK or NG

OK	>> GO TO 7.
NG	>> GO TO 3.

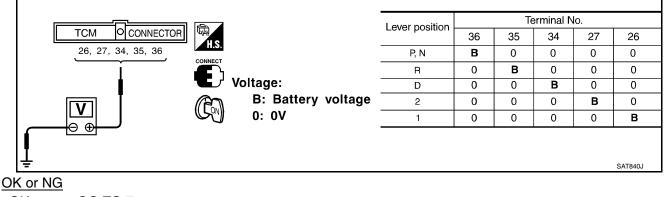
DATA MON	ITOR]
MONITORING		
PN POSI SW	OFF	
R POSITION SW	OFF	
D POSITION SW	OFF	
2 POSITION SW	ON	
1 POSITION SW	OFF	
		SAT701J

Check the following item:			
 Park/neutral position 			
		position (PNP) switch	[]
F29 terminals 1 (G/C	DR) and 2 (B) and b	etween terminals 3 (Y)	
		(G/W) and 9 (G) while	
moving manual shaft	through each position	on.	1, (3) 2,(4,5,6,7,8,9)
Lever position	Termi	nal No.	
Р	3 - 7	1 - 2	
R	3 - 8		Ω
Ν	3 - 9	1 - 2	
D	3 - 6		WCIA0096E
2	3 - 5		-
1	3 - 4		-
NG >> GO TO 4.			
NG >> GO TO 4. 1. CHECK MANUAL C Check PNP switch again est group 1.			m manual shaft of A/T assembly. Refer to
NG >> GO TO 4. 1. CHECK MANUAL C Check PNP switch again est group 1. <u>OK or NG</u>	with manual control	cable disconnected from	
NG >> GO TO 4. CHECK MANUAL C Check PNP switch again est group 1. <u>OK or NG</u> OK >> Adjust manua	with manual control al control cable. Refe		
NG >> GO TO 4. CHECK MANUAL C Check PNP switch again est group 1. <u>DK or NG</u> OK >> Adjust manua NG >> Repair or rep	with manual control al control cable. Refe blace PNP switch.	cable disconnected from	
NG >> GO TO 4. CHECK MANUAL C Check PNP switch again est group 1. <u>DK or NG</u> OK >> Adjust manual NG >> Repair or rep	with manual control al control cable. Refe blace PNP switch.	cable disconnected from	
NG >> GO TO 4. CHECK MANUAL C Check PNP switch again est group 1. <u>OK or NG</u> OK >> Adjust manua NG >> Repair or rep D. DETECT MALFUNC	with manual control al control cable. Refe blace PNP switch. TIONING ITEM	cable disconnected from	
NG >> GO TO 4. CHECK MANUAL C Check PNP switch again est group 1. OK or NG OK >> Adjust manua NG >> Repair or rep D. DETECT MALFUNC Check the following items	with manual control al control cable. Refe place PNP switch. TIONING ITEM	cable disconnected fror	
NG >> GO TO 4. CHECK MANUAL C Check PNP switch again est group 1. <u>OK or NG</u> OK >> Adjust manual NG >> Repair or rep D. DETECT MALFUNC Check the following items Harness for short or	with manual control al control cable. Refe blace PNP switch. TIONING ITEM s: open between ignitio	cable disconnected from er to <u>AT-645, "Control C</u> n switch and park/neut	able Adjustment" .
NG >> GO TO 4. 1. CHECK MANUAL C Check PNP switch again est group 1. <u>DK or NG</u> OK >> Adjust manual NG >> Repair or rep 5. DETECT MALFUNC Check the following items Harness for short or Harness for short or Fuse	with manual control al control cable. Refe blace PNP switch. TIONING ITEM s: open between ignitio	cable disconnected from er to <u>AT-645, "Control C</u> n switch and park/neut	able Adjustment" . ral position (PNP) switch (Main harness)
NG >> GO TO 4. 1. CHECK MANUAL C Check PNP switch again est group 1. <u>OK or NG</u> OK >> Adjust manual NG >> Repair or rep 5. DETECT MALFUNC Check the following items b Harness for short or Harness for short or b Fuse Ignition switch	with manual control al control cable. Refe blace PNP switch. TIONING ITEM S: open between ignitio open between park/r	cable disconnected from er to <u>AT-645, "Control C</u> on switch and park/neute neutral position (PNP) s	able Adjustment" . ral position (PNP) switch (Main harness)
NG >> GO TO 4. CHECK MANUAL C Check PNP switch again est group 1. OK or NG OK >> Adjust manua NG >> Repair or rep D. DETECT MALFUNC Check the following items Harness for short or Harness for short or Fuse Ignition switch Refer to <u>PG-2, "POW</u>	with manual control al control cable. Refe blace PNP switch. TIONING ITEM S: open between ignitio open between park/r	cable disconnected from er to <u>AT-645, "Control C</u> on switch and park/neute neutral position (PNP) s	able Adjustment" . ral position (PNP) switch (Main harness)
NG >> GO TO 4. 1. CHECK MANUAL C Check PNP switch again est group 1. <u>DK or NG</u> OK >> Adjust manual NG >> Repair or rep 5. DETECT MALFUNC Check the following items b Harness for short or b Harness for short or b Fuse Ignition switch	with manual control al control cable. Refe blace PNP switch. TIONING ITEM S: open between ignitio open between park/r	cable disconnected from er to <u>AT-645, "Control C</u> on switch and park/neute neutral position (PNP) s	able Adjustment" . ral position (PNP) switch (Main harness)

6. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

- 1. Turn ignition switch to ON position. (Do not start engine.)
- 2. Check voltage between TCM terminals 26 (OR), 27 (L), 34 (W/G), 35 (G/W), 36 (BR/W) and ground while moving selector lever through each position.



OK >> GO TO 7. NG >> GO TO 5.

7. СНЕСК DTC

Perform AT-489, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

OK >> INSPECTION END

NG >> GO TO 8.

8. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

Description

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

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approximately)	
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ	
				- n

On Board Diagnosis Logic

Diagnostic trouble code ATF TEMP SEN/CIRC with CONSULT-II or P0710 without CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

Check the following items.

- Harness or connectors (The sensor circuit is open or shorted.)
- A/T fluid temperature sensor

Diagnostic Trouble Code (DTC) Confirmation Procedure

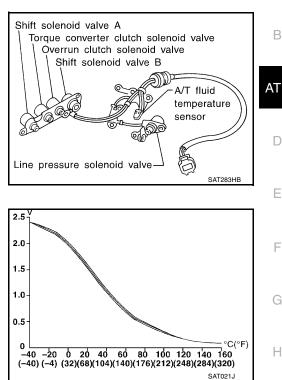
CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

After the repair, perform the following procedure to confirm the malfunction is eliminated.





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ECS00636

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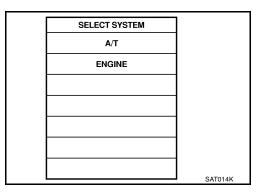
PFP:31940

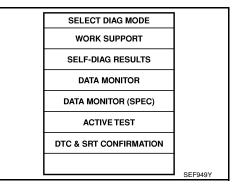
ECS00635

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WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.





Start engine and maintain the following conditions for at least 10 minutes (Total). (It is not necessary to maintain continuously.)
 CMPS-RPM (REF): 450 rpm or more
 VHCL SPEED SE: 10 km/h (6 MPH) or more

VHCL SPEED SE: 10 km/h (6 MPH) or more THRTL POS SEN: More than 1.2V Selector lever: D position (O/D ON)

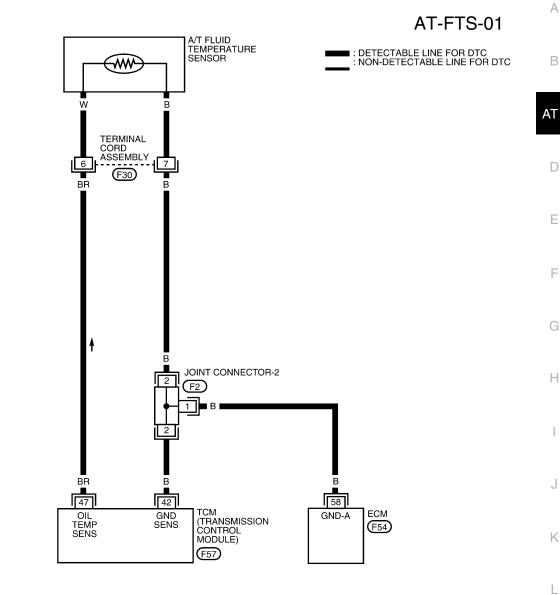
WITH GST

Follow the procedure "With CONSULT-II".

[RE4F04B]

ECS00639

Wiring Diagram — AT — FTS



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REFER TO THE FOLLOWING. F2 - JOINT CONNECTOR

F54 - ELECTRICAL UNITS

WCWA0014E

26 27 28 29 30 31 32 33

34 35

43 44 45

36 37 38 39 40 41 42

46 47 48

(F57)

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[RE4F04B]

TCM TERMIN	TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)						
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)			
42	В	SENSOR GROUND	_	_			
47	BR A/T FLUID TE	A/T FLUID TEMPERATURE	IGNITION ON AND ATF TEMPER- ATURE IS 20°C (68°F)	APPROX. 1.5V			
47	Bh	SENSOR	IGNITION ON AND ATF TEMPER- ATURE IS 80°C (176°F)	APPROX. 0.5V			

Diagnostic Procedure

ECS0063A

1. INSPECTION START

Do you have CONSULT-II? Yes or No Yes >> GO TO 2.

No >> GO TO 6.

2. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (WITH CONSULT-II)

With CONSULT-II

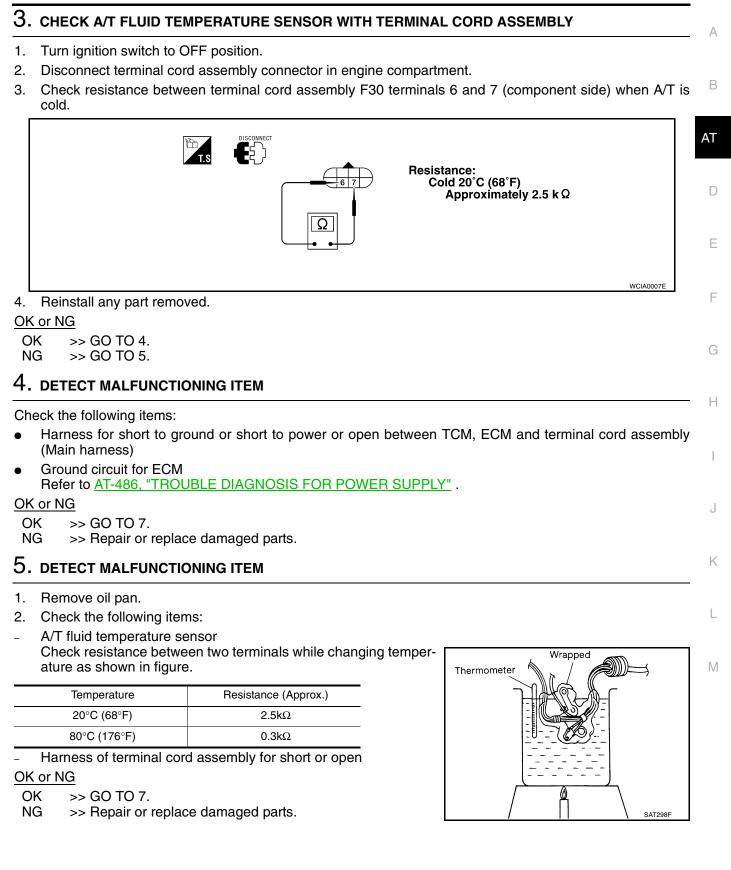
- 1. Start engine.
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3. Read out the value of "FLUID TEMP SE".

DA	DATA MONITOR	
MONITO	ORING	
VHCL/S SE	E-A/T	XXX km/h
VHCL/S SE	E-MTR	XXX km/h
THRTL PO	DS SEN	xxx v
FLUIDTEM	MP SE	xxx v
BATTERY	VOLT	xxx v

$\begin{array}{ll} \mbox{Voltage} & :\mbox{Cold} \ [20^\circ\mbox{C} \ (68^\circ\mbox{F})] \rightarrow \mbox{Hot} \ [80^\circ\mbox{C} \ (176^\circ\mbox{F})] \\ & :\mbox{Approximately} \ 1.5V \rightarrow 0.5V \end{array}$

OK or NG

OK	>> GO TO 7.
NG	>> GO TO 3.



[RE4F04B]

6. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (WITHOUT CONSULT-II)

8 Without CONSULT-II

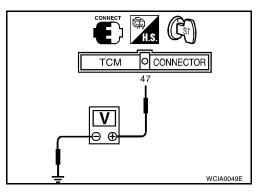
- 1. Start engine.
- 2. Check voltage between TCM connector F57 terminal 47 (BR) and ground while warming up A/T.

```
Voltage :Cold [20°C (68°F)] \rightarrow Hot [80°C (176°F)]
```

:Approximately $1.5V \rightarrow 0.5V$

OK or NG

OK >> GO TO 7. NG >> GO TO 3.



7. снеск отс

Perform AT-495, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

OK >> INSPECTION END NG >> GO TO 8.

8. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR) [RE4F04B]

DTC P0720 VEHICLE SPEED SENSOR A/T (REVOLUTION SENSOR)

Description

The revolution sensor detects the revolution of the idler gear parking pawl lock gear and emits a pulse signal. The pulse signal is sent to the TCM which converts it into vehicle speed.

On Board Diagnosis Logic

Diagnostic trouble code VEH SPD SEN/CIR AT with CONSULT-II or P0720 without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

Check the following items.

- Harness or connectors (The sensor circuit is open or shorted.)
- Revolution sensor

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

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

NOTE:

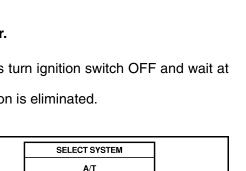
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

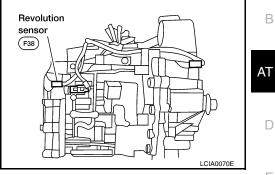
WITH CONSULT-II

Turn ignition switch ON and select "DATA MONITOR" mode for 1. "A/T" with CONSULT-II.

SELECT DIAG MODE	
SELF-DIAG RESULTS	
DATA MONITOR	
DTC WORK SUPPORT	
TCM PART NUMBER	
	SAT971J



ENGINE



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ECS0063C

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ECS0063B

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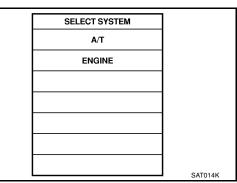
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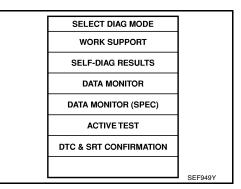
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DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) [RE4F04B]

- Drive vehicle and check for an increase of "VHCL/S SE·MTR" value. If the check result is NG, go to <u>AT-504, "Diagnostic Procedure"</u>. If the check result is OK, go to following step.
- 3. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.



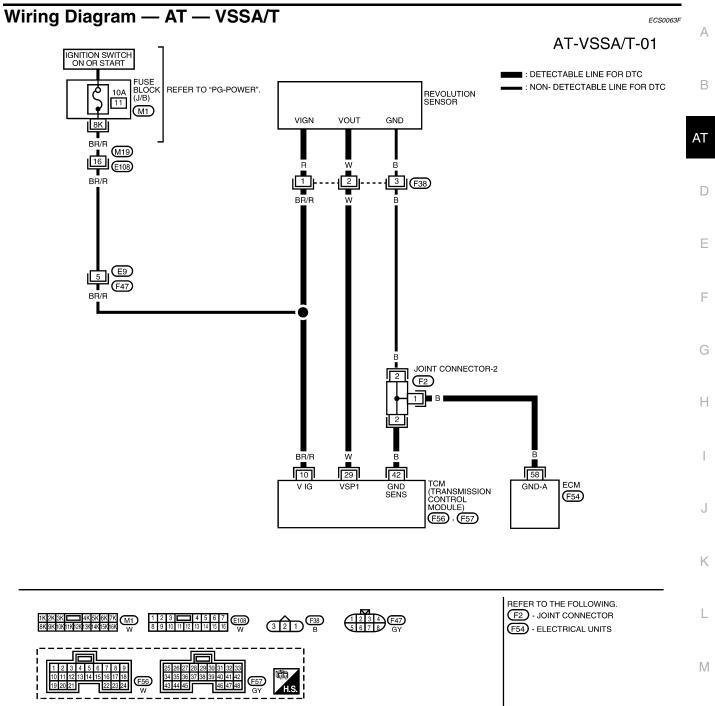


- 4. Start engine and maintain the following conditions for at least 5 consecutive seconds. VHCL SPEED SE: 30 km/h (19 MPH) or more THRTL POS SEN: More than 1.2V Selector lever: D position (O/D ON) Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test. If the check result is NG, go to <u>AT-504, "Diagnostic Procedure"</u>. If the check result is OK, go to following step.
- Maintain the following conditions for at least 5 consecutive seconds. CMPS·RPM (REF): 3,500 rpm or more THRTL POS SEN: More than 1.2V Selector lever: D position (O/D ON) Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

WITH GST

Follow the procedure "With CONSULT-II".

DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR) [RE4F04B]



WCWA0016E

DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR) [RE4F04B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
29	w	REVOLUTION SENSOR	VEHICLE MOVING AT 20 KM/H (12 MPH). USE THE CONSULT-II PULSE FREQUENCY MEASURING FUNCTION. A CIRCUIT TESTER CANNOT BE USED TO TEST THIS ITEM. CAUTION: CONNECT THE DIAG- NOSIS DATA LINK CABLE TO THE VEHICLE DIAGNOSIS CON- NECTOR.	450 HZ
			VEHICLE NOT MOVING.	LESS THAN 1.3V OR GREATER THAN 4.5V
42	В	SENSOR GROUND	_	_

Diagnostic Procedure

ECS0063G

1. CHECK INPUT SIGNAL (WITH CONSULT-II)

With CONSULT-II

- 1. Start engine.
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3. Read out the value of "VHCL/S SE-A/T" while driving. Check the value changes according to driving speed.

DATA MONITOR	
MONITORING	
VHCL/S SE-A/T XXX km/h	
VHCL/S SE-MTR XXX km/h	
THRTL POS SEN XXX V	
FLUID TEMP SE XXX V	
BATTERY VOLT XXX V	
	SAT6

OK or NG

OK >> GO TO 3. NG

>> GO TO 2.

2. CHECK REVOLUTION SENSOR (WITH CONSULT-II)

With CONSULT-II

1. Start engine.

Condition	Judgement standard (Approx.)	
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring func- tion. *1		
CAUTION: Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	450 Hz	
When vehicle parks.	Under 1.3V or over 4.5V	
		MTBL059

OK or NG

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

3. снеск отс

Perform AT-501, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or	NG	
OK	>> INSPECTION END	

NG >> GO TO 4.

4. CHECK TCM INSPECTION

Perform TCM input/output signal inspection.
 If NG, recheck TCM pin terminals for damage or loose connection with harness connector.
 OK or NG
 OK >> INSPECTION END
 NG >> Repair or replace damaged parts.

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DTC P0725 ENGINE SPEED SIGNAL

Description

The engine speed signal is sent from the ECM to the TCM.

On Board Diagnosis Logic

Diagnostic trouble code ENGINE SPEED SIG with CONSULT-II or P0725 without CONSULT-II is detected when TCM does not receive the proper voltage signal from ECM.

Possible Cause

Check harness or connectors. (The sensor circuit is open or shorted.)

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

Turn ignition switch ON and select "DATA MONITOR" mode for 1. "ENGINE" with CONSULT-II.

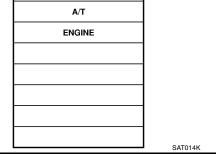
> SELECT DIAG MODE WORK SUPPORT SELF-DIAG RESULTS DATA MONITOR DATA MONITOR (SPEC) ACTIVE TEST **DTC & SRT CONFIRMATION** SEF949Y

Start engine and maintain the following conditions for at least 10 consecutive seconds. 2. VHCL SPEED SE: 10 km/h (6 MPH) or more THRTL POS SEN: More than 1.2V Selector lever: D position (O/D ON)

WITH GST

Follow the procedure "With CONSULT-II".

SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K





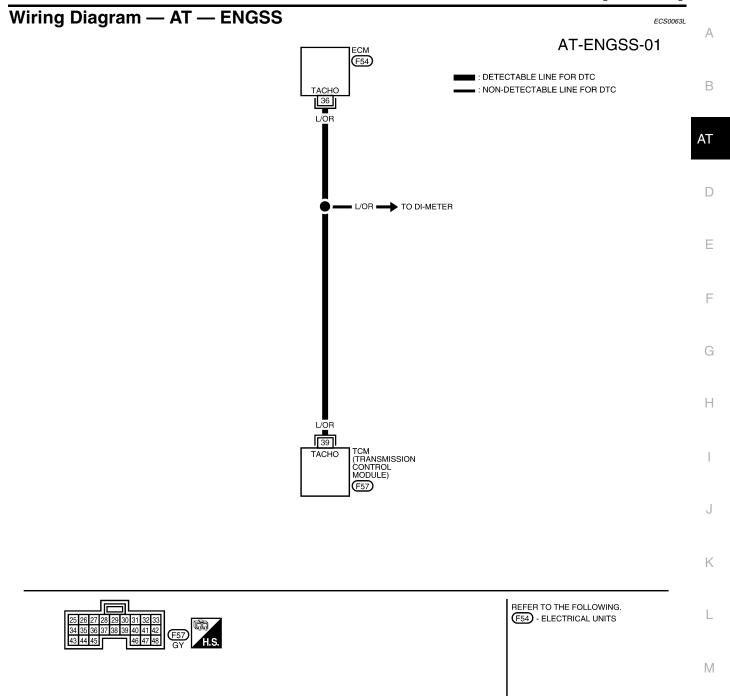
ECS0063H

ECS00631

ECS0063J

ECS0063K

[RE4F04B]



[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)					
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	
39	L/OR	ENGINE SPEED SIGNAL	WITH ENGINE RUNNING AT IDLE SPEED	APPROX. 0.6V	
	L/ON		WITH ENGINE RUNNING AT 3,000 RPM	APPROX. 2.2V	

Diagnostic Procedure

ECS0063M

1. СНЕСК DTC WITH ЕСМ

 Check P code with CONSULT-II "ENGINE". Turn ignition switch ON and select "SELF-DIAGNOSTIC RESULTS" mode for "ENGINE" with CONSULT-II.

Refer to EC-1259, "Malfunction Indicator Lamp (MIL)" .

OK or NG

OK (with CONSULT-II)>>GO TO 2.

OK (without CONSULT-II)>>GO TO 4.

NG >> Check ignition signal circuit for engine control. Refer to EC-1761, "IGNITION SIGNAL".

2. CHECK INPUT SIGNAL (WITH CONSULT-II)

With CONSULT-II

- 1. Start engine.
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3. Read out the value of "ENGINE SPEED". Check engine speed changes according to throttle position.

OK or NG

OK >> GO TO 6. NG >> GO TO 3.

DATA MOI	DATA MONITOR	
MONITORING	MONITORING	
ENGINE SPEED	XXX rpm	
TURBINE REV	XXX rpm	
OVERDRIVE SW	ON	
PN POSI SW	OFF	
R POSITION SW	OFF	
		SAT645

3. DETECT MALFUNCTIONING ITEM

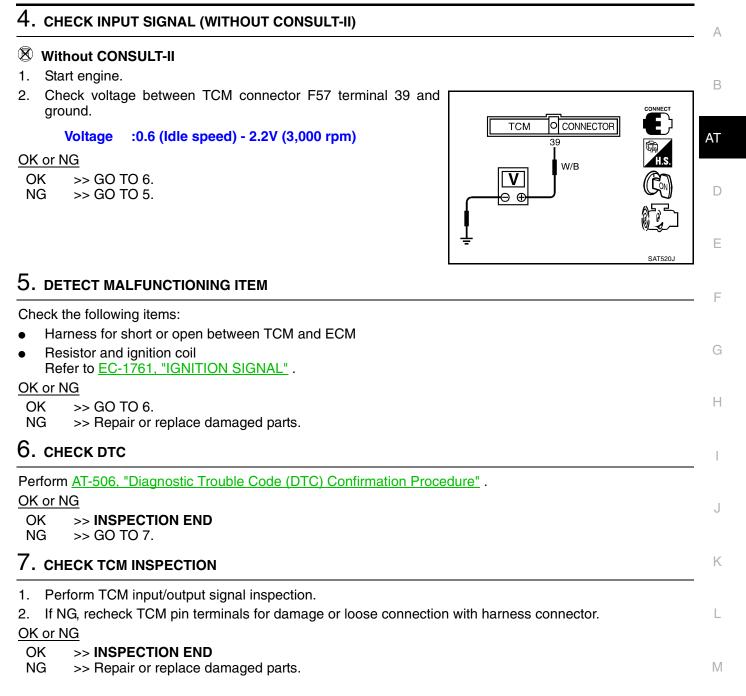
Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil Refer to <u>EC-1761, "IGNITION SIGNAL"</u>.

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace damaged parts.

[RE4F04B]



DTC P0731 A/T 1ST GEAR FUNCTION

Description

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into first gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

On Board Diagnosis Logic

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:

Torque converter slip ratio = A x C/B

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is higher than the position (1st) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.

This malfunction will be caused when either shift solenoid valve A is stuck open or shift solenoid valve B is stuck open.

Gear positions supposed by TCM are as follows.

In case of gear position with no malfunctions: 1, 2, 3 and 4 positions

In case of gear position with shift solenoid valve A stuck open: 2* , 2, 3 and 3 positions

In case of gear position with shift solenoid value B stuck open: 4^* , 3, 3 and 4 positions to each gear position above

*: P0731 is detected.

Diagnostic trouble code A/T 1ST GR FNCTN with CONSULT-II or P0731 without CONSULT-II is detected when A/T cannot be shifted to the 1st gear position even if electrical circuit is good.

Possible Cause

Check the following items.

- Shift solenoid valve A
- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

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

NOTE:

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

TESTING CONDITION:

Always drive vehicle on a level road to improve the accuracy of test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

PFP:31940

[RE4F04B]

ECS0063N

ECS00630

ECS0063P

ECS0063Q

111.010

WITH CONSULT-II

- 1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SEN: 0.4 - 1.5V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).

- 3. Select "1ST GR FNCTN P0731" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
- 4. Accelerate vehicle to 20 to 25 km/h (12 to 16 MPH) under the following condition and release the accelerator pedal completely.

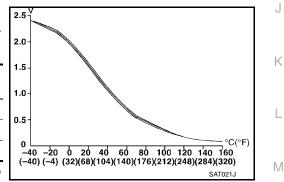
THROTTLE POSI: Less than 1.0/8 (at all times during step 4) Selector lever: D position (O/D ON)

- Check that "GEAR" shows "2" after releasing pedal.
- 5. Depress accelerator pedal to WOT (more than 7.0/8 of "THROT-TLE POSI") quickly from a speed of 20 to 25 km/h (12 to 16 MPH) until "TESTING" changes to "STOP VEHICLE" or "COM-PLETED". (It will take approximately 3 seconds.) If the check result NG appears on CONSULT-II screen, go to <u>AT-513. "Diagnostic Procedure"</u>. If "STOP VEHICLE" appears on CONSULT-II screen, go to the following step.

Check that "GEAR" shows "1" when depressing accelerator pedal to WOT.

- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS" for "ENGINE". In case a 1st trip DTC other than P0731 is shown, refer to applicable "TROUBLE DIAG-NOSIS FOR DTC".
- 6. Stop vehicle.
- 7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

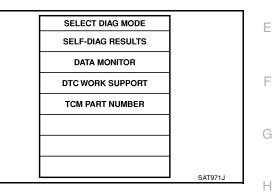
Vehicle condition	Gear on actual transmission shift pattern when screen is changed to $1 \to 2 \to 3 \to 4$
No malfunction exists.	$1 \rightarrow 2 \rightarrow 3 \rightarrow 4$
Molfunction for D0701 ovicto	$2 \rightarrow 2 \rightarrow 3 \rightarrow 3$
Malfunction for P0731 exists.	$4 \rightarrow 3 \rightarrow 3 \rightarrow 4$



 Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".) Refer to <u>AT-513, "Diagnostic Procedure"</u>. Refer to <u>AT-750, "Shift Schedule"</u>.

WITH GST

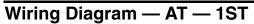
Follow the procedure "With CONSULT-II".

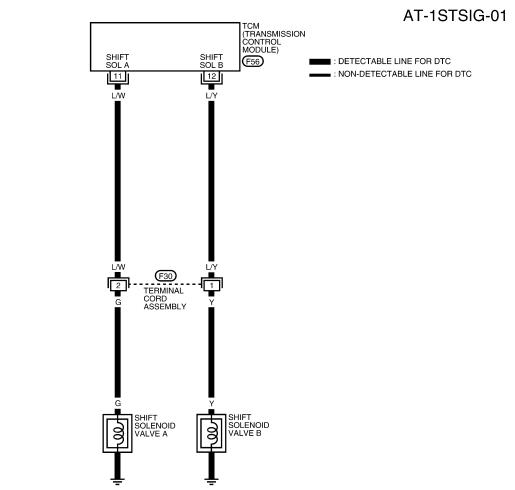


[RE4F04B]

[RE4F04B]

ECS0063R







WCWA0021E

[RE4F04B]

ICM TERMIN		RENCE VALUE MEASURED BET	WEEN EACH TERMINAL AND 25 O	R 48 (TCM GROUND)	
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	
11	11 L/W SHIFT SOLENOID VALVE A		WHEN SHIFT SOLENOID VALVE A IS OPERATING (DRIVING IN D1 OR D4)	BATTERY VOLTAGE	
11	L	V SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A WHEN SHIFT SOLENOID VALVE A IS NOT OPERATING (DRIVING IN D2 OR D3)	APPROX. 0V	A
12	LY		WHEN SHIFT SOLENOID VALVE B IS OPERATING (DRIVING IN D1 OR D2)	BATTERY VOLTAGE	
12	12 L/Y SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS NOT OPERATING (DRIVING IN D3 OR D4)	APPROX. 0V		

Diagnostic Procedure

ECS0063S

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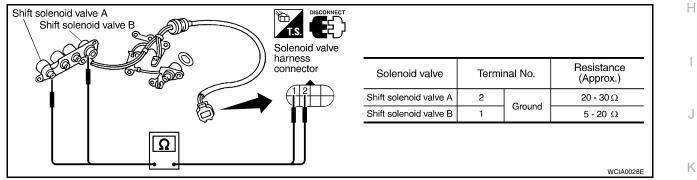
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1. CHECK VALVE RESISTANCE

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" .
- Shift solenoid valve A _
- Shift solenoid valve B
- 2. Check resistance between terminal cord assembly F30 terminals 1 and 2, and ground.



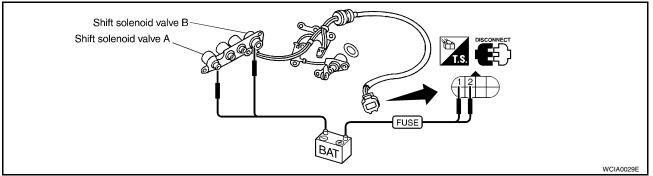
OK or NG

OK >> GO TO 2.

NG >> Repair or replace damaged parts.

2. CHECK VALVE OPERATION

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL".
- Shift solenoid valve A
- Shift solenoid valve B
- 2. Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.



OK or NG

OK >> GO TO 3.

NG >> Repair or replace shift solenoid valve assembly.

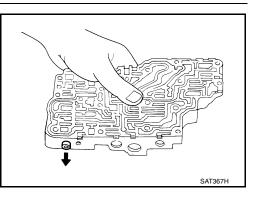
3. CHECK CONTROL VALVE

- 1. Disassemble control valve assembly. Refer to <u>AT-677, "DISAS-</u> <u>SEMBLY"</u>.
- 2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 4.

NG >> Repair control valve assembly.



4. снеск отс

Perform AT-510, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

- OK >> INSPECTION END
- NG >> Check control valve again. Repair or replace control valve assembly.

DTC P0732 A/T 2ND GEAR FUNCTION

Description

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis
 B malfunction.
- This malfunction is detected when the A/T does not shift into second gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position	1	2	3	4	-
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	D
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)	

On Board Diagnosis Logic

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:

Torque converter slip ratio = A x C/B

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is higher than the position (2nd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.

This malfunction will be caused when shift solenoid valve B is stuck open.

Gear positions supposed by TCM are as follows.

In case of gear position with no malfunctions: 1, 2, 3 and 4 positions

In case of gear position with shift solenoid value B stuck open: 4, 3^* , 3 and 4 positions to each gear position above

*: P0732 is detected.

Diagnostic trouble code A/T 2ND GR FNCTN with CONSULT-II or P0732 without CONSULT-II is detected when A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.

Possible Cause

Check the following items.

- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

• Always drive vehicle at a safe speed.

• Be careful not to rev engine into the red zone on the tachometer.

NOTE:

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

TESTING CONDITION:

Always drive vehicle on a level road to improve the accuracy of test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

PFP:31940

ECS0063T

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ECS0063U

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ECS0063V

ECS0063W

WITH CONSULT-II

- 1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SEN: 0.4 - 1.5V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).

- 3. Select "2ND GR FNCTN P0732" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
- Accelerate vehicle to 63 to 68 km/h (39 to 42 MPH) under the following condition and release the accelerator pedal completely.

THROTTLE POSI: Less than 1.0/8 Selector lever: D position (O/D ON)

- Check that "GEAR" shows "3" or "4" after releasing pedal.
- Depress accelerator pedal to WOT (more than 7.0/8 of "THROT-TLE POSI") quickly from a speed of 63 to 68 km/h (39 to 42 MPH) until "TESTING" changes to "STOP VEHICLE" or "COM-PLETE". (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to <u>AT-518</u>, "Diagnostic Procedure".

If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.

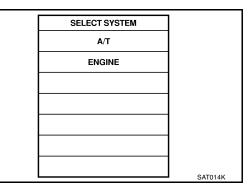
- Check that "GEAR" shows "2" when depressing accelerator pedal to WOT.
- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS" for "ENGINE". In case a 1st trip DTC other than P0732 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".
- 6. Stop vehicle.
- 7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

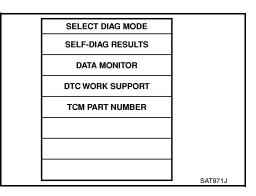
Vehicle condition	Gear on actual transmission shift pattern when screen is changed to $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$
No malfunction exists	$1 \rightarrow 2 \rightarrow 3 \rightarrow 4$
Malfunction for P0732 exists.	$4 \rightarrow 3 \rightarrow 3 \rightarrow 4$

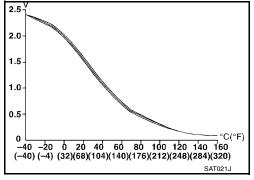
 Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".) Refer to <u>AT-518, "Diagnostic Procedure"</u>. Refer to <u>AT-750, "Shift Schedule"</u>.

WITH GST

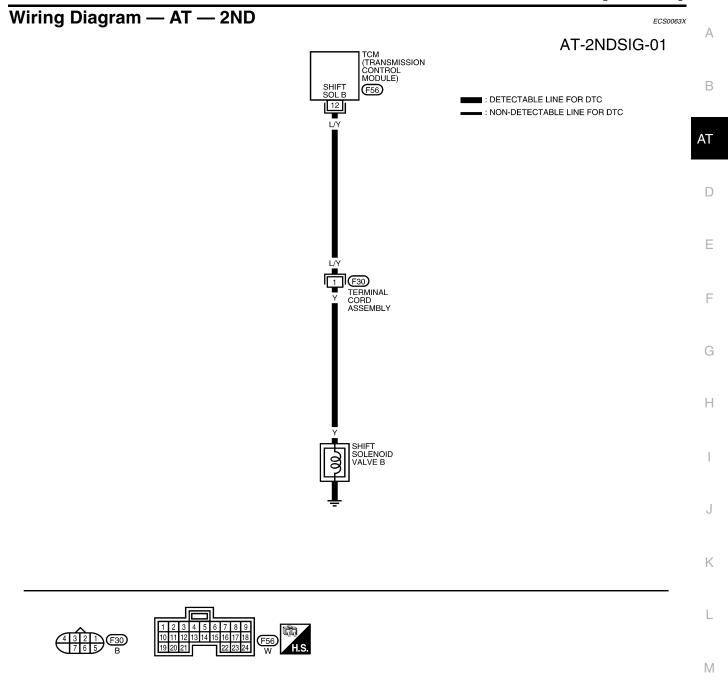
Follow the procedure "With CONSULT-II".







[RE4F04B]



WCWA0022E

[RE4F04B]

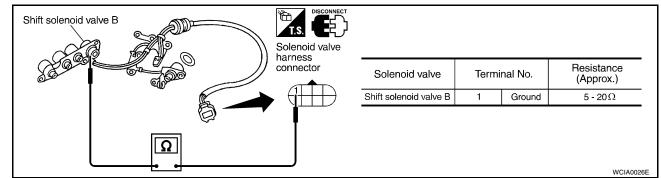
TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)					
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS OPERATING (DRIVING IN D1 OR D2)	BATTERY VOLTAGE	
	L/T	STILL SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS NOT OPERATING (DRIVING IN D3 OR D4)	APPROX. 0V	

Diagnostic Procedure

ECS0063Y

1. CHECK VALVE RESISTANCE

- 1. Remove control valve assembly. Refer to <u>AT-642, "REMOVAL"</u>.
- Shift solenoid valve B
- 2. Check resistance between terminal cord assembly F30 terminal 1 and ground.

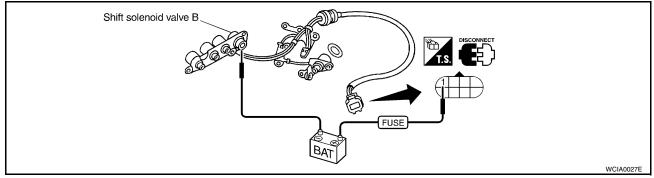


OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace shift solenoid valve assembly.

2. CHECK VALVE OPERATION

- 1. Remove control valve assembly. Refer to <u>AT-642, "REMOVAL"</u>.
- Shift solenoid valve B
- 2. Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.



OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace shift solenoid valve assembly.

3. CHECK CONTROL VALVE

- 1. Disassemble control valve assembly. Refer to AT-677, "DISAS-SEMBLY".
- Check to ensure that: 2.
- Valve, sleeve and plug slide along valve bore under their own _ weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

- OK >> GO TO 4.
- NG >> Repair control valve assembly.

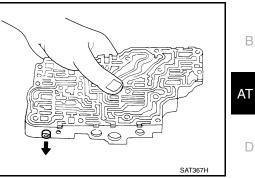
СНЕСК DTC

Perform AT-515, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

OK >> INSPECTION END

NG >> Check control valve again. Repair or replace control valve assembly.



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DTC P0733 A/T 3RD GEAR FUNCTION

Description

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into third gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning servo piston or brake band, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

On Board Diagnosis Logic

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:

Torque converter slip ratio = $A \times C/B$

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is higher than the position (3rd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.

This malfunction will be caused when shift solenoid valve A is stuck closed.

Gear positions supposed by TCM are as follows.

In case of gear position with no malfunctions: 1, 2, 3 and 4 positions

In case of gear position with shift solenoid valve A stuck closed: 1, 1, 4* and 4 positions to each gear position above

*: P0733 is detected.

Diagnostic trouble code A/T 3RD GR FNCTN with CONSULT-II or P0733 without CONSULT-II is detected when A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.

Possible Cause

Check the following items.

- Shift solenoid valve A
- Each clutch
- Hydraulic control circuit

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

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

NOTE:

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

TESTING CONDITION:

Always drive vehicle on a level road to improve the accuracy of test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

[RE4F04B]

PFP:31940

ECS0063Z

ECS00640

ECS00641

ECS00642

WITH CONSULT-II

- 1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SEN: 0.4 - 1.5V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).

- 3. Select "3RD GR FNCTN P0733" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
- 4. Accelerate vehicle to 80 to 95 km/h (50 to 59 MPH) under the following condition and release the accelerator pedal completely.

THROTTLE POSI: Less than 1.0/8 (at all times during step 4) Selector lever: D position (OD "ON")

- Check that "GEAR" shows "4" after releasing pedal.
- Depress accelerator pedal steadily with 3.5/8 4.5/8 of "THROT-TLE POSI" from a speed of 80 to 95 km/h (50 to 59 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.) If the check result NG appears on CONSULT-II screen, go to AT-

If the check result NG appears on CONSULT-II screen, go to <u>AT-</u> 523, "Diagnostic Procedure".

If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.

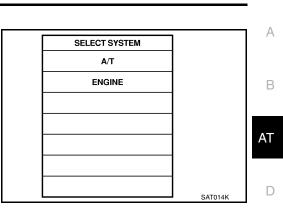
- Check that "GEAR" shows "3" when depressing accelerator pedal with 3.5/8 - 4.5/8 of "THROTTLE POSI".
- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS" for "ENGINE". In case a 1st trip DTC other than P0733 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".
- 6. Stop vehicle.
- 7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

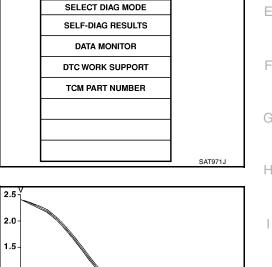
Vehicle condition	Gear on actual transmission shift pattern when screen is changed to $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$
No malfunction exists.	$1 \rightarrow 2 \rightarrow 3 \rightarrow 4$
Malfunction for P0733 exists.	$1 \rightarrow 1 \rightarrow 4 \rightarrow 4$

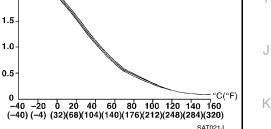
 Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".) Refer to <u>AT-523, "Diagnostic Procedure"</u>. Refer to AT-750, "Shift Schedule".

WITH GST

Follow the procedure "With CONSULT-II".

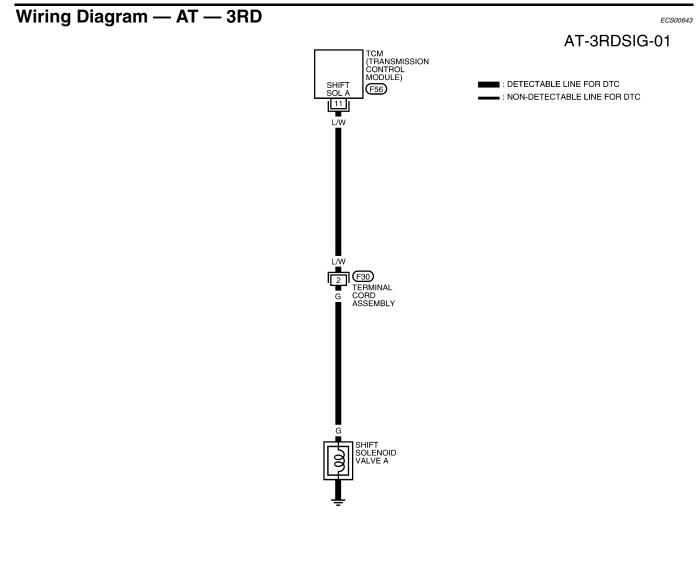


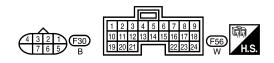




[RE4F04B]

[RE4F04B]





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[RE4F04B]

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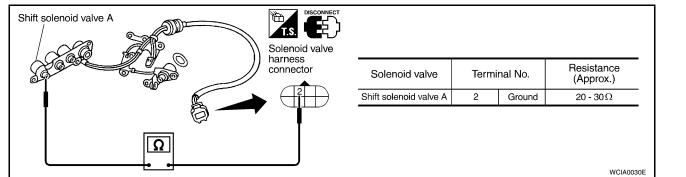
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TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)					
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	/
11	L/W	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A IS OPERATING (DRIVING IN D1 OR D4)	BATTERY VOLTAGE	E
11	L/ VV	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A IS NOT OPERATING (DRIVING IN D2 OR D3)	APPROX. 0V	

Diagnostic Procedure

1. CHECK VALVE RESISTANCE

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" .
- Shift solenoid valve A
- 2. Check resistance between terminal cord assembly F30 terminal 2 and ground.

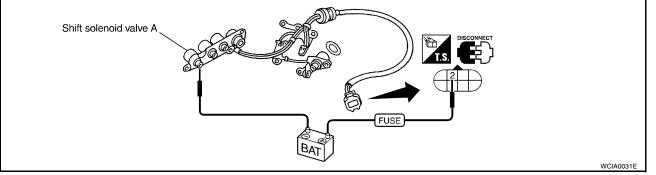


OK or NG

- OK >> GO TO 2. NG >> Repair or
 - >> Repair or replace shift solenoid valve assembly.

2. CHECK VALVE OPERATION

- 1. Remove control valve assembly. Refer to <u>AT-642, "REMOVAL"</u>.
- Shift solenoid valve A
- 2. Check solenoid valve by listening for its operating sound while applying battery voltage and ground ot the solenoid.



OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace shift solenoid valve assembly.

3. CHECK CONTROL VALVE

- Disassemble control valve assembly. Refer to AT-677, "DISAS-1. SEMBLY".
- Check to ensure that: 2.
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

- OK >> GO TO 4.
- NG >> Repair control valve assembly.

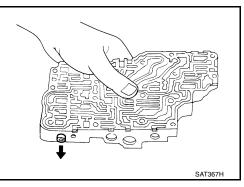
CHECK DTC

Perform AT-520, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

OK >> INSPECTION END

NG >> Check control valve again. Repair or replace control valve assembly.



[RE4F04B]

DTC P0734 A/T 4TH GEAR FUNCTION

Description

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis
 B malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or the torque converter clutch does not lock up as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

Gear position	1	2	3	4	D
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	-
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)	_

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification	
Torque converter clutch solenoid valve duty	Lock-up OFF \downarrow	Approximately 4% ↓	
Solonola valve daty	Lock-up ON	Approximately 94%	(
Line pressure solenoid	Small throttle opening (Low line pressure) \downarrow	Approximately 24% ↓	
valve duty	Large throttle opening (High line pressure)	Approximately 95%	
			·

On Board Diagnosis Logic

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:

Torque converter slip ratio = A x C/B

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction. This malfunction will be caused when shift solenoid value B is stuck closed.

Gear positions supposed by TCM are as follows.

In case of gear position with no malfunctions: 1, 2, 3 and 4 positions

In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and 1* positions to each gear position above

*: P0734 is detected.

Diagnostic trouble code A/T 4TH GR FNCTN with CONSULT-II or P0734 without CONSULT-II is detected when A/T cannot be shifted to the 4th gear position even if electrical circuit is good.

Possible Cause

Check the following items.

- Shift solenoid valve A
- Shift solenoid valve B
- Line pressure solenoid valve
- Each clutch
- Hydraulic control circuit

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

- Always drive vehicle at a safe speed.
- If conducting this "DTC CONFIRMATION PROCEDURE" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.
- Be careful not to rev engine into the red zone on the tachometer.

AT-525

[RE4F04B]

PFP:31940

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ECS00647

[RE4F04B]

NOTE:

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

TESTING CONDITION:

Always drive vehicle on a level road to improve the accuracy of test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

- 1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SEN: 0.4 - 1.5V

If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).

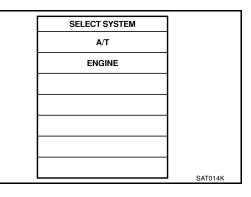
- 3. Select "4TH GR FNCTN P0734" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
- 4. Accelerate vehicle to 60 to 70 km/h (37 to 43 MPH) under the following condition and release the accelerator pedal completely.

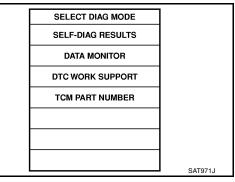
THROTTLE POSI: Less than 5.5/8 (at all times during step 4) Selector lever: D position (O/D ON)

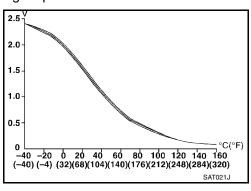
- Check that "GEAR" shows "3" after releasing pedal.
- Depress accelerator pedal steadily with 1.0/8 2.0/8 of "THROT-TLE POSI" from a speed of 60 to 70 km/h (37 to 43 MPH) until "TESTING" has turned to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.) If the check result NG appears on CONSULT-II screen, go to <u>AT-528, "Diagnostic Procedure"</u>.

If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.

- Check that "GEAR" shows "4" when depressing accelerator pedal with 1.0/8 2.0/8 of "THROTTLE POSI".
- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS" for "ENGINE". In case a 1st trip DTC other than P0734 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".
- 6. Stop vehicle.
- 7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)







Vehicle condition	Gear on actual transmission shift pattern when screen is changed to $1 \to 2 \to 3 \to 4$	
No malfunction exists	$1 \rightarrow 2 \rightarrow 3 \rightarrow 4$	
Malfunction for P0734 exists.	$1 \rightarrow 2 \rightarrow 2 \rightarrow 1$	

 Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".) Refer to <u>AT-528, "Diagnostic Procedure"</u>. Refer to AT-750, "Shift Schedule".

WITH GST

Follow the procedure "With CONSULT-II".

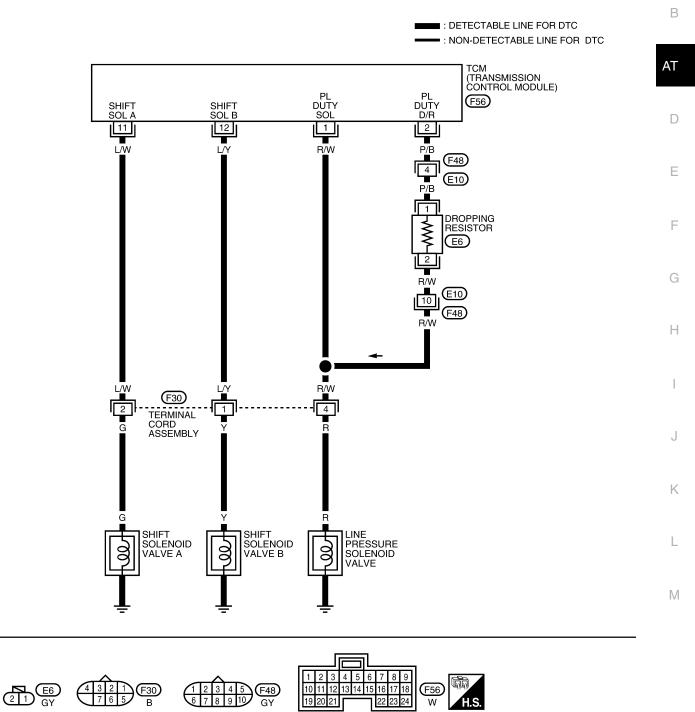
Wiring Diagram — AT — 4TH

[RE4F04B]

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AT-4THSIG-01



[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1 B/W	LINE PRESSURE SOLENOID	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	APPROX. 1.5 - 3.0V	
I	1774	VALVE	WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	APPROX. 0V
2	P/B		WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	APPROX. 4 - 14V
2		VALVE (DROPPING RESIS- TOR)	WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	APPROX. 0V
		WHEN SHIFT SOLENOID VALVE A IS OPERATING (DRIVING IN D1 OR D4)	BATTERY VOLTAGE	
11 L/W SHIFT SOLENOID VALVE A		WHEN SHIFT SOLENOID VALVE A IS NOT OPERATING (DRIVING IN D2 OR D3)	APPROX. 0V	
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS OPERATING (DRIVING IN D1 OR D2)	BATTERY VOLTAGE
12	L/ I	SHILL SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE BE IS NOT OPERATING (DRIV- ING IN D3 OR D4)	APPROX. 0V

Diagnostic Procedure

ECS0064A

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1. CHECK SHIFT UP (D3 TO D4)

During <u>AT-463, "Cruise Test — Part 1"</u> , does A/T shift from D3 to D4 at the specified speed?	
<u>Yes or No</u> Yes >> GO TO 11. No >> GO TO 2.	Accelerator pedal

Halfway

2. CHECK LINE PRESSURE

Perform line pressure test.

Engine Speed	Line Pressure k	Pa (kg/cm ² , psi)
RPM	D, 2 and 1 Position	R Position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,223 (12.6, 179)	1,918 (19.6, 278)

Refer to AT-454, "Line Pressure Test" .

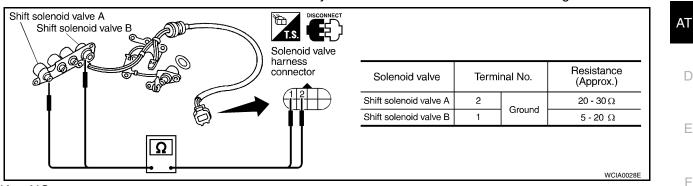
OK or NG

OK >> GO TO 3. NG >> GO TO 7.

[RE4F04B]

3. CHECK VALVE RESISTANCE

- Remove control valve assembly. Refer to AT-642, "REMOVAL" . 1.
- Shift solenoid valve A
- Shift solenoid valve B
- Check resistance between terminal cord assembly connector F30 terminals 1 and 2 and ground. 2.

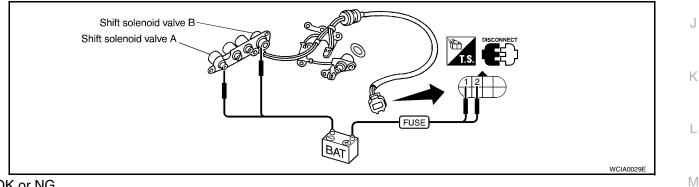


OK or NG

OK >> GO TO 5.

4. CHECK VALVE OPERATION

- Remove control valve assembly. Refer to AT-642, "REMOVAL" . 1.
- Shift solenoid valve A
- Shift solenoid valve B
- 2. Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.



OK or NG

- OK >> GO TO 5.
- NG >> Replace solenoid valve assembly.

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NG >> Replace solenoid valve assembly.

5. CHECK CONTROL VALVE

- Disassemble control valve assembly. Refer to <u>AT-677, "DISAS-</u> <u>SEMBLY"</u>.
- 2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 6.

NG >> Repair control valve.

6. CHECK SHIFT UP (D3 TO D4)

Does A/T shift from D3 to D4 at the specified speed?

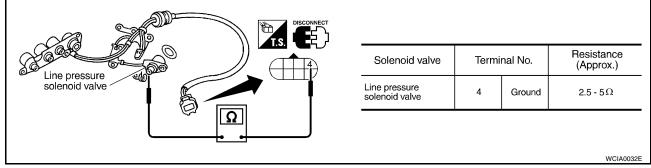
Yes or No

Yes >> GO TO 11.

No >> Check control valve again. Repair or replace control valve assembly.

7. CHECK VALVE RESISTANCE

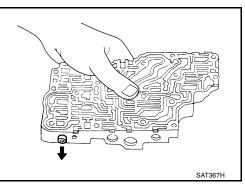
- 1. Remove control valve assembly. Refer to <u>AT-642, "REMOVAL"</u>.
- Line pressure solenoid valves
- 2. Check resistance between the terminal cord assembly connector F30 terminal 4 and ground.



OK or NG

OK >> GO TO 9.

NG >> Replace solenoid valve assembly.



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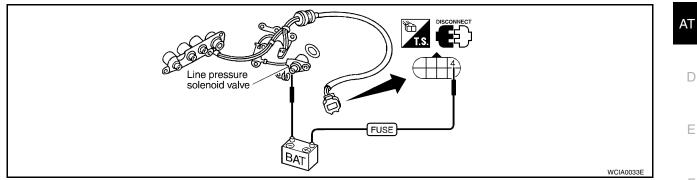
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8. CHECK VALVE OPERATION

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL".
- Line pressure solenoid valves _
- В 2. Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.



OK or NG

OK >> GO TO 9.

>> Replace solenoid valve assembly. NG

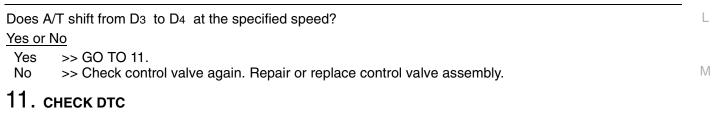
9. CHECK CONTROL VALVE

- Disassemble control valve assembly. Refer to AT-677, "DISAS-1. SEMBLY".
- 2. Check line pressure circuit valves for sticking.
- Pressure regulator valve
- Pilot valve
- Pressure modifier valve

OK or NG

- OK >> GO TO 10.
- NG >> Repair control valve.

10. CHECK SHIFT UP (D3 TO D4)



Perform AT-525, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

OK >> INSPECTION END

NG >> Perform "Cruise test — Part 1" again and return to the start point of this test group.



DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Description

The torque converter clutch solenoid valve is activated, with the gear in D4, by the TCM in response to signals sent from the vehicle speed and the ECM (throttle opening). Lock-up piston operation will then be controlled.

Lock-up operation, however, is prohibited when A/T fluid temperature is too low.

When the accelerator pedal is depressed (less than 2/8) in lock-up condition, the engine speed should not change abruptly. If there is a big jump in engine speed, there is no lock-up.

Shift solenoid valve A Torque converter clutch solenoid valve Overrun clutch solenoid valve Shift solenoid valve B A/T fluid temperature sensor Line pressure solenoid valve SAT283HE

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification	
Torque converter clutch solenoid valve duty	Lock-up OFF ↓ Lock-up ON	Approximately 4% ↓ Approximately 94%	

On Board Diagnosis Logic

Diagnostic trouble code TCC SOLENOID/CIRC with CONSULT-II or P0740 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

Check the following items.

- Torque converter clutch solenoid valve
- Harness or connectors (The solenoid circuit is open or shorted.)

Diagnostic Trouble Code (DTC) Confirmation Procedure

NOTE:

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

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1 Turn ignition switch ON.

SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K
	SAT014K

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ECS0064C

ECS0064E

PFP:31940

[RE4F04B]

ECS0064B

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE [RE4F04B]

2. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II and wait at least 1 second.

SELECT DIAG MODE	
WORK SUPPORT	
SELF-DIAG RESULTS	
DATA MONITOR	
DATA MONITOR (SPEC)	
ACTIVE TEST	
DTC & SRT CONFIRMATION	
	SEF949Y

WITH GST

Follow the procedure "With CONSULT-II".

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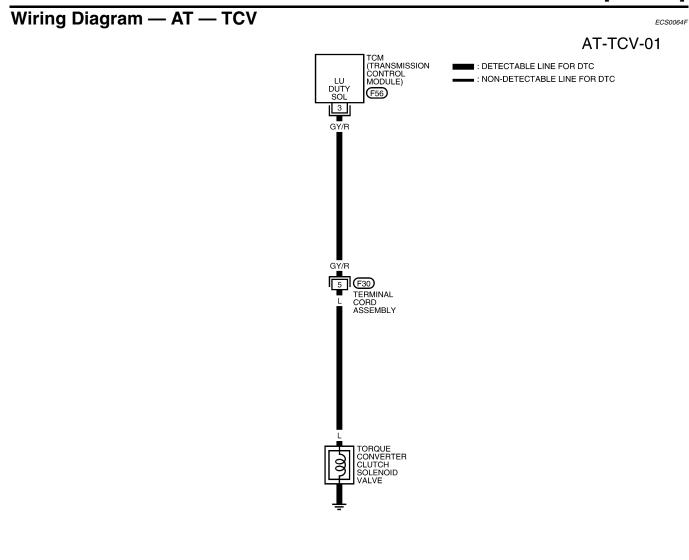
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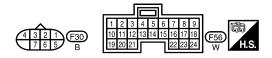
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DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE [RE4F04B]





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DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

[RE4F04B]

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TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)					
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	Α
3 GY/R TORQUE CONVERTER CLUTCH SOLENOID VALVE	GV/B	TORQUE CONVERTER	WITH TORQUE CONVERTER LOCK-UP	APPROX. 8 - 15V	
	WITHOUT TORQUE CON- VERTER LOCK-UP	APPROX. 0V	В		

Diagnostic Procedure

1. CHECK VALVE RESISTANCE

- Turn ignition switch to OFF position. 1.
- 2. Disconnect terminal cord assembly connector in engine compartment.
- 3. Check resistance between terminal cord assembly connector F30 terminal 5 and ground.

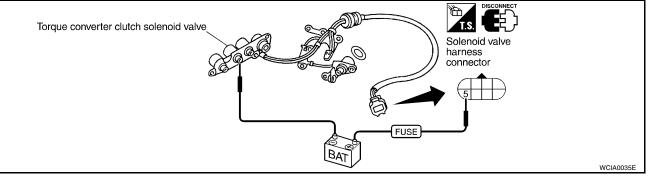
Sub-harness connector		F
	Resistance: 5 - 20 Ω (Approx.)	G
	WCIA0034E	Н
OK or NG		

OK

>> GO TO 3. NG >> GO TO 2.

2. CHECK VALVE OPERATION

- 1. Remove oil pan.
- 2. Check the following items:
- Torque converter clutch solenoid valve
- Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the • solenoid.



Harness of terminal cord assembly for short or open

OK or NG

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

3. CHECK POWER SOURCE CIRCUIT

- 1. Turn ignition switch to OFF position.
- 2. Disconnect TCM harness connector.
- Check continuity between terminal cord assembly harness connector F30 terminal 5 and TCM harness connector F56 terminal 3. Refer to <u>AT-534, "Wiring Diagram — AT — TCV"</u>.

Continuity should exist.

4. Reinstall any part removed.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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Perform AT-532, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

OK >> INSPECTION END

NG >> GO TO 5.

5. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

Description

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the O/D OFF indicator lamp is indicating another self-diagnosis
 B malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or the torque converter clutch does not lock up as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification	
Torque converter clutch solenoid valve duty	Lock-up OFF ↓ Lock-up ON	Approximately 4% ↓ Approximately 94%	E

On Board Diagnosis Logic

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:

Torque converter slip ratio = $A \times C/B$

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction. This malfunction will be caused when shift solenoid valve B is stuck closed.

Gear positions supposed by TCM are as follows.

In case of gear position with no malfunctions: 1, 2, 3 and 4 positions

In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and 1* positions to each gear position above

*: P0744 is detected.

Diagnostic trouble code A/T TCC S/V FNCTN with CONSULT-II or P0744 without CONSULT-II is detected when A/T cannot perform lock-up even if electrical circuit is good.

Possible Cause	ECS0064J	1.
Check the following items.		
Line pressure solenoid valve		L
Torque converter clutch solenoid valve		
Each clutch		NЛ
Hydraulic control circuit		IVI
Diagnostic Trouble Code (DTC) Confirmation Procedure	ECS0064K	

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

After the repair, perform the following procedure to confirm the malfunction is eliminated.

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WITH CONSULT-II

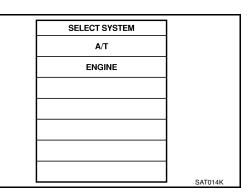
- 1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- Make sure that output voltage of A/T fluid temperature sensor is within the range below.
 FLUID TEMP SEN: 0.4 - 1.5V

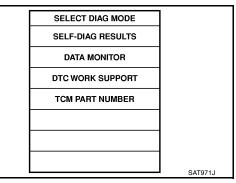
If out of range, drive vehicle to decrease voltage (warm up the fluid) or stop engine to increase voltage (cool down the fluid).

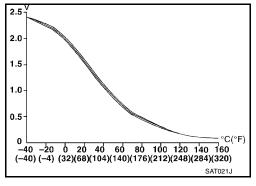
- 3. Select "TCC S/V FNCTN P0744" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
- 4. Accelerate vehicle to more than 70 km/h (43 MPH) and maintain the following condition continuously until "TESTING" has turned to "COMPLETE". (It will take approximately 30 seconds after "TESTING" shows.)
 THROTTLE POSI: 1.0/8 2.0/8 (at all times during step 4) Selector lever: D position (O/D ON) TCC S/V DUTY: More than 94% VHCL/S SE·A/T: Constant speed of more than 70 km/h (43 MPH)
- Check that "GEAR" shows "4".
- For shift schedule, refer to AT-750, "Shift Schedule".
- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS". In case a 1st trip DTC other than P0744 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".
- Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".) Refer to <u>AT-540, "Diagnostic Procedure"</u>.
 Refer to <u>AT-750, "Shift Schedule"</u>.



Follow the procedure "With CONSULT-II".





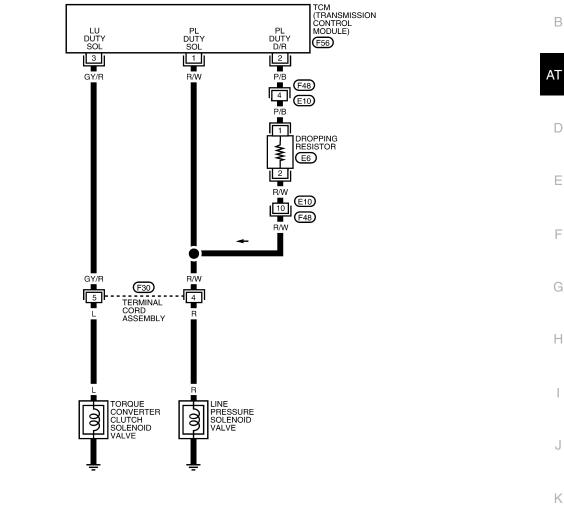


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[RE4F04B]

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[RE4F04B]

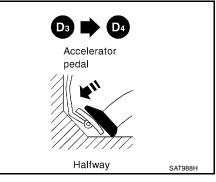
TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	1 R/W	LINE PRESSURE SOLENOID VALVE	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	APPROX. 1.5 - 3.0V
·			WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	APPROX. 0V
2	2 P/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESIS- TOR)	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	APPROX. 4 - 14V
2			WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	APPROX. 0V
3	GY/R	/R TORQUE CONVERTER CLUTCH SOLENOID VALVE	WITH TORQUE CONVERTER LOCK-UP	APPROX. 8 - 15V
3	GT/h		WITHOUT TORQUE CON- VERTER LOCK-UP	APPROX. 0V

Diagnostic Procedure

ECS0064M

1. CHECK SHIFT UP (D3 TO D4)

	During <u>AT-463, "Cruise Test — Part 1"</u> , does A/T shift from D3 to D4 at the specified speed?				
Yes or	No				
Yes No	>> GO TO 11. >> GO TO 2.				



2. CHECK LINE PRESSURE

Perform line pressure test.

Engine Speed	Line Pressure kPa (kg/cm ² , psi)	
RPM	D, 2 and 1 Position	R Position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,223 (12.6, 179)	1,918 (19.6, 278)

Refer to AT-454, "Line Pressure Test" .

<u>OK or NG</u>

OK >> GO TO 3. NG >> GO TO 6.

DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

3. CHECK CONTROL VALVE

- 1. Disassemble control valve assembly. Refer to <u>AT-677, "DISAS-</u> <u>SEMBLY"</u>.
- 2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 4.

NG >> Repair control valve.

4. CHECK SHIFT UP (D3 TO D4)

Does A/T shift from D3 to D4 at the specified speed?

Yes or No

Yes >> GO TO 5.

No >> Check control valve again. Repair or replace control valve assembly.

5. снеск отс

Perform AT-537, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

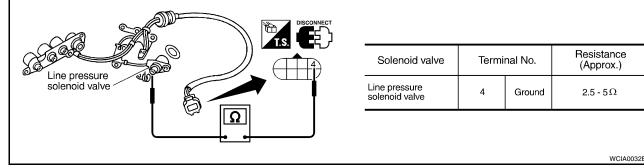
OK or NG

OK >> INSPECTION END

NG >> GO TO 11. Check for proper lock-up.

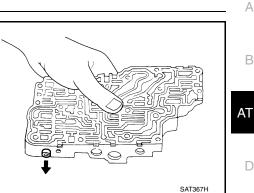
6. CHECK VALVE RESISTANCE

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" .
- Line pressure solenoid valve
- 2. Check resistance to the terminal and ground.



OK or NG

- OK >> GO TO 8.
- NG >> Replace solenoid valve assembly.



[RE4F04B]

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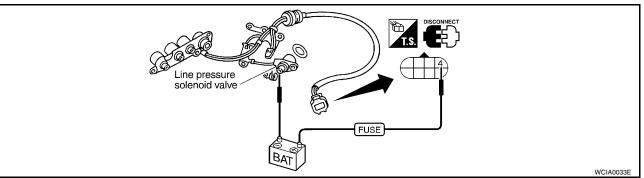
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7. CHECK VALVE OPERATION

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL".
- Line pressure solenoid valve
- 2. Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.



OK or NG

OK >> GO TO 8.

NG >> Replace solenoid valve assembly.

8. CHECK CONTROL VALVE

- 1. Disassemble control valve assembly. Refer to <u>AT-677, "DISAS-</u> <u>SEMBLY"</u>.
- 2. Check line pressure circuit valves for sticking.
- Pressure regulator valve
- Pilot valve
- Pressure modifier valve

OK or NG

- OK >> GO TO 9.
- NG >> Repair control valve.



Does A/T shift from D3 to D4 at the specified speed?

Yes or No

Yes >> GO TO 10.

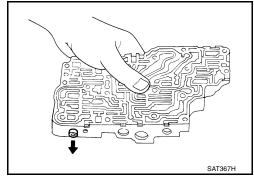
No >> Check control valve again. Repair or replace control valve assembly.

10. снеск отс

Perform AT-537, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

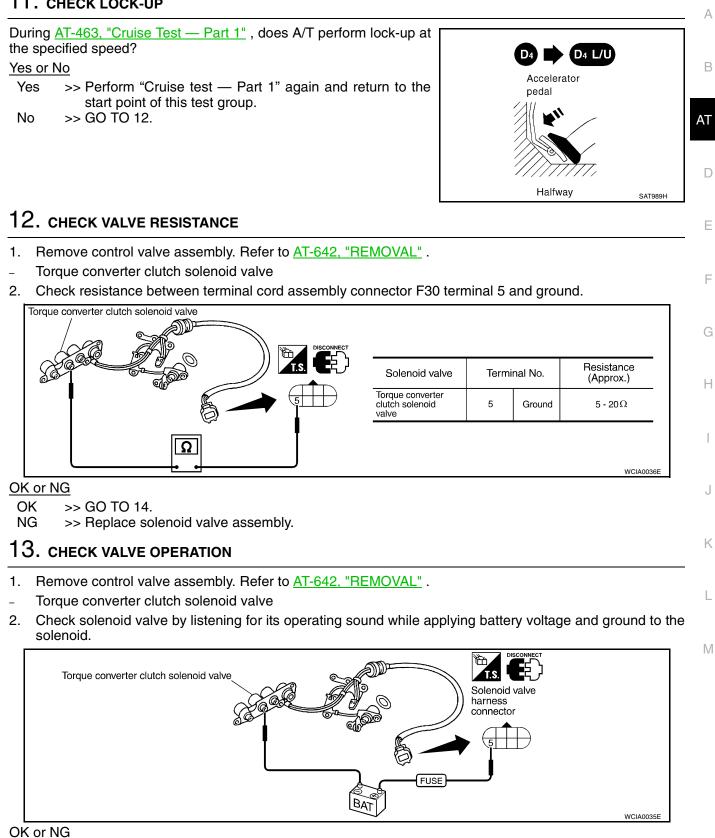
- OK >> INSPECTION END
- NG >> GO TO 11. Check for proper lock-up.



AT-542

11. CHECK LOCK-UP

[RE4F04B]



- OK >> GO TO 14.
- NG >> Replace solenoid valve assembly.

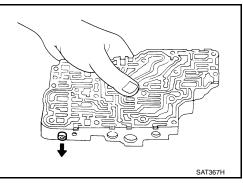
14. CHECK CONTROL VALVE

- 1. Disassemble control valve assembly. Refer to <u>AT-677, "DISAS-</u> <u>SEMBLY"</u>.
- 2. Check control valves for sticking.
- Torque converter clutch control valve
- Torque converter clutch relief valve

OK or NG

OK >> GO TO 15.

NG >> Repair control valve.



15. СНЕСК LOCK-UP

Does A/T perform lock-up at the specified speed?

Yes or No

Yes >> GO TO 16.

No >> Check control valve again. Repair or replace control valve assembly.

16. снеск отс

Perform AT-537, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

- OK >> INSPECTION END
- NG >> Perform "Cruise test Part 1" again and return to the start point of this test group.

Description

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

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE Bemarks: Specification data are reference values

Monitor item	Condition	Specification
Line pressure solenoid valve duty	Small throttle opening (Low line pressure) ↓ Large throttle opening (High line pressure)	Approximately 24% ↓ Approximately 95%

On Board Diagnosis Logic

Diagnostic trouble code L/PRESS SOL/CIRC with CONSULT-II or P0745 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause	ECS0064P	I
Check the following items.		
 Harness or connectors (The solenoid circuit is open or shorted.) Line pressure solenoid valve 		J
Diagnostic Trouble Code (DTC) Confirmation Procedure	ECS0064Q	k
NOTE: If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and v least 10 seconds before conducting the next test. After the repair, perform the following procedure to confirm the malfunction is eliminated.	wait at	L

1. Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.

SELECT SYSTEM
A/T
ENGINE
SAT014K



PFP:31940

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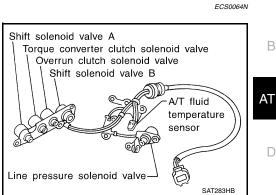
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ECS00640



[RE4F04B]

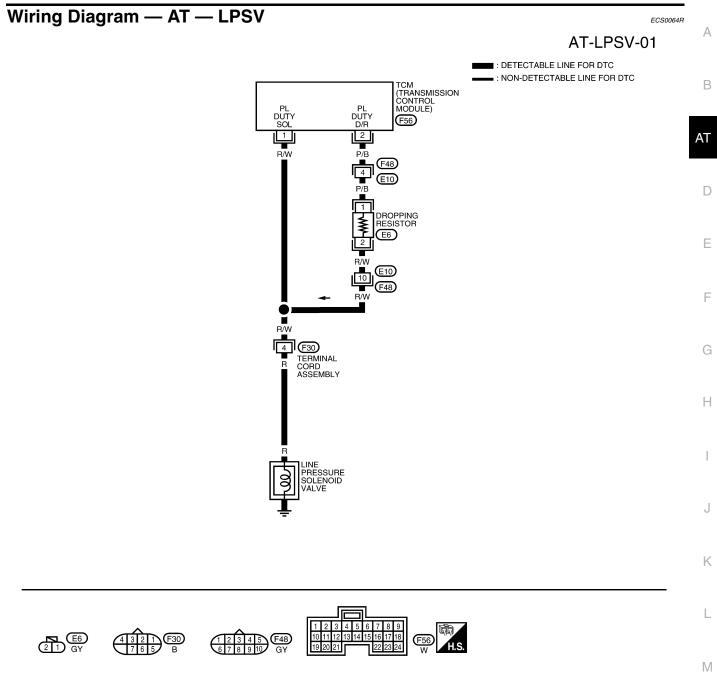
2. Depress accelerator pedal completely and wait at least 1 second.

SELECT DIAG MODE	
WORK SUPPORT	
SELF-DIAG RESULTS	
DATA MONITOR	
DATA MONITOR (SPEC)	
ACTIVE TEST	
DTC & SRT CONFIRMATION	
	SEF949Y
	· 3EF9491

WITH GST

Follow the procedure "With CONSULT-II".

[RE4F04B]



WCWA0027E

[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	R/W	LINE PRESSURE SOLENOID VALVE	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	APPROX. 1.5 - 3.0V
			WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	APPROX. 0V
2	P/B	LINE PRESSURE SOLENOID P/B VALVE (DROPPING RESIS-	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	APPROX. 4 - 14V
		TOR)	WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	APPROX. 0V

Diagnostic Procedure

ECS0064S

1. CHECK VALVE RESISTANCE

- 1. Turn ignition switch to OFF position.
- 2. Disconnect terminal cord assembly connector in engine compartment.
- 3. Check resistance between terminal cord assembly connector F30 terminal 4 and ground.

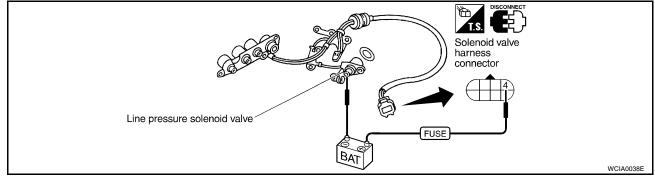
Sub-harness connector	
	Resistance: 2.5 - 5 Ω
	WCIA0037E

OK or NG

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

2. CHECK VALVE OPERATION

- 1. Remove control valve assembly. Refer to <u>AT-642, "REMOVAL"</u>.
- 2. Check the following items:
- Line pressure solenoid valve
- Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.



Harness of terminal cord assembly for short or open

OK or NG

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

AT-548

[RE4F04B]

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3. CHECK POWER SOURCE AND DROPPING RESISTOR CIRCUIT

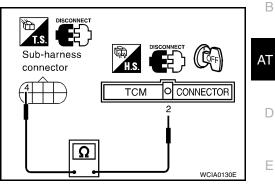
- 1. Turn ignition switch to OFF position.
- 2. Disconnect TCM harness connector.
- Check resistance between terminal cord assembly harness connector F30 terminal 4 and TCM harness connector F56 terminal 2.

Resistance

: Approximately 12Ω

OK or NG

OK >> GO TO 5. NG >> GO TO 4.



4. DETECT MALFUNCTIONING ITEM

Check the following items:

- Dropping resistor
- Check resistance between two terminals.

Resistance

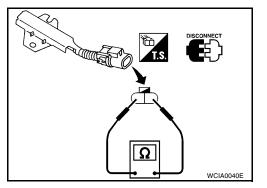
: Approximately 12 Ω

 Harness for short or open between TCM terminal 2 and terminal cord assembly (Main harness)

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.



5. CHECK POWER SOURCE CIRCUIT

- 1. Turn ignition switch to OFF position.
- Check continuity between terminal cord assembly connector F30 terminal 4 and TCM harness connector F56 terminal 1. Refer to <u>AT-547</u>, "Wiring Diagram — <u>AT</u> — <u>LPSV</u>".

Continuity should exist.

3. Reinstall any part removed.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. снеск отс

Perform AT-545, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

OK >> INSPECTION END

NG >> GO TO 7.

$7. \ \text{CHECK TCM INSPECTION}$

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector. <u>OK or NG</u>

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

Description

Shift solenoid valves A and B are turned ON or OFF by the TCM in response to signals sent from the park/neutral position (PNP) switch, vehicle speed and ECM (throttle opening). Gears will then be shifted to the optimum position.

1

ON (Closed)

ON (Closed)

On Board Diagnosis Log	gic
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Diagnostic trouble code SFT SOL A/CIRC with CONSULT-II or P0750 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

2

OFF (Open)

ON (Closed)

Possible Cause

Check the following items.

Gear position

Shift solenoid valve A

Shift solenoid valve B

- Harness or connectors (The solenoid circuit is open or shorted.)
- Shift solenoid valve A

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

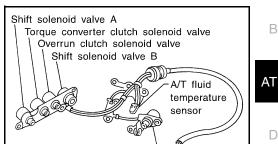
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.

SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K



Line pressure solenoid valve

3

OFF (Open)

OFF (Open)

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SAT283HB

4

ON (Closed)

OFF (Open)

ECS0064U

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ECS0064V H
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ECS0064W

PFP:31940

ECS0064T

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[RE4F04B]

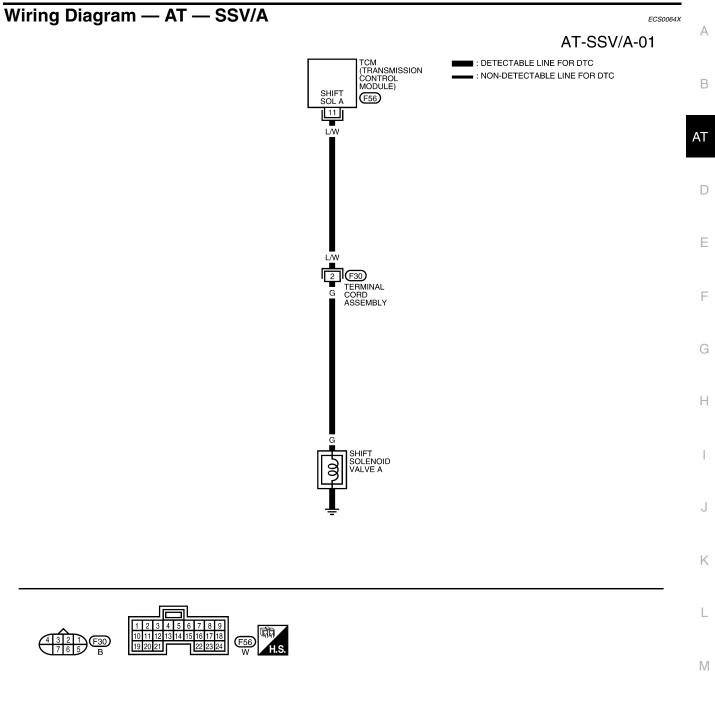
- 2. Start engine.
- 3. Drive vehicle in D position and allow the transmission to shift 1 \rightarrow 2 ("GEAR").

SELECT DIAG MODE	
WORK SUPPORT	
SELF-DIAG RESULTS	
DATA MONITOR	
DATA MONITOR (SPEC)	
ACTIVE TEST	
DTC & SRT CONFIRMATION	
	SEF949Y
	5EF9491

WITH GST

Follow the procedure "With CONSULT-II".

[RE4F04B]



[RE4F04B]

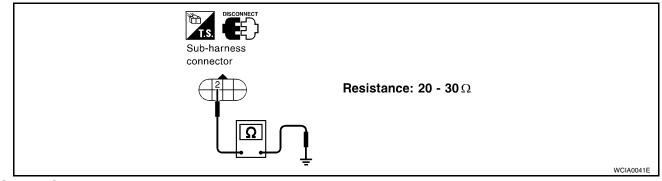
TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
11	L/W SHIFT SOLENOID VALVE A		WHEN SHIFT SOLENOID VALVE A IS OPERATING (DRIVING IN D1 OR D4)	BATTERY VOLTAGE
		WHEN SHIFT SOLENOID VALVE A IS NOT OPERATING (DRIVING IN D2 OR D3)	APPROX. 0V	

Diagnostic Procedure

ECS0064Y

1. CHECK VALVE RESISTANCE

- 1. Turn ignition switch to OFF position.
- 2. Disconnect terminal cord assembly connector in engine compartment.
- 3. Check resistance between terminal cord assembly connector F30 terminal 2 and ground.

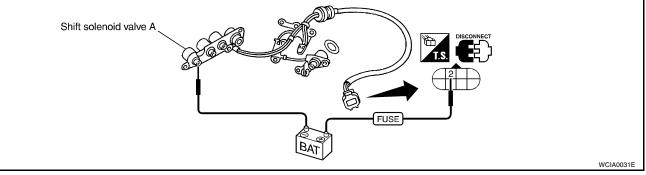


OK or NG

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

2. CHECK VALVE OPERATION

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" .
- 2. Check the following items:
- Shift solenoid valve A
- Operation check
- Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.



- Harness of terminal cord assembly for short or open

OK or NG

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

AT-554

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[RE4F04B]

3. CHECK POWER SOURCE CIRCUIT	А
1. Turn ignition switch to OFF position.	
2. Disconnect TCM harness connector.	D
 Check continuity between terminal cord assembly harness connector F30 terminal 2 and TCM harness connector F56 terminal 11. Refer to <u>AT-553</u>, "Wiring Diagram — <u>AT</u> — <u>SSV/A</u>". 	В
Continuity should exist.	AT
4. Reinstall any part removed.	
OK or NG	_
OK >> GO TO 4. NG >> Repair open circuit or short to ground or short to power in harness or connectors.	D
4. СНЕСК DTC	Ε
Perform AT-551, "Diagnostic Trouble Code (DTC) Confirmation Procedure"	
OK or NG	F
OK >> INSPECTION END NG >> GO TO 5.	1
5. CHECK TCM INSPECTION	G
1. Perform TCM input/output signal inspection.	
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.	Н
OK or NG	
OK >> INSPECTION END NG >> Repair or replace damaged parts.	I
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Description

Shift solenoid valves A and B are turned ON or OFF by the TCM in response to signals sent from the park/neutral position (PNP) switch, vehicle speed and ECM (throttle opening). Gears will then be shifted to the optimum position.

1

ON (Closed)

ON (Closed)

On Board Diagnosis Logic

Diagnostic trouble code SFT SOL B/CIRC with CONSULT-II or P0755 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

2

OFF (Open)

ON (Closed)

Possible Cause

Check the following items.

Gear position

Shift solenoid valve A

Shift solenoid valve B

- Harness or connectors (The solenoid circuit is open or shorted.)
- Shift solenoid valve B

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

Turn ignition switch ON and select "DATA MONITOR" mode for 1. "ENGINE" with CONSULT-II.

Torque converter clutch solenoid valve Overrun clutch solenoid valve Shift solenoid valve B A/T fluid temperature sensor Line pressure solenoid valve

3

OFF (Open)

OFF (Open)

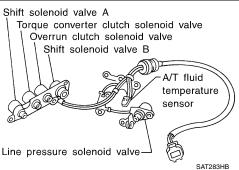
SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K

ECS0064Z

4 ON (Closed) OFF (Open) ECS00650

ECS00652

ECS00651



PFP:31940

[RE4F04B]

- 2. Start engine.
- 3. Drive vehicle in D position and allow the transmission to shift 1 \rightarrow 2 \rightarrow 3 ("GEAR").

SELECT DIAG MODE	
WORK SUPPORT	
SELF-DIAG RESULTS	
DATA MONITOR	
DATA MONITOR (SPEC)	
ACTIVE TEST	
DTC & SRT CONFIRMATION	
	SEF949Y

WITH GST

Follow the procedure "With CONSULT-II".

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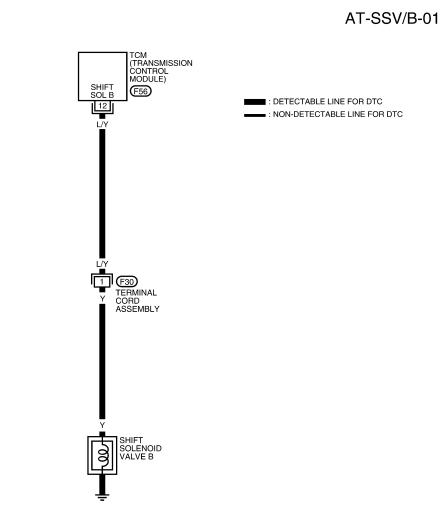
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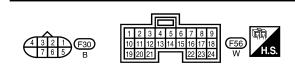
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[RE4F04B]

ECS00653

Wiring Diagram — AT — SSV/B





WCWA0029E

[RE4F04B]

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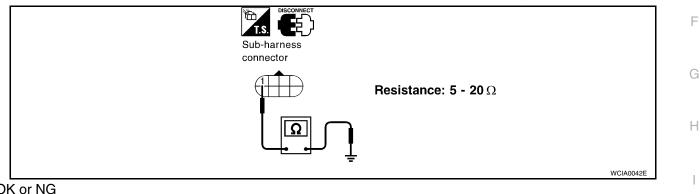
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TERMINAL	WIRE COLOR	ITEM	TWEEN EACH TERMINAL AND 25 O CONDITION	DATA (DC)	
10	L/Y SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS OPERATING (DRIVING IN D1 OR D2)	BATTERY VOLTAGE		
12		WHEN SHIFT SOLENOID VALVE BE IS NOT OPERATING (DRIV- ING IN D3 OR D4)	APPROX. OV		
Diagnostic Procedure					ECS00654

1. CHECK VALVE RESISTANCE

- 1. Turn ignition switch to OFF position.
- Disconnect terminal cord assembly connector in engine compartment. 2.
- Check resistance between terminal cord assembly connector F30 terminal 1 and ground. 3.

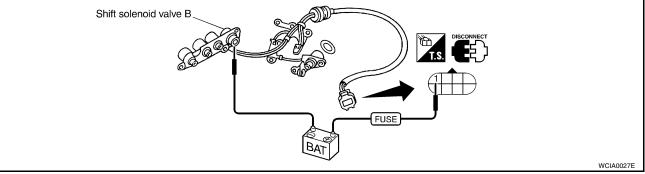


OK or NG

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

2. CHECK VALVE OPERATION

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" .
- 2. Check the following items:
- Shift solenoid valve B
- **Operation check**
- Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.



Harness of terminal cord assembly for short or open

OK or NG

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

AT-559

3. CHECK POWER SOURCE CIRCUIT

- 1. Turn ignition switch to OFF position.
- 2. Disconnect TCM harness connector.
- Check continuity between terminal cord assembly harness connector F30 terminal 1 and TCM harness connector F56 terminal 12. Refer to <u>AT-558</u>, "Wiring Diagram — <u>AT</u> — <u>SSV/B</u>".

Continuity should exist.

4. Reinstall any part removed.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. снеск отс

Perform AT-556, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

OK >> INSPECTION END

NG >> GO TO 5.

5. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

[RE4F04B]

ECS00655

ECS00656

ECS00657

ECS00658

DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Description

The throttle position sensor [accelerator pedal position (APP) sensor] is part of the system that controls throttle position. This system also uses an electric throttle control actuator which consists of a throttle control motor and throttle position sensors. Accelerator pedal position signal is sent to the ECM.

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification	
Throttle position sensor	Fully-closed throttle	Approximately 0.5V	D
[accelerator pedal position (APP) sensor]	Fully-open throttle	Approximately 4V	

On Board Diagnosis Logic

Diagnostic trouble code TP SEN/CIRC A/T with CONSULT-II or P1705 without CONSULT-II is detected when TCM receives an excessively low or high voltage from the ECM.

Possible Cause

Check the following items.

 Harness or connectors (The sensor circuit is open or shorted.)

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.

Accelerator pedal condition	THRTL POS SEN	CLOSED THL/SW	W/O THRL/P·SW
Fully released	Less than 4.7V	ON	OFF
Partially depressed	0.1 - 4.6V	OFF	OFF
Fully depressed	1.9 - 4.6V	OFF	ON

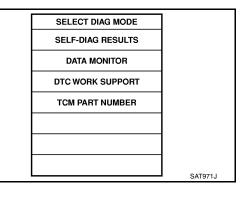
If the check result is NG, go to <u>AT-564, "Diagnostic Procedure"</u> If the check result is OK, go to following step.

- 2. Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- Start engine and maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.
 VHCL SPEED SE: 10 km/h (6 MPH) or more

THRTL POS SEN: Approximately 3V or less Selector lever: D position (O/D ON) If the check result is NG, go to AT-564, "Diagnostic Procedure".

If the check result is OK, go to following step.

SELECT SYSTEM		1Z
A/T		N.
ENGINE		
		L
		M
	SAT014K	



4. Maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.

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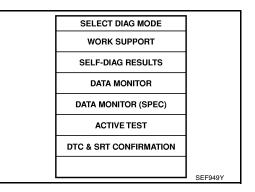
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[RE4F04B]

VHCL SPEED SE: 10 km/h (6 MPH) or more Accelerator pedal: Wide open throttle Selector lever: D position (O/D ON)

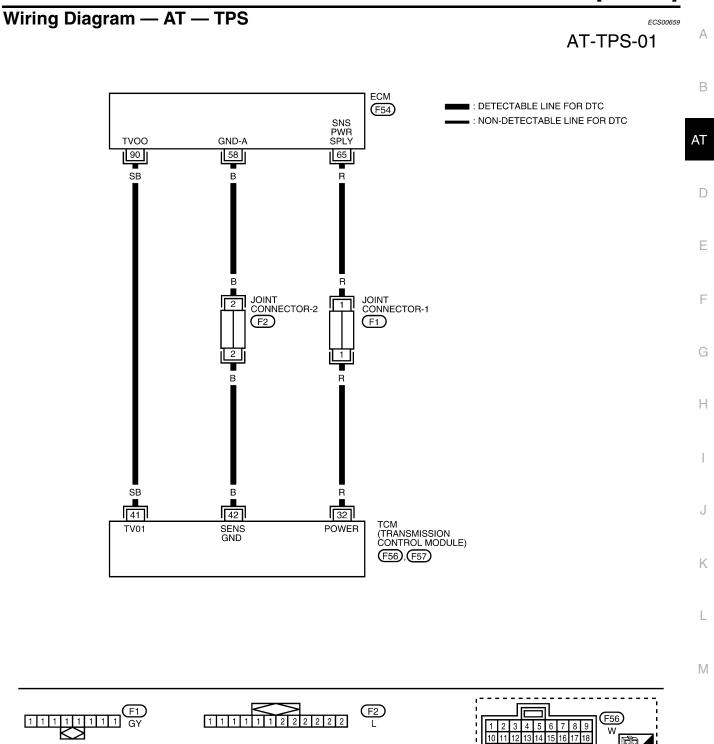
SELECT SYSTEM	
A/T	
ENGINE	
	SAT014K
	3,1101410

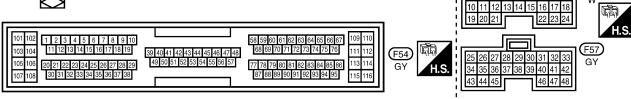


WITH GST

Follow the procedure "With CONSULT-II".

[RE4F04B]





WCWA0079E

[RE4F04B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
32 R S	SENSOR POWER	IGNITION SWITCH ON	4.5 - 5.5V	
52	п	SENSON FOWER	IGNITION SWITCH OFF	0V
41	41 SB THROTTLE POSITION SEN- SOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]	IGNITION ON AND ACCELERA- TOR PEDAL IS DEPRESSED	FULLY CLOSED THROTTLE: 0.5V	
41		POSITION (APP) SENSORI		SLOWLY AFTER WARMING UP
42	В	SENSOR GROUND	_	—

Diagnostic Procedure

ECS0065A

1. СНЕСК DTC WITH ECM

Check P code with CONSULT-II "ENGINE".

Turn ignition switch ON and select "SELF DIAGNOSTIC RESULTS" mode for "ENGINE" with CONSULT-II.

Refer to EC-1259, "Malfunction Indicator Lamp (MIL)" .

OK or NG

OK (with CONSULT-II)>>GO TO 2.

OK (without CONSULT-II)>>GO TO 3.

NG >> Check throttle position sensor [accelerator pedal position (APP) sensor] circuit for engine control. Refer to <u>EC-1459, "DTC P0222, P0223 TP SENSOR"</u> and <u>EC-1754, "DTC P2138 APP SEN-SOR"</u>.

2. CHECK INPUT SIGNAL (WITH CONSULT-II)

With CONSULT-II

- 1. Turn ignition switch to ON position. (Do not start engine.)
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3. Read out the value of "THRTL POS SEN".

DATA MONITO	OR
MONITORING	
VHCL/S SE-A/T XX	KX km/h
VHCL/S SE-MTR XX	KX km/h
THRTL POS SEN X	xxx v
FLUID TEMP SE X	xxx v
BATTERY VOLT X	XXX V

Voltage:

Fully-closed throttle Fully-open throttle :Approximately 0.5V :Approximately 4V

OK or NG

OK >> GO TO 4.

NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor [accelerator pedal position (APP) sensor] circuit. (Main harness)

[RE4F04B]

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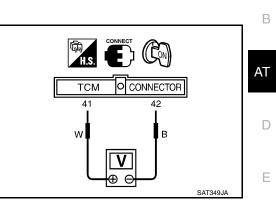
Κ

З.	CHECK INPUT	SIGNAL	(WITHOUT	CONSULT-II)
----	-------------	--------	----------	-------------

Without CONSULT-II

- 1. Turn ignition switch to ON position. (Do not start engine.)
- 2. Check voltage between TCM terminals 41 and 42 while accelerator pedal is depressed slowly.

Voltage:	
Fully-closed throttle valve	:Approximately 0.5V
Fully-open throttle valve	:Approximately 4V
(Voltage rises gradually i tion.)	n response to throttle posi-



OK or NG

OK >> GO TO 4.

NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor [accelerator pedal position (APP) sensor] circuit. (Main harness)

4. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

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DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

Description

The overrun clutch solenoid valve is activated by the TCM in response to signals sent from the park/neutral position (PNP) switch, overdrive control switch, vehicle speed and ECM (throttle opening). The overrun clutch operation will then be controlled.

On Board Diagnosis Logic

Diagnostic trouble code O/R CLTCH SOL/CIRC with CONSULT-II or P1760 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

Check the following items.

- Harness or connectors (The solenoid circuit is open or shorted.)
- Overrun clutch solenoid valve

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

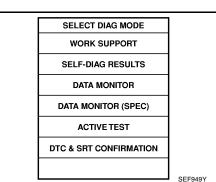
TESTING CONDITION:

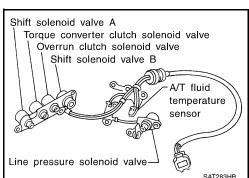
Always drive vehicle on a level road to improve accuracy of test.

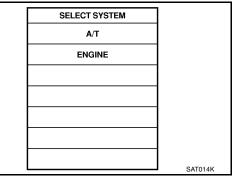
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

- 1. Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 2. Start engine.
- 3. Accelerate vehicle to a speed of more than 10 km/h (6 MPH) with D position (O/D ON).
- 4. Release accelerator pedal completely with D position (O/D OFF).









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PFP:31940

[RE4F04B]

ECS0065B

DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

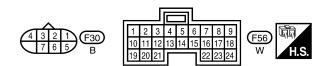
[RE4F04B]

WITH GST	
Follow the procedure "With CONSULT-II".	А
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	AT
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[RE4F04B]

Wiring Diagram — AT — OVRCSV ECS0065F AT-OVRCSV-01 TCM (TRANSMISSION CONTROL MODULE) : DETECTABLE LINE FOR DTC - : NON-DETECTABLE LINE FOR DTC OVR/C SOL (F56) 20 L/B L/B GY GY CORD ASSEMBLY GΥ OVERRUN CLUTCH SOLENOID VALVE 00



WCWA0031E

DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)					
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	Α
20	L/B	OVERRUN CLUTCH SOLE- NOID VALVE	WHEN OVERRUN CLUTCH SOLENOID VALVE OPERATES	BATTERY VOLTAGE	
			WHEN OVERRUN CLUTCH SOLENOID VALVE DOES NOT OPERATE	APPROX. 0V	В
			· · · · · · -		

Diagnostic Procedure

1. CHECK VALVE RESISTANCE

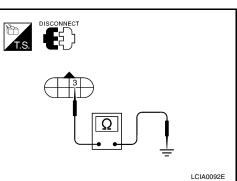
- 1. Turn ignition switch to OFF position.
- 2. Disconnect terminal cord assembly connector in engine compartment.
- Check resistance between terminal cord assembly F30 terminal 3 (component side) and ground.

: **20 - 30**Ω

Resistance

OK or NG

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



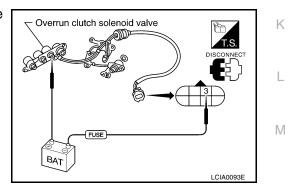
2. CHECK VALVE OPERATION

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" .
- 2. Check the following items:
- Overrun clutch solenoid valve
- Operation check
- Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.
- Harness of terminal cord assembly for short or open

OK or NG

OK >> GO TO 3.

NG >> Repair or replace damaged parts.



3. CHECK POWER SOURCE CIRCUIT

- 1. Turn ignition switch to OFF position.
- 2. Disconnect TCM harness connector.
- Check continuity between terminal cord assembly connector F30 terminal 3 and TCM harness connector F56 terminal 20. Refer to <u>AT-568</u>, "Wiring Diagram — <u>AT — OVRCSV"</u>.

Continuity should exist.

4. Reinstall any part removed.

OK or NG

- OK >> GO TO 4.
- NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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Perform AT-566, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

OK >> INSPECTION END

NG >> GO TO 5.

5. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

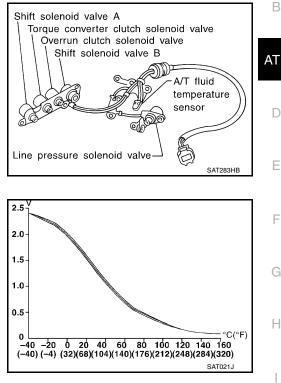
NG >> Repair or replace damaged parts.

[RE4F04B]

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM **POWER SOURCE)**

Description

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



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification (Approximately)		_ 0
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ	ŀ

On Board Diagnosis Logic

Diagnostic trouble code BATT/FLUID TEMP SEN with CONSULT-II or 8th judgement flicker without CON-SULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

Check the following items.

- Harness or connectors (The sensor circuit is open or shorted.)
- A/T fluid temperature sensor

Diagnostic Trouble Code (DTC) Confirmation Procedure

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Start engine.

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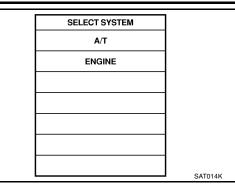
ECS0065K

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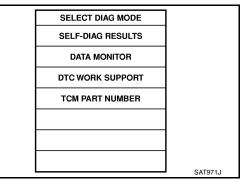
А

[RE4F04B]

2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.



Drive vehicle under the following conditions: Selector lever in D, vehicle speed higher than 20 km/h (12 MPH).

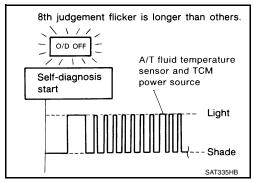


WITHOUT CONSULT-II

1. Start engine.

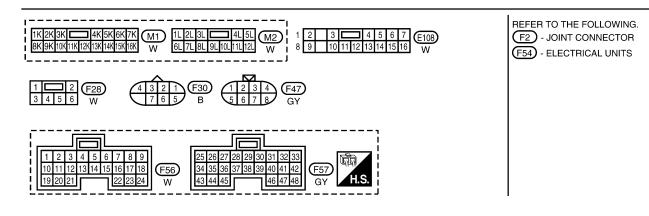
3.

- Drive vehicle under the following conditions: Selector lever in D, vehicle speed higher than 20 km/h (12 MPH).
- 3. Perform self-diagnosis. Refer to <u>AT-440, "TCM SELF-DIAGNOSTIC PROCEDURE (NO</u> <u>TOOLS)"</u>.



Wiring Diagram — AT — BA/FTS ECS0065L А AT-BA/FTS-01 IGNITION SWITCH ON OR START BATTERY FUSE BLOCK В Ò 10A þ REFER TO "PG-POWER". 10A (J/B) 12 11 Ŷ • (M1) ■ : DETECTABLE LINE FOR DTC (M2) 10L 8K : NON-DETECTABLE LINE FOR DTC AT Т R/B BR/R A/T FLUID TEMPERATURE SENSOR -MM-) D Ŵ В Ε TERMINAL CORD ASSEMBLY M19 16 12 6 E108 (F30) BR/R BR F R R/B (M60) (F28) T г/В (E9) 5 (F47) BR/R Н 2 JOINT CONNECTOR-2 F2 1 R 2 R/B BR/R BR/R BR в в 28 19 47 42 58 10 TCM (TRANSMISSION CONTROL MODULE) ECM MEMORY V IG OIL TEMP GND SENS GND-A V IG (F54) B/U Κ SENS (F56), (F57)

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AT-573

[RE4F04B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	BR/R	POWER SOURCE	IGNITION ON	BATTERY VOLTAGE
10		FOWEN SOUNCE	IGNITION OFF	APPROX. 0V
19	BR/R	POWER SOURCE	IGNITION ON	BATTERY VOLTAGE
19	Dn/n		IGNITION OFF	APPROX. 0V
28	R/B	POWER SOURCE (MEMORY BACKUP)	IGNITION ON	BATTERY VOLTAGE
			IGNITION OFF	BATTERY VOLTAGE
42	В	SENSOR GROUND	_	_
47	47 BR	A/T FLUID TEMPERATURE SENSOR	IGNITION ON WITH ATF TEM- PERATURE AT 20°C (68°F)	APPROX. 1.5V
47			IGNITION ON WITH ATF TEM- PERATURE AT 80°C (176°F)	APPROX. 0.5V

Diagnostic Procedure

ECS0065M

1. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (WITH CONSULT-II)

With CONSULT-II

- 1. Start engine.
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3. Read out the value of "FLUID TEMP SE".

DATA MONITOR	
MONITORING	
VHCL/S SE-A/T	XXX km/h
VHCL/S SE-MTR	XXX km/h
THRTL POS SEN	xxx v
FLUID TEMP SE	XXX V
BATTERY VOLT	xxx v

$\begin{array}{ll} \mbox{Voltage} & :\mbox{Cold} \ [20^\circ\mbox{C} \ (68^\circ\mbox{F})] \rightarrow \mbox{Hot} \ [80^\circ\mbox{C} \ (176^\circ\mbox{F})] \\ & :\mbox{Approximately} \ 1.5V \rightarrow 0.5V \end{array}$

OK or NG

OK >> GO TO 9. NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following items:

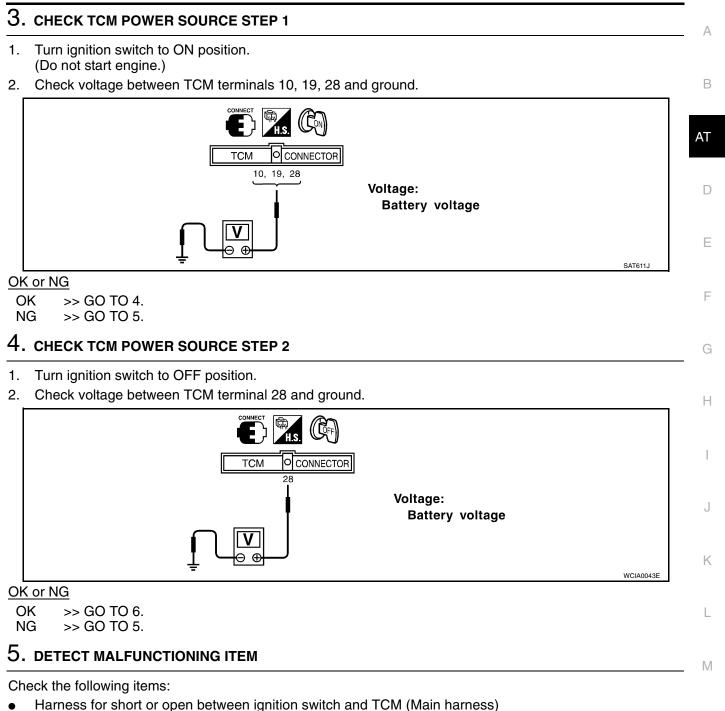
- Harness for short or open between TCM, ECM and terminal cord assembly (Main harness)
- Harness for short or open between battery and TCM (Main harness)
- Ground circuit for ECM Refer to <u>EC-1326, "POWER SUPPLY CIRCUIT FOR ECM"</u>.

OK or NG

- OK >> GO TO 9.
- NG >> Repair or replace damaged parts.

AT-574

[RE4F04B]



- Harness for short or open between battery and TCM (Main harness)
- Ignition switch and fuse Refer to <u>PG-2, "POWER SUPPLY ROUTING"</u>.

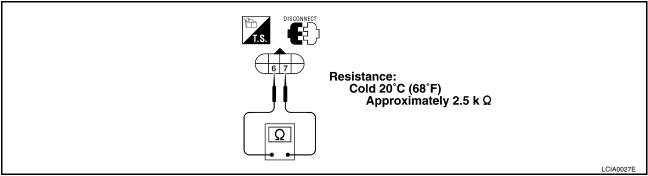
OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace damaged parts.

[RE4F04B]

6. CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

- 1. Turn ignition switch to OFF position.
- 2. Disconnect terminal cord assembly connector in engine compartment.
- 3. Check resistance between terminal cord assembly F30 terminals 6 and 7 (component side) when A/T is cold.



4. Reinstall any part removed.

OK or NG

OK (without CONSULT-II) >> GO TO 8. NG \rightarrow >> GO TO 7.

7. DETECT MALFUNCTIONING ITEM

- 1. Remove oil pan.
- 2. Check the following items:
- A/T fluid temperature sensor
- Check resistance between two terminals while changing temperature as shown.

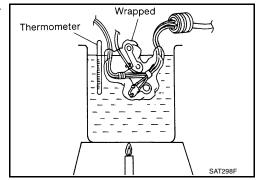
Temperature	Resistance (Approx.)	
20°C (68°F)	2.5kΩ	
80°C (176°F)	0.3kΩ	

- Harness of terminal cord assembly for short or open

OK or NG

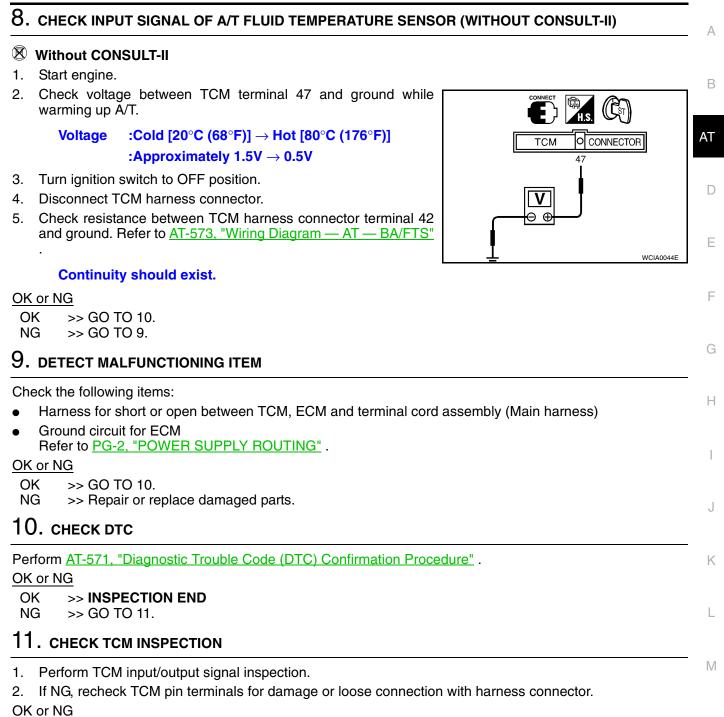
OK (without CONSULT-II) >> GO TO 8.

NG >> Repair or replace damaged parts.



DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

[RE4F04B]



OK >> INSPECTION END

NG >> Repair or replace damaged parts.

Description

The vehicle speed sensor MTR is built into the speedometer assembly. The sensor functions as an auxiliary device to the revolution sensor when it is malfunctioning. The TCM will then use a signal sent from the vehicle speed sensor MTR.

On Board Diagnosis Logic

Diagnostic trouble code VHCL SPEED SEN MTR with CONSULT-II or 2nd judgement flicker without CON-SULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

Check the following items.

- Harness or connectors (The sensor circuit is open or shorted.)
- Vehicle speed sensor

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

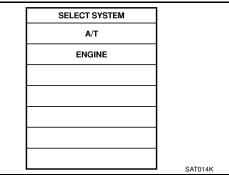
- Always drive vehicle at a safe speed.
- If conducting this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

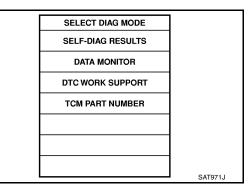
After the repair, perform the following procedure to confirm the malfunction is eliminated.

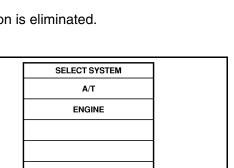
WITH CONSULT-II

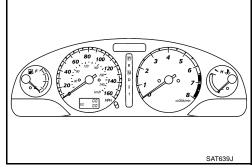
1. Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.

2. Start engine and accelerate vehicle from 0 to 25 km/h (0 to 16 MPH).









[RE4F04B]

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ECS0065N

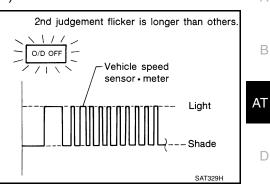
ECS0065Q

ECS00650

ECS0065P

[RE4F04B]

- Drive vehicle under the following conditions: 2. Selector lever in D and vehicle speed higher than 25 km/h (16 MPH).
- 3. Perform self-diagnosis. Refer to AT-440, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)".





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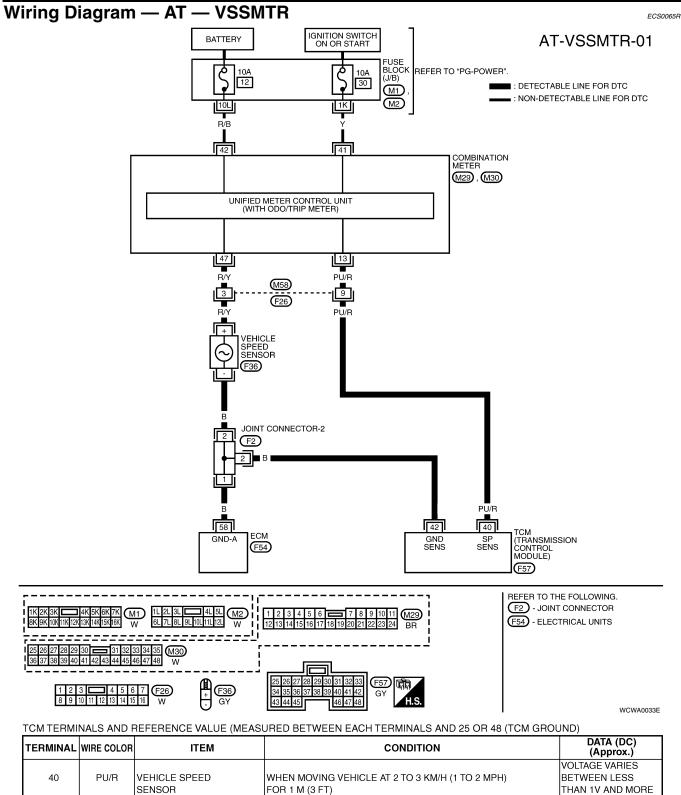
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[RE4F04B]



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Diagnostic Procedure

[RE4F04B]

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1. CHECK INPUT SIGNAL

With CONSULT-II

DATA M	IONITOR	
MONITORING	G	
VHCL/S SE-A/T	· XXX km/h	
VHCL/S SE-MTR	R XXX km/h	
THRTL POS SEN	N XXX V	
FLUID TEMP SE	≡ xxx v	
BATTERY VOLT	- xxx v	
		SAT614J

1. Start engine.

- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3. Read out the value of "VHCL/S SE·MTR" while driving. Check the value changes according to driving speed.

Without CONSULT-II

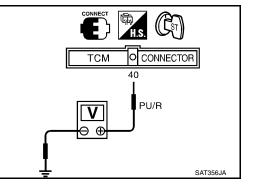
1. Start engine.

2. Check voltage between TCM terminal 40 and ground while driving at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.

Voltage :Voltage varies between less than 1V and more than 4.5V.

OK or NG

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



2. DETECT MALFUNCTIONING ITEM

Check the following items:

- Vehicle speed sensor and ground circuit for vehicle speed sensor Refer to <u>DI-3, "METERS AND GAUGES"</u>.
- Harness for short or open between TCM and vehicle speed sensor (Main harness)

OK or NG

OK >> GO TO 3.

NG >> Repair or replace damaged parts.

З. снеск отс

Perform AT-578, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

- OK >> INSPECTION END
- $\mathsf{NG} \quad \mathsf{>>} \mathsf{GO} \ \mathsf{TO} \ \mathsf{4}.$

4. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector. OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

Description

The turbine revolution sensor detects input shaft rpm (revolutions per minute). It is located on the input side of the automatic transaxle. The vehicle speed sensor A/T (Revolution sensor) is located on the output side of the automatic transaxle. With the two sensors, input and output shaft rpms are accurately detected. The result is optimal shift timing during deceleration and improved shifting.

ON BOARD DIAGNOSIS LOGIC

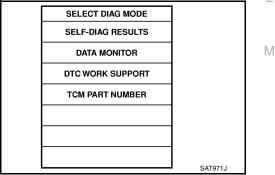
Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)	
	TCM does not receive the proper voltage signal from the sensor.	Harness or connectors (The sensor circuit is open or shorted.)	
🗵 : 10th judgement flicker	5	 Turbine revolution sensor 	

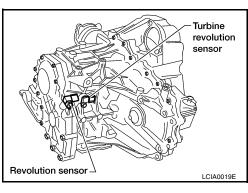
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE CAUTION:

- Always drive vehicle at a safe speed.
- If conducting this "DTC CONFIRMATION PROCEDURE" again, always turn ignition switch OFF and wait at least 5 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

- With CONSULT-II
- 1. Start engine.
- 2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- Drive vehicle under the following conditions: Selector lever in D, vehicle speed higher than 40 km/h (25 MPH), engine speed higher than 1,500 rpm, throttle opening greater than 1.0/8 of the full throttle position and driving for more than 5 seconds.
- Without CONSULT-II
- 1. Start engine.
- Drive vehicle under the following conditions: Selector lever in "D" and vehicle speed higher than 40 km/h (25 MPH), engine speed higher than 1,500 rpm, throttle opening greater than 1/8 of the full throttle position and driving for more than 5 seconds.





SELECT SYSTEM

A/T

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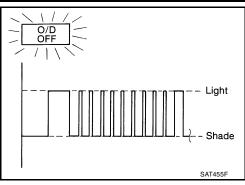
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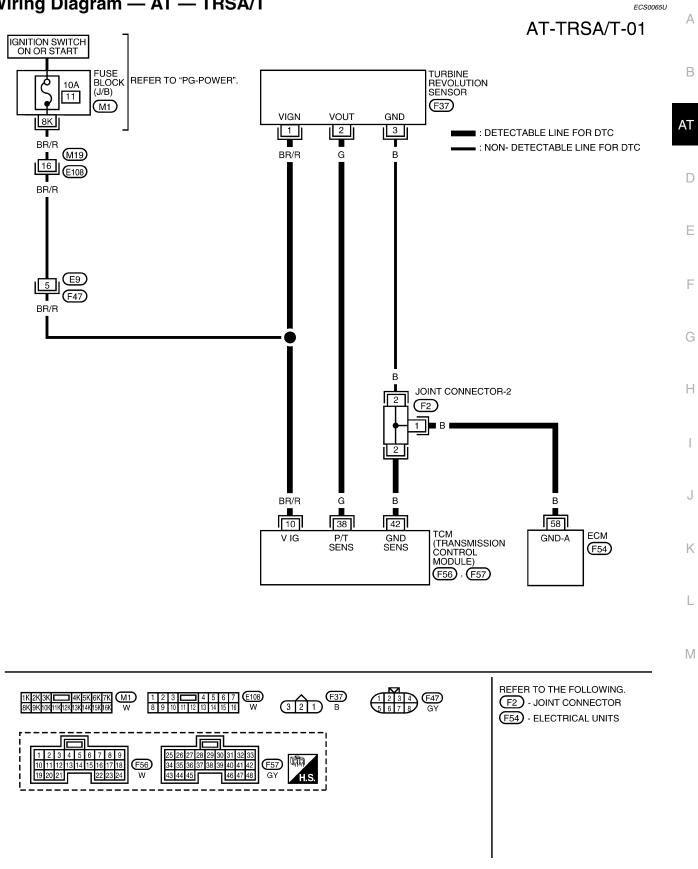
[RE4F04B]

3. Perform self-diagnosis. Refer to <u>AT-440, "TCM SELF-DIAGNOSTIC PROCEDURE (NO</u> <u>TOOLS)"</u>.



[RE4F04B]





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[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	BR/R	TURBINE REVOLUTION SEN- SOR (POWER)	IGNITION ON	BATTERY VOLTAGE
38	G	TURBINE REVOLUTION SEN- SOR (SIGNAL)	WITH ENGINE RUNNING AT 1,000 RPM	APPROX. 1.2V VOLTAGE SHOULD INCREASE WITH ENGINE RPM
42	В	SENSOR GROUND	_	_

Diagnostic Procedure

ECS0065V

1. CHECK INPUT SIGNAL

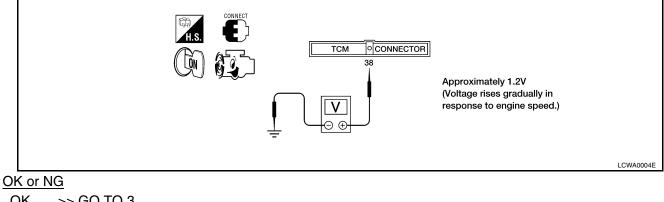
With CONSULT-II

- 1. Start engine.
- 2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3. Read out the value of "TURBINE REF" while driving. Check the value changes according to driving speed.

DATA MOI	1	
MONITORING		1
ENGINE SPEED	XXX rpm	
TURBINE REV	XXX rpm	
OVERDRIVE SW	ON	
PN POSI SW	OFF	
R POSITION SW	OFF	
		SAT740J

Without CONSULT-II

- 1. Start engine.
- 2. Check voltage between TCM terminal 38 and ground (measure in AC range).



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

2. DETECT MALFUNCTIONING ITEM

Check harness for short or open between TCM and turbine revolution sensor.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace damaged parts.

AT-586

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Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION, <u>AT-583, "DIAGNOSTIC TROUBLE CODE</u> (<u>DTC) CONFIRMATION PROCEDURE"</u>.

OK or NG

OK >> INSPECTION END.

NG >> GO TO 4.

4. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminal for damage or loose connection with harness connector.

OK or NG

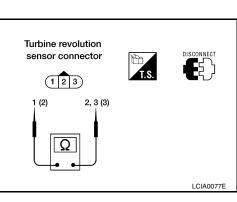
OK >> INSPECTION END.

NG >> Repair or replace damaged parts.

Component Inspection TURBINE REVOLUTION SENSOR

• Check resistance between terminals 1, 2 and 3.

Termi	Resistance (Approx.)	
1	2	2.4 - 2.8kΩ
1	3	No continuity
2	3	No continuity



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[RE4F04B]

DTC U1000 CAN COMMUNICATION LINE

Description

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

On Board Diagnosis Logic

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "CAN COMM CIRCUIT" with CONSULT-II or U1000 without CONSULT-II is detected when TCM cannot communicate to other control unit.

Possible Cause

Harness or connectors (CAN communication line is open or shorted.)

DTC Confirmation Procedure

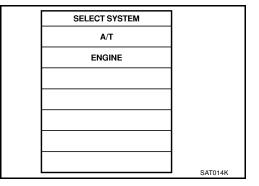
NOTE:

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

After the repair, perform the following procedure to confirm the malfunction is eliminated.

(I) WITH CONSULT-II

- Turn ignition switch to ON position. (Do not start engine.) 1.
- Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II. 2.
- 3. Start engine and wait for at least 6 seconds.
- If DTC is detected, go to AT-590, "Diagnostic Procedure". 4.



G WITH GST

Follow the procedure "WITH CONSULT-II".

PFP:23710 ECS0065X

[RE4F04B]

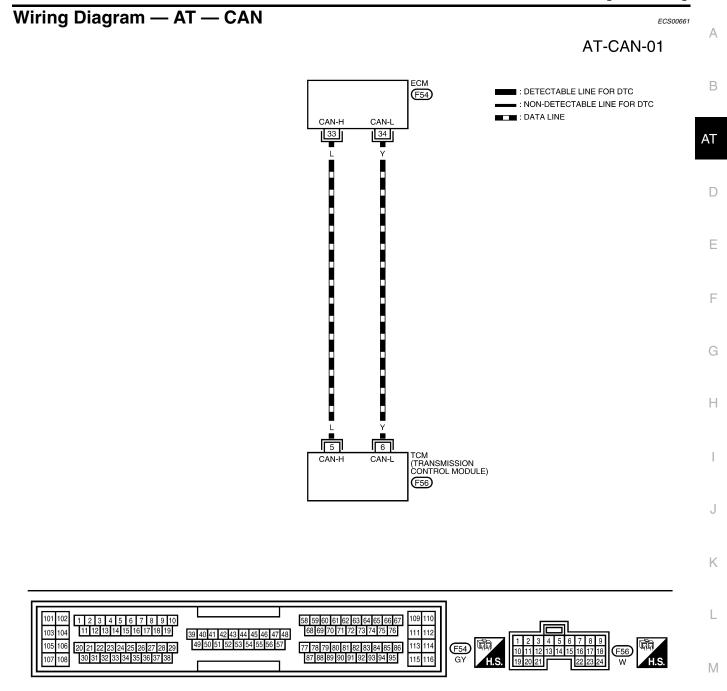
ECS0065Y

ECS0065Z

ECS00660

DTC U1000 CAN COMMUNICATION LINE

[RE4F04B]



LCWA0002E

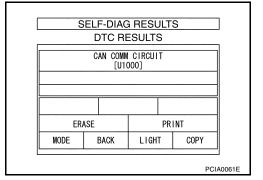
Diagnostic Procedure

1. CHECK CAN COMMUNICATION CIRCUIT

- 1. Turn ignition switch to ON position. (Do not start engine.)
- 2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3. The "CAN COMM CIRCUIT" is detected.

Yes or No

- Yes >> Print out CONSULT-II screen, GO TO 2.
- No >> INSPECTION END.



2. CHECK CAN COMMUNICATION SIGNALS

- With CONSULT-II
- 1. Turn ignition switch to ON position. (Do not start engine.)
- 2. Select "CAN COMM SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.

>> Print out CONSULT-II screen, go to AT-419, "CAN Communication" .

CAN COMMUNICATION SIGNALS

Normal conditions	Abnormal conditions (examples)
CAN COMM : OK	CAN COMM : OK
CAN CIRC 1 : OK	CAN CIRC 1 : UNKWN
CAN CIRC 2 : OK	CAN CIRC 2 : UNKWN
CAN CIRC 3 : OK	CAN CIRC 3 : UNKWN
CAN CIRC 4 : OK	CAN CIRC 4 : UNKWN
CAN CIRC 5 : UNKWN	CAN CIRC 5 : UNKWN
CAN CIRC 6 : UNKWN	CAN CIRC 6 : UNKWN

ECS00662

DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)

Description

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T.

On Board Diagnosis Logic

Diagnostic trouble code CONTROL UNIT (RAM), CONTROL UNIT (ROM) with CONSULT-II is detected when TCM memory (RAM) or (ROM).

Possible Cause

Check TCM.

Diagnostic Trouble Code (DTC) Confirmation Procedure

NOTE:

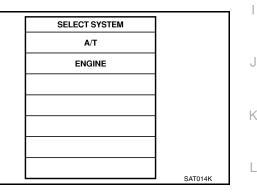
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

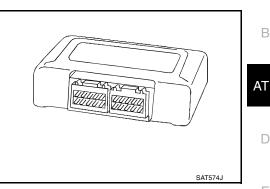
WITH CONSULT-II

- 1. Turn ignition switch ON and select "DATA MONITOR" mode for A/T with CONSULT-II.
- 2. Start engine.

Run engine for at least 2 seconds at idle speed. 3.

SELECT DIAG MODE	
SELF-DIAG RESULTS	
DATA MONITOR	
DTC WORK SUPPORT	
TCM PART NUMBER	





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[RE4F04B]

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ECS00663

Diagnostic Procedure

ECS00667

[RE4F04B]

1. INSPECTION START

(I) With CONSULT-II

1. Turn ignition switch ON and select "SELF DIAGNOSIS" mode for A/T with CONSULT-II.

2. Touch "ERASE".

3. Perform AT-591, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

4. Is the "CONTROL UNIT (RAM)" or "CONTROL UNIT (ROM)" displayed again?

Yes or No

Yes >> Replace TCM.

No >> INSPECTION END

DTC CONTROL UNIT (EEP ROM)

Description

The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T.

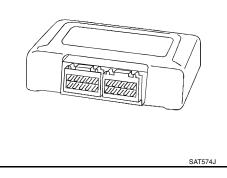
ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when	Check item (Possible cause)	
(E) : CONT UNIT (EEP ROM)	TCM memory (EEP ROM) is malfunction- ing.	• TCM	

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.

- With CONSULT-II
- 1. Turn ignition switch ON and select "DATA MONITOR" mode for A/T with CONSULT-II.
- 2. Start engine.
- 3. Run engine for at least 2 seconds at idle speed.



SELECT SYSTEM

A/T

ENGINE

		l K
SELECT DIAG MODE		
SELF-DIAG RESULTS		
DATA MONITOR		L
DTC WORK SUPPORT		
TCM PART NUMBER		
		M
	SAT971J	



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Diagnostic Procedure

[RE4F04B]

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(I) With CONSULT-II

- 1. Turn ignition switch ON and select "SELF DIAGNOSIS" mode for A/T with CONSULT-II.
- 2. Move selector lever to "R" position.
- 3. Depress accelerator pedal (Full throttle position).
- 4. Touch "ERASE".
- 5. Turn ignition switch OFF position for 10 seconds.

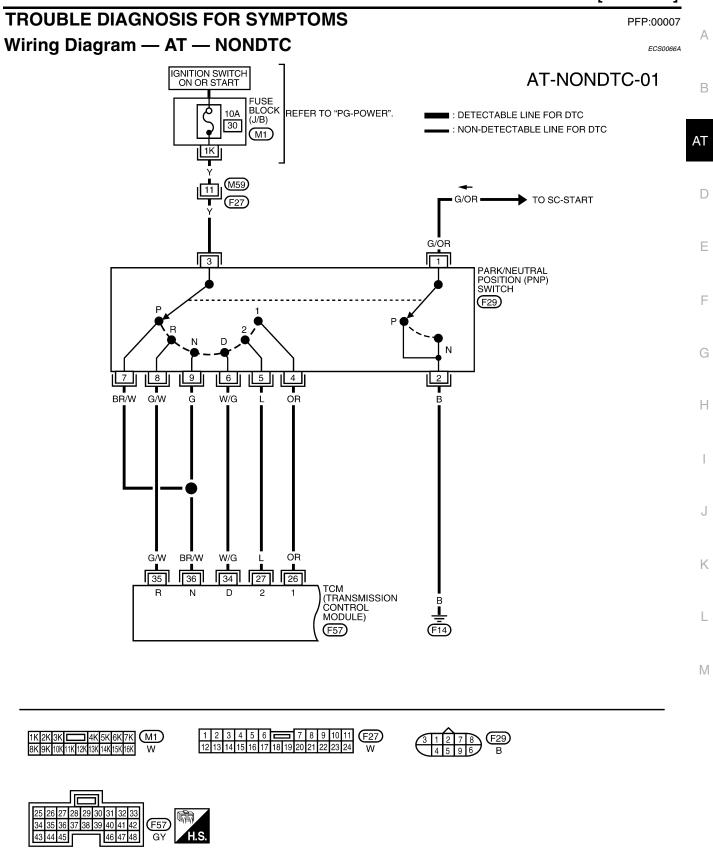
Perform AT-593, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

Is the "CONT UNIT (EEP ROM)" displayed again?

Yes >> Replace TCM.

No >> INSPECTION END

[RE4F04B]

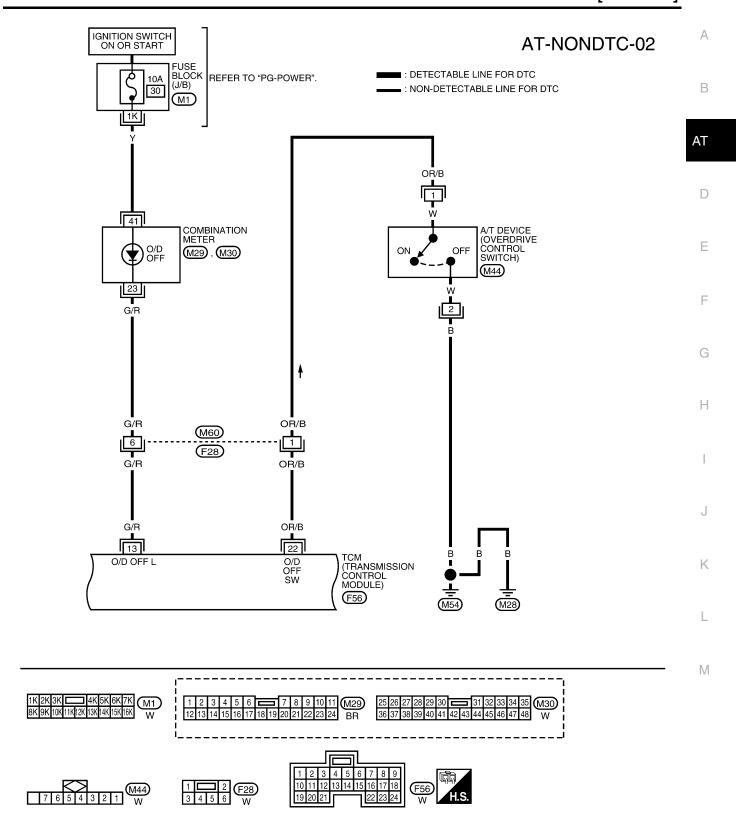


[RE4F04B]

		ENCE VALUE MEASURED BET	WEEN EACH TERMINAL AND 25 OF			
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)		
26	0.5	OR	OD PN	PNP SWITCH	IGNITION ON AND SELECTOR LEVER IN 1 POSITION	BATTERY VOLTAGE
20	on	1 POSITION	IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V		
27	I	PNP SWITCH	IGNITION ON AND SELECTOR LEVER IN 2 POSITION	BATTERY VOLTAGE		
27 L	L	2 POSITION	IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V		
34 W	W/G	PNP SWITCH	IGNITION ON AND SELECTOR LEVER IN D POSITION	BATTERY VOLTAGE		
	Wa	D POSITION	IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V		
35	G/W	PNP SWITCH	IGNITION ON AND SELECTOR LEVER IN R POSITION	BATTERY VOLTAGE		
35		G/W	R POSITION	R POSITION	IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V
36	BR/W PNP SWITCH P OR N POSITION	PNP SWITCH	IGNITION ON AND SELECTOR LEVER IN P OR N POSITION	BATTERY VOLTAGE		
		IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V			

[RE4F04B]

TROUBLE DIAGNOSIS FOR SYMPTOMS

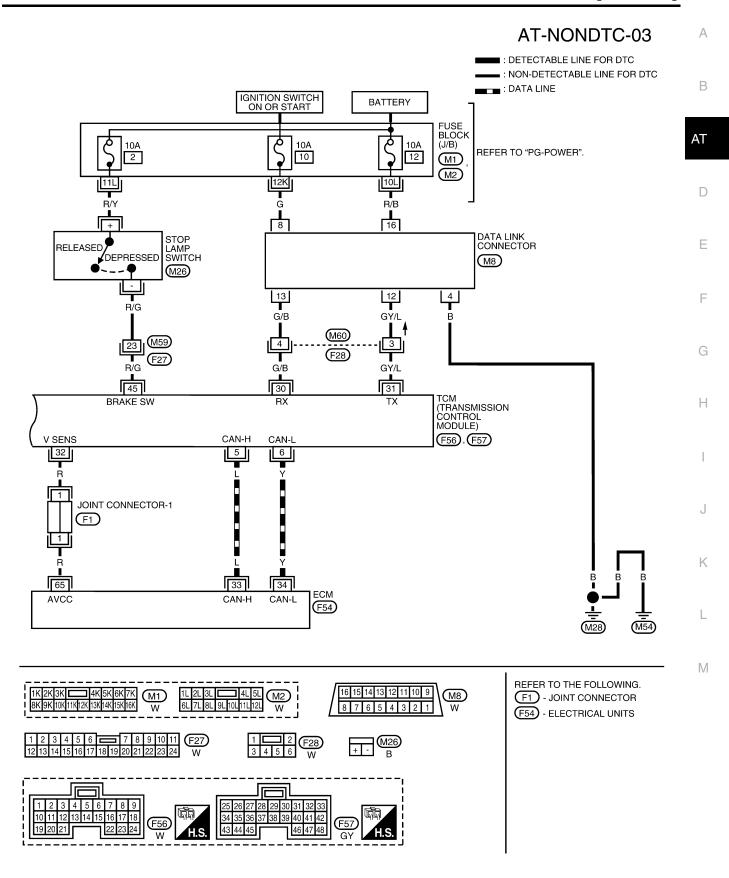


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[RE4F04B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
13	13 G/R O/D OFF INDICATO LAMP		WHEN SETTING OVERDRIVE CONTROL SWITCH "OFF"	0V
13		LAMP	WHEN SETTING OVERDRIVE CONTROL SWITCH "ON"	BATTERY VOLTAGE
22 OR/B	OR/B OVERDRIVE CONTROL	WHEN SETTING OVERDRIVE CONTROL SWITCH "ON"	BATTERY VOLTAGE	
		SWITCH	WHEN SETTING OVERDRIVE CONTROL SWITCH "OFF"	oV

[RE4F04B]



WCWA0083E

AT-599

[RE4F04B]

ECS0066B

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)					
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	
5	L	CAN-H	_	_	
6	Y	CAN-L		_	
30	G/B	DATA LINK CONNECTOR (RX)		_	
31	GY/L	DATA LINK CONNECTOR (TX)	_	_	
32	R	SENSOR POWER	IGNITION SWITCH ON	APPROX. 4.5 - 5.5v	
			IGNITION SWITCH OFF	APPROX. 0V	
45	R/G	STOP LAMP SWITCH	BRAKE PEDAL DEPRESSED	BATTERY VOLTAGE	
			BRAKE PEDAL RELEASED	APPROX. 0V	

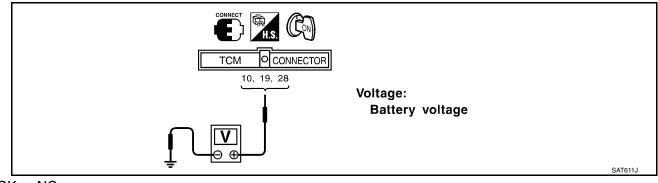
1. O/D OFF Indicator Lamp Does Not Come On

SYMPTOM:

O/D OFF indicator lamp does not come on for about 2 seconds when turning ignition switch to ON.

1. CHECK TCM POWER SOURCE

- 1. Turn ignition switch to ON position. (Do not start engine.)
- 2. Check voltage between TCM terminals 10, 19, 28 and ground.

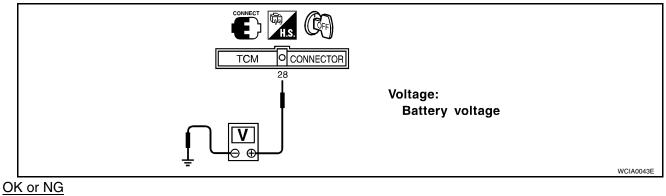


OK or NG

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

2. CHECK POWER SOURCE STEP 2

- 1. Turn ignition switch to OFF position.
- 2. Check voltage between TCM terminal 28 and ground.



OK >> GO TO 4.

NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and TCM (Main harness) Refer to <u>AT-486, "Wiring Diagram — AT — MAIN"</u>.
- Harness for short or open between battery and TCM (Main harness) Refer to <u>AT-486, "Wiring Diagram — AT — MAIN"</u>.
- Ignition switch and fuse Refer to <u>PG-2, "POWER SUPPLY ROUTING"</u>.

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace damaged parts.

4. CHECK TCM GROUND CIRCUIT

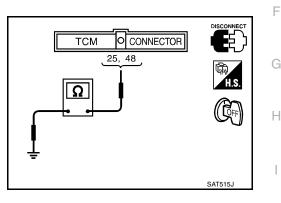
- 1. Turn ignition switch to OFF position.
- 2. Disconnect TCM harness connector.
- 3. Check continuity between TCM terminals 25, 48 and ground.

Continuity should exist.

OK or NG

OK >> GO TO 5.

NG >> Repair open circuit or short to ground or short to power in harness or connectors. Refer to <u>AT-486, "Wiring Dia-</u> <u>gram — AT — MAIN"</u>.



5. CHECK LAMP CIRCUIT

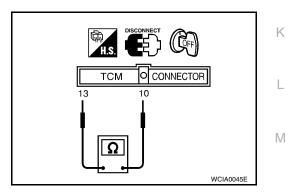
- 1. Turn ignition switch to OFF position.
- 2. Check resistance between TCM terminals 10 and 13.

Resistance :50 - 100 Ω

3. Reinstall any part removed.

OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.



6. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness and fuse for short or open between ignition switch and O/D OFF indicator lamp (Main harness) Refer to <u>PG-2, "POWER SUPPLY ROUTING"</u>.
- Harness for short or open between O/D OFF indicator lamp and TCM.

OK or NG

- OK >> GO TO 7.
- NG >> Repair or replace damaged parts.

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Check again.

OK or NG

OK >> INSPECTION END

NG >> GO TO 8.

8. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

2. Engine Cannot Be Started In P and N Position

SYMPTOM:

- Engine cannot be started with selector lever in P or N position.
- Engine can be started with selector lever in D, 2, 1 or R position.

1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

With CONSULT-II

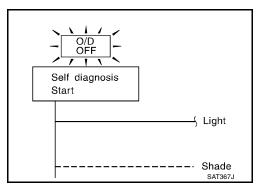
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?

Without CONSULT-II

Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?

Yes or No

Yes >> Check park/neutral position (PNP) switch circuit. Refer to <u>AT-489, "DTC P0705 PARK/NEUTRAL POSITION</u> <u>SWITCH"</u>. No >> GO TO 2.



2. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

Check for short or open of park/neutral position (PNP) switch harness connector terminals 1 and 2. Refer to <u>AT-491, "Wiring Diagram — AT — PNP/SW"</u>.

OK or NG

OK >> GO TO 3.

NG >> Repair or replace park/neutral position (PNP) switch.

3. CHECK STARTING SYSTEM

Check starting system. Refer to SC-9, "STARTING SYSTEM" .

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

3. In P Position, Vehicle Moves Forward or Backward When Pushed

SYMPTOM:

Vehicle moves when it is pushed forward or backward with selector lever in P position.

Check parking components. Refer to AT-650, "OVERHAUL" and AT-

727, "ASSEMBLY" . OK or NG G OK >> INSPECTION END צי ניצ D NG >> Repair or replace damaged parts. Ε Idler gear Parking pawl SAT282F F 4. In N Position, Vehicle Moves ECS0066E SYMPTOM: Vehicle moves forward or backward when selecting N position. 1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT Н With CONSULT-II Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit? **Without CONSULT-II** Does self-diagnosis show damage to park/neutral position (PNP) switch circuit? O/D Yes or No OFF Yes >> Check park/neutral position (PNP) switch circuit. Refer Κ Self diagnosis to AT-489, "DTC P0705 PARK/NEUTRAL POSITION Start SWITCH". >> GO TO 2. No 🖌 Light L −· Shade SAT367. Μ

2. CHECK CONTROL LINKAGE

Check control cable.

OK or NG

OK >> GO TO 4. NG >> GO TO 3. [RE4F04B]

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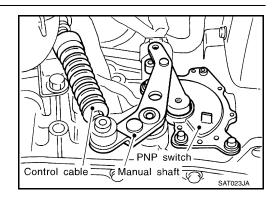
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3. Adjust control cable

Adjust control cable.

>> Refer to AT-645, "Control Cable Adjustment" .



4. CHECK A/T FLUID LEVEL

Check A/T fluid level.

OK or NG OK >> GO TO 5. NG >> Refill ATF.

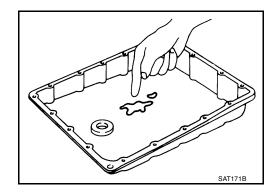


- 1. Remove oil pan.
- 2. Check A/T fluid condition.

OK or NG

OK >> GO TO 7. NG >> GO TO 6.





6. DETECT MALFUNCTIONING ITEM

- 1. Disassemble A/T.
- 2. Check the following items:
- Forward clutch assembly
- Overrun clutch assembly
- Reverse clutch assembly

OK or NG

- OK >> GO TO 7.
- NG >> Repair or replace damaged parts.

[RE4F04B]

[RE4FV4D]
_
n with harness connector.
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Image: Self-diagnosis Throttle position sensor circuit Image: Self-diagnosis A/T fluid temperature sensor circuit Image: Self-diagnosis Line pressure solenoid valve
start circuit Light Shade
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RE SENSOR CIRCUIT", AT-545, "DTC 61, "DTC P1705 THROTTLE POSITION ENSOR]".
DAL POSITION (APP) SENSOR]
Throttle position sensor (accelerator pedal

AT-605

4. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in D position. Refer to AT-454, "Line Pressure Test".

OK or NG

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



5. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to <u>AT-642, "REMOVAL"</u>.
- 2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve

OK or NG

OK >> GO TO 6.

NG >> Repair or replace damaged parts.

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Check again.

OK or NG

OK >> INSPECTION END NG >> GO TO 7.

7. CHECK TCM INSPECTION

- 1. Perform TCM input/output signal inspection.
- 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

6. Vehicle Does Not Creep Backward In R Position

SYMPTOM:

Vehicle does not creep backward when selecting R position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level. <u>OK or NG</u> OK >> GO TO 2. NG >> Refill ATF.

2. CHECK STALL REVOLUTION

Check stall revolution with selector lever in 1 and R positions. OK or NG

OK >> GO TO 5. OK in 1 position, NG in R position>>GO TO 3. NG in both 1 and R positions>>GO TO 4.



- 1. Remove control valve assembly. Refer to <u>AT-642, "REMOVAL"</u>.
- 2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
- 3. Disassemble A/T.
- 4. Check the following items:
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace damaged parts.





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4. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" .
- 2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
- 3. Disassemble A/T.
- 4. Check the following items:
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly
- Low & reverse brake assembly
- Low one-way clutch

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

5. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in R position. Refer to <u>AT-454</u>, "Line Pressure Test".

OK or NG

OK >> GO TO 7. NG >> GO TO 6.



6. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" .
- 2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
- 3. Disassemble A/T.
- 4. Check the following item:
- Oil pump assembly

OK or NG

OK >> GO TO 7.

NG >> Repair or replace damaged parts.

[RE4F04B]

7. CHECK A/T FLUID CONDITION	А			
1. Remove oil pan.				
2. Check A/T fluid condition.	В			
OK or NG	D			
OK >> GO TO 9. NG >> GO TO 8.				
	AT			
	D			
	D			
SAT171B				
8. DETECT MALFUNCTIONING ITEM	E			
1. Remove control valve assembly. Refer to AT-642, "REMOVAL".	F			
2. Check the following items:	Γ			
 Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot fil- ter) 	0			
 Line pressure solenoid valve 	G			
3. Disassemble A/T.				
4. Check the following items:	Н			
 Oil pump assembly 				
- Torque converter				
 Reverse clutch assembly 				
- High clutch assembly				
- Low & reverse brake assembly	J			
- Low one-way clutch				
OK or NG				
OK >> GO TO 9. NG >> Repair or replace damaged parts.	Κ			
9. снеск зумртом	I			
Check again.	L_			
OK or NG				
OK >> INSPECTION END NG >> GO TO 10.	Μ			
10. CHECK TCM INSPECTION				

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

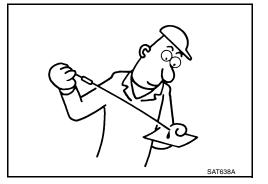
7. Vehicle Does Not Creep Forward in D, 2 or 1 Position

SYMPTOM:

Vehicle does not creep forward when selecting D, 2 or 1 position.

Check A/T fluid level. <u>OK or NG</u> OK >> GO TO 2.

NG >> Refill ATF.



2. CHECK STALL REVOLUTION

Check stall revolution with selector lever in D position. Refer to $\underline{\text{AT-}}$ $\underline{\text{450, "Stall Test"}}$.

OK or NG

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



3. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" .
- 2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
- 3. Disassemble A/T.
- 4. Check the following items:
- Oil pump assembly
- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- Low & reverse brake assembly
- Torque converter

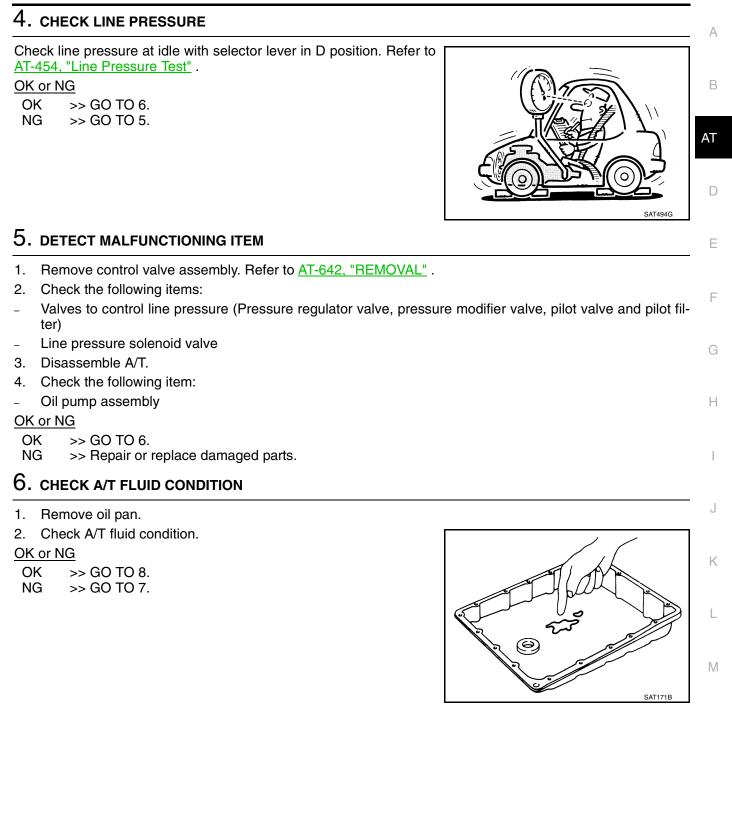
OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace damaged parts.

[RE4F04B]

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[RE4F04B]



7. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" .
- 2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
- 3. Disassemble A/T.
- 4. Check the following items:
- Oil pump assembly
- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- Low & reverse brake assembly
- Torque converter

OK or NG

OK >> GO TO 8.

NG >> Repair or replace damaged parts.

8. снеск зумртом

Check again.

OK or NG

OK >> **INSPECTION END** NG >> GO TO 9.

9. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

8. Vehicle Cannot Be Started From D1

SYMPTOM:

Vehicle cannot be started from D1 on Cruise test — Part 1.

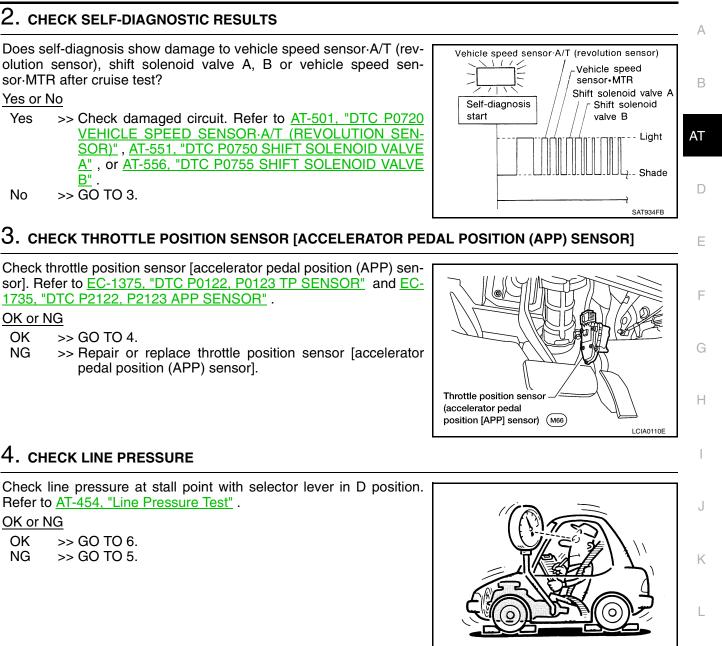
1. СНЕСК ЗУМРТОМ

Is "6. Vehicle Does Not Creep Backward In R Position" OK?

Yes or No

Yes >> GO TO 2. No >> Go to <u>AT-607, "6. Vehicle Does Not Creep Backward In R Position"</u>. ECS0066I

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[RE4F04B]

5. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to <u>AT-642, "REMOVAL"</u>.
- 2. Check the following items:
- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter
- 3. Disassemble A/T.
- 4. Check the following items:
- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- High clutch assembly
- Torque converter
- Oil pump assembly

OK or NG

OK >> GO TO 8.

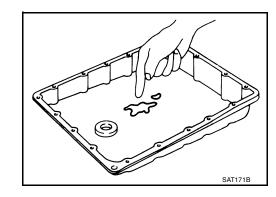
NG >> Repair or replace damaged parts.

6. CHECK A/T FLUID CONDITION

- 1. Remove oil pan.
- 2. Check A/T fluid condition.

OK or NG

OK >> GO TO 7. NG >> GO TO 5.



7. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to <u>AT-642, "REMOVAL"</u>.
- 2. Check the following items:
- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace damage parts.

[RE4F04B]

heck again. <u>K or NG</u> OK >> INSPECTION END	
NG >> GO TO 9.	
. CHECK TCM INSPECTION	
Perform TCM input/output signal inspection. If NG, recheck TCM pin terminals for damage or loose connection with harness connector. K or NG	
DK >> INSPECTION END NG >> Repair or replace damaged parts.	
A/T Does Not Shift: D1 \rightarrow D2 or Does Not Kickdown: D4 \rightarrow D2	66 1
YMPTOM: /T does not shift from D1 to D2 at the specified speed. /T does not shift from D4 to D2 when depressing accelerator pedal fully at the specified speed.	000
. СНЕСК ЅҮМРТОМ	
re "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position" and "8. Vehicle Cannot Be Started From D1 K?	"
es or No Yes >> GO TO 2. No >> Go to <u>AT-610, "7. Vehicle Does Not Creep Forward in D, 2 or 1 Position"</u> and <u>AT-612, "8. Vehic</u> <u>Cannot Be Started From D1"</u> .	<u>le</u>
CHECK SELF-DIAGNOSTIC RESULTS	
No. >> GO TO 3 Work of the second	ir-
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit? Image: Self-diagnosis show damage to park/neutral position (PNP) Does self-diagnosis show damage to park/neutral position (PNP) witch circuit? <u>'es or No</u> Yes >> Check park/neutral position (PNP) switch circuit. Refer to <u>AT-489, "DTC P0705 PARK/NEUTRAL POSITION SWITCH"</u> . No >> GO TO 3.	r-
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit? Image: Self-diagnosis show damage to park/neutral position (PNP) Does self-diagnosis show damage to park/neutral position (PNP) witch circuit? Yes >> Check park/neutral position (PNP) switch circuit. Refer to AT-489, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" No >> GO TO 3.	r-

"DTC P0720 VEHICLE SPEED SENSOR A/T (REVOLUTION SENSOR)" and AT-578, "DTC VEHICLE SPEED SENSOR MTR".

OK or NG

OK >> GO TO 4.

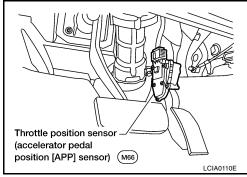
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to <u>EC-1375, "DTC P0122, P0123 TP SENSOR"</u> and <u>EC-1735, "DTC P2122, P2123 APP SENSOR"</u>.

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace throttle position sensor [accelerator pedal position (APP) sensor].

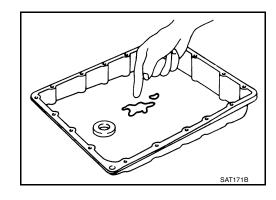


5. CHECK A/T FLUID CONDITION

- 1. Remove oil pan.
- 2. Check A/T fluid condition.

OK or NG

OK	>> GO TO 7.
NG	>> GO TO 6.



6. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve. Refer to AT-642, "REMOVAL" .
- 2. Check the following items:
- Shift valve A
- Shift solenoid valve A
- Pilot valve
- Pilot filter
- 3. Disassemble A/T.
- 4. Check the following items:
- Servo piston assembly
- Brake band
- Oil pump assembly

OK or NG

- OK >> GO TO 8.
- NG >> Repair or replace damaged parts.

[RE4F04B]

7. DETECT MALFUNCTIONING ITEM	А
1. Remove control valve. Refer to AT-642, "REMOVAL".	1
2. Check the following items:	
- Shift valve A	В
- Shift solenoid valve A	
- Pilot valve	AT
- Pilot filter	AI
OK or NG	
OK >> GO TO 8.	D
NG >> Repair or replace damaged parts.	
8. снеск зумртом	F
Check again.	
OK or NG	
OK >> INSPECTION END	F
NG >> GO TO 9.	
9. CHECK TCM INSPECTION	G
1. Perform TCM input/output signal inspection.	
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.	
OK or NG	Н
OK >> INSPECTION END	
NG >> Repair or replace damaged parts.	1
10. A/T Does Not Shift: D2 \rightarrow D3	1
SYMPTOM:	
A/T does not shift from D ₂ to D ₃ at the specified speed.	J
1. СНЕСК ЗҮМРТОМ	K
Are "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position" and "8. Vehicle Cannot Be Started From D1 " OK?	
Yes or No	L
Yes >> GO TO 2. No >> Go to <u>AT-610, "7. Vehicle Does Not Creep Forward in D, 2 or 1 Position"</u> and <u>AT-612, "8. Vehicle Cannot Be Started From D1"</u> .	Μ

2. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

(I) With CONSULT-II

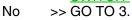
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?

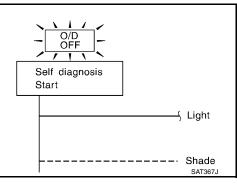
Without CONSULT-II

Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?

Yes or No

Yes >> Check park/neutral position (PNP) switch circuit. Refer to AT-489, "DTC P0705 PARK/NEUTRAL POSITION SWITCH".



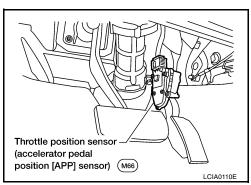


3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-1375, "DTC P0122, P0123 TP SENSOR" and EC-1735, "DTC P2122, P2123 APP SENSOR" .

OK or NG

- OK >> GO TO 4.
- NG >> Repair or replace throttle position sensor [accelerator pedal position (APP) sensor].

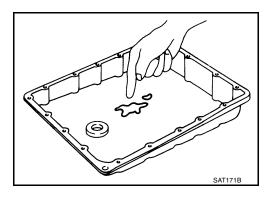


4. CHECK A/T FLUID CONDITION

- 1. Remove oil pan.
- 2. Check A/T fluid condition.

OK or NG

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



[RE4F04B]

5. DETECT MALFUNCTIONING ITEM	Δ
1. Remove control valve assembly. Refer to AT-642, "REMOVAL".	
2. Check the following items:	
- Shift valve B	В
 Shift solenoid valve B 	
 Pilot valve 	A.T.
– Pilot filter	AT
3. Disassemble A/T.	
4. Check the following items:	D
 Servo piston assembly 	_
 High clutch assembly 	
- Oil pump assembly	E
OK or NG	
OK >> GO TO 7.	
NG >> Repair or replace damaged parts.	F
6. DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to AT-642, "REMOVAL".	G
2. Check the following items:	
- Shift valve B	Н
 Shift solenoid valve B 	11
 Pilot valve 	
 Pilot filter 	I
OK or NG	
OK >> GO TO 7.	
NG >> Repair or replace damaged parts.	J
7. снеск зумртом	
Check again.	K
OK or NG	
OK >> INSPECTION END NG >> GO TO 8.	L
8. CHECK TCM INSPECTION	
1. Perform TCM input/output signal inspection.	— M
 If NG, recheck TCM pin terminals for damage or loose connection with harness connection w	nnector.
<u>OK or NG</u>	
<u></u>	

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

11. A/T Does Not Shift: D3 \rightarrow D4

SYMPTOM:

- A/T does not shift from D₃ to D₄ at the specified speed.
- A/T must be warm before D3 to D4 shift will occur.

1. СНЕСК ЗУМРТОМ

Are "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position" and "8. Vehicle Cannot Be Started From D1 " OK?

Yes or No

Yes >> GO TO 2.

No >> Go to <u>AT-610, "7. Vehicle Does Not Creep Forward in D, 2 or 1 Position"</u> and <u>AT-612, "8. Vehicle</u> <u>Cannot Be Started From D1"</u>.

2. CHECK SELF-DIAGNOSTIC RESULTS

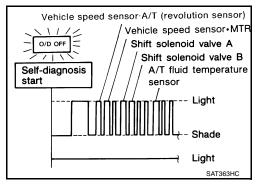
With CONSULT-II

Does self-diagnosis, after cruise test, show damage to any of the following circuits?

- Park/neutral position (PNP) switch
- Overdrive control switch
- A/T fluid temperature sensor
- Vehicle speed sensor·A/T (revolution sensor)
- Shift solenoid valve A or B
- Vehicle speed sensor·MTR

Yes or No

Yes >> Check damaged circuit. Refer to <u>AT-489</u>, "DTC P0705 <u>PARK/NEUTRAL POSITION SWITCH</u>", <u>AT-495</u>, "DTC <u>P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT</u>", <u>AT-501</u>, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)", <u>AT-551</u>, "DTC P0750 <u>SHIFT SOLENOID VALVE A</u>", <u>AT-556</u>, "DTC P0755 <u>SHIFT SOLENOID VALVE B</u>", or <u>AT-578, "DTC VEHI-CLE SPEED SENSOR MTR</u>".



No >> GO TO 3.

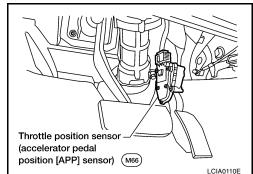
3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to <u>EC-1375, "DTC P0122, P0123 TP SENSOR"</u> and <u>EC-1754, "DTC P2138 APP SENSOR"</u>.

OK or NG

OK >> GO TO 4.

NG >> Repair or replace throttle position sensor [accelerator pedal position (APP) sensor].



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[RE4F04B]

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4. CHECK A/T FLUID CONDITION 1. Remove oil pan. 2. Check A/T fluid condition. OK or NG OK >> GO TO 6. NG >> GO TO 5. SAT171B 5. DETECT MALFUNCTIONING ITEM 1. Remove control valve assembly. Refer to AT-642, "REMOVAL". 2. Check the following items: Shift valve B Overrun clutch control valve Shift solenoid valve B Pilot valve Pilot filter 3. Disassemble A/T. 4. Check the following items: Servo piston assembly _ Brake band Torque converter Oil pump assembly OK or NG OK >> GO TO 7. >> Repair or replace damaged parts. NG 6. DETECT MALFUNCTIONING ITEM 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" . 2. Check the following items: Shift valve B Overrun clutch control valve Shift solenoid valve B Pilot valve _ Pilot filter OK or NG OK >> GO TO 7. NG >> Repair or replace damaged parts. 7. СНЕСК ЗУМРТОМ Check again. OK or NG

OK >> INSPECTION END NG >> GO TO 8.

8. CHECK TCM INSPECTION

- 1. Perform TCM input/output signal inspection.
- 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

noid valve circuit after cruise test?

>> GO TO 2.

NG >> Repair or replace damaged parts.

12. A/T Does Not Perform Lock-up

SYMPTOM:

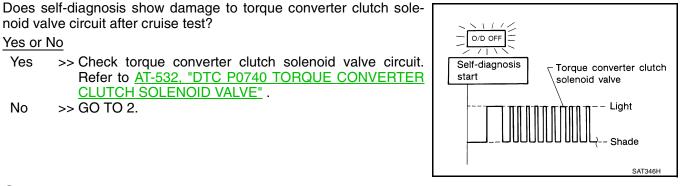
Yes or No Yes

No

A/T does not perform lock-up at the specified speed.

CLUTCH SOLENOID VALVE" .

1. CHECK SELF-DIAGNOSTIC RESULTS



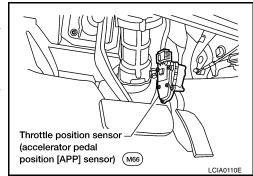
2. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-1459, "DTC P0222, P0223 TP SENSOR" and EC-1754, "DTC P2138 APP SENSOR" .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace throttle position sensor [accelerator pedal position (APP) sensor].



3. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve. Refer to AT-642, "REMOVAL" .
- 2. Check following items:
- Torque converter clutch control valve
- Torque converter relief valve
- Torque converter clutch solenoid valve
- Pilot valve
- Pilot filter

OK or NG

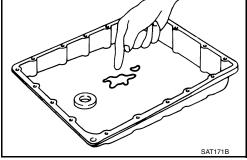
- OK >> GO TO 4.
- NG >> Repair or replace damaged parts.

ECS0066M

[RE4F04B]

	[·····]	
4. СНЕСК ЅҮМРТОМ		А
Check again.		/ \
<u>OK or NG</u> OK >> INSPECTION END NG >> GO TO 5.		В
5. CHECK TCM INSPECTION		AT
 Perform TCM input/output signal inspection. If NG, recheck TCM pin terminals for damage or loose connection <u>OK or NG</u> OK >> INSPECTION END 	with harness connector.	D
NG >> Repair or replace damaged parts.		Е
SYMPTOM: A/T does not hold lock-up condition for more than 30 seconds. 1. CHECK SELF-DIAGNOSTIC RESULTS		F
Does self-diagnosis show damage to engine speed signal circuit after cruise test? <u>Yes or No</u> Yes >> Check engine speed signal circuit. Refer to <u>AT-506,</u> <u>"DTC P0725 ENGINE SPEED SIGNAL"</u> . No >> GO TO 2.	Self-diagnosis start Light	H I J
2. CHECK A/T FLUID CONDITION	SAT347H	
		K

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



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ECS00660

3. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" .
- 2. Check the following items:
- Torque converter clutch control valve
- Pilot valve
- Pilot filter
- 3. Disassemble A/T.
- 4. Check torque converter and oil pump assembly.

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

4. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL".
- 2. Check the following items:
- Torque converter clutch control valve
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

5. снеск сумртом

Check again.

OK or NG

OK >> INSPECTION END

NG >> GO TO 6.

6. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

14. Lock-up Is Not Released

SYMPTOM:

Lock-up is not released when accelerator pedal is released.

[RE4F04B]

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1. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR] CIR-CUIT

With CONSULT-II

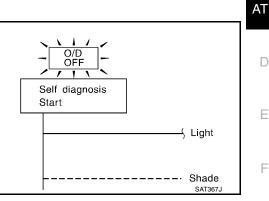
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to the throttle position switch [accelerator pedal position (APP) sensor] circuit?

Without CONSULT-II

Does self-diagnosis show damage to the throttle position sensor [accelerator pedal position (APP) sensor] circuit?

Yes or No

Yes >> Check the throttle position switch [accelerator pedal position (APP) sensor circuit. Refer to <u>EC-1375, "DTC P0122, P0123 TP SENSOR"</u> and <u>EC-1754, "DTC P2138 APP SENSOR"</u>.
No >> GO TO 2.



2. снеск сумртом

Check again.

<u>OK</u>	or	NG

OK >> INSPECTION END

NG >> GO TO 3.

3. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector. OK or NG

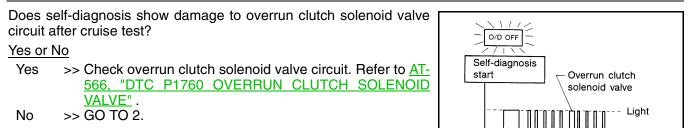
OK >> INSPECTION END

NG >> Repair or replace damaged parts.

15. Engine Speed Does Not Return To Idle (Light Braking D4 \rightarrow D3)ECSODEPSYMPTOM:• Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 .

- Vehicle does not decelerate by engine brake when turning overdrive control switch OFF.
- Vehicle does not decelerate by engine brake when shifting A/T from D to 2 position.

1. CHECK SELF-DIAGNOSTIC RESULTS



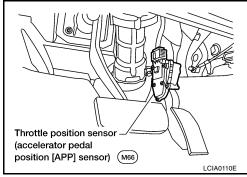
AT-625

2. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-1375, "DTC P0122, P0123 TP SENSOR" and EC-1754, "DTC P2138 APP SENSOR".

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace throttle position sensor [accelerator pedal position (APP) sensor].

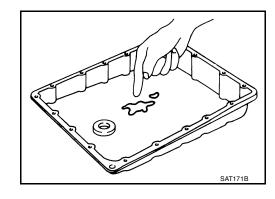


3. CHECK A/T FLUID CONDITION

- 1. Remove oil pan.
- 2. Check A/T fluid condition.

OK or NG

OK	>> GO TO 5.
NG	>> GO TO 4.



4. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL" .
- 2. Check the following items:
- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve
- 3. Disassemble A/T.
- 4. Check the following items:
- Overrun clutch assembly
- Oil pump assembly

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace damaged parts.

5. DETECT MALFUNCTIONING ITEM

- 1. Remove control valve assembly. Refer to AT-642, "REMOVAL".
- 2. Check the following items:
- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

OK or NG

- OK >> GO TO 6.
- NG >> Repair or replace damaged parts.

AT-626

[RE4F04B]

Perform TCM input/output signal inspection. If NG, recheck TCM pin terminals for damage or loose connection with harness connector. <u>K or NG</u> DK \Rightarrow INSPECTION END NG \Rightarrow Repair or replace damaged parts. 6. Vehicle Does Not Start From D1 were the the the term of	[<u> </u>
Kor NG >> INSPECTION END > VG >> GO TO 7. .	. СНЕСК ЅҮМРТОМ	
DK >> INSPECTION END NG >> GO TO 7. • CHECK TCM INSPECTION Perform TCM input/output signal inspection. If ING, recheck TCM pin terminals for damage or loose connection with harness connector. Korn NG DK >> INSPECTION END VG >> Repair or replace damaged parts. 6. Vehicle Does Not Start From D1 reserve YMPTOM: ehicle does not start from D1 on Cruise test — Part 2. • CHECK SELF-DIAGNOSTIC RESULTS Ores self-diagnosis show damage to vehicle speed sensor-A/T (revulation sensor), shift solenoid valve A, B or vehicle speed sensor-A/T (revulation sensor). y-MTR after cruise test? Sen No Yes > Check damaged circuit. Refer to AT-501, "DTC P0720 Vehicle speed sensor A/T (REVOLUTION SENSOR. // T. (REVOLUTION SENSOR. // AT-556. "DTC P0755 SHIFT SOLENOID VALVE B' or AT-578. "DTC VEHICLE SPEED SENSOR MTR". No >> GO TO 2. • CHECK SYMPTOM heck again. Kor NG DK >> Go to AT-612. "8. Vehicle Cannot Be Started From D1". YG >> Go to AT-612. "8. Vehicle Cannot Be Started From D1". YG >> Go TO 3.	neck again.	
DK >> INSPECTION END NG >> GO TO 7. • CHECK TCM INSPECTION Perform TCM input/output signal inspection. If ING, recheck TCM pin terminals for damage or loose connection with harness connector. Korn NG DK >> INSPECTION END VG >> Repair or replace damaged parts. 6. Vehicle Does Not Start From D1 reserve YMPTOM: ehicle does not start from D1 on Cruise test — Part 2. • CHECK SELF-DIAGNOSTIC RESULTS Ores self-diagnosis show damage to vehicle speed sensor-A/T (revulation sensor), shift solenoid valve A, B or vehicle speed sensor-A/T (revulation sensor). y-MTR after cruise test? Sen No Yes > Check damaged circuit. Refer to AT-501, "DTC P0720 Vehicle speed sensor A/T (REVOLUTION SENSOR. // T. (REVOLUTION SENSOR. // AT-556. "DTC P0755 SHIFT SOLENOID VALVE B' or AT-578. "DTC VEHICLE SPEED SENSOR MTR". No >> GO TO 2. • CHECK SYMPTOM heck again. Kor NG DK >> Go to AT-612. "8. Vehicle Cannot Be Started From D1". YG >> Go to AT-612. "8. Vehicle Cannot Be Started From D1". YG >> Go TO 3.	K or NG	
Perform TCM input/output signal inspection. If NG, recheck TCM pin terminals for damage or loose connection with harness connector. <u>K or NG</u> DK →> INSPECTION END NG →> Repair or replace damaged parts. 5. Vehicle Does Not Start From D1 YMPTOM: ehicle does not start from D1 on Cruise test — Part 2. • CHECK SELF-DIAGNOSTIC RESULTS Does self-diagnosis show damage to vehicle speed sensor A/T (rev- tion sensor), shift solenoid valve A, B or vehicle speed sensor-MTR after cruise test? <u>so or No</u> Yfes →> Check damaged circuit. Refer to AT-501. "DTC P0720 WEHCLE SPEED SENSOR A/T (REVOLUTION SEN- SOR!", AT-551. "DTC VEHICLE SPEED SENSOR MTR". No →> GO TO 2. • CHECK SYMPTOM heck again. <u>Kor NG</u> DK →> Co to AT-612. "8. Vehicle Cannot Be Started From D1". NG →> GO TO 3. • CHECK TCM INSPECTION	DK >> INSPECTION END	
If NG, recheck TCM pin terminals for damage or loose connection with harness connector. <u>K or NG</u> DK \rightarrow INSPECTION END NG \rightarrow Repair or replace damaged parts. 6. Vehicle Does Not Start From D1 WMPTOM: ehicle does not start from D1 on Cruise test — Part 2. . CHECK SELF-DIAGNOSTIC RESULTS Does self-diagnosis show damage to vehicle speed sensor-A/T (revultion sensor), shift solenoid valve A, B or vehicle speed sensor-M/T (revultion sensor), shift solenoid valve A, B or vehicle speed sensor-M/TR after cruise test? as or No Yes \rightarrow Check damaged circuit. Refer to AT-501, "DTC P0720 V EHICLE SPEED SENSOR-A/T (REVOLUTION SEN- SOR?, AT-551, "DTC VP755 SHIFT SOLENOID VALVE B" or AT-5756, "DTC VEHICLE SPEED SENSOR MTR". No \Rightarrow GO TO 2. . CHECK SYMPTOM heck again. <u>K or NG</u> DK \Rightarrow Go to AT-612, "8, Vehicle Cannot Be Started From D1". NG \Rightarrow GO TO 3. . CHECK TCM INSPECTION	. CHECK TCM INSPECTION	A
K or NG DK >> INSPECTION END VG >> Repair or replace damaged parts. 6. Vehicle Does Not Start From D1 $ecccccc$ YMPTOM: ehicle does not start from D1 on Cruise test — Part 2. • CHECK SELF-DIAGNOSTIC RESULTS oes self-diagnosis show damage to vehicle speed sensor-A/T (revution sensor), shift solenoid valve A, B or vehicle speed sensor-MTR after cruise test? sor NO YEHICLE SPEED SENSOR-AT (REVOLUTION SENSOR) Yes >> Check damaged circuit. Refer to AT-501, "DTC P0720 VEHICLE SPEED SENSOR-AT (REVOLUTION SENSOR) A'', AT-556, "DTC P0750 SHIFT SOLENOID VALVE B'' or AT-578, "DTC VEHICLE SPEED SENSOR MTR'' Self-diagnosis No >> GO TO 2. • CHECK SYMPTOM heck again. Kor NG DK >> Go to AT-612, "8. Vehicle Cannot Be Started From D1" NG >> Go TO 3.		
DK >> INSPECTION END NG >> Repair or replace damaged parts. 6. Vehicle Does Not Start From D1 200000 YMPTOM: ehicle does not start from D1 on Cruise test — Part 2. • CHECK SELF-DIAGNOSTIC RESULTS 000000000000000000000000000000000000		
NG →> Repair or replace damaged parts. 6. Vehicle Does Not Start From D1 YMPTOM: ehicle does not start from D1 on Cruise test — Part 2. • CHECK SELF-DIAGNOSTIC RESULTS oes self-diagnosis show damage to vehicle speed sensor-A/T (rev- ution sensor), shift solenoid valve A, B or vehicle speed sen- or-MTR after cruise test? <u>as or No</u> Yes >> Check damaged circuit. Refer to AT-501, "DTC P0720 <u>VEHICLE SPEED SENSOR A/T (REVOLUTION SEN- AT-558, "DTC P0750 SHIFT SOLENOID VALVE <u>AT, AT-556, "DTC P0755 SHIFT SOLENOID VALVE</u> <u>AT, AT-558, "DTC VEHICLE SPEED SENSOR MTR"</u>. No >> GO TO 2. • CHECK SYMPTOM heck again. <u>K or NG</u> DK >> Go to <u>AT-612, "8. Vehicle Cannot Be Started From D1"</u>. SG > GO TO 3.</u>		
YMPTOM: ehicle does not start from D1 on Cruise test — Part 2. . CHECK SELF-DIAGNOSTIC RESULTS oes self-diagnosis show damage to vehicle speed sensor.A/T (revultion sensor), shift solenoid valve A, B or vehicle speed sensor.MTR after cruise test? as or NO Yes >> Check damaged circuit. Refer to AT-501, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR), AT-556, "DTC P0750 SHIFT SOLENOID VALVE B" or AT-578, "DTC P0755 SHIFT SOLENOID VALVE B" or AT-578, "DTC VEHICLE SPEED SENSOR MTR". No >> GO TO 2.		
A CHECK SELF-DIAGNOSTIC RESULTS oes self-diagnosis show damage to vehicle speed sensor A/T (revultion sensor), shift solenoid valve A, B or vehicle speed sensor. A/T (revultion sensor), shift solenoid valve A, B or vehicle speed sensor. A/T (revultion sensor), shift solenoid valve A, B or vehicle speed sensor. A/T (revultion sensor) es or NO Yes >> Check damaged circuit. Refer to AT-501, "DTC P0720 VEHICLE SPEED SENSOR. A/T (REVOLUTION SENSOR)", AT-551, "DTC P0750 SHIFT SOLENOID VALVE B" or AT-578, "DTC VEHICLE SPEED SENSOR MTR". No >> GO TO 2. SetHeck SYMPTOM heck again. Kor NG OK >> Go to AT-612, "8. Vehicle Cannot Be Started From D1". NG >> GO TO 3. CHECK TCM INSPECTION	5. Vehicle Does Not Start From D1 Ecsoon	
• CHECK SELF-DIAGNOSTIC RESULTS oes self-diagnosis show damage to vehicle speed sensor A/T (rev- ution sensor), shift solenoid valve A, B or vehicle speed sen- or MTR after cruise test? <u>es or No</u> Yes >> Check damaged circuit. Refer to AT-501, "DTC P0720 <u>VEHICLE SPEED SENSOR AT (REVOLUTION SEN- SOR)", AT-551, "DTC P0750 SHIFT SOLENOID VALVE A", AT-556, "DTC P0755 SHIFT SOLENOID VALVE A", AT-556, "DTC VEHICLE SPEED SENSOR MTR". No ⇒> GO TO 2. CHECK SYMPTOM heck again. <u>Kor NG</u> DK ⇒ Go to AT-612, "8. Vehicle Cannot Be Started From D1". NG ⇒ GO TO 3. CHECK TCM INSPECTION</u>	/МРТОМ:	
oes self-diagnosis show damage to vehicle speed sensor A/T (revution sensor), shift solenoid valve A, B or vehicle speed sensor. AT-578, "DTC PO750 SHIFT SOLENOID VALVE A", AT-556, "DTC VEHICLE SPEED SENSOR MTR". No ⇒> GO TO 2. CHECK SYMPTOM heck again. K or NG DK ⇒> Go to AT-612, "8. Vehicle Cannot Be Started From D1". NG ⇒> GO TO 3. CHECK TCM INSPECTION	shicle does not start from D1 on Cruise test — Part 2.	
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ution sensor), shift solenoid valve A, B or vehicle speed sen- or-MTR after cruise test? <u>es or No</u> Yes >> Check damaged circuit. Refer to <u>AT-501, "DTC P0720</u> <u>VEHICLE SPEED SENSOR A/T (REVOLUTION SEN- SOR)", AT-551, "DTC P0750 SHIFT SOLENOID VALVE A", AT-556, "DTC P0755 SHIFT SOLENOID VALVE B" or <u>AT-578, "DTC VEHICLE SPEED SENSOR MTR"</u>. No >> GO TO 2. CHECK SYMPTOM heck again. <u>K or NG</u> DK >> Go to <u>AT-612, "8. Vehicle Cannot Be Started From D1"</u>. NG >> GO TO 3. CHECK TCM INSPECTION</u>	. CHECK SELF-DIAGNOSTIC RESULTS	(
br-MTR after cruise test? <u>es or No</u> Yes >> Check damaged circuit. Refer to <u>AT-501</u> , "DTC P0720 <u>VEHICLE SPEED SENSOR.A/T (REVOLUTION SEN- SOR)", AT-551, "DTC P0750 SHIFT SOLENOID VALVE A", AT-556, "DTC P0755 SHIFT SOLENOID VALVE A", AT-578, "DTC VEHICLE SPEED SENSOR MTR" No >> GO TO 2. CHECK SYMPTOM heck again. <u>K or NG</u> OK >> Go to <u>AT-612, "8. Vehicle Cannot Be Started From D1</u>". NG >> GO TO 3. CHECK TCM INSPECTION</u>		٦
Ses or No Yes >> Check damaged circuit. Refer to AT-501, "DTC P0720 VEHICLE SPEED SENSOR A/T (REVOLUTION SEN- SOR)", AT-551, "DTC P0750 SHIFT SOLENOID VALVE A", AT-556, "DTC P0755 SHIFT SOLENOID VALVE B" or AT-578, "DTC VEHICLE SPEED SENSOR MTR". No >> GO TO 2. Sates and the second seco	or MTR after cruise test?	
Yes >> Check damaged circuit. Here it Ai-soit. Dic P0720 VEHICLE SPEED SENSOR A/T (REVOLUTION SEN- SOR)", AT-551, "DTC P0750 SHIFT SOLENOID VALVE A", AT-556, "DTC P0755 SHIFT SOLENOID VALVE B" or AT-578, "DTC VEHICLE SPEED SENSOR MTR". No >> GO TO 2. SAT934FA CHECK SYMPTOM heck again. K or NG DK >> Go to AT-612, "8. Vehicle Cannot Be Started From D1". NG >> GO TO 3. CHECK TCM INSPECTION	es or No Self-diagnosis //// Shift solenoid	`
SOR)", AT-551, "DTC P0750 SHIFT SOLENOID VALVEA", AT-556, "DTC P0755 SHIFT SOLENOID VALVE B"or AT-578, "DTC VEHICLE SPEED SENSOR MTR".No $>>$ GO TO 2. CHECK SYMPTOM heck again. <u>K or NG</u> DK $>>$ Go to <u>AT-612, "8. Vehicle Cannot Be Started From D1"</u> . NG $>>$ GO TO 3. CHECK TCM INSPECTION	res >> Check damaged circuit. Refer to A1-501, DTC P0720 $\left[$	
$A^{"}, AT-556, "DTC P0755 SHIFT SOLENOID VALVE B"or AT-578, "DTC VEHICLE SPEED SENSOR MTR".No >> GO TO 2.CHECK SYMPTOMheck again.K or NGDK >> Go to AT-612, "8. Vehicle Cannot Be Started From D1".NG >> GO TO 3.CHECK TCM INSPECTION$		
No >> GO TO 2. SAT934FA A CHECK SYMPTOM heck again. K or NG OK >> Go to AT-612, "8. Vehicle Cannot Be Started From D1". NG >> GO TO 3. CHECK TCM INSPECTION	A", AT-556, "DTC P0755 SHIFT SOLENOID VALVE B"	
AT934FA ACHECK SYMPTOM heck again. K or NG OK >> Go to AT-612, "8. Vehicle Cannot Be Started From D1". NG >> GO TO 3. CHECK TCM INSPECTION		
heck again. <u>K or NG</u> DK >> Go to <u>AT-612, "8. Vehicle Cannot Be Started From D1"</u> . NG >> GO TO 3. CHECK TCM INSPECTION		
<u>K or NG</u> OK >> Go to <u>AT-612, "8. Vehicle Cannot Be Started From D1"</u> . NG >> GO TO 3. • CHECK TCM INSPECTION	. СНЕСК ЅҮМРТОМ	
<u>K or NG</u> OK >> Go to <u>AT-612, "8. Vehicle Cannot Be Started From D1"</u> . NG >> GO TO 3. • CHECK TCM INSPECTION	neck again.	_
NG >> GO TO 3.		
. CHECK TCM INSPECTION		
	. CHECK TCM INSPECTION	

1. Perform TCM input/output signal inspection.

2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> INSPECTION END

NG >> Repair or replace damaged parts.

[RE4F04B]

ECS0066F

17. A/T Does Not Shift: D4 \rightarrow D3 , When Overdrive Control Switch ON \rightarrow OFF

SYMPTOM:

A/T does not shift from D4 to D3 when changing overdrive control switch to OFF position.

1. CHECK OVERDRIVE SWITCH CIRCUIT

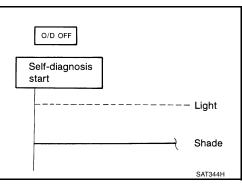
With CONSULT-II

Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to overdrive control switch circuit?

Without CONSULT-II

Does self-diagnosis show damage to overdrive control switch circuit?

Yes or No



18. A/T Does Not Shift: D3 \rightarrow 22 , When Selector Lever D \rightarrow 2 Position

ECS0066S

SYMPTOM:

A/T does not shift from D₃ to 2₂ when changing selector lever from D to 2 position.

1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

With CONSULT-II

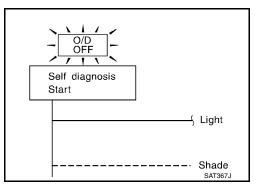
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?

Without CONSULT-II

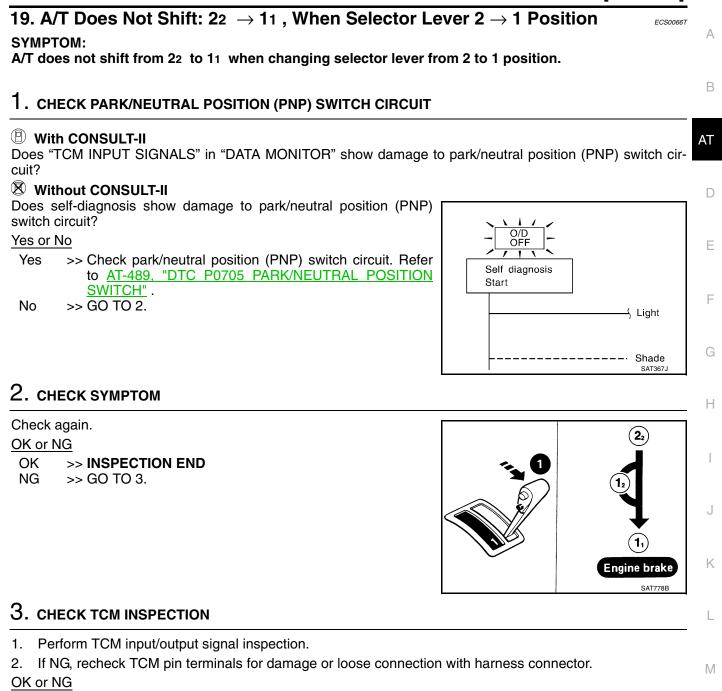
Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?

Yes or No

- Yes >> Check park/neutral position (PNP) switch circuit. Refer to <u>AT-489, "DTC P0705 PARK/NEUTRAL POSITION</u> <u>SWITCH"</u>.
- No >> Go to <u>AT-615</u>, "9. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does <u>Not Kickdown: $D4 \rightarrow D2$ "</u>.



[RE4F04B]



OK >> INSPECTION END

NG >> Repair or replace damaged parts.

20. Vehicle Does Not Decelerate By Engine Brake

SYMPTOM:

Vehicle does not decelerate by engine brake when shifting from 22 (12) to 11.

1. СНЕСК ЗУМРТОМ

Is "6. Vehicle Does Not Creep Backward In R Position" OK?

Yes or No

Yes \rightarrow So to AT-625, "15. Engine Speed Does Not Return To Idle (Light Braking D4 \rightarrow D3)".

No >> Go to AT-607, "6. Vehicle Does Not Creep Backward In R Position".

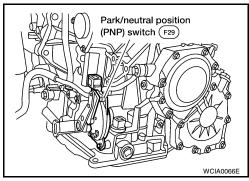
21. TCM Self-diagnosis Does Not Activate {Park/neutral Position (PNP), Overdrive Control and Throttle Position Sensor [Accelerator Pedal Position (APP) Sensor] Switches Circuit Checks}

SYMPTOM:

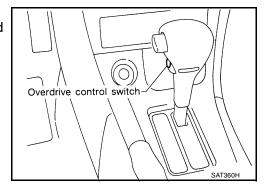
O/D OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

 Park/neutral position (PNP) switch The park/neutral (PNP) switch assembly includes a transmission range switch. The transmission range switch detects the selector lever position and sends a signal to the TCM.

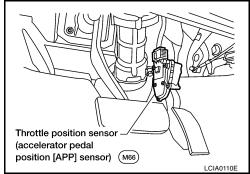


 Overdrive control switch Detects the overdrive control switch position (ON or OFF) and sends a signal to the TCM.



Throttle position sensor [accelerator pedal position (APP) sensor]

The throttle position sensor [accelerator pedal position (APP) sensor] is part of the system that controls the throttle position. This system also uses an electric throttle control actuator, which consists of a throttle control motor and throttle position sensors. Accelerator pedal position signal is sent to the ECM.



[RE4F04B]

[RE4F04B]

DIAGNOSTIC PROCEDURE A NOTE: The diagnostic procedure includes inspections for the overdrive control switch circuits. 1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (WITH CONSULT-II) (I) With CONSULT-II AT Turn ignition switch to ON position. 1. (Do not start engine.) Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II. 2. 3. Read out P/N, R, D, 2 and 1 position switches moving selector lever to each position. Check that the signal of the selector lever position is indicated DATA MONITOR properly. Ε MONITORING OK or NG PN POSI SW OFF OK >> GO TO 5. NG **R POSITION SW** >> GO TO 2. OFF F D POSITION SW OFF 2 POSITION SW ON 1 POSITION SW OFF SAT701J 2. DETECT MALFUNCTIONING ITEM Н Check the following items: Park/neutral position (PNP) switch Check continuity between park/neutral position (PNP) switch F29 terminals 1 (G/OR) and 2 (B) and between terminals 3 (Y) and 4 (OR), 5 (L), 6 (W/G), 7 (BR/W), 8 G/W), 9 (G) while moving manual shaft through each position. 1 (3) 2 (4.5.6.7.8.9) Terminal No. Lever position K Р 3 - 7 1 - 2 Ω R 3 - 8 Ν 3 - 9 1 - 2 L D 3 - 6 WCIA0096E 3 - 5 2 Μ 1 3 - 4

- If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step a.
- If OK on step b, adjust manual control cable. Refer to AT-645, "Control Cable Adjustment" .
- If NG on step b, remove park/neutral position (PNP) switch from A/T and check continuity of park/neutral position (PNP) switch terminals. Refer to step a.
- If OK on step d, adjust park/neutral position (PNP) switch. Refer to <u>AT-644, "Park/Neutral Position (PNP)</u> <u>Switch Adjustment"</u>.
- If NG on step d, replace park/neutral position (PNP) switch.
- Harness for short or open between ignition switch and park/neutral position (PNP) switch (Main harness)
- Harness for short or open between park/neutral position (PNP) switch and TCM (Main harness)
- OK or NG
- OK >> GO TO 5.
- NG >> Repair or replace damaged parts.

AT-631

3. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

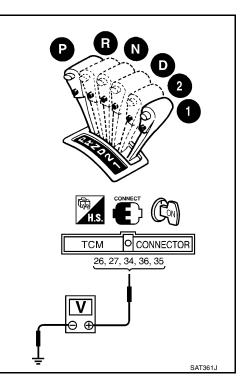
- 1. Turn ignition switch to ON position. (Do not start engine.)
- Check voltage between TCM terminals 26 (OR), 27 (L), 34 (W/G), 35 (G/W), 36 (BR/W) and ground while moving selector lever through each position.

Lever position	Terminal No.				
	36	35	34	27	26
P,N	В	0	0	0	0
R	0	В	0	0	0
D	0	0	В	0	0
2	0	0	0	В	0
1	0	0	0	0	В

Voltage:

B : Battery voltage

0 : 0V



OK or NG

OK >> GO TO 6. NG >> GO TO 4.

[RE4F04B]

SAT645J

4.	DETECT MALFUN	ICTIONING ITEM			А
Ch	eck the following ite	ms:			
•	Park/neutral position	on (PNP) switch			
-	F29 terminals 1 (C and 4 (OR), 5 (L),	between park/neutral G/OR) and 2 (B) and be 6 (W/G), 7 (BR/W), 8 C prough each position.	etween terminals 3 (Y)	DISCONNECT 8 7 2 1 3 6 9 5 4 1, (3) 2,(4,5,6,7,8,9)	B
	Lever position	Termir	nal No.		
	Р	3 - 7	1 - 2		D
	R	3 - 8		Ω	D
	Ν	3 - 9	1 - 2		
	D	3 - 6		WCIA0096E	Е
	2	3 - 5			
	1	3 - 4			F
-	If NG, check agair step a.	with manual control ca	able disconnected from	manual shaft of A/T assembly. Refer to	Г
-		•		ontrol Cable Adjustment".	G
-				A/T and check continuity of park/neutral	
	• • •	tch terminals. Refer to a	•	to AT-644, "Park/Neutral Position (PNP)	
-	Switch Adjustment				Н
_	If NG on step d, re	place park/neutral posit	tion (PNP) switch.		
•	Harness for short of	or open between ignitio	n switch and park/neutra	al position (PNP) switch (Main harness)	
•	Harness for short of	or open between park/n	eutral position (PNP) sv	vitch and TCM (Main harness)	
-	or NG				
	OK >> GO TO 7. J NG >> Repair or replace damaged parts.				
_	I				
5.	CHECK OVERDR	IVE CONTROL SWITC	H CIRCUIT (WITH CON	ISULT-II)	Κ
(With CONSULT-II				
1.	Turn ignition switcl	n to ON position.			I
••	(Do not start engin				L
2.	Select "TCM INPU	T SIGNALS" in "DATA	MONITOR" mode for "A	/T" with CONSULT-II.	
3.	Read out "OVERD				Μ
Check the signal of the overdrive control switch is indicated properly. (Overdrive control switch "ON" displayed on CONSULT-II means					
	overdrive "OFF".)				
<u>OK</u>	or NG			MONITORING ENGINE SPEED XXX rpm	
0					
N	G >> GO TO 6.			TURBINE REV XXX rpm	
				OVERDRIVE SW ON	
				PN POSI SW OFF	
				R POSITION SW OFF	

[RE4F04B]

6. DETECT MALFUNCTIONING ITEM

Check the following items:

- Overdrive control switch M44.
- Check continuity between terminals 1 and 2.

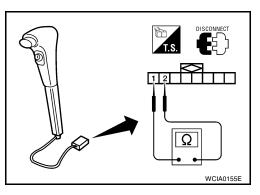
Switch position	Continuity
ON	No
OFF	Yes

- Harness for short or open between TCM and overdrive control switch (Main harness)
- Harness of ground circuit for overdrive control switch (Main harness) for short or open

OK or NG

OK >> GO TO 7.

NG >> Repair or replace damaged parts.



7. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

 Perform throttle position sensor [accelerator pedal position (APP) sensor] inspection. Refer to <u>AT-561,</u> <u>"DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"</u>.

<u>OK or NG</u>

OK >> GO TO 8.

NG >> Repair or replace damaged parts.

8. CHECK TCM INSPECTION

1. Perform TCM input/output inspection. Refer to AT-485, "Input/Output Signal Chart" .

OK or NG

OK >> INSPECTION END.

NG >> Inspect TCM terminals and related wiring harnesses for damage or loose connections. Repair or replace damaged parts.

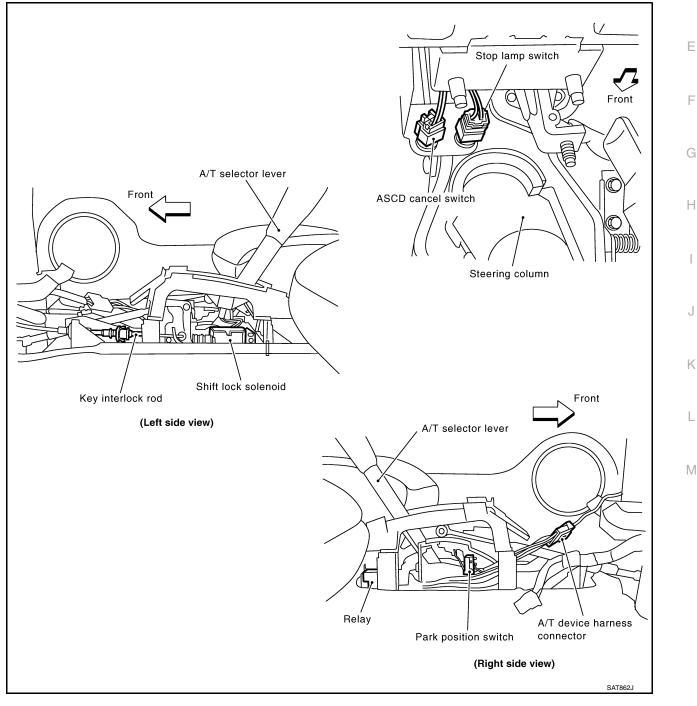
A/T SHIFT LOCK SYSTEM

Description

The mechanical key interlock mechanism also operates as a shift lock:
 With the key switch turned to ON, the selector lever cannot be shifted from "P" (parking) to any other position unless the brake pedal is depressed.
 With the key removed, the selector lever cannot be shifted from "P" to any other position.
 The key cannot be removed unless the selector lever is placed in "P".

• The shift lock and key interlock mechanisms are controlled by the ON-OFF operation of the shift lock solenoid and by the operation of the rotator and slider located inside the key cylinder.

Shift Lock System Electrical Parts Location



PFP:34950

[RE4F04B]

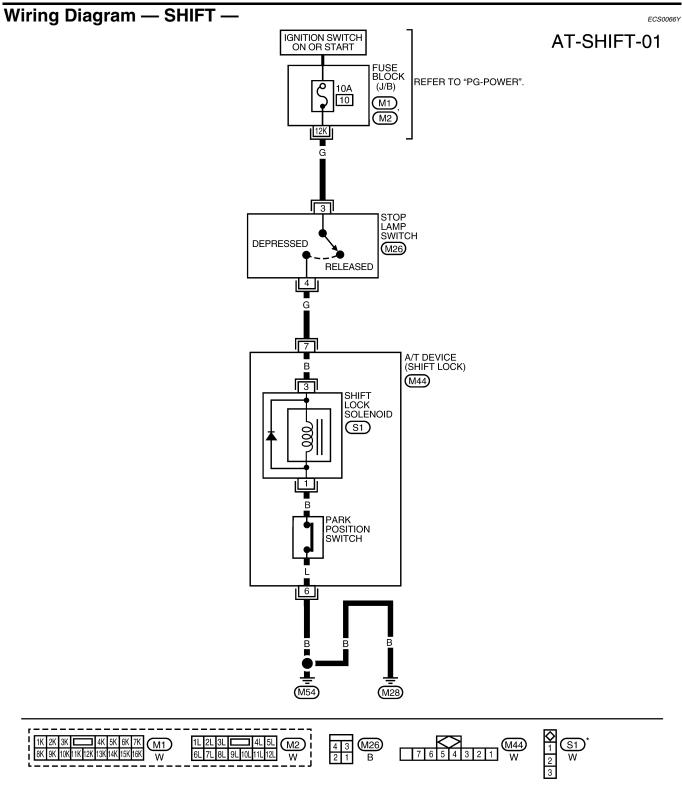
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[RE4F04B]



*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0076E

AT-636

Diagnostic Procedure

SYMPTOM 1:

- Selector lever cannot be moved from "P" position with key in ON position and brake pedal applied.
- Selector lever can be moved from "P" position with key in ON position and brake pedal released.
- Selector lever can be moved from "P" position when key is removed from key cylinder. SYMPTOM 2:

AT Ignition key cannot be removed when selector lever is set to "P" position. It can be removed when selector lever is set to any position except "P".

1. CHECK KEY INTERLOCK CABLE

Check key interlock cable for damage.

OK or NG

OK >> GO TO 2. NG >> Repair key interlock cable. Refer to <u>AT-640, "Components"</u>.

2. CHECK SELECTOR LEVER POSITION

Check selector lever position for damage.

OK or NG

OK >> GO TO 3.

NG >> Check selector lever. Refer to <u>AT-645, "Control Cable Adjustment"</u>.

3. CHECK POWER SOURCE

Turn ignition switch to "OFF" position. (Do not start engine.)

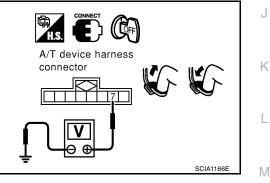
 Check voltage between A/T device harness connector M44 terminal 7 (G) and ground.

Voltage:

Brake pedal depressed: Battery voltage Brake pedal released: 0V

OK or NG

OK >> GO TO 5. NG >> GO TO 4.



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4. DETECT MALFUNCTIONING ITEM

Check the following items.

- 1. Harness for open or short between fuse block (J/B) connector M1 terminal 12K and stop lamp switch harness connector M26 terminal 3.
- 2. Harness for open or short stop lamp switch harness connector M26 terminal 4 and A/T device harness connector M44 terminal 7 (G).
- 3. 10A fuse [10, located in the fuse block (J/B)].
- 4. Check continuity between stop lamp switch harness connector M26 terminals 3 (G) and 4 (G).

Condition	Continuity
When brake pedal is depressed	Yes
When brake pedal is released	No

Check stop lamp switch after adjusting brake pedal —refer to <u>BR-12, "STOP LAMP SWITCH AND ASCD CANCEL SWITCH</u> <u>CLEARANCE"</u>

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

5. CHECK GROUND CIRCUIT

- 1. Turn ignition switch to "OFF" position.
- 2. Disconnect A/T device harness connector.
- 3. Check continuity between A/T device harness M44 terminal 6 (B) and ground.

Continuity should exist

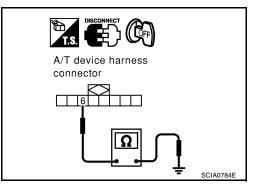
Continuity should exist.

If OK, check harness for short to power.

OK or NG

OK >> GO TO 6.

NG >> Repair open circuit in harness.



6. CHECK PARK POSITION SWITCH

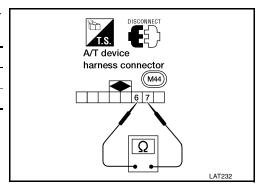
Check continuity between A/T device harness conector M44 terminals 6 (B) and 7 (G).

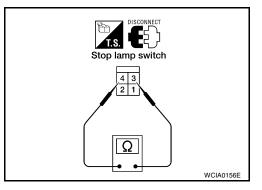
Brake pedal	Operation sound
Depressed	No
Released	Yes

OK or NG

OK >> GO TO 7.

NG >> Replace park position switch.





7. CHECK SHIFT LOCK SOLENOID

- 1. Connect A/T device harness connector.
- 2. Turn ignition switch to "ON" position.
- 3. Check operation sound.

Condition	Brake pedal	Operation sound	_
When ignition switch is turned to "ON" position and selector lever is in the "P" position.	Depressed	Yes	AT
	Released	No	
OK or NG			D
OK >> GO TO 8. NG >> Replace shift lock solenoid.			
8. CHECK SHIFT LOCK OPERATION			E
 Reconnect shift lock harness connector. Turn ignition switch from "OFF" to "ON" pos Recheck shift lock operation. 	ition. (Do not start e	ngine.)	F
OK or NG OK >> INSPECTION END NG >> GO TO 9.			G
9. CHECK A/T DEVICE INSPECTION			Н
 Perform A/T device input/output signal inspect. If NG, recheck harness connector connection OK or NG OK >> INSPECTION END 			I
OK >> INSPECTION END NG >> Repair or replace damaged parts.			J
			К
			L

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[RE4F04B]

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KEY INTERLOCK CABLE

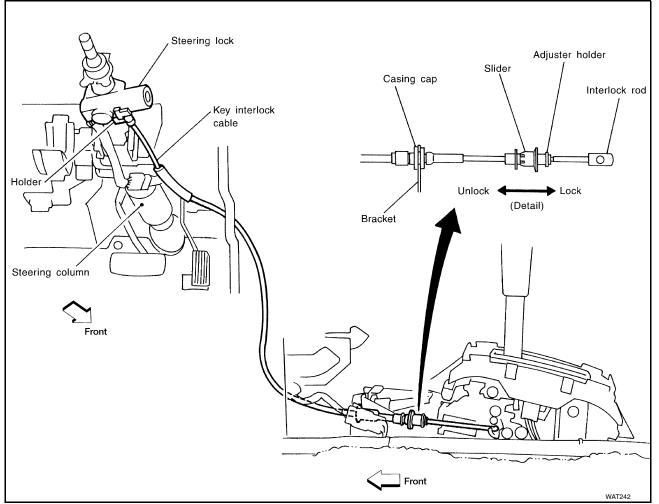
[RE4F04B]

KEY INTERLOCK CABLE

PFP:34908

ECS00670

Components

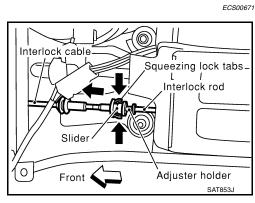


CAUTION:

- Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.
- After installing key interlock cable to control device, make sure that casing cap and bracket are firmly secured in their positions.

Removal

1. Unlock slider by squeezing lock tabs on slider from adjuster holder and remove interlock rod from cable.



KEY INTERLOCK CABLE

[RE4F04B]

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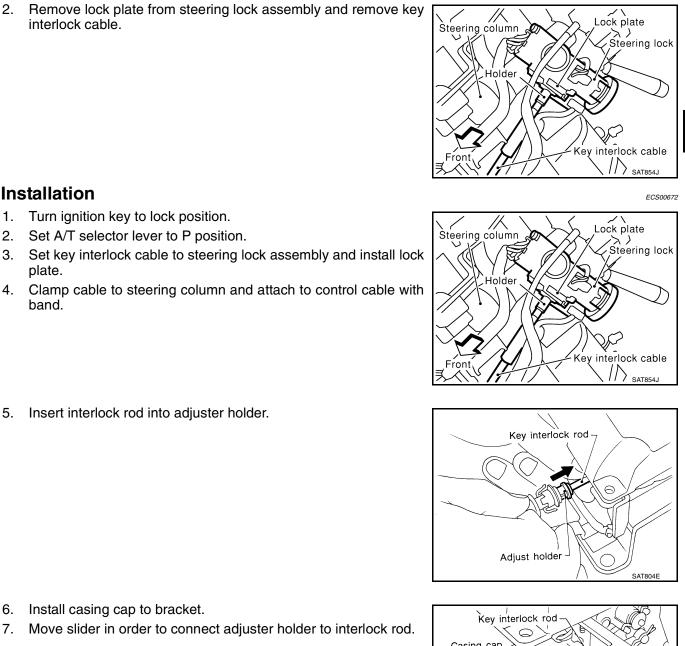
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2. Remove lock plate from steering lock assembly and remove key interlock cable.



6. Install casing cap to bracket.

Installation

plate.

band.

Turn ignition key to lock position.

Set A/T selector lever to P position.

Insert interlock rod into adjuster holder.

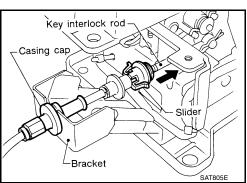
1.

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7. Move slider in order to connect adjuster holder to interlock rod.



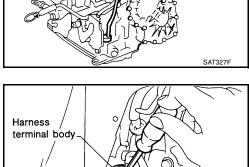
ON-VEHICLE SERVICE

Control Valve Assembly and Accumulators REMOVAL

- 1. Drain ATF from transaxle.
- 2. Remove oil pan and gasket.
 - Always replace oil pan bolts as they are self-sealing bolts.

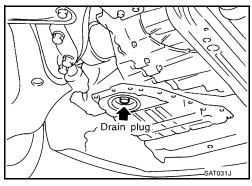
3. Disconnect A/T solenoid harness connector.

- 4. Remove snap ring from terminal cord assembly harness terminal body.
- 5. Remove terminal cord assembly harness from transmission case by pushing on terminal body.



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A/T solenoid harness

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SAT995C

connector

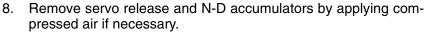


PFP:00000

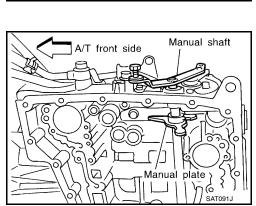
Remove control valve assembly by removing fixing bolts I, X and •.

Bolt length, number and location are shown in the illustration.

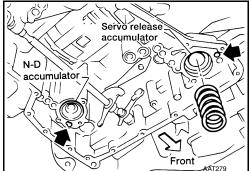
- Be careful not to drop manual valve and servo release accumulator return spring.
- 7. Disassemble and inspect control valve assembly if necessary. Refer to AT-677, "Control Valve Assembly" .



Hold each piston with a rag.



Unit: mm (in) ① 5 bolts Q = 40 (1.57) \otimes 6 bolts $\ell = 33$ (1.30) 2 bolts $\ell = 43.5 (1.713)$ < Q → SAT004F Ć



INSTALLATION

6.

- Set manual shaft in Neutral, then align manual plate with groove in manual valve.
- After installing control valve assembly, make sure that selector lever can be moved to all positions.

[RE4F04B]

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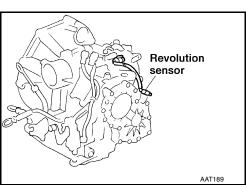
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ON-VEHICLE SERVICE

[RE4F04B]

Revolution Sensor Replacement

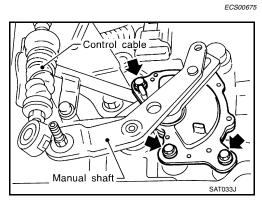
- 1. Remove under cover.
- 2. Remove revolution sensor from A/T.
- 3. Reinstall any part removed.
 - Always use new sealing parts.

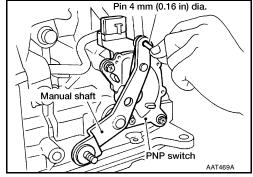


Park/Neutral Position (PNP) Switch Adjustment

- 1. Remove control cable from manual shaft.
- 2. Set manual shaft in N position.
- 3. Loosen park/neutral position (PNP) switch fixing bolts.

- 4. Insert pin into adjustment holes in both park/neutral position (PNP) switch and manual shaft as near vertical as possible.
- 5. Reinstall any part removed.
- 6. Check continuity of park/neutral position (PNP) switch. Refer to <u>AT-492, "Diagnostic Procedure"</u>.





ECS00674

Control Cable Adjustment

AT-645

Move selector lever from the P position to the 1 position. You should be able to feel the detents in each position. If the detents cannot be felt or the pointer indicating the position is improperly aligned, the control cable needs adjustment.

- Place selector lever in P position. 1.
- 2. Loosen control cable lock nut and place manual shaft in P position.

CAUTION:

Turn wheels more than 1/4 rotations and apply the park lock.

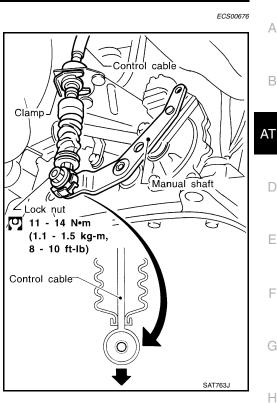
3. Push control cable in the direction of the arrow shown in the illustration by specified force.

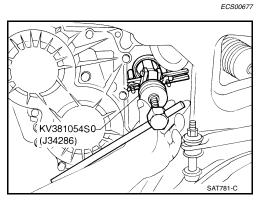
> **Specified force** : 4.9 - 9.8 N (0.5 - 1.0 kg, 1.1 - 2.2 lb)

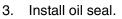
- 4. Tighten control cable lock nut.
- 5. Move selector lever from P to 1 position again. Make sure that selector lever moves smoothly.
 - Make sure that the starter operates when the selector lever is placed in the N or P position.
 - Make sure that the transmission is locked properly when the selector lever is placed in the P position.

Differential Side Oil Seal Replacement

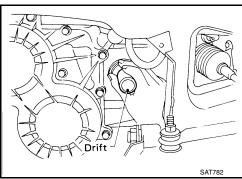
- Remove drive shaft assembly. Refer to FAX-14, "Removal" . 1.
- 2. Remove oil seal.







Apply ATF before installing.



[RE4F04B]

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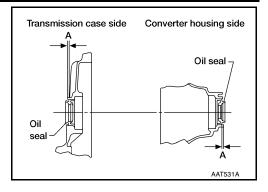
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ON-VEHICLE SERVICE

[RE4F04B]

- Install oil seals so dimension A is within specification
 - A : -0.5 mm (-0.02 in) to 0.5 mm (0.02 in)
- 4. Reinstall any part removed.



REMOVAL AND INSTALLATION

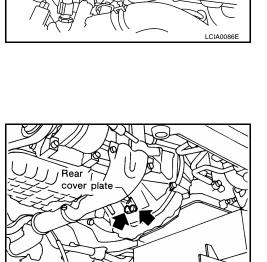
REMOVAL AND INSTALLATION

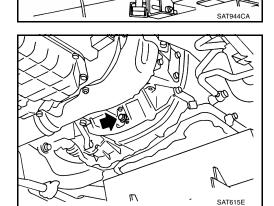
Removal

- 1. Remove battery and bracket.
- 2. Remove air duct and air cleaner assembly, refer to EM-101, "REMOVAL" .
- Disconnect terminal cord assembly harness connector and park/neutral position (PNP) switch harness connectors.
- 4. Disconnect harness connectors of mass air flow sensor, intake air temperature sensor, revolution sensor, AT turbine revolution sensor, vehicle speed sensor and ground cable.

AT-647

- 5. Remove LH mounting bracket from transaxle and body.
- 6. Disconnect control cable at transaxle side.
- 7. Remove drive shafts, refer to FAX-14, "Removal" .
- 8. Drain ATF.
- 9. Remove push clips and engine undercover.
- 10. Disconnect fluid cooler piping.
- 11. Disconnect and remove starter motor from transaxle, refer to <u>SC-21, "Removal"</u>.
- 12. Support engine by placing a jack under oil pan.
 - Do not place jack under oil pan drain plug.
- 13. Remove center member.
- 14. Remove rear cover plate and bolts securing torque converter to drive plate.
 - Rotate crankshaft for access to securing bolts.





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[RE4F04B]

LH mounting

bracket

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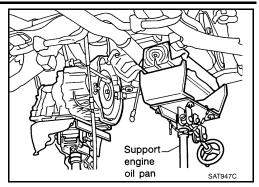
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REMOVAL AND INSTALLATION

[RE4F04B]

- 15. Support transaxle with a jack.
- 16. Remove bolts fixing A/T to engine.
- 17. Lower transaxle while supporting it with a jack.



Installation

• Drive plate runout

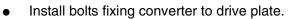
CAUTION:

Do not allow any magnetic materials to contact the ring gear teeth.

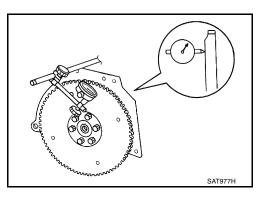
Maximum allowable runout: EM-184, "SERVICE DATA AND SPECIFICATIONS (SDS)".

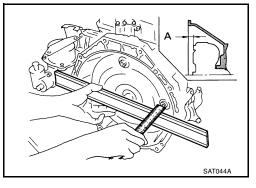
- If this runout is out of allowance, replace drive plate and ring gear.
- When connecting torque converter to transaxle, measure distance "A" to be certain that they are correctly assembled.

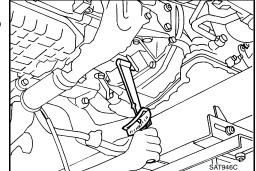
Distance "A" : 14 mm (0.55 in) or more



• With converter installed, rotate crankshaft several turns to check that transaxle rotates freely without binding.







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REMOVAL AND INSTALLATION

[RE4F04B]

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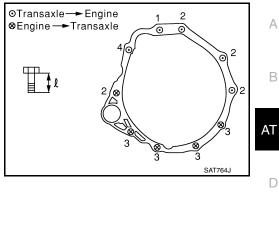
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- Tighten bolts securing transaxle.
- Tighten LH mounting bracket bolts to the specified torque. Refer to EM-154, "Removal and Installation" .
- Tighten center member bolts to the specified torque. Refer to EM-154, "Removal and Installation"
- Tighten rear plate cover bolts to the specified torque. Refer to EM-110, "OIL PAN AND OIL STRAINER"

Bolt No.	Tightening torque N-m (kg-m, ft-lb)	l mm (in)		
1	70 - 79 (7.1 - 8.1, 52 - 58)	65 (2.56)		
2	70 - 79 (7.1 - 8.1, 52 - 58)	52 (2.05)		
3	70 - 79 (7.1 - 8.1, 52 - 58)	40 (1.57)		
4	78 - 98 (7.9 - 10.0, 58 - 72)	124 (4.88)		



Reinstall any part removed.

saxle is shifted.

- Check fluid level in transaxle.
- Move selector lever through all positions to be sure that transaxle operates correctly. With parking brake applied, rotate engine at idling. Move selector lever through N to D, to 2, to 1 and to R position. A slight shock should be felt by hand gripping selector each time tran-
- Perform road test. Refer to AT-455, "Road Test" .

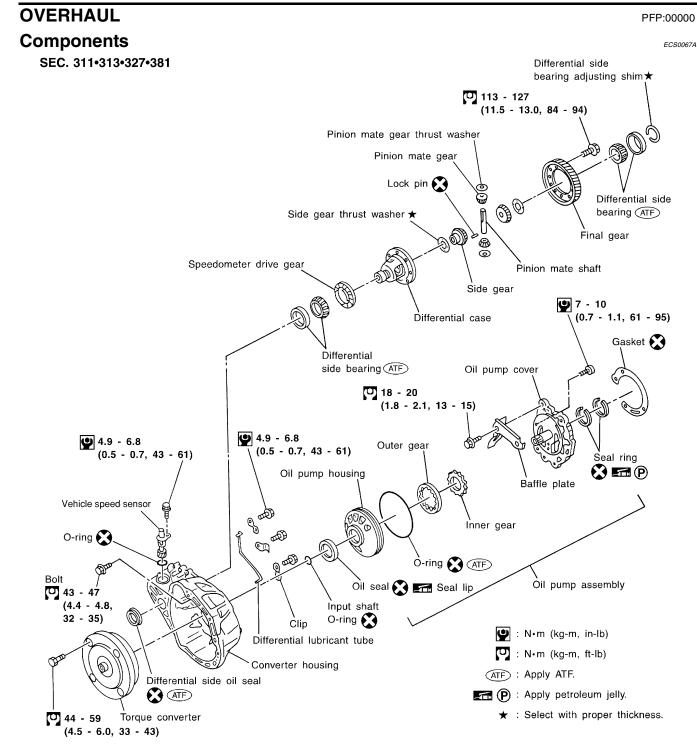


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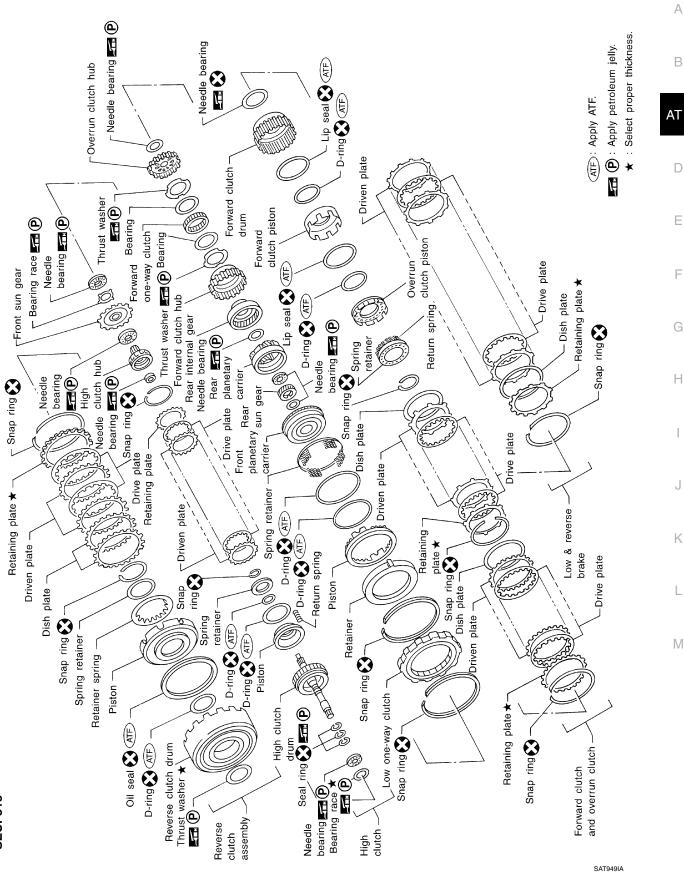
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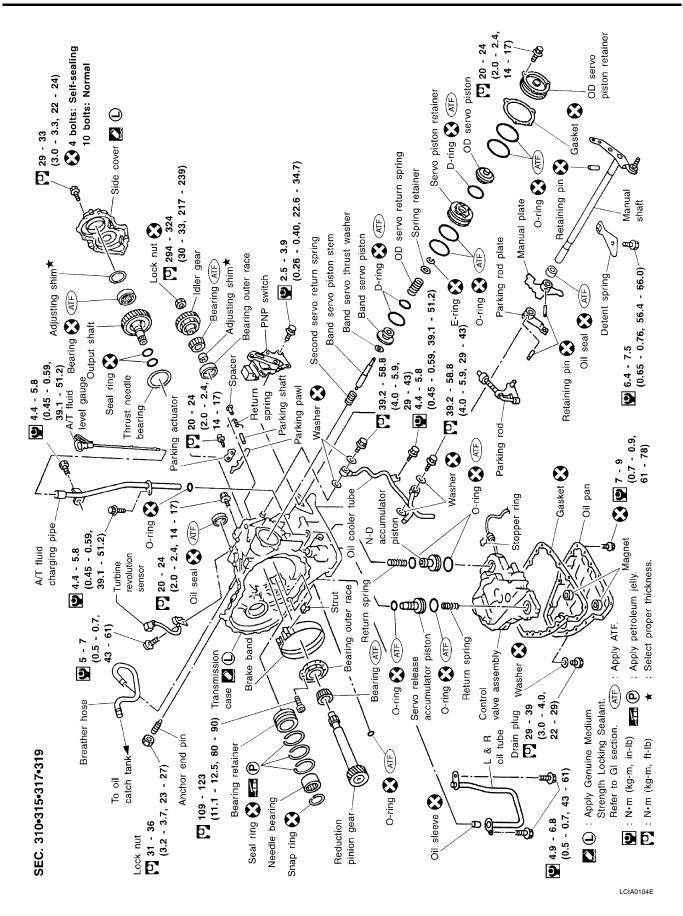


AT-650





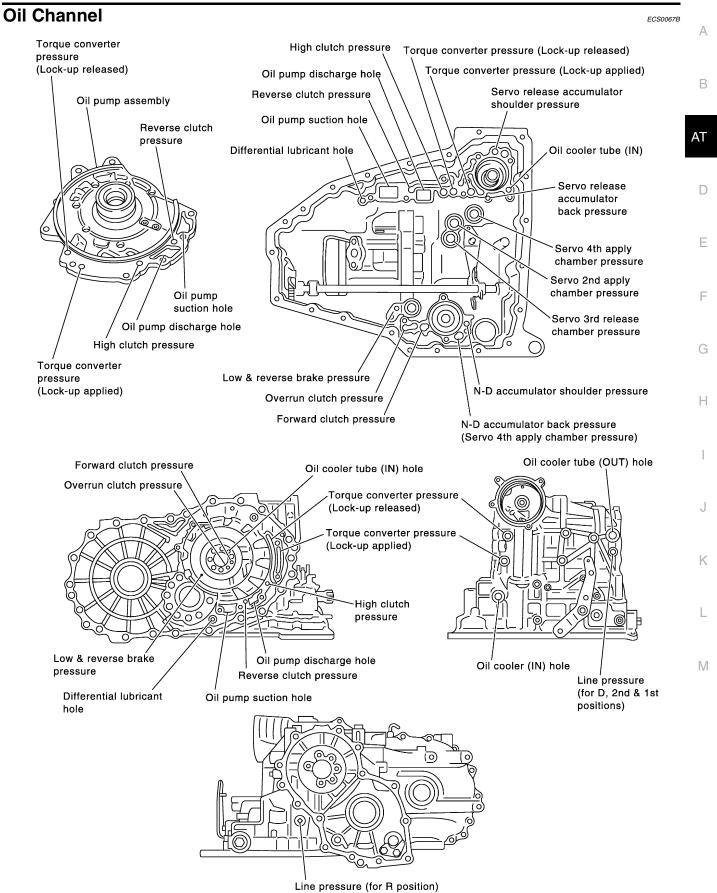
SEC. 315



AT-652

OVERHAUL

[RE4F04B]



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AT-653

Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings

Outer diameter of thrust washers

ltem number	Outer diameter mm (in)	Parts number*
.	76.0 (2.992)	31508 80X13 - 31508 80X20
®★	80.0 (3.150)	31438 80X60 - 31438 80X70

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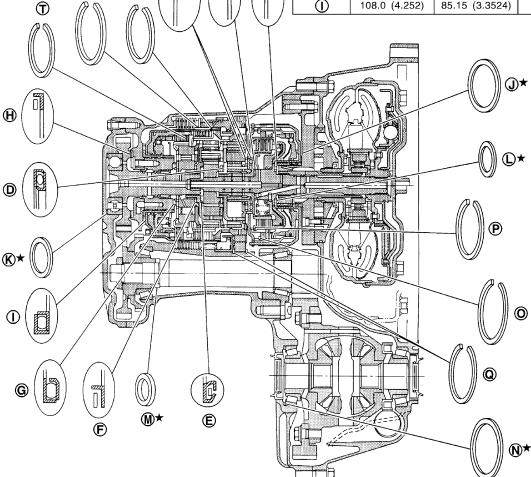
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Outer and inner diameter of needle bearings Inner diameter mm (in) Item Outer diameter Parts number* number mm (in) 50.0 (1.969) 35.1 (1.382) 31407 80X10 A 31407 80X01 B 42.0 (1.654) 23.7 (0.933) \bigcirc 70.0 (2.756) 50.0 (1.969) 31407 80X09 D 51.0 (2.008) 33.1 (1.303) 31407 80X02 E 31407 80X03 48.0 (1.890) 30.0 (1.181) 31407 80X10 Ē 50.0 (1.969) 35.1 (1.382) G 56.5 (2.224) 38.5 (1.516) 31407 80X08 Ð 87.0 (3.425) 69.0 (2.717) 31407 80X07 \bigcirc 108.0 (4.252) 85.15 (3.3524) 31407 80X06



Outer & inner diameter of bearing races,					
adjusting shims and adjusting spacer					

ltem number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
① ★	51.0 (2.008)	36.0 (1.417)	31435 80X00 - 31439 80X14
@ *	38.0 (1.496)	28.1 (1.106)	31439 85X01 - 31439 85X06 31439 83X11 - 31439 83X24 31439 81X00 - 31439 81X24 31439 81X46 - 31439 81X49 31439 81X60 - 31439 81X74
ℕ ★	75.0 (2.953)	67.0 (2.638)	31438 80X00 - 31439 80X11

 \star : Select proper thickness.

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

Outer diameter of snap rings

ltem number	Outer diameter mm (in)	Parts number*
0	150 (5.91)	31506 80X13
P	119.1 (4.689)	31506 80X06
Q	182.8 (7.197)	31506 80X08
®	144.8 (5.701)	31506 80X03
S	173.8 (6.843)	31506 80X09
Ī	133.9 (5.272)	31506 80X01

DISASSEMBLY

DISASSEMBLY

[RE4F04B]

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Screwdriver

0 ND-

(3.94)



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Bend a wire and use

it as a check tool. Approx. 3.0 (0.118) [Bend a 1.5 (0.059) dia.

wire in half.]

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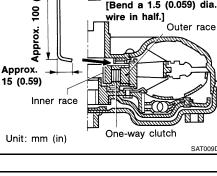
SAT009D

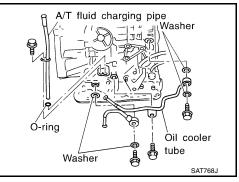
Disassembly

- Drain ATF through drain plug. 1.
- 2. Remove torque converter.

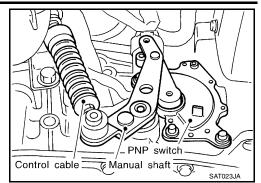
- 3. Check torque converter one-way clutch using check tool.
- Insert check tool into the groove of bearing support built into a. one-way clutch outer race.
- b. When fixing bearing support with check tool, rotate one- way clutch spline using screwdriver.
- Check that inner race rotates clockwise only. If not, replace C. torque converter assembly.

4. Remove A/T fluid charging pipe and fluid cooler tube.

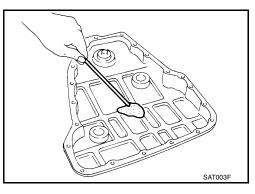


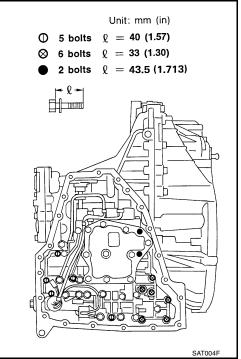


- 5. Set manual shaft to position P.
- 6. Remove park/neutral position (PNP) switch.



- 7. Remove oil pan and oil pan gasket.
 - Always replace oil pan bolts as they are self-sealing bolts.
- 8. Check foreign materials in oil pan to help determine causes of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.
 - If frictional material is detected, replace radiator after repair of A/T. Refer to <u>CO-30, "RADIATOR"</u>.
- 9. Remove control valve assembly according to the following procedures.
- a. Remove control valve assembly mounting bolts I, X and \bullet .
- b. Remove snap ring from terminal cord assembly connector.





- Terminal body
- c. Push terminal body into transmission case and draw out solenoid harness.

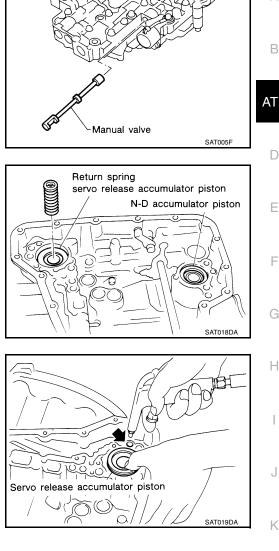
10. Remove manual valve from control valve assembly.

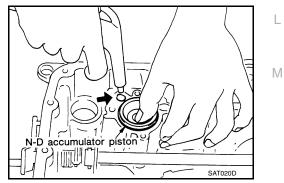
11. Remove return spring from servo release accumulator piston.

12. Remove servo release accumulator piston with compressed air.

- 13. Remove O-rings from servo release accumulator piston.
- 14. Remove N-D accumulator piston and return spring with compressed air.

15. Remove O-rings from N-D accumulator piston.





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[RE4F04B]

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DISASSEMBLY

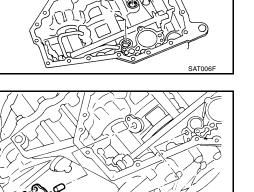
16. Check accumulator pistons and contact surface of transmission case for damage.

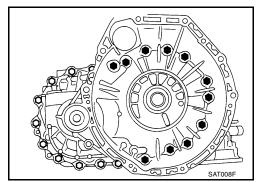
- 17. Check accumulator return springs for damage and free length.
- 18. Remove lip seals.

- 20. Remove converter housing according to the following procedures.
- a. Remove converter housing mounting bolts.

19. Remove L & R oil tube and oil sleeve.

b. Remove converter housing by tapping it lightly.



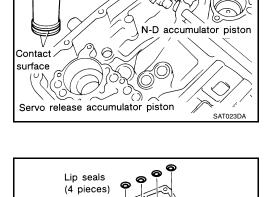


sleeve

L & R oil tube

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DISASSEMBLY

[RE4F04B]

O-ring

Remove O-ring from differential oil port. c.

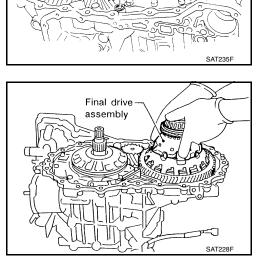
21. Remove final drive assembly from transmission case.

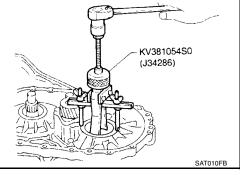
22. Remove differential side bearing outer race and side bearing adjusting shim from transmission case.

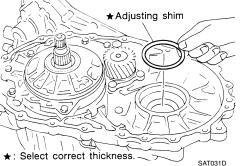
23. Remove differential side bearing adjusting shim from transmission case.

24. Remove differential side bearing outer race from converter housing.

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- 25. Remove oil seal with screwdriver from converter housing.
 - Be careful not to damage case.

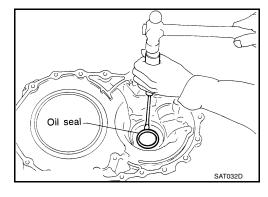
26. Remove differential lubricant tube from converter housing.

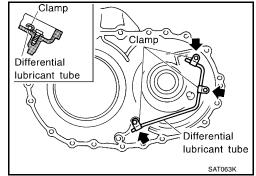
- 27. Remove oil pump according to the following procedures.
- a. Remove O-ring from input shaft.

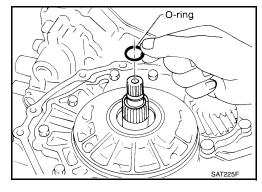
b. Remove oil pump assembly, baffle plate and gasket from transmission case.

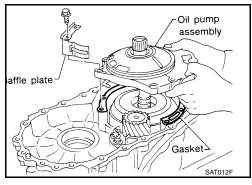
c. Remove thrust washer and bearing race from oil pump assembly.

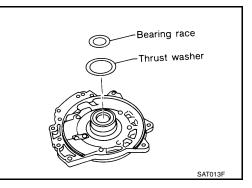
AT-660











Anchor end pin

40 - 50 (1.57 - 1.97)

40 (1.57)

Lock nut

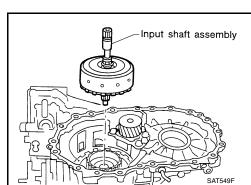
- 28. Remove brake band according to the following procedures.
- a. Loosen lock nut, then back off anchor end pin.
 - Do not reuse anchor end pin.

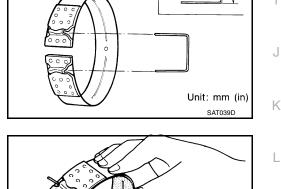
Remove brake band and strut from transmission case. b.

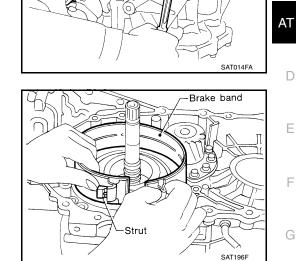
• To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing the brake band, always secure it with a clip as shown. Leave the clip in position after removing the brake band.

Check brake band facing for damage, cracks, wear or burns. c.

- 29. Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures.
- Remove input shaft assembly (high clutch) with reverse clutch. a.







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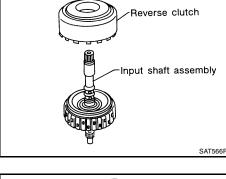
b. Remove input shaft assembly (high clutch) from reverse clutch.

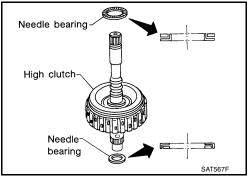
c. Remove needle bearings from high clutch drum and check for damage or wear.

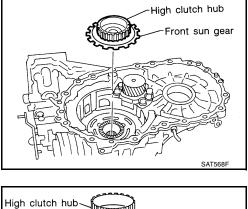
d. Remove high clutch hub and front sun gear from transmission case.

- e. Remove front sun gear and needle bearing from high clutch hub and check for damage or wear.
- f. Remove bearing race from front sun gear and check for damage or wear.

30. Remove needle bearing from transmission case and check for damage or wear.



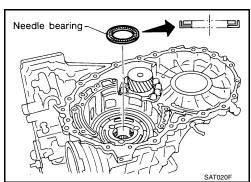




Needle bearing

Front sun gear

Bearing race



SAT019F



DISASSEMBLY

[RE4F04B]

<u>تەر را</u> Low and reverse brake

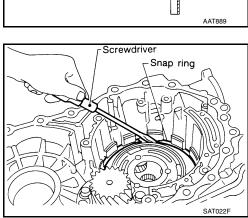
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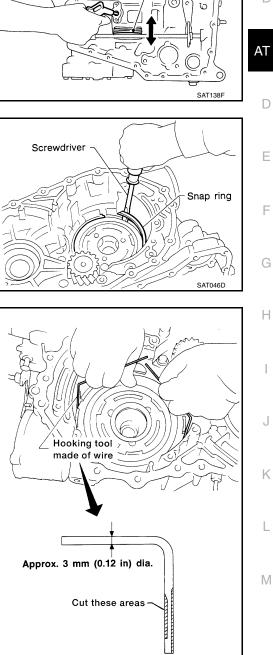
31. Apply compressed air and check to see that low and reverse brake operates.

- 32. Remove low one-way clutch and front planetary carrier assembly according to the following procedures.
- Remove snap ring with flat-bladed screwdriver. a.

Remove low one-way clutch with a hook made of wire. b.

Remove snap ring with flat-bladed screwdriver. c.





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AT-664

DISASSEMBLY

d. Remove front planetary carrier with low and reverse brake piston and retainer.

- Remove low and reverse brake spring retainer. e.
 - Do not remove return springs from spring retainer.

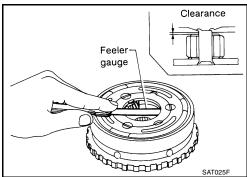
f. Check that low one-way clutch rotates in the direction of the arrow and locks in the opposite direction.

- Remove needle bearing, low and reverse brake piston and g. Low and reverse retainer from front planetary carrier. brake piston. and retainer
- Check front planetary carrier, low one-way clutch and needle h. bearing for damage or wear.

Check clearance between planetary gears and planetary carrier i. with feeler gauge.

Standard clearance	: 0.20 - 0.70 mm (0.0079 - 0.0276 in)
Allowable limit	: 0.80 mm (0.0315 in)

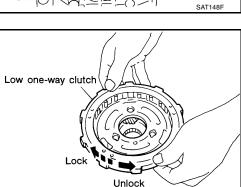
Replace front planetary carrier if the clearance exceeds allowable limit.

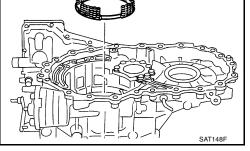


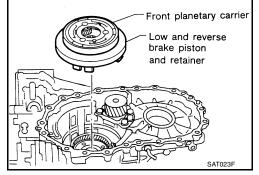
Front planetary

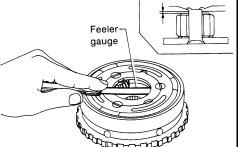
Needle bearing

carrier











Spring retainer

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Black side

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- 33. Remove rear planetary carrier assembly and rear sun gear according to the following procedures.
- Remove rear planetary carrier assembly from transmission a. case.

Remove rear sun gear from rear planetary carrier. b.

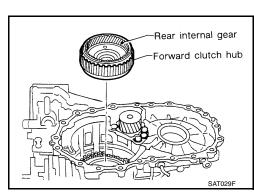
Remove needle bearings from rear planetary carrier assembly. c.

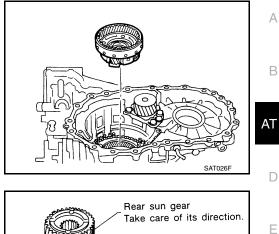
- d. Check rear planetary carrier, rear sun gear and needle bearings for damage or wear.
- Check clearance between pinion washer and rear planetary care. rier with feeler gauge.

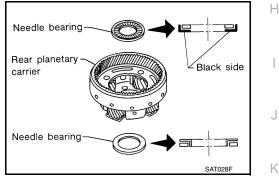
Standard clearance	: 0.20 - 0.70 mm (0.0079 - 0.0276 in)
Allowable limit	: 0.80 mm (0.0315 in)

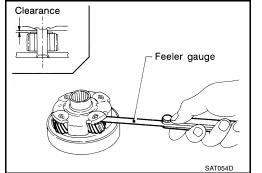
Replace rear planetary carrier if the clearance exceeds allowable limit.

34. Remove rear internal gear and forward clutch hub from transmission case.









Rear planetary carrier

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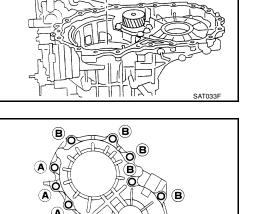
35. Remove overrun clutch hub from transmission case.

36. Remove needle bearing from overrun clutch hub and check for damage or wear.

37. Remove forward clutch assembly from transmission case.

38. Remove needle bearing from transmission case.

- 39. Remove output shaft assembly according to the following procedures.
- a. Remove side cover bolts.
 - Do not mix bolts A and B.
 - Always replace bolts A as they are self-sealing bolts.



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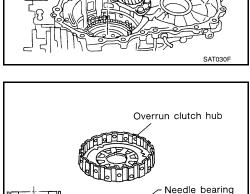
B)

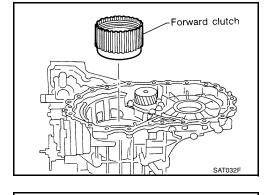
B)

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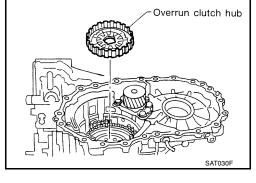
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Black side





Needle bearing



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- Soft hammer SAT434D റ് 3 SAT440D SAT035 Soft hammer SAT435D P Needle bearing
- b. Remove side cover by lightly tapping it with a soft hammer.
 - Be careful not to drop output shaft assembly. It might come out when removing side cover.

Remove adjusting shim. c.

Remove output shaft assembly. d.

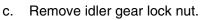
> • If output shaft assembly came off with side cover, tap cover with a soft hammer to separate.

Remove needle bearing. e.

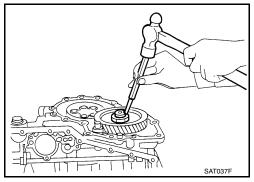
- - õ SAT036F

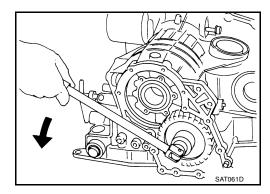


- 40. Disassemble reduction pinion gear according to the following procedures.
- a. Set manual shaft to position P to fix idler gear.
- b. Unlock idler gear lock nut using a pin punch.

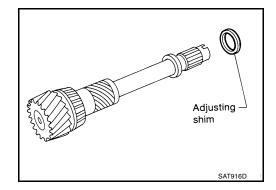


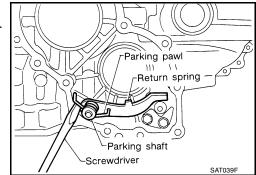
• Do not reuse idler gear lock nut.





ST27180001 (J25726-A)





d. Remove idler gear with puller.

- e. Remove reduction pinion gear.
- f. Remove adjusting shim from reduction pinion gear.

- 41. Remove return spring from parking shaft with screwdriver.
- 42. Draw out parking shaft and remove parking pawl from transmission case.
- 43. Check parking pawl and shaft for damage or wear.

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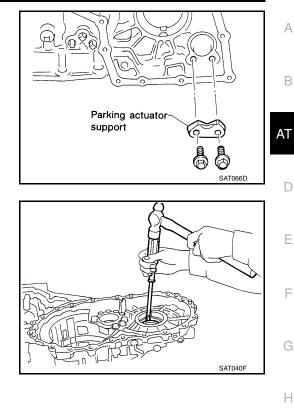
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- 44. Remove parking actuator support from transmission case.
- 45. Check parking actuator support for damage or wear.



46. Remove side oil seal with screwdriver from transmission case.

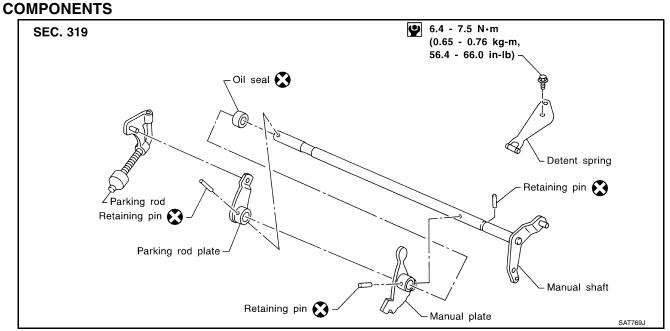
[RE4F04B]

REPAIR FOR COMPONENT PARTS

Manual Shaft

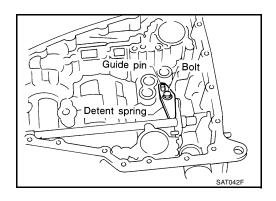


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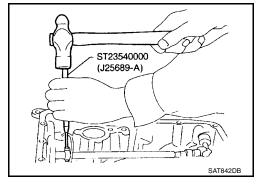


REMOVAL

1. Remove detent spring from transmission case.



2. Drive out manual plate retaining pin.



[RE4F04B]

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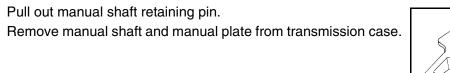
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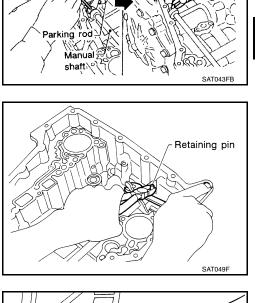
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- 3. Drive and pull out parking rod plate retaining pin.
- 4. Remove parking rod plate from manual shaft.
- 5. Draw out parking rod from transmission case.



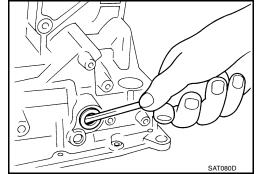


Parking rod

plate

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(J25689-A)



INSPECTION

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7.

8.

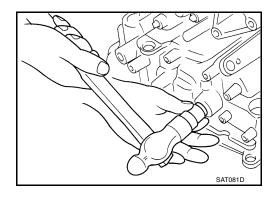
• Check component parts for wear or damage. Replace if necessary.

INSTALLATION

1. Install manual shaft oil seal.

Remove manual shaft oil seal.

• Apply ATF to outer surface of oil seal.



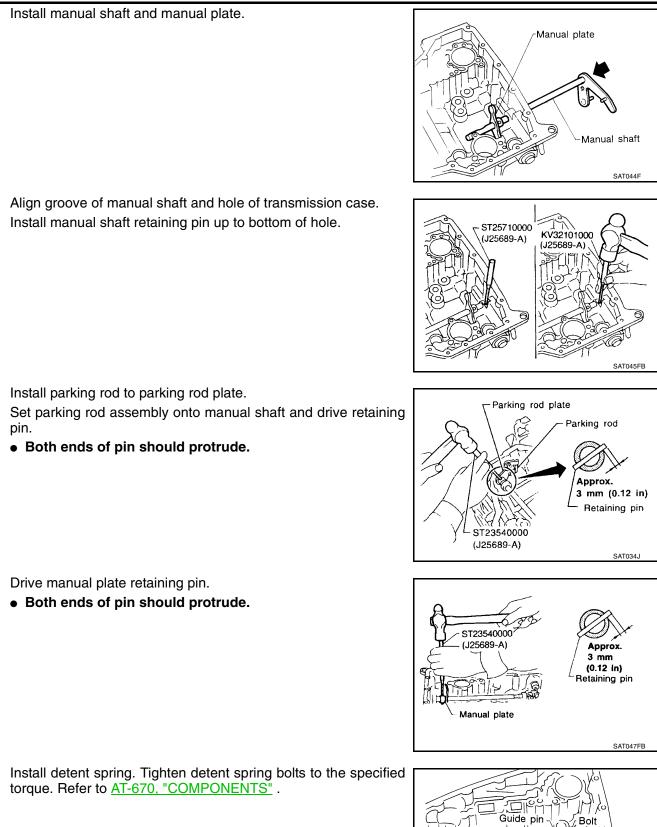
Install manual shaft and manual plate.

2.

3.

4.

[RE4F04B]

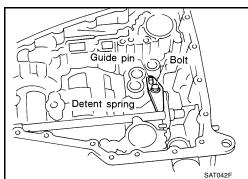


Install manual shaft retaining pin up to bottom of hole.

- 5. Install parking rod to parking rod plate.
- Set parking rod assembly onto manual shaft and drive retaining 6. pin.
 - Both ends of pin should protrude.

7. Drive manual plate retaining pin. • Both ends of pin should protrude.

8. Install detent spring. Tighten detent spring bolts to the specified torque. Refer to AT-670, "COMPONENTS" .



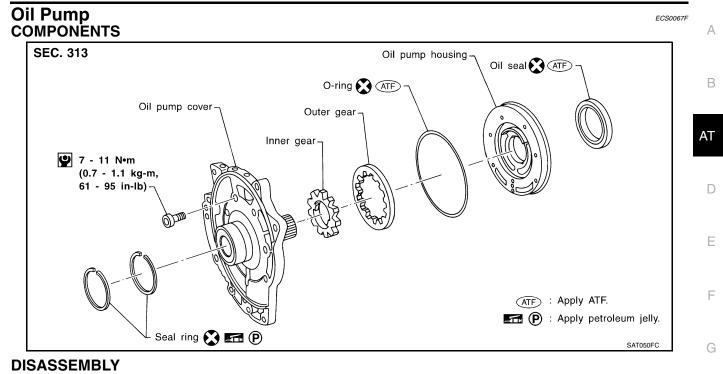
[RE4F04B]

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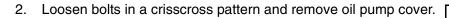
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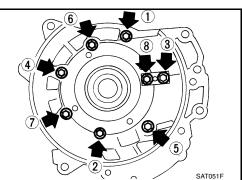
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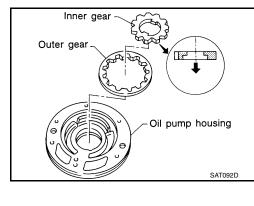
1. Remove seal rings.





Seal ring

SAT699H

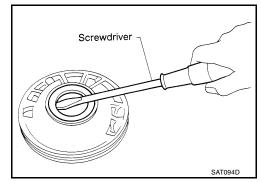


3. Remove inner and outer gear from oil pump housing.

4. Remove O-ring from oil pump housing.

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[RE4F04B]



5. Remove oil pump housing oil seal.

INSPECTION Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear

• Check for wear or damage.

Side Clearances

 Measure side clearance of inner and outer gears in at least four places around each outside edge. Maximum measured values should be within specified positions.

Standard clearance

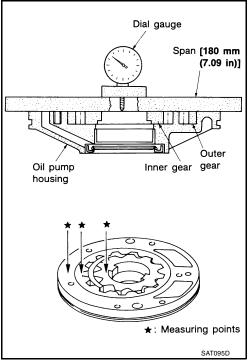
: 0.030 - 0.050 mm (0.0012 - 0.0020 in)

• If clearance is less than standard, select inner and outer gear as a set so that clearance is within specifications.

Inner and outer gear

: Refer to <u>AT-755, "OIL</u> PUMP" .

• If clearance is more than standard, replace whole oil pump assembly except oil pump cover.



[RE4F04B]

Measure clearance between outer gear and oil pump housing.

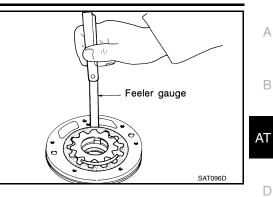
Standard clearance

: 0.111 - 0.181 mm (0.0044 - 0.0071 in)

Allowable limit

: 0.181 mm (0.0071 in)

 If not within allowable limit, replace whole oil pump assembly except oil pump cover.



SEAL RING CLEARANCE

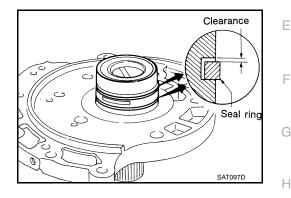
• Measure clearance between seal ring and ring groove.

Standard clearance

: 0.1 - 0.25 mm (0.0039 - 0.0098 in) : 0.25 mm (0.0098 in)

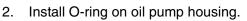
Allowable limit

If not within allowable limit, replace oil pump cover assembly.

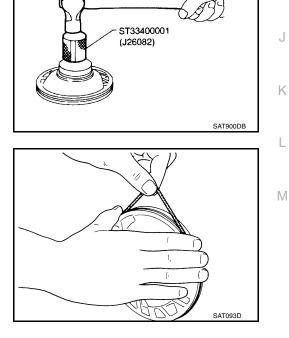


ASSEMBLY

1. Install oil seal on oil pump housing.

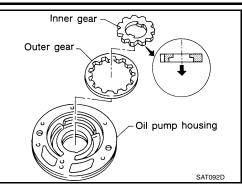


• Apply ATF to O-ring.



[RE4F04B]

- 3. Install inner and outer gears on oil pump housing.
 - Be careful of direction of inner gear.

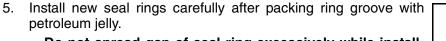


(1)

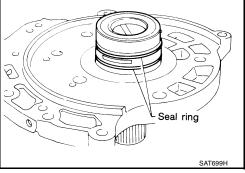
8

- 4. Install oil pump cover on oil pump housing.
- a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.
- b. Tighten bolts in a crisscross pattern. Tighten oil pump cover bolts to the specified torque. Refer to <u>AT-673</u>, "COMPONENTS"
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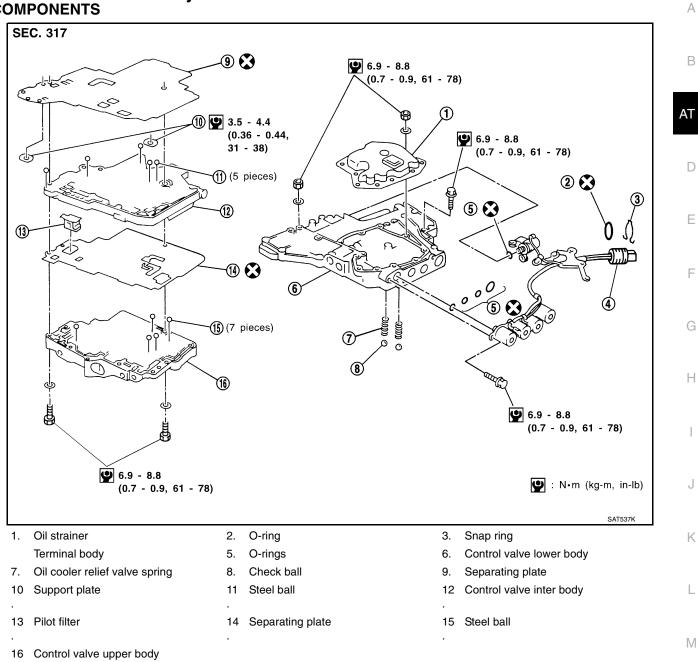
• Do not spread gap of seal ring excessively while installing. The ring may be deformed.



[RE4F04B]







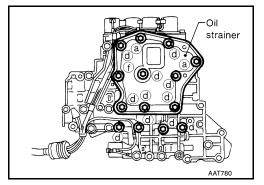
DISASSEMBLY

Disassemble upper, inter and lower bodies.

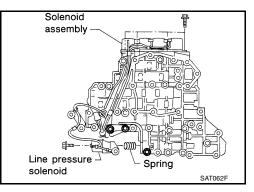
[RE4F04B]

Bolt length, number and location: Bolt symbol f b d а С е g Bolt length " ℓ " mm (in) 13.5 58.0 40.0 66.0 33.0 78.0 18.0 ₽ (0.531) (2.283) (1.575) (2.598) (1.299) (3.071) (0.709) Q Number of bolts 6 3 6 11 2 2 1 f: Reamer bolt and nut. **a a a a (** View X Nut Lower body • Bolt Inter body D 0 Ø Õ Jpper body ©(d) Support plate (f) Reamer Section Y-Y bolt Ζ Section Z-Z × SAT704J

1. Remove bolts a, d and nut f and remove oil strainer from control valve assembly.

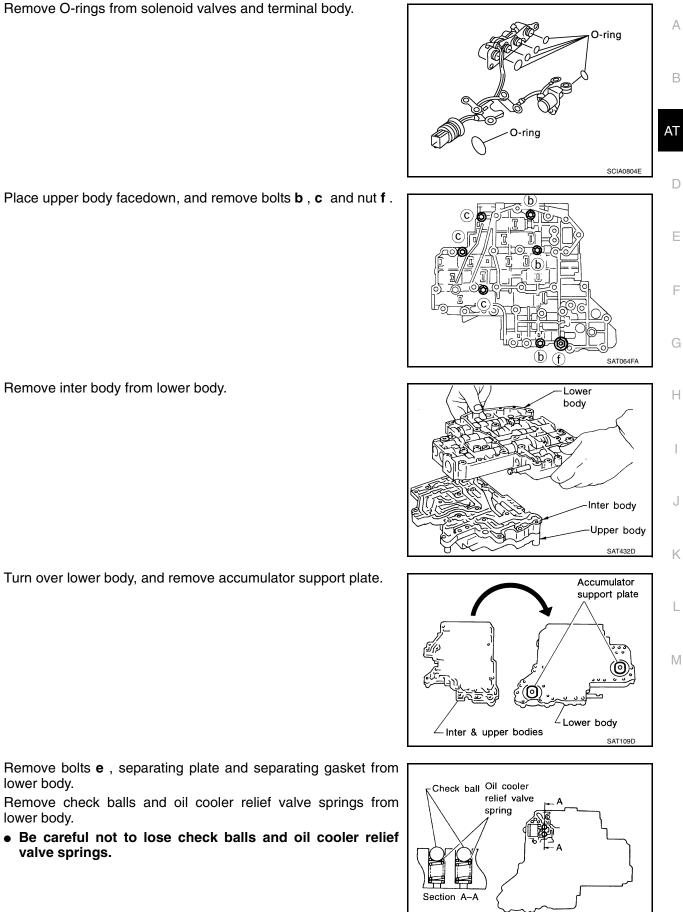


Remove solenoid valve assembly and line pressure solenoid 2. valve from control valve assembly.



[RE4F04B]

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4. Place upper body facedown, and remove bolts **b** , **c** and nut **f** .

5. Remove inter body from lower body.

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6. Turn over lower body, and remove accumulator support plate.

- 7. Remove bolts e, separating plate and separating gasket from lower body.
- Remove check balls and oil cooler relief valve springs from 8. lower body.
 - Be careful not to lose check balls and oil cooler relief valve springs.

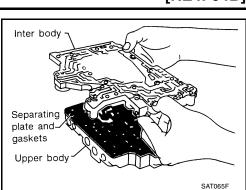
9. Remove inter body from upper body.

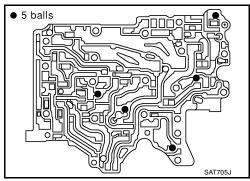
- 10. Check to see that steel balls are properly positioned in inter body and then remove them.
 - Be careful not to lose steel balls.

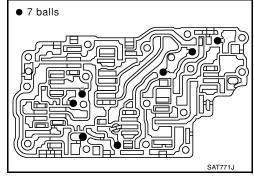
- 11. Check to see that steel balls are properly positioned in upper body and then remove them.
 - Be careful not to lose steel balls.

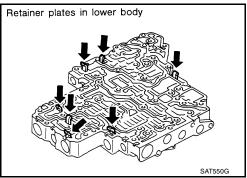


 Check to see that retainer plates are properly positioned in lower body.





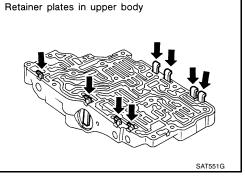




[RE4F04B]

[RE4F04B]

- Check to see that retainer plates are properly positioned in Retainer plates upper body.
- Be careful not to lose these parts.

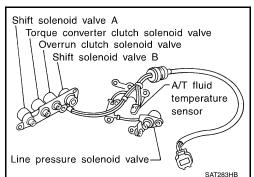


Oil Strainer

• Check wire netting of oil strainer for damage.

Shift Solenoid Valves "A" and "B", Line Pressure Solenoid Valve, Torque Converter Clutch Solenoid Valve and Overrun Clutch Solenoid Valve

- Measure resistance.
- For shift solenoid valve A, refer to AT-554.
- For shift solenoid valve B, refer to AT-559.
- For line pressure solenoid valve, refer to AT-548.
- For torque converter clutch solenoid valve, refer to AT-535.
- For overrun clutch solenoid valve, refer to <u>AT-569</u>.

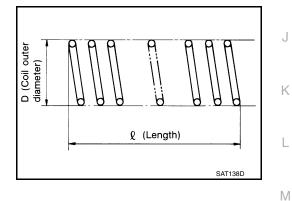


Oil Cooler Relief Valve Spring

- Check springs for damage or deformation.
- Measure free length and outer diameter.

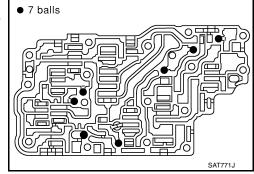
Inspection standard

: Refer to <u>AT-751, "CON-</u> <u>TROL VALVE AND PLUG</u> <u>RETURN SPRINGS"</u>.



ASSEMBLY

- 1. Install upper, inter and lower body.
- a. Place oil circuit of upper body face up. Install steel balls in their proper positions.



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[RE4F04B]

b. Install upper separating gasket, upper inter separating gasket and upper separating plate in order shown in illustration.

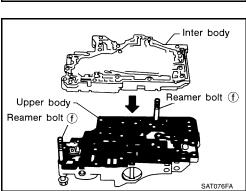
c. Install reamer bolts **f** from bottom of upper body. Using reamer bolts as guides, install separating plate and gaskets as a set.

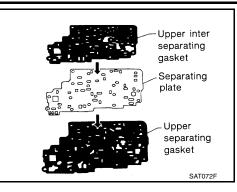
d.

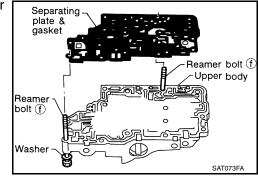
Install pilot filter.

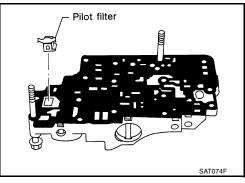
e. Place lower body as shown in illustration (side of inter body face up). Install steel balls in their proper positions.

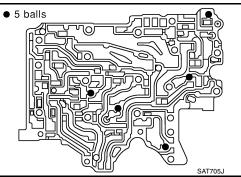
- f. Install inter body on upper body using reamer bolts ${\bf f}$ as guides.
 - Be careful not to dislocate or drop steel balls.



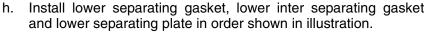






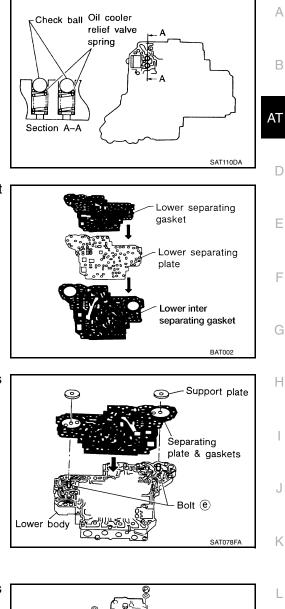


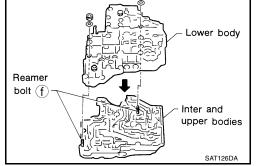
g. Install check balls and oil cooler relief valve springs in their proper positions in lower body.



i. Install bolts **e** from bottom of lower body. Using bolts **e** as guides, install separating plate and gaskets as a set.

- j. Temporarily install support plates on lower body.
- k. Install lower body on inter body using reamer bolts **f** as guides and tighten reamer bolts **f** slightly.

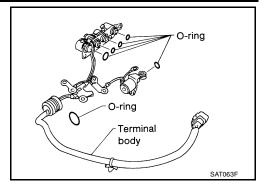




Μ

[RE4F04B]

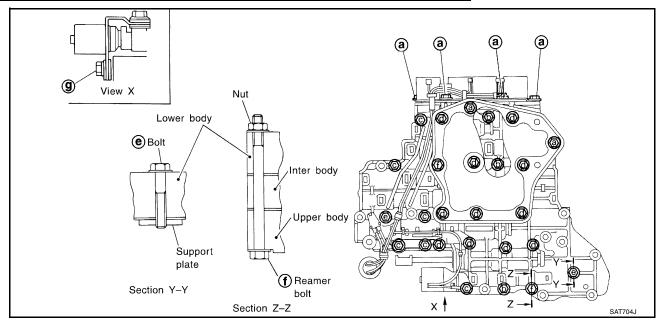
- 2. Install O-rings to solenoid valves and terminal body.
 - Apply ATF to O-rings.



3. Install and tighten bolts.

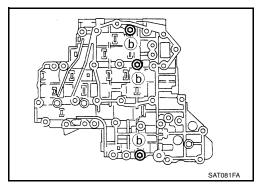
Bolt length, number and location:

Bolt symbol	а	b	С	d	е	f	g
Bolt length " ℓ " mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1



a. Install and tighten bolts **b** to specified torque.

. 7 - 9 N⋅m (0.7 - 0.9 kg-m, 61 - 78 in-lb)

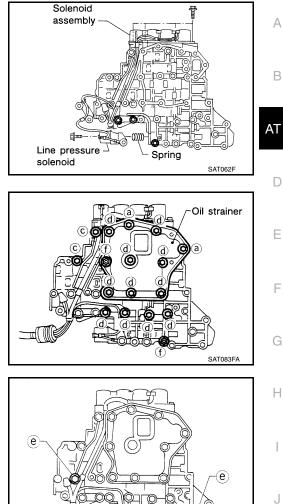


[RE4F04B]

b. Install solenoid valve assembly and line pressure solenoid valve to lower body.

c. Set oil strainer, then tighten bolts ${\bm a}$, ${\bm c}$, ${\bm d}$ and nuts ${\bm f}$ to specified torque.

● : 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



d. Tighten bolts **e** to specified torque.

● : 3.4 - 4.4 N·m (0.35 - 0.45 kg-m, 30.4 - 39.1 in-lb)

Control Valve Upper Body COMPONENTS

Apply ATF to all components before installation.



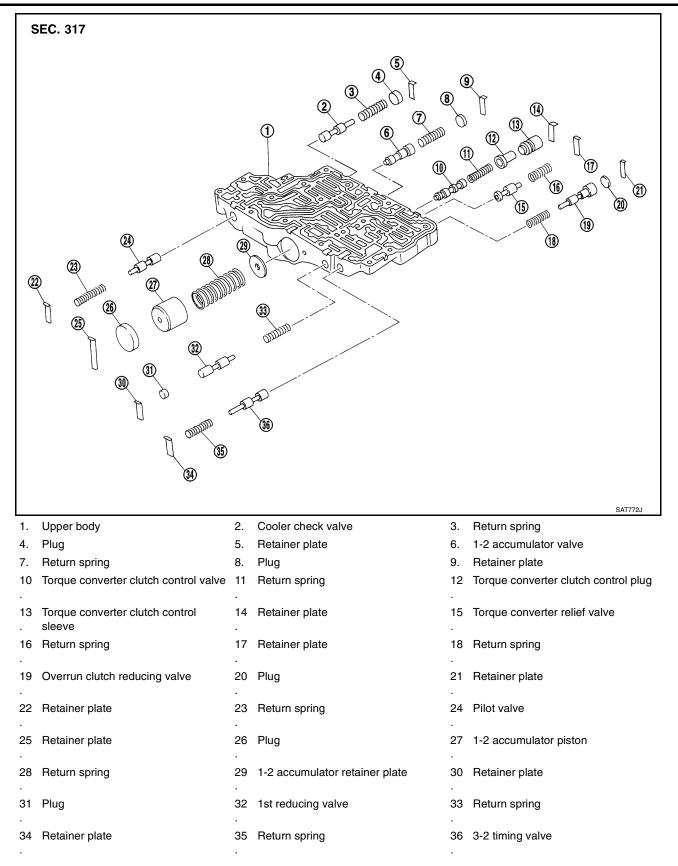
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[RE4F04B]



AT-686

[RE4F04B]

SAT551G

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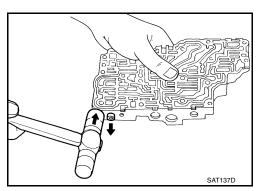
DISASSEMBLY

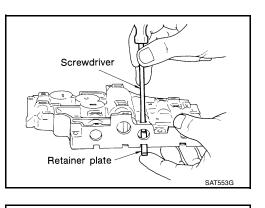
- 1. Remove valves at retainer plates.
 - Do not use a magnetic pick-up tool.

a. Use a screwdriver to remove retainer plates.

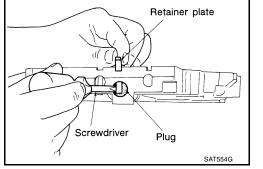
- b. Remove retainer plates while holding spring, plugs or sleeves.
 - Remove plugs slowly to prevent internal parts from jumping out.

- c. Place mating surface of valve body face down, and remove internal parts.
 - If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.
 - Be careful not to drop or damage valves and sleeves.





Retainer plates in upper body



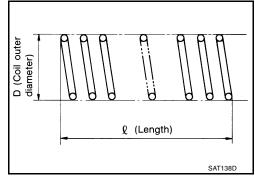
INSPECTION Valve Spring

Measure free length and outer diameter of each valve spring. Also check for damage or deformation.

Inspection standard

: Refer to AT-751, "CON-TROL VALVE AND PLUG **RETURN SPRINGS**".

Replace valve springs if deformed or fatigued.



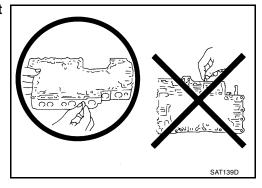
Control Valves

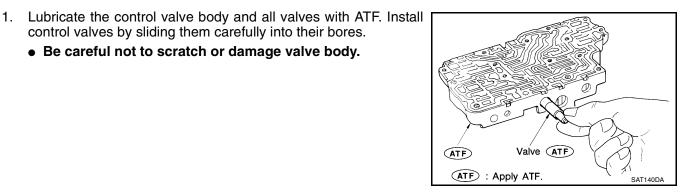
Check sliding surfaces of valves, sleeves and plugs.

ASSEMBLY

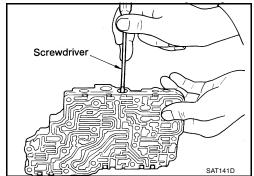
Lay control valve body down when installing valves. Do not stand the control valve body upright.

control valves by sliding them carefully into their bores. Be careful not to scratch or damage valve body.





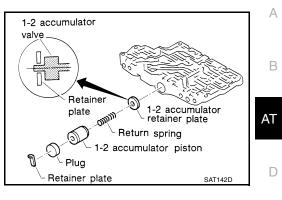
• Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.



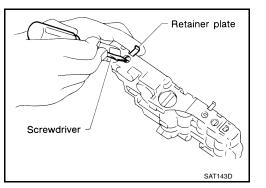
[RE4F04B]

1-2 Accumulator Valve

- Install 1-2 accumulator valve. Align 1-2 accumulator retainer plate from opposite side of control valve body.
- Install return spring, 1-2 accumulator piston and plug.



- 1. Install retainer plates.
 - While pushing plug or return spring, install retainer plate.



Retainer Plate (Upper Body)

			Unit: mm (in)
No.	Name of control valve	Width A	Length B
22	Pilot valve	6.0 (0.236)	21.5 (0.846)
30	1st reducing valve		
34	3-2 timing valve		
17	Torque converter relief valve		
9	1-2 accumulator valve		38.5 (1.516)
25	1-2 accumulator piston valve		
21	Overrun clutch reducing valve		24.0 (0.945)
5	Cooler check valve		
14	Torque converter clutch control valve		28.0 (1.102)

Install proper retainer plates. Refer to AT-685, "Control Valve Upper Body" .

Control Valve Lower Body COMPONENTS

Apply ATF to all components before installation.

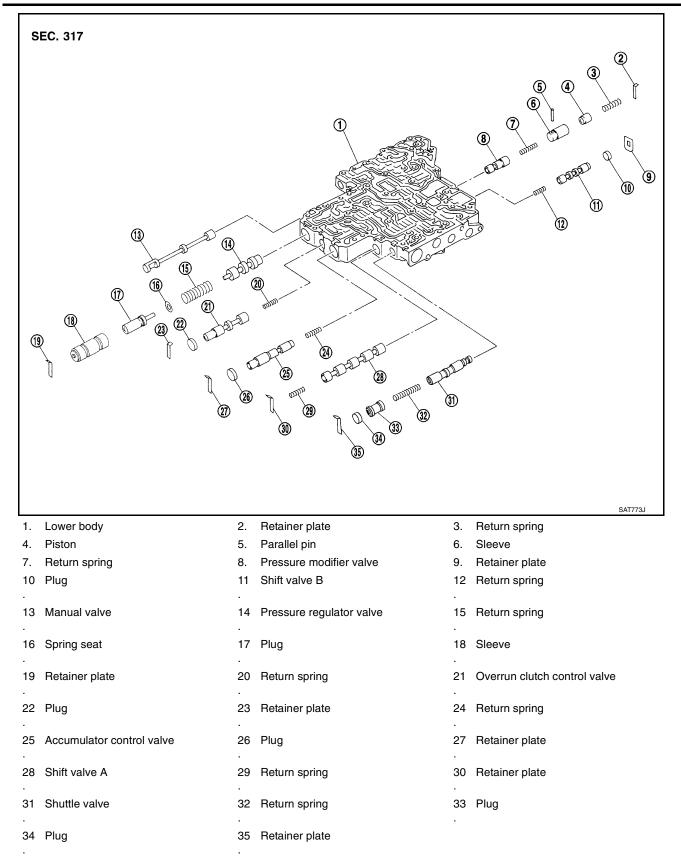
ECS00671

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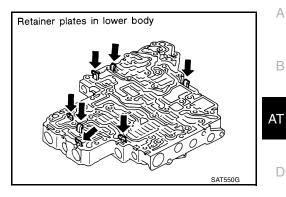
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DISASSEMBLY

• Remove valves at retainer plate. For removal procedures, refer to <u>AT-687, "DISASSEMBLY"</u>.



[RE4F04B]

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INSPECTION

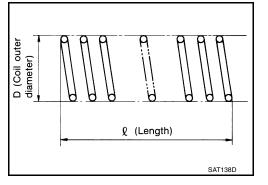
Valve Springs

Check each valve spring for damage or deformation. Also measure free length and outer diameter.

Inspection standard

: Refer to <u>AT-751, "CON-</u> TROL VALVE AND PLUG <u>RETURN SPRINGS"</u>.

• Replace valve springs if deformed or fatigued.

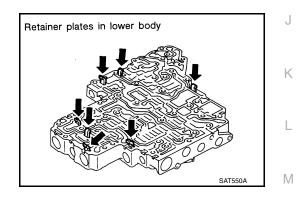


Control Valves

• Check sliding surfaces of control valves, sleeves and plugs for damage.

ASSEMBLY

Install control valves.
 For installation procedures, refer to <u>AT-688, "ASSEMBLY"</u>.



Retainer Plate (Lower Body)

_			l	Jnit: mm (in)	ĩ
No.	Name of control valve and plug	Width A	Length B	Туре	-
19	Pressure regulator valve				
27	Accumulator control valve				
30	Shift valve A	6.0	28.0		
23	Overrun clutch control valve	(0.236)	(1.102)	I	
2	Pressure modifier valve				
35	Shuttle valve				
9	Shift valve B	_	_	II	

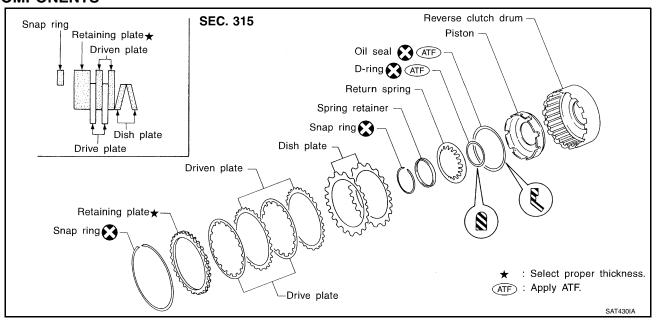
"A" "B" TYPE I TYPE I SAT089F

Install proper retainer plates.
 Refer to <u>AT-689, "Control Valve Lower Body"</u>.

[RE4F04B]

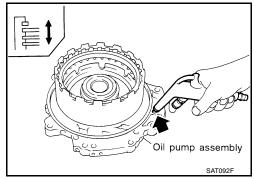
Reverse Clutch COMPONENTS

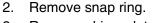




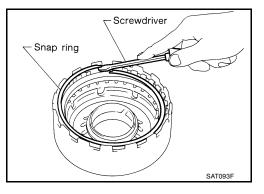
DISASSEMBLY

- 1. Check operation of reverse clutch
- a. Install seal ring onto drum support of oil pump cover and install reverse clutch assembly. Apply compressed air to oil hole.
- b. Check to see that retaining plate moves to snap ring.
- c. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.

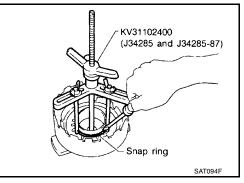




3. Remove drive plates, driven plates, retaining plate, and dish plates.

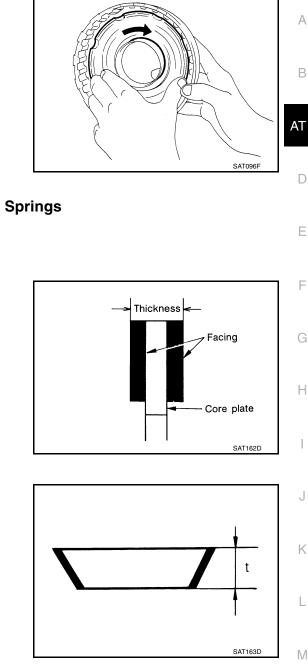


- 4. Set Tool on spring retainer and remove snap ring from reverse clutch drum while compressing return springs.
 - Set Tool directly over springs.
 - Do not expand snap ring excessively.
- 5. Remove spring retainer and return springs.



[RE4F04B]

- 6. Remove piston from reverse clutch drum by turning it.
- 7. Remove D-ring and oil seal from piston.



INSPECTION

Reverse Clutch Snap Ring, Spring Retainer and Return Springs

• Check for deformation, fatigue or damage. If necessary, replace.

Reverse Clutch Drive Plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate:Standard value: 1.6 mm (0.063 in)Wear limit: 1.4 mm (0.055 in)

• If not within wear limit, replace.

Reverse Clutch Dish Plates

- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate : 3.08 mm (0.1213 in)

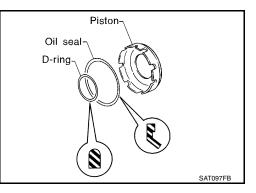
• If deformed or fatigued, replace.



- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.

ASSEMBLY

- 1. Install D-ring and oil seal on piston.
 - Take care with the direction of oil seal.
 - Apply ATF to both parts.

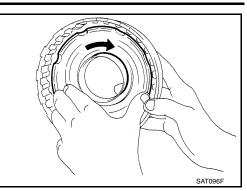


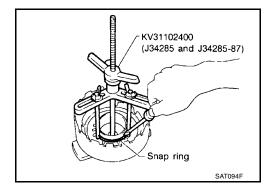
AT-693

[RE4F04B]

- 2. Install piston assembly by turning it slowly.
 - Apply ATF to inner surface of drum.

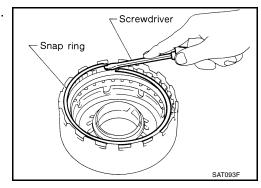
Install return springs and spring retainer on piston.





- 4. Set Tool on spring retainer and install snap ring while compressing return springs.
 - Set Tool directly over return springs.
- 5. Install drive plates, driven plates, retaining plate and dish plates.
 - Take care with order of plates.
- 6. Install snap ring.

3.



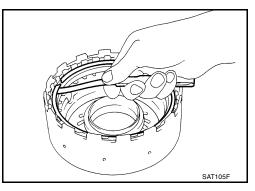
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

Specified clearance Standard Allowable limit Retaining plate

: 0.5 - 0.8 mm (0.020 - 0.031 in)

: 1.2 mm (0.047 in)

: Refer to <u>AT-752, "REVERSE</u> CLUTCH".

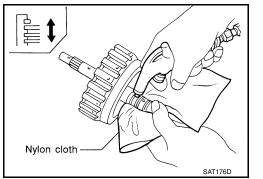


Check operation of reverse clutch. Refer to AT-692, "DISASSEMBLY" . А В AT Oil pump assembly SAT092F **High Clutch** ECS0067K COMPONENTS Ε SEC. 315 Driven plate [Thickness: 1.4 mm (0.055 in)] For the number of clutch plates (drive and driven plates), refer to the Driven plate Retaining plate* Seal ring 💽 🚮 🕑 [Thickness: 2.0 mm cross-section. (0.079 in)] 8 F 8 Snap ring Drive plate Driven plate Input shaft assembly Retaining Piston (High clutch drum) plate ★ Return spring Н D-ring 💽 (ATF) D-ring 🚫 (ATF) Spring retainer Snap ring 😭 P: Apply petroleum jelly. Drive plate (ATF) : Apply ATF. ★ : Select proper thickness. J Snap ring 💽 SAT774J

DISASSEMBLY

8.

- Check operation of high clutch. 1.
- Apply compressed air to oil hole of input shaft with nylon cloth. a.
 - Stop up hole on opposite side of input shaft with nylon cloth.
- Check to see that retaining plate moves to snap ring. b.
- If retaining plate does not contact snap ring: c.
 - D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.
- 2. Remove seal rings from input shaft.
 - Always replace when removed.

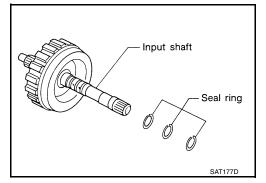


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[RE4F04B]



AT-695

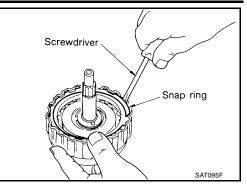
[RE4F04B]

3. Remove snap ring.

7.

8.

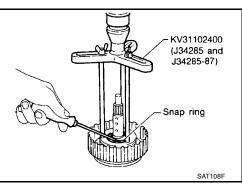
4. Remove drive plates, driven plates and retaining plate.

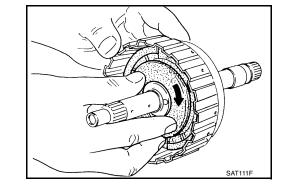


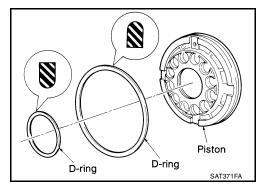
- 5. Set Tool on spring retainer and remove snap ring from high clutch drum while compressing return springs.
 - Set Tool directly over springs.
 - Do not expand snap ring excessively.

Remove piston from high clutch drum by turning it.

6. Remove spring retainer and return springs.







INSPECTION High Clutch Snap Ring, Spring Retainer and Return Springs

• Check for deformation, fatigue or damage. If necessary, replace.

Remove D-rings from piston.

• When replacing spring retainer and return springs, replace them as a set.

[RE4F04B]

High Clutch Drive Plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

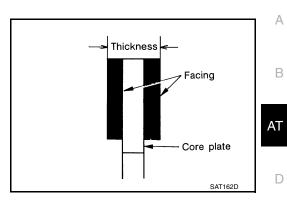
Thickness of drive plate: Standard value : 1.6 mm (0.063 in) Wear limit : 1.4 mm (0.055 in)

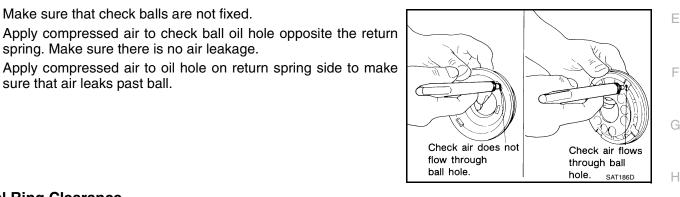
Make sure that check balls are not fixed.

spring. Make sure there is no air leakage.

If not within wear limit, replace.

sure that air leaks past ball.





Seal Ring Clearance

High Clutch Piston

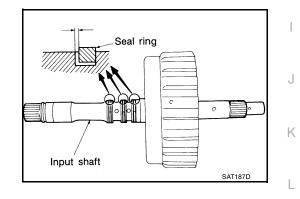
- Install new seal rings onto input shaft.
- Measure clearance between seal ring and ring groove.

Standard clearance

: 0.08 - 0.23 mm (0.0031 - 0.0091 in) : 0.23 mm (0.0091 in)

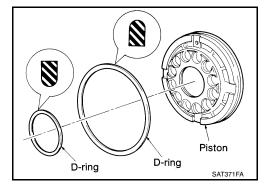
Allowable limit

If not within allowable limit, replace input shaft assembly.





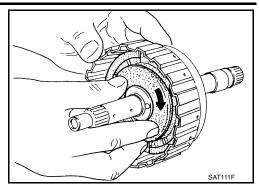
- 1. Install D-rings on piston.
 - Apply ATF to both parts.



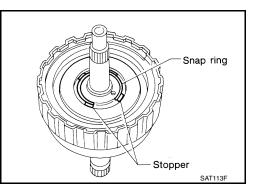
Μ

[RE4F04B]

- 2. Install piston assembly by turning it slowly.
 - Apply ATF to inner surface of drum.



- Spring retainer Return spring
 - KV31102400 (J34285 and J34285-87) Snap ring SAT108F



Screwdriver Snap ring SAT095F

3. Install return springs and spring retainer on piston.

- 4. Set Tool on spring retainer and install snap ring while compressing return springs.
 - Set Tool directly over return springs.

• Do not align snap ring gap with spring retainer stopper.

5. Install drive plates, driven plates and retaining plate.

Take care with the order and direction of plates.

 Screwdri

[RE4F04B]

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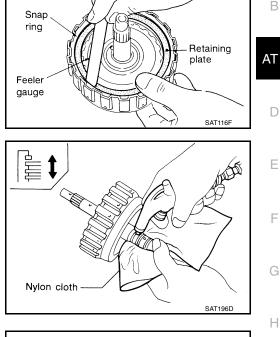
с

- 6. Install snap ring.
- 7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

Specified clearance Standard Allowable limit **Retaining plate**

: 1.8 - 2.2 mm (0.071 - 0.087 in) : 2.8 mm (0.110 in) : Refer to AT-752, "HIGH CLUTCH".

8. Check operation of high clutch. Refer to AT-695, "DISASSEMBLY" .



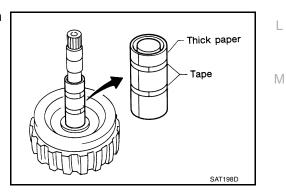
Apply petroleum jelly

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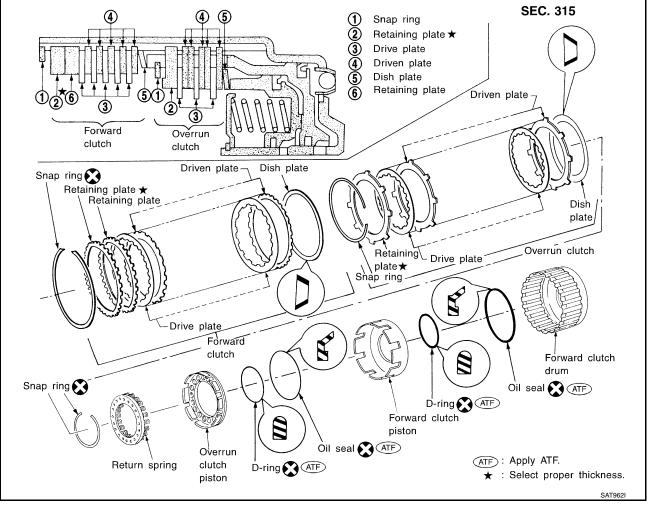
С

- 9. Install seal rings to input shaft.
 - Apply petroleum jelly to seal rings.
 - Always replace when removed.

• Roll paper around seal rings to prevent seal rings from spreading.

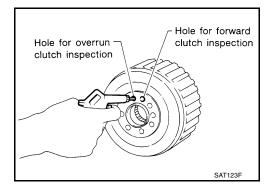


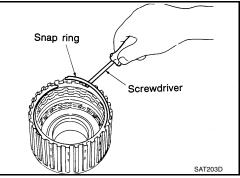
Forward And Overrun Clutches COMPONENTS



DISASSEMBLY

- 1. Check operation of forward clutch and overrun clutch.
- a. Install bearing retainer on forward clutch drum.
- b. Apply compressed air to oil hole of forward clutch drum.
- c. Check to see that retaining plate moves to snap ring.
- d. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.
- 2. Remove snap ring for forward clutch.
- 3. Remove drive plates, driven plates, retaining plate and dish plate for forward clutch.





[RE4F04B]

[RE4F04B]

Remove snap ring for overrun clutch. 4. А 5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch. Screwdriver В Snap ring AT SAT204D D 6. Set Tool on spring retainer and remove snap ring from forward clutch drum while compressing return springs. KV31102400 • Set Tool directly over return springs. (J34285 and Ε J34285-87) • Do not expand snap ring excessively. 7. Remove spring retainer and return springs. Snap ring • Do not remove return springs from spring retainer. F SAT124FB 8. Remove forward clutch piston with overrun clutch piston from Н Forward clutch piston forward clutch drum by turning it. Overrun clutch piston SAT125F Κ 9. Remove overrun clutch piston from forward clutch piston by turning it. Overrun clutch Forward clutch piston piston L Μ SAT126F 10. Remove D-rings and oil seals from forward clutch piston and overrun clutch piston. Oil seal D-ring Forward clutch Oil seal ^{piston} -D-ring Overrun clutch piton SAT127FB

INSPECTION

Snap Rings, Spring Retainer and Return Springs

- Check for deformation, fatigue or damage. •
- Replace if necessary.
- When replacing spring retainer and return springs, replace them as a set.

Forward Clutch and Overrun Clutch Drive Plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate: Forward clutch Standard value : 1.6 mm (0.063 in) Wear limit : 1.4 mm (0.055 in) **Overrun clutch Standard value** : 1.6 mm (0.063 in) Wear limit : 1.4 mm (0.055 in)

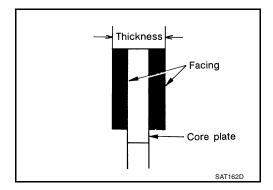
If not within wear limit, replace.

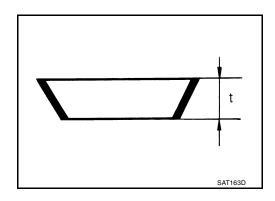
Forward Clutch and Overrun Clutch Dish Plates

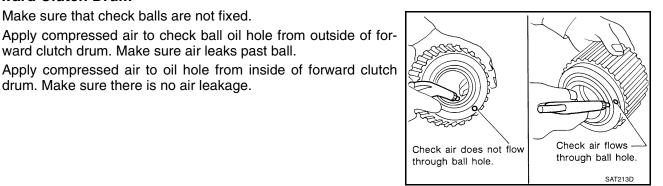
- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate Forward clutch : 2.7 mm (0.106 in) **Overrun clutch** : 2.7 mm (0.106 in)

If deformed or fatigued, replace.







Overrun Clutch Piston

Forward Clutch Drum

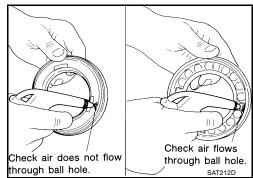
Make sure that check balls are not fixed.

Make sure that check balls are not fixed.

drum. Make sure there is no air leakage.

ward clutch drum. Make sure air leaks past ball.

- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side. Make sure that air leaks past ball.



AT-702

[RE4F04B]

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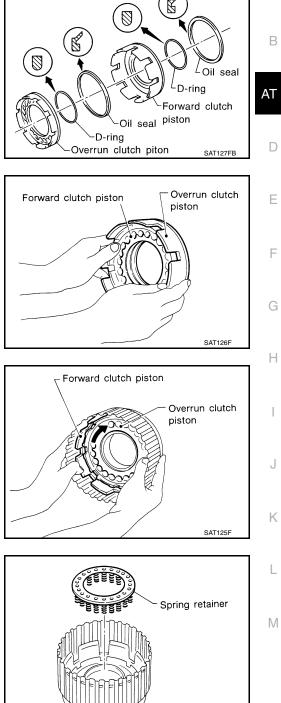
ASSEMBLY

- 1. Install D-rings and oil seals on forward clutch piston and overrun clutch piston.
 - Take care with direction of oil seal.
 - Apply ATF to both parts.

- 2. Install overrun clutch piston assembly on forward clutch piston by turning it slowly.
 - Apply ATF to inner surface of forward clutch piston.

- 3. Install forward clutch piston assembly on forward clutch drum by turning it slowly.
 - Apply ATF to inner surface of drum.

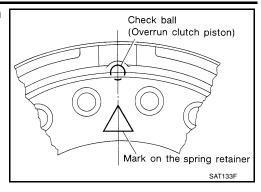
4. Install return spring on overrun clutch piston.



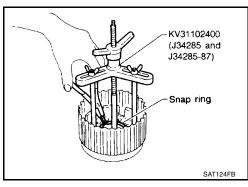
SAT131F

[RE4F04B]

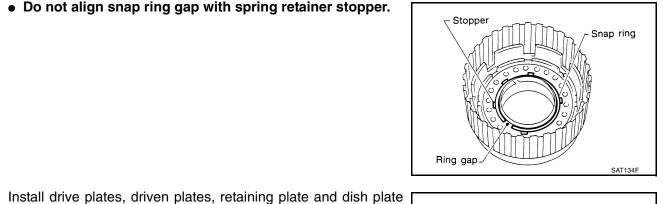
• Align the mark on spring retainer with check ball in overrun clutch piston.

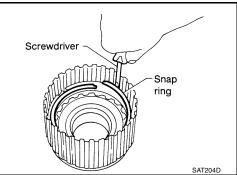


- 5. Set Tool on spring retainer and install snap ring while compressing return springs.
 - Set Tool directly over return springs.



• Do not align snap ring gap with spring retainer stopper.





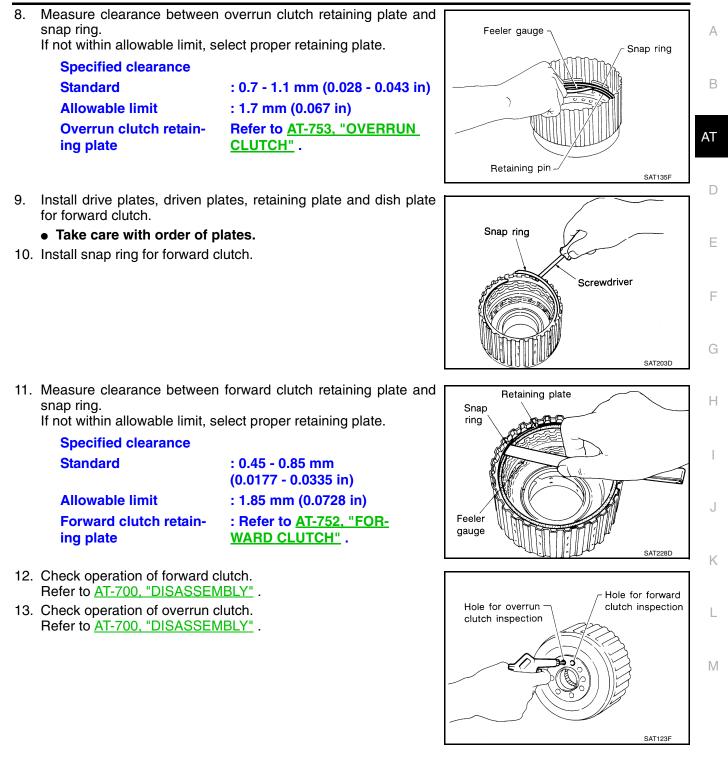
• Take care with order of plates.

Install snap ring for overrun clutch. 7.

for overrun clutch.

6.

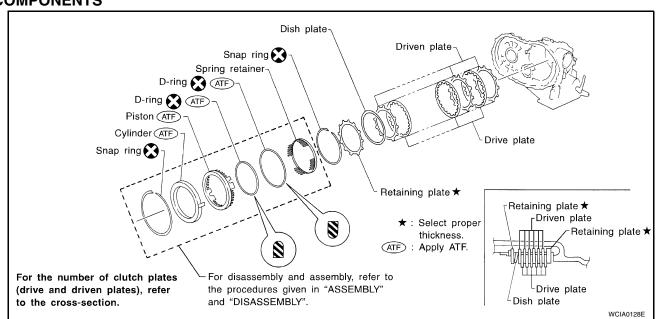
[RE4F04B]



[RE4F04B]

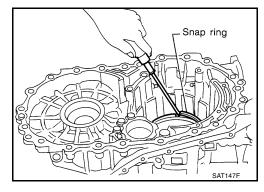
Low & Reverse Brake COMPONENTS

ECS0067M

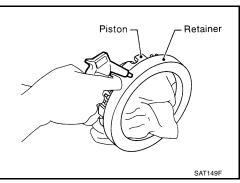


DISASSEMBLY

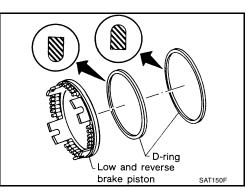
- 1. Check operation of low & reverse brake.
- a. Apply compressed air to oil hole of transmission case.
- b. Check to see that retaining plate moves to snap ring.
- c. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Fluid might be leaking past piston check ball.



- 2. In order to remove piston, apply compressed air to oil hole of retainer while holding piston.
 - Apply air gradually and allow piston to come out evenly.



3. Remove D-rings from piston.



INSPECTION

Low and Reverse Brake Snap Ring, Spring Retainer and Return Springs

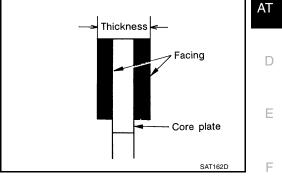
- Check for deformation, fatigue or damage. If necessary, replace.
- When replacing spring retainer and return springs, replace them as a set.

Low and Reverse Brake Drive Plate

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

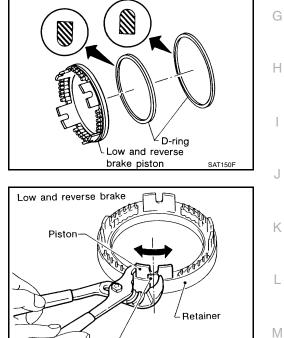
Thickness of drive plate Standard value : 1.8 mm (0.071 in) Wear limit : 1.6 mm (0.063 in)

If not within wear limit, replace.





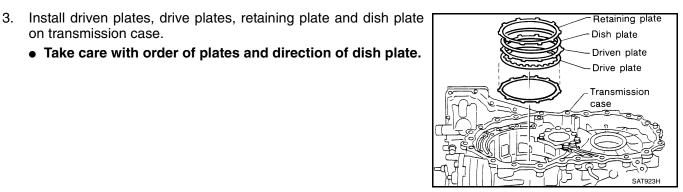
• Apply ATF to both parts.



2. Set and align piston with retainer.

on transmission case.

• This operation is required in order to engage the protrusions of piston to return springs correctly. Further procedures are given in "ASSEMBLY". Refer to AT-727, "ASSEMBLY" .



∠Bracket

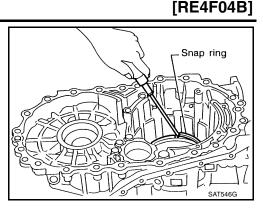
SAT323F

[RE4F04B]

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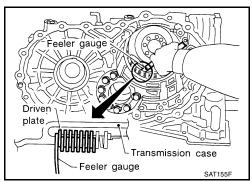
4. Install snap ring.



5. Measure clearance between driven plate and transmission case. If not within allowable limit, select proper retaining plate. (front side)

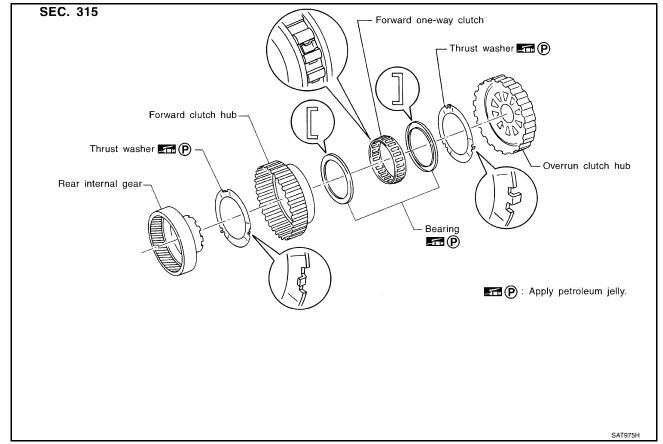
Specified clearance Standard Allowable limit Retaining plate

: 1.7 - 2.1 mm (0.067 - 0.083 in) : 3.3 mm (0.130 in) Refer to <u>AT-753, "LOW &</u> <u>REVERSE BRAKE"</u>.



Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

ECS0067N



[RE4F04B]

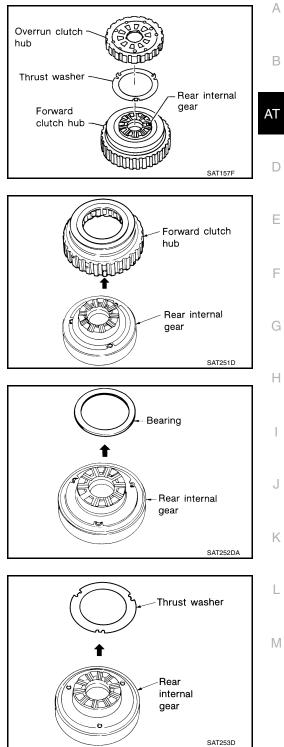
DISASSEMBLY

1. Remove overrun clutch hub and thrust washer from forward clutch hub.

2. Remove forward clutch hub from rear internal gear.

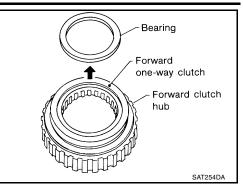
3. Remove bearing from rear internal gear.

4. Remove thrust washer from rear internal gear.



[RE4F04B]

5. Remove bearing from forward one-way clutch.



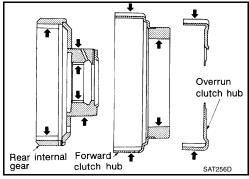
Forward one-way clutch Forward clutch hub SAT255D

INSPECTION Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

Remove forward one-way clutch from forward clutch hub.

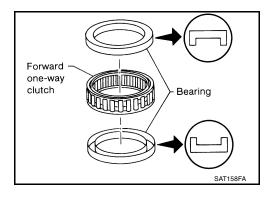
• Check rubbing surfaces for wear or damage.

6.



Bearings and Forward One-Way Clutch

- Check bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.



[RE4F04B]

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ASSEMBLY

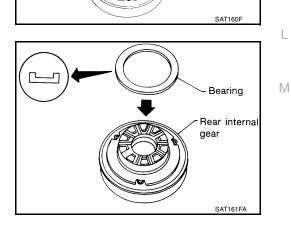
- 1. Install forward one-way clutch on forward clutch.
 - Take care with the direction of forward one-way clutch.
 - Forward clutch hub TELE Unu AT Hole Protrusion Forward one-way clutch SAT976H Bearing F Forward one-way clutch Daan Forward clutch hub SAT159FA Thrust washer • Align hooks of thrust washer with holes of rear internal Pawl Rear
- 2. Install bearing on forward one-way clutch.
 - Apply petroleum jelly to bearing.

gear.

3. Install thrust washer on rear internal gear.

• Apply petroleum jelly to thrust washer.

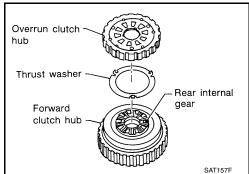
- 4. Install bearing on rear internal gear.
 - Apply petroleum jelly to bearing.



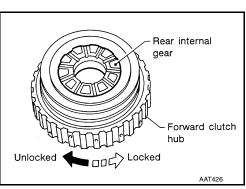
internal

gear

- 5. Install thrust washer and overrun clutch hub.
 - Apply petroleum jelly to thrust washer.
 - Align hooks of thrust washer with holes of overrun clutch hub.
 - Align projections of rear internal gear with holes of overrun clutch hub.

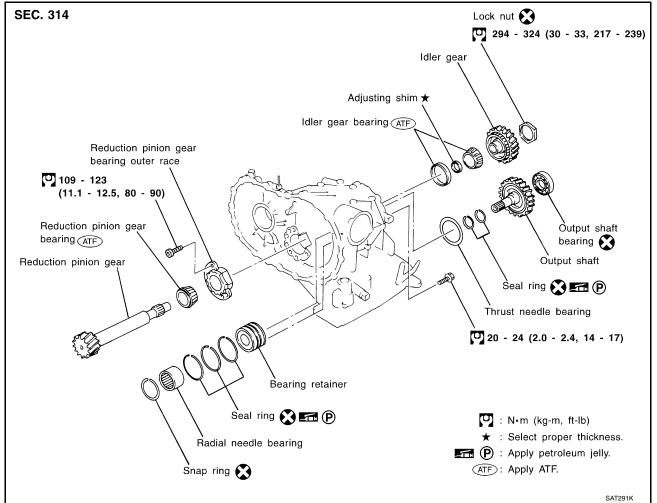


- 6. Install forward clutch hub on rear internal gear.
 - Check operation of forward one-way clutch. Hold rear internal gear and turn forward clutch hub. Check forward clutch hub for correct locking and unlocking directions.
 - If not as shown in illustration, check installation direction of forward one-way clutch.



Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer COMPONENTS

ECS00670



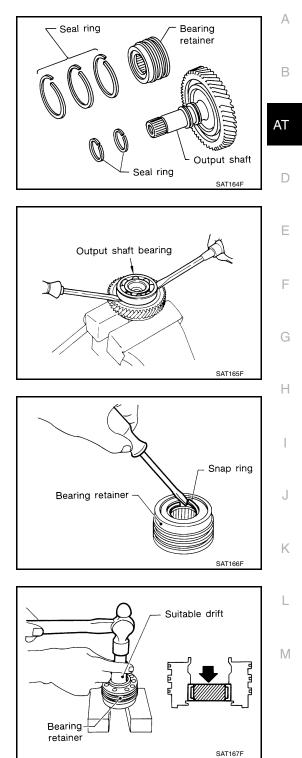
AT-712

[RE4F04B]

[RE4F04B]

DISASSEMBLY

1. Remove seal rings from output shaft and bearing retainer.



- 2. Remove output shaft bearing with screwdrivers.
 - Always replace bearing with a new one when removed.
 - Do not damage output shaft.

3. Remove snap ring from bearing retainer.

4. Remove needle bearing from bearing retainer.

AT-714

- **REPAIR FOR COMPONENT PARTS**
- 5. Remove idler gear bearing inner race from idler gear.

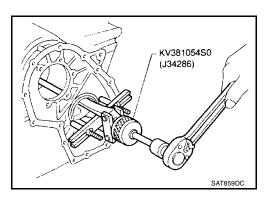
6. Remove idler gear bearing outer race from transmission case.

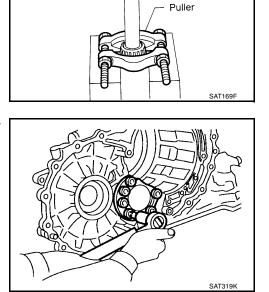
7. Press out reduction pinion gear bearing inner race from reduction pinion gear.

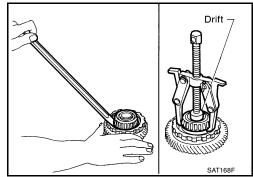
8. Remove reduction pinion gear bearing outer race from transmission case.

INSPECTION Output Shaft, Idler Gear and Reduction Pinion Gear

- Check shafts for cracks, wear or bending.
- Check gears for wear, chips and cracks.





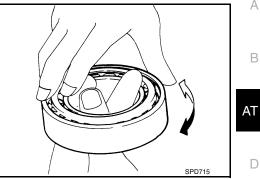


[RE4F04B]

Suitable drift

Bearing

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- When replacing taper roller bearing, replace outer and inner race as a set.



Seal Ring Clearance

- Install new seal rings to output shaft.
- Measure clearance between seal ring and ring groove of output shaft.

Standard clearance

: 0.10 - 0.25 mm (0.0039 - 0.0098 in) : 0.25 mm (0.0098 in)

Allowable limit

- If not within allowable limit, replace output shaft.
- Install new seal rings to bearing retainer.
- Measure clearance between seal ring and ring groove of bearing retainer.

Standard clearance

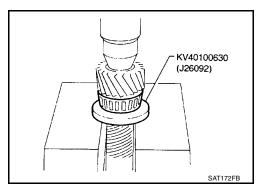
Allowable limit

: 0.10 - 0.30 mm (0.0039 - 0.0118 in) : 0.30 mm (0.0118 in)

If not within allowable limit, replace bearing retainer.

ASSEMBLY

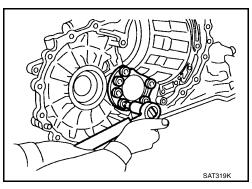
Press reduction pinion gear bearing inner race on reduction pin-1. ion gear.



2. Install reduction pinion gear bearing outer race on transmission case.



: 109 - 123 N·m (11.1 - 12.5 kg-m, 80 - 90 ft-lb)



Clearance Seal ring Bearing retainer Output shaft SAT171F

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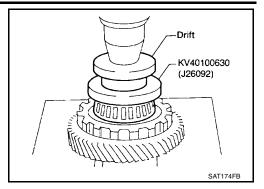
Н

[RE4F04B]

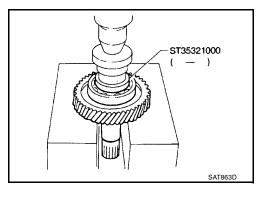
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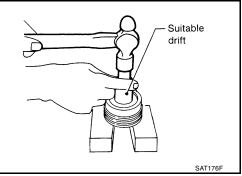
[RE4F04B]

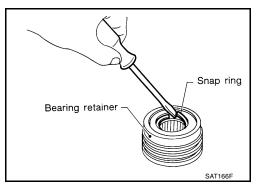
3. Press idler gear bearing inner race on idler gear.



ST30720000 (J25405 and J34331)







4. Install idler gear bearing outer race on transmission case.

5. Press output shaft bearing on output shaft.

6. Press needle bearing on bearing retainer.

7. Install snap ring to bearing retainer.

[RE4F04B]

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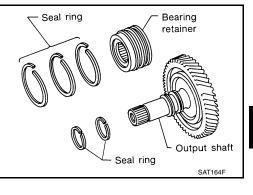
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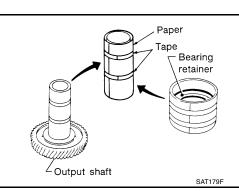
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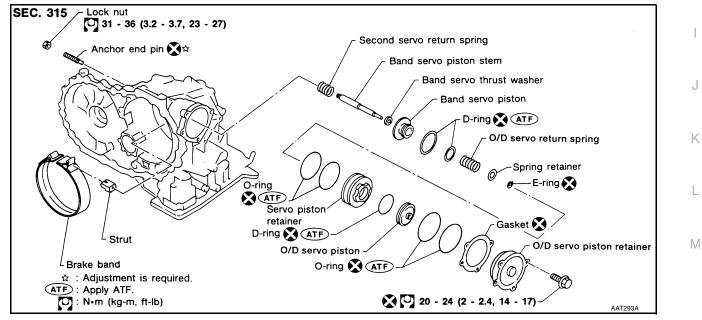
8. After packing ring grooves with petroleum jelly, carefully install new seal rings on output shaft and bearing retainer.



• Roll paper around seal rings to prevent seal rings from spreading.

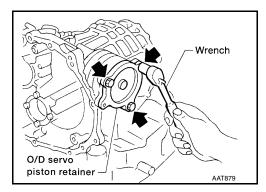


Band Servo Piston Assembly COMPONENTS



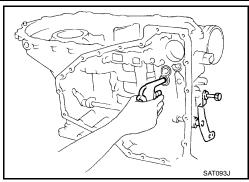
DISASSEMBLY

1. Remove band servo piston fixing bolts.



[RE4F04B]

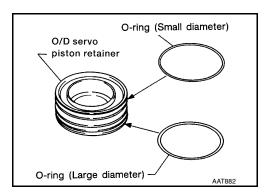
- 2. Apply compressed air to oil hole in transmission case to remove O/D servo piston retainer and band servo piston assembly.
 - Hold band servo piston assembly with a rag or nylon waste.



- 3. Apply compressed air to oil hole in O/D servo piston retainer to remove O/D servo piston from retainer.
 - Hold O/D band servo piston while applying compressed air.
- O/D servo piston Nylon waste

4. Remove D-ring from O/D servo piston.

5. Remove O-rings from O/D servo piston retainer.

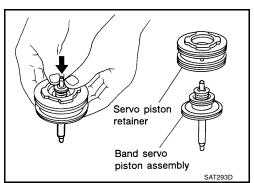


O/D servo piston

D-ring

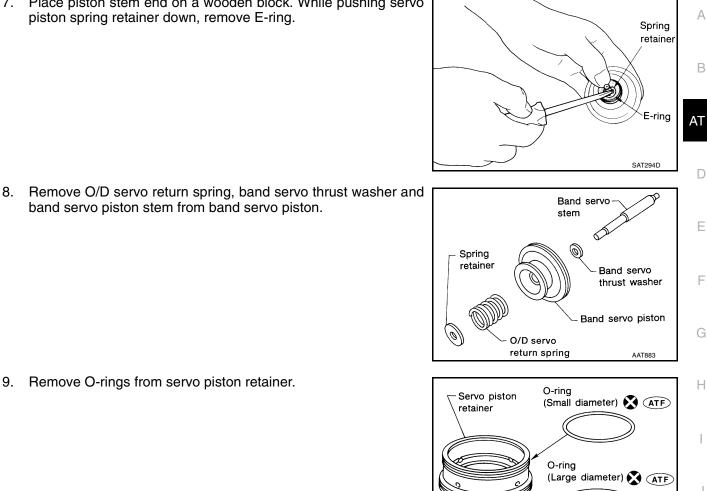
AAT881

6. Remove band servo piston assembly from servo piston retainer by pushing it forward.



[RE4F04B]

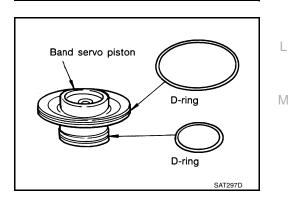
7. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.



9. Remove O-rings from servo piston retainer.

band servo piston stem from band servo piston.

10. Remove D-rings from band servo piston.



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ATF : Apply ATF.

INSPECTION Pistons, Retainers and Piston Stem

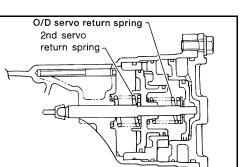
Check frictional surfaces for abnormal wear or damage.

Return Springs

- Check for deformation or damage.
- Measure free length and outer diameter.

Inspection standard

: Refer to <u>AT-756.</u> "RETURN SPRING" .



[RE4F04B]

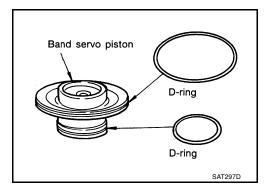
AAT884

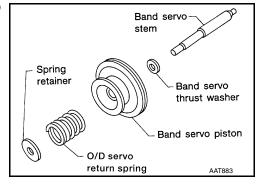
ASSEMBLY

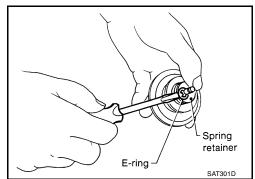
- 1. Install D-rings to servo piston retainer.
 - Apply ATF to D-rings.
 - Pay attention to position of each O-ring.

2. Install band servo piston stem, band servo thrust washer, O/D servo return spring and spring retainer to band servo piston.

3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.







[RE4F04B]

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- Install O-rings to servo piston retainer. O-ring (Small diameter) 🗴 (ATF) Servo piston • Apply ATF to O-rings. retainer • Pay attention to position of each O-ring. O-ring (Large diameter) 🕅 ATF ATF : Apply ATF. SAT296DA Install band servo piston assembly to servo piston retainer by SAT303D 6. Install D-ring to O/D servo piston. • Apply ATF to D-ring. D-ring O/D servo piston AAT881 O-ring (Small diameter) O/D servo piston retainer O-ring (Large diameter) AAT882 O/D servo piston retainer O/D servo piston

4.

5.

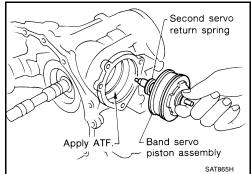
pushing it inward.

- 7. Install O-rings to O/D servo piston retainer.
 - Apply ATF to O-rings.
 - Pay attention to position of each O-ring.

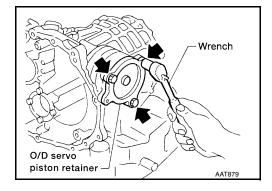
8. Install O/D servo piston to O/D servo piston retainer.

[RE4F04B]

- 9. Install band servo piston assembly and 2nd servo return spring to transmission case.
 - Apply ATF to O-ring of band servo piston and transmission case.



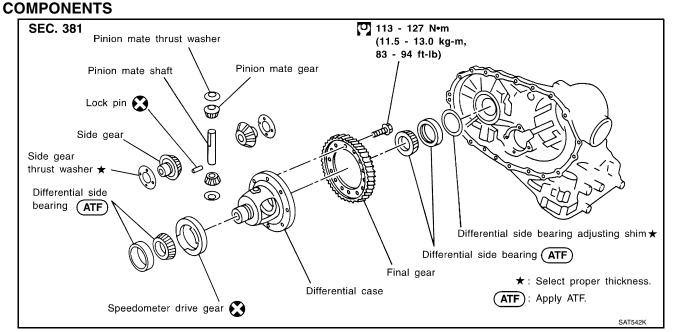
- 10. Install O/D servo piston assembly to transmission case.
 - Apply ATF to O-ring of band servo piston and transmission case.
- Apply ATF. O/D servo?) piston assembly AAT885



11. Install O/D servo piston retainer to transmission case. Refer to <u>AT-720, "ASSEMBLY"</u>.

Final Drive

ECS0067Q

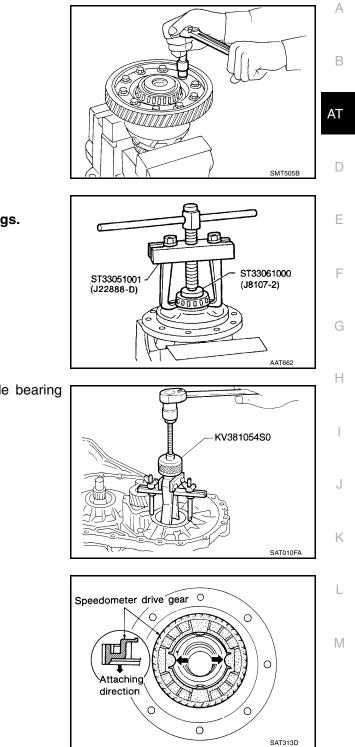


AT-722

DISASSEMBLY

1. Remove final gear.





- 2. Press out differential side bearings.
 - Be careful not to mix up the right and left bearings.

3. Remove differential side bearing outer race and side bearing adjusting shim from transaxle case.

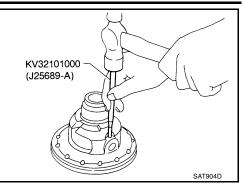
4. Remove speedometer drive gear.

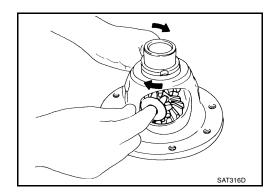
[RE4F04B]

5. Drive out pinion mate shaft lock pin.

6. Draw out pinion mate shaft lock pin.

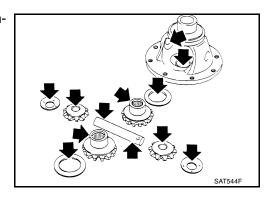
7. Remove pinion mate gears and side gears.





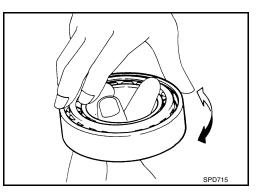
INSPECTION Gear, Washer, Shaft and Case

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.



Bearings

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- When replacing taper roller bearing, replace outer and inner race as a set.



[RE4F04B]

: 0.1 - 0.2 mm (0.004 - 0.008 in) : Refer to AT-754, "DIF-FERENTIAL SIDE GEAR THRUST WASHERS". AT-725

2. Insert pinion mate shaft.

• Apply ATF to any parts.

ASSEMBLY

• When inserting, be careful not to damage pinion mate thrust washers.

1. Attach side gear thrust washers to side gears, then install pinion

mate thrust washers and pinion mate gears in place.

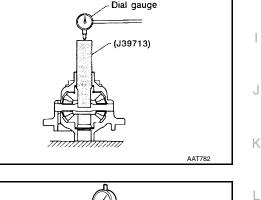
- 3. Measure clearance between side gear and differential case with washers following the procedure below:
- a. Set Tool and dial indicator on side gear.

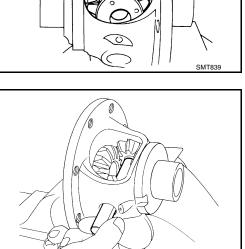
Move side gear up and down to measure dial indicator deflecb. tion. Always measure indicator deflection on both side gears.

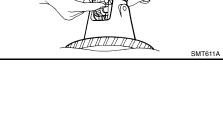
> **Clearance between** side gear and differential case with washer

c. If not within specification, adjust clearance by changing thickness of differential side gear thrust washers.

> Differential side gear thrust washers







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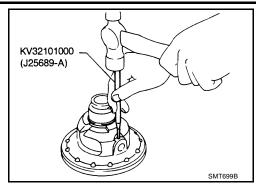
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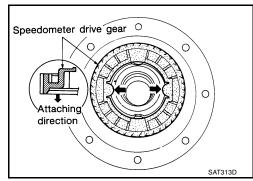
[RE4F04B]

4. Install lock pin.

• Make sure that lock pin is flush with case.



- 5. Install speedometer drive gear on differential case.
 - Align the projection of speedometer drive gear with the groove of differential case.



- ST33230000 (J25805-01)
- ATTEGS

SAT546F

6. Press on differential side bearings.

7. Install final gear and tighten fixing bolts in a crisscross pattern. Tighten final gear bolts to the specified torque. Refer to <u>AT-722</u>, <u>"COMPONENTS"</u>.

ASSEMBLY

- Assembly (1)
- 1. Install differential side oil seals on transmission case and con-Converter housing side verter housing.

()Inside Parking actuator 0 0 support Ø Outside

ST33400001

(J26082)

Transmission case side

Suitable drift



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0 \odot Parking pawl 111 11 Return spring \cap 0 \frown ^{_}Parking shaft -Screwdriver SAT039F

- 2. Install parking actuator support to transmission case. Tighten parking actuator support bolts to the specified torque. Refer to AT-650, "OVERHAUL"
 - Pay attention to direction of parking actuator support.

- 3. Install parking pawl on transmission case and fix it with parking shaft.
- 4. Install return spring.

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Adjustment (1) DIFFERENTIAL SIDE BEARING PRELOAD

- 1. Install differential side bearing outer race without adjusting shim on transmission case.
- 2. Install differential side bearing outer race on converter housing.

- 3. Place final drive assembly on transmission case.
- 4. Install transmission case on converter housing. Tighten transmission case fixing bolts to the specified torque. Refer to <u>AT-650, "OVERHAUL"</u>.

- 5. Attach dial indicator on differential case at converter housing side.
- 6. Insert Tool into differential side gear from transmission case side.
- 7. Move Tool up and down and measure dial indicator deflection.
- 8. Select proper thickness of differential side bearing adjusting shim(s).

Suitable shim thickness = Dial indicator deflection + Specified bearing preload

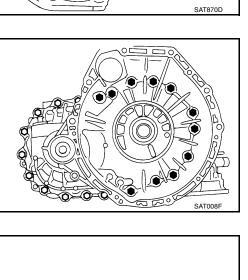
Differential side bearing preload adjusting shim

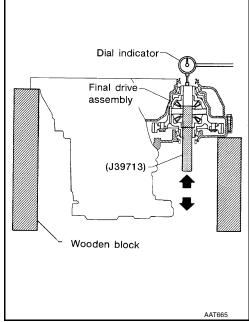
Bearing preload

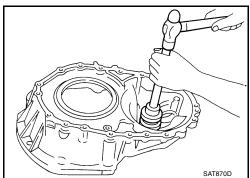
ING PRELOAD ADJUSTING SHIMS" . : 0.05 - 0.09 mm (0.0020 - 0.0035 in)

: Refer to AT-754, "DIF-

FERENTIAL SIDE BEAR-







[RE4F04B]

- Remove converter housing from transmission case. 9.
- 10. Remove final drive assembly from transmission case.
- 11. Remove differential side bearing outer race from transmission case.
- 12. Reinstall differential side bearing outer race and shim(s) selected from SDS table on transmission case.
- 13. Reinstall converter housing on transmission case and tighten transmission case fixing bolts to the specified torque. Refer to AT-650, "OVERHAUL" .
- 14. Insert Tool and measure turning torque of final drive assembly.
 - Turn final drive assembly in both directions several times to seat bearing rollers correctly.

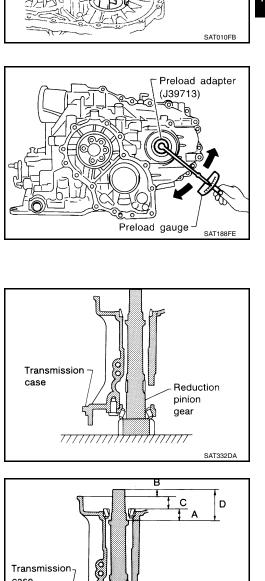
: 0.78 - 1.37 N·m **Turning torgue of final** drive assembly (New (8.0 - 14.0 kg-cm, 6.9 - 12.2 in-lb) bearing)

- When old bearing is used again, turning torque will be slightly less than the above.
- Make sure torgue is close to the specified range.

Preload adapter : J39713

REDUCTION PINION GEAR BEARING PRELOAD

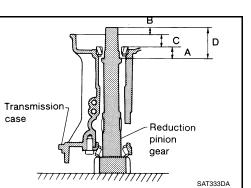
- Remove transmission case and final drive assembly from con-1. verter housing.
- Select proper thickness of reduction pinion gear bearing adjust-2. ing shim using the following procedures.
- Place reduction pinion gear on transmission case as shown. а.



- Place idler gear bearing on transmission case. b.
- Measure dimensions "B" "C" and "D" and calculate dimension C. "A".

 $\mathbf{A} = \mathbf{D} - (\mathbf{B} + \mathbf{C})$ "**A**"

: Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.



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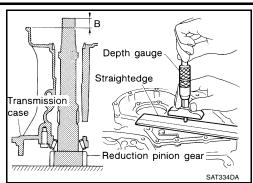
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- Measure dimension "B" between the end of reduction pinion gear and the surface of transmission case.
- Measure dimension "B" in at least two places.



C Idler gear bearing

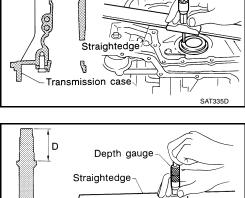
Depth

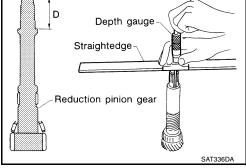
gauge

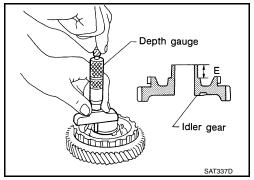
- Measure dimension "C" between the surface of idler gear bearing inner race and the surface of transmission case.
- Measure dimension "C" in at least two places.

- Measure dimension "D" between the end of reduction pinion gear and the adjusting shim mating surface of reduction pinion gear.
- Measure dimension "D" in at least two places.
- Calculate dimension "A".

 $\mathbf{A} = \mathbf{D} - (\mathbf{B} + \mathbf{C})$







d. Measure dimension "E" between the end of idler gear and the idler gear bearing inner race mating surface of idler gear.

• Measure dimension "E" in at least two places.

e. Select proper thickness of reduction pinion gear bearing adjusting shim.

Proper shim thickness = A - E - 0.05 mm (0.0020 in)*

(*: Bearing preload) Reduction pinion gear bearing adjusting shim

: Refer to <u>AT-755.</u> <u>"REDUCTION PINION</u> <u>GEAR BEARING ADJUST-</u> <u>ING SHIMS"</u>.

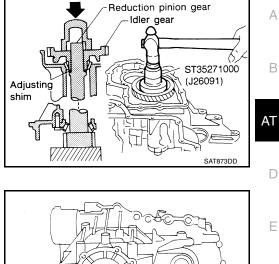
ASSEMBLY

- 3. Install reduction gear and reduction gear bearing adjusting shim selected in step 2-e on transmission case.
- 4. Press idler gear bearing inner race on idler gear.
- 5. Press idler gear on reduction gear.
 - Press idler gear until idler gear fully contacts adjusting shim.
- 6. Tighten idler gear lock nut to the specified torque. Refer to AT-650, "OVERHAUL" .
 - Lock idler gear with parking pawl when tightening lock nut.

- 7. Measure turning torque of reduction pinion gear.
 - When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.

Turning torque of reduction pinion gear : 0.05 - 0.39 N·m (0.5 - 4.0 kg-cm, 0.43 - 3.47 in-lb)

- If turning torque is out of specification, decrease or increase thickness of reduction pinion gear bearing adjusting shim.
- 8. After properly adjusting turning torque, clinch idler gear lock nut as shown.



[RE4F04B]

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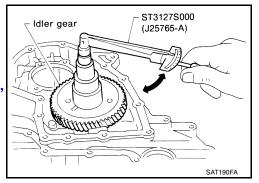
D

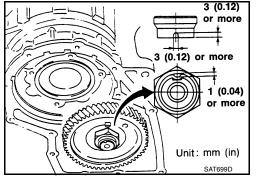
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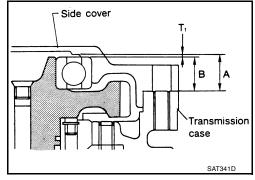


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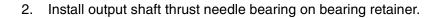
Μ

OUTPUT SHAFT END PLAY

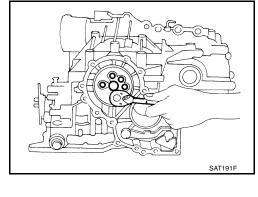
- Measure clearance between side cover and the end of the output shaft bearing.
- Select proper thickness of adjusting shim so that clearance is within specifications.

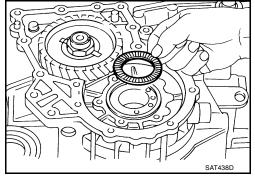


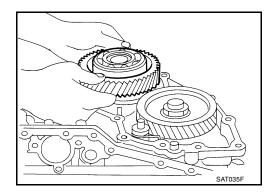
1. Install bearing retainer for output shaft.



3. Install output shaft on transmission case.







ASSEMBLY

- 4. Measure dimensions " ℓ 1 " and " ℓ 2 " at side cover and then calculate dimension "A".
 - Measure dimension " ℓ 1" and " ℓ 2" in at least two places.
 - "**A**"

: Distance between transmission case fitting surface and adjusting shim mating surface.

 $\mathbf{A} = \ell \mathbf{1} - \ell \mathbf{2}$ $\ell \mathbf{2}$

: Height of gauge

- 5. Measure dimensions " ℓ 2 " and " ℓ 3 " and then calculate dimension "B".
 - Measure " ℓ 2 " and " ℓ 3 " in at least two places.

"**B**"

: Distance between the end of output shaft bearing outer race and the side cover fitting surface of transmission case.

 $\mathbf{B} = \ell \mathbf{2} - \ell \mathbf{3}$ $\ell \mathbf{2}$

: Height of gauge

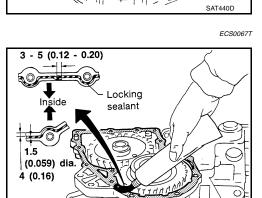
6. Select proper thickness of adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications.

Output shaft end play
(A - B): 0 - 0.15 mm (0 - 0.0059 in)Output shaft end play
adjusting shims: Refer to AT-757, "OUT-
PUT SHAFT ADJUSTING
SHIMS" .

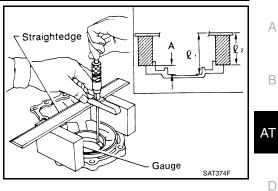
7. Install adjusting shim on output shaft bearing.

Assembly (2)

1. Apply anaerobic liquid gasket to transmission case as shown in illustration. Refer to <u>GI-44</u>, "Recommended Chemical Products <u>and Sealants"</u>



Unit: mm



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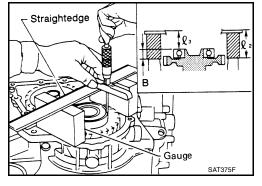
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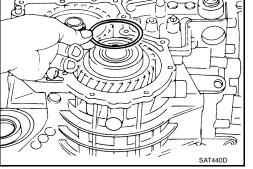
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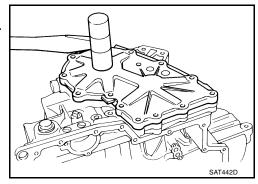
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SAT441D





- 2. Set side cover on transmission case.
 - Apply locking sealant to the mating surface of transmission case.



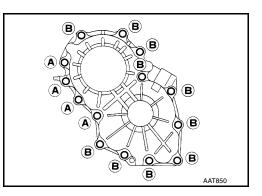
- 3. Tighten side cover fixing bolts to specified torque. Refer to <u>AT-650, "OVERHAUL"</u>.
 - Do not mix bolts A and B.

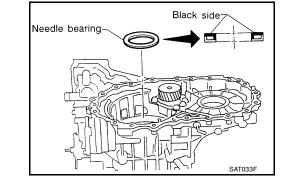
4. Remove paper rolled around bearing retainer.

• Apply petroleum jelly to thrust washer.

5. Install thrust washer on bearing retainer.

• Always replace bolts A as they are self-sealing bolts.





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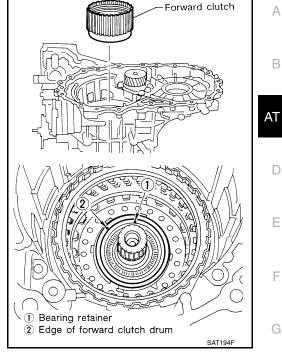
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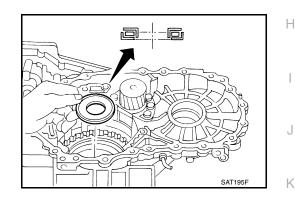
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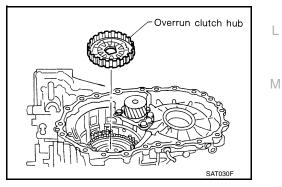
- 6. Install forward clutch assembly.
 - Align teeth of low & reverse brake drive plates before installing.
 - Make sure that bearing retainer seal rings are not spread.
 - If forward clutch assembly is correctly seated, points 1 and 2 are at almost same level.



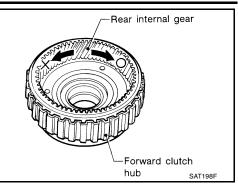
- 7. Install thrust needle bearing on bearing retainer.
 - Apply petroleum jelly to thrust needle bearing.
 - Pay attention to direction of thrust needle bearing.



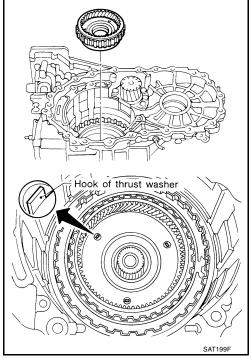
- 8. Install overrun clutch hub.
 - Apply petroleum jelly to thrust washers.
 - Align teeth of overrun clutch drive plates before installing.



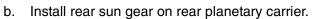
- 9. Hold forward clutch hub and turn rear internal gear. Check overrun clutch hub for correct directions of lock and unlock.
 - If not shown as illustrated, check installed direction of forward one-way clutch.



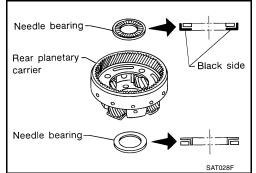
- 10. Install forward clutch hub and rear internal gear assembly.
 - Align teeth of forward clutch drive plates before installing.
 - Check that three hooks of thrust washer are correctly aligned after installing.

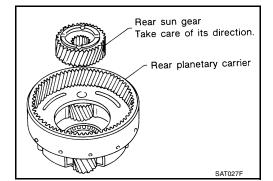


- 11. Install rear planetary carrier assembly and rear sun gear according to the following procedures.
- a. Install needle bearings on rear planetary carrier.
 - Apply petroleum jelly to needle bearings.
 - Pay attention to direction of needle bearings.



• Pay attention to direction of rear sun gear.





AT-736

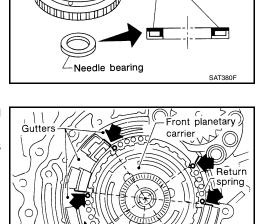
c. Install rear planetary carrier on transmission case.

- 12. Install thrust needle bearing on front planetary carrier, then install them together on transmission case.
 - Apply petroleum jelly to thrust needle bearing.
 - Pay attention to direction of thrust needle bearing.

- 13. Install low and reverse brake piston according to the following procedures.
- a. Set and align return springs to transmission case gutters as shown in illustration.

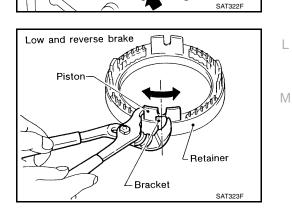
b. Set and align piston with retainer.





Front planetary

carrier



[RE4F04B]

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Black side

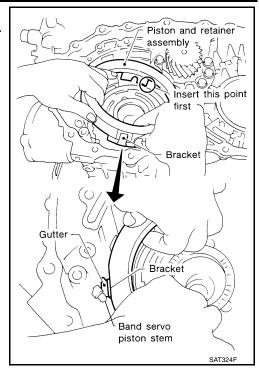


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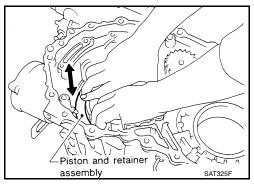
А

Install piston and retainer assembly on the transmission case.
Align bracket to specified gutter as indicated in illustration.

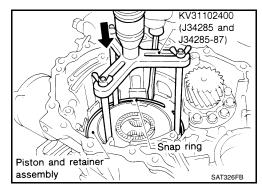
c.



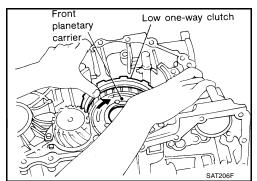
- d. Check that each protrusion of piston is correctly set to corresponding return spring as follows.
 - Push piston and retainer assembly evenly and confirm they move smoothly.
 - If they can not move smoothly, remove piston and retainer assembly and align return spring correctly as instructed in step "a".



e. Push down piston and retainer assembly and install snap ring.



14. Install low one-way clutch to front planetary carrier by turning carrier in the direction of the arrow shown.



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- Forward clutch and bearing must be correctly installed Screwdriver for snap ring to fit into groove of transmission case. Snap ring SAT046D Needle bearing SAT020F High clutch hub Needle bearing Front sun gear Bearing race SAT019F High clutch drum Needle bearing High clutch hub SAT018F
- 16. Install needle bearing on transmission case.

15. Install snap ring with screwdriver.

- Apply petroleum jelly to needle bearing.
- Pay attention to direction of needle bearing.

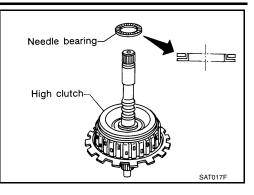
- 17. Install bearing race, needle bearing and high clutch hub on front sun gear.
 - Apply petroleum jelly to needle bearing.
 - Pay attention to direction of needle bearing.

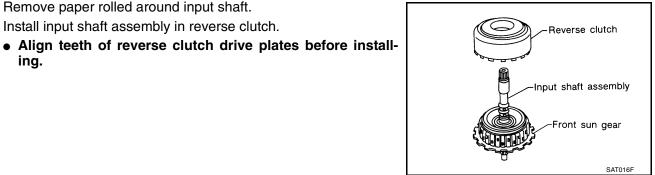
18. Install needle bearing and high clutch drum on high clutch hub.

19. Install needle bearing on high clutch drum.

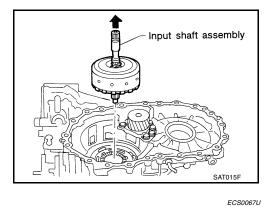
20. Remove paper rolled around input shaft. 21. Install input shaft assembly in reverse clutch.

- Apply petroleum jelly to needle bearing.
- Pay attention to direction of needle bearing.





- 22. Install reverse clutch assembly on transmission case.
 - Align teeth of high clutch drive plates before installing.



Adjustment (2)

ing.

When any parts listed below are replaced, adjust total end play and reverse clutch end play.

Part name	Total end play	Reverse clutch end play
Transmission case	•	•
Overrun clutch hub	•	•
Rear internal gear	•	•
Rear planetary carrier	•	•
Rear sun gear	•	•
Front planetary carrier	•	•
Front sun gear	•	•
High clutch hub	•	•
High clutch drum	•	•
Oil pump cover	•	•
Reverse clutch drum	—	•

Bearing race -Needle

bearing

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TOTAL END PLAY

1. Adjust total end play "T1".

a. With original bearing race installed, place Tool onto oil pump. The long ends of legs should be placed firmly on machined surface of oil pump assembly. The gauging cylinder should rest on top of bearing race. Lock gauging cylinder in place with set screw.

b. Install gauging plunger into cylinder.

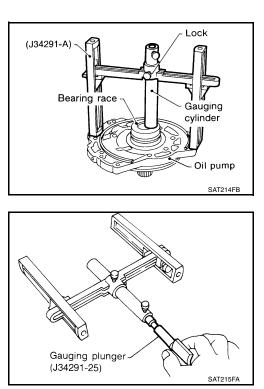
- c. With needle bearing installed on high clutch drum, place Tool legs on machined surface of transmission case (with gasket). Then allow plunger to rest on needle bearing.
- d. Measure gap between cylinder and plunger. This measurement should give exact total end play.

```
Total end play "T1 "
```

: 0.25 - 0.55 mm (0.0098 - 0.0217 in)

• If end play is out of specification, decrease or increase thickness of bearing race as necessary.

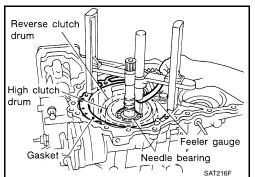
Available bearing race for adjusting total end play : Refer to <u>AT-757, "BEAR-</u> ING RACE FOR ADJUST-ING TOTAL END PLAY".



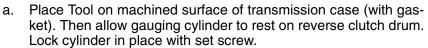
∕ ∠High clutch drum -Reverse clutch drum

Oil pump

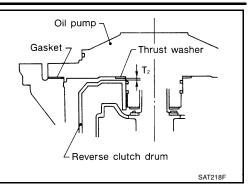
Gasket

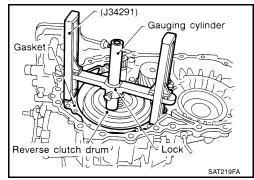


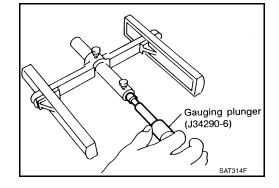
2. Adjust reverse clutch drum end play "T2 ".

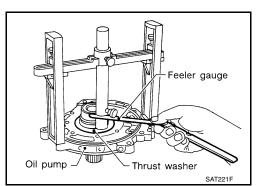


b. Install gauging plunger into cylinder.









- c. With original thrust washer installed on oil pump, place Tool legs onto machined surface of oil pump assembly. Then allow plunger to rest on thrust washer.
- d. Measure gap between cylinder and plunger with feeler gauge. This measurement should give exact reverse clutch drum end play.

Reverse clutch drum : 0.55 - 0.90 mm (0.0217 - 0.0354 end play "T₂" in)

• If end play is out of specification, decrease or increase thickness of thrust washer as necessary.

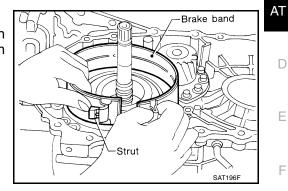
ECS0067V

Available thrust washer for adjusting reverse clutch drum end play

: Refer to <u>AT-757,</u> <u>"THRUST WASHERS FOR</u> <u>ADJUSTING REVERSE</u> <u>CLUTCH DRUM END</u> <u>PLAY"</u>.

Assembly (3)

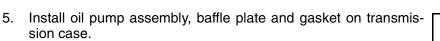
- 1. Install anchor end pin and lock nut on transmission case.
- 2. Place brake band on outside of reverse clutch drum. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.



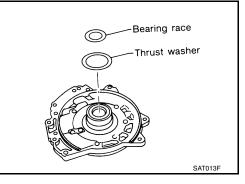
3. Place bearing race selected in total end play adjustment step on oil pump cover.

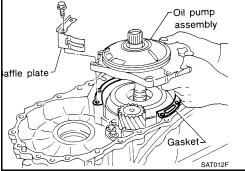
• Apply petroleum jelly to bearing race.

- 4. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.
 - Apply petroleum jelly to thrust washer.



6. Tighten oil pump fixing bolts to the specified torque.







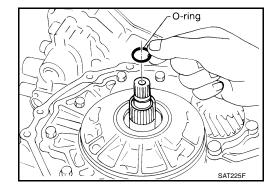
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- 7. Install O-ring to input shaft.
 - Apply ATF to O-ring.



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8. Adjust brake band.

a. Tighten anchor end pin to the specified torque.

Anchor end pin

: Refer to <u>AT-754, "BRAKE</u> <u>BAND"</u>.

- b. Back off anchor end pin two and a half turns.
- c. While holding anchor end pin, tighten lock nut.

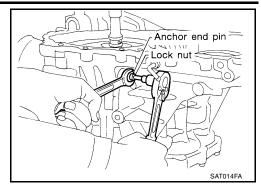
Lock nut

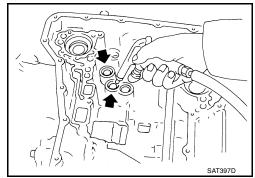
: Refer to <u>AT-754, "BRAKE</u> <u>BAND"</u> .

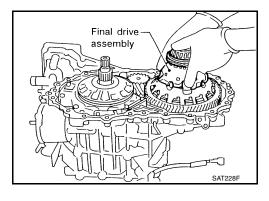
9. Apply compressed air to oil holes of transmission case and check operation of brake band.

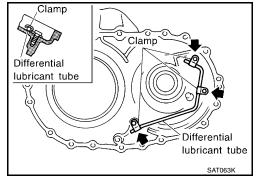
10. Install final drive assembly on transmission case.

11. Install differential lubricant tube on converter housing. Tighten differential lubricant tube bolts to the specified torque. Refer to AT-650, "OVERHAUL".









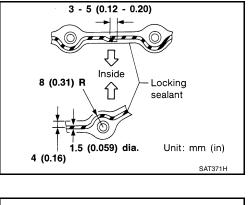
[RE4F04B]

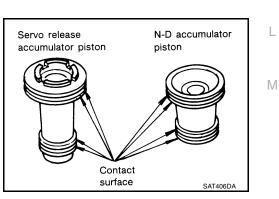
12. Install O-ring on differential oil port of transmission case.

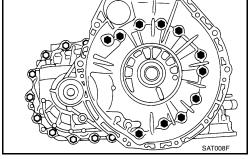
- 13. Install converter housing on transmission case.
 - Apply locking sealant to mating surface of converter housing.

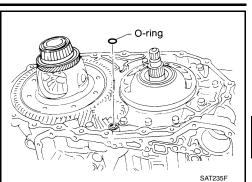
• Tighten converter housing bolts to the specified torque. Refer to <u>AT-650, "OVERHAUL"</u>.

- 14. Install accumulator piston.
- a. Check contact surface of accumulator piston for damage.









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b. Install O-rings on accumulator piston.

Apply ATF to O-rings.
 Accumulator piston O-rings : Refer to AT-751, "O-RING"

- c. Install accumulator pistons and return springs on transmission case.
 - Apply ATF to inner surface of transmission case.

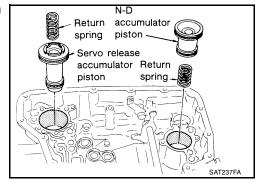
Return springs

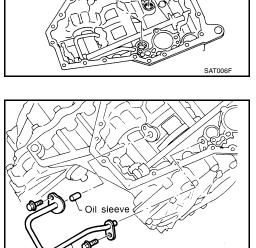
: Refer to <u>AT-752,</u> "RETURN SPRING" .

- 15. Install lip seals for band servo oil holes on transmission case.
 - Apply petroleum jelly to lip seals.

16. Install L & R oil tube and oil sleeve. Tighten L & R oil tube bolts to the specified torque. Refer to <u>AT-650, "OVERHAUL"</u>.

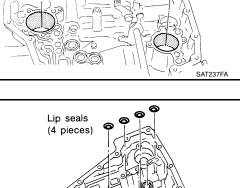
N-D accumulator piston piston



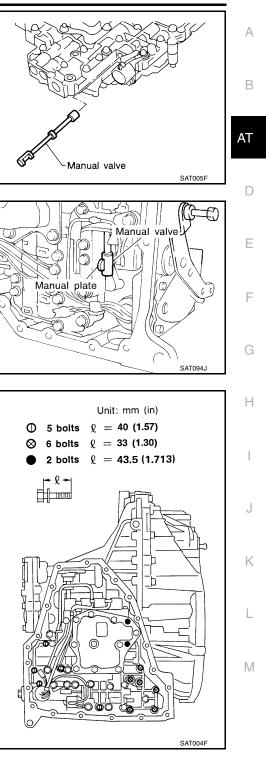


L & R oil tube

SAT862HA



[RE4F04B]



• Apply ATF to manual valve.

17. Install control valve assembly.

a. Insert manual valve into control valve assembly.

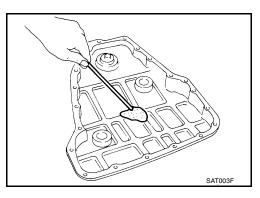
- b. Set manual shaft in Neutral position.
- c. Install control valve assembly on transmission case while aligning manual valve with manual plate.
- d. Pass terminal cord assembly connector through transmission case and install terminal body on transmission case by pushing it.
- e. Install snap ring to terminal cord assembly connector.
- f. Tighten bolts I, X and \bullet .

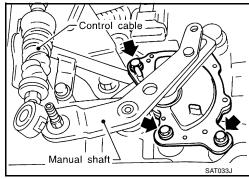
Bolt length, number and location:

Bolt	I	Х	٠
Bolt length " ℓ " $\stackrel{\square}{\longleftarrow}$ mm (in)	40 (1.57)	33 (1.30)	43.5 (1.713)
Number of bolts	5	6	2

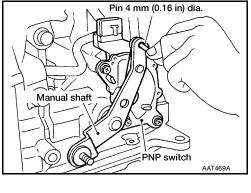
18. Install oil pan.

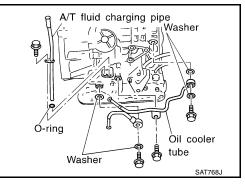
- a. Attach a magnet to oil pan.
- b. Install new oil pan gasket on transmission case.
- c. Install oil pan on transmission case.
 - Always replace oil pan bolts as they are self-sealing bolts.
 - Tighten four bolts in a criss-cross pattern to prevent dislocation of gasket.
- d. Tighten oil pan bolts and drain plug to the specified torque. Refer to <u>AT-650, "OVERHAUL"</u>.
- 19. Install park/neutral position (PNP) switch.
- a. Set manual shaft in P position.
- b. Temporarily install park/neutral position (PNP) switch on manual shaft.
- c. Move selector lever to N position.





- d. Use a 4 mm (0.16 in) pin for this adjustment.
- i. Insert the pin straight into the manual shaft adjustment hole.
- ii. Rotate park/neutral position (PNP) switch until the pin can also be inserted straight into hole in park/neutral position (PNP) switch.
- e. Tighten park/neutral position (PNP) switch fixing bolts. Refer to <u>AT-650, "OVERHAUL"</u>.
- f. Remove pin from adjustment hole after adjusting park/neutral position (PNP) switch.
- 20. Install A/T fluid charging pipe and fluid cooler tube to transmission case. Tighten A/T fluid charging pipe and fluid cooler tube bolts to the specified torque. Refer to <u>AT-650, "OVERHAUL"</u>.





- Approximately 1 liter (1-1/8 US qt, 7/8 Imp qt) of fluid is ATF • When reusing old torque converter, add the same amount SAT428DA Torque converter SAT429D
- b. Install torque converter while aligning notches of torque converter with notches of oil pump.

Measure distance "A" to check that torque converter is in proper c. position.

Distance A

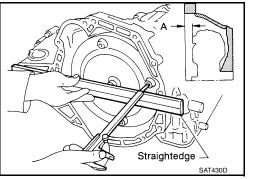
21. Install torque converter.

a. Pour ATF into torque converter.

of fluid as was drained.

required for a new torque converter.

: 14 mm (0.55 in) or more



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В

А

AT

D

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F

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[RE4F04B]

PFP:00030

ECS0067W

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

Engine		QR25DE
Automatic transaxle mod	lel	RE4F04B
Automatic transaxle assembly	Model code number	85X63
	1st	2.785
	2nd	1.545
Transayla goor ratio	3rd	1.000
Transaxle gear ratio	4th	0.694
	Reverse	2.272
Final drive		4.087
Recommended fluid		Nissan Matic "D" (Continental U.S. and Alaska) or Canada Nissan Auto- matic Transmission Fluid*
Fluid capacity ℓ (US q	t, Imp qt)	8.5 (9, 7.5)

*: Refer to MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS" .

Shift Schedule VEHICLE SPEED WHEN SHIFTING GEARS THROTTLE POSITION

ECS0067X

Throttle	Shift pattorn	Vehicle speed km/h (MPH)					
position	position Shift pattern	$D1 \rightarrow D2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D4 \rightarrow D3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$
Full throttle	Comfort	52 - 60 (32 - 37)	97 - 105 (60 - 66)	153 - 161 (95 - 100)	149 - 157 (93 - 98)	87 - 95 (41 - 54)	41 - 49 (25 - 30)
i un unottie	Auto power	52 - 60 (32 - 37)	97 - 105 (60 - 66)	153 - 161 (95 - 100)	149 - 157 (93 - 98)	87 - 95 (41 - 54)	41 - 49 (25 - 30)
Half throttle	Comfort	37 - 45 (23 - 28)	67 - 75 (42 - 47)	119 - 127 (74 - 79)	90 - 98 (56 - 61)	39 - 47 (24 - 27)	24 - 32 (15 - 20)
	Auto power	39 - 47 (24 - 29)	73 - 81 (45 - 50)	119 - 127 (74 - 79)	90 - 98 (56 - 61)	46 - 54 (26 - 34)	24 - 32 (15 - 20)

VEHICLE SPEED WHEN PERFORMING AND RELEASING LOCK-UP

Unit: km/h (MPH)

ECS0067Y

Selector lever position	D4 (O/D ON) position		D3 (O/D OFF) position	
Shift pattern	Comfort	Auto power	Comfort	Auto power
Lock-up "ON"	62 - 70 (38 - 43)	62 - 70 (38 - 43)	86 - 94 (53 - 58)	86 - 94 (53 - 58)
Lock-up "OFF"	51 - 59 (31 - 36)	51 - 59 (31 - 36)	83 - 91 (52 - 57)	83 - 91 (52 - 57)

NOTE:

• Lock-up vehicle speed indicates the speed in D4 (O/D ON) position.

- Perform lock-up inspection after warming up engine.
- Lock-up vehicle speed may vary depending on the driving conditions and circumstances.

Stall Revolution

Engine	Stall revolution rpm
QR25DE	2,350 - 2,800

AT-750

[RE4F04B]

Line Press	sure					ECS0067Z	A
Engine sp	eed	Line pressure kPa (kg/cm ² , psi)					A
rpm		D, 2 and 1 positions			R position		
Idle		500 (5.1, 73)			778 (7.9, 1	13)	В
Stall		1,223 (12.6, 179)			1,918 (19.6,	278)	
Control Va		AND PLUG RETURN SPRING	GS			ECS00680	
					Item	Unit: mm (in)	
		Parts	Part N	o *	Free length	Outer diameter	D
	23	Pilot valve spring	31742-8		38.98 (1.535)	8.9 (0.350)	
	7	1-2 accumulator valve spring	31742-8		20.5 (0.807)	6.95 (0.274)	E
	28	1-2 accumulator piston spring	31742-8		55.26 (2.176)	19.6 (0.772)	
	33	1st reducing valve spring	31742-8		27.0 (1.063)	7.0 (0.276)	_
Upper body	35	3-2 timing valve spring	31736-0		23.0 (0.906)	6.65 (0.262)	F
	18	Overrun clutch reducing valve spring	31742-8	0L09	37.5 (1.476)	6.9 (0.272)	
	16	Torque converter relief valve spring	31742-8	0L10	31.0 (1.220)	9.0 (0.354)	G
	11	Torque converter clutch control valve	31742-8	0L16	56.98 (2.243)	6.5 (0.256)	
	3	Cooler check valve spring	31742-8	5X01	29.4 (1.157)	6.0 (0.236)	Н
	15	Pressure regulator valve spring	31742-8	0L01	45.0 (1.772)	15.0 (0.591)	
	20	Overrun clutch control valve spring	31762-8	0L00	21.7 (0.854)	7.0 (0.276)	
	24	Accumulator control valve spring	31742-8	0L02	22.0 (0.866)	6.5 (0.256)	
	29	Shift valve A spring	31762-8	0L00	21.7 (0.854)	7.0 (0.276)	
Lower body	32	Shuttle valve spring	31762-4	1X04	51.0 (2.008)	5.65 (0.222)	
	12	Shift valve B spring	31762-8	0L00	21.7 (0.854)	7.0 (0.276)	J
	7	Proceure modifier valve enring	31742-8	0L13	30.5 (1.201)	9.8 (0.386)	
	3	Pressure modifier valve spring	31742-8	0L04	32.0 (1.260)	6.9 (0.272)	K
	—	Oil cooler relief valve spring	31742-8	0L12	17.02 (0.670)	8.0 (0.315)	

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

Accumulator **O-RING**

Unit: mm (in)

ECS00681

Accumulator	Part No.*	Inner diameter (Small)	Part No.*	Inner diameter (Large)
Servo release accumulator	31526-41X03	26.9 (1.059)	31526-41X02	44.2 (1.740)
N-D accumulator	31526-31X08	34.6 (1.362)	31672-21X00	39.4 (1.551)

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

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RETURN SPRING

Unit: mm (in)

[RE4F04B]

Accumulator	Part number*	Free length	Outer diameter
Servo release accumulator	31605-85X00	62.8 (2.473)	21 (0.827)
N-D accumulator	31605-80L03	43.5 (1.713)	28.0 (1.102)

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

Clutch and Brakes REVERSE CLUTCH

ECS00682

Model code number		85X0	85X63		
Number of drive plates		2	2		
Number of driven plates		2			
Drive plate thickness mm (in)	Standard	1.6 (0.	063)		
	Allowable limit	1.4 (0.	055)		
Driven plate thickness mm (in)	Standard	1.8 (0.	070)		
Clearance mm (in)	Standard	0.5 - 0.8 (0.0	20 - 0.031)		
Clearance mm (in)	Allowable limit	1.2 (0.	047)		
	L	Thickness mm (in)	Part number*		
Thickness of retaining plates		6.6 (0.260) 6.8 (0.268) 7.0 (0.276) 7.2 (0.283) 7.4 (0.291) 7.6 (0.299) 7.8 (0.307)	31537-80L00 31537-80L01 31537-80L02 31537-80L03 31537-80L04 31537-80L05 31537-80L05 31537-80L06		

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

HIGH CLUTCH

Model code number		85X	85X63		
Number of drive plates		3	3		
Number of driven plates		7*2 +	1*3		
	Standard	1.6 (0.	063)		
Drive plate thickness mm (in)	Allowable limit	1.4 (0.	055)		
	Other week and	*2	*3		
riven plate thickness mm (in)	Standard	1.4 (0.055)	2.0 (0.079)		
	Standard		71 - 0.087)		
Clearance mm (in)	Allowable limit	2.8 (0.	.110)		
		Thickness mm (in)	Part number*		
		3.2 (0.126)	31537-80L20		
Thickness of retaining plates		3.4 (0.134)	31537-80L21		
		3.6 (0.142)	31537-80L22		
		3.8 (0.150)	31537-80L23		
		4.0 (0.157)	31537-80L24		

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

FORWARD CLUTCH

Model code number		85X63
Number of drive plates		5
Number of driven plates		5
Drive plate thickness mm (in)	Standard	1.6 (0.063)
Drive plate trickness min (in)	Allowable limit	1.4 (0.055)

[RE4F04B]

Driven plate thickness mm (in) Standard		1.8 (0.071)			
Clearance mm (in) Standard Allowable limit		0.45 - 0.85 (0.0177 - 0.0335)		A	
		1.85 (0.0728)			
	!		Part number*	В	
Thickness of retaining plates		3.2 (0.126)	31537-80L18		
		3.4 (0.134)	31537-80L17	AT	
		3.6 (0.142)	31537-80L12		
		3.8 (0.150)	31537-80L13		
		4.0 (0.157)	31537-80L14		
		4.2 (0.165)	31537-80L15		
		4.4 (0.173)	31537-80L16	D	

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

OVERRUN CLUTCH

Model code number		85X63		
Number of drive plates		3		
Number of driven plates		5		
Standard		1.6 (0.063)		
Drive plate thickness mm (in)	Allowable limit	1.4 (0.055)		
Driven plate thickness mm (in)	Standard	1.8 (0.071)		
Standard		0.7 - 1.1 (0.028 - 0.043)		
Clearance mm (in)	Allowable limit	1.7 (0.067)		
Thickness of retaining plates		Thickness mm (in)	Part number*	
		3.0 (0.118) 3.2 (0.126)	31537-80L07 31537-80L08	
		3.4 (0.134) 3.6 (0.142) 3.8 (0.150)	31537-80L09 31537-80L10 31537-80L11	

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

LOW & REVERSE BRAKE

Model code number		85X63		
Number of drive plates		6		
Number of driven plates		6		
Drive plate this/mass. mm (in)	Standard	1.8 (0.071)		
Drive plate thickness mm (in)	Allowable limit	1.6 (0.063)		
Driven plate thickness mm (in)	Standard	1.8 (0.071)		
Clearance mm (in)	Standard	1.7 - 2.1 (0.067 - 0.083)		
	Allowable limit	3.3 (0.130)		
		Thickness mm (in)	Part number*	
		2.0 (0.079)	31667-80L00	
		2.2 (0.087)	31667-80L01	
		2.4 (0.094)	31667-80L02	
Thickness of retaining plates		2.6 (0.102)	31667-80L03	
		2.8 (0.110)	31667-80L04	
		3.0 (0.118)	31667-80L05	
		3.2 (0.126)	31667-80L06	
		3.4 (0.134) 31667-80L07		

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

[RE4F04B]

ECS00683

ECS00684

CLUTCH AND BRAKE RETURN SPRINGS

		Unit: mm (in)		
Parts	Part number*	Free length	Outer diameter	
Forward clutch (Overrun clutch) (22 pcs)	31505-80L00	21.4 (0.843)	10.3 (0.406)	
High clutch (10 pcs)	31505-80L02	22.5 (0.886)	10.8 (0.425)	
Low & reverse brake (24 pcs)	31505-80L01	24.1 (0.949)	6.6 (0.260)	

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

BRAKE BAND

Anchor end pin tightening torque N-m (kg-m, in-lb)	4.0 - 5.8 (0.4 - 0.6, 36 - 52)		
Number of returning revolutions for anchor end pin	2.5		
Lock nut tightening torque N-m (kg-m, ft-lb)	31 - 36 (3.2 - 3.7, 23 - 27)		

Final Drive DIFFERENTIAL SIDE GEAR CLEARANCE

Clearance between side gear and differential case with	0.1 - 0.2 (0.004 - 0.008)
washer mm (in)	0.1 - 0.2 (0.004 - 0.008)

DIFFERENTIAL SIDE GEAR THRUST WASHERS

Thickness mm (in)	Part number*
0.75 (0.0295)	38424-81X00
0.80 (0.0315)	38424-81X01
0.85 (0.0335)	38424-81X02
0.90 (0.0354)	38424-81X03
0.95 (0.0374)	38424-81X04

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

DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS

Thickness mm (in)	Part number*
0.48 (0.0189)	31438-80X00
0.52 (0.0205)	31438-80X01
0.56 (0.0220)	31438-80X02
0.60 (0.0236)	31438-80X03
0.64 (0.0252)	31438-80X04
0.68 (0.0268)	31438-80X05
0.72 (0.0283)	31438-80X06
0.76 (0.0299)	31438-80X07
0.80 (0.0315)	31438-80X08
0.84 (0.0331)	31438-80X09
0.88 (0.0346)	31438-80X10
0.92 (0.0362)	31438-80X11

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

BEARING PRELOAD

Differential side bearing preload mm (in) 0.05 - 0.09 (0.0020 - 0.0035)	
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TURNING TORQUE

Turning torque of final drive assembly N-m (kg-cm, in-lb)

0.78 - 1.37 (8.0 - 14.0, 6.9 - 12.2)

Planetary Carrier and Oil Pump PLANETARY CARRIER

Clearance between planetary carrier	Standard	0.20 - 0.70 (0.0079 - 0.0276)
and pinion washer mm (in)	Allowable limit	0.80 (0.0315)

[RE4F04B]

13

14

15

5.24 (0.2063)

5.26 (0.2071)

5.28 (0.2079)

	P						
Oil pump side clearance mm (in)			0.030 - 0.050 (0.0012 - 0.0020)				
			Inner gear				
			Thick	ness mm (in)	Part number*		
			11.99 - 12.	0 (0.4720 - 0.4724)	31346-80L00		
					99 (0.4717 - 0.4720) 98 (0.4713 - 0.4717)	31346-80L01	
Thickness c	of inner gears and ou	uter gea	ars	11.97 - 11.8	Outer ge	31346-80L02	
-			Thick	ness mm (in)	Part number*		
				-	0 (0.4720 - 0.4724)	31347-80L00	
					99 (0.4717 - 0.4720)	31347-80L01	
				11.97 - 11.9	98 (0.4713 - 0.4717)	31347-80L02	
	between oil pump	Stand	dard		0.111 - 0.181 (0.00	044 - 0.0071)	
(in)	d outer gear mm	Allow	vable limit		0.181 (0.0	071)	
Oil pump co	over seal ring	Stand	dard		0.1 - 0.25 (0.0039 - 0.0098)		
clearance	mm (in)	Allow	vable limit		0.25 (0.00	098)	
: Always che	eck with the Parts De	epartme	ent for the latest parts info	rmation.			
nput Sł						ECS00685	
SÉAL RIN	NG CLEARAN	CE					
Input shaft s	seal ring clearance	mm	Standard	0.08 - 0.23 (0.0031 - 0.0091)			
(in)			Allowable limit	0.23 (0.0091)			
SEAL RIN	NG						
Outer d	diameter mm (in) Inner diameter mm (in)		Wi	dth mm (in)	Part number*		
2	26 (1.024)		22.4 (0.882)	1.971 (0.078)		31525-80X02	
: Always che	eck with the Parts De	epartme	ent for the latest parts info	rmation.			
Reducti	on Pinion G	ear				ECS00686	
FURNING	TORQUE						
Turning torque of reduction pinion gear N-m (kg-cm, in-lb)			0.05 - 0.39 (0.5 - 4.	0, 0.43 - 3.47)			
REDUCT	ION PINION G	EAR	BEARING ADJUS	TING SHIN	IS		
NO.	Thickness mm	ו (in)	Part number	NO.	Thickness mm (in) Part number*	
1	5.00 (0.1969	9)	31439-81X00	18	5.34 (0.2102)	31439-81X17	
2	5.02 (0.1976	5)	31439-81X01	19	5.36 (0.2110)	31439-81X18	
3	5.04 (0.1984	- 	31439-81X02	20	5.38 (0.2118)	31439-81X19	
4	5.06 (0.1992	2)	31439-81X03	21	5.40 (0.2126)	31439-81X20	
5	5.08 (0.2000)		31439-81X04	22	5.42 (0.2134)	31439-81X21	
6	5.10 (0.2008)		31439-81X05	23	5.44 (0.2142)	31439-81X22	
7	5.12 (0.2016)		31439-81X06	24	5.46 (0.2150)	31439-81X23	
8	5.14 (0.2024)		31439-81X07	25	5.48 (0.2157)	31439-81X24	
9	5.16 (0.2031)	31439-81X08	26	5.50 (0.2165)	31439-81X46	
10	5.18 (0.2039	9)	31439-81X09	27	5.52 (0.2173)	31439-81X47	
11	5.20 (0.2047	-	31439-81X10	28	5.54 (0.2181)	31439-81X48	
12	5.22 (0.2055	5)	31439-81X11	29	5.56 (0.2189)	31439-81X49	

30

31

32

5.58 (0.2197)

5.60 (0.2205)

5.62 (0.2213)

31439-81X60

31439-81X61

31439-81X62

31439-81X12

31439-81X13

31439-81X14

[RE4F04B]

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
16	5.30 (0.2087)	31439-81X15	33	5.64 (0.2220)	31439-81X63
17	5.32 (0.2094)	31439-81X16	34	5.66 (0.2228)	31439-81X64
35	5.68 (0.2236)	31439-81X65	50	4.70 (0.1850)	31439-83X10
36	5.70 (0.2244)	31439-81X66	51	4.72 (0.1858)	31439-83X11
37	5.72 (0.2252)	31439-81X67	52	4.74 (0.1866)	31439-83X12
38	5.74 (0.2260)	31439-81X68	53	4.76 (0.1874)	31439-83X13
39	5.76 (0.2268)	31439-81X69	54	4.78 (0.1882)	31439-83X14
40	5.78 (0.2276)	31439-81X70	55	4.80 (0.1890)	31439-83X15
41	5.80 (0.2283)	31439-81X71	56	4.82 (0.1898)	31439-83X16
42	5.82 (0.2291)	31439-81X72	57	4.84 (0.1906)	31439-83X17
43	5.84 (0.2299)	31439-81X73	58	4.86 (0.1913)	31439-83X18
44	5.86 (0.2307)	31439-81X74	59	4.88 (0.1921)	31439-83X19
45	4.60 (0.1811)	31439-85X05	60	4.90 (0.1929)	31439-83X20
46	4.62 (0.1819)	31439-85X06	61	4.92 (0.1937)	31439-83X21
47	4.64 (0.1827)	31439-85X07	62	4.94 (0.1945)	31439-83X22
48	4.66 (0.1835)	31439-85X08	63	4.96 (0.1953)	31439-83X23
49	4.68 (0.1843)	31439-85X09	64	4.98 (0.1961)	31439-83X24

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

Band Servo RETURN SPRING

Part number* Return spring Free length Outer diameter 2nd servo return spring 31605-80L05 32.5 (1.280) 25.9 (1.020) OD servo return spring 31605-80L06 62.6 (2.465) 21.7 (0.854)

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

Output Shaft SEAL RING CLEARANCE

0.10 - 0.25 (0.0039 - 0.0098) Standard Output shaft seal ring clearance mm (in) Allowable limit 0.25 (0.0098)

SEAL RING

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
33.71 (1.327)	30.25 (1.191)	1.95 (0.077)	31525-80809

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

END PLAY

Output shaft end play mm (in)	0 - 0.15 (0 - 0.0059)
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ECS00687

Unit: mm (in)

ECS00688

OUTPUT SHAFT ADJUSTING SHIMS

Bearing Retainer

Bearing retainer seal ring

clearance mm (in)

Total End Play

Total end play mm (in)

SEAL RING CLEARANCE

0.80 (0.0315)

0.84 (0.0331)

0.88 (0.0346)

0.92 (0.0362)

0.96 (0.0378)

1.00 (0.0394)

1.04 (0.0409)

1.08 (0.0425)

1.12 (0.0441)

1.16 (0.0457)

1.20 (0.0472)

Thickness mm (in) Part number* 31438-80X60 31438-80X61 В 31438-80X62 31438-80X63 31438-80X64 31438-80X65 AT 31438-80X66 31438-80X67 31438-80X68 31438-80X69 31438-80X70 *: Always check with the Parts Department for the latest parts information. Ε ECS00689 Standard 0.10 - 0.30 (0.0039 - 0.0118) F Allowable limit 0.30 (0.0118) ECS0068A

0.25 - 0.55 (0.0098 - 0.0217)

BEARING RACE FOR ADJUSTING TOTAL END PLAY

Part number*	Thickness mm (in)
 31435-80X00	0.8 (0.031)
31435-80X01	1.0 (0.039)
31435-80X02	1.2 (0.047)
31435-80X03	1.4 (0.055)
31435-80X04	1.6 (0.063)
31435-80X05	1.8 (0.071)
31435-80X06	2.0 (0.079)
31435-80X09	0.9 (0.035)
31435-80X10	1.1 (0.043)
31435-80X11	1.3 (0.051)
31435-80X12	1.5 (0.059)
31435-80X13	1.7 (0.067)
31435-80X14	1.9 (0.075)

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

Reverse Clutch End Play

	M
Reverse clutch end play mm (in)	0.55 - 0.90 (0.0217 - 0.0354)

THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH DRUM END PLAY

Thickness mm (in)	Part number*
0.80 (0.0315)	31508-80X13
0.95 (0.0374)	31508-80X14
1.10 (0.0433)	31508-80X15
1.25 (0.0492)	31508-80X16
1.40 (0.0551)	31508-80X17
1.55 (0.0610)	31508-80X18
1.70 (0.0669)	31508-80X19
1.85 (0.0728)	31508-80X20

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

Removal and Installation

Distance between end of converter housing and torque converter

Unit: mm (in)

14 (0.55)

AT-757

[RE4F04B]

А

1.1

ECS0068B

ECS0068C

Shift Solenoid Valves

ECS0068D	

[RE4F04B]

Gear position	1	2	3	4	
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)	
Solenoid Valves				ECS0068	
Solenoid valve	s	Resistance (Approx.)	Ω	Terminal No.	
Shift solenoid valve A		20 - 30	20 - 30 2		
Shift solenoid valve B		5 - 20	5 - 20 1		
Overrun clutch solenoid valve		20 - 30	20 - 30 3		
Line pressure solenoid valve		2.5 - 5		4	
Torque converter clutch solenoi	d valve	5 - 20		5	
A/T Fluid Temperat				ECS0068	
Monitor item	Condition		Specification (Approxim		
	Cold [20°C (68	B°F)] 1	.5V	2.5 kΩ	
A/T fluid temperature sensor	↓ Hot [80°C (176	6°F)] 0	↓ .5V	↓ 0.3 kΩ	
Revolution Sensor				ECS00680	
	Condition			Judgement standard	
When moving at 20 km/h (12 M tion.*1	PH), use the CONSULT	T-II pulse frequency measuri	ng func-		
CAUTION: Connect the diagnosis data li *1: A circuit tester cannot be us		e diagnosis connector.		450 Hz (Approx.)	
When vehicle is parked.				0V	
Dropping Resistor				ECS0068.	
Resistance			Approx. 1	2Ω	
Turbine Revolution	Sensor			ECS006	
	Condition			Judgement standard	
When moving at 20 km/h (12 M tion.*1	PH), use the CONSULT	T-II pulse frequency measuri	ng func-		
CAUTION: Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.				240 Hz (Approx.)	
When vehicle is parked.			1		