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SECTION **AT**

AUTOMATIC TRANSAXLE

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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

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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.

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

ECS005VV

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.

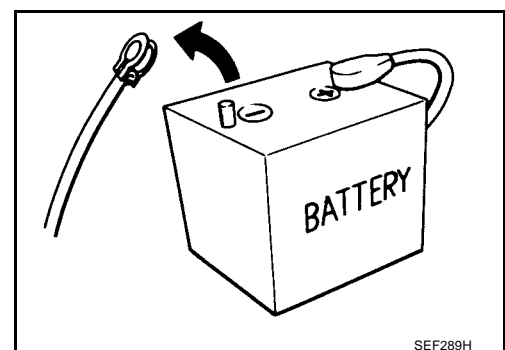
CAUTION:

- 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 and ECM before returning the vehicle to the customer.

Precautions

ECS005VX

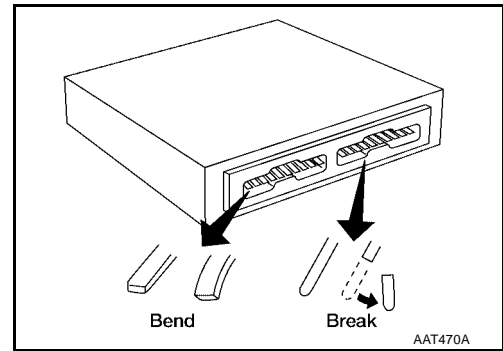
- Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the TCM. Because battery voltage is applied to TCM even if ignition switch is turned off.



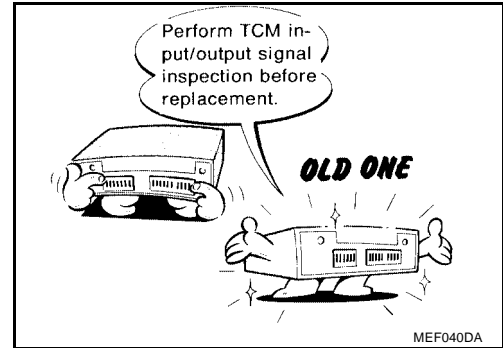
PRECAUTIONS

[RE4F03B]

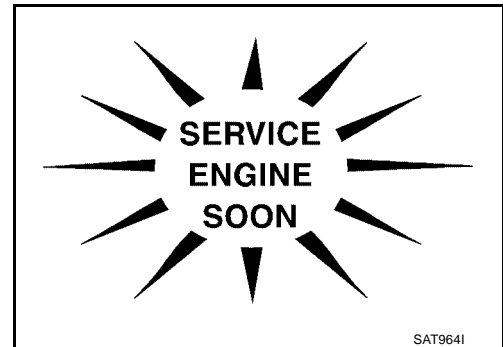
- When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).
Make sure that there are not any bends or breaks on TCM pin terminal, when connecting pin connectors.



- Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. See page [AT-110](#) .



- After performing each TROUBLE DIAGNOSIS, perform "DTC (Diagnostic Trouble Code) CONFIRMATION PROCEDURE".
The DTC should not be displayed in the "DTC CONFIRMATION 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 [AT-11, "ATF COOLER SERVICE"](#) .
- 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"](#) .

Service Notice or Precautions**FAIL-SAFE**

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. [For "TCM Self-diagnostic Procedure (No Tools)", refer to [AT-52, "TCM Self-diagnostic Procedure \(No Tools\)"](#) .]

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 [AT-61, "Work Flow"](#) .

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 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.
- 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

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 [CO-13, "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 [AT-55, "Judgement of Self-diagnosis Code"](#) 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 [AT-40](#) 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

PRECAUTIONS

[RE4F03B]

*: For details of OBD-II, refer to [EC-58, "ON BOARD DIAGNOSTIC \(OBD\) SYSTEM"](#) [QG18DE (ULEV)] or [EC-639, "ON BOARD DIAGNOSTIC \(OBD\) SYSTEM"](#) [QG18DE (SULEV)].

- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to [PG-47, "HARNES CONNECTOR \(SLIDE-LOCKING TYPE\)"](#) .

Wiring Diagrams and Trouble Diagnosis

ECS005VZ

When you read wiring diagrams, refer to the following:

- [GI-13, "How to Read Wiring Diagrams"](#).
- [PG-2, "POWER SUPPLY ROUTING"](#).

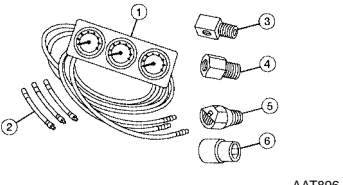
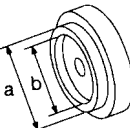
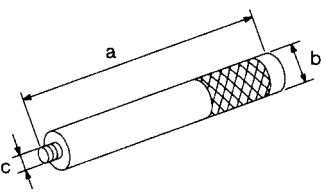
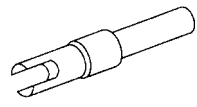
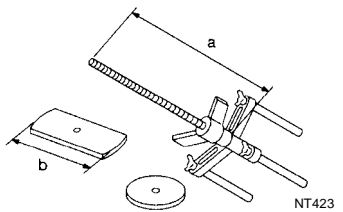
When you perform trouble diagnosis, refer to the following:

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

PREPARATION

Special Service Tools

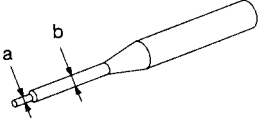


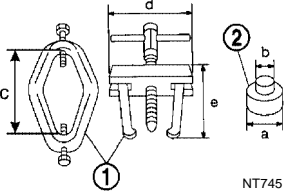
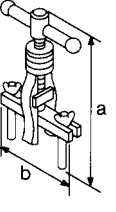
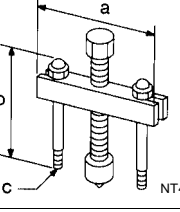
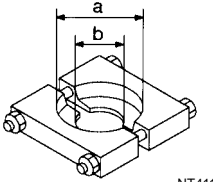
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
(J34301-C) Oil pressure gauge set 1 (J34301-1) Oil pressure gauge 2 (J34301-2) Hoses 3 (J34298) Adapter 4 (J34282) Adapter 5 (790-301-1230-A) 60° Adapter 6 (J34301-15) Square socket	 AAT896 Measuring line pressure
KV31103000 (J38982) Drift	 NT105 Installing differential oil seal (Use with ST35325000.) a: 59 mm (2.32 in) dia. b: 49 mm (1.93 in) dia.
ST35325000 (—) Drift	 NT417 Installing differential oil seal (Use with KV31103000.) a: 215 mm (8.46 in) b: 25 mm (0.98 in) dia. c: M12 x 1.5P
KV38107700 (J39027) Preload adapter	 NT087 <ul style="list-style-type: none"> ● Measuring turning torque of final drive assembly ● Measuring clearance between side gear and differential case with washer ● Selecting differential side bearing adjusting shim
KV31103200 (J34285-A and J34285-87) Clutch spring compressor	 NT423 Removing and installing clutch return spring a: 320 mm (12.60 in) b: 174 mm (6.85 in)

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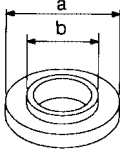
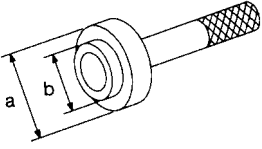
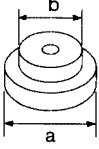
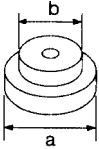
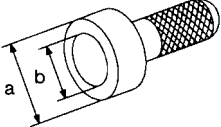
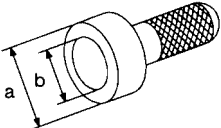
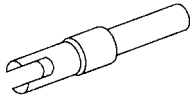
PREPARATION

[RE4F03B]

Tool number (Kent-Moore No.) Tool name	Description
ST23540000 (J25689-A) Pin punch <div style="text-align: center;">  <p style="text-align: right;">NT442</p> </div>	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.
KV32101000 (J25689-A) Pin punch <div style="text-align: center;">  <p style="text-align: right;">NT410</p> </div>	Installing throttle lever and manual shaft retaining pins a: 4 mm (0.16 in) dia.
ST25710000 (—) Pin punch <div style="text-align: center;">  <p style="text-align: right;">NT410</p> </div>	Aligning groove of manual shaft and hole of transmission case a: 2 mm (0.08 in) dia.
ST3306S001 (J22888-D) Differential side bearing puller set 1 ST33051001 (J22888-D) Puller 2 ST33061000 (J8107-2) Adapter <div style="text-align: center;">  <p style="text-align: right;">NT745</p> </div>	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 <div style="text-align: center;">  <p style="text-align: right;">NT414</p> </div>	<ul style="list-style-type: none"> ● 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 <div style="text-align: center;">  <p style="text-align: right;">NT424</p> </div>	<ul style="list-style-type: none"> ● Removing idler gear a: 100 mm (3.94 in) b: 110 mm (4.33 in) c: M8 x 1.25P
ST30031000 (J22912-O1) Puller <div style="text-align: center;">  <p style="text-align: right;">NT411</p> </div>	Removing reduction gear bearing inner race a: 90 mm (3.54 in) dia. b: 50 mm (1.97 in) dia.

PREPARATION

[RE4F03B]

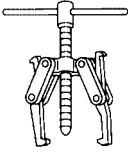
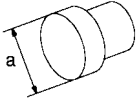
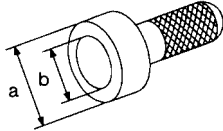
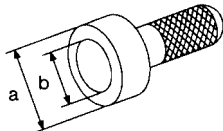
Tool number (Kent-Moore No.) Tool name	Description	
ST35272000 (J26092) Drift <div data-bbox="618 268 737 422" style="text-align: center;">  </div> <div data-bbox="850 457 894 474" style="text-align: right;"> <small>NT426</small> </div>	<ul style="list-style-type: none"> ● Installing reduction gear bearing inner race ● Installing idler gear bearing inner race <p>a: 72 mm (2.83 in) dia. b: 35.5 mm (1.398 in) dia.</p>	A B AT
ST37830000 (—) Drift <div data-bbox="610 506 870 653" style="text-align: center;">  </div> <div data-bbox="850 688 894 705" style="text-align: right;"> <small>NT427</small> </div>	Installing idler gear bearing outer race a: 62 mm (2.44 in) dia. b: 39 mm (1.54 in) dia.	D E
ST35321000 (—) Drift <div data-bbox="727 768 824 915" style="text-align: center;">  </div> <div data-bbox="850 926 894 942" style="text-align: right;"> <small>NT073</small> </div>	Installing output shaft bearing a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia.	F G
ST30633000 (—) Drift <div data-bbox="727 999 824 1146" style="text-align: center;">  </div> <div data-bbox="850 1161 894 1178" style="text-align: right;"> <small>NT073</small> </div>	Installing differential side bearing outer race a: 67 mm (2.64 in) dia. b: 49 mm (1.93 in) dia.	H I
ST35271000 (J26091) Drift <div data-bbox="667 1241 886 1367" style="text-align: center;">  </div> <div data-bbox="850 1392 894 1409" style="text-align: right;"> <small>NT115</small> </div>	<ul style="list-style-type: none"> ● Installing idler gear <p>a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia.</p>	J K L
ST33400001 (J26082) Drift <div data-bbox="667 1472 886 1598" style="text-align: center;">  </div> <div data-bbox="850 1623 894 1640" style="text-align: right;"> <small>NT115</small> </div>	<ul style="list-style-type: none"> ● Installing oil pump housing oil seal <p>a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.</p>	M
KV38105710 (—) <div data-bbox="678 1724 870 1818" style="text-align: center;">  </div> <div data-bbox="850 1854 894 1871" style="text-align: right;"> <small>NT087</small> </div>	<ul style="list-style-type: none"> ● Measuring clearance between side gear and differential case 	

PREPARATION

[RE4F03B]

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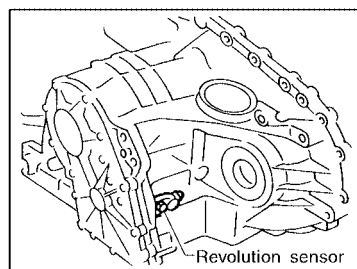
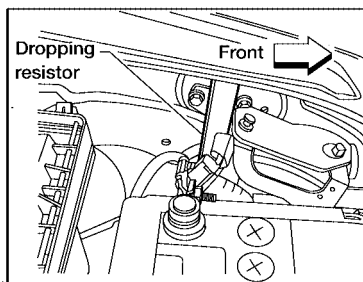
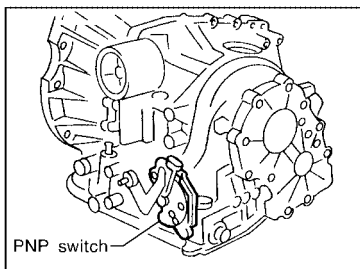
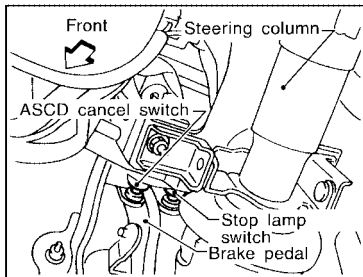
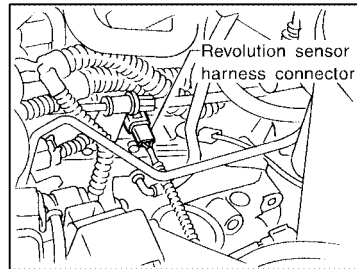
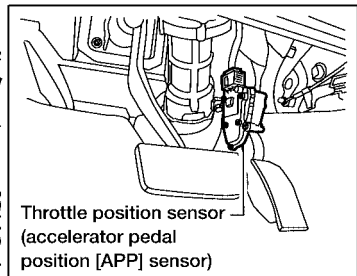
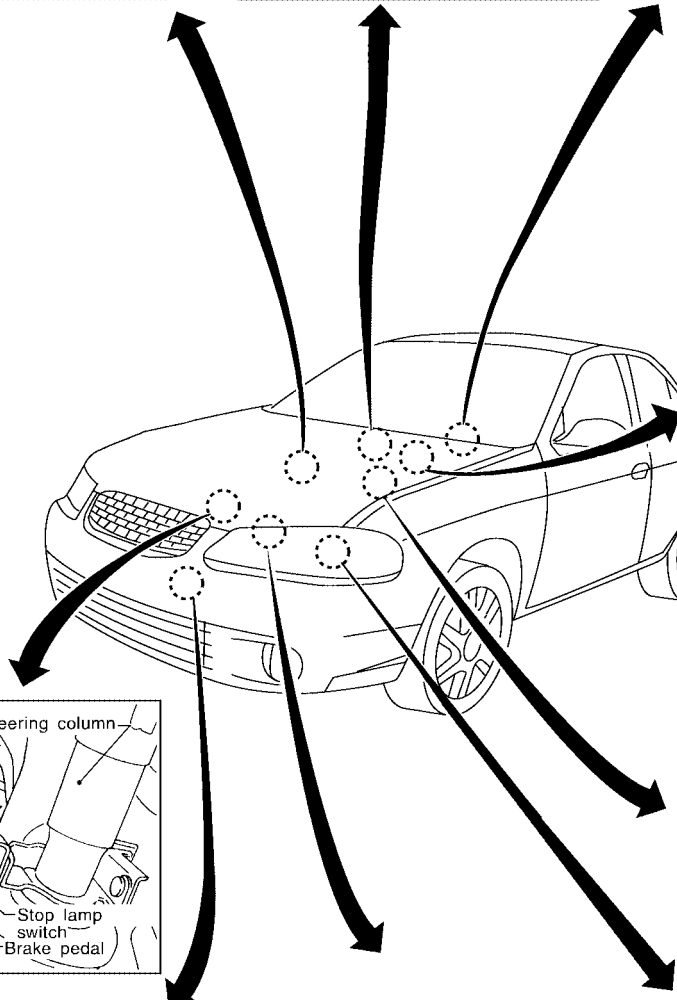
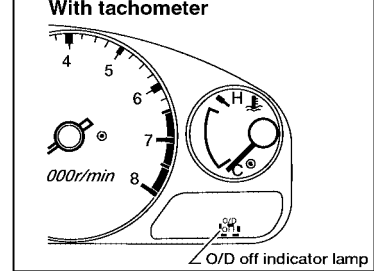
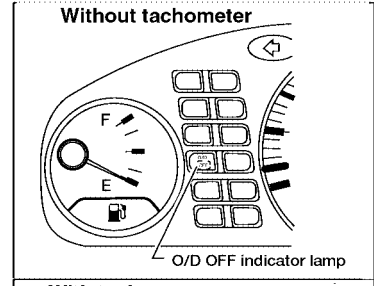
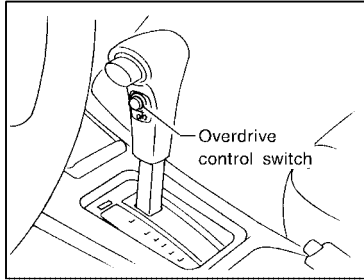
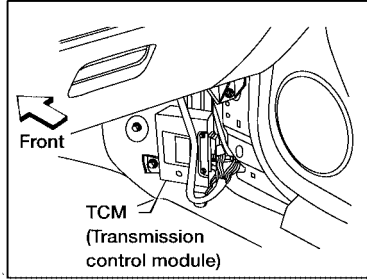
Commercial Service Tools

Tool name	Description
<p>Puller</p>  <p style="text-align: center;">NT077</p>	<ul style="list-style-type: none"> ● Removing idler gear bearing inner race ● Removing and installing band servo piston snap ring
<p>Drift</p>  <p style="text-align: center;">NT109</p>	<p>Removing idler gear bearing inner race a: 34 mm (1.34 in) dia.</p>
<p>Drift</p>  <p style="text-align: center;">NT115</p>	<p>Installing differential left side bearing a: 86 mm (3.39 in) dia. b: 80 mm (3.15 in) dia.</p>
<p>Drift</p>  <p style="text-align: center;">NT115</p>	<p>Installing differential right side bearing a: 46 mm (1.81 in) dia. b: 40 mm (1.57 in) dia.</p>

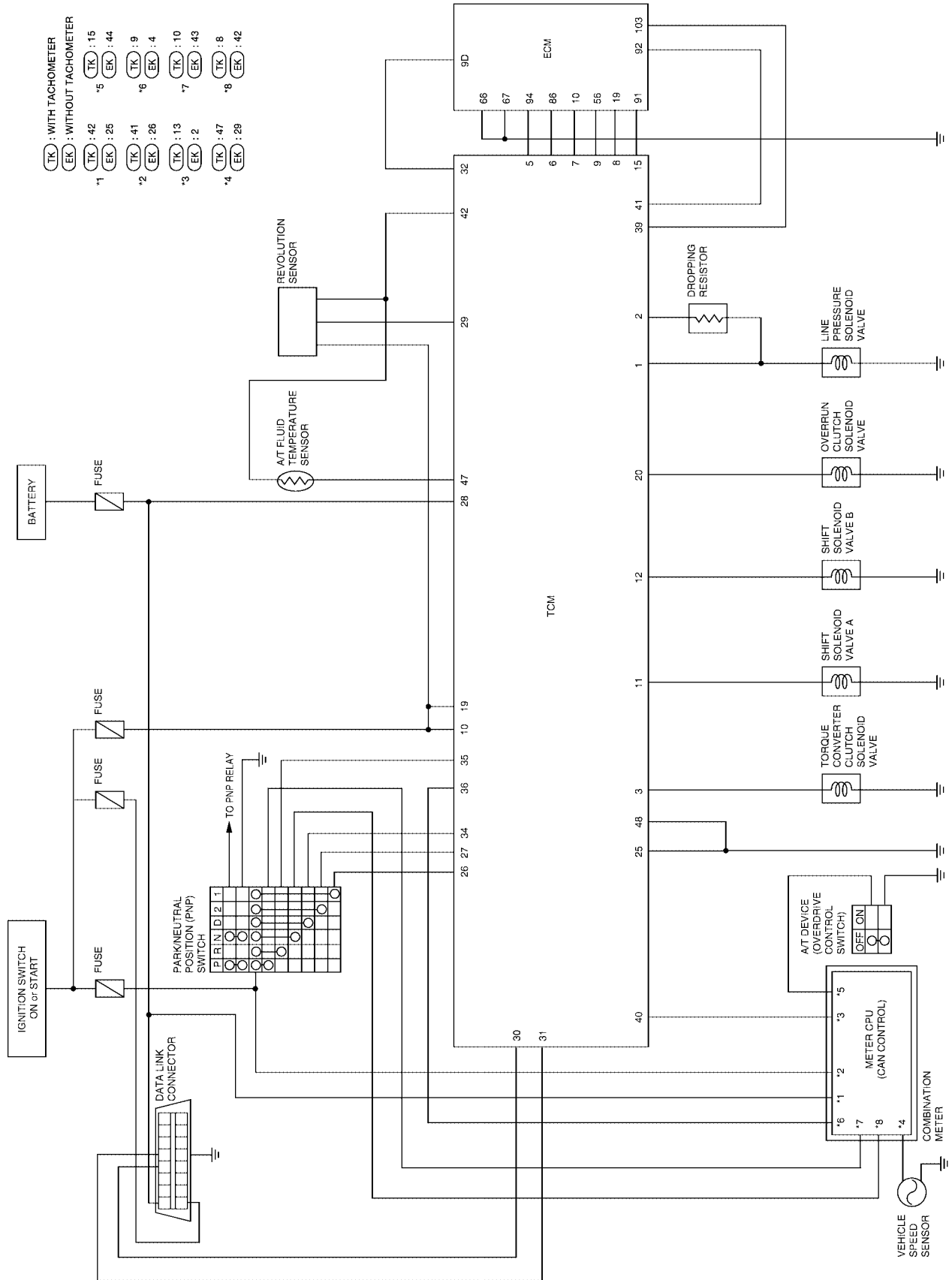
OVERALL SYSTEM

A/T Electrical Parts Location

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Circuit Diagram

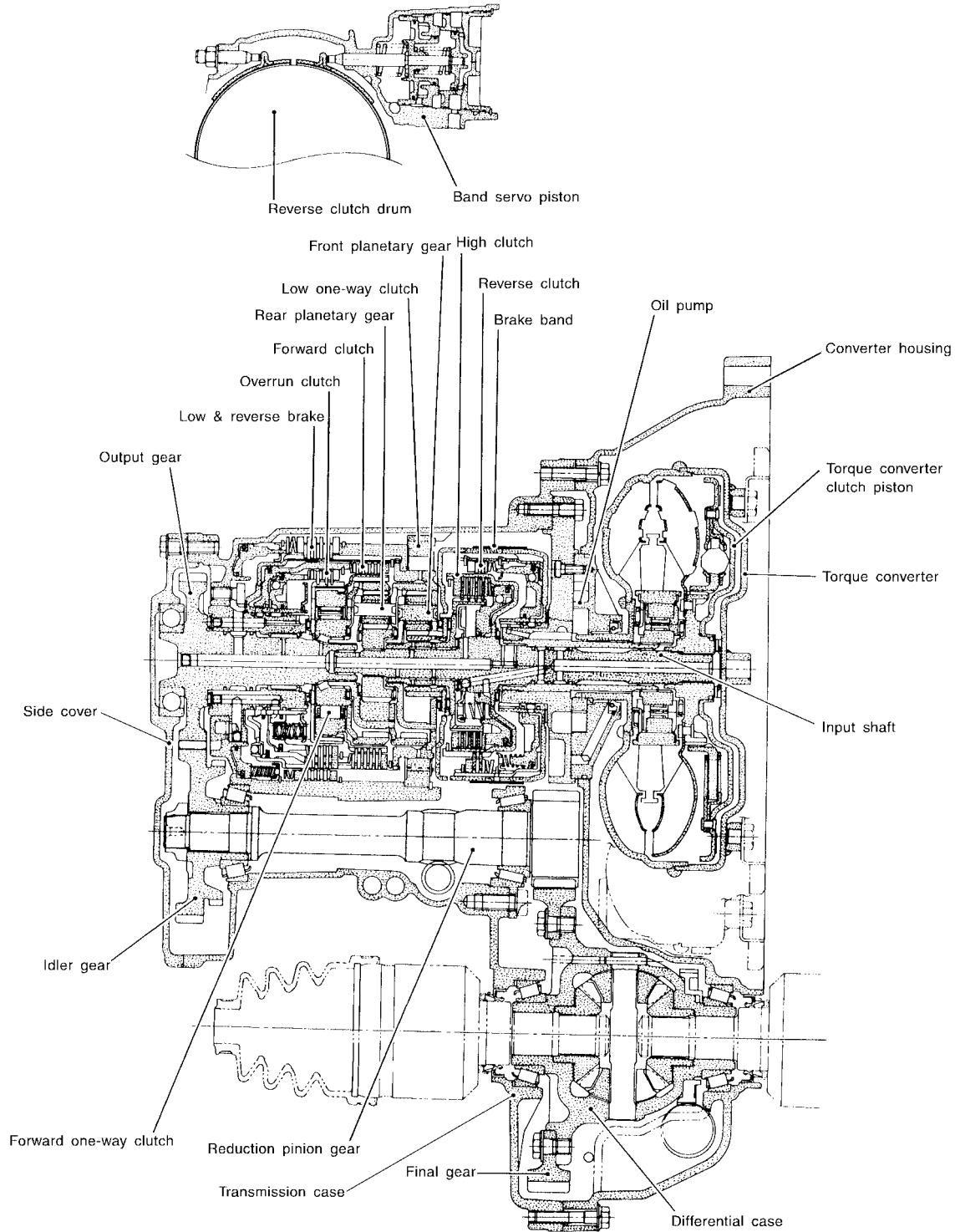


OVERALL SYSTEM

[RE4F03B]

Cross-sectional View

ECS005W4

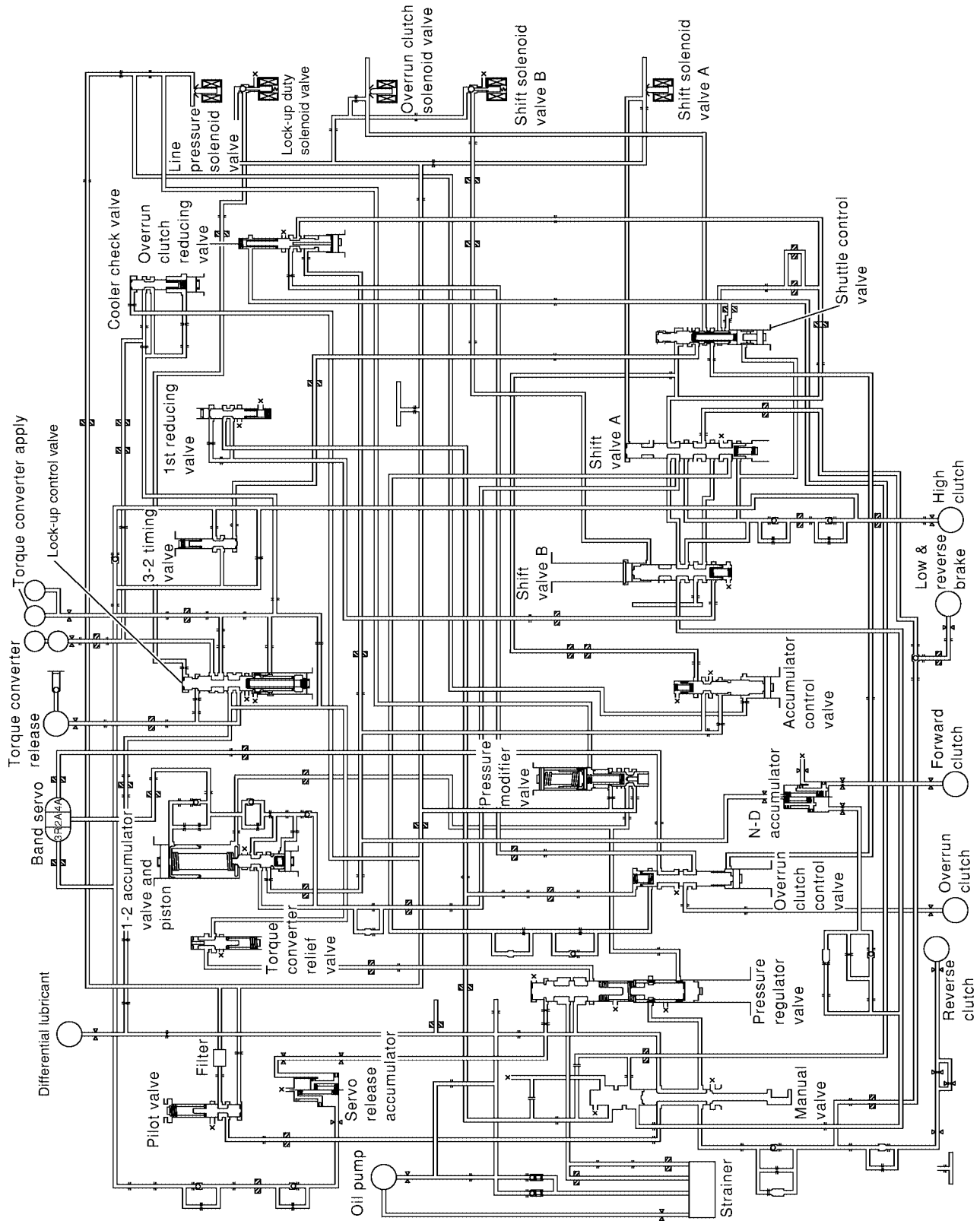


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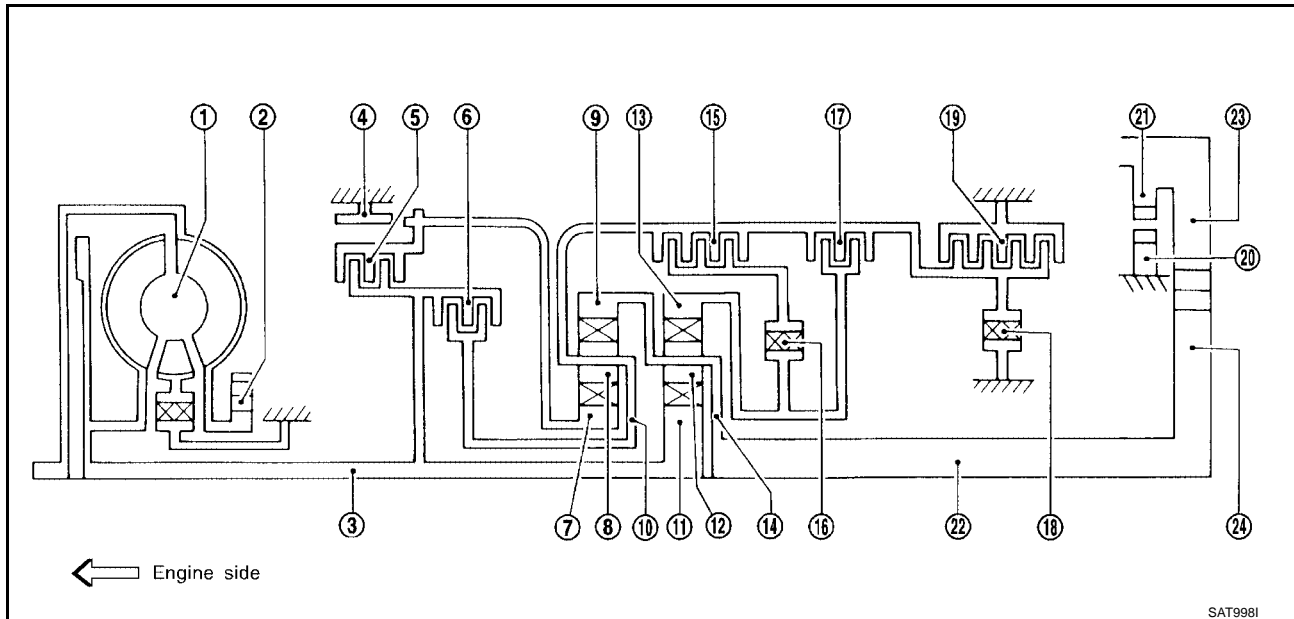
Hydraulic Control Circuit

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WAT408

Shift Mechanism CONSTRUCTION



- | | | |
|-----------------------------|----------------------------|------------------------|
| 1. Torque converter | 2. Oil pump | 3. Input shaft |
| 4. Brake band | 5. Reverse clutch | 6. High clutch |
| 7. Front sun gear | 8. Front pinion gear | 9. Front internal gear |
| 10. Front planetary carrier | 11. Rear sun gear | 12. Rear pinion gear |
| 13. Rear internal gear | 14. Rear planetary carrier | 15. Forward clutch |
| 16. Forward one-way clutch | 17. Overrun clutch | 18. Low one-way clutch |
| 19. Low & reverse brake | 20. Parking pawl | 21. Parking gear |
| 22. Output shaft | 23. Idle gear | 24. Output gear |

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 .

OVERALL SYSTEM

[RE4F03B]

CLUTCH AND BAND CHART

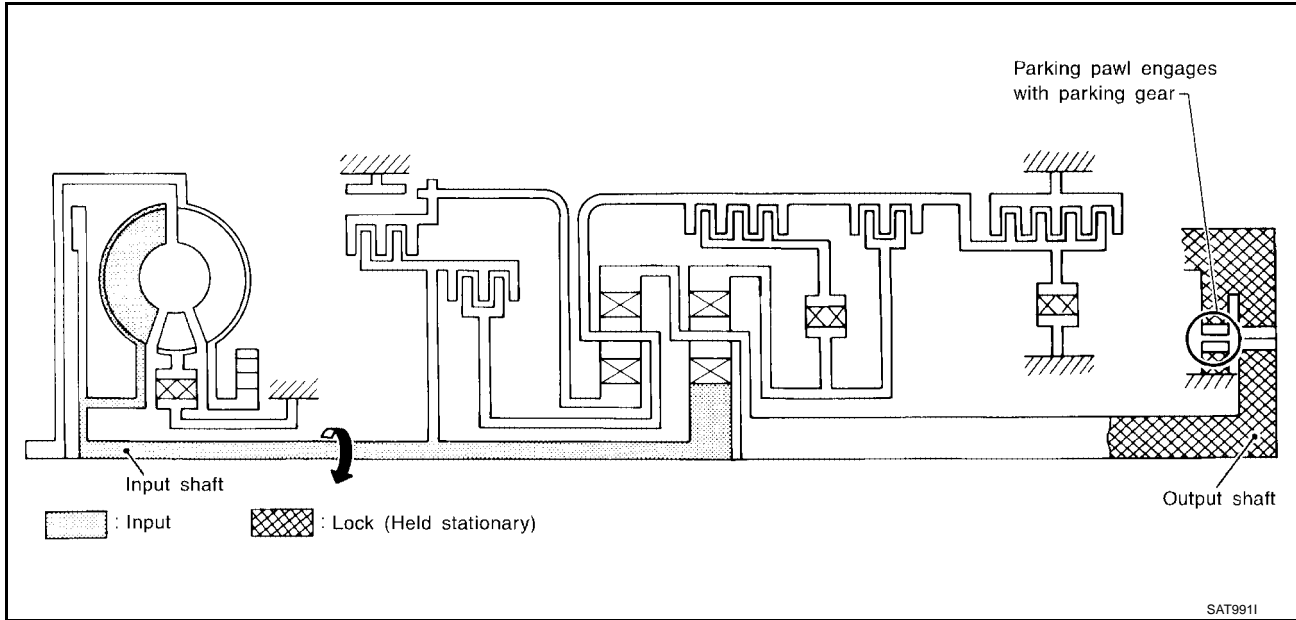
Shift position	Reverse clutch 5	High clutch 6	Forward clutch 15	Over-run clutch 17	Band servo			Forward one-way clutch 16	Low one-way clutch 18	Low & reverse brake 19	Lock-up	Remarks
					2nd apply	3rd release	4th apply					
P												PARK POSITION
R	O									O		REVERSE POSITION
N												NEUTRAL POSITION
D *4	1st		O	*1 D				B	B			Automatic shift 1 ↔ 2 ↔ 3 ↔ 4
	2nd		O	*1 A	O			B				
	3rd		O	O	*1 A	*2 C	C				*1 O	
	4th		O	C		*3 C	C	O			O	
2	1st		O	O	*2 C			B	B			Automatic shift 1 ↔ 2 ↔ 3
	2nd		O	O	O			B				
	3rd		O	O	*2 C			B				
1	1st		O	O				B		O		Locks (held stationary) in 1st speed 1 ← 2 ← 3
	2nd		O	O	O			B				
	3rd		O	O	*2 C			B				

- *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

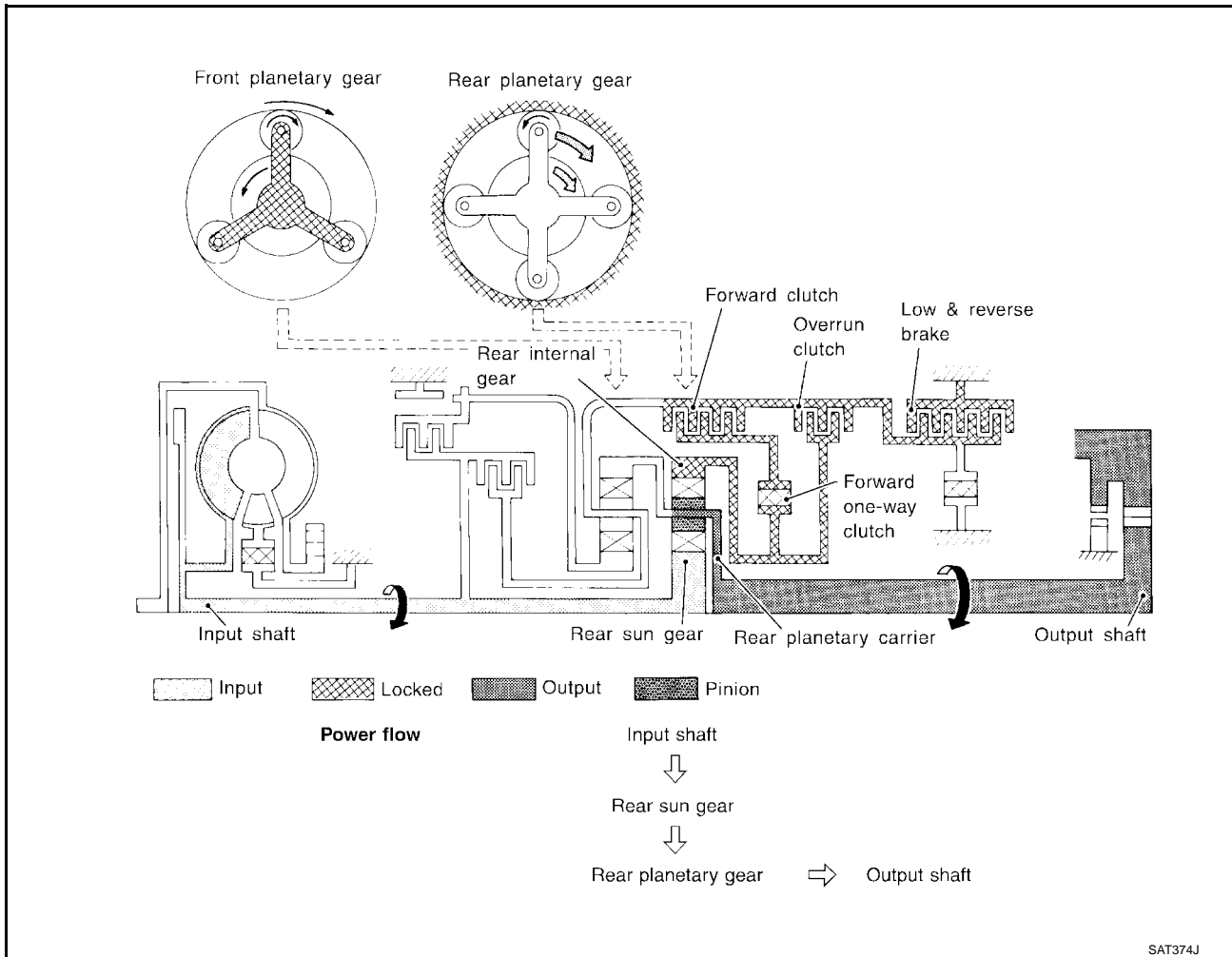
“N” and “P” Positions

- “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.



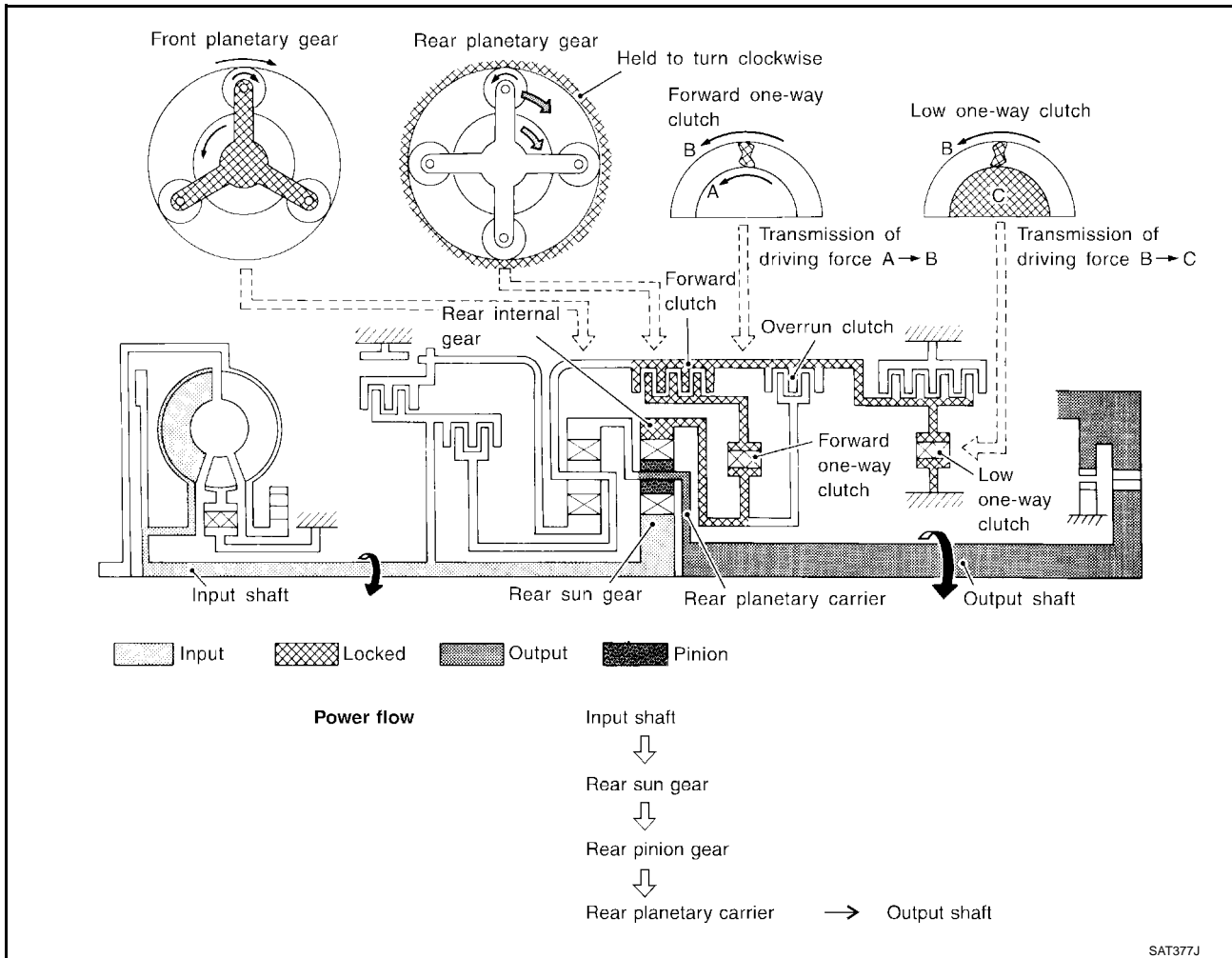
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"11" Position



<ul style="list-style-type: none"> ● Forward clutch ● Forward one-way clutch ● Overrun clutch ● Low and reverse brake 	<p>As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake. This is different from that of D1 and 21.</p>
<p>Engine brake</p>	<p>Overrun clutch always engages, therefore engine brake can be obtained when decelerating.</p>

“D1 ” and “21 ” Positions



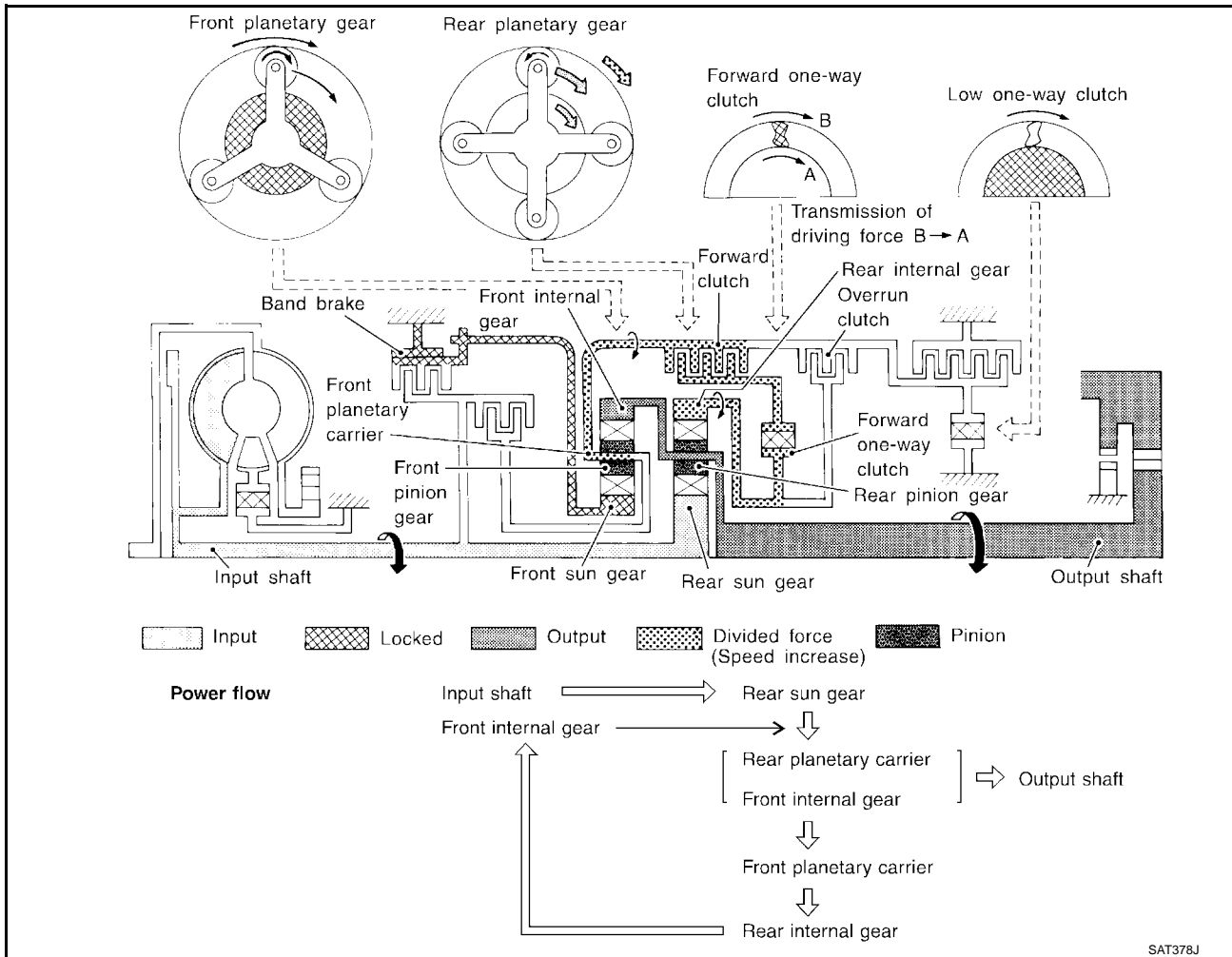
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<ul style="list-style-type: none"> ● Forward one-way clutch ● Forward clutch ● Low one-way clutch 	<p>Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches.</p>
<p>Overrun clutch engagement conditions (Engine brake)</p>	<p>D1 : Overdrive control switch “OFF” and throttle opening is less than 3/16 21 : Always engaged At D1 and 21 positions, engine brake is not activated due to free turning of low one-way clutch.</p>

OVERALL SYSTEM

[RE4F03B]

“D2”, “22” and “12” Positions

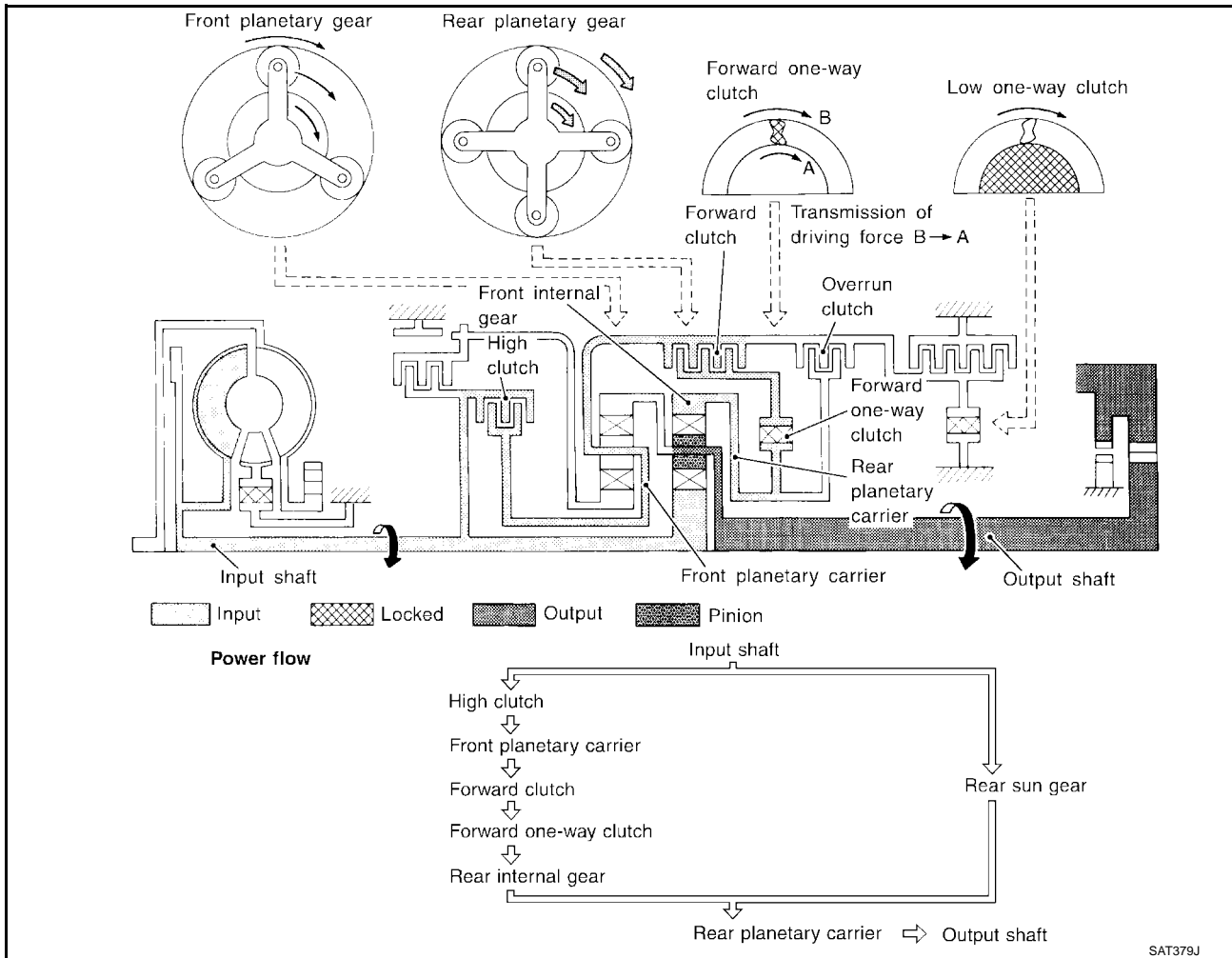


<ul style="list-style-type: none"> ● Forward clutch ● Forward one-way clutch ● Brake band 	<p>Rear sun gear drives rear planetary carrier and combined front internal gear. Front internal gear now rotates around front sun gear accompanying front planetary carrier.</p> <p>As front planetary carrier transfers the power to rear internal gear through forward clutch and forward one-way clutch, this rotation of rear internal gear increases the speed of rear planetary carrier compared with that of the 1st speed.</p>
<p>Overrun clutch engagement conditions</p>	<p>D2 : Overdrive control switch “OFF” and throttle opening is less than 3/16</p> <p>22 and 12 : Always engaged</p>

OVERALL SYSTEM

[RE4F03B]

“D3 ” “23 ” and “13 ” Positions

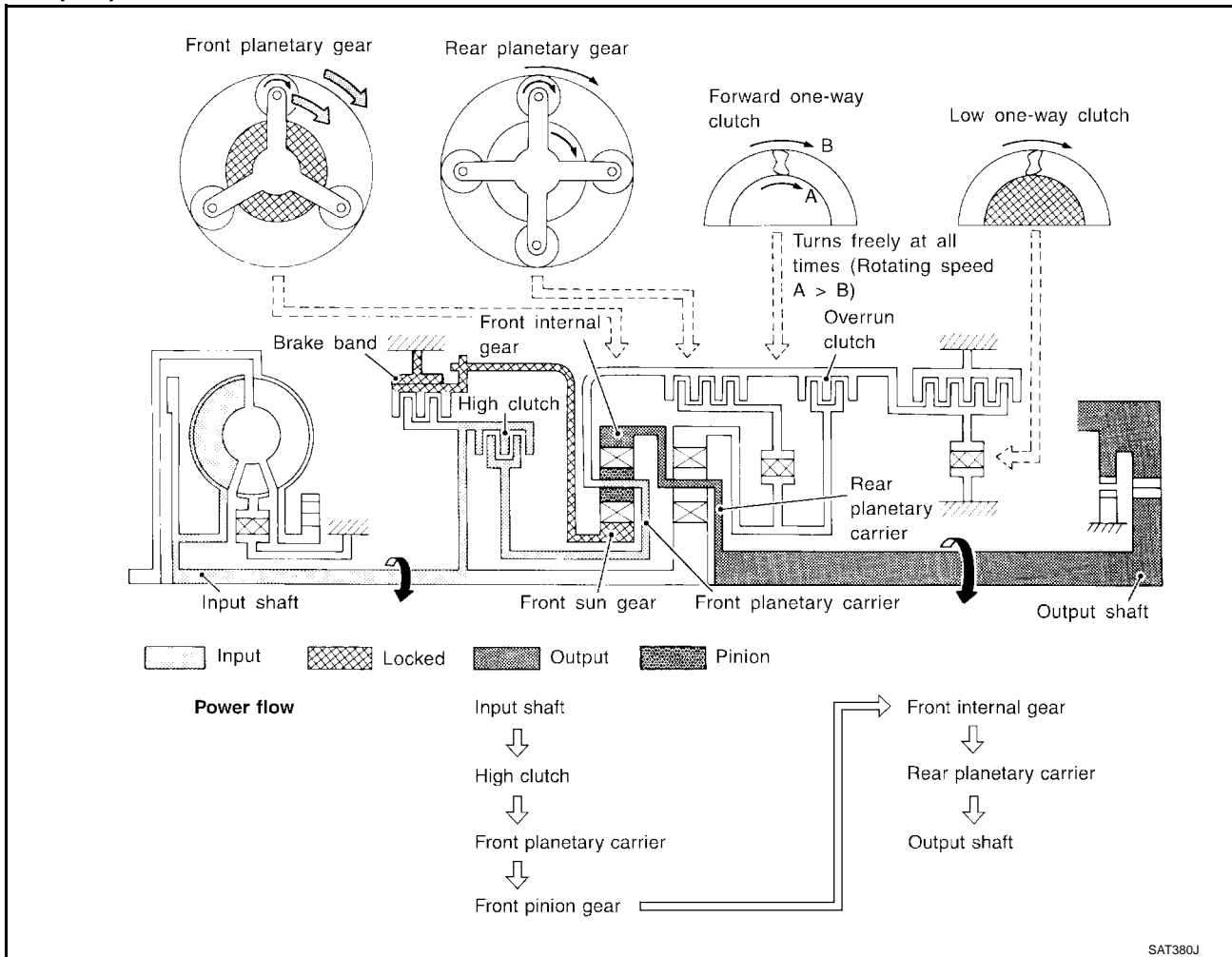


<ul style="list-style-type: none"> ● High clutch ● Forward clutch ● Forward one-way clutch 	<p>Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch. This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.</p>
<p>Overrun clutch engagement conditions</p>	<p>D3 : Overdrive control switch “OFF” and throttle opening is less than 3/16 23 and 13 : Always engaged</p>

OVERALL SYSTEM

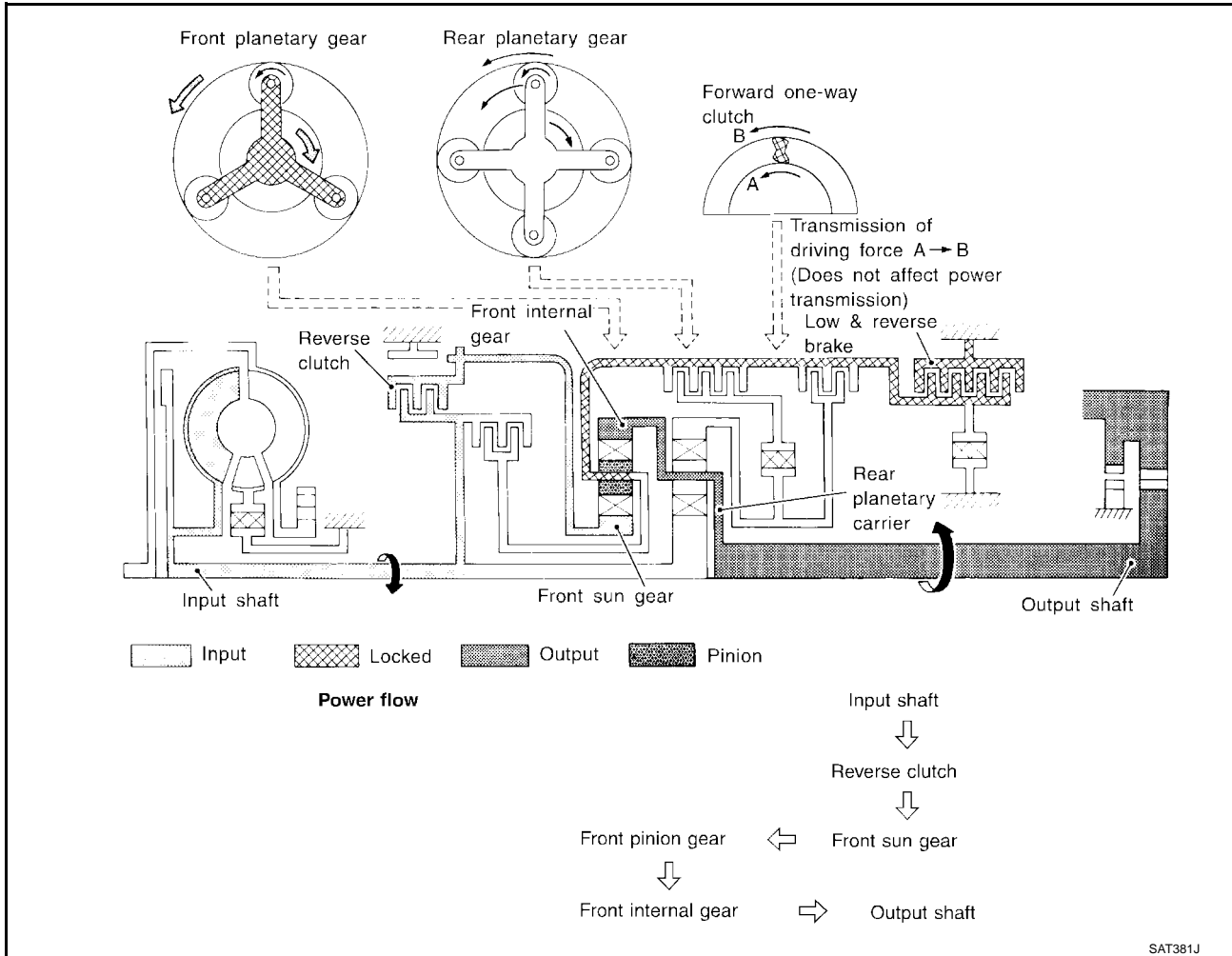
[RE4F03B]

"D4" (OD) Position



<ul style="list-style-type: none"> ● High clutch ● Brake band ● Forward clutch (Does not affect power transmission) 	<p>Input power is transmitted to front carrier through high clutch.</p> <p>This front carrier turns around the sun gear which is fixed by brake band and makes front internal gear (output) turn faster.</p>
<p>Engine brake</p>	<p>At D4 position, there is no one-way clutch in the power transmission line and engine brake can be obtained when decelerating.</p>

“R” Position



SAT381J

<ul style="list-style-type: none"> ● Reverse clutch ● Low and reverse brake 	<p>Front planetary carrier is stationary because of the operation of low and reverse brake. Input power is transmitted to front sun gear through reverse clutch, which drives front internal gear in the opposite direction.</p>
<p>Engine brake</p>	<p>As there is no one-way clutch in the power transmission line, engine brake can be obtained when decelerating.</p>

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OVERALL SYSTEM

[RE4F03B]

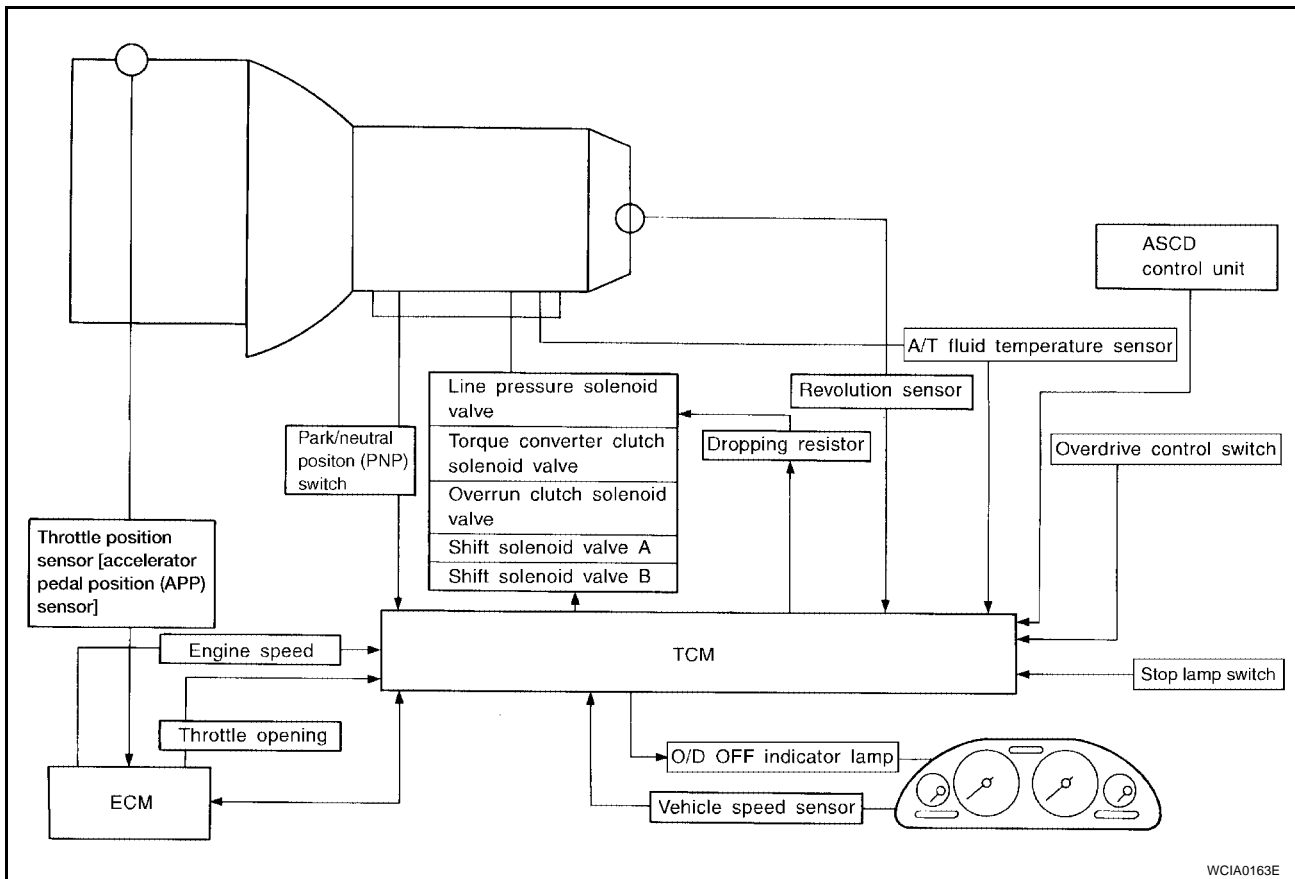
ECS005W7

Control System OUTLINE

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	TCM	ACTUATORS
Park/neutral position (PNP) switch Throttle position sensor [accelerator 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



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
Input	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.
	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.
Output	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.
	Torque converter clutch solenoid valve	Regulates (or decreases) 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.

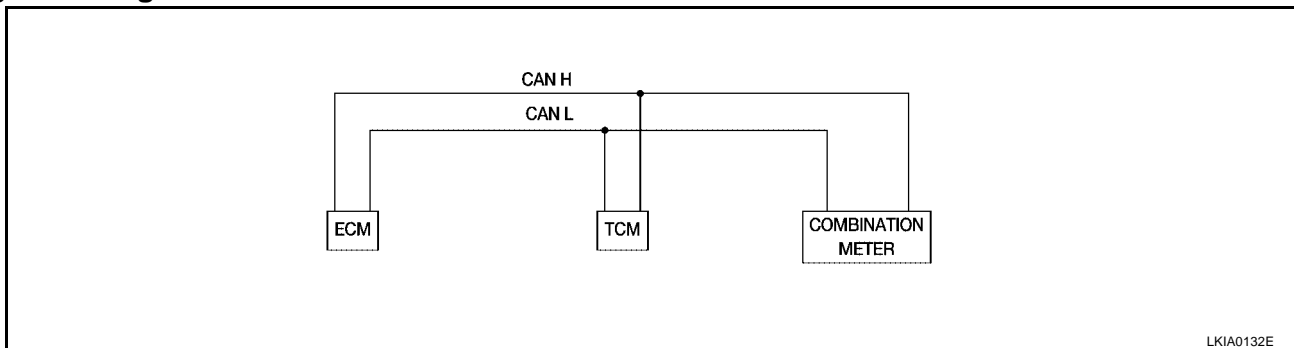
CAN Communication SYSTEM DESCRIPTION

ECS006H7

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



LKIA0132E

Input/output signal chart

T: Transmit R: Receive

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

Control Mechanism LINE PRESSURE CONTROL

ECS005W8

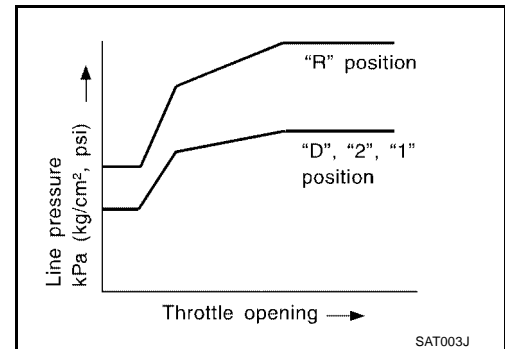
TCM has various line pressure control characteristics to match the driving conditions.

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 torque. This results in smooth shift operation.

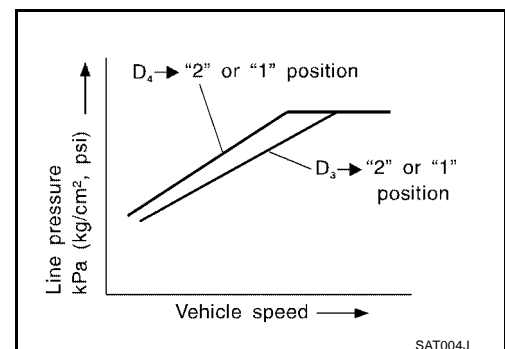
Normal Control

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



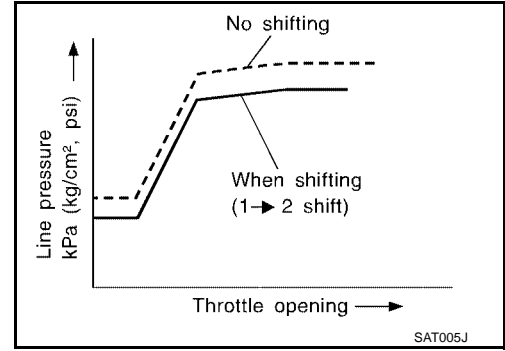
Back-up Control (Engine brake)

If the selector lever is shifted to "2" position while driving in D4 (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.



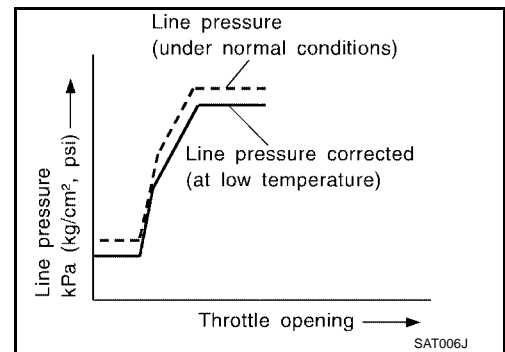
During Shift Change

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.

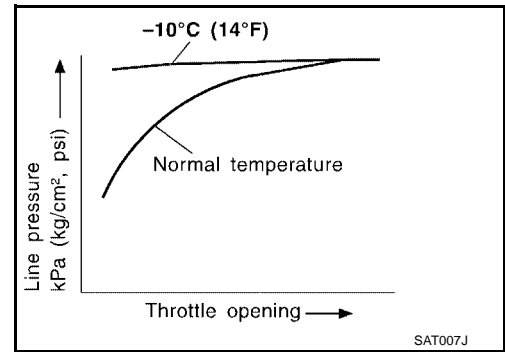


At Low Fluid Temperature

- 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.



- Line pressure is increased to a maximum, irrespective of the 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 temperature.

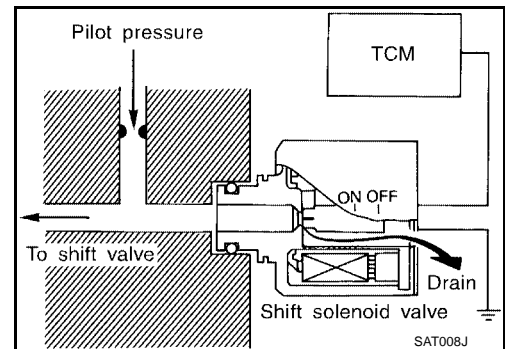


SHIFT CONTROL

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

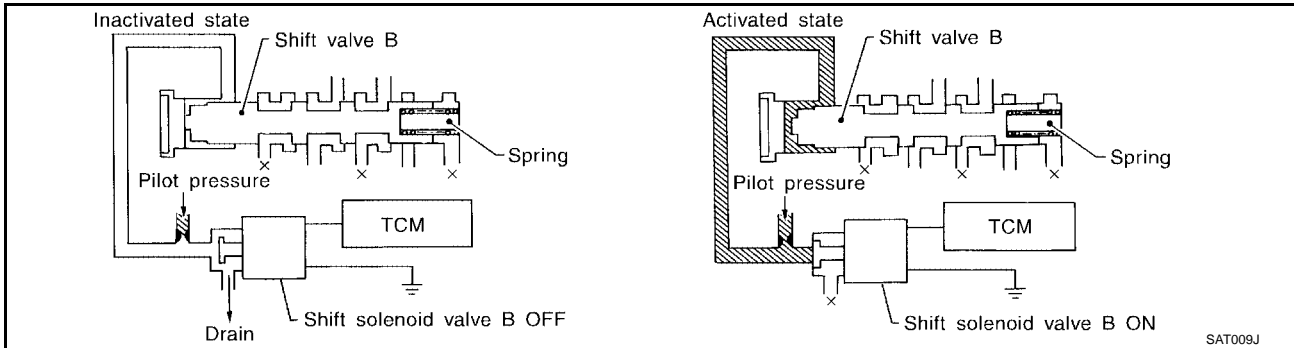
The TCM activates shift solenoid valves A and B according to signals from the throttle position sensor [accelerator pedal position (APP) sensor] and revolution sensor to select the optimum gear position on the basis of the shift schedule memorized in the TCM. The shift solenoid valve performs simple 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	D3	D4 (OD)	N-P
A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	ON (Closed)
B	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.

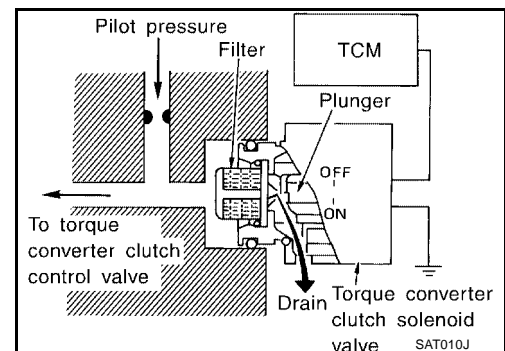
Conditions for Lock-up Operation

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.



OVERALL SYSTEM

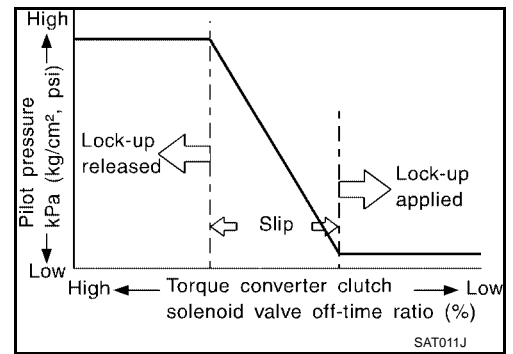
[RE4F03B]

The torque converter clutch piston is designed to slip to adjust the ratio of ON-OFF, thereby reducing lock-up shock.
OFF-time INCREASING

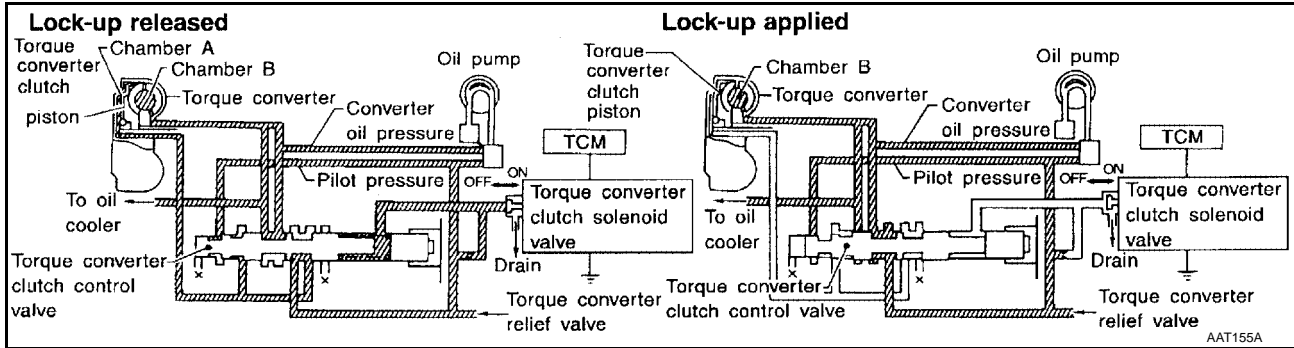
↓
Amount of drain DECREASING

↓
Pilot pressure HIGH

↓
Lock-up RELEASING



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.

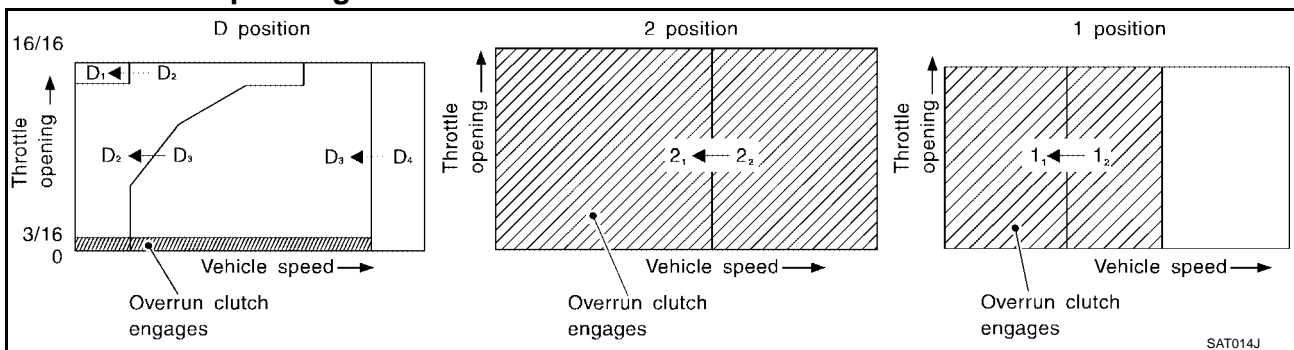
Also smooth lock-up is provided by transient application and release of the lock-up.

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



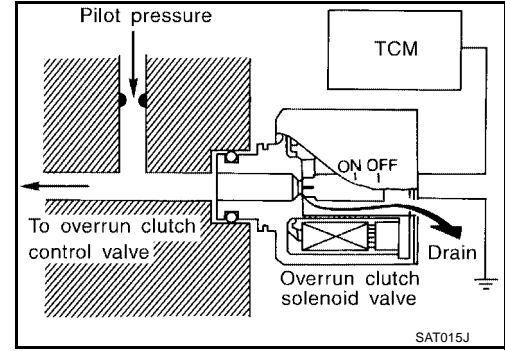
Selector lever position	Gear position	Throttle opening
"D" position	D1, D2, D3 gear position	Less than 3/16
"2" position	21, 22 gear position	
"1" position	11, 12 gear position	At any position

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.

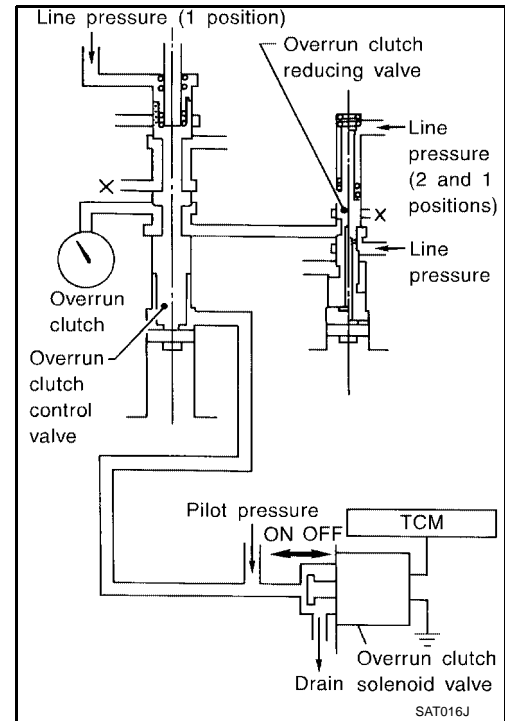


Overrun Clutch Control Valve Operation

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	Regulates oil discharged from the oil pump to provide optimum line pressure for all driving conditions.
Pressure modifier valve and sleeve	Used as a signal supplementary valve to the pressure regulator valve. Regulates pressure-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 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 → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 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 → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve A.

OVERALL SYSTEM

[RE4F03B]

Valve name	Function
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 .)
1st reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when down-shifting 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 oil pressure with 3-2 timing valve according to throttle opening.
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

PFP:00000

Introduction

ECS005WA

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 [AT-43, "SELF-DIAGNOSTIC RESULT TEST MODE"](#) .

OBD-II Function for A/T System

ECS005WB

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

ECS005WC

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	MIL	
	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] or switch — DTC: P1705	X	
Except above		X



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)

ECS005WD

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.**

A sample of CONSULT-II display for DTC and 1st trip DTC is shown. 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

A
B
AT

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

SELF-DIAG RESULTS	
DTC RESULTS	TIME
PNP SW/CIRC [P0705]	0
SAT015K	

D
E
F
G

If a 1st trip DTC is stored in the ECM, the time data will be "1t".

SELF-DIAG RESULTS	
DTC RESULTS	TIME
PNP SW/CIRC [P0705]	1 t
SAT016K	

H
I
J
K

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-643, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA"](#) (SULEV Model)].

Only one set of freeze frame data (either 1st trip freeze frame data or 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 data	

L
M

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 [EC-71, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) [QG18DE (ULEV)] or [EC-651, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) [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**

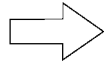
HOW TO ERASE DTC (WITH CONSULT-II)

- **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.)

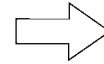
How to erase DTC (With CONSULT-II)

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.

SELECT SYSTEM
A/T
ENGINE



SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
CAN DIAG SUPPORT MNTR
FUNCTION TEST
DTC WORK SUPPORT



SELF DIAG RESULTS
DTC RESULTS
T/C CLUTCH SOL/V [P0740]

2. Turn CONSULT-II "ON", and touch "A/T".

3. Touch "SELF DIAG-RESULTS".

4. Touch "ERASE". (The DTC in the TCM will be erased.)

Touch "BACK".

Touch "BACK".



SELECT SYSTEM
A/T
ENGINE

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR(SPEC)
CAN DIAG SUPPORT MNTR
ACTIVE TEST

SELF DIAG RESULTS	
DTC RESULTS	TIME
TCC SOLENOID/CIRC [P0740]	0

5. Touch "ENGINE".

6. Touch "SELF DIAG-RESULTS".

7. Touch "ERASE". (The DTC in the ECM will be erased.)

SCIA5586E

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 [AT-52, "TCM Self-diagnostic Procedure \(No Tools\)"](#) . (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 [EC-71, "How to Erase DTC \(With GST\)"](#) [QG18DE (ULEV)] or [EC-652, "How to Erase DTC \(With GST\)"](#) [QG18DE (SULEV)].

HOW TO ERASE DTC (NO TOOLS)

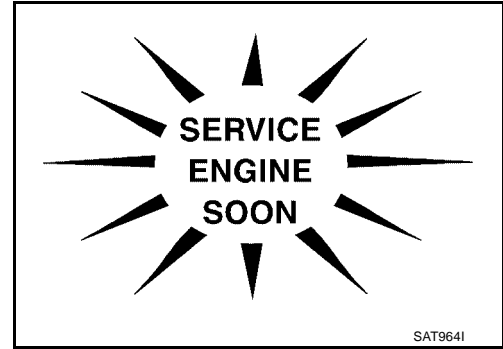
1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 5 seconds and then turn it "ON" (engine stopped) again.
2. Perform TCM Self-diagnostic Procedure. Refer to [AT-52, "TCM Self-diagnostic Procedure \(No Tools\)"](#) . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Perform OBD-II Self-diagnostic Procedure. Refer to [AT-52, "TCM Self-diagnostic Procedure \(No Tools\)"](#) .

A
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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-653, "Malfunction Indicator Lamp \(MIL\)"](#) [QG18DE (SULEV)], and [EC-113, "CONSULT-II Function"](#) [QG18DE (ULEV)] or [EC-694, "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) malfunction. For detail, refer to [EC-59, "Emission-related Diagnostic Information"](#) [QG18DE (ULEV)] or [EC-640, "Emission-related Diagnostic Information"](#) [QG18DE (SULEV)].

CONSULT-II

After performing "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" ([AT-43, "SELF-DIAGNOSTIC PROCEDURE \(WITH CONSULT-II\)"](#)), place check marks for results on the "DIAGNOSTIC WORKSHEET", ([AT-58, "DIAGNOSTIC WORKSHEET"](#)). Reference pages are provided following the items.

NOTICE:

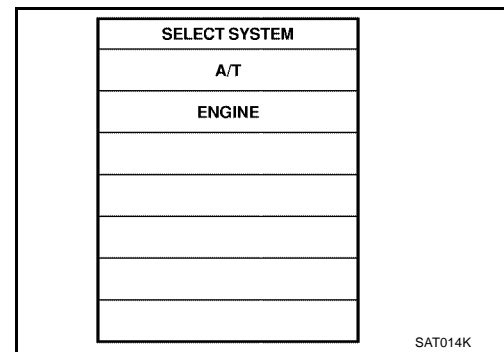
1. The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
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.

FUNCTION

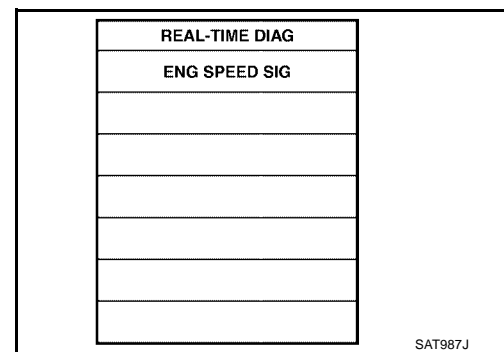
Diagnostic test mode	Function	Reference Page
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-II.	—
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	AT-43
Data monitor	Input/Output data in the ECM can be read.	AT-45
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.	AT-43
Function test	Performed by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".	—
DTC work support	Select the operating condition to confirm Diagnosis Trouble Codes.	—
TCM part number	TCM part number can be read.	—

Ⓜ SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)

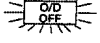
- Turn on CONSULT-II and touch "ENGINE" for OBD-II detected items or touch "A/T" for TCM self-diagnosis.
If A/T is not displayed, check TCM power supply and ground circuit. Refer to [AT-113, "TROUBLE DIAGNOSIS FOR POWER SUPPLY"](#) . If result is NG, refer to [PG-2, "POWER SUPPLY ROUTING"](#) .



- Touch "SELF DIAG RESULTS".
Display shows malfunction experienced since the last erasing operation.
CONSULT-II performs "REAL TIME DIAG".
Also, any malfunction detected while in this mode will be displayed at real time.

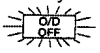



SELF-DIAGNOSTIC RESULT TEST MODE

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		<ul style="list-style-type: none"> TCM does not receive the correct voltage signal (based on the gear position) from the switch. TCM does not receive the proper voltage signal from the sensor. 	Available by O/D OFF  indicator lamp or "A/T" on CONSULT-II
PNP switch circuit	PNP SW/CIRC	—		P0705
Revolution sensor	VEH SPD SEN/CIR		X	P0720
VHCL SPEED SEN-A/T	VEH SPD SEN/CIR AT			



ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F03B]

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		Available by O/D OFF  indicator lamp or "A/T" on CONSULT-II	 Available by malfunction indicator lamp *2, "ENGINE" on CONSULT-II or GST
Vehicle speed sensor (Meter)		● TCM does not receive the proper voltage signal from the sensor.	X	—
VHCL SPEED SEN-MTR	—			
A/T 1st gear function		● A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	—	P0731*1
A/T 1ST GR FNCTN	A/T 1ST GR FNCTN			
A/T 2nd gear function		● A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	—	P0732*1
A/T 2ND GR FNCTN	A/T 2ND GR FNCTN			
A/T 3rd gear function		● A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	—	P0733*1
A/T 3RD GR FNCTN	A/T 3RD GR FNCTN			
A/T 4th gear function		● A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	—	P0734*1
A/T 4TH GR FNCTN	A/T 4TH GR FNCTN			
A/T TCC S/V function (lock-up)		● A/T cannot perform lock-up even if electrical circuit is good.	—	P0744*1
A/T TCC S/V FNCTN	A/T TCC S/V FNCTN			
Shift solenoid valve A		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0750
SHIFT SOLENOID/V A	SFT SOL A/CIRC A			
Shift solenoid valve B		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0755
SHIFT SOLENOID/V B	SFT SOL B/CIRC B			
Overrun clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P1760
OVERRUN CLUTCH S/V	O/R CLUCH SOL/CIRC			
T/C clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0740
T/C CLUTCH SOL/V	TCC SOLENOID/CIRC			
Line pressure solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0745
LINE PRESSURE S/V	L/PRESS SOL/CIRC V			
Throttle position sensor, Throttle position switch		● TCM receives an excessively low or high voltage from the sensor.	X	P1705
THROTTLE POSI SEN	TP SEN/CIRC A/T			
Engine speed signal		● TCM does not receive the proper voltage signal from the ECM.	X	P0725
ENGINE SPEED SIG				
A/T fluid temperature sensor		● TCM receives an excessively low or high voltage from the sensor.	X	P0710
BATT/FLUID TEMP SEN	ATF TEMP SEN/CIRC			
TCM (RAM)		● TCM memory (RAM) is malfunctioning.	—	—
CONTROL UNIT (RAM)	—			

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F03B]

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		Available by O/D OFF  indicator lamp or "A/T" on CONSULT-II	 Available by malfunction indicator lamp *2, "ENGINE" on CONSULT-II or GST
TCM (ROM)		● TCM memory (ROM) is malfunctioning.	—	—
CONTROL UNIT (ROM)	—			
TCM (EEP ROM)		● TCM memory (EEP ROM) is malfunctioning.	—	—
CONT UNIT (EEP ROM)	—			
Initial start		● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)	X	—
INITIAL START	—			
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED**)		● No failure has been detected.	X	X

X: Applicable

—: Not applicable

*1: These malfunctions cannot be displayed by MIL  if another malfunction is assigned to MIL.

*2: Refer to [EC-72, "Malfunction Indicator Lamp \(MIL\)"](#) [QG18DE (ULEV)] or [EC-653, "Malfunction Indicator Lamp \(MIL\)"](#) [QG18DE (SULEV)].

DATA MONITOR MODE (A/T)

Item	Display	Monitor item		Description	Remarks
		TCM input signals	Main signals		
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" 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]	X	—	● Vehicle speed computed from signal of vehicle speed sensor is displayed.	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 stationary.
Throttle position sensor [accelerator pedal position (APP) sensor]	THRTL POS SEN [V]	X	—	● Throttle position sensor [accelerator pedal position (APP) sensor] signal voltage is displayed.	
A/T fluid temperature sensor	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]	X	—	● Source voltage of TCM is displayed.	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F03B]

Item	Display	Monitor item		Description	Remarks
		TCM input signals	Main signals		
Engine speed	ENGINE SPEED [rpm]	X	X	<ul style="list-style-type: none"> ● 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]	X	—	<ul style="list-style-type: none"> ● ON/OFF state computed from signal of overdrive control SW is displayed. 	
PN position switch	PN POSI SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ● ON/OFF state computed from signal of PN position SW is displayed. 	
R position switch	R POSITION SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ● ON/OFF state computed from signal of R position SW is displayed. 	
D position switch	D POSITION SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ● ON/OFF state computed from signal of D position SW is displayed. 	
2 position switch	2 POSITION SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ● ON/OFF status, computed from signal of 2 position SW, is displayed. 	
1 position switch	1 POSITION SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ● ON/OFF status, computed from signal of 1 position SW, is displayed. 	
ASCD cruise signal	ASCD CRUISE [ON/OFF]	X	—	<ul style="list-style-type: none"> ● Status of ASCD cruise signal is displayed. ON ... Cruising state OFF ... Normal running state 	<ul style="list-style-type: none"> ● This is displayed even when no ASCD is mounted.
ASCD OD cut signal	ASCD OD CUT [ON/OFF]	X	—	<ul style="list-style-type: none"> ● Status of ASCD OD release signal is displayed. ON ... OD released OFF ... OD not released 	<ul style="list-style-type: none"> ● This is displayed even when no ASCD is mounted.
Kickdown switch	KICKDOWN SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ● ON/OFF status, computed from signal of kickdown SW, is displayed. 	<ul style="list-style-type: none"> ● This is displayed even when no kickdown switch is equipped.
Gear position	GEAR	—	X	<ul style="list-style-type: none"> ● Gear position data used for computation by TCM, is displayed. 	
Selector lever position	SLCT LVR POSI	—	X	<ul style="list-style-type: none"> ● Selector lever position data, used for computation by TCM, is displayed. 	<ul style="list-style-type: none"> ● A specific value used for control is displayed if fail-safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	—	X	<ul style="list-style-type: none"> ● Vehicle speed data, used for computation by TCM, is displayed. 	
Stop lamp switch	BRAKE SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ● ON/OFF status are displayed. ON: Brake pedal is depressed. OFF: Brake pedal is released. 	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F03B]

Item	Display	Monitor item		Description	Remarks
		TCM input signals	Main signals		
Throttle position	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.
Line pressure duty	LINE PRES DTY [%]	—	X	● Control value of line pressure solenoid valve, computed 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]	—	X	● Control value of shift solenoid 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 if solenoid circuit is shorted.
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	—	X	● Control value of shift solenoid valve B, computed by TCM from each input signal, is displayed.	
Overrun clutch solenoid valve	VERRUN/C S/V [ON/OFF]	—	X	● Control value of overrun clutch solenoid valve computed by TCM from each input signal is displayed.	
Self-diagnosis display lamp (O/D OFF indicator lamp)	SELF-D DP LMP [ON/OFF]	—	X	● Control status of O/D OFF indicator lamp is displayed.	

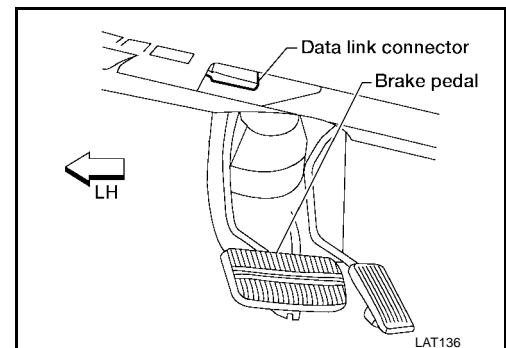
X: Applicable

—: Not applicable

DTC WORK SUPPORT MODE WITH CONSULT-II

CONSULT-II Setting Procedure

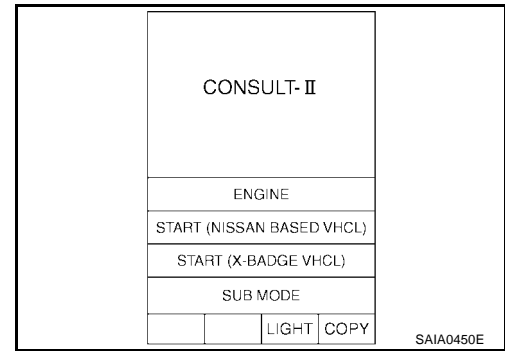
1. Turn ignition switch "OFF".
2. Connect CONSULT-II to Data link connector which is located in left side lower dash panel.



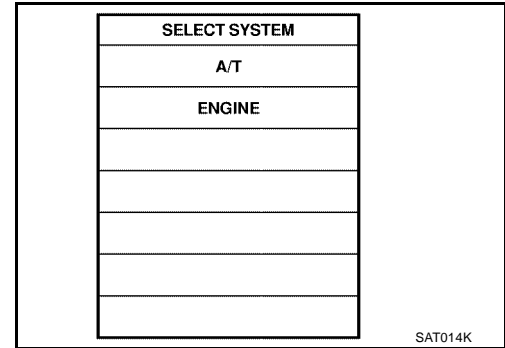
ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F03B]

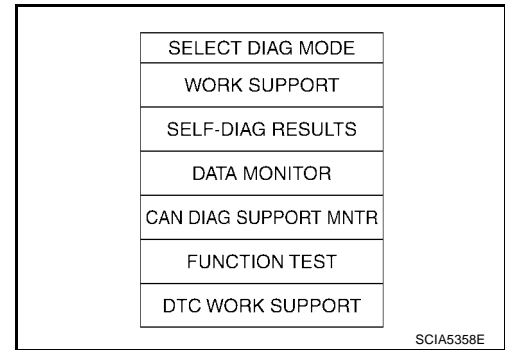
3. Turn ignition switch "ON".
4. Touch "START (NISSAN BASED VHCL)".



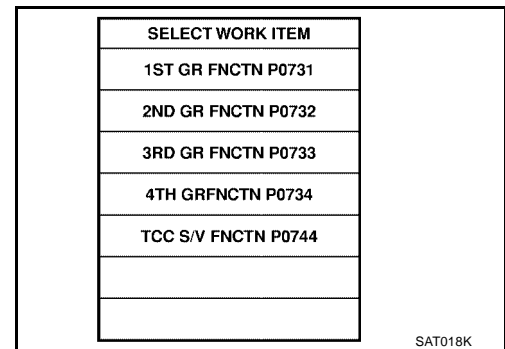
5. Touch "A/T".



6. Touch "DTC WORK SUPPORT".



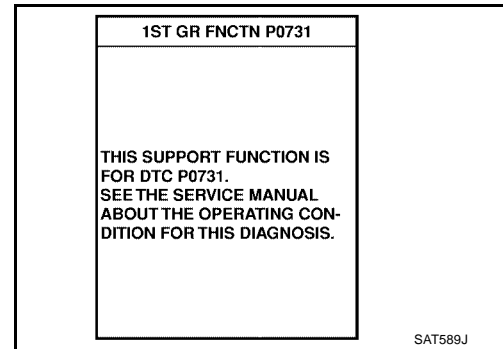
7. Touch select item menu (1ST, 2ND, etc.).



ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F03B]

8. Touch "START".

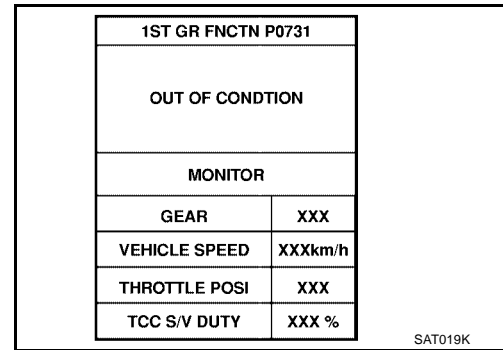


A

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AT

9. Perform driving test according to "DTC CONFIRMATION PROCEDURE" in "TROUBLE DIAGNOSIS FOR DTC".



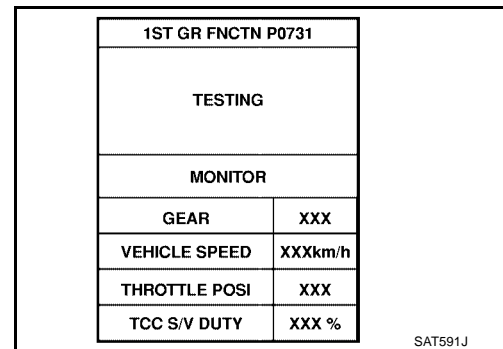
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- When testing conditions are satisfied, CONSULT-II screen changes from "OUT OF CONDITION" to "TESTING".



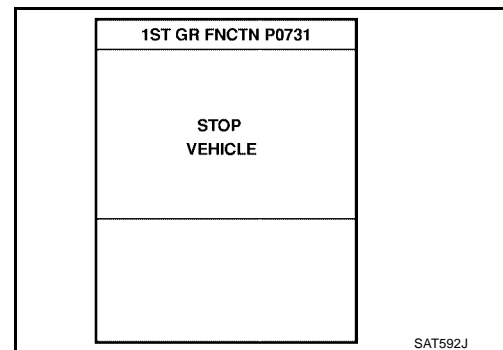
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10. Stop vehicle. If "NG" appears on the screen, malfunction may exist. Go to "DIAGNOSTIC PROCEDURE".

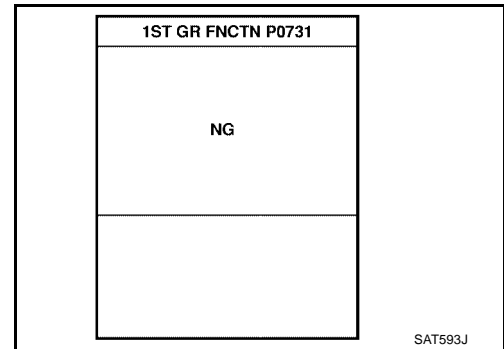


L

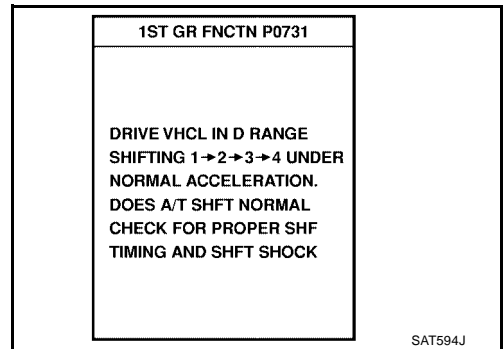
M

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

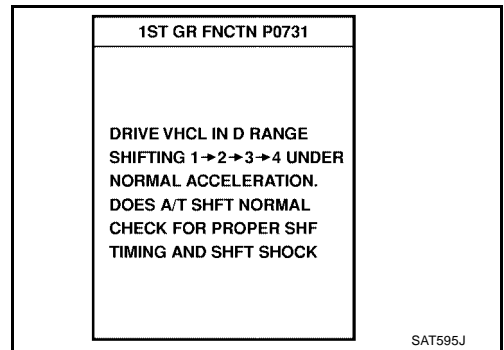
[RE4F03B]



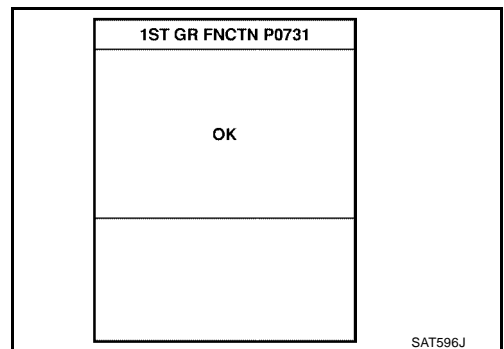
11. Perform test drive to check gear shift feeling in accordance with instructions displayed.

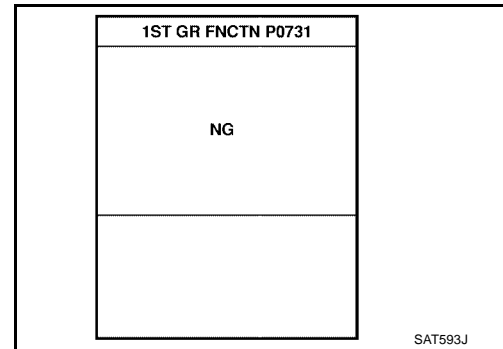


12. Touch "YES" or "NO".



13. CONSULT-II procedure ended.





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. <ul style="list-style-type: none"> ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG) 	<ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG) 	<ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG) 	<ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG) 	<ul style="list-style-type: none"> ● 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. <ul style="list-style-type: none"> ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG) 	<ul style="list-style-type: none"> ● Torque converter clutch solenoid valve ● Each clutch ● Hydraulic control circuit

DIAGNOSTIC PROCEDURE WITHOUT CONSULT-II

OBD-II Self-diagnostic Procedure (With GST)

Refer to [EC-125, "Generic Scan Tool \(GST\) Function"](#) [QG18DE (ULEV)], [EC-709, "Generic Scan Tool \(GST\)"](#) [QG18DE (SULEV)].

OBD-II Self-diagnostic Procedure (No Tools)

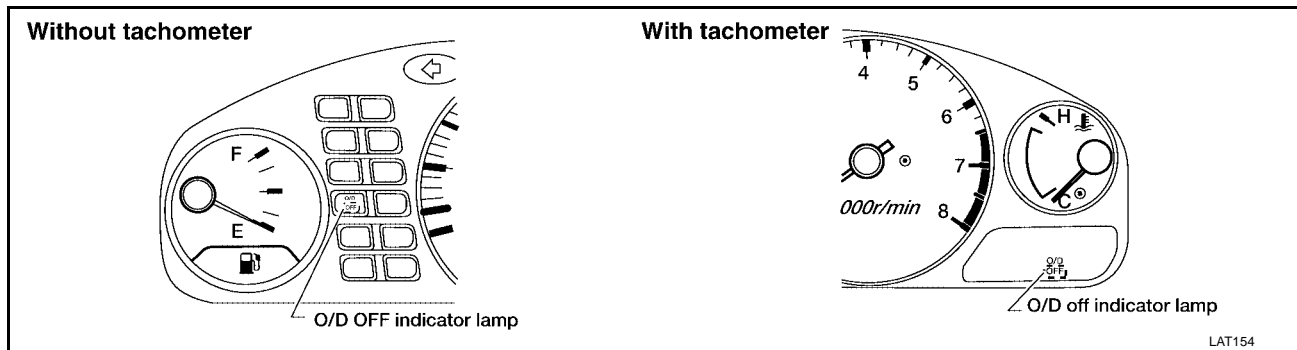
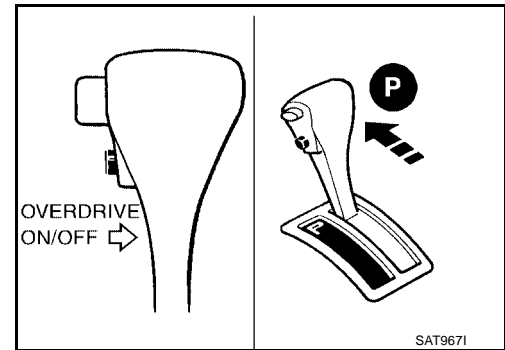
Refer to [EC-72, "Malfunction Indicator Lamp \(MIL\)"](#) [QG18DE (ULEV)] or [EC-653, "Malfunction Indicator Lamp \(MIL\)"](#) [QG18DE (SULEV)].



TCM Self-diagnostic Procedure (No Tools)

1. CHECK O/D OFF INDICATOR LAMP

1. Move A/T selector lever to "P" position.
Start the engine.
Warm engine to normal 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?

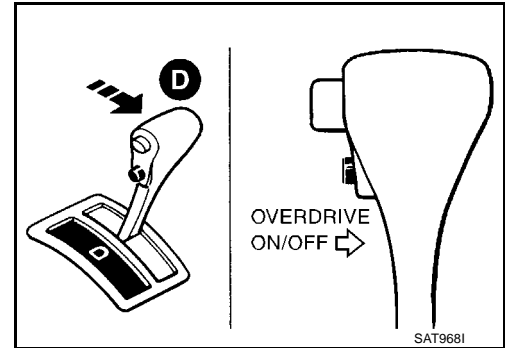


Yes or No

- Yes >> GO TO 2.
 No >> GO TO [AT-221, "1. O/D OFF Indicator Lamp Does Not Come On"](#) .

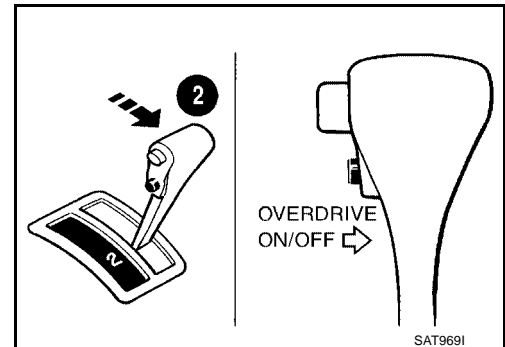
2. JUDGEMENT PROCEDURE STEP 1

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 [AT-250, "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}"](#).
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 A/T selector lever to "2" position.
11. Depress and release the overdrive control switch (the O/D OFF indicator lamp will be "ON").



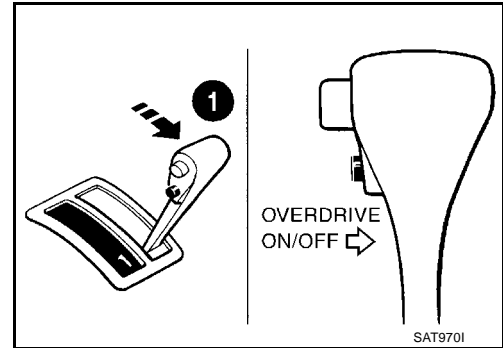
12. Depress and hold the overdrive control switch (the O/D OFF indicator lamp will be "OFF") until directed to release the switch.

>> GO TO 3.



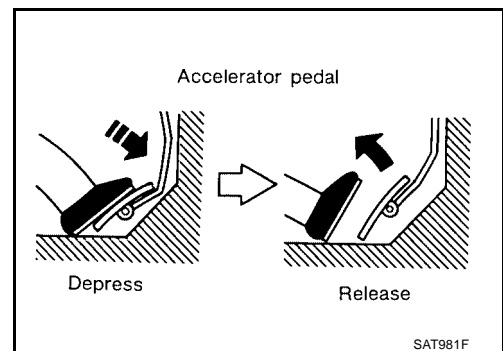
3. JUDGEMENT PROCEDURE STEP 2

1. Move A/T selector lever to "1" position.
2. Release the overdrive control switch.
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").
5. Depress and hold the overdrive control switch (the O/D OFF indicator lamp will be "ON") until directed to release the switch.



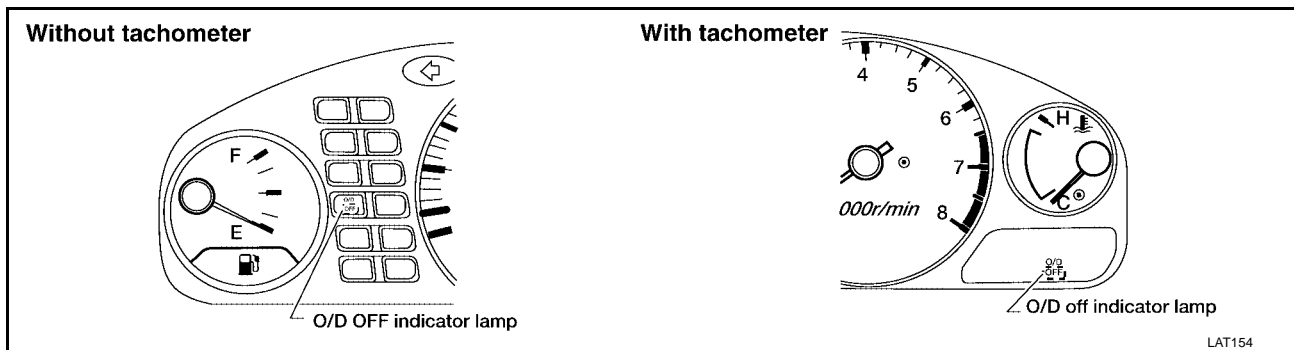
6. Depress accelerator pedal fully and release.
7. Release the overdrive control switch (the O/D OFF indicator lamp will begin to flash "ON" and "OFF").

>> GO TO 4.



4. CHECK SELF-DIAGNOSIS CODE

Check O/D OFF indicator lamp. Refer to [AT-55, "Judgement of Self-diagnosis Code"](#) .



>> DIAGNOSIS END

Judgement of Self-diagnosis Code

O/D OFF indicator lamp:

A

B

AT

D

E

F

G

H

I

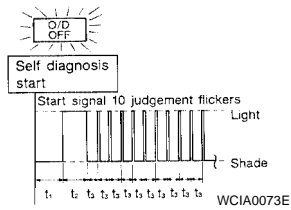
J

K

L

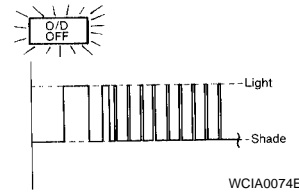
M

All judgement flickers are the same.



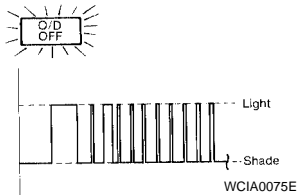
All circuits that can be confirmed by self-diagnosis are OK.

1st judgement flicker is longer than others.



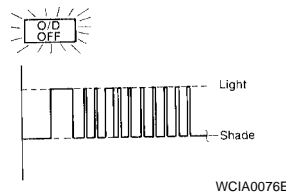
Revolution sensor circuit is short-circuited or disconnected.
 ⇒ Go to [AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#).

2nd judgement flicker is longer than others.



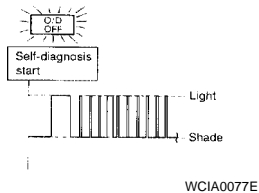
Vehicle speed sensor circuit is short-circuited or disconnected.
 ⇒ Go to [AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"](#).

3rd judgement flicker is longer than others.



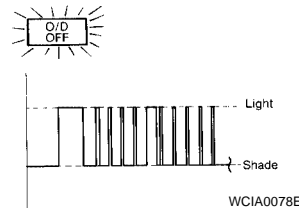
Throttle position sensor [accelerator pedal position (APP) sensor] circuit is short-circuited or disconnected.
 ⇒ Go to [AT-188, "DTC P1705 THROTTLE POSITION SENSOR \[ACCELERATOR PEDAL POSITION \(APP\) SENSOR\]"](#).

4th judgement flicker is longer than others.



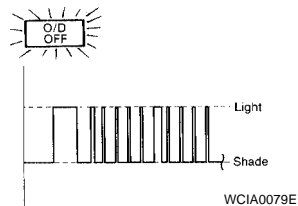
Shift solenoid valve A circuit is short-circuited or disconnected.
 ⇒ Go to [AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"](#).

5th judgement flicker is longer than others.



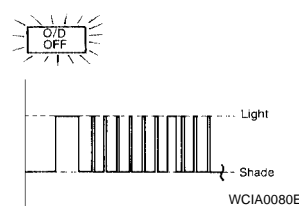
Shift solenoid valve B circuit is short-circuited or disconnected.
 ⇒ Go to [AT-184, "DTC P0755 SHIFT SOLENOID VALVE B"](#).

6th judgement flicker is longer than others.



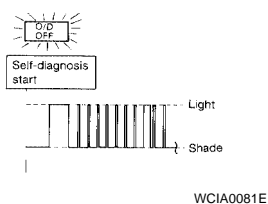
Overrun clutch solenoid valve circuit is short-circuited or disconnected.
 ⇒ Go to [AT-194, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"](#).

7th judgement flicker is longer than others.



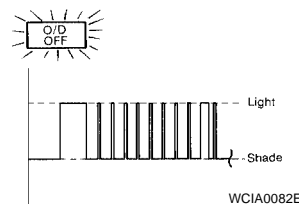
Torque converter clutch solenoid valve circuit is short-circuited or disconnected.
 ⇒ Go to [AT-160, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#).

8th judgement flicker is longer than others.



A/T fluid temperature sensor is disconnected or TCM power source circuit is damaged.
 ⇒ Go to [AT-198, "DTC BATT/FLUID TEMP SEN \(A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE\)"](#).

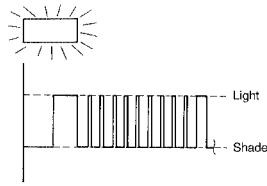
9th judgement flicker is longer than others.



Engine speed signal circuit is short-circuited or disconnected.
 ⇒ Go to [AT-132, "DTC P0725 ENGINE SPEED SIGNAL"](#).

O/D OFF indicator lamp:

10th judgement flicker is longer than others.

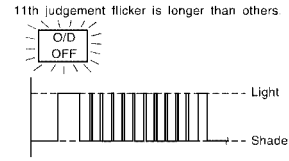


WCIA0083E

Line pressure solenoid valve circuit is short-circuited or disconnected.

⇒ Go to [AT-174. "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#) .

11th judgement flicker is longer than others.

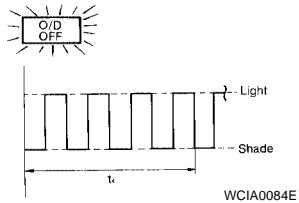


SAT599J

The ECM-A/T communication line is open or shorted.

⇒ Go to [AT-209. "DTC U1000 CAN COMMUNICATION LINE"](#) .

Flickers as shown below.



WCIA0084E

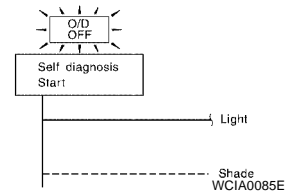
Battery power is low.

Battery has been disconnected for a long time.

Battery is connected conversely.

(When reconnecting TCM connectors. — This is not a problem.)

Lamp comes on.



WCIA0085E

PNP switch, overdrive control switch or throttle position switch circuit is disconnected or TCM is damaged.

⇒ Go to [AT-250. "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}"](#) .

t1 = 2.5 seconds t2 = 2.0 seconds t3 = 1.0 second t4 = 1.0 second

TROUBLE DIAGNOSIS — INTRODUCTION

PF0:0000

ECS005WG

Introduction

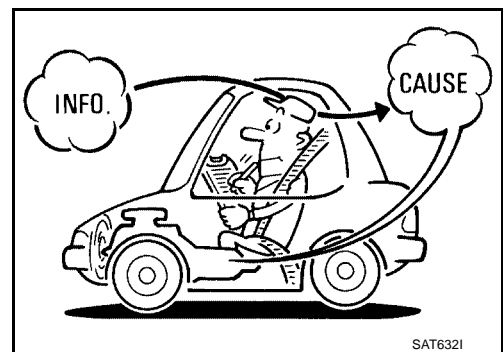
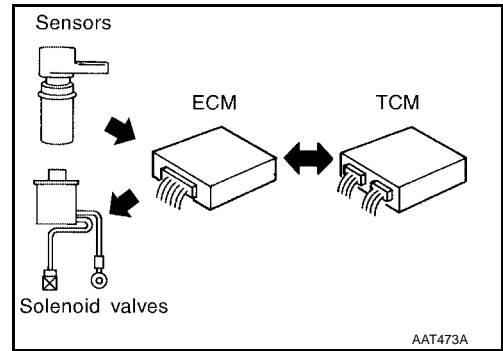
The TCM receives a signal from the vehicle speed sensor, throttle position sensor [accelerator pedal position (APP) sensor] or PNP switch and provides shift control or lock-up control via A/T solenoid valves.

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.

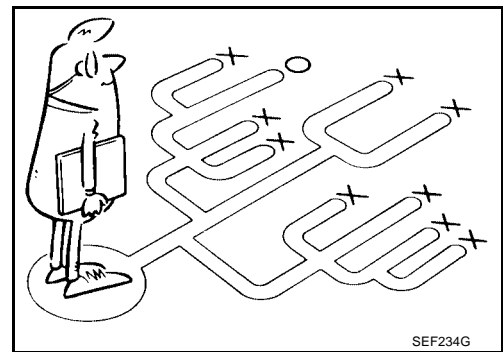
A visual check only may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow". Refer to [AT-61, "Work Flow"](#) .



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 ([AT-59, "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.



A
B
AT
D
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F
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I
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TROUBLE DIAGNOSIS — INTRODUCTION

[RE4F03B]

Diagnostic Worksheet

1.	<input type="checkbox"/> Read the "FAIL-SAFE" and listen to customer complaints.	AT-11, "FAIL-SAFE"	A
2.	<input type="checkbox"/> CHECK A/T FLUID <input type="checkbox"/> Leakage (Follow specified procedure) <input type="checkbox"/> Fluid condition <input type="checkbox"/> Fluid level	AT-64, "A/T Fluid Check"	B
3.	<input type="checkbox"/> Perform STALL TEST and LINE PRESSURE TEST. <input type="checkbox"/> Stall test — Mark possible damaged components/others. <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="checkbox"/> Torque converter one-way clutch <input type="checkbox"/> Reverse clutch <input type="checkbox"/> Forward clutch <input type="checkbox"/> Overrun clutch <input type="checkbox"/> Forward one-way clutch </div> <div style="width: 45%;"> <input type="checkbox"/> Low & reverse brake <input type="checkbox"/> Low one-way clutch <input type="checkbox"/> Engine <input type="checkbox"/> Line pressure is low <input type="checkbox"/> Clutches and brakes except high clutch and brake band are OK </div> </div> <input type="checkbox"/> Line Pressure test — Suspected parts:	AT-64, "Stall Test", AT-68, "Line Pressure Test"	AT
4.	<input type="checkbox"/> Perform all ROAD TEST and mark required procedures. <div style="border: 1px solid black; padding: 5px;"> 4-1. Check before engine is started. <input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE — Mark detected items. <input type="checkbox"/> PNP switch, AT-116, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . <input type="checkbox"/> A/T fluid temperature sensor, AT-121, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" . <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)" . <input type="checkbox"/> Engine speed signal, AT-132, "DTC P0725 ENGINE SPEED SIGNAL" . <input type="checkbox"/> Torque converter clutch solenoid valve, . <input type="checkbox"/> Line pressure solenoid valve, AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE" . <input type="checkbox"/> Shift solenoid valve A, AT-180, "DTC P0750 SHIFT SOLENOID VALVE A" . <input type="checkbox"/> Shift solenoid valve B, AT-184, "DTC P0755 SHIFT SOLENOID VALVE B" . <input type="checkbox"/> Throttle position sensor [accelerator pedal position (APP) sensor], AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]" . <input type="checkbox"/> Overrun clutch solenoid valve, AT-194, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" . <input type="checkbox"/> PNP, overdrive control and throttle position sensor [accelerator pedal position (APP) sensor], AT-250, "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)" . <input type="checkbox"/> A/T fluid temperature sensor and TCM power source, AT-198, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" . <input type="checkbox"/> Vehicle speed sensor-MTR, AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR" . <input type="checkbox"/> Control unit (RAM), control unit (ROM), AT-212, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . <input type="checkbox"/> Control unit (EEP ROM), AT-214, "DTC CONTROL UNIT (EEP ROM)" . <input type="checkbox"/> Battery <input type="checkbox"/> Others </div>	AT-69, "Road Test" AT-71, "1. CHECK BEFORE ENGINE IS STARTED"	F
4-2.	Check at idle <input type="checkbox"/> 1. O/D OFF Indicator Lamp Does Not Come On, AT-221, "1. O/D OFF Indicator Lamp Does Not Come On" . <input type="checkbox"/> 2. Engine Cannot Be Started In "P" And "N" Position, AT-223, "2. Engine Cannot Be Started In "P" and "N" Position" . <input type="checkbox"/> 3. In "P" Position, Vehicle Moves Forward Or Backward When Pushed, AT-224, "3. In "P" Position, Vehicle Moves Forward Or Backward When Pushed" . <input type="checkbox"/> 4. In "N" Position, Vehicle Moves, AT-225, "4. In "N" Position, Vehicle Moves" . <input type="checkbox"/> 5. Large Shock. "N" → "R" Position, AT-226, "5. Large Shock. "N" → "R" Position" . <input type="checkbox"/> 6. Vehicle Does Not Creep Backward In "R" Position, AT-227, "6. Vehicle Does Not Creep Backward In "R" Position" . <input type="checkbox"/> 7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position, AT-229, "7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position" .	AT-72, "2. CHECK AT IDLE"	G

TROUBLE DIAGNOSIS — INTRODUCTION

[RE4F03B]

4. (cont'd)	4-3 (cont'd)	<p>Cruise test</p> <p>Part-1</p> <ul style="list-style-type: none"> <input type="checkbox"/> 8. Vehicle Cannot Be Started From D1 , AT-231, "8. Vehicle Cannot Be Started From D1" . <input type="checkbox"/> 9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , AT-234, "9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2" . <input type="checkbox"/> 10. A/T Does Not Shift: D2 → D3 , AT-236, "10. A/T Does Not Shift: D2 → D3" . <input type="checkbox"/> 11. A/T Does Not Shift: D3 → D4 , AT-238, "11. A/T Does Not Shift: D3 → D4" . <input type="checkbox"/> 12. A/T Does Not Perform Lock-up, AT-240, "12. A/T Does Not Perform Lock-up" . <input type="checkbox"/> 13. A/T Does Not Hold Lock-up Condition, AT-241, "13. A/T Does Not Hold Lock-up Condition" . <input type="checkbox"/> 14. Lock-up Is Not Released, AT-243, "14. Lock-up Is Not Released" . <input type="checkbox"/> 15. Engine Speed Does Not Return To Idle (Light Braking D4 → D3) , AT-244, "15. Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" . <p>Part-2</p> <ul style="list-style-type: none"> <input type="checkbox"/> 16. Vehicle Does Not Start From D1 , AT-245, "16. Vehicle Does Not Start From D1" . <input type="checkbox"/> 9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , AT-234, "9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2" . <input type="checkbox"/> 10. A/T Does Not Shift: D2 → D3 , AT-236, "10. A/T Does Not Shift: D2 → D3" . <input type="checkbox"/> 11. A/T Does Not Shift: D3 → D4 , AT-238, "11. A/T Does Not Shift: D3 → D4" . 	AT-74, "3. CRUISE TEST" AT-78, "Cruise Test — Part 1"
4. (cont'd)	4-3 . (cont'd)	<p>Part-3</p> <ul style="list-style-type: none"> <input type="checkbox"/> 17. A/T Does Not Shift: D4 → D3 When Overdrive Control Switch "ON" → "OFF", AT-247, "17. A/T Does Not Shift: D4 → D3 , When Overdrive Control Switch "ON" → "OFF"" . <input type="checkbox"/> 15. Engine Speed Does Not Return To Idle (Engine Brake In D3) , AT-244, "15. Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" . <input type="checkbox"/> 18. A/T Does Not Shift: D3 → 22 , When Selector Lever "D" → "2" Position, AT-248, "18. A/T Does Not Shift: D3 → 22 , When Selector Lever "D" → "2" Position" . <input type="checkbox"/> 15. Engine Speed Does Not Return To Idle (Light Braking D4 → D2) , AT-244, "15. Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" . <input type="checkbox"/> 19. A/T Does Not Shift: 22 → 11 , When Selector Lever "2" → "1" Position, AT-249, "19. A/T Does Not Shift: 22 → 11 , When Selector Lever "2" → "1" Position" . <input type="checkbox"/> 20. Vehicle Does Not Decelerate By Engine Brake, AT-250, "20. Vehicle Does Not Decelerate By Engine Brake" . <input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE — Mark detected items. <ul style="list-style-type: none"> <input type="checkbox"/> PNP switch, AT-116, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . <input type="checkbox"/> A/T fluid temperature sensor, AT-121, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" . <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)" . <input type="checkbox"/> Engine speed signal, AT-132, "DTC P0725 ENGINE SPEED SIGNAL" . <input type="checkbox"/> Torque converter clutch solenoid valve, AT-160, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" . <input type="checkbox"/> Line pressure solenoid valve, AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE" . <input type="checkbox"/> Shift solenoid valve A, AT-180, "DTC P0750 SHIFT SOLENOID VALVE A" . <input type="checkbox"/> Shift solenoid valve B, AT-184, "DTC P0755 SHIFT SOLENOID VALVE B" . <input type="checkbox"/> Throttle position sensor [accelerator pedal position (APP) sensor], AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]" . <input type="checkbox"/> Overrun clutch solenoid valve, AT-194, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" . <input type="checkbox"/> PNP, overdrive control and throttle position sensor [accelerator pedal position (APP) sensor], AT-250, "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}" . <input type="checkbox"/> A/T fluid temperature sensor and TCM power source, AT-198, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" . <input type="checkbox"/> Vehicle speed sensor-MTR, AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR" . <input type="checkbox"/> Control unit (RAM), control unit (ROM), AT-212, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . <input type="checkbox"/> Control unit (EEP ROM), AT-214, "DTC CONTROL UNIT (EEP ROM)" . <input type="checkbox"/> Battery <input type="checkbox"/> Others 	AT-83, "Cruise Test — Part 3"

TROUBLE DIAGNOSIS — INTRODUCTION

[RE4F03B]

5.	<input type="checkbox"/> For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.	AT-43, "SELF-DIAGNOSTIC RESULT TEST MODE"	A B
6.	<input type="checkbox"/> Perform all ROAD TEST and re-mark required procedures.	AT-69, "Road Test"	B
7.	<input type="checkbox"/> Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items. Refer to EC-123, "DTC & SRT CONFIRMATION MODE" [QG18DE (ULEV)] or EC-706, "DTC & SRT CONFIRMATION MODE" [QG18DE (SULEV)].	EC section	AT
	<input type="checkbox"/> DTC (P0731), AT-136, "DTC P0731 A/T 1ST GEAR FUNCTION" . <input type="checkbox"/> DTC (P0732), AT-141, "DTC P0732 A/T 2ND GEAR FUNCTION" . <input type="checkbox"/> DTC (P0733), AT-146, "DTC P0733 A/T 3RD GEAR FUNCTION" . <input type="checkbox"/> DTC (P0734), AT-151, "DTC P0734 A/T 4TH GEAR FUNCTION" . <input type="checkbox"/> DTC (P0744), AT-164, "DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)" .		D E
8.	<input type="checkbox"/> 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-DIAGNOSTIC RESULT TEST MODE" AT-85, "Symptom Chart"	F G
9.	<input type="checkbox"/> Erase DTC from TCM and ECM memories.	AT-40, "HOW TO ERASE DTC"	H

Work Flow

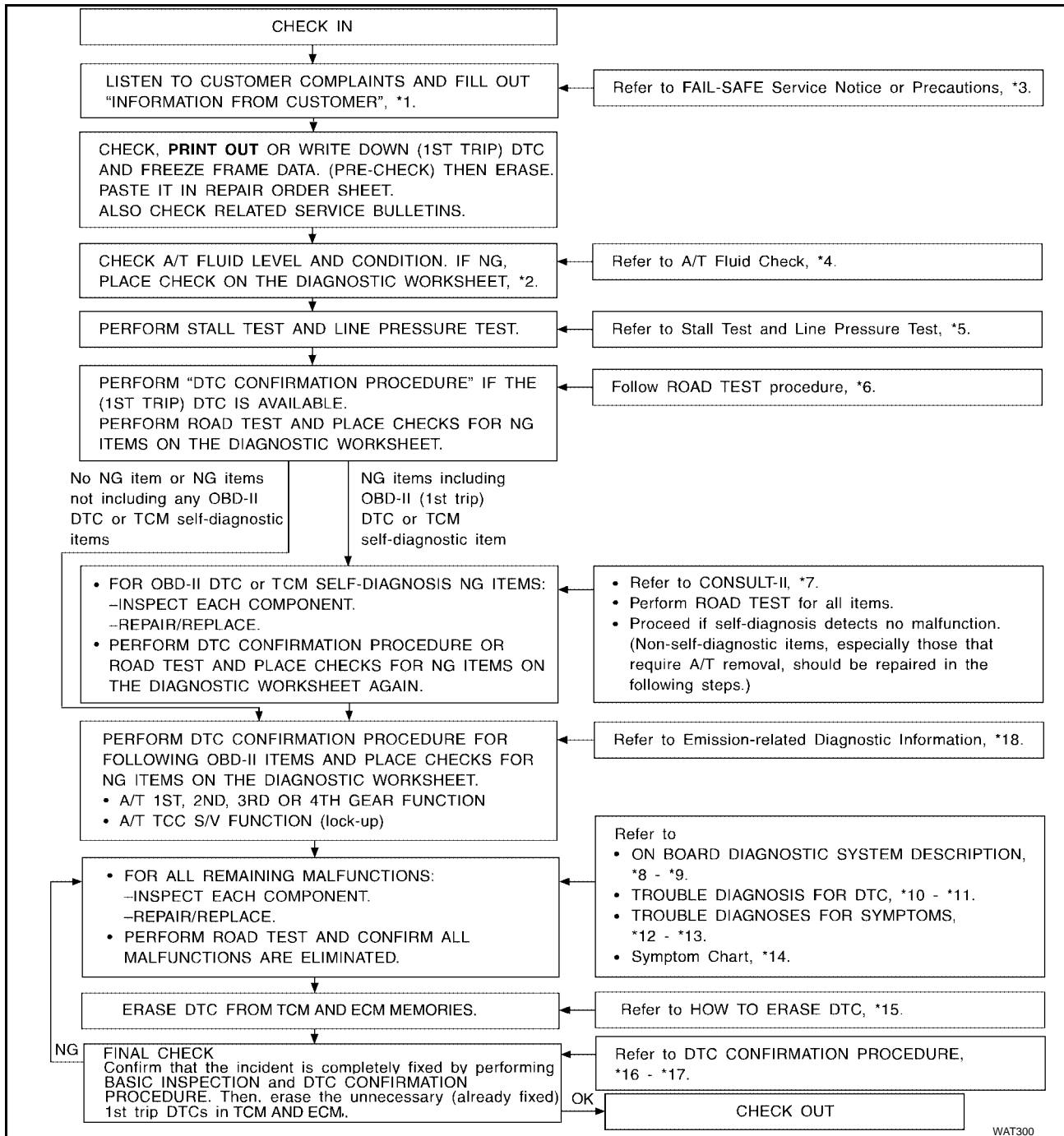
HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

ECS005WH

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" ([AT-58, "Information from Customer"](#)) and "Diagnostic Worksheet" ([AT-59, "Diagnostic Worksheet"](#)), to perform the best troubleshooting possible.

WORK FLOW CHART



*1 [AT-58, "Information from Customer"](#)

*2 [AT-59, "Diagnostic Worksheet"](#)

*3 [AT-11, "FAIL-SAFE"](#)

*4 [AT-64, "A/T Fluid Check"](#)

*5 [AT-64, "Stall Test", AT-68, "Line Pressure Test"](#)

*6 [AT-69, "Road Test"](#)

*7 [AT-42, "CONSULT-II"](#)

*8 [AT-38, "Introduction"](#)

*9 [AT-55, "Judgement of Self-diagnosis Code"](#)

*1 [AT-116, "Description"](#)

*1 [AT-214, "Description"](#)

*1 [AT-221, "1. O/D OFF Indicator Lamp Does Not Come On"](#)

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WAT300

TROUBLE DIAGNOSIS — INTRODUCTION

[RE4F03B]

<p>*1 AT-250. "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)"</p>	<p>*1 AT-85. "Symptom Chart"</p>	<p>*1 AT-40. "HOW TO ERASE DTC"</p>	A
<p>3</p>	<p>4</p>	<p>5</p>	B
<p>*1 AT-116. "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE"</p>	<p>*1 AT-214. "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE"</p>	<p>*1 EC-59. "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS" [QG18DE (ULEV)] or EC-640. "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS" [QG18DE (SULEV)].</p>	AT
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TROUBLE DIAGNOSIS — BASIC INSPECTION

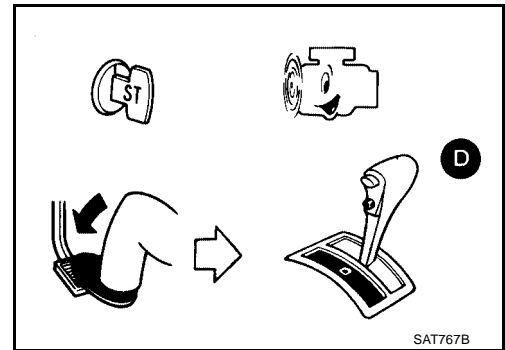
PF0:0000

A/T Fluid Check

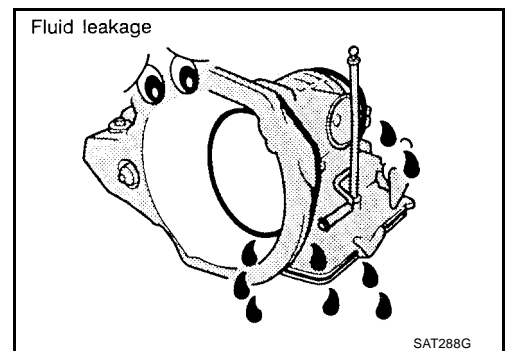
ECS005WJ

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.

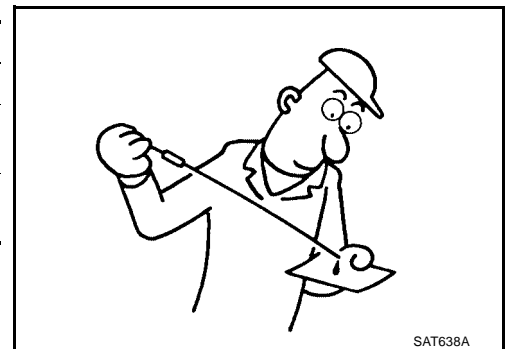


4. Check for fresh leakage.



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"](#) .

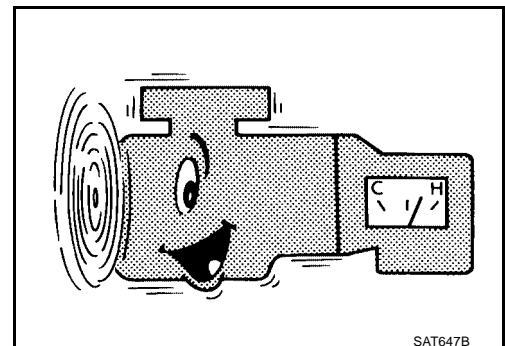
Stall Test

ECS005WJ

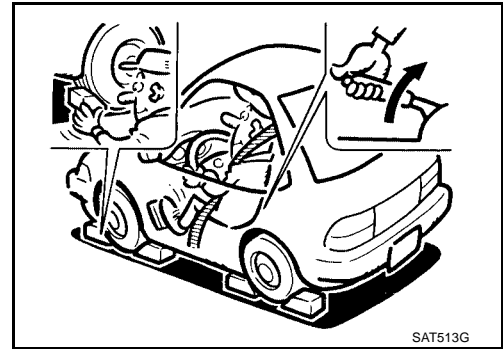
STALL TEST PROCEDURE

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.

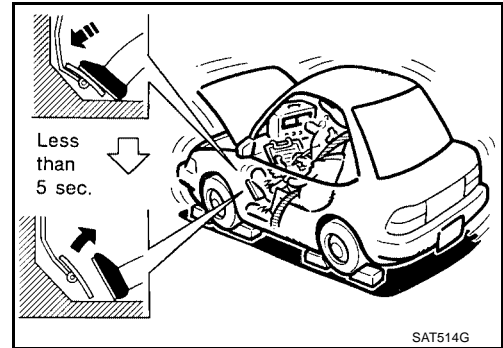
ATF operating temperature : 50 - 80°C (122 - 176°F)



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.

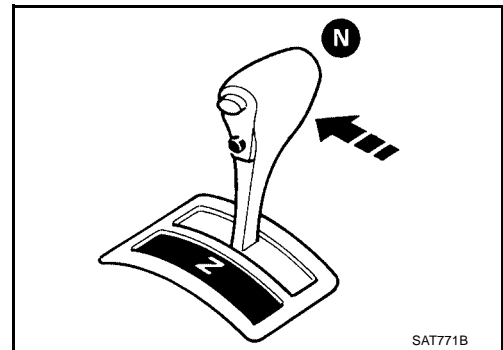


5. Start engine, apply foot brake, and place selector lever in "D" position.
6. Accelerate to wide open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.
 - During test, never hold throttle wide open for more than 5 seconds.



Stall revolution
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 [AT-61, "Work Flow"](#).

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

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TROUBLE DIAGNOSIS — BASIC INSPECTION

[RE4F03B]

-
- 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 slippage in torque converter

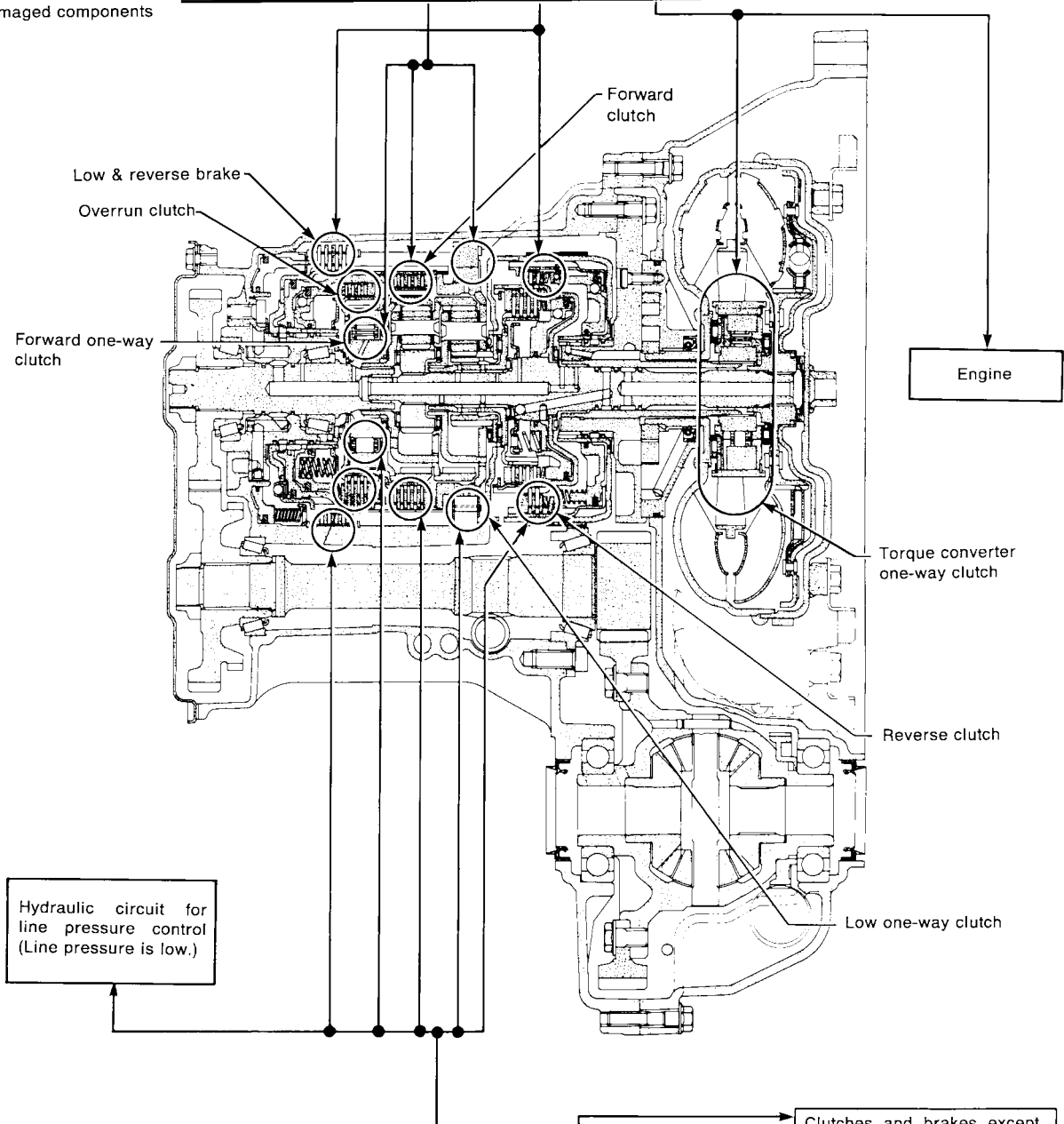
TROUBLE DIAGNOSIS — BASIC INSPECTION

[RE4F03B]

Selector lever position	Judgement		
	H	O	L
D	H	O	L
2	H	O	L
1	H	O	L
R	O	H	L

O : Stall revolution is normal.
 H : Stall revolution is higher than specified.
 L : Stall revolution is lower than specified.

Damaged components



D	H	O
2	H	O
1	H	O
R	H	O
Selector lever position	Judgement	

Clutches and brakes except high clutch and brake band are OK. (Condition of high clutch and brake band cannot be confirmed by stall test.)

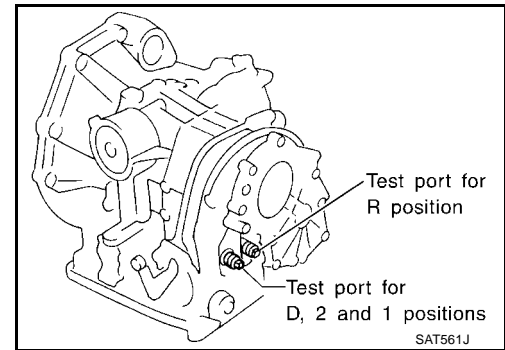
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Line Pressure Test LINE PRESSURE TEST PORTS

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

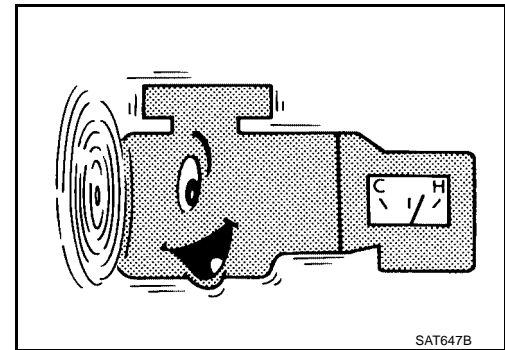
- Always replace pressure plugs as they are self-sealing bolts.



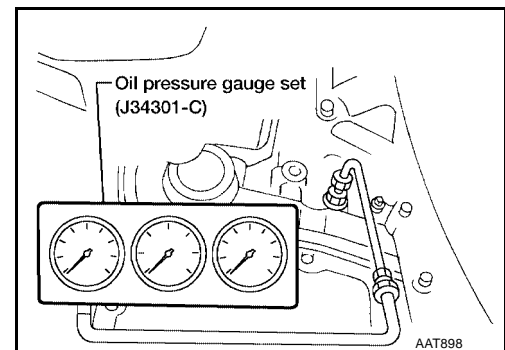
LINE PRESSURE TEST PROCEDURE

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

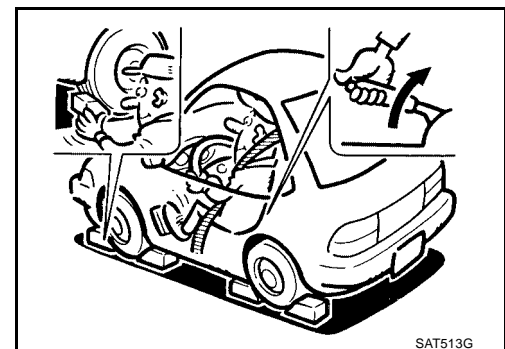
ATF operating temperature : 50 - 80°C (122 - 176°F)



3. Install pressure gauge to corresponding line pressure port.

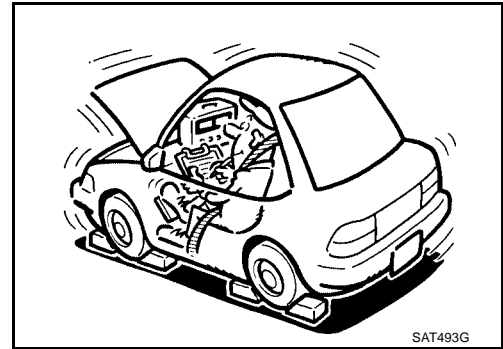


4. Set parking brake and block wheels.
 - Continue to depress brake pedal fully while line pressure test is being performed at stall speed.



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-68, "Line Pressure Test"](#) .



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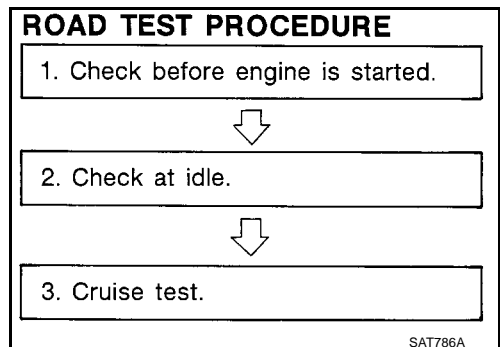
JUDGEMENT OF LINE PRESSURE TEST

Judgement		Suspected parts
At idle	Line pressure is low in all positions.	<ul style="list-style-type: none"> ● 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
	Line pressure is low in particular position.	<ul style="list-style-type: none"> ● Fluid pressure leakage between manual valve and particular clutch ● For example, line pressure is: <ul style="list-style-type: none"> – 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" .
	Line pressure is high.	<ul style="list-style-type: none"> ● 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.	<ul style="list-style-type: none"> ● 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

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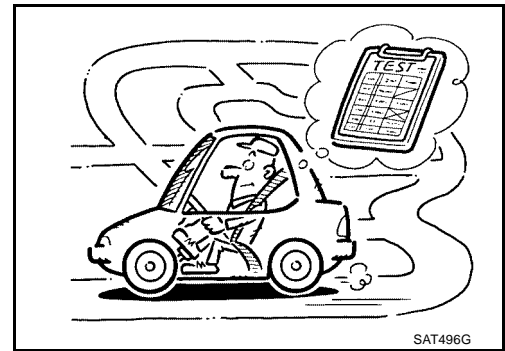
Road Test DESCRIPTION

- 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



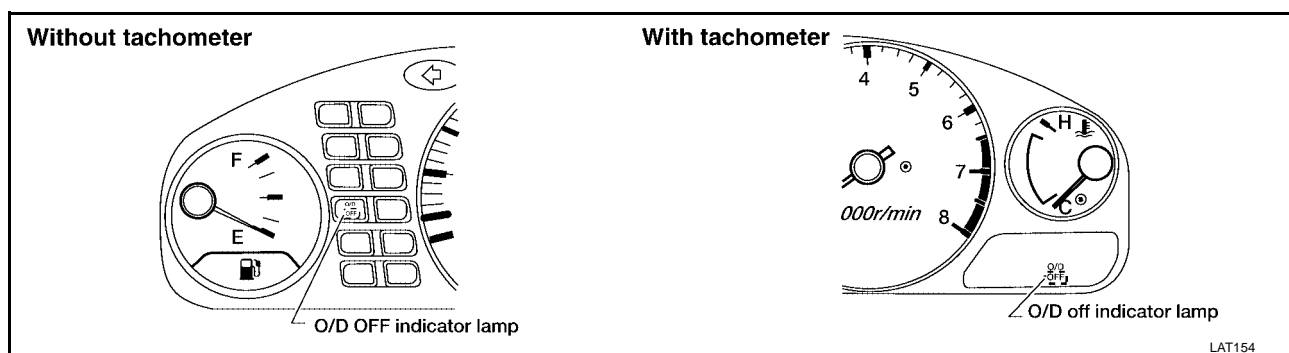
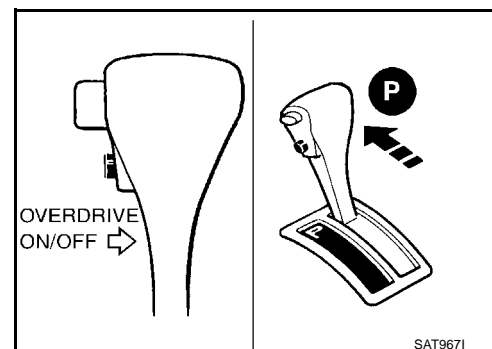
3. Cruise test

- 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 [AT-38, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION"](#) and [AT-216, "TROUBLE DIAGNOSES FOR SYMPTOMS"](#).



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?

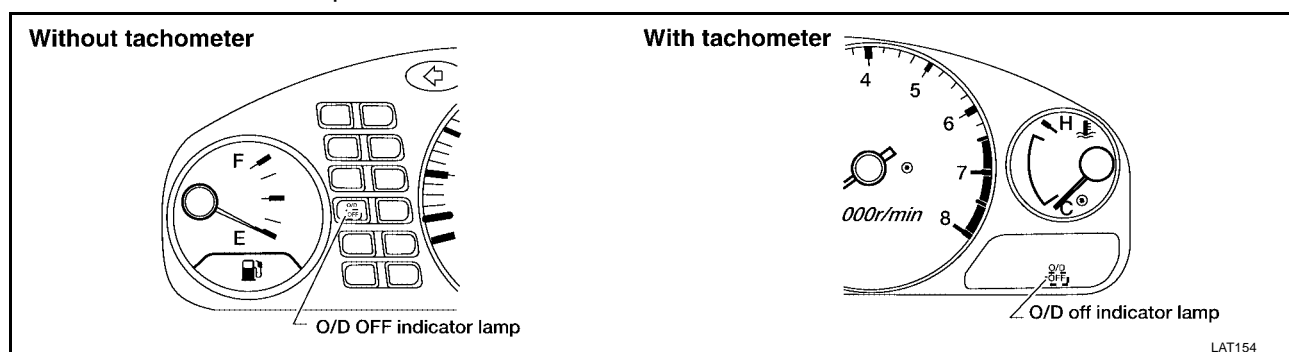
**Yes or No**

Yes >> GO TO 2.

No >> Stop ROAD TEST. Go to [AT-221, "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 [AT-59, "Diagnostic Worksheet"](#) . Refer to [AT-52, "TCM Self-diagnostic Procedure \(No Tools\)"](#) .

No >> 1. Turn ignition switch to "OFF" position.

2. Perform self-diagnosis and note NG items.

Refer to [AT-52, "TCM Self-diagnostic Procedure \(No Tools\)"](#) .

3. Go to [AT-72, "2. CHECK AT IDLE"](#) .

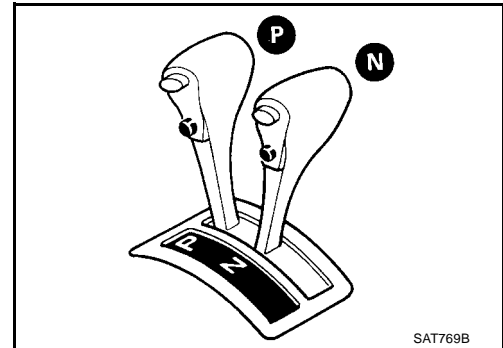
2. CHECK AT IDLE**1. CHECK ENGINE START**

1. Park vehicle on flat surface.
2. Move A/T 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 >> GO TO 2.

No >> Stop ROAD TEST. Mark the box on the DIAGNOSTIC WORKSHEET. Go to [AT-223](#), "[2. Engine Cannot Be Started In "P" and "N" Position](#)".

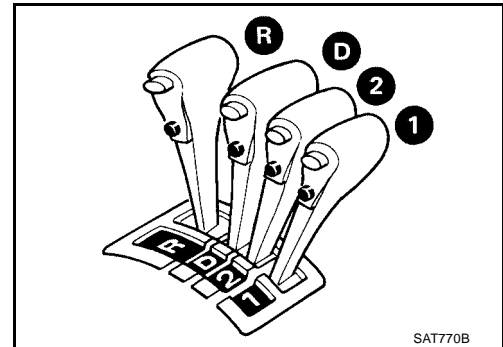
**2. CHECK ENGINE START**

1. Turn ignition switch to "ACC" position.
2. Move A/T selector lever to "D", "1", "2" or "R" position.
3. Turn ignition switch to "START" position.
4. Is engine started?

Yes or No

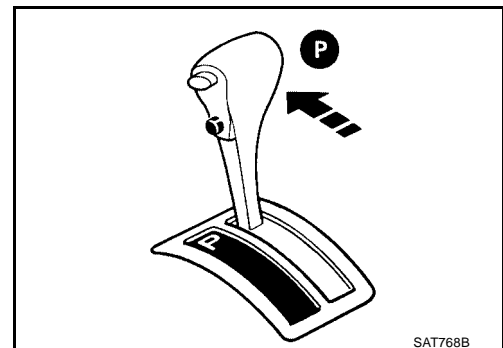
Yes >> Stop ROAD TEST. Mark the box on the DIAGNOSTIC WORKSHEET. Go to [AT-223](#), "[2. Engine Cannot Be Started In "P" and "N" Position](#)".

No >> GO TO 3.

**3. CHECK VEHICLE MOVE**

1. Move A/T selector lever to "P" position.
2. Turn ignition switch to "OFF" position.
3. Release parking brake.

>> GO TO 4.

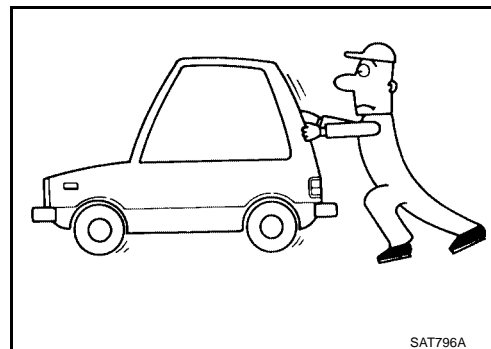


4. CHECK VEHICLE MOVE

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-224, "3. In "P" Position, Vehicle Moves Forward Or Backward When Pushed"](#) . Continue ROAD TEST.
- No >> GO TO 5.

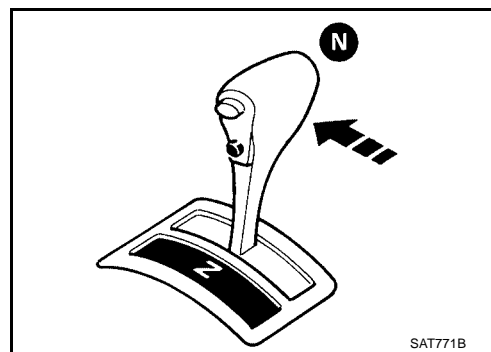


5. CHECK VEHICLE MOVE

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

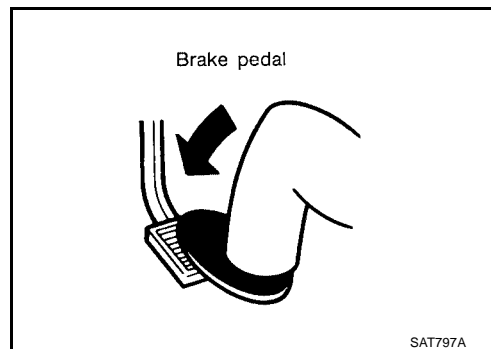
Yes or No

- Yes >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to [AT-225, "4. In "N" Position, Vehicle Moves"](#) . Continue ROAD TEST.
- No >> GO TO 6.



6. CHECK SHIFT SHOCK

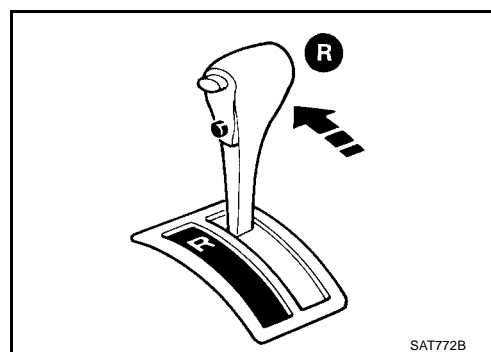
1. Apply foot brake.



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 [AT-226, "5. Large Shock. "N" → "R" Position"](#) . Continue ROAD TEST.
- No >> GO TO 7.



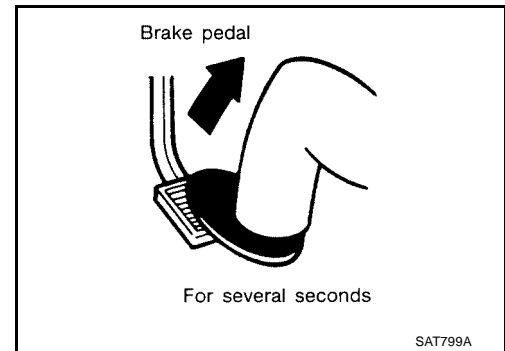
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7. CHECK VEHICLE MOVE

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

Yes or No

- Yes >> GO TO 8.
 No >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to [AT-227, "6. Vehicle Does Not Creep Backward In "R" Position"](#) . Continue ROAD TEST.

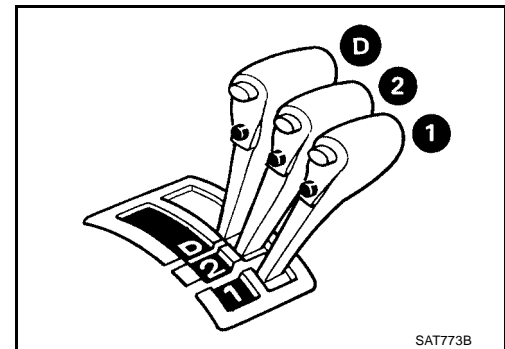


8. CHECK VEHICLE MOVE

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

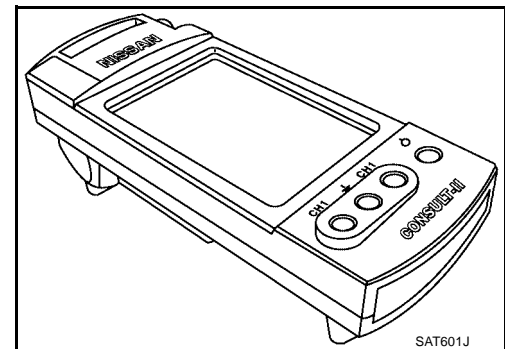
Yes or No

- Yes >> Go to [AT-74, "3. CRUISE TEST"](#) .
 No >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to [AT-229, "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.

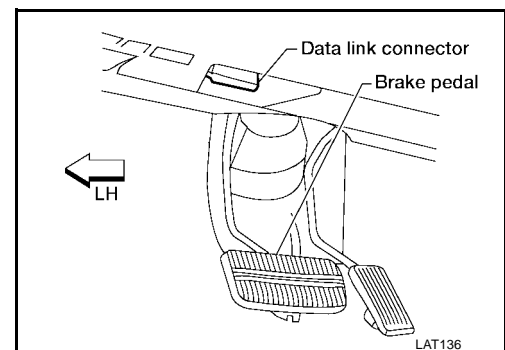


Ⓜ With CONSULT-II

- 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

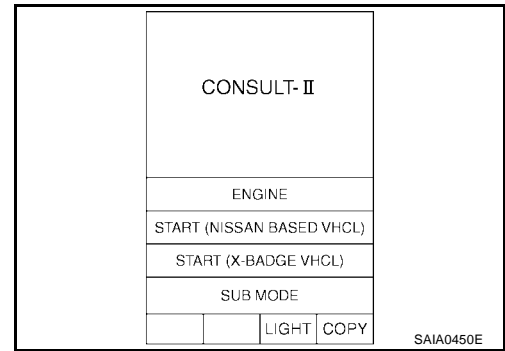
1. Turn ignition switch "OFF".
2. Connect CONSULT-II to Data link connector which is located in left side lower dash panel.



TROUBLE DIAGNOSIS — BASIC INSPECTION

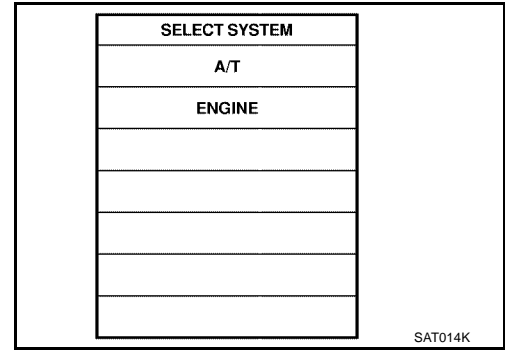
[RE4F03B]

3. Turn ignition switch "ON".
4. Touch "START (NISSAN BASED VHCL)".



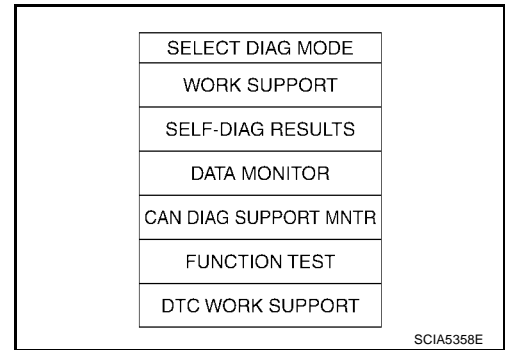
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5. Touch "A/T".



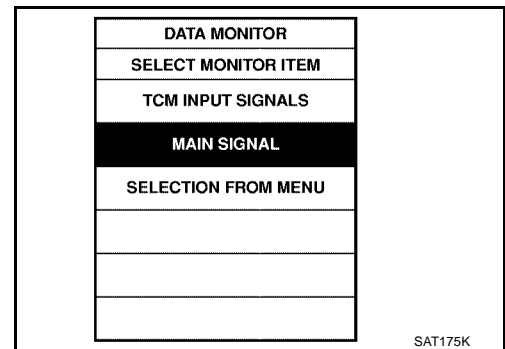
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6. Touch "DATA MONITOR".



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

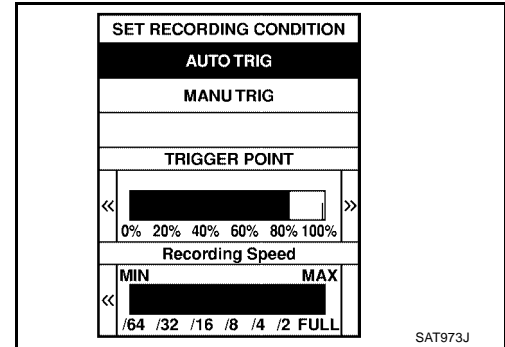


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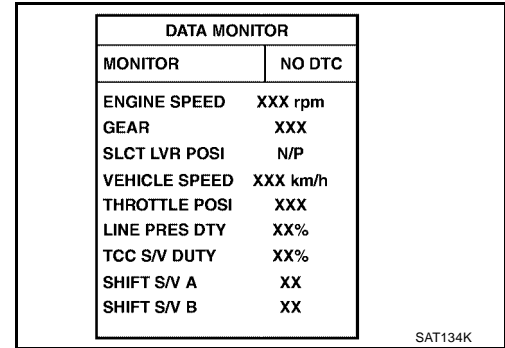
TROUBLE DIAGNOSIS — BASIC INSPECTION

[RE4F03B]

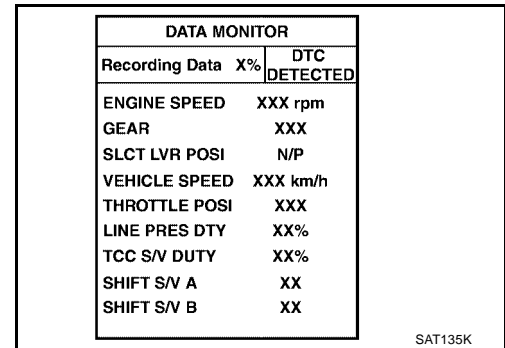
9. Touch "SETTING" to recording condition ("AUTO TRIG" or "MANU TRIG") and touch "BACK".
10. Touch "START".



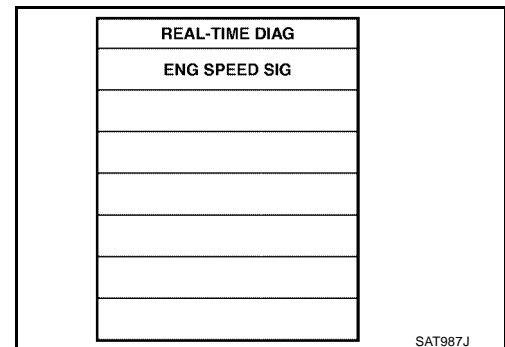
11. When performing cruise test, touch "RECORD".



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



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



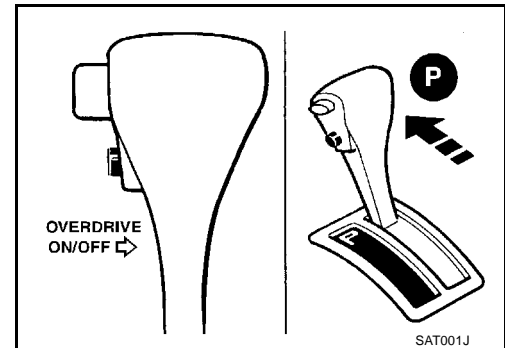
Cruise Test — Part 1

1. CHECK STARTING GEAR (D1) POSITION

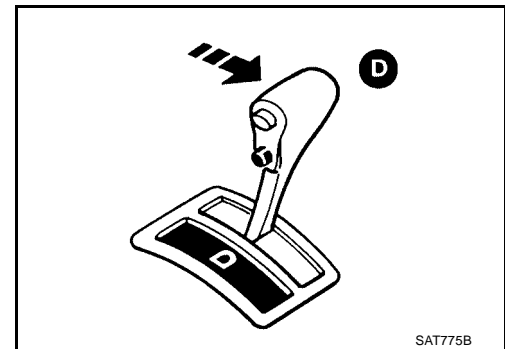
1. Drive vehicle for approx. 10 minutes to warm engine oil and ATF up to operating temperature.

ATF operating temperature : 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.

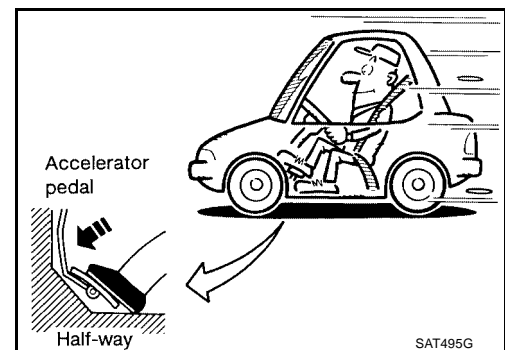


7. Accelerate vehicle by constantly depressing accelerator pedal halfway.
8. Does vehicle start from D1 ?

Ⓜ **Read gear position.**

Yes or No

- Yes >> GO TO 2.
 No >> Go to [AT-231, "8. Vehicle Cannot Be Started From D1"](#).
 Continue ROAD TEST.



2. CHECK SHIFT UP (D1 TO D2)

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

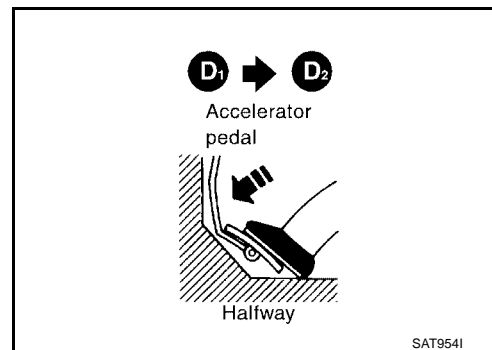
④ Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D1 to D2 : Refer to AT-386, "Shift Schedule" .

Yes or No

Yes >> GO TO 3.

No >> Go to AT-234, "9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2" . Continue ROAD TEST.



3. CHECK SHIFT UP (D2 TO D3)

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

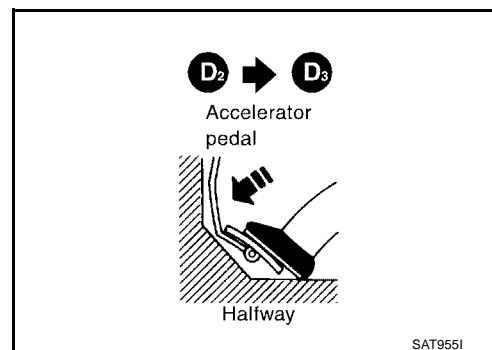
④ Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D2 to D3 : Refer to AT-386, "Shift Schedule" .

Yes or No

Yes >> GO TO 4.

No >> Go to AT-236, "10. A/T Does Not Shift: D2 → D3" . Continue ROAD TEST.



4. CHECK SHIFT UP (D3 TO D4)

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

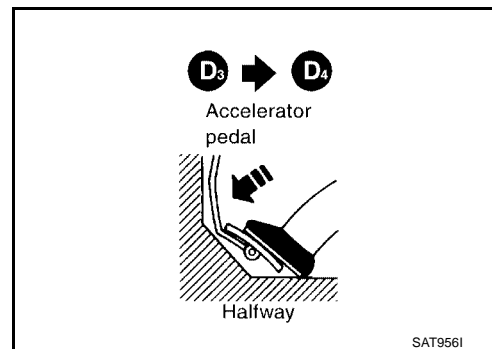
④ Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D3 to D4 : Refer to AT-386, "Shift Schedule" .

Yes or No

Yes >> GO TO 5.

No >> Go to AT-238, "11. A/T Does Not Shift: D3 → D4" . Continue ROAD TEST.



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5. CHECK LOCK-UP (D4 TO D4 L/U)

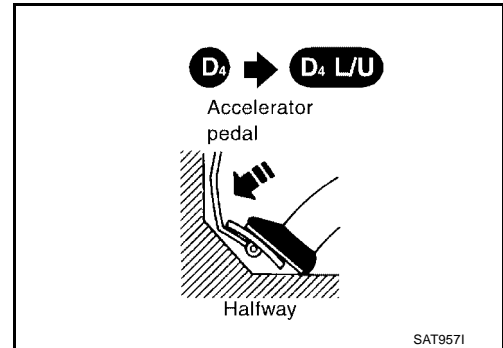
Does A/T perform lock-up at the specified speed?

Ⓢ Read vehicle speed, throttle position when lock-up duty becomes 94%.

Specified speed when lock-up occurs : Refer to [AT-386, "Shift Schedule"](#) .

Yes or No

- Yes >> GO TO 6.
- No >> Go to [AT-240, "12. A/T Does Not Perform Lock-up"](#) . Continue ROAD TEST.



6. CHECK HOLD LOCK-UP

Does A/T hold lock-up condition for more than 30 seconds?

Yes or No

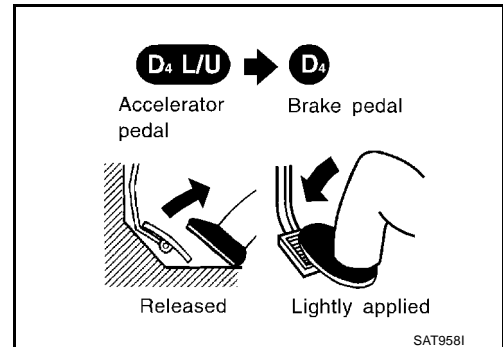
- Yes >> GO TO 7.
- No >> Go to [AT-241, "13. A/T Does Not Hold Lock-up Condition"](#) .

7. CHECK SHIFT DOWN (D4 L/U TO D4)

1. Release accelerator pedal.
2. Is lock-up released when accelerator pedal is released?

Yes or No

- Yes >> GO TO 8.
- No >> Go to [AT-243, "14. Lock-up Is Not Released"](#) . Continue ROAD TEST.



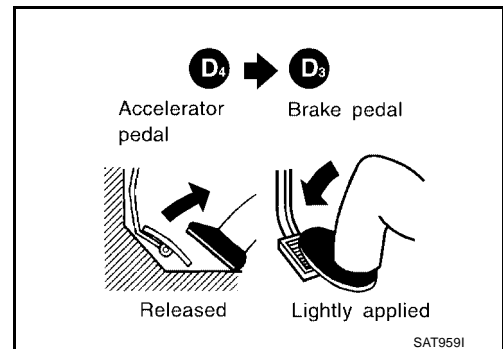
8. CHECK SHIFT DOWN (D4 TO D3)

1. Decelerate vehicle by applying foot brake lightly.
2. Does engine speed return to idle smoothly when A/T is shifted from D4 to D3 ?

Ⓢ Read gear position and engine speed.

Yes or No

- Yes >> 1. Stop vehicle.
2. Go to [AT-81, "Cruise Test — Part 2"](#) .
- No >> Go to [AT-244, "15. Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) . Continue ROAD TEST.



Cruise Test — Part 2

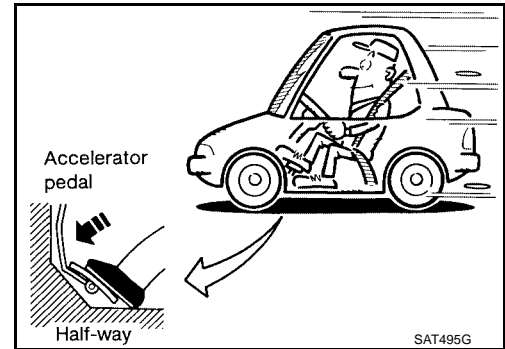
1. CHECK STARTING GEAR (D1) POSITION

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 ?

 **Read gear position.**

Yes or No

- Yes >> GO TO 2.
- No >> Go to [AT-245, "16. Vehicle Does Not Start From D1"](#) . Continue ROAD TEST.



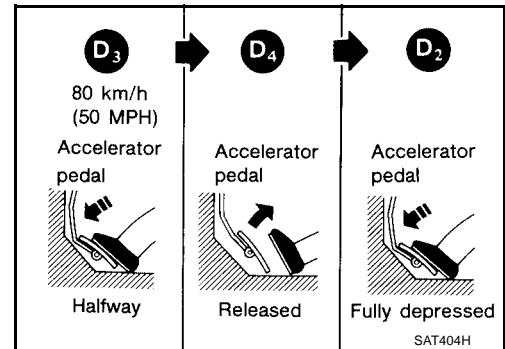
2. CHECK SHIFT UP AND SHIFT DOWN (D3 TO D4 TO D2)

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?

 **Read gear position and throttle position.**

Yes or No

- Yes >> GO TO 3.
- No >> Go to [AT-234, "9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2"](#) . Continue ROAD TEST.



3. CHECK SHIFT UP (D2 TO D3)

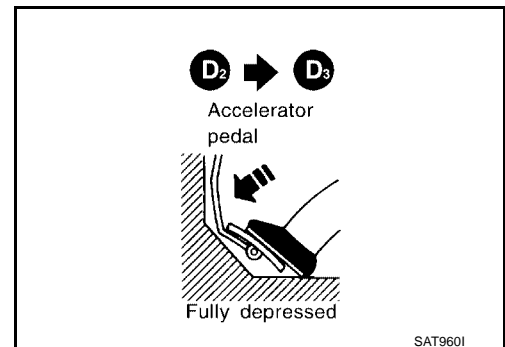
Does A/T shift from D2 to D3 at the specified speed?

 **Read gear position, throttle position and vehicle speed.**

Specified speed when shifting from D2 to D3 : Refer to [AT-386, "Shift Schedule"](#) .

Yes or No

- Yes >> GO TO 4.
- No >> Go to [AT-236, "10. A/T Does Not Shift: D2 → D3"](#) . Continue ROAD TEST.



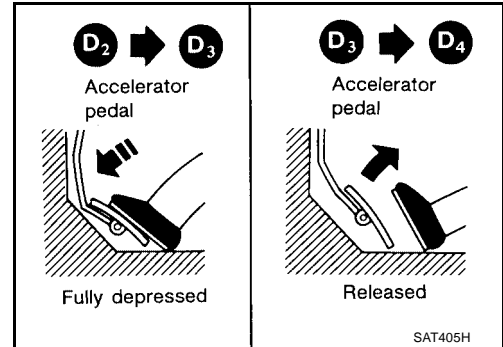
4. CHECK SHIFT UP (D₃ TO D₄) AND ENGINE BRAKE

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

 **Read gear position, throttle position and vehicle speed.**

Yes or No

- Yes >> 1. Stop vehicle.
2. Go to [AT-83, "Cruise Test — Part 3"](#).
- No >> Go to [AT-238, "11. A/T Does Not Shift: D₃ → D₄"](#). Continue ROAD TEST.



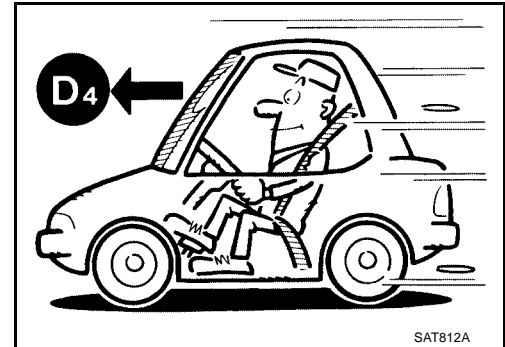
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Cruise Test — Part 3

1. VEHICLE SPEED D4 POSITION

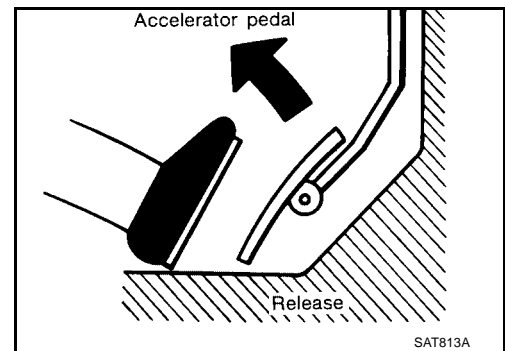
1. Confirm overdrive control switch is in "ON" position.
2. Confirm selector lever is in "D" position.
3. Accelerate vehicle using half-throttle to D4 .

>> GO TO 2.



2. CHECK SHIFT DOWN (D4 TO D3)

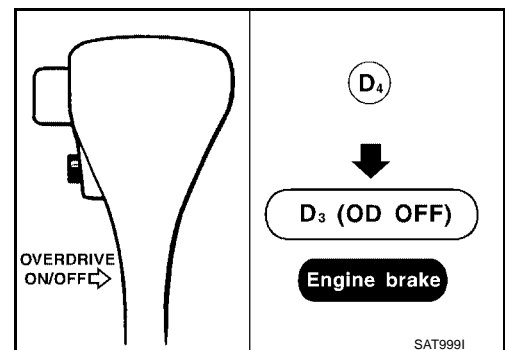
1. Release accelerator pedal.
2. Set overdrive control switch to "OFF" position while driving in D4 .
3. Does A/T shift from D4 to D3 (O/D OFF)?



Read gear position and vehicle speed.

Yes or No

- Yes >> GO TO 3.
- No >> Go to [AT-247, "17. A/T Does Not Shift: D4 → D3 , When Overdrive Control Switch "ON" → "OFF" .](#) Continue ROAD TEST.

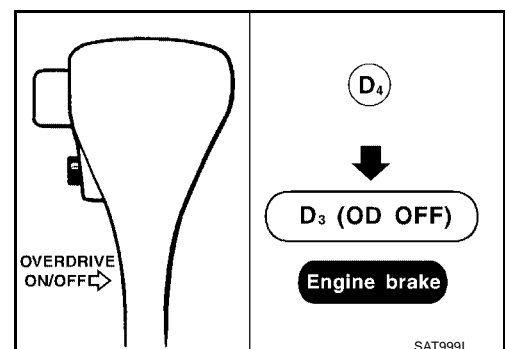


3. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> GO TO 4.
- No >> Go to [AT-244, "15. Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\) .](#) Continue ROAD TEST.



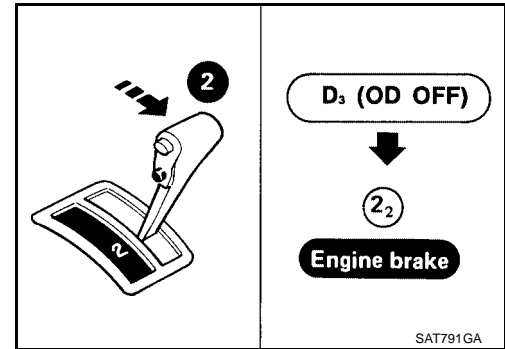
4. CHECK SHIFT DOWN (D3 TO D2)

1. Move A/T 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 D2 ?

 **Read gear position.**

Yes or No

- Yes >> GO TO 5.
 No >> Go to [AT-248, "18. A/T Does Not Shift: D3 → 2₂ , When Selector Lever "D" → "2" Position"](#) . Continue ROAD TEST.

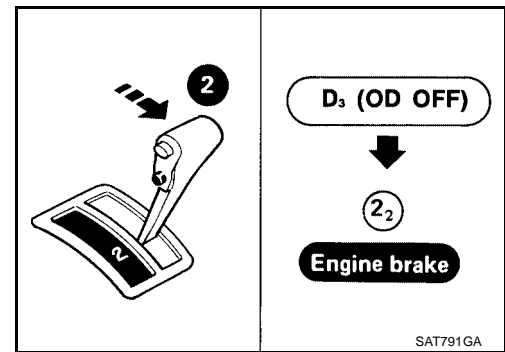


5. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> GO TO 6.
 No >> Go to [AT-244, "15. Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) . Continue ROAD TEST.



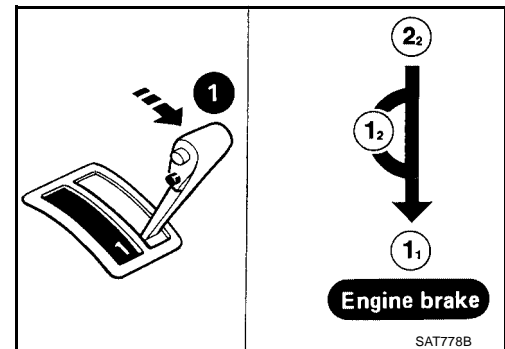
6. CHECK SHIFT DOWN

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?

 **Read gear position.**

Yes or No

- Yes >> GO TO 7.
 No >> Go to [AT-249, "19. A/T Does Not Shift: 2₂ → 1₁ , When Selector Lever "2" → "1" Position"](#) . Continue ROAD TEST.

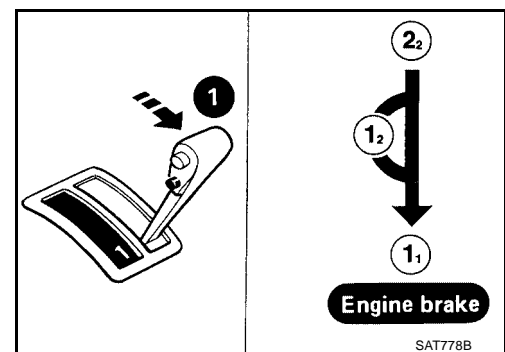


7. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> 1. Stop vehicle.
 2. Perform self-diagnosis. Refer to [AT-52, "TCM Self-diagnostic Procedure \(No Tools\)"](#) .
 No >> Go to [AT-250, "20. Vehicle Does Not Decelerate By Engine Brake"](#) . Continue ROAD TEST.



TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

PF0:0000

ECS005WM

Symptom Chart

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

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Not Used	Engine cannot start in "P" and "N" positions. AT-223, "2. Engine Cannot Be Started In "P" and "N" Position"	ON vehicle	1. Ignition switch and starter	PG-2, "POWER SUPPLY ROUTING" and SC-9, "STARTING SYSTEM"	
			2. Control cable adjustment	AT-263, "Control Cable Adjustment"	
			3. PNP switch adjustment	AT-263, "Park/Neutral Position (PNP) Switch Adjustment"	
	Engine starts in position other than "N" and "P" positions. AT-223, "2. Engine Cannot Be Started In "P" and "N" Position"	ON vehicle	1. Control cable adjustment	AT-263, "Control Cable Adjustment"	
			2. PNP switch adjustment	AT-263, "Park/Neutral Position (PNP) Switch Adjustment"	
Not Used	Transaxle noise in "P" and "N" positions.	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
			2. Line pressure test	AT-68, "Line Pressure Test"	
			3. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"	
		OFF vehicle	5. Oil pump	AT-293, "Components"	
			6. Torque converter	AT-273, "Disassembly"	

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Not Used	Vehicle moves when changing into "P" position, or parking gear does not disengage when shifted out of "P" position. AT-224, "3. In "P" Position, Vehicle Moves Forward Or Backward When Pushed"	ON vehicle	1. Control cable adjustment	AT-263, "Control Cable Adjustment"	
		OFF vehicle	2. Parking components	AT-268, "Components"	
	Vehicle moves in "N" position. AT-225, "4. In "N" Position, Vehicle Moves"	ON vehicle	1. Control cable adjustment	AT-263, "Control Cable Adjustment"	
		OFF vehicle	2. Forward clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"	
			3. Reverse clutch	AT-314, "REVERSE CLUTCH"	
			4. Overrun clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"	
Slips/Will Not Engage	Vehicle will not run in "R" position (but runs in "D", "2" and "1" positions). Clutch slips. Very poor acceleration. AT-227, "6. Vehicle Does Not Creep Backward In "R" Position"	ON vehicle	1. Control cable adjustment	AT-263, "Control Cable Adjustment"	
			2. Stall test	AT-64, "Stall Test"	
			3. Line pressure test	AT-68, "Line Pressure Test"	
			4. Line pressure solenoid valve	AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE"	
			5. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	6. Reverse clutch	AT-314, "REVERSE CLUTCH"	
			7. High clutch	AT-319, "HIGH CLUTCH"	
			8. Forward clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"	
			9. Overrun clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"	
			10. Low & reverse brake	AT-333, "LOW & REVERSE BRAKE"	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Not Used	Vehicle braked when shifting into "R" position.	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
			2. Line pressure test	AT-68, "Line Pressure Test"	
			3. Line pressure solenoid valve	AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE"	
			4. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	5. High clutch	AT-319, "HIGH CLUTCH"	
			6. Brake band	AT-349, "Components"	
			7. Forward clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"	
			8. Overrun clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"	
Shift Shock	Sharp shock in shifting from "N" to "D" position.	ON vehicle	1. Engine idling rpm	EC-624, "Idle Speed/ Ignition Timing/ Idle Mixture Ratio Adjustment"	EC-43, "Idle Speed/ Ignition Timing/Idle Mixture Ratio Adjustment"
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			3. Line pressure test	AT-68, "Line Pressure Test"	
			4. A/T fluid temperature sensor	AT-121, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"	
			5. Engine speed signal	AT-132, "DTC P0725 ENGINE SPEED SIGNAL"	
			6. Line pressure solenoid valve	AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE"	
			7. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
			8. Accumulator N-D	AT-298, "Components"	
		OFF vehicle	9. Forward clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"	

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Slips/Will Not Engage	Vehicle will not run in "D" and "2" positions (but runs in "1" and "R" positions).	ON vehicle	1. Control cable adjustment	AT-263, "Control Cable Adjustment"	
		OFF vehicle	2. Low one-way clutch	AT-268, "Components"	
	Vehicle will not run in "D", "1", "2" positions (but runs in "R" position). Clutch slips. Very poor acceleration.	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
			2. Stall test	AT-64, "Stall Test"	
			3. Line pressure test	AT-68, "Line Pressure Test"	
			4. Line pressure solenoid valve	AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE"	
			5. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
			6. Accumulator N-D	AT-298, "Components"	
	OFF vehicle	7. Reverse clutch	AT-314, "REVERSE CLUTCH"		
		8. High clutch	AT-319, "HIGH CLUTCH"		
		9. Forward clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"		
10. Forward one-way clutch		AT-338, "Components"			
11. Low one-way clutch		AT-268, "Components"			

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Slips/Will Not Engage	Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-64. "FLUID LEVEL CHECK"	
			2. Control cable adjustment	AT-263. "Control Cable Adjustment"	
			3. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			4. Line pressure test	AT-68. "Line Pressure Test"	
			5. Line pressure solenoid valve	AT-174. "DTC P0745 LINE PRESSURE SOLENOID VALVE"	
			6. Control valve assembly	AT-298. "CONTROL VALVE ASSEMBLY"	
			7. Accumulator N-D	AT-298. "Components"	
			8. Shift solenoid valve A	AT-180. "DTC P0750 SHIFT SOLENOID VALVE A"	
			9. Shift solenoid valve B	AT-184. "DTC P0755 SHIFT SOLENOID VALVE B"	
			10. Overrun clutch solenoid	AT-194. "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"	
			11. Torque converter clutch solenoid valve	AT-160. "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"	
		OFF vehicle	12. Forward clutch	AT-325. "FORWARD CLUTCH AND OVERRUN CLUTCH"	
			13. Reverse clutch	AT-314. "REVERSE CLUTCH"	
			14. Low & reverse brake	AT-333. "LOW & REVERSE BRAKE"	
			15. Oil pump	AT-293. "OIL PUMP"	
			16. Torque converter	AT-268. "Components"	
Not Used	Excessive creep.	ON vehicle	1. Engine idling rpm	EC-624. "Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment"	EC-43. "Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Slips/Will Not Engage	No creep at all. AT-227, "6. Vehicle Does Not Creep Backward In "R" Position" , AT-229, "7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
			2. Line pressure test	AT-68, "Line Pressure Test"	
			3. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	4. Forward clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"	
			5. Oil pump	AT-293, "OIL PUMP"	
			6. Torque converter	AT-268, "Components"	
No Up Shift	Failure to change gear from "D1 " to "D2 ".	ON vehicle	1. Control cable adjustment	AT-263, "Control Cable Adjustment"	
			2. Shift solenoid valve A	AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"	
			3. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)" , AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"	
			5. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
		OFF vehicle	6. Brake band	AT-349, "Components"	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
No Up Shift	Failure to change gear from "D2 " to "D3 ".	ON vehicle	1. Control cable adjustment	AT-263, "Control Cable Adjustment"	
			2. Shift solenoid valve B	AT-184, "DTC P0755 SHIFT SOLENOID VALVE B"	
			3. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"	
			5. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
		OFF vehicle	6. High clutch	AT-319, "HIGH CLUTCH"	
		7. Brake band	AT-349, "Components"		

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
No Up Shift	Failure to change gear from "D3" to "D4".	ON vehicle	1. PNP switch adjustment	AT-263. "Park/Neutral Position (PNP) Switch Adjustment"	
			2. Overdrive control switch	AT-250. "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)"	
			3. Shift solenoid valve A	AT-180. "DTC P0750 SHIFT SOLENOID VALVE A"	
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-127. "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-204. "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"	
			5. A/T fluid temperature sensor	AT-121. "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"	
			6. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
		OFF vehicle	7. Brake band	AT-349. "Components"	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Improper Shift Timing	Too high a gear change point from "D1" to "D2", from "D2" to "D3", from "D3" to "D4". AT-234, "9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2" , AT-236, "10. A/T Does Not Shift: D2 → D3" , AT-238, "11. A/T Does Not Shift: D3 → D4"	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR" or AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)"	
			3. Shift solenoid valve A	AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"	
			4. Shift solenoid valve B	AT-184, "DTC P0755 SHIFT SOLENOID VALVE B"	
	Gear change directly from "D1" to "D3" occurs.	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
		OFF vehicle	2. Accumulator servo release	AT-298, "Components"	
			3. Brake band	AT-349, "Components"	
	Not Used	Engine stops when shifting lever into "R", "D", "2" and "1".	ON vehicle	1. Engine idling rpm	EC-624, "Idle Speed/ Ignition Timing/ Idle Mixture Ratio Adjustment"
2. Fluid level				AT-64, "FLUID LEVEL CHECK"	
3. Torque converter clutch solenoid valve				AT-160, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"	
4. Control valve assembly				AT-298, "CONTROL VALVE ASSEMBLY"	
OFF vehicle			5. Torque converter	AT-268, "Components"	

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Shift Shock	Too sharp a shock in change from "D1 " to "D2 ".	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			2. Line pressure test	AT-68, "Line Pressure Test"	
			3. Accumulator servo release	AT-298, "Components"	
			4. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
			5. A/T fluid temperature sensor	AT-121, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"	
		OFF vehicle	6. Brake band	AT-349, "Components"	
Shift Shock	Too sharp a shock in change from "D2 " to "D3 ".	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			2. Line pressure test	AT-68, "Line Pressure Test"	
			3. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
			4. A/T fluid temperature sensor	AT-121, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"	
		OFF vehicle	5. High clutch	AT-319, "HIGH CLUTCH"	
			6. Brake band	AT-349, "Components"	
Shift Shock	Too sharp a shock in change from "D3 " to "D4 ".	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			2. Line pressure test	AT-68, "Line Pressure Test"	
			3. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
			4. A/T fluid temperature sensor	AT-121, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"	
		OFF vehicle	5. Brake band	AT-349, "Components"	
			6. Forward one-way clutch	AT-325, "Components"	
			7. Overrun clutch	AT-325, "FORWARD CLUTCH AND OVERRUN CLUTCH"	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Slips/Will Not Engage	Almost no shock or clutches slipping in change from "D1 " to "D2 ".	ON vehicle	1. Fluid level	AT-64. "FLUID LEVEL CHECK"	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			3. Line pressure test	AT-68. "Line Pressure Test"	
			4. Accumulator servo release	AT-298. "Components"	
			5. Control valve assembly	AT-298. "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	6. Brake band	AT-349. "Components"	
	Almost no shock or slipping in change from "D2 " to "D3 ".	ON vehicle	1. Fluid level	AT-64. "FLUID LEVEL CHECK"	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			3. Line pressure test	AT-68. "Line Pressure Test"	
			4. Control valve assembly	AT-298. "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	5. High clutch	AT-319. "HIGH CLUTCH"	
6. Brake band			AT-349. "Components"		
Slips/Will Not Engage	Almost no shock or slipping in change from "D3 " to "D4 ".	ON vehicle	1. Fluid level	AT-64. "FLUID LEVEL CHECK"	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			3. Line pressure test	AT-68. "Line Pressure Test"	
			4. Control valve assembly	AT-298. "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	5. Brake band	AT-349. "Components"	

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Not Used	Vehicle braked by gear change from "D1 " to "D2 ".	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
		OFF vehicle	2. Reverse clutch	AT-314, "REVERSE CLUTCH"	
			3. Low & reverse brake	AT-333, "LOW & REVERSE BRAKE"	
			4. High clutch	AT-319, "HIGH CLUTCH"	
			5. Low one-way clutch	AT-268, "Components"	
	Vehicle braked by gear change from "D2 " to "D3 ".	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
		OFF vehicle	2. Brake band	AT-349, "Components"	
	Vehicle braked by gear change from "D3 " to "D4 ".	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
		OFF vehicle	2. Overrun clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"	
			3. Forward one-way clutch	AT-338, "Components"	
			4. Reverse clutch	AT-314, "REVERSE CLUTCH"	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Not Used	Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-64. "FLUID LEVEL CHECK"	
			2. PNP switch adjustment	AT-263. "Park/Neutral Position (PNP) Switch Adjustment"	
			3. Overdrive control switch	AT-250. "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)"	
			4. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			5. Vehicle speed sensor · A/T (revolution sensor) and vehicle speed sensor · MTR	AT-127. "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"	
			6. Shift solenoid valve A	AT-180. "DTC P0750 SHIFT SOLENOID VALVE A"	
			7. Shift solenoid valve B	AT-184. "DTC P0755 SHIFT SOLENOID VALVE B"	
			8. Control valve assembly	AT-298. "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	9. Reverse clutch	AT-314. "REVERSE CLUTCH"	
			10. High clutch	AT-319. "HIGH CLUTCH"	
			11. Brake band	AT-349. "Components"	
			12. Low & reverse brake	AT-333. "LOW & REVERSE BRAKE"	
			13. Oil pump	AT-293. "OIL PUMP"	
			14. Torque converter	AT-268. "Components"	

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
No Down Shift	Failure to change gear from "D4" to "D3".	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			3. Overrun clutch solenoid valve	AT-194, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"	
			4. Shift solenoid valve A	AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"	
			5. Line pressure solenoid valve	AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE"	
			6. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	7. Brake band	AT-349, "Components"	
			8. Overrun clutch	AT-325, "FORWARD CLUTCH AND OVERRUN CLUTCH"	
	Failure to change gear from "D3" to "D2" or from "D4" to "D2".	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			3. Shift solenoid valve A	AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"	
			4. Shift solenoid valve B	AT-184, "DTC P0755 SHIFT SOLENOID VALVE B"	
			5. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	6. High clutch	AT-319, "HIGH CLUTCH"	
7. Brake band			AT-349, "Components"		

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
No Down Shift	Failure to change gear from "D2 " to "D1 " or from "D3 " to "D1 ".	ON vehicle	1. Fluid level	AT-64. "FLUID LEVEL CHECK"	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			3. Shift solenoid valve A	AT-180. "DTC P0750 SHIFT SOLENOID VALVE A"	
			4. Shift solenoid valve B	AT-184. "DTC P0755 SHIFT SOLENOID VALVE B"	
		5. Control valve assembly	AT-298. "CONTROL VALVE ASSEMBLY"		
		OFF vehicle	6. Low one-way clutch	AT-268. "Components"	
			7. High clutch	AT-319. "HIGH CLUTCH"	
			8. Brake band	AT-349. "Components"	
Shift Shock	Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			2. Line pressure test	AT-68. "Line Pressure Test"	
			3. Overrun clutch solenoid valve	AT-194. "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"	
			4. Control valve assembly	AT-298. "CONTROL VALVE ASSEMBLY"	
Improper Shift Timing	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-188. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-127. "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-204. "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"	

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Improper Shift Timing	Kickdown does not operate when depressing pedal in "D4 " within kickdown vehicle speed.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			2. Revolution sensor and vehicle speed sensor	AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"	
			3. Shift solenoid valve A	AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"	
			4. Shift solenoid valve B	AT-184, "DTC P0755 SHIFT SOLENOID VALVE B"	
	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 vehicle speed sensor-MTR	AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			3. Shift solenoid valve A	AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"	
			4. Shift solenoid valve B	AT-184, "DTC P0755 SHIFT SOLENOID VALVE B"	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Slips/Will Not Engage	Races extremely fast or slips in changing from "D4 " to "D3 " when depressing pedal.	ON vehicle	1. Fluid level	AT-64. "FLUID LEVEL CHECK"	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			3. Line pressure test	AT-68. "Line Pressure Test"	
			4. Line pressure solenoid valve	AT-174. "DTC P0745 LINE PRESSURE SOLENOID VALVE"	
			5. Shift solenoid valve A	AT-180. "DTC P0750 SHIFT SOLENOID VALVE A"	
			6. Control valve assembly	AT-298. "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	7. Brake band	AT-349. "Components"	
			8. Forward clutch	AT-325. "FORWARD CLUTCH AND OVER-RUN CLUTCH"	
	Races extremely fast or slips in changing from "D4 " to "D2 " when depressing pedal.	ON vehicle	1. Fluid level	AT-64. "FLUID LEVEL CHECK"	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188. "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			3. Line pressure test	AT-68. "Line Pressure Test"	
			4. Line pressure solenoid valve	AT-174. "DTC P0745 LINE PRESSURE SOLENOID VALVE"	
			5. Shift solenoid valve A	AT-180. "DTC P0750 SHIFT SOLENOID VALVE A"	
			6. Shift solenoid valve B	AT-184. "DTC P0755 SHIFT SOLENOID VALVE B"	
7. Control valve assembly		AT-298. "CONTROL VALVE ASSEMBLY"			
OFF vehicle		8. Brake band	AT-349. "Components"		
		9. High clutch	AT-319. "HIGH CLUTCH"		
		10. Forward clutch	AT-325. "FORWARD CLUTCH AND OVER-RUN CLUTCH"		

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page		
				QG18DE (SULEV)	QG18DE (ULEV)	
Slips/Will Not Engage	Races extremely fast or slips in changing from "D3" to "D2" when depressing pedal.	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"		
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"		
			3. Line pressure test	AT-68, "Line Pressure Test"		
			4. Line pressure solenoid valve	AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE"		
			5. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"		
			6. Shift solenoid valve B	AT-184, "DTC P0755 SHIFT SOLENOID VALVE B"		
		OFF vehicle	7. Brake band	AT-349, "Components"		
			8. High clutch	AT-319, "HIGH CLUTCH"		
		Races extremely fast or slips in changing from "D4" or "D3" to "D1" when depressing pedal.	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
				2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
				3. Line pressure test	AT-68, "Line Pressure Test"	
				4. Line pressure solenoid valve	AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE"	
	5. Shift solenoid valve A			AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"		
	6. Shift solenoid valve B			AT-184, "DTC P0755 SHIFT SOLENOID VALVE B"		
7. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"					
OFF vehicle	8. Forward clutch		AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"			
	9. Forward one-way clutch		AT-338, "Components"			
	10. Low one-way clutch		AT-268, "Components"			

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Slips/Will Not Engage	Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
			2. Control cable adjustment	AT-263, "Control Cable Adjustment"	
			3. Line pressure test	AT-68, "Line Pressure Test"	
			4. Line pressure solenoid valve	AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE"	
		OFF vehicle	5. Oil pump	AT-293, "OIL PUMP"	
			6. High clutch	AT-319, "HIGH CLUTCH"	
			7. Brake band	AT-349, "Components"	
			8. Low & reverse brake	AT-333, "LOW & REVERSE BRAKE"	
			9. Torque converter	AT-268, "Components"	
			10. Parking components	AT-268, "Components"	
Not Used	Transmission noise in "D", "2", "1" and "R" positions.	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
		OFF vehicle	2. Torque converter	AT-268, "Components"	
No Down Shift	Failure to change from "D3" to "2" when changing lever into "2" position. AT-248, "18. A/T Does Not Shift: D3 → 22, When Selector Lever "D" → "2" Position"	OFF vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			2. Shift solenoid valve B	AT-184, "DTC P0755 SHIFT SOLENOID VALVE B"	
			3. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
			4. Control cable adjustment	AT-263, "Control Cable Adjustment"	
			5. Brake band	AT-349, "Components"	
Improper Shift Timing	Gear change from "22" to "23" in "2" position.	ON vehicle	1. PNP switch adjustment	AT-263, "Park/Neutral Position (PNP) Switch Adjustment"	
			2. Control cable adjustment	AT-263, "Control Cable Adjustment"	

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Not Used	Engine brake does not operate in "1" position. AT-249, "19. A/T Does Not Shift: 22 → 11, When Selector Lever "2" → "1" Position"	ON vehicle	1. PNP switch adjustment	AT-263, "Park/Neutral Position (PNP) Switch Adjustment"	
			2. Control cable adjustment	AT-263, "Control Cable Adjustment"	
			3. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"	
			4. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
Not Used	Engine brake does not operate in "1" position. AT-249, "19. A/T Does Not Shift: 22 → 11, When Selector Lever "2" → "1" Position"	ON vehicle	5. Overrun clutch solenoid valve	AT-194, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"	
		OFF vehicle	6. Overrun clutch	AT-325, "FORWARD CLUTCH AND OVERRUN CLUTCH"	
			7. Low & reverse brake	AT-333, "LOW & REVERSE BRAKE"	
Improper Shift Timing	Gear change from "11" to "12" in "1" position.	ON vehicle	1. PNP switch adjustment	AT-263, "Park/Neutral Position (PNP) Switch Adjustment"	
			2. Control cable adjustment	AT-263, "Control Cable Adjustment"	
No Down Shift	Does not change from "12" to "11" in "1" position.	ON vehicle	1. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"	
			2. Shift solenoid valve A	AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"	
			3. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	4. Low one-way clutch	AT-268, "Components"	
			5. Brake band	AT-349, "Components"	
			6. Low & reverse brake	AT-333, "LOW & REVERSE BRAKE"	
Shift Shock	Large shock changing from "12" to "11" in "1" position.	ON vehicle	1. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	2. Low & reverse brake	AT-333, "LOW & REVERSE BRAKE"	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page		
				QG18DE (SULEV)	QG18DE (ULEV)	
Not used	Transaxle overheats.	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"		A
			2. Engine idling rpm	EC-624, "Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment"	EC-43, "Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment"	B AT
			3. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"		D
			4. Line pressure test	AT-68, "Line Pressure Test"		E
			5. Line pressure solenoid valve	AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE"		F
			6. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"		G
		OFF vehicle	7. Oil pump	AT-293, "OIL PUMP"		H
			8. Reverse clutch	AT-314, "REVERSE CLUTCH"		I
			9. High clutch	AT-319, "HIGH CLUTCH"		J
			10. Brake band	AT-349, "Components"		K
			11. Forward clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"		L
			12. Overrun clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"		M
			13. Low & reverse brake	AT-333, "LOW & REVERSE BRAKE"		
			14. Torque converter	AT-268, "Components"		

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
Not Used	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
		OFF vehicle	2. Reverse clutch	AT-314, "REVERSE CLUTCH"	
			3. High clutch	AT-319, "HIGH CLUTCH"	
			4. Brake band	AT-349, "Components"	
			5. Forward clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"	
			6. Overrun clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"	
			7. Low & reverse brake	AT-333, "LOW & REVERSE BRAKE"	
	Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
		OFF vehicle	2. Torque converter	AT-268, "Components"	
			3. Oil pump	AT-293, "OIL PUMP"	
			4. Reverse clutch	AT-314, "REVERSE CLUTCH"	
			5. High clutch	AT-319, "HIGH CLUTCH"	
			6. Brake band	AT-349, "Components"	
			7. Forward clutch	AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"	
8. Overrun clutch			AT-325, "FORWARD CLUTCH AND OVER-RUN CLUTCH"		
9. Low & reverse brake	AT-333, "LOW & REVERSE BRAKE"				

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
No Lockup Engagement/ TCC Inoperative	Torque converter is not locked up.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"	
			3. Engine speed signal	AT-132, "DTC P0725 ENGINE SPEED SIGNAL"	
			4. A/T fluid temperature sensor	AT-121, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"	
			5. Line pressure test	AT-68, "Line Pressure Test"	
			6. Torque converter clutch solenoid valve	AT-160, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"	
			7. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	8. Torque converter	AT-268, "Components"	

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
No Lockup Engagement/ TCC Inoperative	Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-64, "FLUID LEVEL CHECK"	
			2. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			3. Line pressure test	AT-68, "Line Pressure Test"	
			4. Torque converter clutch solenoid valve	AT-160, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"	
			5. Line pressure solenoid valve	AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE"	
			6. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
		OFF vehicle	7. Torque converter	AT-268, "Components"	
	Lock-up point is extremely high or low.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"	
			3. Torque converter clutch solenoid valve	AT-160, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"	
4. Control valve assembly			AT-298, "CONTROL VALVE ASSEMBLY"		

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				QG18DE (SULEV)	QG18DE (ULEV)
No Up 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-188, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]"	
			2. PNP switch adjustment	AT-263, "Park/Neutral Position (PNP) Switch Adjustment"	
			3. Overdrive control switch	AT-250, "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)"	
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"	
			5. Shift solenoid valve A	AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"	
			6. Overrun clutch solenoid valve	AT-194, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"	
			7. Control valve assembly	AT-298, "CONTROL VALVE ASSEMBLY"	
			8. A/T fluid temperature sensor	AT-121, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"	
			9. Line pressure test	AT-68, "Line Pressure Test"	
		OFF vehicle	10. Brake band	AT-349, "Components"	
			11. Overrun clutch	AT-325, "FORWARD CLUTCH AND OVERRUN CLUTCH"	

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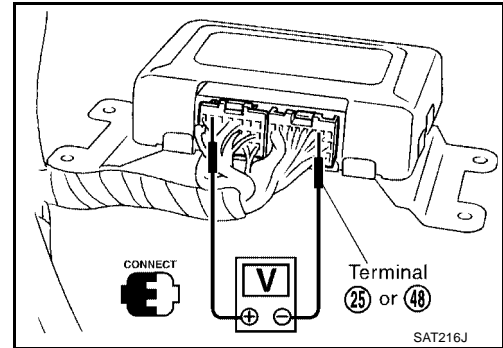
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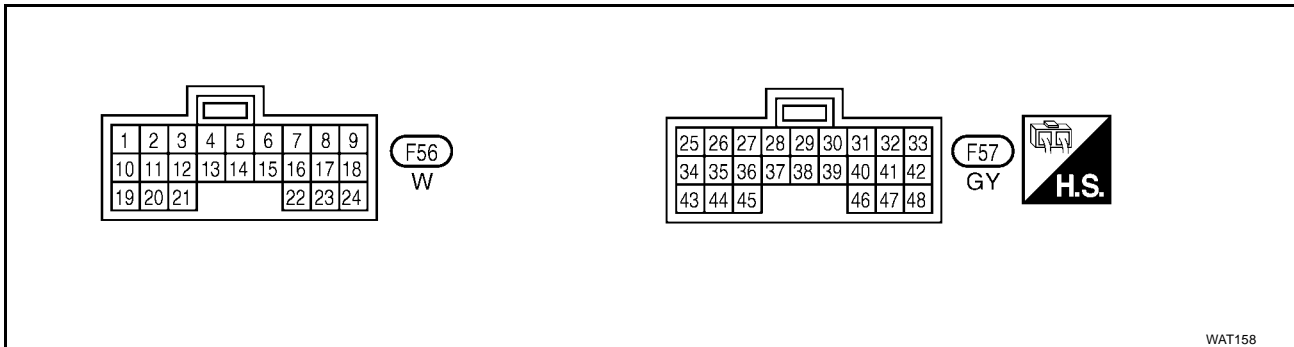
TCM Terminals and Reference Value

PREPARATION

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



TCM HARNESS CONNECTOR TERMINAL LAYOUT









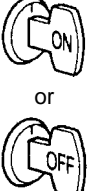


TCM INSPECTION TABLE

(Data are reference values.)

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
1	R/W	Line pressure solenoid valve	When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
			When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve (with dropping resistor)	When releasing accelerator pedal after warming up engine.	4 - 14V
			When depressing accelerator pedal fully after warming up engine.	0V
3	Y/G	Torque converter clutch solenoid valve	When A/T performs lock-up.	8 - 15V
			When A/T does not perform lock-up.	0V
5	L	CAN-H	—	—
6	Y	CAN-L	—	—
10	BR/R	Power source	When turning ignition switch to "ON".	Battery voltage
			When turning ignition switch to "OFF".	0V

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RE4F03B]

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)		
11	L/W	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in "D1 " or "D4 ".)	Battery voltage	A
				When shift solenoid valve A does not operate. (When driving in "D2 " or "D3 ".)	0V	B
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in "D1 " or "D2 ".)	Battery voltage	AT
				When shift solenoid valve B does not operate. (When driving in "D3 " or "D4 ".)	0V	D
19	PU	OBD-II		When turning ignition switch to "ON".	Battery voltage	E
				When turning ignition switch to "OFF".	0V	F
20	L/B	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage	G
				When overrun clutch solenoid valve does not operate.	0V	H
25	B	Ground	—	0V	I	
26	BR/Y	PNP switch "1" position		When setting selector lever to "1" position.	Battery voltage	J
				When setting selector lever to other positions.	0V	K
27	B/R	PNP switch "2" position		When setting selector lever to "2" position.	Battery voltage	L
				When setting selector lever to other positions.	0V	M
28	R/B	Power source (Memory back-up)	 or 	When turning ignition switch to "OFF".	Battery voltage	
				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]

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
30 **	G/B	Data link connector	—	—
31 **	GY/L	Data link connector	—	—
32	R	Throttle position sensor (Power source)	When turning ignition switch to "ON".	4.5 - 5.5V
			When turning ignition switch to "OFF".	0V
34	W/G	PNP switch "D" position	When setting selector lever to "D" position.	Battery voltage
			When setting selector lever to other positions.	0V
35	G/Y	PNP switch "R" position	When setting selector lever to "R" position.	Battery voltage
			When setting selector lever to other positions.	0V
36	LG	PNP switch "N" or "P" position	When setting selector lever to "N" or "P" position.	Battery voltage
			When setting selector lever to other positions.	0V
39 *	L/OR	Engine speed signal	Refer to EC-105. "ECM INSPECTION TABLE" [QG18DE (ULEV)] or EC-686. "ECM INSPECTION TABLE" [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 throttle: 4V
42	B/W	Throttle position sensor (Ground)	—	0V
47	BR	A/T fluid temperature sensor	When ATF temperature is 20°C (68°F).	1.5V
			When ATF temperature is 80°C (176°F).	0.5V
48	B	Ground	—	0V

* : This terminal is connected to the ECM.

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

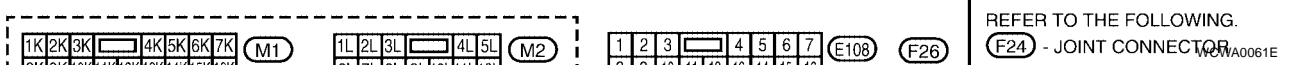
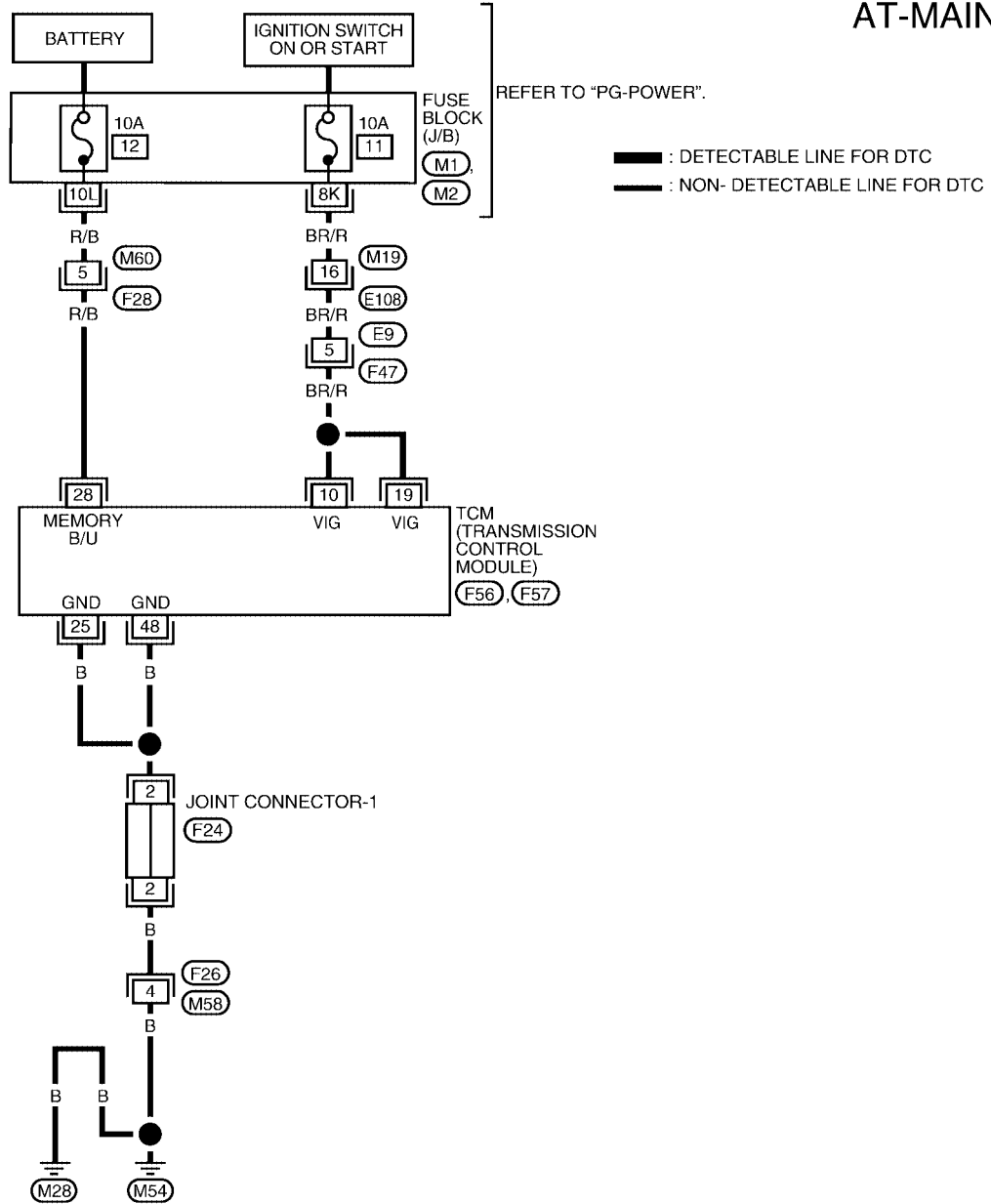
TROUBLE DIAGNOSIS FOR POWER SUPPLY

PF0:0000

Wiring Diagram — AT — MAIN

ECS005WO

AT-MAIN-01



REFER TO THE FOLLOWING.

F24 - JOINT CONNECTOR

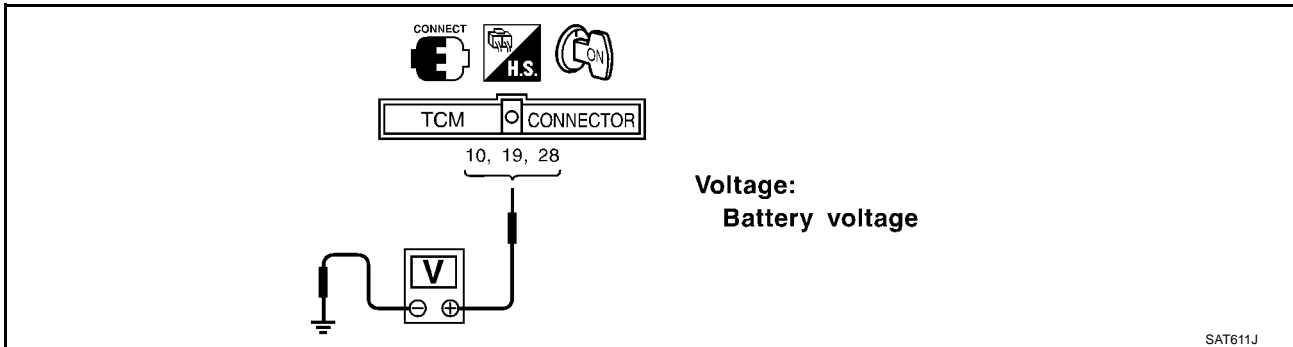
TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
10	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH TO "OFF"	0V
19	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH TO "OFF"	0V
25	B	GROUND	—	0C
28	R/B	POWER SOURCE (MEMORY BACKUP)	WHEN TURNING IGNITION SWITCH TO "OFF"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
48	B	GROUND	—	0V

Diagnostic Procedure

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, 19, 28 and ground.

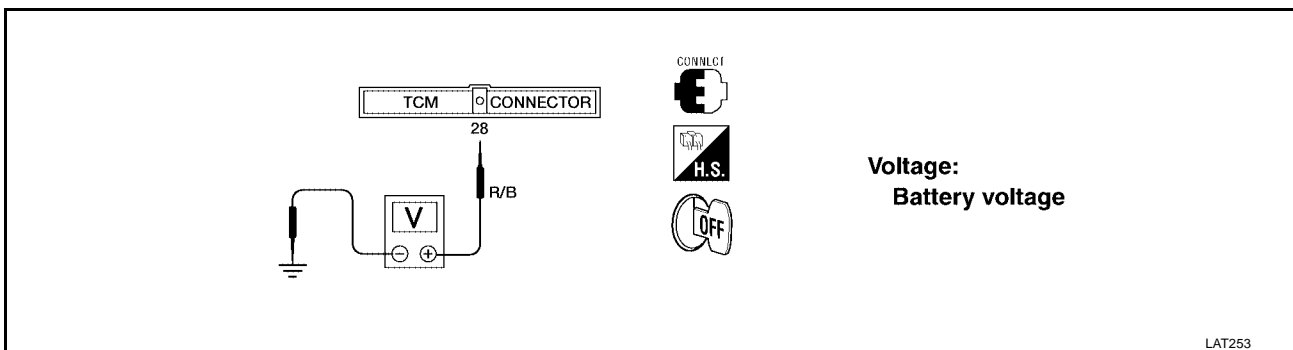


OK or NG

- 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 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 [PG-2, "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 [AT-113, "Wiring Diagram — AT — MAIN"](#).

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.

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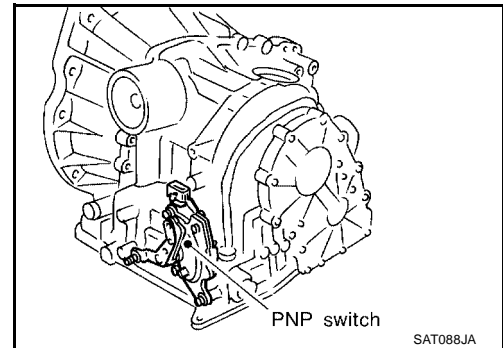
DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

PFP:32006

Description

ECS005WQ

- 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.



ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
(H) : PNP SW/CIRC (GST) : P0705	TCM does not receive the correct voltage signal from the switch based on the gear position.	<ul style="list-style-type: none"> ● 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 PROCEDURE” 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.

(H) With CONSULT-II

1. Turn ignition switch “ON”.

2. Select “DATA MONITOR” mode for “ENGINE” with CONSULT-II.

3. Start engine and maintain the following conditions for at least 5 consecutive seconds.

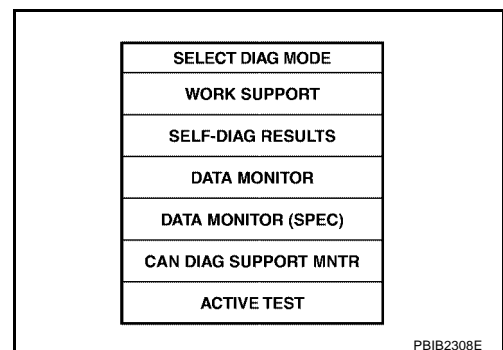
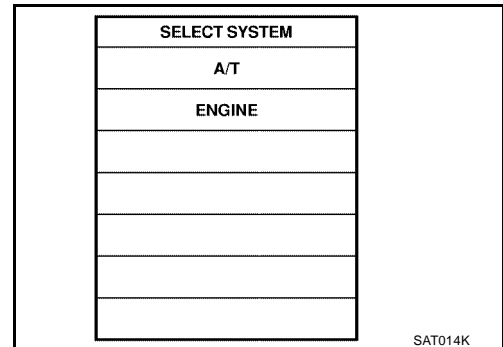
VHCL SPEED SE: 10 km/h (6 MPH) or more

THRTL POS SEN: More than 1.3V

Selector lever: D position (OD “ON” or “OFF”)

(GST) With GST

Follow the procedure “With CONSULT-II”.



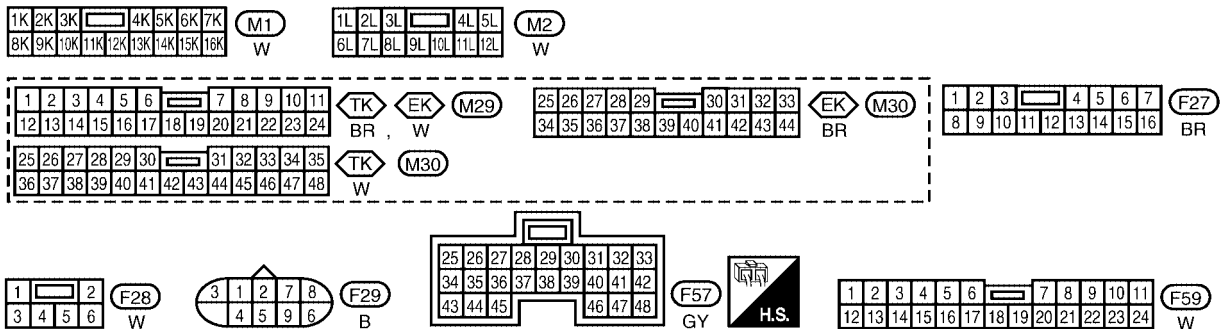
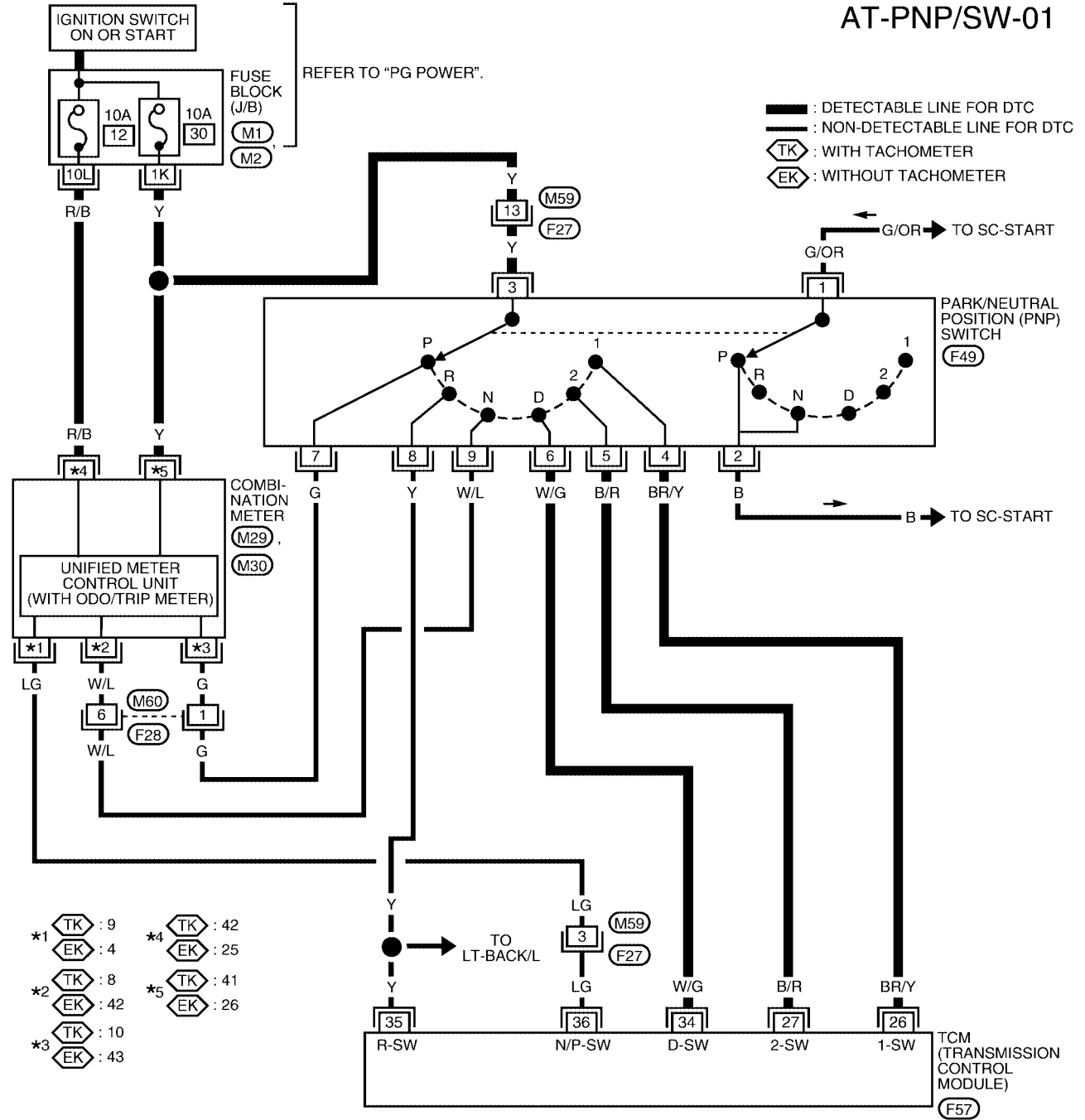
DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

[RE4F03B]

Wiring Diagram — AT — PNP/SW

ECS005WR

AT-PNP/SW-01



DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

[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
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	0V
27	B/R	PNP SWITCH "2" POSITION	WHEN SETTING SELECTOR LEVER TO "2" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	0V
34	W/G	PNP SWITCH "D" POSITION	WHEN SETTING SELECTOR LEVER TO "D" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	0V
35	G/Y	PNP SWITCH "R" POSITION	WHEN SETTING SELECTOR LEVER TO "R" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	0V
36	LG	PNP SWITCH "N" OR "P" POSITION	WHEN SETTING SELECTOR LEVER TO "N" OR "P" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	0V

Diagnostic Procedure

ECS005WS

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

Ⓜ With CONSULT-II

- Turn ignition switch to "ON" position.
(Do not start engine.)
- 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 the signal of the selector lever position is indicated properly.

OK or NG

OK >> GO TO 3.

NG >> Check the following items:

- PNP switch
Refer to [AT-120, "Component Inspection"](#) .
- 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 [PG-2, "POWER SUPPLY ROUTING"](#) .

DATA MONITOR	
MONITORING	
PN POSI SW	OFF
R POSITION SW	OFF
D POSITION SW	OFF
2 POSITION SW	ON
1 POSITION SW	OFF

SAT701J

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	B	0	0	0	0
R	0	B	0	0	0
D	0	0	B	0	0
2	0	0	0	B	0
1	0	0	0	0	B

Voltage

B : Battery voltage

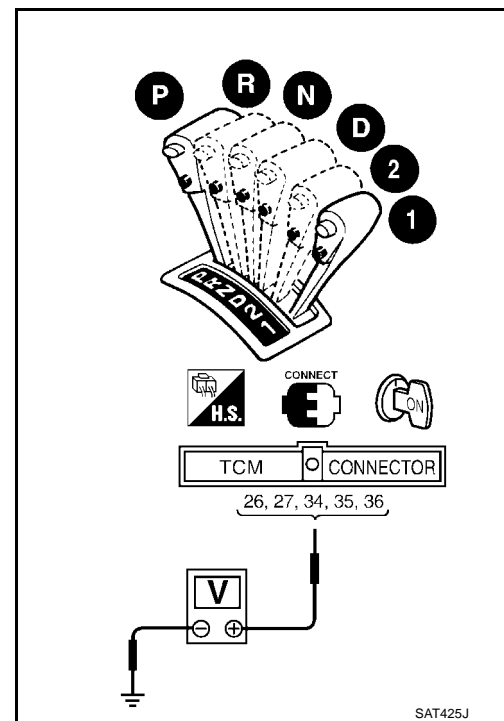
0 : 0V

OK or NG

OK >> GO TO 3.

NG >> Check the following items:

- PNP switch
Refer to [AT-120, "Component Inspection"](#) .
- 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 [PG-2, "POWER SUPPLY ROUTING"](#) .



3. CHECK DTC

Perform [AT-116, "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 P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

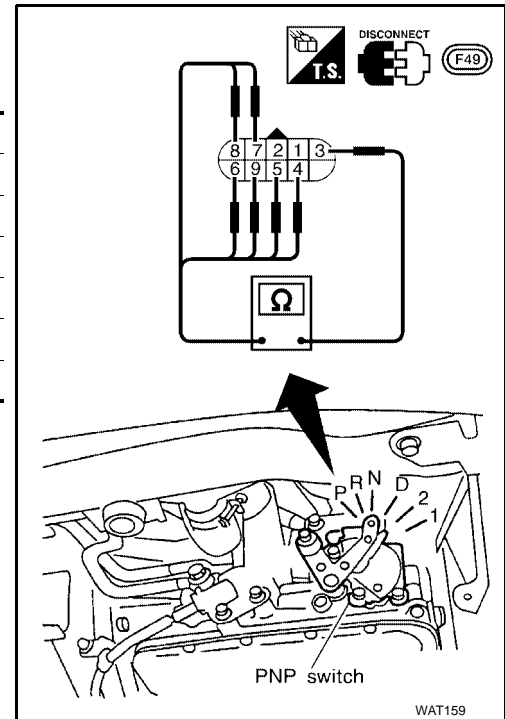
[RE4F03B]

ECS005WT

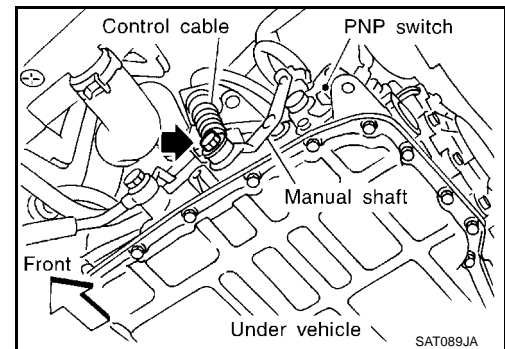
Component Inspection PARK/NEUTRAL POSITION SWITCH

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	Terminal No.	
P	3 — 7	1 — 2
R	3 — 8	
N	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-263, "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-263, "Park/Neutral Position \(PNP\) Switch Adjustment"](#).
6. If NG on step 4, replace PNP switch.



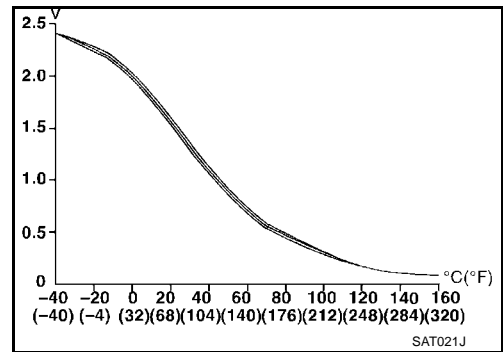
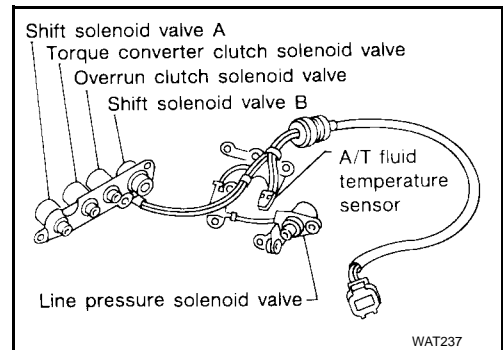
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

PF3:31940

Description

ECS005WU

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)
(P) : ATF TEMP SEN/CIRC (P) : P0710	TCM receives an excessively low or high voltage from the sensor.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● A/T fluid temperature sensor

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

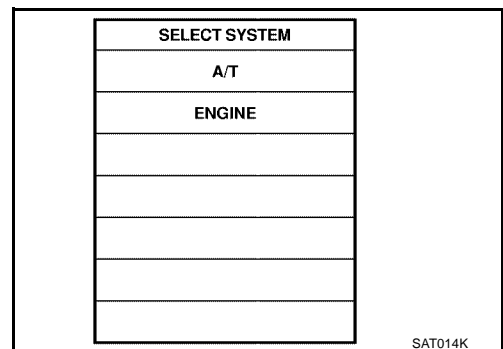
CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" 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.



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.
2. 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")

Ⓜ With GST

Follow the procedure "With CONSULT-II".

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
CAN DIAG SUPPORT MNTR
ACTIVE TEST

PBIB2308E

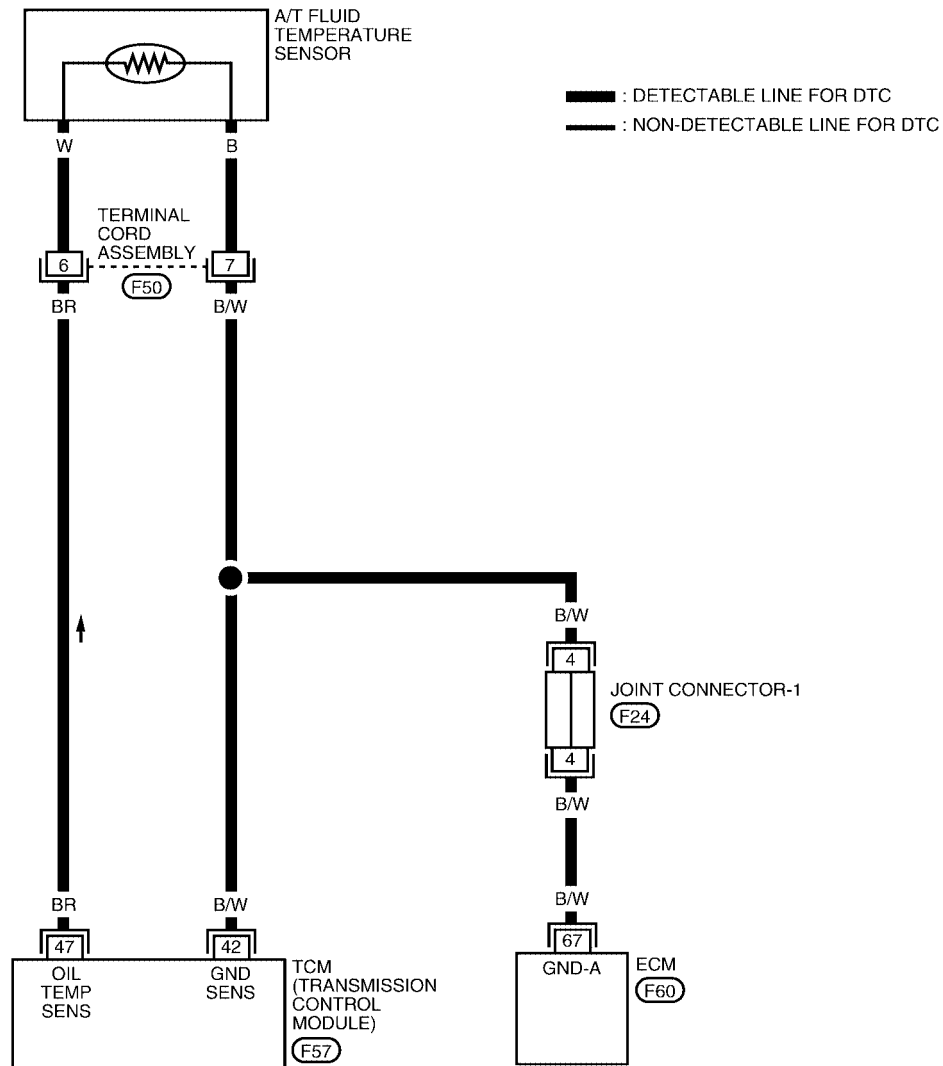
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[RE4F03B]

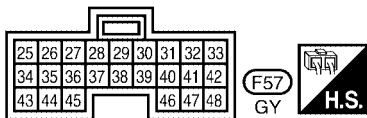
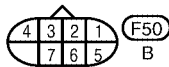
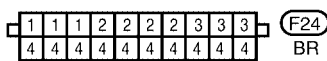
Wiring Diagram — AT — FTS

ECS005WV

AT-FTS-01



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REFER TO THE FOLLOWING.
 (F60) - ELECTRICAL UNITS

WCWA0059E

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[RE4F03B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
42	B/W	SENSOR (GROUND)	—	0V
47	BR	A/T FLUID TEMPERATURE SENSOR	WHEN ATF FLUID TEMPERATURE IS 20°C (68°F)	1.5V
			WHEN ATF FLUID TEMPERATURE IS 80°C (176°F)	0.5V

Diagnostic Procedure

ECS005WW

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.

No >> GO TO 3.

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".

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

SAT614J

Voltage

Cold [20°C (68°F)] → : Approximately 1.5V →
Hot [80°C (176°F)] 0.5V

OK or NG

OK >> GO TO 4.

NG >> GO TO 5.

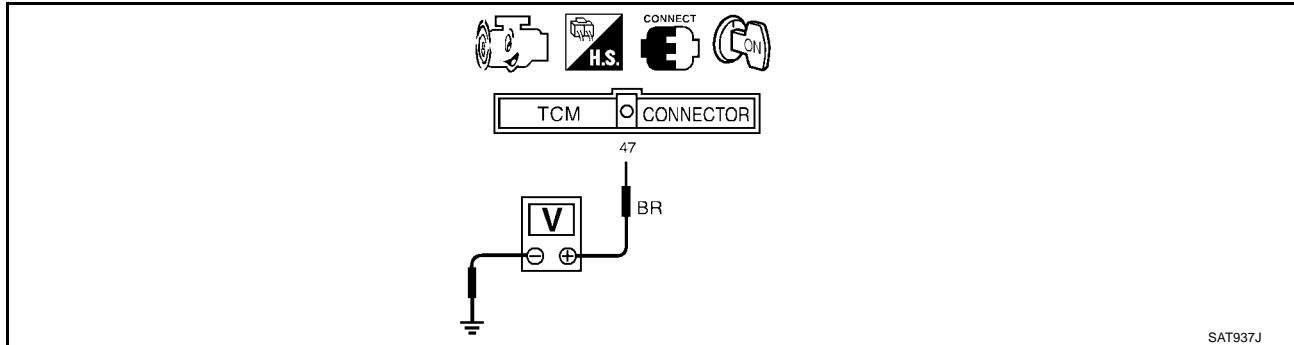
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[RE4F03B]

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)] → : Approximately 1.5V →
Hot [80°C (176°F)] → 0.5V

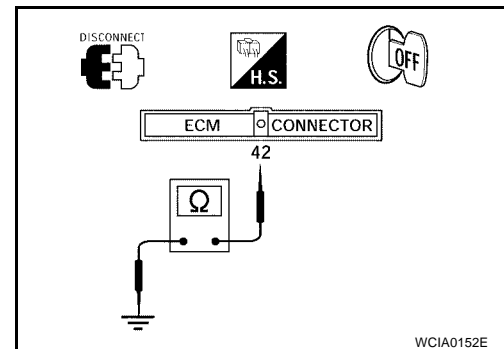
3. Turn ignition switch to "OFF" position.
4. Disconnect TCM harness connector.
5. Check continuity between TCM harness connector F57 terminal 42 (B/W) and ground.

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. CHECK DTC

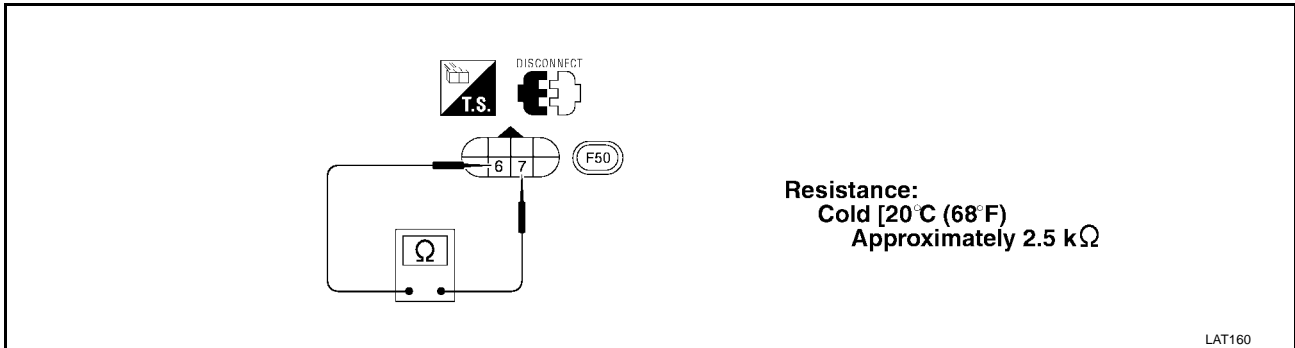
Perform [AT-121, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"](#) .

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. 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 terminals 6 and 7 when A/T is cold.



4. Reinstall any part removed.

OK or NG

- OK (With CONSULT-II)>> GO TO 2.
- OK (Without CONSULT-II)>> GO TO 3.
- NG >> 1. Remove oil pan.

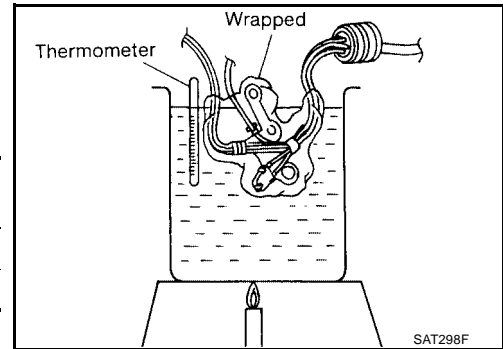
2. Check the following items:
 - A/T fluid temperature sensor
Refer to [AT-126, "Component Inspection"](#) .
 - Harness of terminal cord assembly for short or open

Component Inspection A/T FLUID TEMPERATURE SENSOR

ECS005WX

- For removal, refer to [AT-260, "Control Valve Assembly and Accumulators"](#) .
- Check resistance between two terminals while changing temperature as shown at left.

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



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

[RE4F03B]

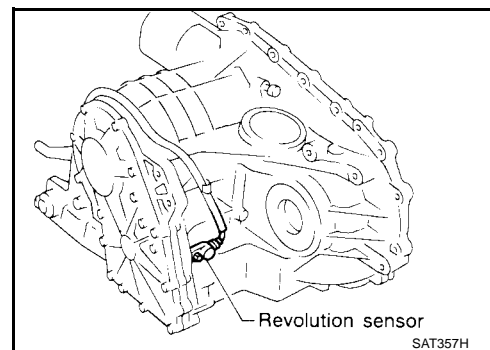
DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

PF0:32702

Description

ECS005WY

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)
<ul style="list-style-type: none"> Ⓜ : VEH SPD SEN/CIR AT Ⓜ : P0720 	TCM does not receive the proper voltage signal from the sensor.	<ul style="list-style-type: none"> ● 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 "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" 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 "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-127, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).
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.

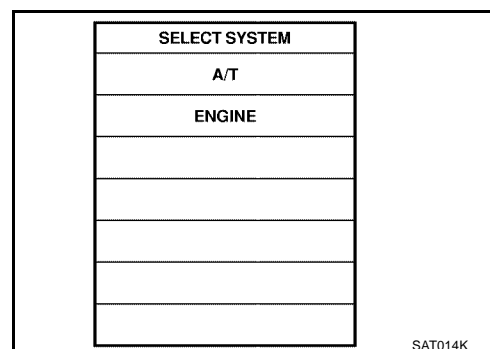
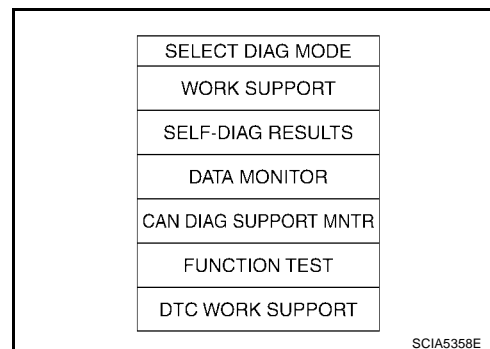
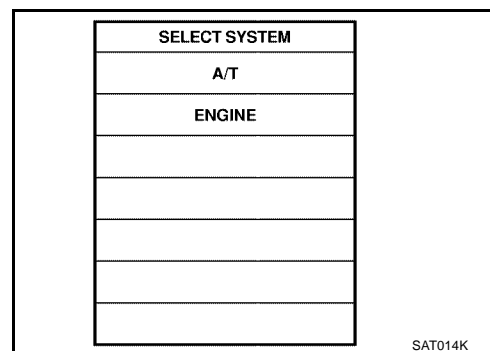
VHCL SPEED SE: 30 km/h (19 MPH) or more

THRTL POS SEN: More than 1.2V

Selector lever: D position (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-130, "Diagnostic Procedure"](#).



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

[RE4F03B]

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.



With GST

Follow the procedure "With CONSULT-II".

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
CAN DIAG SUPPORT MNTR
ACTIVE TEST

PBIB2308E

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

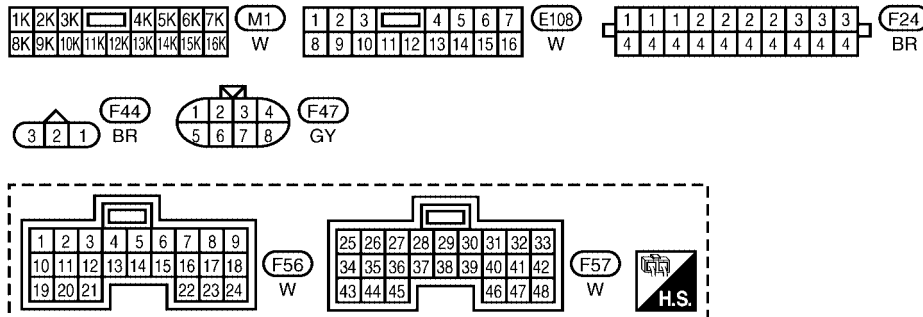
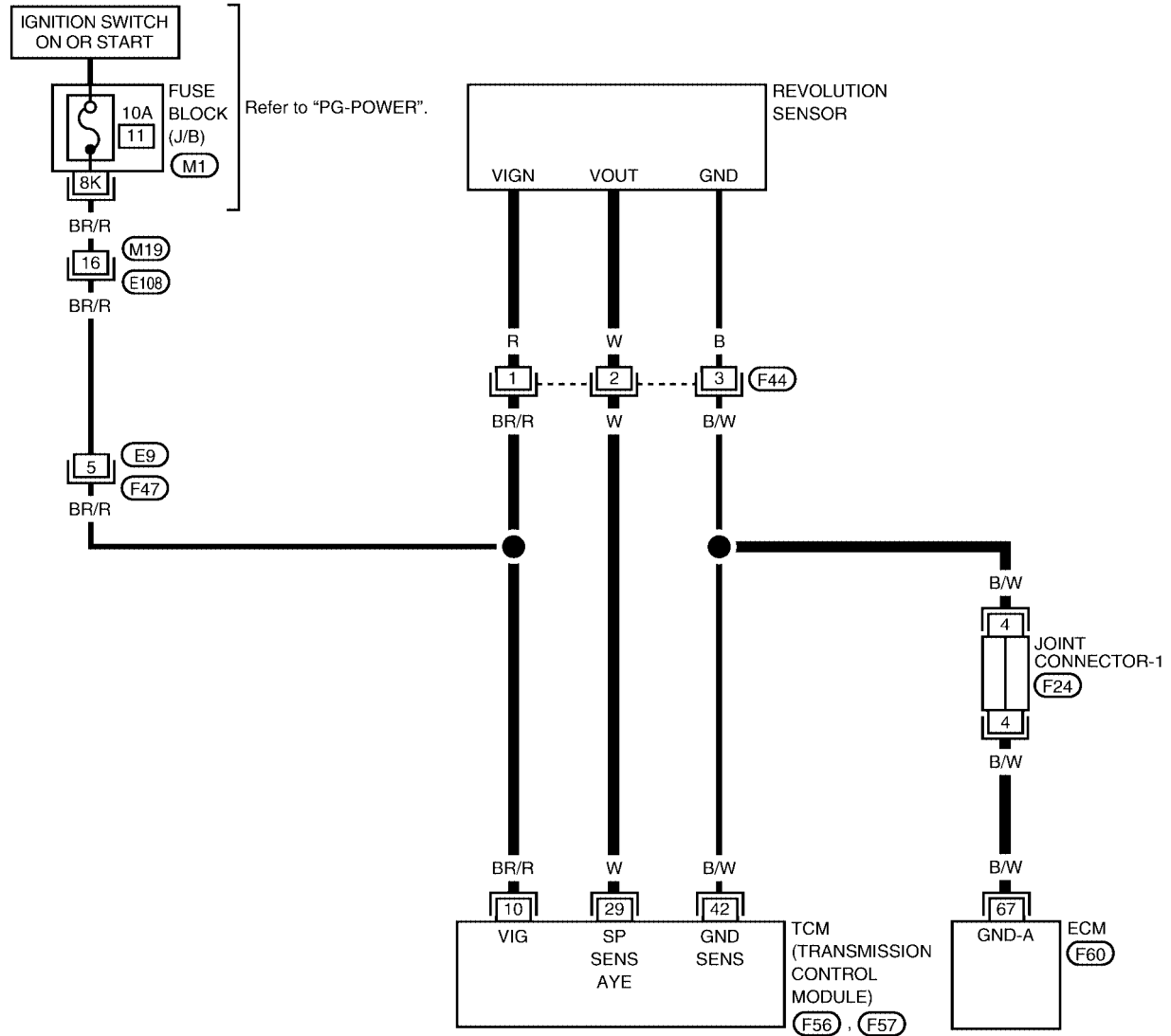
[RE4F03B]

Wiring Diagram — AT — VSSA/T

ECS005WZ

AT-VSSA/T-01

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



Refer to the following.
 F60 - ELECTRICAL UNITS

WCWA0063E

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

[RE4F03B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH TO "OFF"	0V
29	W	REVOLUTION SENSOR	WHEN MOVING AT 20 KM/H (12 MPH). USE CONSULT-II PULSE FREQUENCY MEASURING FUNCTION	150 Hz
42	B/W	THROTTLE POSITION SENSOR (GROUND)	—	0V

Diagnostic Procedure

ECS005X0

1. CHECK INPUT SIGNAL (WITH CONSULT-II)

④ 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

SAT614J

OK or NG

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

2. CHECK REVOLUTION SENSOR (WITH CONSULT-II)

④ 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

WAT402

- Check harness for short or open between TCM, ECM and revolution sensor. Refer to [AT-129, "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. CHECK DTC

Perform [AT-127, "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.

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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	Malfunction is detected when ...	Check item (Possible cause)
 : ENGINE SPEED SIG  : P0725	TCM does not receive the proper voltage signal from ECM.	<ul style="list-style-type: none"> ● 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 “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch “OFF” and wait at least 5 seconds before conducting the next test.

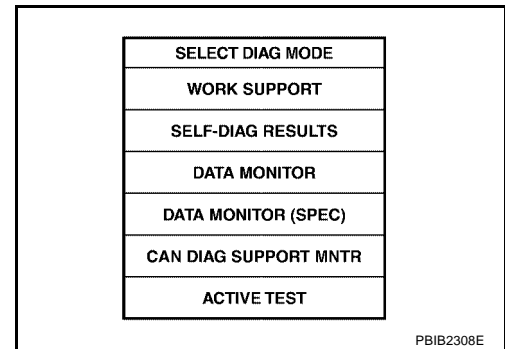
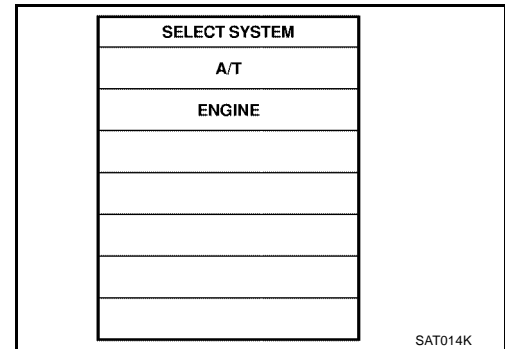
After the repair, perform the following procedure to confirm the malfunction is eliminated.

 With CONSULT-II

1. Turn ignition switch “ON” and select “DATA MONITOR” mode for “ENGINE” with CONSULT-II.
2. 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”.



DTC P0725 ENGINE SPEED SIGNAL

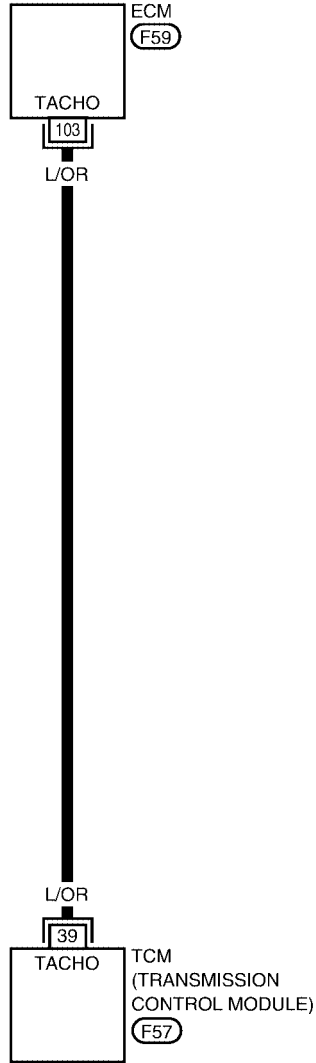
[RE4F03B]

Wiring Diagram — AT — ENGSS

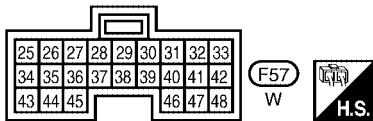
ECS005X2

AT-ENGSS-01

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



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Refer to the following.
F29 - ELECTRICAL UNITS

WCWA0064E

DTC P0725 ENGINE SPEED SIGNAL

[RE4F03B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
39	L/OR	ENGINE SPEED SIGNAL	REFER TO ECM TABLE	—

Diagnostic Procedure

ECS005X3

1. CHECK DTC WITH ECM

Perform diagnostic test mode II (self-diagnostic results) for engine control. Check ignition signal circuit condition.

OK or NG

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

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

NG >> Check ignition signal circuit for engine control. Refer to [EC-38, "INPUT/OUTPUT SIGNAL CHART"](#) [QG18DE (ULEV)] or [EC-619, "INPUT/OUTPUT SIGNAL CHART"](#) [QG18DE (SULEV)].

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 4.

NG >> Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
Refer to [EC-38, "SYSTEM DESCRIPTION"](#) [QG18DE (ULEV)] or [EC-619, "SYSTEM DESCRIPTION"](#) [QG18DE (SULEV)].

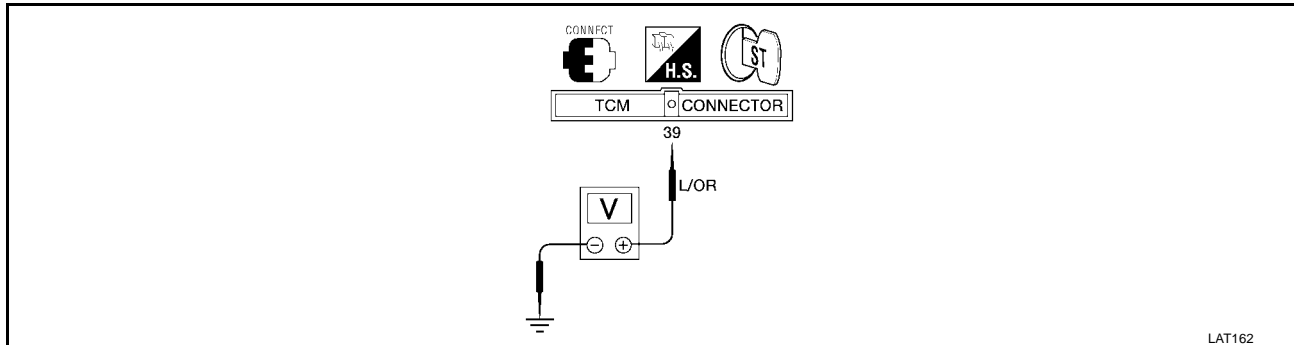
DATA MONITOR	
MONITORING	
ENGINE SPEED	XXX rpm
TURBINE REV	XXX rpm
OVERDRIVE SW	ON
PN POSI SW	OFF
R POSITION SW	OFF

SAT645J

3. CHECK INPUT SIGNAL (WITHOUT CONSULT-II)

⊗ Without CONSULT-II

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



Voltage (Idle speed) : Refer to [AT-110, "TCM Terminals and Reference Value"](#) .

OK or NG

OK >> GO TO 4.

NG >> Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
Refer to [EC-38, "SYSTEM DESCRIPTION"](#) [QG18DE (ULEV)] or [EC-619, "SYSTEM DESCRIPTION"](#) [QG18DE (SULEV)].

4. CHECK DTC

Perform [AT-132, "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

ECS005X4

- 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 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 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  : P0731	A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	<ul style="list-style-type: none"> ● Shift solenoid valve A ● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

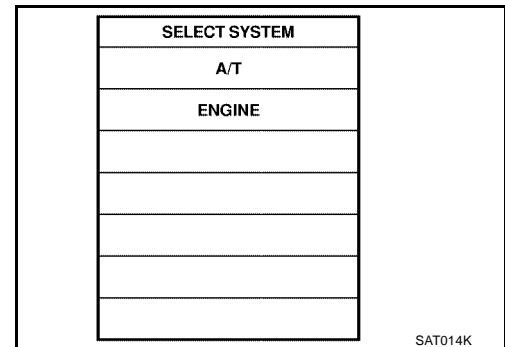
- Always drive vehicle at a safe speed.
- Be careful not to rev engine into the red zone on the tachometer.

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" 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.

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 (OD "ON")

- Check that "GEAR" shows "2" after releasing pedal.

5. Depress accelerator pedal to WOT (more than 7.0/8 of "THROTTLE POSI") quickly from a speed of 20 to 25 km/h (12 to 16 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-139, "Diagnostic Procedure"](#).

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 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 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for P0731 exists.	2 → 2 → 3 → 3
	4 → 3 → 3 → 4

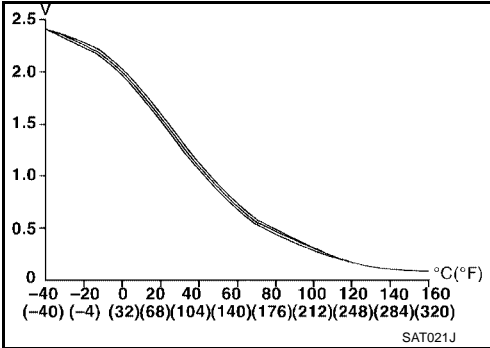
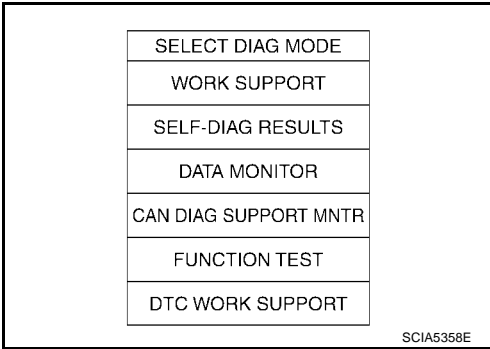
8. Make sure that "OK" is displayed. (If "NG" is displayed, refer to "Diagnostic Procedure".)

Refer to [AT-139, "Diagnostic Procedure"](#).

Refer to [AT-386, "Shift Schedule"](#).

With GST

Follow the procedure "With CONSULT-II".



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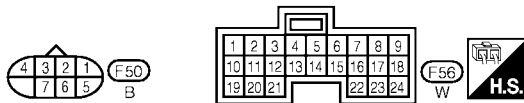
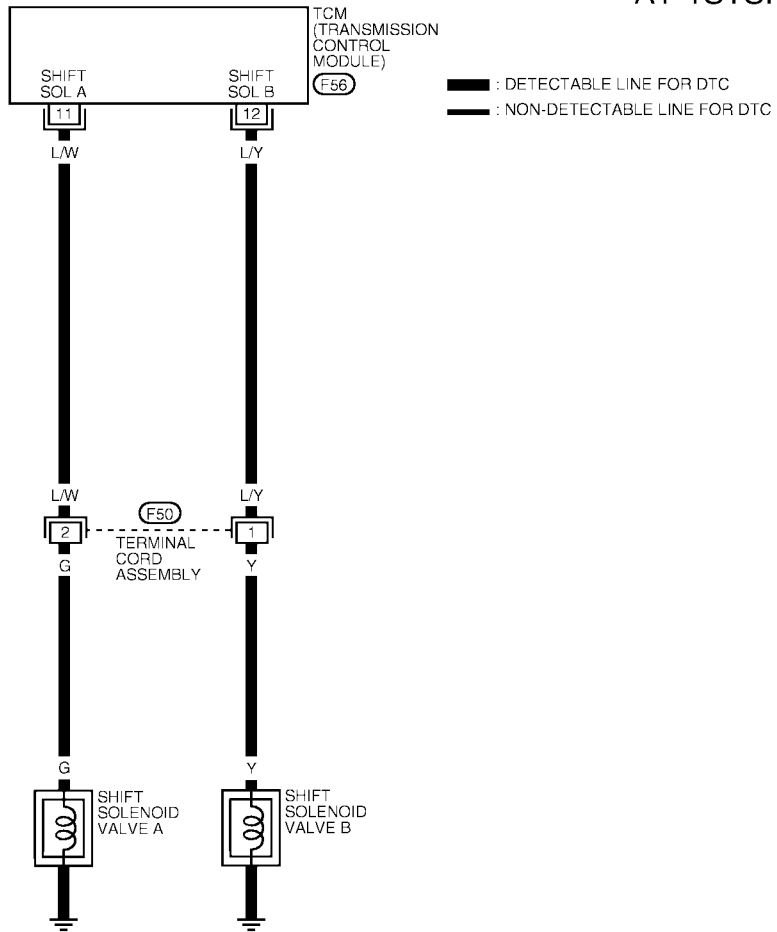
DTC P0731 A/T 1ST GEAR FUNCTION

[RE4F03B]

Wiring Diagram — AT — 1ST

ECS005X5

AT-1STSIG-01



WAT118

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
			WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATE	0V
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	0V

WAT343

Diagnostic Procedure

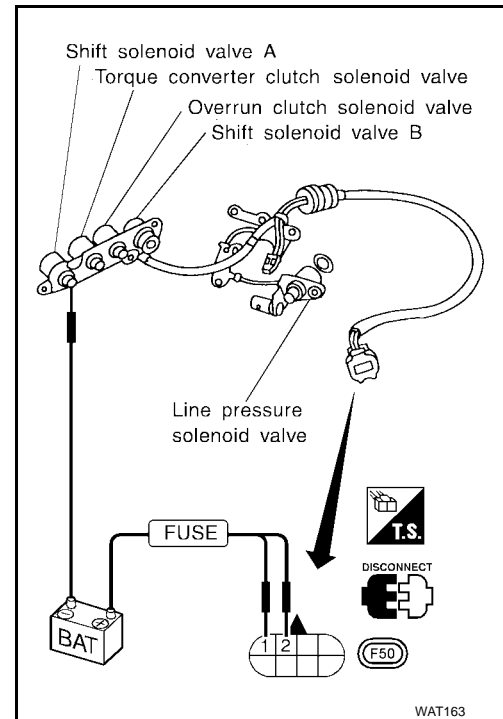
1. CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to [AT-260, "REMOVAL"](#).
2. Check shift solenoid valve operation.
 - Shift solenoid valve A
 - Shift solenoid valve B

Refer to [AT-140, "Component Inspection"](#).

OK or NG

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

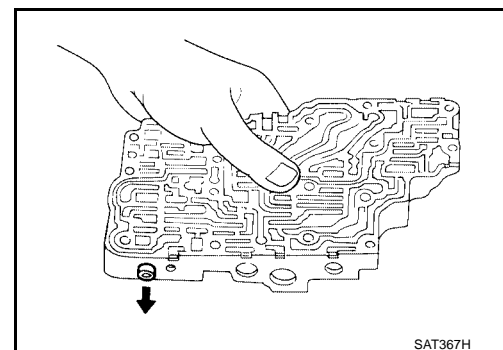


2. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-299, "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.



3. CHECK DTC

Perform [AT-136, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).

OK or NG

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

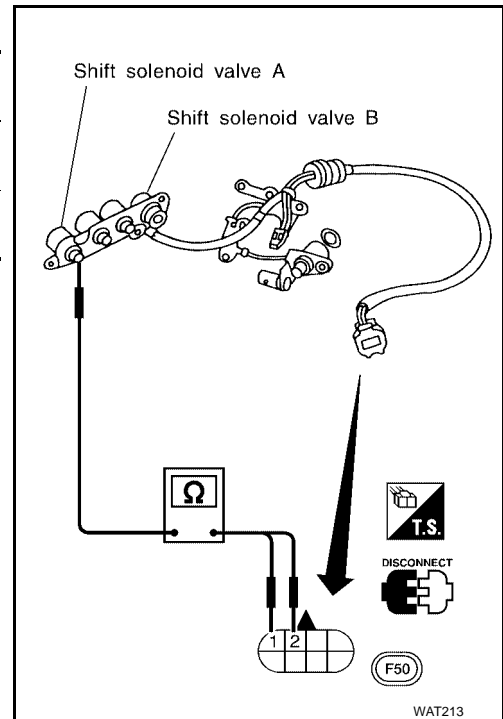
Component Inspection SHIFT SOLENOID VALVE A AND B

- Refer to [AT-260, "Control Valve Assembly and Accumulators"](#).

Resistance Check

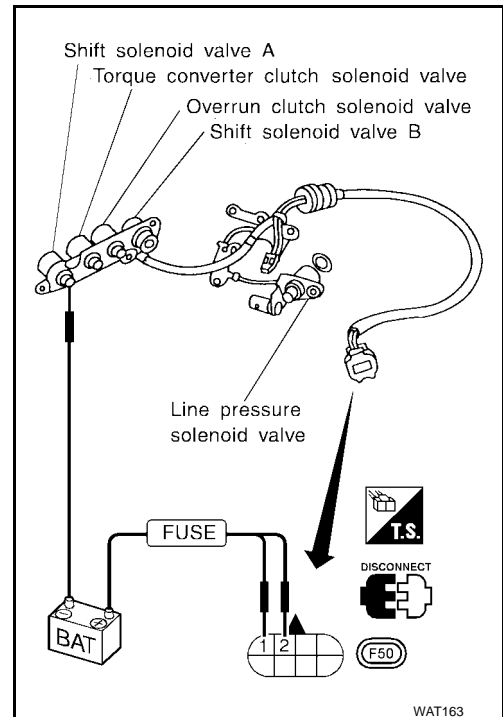
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω
Shift solenoid valve B	1		5 - 20Ω



Operation Check

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



DTC P0732 A/T 2ND GEAR FUNCTION

PF3:31940

ECS005X8

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 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 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	A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	<ul style="list-style-type: none"> • Shift solenoid valve B • Each clutch • Hydraulic control circuit
Ⓜ : P0732		

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 PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

TESTING CONDITION:

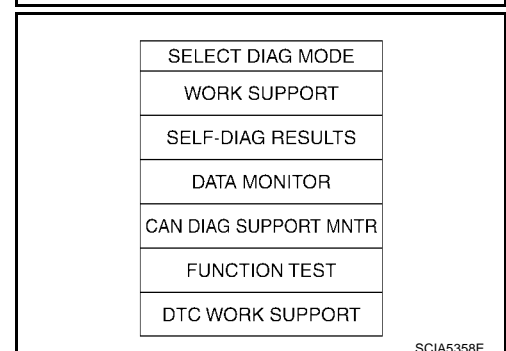
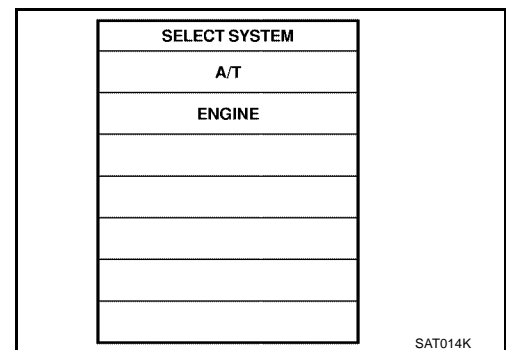
Always drive vehicle on a level road to improve the accuracy of test.

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.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.

FLUID TEMP SEN: 0.4 - 1.5V



DTC P0732 A/T 2ND GEAR FUNCTION

[RE4F03B]

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 "THROTTLE POSI") quickly from a speed of 50 to 55 km/h (31 to 34 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-144, "Diagnostic Procedure"](#).

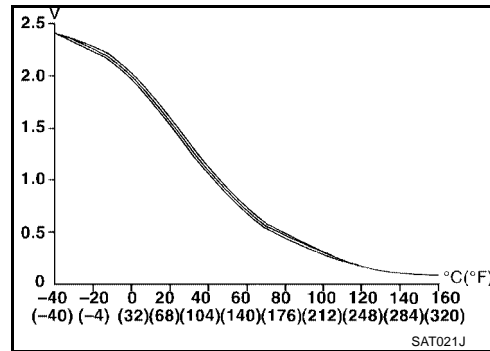
If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.

- 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 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 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for P0732 exists.	4 → 3 → 3 → 4

8. Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)

Refer to [AT-144, "Diagnostic Procedure"](#).

Refer to [AT-386, "Shift Schedule"](#).

 **With GST**

Follow the procedure "With CONSULT-II".

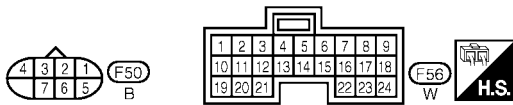
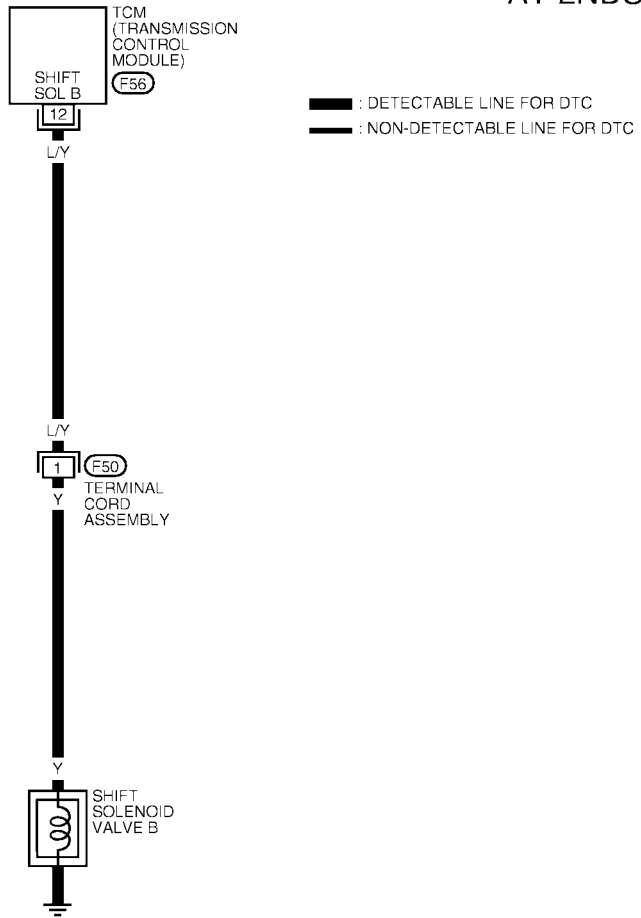
DTC P0732 A/T 2ND GEAR FUNCTION

[RE4F03B]

Wiring Diagram — AT — 2ND

ECS005X9

AT-2NDSIG-01



WAT119

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

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

WAT344

Diagnostic Procedure

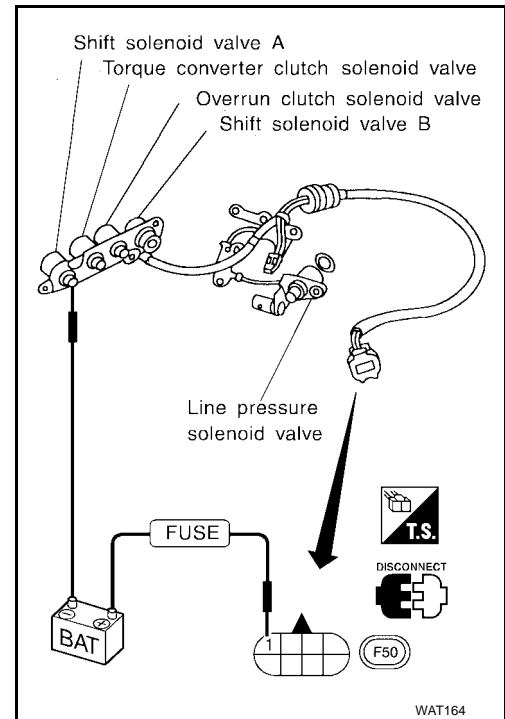
1. CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to [AT-260, "REMOVAL"](#) .
2. Check shift solenoid valve operation.
 - Shift solenoid valve B

Refer to [AT-145, "Component Inspection"](#) .

OK or NG

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

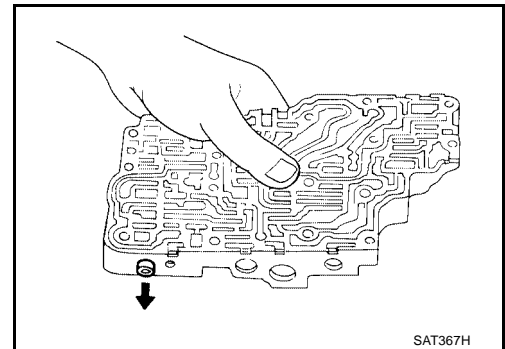


2. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-299, "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.



3. CHECK DTC

Perform [AT-141, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

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

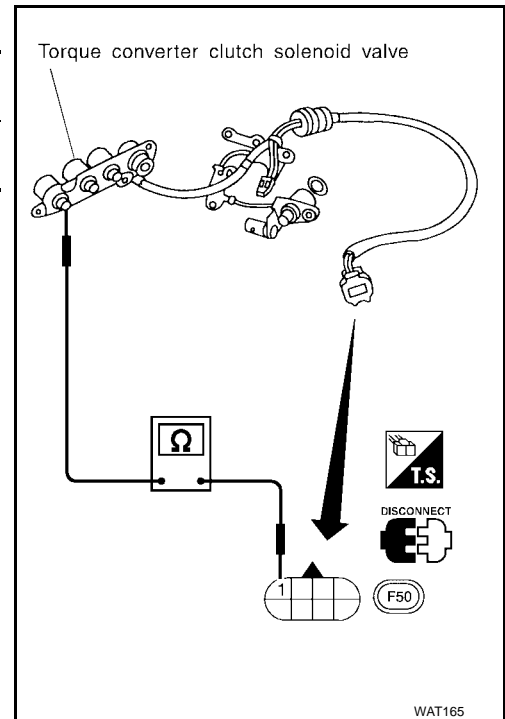
Component Inspection SHIFT SOLENOID VALVE B

- Refer to [AT-260, "Control Valve Assembly and Accumulators"](#) .

Resistance Check

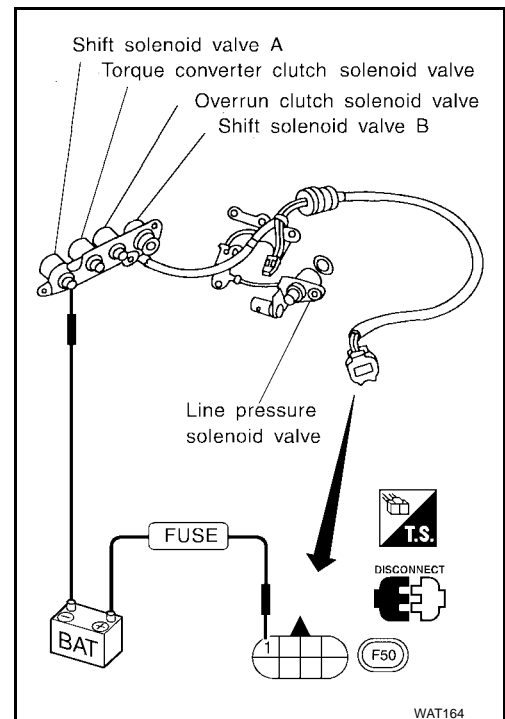
- Check resistance between two terminals.

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.



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DTC P0733 A/T 3RD GEAR FUNCTION

PF0:31940

Description

ECS005XC

- 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 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 (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 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 closed	1	1	4*	4

*: P0733 is detected.

Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
 : A/T 3RD GR FNCTN  : P0733	A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	<ul style="list-style-type: none"> • Shift solenoid valve A • Each clutch • Hydraulic control circuit

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

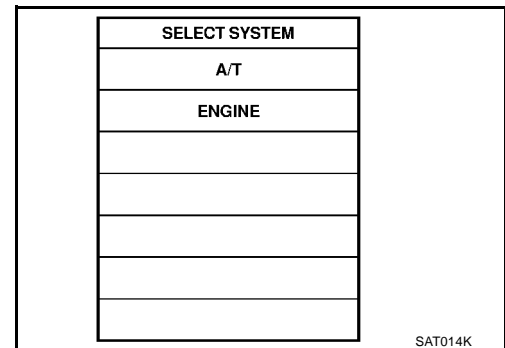
- Always drive vehicle at a safe speed.
- Be careful not to rev engine into the red zone on the tachometer.

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" 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.

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 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 "THROTTLE 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 [AT-149, "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-DIAGNOSIS" 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 → 2 → 3 → 4
No malfunction exists.	1 → 2 → 3 → 4
Malfunction for P0733 exists.	1 → 1 → 4 → 4

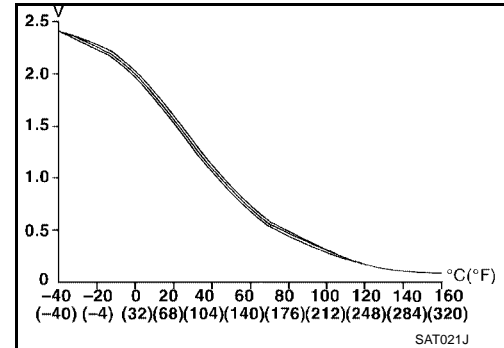
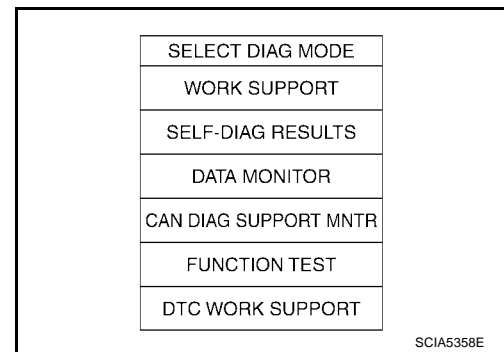
8. Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)

Refer to [AT-149, "Diagnostic Procedure"](#).

Refer to [AT-386, "Shift Schedule"](#).

With GST

Follow the procedure "With CONSULT-II".



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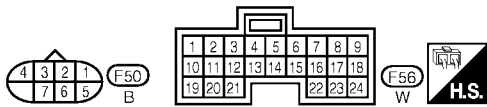
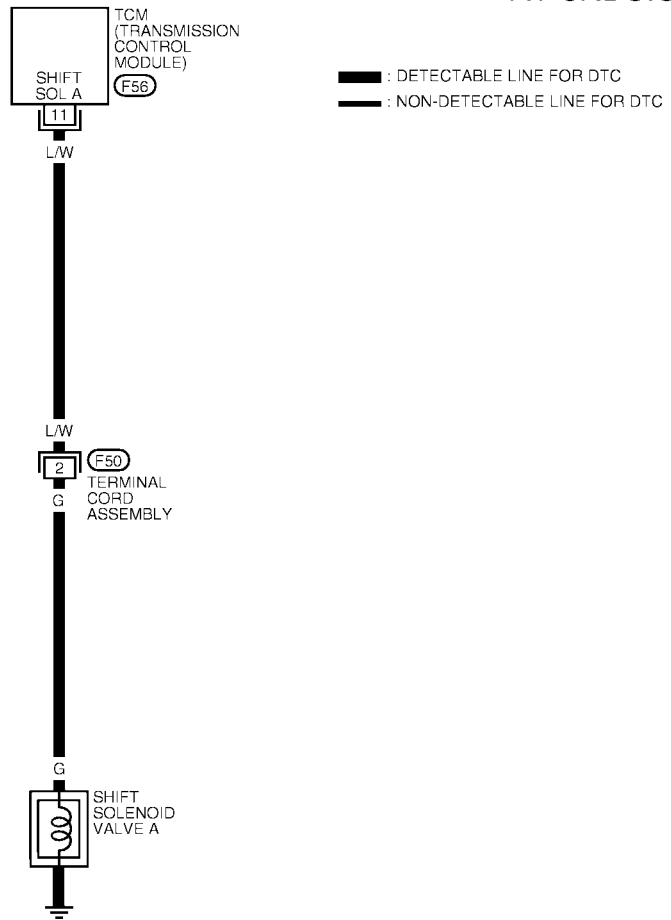
DTC P0733 A/T 3RD GEAR FUNCTION

[RE4F03B]

Wiring Diagram — AT — 3RD

ECS005XD

AT-3RDSIG-01



WAT120

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

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

WAT345

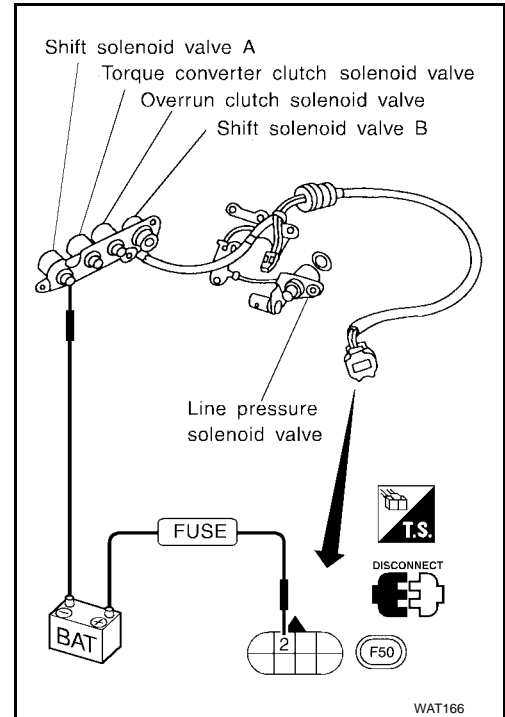
Diagnostic Procedure

1. CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to [AT-260, "REMOVAL"](#) .
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.

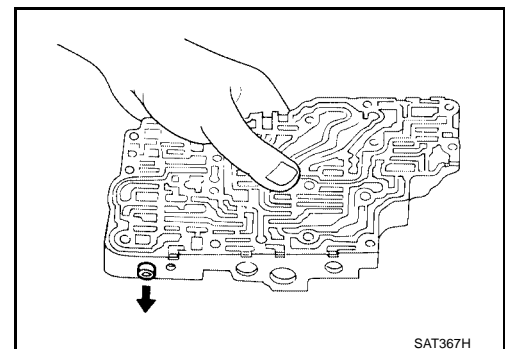


2. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-299, "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.



3. CHECK DTC

Perform [AT-146, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

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

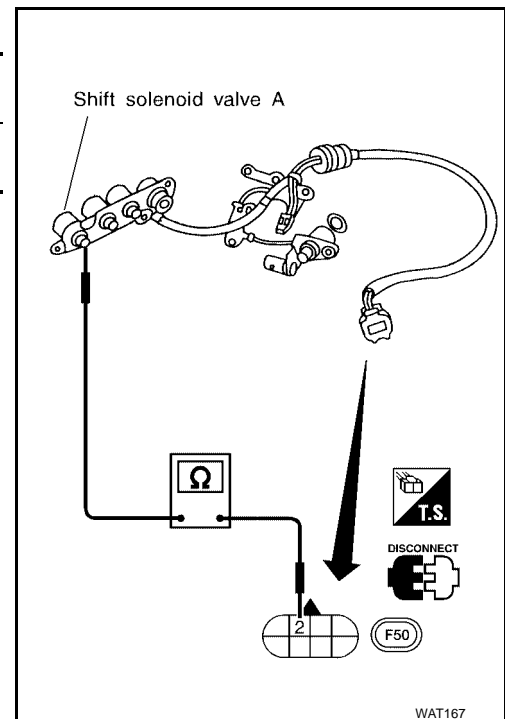
Component Inspection SHIFT SOLENOID VALVE A

- Refer to [AT-260, "REMOVAL"](#).

Resistance Check

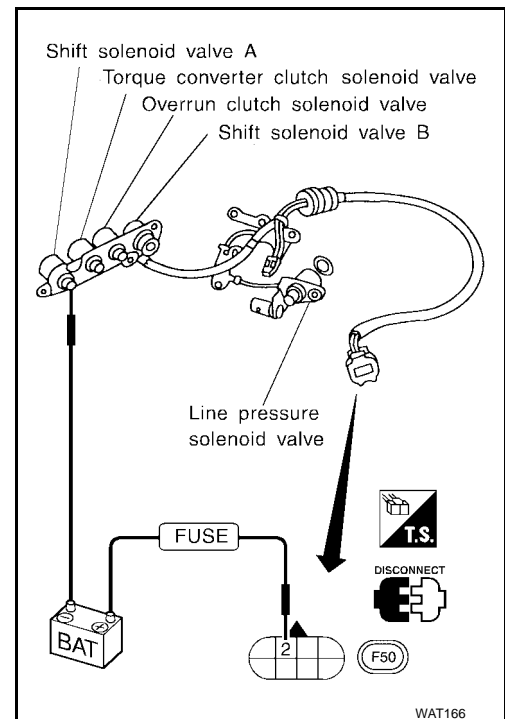
- Check resistance between two terminals.

Solenoid valve	Terminal 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.



DTC P0734 A/T 4TH GEAR FUNCTION

PFP:31940

Description

ECS005XG

- 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)	24%
	↓	↓
	Large throttle opening (High line pressure)	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	A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	<ul style="list-style-type: none"> ● Shift solenoid valve A ● Shift solenoid valve B ● Line pressure solenoid valve ● Each clutch ● Hydraulic control circuit
 : P0734		

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.
- Be careful not to rev engine into the red zone on the tachometer.

NOTE:

If “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE” 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.
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 45 to 55 km/h (28 to 34 MPH) under the following condition and release the accelerator pedal completely.

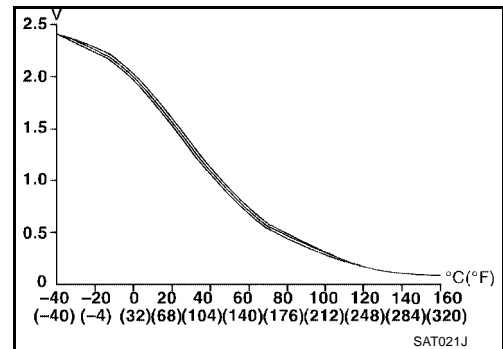
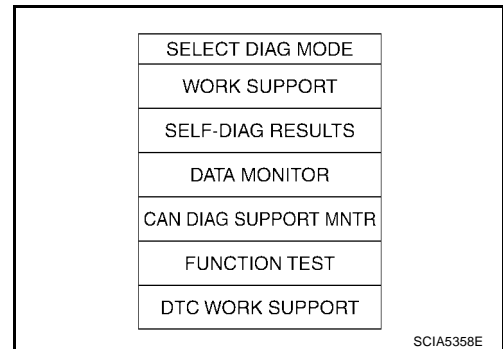
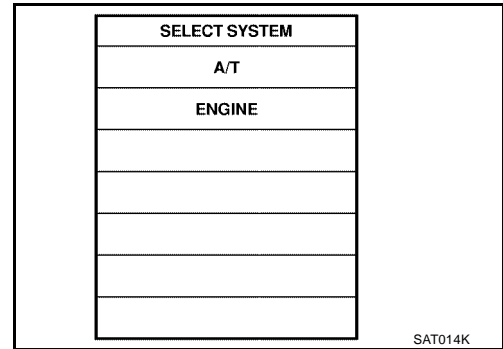
THROTTLE POSI: Less than 5.5/8 (at all times during step 4)

Selector lever: D position (OD “ON”)

- Check that “GEAR” shows “3” after releasing pedal.
5. Depress accelerator pedal steadily with 1.0/8 - 2.0/8 of “THROTTLE POSI” from a speed of 45 to 55 km/h (28 to 34 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 [AT-155, "Diagnostic Procedure"](#).
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-DIAGNOSIS” 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 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for P0734 exists.	1 → 2 → 2 → 1

8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “Diagnostic Procedure”.)
Refer to [AT-155, "Diagnostic Procedure"](#).
Refer to [AT-386, "Shift Schedule"](#).





With GST

Follow the procedure "With CONSULT-II".

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DTC P0734 A/T 4TH GEAR FUNCTION

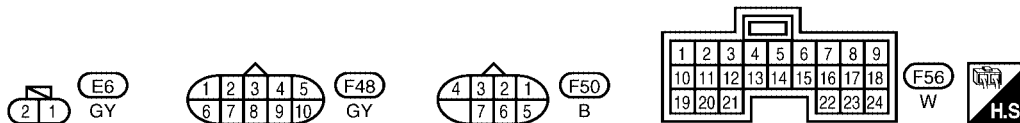
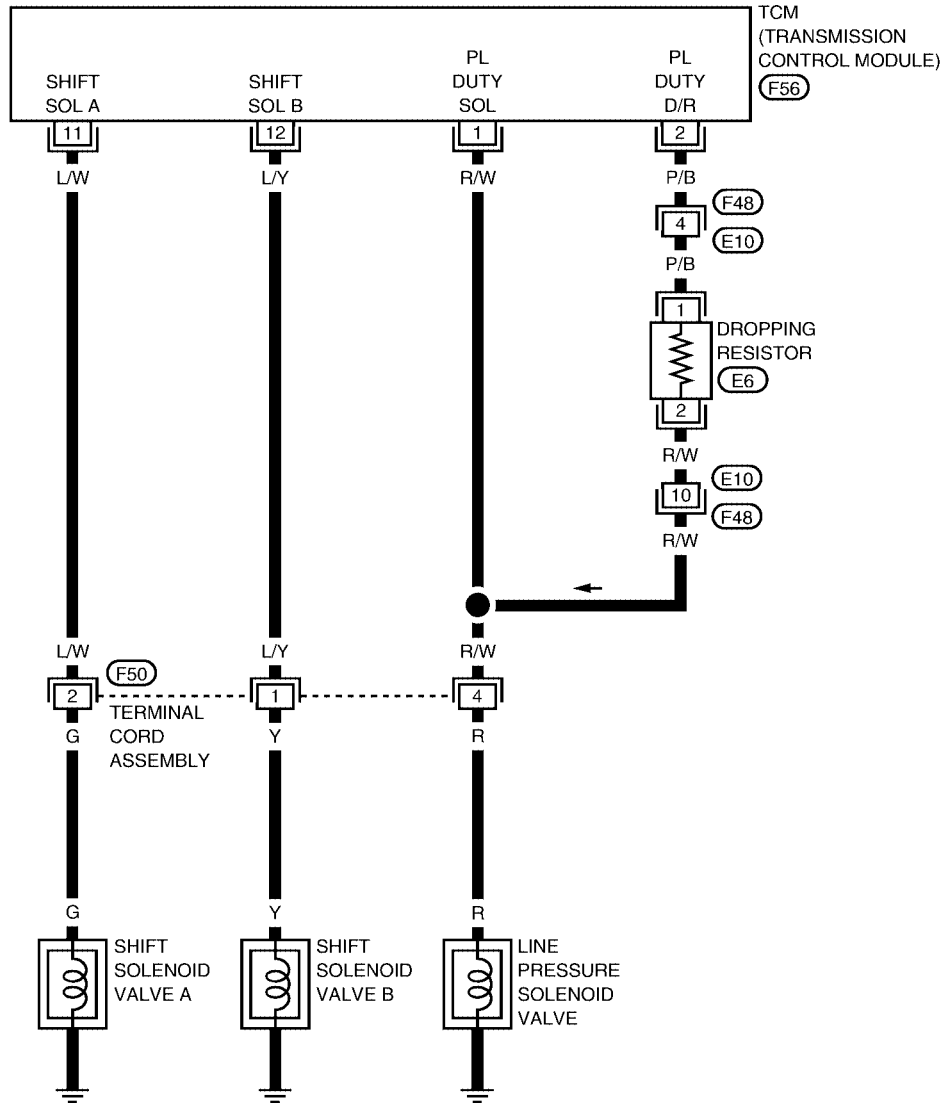
[RE4F03B]

Wiring Diagram — AT — 4TH

ECS005XH

AT-4THSIG-01

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



WCWA0065E

DTC P0734 A/T 4TH GEAR FUNCTION

[RE4F03B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	R/W	LINE PRESSURE SOLENOID VALVE	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	1.5 - 2.5V
			WHEN DEPRESSING ACCELERATOR PEDAL (ENGINE WARM)	0V
2	P/B	LINE PRESSURE SOLENOID 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	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATES	0V
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATES	0V

Diagnostic Procedure

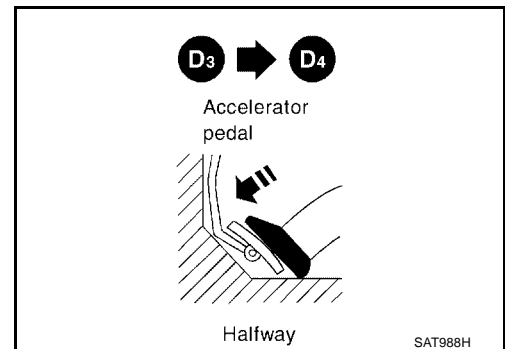
ECS005XI

1. CHECK SHIFT UP (D3 TO D4)

During "Cruise Test – Part 1" ([AT-78, "Cruise Test — Part 1"](#)), does A/T shift from D3 to D4 at the specified speed?

Yes or No

- Yes >> GO TO 9.
- No >> GO TO 2.



2. CHECK LINE PRESSURE

Perform line pressure test.

Refer to [AT-68, "Line Pressure Test"](#).

Engine speed rpm	Line pressure kPa (kg/cm ² , psi)	
	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)

LAT236

OK or NG

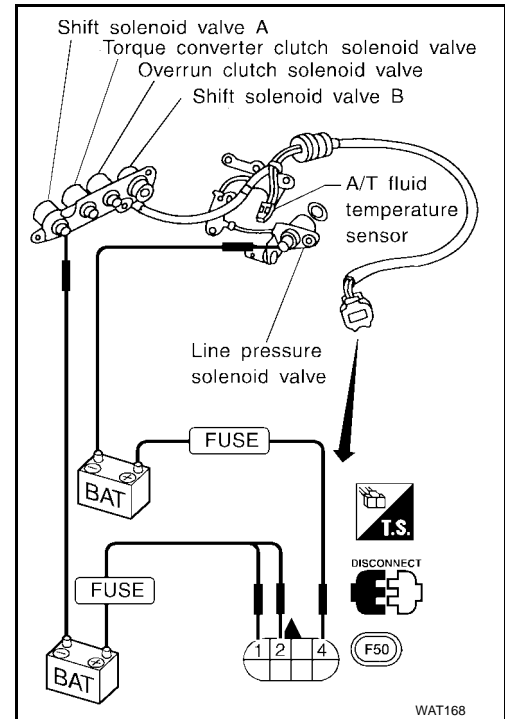
- OK >> GO TO 3.
- NG >> GO TO 6.

3. CHECK SOLENOID VALVES

1. Remove control valve assembly.
Refer to [AT-260, "REMOVAL"](#) .
2. Refer to [AT-159, "SOLENOID VALVES"](#) .

OK or NG

- OK >> GO TO 4.
 NG >> Replace solenoid valve assembly.

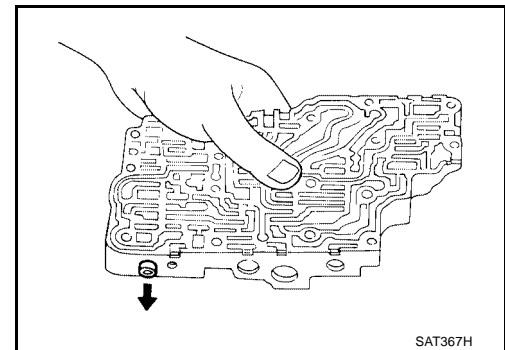


4. CHECK CONTROL VALVE

1. Disassemble control valve assembly.
Refer to [AT-299, "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 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

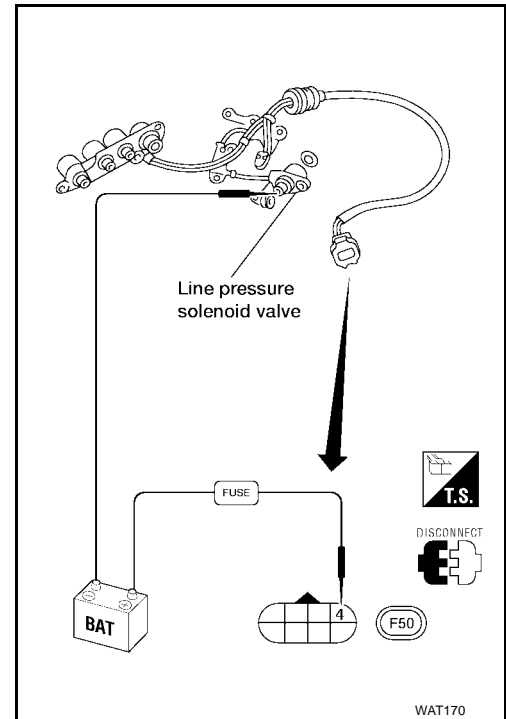
- OK >> GO TO 9.
 NG >> Check transaxle internal components (clutch, brake, etc.).

6. CHECK LINE PRESSURE SOLENOID VALVE

1. Remove control valve assembly.
Refer to [AT-260, "REMOVAL"](#) .
2. Refer to [AT-159, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
 NG >> Replace solenoid valve assembly.

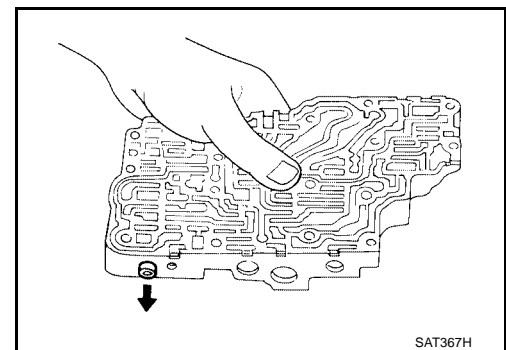


7. CHECK CONTROL VALVE

1. Disassemble control valve assembly.
Refer to [AT-299, "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.



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.).

9. CHECK DTC

Perform [AT-152, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

OK >> **INSPECTION END**

NG >> Perform "Cruise Test — Part 1" ([AT-78, "Cruise Test — Part 1"](#)) again and return to the start point of this test group.

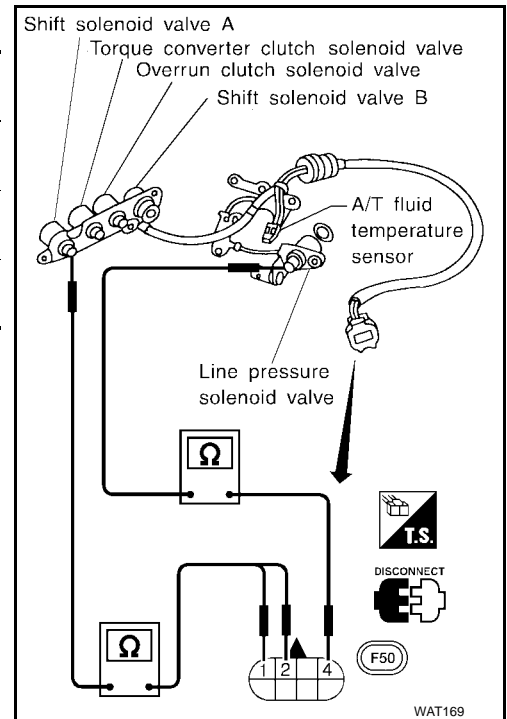
Component Inspection SOLENOID VALVES

- Refer to [AT-260, "REMOVAL"](#).

Resistance Check

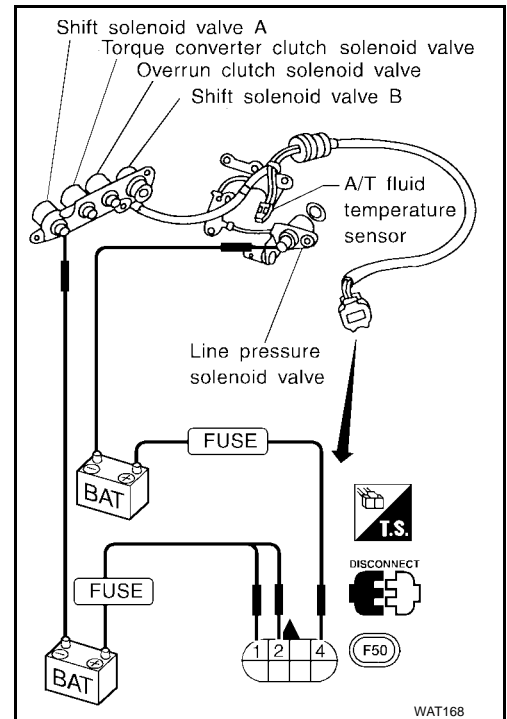
- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω
Shift solenoid valve B	1		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.



DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

[RE4F03B]

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

PF3:31940

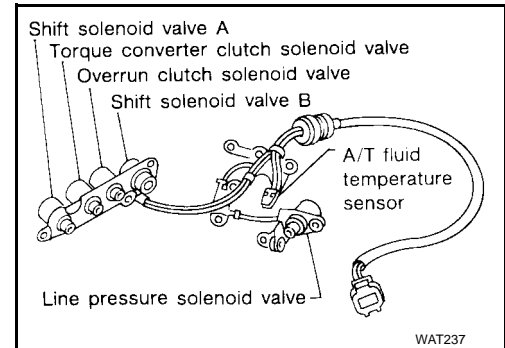
Description

ECS005XK

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.



WAT237

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

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

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: TCC SOLENOID/CIRC : P0740	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> • Harness or connectors (The solenoid circuit is open or shorted.) • T/C clutch solenoid valve

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

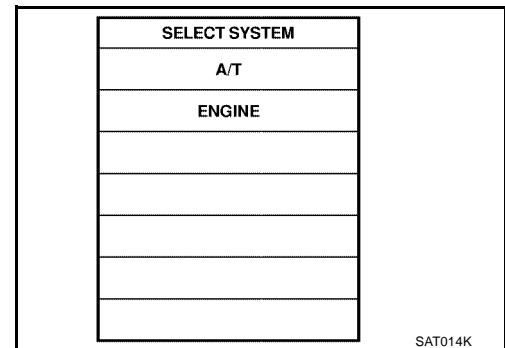
NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" 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".

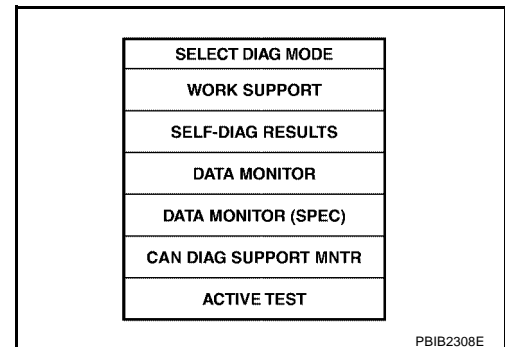


SAT014K

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

With GST

Follow the procedure "With CONSULT-II".



PBIB2308E

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

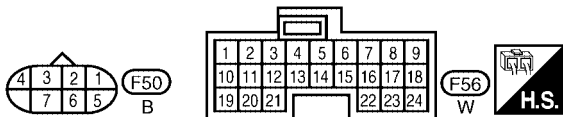
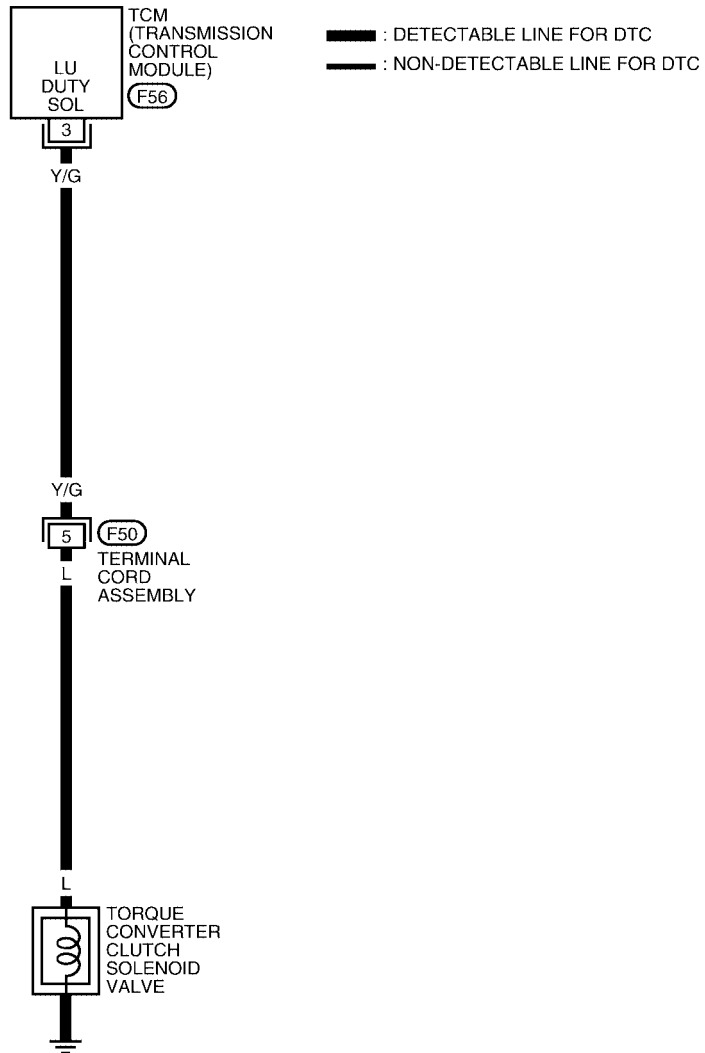
[RE4F03B]

Wiring Diagram — AT — TCV

ECS005XL

AT-TCV-01

A
B
AT
D
E
F
G
H
I
J
K
L
M



WCWA0066E

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

[RE4F03B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND

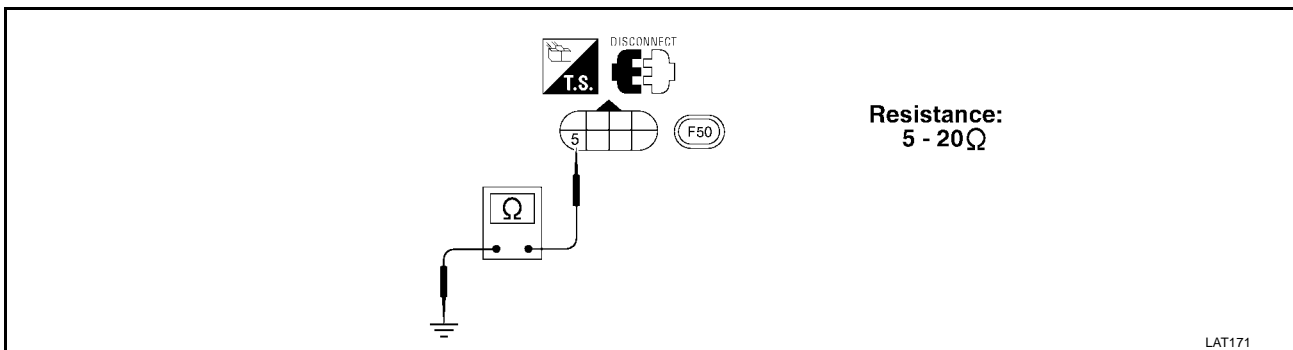
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
3	Y/G	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WHEN A/T PERFORMS LOCK-UP	8 - 15V
			WHEN A/T DOES NOT PERFORM LOCK-UP	0V

Diagnostic Procedure

ECS005XM

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 5 and ground.



OK or NG

OK >> GO TO 2.

NG >> 1. Remove oil pan. Refer to [AT-260, "REMOVAL"](#).

2. Check the following items:

- Torque converter clutch solenoid valve
Refer to [AT-163, "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.

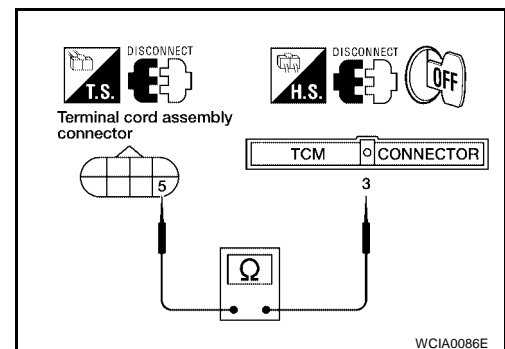
If OK, check harness for short to ground and short to power.

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-160, "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 P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

[RE4F03B]

ECS005XN

Component Inspection

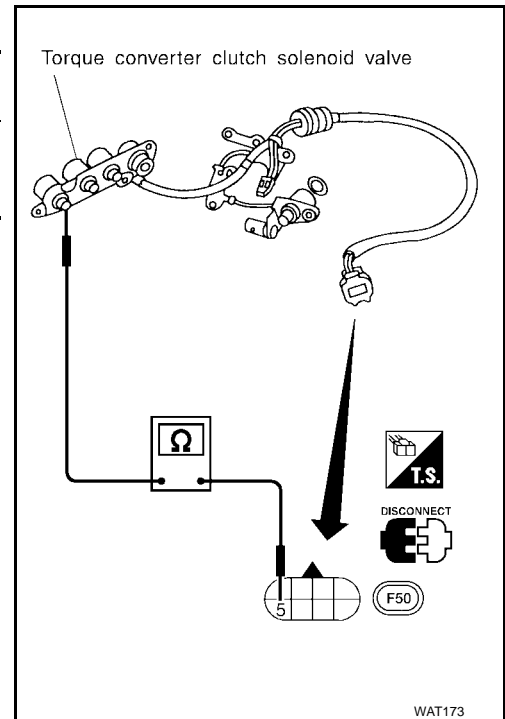
TORQUE CONVERTER CLUTCH SOLENOID VALVE

- Refer to [AT-260, "REMOVAL"](#).

Resistance Check

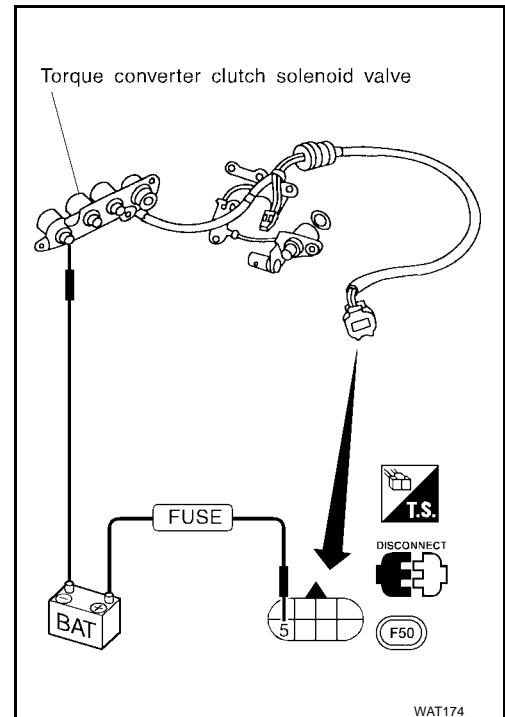
- Check resistance between two terminals.

Solenoid valve	Terminal 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.



A
B
AT
D
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F
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K
L
M

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

[RE4F03B]

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

PF0:31940

Description

ECS005X0

- 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 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.)
Torque converter clutch solenoid valve duty	Lock-up "OFF"	4%
	↓ Lock-up "ON"	↓ 94%

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)
 : A/T TCC S/V FNCTN  : P0744	A/T cannot perform lock-up even if electrical circuit is good.	<ul style="list-style-type: none"> ● Torque converter clutch solenoid valve ● Line pressure solenoid valve ● Each clutch ● Hydraulic control circuit

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

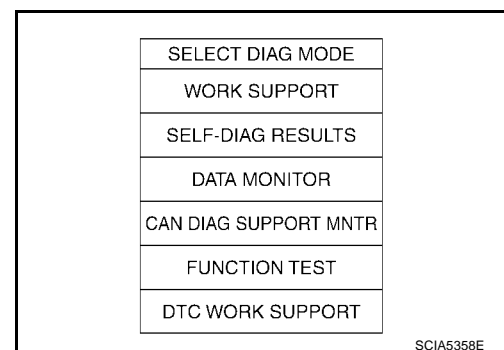
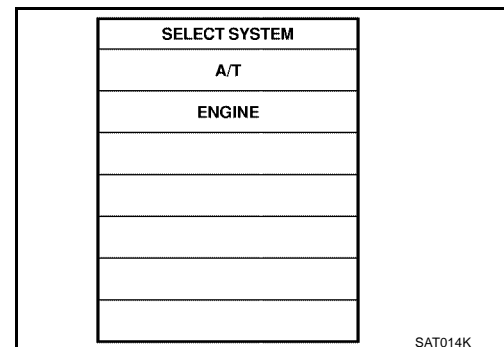
NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" 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".



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

[RE4F03B]

- Accelerate vehicle to more than 80 km/h (50 MPH) and maintain the following condition continuously until "TESTING" has turned to "COMPLETE". (It will take approximately 30 seconds after "TESTING" shows.)

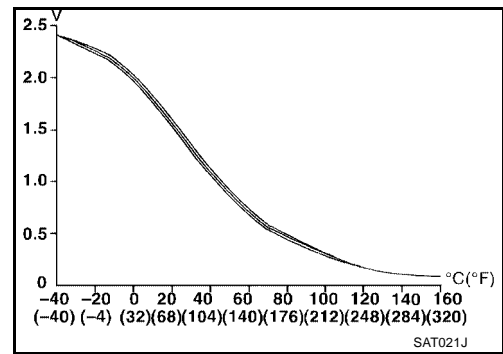
THROTTLE POSI: 1.0/8 - 2.0/8 (at all times during step 4)

Selector lever: D position (OD "ON")

TCC S/V DUTY: More than 94%

VHCL/S SE-A/T: Constant speed of more than 80 km/h (50 MPH)

- Check that "GEAR" shows "4".
 - If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAGNOSIS". 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 [AT-168, "Diagnostic Procedure"](#) .)
Refer to [AT-168, "Diagnostic Procedure"](#) .
Refer to [AT-386, "Shift Schedule"](#) .



With GST

Follow the procedure "With CONSULT-II".

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

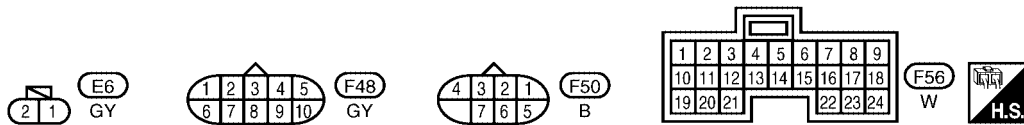
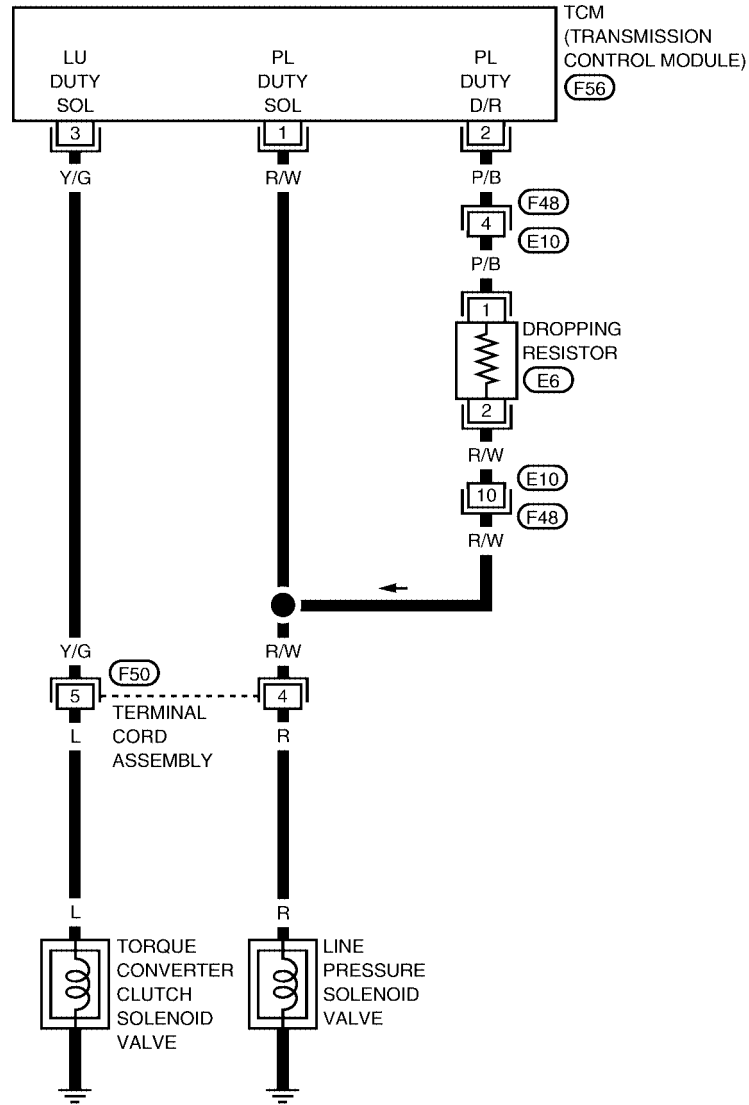
[RE4F03B]

Wiring Diagram — AT — TCCSIG

ECS005XP

AT-TCCSIG-01

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



WCWA0067E

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

[RE4F03B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	R/W	LINE PRESSURE SOLENOID VALVE	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	1.5 - 2.5V
			WHEN DEPRESSING ACCELERATOR PEDAL (ENGINE WARM)	0.5V OR LESS
2	P/B	LINE PRESSURE SOLENOID VALVE (WITH DROPPING RESISTOR)	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	5 - 14V
			WHEN DEPRESSING ACCELERATOR PEDAL (ENGINE WARM)	0.5V OR LESS
3	Y/G	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WHEN A/T PERFORMS LOCK-UP	8 - 14V
			WHEN A/T DOES NOT PERFORM LOCK-UP	0V

Diagnostic Procedure

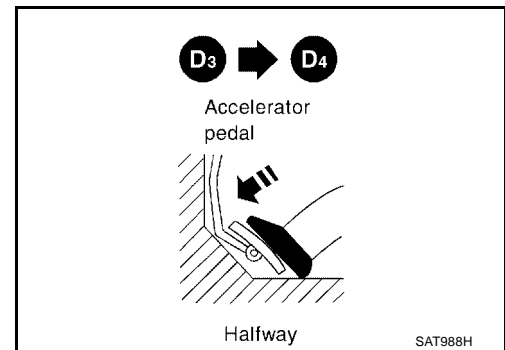
ECS005XQ

1. CHECK SHIFT UP (D3 TO D4)

During "Cruise Test – Part 1" ([AT-78, "Cruise Test — Part 1"](#)), does A/T shift from D3 to D4 at the specified speed?

Yes or No

- Yes >> GO TO 10.
- No >> GO TO 2.



2. CHECK LINE PRESSURE

Perform line pressure test.

Refer to [AT-68, "Line Pressure Test"](#).

Engine speed rpm	Line pressure kPa (kg/cm ² , psi)	
	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)

LAT236

OK or NG

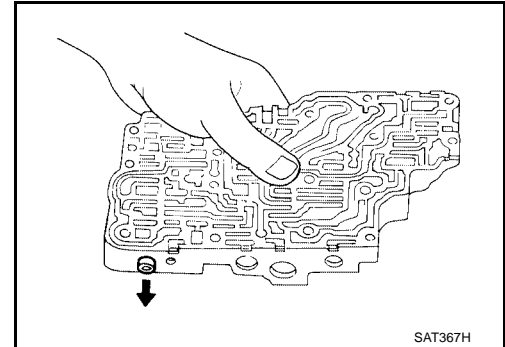
- OK >> GO TO 3.
- NG >> GO TO 6.

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly.
Refer to [AT-299, "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 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. CHECK DTC

Perform [AT-165, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

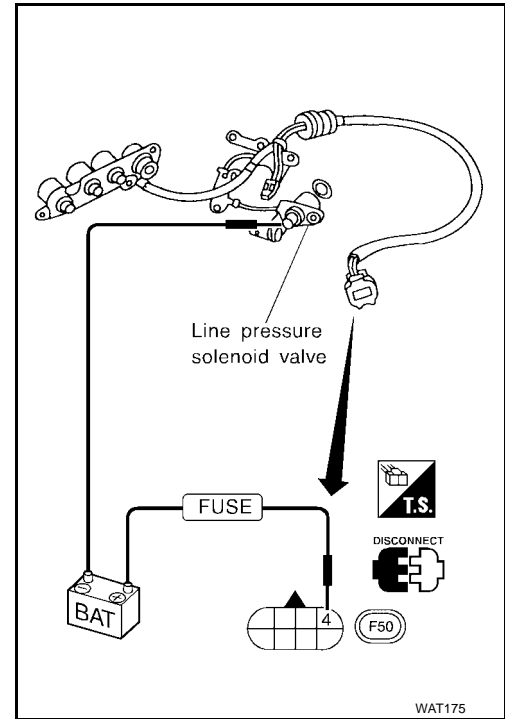
- OK >> **INSPECTION END**
NG >> GO TO 10. Check lock-up condition.

6. CHECK LINE PRESSURE SOLENOID VALVE

1. Remove control valve assembly.
Refer to [AT-260, "REMOVAL"](#) .
2. Check line pressure solenoid valve operation.
Refer to [AT-178, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.
NG >> Replace solenoid valve assembly.

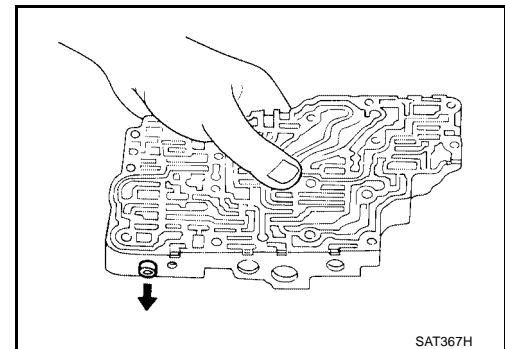


7. CHECK CONTROL VALVE

1. Disassemble control valve assembly.
Refer to [AT-299, "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.



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.).

9. CHECK DTC

Perform [AT-165, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

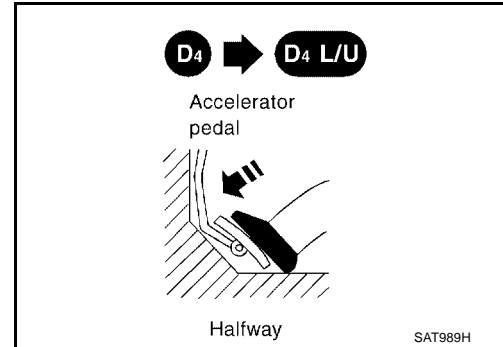
- OK >> **INSPECTION END**
- NG >> GO TO 10. Check for proper lock-up.

10. CHECK LOCK-UP CONDITION

During "Cruise Test – Part 1" ([AT-78, "Cruise Test — Part 1"](#)), does A/T perform lock-up at the specified speed?

Yes or No

- Yes >> Perform "Cruise Test – Part 1" ([AT-78, "Cruise Test — Part 1"](#)) again and return to the start point of this test group.
- No >> GO TO 11.

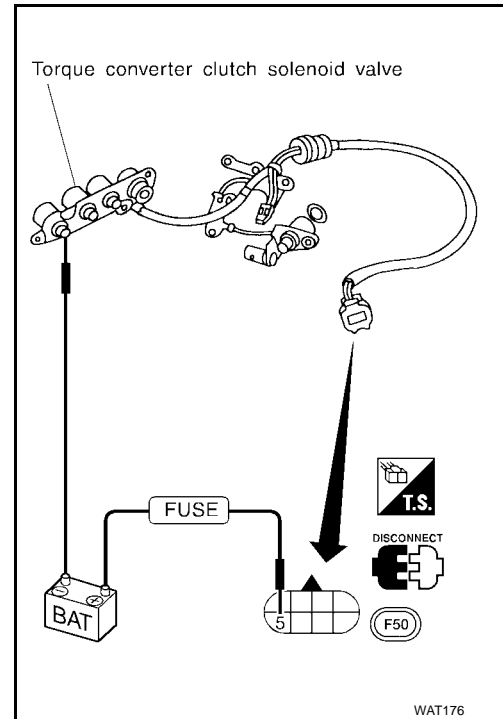


11. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE

1. Remove control valve assembly. Refer to [AT-260, "REMOVAL"](#) .
2. Check torque converter clutch solenoid valve operation. Refer to [AT-163, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#)

OK or NG

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

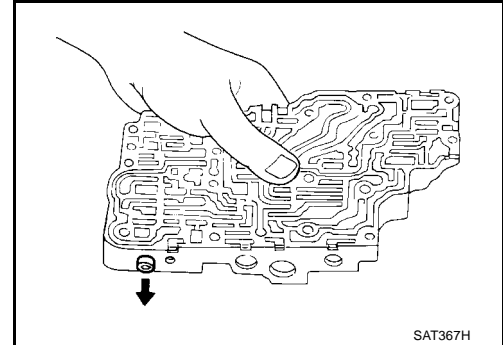


12. CHECK CONTROL VALVE

1. Disassemble control valve assembly.
Refer to [AT-299, "Disassembly"](#) .
2. Check control valves for sticking.
 - Torque converter clutch control valve
 - Torque converter clutch relief valve

OK or NG

- OK >> GO TO 13.
NG >> Repair control valve.



13. CHECK LOCK-UP CONDITION

Does A/T perform lock-up at the specified speed?

Yes or No

- Yes >> GO TO 14.
No >> Check transaxle internal components (clutch, brake, etc.).

14. CHECK DTC

Perform [AT-165, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> Perform "Cruise Test — Part 1" ([AT-78, "Cruise Test — Part 1"](#)) again and return to the start point of this test group.

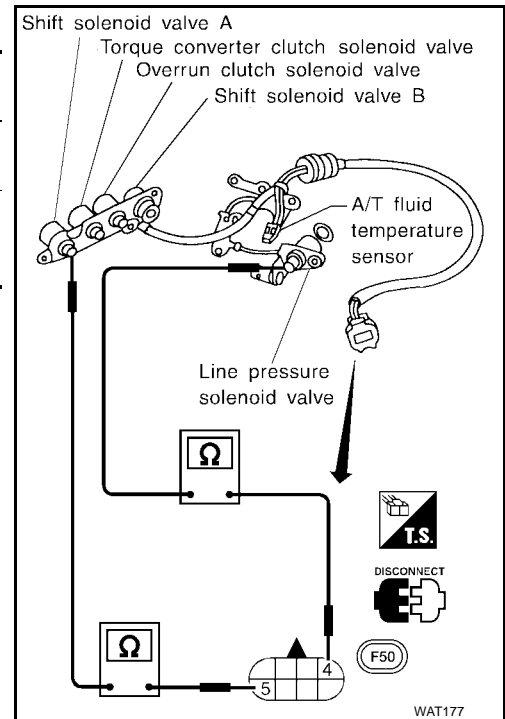
Component Inspection SOLENOID VALVES

- Refer to [AT-260, "REMOVAL"](#).

Resistance Check

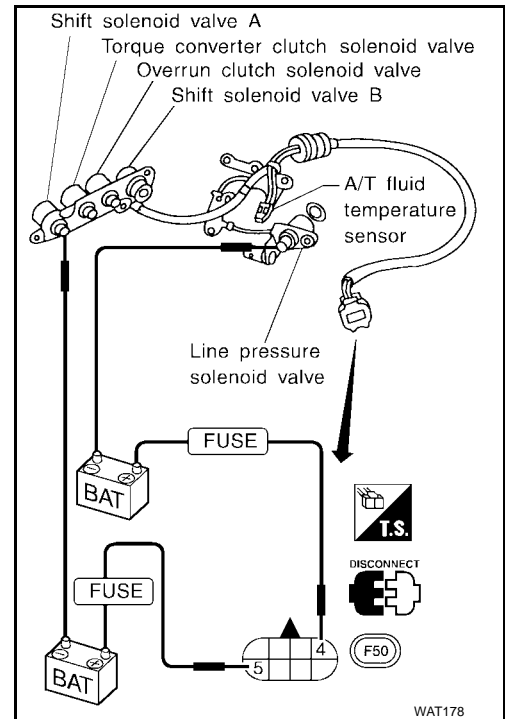
- Check resistance between two terminals.

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



Operation Check

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

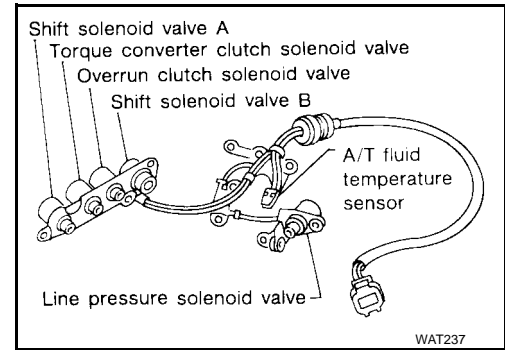


DTC P0745 LINE PRESSURE SOLENOID VALVE

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.)
Line pressure solenoid valve duty	Small throttle opening (Low line pressure)	24%
	↓ Large throttle opening (High line pressure)	↓ 95%

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)
ⓘ : L/PRESS SOL/CIRC ⓘ : P0745	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> ● Harness or connectors (The solenoid circuit is open or shorted.) ● Line pressure solenoid valve

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

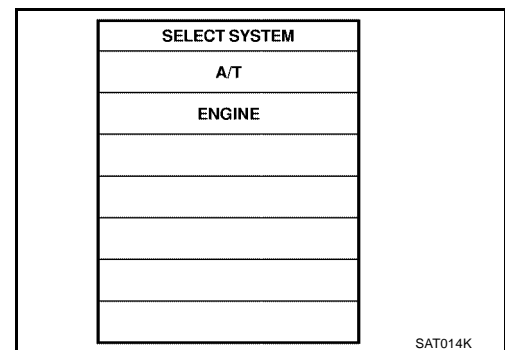
NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" 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

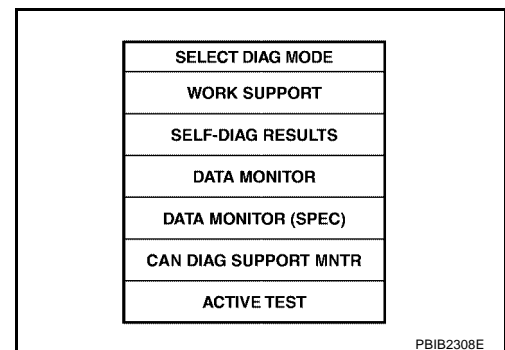
1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.



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

ⓘ With GST

Follow the procedure "With CONSULT-II".



DTC P0745 LINE PRESSURE SOLENOID VALVE

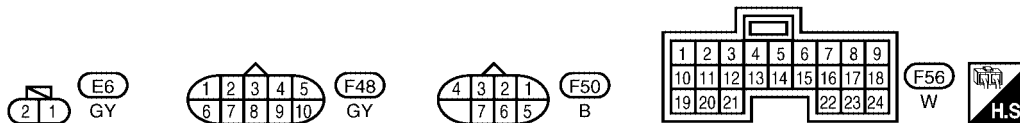
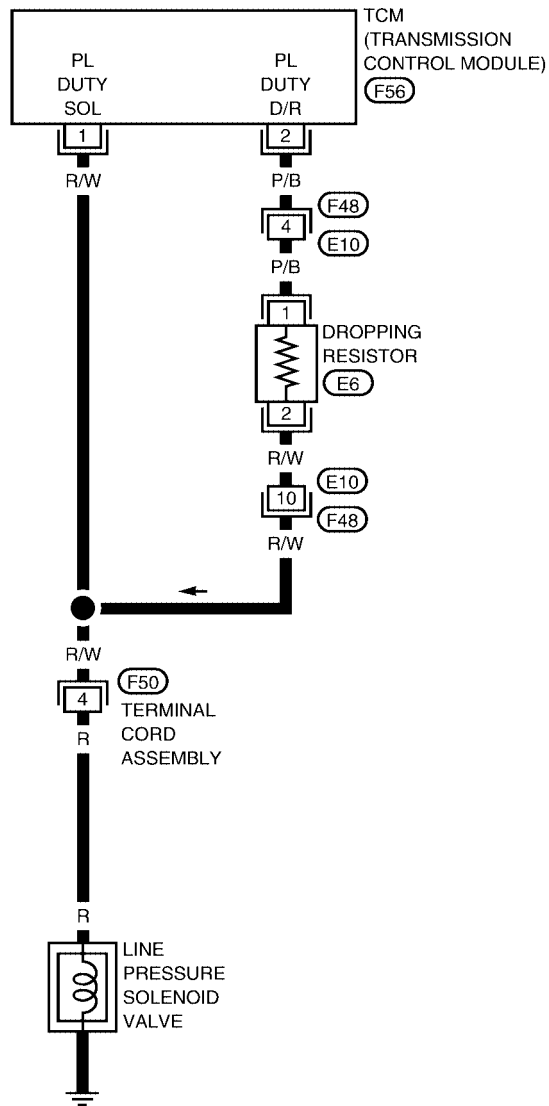
[RE4F03B]

Wiring Diagram — AT — LPSV

ECS005XT

AT-LPSV-01

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



WCWA0068E

DTC P0745 LINE PRESSURE SOLENOID VALVE

[RE4F03B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

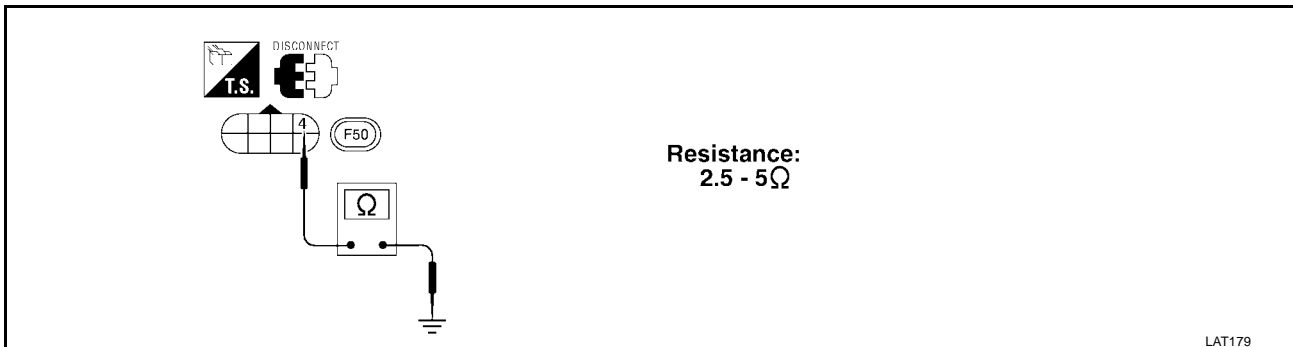
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	R/W	LINE PRESSURE SOLENOID VALVE	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	1.5 - 3.0V
			WHEN DEPRESSING ACCELERATOR PEDAL (ENGINE WARM)	0.5V OR LESS
2	P/B	LINE PRESSURE SOLENOID VALVE (WITH DROPPING RESISTOR)	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	5 - 14v
			WHEN DEPRESSING ACCELERATOR PEDAL (ENGINE WARM)	0.5V OR LESS

Diagnostic Procedure

ECS005XU

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 or NG

OK >> GO TO 2.

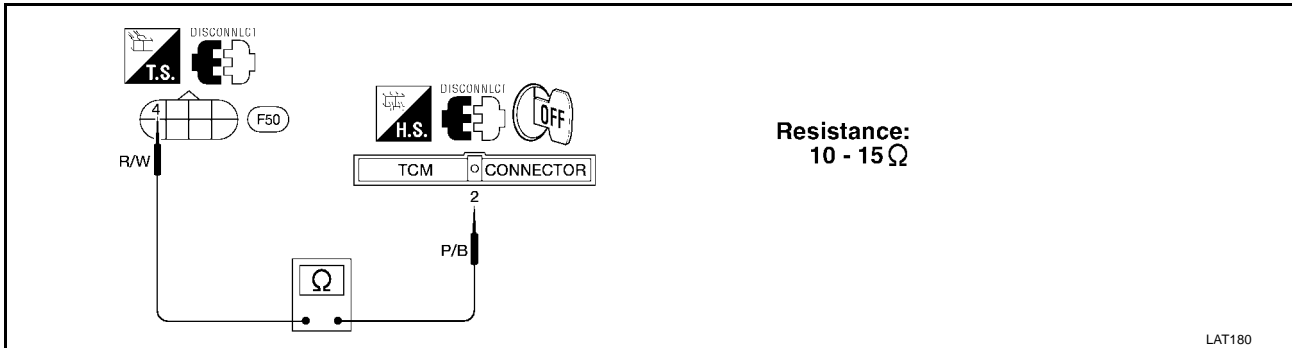
NG >> 1. Remove control valve assembly. Refer to [AT-260, "REMOVAL"](#) .

2. Check the following items:

- Line pressure solenoid valve
Refer to [AT-178, "Component Inspection"](#) .
- 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.
3. Check resistance between terminal 4 and TCM harness connector terminal 2.



OK or NG

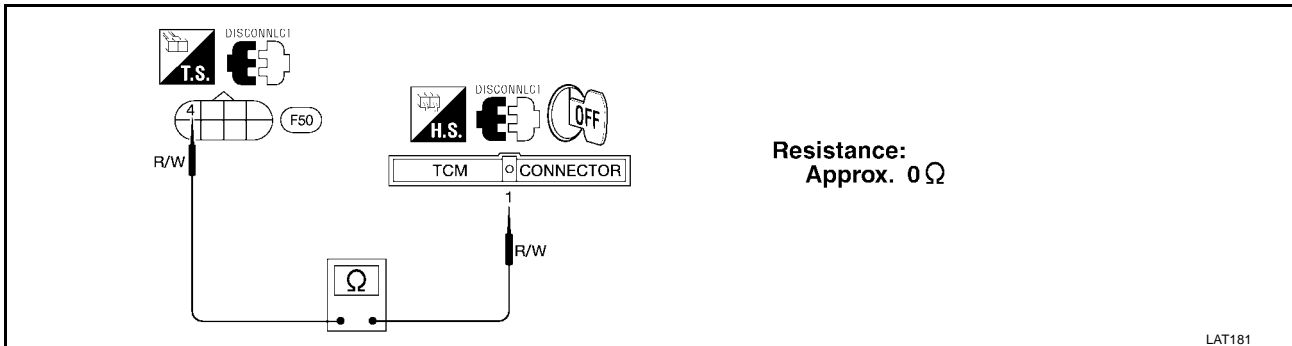
OK >> GO TO 3.

NG >> Check the following items:

- Dropping resistor
Refer to [AT-179, "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.

4. CHECK DTC

Perform [AT-174, "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 P0745 LINE PRESSURE SOLENOID VALVE

[RE4F03B]

ECS005XV

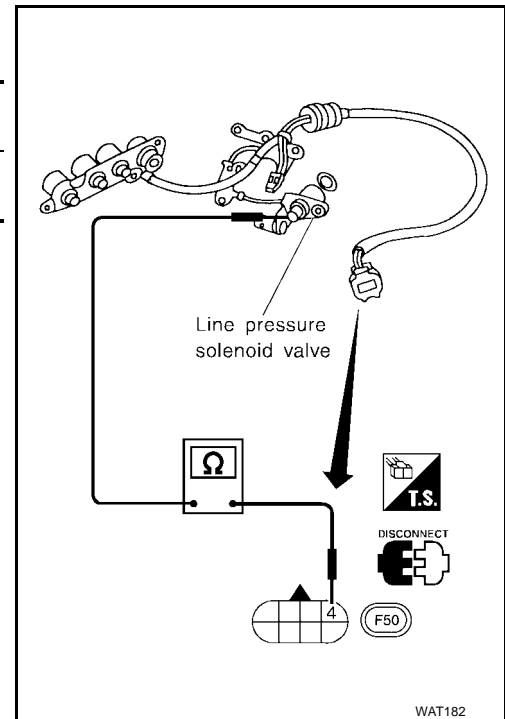
Component Inspection LINE PRESSURE SOLENOID VALVE

- Refer to [AT-260, "REMOVAL"](#).

Resistance Check

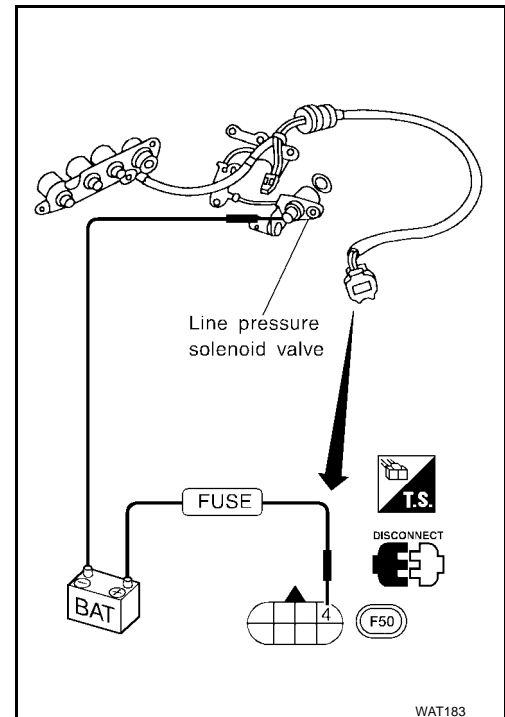
- Check resistance between two terminals.

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.



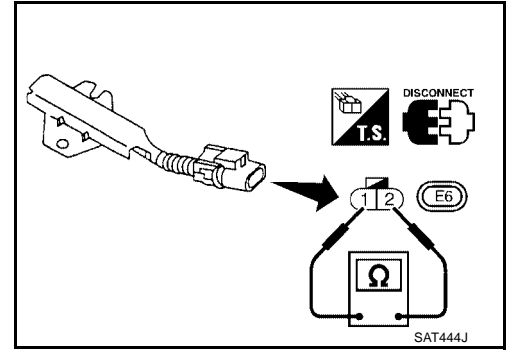
DTC P0745 LINE PRESSURE SOLENOID VALVE

[RE4F03B]

DROPPING RESISTOR

- Check resistance between two terminals.

Resistance : 10 - 15Ω



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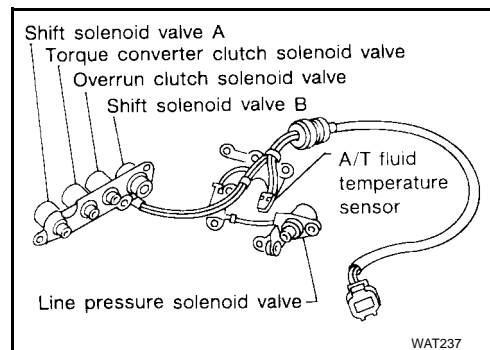
DTC P0750 SHIFT SOLENOID VALVE A

PFP:31940

Description

ECS005XW

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.



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

Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
: SFT SOL A/CIRC : P0750	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> ● 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 "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

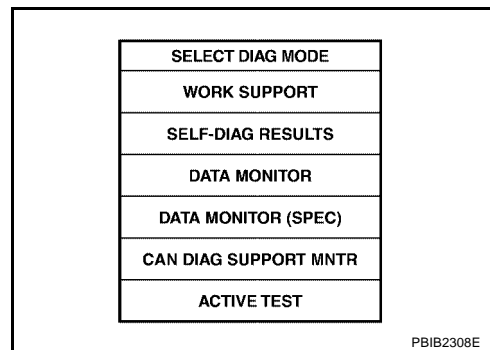
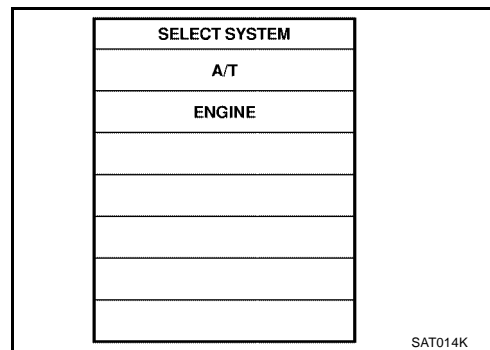
After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

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

With GST

Follow the procedure "With CONSULT-II".



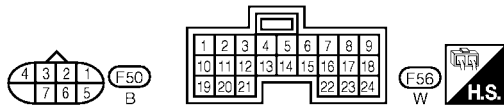
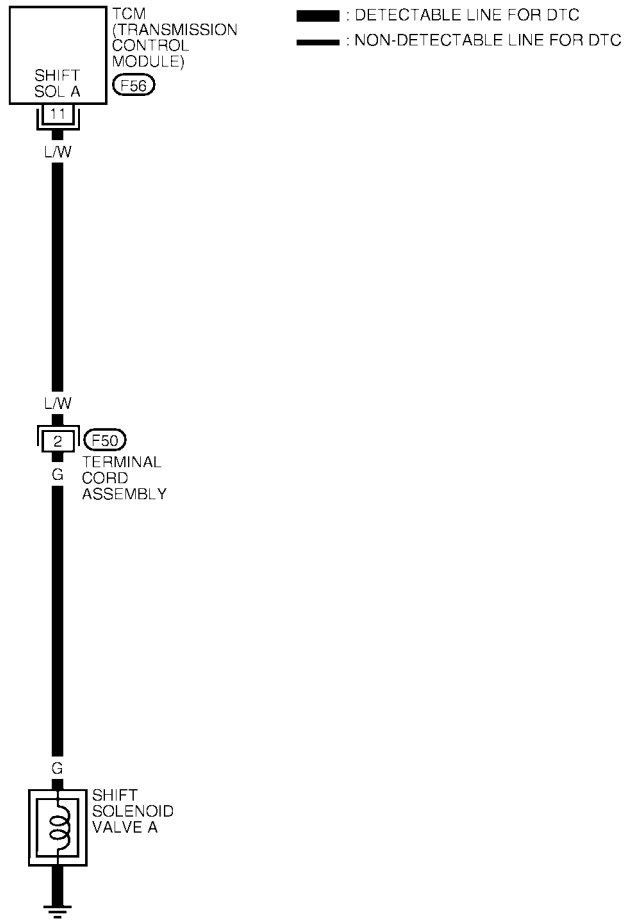
DTC P0750 SHIFT SOLENOID VALVE A

[RE4F03B]

Wiring Diagram — AT — SSV/A

ECS005XX

AT-SSV/A-01



WAT125

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

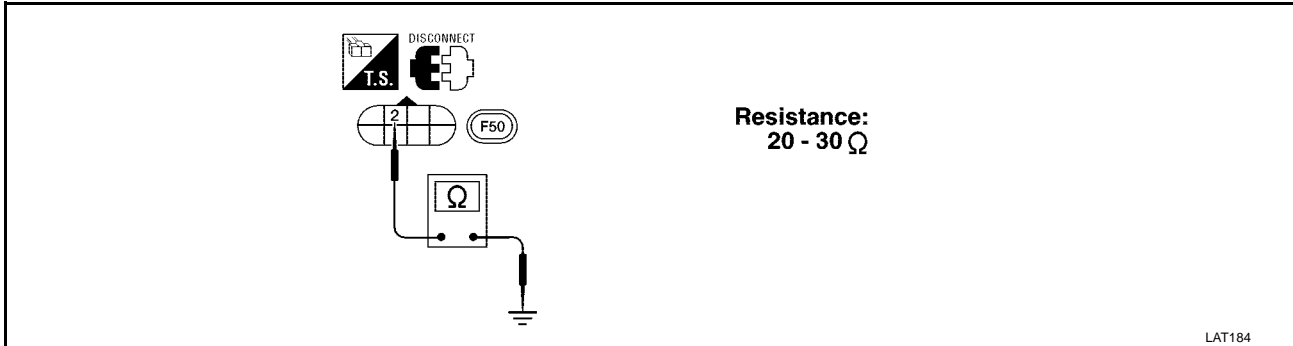
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	L/W	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATE	0V

WAT345

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 2 and ground.



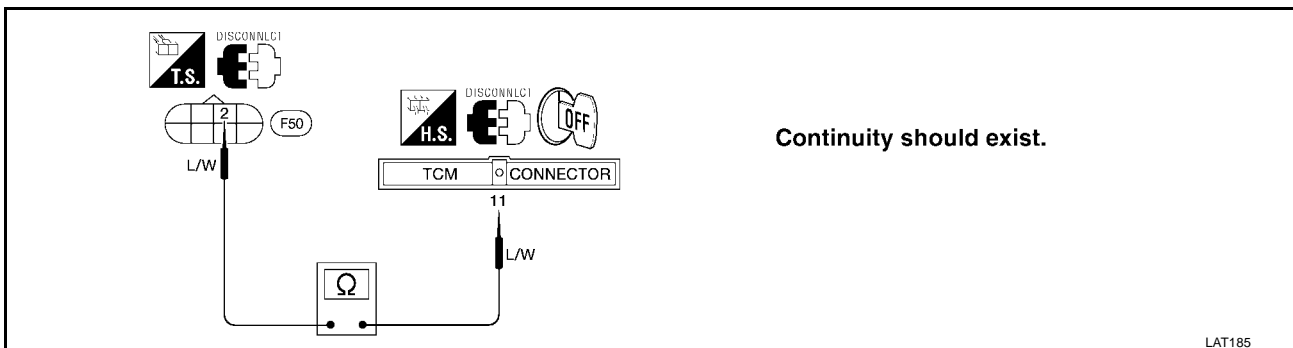
OK or NG

OK >> GO TO 2.

- NG >> 1. Remove control valve assembly. Refer to [AT-260, "REMOVAL"](#) .
2. Check the following items:
- Shift solenoid valve A
Refer to [AT-183, "Component Inspection"](#) .
 - 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.
3. 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-180, "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 P0750 SHIFT SOLENOID VALVE A

[RE4F03B]

ECS005XZ

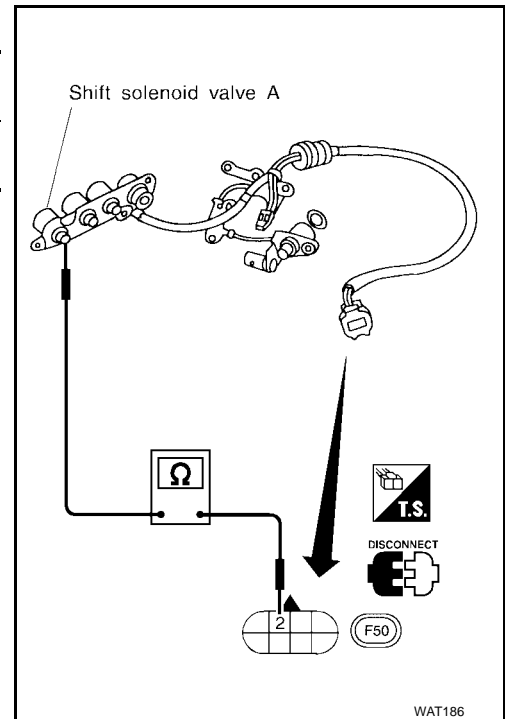
Component Inspection SHIFT SOLENOID VALVE A

- Refer to [AT-183, "Component Inspection"](#).

Resistance Check

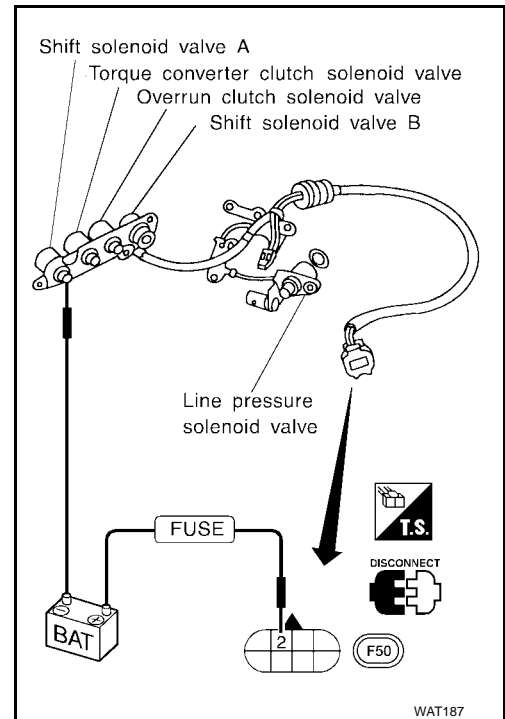
- Check resistance between two terminals.

Solenoid valve	Terminal 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.



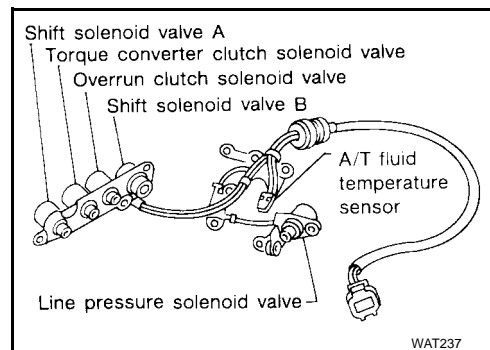
DTC P0755 SHIFT SOLENOID VALVE B

PFP:31940

Description



ECS005Y0

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.



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

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.	<ul style="list-style-type: none"> ● Harness or connectors (The solenoid circuit is open or shorted.) ● Shift solenoid valve B

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

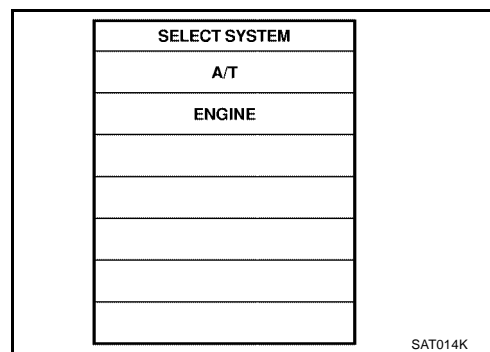
CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE” 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.

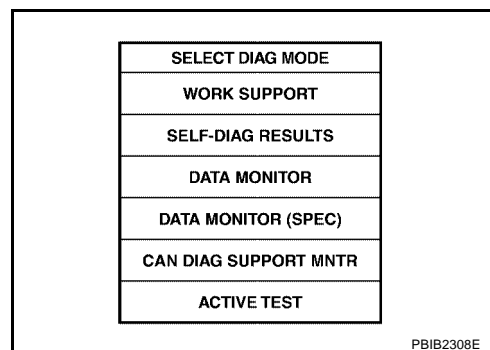


 With CONSULT-II

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

 **With GST**

Follow the procedure “With CONSULT-II”.



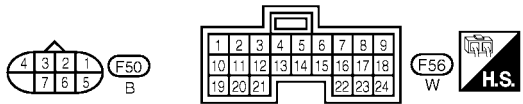
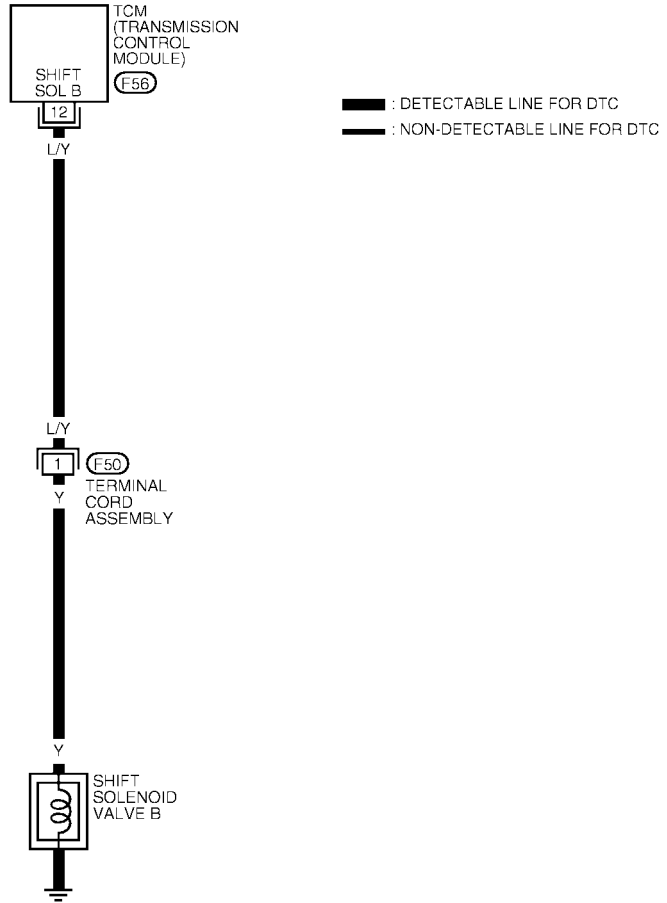
DTC P0755 SHIFT SOLENOID VALVE B

[RE4F03B]

Wiring Diagram — AT — SSV/B

ECS005Y1

AT-SSV/B-01



WAT126

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

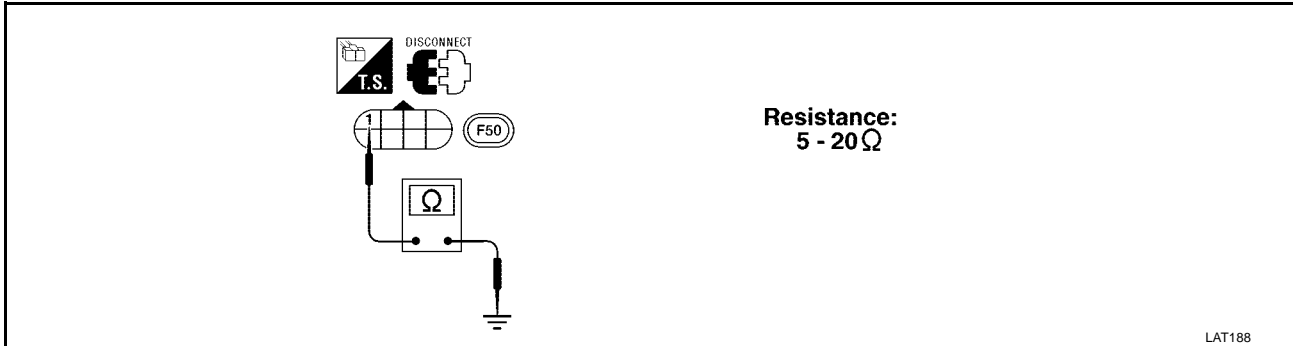
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	0V

WAT344

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 1 and ground.

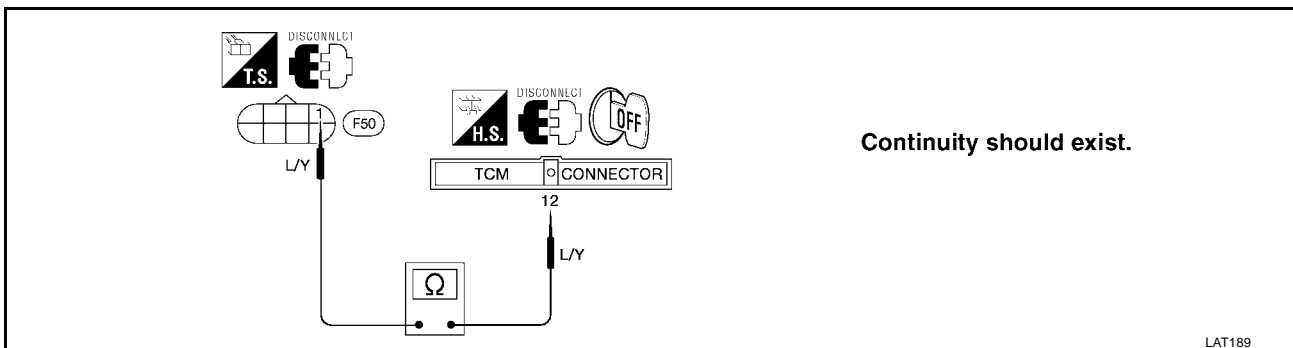


OK or NG

- OK >> GO TO 2.
- NG >> 1. Remove control valve assembly. Refer to [AT-260, "REMOVAL"](#) .
2. Check the following items:
- Shift solenoid valve B
Refer to [AT-187, "Component Inspection"](#) .
 - 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.
3. Check continuity between terminal 1 and TCM harness connector terminal 12.



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-184, "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 P0755 SHIFT SOLENOID VALVE B

[RE4F03B]

ECS005Y3

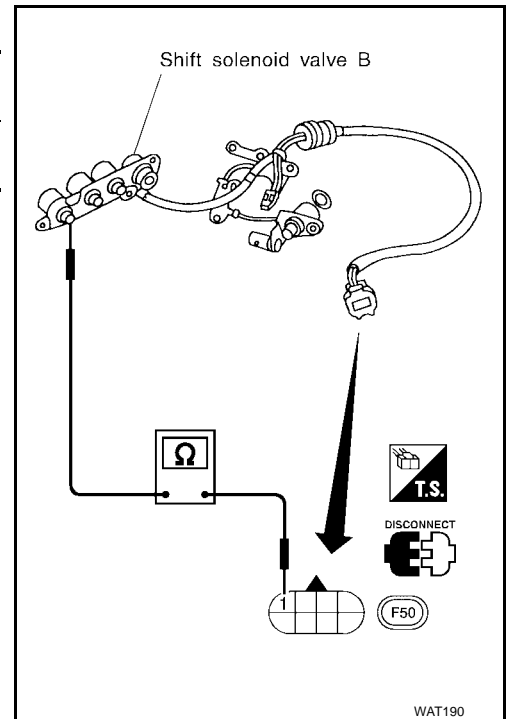
Component Inspection SHIFT SOLENOID VALVE B

- Refer to [AT-260, "REMOVAL"](#).

Resistance Check

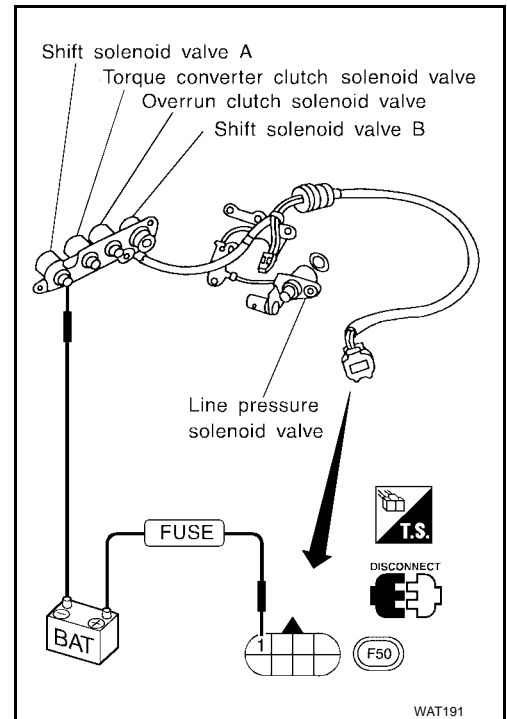
- Check resistance between two terminals.

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.



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

[RE4F03B]

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

PFM:22560

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 [accelerator pedal position (APP) sensor]	Fully-closed throttle	Approximately 0.5V
	Fully-open throttle	Approximately 4V

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

[RE4F03B]

On Board Diagnosis Logic

ECS006GT

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

ECS006GU

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS006GV

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

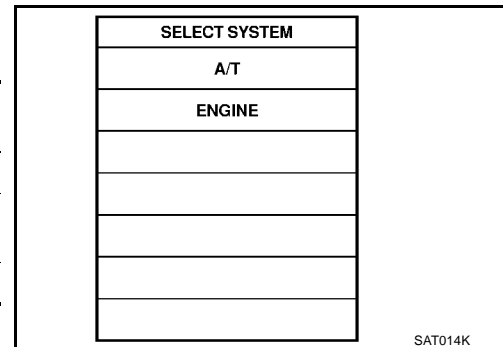
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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

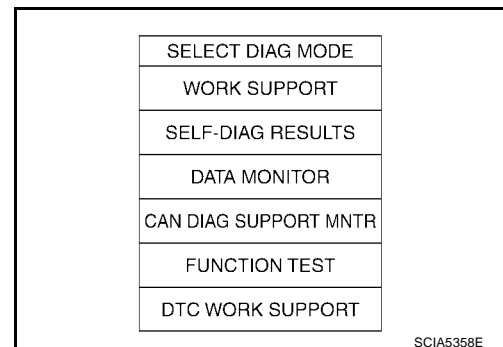


If the check result is NG, go to [AT-192, "Diagnostic Procedure"](#).
If the check result is OK, go to following step.

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

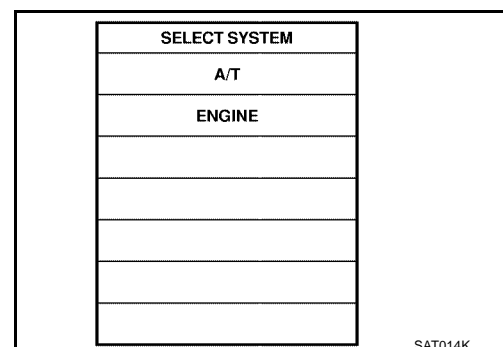
VHCL SPEED SE: 10 km/h (6 MPH) or more
THRTL POS SEN: Approximately 3V or less
Selector lever: D position (O/D ON)

If the check result is NG, go to [AT-192, "Diagnostic Procedure"](#).
If the check result is OK, go to following step.



4. 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
Accelerator pedal: Wide open throttle
Selector lever: D position (O/D ON)



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

[RE4F03B]

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
CAN DIAG SUPPORT MNTR
ACTIVE TEST

PBIB2308E

WITH GST

Follow the procedure "With CONSULT-II".

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

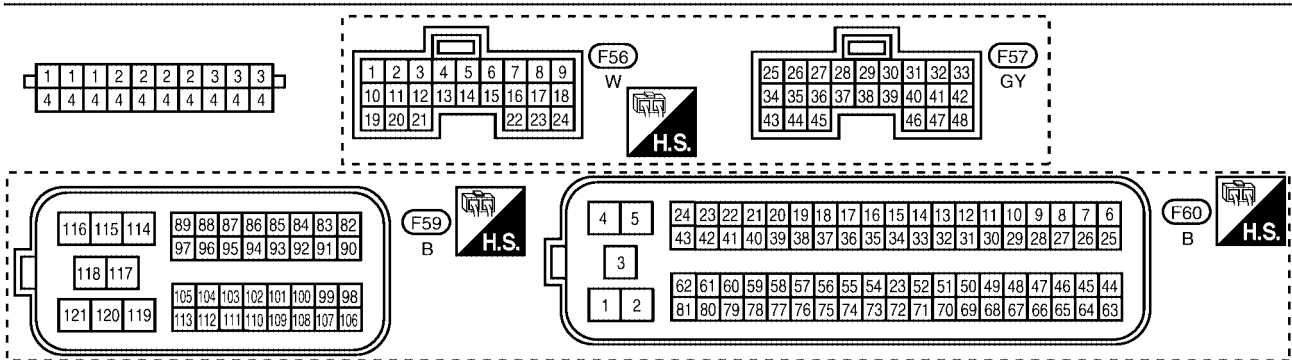
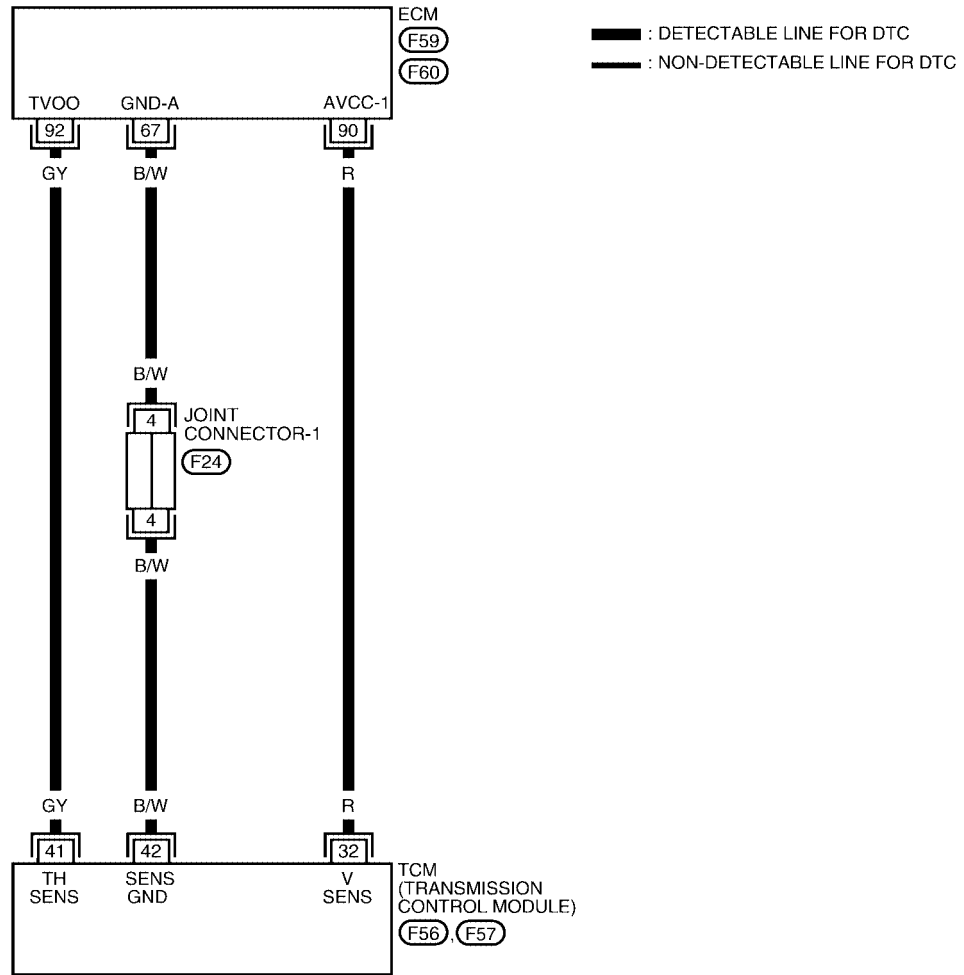
[RE4F03B]

Wiring Diagram — AT — TPS

ECS006GW

AT-TPS-01

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WCWA0069E

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

[RE4F03B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
32	R	SENSOR POWER	IGNITION SWITCH ON	4.5 - 5.5V
			IGNITION SWITCH OFF	0V
41	GY	THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]	IGNITION ON AND ACCELERATOR PEDAL IS DEPRESSED SLOWLY AFTER WARMING UP ENGINE	FULLY CLOSED THROTTLE: 0.5V WIDE OPEN THROTTLE: 4.0V
42	B/W	SENSOR GROUND	—	—

Diagnostic Procedure

ECS006GX

1. CHECK 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-72, "Malfunction Indicator Lamp \(MIL\)"](#) [QG18DE (ULEV)] or [EC-653, "Malfunction Indicator Lamp \(MIL\)"](#) [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 [EC-260, "DTC P0222, P0223 TP SENSOR"](#) [QG18DE (ULEV)] or [EC-818, "DTC P0222, P0223 TP SENSOR"](#) [QG18DE (SULEV)] and [EC-503, "DTC P2122, P2123 APP SENSOR"](#) [QG18DE (ULEV)] or [EC-1125, "DTC P2122, P2123 APP SENSOR"](#) [QG18DE (SULEV)].

2. CHECK INPUT SIGNAL (WITH CONSULT-II)

Ⓜ With CONSULT-II

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

DATA MONITOR	
MONITORING	VALUE
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

SAT614J

Voltage:

Fully-closed throttle :Approximately 0.5V

Fully-open throttle :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)

3. CHECK INPUT SIGNAL (WITHOUT CONSULT-II)

⊗ Without CONSULT-II

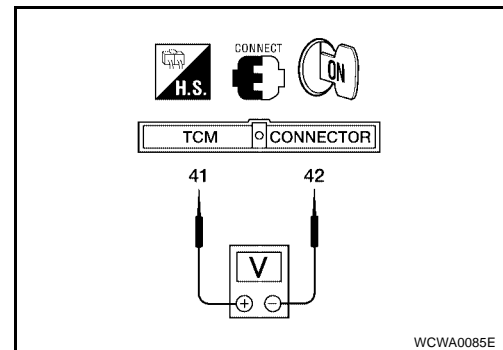
1. Turn ignition switch to ON position. (Do not start engine.)
2. Check voltage between TCM terminals 41 (GY) and 42 (B/W) while accelerator pedal is depressed slowly.

Voltage:

Fully-closed throttle valve :Approximately 0.5V

Fully-open throttle valve :Approximately 4V

(Voltage rises gradually in response to throttle position.)



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.

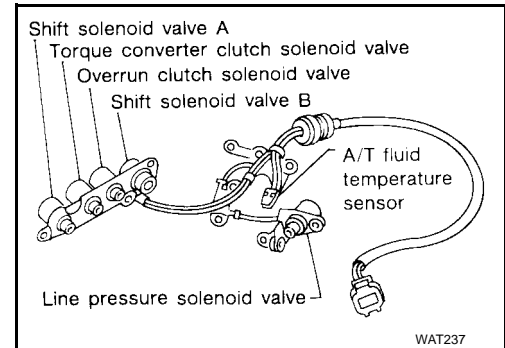
DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

PFP:31940

Description

ECS005Y8

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.	<ul style="list-style-type: none"> ● 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 5 seconds before conducting the next test.

TESTING CONDITION:

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

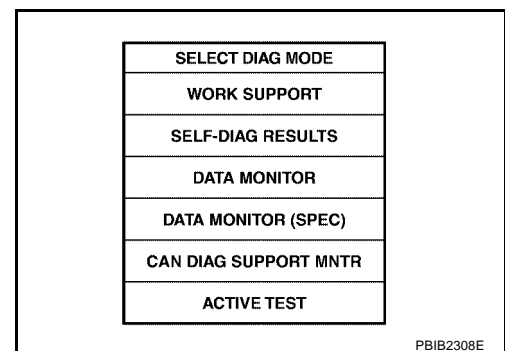
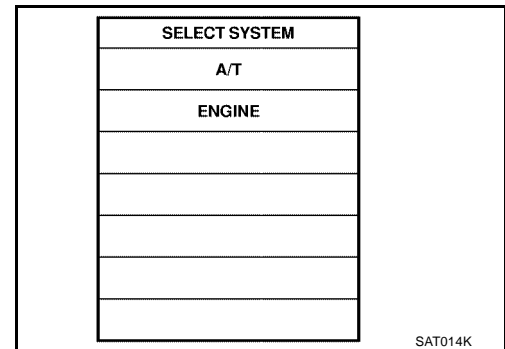
After the repair, perform the following procedure to confirm the malfunction is eliminated.

⊕ 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”.



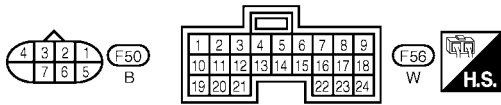
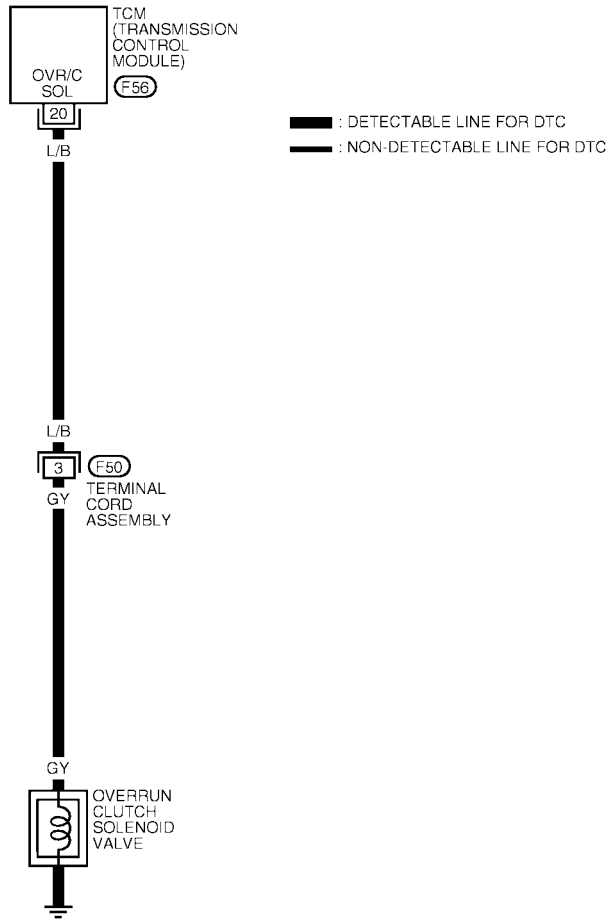
DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

[RE4F03B]

Wiring Diagram — AT — OVRCSV

ECS005Y9

AT-OVRCSV-01



WAT128

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

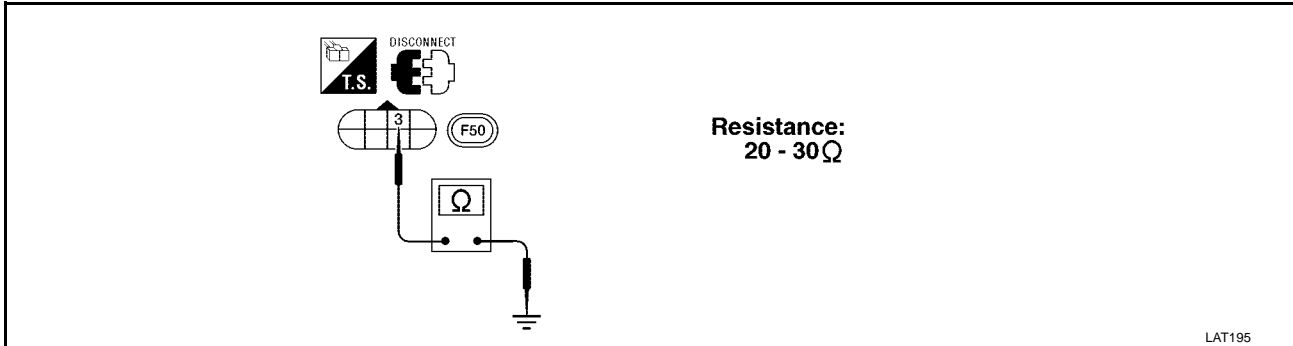
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
20	L/B	OVERRUN CLUTCH SOLENOID VALVE	WHEN OVERRUN CLUTCH SOLENOID VALVE OPERATES	BATTERY VOLTAGE
			WHEN OVERRUN CLUTCH SOLENOID VALVE DOES NOT OPERATE	0V

WAT351

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 3 and ground.

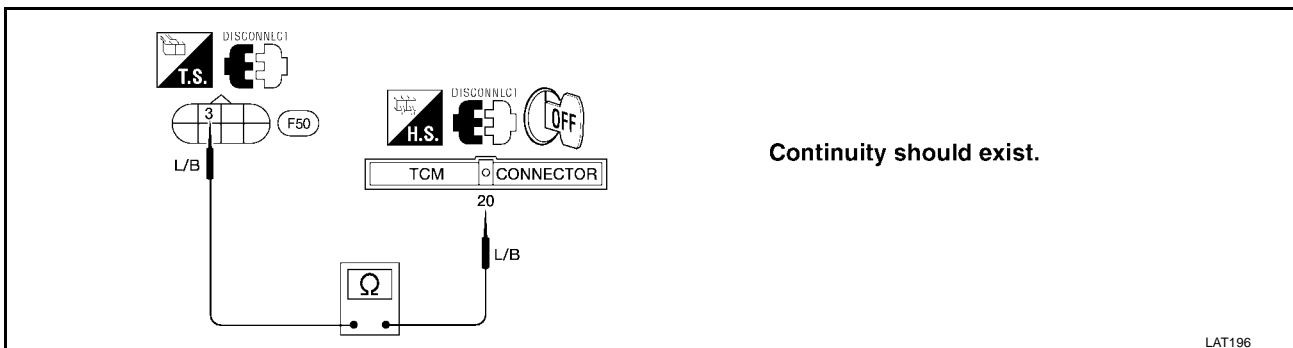


OK or NG

- OK >> GO TO 2.
- NG >> 1. Remove control valve assembly. Refer to [AT-260, "REMOVAL"](#) .
2. Check the following items:
- Overrun clutch solenoid valve
Refer to [AT-197, "Component Inspection"](#) .
 - 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.
3. Check continuity between terminal 3 and TCM harness connector terminal 20.



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-194, "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 P1760 OVERRUN CLUTCH SOLENOID VALVE

[RE4F03B]

ECS005YB

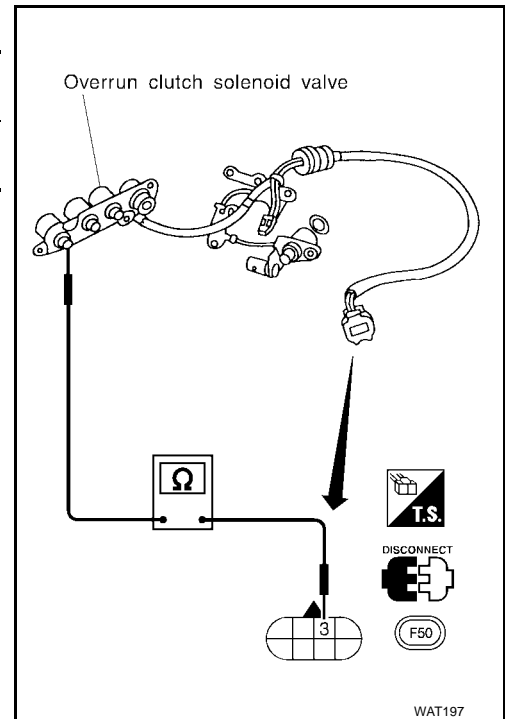
Component Inspection OVERRUN CLUTCH SOLENOID VALVE

- Refer to [AT-197, "Component Inspection"](#).

Resistance Check

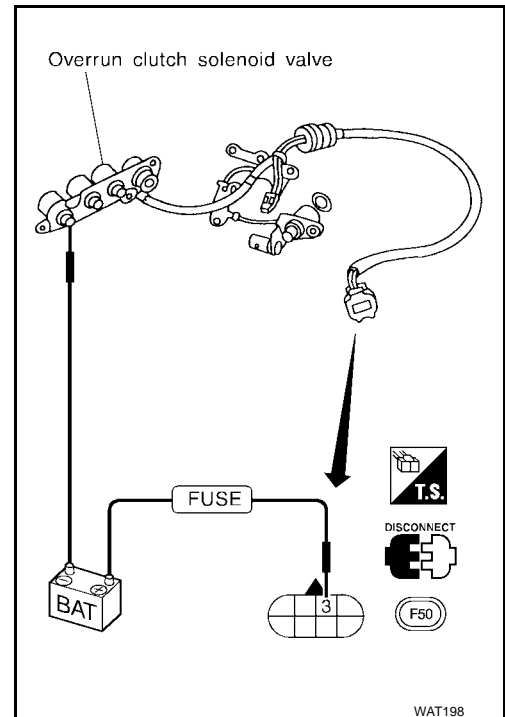
- Check resistance between two terminals.

Solenoid valve	Terminal 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.



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

[RE4F03B]

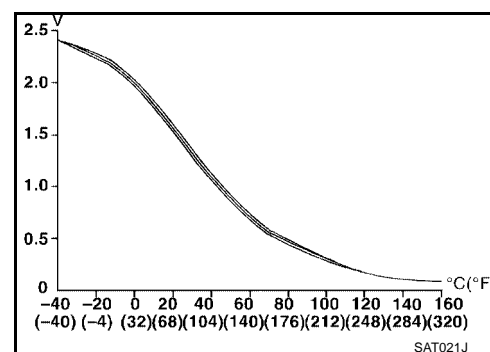
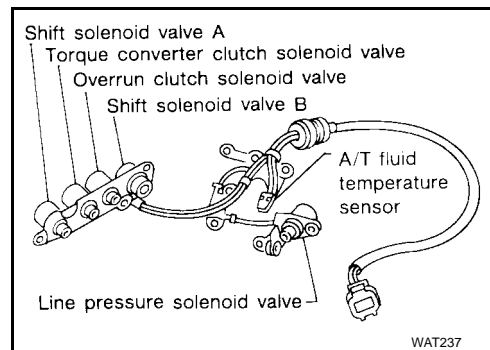
DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

PFP:31940

Description

ECS005YC

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)
<input type="checkbox"/> : BATT/FLUID TEMP SEN <input checked="" type="checkbox"/> : 8th judgement flicker	TCM receives an excessively low or high voltage from the sensor.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● A/T fluid temperature sensor

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

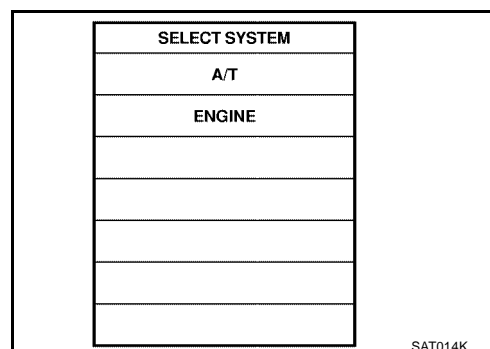
After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

1. Start engine.
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Drive vehicle under the following conditions:
Selector lever in "D", vehicle speed higher than 20 km/h (12 MPH).

Without CONSULT-II

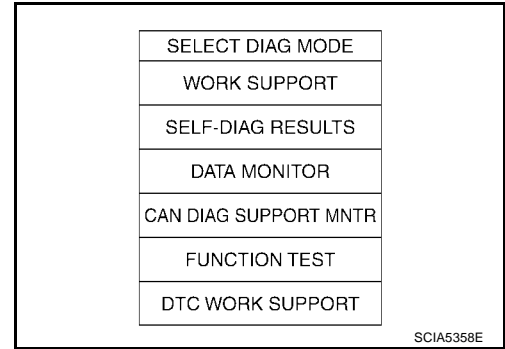
1. Start engine.



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

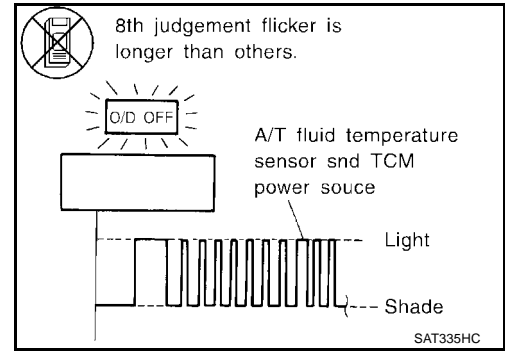
[RE4F03B]

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



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3. Perform self-diagnosis.
Refer to TCM Self-diagnostic Procedure (No Tools), [AT-52](#), ["TCM Self-diagnostic Procedure \(No Tools\)"](#).



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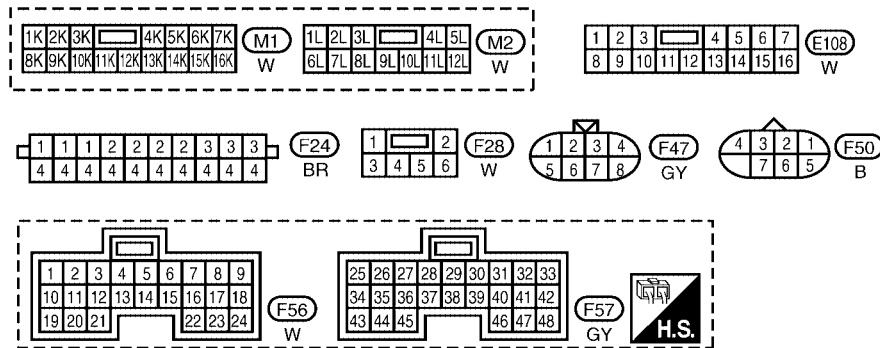
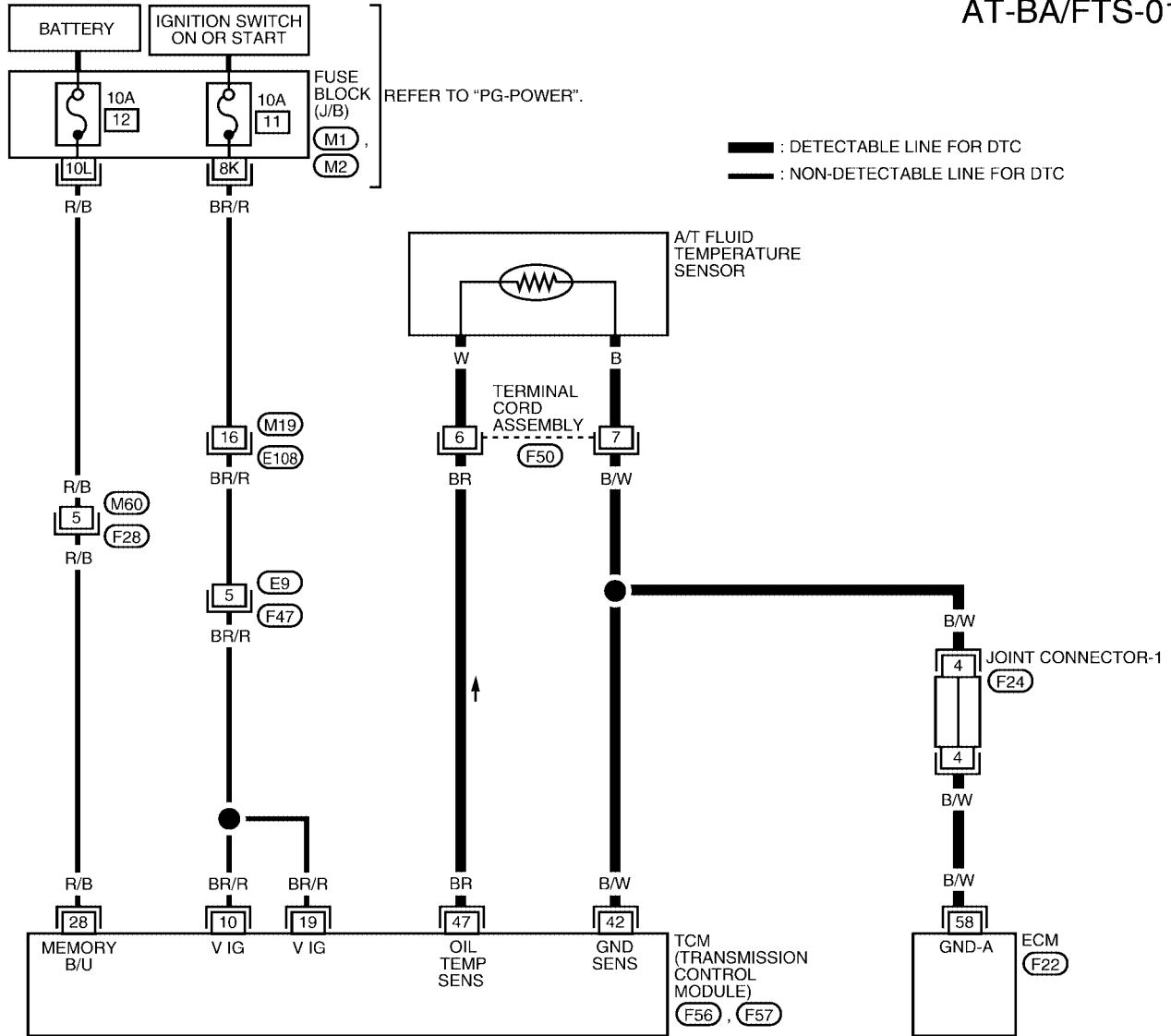
DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

[RE4F03B]

ECS005YD

Wiring Diagram — AT — BA/FTS

AT-BA/FTS-01



REFER TO THE FOLLOWING.
 (F60) - ELECTRICAL UNITS

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

[RE4F03B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH TO "OFF"	0V
19	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH TO "OFF"	0V
28	R/B	POWER SOURCE (MEMORY BACK UP)	WHEN TURNING IGNITION SWITCH TO "OFF"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
42	B/W	GROUND (A/T FLUID TEMPERATURE SENSOR)	—	0V
47	BR	A/T FLUID TEMPERATURE SENSOR	WHEN ATF TEMPERATURE IS 20°C (68°F)	APPROX. 1.5V
			WHEN ATF TEMPERATURE IS 80°C (176°F)	APPROX. 0.5V

Diagnostic Procedure

ECS005YE

1. CHECK TCM POWER SOURCE

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

Voltage : Battery voltage

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

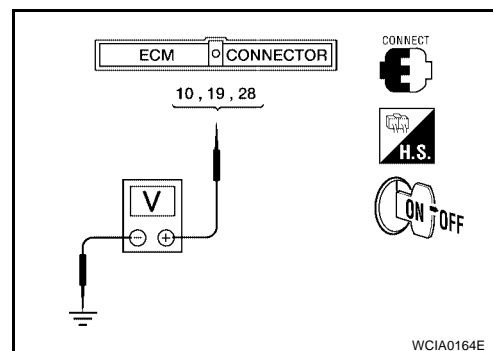
Voltage : Battery voltage

OK or NG

OK >> GO TO 2.

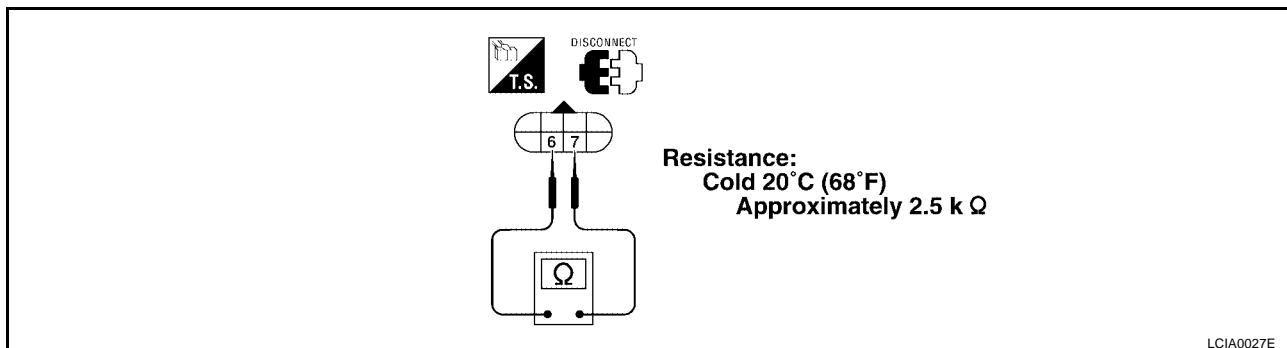
NG >> Check the following items:

- Harness for short or open between ignition switch and TCM (Main harness)
- Harness for short or open between battery and TCM (Main harness)
- Ignition switch and fuse
Refer to [PG-2, "POWER SUPPLY ROUTING"](#).



2. CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector F50 in engine compartment.
3. Check resistance between terminal cord assembly F50 terminals 6 and 7 when A/T is cold.



4. Reinstall any part removed.

OK or NG

OK (With CONSULT-II)>> GO TO 3.

OK (Without CONSULT-II)>> GO TO 4.

NG >> 1. Remove oil pan.

2. Check the following items:

- A/T fluid temperature sensor
Refer to [AT-203, "Component Inspection"](#) .
- Harness of terminal cord assembly for short or open

3. 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	VALUE
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

SAT614J

Voltage

Cold [20°C (68°F)] → : Approximately 1.5V →
Hot [80°C (176°F)] → 0.5V

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 [EC-138, "Wiring Diagram"](#) [QG18DE (ULEV)] or [EC-721, "Wiring Diagram"](#) [QG18DE (SULEV)].

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

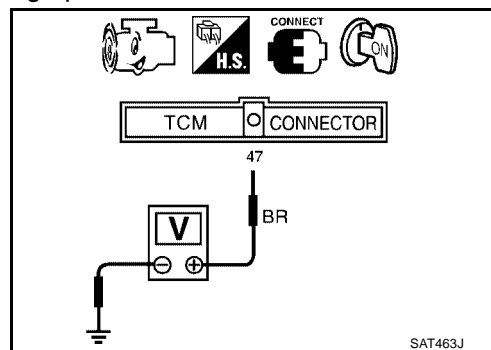
⊗ **Without CONSULT-II**

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

Voltage

Cold [20°C (68°F)] → : Approximately 1.5V →
Hot [80°C (176°F)] → 0.5V

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



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

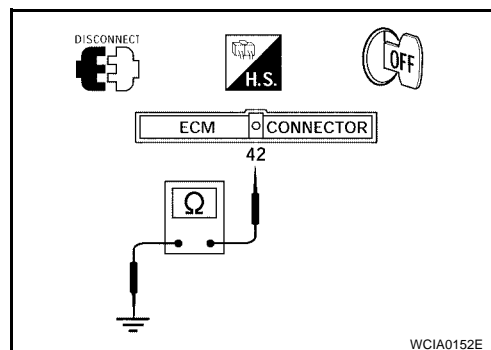
Continuity should exist.

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 [EC-138, "Wiring Diagram"](#) [QG18DE (ULEV)] or [EC-721, "Wiring Diagram"](#) [QG18DE (SULEV)].



5. CHECK DTC

Perform [AT-198, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).

OK or NG

OK >> **INSPECTION END**

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

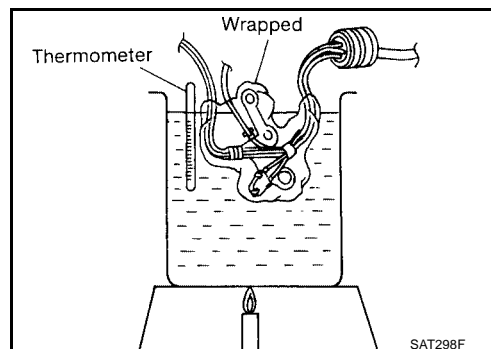
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection A/T FLUID TEMPERATURE SENSOR

ECS005YF

- Refer to [AT-260, "REMOVAL"](#).
- 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



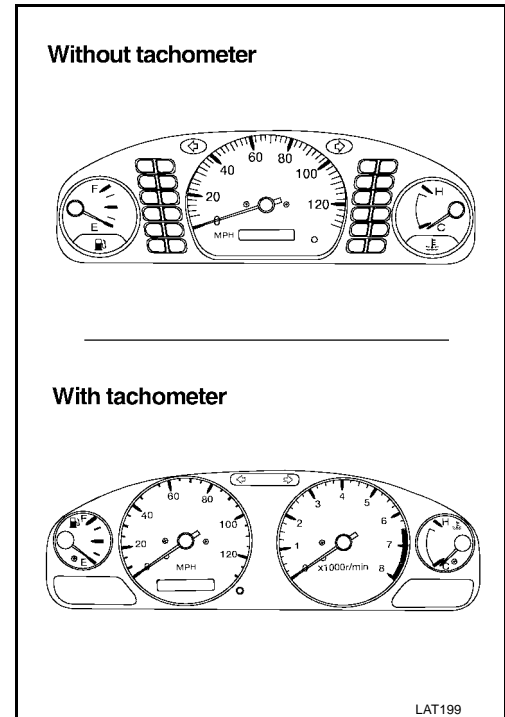
DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR

PFP:24814

Description

ECS005YG

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)
⊕ : VHCL SPEED SEN-MTR ⊗ : 2nd judgement flicker	TCM does not receive the proper voltage signal from the sensor.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Vehicle speed sensor

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

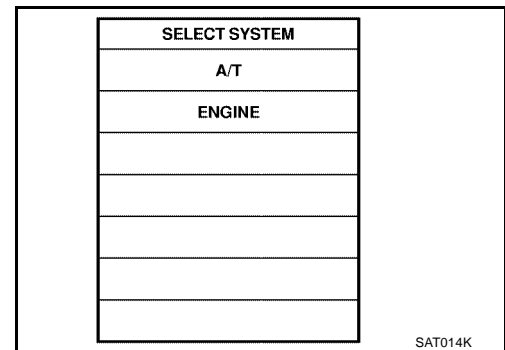
CAUTION:

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

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

⊕ With CONSULT-II

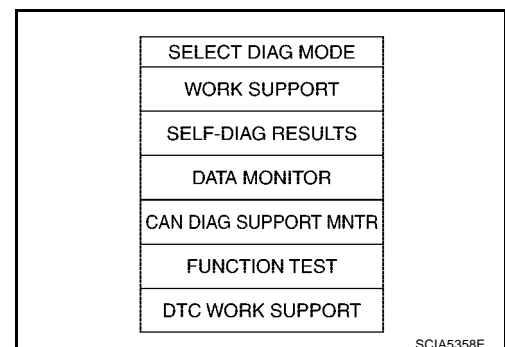
1. Turn ignition switch “ON” and select “DATA MONITOR” mode for “A/T” with CONSULT-II.



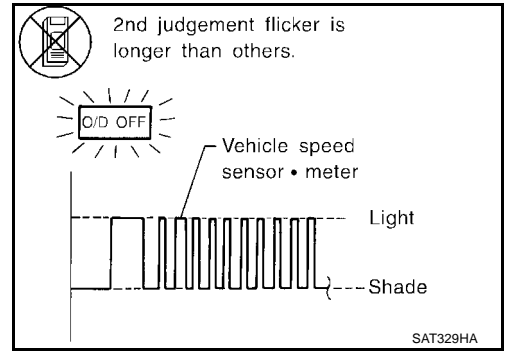
2. Start engine and accelerate vehicle from 0 to 25 km/h (0 to 16 MPH).

⊗ Without CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions:
Selector lever in “D” and vehicle speed higher than 25 km/h (16 MPH).



3. Perform self-diagnosis.
Refer to "TCM Self-diagnostic Procedure (No Tools)", [AT-52](#),
["TCM Self-diagnostic Procedure \(No Tools\)"](#) .



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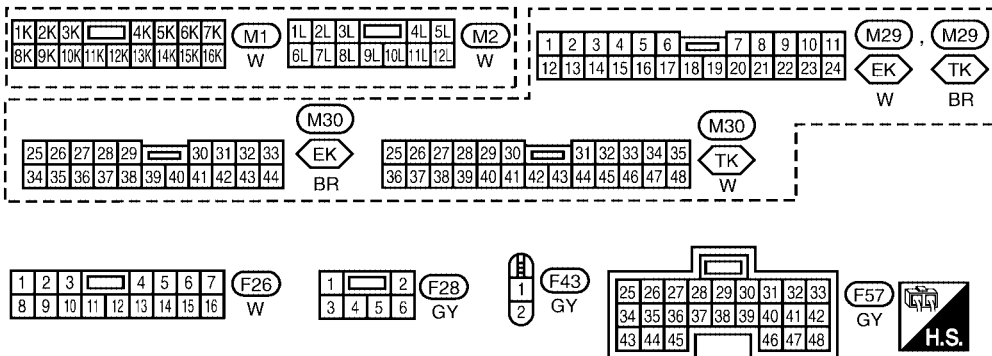
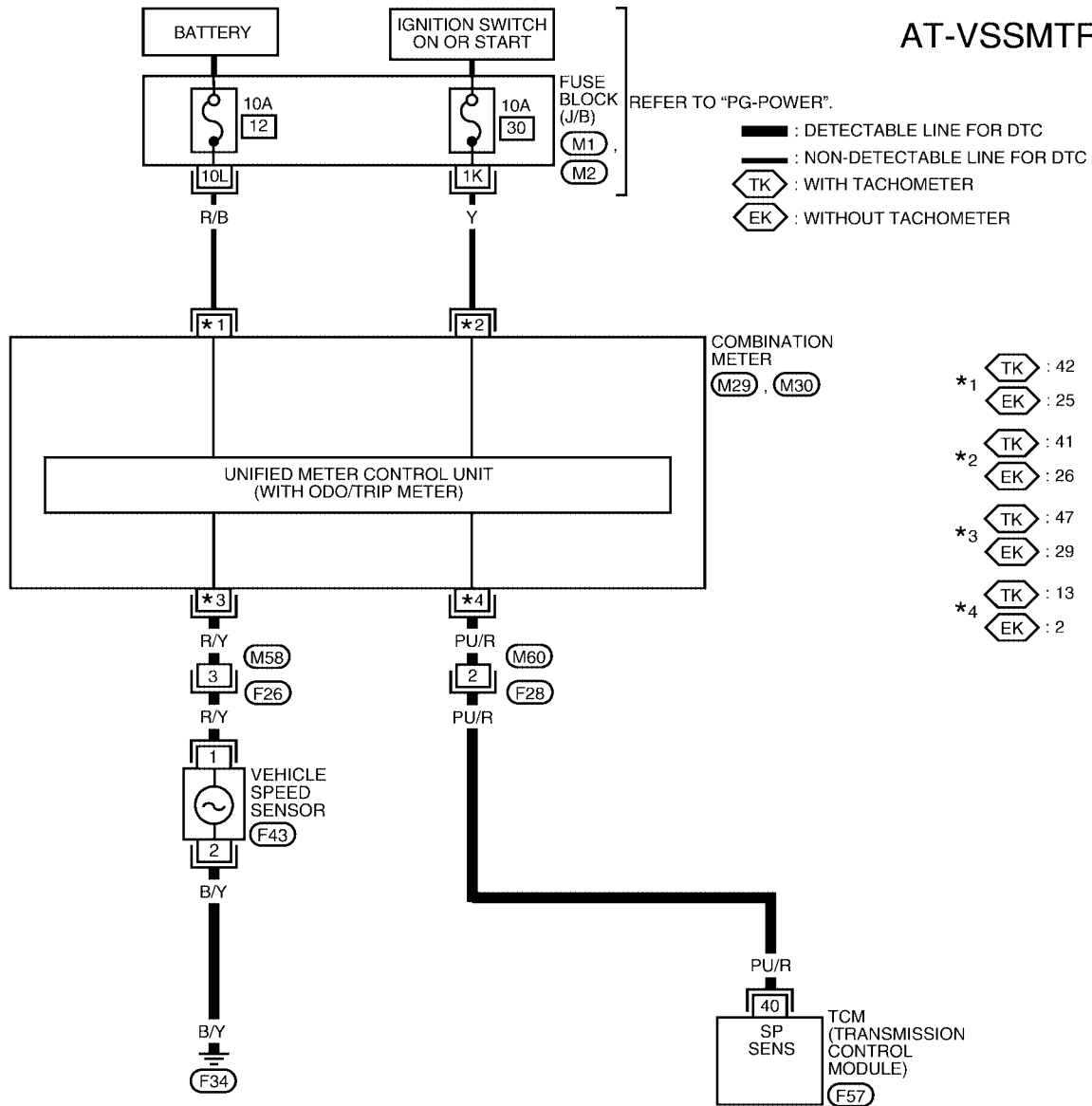
DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR

[RE4F03B]

ECS005YH

Wiring Diagram — AT — VSSMTR

AT-VSSMTR-01



WCWA0071E

DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR

[RE4F03B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN 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

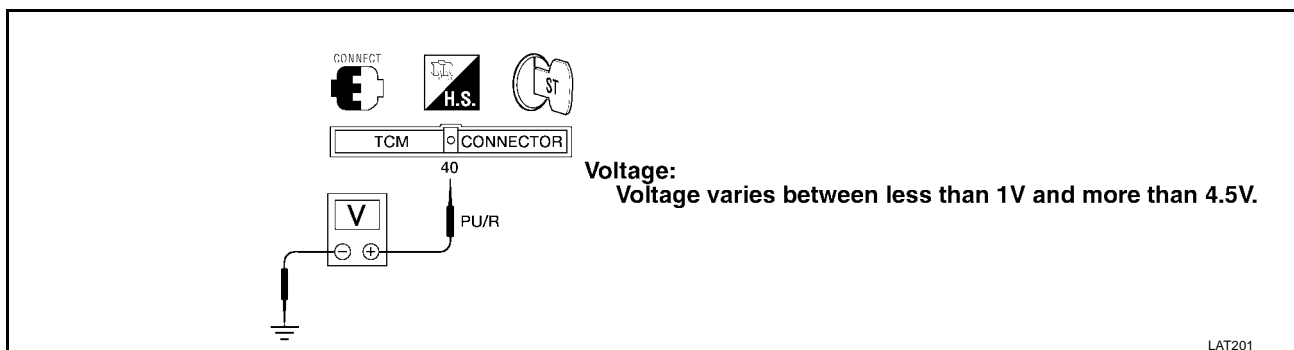
1. Start engine.
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "VHCL/S SE-MTR" while driving. Check the value changes according to driving speed.

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

SAT614J

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.



OK or NG

OK >> GO TO 2.

NG >> Check the following items:

- Vehicle speed sensor and ground circuit for vehicle speed sensor
Refer to [DI-26, "VEHICLE SPEED SENSOR SIGNAL CHECK"](#) .
- Harness for short or open between TCM and vehicle speed sensor (Main harness)

2. CHECK DTC

Perform [AT-204, "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 U1000 CAN COMMUNICATION LINE

PF2:23710

Description

ECS006GM

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

ECS006GN

- 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

ECS006GO

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

DTC Confirmation Procedure

ECS006GP

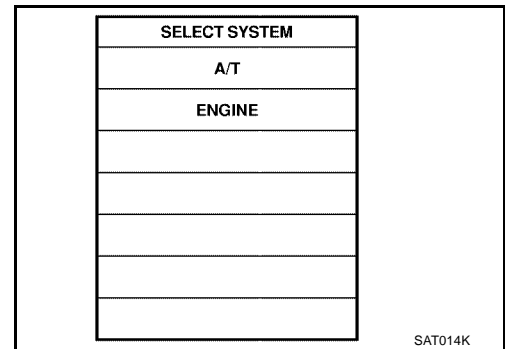
NOTE:

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 to ON position. (Do not start engine.)
2. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
3. Start engine and wait for at least 6 seconds.
4. If DTC is detected, go to [AT-211, "Diagnostic Procedure"](#).



WITH GST

Follow the procedure "WITH CONSULT-II".

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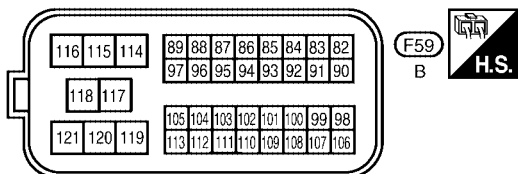
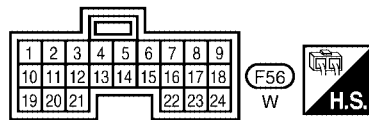
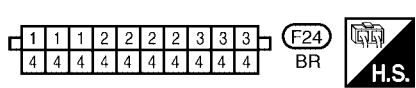
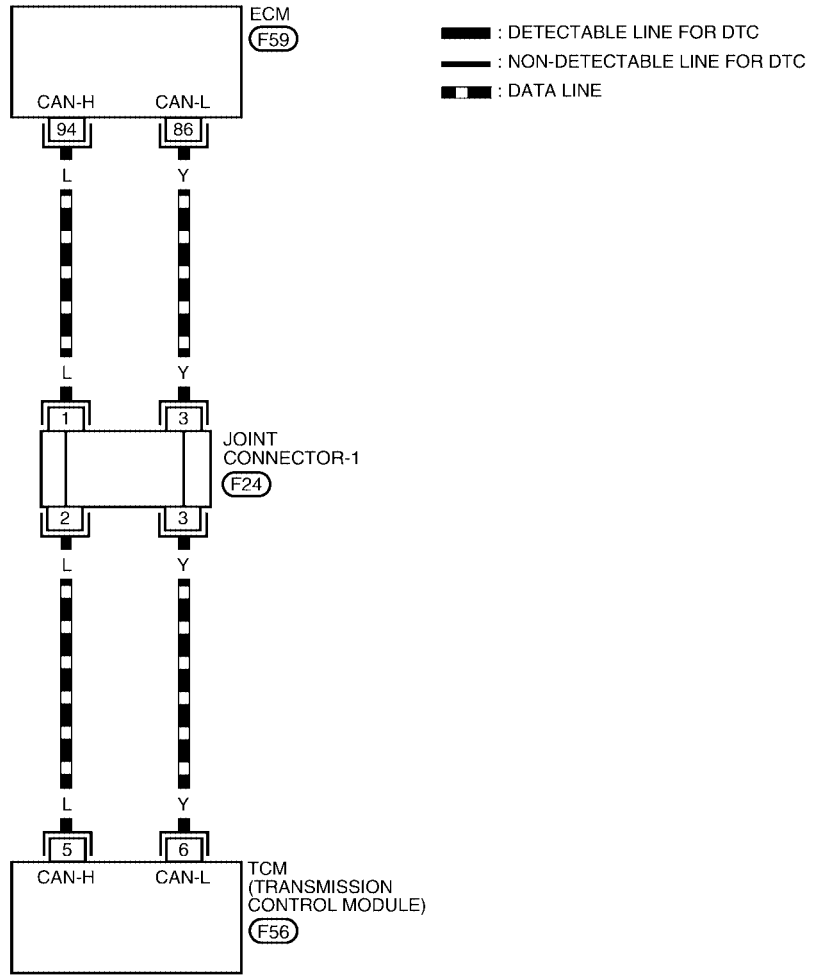
DTC U1000 CAN COMMUNICATION LINE

[RE4F03B]

Wiring Diagram — AT — CAN

ECS006GQ

AT-CAN-01



WCWA0072E

Diagnostic Procedure

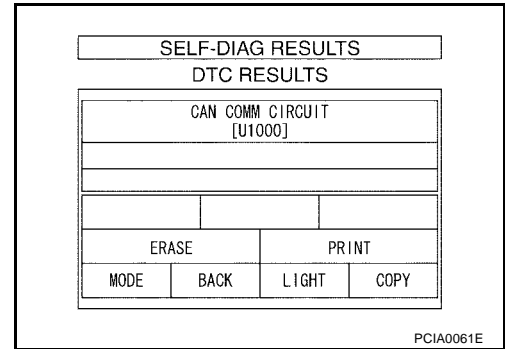
1. CHECK CAN COMMUNICATION CIRCUIT

 With CONSULT-II

1. Turn ignition switch "ON" and start engine.
2. Select "SELF-DIAG RESULTS" mode for "A/T" with CONSULT-II.

Is any malfunction of the "CAN COMM CIRCUIT" indicated?

- Yes >> Print out CONSULT-II screen, GO TO LAN section.
 Refer to [LAN-3, "CAN Communication Unit"](#) .
- No >> Inspection End.



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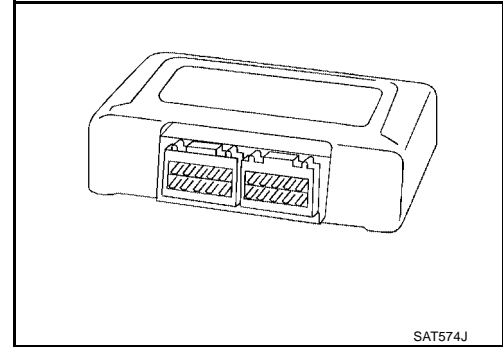
DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)

PFP:31036

Description

ECS005YJ

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)
④ : CONTROL UNIT (RAM), CONTROL UNIT (ROM)	TCM memory (RAM) or (ROM) is malfunctioning.	● TCM

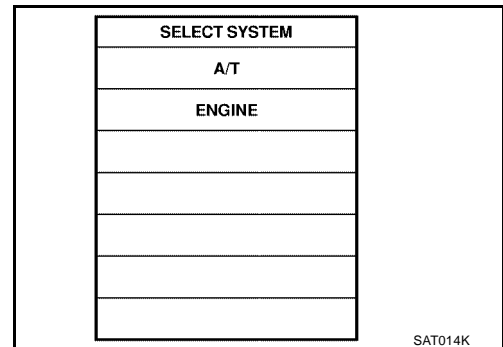
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NOTE:

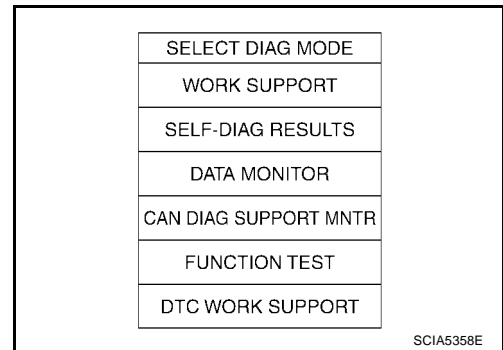
If “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch “OFF” and wait at least 5 seconds before conducting the next test.

④ 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.



Diagnostic Procedure

ECS005YK

1. INSPECTION START (WITH CONSULT-II)

④ 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.

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

[RE4F03B]

2. CHECK DTC

Perform [AT-212, "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**

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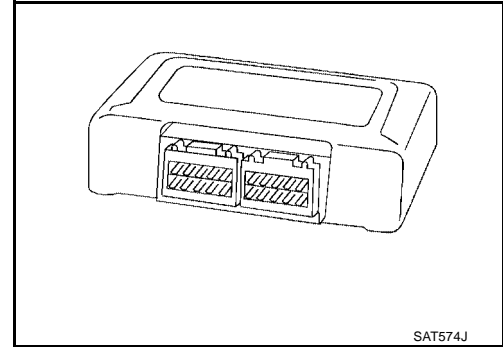
DTC CONTROL UNIT (EEP ROM)

PFP:31036

Description

ECS005YL

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)
Ⓜ : CONT UNIT (EEP ROM)	TCM memory (EEP ROM) is malfunctioning.	● TCM

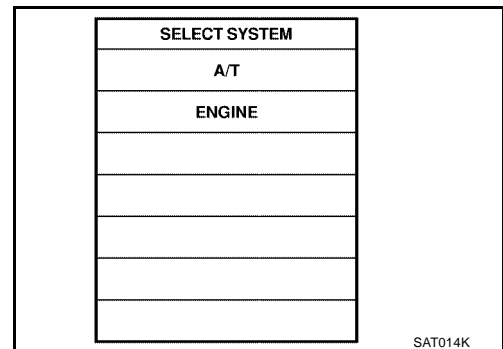
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NOTE:

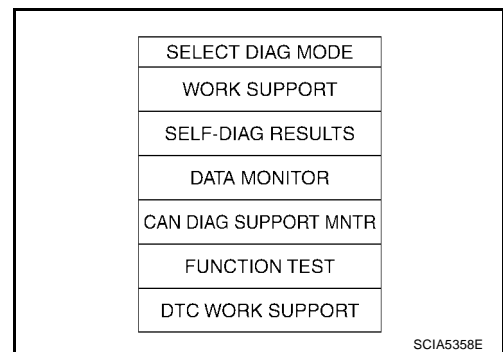
If “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch “OFF” and wait at least 5 seconds before conducting the next test.

Ⓜ 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.



Diagnostic Procedure

ECS005YM

1. CHECK DTC

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-214, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).

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

Yes >> Replace TCM.

No >> **INSPECTION END**

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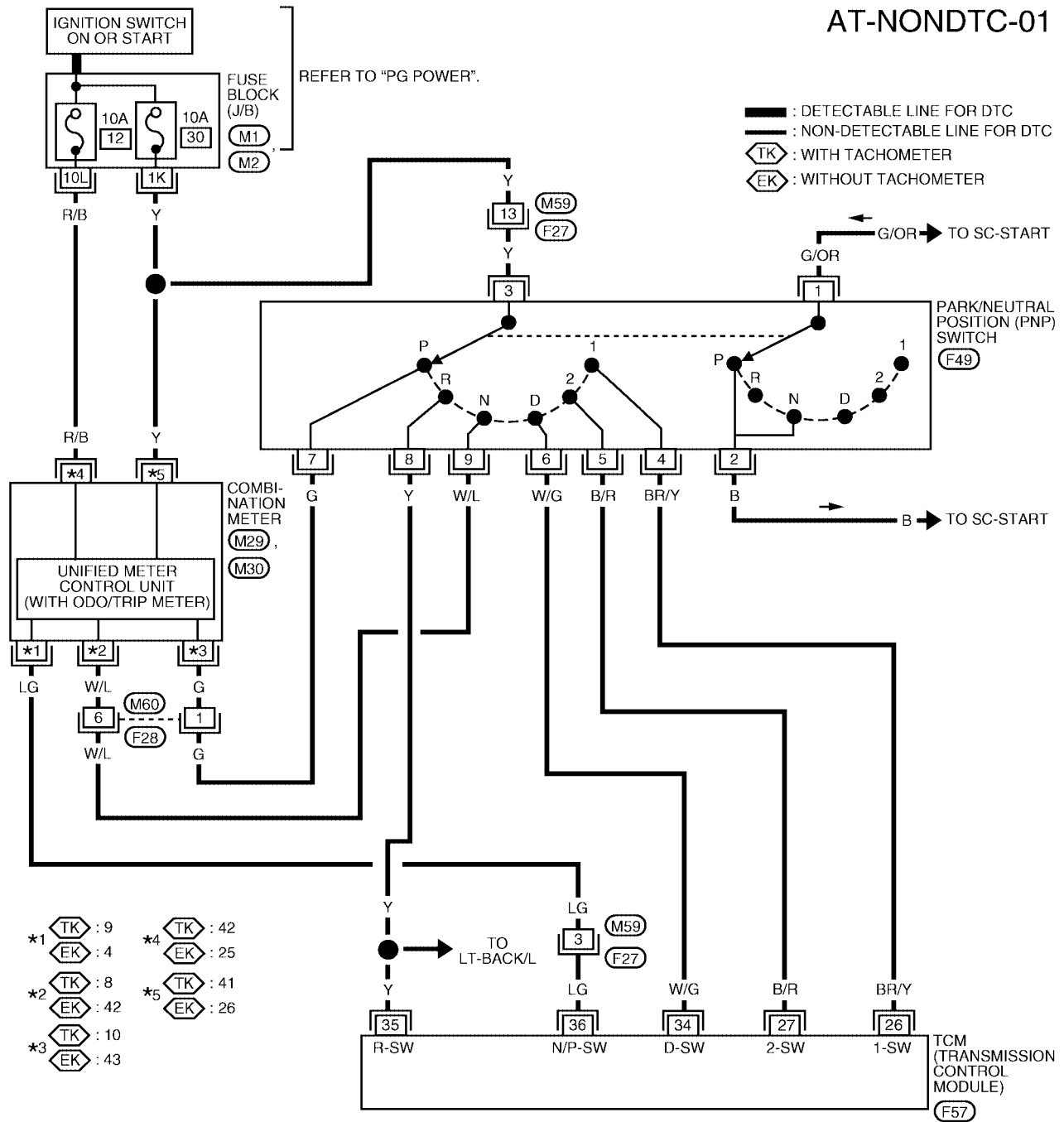
L

M

TROUBLE DIAGNOSES FOR SYMPTOMS

Wiring Diagram — AT — NONDTC

AT-NONDTC-01



- *1 TK : 9 EK : 4
- *2 TK : 8 EK : 42
- *3 TK : 10 EK : 43
- *4 TK : 42 EK : 25
- *5 TK : 41 EK : 26

1K	2K	3K	4K	5K	6K	7K		
8K	9K	10K	11K	12K	13K	14K	15K	16K

(M1) W

1L	2L	3L	4L	5L		
6L	7L	8L	9L	10L	11L	12L

(M2) W

1	2	3	4	5	6	7	8	9	10	11	TK	EK	(M29)	25	26	27	28	29	30	31	32	33	EK	(M30)	1	2	3	4	5	6	7	(F27)			
12	13	14	15	16	17	18	19	20	21	22	23	24	BR	W	34	35	36	37	38	39	40	41	42	43	44	BR	8	9	10	11	12	13	14	15	16

25	26	27	28	29	30	31	32	33	34	35	TK	(M30)	
36	37	38	39	40	41	42	43	44	45	46	47	48	W

1	2		
3	4	5	6

(F28) W

3	1	2	7	8
4	5	9	6	

(F29) B

25	26	27	28	29	30	31	32	33
34	35	36	37	38	39	40	41	42
43	44	45						

(F57) GY



1	2	3	4	5	6	7	8	9	10	11		
12	13	14	15	16	17	18	19	20	21	22	23	24

(F59) W

TROUBLE DIAGNOSES FOR SYMPTOMS

[RE4F03B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND

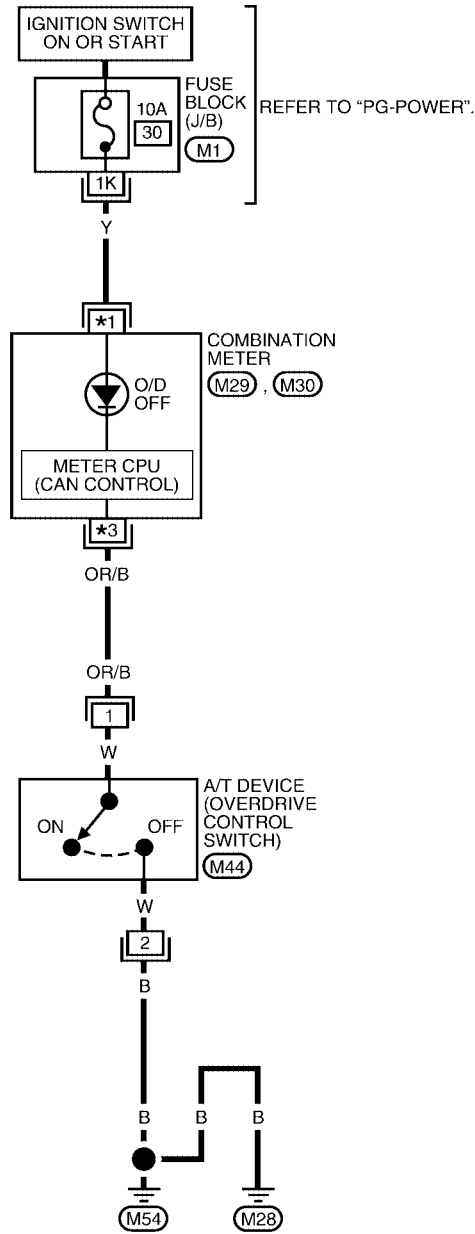
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)	
26	BR/Y	PNP SWITCH "1" POSITION	WHEN SETTING SELECTOR LEVER TO "1" POSITION	BATTERY VOLTAGE	A
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	0V	B
27	B/R	PNP SWITCH "2" POSITION	WHEN SETTING SELECTOR LEVER TO "2" POSITION	BATTERY VOLTAGE	AT
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	0V	
34	W/G	PNP SWITCH "D" POSITION	WHEN SETTING SELECTOR LEVER TO "D" POSITION	BATTERY VOLTAGE	D
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	0V	E
35	G/Y	PNP SWITCH "R" POSITION	WHEN SETTING SELECTOR LEVER TO "R" POSITION	BATTERY VOLTAGE	F
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	0V	
36	LG	PNP SWITCH "N" OR "P" POSITION	WHEN SETTING SELECTOR LEVER TO "N" OR "P" POSITION	BATTERY VOLTAGE	G
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	0V	H

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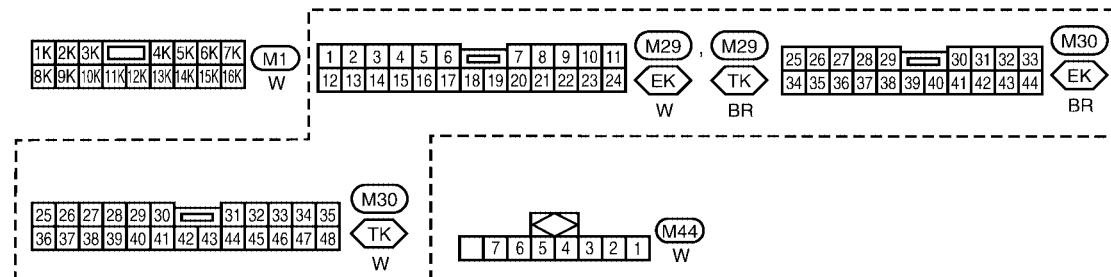
TROUBLE DIAGNOSES FOR SYMPTOMS

[RE4F03B]

AT-NONDTC-02



- █ : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- TK : WITH TACHOMETER
- EK : WITHOUT TACHOMETER
- *1 TK : 41
- *1 EK : 26
- *3 TK : 15
- *3 EK : 44

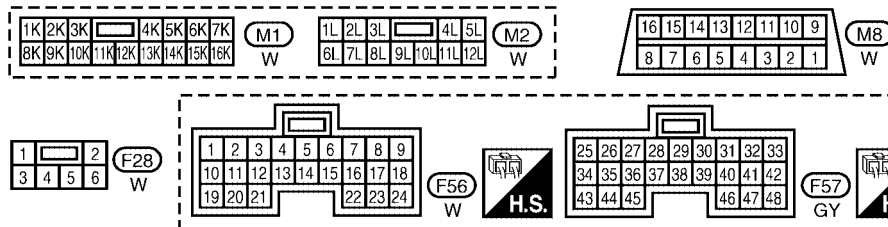
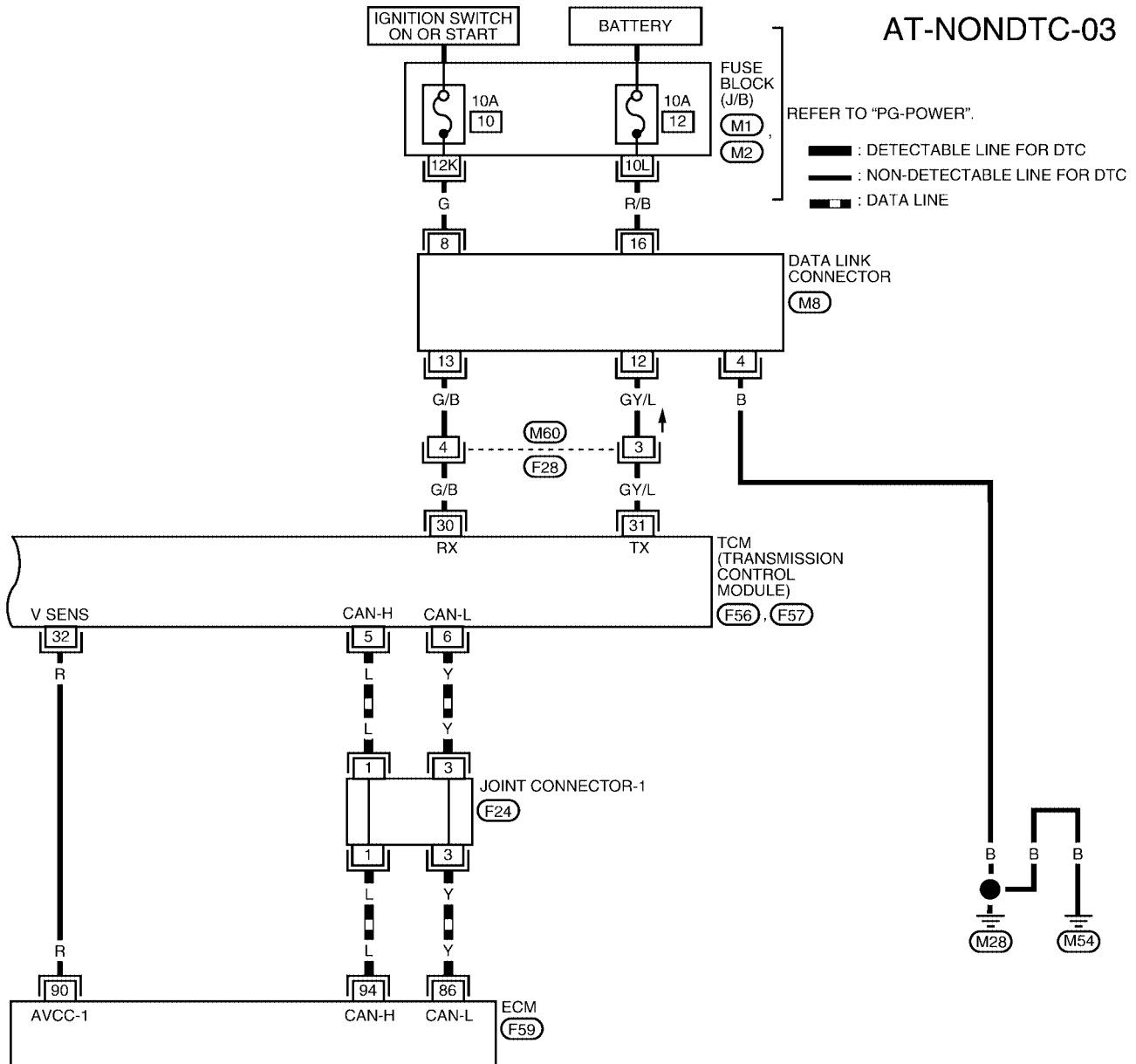


WCWA0074E

TROUBLE DIAGNOSES FOR SYMPTOMS

[RE4F03B]

AT-NONDTC-03



REFER TO THE FOLLOWING.
 (F24) - JOINT CONNECTOR
 (F59) - ELECTRICAL UNITS

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND

WCWA0075E

TROUBLE DIAGNOSES FOR SYMPTOMS

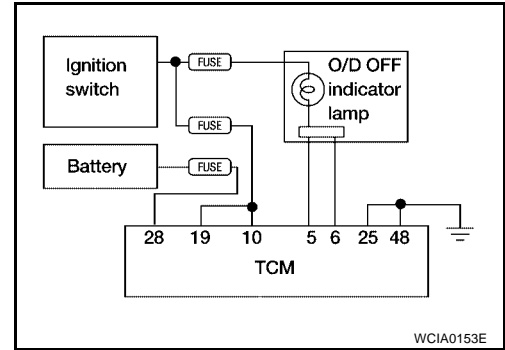
[RE4F03B]

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

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.

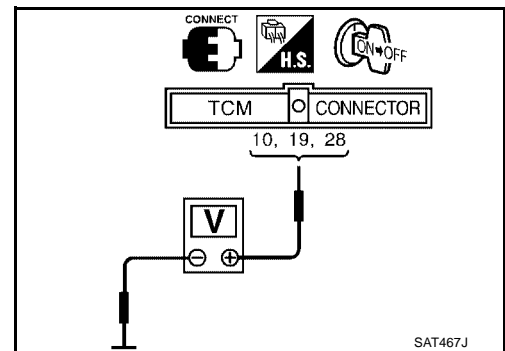
Voltage : **Battery voltage**

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 [AT-113, "Wiring Diagram — AT — MAIN"](#) .
- Harness for short or open between battery and TCM (Main harness) Refer to [AT-113, "Wiring Diagram — AT — MAIN"](#) .
- 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.

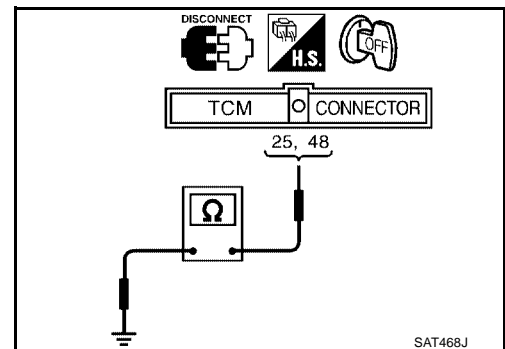
Continuity should exist.

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 [AT-113, "Wiring Diagram — AT — MAIN"](#) .



3. CHECK SELF-DIAGNOSIS RESULTS

 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?

YES or NO

YES >> Check the CAN communication line. Refer to [AT-209, "DTC U1000 CAN COMMUNICATION LINE"](#).

NO >> GO TO 4.

4. CHECK O/D OFF INDICATOR LAMP CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Check the combination meter.
Refer to [DI-8, "Combination Meter"](#)

OK or NG

OK >> GO TO 5.

NG >> Replace the combination meter.

5. CHECK SYMPTOM

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.

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

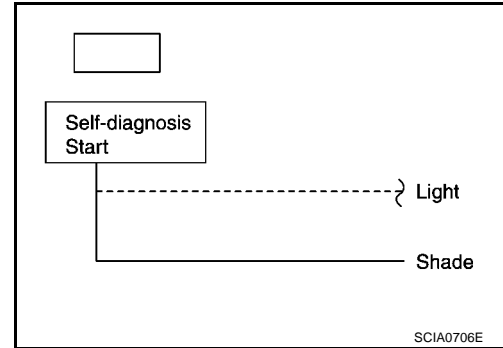
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit?

Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to [AT-116, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) .
- 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 [AT-118, "Diagnostic Procedure"](#) .

OK or NG

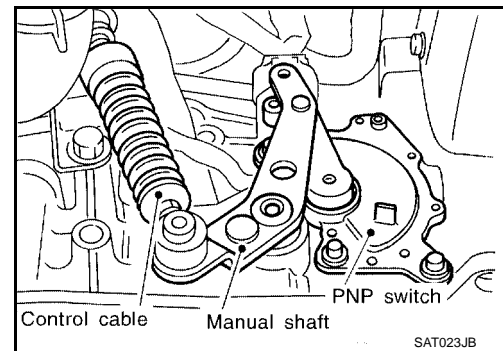
- OK >> GO TO 3.
- NG >> Repair or replace PNP switch.

3. CHECK CONTROL CABLE

Check control cable. Refer to [AT-263, "Control Cable Adjustment"](#)

OK or NG

- OK >> GO TO 4.
- NG >> Adjust control cable. Refer to [AT-263, "Control Cable Adjustment"](#) .



4. 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.

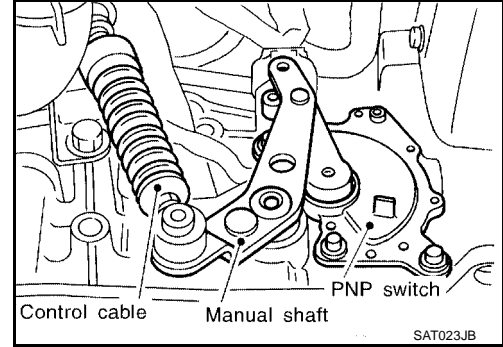
1. CHECK CONTROL CABLE

Check control cable. Refer to [AT-263, "Control Cable Adjustment"](#)

OK or NG

OK >> GO TO 2.

NG >> Adjust control cable. Refer to [AT-263, "Control Cable Adjustment"](#) .



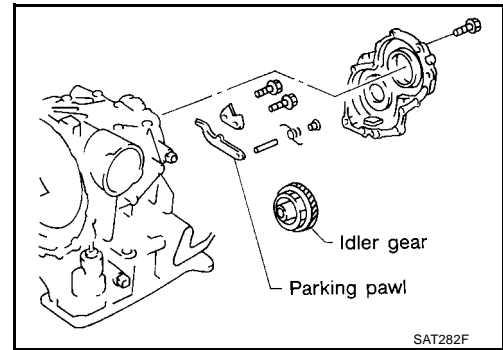
2. CHECK PARKING COMPONENTS

Check parking components. Refer to [AT-268, "Components"](#) .

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.



4. In "N" Position, Vehicle Moves**SYMPTOM:**

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

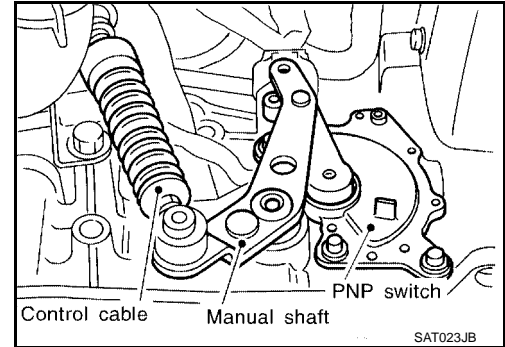
1. CHECK CONTROL CABLE

Check control cable. Refer to [AT-263, "Control Cable Adjustment"](#) .

OK or NG

OK >> GO TO 2.

NG >> Adjust control cable. Refer to [AT-263, "Control Cable Adjustment"](#) .

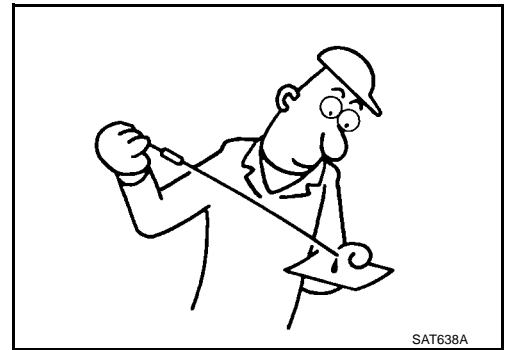
**2. CHECK A/T FLUID LEVEL**

Check A/T fluid level again.

OK or NG

OK >> GO TO 3.

NG >> Refill ATF.

**3. CHECK A/T FLUID CONDITION**

1. Remove oil pan.

2. Check A/T fluid condition.

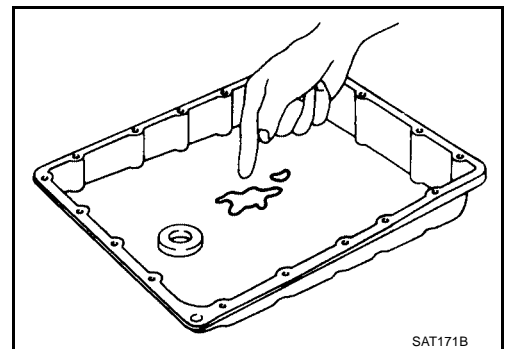
OK or NG

OK >> GO TO 4.

NG >> 1. Disassemble A/T.

2. Check the following items:

- Forward clutch assembly
- Overrun clutch assembly
- Reverse clutch assembly

**4. CHECK SYMPTOM**

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" → "R" Position

SYMPTOM:

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

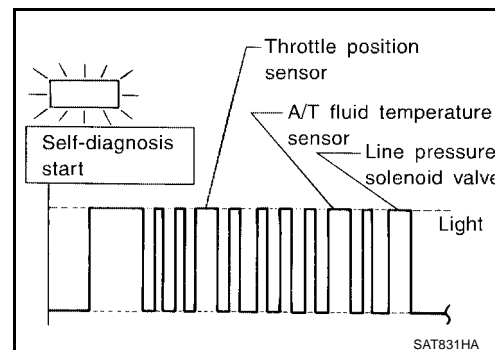
1. CHECK SELF-DIAGNOSTIC RESULTS

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-121, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"](#), [AT-174, "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#) or [AT-188, "DTC P1705 THROTTLE POSITION SENSOR \[ACCELERATOR PEDAL POSITION \(APP\) SENSOR\]"](#).

No >> GO TO 2.



2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in "D" position. Refer to [AT-68, "Line Pressure Test"](#).

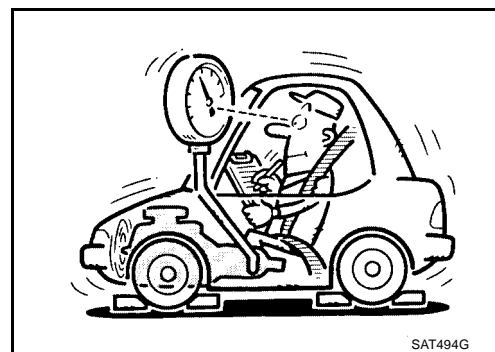
OK or NG

OK >> GO TO 3.

NG >> 1. Remove control valve assembly. Refer to [AT-260, "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
- Oil pump assembly



3. CHECK SYMPTOM

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. Vehicle Does Not Creep Backward In “R” Position**SYMPTOM:**

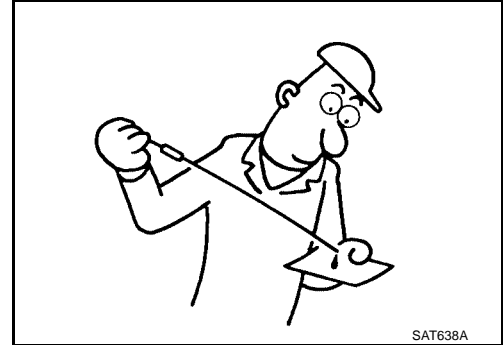
Vehicle does not creep backward when selecting “R” position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

- OK >> GO TO 2.
NG >> Refill ATF.



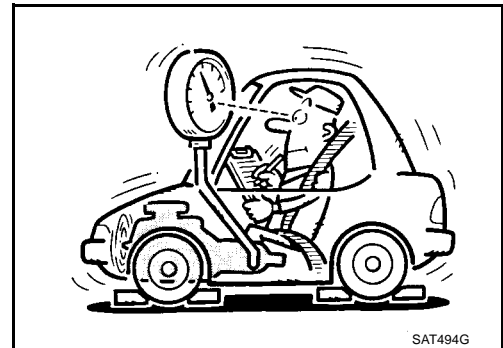
SAT638A

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “R” position. Refer to [AT-68, "Line Pressure Test"](#).

OK or NG

- OK >> GO TO 3.
NG >> 1. Remove control valve assembly. Refer to [AT-260, "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



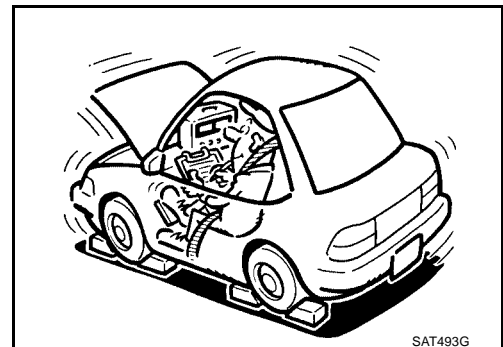
SAT494G

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.



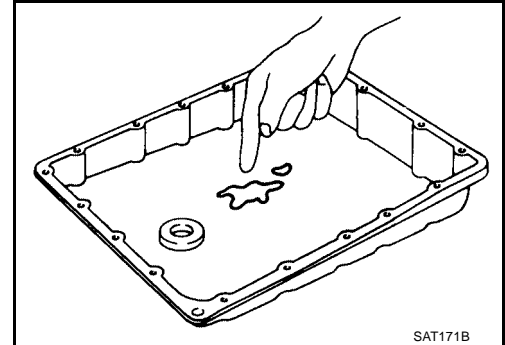
SAT493G

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 6.

**5. CHECK SYMPTOM**

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. Disassemble A/T.
2. Check the following items:
 - Reverse clutch assembly
 - High clutch assembly
 - Low & reverse brake assembly
 - Forward clutch assembly
 - Overrun clutch assembly

OK or NG

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

7. Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position**SYMPTOM:**

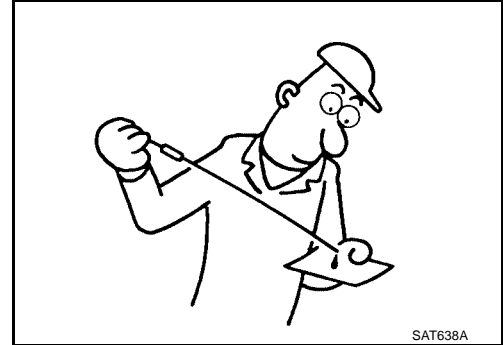
Vehicle does not creep forward when selecting “D”, “2” or “1” position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

- OK >> GO TO 2.
 NG >> Refill ATF.



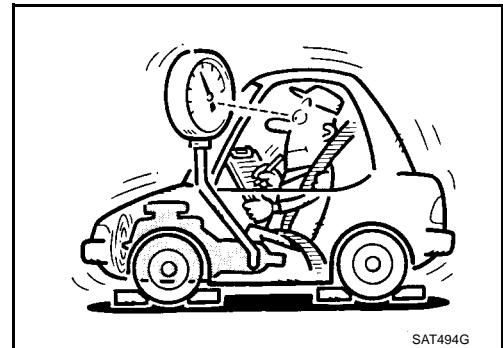
SAT638A

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to [AT-68, "Line Pressure Test"](#).

OK or NG

- OK >> GO TO 3.
 NG >> 1. Remove control valve assembly. Refer to [AT-260, "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



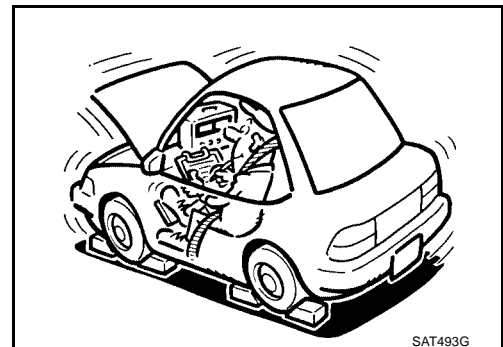
SAT494G

3. CHECK STALL TEST

Check stall revolution with selector lever in “D” position. Refer to [AT-64, "Stall Test"](#).

OK or NG

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



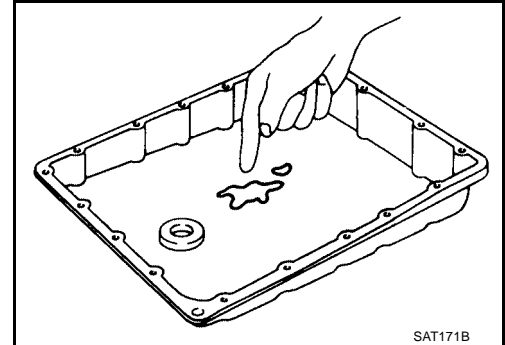
SAT493G

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 6.

**5. CHECK SYMPTOM**

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. Disassemble A/T.
2. Check the following items:
 - Forward clutch assembly
 - Forward one-way clutch
 - Low one-way clutch
 - Reverse clutch assembly
 - High clutch assembly

OK or NG

- OK >> GO TO 5.
 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. CHECK SYMPTOM

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

Yes or No

Yes >> GO TO 2.

No >> Go to [AT-227, "6. Vehicle Does Not Creep Backward In "R" Position"](#) .

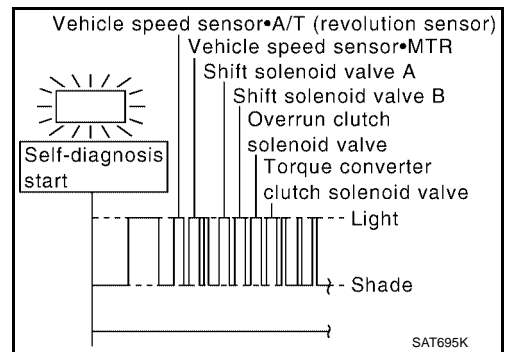
2. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to vehicle speed sensor-A/T (revolution sensor), overrun clutch solenoid valve, torque converter 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-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) , [AT-160, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#) , [AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"](#) , [AT-184, "DTC P0755 SHIFT SOLENOID VALVE B"](#) , [AT-194, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"](#) or [AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"](#) .

No >> GO TO 3.



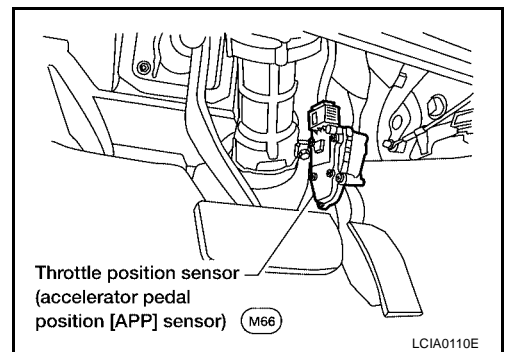
3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to [EC-186, "DTC P0122, P0123 TP SENSOR"](#) [QG18DE (ULEV)] or [EC-818, "DTC P0222, P0223 TP SENSOR"](#) [QG18DE (SULEV)].

OK or NG

OK >> GO TO 4.

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



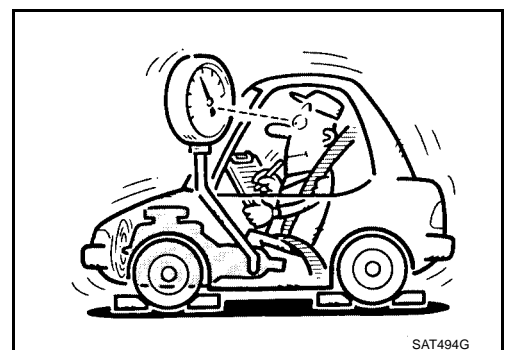
4. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in "D" position. Refer to [AT-68, "Line Pressure Test"](#) .

OK or NG

OK >> GO TO 5.

NG >> GO TO 8.

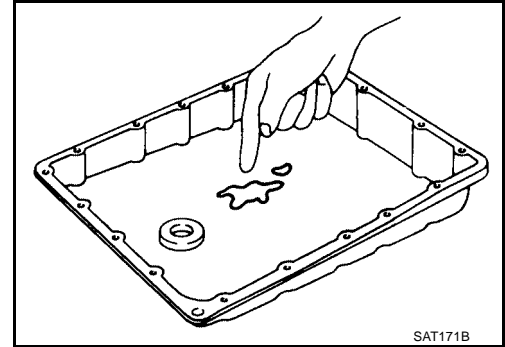


5. CHECK A/T FLUID CONDITION

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 assembly. Refer to [AT-260, "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. CHECK SYMPTOM

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 assembly. Refer to [AT-260, "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 or NG

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

A
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9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2**SYMPTOM:**

A/T does not shift from D1 to D2 at the specified speed.

A/T does not shift from D4 to D2 when depressing accelerator pedal fully at the specified speed.

1. CHECK SYMPTOM

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 [AT-229, "7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"](#) , [AT-231, "8. Vehicle Cannot Be Started From D1"](#) .

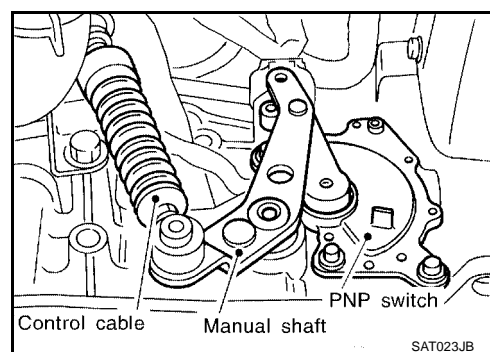
2. CHECK CONTROL CABLE

Check control cable. Refer to [AT-263, "Control Cable Adjustment"](#)

OK or NG

OK >> GO TO 3.

NG >> Adjust control cable. Refer to [AT-263, "Control Cable Adjustment"](#) .

**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 [AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) , [AT-204, "DTC VHCL SPEED SEN-MTR 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.

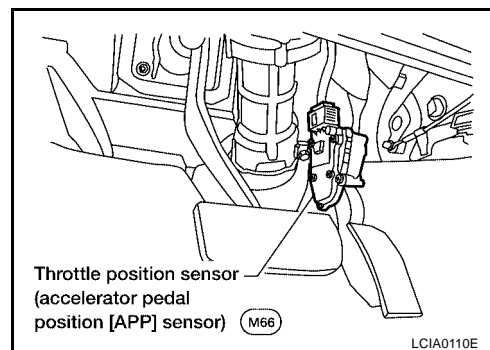
4. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to [EC-186, "DTC P0122, P0123 TP SENSOR" \[QG18DE \(ULEV\)\]](#) or [EC-765, "DTC P0122, P0123 TP SENSOR" \[QG18DE \(SULEV\)\]](#).

OK or NG

OK >> GO TO 5.

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

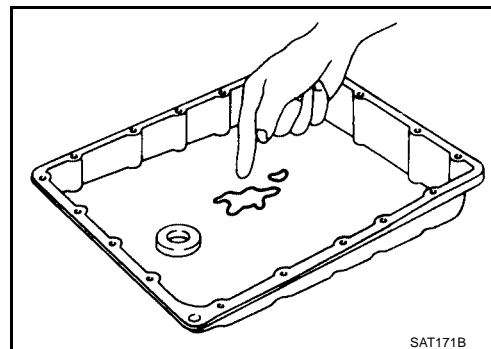


5. CHECK A/T FLUID CONDITION

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

OK or NG

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

**6. DETECT MALFUNCTIONING ITEM**

1. Remove control valve. Refer to [AT-260, "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. CHECK SYMPTOM

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-260, "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 or NG

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

10. A/T Does Not Shift: D2 → D3

SYMPTOM:

A/T does not shift from D2 to D3 at the specified speed.

1. CHECK SYMPTOM

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 [AT-229, "7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"](#) , [AT-231, "8. Vehicle Cannot Be Started From D1"](#) .

2. CHECK PNP SWITCH CIRCUIT

With CONSULT-II

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

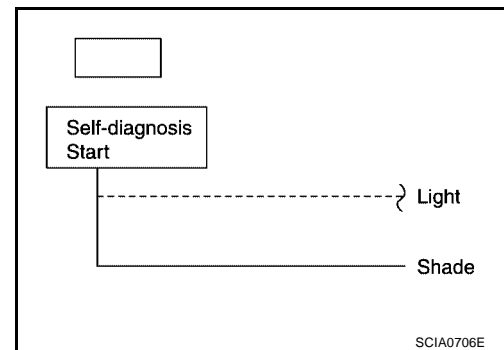
Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to [AT-116, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) .

No >> GO TO 3.



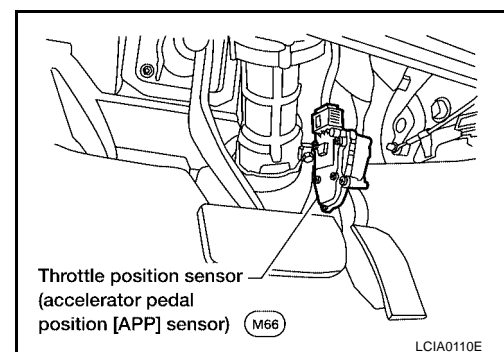
3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to [EC-765, "DTC P0122, P0123 TP SENSOR"](#) [QG18DE (ULEV)] or [EC-186, "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].

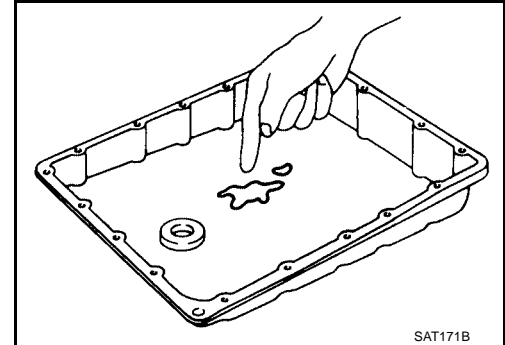


4. CHECK A/T FLUID CONDITION

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-260, "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. CHECK SYMPTOM

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-260, "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 or NG

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

11. A/T Does Not Shift: D3 → 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. CHECK SYMPTOM

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 [AT-229, "7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"](#) , [AT-231, "8. Vehicle Cannot Be Started From D1"](#) .

2. CHECK SELF-DIAGNOSTIC RESULTS

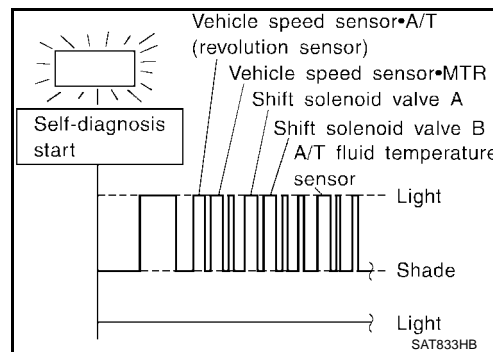
Ⓜ With CONSULT-II

Does self-diagnosis, after cruise test, show damage to any of the following circuits?

- 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 [AT-116, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) , [AT-121, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"](#) , [AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) , [AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"](#) , [AT-184, "DTC P0755 SHIFT SOLENOID VALVE B"](#) , [AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"](#) .
- No >> GO TO 3.

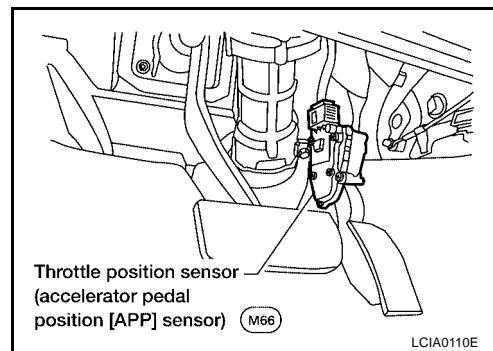


3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to [EC-186, "DTC P0122, P0123 TP SENSOR"](#) [QG18DE (ULEV)] or [EC-765, "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].

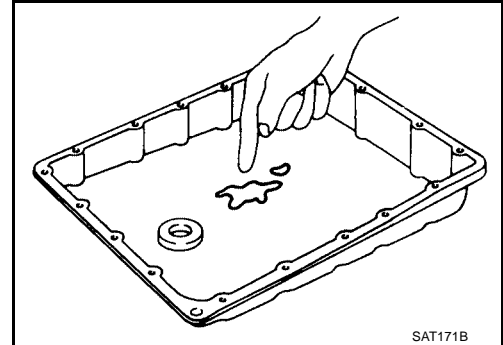


4. CHECK A/T FLUID CONDITION

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-260, "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. CHECK SYMPTOM

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-260, "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.

12. A/T Does Not Perform Lock-up

SYMPTOM:

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

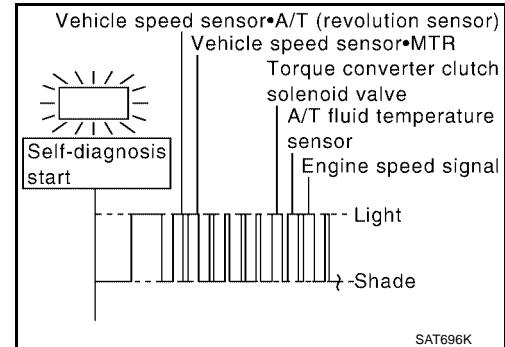
1. CHECK SELF-DIAGNOSTIC RESULTS

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 torque converter clutch solenoid valve circuit. Refer to [AT-121, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"](#), [AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#), [AT-132, "DTC P0725 ENGINE SPEED SIGNAL"](#), [AT-160, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#), and [AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"](#).

No >> GO TO 2.



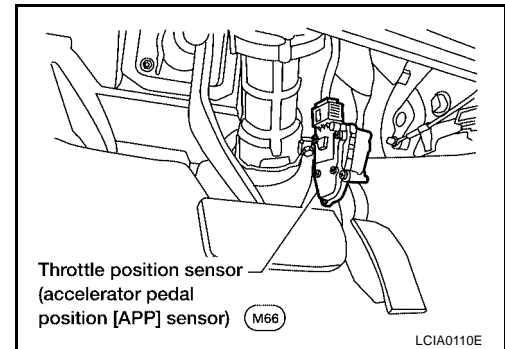
2. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to [EC-186, "DTC P0122, P0123 TP SENSOR" \[QG18DE \(ULEV\)\]](#) or [EC-765, "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].



3. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to [AT-260, "REMOVAL"](#).

2. Check the following items:

- Torque converter clutch control valve
- Torque converter relief valve
- Pilot valve
- Pilot filter

3. Remove A/T.

4. Check torque converter.

OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

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.

13. A/T Does Not Hold Lock-up Condition

SYMPTOM:

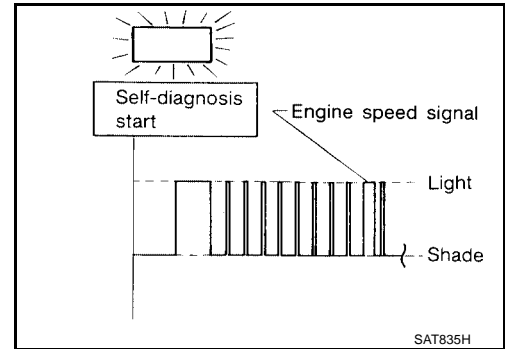
A/T does not hold lock-up condition for more than 30 seconds.

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 [AT-132](#), "[DTC P0725 ENGINE SPEED SIGNAL](#)".
- No >> GO TO 2.

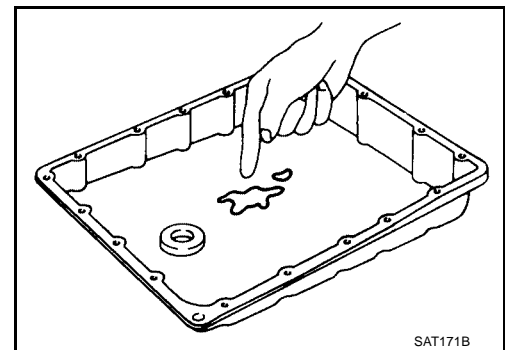


2. CHECK A/T FLUID CONDITION

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-260](#), "[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. CHECK SYMPTOM

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

1. Remove control valve assembly. Refer to [AT-260, "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 4.
- NG >> Repair or replace damaged parts.

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**

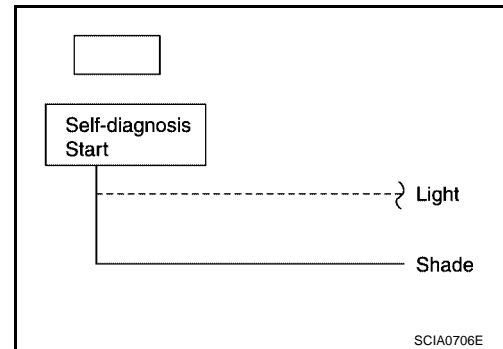
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to closed throttle position switch circuit?

ⓧ 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 [AT-116, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#).
- No >> GO TO 2.

**2. CHECK SYMPTOM**

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.

15. Engine Speed Does Not Return To Idle (Light Braking D4 → D3)

SYMPTOM:

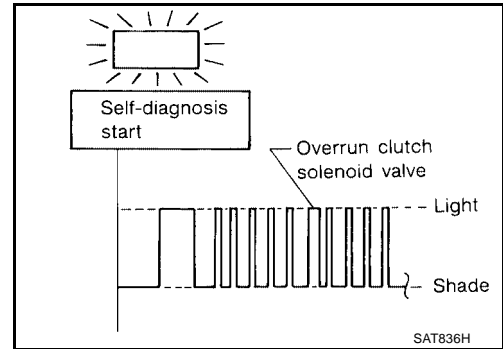
- Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 .
- Vehicle does not decelerate by engine brake when turning overdrive control switch OFF.
- Vehicle does not decelerate by engine brake when shifting A/T from “D” to “2” position.

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to overrun clutch solenoid valve circuit after cruise test?

Yes or No

- Yes >> Check overrun clutch solenoid valve circuit. Refer to [AT-194, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"](#) .
- No >> GO TO 2.

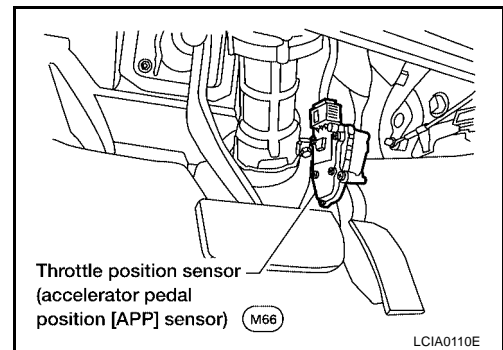


2. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to [EC-186, "DTC P0122, P0123 TP SENSOR"](#) [QG18DE (ULEV)] or [EC-765, "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].

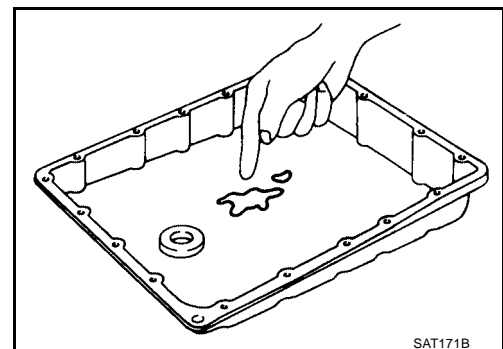


3. CHECK A/T FLUID CONDITION

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

OK or NG

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



4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-260, "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. CHECK SYMPTOM

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-260, "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

ECS005Z3

SYMPTOM:

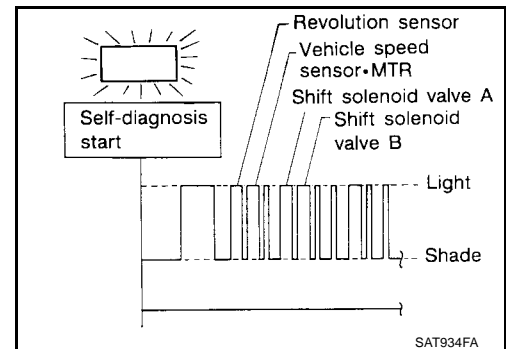
Vehicle does not start from D1 on Cruise test — Part 2.

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 [AT-127, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) , [AT-180, "DTC P0750 SHIFT SOLENOID VALVE A"](#) , [AT-184, "DTC P0755 SHIFT SOLENOID VALVE B"](#) , [AT-204, "DTC VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR"](#) .
- No >> GO TO 2.



2. CHECK SYMPTOM

Check again.

OK or NG

- OK >> Go to [AT-231, "8. Vehicle Cannot Be Started From D1"](#) .
- NG >> 1. Perform TCM input/output signal inspection.
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

17. A/T Does Not Shift: D4 → D3 , When Overdrive Control Switch “ON” → “OFF”

ECS005Z4

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?

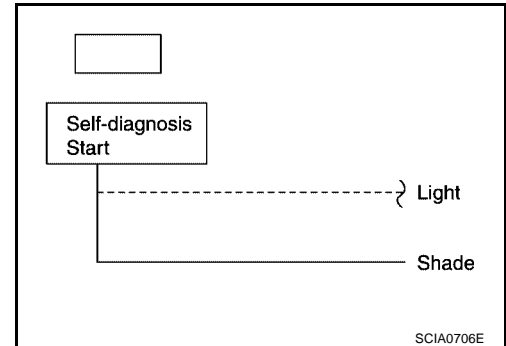
Without CONSULT-II

Does self-diagnosis show damage to overdrive control switch circuit?

Yes or No

Yes >> Check overdrive control switch circuit. Refer to [AT-250, "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}"](#) .

No >> Go to [AT-236, "10. A/T Does Not Shift: D2 → D3"](#) .



SCIA0706E

18. A/T Does Not Shift: D3 → 22 , When Selector Lever “D” → “2” Position ECS005Z5**SYMPTOM:**

A/T does not shift from D3 to 22 when changing selector lever from “D” to “2” position.

1. CHECK PNP SWITCH CIRCUIT**④ With CONSULT-II**

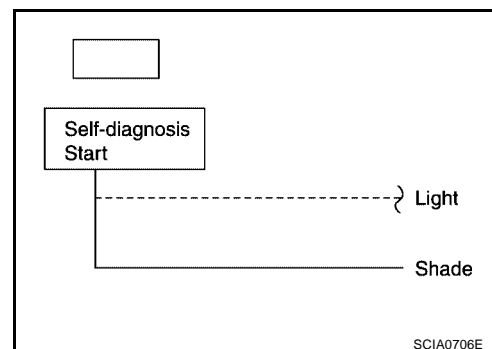
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

⊗ Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to [AT-116, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#)
- No >> Go to [AT-234, "9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2"](#) .



19. A/T Does Not Shift: 22 → 11 , When Selector Lever “2” → “1” Position

ECS005Z6

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

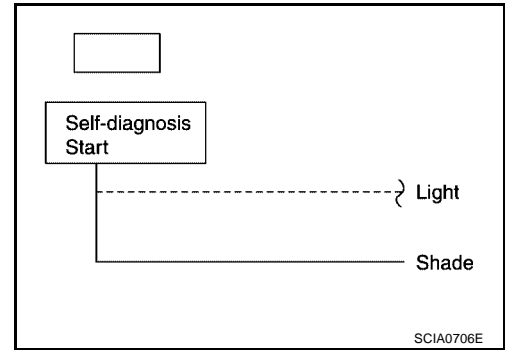
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to [AT-116. "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) .
- No >> GO TO 2.

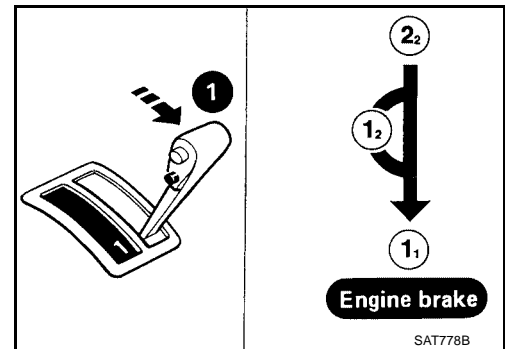


2. CHECK SYMPTOM

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.



20. Vehicle Does Not Decelerate By Engine Brake

SYMPTOM:

Vehicle does not decelerate by engine brake when shifting from 22 (12) to 11.

1. CHECK SYMPTOM

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

Yes or No

- Yes >> Go to [AT-244, "15. Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) .
 No >> Go to [AT-227, "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}

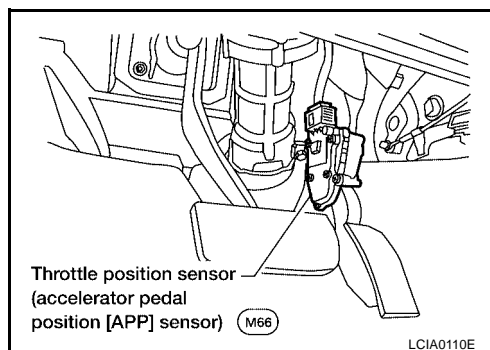
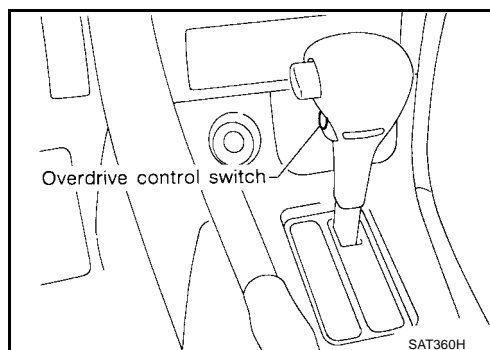
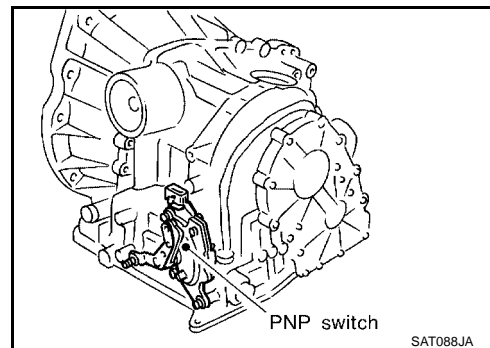
ECS006GY

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.



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

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 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 [AT-116, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#))
- Harness for short or open between ignition switch and PNP switch
- Harness for short or open between PNP switch and TCM

DATA MONITOR	
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.
3. 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 [AT-252, "Overdrive Control Switch"](#))
- Harness for short or open between TCM and overdrive control switch
- Harness of ground for overdrive control switch for short or open

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 [AT-188, "DTC P1705 THROTTLE POSITION SENSOR \[ACCELERATOR PEDAL POSITION \(APP\) SENSOR\]"](#).

OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK TCM INSPECTION

1. Perform [AT-251, "DIAGNOSTIC PROCEDURE"](#)

OK or NG

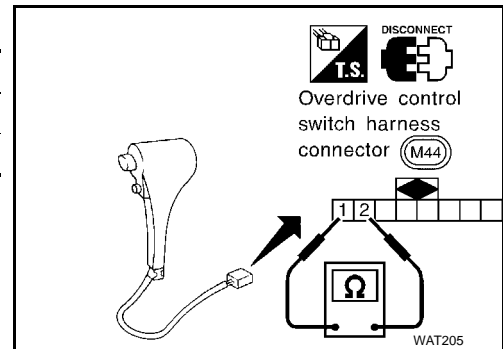
- OK >> INSPECTION END.
- NG >> ● Perform TCM input/output signal inspection.
 - If NG, recheck TCM pin terminals for damage or loose connections with harness connector.

COMPONENT INSPECTION

Overdrive Control Switch

- Check continuity between terminals 1 and 2.

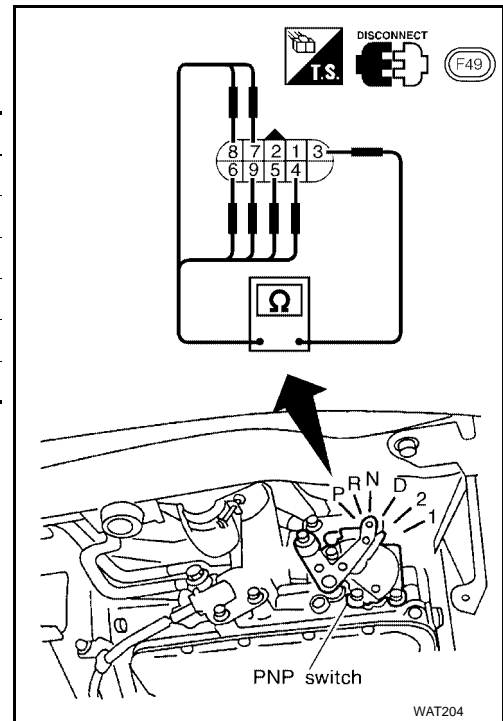
Switch position	Continuity
RELEASED	No
DEPRESSED	Yes



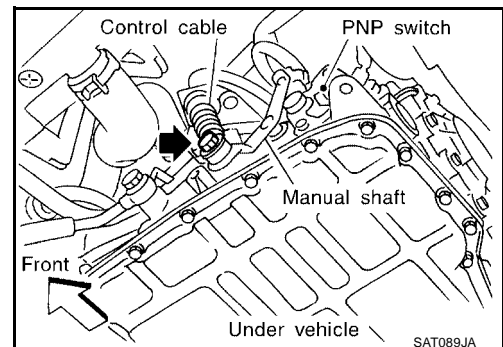
PNP Switch

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.	
P	3 — 7	1 — 2
R	3 — 8	
N	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-263, "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-263, "Park/Neutral Position \(PNP\) Switch Adjustment"](#).
6. If NG on step 4, replace PNP switch.



A/T SHIFT LOCK SYSTEM

PFP:34950

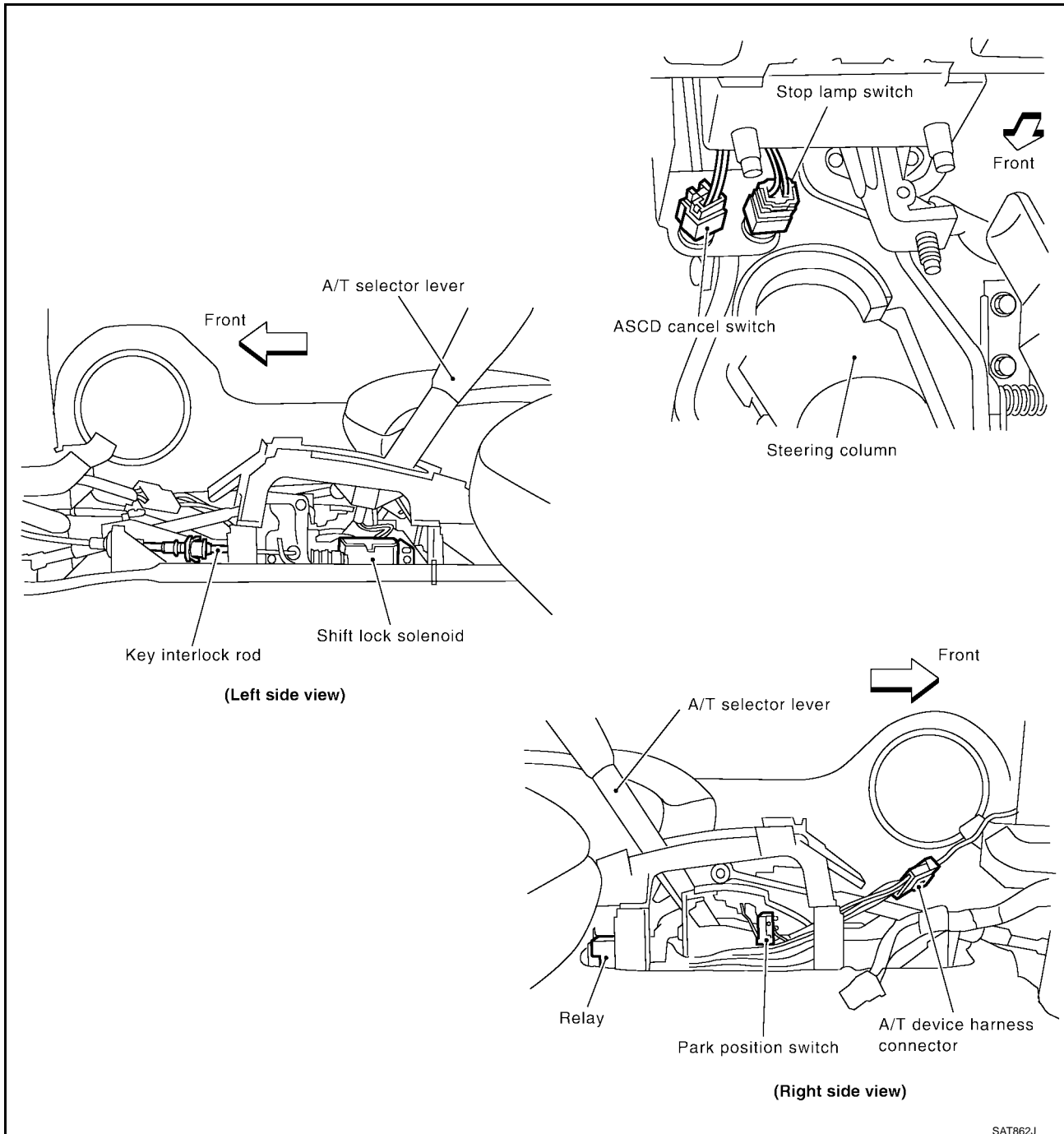
ECS006H0

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

ECS006H1



SAT862J

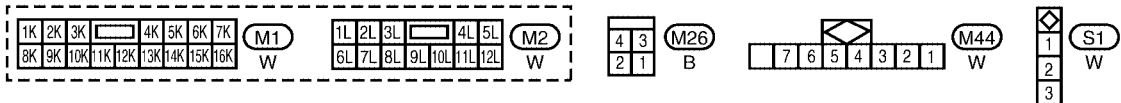
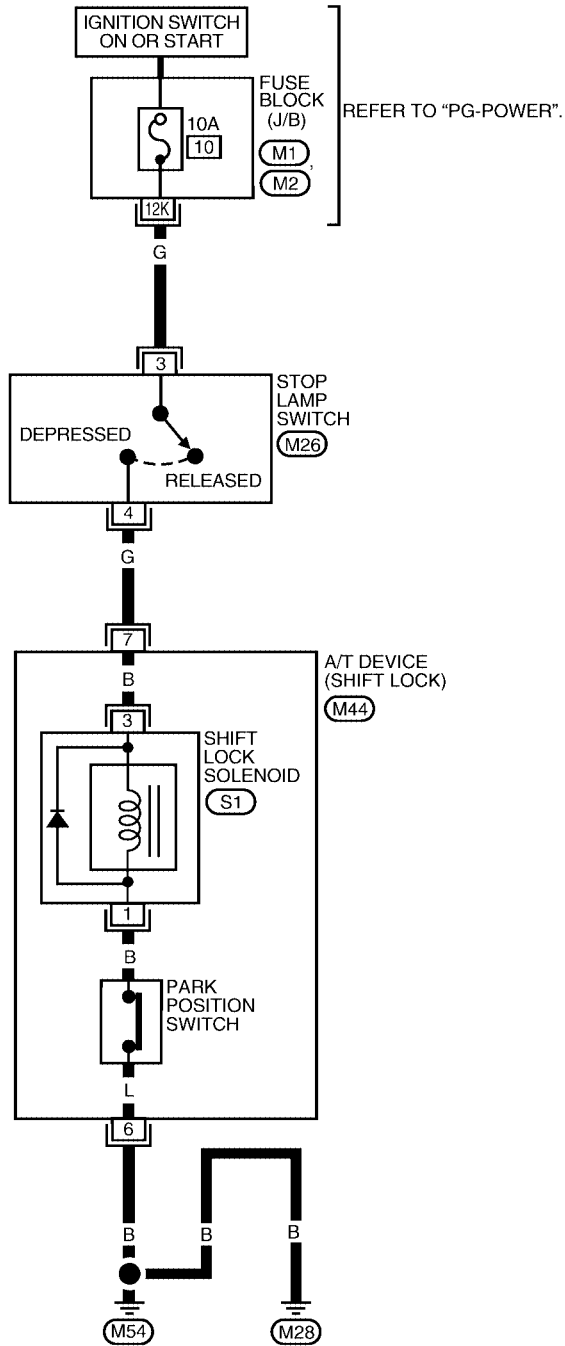
A/T SHIFT LOCK SYSTEM

[RE4F03B]

Wiring Diagram — SHIFT —

ECS006H2

AT-SHIFT-01



*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0076E

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:

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 [AT-642, "Components"](#).

2. CHECK SELECTOR LEVER POSITION

Check selector lever position for damage.

OK or NG

- OK >> GO TO 3.
- NG >> Check selector lever. Refer to [AT-647, "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.

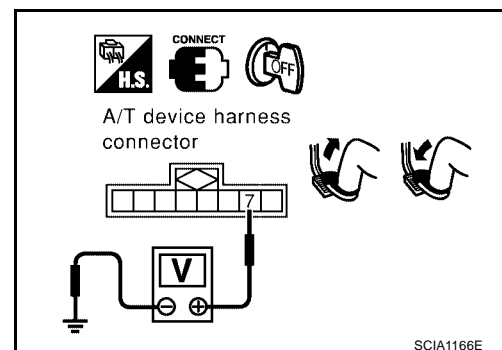
Voltage:

Brake pedal depressed: Battery voltage

Brake pedal released: 0V

OK or NG

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



4. DETECT MALFUNCTIONING ITEM

Check the following items.

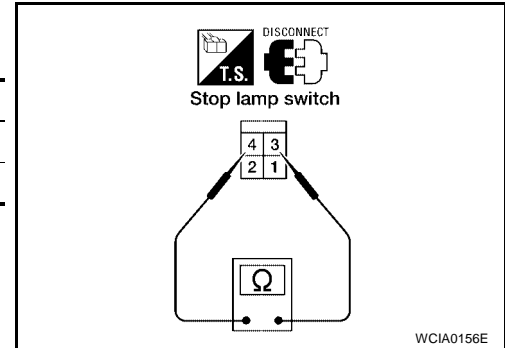
1. Harness for open or short between fuse block (J/B) connector M1 terminal 12K and stop lamp switch harness connector M26 terminal 3.
2. Harness for open or short stop lamp switch harness connector M26 terminal 4 and A/T device harness connector M44 terminal 7 (G).
3. 10A fuse [10, located in the fuse 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 [BR-12, "STOP LAMP SWITCH AND ASCD CANCEL SWITCH CLEARANCE"](#)

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace damaged parts.



5. CHECK GROUND CIRCUIT

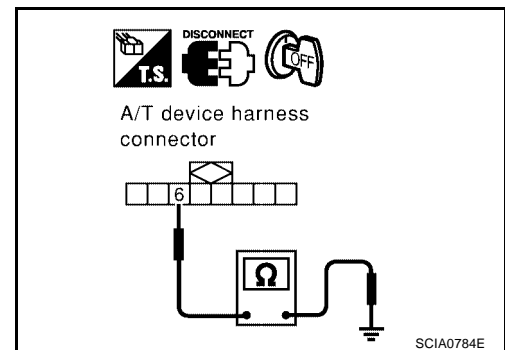
1. Turn ignition switch to "OFF" position.
2. Disconnect A/T device harness connector.
3. Check continuity between A/T device harness M44 terminal 6 (B) and ground.

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.



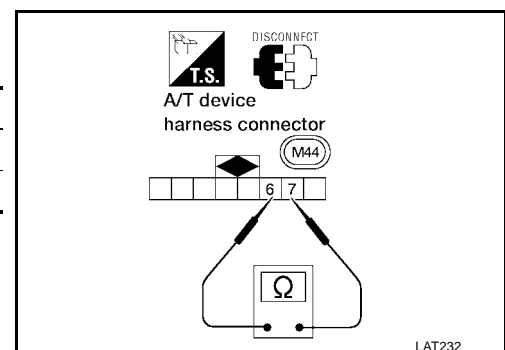
6. CHECK PARK POSITION SWITCH

Check continuity between A/T device harness connector 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

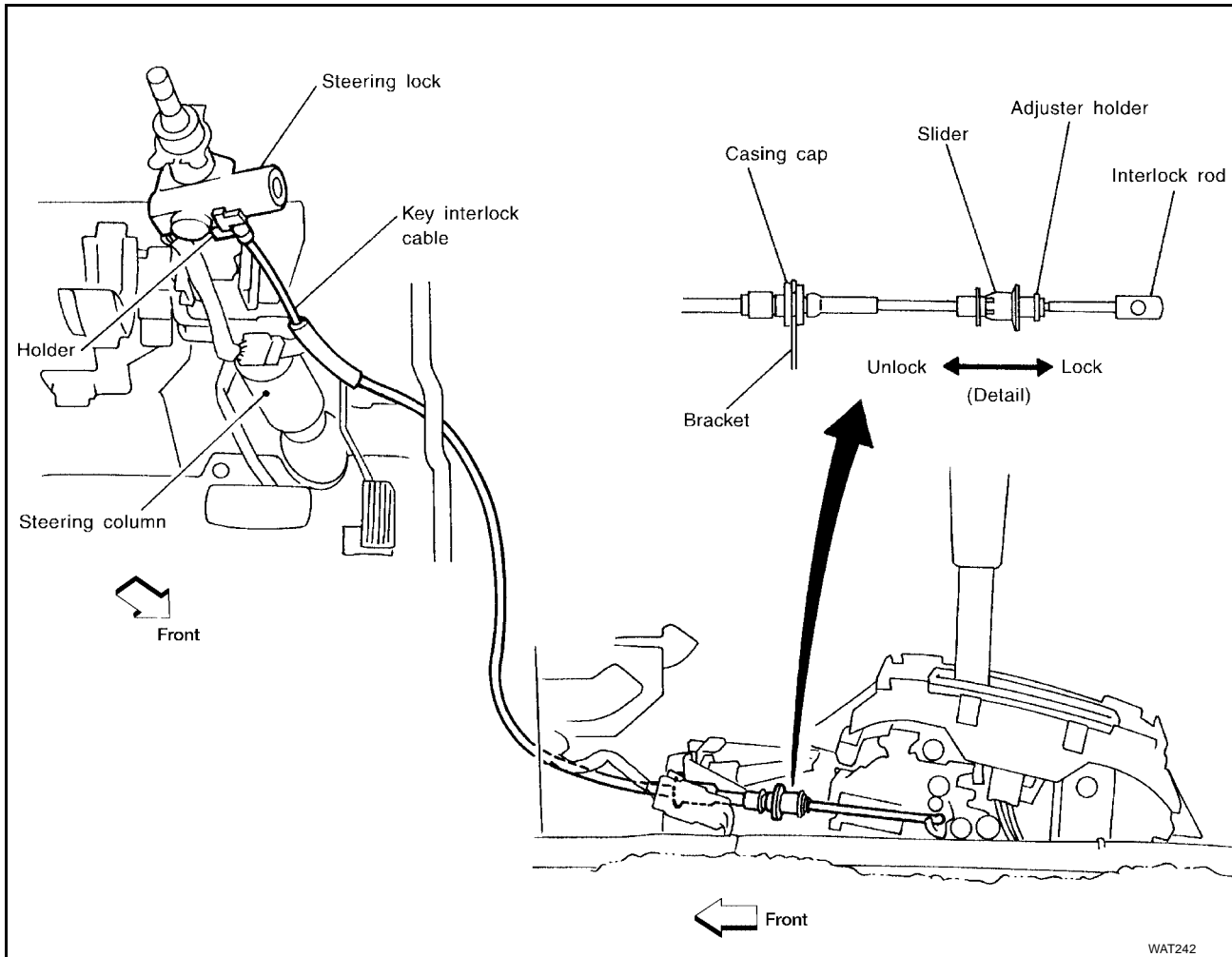
- OK >> INSPECTION END
 NG >> Repair or replace damaged parts.

A
B
AT
D
E
F
G
H
I
J
K
L
M

KEY INTERLOCK CABLE

Components

ECS005ZD



WAT242

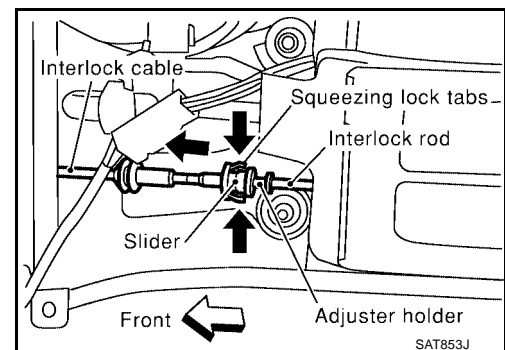
CAUTION:

- 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

ECS005ZE

1. Unlock slider by squeezing lock tabs on slider from adjuster holder and remove interlock rod from cable.

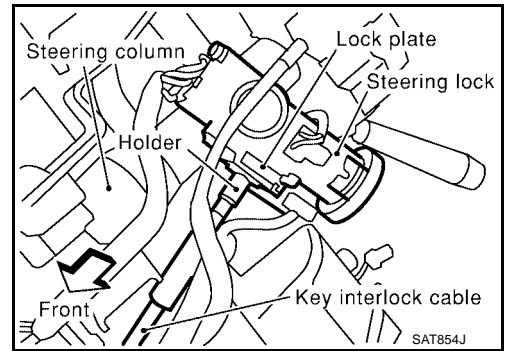


SAT853J

KEY INTERLOCK CABLE

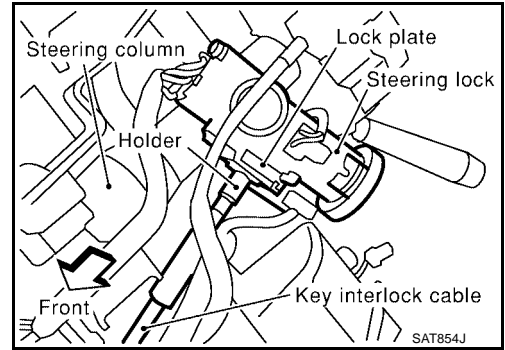
[RE4F03B]

2. Remove lock plate from steering lock assembly and remove key interlock cable.

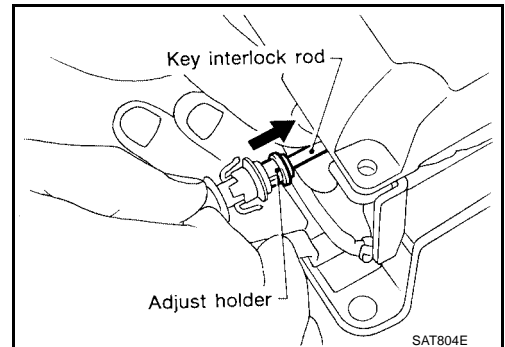


Installation

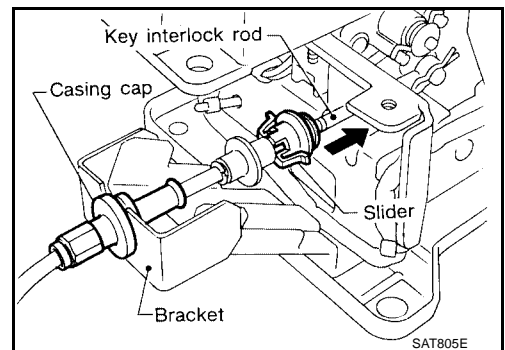
1. Turn ignition key to lock position.
2. Set A/T selector lever to "P" position.
3. Set key interlock cable to steering lock assembly and install lock plate.
4. Clamp cable to steering column and attach to control cable with band.



5. Insert interlock rod into adjuster holder.



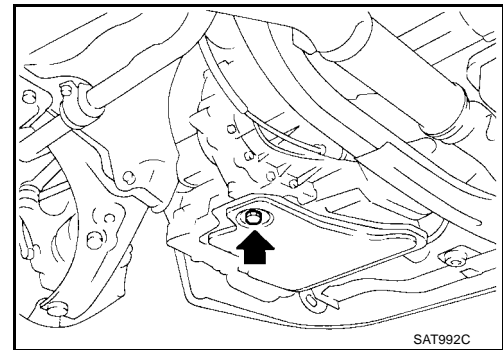
6. Install casing cap to bracket.
7. Move slider in order to connect adjuster holder to interlock rod.



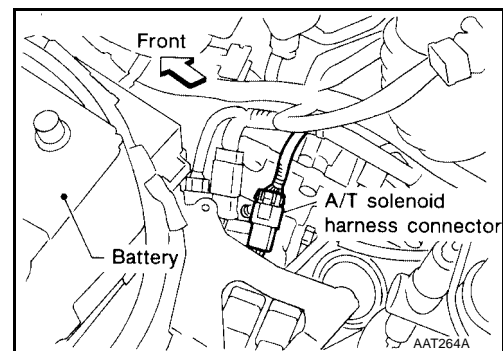
A
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ON-VEHICLE SERVICE**Control Valve Assembly and Accumulators
REMOVAL**

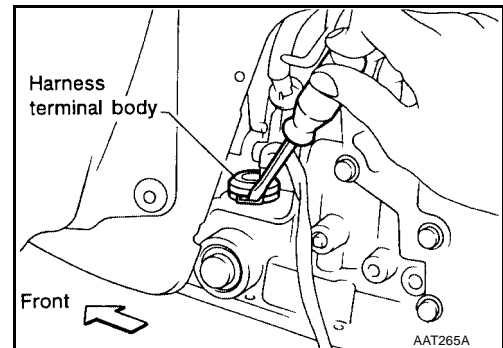
1. Drain ATF from transaxle.
2. Remove oil pan and gasket.
 - Always replace oil pan bolts as they are self-sealing bolts.



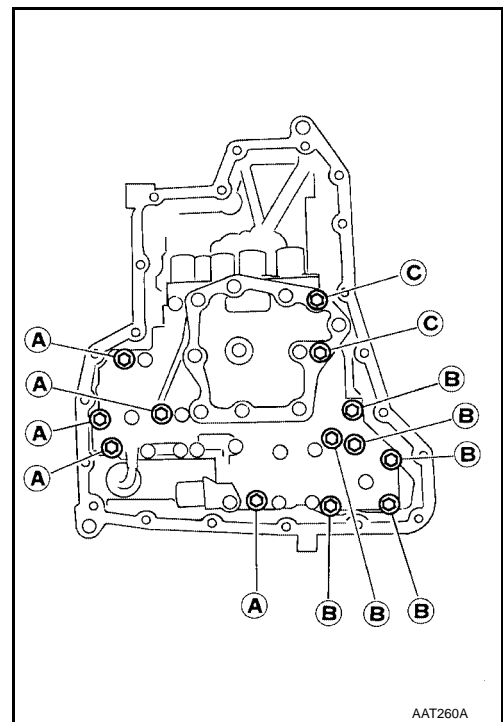
3. Disconnect A/T solenoid valve harness connector.




4. Remove stopper ring from A/T solenoid harness terminal body.
5. Remove A/T solenoid harness by pushing terminal body into transmission case.



6. Remove control valve assembly mounting bolts A, B and C.



Bolt length, number and location:

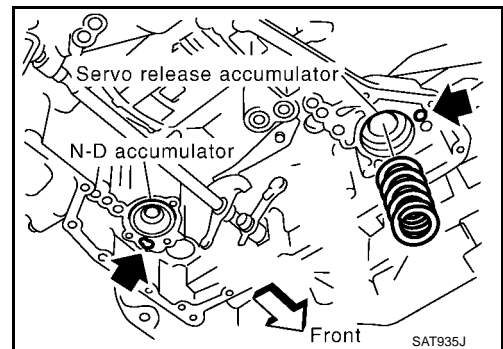
Bolt symbol	A	B	C
Bolt length "l" 	40.0 mm (1.575 in)	33.0 mm (1.299 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2

- **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-298, "Components"](#) .

8. Remove servo release and N-D accumulators by applying compressed air if necessary.

- **Hold each piston with a clean, lint-free towel.**

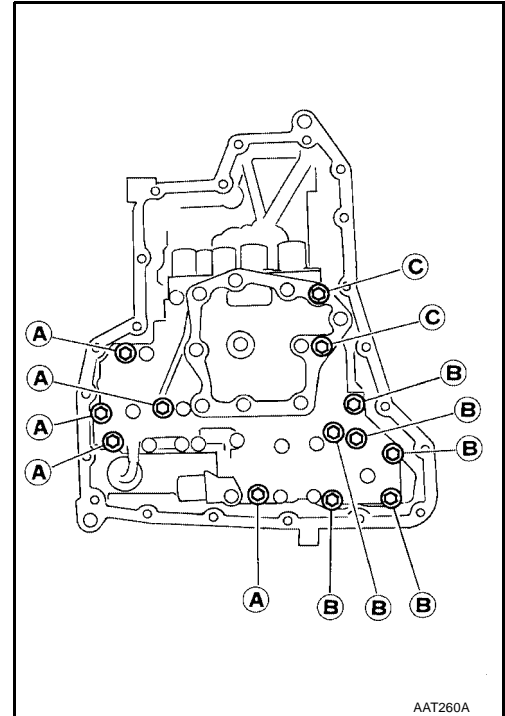


INSTALLATION

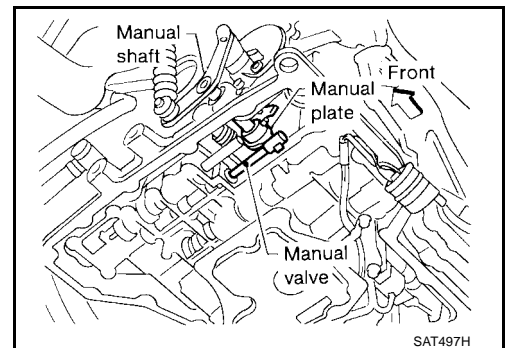
- Tighten mounting bolts A, B and C to specification.



: 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



- 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.



ECS005ZH


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.

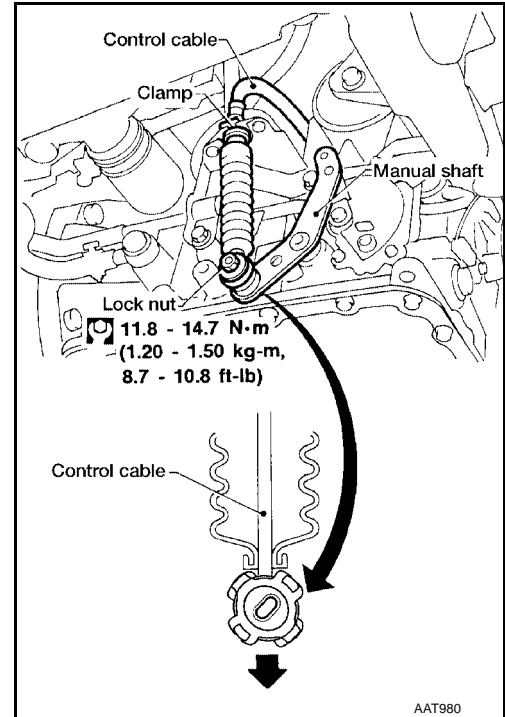
1. Place selector lever in "P" position.
2. Loosen control cable lock nut and place manual shaft in "P" position.
3. Push control cable, by specified force, in the direction of the arrow shown in the illustration.

Specified force : 9.8 N (1.0 kg, 2.2 lb)

4. Release control cable in the opposite direction of the arrow for 1.0 mm (0.039 in).
5. Tighten control cable lock nut by hand.
6. Tighten control cable lock nut.

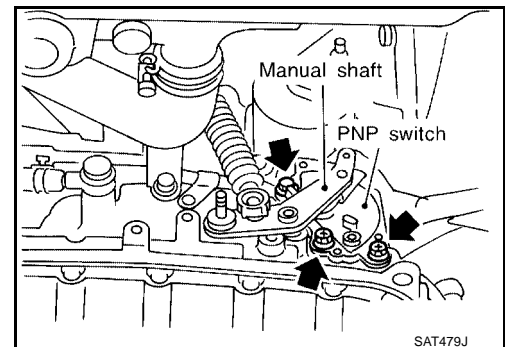
 : 11.8 - 14.7 N·m (1.20 - 1.50 kg-m, 8.7 - 10.8 ft-lb)

7. Move selector lever from "P" to "1" position again. Make sure that selector lever moves smoothly.
8. Apply grease to contacting areas of selector lever and control cable. Install any part removed.

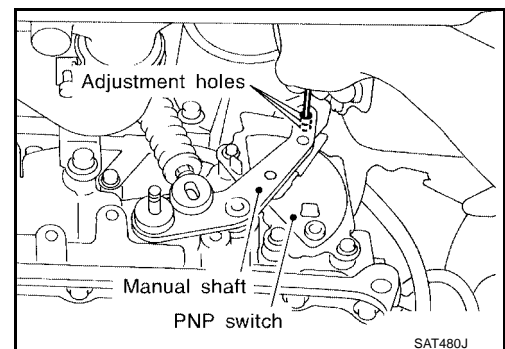


Park/Neutral Position (PNP) Switch Adjustment

1. Remove control cable end from manual shaft.
2. Set manual shaft in "N" position.
3. Loosen PNP switch fixing bolts.



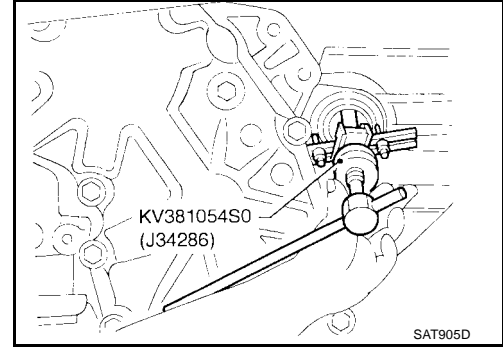
4. Use a 4 mm (0.157 in) pin for this adjustment.
 - a. Insert the pin straight into the manual shaft adjustment hole.
 - b. Rotate PNP switch until the pin can also be inserted straight into hole in PNP switch.
5. Tighten PNP switch fixing bolts.
6. Remove pin from adjustment hole after adjusting PNP switch.
7. Reinstall any part removed.
8. Adjust control cable. Refer to [AT-263, "Control Cable Adjustment"](#).
9. Check continuity of PNP switch. Refer to [AT-120, "Component Inspection"](#).



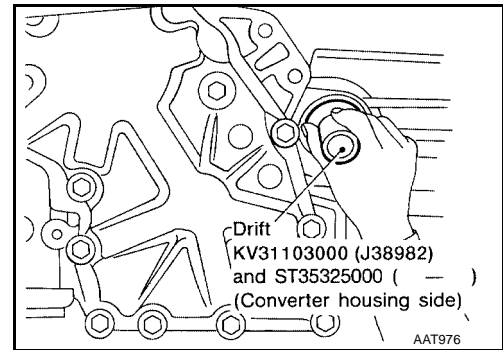
ECS005ZJ

Differential Side Oil Seal Replacement

1. Remove drive shaft assemblies using Tool. Refer to [FAX-14](#), "[Removal](#)".
2. Remove oil seals.



3. Install oil seals using Tool.
 - Apply ATF to oil seal surface before installing.

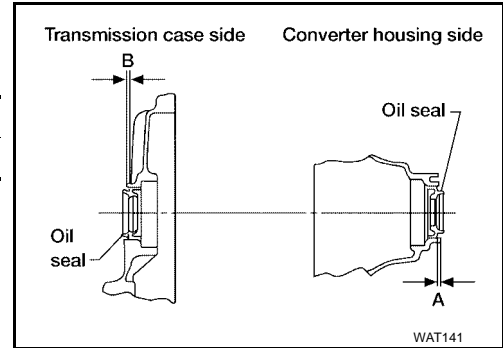


- Install oil seals so that dimensions "A" and "B" are within specifications.

Unit: mm (in)

A	B
5.5 - 6.5 (0.217 - 0.256)	-0.5 to 0.5 (-0.020 to 0.020)

4. Reinstall any part removed.

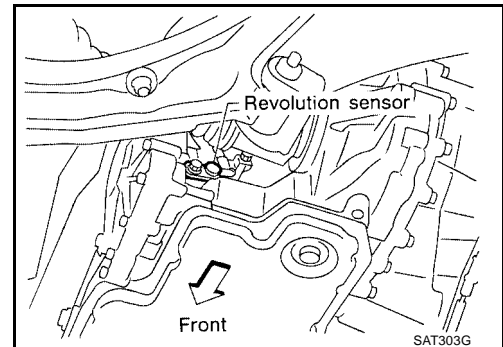


Revolution Sensor Replacement

ECS005ZK

1. Disconnect revolution sensor harness connector.
2. Remove harness bracket from A/T.
3. Remove revolution sensor from A/T.
4. Reinstall any part removed.

Always use new sealing parts.



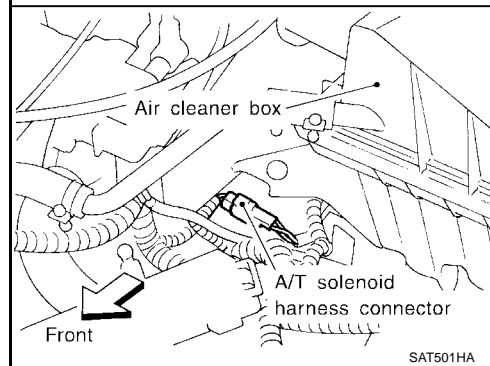
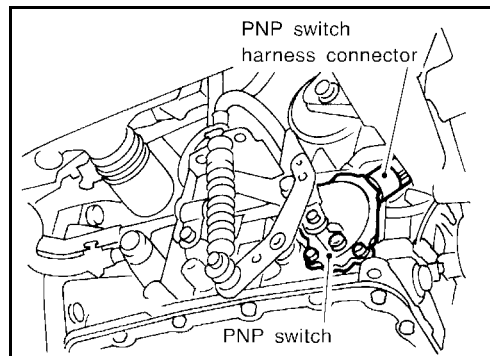
REMOVAL AND INSTALLATION

Removal

CAUTION:

Before separating transaxle from engine, remove the crankshaft position sensor (OBD) from transaxle. Be careful not to damage sensor.

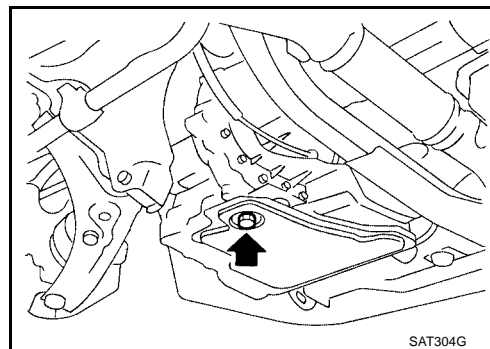
1. Remove battery and bracket.
2. Remove air duct between throttle body and air cleaner.
3. Disconnect terminal cord assembly, PNP switch harness connector and revolution sensor harness connector.



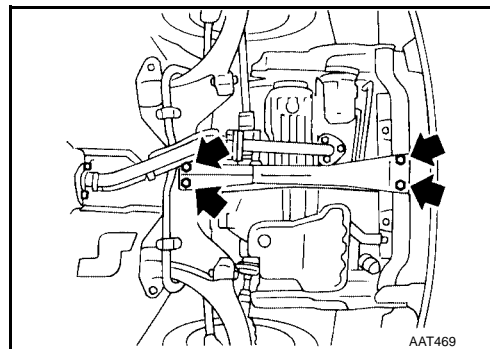
4. Drain ATF from transaxle.
5. Disconnect control cable from transaxle.
6. Disconnect oil cooler hoses.
7. Remove drive shafts. Refer to [FAX-14, "Removal"](#).
8. Remove the intake manifold support bracket. Refer to [EM-12, "Removal and Installation"](#).
9. Remove starter motor from transaxle.

Tighten bolts to specified torque.

 : 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 [EM-66, "INSTALLATION"](#).

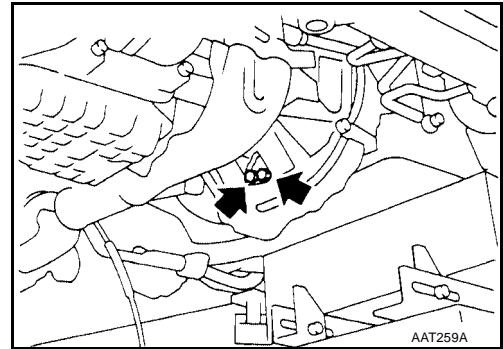


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REMOVAL AND INSTALLATION

[RE4F03B]

13. Remove rear plate cover.
14. Remove torque 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.



ECS005ZM

Installation

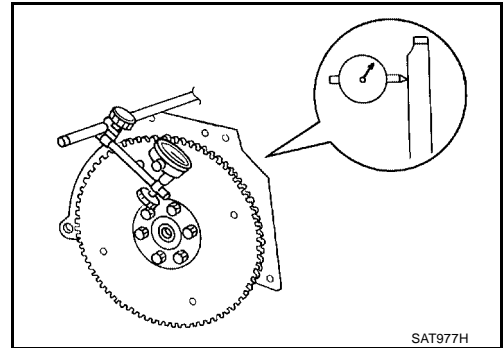
1. Check drive plate runout.

CAUTION:

Do not allow any magnetic materials to contact the ring gear teeth.

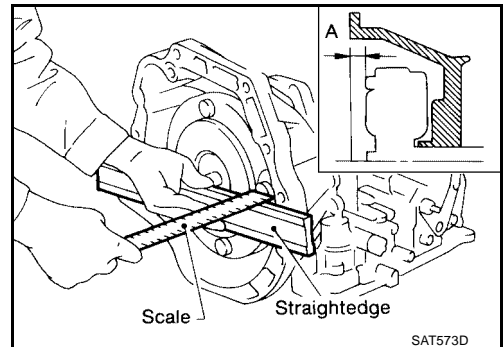
Maximum allowable runout : [EM-77, "Flywheel Runout"](#) .

- If this runout is out of allowance, replace drive plate with ring gear.



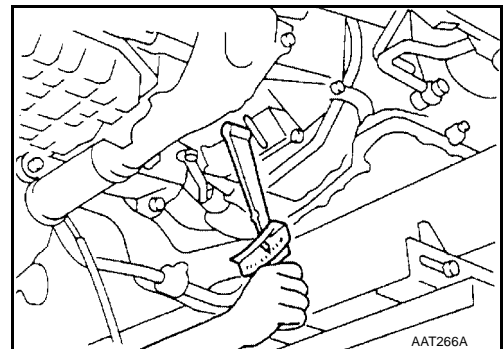
2. When connecting torque converter to transaxle, measure distance "A" to be certain that they are correctly assembled.

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.**

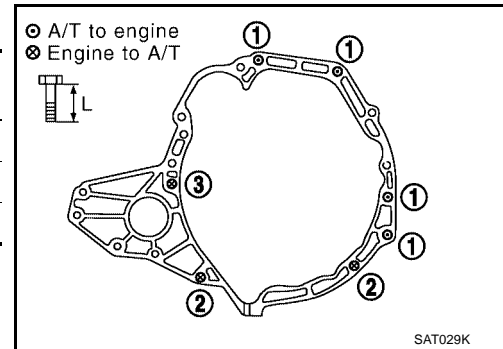


REMOVAL AND INSTALLATION

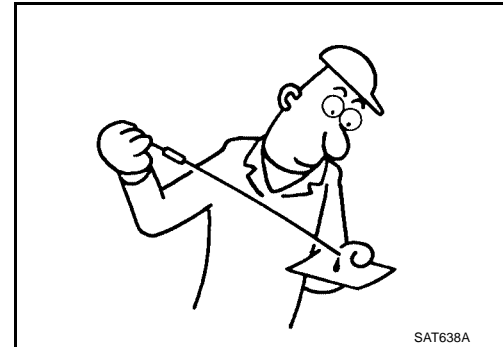
[RE4F03B]

4. Tighten bolts fixing transaxle.

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	Bolt length "l" 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)



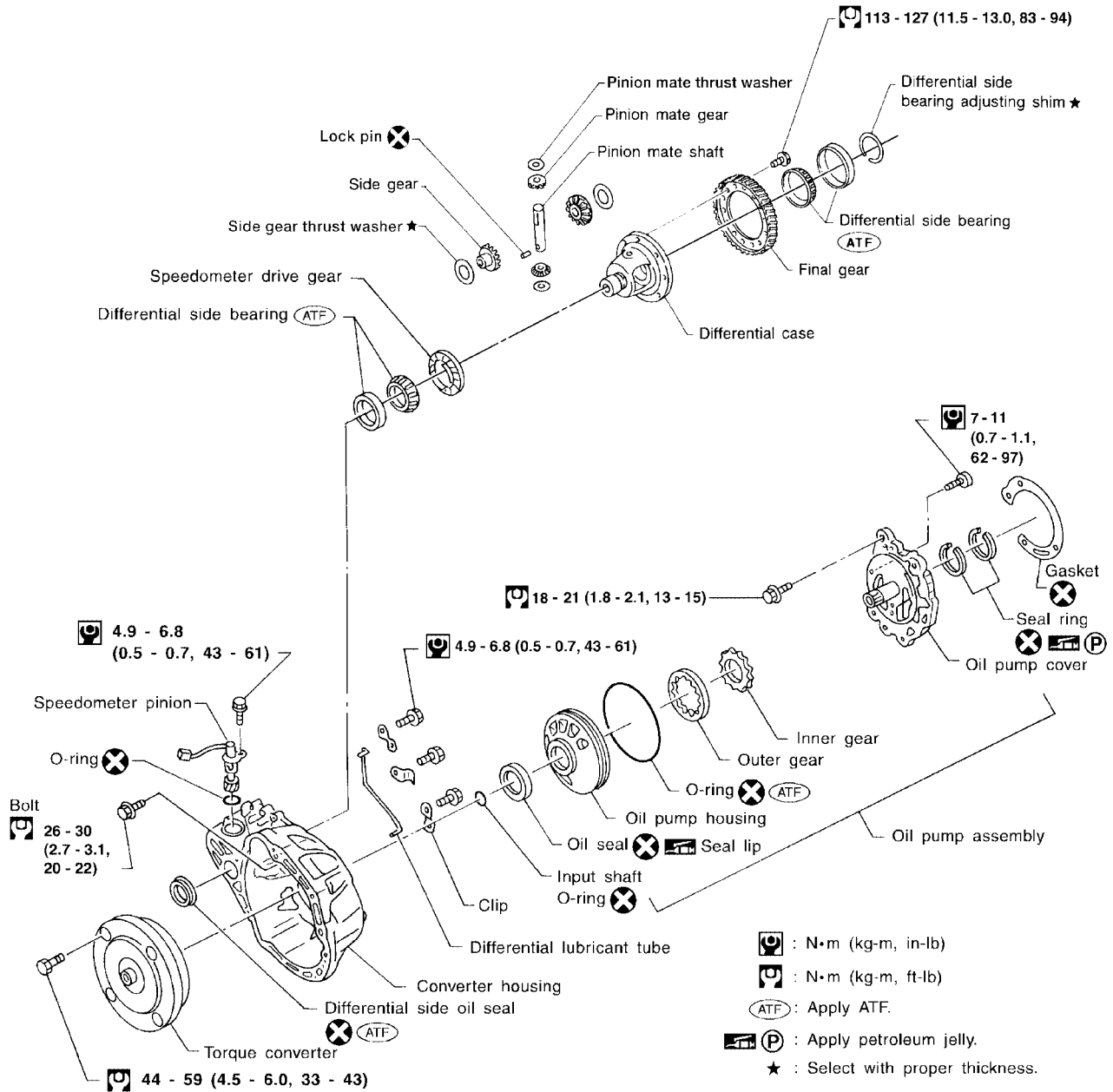
5. Reinstall any part removed.
6. Adjust control cable. Refer to [AT-263, "Control Cable Adjustment"](#) .
7. Check continuity of PNP switch. Refer to [AT-120, "PARK/NEUTRAL POSITION SWITCH"](#) .
8. Refill transaxle with ATF and check fluid level.
9. Move selector lever through all positions to be sure 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-69, "Road Test"](#) .



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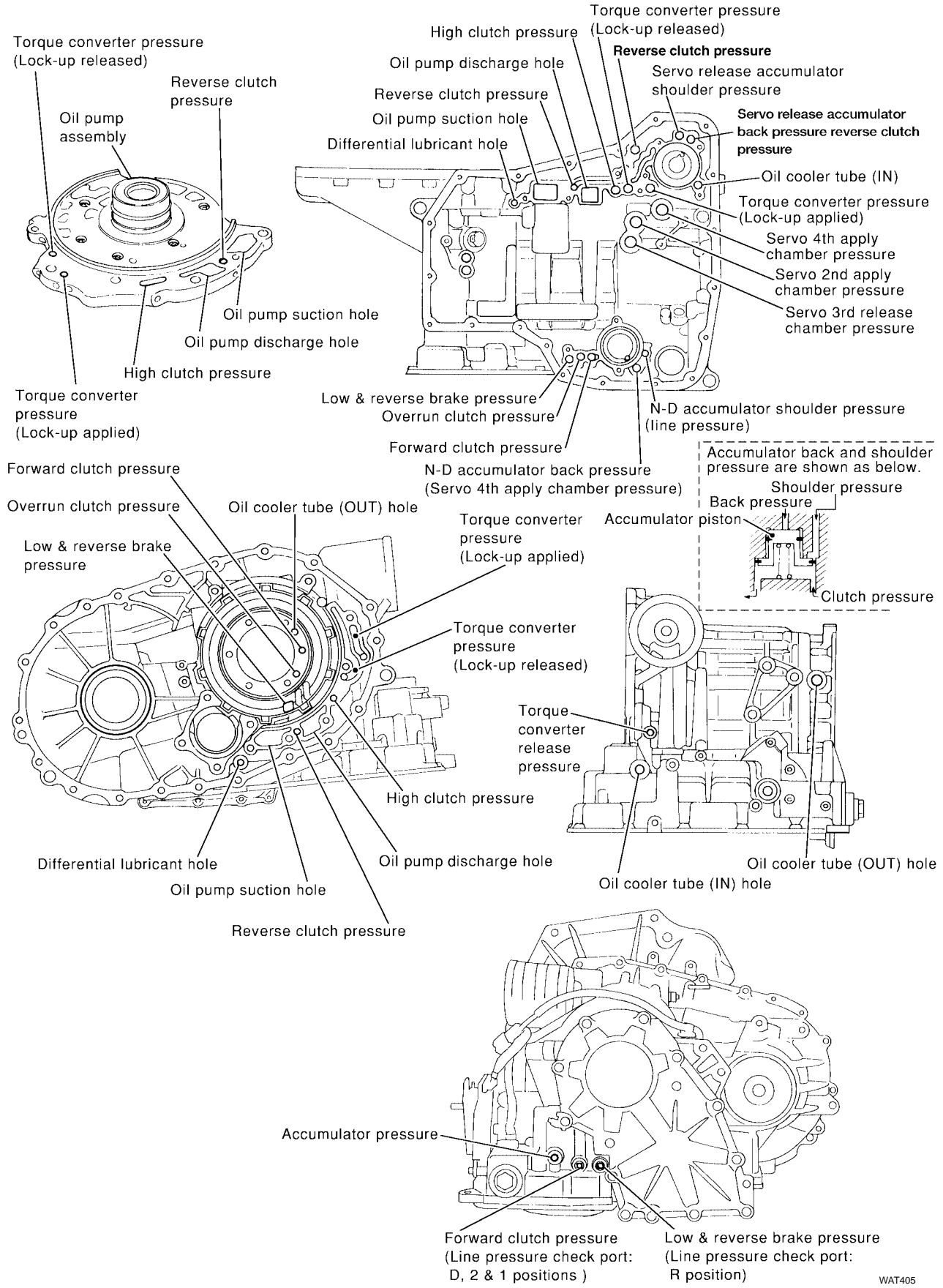
OVERHAUL Components

SEC. 311•313•327•381



Oil Channel

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WAT405

Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings

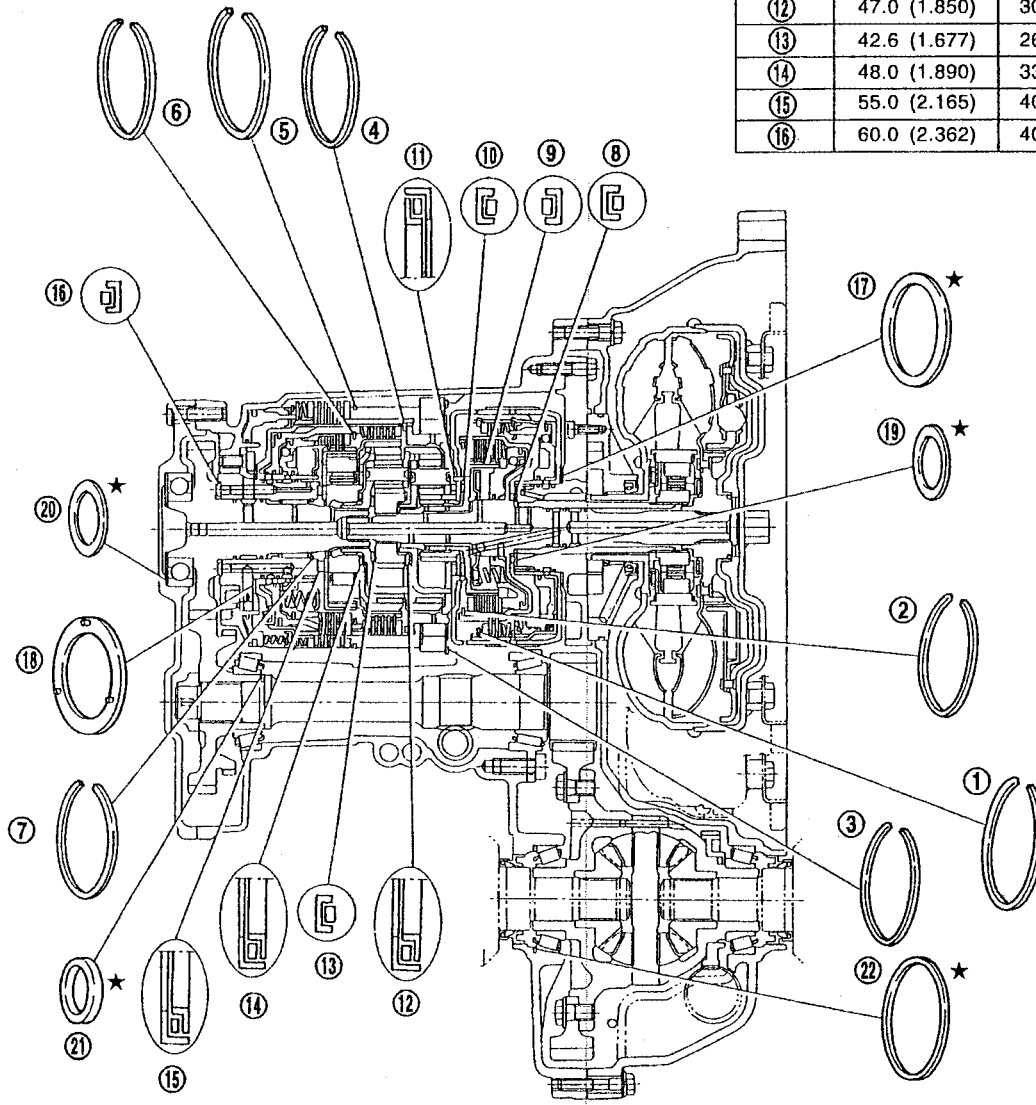
ECS005ZP

Outer diameter and color of thrust washers

Item number	Outer diameter mm (in)	Color
(17)	72.0 (2.835)	Black
(18)	78.5 (3.091)	

Outer and inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)
(8)	47.0 (1.850)	32.0 (1.260)
(9)	35.0 (1.378)	20.1 (0.791)
(10)	60.0 (2.362)	42.0 (1.657)
(11)	60.0 (2.362)	45.0 (1.772)
(12)	47.0 (1.850)	30.0 (1.181)
(13)	42.6 (1.677)	26.0 (1.024)
(14)	48.0 (1.890)	33.5 (1.319)
(15)	55.0 (2.165)	40.5 (1.594)
(16)	60.0 (2.362)	40.0 (1.579)



★ : Select proper thickness.

Outer and inner diameter of bearing race and adjusting shims

Item 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)

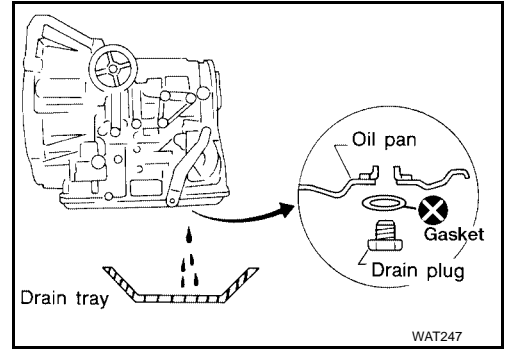
Outer diameter of snap rings

Item 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)
(7)	40.5 (1.594)

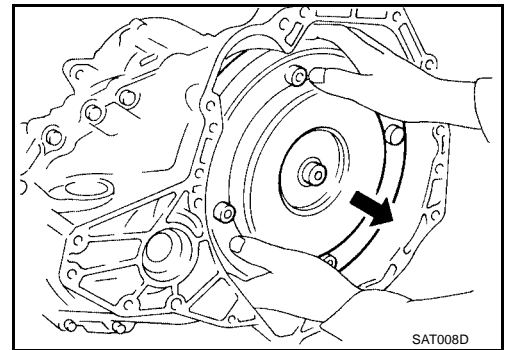
WAT246

Disassembly

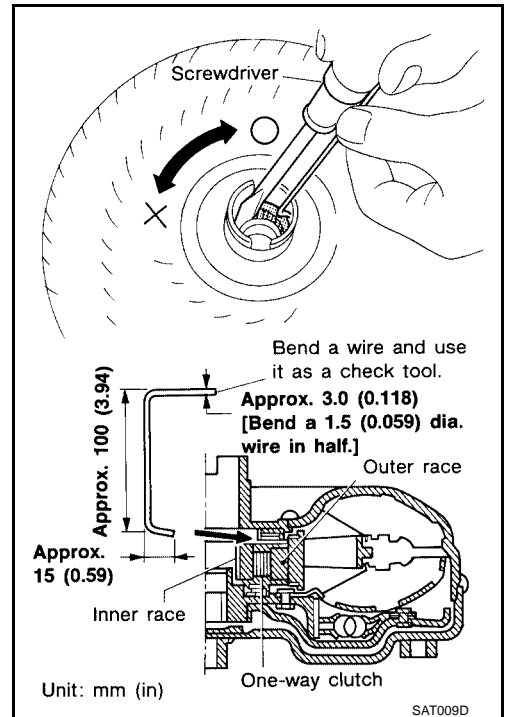
1. Drain ATF through drain plug.



2. Remove torque converter.



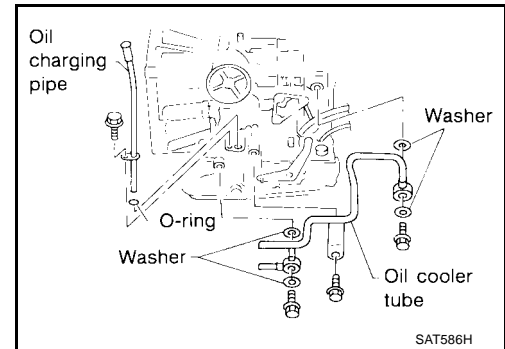
3. Check torque converter one-way clutch using check tool as shown.
 - a. Insert check tool into the groove of bearing support built into one-way clutch outer race.
 - b. While fixing bearing support with check tool, rotate one-way clutch spline using flat-bladed screwdriver.
 - c. Check to make sure the inner race rotates clockwise only. If not, replace torque converter assembly.



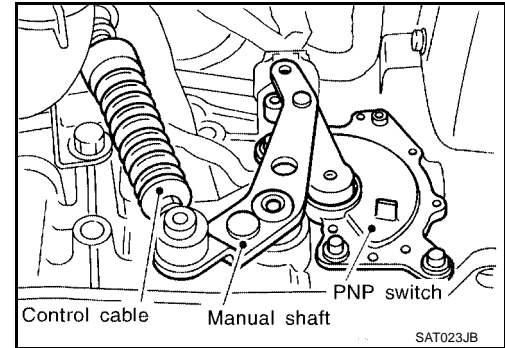
OVERHAUL

[RE4F03B]

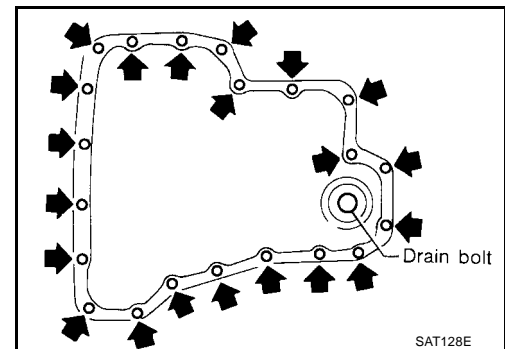
4. Remove oil charging pipe and oil cooler tube.



5. Set manual shaft to "P" position.
6. Remove PNP switch.

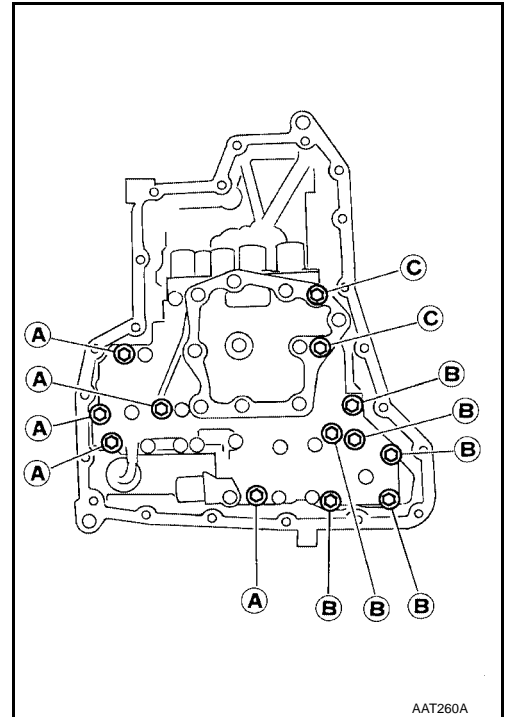


7. Remove oil pan and oil pan gasket.
 - Always replace oil pan bolts as they are self-sealing bolts.
8. Check foreign materials in oil pan to help determine cause of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need 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"](#).

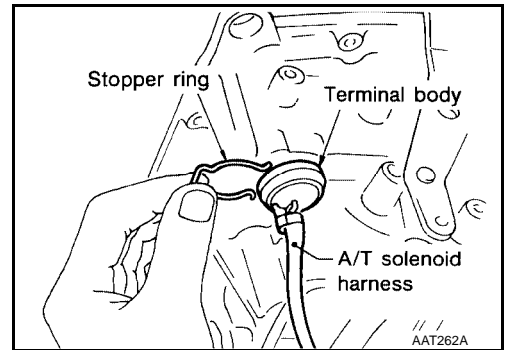


9. Remove control valve assembly according to the following procedures.

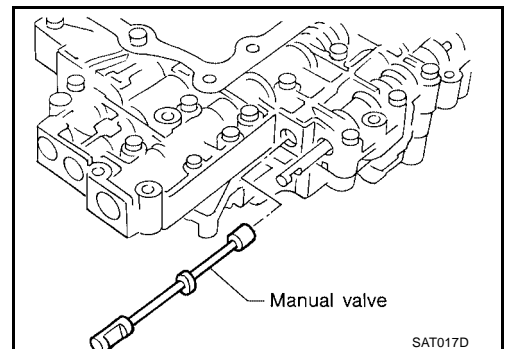
- a. Remove control valve assembly mounting bolts A, B and C.



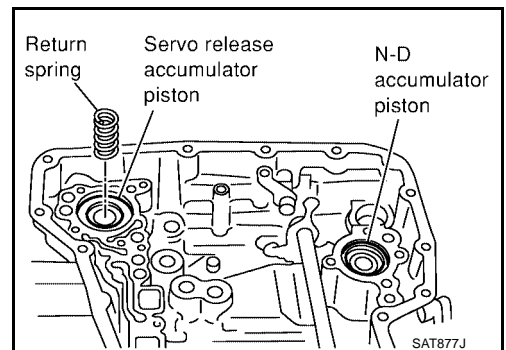
- b. Remove stopper ring from terminal body.
 c. Push terminal body into transmission case and draw out solenoid harness.



10. Remove manual valve from control valve assembly as a precaution.



11. Remove return spring from servo release accumulator piston.

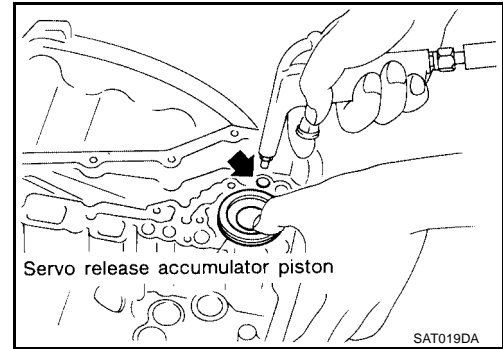


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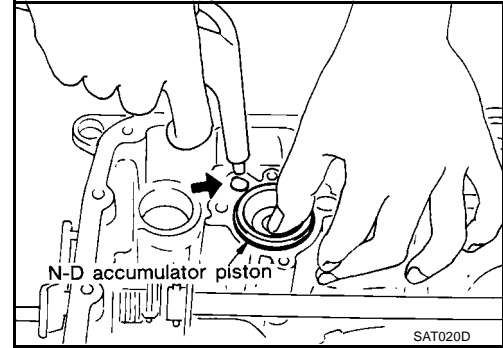
OVERHAUL

[RE4F03B]

12. Remove servo release accumulator piston with compressed air.
13. Remove O-rings from servo release accumulator piston.

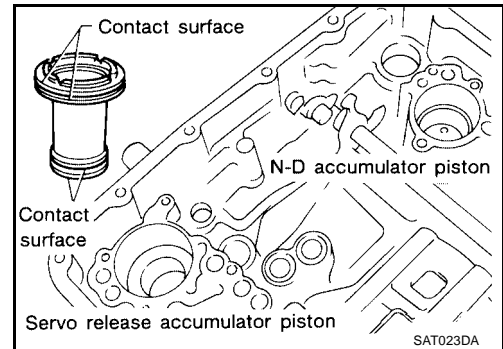


14. Remove N-D accumulator piston and return spring with compressed air.
15. Remove O-rings from N-D accumulator piston.

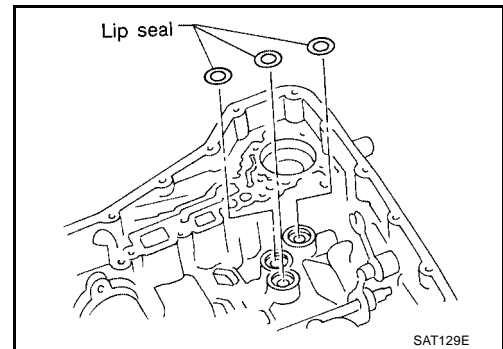


16. Check accumulator pistons and contact surface of transmission case for damage.
17. Check accumulator return springs for damage and free length.

Return springs : Refer to [AT-394, "RETURN SPRING"](#)



Remove lip seals from band servo oil port.

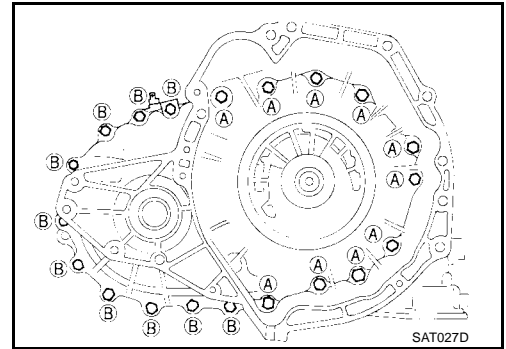


19. Remove converter housing according to the following procedures.

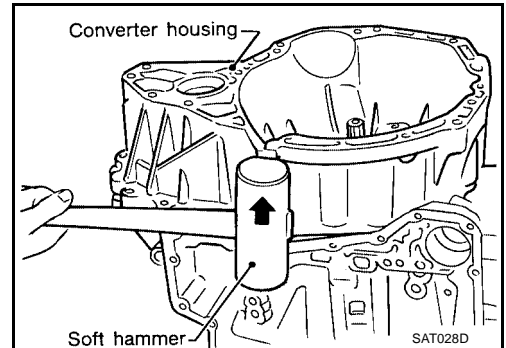
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[RE4F03B]

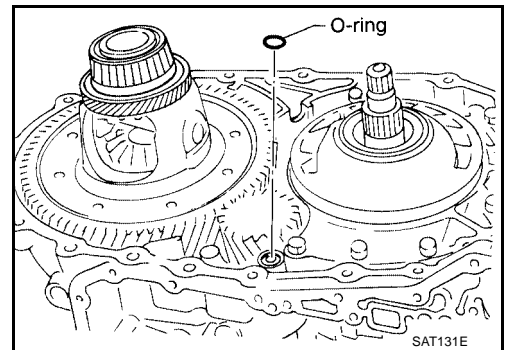
- a. Remove converter housing mounting bolts A and B.



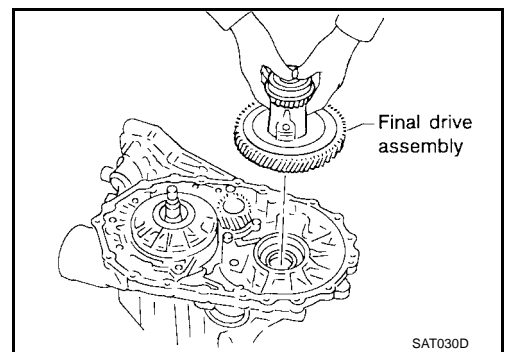
- b. Remove converter housing.



- c. Remove O-ring from differential oil port.



20. Remove final drive assembly from transmission case.

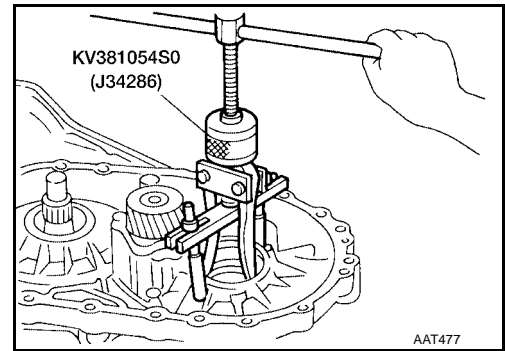


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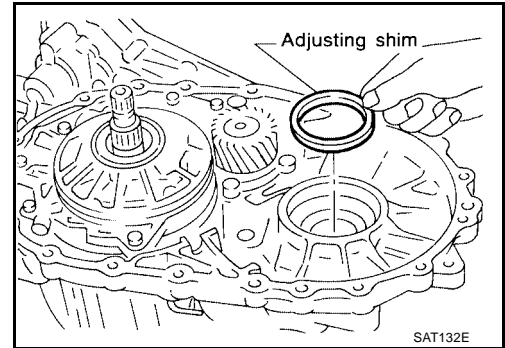
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[RE4F03B]

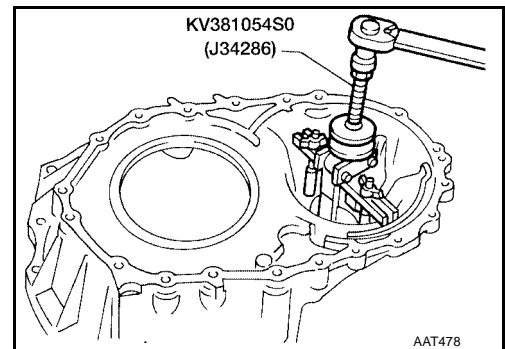
21. Remove differential side bearing outer race from transmission case using Tool.



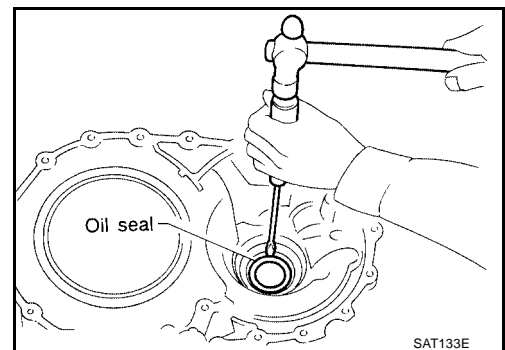
22. Remove differential side bearing adjusting shim from transmission case.



23. Remove differential side bearing outer race from converter housing using Tool.



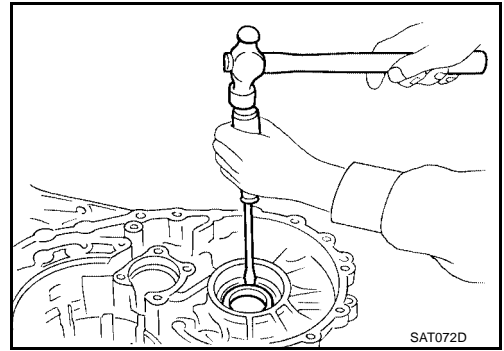
24. Remove oil seal from converter housing using a screwdriver.
- **Be careful not to damage case.**



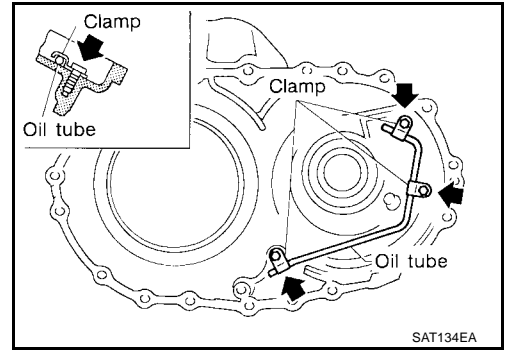
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[RE4F03B]

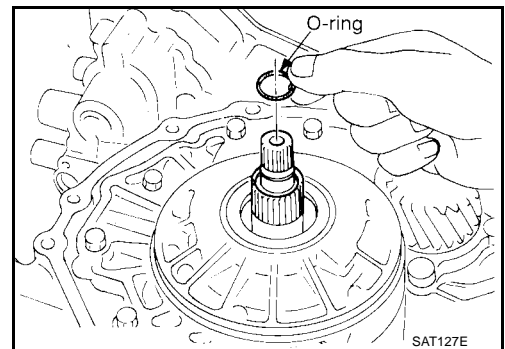
25. Remove side oil seal from transmission case using a screwdriver.



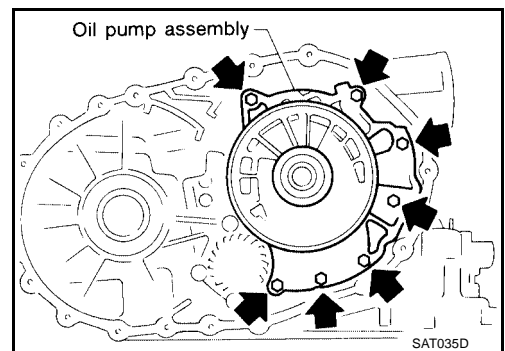
26. Remove oil tube from converter housing.



27. Remove oil pump according to the following procedures.
a. Remove O-ring from input shaft.



Remove oil pump assembly from transmission case.

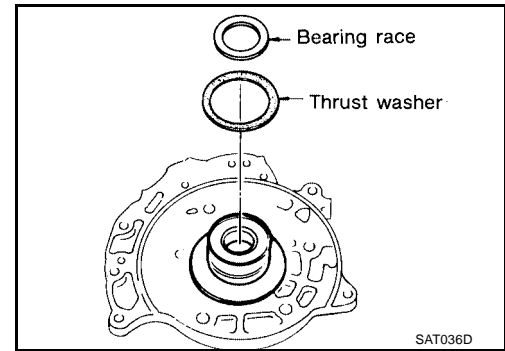


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[RE4F03B]

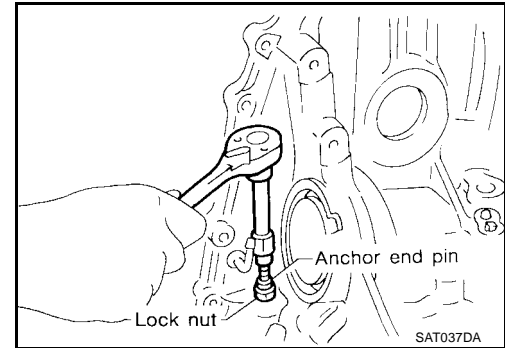
- c. Remove thrust washer and bearing race from oil pump assembly.



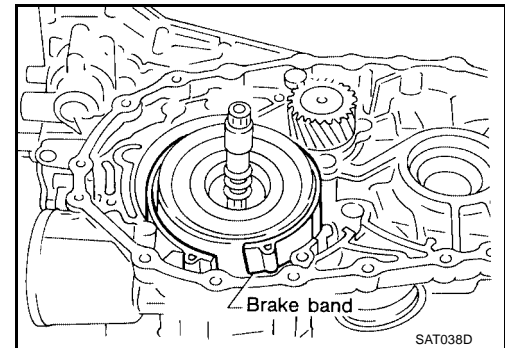
28. Remove brake band according to the following procedures.

- a. Loosen lock nut, then back off anchor end pin.

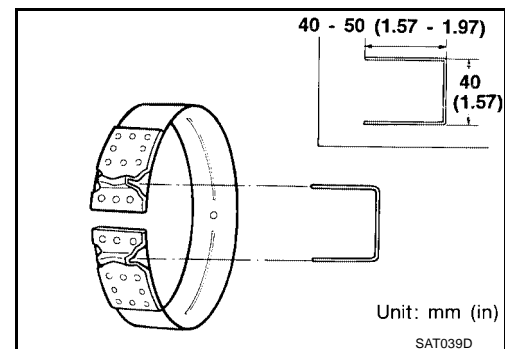
- Do not reuse anchor end pin.



- b. Remove brake band from transmission case.



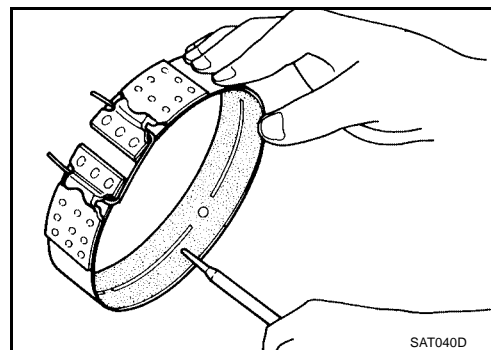
- To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing the brake band, always secure it with a clip as shown. Leave the clip in position after removing the brake band.



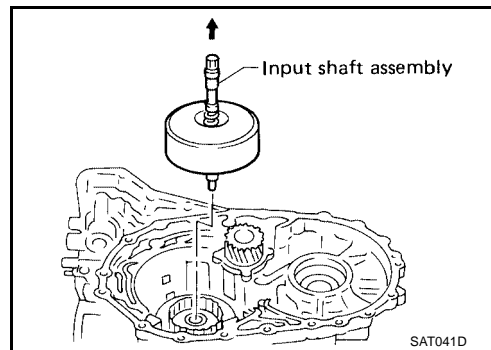
OVERHAUL

[RE4F03B]

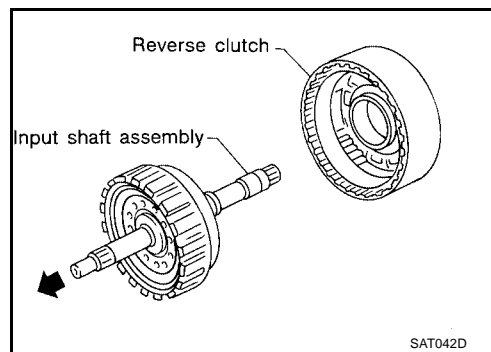
- c. Check brake band facing for damage, cracks, wear or burns.



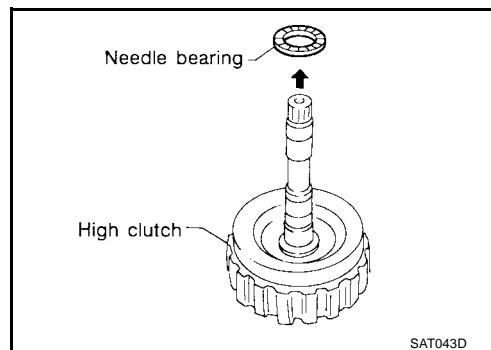
29. Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures.



- a. Remove input shaft assembly (high clutch) with reverse clutch.
b. Remove input shaft assembly (high clutch) from reverse clutch.



- c. Remove needle bearing from high clutch drum.
d. Check input shaft assembly and needle bearing for damage or wear.

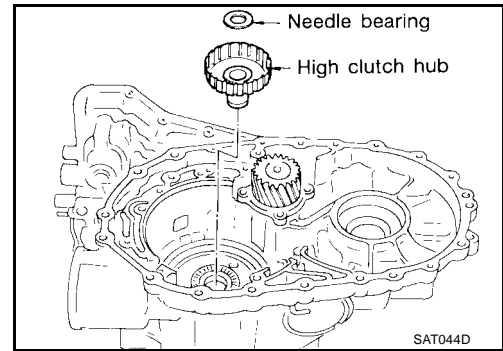


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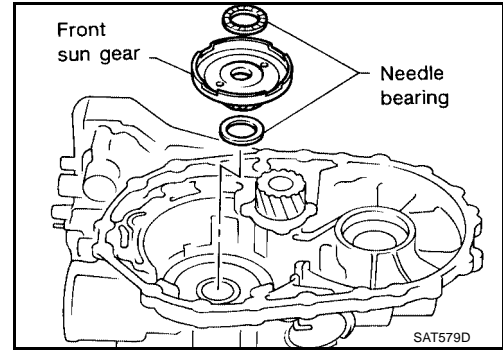
OVERHAUL

[RE4F03B]

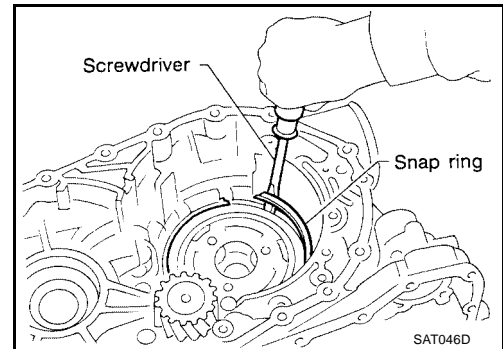
30. Remove high clutch hub and needle bearing from transmission case.
31. Check high clutch hub and needle bearing for damage or wear.



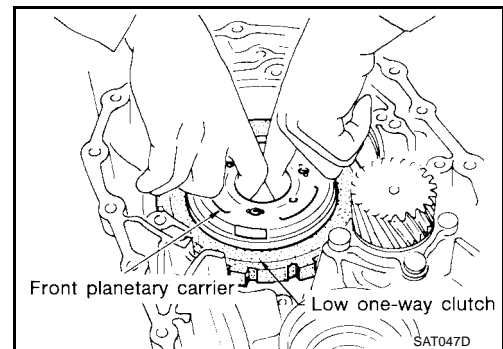
32. Remove front sun gear and needle bearings from transmission case.
33. Check front sun gear and needle bearings for damage or wear.



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.



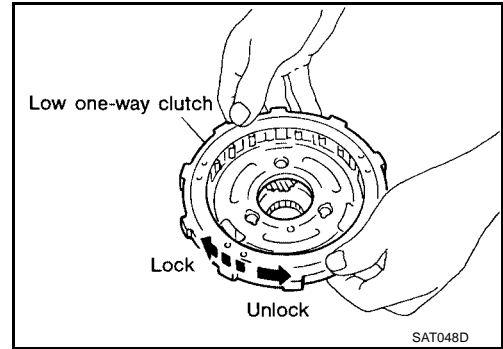
- b. Remove front planetary carrier with low one-way clutch.



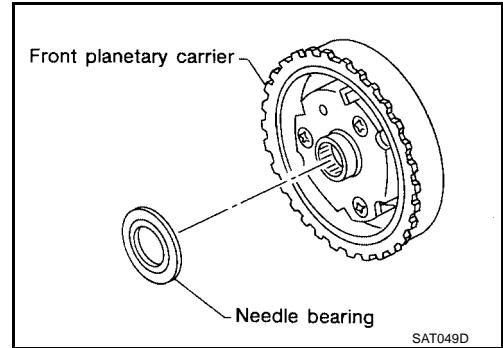
OVERHAUL

[RE4F03B]

- c. Check that low one-way clutch rotates in the direction of the arrow and locks in the opposite direction.



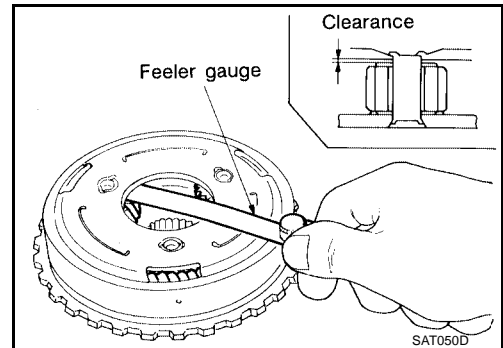
- d. Remove low one-way clutch from front planetary carrier by rotating it in the direction of unlock.
e. Remove needle bearing from front planetary carrier.



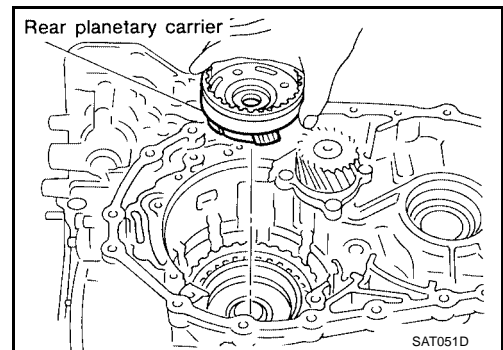
- f. Check front planetary carrier, low one-way clutch and needle bearing for damage or wear.
g. Check clearance between pinion washer and planetary carrier using feeler gauge.

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.



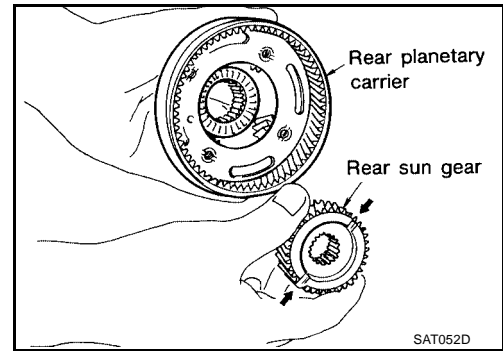
- a. Remove rear planetary carrier assembly from transmission case.

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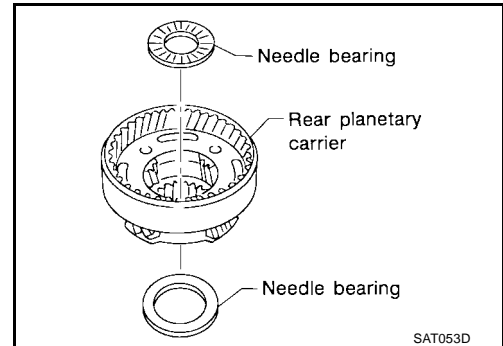
OVERHAUL

[RE4F03B]

- b. Remove rear sun gear from rear planetary carrier.



- c. Remove needle bearings from rear planetary carrier assembly.

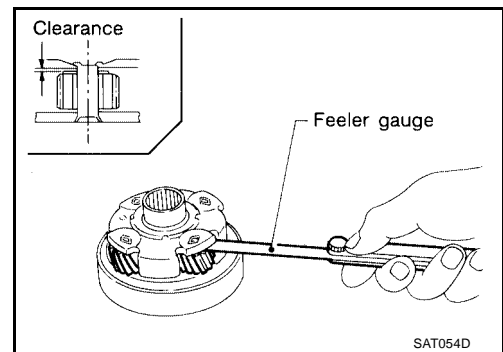


- d. Check rear planetary carrier, rear sun gear and needle bearings for damage or wear.
e. Check clearance between pinion washer and rear planetary carrier using feeler gauge.

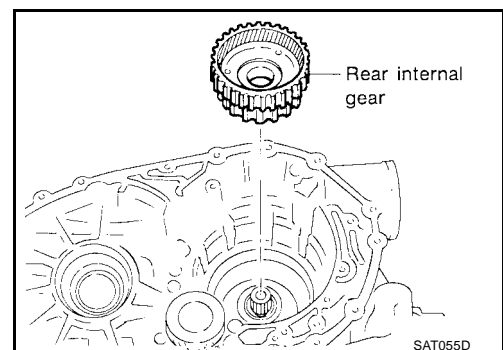
Standard clearance : 0.15 - 0.70 mm (0.0059 - 0.0276 in)

Allowable limit : 0.80 mm (0.0315 in)

Replace rear planetary carrier if the clearance exceeds allowable limit.

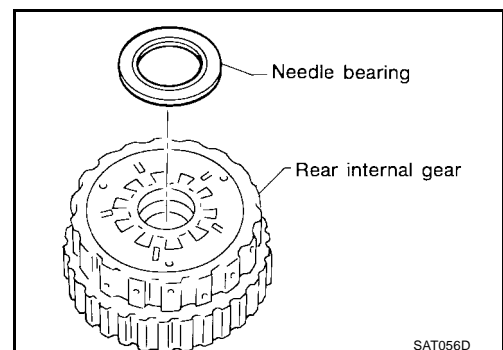


36. Remove rear internal gear from transmission case.

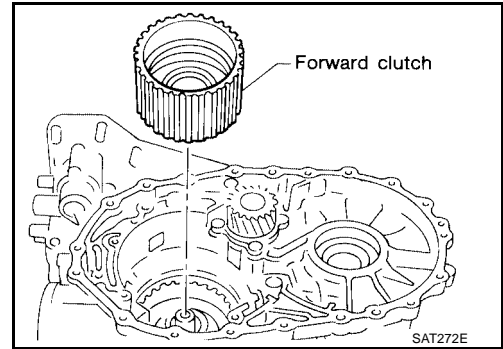


37. Remove needle bearing from rear internal gear.

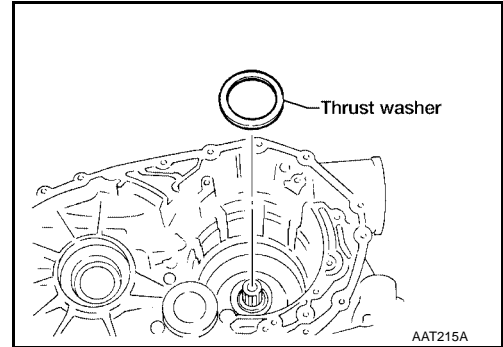
- Check needle bearing for damage or wear.



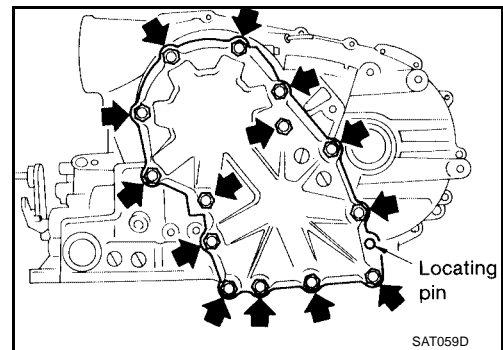
38. Remove forward clutch assembly from transmission case.



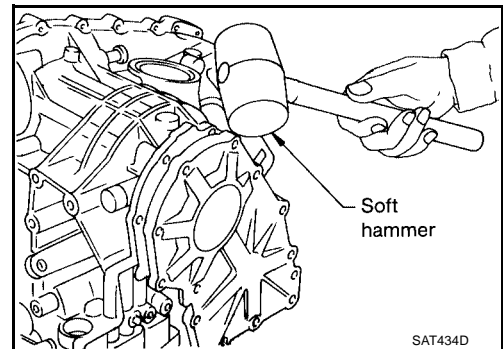
39. Remove thrust washer from transmission case.



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.



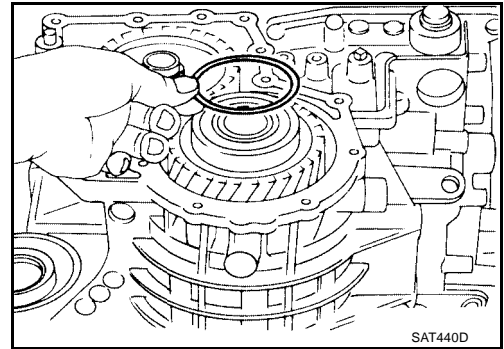
- Be careful not to drop output shaft assembly. It might come out when removing side cover.

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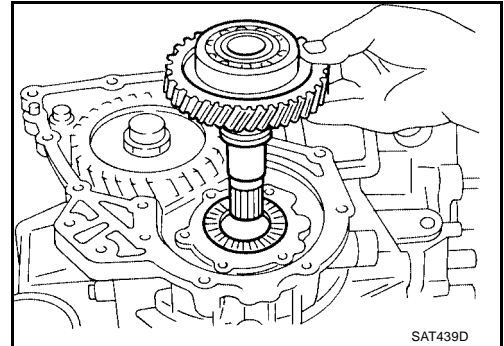
OVERHAUL

[RE4F03B]

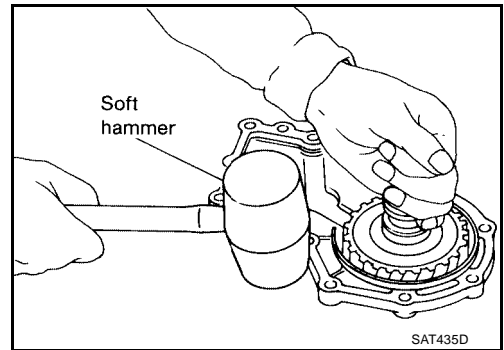
c. Remove adjusting shim.



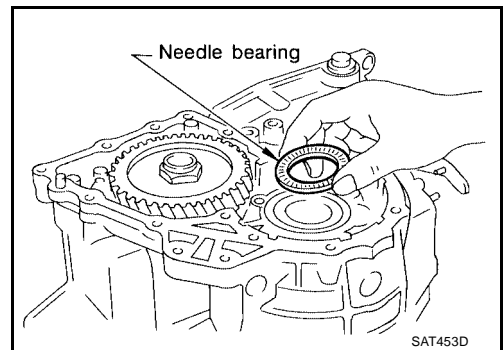
d. Remove output shaft assembly.



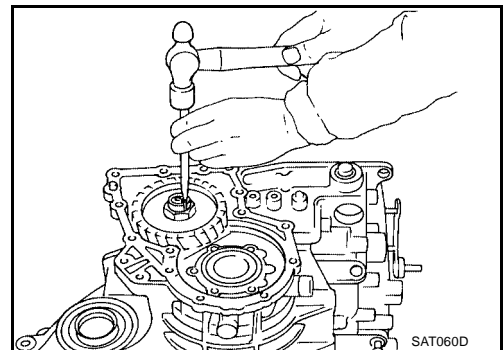
- If output shaft assembly came off with side cover, tap cover with a soft hammer to separate.



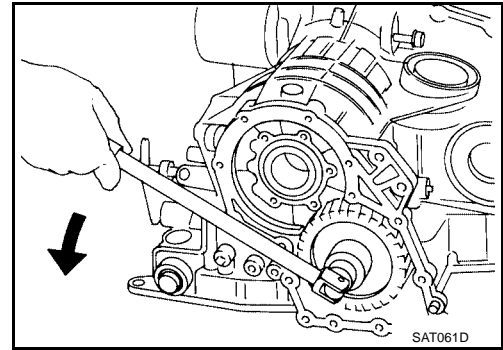
e. Remove needle bearing.



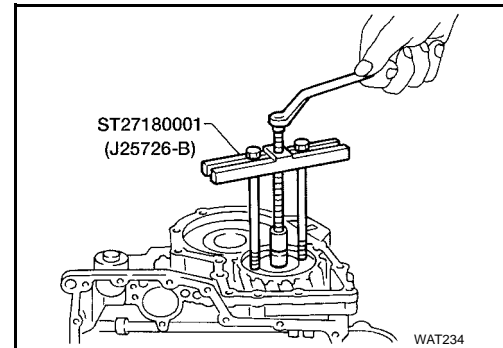
41. Disassemble reduction pinion gear according to the following procedures.



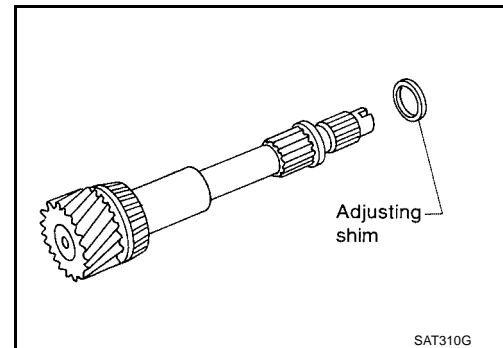
- a. Set manual shaft to position "P" to fix idler gear.
- b. Unlock idler gear lock nut using a pin punch.
- c. Remove idler gear lock nut.
 - **Do not reuse idler gear lock nut.**



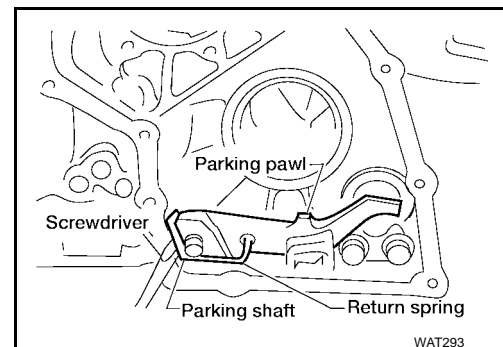
- d. Remove idler gear with puller using Tool.



- e. Remove reduction pinion gear.
- f. Remove adjusting shim from reduction pinion gear.



42. Remove return spring from parking shaft using a screwdriver.

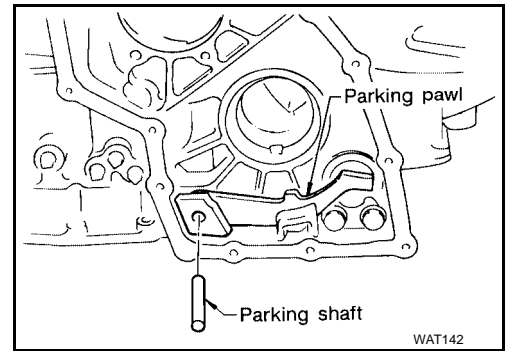


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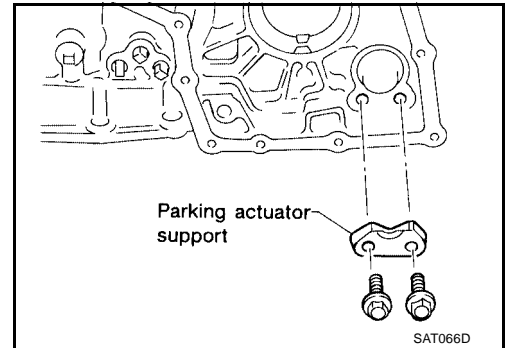
OVERHAUL

[RE4F03B]

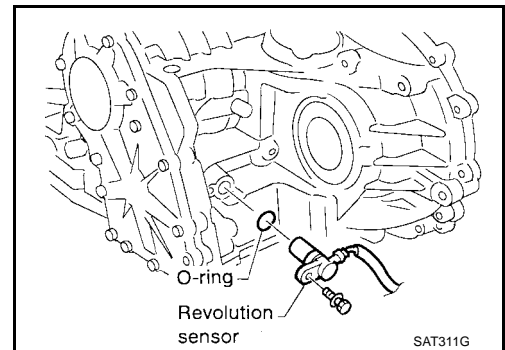
43. Draw out parking shaft and remove parking pawl from transmission case.
44. Check parking pawl and shaft for damage or wear.



45. Remove parking actuator support from transmission case.
 - Check parking actuator support for damage or wear.



46. Remove revolution sensor from transmission case.

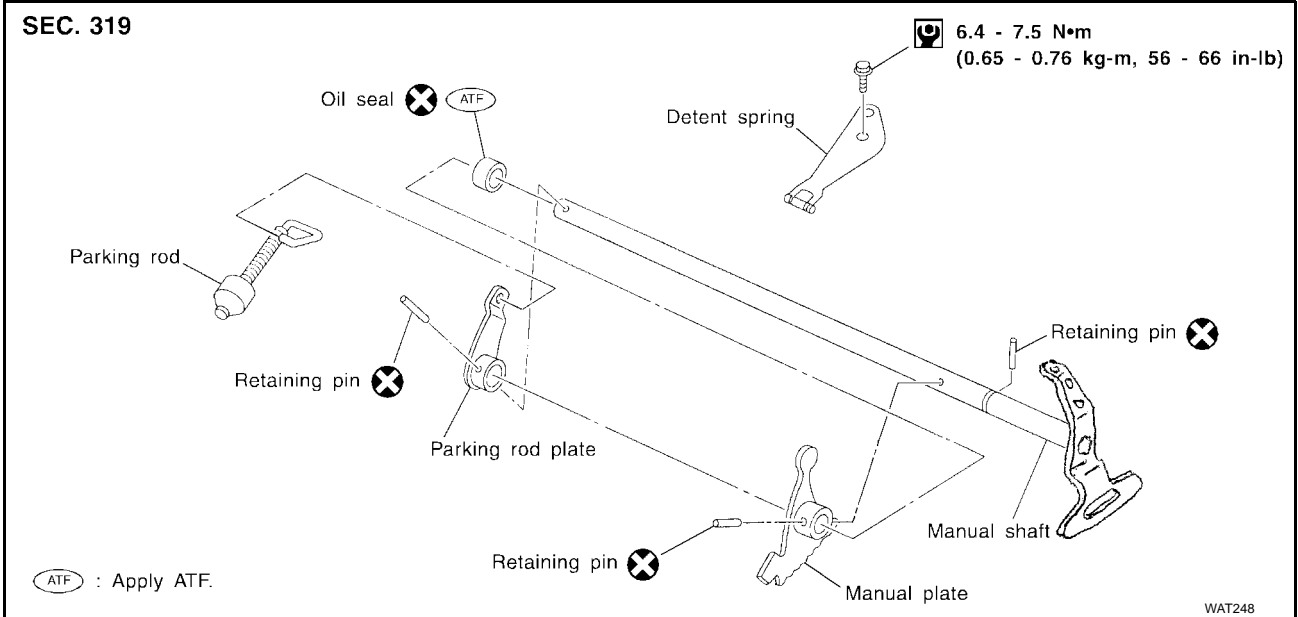


MANUAL SHAFT

PFP:31920

Components

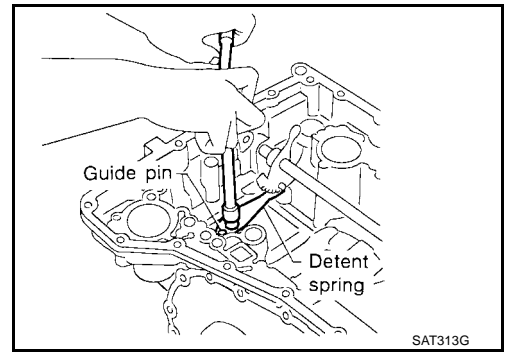
ECS005ZR



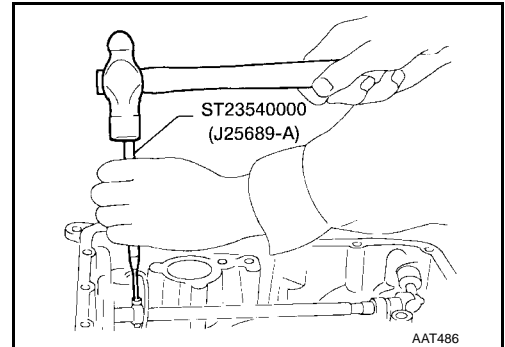
Removal

ECS005ZS

1. Remove detent spring from transmission case.



2. Drive out manual plate retaining pin using Tool.

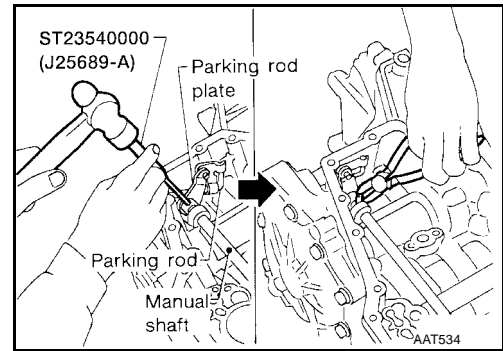


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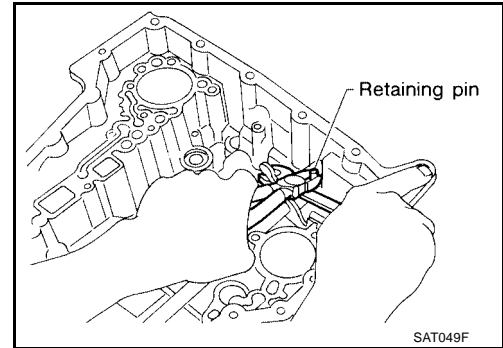
MANUAL SHAFT

[RE4F03B]

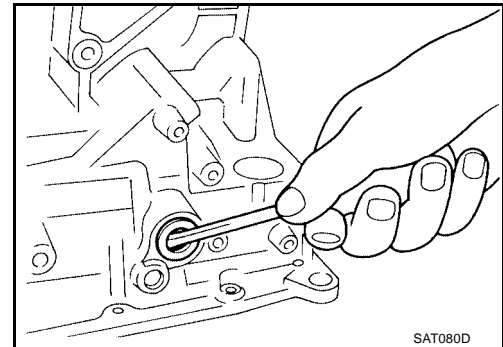
3. Drive and pull out parking rod plate retaining pin using Tool.
4. Remove parking rod plate from manual shaft.
5. Draw out parking rod from transmission case.



6. Pull out manual shaft retaining pin.



7. Remove manual shaft and manual plate from transmission case.
8. Remove manual shaft oil seal.



ECS005ZT

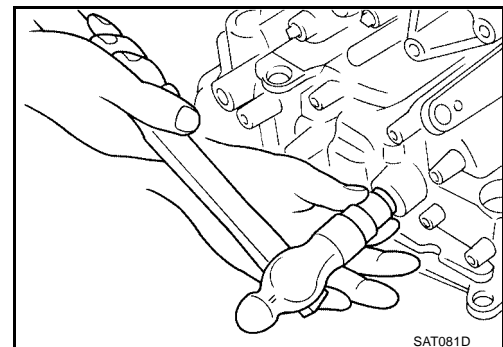
Inspection

- Check component parts for wear or damage. Replace if necessary.

Installation

1. Install manual shaft oil seal using a suitable tool.
 - Apply ATF to outer surface of oil seal.

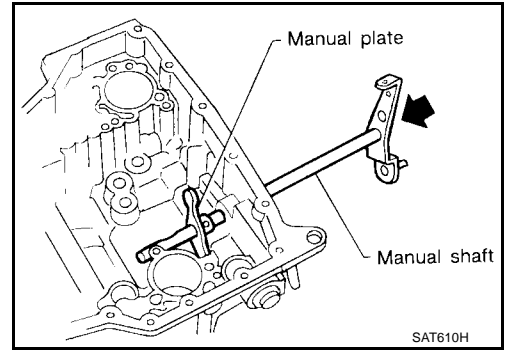
ECS005ZU



MANUAL SHAFT

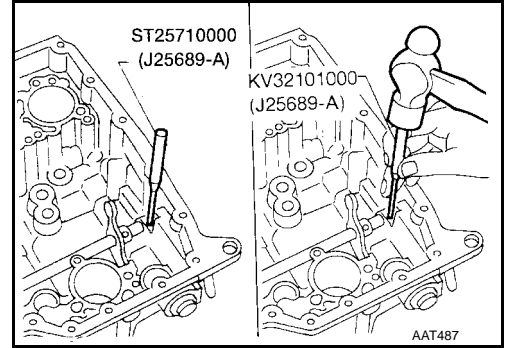
[RE4F03B]

2. Install manual shaft and manual plate.



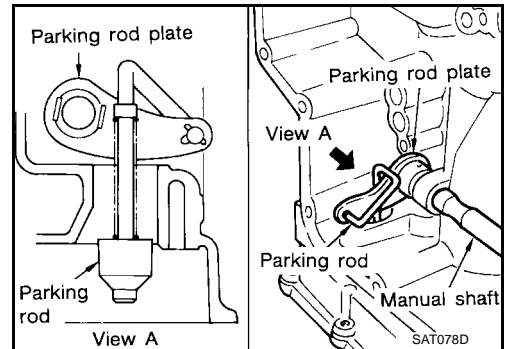
3. Align groove of manual shaft and hole of transmission case.

4. Install manual shaft retaining pin using Tool.

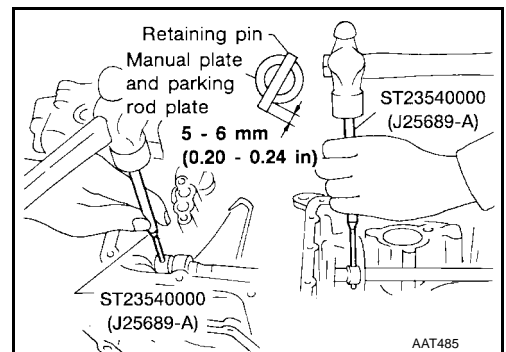


5. Install parking rod to parking rod plate.

6. Set parking rod assembly onto manual shaft.



7. Drive in manual plate retaining pin and parking rod plate retaining pin using Tool.

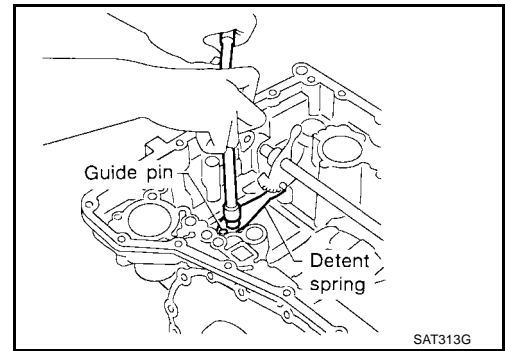


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8. Install detent spring.



: 6.4 - 7.5 N·m (0.65 - 0.76 kg·m, 56.4 - 66.0 in-lb)



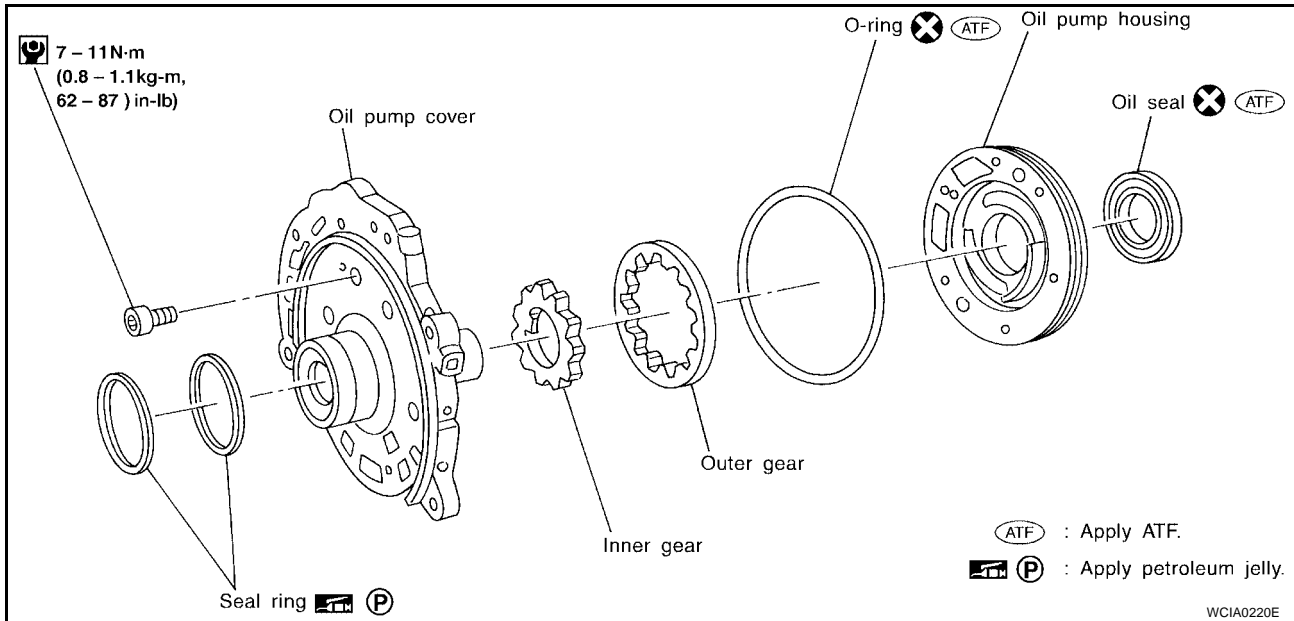
OIL PUMP

[RE4F03B]

OIL PUMP Components

PFP:15010

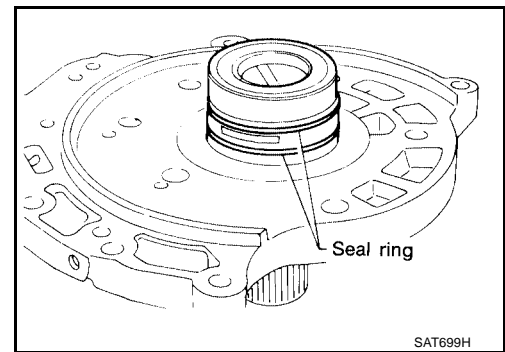
ECS005ZV



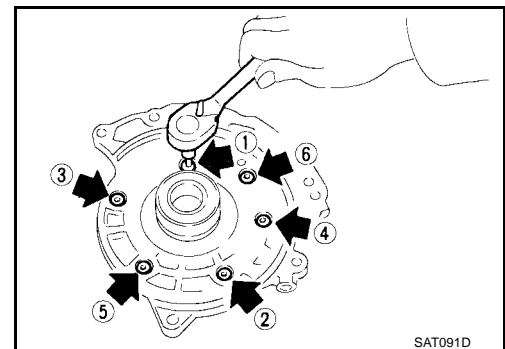
Disassembly

ECS005ZW

1. Remove seal rings.



2. Loosen bolts in numerical order and remove oil pump cover.

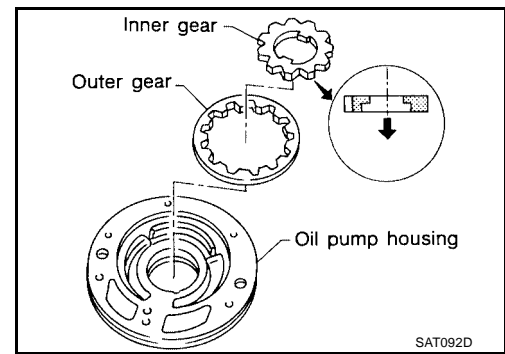


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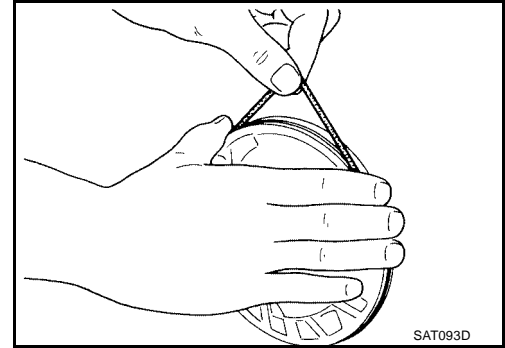
OIL PUMP

[RE4F03B]

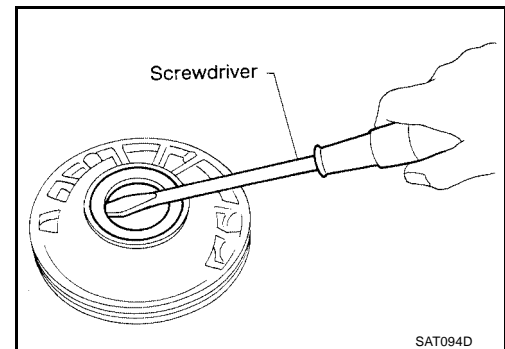
3. Remove inner and outer gear from oil pump housing.



4. Remove O-ring from oil pump housing.



5. Remove oil pump housing oil seal.



Inspection

OIL PUMP HOUSING, OIL PUMP COVER, INNER GEAR AND OUTER GEAR

- Check for wear or damage.

ECS005ZX

SIDE CLEARANCES

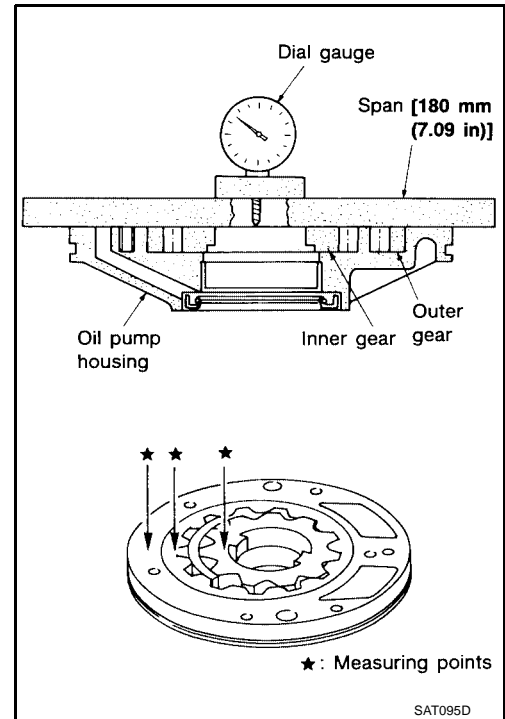
- Measure side clearance of inner and outer gears in at least four places around each outside edge. Maximum measured values should be within specified range.

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 AT-295, "SIDE CLEARANCES" .

- If clearance is more than standard, replace whole oil pump assembly except oil pump cover.

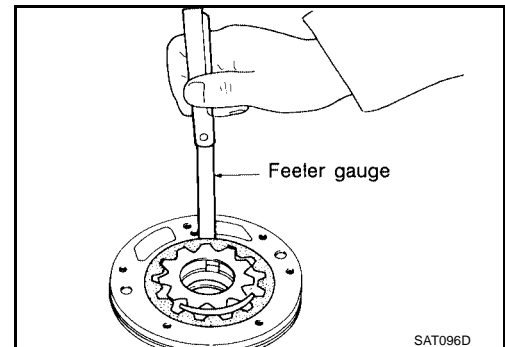


- Measure clearance between outer gear and oil pump housing.

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.



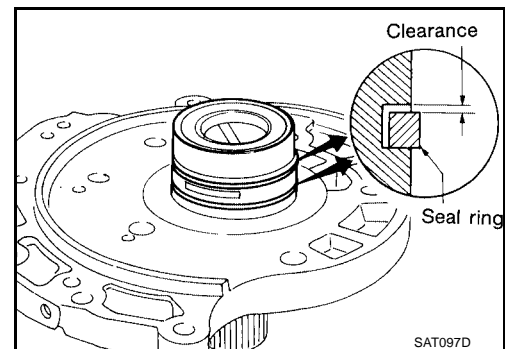
SIDE RING CLEARANCE

- 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)

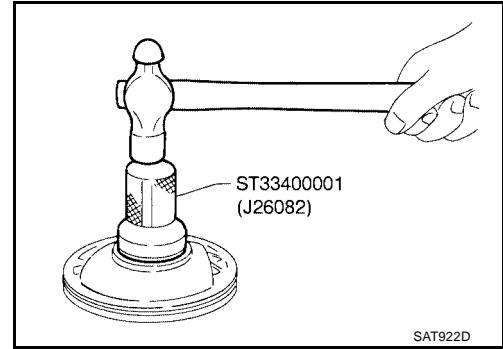
- If not within allowable limit, replace oil pump cover assembly.



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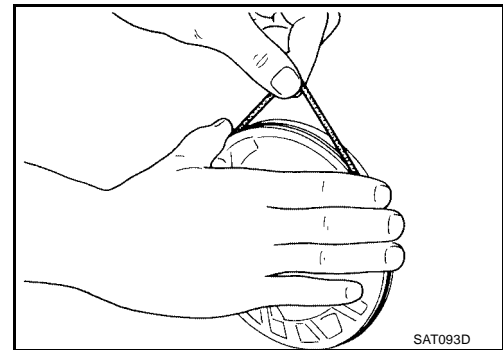
Assembly

1. Install oil seal on oil pump housing using Tool.



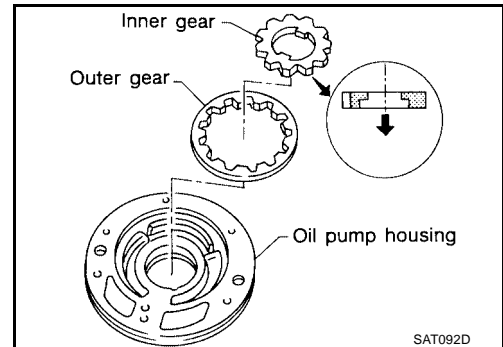
2. Install O-ring on oil pump housing.

- Apply ATF to O-ring.



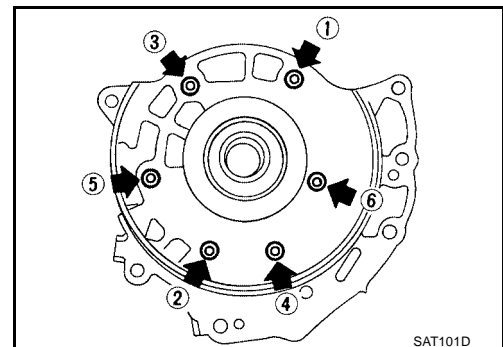
3. Install inner and outer gears on oil pump housing.

- Take care with the direction of the inner gear.



4. Install oil pump cover on oil pump housing.

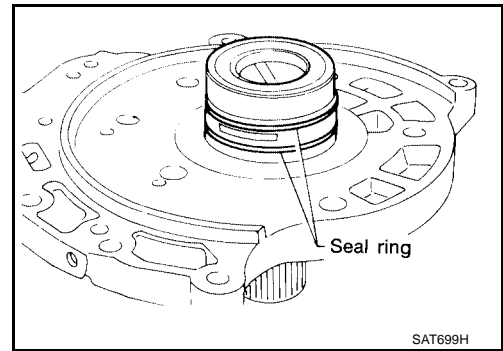
- Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.
- Tighten bolts in numerical order.



OIL PUMP

[RE4F03B]

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.



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CONTROL VALVE ASSEMBLY

[RE4F03B]

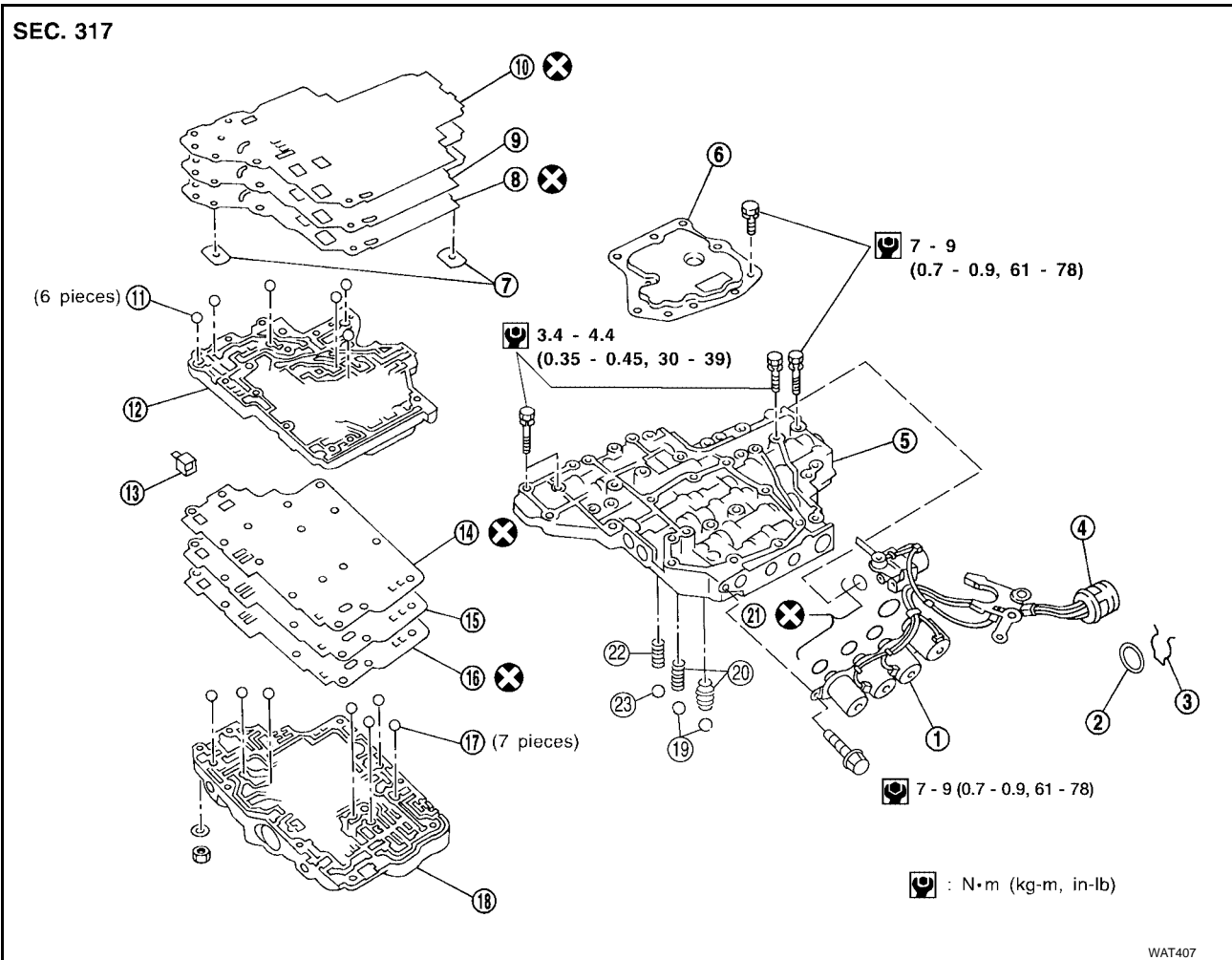
CONTROL VALVE ASSEMBLY

PF3:31705

Components

ECS005ZZ

SEC. 317



WAT407

- | | | |
|---------------------------------|------------------------------------|------------------------------|
| 1. Solenoid valve assembly | 2. O-ring | 3. Stopper ring |
| 4. Terminal body | 5. Control valve lower body | 6. Oil strainer |
| 7. Support plate | 8. Lower inter separating gasket | 9. Separating plate |
| 10. Lower separating gasket | 11. Steel ball | 12. Control valve inter body |
| 13. Pilot filter | 14. Upper inter separating gasket | 15. Separating plate |
| 16. Upper separating gasket | 17. Steel ball | 18. Control valve upper body |
| 19. Check ball | 20. Oil cooler relief valve spring | 21. O-ring |
| 22. T/C pressure holding spring | 23. Check ball | |

CONTROL VALVE ASSEMBLY


[RE4F03B]

ECS00600

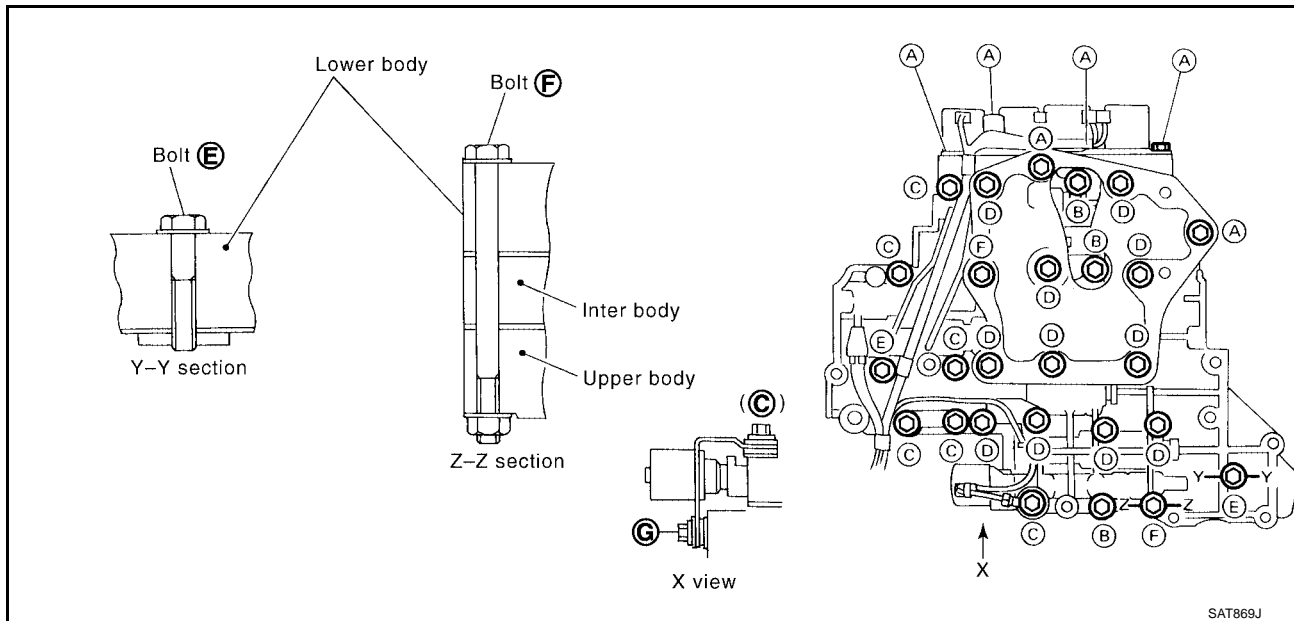
Disassembly

- Disassemble upper, inter and lower bodies.

Bolt length, number and location:

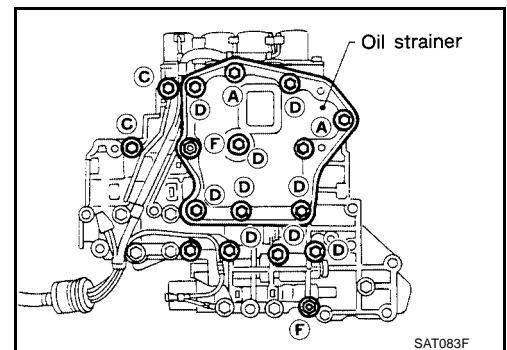
Bolt symbol	A	B	C	D	E	F	G
Bolt length "l" 	13.5 mm (0.531 in)	58.0 mm (2.283 in)	40.0 mm (1.575 in)	66.0 mm (2.598 in)	33.0 mm (1.299 in)	78.0 mm (3.071 in)	18.0 mm (0.709 in)
Number of bolts	6	3	6	11	2	2	1

F: Reamer bolt with nut



SAT869J

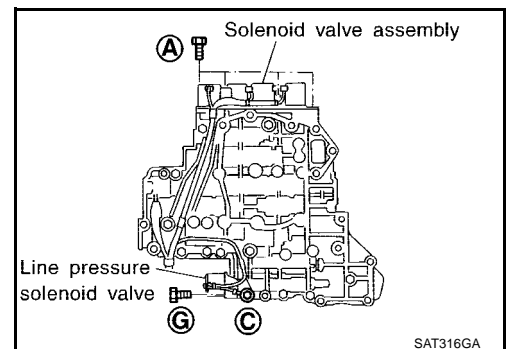
- Remove bolts A, D and F, and remove oil strainer from control valve assembly.



SAT083F

- Remove solenoid valve assembly and line pressure solenoid valve from control valve assembly.

- Be careful not to lose the line pressure solenoid valve spring.

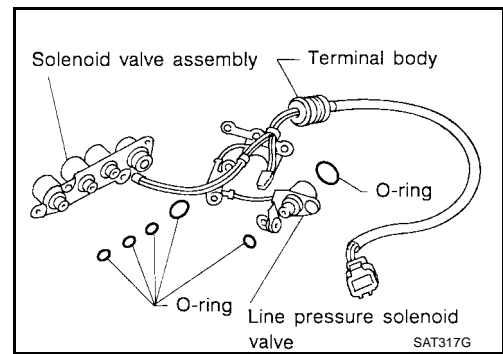


SAT316GA

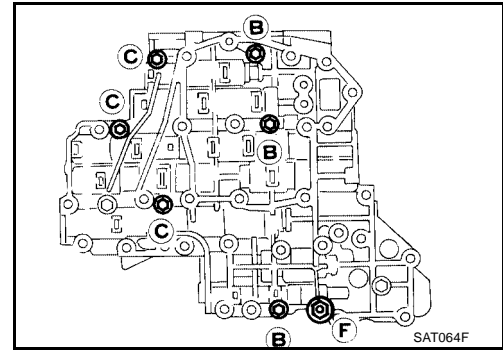
CONTROL VALVE ASSEMBLY

[RE4F03B]

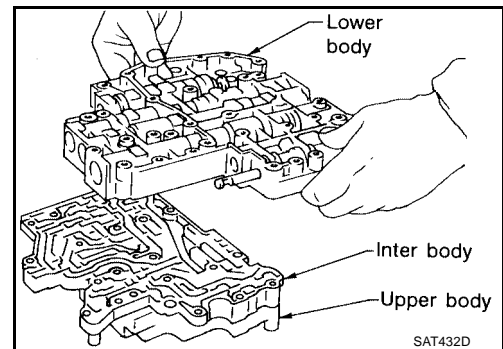
3. Remove O-rings from solenoid valves and terminal body.



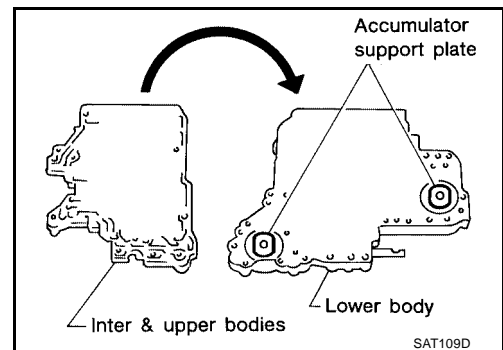
4. Place upper body face down, and remove bolts B, C and F.



5. Remove lower body from inter body.



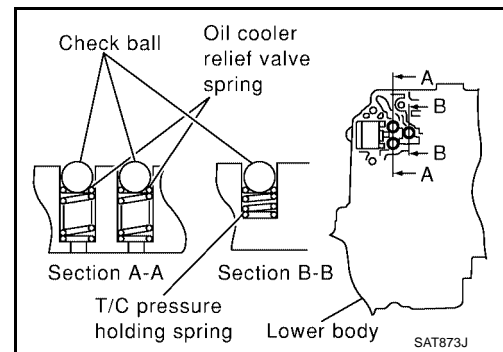
6. Turn over lower body, and accumulator support plates.



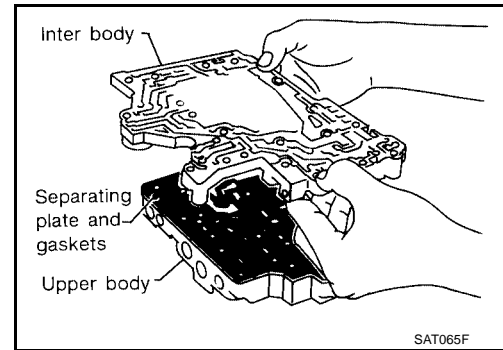
CONTROL VALVE ASSEMBLY

[RE4F03B]

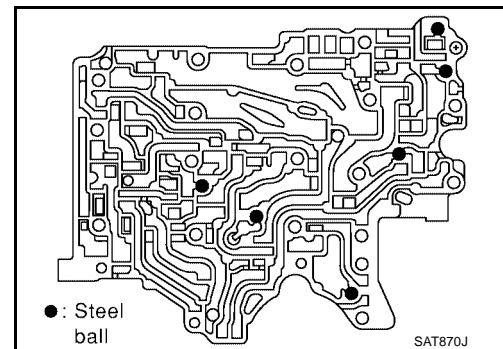
7. Remove bolts E, separating plate and separating gaskets from lower body.
8. Remove check balls, oil cooler relief valve springs and T/C pressure holding spring from lower body.
 - **Be careful not to lose steel balls and relief valve springs.**



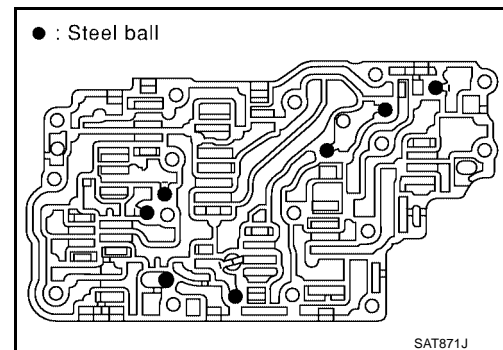
9. Remove inter body from upper body.
10. Remove pilot filter, separating plate and gaskets from upper body.



11. Check to see that steel balls are properly positioned in inter body and then remove them.
 - **Be careful not to lose steel balls.**



12. Check to see that steel balls are properly positioned in upper body and then remove them.
 - **Be careful not to lose steel balls.**



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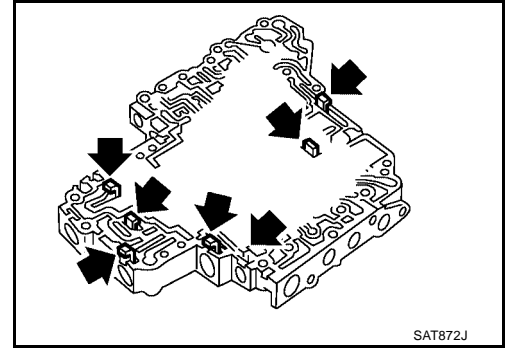
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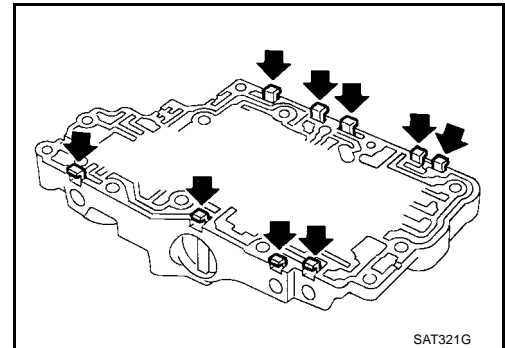
Inspection

LOWER AND UPPER BODIES

- Check to see that retainer plates are properly positioned in lower body.

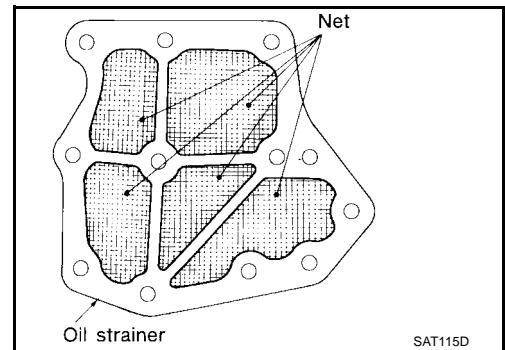


- Check to see that retainer plates are properly positioned in upper body.



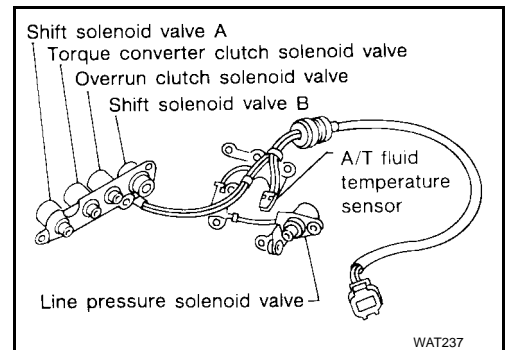
OIL STRAINER

- Check wire netting of oil strainer for damage.



SHIFT SOLENOID VALVES A AND B, LINE PRESSURE SOLENOID VALVE, TORQUE CONVERTER CLUTCH SOLENOID VALVE AND OVERRUN CLUTCH SOLENOID VALVE

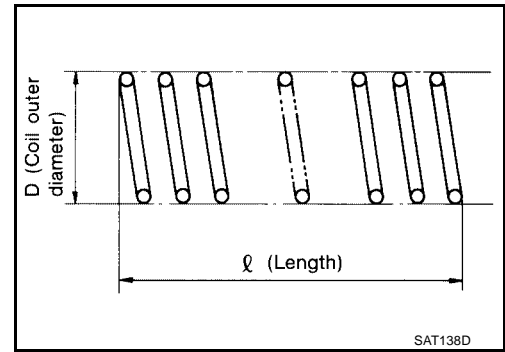
- Refer to [AT-183, "SHIFT SOLENOID VALVE A"](#) , [AT-187, "SHIFT SOLENOID VALVE B"](#) , [AT-178, "LINE PRESSURE SOLENOID VALVE"](#) , [AT-178, "LINE PRESSURE SOLENOID VALVE"](#) and [AT-197, "OVERRUN CLUTCH SOLENOID VALVE"](#)



OIL COOLER RELIEF VALVE SPRING

- Check springs for damage or deformation.
- Measure free length and outer diameter.

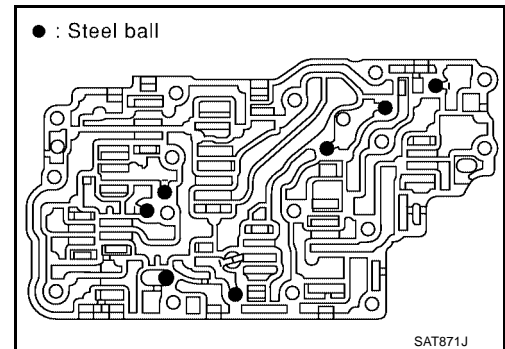
Inspection standard : Refer to [AT-389, "Clutch and Brake Return Springs"](#)



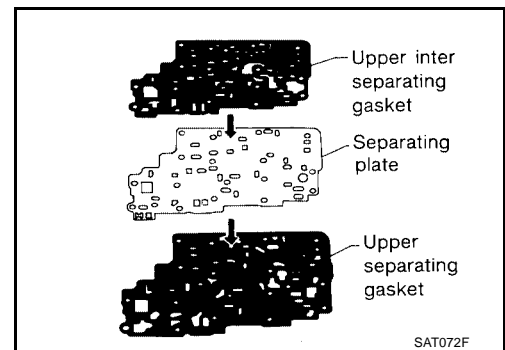
ECS00602

Assembly

1. Install upper, inter and lower body.

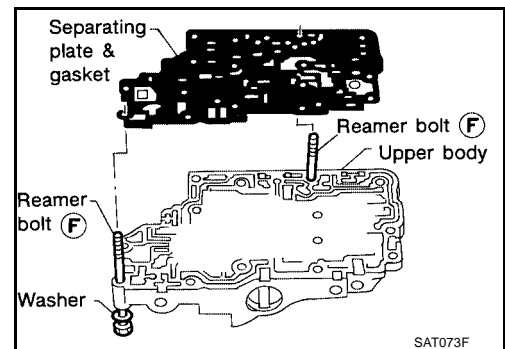


- a. Place oil circuit of upper body face up. Install steel balls in their proper positions.
- b. Install upper separating gasket, upper inter separating gasket and upper separating plate in order shown in illustration.



- **Always use new gaskets.**

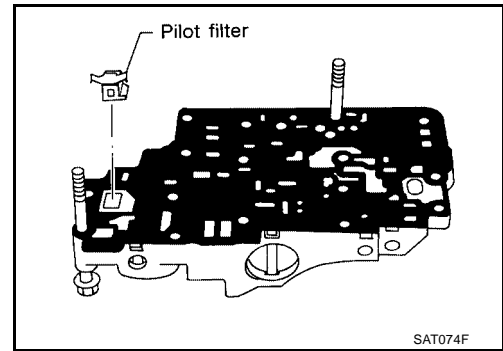
- c. Install reamer bolts **F** from bottom of upper body. Using reamer bolts as guides, install separating plate and gaskets as a set.



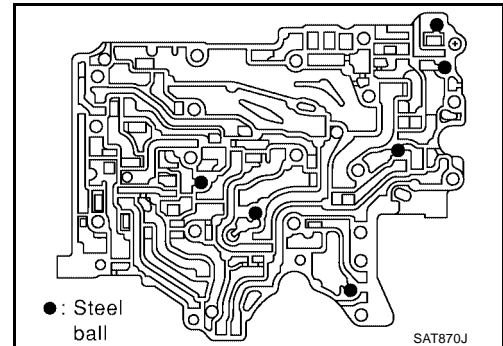
CONTROL VALVE ASSEMBLY

[RE4F03B]

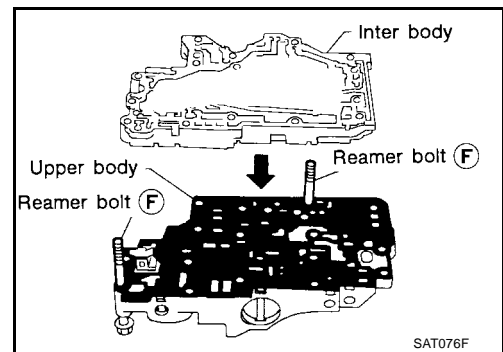
d. Install pilot filter.



e. Place inter body as shown in the illustration. Install steel balls in their proper positions.

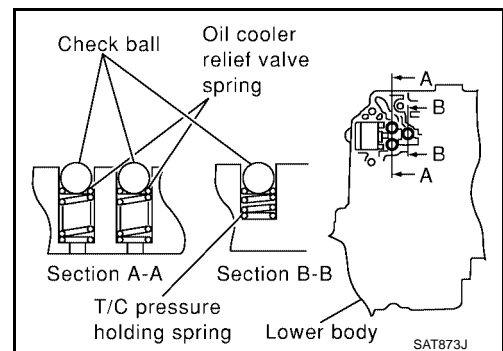


f. Install inter body on upper body using reamer bolts **F** as guides.



● **Be careful not to dislocate or drop steel balls.**

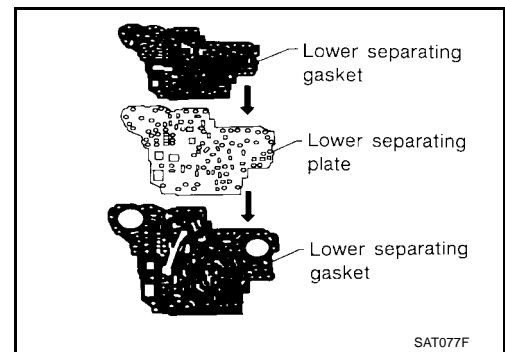
g. Install steel balls, oil cooler relief valve springs and T/C pressure holding spring in their proper positions in lower body.



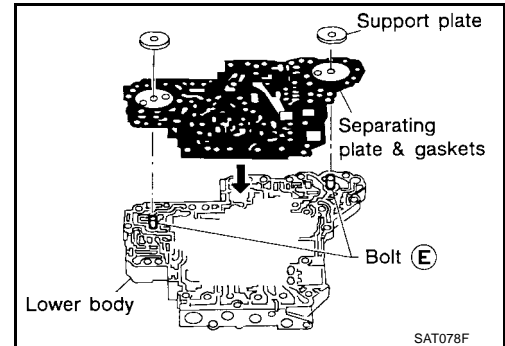
CONTROL VALVE ASSEMBLY

[RE4F03B]

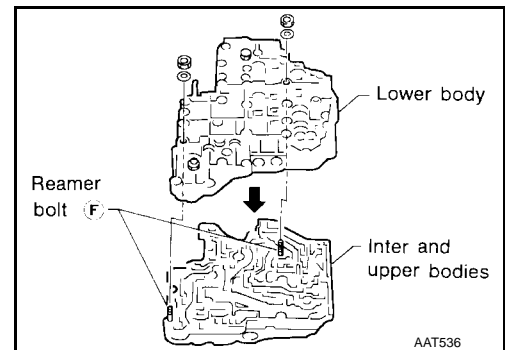
- h. Install lower separating gasket, inter separating gasket and lower separating plate in order shown in the illustration.



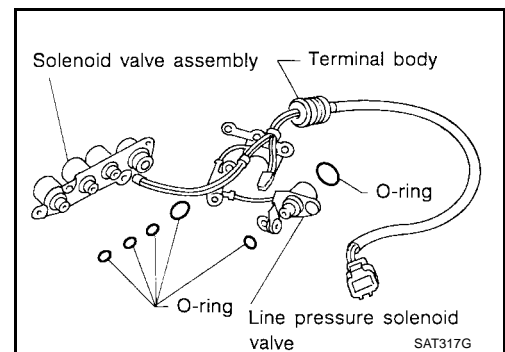
- i. Install bolts **E** from bottom of lower body. Using bolts **E** as guides, install separating plate and gaskets as a set.



- 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.



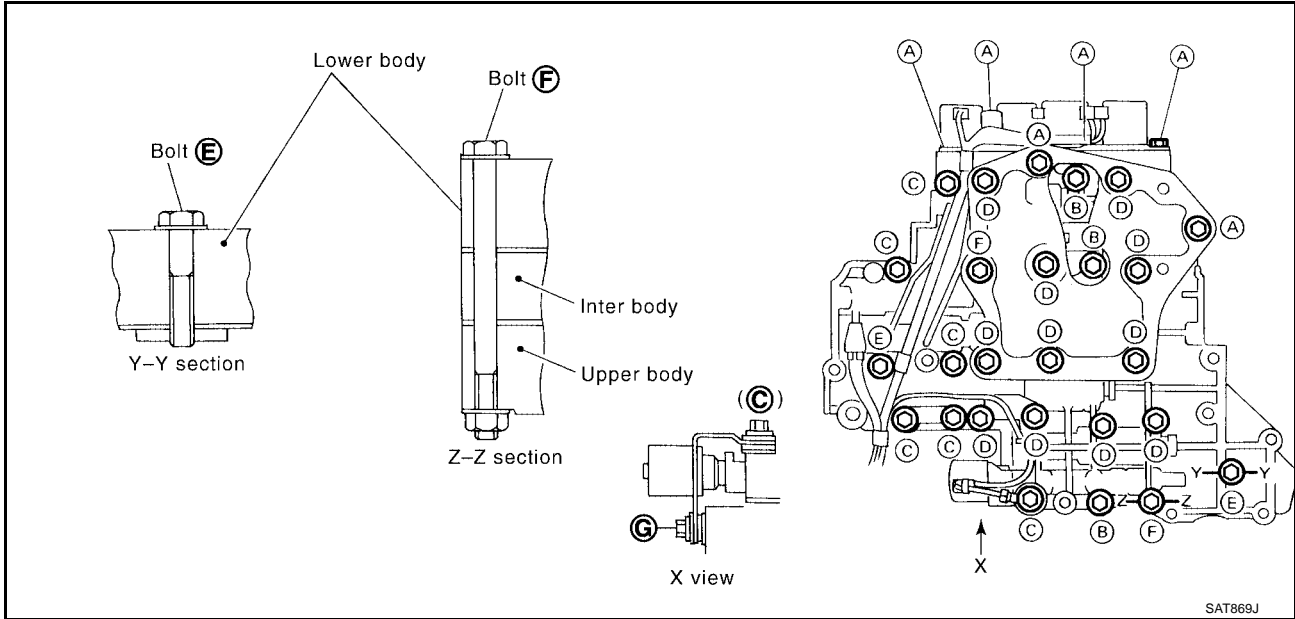
CONTROL VALVE ASSEMBLY

[RE4F03B]

Bolt length, number and location:

Bolt symbol	A	B	C	D	E	F	G
Bolt length "l" 	13.5 mm (0.531 in)	58.0 mm (2.283 in)	44.0 mm (1.732 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

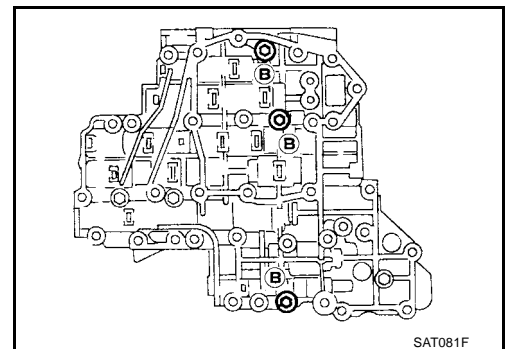
F: Reamer bolt with nut



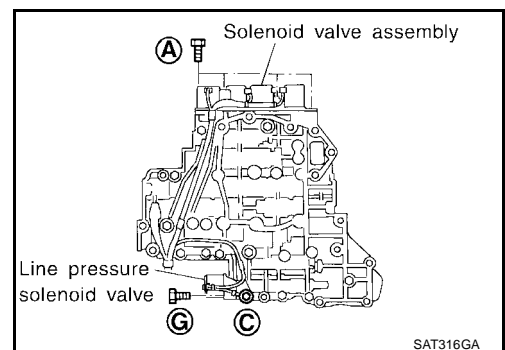
- a. Install and tighten bolts **B** to specified torque.



: 7 - 9 N·m (0.7 - 0.9 kg·m, 61 - 78 in·lb)



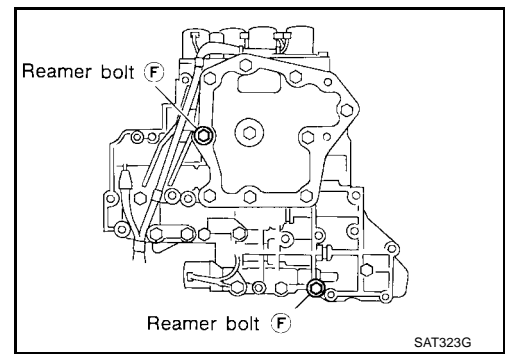
- b. Install solenoid valve assembly and line pressure solenoid valve to lower body.




CONTROL VALVE ASSEMBLY

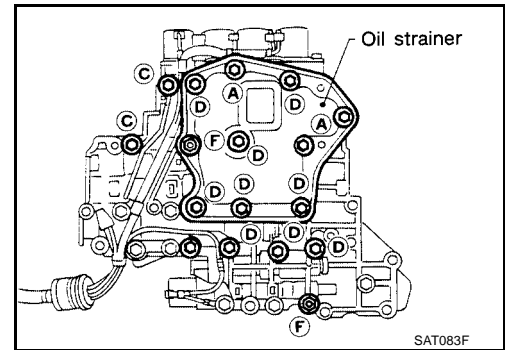
[RE4F03B]

- c. Remove reamer bolts **F** and set oil strainer on control valve assembly.




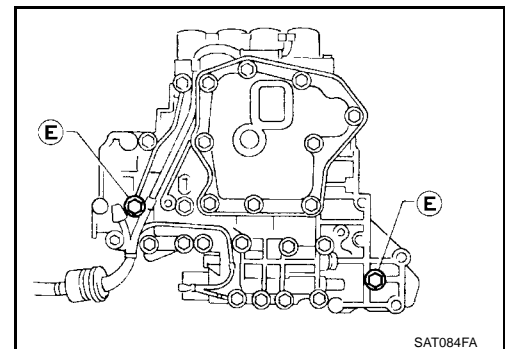
- d. Reinstall reamer bolts **F** from lower body side.
e. Tighten bolts **A**, **C**, **D** and **F** to specified torque.

 : 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)



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CONTROL VALVE UPPER BODY

[RE4F03B]

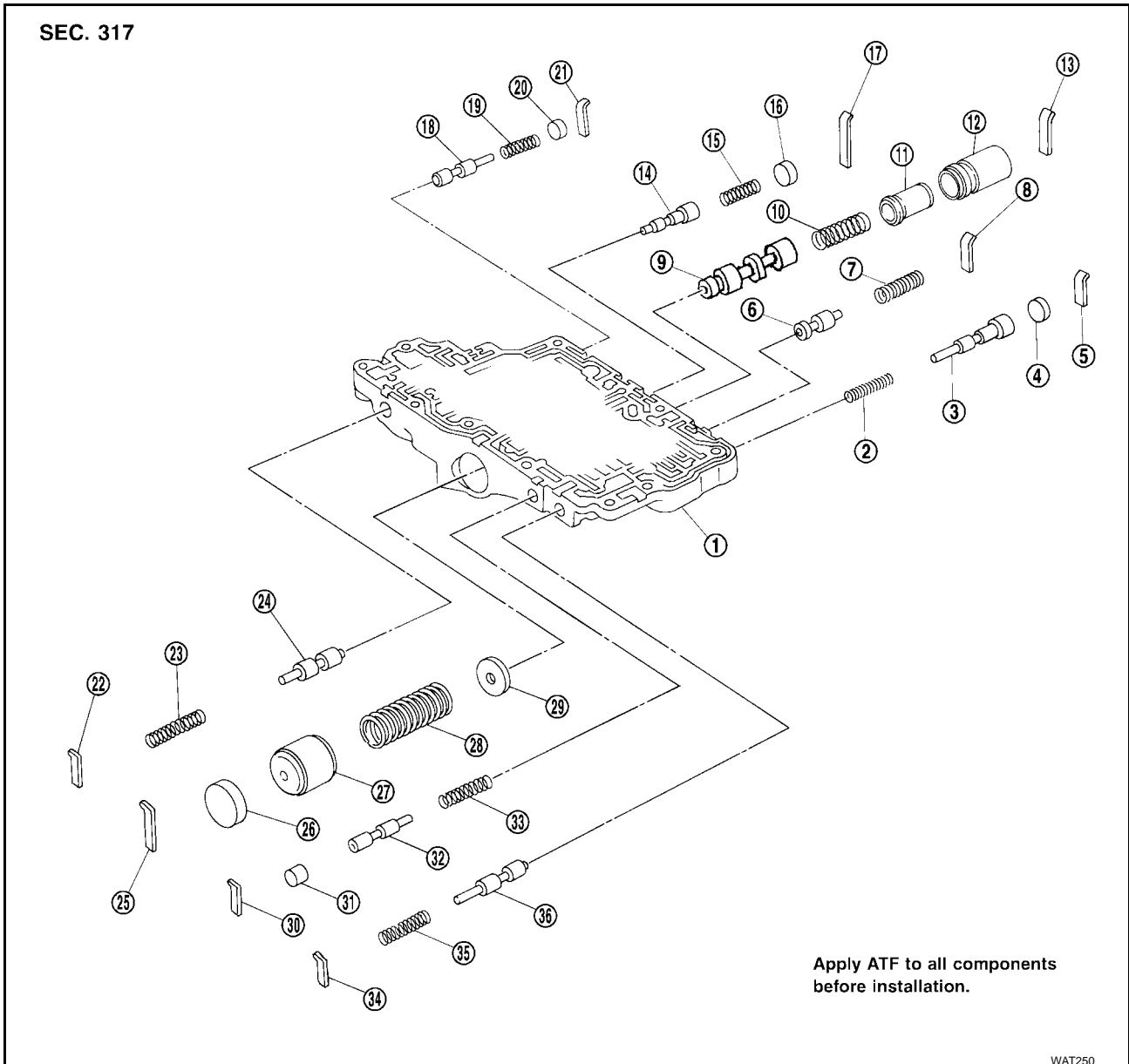
CONTROL VALVE UPPER BODY

PF3:31711

Components

ECS00603

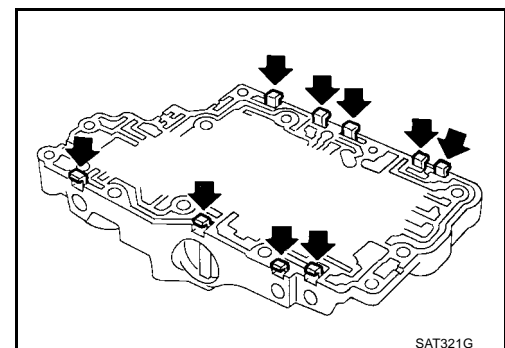
Numbers preceding valve springs correspond with those shown in [AT-387, "CONTROL VALVE AND PLUG RETURN SPRINGS"](#).



Disassembly

ECS00604

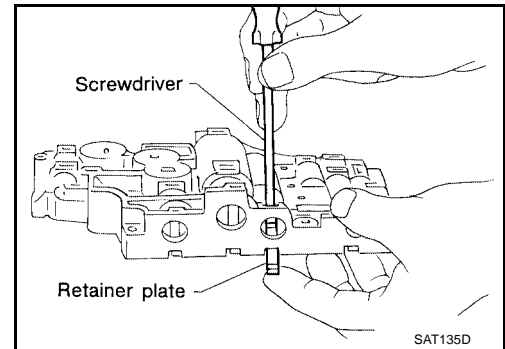
1. Remove valves at retainer plates.
 - Do not use a magnetic "hand".



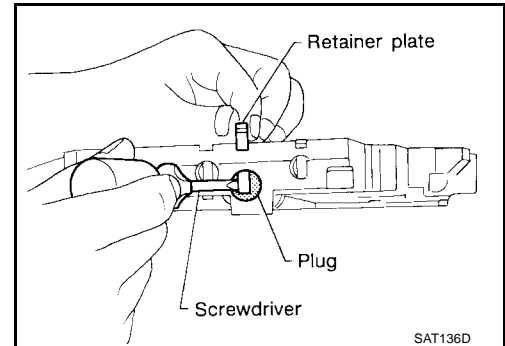
CONTROL VALVE UPPER BODY

[RE4F03B]

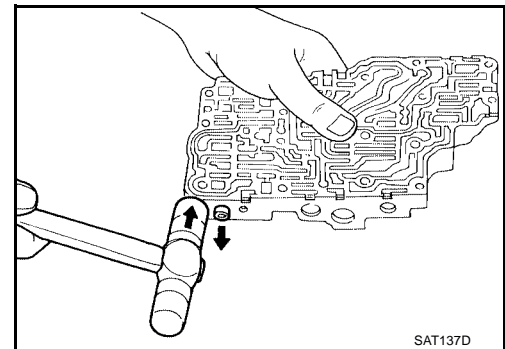
- a. Use a screwdriver to remove retainer plates.



- 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.



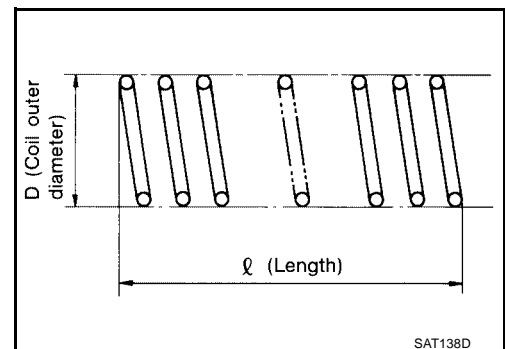
ECS00605

Inspection VALVE SPRING

- Measure free length and outer diameter of each valve spring. Also check for damage or deformation.

Inspection standard : Refer to [AT-387, "CONTROL VALVE AND PLUG RETURN SPRINGS"](#) .

- Replace valve springs if deformed or fatigued.



CONTROL VALVES

- Check sliding surfaces of valves, sleeves and plugs.

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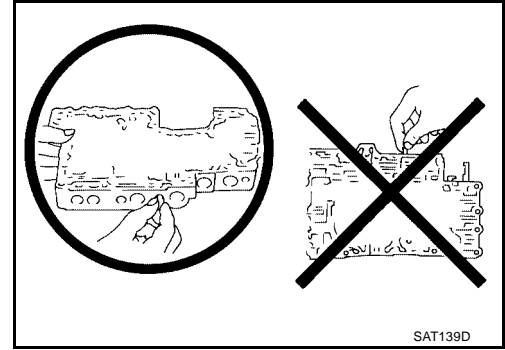
CONTROL VALVE UPPER BODY

[RE4F03B]

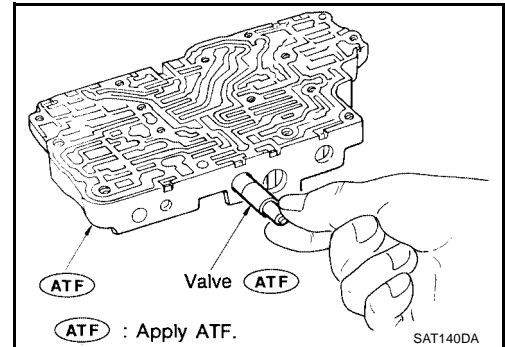
ECS00606

Assembly

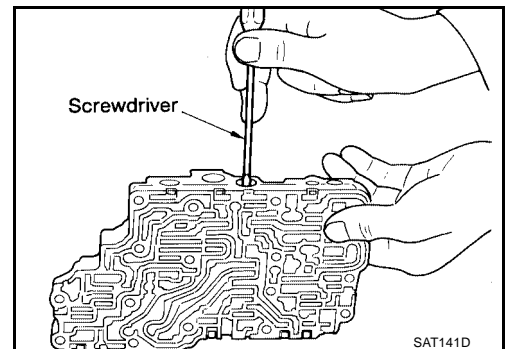
- Lay control valve body down when installing valves. Do not stand the control valve body upright.



1. Lubricate the control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.

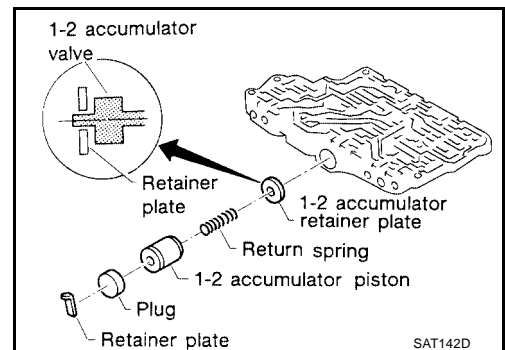


- Be careful not to scratch or damage valve body.
- Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.



1-2 ACCUMULATOR VALVE

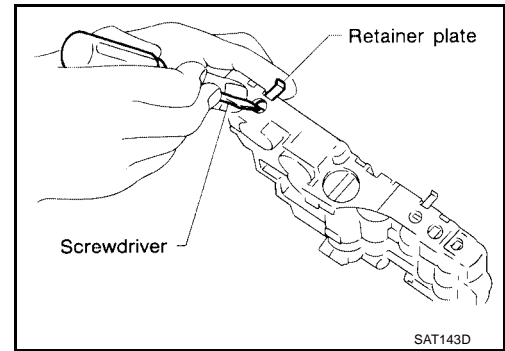
- Install 1-2 accumulator valve. Align 1-2 accumulator retainer plate from opposite side of control valve body.
- Install return spring, 1-2 accumulator piston and plug.



CONTROL VALVE UPPER BODY

[RE4F03B]

1. Install retainer plates.
 - Install retainer plate while pushing plug or return spring.

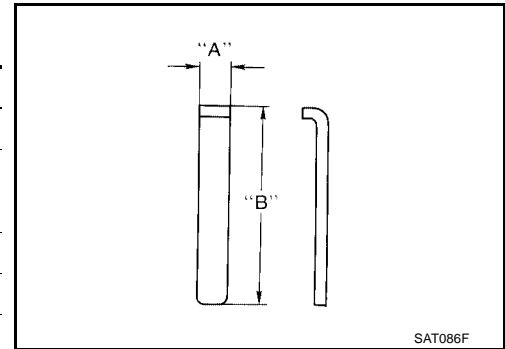


RETAINER PLATE (FOR CONTROL VALVE UPPER BODY)

Refer to [AT-308, "CONTROL VALVE UPPER BODY"](#) .

Unit: mm (in)

Name of valve and piston	No.	Width A	Length B
Pilot valve	22	6.0 (0.236)	21.5 (0.846)
1-2 accumulator valve	17		40.5 (1.594)
1-2 accumulator piston	25		21.5 (0.846)
1st reducing valve	30		24.0 (0.945)
Overrun clutch reducing valve	5		21.5 (0.846)
Torque converter relief valve	8		28.0 (1.102)
Torque converter clutch control valve	13		21.5 (0.846)
3-2 timing valve	34		24.0 (0.945)
Cooler check valve	21		



- Install proper retainer plates.

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CONTROL VALVE LOWER BODY

[RE4F03B]

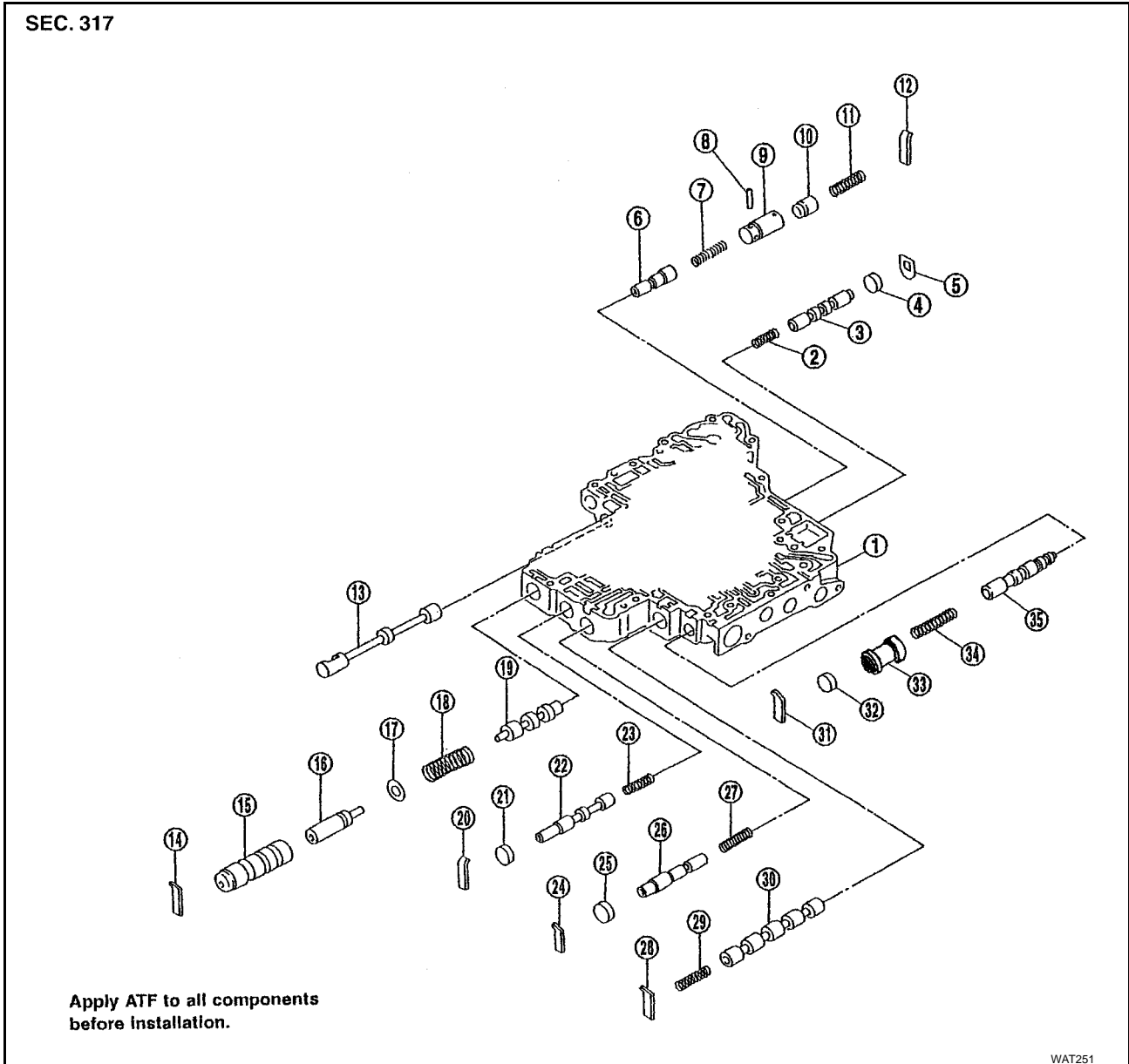
CONTROL VALVE LOWER BODY

PF3:31713

Components

ECS00607

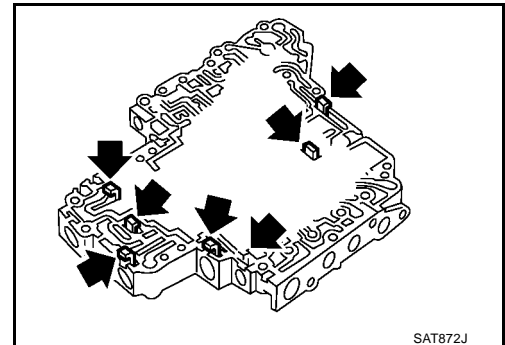
Numbers preceding valve springs correspond with those shown in [AT-387, "CONTROL VALVE AND PLUG RETURN SPRINGS"](#).



Disassembly

ECS00608

Remove valves at retainer plate.
For removal procedures, refer to [AT-312, "Disassembly"](#).



CONTROL VALVE LOWER BODY

[RE4F03B]

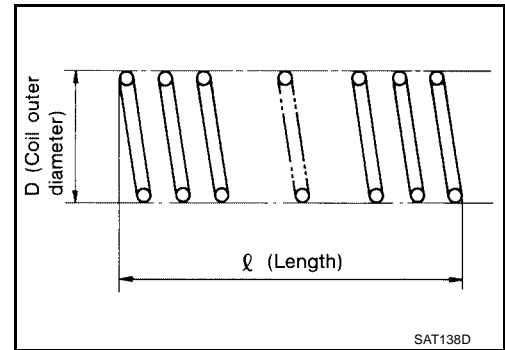
ECS00609

Inspection VALVE SPRINGS

- Check each valve spring for damage or deformation. Also measure free length and outer diameter.

Inspection standard : Refer to [AT-387, "CONTROL VALVE AND PLUG RETURN SPRINGS"](#) .

- Replace valve springs if deformed or fatigued.



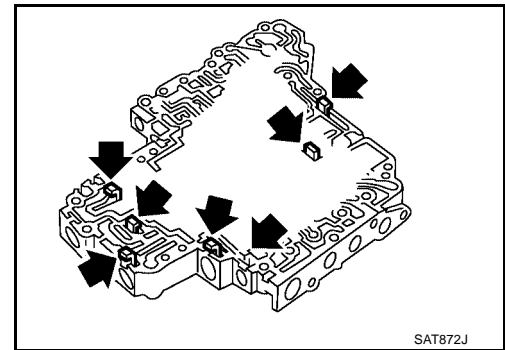
CONTROL VALVES

- Check sliding surfaces of control valves, sleeves and plugs for damage.

Assembly

- Install control valves. For installation procedures, refer to [AT-313, "Assembly"](#) .

ECS0060A

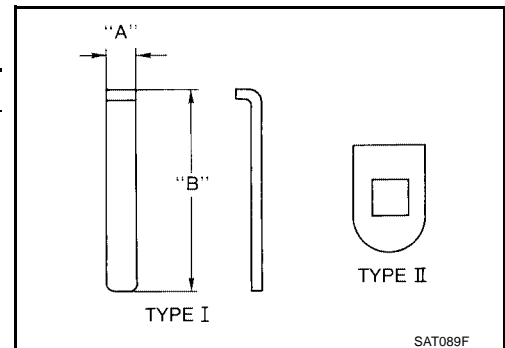


RETAINER PLATE (FOR CONTROL VALVE LOWER BODY)

Refer to [AT-312, "CONTROL VALVE LOWER BODY"](#) .

Unit: mm (in)

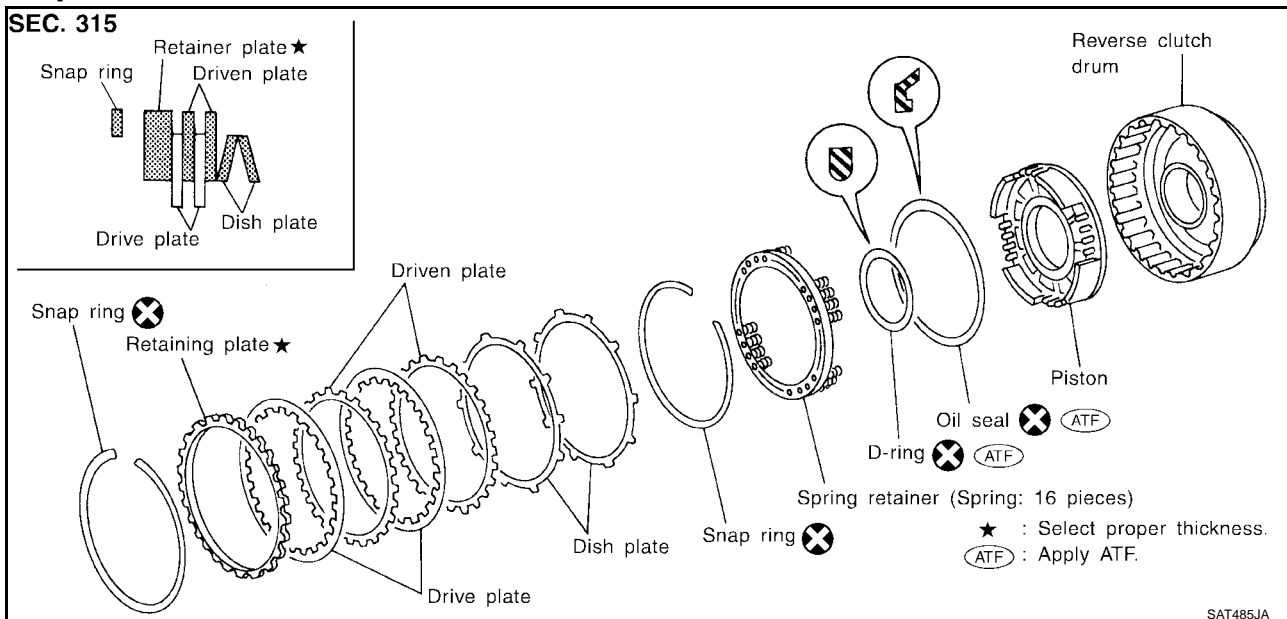
Name of control valve	No.	Width A	Length B	Type
Pressure regulator valve	14	6.0 (0.236)	28.0 (1.102)	I
Accumulator control valve	24			
Shift valve A	28			
Overrun clutch control valve	20			
Pressure modifier valve	12			
Shuttle control valve	31	—	—	II
Shift valve B	5			



- Install proper retainer plates.

REVERSE CLUTCH

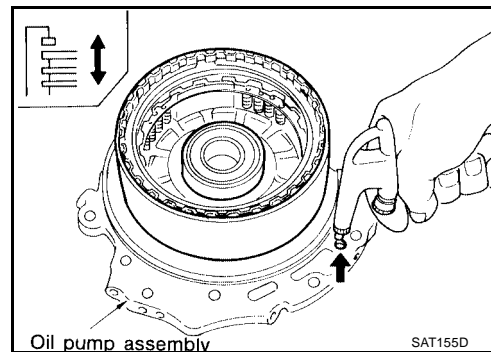
Components



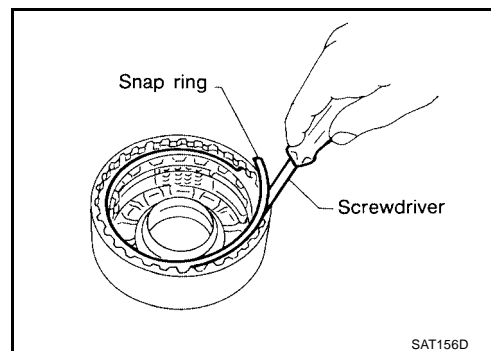
SAT485JA

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.
2. Remove snap ring.
 - **Do not expand snap ring excessively.**
3. Remove drive plates, driven plates, retaining plate, and dish plates.



SAT155D

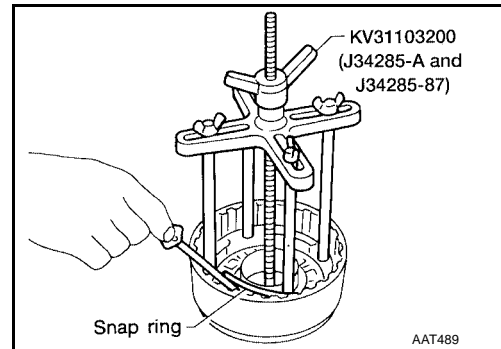


SAT156D

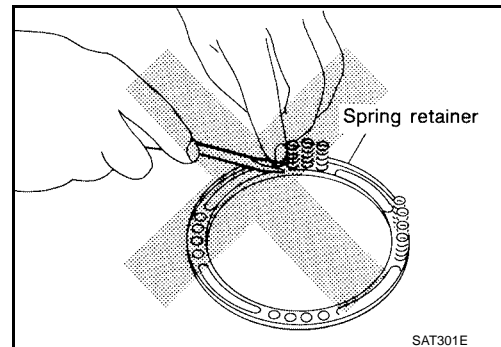
REVERSE CLUTCH

[RE4F03B]

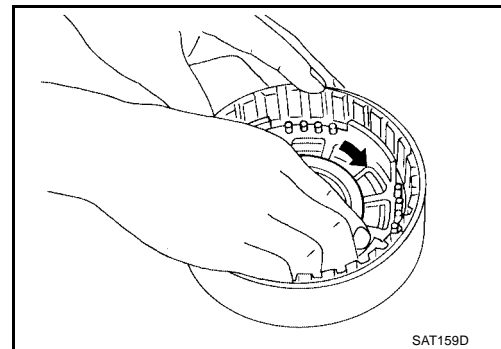
4. Set Tool on spring retainer and remove snap ring from reverse clutch drum while compressing return springs.
 - **Set Tool directly above springs.**
 - **Do not expand snap ring excessively.**



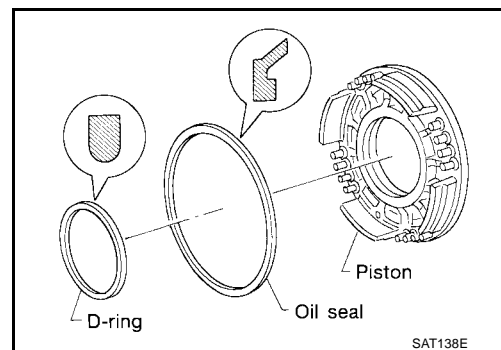
5. Remove spring retainer and return springs.
 - **Do not remove return springs from spring retainer.**



6. Remove piston from reverse clutch drum by turning it.



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.
- Replace if necessary.
- **When replacing spring retainer and return springs, replace them as a set.**

ECS0060D

REVERSE CLUTCH DRIVE PLATES

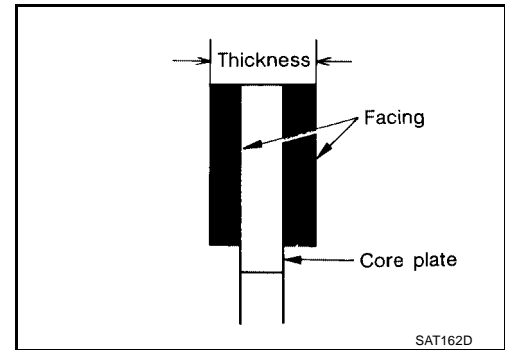
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate

Standard value : 2.0 mm (0.079 in)

Wear limit : 1.8 mm (0.071 in)

- If not within wear limit, replace.

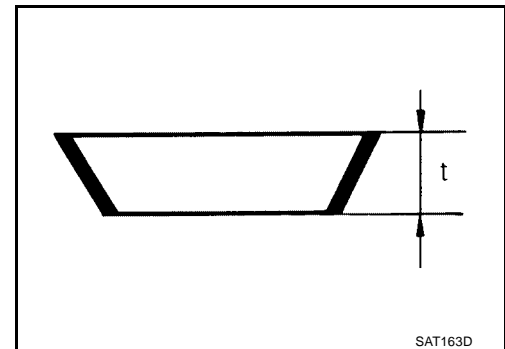


REVERSE CLUTCH DISH PLATES

- Check for deformation or damage.
- Measure thickness of dish plate.

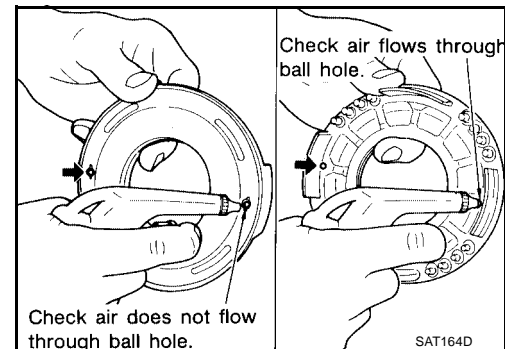
Thickness of dish plate : 2.8 mm (0.110 in)
"t"

- If deformed or fatigued, replace.



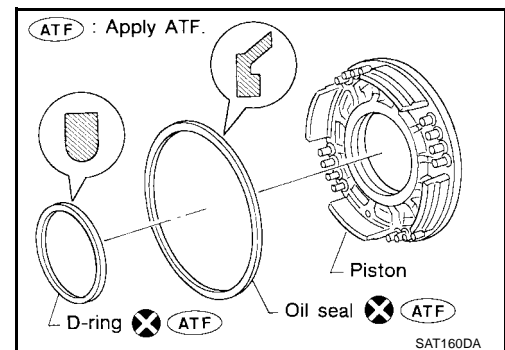
REVERSE CLUTCH PISTON

- 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.



Assembly

1. Install D-ring and oil seal on piston.
 - Take care with the direction of the oil seal.
 - Apply ATF to both parts.

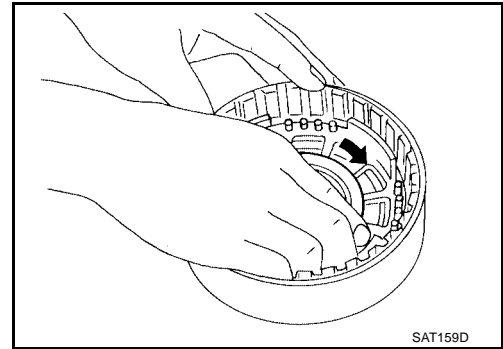


ECS0060E

REVERSE CLUTCH

[RE4F03B]

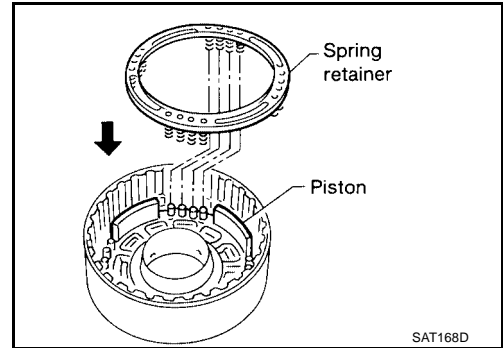
2. Install piston assembly by turning it slowly.
 - Apply ATF to inner surface of drum.



3. Install return springs and spring retainer on piston.

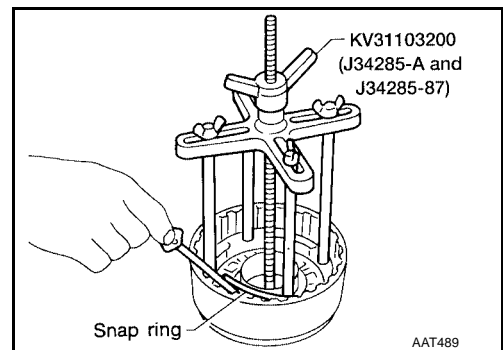
Return spring

: Refer to [AT-389, "Clutch and Brake Return Springs"](#) .

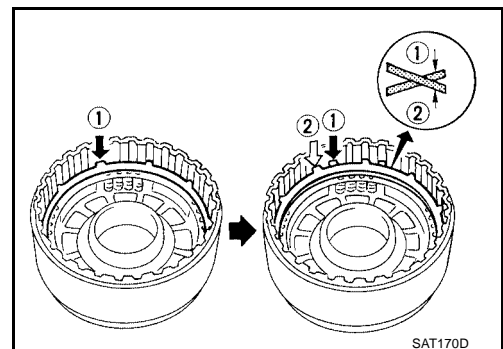


4. Set Tool on spring retainer and install snap ring while compressing return springs.

- **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.**

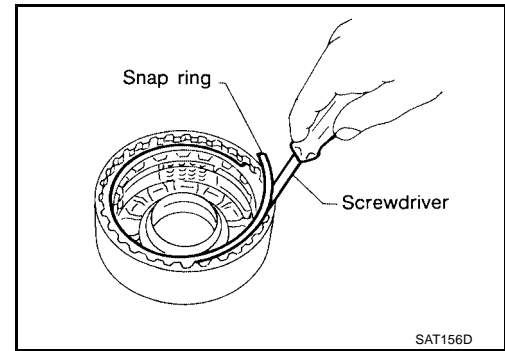


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REVERSE CLUTCH

[RE4F03B]

6. Install snap ring.
- Do not expand snap ring excessively.



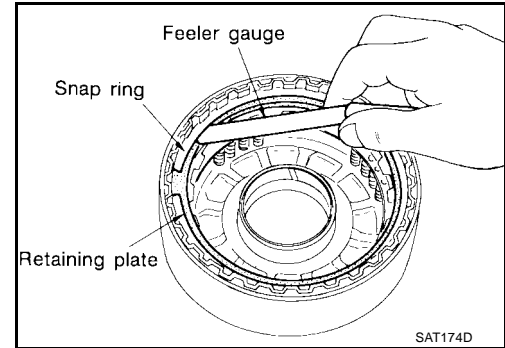
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

Specified clearance

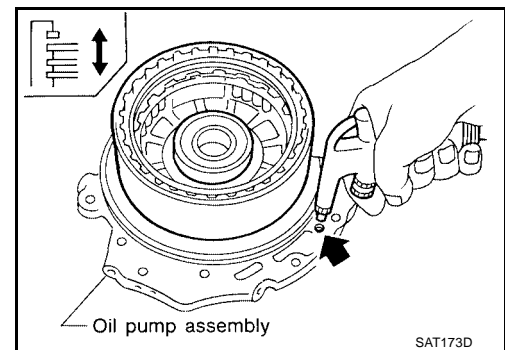
Standard : 0.5 - 0.8 mm (0.020 - 0.031 in)

Allowable limit : 1.2 mm (0.047 in)

Retaining plate : Refer to [AT-387, "REVERSE CLUTCH"](#)



8. Check operation of reverse clutch.
Refer to [AT-314, "Components"](#) .

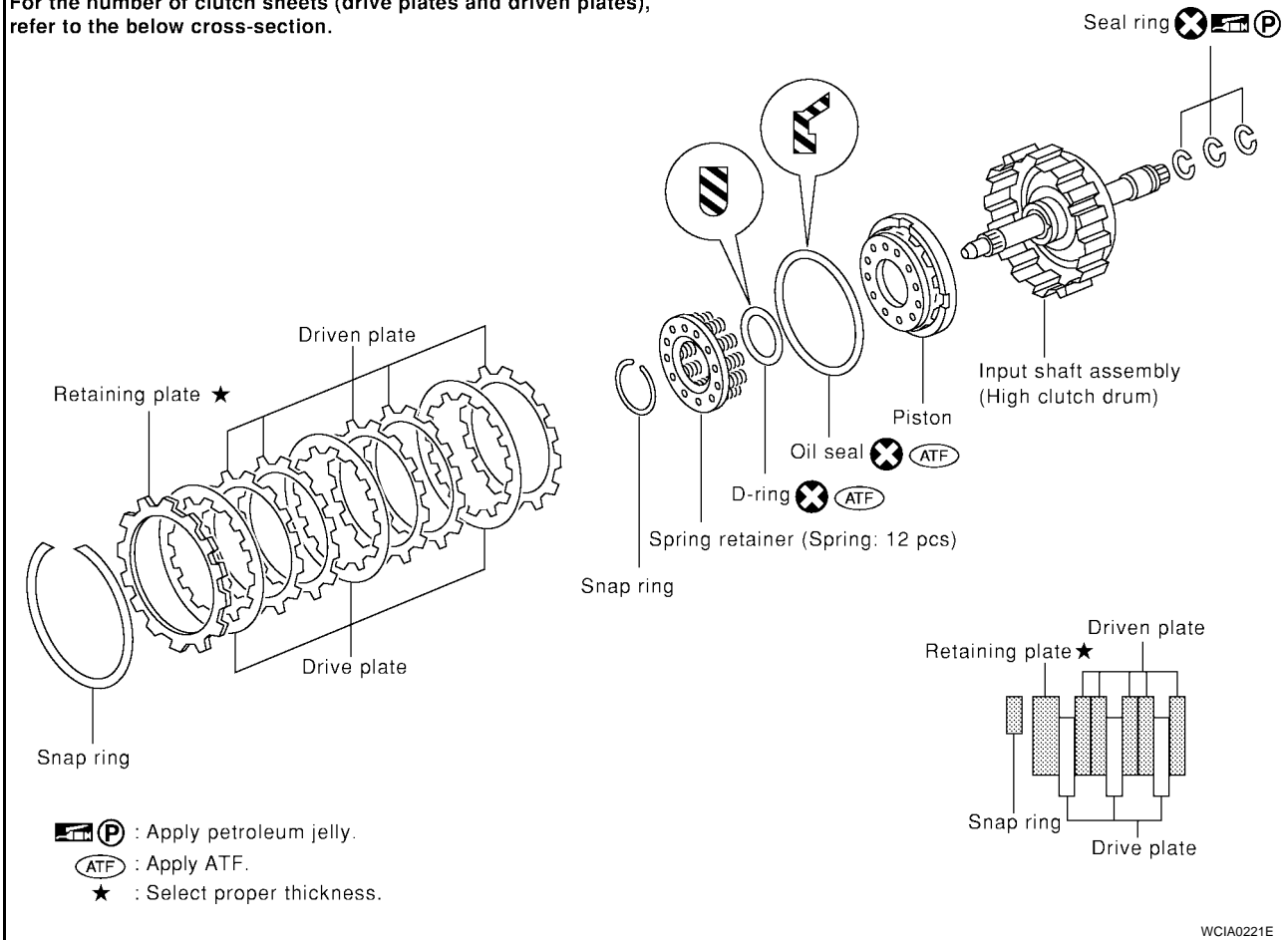


HIGH CLUTCH

Components

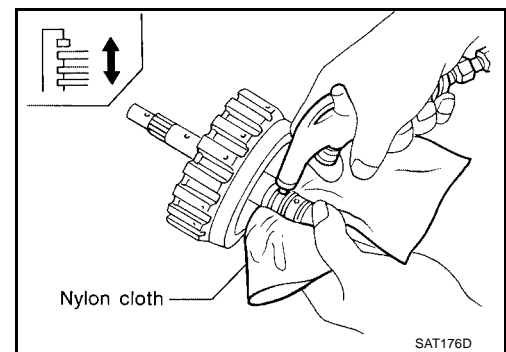
SEC. 315

For the number of clutch sheets (drive plates and driven plates), refer to the below cross-section.



Disassembly

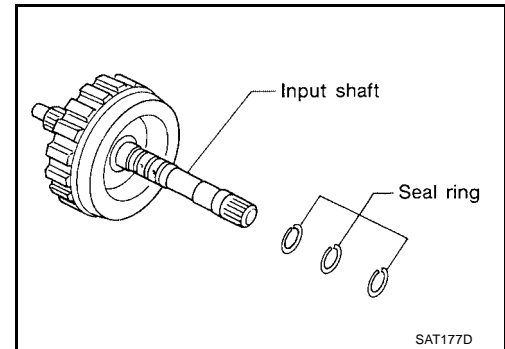
1. Check operation of high clutch.
 - a. Apply compressed air to oil hole of input shaft.
 - Stop up a hole on opposite side of input shaft.
 - b. Check to see that retaining plate moves to snap ring.
 - c. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.



HIGH CLUTCH

[RE4F03B]

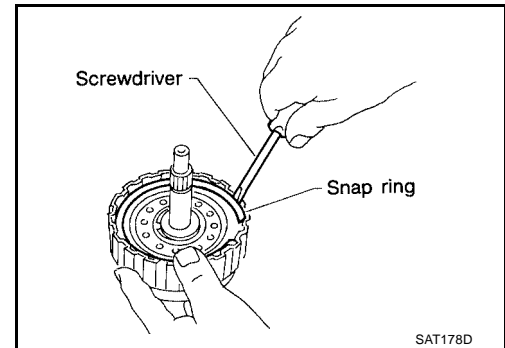
2. Remove seal rings from input shaft.



3. Remove snap ring.

- Do not expand snap ring excessively.

4. Remove drive plates, driven plates and retaining plate.



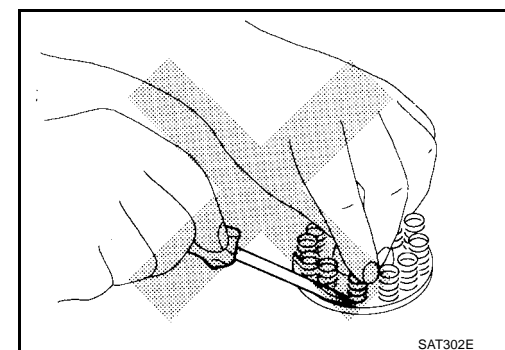
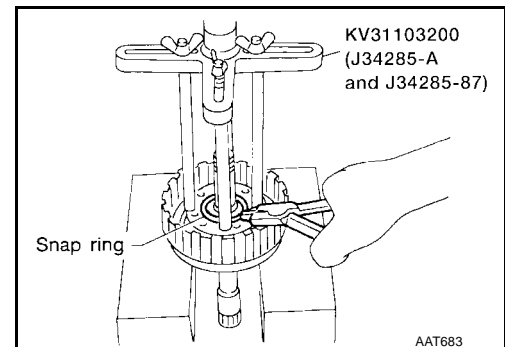
5. Set Tool on spring retainer and remove snap ring from high clutch drum while compressing return springs.

- Set Tool directly above springs.

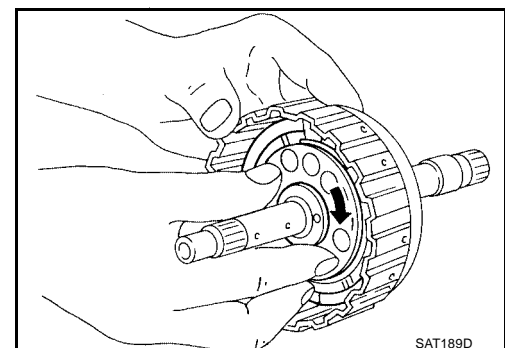
- Do not expand snap ring excessively.

6. Remove spring retainer and return springs.

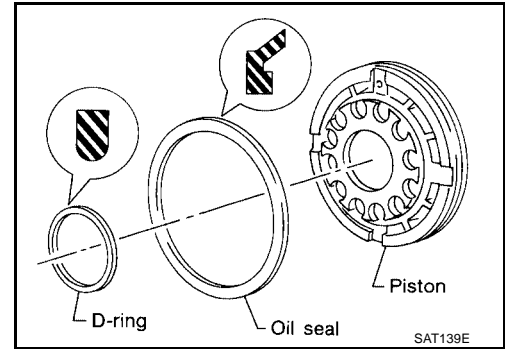
- Do not remove return spring from spring retainer.



7. Remove piston from high clutch drum by turning it.



- Remove D-ring and oil seal from piston.



ECS0060H

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.**

HIGH CLUTCH DRIVE PLATES

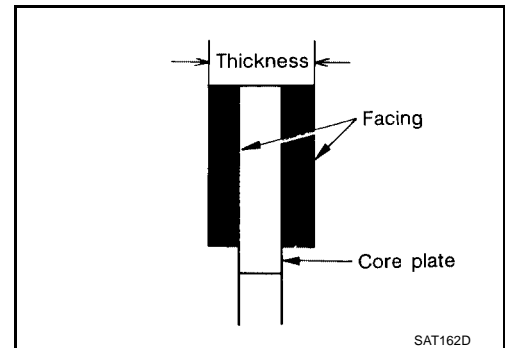
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate

Standard value : 2.0 mm (0.079 in)

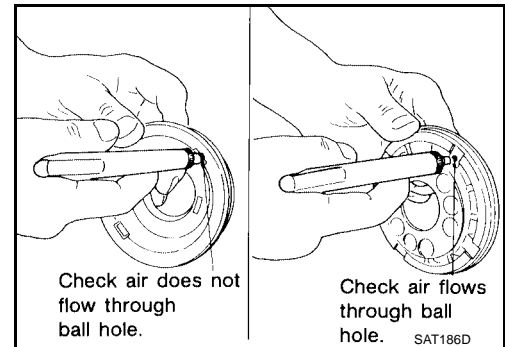
Wear limit : 1.8 mm (0.071 in)

- If not within wear limit, replace.



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.



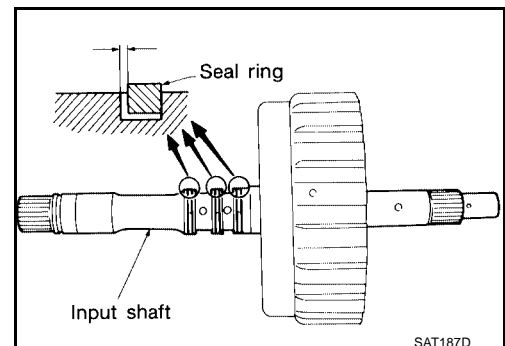
SEAL RING CLEARANCE

- 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)

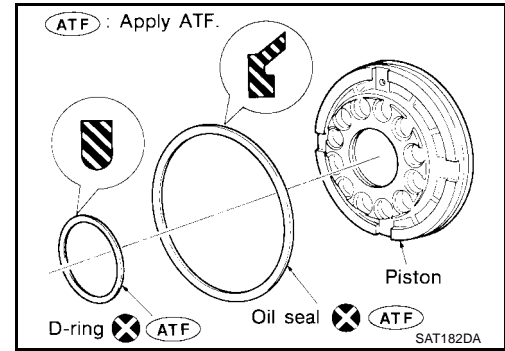
Allowable limit : 0.23 mm (0.0091 in)

- If not within wear limit, replace input shaft assembly.

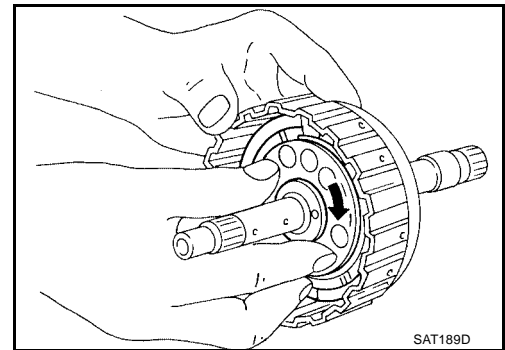


Assembly

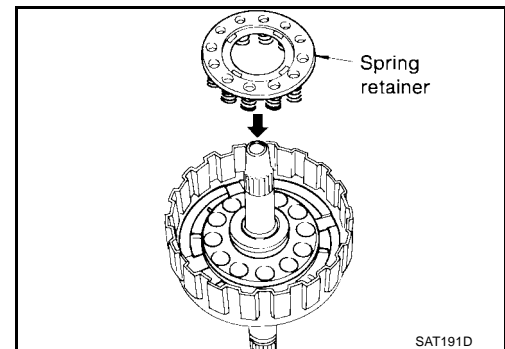
1. Install D-ring and oil seal on piston.
 - Take care with the direction of the oil seal.
 - Apply ATF to both parts.



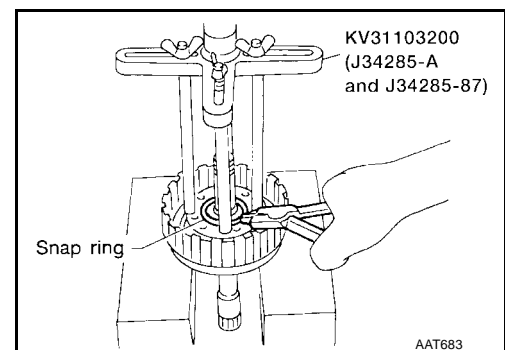
2. Install piston assembly by turning it slowly.
 - Apply ATF to inner surface of drum.



3. Install return springs and spring retainer on piston.
 - Return spring** : Refer to [AT-389, "Clutch and Brake Return Springs"](#) .



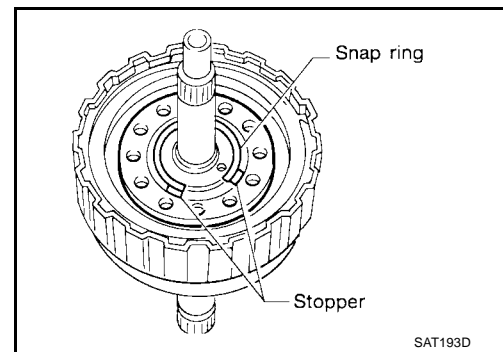
4. Set Tool on spring retainer and install snap ring while compressing return springs.
 - Set Tool directly above return springs.
 - Do not expand snap ring excessively.



HIGH CLUTCH

[RE4F03B]

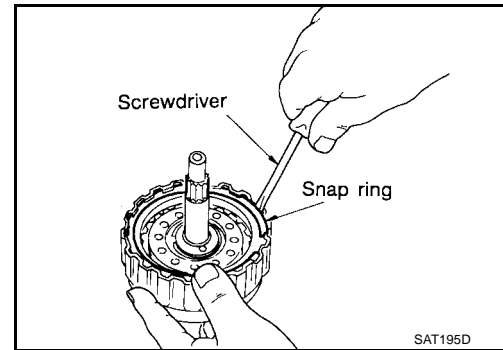
- Do not align snap ring gap with spring retainer stopper.



5. Install drive plates, driven plates and retaining plate.
Take care with the order and direction of plates.

6. Install snap ring.

- Do not expand snap ring excessively.



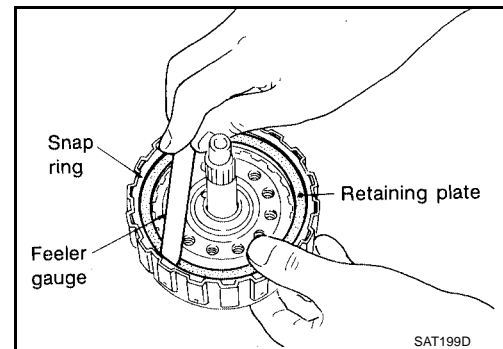
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

Specified clearance

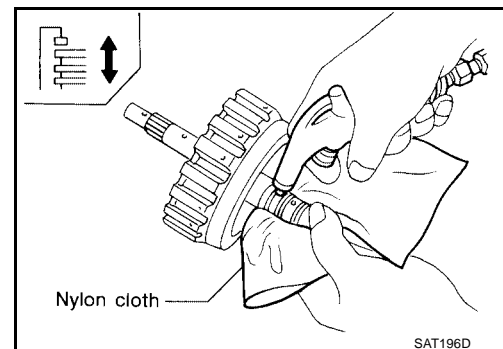
Standard : 1.4 - 1.8 mm (0.055 - 0.071 in)

Allowable limit : 2.4 mm (0.094 in)

Retaining plate : Refer to [AT-388, "HIGH CLUTCH"](#) .



8. Check operation of high clutch.
Refer to [AT-319, "HIGH CLUTCH"](#) .

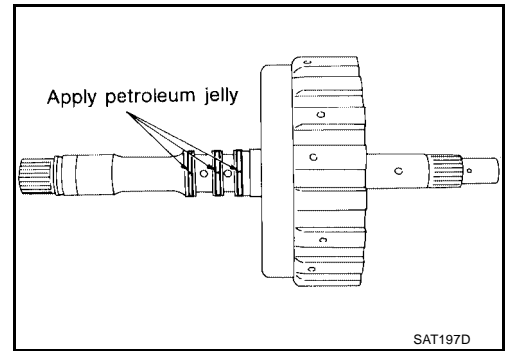


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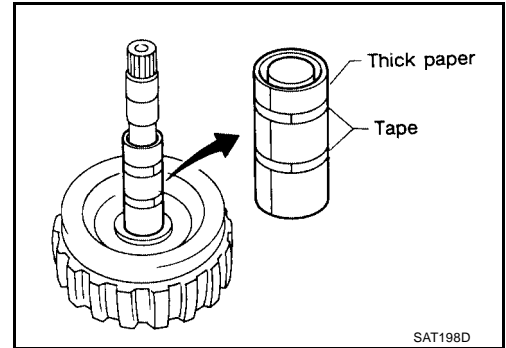
HIGH CLUTCH

[RE4F03B]

9. Install seal rings to input shaft.
- Apply petroleum jelly to seal rings.

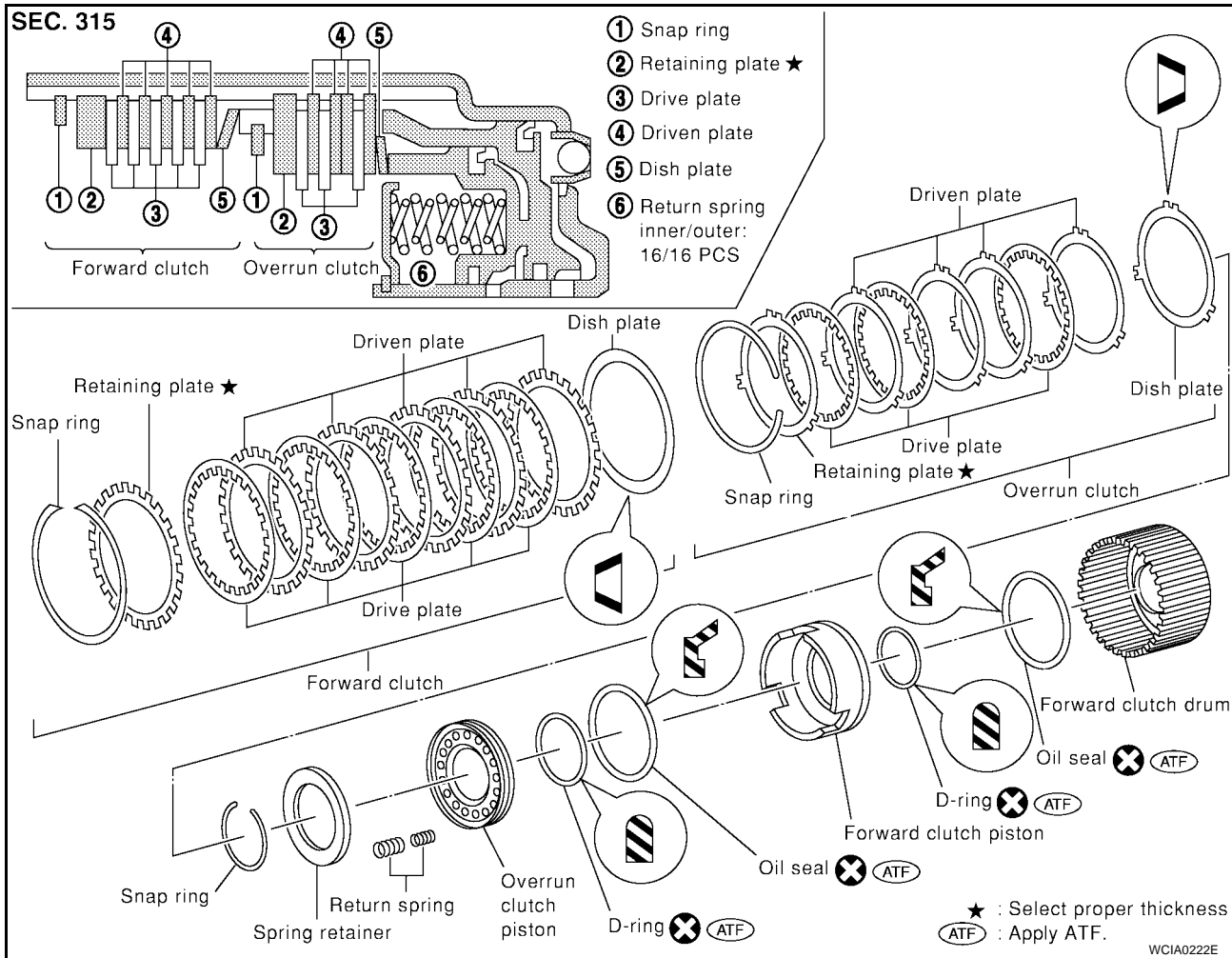


- Roll paper around seal rings to prevent seal rings from spreading.



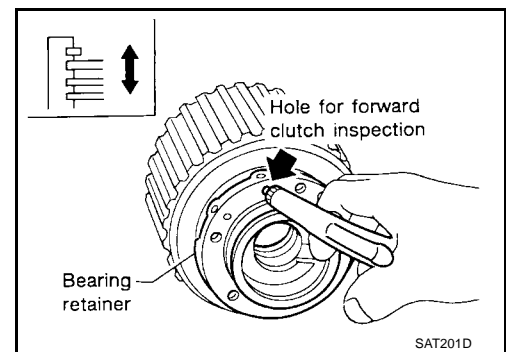
FORWARD CLUTCH AND OVERRUN CLUTCH

Components



Disassembly

1. Check operation of forward clutch and overrun clutch.

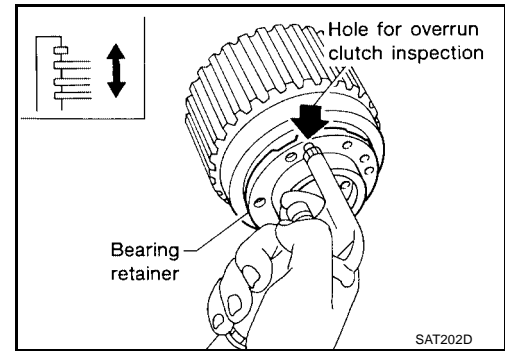


- a. Install bearing retainer on forward clutch drum.
- b. Apply compressed air to oil hole of forward clutch drum.
- c. Check to see that retaining plate moves to snap ring.

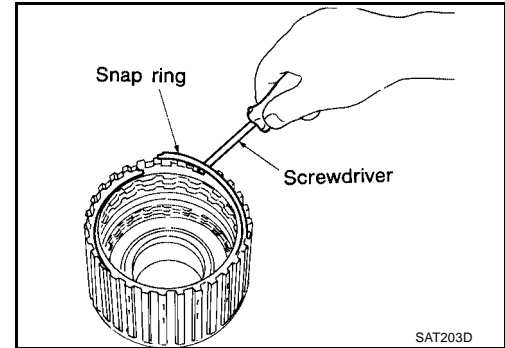
FORWARD CLUTCH AND OVERRUN CLUTCH

[RE4F03B]

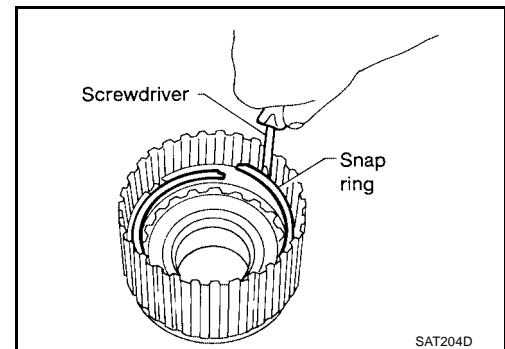
- d. If retaining plate does not contact snap ring:
- D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.



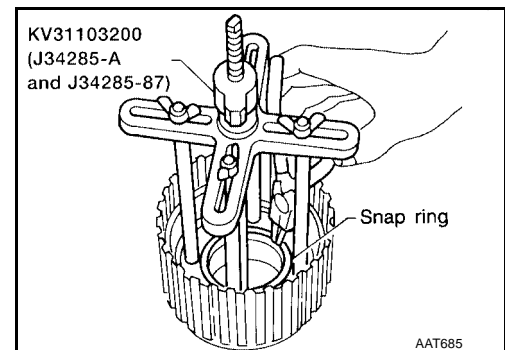
2. Remove snap ring for forward clutch.
- **Do not expand snap ring excessively.**
3. Remove drive plates, driven plates, retaining plate and dish plate for forward clutch.



4. Remove snap ring for overrun clutch.
- **Do not expand snap ring excessively.**
5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.



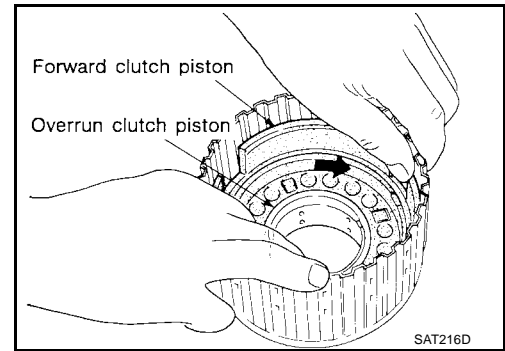
6. Set Tool on spring retainer and remove snap ring from forward clutch drum while compressing return springs.
- **Set Tool directly above return springs.**
 - **Do not expand snap ring excessively.**
7. Remove spring retainer and return springs.



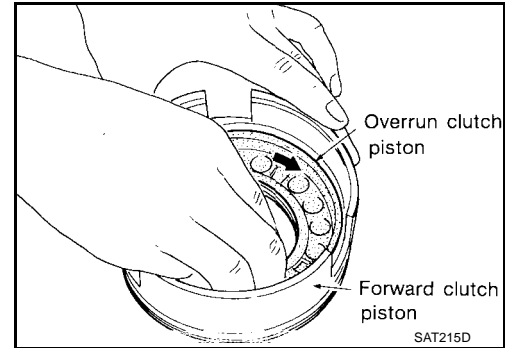
FORWARD CLUTCH AND OVERRUN CLUTCH

[RE4F03B]

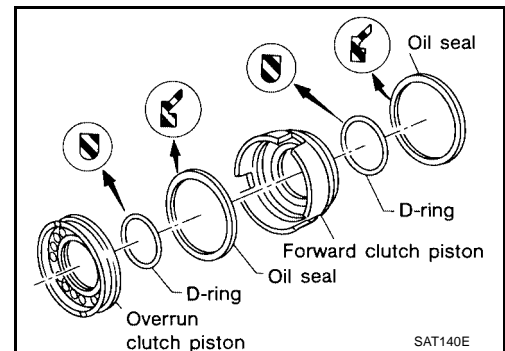
8. Remove forward clutch piston with overrun clutch piston from forward clutch drum by turning it.



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.



Inspection

SNAP RINGS AND SPRING RETAINER

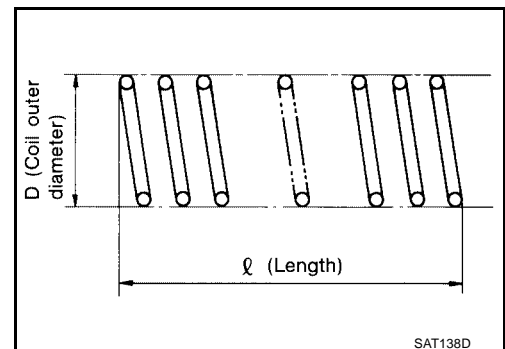
- Check for deformation, fatigue or damage.

FORWARD CLUTCH AND OVERRUN CLUTCH RETURN SPRINGS

- Check for deformation or damage.
- Measure free length and outer diameter.

Inspection standard : Refer to [AT-389, "Clutch and Brake Return Springs"](#) .

- Replace if deformed or fatigued.



FORWARD CLUTCH AND OVERRUN CLUTCH DRIVE PLATES

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate

Forward clutch

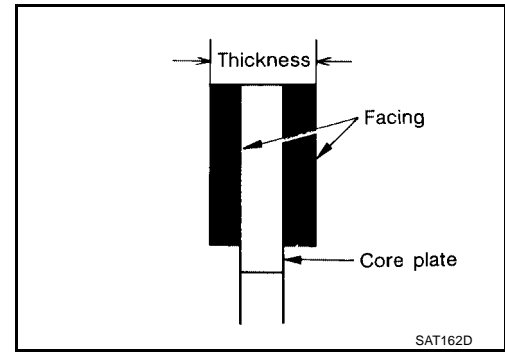
Standard value : 1.8 mm (0.071 in)

Wear limit : 1.6 mm (0.063 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

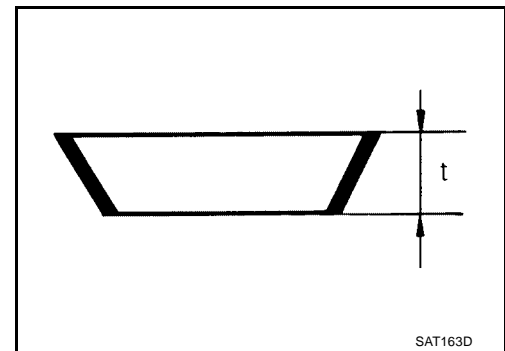
- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate "t"

Forward clutch : 2.5 mm (0.098 in)

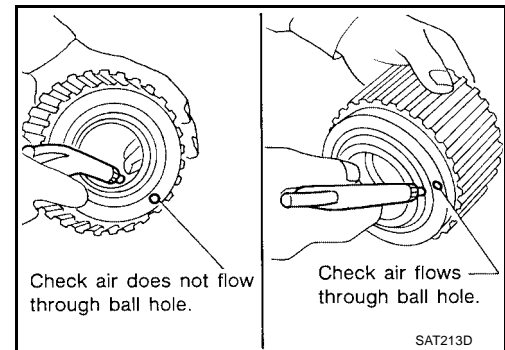
Overrun clutch : 2.15 mm (0.0846 in)

- If deformed or fatigued, replace.



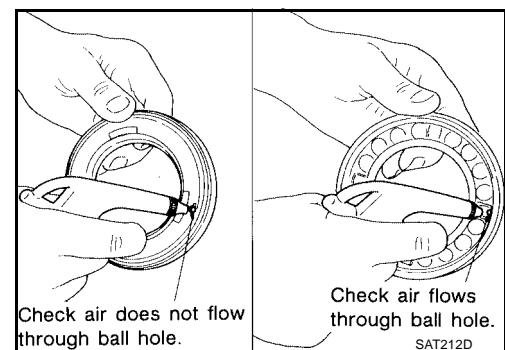
FORWARD CLUTCH DRUM

- 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.



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.



FORWARD CLUTCH AND OVERRUN CLUTCH

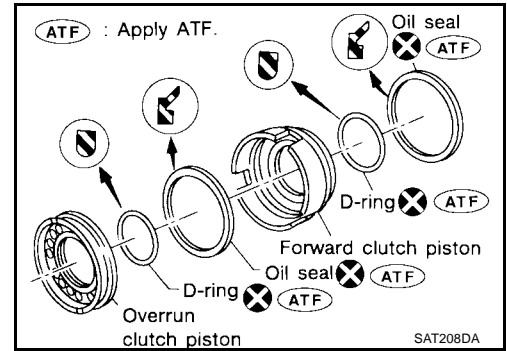
[RE4F03B]

ECS0060M

Assembly

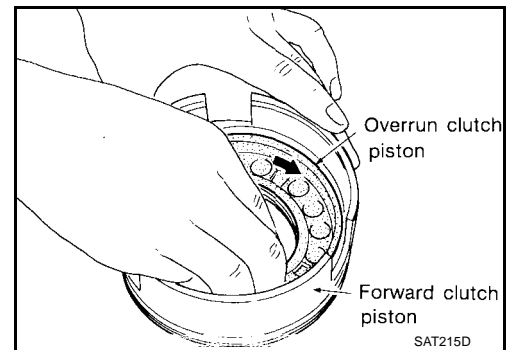
1. Install D-rings and oil seals on forward clutch piston and overrun clutch piston.

- Take care with direction of oil seal.
- Apply ATF to both parts.



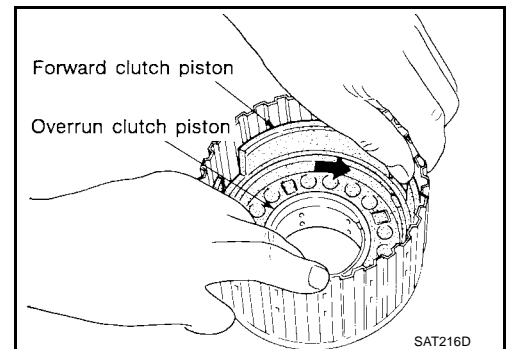
2. Install overrun clutch piston assembly on forward clutch piston while turning it slowly.

- Apply ATF to inner surface of forward clutch piston.

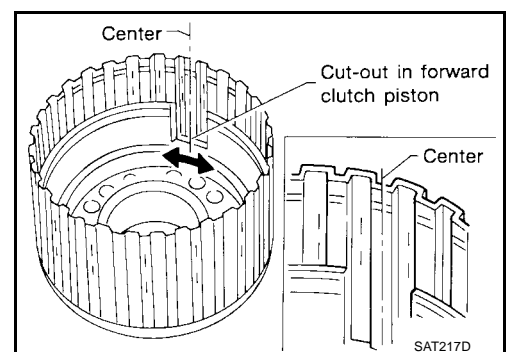


3. Install forward clutch piston assembly on forward clutch drum while turning it slowly.

- Apply ATF to inner surface of drum.



4. Align notch in forward clutch piston with groove in forward clutch drum.



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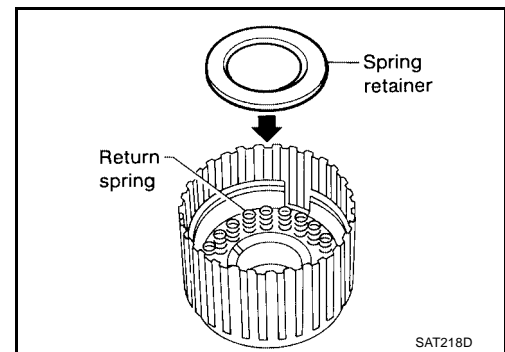
FORWARD CLUTCH AND OVERRUN CLUTCH

[RE4F03B]

5. Install return spring on piston.
6. Install spring retainer on return springs.

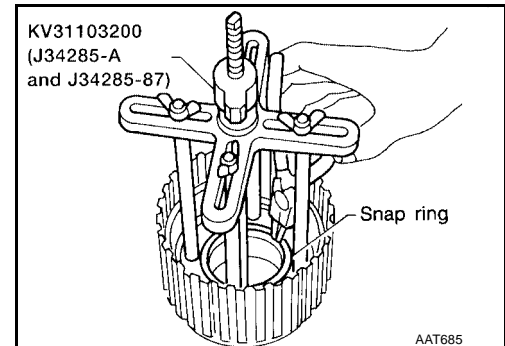
Return spring

: Refer to [AT-389, "Clutch and Brake Return Springs"](#) .

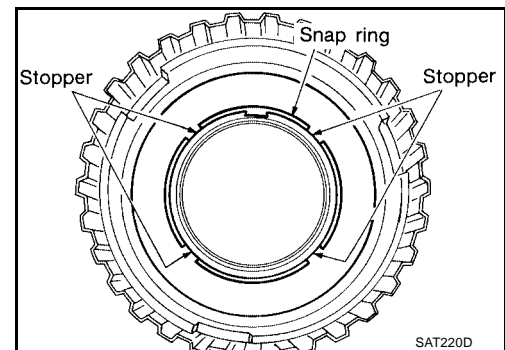


7. Set Tool on spring retainer and install snap ring while compressing return springs.

- **Set Tool directly above return springs.**
- **Do not expand snap ring excessively.**



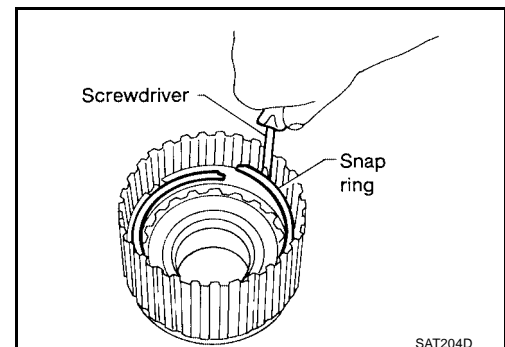
- **Do not align snap ring gap with spring retainer stopper.**



8. Install drive plates, driven plates, retaining plate and dish plate for overrun clutch.

9. Install snap ring for overrun clutch.

- **Do not expand snap ring excessively.**



FORWARD CLUTCH AND OVERRUN CLUTCH

[RE4F03B]

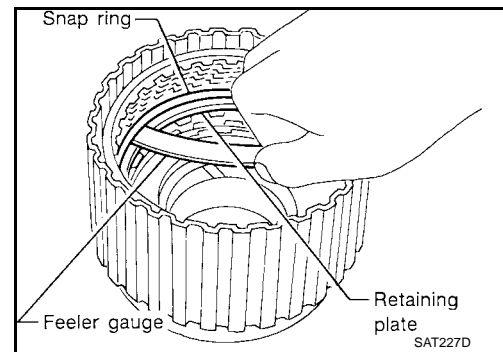
10. Measure clearance between overrun clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate.

Specified clearance

Standard : 1.0 - 1.4 mm (0.039 - 0.055 in)

Allowable limit : 2.0 mm (0.079 in)

Overrun clutch retaining plate : Refer to [AT-388, "OVERRUN CLUTCH"](#) .

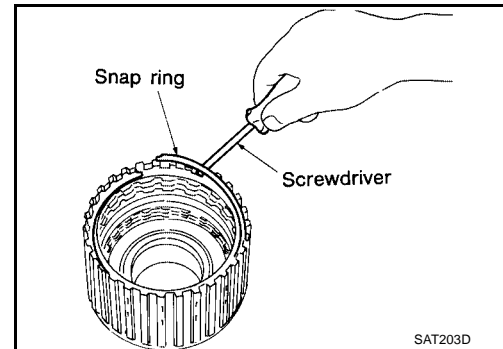


11. Install drive plates, driven plates, retaining plate and dish plate for forward clutch.

Take care with the order and direction of plates.

12. Install snap ring for forward clutch.

- Do not expand snap ring excessively.



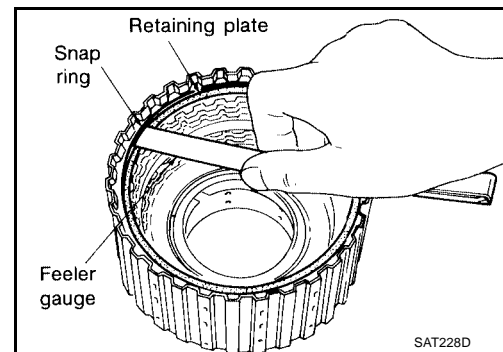
13. Measure clearance between forward clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate.

Specified clearance

Standard : 0.45 - 0.85 mm (0.0177 - 0.0335 in)

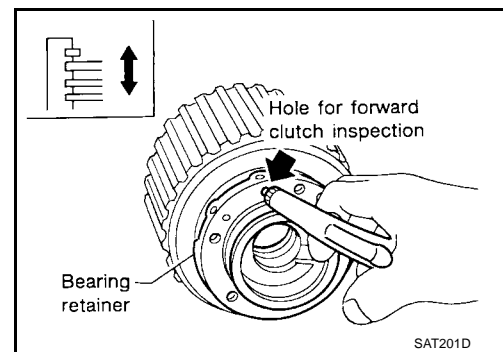
Allowable limit : 1.85 mm (0.0728 in)

Forward clutch retaining plate : Refer to [AT-388, "FORWARD CLUTCH"](#) .



14. Check operation of forward clutch.

Refer to [AT-325, "FORWARD CLUTCH AND OVERRUN CLUTCH"](#) .

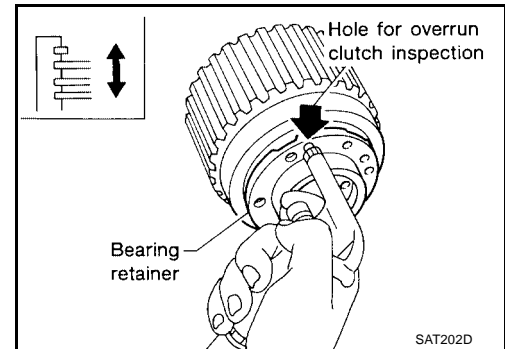


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FORWARD CLUTCH AND OVERRUN CLUTCH

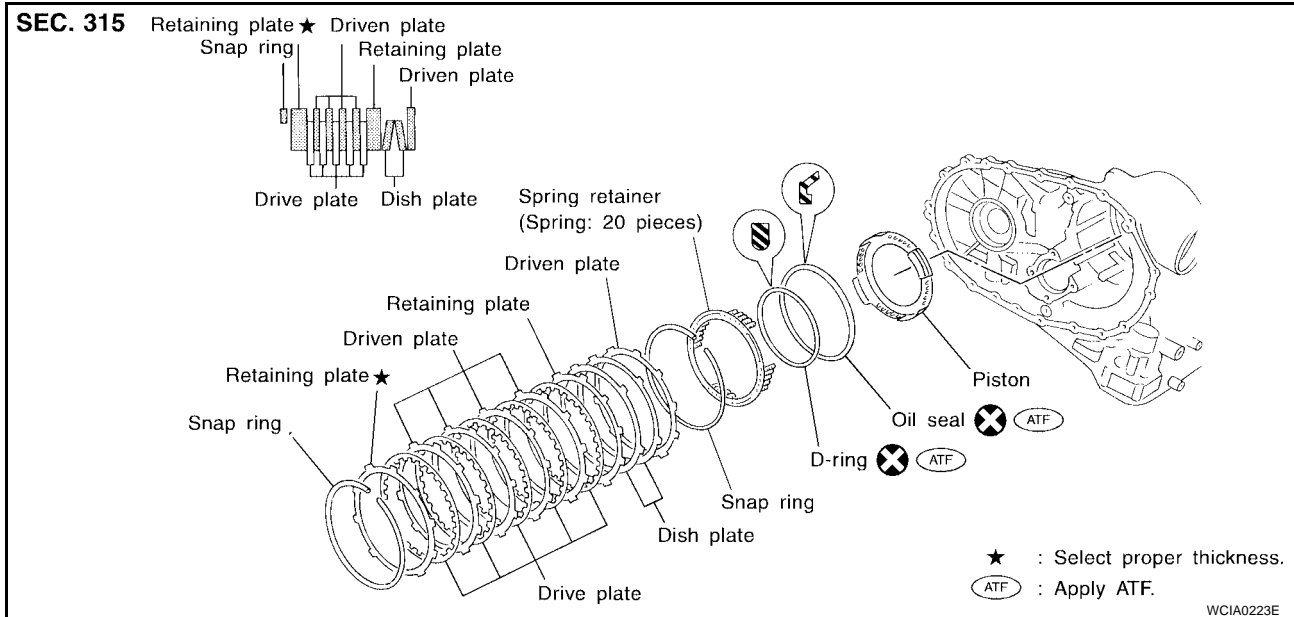
[RE4F03B]

15. Check operation of overrun clutch.
Refer to [AT-325, "FORWARD CLUTCH AND OVERRUN CLUTCH"](#).



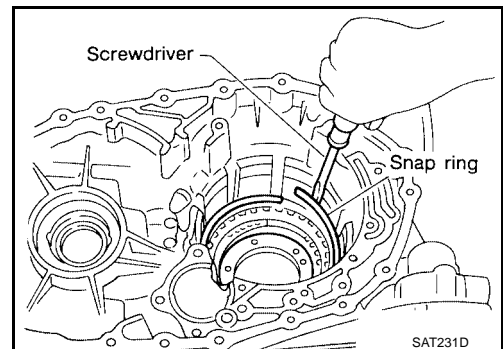
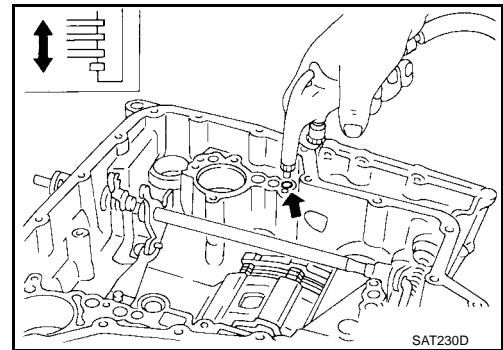
LOW & REVERSE BRAKE

Components



Disassembly

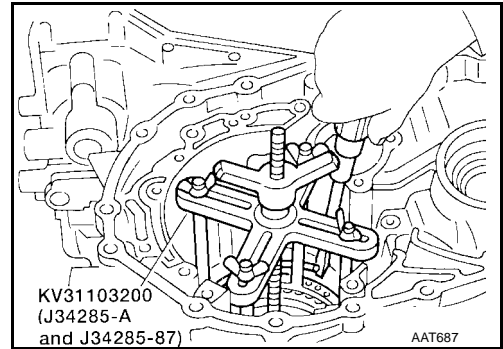
1. Check operation of low & reverse brake.
 - a. Apply compressed air to oil hole of transmission case.
 - b. Check to see that retaining plate moves to snap ring.
 - c. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking 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.



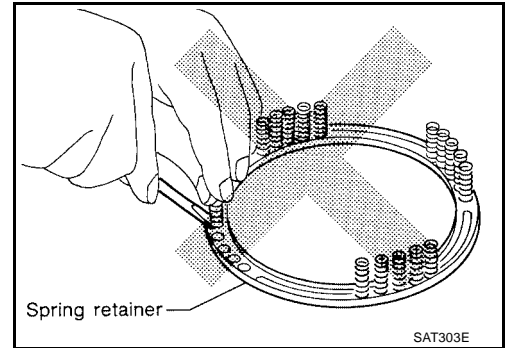
LOW & REVERSE BRAKE

[RE4F03B]

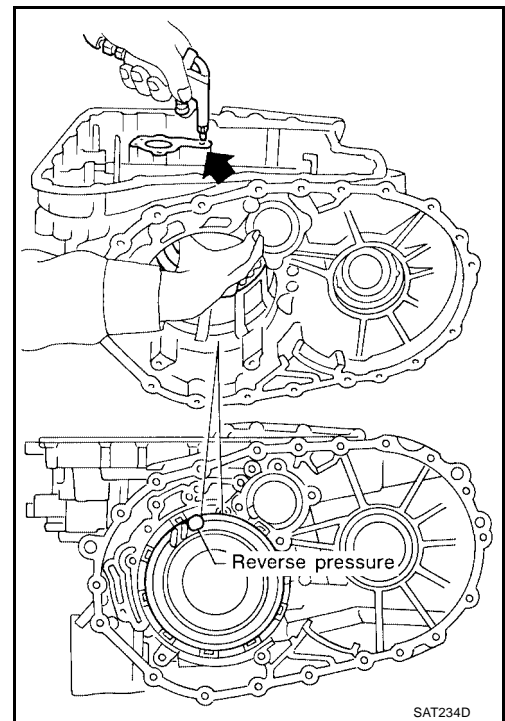
5. Set Tool on spring retainer and remove snap ring while compressing return springs.
 - **Set Tool directly above return springs.**
 - **Do not expand snap ring excessively.**
6. Remove spring retainer and return springs.



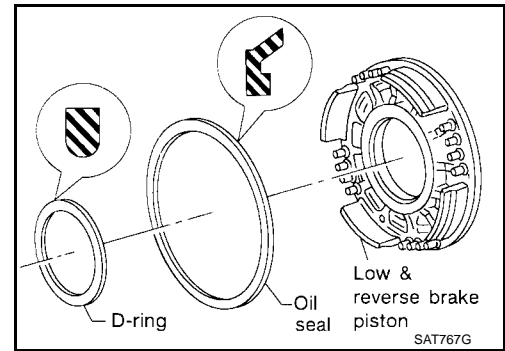
- **Do not remove return springs from spring retainer.**



7. Apply compressed air to oil hole of transmission case while holding piston.
8. Remove piston from transmission case by turning it.



- Remove D-ring and oil seal from piston.



Inspection

LOW & REVERSE CLUTCH SNAP RING, SPRING RETAINER AND RETURN SPRINGS

ECS0060P

- 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

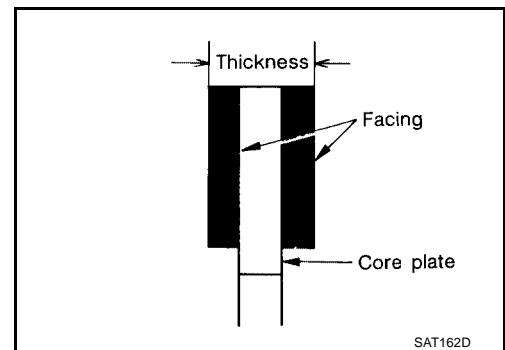
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate

Standard value : 2.0 mm (0.079 in)

Wear limit : 1.8 mm (0.071 in)

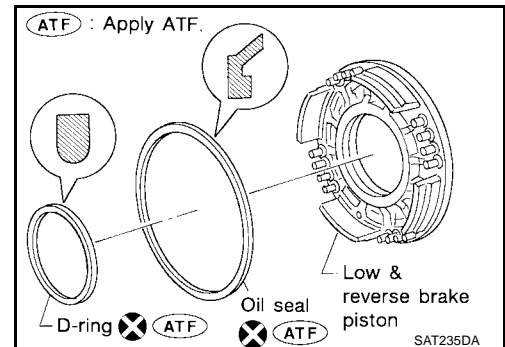
- If not within wear limit, replace.



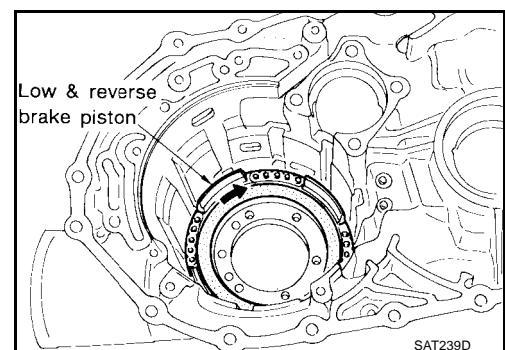
ECS0060Q

Assembly

- Install D-ring and oil seal on piston.
 - Take care with the direction of the oil seal.
 - Apply ATF to both parts.



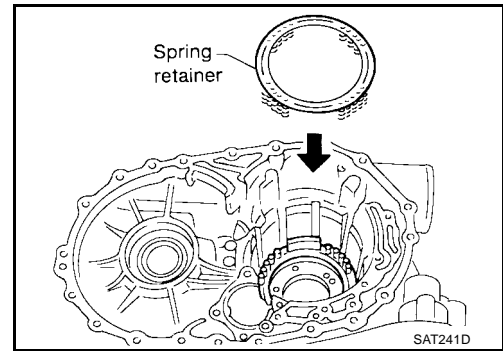
- Stand transmission case.
- Install piston assembly on transmission case while turning it slowly.
 - Apply ATF to inner surface of transmission case.



4. Install return springs and spring retainer on piston.

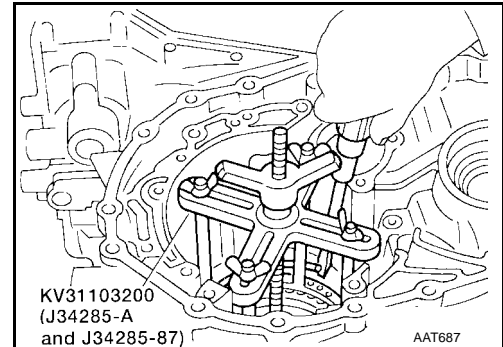
Return spring

:Refer to [AT-389. "Clutch and Brake Return Springs"](#) .



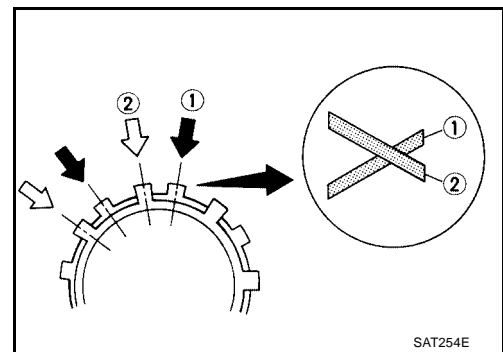
5. Install snap ring while compressing return springs.

- **Set Tool** directly above return springs.



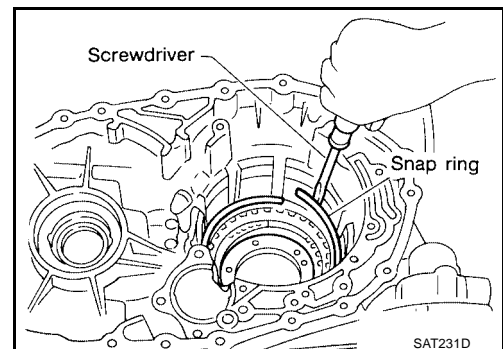
6. Install drive plates, driven plates, retaining plates and dished plates.

- **Do not align the projections on the two dished plates.**
- **Make sure to put the plates in the correct order and direction.**



7. Install snap ring.

- **Do not expand snap ring excessively.**



LOW & REVERSE BRAKE

[RE4F03B]

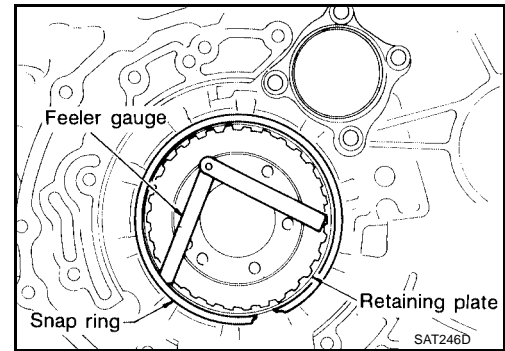
8. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate (front side).

Specified clearance

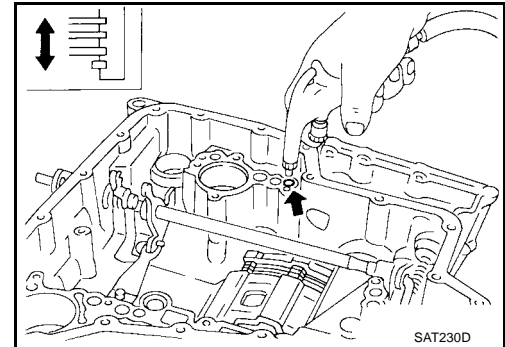
Standard : 1.4 - 1.8 mm (0.055 - 0.071 in)

Allowable limit : 2.8 mm (0.110 in)

Retaining plate : Refer to [AT-388, "LOW & REVERSE BRAKE"](#) .



9. Check operation of low and reverse brake.
Refer to [AT-333, "LOW & REVERSE BRAKE"](#) .



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REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB

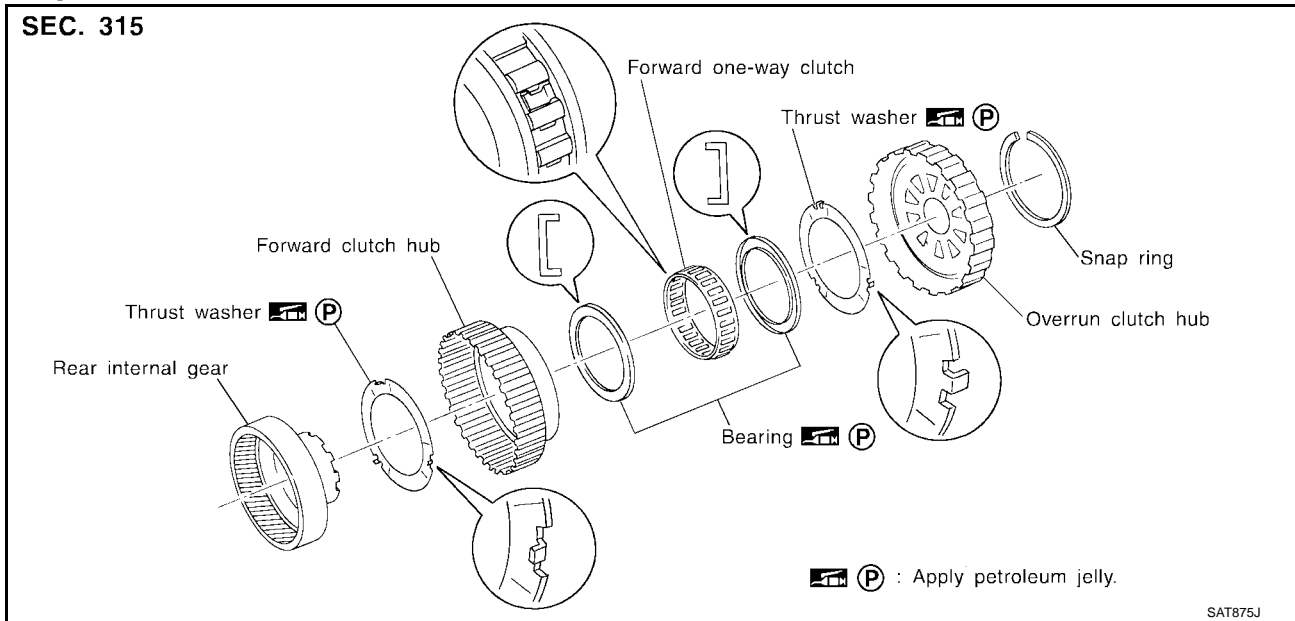
[RE4F03B]

REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB

PF3:31450

Components

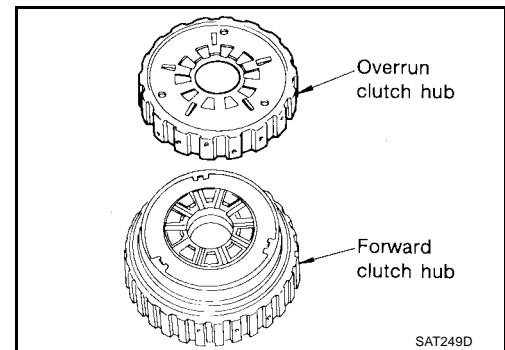
ECS0060R



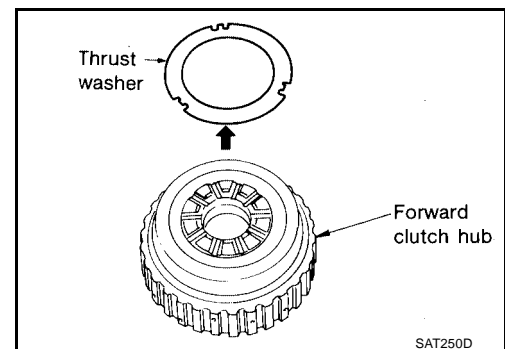
Disassembly

ECS0060S

1. Remove snap ring from overrun clutch hub.
2. Remove overrun clutch hub from forward clutch hub.



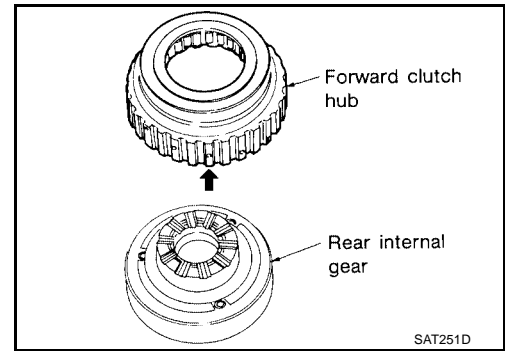
3. Remove thrust washer from forward clutch hub.



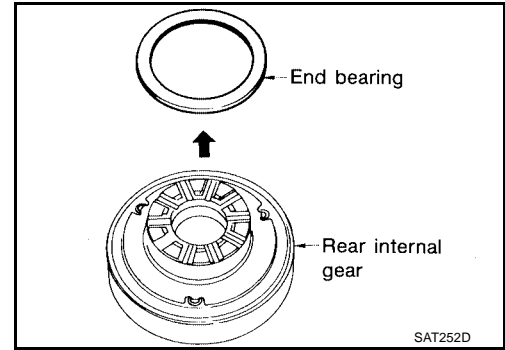
REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB

[RE4F03B]

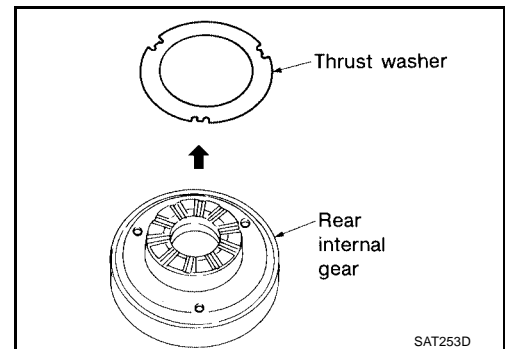
4. Remove forward clutch hub from rear internal gear.



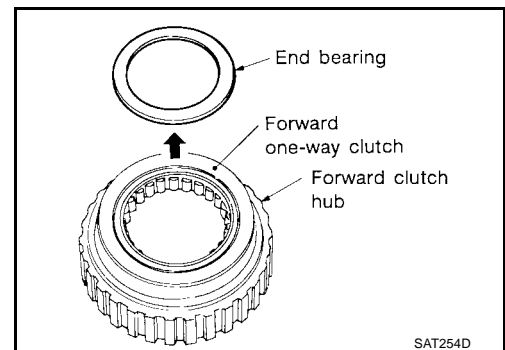
5. Remove end bearing from rear internal gear.



6. Remove thrust washer from rear internal gear.



7. Remove end bearing from forward one-way clutch.



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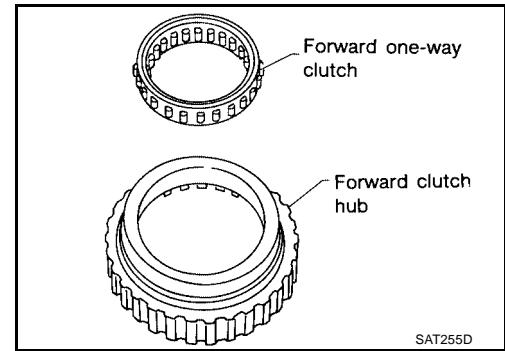
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REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB

[RE4F03B]

8. Remove one-way clutch from forward clutch hub.

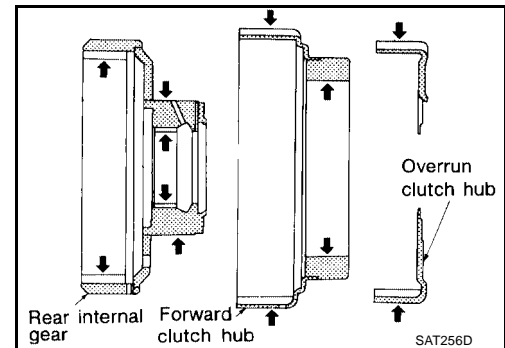


Inspection

REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB

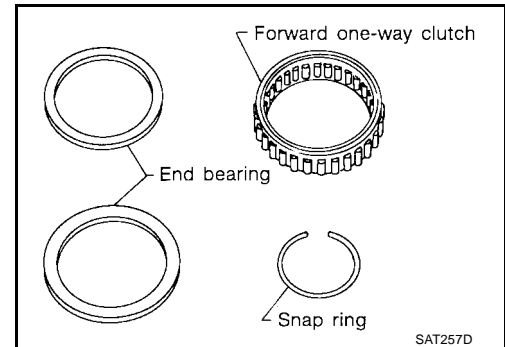
ECS0060T

- Check rubbing surfaces for wear or damage.



SNAP RING, END BEARINGS AND FORWARD ONE-WAY CLUTCH

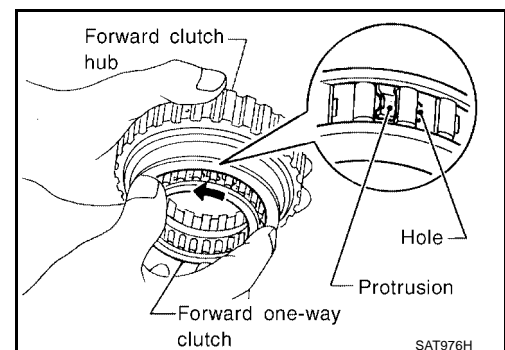
- Check snap ring and end bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.



Assembly

1. Install forward one-way clutch on forward clutch.
 - Take care with the direction of forward one-way clutch.

ECS0060U

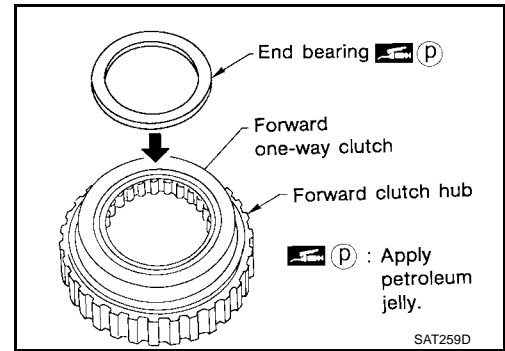


REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB

[RE4F03B]

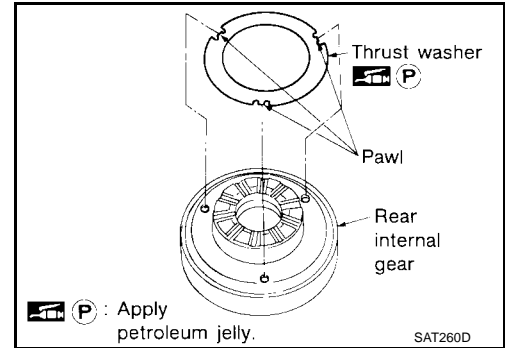
2. Install end bearing on forward one-way clutch.

- Apply petroleum jelly to end bearing.



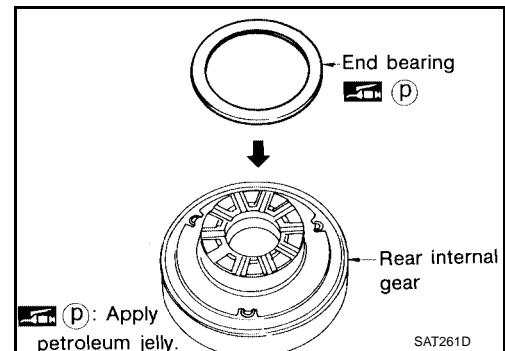
3. Install thrust washer on rear internal gear.

- Apply petroleum jelly to thrust washer.
- Align pawls of thrust washer with holes of rear internal gear.



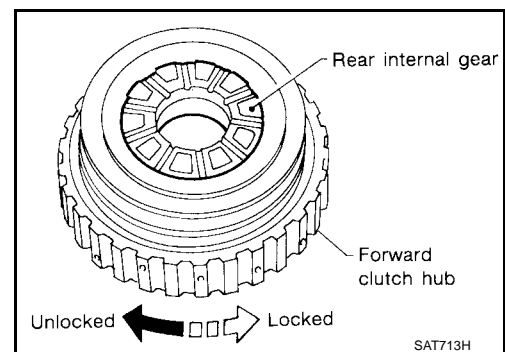
4. Install end bearing on rear internal gear.

- Apply petroleum jelly to end bearing.



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 unlocking directions.
- If not as shown in illustration, check installation direction of forward one-way clutch.



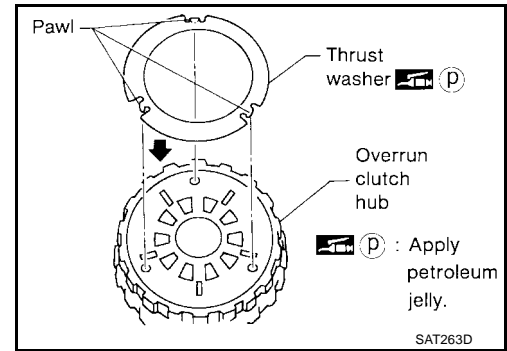
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REAR INTERNAL GEAR, FORWARD CLUTCH HUB AND OVERRUN CLUTCH HUB

[RE4F03B]

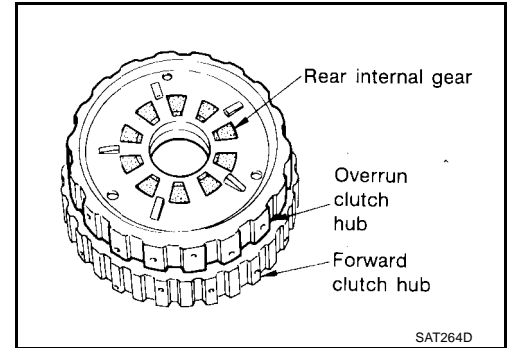
6. Install thrust washer and overrun clutch hub.

- Apply petroleum jelly to thrust washer.
- Align pawls of thrust washer with holes of overrun clutch hub.

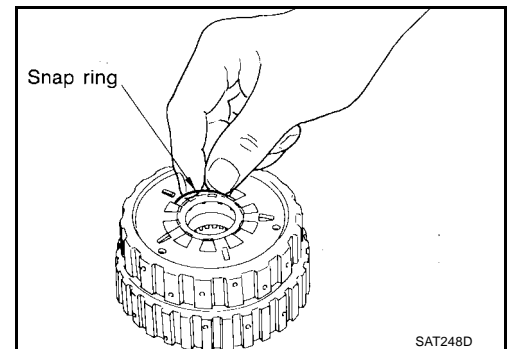


7. Install overrun clutch hub on rear internal gear.

- Align projections of rear internal gear with holes of overrun clutch hub.



8. Install snap ring to groove of rear internal gear.



OUTPUT SHAFT, IDLER GEAR, REDUCTION PINION GEAR AND BEARING RETAINER

[RE4F03B]

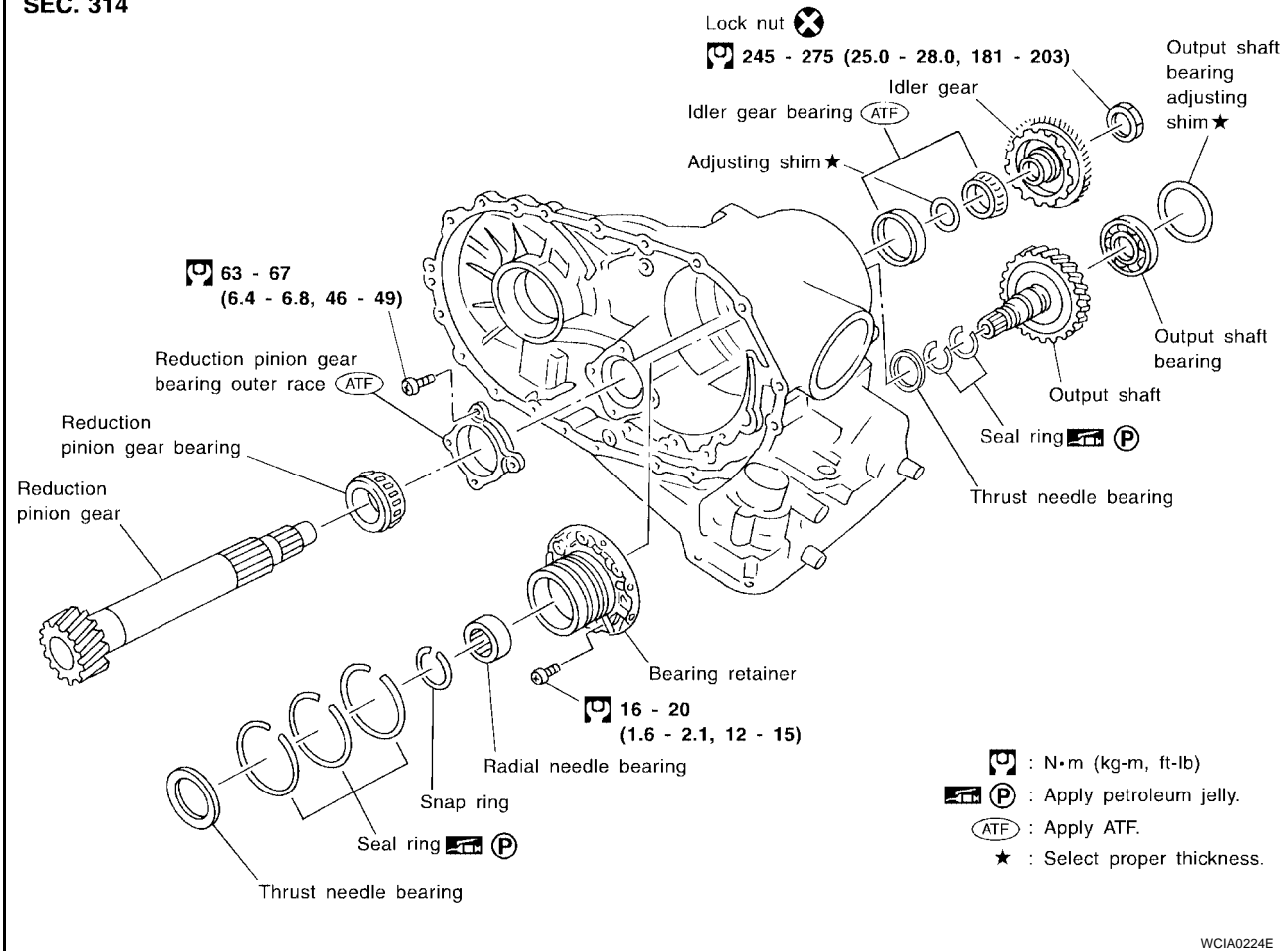
OUTPUT SHAFT, IDLER GEAR, REDUCTION PINION GEAR AND BEARING RETAINER

PFP:31480

Components

ECS0060V

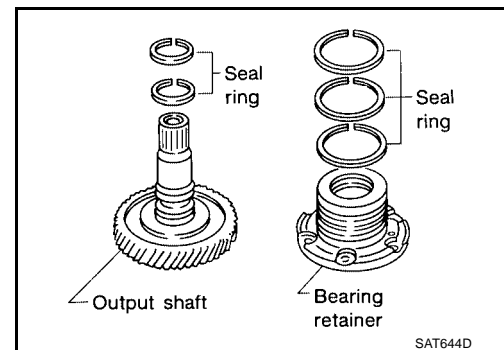
SEC. 314



Disassembly

ECS0060W

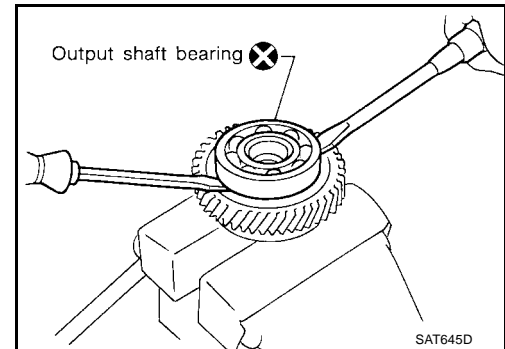
1. Remove seal rings from output shaft and bearing retainer.



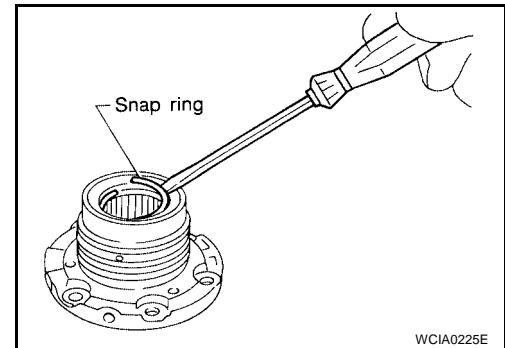
OUTPUT SHAFT, IDLER GEAR, REDUCTION PINION GEAR AND BEARING RETAINER

[RE4F03B]

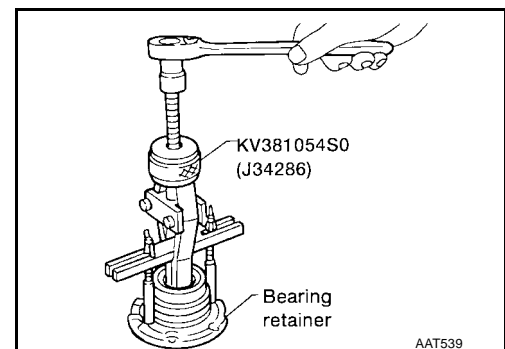
2. Remove output shaft bearing with screwdrivers.
 - Always replace bearing with a new one when removed.
 - Do not damage output shaft.



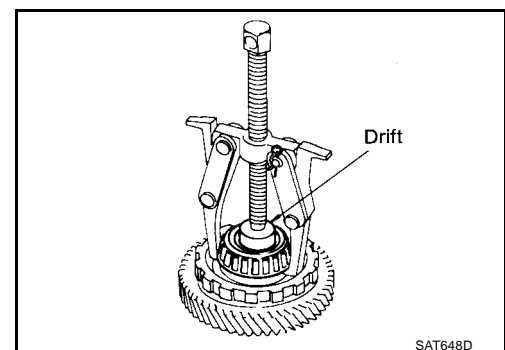
3. Remove snap ring from bearing retainer.
 - Do not expand snap ring excessively.



4. Remove needle bearing from bearing retainer.



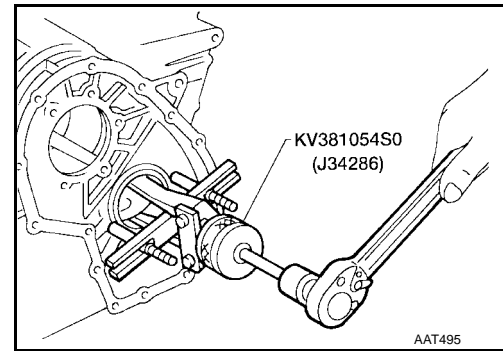
5. Remove idler gear bearing inner race from idler gear.



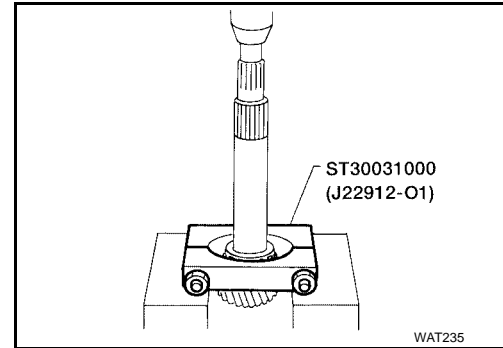
OUTPUT SHAFT, IDLER GEAR, REDUCTION PINION GEAR AND BEARING RETAINER

[RE4F03B]

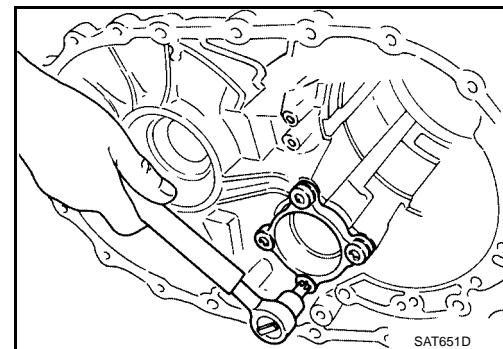
6. Remove idler gear bearing outer race from transmission case.



7. Press out reduction pinion gear bearing from reduction pinion gear.



8. Remove reduction pinion gear bearing outer race from transmission case.



EC50060X

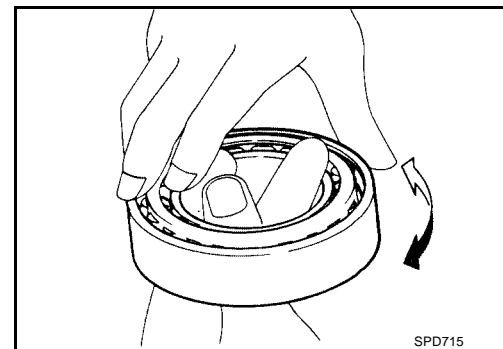
Inspection

OUTPUT SHAFT, IDLER GEAR AND REDUCTION PINION GEAR

- 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.**



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OUTPUT SHAFT, IDLER GEAR, REDUCTION PINION GEAR AND BEARING RETAINER

[RE4F03B]

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)

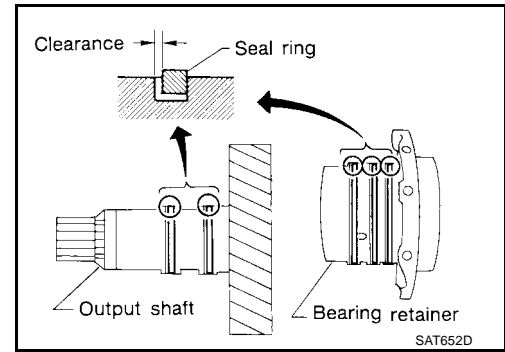
Allowable limit : 0.25 mm (0.0098 in)

- 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)

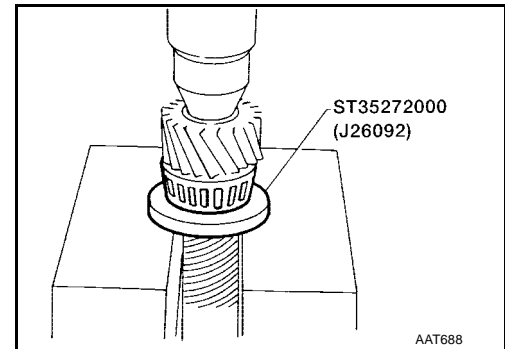
- If not within allowable limit, replace bearing retainer.



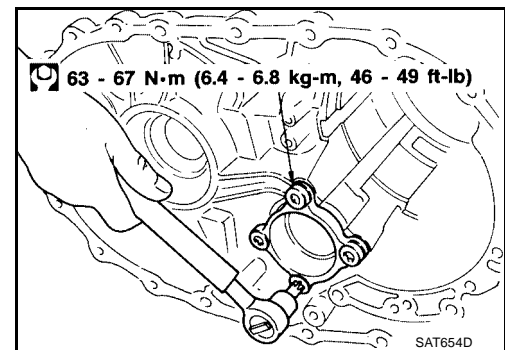
Assembly

1. Press reduction pinion gear bearing on reduction pinion gear.

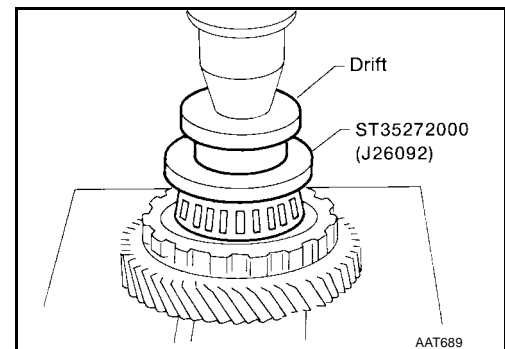
ECS0060Y



2. Install reduction pinion gear bearing outer race on transmission case.



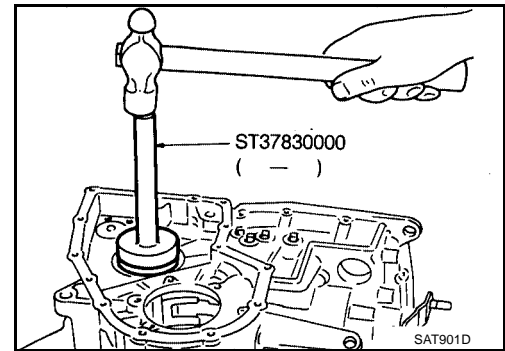
3. Press idler gear bearing inner race on idler gear.



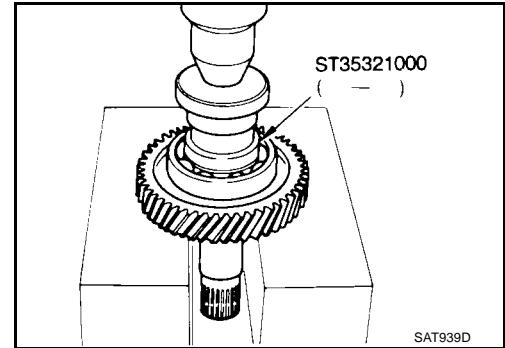
OUTPUT SHAFT, IDLER GEAR, REDUCTION PINION GEAR AND BEARING RETAINER

[RE4F03B]

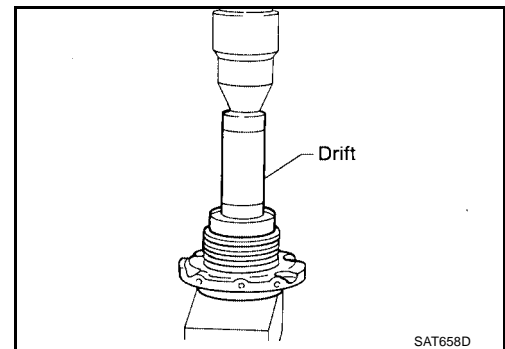
4. Install idler gear bearing outer race on transmission case.



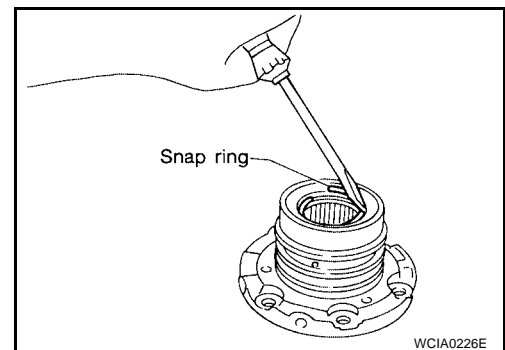
5. Press output shaft bearing on output shaft.



6. Press needle bearing on bearing retainer.



7. Install snap ring to bearing retainer.



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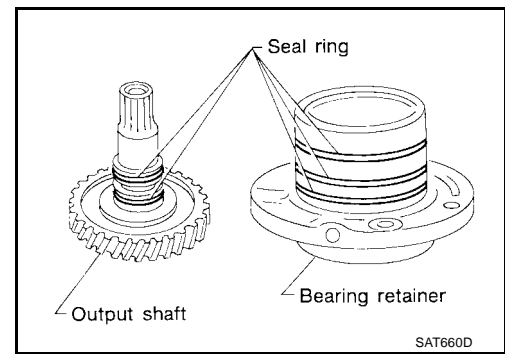
OUTPUT SHAFT, IDLER GEAR, REDUCTION PINION GEAR AND BEARING RETAINER

[RE4F03B]

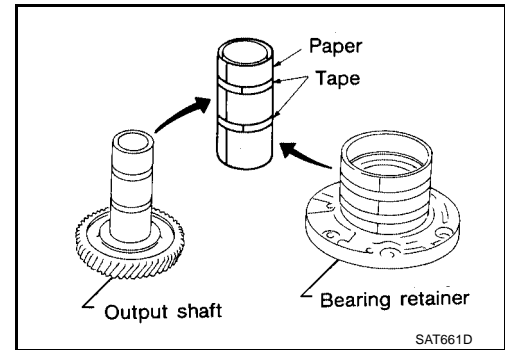
8. After packing ring grooves with petroleum jelly, carefully install new seal rings on output shaft and bearing retainer.

NOTE:

Do not align gaps in seal rings.



- Roll paper around seal rings to prevent seal rings from spreading.

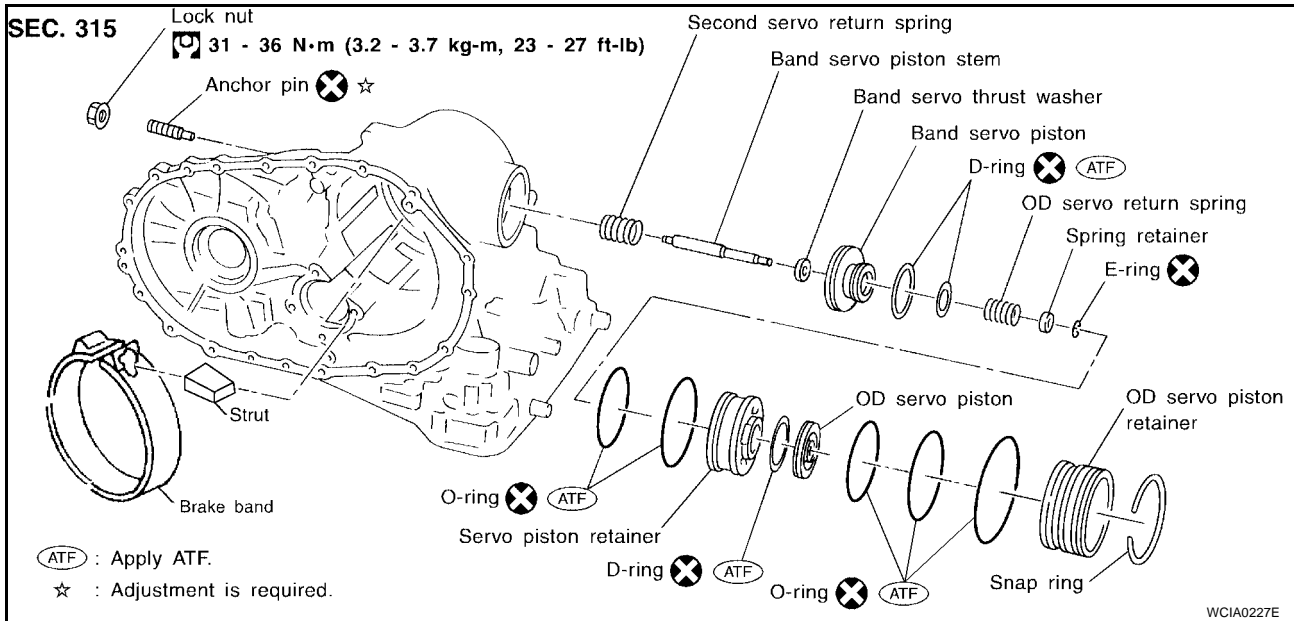


BAND SERVO PISTON ASSEMBLY

PFP:31615

ECS0060Z

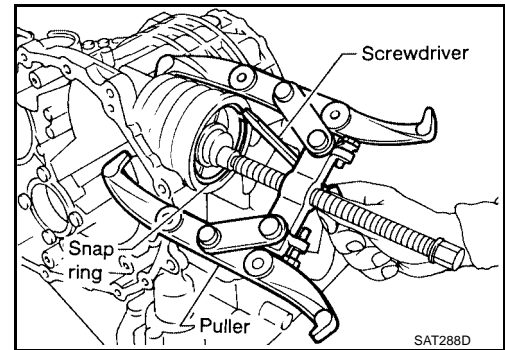
Components



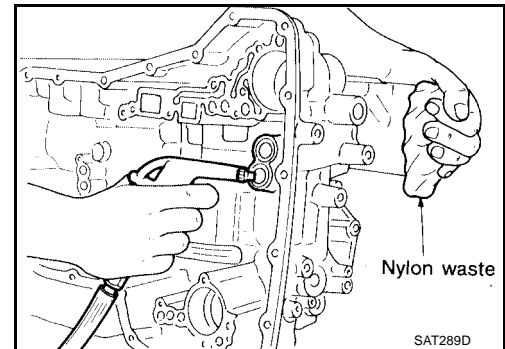
Disassembly

ECS00610

1. Remove band servo piston snap ring.



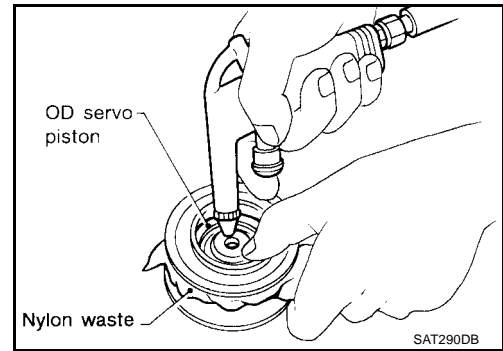
2. Apply compressed air to oil hole in transmission case to remove OD servo piston retainer and band servo piston assembly.
 - Hold band servo piston assembly with a rag or nylon waste.



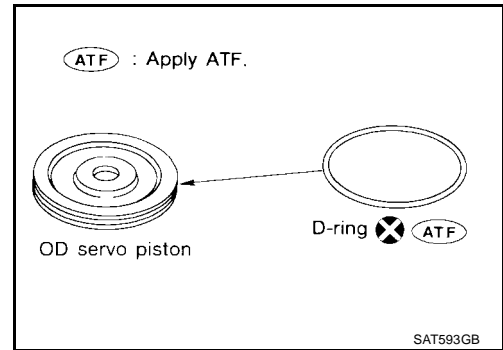
BAND SERVO PISTON ASSEMBLY

[RE4F03B]

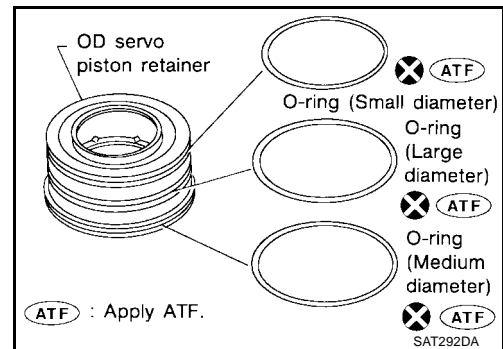
3. Apply compressed air to oil hole in OD servo piston retainer to remove OD servo piston from retainer.
- **Hold OD servo piston while applying compressed air.**



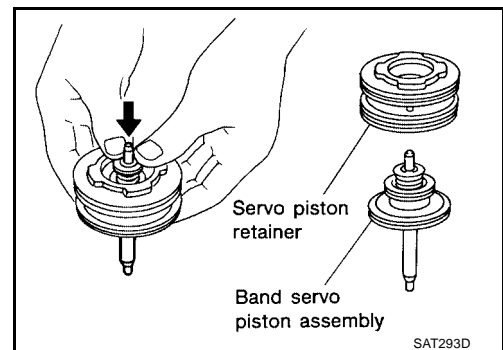
4. Remove D-ring from OD servo piston.



5. Remove O-rings from OD servo piston retainer.



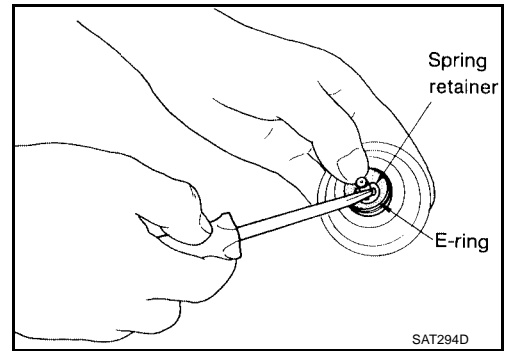
6. Remove band servo piston assembly from servo piston retainer by pushing it forward.



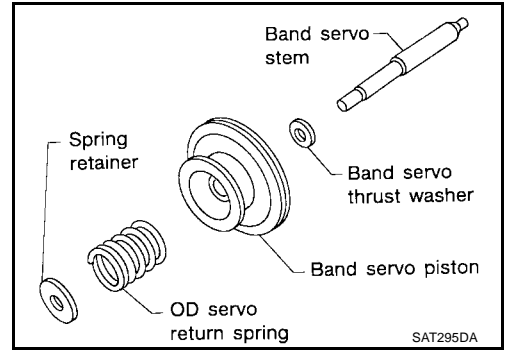
BAND SERVO PISTON ASSEMBLY

[RE4F03B]

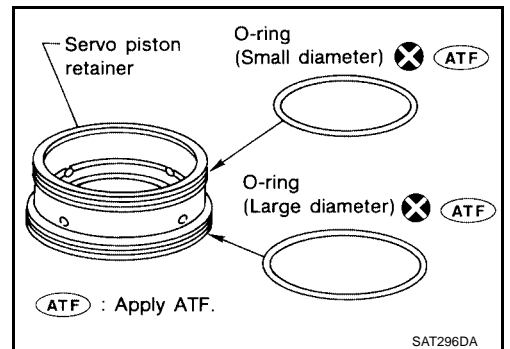
7. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.



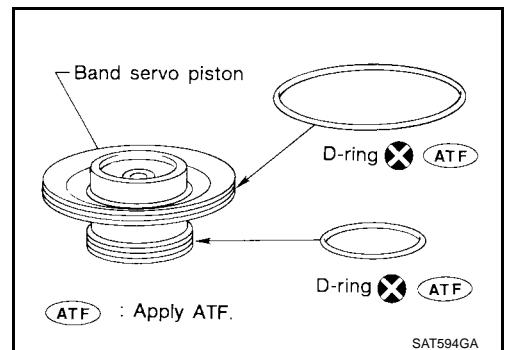
8. Remove OD servo return spring, band servo thrust washer and band servo piston stem from band servo piston.



9. Remove O-rings from servo piston retainer.



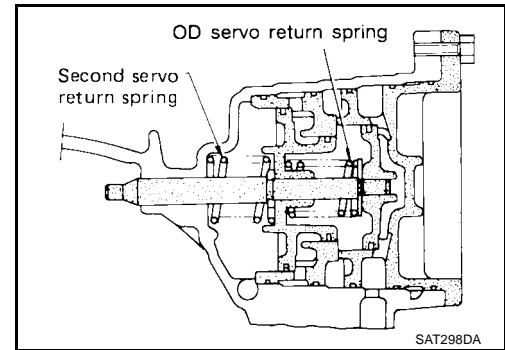
10. Remove D-rings from band servo piston.



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Inspection PISTONS, RETAINERS AND PISTON STEM

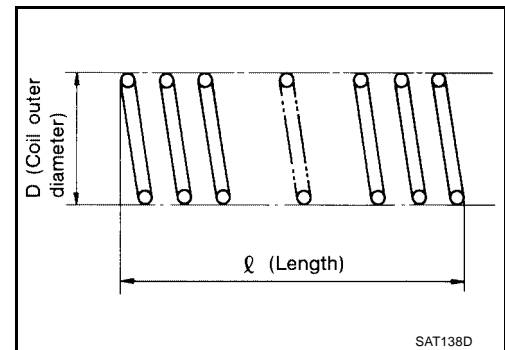
- Check frictional surfaces for abnormal wear or damage.



RETURN SPRINGS

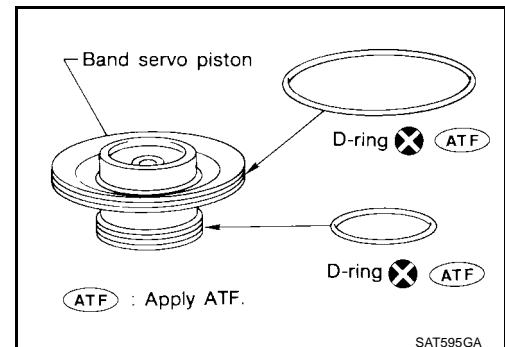
- Check for deformation or damage.
- Measure free length and outer diameter.

Band servo inspection standard : Refer to [AT-394](#), "[RETURN SPRING](#)".

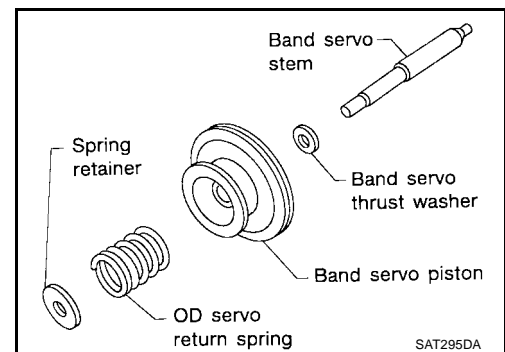


Assembly

1. Install D-rings to band servo piston retainer.
 - Apply ATF to D-rings.
 - Pay attention to position of each D-ring.



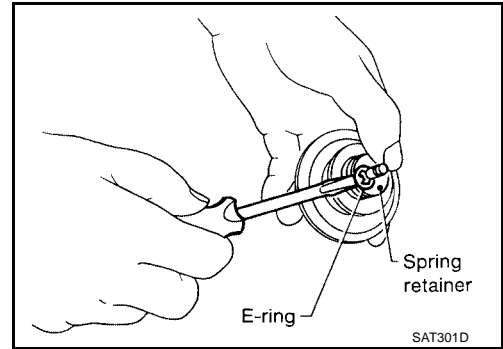
2. Install band servo piston stem, band servo thrust washer, OD servo return spring and spring retainer to band servo piston.



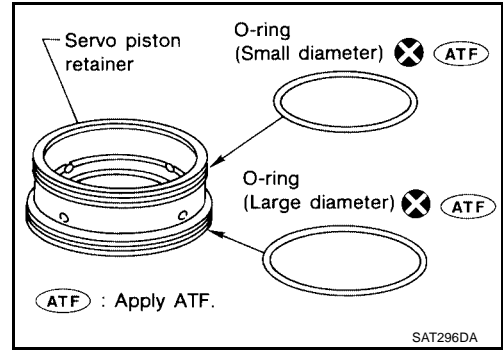
BAND SERVO PISTON ASSEMBLY

[RE4F03B]

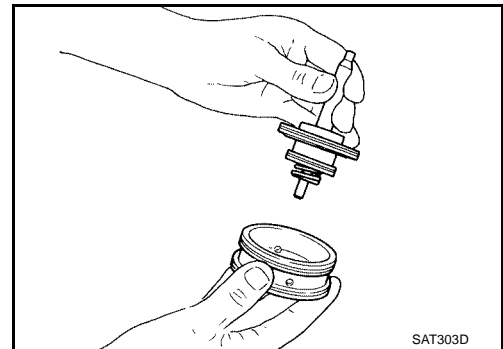
3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.



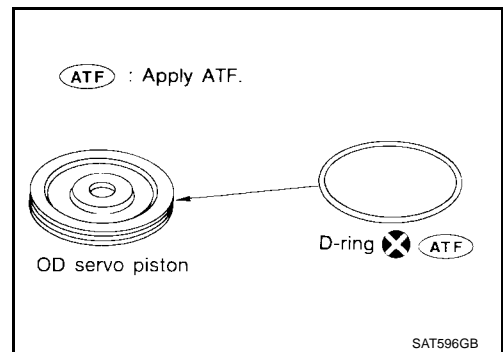
4. Install O-rings to servo piston retainer.
- Apply ATF to O-rings.
 - Pay attention to the positions of the O-rings.



5. Install band servo piston assembly to servo piston retainer by pushing it inward.



6. Install D-ring to OD servo piston.
- Apply ATF to D-ring.



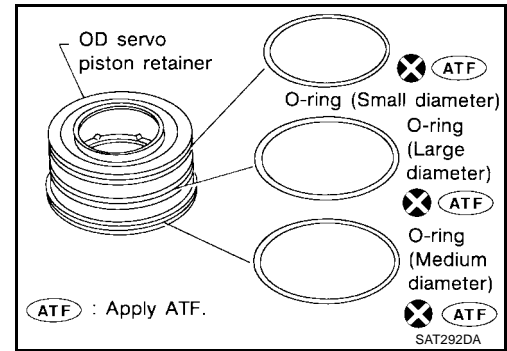
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BAND SERVO PISTON ASSEMBLY

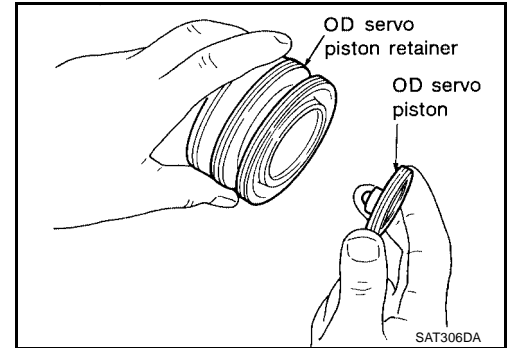
[RE4F03B]

7. Install O-rings to OD servo piston retainer.

- Apply ATF to O-rings.
- Pay attention to the positions of the O-rings.

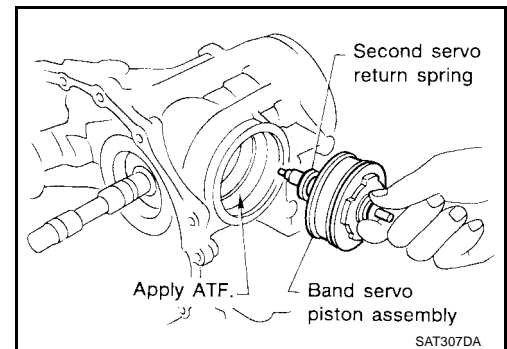


8. Install OD servo piston to OD servo piston retainer.



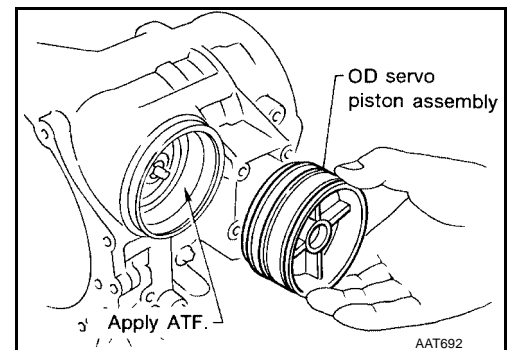
9. Install band servo piston assembly and 2nd servo return spring to transmission case.

- Apply ATF to O-ring of band servo piston and transmission case.



10. Install OD servo piston assembly to transmission case.

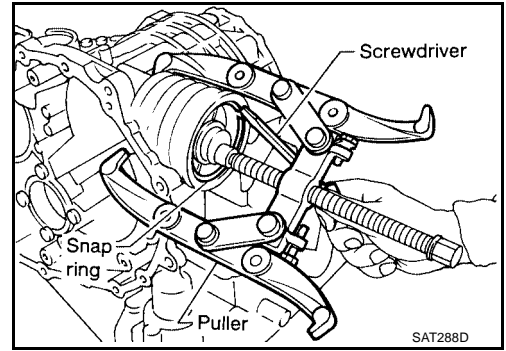
- Apply ATF to O-ring of band servo piston and transmission case.



BAND SERVO PISTON ASSEMBLY

[RE4F03B]

11. Install band servo piston snap ring to transmission case.



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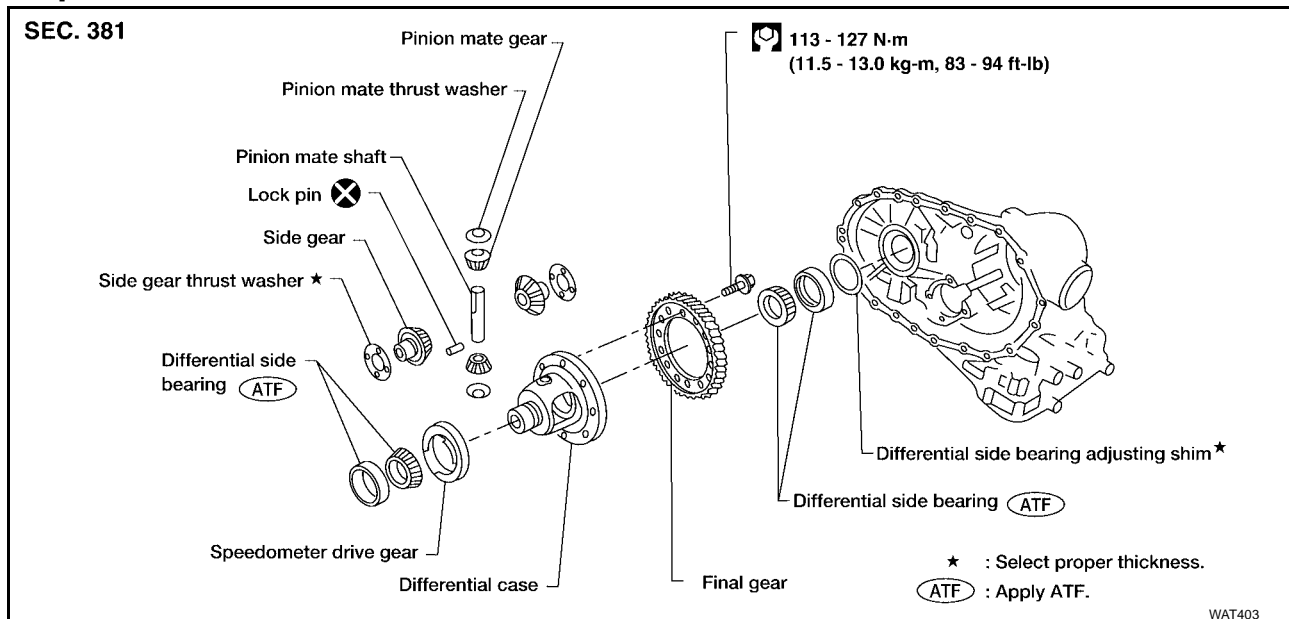
M

FINAL DRIVE

PF3:38411

Components

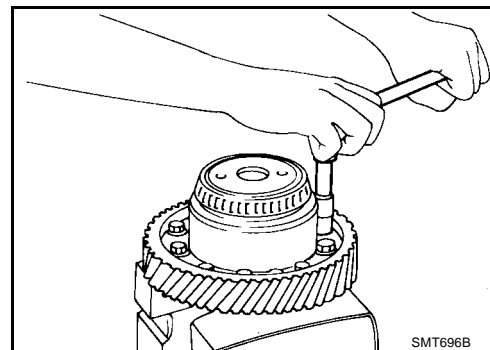
ECS00613



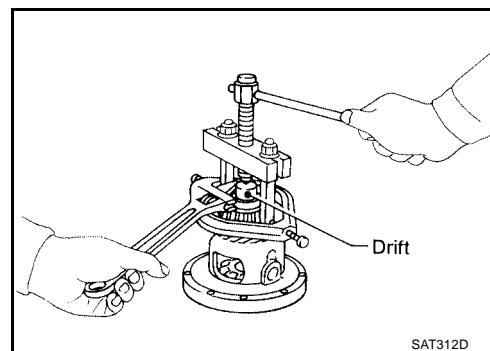
Disassembly

ECS00614

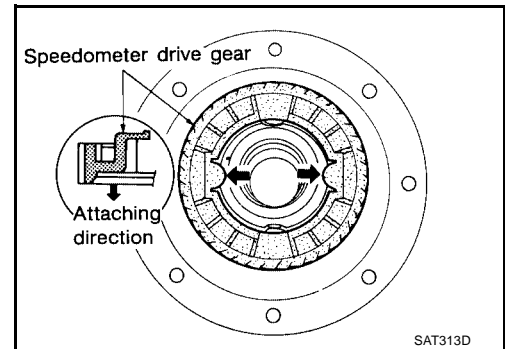
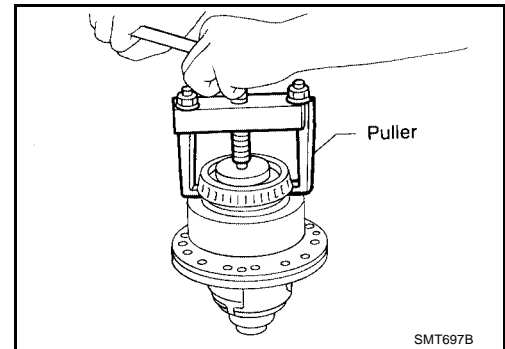
1. Remove final gear.



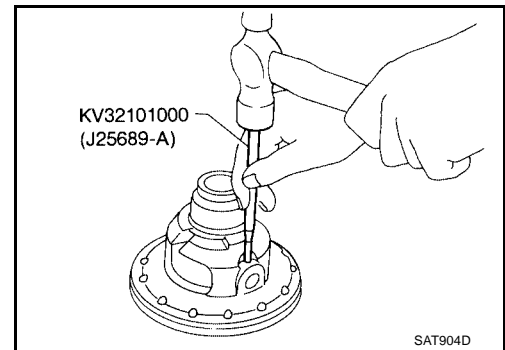
2. Press out differential side bearings.



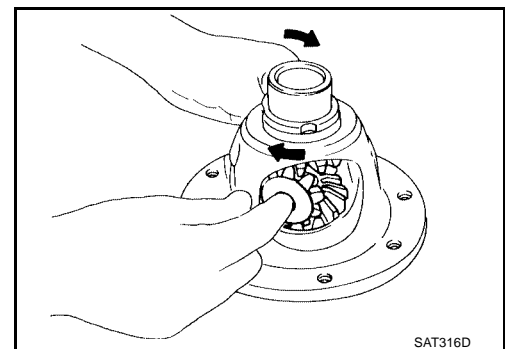
- Remove speedometer drive gear.



- Drive out pinion mate shaft lock pin.



- Draw out pinion mate shaft from differential case.
- Remove pinion mate gears and side gears.

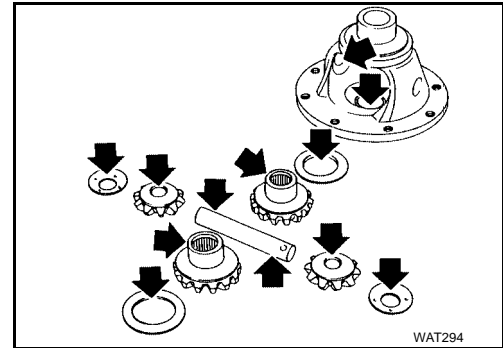


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Inspection

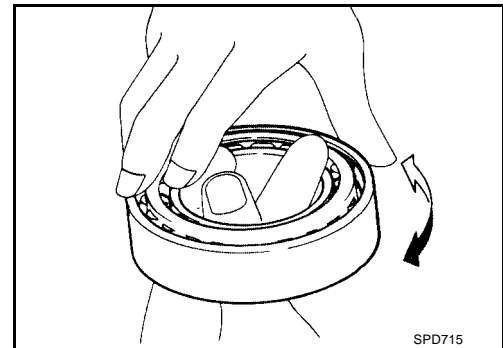
GEAR, WASHER, SHAFT AND CASE

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.



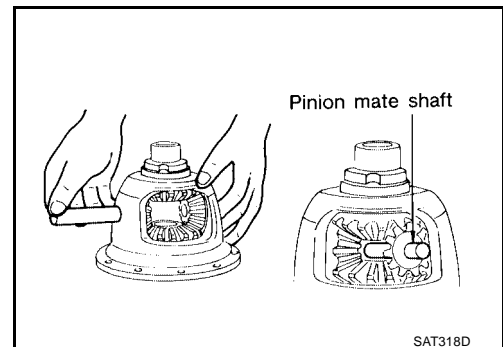
BEARINGS

- 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.**



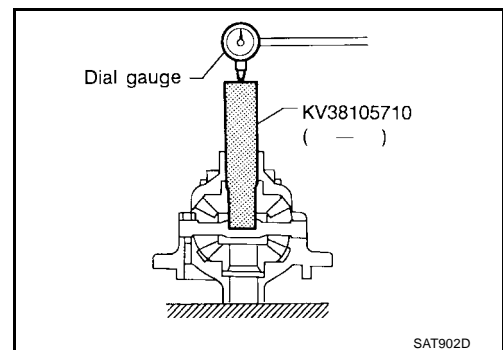
Assembly

1. Install side gear and thrust washers in differential case.
2. Install pinion mate gears and thrust washers in differential case while rotating them.
 - **When inserting, be careful not to damage pinion mate gear washers.**
 - **Apply ATF to any parts.**



3. Measure clearance between side gear and differential case with washers using the following procedure.
 - a. Set Tool and dial indicator on side gear.
 - b. Move side gear up and down to measure dial indicator deflection. Always measure indicator deflection on both side gears.

Clearance between side gear and differential case with washers : 0.1 - 0.2 mm (0.004 - 0.008 in)



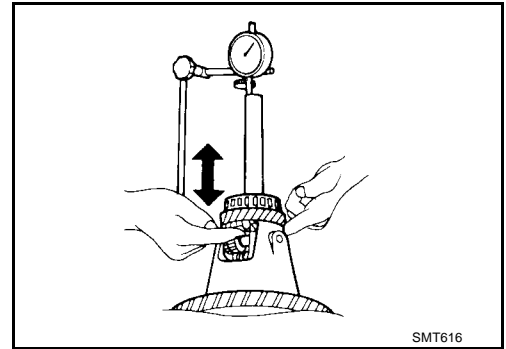
FINAL DRIVE

[RE4F03B]

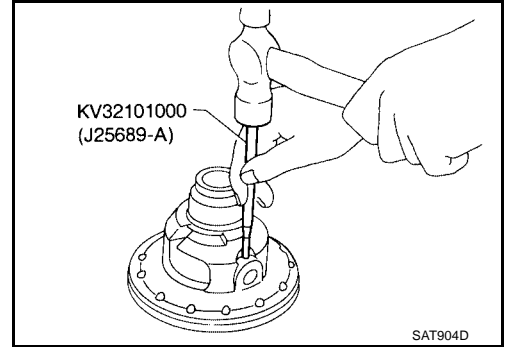
- c. If not within specification adjust clearance by changing thickness of side gear thrust washers.

Side gear thrust washer

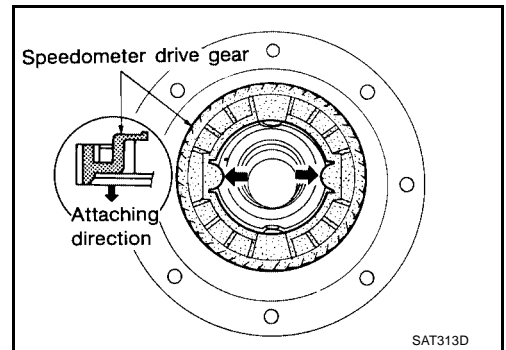
: Refer to [AT-390, "DIFFERENTIAL SIDE GEAR THRUST WASHERS"](#) .




4. Install lock pin.
● **Make sure that lock pin is flush with case.**

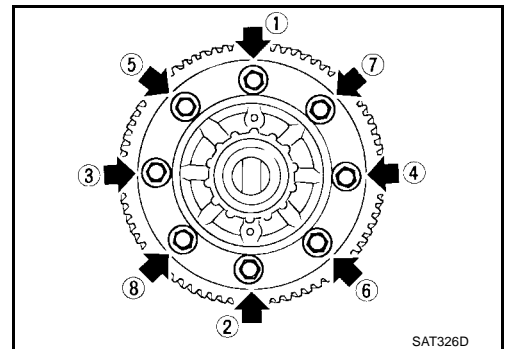


5. Install speedometer drive gear on differential case.
● **Align the projection of speedometer drive gear with the groove of differential case.**



6. Install final gear and tighten fixing bolts in numerical order.

 : **113 - 127 N·m (11.5 - 13.0 kg·m, 83 - 94 ft·lb)**

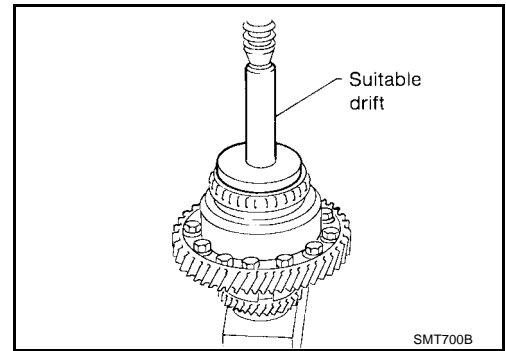


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FINAL DRIVE

[RE4F03B]

7. Press on differential side bearings.



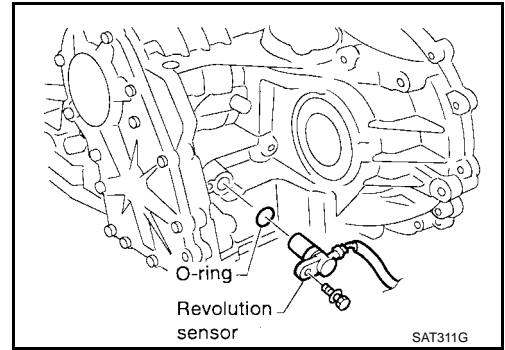
ASSEMBLY

PFP:00000

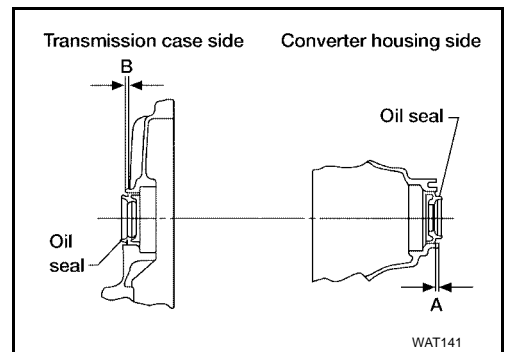
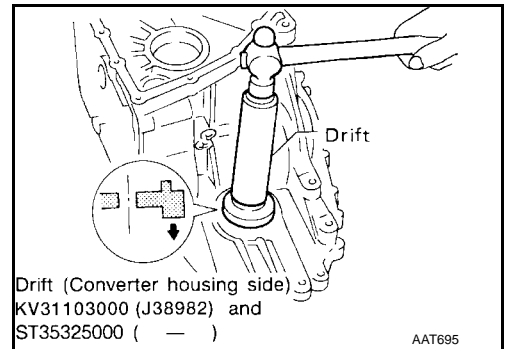
Assembly (1)

ECS00617

1. Install revolution sensor onto transmission case.
Always use new sealing parts.



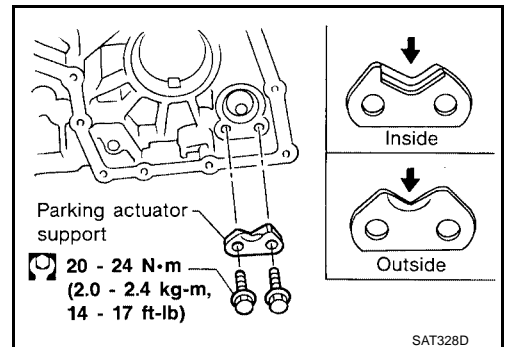
2. Install differential side oil seals on transmission case and converter housing, so that "A" and "B" are within specifications.



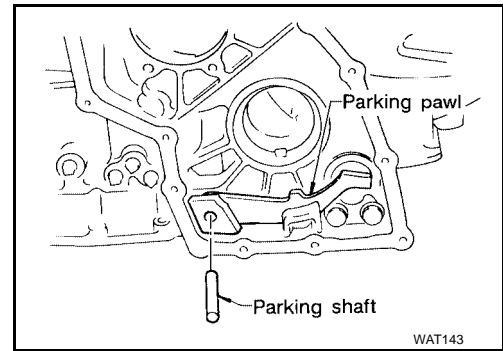
Unit: mm (in)

A	B
5.5 - 6.5 (0.217 - 0.256)	-0.5 to 0.5 (-0.020 to 0.020)

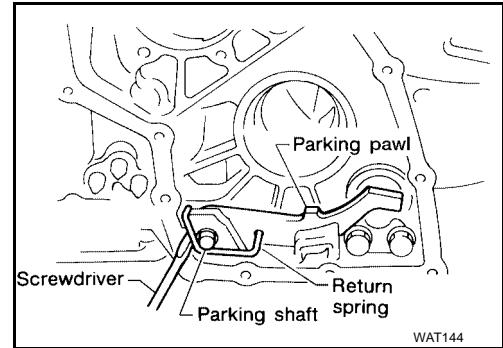
3. Install parking actuator support to transmission case.
 - Pay attention to direction of parking actuator support.



4. Install parking pawl on transmission case and fix it with parking shaft.



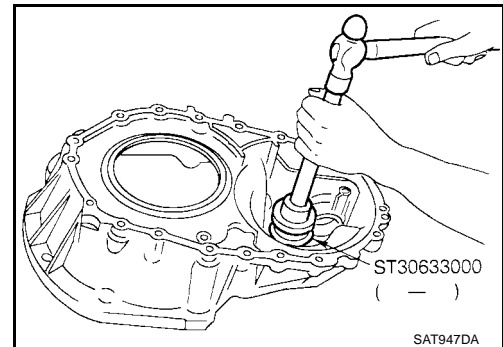
5. Install return spring.



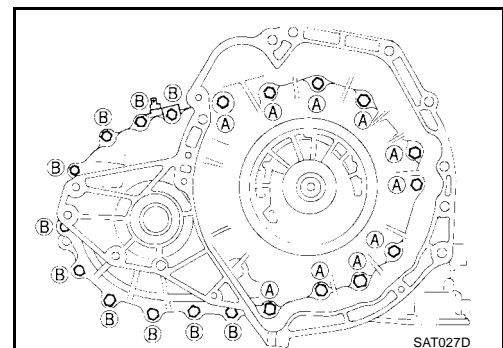
Adjustment (1) DIFFERENTIAL SIDE BEARING PRELOAD

ECS00618

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.

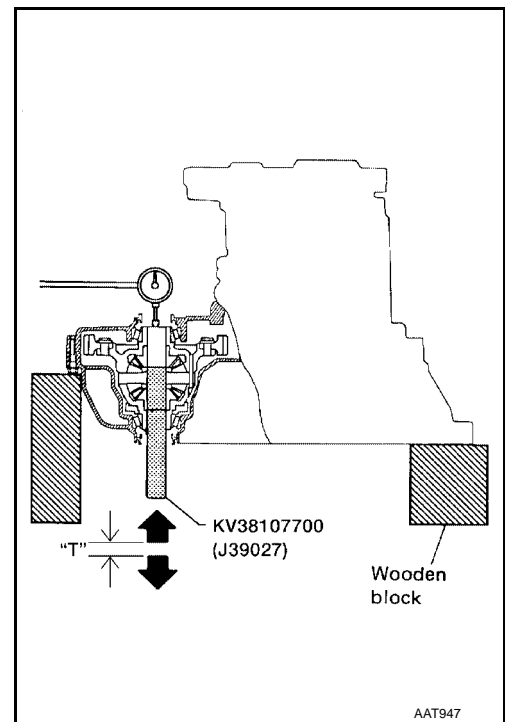


5. Attach dial indicator on differential case at transmission case side.
6. Insert Tool into differential side gear from converter housing.
7. Move Tool up and down and measure dial indicator deflection.

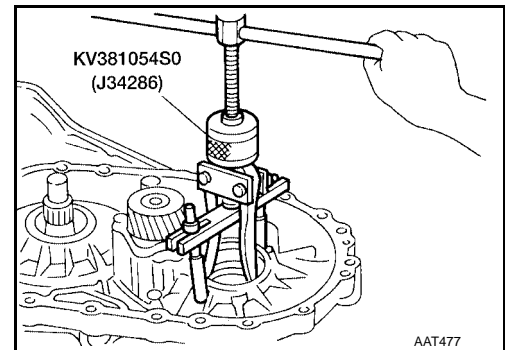
Differential side bearing preload "T" : 0.04 - 0.09 mm (0.0016 - 0.0035 in)

8. Select proper thickness of differential side bearing adjusting shim(s) using SDS table as a guide.

Differential side bearing adjusting shim : Refer to **AT-390, "DIFFERENTIAL SIDE BEARING ADJUSTING SHIMS"**.



9. Remove converter housing from transmission case.
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.

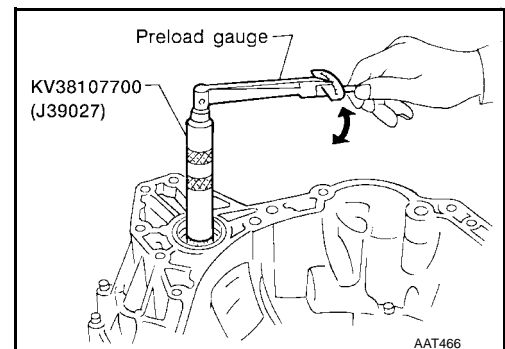


14. Insert Tool into differential case and measure turning torque of final drive assembly.

- Turn final drive assembly in both directions several times to seat bearing rollers correctly.

Turning torque of final drive assembly (New bearing) : 0.49 - 1.08 N·m (5.0 - 11.0 kg·cm, 4.3 - 9.5 in·lb)

- When old bearing is used again, turning torque will be slightly less than the above.
- Make sure torque is within the specified range.



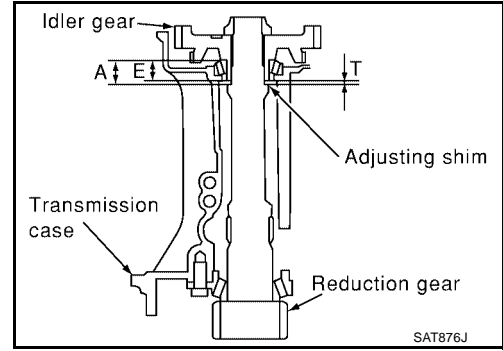
REDUCTION PINION GEAR BEARING PRELOAD

- 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.

$$T = A - E$$

Inspection standard for preload : 0.1 - 0.69 N·m (1.1 - 7.0 kg·cm, 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.

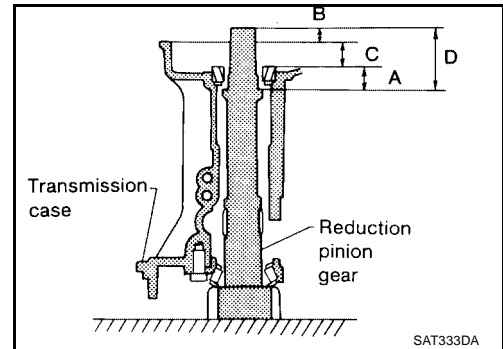
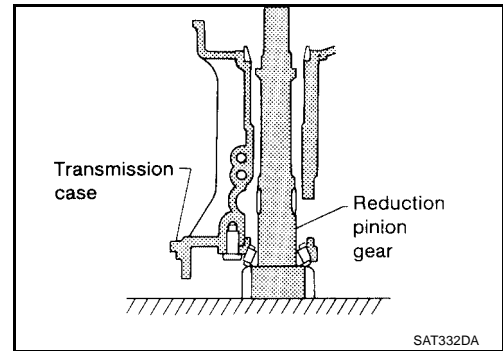


- b. Place idler gear bearing on transmission case.
- c. Measure dimensions "B", "C" and "D" and calculate dimension "A".

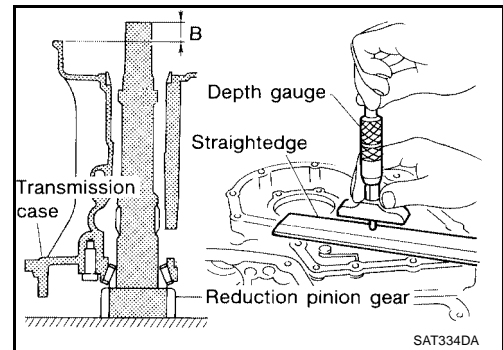
$$A = D - (B + C)$$

"A"

: Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.



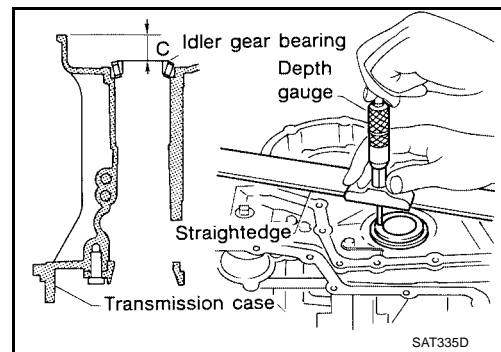
- Measure dimension "B" between the end of reduction pinion gear and the surface of transmission case.
- Measure dimension "B" in at least two places.



ASSEMBLY

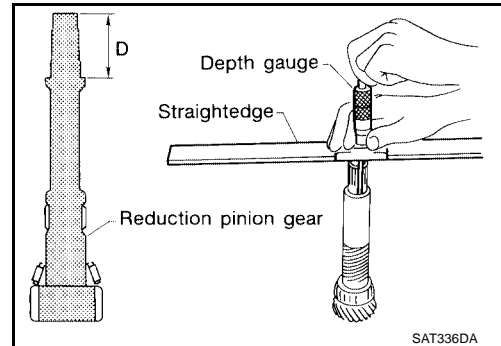
[RE4F03B]

- 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".

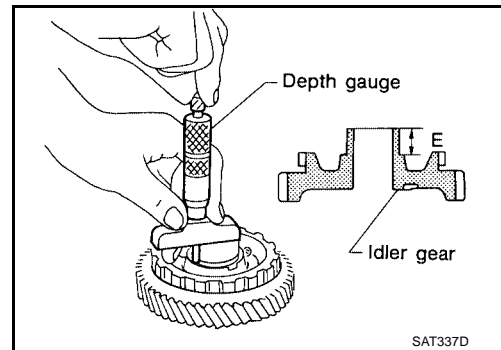
$$A = D - (B + C)$$



- 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.

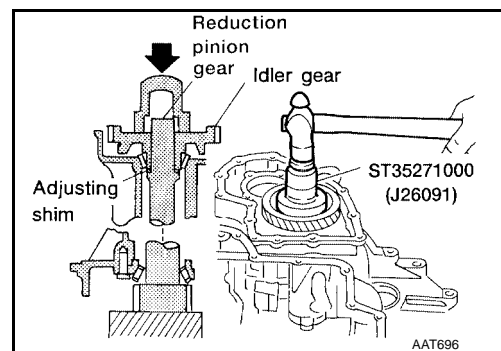
$$T = A - E - 0.05 \text{ mm (0.0020 in)*}$$

Reduction pinion gear bearing adjusting shim : Refer to [AT-392](#).
"REDUCTION PINION GEAR BEARING ADJUSTING SHIMS" .

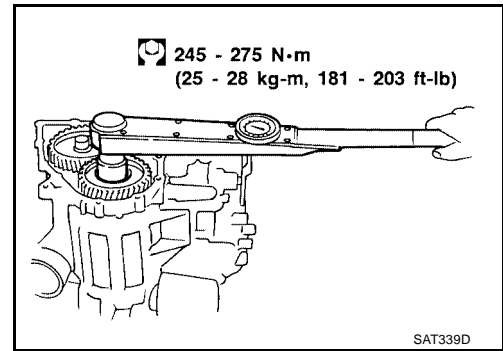


*: Bearing preload

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.

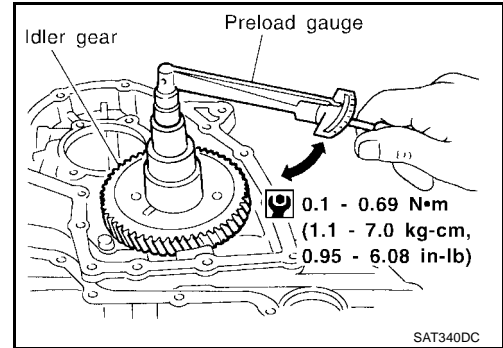


6. Tighten idler gear lock nut to the specified torque.
 - Lock idler gear with parking pawl when tightening lock nut.



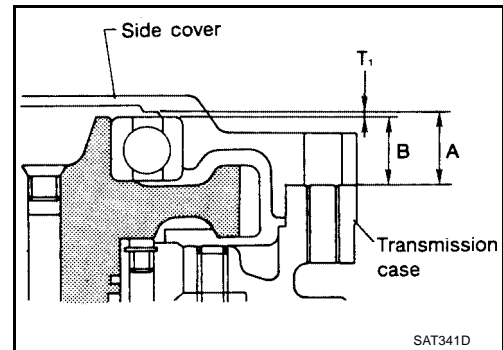
7. Measure turning torque of reduction pinion gear.
 - When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.

Turning torque of reduction pinion gear : 0.1 - 0.69 N·m (1.1 - 7.0 kg-cm, 0.95 - 6.08 in-lb)

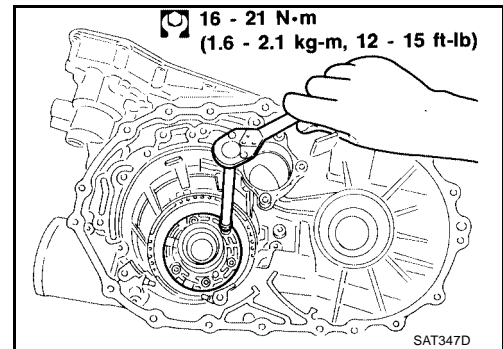


OUTPUT SHAFT END PLAY

- 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.



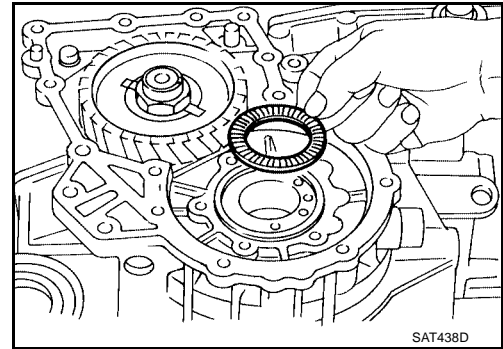
1. Install bearing retainer for output shaft.



ASSEMBLY

[RE4F03B]

2. Install output shaft thrust needle bearing on bearing retainer.

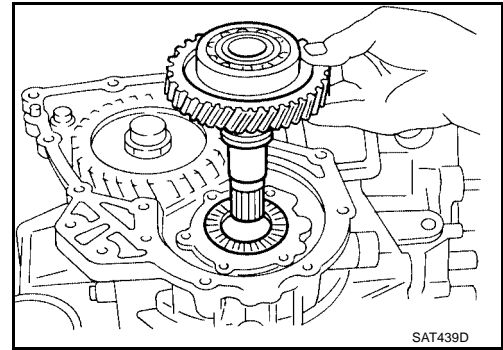


A

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3. Install output shaft on transmission case.



D

E

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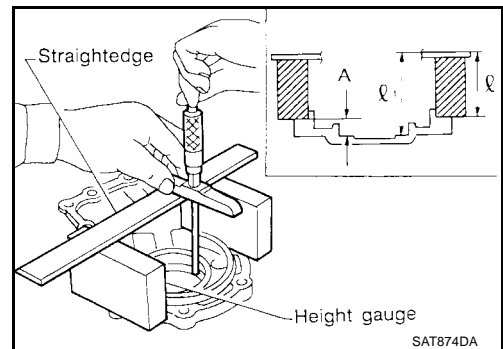
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4. Measure dimensions "l1" and "l2" at side cover and then calculate dimension "A".

- Measure dimension "l1" and "l2" in at least two places
"A": Distance between transmission case fitting surface and adjusting shim mating surface

$$A = l_1 - l_2$$

l_2 : Height of gauge



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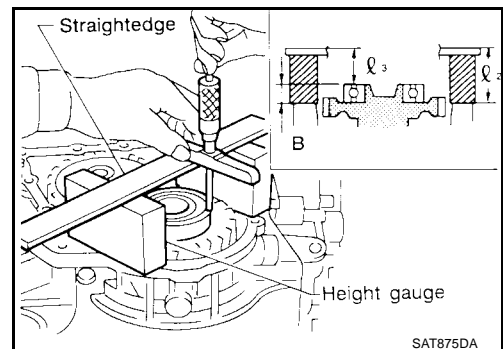
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5. Measure dimensions "l2" and "l3" and then calculate dimension "B".

- 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

$$B = l_2 - l_3$$

l_2 : Height of gauge



L

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ASSEMBLY

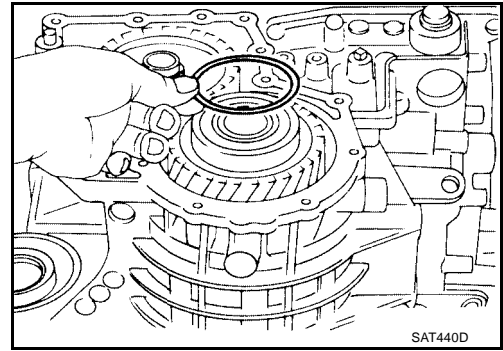
[RE4F03B]

6. Select proper thickness of adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications.

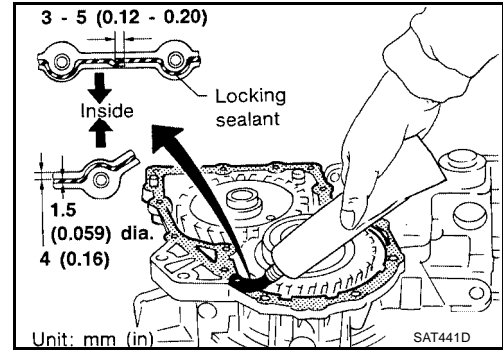
Output shaft end play (A – B) : 0 - 0.5 mm (0 - 0.020 in)

Output shaft end play adjusting shim : Refer to [AT-393, "OUTPUT SHAFT END PLAY ADJUSTING SHIMS"](#) .

7. Install adjusting shim on output shaft bearing.

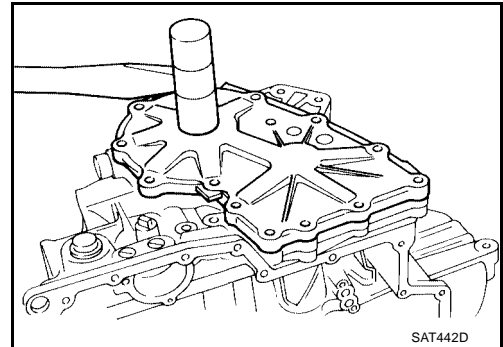


8. Apply locking sealant (Loctite 5/8 or equivalent) to transmission case as shown in illustration.



9. Install side cover on transmission case.

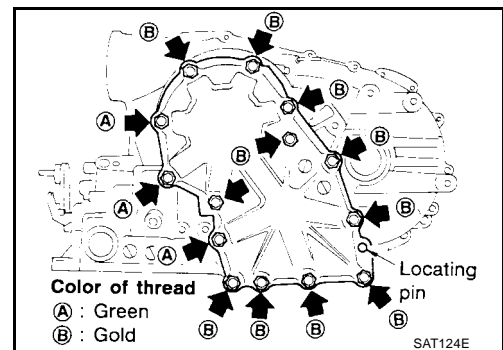
- **Apply locking sealant to the mating surface of transmission case.**



10. Tighten side cover fixing bolts to specified torque.

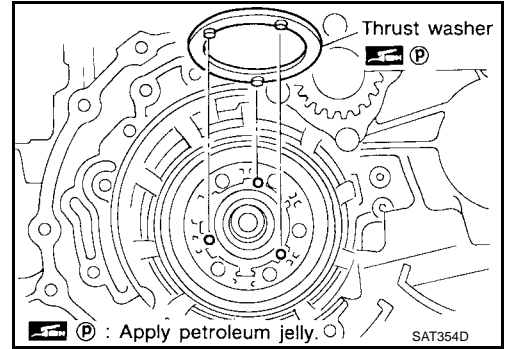
 : **26 - 30 N·m (2.7 - 3.1 kg-m, 20 - 22 ft-lb)**

- **Do not mix bolts A and B.**
- **Always replace bolts A as they are self-sealing bolts.**

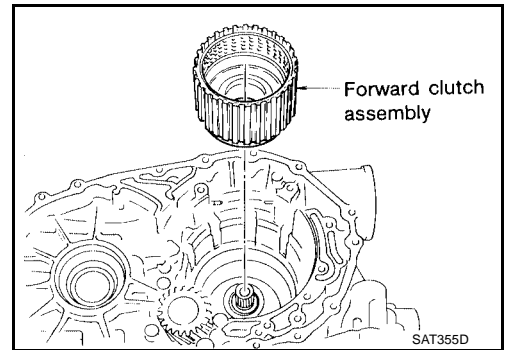


Assembly (2)

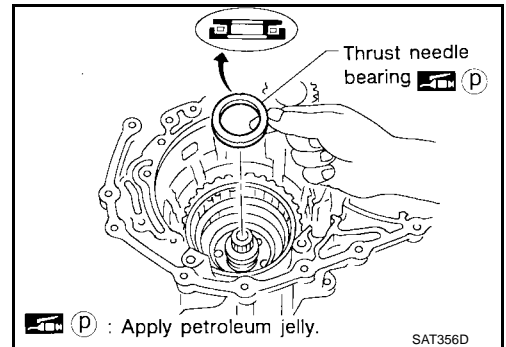
1. Remove paper rolled around bearing retainer.
2. Install thrust washer on bearing retainer.
 - Apply petroleum jelly to thrust washer.



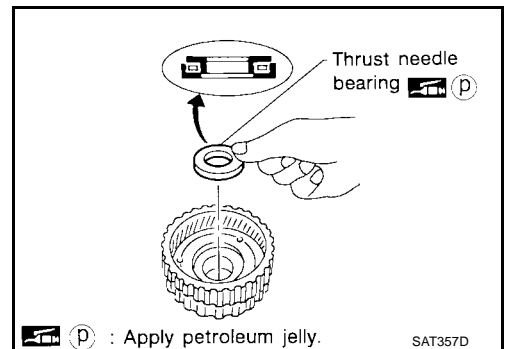
3. Install forward clutch assembly.
 - Align teeth of low & reverse brake drive plates before installing.
 - Make sure that bearing retainer seal rings are not spread.



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.

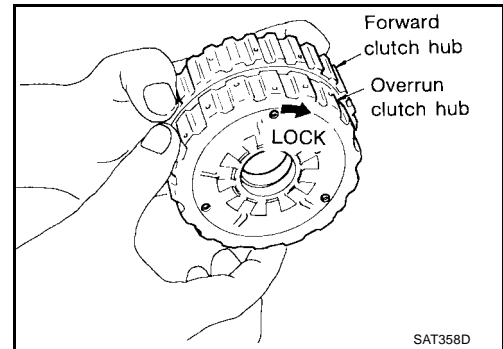


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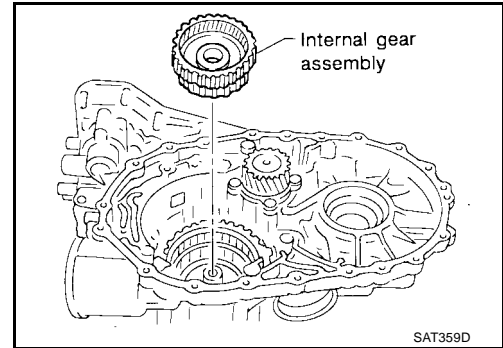
ASSEMBLY

[RE4F03B]

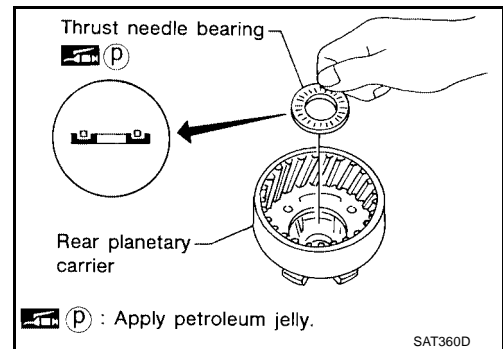
6. Hold forward clutch hub and turn overrun clutch hub.
Check overrun clutch hub for directions of lock and unlock.
- If not as shown in illustration, check installed direction of forward one-way clutch.



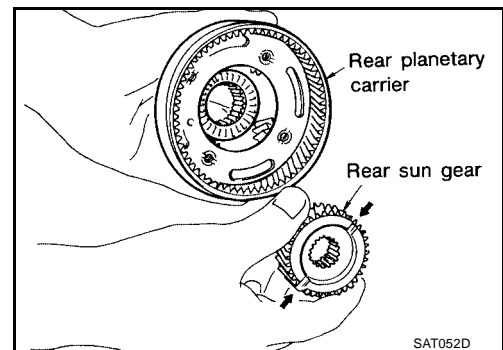
7. Install rear internal gear assembly.
- **Align teeth of forward clutch and overrun clutch drive plate.**



8. Install needle bearing on rear planetary carrier.
- **Apply petroleum jelly to needle bearing.**
 - **Pay attention to direction of needle bearing.**



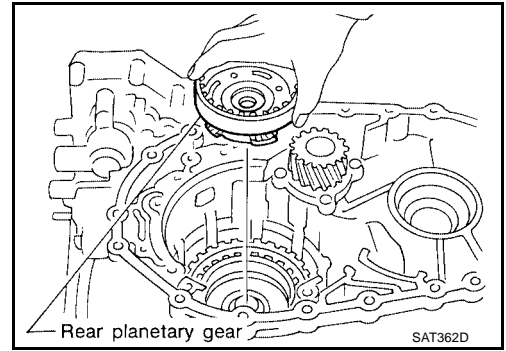
9. Install rear sun gear on rear planetary carrier.
- **Pay attention to direction of rear sun gear.**



ASSEMBLY

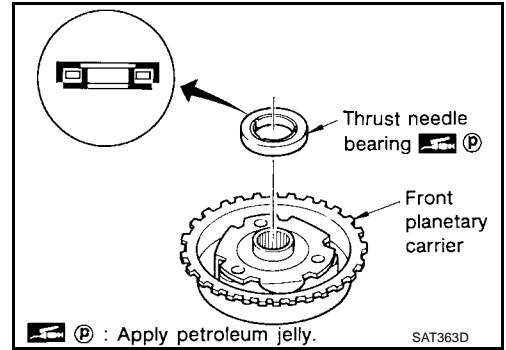
[RE4F03B]

10. Install rear planetary carrier on transmission case.



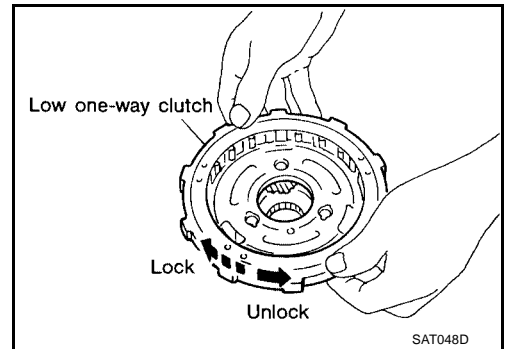
11. Install thrust needle bearing on front planetary carrier.

- Apply petroleum jelly to thrust needle bearing.
- Pay attention to direction of thrust needle bearing.

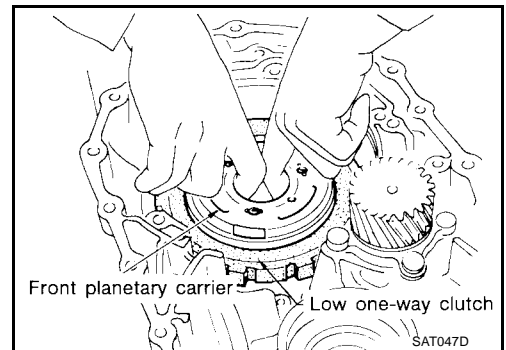


12. Install low one-way clutch to front planetary carrier by turning it in the direction of the arrow as shown.

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.



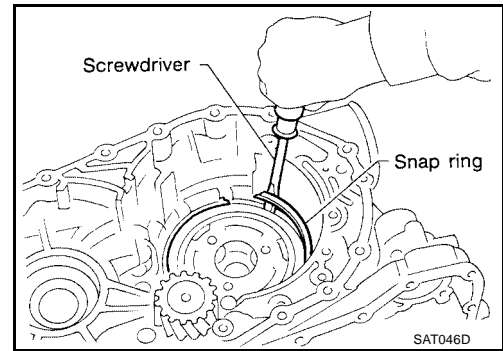
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ASSEMBLY

[RE4F03B]

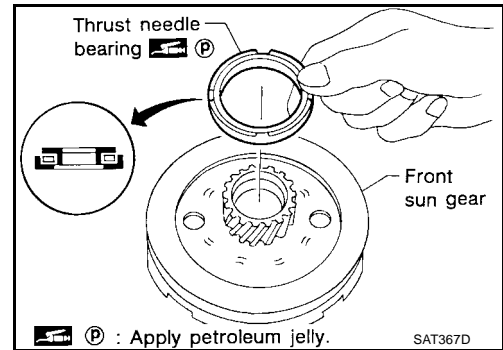
15. Install snap ring with screwdriver.

- Forward clutch and bearings must be correctly installed for snap ring to fit groove of transmission case.

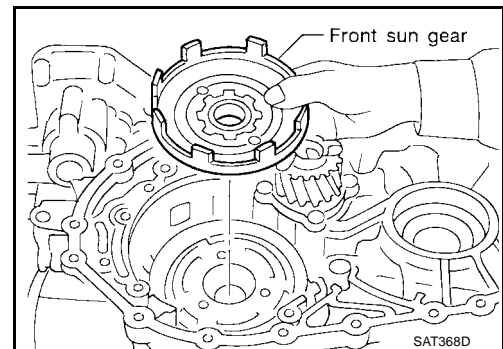


16. Install needle bearing on front sun gear.

- Apply petroleum jelly to needle bearing.
- Pay attention to direction of needle bearing.

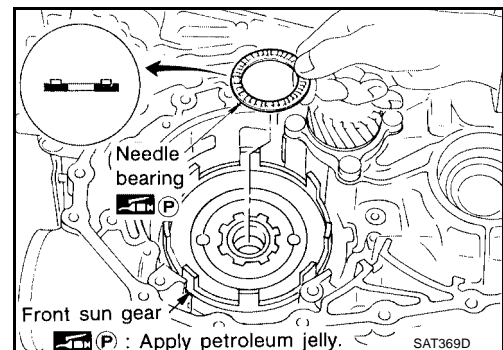


17. Install front sun gear on front planetary carrier.

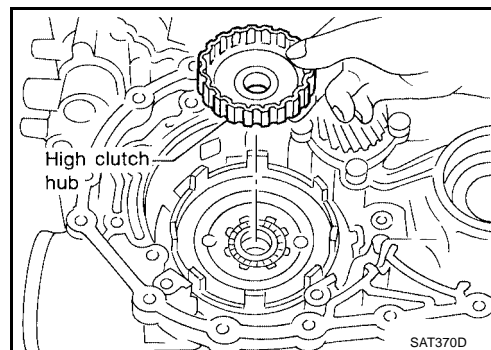


18. Install needle bearing on front sun gear.

- Apply petroleum jelly to needle bearing.
- Pay attention to direction of needle bearing.

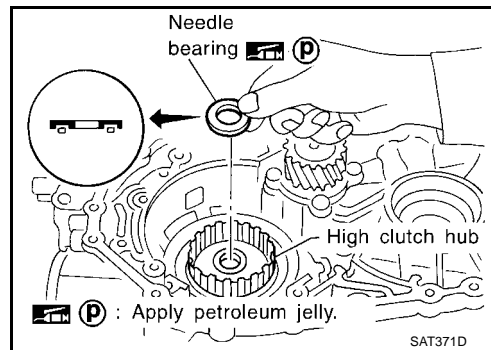


19. Install high clutch hub on front sun gear.



20. Install needle bearing on high clutch hub.

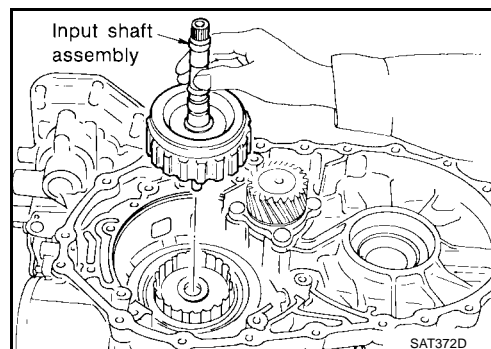
- Apply petroleum jelly to needle bearing.
- Pay attention to direction of needle bearing.



21. Remove paper rolled around input shaft.

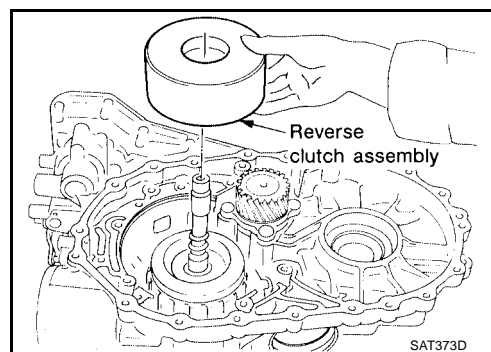
22. Install input shaft assembly.

- Align teeth of high clutch drive plates before installing.



23. Install reverse clutch assembly.

- Align teeth of reverse clutch drive plates before installing.



Adjustment (2)

ECS0061A

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	●	●

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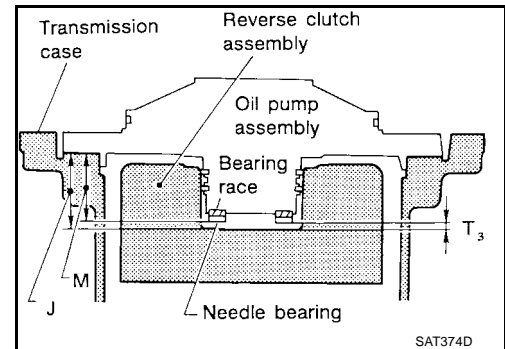
ASSEMBLY

[RE4F03B]

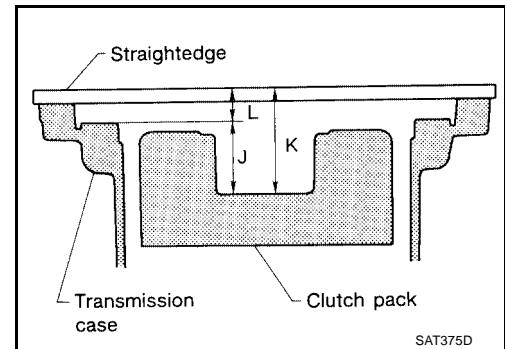
Part name	Total end play	Reverse clutch end play
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
High clutch drum	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●

TOTAL END PLAY

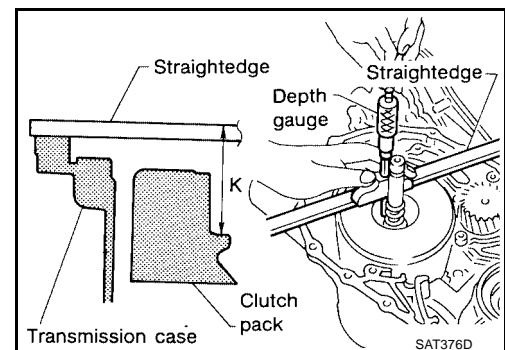
- Measure clearance between reverse clutch drum and needle bearing for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



1. Measure dimensions "K" and "L" and then calculate dimension "J".



- a. Measure dimension "K".

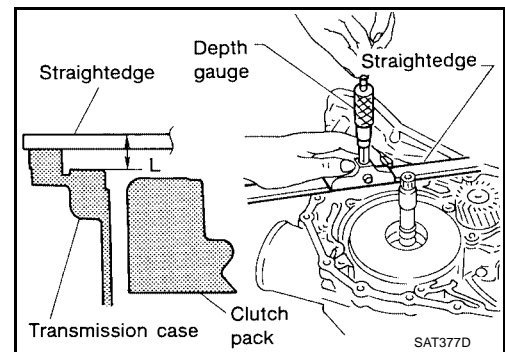


ASSEMBLY

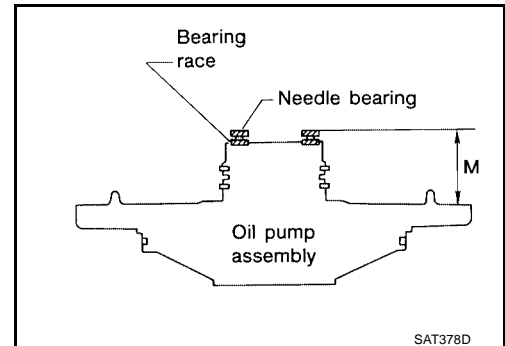
[RE4F03B]

- 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 drum

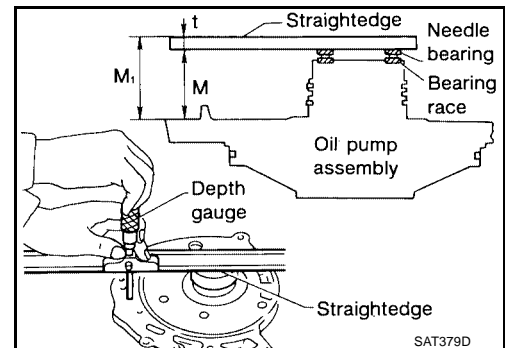
$$J = K - L$$



2. Measure dimension "M".



- 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".

$$M = M_1 - t$$

3. Adjust total end play "T3".

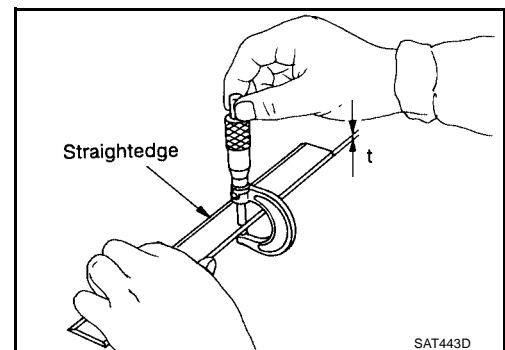
$$T_3 = J - M$$

Total end play "T3" : 0.25 - 0.55 mm (0.0098 - 0.0217 in)

- Select proper thickness of bearing race so that total end play is within specifications.

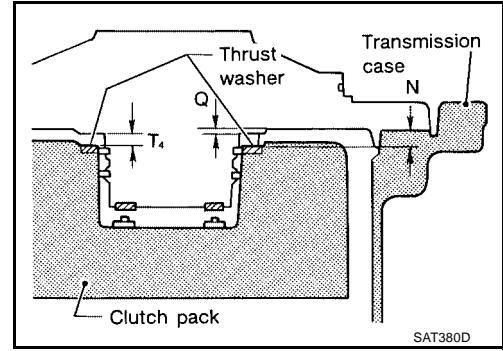
Bearing races

: Refer to [AT-394](#). "[BEARING RACE FOR ADJUSTING TOTAL END PLAY](#)"

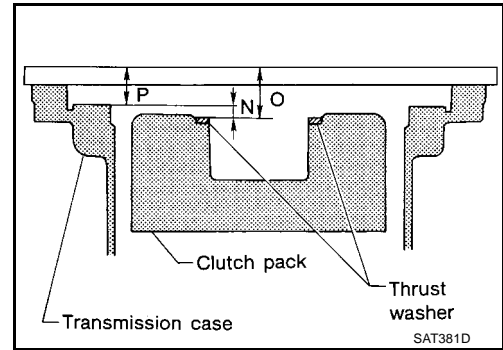


REVERSE CLUTCH END PLAY

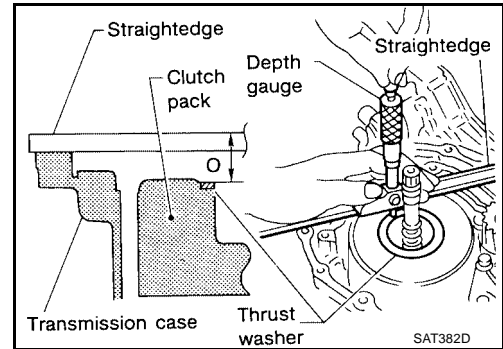
- Measure clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specifications.



1. Measure dimensions "O" and "P" and then calculate dimension "N".

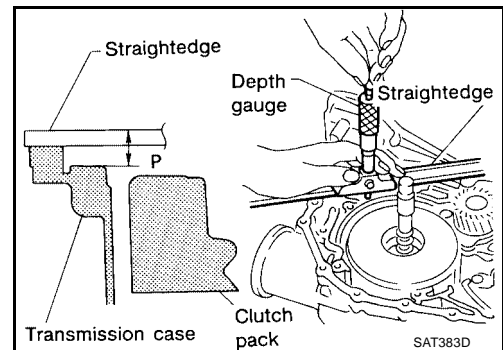


- a. Place thrust washer on reverse clutch drum.

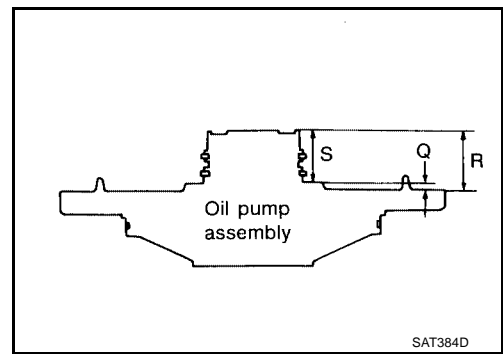


- b. Measure dimension "O".
 - c. Measure dimension "P".
 - d. Calculate dimension "N".
- "N": Distance between oil pump fitting surface of transmission case and thrust washer on reverse clutch drum**

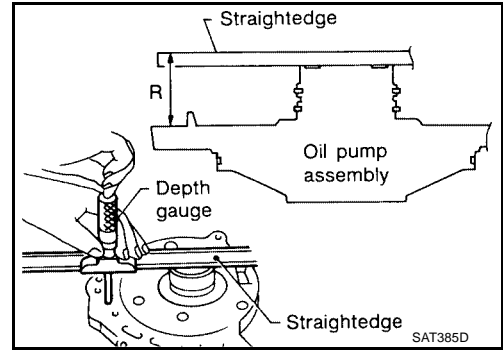
$$N = O - P$$



2. Measure dimensions "R" and "S" and then calculate dimension "Q".



- a. Measure dimension "R".



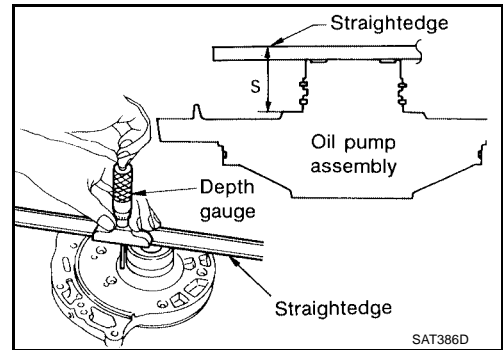
- b. Measure dimension "S".
 - c. Calculate dimension "Q".
- "Q": Distance between transmission case fitting surface and thrust washer mating surface**

$$Q = R - S$$

3. Adjust reverse clutch end play "T4".

$$T4 = N - Q$$

Reverse clutch end play : 0.65 - 1.00 mm (0.0256 - 0.0394 in)

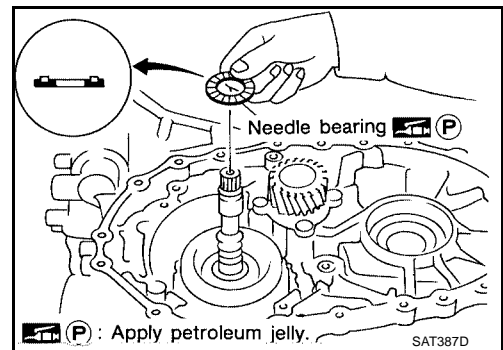


- Select proper thickness of thrust washer so that reverse clutch end play is within specifications.

Thrust washer : Refer to [AT-394](#), "[THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH END PLAY](#)"

Assembly (3)

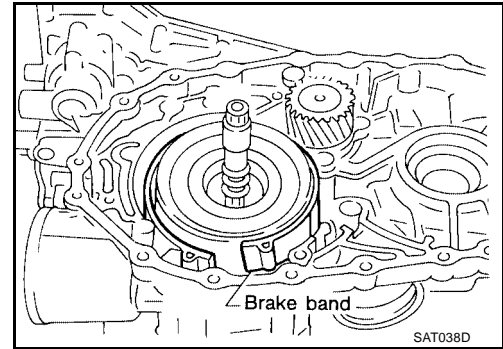
1. Remove reverse clutch assembly and install needle bearing on high clutch assembly.
 - Pay attention to direction of needle bearing.
2. Install reverse clutch assembly.



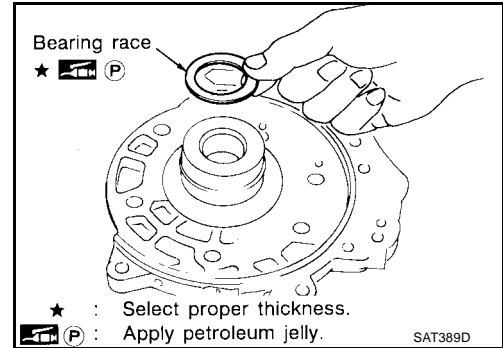
ASSEMBLY

[RE4F03B]

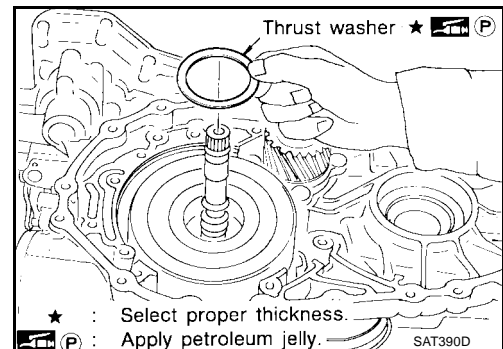
3. Install anchor end pin and lock nut on transmission case.
4. Place brake band on outside of reverse clutch drum. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.



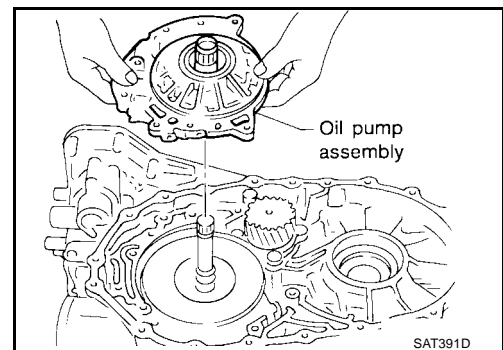
5. Place bearing race selected in total end play adjustment step on oil pump cover.
 - Apply petroleum jelly to bearing race.




6. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.
 - Apply petroleum jelly to thrust washer.

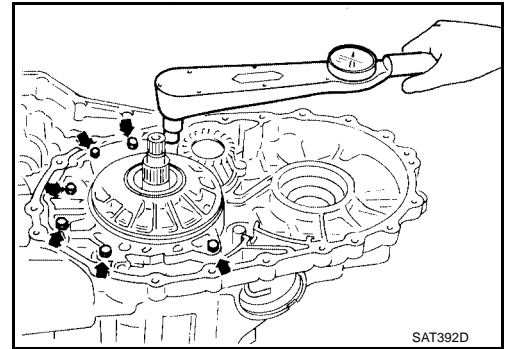


7. Install oil pump assembly on transmission case.



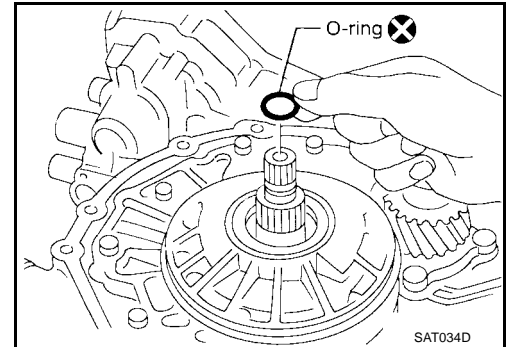
8. Tighten oil pump fixing bolts to specified torque.

 : 18 - 21 N·m (1.8 - 2.1 kg·m, 13 - 15 ft·lb)



9. Install O-ring to input shaft.

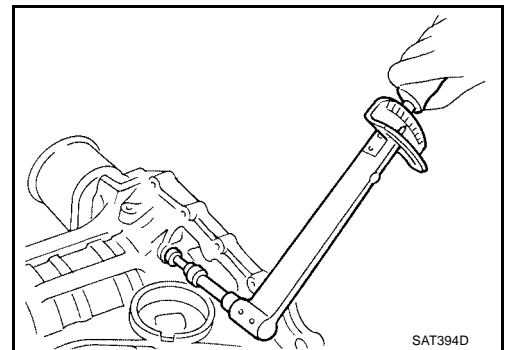
● Apply ATF to O-ring.



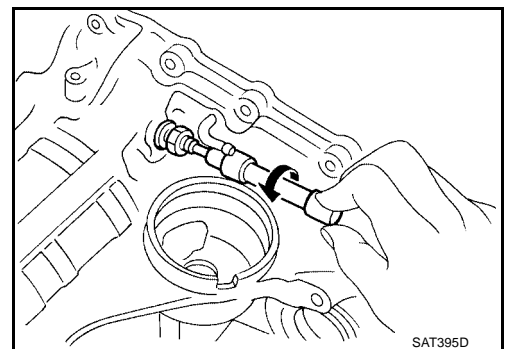
10. Adjust brake band.

a. Tighten anchor end pin to specified torque.

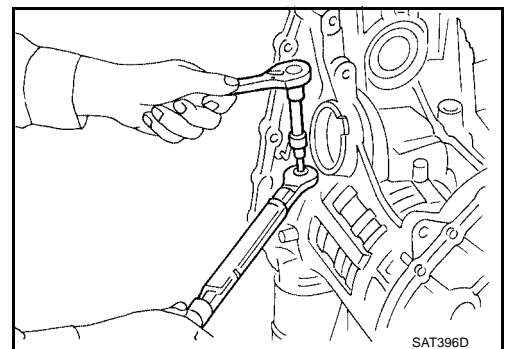
Anchor end pin : 3.9 - 5.9 N·m (0.4 - 0.6 kg·m, 35 - 52 in·lb)



b. Back off anchor end pin two and a half turns.

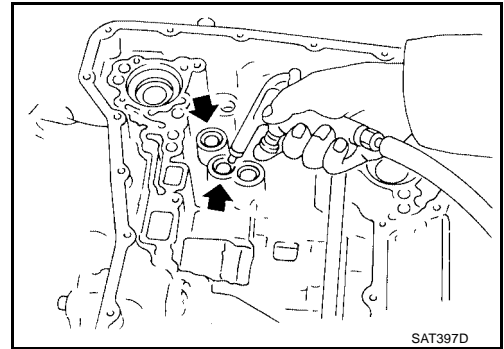


c. While holding anchor end pin, tighten lock nut.



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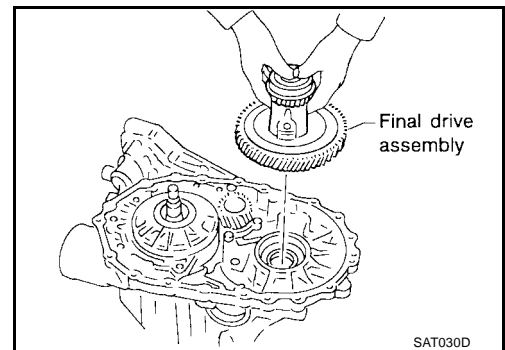
11. Apply compressed air to oil holes of transmission case and check operation of brake band.



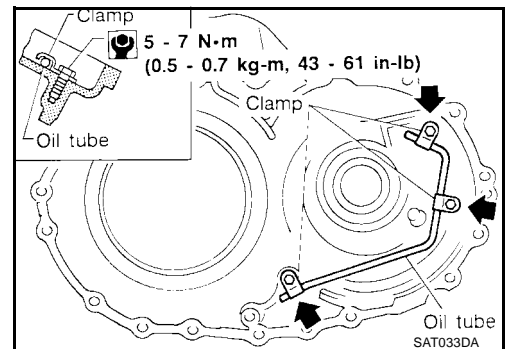
ECS0061C

Assembly (4)

1. Install final drive assembly on transmission case.



2. Install oil tube on converter housing.

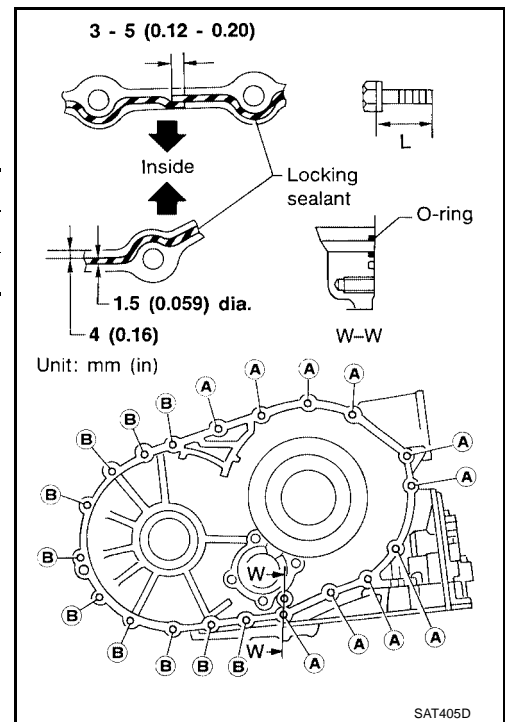


ASSEMBLY

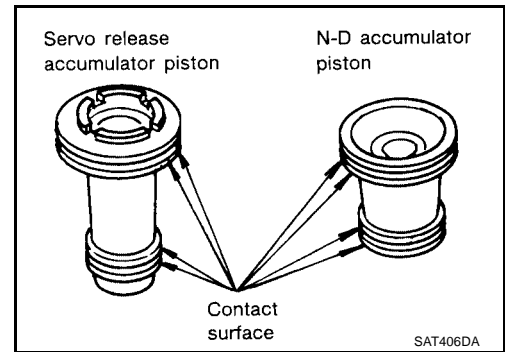
[RE4F03B]

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)
B	40 (1.57)

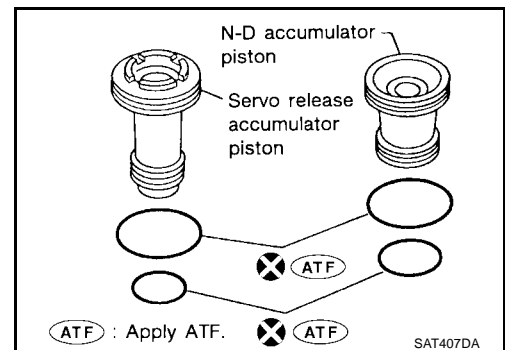


5. Install accumulator piston.
 - a. Check contact surface of accumulator piston for damage.



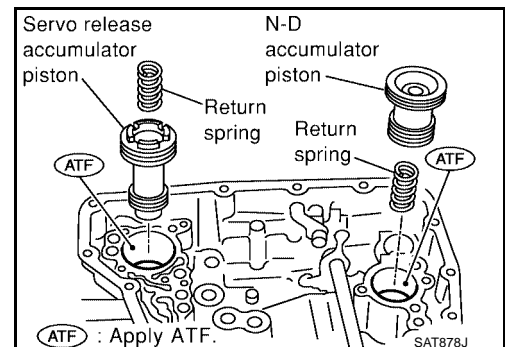
- b. Install O-rings on accumulator piston.
 - Apply ATF to O-rings.

Accumulator piston O-rings : Refer to [AT-394, "O-RING"](#) .

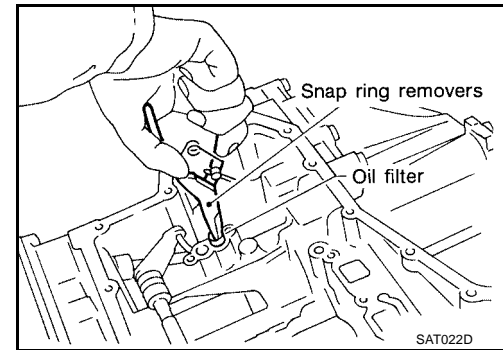
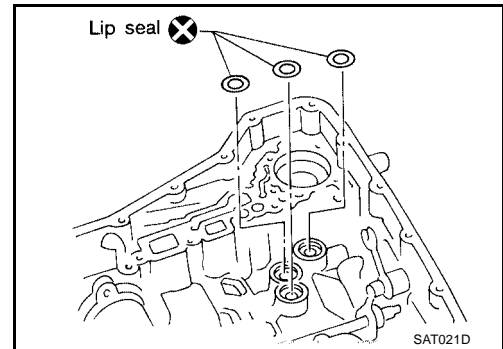


- c. Install accumulator pistons and return springs on transmission case.
 - **Apply ATF to inner surface of transmission case.**

Return springs : Refer to [AT-394, "RETURN SPRING"](#) .

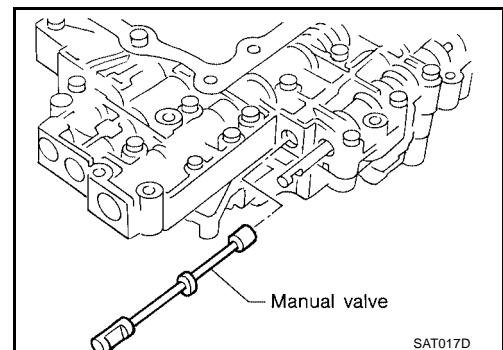


6. Install lip seals for band servo oil holes on transmission case.

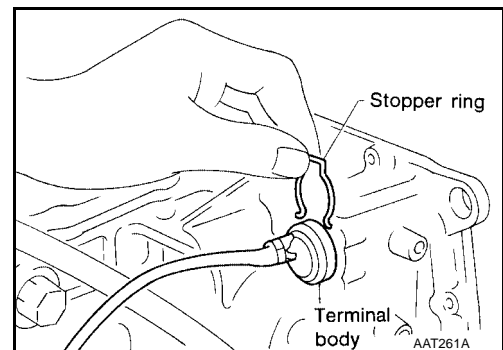


- Apply petroleum jelly to lip seals.

7. Install control valve assembly.
- a. Insert manual valve into control valve assembly.
- Apply ATF to manual valve.



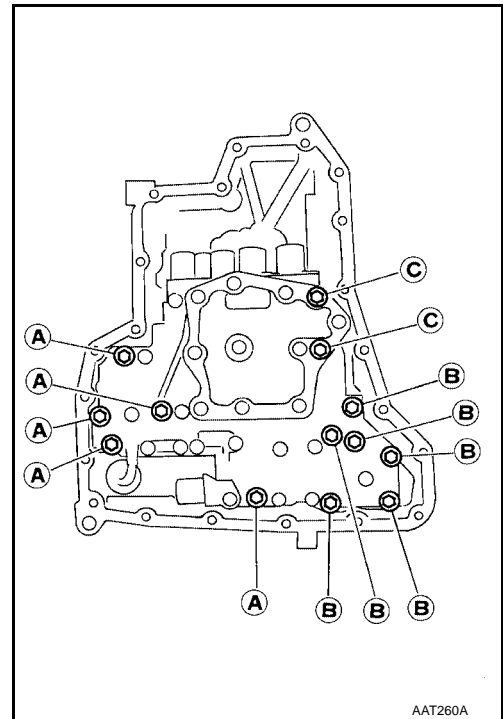
- b. Pass solenoid harness through transmission case and install terminal body on transmission case by pushing it.
- c. Install stopper ring to terminal body.



d. Tighten bolts **A** , **B** and **C** .



: 7 - 9 N-m (0.7 - 0.9 kg-m,
61 - 78 in-lb)



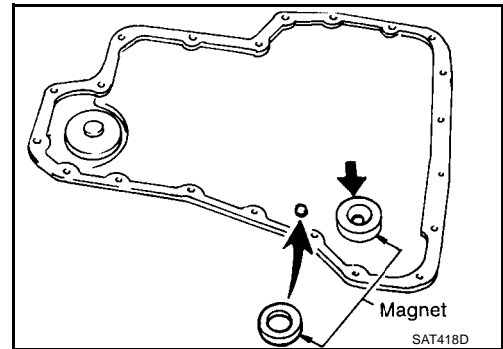
A
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Bolt length, number and location

Bolt symbol	A	B	C
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.



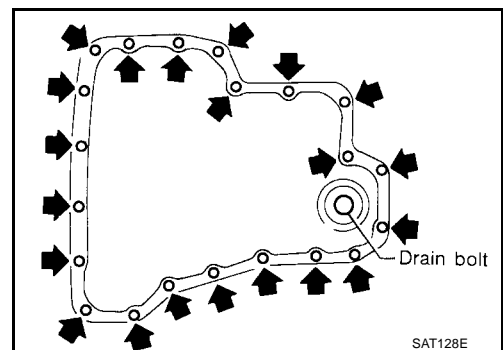
H
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b. Install new oil pan gasket on transmission case.

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.**

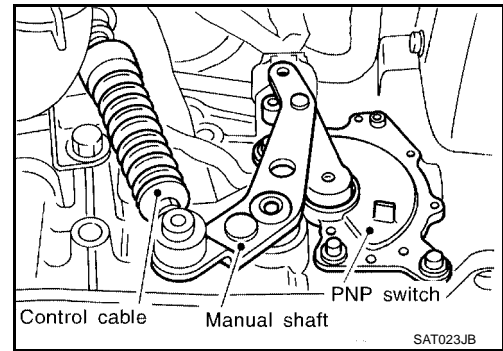
d. Tighten drain plug to specified torque.



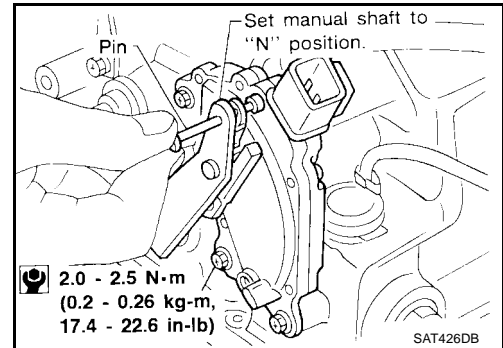
ASSEMBLY

[RE4F03B]

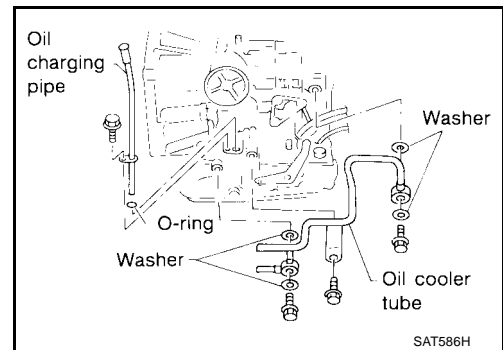
9. Install PNP switch.
 - a. Set manual shaft in "P" position.
 - b. Temporarily install PNP switch on manual shaft.
 - c. Move selector lever to "N" position.



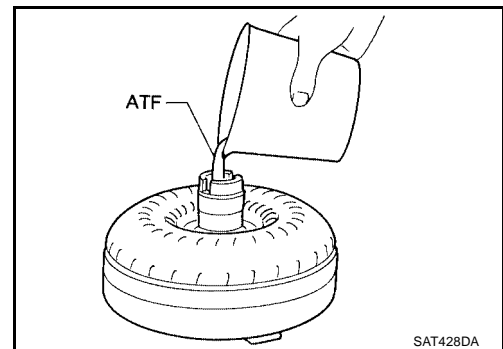
- d. Use a 4 mm (0.157 in) pin for this adjustment.
 1. Insert the pin straight into the manual shaft adjustment hole.
 2. Rotate PNP switch until the pin can also be inserted straight into hole in PNP switch.
- e. Tighten PNP switch fixing bolts.
- f. Remove pin from adjustment hole after adjusting PNP switch.



10. Install oil charging pipe and oil cooler tube to transmission case.



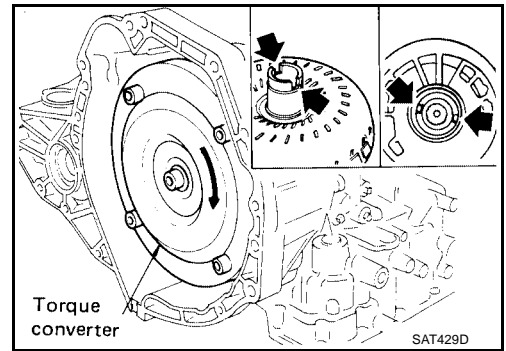
11. Install torque converter.
 - a. Pour ATF into torque converter.
 - **Approximately 1 liter (1-1/8 US qt, 7/8 Imp qt) of fluid is required for a new torque converter.**
 - **When reusing old torque converter, add the same amount of fluid as was drained.**



ASSEMBLY

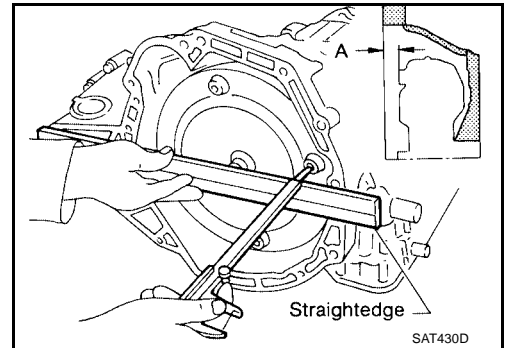
[RE4F03B]

- 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)



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SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F03B]

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ECS0061D

Engine		QG18DE
Automatic transaxle model		RE4F03B
Automatic transaxle assembly	Model code number	3AX60
Transaxle gear ratio	1st	2.861
	2nd	1.562
	3rd	1.000
	4th	0.698
	Reverse	2.230
	Final drive	3.827
Recommended fluid		Nissan Matic "D" (Continental U.S. and Alaska) or Genuine Nissan Automatic Transmission Fluid (Canada)*1
Fluid capacity		7.0l (7-3/8 US qt, 6-1/8 Imp qt)

*1: Refer to [MA-13, "Fluids and Lubricants"](#).

Shift Schedule VEHICLE SPEED WHEN SHIFTING GEARS QG18DE (Calif. CA Model)

ECS0061E

Throttle position	Shift pattern	Vehicle speed km/h (MPH)						
		D1 → D2	D2 → D3	D3 → D4	D4 → D3	D3 → D2	D2 → D1	12 → 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 pattern	Vehicle speed km/h (MPH)						
		D1 → D2	D2 → D3	D3 → D4	D4 → D3	D3 → D2	D2 → D1	12 → 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
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
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

ECS0061F

Engine model	Stall revolution rpm
QG18DE	2,350 - 2,800

SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F03B]

Line Pressure

ECS0061G

Engine speed rpm	Line pressure kPa (kg/cm ² , psi)			
	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

Unit: mm (in)

No.	Parts	Part No.*	Free length	Outer diameter	
Upper body Refer to AT-308 . "CON- TROL VALVE UPPER BODY".	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)
	23	Pilot valve spring	31742-3AX03	38.98 (1.5346)	8.9 (0.350)
	15	1-2 accumulator valve spring	31742-3AX00	20.5 (0.807)	6.95 (0.2736)
	28	1-2 accumulator piston spring	31742-3AX09	55.66 (2.1913)	19.5 (0.7677)
	33	1st reducing valve spring	31742-80X05	27.0 (1.063)	7.0 (0.276)
	2	Overrun clutch reducing valve spring	31742-80X06	37.5 (1.476)	7.0 (0.276)
	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)
Lower body Refer to AT-312 . "CON- TROL VALVE LOWER BODY".	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)
	23	Overrun clutch control valve spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	27	Accumulator control valve spring	31742-80X02	22.0 (0.866)	6.5 (0.256)
	29	Shift valve A spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	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)
	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

ECS0061I

Number of drive plates	2	
Number of driven plates	2	
Drive plate thickness mm (in)	Standard	2.0 (0.079)
	Allowable limit	1.8 (0.071)
Clearance mm (in)	Standard	0.5 - 0.8 (0.020 - 0.031)
	Allowable limit	1.2 (0.047)
Thickness of retaining plates	Thickness mm (in)	Part number*
	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.

SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F03B]

HIGH CLUTCH

Number of drive plates		3
Number of driven plates		5
Drive plate thickness mm (in)	Standard	2.0 (0.079)
	Allowable limit	1.8 (0.071)
Clearance mm (in)	Standard	1.4 - 1.8 (0.055 - 0.071)
	Allowable limit	2.4 (0.094)
Thickness of retaining plates	Thickness mm (in)	Part number*
	4.8 (0.189)	31537-32X05
	5.0 (0.197)	31537-32X06
	5.2 (0.205)	31537-32X07
	5.4 (0.213)	31537-32X08
	5.6 (0.220)	31537-32X09
	5.8 (0.228)	31537-32X10
6.0 (0.236)	31537-32X11	

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

FORWARD CLUTCH

Number of drive plates		5
Number of driven plates		5
Drive plate thickness mm (in)	Standard	1.8 (0.071)
	Allowable limit	1.6 (0.063)
Clearance mm (in)	Standard	0.45 - 0.85 (0.0177 - 0.0335)
	Allowable limit	1.85 (0.0728)
Thickness of retaining plate	Thickness mm (in)	Part number*
	3.6 (0.142)	31537-31X60
	3.8 (0.150)	31537-31X61
	4.0 (0.157)	31537-31X62
	4.2 (0.165)	31537-31X63
	4.4 (0.173)	31537-31X64
	4.6 (0.181)	31537-31X65

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

OVERRUN CLUTCH

Number of drive plates		3
Number of driven plates		4
Drive plate thickness mm (in)	Standard	1.6 (0.063)
	Allowable limit	1.4 (0.055)
Clearance mm (in)	Standard	1.0 - 1.4 (0.039 - 0.055)
	Allowable limit	2.0 (0.079)
Thickness of retaining plate	Thickness mm (in)	Part number*
	3.6 (0.142)	31567-31X79
	3.8 (0.150)	31567-31X80
	4.0 (0.157)	31567-31X81
	4.2 (0.165)	31567-31X82
	4.4 (0.173)	31567-31X83

*: 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

SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F03B]

Drive plate thickness mm (in)	Standard	2.0 (0.079)	
	Allowable limit	1.8 (0.071)	
Clearance mm (in)	Standard	1.4 - 1.8 (0.055 - 0.071)	
	Allowable limit	2.8 (0.110)	
Thickness of retaining plate	Thickness mm (in)	Part number*	
	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

ECS0061J

Unit: mm (in)

Parts	Free length	Outer diameter	Part number*	
Forward clutch (Overrun clutch)	Outer (16 pcs)	26.6 (1.047)	10.6 (0.417)	31505-31X02
	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)	0.02 - 0.04 (0.0008 - 0.0016)		
Thickness of inner gears and outer gears	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	
	Outer gear		
	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 housing and outer gear mm (in)	Standard	0.08 - 0.15 (0.0031 - 0.0059)	
	Allowable limit	0.15 (0.0059)	
Oil pump cover seal ring clearance mm (in)	Standard	0.1 - 0.25 (0.0039 - 0.0098)	
	Allowable limit	0.25 (0.0098)	

*: 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)
	Allowable limit	0.23 (0.0091)

SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F03B]

Planetary Carrier

ECS0061M

Unit: mm (in)

Clearance between planetary carrier and pinion washer	Standard	0.15 - 0.70 (0.0059 - 0.0276)
	Allowable limit	0.80 (0.0315)

Final Drive

ECS0061N

DIFFERENTIAL SIDE GEAR CLEARANCE

Clearance between side gear and differential case with washer	0.1 - 0.2 mm (0.004 - 0.008 in)
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DIFFERENTIAL SIDE GEAR THRUST WASHERS

Thickness mm (in)	Part number*
0.75 - 0.80 (0.0295 - 0.0315)	38424-D2111
0.80 - 0.85 (0.0315 - 0.0335)	38424-D2112
0.85 - 0.90 (0.0335 - 0.0354)	38424-D2113
0.90 - 0.95 (0.0354 - 0.0374)	38424-D2114
0.95 - 1.00 (0.0374 - 0.0394)	38424-D2115

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

BEARING PRELOAD

Differential side bearing preload "T"	0.04 - 0.09 mm (0.0016 - 0.0035 in)
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TURNING TORQUE

Turning torque of final drive assembly	0.49 - 1.08 N-m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb)
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DIFFERENTIAL SIDE BEARING ADJUSTING SHIMS

Thickness mm (in)	Part number*
0.40 (0.0157)	31499-21X07
0.44 (0.0173)	31499-21X08
0.48 (0.0189)	31499-21X09
0.52 (0.0205)	31499-21X10
0.56 (0.0220)	31499-21X11
0.60 (0.0236)	31499-21X12
0.64 (0.0252)	31499-21X13
0.68 (0.0268)	31499-21X14
0.72 (0.0283)	31499-21X15
0.76 (0.0299)	31499-21X16
0.80 (0.0315)	31499-21X17
0.84 (0.0331)	31499-21X18
0.88 (0.0346)	31499-21X19
0.92 (0.0362)	31499-21X20
1.44 (0.0567)	31499-21X21

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

SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F03B]

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)

Reduction Pinion Gear BEARING PRELOAD

ECS00610

Reduction pinion gear bearing preload	0.05 mm (0.0020 in)
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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)
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SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F03B]

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.

SERVICE DATA AND SPECIFICATIONS (SDS)

[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

ECS0061P

Unit: mm (in)

Output shaft seal ring clearance	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

END PLAY

Output shaft end play	0 - 0.5 mm (0 - 0.020 in)
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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)
	Allowable limit	0.25 (0.0098)

SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F03B]

Total End Play

ECS0061R

Total end play "T3 "	0.25 - 0.55 mm (0.0098 - 0.0217 in)
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BEARING RACE FOR ADJUSTING TOTAL END PLAY

Thickness mm (in)	Part number*
0.6 (0.024)	31435-31X01
0.8 (0.031)	31435-31X02
1.0 (0.039)	31435-31X03
1.2 (0.047)	31435-31X04
1.4 (0.055)	31435-31X05
1.6 (0.063)	31435-31X06
1.8 (0.071)	31435-31X07
2.0 (0.079)	31435-31X08

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

Reverse Clutch End Play

ECS0061S

Reverse clutch end play "T4 "	0.65 - 1.00 mm (0.0256 - 0.0394 in)
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THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH END PLAY

Thickness mm (in)	Part number*
0.65 (0.0256)	31508-31X10
0.80 (0.0315)	31508-31X11
0.95 (0.0374)	31508-31X12
1.10 (0.0433)	31508-31X13
1.25 (0.0492)	31508-31X14
1.40 (0.0551)	31508-31X15

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

Accumulator O-RING

ECS0061T

Unit: mm (in)

Accumulator	Diameter (Small)	Part number*	Diameter (Large)	Part number*
Servo release accumulator	26.9 (1.059)	31526-41X03	44.2 (1.740)	31526-41X02
N-D accumulator	34.6 (1.362)	31526-31X08	39.4 (1.551)	31672-21X00

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

RETURN SPRING

Unit: mm (in)

Accumulator	Free length	Outer diameter	Part number*
Servo release accumulator spring	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

ECS0061U

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)
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SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F03B]

Shift Solenoid Valves

ECS0061W

Gear	Solenoid A	Solenoid B
1st	ON	ON
2nd	OFF	ON
3rd	OFF	OFF
4th	ON	OFF

Solenoid Valve

ECS0061X

Solenoid valve	Resistance (Approx.)	Terminal 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

A/T Fluid Temperature Sensor

ECS0061Y

Monitor Item	Condition	Specification (Approx.)	
		A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]

Revolution Sensor

ECS0061Z

Condition	Judgement standard
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.	Approximately 150 Hz
When vehicle not moving.	Under 1.3V or over 4.5V

Dropping Resistor

ECS00620

Resistance	10 - 15Ω
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TROUBLE DIAGNOSIS - INDEX

[RE4F04B]

TROUBLE DIAGNOSIS - INDEX

PFP:00000

Alphabetical & P No. Index for DTC ALPHABETICAL INDEX FOR DTC

ECS00621

Items (CONSULT-II screen terms)	DTC	Reference page
	CONSULT-II GST*1	
A/T 1ST GR FNCTN	P0731	AT-512
A/T 2ND GR FNCTN	P0732	AT-517
A/T 3RD GR FNCTN	P0733	AT-522
A/T 4TH GR FNCTN	P0734	AT-527
A/T TCC S/V FNCTN	P0744	AT-539
ATF TEMP SEN/CIRC	P0710	AT-497
ENGINE SPEED SIG	P0725	AT-508
L/PRESS SOL/CIRC	P0745	AT-547
O/R CLTCH SOL/CIRC	P1760	AT-568
PNP SW/CIRC	P0705	AT-491
SFT SOL A/CIRC*2	P0750	AT-553
SFT SOL B/CIRC*2	P0755	AT-558
TCC SOLENOID/CIRC	P0740	AT-534
TP SEN/CIRC A/T*2	P1705	AT-563
VEH SPD SEN/CIR AT*3	P0720	AT-503
CAN COMM CIRCUIT	U1000	AT-590

*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.

TROUBLE DIAGNOSIS - INDEX

[RE4F04B]

P NO. INDEX FOR DTC

DTC	Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*1		
P0705	PNP SW/CIRC	AT-491
P0710	ATF TEMP SEN/CIRC	AT-497
P0720	VEH SPD SEN/CIR AT*3	AT-503
P0725	ENGINE SPEED SIG	AT-508
P0731	A/T 1ST GR FNCTN	AT-512
P0732	A/T 2ND GR FNCTN	AT-517
P0733	A/T 3RD GR FNCTN	AT-522
P0734	A/T 4TH GR FNCTN	AT-527
P0740	TCC SOLENOID/CIRC	AT-534
P0744	A/T TCC S/V FNCTN	AT-539
P0745	L/PRESS SOL/CIRC	AT-547
P0750	SFT SOL A/CIRC*2	AT-553
P0755	SFT SOL B/CIRC*2	AT-558
P1705	TP SEN/CIRC A/T*2	AT-563
P1760	O/R CLTCH SOL/CIRC	AT-568
U1000	CAN COMM CIRCUIT	AT-590

*1: These numbers are prescribed by SAE J2012.

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

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PRECAUTIONS

PF0:00001

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

ECS00622

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

ECS00623

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.

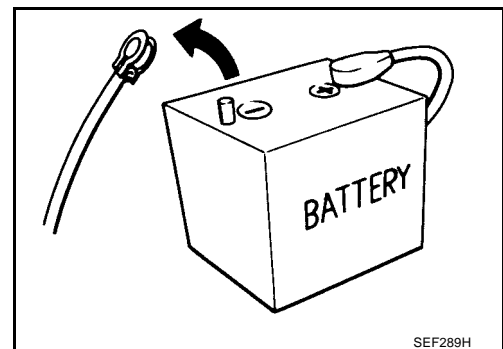
CAUTION:

- 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

ECS00624

- 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.

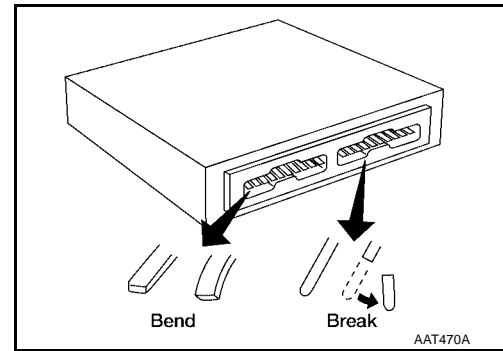


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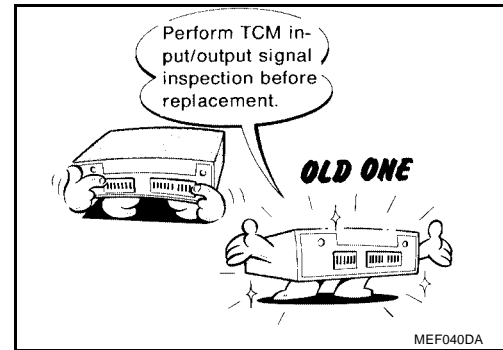
PRECAUTIONS

[RE4F04B]

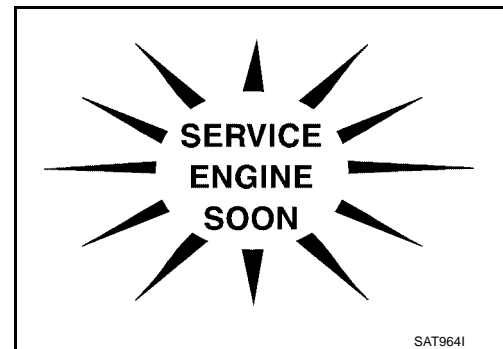
- When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).
Make sure that there are not any bends or breaks on TCM pin terminal, when connecting pin connectors.



- Before replacing TCM, perform TCM input/output signal inspection and verify whether TCM functions properly or not. Refer to [AT-420, "INPUT/OUTPUT SIGNAL OF TCM"](#).



- After performing each TROUBLE DIAGNOSIS, perform "DTC (Diagnostic Trouble Code) CONFIRMATION PROCEDURE".
The DTC should not be displayed in the "DTC CONFIRMATION 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 [AT-400, "ATF COOLER SERVICE"](#).
- 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"](#).

Service Notice or Precautions

FAIL-SAFE

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 [AT-442, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#)].

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 [AT-450, "Work Flow"](#) .

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 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.
- 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 [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 [AT-433](#) 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 [AT-430](#) 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 [EC-1260, "ON BOARD DIAGNOSTIC \(OBD\) SYSTEM"](#) .

- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector.**

PRECAUTIONS

[RE4F04B]

For description and how to disconnect, refer to [GI-23, "How to Check Terminal"](#) .

Wiring Diagrams and Trouble Diagnosis

ECS00626

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"](#)

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PREPARATION

[RE4F04B]

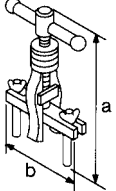
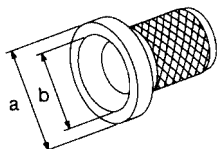
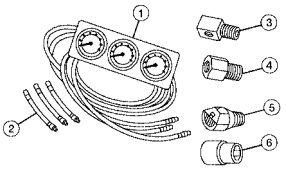
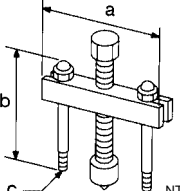
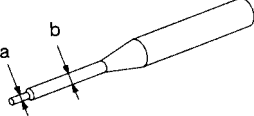
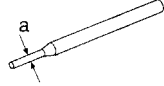
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ECS00627

PREPARATION


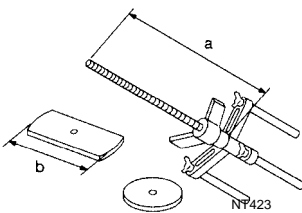
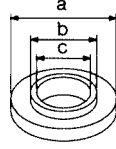
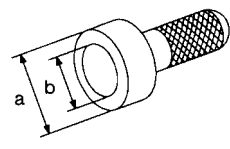
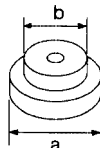
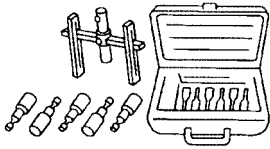
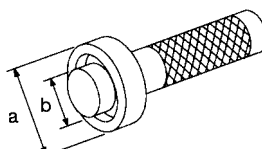
Special Service Tools

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV381054S0 (J34286) Puller	 <ul style="list-style-type: none"> ● Removing differential side oil seals ● Removing differential side bearing outer race ● Removing idler gear bearing outer race <p>a: 250 mm (9.84 in) b: 160 mm (6.30 in)</p>
ST33400001 (J26082) Drift	 <ul style="list-style-type: none"> ● Installing differential side oil seal F04B and F04W (RH side) ● Installing oil seal on oil pump housing <p>a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.</p>
(J34301-C) Oil pressure gauge set 1 (J34301-1) Oil pressure gauge 2 (J34301-2) Hoses 3 (J34298) Adapter 4 (J34282-2) Adapter 5 (790-301-1230-A) 60° Adapter 6 (J34301-15) Square socket	 <ul style="list-style-type: none"> ● Measuring line pressure
ST27180001 (J25726-A) Puller	 <ul style="list-style-type: none"> ● Removing idler gear <p>a: 100 mm (3.94 in) b: 110 mm (4.33 in) c: M8 x 1.25P</p>
ST23540000 (J25689-A) Pin punch	 <ul style="list-style-type: none"> ● Removing and installing parking rod plate and manual plate pins <p>a: 2.3 mm (0.091 in) dia. b: 4 mm (0.16 in) dia.</p>
ST25710000 (J25689-A) Pin punch	 <ul style="list-style-type: none"> ● Aligning groove of manual shaft and hole of transmission case <p>a: 2 mm (0.08 in) dia.</p>

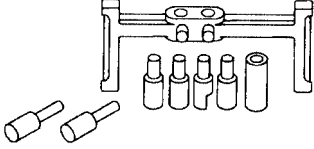
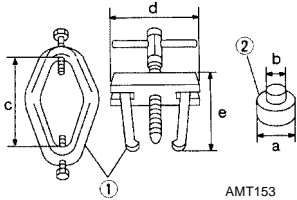
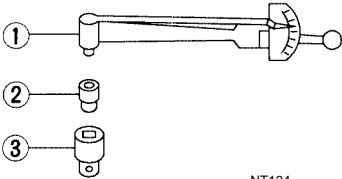
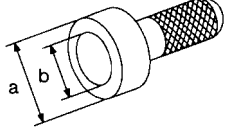
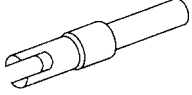
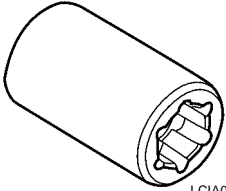
PREPARATION

[RE4F04B]

Tool number (Kent-Moore No.) Tool name	Description	
KV32101000 (J25689-A) Pin punch  NT410	<ul style="list-style-type: none"> ● Removing and installing manual shaft retaining pin ● Removing and installing pinion mate shaft lock pin <p>a: 4 mm (0.16 in) dia.</p>	A B AT
KV31102400 (J34285 and J34285-87) Clutch spring compressor  NT423	<ul style="list-style-type: none"> ● Removing and installing clutch return springs ● Installing low and reverse brake piston <p>a: 320 mm (12.60 in) b: 174 mm (6.85 in)</p>	D E
KV40100630 (J26092) Drift  NT107	<ul style="list-style-type: none"> ● Installing reduction gear bearing inner race ● Installing idler gear bearing inner race <p>a: 67.5 mm (2.657 in) dia. b: 44 mm (1.73 in) dia. c: 38.5 mm (1.516 in) dia.</p>	F G H
ST30720000 (J25405 and J34331) Bearing installer  NT115	<ul style="list-style-type: none"> ● Installing idler gear bearing outer race <p>a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.</p>	I J
ST35321000 () Drift  NT073	<ul style="list-style-type: none"> ● Installing output shaft bearing <p>a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia.</p>	K L
(J34291-A) Shim setting gauge set  NT101	<ul style="list-style-type: none"> ● Selecting oil pump cover bearing race and oil pump thrust washer ● Selecting side gear thrust washer 	M
ST33230000 (J25805-01) Drift  NT084	<ul style="list-style-type: none"> ● Installing differential side bearing inner race (RH side) <p>a: 51 mm (2.01 in) dia. b: 28.5 mm (1.122 in) dia.</p>	

PREPARATION

[RE4F04B]

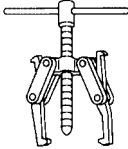
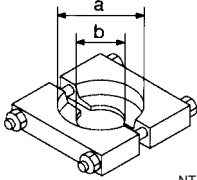
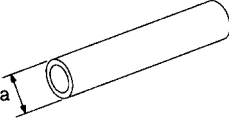
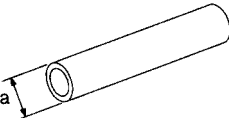
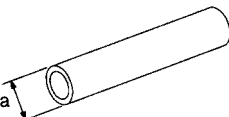
Tool number (Kent-Moore No.) Tool name	Description
(J34290) Shim selecting tool set  <p style="text-align: center;">NT080</p>	<ul style="list-style-type: none"> ● Selecting differential side bearing adjusting shim
ST3306S001 (J22888-D) Differential side bearing puller set 1 ST33051001 (J22888-D) Puller 2 ST33061000 (J8107-2) Adapter  <p style="text-align: center;">AMT153</p>	<ul style="list-style-type: none"> ● Removing differential side bearing inner race <p> 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) </p>
ST3127S000 (J25765-A) Preload gauge 1 GG91030000 (J25765-A) Torque wrench 2 HT62940000 (—) Socket adapter 3 HT62900000 (—) Socket adapter  <p style="text-align: center;">NT124</p>	<ul style="list-style-type: none"> ● Checking differential side bearing preload
ST35271000 (J26091) Drift  <p style="text-align: center;">NT115</p>	<ul style="list-style-type: none"> ● Installing idler gear <p> a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia. </p>
(J39713) Preload adapter  <p style="text-align: center;">NT087</p>	<ul style="list-style-type: none"> ● Selecting differential side bearing adjusting shim ● Checking differential side bearing preload
J45816 E20 TORX socket  <p style="text-align: center;">LCIA0258E</p>	<ul style="list-style-type: none"> ● Removing flex plate bolts on vehicles equipped with QR25DE engines

PREPARATION

[RE4F04B]

Commercial Service Tools

ECS00628

Tool name	Description
Puller  NT077	<ul style="list-style-type: none"> ● Removing idler gear bearing inner race ● Removing and installing band servo piston snap ring
Puller  NT411	<ul style="list-style-type: none"> ● Removing reduction gear bearing inner race <p>a: 60 mm (2.36 in) dia. b: 35 mm (1.38 in) dia.</p>
Drift  NT083	<ul style="list-style-type: none"> ● Installing needle bearing on bearing retainer <p>a: 36 mm (1.42 in) dia.</p>
Drift  NT083	<ul style="list-style-type: none"> ● Removing needle bearing from bearing retainer <p>a: 33.5 mm (1.319 in) dia.</p>
Drift  NT083	<ul style="list-style-type: none"> ● Installing differential side bearing outer race (RH side) <p>a: 75 mm (2.95 in) dia.</p>

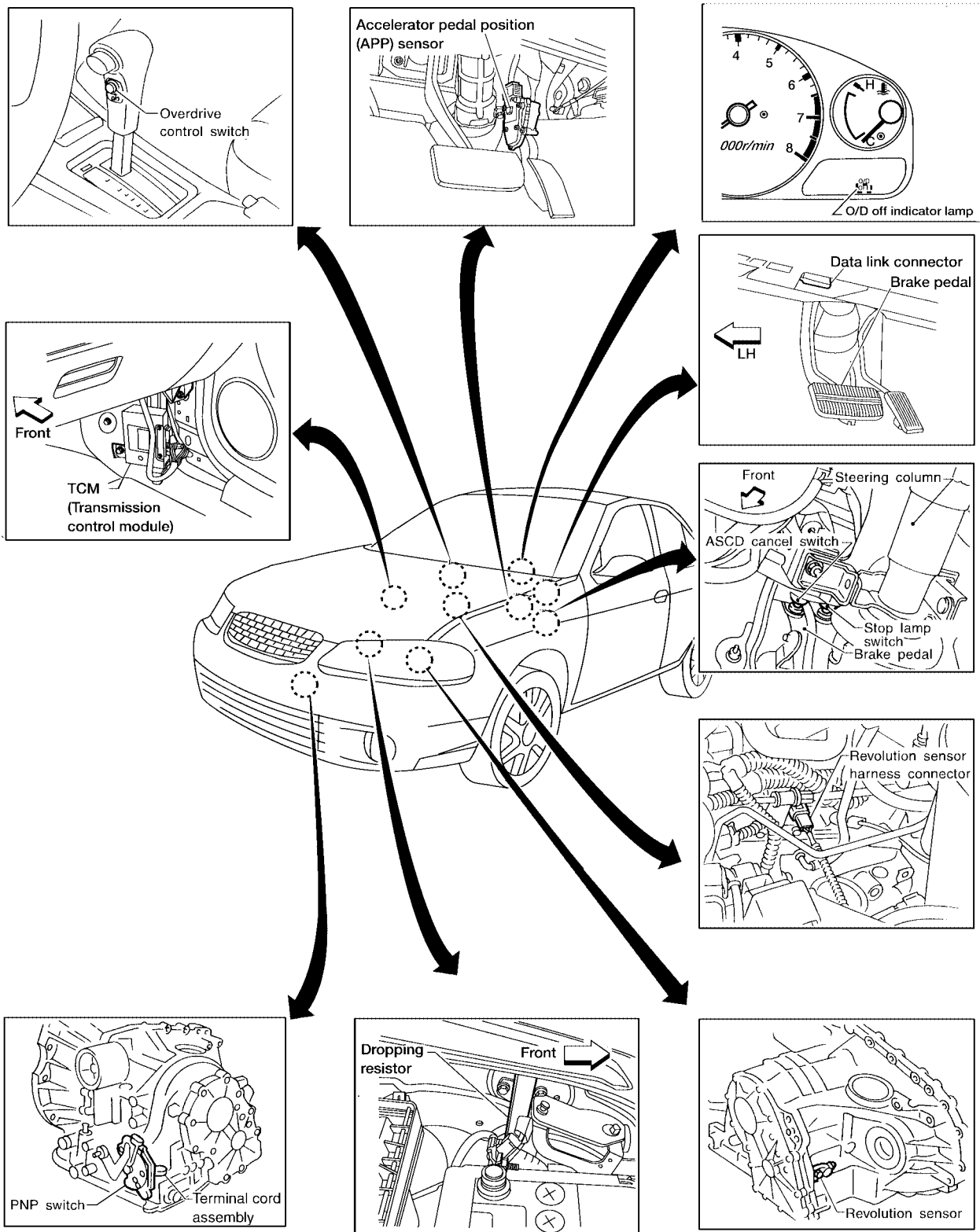
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OVERALL SYSTEM

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A/T Electrical Parts Location

ECS00629

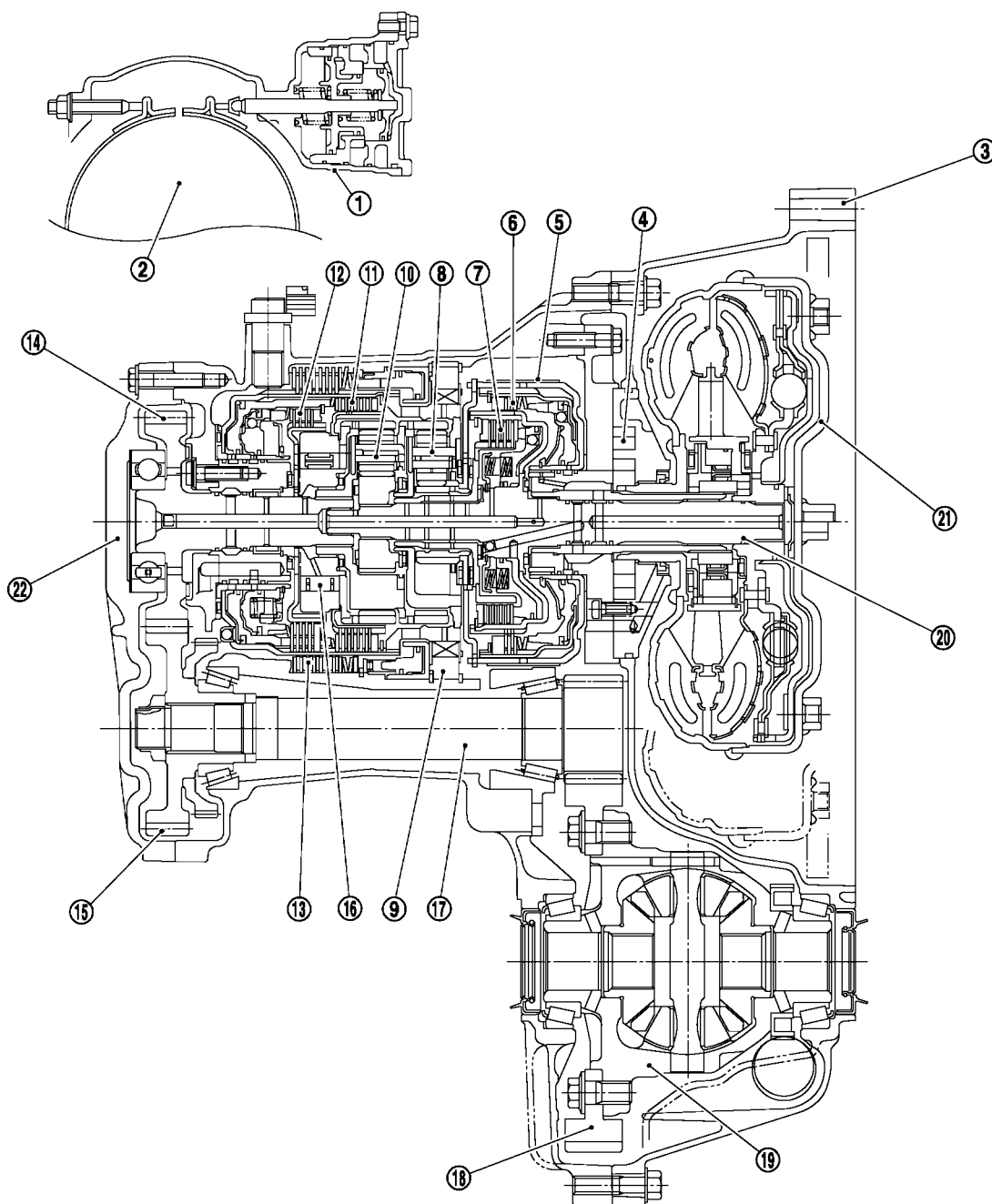


OVERALL SYSTEM

[RE4F04B]

Cross-sectional View

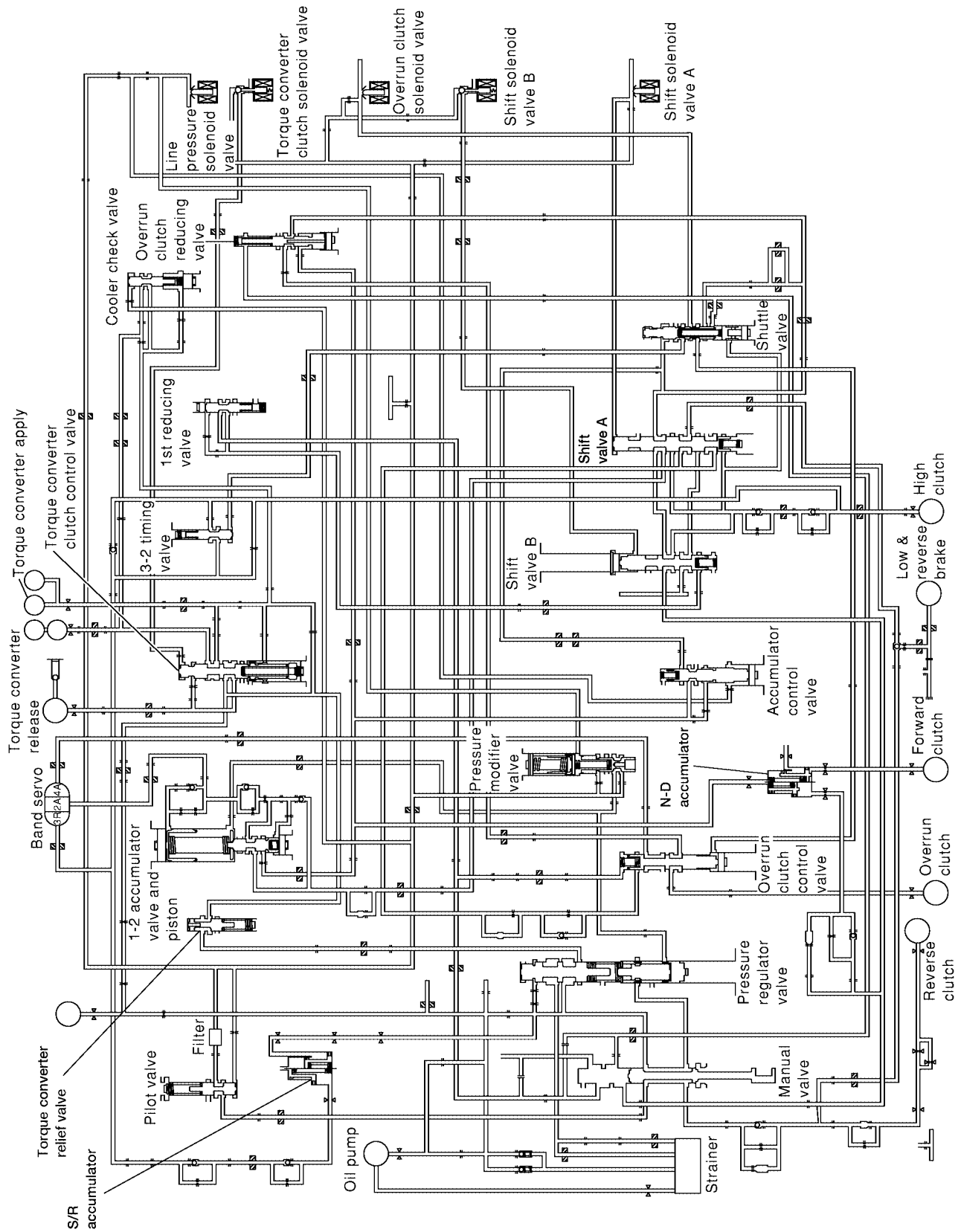
ECS0062B



- | | | |
|----------------------------|---------------------------|-----------------------|
| 1. Band servo piston | 2. Reverse clutch drum | 3. Converter housing |
| 4. Oil pump | 5. Brake band | 6. Reverse clutch |
| 7. High clutch | 8. Front planetary gear | 9. Low one-way clutch |
| 10. Rear planetary gear | 11. Forward clutch | 12. Overrun clutch |
| 13. Low & reverse brake | 14. Output gear | 15. Idler gear |
| 16. Forward one-way clutch | 17. Pinion reduction gear | 18. Final gear |
| 19. Differential case | 20. Input shaft | 21. Torque converter |
| 22. Side cover | | |

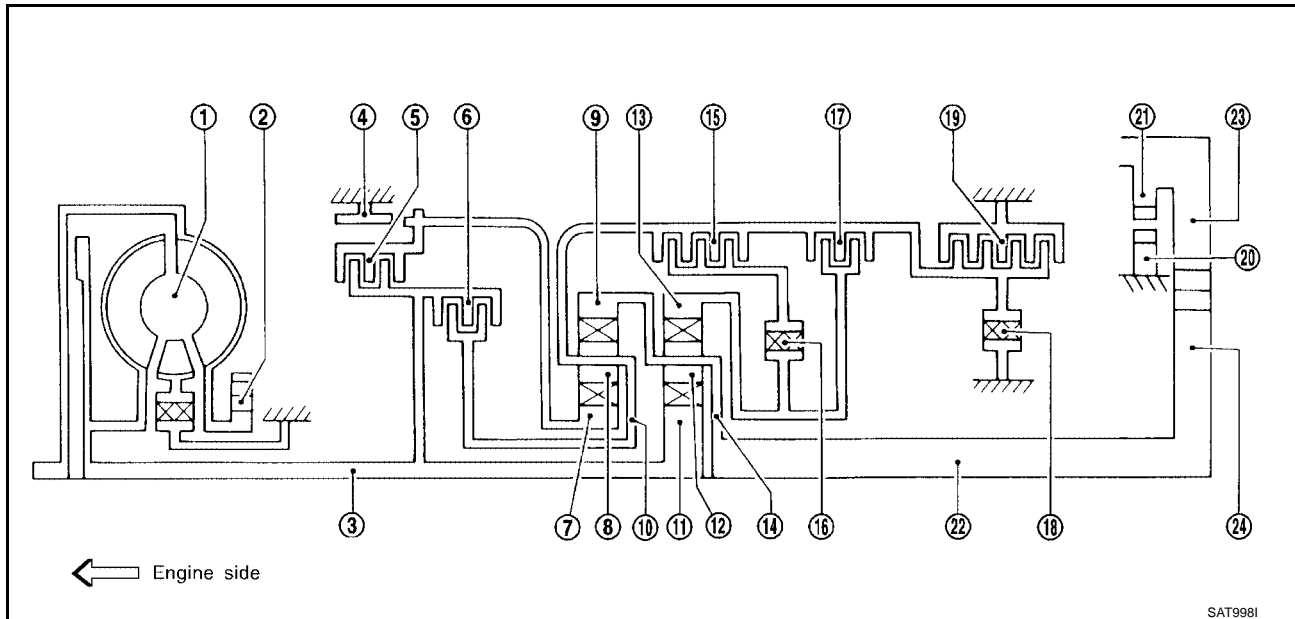
SAT488K

Hydraulic Control Circuit



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Shift Mechanism CONSTRUCTION



- | | | |
|-----------------------------|----------------------------|------------------------|
| 1. Torque converter | 2. Oil pump | 3. Input shaft |
| 4. Brake band | 5. Reverse clutch | 6. High clutch |
| 7. Front sun gear | 8. Front pinion gear | 9. Front internal gear |
| 10. Front planetary carrier | 11. Rear sun gear | 12. Rear pinion gear |
| . | . | . |
| 13. Rear internal gear | 14. Rear planetary carrier | 15. Forward clutch |
| . | . | . |
| 16. Forward one-way clutch | 17. Overrun clutch | 18. Low one-way clutch |
| . | . | . |
| 19. Low & reverse brake | 20. Parking pawl | 21. Parking gear |
| . | . | . |
| 22. Output shaft | 23. Idle gear | 24. Output gear |
| . | . | . |

SAT998I

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 clutch 16 .
Overrun clutch 17	O/C	To connect front planetary carrier 10 with rear internal gear 13 .
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 13 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 .

OVERALL SYSTEM

[RE4F04B]

CLUTCH AND BAND CHART

Shift position	Reverse clutch 5	High clutch 6	For-ward clutch 15	Over-run clutch 17	Band servo			For-ward one-way clutch 16	Low one-way clutch 18	Low & reverse brake 19	Lock-up	Remarks
					2nd apply	3rd release	4th apply					
P												PARK POSITION
R	O									O		REVERSE POSITION
N												NEUTRAL POSITION
D*4	1st		O	*1 D				B	B			Automatic shift 1 ⇔ 2 ⇔ 3 ⇔ 4
	2nd		O	*1 A	O			B				
	3rd		O	O	*1 A	*2 C	C	B			*4 O	
	4th		O	C		*3 C	C	O	B		O	
2	1st		O	O				B	B			Automatic shift 1 ⇔ 2 ⇔ 3
	2nd		O	O	O			B				
	3rd		O	O				B				
1	1st		O	O				B		O		Locks (held stationary) in 1st speed 1 ⇔ 2 ⇔ 3
	2nd		O	O	O			B				
	3rd		O	O	*2 C			B				

*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.

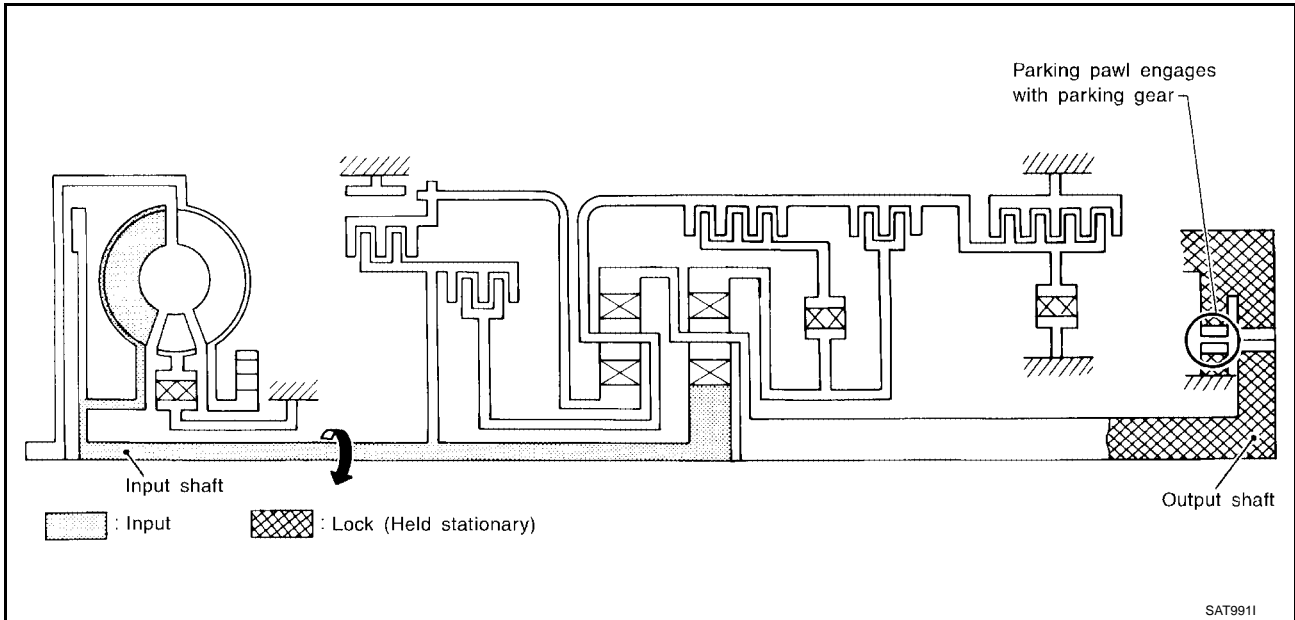
C: Operates but does not affect power transmission.

D: Operates when throttle opening is less than 3/16, but does not affect engine brake.

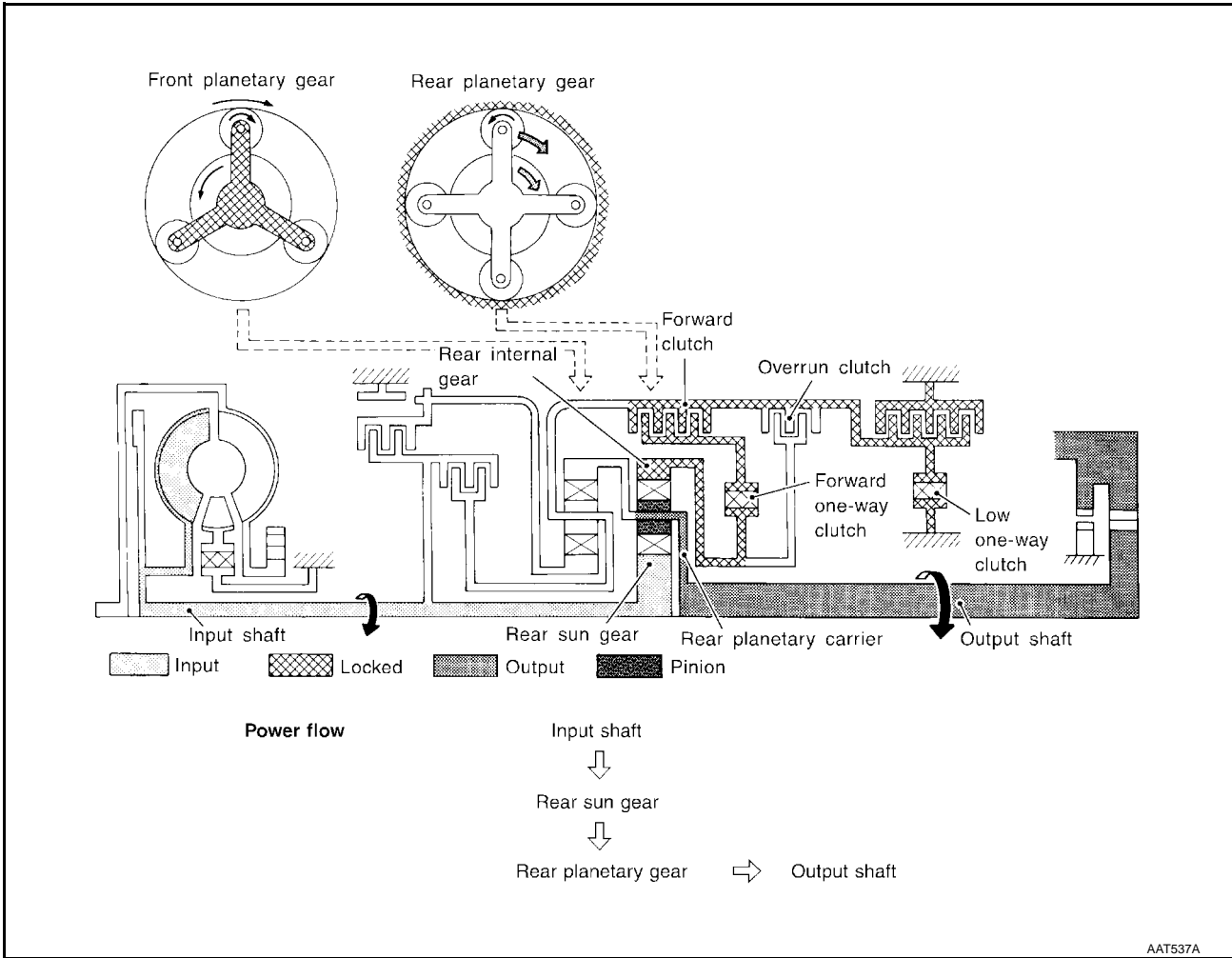
POWER TRANSMISSION

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.



11 Position



<ul style="list-style-type: none"> ● Forward clutch ● Forward one-way clutch ● Overrun clutch ● Low and reverse brake 	<p>As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake. This is different from that of D1 and 21 .</p>
<p>Engine brake</p>	<p>Overrun clutch always engages, therefore engine brake can be obtained when decelerating.</p>

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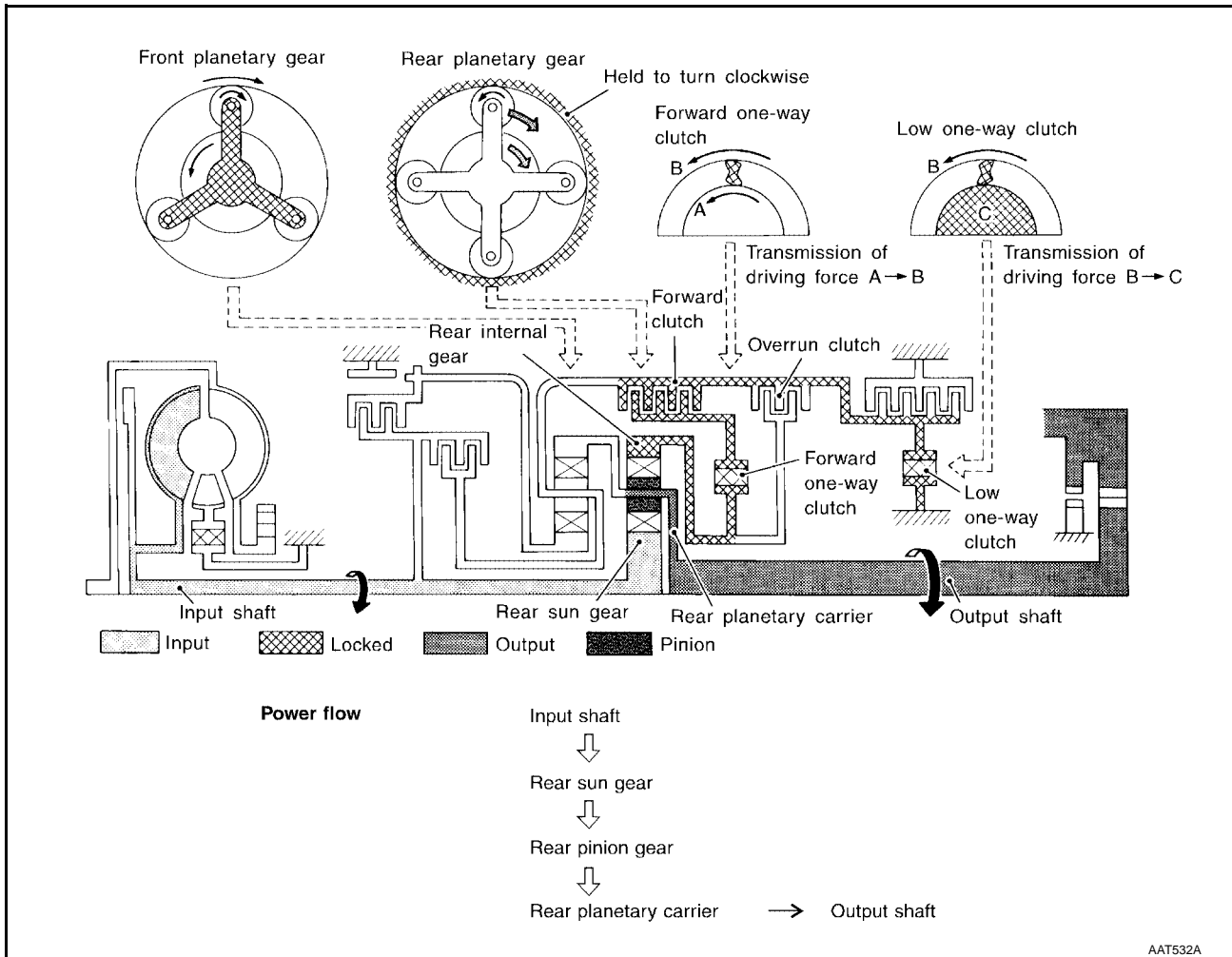
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OVERALL SYSTEM

[RE4F04B]

D1 and 21 Positions

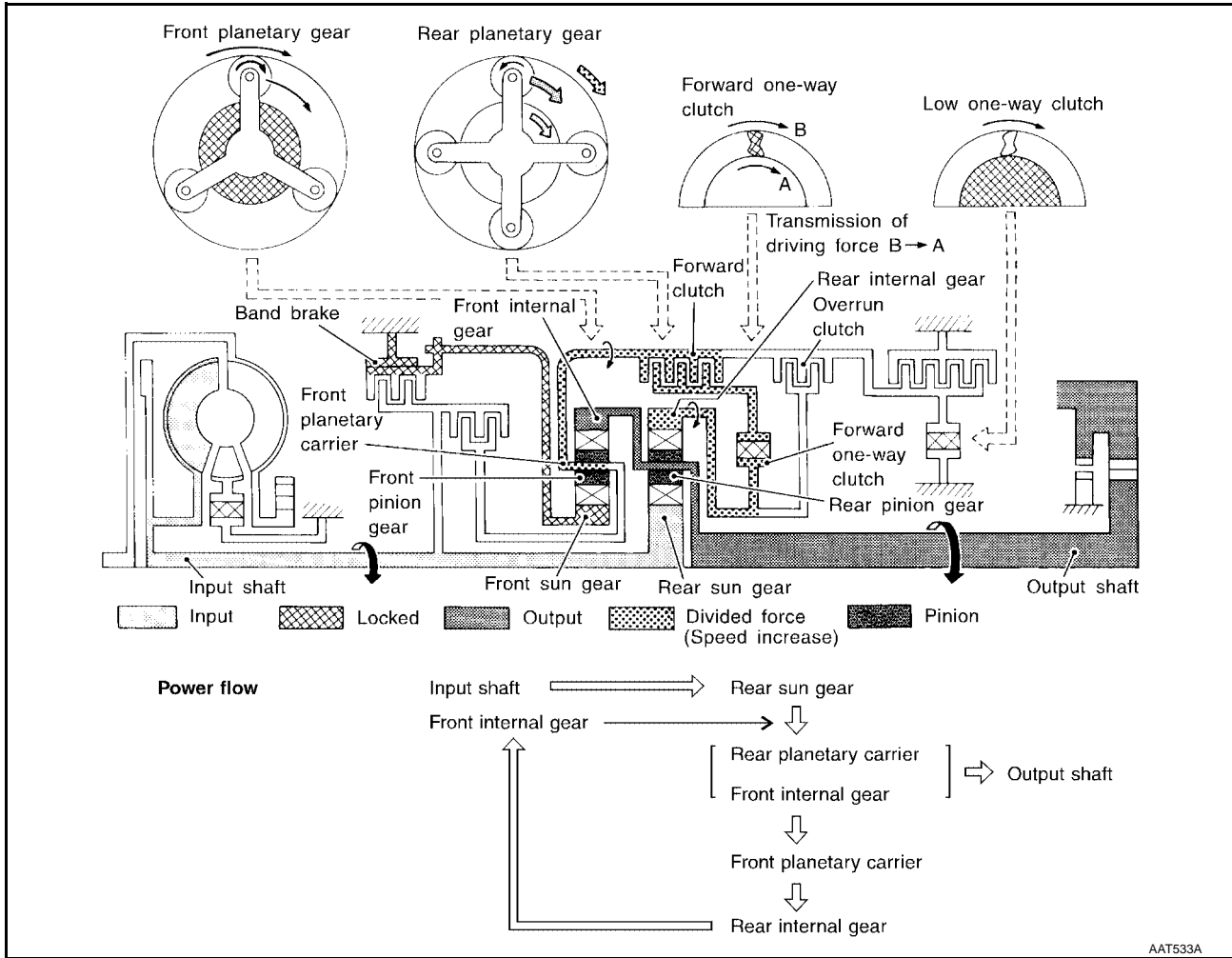


<ul style="list-style-type: none"> ● Forward one-way clutch ● Forward clutch ● Low one-way clutch 	<p>Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches.</p>
<p>Overrun clutch engagement conditions (Engine brake)</p>	<p>D1 : Overdrive control switch OFF and throttle opening is less than 3/16 21 : Always engaged At D1 and 21 positions, engine brake is not activated due to free turning of low one-way clutch.</p>

OVERALL SYSTEM

[RE4F04B]

D2 , 32 , 22 and 12 Positions



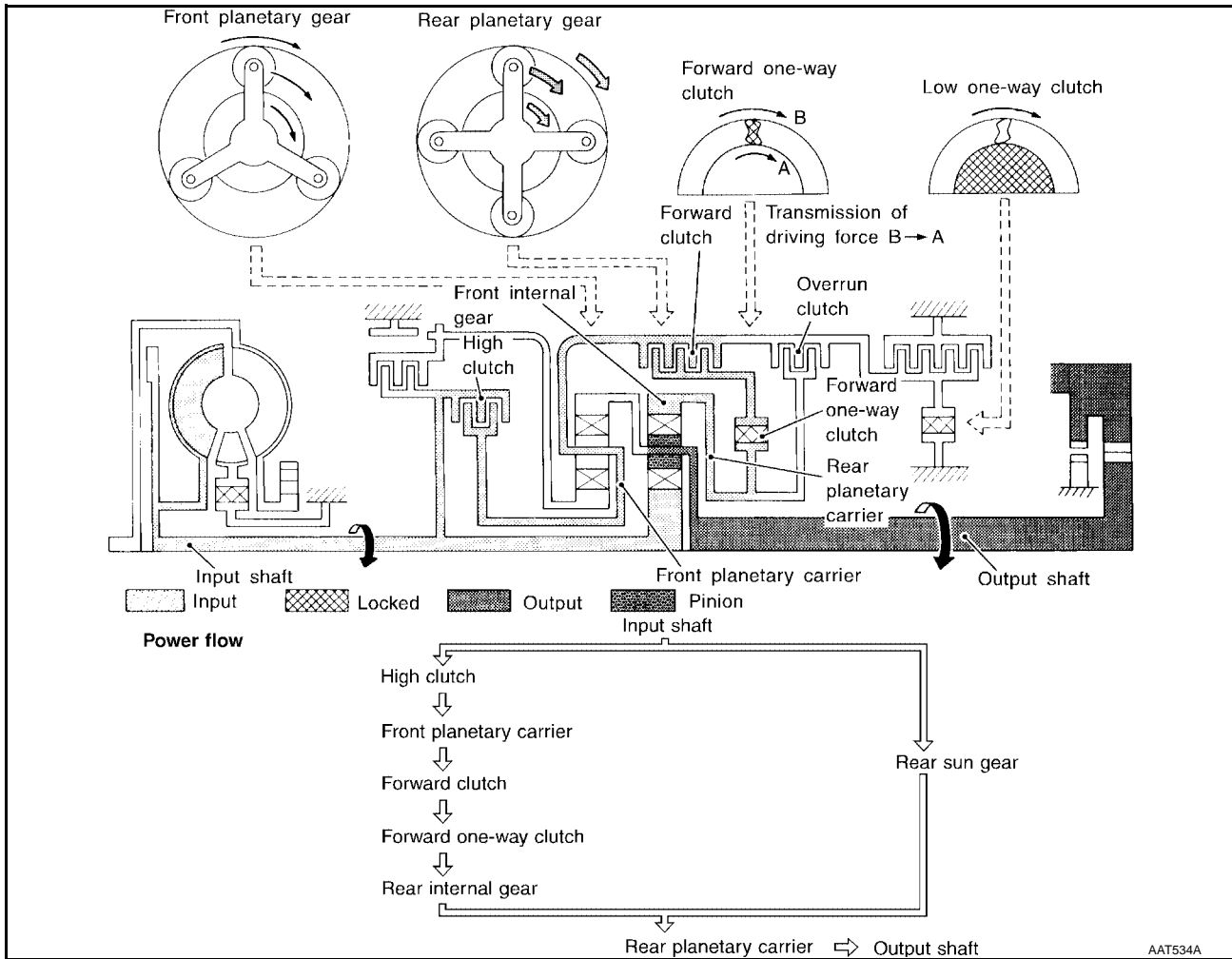
AAT533A

<ul style="list-style-type: none"> ● Forward clutch ● Forward one-way clutch ● Brake band 	<p>Rear sun gear drives rear planetary carrier and combined front internal gear. Front internal gear now rotates around front sun gear accompanying front planetary carrier. As front planetary carrier transfers the power to rear internal gear through forward clutch and forward one-way clutch, this rotation of rear internal gear increases the speed of rear planetary carrier compared with that of the 1st speed.</p>
<p>Overrun clutch engagement conditions</p>	<p>D2 : Overdrive control switch OFF and throttle opening is less than 3/16 22 and 12 : Always engaged</p>

OVERALL SYSTEM

[RE4F04B]

D3 and 33 Positions

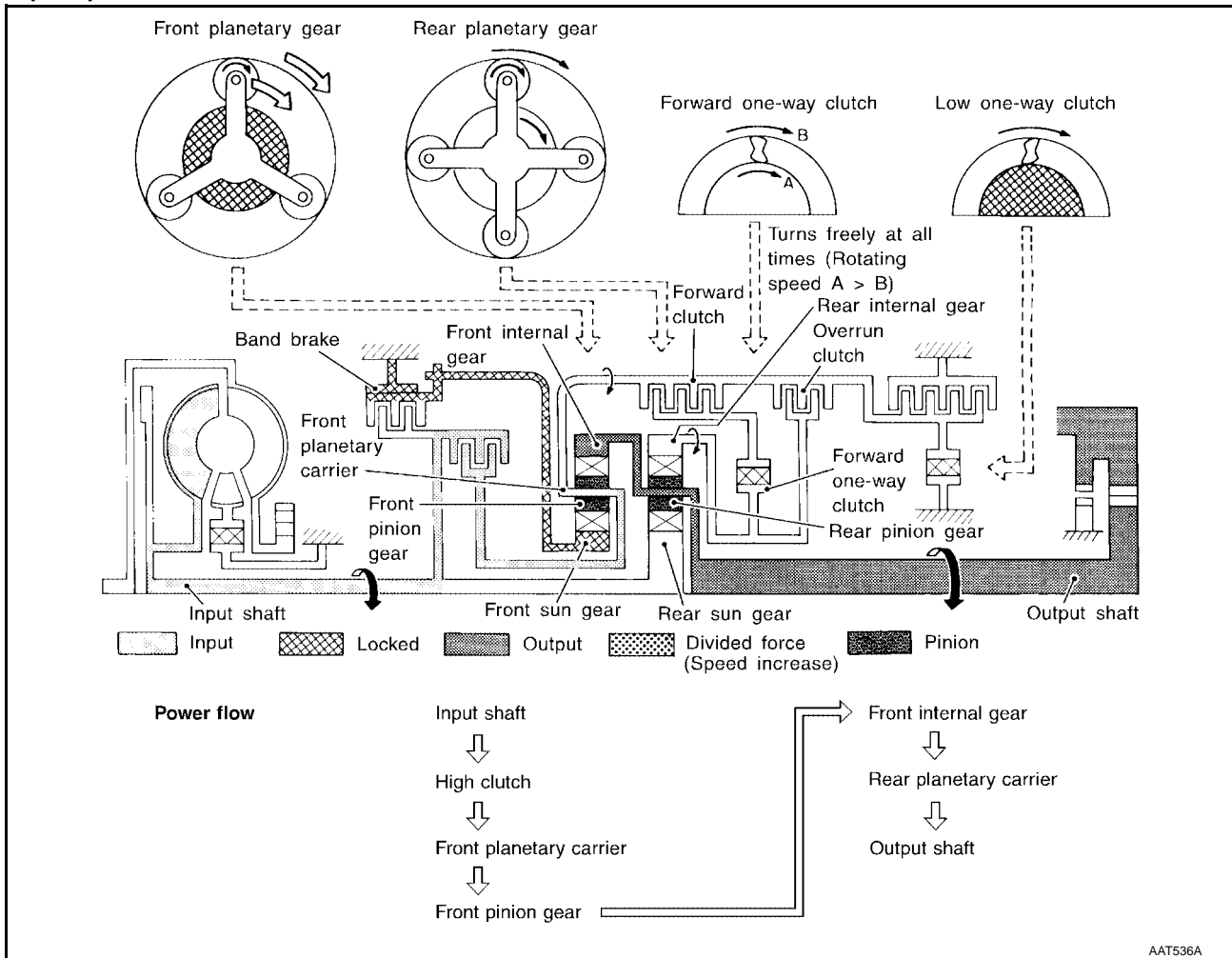


<ul style="list-style-type: none"> ● High clutch ● Forward clutch ● Forward one-way clutch 	<p>Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch.</p> <p>This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.</p>
<p>Overrun clutch engagement conditions</p>	<p>D3 : Overdrive control switch OFF and throttle opening is less than 3/16</p>

OVERALL SYSTEM

[RE4F04B]

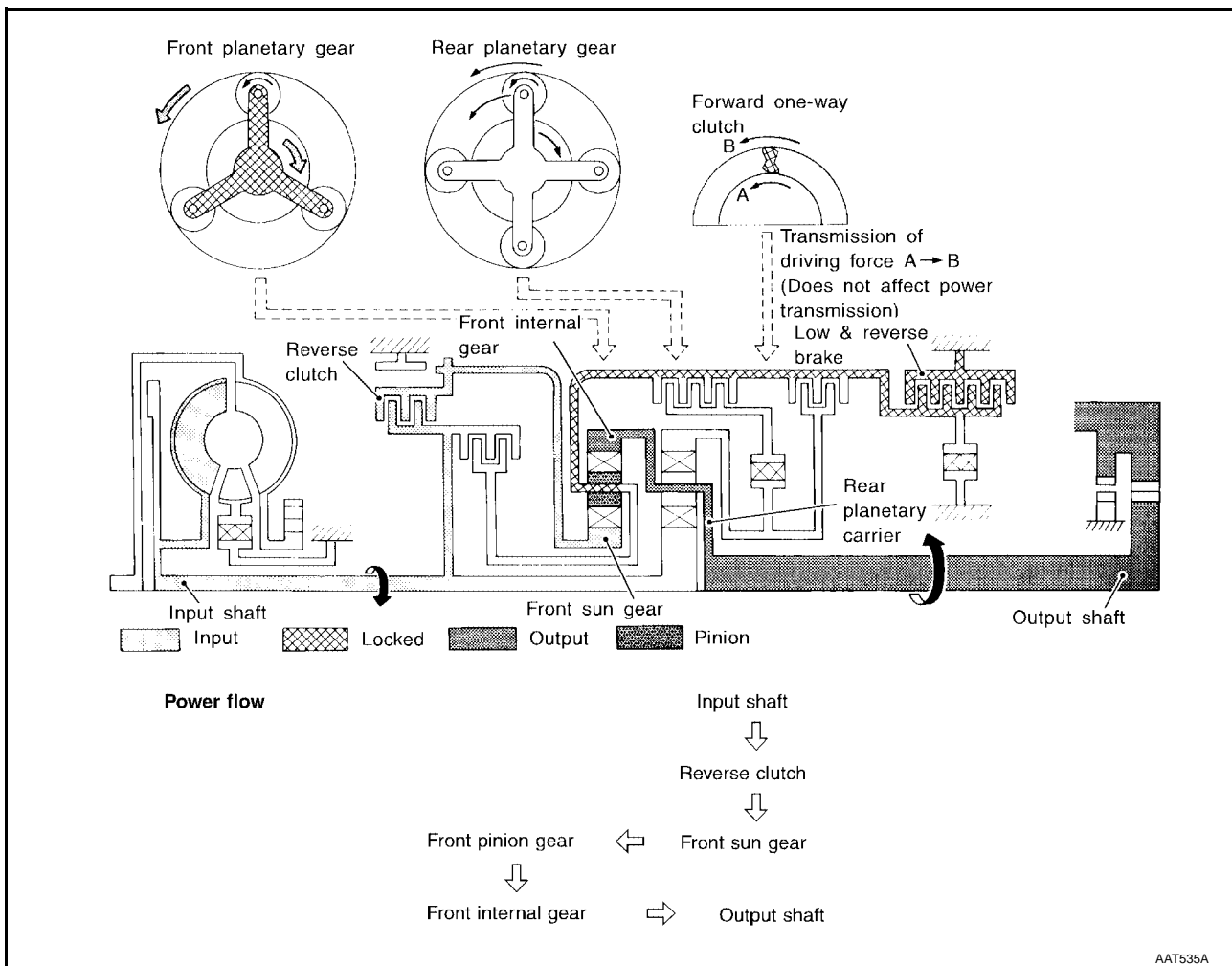
D4 (O/D) Position



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<ul style="list-style-type: none"> ● High clutch ● Brake band ● Forward clutch (Does not affect power transmission) 	<p>Input power is transmitted to front carrier through high clutch. This front carrier turns around the sun gear which is fixed by brake band and makes front internal gear (output) turn faster.</p>
<p>Engine brake</p>	<p>At D4 position, there is no one-way clutch in the power transmission line and engine brake can be obtained when decelerating.</p>

R Position



AAT535A

<ul style="list-style-type: none"> ● Reverse clutch ● Low and reverse brake 	<p>Front planetary carrier is stationary because of the operation of low and reverse brake. Input power is transmitted to front sun gear through reverse clutch, which drives front internal gear in the opposite direction.</p>
<p>Engine brake</p>	<p>As there is no one-way clutch in the power transmission line, engine brake can be obtained when decelerating.</p>

OVERALL SYSTEM

[RE4F04B]

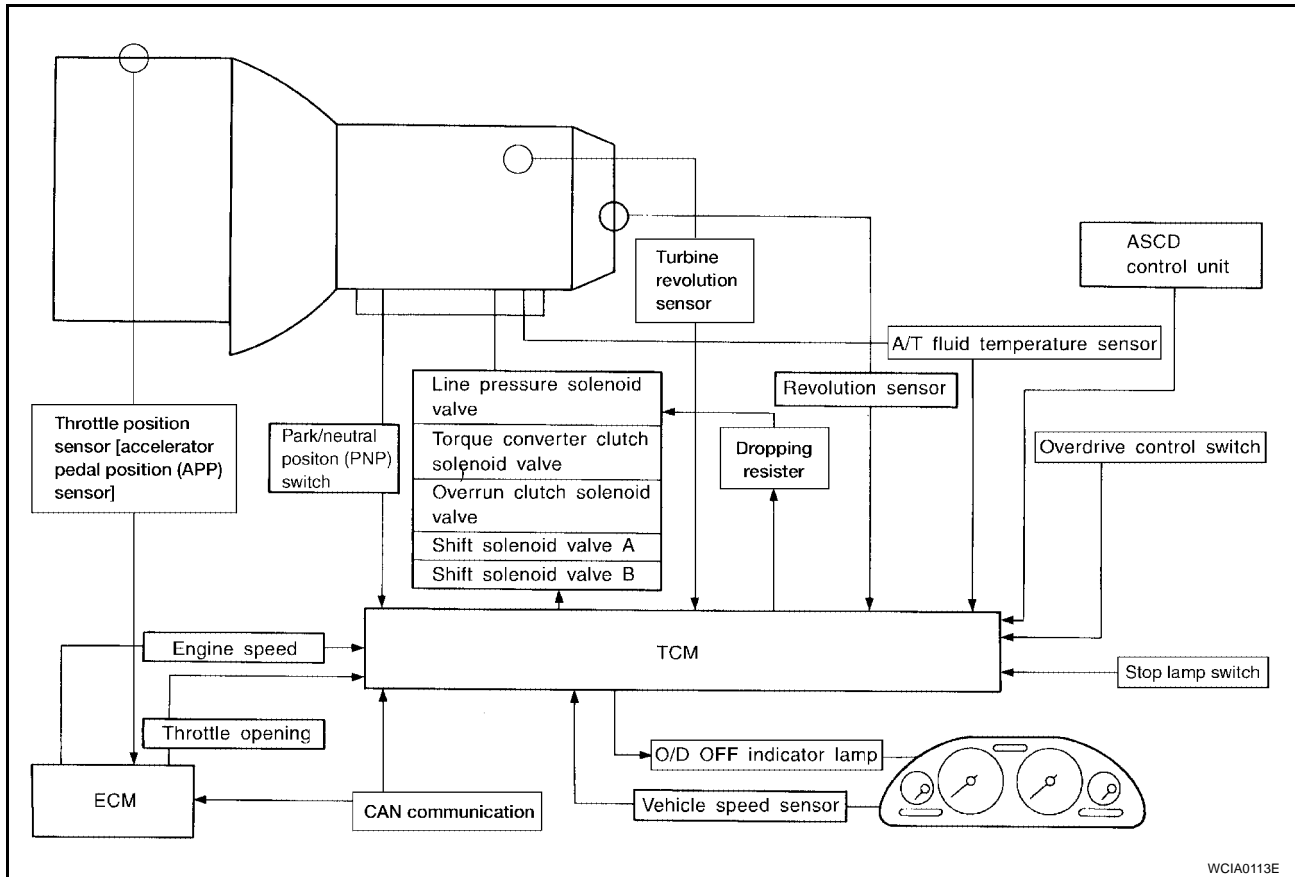
ECS0062E

Control System OUTLINE

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	TCM	ACTUATORS
Park/neutral position (PNP) switch Throttle position sensor [accelerator 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
Input	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.
	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.
Output	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.
	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.

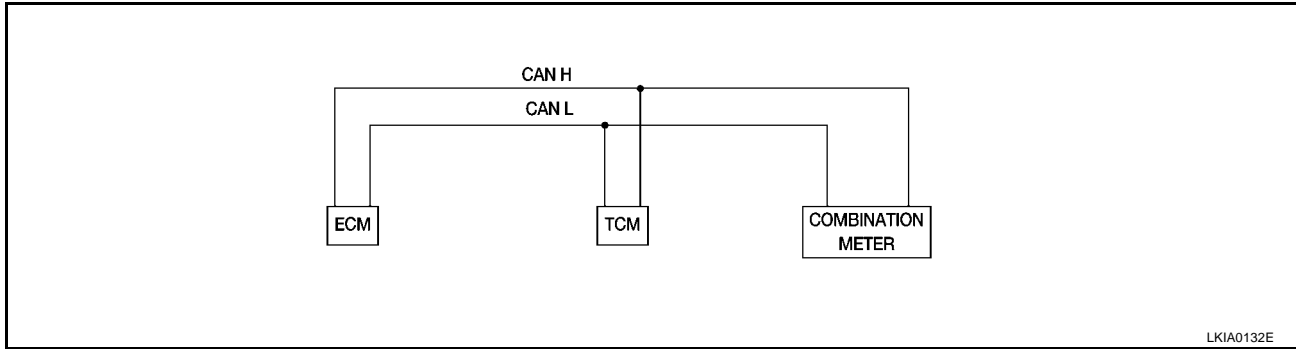
CAN Communication SYSTEM DESCRIPTION

ECS006H8

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



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	TCM
Accelerator pedal position signal	T	R
Output shaft revolution signal	R	T
A/T self-diagnosis signal	R	T
Wide open throttle position signal	T	R
Overdrive cancel signal	T	R

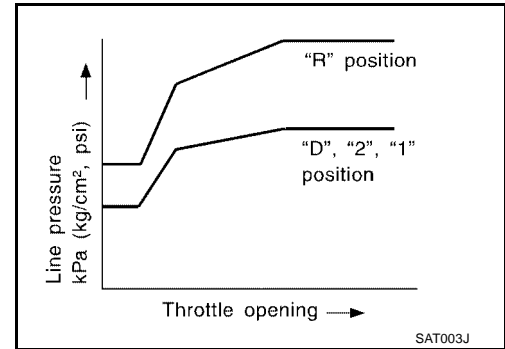
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Control Mechanism
LINE PRESSURE CONTROL

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.

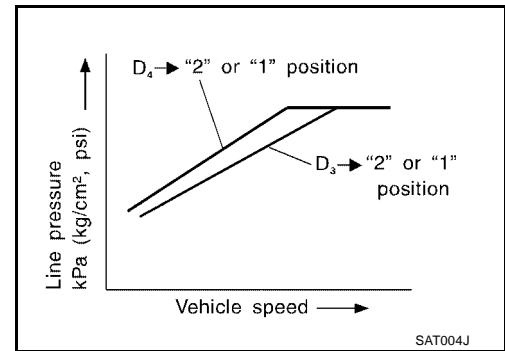
Normal Control

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



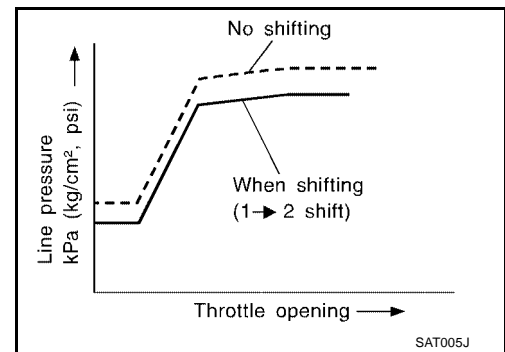
Back-up Control (Engine brake)

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.



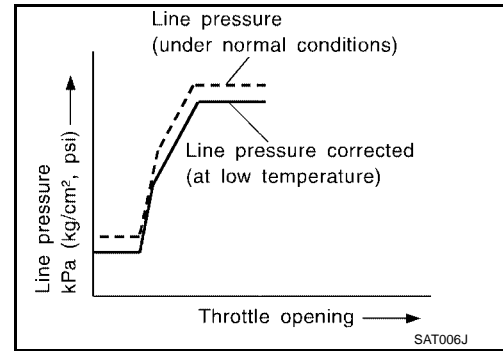
At Low Fluid Temperature

- 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.

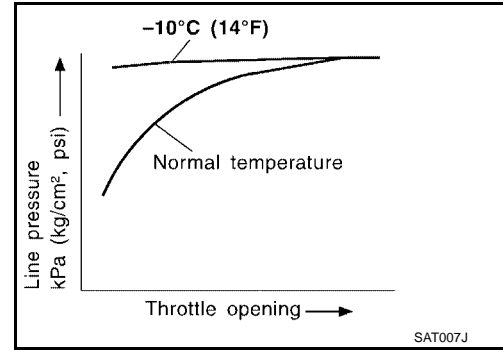
OVERALL SYSTEM

[RE4F04B]

- 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 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 temperature.



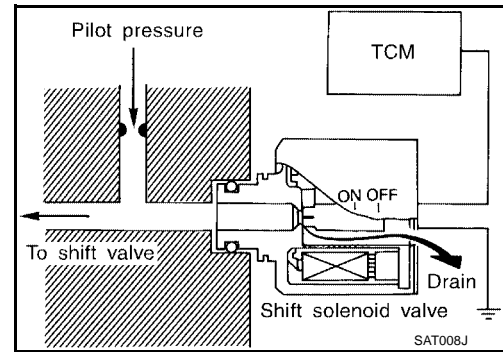
SHIFT CONTROL

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 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.

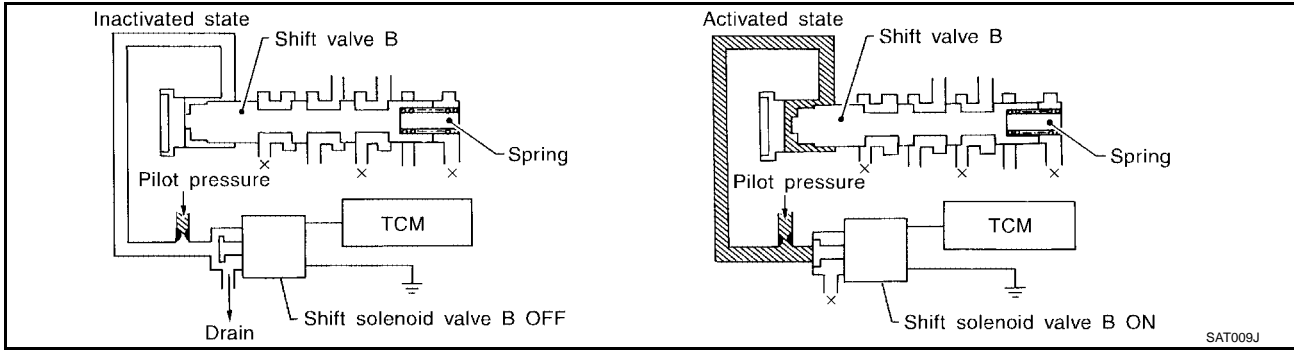
The shift solenoid valve performs simple ON-OFF operation. When set to ON, the drain circuit closes and pilot pressure is applied to the shift valve.



Relation between shift solenoid valves A and B and gear positions

Shift solenoid valve	Gear position				
	D1 , 21 , 11	D2 , 22 , 12	D3	D4 (O/D)	N-P
A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	ON (Closed)
B	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.

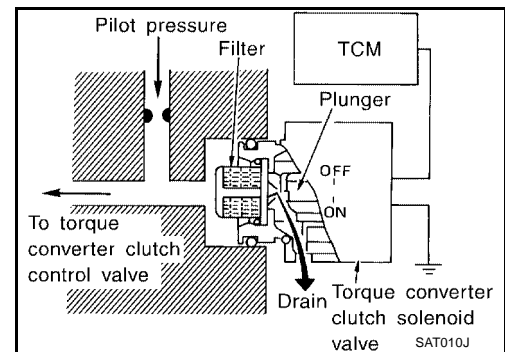
Conditions for Lock-up Operation

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.



OVERALL SYSTEM

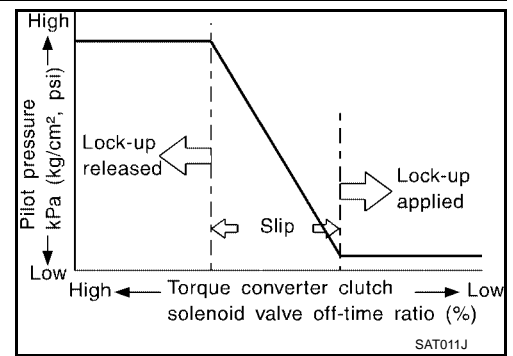
[RE4F04B]

The torque converter clutch piston is designed to slip to adjust the ratio of ON-OFF, thereby reducing lock-up shock.
OFF-time INCREASING

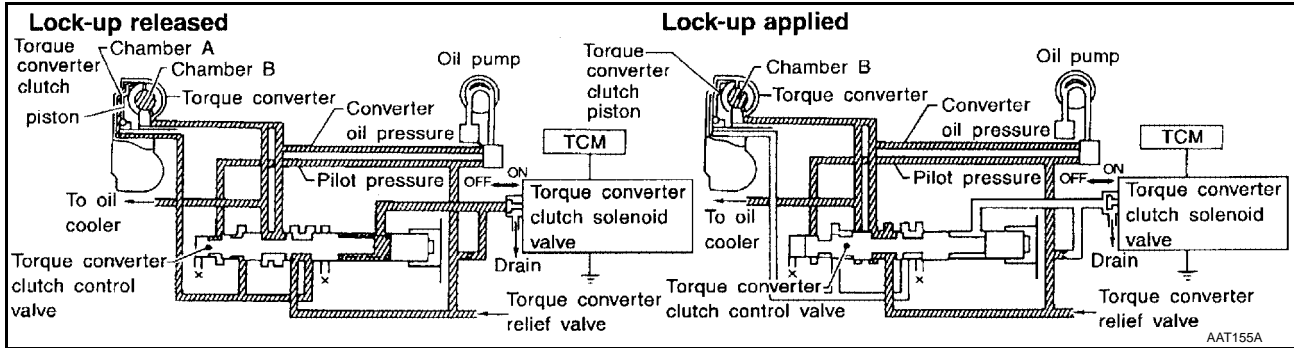
↓
Amount of drain DECREASING

↓
Pilot pressure HIGH

↓
Lock-up RELEASING



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.

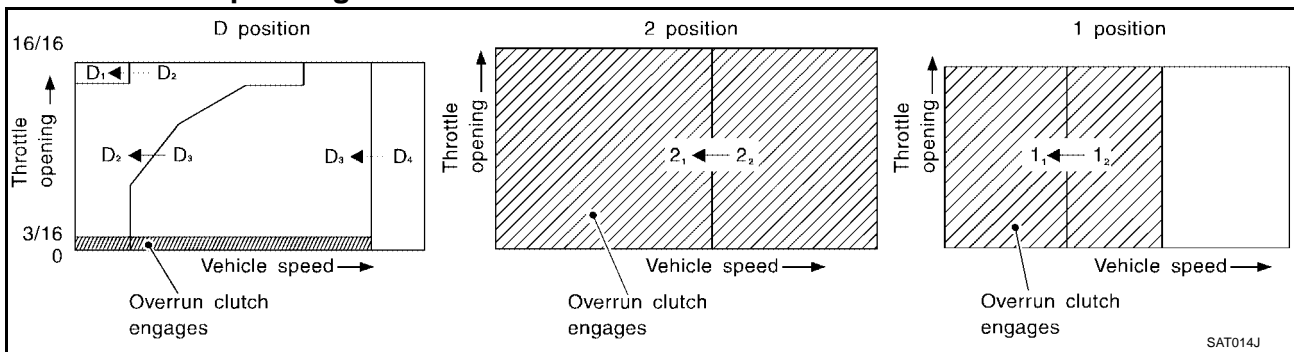
Also smooth lock-up is provided by transient application and release of the lock-up.

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



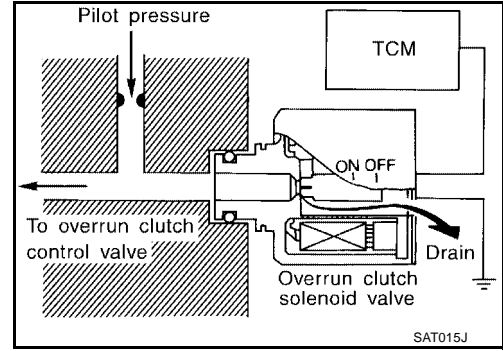
	Gear position	Throttle opening
D position	D1, D2, D3 gear position	Less than 3/16
2 position	21, 22 gear position	
1 position	11, 12 gear position	At any position

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.

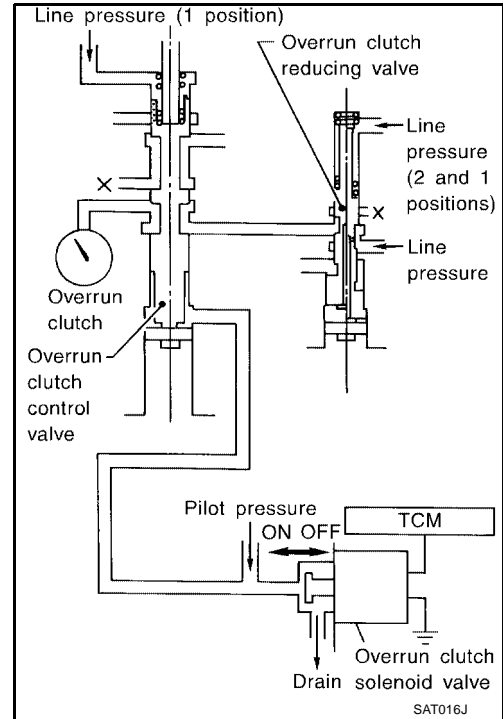


Overrun Clutch Control Valve Operation

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 driving conditions.
Pressure modifier valve and sleeve	Used as a signal supplementary valve to the pressure regulator valve. Regulates pressure-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 → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve B.

OVERALL SYSTEM

[RE4F04B]

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 → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 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-shifting 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.

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

PFP:00000

Introduction

ECS0062H

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 stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For details, refer to [AT-428, "OBD-II Function for A/T System"](#).

OBD-II Function for A/T System

ECS0062I

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**

ECS0062J

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	MIL	
	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		X

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**

ECS0062K

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.**

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[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

A
B
AT

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

SELF-DIAG RESULTS	
DTC RESULTS	TIME
PNP SW/CIRC [P0705]	0

SAT015K

D
E
F
G

If a 1st trip DTC is stored in the ECM, the time data will be "1t".

SELF-DIAG RESULTS	
DTC RESULTS	TIME
PNP SW/CIRC [P0705]	1 t

SAT016K

H
I
J
K

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-1264, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA"](#).

Only one set of freeze frame data (either 1st trip freeze frame data or 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 - 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	

L
M

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 described in the following.

- **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 [EC-1261, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS"](#) .

- **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**

Ⓜ HOW TO ERASE DTC (WITH CONSULT-II)

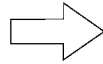
- **If a DTC is displayed for both ECM and TCM, it needs to be erased for both ECM and TCM.**
1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
 2. Turn CONSULT-II "ON" and touch "A/T".
 3. Touch "SELF-DIAG RESULTS".
 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.)

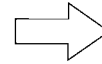
How to erase DTC (With CONSULT-II)

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.

SELECT SYSTEM
A/T
ENGINE



SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
CAN DIAG SUPPORT MNTR
FUNCTION TEST
DTC WORK SUPPORT

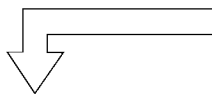


SELF DIAG RESULTS
DTC RESULTS
T/C CLUTCH SOL/V [P0740]

2. Turn CONSULT-II "ON", and touch "A/T".

3. Touch "SELF DIAG-RESULTS".

4. Touch "ERASE". (The DTC in the TCM will be erased.)



Touch "BACK".

Touch "BACK".

SELECT SYSTEM
A/T
ENGINE

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR(SPEC)
CAN DIAG SUPPORT MNTR
ACTIVE TEST

SELF DIAG RESULTS	
DTC RESULTS	TIME
TCC SOLENOID/CIRC [P0740]	0

5. Touch "ENGINE".

6. Touch "SELF DIAG-RESULTS".

7. Touch "ERASE". (The DTC in the ECM will be erased.)

SCIA5586E

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.
2. Perform TCM self-diagnostic procedure. Refer to [AT-442, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) . (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 [EC-1274, "How to Erase DTC \(With GST\)"](#) .

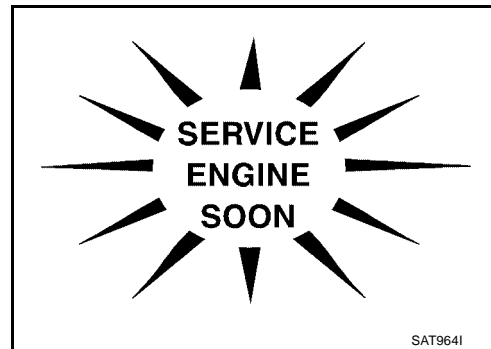
HOW TO ERASE DTC (NO TOOLS)

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.
2. Perform TCM self-diagnostic procedure. Refer to [AT-442, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) . (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-441, "OBD-II SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)

Malfunction Indicator Lamp (MIL)

ECS0062L

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 [AT-432, "Malfunction Indicator Lamp \(MIL\)"](#) .)
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) malfunction. For details, refer to [AT-428, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION"](#) .

**CONSULT-II**

ECS0062M

After performing [AT-433, "SELF-DIAGNOSTIC PROCEDURE \(WITH CONSULT-II\)"](#) , place check marks for results on the [AT-447, "DIAGNOSTIC WORKSHEET"](#) . Reference pages are provided following the items.

NOTICE:

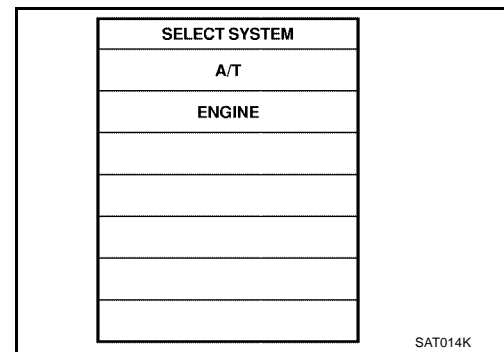
1. The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
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.

FUNCTION

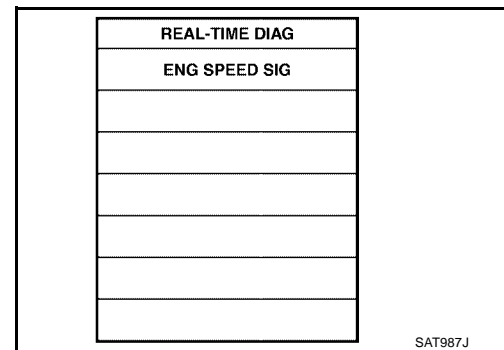
Diagnostic test mode	Function	Reference Page
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-II.	—
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	AT-433
Data monitor	Input/Output data in the ECM can be read.	AT-435
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.	—
Function test	Performed by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".	—
DTC work support	Select the operating condition to confirm Diagnosis Trouble Codes.	AT-437
TCM part number	TCM part number can be read.	—

Ⓜ 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-488, "TROUBLE DIAGNOSIS FOR POWER SUPPLY"](#). If result is NG, refer to [PG-2, "POWER SUPPLY ROUTING"](#).



- 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.



SELF-DIAGNOSTIC RESULT TEST MODE

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		Available by O/D OFF indicator lamp or "A/T" on CONSULT-II	Available by malfunction indicator lamp*2, "ENGINE" on CONSULT-II or GST
Park/neutral position (PNP) switch circuit	PNP SW/CIRC	● TCM does not receive the correct voltage signal (based on the gear position) from the switch.	—	P0705
—				
Revolution sensor	VEH SPD SEN/ CIR AT	● TCM does not receive the proper voltage signal from the sensor.	X	P0720
VHCL SPEED SEN-A/T				
Vehicle speed sensor (Meter)	—	● TCM does not receive the proper voltage signal from the sensor.	X	—
VHCL SPEED SEN-MTR				

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F04B]

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
			Available by O/D OFF indicator lamp or "A/T" on CONSULT-II	Available by malfunction indicator lamp*2, "ENGINE" on CONSULT-II or GST
"A/T"	"ENGINE"			
A/T 1st gear function		● A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	—	P0731*1
A/T 1ST GR FNCTN	A/T 1ST GR FNCTN			
A/T 2nd gear function		● A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	—	P0732*1
A/T 2ND GR FNCTN	A/T 2ND GR FNCTN			
A/T 3rd gear function		● A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	—	P0733*1
A/T 3RD GR FNCTN	A/T 3RD GR FNCTN			
A/T 4th gear function		● A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	—	P0734*1
A/T 4TH GR FNCTN	A/T 4TH GR FNCTN			
A/T TCC S/V function (lock-up)		● A/T cannot perform lock-up even if electrical circuit is good.	—	P0744*1
A/T TCC S/V FNCTN	A/T TCC S/V FNCTN			
Shift solenoid valve A		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0750
SHIFT SOLENOID/V A	SFT SOL A/CIRC			
Shift solenoid valve B		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0755
SHIFT SOLENOID/V B	SFT SOL B/CIRC			
Overrun clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P1760
OVERRUN CLUTCH S/V	O/R CLUCH SOL/CIRC			
T/C clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0740
T/C CLUTCH SOL/V	TCC SOLENOID/CIRC			
Line pressure solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0745
LINE PRESSURE S/V	L/PRESS SOL/CIRC			
Throttle position sensor [accelerator pedal position (APP) sensor] signal		● TCM receives an excessively low or high voltage from this sensor.	X	P1705
THROTTLE POSI SEN TP/SEN/CIRC A/T				
Engine speed signal		● TCM does not receive the proper voltage signal from the ECM.	X	P0725
ENGINE SPEED SIG				
A/T fluid temperature sensor		● TCM receives an excessively low or high voltage from the sensor.	X	P0710
BATT/FLUID TEMP SEN	ATF TEMP SEN/CIRC			
Engine control		● The ECM-A/T communication line is open or shorted.	X	U1000
A/T COMM LINE	—			
Turbine revolution sensor		● TCM does not receive the proper voltage signal from the sensor.	X	P0710
TURBINE REV				
TCM (RAM)		● TCM memory (RAM) is malfunctioning	—	—
CONTROL UNIT (RAM)	—			

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F04B]

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		Available by O/D OFF indicator lamp or "A/T" on CONSULT-II	Available by malfunction indicator lamp*2, "ENGINE" on CONSULT-II or GST
TCM (ROM)		● TCM memory (ROM) is malfunctioning	—	—
CONTROL UNIT (ROM)	—			
TCM (EEP ROM)		● TCM memory (EEP ROM) is malfunctioning.	—	—
CONT UNIT(EEP ROM)	—			
Initial start		● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)	X	—
INITIAL START	—			
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED**)		● No failure has been detected.	X	X

X: Applicable
 -: Not applicable

*1: These malfunctions cannot be displayed by MIL SERVICE ENGINE SOON if another malfunction is assigned to MIL.

*2: Refer to [EC-1275, "Malfunction Indicator Lamp \(MIL\)"](#) .

DATA MONITOR MODE (A/T)

Item	Display	Monitor item		Description	Remarks
		TCM Input signals	Main signals		
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 displayed.	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 stationary.
Throttle position sensor [accelerator pedal position (APP) sensor]	THRTL POS SEN [V]	X	—	● Throttle position sensor signal voltage is displayed.	
A/T fluid temperature sensor	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]	X	—	● Source voltage of TCM is displayed.	
Engine speed	ENGINE SPEED [rpm]	X	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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F04B]

Item	Display	Monitor item		Description	Remarks
		TCM Input signals	Main signals		
Turbine revolution sensor	TURBINE REV	X	—	<ul style="list-style-type: none"> Checks changing speed then performs oil pressure control and torque down control. 	
Overdrive control switch	OVERDRIVE SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ON/OFF state computed from signal of overdrive control SW is displayed. 	
PN position (PNP) switch	PN POSI SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ON/OFF state computed from signal of PN position SW is displayed. 	
R position switch	R POSITION SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ON/OFF state computed from signal of R position SW is displayed. 	
D position switch	D POSITION SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ON/OFF state computed from signal of D position SW is displayed. 	
2 position switch	2 POSITION SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ON/OFF status, computed from signal of 2 position SW, is displayed. 	
1 position switch	1 POSITION SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ON/OFF status, computed from signal of 1 position SW, is displayed. 	
ASCD cruise signal	ASCD-CRUISE [ON/OFF]	X	—	<ul style="list-style-type: none"> Status of ASCD cruise signal is displayed. ON ... Cruising state OFF ... Normal running state 	<ul style="list-style-type: none"> This is displayed even when no ASCD is mounted.
ASCD OD cut signal	ASCD-OD CUT [ON/OFF]	X	—	<ul style="list-style-type: none"> Status of ASCD OD release signal is displayed. ON ... OD released OFF ... OD not released 	<ul style="list-style-type: none"> This is displayed even when no ASCD is mounted.
Kickdown switch	KICKDOWN SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ON/OFF status, computed from signal of kickdown SW, is displayed. 	<ul style="list-style-type: none"> This is displayed even when no kickdown switch is equipped.
Gear position	GEAR	—	X	<ul style="list-style-type: none"> Gear position data used for computation by TCM, is displayed. 	
Selector lever position	SLCT LVR POSI	—	X	<ul style="list-style-type: none"> Selector lever position data, used for computation by TCM, is displayed. 	<ul style="list-style-type: none"> A specific value used for control is displayed if fail-safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	—	X	<ul style="list-style-type: none"> Vehicle speed data, used for computation by TCM, is displayed. 	
Throttle position sensor [accelerator pedal position (APP) sensor]	THROTTLE POSI [/8]	—	X	<ul style="list-style-type: none"> Throttle position data, used for computation by TCM, is displayed. 	<ul style="list-style-type: none"> A specific value used for control is displayed if fail-safe is activated due to error.
Stop lamp switch	BRAKE SW [ON/OFF]	X	—	<ul style="list-style-type: none"> ON/OFF status is displayed. ON ... Brake pedal is depressed. OFF ... Brake pedal is released. 	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F04B]

Item	Display	Monitor item		Description	Remarks
		TCM Input signals	Main signals		
Line pressure duty	LINE PRES DTY [%]	—	X	● Control value of line pressure solenoid valve, computed 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]	—	X	● Control value of shift solenoid 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 if solenoid circuit is shorted.
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	—	X	● Control value of shift solenoid valve B, computed by TCM from each input signal, is displayed.	
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 displayed.	
Self-diagnosis display lamp (O/D OFF indicator lamp)	SELF-D DP LMP [ON/OFF]	—	X	● Control status of O/D OFF indicator lamp is displayed.	

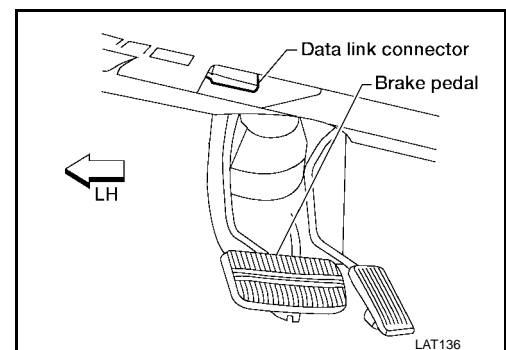
X: Applicable

—: Not applicable

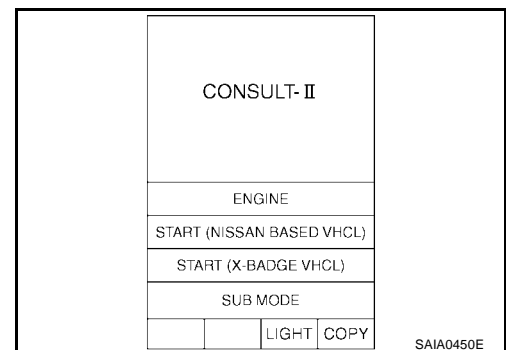
DTC WORK SUPPORT MODE WITH CONSULT-II

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.



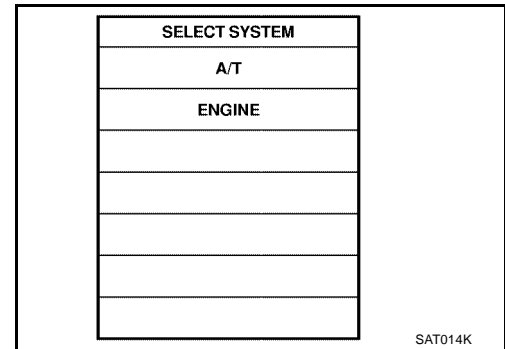
3. Turn ignition switch ON.
4. Touch "START (NISSAN BASED VHCL)".



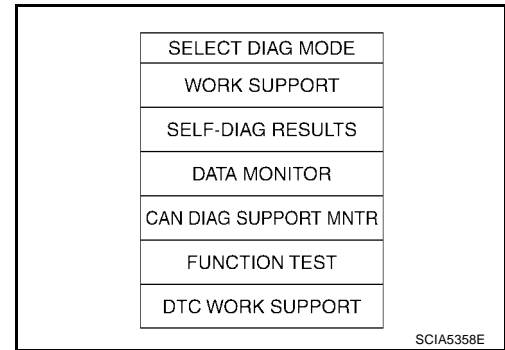
ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F04B]

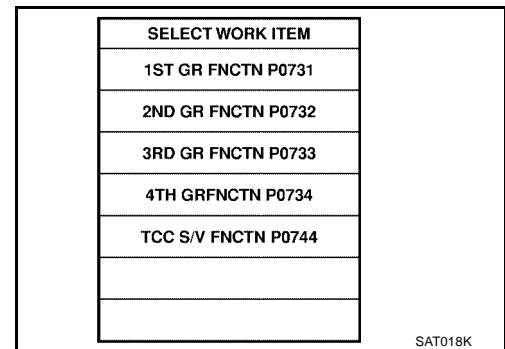
5. Touch "A/T".



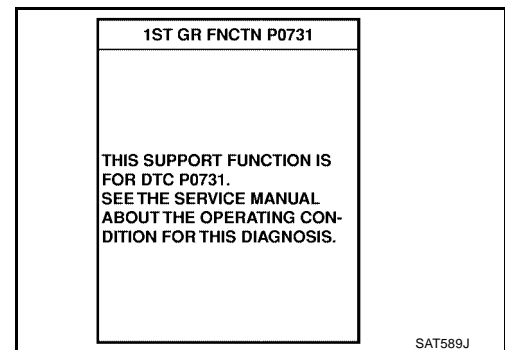
6. Touch "DTC WORK SUPPORT".



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



8. Touch "START".



ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F04B]

- Perform driving test according to "DTC CONFIRMATION PROCEDURE" in "TROUBLE DIAGNOSIS FOR DTC".

1ST GR FNCTN P0731	
OUT OF CONDITION	
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

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

1ST GR FNCTN P0731	
STOP VEHICLE	

SAT592J

1ST GR FNCTN P0731	
NG	

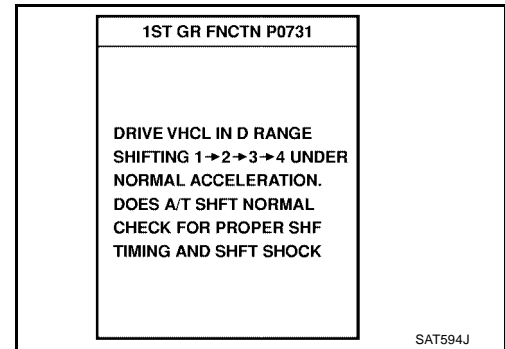
SAT593J

A
B
AT
D
E
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L
M

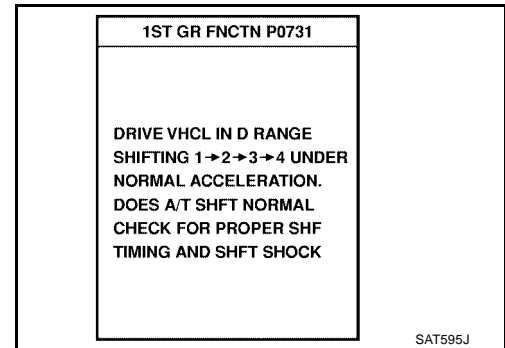
ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F04B]

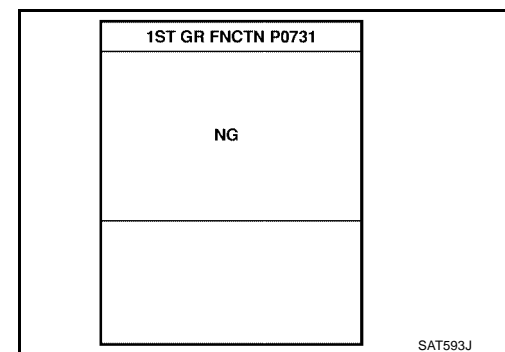
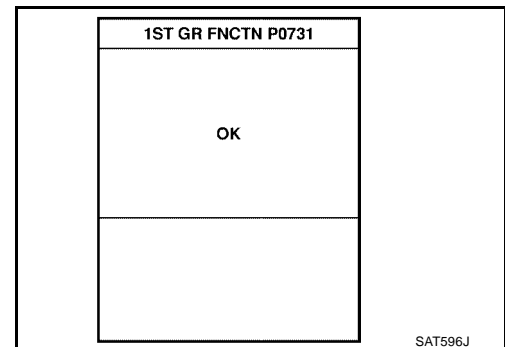
11. Perform test drive to check gear shift feeling in accordance with instructions displayed.



12. Touch "YES" or "NO".



13. CONSULT-II procedure ended.



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

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4F04B]

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 solenoid valve ● Each clutch ● Hydraulic control circuit

Diagnostic Procedure Without CONSULT-II OBD-II SELF-DIAGNOSTIC PROCEDURE (WITH GST)

ECS0062N



Refer to [EC-1329, "Generic Scan Tool \(GST\) Function"](#) .

OBD-II SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)



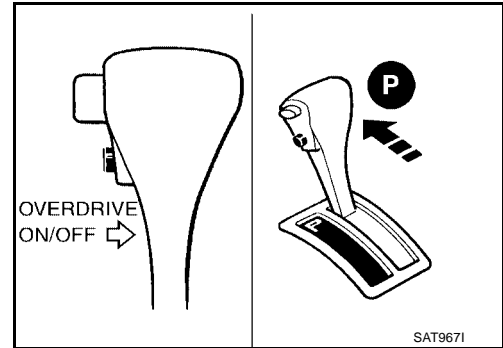
Refer to [EC-1275, "Malfunction Indicator Lamp \(MIL\)"](#) .



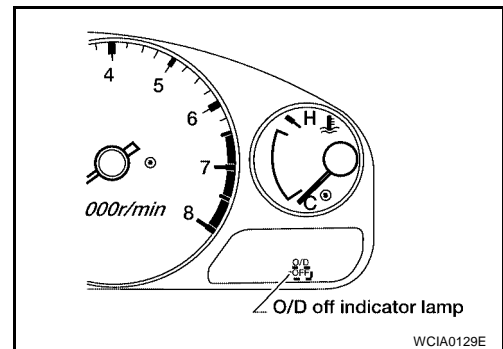
TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

1. CHECK O/D OFF INDICATOR LAMP

1. 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?

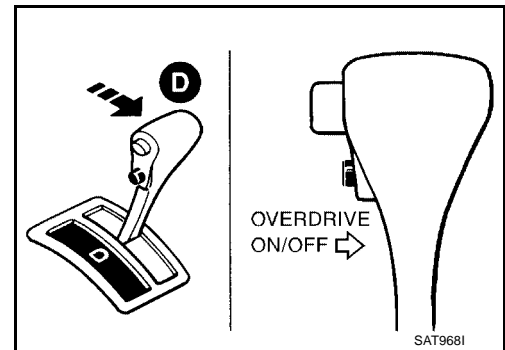


Yes or No

- Yes >> GO TO 2.
 No >> Stop procedure. Perform [AT-602, "1. O/D OFF Indicator Lamp Does Not Come On"](#) before proceeding.

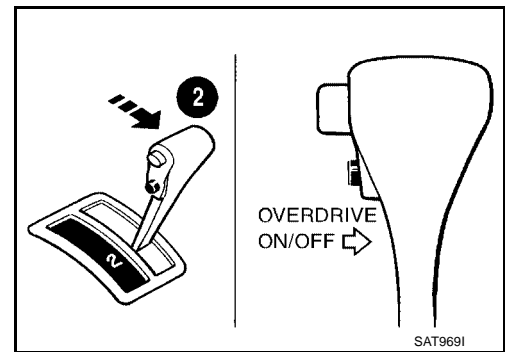
2. JUDGEMENT PROCEDURE STEP 1

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.)
5. Depress and hold overdrive control switch in OFF position (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, refer to "Steps 3 and 4" in [AT-602, "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.

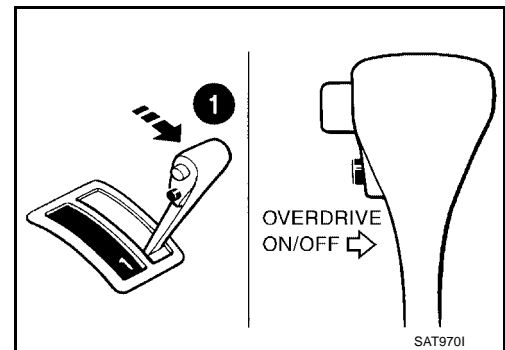
>> GO TO 3.



3. JUDGEMENT PROCEDURE STEP 2

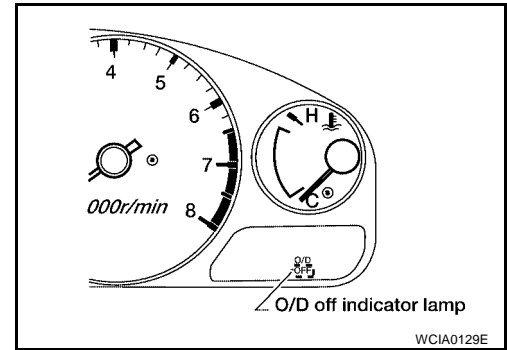
1. Move selector lever to 1 position.
2. Release the overdrive control switch.
3. Depress and release the overdrive control switch (the O/D OFF indicator lamp will be ON).
4. Depress and release the overdrive control switch (the O/D OFF indicator lamp will be OFF).
5. Depress and hold the overdrive control 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.



4. CHECK SELF-DIAGNOSTIC CODE

Check O/D OFF indicator lamp.
Refer to [AT-444, "JUDGEMENT OF SELF-DIAGNOSIS CODE"](#) .



>> DIAGNOSIS END

JUDGEMENT OF SELF-DIAGNOSIS CODE

O/D OFF indicator lamp:

<p>All judgement flickers are the same.</p> <p>Self diagnosis start Start signal 11 judgement flickers Light Shade t t t t t t t t t t t t t WCIA0114E</p> <p>All circuits that can be confirmed by self-diagnosis are OK.</p>	<p>1st judgement flicker is longer than others.</p> <p>1st judgement flicker is longer than others. O/D OFF Light Shade WCIA0115E</p> <p>Revolution sensor circuit is short-circuited or disconnected. ⇒ Go to AT-503, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)" .</p>
<p>2nd judgement flicker is longer than others.</p> <p>2nd judgement flicker is longer than others. O/D OFF Light Shade WCIA0116E</p> <p>Vehicle speed sensor circuit is short-circuited or disconnected. ⇒ Go to AT-580, "DTC VEHICLE SPEED SENSOR MTR" .</p>	<p>3rd judgement flicker is longer than others.</p> <p>3rd judgement flicker is longer than others. O/D OFF Light Shade WCIA0117E</p> <p>Throttle position sensor [accelerator pedal position (APP) sensor] circuit is short-circuited or disconnected. ⇒ Go to AT-563, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]" .</p>
<p>4th judgement flicker is longer than others.</p> <p>4th judgement flicker is longer than others. O/D OFF Light Shade WCIA0118E</p> <p>Shift solenoid valve A circuit is short-circuited or disconnected. ⇒ Go to AT-553, "DTC P0750 SHIFT SOLENOID VALVE A" .</p>	<p>5th judgement flicker is longer than others.</p> <p>5th judgement flicker is longer than others. O/D OFF Light Shade WCIA0119E</p> <p>Shift solenoid valve B circuit is short-circuited or disconnected. ⇒ Go to AT-558, "DTC P0755 SHIFT SOLENOID VALVE B" .</p>

O/D OFF indicator lamp:

A

B

AT

D

E

F

G

H

I

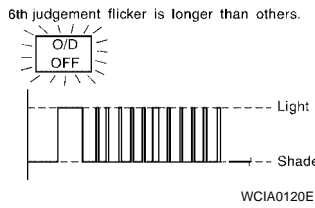
J

K

L

M

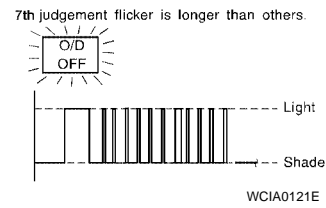
6th judgement flicker is longer than others.



Overrun clutch solenoid valve circuit is short-circuited or disconnected.

⇒ Go to [AT-568. "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"](#) .

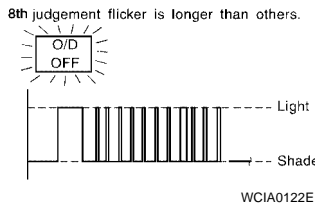
7th judgement flicker is longer than others.



Torque converter clutch solenoid valve circuit is short-circuited or disconnected.

⇒ Go to [AT-534. "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#) .

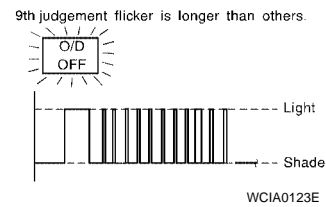
8th judgement flicker is longer than others.



A/T fluid temperature sensor is disconnected or TCM power source circuit is damaged.

⇒ Go to [AT-497. "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"](#) .

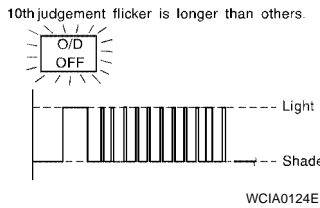
9th judgement flicker is longer than others.



Engine speed signal circuit is short-circuited or disconnected.

⇒ Go to [AT-508. "DTC P0725 ENGINE SPEED SIGNAL"](#) .

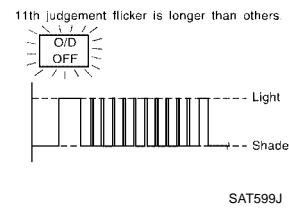
10th judgement flicker is longer than others.



Line pressure solenoid valve circuit is short-circuited or disconnected.

⇒ Go to [AT-547. "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#) .

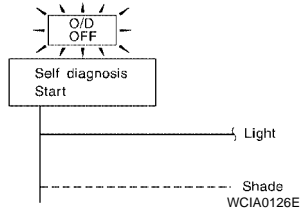
11th judgement flicker is longer than others.



The ECM-A/T communication line is open or shorted.

⇒ Go to [AT-590. "DTC U1000 CAN COMMUNICATION LINE"](#) .

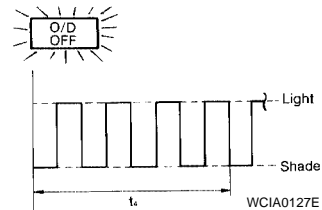
Lamp comes on.



Park/neutral position (PNP) switch, overdrive control switch or throttle position switch circuit is disconnected or TCM is damaged.

⇒ Go to [AT-632. "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}"](#) .

Flickers as shown below.



Battery power is low.

Battery has been disconnected for a long time.

Battery is connected conversely.

(When reconnecting TCM connectors. — This is not a problem.)

t1 = 2.5 seconds t2 = 2.0 seconds t3 = 1.0 second t4 = 1.0 second

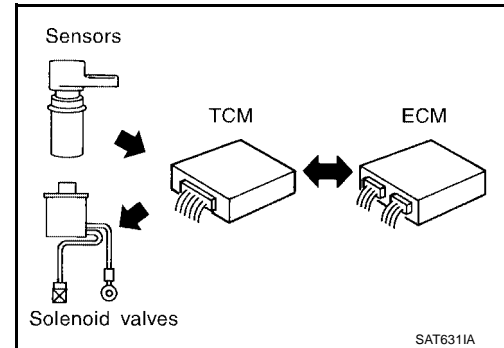
TROUBLE DIAGNOSIS - INTRODUCTION

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.

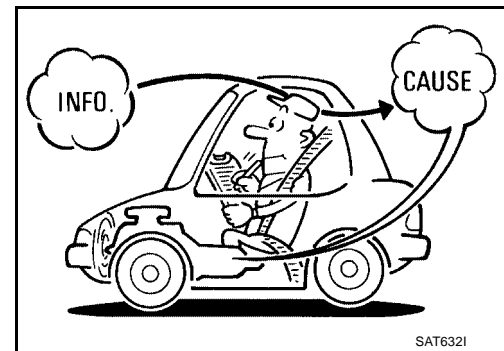
The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the OBD-related parts of the A/T system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.

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.

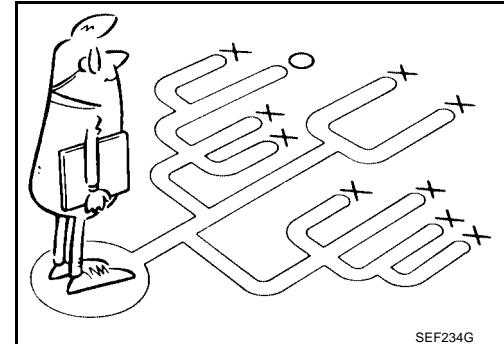
A visual check only, may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow". Refer to [AT-450, "Work Flow"](#)



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 [AT-447](#) 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.



TROUBLE DIAGNOSIS - INTRODUCTION

[RE4F04B]

Diagnostic Worksheet

1.	<input type="checkbox"/> Read the Fail-safe and listen to customer complaints.	AT-400		
2.	<input type="checkbox"/> CHECK A/T FLUID	AT-452		
	<input type="checkbox"/> Leakage (Follow specified procedure) <input type="checkbox"/> Fluid condition <input type="checkbox"/> Fluid level			
3.	<input type="checkbox"/> Perform STALL TEST and PRESSURE TEST.	AT-452 , AT-456		
	<input type="checkbox"/> Stall test — Mark possible damaged components/others.			
	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> <input type="checkbox"/> Torque converter one-way clutch <input type="checkbox"/> Reverse clutch <input type="checkbox"/> Forward clutch <input type="checkbox"/> Overrun clutch <input type="checkbox"/> Forward one-way clutch </td> <td style="width: 50%; border: none; vertical-align: top;"> <input type="checkbox"/> Low & reverse brake <input type="checkbox"/> Low one-way clutch <input type="checkbox"/> Engine <input type="checkbox"/> Line pressure is low <input type="checkbox"/> Clutches and brakes except high clutch and brake band are OK </td> </tr> </table>	<input type="checkbox"/> Torque converter one-way clutch <input type="checkbox"/> Reverse clutch <input type="checkbox"/> Forward clutch <input type="checkbox"/> Overrun clutch <input type="checkbox"/> Forward one-way clutch	<input type="checkbox"/> Low & reverse brake <input type="checkbox"/> Low one-way clutch <input type="checkbox"/> Engine <input type="checkbox"/> Line pressure is low <input type="checkbox"/> Clutches and brakes except high clutch and brake band are OK	
<input type="checkbox"/> Torque converter one-way clutch <input type="checkbox"/> Reverse clutch <input type="checkbox"/> Forward clutch <input type="checkbox"/> Overrun clutch <input type="checkbox"/> Forward one-way clutch	<input type="checkbox"/> Low & reverse brake <input type="checkbox"/> Low one-way clutch <input type="checkbox"/> Engine <input type="checkbox"/> Line pressure is low <input type="checkbox"/> Clutches and brakes except high clutch and brake band are OK			
	<input type="checkbox"/> Pressure test — Suspected parts:			
4.	<input type="checkbox"/> Perform all ROAD TEST and mark required procedures.	AT-457		
4-1.	Check before engine is started.	AT-459		
	<input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE - Mark detected items.			
	<input type="checkbox"/> Park/neutral position (PNP) switch, AT-491 . <input type="checkbox"/> A/T fluid temperature sensor, AT-573 . <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-503 . <input type="checkbox"/> Engine speed signal, AT-508 . <input type="checkbox"/> Turbine revolution sensor, AT-585 . <input type="checkbox"/> Torque converter clutch solenoid valve, AT-534 . <input type="checkbox"/> Line pressure solenoid valve, AT-547 . <input type="checkbox"/> Shift solenoid valve A, AT-553 . <input type="checkbox"/> Shift solenoid valve B, AT-558 . <input type="checkbox"/> Throttle position sensor [accelerator pedal position (APP) sensor, AT-563 . <input type="checkbox"/> Overrun clutch solenoid valve, AT-568 . <input type="checkbox"/> Park/neutral position (PNP), overdrive control and throttle position sensor [accelerator pedal position (APP) sensor] circuit checks, AT-632 . <input type="checkbox"/> A/T fluid temperature sensor and TCM power source, AT-488 . <input type="checkbox"/> Vehicle speed sensor-MTR, AT-580 . <input type="checkbox"/> A/T communication line, AT-590 . <input type="checkbox"/> Control unit (RAM), Control unit (ROM), AT-593 . <input type="checkbox"/> Control unit (EEP ROM), AT-595 . <input type="checkbox"/> Battery <input type="checkbox"/> Others			

TROUBLE DIAGNOSIS - INTRODUCTION

[RE4F04B]

4-	Check at idle		AT-459	
2.		<input type="checkbox"/> 1. O/D OFF Indicator Lamp Does Not Come On, AT-602 . <input type="checkbox"/> 2. Engine Cannot Be Started In P and N Position, AT-604 . <input type="checkbox"/> 3. In P Position, Vehicle Moves Forward or Backward When Pushed, AT-605 . <input type="checkbox"/> 4. In N Position, Vehicle Moves, AT-605 . <input type="checkbox"/> 5. Large Shock. N → R Position, AT-607 . <input type="checkbox"/> 6. Vehicle Does Not Creep Backward In R Position, AT-609 . <input type="checkbox"/> 7. Vehicle Does Not Creep Forward In D, 2 or 1 Position, AT-612 .		A B
4-	Cruise test		AT-462	AT
3.	Part-1		AT-465	
		<input type="checkbox"/> 8. Vehicle Cannot Be Started From D1 , AT-614 . <input type="checkbox"/> 9. A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2 , AT-617 . <input type="checkbox"/> 10. A/T Does Not Shift: D2 → D3 , AT-619 . <input type="checkbox"/> 11. A/T Does Not Shift: D3 → D4 , AT-622 . <input type="checkbox"/> 12. A/T Does Not Perform Lock-up, AT-624 . <input type="checkbox"/> 13. A/T Does Not Hold Lock-up Condition, AT-625 . <input type="checkbox"/> 14. Lock-up Is Not Released, AT-626 . <input type="checkbox"/> 15. Engine Speed Does Not Return To Idle (Light Braking D4 → D3) , AT-627 .		D E F
	Part-2		AT-468	
		<input type="checkbox"/> 16. Vehicle Does Not Start From D1 , AT-629 . <input type="checkbox"/> 9. A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2 , AT-617 . <input type="checkbox"/> 10. A/T Does Not Shift: D2 → D3 , AT-619 . <input type="checkbox"/> 11. A/T Does Not Shift: D3 → D4 , AT-622 .		G
4.	Part-3		AT-470	
		<input type="checkbox"/> 17. A/T Does Not Shift: D4 → D3 When Overdrive Control Switch ON → OFF, AT-630 . <input type="checkbox"/> 15. Engine Speed Does Not Return To Idle (Engine Brake In D3) , AT-627 . <input type="checkbox"/> 18. A/T Does Not Shift: D3 → 22 , When Selector Lever D → 2 Position, AT-630 . <input type="checkbox"/> 15. Engine Speed Does Not Return To Idle (Engine Brake In 22) , AT-627 . <input type="checkbox"/> 19. A/T Does Not Shift: 22 → 11 , When Selector Lever 2 → 1 Position, AT-631 . <input type="checkbox"/> 20. Vehicle Does Not Decelerate By Engine Brake, AT-632 . <input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE — Mark detected items.		H I J
		<input type="checkbox"/> Park/neutral position (PNP) switch, AT-491 . <input type="checkbox"/> A/T fluid temperature sensor, AT-497 . <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-503 . <input type="checkbox"/> Engine speed signal, AT-508 . <input type="checkbox"/> Turbine revolution sensor, AT-585 . <input type="checkbox"/> Torque converter clutch solenoid valve, AT-534 . <input type="checkbox"/> Line pressure solenoid valve, AT-547 . <input type="checkbox"/> Shift solenoid valve A, AT-553 . <input type="checkbox"/> Shift solenoid valve B, AT-558 . <input type="checkbox"/> Throttle position sensor [accelerator pedal position (APP) sensor], AT-563 . <input type="checkbox"/> Overrun clutch solenoid valve, AT-568 . <input type="checkbox"/> Park/neutral position (PNP), overdrive control and throttle position sensor [accelerator pedal position (APP) sensor] circuit checks, AT-632 . <input type="checkbox"/> A/T fluid temperature sensor and TCM power source, AT-488 . <input type="checkbox"/> Vehicle speed sensor-MTR, AT-580 . <input type="checkbox"/> A/T communication line, AT-590 . <input type="checkbox"/> Control unit (RAM), Control unit (ROM), AT-593 . <input type="checkbox"/> Control unit (EEP ROM), AT-595 . <input type="checkbox"/> Battery <input type="checkbox"/> Others		K L M
5.		<input type="checkbox"/> For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.	AT-644	
6.		<input type="checkbox"/> Perform all ROAD TEST and re-mark required procedures.	AT-457	
7.		<input type="checkbox"/> Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items. Refer to EC-1261 , "Emission-related Diagnostic Information".	EC-1261	
		<input type="checkbox"/> DTC (P0731) A/T 1st gear function, AT-512 . <input type="checkbox"/> DTC (P0732) A/T 2nd gear function, AT-517 . <input type="checkbox"/> DTC (P0733) A/T 3rd gear function, AT-522 . <input type="checkbox"/> DTC (P0734) A/T 4th gear function, AT-527 . <input type="checkbox"/> DTC (P0744) A/T TCC S/V function (lock-up), AT-539 .		

TROUBLE DIAGNOSIS - INTRODUCTION

[RE4F04B]

8.	<input type="checkbox"/> 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-433 AT-441
9.	<input type="checkbox"/> Erase DTC from TCM and ECM memories.	AT-430

Work Flow

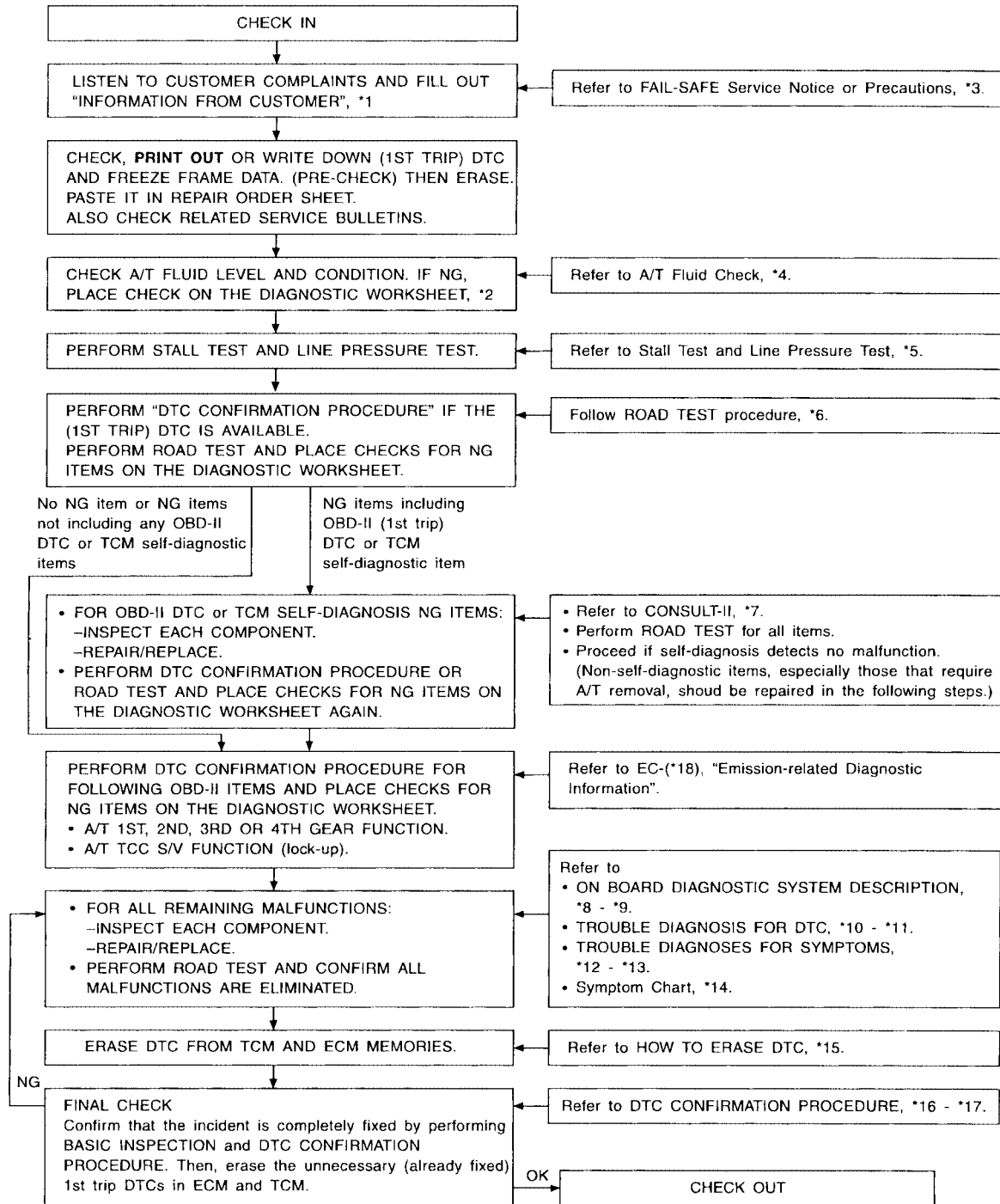
ECS0062P

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, [AT-447, "Information from Customer"](#) and [AT-448, "Diagnostic Worksheet"](#), to perform the best troubleshooting possible.

WORK FLOW CHART



*1: [AT-447](#)

*4: [AT-452](#)

*7: [AT-432](#)

*10: [AT-491](#)

*13: [AT-637](#)

*16: [AT-491](#)

*2: [AT-448](#)

*5: [AT-452, AT-456](#)

*8: [AT-428](#)

*11: [AT-597](#)

*14: [AT-473](#)

*17: [AT-593](#)

*3: [AT-400](#)

*6: [AT-457](#)

*9: [AT-446](#)

*12: [AT-597](#)

*15: [AT-430](#)

*18: [EC-1261](#)

SAT086JI

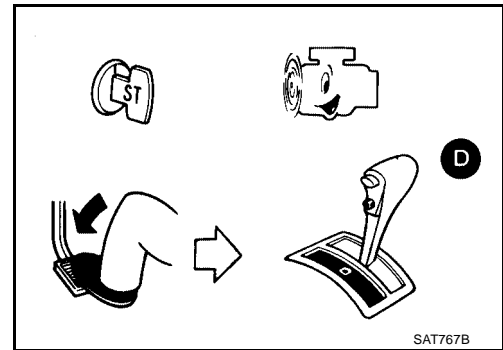
TROUBLE DIAGNOSIS - BASIC INSPECTION

PF0:0000

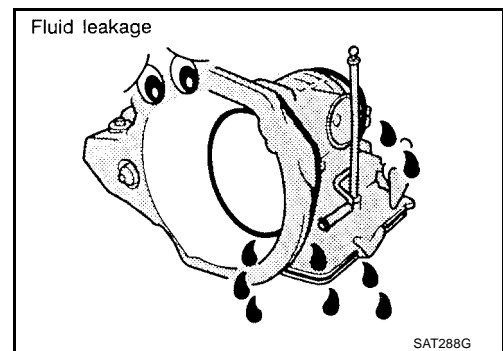
ECS0062Q

**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.

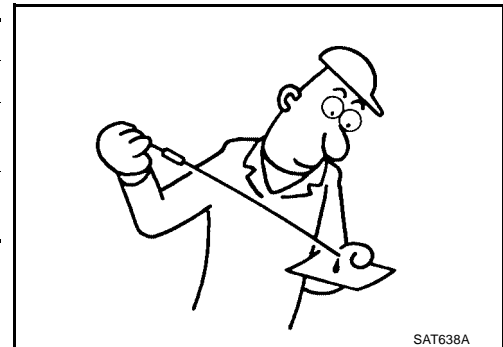


4. Check for fresh leakage.



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

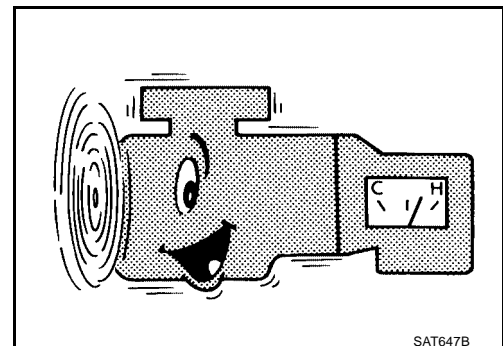
Refer to [MA-30, "Checking A/T Fluid"](#) .

**Stall Test
STALL TEST PROCEDURE**

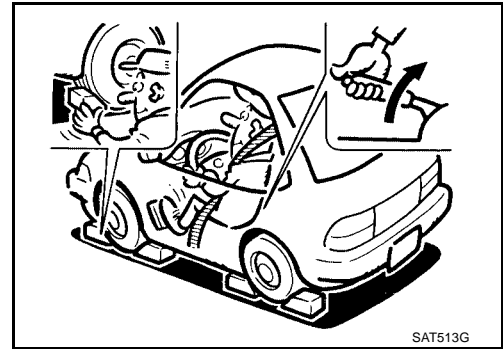
ECS0062R

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)

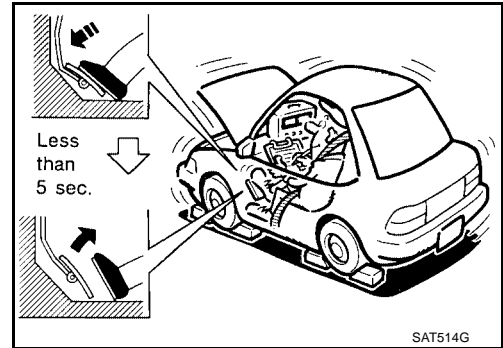


3. Set parking brake and block wheels.
4. Install a tachometer where it can be seen by driver during test.
 - It is good practice to mark the point of specified engine rpm on indicator.

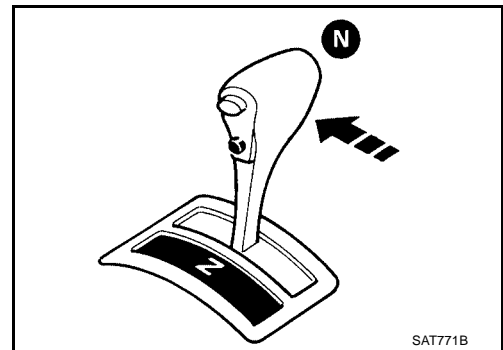


5. Start engine, apply foot brake, and place selector lever in D position.
6. Accelerate to wide open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.
 - During test, never hold throttle wide open for more than 5 seconds.

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-451, "WORK FLOW CHART"](#).

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

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TROUBLE DIAGNOSIS - BASIC INSPECTION

[RE4F04B]

-
- 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

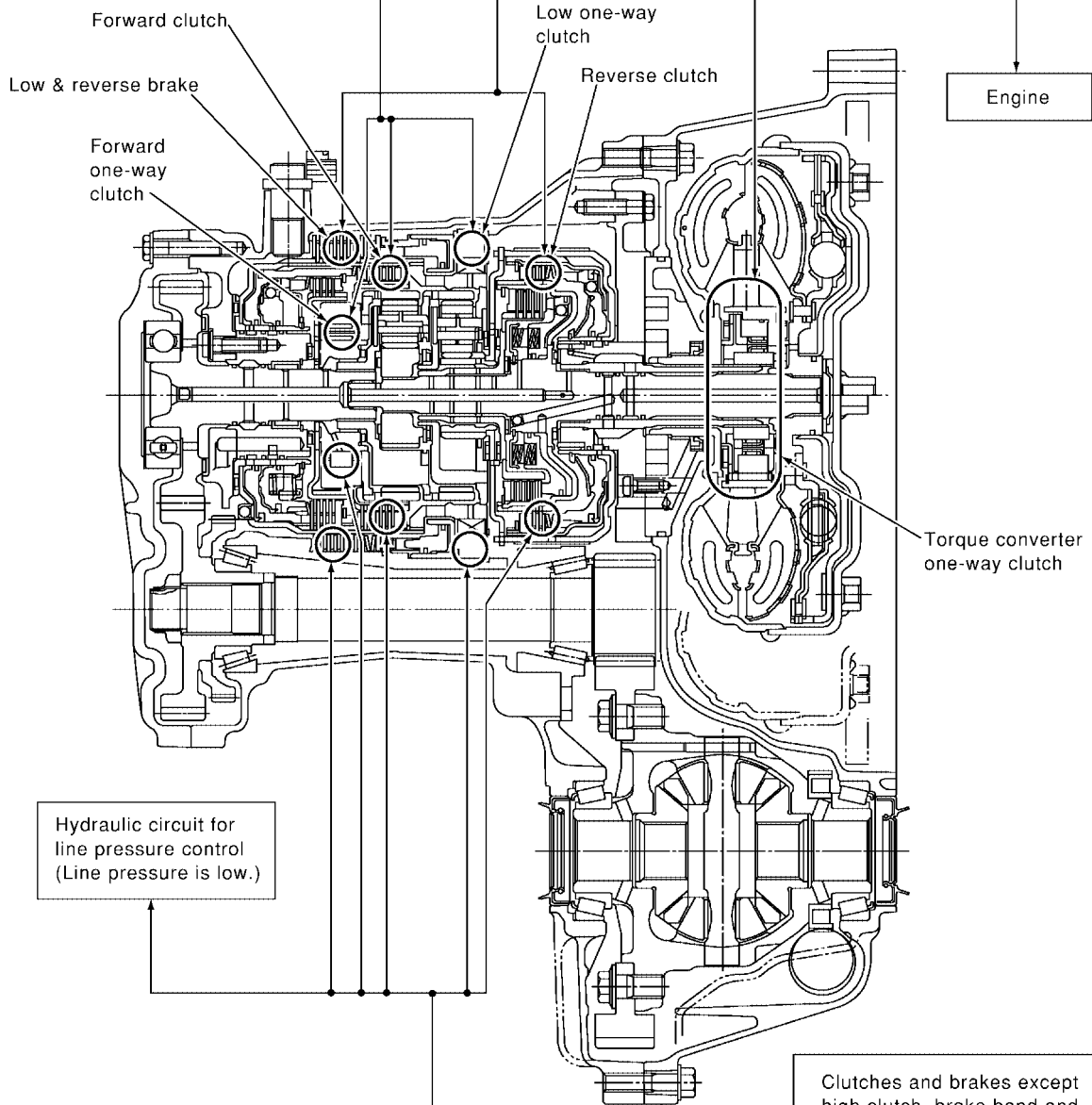
TROUBLE DIAGNOSIS - BASIC INSPECTION

[RE4F04B]

Selector lever position	Judgement		
D	H	O	L
2	H	O	L
1	H	O	L
R	O	H	L

O : Stall revolution is normal.
 H : Stall revolution is higher than specified.
 L : Stall revolution is lower than specified.

Damaged components



D	H	O
2	H	O
1	H	O
R	H	O
Selector lever position	Judgement	

Clutches and brakes except high clutch, brake band and overrun clutch are OK. (Condition of high clutch, brake band and overrun clutch cannot be confirmed by stall test.)

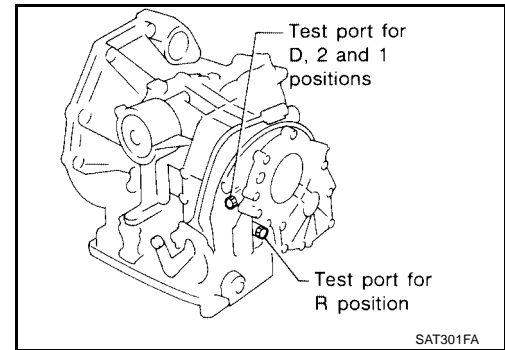
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SAT499K

Line Pressure Test LINE PRESSURE TEST PORTS

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

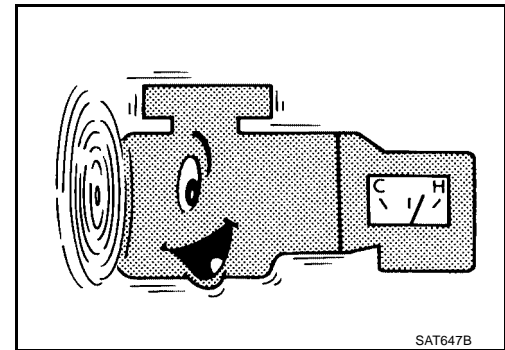
- Always replace pressure plugs as they are self-sealing bolts.



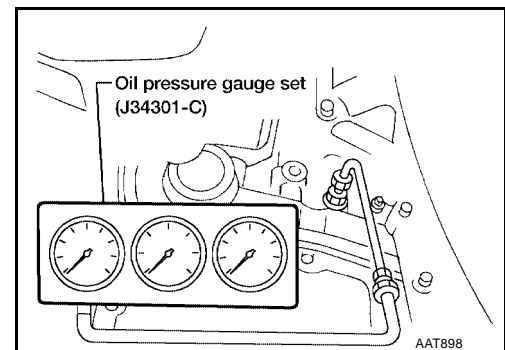
LINE PRESSURE TEST PROCEDURE

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.

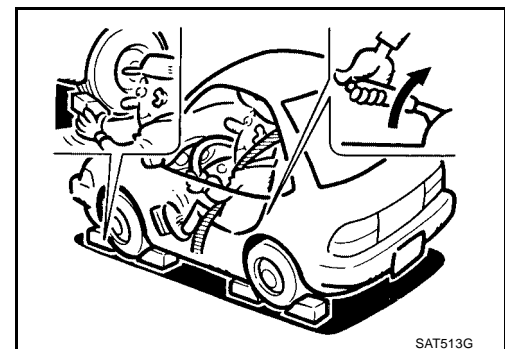
ATF operating temperature :50 - 80°C (122 - 176°F)



3. Install pressure gauge to corresponding line pressure port.

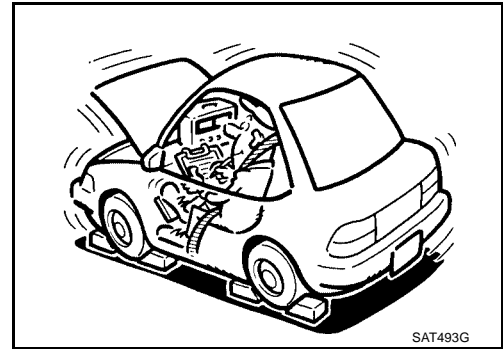


4. Set parking brake and block wheels.
 - Continue to depress brake pedal fully while line pressure test is being performed at stall speed.



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-456, "Line Pressure Test"](#) : Refer to SDS, [AT-753, "Line Pressure"](#)



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JUDGEMENT OF LINE PRESSURE TEST

Judgement		Suspected parts
At idle	Line pressure is low in all positions.	<ul style="list-style-type: none"> ● 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
	Line pressure is low in particular position.	<ul style="list-style-type: none"> ● Fluid pressure leakage between manual valve and particular clutch ● For example, line pressure is: <ul style="list-style-type: none"> – 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-411, "CLUTCH AND BAND CHART" .
	Line pressure is high.	<ul style="list-style-type: none"> ● 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.	<ul style="list-style-type: none"> ● 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

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Road Test DESCRIPTION

EC50062T

- The purpose of the test is to determine overall performance of A/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

ROAD TEST PROCEDURE

1. Check before engine is started.



2. Check at idle.



3. Cruise test.

SAT786A

TROUBLE DIAGNOSIS - BASIC INSPECTION

[RE4F04B]

- 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 [AT-428, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION"](#) and [AT-597, "TROUBLE DIAGNOSIS FOR SYMPTOMS"](#).



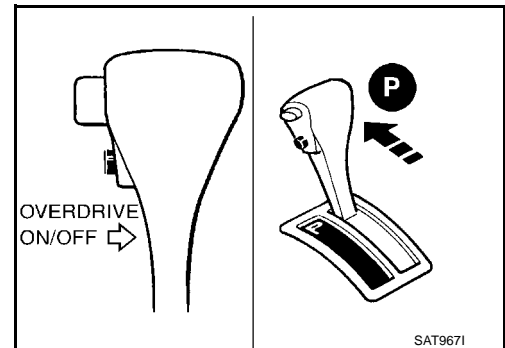
1. CHECK BEFORE ENGINE IS STARTED

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 [AT-602, "1. O/D OFF Indicator Lamp Does Not Come On"](#) .

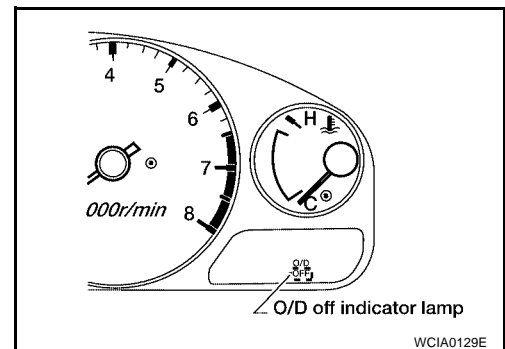


2. CHECK O/D OFF INDICATOR LAMP

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 DIAGNOSTIC WORKSHEET, [AT-448](#) . Refer to [AT-442, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) .
 No >> 1. Turn ignition switch to OFF position.
 2. Perform self-diagnosis and note NG items. Refer to [AT-442, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) .
 3. Go to [AT-459, "2. CHECK AT IDLE"](#) .



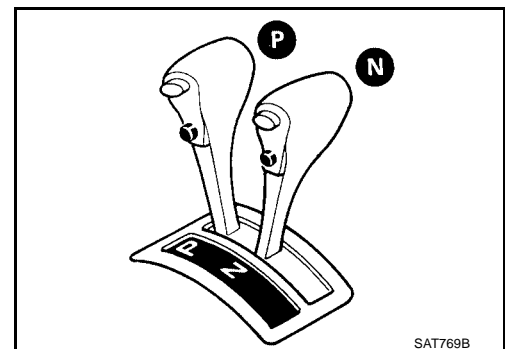
2. CHECK AT IDLE

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-604, "2. Engine Cannot Be Started In P and N Position"](#) .

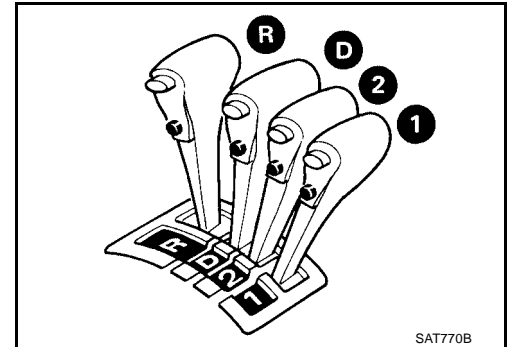


2. CHECK ENGINE START

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?

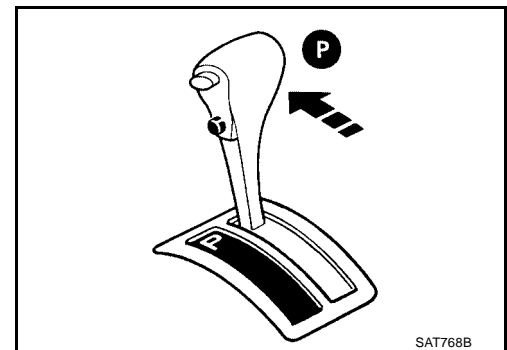
Yes or No

- Yes >> Stop ROAD TEST. Mark the box on the DIAGNOSTIC WORKSHEET. Go to [AT-604, "2. Engine Cannot Be Started In P and N Position"](#) .
- 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-605, "3. In P Position, Vehicle Moves Forward or Backward When Pushed"](#) . Continue ROAD TEST.
- No >> GO TO 4.

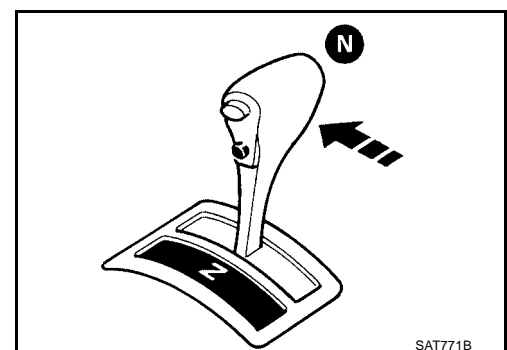


4. CHECK VEHICLE MOVE

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

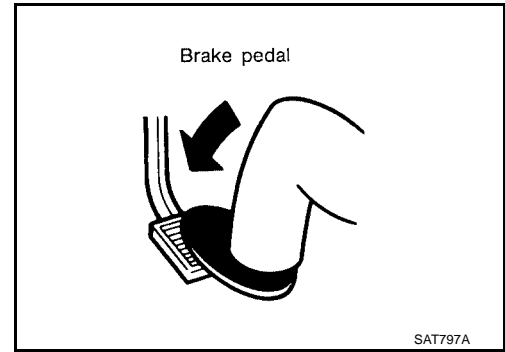
Yes or No

- Yes >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to [AT-605, "4. In N Position, Vehicle Moves"](#) . Continue ROAD TEST.
- No >> GO TO 5.



5. CHECK SHIFT LOCK

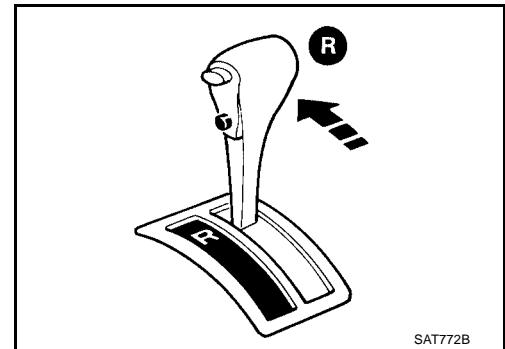
1. Apply foot brake.



2. Move 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 [AT-607, "5. Large Shock N → R Position"](#) . Continue ROAD TEST.
- No >> GO TO 6.

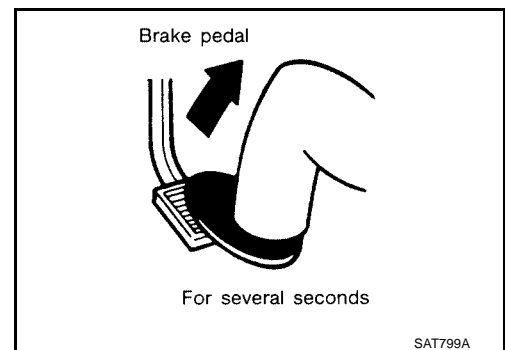


6. CHECK VEHICLE MOVE

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

Yes or No

- Yes >> GO TO 7.
- No >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to [AT-609, "6. Vehicle Does Not Creep Backward In R Position"](#) . Continue ROAD TEST.

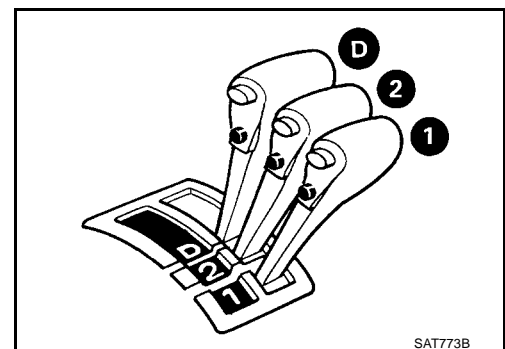


7. CHECK VEHICLE MOVE

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

Yes or No

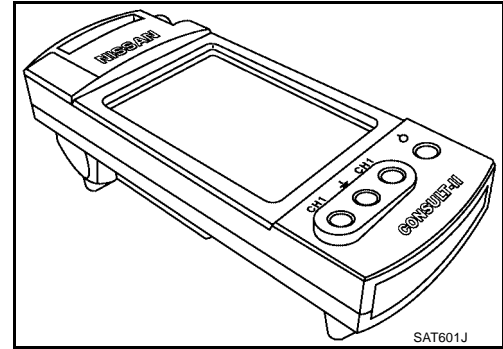
- Yes >> Go to [AT-462, "3. CRUISE TEST"](#) .
- No >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to [AT-612, "7. Vehicle Does Not Creep Forward in D, 2 or 1 Position"](#) . Continue ROAD TEST.



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3. CRUISE TEST

- Check all items listed in Parts 1 through 3.

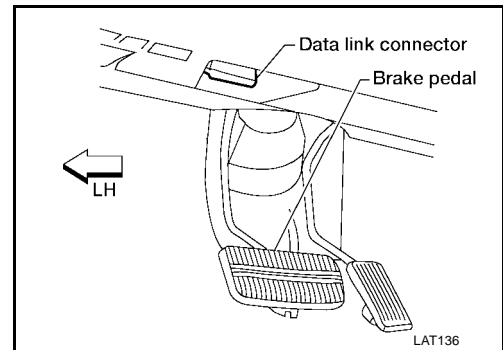


With CONSULT-II

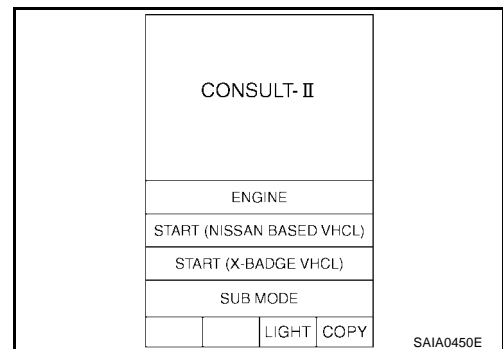
- Using CONSULT-II, conduct a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per Shift Schedule. Refer to [AT-752](#), "[Shift Schedule](#)".

CONSULT-II Setting Procedure

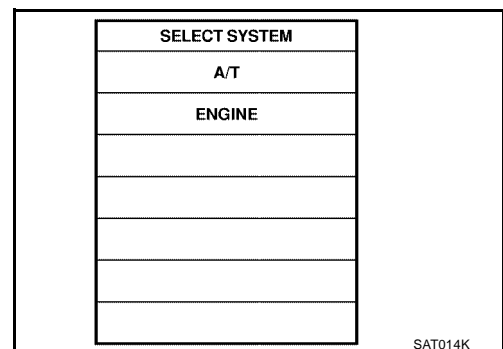
1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector, which is located in left side dash panel.
3. Turn ignition switch ON.



4. Touch "START (NISSAN BASED VHCL)".



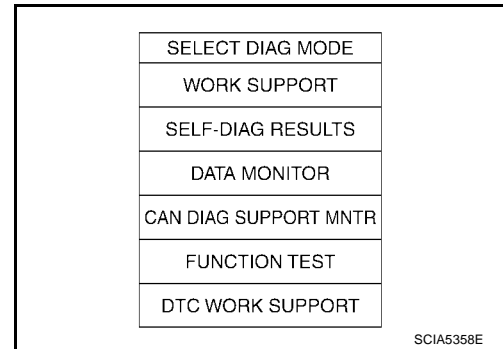
5. Touch "A/T".



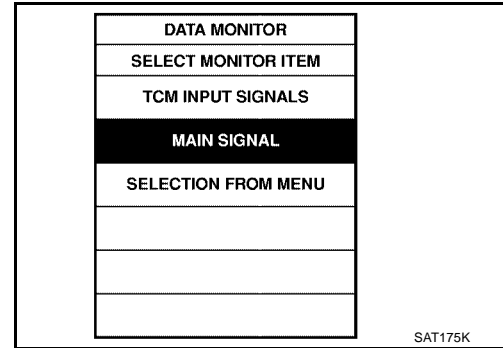
TROUBLE DIAGNOSIS - BASIC INSPECTION

[RE4F04B]

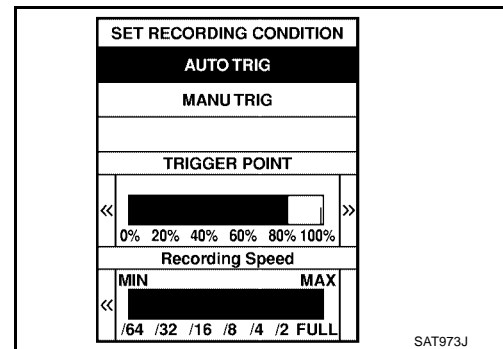
6. Touch "DATA MONITOR".



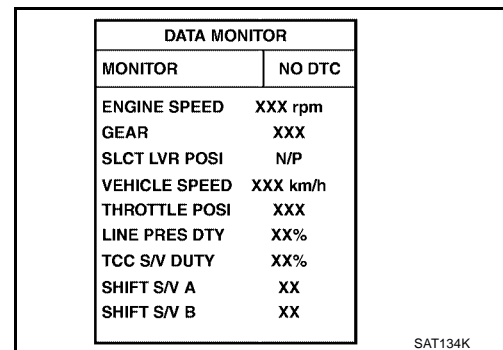
7. Touch "MAIN SIGNAL" or "TCM INPUT SIGNALS".
 8. See "NUMERICAL DISPLAY", "BARCHART DISPLAY" or "LINE GRAPH DISPLAY".



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



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



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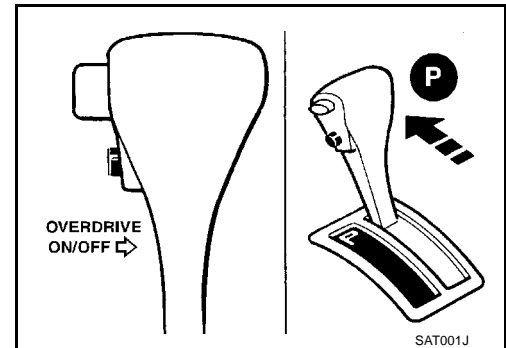
Cruise Test — Part 1

1. CHECK STARTING GEAR (D1) POSITION

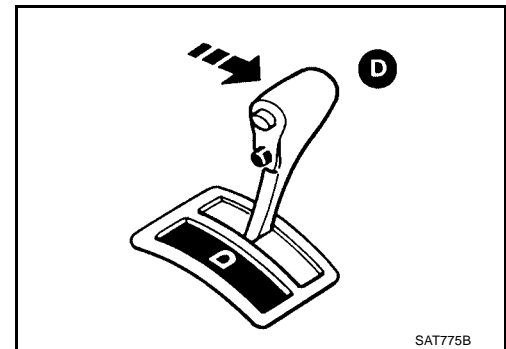
1. Drive vehicle for approx. 10 minutes to warm engine oil and ATF up to operating temperature.

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

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



6. Move selector lever to D position.

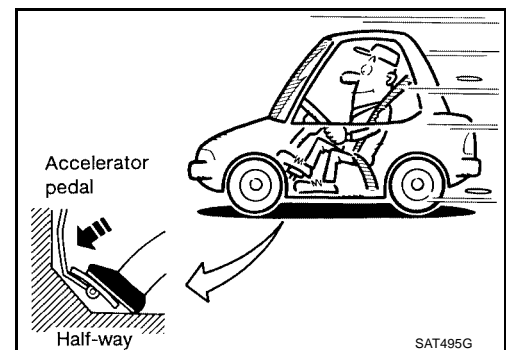


7. Accelerate vehicle by constantly depressing accelerator pedal half-way.
8. Does vehicle start from D1 ?

Read gear position.

Yes or No

- Yes >> GO TO 2.
- No >> Go to [AT-614, "8. Vehicle Cannot Be Started From D1"](#). Continue ROAD TEST.



2. CHECK SHIFT UP (D1 TO D2)

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

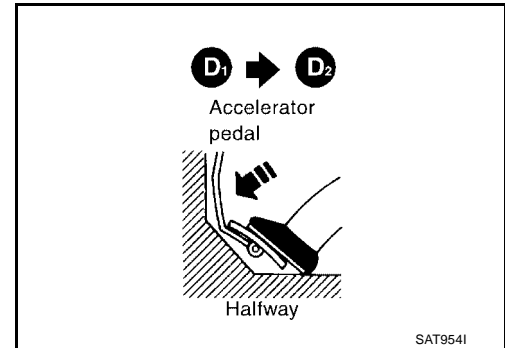
① Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D1 to D2 :Refer to [AT-752, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 3.

No >> Go to [AT-617, "9. A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2"](#) . Continue ROAD TEST.



3. CHECK SHIFT UP (D2 TO D3)

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

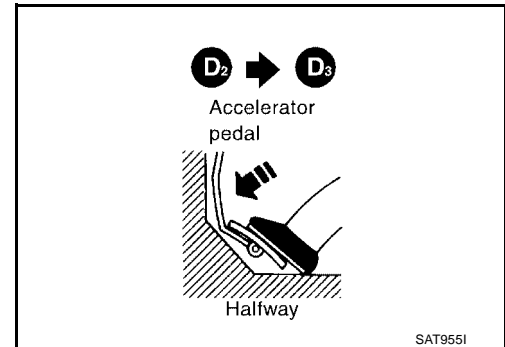
① Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D2 to D3 :Refer to [AT-752, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 4.

No >> Go to [AT-619, "10. A/T Does Not Shift: D2 → D3"](#) . Continue ROAD TEST.



4. CHECK SHIFT UP (D3 TO D4)

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

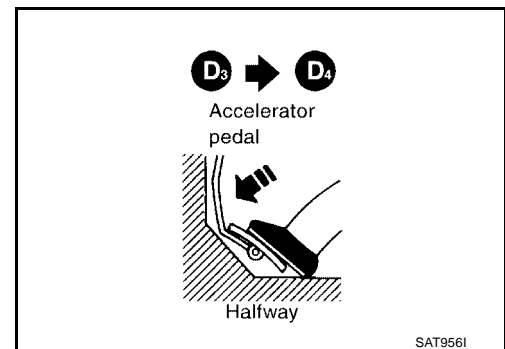
① Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D3 to D4 :Refer to [AT-752, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 5.

No >> Go to [AT-622, "11. A/T Does Not Shift: D3 → D4"](#) . Continue ROAD TEST.



5. CHECK LOCK-UP (D4 TO D4 L/U)

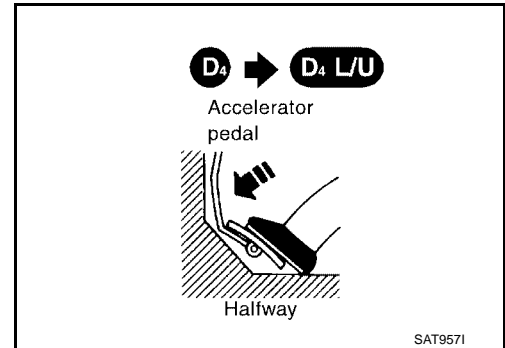
Does A/T perform lock-up at the specified speed?

Read vehicle speed, throttle opening when lock-up duty becomes 94%.

Specified speed when lock-up occurs :Refer to [AT-752, "Shift Schedule"](#) .

Yes or No

- Yes >> GO TO 6.
- No >> Go to [AT-624, "12. A/T Does Not Perform Lock-up"](#) . Continue ROAD TEST.



6. CHECK HOLD LOCK-UP

Does A/T hold lock-up condition for more than 30 seconds?

Yes or No

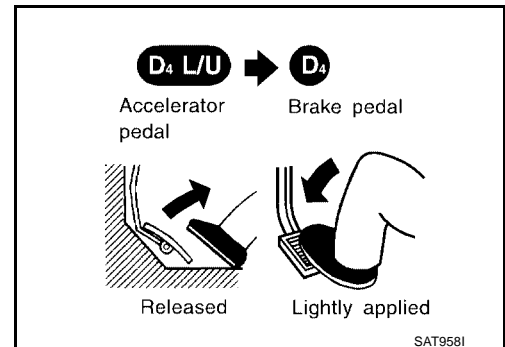
- Yes >> GO TO 7.
- No >> Go to [AT-625, "13. A/T Does Not Hold Lock-up Condition"](#) .

7. CHECK SHIFT DOWN (D4 L/U TO D4)

1. Release accelerator pedal.
2. Is lock-up released when accelerator pedal is released?

Yes or No

- Yes >> GO TO 8.
- No >> Go to [AT-626, "14. Lock-up Is Not Released"](#) . Continue ROAD TEST.



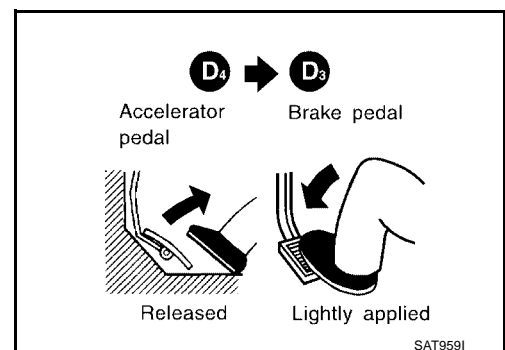
8. CHECK SHIFT DOWN (D4 TO D3)

1. Decelerate vehicle by applying foot brake lightly.
2. Does engine speed return to idle smoothly when A/T is shifted from D4 to D3 ?

Read gear position and engine speed.

Yes or No

- Yes >> 1. Stop vehicle.
2. Go to [AT-468, "Cruise Test — Part 2"](#) .
- No >> Go to [AT-627, "15. Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) . Continue ROAD TEST.



Cruise Test — Part 2

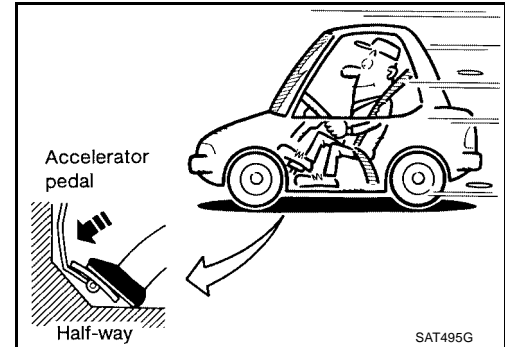
1. CHECK STARTING GEAR (D1) POSITION

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 ?

 **Read gear position.**

Yes or No

- Yes >> GO TO 2.
 No >> Go to [AT-629, "16. Vehicle Does Not Start From D1"](#) .
 Continue ROAD TEST.



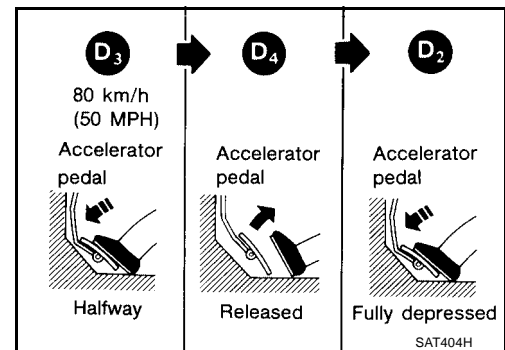
2. CHECK SHIFT UP AND SHIFT DOWN (D3 TO D4 TO D2)

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?

 **Read gear position and throttle opening.**

Yes or No

- Yes >> GO TO 3.
 No >> Go to [AT-617, "9. A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2"](#) . Continue ROAD TEST.



3. CHECK SHIFT UP (D2 TO D3)

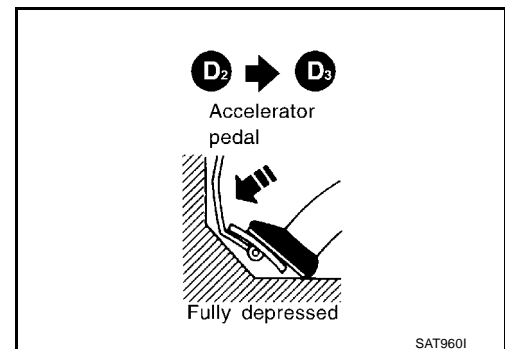
Does A/T shift from D2 to D3 at the specified speed?

 **Read gear position, throttle opening and vehicle speed.**

Specified speed when shifting from D2 to D3 :Refer to [AT-752, "Shift Schedule"](#) .

Yes or No

- Yes >> GO TO 4.
 No >> Go to [AT-619, "10. A/T Does Not Shift: D2 → D3"](#) . Continue ROAD TEST.



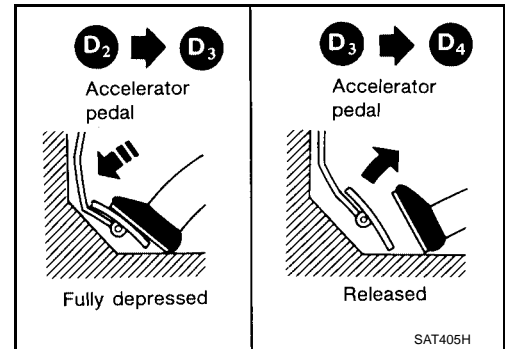
4. CHECK SHIFT UP (D3 TO D4) AND ENGINE BRAKE

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

 **Read gear position, throttle opening and vehicle speed.**

Yes or No

- Yes >> 1. Stop vehicle.
2. Go to [AT-470, "Cruise Test — Part 3"](#) .
- No >> Go to [AT-622, "11. A/T Does Not Shift: D3 → D4"](#) . Continue ROAD TEST.

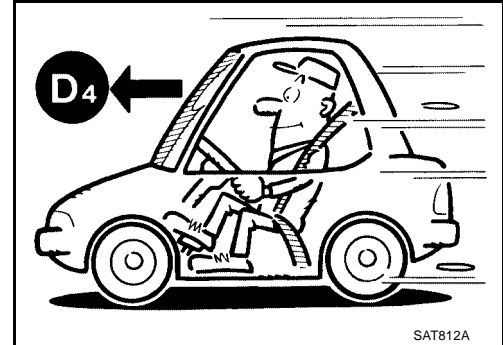


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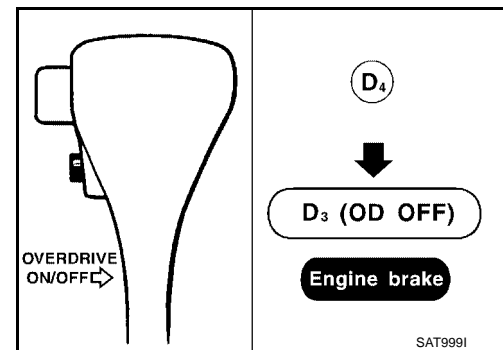
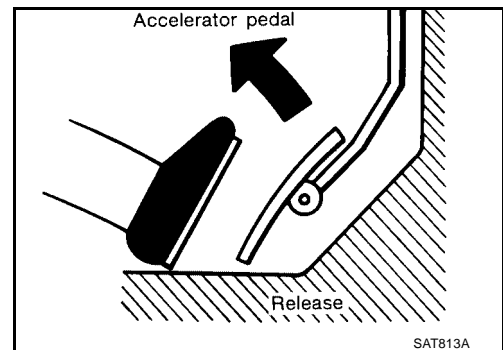
Cruise Test — Part 3

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)?
 Read gear position and vehicle speed.



Yes or No

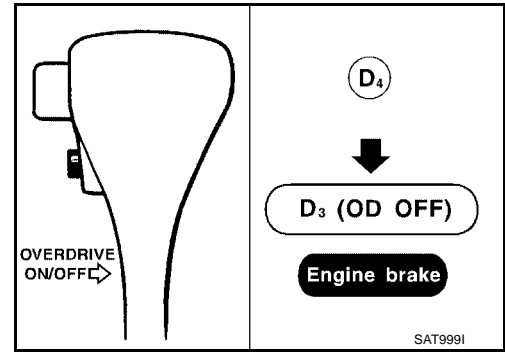
- Yes >> GO TO 2.
 No >> Go to [AT-630, "17. A/T Does Not Shift: D4 → D3 , When Overdrive Control Switch ON → OFF"](#) .
 Continue ROAD TEST.

2. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> GO TO 3.
- No >> Go to [AT-627, "15. Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) . Continue ROAD TEST.



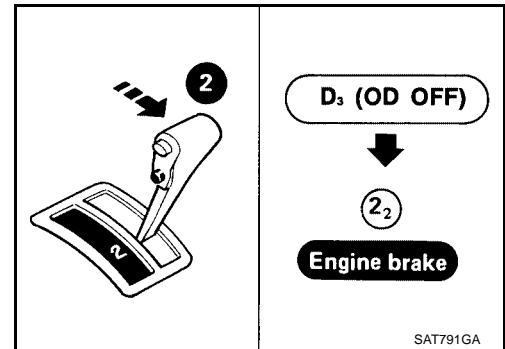
3. CHECK SHIFT DOWN (D3 TO D2)

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 ?

Read gear position.

Yes or No

- Yes >> GO TO 4.
- No >> Go to [AT-630, "18. A/T Does Not Shift: D3 → 2₂ , When Selector Lever D → 2 Position"](#) . Continue ROAD TEST.

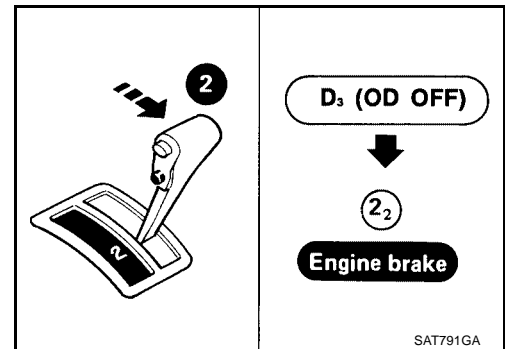


4. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> GO TO 5.
- No >> Go to [AT-627, "15. Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) . Continue ROAD TEST.



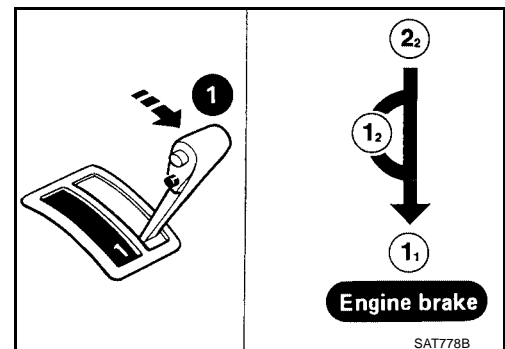
5. CHECK SHIFT DOWN (2₂ TO 1₁)

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

Read gear position.

Yes or No

- Yes >> GO TO 6.
- No >> Go to [AT-631, "19. A/T Does Not Shift: 2₂ → 1₁ , When Selector Lever 2 → 1 Position"](#) . Continue ROAD TEST.

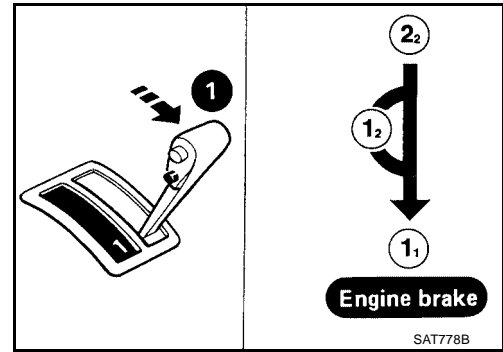


6. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> 1. Stop vehicle.
2. Perform self-diagnosis. Refer to [AT-442, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#).
- No >> Go to [AT-632, "20. Vehicle Does Not Decelerate By Engine Brake"](#). Continue ROAD TEST.



TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

PFP:00000

Symptom Chart

ECS0062U

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

Items	Symptom	Condition	Diagnostic Item	Reference Page
No Lock-up Engagement/ TCC Inoperative	Torque converter is not locked up.	ON vehicle	1. Throttle position sensor {accelerator pedal position (APP) sensor}	AT-563
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-503, AT-580
			3. Engine speed signal	AT-508
			4. A/T fluid temperature sensor	AT-573
			5. Line pressure test	AT-456
			6. Torque converter clutch solenoid valve	AT-534
			7. Control valve assembly	AT-644
		OFF vehicle	8. Torque converter	AT-657
	Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-452
			2. Throttle position sensor {accelerator pedal position (APP) sensor}	AT-563
			3. Line pressure test	AT-456
			4. Torque converter clutch solenoid valve	AT-534
			5. Line pressure solenoid valve	AT-547
			6. Control valve assembly	AT-644
			OFF vehicle	7. Torque converter
Lock-up point is extremely high or low.	ON vehicle	1. Throttle position sensor {accelerator pedal position (APP) sensor}	AT-563	
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-503, AT-580	
		3. Torque converter clutch solenoid valve	AT-534	
		4. Control valve assembly	AT-644	
Shift Shock	ON vehicle	1. Engine idling rpm	EC-1244	
		2. Throttle position sensor {accelerator pedal position (APP) sensor}	AT-563	
		3. Line pressure test	AT-456	
		4. A/T fluid temperature sensor	AT-573	
		5. Engine speed signal	AT-508	
		6. Line pressure solenoid valve	AT-547	
		7. Control valve assembly	AT-644	
		8. Accumulator N-D	AT-657	
		OFF vehicle	9. Forward clutch	AT-702

TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

Items	Symptom	Condition	Diagnostic Item	Reference Page
Shift Shock	Too sharp a shock in change from D1 to D2 .	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-563
			2. Line pressure test	AT-456
			3. Accumulator servo release	AT-657
			4. Control valve assembly	AT-644
			5. A/T fluid temperature sensor	AT-573
		OFF vehicle	6. Brake band	AT-657
	Too sharp a shock in change from D2 to D3 .	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-563
			2. Line pressure test	AT-456
			3. Control valve assembly	AT-644
			4. A/T fluid temperature sensor	AT-497
		OFF vehicle	5. High clutch	AT-697
			6. Brake band	AT-657
	Too sharp a shock in change from D3 to D4 .	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor]	AT-563
			2. Line pressure test	AT-456
			3. Control valve assembly	AT-644
			4. A/T fluid temperature sensor	AT-497
		OFF vehicle	5. Brake band	AT-657
			6. Overrun clutch	AT-702
			7. Forward one-way clutch	AT-657#####
	Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
2. Line pressure test			AT-456	
3. Overrun clutch solenoid valve			AT-568	
4. Control valve assembly			AT-644	
Large shock changing from 12 to 11 in 1 position.	ON vehicle	1. Control valve assembly	AT-644	
	ON vehicle	2. Low & reverse brake	AT-708	

TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

Items	Symptom	Condition	Diagnostic Item	Reference Page
Improper Shift Timing	Too high a gear change point from D1 to D2 , from D2 to D3 , from D3 to D4 .	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-503, AT-580
			3. Shift solenoid valve A	AT-553
			4. Shift solenoid valve B	AT-558
	Gear change directly from D1 to D3 occurs.	ON vehicle	1. Fluid level	AT-452
		OFF vehicle	2. Accumulator servo release	AT-657
	Too high a change point from D4 to D3 , from D3 to D2 , from D2 to D1 .	ON vehicle	3. Brake band	AT-657
			1. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
	Kickdown does not operate when depressing pedal in D4 within kickdown vehicle speed.	ON vehicle	2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-503, AT-580
			3. Shift solenoid valve A	AT-553
			4. Shift solenoid valve B	AT-558
			1. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-503, AT-580
Improper Shift Timing	Kickdown operates or engine overruns when depressing pedal in D4 beyond kickdown vehicle speed limit.	ON vehicle	2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			3. Shift solenoid valve A	AT-553
			4. Shift solenoid valve B	AT-558
			1. Park/neutral position (PNP) switch adjustment	AT-646
	Gear change from 22 to 23 in 2 position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-646
			2. Control cable adjustment	AT-647

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TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

Items	Symptom	Condition	Diagnostic Item	Reference Page
No Down Shift	Failure to change gear from D4 to D3 .	ON vehicle	1. Fluid level	AT-452
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			3. Overrun clutch solenoid valve	AT-568
			4. Shift solenoid valve A	AT-553
			5. Line pressure solenoid valve	AT-547
			6. Control valve assembly	AT-644
		OFF vehicle	7. Low & reverse brake	AT-708
			8. Overrun clutch	AT-702
	Failure to change gear from D3 to D2 or from D4 to D2 .	ON vehicle	1. Fluid level	AT-452
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			3. Shift solenoid valve A	AT-553
			4. Shift solenoid valve B	AT-558
			5. Control valve assembly	AT-644
		OFF vehicle	6. High clutch	AT-697
7. Brake band			AT-657	
Failure to change gear from D2 to D1 or from D3 to D1 .	ON vehicle	1. Fluid level	AT-452	
		2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255	
		3. Shift solenoid valve A	AT-553	
		4. Shift solenoid valve B	AT-558	
		5. Control valve assembly	AT-644	
	OFF vehicle	6. Low one-way clutch	AT-657	
		7. High clutch	AT-697	
		8. Brake band	AT-657	
No Down Shift	Failure to change from D3 to 22 when changing lever into 2 position. AT-630	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-646
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			3. Overrun clutch solenoid valve	AT-568
			4. Shift solenoid valve B	AT-558
			5. Shift solenoid valve A	AT-553
			6. Control valve assembly	AT-644
			7. Control cable adjustment	AT-647
		OFF vehicle	8. Brake band	AT-657
			9. Overrun clutch	AT-702
			Does not change from 12 to 11 in 1 position.	ON vehicle
	2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-503 , AT-580		
	3. Shift solenoid valve A	AT-553		
	4. Control valve assembly	AT-644		
	5. Overrun clutch solenoid valve	AT-568		
OFF vehicle	6. Overrun clutch	AT-702		
	7. Low & reverse brake	AT-708		

TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

Items	Symptom	Condition	Diagnostic Item	Reference Page
No Up Shift	Failure to change gear from D1 to D2 .	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-646
			2. Control cable adjustment	AT-647
			3. Shift solenoid valve A	AT-553
			4. Control valve assembly	AT-644
			5. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-503 , AT-580
		OFF vehicle	6. Brake band	AT-657
	Failure to change gear from D2 to D3 .	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-646
			2. Control cable adjustment	AT-647
			3. Shift solenoid valve B	AT-558
			4. Control valve assembly	AT-644
5. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR			AT-503 , AT-580	
		OFF vehicle	6. High clutch	AT-697
			7. Brake band	AT-657
No Up Shift	Failure to change gear from D3 to D4 .	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-646
			2. Control cable adjustment	AT-647
			3. Shift solenoid valve A	AT-553
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-503 , AT-580
			5. A/T fluid temperature sensor	AT-573
		OFF vehicle	6. Brake band	AT-657
	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] (Adjustment)	EC-1255
			2. Park/neutral position (PNP) switch adjustment	AT-646
			3. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-503 , AT-580
			4. Shift solenoid valve A	AT-553
5. Overrun clutch solenoid valve			AT-568	
6. Control valve assembly	AT-644			
7. A/T fluid temperature sensor	AT-573			
8. Line pressure solenoid valve	AT-547			
	OFF vehicle	9. Brake band	AT-657	
		10. Overrun clutch	AT-702	

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TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

Items	Symptom	Condition	Diagnostic Item	Reference Page
Slips/Will Not Engage	Vehicle will not run in R position (but runs in D, 2 and 1 positions). Clutch slips. Very poor acceleration. AT-609	ON vehicle	1. Control cable adjustment	AT-647
			2. Line pressure test	AT-456
			3. Line pressure solenoid valve	AT-547
			4. Control valve assembly	AT-644
		OFF vehicle	5. Reverse clutch	AT-694
			6. High clutch	AT-697
			7. Forward clutch	AT-702
			8. Overrun clutch	AT-702
			9. Low & reverse brake	AT-708
		Vehicle will not run in D and 2 positions (but runs in 1 and R positions).	ON vehicle	1. Control cable adjustment
OFF vehicle	2. Low one-way clutch		AT-657	

TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

Items	Symptom	Condition	Diagnostic Item	Reference Page
Slips/Will Not Engage	Vehicle will not run in D, 1, 2 positions (but runs in R position). Clutch slips. Very poor acceleration. AT-612	ON vehicle	1. Fluid level	AT-452
			2. Line pressure test	AT-456
			3. Line pressure solenoid valve	AT-547
			4. Control valve assembly	AT-644
			5. Accumulator N-D	AT-657
		OFF vehicle	6. Reverse clutch	AT-694
			7. High clutch	AT-697
			8. Forward clutch	AT-702
			9. Forward one-way clutch	AT-657
			10. Low one-way clutch	AT-657
	Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-452
			2. Control cable adjustment	AT-647
			3. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			4. Line pressure test	AT-456
			5. Line pressure solenoid valve	AT-547
			6. Control valve assembly	AT-644
			7. Accumulator N-D	AT-657
		OFF vehicle	8. Forward clutch	AT-702
			9. Reverse clutch	AT-694
			10. Low & reverse brake	AT-708
			11. Oil pump	AT-675
			12. Torque converter	AT-657
	No creep at all. AT-609 , AT-612	ON vehicle	1. Fluid level	AT-452
			2. Line pressure test	AT-456
3. Control valve assembly			AT-644	
OFF vehicle		4. Forward clutch	AT-702	
		5. Oil pump	AT-675	
		6. Torque converter	AT-657	
Almost no shock or clutches slipping in change from D1 to D2 .	ON vehicle	1. Fluid level	AT-452	
		2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255	
		3. Line pressure test	AT-456	
		4. Accumulator servo release	AT-657	
		5. Control valve assembly	AT-644	
	OFF vehicle	6. Brake band	AT-657	

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TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

Items	Symptom	Condition	Diagnostic Item	Reference Page
Slips/Will Not Engage	Almost no shock or slipping in change from D2 to D3 .	ON vehicle	1. Fluid level	AT-452
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			3. Line pressure test	AT-456
			4. Control valve assembly	AT-644
		OFF vehicle	5. High clutch	AT-697
			6. Forward clutch	AT-702
	Almost no shock or slipping in change from D3 to D4 .	ON vehicle	1. Fluid level	AT-452
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			3. Line pressure test	AT-456
			4. Control valve assembly	AT-644
		OFF vehicle	5. High clutch	AT-697
			6. Brake band	AT-657
	Races extremely fast or slips in changing from D4 to D3 when depressing pedal.	ON vehicle	1. Fluid level	AT-452
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			3. Line pressure test	AT-456
			4. Line pressure solenoid valve	AT-547
			5. Control valve assembly	AT-644
		OFF vehicle	6. High clutch	AT-697
			7. Forward clutch	AT-702
	Races extremely fast or slips in changing from D4 to D2 when depressing pedal.	ON vehicle	1. Fluid level	AT-452
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			3. Line pressure test	AT-456
			4. Line pressure solenoid valve	AT-547
			5. Shift solenoid valve A	AT-553
6. Control valve assembly			AT-644	
OFF vehicle		7. Brake band	AT-657	
		8. Forward clutch	AT-702	
Races extremely fast or slips in changing from D3 to D2 when depressing pedal.	ON vehicle	1. Fluid level	AT-452	
		2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255	
		3. Line pressure test	AT-456	
		4. Line pressure solenoid valve	AT-547	
		5. Control valve assembly	AT-644	
		6. A/T fluid temperature sensor	AT-573	
	OFF vehicle	7. Brake band	AT-657	
		8. Forward clutch	AT-702	
		9. High clutch	AT-697	

TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

Items	Symptom	Condition	Diagnostic Item	Reference Page
Slips/Will Not Engage	Races extremely fast or slips in changing from D4 or D3 to D1 when depressing pedal.	ON vehicle	1. Fluid level	AT-452
			2. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			3. Line pressure test	AT-456
			4. Line pressure solenoid valve	AT-547
			5. Control valve assembly	AT-644
	OFF vehicle	6. Forward clutch	AT-702	
		7. Forward one-way clutch	AT-657	
		8. Low one-way clutch	AT-657	
	Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-452
			2. Control cable adjustment	AT-647
3. Line pressure test			AT-456	
4. Line pressure solenoid valve			AT-547	
OFF vehicle		5. Oil pump	AT-675	
		6. High clutch	AT-697	
		7. Brake band	AT-657	
		8. Low & reverse brake	AT-708	
		9. Torque converter	AT-657	
		10. Parking components	AT-672	
Engine cannot be started in P and N positions. AT-604	ON vehicle	1. Ignition switch and starter	PG-2, SC-9	
		2. Control cable adjustment	AT-647	
		3. Park/neutral position (PNP) switch adjustment	AT-646	
	Engine starts in positions other than P and N. AT-604	ON vehicle	1. Control cable adjustment	AT-647
			2. Park/neutral position (PNP) switch adjustment	AT-646
	Transaxle noise in P and N positions.	ON vehicle	1. Fluid level	AT-452
			2. Line pressure test	AT-456
			3. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-503, AT-580
5. Engine speed signal			AT-508	
OFF vehicle		6. Oil pump	AT-675	
		7. Torque converter	AT-657	
Vehicle moves when changing into P position or parking gear does not disengage when shifted out of P position. AT-605	ON vehicle	1. Control cable adjustment	AT-647	
	OFF vehicle	2. Parking components	AT-672	
NOT USED	Transaxle noise in P and N positions.	ON vehicle	1. Fluid level	AT-452
			2. Line pressure test	AT-456
			3. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-503, AT-580
			5. Engine speed signal	AT-508
		OFF vehicle	6. Oil pump	AT-675
			7. Torque converter	AT-657
			8. Low & reverse brake	AT-708
			9. Brake band	AT-657
			10. High clutch	AT-697

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TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

Items	Symptom	Condition	Diagnostic Item	Reference Page
NOT USED	Vehicle runs in N position. AT-605	ON vehicle	1. Control cable adjustment	AT-647
		OFF vehicle	2. Forward clutch	AT-702
			3. Reverse clutch	AT-694
			4. Overrun clutch	AT-702
	Vehicle braked when shifting into R position.	ON vehicle	1. Fluid level	AT-452
			2. Control cable adjustment	AT-647
			3. Line pressure test	AT-456
			4. Line pressure solenoid valve	AT-547
			5. Control valve assembly	AT-644
		OFF vehicle	6. High clutch	AT-697
			7. Brake band	AT-657
			8. Forward clutch	AT-702
			9. Overrun clutch	AT-702
	Excessive creep.	ON vehicle	1. Engine idling rpm	EC-1244
	Engine stops when shifting lever into R, D, 2 and 1.	ON vehicle	1. Engine idling rpm	EC-1244
			2. Torque converter clutch solenoid valve	AT-534
			3. Control valve assembly	AT-644
		OFF vehicle	4. Torque converter	AT-657
	Vehicle braked by gear change from D1 to D2 .	ON vehicle	1. Fluid level	AT-452
		OFF vehicle	2. Reverse clutch	AT-694
3. Low & reverse brake			AT-708	
4. High clutch			AT-697	
5. Low one-way clutch			AT-657	
Vehicle braked by gear change from D2 to D3 .	ON vehicle	1. Fluid level	AT-452	
	OFF vehicle	2. Brake band	AT-657	
Vehicle braked by gear change from D3 to D4 .	ON vehicle	1. Fluid level	AT-452	
	OFF vehicle	2. Overrun clutch	AT-702	
		3. Forward one-way clutch	AT-657	
		4. Reverse clutch	AT-694	

TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

Items	Symptom	Condition	Diagnostic Item	Reference Page
NOT USED	Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-452
			2. Park/neutral position (PNP) switch adjustment	AT-646
			3. Shift solenoid valve A	AT-553
			4. Shift solenoid valve B	AT-558
			5. Control valve assembly	AT-644
		OFF vehicle	6. Reverse clutch	AT-694
			7. High clutch	AT-697
			8. Brake band	AT-657
			9. Low & reverse brake	AT-708
			10. Oil pump	AT-675
			11. Torque converter	AT-657
	Transaxle noise in D, 2, 1 and R positions.	ON vehicle	1. Fluid level	AT-452
		ON vehicle	2. Torque converter	AT-657
	Engine brake does not operate in "1" position. AT-632	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-646
			2. Control cable adjustment	AT-647
			3. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-503, AT-580
			5. Shift solenoid valve A	AT-553
			6. Control valve assembly	AT-644
			7. Overrun clutch solenoid valve	AT-568
		OFF vehicle	8. Overrun clutch	AT-702
			9. Low & reverse brake	AT-708
	Transaxle overheats.	ON vehicle	1. Fluid level	AT-452
			2. Engine idling rpm	EC-1244
			3. Throttle position sensor [accelerator pedal position (APP) sensor] (Adjustment)	EC-1255
			4. Line pressure test	AT-456
			5. Line pressure solenoid valve	AT-547
			6. Control valve assembly	AT-644
OFF vehicle		7. Oil pump	AT-675	
		8. Reverse clutch	AT-694	
		9. High clutch	AT-697	
		10. Brake band	AT-657	
		11. Forward clutch	AT-702	
		12. Overrun clutch	AT-702	
		13. Low & reverse brake	AT-708	
		14. Torque converter	AT-657	

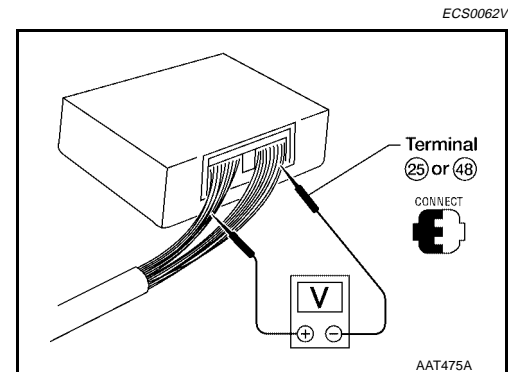
A
B
AT
D
E
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G
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I
J
K
L
M

TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

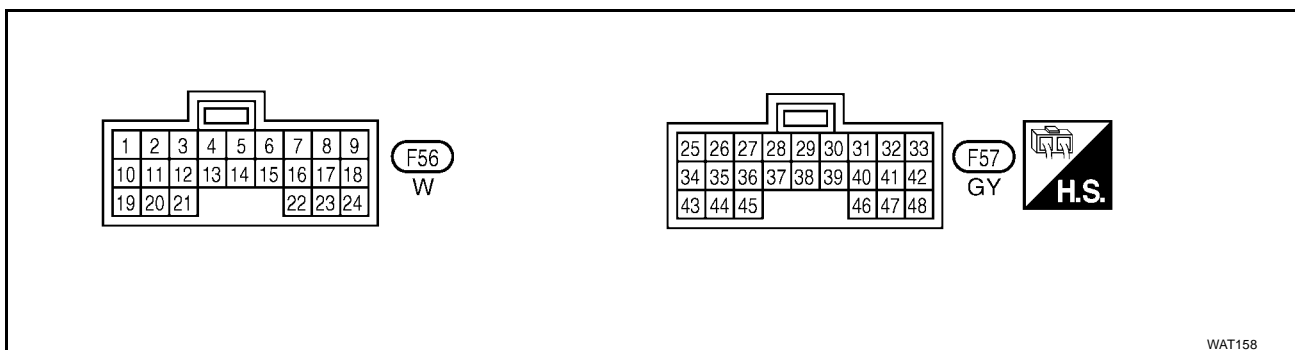
Items	Symptom	Condition	Diagnostic Item	Reference Page
NOT USED	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-452
		OFF vehicle	2. Reverse clutch	AT-694
			3. High clutch	AT-697
			4. Brake band	AT-657
			5. Forward clutch	AT-702
			6. Overrun clutch	AT-702
			7. Low & reverse brake	AT-708
	Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-452
		OFF vehicle	2. Torque converter	AT-657
			3. Oil pump	AT-675
			4. Reverse clutch	AT-694
			5. High clutch	AT-697
			6. Brake band	AT-657
			7. Forward clutch	AT-702
			8. Overrun clutch	AT-702
9. Low & reverse brake			AT-708	
Engine is stopped at R, D, 2 and 1 positions.	ON vehicle	1. Fluid level	AT-452	
		2. Torque converter clutch solenoid valve	AT-534	
		3. Shift solenoid valve B	AT-558	
		4. Shift solenoid valve A	AT-553	
		5. Control valve assembly	AT-644	

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
















TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]













TCM INSPECTION TABLE

(Data are reference values.)

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	R/W	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V
3	GY/R	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V
5*	L	CAN-H	—	—	—
6*	Y	CAN-L	—	—	—
10	BR/R	Power source	 	When turning ignition switch to ON.	Battery voltage
				When turning ignition switch to OFF.	0V
11	L/W	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in D1 or D4 .)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in D2 or D3 .)	0V
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in D1 or D2 .)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in D3 or D4 .)	0V
13	G/R	O/D OFF indicator lamp		When setting overdrive control switch in OFF position.	0V
				When setting overdrive control switch in ON position.	Battery voltage
19	BR/R	Power source	 	With ignition switch ON.	Battery voltage
				With ignition switch OFF.	0V
20	L/B	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	0V
22	OR/B	Overdrive control switch	 	When setting overdrive control switch in ON position.	Battery voltage
				When setting overdrive control switch in OFF position.	0V
25	B	Ground	—	—	—







TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
26	OR	PNP switch 1 position		When setting selector lever to 1 position.	Battery voltage
				When setting selector lever to other positions.	0V
27	L	PNP switch 2 position		When setting selector lever to 2 position.	Battery voltage
				When setting selector lever to other positions.	0V
28	R/B	Power source (Memory back-up)	 	With ignition switch OFF.	Battery voltage
				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 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.	450 Hz
				When vehicle is parked.	Under 1.3V or over 4.5V
30**	G/B	Data link connector (RX)		—	—
31**	GY/L	Data link connector (TX)		—	—
32	R	Sensor power	 	Ignition switch ON.	4.5 - 5.5V
				Ignition switch OFF.	0V
34	W/G	PNP switch D position		When setting selector lever to D position.	Battery voltage
				When setting selector lever to other positions.	0V
35	G/W	PNP switch R position		When setting selector lever to R position.	Battery voltage
				When setting selector lever to other positions.	0V
36	BR/W	PNP switch P or N position		When setting selector lever to P or N position.	Battery voltage
				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 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.	240 Hz
				When vehicle is parked.	Under 1.3V or over 4.5V

TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

[RE4F04B]

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)	
39	L/OR	Engine speed signal	 	Refer to EC-1308, "ECM INSPECTION TABLE"	
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	S/B	Throttle position sensor [accelerator pedal position (APP) sensor]		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
42	B	Sensor ground	—	—	—
45	R/G	Stop lamp switch		With brake pedal depressed	Battery voltage
		With brake pedal released		0V	
47	BR	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
		When ATF temperature is 80°C (176°F).		0.5V	
48	B	Ground	—	—	—

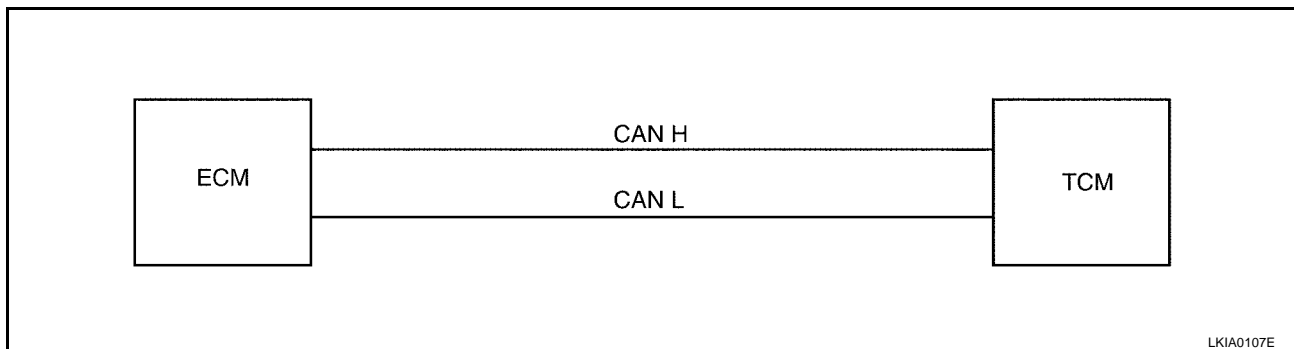
*: These terminals are connected to the ECM.

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

System Description

ECS0062W

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	TCM
Accelerator pedal position signal	T	R
Output shaft revolution signal	R	T
A/T self-diagnosis signal	R	T

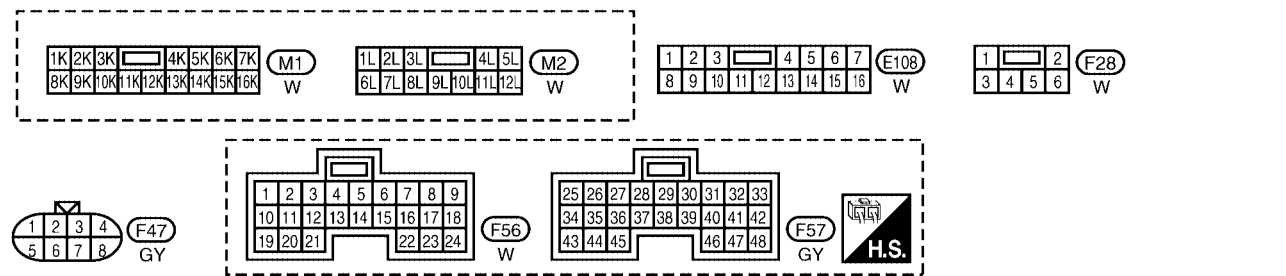
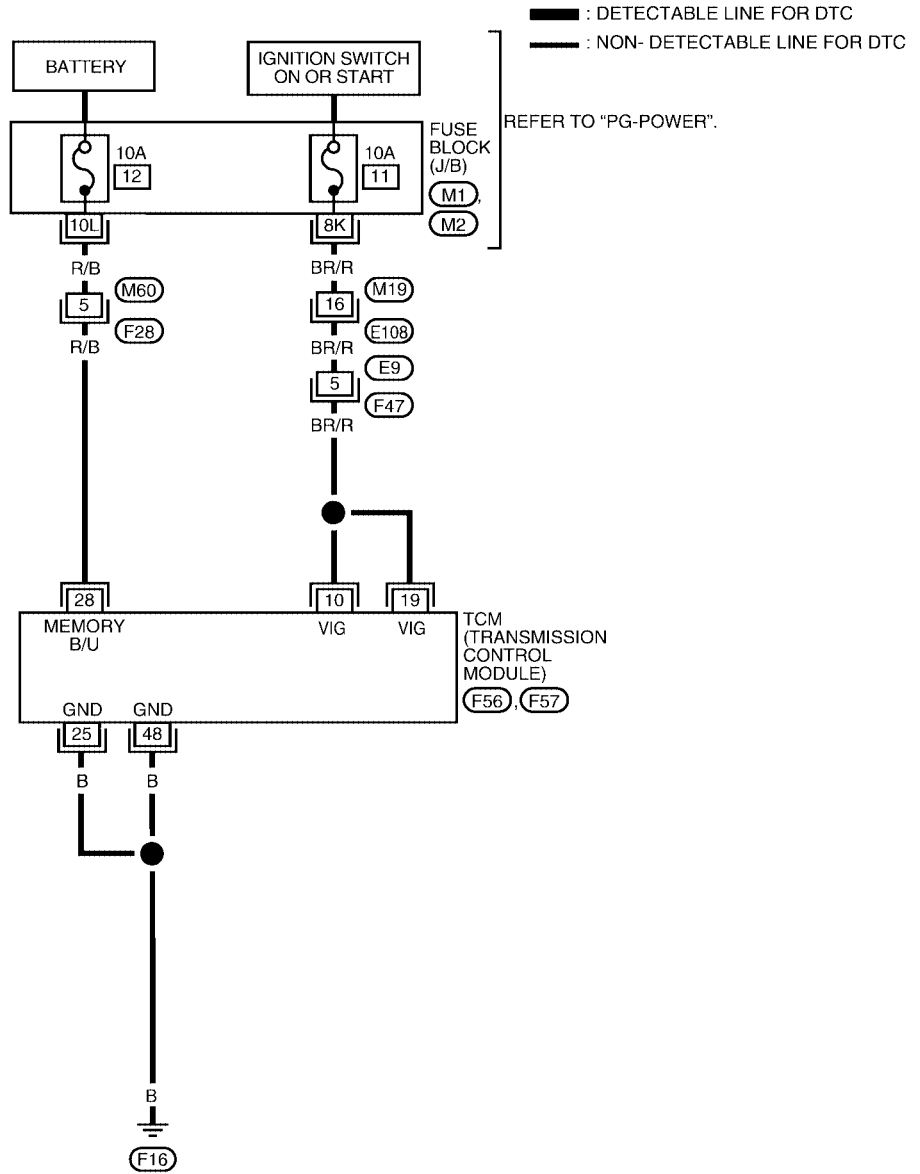
TROUBLE DIAGNOSIS FOR POWER SUPPLY

PF0:0000

Wiring Diagram — AT — MAIN

ECS0062X

AT-MAIN-01



TROUBLE DIAGNOSIS FOR POWER SUPPLY

[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)

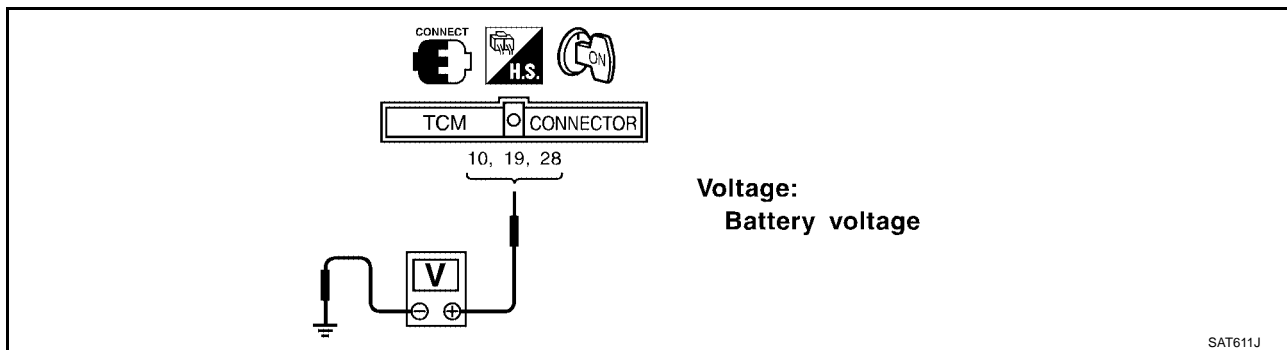
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	BR/R	POWER SOURCE	IGNITION ON	BATTERY VOLTAGE
			IGNITION OFF	APPROX. 0V
19	BR/R	POWER SOURCE	IGNITION ON	BATTERY VOLTAGE
			IGNITION OFF	APPROX. 0V
25	B	GROUND	—	—
28	R/B	POWER SOURCE (MEMORY BACKUP)	IGNITION ON	BATTERY VOLTAGE
			IGNITION OFF	BATTERY VOLTAGE
48	B	GROUND	—	—

Diagnostic Procedure

ECS0062Y

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.

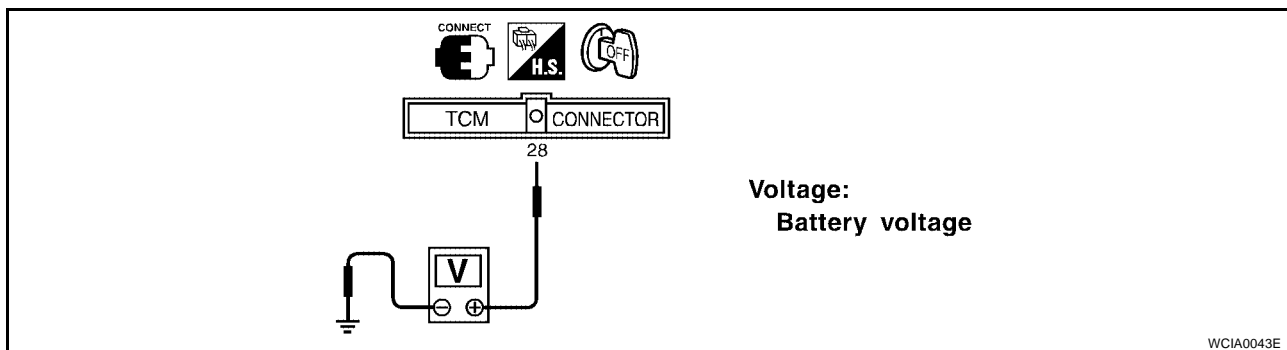


OK or NG

- 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 [PG-2, "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 [AT-488, "Wiring Diagram — AT — MAIN"](#) .

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.

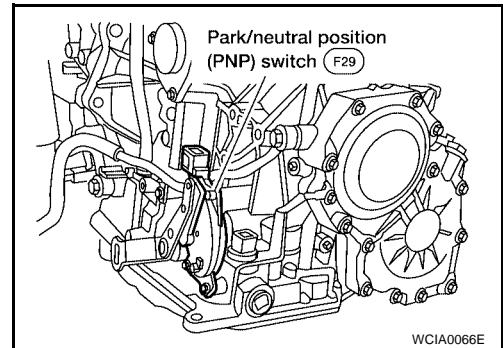
DTC P0705 PARK/NEUTRAL POSITION SWITCH

PF3:32006

Description

ECS0062Z

- 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.



WCIA0066E

On Board Diagnosis Logic

ECS00630

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

ECS00631

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

ECS00632

CAUTION:

Always drive vehicle at a safe speed.

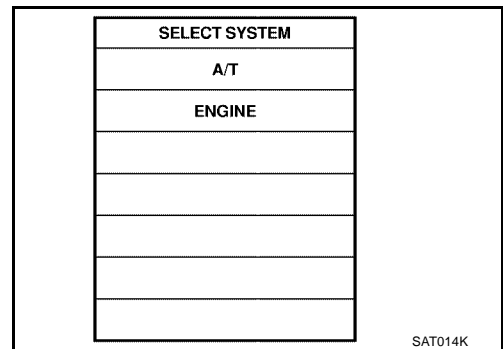
NOTE:

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

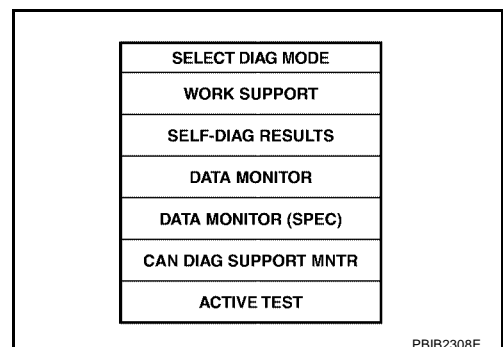
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON.



SAT014K



PBIB2308E

2. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.

DTC P0705 PARK/NEUTRAL POSITION SWITCH

[RE4F04B]

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 (O/D ON or OFF)

WITH GST

Follow the procedure "With CONSULT-II".

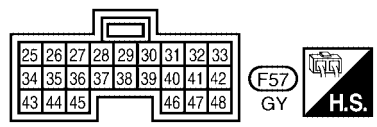
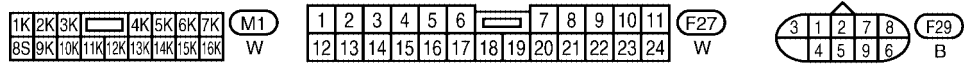
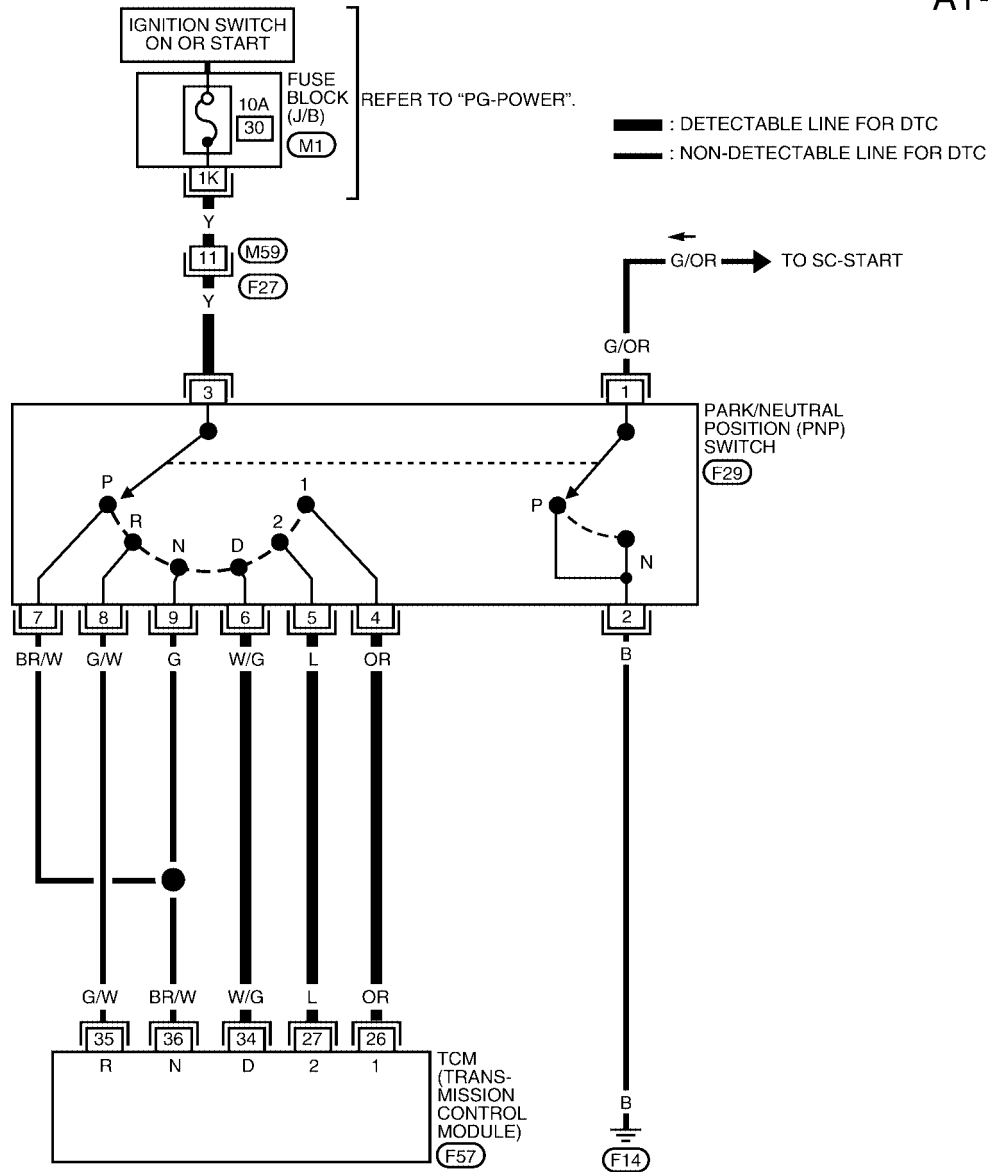
DTC P0705 PARK/NEUTRAL POSITION SWITCH

[RE4F04B]

ECS00633

Wiring Diagram — AT — PNP/SW

AT-PNP/SW-01



WCWA0077E

DTC P0705 PARK/NEUTRAL POSITION SWITCH

[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 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
			IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V
27	L	PNP SWITCH 2 POSITION	IGNITION ON AND SELECTOR LEVER IN 2 POSITION	BATTERY VOLTAGE
			IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V
34	W/G	PNP SWITCH D POSITION	IGNITION ON AND SELECTOR LEVER IN D POSITION	BATTERY VOLTAGE
			IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V
35	G/W	PNP SWITCH R POSITION	IGNITION ON AND SELECTOR LEVER IN R POSITION	BATTERY VOLTAGE
			IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V
36	BR/W	PNP SWITCH P OR N POSITION	IGNITION ON AND SELECTOR LEVER IN P OR N POSITION	BATTERY VOLTAGE
			IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V

Diagnostic Procedure

ECS00634

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 6.

2. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (WITH CONSULT-II)

Ⓜ With CONSULT-II

- Turn ignition switch to ON position.
(Do not start engine.)
- 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 MONITOR	
MONITORING	
PN POSI SW	OFF
R POSITION SW	OFF
D POSITION SW	OFF
2 POSITION SW	ON
1 POSITION SW	OFF

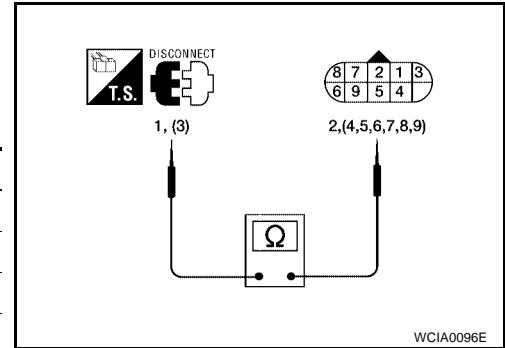
SAT701J

3. DETECT MALFUNCTIONING ITEM

Check the following item:

- 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) and 9 (G) while moving manual shaft through each position.

Lever position	Terminal No.	
P	3 - 7	1 - 2
R	3 - 8	
N	3 - 9	1 - 2
D	3 - 6	
2	3 - 5	
1	3 - 4	



OK or NG

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

4. CHECK MANUAL CONTROL CABLE ADJUSTMENT

Check PNP switch again with manual control cable disconnected from manual shaft of A/T assembly. Refer to test group 1.

OK or NG

- OK >> Adjust manual control cable. Refer to [AT-647, "Control Cable Adjustment"](#).
- NG >> Repair or replace PNP switch.

5. DETECT MALFUNCTIONING ITEM

Check the following items:

- 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)
- Fuse
- Ignition switch
Refer to [PG-2, "POWER SUPPLY ROUTING"](#).

OK or NG

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

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.

Voltage:
B: Battery voltage
0: 0V

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

SAT840J

OK or NG

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

7. CHECK DTC

Perform [AT-491, "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.

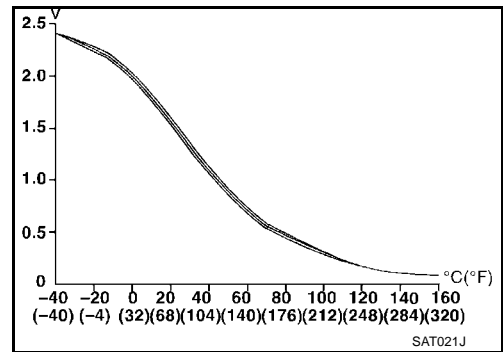
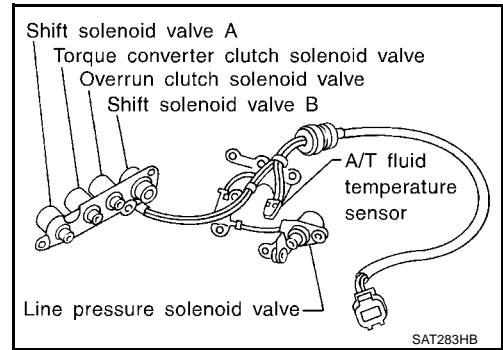
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

PF3:31940

Description

ECS00635

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)]	1.5V	2.5 kΩ
	↓ Hot [80°C (176°F)]	0.5V	0.3 kΩ

On Board Diagnosis Logic

ECS00636

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

ECS00637

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

ECS00638

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.

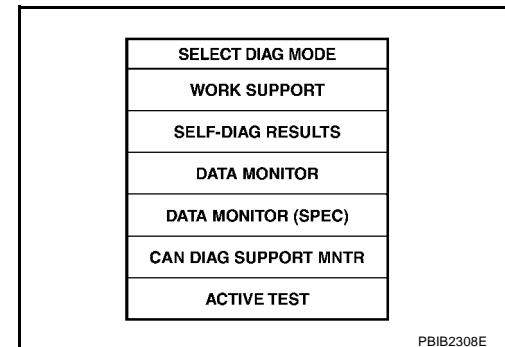
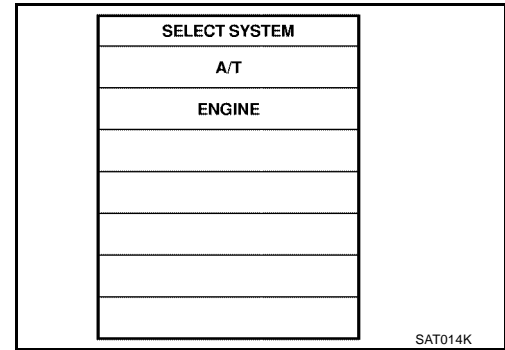
After the repair, perform the following procedure to confirm the malfunction is eliminated.

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[RE4F04B]

WITH CONSULT-II

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



2. 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 (O/D ON)

WITH GST

Follow the procedure "With CONSULT-II".

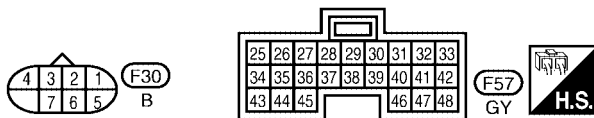
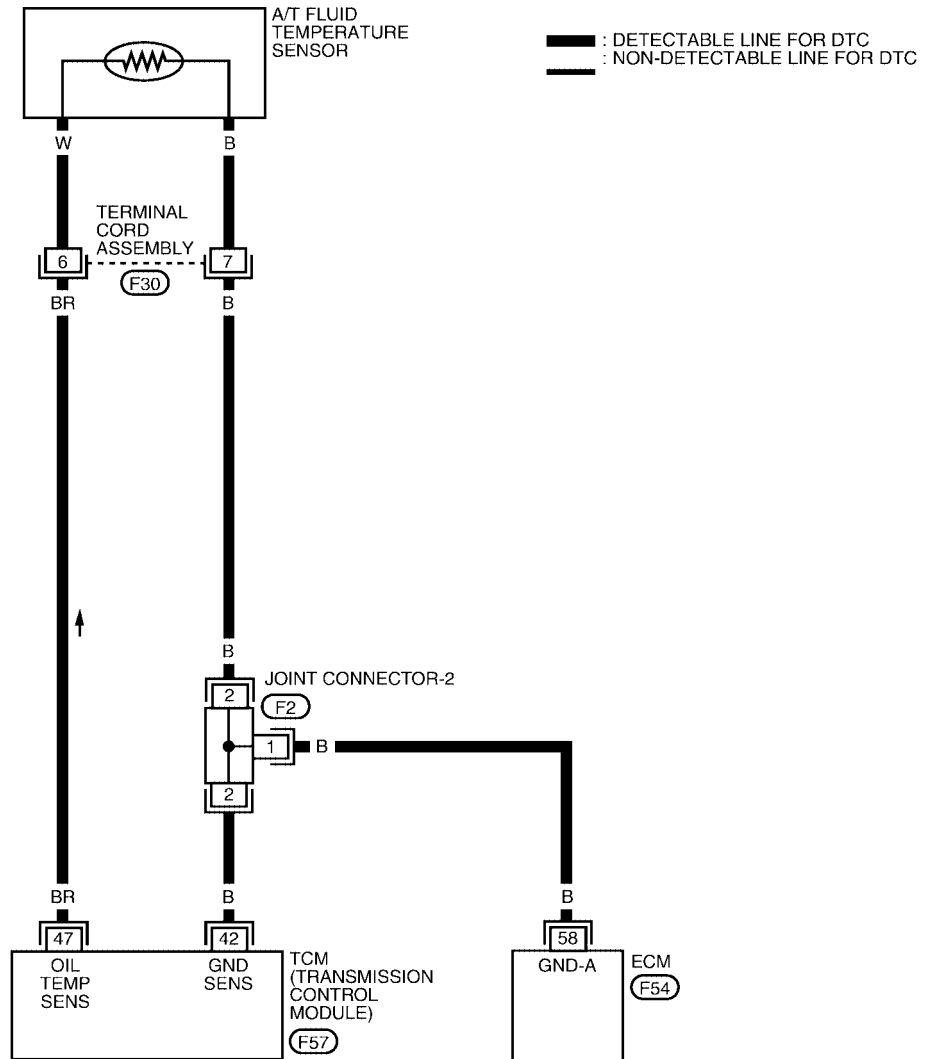
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[RE4F04B]

Wiring Diagram — AT — FTS

ECS00639

AT-FTS-01



REFER TO THE FOLLOWING.

(F2) - JOINT CONNECTOR

(F54) - ELECTRICAL UNITS

WCWA0014E

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
42	B	SENSOR GROUND	—	—
47	BR	A/T FLUID TEMPERATURE SENSOR	IGNITION ON AND ATF TEMPERATURE IS 20°C (68°F)	APPROX. 1.5V
			IGNITION ON AND ATF TEMPERATURE 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".

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

SAT614J

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

:Approximately 1.5V → 0.5V

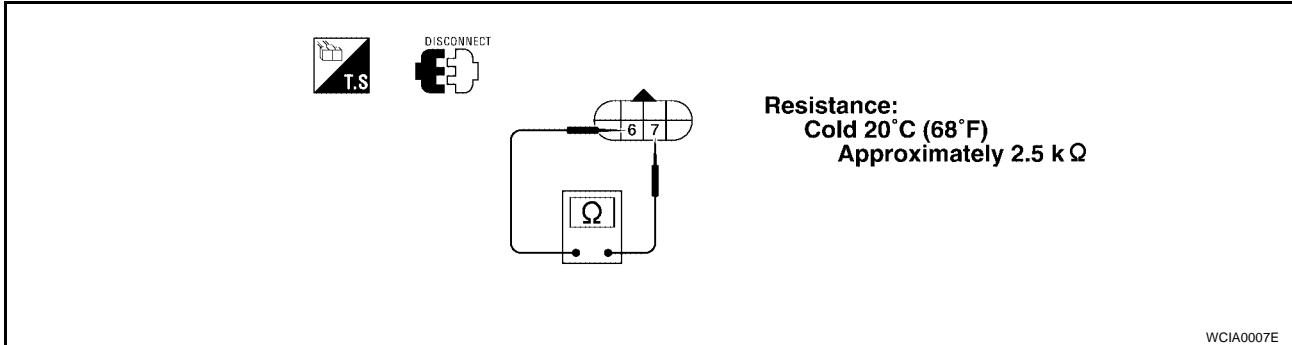
OK or NG

OK >> GO TO 7.

NG >> GO TO 3.

3. 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 >> GO TO 4.
- NG >> GO TO 5.

4. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short to ground or short to power or open between TCM, ECM and terminal cord assembly (Main harness)
- Ground circuit for ECM
Refer to [AT-488, "TROUBLE DIAGNOSIS FOR POWER SUPPLY"](#).

OK or NG

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

5. DETECT MALFUNCTIONING ITEM

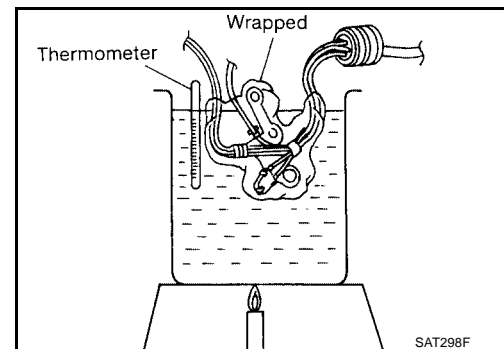
1. Remove oil pan.
2. Check the following items:
 - A/T fluid temperature sensor
Check resistance between two terminals while changing temperature as shown in figure.

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



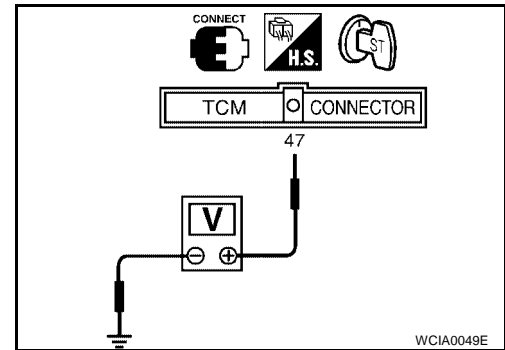
6. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (WITHOUT CONSULT-II)**⊗ Without CONSULT-II**

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)] → Hot [80°C (176°F)]
 :Approximately 1.5V → 0.5V

OK or NG

- OK >> GO TO 7.
 NG >> GO TO 3.

**7. CHECK DTC**

Perform [AT-497, "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]

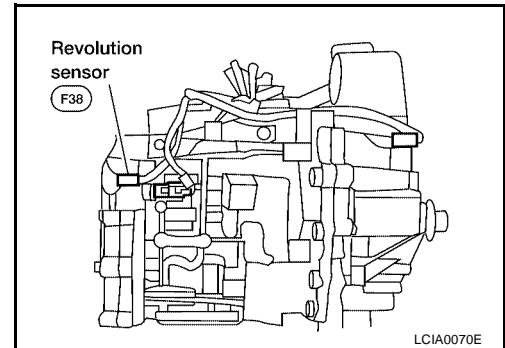
DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

PF3:32702

Description

ECS0063B

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

ECS0063C

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

ECS0063D

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0063E

CAUTION:

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

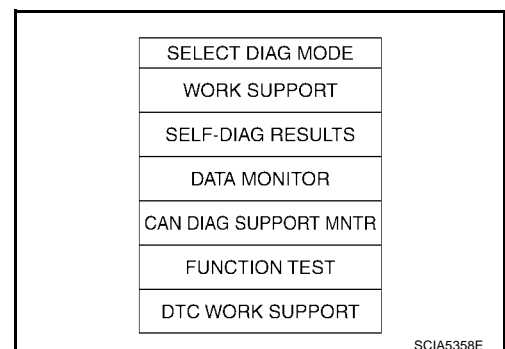
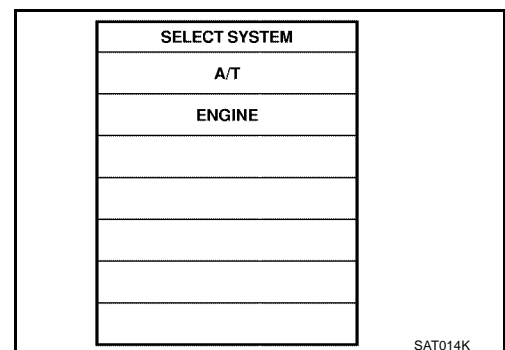
NOTE:

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

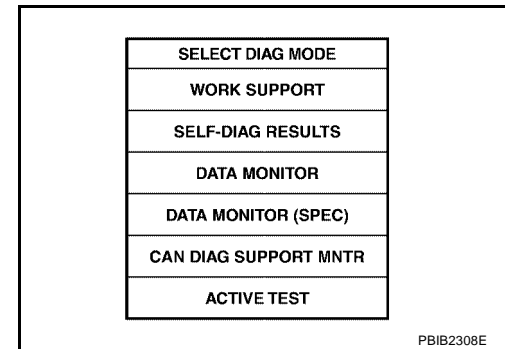
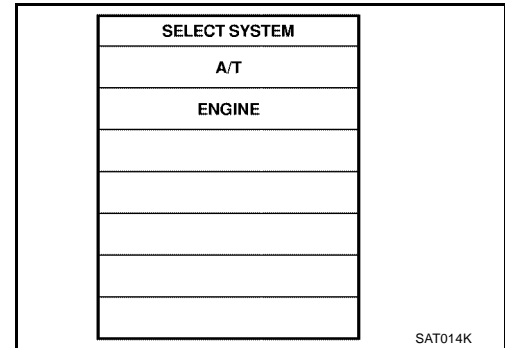
1. Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.



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

[RE4F04B]

2. Drive vehicle and check for an increase of "VHCL/S SE-MTR" value.
If the check result is NG, go to [AT-506, "Diagnostic Procedure"](#) .
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 [AT-506, "Diagnostic Procedure"](#) .
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 (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".

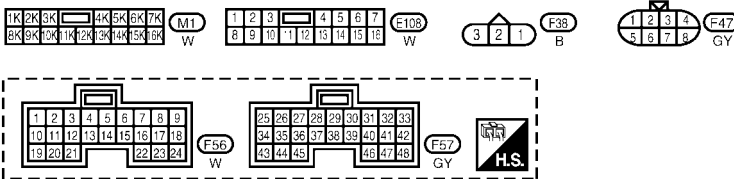
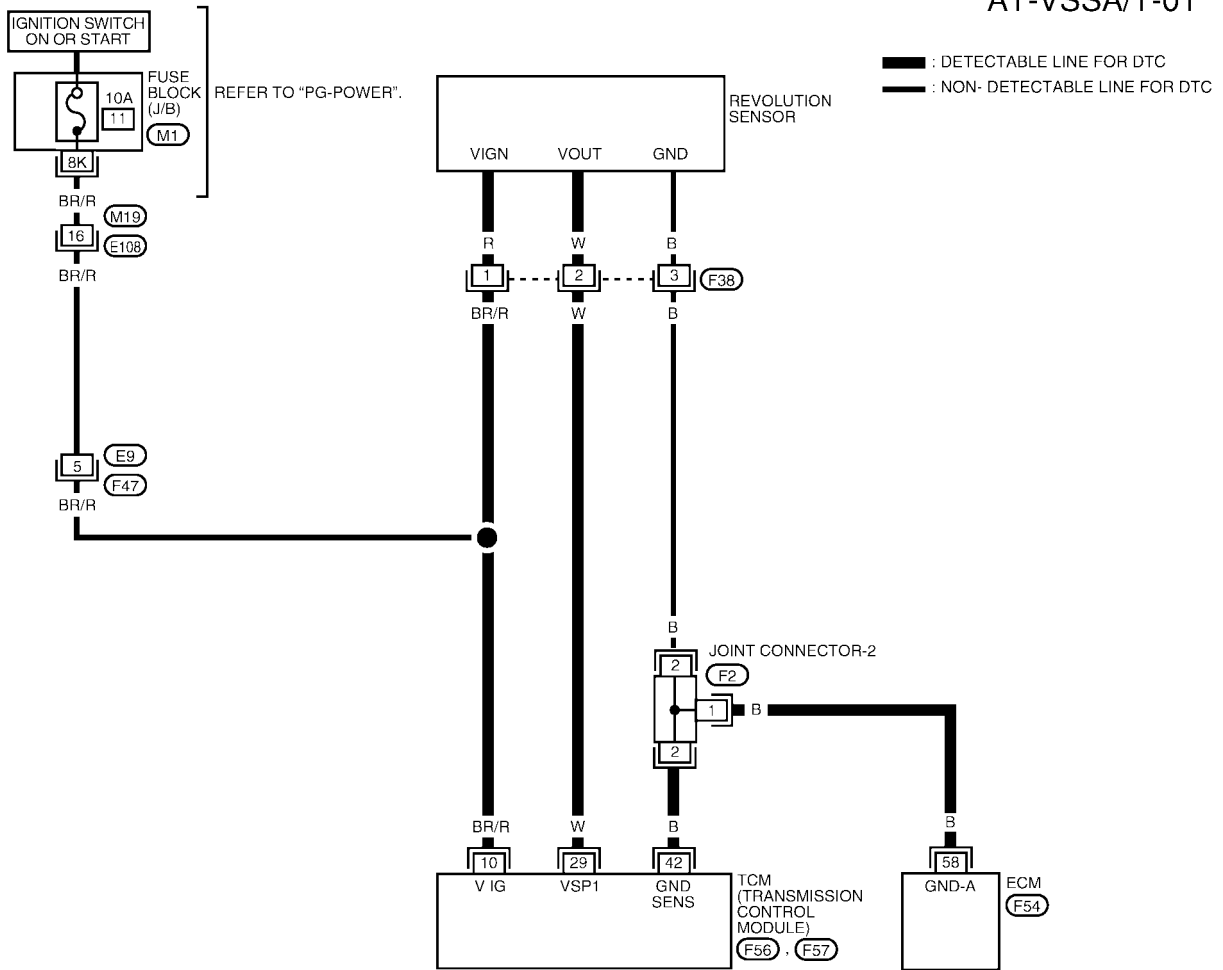
DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

[RE4F04B]

Wiring Diagram — AT — VSSA/T

ECS0063F

AT-VSSA/T-01



REFER TO THE FOLLOWING.
 (F2) - JOINT CONNECTOR
 (F54) - ELECTRICAL UNITS

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 DIAGNOSIS DATA LINK CABLE TO THE VEHICLE DIAGNOSIS CONNECTOR.	450 HZ
			VEHICLE NOT MOVING.	LESS THAN 1.3V OR GREATER THAN 4.5V
42	B	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

SAT614J

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.	450 Hz
When vehicle parks.	Under 1.3V or over 4.5V

MTBL0594

- Harness for short or open between TCM, ECM and revolution sensor (Main harness)

OK or NG

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

3. CHECK DTC

Perform [AT-503, "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.

A
B
AT
D
E
F
G
H
I
J
K
L
M

DTC P0725 ENGINE SPEED SIGNAL

PF2:24825

Description

ECS0063H

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

On Board Diagnosis Logic

ECS0063I

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

ECS0063J

Check harness or connectors. (The sensor circuit is open or shorted.)

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0063K

CAUTION:

Always drive vehicle at a safe speed.

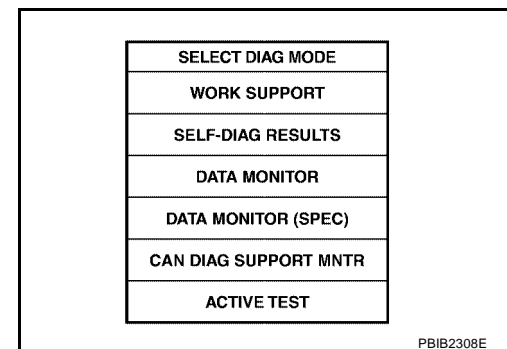
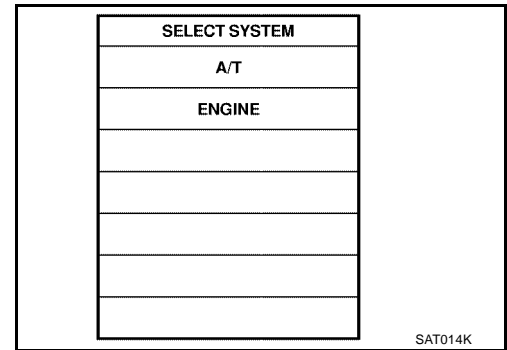
NOTE:

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.



2. 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 (O/D ON)

WITH GST

Follow the procedure "With CONSULT-II".

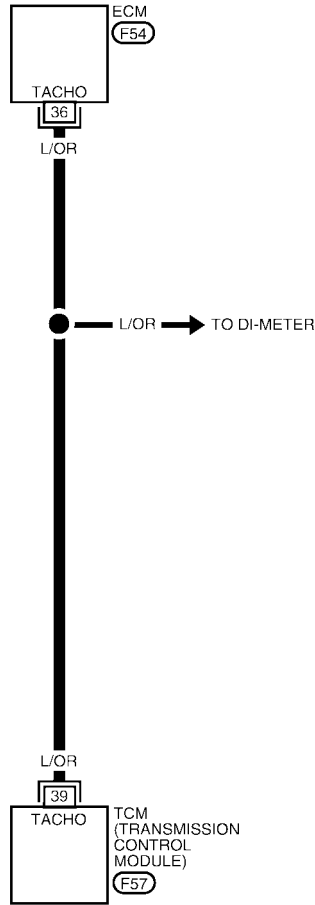
DTC P0725 ENGINE SPEED SIGNAL

[RE4F04B]

Wiring Diagram — AT — ENGSS

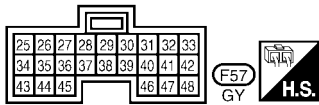
ECS0063L

AT-ENGSS-01



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

A
B
AT
D
E
F
G
H
I
J
K
L
M



REFER TO THE FOLLOWING.
F64 - ELECTRICAL UNITS

WCWA0017E

DTC P0725 ENGINE SPEED SIGNAL

[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
			WITH ENGINE RUNNING AT 3,000 RPM	APPROX. 2.2V

Diagnostic Procedure

ECS0063M

1. CHECK 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-1275, "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-1777, "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 MONITOR	
MONITORING	
ENGINE SPEED	XXX rpm
TURBINE REV	XXX rpm
OVERDRIVE SW	ON
PN POSI SW	OFF
R POSITION SW	OFF

SAT645J

3. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
Refer to [EC-1777, "IGNITION SIGNAL"](#).

OK or NG

OK >> GO TO 6.

NG >> Repair or replace damaged parts.

4. CHECK INPUT SIGNAL (WITHOUT CONSULT-II)

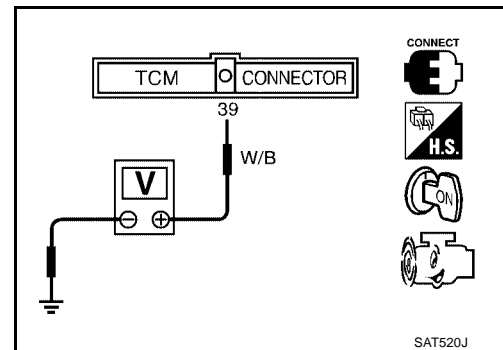
⊗ Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector F57 terminal 39 and ground.

Voltage :0.6 (Idle speed) - 2.2V (3,000 rpm)

OK or NG

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



5. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
Refer to [EC-1777, "IGNITION SIGNAL"](#).

OK or NG

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

6. CHECK DTC

Perform [AT-508, "Diagnostic Trouble Code \(DTC\) Confirmation Procedure"](#).

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.

DTC P0731 A/T 1ST GEAR FUNCTION

PFP:31940

Description

ECS0063N

- 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

ECS0063O

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 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 valve 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

ECS0063P

Check the following items.

- Shift solenoid valve A
- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0063Q

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.

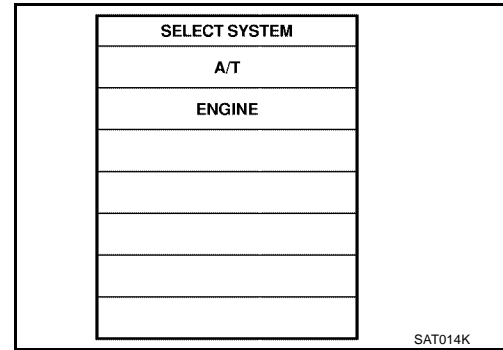
TESTING CONDITION:

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

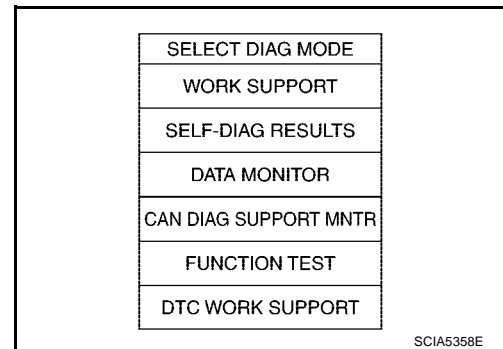
After the repair, perform the following procedure to confirm the malfunction is eliminated.

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)



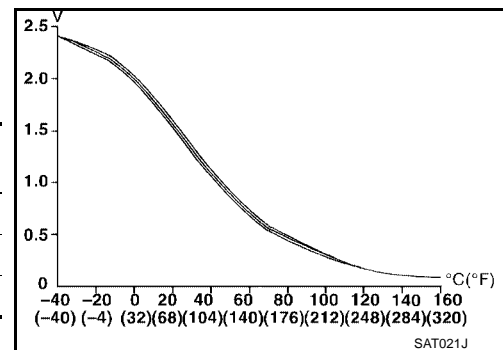
- Check that "GEAR" shows "2" after releasing pedal.
5. Depress accelerator pedal to WOT (more than 7.0/8 of "THROTTLE POSI") quickly from a speed of 20 to 25 km/h (12 to 16 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to [AT-515, "Diagnostic Procedure"](#).

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 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 → 2 → 3 → 4
No malfunction exists.	1 → 2 → 3 → 4
Malfunction for P0731 exists.	2 → 2 → 3 → 3
	4 → 3 → 3 → 4



8. Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
 Refer to [AT-515, "Diagnostic Procedure"](#).
 Refer to [AT-752, "Shift Schedule"](#).

WITH GST

Follow the procedure "With CONSULT-II".

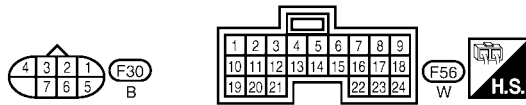
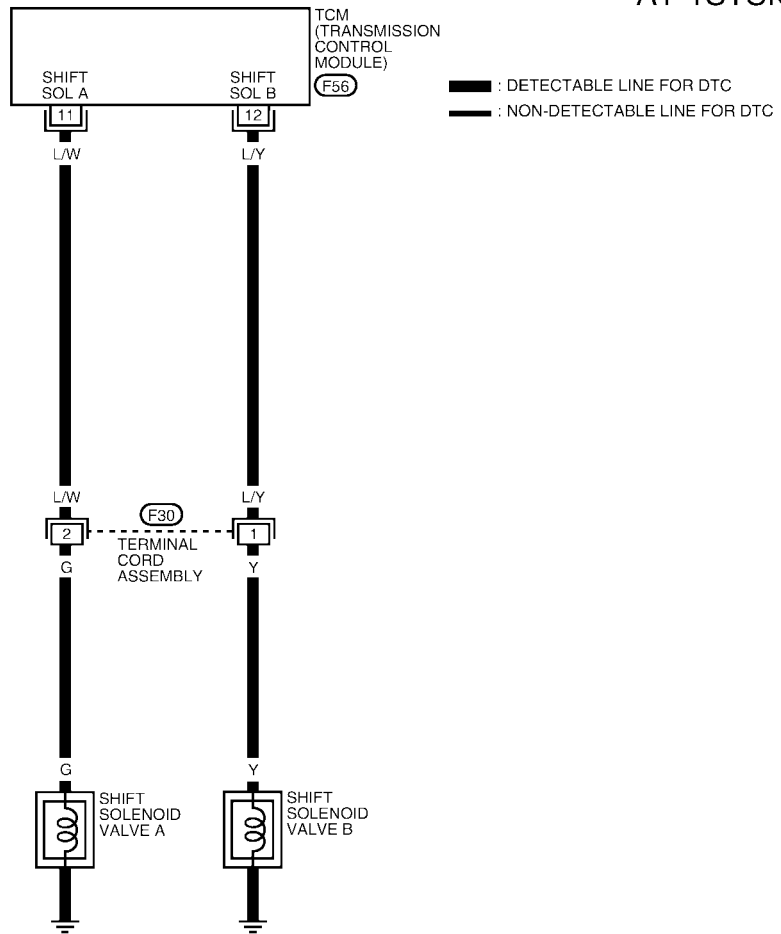
DTC P0731 A/T 1ST GEAR FUNCTION

[RE4F04B]

Wiring Diagram — AT — 1ST

ECS0063R

AT-1STSIG-01



WCWA0021E

DTC P0731 A/T 1ST GEAR FUNCTION

[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)

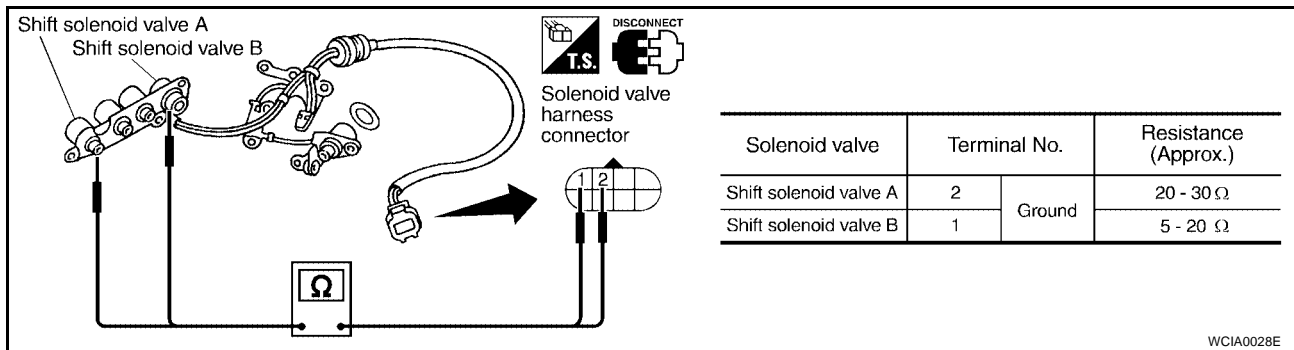
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
11	L/W	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A IS OPERATING (DRIVING IN D1 OR D4)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A IS NOT OPERATING (DRIVING IN D2 OR D3)	APPROX. 0V
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS OPERATING (DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B IS NOT OPERATING (DRIVING IN D3 OR D4)	APPROX. 0V

Diagnostic Procedure

ECS0063S

1. CHECK VALVE RESISTANCE

- Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#).
 - Shift solenoid valve A
 - Shift solenoid valve B
- Check resistance between terminal cord assembly F30 terminals 1 and 2, and ground.

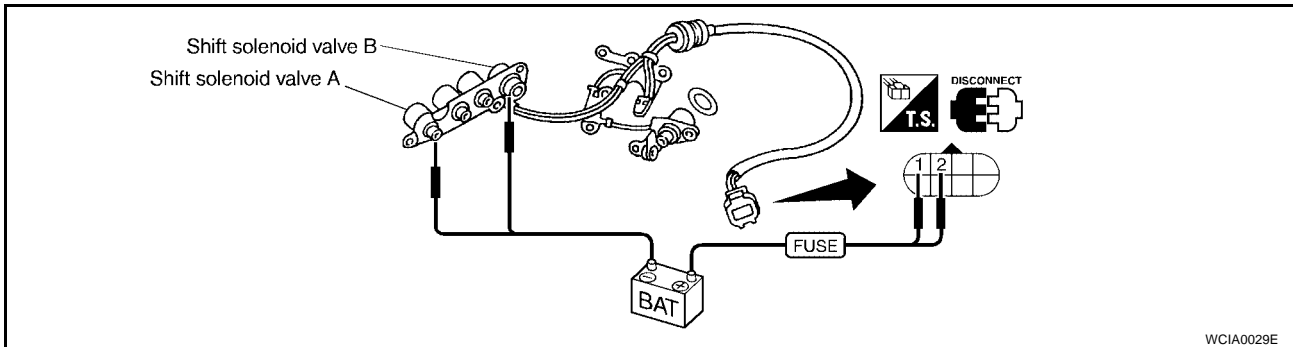


OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace damaged parts.

2. CHECK VALVE OPERATION

- Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#) .
 - Shift solenoid valve A
 - Shift solenoid valve B
- Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.

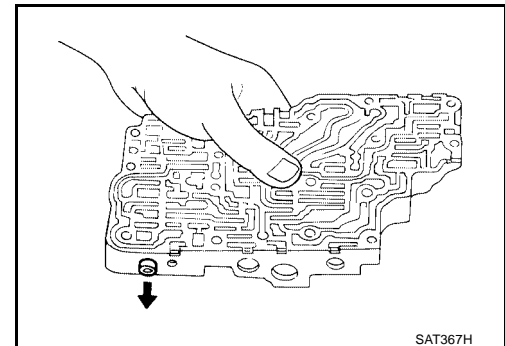


OK or NG

- OK >> GO TO 3.
 NG >> Repair or replace shift solenoid valve assembly.

3. CHECK CONTROL VALVE

- Disassemble control valve assembly. Refer to [AT-679, "DISASSEMBLY"](#) .
- 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. CHECK DTC

Perform [AT-512, "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

PFP:31940

Description

ECS0063T

- 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 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 Diagnosis Logic

ECS0063U

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 valve 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

ECS0063V

Check the following items.

- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0063W

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.

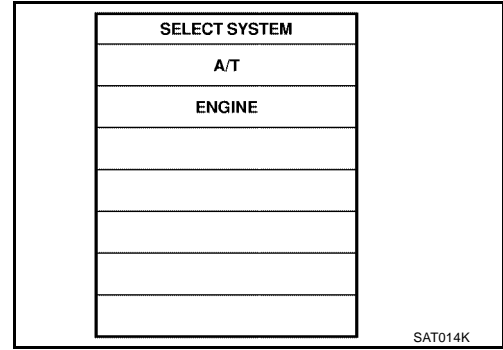
TESTING CONDITION:

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.

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".



4. 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)

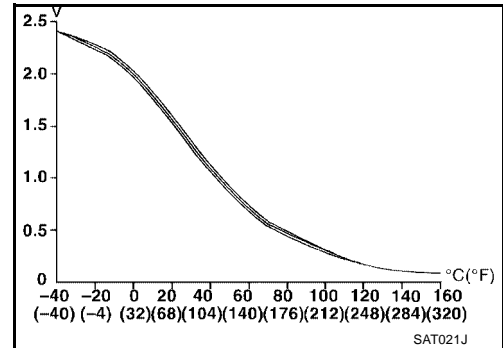
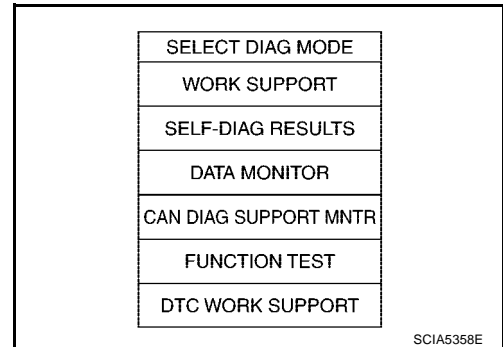
- Check that "GEAR" shows "3" or "4" after releasing pedal.
5. Depress accelerator pedal to WOT (more than 7.0/8 of "THROTTLE POSI") quickly from a speed of 63 to 68 km/h (39 to 42 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETE". (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to [AT-520, "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 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for P0732 exists.	4 → 3 → 3 → 4

8. Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
 Refer to [AT-520, "Diagnostic Procedure"](#).
 Refer to [AT-752, "Shift Schedule"](#).

WITH GST

Follow the procedure "With CONSULT-II".

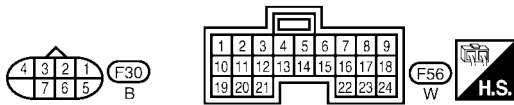
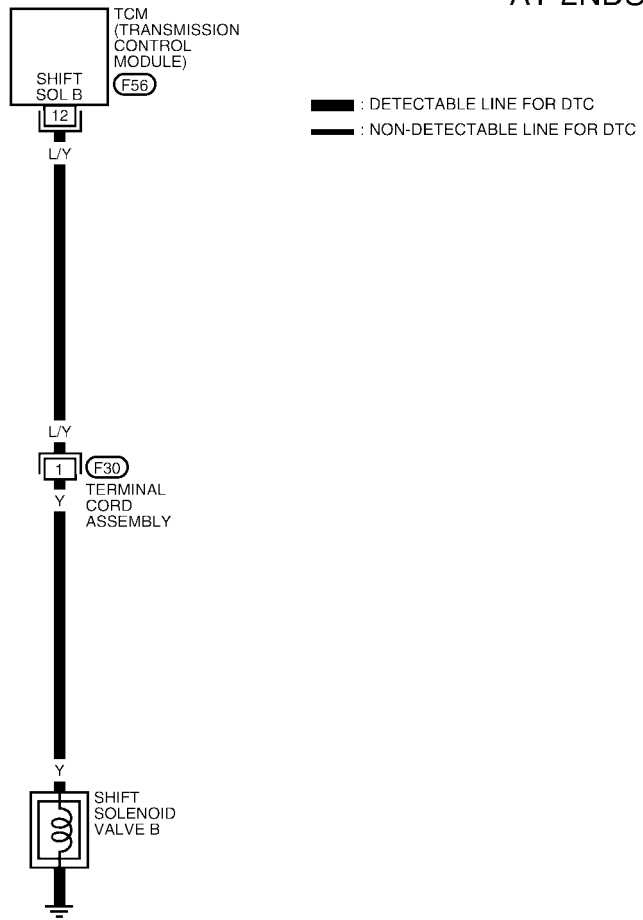
DTC P0732 A/T 2ND GEAR FUNCTION

[RE4F04B]

Wiring Diagram — AT — 2ND

ECS0063X

AT-2NDSIG-01



A

B

AT

D

E

F

G

H

I

J

K

L

M

WCWA0022E

DTC P0732 A/T 2ND GEAR FUNCTION

[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)

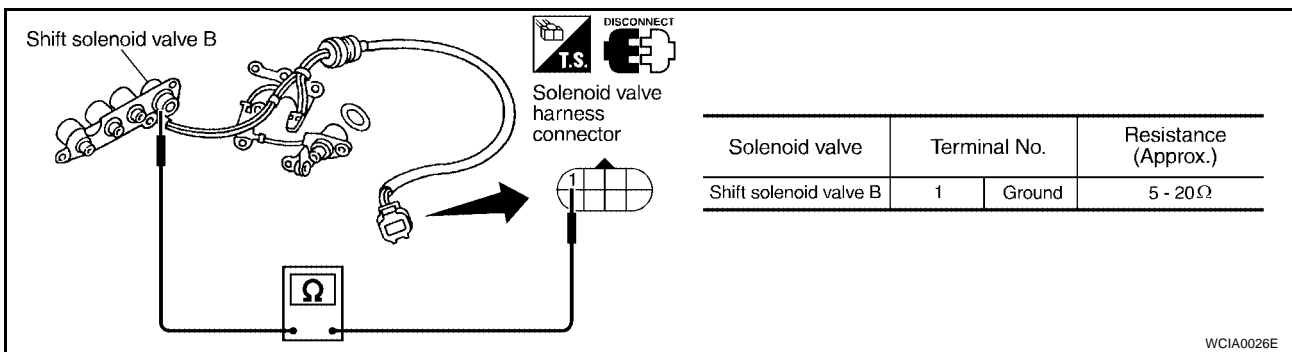
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS OPERATING (DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B IS NOT OPERATING (DRIVING IN D3 OR D4)	APPROX. 0V

Diagnostic Procedure

ECS0063Y

1. CHECK VALVE RESISTANCE

- Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#).
 - Shift solenoid valve B
- Check resistance between terminal cord assembly F30 terminal 1 and ground.



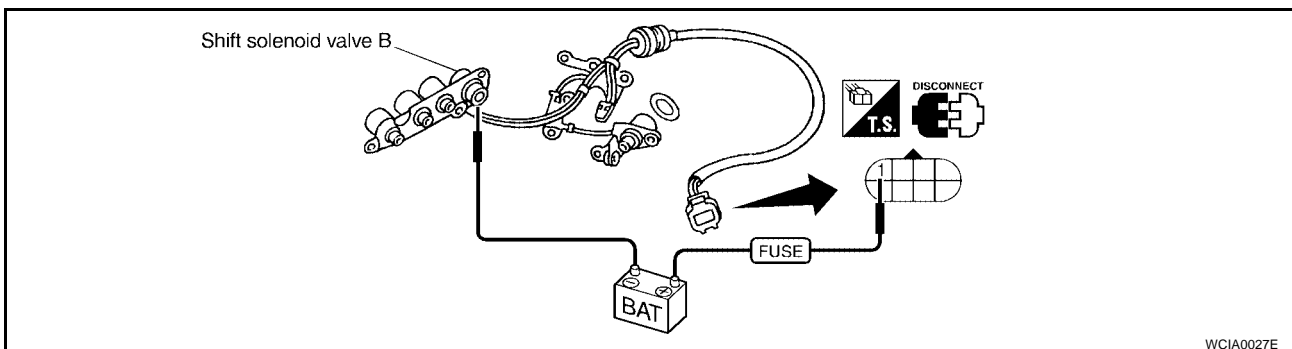
WCIA0026E

OK or NG

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

2. CHECK VALVE OPERATION

- Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#).
 - Shift solenoid valve B
- Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.



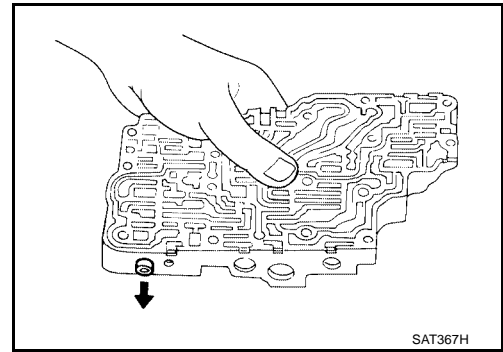
WCIA0027E

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-679, "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 4.
 NG >> Repair control valve assembly.

4. CHECK DTC

Perform [AT-517, "Diagnostic Trouble Code \(DTC\) Confirmation Procedure"](#) .

OK or NG

- OK >> **INSPECTION END**
 NG >> Check control valve again. Repair or replace control valve assembly.

A
 B
 AT
 D
 E
 F
 G
 H
 I
 J
 K
 L
 M

DTC P0733 A/T 3RD GEAR FUNCTION

PFP:31940

Description

ECS0063Z

- 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

ECS00640

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 (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

ECS00641

Check the following items.

- Shift solenoid valve A
- Each clutch
- Hydraulic control circuit

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS00642

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.

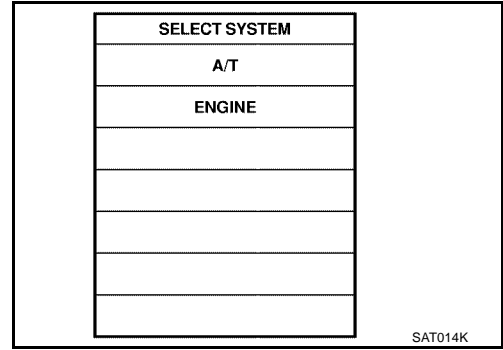
TESTING CONDITION:

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.

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")

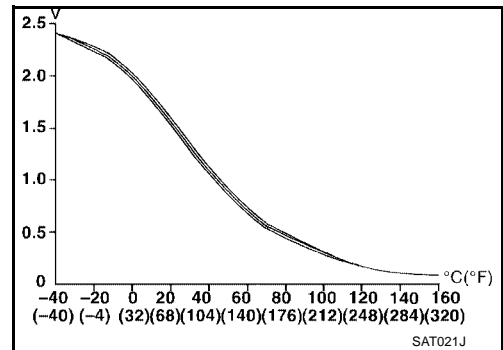
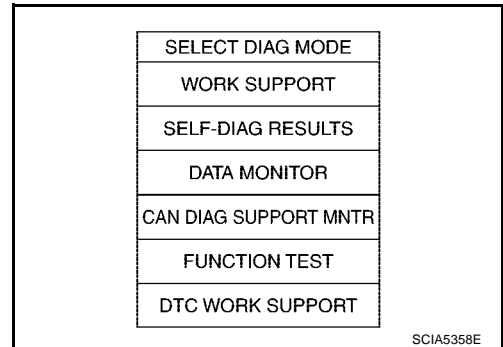
- Check that "GEAR" shows "4" after releasing pedal.
5. Depress accelerator pedal steadily with 3.5/8 - 4.5/8 of "THROTTLE POSI" from a speed of 80 to 95 km/h (50 to 59 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to [AT-525, "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 → 2 → 3 → 4
No malfunction exists.	1 → 2 → 3 → 4
Malfunction for P0733 exists.	1 → 1 → 4 → 4

8. Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
 Refer to [AT-525, "Diagnostic Procedure"](#).
 Refer to [AT-752, "Shift Schedule"](#).

WITH GST

Follow the procedure "With CONSULT-II".

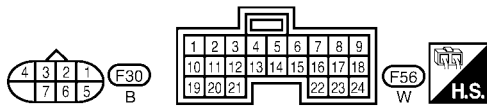
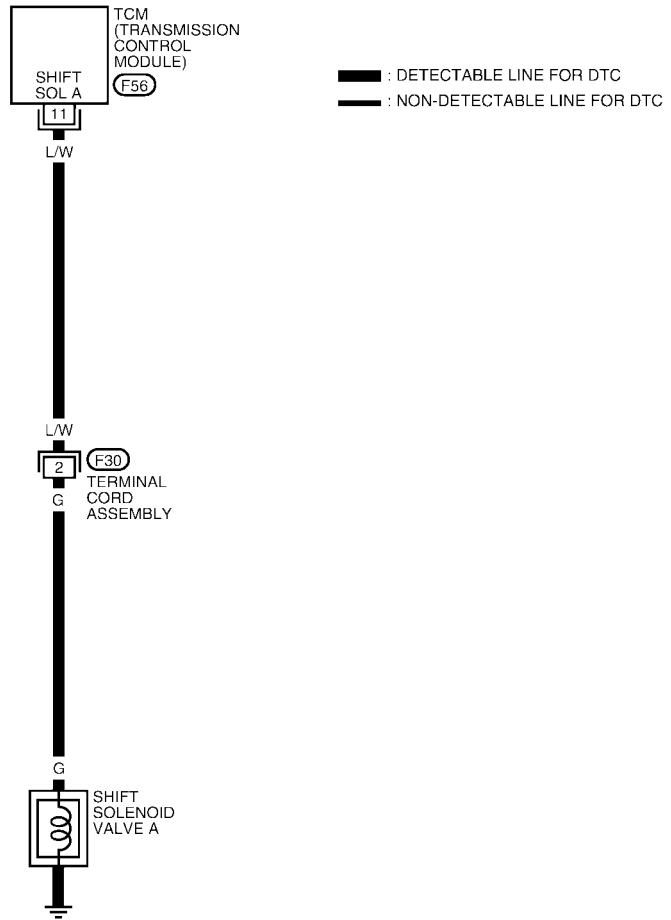
DTC P0733 A/T 3RD GEAR FUNCTION

[RE4F04B]

ECS00643

Wiring Diagram — AT — 3RD

AT-3RDSIG-01



WCWA0023E

DTC P0733 A/T 3RD GEAR FUNCTION

[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)

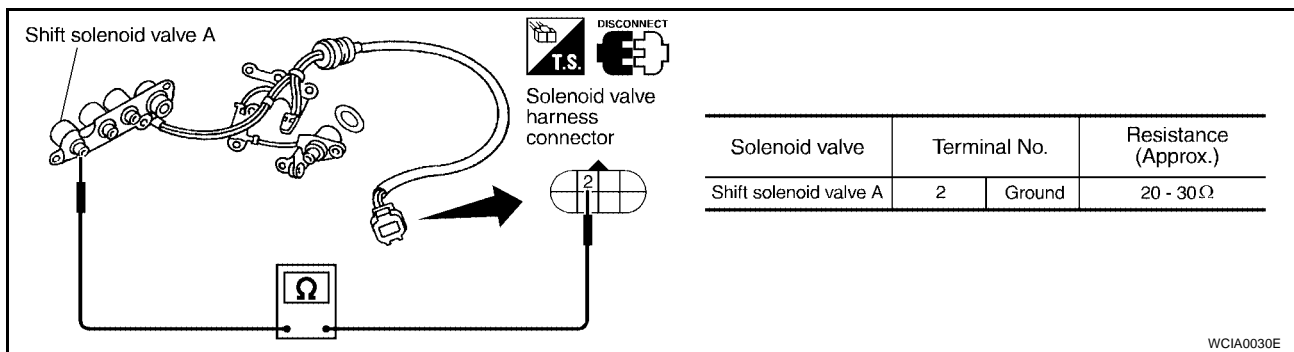
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
11	L/W	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A IS OPERATING (DRIVING IN D1 OR D4)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A IS NOT OPERATING (DRIVING IN D2 OR D3)	APPROX. 0V

Diagnostic Procedure

ECS00644

1. CHECK VALVE RESISTANCE

- Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#).
 - Shift solenoid valve A
- Check resistance between terminal cord assembly F30 terminal 2 and ground.

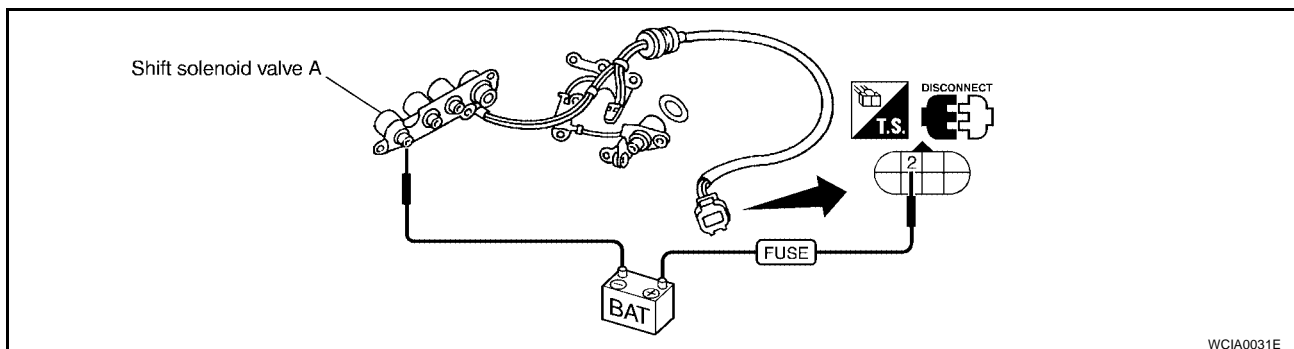


OK or NG

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

2. CHECK VALVE OPERATION

- Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#).
 - Shift solenoid valve A
- Check solenoid valve by listening for its operating sound while applying battery voltage and ground of the solenoid.



OK or NG

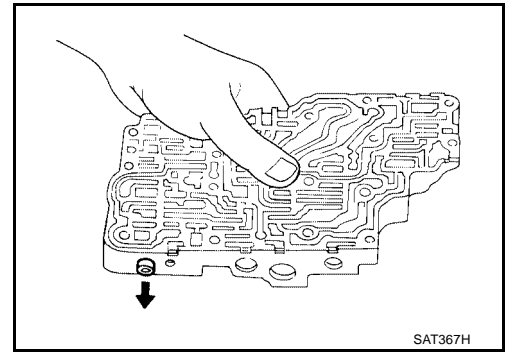
- OK >> GO TO 3.
- NG >> Repair or replace shift solenoid valve assembly.

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-679, "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 4.
NG >> Repair control valve assembly.



4. CHECK DTC

Perform [AT-522, "Diagnostic Trouble Code \(DTC\) Confirmation Procedure"](#) .

OK or NG

- OK >> **INSPECTION END**
NG >> Check control valve again. Repair or replace control valve assembly.

DTC P0734 A/T 4TH GEAR FUNCTION

PF3:31940

Description

ECS00645

- 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 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
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	Approximately 4%
	↓ Lock-up ON	Approximately 94%
Line pressure solenoid valve duty	Small throttle opening (Low line pressure)	Approximately 24%
	↓ Large throttle opening (High line pressure)	Approximately 95%

On Board Diagnosis Logic

ECS00646

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 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

ECS00647

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

ECS00648

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.

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.

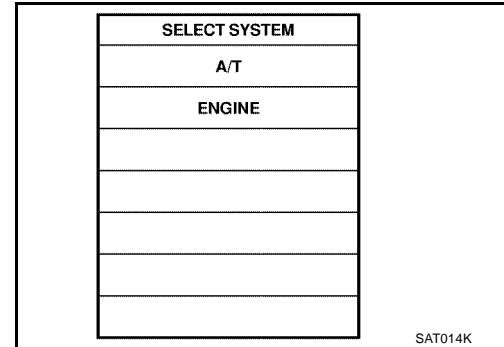
TESTING CONDITION:

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)

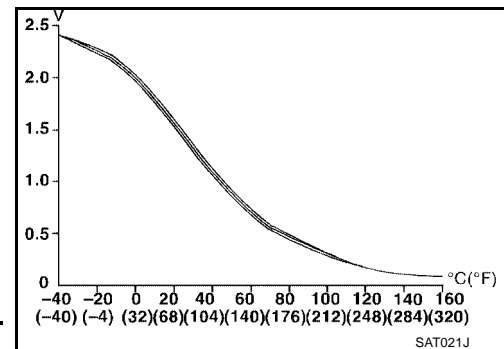
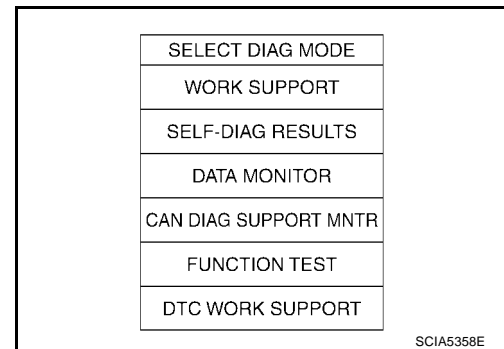
- Check that "GEAR" shows "3" after releasing pedal.
5. Depress accelerator pedal steadily with 1.0/8 - 2.0/8 of "THROTTLE POSI" from a speed of 60 to 70 km/h (37 to 43 MPH) until "TESTING" has turned to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to [AT-530, "Diagnostic Procedure"](#).

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 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for P0734 exists.	1 → 2 → 2 → 1

8. Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
 Refer to [AT-530, "Diagnostic Procedure"](#).
 Refer to [AT-752, "Shift Schedule"](#).

WITH GST

Follow the procedure "With CONSULT-II".

DTC P0734 A/T 4TH GEAR FUNCTION

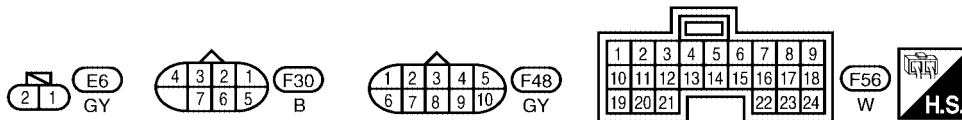
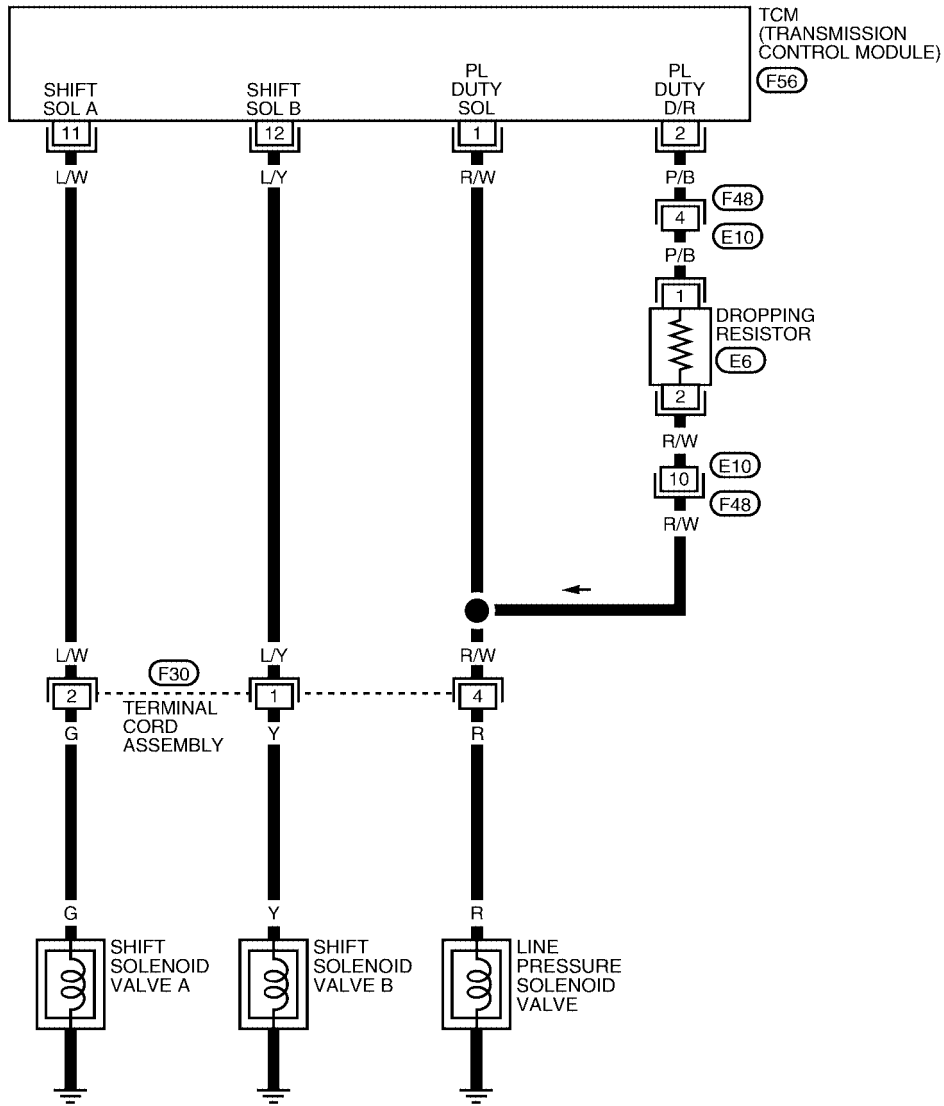
[RE4F04B]

Wiring Diagram — AT — 4TH

ECS00649

AT-4THSIG-01

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



WCWA0024E

DTC P0734 A/T 4TH GEAR FUNCTION

[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 VALVE (DROPPING RESISTOR)	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	APPROX. 4 - 14V
			WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	APPROX. 0V
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
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS OPERATING (DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE BE IS NOT OPERATING (DRIVING IN D3 OR D4)	APPROX. 0V

Diagnostic Procedure

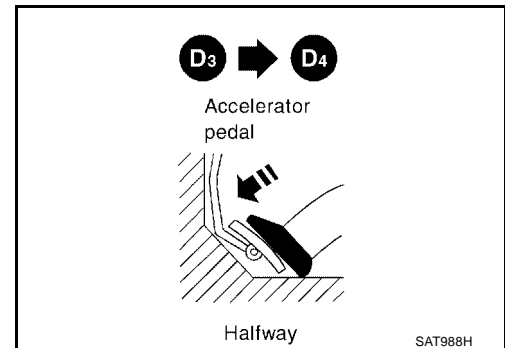
ECS0064A

1. CHECK SHIFT UP (D3 TO D4)

During [AT-465, "Cruise Test — Part 1"](#) , does A/T shift from D3 to D4 at the specified speed?

Yes or No

- Yes >> GO TO 11.
- No >> GO TO 2.



2. CHECK LINE PRESSURE

Perform line pressure test.

Engine Speed RPM	Line Pressure kPa (kg/cm ² , psi)	
	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)

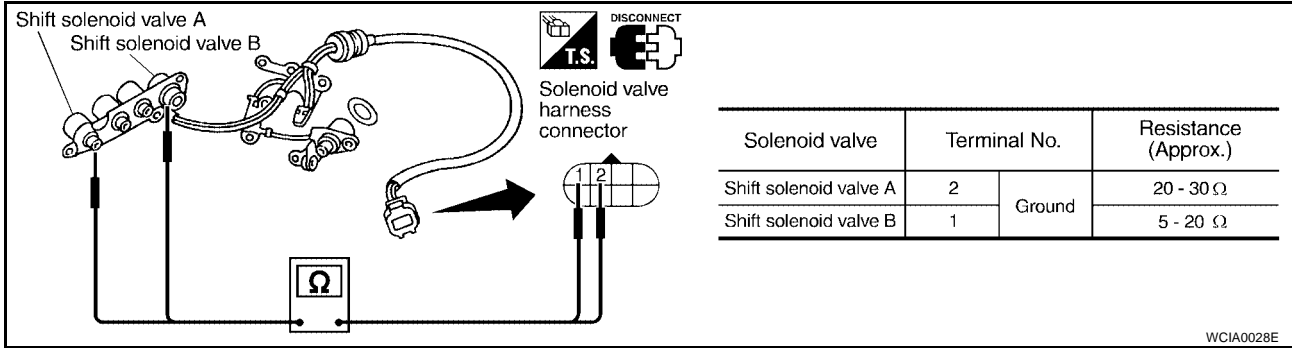
Refer to [AT-456, "Line Pressure Test"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 7.

3. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#) .
 - Shift solenoid valve A
 - Shift solenoid valve B
2. Check resistance between terminal cord assembly connector F30 terminals 1 and 2 and ground.

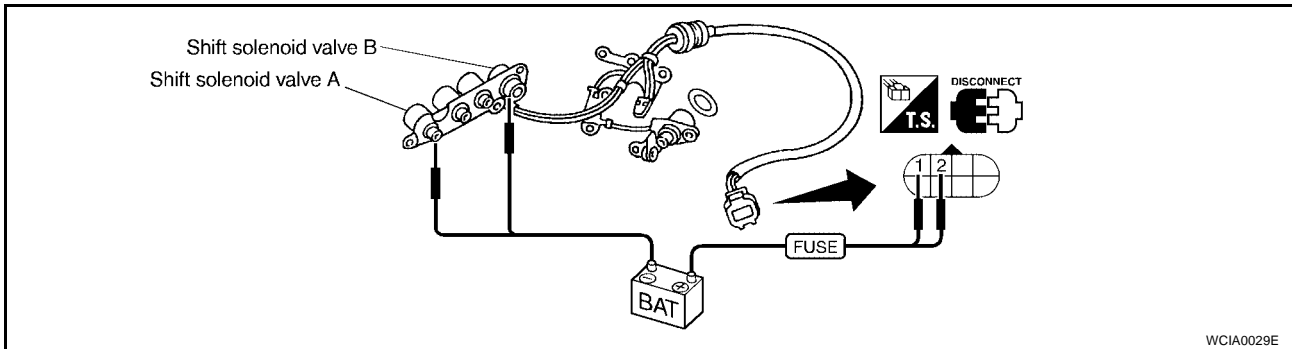


OK or NG

- OK >> GO TO 5.
- NG >> Replace solenoid valve assembly.

4. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to [AT-644, "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.

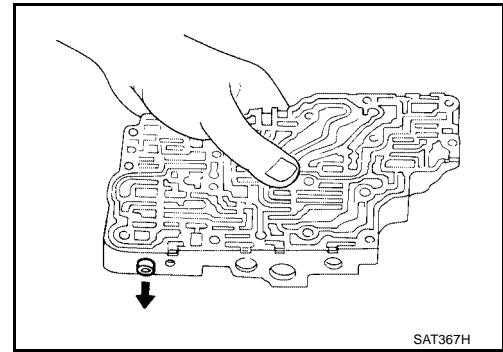


OK or NG

- OK >> GO TO 5.
- NG >> Replace solenoid valve assembly.

5. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-679, "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 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 [AT-644, "REMOVAL"](#) .
 - Line pressure solenoid valves
2. Check resistance between the terminal cord assembly connector F30 terminal 4 and ground.

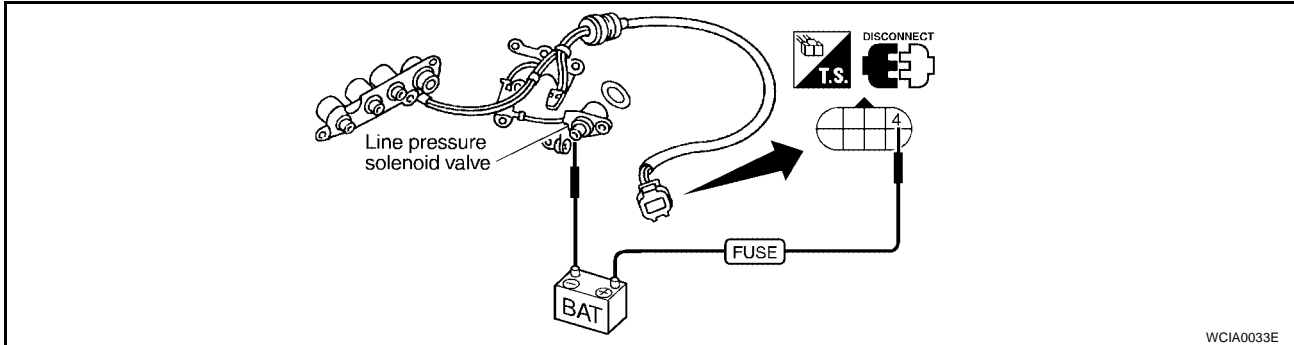
Solenoid valve	Terminal No.		Resistance (Approx.)
Line pressure solenoid valve	4	Ground	2.5 - 5Ω

OK or NG

- OK >> GO TO 9.
- NG >> Replace solenoid valve assembly.

8. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#) .
 - Line pressure solenoid valves
2. Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.

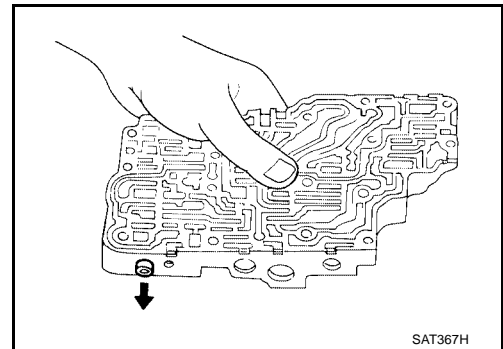


OK or NG

- OK >> GO TO 9.
- NG >> Replace solenoid valve assembly.

9. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-679, "DISASSEMBLY"](#) .
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)

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.

11. CHECK DTC

Perform [AT-527, "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

[RE4F04B]

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

PFP:31940

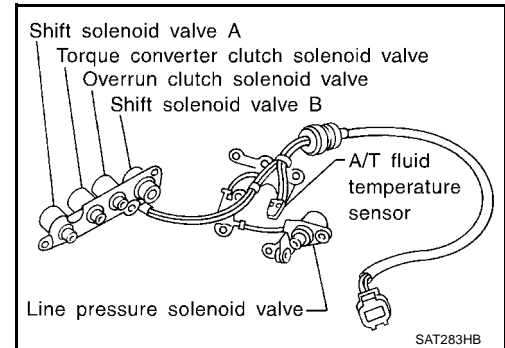
Description

ECS0064B

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.



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	Approximately 4%
	↓ Lock-up ON	↓ Approximately 94%

On Board Diagnosis Logic

ECS0064C

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

ECS0064D

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

ECS0064E

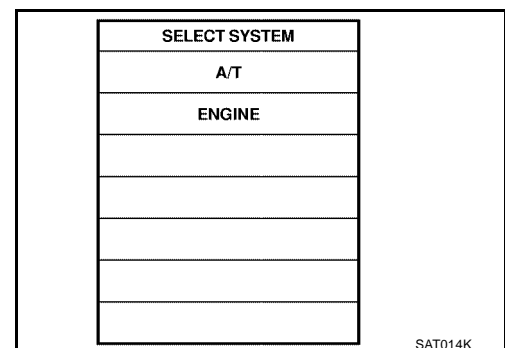
NOTE:

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

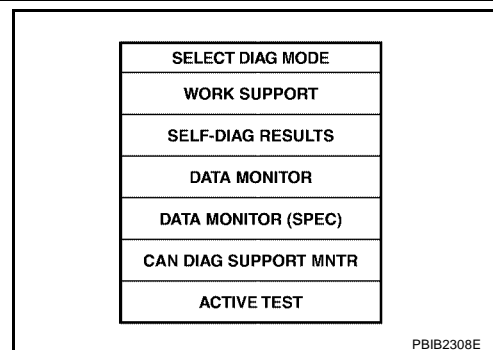
1. Turn ignition switch ON.



DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

[RE4F04B]

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



WITH GST

Follow the procedure "With CONSULT-II".

A

B

AT

D

E

F

G

H

I

J

K

L

M

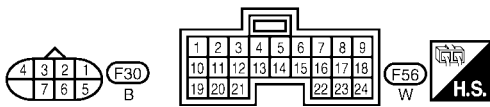
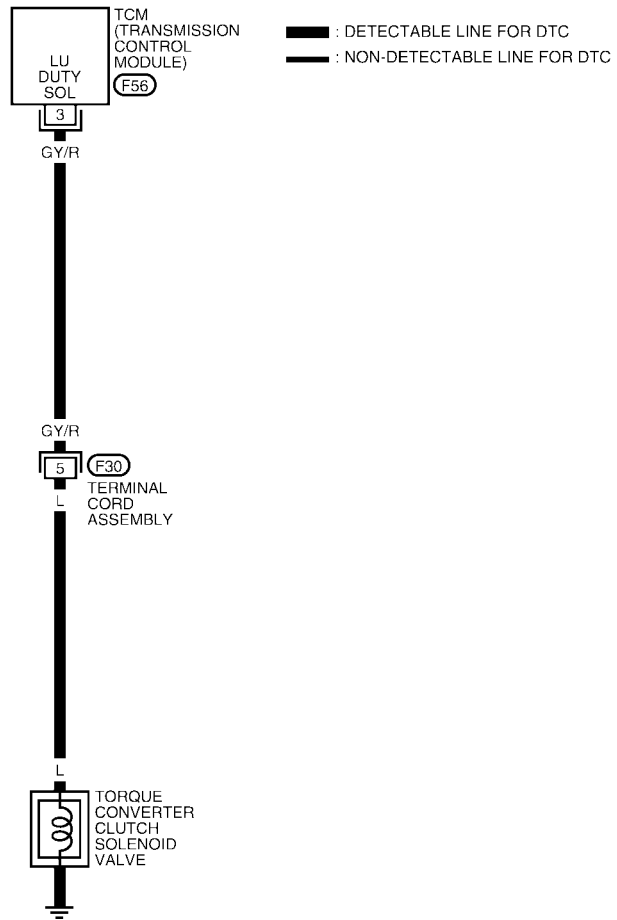
DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

[RE4F04B]

Wiring Diagram — AT — TCV

ECS0064F

AT-TCV-01



WCWA0025E

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)

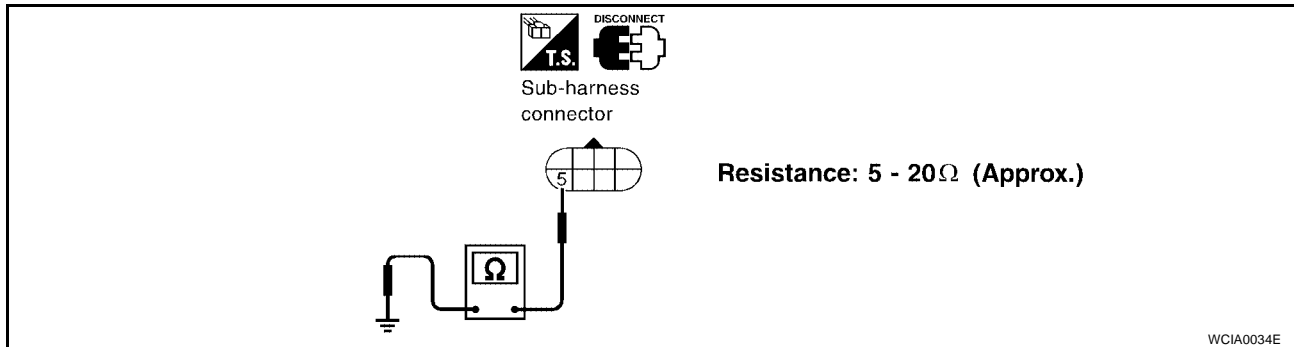
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
3	GY/R	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WITH TORQUE CONVERTER LOCK-UP	APPROX. 8 - 15V
			WITHOUT TORQUE CONVERTER LOCK-UP	APPROX. 0V

Diagnostic Procedure

ECS0064G

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 5 and ground.

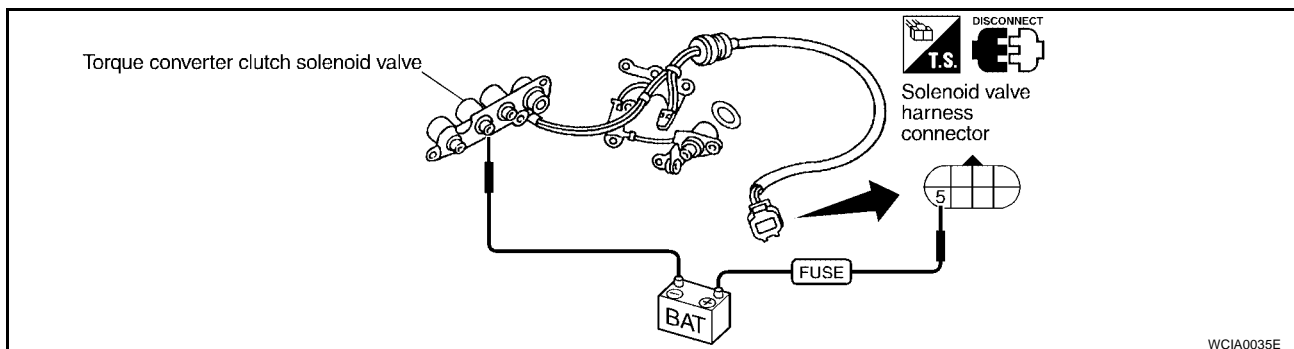


OK or NG

- 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.
3. Check continuity between terminal cord assembly harness connector F30 terminal 5 and TCM harness connector F56 terminal 3. Refer to [AT-536, "Wiring Diagram — AT — TCV"](#) .

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. CHECK DTC

Perform [AT-534, "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)

PF3:31940

Description

ECS0064H

- 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 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	Approximately 4%
	↓ Lock-up ON	↓ Approximately 94%

On Board Diagnosis Logic

ECS0064I

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 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

Check the following items.

- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- Each clutch
- Hydraulic control circuit

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0064K

CAUTION:

Always drive vehicle at a safe speed.

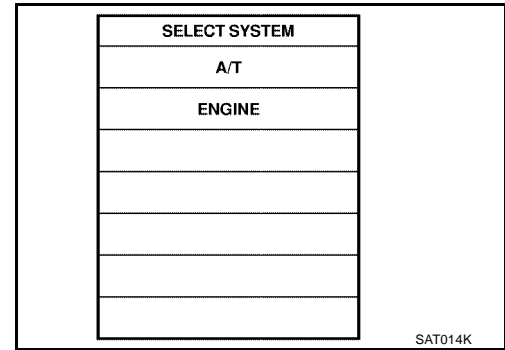
NOTE:

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

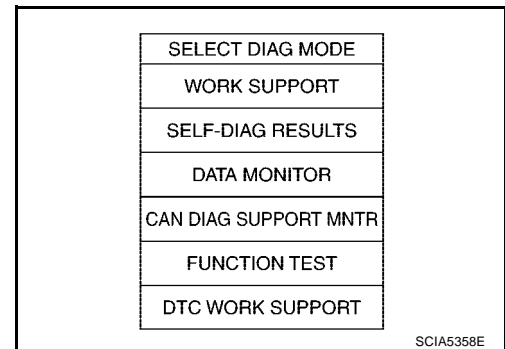
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

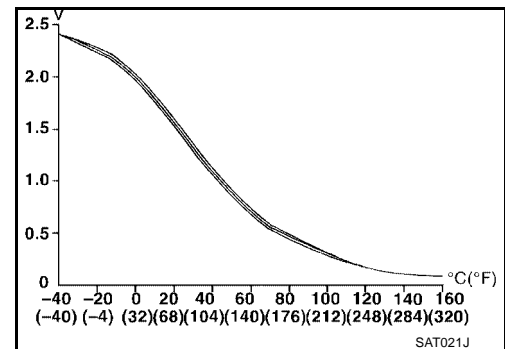
1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
FLUID TEMP SEN: 0.4 - 1.5V
 If out of range, drive vehicle to decrease voltage (warm up the fluid) or stop engine to increase voltage (cool 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-752, "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".
5. Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
 Refer to [AT-542, "Diagnostic Procedure"](#).
 Refer to [AT-752, "Shift Schedule"](#).



WITH GST

Follow the procedure "With CONSULT-II".

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

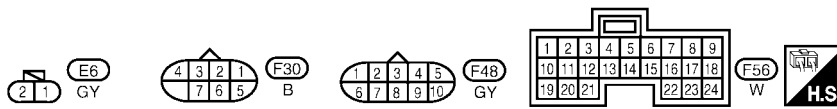
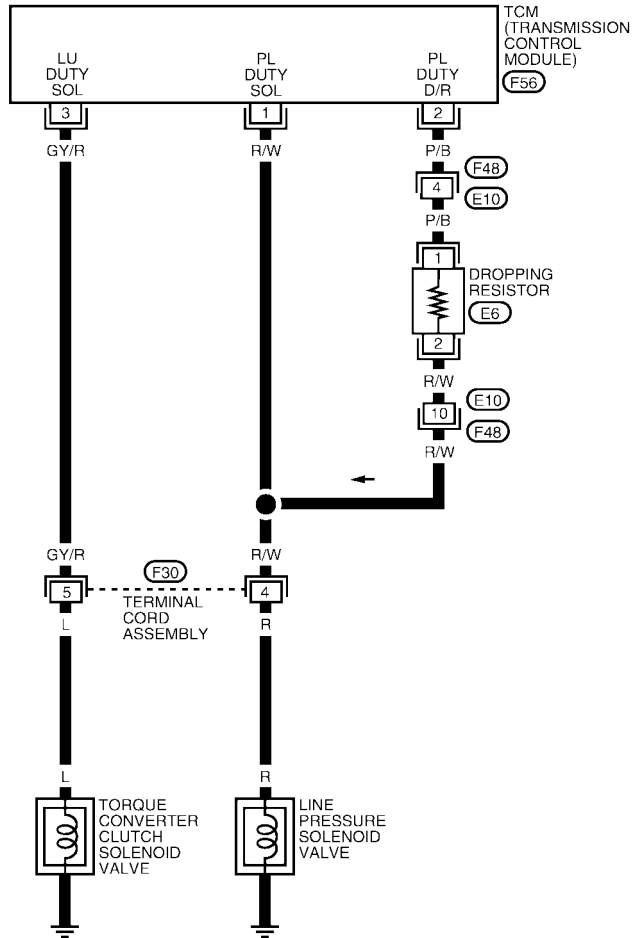
[RE4F04B]

Wiring Diagram — AT — TCCSIG

ECS0064L

AT-TCCSIG-01

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



WCWA0026E

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

[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 VALVE (DROPPING RESISTOR)	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	APPROX. 4 - 14V
			WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	APPROX. 0V
3	GY/R	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WITH TORQUE CONVERTER LOCK-UP	APPROX. 8 - 15V
			WITHOUT TORQUE CONVERTER LOCK-UP	APPROX. 0V

Diagnostic Procedure

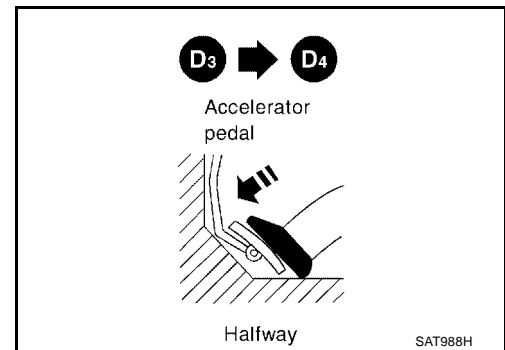
ECS0064M

1. CHECK SHIFT UP (D3 TO D4)

During [AT-465, "Cruise Test — Part 1"](#), does A/T shift from D3 to D4 at the specified speed?

Yes or No

- Yes >> GO TO 11.
- No >> GO TO 2.



2. CHECK LINE PRESSURE

Perform line pressure test.

Engine Speed RPM	Line Pressure kPa (kg/cm ² , psi)	
	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)

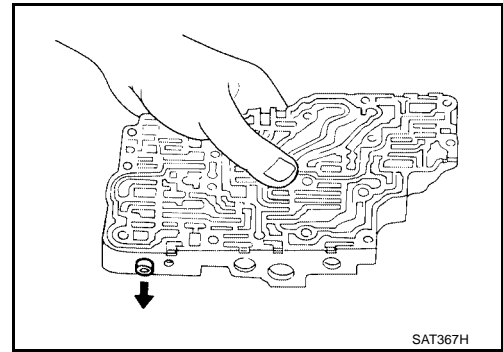
Refer to [AT-456, "Line Pressure Test"](#).

OK or NG

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

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-679, "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 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. CHECK DTC

Perform [AT-539, "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-644, "REMOVAL"](#) .
 - Line pressure solenoid valve
2. Check resistance to the terminal and ground.

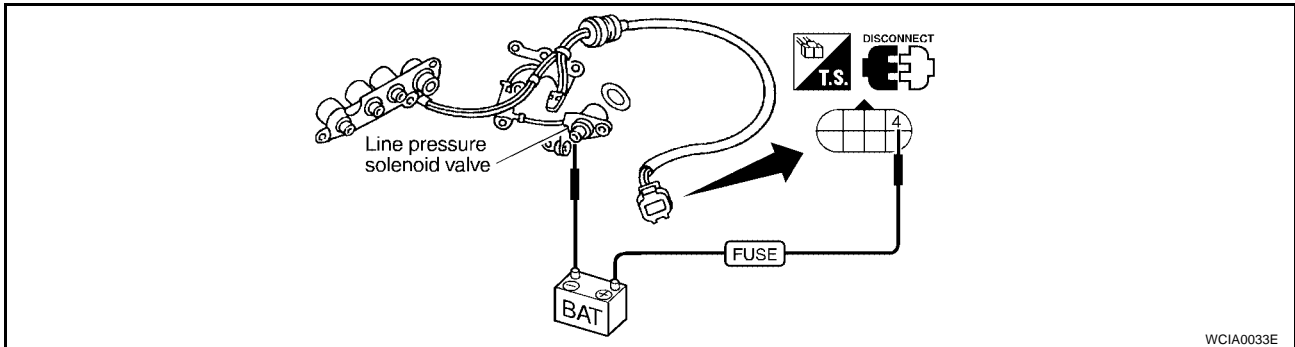
Solenoid valve	Terminal No.		Resistance (Approx.)
Line pressure solenoid valve	4	Ground	2.5 - 5Ω

OK or NG

- OK >> GO TO 8.
- NG >> Replace solenoid valve assembly.

7. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#) .
 - Line pressure solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.

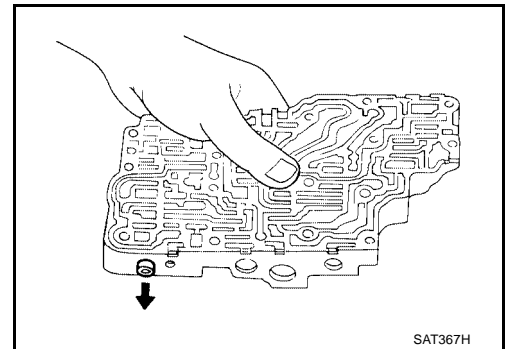


OK or NG

- OK >> GO TO 8.
- NG >> Replace solenoid valve assembly.

8. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-679, "DISASSEMBLY"](#) .
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.

9. CHECK SHIFT UP (D3 TO D4)

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. CHECK DTC

Perform [AT-539, "Diagnostic Trouble Code \(DTC\) Confirmation Procedure"](#) .

OK or NG

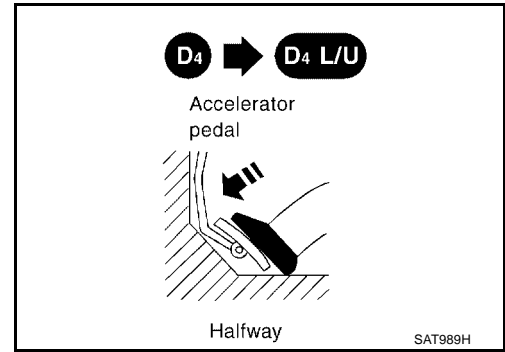
- OK >> **INSPECTION END**
- NG >> GO TO 11. Check for proper lock-up.

11. CHECK LOCK-UP

During [AT-465, "Cruise Test — Part 1"](#) , does A/T perform lock-up at the specified speed?

Yes or No

- Yes >> Perform "Cruise test — Part 1" again and return to the start point of this test group.
- No >> GO TO 12.



12. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#) .
 - Torque converter clutch solenoid valve
2. Check resistance between terminal cord assembly connector F30 terminal 5 and ground.

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

WCIA0036E

OK or NG

- OK >> GO TO 14.
- NG >> Replace solenoid valve assembly.

13. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#) .
 - Torque converter clutch solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage and ground to the solenoid.

WCIA0035E

OK or NG

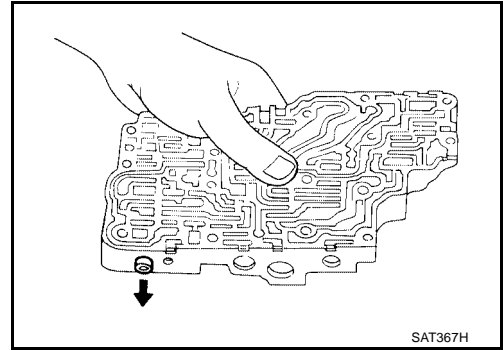
- OK >> GO TO 14.
- NG >> Replace solenoid valve assembly.

14. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-679, "DISASSEMBLY"](#).
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. CHECK 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. CHECK DTC

Perform [AT-539, "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 P0745 LINE PRESSURE SOLENOID VALVE

[RE4F04B]

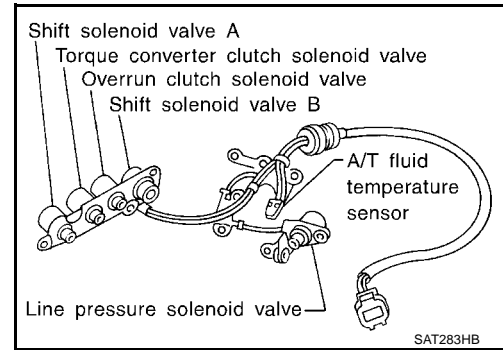
DTC P0745 LINE PRESSURE SOLENOID VALVE

PF3:31940

ECS0064N

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

Remarks: Specification data are reference values.

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

On Board Diagnosis Logic

ECS0064O

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

Check the following items.

- Harness or connectors
(The solenoid circuit is open or shorted.)
- Line pressure solenoid valve

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0064Q

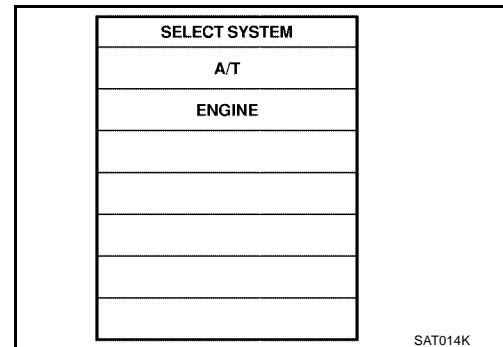
NOTE:

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

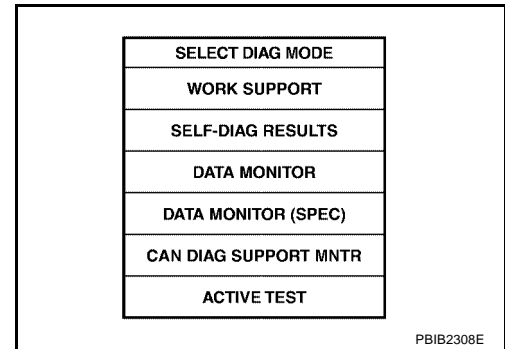
1. Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.



DTC P0745 LINE PRESSURE SOLENOID VALVE

[RE4F04B]

- Depress accelerator pedal completely and wait at least 1 second.



WITH GST

Follow the procedure "With CONSULT-II".

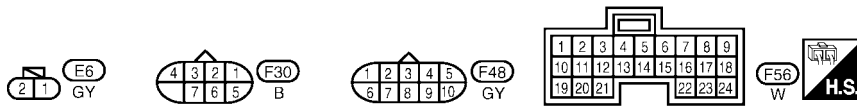
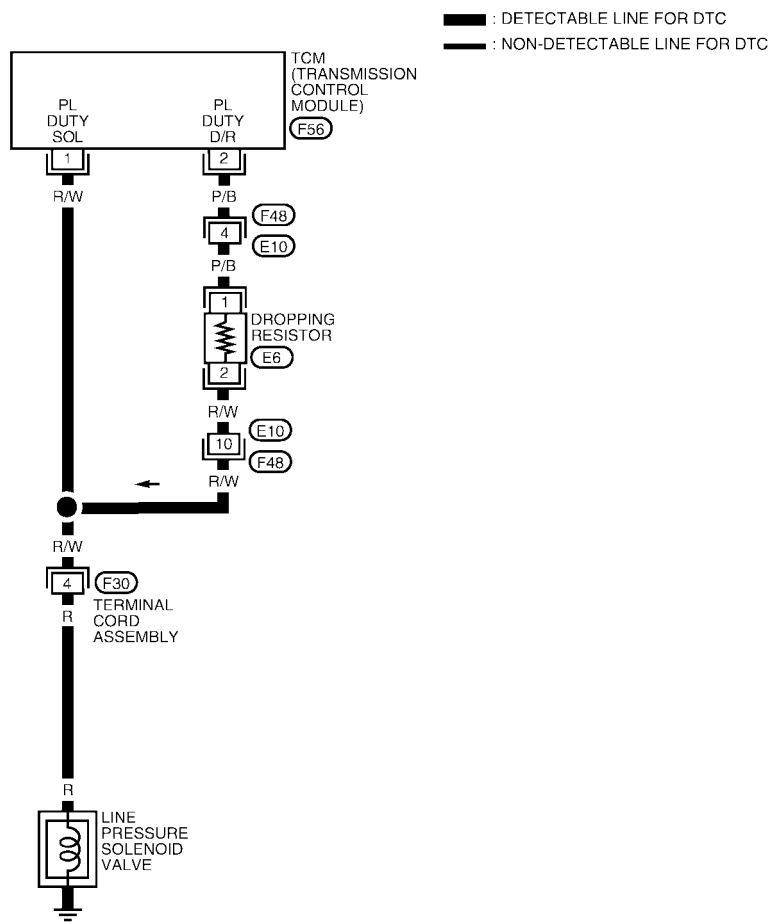
DTC P0745 LINE PRESSURE SOLENOID VALVE

[RE4F04B]

Wiring Diagram — AT — LPSV

ECS0064R

AT-LPSV-01



WCWA0027E

DTC P0745 LINE PRESSURE SOLENOID VALVE

[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)

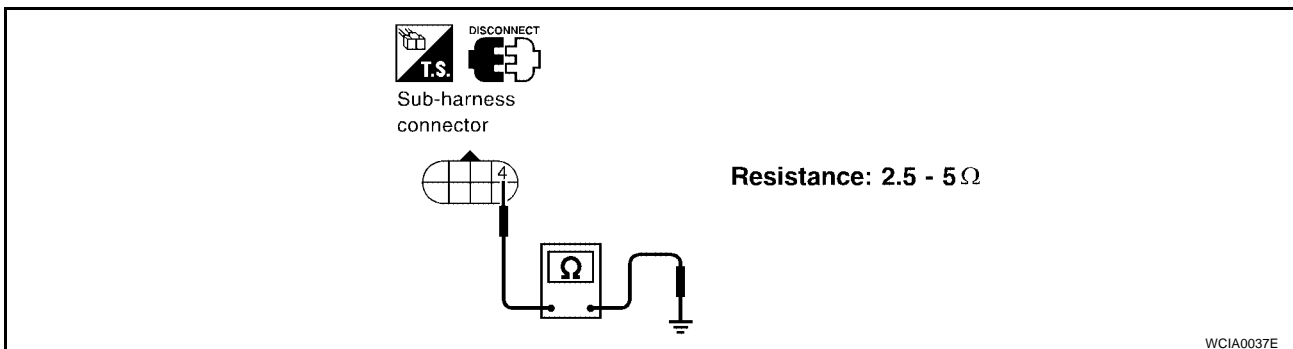
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	R/W	LINE PRESSURE SOLENOID VALVE	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	APPROX. 1.5 - 3.0V
			WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	APPROX. 0V
2	P/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	APPROX. 4 - 14V
			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.

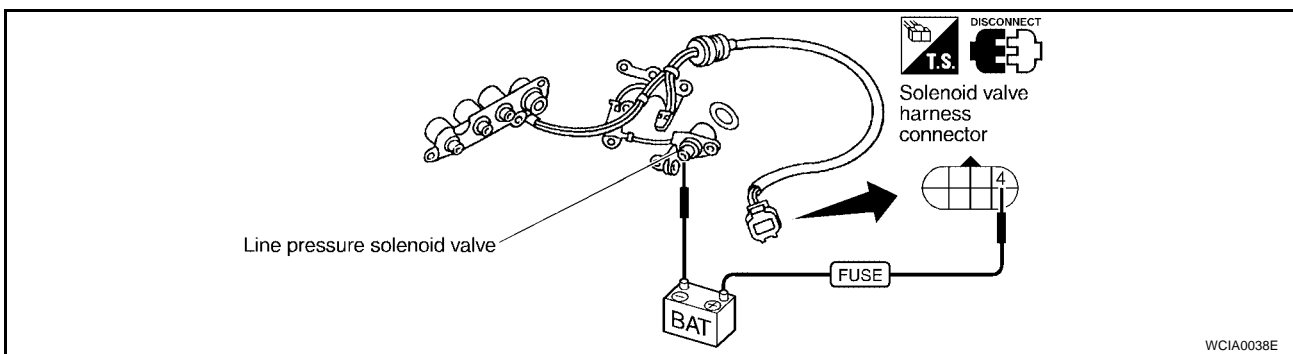


OK or NG

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

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#).
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.

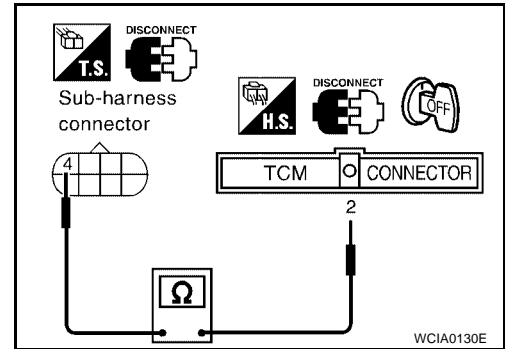
3. CHECK POWER SOURCE AND DROPPING RESISTOR CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. 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:

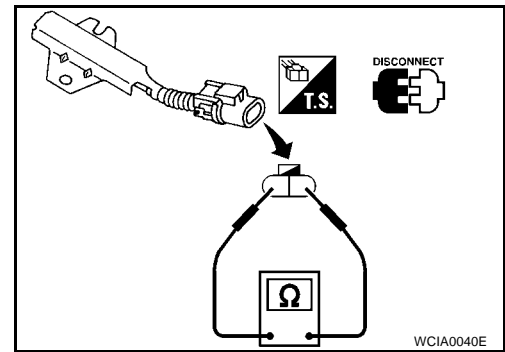
- Dropping resistor
- Check resistance between two terminals.

Resistance : Approximately 12Ω

- 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.
2. Check continuity between terminal cord assembly connector F30 terminal 4 and TCM harness connector F56 terminal 1. Refer to [AT-549, "Wiring Diagram — AT — LPSV"](#).

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. CHECK DTC

Perform [AT-547, "Diagnostic Trouble Code \(DTC\) Confirmation Procedure"](#).

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.

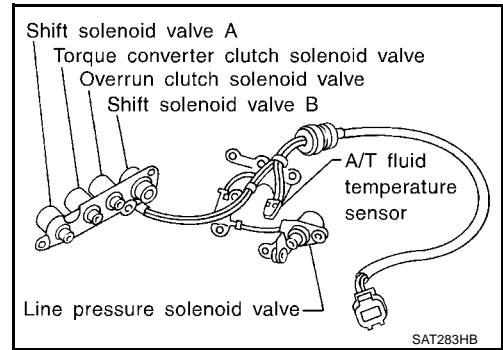
DTC P0750 SHIFT SOLENOID VALVE A

PF3:31940

Description

ECS0064T

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.



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

ECS0064U

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.

Possible Cause

ECS0064V

Check the following items.

- Harness or connectors (The solenoid circuit is open or shorted.)
- Shift solenoid valve A

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0064W

CAUTION:

Always drive vehicle at a safe speed.

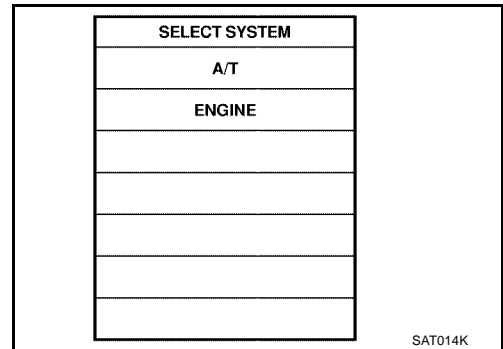
NOTE:

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.



DTC P0750 SHIFT SOLENOID VALVE A

[RE4F04B]

2. Start engine.
3. Drive vehicle in D position and allow the transmission to shift 1 → 2 (“GEAR”).

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
CAN DIAG SUPPORT MNTR
ACTIVE TEST

PBIB2308E

WITH GST

Follow the procedure “With CONSULT-II”.

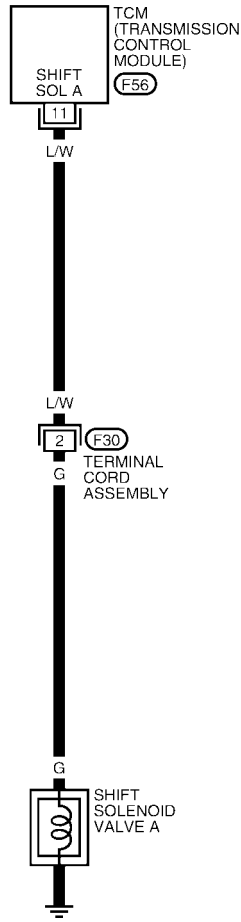
DTC P0750 SHIFT SOLENOID VALVE A

[RE4F04B]

Wiring Diagram — AT — SSV/A

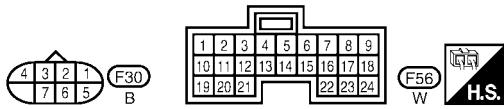
ECS0064X

AT-SSV/A-01



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

A
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AT
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 F
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 H
 I
 J
 K
 L
 M



WCWA0028E

DTC P0750 SHIFT SOLENOID VALVE A

[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)

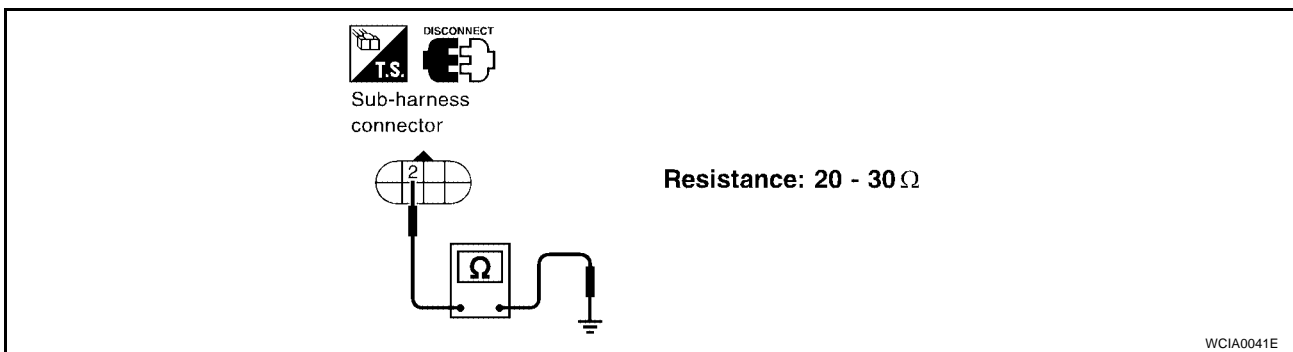
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
11	L/W	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A IS OPERATING (DRIVING IN D1 OR D4)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A IS NOT OPERATING (DRIVING IN D2 OR D3)	APPROX. 0V

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.

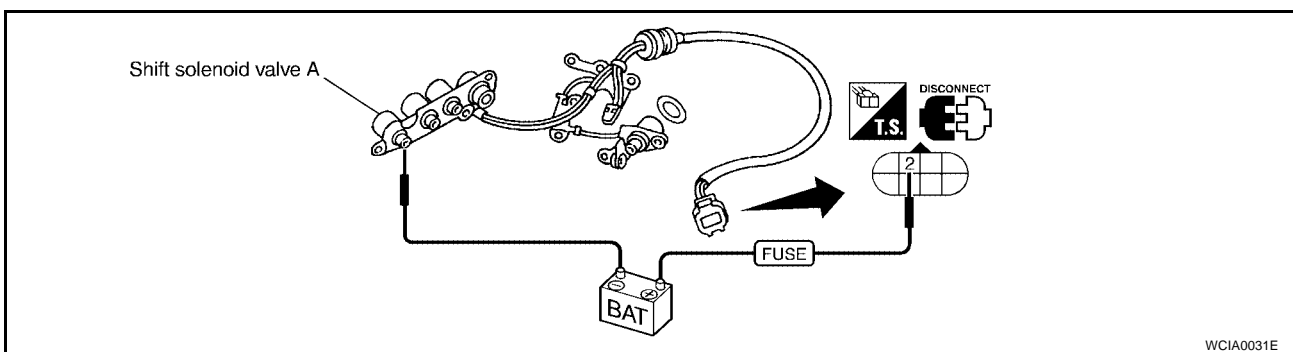


OK or NG

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

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to [AT-644, "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.

3. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal cord assembly harness connector F30 terminal 2 and TCM harness connector F56 terminal 11. Refer to [AT-555, "Wiring Diagram — AT — SSV/A"](#).

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. CHECK DTC

Perform [AT-553, "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.

A

B

AT

D

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L

M

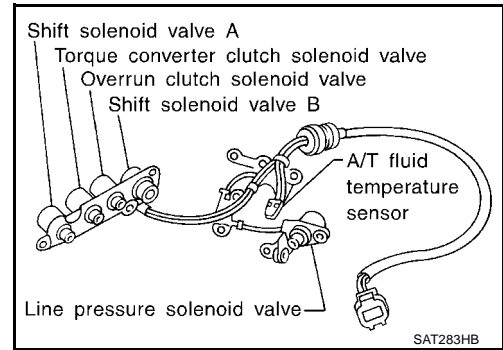
DTC P0755 SHIFT SOLENOID VALVE B

PFP:31940

Description

ECS0064Z

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.



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

ECS00650

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.

Possible Cause

ECS00651

Check the following items.

- Harness or connectors
(The solenoid circuit is open or shorted.)
- Shift solenoid valve B

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS00652

CAUTION:

Always drive vehicle at a safe speed.

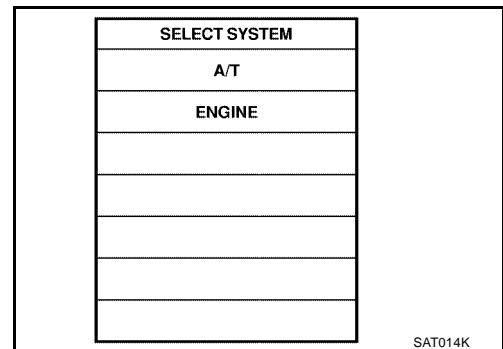
NOTE:

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

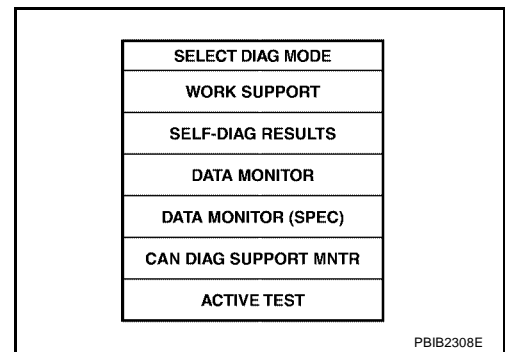
1. Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.



DTC P0755 SHIFT SOLENOID VALVE B

[RE4F04B]

2. Start engine.
3. Drive vehicle in D position and allow the transmission to shift 1 → 2 → 3 (“GEAR”).



A
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AT

WITH GST

Follow the procedure “With CONSULT-II”.

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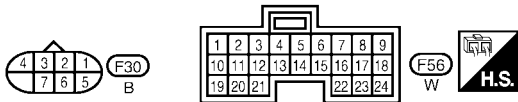
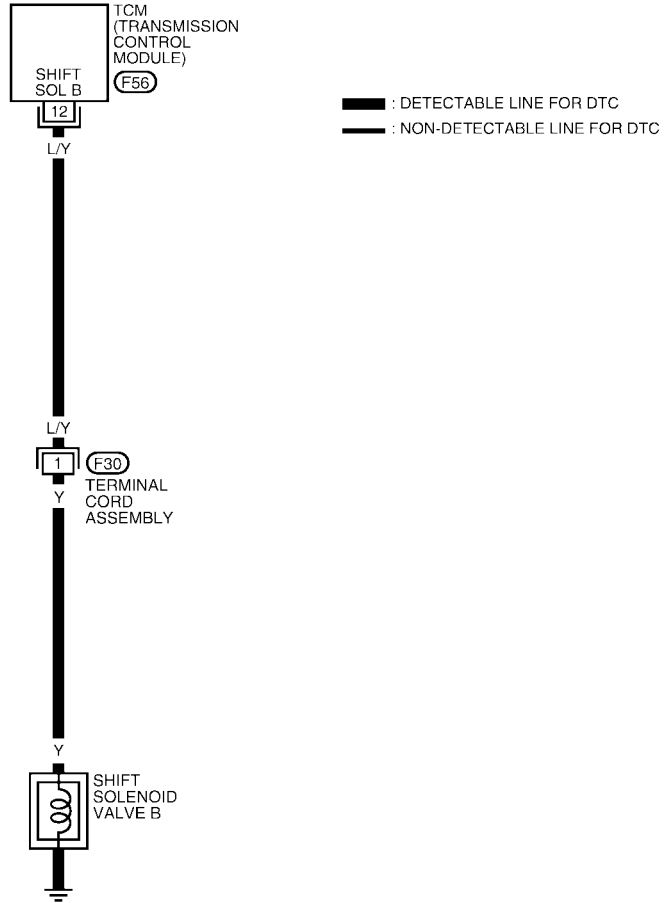
DTC P0755 SHIFT SOLENOID VALVE B

[RE4F04B]

Wiring Diagram — AT — SSV/B

ECS00653

AT-SSV/B-01



WCWA0029E

DTC P0755 SHIFT SOLENOID VALVE B

[RE4F04B]

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)

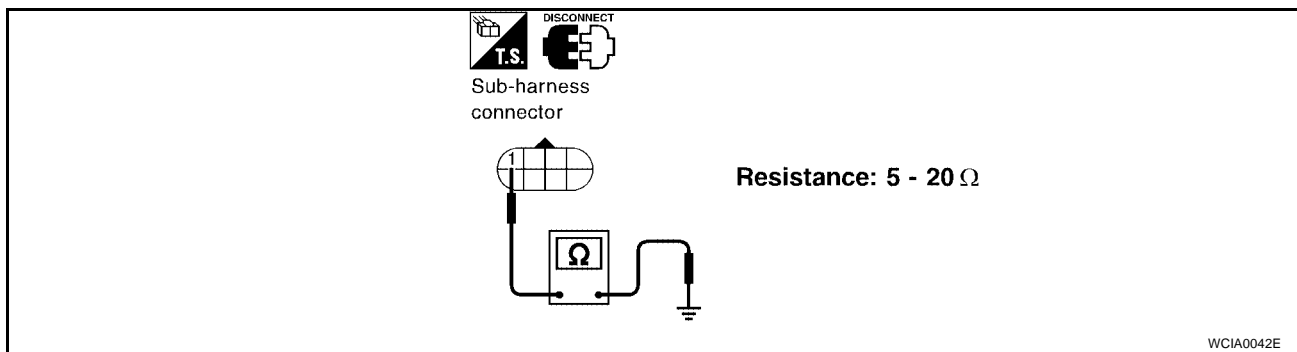
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS OPERATING (DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE BE IS NOT OPERATING (DRIVING IN D3 OR D4)	APPROX. 0V

Diagnostic Procedure

ECS00654

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 1 and ground.

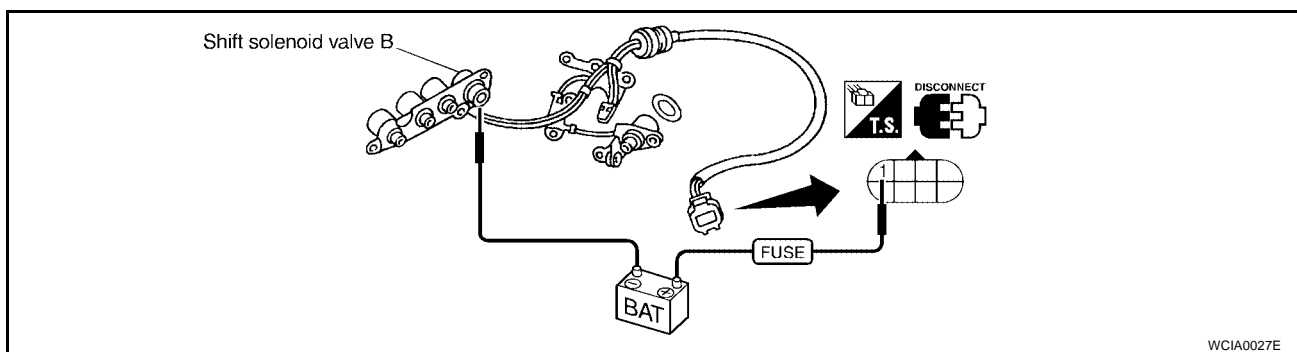


OK or NG

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

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to [AT-644, "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.

3. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal cord assembly harness connector F30 terminal 1 and TCM harness connector F56 terminal 12. Refer to [AT-560, "Wiring Diagram — AT — SSV/B"](#) .

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. CHECK DTC

Perform [AT-558, "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 P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

[RE4F04B]

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

PF2:22560

Description

ECS00655

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 [accelerator pedal position (APP) sensor]	Fully-closed throttle	Approximately 0.5V
	Fully-open throttle	Approximately 4V

On Board Diagnosis Logic

ECS00656

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

ECS00657

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS00658

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

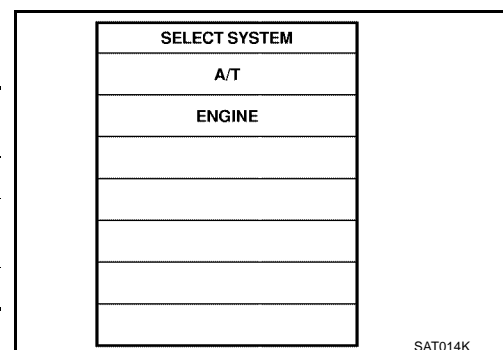
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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

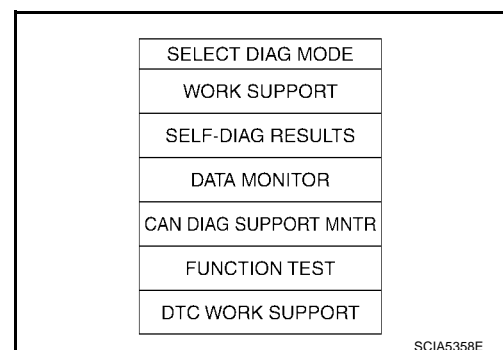


If the check result is NG, go to [AT-566, "Diagnostic Procedure"](#).
If the check result is OK, go to following step.

2. Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
3. 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-566, "Diagnostic Procedure"](#).
If the check result is OK, go to following step.

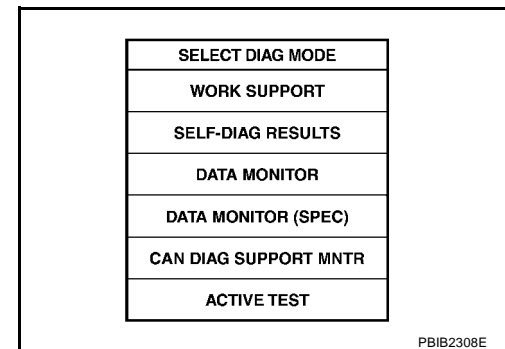
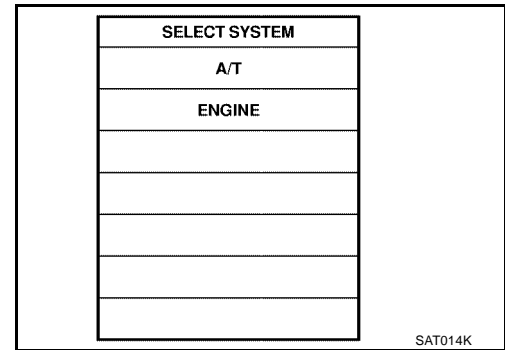


4. Maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.

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

[RE4F04B]

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



WITH GST

Follow the procedure "With CONSULT-II".

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

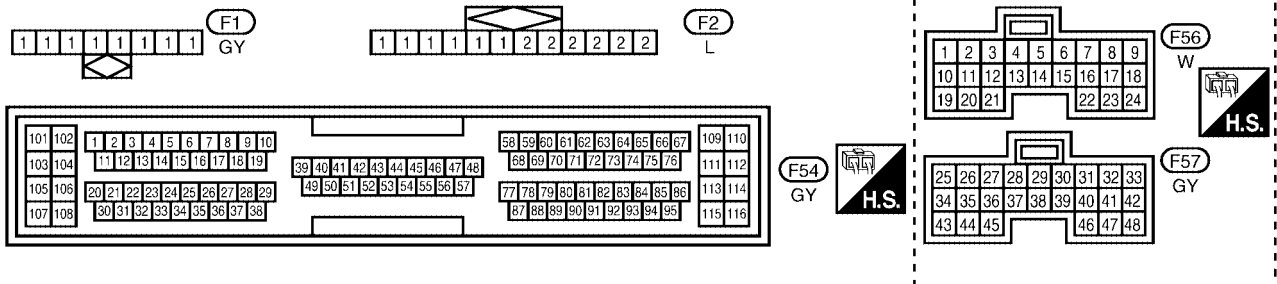
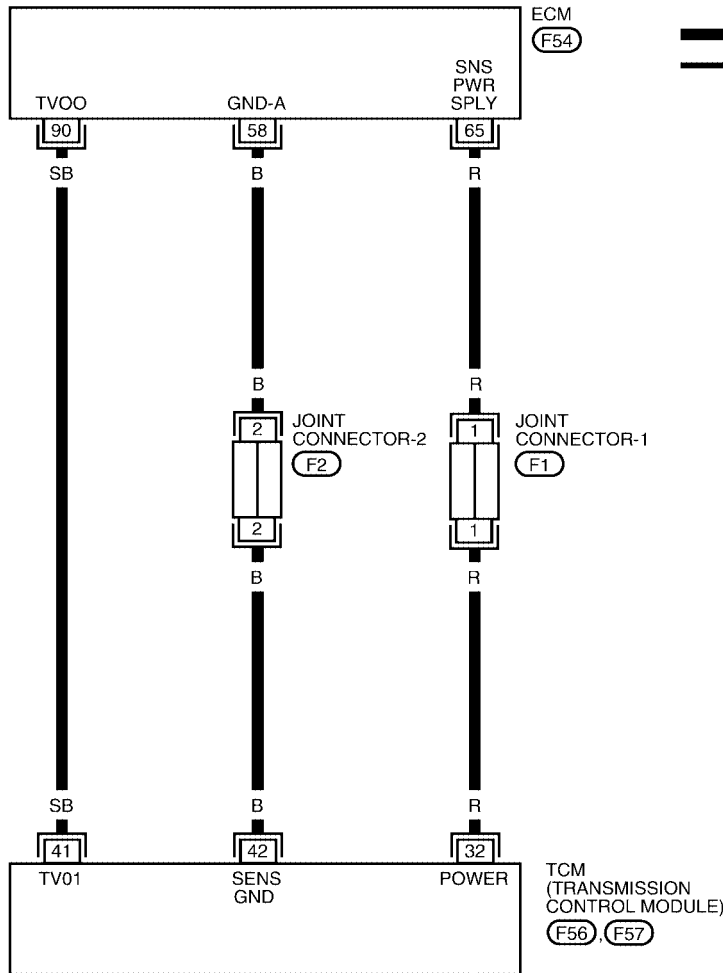
[RE4F04B]

Wiring Diagram — AT — TPS

ECS00659

AT-TPS-01

A
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WCWA0079E

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

[RE4F04B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
32	R	SENSOR POWER	IGNITION SWITCH ON	4.5 - 5.5V
			IGNITION SWITCH OFF	0V
41	SB	THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]	IGNITION ON AND ACCELERATOR PEDAL IS DEPRESSED SLOWLY AFTER WARMING UP ENGINE	FULLY CLOSED THROTTLE: 0.5V WIDE OPEN THROTTLE: 4.0V
42	B	SENSOR GROUND	—	—

Diagnostic Procedure

ECS0065A

1. CHECK 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-1275, "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 [EC-1475, "DTC P0222, P0223 TP SENSOR"](#) and [EC-1770, "DTC P2138 APP SENSOR"](#) .

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	VALUE
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

SAT614J

Voltage:

Fully-closed throttle :Approximately 0.5V

Fully-open throttle :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)

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

[RE4F04B]

3. CHECK INPUT SIGNAL (WITHOUT CONSULT-II)

⊗ Without CONSULT-II

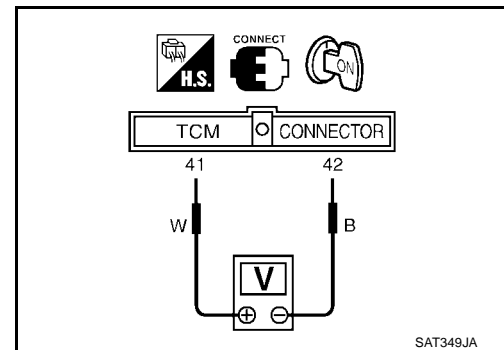
1. Turn ignition switch to ON position. (Do not start engine.)
2. Check voltage between TCM terminals 41 and 42 while accelerator pedal is depressed slowly.

Voltage:

Fully-closed throttle valve :Approximately 0.5V

Fully-open throttle valve :Approximately 4V

(Voltage rises gradually in response to throttle position.)



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.

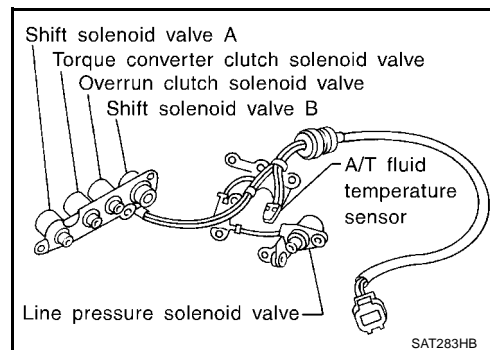
DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

PF3:31940

Description

ECS0065B

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.



SAT283HB

On Board Diagnosis Logic

ECS0065C

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

ECS0065D

Check the following items.

- Harness or connectors
(The solenoid circuit is open or shorted.)
- Overrun clutch solenoid valve

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0065E

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.

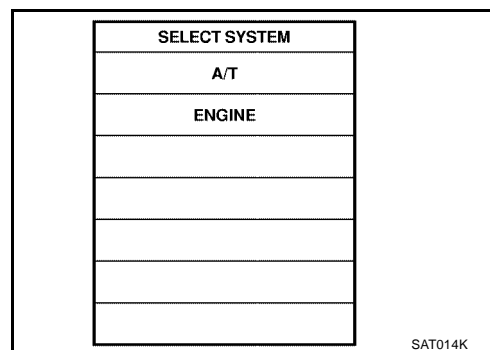
TESTING CONDITION:

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.

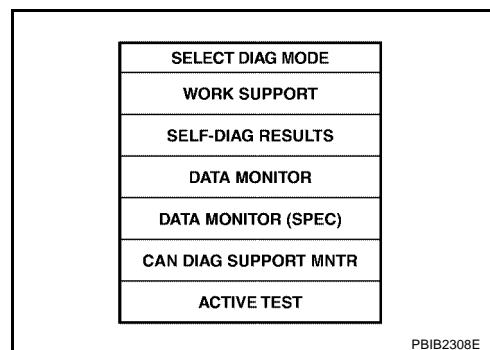
WITH CONSULT-II

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).



SAT014K

4. Release accelerator pedal completely with D position (O/D OFF).



PBIB2308E

DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

[RE4F04B]

WITH GST

Follow the procedure "With CONSULT-II".

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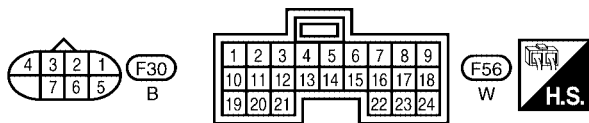
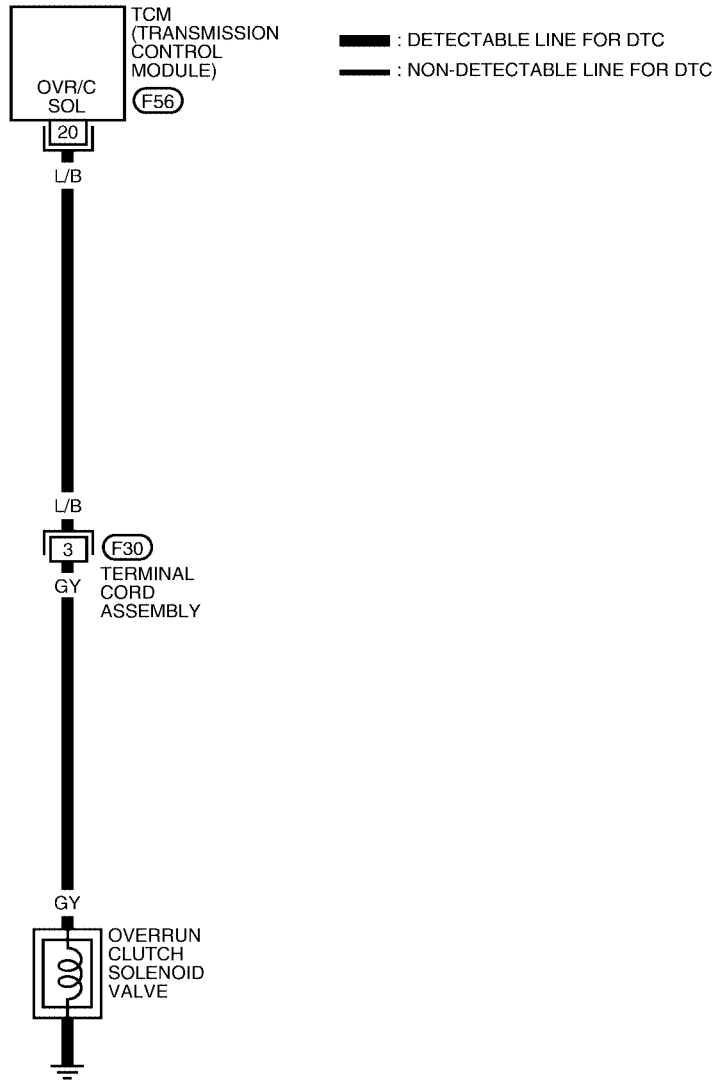
DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

[RE4F04B]

Wiring Diagram — AT — OVRCSV

ECS0065F

AT-OVRCSV-01



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)
20	L/B	OVERRUN CLUTCH SOLENOID VALVE	WHEN OVERRUN CLUTCH SOLENOID VALVE OPERATES	BATTERY VOLTAGE
			WHEN OVERRUN CLUTCH SOLENOID VALVE DOES NOT OPERATE	APPROX. 0V

Diagnostic Procedure

ECS0065G

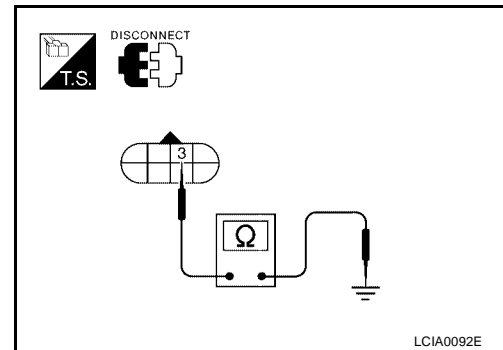
1. CHECK VALVE RESISTANCE

1. Turn ignition switch to OFF position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal cord assembly F30 terminal 3 (component side) and ground.

Resistance : 20 - 30Ω

OK or NG

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

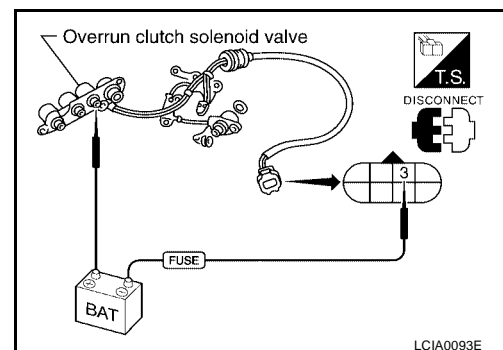


2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to [AT-644, "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.
3. Check continuity between terminal cord assembly connector F30 terminal 3 and TCM harness connector F56 terminal 20. Refer to [AT-570, "Wiring Diagram — AT — OVRCSV"](#).

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. CHECK DTC

Perform [AT-568, "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 BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

[RE4F04B]

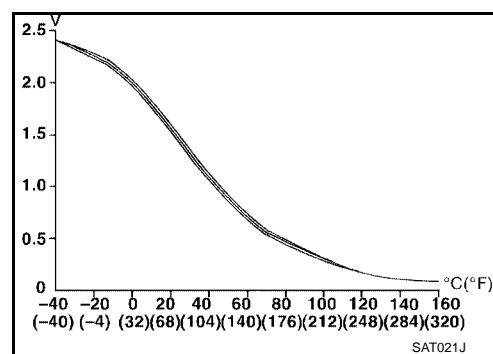
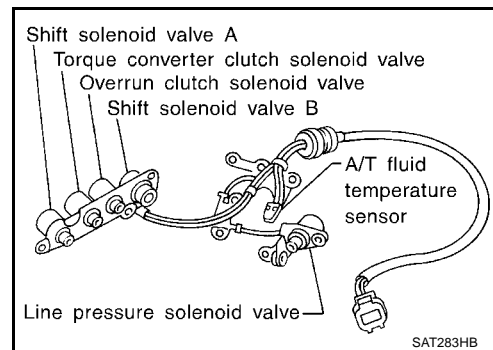
DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

PFP:31940

Description

ECS0065H

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)]	1.5V	2.5 kΩ
	↓ Hot [80°C (176°F)]	0.5V	0.3 kΩ

On Board Diagnosis Logic

ECS0065I

Diagnostic trouble code BATT/FLUID TEMP SEN with CONSULT-II or 8th judgement flicker without CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

ECS0065J

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

ECS0065K

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

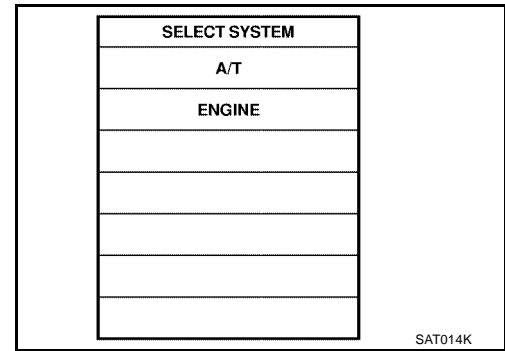
WITH CONSULT-II

1. Start engine.

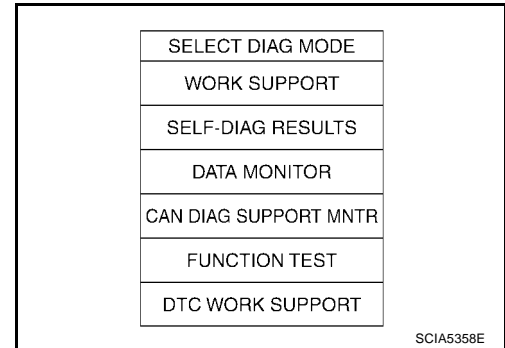
DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

[RE4F04B]

2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.

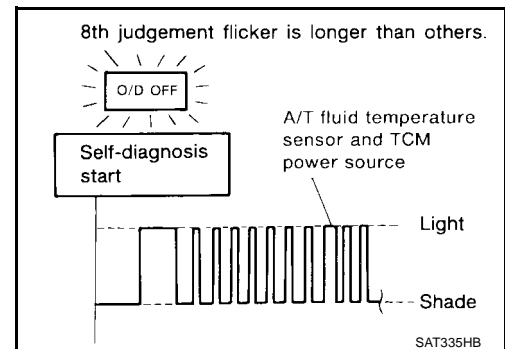


3. Drive vehicle under the following conditions:
Selector lever in D, vehicle speed higher than 20 km/h (12 MPH).



WITHOUT CONSULT-II

1. Start engine.
2. 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 [AT-442, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#).



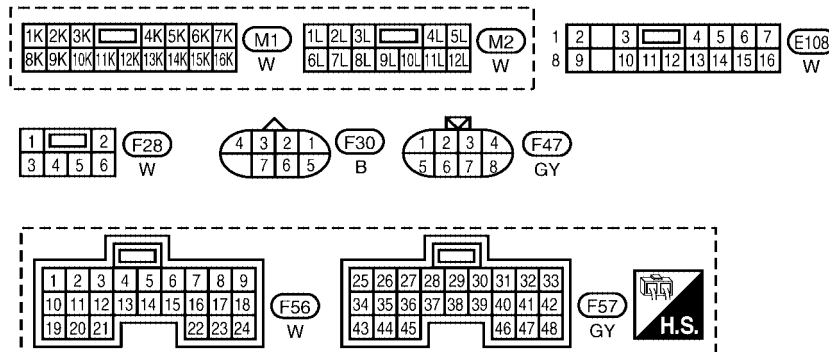
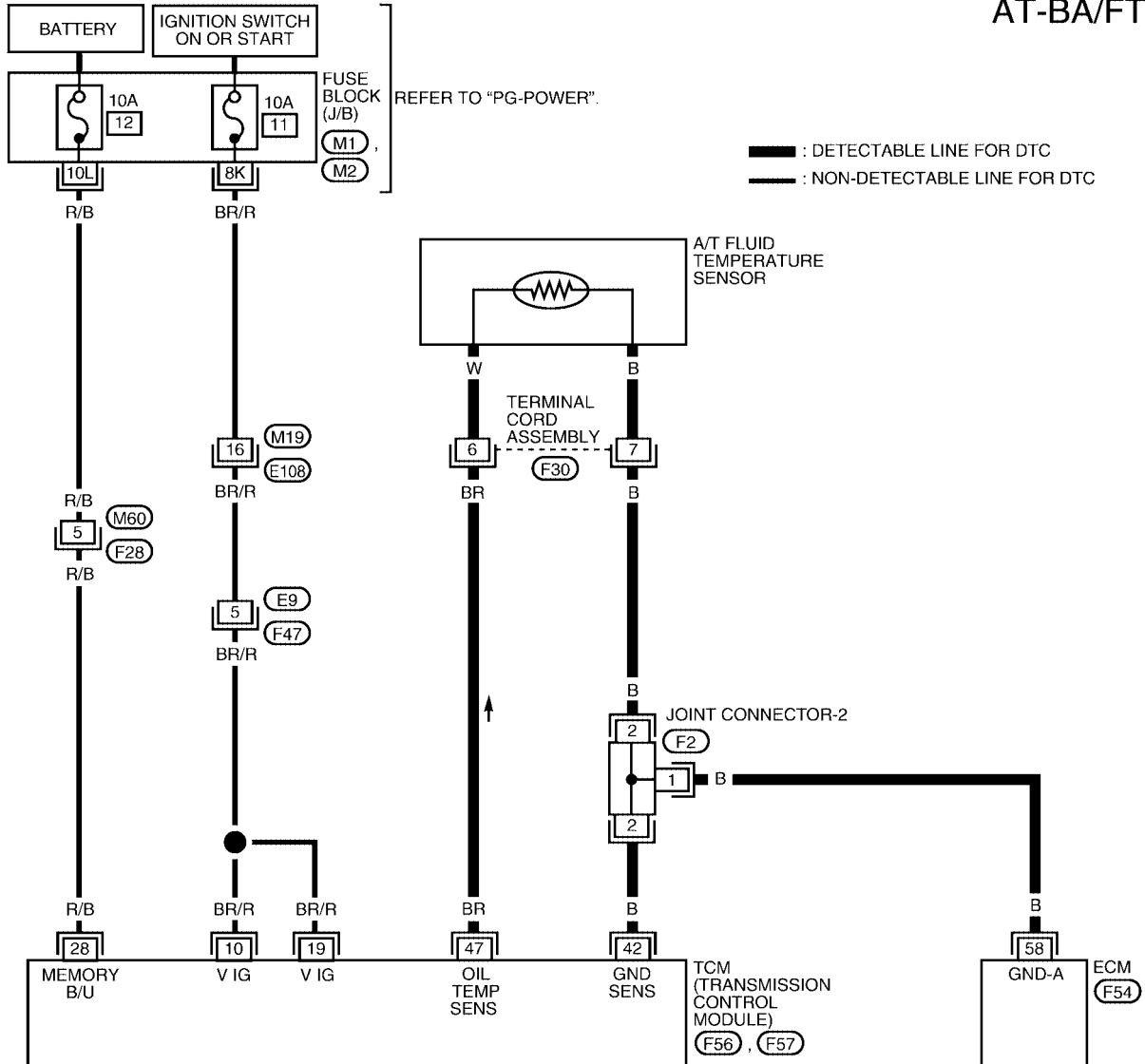
DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

[RE4F04B]

ECS0065L

Wiring Diagram — AT — BA/FTS

AT-BA/FTS-01



REFER TO THE FOLLOWING.
 (F2) - JOINT CONNECTOR
 (F54) - ELECTRICAL UNITS

WCWA0080E

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

[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
			IGNITION OFF	APPROX. 0V
19	BR/R	POWER SOURCE	IGNITION ON	BATTERY VOLTAGE
			IGNITION OFF	APPROX. 0V
28	R/B	POWER SOURCE (MEMORY BACKUP)	IGNITION ON	BATTERY VOLTAGE
			IGNITION OFF	BATTERY VOLTAGE
42	B	SENSOR GROUND	—	—
47	BR	A/T FLUID TEMPERATURE SENSOR	IGNITION ON WITH ATF TEMPERATURE AT 20°C (68°F)	APPROX. 1.5V
			IGNITION ON WITH ATF TEMPERATURE 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	VALUE
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

SAT614J

Voltage :Cold [20°C (68°F)] → Hot [80°C (176°F)]
:Approximately 1.5V → 0.5V

OK or NG

- OK >> GO TO 9.
- NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following items:

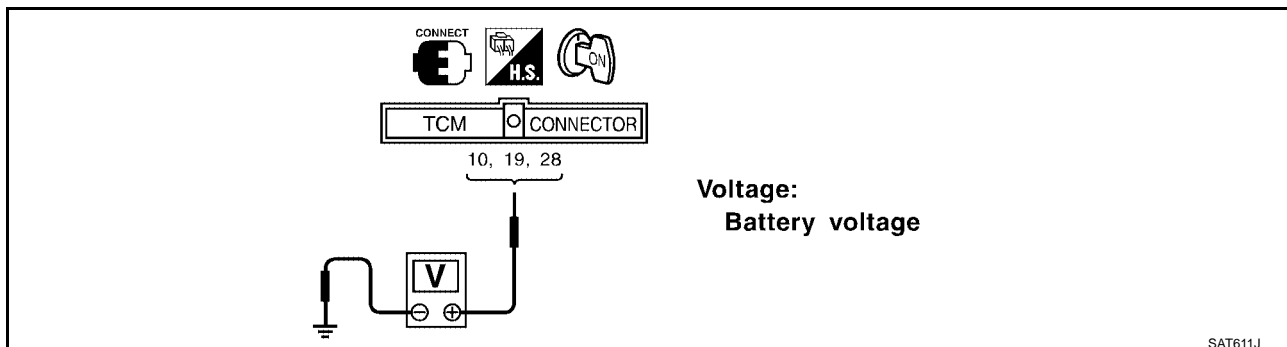
- Harness for short or open between TCM, ECM and terminal cord assembly (Main harness)
- Harness for short or open between battery and TCM (Main harness)
- Ground circuit for ECM
Refer to [EC-1342, "POWER SUPPLY CIRCUIT FOR ECM"](#) .

OK or NG

- OK >> GO TO 9.
- NG >> Repair or replace damaged parts.

3. CHECK TCM POWER SOURCE STEP 1

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

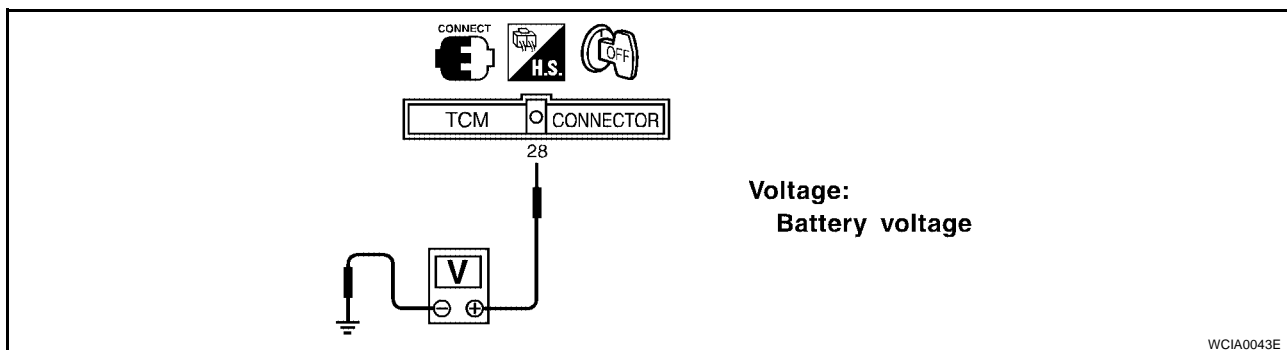


OK or NG

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

4. CHECK TCM POWER SOURCE STEP 2

1. Turn ignition switch to OFF position.
2. Check voltage between TCM terminal 28 and ground.



OK or NG

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

5. DETECT MALFUNCTIONING ITEM

Check the following items:

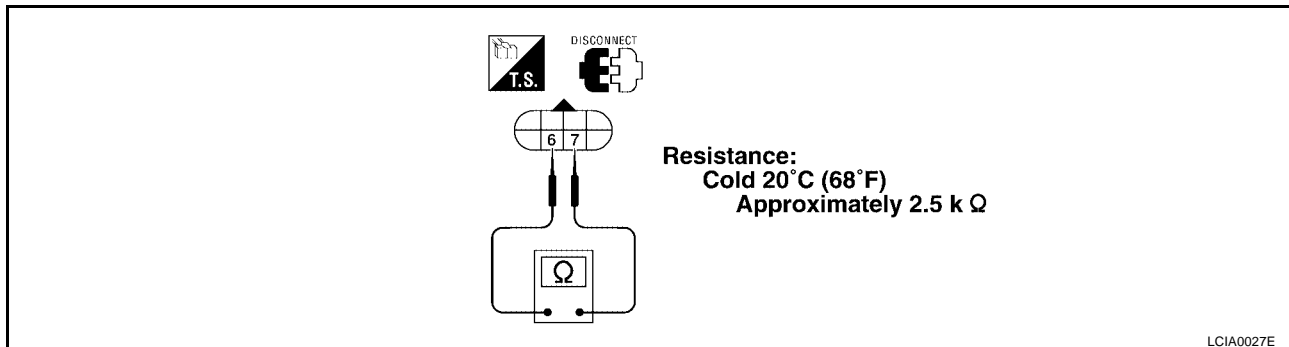
- Harness for short or open between ignition switch and TCM (Main harness)
- Harness for short or open between battery and TCM (Main harness)
- Ignition switch and fuse
Refer to [PG-2. "POWER SUPPLY ROUTING"](#).

OK or NG

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

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 >> 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.

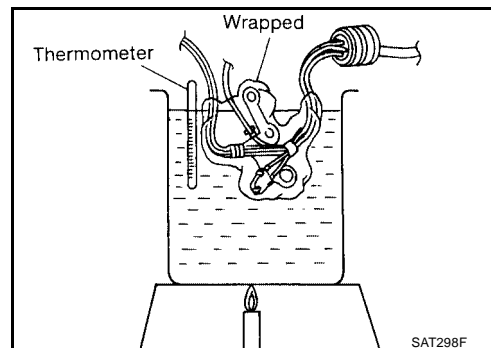
Temperature	Resistance (Approx.)
20°C (68°F)	2.5kΩ
80°C (176°F)	0.3kΩ

- 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.



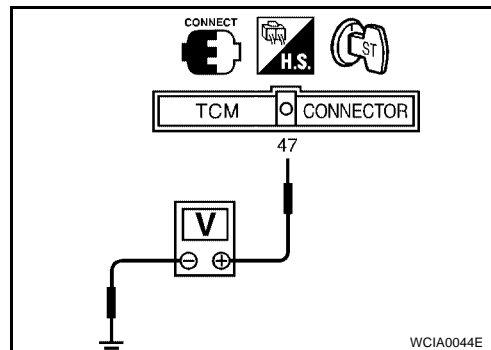
8. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (WITHOUT CONSULT-II)

⊗ 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 → 0.5V

3. Turn ignition switch to OFF position.
4. Disconnect TCM harness connector.
5. Check resistance between TCM harness connector terminal 42 and ground. Refer to [AT-575, "Wiring Diagram — AT — BA/FTS"](#)



Continuity should exist.

OK or NG

- OK >> GO TO 10.
- NG >> GO TO 9.

9. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM, ECM and terminal cord assembly (Main harness)
- Ground circuit for ECM
 Refer to [PG-2, "POWER SUPPLY ROUTING"](#).

OK or NG

- OK >> GO TO 10.
- NG >> Repair or replace damaged parts.

10. CHECK DTC

Perform [AT-573, "Diagnostic Trouble Code \(DTC\) Confirmation Procedure"](#).

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 11.

11. 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.

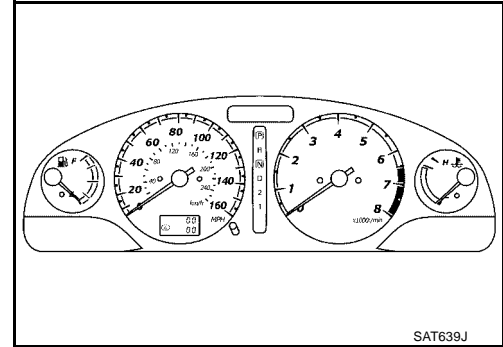
DTC VEHICLE SPEED SENSOR MTR

PFP:24814

Description

ECS0065N

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

ECS0065O

Diagnostic trouble code VHCL SPEED SEN-MTR with CONSULT-II or 2nd judgement flicker without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

ECS0065P

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0065Q

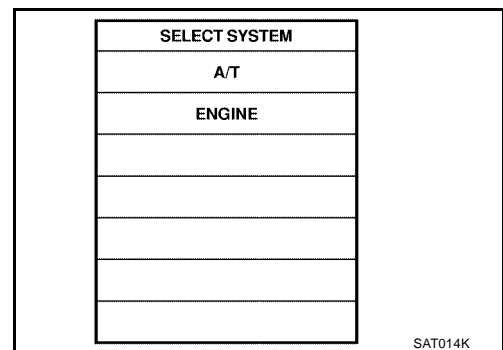
CAUTION:

- 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.

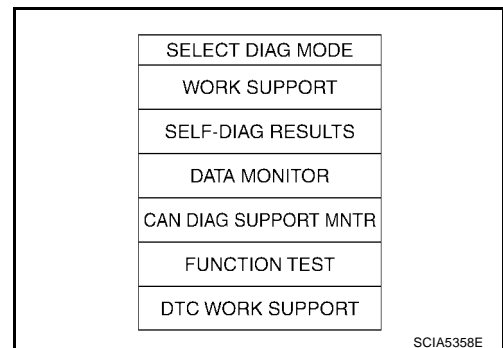
After the repair, perform the following procedure to confirm the malfunction is eliminated.

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).



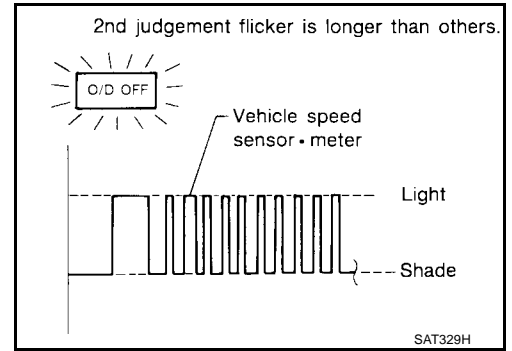
WITHOUT CONSULT-II

1. Start engine.

DTC VEHICLE SPEED SENSOR MTR

[RE4F04B]

2. Drive vehicle under the following conditions:
Selector lever in D and vehicle speed higher than 25 km/h (16 MPH).
3. Perform self-diagnosis.
Refer to [AT-442, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) .



A
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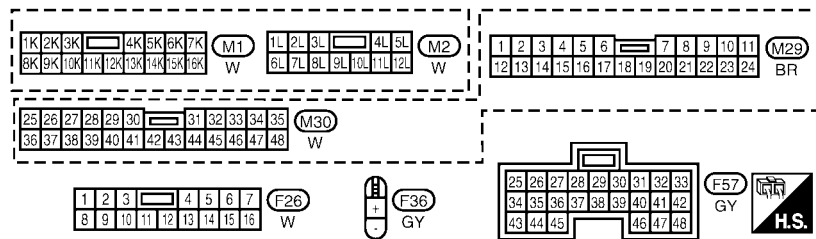
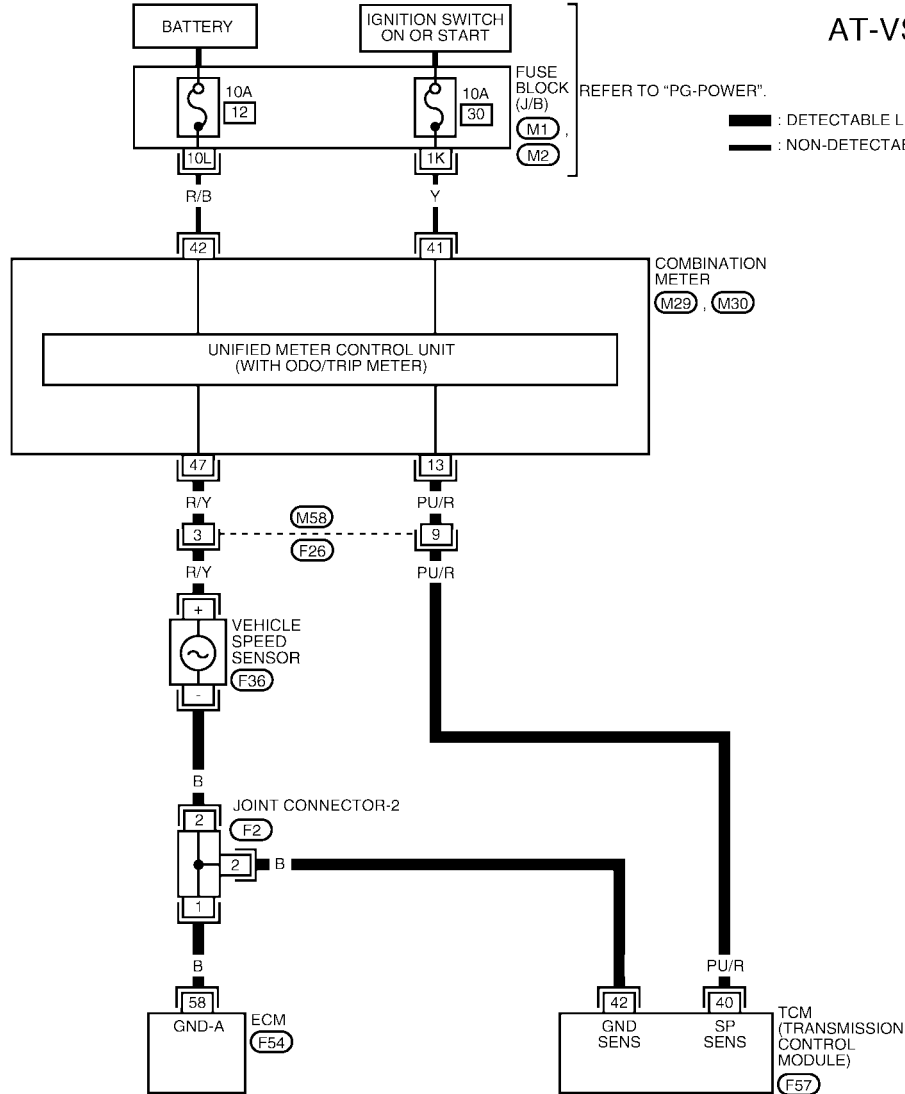
DTC VEHICLE SPEED SENSOR MTR

[RE4F04B]

ECS0065R

Wiring Diagram — AT — VSSMTR

AT-VSSMTR-01



REFER TO THE FOLLOWING.
 (F2) - JOINT CONNECTOR
 (F54) - ELECTRICAL UNITS

WCWA0033E

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINALS AND 25 OR 48 (TCM GROUND))

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
40	PU/R	VEHICLE SPEED SENSOR	WHEN MOVING VEHICLE AT 2 TO 3 KM/H (1 TO 2 MPH) FOR 1 M (3 FT)	VOLTAGE VARIES BETWEEN LESS THAN 1V AND MORE THAN 4.5 V

SAT313K

Diagnostic Procedure

1. CHECK INPUT SIGNAL

With CONSULT-II

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

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.

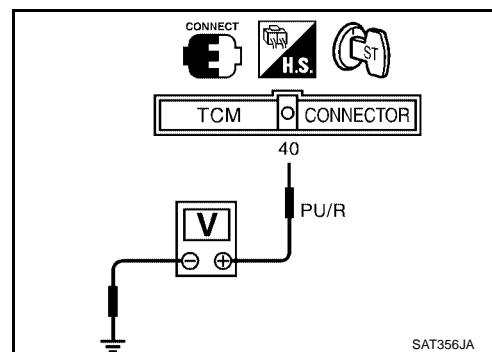
Without CONSULT-II

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 [DI-3, "METERS AND GAUGES"](#) .
- 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.

3. CHECK DTC

Perform [AT-580, "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.

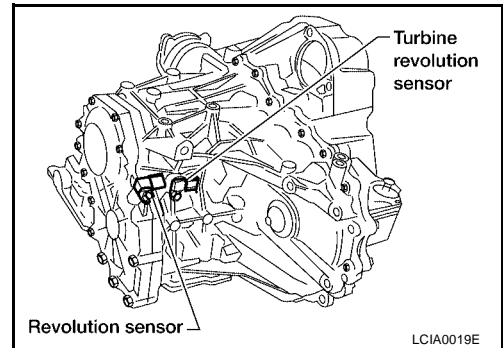
DTC TURBINE REVOLUTION SENSOR

PFP:31935

ECS0065T

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)
⊕ : TURBINE REV ⊗ : 10th judgement flicker	TCM does not receive the proper voltage signal from the sensor.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Turbine revolution sensor

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

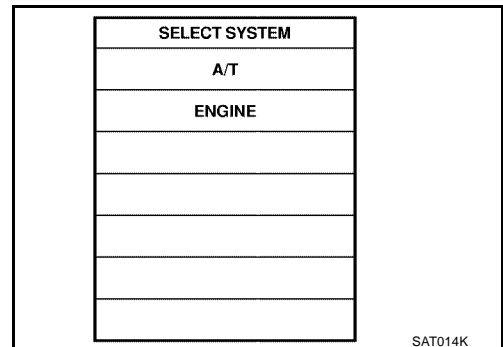
CAUTION:

- 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

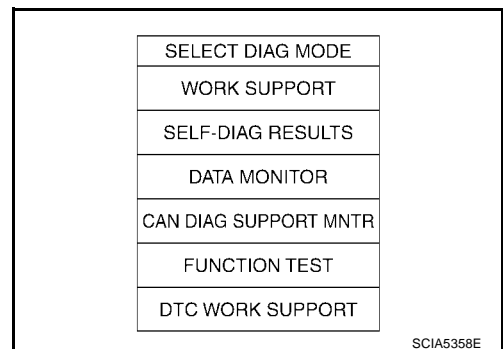
1. Start engine.



2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. 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

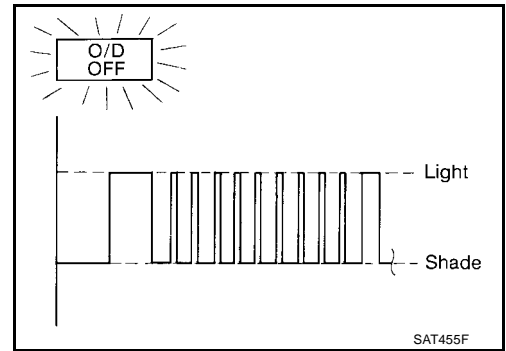
1. Start engine.
2. Drive vehicle under the following conditions: Selector lever in "D" and vehicle speed higher than 40 km/h (25 MPH), engine speed higher than 1,500 rpm, throttle opening greater than 1/8 of the full throttle position and driving for more than 5 seconds.



DTC TURBINE REVOLUTION SENSOR

[RE4F04B]

3. Perform self-diagnosis.
Refer to [AT-442, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#).



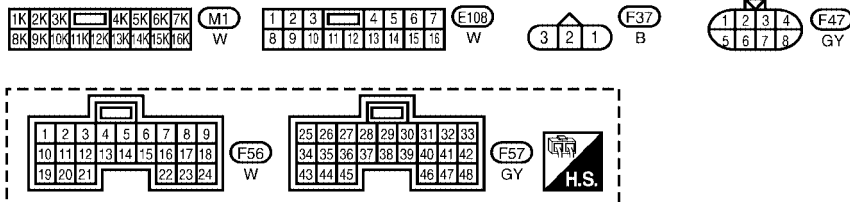
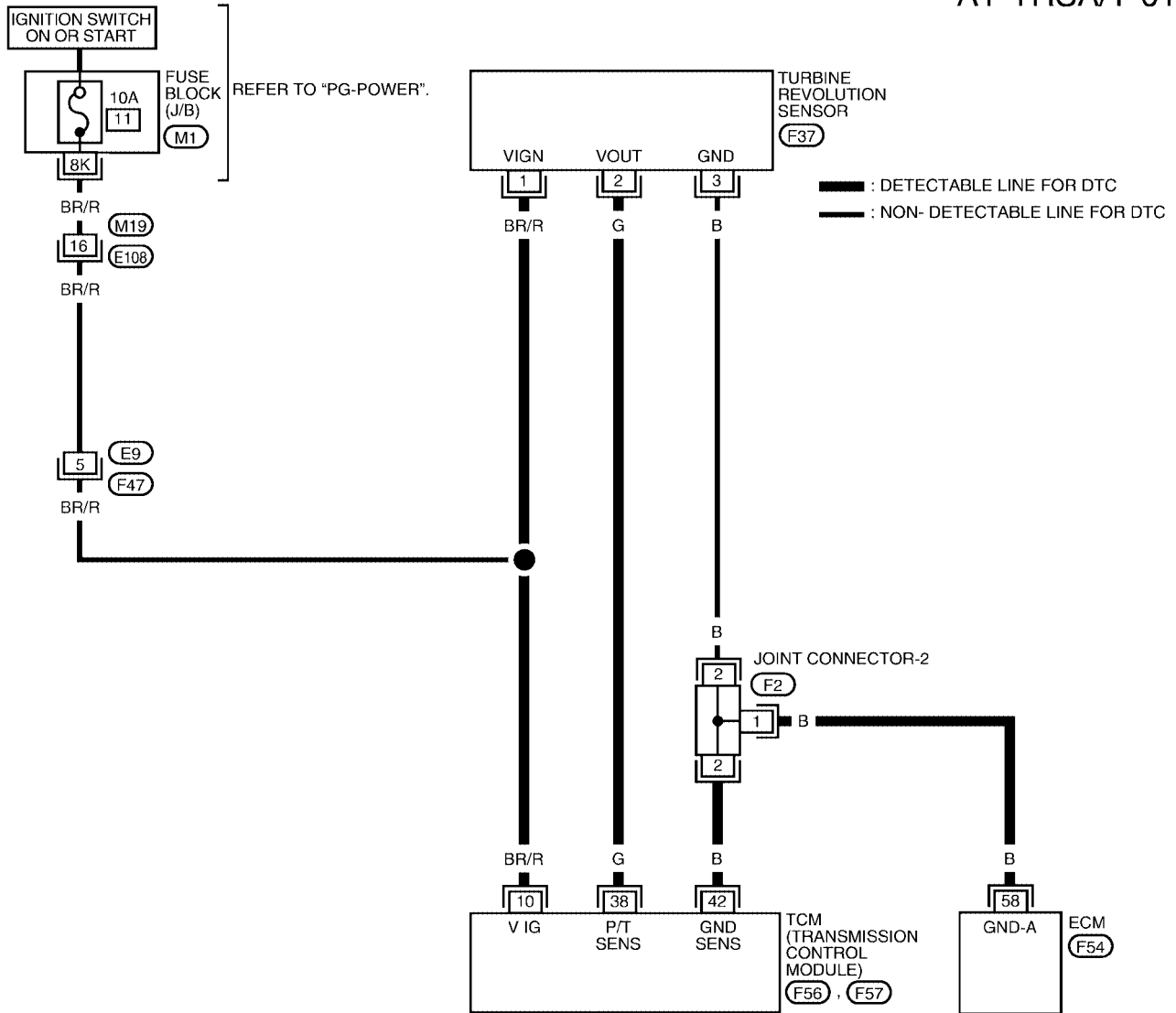
DTC TURBINE REVOLUTION SENSOR

[RE4F04B]

ECS0065U

Wiring Diagram — AT — TRSA/T

AT-TRSA/T-01



REFER TO THE FOLLOWING.
 (F2) - JOINT CONNECTOR
 (F54) - ELECTRICAL UNITS

LCWA0003E

DTC TURBINE REVOLUTION SENSOR

[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 SENSOR (POWER)	IGNITION ON	BATTERY VOLTAGE
38	G	TURBINE REVOLUTION SENSOR (SIGNAL)	WITH ENGINE RUNNING AT 1,000 RPM	APPROX. 1.2V VOLTAGE SHOULD INCREASE WITH ENGINE RPM
42	B	SENSOR GROUND	—	—

Diagnostic Procedure

ECS0065V

1. CHECK INPUT SIGNAL

With CONSULT-II

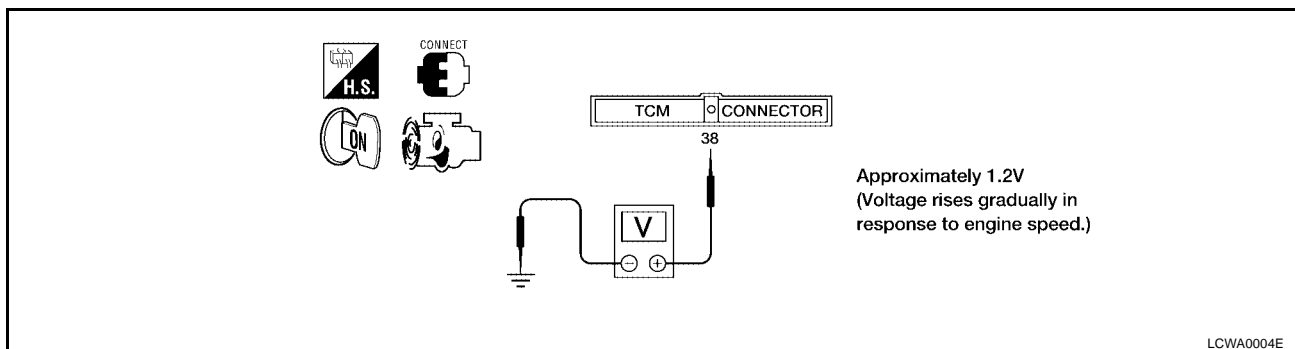
1. Start engine.
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "TURBINE REF" while driving.
Check the value changes according to driving speed.

DATA MONITOR	
MONITORING	
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 or NG

- 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.

3. CHECK DTC

Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION, [AT-585, "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 terminal for damage or loose connection with harness connector.

OK or NG

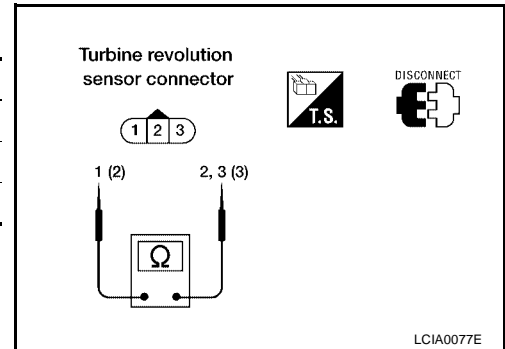
- OK >> **INSPECTION END.**
- NG >> Repair or replace damaged parts.

Component Inspection TURBINE REVOLUTION SENSOR

ECS0065W

- Check resistance between terminals 1, 2 and 3.

Terminal No.		Resistance (Approx.)
1	2	2.4 - 2.8kΩ
1	3	No continuity
2	3	No continuity



DTC U1000 CAN COMMUNICATION LINE

PFP:23710

Description

ECS0065X

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

ECS0065Y

- 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

ECS0065Z

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

DTC Confirmation Procedure

ECS00660

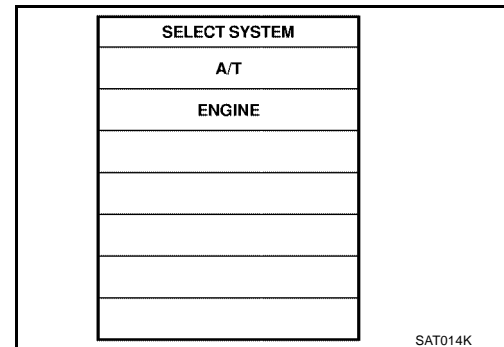
NOTE:

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.

④ WITH CONSULT-II

1. Turn ignition switch to ON position. (Do not start engine.)
2. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
3. Start engine and wait for at least 6 seconds.
4. If DTC is detected, go to [AT-592, "Diagnostic Procedure"](#).



④ WITH GST

Follow the procedure "WITH CONSULT-II".

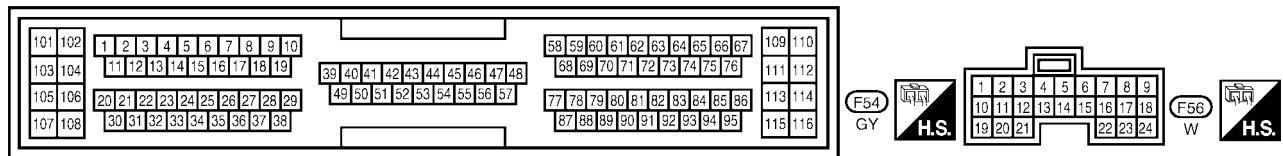
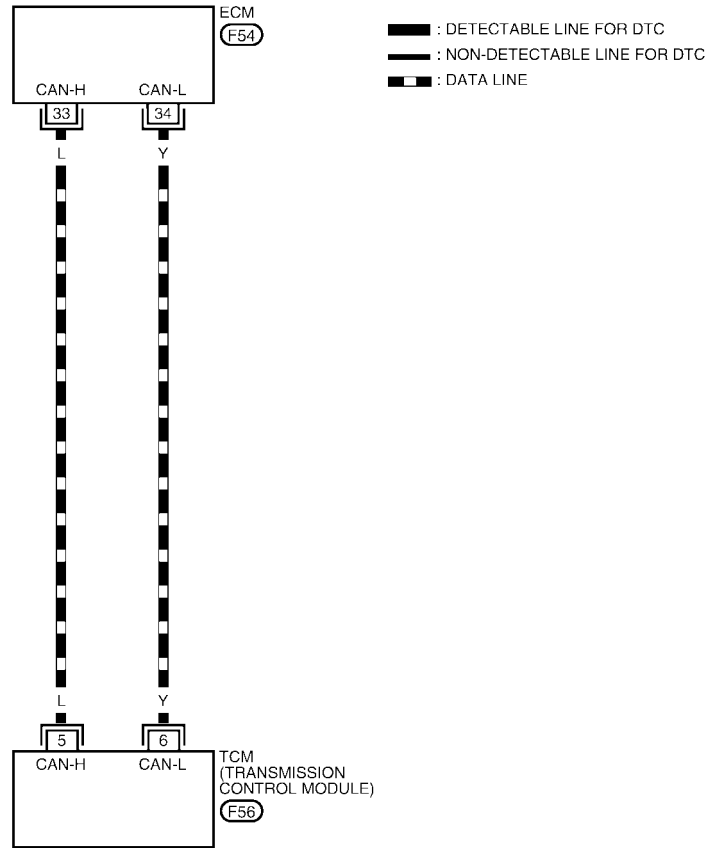
DTC U1000 CAN COMMUNICATION LINE

[RE4F04B]

Wiring Diagram — AT — CAN

ECS00661

AT-CAN-01



LCWA0002E

Diagnostic Procedure

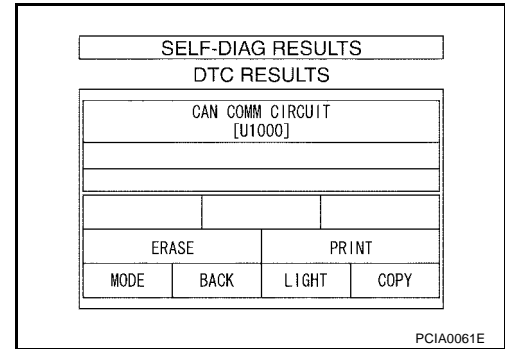
1. CHECK CAN COMMUNICATION CIRCUIT

① With CONSULT-II

1. Turn ignition switch "ON" and start engine.
2. Select "SELF-DIAG RESULTS" mode for "A/T" with CONSULT-II.

Is any malfunction of the "CAN COMM CIRCUIT" indicated?

- Yes >> Print out CONSULT-II screen, GO TO LAN section.
 Refer to [LAN-3, "CAN Communication Unit"](#) .
- No >> Inspection End.



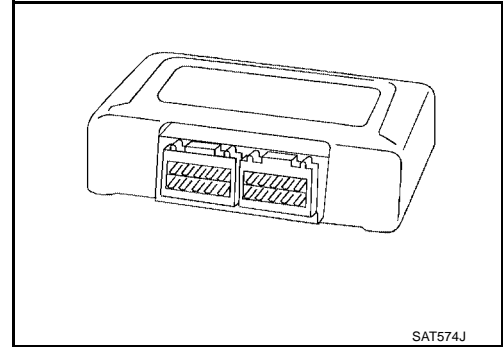
DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)

PF3:31036

Description

ECS00663

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

ECS00664

Diagnostic trouble code CONTROL UNIT (RAM), CONTROL UNIT (ROM) with CONSULT-II is detected when TCM memory (RAM) or (ROM).

Possible Cause

ECS00665

Check TCM.

Diagnostic Trouble Code (DTC) Confirmation Procedure

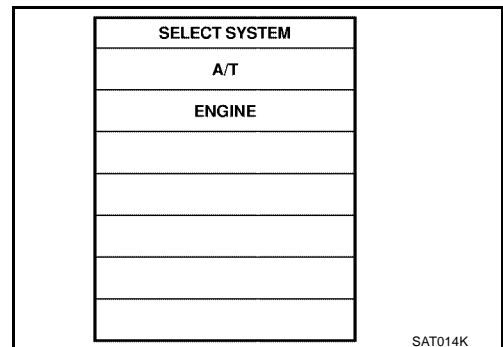
ECS00666

NOTE:

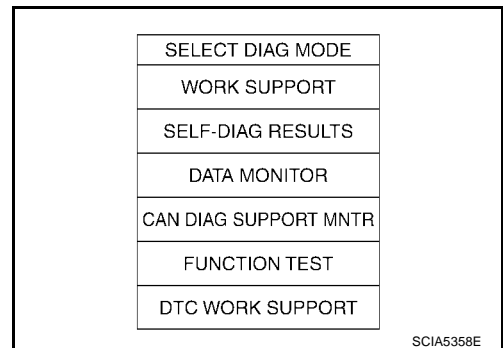
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

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



3. Run engine for at least 2 seconds at idle speed.



A
B
AT
D
E
F
G
H
I
J
K
L
M

Diagnostic Procedure

ECS00667

1. INSPECTION START

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-593, "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**

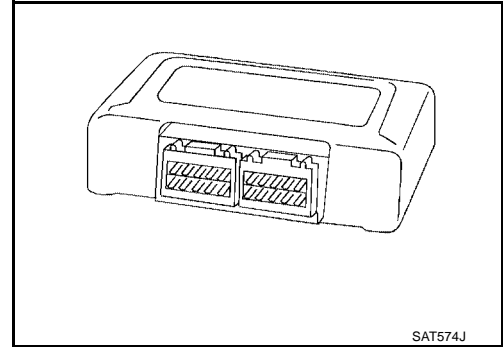
DTC CONTROL UNIT (EEP ROM)

PF3:31036

Description

ECS00668

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)
Ⓜ : CONT UNIT (EEP ROM)	TCM memory (EEP ROM) is malfunctioning.	● TCM

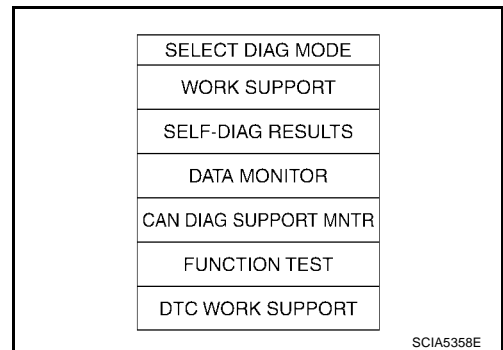
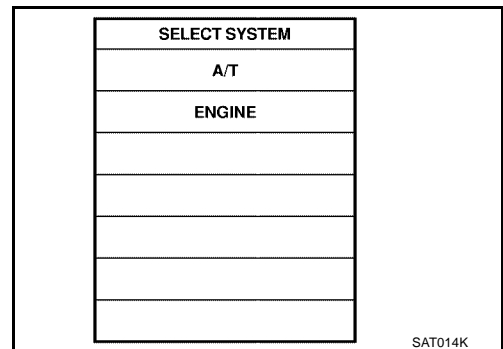
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" 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.



Diagnostic Procedure

1. CHECK DTC

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-595. "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

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

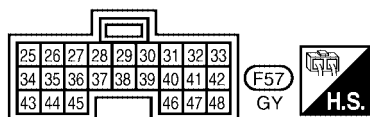
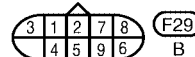
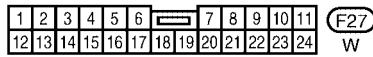
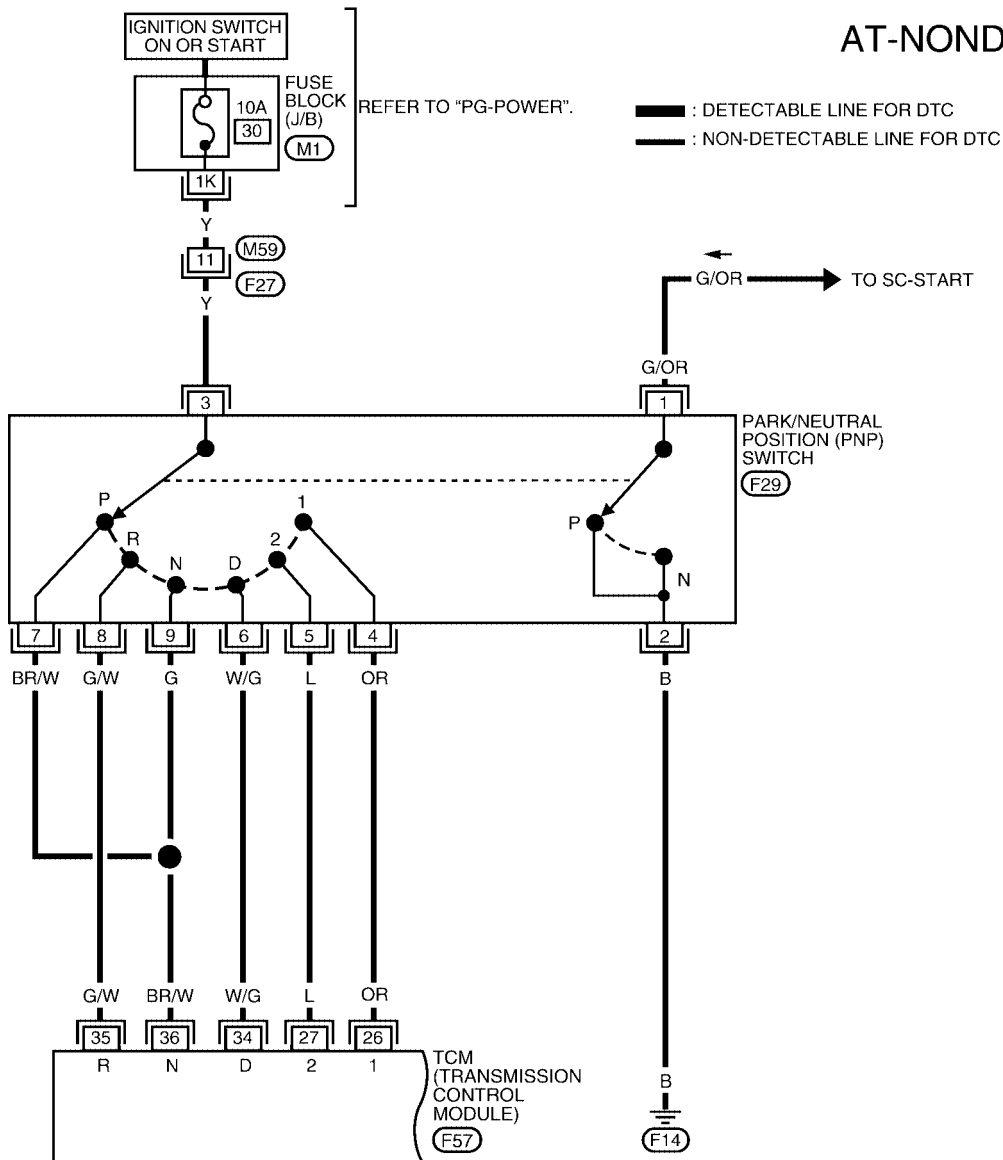
Yes >> Replace TCM.

No >> **INSPECTION END**

TROUBLE DIAGNOSIS FOR SYMPTOMS

Wiring Diagram — AT — NONDTC

AT-NONDTC-01



TROUBLE DIAGNOSIS FOR SYMPTOMS

[RE4F04B]

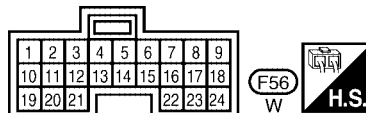
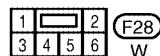
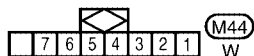
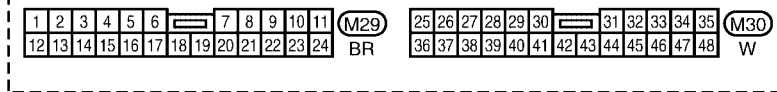
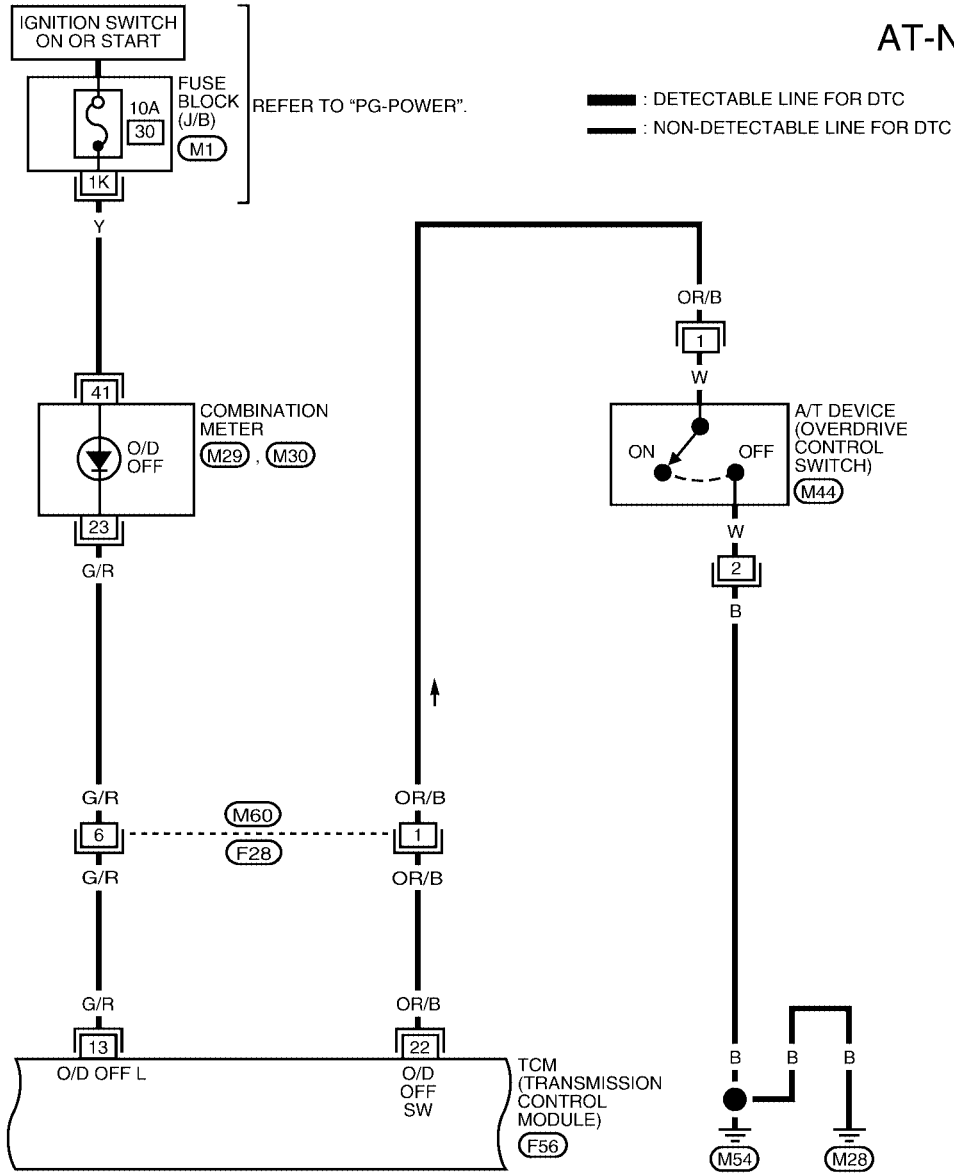
TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
26	OR	PNP SWITCH 1 POSITION	IGNITION ON AND SELECTOR LEVER IN 1 POSITION	BATTERY VOLTAGE
			IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V
27	L	PNP SWITCH 2 POSITION	IGNITION ON AND SELECTOR LEVER IN 2 POSITION	BATTERY VOLTAGE
			IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V
34	W/G	PNP SWITCH D POSITION	IGNITION ON AND SELECTOR LEVER IN D POSITION	BATTERY VOLTAGE
			IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V
35	G/W	PNP SWITCH R POSITION	IGNITION ON AND SELECTOR LEVER IN R POSITION	BATTERY VOLTAGE
			IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V
36	BR/W	PNP SWITCH P OR N POSITION	IGNITION ON AND SELECTOR LEVER IN P OR N POSITION	BATTERY VOLTAGE
			IGNITION ON AND SELECTOR LEVER IN OTHER POSITIONS	APPROX. 0V

TROUBLE DIAGNOSIS FOR SYMPTOMS

[RE4F04B]

AT-NONDTC-02



WCWA0082E

TROUBLE DIAGNOSIS FOR SYMPTOMS

[RE4F04B]

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND

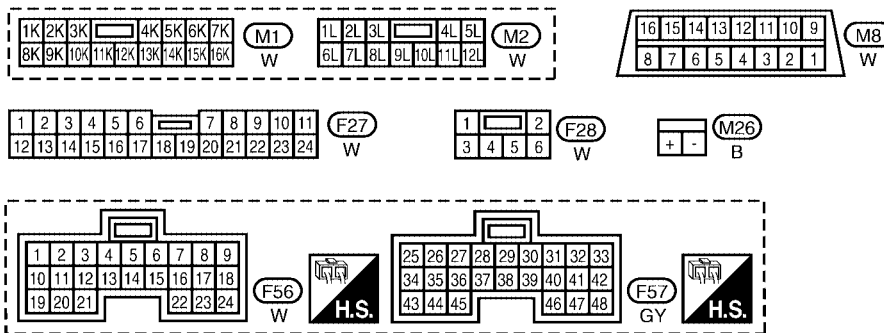
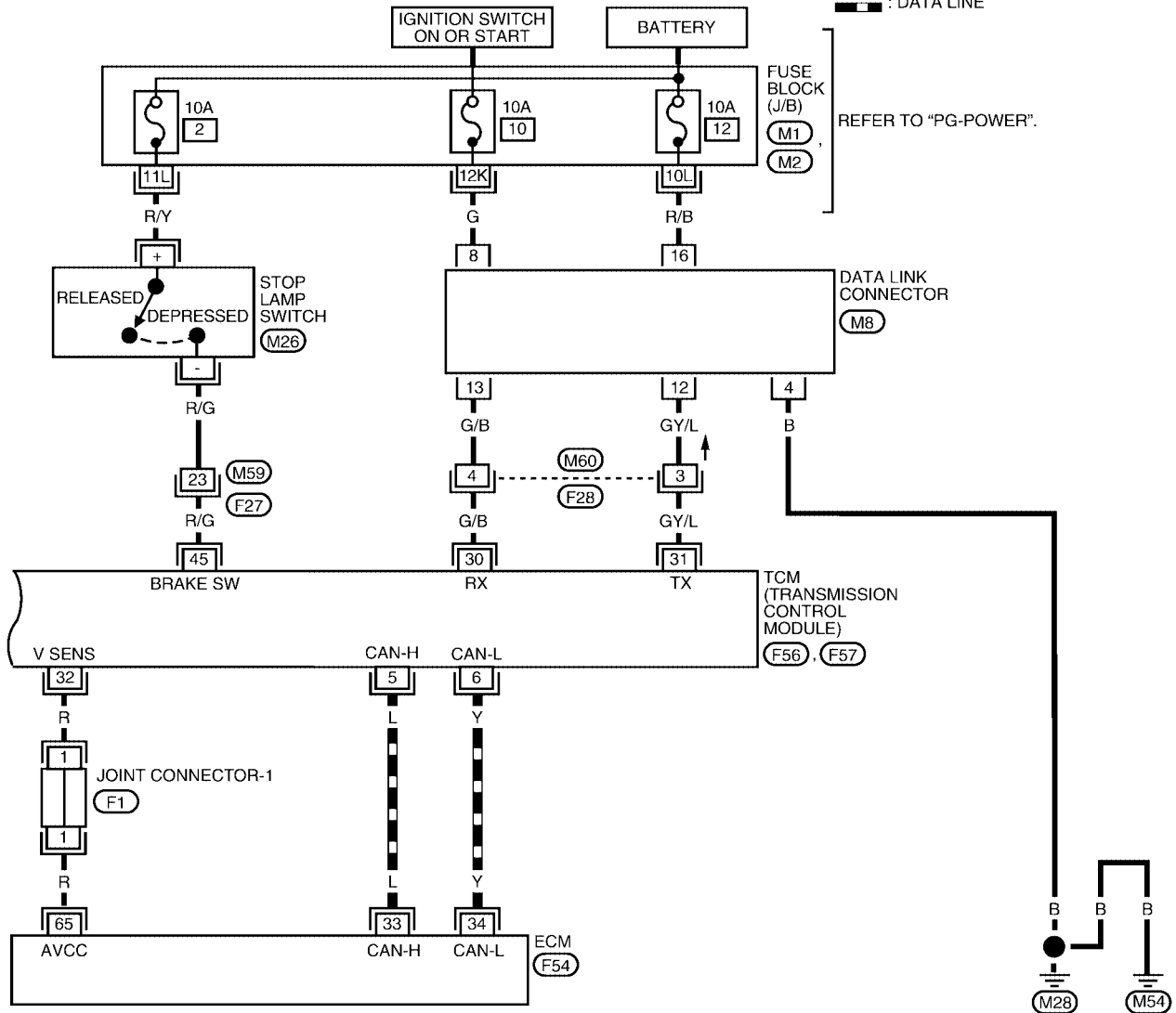
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
13	G/R	O/D OFF INDICATOR LAMP	WHEN SETTING OVERDRIVE CONTROL SWITCH "OFF"	0V
			WHEN SETTING OVERDRIVE CONTROL SWITCH "ON"	BATTERY VOLTAGE
22	OR/B	OVERDRIVE CONTROL SWITCH	WHEN SETTING OVERDRIVE CONTROL SWITCH "ON"	BATTERY VOLTAGE
			WHEN SETTING OVERDRIVE CONTROL SWITCH "OFF"	0V

TROUBLE DIAGNOSIS FOR SYMPTOMS

[RE4F04B]

AT-NONDTC-03

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



REFER TO THE FOLLOWING.
F1 - JOINT CONNECTOR
F54 - ELECTRICAL UNITS

TROUBLE DIAGNOSIS FOR SYMPTOMS

[RE4F04B]

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

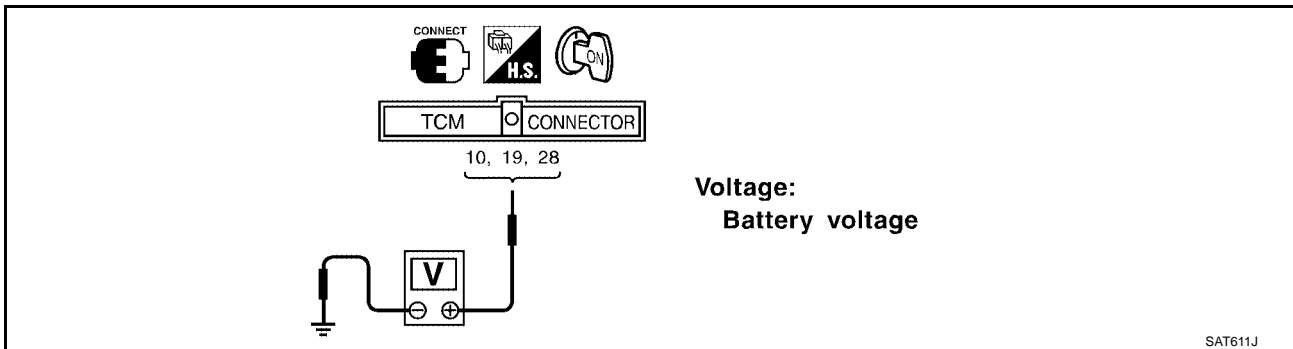
ECS0066B

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.



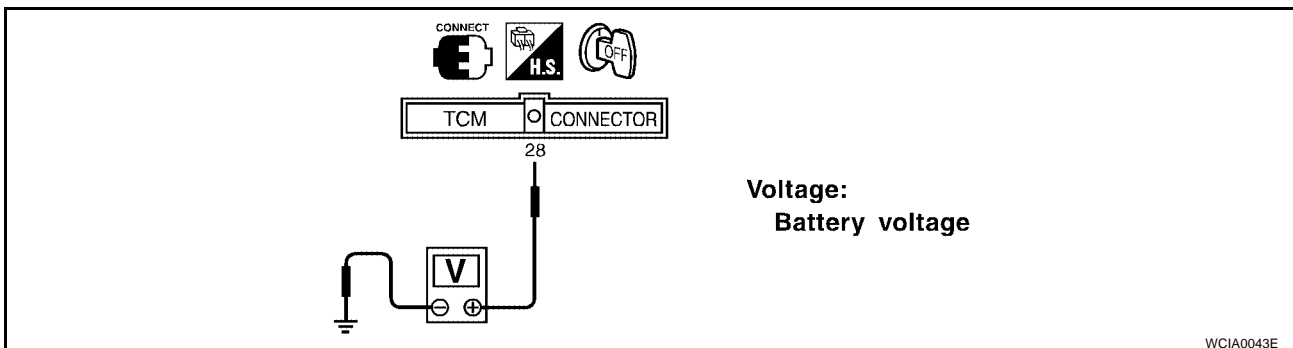
SAT611J

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.



WCIA0043E

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 (Main harness)
Refer to [AT-488, "Wiring Diagram — AT — MAIN"](#) .
- Harness for short or open between battery and TCM (Main harness)
Refer to [AT-488, "Wiring Diagram — AT — MAIN"](#) .
- Ignition switch and fuse
Refer to [PG-2, "POWER SUPPLY ROUTING"](#) .

OK or NG

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

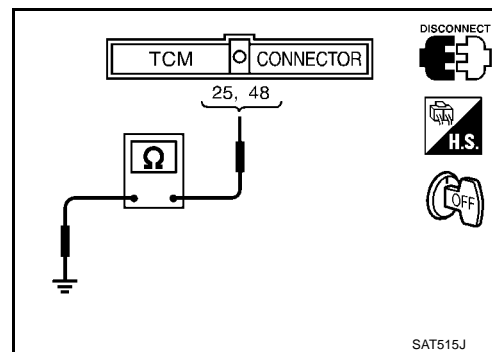
4. CHECK TCM GROUND CIRCUIT

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

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 [AT-488, "Wiring Diagram — AT — MAIN"](#) .



5. CHECK LAMP CIRCUIT

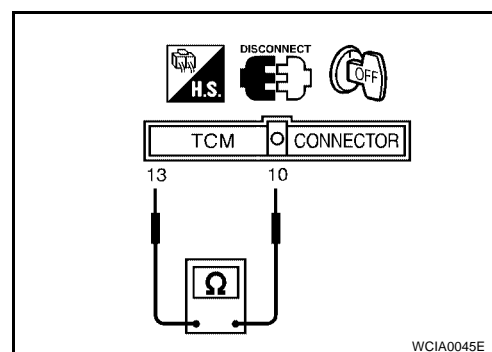
1. Turn ignition switch to OFF position.
2. Check resistance between TCM terminals 10 and 13.

Resistance :50 - 100Ω

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 [PG-2, "POWER SUPPLY ROUTING"](#) .
- 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.

7. CHECK SYMPTOM

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

ECS0066C

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**

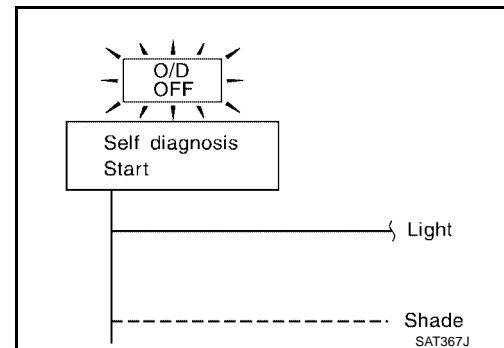
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?

 **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 [AT-491, "DTC P0705 PARK/NEUTRAL POSITION SWITCH"](#).
 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 [AT-493, "Wiring Diagram — AT — PNP/SW"](#).

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

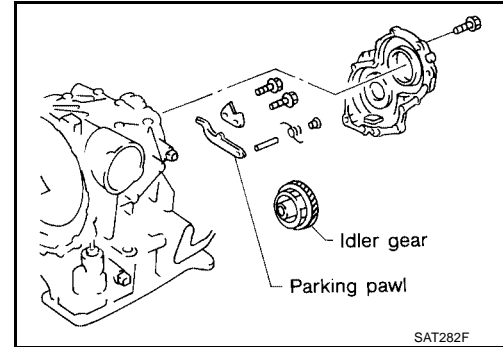
ECS0066D

SYMPTOM:

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

1. CHECK PARKING COMPONENTSCheck parking components. Refer to [AT-652, "OVERHAUL"](#) and [AT-729, "ASSEMBLY"](#).**OK or NG**

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

**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**With CONSULT-II**

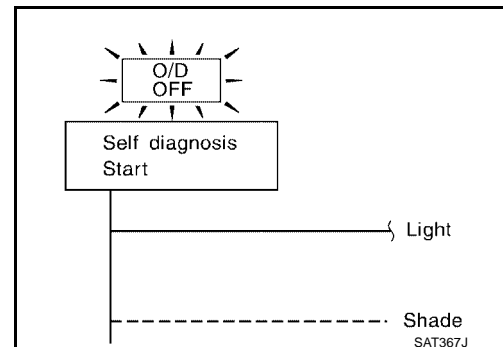
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?

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-491, "DTC P0705 PARK/NEUTRAL POSITION SWITCH"](#).
 No >> GO TO 2.

**2. CHECK CONTROL LINKAGE**

Check control cable.

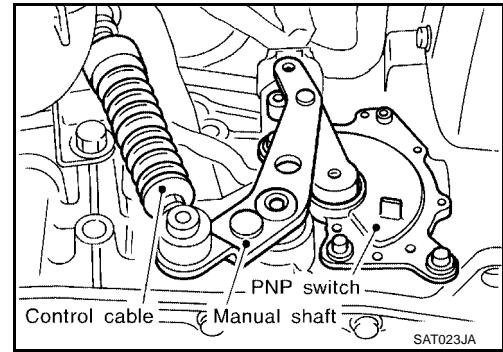
OK or NG

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

3. ADJUST CONTROL CABLE

Adjust control cable.

>> Refer to [AT-647, "Control Cable Adjustment"](#) .

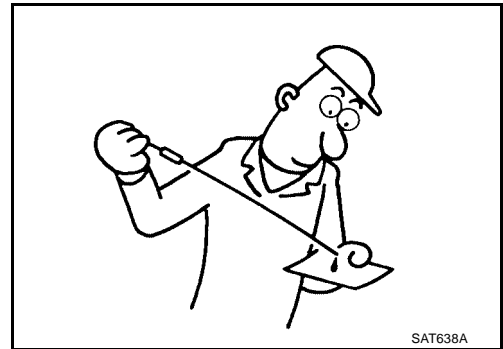


4. CHECK A/T FLUID LEVEL

Check A/T fluid level.

OK or NG

OK >> GO TO 5.
NG >> Refill ATF.

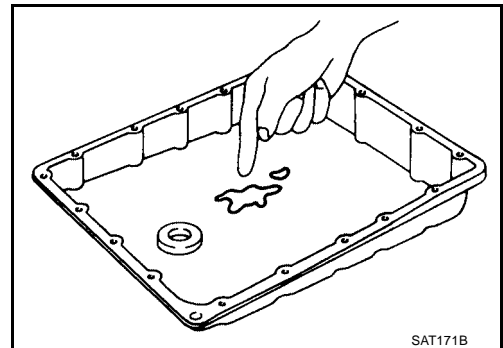


5. CHECK A/T FLUID CONDITION

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. 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.

7. CHECK SYMPTOM

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.

5. Large Shock N → R Position

ECS0066F

SYMPTOM:

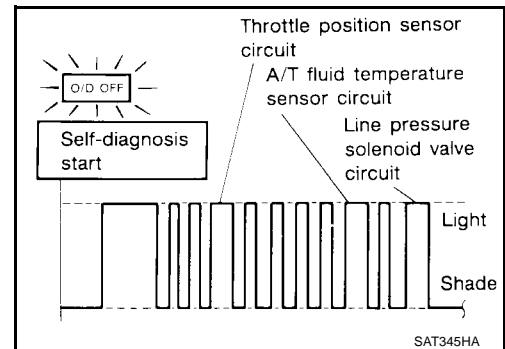
There is large shock when changing from N to R position.

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 >> GO TO 2.
 No >> GO TO 3.

**2. CHECK DAMAGED CIRCUIT**

Check damaged circuit.

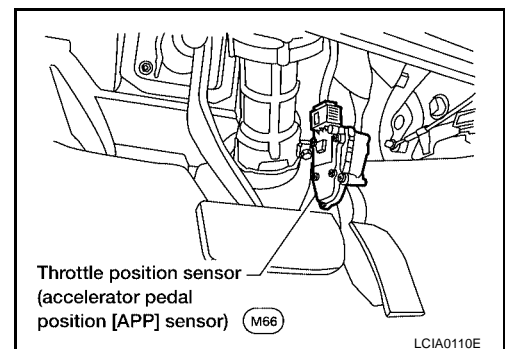
- >> Refer to [AT-497, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"](#), [AT-547, "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#), and [AT-563, "DTC P1705 THROTTLE POSITION SENSOR \[ACCELERATOR PEDAL POSITION \(APP\) SENSOR\]"](#).

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

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to [EC-1475, "DTC P0222, P0223 TP SENSOR"](#), and [EC-1751, "DTC P2122, P2123 APP SENSOR"](#).

OK or NG

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

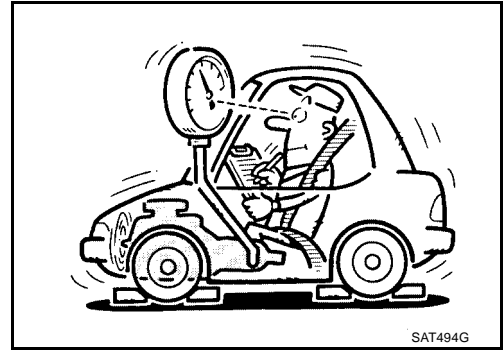


4. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in D position. Refer to [AT-456, "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 [AT-644, "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

OK or NG

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

6. CHECK SYMPTOM

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:**

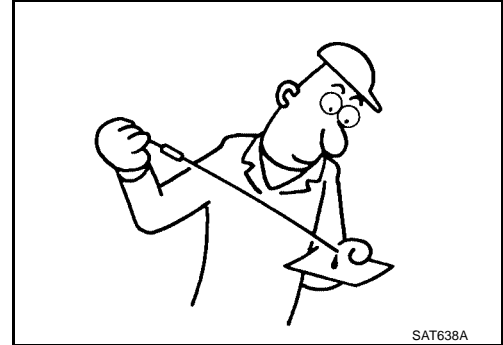
Vehicle does not creep backward when selecting R position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level.

OK or NG

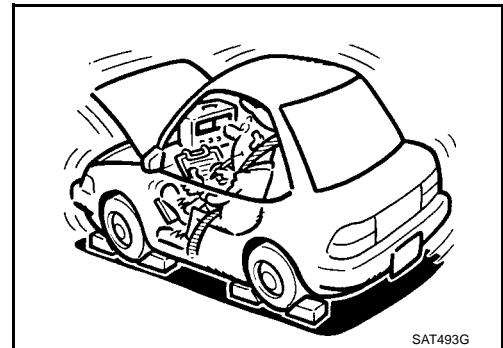
- OK >> GO TO 2.
NG >> Refill ATF.

**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.

**3. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-644, "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

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-644, "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

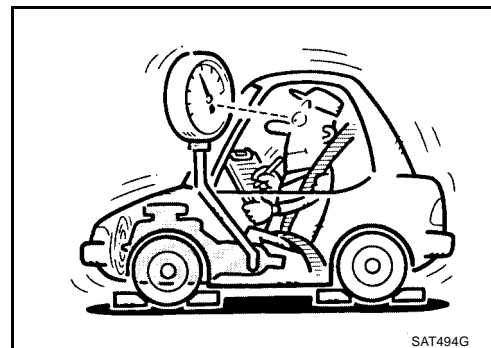
- OK >> GO TO 5.
 NG >> Repair or replace damaged parts.

5. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in R position. Refer to [AT-456, "Line Pressure Test"](#) .

OK or NG

- OK >> GO TO 7.
 NG >> GO TO 6.



SAT494G

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-644, "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

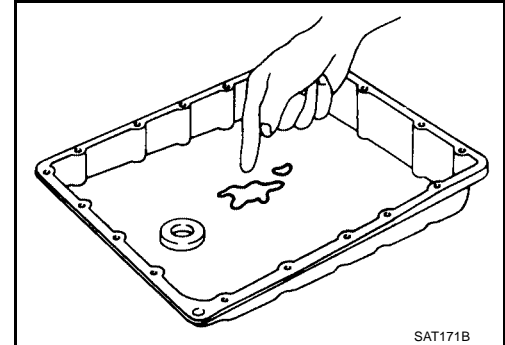
- OK >> GO TO 7.
 NG >> Repair or replace damaged parts.

7. CHECK A/T FLUID CONDITION

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

OK or NG

- OK >> GO TO 9.
 NG >> GO TO 8.

**8. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-644, "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 9.
 NG >> Repair or replace damaged parts.

9. CHECK SYMPTOM

Check again.

OK or NG

- OK >> **INSPECTION END**
 NG >> GO TO 10.

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:**

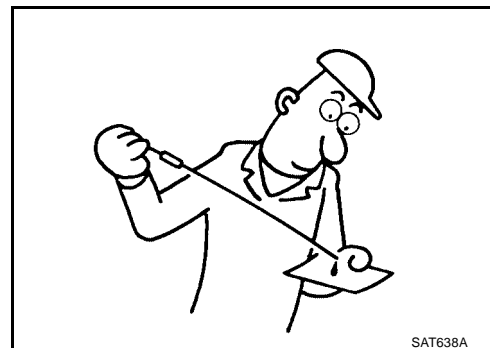
Vehicle does not creep forward when selecting D, 2 or 1 position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level.

OK or NG

- OK >> GO TO 2.
NG >> Refill ATF.



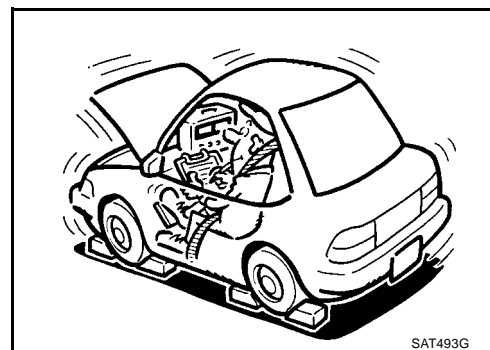
SAT638A

2. CHECK STALL REVOLUTION

Check stall revolution with selector lever in D position. Refer to [AT-452, "Stall Test"](#).

OK or NG

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



SAT493G

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-644, "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

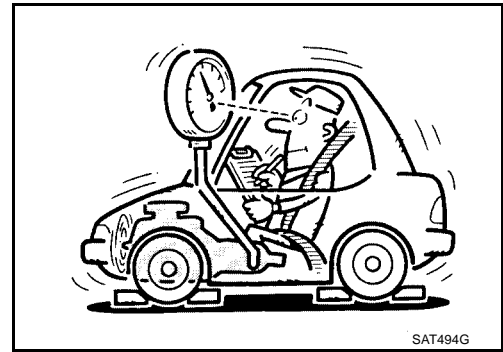
- OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in D position. Refer to [AT-456, "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 [AT-644, "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

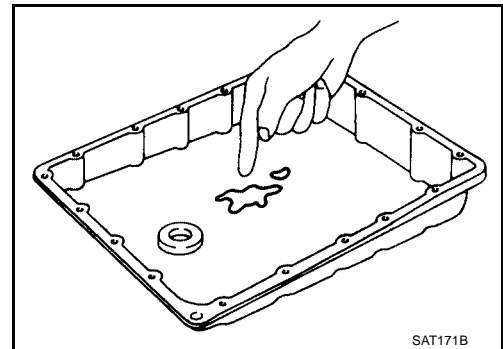
- OK >> GO TO 6.
- NG >> Repair or replace damaged parts.

6. CHECK A/T FLUID CONDITION

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

OK or NG

- OK >> GO TO 8.
- NG >> GO TO 7.



7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-644, "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. CHECK SYMPTOM

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

ECS0066I

SYMPTOM:

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

1. CHECK SYMPTOM

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

Yes or No

- Yes >> GO TO 2.
 No >> Go to [AT-609, "6. Vehicle Does Not Creep Backward In R Position"](#) .

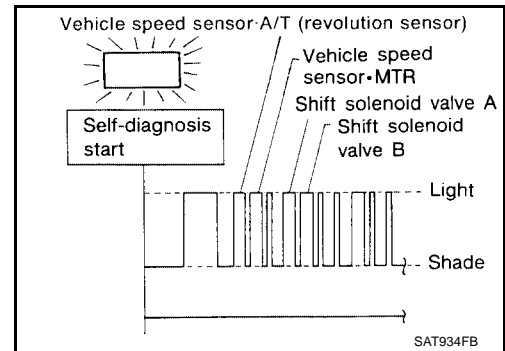
2. CHECK SELF-DIAGNOSTIC RESULTS

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 [AT-503, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#), [AT-553, "DTC P0750 SHIFT SOLENOID VALVE A"](#), or [AT-558, "DTC P0755 SHIFT SOLENOID VALVE B"](#).

No >> GO TO 3.



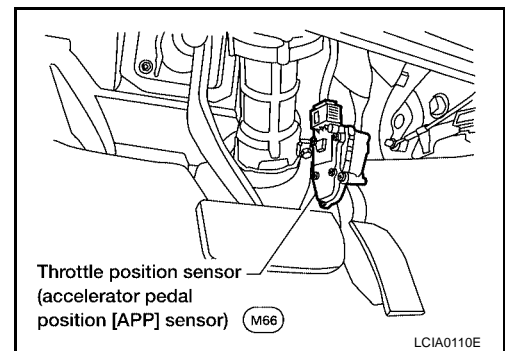
3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to [EC-1391, "DTC P0122, P0123 TP SENSOR"](#) and [EC-1751, "DTC P2122, P2123 APP SENSOR"](#).

OK or NG

OK >> GO TO 4.

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



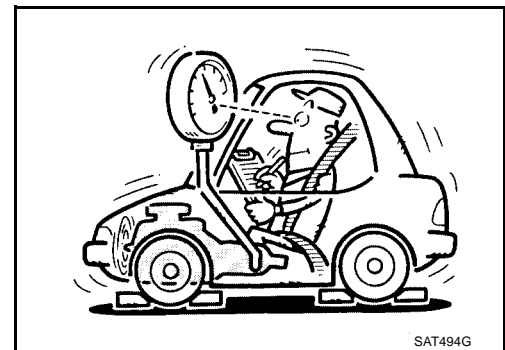
4. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in D position. Refer to [AT-456, "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 [AT-644, "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:
 - Forward clutch assembly
 - Forward one-way clutch
 - Low one-way clutch
 - High clutch assembly
 - Torque converter
 - Oil pump assembly

OK or NG

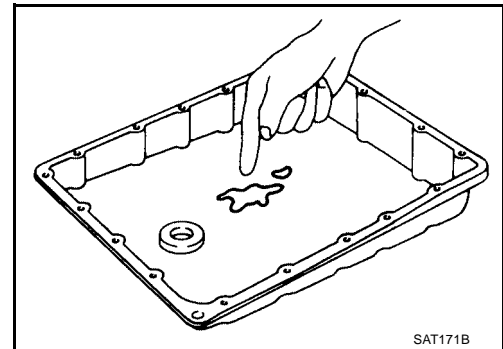
- OK >> GO TO 8.
 NG >> Repair or replace damaged parts.

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 [AT-644, "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 8.
 NG >> Repair or replace damage parts.

8. CHECK SYMPTOM

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.

9. A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2

ECS0066J

SYMPTOM:

A/T does not shift from D1 to D2 at the specified speed.

A/T does not shift from D4 to D2 when depressing accelerator pedal fully at the specified speed.

1. CHECK SYMPTOM

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 [AT-612, "7. Vehicle Does Not Creep Forward in D, 2 or 1 Position"](#) and [AT-614, "8. Vehicle Cannot Be Started From D1"](#).

2. CHECK SELF-DIAGNOSTIC RESULTS

Ⓜ With CONSULT-II

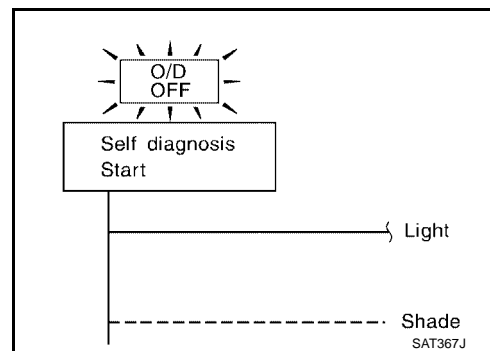
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?

ⓧ 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-491, "DTC P0705 PARK/NEUTRAL POSITION SWITCH"](#).
 No >> GO TO 3.

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

Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-503, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and [AT-580, "DTC VEHICLE SPEED SENSOR MTR"](#).

OK or NG

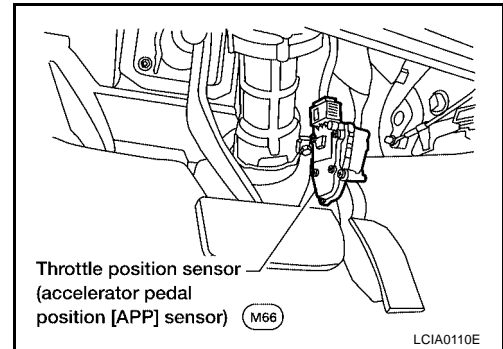
- OK >> GO TO 4.
 NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

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

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to [EC-1391, "DTC P0122, P0123 TP SENSOR"](#) and [EC-1751, "DTC P2122, P2123 APP SENSOR"](#).

OK or NG

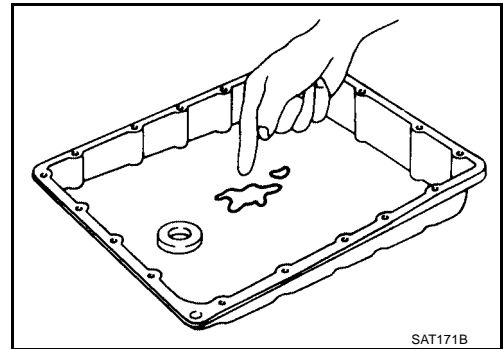
- OK >> GO TO 5.
 NG >> Repair or replace throttle position sensor [accelerator pedal position (APP) sensor].

**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-644, "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.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to [AT-644, "REMOVAL"](#) .
2. Check the following items:
 - Shift valve A
 - Shift solenoid valve A
 - Pilot valve
 - Pilot filter

OK or NG

- OK >> GO TO 8.
 NG >> Repair or replace damaged parts.

8. CHECK SYMPTOM

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.

10. A/T Does Not Shift: D2 → D3

ECS0066K

SYMPTOM:**A/T does not shift from D2 to D3 at the specified speed.****1. CHECK SYMPTOM**

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 [AT-612, "7. Vehicle Does Not Creep Forward in D, 2 or 1 Position"](#) and [AT-614, "8. Vehicle Cannot Be Started From D1"](#) .

2. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

With CONSULT-II

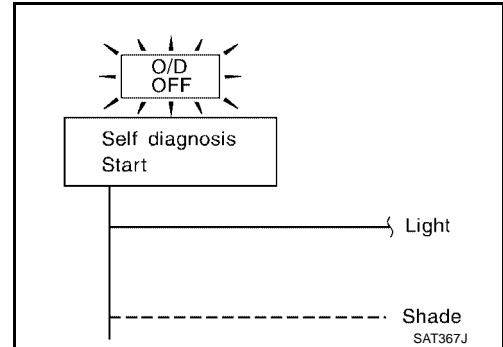
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?

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 [AT-491, "DTC P0705 PARK/NEUTRAL POSITION SWITCH"](#).
- No >> GO TO 3.

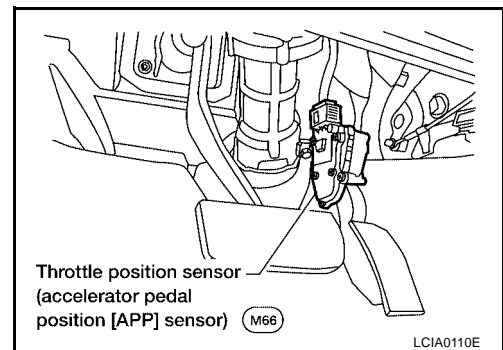


3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to [EC-1391, "DTC P0122, P0123 TP SENSOR"](#) and [EC-1751, "DTC P2122, P2123 APP SENSOR"](#).

OK or NG

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

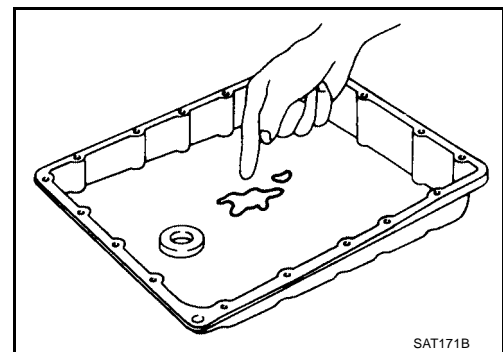


4. CHECK A/T FLUID CONDITION

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

OK or NG

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



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-644, "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
 - Oil pump assembly

OK or NG

OK >> GO TO 7.

NG >> Repair or replace damaged parts.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-644, "REMOVAL"](#) .
2. Check the following items:
 - Shift valve B
 - Shift solenoid valve B
 - Pilot valve
 - Pilot filter

OK or NG

OK >> GO TO 7.

NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again.

OK or NGOK >> **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 NGOK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

11. A/T Does Not Shift: D3 → 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. CHECK SYMPTOM

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 [AT-612, "7. Vehicle Does Not Creep Forward in D, 2 or 1 Position"](#) and [AT-614, "8. Vehicle Cannot Be Started From D1"](#).

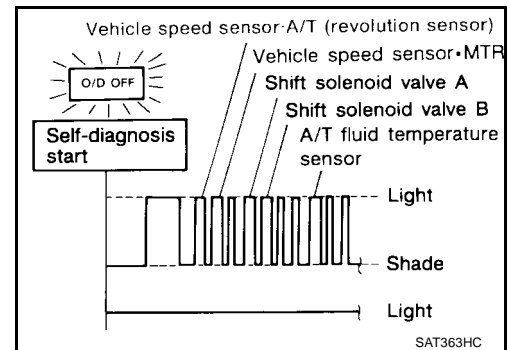
2. CHECK SELF-DIAGNOSTIC RESULTS**Ⓜ With CONSULT-II**

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

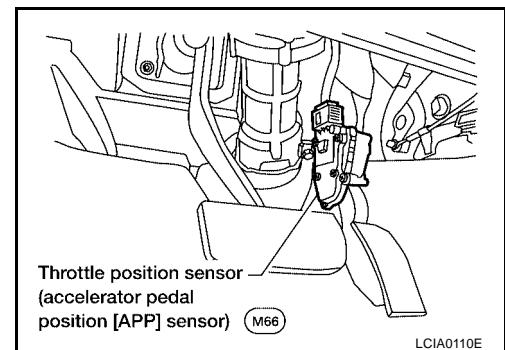
- Yes >> Check damaged circuit. Refer to [AT-491, "DTC P0705 PARK/NEUTRAL POSITION SWITCH"](#), [AT-497, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"](#), [AT-503, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#), [AT-553, "DTC P0750 SHIFT SOLENOID VALVE A"](#), [AT-558, "DTC P0755 SHIFT SOLENOID VALVE B"](#), or [AT-580, "DTC 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-1391, "DTC P0122, P0123 TP SENSOR"](#) and [EC-1770, "DTC P2138 APP SENSOR"](#).

OK or NG

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

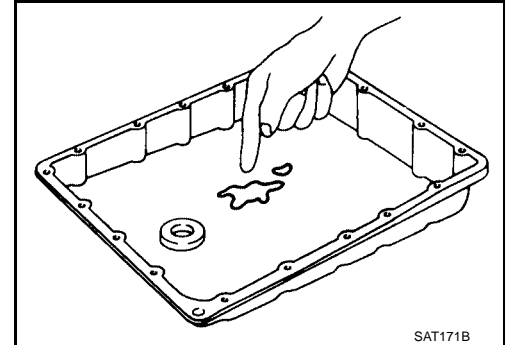


4. CHECK A/T FLUID CONDITION

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

OK or NG

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

**5. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-644, "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.
 NG >> Repair or replace damaged parts.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-644, "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. CHECK SYMPTOM

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.

12. A/T Does Not Perform Lock-up

ECS0068M

SYMPTOM:

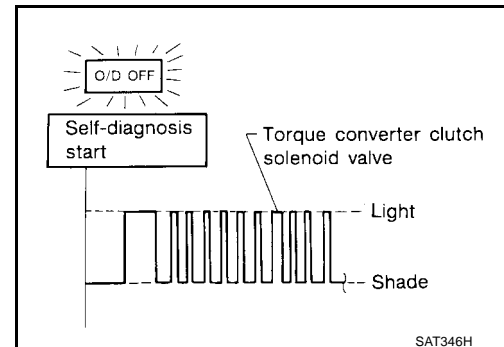
A/T does not perform lock-up at the specified speed.

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to torque converter clutch solenoid valve circuit after cruise test?

Yes or No

- Yes >> Check torque converter clutch solenoid valve circuit. Refer to [AT-534, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#).
 No >> GO TO 2.

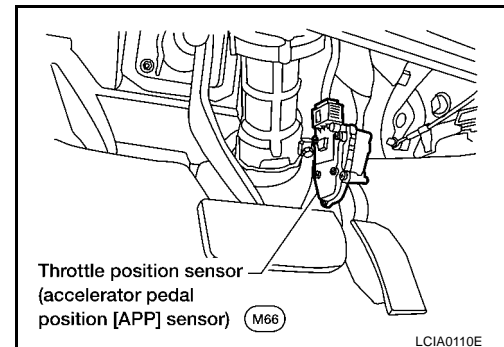


2. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to [EC-1475, "DTC P0222, P0223 TP SENSOR"](#) and [EC-1770, "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-644, "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.

4. CHECK SYMPTOM

Check again.

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.

13. A/T Does Not Hold Lock-up Condition

ECS0066N

SYMPTOM:

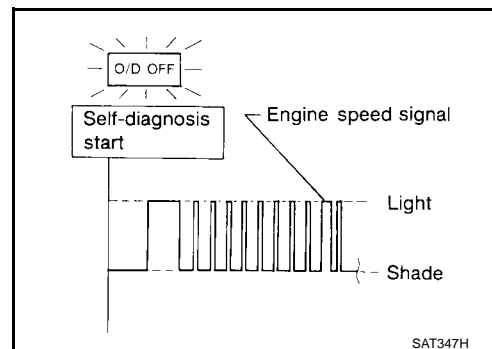
A/T does not hold lock-up condition for more than 30 seconds.

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to engine speed signal circuit after cruise test?

Yes or No

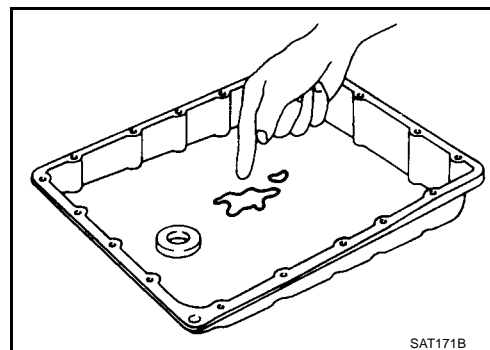
- Yes >> Check engine speed signal circuit. Refer to [AT-508](#), "[DTC P0725 ENGINE SPEED SIGNAL](#)".
 No >> GO TO 2.

**2. CHECK A/T FLUID CONDITION**

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

OK or NG

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



3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-644, "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-644, "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. CHECK SYMPTOM

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

ECS00660

SYMPTOM:

Lock-up is not released when accelerator pedal is released.

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

With CONSULT-II

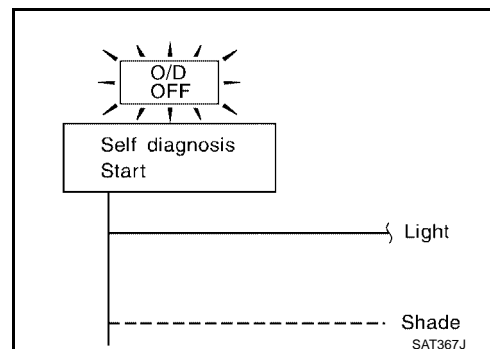
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to the throttle position switch [accelerator pedal position (APP) sensor] circuit?

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 [EC-1391, "DTC P0122, P0123 TP SENSOR"](#) and [EC-1770, "DTC P2138 APP SENSOR"](#).
- No >> GO TO 2.



2. CHECK SYMPTOM

Check again.

OK or NG

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

3. 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.

15. Engine Speed Does Not Return To Idle (Light Braking D4 → D3)

EC50066P

SYMPTOM:

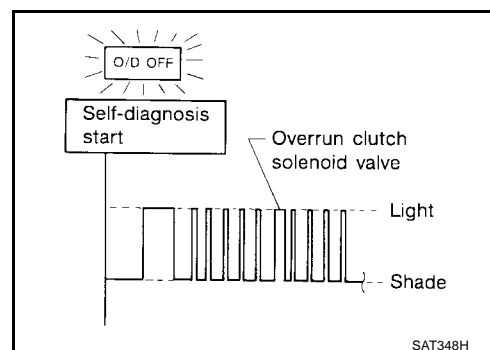
- Engine speed does not smoothly return to idle when A/T shifts from D4 to D3.
- Vehicle does not decelerate by engine brake when turning overdrive control switch OFF.
- Vehicle does not decelerate by engine brake when shifting A/T from D to 2 position.

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to overrun clutch solenoid valve circuit after cruise test?

Yes or No

- Yes >> Check overrun clutch solenoid valve circuit. Refer to [AT-568, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"](#).
- No >> GO TO 2.

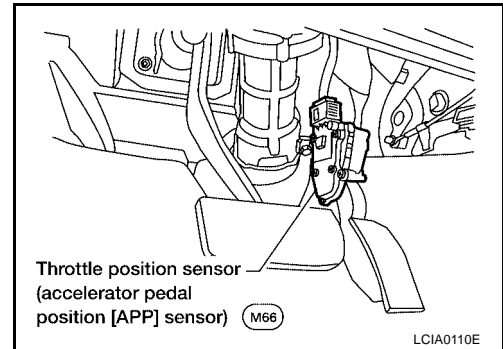


2. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to [EC-1391, "DTC P0122, P0123 TP SENSOR"](#) and [EC-1770, "DTC P2138 APP SENSOR"](#).

OK or NG

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

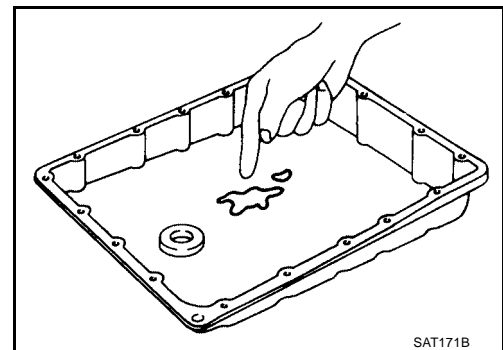


3. CHECK A/T FLUID CONDITION

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-644, "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-644, "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.

6. CHECK SYMPTOM

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.

16. Vehicle Does Not Start From D1

ECS0066Q

SYMPTOM:

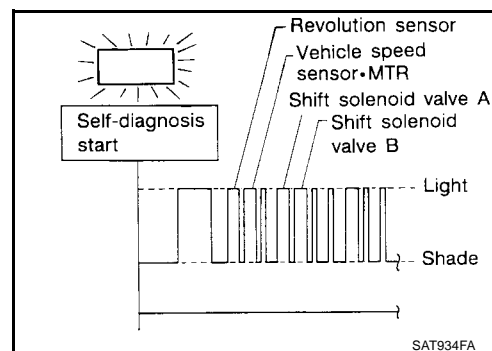
Vehicle does not start from D1 on Cruise test — Part 2.

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 [AT-503, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#), [AT-553, "DTC P0750 SHIFT SOLENOID VALVE A"](#), [AT-558, "DTC P0755 SHIFT SOLENOID VALVE B"](#) or [AT-580, "DTC VEHICLE SPEED SENSOR MTR"](#).
- No >> GO TO 2.

**2. CHECK SYMPTOM**

Check again.

OK or NG

- OK >> Go to [AT-614, "8. Vehicle Cannot Be Started From D1"](#).
 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.

17. A/T Does Not Shift: D4 → D3 , When Overdrive Control Switch ON → OFF

ECS0066R

SYMPTOM:

A/T does not shift from D4 to D3 when changing overdrive control switch to OFF position.

1. CHECK OVERDRIVE SWITCH CIRCUIT

④ With CONSULT-II

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

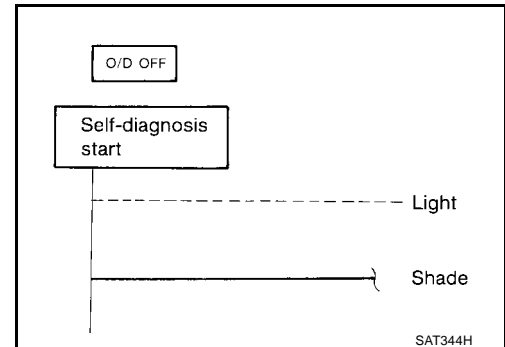
⊗ Without CONSULT-II

Does self-diagnosis show damage to overdrive control switch circuit?

Yes or No

Yes >> Check overdrive control switch circuit. Refer to [AT-632, "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}"](#).

No >> Go to [AT-619, "10. A/T Does Not Shift: D2 → D3"](#).



18. A/T Does Not Shift: D3 → 22 , When Selector Lever D → 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

④ With CONSULT-II

Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?

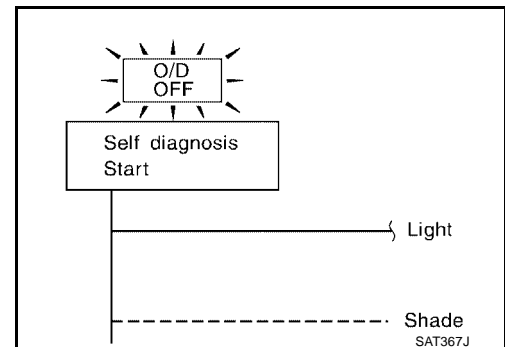
⊗ Without CONSULT-II

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-491, "DTC P0705 PARK/NEUTRAL POSITION SWITCH"](#).

No >> Go to [AT-617, "9. A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2"](#).



19. A/T Does Not Shift: 22 → 11 , When Selector Lever 2 → 1 Position

SYMPTOM:

A/T does not shift from 22 to 11 when changing selector lever from 2 to 1 position.

1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

With CONSULT-II

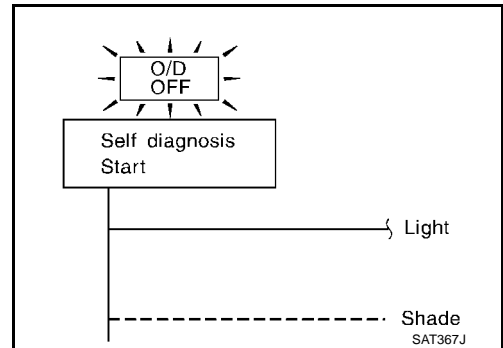
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?

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 [AT-491](#), "DTC P0705 PARK/NEUTRAL POSITION SWITCH".
- No >> GO TO 2.

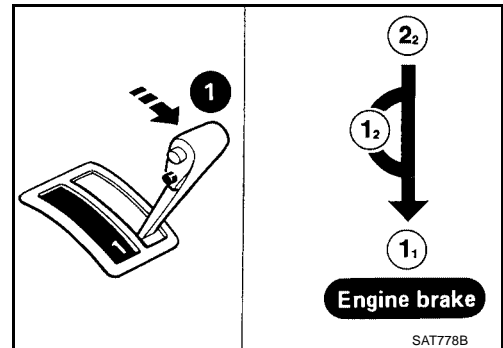


2. CHECK SYMPTOM

Check again.

OK 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.

20. Vehicle Does Not Decelerate By Engine Brake

SYMPTOM:

Vehicle does not decelerate by engine brake when shifting from 22 (12) to 11 .

1. CHECK SYMPTOM

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

Yes or No

- Yes >> Go to [AT-627, "15. Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) .
 No >> Go to [AT-609, "6. Vehicle Does Not Creep Backward In R Position"](#) .

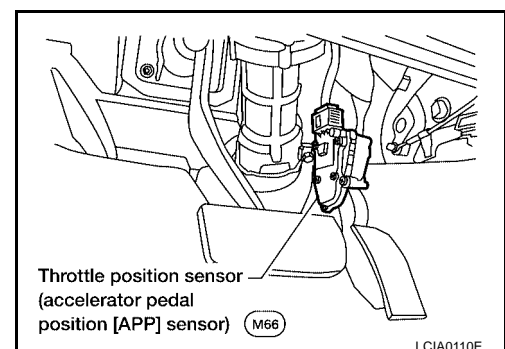
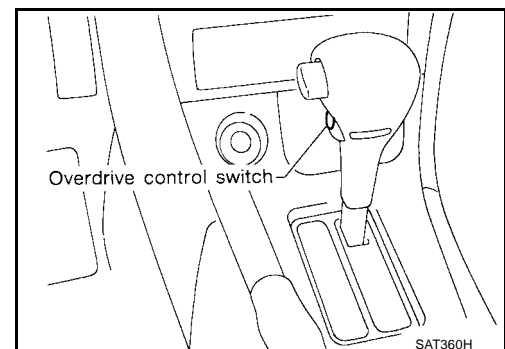
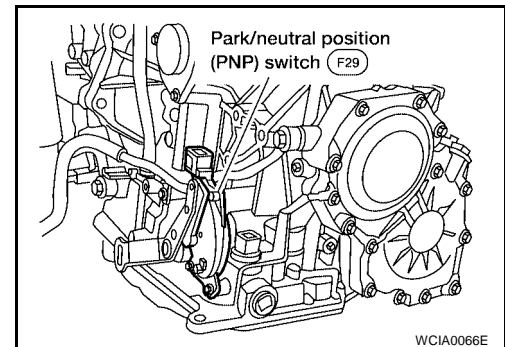
21. TCM Self-diagnosis Does Not Activate {Park/neutral Position (PNP), Overdrive Control and Throttle Position Sensor [Accelerator Pedal Position (APP) Sensor] Switches Circuit Checks}

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.



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

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 selector lever to each position.
Check that the signal of the selector lever position is indicated properly.

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 2.

DATA MONITOR	
MONITORING	MONITORING
PN POSI SW	OFF
R POSITION SW	OFF
D POSITION SW	OFF
2 POSITION SW	ON
1 POSITION SW	OFF

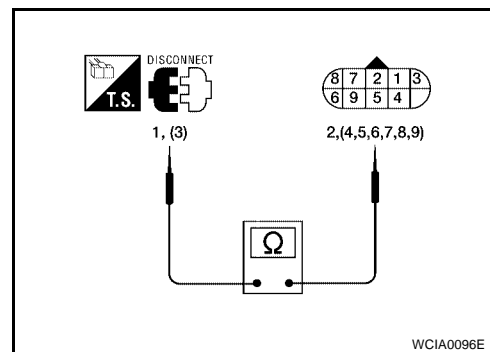
SAT701J

2. DETECT MALFUNCTIONING ITEM

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.

Lever position	Terminal No.	
P	3 - 7	1 - 2
R	3 - 8	
N	3 - 9	1 - 2
D	3 - 6	
2	3 - 5	
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-647, "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 [AT-646, "Park/Neutral Position \(PNP\) Switch Adjustment"](#) .
- 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)

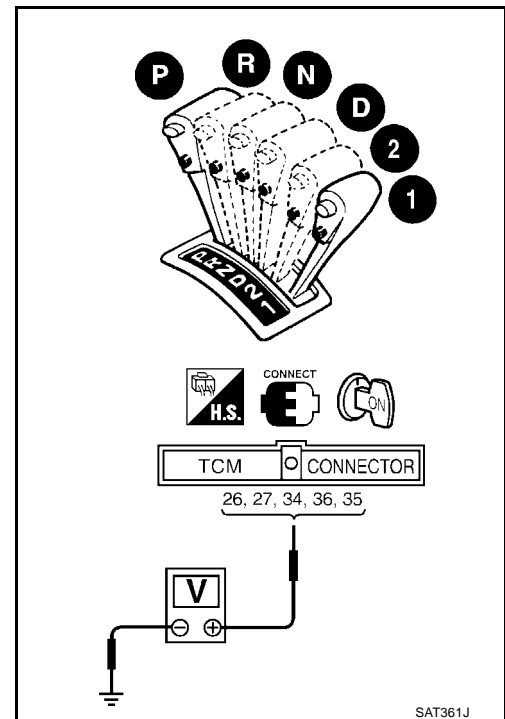
OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace damaged parts.

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.)
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.

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

Voltage:**B : Battery voltage****0 : 0V**

SAT361J

OK or NG

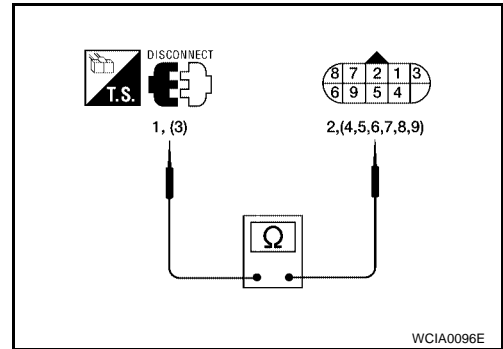
- OK >> GO TO 6.
 NG >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

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.

Lever position	Terminal No.	
P	3 - 7	1 - 2
R	3 - 8	
N	3 - 9	1 - 2
D	3 - 6	
2	3 - 5	
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-647, "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 [AT-646, "Park/Neutral Position \(PNP\) Switch Adjustment"](#) .
- 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 7.
- NG >> Repair or replace damaged parts.

5. 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.
3. 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 7.
- NG >> GO TO 6.

DATA MONITOR	
MONITORING	
ENGINE SPEED	XXX rpm
TURBINE REV	XXX rpm
OVERDRIVE SW	ON
PN POSI SW	OFF
R POSITION SW	OFF

6. DETECT MALFUNCTIONING ITEM

Check the following items:

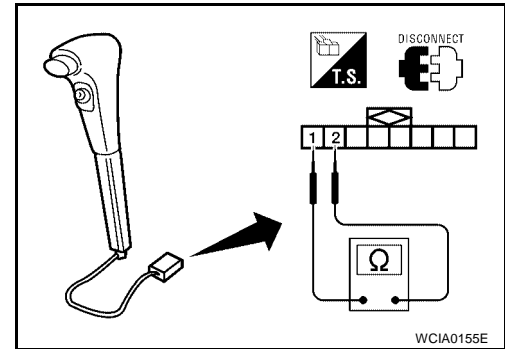
- Overdrive control switch M44.
- Check continuity between terminals 1 and 2.

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 [AT-563, "DTC P1705 THROTTLE POSITION SENSOR \[ACCELERATOR PEDAL POSITION \(APP\) SENSOR\]"](#).

OK or NG

- OK >> GO TO 8.
 NG >> Repair or replace damaged parts.

8. CHECK TCM INSPECTION

1. Perform TCM input/output inspection. Refer to [AT-487, "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

PFP:34950

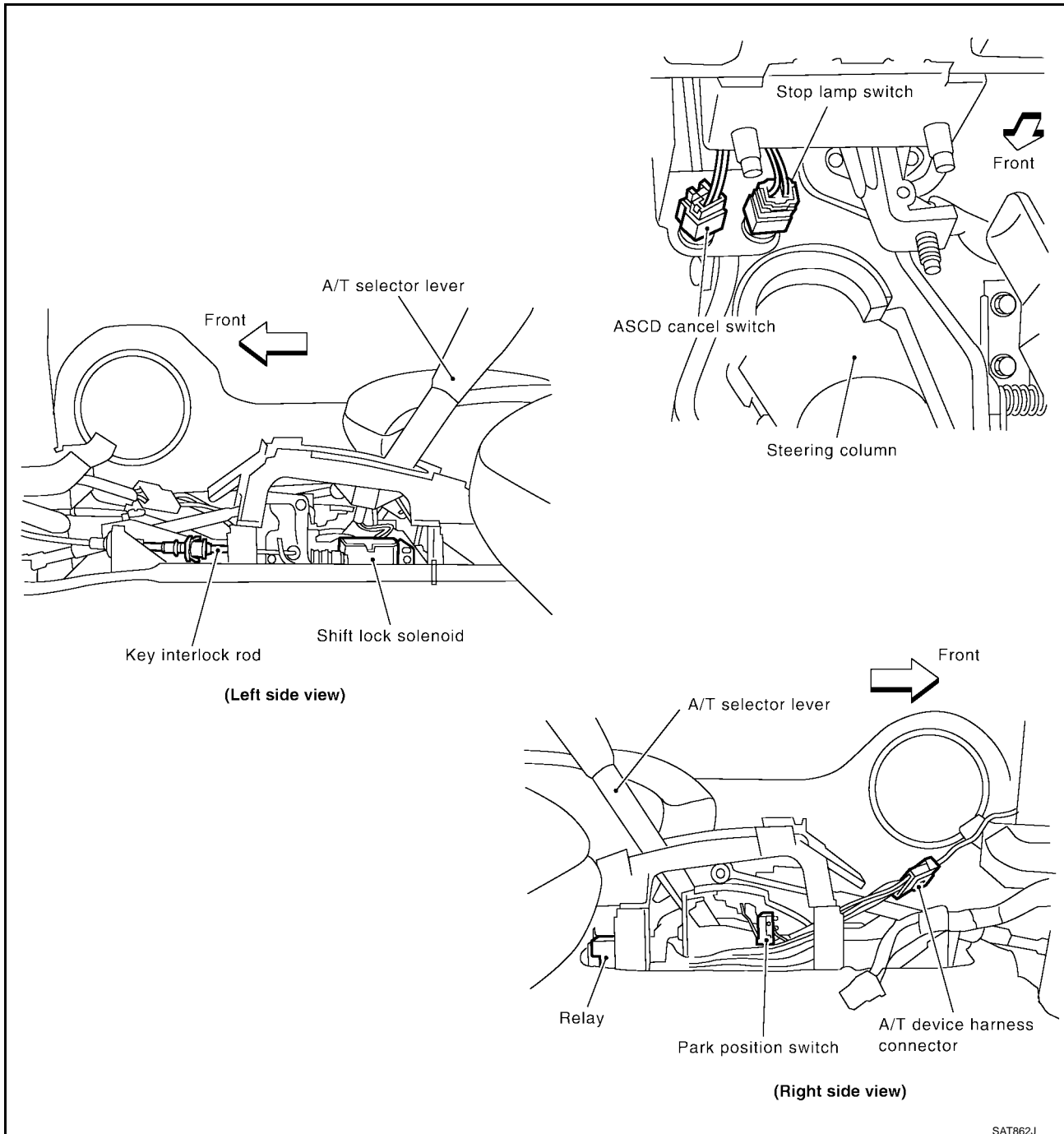
ECS0066W

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

ECS0066X



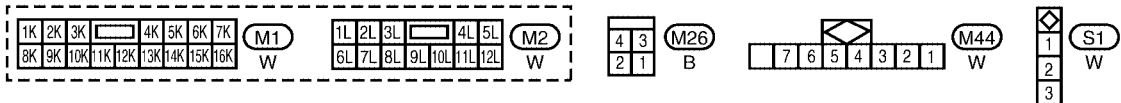
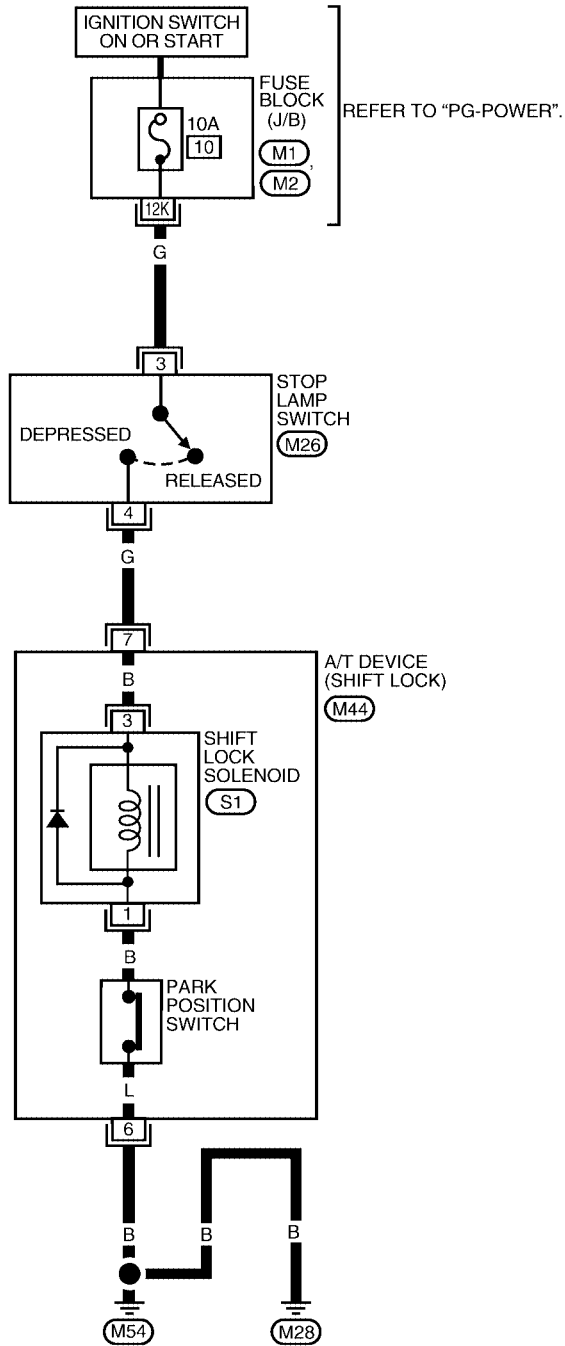
A/T SHIFT LOCK SYSTEM

[RE4F04B]

Wiring Diagram — SHIFT —

ECS0066Y

AT-SHIFT-01



*: THIS CONNECTOR IS NOT SHOWN IN "HARNES LAYOUT" OF PG SECTION.

WCWA0076E

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:

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 [AT-642, "Components"](#).

2. CHECK SELECTOR LEVER POSITION

Check selector lever position for damage.

OK or NG

- OK >> GO TO 3.
- NG >> Check selector lever. Refer to [AT-647, "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.

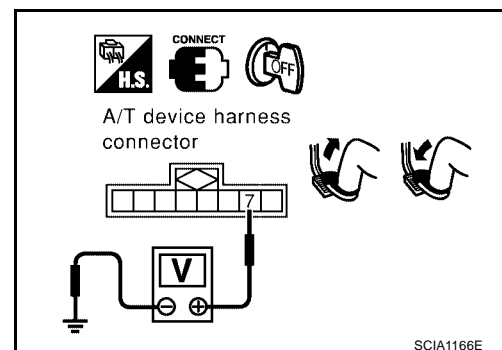
Voltage:

Brake pedal depressed: Battery voltage

Brake pedal released: 0V

OK or NG

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



4. DETECT MALFUNCTIONING ITEM

Check the following items.

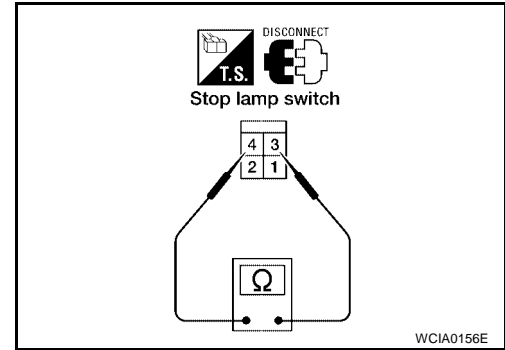
1. Harness for open or short between fuse block (J/B) connector M1 terminal 12K and stop lamp switch harness connector M26 terminal 3.
2. Harness for open or short stop lamp switch harness connector M26 terminal 4 and A/T device harness connector M44 terminal 7 (G).
3. 10A fuse [10, located in the fuse 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 [BR-12, "STOP LAMP SWITCH AND ASCD CANCEL SWITCH CLEARANCE"](#)

OK or NG

- OK >> GO TO 5.
- NG >> Repair or replace damaged parts.



5. CHECK GROUND CIRCUIT

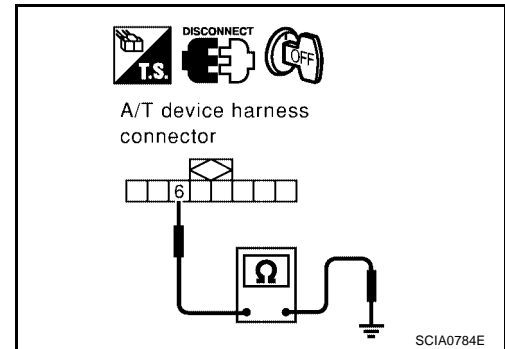
1. Turn ignition switch to "OFF" position.
2. Disconnect A/T device harness connector.
3. Check continuity between A/T device harness M44 terminal 6 (B) and ground.

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.



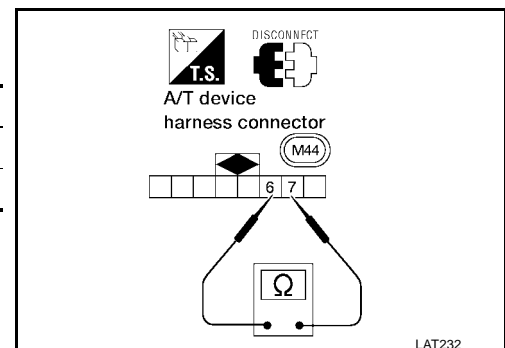
6. CHECK PARK POSITION SWITCH

Check continuity between A/T device harness connector 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

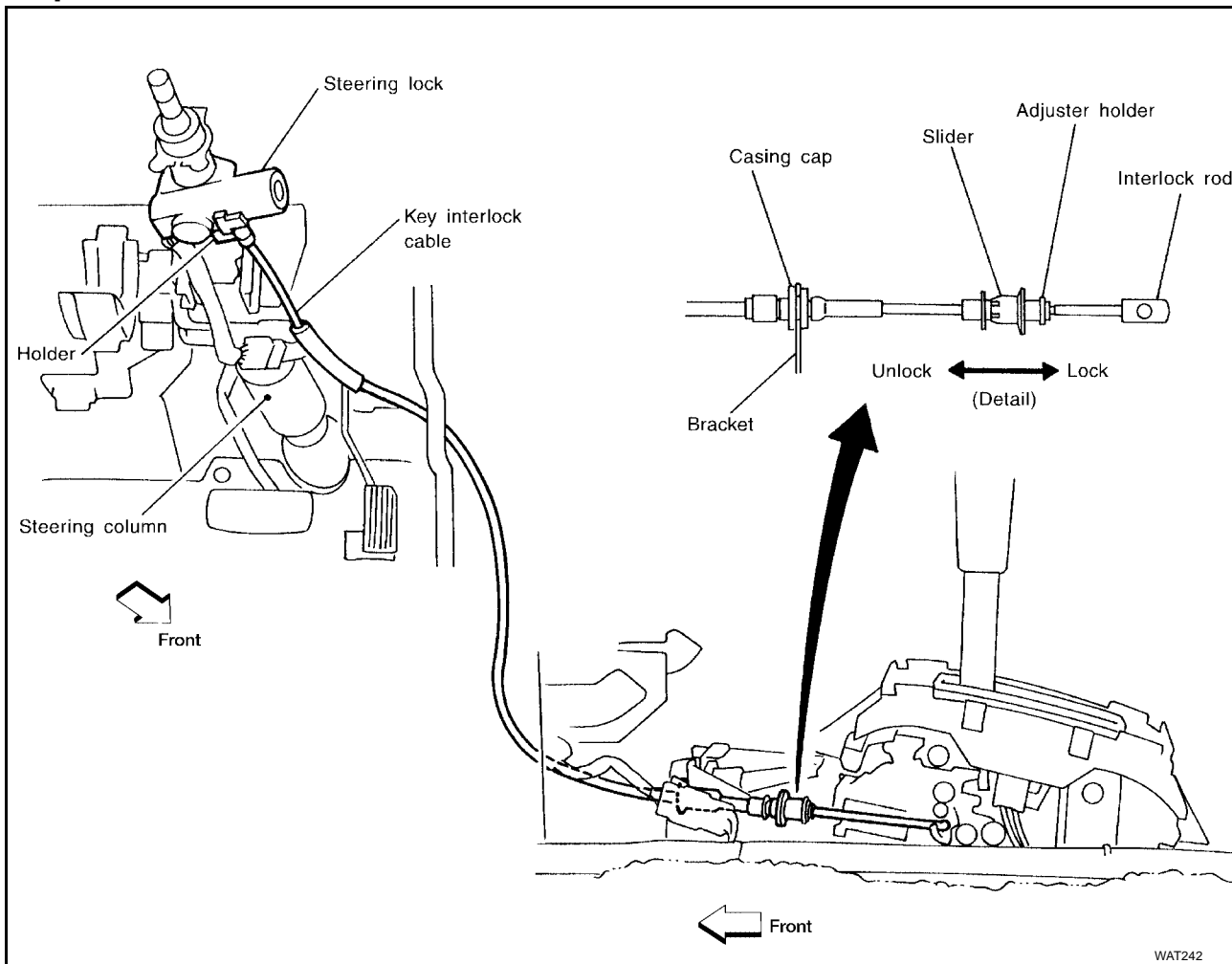
- OK >> INSPECTION END
- NG >> Repair or replace damaged parts.

A
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AT
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M

KEY INTERLOCK CABLE

Components

ECS00670



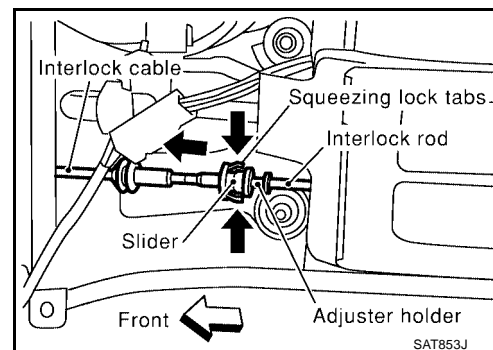
CAUTION:

- 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

ECS00671

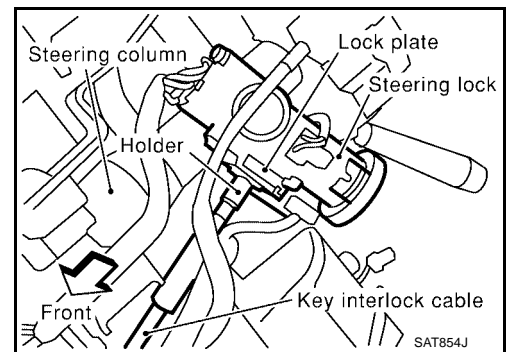
1. Unlock slider by squeezing lock tabs on slider from adjuster holder and remove interlock rod from cable.



KEY INTERLOCK CABLE

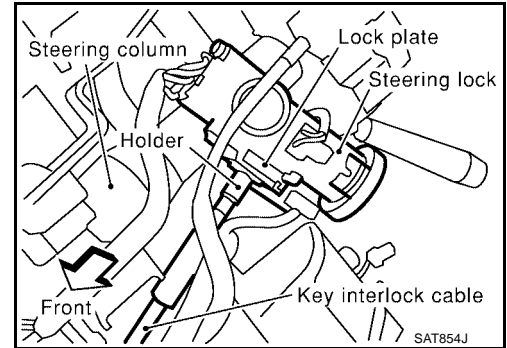
[RE4F04B]

2. Remove lock plate from steering lock assembly and remove key interlock cable.

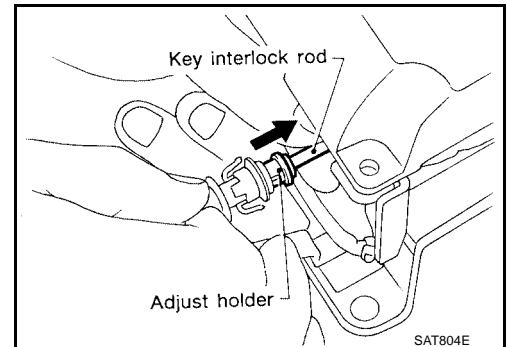


Installation

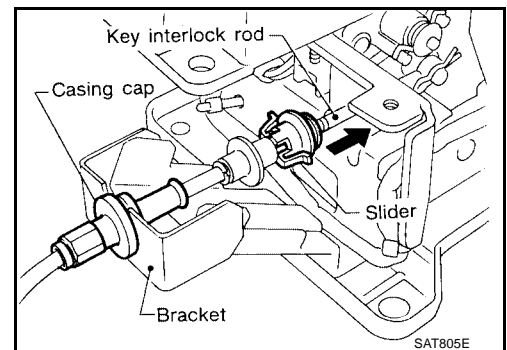
1. Turn ignition key to lock position.
2. Set A/T selector lever to P position.
3. Set key interlock cable to steering lock assembly and install lock plate.
4. Clamp cable to steering column and attach to control cable with band.



5. Insert interlock rod into adjuster holder.



6. Install casing cap to bracket.
7. Move slider in order to connect adjuster holder to interlock rod.

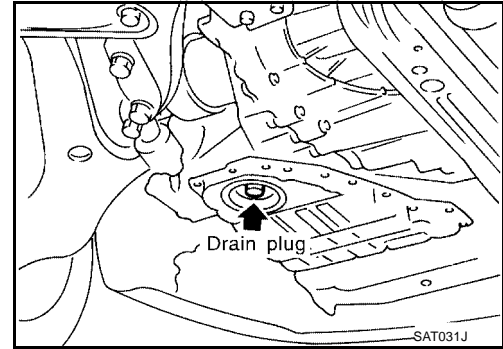


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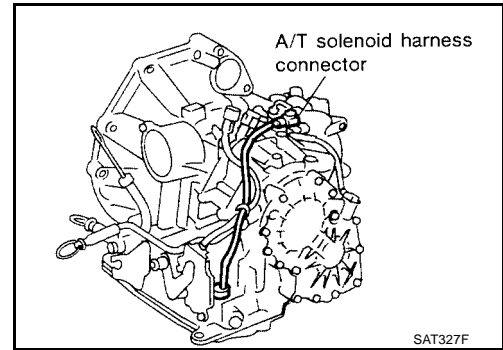
ON-VEHICLE SERVICE

**Control Valve Assembly and Accumulators
REMOVAL**

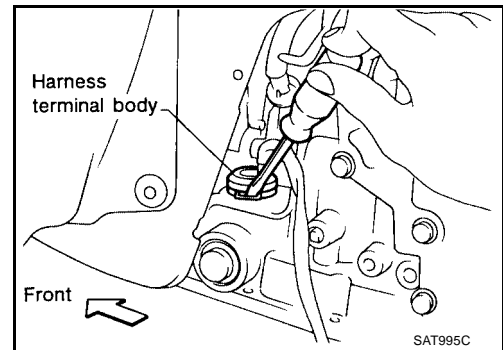
1. Drain ATF from transaxle.
2. Remove oil pan and gasket.
 - Always replace oil pan bolts as they are self-sealing bolts.



3. Disconnect A/T solenoid harness connector.



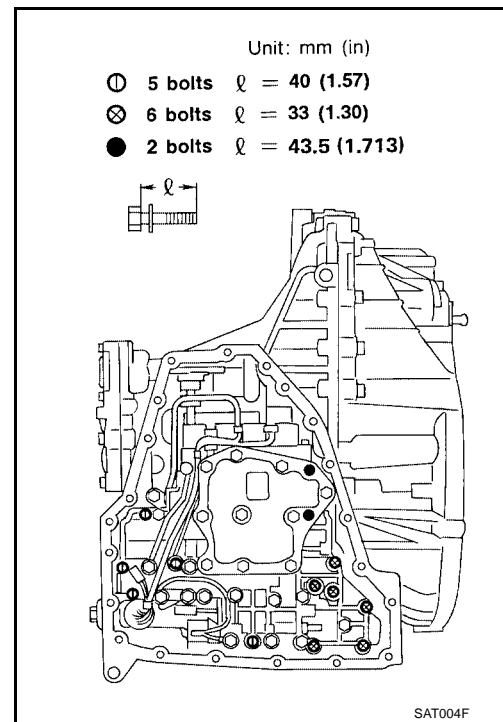
4. Remove snap ring from terminal cord assembly harness terminal body.
5. Remove terminal cord assembly harness from transmission case by pushing on terminal body.



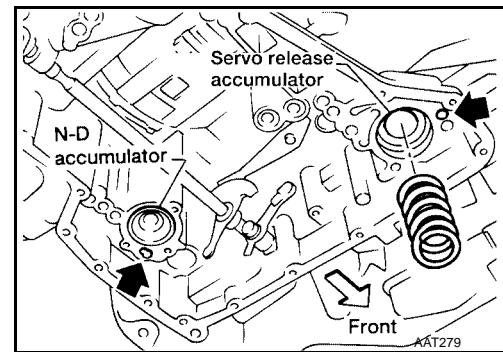
- Remove control valve assembly by removing fixing bolts I , X and ●.

Bolt length, number and location are shown in the illustration.

- **Be careful not to drop manual valve and servo release accumulator return spring.**
- Disassemble and inspect control valve assembly if necessary. Refer to [AT-679, "Control Valve Assembly"](#).

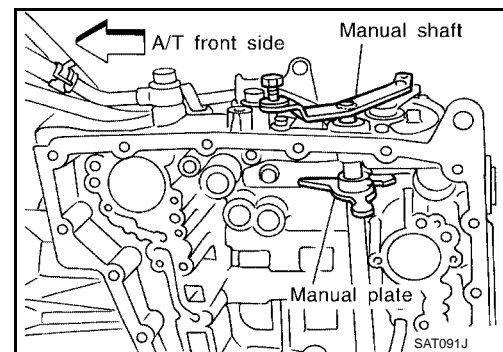


- Remove servo release and N-D accumulators by applying compressed air if necessary.
 - **Hold each piston with a rag.**



INSTALLATION

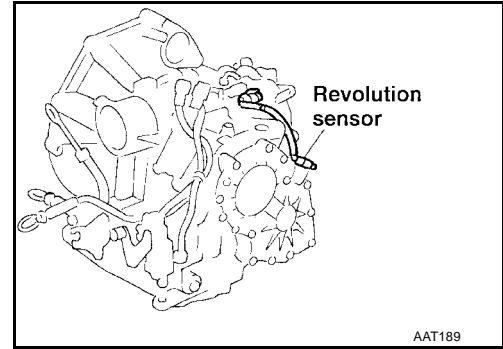
- Set manual shaft in Neutral, then align manual plate with groove in manual valve.
- After installing control valve assembly, make sure that selector lever can be moved to all positions.



Revolution Sensor Replacement

ECS00674

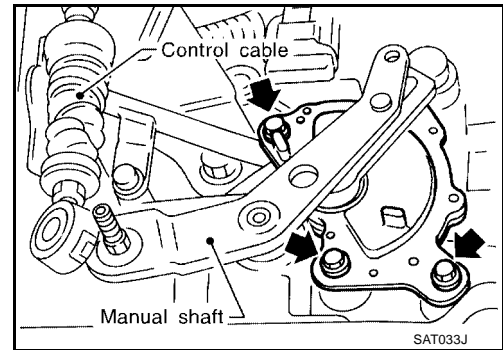
1. Remove under cover.
2. Remove revolution sensor from A/T.
3. Reinstall any part removed.
 - Always use new sealing parts.



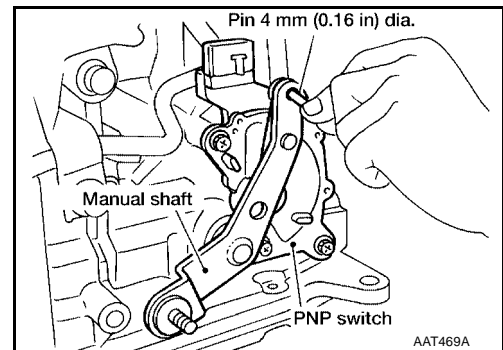
Park/Neutral Position (PNP) Switch Adjustment

ECS00675

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 [AT-494, "Diagnostic Procedure"](#).



ECS00676

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 the pointer indicating the position is improperly aligned, the control cable needs adjustment.

1. Place selector lever in P position.
2. Loosen control cable lock nut and place manual shaft in P position.

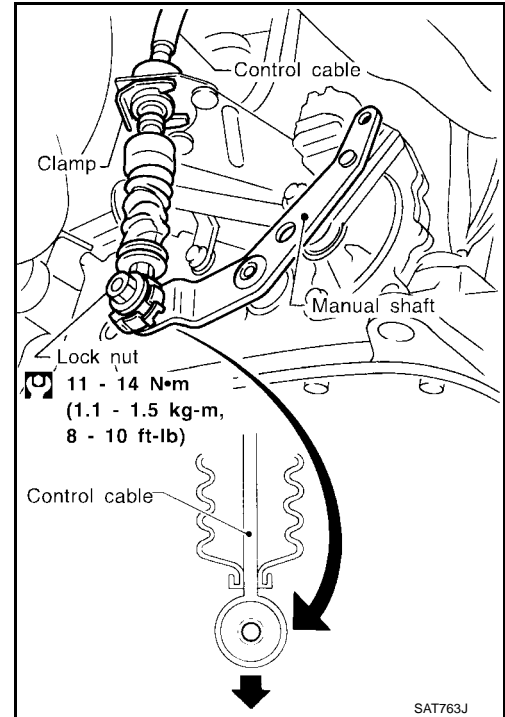
CAUTION:

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)

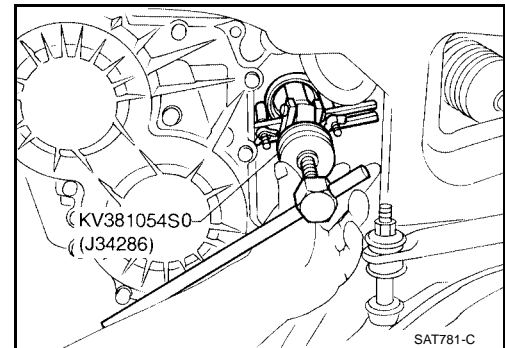
4. Tighten control cable lock nut.
5. Move selector lever from P to 1 position again. Make sure that selector lever moves smoothly.
 - Make sure that the starter operates when the selector lever is placed in the N or P position.
 - Make sure that the transmission is locked properly when the selector lever is placed in the P position.



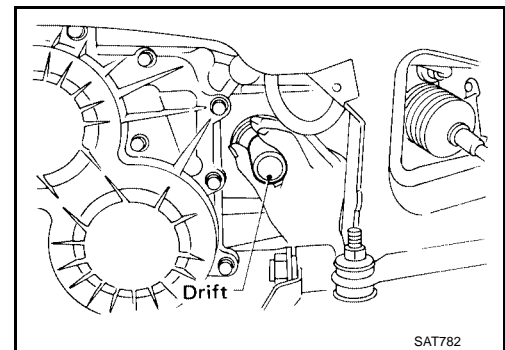
Differential Side Oil Seal Replacement

ECS00677

1. Remove drive shaft assembly. Refer to [FAX-14, "Removal"](#).
2. Remove oil seal.



3. Install oil seal.
 - Apply ATF before installing.



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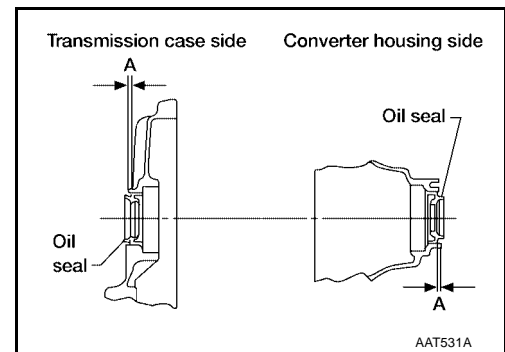
ON-VEHICLE SERVICE

[RE4F04B]

- Install oil seals so dimension A is within specification

A : -0.5 mm (-0.02 in) to 0.5 mm (0.02 in)

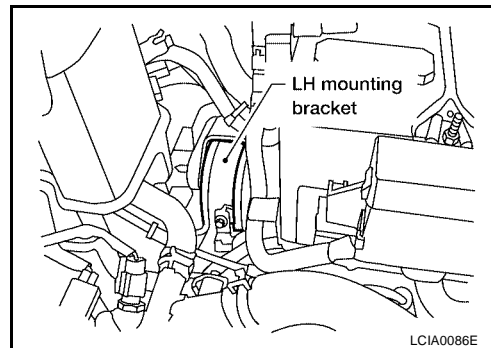
4. Reinstall any part removed.



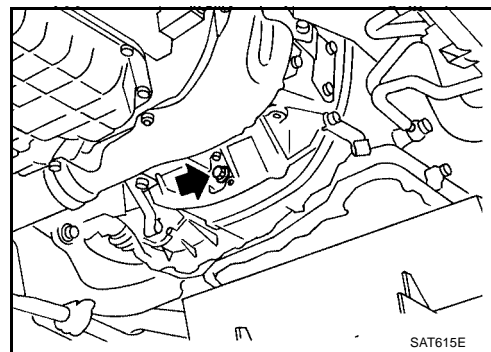
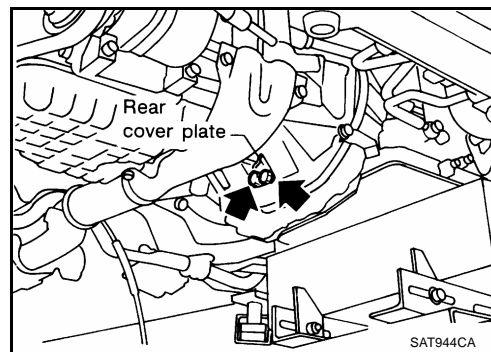
REMOVAL AND INSTALLATION

Removal

1. Remove battery and bracket.
2. Remove air duct and air cleaner assembly, refer to [EM-103, "REMOVAL"](#) .
3. 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, turbine revolution sensor, vehicle speed sensor and ground cable.
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 [SC-21, "Removal"](#) .



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.**

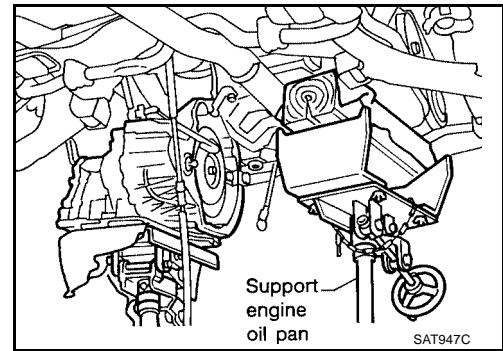


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REMOVAL AND INSTALLATION

[RE4F04B]

15. Support transaxle with a jack.
16. Remove bolts fixing A/T to engine.
17. Lower transaxle while supporting it with a jack.



ECS00679

Installation

- Drive plate runout

CAUTION:

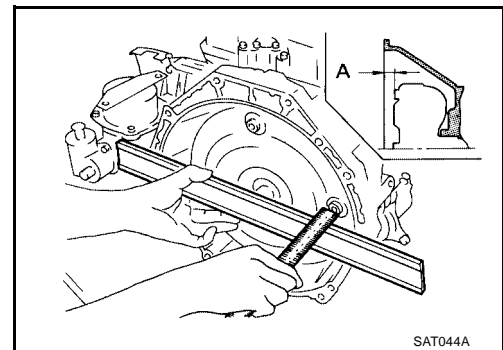
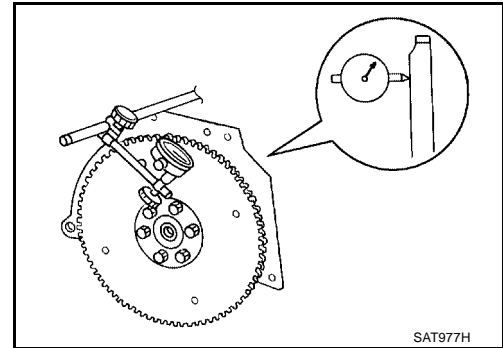
Do not allow any magnetic materials to contact the ring gear teeth.

Maximum allowable runout:

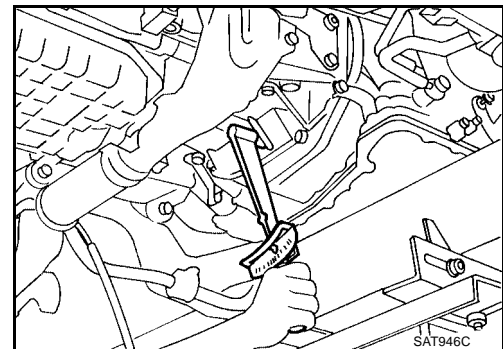
EM-186. "SERVICE DATA AND SPECIFICATIONS (SDS)".

- 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



- Install bolts fixing converter to drive plate.
- **With converter installed, rotate crankshaft several turns to check that transaxle rotates freely without binding.**



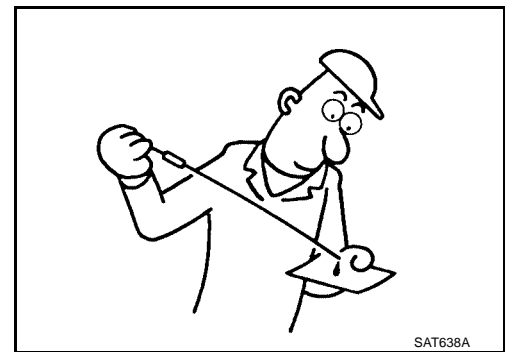
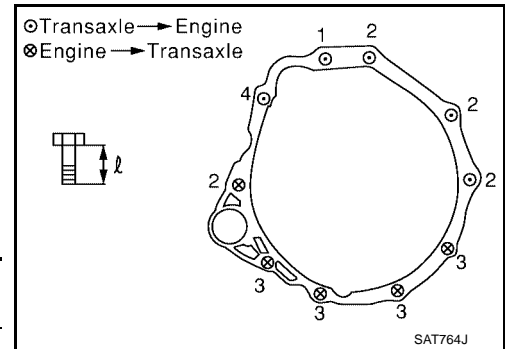
REMOVAL AND INSTALLATION

[RE4F04B]

- Tighten bolts securing transaxle.
- Tighten LH mounting bracket bolts to the specified torque. Refer to [EM-156, "Removal and Installation"](#) .
- Tighten center member bolts to the specified torque. Refer to [EM-156, "Removal and Installation"](#) .
- Tighten rear plate cover bolts to the specified torque. Refer to [EM-112, "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.
- 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 transaxle is shifted.
- Perform road test. Refer to [AT-457, "Road Test"](#) .



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OVERHAUL

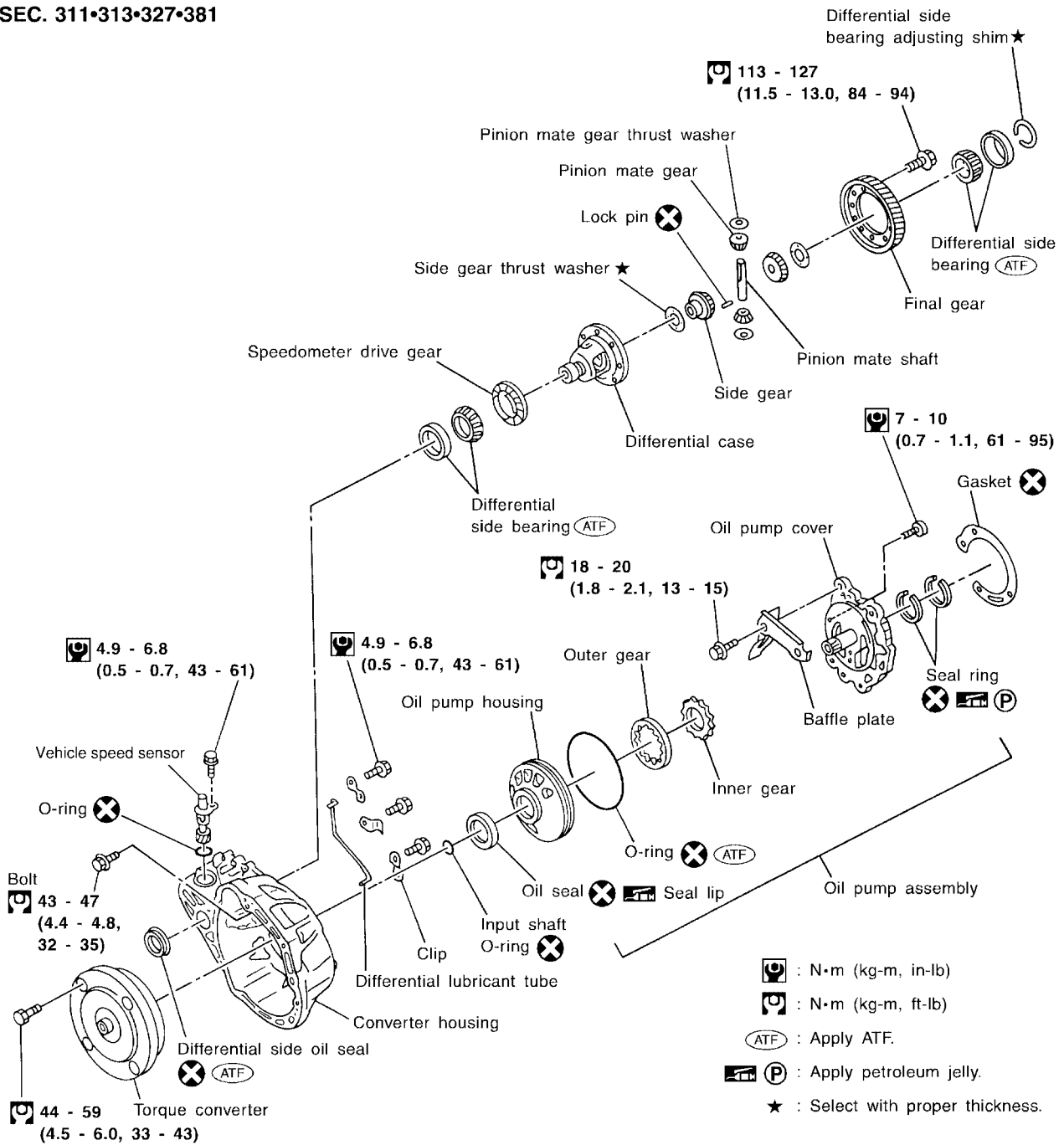
[RE4F04B]

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ECS0067A

OVERHAUL Components

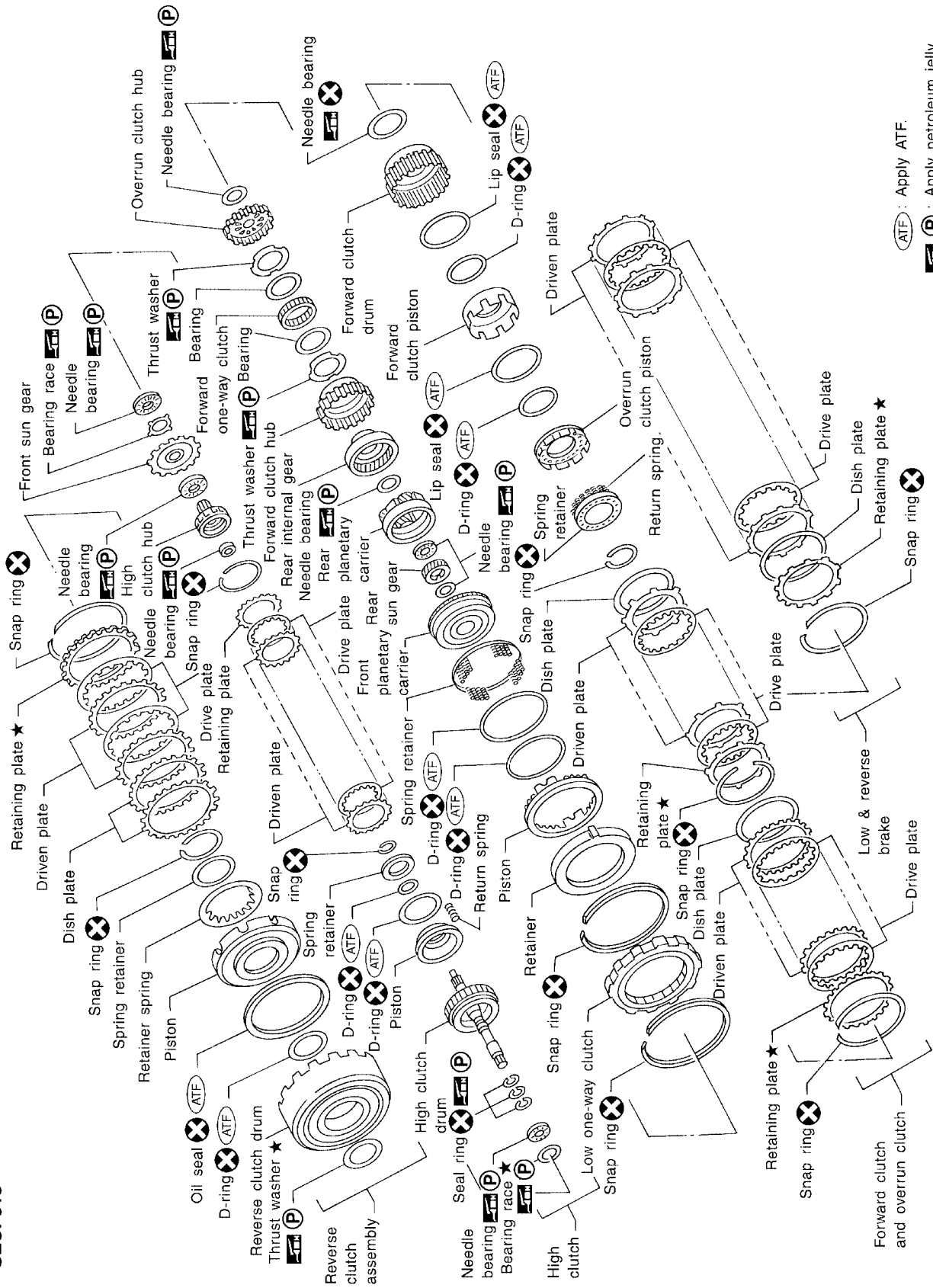
SEC. 311•313•327•381



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SEC. 315



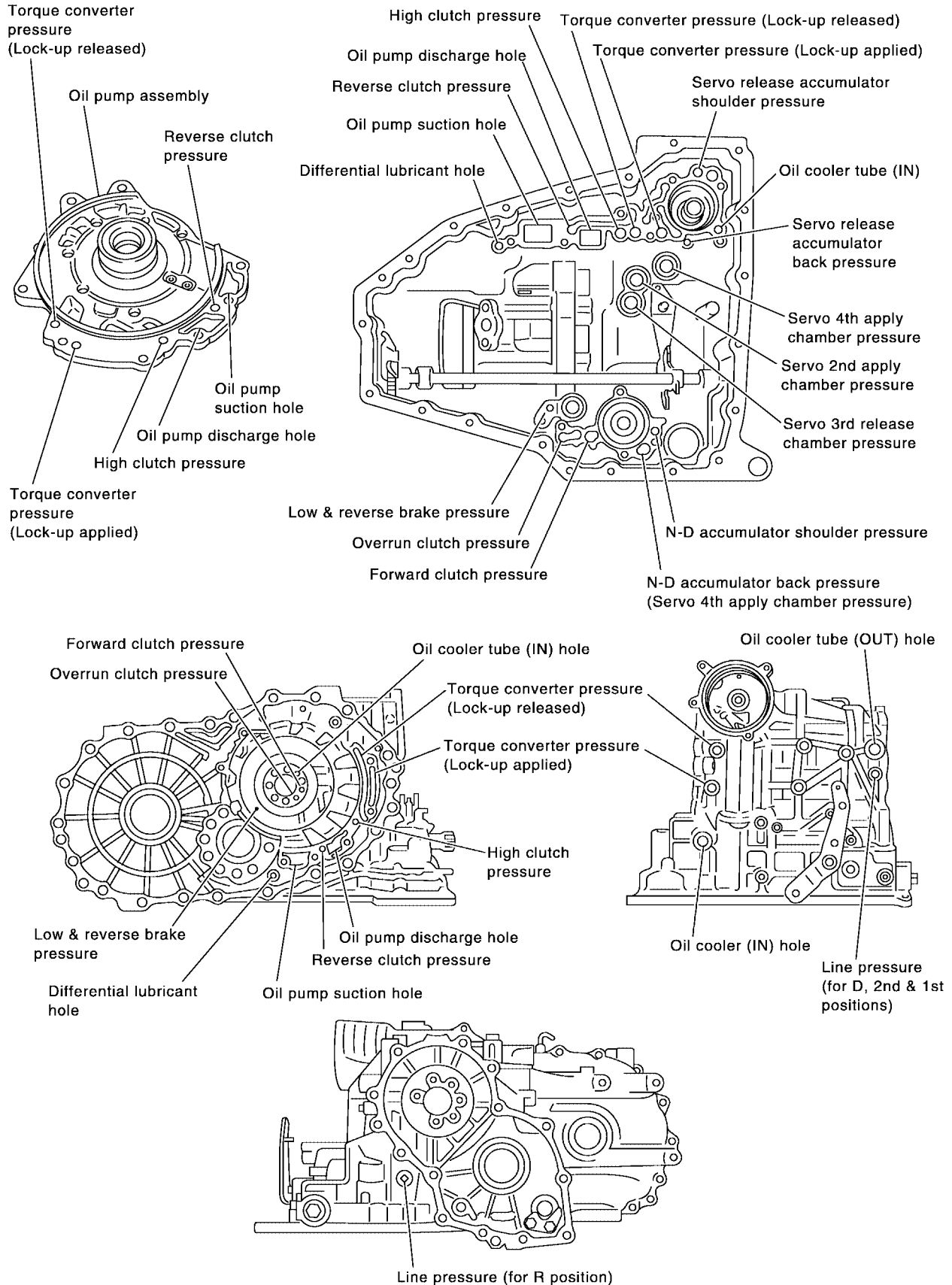
: Apply ATF.
 : Apply petroleum jelly.
 : Select proper thickness.

OVERHAUL

[RE4F04B]

ECS0067B

Oil Channel



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SAT573K

OVERHAUL

[RE4F04B]

Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings

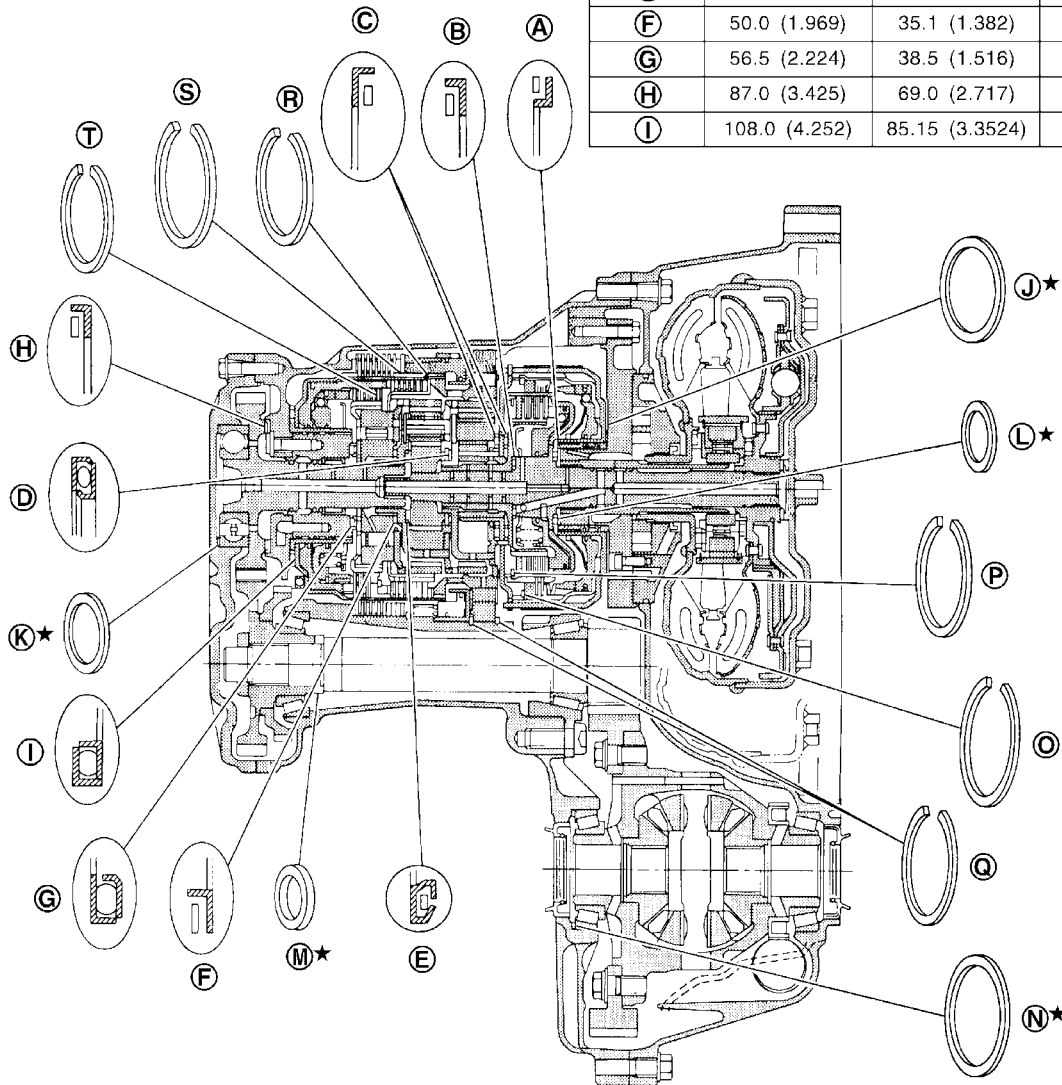
ECS0067C

Outer diameter of thrust washers

Item number	Outer diameter mm (in)	Parts number*
J ★	76.0 (2.992)	31508 80X13 - 31508 80X20
K ★	80.0 (3.150)	31438 80X60 - 31438 80X70

Outer and inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
A	50.0 (1.969)	35.1 (1.382)	31407 80X10
B	42.0 (1.654)	23.7 (0.933)	31407 80X01
C	70.0 (2.756)	50.0 (1.969)	31407 80X09
D	51.0 (2.008)	33.1 (1.303)	31407 80X02
E	48.0 (1.890)	30.0 (1.181)	31407 80X03
F	50.0 (1.969)	35.1 (1.382)	31407 80X10
G	56.5 (2.224)	38.5 (1.516)	31407 80X08
H	87.0 (3.425)	69.0 (2.717)	31407 80X07
I	108.0 (4.252)	85.15 (3.3524)	31407 80X06



Outer & inner diameter of bearing races, adjusting shims and adjusting spacer

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
L ★	51.0 (2.008)	36.0 (1.417)	31435 80X00 - 31439 80X14
M ★	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

Outer diameter of snap rings

Item number	Outer diameter mm (in)	Parts number*
O	150 (5.91)	31506 80X13
P	119.1 (4.689)	31506 80X06
Q	182.8 (7.197)	31506 80X08
R	144.8 (5.701)	31506 80X03
S	173.8 (6.843)	31506 80X09
T	133.9 (5.272)	31506 80X01

★ : Select proper thickness.

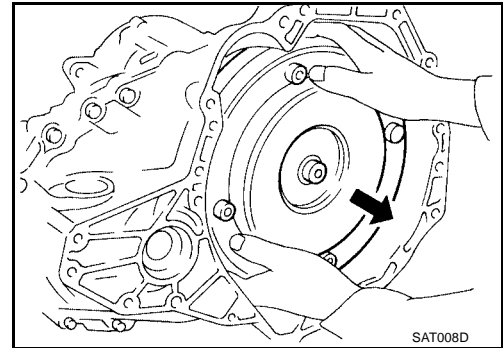
* : Always check with the Parts Department for the latest parts information.

SAT565K

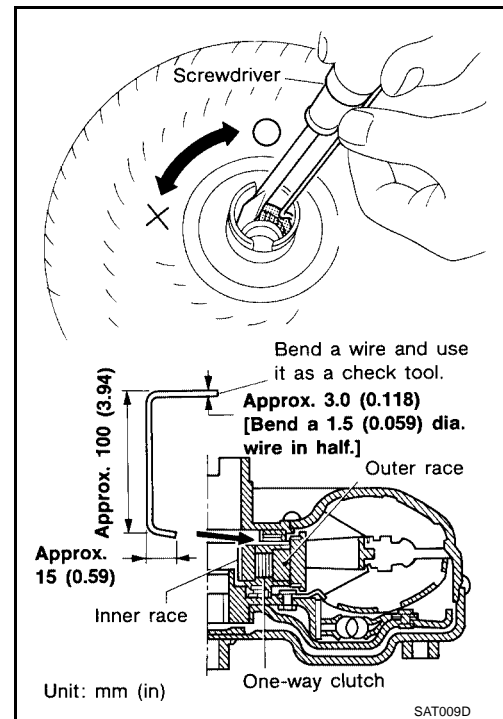
DISASSEMBLY

Disassembly

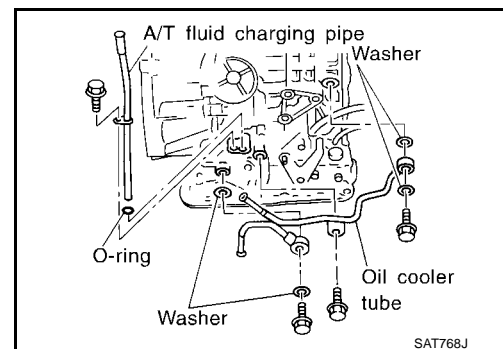
1. Drain ATF through drain plug.
2. Remove torque converter.



3. Check torque converter one-way clutch using check tool.
 - a. Insert check tool into the groove of bearing support built into one-way clutch outer race.
 - b. When fixing bearing support with check tool, rotate one-way clutch spline using screwdriver.
 - c. Check that inner race rotates clockwise only. If not, replace torque converter assembly.



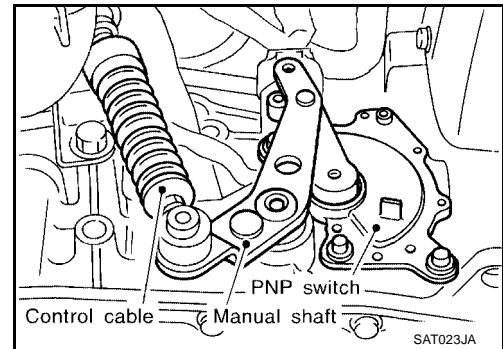
4. Remove A/T fluid charging pipe and fluid cooler tube.



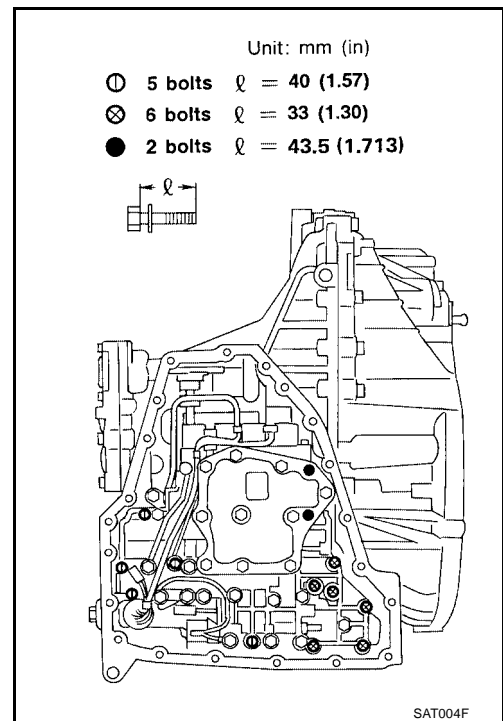
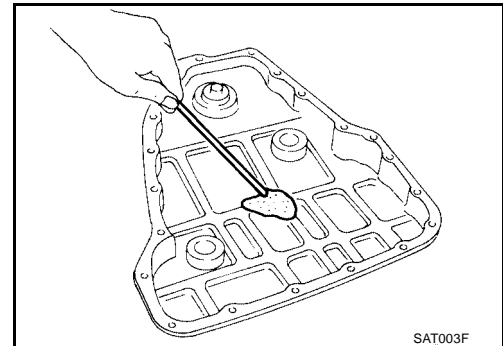
DISASSEMBLY

[RE4F04B]

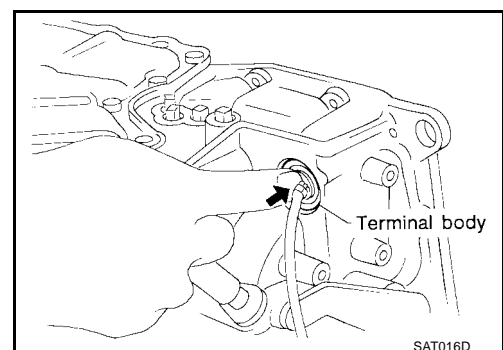
5. Set manual shaft to position P.
6. Remove park/neutral position (PNP) switch.



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 [CO-30, "RADIATOR"](#).**
9. Remove control valve assembly according to the following procedures.
 - a. Remove control valve assembly mounting bolts I, X and ●.
 - b. Remove snap ring from terminal cord assembly connector.



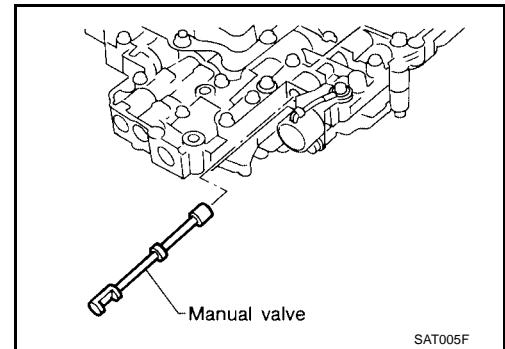
- c. Push terminal body into transmission case and draw out solenoid harness.



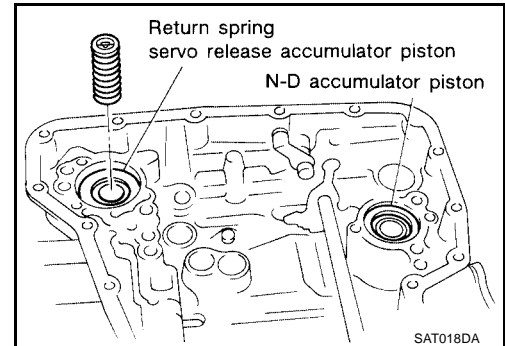
DISASSEMBLY

[RE4F04B]

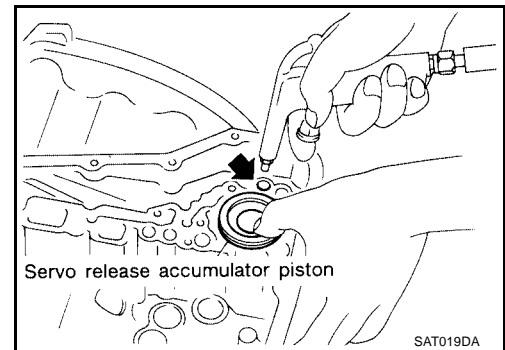
10. Remove manual valve from control valve assembly.



11. Remove return spring from servo release accumulator piston.

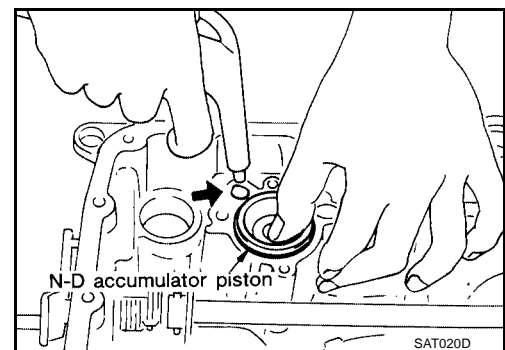


12. Remove servo release accumulator piston with compressed air.



13. Remove O-rings from servo release accumulator piston.

14. Remove N-D accumulator piston and return spring with compressed air.



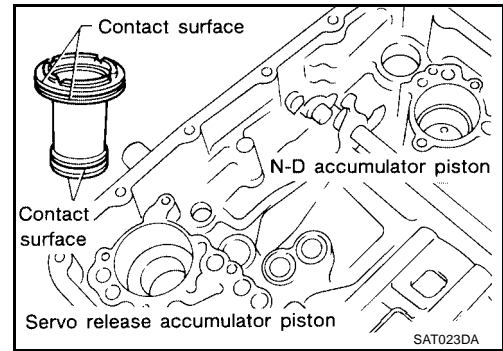
15. Remove O-rings from N-D accumulator piston.

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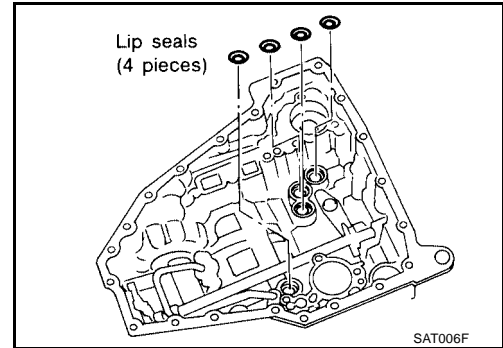
DISASSEMBLY

[RE4F04B]

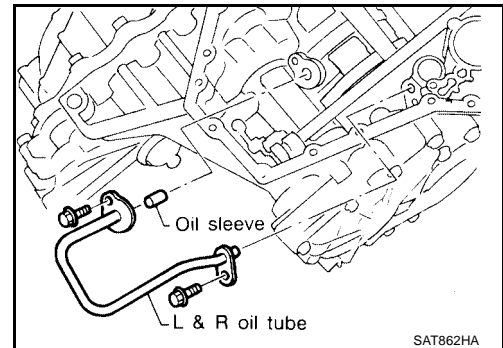
16. Check accumulator pistons and contact surface of transmission case for damage.



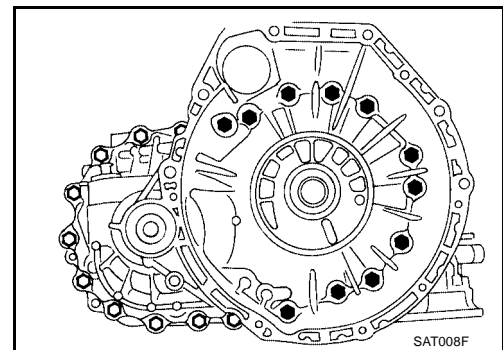
17. Check accumulator return springs for damage and free length.
18. Remove lip seals.



19. Remove L & R oil tube and oil sleeve.



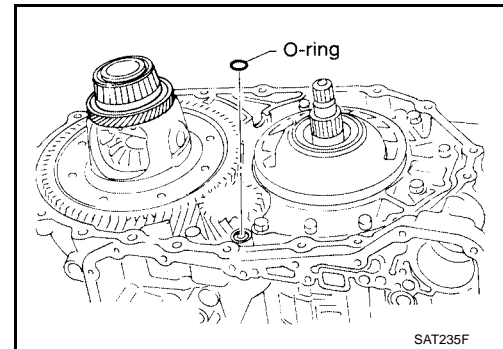
20. Remove converter housing according to the following procedures.
a. Remove converter housing mounting bolts.
b. Remove converter housing by tapping it lightly.



DISASSEMBLY

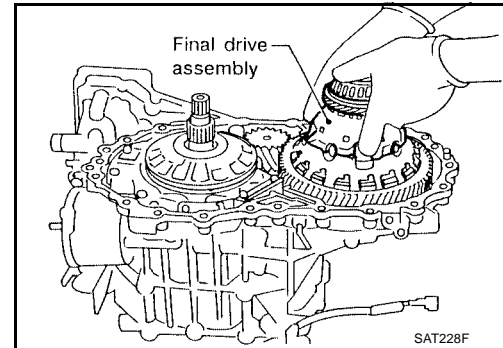
[RE4F04B]

c. Remove O-ring from differential oil port.



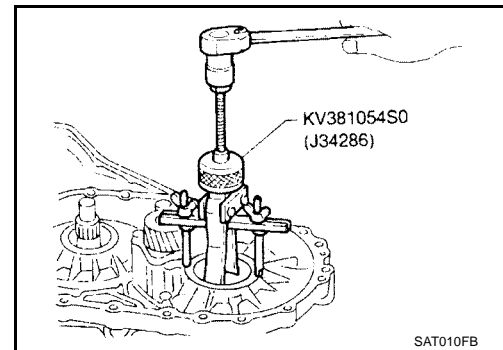
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21. Remove final drive assembly from transmission case.



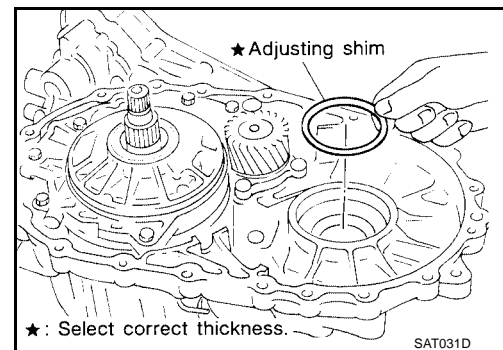
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22. Remove differential side bearing outer race and side bearing adjusting shim from transmission case.



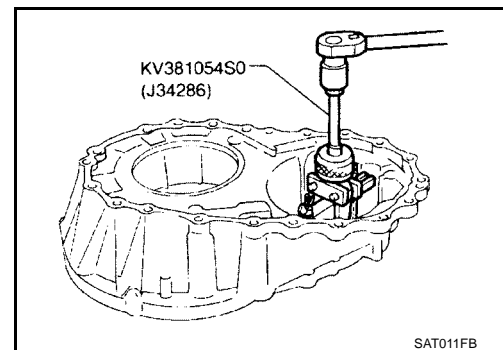
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23. Remove differential side bearing adjusting shim from transmission case.



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24. Remove differential side bearing outer race from converter housing.

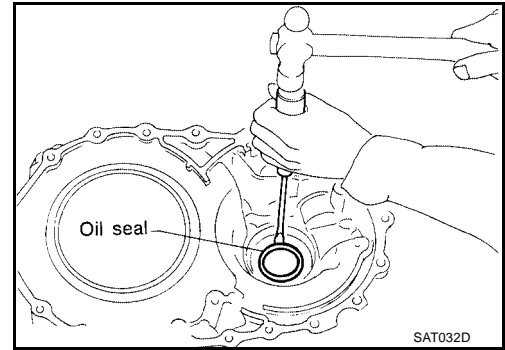


DISASSEMBLY

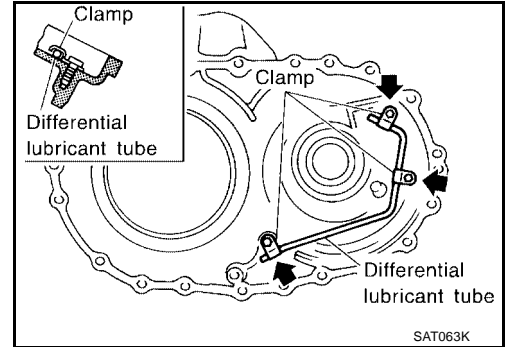
[RE4F04B]

25. Remove oil seal with screwdriver from converter housing.

- Be careful not to damage case.

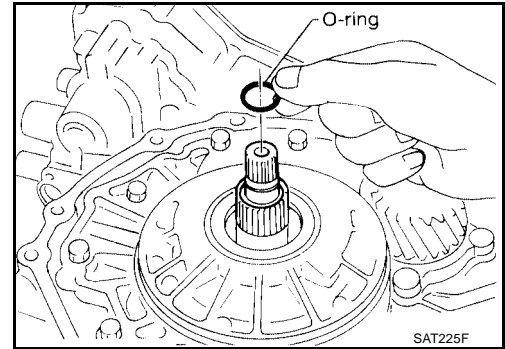


26. Remove differential lubricant tube from converter housing.

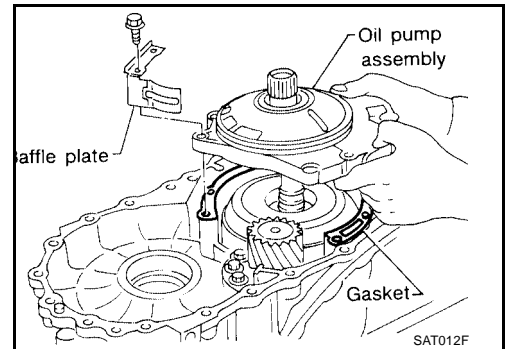


27. Remove oil pump according to the following procedures.

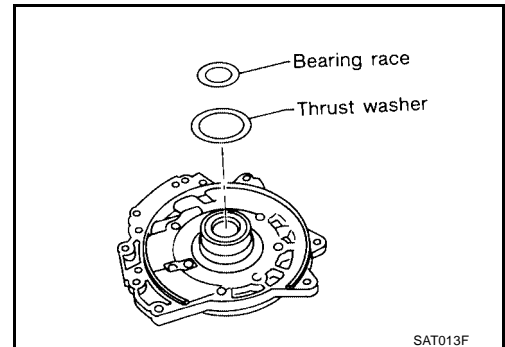
a. Remove O-ring from input shaft.



b. Remove oil pump assembly, baffle plate and gasket from transmission case.



c. Remove thrust washer and bearing race from oil pump assembly.



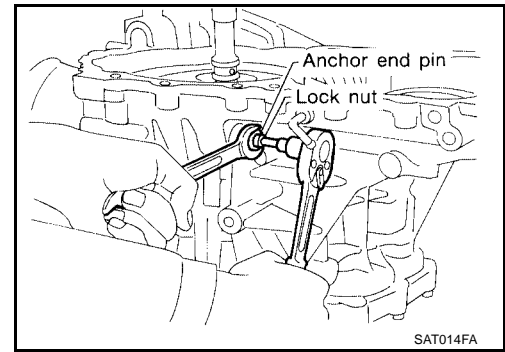
DISASSEMBLY

[RE4F04B]

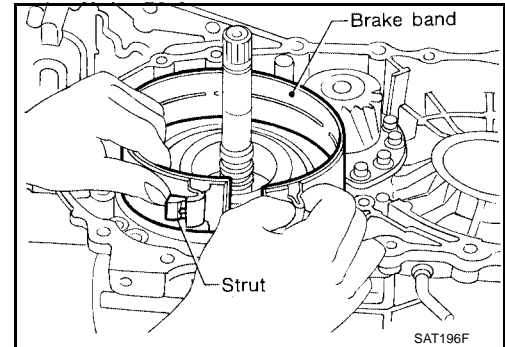
28. Remove brake band according to the following procedures.

a. Loosen lock nut, then back off anchor end pin.

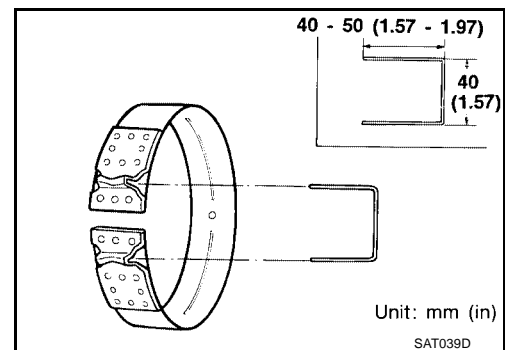
- Do not reuse anchor end pin.



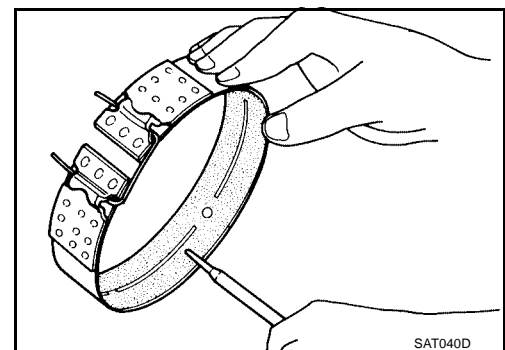
b. Remove brake band and strut from transmission case.



- 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.

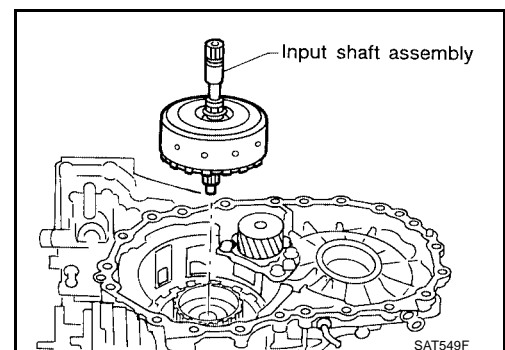


c. Check brake band facing for damage, cracks, wear or burns.



29. Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures.

a. Remove input shaft assembly (high clutch) with reverse clutch.

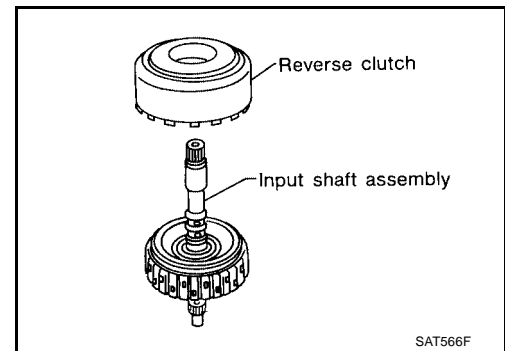


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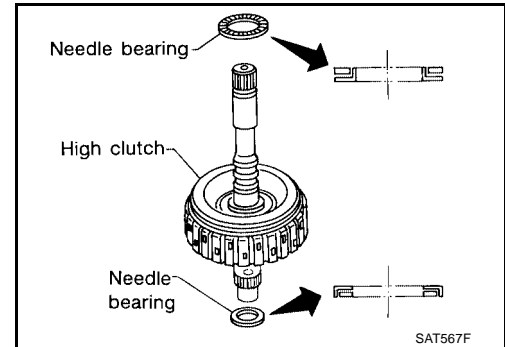
DISASSEMBLY

[RE4F04B]

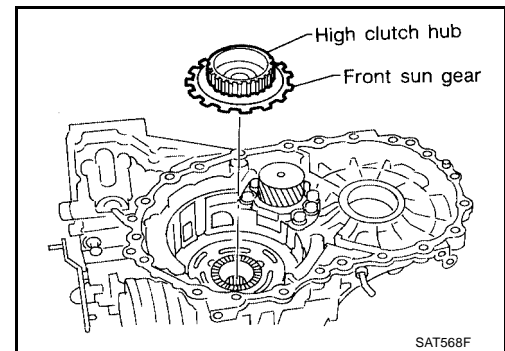
- b. Remove input shaft assembly (high clutch) from reverse clutch.



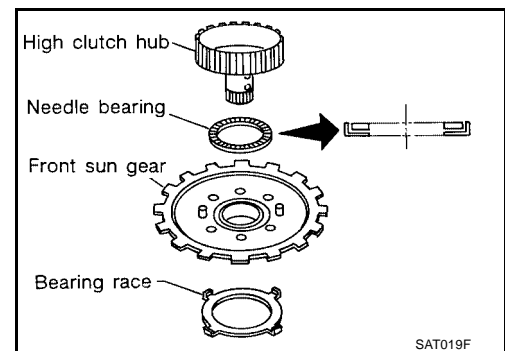
- c. Remove needle bearings from high clutch drum and check for damage or wear.



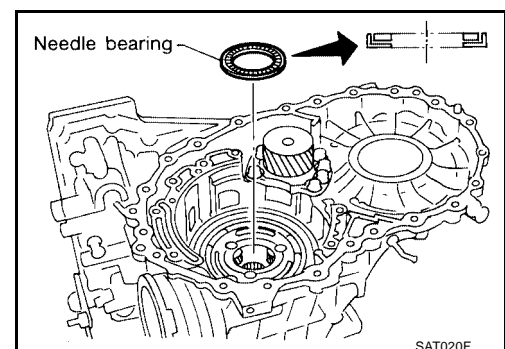
- d. Remove high clutch hub and front sun gear from transmission case.



- 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.



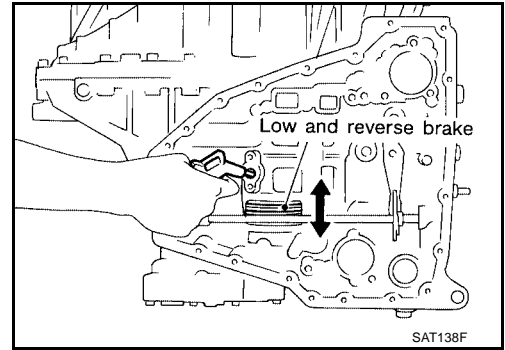
30. Remove needle bearing from transmission case and check for damage or wear.



DISASSEMBLY

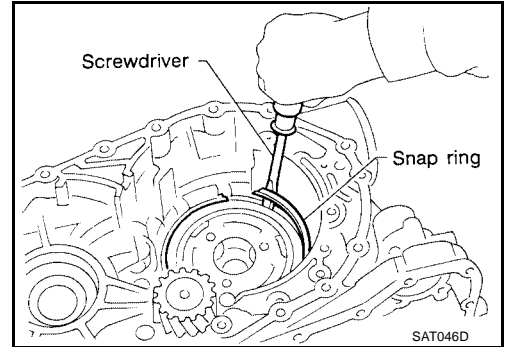
[RE4F04B]

31. Apply compressed air and check to see that low and reverse brake operates.

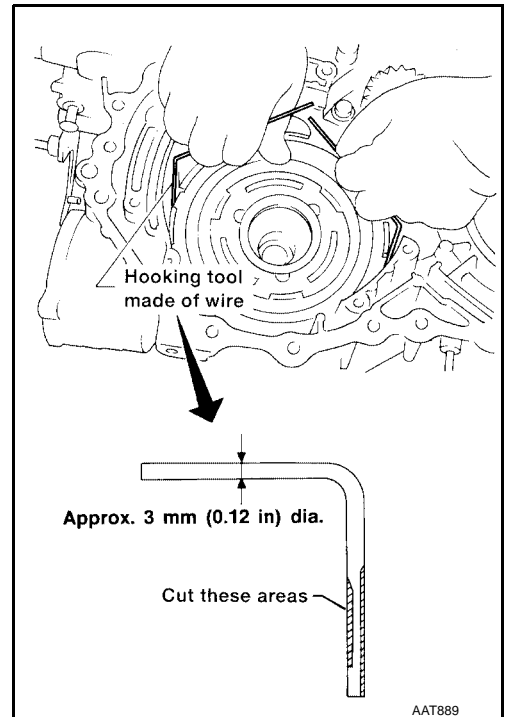


32. Remove low one-way clutch and front planetary carrier assembly according to the following procedures.

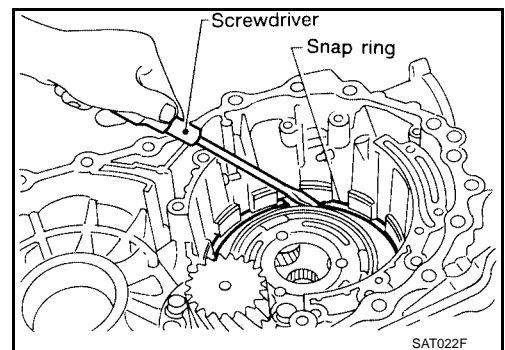
- a. Remove snap ring with flat-bladed screwdriver.



- b. Remove low one-way clutch with a hook made of wire.



- c. Remove snap ring with flat-bladed screwdriver.

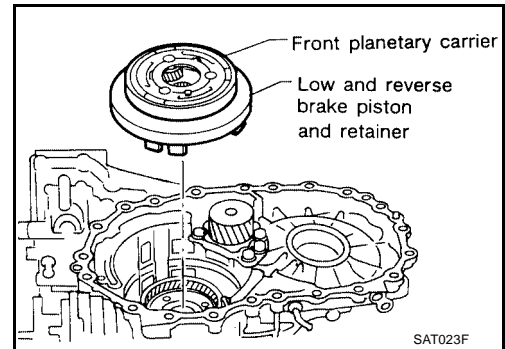


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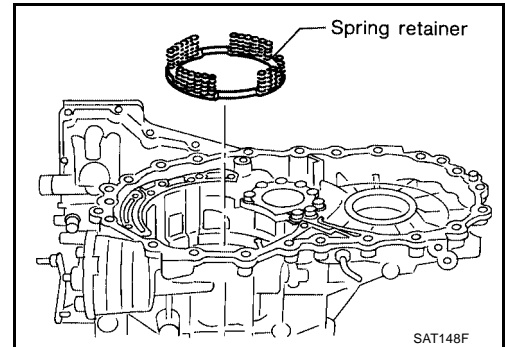
DISASSEMBLY

[RE4F04B]

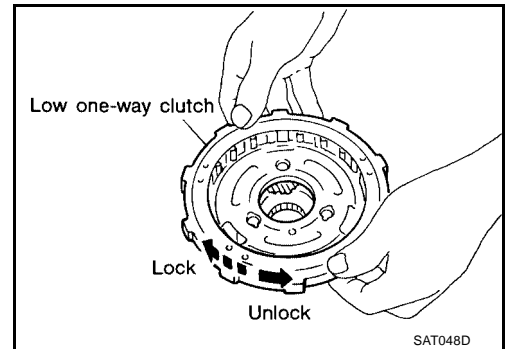
- d. Remove front planetary carrier with low and reverse brake piston and retainer.



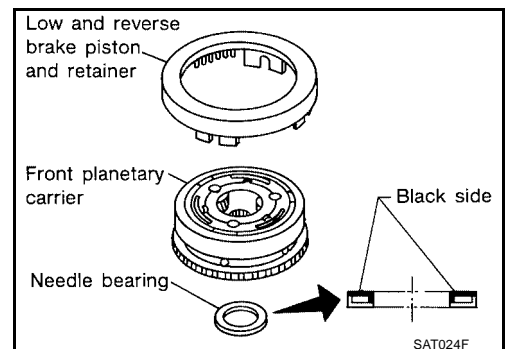
- e. Remove low and reverse brake spring retainer.
● Do not remove return springs from spring retainer.



- f. Check that low one-way clutch rotates in the direction of the arrow and locks in the opposite direction.



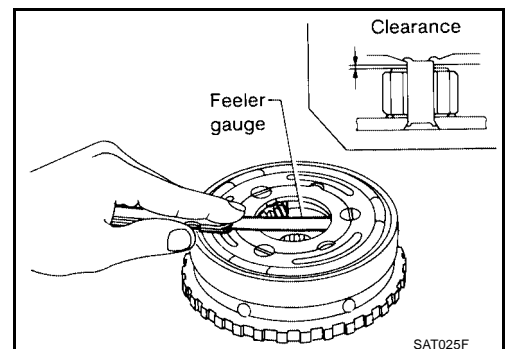
- g. Remove needle bearing, low and reverse brake piston and retainer from front planetary carrier.
h. Check front planetary carrier, low one-way clutch and needle bearing for damage or wear.



- i. Check clearance between planetary gears and planetary carrier 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.

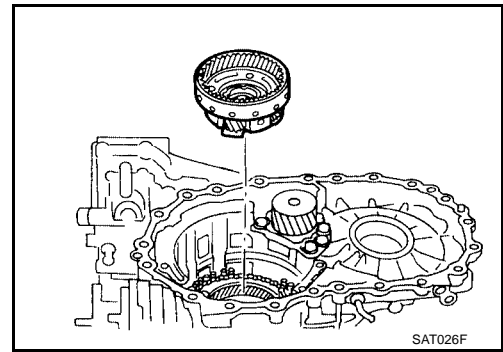


DISASSEMBLY

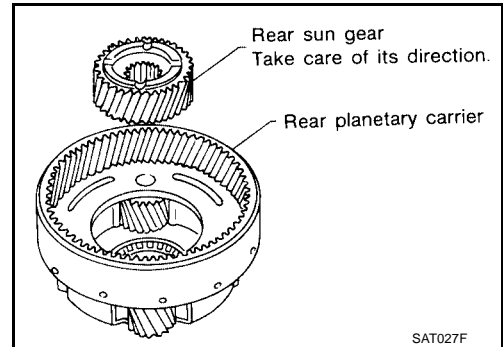
[RE4F04B]

33. Remove rear planetary carrier assembly and rear sun gear according to the following procedures.

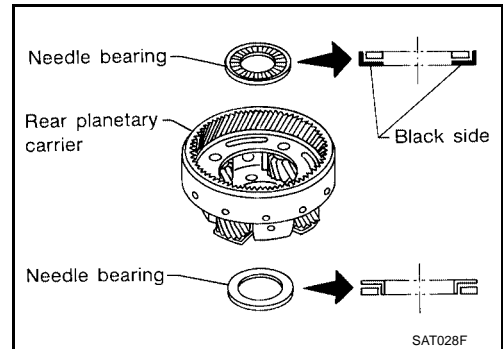
a. Remove rear planetary carrier assembly from transmission case.



b. Remove rear sun gear from rear planetary carrier.



c. Remove needle bearings from rear planetary carrier assembly.

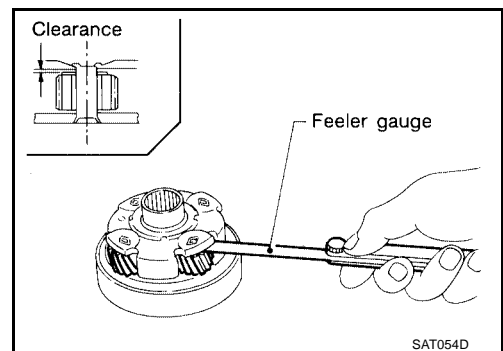


d. Check rear planetary carrier, rear sun gear and needle bearings for damage or wear.

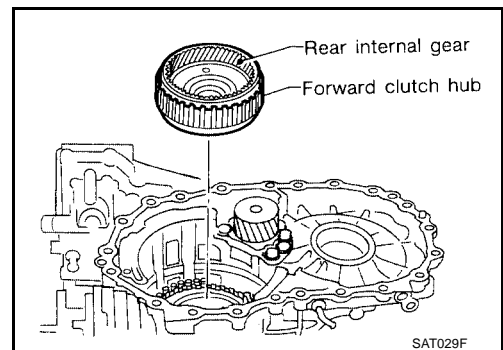
e. Check clearance between pinion washer and rear planetary carrier with feeler gauge.

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.

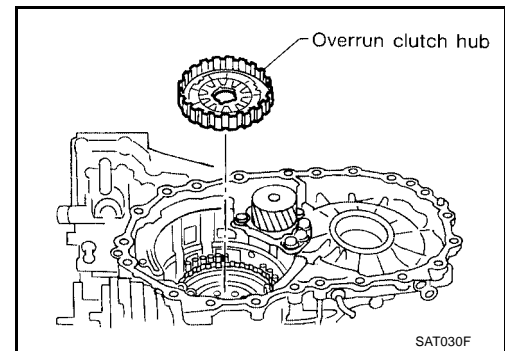


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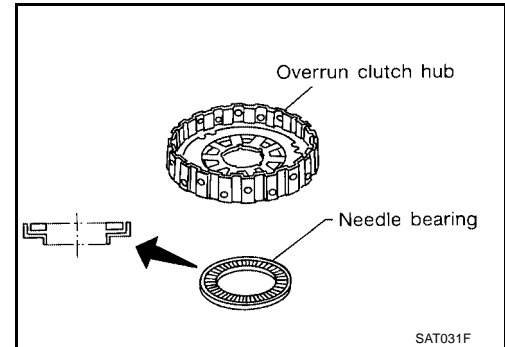
DISASSEMBLY

[RE4F04B]

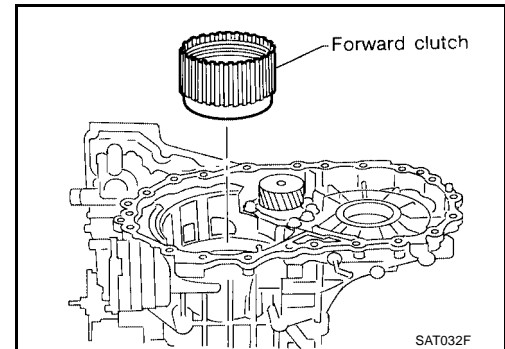
35. Remove overrun clutch hub from transmission case.



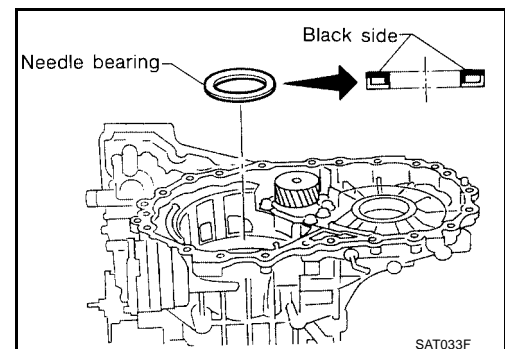
36. Remove needle bearing from overrun clutch hub and check for damage or wear.



37. Remove forward clutch assembly from transmission case.



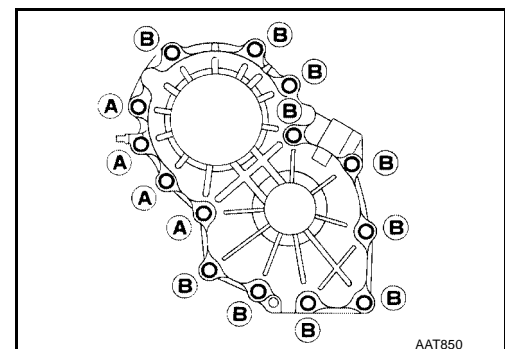
38. Remove needle bearing from transmission case.



39. Remove output shaft assembly according to the following procedures.

a. Remove side cover bolts.

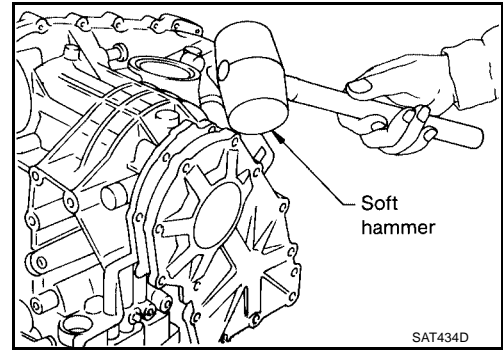
- Do not mix bolts A and B.
- Always replace bolts A as they are self-sealing bolts.



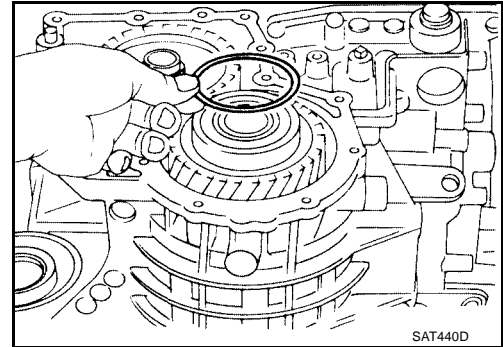
DISASSEMBLY

[RE4F04B]

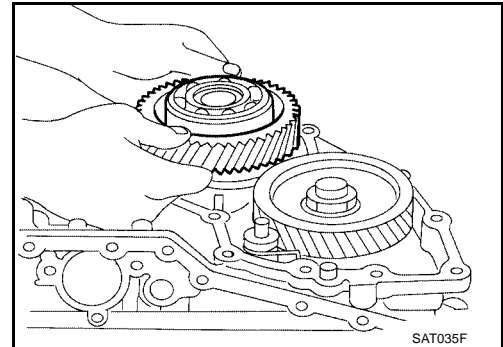
- b. Remove side cover by lightly tapping it with a soft hammer.
- Be careful not to drop output shaft assembly. It might come out when removing side cover.



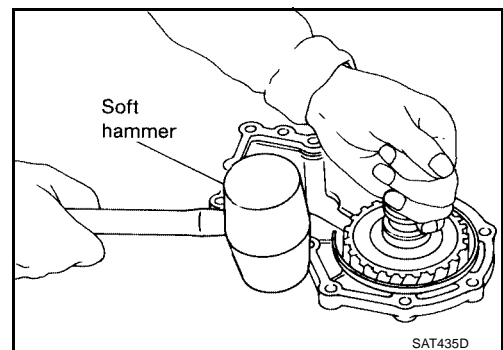
- c. Remove adjusting shim.



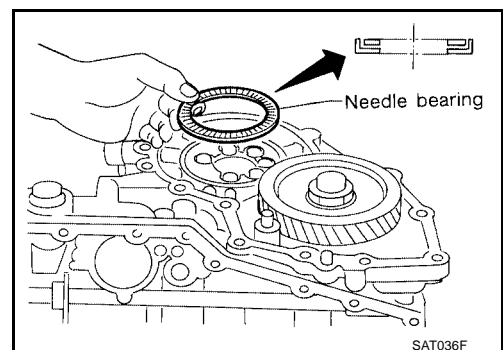
- d. Remove output shaft assembly.



- If output shaft assembly came off with side cover, tap cover with a soft hammer to separate.



- e. Remove needle bearing.



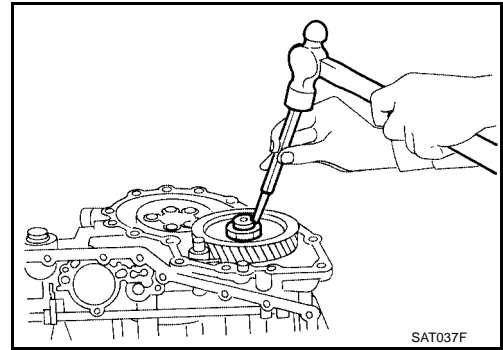
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DISASSEMBLY

[RE4F04B]

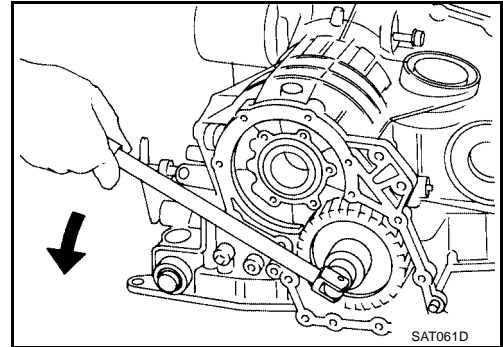
40. Disassemble reduction pinion gear according to the following procedures.

- a. Set manual shaft to position P to fix idler gear.
- b. Unlock idler gear lock nut using a pin punch.

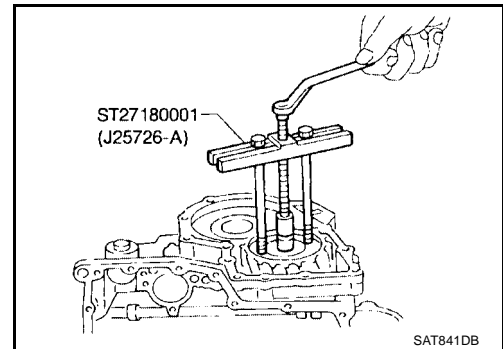


c. Remove idler gear lock nut.

- **Do not reuse idler gear lock nut.**

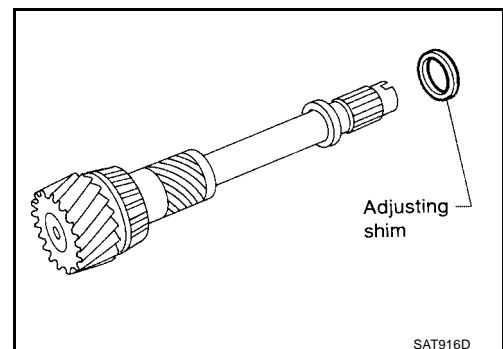


d. Remove idler gear with puller.



e. Remove reduction pinion gear.

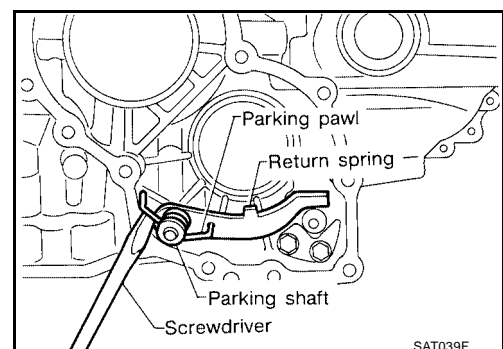
f. Remove adjusting shim from reduction pinion gear.



41. Remove return spring from parking shaft with screwdriver.

42. Draw out parking shaft and remove parking pawl from transmission case.

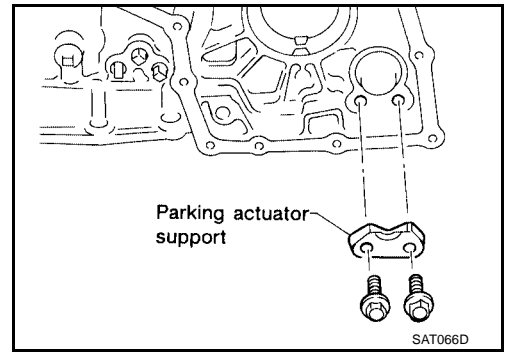
43. Check parking pawl and shaft for damage or wear.



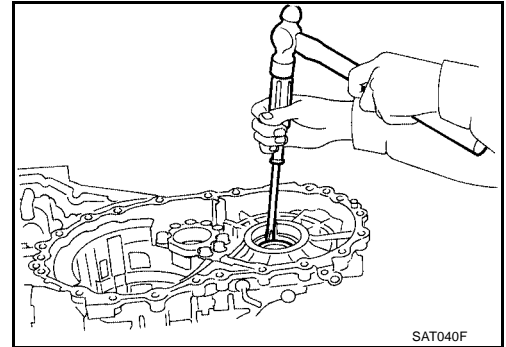
DISASSEMBLY

[RE4F04B]

- 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.



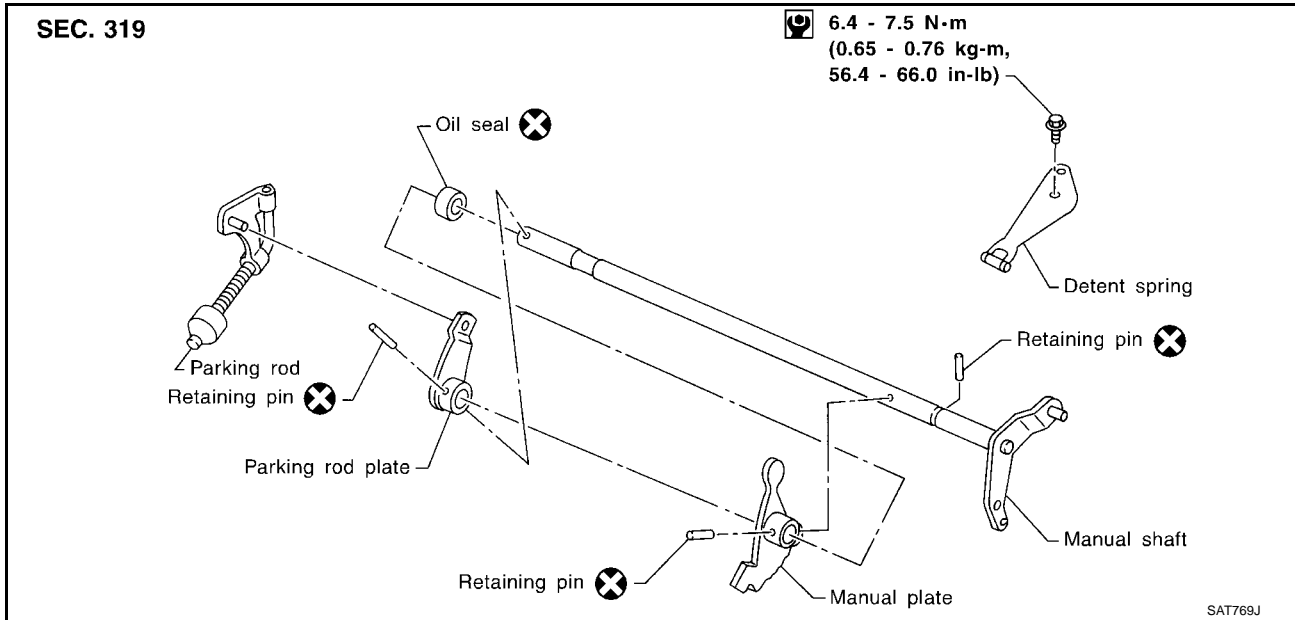
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REPAIR FOR COMPONENT PARTS

PFP:00000

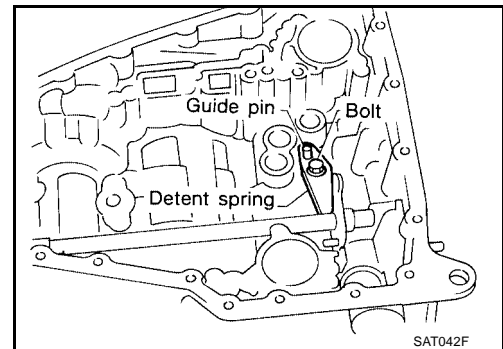
Manual Shaft
COMPONENTS

ECS0067E

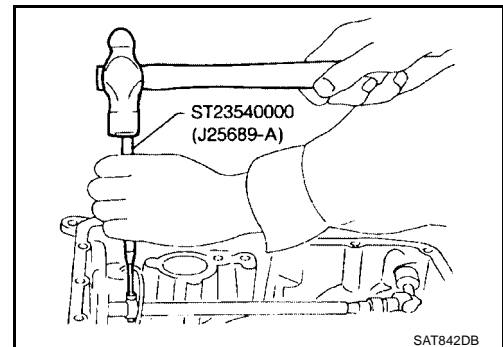


REMOVAL

1. Remove detent spring from transmission case.



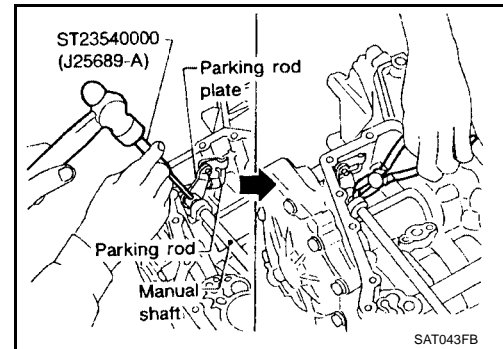
2. Drive out manual plate retaining pin.



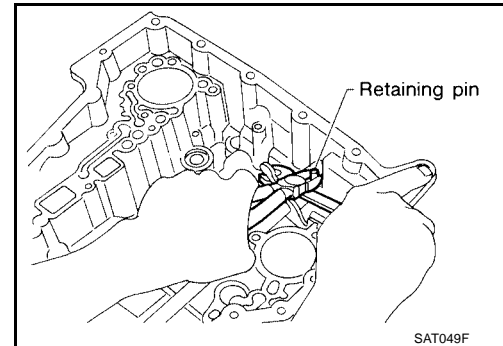
REPAIR FOR COMPONENT PARTS

[RE4F04B]

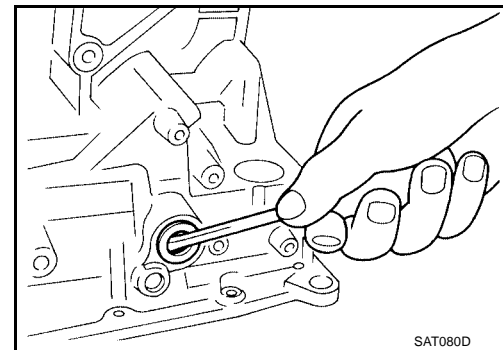
3. Drive and pull out parking rod plate retaining pin.
4. Remove parking rod plate from manual shaft.
5. Draw out parking rod from transmission case.



6. Pull out manual shaft retaining pin.
7. Remove manual shaft and manual plate from transmission case.



8. Remove manual shaft oil seal.

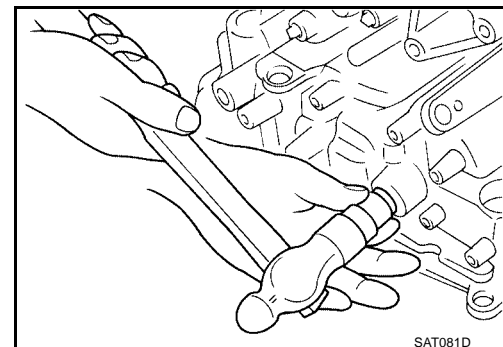


INSPECTION

- Check component parts for wear or damage. Replace if necessary.

INSTALLATION

1. Install manual shaft oil seal.
 - Apply ATF to outer surface of oil seal.

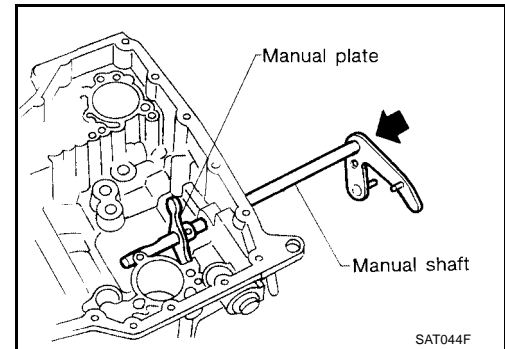


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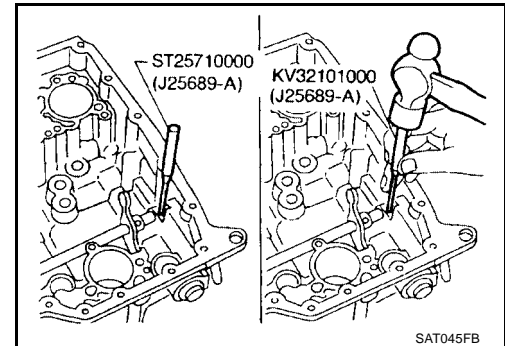
REPAIR FOR COMPONENT PARTS

[RE4F04B]

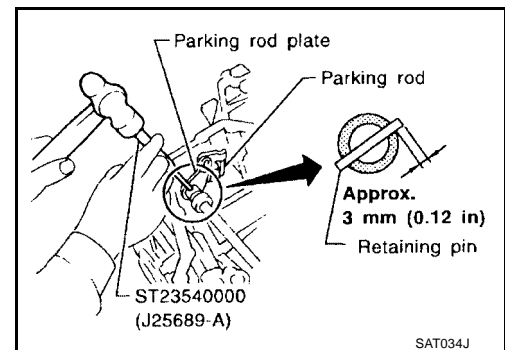
2. Install manual shaft and manual plate.



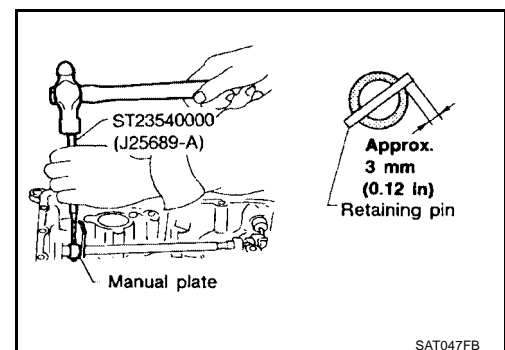
3. Align groove of manual shaft and hole of transmission case.
4. Install manual shaft retaining pin up to bottom of hole.



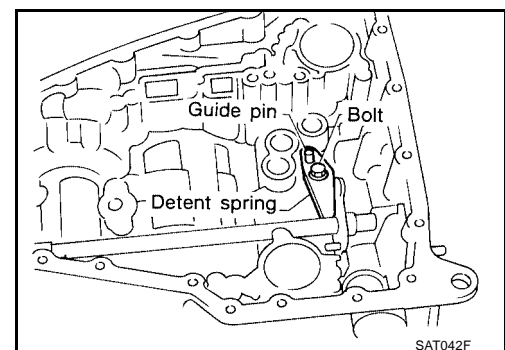
5. Install parking rod to parking rod plate.
6. Set parking rod assembly onto manual shaft and drive retaining pin.
● Both ends of pin should protrude.



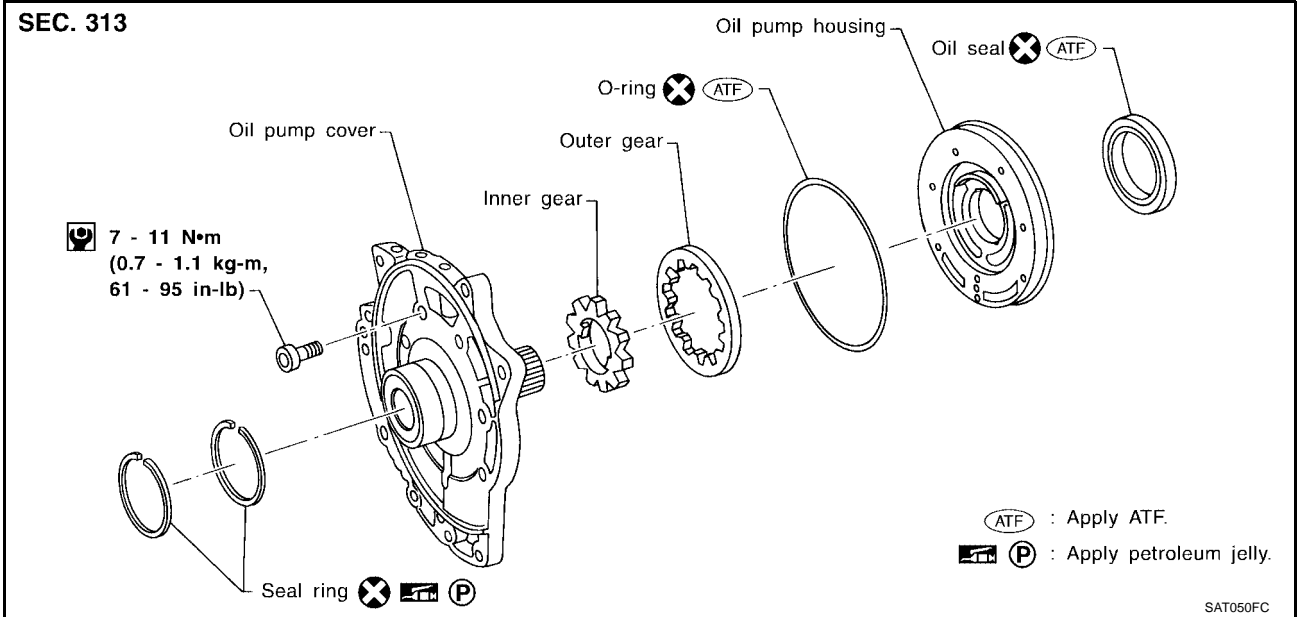
7. Drive manual plate retaining pin.
● Both ends of pin should protrude.



8. Install detent spring. Tighten detent spring bolts to the specified torque. Refer to [AT-672, "COMPONENTS"](#).

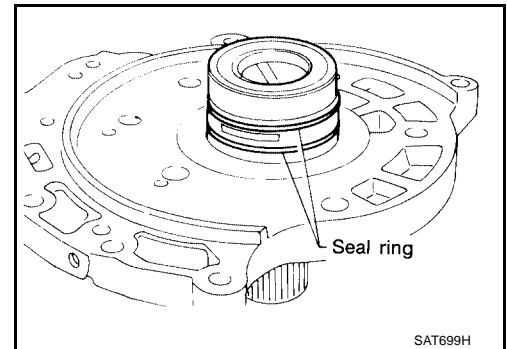


Oil Pump COMPONENTS

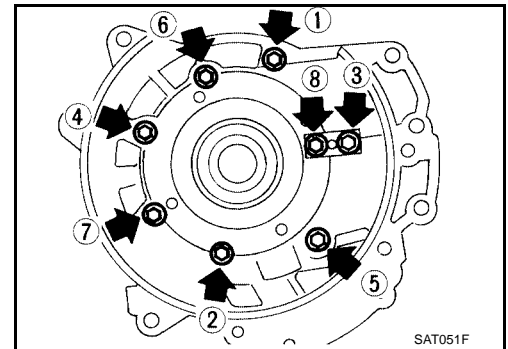


DISASSEMBLY

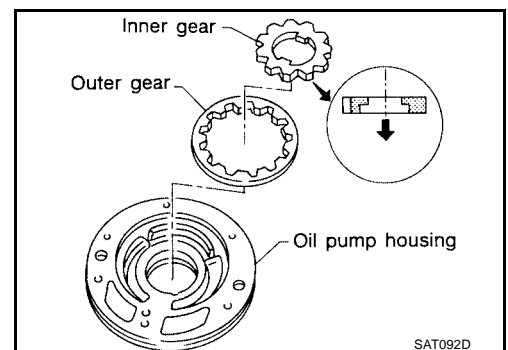
1. Remove seal rings.



2. Loosen bolts in a crisscross pattern and remove oil pump cover.

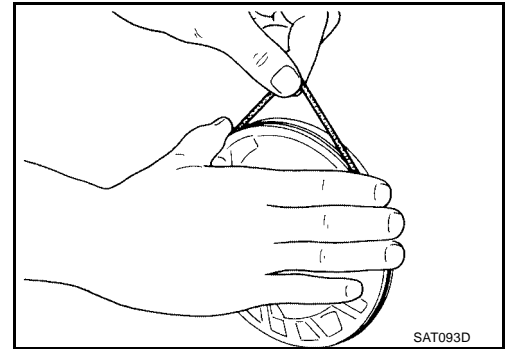


3. Remove inner and outer gear from oil pump housing.

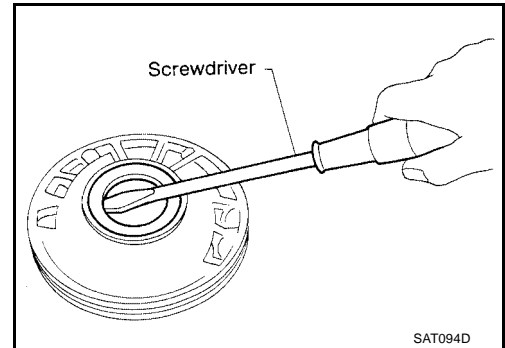


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- Remove O-ring from oil pump housing.



- 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

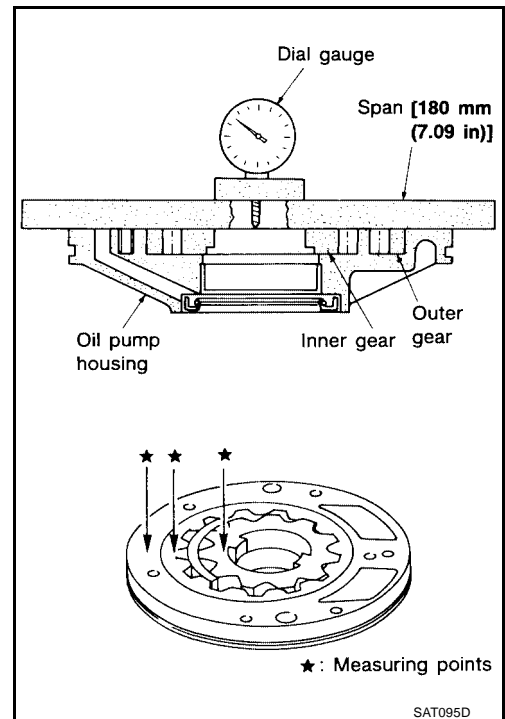
- Measure side clearance of inner and outer gears in at least four places around each outside edge. Maximum measured values should be within specified positions.

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 [AT-757, "OIL PUMP"](#) .

- If clearance is more than standard, replace whole oil pump assembly except oil pump cover.



REPAIR FOR COMPONENT PARTS

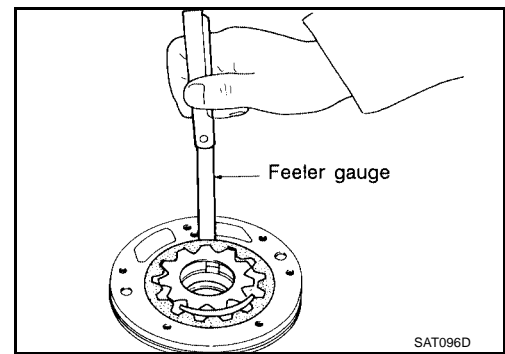
[RE4F04B]

- 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.



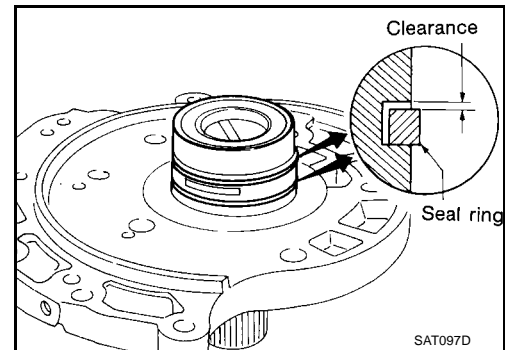
SEAL RING CLEARANCE

- Measure clearance between seal ring and ring groove.

Standard clearance : 0.1 - 0.25 mm
(0.0039 - 0.0098 in)

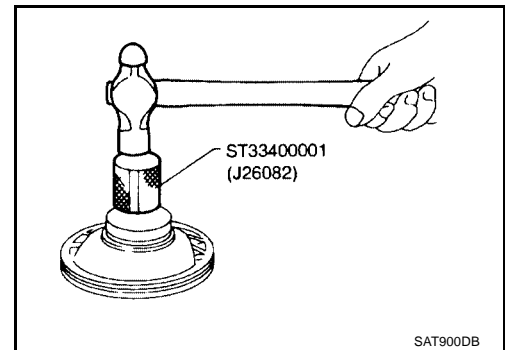
Allowable limit : 0.25 mm (0.0098 in)

- If not within allowable limit, replace oil pump cover assembly.

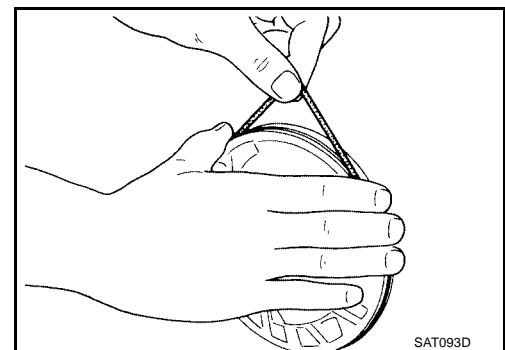


ASSEMBLY

1. Install oil seal on oil pump housing.



2. Install O-ring on oil pump housing.
 - Apply ATF to O-ring.



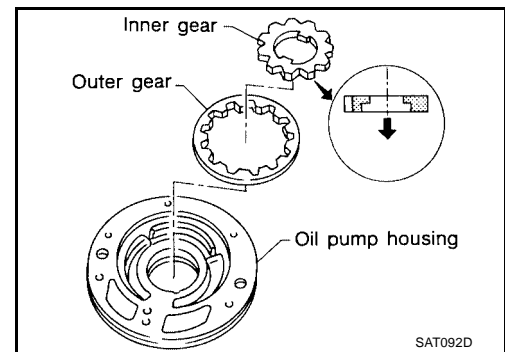
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REPAIR FOR COMPONENT PARTS

[RE4F04B]

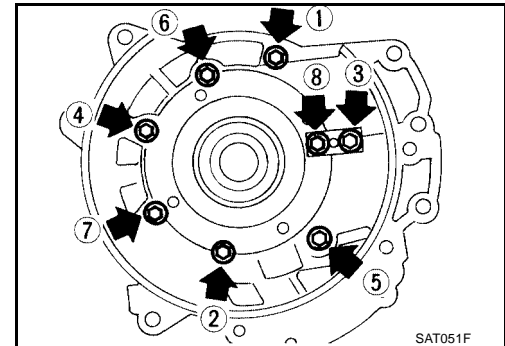
3. Install inner and outer gears on oil pump housing.

- Be careful of direction of inner gear.



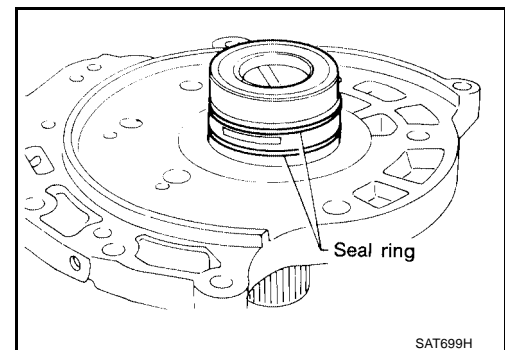
4. Install oil pump cover on oil pump housing.

- 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.
- Tighten bolts in a crisscross pattern. Tighten oil pump cover bolts to the specified torque. Refer to [AT-675, "COMPONENTS"](#)



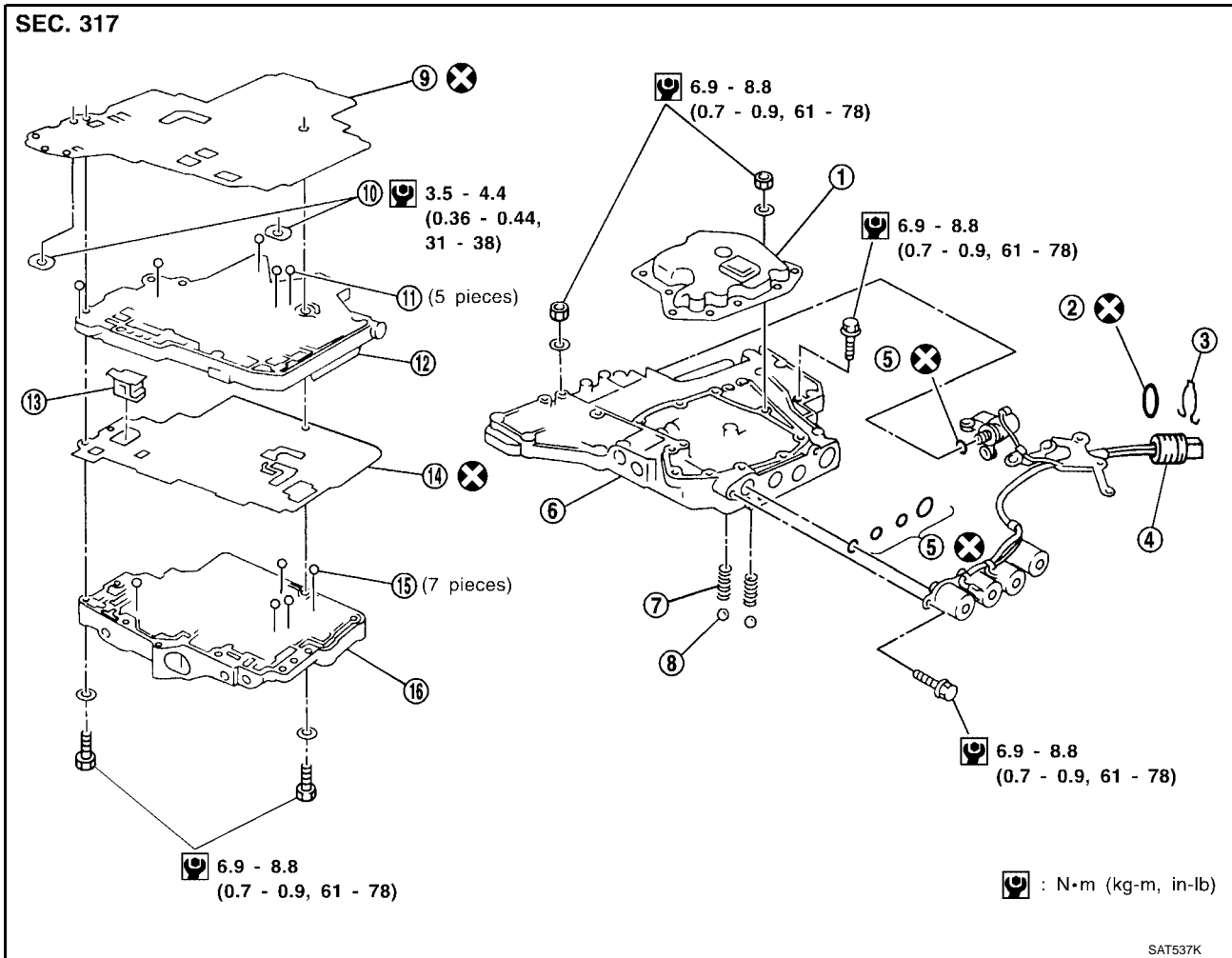
5. Install new seal rings carefully after packing ring groove with petroleum jelly.

- Do not spread gap of seal ring excessively while installing. The ring may be deformed.



**Control Valve Assembly
COMPONENTS**

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


- | | | |
|-----------------------------------|----------------------|------------------------------|
| 1. Oil strainer | 2. O-ring | 3. Snap ring |
| Terminal body | 5. O-rings | 6. Control valve lower body |
| 7. Oil cooler relief valve spring | 8. Check ball | 9. Separating plate |
| 10. Support plate | 11. Steel ball | 12. Control valve inter body |
| 13. Pilot filter | 14. Separating plate | 15. Steel ball |
| 16. Control valve upper body | | |

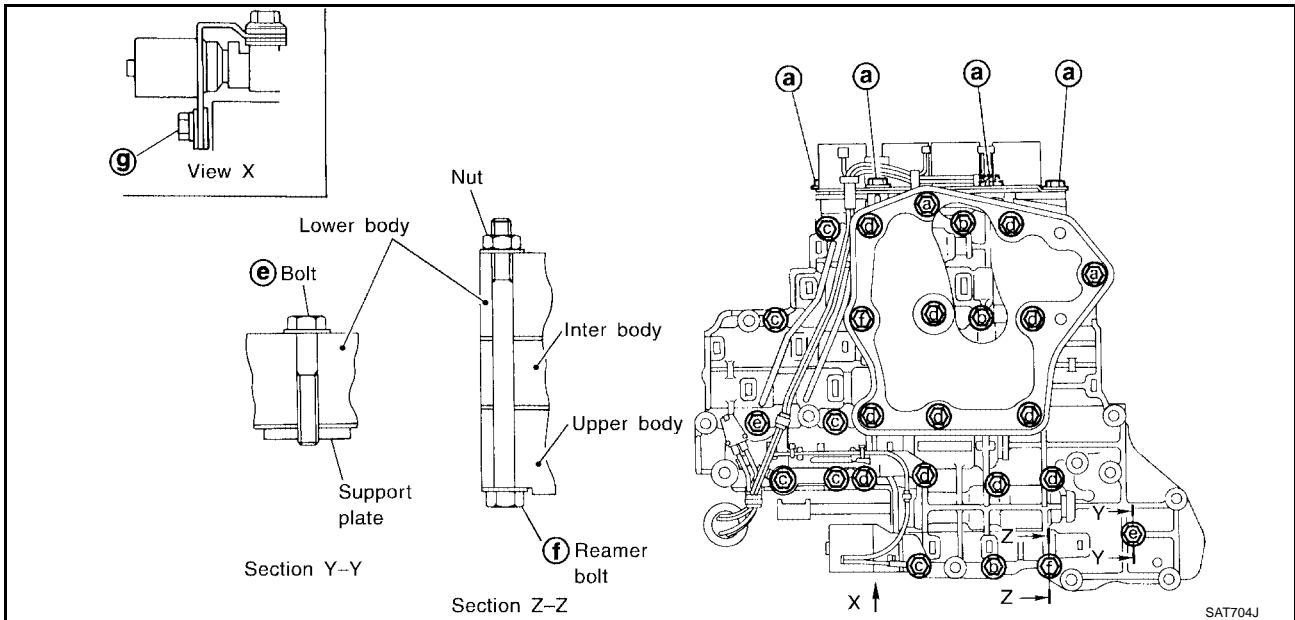
DISASSEMBLY

Disassemble upper, inter and lower bodies.

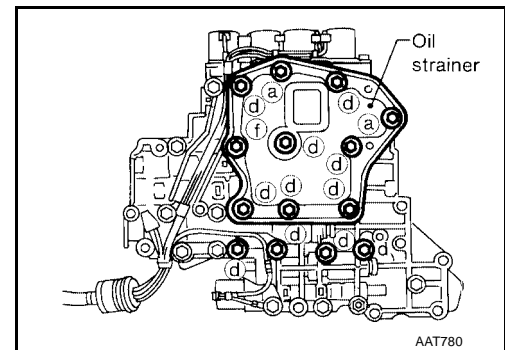
Bolt length, number and location:

Bolt symbol	a	b	c	d	e	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

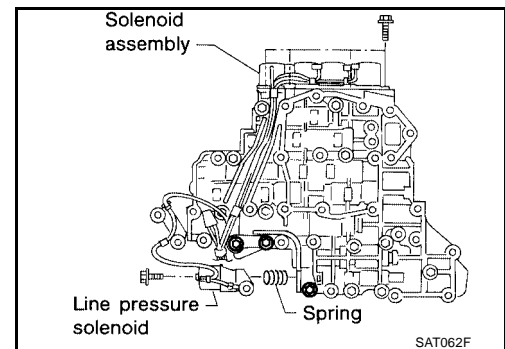
f: Reamer bolt and nut.



1. Remove bolts **a** , **d** and nut **f** and remove oil strainer from control valve assembly.



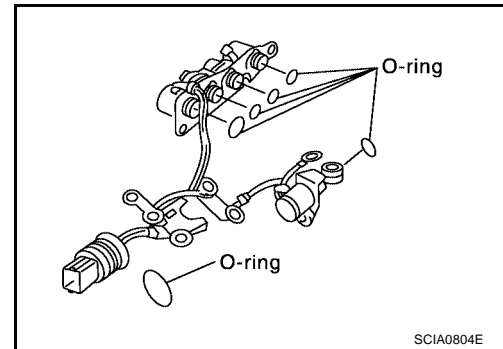
2. Remove solenoid valve assembly and line pressure solenoid valve from control valve assembly.



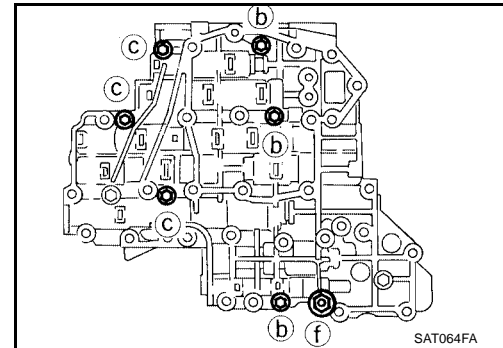
REPAIR FOR COMPONENT PARTS

[RE4F04B]

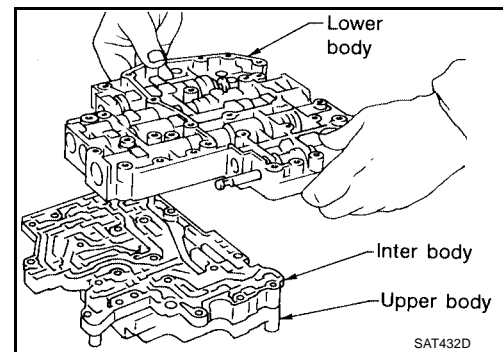
3. Remove O-rings from solenoid valves and terminal body.



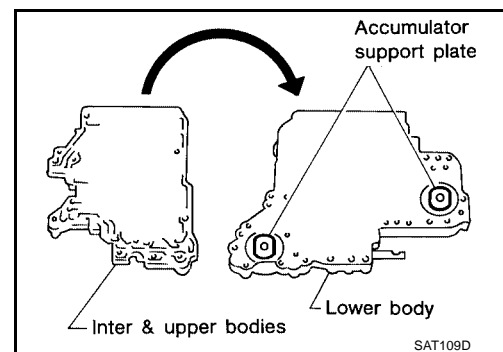
4. Place upper body facedown, and remove bolts **b** , **c** and nut **f** .



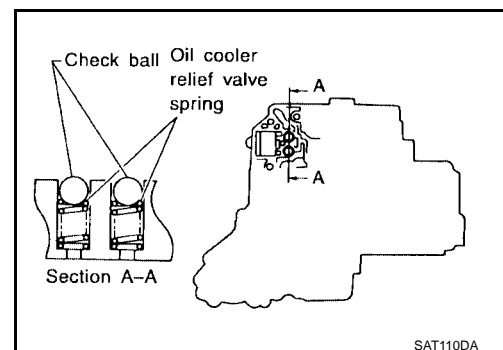
5. Remove inter body from lower body.



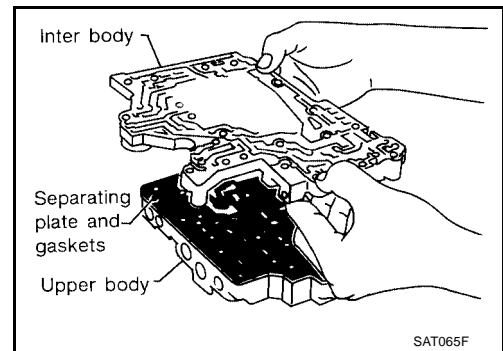
6. Turn over lower body, and remove accumulator support plate.



7. Remove bolts **e** , separating plate and separating gasket from lower body.
8. Remove check balls and oil cooler relief valve springs from lower body.
● Be careful not to lose check balls and oil cooler relief valve springs.

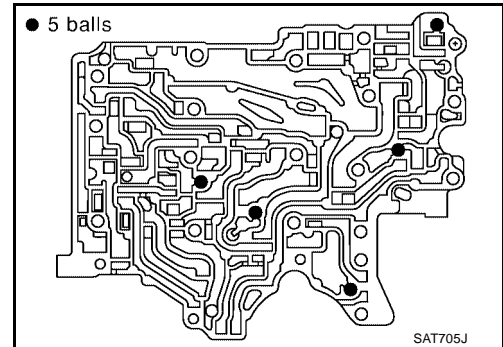


9. Remove inter body from upper body.



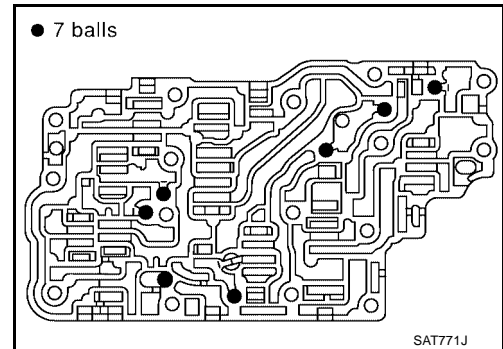
10. Check to see that steel balls are properly positioned in inter body and then remove them.

- Be careful not to lose steel balls.



11. Check to see that steel balls are properly positioned in upper body and then remove them.

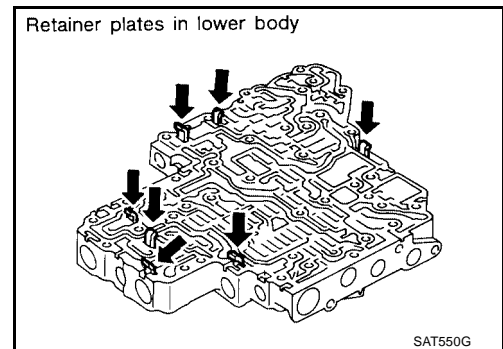
- Be careful not to lose steel balls.



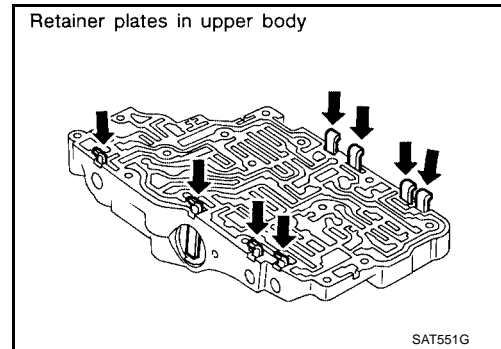
INSPECTION

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.
- **Be careful not to lose these parts.**

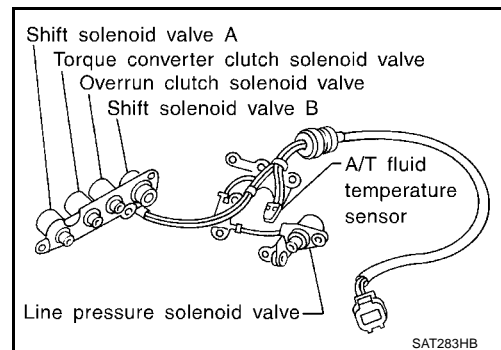


Oil Strainer

- 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

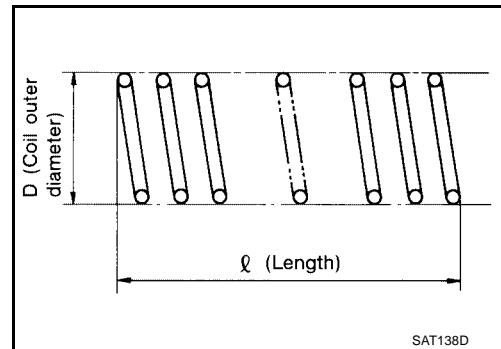
- Measure resistance.
- For shift solenoid valve A, refer to [AT-556](#) .
- For shift solenoid valve B, refer to [AT-561](#) .
- For line pressure solenoid valve, refer to [AT-550](#) .
- For torque converter clutch solenoid valve, refer to [AT-537](#) .
- For overrun clutch solenoid valve, refer to [AT-571](#) .



Oil Cooler Relief Valve Spring

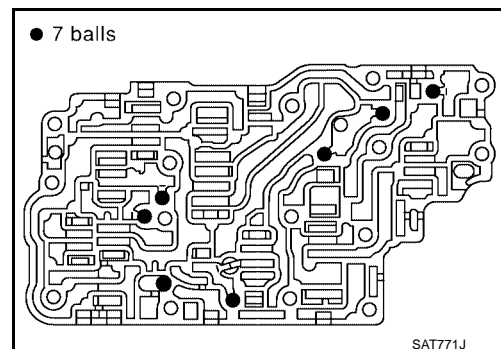
- Check springs for damage or deformation.
- Measure free length and outer diameter.

Inspection standard : Refer to [AT-753, "CONTROL VALVE AND PLUG RETURN SPRINGS"](#) .



ASSEMBLY

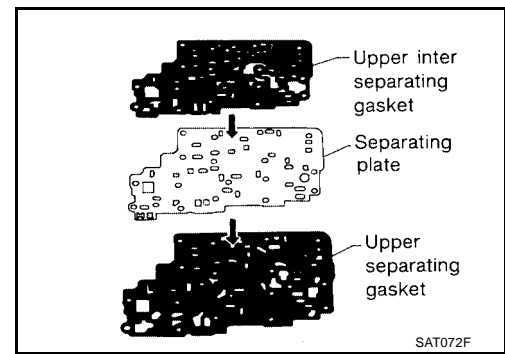
1. Install upper, inter and lower body.
 - a. Place oil circuit of upper body face up. Install steel balls in their proper positions.



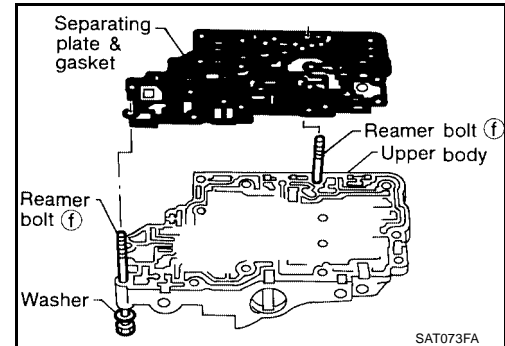
REPAIR FOR COMPONENT PARTS

[RE4F04B]

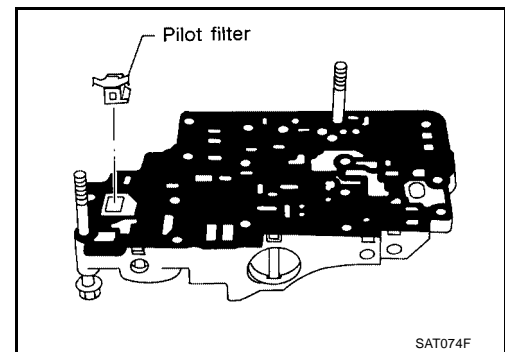
- b. Install upper separating gasket, upper inter separating gasket and upper separating plate in order shown in illustration.



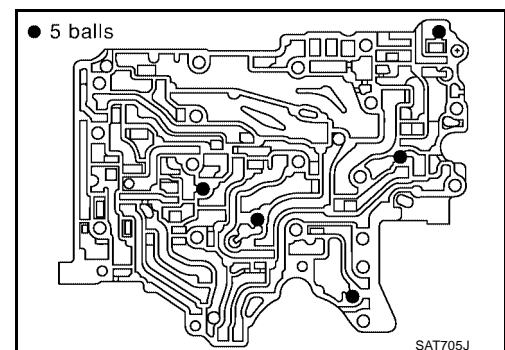
- c. Install reamer bolts **f** from bottom of upper body. Using reamer bolts as guides, install separating plate and gaskets as a set.



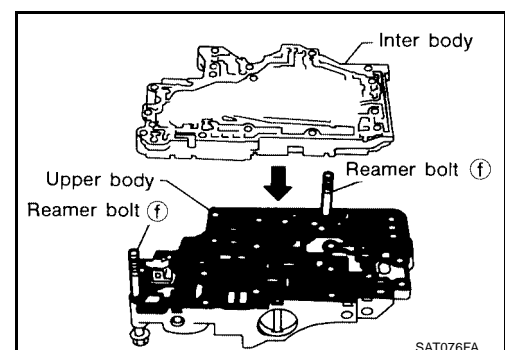
- d. Install pilot filter.



- e. Place lower body as shown in illustration (side of inter body face up). Install steel balls in their proper positions.



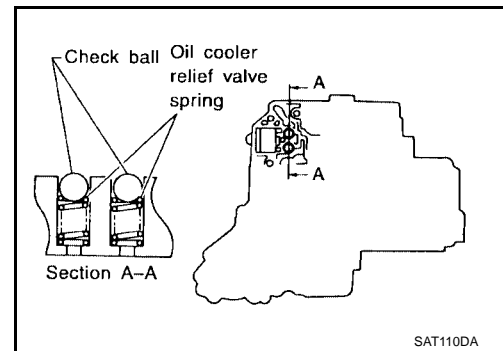
- f. Install inter body on upper body using reamer bolts **f** as guides.
● Be careful not to dislocate or drop steel balls.



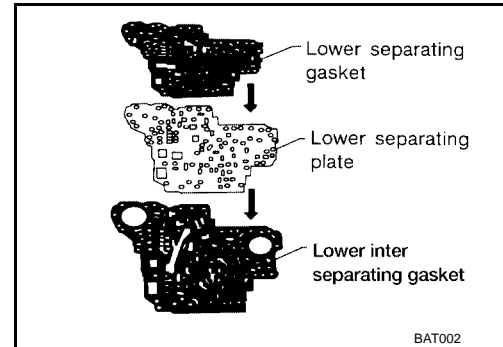
REPAIR FOR COMPONENT PARTS

[RE4F04B]

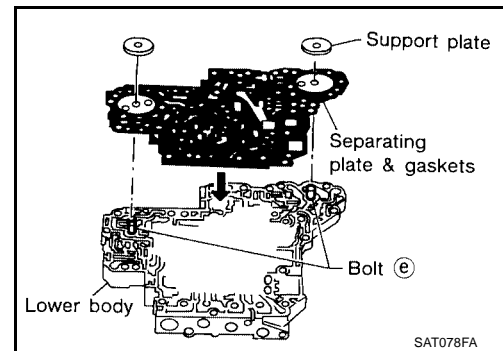
- g. Install check balls and oil cooler relief valve springs in their proper positions in lower body.



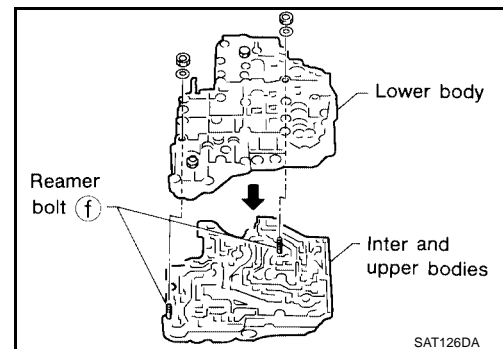
- h. Install lower separating gasket, lower inter separating gasket and lower separating plate in order shown in illustration.



- i. Install bolts **e** from bottom of lower body. Using bolts **e** as guides, install separating plate and gaskets as a set.



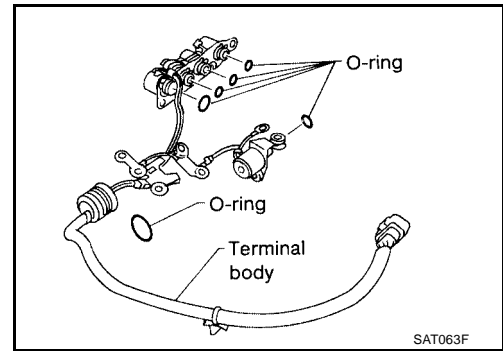
- j. Temporarily install support plates on lower body.
- k. Install lower body on inter body using reamer bolts **f** as guides and tighten reamer bolts **f** slightly.



REPAIR FOR COMPONENT PARTS

[RE4F04B]

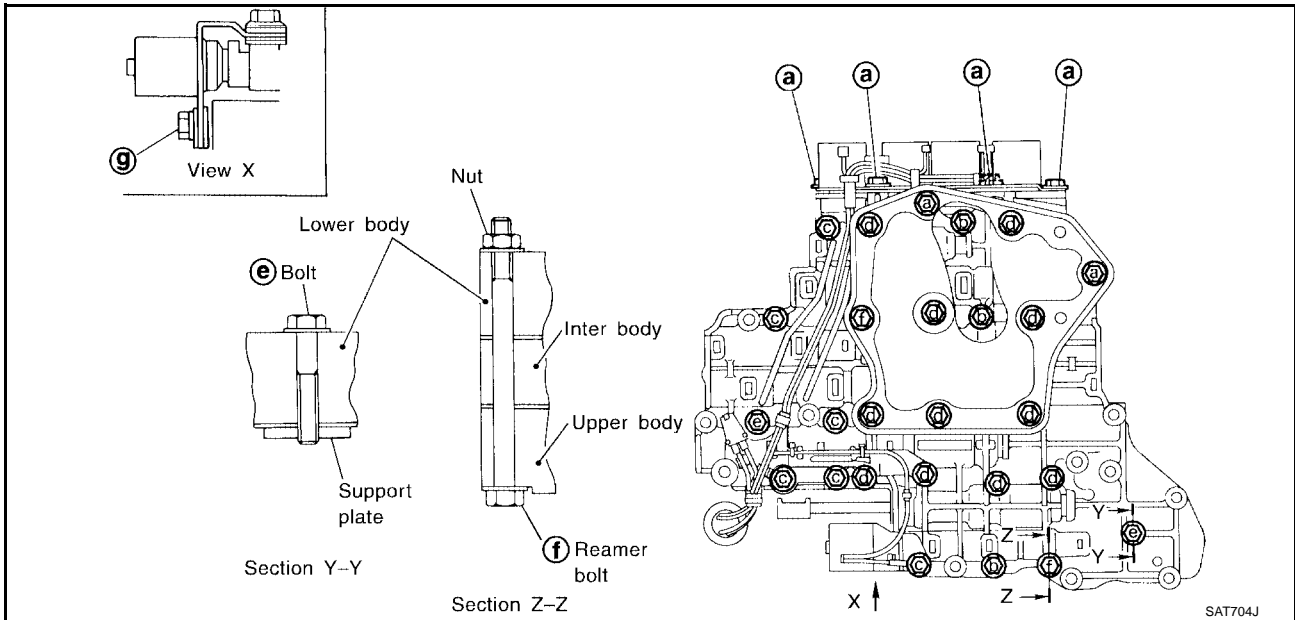
2. Install O-rings to solenoid valves and terminal body.
 - Apply ATF to O-rings.



3. Install and tighten bolts.

Bolt length, number and location:

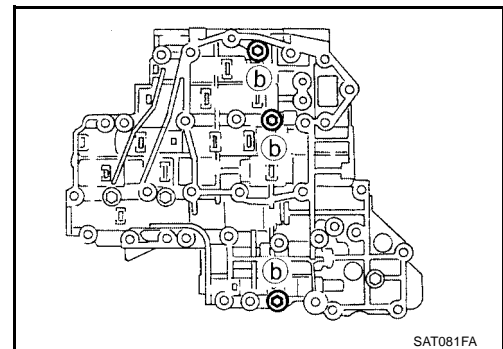
Bolt symbol	a	b	c	d	e	f	g
Bolt length "ℓ" mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1



- a. Install and tighten bolts **b** to specified torque.



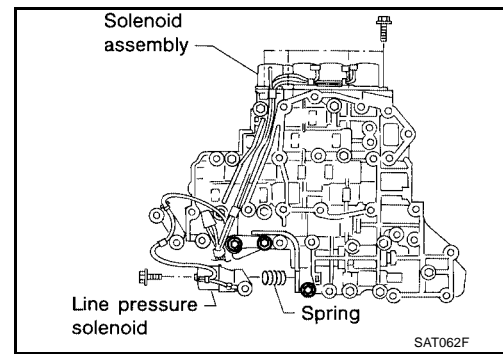
: 7 - 9 N·m (0.7 - 0.9 kg·m, 61 - 78 in-lb)




REPAIR FOR COMPONENT PARTS

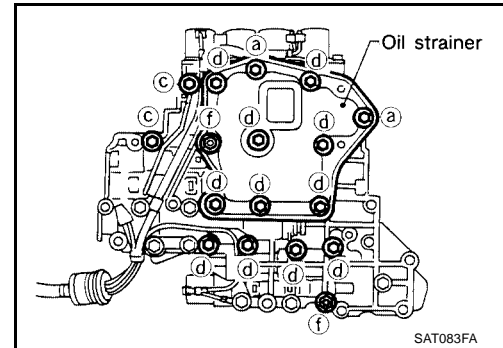
[RE4F04B]

- b. Install solenoid valve assembly and line pressure solenoid valve to lower body.




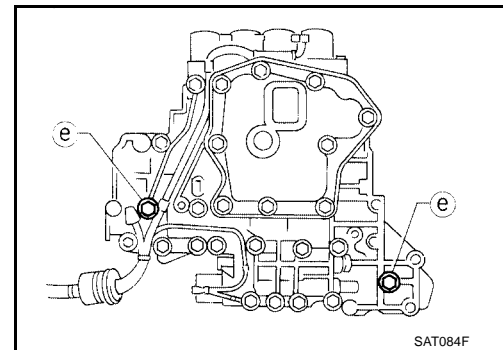
- c. Set oil strainer, then tighten bolts **a**, **c**, **d** and nuts **f** to specified torque.

 : 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.

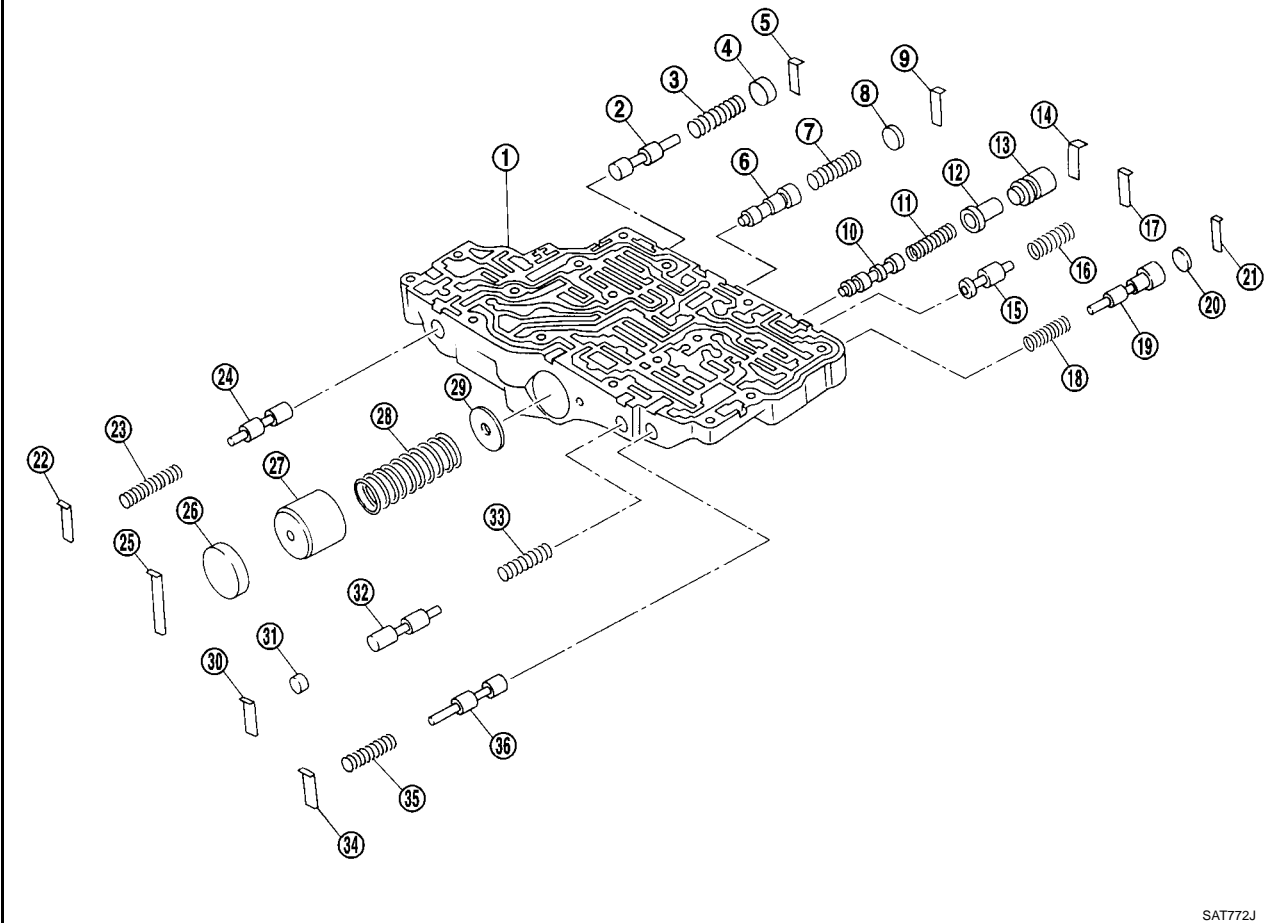
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REPAIR FOR COMPONENT PARTS

[RE4F04B]

SEC. 317

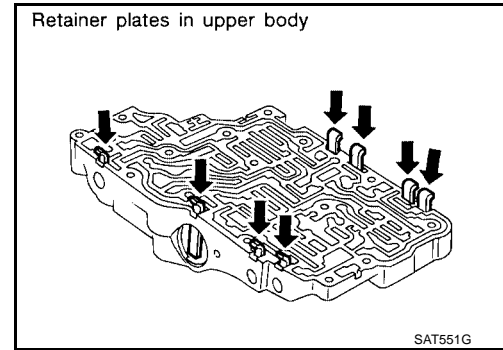


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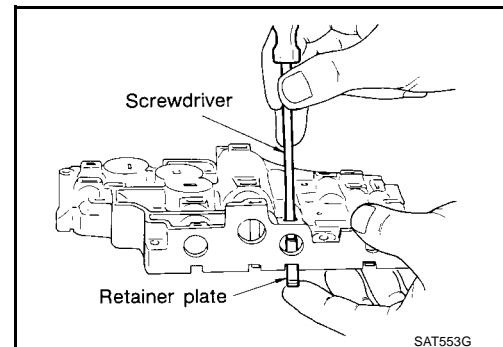
- | | | |
|--|------------------------------------|--|
| 1. Upper body | 2. Cooler check valve | 3. Return spring |
| 4. Plug | 5. Retainer plate | 6. 1-2 accumulator valve |
| 7. Return spring | 8. Plug | 9. Retainer plate |
| 10. Torque converter clutch control valve | 11. Return spring | 12. Torque converter clutch control plug |
| . | . | . |
| 13. Torque converter clutch control sleeve | 14. Retainer plate | 15. Torque converter relief valve |
| . | . | . |
| 16. Return spring | 17. Retainer plate | 18. Return spring |
| . | . | . |
| 19. Overrun clutch reducing valve | 20. Plug | 21. Retainer plate |
| . | . | . |
| 22. Retainer plate | 23. Return spring | 24. Pilot valve |
| . | . | . |
| 25. Retainer plate | 26. Plug | 27. 1-2 accumulator piston |
| . | . | . |
| 28. Return spring | 29. 1-2 accumulator retainer plate | 30. Retainer plate |
| . | . | . |
| 31. Plug | 32. 1st reducing valve | 33. Return spring |
| . | . | . |
| 34. Retainer plate | 35. Return spring | 36. 3-2 timing valve |
| . | . | . |

DISASSEMBLY

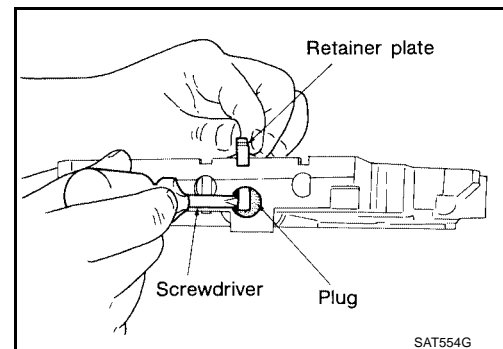
1. Remove valves at retainer plates.
 - Do not use a magnetic pick-up tool.



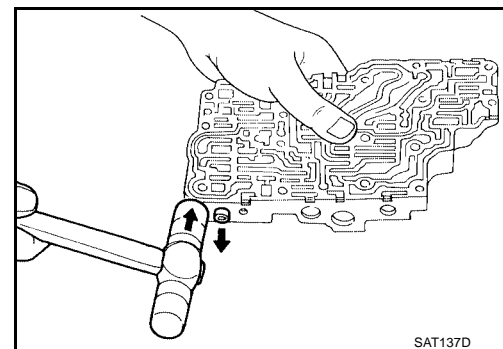
- a. Use a screwdriver to remove retainer plates.



- 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.



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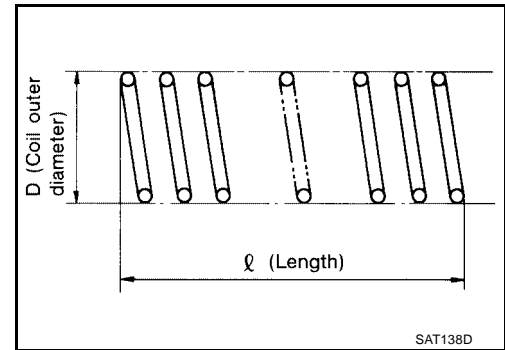
INSPECTION

Valve Spring

- Measure free length and outer diameter of each valve spring. Also check for damage or deformation.

Inspection standard : Refer to [AT-753, "CONTROL VALVE AND PLUG RETURN SPRINGS"](#) .

- Replace valve springs if deformed or fatigued.

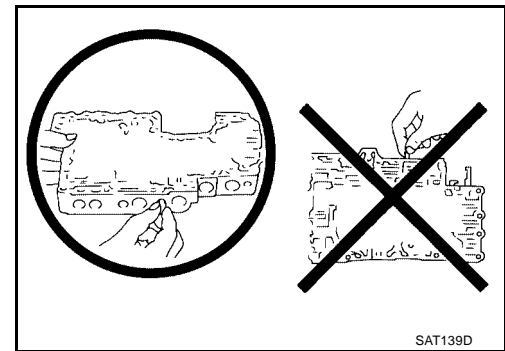


Control Valves

- Check sliding surfaces of valves, sleeves and plugs.

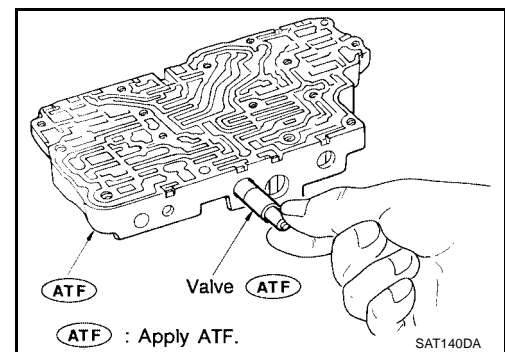
ASSEMBLY

- Lay control valve body down when installing valves. Do not stand the control valve body upright.

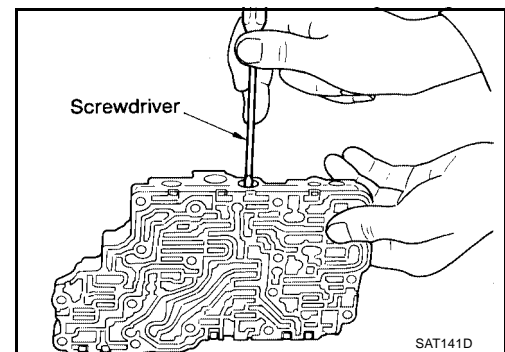


1. Lubricate the control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.

- Be careful not to scratch or damage valve body.

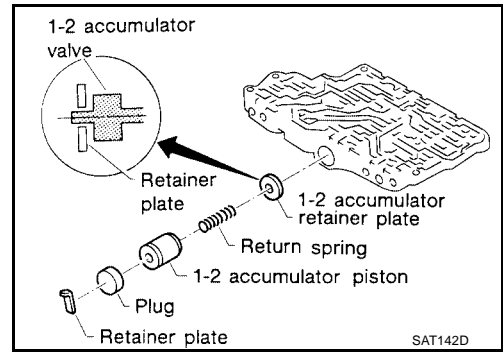


- Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.

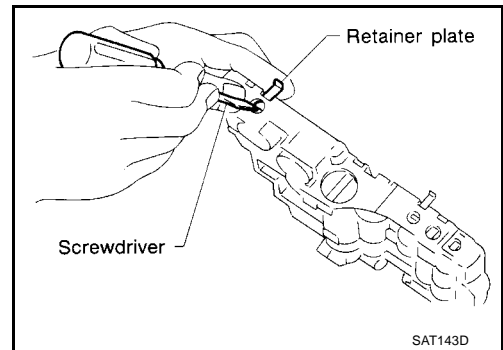


1-2 Accumulator Valve

- 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.



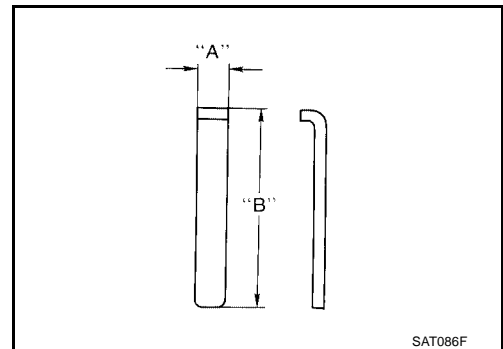
1. Install retainer plates.
 - While pushing plug or return spring, install retainer plate.



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		38.5 (1.516)
9	1-2 accumulator valve		
25	1-2 accumulator piston valve		24.0 (0.945)
21	Overrun clutch reducing valve		
5	Cooler check valve		28.0 (1.102)
14	Torque converter clutch control valve		



- Install proper retainer plates.
Refer to [AT-687, "Control Valve Upper Body"](#).

Control Valve Lower Body COMPONENTS

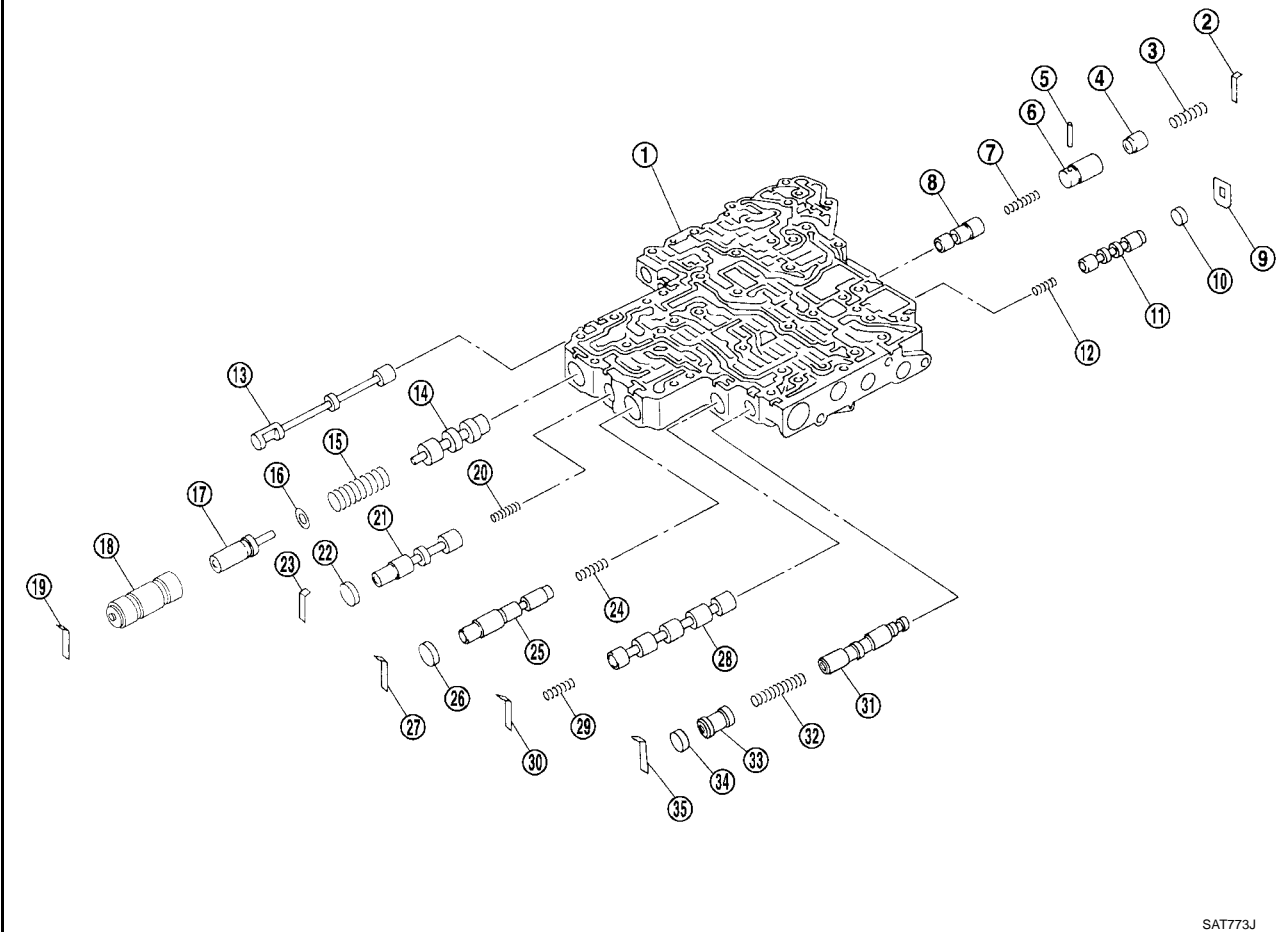
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Apply ATF to all components before installation.

REPAIR FOR COMPONENT PARTS

[RE4F04B]

SEC. 317

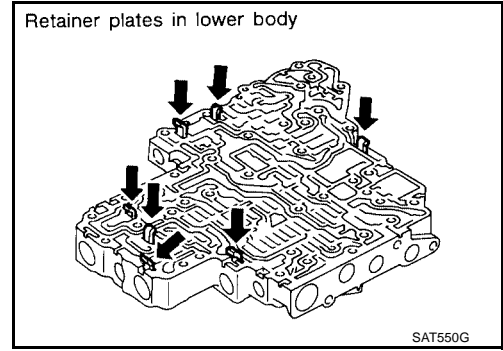


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- | | | |
|-------------------------------|------------------------------|----------------------------------|
| 1. Lower body | 2. Retainer plate | 3. Return spring |
| 4. Piston | 5. Parallel pin | 6. Sleeve |
| 7. Return spring | 8. Pressure modifier valve | 9. Retainer plate |
| 10. Plug | 11. Shift valve B | 12. Return spring |
| . | . | . |
| 13. Manual valve | 14. Pressure regulator valve | 15. Return spring |
| . | . | . |
| 16. Spring seat | 17. Plug | 18. Sleeve |
| . | . | . |
| 19. Retainer plate | 20. Return spring | 21. Overrun clutch control valve |
| . | . | . |
| 22. Plug | 23. Retainer plate | 24. Return spring |
| . | . | . |
| 25. Accumulator control valve | 26. Plug | 27. Retainer plate |
| . | . | . |
| 28. Shift valve A | 29. Return spring | 30. Retainer plate |
| . | . | . |
| 31. Shuttle valve | 32. Return spring | 33. Plug |
| . | . | . |
| 34. Plug | 35. Retainer plate | . |
| . | . | . |

DISASSEMBLY

- Remove valves at retainer plate.
For removal procedures, refer to [AT-689, "DISASSEMBLY"](#).



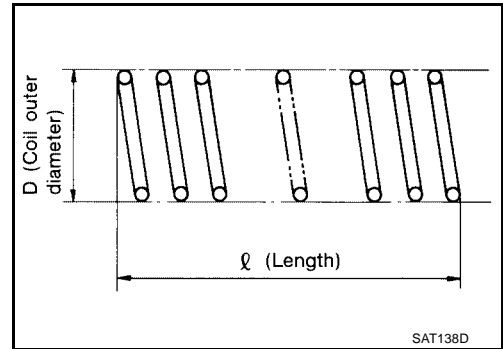
INSPECTION

Valve Springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter.

Inspection standard : Refer to [AT-753, "CONTROL VALVE AND PLUG RETURN SPRINGS"](#).

- Replace valve springs if deformed or fatigued.

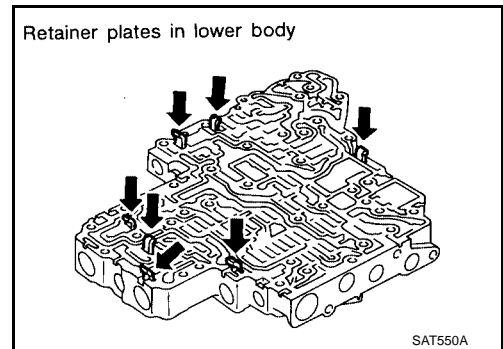


Control Valves

- Check sliding surfaces of control valves, sleeves and plugs for damage.

ASSEMBLY

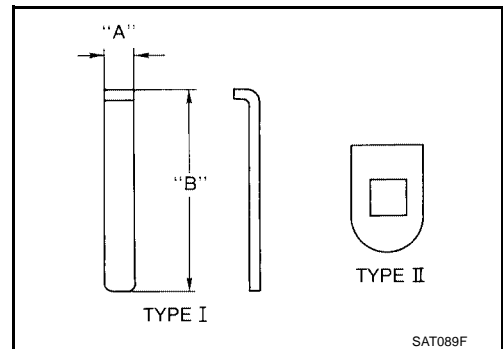
- Install control valves.
For installation procedures, refer to [AT-690, "ASSEMBLY"](#).



Retainer Plate (Lower Body)

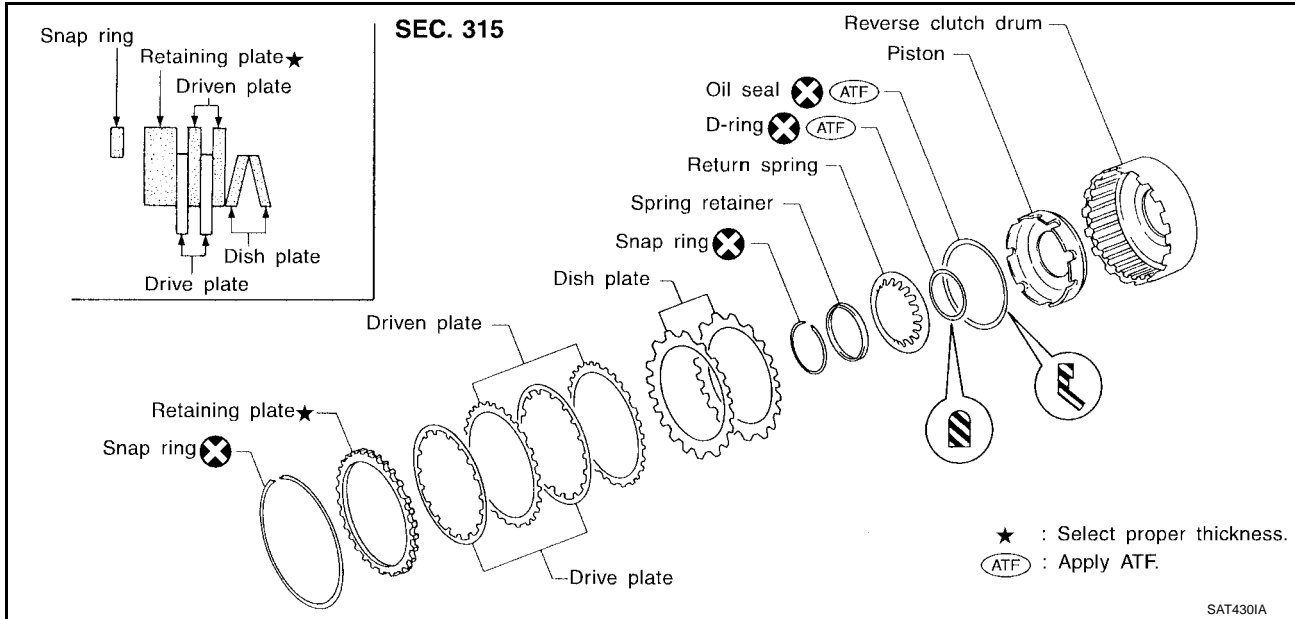
Unit: mm (in)

No.	Name of control valve and plug	Width A	Length B	Type
19	Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
27	Accumulator control valve			
30	Shift valve A			
23	Overrun clutch control valve			
2	Pressure modifier valve			
35	Shuttle valve	—	—	II
9	Shift valve B			



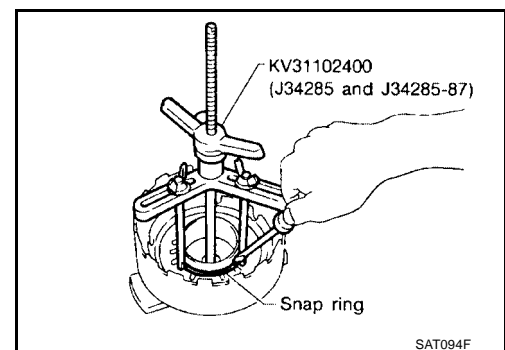
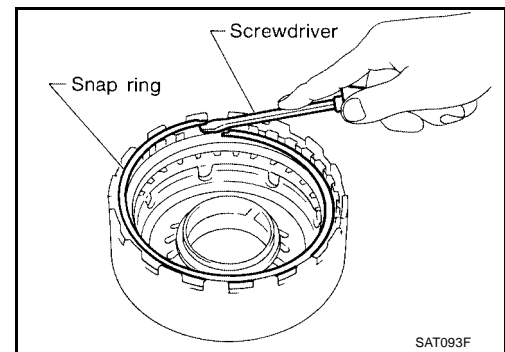
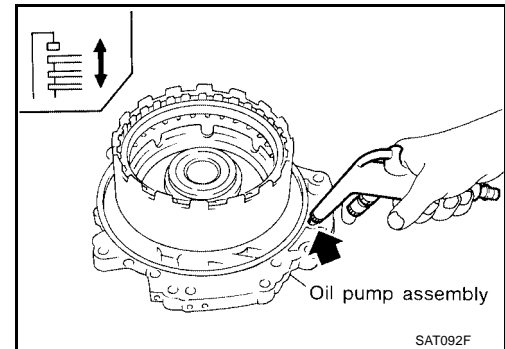
- Install proper retainer plates.
Refer to [AT-691, "Control Valve Lower Body"](#).

Reverse Clutch COMPONENTS

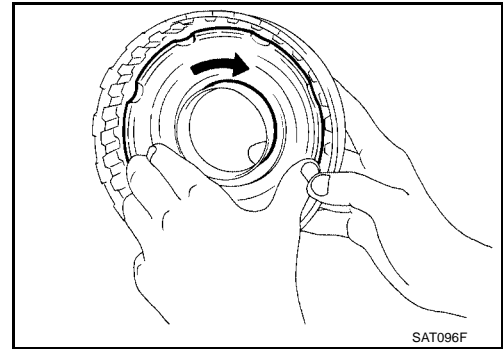


DISASSEMBLY

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.
2. Remove snap ring.
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.



6. Remove piston from reverse clutch drum by turning it.
7. Remove D-ring and oil seal from piston.



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INSPECTION

Reverse Clutch Snap Ring, Spring Retainer and Return Springs

- Check for deformation, fatigue or damage.
If necessary, replace.

Reverse Clutch Drive Plates

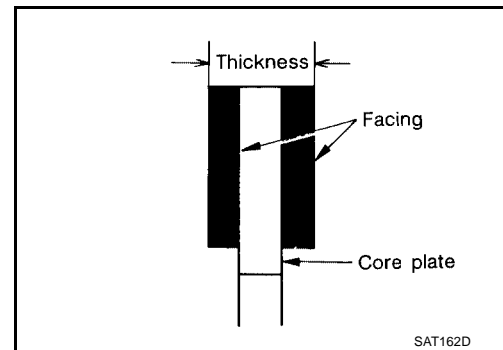
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

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.



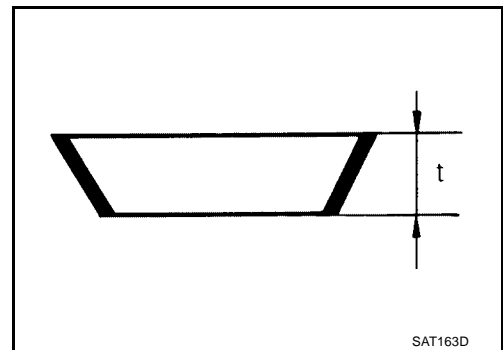
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Reverse Clutch Dish Plates

- 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.



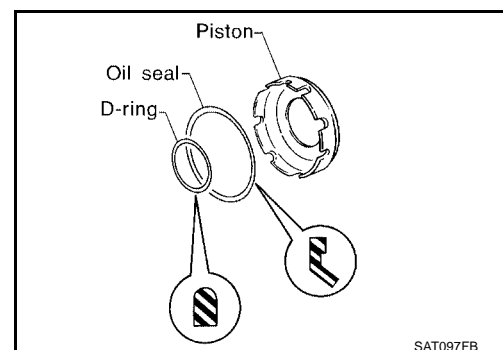
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Reverse Clutch Piston

- 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

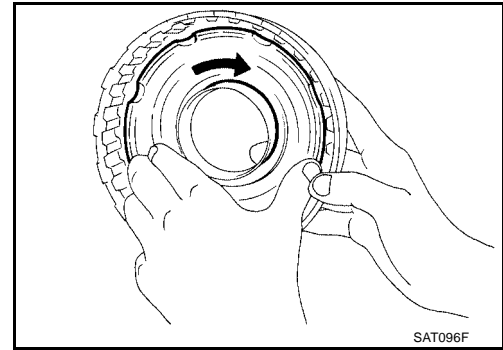
1. Install D-ring and oil seal on piston.
 - Take care with the direction of oil seal.
 - Apply ATF to both parts.



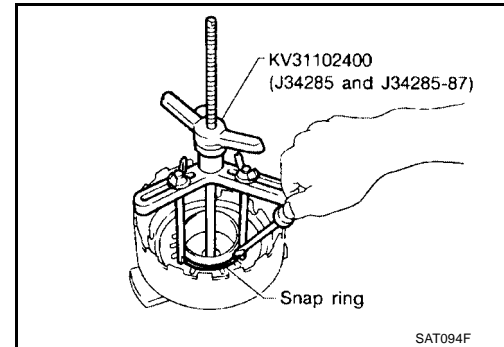
REPAIR FOR COMPONENT PARTS

[RE4F04B]

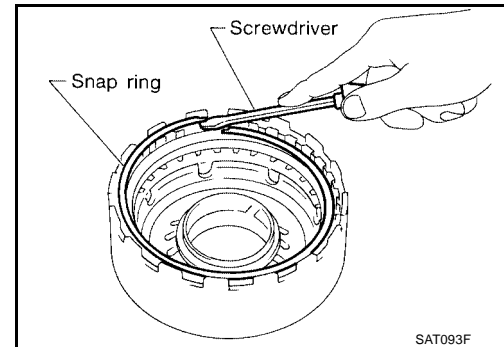
2. Install piston assembly by turning it slowly.
 - Apply ATF to inner surface of drum.



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.
5. Install drive plates, driven plates, retaining plate and dish plates.
 - Take care with order of plates.
6. Install snap ring.



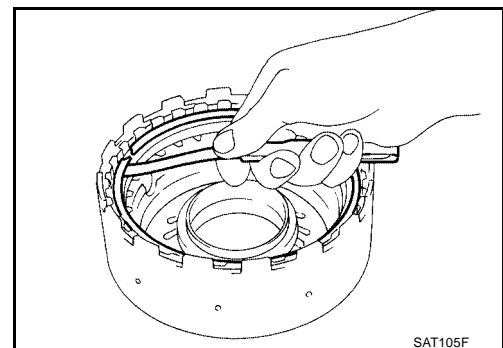
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

Specified clearance

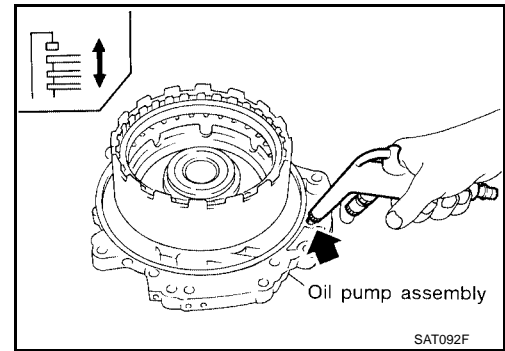
Standard : 0.5 - 0.8 mm (0.020 - 0.031 in)

Allowable limit : 1.2 mm (0.047 in)

Retaining plate : Refer to [AT-754, "REVERSE CLUTCH"](#) .



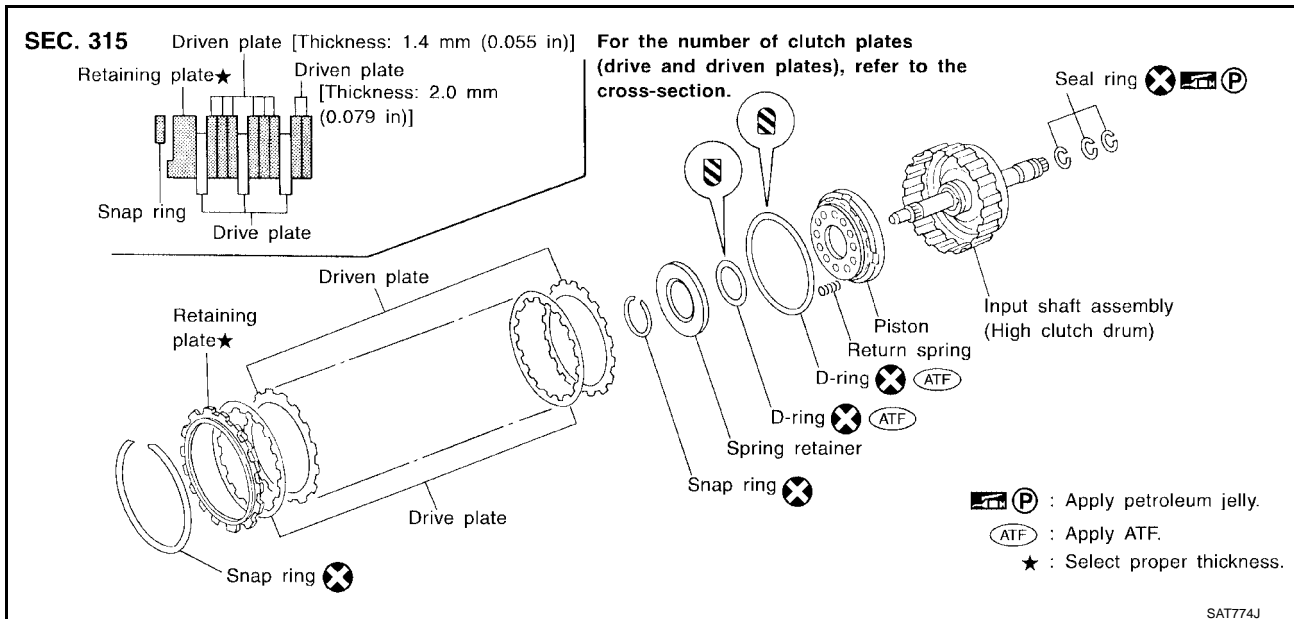
8. Check operation of reverse clutch.
Refer to [AT-694, "DISASSEMBLY"](#).



SAT092F

ECS0067K

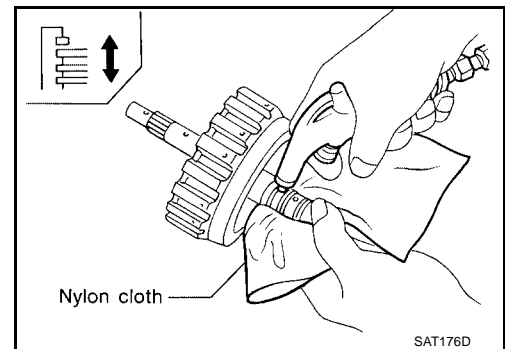
High Clutch COMPONENTS



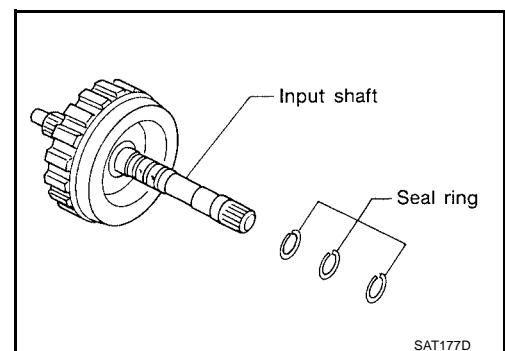
SAT774J

DISASSEMBLY

1. Check operation of high clutch.
 - a. Apply compressed air to oil hole of input shaft with nylon cloth.
 - Stop up hole on opposite side of input shaft with nylon cloth.
 - 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. Remove seal rings from input shaft.
 - Always replace when removed.



SAT176D

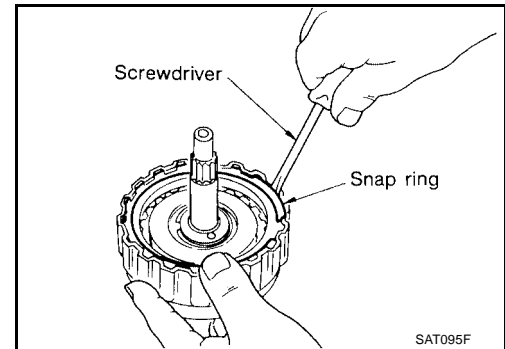


SAT177D

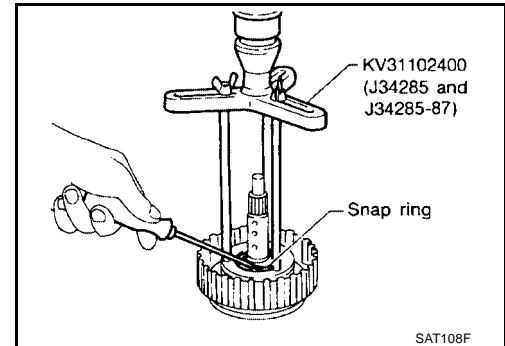
REPAIR FOR COMPONENT PARTS

[RE4F04B]

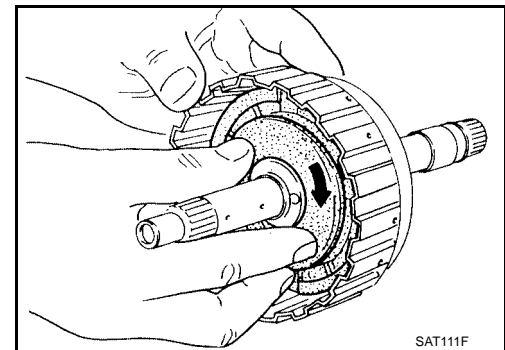
3. Remove snap ring.
4. Remove drive plates, driven plates and retaining plate.



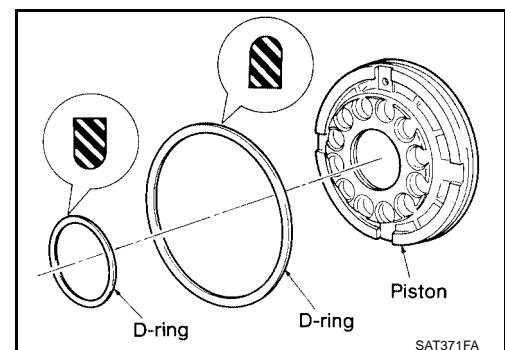
5. Set Tool on spring retainer and remove snap ring from high clutch drum while compressing return springs.
 - **Set Tool directly over springs.**
 - **Do not expand snap ring excessively.**
6. Remove spring retainer and return springs.



7. Remove piston from high clutch drum by turning it.



8. Remove D-rings from piston.



INSPECTION

High Clutch 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.**

High Clutch Drive Plates

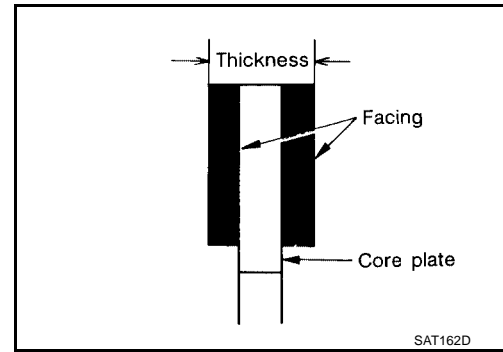
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate:

Standard value : 1.6 mm (0.063 in)

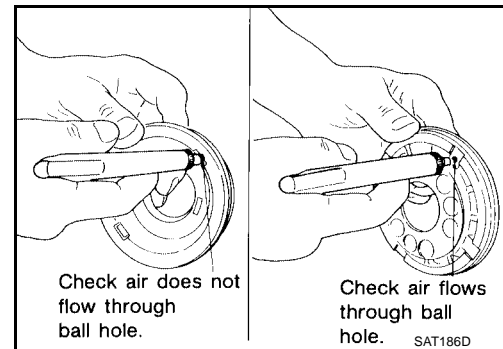
Wear limit : 1.4 mm (0.055 in)

- If not within wear limit, replace.



High Clutch Piston

- 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.



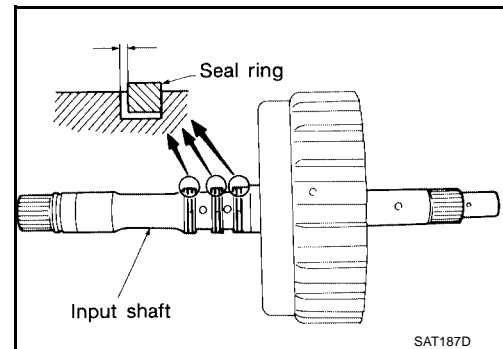
Seal Ring Clearance

- 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)

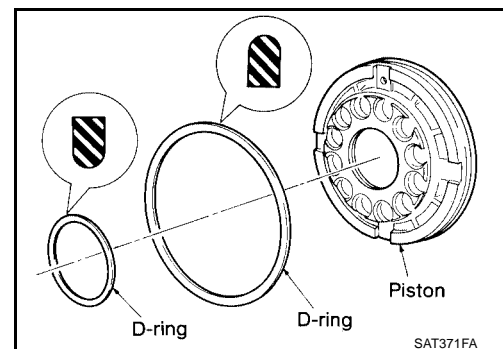
Allowable limit : 0.23 mm (0.0091 in)

- If not within allowable limit, replace input shaft assembly.



ASSEMBLY

1. Install D-rings on piston.
 - Apply ATF to both parts.

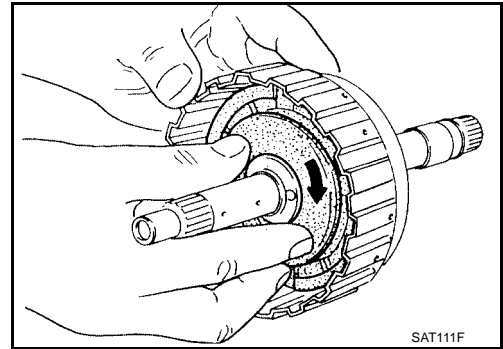


REPAIR FOR COMPONENT PARTS

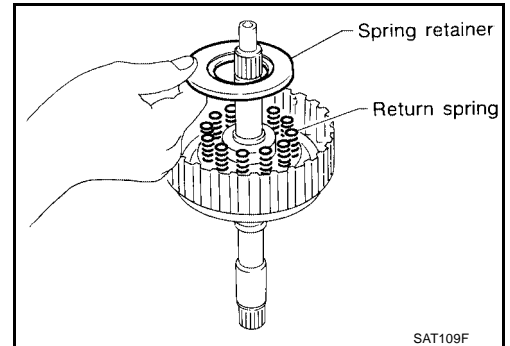
[RE4F04B]

2. Install piston assembly by turning it slowly.

- Apply ATF to inner surface of drum.

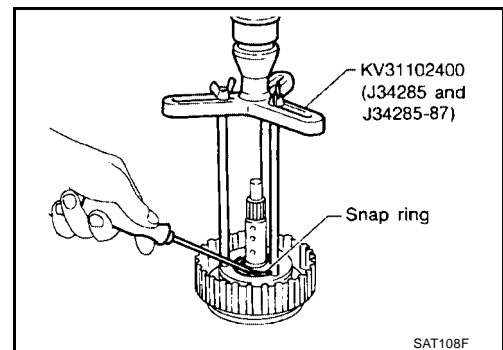


3. Install return springs and spring retainer on piston.

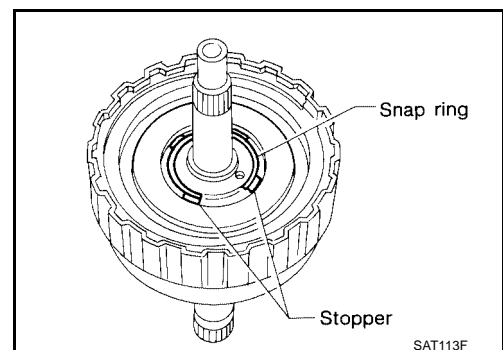


4. Set Tool on spring retainer and install snap ring while compressing return springs.

- Set Tool directly over return springs.

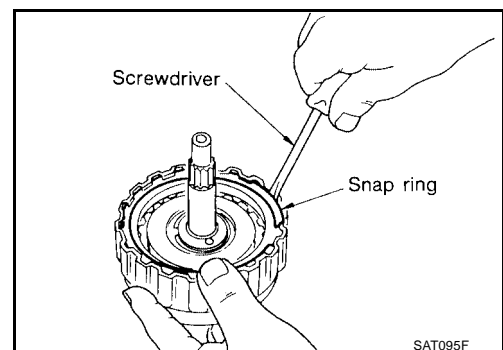


- Do not align snap ring gap with spring retainer stopper.



5. Install drive plates, driven plates and retaining plate.

- Take care with the order and direction of plates.



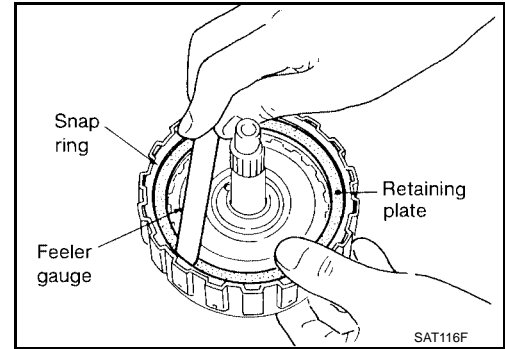
6. Install snap ring.
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

Specified clearance

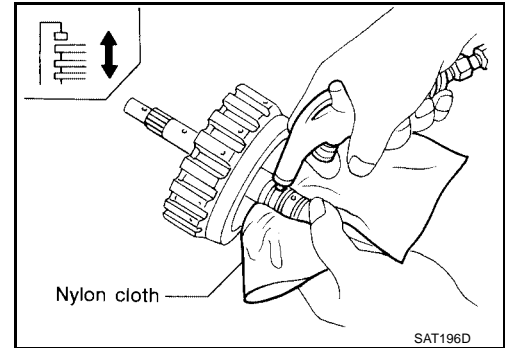
Standard : 1.8 - 2.2 mm (0.071 - 0.087 in)

Allowable limit : 2.8 mm (0.110 in)

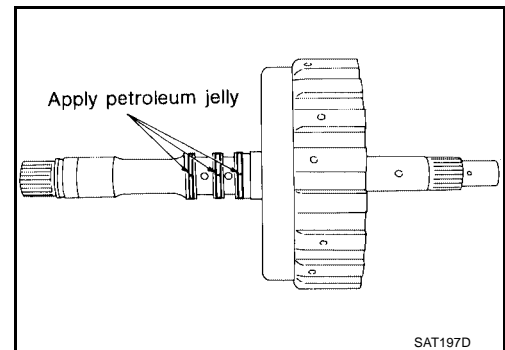
Retaining plate : Refer to [AT-754, "HIGH CLUTCH"](#) .



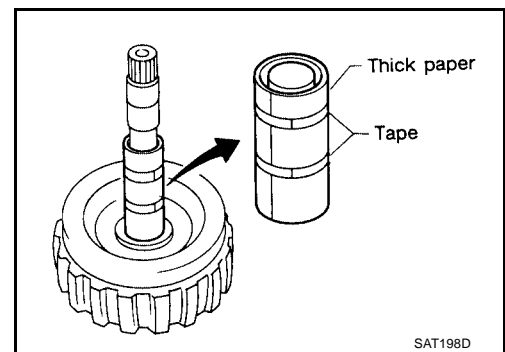
8. Check operation of high clutch.
Refer to [AT-697, "DISASSEMBLY"](#) .



9. Install seal rings to input shaft.
 - Apply petroleum jelly to seal rings.
 - Always replace when removed.

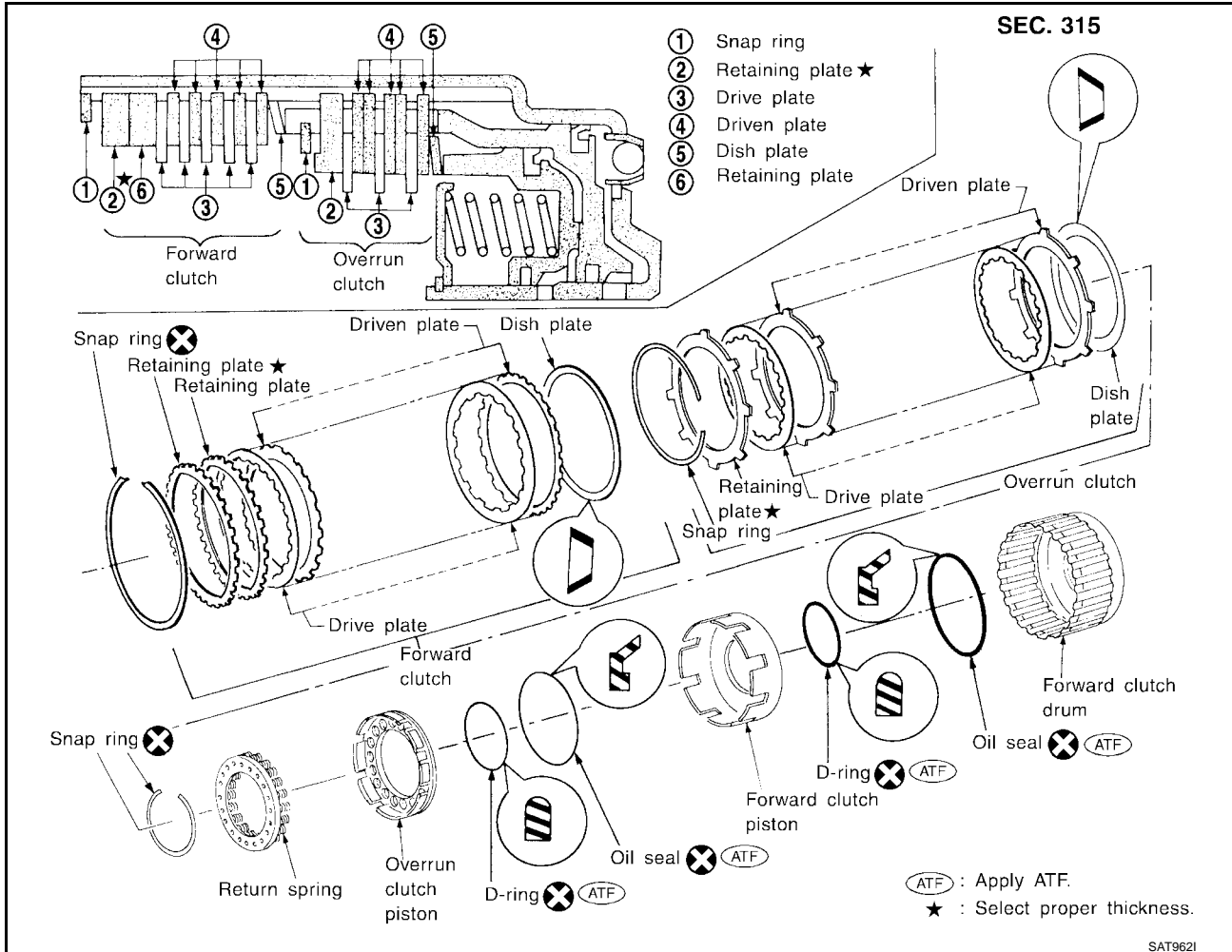


- Roll paper around seal rings to prevent seal rings from spreading.



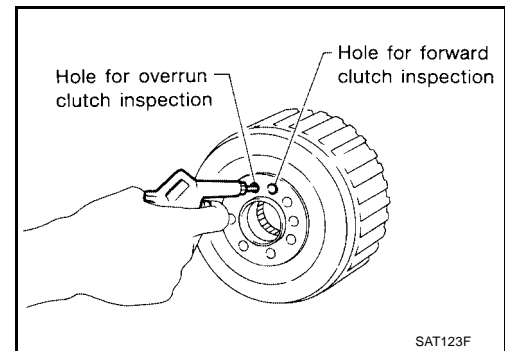
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Forward And Overrun Clutches
COMPONENTS

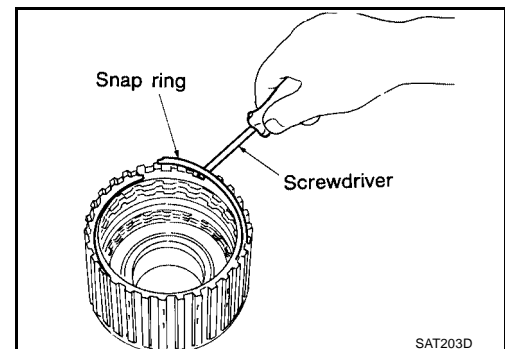


DISASSEMBLY

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.



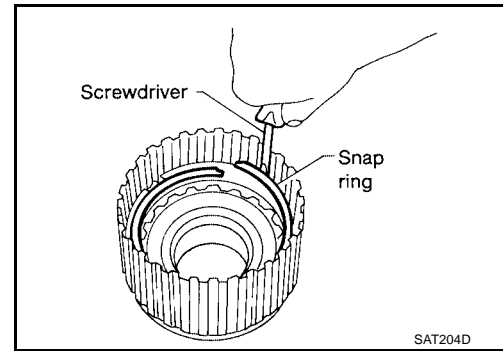
2. Remove snap ring for forward clutch.
3. Remove drive plates, driven plates, retaining plate and dish plate for forward clutch.



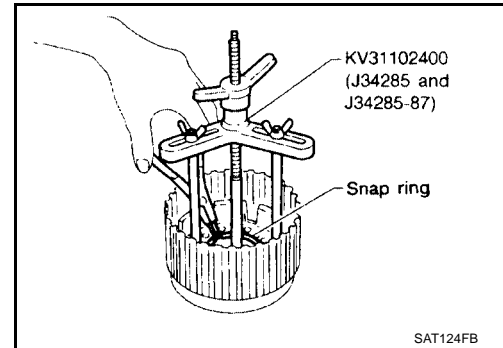
REPAIR FOR COMPONENT PARTS

[RE4F04B]

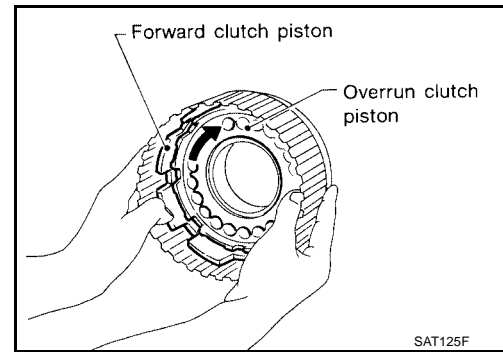
4. Remove snap ring for overrun clutch.
5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.



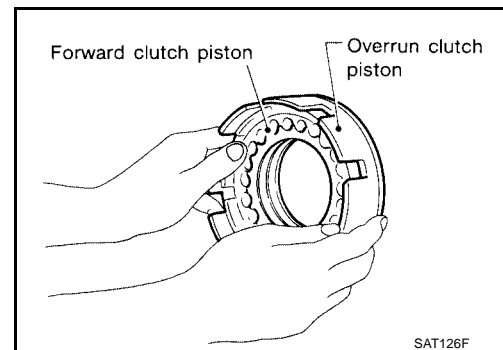
6. Set Tool on spring retainer and remove snap ring from forward clutch drum while compressing return springs.
 - Set Tool directly over return springs.
 - Do not expand snap ring excessively.
7. Remove spring retainer and return springs.
 - Do not remove return springs from spring retainer.



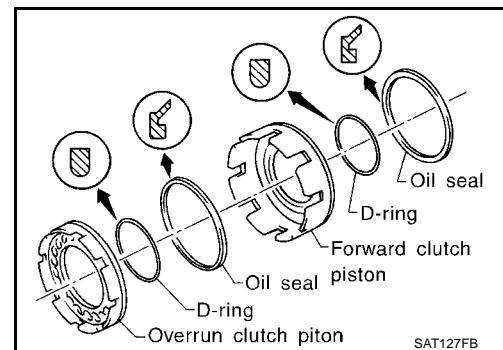
8. Remove forward clutch piston with overrun clutch piston from forward clutch drum by turning it.



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, 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)

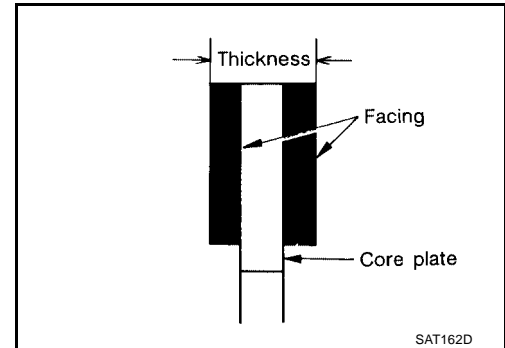
Wear limit : 1.4 mm (0.055 in)

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

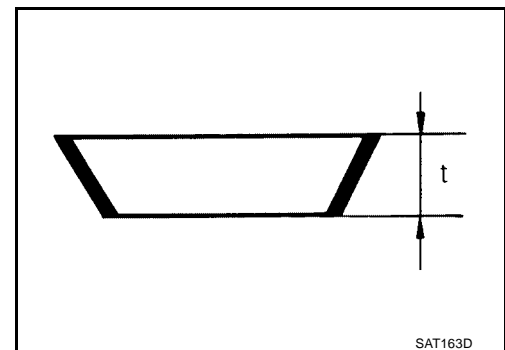
- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate

Forward clutch : 2.7 mm (0.106 in)

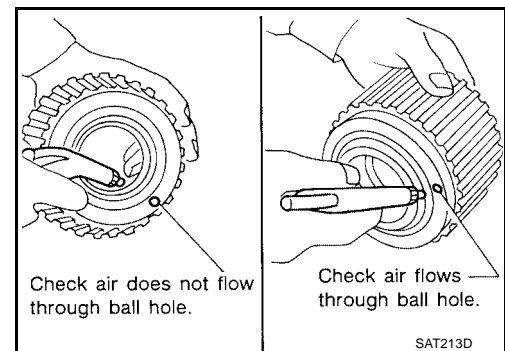
Overrun clutch : 2.7 mm (0.106 in)

- If deformed or fatigued, replace.



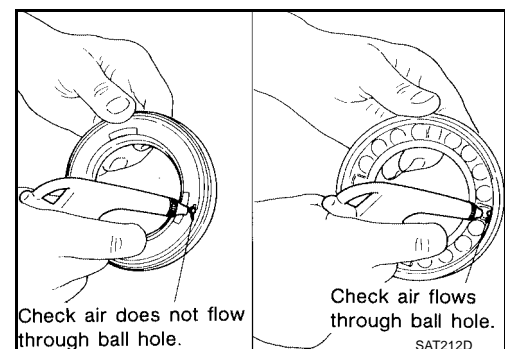
Forward Clutch Drum

- Make sure that 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.



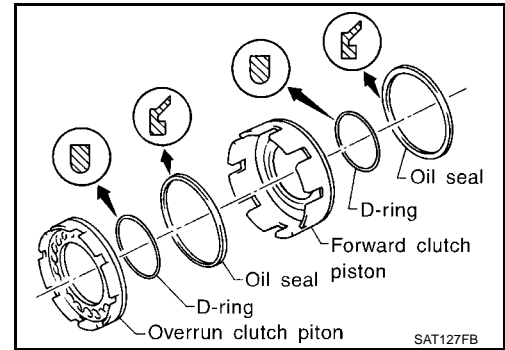
Overrun Clutch Piston

- 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. Make sure that air leaks past ball.

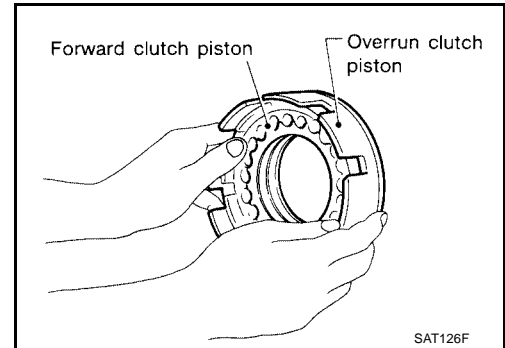


ASSEMBLY

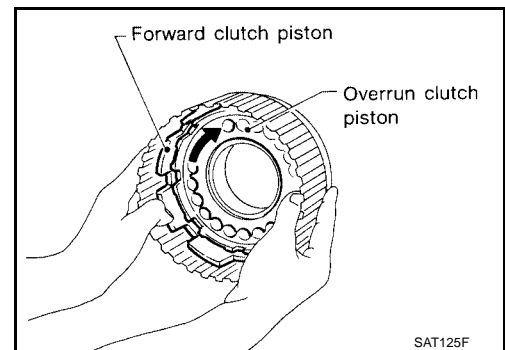
1. Install D-rings and oil seals on forward clutch piston and overrun clutch piston.
 - Take care with direction of oil seal.
 - Apply ATF to both parts.



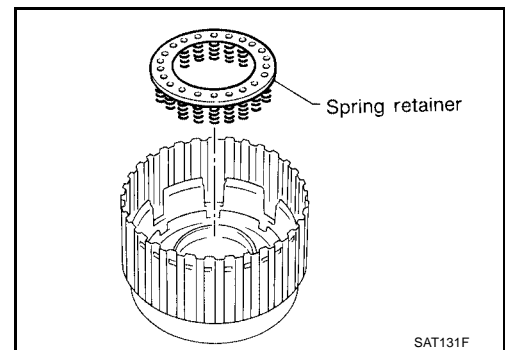
2. Install overrun clutch piston assembly on forward clutch piston by turning it slowly.
 - Apply ATF to inner surface of forward clutch piston.



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.

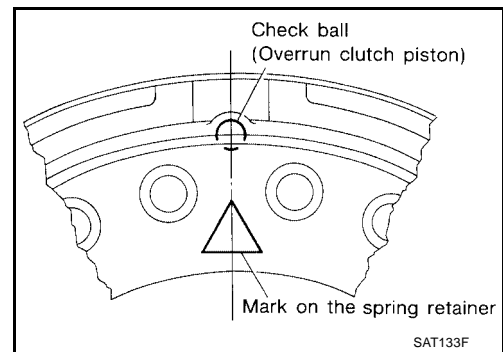


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REPAIR FOR COMPONENT PARTS

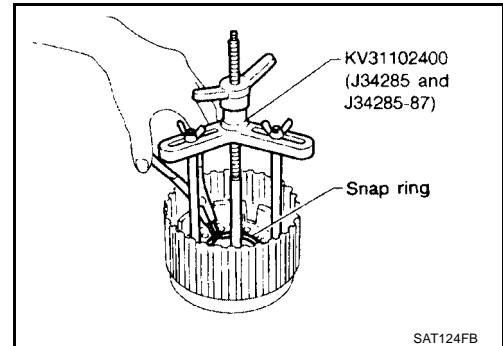
[RE4F04B]

- Align the mark on spring retainer with check ball in overrun clutch piston.

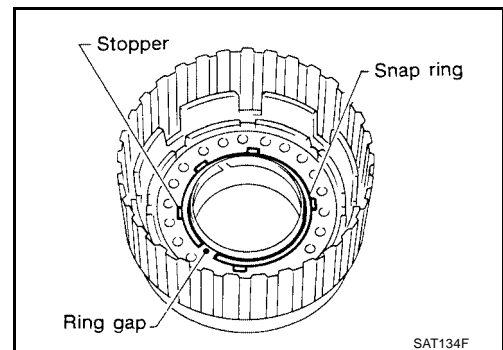


5. Set Tool on spring retainer and install snap ring while compressing return springs.

- **Set Tool directly over return springs.**

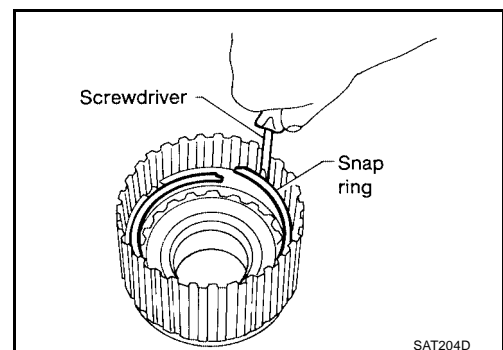


- **Do not align snap ring gap with spring retainer stopper.**



6. Install drive plates, driven plates, retaining plate and dish plate for overrun clutch.

- **Take care with order of plates.**



7. Install snap ring for overrun clutch.

REPAIR FOR COMPONENT PARTS

[RE4F04B]

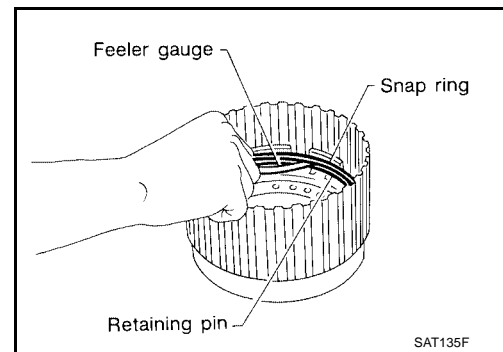
8. Measure clearance between overrun clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate.

Specified clearance

Standard : 0.7 - 1.1 mm (0.028 - 0.043 in)

Allowable limit : 1.7 mm (0.067 in)

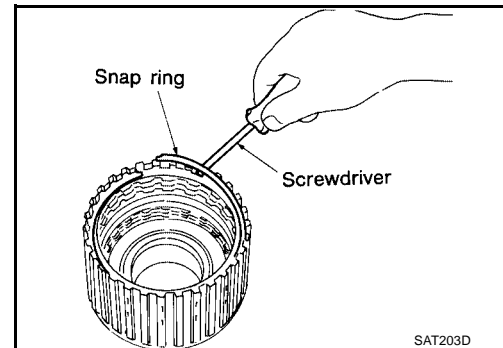
Overrun clutch retaining plate : Refer to [AT-755, "OVERRUN CLUTCH"](#) .



9. Install drive plates, driven plates, retaining plate and dish plate for forward clutch.

● **Take care with order of plates.**

10. Install snap ring for forward clutch.



11. Measure clearance between forward clutch retaining plate and snap ring.

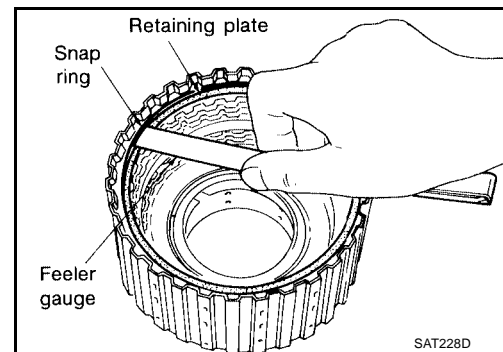
If not within allowable limit, select proper retaining plate.

Specified clearance

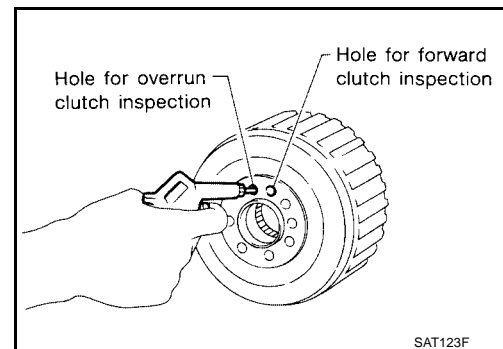
Standard : 0.45 - 0.85 mm (0.0177 - 0.0335 in)

Allowable limit : 1.85 mm (0.0728 in)

Forward clutch retaining plate : Refer to [AT-754, "FORWARD CLUTCH"](#) .

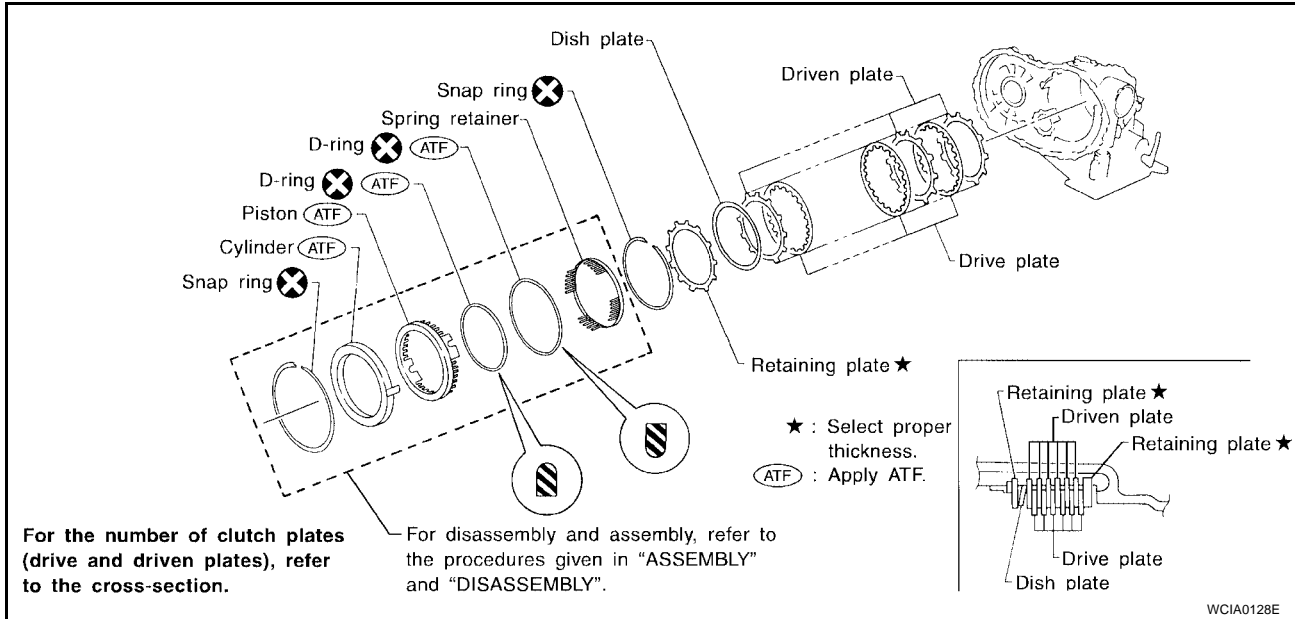


12. Check operation of forward clutch.
Refer to [AT-702, "DISASSEMBLY"](#) .
13. Check operation of overrun clutch.
Refer to [AT-702, "DISASSEMBLY"](#) .



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Low & Reverse Brake COMPONENTS

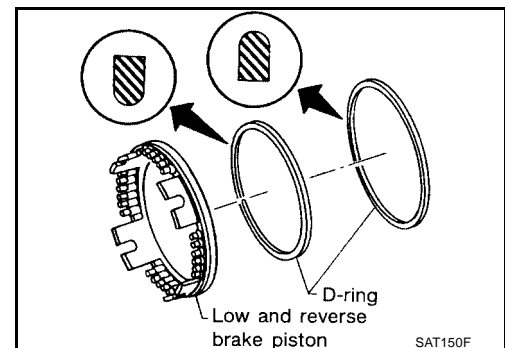
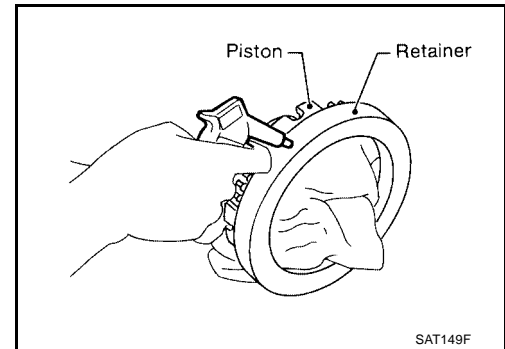
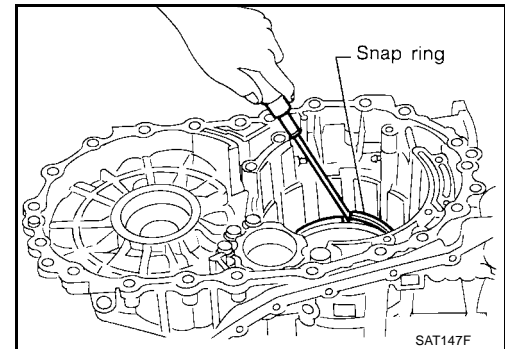


DISASSEMBLY

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.
 - 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

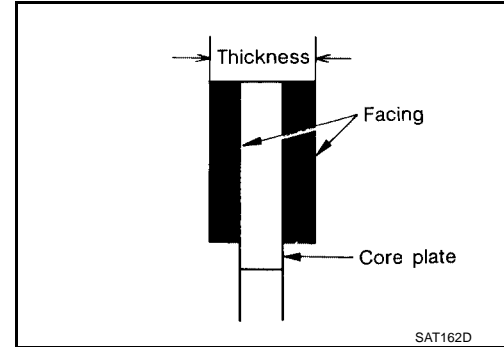
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate

Standard value : 1.8 mm (0.071 in)

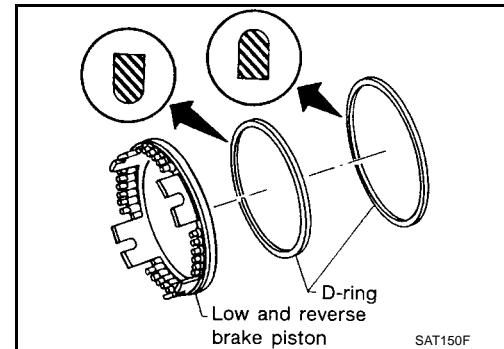
Wear limit : 1.6 mm (0.063 in)

- If not within wear limit, replace.

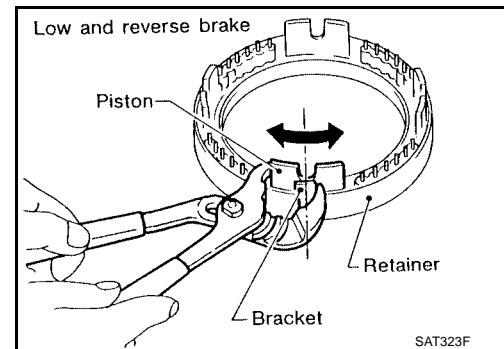


ASSEMBLY

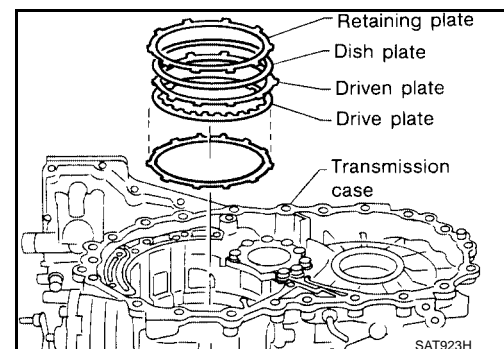
1. Install D-rings on piston.
 - **Apply ATF to both parts.**



2. Set and align piston with retainer.
 - **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-729, "ASSEMBLY"](#).**

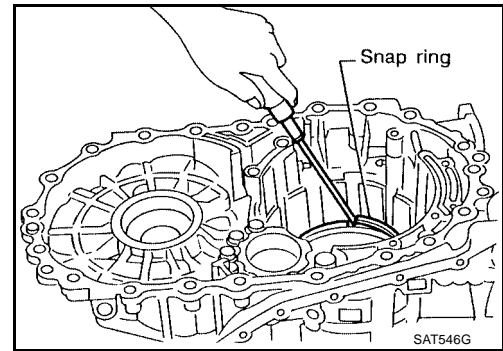


3. Install driven plates, drive plates, retaining plate and dish plate on transmission case.
 - **Take care with order of plates and direction of dish plate.**



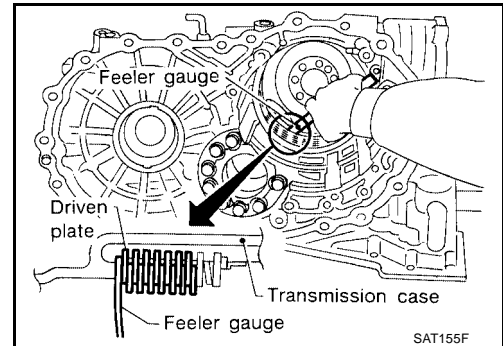
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4. Install snap ring.



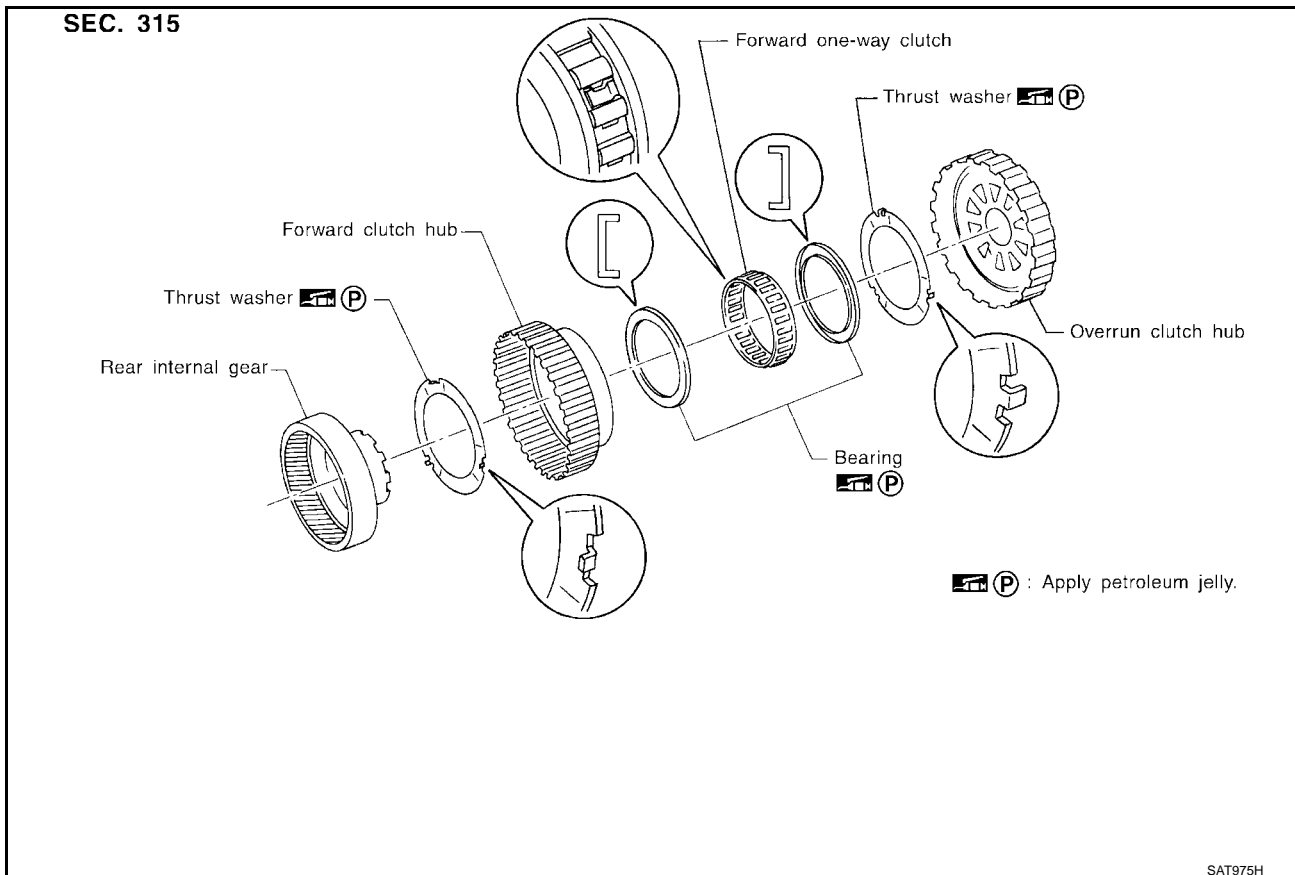
5. Measure clearance between driven plate and transmission case. If not within allowable limit, select proper retaining plate. (front side)

Specified clearance
Standard : 1.7 - 2.1 mm (0.067 - 0.083 in)
Allowable limit : 3.3 mm (0.130 in)
Retaining plate Refer to [AT-755, "LOW & REVERSE BRAKE"](#) .



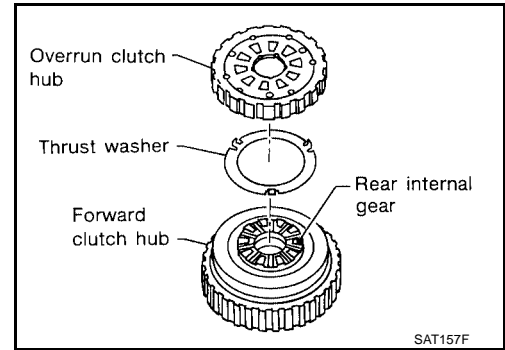
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub COMPONENTS

ECS0067N

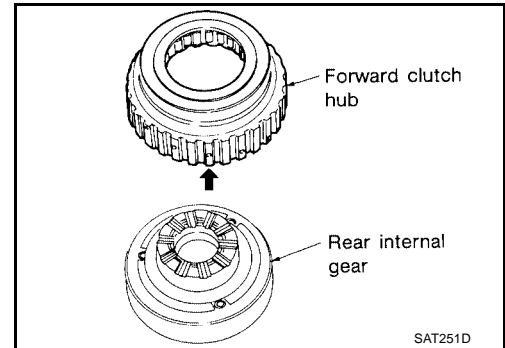


DISASSEMBLY

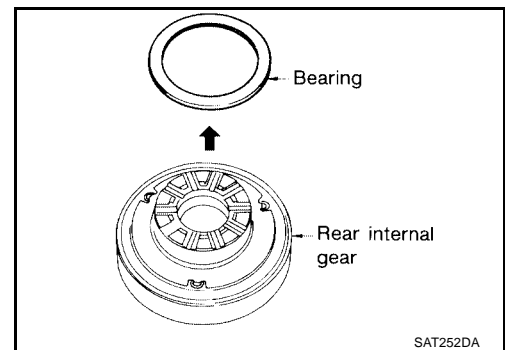
1. Remove overrun clutch hub and thrust washer from forward clutch hub.



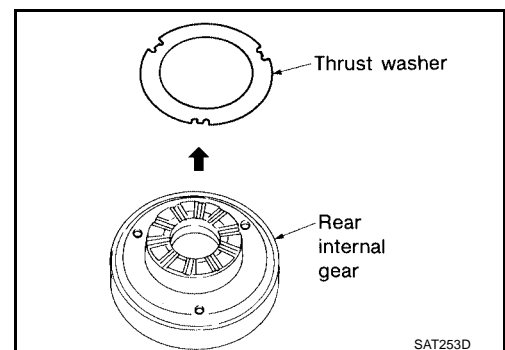
2. Remove forward clutch hub from rear internal gear.



3. Remove bearing from rear internal gear.



4. Remove thrust washer from rear internal gear.

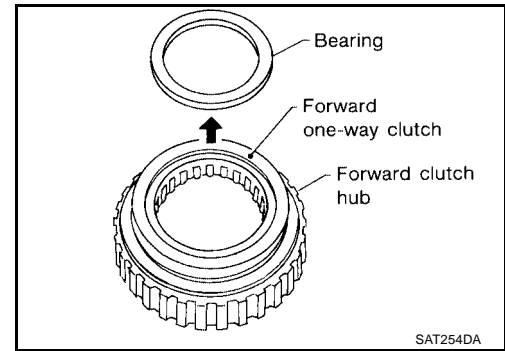


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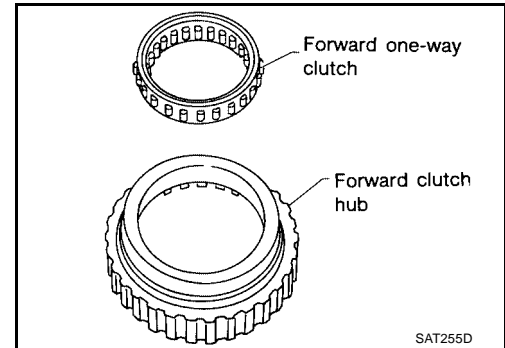
REPAIR FOR COMPONENT PARTS

[RE4F04B]

5. Remove bearing from forward one-way clutch.



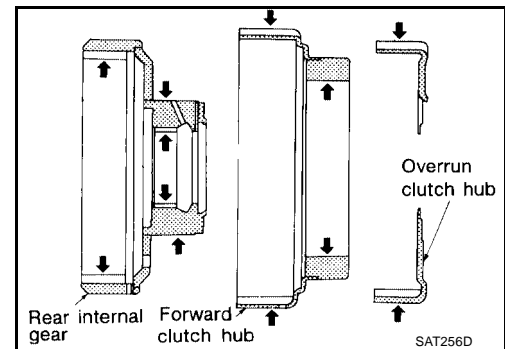
6. Remove forward one-way clutch from forward clutch hub.



INSPECTION

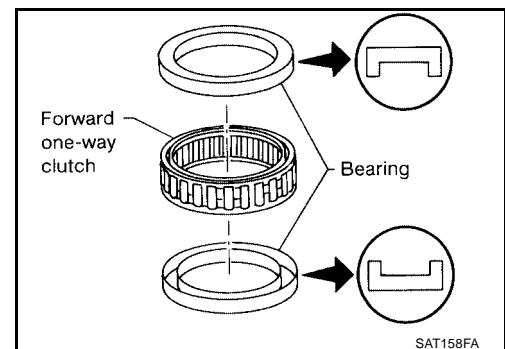
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

- Check rubbing surfaces for wear or damage.



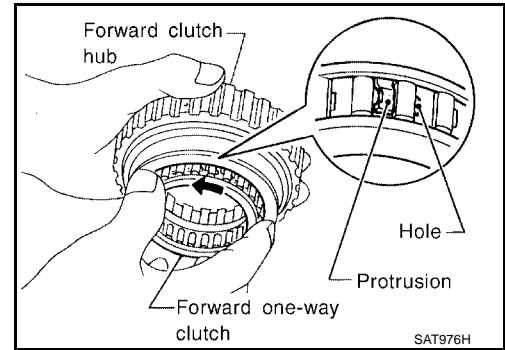
Bearings and Forward One-Way Clutch

- Check bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.

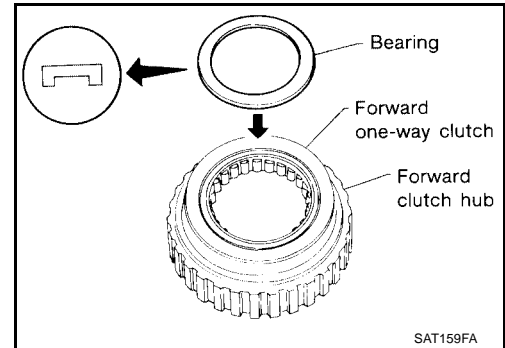


ASSEMBLY

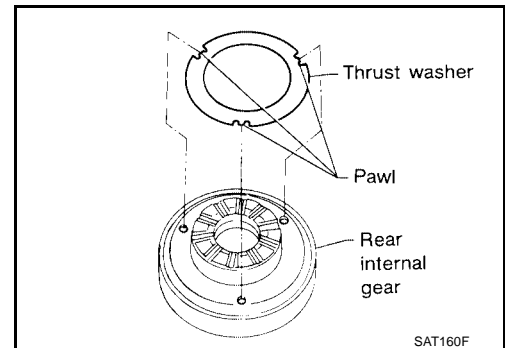
1. Install forward one-way clutch on forward clutch.
 - Take care with the direction of forward one-way clutch.



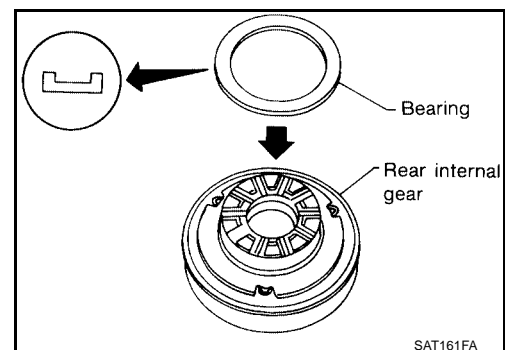
2. Install bearing on forward one-way clutch.
 - Apply petroleum jelly to bearing.



3. Install thrust washer on rear internal gear.
 - Apply petroleum jelly to thrust washer.
 - Align hooks of thrust washer with holes of rear internal gear.



4. Install bearing on rear internal gear.
 - Apply petroleum jelly to bearing.

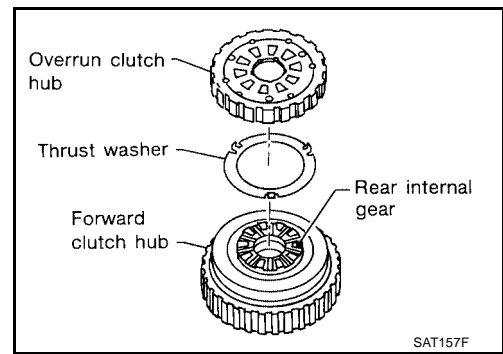


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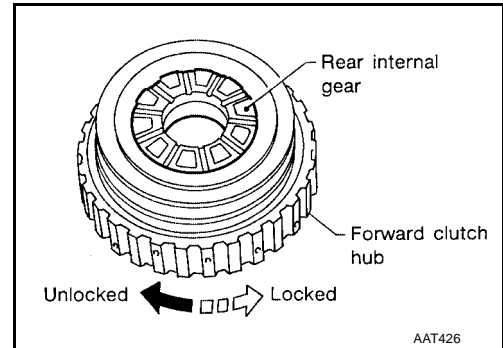
REPAIR FOR COMPONENT PARTS

[RE4F04B]

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.

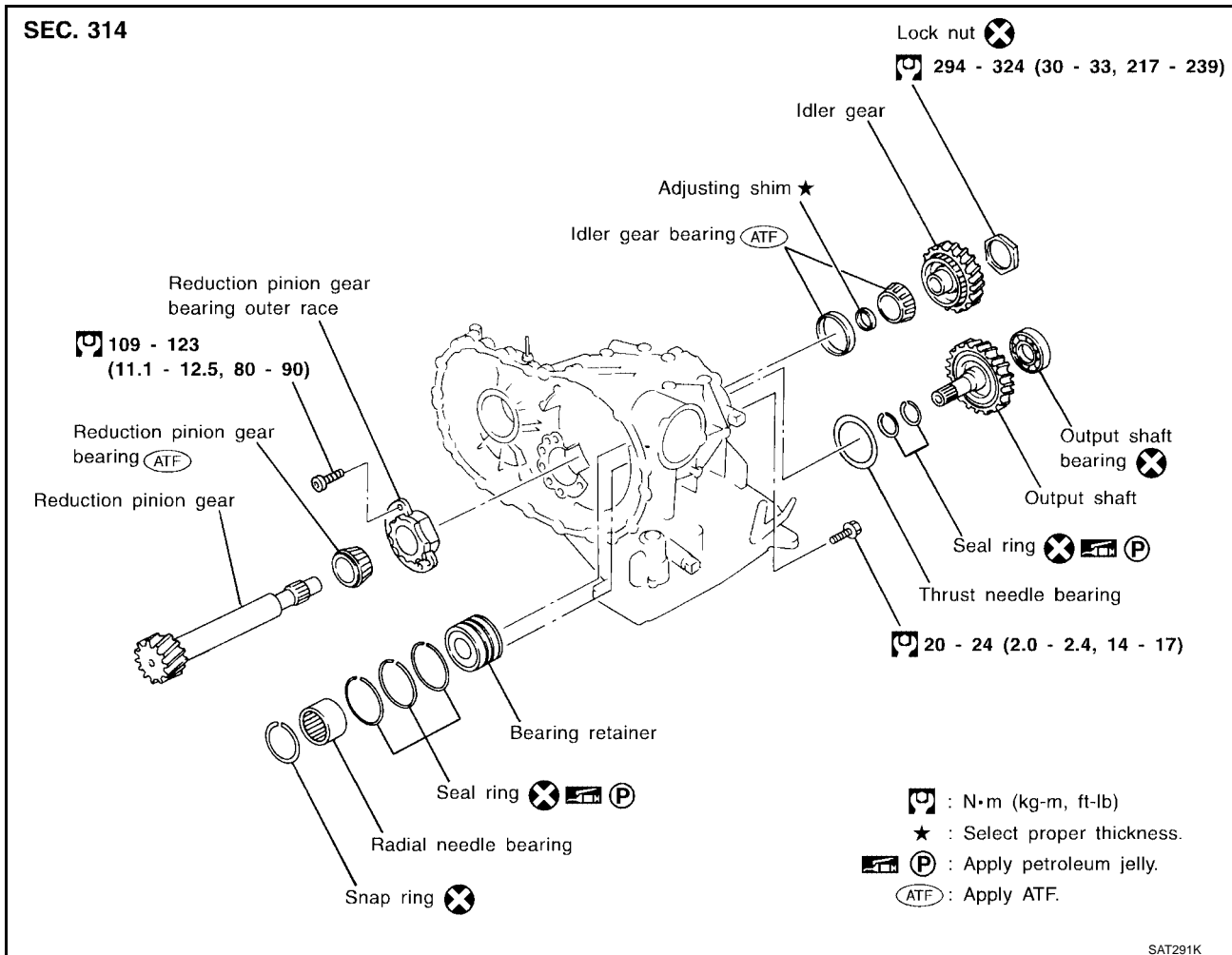


6. Install forward clutch hub on rear internal gear.
 - Check operation of forward one-way clutch. Hold rear internal gear and turn forward clutch hub. Check forward clutch hub for correct locking and unlocking directions.
 - If not as shown in illustration, check installation direction of forward one-way clutch.



Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer COMPONENTS

ECS00670

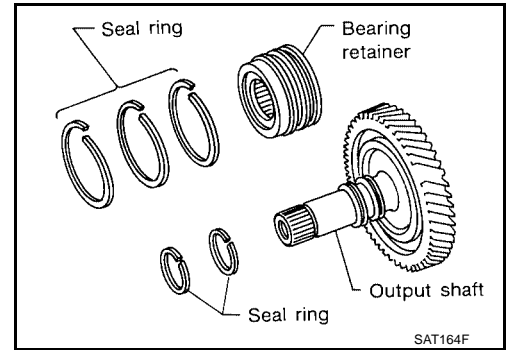


REPAIR FOR COMPONENT PARTS

[RE4F04B]

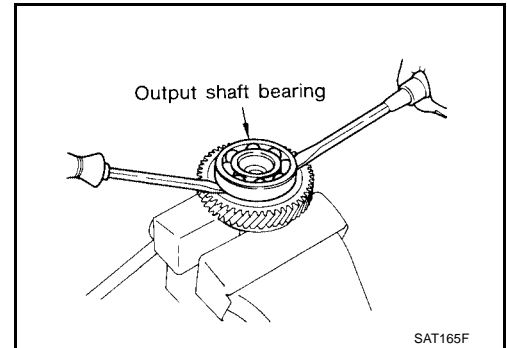
DISASSEMBLY

1. Remove seal rings from output shaft and bearing retainer.

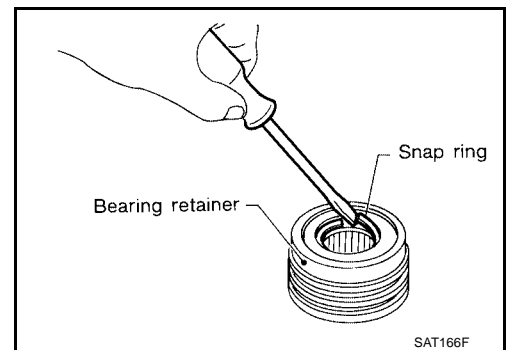


2. Remove output shaft bearing with screwdrivers.

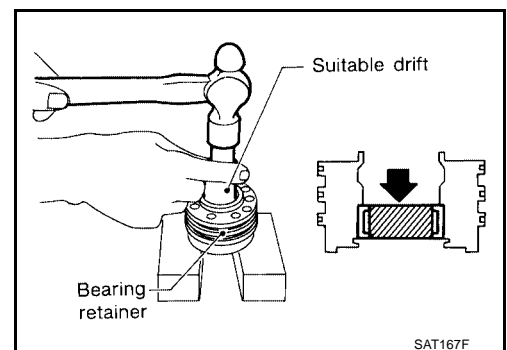
- Always replace bearing with a new one when removed.
- Do not damage output shaft.



3. Remove snap ring from bearing retainer.



4. Remove needle bearing from bearing retainer.



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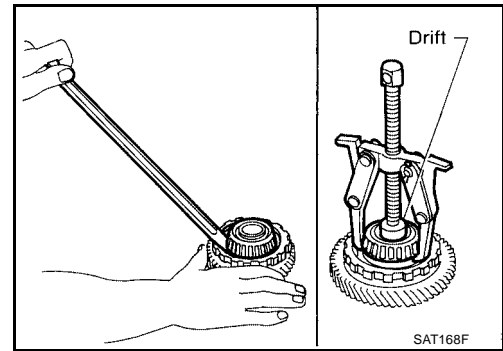
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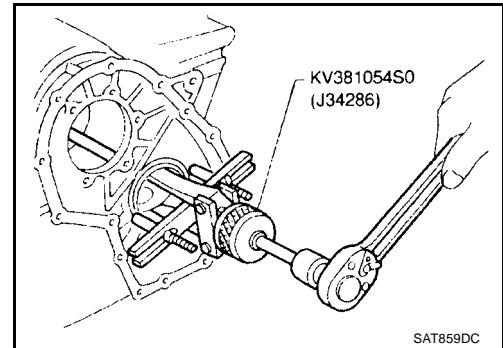
REPAIR FOR COMPONENT PARTS

[RE4F04B]

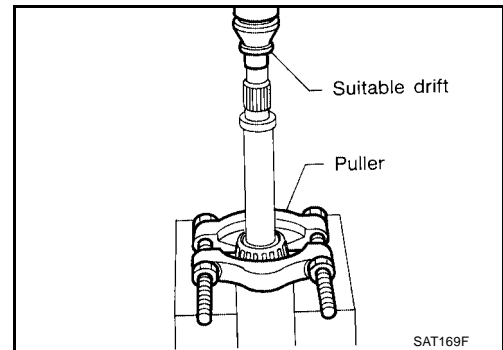
5. Remove idler gear bearing inner race from idler gear.



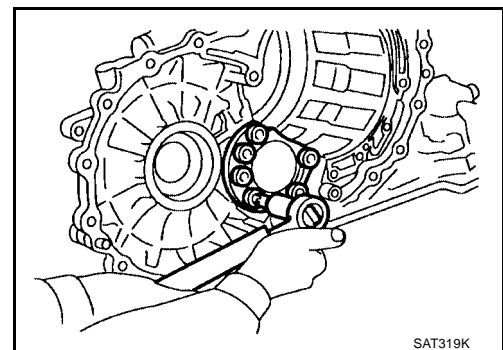
6. Remove idler gear bearing outer race from transmission case.



7. Press out reduction pinion gear bearing inner race from reduction pinion gear.



8. Remove reduction pinion gear bearing outer race from transmission case.



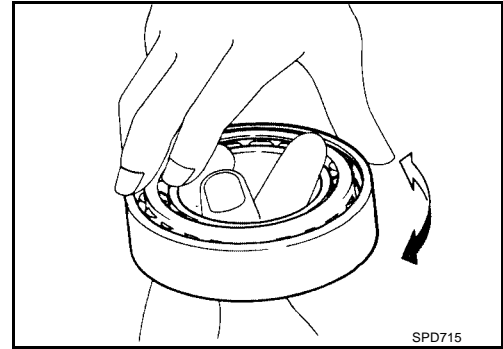
INSPECTION

Output Shaft, Idler Gear and Reduction Pinion Gear

- Check shafts for cracks, wear or bending.
- Check gears for wear, chips and cracks.

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)

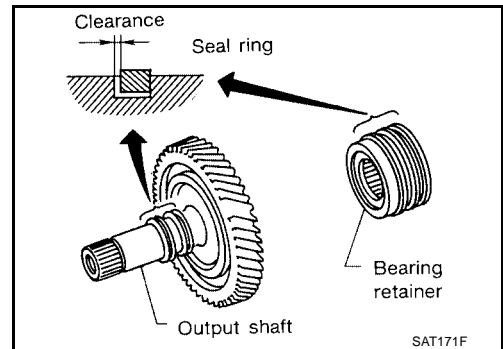
Allowable limit : 0.25 mm (0.0098 in)

- 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 - 0.30 mm
(0.0039 - 0.0118 in)

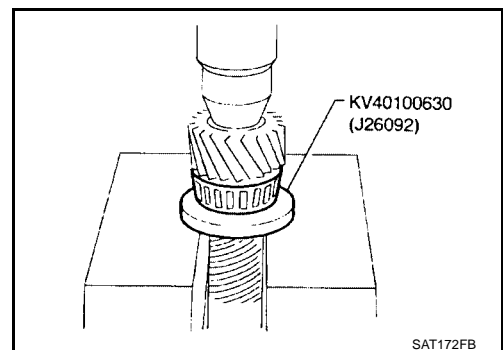
Allowable limit : 0.30 mm (0.0118 in)

- If not within allowable limit, replace bearing retainer.



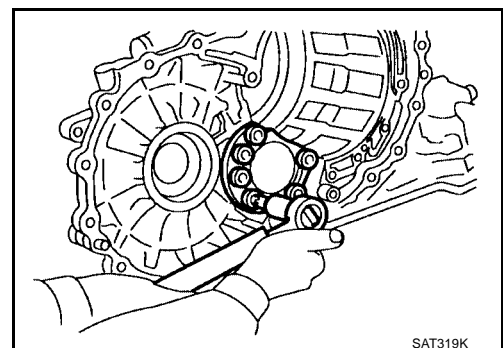
ASSEMBLY

1. Press reduction pinion gear bearing inner race on reduction pinion 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)

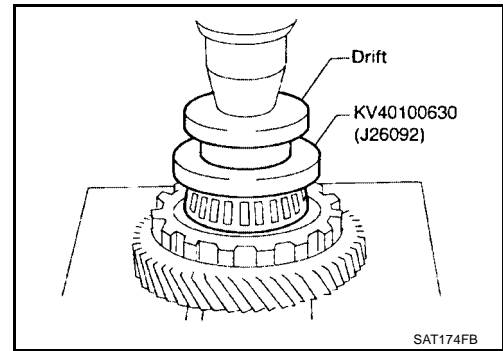


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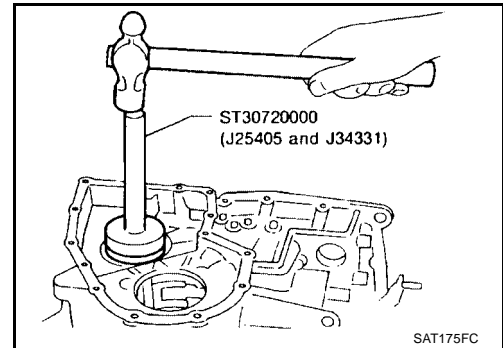
REPAIR FOR COMPONENT PARTS

[RE4F04B]

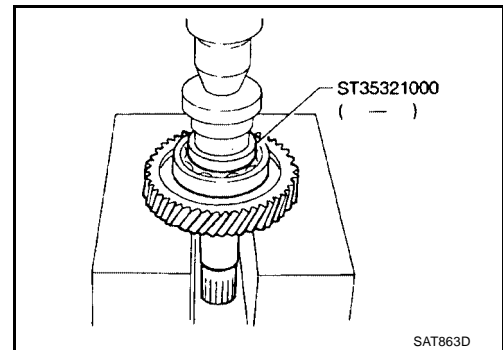
3. Press idler gear bearing inner race on idler gear.



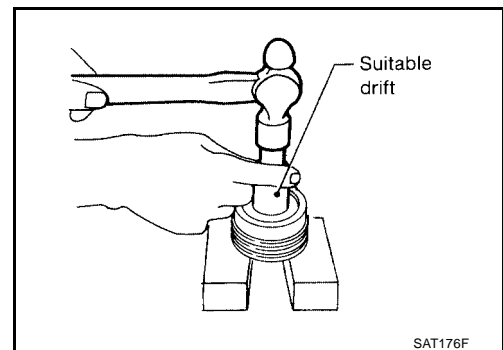
4. Install idler gear bearing outer race on transmission case.



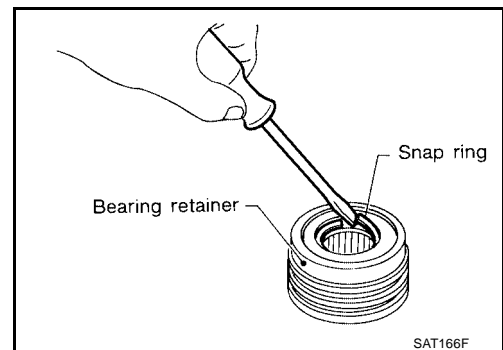
5. Press output shaft bearing on output shaft.



6. Press needle bearing on bearing retainer.



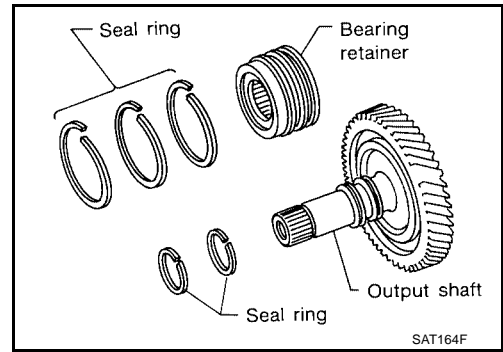
7. Install snap ring to bearing retainer.



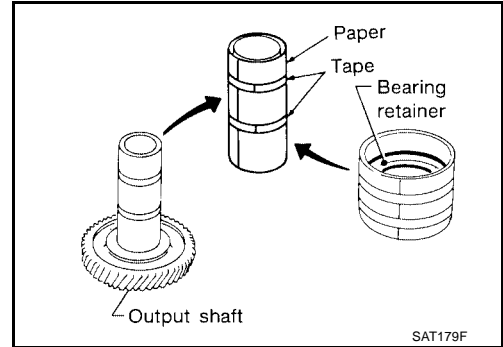
REPAIR FOR COMPONENT PARTS

[RE4F04B]

- After packing ring grooves with petroleum jelly, carefully install new seal rings on output shaft and bearing retainer.

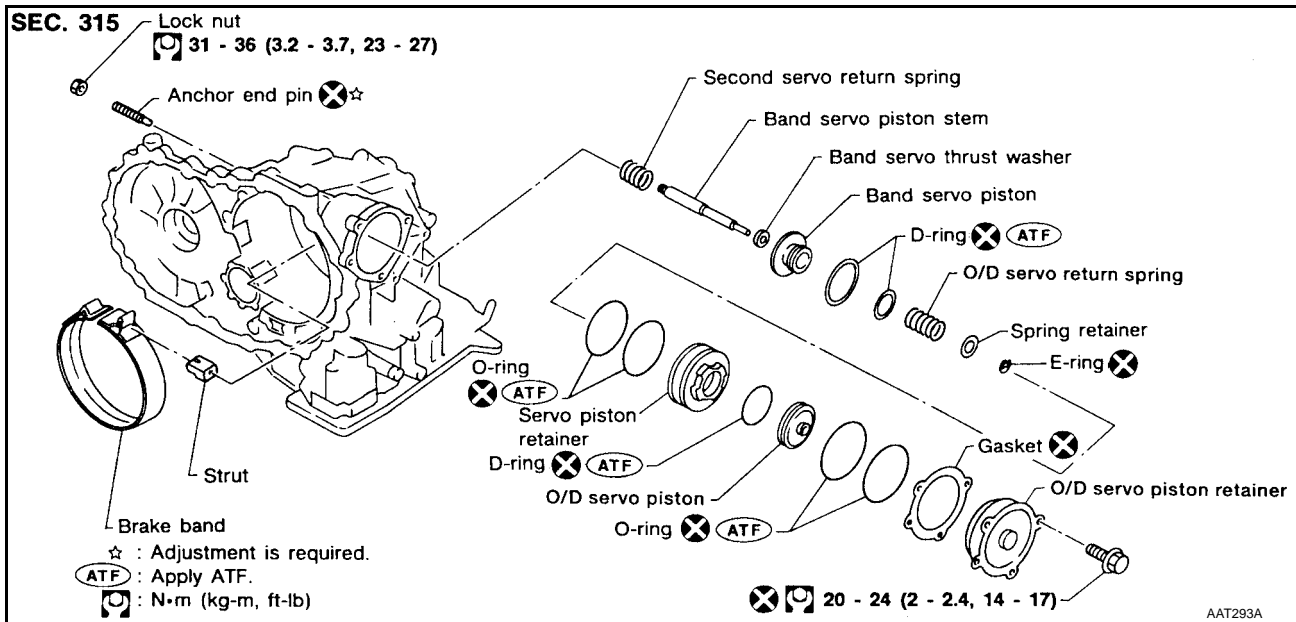


- Roll paper around seal rings to prevent seal rings from spreading.



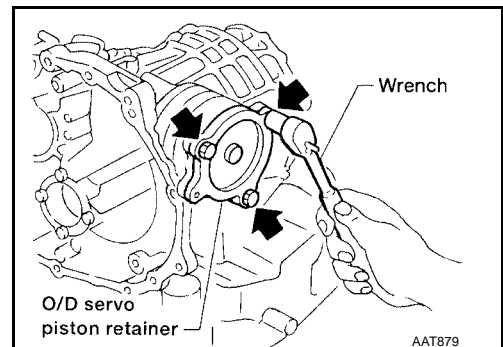
Band Servo Piston Assembly COMPONENTS

ECS0067P



DISASSEMBLY

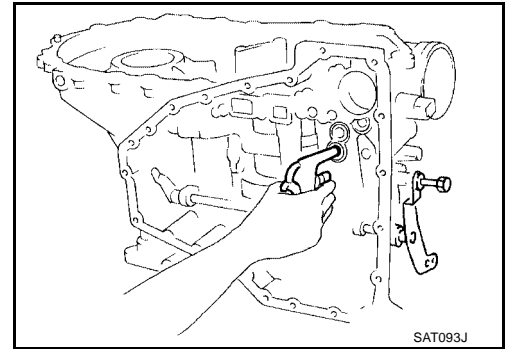
- Remove band servo piston fixing bolts.



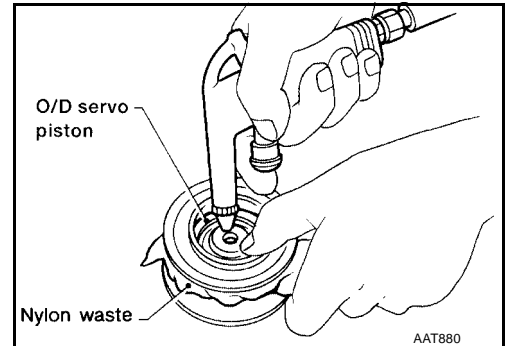
REPAIR FOR COMPONENT PARTS

[RE4F04B]

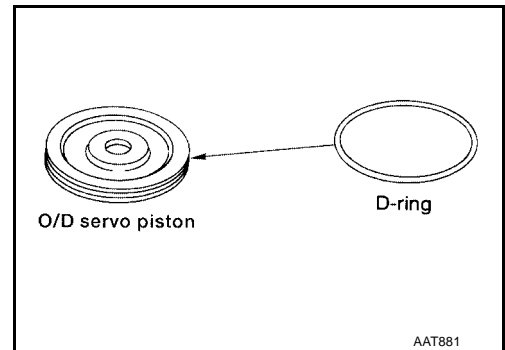
2. Apply compressed air to oil hole in transmission case to remove O/D servo piston retainer and band servo piston assembly.
 - Hold band servo piston assembly with a rag or nylon waste.



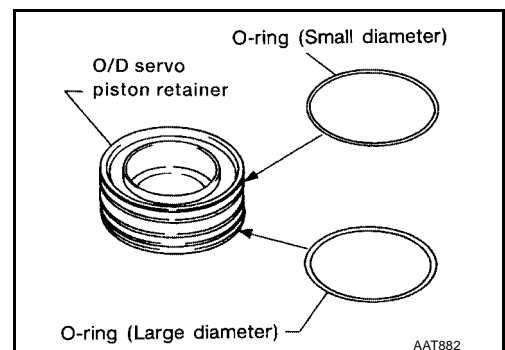
3. Apply compressed air to oil hole in O/D servo piston retainer to remove O/D servo piston from retainer.
 - Hold O/D band servo piston while applying compressed air.



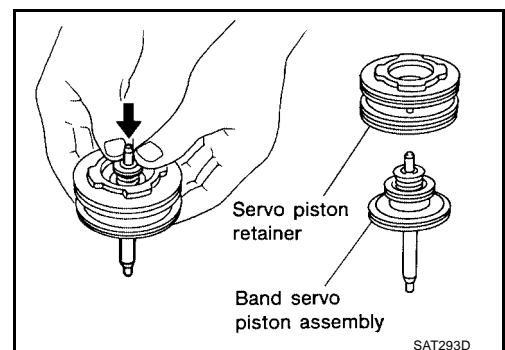
4. Remove D-ring from O/D servo piston.



5. Remove O-rings from O/D servo piston retainer.



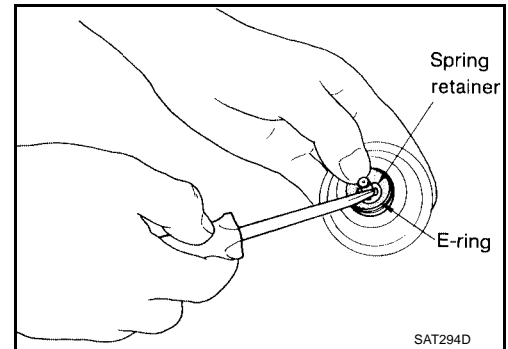
6. Remove band servo piston assembly from servo piston retainer by pushing it forward.



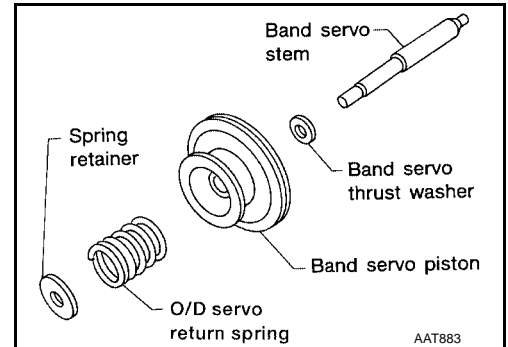
REPAIR FOR COMPONENT PARTS

[RE4F04B]

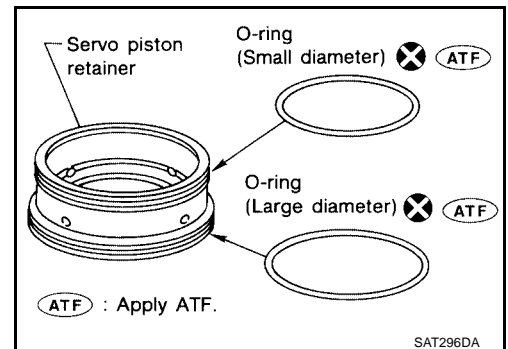
7. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.



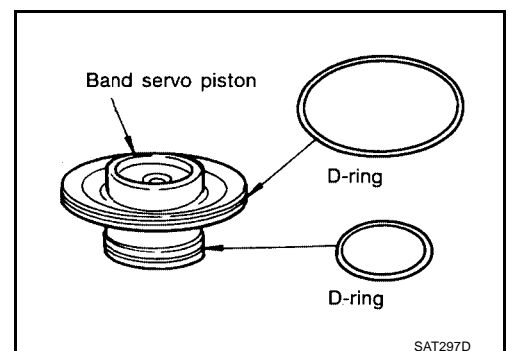
8. Remove O/D servo return spring, band servo thrust washer and band servo piston stem from band servo piston.



9. Remove O-rings from servo piston retainer.



10. Remove D-rings from band servo piston.



INSPECTION

Pistons, Retainers and Piston Stem

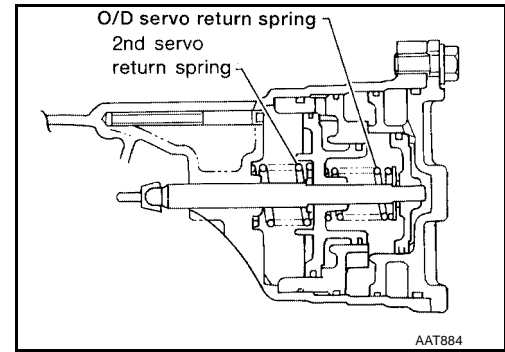
- Check frictional surfaces for abnormal wear or damage.

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Return Springs

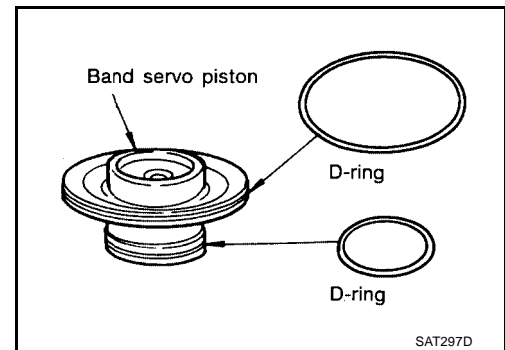
- Check for deformation or damage.
- Measure free length and outer diameter.

Inspection standard : Refer to [AT-758](#),
"RETURN SPRING" .

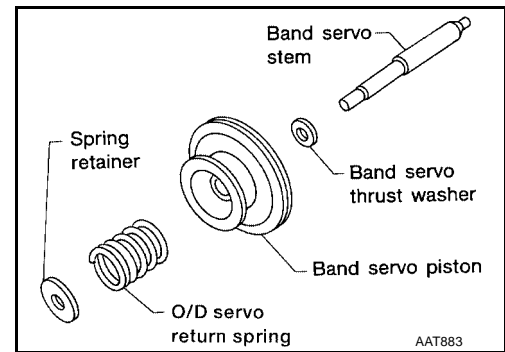


ASSEMBLY

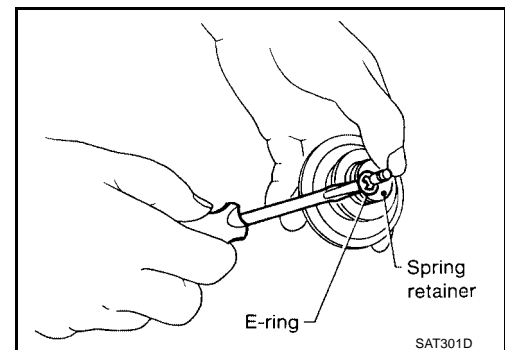
1. Install D-rings to servo piston retainer.
 - Apply ATF to D-rings.
 - Pay attention to position of each O-ring.



2. Install band servo piston stem, band servo thrust washer, O/D servo return spring and spring retainer to band servo piston.



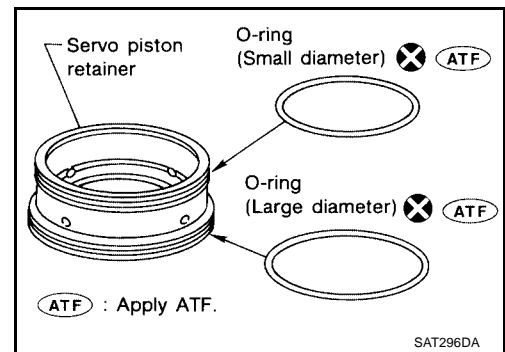
3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.



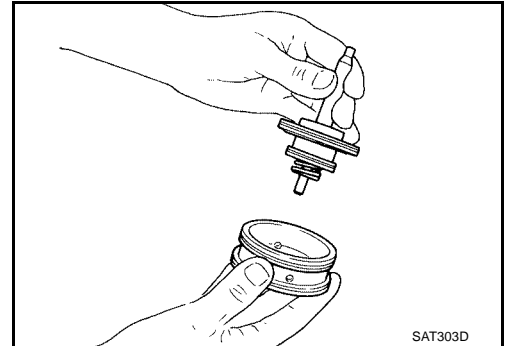
REPAIR FOR COMPONENT PARTS

[RE4F04B]

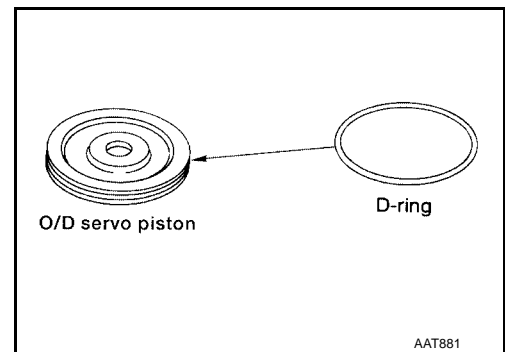
4. Install O-rings to servo piston retainer.
- **Apply ATF to O-rings.**
 - **Pay attention to position of each O-ring.**



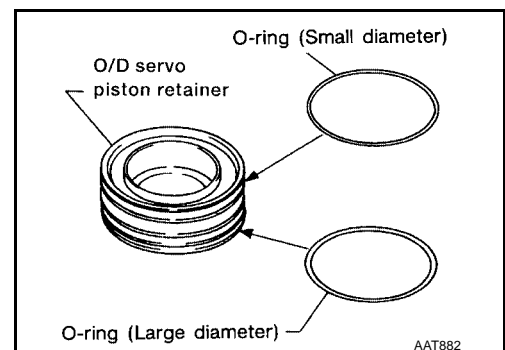
5. Install band servo piston assembly to servo piston retainer by pushing it inward.



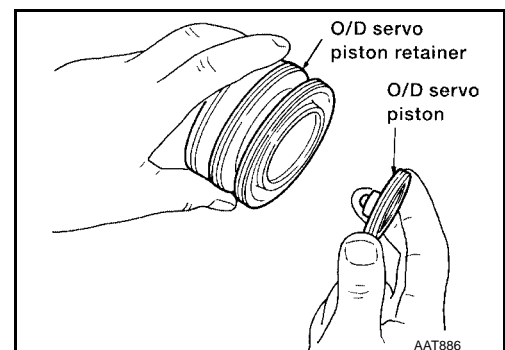
6. Install D-ring to O/D servo piston.
- **Apply ATF to D-ring.**



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.



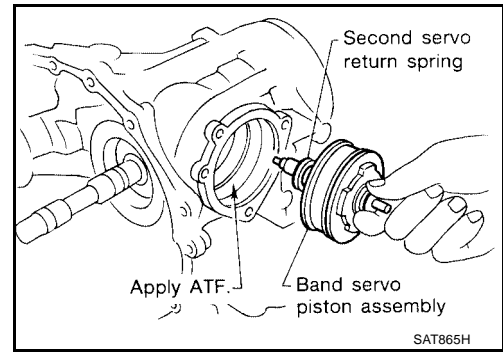
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REPAIR FOR COMPONENT PARTS

[RE4F04B]

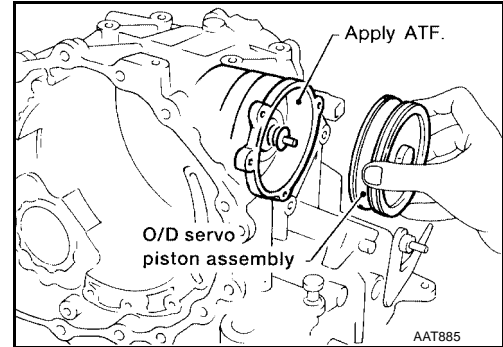
9. Install band servo piston assembly and 2nd servo return spring to transmission case.

- Apply ATF to O-ring of band servo piston and transmission case.

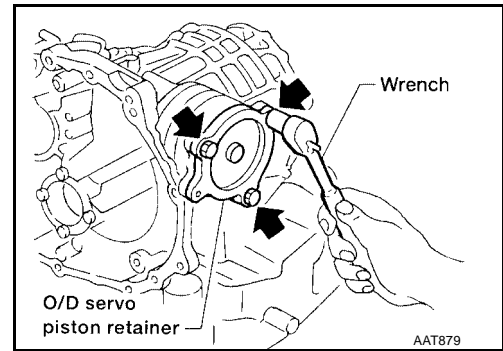


10. Install O/D servo piston assembly to transmission case.

- Apply ATF to O-ring of band servo piston and transmission case.

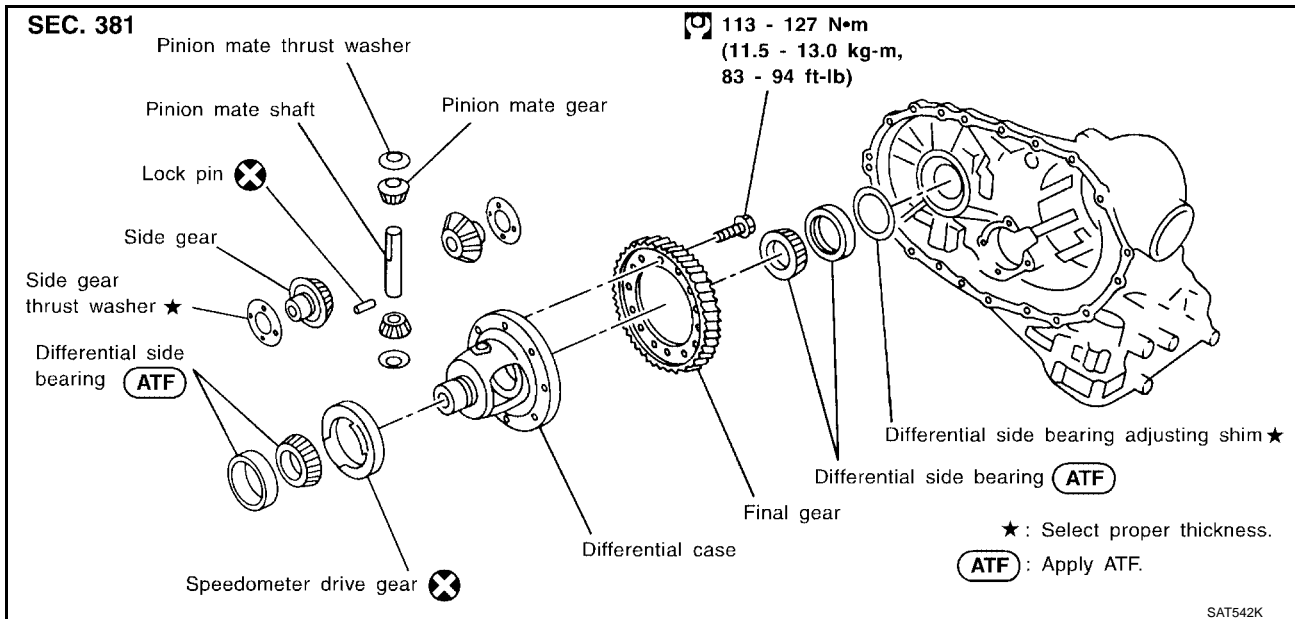


11. Install O/D servo piston retainer to transmission case. Refer to [AT-722, "ASSEMBLY"](#).



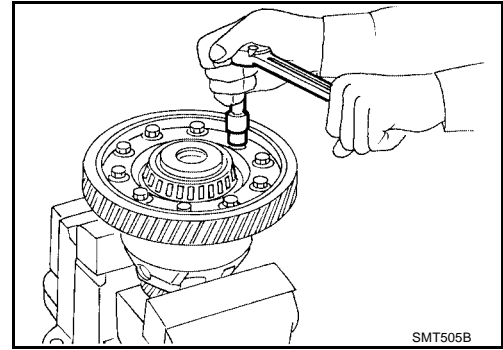
Final Drive COMPONENTS

ECS0067Q



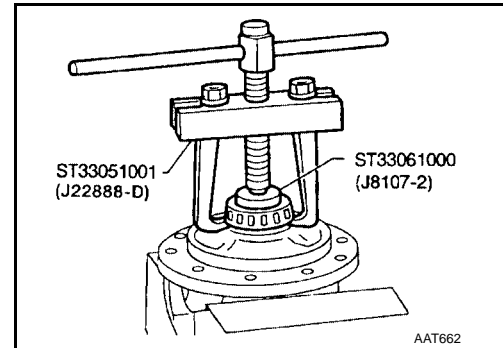
DISASSEMBLY

1. Remove final gear.

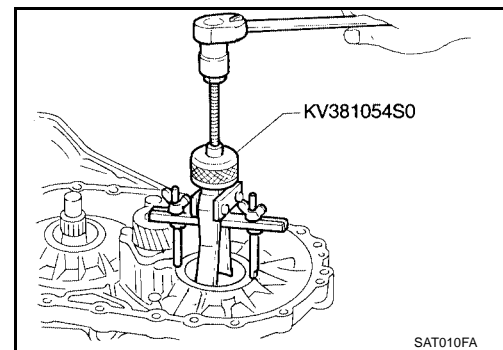


2. Press out differential side bearings.

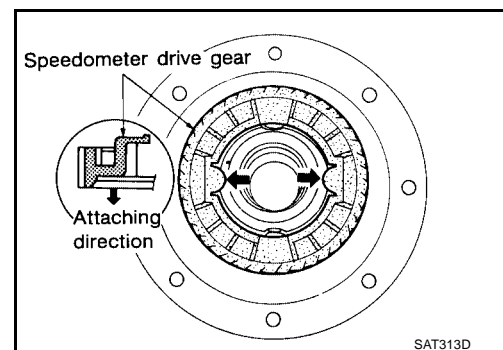
- Be careful not to mix up the right and left bearings.



3. Remove differential side bearing outer race and side bearing adjusting shim from transaxle case.

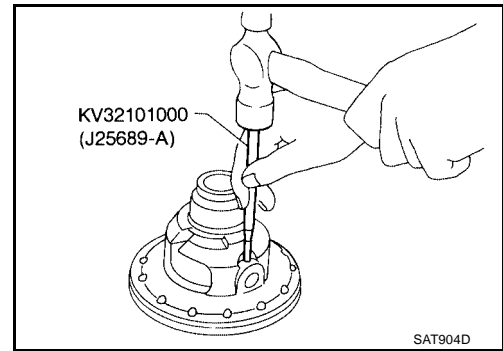


4. Remove speedometer drive gear.



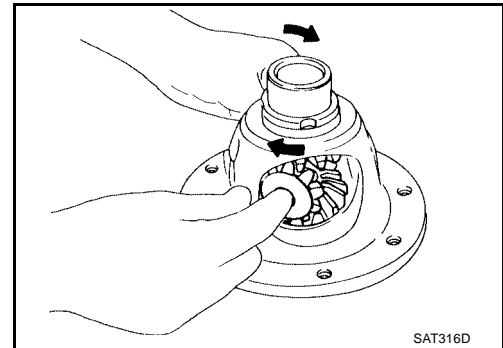
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5. Drive out pinion mate shaft lock pin.



6. Draw out pinion mate shaft lock pin.

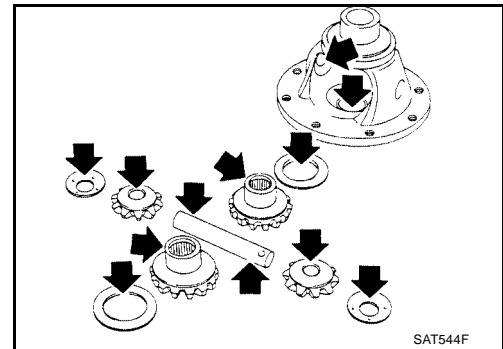
7. Remove pinion mate gears and side gears.



INSPECTION

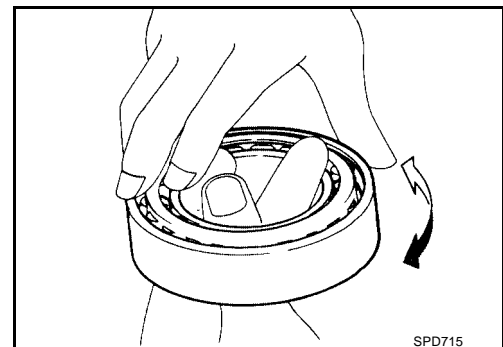
Gear, Washer, Shaft and Case

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.



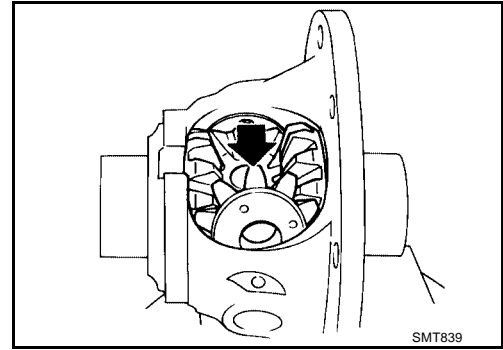
Bearings

- 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.**

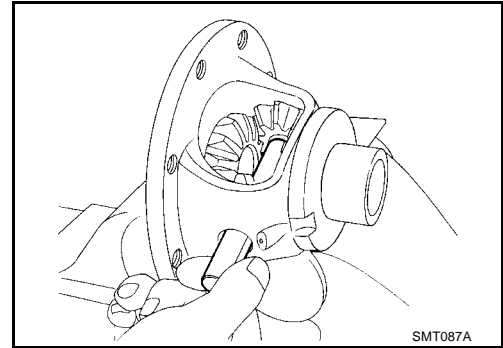


ASSEMBLY

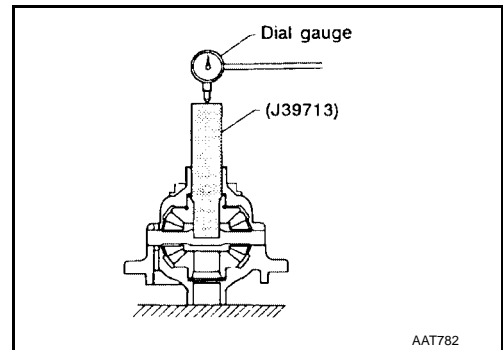
1. Attach side gear thrust washers to side gears, then install pinion mate thrust washers and pinion mate gears in place.
 - **Apply ATF to any parts.**



2. Insert pinion mate shaft.
 - **When inserting, be careful not to damage pinion mate thrust washers.**



3. Measure clearance between side gear and differential case with washers following the procedure below:
 - a. Set Tool and dial indicator on side gear.

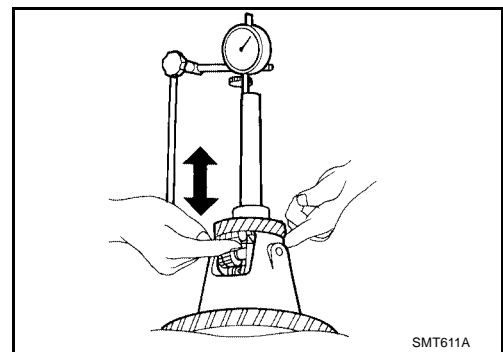


- b. Move side gear up and down to measure dial indicator deflection. Always measure indicator deflection on both side gears.

Clearance between side gear and differential case with washer : 0.1 - 0.2 mm (0.004 - 0.008 in)

- c. If not within specification, adjust clearance by changing thickness of differential side gear thrust washers.

Differential side gear thrust washers : Refer to [AT-756, "DIFFERENTIAL SIDE GEAR THRUST WASHERS"](#) .



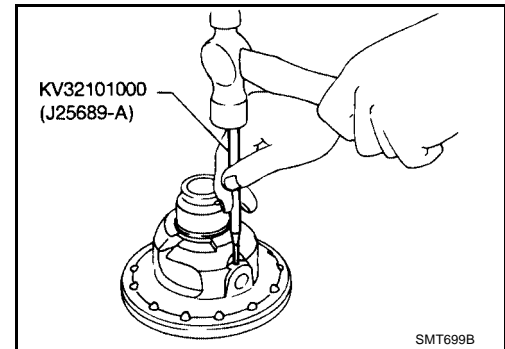
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REPAIR FOR COMPONENT PARTS

[RE4F04B]

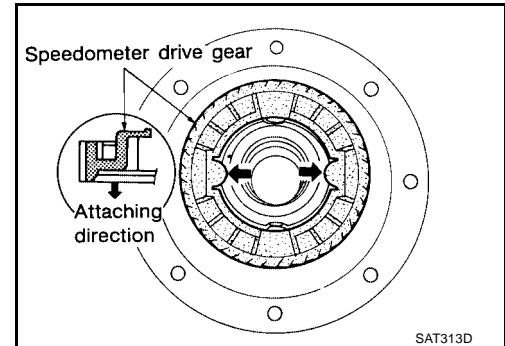
4. Install lock pin.

- Make sure that lock pin is flush with case.

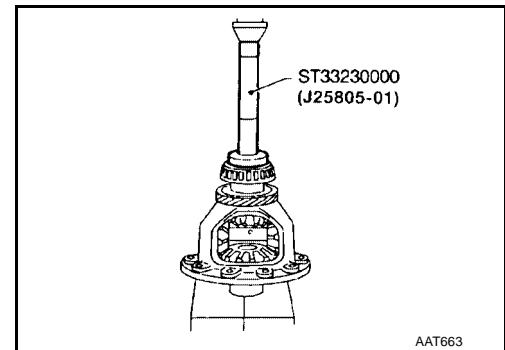


5. Install speedometer drive gear on differential case.

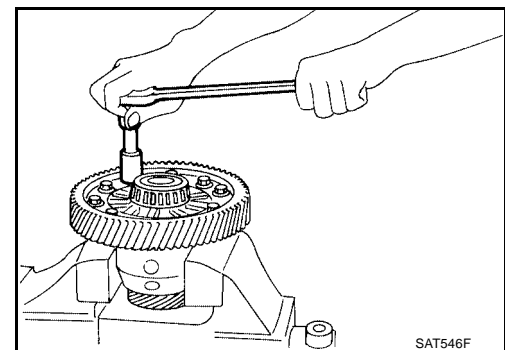
- Align the projection of speedometer drive gear with the groove of differential case.



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 [AT-724](#), "[COMPONENTS](#)".



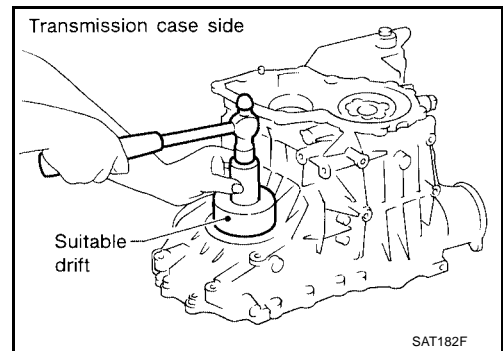
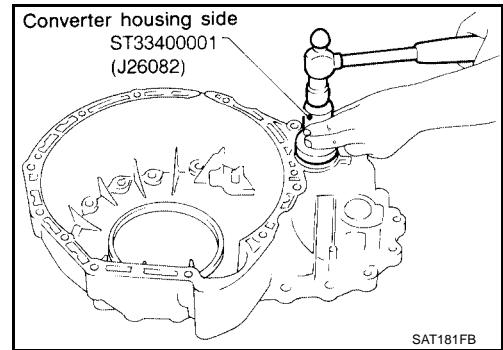
ASSEMBLY

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ECS0067R

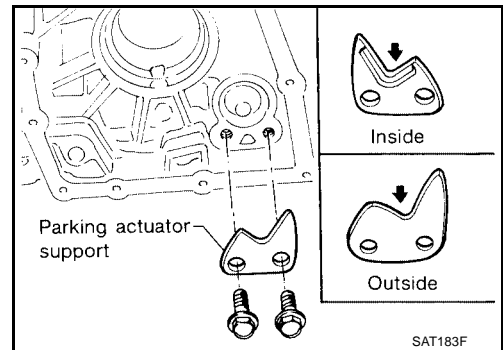
Assembly (1)

1. Install differential side oil seals on transmission case and converter housing.

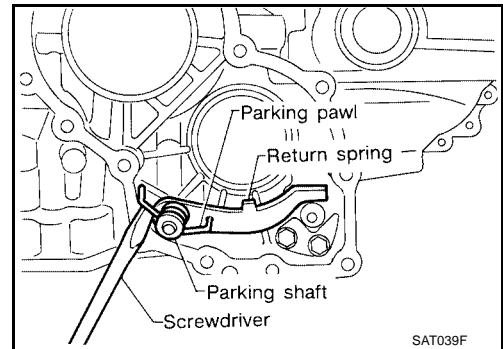


2. Install parking actuator support to transmission case. Tighten parking actuator support bolts to the specified torque. Refer to [AT-652, "OVERHAUL"](#).

- Pay attention to direction of parking actuator support.

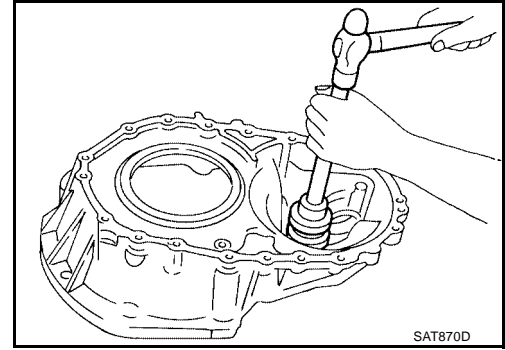


3. Install parking pawl on transmission case and fix it with parking shaft.
4. Install return spring.

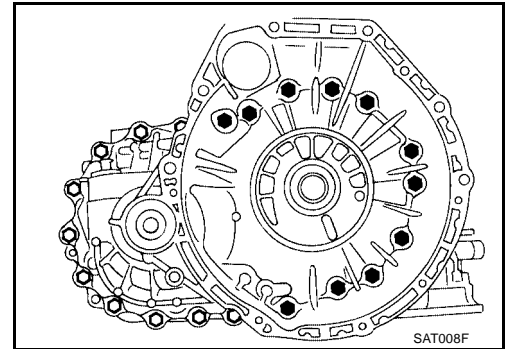


Adjustment (1) DIFFERENTIAL SIDE BEARING PRELOAD

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 [AT-652, "OVERHAUL"](#).



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).

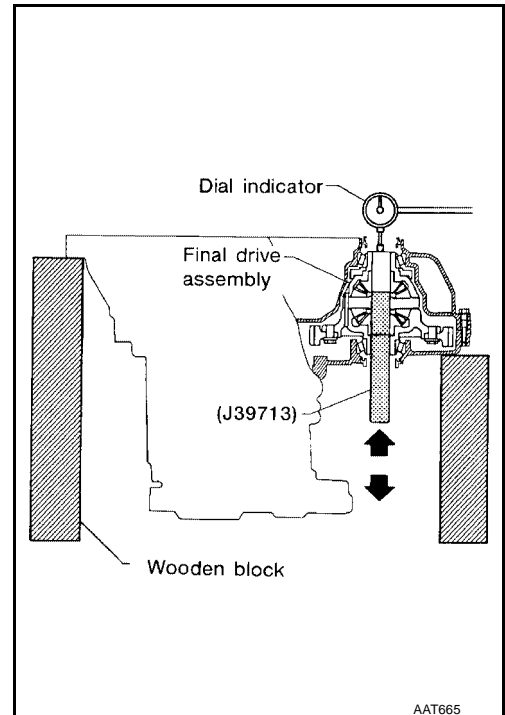
Suitable shim thickness = Dial indicator deflection + Specified bearing preload

Differential side bearing preload adjusting shim

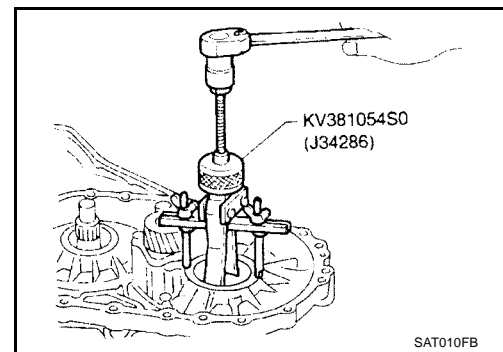
: Refer to [AT-756, "DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS"](#).

Bearing preload

**: 0.05 - 0.09 mm
(0.0020 - 0.0035 in)**



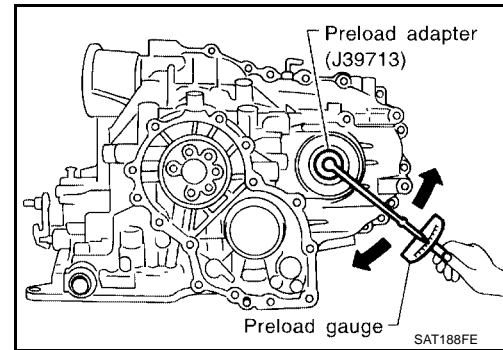
9. Remove converter housing from transmission case.
10. Remove final drive assembly from transmission case.
11. Remove differential side bearing outer race from transmission case.
12. Reinstall differential side bearing outer race and shim(s) selected from SDS table on transmission case.
13. Reinstall converter housing on transmission case and tighten transmission case fixing bolts to the specified torque. Refer to [AT-652, "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.

Turning torque of final drive assembly (New bearing) : 0.78 - 1.37 N·m (8.0 - 14.0 kg·cm, 6.9 - 12.2 in·lb)
 - When old bearing is used again, turning torque will be slightly less than the above.
 - Make sure torque is close to the specified range.

Preload adapter : J39713



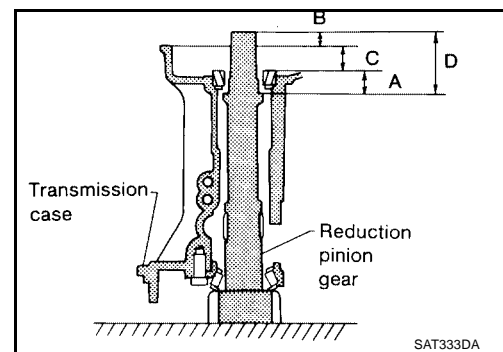
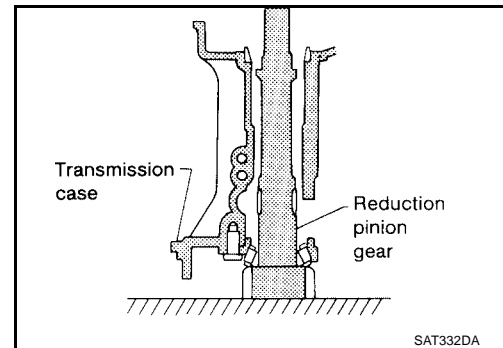
REDUCTION PINION GEAR BEARING PRELOAD

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.
- b. Place idler gear bearing on transmission case.
- c. Measure dimensions "B" "C" and "D" and calculate dimension "A".

$$A = D - (B + C)$$

"A"

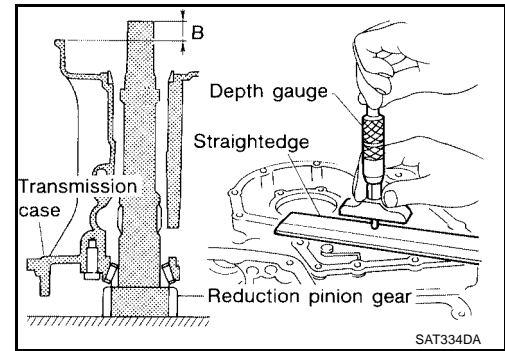
: Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.



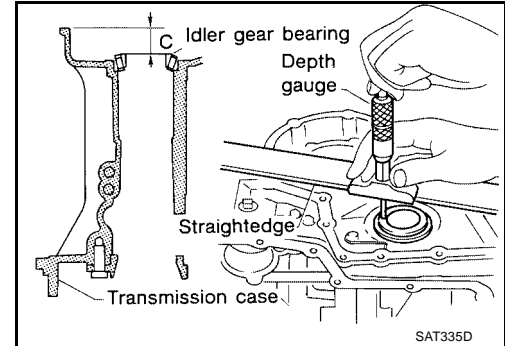
ASSEMBLY

[RE4F04B]

- Measure dimension "B" between the end of reduction pinion gear and the surface of transmission case.
- **Measure dimension "B" in at least two places.**

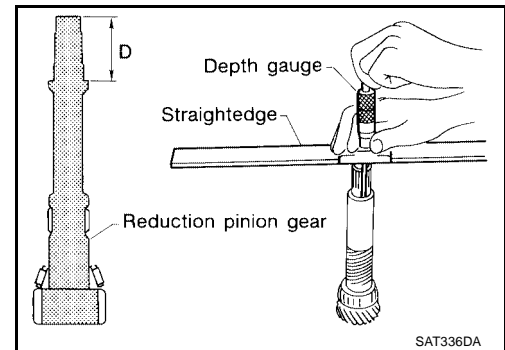


- Measure dimension "C" between the surface of idler gear bearing inner race and the surface of transmission case.
- **Measure dimension "C" in at least two places.**



- 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".

$$A = D - (B + C)$$



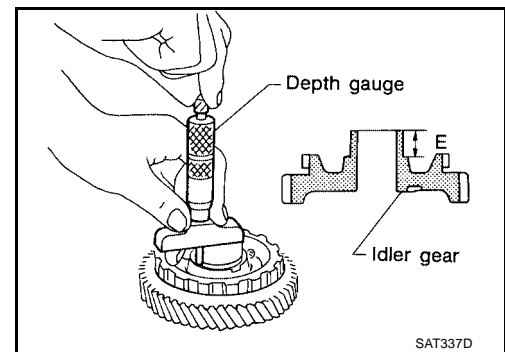
- d. Measure dimension "E" between the end of idler gear and the idler gear bearing inner race mating surface of idler gear.
- **Measure dimension "E" in at least two places.**
- e. Select proper thickness of reduction pinion gear bearing adjusting shim.

$$\text{Proper shim thickness} = A - E - 0.05 \text{ mm (0.0020 in)*}$$

(*: Bearing preload)

Reduction pinion gear bearing adjusting shim

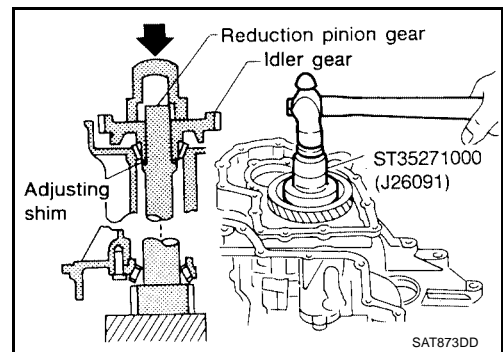
: Refer to [AT-757](#), "[REDUCTION PINION GEAR BEARING ADJUSTING SHIMS](#)".



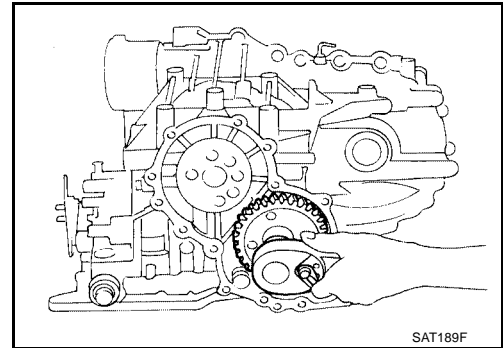
ASSEMBLY

[RE4F04B]

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.

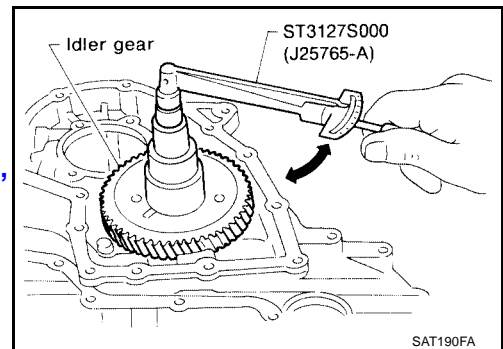


6. Tighten idler gear lock nut to the specified torque. Refer to [AT-652, "OVERHAUL"](#).
 - Lock idler gear with parking pawl when tightening lock nut.

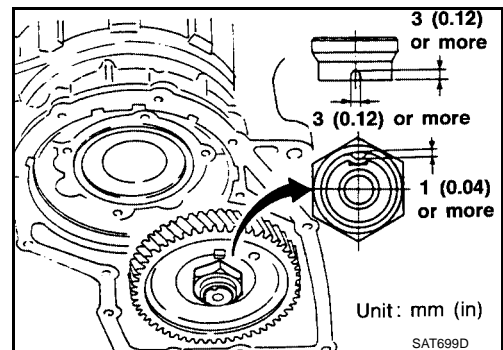


7. Measure turning torque of reduction pinion gear.
 - When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.

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.

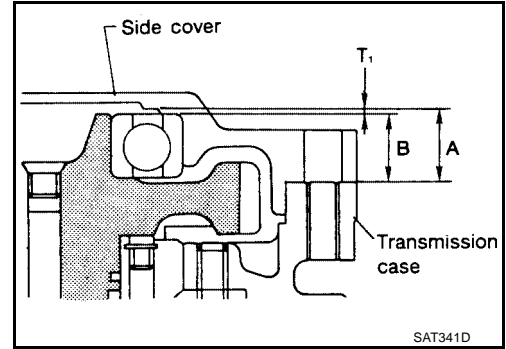


8. After properly adjusting turning torque, clinch idler gear lock nut as shown.

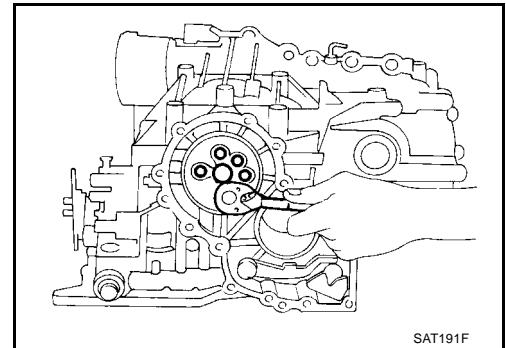


OUTPUT SHAFT END PLAY

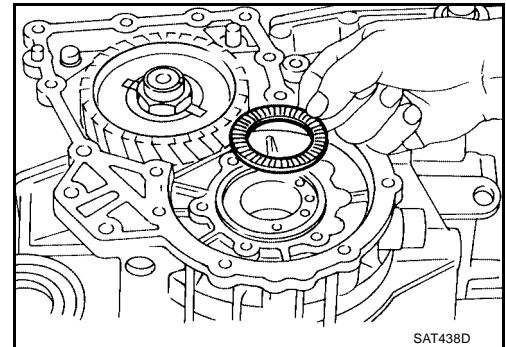
- Measure clearance between side cover and the end of the output shaft bearing.
- Select proper thickness of adjusting shim so that clearance is within specifications.



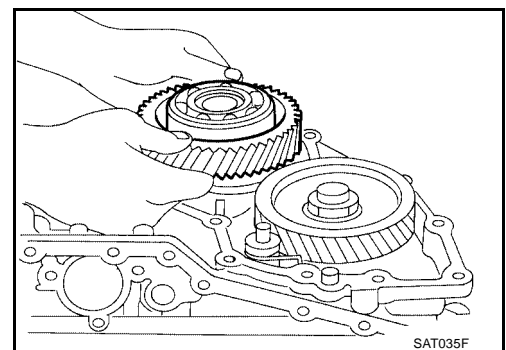
1. Install bearing retainer for output shaft.



2. Install output shaft thrust needle bearing on bearing retainer.



3. Install output shaft on transmission case.



ASSEMBLY

[RE4F04B]

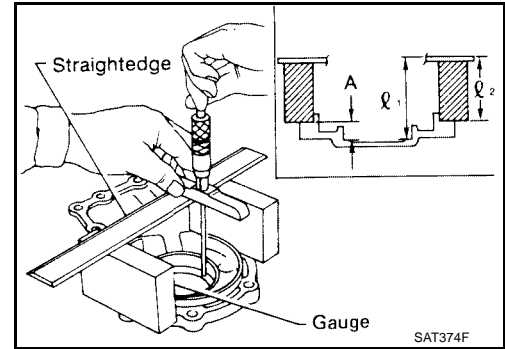
4. Measure dimensions " ℓ_1 " and " ℓ_2 " at side cover and then calculate dimension "A".

- Measure dimension " ℓ_1 " and " ℓ_2 " in at least two places.

"A" : Distance between transmission case fitting surface and adjusting shim mating surface.

$$A = \ell_1 - \ell_2$$

ℓ_2 : Height of gauge



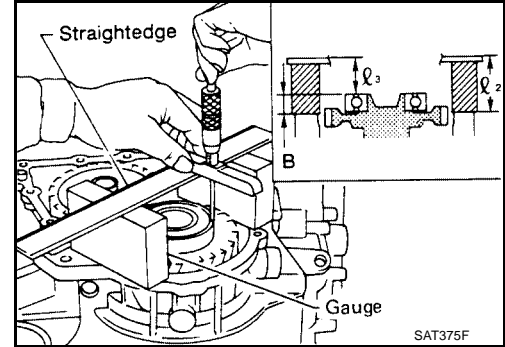
5. Measure dimensions " ℓ_2 " and " ℓ_3 " and then calculate dimension "B".

- 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.

$$B = \ell_2 - \ell_3$$

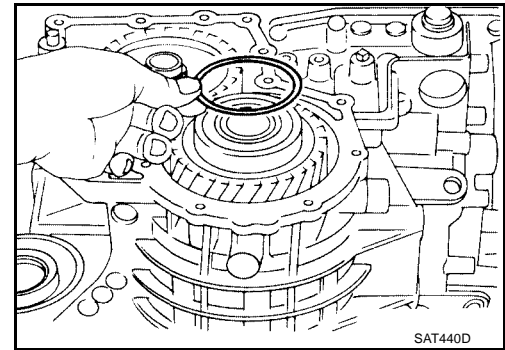
ℓ_2 : Height of gauge



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)

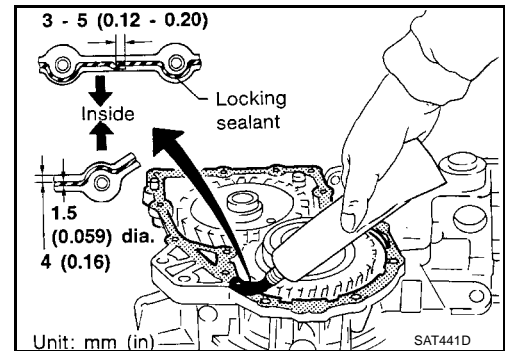
Output shaft end play adjusting shims : Refer to [AT-759, "OUTPUT SHAFT ADJUSTING SHIMS"](#).



7. Install adjusting shim on output shaft bearing.

Assembly (2)

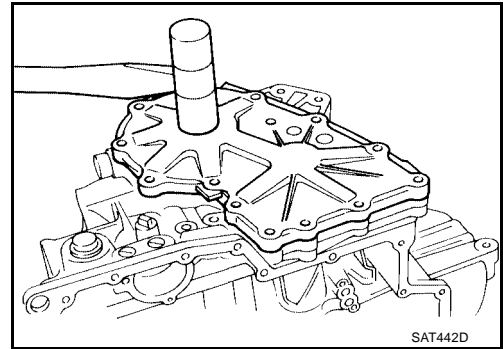
1. Apply anaerobic liquid gasket to transmission case as shown in illustration. Refer to [GI-44, "Recommended Chemical Products and Sealants"](#)



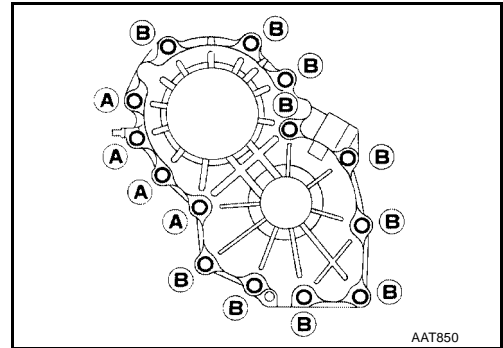
ASSEMBLY

[RE4F04B]

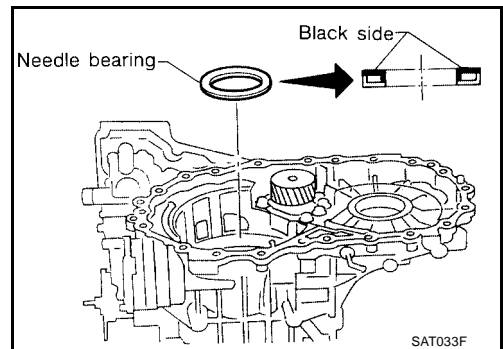
2. Set side cover on transmission case.
 - Apply locking sealant to the mating surface of transmission case.



3. Tighten side cover fixing bolts to specified torque. Refer to [AT-652, "OVERHAUL"](#).
 - Do not mix bolts A and B.
 - Always replace bolts A as they are self-sealing bolts.



4. Remove paper rolled around bearing retainer.
5. Install thrust washer on bearing retainer.
 - Apply petroleum jelly to thrust washer.

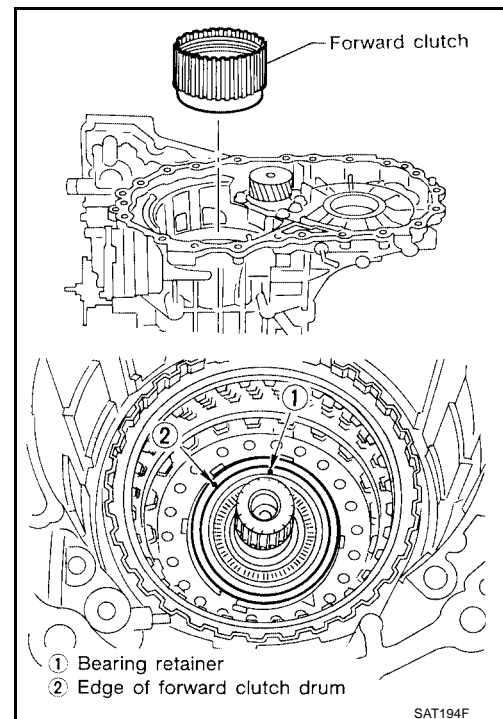


ASSEMBLY

[RE4F04B]

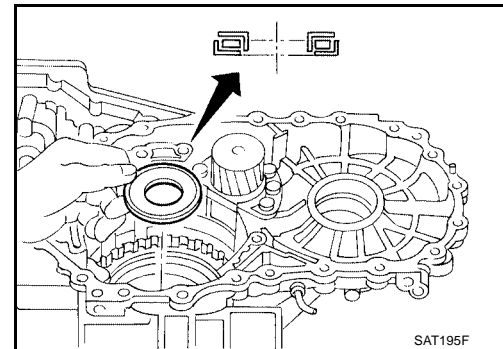
6. Install forward clutch assembly.

- 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.



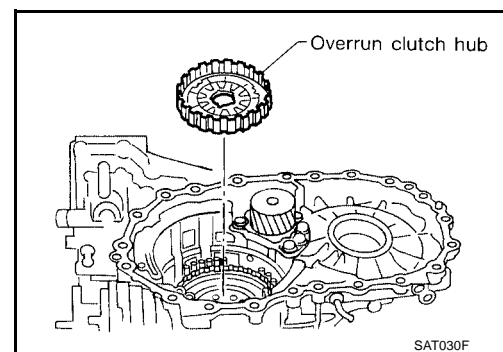
7. Install thrust needle bearing on bearing retainer.

- 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.



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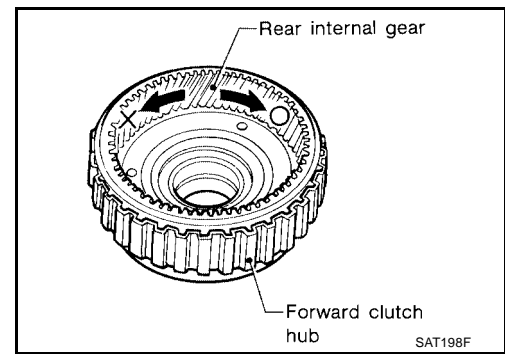
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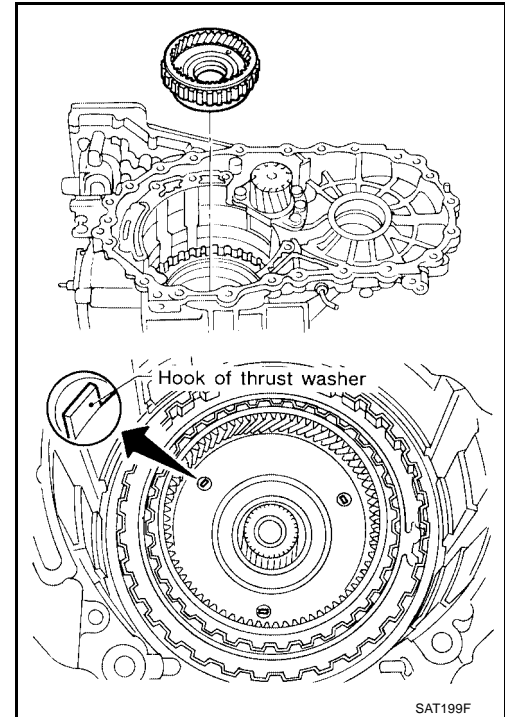
ASSEMBLY

[RE4F04B]

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.

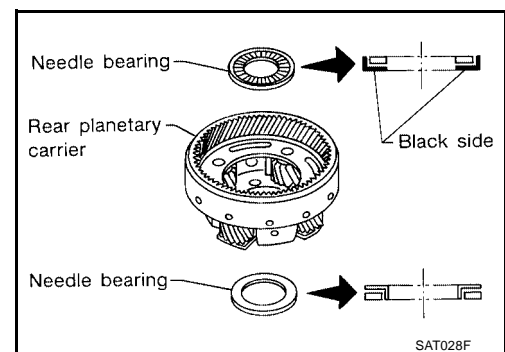


10. Install forward clutch hub and rear internal gear assembly.
- Align teeth of forward clutch drive plates before installing.
 - Check that three hooks of thrust washer are correctly aligned after installing.

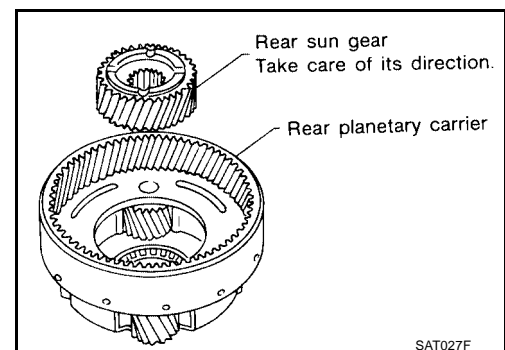


11. Install rear planetary carrier assembly and rear sun gear according to the following procedures.

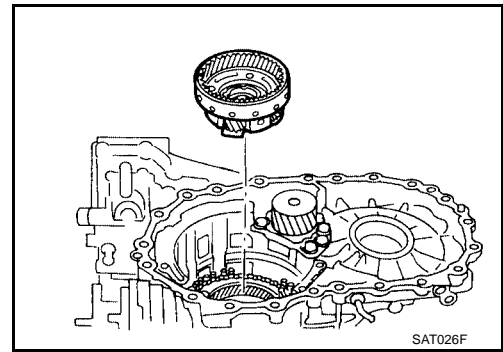
- a. Install needle bearings on rear planetary carrier.
- Apply petroleum jelly to needle bearings.
 - Pay attention to direction of needle bearings.



- b. Install rear sun gear on rear planetary carrier.
- Pay attention to direction of rear sun gear.

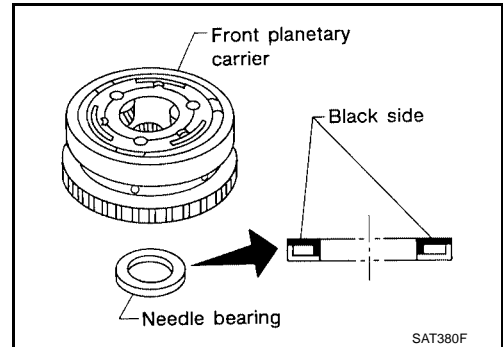


c. Install rear planetary carrier on transmission case.



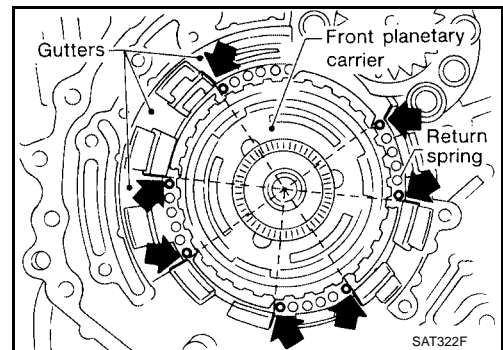
12. Install thrust needle bearing on front planetary carrier, then install them together on transmission case.

- Apply petroleum jelly to thrust needle bearing.
- Pay attention to direction of thrust needle bearing.

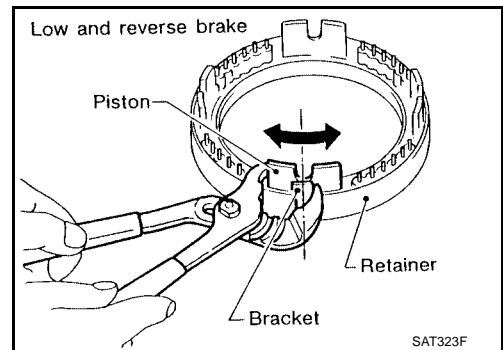


13. Install low and reverse brake piston according to the following procedures.

a. Set and align return springs to transmission case gutters as shown in illustration.



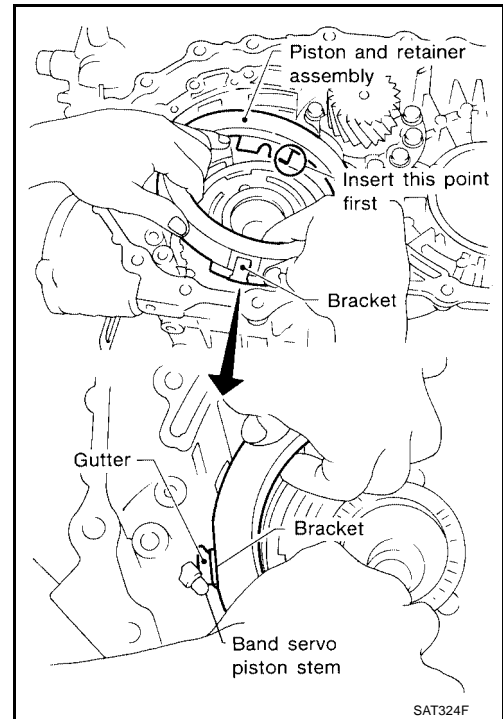
b. Set and align piston with retainer.



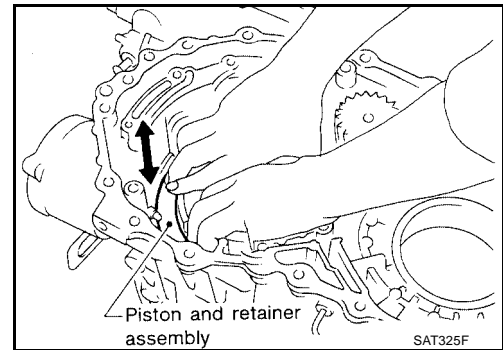
ASSEMBLY

[RE4F04B]

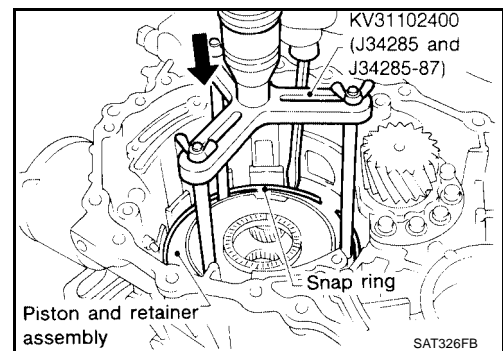
- c. Install piston and retainer assembly on the transmission case.
- **Align bracket to specified gutter as indicated in illustration.**



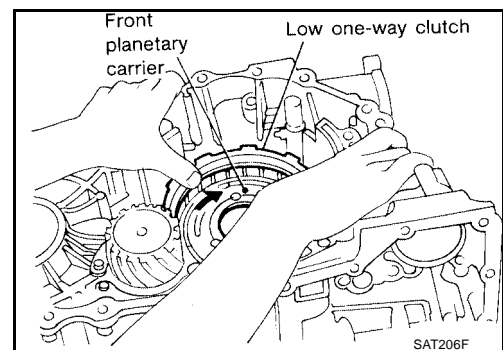
- d. Check that each protrusion of piston is correctly set to corresponding return spring as follows.
- **Push piston and retainer assembly evenly and confirm they move smoothly.**
 - **If they can not move smoothly, remove piston and retainer assembly and align return spring correctly as instructed in step "a".**



- e. Push down piston and retainer assembly and install snap ring.

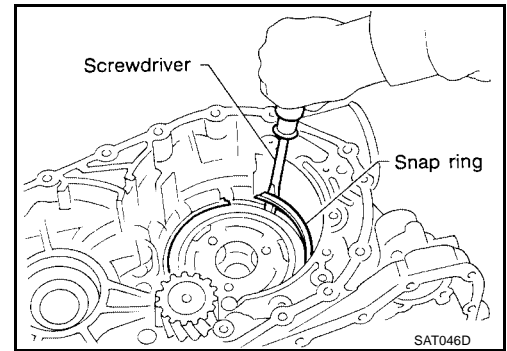


14. Install low one-way clutch to front planetary carrier by turning carrier in the direction of the arrow shown.



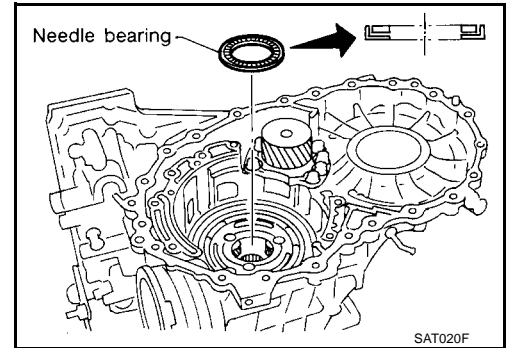
15. Install snap ring with screwdriver.

- Forward clutch and bearing must be correctly installed for snap ring to fit into groove of transmission case.



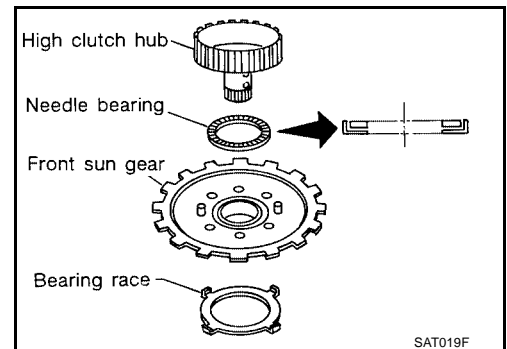
16. Install needle bearing on transmission case.

- Apply petroleum jelly to needle bearing.
- Pay attention to direction of needle bearing.

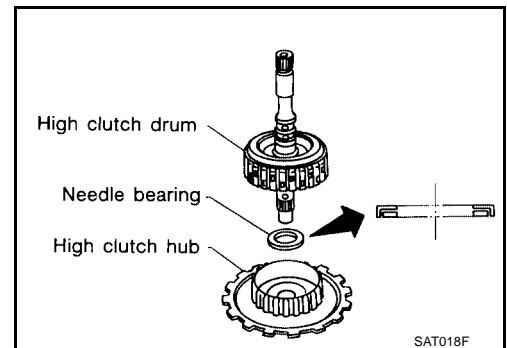


17. Install bearing race, needle bearing and high clutch hub on front sun gear.

- 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.



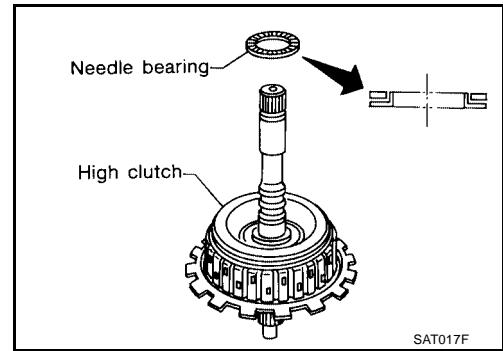
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ASSEMBLY

[RE4F04B]

19. Install needle bearing on high clutch drum.

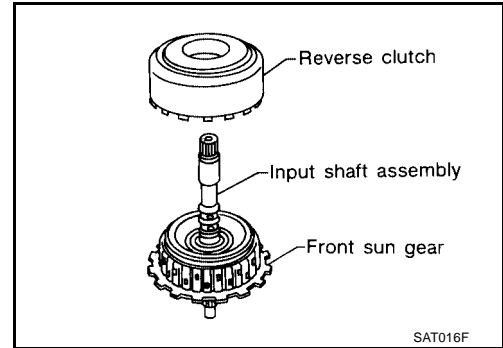
- Apply petroleum jelly to needle bearing.
- Pay attention to direction of needle bearing.



20. Remove paper rolled around input shaft.

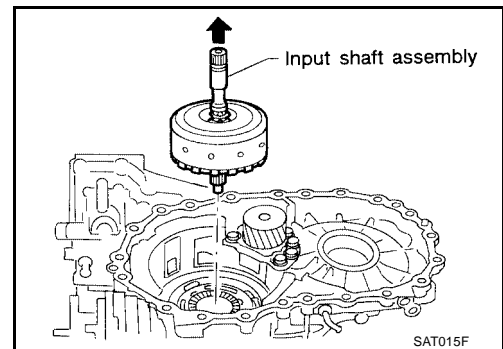
21. Install input shaft assembly in reverse clutch.

- Align teeth of reverse clutch drive plates before installing.



22. Install reverse clutch assembly on transmission case.

- Align teeth of high clutch drive plates before installing.



Adjustment (2)

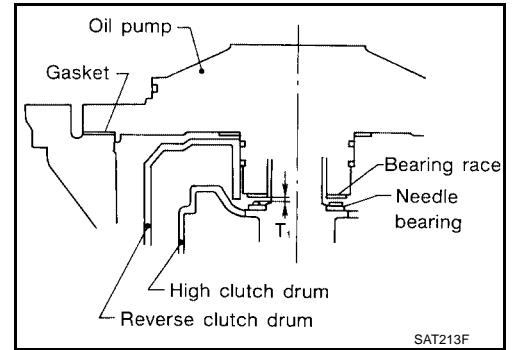
ECS0067U

When any parts listed below are replaced, adjust total end play and reverse clutch end play.

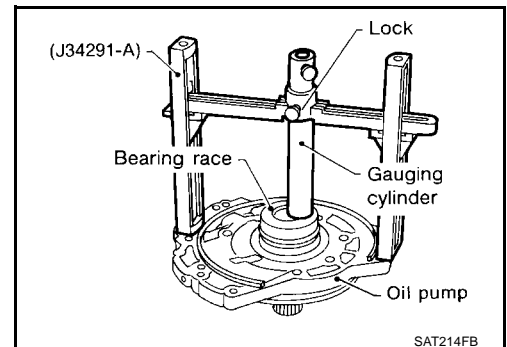
Part name	Total end play	Reverse clutch end play
Transmission case	●	●
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
High clutch drum	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●

TOTAL END PLAY

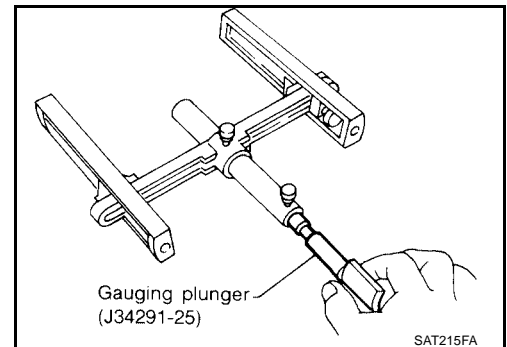
1. Adjust total end play "T₁".



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.



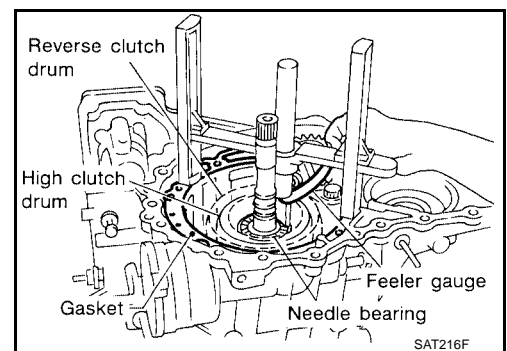
c. With needle bearing installed on high clutch drum, place Tool legs on machined surface of transmission case (with gasket). Then allow plunger to rest on needle bearing.

d. Measure gap between cylinder and plunger. This measurement should give exact total end play.

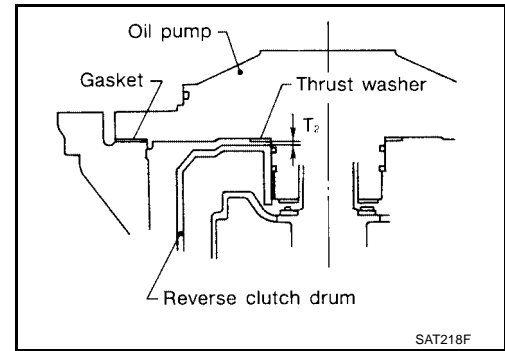
**Total end play "T₁" : 0.25 - 0.55 mm
(0.0098 - 0.0217 in)**

- If end play is out of specification, decrease or increase thickness of bearing race as necessary.

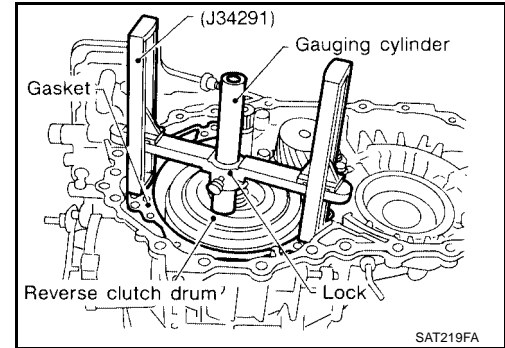
Available bearing race for adjusting total end play : Refer to [AT-759. "BEARING RACE FOR ADJUSTING TOTAL END PLAY"](#).



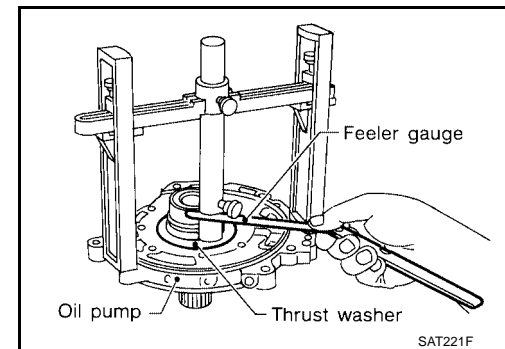
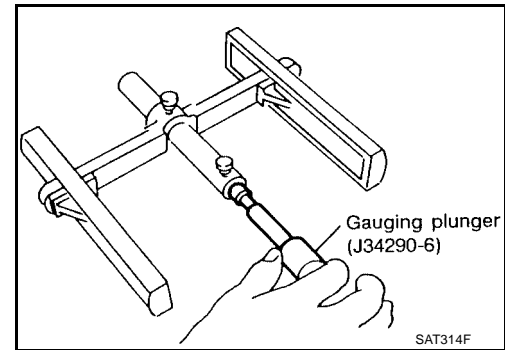
2. Adjust reverse clutch drum end play "T₂".



a. Place Tool on machined surface of transmission case (with gasket). Then allow gauging cylinder to rest on reverse clutch drum. Lock cylinder in place with set screw.



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 end play "T₂" : 0.55 - 0.90 mm (0.0217 - 0.0354 in)

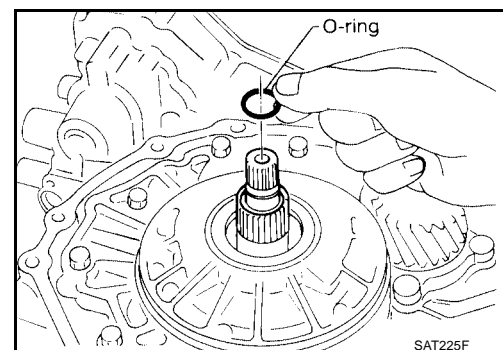
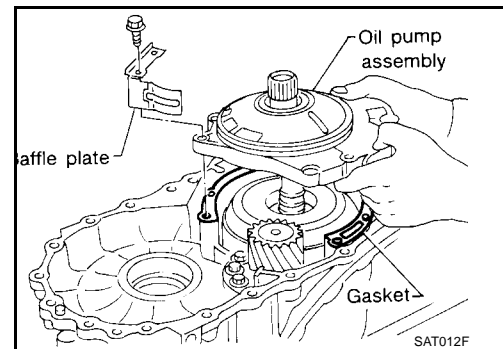
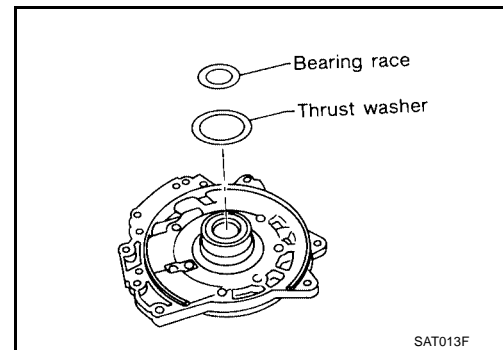
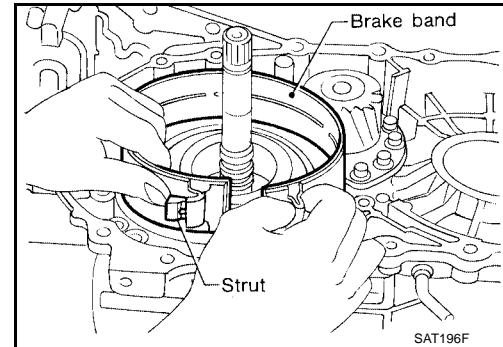
- If end play is out of specification, decrease or increase thickness of thrust washer as necessary.

Available thrust washer for adjusting reverse clutch drum end play : Refer to [AT-759](#), "[THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH DRUM END PLAY](#)".

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.**
5. Install oil pump assembly, baffle plate and gasket on transmission case.
6. Tighten oil pump fixing bolts to the specified torque.
7. Install O-ring to input shaft.
 - **Apply ATF to O-ring.**

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ASSEMBLY

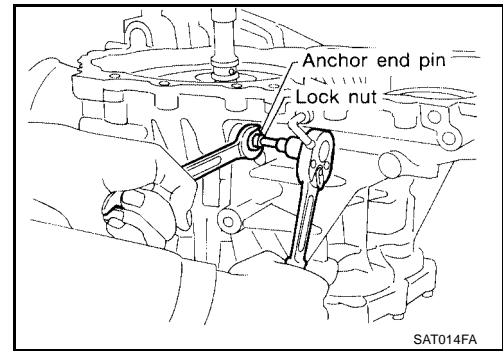
[RE4F04B]

8. Adjust brake band.
 - a. Tighten anchor end pin to the specified torque.

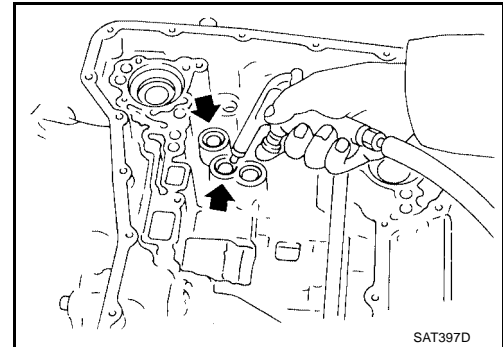
Anchor end pin : Refer to [AT-756, "BRAKE BAND"](#) .

- b. Back off anchor end pin two and a half turns.
 - c. While holding anchor end pin, tighten lock nut.

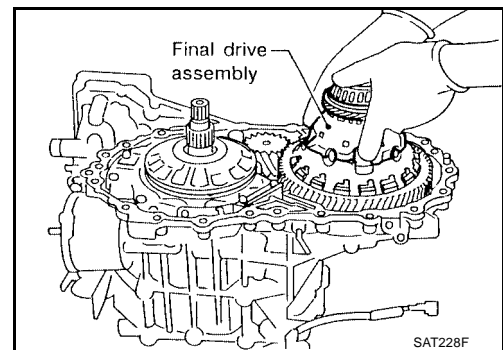
Lock nut : Refer to [AT-756, "BRAKE BAND"](#) .



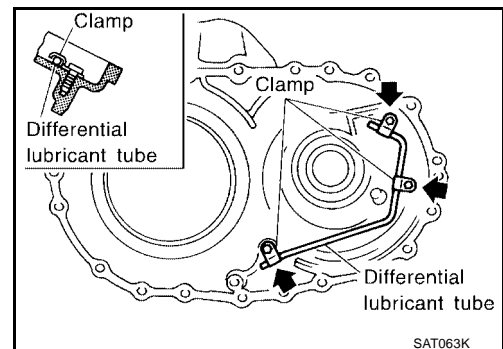
9. Apply compressed air to oil holes of transmission case and check operation of brake band.



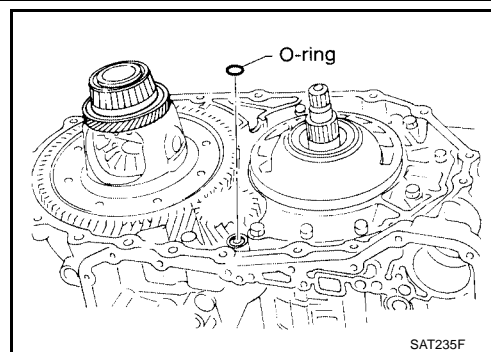
10. Install final drive assembly on transmission case.



11. Install differential lubricant tube on converter housing. Tighten differential lubricant tube bolts to the specified torque. Refer to [AT-652, "OVERHAUL"](#) .

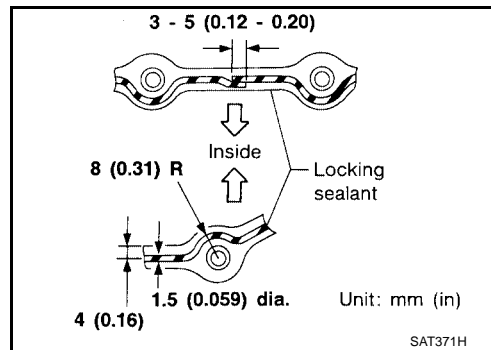


12. Install O-ring on differential oil port of transmission case.

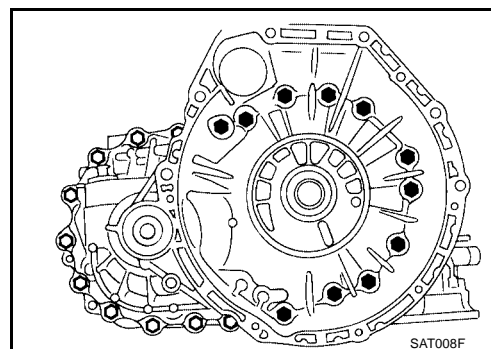


13. Install converter housing on transmission case.

- Apply locking sealant to mating surface of converter housing.

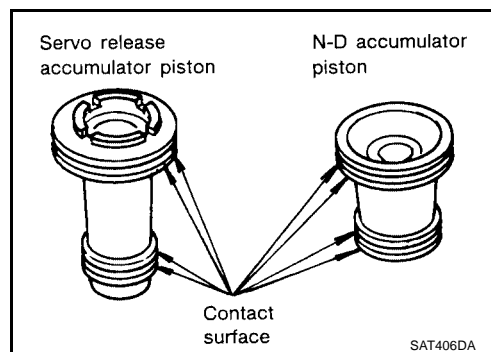


- Tighten converter housing bolts to the specified torque. Refer to [AT-652, "OVERHAUL"](#).



14. Install accumulator piston.

- Check contact surface of accumulator piston for damage.



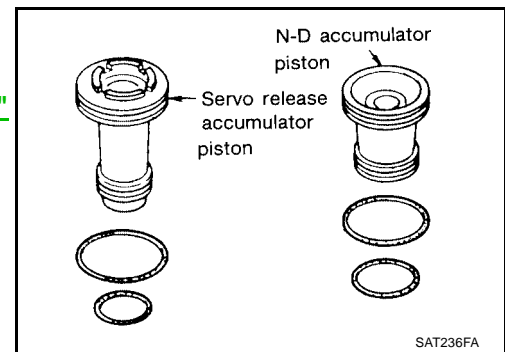
ASSEMBLY

[RE4F04B]

b. Install O-rings on accumulator piston.

- Apply ATF to O-rings.

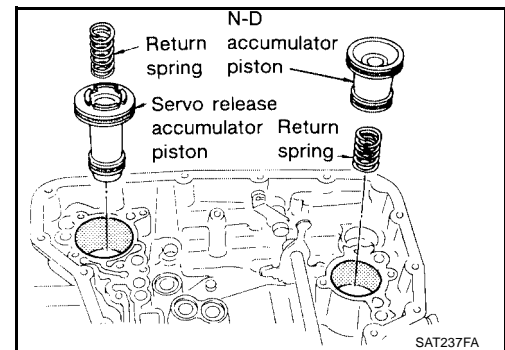
Accumulator piston O-rings : Refer to [AT-753, "O-RING"](#)



c. Install accumulator pistons and return springs on transmission case.

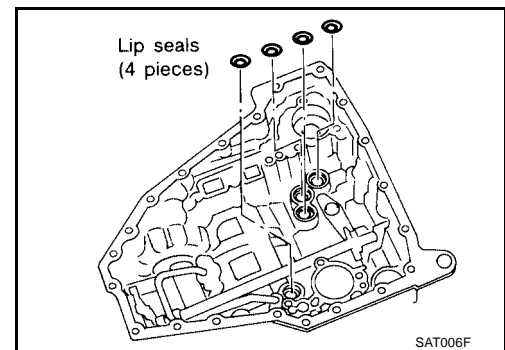
- Apply ATF to inner surface of transmission case.

Return springs : Refer to [AT-754, "RETURN SPRING"](#).

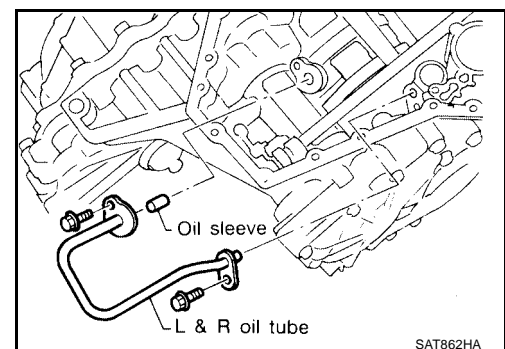


15. Install lip seals for band servo oil holes on transmission case.

- 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 [AT-652, "OVERHAUL"](#).



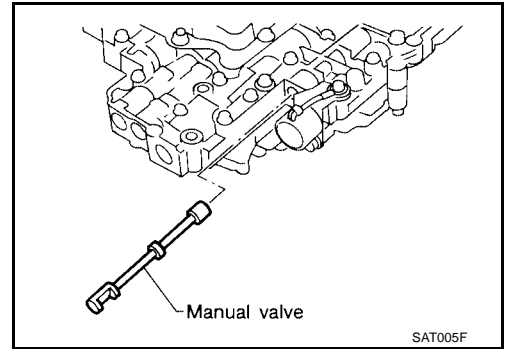
ASSEMBLY

[RE4F04B]

17. Install control valve assembly.

a. Insert manual valve into control valve assembly.

- Apply ATF to manual valve.

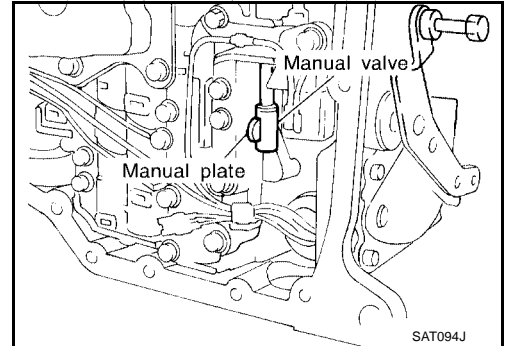


b. Set manual shaft in Neutral position.

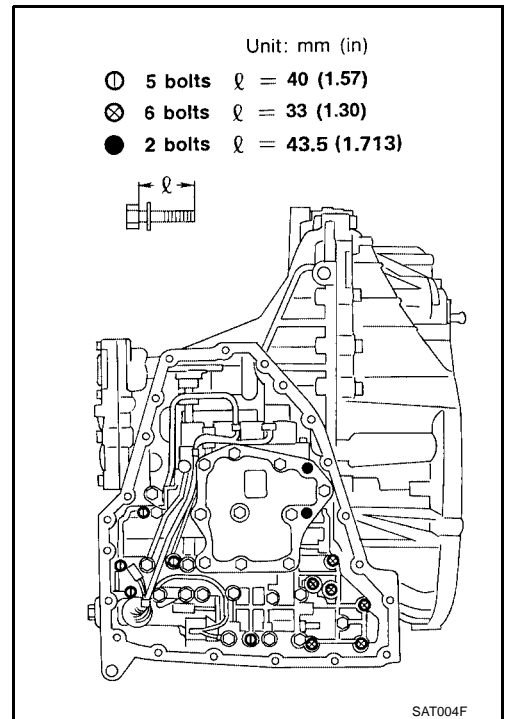
c. Install control valve assembly on transmission case while aligning manual valve with manual plate.

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 ●.

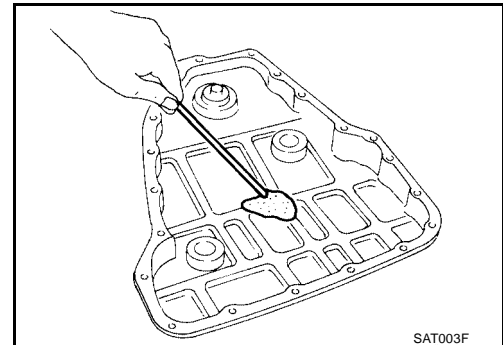


Bolt length, number and location:

Bolt	I	X	●
Bolt length "ℓ"  mm (in)	40 (1.57)	33 (1.30)	43.5 (1.713)
Number of bolts	5	6	2

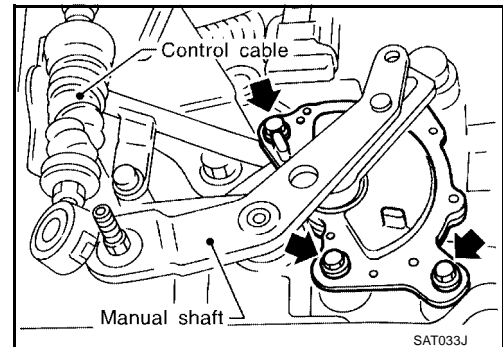
18. Install oil pan.

- 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 [AT-652, "OVERHAUL"](#) .

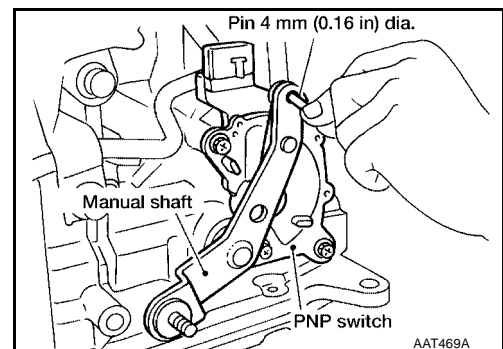


19. Install park/neutral position (PNP) switch.

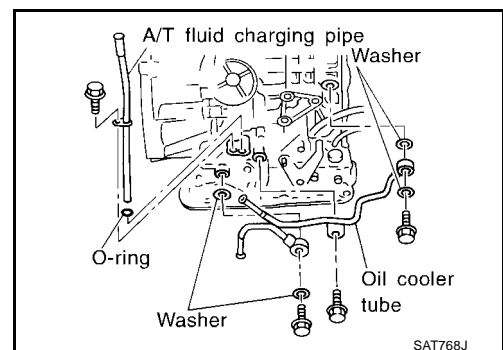
- a. Set manual shaft in P position.
- b. Temporarily install park/neutral position (PNP) switch on manual shaft.
- c. Move selector lever to N position.



- 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 [AT-652, "OVERHAUL"](#) .
- 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 [AT-652, "OVERHAUL"](#) .



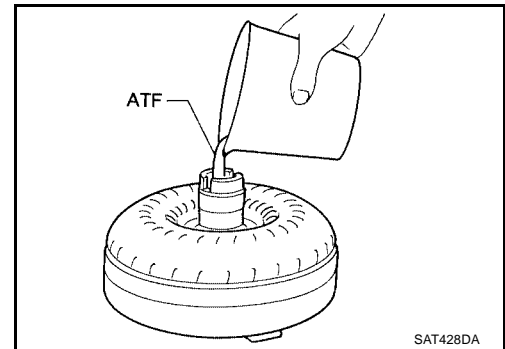
ASSEMBLY

[RE4F04B]

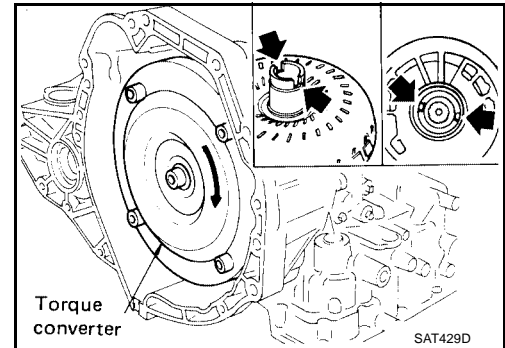
21. Install torque converter.

a. Pour ATF into torque converter.

- Approximately 1 liter (1-1/8 US qt, 7/8 Imp qt) of fluid is required for a new torque converter.
- When reusing old torque converter, add the same amount of fluid as was drained.

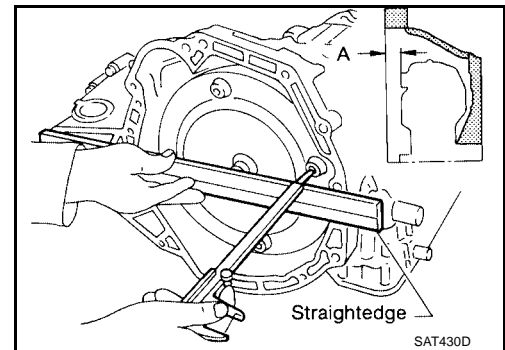


b. Install torque converter while aligning notches of torque converter with notches of oil pump.



c. Measure distance "A" to check that torque converter is in proper position.

Distance A : 14 mm (0.55 in) or more



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SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F04B]

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ECS0067W

Engine		QR25DE
Automatic transaxle model		RE4F04B
Automatic transaxle assembly	Model code number	85X63
Transaxle gear ratio	1st	2.785
	2nd	1.545
	3rd	1.000
	4th	0.694
	Reverse	2.272
	Final drive	4.087
Recommended fluid		Nissan Matic "D" (Continental U.S. and Alaska) or Canada Nissan Automatic Transmission Fluid*
Fluid capacity ℓ (US qt, Imp qt)		8.5 (9, 7.5)

*: Refer to [MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS"](#).

Shift Schedule

ECS0067X

VEHICLE SPEED WHEN SHIFTING GEARS THROTTLE POSITION

Throttle position	Shift pattern	Vehicle speed km/h (MPH)					
		D1 → D2	D2 → D3	D3 → D4	D4 → D3	D3 → D2	D2 → D1
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)
	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)

Selector lever position	D4 (O/D ON) position		D3 (O/D OFF) position	
	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

ECS0067Y

Engine	Stall revolution rpm
QR25DE	2,350 - 2,800

SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F04B]

Line Pressure

ECS0067Z

Engine speed rpm	Line pressure kPa (kg/cm ² , psi)	
	D, 2 and 1 positions	R position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,223 (12.6, 179)	1,918 (19.6, 278)

Control Valves CONTROL VALVE AND PLUG RETURN SPRINGS

ECS00680

Unit: mm (in)

	Parts	Item			
		Part No.*	Free length	Outer diameter	
Upper body	23	Pilot valve spring	31742-80L13	38.98 (1.535)	8.9 (0.350)
	7	1-2 accumulator valve spring	31742-80L15	20.5 (0.807)	6.95 (0.274)
	28	1-2 accumulator piston spring	31742-80L14	55.26 (2.176)	19.6 (0.772)
	33	1st reducing valve spring	31742-80L08	27.0 (1.063)	7.0 (0.276)
	35	3-2 timing valve spring	31736-01X00	23.0 (0.906)	6.65 (0.262)
	18	Overrun clutch reducing valve spring	31742-80L09	37.5 (1.476)	6.9 (0.272)
	16	Torque converter relief valve spring	31742-80L10	31.0 (1.220)	9.0 (0.354)
	11	Torque converter clutch control valve	31742-80L16	56.98 (2.243)	6.5 (0.256)
	3	Cooler check valve spring	31742-85X01	29.4 (1.157)	6.0 (0.236)
Lower body	15	Pressure regulator valve spring	31742-80L01	45.0 (1.772)	15.0 (0.591)
	20	Overrun clutch control valve spring	31762-80L00	21.7 (0.854)	7.0 (0.276)
	24	Accumulator control valve spring	31742-80L02	22.0 (0.866)	6.5 (0.256)
	29	Shift valve A spring	31762-80L00	21.7 (0.854)	7.0 (0.276)
	32	Shuttle valve spring	31762-41X04	51.0 (2.008)	5.65 (0.222)
	12	Shift valve B spring	31762-80L00	21.7 (0.854)	7.0 (0.276)
	7	Pressure modifier valve spring	31742-80L13	30.5 (1.201)	9.8 (0.386)
	3		31742-80L04	32.0 (1.260)	6.9 (0.272)
	—	Oil cooler relief valve spring	31742-80L12	17.02 (0.670)	8.0 (0.315)

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

Accumulator O-RING

ECS00681

Unit: mm (in)

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.

SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F04B]

RETURN SPRING

Unit: mm (in)

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		85X63	
Number of drive plates		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 (0.020 - 0.031)	
	Allowable limit	1.2 (0.047)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		6.6 (0.260)	31537-80L00
		6.8 (0.268)	31537-80L01
		7.0 (0.276)	31537-80L02
		7.2 (0.283)	31537-80L03
		7.4 (0.291)	31537-80L04
		7.6 (0.299)	31537-80L05
		7.8 (0.307)	31537-80L06

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

HIGH CLUTCH

Model code number		85X63	
Number of drive plates		3	
Number of driven plates		7*2 + 1*3	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Driven plate thickness mm (in)	Standard	*2	*3
		1.4 (0.055)	2.0 (0.079)
Clearance mm (in)	Standard	1.8 - 2.2 (0.071 - 0.087)	
	Allowable limit	2.8 (0.110)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		3.2 (0.126)	31537-80L20
		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)	
	Allowable limit	1.4 (0.055)	

SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F04B]

Driven plate thickness mm (in)	Standard	1.8 (0.071)	
Clearance mm (in)	Standard	0.45 - 0.85 (0.0177 - 0.0335)	
	Allowable limit	1.85 (0.0728)	
Thickness of retaining plates	Thickness mm (in)		Part number*
	3.2 (0.126)		31537-80L18
	3.4 (0.134)		31537-80L17
	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	

*: 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		
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Driven plate thickness mm (in)	Standard	1.8 (0.071)	
Clearance mm (in)	Standard	0.7 - 1.1 (0.028 - 0.043)	
	Allowable limit	1.7 (0.067)	
Thickness of retaining plates	Thickness mm (in)		Part number*
	3.0 (0.118)		31537-80L07
	3.2 (0.126)		31537-80L08
	3.4 (0.134)		31537-80L09
	3.6 (0.142)		31537-80L10
	3.8 (0.150)		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 thickness mm (in)	Standard	1.8 (0.071)	
	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 of retaining plates	Thickness mm (in)		Part number*
	2.0 (0.079)		31667-80L00
	2.2 (0.087)		31667-80L01
	2.4 (0.094)		31667-80L02
	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.

SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F04B]

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

ECS00683

Clearance between side gear and differential case with washer mm (in)	0.1 - 0.2 (0.004 - 0.008)
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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)
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Planetary Carrier and Oil Pump PLANETARY CARRIER

ECS00684

Clearance between planetary carrier and pinion washer mm (in)	Standard	0.20 - 0.70 (0.0079 - 0.0276)
	Allowable limit	0.80 (0.0315)

SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F04B]

OIL PUMP

Oil pump side clearance mm (in)	0.030 - 0.050 (0.0012 - 0.0020)	
Thickness of inner gears and outer gears	Inner gear	
	Thickness mm (in)	Part number*
	11.99 - 12.0 (0.4720 - 0.4724)	31346-80L00
	11.98 - 11.99 (0.4717 - 0.4720)	31346-80L01
	11.97 - 11.98 (0.4713 - 0.4717)	31346-80L02
	Outer gear	
Thickness mm (in)	Part number*	
11.99 - 12.0 (0.4720 - 0.4724)	31347-80L00	
11.98 - 11.99 (0.4717 - 0.4720)	31347-80L01	
11.97 - 11.98 (0.4713 - 0.4717)	31347-80L02	
Clearance between oil pump housing and outer gear mm (in)	Standard	0.111 - 0.181 (0.0044 - 0.0071)
	Allowable limit	0.181 (0.0071)
Oil pump cover seal ring clearance mm (in)	Standard	0.1 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

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

Input Shaft SEAL RING CLEARANCE

ECS00685

Input shaft seal ring clearance mm (in)	Standard	0.08 - 0.23 (0.0031 - 0.0091)
	Allowable limit	0.23 (0.0091)

SEAL RING

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
26 (1.024)	22.4 (0.882)	1.971 (0.078)	31525-80X02

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

Reduction Pinion Gear TURNING TORQUE

ECS00686

Turning torque of reduction pinion gear N-m (kg-cm, in-lb)	0.05 - 0.39 (0.5 - 4.0, 0.43 - 3.47)
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REDUCTION PINION GEAR BEARING ADJUSTING SHIMS

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
1	5.00 (0.1969)	31439-81X00	18	5.34 (0.2102)	31439-81X17
2	5.02 (0.1976)	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)	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)	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)	31439-81X11	29	5.56 (0.2189)	31439-81X49
13	5.24 (0.2063)	31439-81X12	30	5.58 (0.2197)	31439-81X60
14	5.26 (0.2071)	31439-81X13	31	5.60 (0.2205)	31439-81X61
15	5.28 (0.2079)	31439-81X14	32	5.62 (0.2213)	31439-81X62

SERVICE DATA AND SPECIFICATIONS (SDS)

[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

ECS00687

Unit: mm (in)

Return spring	Part number*	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

ECS00688

Output shaft seal ring clearance mm (in)	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	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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SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F04B]

OUTPUT SHAFT ADJUSTING SHIMS

Thickness mm (in)	Part number*
0.80 (0.0315)	31438-80X60
0.84 (0.0331)	31438-80X61
0.88 (0.0346)	31438-80X62
0.92 (0.0362)	31438-80X63
0.96 (0.0378)	31438-80X64
1.00 (0.0394)	31438-80X65
1.04 (0.0409)	31438-80X66
1.08 (0.0425)	31438-80X67
1.12 (0.0441)	31438-80X68
1.16 (0.0457)	31438-80X69
1.20 (0.0472)	31438-80X70

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

Bearing Retainer SEAL RING CLEARANCE

ECS00689

Bearing retainer seal ring clearance mm (in)	Standard	0.10 - 0.30 (0.0039 - 0.0118)
	Allowable limit	0.30 (0.0118)

Total End Play

ECS0068A

Total end play mm (in)	0.25 - 0.55 (0.0098 - 0.0217)
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BEARING RACE FOR ADJUSTING TOTAL END PLAY

Thickness mm (in)	Part number*
0.8 (0.031)	31435-80X00
1.0 (0.039)	31435-80X01
1.2 (0.047)	31435-80X02
1.4 (0.055)	31435-80X03
1.6 (0.063)	31435-80X04
1.8 (0.071)	31435-80X05
2.0 (0.079)	31435-80X06
0.9 (0.035)	31435-80X09
1.1 (0.043)	31435-80X10
1.3 (0.051)	31435-80X11
1.5 (0.059)	31435-80X12
1.7 (0.067)	31435-80X13
1.9 (0.075)	31435-80X14

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

Reverse Clutch End Play

ECS0068B

Reverse clutch end play mm (in)	0.55 - 0.90 (0.0217 - 0.0354)
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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

ECS0068C

Unit: mm (in)

Distance between end of converter housing and torque converter	14 (0.55)
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SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4F04B]

Shift Solenoid Valves

ECS0068D

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

ECS0068E

Solenoid valves	Resistance (Approx.) Ω	Terminal No.
Shift solenoid valve A	20 - 30	2
Shift solenoid valve B	5 - 20	1
Overrun clutch solenoid valve	20 - 30	3
Line pressure solenoid valve	2.5 - 5	4
Torque converter clutch solenoid valve	5 - 20	5

A/T Fluid Temperature Sensor

ECS0068F

Remarks: Specification data are reference values.

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

Revolution Sensor

ECS0068G

Condition	Judgement standard
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.	450 Hz (Approx.)
When vehicle is parked.	0V

Dropping Resistor

ECS0068H

Resistance	Approx. 12 Ω
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Turbine Revolution Sensor

ECS0068I

Condition	Judgement standard
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.	240 Hz (Approx.)
When vehicle is parked.	Under 1.3V or over 4.5V