AUTOMATIC TRANSAXLE

SECTION AT

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Alphabetical & P No. Index for DTC

NIAT0001

ALPHABETICAL INDEX FOR DTC

NIAT0001S01

Items (CONSULT-II screen terms)	DTC	Reference page	
	CONSULT-II GST*1	QG18DE (Calif. CA Model) & SR20DE	QG18DE (Except Calif. CA Model)
A/T 1ST GR FNCTN	P0731	AT-135	AT-295
A/T 2ND GR FNCTN	P0732	AT-142	AT-302
A/T 3RD GR FNCTN	P0733	AT-148	AT-308
A/T 4TH GR FNCTN	P0734	AT-154	AT-314
A/T TCC S/V FNCTN	P0744	AT-163	AT-323
ATF TEMP SEN/CIRC	P0710	AT-120	AT-280
ENGINE SPEED SIG	P0725	AT-131	AT-291
L/PRESS SOL/CIRC	P0745	AT-178	AT-338
O/R CLTCH SOL/CIRC	P1760	AT-199	AT-359
PNP SW/CIRC	P0705	AT-115	AT-275
SFT SOL A/CIRC*2	P0750	AT-183	AT-343
SFT SOL B/CIRC*2	P0755	AT-187	AT-347
TCC SOLENOID/CIRC	P0740	AT-163	AT-323
TP SEN/CIRC A/T*2	P1705	AT-191	AT-351
VEH SPD SEN/CIR AT*3	P0720	AT-126	AT-286

*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.

P NO. INDEX FOR DTC

=NIAT0001S02

DTC	Items (CONSULT-II screen terms)	Reference page	
CONSULT-II GST*1		QG18DE (Calif. CA Model) & SR20DE	QG18DE (Except Calif. CA Model)
P0705	PNP SW/CIRC	AT-115	AT-275
P0710	ATF TEMP SEN/CIRC	AT-120	AT-280
P0720	VEH SPD SEN/CIR AT*3	AT-126	AT-286
P0725	ENGINE SPEED SIG	AT-131	AT-291
P0731	A/T 1ST GR FNCTN	AT-135	AT-295
P0732	A/T 2ND GR FNCTN	AT-142	AT-302
P0733	A/T 3RD GR FNCTN	AT-148	AT-308
P0734	A/T 4TH GR FNCTN	AT-154	AT-314
P0740	TCC SOLENOID/CIRC	AT-163	AT-323
P0744	A/T TCC S/V FNCTN	AT-167	AT-327
P0745	L/PRESS SOL/CIRC	AT-178	AT-338
P0750	SFT SOL A/CIRC*2	AT-183	AT-343
P0755	SFT SOL B/CIRC*2	AT-187	AT-347
P1705	TP SEN/CIRC A/T*2	AT-191	AT-351
P1760	O/R CLTCH SOL/CIRC	AT-199	AT-359

*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.

Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

NIAT0002

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN B15 is as follows:

- For a frontal collision
  The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), front seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision
  The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), side air bag (satellite) sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS 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 should be performed by an authorized NISSAN 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 RS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. Spiral cable and wiring harnesses covered with yellow insulation tape either just before the harness connectors or for the complete harness are related to the SRS.**

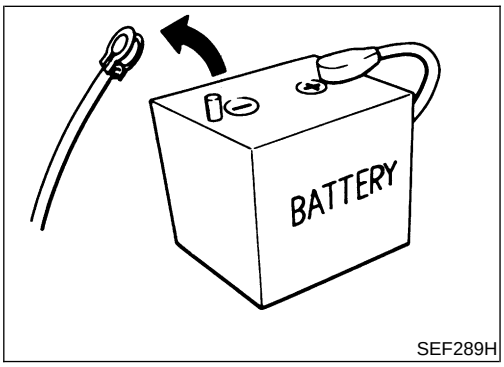
Precautions for On Board Diagnostic (OBD) System of A/T and Engine

NIAT0003

The ECM/PCM 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/PCM and ECM before returning the vehicle to the customer.**

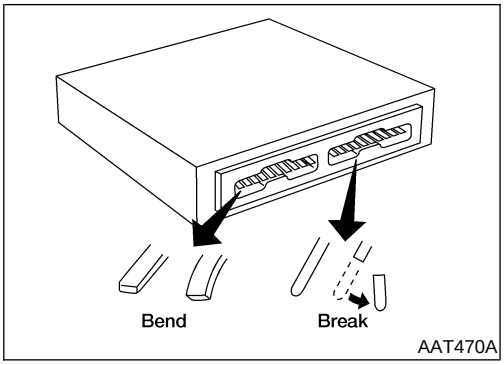


SEF289H

Precautions

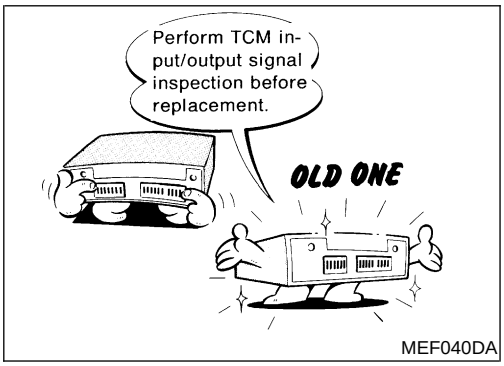
NIAT0004

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



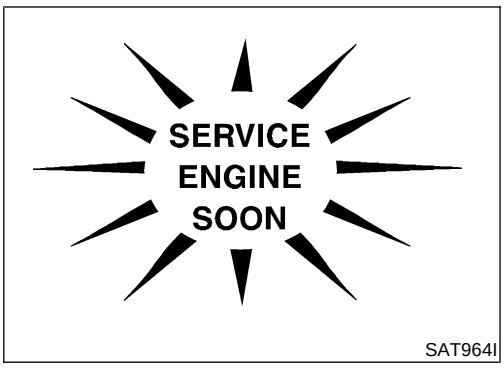
AAT470A

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



MEF040DA

- **Before replacing TCM/PCM, perform TCM/PCM input/output signal inspection and make sure whether TCM/PCM functions properly or not. See page AT-108 [QG18DE (Calif. CA Model) and SR20DE], AT-268 [QG18DE (except Calif. CA Model)].**



SAT964I

- **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 "Changing A/T Fluid", ***MA-36***.

Service Notice or Precautions

NIAT0005

FAIL-SAFE

NIAT0005S01

The TCM/PCM 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/PCM Self-diagnostic Procedure (No Tools)", refer to AT-52.]
Fail-Safe may occur without electrical circuit damage if the vehicle is driven under extreme conditions (such as excessive wheel spin followed by sudden braking). To recover normal shift pattern, turn the ignition key "OFF" for 5 seconds, then "ON".
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-65).
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

NIAT0005S02

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

NIAT0005S03

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 ***LC-18***, "Radiator".

OBD-II SELF-DIAGNOSIS

NIAT0005S04

- A/T self-diagnosis is performed by the PCM or 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-43 for the indicator used to display each self-diagnostic result.
- The self-diagnostic results indicated by the MIL are automatically stored in the PCM or in both the ECM and TCM memories.
  Always perform the procedure "HOW TO ERASE DTC" on AT-40 to complete the repair and avoid unnecessary blinking of the MIL.
- The following self-diagnostic items can be detected using ECM/PCM self-diagnostic results mode* only when the O/D OFF indicator lamp does not indicate any malfunctions.

− PNP switch
− A/T 1st, 2nd, 3rd, or 4th gear function
− A/T TCC S/V function (lock-up).

*: For details of OBD-II, refer to ***EC-85*** [QG18DE (Except Calif. CA Model)], ***EC-758*** [QG18DE (Calif. CA Model)], ***EC-1426*** (SR20DE), "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION".

- **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 *EL-5*, "HARNESS CONNECTOR".

Wiring Diagrams and Trouble Diagnosis

NIAT0006

When you read wiring diagrams, refer to the following:

- ***GI-11***, "HOW TO READ WIRING DIAGRAMS".
- ***EL-9***, "POWER SUPPLY ROUTING".

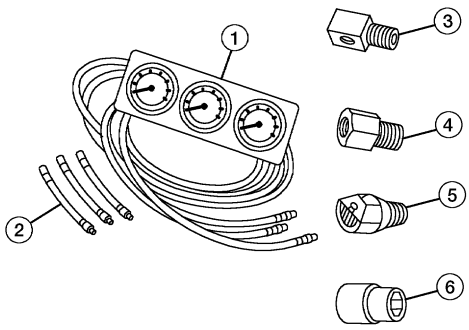
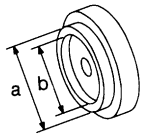
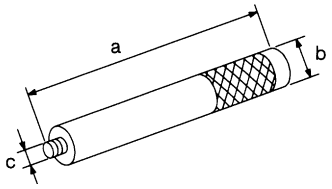
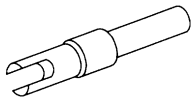
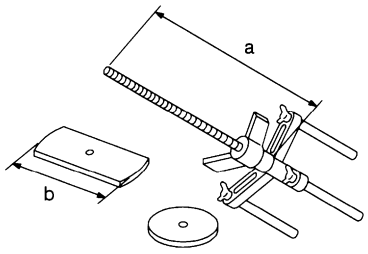
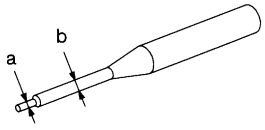
When you perform trouble diagnosis, refer to the following:

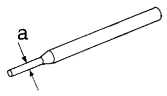
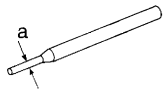
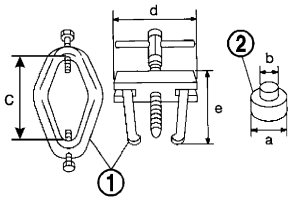
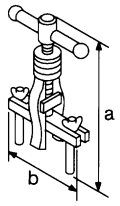
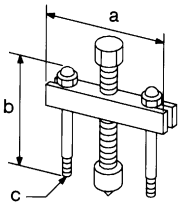
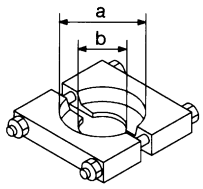
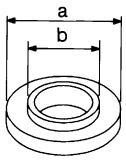
- ***GI-36***, "How to Follow Test Group in Trouble Diagnosis".
- ***GI-25***, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT".

Special Service Tools

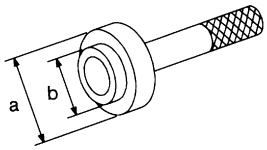
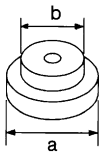
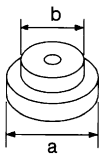
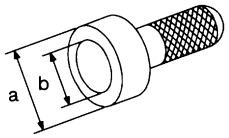
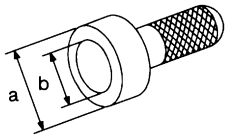
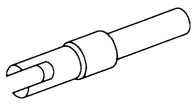
NIAT0007

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	• 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)**
ST23540000 (J25689-A) Pin punch	 NT442	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.**

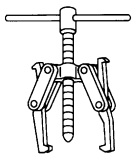
Tool number (Kent-Moore No.) Tool name	Description	
KV32101000 (J25689-A) Pin punch	 NT410	Installing throttle lever and manual shaft retaining pins **a: 4 mm (0.16 in) dia.**
ST25710000 (—) Pin punch	 NT410	Aligning groove of manual shaft and hole of transmission case **a: 2 mm (0.08 in) dia.**
ST3306S001 (J22888-D) Differential side bearing puller set 1 ST33051001 (J22888-D) Puller 2 ST33061000 (J8107-2) Adapter	 NT745	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	 NT414	• Removing idler gear bearing outer race • Removing differential side oil seals • Removing differential side bearing outer race • Removing needle bearing from bearing retainer **a: 250 mm (9.84 in)** **b: 160 mm (6.30 in)**
ST27180001 (J25726-B) Puller	 NT424	• Removing idler gear **a: 100 mm (3.94 in)** **b: 110 mm (4.33 in)** **c: M8 x 1.25P**
ST30031000 (J22912-O1) Puller	 NT411	Removing reduction gear bearing inner race **a: 90 mm (3.54 in) dia.** **b: 50 mm (1.97 in) dia.**
ST35272000 (J26092) Drift	 NT426	• Installing reduction gear bearing inner race • Installing idler gear bearing inner race **a: 72 mm (2.83 in) dia.** **b: 35.5 mm (1.398 in) dia.**

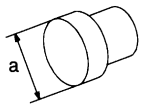
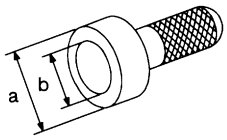
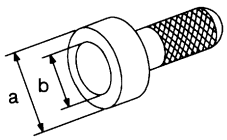
Special Service Tools (Cont'd)

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

Commercial Service Tools

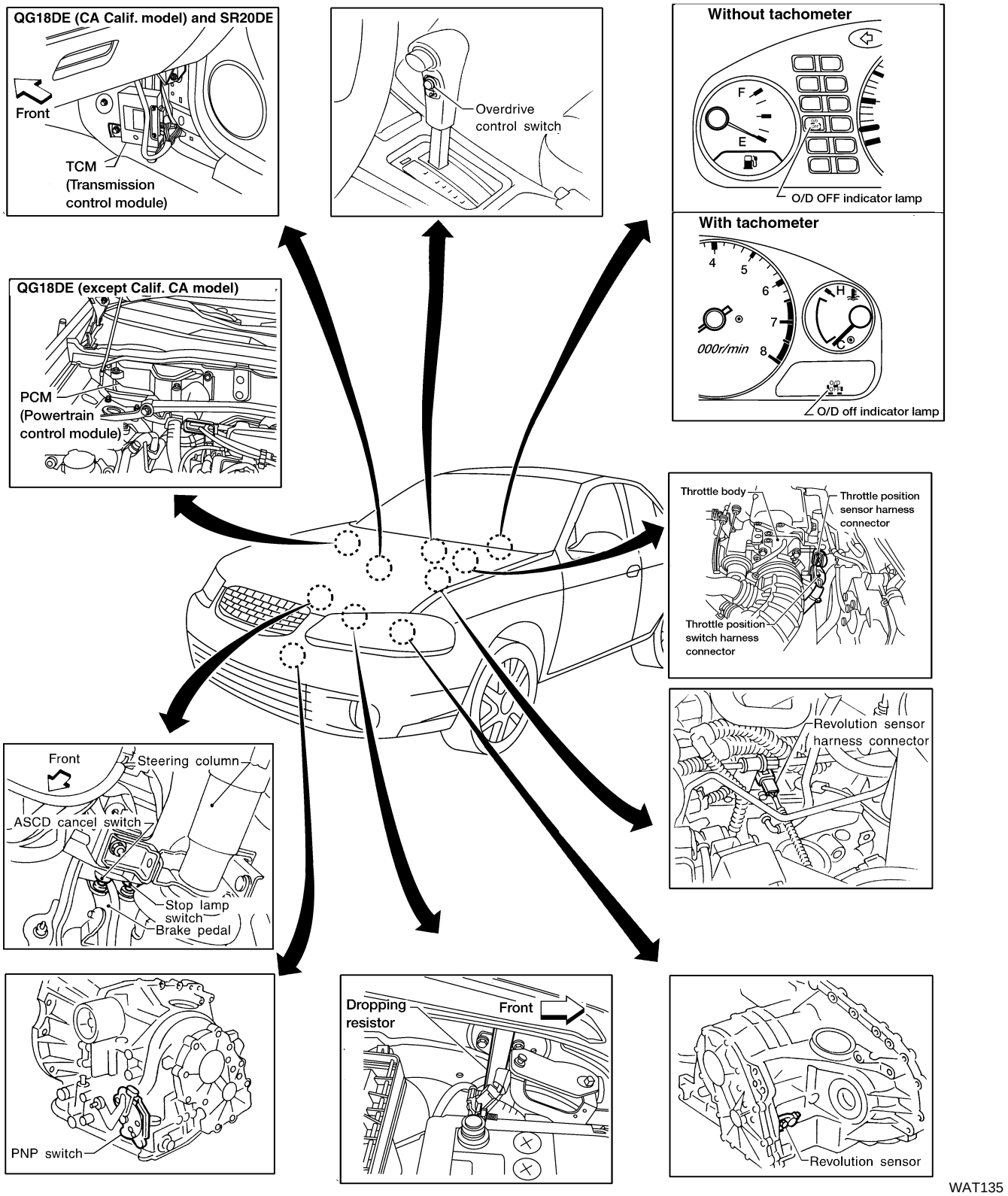
NIAT0008

Tool name	Description	
Puller	 NT077	• Removing idler gear bearing inner race • Removing and installing band servo piston snap ring

Tool name	Description	
Drift	 NT109	Removing idler gear bearing inner race **a: 34 mm (1.34 in) dia.**
Drift	 NT115	Installing differential left side bearing **a: 86 mm (3.39 in) dia.** **b: 80 mm (3.15 in) dia.**
Drift	 NT115	Installing differential right side bearing **a: 46 mm (1.81 in) dia.** **b: 40 mm (1.57 in) dia.**

A/T Electrical Parts Location

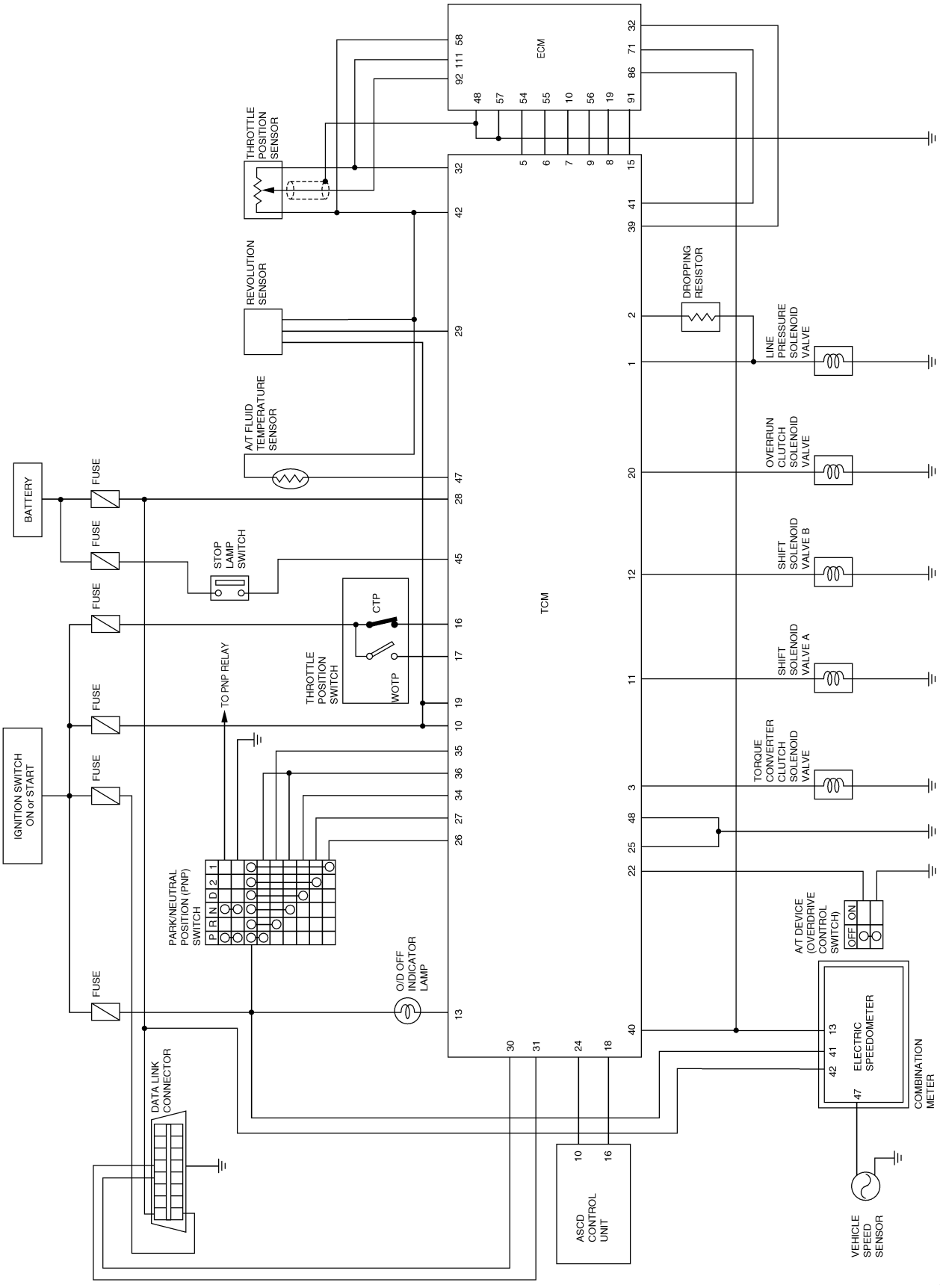
NIAT0009



WAT135

Circuit Diagram — QG18DE (Calif. CA Model) & SR20DE

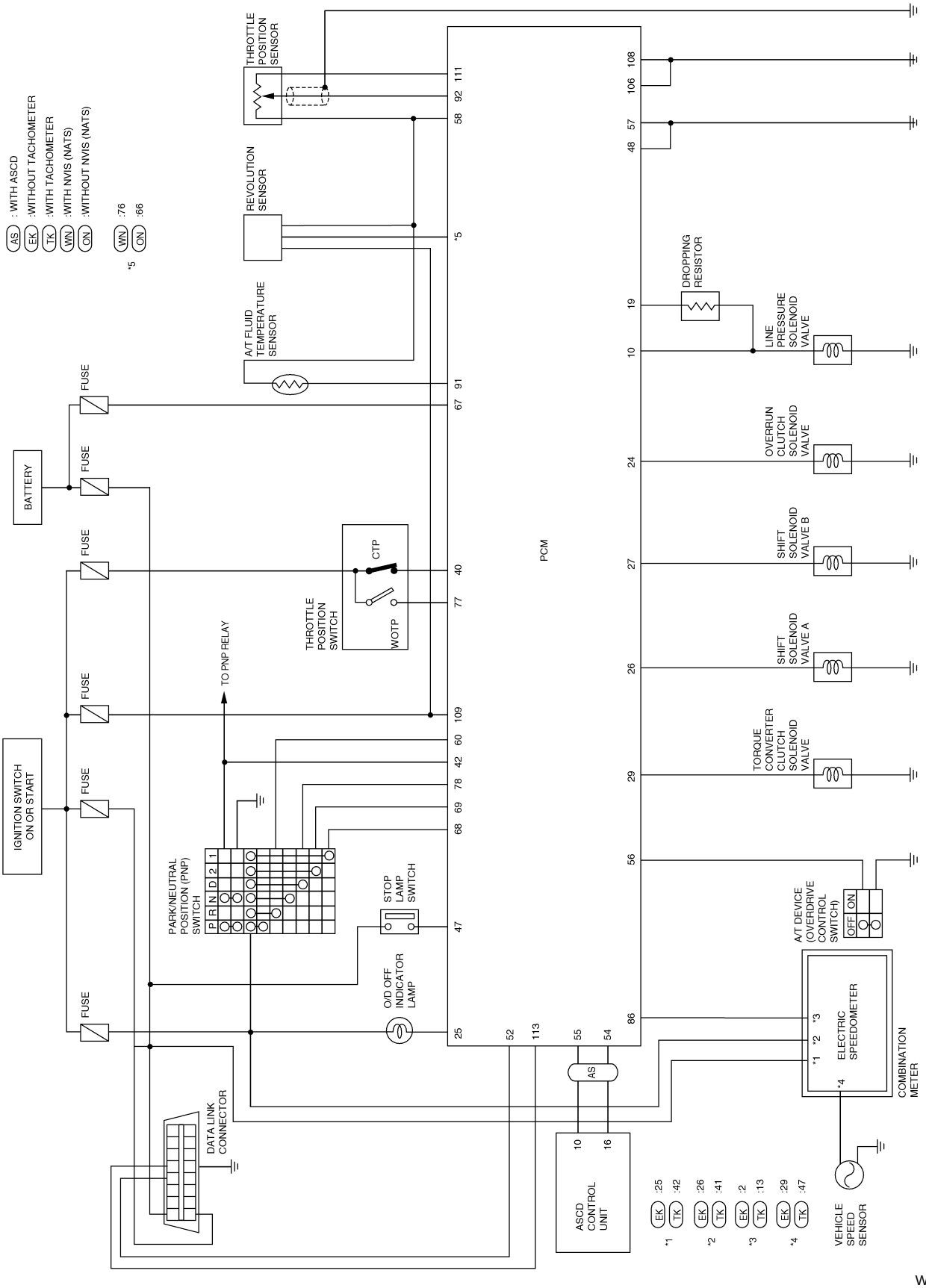
NIAT0010



WAT112

Circuit Diagram — QG18DE (Except Calif. CA Model)

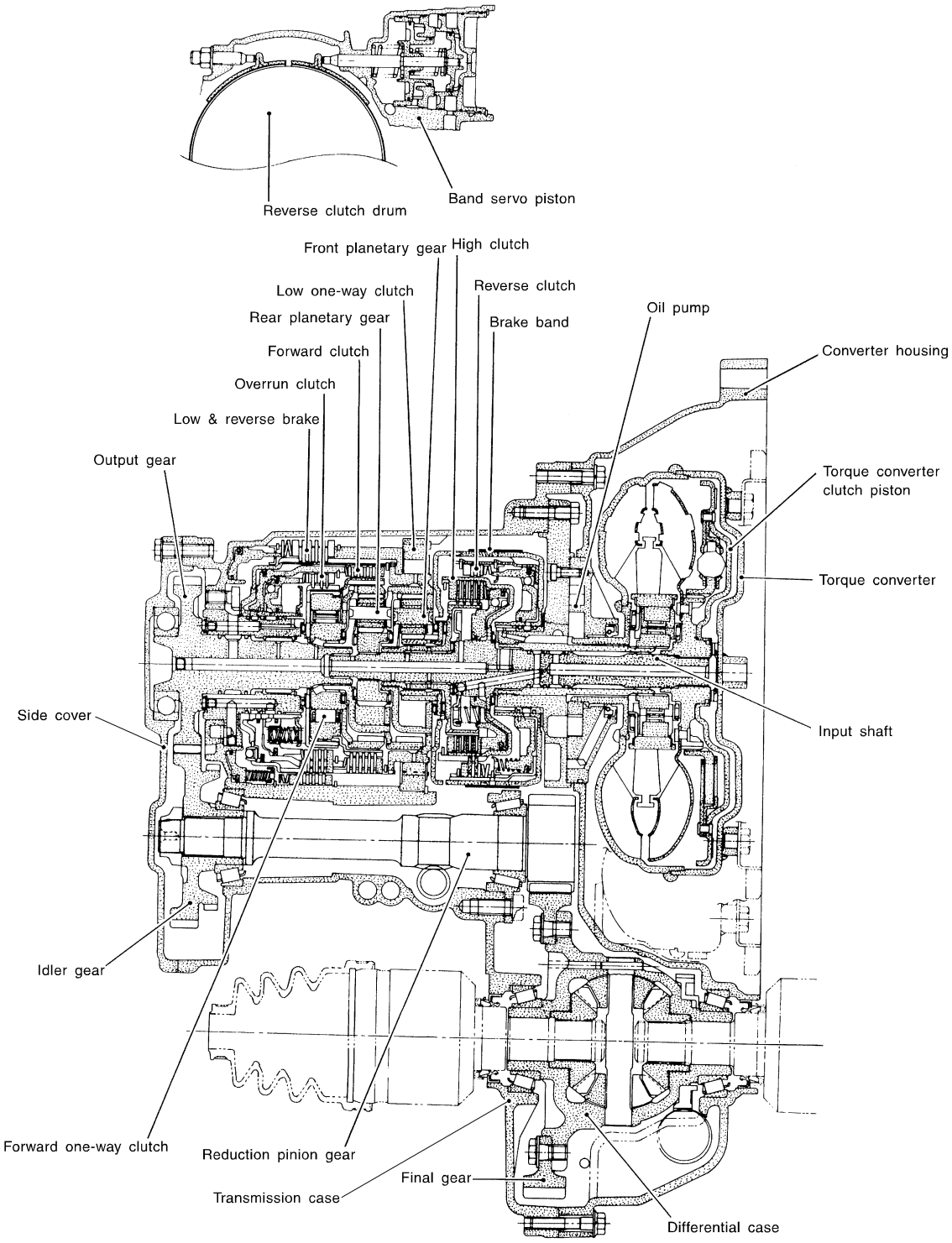
NIAT0328



WAT091

Cross-sectional View — RE4F03B

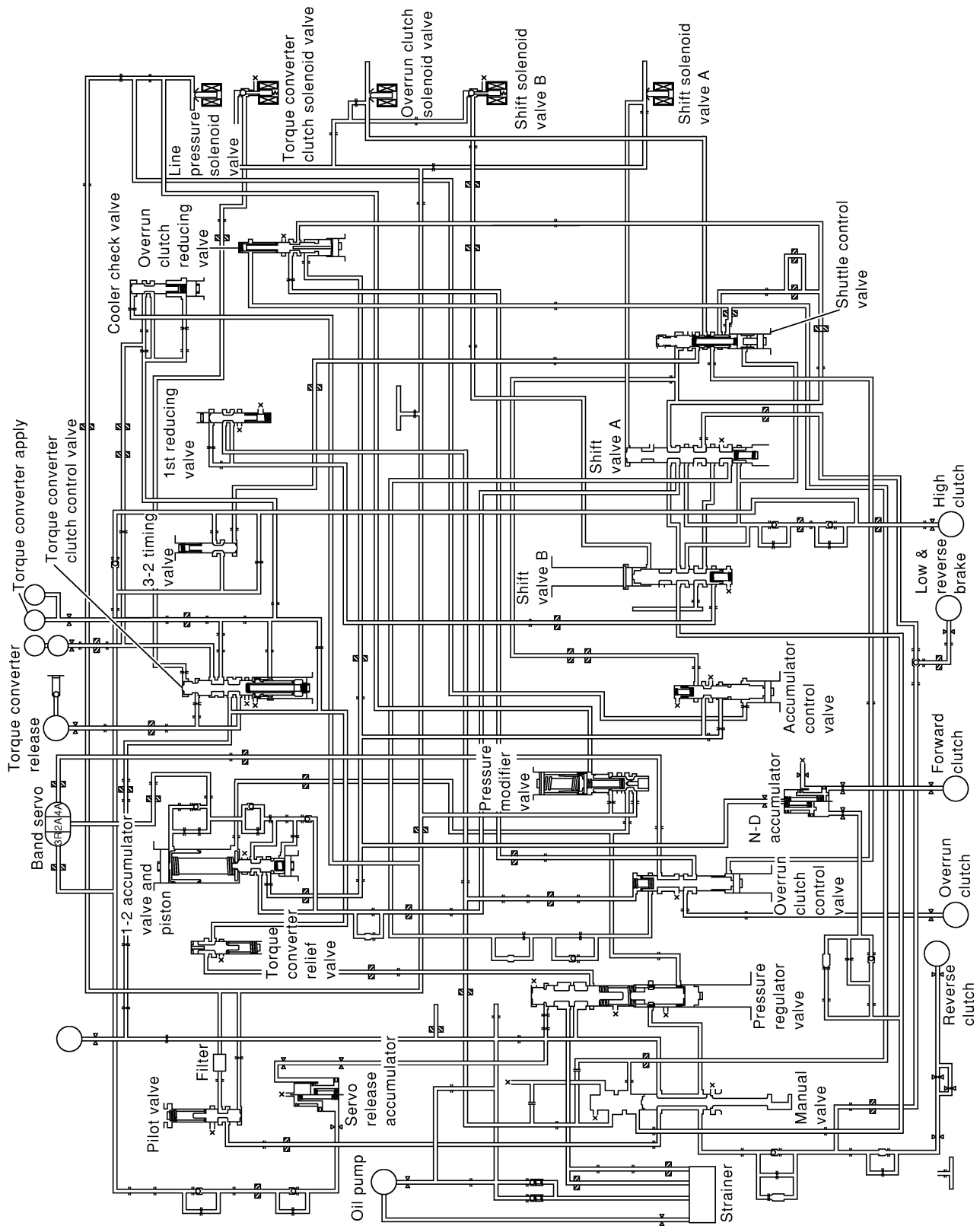
NIAT0011



SAT842J

Hydraulic Control Circuit

NIAT0013



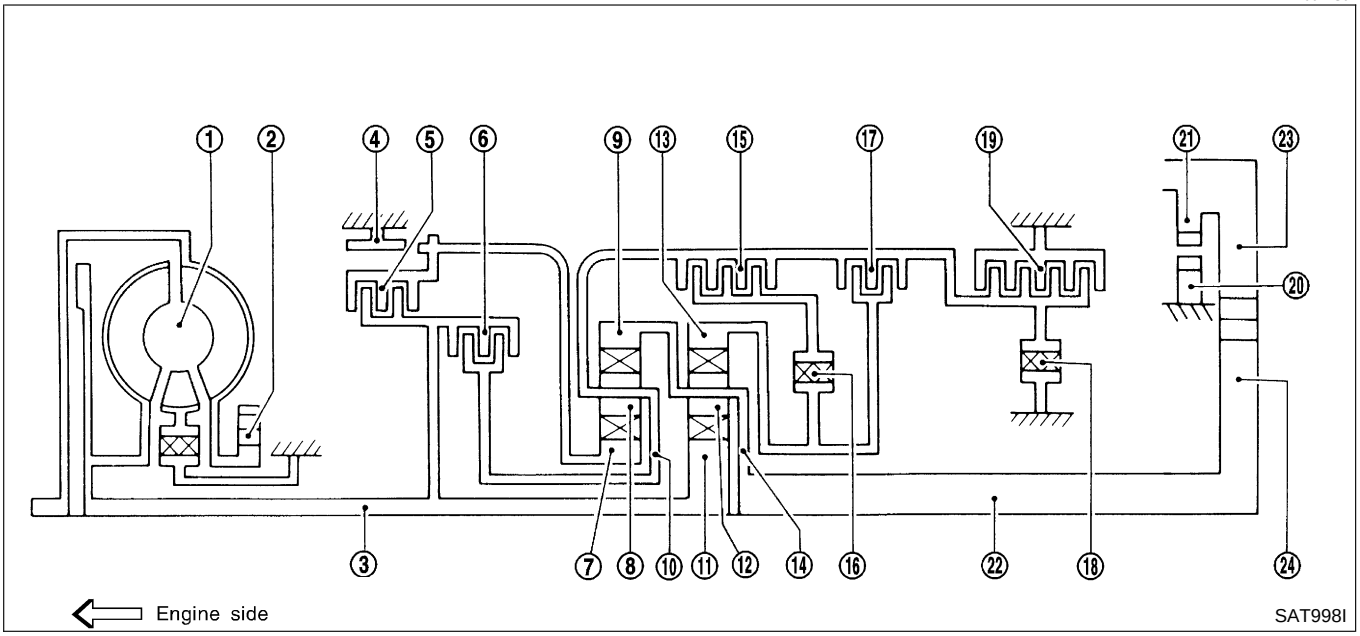
SAT844J

Shift Mechanism

NIAT0014

CONSTRUCTION

NIAT0014S01



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

NIAT0014S02

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**.

Shift Mechanism (Cont'd)

CLUTCH AND BAND CHART

NIAT0014S03

Shift position		Reverse clutch **5**	High clutch **6**	For-ward 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		◯									◯		REVERSE POSITION
N													NEUTRAL POSITION
D*4	1st			◯	*1D				B	B			Automatic shift 1 ⇔ 2 ⇔ 3 ⇔ 4
	2nd			◯	*1A	◯			B				
	3rd		◯	◯	*1A	*2C	C		B			*5◯	
	4th		◯	C		*3C	C	◯				◯	
2	1st			◯	D				B	B			Automatic shift 1 ⇔ 2
	2nd			◯	A	◯			B				
1	1st			◯	◯				B		◯		Locks (held stationary) in 1st speed 1 ⇐ 2
	2nd			◯	◯	◯			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.

*5: Operates when overdrive control switch is "OFF".

◯ : 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.

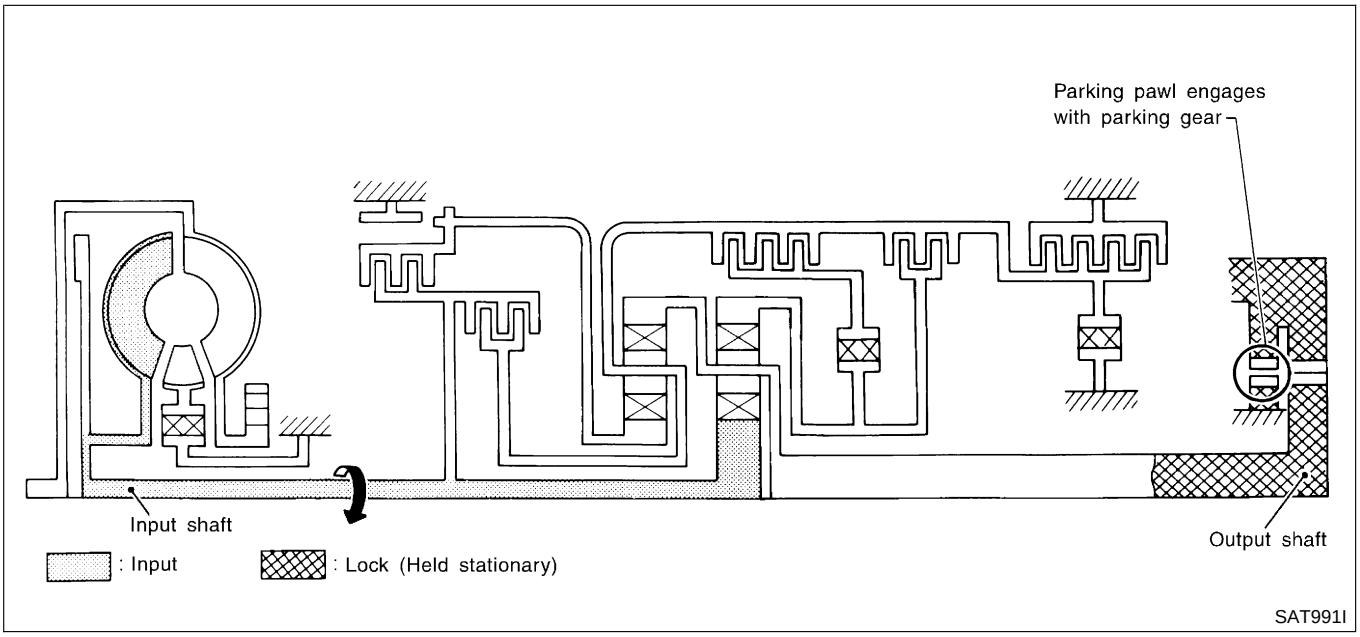
POWER TRANSMISSION

=NIAT0014S04

"N" and "P" Positions

NIAT0014S0401

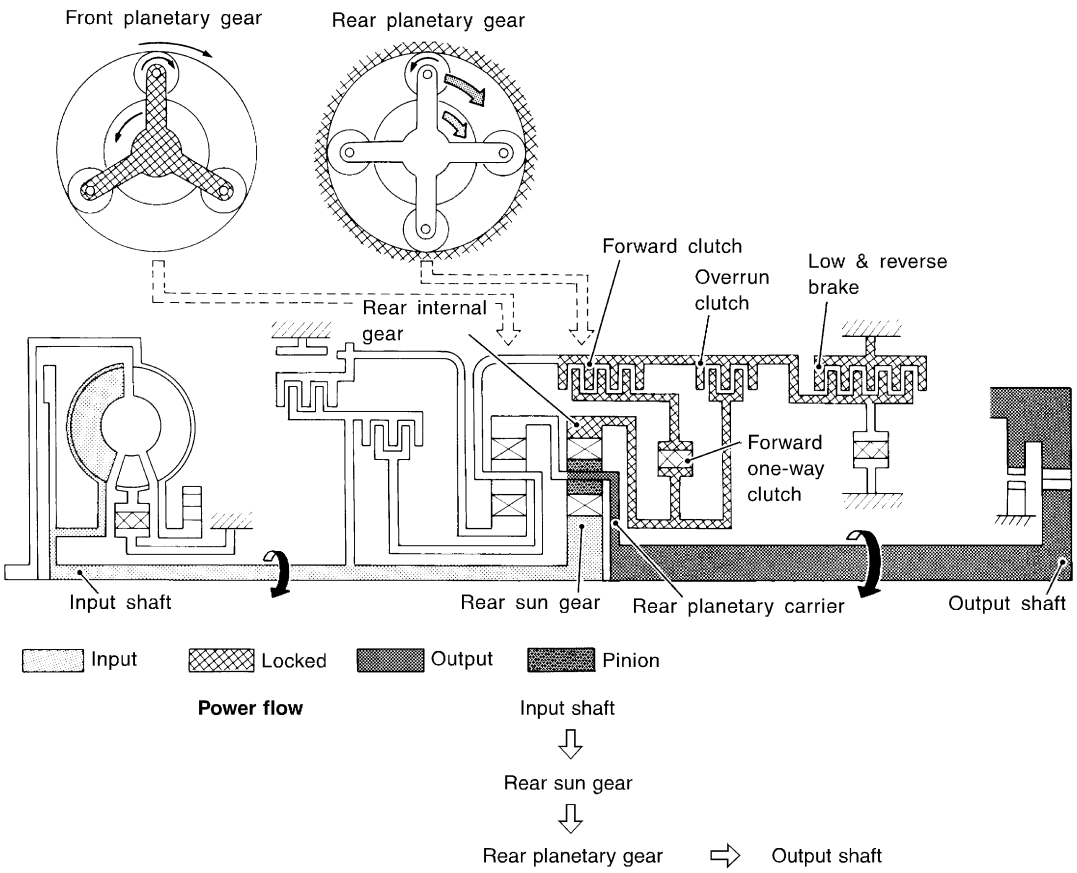
- "N" position
  Power from the input shaft is not transmitted to the output shaft because the clutches do not operate.
- "P" position
  Similar to the "N" position, the clutches do not operate. The parking pawl engages with the parking gear to mechanically hold the output shaft so that the power train is locked.



"1_1" Position

=NIAT0014S0402

• **Forward clutch** • **Forward one-way clutch** • **Overrun clutch** • **Low and reverse brake**	As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake. This is different from that of D_1 and 2_1.
Engine brake	Overrun clutch always engages, therefore engine brake can be obtained when decelerating.

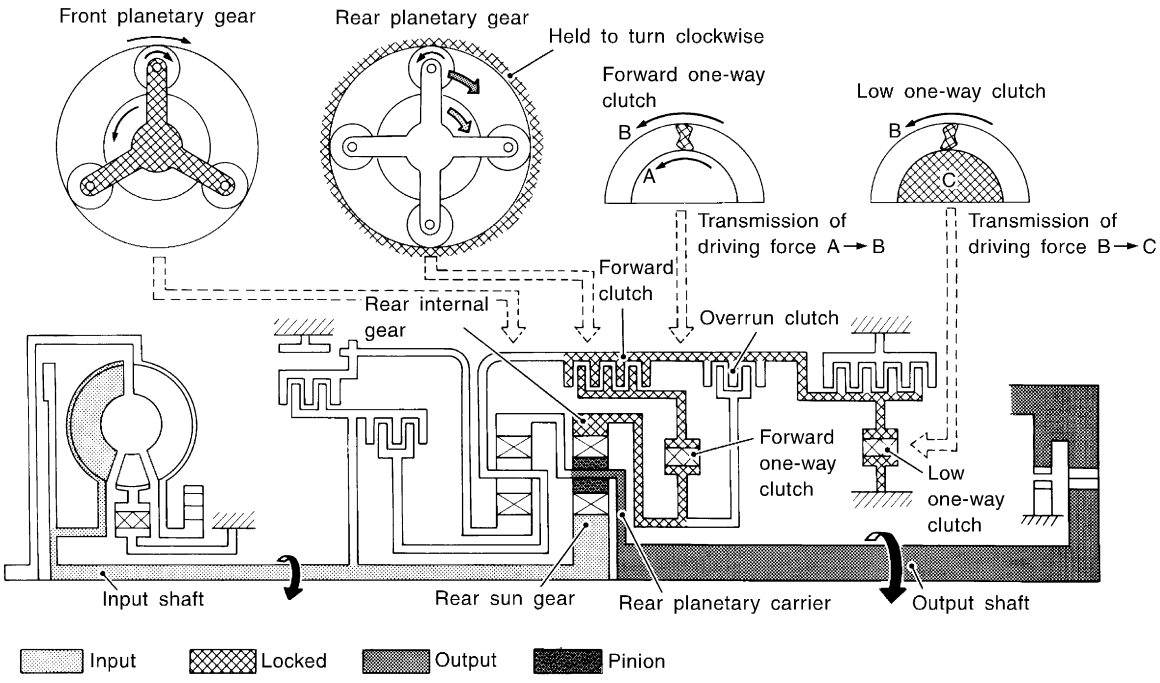


SAT374J

"D_1" and "2_1" Positions

=NIAT0014S0403

• **Forward one-way clutch** • **Forward clutch** • **Low one-way clutch**	Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches.
Overrun clutch engagement conditions (Engine brake)	D_1: Overdrive control switch "OFF" and throttle opening is less than 3/16 2_1: Always engaged At D_1 and 2_1 positions, engine brake is not activated due to free turning of low one-way clutch.



Power flow

Input shaft
⇩
Rear sun gear
⇩
Rear pinion gear
⇩
Rear planetary carrier → Output shaft

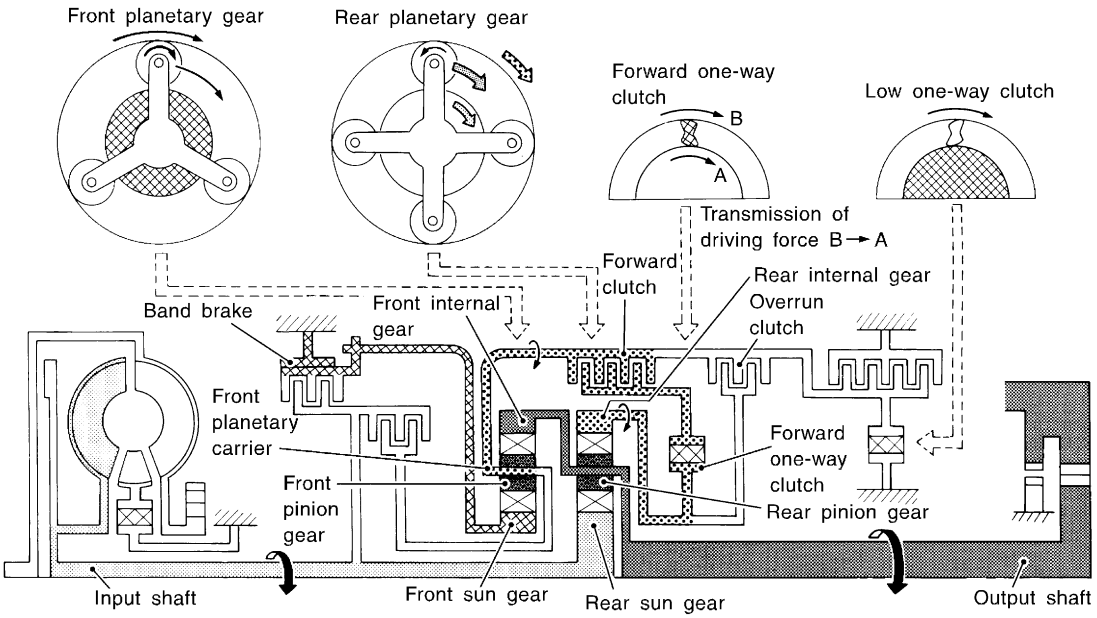
SAT377J

Shift Mechanism (Cont'd)

"D_2", "2_2" and "1_2" Positions

=NIAT0014S0404

• **Forward clutch** • **Forward one-way clutch** • **Brake band**	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.
Overrun clutch engagement conditions	D_2: Overdrive control switch "OFF" and throttle opening is less than 3/16 2_2 and 1_2: Always engaged

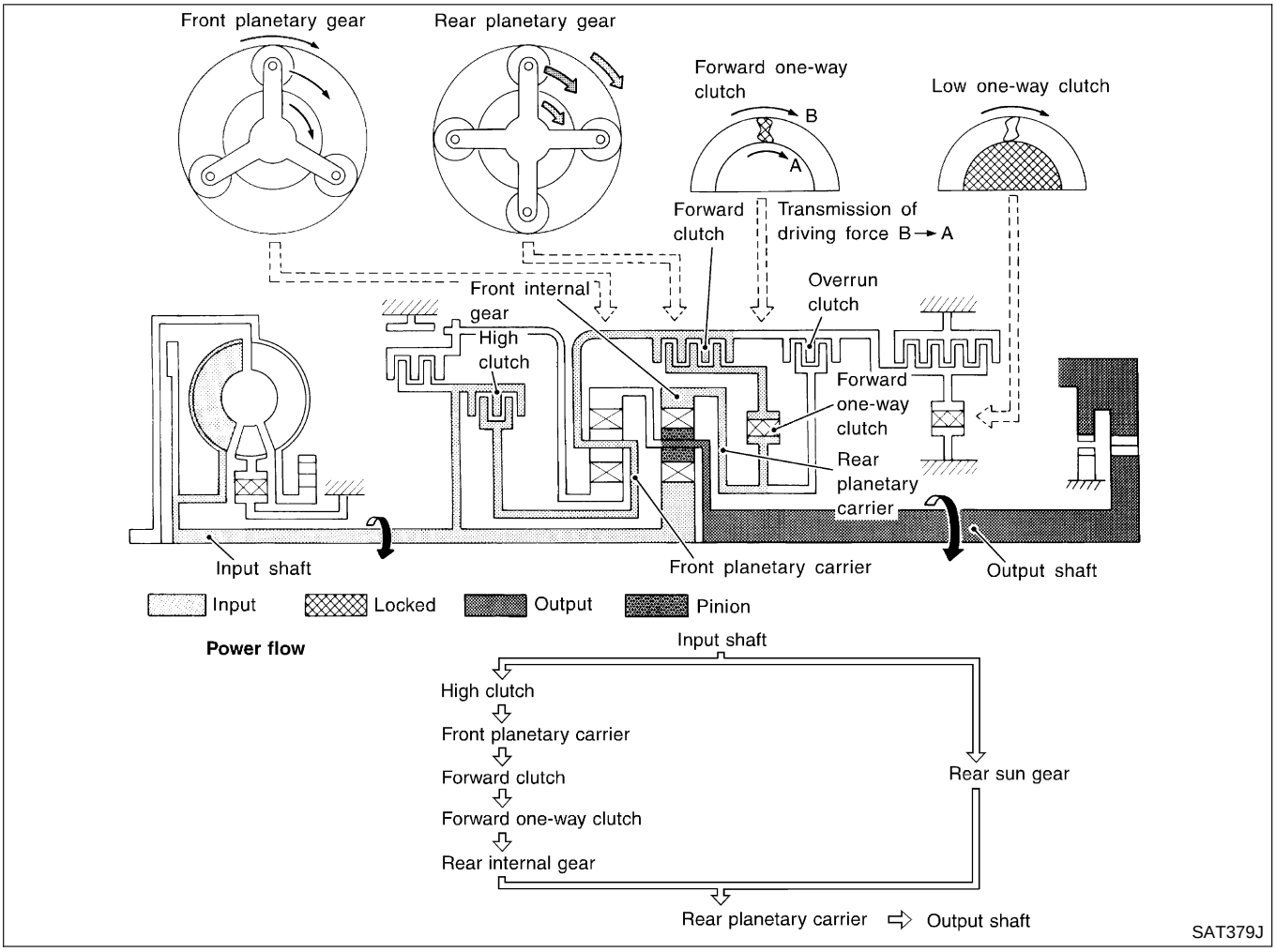


SAT378J

"D_3" Position

=NIAT0014S0405

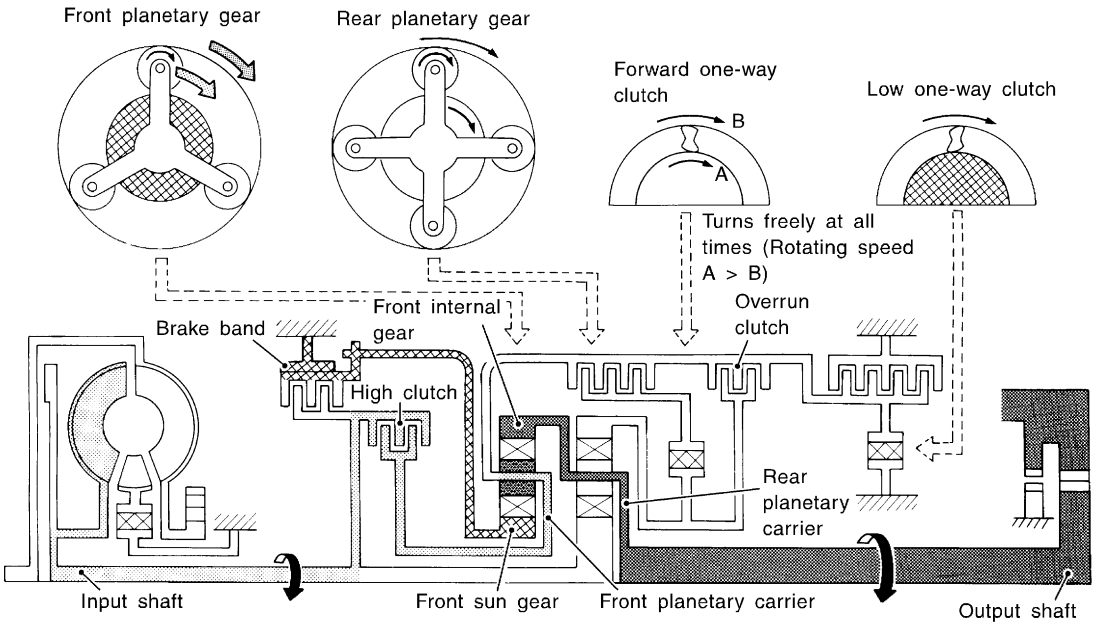
• **High clutch** • **Forward clutch** • **Forward one-way clutch**	Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch. This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.
Overrun clutch engagement conditions	D_3: Overdrive control switch "OFF" and throttle opening is less than 3/16



"D_4" (OD) Position

=NIAT0014S0406

• **High clutch** • **Brake band** • **Forward clutch** (Does not affect power transmission)	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.
Engine brake	At D_4 position, there is no one-way clutch in the power transmission line and engine brake can be obtained when decelerating.



Power flow

Input shaft
⇩
High clutch
⇩
Front planetary carrier
⇩
Front pinion gear

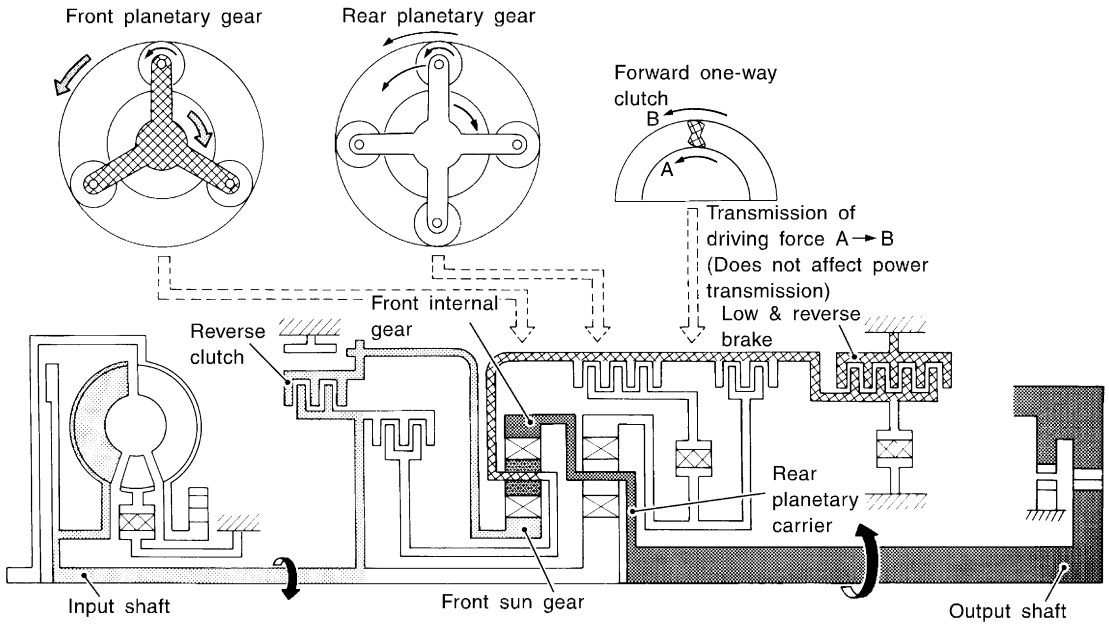
Front internal gear
⇩
Rear planetary carrier
⇩
Output shaft

SAT380J

"R" Position

=NIAT0014S0407

• **Reverse clutch** • **Low and reverse brake**	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.
Engine brake	As there is no one-way clutch in the power transmission line, engine brake can be obtained when decelerating.



Power flow

Input shaft
⇩
Reverse clutch
⇩
Front pinion gear ⇦ Front sun gear
⇩
Front internal gear ⇨ Output shaft

SAT381J

Control System

=NIAT0015

OUTLINE

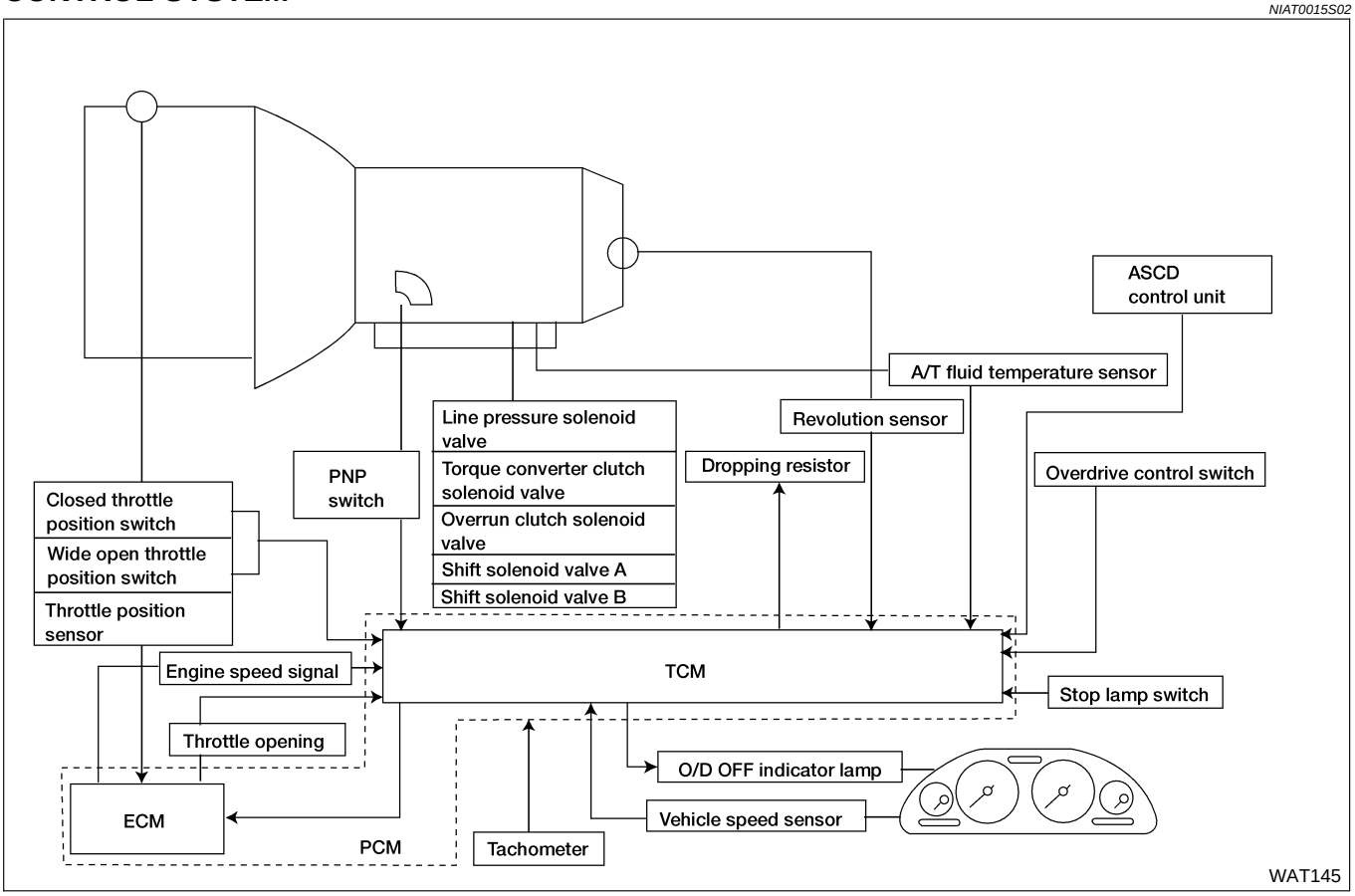
NIAT0015S01

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/PCM		ACTUATORS
PNP switch Throttle position sensor Closed throttle position switch Wide open throttle position switch Engine speed signal A/T fluid temperature sensor Revolution sensor Vehicle speed sensor Overdrive control switch ASCD control unit Stop lamp switch	▶	Shift control Line pressure control Lock-up control Overrun clutch control Timing control Fail-safe control Self-diagnosis CONSULT-II communication line control Duet-EA 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

NIAT0015S02



TCM/PCM FUNCTION

=NIAT0015S03

The function of the TCM/PCM 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/PCM

NIAT0015S04

	Sensors, switches and solenoid valves	Function
Input	PNP switch	Detects select lever position and sends a signal to TCM/PCM.
	Throttle position sensor	Detects throttle valve position and sends a signal to TCM/PCM.
	Closed throttle position switch	Detects throttle valve's fully-closed position and sends a signal to TCM/PCM.
	Wide open throttle position switch	Detects a throttle valve position of greater than 1/2 of full throttle and sends a signal to TCM/PCM.
	Engine speed signal	From ECM or Tachometer (PCM).
	A/T fluid temperature sensor	Detects transmission fluid temperature and sends a signal to TCM/PCM.
	Revolution sensor	Detects output shaft rpm and sends a signal to TCM/PCM.
	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 "D_4" (overdrive) position, to the TCM/PCM.
	ASCD control unit	Sends the cruise signal and "D_4" (overdrive) cancellation signal from ASCD control unit to TCM/PCM.
	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/PCM.
	Line pressure solenoid valve	Regulates (or decreases) line pressure suited to driving conditions in relation to a signal sent from TCM/PCM.
	Torque converter clutch solenoid valve	Regulates (or decreases) lock-up pressure suited to driving conditions in relation to a signal sent from TCM/PCM.
	Overrun clutch solenoid valve	Controls an "engine brake" effect suited to driving conditions in relation to a signal sent from TCM/PCM.
	O/D OFF indicator lamp	Shows TCM/PCM faults, when A/T control components malfunction.

Control Mechanism

NIAT0016

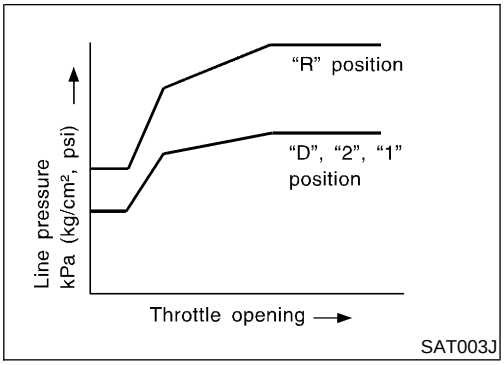
LINE PRESSURE CONTROL

NIAT0016S01

TCM/PCM 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/PCM characteristics.

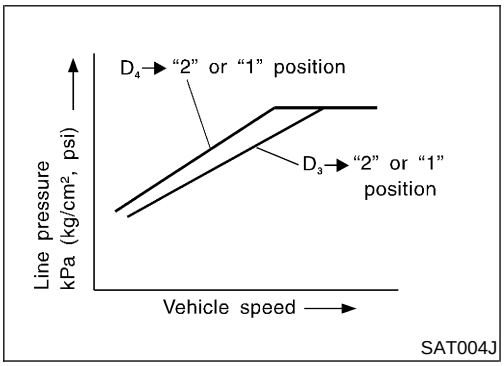
Hydraulic pressure on the clutch and brake is electronically controlled through the line pressure solenoid valve to accommodate engine torque. This results in smooth shift operation.



Normal Control

NIAT0016S0101

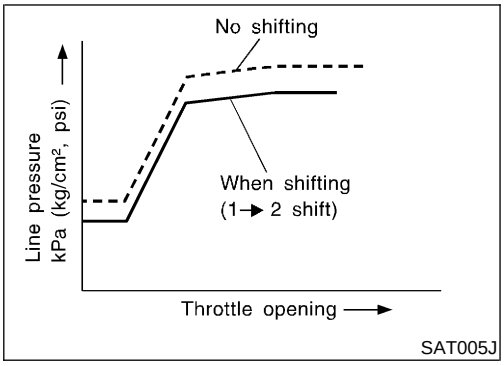
The line pressure to throttle opening characteristics is set for suitable clutch operation.



Back-up Control (Engine brake)

NIAT0016S0102

If the selector lever is shifted to "2" position while driving in D_4 (OD) or D_3, 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

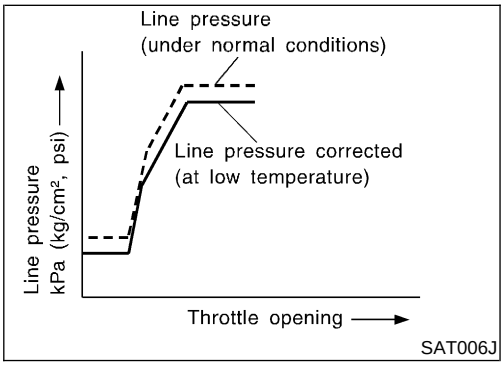
NIAT0016S0103

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.

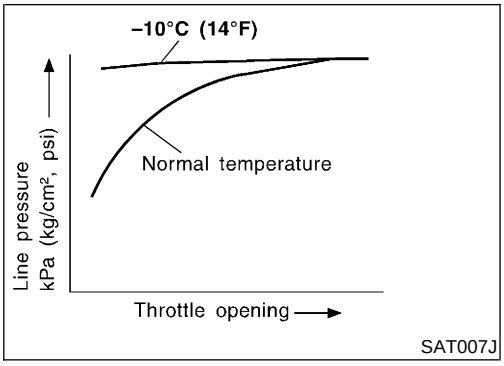
At Low Fluid Temperature

NIAT0016S0104

- 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.

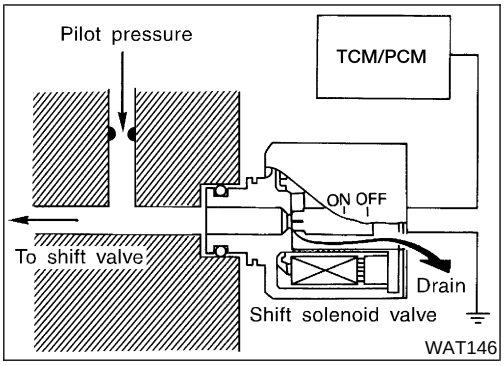


- Line pressure is increased to a maximum irrespective of the throttle opening when fluid temperature drops to −10°C (14°F). This pressure rise is adopted to prevent a delay in clutch and brake operation due to extreme drop of fluid viscosity at low temperature.

SHIFT CONTROL

NIAT0016S02

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. This results in improved acceleration performance and fuel economy.



Control of Shift Solenoid Valves A and B

NIAT0016S0201

The TCM/PCM activates shift solenoid valves A and B according to signals from the throttle position sensor and revolution sensor to select the optimum gear position on the basis of the shift schedule memorized in the TCM/PCM.

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.

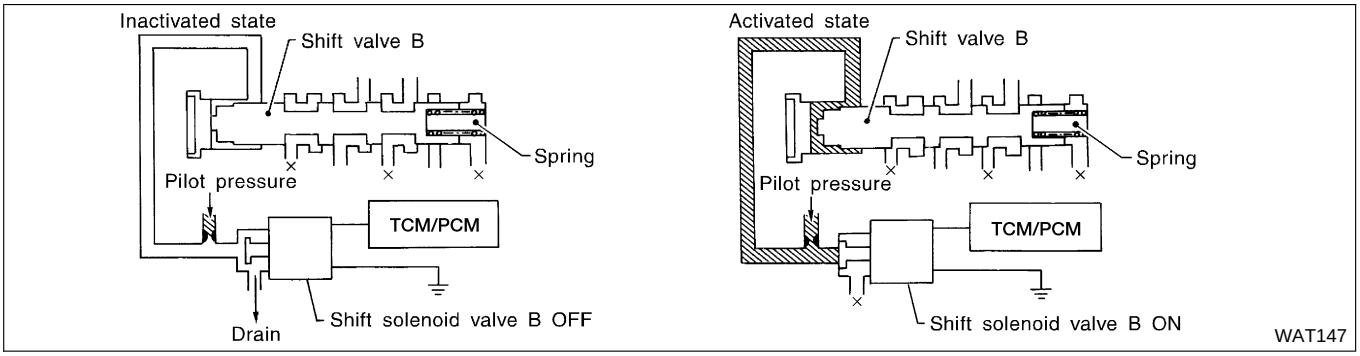
Relation Between Shift Solenoid Valves A and B and Gear Positions

NIAT0016S0202

Shift solenoid valve	Gear position				
	D_1, 2_1, 1_1	D_2, 2_2, 1_2	D_3	D_4 (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

NIAT0016S0203



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

NIAT0016S03

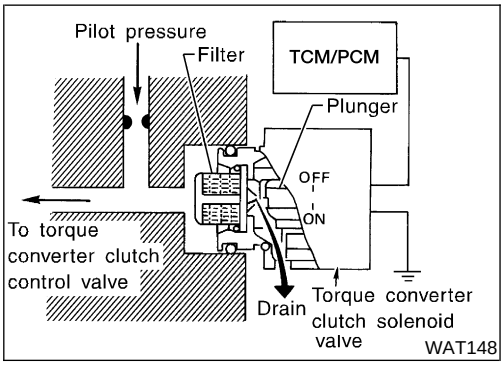
The torque converter clutch piston in the torque converter is locked to eliminate torque converter slip to increase power transmission efficiency. The solenoid valve is controlled by an ON-OFF duty signal sent from the TCM/PCM. The signal is converted to an oil pressure signal which controls the torque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

Conditions for Lock-up Operation

NIAT0016S0301

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

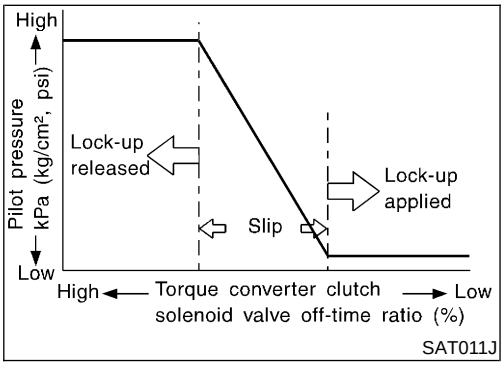
Overdrive control switch	ON	OFF
Selector lever	"D" position	
Gear position	D_4	D_3
Vehicle speed sensor	More than set value	
Throttle position sensor	Less than set opening	
Closed throttle position switch	OFF	
A/T fluid temperature sensor	More than 40°C (104°F)	



Torque Converter Clutch Solenoid Valve Control

NIAT0016S0302

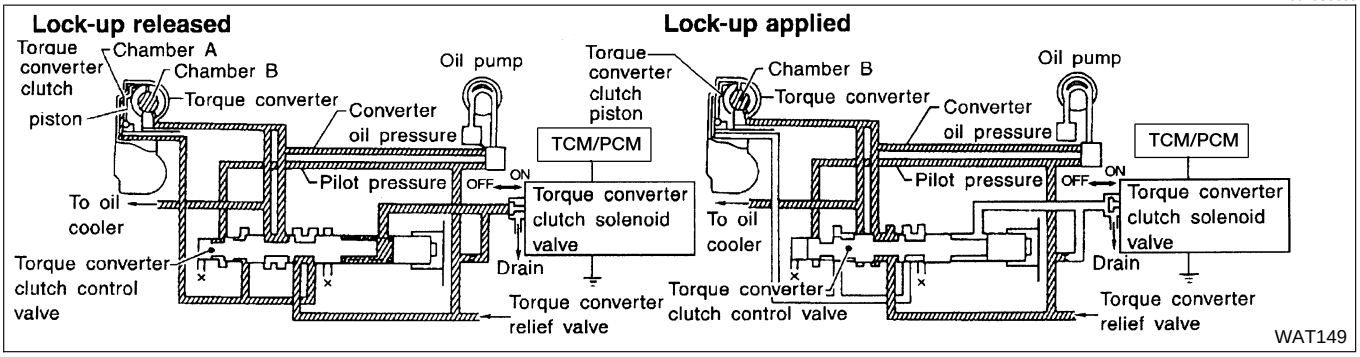
The torque converter clutch solenoid valve is controlled by the TCM/PCM. The plunger closes the drain circuit during the "OFF" period, and opens the circuit during the "ON" period. If the percentage of OFF-time increases in one cycle, the pilot pressure drain time is reduced and pilot pressure remains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

NIAT0016S0303



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)

NIAT0016S04

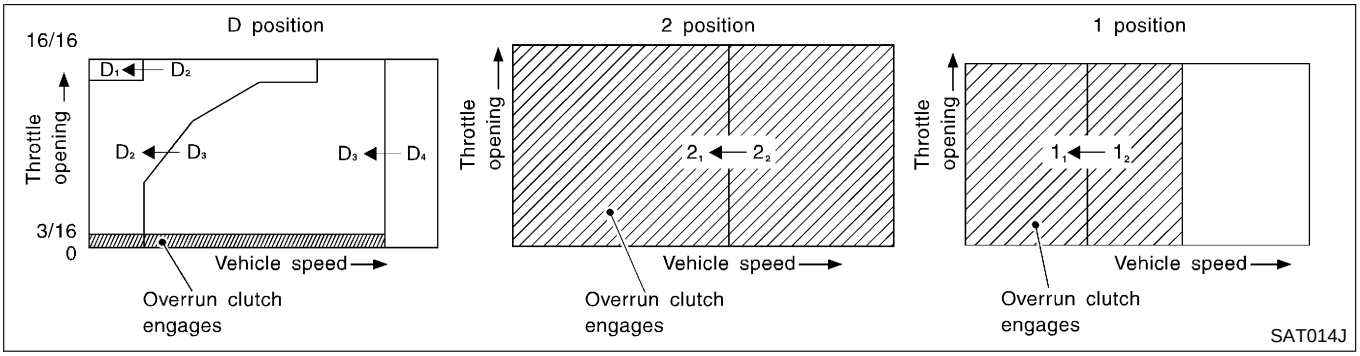
Forward one-way clutch is used to reduce shifting shocks in down-shifting operations. This clutch transmits engine torque to the wheels. However, drive force from the wheels is not transmitted to the engine because the one-way clutch rotates idle. This means the engine brake is not effective.

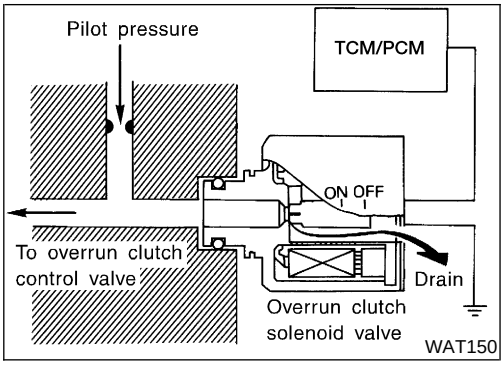
The overrun clutch operates when the engine brake is needed.

Overrun Clutch Operating Conditions

NIAT0016S0401

Selector lever position	Gear position	Throttle opening
"D" position	D_1, D_2, D_3 gear position	Less than 3/16
"2" position	2_1, 2_2 gear position	
"1" position	1_1, 1_2 gear position	At any position

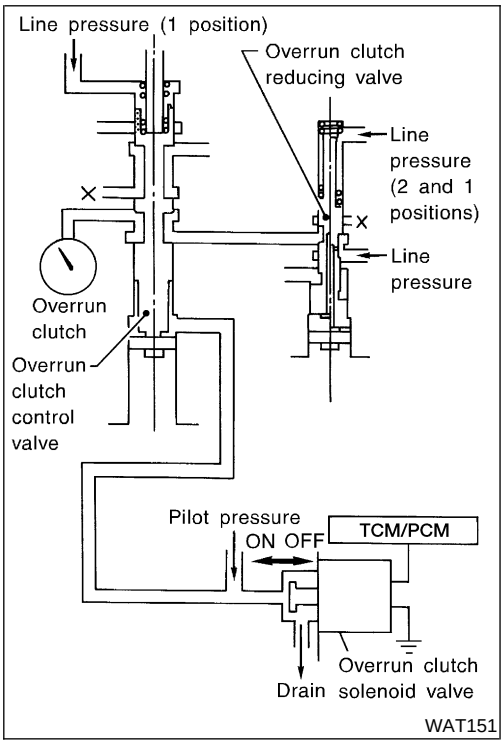




Overrun Clutch Solenoid Valve Control

NIAT0016S0402

The overrun clutch solenoid valve is operated by an ON-OFF signal transmitted by the TCM/PCM 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

NIAT0016S0403

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

NIAT0017

FUNCTION OF CONTROL VALVES

NIAT0017S01

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 backpressure 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.

Valve name	Function
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.
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with application of the brake band in D_4. (Interlocking occurs if the overrun clutch engages during D_4.)
1st reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when down-shifting from the "1" position 1_2 to 1_1.
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.

Introduction

NIAT0018

The A/T system has two self-diagnostic systems.
The first is the emission-related on board diagnostic system (OBD-II) performed by the PCM or 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 PCM or in the ECM memory but not the TCM memory.
The second is the TCM/PCM original self-diagnosis indicated by the O/D OFF indicator lamp. The malfunction is stored in the TCM/PCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For detail, refer to AT-43.

OBD-II Function for A/T System

NIAT0019

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

NIAT0020

ONE TRIP DETECTION LOGIC

NIAT0020S01

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

TWO TRIP DETECTION LOGIC

NIAT0020S02

When a malfunction is sensed during the first test drive, it is stored in the ECM/PCM 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 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)

NIAT0021

HOW TO READ DTC AND 1ST TRIP DTC

NIAT0021S01

DTC and 1st trip DTC can be read by the following methods.
(with CONSULT-II or GST) 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 is shown in the following page. DTC or 1st trip DTC of a malfunction is displayed in SELF DIAGNOSIS mode for “ENGINE” with CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

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

SAT015K

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

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

SAT016K

Freeze Frame Data and 1st Trip Freeze Frame Data

NIAT0021S0101

The ECM/PCM 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/PCM detects a malfunction.

Data which are stored in the ECM/PCM 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-107*** [QG18DE (Except Calif. CA Model)], ***EC-779*** [QG18DE (Calif. CA Model)], ***EC-1447*** (SR20DE), "CONSULT-II".

Only one set of freeze frame data (either 1st trip freeze frame data of freeze frame data) can be stored in the ECM/PCM. 1st trip freeze frame data is stored in the ECM/PCM 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/PCM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM/PCM. The ECM/PCM 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	

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

HOW TO ERASE DTC

NIAT0021S02

The diagnostic trouble code can be erased by CONSULT-II, GST or ECM/PCM DIAGNOSTIC TEST MODE as described 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, GST or PCM is easier and quicker than switching the mode selector on the ECM/PCM.**

The following emission-related diagnostic information is cleared from the ECM/PCM memory when erasing DTC related to OBD-II. For details, refer to ***EC-86*** [QG18DE (Except Calif. CA Model)], ***EC-759*** [QG18DE (Calif. CA Model)], ***EC-1427*** (SR20DE), "Emission-related Diagnostic Information".

- **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)

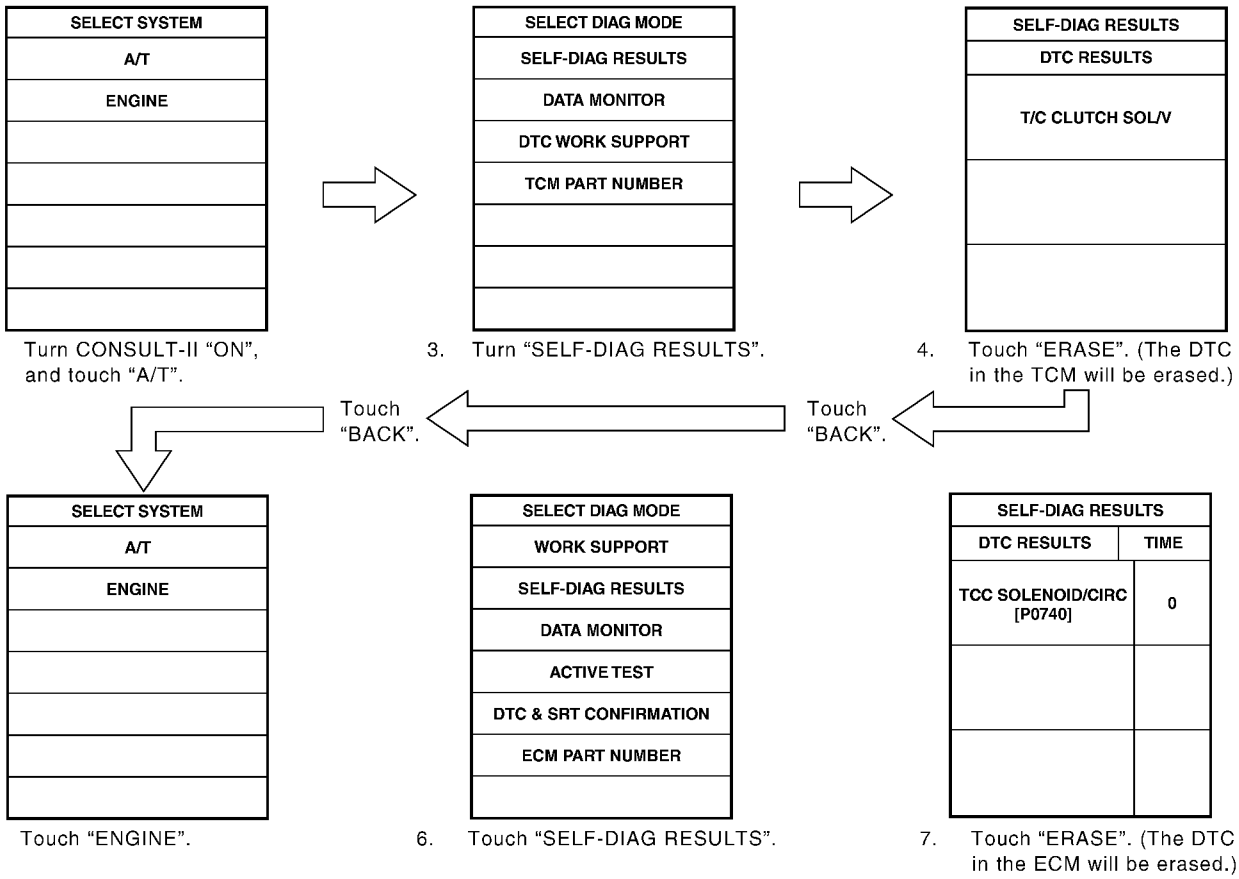
NIAT0021S03

- **If a DTC is displayed for both ECM and TCM or PCM, it needs to be erased for both ECM and TCM or PCM.**

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. 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 5 seconds and then turn it "ON" (engine stopped) again.



SAT017K

HOW TO ERASE DTC (WITH GST)

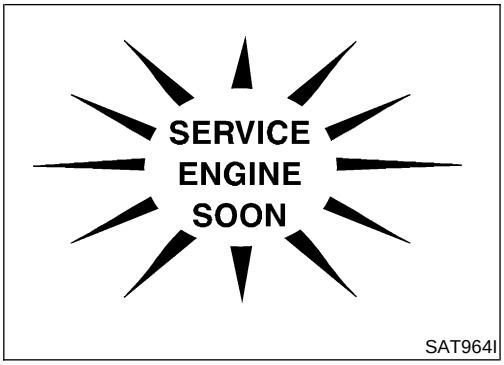
NIAT0021S04

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 "OBD-II Self-diagnostic Procedure (No Tools)". Refer to AT-52. (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-125*** [QG18DE (Except Calif. CA Model)], ***EC-796*** [QG18DE (Calif. CA Model)], ***EC-1464*** (SR20DE), " Generic Scan Tool (GST)".

HOW TO ERASE DTC (NO TOOLS)

NIAT0021S05

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/PCM Self-diagnostic Procedure (No Tools)". Refer to AT-52. (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)



SAT964I

Malfunction Indicator Lamp (MIL)

=NIAT0022

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 "WARNING LAMPS", ***EL-105***.
  (Or see MIL & CONSULT-II in EC section. Refer to ***EC-100*** [QG18DE (Except Calif. CA Model)], ***EC-772*** [QG18DE (Calif. CA Model)], ***EC-1440*** (SR20DE), "Malfunction Indicator Lamp (MIL)", and ***EC-107*** [QG18DE (Except Calif. CA Model)], ***EC-779*** [QG18DE (Calif. CA Model)], ***EC-1447*** (SR20DE), "CONSULT-II".)

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-85*** [QG18DE (Except Calif. CA Model)], ***EC-758*** [QG18DE (Calif. CA Model)], ***EC-1426*** (SR20DE), "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION".

CONSULT-II

NIAT0023

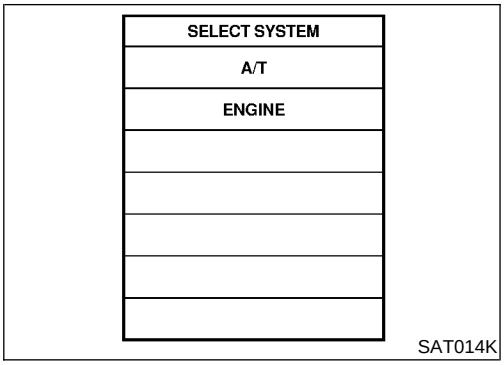
After performing "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" (AT-43), place check marks for results on the "DIAGNOSTIC WORKSHEET", AT-61. Reference pages are provided following the items.

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.

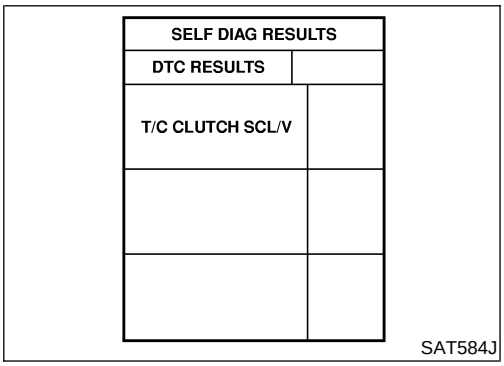
3) Shift solenoid valve "A" or "B" is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM/PCM).
4) Additional CONSULT-II information can be found in the Operation Manual supplied with the CONSULT-II unit.



SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)

NIAT0023S01

1. Turn on CONSULT-II and touch "ENGINE" for OBD-II detected items or touch "A/T" for TCM/PCM self-diagnosis.
   If A/T is not displayed, check TCM/PCM power supply and ground circuit. Refer to AT-108 (QG18DE (Calif. CA Model) and SR20DE models) or AT-268 (QG18DE (Except Calif. CA Model). If result is NG, refer to "POWER SUPPLY ROUTING", ***EL-9***.



2. 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

NIAT0023S02

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM/PCM self-diagnosis	OBD-II (DTC)
			O/D OFF	SERVICE ENGINE SOON
"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
PNP switch circuit		• TCM/PCM does not receive the correct voltage signal (based on the gear position) from the switch.	—	P0705
—	PNP SW/CIRC			
Revolution sensor		• TCM/PCM does not receive the proper voltage signal from the sensor.	X	P0720
VHCL SPEED SEN·A/T	VEH SPD SEN/CIR AT			
Vehicle speed sensor (Meter)		• TCM/PCM 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 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 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			

CONSULT-II (Cont'd)

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM/PCM 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 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 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			
Shift solenoid valve A		• TCM/PCM 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/PCM 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/PCM 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/PCM 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/PCM 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, Throttle position switch		• TCM/PCM 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 or the PCM does not receive the proper voltage signal from the Tachometer.	X	P0725
ENGINE SPEED SIG				
A/T fluid temperature sensor		• TCM/PCM receives an excessively low or high voltage from the sensor.	X	P0710
BATT/FLUID TEMP SEN	ATF TEMP SEN/ CIRC			
TCM/PCM (RAM)		• TCM/PCM memory (RAM) is malfunctioning.	—	—
CONTROL UNIT (RAM)	—			
TCM/PCM (ROM)		• TCM/PCM memory (ROM) is malfunctioning.	—	—
CONTROL UNIT (ROM)	—			

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM/PCM self-diagnosis	OBD-II (DTC)
			O/D OFF Available by O/D OFF indicator lamp or "A/T" on CONSULT-II	SERVICE ENGINE SOON Available by malfunction indicator lamp*2, "ENGINE" on CONSULT-II or GST
"A/T"	"ENGINE"			
TCM/PCM (EEP ROM)		• TCM/PCM 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/PCM, 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-100*** [QG18DE (Except Calif. CA Model)], ***EC-772*** [QG18DE (Calif. CA Model)], ***EC-1440***, "Malfunction Indicator Lamp (MIL)".

DATA MONITOR MODE (A/T)

NIAT0023S03

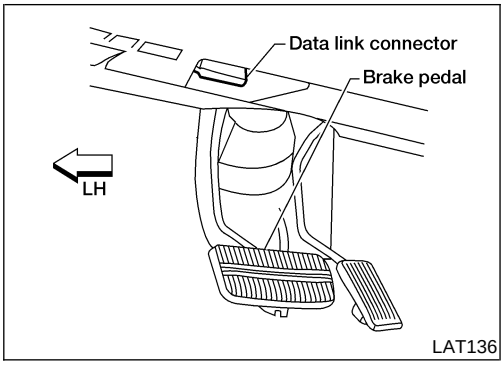
Item	Display	Monitor item		Description	Remarks
		ECU input signals	Main signals		
Vehicle speed sensor 1 (A/T) (Revolution sensor)	VHCL/S SE·A/T [km/h] or [mph]	X	—	• Vehicle speed computed from signal of revolution sensor is displayed.	When racing engine in "N" or "P" position with vehicle stationary, 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	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/PCM is displayed.	

CONSULT-II (Cont'd)

Item	Display	Monitor item		Description	Remarks
		ECU input signals	Main signals		
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.
Overdrive control switch	OVERDRIVE SW [ON/OFF]	X	—	• ON/OFF state computed from signal of overdrive control SW is displayed.	
P/N position switch	P/N POSI SW [ON/OFF]	X	—	• ON/OFF state computed from signal of P/N position SW is displayed.	
R position switch	R POSITION SW [ON/OFF]	X	—	• ON/OFF state computed from signal of R position SW is displayed.	
D position switch	D POSITION SW [ON/OFF]	X	—	• ON/OFF state computed from signal of D position SW is displayed.	
2 position switch	2 POSITION SW [ON/OFF]	X	—	• ON/OFF status, computed from signal of 2 position SW, is displayed.	
1 position switch	1 POSITION SW [ON/OFF]	X	—	• ON/OFF status, computed from signal of 1 position SW, is displayed.	
ASCD cruise signal	ASCD·CRUISE [ON/OFF]	X	—	• Status of ASCD cruise signal is displayed. ON ... Cruising state OFF ... Normal running state	• This is displayed even when no ASCD is mounted.
ASCD OD cut signal	ASCD·OD CUT [ON/OFF]	X	—	• Status of ASCD OD release signal is displayed. ON ... OD released OFF ... OD not released	• This is displayed even when no ASCD is mounted.
Kickdown switch	KICKDOWN SW [ON/OFF]	X	—	• ON/OFF status, computed from signal of kickdown SW, is displayed.	• This is displayed even when no kickdown switch is equipped.
Closed throttle position switch	CLOSED THL/SW [ON/OFF]	X	—	• ON/OFF status, computed from signal of closed throttle position SW, is displayed.	
Wide open throttle position switch	W/O THRL/P-SW [ON/OFF]	X	—	• ON/OFF status, computed from signal of wide open throttle position SW, is displayed.	
Gear position	GEAR	—	X	• Gear position data used for computation by TCM/PCM, is displayed.	

Item	Display	Monitor item		Description	Remarks
		ECU input signals	Main signals		
Selector lever position	SLCT LVR POSI	—	X	• Selector lever position data, used for computation by TCM/PCM, is displayed.	• A specific value used for control is displayed if fail-safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	—	X	• Vehicle speed data, used for computation by TCM/PCM, is displayed.	
Stop lamp switch	BRAKE SW [ON/OFF]	X	—	• ON/OFF status are displayed. ON: Brake pedal is depressed. OFF: Brake pedal is released.	
Throttle position	THROTTLE POSI [/8]	—	X	• Throttle position data, used for computation by TCM/PCM, 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/PCM 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/PCM 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/PCM 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/PCM 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/PCM 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



LAT136

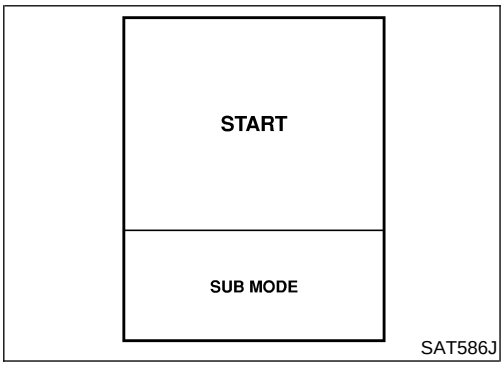
DTC WORK SUPPORT MODE WITH CONSULT-II

NIAT0023S04

CONSULT-II Setting Procedure

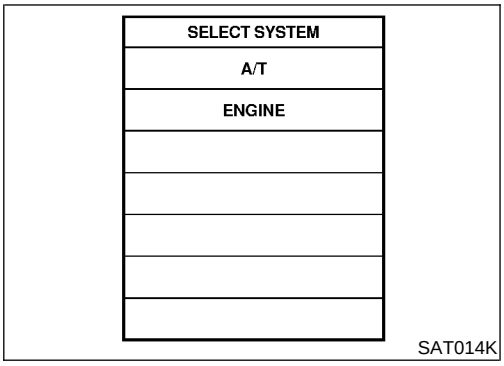
NIAT0023S0401

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



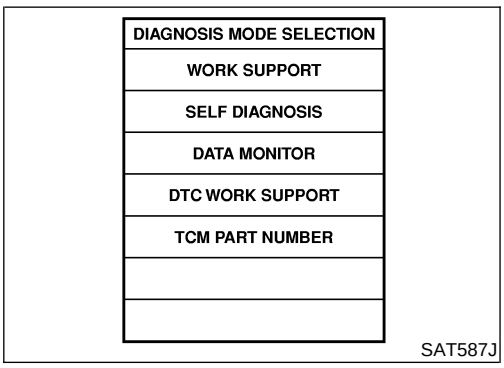
SAT586J

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



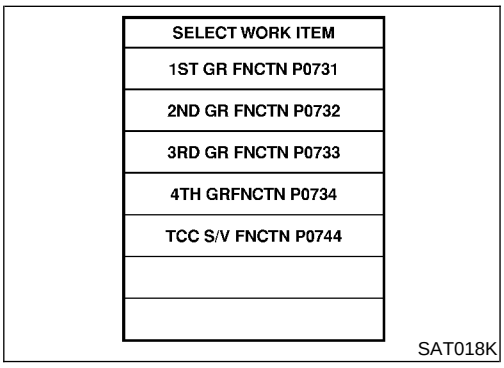
SAT014K

5. Touch "A/T".



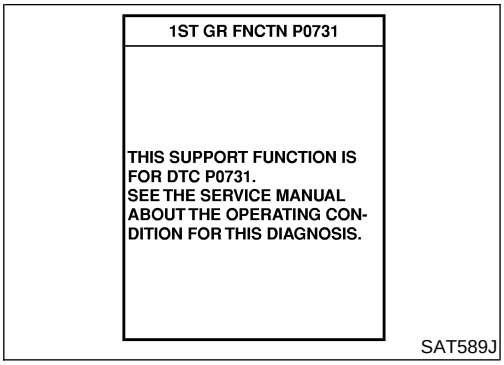
SAT587J

6. Touch "DTC WORK SUPPORT".

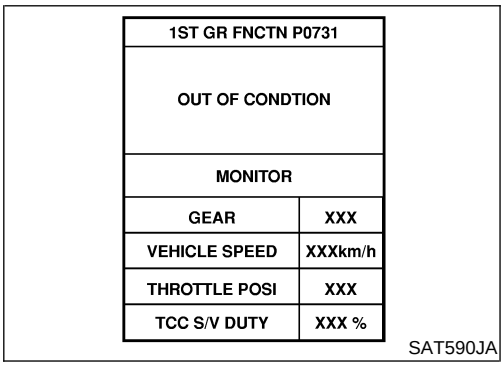


SAT018K

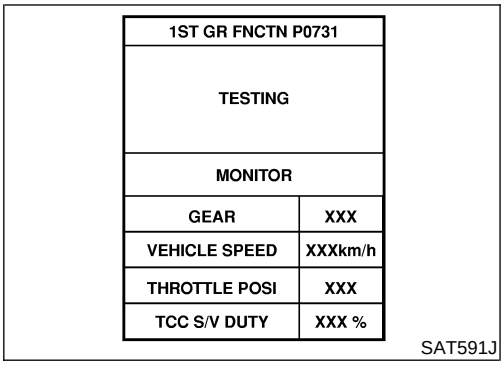
7. Touch select item menu (1ST, 2ND, etc.).



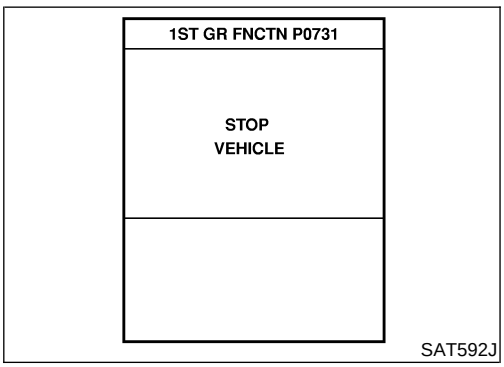
8. Touch "START".



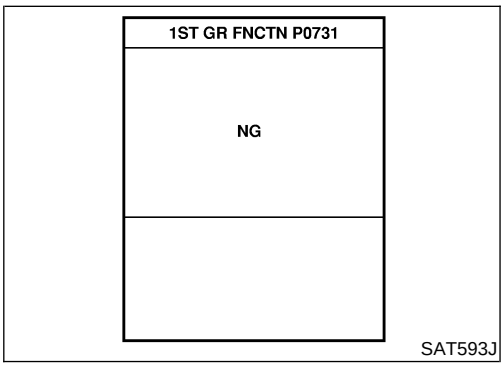
9. Perform driving test according to "DTC CONFIRMATION PROCEDURE" in "TROUBLE DIAGNOSIS FOR DTC".



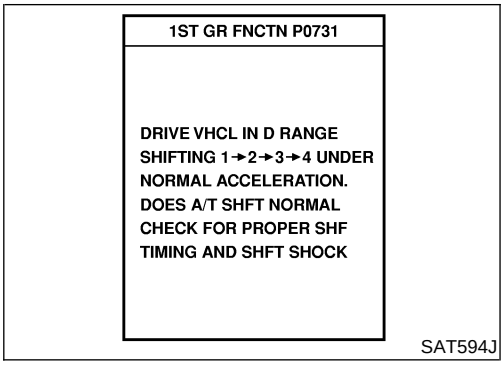
- **When testing conditions are satisfied, CONSULT-II screen changes from "OUT OF CONDITION" to "TESTING".**



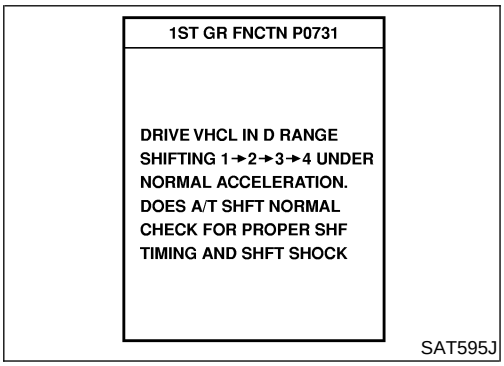
10. Stop vehicle. If "NG" appears on the screen, malfunction may exist. Go to "DIAGNOSTIC PROCEDURE".



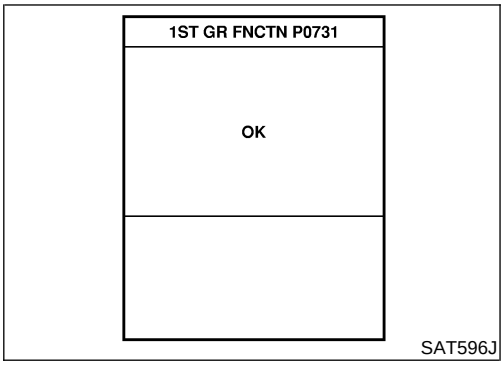
CONSULT-II (Cont'd)



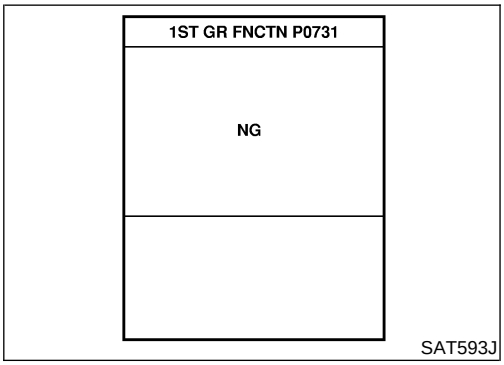
11. Perform test drive to check gear shift feeling in accordance with instructions displayed.



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

NIAT0023S05

DTC work support item	Description	Check items (Possible cause)
1ST GR FNCTN P0731	Following items for "A/T 1st gear function (P0731)" can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve A ● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit

DTC work support item	Description	Check items (Possible cause)
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 ● Overrun clutch solenoid valve ● 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

NIAT0023S06

OBD-II Self-diagnostic Procedure (With GST)

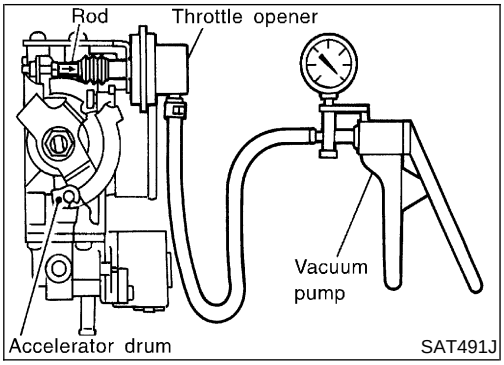
NIAT0023S0601

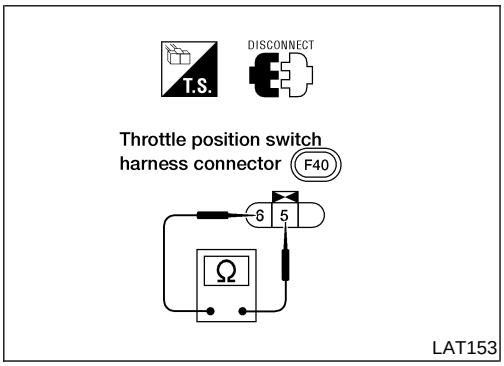
Refer to ***EC-125*** [QG18DE (Except Calif. CA Model)], ***EC-796*** [QG18DE (Calif. CA Model)], ***EC-1464*** (SR20DE), "Generic Scan Tool (GST)".

OBD-II Self-diagnostic Procedure (No Tools)

NIAT0023S0602

Refer to ***EC-100*** [QG18DE (Except Calif. CA Model)], ***EC-772*** [QG18DE (Calif. CA Model)], ***EC-1440*** (SR20DE), "Malfunction Indicator Lamp (MIL)".





TCM/PCM Self-diagnostic Procedure (No Tools)

NIAT0023S0603

Preparation

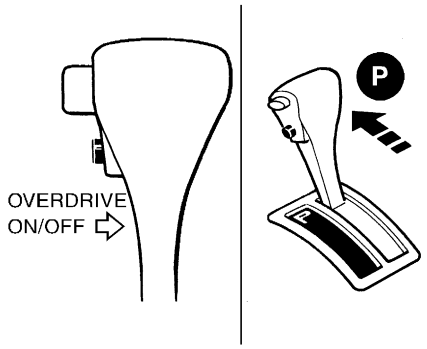
1. Turn ignition switch to "OFF" position.
2. Connect the handy type vacuum pump to the throttle opener and apply vacuum −25.3 kPa (−190 mmHg, −7.48 inHg).
3. Disconnect the throttle position switch harness connector.
4. Turn ignition switch to "ON" position.
5. Check continuity of the closed throttle position switch.

   Continuity should exist.

   (If continuity does not exist, check throttle opener and closed throttle position switch. Then increase vacuum until closed throttle position switch shows continuity.)
6. Go to test group 1, "CHECK O/D OFF INDICATOR LAMP", AT-53.

1	CHECK O/D OFF INDICATOR LAMP

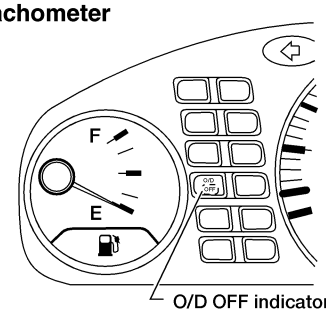
1. Move A/T selector lever in "P" position.
   Start the engine.
   Warm engine to normal operating temperature.
2. Turn ignition switch to "OFF" position.
3. Wait 5 seconds.



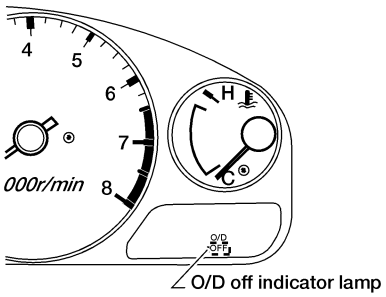
SAT967I

4. Turn ignition switch to "ON" position.
   (Do not start engine.)
5. Does O/D OFF indicator lamp come on for about 2 seconds?

Without tachometer



With tachometer



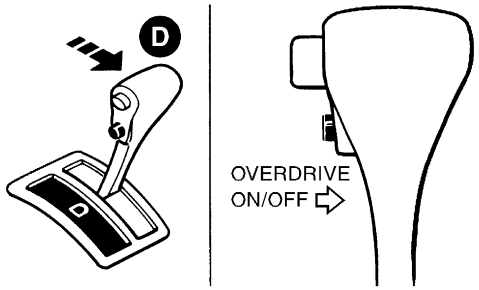
LAT154

Yes or No

Yes	▶	GO TO 2.
No	▶	Go to "1. O/D OFF Indicator Lamp Does Not Come On", AT-221 [QG18DE (Calif. CA Model) and SR20DE], AT-380 [QG18DE (Except Calif. CA Model)].

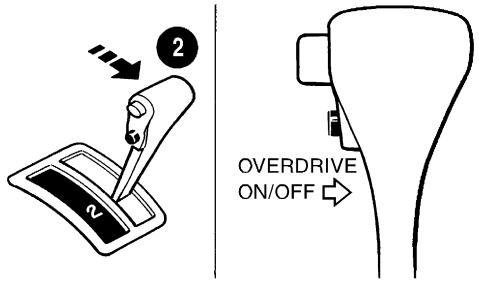
2	JUDGEMENT PROCEDURE STEP 1

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 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, go to "21. TCM Self-diagnosis Does Not Activate (PNP, Overdrive Control and Throttle Position Switches Circuit Checks)" on AT-259 [QG18DE (Calif. CA Model) and SR20DE], or "21. PCM Self-diagnosis Does Not Activate (PNP, Overdrive Control and Throttle Position Switches Circuit Checks)" AT-418 [QG18DE (Except Calif. CA Model)].
6. Turn ignition switch to "OFF" position.



SAT968I

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.

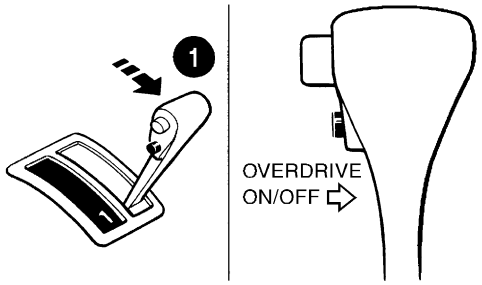


SAT969I

▶	GO TO 3.

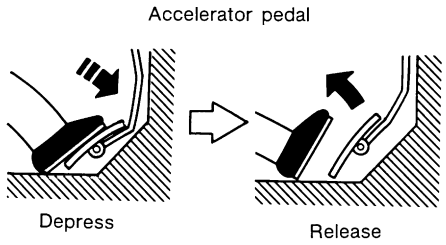
3	JUDGEMENT PROCEDURE STEP 2

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.



SAT970I

6. Depress accelerator pedal fully and release.



SAT981F

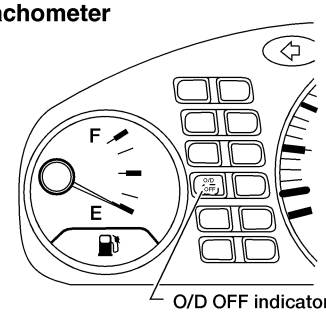
7. Release the overdrive control switch (the O/D OFF indicator lamp will begin to flash "ON" and "OFF").

▶	GO TO 4.

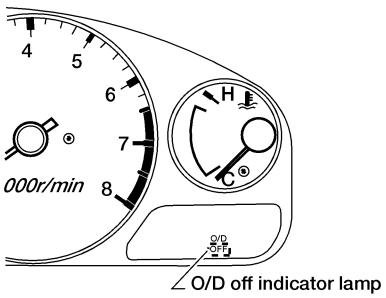
4	CHECK SELF-DIAGNOSIS CODE

Check O/D OFF indicator lamp. Refer to "Judgement of Self-diagnosis Code", AT-56.

Without tachometer



With tachometer



LAT154

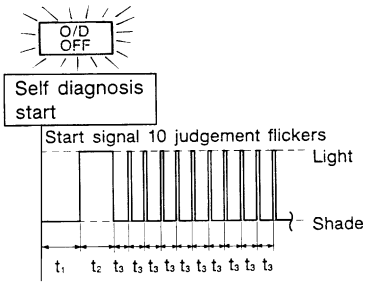
▶	DIAGNOSIS END

Judgement of Self-diagnosis Code

NIAT0023S0604

O/D OFF indicator lamp:

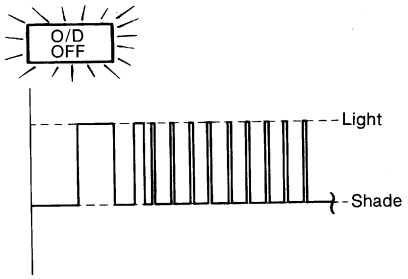
All judgement flickers are the same.



SAT436F

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

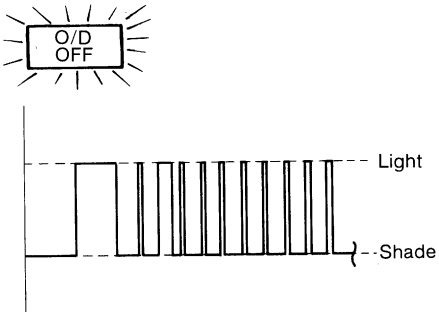
1st judgement flicker is longer than others.



SAT437F

Revolution sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR), AT-126 [QG18DE (Calif. CA Model) and SR20DE], AT-286 [QG18DE (Except Calif. CA Model)].**

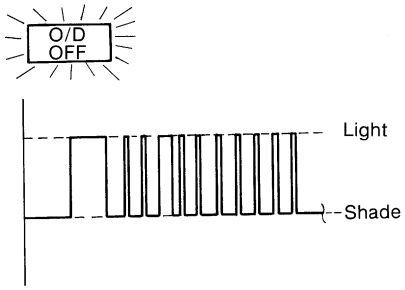
2nd judgement flicker is longer than others.



SAT439F

Vehicle speed sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·MTR, AT-210 [QG18DE (Calif. CA Model) and SR20DE], AT-369 [QG18DE (Except Calif. CA Model)].**

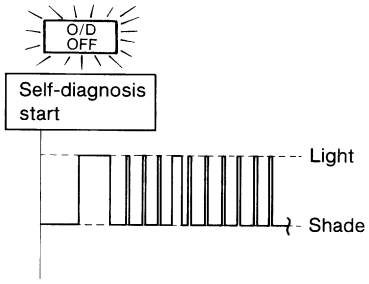
3rd judgement flicker is longer than others.



SAT441F

Throttle position sensor circuit is short-circuited or disconnected.
⇒ **Go to THROTTLE POSITION SENSOR, AT-191 [QG18DE (Calif. CA Model) and SR20DE], AT-351 [QG18DE (Except Calif. CA Model)].**

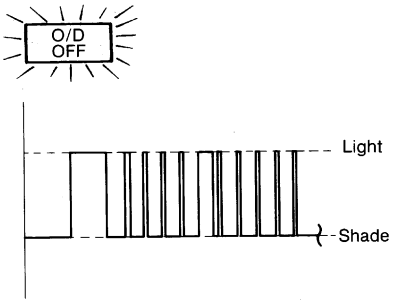
4th judgement flicker is longer than others.



SAT443F

Shift solenoid valve A circuit is short-circuited or disconnected.
⇒ **Go to SHIFT SOLENOID VALVE A, AT-183 [QG18DE (Calif. CA Model) and SR20DE], AT-343 [QG18DE (Except Calif. CA Model)].**

5th judgement flicker is longer than others.

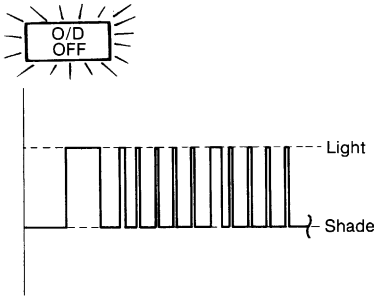


SAT445F

Shift solenoid valve B circuit is short-circuited or disconnected.
⇒ **Go to SHIFT SOLENOID VALVE B, AT-187 [QG18DE (Calif. CA Model) and SR20DE], AT-347 [QG18DE (Except Calif. CA Model)].**

O/D OFF indicator lamp:

6th judgement flicker is longer than others.

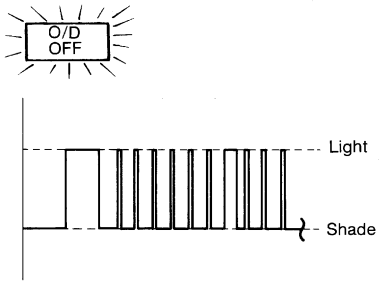


SAT447F

Overrun clutch solenoid valve circuit is short-circuited or disconnected.

⇒ **Go to OVERRUN CLUTCH SOLENOID VALVE, AT-199 [QG18DE (Calif. CA Model) and SR20DE], AT-359 [QG18DE (Except Calif. CA Model)].**

7th judgement flicker is longer than others.

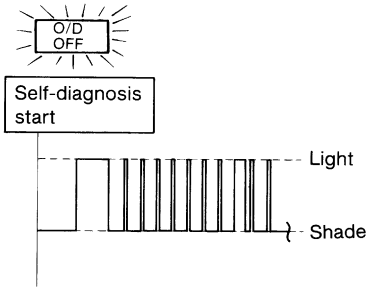


SAT449F

Torque converter clutch solenoid valve circuit is short-circuited or disconnected.

⇒ **Go to TORQUE CONVERTER CLUTCH SOLENOID VALVE, AT-163 [QG18DE (Calif. CA Model) and SR20DE], AT-323 [QG18DE (Except Calif. CA Model)].**

8th judgement flicker is longer than others.

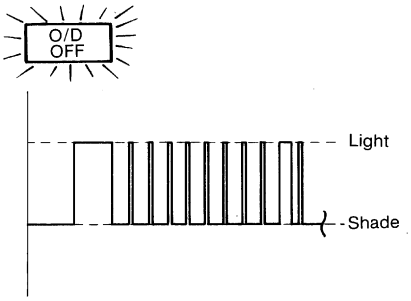


SAT451F

A/T fluid temperature sensor is disconnected or TCM/PCM power source circuit is damaged.

⇒ **Go to DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE), AT-203 [QG18DE (Calif. CA Model) and SR20DE] or DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND PCM POWER SOURCE), AT-363 [QG18DE (Except Calif. CA Model)].**

9th judgement flicker is longer than others.

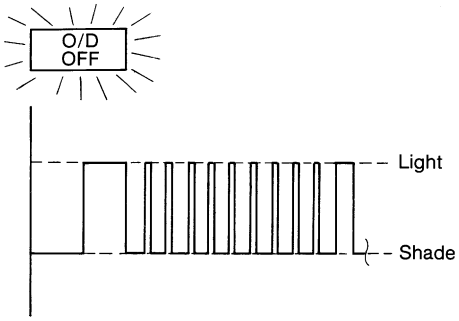


SAT453F

Engine speed signal circuit is short-circuited or disconnected.

⇒ **Go to ENGINE SPEED SIGNAL, AT-131 [QG18DE (Calif. CA Model) and SR20DE], AT-291 [QG18DE (Except Calif. CA Model)].**

10th judgement flicker is longer than others.

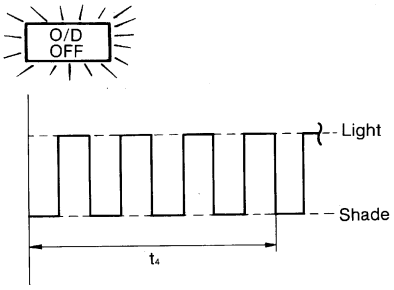


SAT455F

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

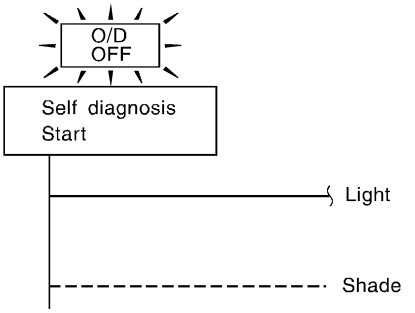
⇒ **Go to LINE PRESSURE SOLENOID VALVE, AT-178 [QG18DE (Calif. CA Model) and SR20DE], AT-338 [QG18DE (Except Calif. CA Model)].**

Flickers as shown below.

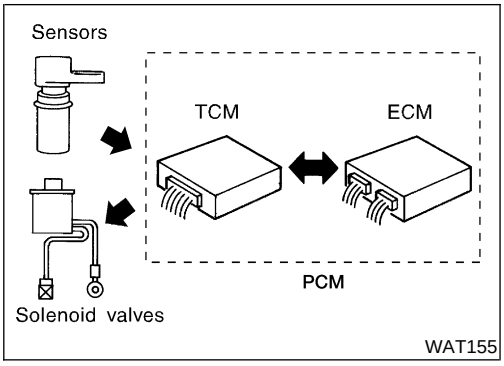


SAT457F

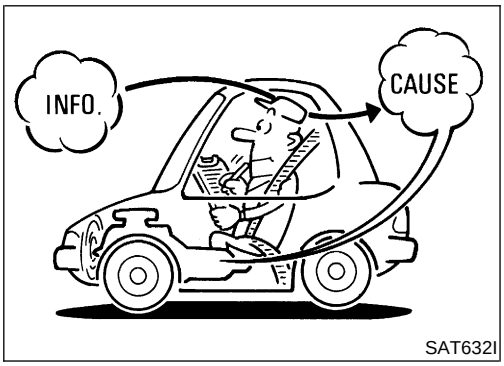
Battery power is low.
Battery has been disconnected for a long time.
Battery is connected conversely.
(When reconnecting TCM/PCM connectors. — This is not a problem.)

O/D OFF indicator lamp:	
Lamp comes on.  SAT367J PNP switch, overdrive control switch or throttle position switch circuit is disconnected or TCM/PCM is damaged. ⇒ **Go to 21. TCM Self-diagnosis Does Not Activate (PNP, Overdrive Control and Throttle Position Switches Circuit Checks), AT-259 [QG18DE (Calif. CA Model) and SR20DE] or 21. PCM Self-diagnosis Does Not Activate (PNP, Overdrive Control and Throttle Position Switches Circuit Checks), AT-418 [QG18DE (Except Calif. CA Model)].**	

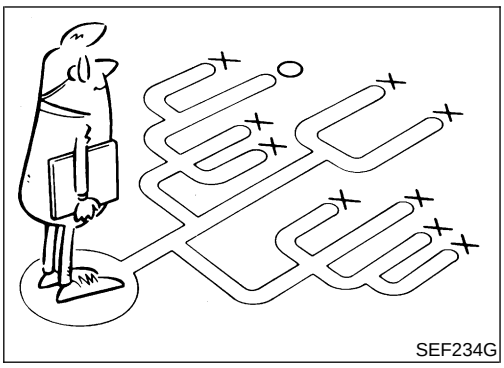
t_1 = 2.5 seconds t_2 = 2.0 seconds t_3 = 1.0 second t_4 = 1.0 second



WAT155



SAT632I


SEF234G

Introduction

NIAT0024

The TCM/PCM receives a signal from the vehicle speed sensor, throttle position sensor or PNP switch and provides shift control or lock-up control via A/T solenoid valves.

The TCM also communicates with the ECM [QG18DE (Calif. CA Model) and SR20DE] 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-65.

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-61) 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.

DIAGNOSTIC WORKSHEET

=NIAT0024S01

Information from Customer

NIAT0024S0101

KEY POINTS

WHAT ..... Vehicle & A/T model
WHEN..... Date, Frequencies
WHERE..... Road conditions
HOW..... Operating conditions, Symptoms

Customer name MR/MS	Model & Year	VIN
Trans. model	Engine	Mileage
Incident Date	Manuf. Date	In Service Date
Frequency	☐ Continuous ☐ Intermittent (times a day)	
Symptoms	☐ Vehicle does not move. (☐ Any position ☐ Particular position)	
	☐ No up-shift (☐ 1st → 2nd ☐ 2nd → 3rd ☐ 3rd → O/D)	
	☐ No down-shift (☐ O/D → 3rd ☐ 3rd → 2nd ☐ 2nd → 1st)	
	☐ Lockup malfunction	
	☐ Shift point too high or too low.	
	☐ Shift shock or slip (☐ N → D ☐ Lockup ☐ Any drive position)	
	☐ Noise or vibration	
	☐ No kickdown	
	☐ No pattern select	
	☐ Others ( )	
O/D OFF indicator lamp	Blinks for about 8 seconds.	
	☐ Continuously lit	☐ Not lit
Malfunction indicator lamp (MIL)	☐ Continuously lit	☐ Not lit

Diagnostic Worksheet

=NIAT0024S0102

1.	☐ Read the "FAIL-SAFE" and listen to customer complaints.			AT-10
2.	☐ CHECK A/T FLUID			AT-68
		☐ Leakage (Follow specified procedure) ☐ Fluid condition ☐ Fluid level		
3.	☐ Perform STALL TEST and LINE PRESSURE TEST.			AT-68, 72
		☐ Stall test — Mark possible damaged components/others.		
		☐ Torque converter one-way clutch ☐ Reverse clutch ☐ Forward clutch ☐ Overrun clutch ☐ Forward one-way clutch	☐ Low & reverse brake ☐ Low one-way clutch ☐ Engine ☐ Line pressure is low ☐ Clutches and brakes except high clutch and brake band are OK	
		☐ Line Pressure test — Suspected parts:		

4.	☐ Perform all ROAD TEST and mark required procedures.		AT-73
	4-1.	Check before engine is started.	AT-74
		☐ SELF-DIAGNOSTIC PROCEDURE — Mark detected items.	
		☐ PNP switch, AT-115 [QG18DE (Calif. CA Model) and SR20DE], AT-275 [QG18DE (Except Calif. CA Model)]. ☐ A/T fluid temperature sensor, AT-120 [QG18DE (Calif. CA Model) and SR20DE], AT-280 [QG18DE (Except Calif. CA Model)]. ☐ Vehicle speed sensor·A/T (Revolution sensor), AT-126 [QG18DE (Calif. CA Model) and SR20DE], AT-286 [QG18DE (Except Calif. CA Model)]. ☐ Engine speed signal, AT-131 [QG18DE (Calif. CA Model) and SR20DE], AT-291 [QG18DE (Except Calif. CA Model)]. ☐ Torque converter clutch solenoid valve, AT-163 [QG18DE (Calif. CA Model) and SR20DE], AT-323 [QG18DE (Except Calif. CA Model)]. ☐ Line pressure solenoid valve, AT-178 [QG18DE (Calif. CA Model) and SR20DE], AT-338 [QG18DE (Except Calif. CA Model)]. ☐ Shift solenoid valve A, AT-183 [QG18DE (Calif. CA Model) and SR20DE], AT-343 [QG18DE (Except Calif. CA Model)]. ☐ Shift solenoid valve B, AT-187 [QG18DE (Calif. CA Model) and SR20DE], AT-347 [QG18DE (Except Calif. CA Model)]. ☐ Throttle position sensor, AT-191 [QG18DE (Calif. CA Model) and SR20DE], AT-351 [QG18DE (Except Calif. CA Model)]. ☐ Overrun clutch solenoid valve, AT-199 [QG18DE (Calif. CA Model) and SR20DE], AT-359 [QG18DE (Except Calif. CA Model)]. ☐ PNP, overdrive control and throttle position switches, AT-259 [QG18DE (Calif. CA Model) and SR20DE], AT-418 [QG18DE (Except Calif. CA Model)]. ☐ A/T fluid temperature sensor and TCM/PCM power source, AT-203 [QG18DE (Calif. CA Model) and SR20DE], AT-363 [QG18DE (Except Calif. CA Model)]. ☐ Vehicle speed sensor·MTR, AT-210 [QG18DE (Calif. CA Model) and SR20DE], AT-369 [QG18DE (Except Calif. CA Model)]. ☐ Control unit (RAM), control unit (ROM), AT-214 [QG18DE (Calif. CA Model) and SR20DE], AT-373 [QG18DE (Except Calif. CA Model)]. ☐ Control unit (EEP ROM), AT-216 [QG18DE (Calif. CA Model) and SR20DE], AT-375 [QG18DE (Except Calif. CA Model)]. ☐ Battery ☐ Others	
	4-2.	Check at idle	AT-76
		☐ 1. O/D OFF Indicator Lamp Does Not Come On, AT-221 [QG18DE (Calif. CA Model) and SR20DE], AT-380 [QG18DE (Except Calif. CA Model)]. ☐ 2. Engine Cannot Be Started In "P" And "N" Position, AT-224 [QG18DE (Calif. CA Model) and SR20DE], AT-383 [QG18DE (Except Calif. CA Model)]. ☐ 3. In "P" Position, Vehicle Moves Forward Or Backward When Pushed, AT-225 [QG18DE (Calif. CA Model) and SR20DE], AT-384 [QG18DE (Except Calif. CA Model)]. ☐ 4. In "N" Position, Vehicle Moves, AT-226 [QG18DE (Calif. CA Model) and SR20DE], AT-385 [QG18DE (Except Calif. CA Model)]. ☐ 5. Large Shock. "N" → "R" Position, AT-228 [QG18DE (Calif. CA Model) and SR20DE], AT-387 [QG18DE (Except Calif. CA Model)]. ☐ 6. Vehicle Does Not Creep Backward In "R" Position, AT-230 [QG18DE (Calif. CA Model) and SR20DE], AT-389 [QG18DE (Except Calif. CA Model)]. ☐ 7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position, AT-233 [QG18DE (Calif. CA Model) and SR20DE], AT-392 [QG18DE (Except Calif. CA Model)].	

4. (con t'd)	4-3 (con t'd)	Cruise test	AT-79 AT-83
		Part-1	
		☐ 8. Vehicle Cannot Be Started From D_1, AT-236 [QG18DE (Calif. CA Model) and SR20DE], AT-395 [QG18DE (Except Calif. CA Model)]. ☐ 9. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$, AT-239 [QG18DE (Calif. CA Model) and SR20DE], AT-398 [QG18DE (Except Calif. CA Model)]. ☐ 10. A/T Does Not Shift: $D_2 \rightarrow D_3$, AT-242 [QG18DE (Calif. CA Model) and SR20DE], AT-401 [QG18DE (Except Calif. CA Model)]. ☐ 11. A/T Does Not Shift: $D_3 \rightarrow D_4$, AT-245 [QG18DE (Calif. CA Model) and SR20DE], AT-404 [QG18DE (Except Calif. CA Model)]. ☐ 12. A/T Does Not Perform Lock-up, AT-248 [QG18DE (Calif. CA Model) and SR20DE], AT-407 [QG18DE (Except Calif. CA Model)]. ☐ 13. A/T Does Not Hold Lock-up Condition, AT-250 [QG18DE (Calif. CA Model) and SR20DE], AT-409 [QG18DE (Except Calif. CA Model)]. ☐ 14. Lock-up Is Not Released, AT-252 [QG18DE (Calif. CA Model) and SR20DE], AT-411 [QG18DE (Except Calif. CA Model)]. ☐ 15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$), AT-253 [QG18DE (Calif. CA Model) and SR20DE], AT-412 [QG18DE (Except Calif. CA Model)].	
		Part-2	AT-87
		☐ 16. Vehicle Does Not Start From D_1, AT-255 [QG18DE (Calif. CA Model) and SR20DE], AT-414 [QG18DE (Except Calif. CA Model)]. ☐ 9. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$, AT-239 [QG18DE (Calif. CA Model) and SR20DE], AT-398 [QG18DE (Except Calif. CA Model)]. ☐ 10. A/T Does Not Shift: $D_2 \rightarrow D_3$, AT-242 [QG18DE (Calif. CA Model) and SR20DE], AT-401 [QG18DE (Except Calif. CA Model)]. ☐ 11. A/T Does Not Shift: $D_3 \rightarrow D_4$, AT-245 [QG18DE (Calif. CA Model) and SR20DE], AT-404 [QG18DE (Except Calif. CA Model)].	

4. (cont'd)	4-3. (cont'd)	Part-3	AT-89
		☐ 17. A/T Does Not Shift: $D_4 \rightarrow D_3$ When Overdrive Control Switch "ON" → "OFF", AT-256 [QG18DE (Calif. CA Model) and SR20DE], AT-415 [QG18DE (Except Calif. CA Model)]. ☐ 15. Engine Speed Does Not Return To Idle (Engine Brake In D_3), AT-253 [QG18DE (Calif. CA Model) and SR20DE], AT-412 [QG18DE (Except Calif. CA Model)]. ☐ 18. A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" → "2" Position, AT-257 [QG18DE (Calif. CA Model) and SR20DE], AT-416 [QG18DE (Except Calif. CA Model)]. ☐ 15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_2$), AT-253 [QG18DE (Calif. CA Model) and SR20DE], AT-412 [QG18DE (Except Calif. CA Model)]. ☐ 19. A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever "2" → "1" Position, AT-258 [QG18DE (Calif. CA Model) and SR20DE], AT-417 [QG18DE (Except Calif. CA Model)]. ☐ 20. Vehicle Does Not Decelerate By Engine Brake, AT-259 [QG18DE (Calif. CA Model) and SR20DE], AT-418 [QG18DE (Except Calif. CA Model)]. ☐ SELF-DIAGNOSTIC PROCEDURE — Mark detected items.	
		☐ PNP switch, AT-115 [QG18DE (Calif. CA Model) and SR20DE], AT-275 [QG18DE (Except Calif. CA Model)]. ☐ A/T fluid temperature sensor, AT-120 [QG18DE (Calif. CA Model) and SR20DE], AT-280 [QG18DE (Except Calif. CA Model)]. ☐ Vehicle speed sensor·A/T (Revolution sensor), AT-126 [QG18DE (Calif. CA Model) and SR20DE], AT-286 [QG18DE (Except Calif. CA Model)]. ☐ Engine speed signal, AT-131 [QG18DE (Calif. CA Model) and SR20DE], AT-291 [QG18DE (Except Calif. CA Model)]. ☐ Torque converter clutch solenoid valve, AT-163 [QG18DE (Calif. CA Model) and SR20DE], AT-323 [QG18DE (Except Calif. CA Model)]. ☐ Line pressure solenoid valve, AT-178 [QG18DE (Calif. CA Model) and SR20DE], AT-338 [QG18DE (Except Calif. CA Model)]. ☐ Shift solenoid valve A, AT-183 [QG18DE (Calif. CA Model) and SR20DE], AT-343 [QG18DE (Except Calif. CA Model)]. ☐ Shift solenoid valve B, AT-187 [QG18DE (Calif. CA Model) and SR20DE], AT-347 [QG18DE (Except Calif. CA Model)]. ☐ Throttle position sensor, AT-191 [QG18DE (Calif. CA Model) and SR20DE], AT-351 [QG18DE (Except Calif. CA Model)]. ☐ Overrun clutch solenoid valve, AT-199 [QG18DE (Calif. CA Model) and SR20DE], AT-359 [QG18DE (Except Calif. CA Model)]. ☐ PNP, overdrive control and throttle position switches, AT-259 [QG18DE (Calif. CA Model) and SR20DE], AT-418 [QG18DE (Except Calif. CA Model)]. ☐ A/T fluid temperature sensor and TCM/PCM power source, AT-203 [QG18DE (Calif. CA Model) and SR20DE], AT-363 [QG18DE (Except Calif. CA Model)]. ☐ Vehicle speed sensor·MTR, AT-210 [QG18DE (Calif. CA Model) and SR20DE], AT-369 [QG18DE (Except Calif. CA Model)]. ☐ Control unit (RAM), control unit (ROM), AT-214 [QG18DE (Calif. CA Model) and SR20DE], AT-373 [QG18DE (Except Calif. CA Model)]. ☐ Control unit (EEP ROM), AT-216 [QG18DE (Calif. CA Model) and SR20DE], AT-375 [QG18DE (Except Calif. CA Model)]. ☐ Battery ☐ Others	
5.	☐ For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.		AT-43
6.	☐ Perform all ROAD TEST and re-mark required procedures.		AT-73
7.	☐ Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items. Refer to ***EC-86*** [QG18DE (Except Calif. CA Model)], ***EC-759*** [QG18DE (Calif. CA Model)], ***EC-1427*** (SR20DE), "Emission-related Diagnostic Information".		EC section
		☐ DTC (P0731) A/T 1ST GEAR FUNCTION, AT-135 [QG18DE (Calif. CA Model) and SR20DE], AT-295 [QG18DE (Except Calif. CA Model)]. ☐ DTC (P0732) A/T 2ND GEAR FUNCTION, AT-142 [QG18DE (Calif. CA Model) and SR20DE], AT-302 [QG18DE (Except Calif. CA Model)]. ☐ DTC (P0733) A/T 3RD GEAR FUNCTION, AT-148 [QG18DE (Calif. CA Model) and SR20DE], AT-308 [QG18DE (Except Calif. CA Model)]. ☐ DTC (P0734) A/T 4TH GEAR FUNCTION, AT-154 [QG18DE (Calif. CA Model) and SR20DE], AT-314 [QG18DE (Except Calif. CA Model)]. ☐ DTC (P0744) A/T TCC S/V FUNCTION (LOCK-UP), AT-163 [QG18DE (Calif. CA Model) and SR20DE], AT-323 [QG18DE (Except Calif. CA Model)].	

8.	☐ Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.)	AT-108 [QG18DE (Calif. CA Model) and SR20DE], AT-268 [QG18DE (Except Calif. CA Model)] AT-93
9.	☐ Erase DTC from TCM, ECM and PCM memories.	AT-40

Work Flow

NIAT0025

HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

NIAT0025S01

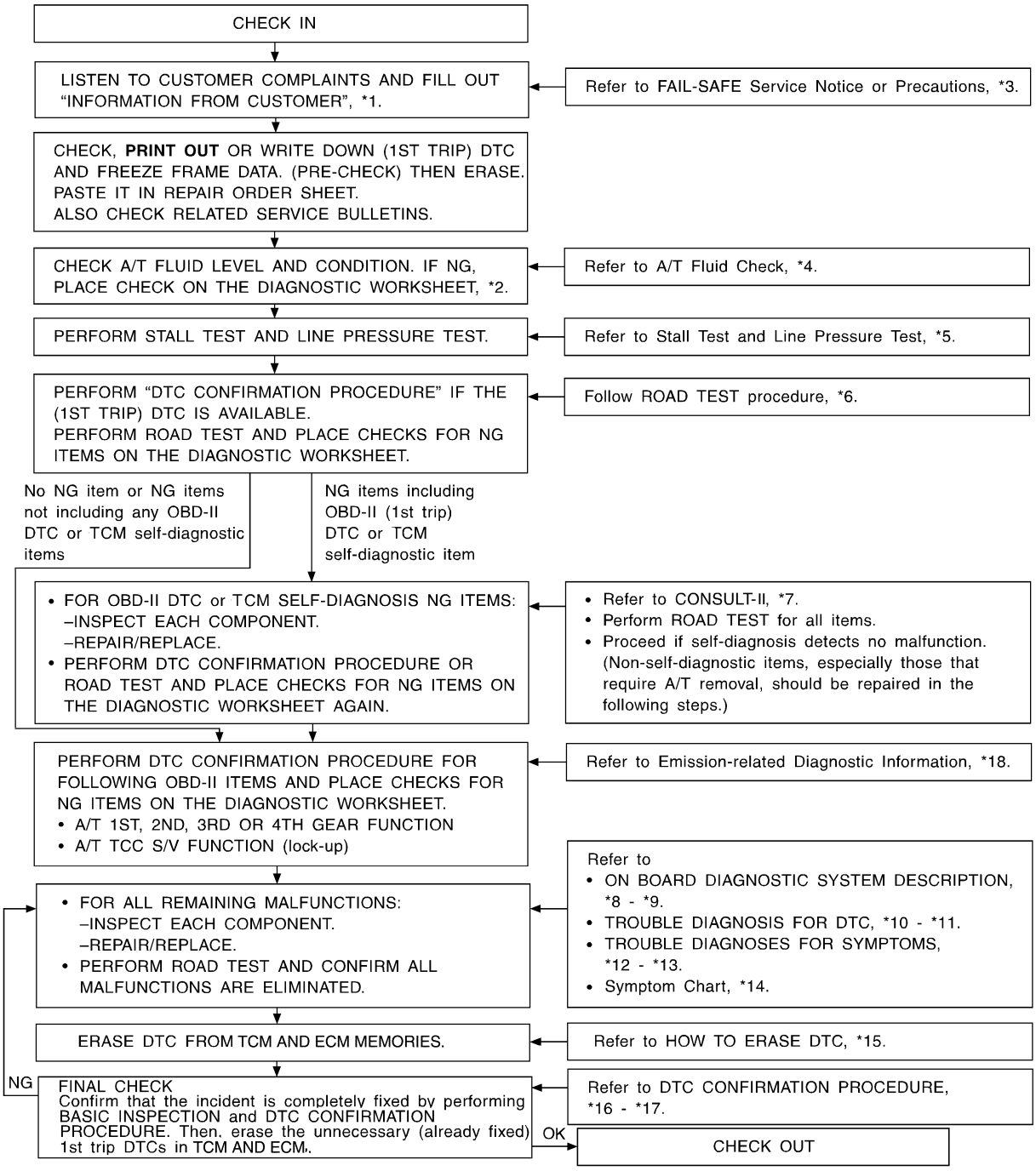
A good understanding of the malfunction conditions can make troubleshooting faster and more accurate. In general, each customer feels differently about a problem. It is important to fully understand the symptoms or conditions for a customer complaint.

Make good use of the two sheets provided, "Information from Customer" (AT-60) and "Diagnostic Worksheet" (AT-61), to perform the best troubleshooting possible.

Work Flow (Cont'd)

WORK FLOW CHART — QG18DE (CALIF. CA MODEL) AND SR20DE MODEL

NIAT0025S02

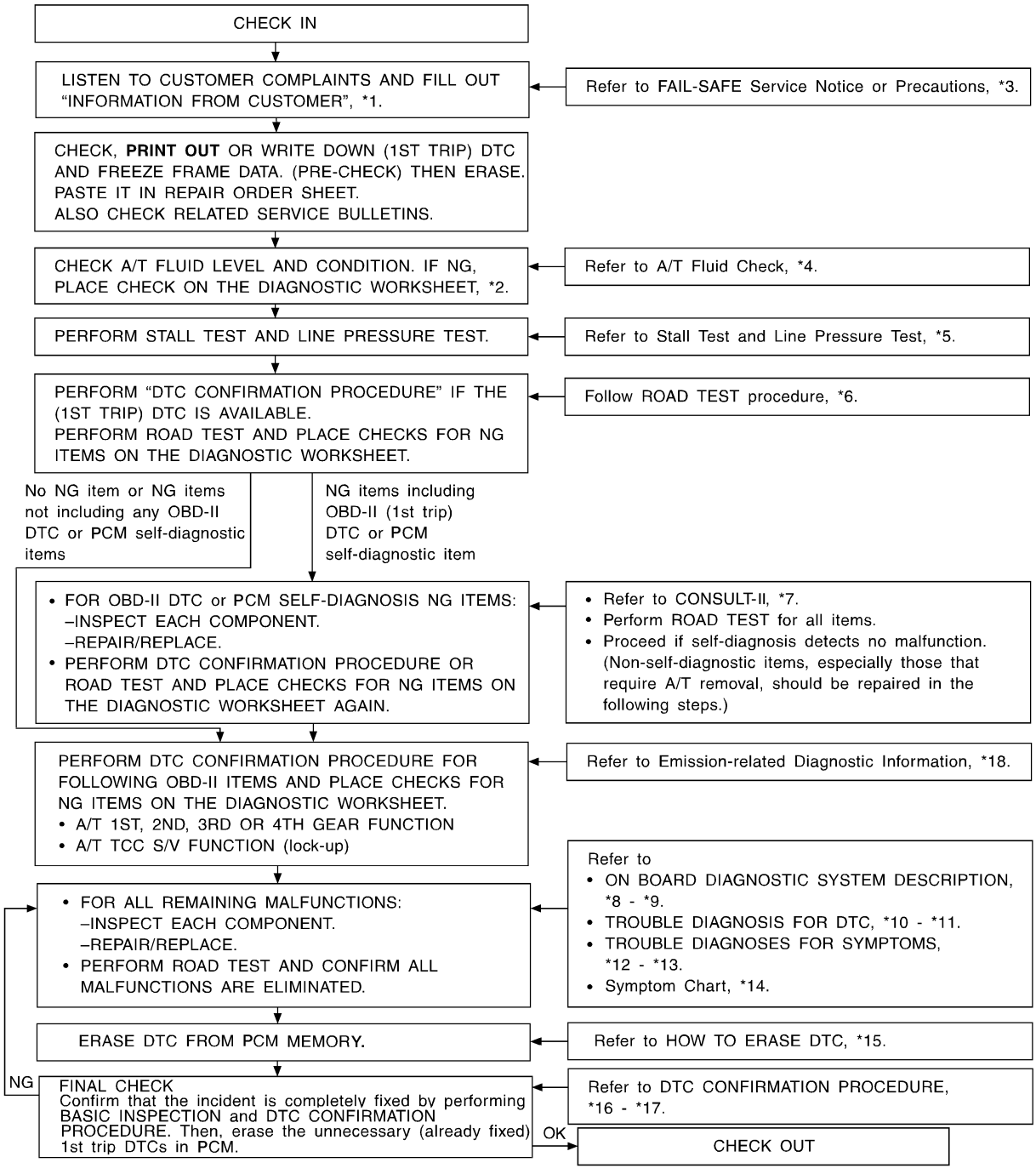


WAT300

*1: AT-60
*2: AT-61
*3: AT-10
*4: AT-68
*5: AT-68, 72
*6: AT-73
*7: AT-42
*8: AT-38
*9: AT-56
*10: AT-115
*11: AT-216
*12: AT-218
*13: AT-259
*14: AT-93
*15: AT-40
*16: AT-115
*17: AT-216
*18: ***EC-759*** [QG18DE (Calif. CA Model)], ***EC-1427*** (SR20DE),

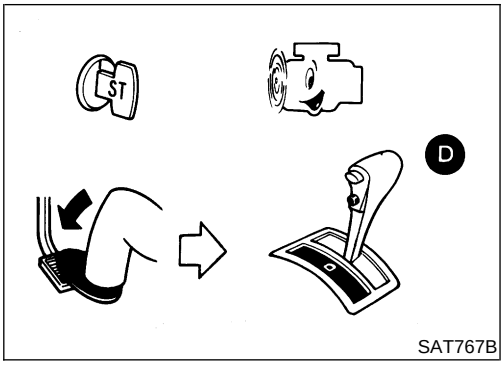
WORK FLOW CHART — QG18DE (EXCEPT CALIF. CA MODEL)

NIAT0025S03



WAT156

*1: AT-60
*2: AT-61
*3: AT-10
*4: AT-68
*5: AT-68, 72
*6: AT-73
*7: AT-42
*8: AT-38
*9: AT-56
*10: AT-275
*11: AT-375
*12: AT-377
*13: AT-418
*14: AT-93
*15: AT-40
*16: AT-275
*17: AT-375
*18: ***EC-86*** [QG18DE (Except Calif. CA Model)]



SAT767B

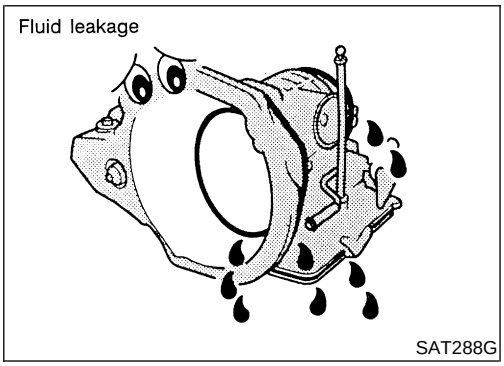
A/T Fluid Check

NIAT0026

FLUID LEAKAGE CHECK

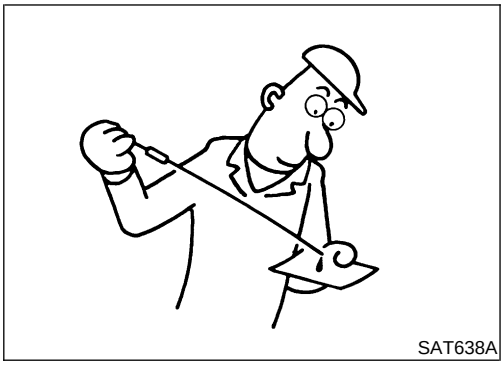
NIAT0026S01

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.



SAT288G

4. Check for fresh leakage.


SAT638A

FLUID CONDITION CHECK

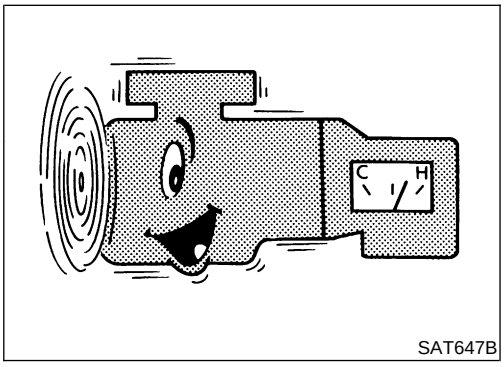
NIAT0026S02

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

NIAT0026S03

Refer to***MA-36***, “Checking A/T Fluid”.



SAT647B

Stall Test

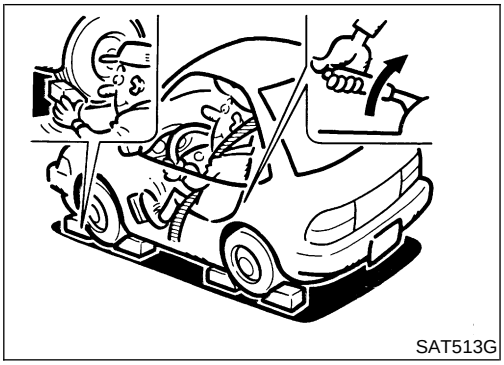
NIAT0027

STALL TEST PROCEDURE

NIAT0027S01

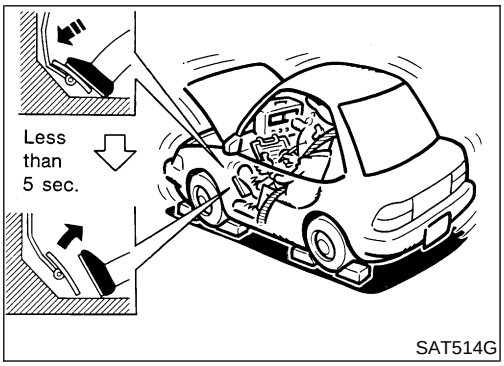
1. Check A/T fluid and engine oil levels. If necessary, add.
2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

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


SAT513G

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.**



SAT514G

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.

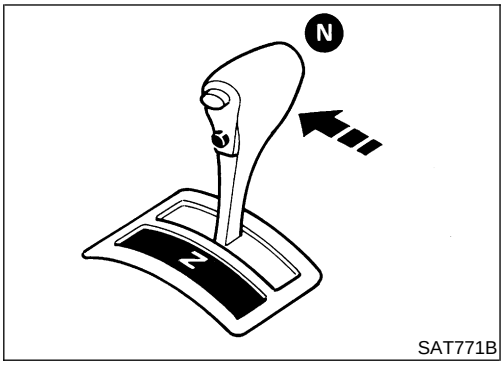
- **During test, never hold throttle wide open for more than 5 seconds.**

Stall revolution:
QG18DE: 2,350 - 2,800 rpm
SR20DE: 2,350 - 2,850 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.



SAT771B

JUDGEMENT OF STALL TEST

NIAT0027S02

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 "Work Flow" shown in AT-65.

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

Stall Test (Cont'd)

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
- 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".

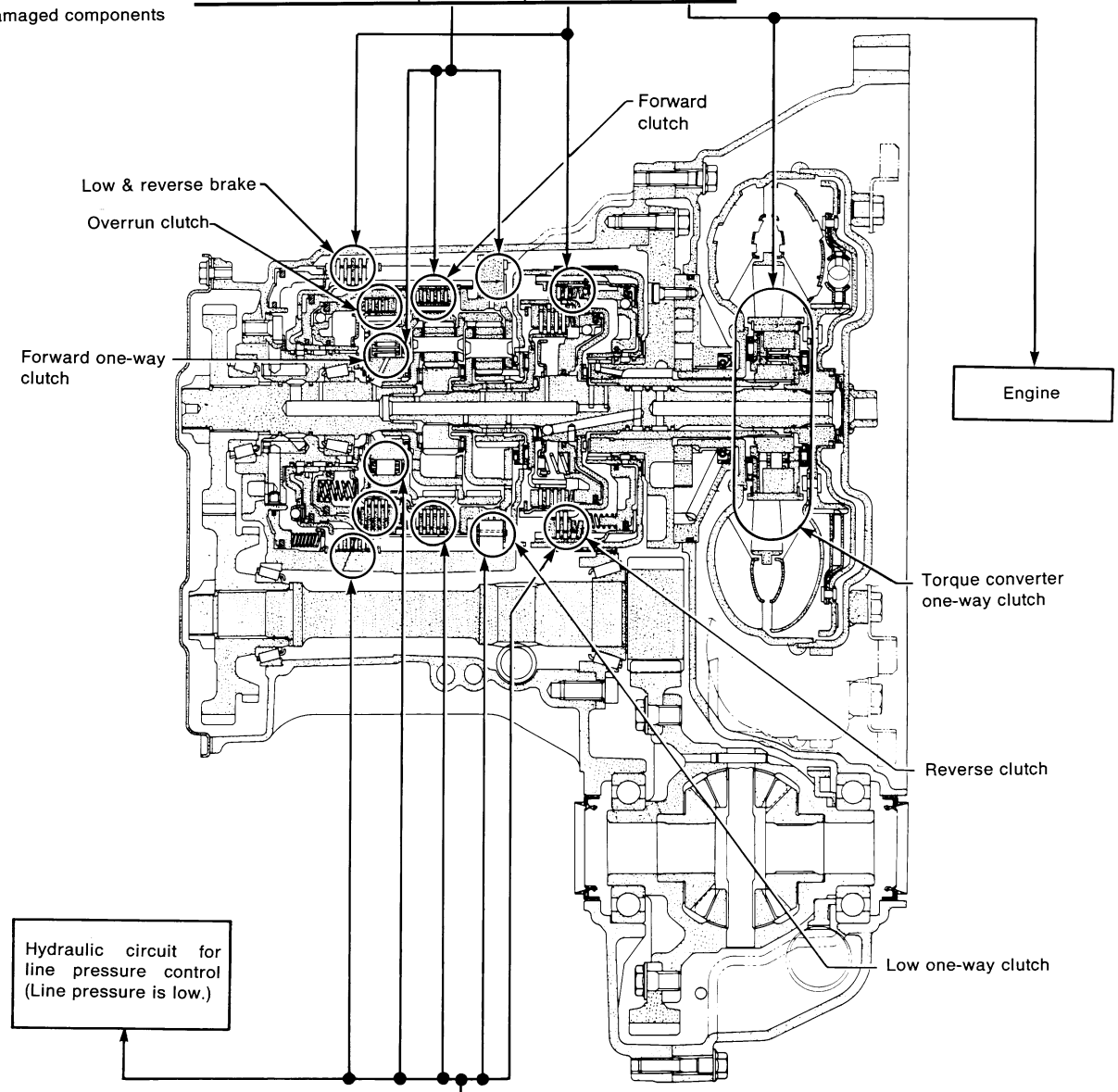
Stall revolution less than specifications:

- Poor acceleration during starts. ..... One-way clutch seizure in torque converter

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.

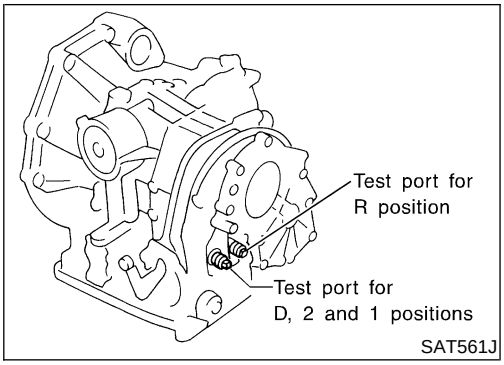
Damaged components



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

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

SAT871HA



SAT561J

Line Pressure Test

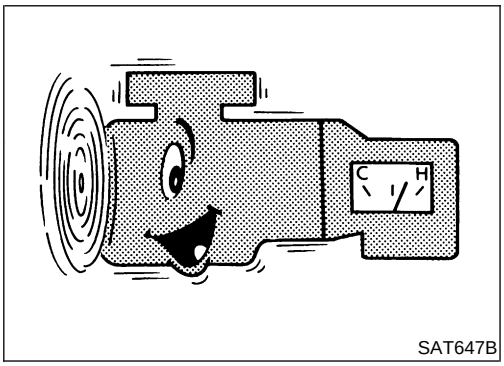
NIAT0028

LINE PRESSURE TEST PORTS

NIAT0028S01

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

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



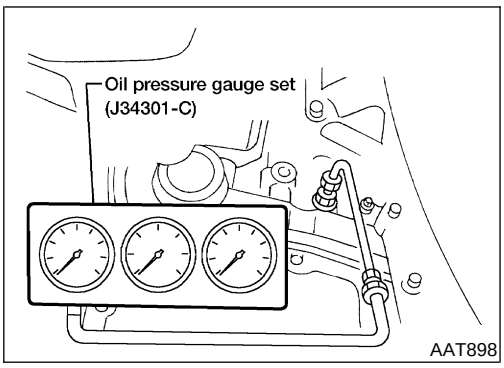
SAT647B

LINE PRESSURE TEST PROCEDURE

NIAT0028S02

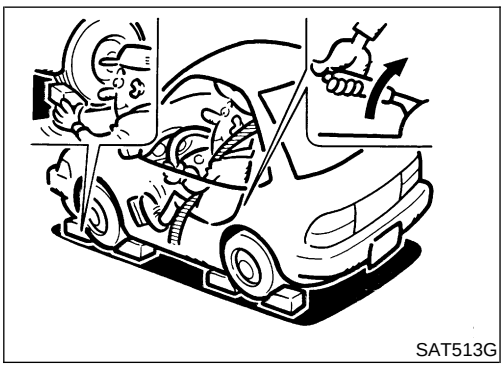
1. Check A/T fluid and engine oil levels. If necessary, add fluid or oil.
2. Drive vehicle for approx. 10 minutes or until engine oil and ATF reach operating temperature.

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

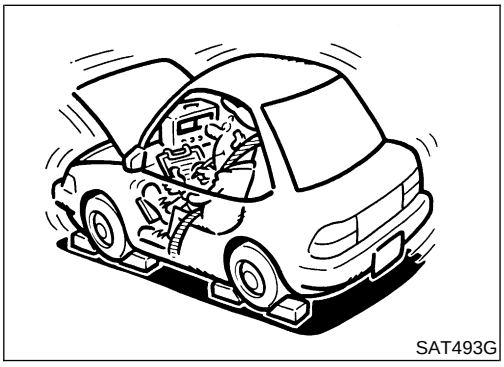


AAT898

3. Install pressure gauge to corresponding line pressure port.


SAT513G

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


SAT493G

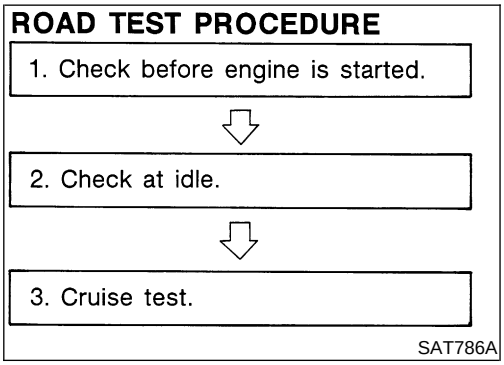
5. Start engine and measure line pressure at idle and stall speed.
- **When measuring line pressure at stall speed, follow the stall test procedure.**

Refer to “Line Pressure”, AT-541.

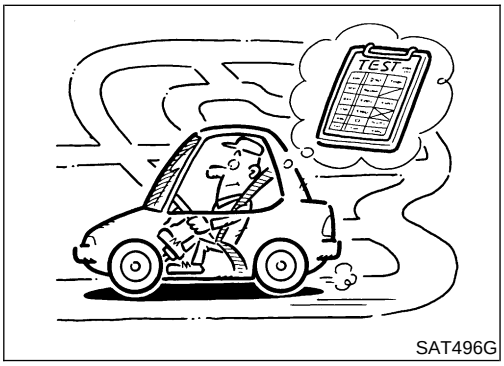
JUDGEMENT OF LINE PRESSURE TEST

NIAT0028S03

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



SAT786A



SAT496G

Road Test

DESCRIPTION

NIAT0029

NIAT0029S01

- 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

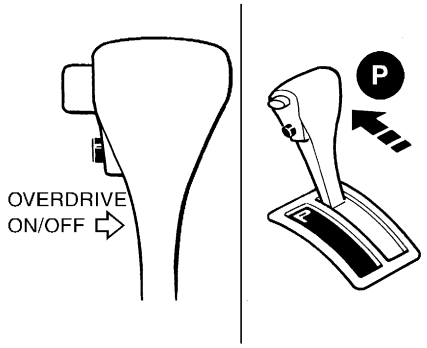
- Before road test, familiarize yourself with all test procedures and items to check.
- Conduct tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test. Refer to "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION", AT-38 - 56 and "TROUBLE DIAGNOSES FOR SYMPTOMS", AT-218 - 259 [QG18DE (Calif. CA Model) and SR20DE], AT-377 - 418 [QG18DE (Except Calif. CA Model)].

1. CHECK BEFORE ENGINE IS STARTED

=NIAT0029S02

1	CHECK O/D OFF INDICATOR LAMP

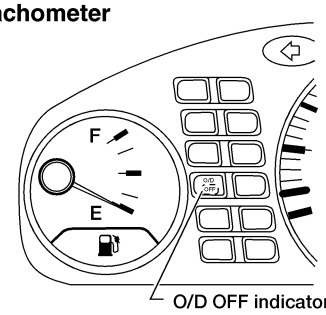
1. Park vehicle on flat surface.
2. Move A/T selector lever to "P" position.



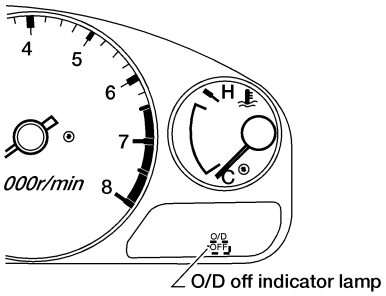
SAT967I

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?

Without tachometer



With tachometer



LAT154

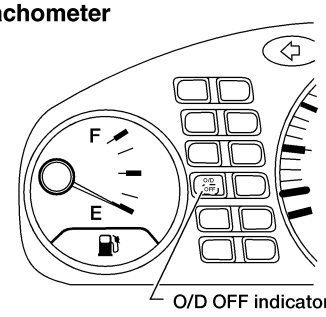
Yes or No

Yes	▶	GO TO 2.
No	▶	Stop ROAD TEST. Go to "1. O/D OFF Indicator Lamp Does Not Come On", AT-221 [QG18DE (Calif. CA Model) and SR20DE], AT-380 [QG18DE (Except Calif. CA Model)].

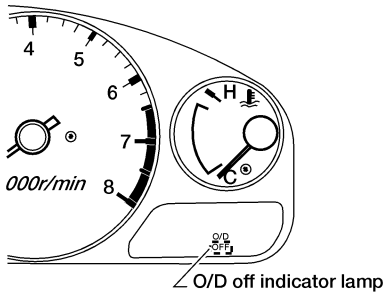
2	CHECK O/D OFF INDICATOR LAMP

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

Without tachometer



With tachometer



LAT154

Yes or No

Yes	▶	Perform self-diagnosis and check NG items on the "Diagnostic Worksheet", AT-61. Refer to "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
No	▶	1. Turn ignition switch to "OFF" position. 2. Perform self-diagnosis and note NG items. Refer to "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52. 3. Go to "2. CHECK AT IDLE", AT-76.

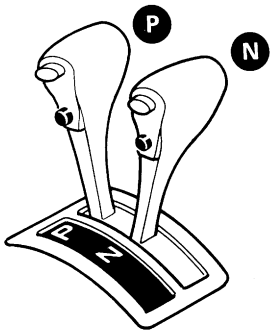
Road Test (Cont'd)

2. CHECK AT IDLE

=NIAT0029S03

1	CHECK ENGINE START

1. Park vehicle on flat surface.
2. Move A/T selector lever to "P" position.



SAT769B

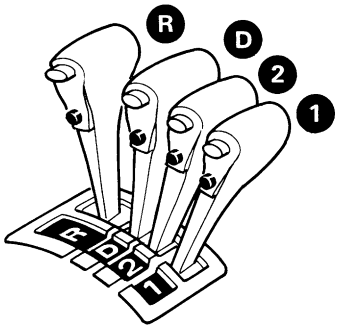
3. Turn ignition switch to "OFF" position.
4. Turn ignition switch to "START" position.
5. Is engine started?

Yes or No

Yes	▶	GO TO 2.
No	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "2. Engine Cannot Be Started In "P" and "N" Position", AT-224 [QG18DE (Calif. CA Model) and SR20DE], AT-383 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

2	CHECK ENGINE START

1. Turn ignition switch to "ACC" position.
2. Move A/T selector lever to "D", "1", "2" or "R" position.



SAT770B

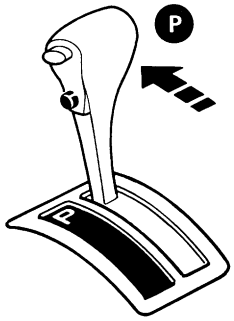
3. Turn ignition switch to "START" position.
4. Is engine started?

Yes or No

Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "2. Engine Cannot Be Started In "P" and "N" Position", AT-224 [QG18DE (Calif. CA Model) and SR20DE], AT-383 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.
No	▶	GO TO 3.

3	CHECK VEHICLE MOVE

1. Move A/T selector lever to "P" position.



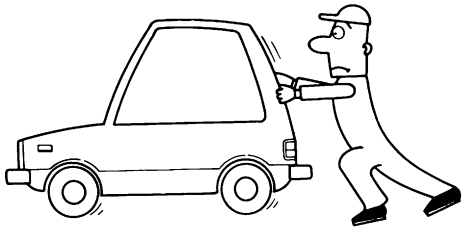
SAT768B

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?



SAT796A

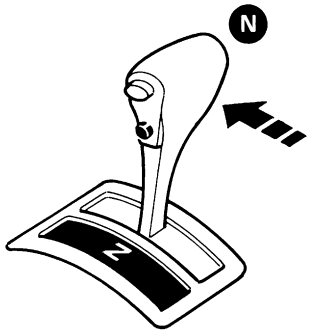
3. Apply parking brake.

Yes or No

Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "3. In "P" Position, Vehicle Moves Forward Or Backward When Pushed", AT-225 [QG18DE (Calif. CA Model) and SR20DE], AT-384 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.
No	▶	GO TO 5.

5	CHECK VEHICLE MOVE

1. Start engine.
2. Move A/T selector lever to "N" position.



SAT771B

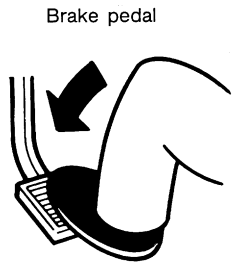
3. Release parking brake.
4. Does vehicle move forward or backward?

Yes or No

Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "4. In "N" Position, Vehicle Moves", AT-226 [QG18DE (Calif. CA Model) and SR20DE], AT-385 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.
No	▶	GO TO 6.

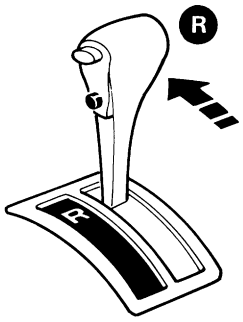
6	CHECK SHIFT SHOCK

1. Apply foot brake.



SAT797A

2. Move A/T selector lever to "R" position.



SAT772B

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 "5. Large Shock "N" → "R" Position", AT-228 [QG18DE (Calif. CA Model) and SR20DE], AT-387 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.
No	▶	GO TO 7.

7	CHECK VEHICLE MOVE

1. Release foot brake for several seconds.

SAT799A

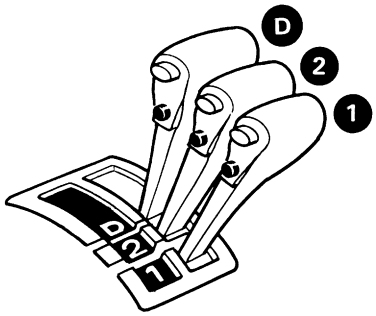
2. Does vehicle creep backward when foot brake is released?

Yes or No

Yes	▶	GO TO 8.
No	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "6. Vehicle Does Not Creep Backward In "R" Position", AT-230 [QG18DE (Calif. CA Model) and SR20DE], AT-389 [QG18DE (Except Calif. CA Model)]. 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.

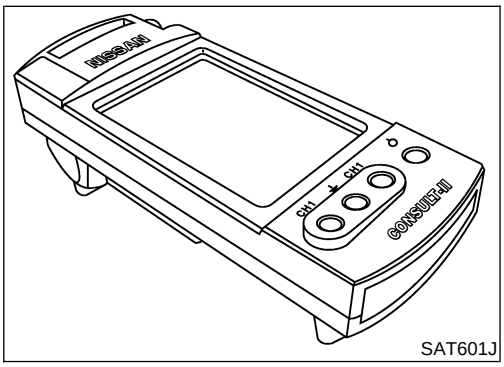


SAT773B

2. Does vehicle creep forward in all three positions?

Yes or No

Yes	▶	Go to 3. CRUISE TEST, AT-79.
No	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position", AT-233 [QGI8DE (Calif. CA Model) and SR20DE], AT-392 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.



SAT601J

3. CRUISE TEST

NIAT0029S04

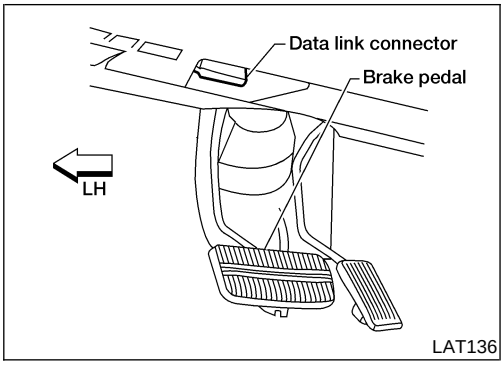
- Check all items listed in Parts 1 through 3.

With CONSULT-II

NIAT0029S0401

- 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.

Road Test (Cont'd)

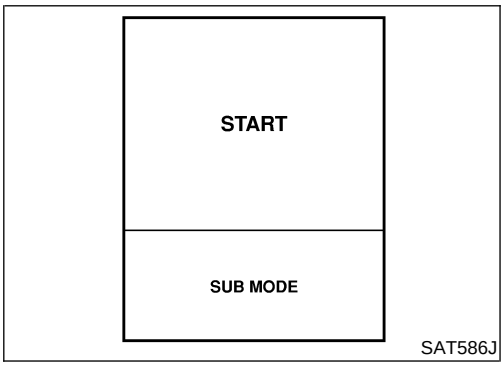


LAT136

CONSULT-II Setting Procedure

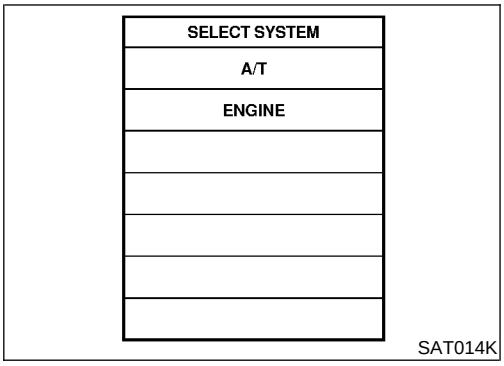
NIAT0029S0402

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



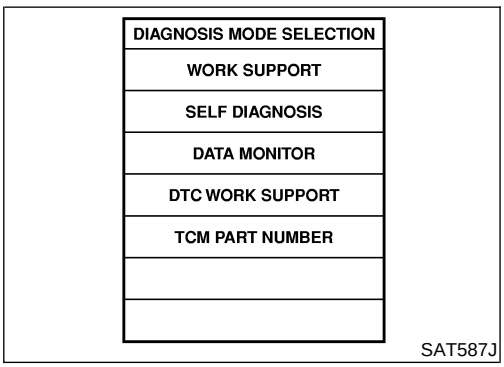
SAT586J

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



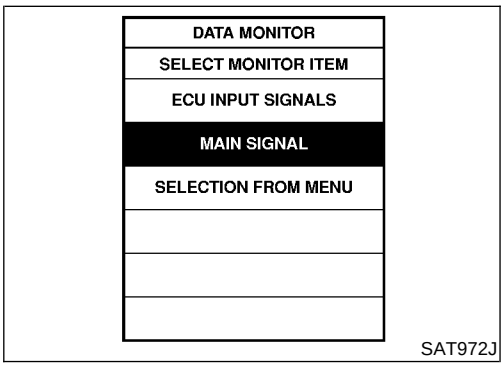
SAT014K

5. Touch "A/T".



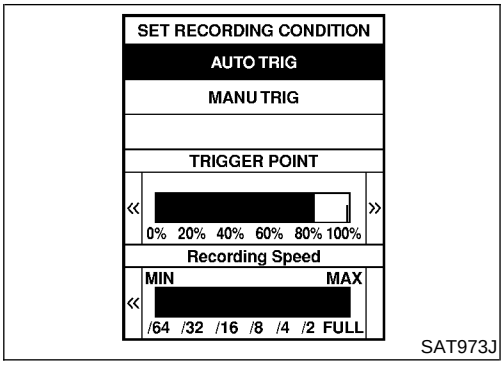
SAT587J

6. Touch "DATA MONITOR".



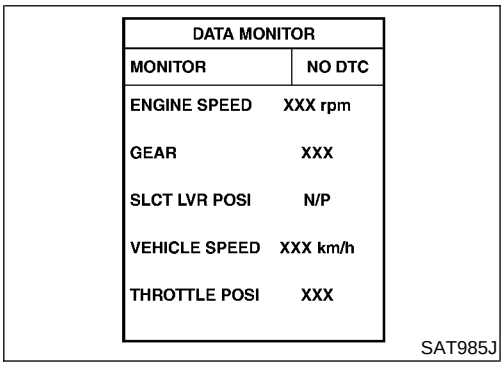
SAT972J

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



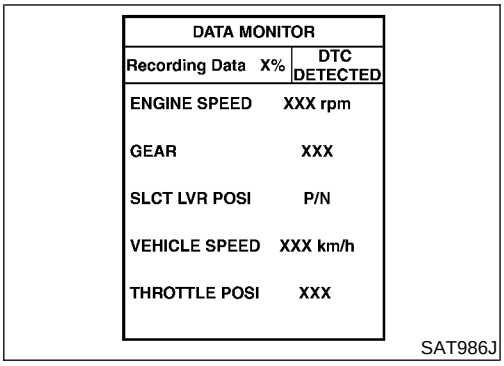
SAT973J

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



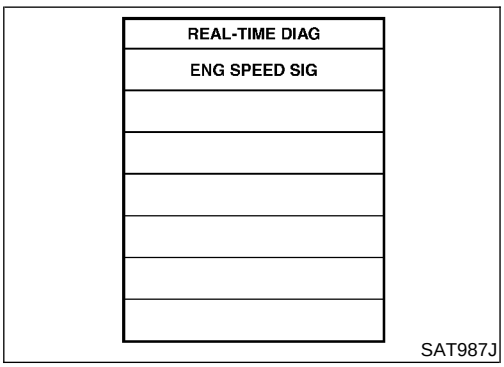
SAT985J

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



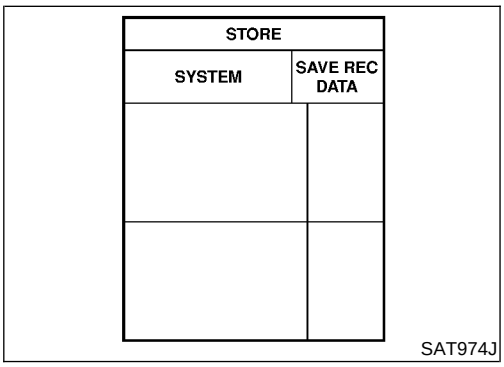
SAT986J

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



SAT987J

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



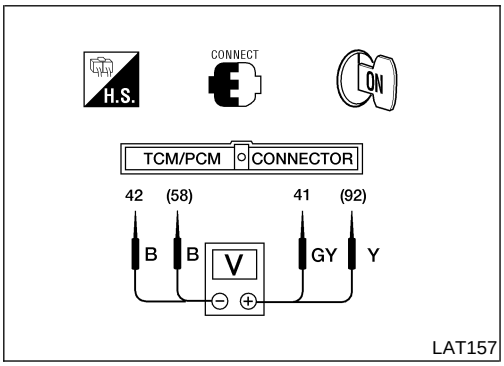
SAT974J

Road Test (Cont'd)

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

SAT975J

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



LAT157

Without CONSULT-II

NIAT0029S0403

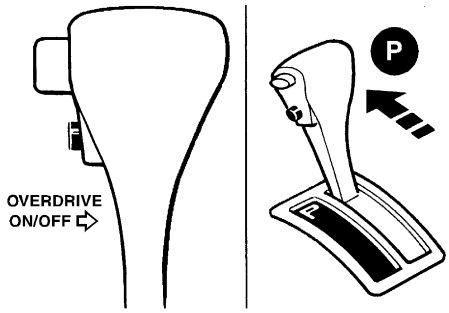
- Throttle position sensor can be checked by voltage across terminals 41/(58) and 42/(92) of TCM/(PCM).

Cruise Test — Part 1

=NIAT0029S0404

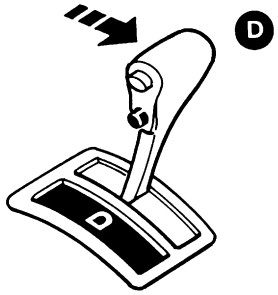
1	CHECK STARTING GEAR (D_1) POSITION

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 A/T selector lever to "P" position.



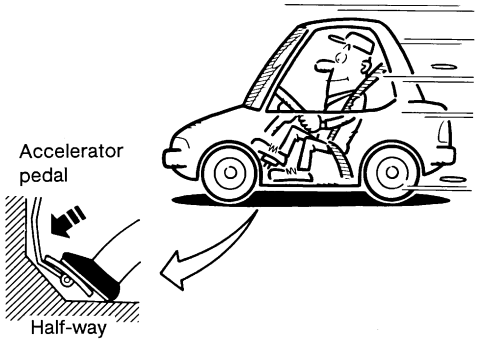
SAT001J

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



SAT775B

7. Accelerate vehicle by constantly depressing accelerator pedal halfway.



SAT495G

8. Does vehicle start from D_1?
   Read gear position.

Yes or No

Yes	▶	GO TO 2.
No	▶	Go to "8. Vehicle Cannot Be Started From D_1", AT-236 [QG18DE (Calif. CA Model) and SR20DE], AT-395 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

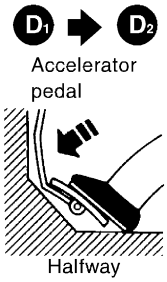
2	CHECK SHIFT UP (D_1 TO D_2)

Does A/T shift from D_1 to D_2 at the specified speed?

Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D_1 to D_2:

Refer to "Shift Schedule", AT-540.



SAT954I

Yes or No

Yes	▶	GO TO 3.
No	▶	Go to "9. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$", AT-239 [QG18DE (Calif. CA Model) and SR20DE], AT-398 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

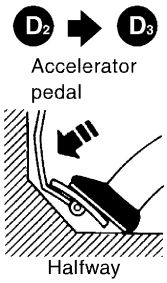
3	CHECK SHIFT UP (D_2 TO D_3)

Does A/T shift from D_2 to D_3 at the specified speed?

Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D_2 to D_3:

Refer to "Shift Schedule", AT-540.



SAT955I

Yes or No

Yes	▶	GO TO 4.
No	▶	Go to "10. A/T Does Not Shift: $D_2 \rightarrow D_3$", AT-242 [QG18DE (Calif. CA Model) and SR20DE], AT-401 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

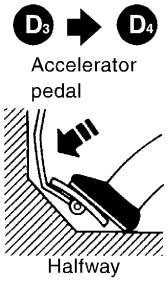
4	CHECK SHIFT UP (D_3 TO D_4)

Does A/T shift from D_3 to D_4 at the specified speed?

Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D_3 to D_4:

Refer to "Shift Schedule", AT-540.



SAT956I

Yes or No

Yes	▶	GO TO 5.
No	▶	Go to "11. A/T Does Not Shift: $D_3 \rightarrow D_4$", AT-245 [QG18DE (Calif. CA Model) and SR20DE], AT-404 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

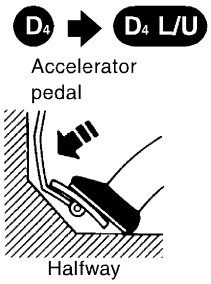
5	CHECK LOCK-UP (D_4 TO D_4 L/U)

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 Shift schedule, AT-540.



SAT957I

Yes or No

Yes	▶	GO TO 6.
No	▶	Go to "12. A/T Does Not Perform Lock-up", AT-248 [QG18DE (Calif. CA Model) and SR20DE], AT-407 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

6	CHECK HOLD LOCK-UP

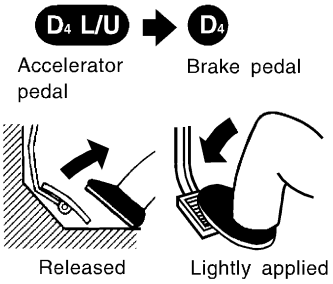
Does A/T hold lock-up condition for more than 30 seconds?

Yes or No

Yes	▶	GO TO 7.
No	▶	Go to "13. A/T Does Not Hold Lock-up Condition", AT-250 [QG18DE (Calif. CA Model) and SR20DE], AT-409 [QG18DE (Except Calif. CA Model)].

7	CHECK SHIFT DOWN (D_4 L/U TO D_4)

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



SAT958I

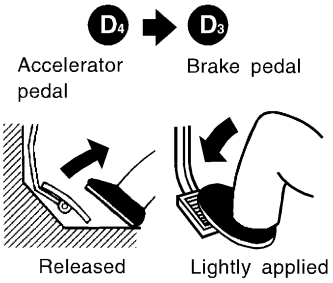
Yes or No

Yes	▶	GO TO 8.
No	▶	Go to "14. Lock-up Is Not Released", AT-252 [QG18DE (Calif. CA Model) and SR20DE], AT-411 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

8	CHECK SHIFT DOWN (D_4 TO D_3)

1. Decelerate vehicle by applying foot brake lightly.
2. Does engine speed return to idle smoothly when A/T is shifted from D_4 to D_3?

Read gear position and engine speed.



SAT959I

Yes or No

Yes	▶	1. Stop vehicle. 2. Go to "Cruise Test — Part 2", AT-87.
No	▶	Go to "15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)", AT-253 [QG18DE (Calif. CA Model) and SR20DE], AT-412 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

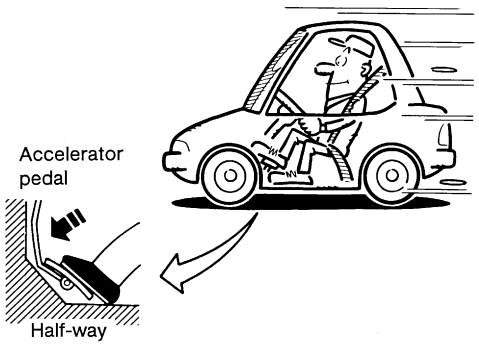
Cruise Test — Part 2

=NIAT0029S0405

1	CHECK STARTING GEAR (D_1) 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 D_1?

Ⓟ **Read gear position.**



SAT495G

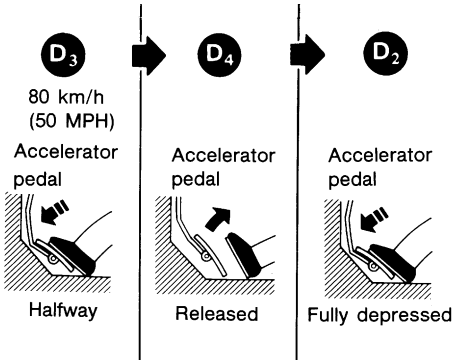
Yes or No

Yes	▶	GO TO 2.
No	▶	Go to "16. Vehicle Does Not Start From D_1", AT-255 [QG18DE (Calif. CA Model) and SR20DE], AT-414 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

2	CHECK SHIFT UP AND SHIFT DOWN (D_3 TO D_4 TO D_2)

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 D_4 to D_2 as soon as accelerator pedal is depressed fully?

Ⓟ **Read gear position and throttle position.**



SAT404H

Yes or No

Yes	▶	GO TO 3.
No	▶	Go to "9. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$", AT-239 [QG18DE (Calif. CA Model) and SR20DE], AT-398 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

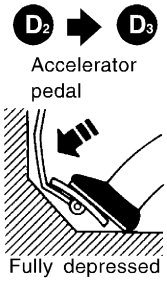
3	CHECK SHIFT UP (D_2 TO D_3)

Does A/T shift from D_2 to D_3 at the specified speed?

Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D_2 to D_3:

Refer to Shift schedule, AT-540.



SAT960I

Yes or No

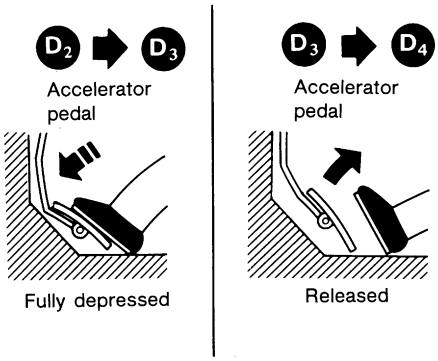
Yes	▶	GO TO 4.
No	▶	Go to "10. A/T Does Not Shift: $D_2 \rightarrow D_3$", AT-242 [QG18DE (Calif. CA Model) and SR20DE], AT-401 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

4	CHECK SHIFT UP (D_3 TO D_4) AND ENGINE BRAKE

Release accelerator pedal after shifting from D_2 to D_3.

Does A/T shift from D_3 to D_4 and does vehicle decelerate by engine brake?

Read gear position, throttle position and vehicle speed.



SAT405H

Yes or No

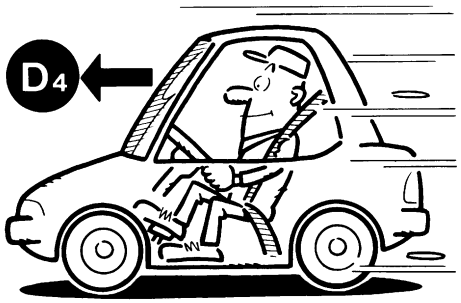
Yes	▶	1. Stop vehicle. 2. Go to "Cruise Test — Part 3", AT-89.
No	▶	Go to "11. A/T Does Not Shift: $D_3 \rightarrow D_4$", AT-245 [QG18DE (Calif. CA Model) and SR20DE], AT-404 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

Cruise Test — Part 3

=NIAT0029S0406

1	VEHICLE SPEED D_4 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 D_4.

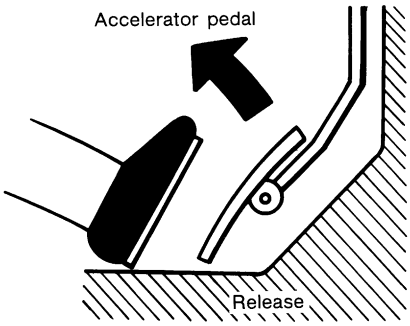


SAT812A

▶ GO TO 2.

2	CHECK SHIFT DOWN (D_4 TO D_3)

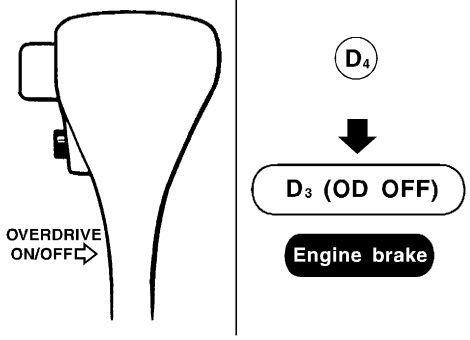
1. Release accelerator pedal.



SAT813A

2. Set overdrive control switch to "OFF" position while driving in D_4.
3. Does A/T shift from D_4 to D_3 (O/D OFF)?

Ⓗ **Read gear position and vehicle speed.**



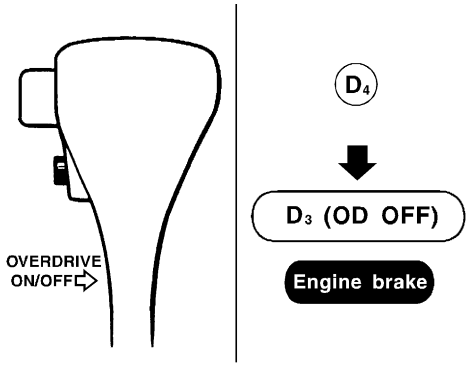
SAT999I

Yes or No

Yes	▶	GO TO 3.
No	▶	Go to "17. A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch "ON" → "OFF", AT-256 [QG18DE (Calif. CA Model) and SR20DE], AT-415 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

3	CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?



SAT999I

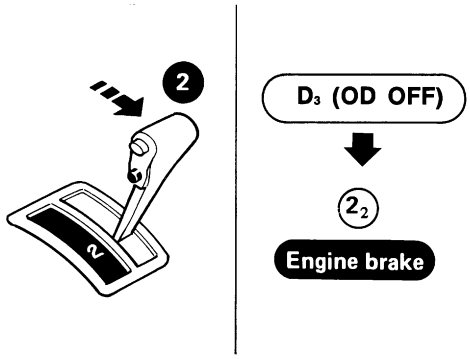
Yes or No

Yes	▶	GO TO 4.
No	▶	Go to "15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)", AT-253 [QG18DE (Calif. CA Model) and SR20DE], AT-412 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

4	CHECK SHIFT DOWN (D_3 TO D_2)

1. Move A/T selector lever from "D" to "2" position while driving in D_3 (O/D OFF).
2. Does A/T shift from D_3 (O/D OFF) to 2_2?

Read gear position.



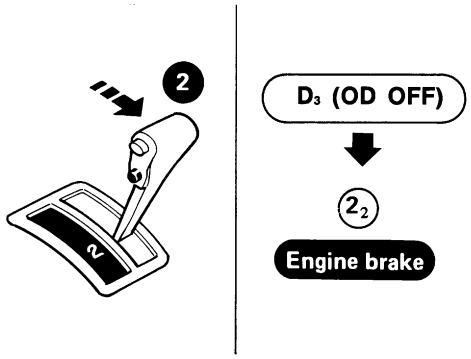
SAT791GA

Yes or No

Yes	▶	GO TO 5.
No	▶	Go to "18. A/T Does Not Shift: $D_3 \rightarrow D_2$, When A/T Selector Lever "D" → "2" Position", AT-257 [QG18DE (Calif. CA Model) and SR20DE], AT-416 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

5	CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?



SAT791GA

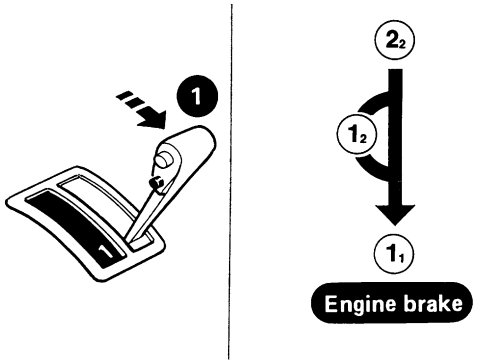
Yes or No

Yes	▶	GO TO 6.
No	▶	Go to "15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)", AT-253 [QG18DE (Calif. CA Model) and SR20DE], AT-412 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

6	CHECK SHIFT DOWN

1. Move A/T selector lever from "2" to "1" position while driving in 2_2.
2. Does A/T shift from 2_2 to 1_1 position?

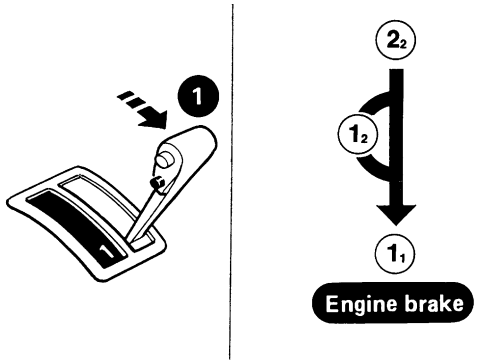
Read gear position.



SAT778B

Yes or No

Yes	▶	GO TO 7.
No	▶	Go to "19. A/T Does Not Shift: $2_2 \rightarrow 1_1$, When A/T Selector Lever "2" → "1" Position", AT-258 [QG18DE (Calif. CA Model) and SR20DE], AT-417 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

7	CHECK ENGINE BRAKE
Does vehicle decelerate by engine brake?  SAT778B	
Yes or No	
Yes ▶	1. Stop vehicle. 2. Perform self-diagnosis. Refer to "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
No ▶	Go to "20. Vehicle Does Not Decelerate By Engine Brake", AT-259 [QG18DE (Calif. CA Model) and SR20DE], AT-418 [QG18DE (Except Calif. CA Model)]. Continue ROAD TEST.

Symptom Chart

NIAT0030

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

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Engine cannot start in “P” and “N” positions. AT-224, [QG18DE (Calif. CA Model) & SR20DE] or AT-383, [QG18DE (Except Calif. CA Model)]	ON vehicle	1. Ignition switch and starter	***EL-9***, “POWER SUPPLY ROUTING” and ***SC-6***, “STARTING SYSTEM”		
		2. Control cable adjustment	AT-434		
		3. PNP switch adjustment	AT-434		
Engine starts in position other than “N” and “P” positions. AT-224, [QG18DE (Calif. CA Model) & SR20DE] or AT-383, [QG18DE (Except Calif. CA Model)]	ON vehicle	1. Control cable adjustment	AT-434		
		2. PNP switch adjustment	AT-434		
Transaxle noise in “P” and “N” positions.	ON vehicle	1. Fluid level	AT-68		
		2. Line pressure test	AT-72		
		3. Throttle position sensor (Adjustment)	***EC-875***, “DTC P0120 THROTTLE POSITION SENSOR”	***EC-1540***, “DTC P0120 THROTTLE POSITION SENSOR”	***EC-201***, “DTC P0120 THROTTLE POSITION SENSOR”
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, AT-210		AT-286, AT-369
		5. Engine speed signal	AT-131		AT-291
	OFF vehicle	6. Oil pump	AT-461		
		7. Torque converter	AT-444		
Vehicle moves when changing into “P” position, or parking gear does not disengage when shifted out of “P” position. AT-225, [QG18DE (Calif. CA Model) & SR20DE] or AT-384, [QG18DE (Except Calif. CA Model)]	ON vehicle	1. Control cable adjustment	AT-434		
	OFF vehicle	2. Parking components	AT-439		
Vehicle moves in “N” position. AT-226, [QG18DE (Calif. CA Model) & SR20DE] or AT-385, [QG18DE (Except Calif. CA Model)]	ON vehicle	1. Control cable adjustment	AT-434		
	OFF vehicle	2. Forward clutch	AT-490		
		3. Reverse clutch	AT-481		
		4. Overrun clutch	AT-490		

Symptom Chart (Cont'd)

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Vehicle will not run in "R" position (but runs in "D", "2" and "1" positions). Clutch slips. Very poor acceleration. AT-230, [QG18DE (Calif. CA Model) & SR20DE] or AT-389, [QG18DE (Except Calif. CA Model)]	ON vehicle	1. Control cable adjustment	AT-434		
		2. Line pressure test	AT-72		
		3. Line pressure solenoid valve	AT-178		AT-338
		4. Control valve assembly	AT-465		
	OFF vehicle	5. Reverse clutch	AT-481		
		6. High clutch	AT-485		
		7. Forward clutch	AT-490		
		8. Overrun clutch	AT-490		
		9. Low & reverse brake	AT-497		
Vehicle braked when shifting into "R" position.	ON vehicle	1. Fluid level	AT-68		
		2. Control cable adjustment	AT-434		
		3. Line pressure test	AT-72		
		4. Line pressure solenoid valve	AT-178		AT-338
		5. Control valve assembly	AT-465		
	OFF vehicle	6. High clutch	AT-485		
		7. Brake band	AT-510		
		8. Forward clutch	AT-490		
		9. Overrun clutch	AT-490		
Sharp shock in shifting from "N" to "D" position.	ON vehicle	1. Engine idling rpm	***EC-747***, "Idle Speed/ Ignition Timing/Idle Mixture Ratio Adjustment"	***EC-1411***, "Idle Speed/ Ignition Timing/Idle Mixture Ratio Adjustment"	***EC-71***, "Idle Speed/ Ignition Timing/Idle Mixture Ratio Adjustment"
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Line pressure test	AT-72		
		4. A/T fluid temperature sensor	AT-120		AT-280
		5. Engine speed signal	AT-131		AT-291
		6. Line pressure solenoid valve	AT-178		AT-338
		7. Control valve assembly	AT-465		
		8. Accumulator N-D	AT-465		
	OFF vehicle	9. Forward clutch	AT-490		
Vehicle will not run in "D" and "2" positions (but runs in "1" and "R" positions).	ON vehicle	1. Control cable adjustment	AT-434		
	OFF vehicle	2. Low one-way clutch	AT-439		

Symptom Chart (Cont'd)

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Vehicle will not run in "D", "1", "2" positions (but runs in "R" position). Clutch slips. Very poor acceleration. AT-233, [QG18DE (Calif. CA Model) & SR20DE] or AT-392, [QG18DE (Except Calif. CA Model)]	ON vehicle	1. Fluid level	AT-68		
		2. Line pressure test	AT-72		
		3. Line pressure solenoid valve	AT-178		AT-338
		4. Control valve assembly	AT-465		
		5. Accumulator N-D	AT-465		
	OFF vehicle	6. Reverse clutch	AT-481		
		7. High clutch	AT-485		
		8. Forward clutch	AT-490		
		9. Forward one-way clutch	AT-501		
		10. Low one-way clutch	AT-439		
Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-68		
		2. Control cable adjustment	AT-434		
		3. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		4. Line pressure test	AT-72		
		5. Line pressure solenoid valve	AT-178		AT-338
		6. Control valve assembly	AT-465		
		7. Accumulator N-D	AT-465		
	OFF vehicle	8. Forward clutch	AT-490		
		9. Reverse clutch	AT-481		
		10. Low & reverse brake	AT-497		
		11. Oil pump	AT-461		
		12. Torque converter	AT-444		
Excessive creep.	ON vehicle	1. Engine idling rpm	***EC-747***, "Idle Speed/ Ignition Timing/Idle Mixture Ratio Adjustment"	***EC-1411***, "Idle Speed/ Ignition Timing/Idle Mixture Ratio Adjustment"	***EC-71***, "Idle Speed/ Ignition Timing/Idle Mixture Ratio Adjustment"
No creep at all. AT-230, 233, [QG18DE (Calif. CA Model) and SR20DE] or AT-389, 392, [QG18DE (Except Calif. CA Model)]	ON vehicle	1. Fluid level	AT-68		
		2. Line pressure test	AT-434		
		3. Control valve assembly	AT-465		
	OFF vehicle	4. Forward clutch	AT-490		
		5. Oil pump	AT-461		
		6. Torque converter	AT-444		

Symptom Chart (Cont'd)

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Failure to change gear from "D_1" to "D_2".	ON vehicle	1. PNP switch adjustment	AT-434		
		2. Control cable adjustment	AT-434		
		3. Shift solenoid valve A	AT-183		AT-343
		4. Control valve assembly	AT-465		
		5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, AT-210		AT-286, AT-369
	OFF vehicle	6. Brake band	AT-510		
Failure to change gear from "D_2" to "D_3".	ON vehicle	1. PNP switch adjustment	AT-434		
		2. Control cable adjustment	AT-434		
		3. Shift solenoid valve B	AT-187		AT-347
		4. Control valve assembly	AT-465		
		5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, AT-210		AT-286, AT-369
	OFF vehicle	6. High clutch	AT-485		
		7. Brake band	AT-510		
Failure to change gear from "D_3" to "D_4".	ON vehicle	1. PNP switch adjustment	AT-434		
		2. Control cable adjustment	AT-434		
		3. Shift solenoid valve A	AT-183		AT-343
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, AT-210		AT-286, AT-369
		5. A/T fluid temperature sensor	AT-120		AT-280
	OFF vehicle	6. Brake band	AT-510		
Too high a gear change point from "D_1" to "D_2", from "D_2" to "D_3", from "D_3" to "D_4". AT-239, AT-242, AT-245, [QG18DE (Calif. CA Model) & SR20DE] or AT-398, AT-401, AT-404, [QG18DE (Except Calif. CA Model)]	ON vehicle	1. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, AT-210		AT-286, AT-369
		3. Shift solenoid valve A	AT-183		AT-343
		4. Shift solenoid valve B	AT-187		AT-347
Gear change directly from "D_1" to "D_3" occurs.	ON vehicle	1. Fluid level	AT-68		
		2. Accumulator servo release	AT-465		
	OFF vehicle	3. Brake band	AT-510		

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Engine stops when shifting lever into "R", "D", "2" and "1".	ON vehicle	1. Engine idling rpm	***EC-747***, "Idle Speed/ Ignition Timing/Idle Mixture Ratio Adjustment"	***EC-1411***, "Idle Speed/ Ignition Timing/Idle Mixture Ratio Adjustment"	***EC-71***, "Idle Speed/ Ignition Timing/Idle Mixture Ratio Adjustment"
		2. Torque converter clutch solenoid valve	AT-444		
		3. Control valve assembly	AT-465		
	OFF vehicle	4. Torque converter	AT-444		
Too sharp a shock in change from "D_1" to "D_2".	ON vehicle	1. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		2. Line pressure test	AT-72		
		3. Accumulator servo release	AT-465		
		4. Control valve assembly	AT-465		
		5. A/T fluid temperature sensor	AT-120		AT-280
	OFF vehicle	6. Brake band	AT-510		
Too sharp a shock in change from "D_2" to "D_3".	ON vehicle	1. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		2. Line pressure test	AT-72		
		3. Control valve assembly	AT-465		
	OFF vehicle	4. High clutch	AT-485		
		5. Brake band	AT-510		
Too sharp a shock in change from "D_3" to "D_4".	ON vehicle	1. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		2. Line pressure test	AT-72		
		3. Control valve assembly	AT-465		
	OFF vehicle	4. Brake band	AT-510		
		5. Overrun clutch	AT-501		

Symptom Chart (Cont'd)

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Almost no shock or clutches slipping in change from "D_1" to "D_2".	ON vehicle	1. Fluid level	AT-68		
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Line pressure test	AT-72		
		4. Accumulator servo release	AT-465		
		5. Control valve assembly	AT-465		
	OFF vehicle	6. Brake band	AT-510		
Almost no shock or slipping in change from "D_2" to "D_3".	ON vehicle	1. Fluid level	AT-68		
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Line pressure test	AT-72		
		4. Control valve assembly	AT-465		
	OFF vehicle	5. High clutch	AT-485		
		6. Brake band	AT-510		
Almost no shock or slipping in change from "D_3" to "D_4".	ON vehicle	1. Fluid level	AT-68		
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Line pressure test	AT-72		
		4. Control valve assembly	AT-465		
	OFF vehicle	5. High clutch	AT-485		
		6. Brake band	AT-510		
Vehicle braked by gear change from "D_1" to "D_2".	ON vehicle	1. Fluid level	AT-68		
	OFF vehicle	2. Reverse clutch	AT-481		
		3. Low & reverse brake	AT-497		
		4. High clutch	AT-485		
		5. Low one-way clutch	AT-439		
Vehicle braked by gear change from "D_2" to "D_3".	ON vehicle	1. Fluid level	AT-68		
	OFF vehicle	2. Brake band	AT-510		

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Vehicle braked by gear change from "D_3" to "D_4".	ON vehicle	1. Fluid level	AT-68		
	OFF vehicle	2. Overrun clutch	AT-490		
		3. Forward one-way clutch	AT-501		
		4. Reverse clutch	AT-481		
Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-68		
		2. PNP switch adjustment	AT-434		
		3. Shift solenoid valve A	AT-183		AT-343
		4. Shift solenoid valve B	AT-187		AT-347
		5. Control valve assembly	AT-465		
	OFF vehicle	6. Reverse clutch	AT-481		
		7. High clutch	AT-485		
		8. Brake band	AT-510		
		9. Low & reverse brake	AT-497		
		10. Oil pump	AT-461		
		11. Torque converter	AT-444		
Failure to change gear from "D_4" to "D_3".	ON vehicle	1. Fluid level	AT-68		
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Overrun clutch solenoid valve	AT-199		AT-359
		4. Shift solenoid valve A	AT-183		AT-343
		5. Line pressure solenoid valve	AT-178		AT-338
		6. Control valve assembly	AT-465		
	OFF vehicle	7. Low & reverse brake	AT-497		
		8. Overrun clutch	AT-490		
Failure to change gear from "D_3" to "D_2" or from "D_4" to "D_2".	ON vehicle	1. Fluid level	AT-68		
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Shift solenoid valve A	AT-183		AT-343
		4. Shift solenoid valve B	AT-187		AT-347
		5. Control valve assembly	AT-465		
	OFF vehicle	6. High clutch	AT-485		
		7. Brake band	AT-510		

Symptom Chart (Cont'd)

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Failure to change gear from "D_2" to "D_1" or from "D_3" to "D_1".	ON vehicle	1. Fluid level	AT-68		
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Shift solenoid valve A	AT-183		AT-343
		4. Shift solenoid valve B	AT-187		AT-347
		5. Control valve assembly	AT-465		
	OFF vehicle	6. Low one-way clutch	AT-439		
		7. High clutch	AT-485		
		8. Brake band	AT-510		
Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		2. Line pressure test	AT-72		
		3. Overrun clutch solenoid valve	AT-199		AT-359
		4. Control valve assembly	AT-465		
Too high a change point from "D_4" to "D_3", from "D_3" to "D_2", from "D_2" to "D_1".	ON vehicle	1. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, AT-210		AT-286, AT-369
Kickdown does not operate when depressing pedal in "D_4" within kickdown vehicle speed.	ON vehicle	1. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		2. Revolution sensor and vehicle speed sensor	AT-126, AT-210		AT-286, AT-369
		3. Shift solenoid valve A	AT-183		AT-343
		4. Shift solenoid valve B	AT-187		AT-347

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Kickdown operates or engine overruns when depressing pedal in "D_4" beyond kickdown vehicle speed limit.	ON vehicle	1. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, AT-210		AT-286, AT-369
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Shift solenoid valve A	AT-183		AT-343
		4. Shift solenoid valve B	AT-187		AT-347
Races extremely fast or slips in changing from "D_4" to "D_3" when depressing pedal.	ON vehicle	1. Fluid level	AT-68		
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Line pressure test	AT-72		
		4. Line pressure solenoid valve	AT-178		AT-338
		5. Control valve assembly	AT-465		
	OFF vehicle	6. High clutch	AT-485		
		7. Forward clutch	AT-490		
Races extremely fast or slips in changing from "D_4" to "D_2" when depressing pedal.	ON vehicle	1. Fluid level	AT-68		
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Line pressure test	AT-72		
		4. Line pressure solenoid valve	AT-178		AT-338
		5. Shift solenoid valve A	AT-183		AT-343
		6. Control valve assembly	AT-465		
	OFF vehicle	7. Brake band	AT-510		
		8. Forward clutch	AT-490		

Symptom Chart (Cont'd)

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Races extremely fast or slips in changing from "D_3" to "D_2" when depressing pedal.	ON vehicle	1. Fluid level	AT-68		
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Line pressure test	AT-72		
		4. Line pressure solenoid valve	AT-178		AT-338
		5. Control valve assembly	AT-465		
		6. A/T fluid temperature sensor	AT-120		AT-280
	OFF vehicle	7. Brake band	AT-510		
		8. Forward clutch	AT-490		
		9. High clutch	AT-485		
Races extremely fast or slips in changing from "D_4" or "D_3" to "D_1" when depressing pedal.	ON vehicle	1. Fluid level	AT-68		
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Line pressure test	AT-72		
		4. Line pressure solenoid valve	AT-178		AT-338
		5. Control valve assembly	AT-465		
	OFF vehicle	6. Forward clutch	AT-490		
		7. Forward one-way clutch	AT-501		
		8. Low one-way clutch	AT-439		
Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-68		
		2. Control cable adjustment	AT-434		
		3. Line pressure test	AT-72		
		4. Line pressure solenoid valve	AT-178		AT-338
	OFF vehicle	5. Oil pump	AT-461		
		6. High clutch	AT-485		
		7. Brake band	AT-510		
		8. Low & reverse brake	AT-497		
		9. Torque converter	AT-444		
		10. Parking components	AT-439		
Transmission noise in "D", "2", "1" and "R" positions.	ON vehicle	1. Fluid level	AT-68		
	OFF vehicle	2. Torque converter	AT-444		

Symptom Chart (Cont'd)

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Failure to change from "D_3" to "2_2" when changing lever into "2" position. AT-257, [QG18DE (Calif. CA Model) & SR20DE] or AT-416, [QG18DE (Except Calif. CA Model)]	ON vehicle	1. PNP switch adjustment	AT-434		
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Overrun clutch solenoid valve	AT-199		AT-359
		4. Shift solenoid valve B	AT-187		AT-347
		5. Shift solenoid valve A	AT-183		AT-343
		6. Control valve assembly	AT-465		
		7. Control cable adjustment	AT-434		
	OFF vehicle	8. Brake band	AT-510		
		9. Overrun clutch	AT-490		
Gear change from "2_2" to "2_3" in "2" position.	ON vehicle	1. PNP switch adjustment	AT-434		
Engine brake does not operate in "1" position. AT-258, [QG18DE (Calif. CA Model) & SR20DE] or AT-417, [QG18DE (Except Calif. CA Model)]	ON vehicle	1. PNP switch adjustment	AT-434		
		2. Control cable adjustment	AT-434		
		3. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, AT-210		AT-286, AT-369
		5. Shift solenoid valve A	AT-183		AT-343
		6. Control valve assembly	AT-465		
		7. Overrun clutch solenoid valve	AT-199		AT-359
	OFF vehicle	8. Overrun clutch	AT-501		
		9. Low & reverse brake	AT-497		
Gear change from "1_1" to "1_2" in "1" position.	ON vehicle	1. PNP switch adjustment	AT-434		
		2. Control cable adjustment	AT-434		

Symptom Chart (Cont'd)

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Does not change from "1_2" to "1_1" in "1" position.	ON vehicle	1. PNP switch adjustment	AT-434		
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, AT-210		AT-286, AT-369
		3. Shift solenoid valve A	AT-183		AT-343
		4. Control valve assembly	AT-465		
		5. Overrun clutch solenoid valve	AT-199		AT-359
	OFF vehicle	6. Overrun clutch	AT-490		
		7. Low & reverse brake	AT-497		
Large shock changing from "1_2" to "1_1" in "1" position.	ON vehicle	1. Control valve assembly	AT-465		
	OFF vehicle	2. Low & reverse brake	AT-497		
Transmission overheats.	ON vehicle	1. Fluid level	AT-68		
		2. Engine idling rpm	***EC-747***, "Idle speed/ ignition timing/idle mixture ratio adjustment"	***EC-1411***, "Idle speed/ ignition timing/idle mixture ratio adjustment"	***EC-71***, "Idle speed/ ignition timing/idle mixture ratio adjustment"
		3. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		4. Line pressure test	AT-72		
		5. Line pressure solenoid valve	AT-178		AT-338
		6. Control valve assembly	AT-465		
	OFF vehicle	7. Oil pump	AT-461		
		8. Reverse clutch	AT-481		
		9. High clutch	AT-485		
		10. Brake band	AT-510		
		11. Forward clutch	AT-490		
		12. Overrun clutch	AT-490		
		13. Low & reverse brake	AT-497		
		14. Torque converter	AT-444		

Symptom Chart (Cont'd)

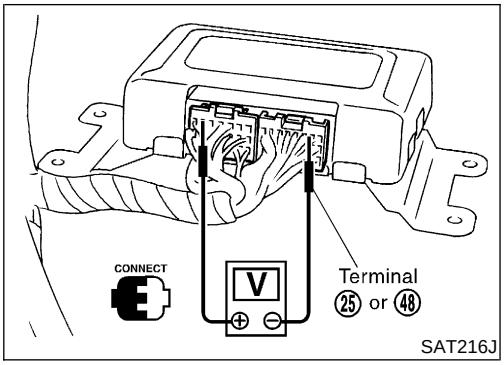
Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-68		
	OFF vehicle	2. Reverse clutch	AT-481		
		3. High clutch	AT-485		
		4. Brake band	AT-510		
		5. Forward clutch	AT-490		
		6. Overrun clutch	AT-490		
		7. Low & reverse brake	AT-497		
Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-68		
	OFF vehicle	2. Torque converter	AT-444		
		3. Oil pump	AT-461		
		4. Reverse clutch	AT-481		
		5. High clutch	AT-485		
		6. Brake band	AT-510		
		7. Forward clutch	AT-490		
		8. Overrun clutch	AT-490		
		9. Low & reverse brake	AT-497		
Torque converter is not locked up.	ON vehicle	1. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, AT-210		AT-286, AT-369
		3. PNP switch adjustment	AT-434		
		4. Engine speed signal	AT-131		AT-291
		5. A/T fluid temperature sensor	AT-120		AT-280
		6. Line pressure test	AT-72		
		7. Torque converter clutch solenoid valve	AT-163		AT-323
		8. Control valve assembly	AT-465		
	OFF vehicle	9. Torque converter	AT-444		

Symptom Chart (Cont'd)

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-68		
		2. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		3. Line pressure test	AT-72		
		4. Torque converter clutch solenoid valve	AT-163		AT-323
		5. Line pressure solenoid valve	AT-178		AT-338
		6. Control valve assembly	AT-465		
	OFF vehicle	7. Torque converter	AT-444		
Lock-up point is extremely high or low. AT-248, [QG18DE (Calif. CA Model) & SR20DE] or AT-407, [QG18DE (Except Calif. CA Model)]	ON vehicle	1. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, AT-210		AT-286, AT-369
		3. Torque converter clutch solenoid valve	AT-163		AT-323
		4. Control valve assembly	AT-465		
A/T does not shift to "D_4" when driving with overdrive control switch "ON".	ON vehicle	1. Throttle position sensor (Adjustment)	***EC-875***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-1540***, "DTC P0120 THROTTLE POSITION SENSOR"	***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR"
		2. PNP switch adjustment	AT-434		
		3. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-126, AT-210		AT-286, AT-369
		4. Shift solenoid valve A	AT-183		AT-343
		5. Overrun clutch solenoid valve	AT-199		AT-359
		6. Control valve assembly	AT-465		
		7. A/T fluid temperature sensor	AT-120		AT-280
		8. Line pressure test	AT-72		
	OFF vehicle	9. Brake band	AT-510		
		10. Overrun clutch	AT-490		

Symptom Chart (Cont'd)

Symptom	Condition	Diagnostic Item	Reference Page		
			QG18DE (Calif. CA Model)	SR20DE	QG18DE (Except Calif. CA Model)
Engine is stopped at "R", "D", "2" and "1" positions.	ON vehicle	1. Fluid level	AT-68		
		2. Torque converter clutch solenoid valve	AT-163		AT-323
		3. Shift solenoid valve B	AT-187		AT-347
		4. Shift solenoid valve A	AT-183		AT-343
		5. Control valve assembly	AT-465		



TCM Terminals and Reference Value

NIAT0033

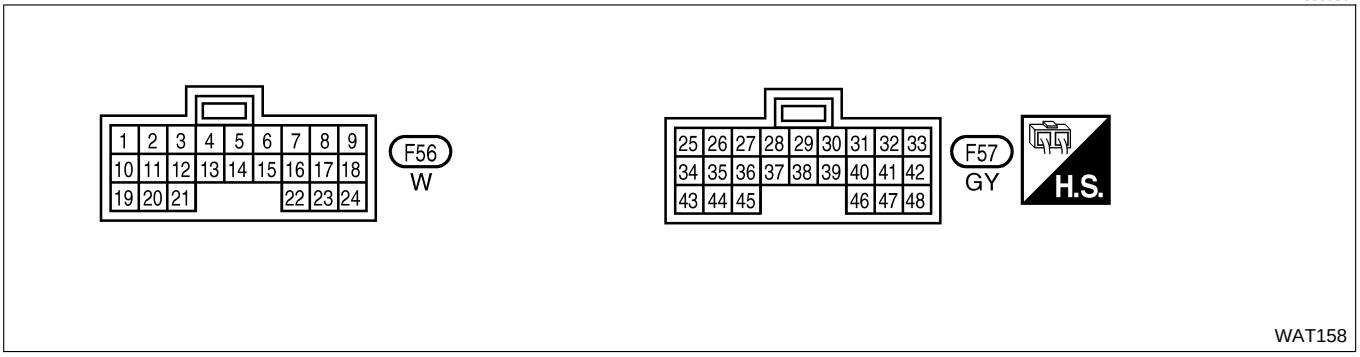
PREPARATION — QG18DE (CALIF. CA MODEL) & SR20DE

NIAT0033S01

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

TCM HARNESS CONNECTOR TERMINAL LAYOUT

NIAT0033S02



TCM INSPECTION TABLE

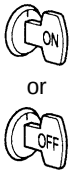
(Data are reference values.)

NIAT0033S03

Terminal No.	Wire color	Item	Condition		Judgement standard
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.	0.5V or less
2	P/B	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	5 - 14V
				When depressing accelerator pedal fully after warming up engine.	0.5V or less
3	GY/R	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	1V or less
5 *2	Y/R	—		—	—
6 *2	Y/G	—		—	—
7 *2	Y/B	—		—	—
8*2	BR/W	—		—	—
9*2	G/Y	—		—	—
10	BR/R	Power source		When turning ignition switch to “ON”.	Battery voltage
				When turning ignition switch to “OFF”.	1V or less

Terminal No.	Wire color	Item	Condition		Judgement standard
11	L/W	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in "D_1" or "D_4".)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in "D_2" or "D_3".)	1V or less
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in "D_1" or "D_2".)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in "D_3" or "D_4".)	1V or less
13	G/R	O/D OFF indicator lamp		When setting overdrive control switch in "OFF" position.	1V or less
				When setting overdrive control switch in "ON" position.	Battery voltage
15 *2	PU	—		—	—
16	Y/PU	Closed throttle position switch (in throttle position switch)		When releasing accelerator pedal after warming up engine. Refer to "TCM/PCM SELF-DIAGNOSTIC PROCEDURE (No tools)", AT-52.	Battery voltage
				When depressing accelerator pedal after warming up engine. Refer to "TCM/PCM SELF-DIAGNOSTIC PROCEDURE (No tools)", AT-52.	1V or less
17	LG	Wide open throttle position switch (in throttle position switch)		When depressing accelerator pedal more than half-way after warming up engine.	Battery voltage
				When releasing accelerator pedal after warming up engine.	1V or less
18	OR	ASCD cruise switch		When ASCD cruise is being performed. ("CRUISE" light comes on.)	Battery voltage
				When ASCD cruise is not being performed. ("CRUISE" light does not comes on.)	1V or less
19	BR/R	Power source		When turning ignition switch to "ON".	Battery voltage
				When turning ignition switch to "OFF".	1V or less
20	L/B	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	1V or less
22	OR/B	Overdrive control switch		When setting overdrive control switch in "ON" position	Battery voltage
				When setting overdrive control switch in "OFF" position	1V or less

TCM Terminals and Reference Value (Cont'd)

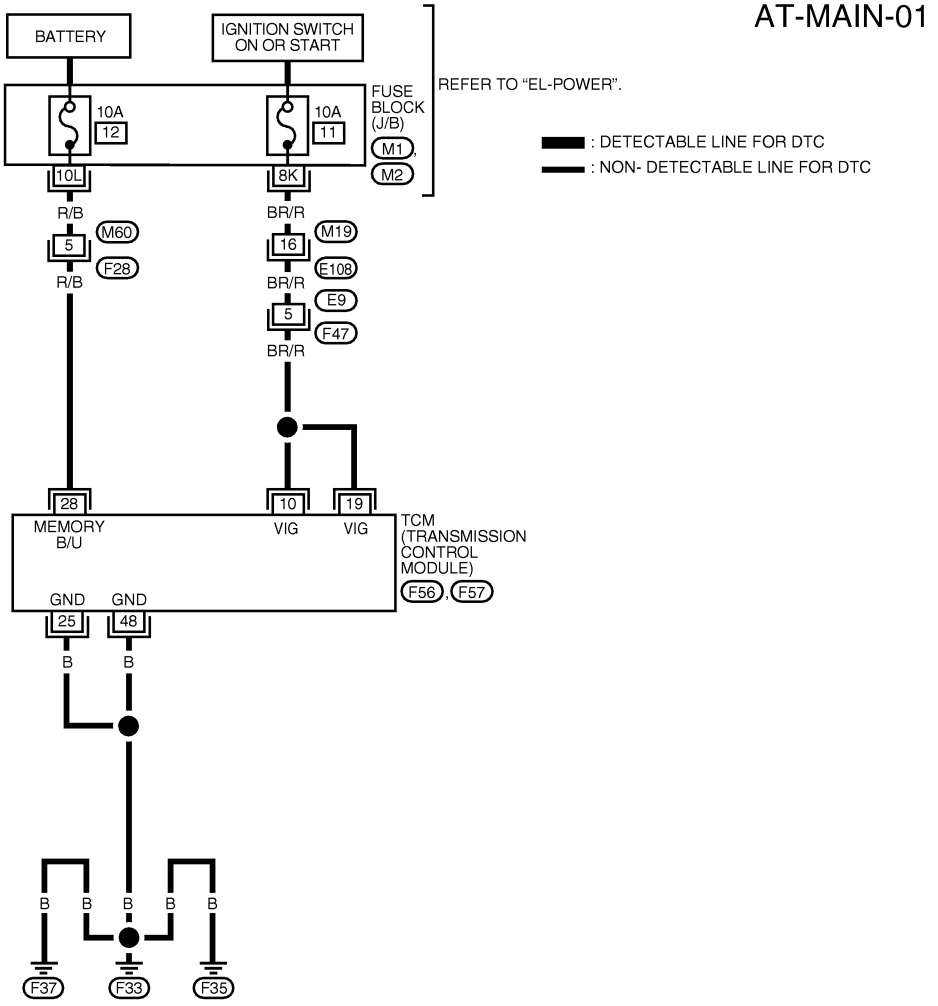
Terminal No.	Wire color	Item	Condition		Judgement standard
24	W/PU	ASCD OD cut signal		When "ACCEL" set switch on ASCD cruise is in "D_4" position.	5 - 10V
				When "ACCEL" set switch on ASCD cruise is in "D_3" position.	Less than 2V
25	B	Ground		—	1V or less
26	BR/Y	PNP switch "1" position		When setting selector lever to "1" position.	Battery voltage
				When setting selector lever to other positions.	1V or less
27	L	PNP switch "2" position		When setting selector lever to "2" position.	Battery voltage
				When setting selector lever to other positions.	1V or less
28	R/B	Power source (Memory back-up)		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
30 *3	G/B	—		—	—
31 *3	GY/L	—		—	—
32	R	Throttle position sensor (Power source)		When turning ignition switch to "ON".	4.5 - 5.5V
				When turning ignition switch to "OFF".	1V or less
34	W/G	PNP switch "D" position		When setting selector lever to "D" position.	Battery voltage
				When setting selector lever to other positions.	1V or less
35	G/W	PNP switch "R" position		When setting selector lever to "R" position.	Battery voltage
				When setting selector lever to other positions.	1V or less
36	G	PNP switch "N" or "P" position		When setting selector lever to "N" or "P" position.	Battery voltage
				When setting selector lever to other positions.	1V or less

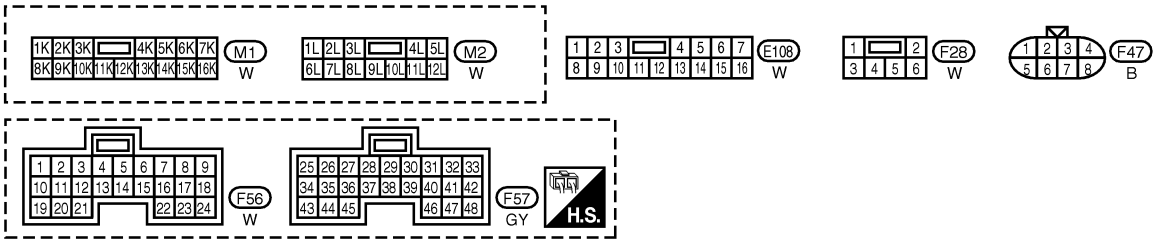
Terminal No.	Wire color	Item	Condition		Judgement standard
39	L/OR	Engine speed signal		Refer to ***EC-829*** [QG18DE (Calif. CA Model)], ***EC-1496*** (SR20DE), "ECM Inspection Table".	—
40	PU/R	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 1V and more than 4.5V
41	GY	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: Approximately 0.5 - 0.7V Fully-open throttle: Approximately 4V
42	B	Throttle position sensor (Ground)		—	1V or less
45	R/G	Stop lamp switch		When depressing brake pedal.	Battery voltage
				When releasing brake pedal.	1V or less
47	BR	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	Approximately 1.5V
				When ATF temperature is 80°C (176°F).	Approximately 0.5V
48	B	Ground		—	1V or less

*2: This terminal is connected to the ECM.
*3: These terminals are connected to the Data link connector.

Wiring Diagram — AT — MAIN

NIAT0034





WAT113

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN 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"	1V OR LESS
19	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH TO "OFF"	1V OR LESS
25	B	GROUND	—	1V OR LESS
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	—	1V OR LESS

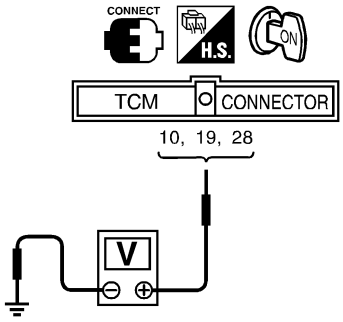
LAT254

Diagnostic Procedure

NIAT0330

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.



Voltage:
Battery voltage

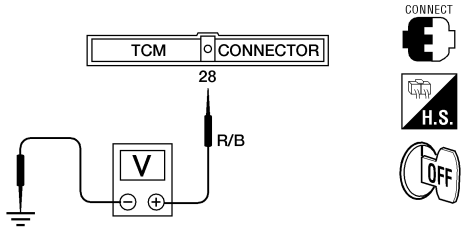
SAT611J

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.



Voltage:
Battery voltage

LAT253

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 ***EL-9***, “POWER SUPPLY ROUTING”.

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.

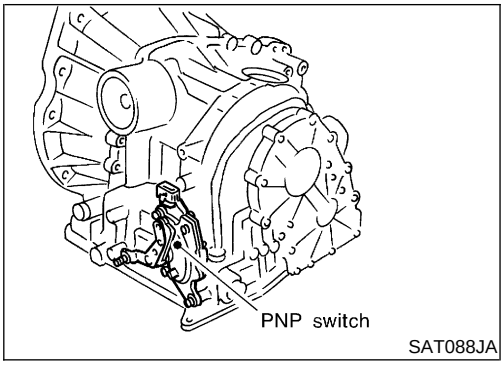
Diagnostic Procedure (Cont'd)

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 wiring diagram, AT-112.
   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.



SAT088JA

Description

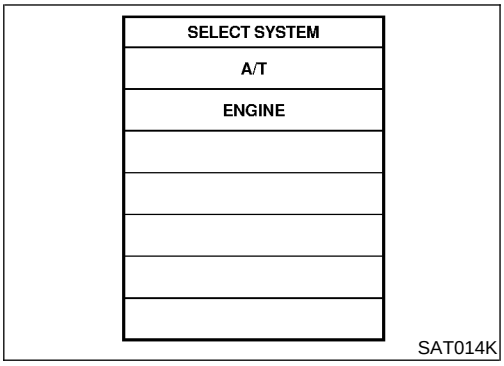
NIAT0035

- 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.

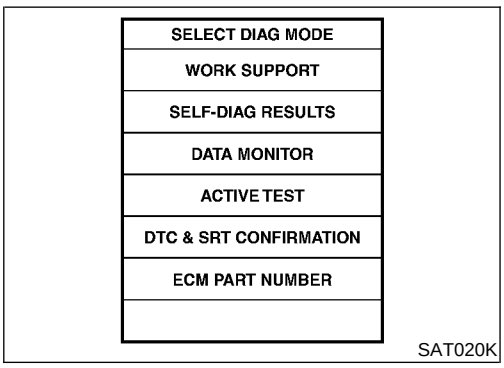
ON BOARD DIAGNOSIS LOGIC

NIAT0035S02

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



SAT014K



SAT020K

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0035S03

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

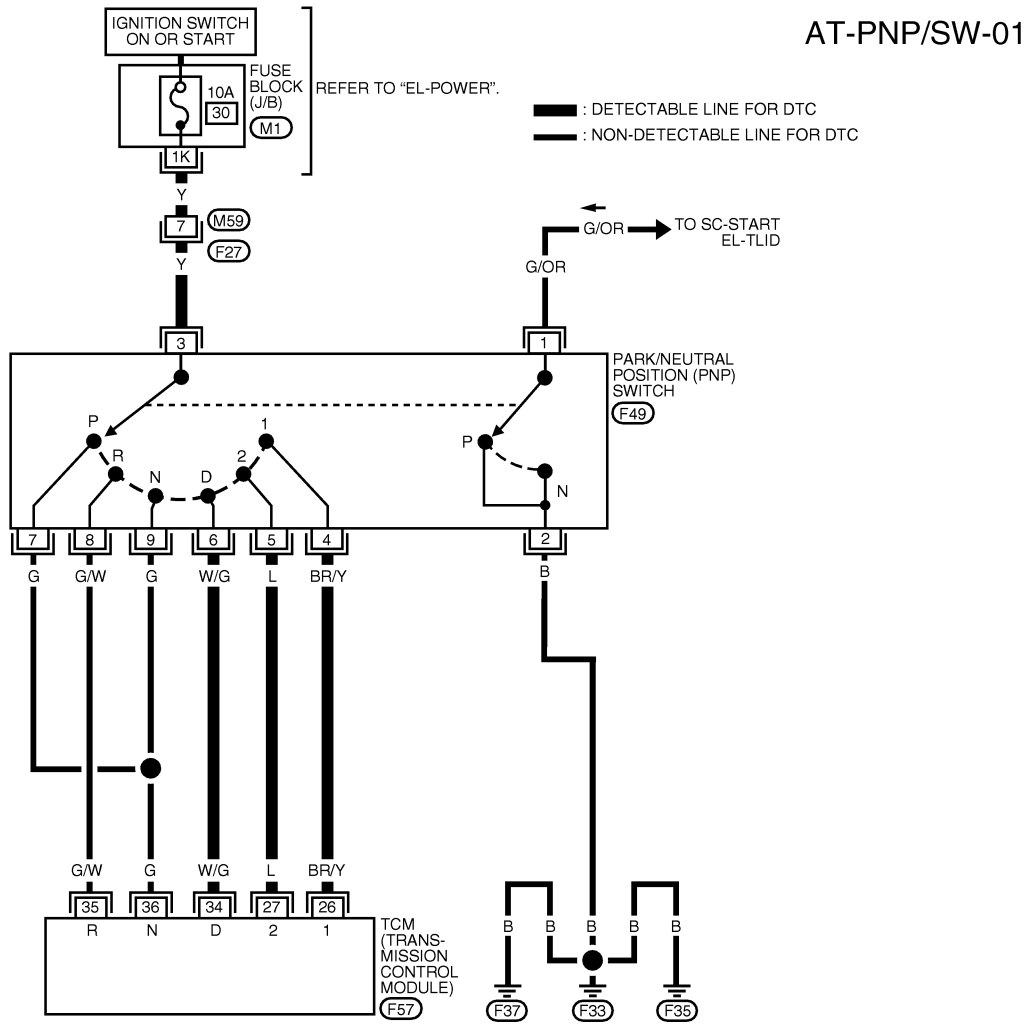
1) Turn ignition switch "ON".
2) Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
3) Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   THRTL POS SEN: More than 1.3V
   Selector lever: D position (OD "ON" or "OFF")

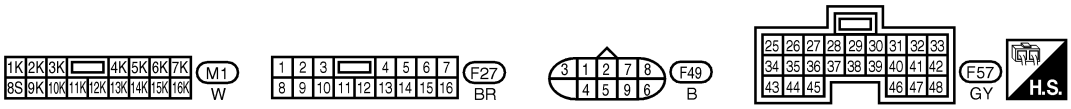
With GST

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — PNP/SW

NIAT0036





WAT114

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
26	BR/Y	PNP SWITCH "1" POSITION	WHEN SETTING SELECTOR LEVER TO "1" POSITON	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
27	L	PNP SWITCH "2" POSITION	WHEN SETTING SELECTOR LEVER TO "2" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
34	W/G	PNP SWITCH "D" POSITION	WHEN SETTING SELECTOR LEVER TO "D" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
35	G/W	PNP SWITCH "R" POSITION	WHEN SETTING SELECTOR LEVER TO "R" POSTION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
36	G	PNP SWITCH "N" OR "P" POSITION	WHEN SETTING SELECTOR LEVER TO "N" OR "P" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS

LAT255

Diagnostic Procedure

NIAT0037

1	CHECK PNP SWITCH CIRCUIT (With CONSULT-II)

With CONSULT-II

1. Turn ignition switch to “ON” position.
   (Do not start engine.)
2. Select “ECU 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 the signal of the selector lever position is indicated properly.

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

SAT701J

OK or NG

OK	▶	GO TO 3.
NG	▶	**Check the following items:** ● PNP switch Refer to “Component Inspection”, AT-119. ● 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 ***EL-9***, “POWER SUPPLY ROUTING”. ● Diode (P, N positions)

Diagnostic Procedure (Cont'd)

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.

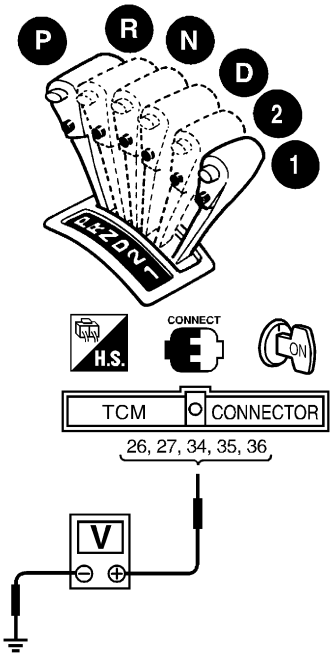
Voltage:

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**

MTBL0136

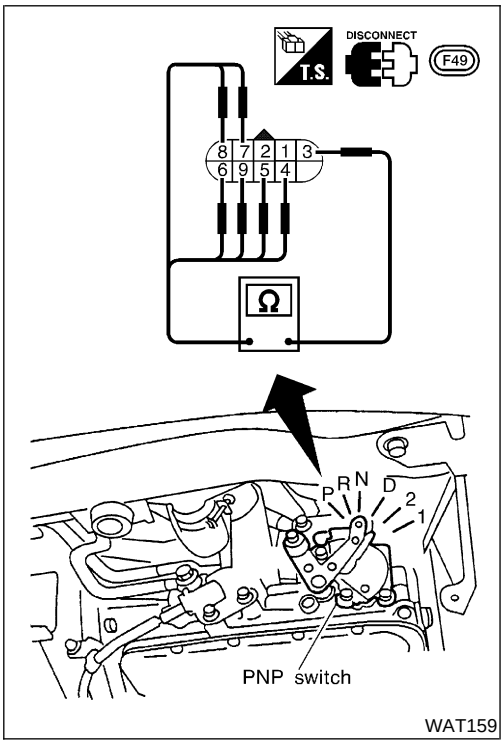


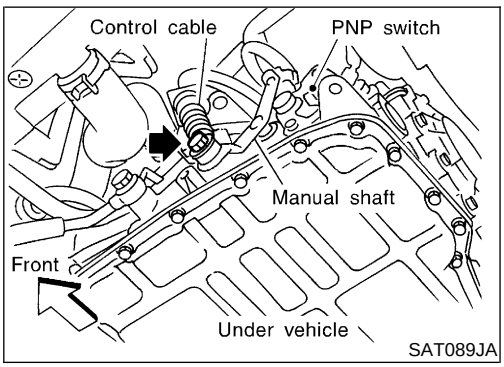
SAT425J

OK or NG

OK	▶	GO TO 3.
NG	▶	**Check the following items:** ● PNP switch Refer to "Component Inspection", AT-119. ● 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 ***EL-9***, "POWER SUPPLY ROUTING". ● Diode (P, N positions)

3	CHECK DTC	
Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-115.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.





Component Inspection

PARK/NEUTRAL POSITION SWITCH

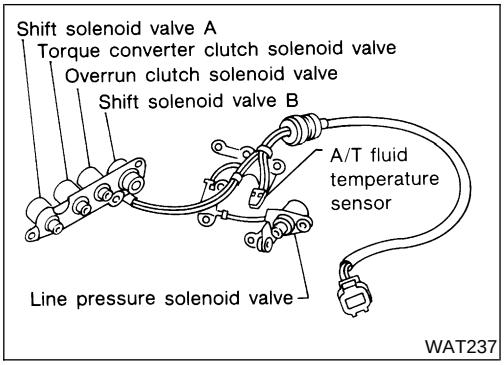
NIAT0038

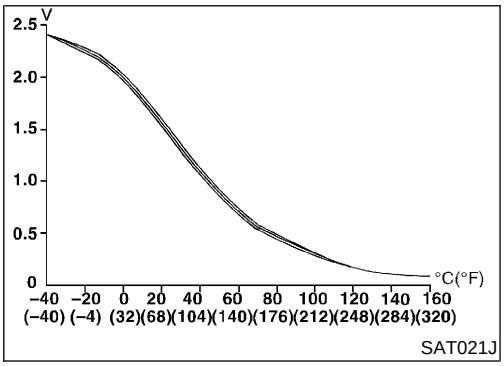
NIAT0038S01

1. Check continuity between terminals 1 and 3 and between terminals 2 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-434.
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-434.
6. If NG on step 4, replace PNP switch.





Description

NIAT0039

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

NIAT0039S01

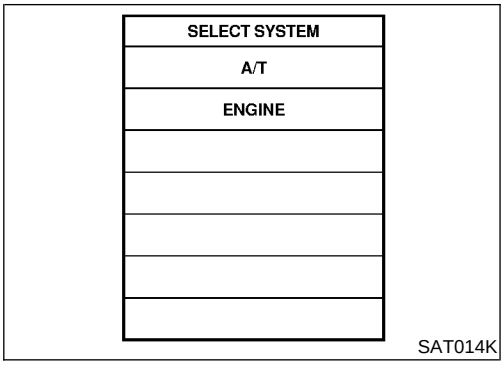
Remarks: Specification data are reference values.

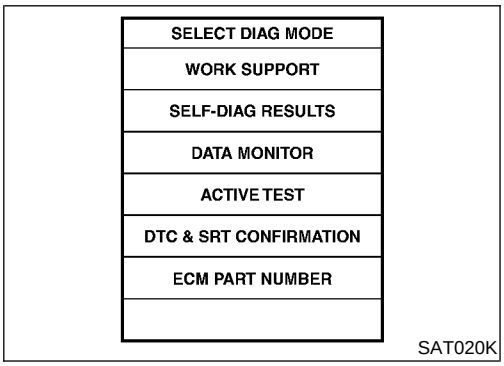
Monitor item	Condition	Specification
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	Approximately 1.5V ↓ Approximately 0.5V

ON BOARD DIAGNOSIS LOGIC

NIAT0039S03

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





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0039S04

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 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")

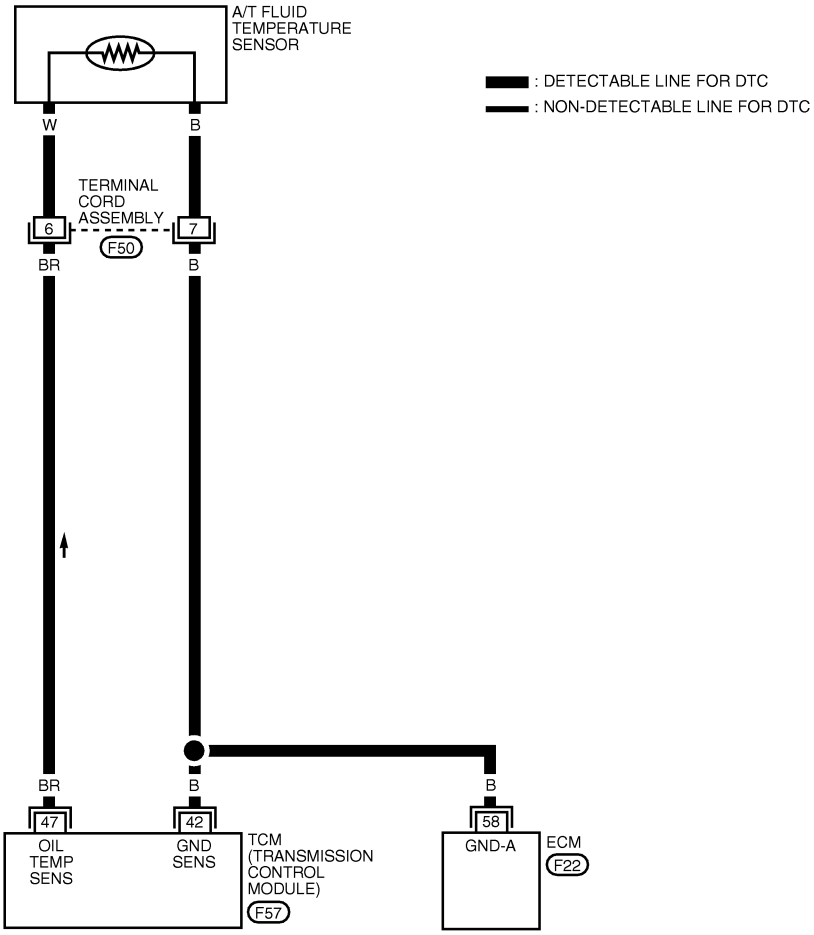
With GST

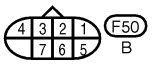
Follow the procedure "With CONSULT-II".

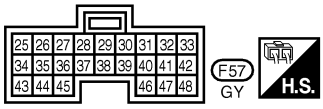
Wiring Diagram — AT — FTS

NIAT0040

AT-FTS-01







REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT115

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
42	B	THROTTLE POSITON SENSOR (GROUND)	—	1V OR LESS
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

LAT256

Diagnostic Procedure

NIAT0041

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 “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “FLUID TEMP SE”.

Voltage:

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

Approximately 1.5V → 0.5V

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 4.
NG ▶	GO TO 5.

Diagnostic Procedure (Cont'd)

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

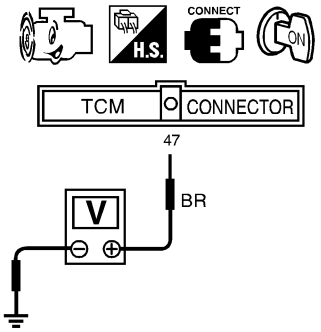
Without CONSULT-II

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

Voltage:

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

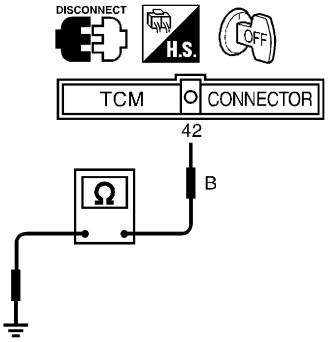
Approximately 1.5V → 0.5V



SAT937J

3. Turn ignition switch to "OFF" position.
4. Disconnect TCM harness connector.
5. Check continuity between terminal 42 and ground.

Continuity should exist.



SAT421J

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

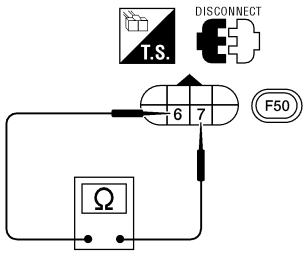
Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-121.

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.



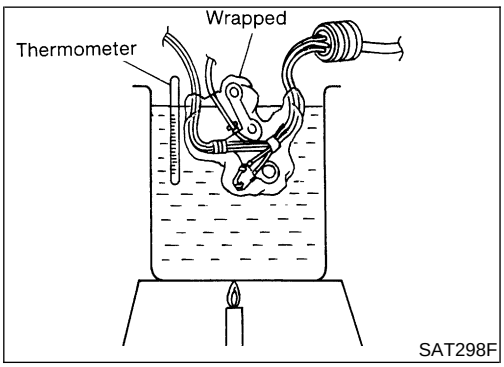
Resistance:
Cold [20°C (68°F)
Approximately 2.5 kΩ

LAT160

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 "Component Inspection", AT-125. ● Harness of terminal cord assembly for short or open



Component Inspection

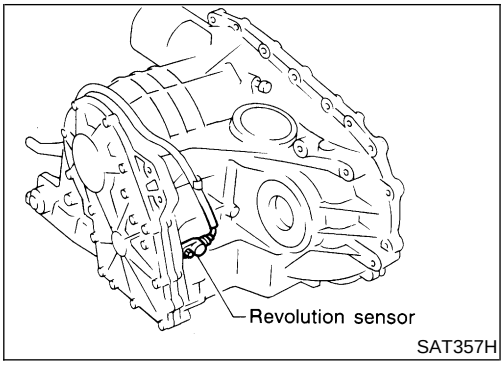
NIAT0042

A/T FLUID TEMPERATURE SENSOR

NIAT0042S01

- For removal, refer to AT-433.
- Check resistance between two terminals while changing temperature as shown at left.

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



Description

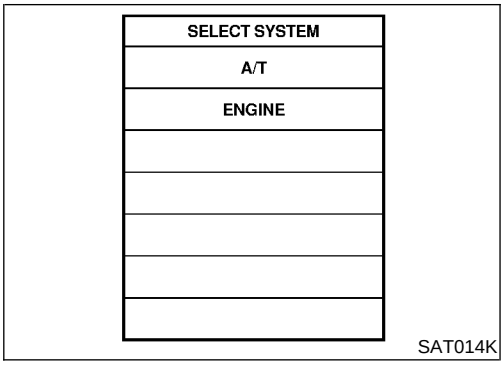
NIAT0043

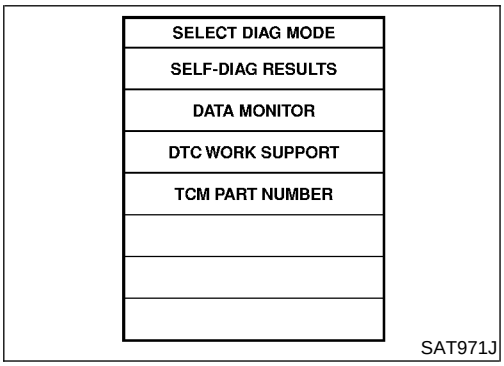
The revolution sensor detects the revolution of the idler gear parking pawl lock gear and emits a pulse signal. The pulse signal is sent to the TCM which converts it into vehicle speed.

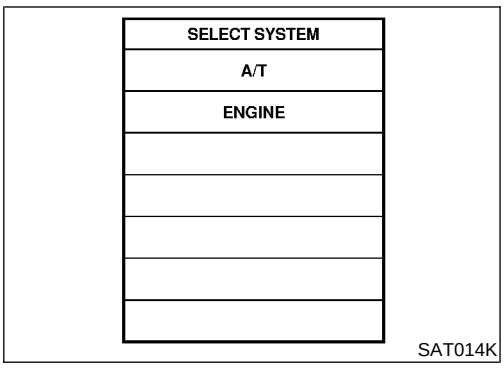
ON BOARD DIAGNOSIS LOGIC

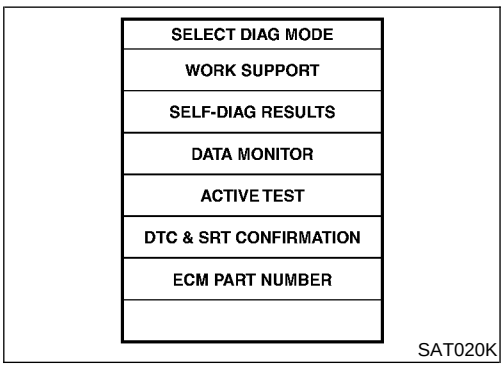
NIAT0043S02

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









DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0043S03

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

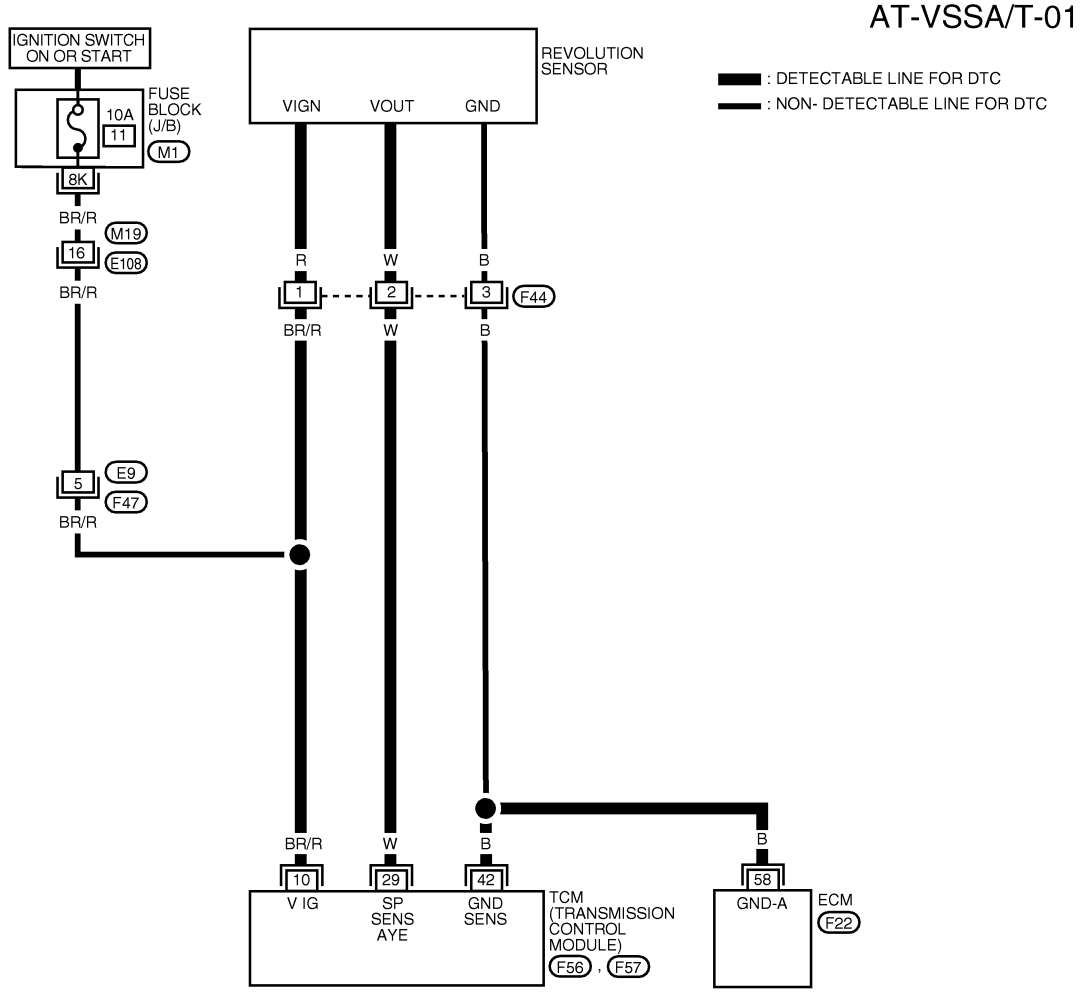
1) Turn ignition switch "ON" and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2) Drive vehicle and check for an increase of "VHCL/S SE·MTR" value increase.
   If the check result is NG, go to "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-211.
   If the check result is OK, go to 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 "Diagnostic Procedure", AT-129.
   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.

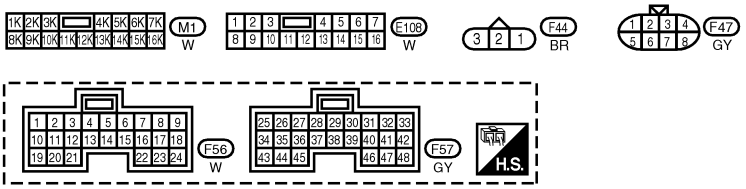
With GST

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — VSSA/T

NIAT0044





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT116

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN 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"	1V OR LESS
29	W	REVOLUTION SENSOR	WHEN MOVING AT 20 KM/H (12 MPH), USE THE CONSULT-II PULSE FREQUENCY MEASURING FUNCTION	150 Hz
42	B	THROTTLE POSITION SENSOR (GROUND)	—	1V OR LESS

LAT257

Diagnostic Procedure

NIAT0045

1	CHECK INPUT SIGNAL (With CONSULT-II)

With CONSULT-II

1. Start engine.
2. Select “ECU 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 using "TCM TERMINALS AND REFERENCE VALUE"
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

LAT238

- Harness for short or open between TCM, ECM and revolution sensor (Main harness). Refer to wiring diagram, AT-128.

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

3	CHECK DTC

Perform “DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE”, AT-127.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 4.

Diagnostic Procedure (Cont'd)

4	CHECK TCM INSPECTION	
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.

Description

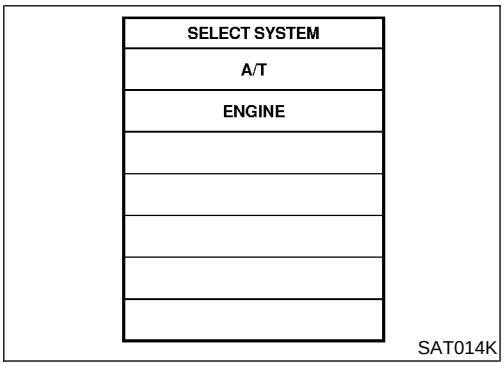
NIAT0047

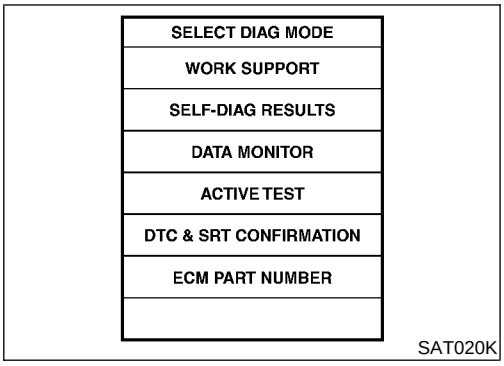
The engine speed signal is sent from the ECM to the TCM.

ON BOARD DIAGNOSIS LOGIC

NIAT0047S02

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





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0047S03

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

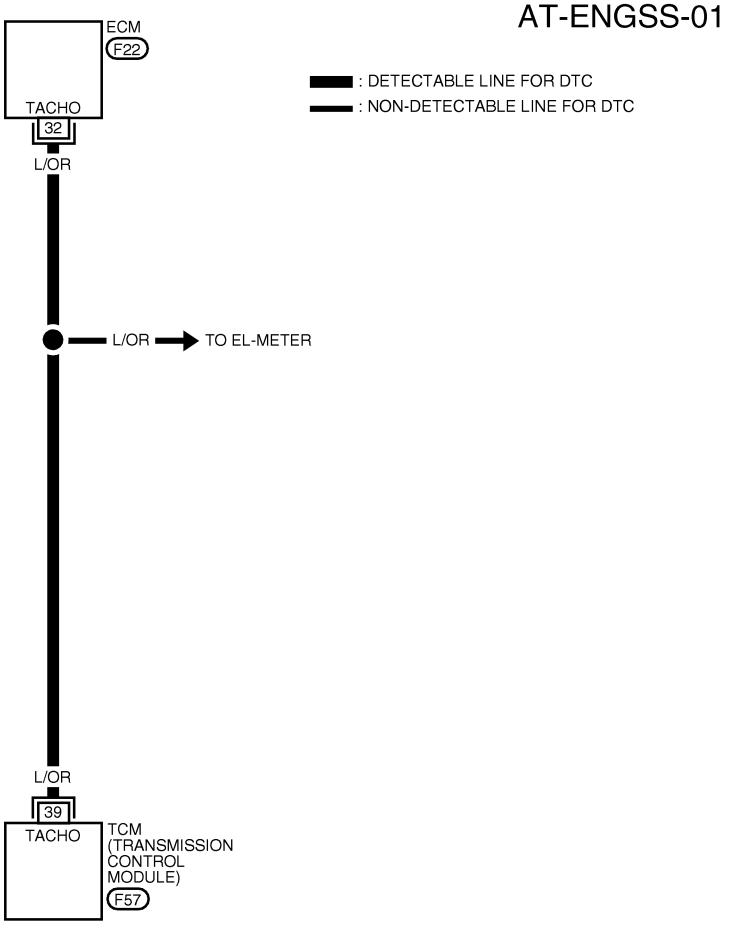
1) Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
2) Start engine and maintain the following conditions for at least 10 consecutive seconds.
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   THRTL POS SEN: More than 1.2V
   Selector lever: D position (OD "ON")

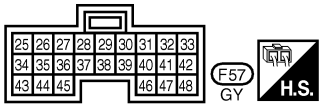
With GST

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — ENGSS

NIAT0048





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT117

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

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

LAT258

Diagnostic Procedure

NIAT0049

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-1233*** [QG18DE (Calif. CA Model)], ***EC-1820*** (SR20DE), “DTC P1320 IGNITION SIGNAL”.

2	CHECK INPUT SIGNAL (With CONSULT-II)	
With CONSULT-II 1. Start engine. 2. Select “ECU 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-1233*** [QG18DE (Calif. CA Model)], ***EC-1820*** (SR20DE), “DTC P1320 IGNITION SIGNAL”.

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

SAT645J

Diagnostic Procedure (Cont'd)

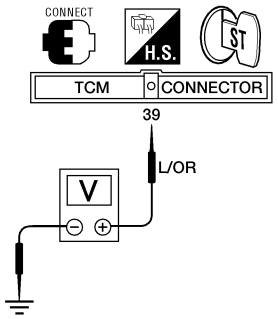
3	CHECK INPUT SIGNAL (Without CONSULT-II)

Without CONSULT-II

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

Voltage (Idle speed):

Refer to *EC-828* [QG18DE (Calif. CA Model)], ***EC-1495*** (SR20DE), "ECM Terminals and Reference Value".



LAT162

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-1233*** [QG18DE (Calif. CA Model)], ***EC-1820*** (SR20DE), "DTC P1320 IGNITION SIGNAL".

4	CHECK DTC

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

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.

Description

NIAT0050

- 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 DIAGNOSTIC LOGIC

NIAT0050S02

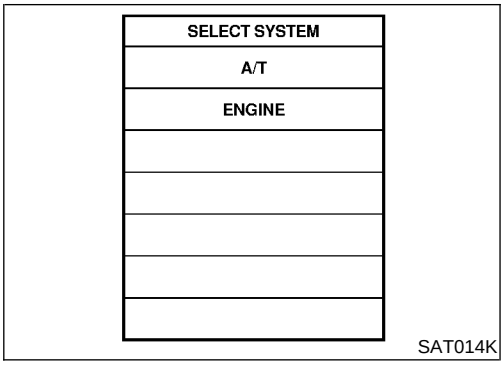
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
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

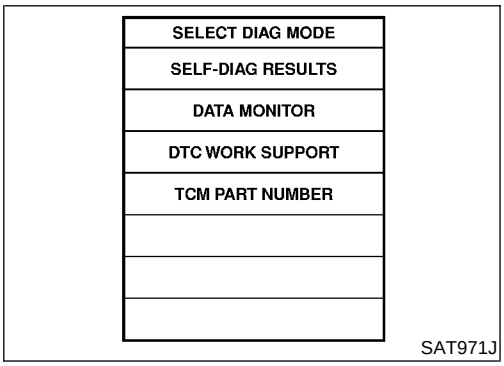
*: P0731 is detected.

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

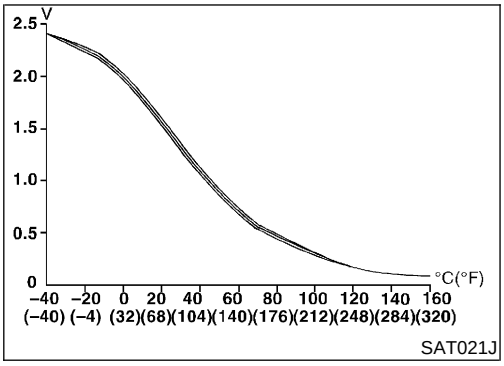
Description (Cont'd)



SAT014K



SAT971J



SAT021J

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0050S03

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 "Diagnostic Procedure", AT-139.
   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 "Diagnostic Procedure", AT-139.
Refer to "Shift Schedule", AT-540.

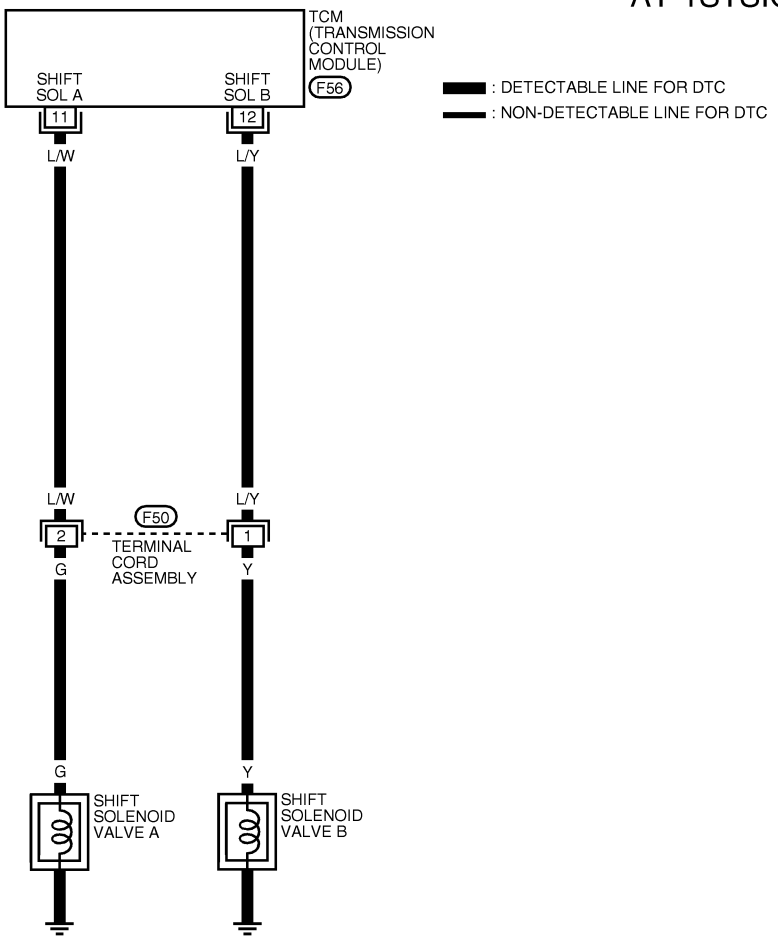
With GST

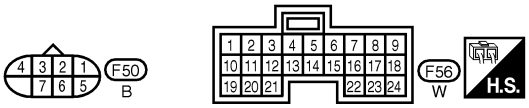
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 1ST

=NIAT0051

AT-1STSIG-01





WAT118

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
11	L/W	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATE	1V OR LESS
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	1V OR LESS

LAT259

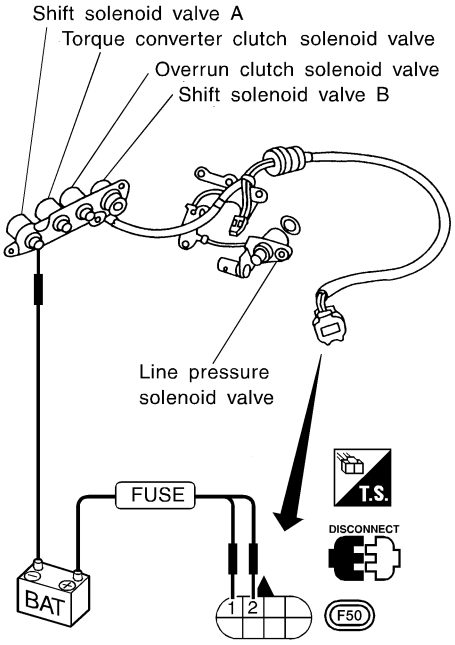
Diagnostic Procedure

NIAT0052

1	CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to “Removal”, AT-433.
2. Check shift solenoid valve operation.
- Shift solenoid valve A
- Shift solenoid valve B

Refer to “Component Inspection”, AT-140.



WAT163

OK or NG

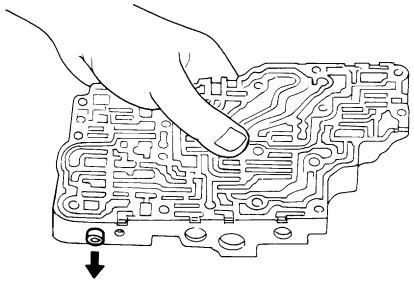
OK	▶	GO TO 2.
NG	▶	Repair or replace shift solenoid valve assembly.

Diagnostic Procedure (Cont'd)

2	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to "Control Valve Assembly", AT-465.
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.



SAT367H

OK or NG

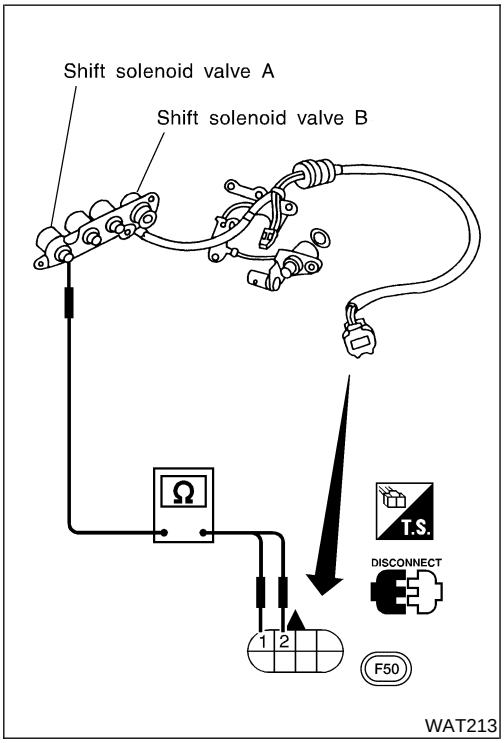
OK	▶	GO TO 3.
NG	▶	Repair control valve assembly.

3	CHECK DTC

Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-136.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	Check control valve again. Repair or replace control valve assembly.



WAT213

Component Inspection

NIAT0053

SHIFT SOLENOID VALVE A AND B

NIAT0053S01

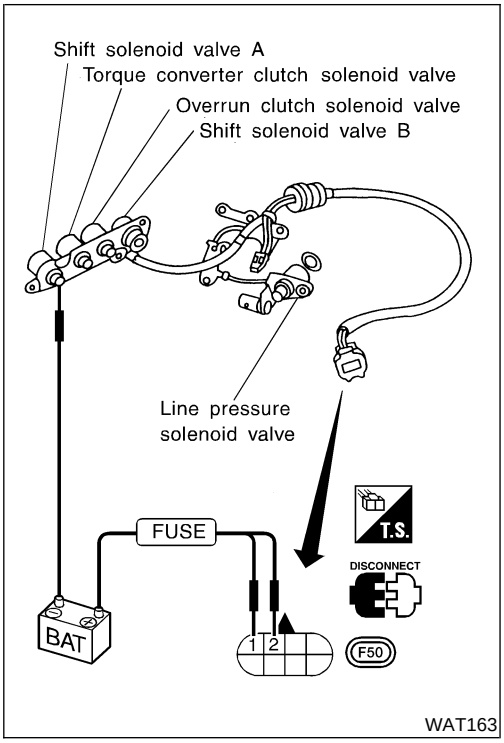
- Refer to "Removal", AT-433.

Resistance Check

NIAT0053S0101

- 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

NIAT0053S0102

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

Description

NIAT0054

- 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 DIAGNOSTIC LOGIC

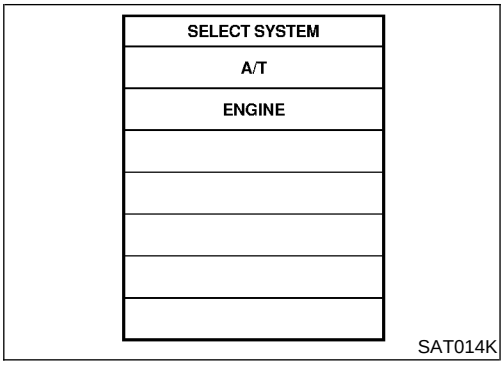
NIAT0054S02

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.

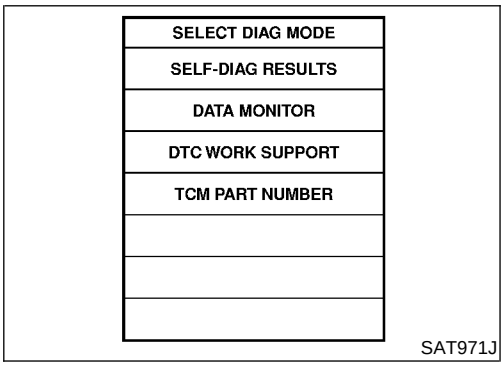
Gear position supposed by TCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve B stuck open	4	3*	3	4

*: P0732 is detected.

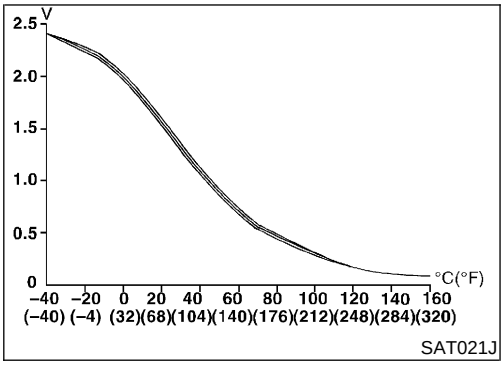
Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
: A/T 2ND GR FNCTN	A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	• Shift solenoid valve B • Each clutch • Hydraulic control circuit
: P0732		



SAT014K



SAT971J



SAT021J

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0054S03

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 "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) –QG18DE (Calif. CA Model)–or 59 to 64 km/h (37 to 40 MPH)–SR20DE– 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) –QG18DE (Calif. CA Model)–or 59 to 64 km/h (37 to 40 MPH)–SR20DE– 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 "Diagnostic Procedure", AT-146.
   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

Description (Cont'd)

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 "Diagnostic Procedure", AT-146.
   Refer to "Shift Schedule", AT-540.

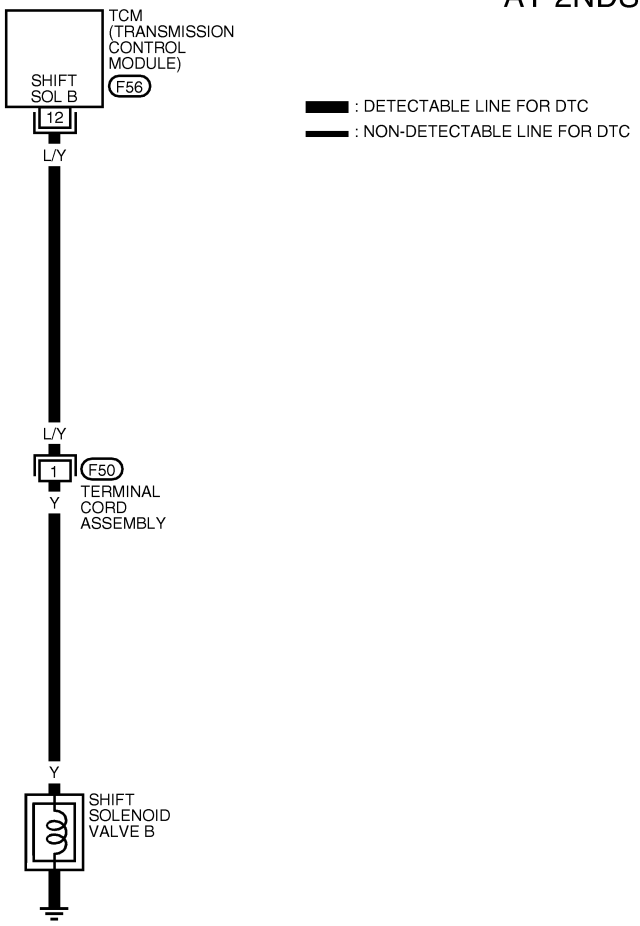
With GST

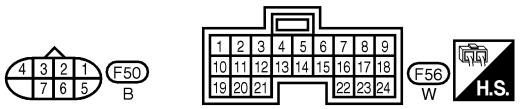
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 2ND

=NIAT0055

AT-2NDSIG-01





WAT119

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	1V OR LESS

LAT260

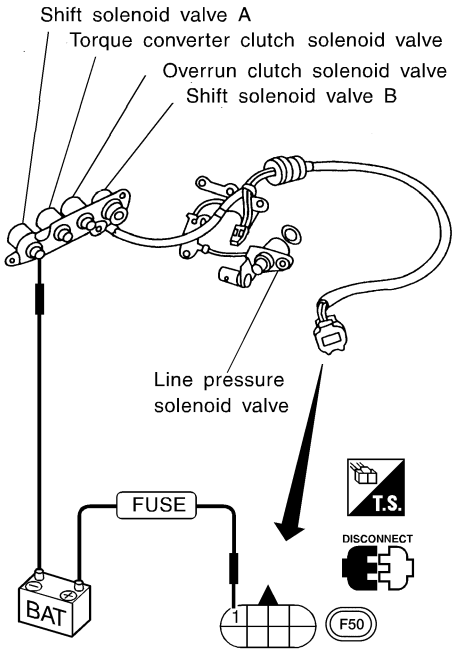
Diagnostic Procedure

NIAT0056

1	CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to “Removal”, AT-433.
2. Check shift solenoid valve operation.
- Shift solenoid valve B

Refer to “Component Inspection”, AT-147.



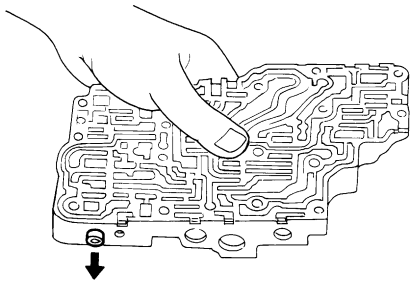
WAT164

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 “Control Valve Assembly”, AT-465.
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.

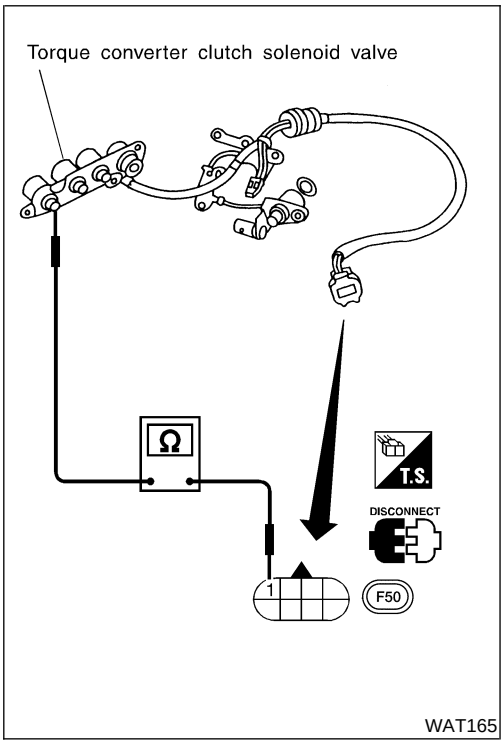


SAT367H

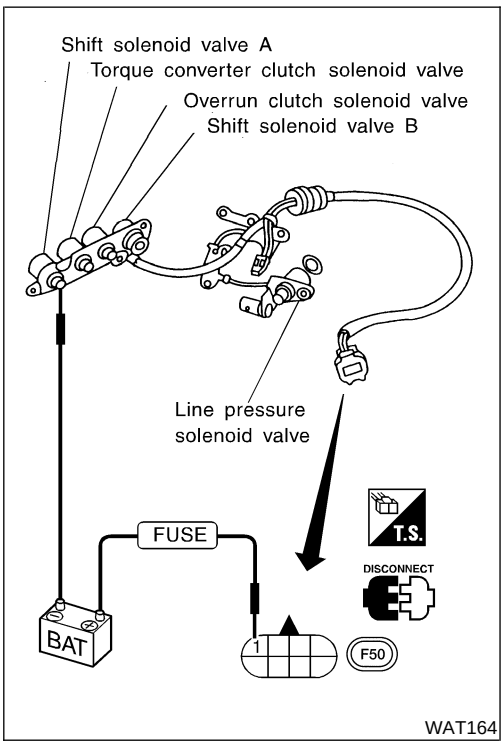
OK or NG

OK	▶	GO TO 3.
NG	▶	Repair control valve assembly.

3	CHECK DTC	
Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-143.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	Check control valve again. Repair or replace control valve assembly.



WAT165



WAT164

Component Inspection

SHIFT SOLENOID VALVE B

NIAT0057

NIAT0057S01

- Refer to "Removal", AT-433.

Resistance Check

NIAT0057S0101

- Check resistance between two terminals.

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

Operation Check

NIAT0057S0102

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

Description

NIAT0058

- 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 DIAGNOSTIC LOGIC

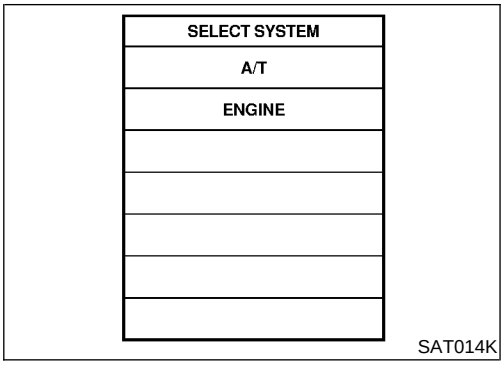
NIAT0058S02

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.

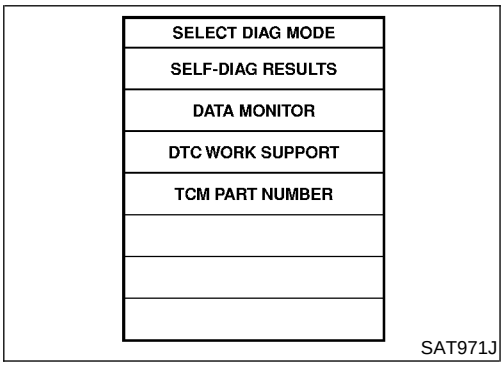
Gear position supposed by TCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve A stuck closed	1	1	4*	4

*: P0733 is detected.

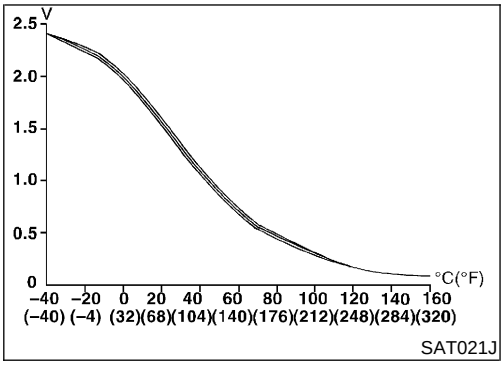
Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
: A/T 3RD GR FNCTN	A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	• Shift solenoid valve A • Each clutch • Hydraulic control circuit
: P0733		



SAT014K



SAT971J



SAT021J

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0058S03

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 "Diagnostic Procedure", AT-152.
   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

Description (Cont'd)

8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
   Refer to "Diagnostic Procedure", AT-152.
   Refer to "Shift Schedule", AT-540.

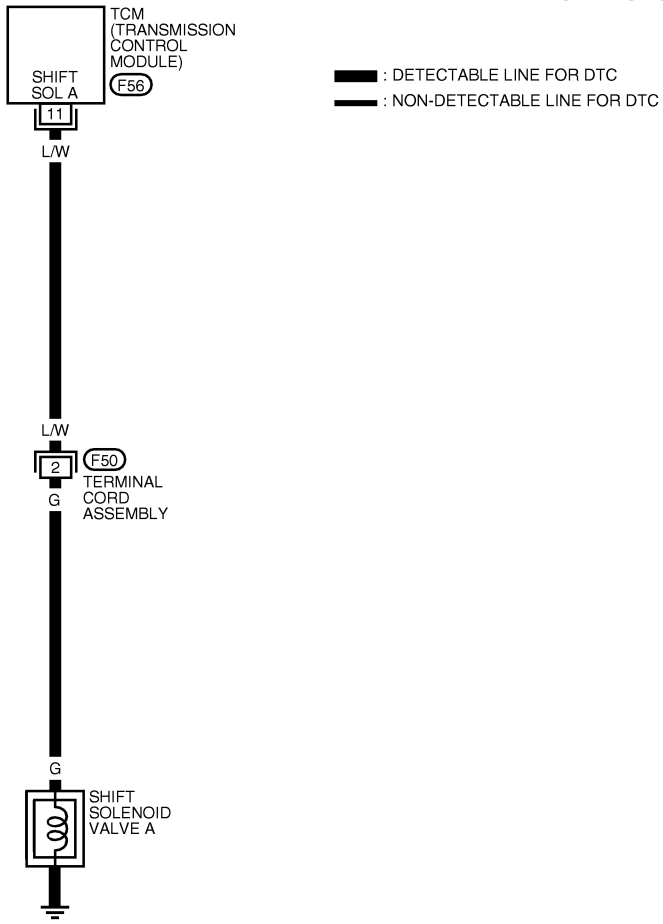
With GST

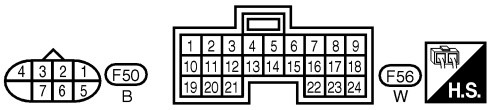
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 3RD

=NIAT0059

AT-3RDSIG-01





WAT120

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

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

LAT261

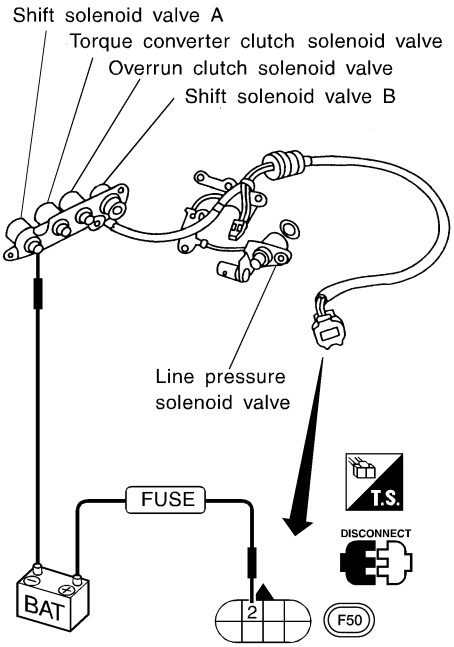
Diagnostic Procedure

NIAT0060

1	CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to “Removal”, AT-433.
2. Check shift solenoid valve operation.

- Shift solenoid valve A
  Refer to “Component Inspection” below.



WAT166

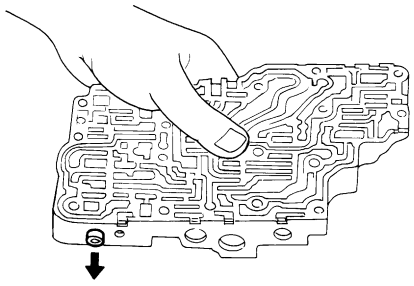
OK or NG

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

2	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to “Control Valve Assembly”, AT-465.
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.

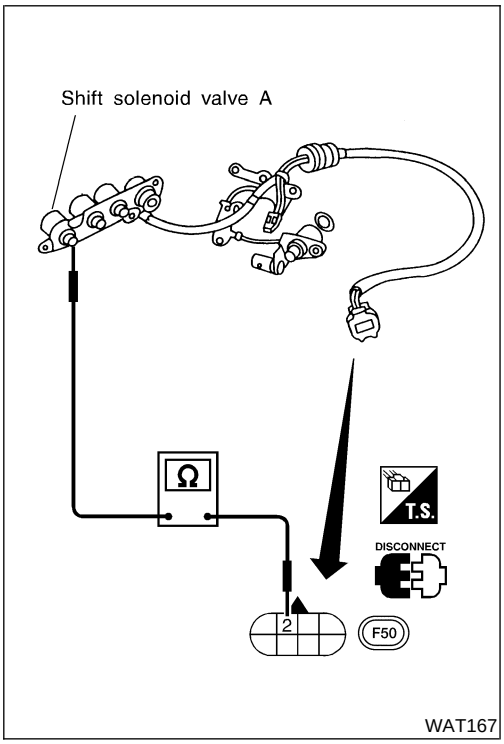


SAT367H

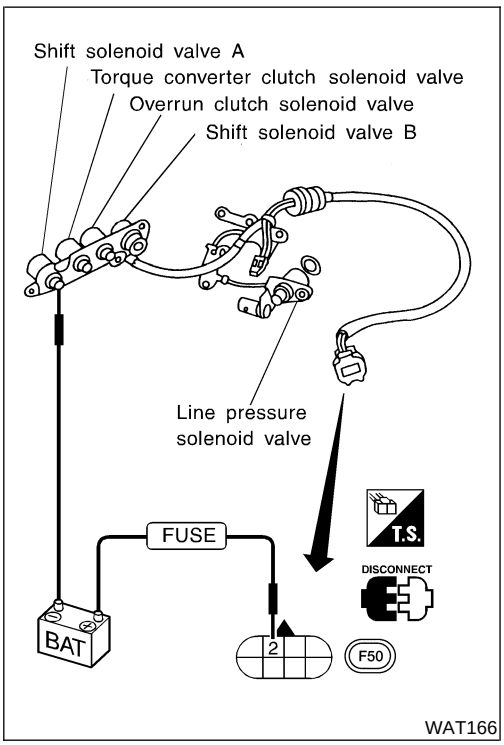
OK or NG

OK	▶	GO TO 3.
NG	▶	Repair control valve assembly.

3	CHECK DTC	
Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-149.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	Check control valve again. Repair or replace control valve assembly.



WAT167



WAT166

Component Inspection

SHIFT SOLENOID VALVE A

NIAT0061

NIAT0061S01

- Refer to "Removal", AT-433.

Resistance Check

NIAT0061S0101

- Check resistance between two terminals.

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

Operation Check

NIAT0061S0102

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

Description

NIAT0062

- 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

NIAT0062S01

Remarks: Specification data are reference values.

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

ON BOARD DIAGNOSTIC LOGIC

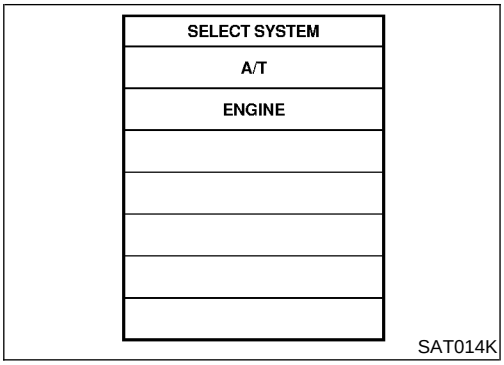
NIAT0062S03

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.

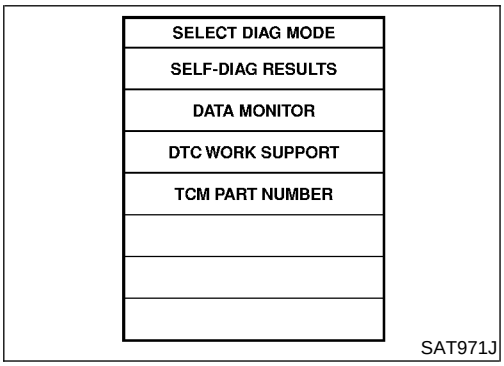
Gear position supposed by TCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve B stuck closed	1	2	2	1*

*: P0734 is detected.

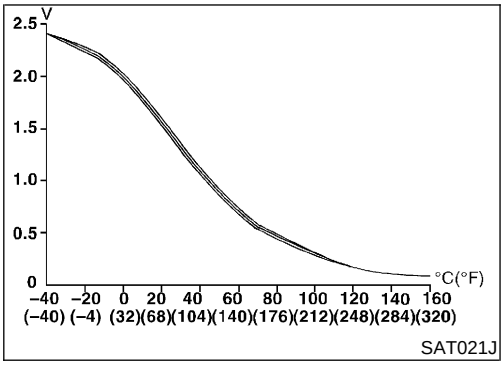
Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
: A/T 4TH GR FNCTN	A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	• Shift solenoid valve A • Shift solenoid valve B • Line pressure solenoid valve • Each clutch • Hydraulic control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



SAT014K



SAT971J



SAT021J

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0062S04

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) –QG18DE (Calif. CA Model)–or 40 to 50 km/h (25 to 31 MPH)–SR20DE– 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) –QG18DE (Calif. CA Model)–or 40 to 50 km/h (25 to 31 MPH)–SR20DE–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 "Diagnostic Procedure", AT-158.
   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.)

Description (Cont'd)

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 "Diagnostic Procedure", AT-158.
   Refer to "Shift Schedule", AT-540.

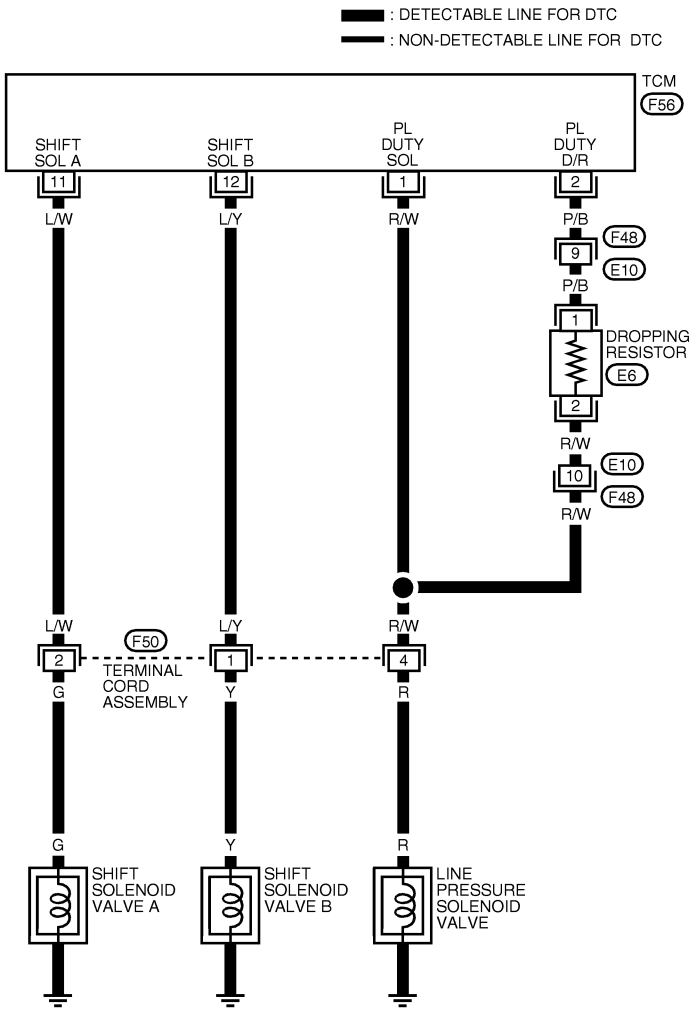
With GST

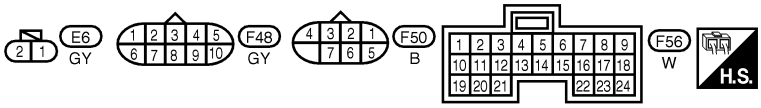
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 4TH

NIAT0063

AT-4THSIG-01





WAT121

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN 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
11	L/W	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATE	1V OR LESS
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	1V OR LESS

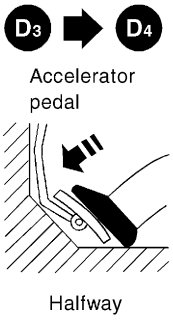
LAT262

Diagnostic Procedure

NIAT0064

1	CHECK SHIFT UP (D_3 TO D_4)

During “Cruise Test − Part 1” (AT-83), does A/T shift from D_3 to D_4 at the specified speed?



SAT988H

Yes or No

Yes	▶	GO TO 9.
No	▶	GO TO 2.

2	CHECK LINE PRESSURE

Perform line pressure test.
Refer to AT-72.

Engine speed rpm	Line pressure kPa (kg/cm², 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)

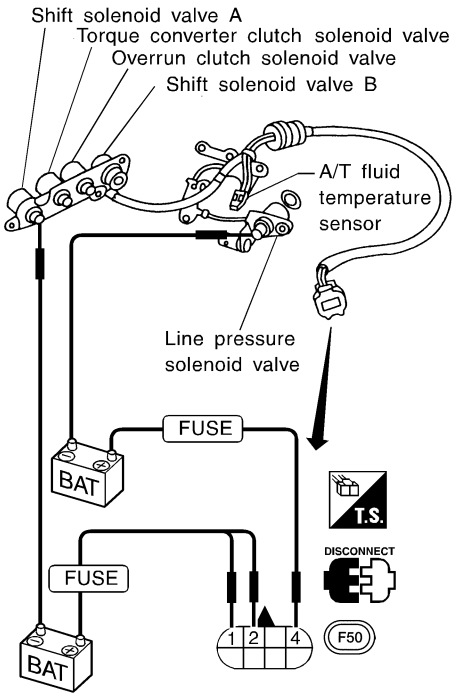
LAT236

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 6.

3	CHECK SOLENOID VALVES

1. Remove control valve assembly.
   Refer to "Removal", AT-433.
2. Refer to "Component Inspection", AT-162.



WAT168

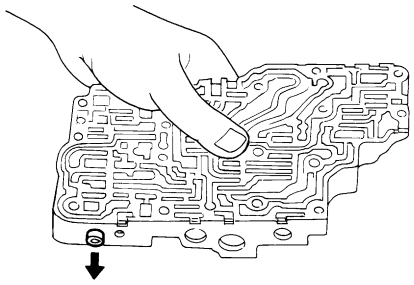
OK or NG

OK	▶	GO TO 4.
NG	▶	Replace solenoid valve assembly.

4	CHECK CONTROL VALVE

1. Disassemble control valve assembly.
   Refer to "Components", AT-465.
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.



SAT367H

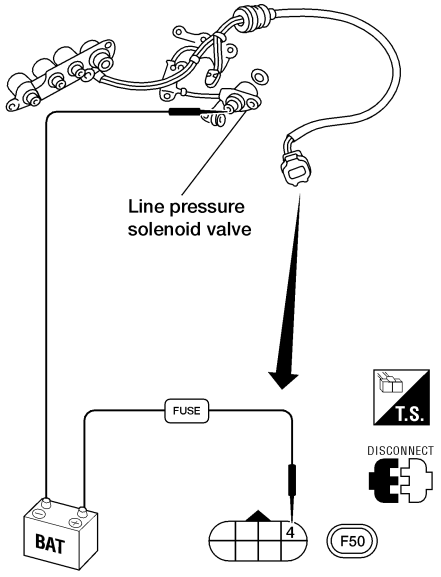
OK or NG

OK	▶	GO TO 5.
NG	▶	Repair control valve.

Diagnostic Procedure (Cont'd)

5	CHECK SHIFT UP (D_3 TO D_4)	
Does A/T shift from D_3 to D_4 at the specified speed?		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Check control valve again. Repair or replace control valve assembly.

6	CHECK LINE PRESSURE SOLENOID VALVE	
1. Remove control valve assembly. Refer to AT-433. 2. Refer to "Component Inspection", AT-162.		



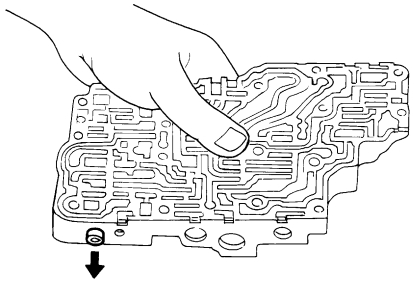
WAT170

OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace solenoid valve assembly.

7	CHECK CONTROL VALVE

1. Disassemble control valve assembly.
   Refer to "Components", AT-465.
2. Check line pressure circuit valves for sticking.

- Pressure regulator valve
- Pilot valve
- Pressure modifier valve



SAT367H

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair control valve.

8	CHECK SHIFT UP (D_3 TO D_4)

Does A/T shift from D_3 to D_4 at the specified speed?

Yes or No

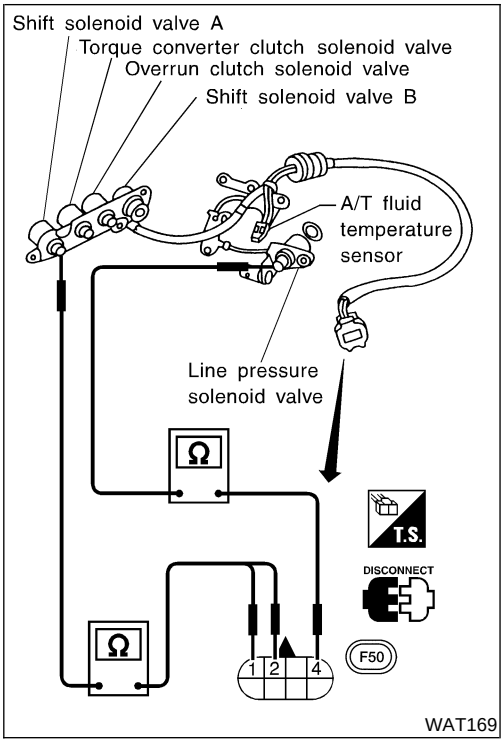
Yes	▶	GO TO 9.
No	▶	Check control valve again. Repair or replace control valve assembly.

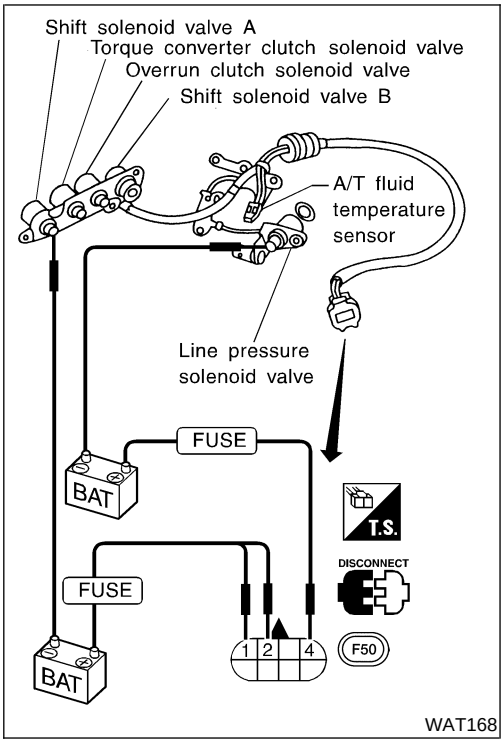
9	CHECK DTC

Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-155.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	Perform "Cruise Test — Part 1" again and return to the start point of this test group.





Component Inspection

=NIAT0065

SOLENOID VALVES

NIAT0065S01

- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0065S0101

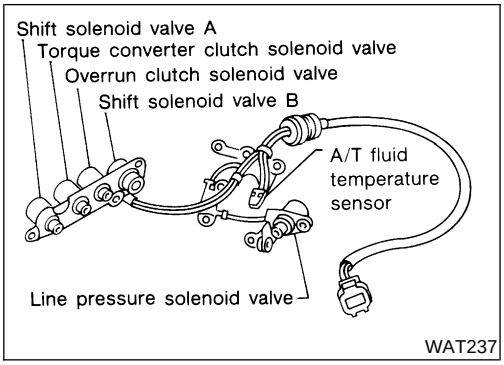
- Check resistance between two terminals.

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

NIAT0065S0102

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



Description

NIAT0066

The torque converter clutch solenoid valve is activated, with the gear in "D_4", by the TCM in response to signals sent from the vehicle speed and throttle position sensors. 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

NIAT0066S01

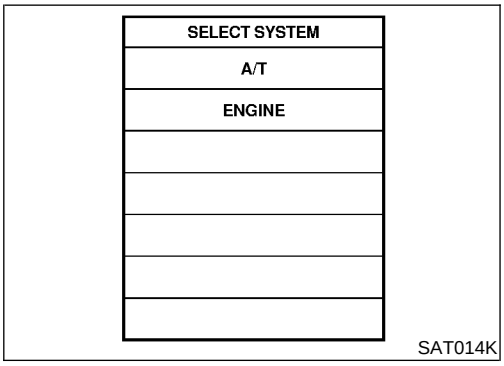
Remarks: Specification data are reference values.

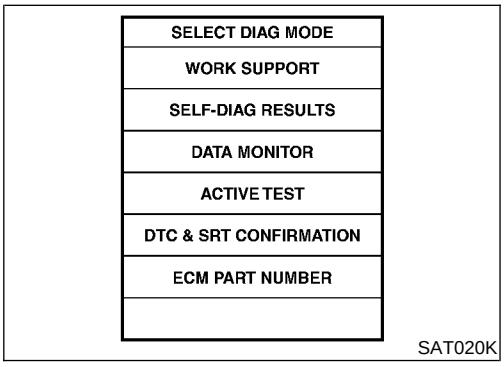
Monitor item	Condition	Specification
Torque converter clutch solenoid valve duty	Lock-up "OFF" ↓ Lock-up "ON"	Approximately 4% ↓ Approximately 94%

ON BOARD DIAGNOSIS LOGIC

NIAT0066S03

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





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0066S04

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.

(P) With CONSULT-II

1) Turn ignition switch "ON".
2) Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II and wait at least 1 second.

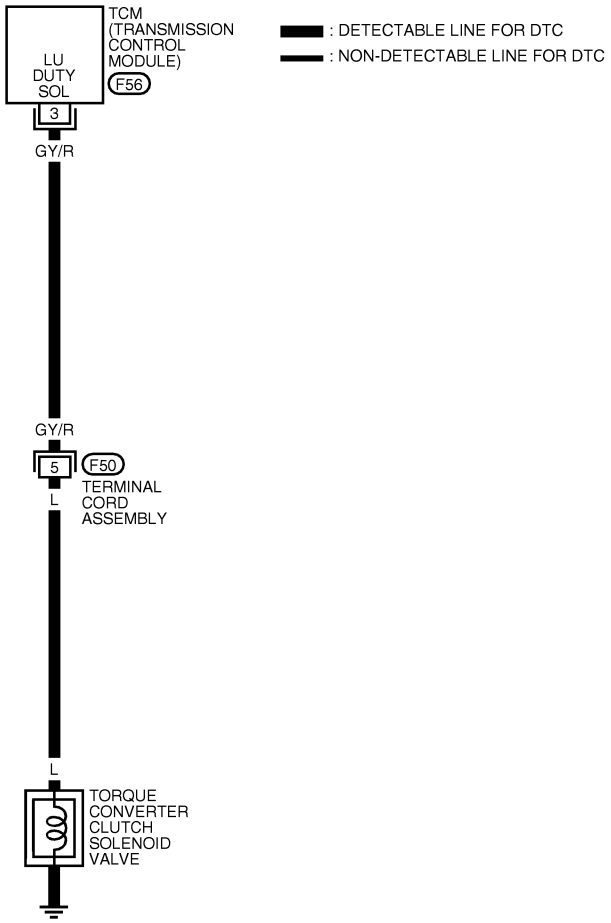
(GST) With GST

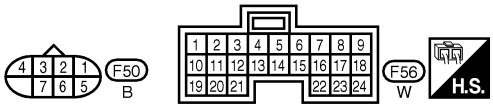
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — TCV

NIAT0067

AT-TCV-01





WAT122

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
3	GY/R	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WHEN A/T PERFORMS LOCK-UP	8 - 15V
			WHEN A/T DOES NOT PERFORM LOCK-UP	1V OR LESS

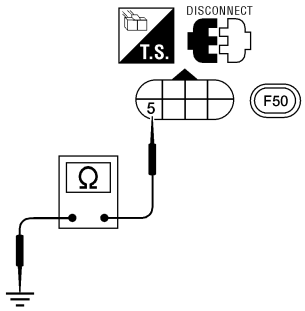
LAT263

Diagnostic Procedure

NIAT0068

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.



Resistance:
5 - 20Ω

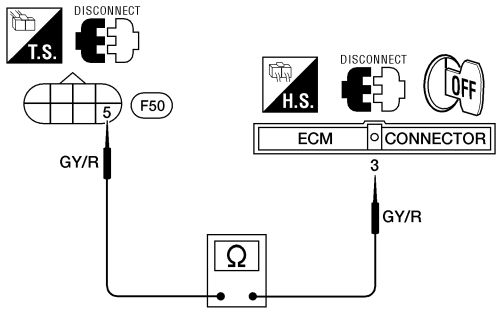
LAT171

OK or NG

OK	▶	GO TO 2.
NG	▶	1. Remove oil pan. Refer to “Removal”, AT-433. 2. Check the following items: ● Torque converter clutch solenoid valve Refer to “Component Inspection”, AT-166. ● 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 5 and TCM harness connector terminal 3.



Continuity should exist.

LAT172

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

4. Reinstall any part removed.

OK or NG

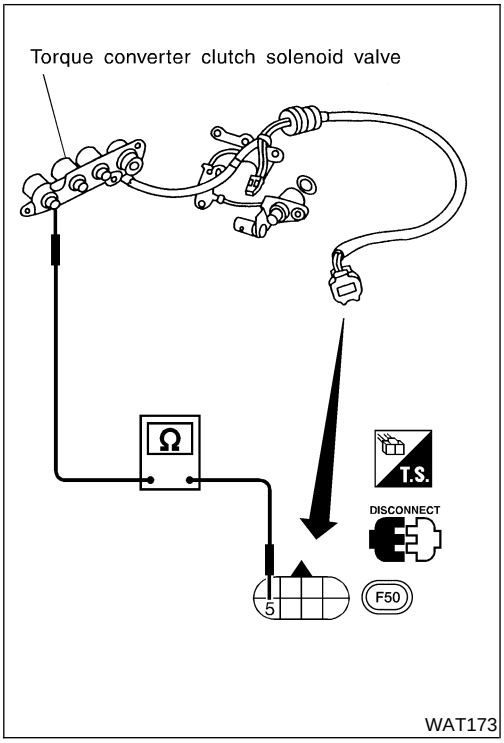
OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK DTC

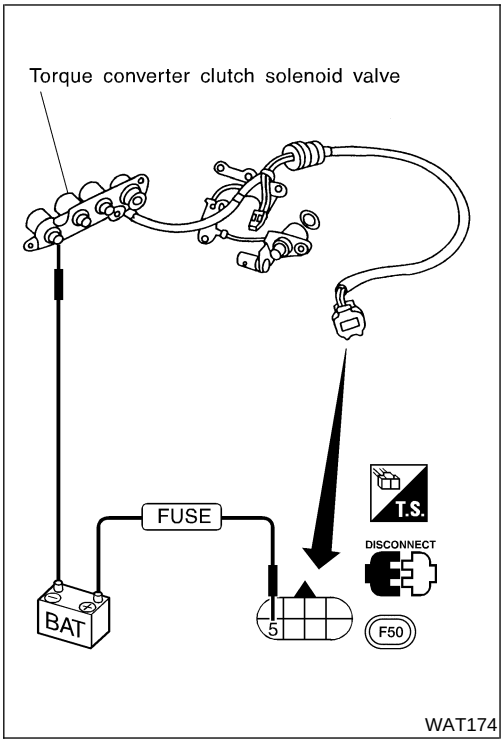
Perform “DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE”, AT-163.

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.



WAT173



WAT174

Component Inspection

NIAT0069

TORQUE CONVERTER CLUTCH SOLENOID VALVE

NIAT0069S01

- Refer to “Removal”, AT-433.

Resistance Check

NIAT0069S0101

- Check resistance between two terminals.

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

Operation Check

NIAT0069S0102

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

Description

NIAT0070

- 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

NIAT0070S01

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Torque converter clutch solenoid valve duty	Lock-up “OFF” ↓ Lock-up “ON”	Approximately 4% ↓ Approximately 94%

Description (Cont'd)

ON BOARD DIAGNOSTIC LOGIC

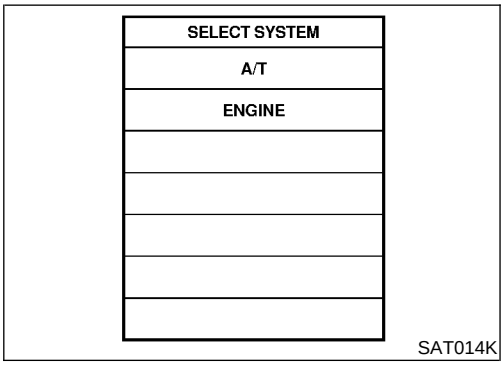
=NIAT0070S03

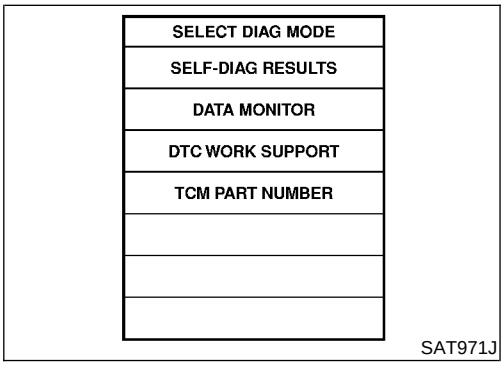
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
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.	• Torque converter clutch solenoid valve • Line pressure solenoid valve • Each clutch • Hydraulic control circuit





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0070S04

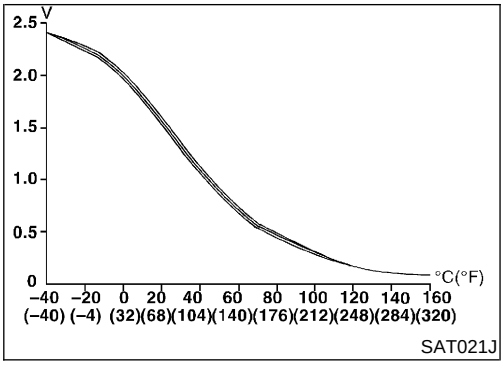
CAUTION:
Always drive vehicle at a safe speed.

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".



4) 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) –QG18DE (Calif. CA Model) or 70 km/h (43 MPH) –SR20DE

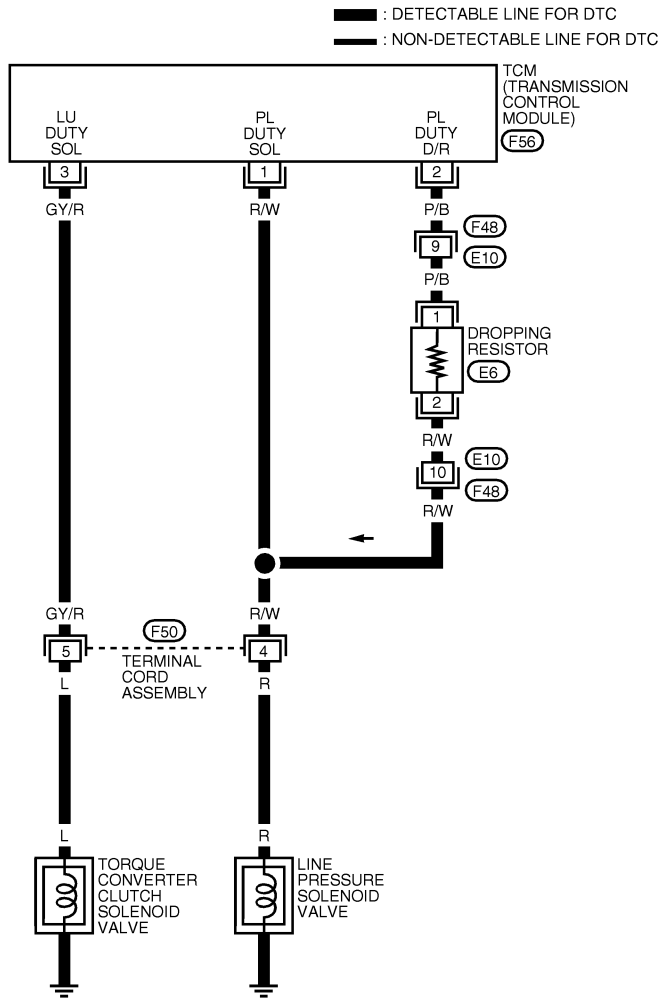
- **Check that "GEAR" shows "4".**
- **For "Shift Schedule", refer to SDS, AT-540.**
- **If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAGNOSIS". In case a 1st trip DTC other than P0744 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".**

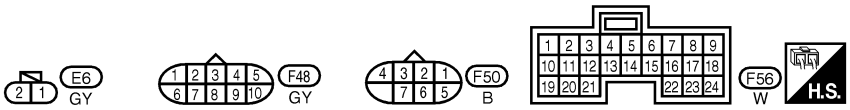
5) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
Refer to "Diagnostic Procedure", AT-171.
Refer to "Shift Schedule", AT-540.

With GST
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — TCCSIG

NIAT0071





WAT123

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN 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	GY/R	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WHEN A/T PERFORMS LOCK-UP	8 - 14V
			WHEN A/T DOES NOT PERFORM LOCK-UP	1V OR LESS

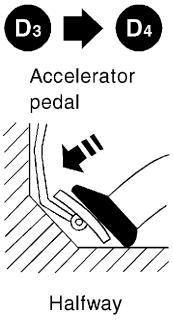
LAT264

Diagnostic Procedure

NIAT0072

1	CHECK SHIFT UP (D_3 TO D_4)

During “Cruise Test − Part 1” (AT-83), does A/T shift from D_3 to D_4 at the specified speed?



SAT988H

Yes or No

Yes	▶	GO TO 10.
No	▶	GO TO 2.

2	CHECK LINE PRESSURE

Perform line pressure test.
Refer to “Line Pressure Test”, AT-72.

Engine speed rpm	Line pressure kPa (kg/cm², 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

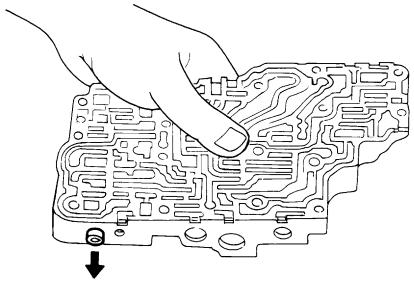
OK	▶	GO TO 3.
NG	▶	GO TO 6.

Diagnostic Procedure (Cont'd)

3	CHECK CONTROL VALVE

1. Disassemble control valve assembly.
   Refer to "DISASSEMBLY", AT-466.
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.



SAT367H

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair control valve.

4	CHECK SHIFT UP (D_3 TO D_4)

Does A/T shift from D_3 to D_4 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

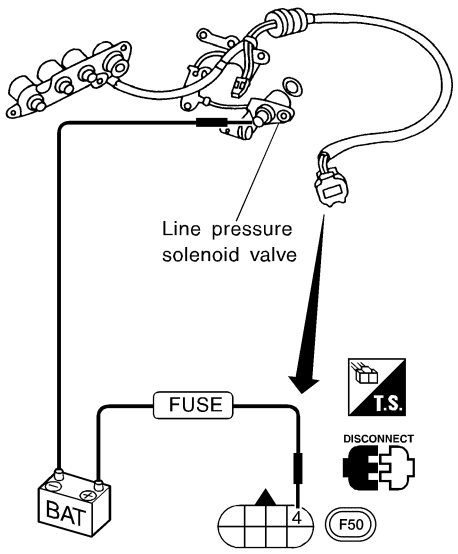
Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-168.

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 "REMOVAL", AT-433.
2. Check line pressure solenoid valve operation.
   Refer to "Component Inspection", AT-177.



WAT175

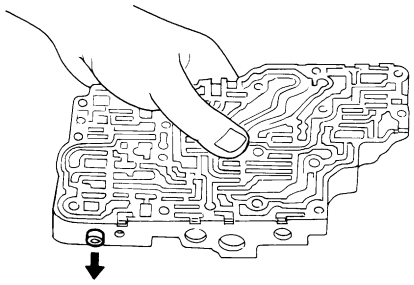
OK or NG

OK	▶	GO TO 7.
NG	▶	Replace solenoid valve assembly.

7	CHECK CONTROL VALVE

1. Disassemble control valve assembly.
   Refer to "DISASSEMBLY", AT-466.
2. Check line pressure circuit valves for sticking.

- Pressure regulator valve
- Pilot valve
- Pressure modifier valve



SAT367H

OK or NG

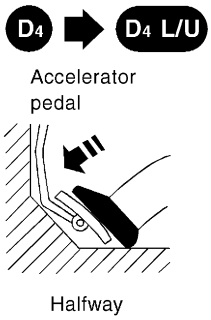
OK	▶	GO TO 8.
NG	▶	Repair control valve.

Diagnostic Procedure (Cont'd)

8	CHECK SHIFT UP (D_3 TO D_4)	
Does A/T shift from D_3 to D_4 at the specified speed?		
Yes or No		
Yes	▶	GO TO 9.
No	▶	Check control valve again. Repair or replace control valve assembly.

9	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-168.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 10. And check for proper lock-up.

10	CHECK LOCK-UP CONDITION	
During "Cruise Test − Part 1" (AT-83), does A/T perform lock-up at the specified speed?		

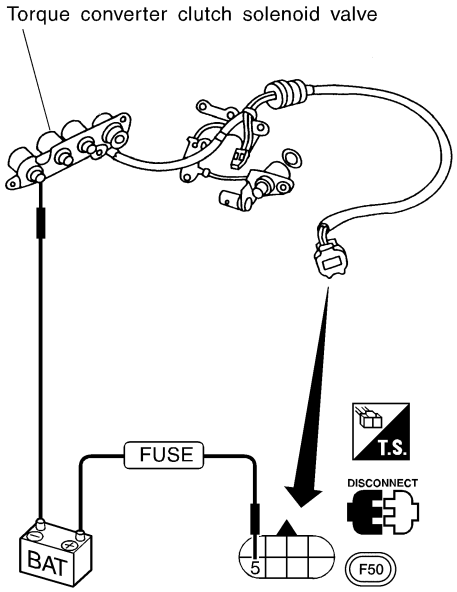


SAT989H

Yes or No		
Yes	▶	Perform "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 "REMOVAL", AT-433.
2. Check torque converter clutch solenoid valve operation. Refer to "Component Inspection", AT-177.



WAT176

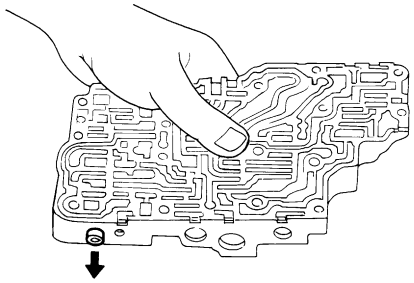
OK or NG

OK	▶	GO TO 12.
NG	▶	Replace solenoid valve assembly.

12	CHECK CONTROL VALVE

1. Disassemble control valve assembly.
   Refer to "DISASSEMBLY", AT-466.
2. Check control valves for sticking.

- Torque converter clutch control valve
- Torque converter clutch relief valve



SAT367H

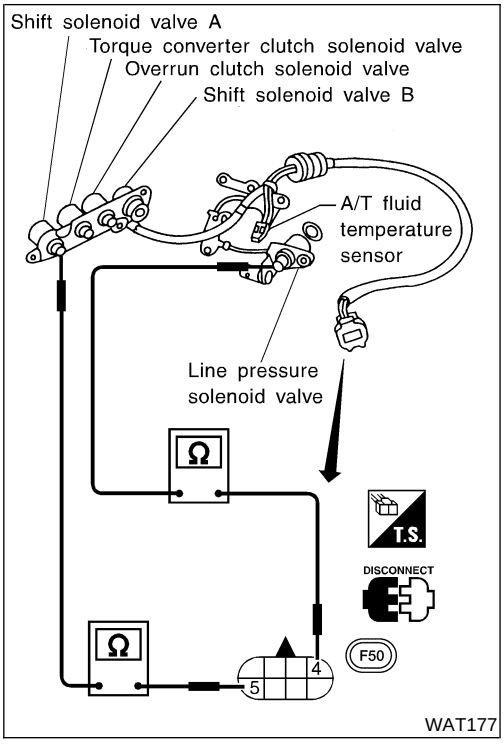
OK or NG

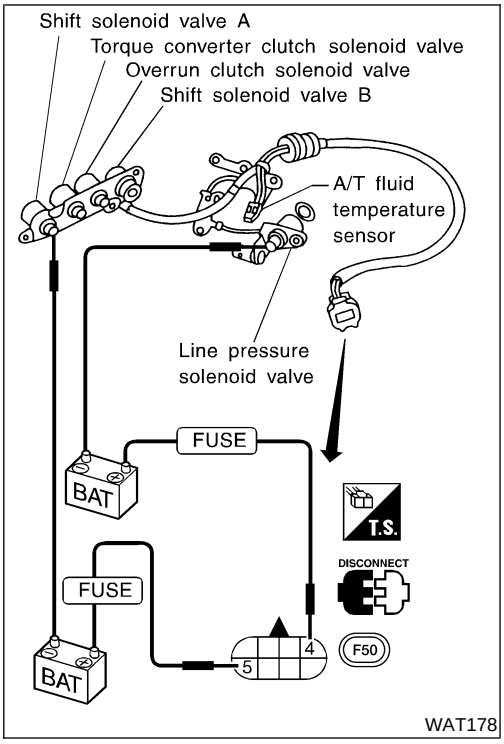
OK	▶	GO TO 13.
NG	▶	Repair control valve.

Diagnostic Procedure (Cont'd)

13	CHECK LOCK-UP CONDITION	
Does A/T perform lock-up at the specified speed?		
Yes or No		
Yes	▶	GO TO 14.
No	▶	Check control valve again. Repair or replace control valve assembly.

14	CHECK DTC	
Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-168.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	Perform "Cruise Test — Part 1" again and return to the start point of this test group.





Component Inspection

=NIAT0073

SOLENOID VALVES

NIAT0073S01

- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0073S0101

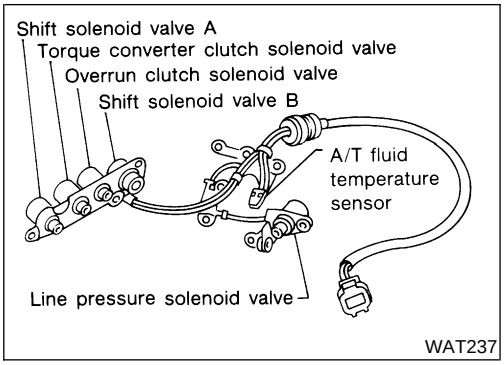
- Check resistance between two terminals.

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

NIAT0073S0102

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



Description

NIAT0074

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

NIAT0074S01

Remarks: Specification data are reference values.

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

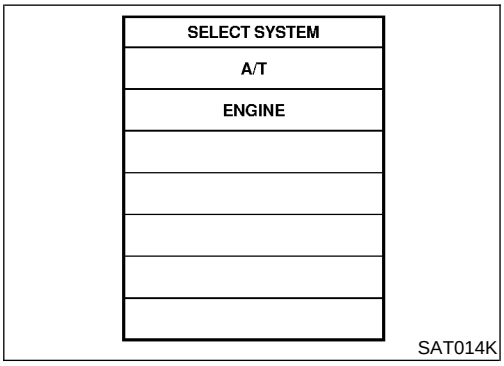
NOTE:

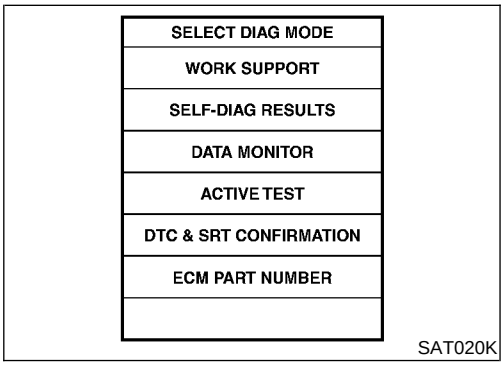
The line pressure duty cycle value is not consistent when the closed throttle position switch is "ON". To confirm the line pressure duty cycle at low pressure, the accelerator (throttle) should be open until the closed throttle position switch is "OFF".

ON BOARD DIAGNOSIS LOGIC

NIAT0074S03

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.	• Harness or connectors (The solenoid circuit is open or shorted.) • Line pressure solenoid valve





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0074S04

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 1 second.

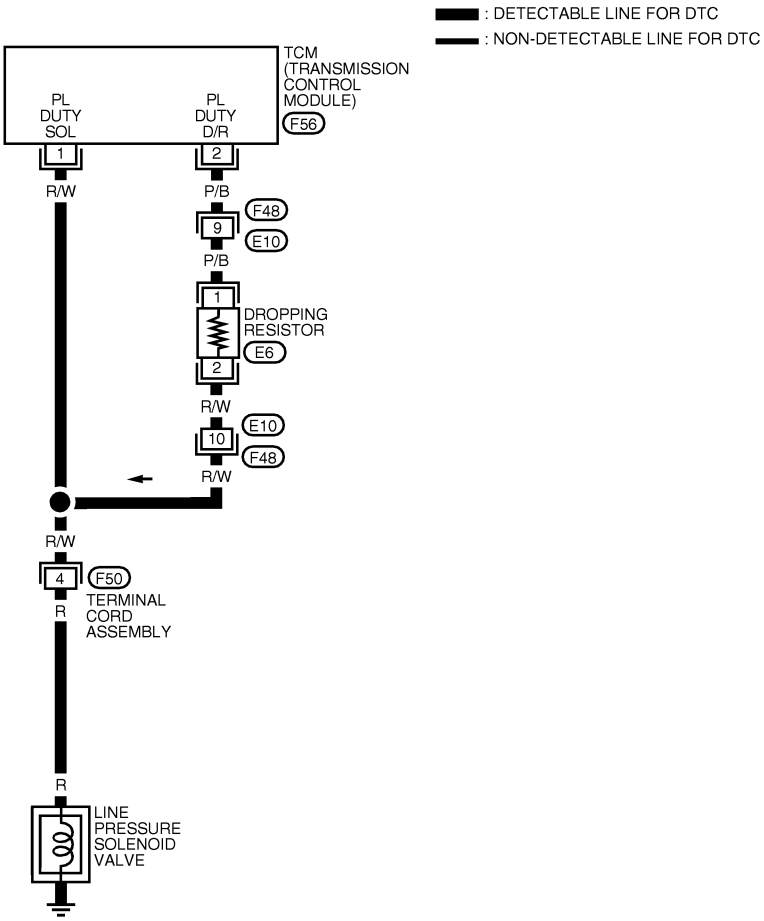
With GST

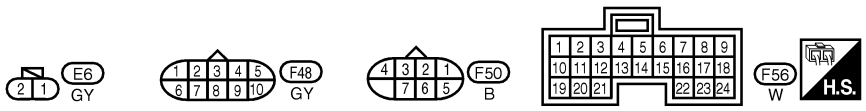
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — LPSV

NIAT0075

AT-LPSV-01





WAT124

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN 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 - 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

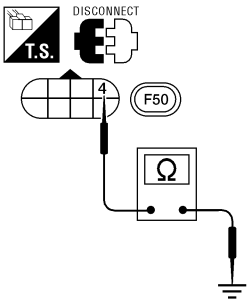
LAT265

Diagnostic Procedure

NIAT0076

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.



Resistance:
2.5 - 5Ω

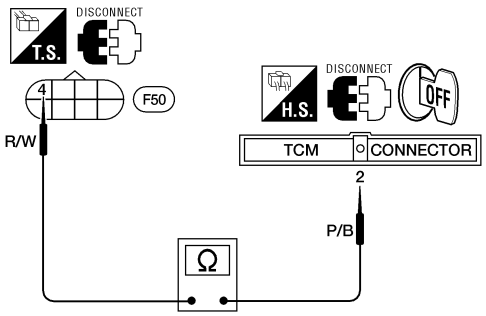
LAT179

OK or NG

OK	▶	GO TO 2.
NG	▶	1. Remove control valve assembly. Refer to “REMOVAL”, AT-433. 2. Check the following items: ● Line pressure solenoid valve Refer to “Component Inspection”, AT-182. ● 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.



Resistance:
10 - 15Ω

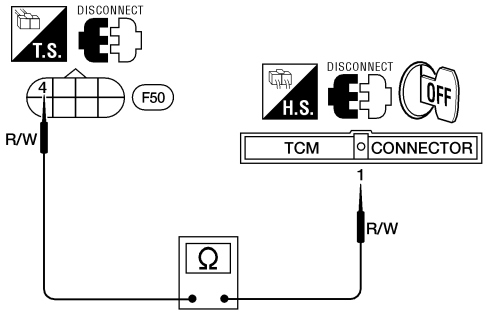
LAT180

OK or NG

OK	▶	GO TO 3.
NG	▶	**Check the following items:** ● Dropping resistor Refer to “Component Inspection”, AT-182. ● 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.



Resistance:
Approx. 0 Ω

LAT181

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

3. Reinstall any part removed.

OK or NG

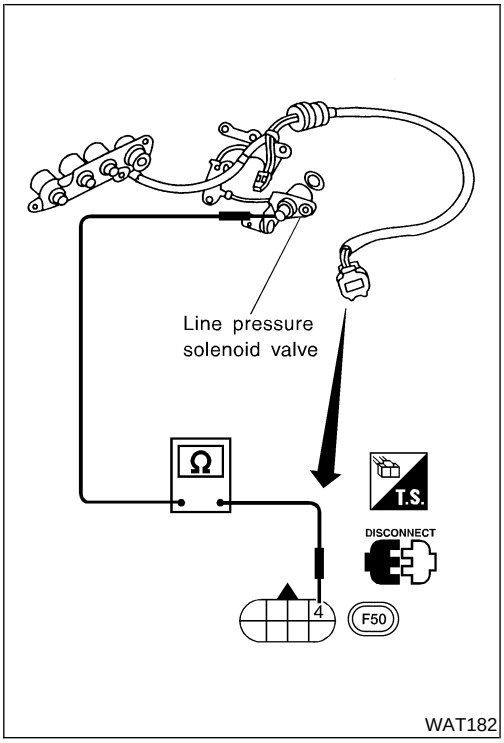
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

4	CHECK DTC

Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-178.

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.



WAT182

Component Inspection

=NIAT0077

LINE PRESSURE SOLENOID VALVE

NIAT0077S01

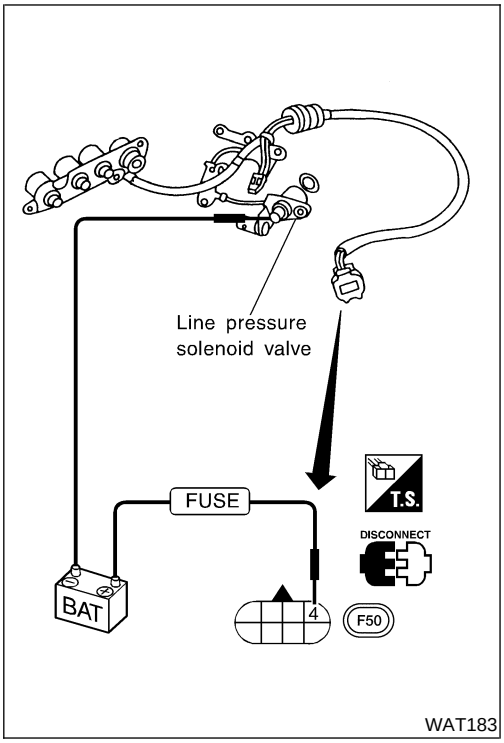
- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0077S0101

- Check resistance between two terminals.

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

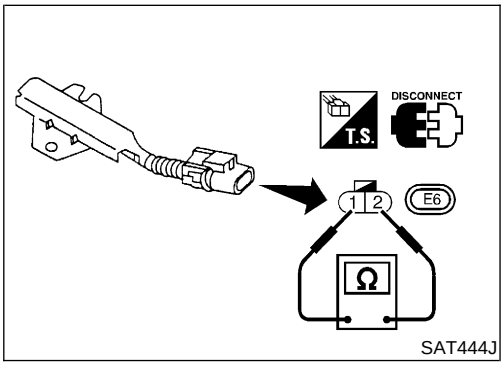


WAT183

Operation Check

NIAT0077S0102

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



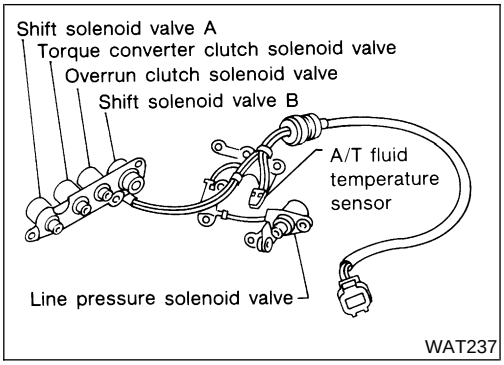
SAT444J

DROPPING RESISTOR

NIAT0077S02

- Check resistance between two terminals.

Resistance:
10 - 15Ω



Description

NIAT0078

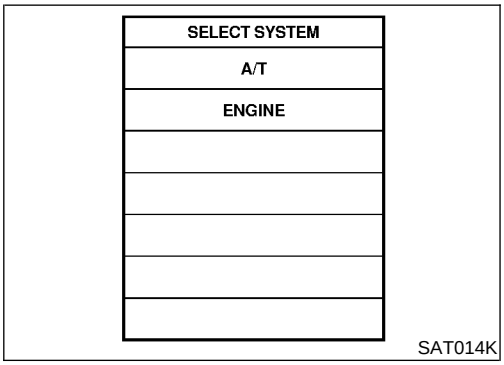
Shift solenoid valves A and B are turned “ON” or “OFF” by the TCM in response to signals sent from the PNP switch, vehicle speed and throttle position sensors. Gears will then be shifted to the optimum position.

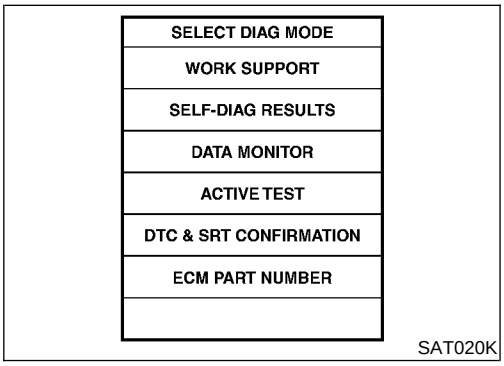
Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

ON BOARD DIAGNOSIS LOGIC

NIAT0078S02

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.	• Harness or connectors (The solenoid circuit is open or shorted.) • Shift solenoid valve A





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0078S03

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”).

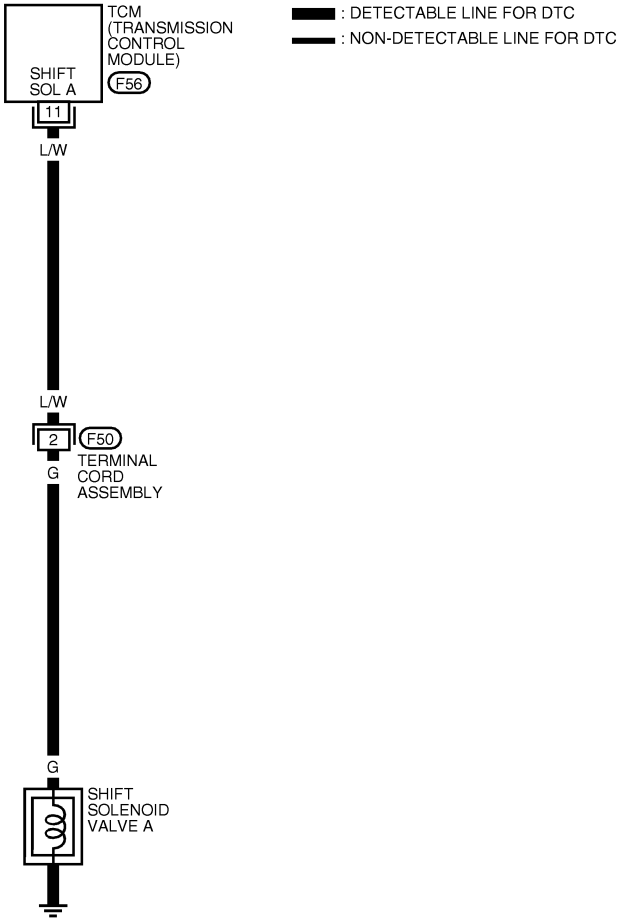
With GST

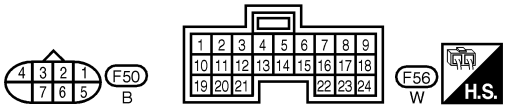
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/A

NIAT0079

AT-SSV/A-01





WAT125

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

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

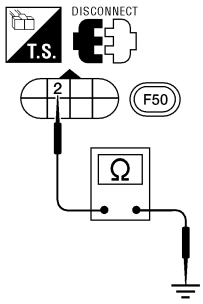
LAT261

Diagnostic Procedure

NIAT0080

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.



Resistance:
20 - 30 Ω

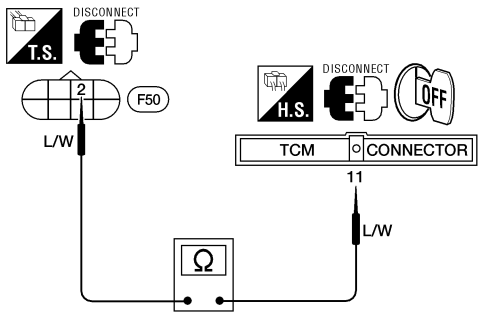
LAT184

OK or NG

OK	▶	GO TO 2.
NG	▶	1. Remove control valve assembly. Refer to AT-433. 2. Check the following items: ● Shift solenoid valve A Refer to “Component Inspection”, AT-186. ● 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.



Continuity should exist.

LAT185

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

4. Reinstall any part removed.

OK or NG

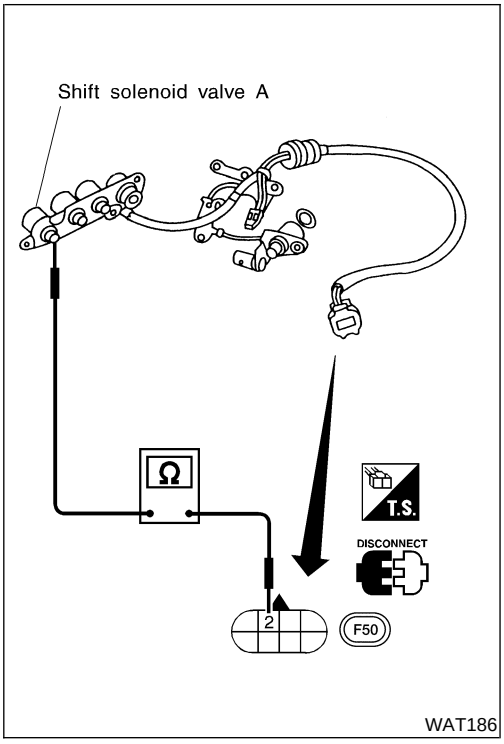
OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK DTC

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

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

NIAT0081

SHIFT SOLENOID VALVE A

NIAT0081S01

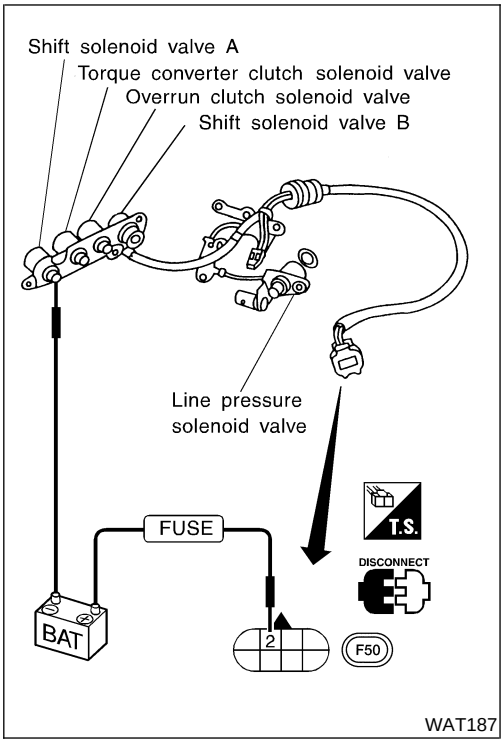
- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0081S0101

- Check resistance between two terminals.

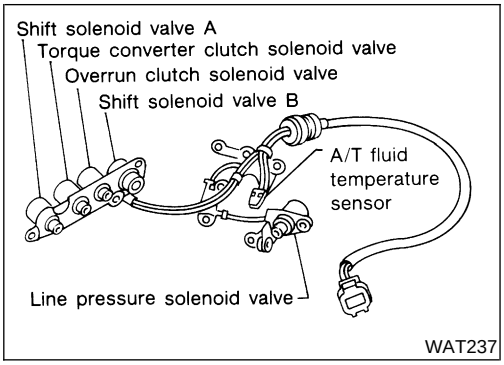
Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω



Operation Check

NIAT0081S0102

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



Description

NIAT0082

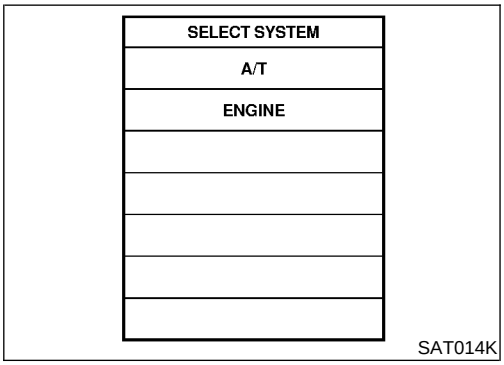
Shift solenoid valves A and B are turned “ON” or “OFF” by the TCM in response to signals sent from the PNP switch, vehicle speed and throttle position sensors. Gears will then be shifted to the optimum position.

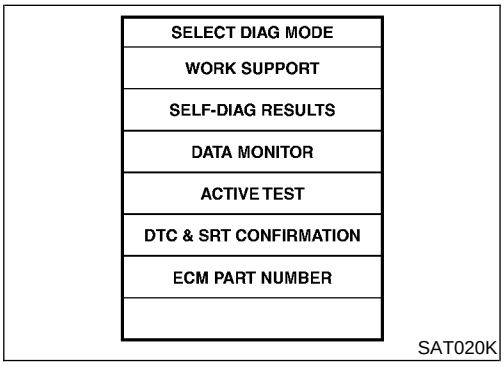
Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

ON BOARD DIAGNOSIS LOGIC

NIAT0082S02

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





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0082S03

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”).

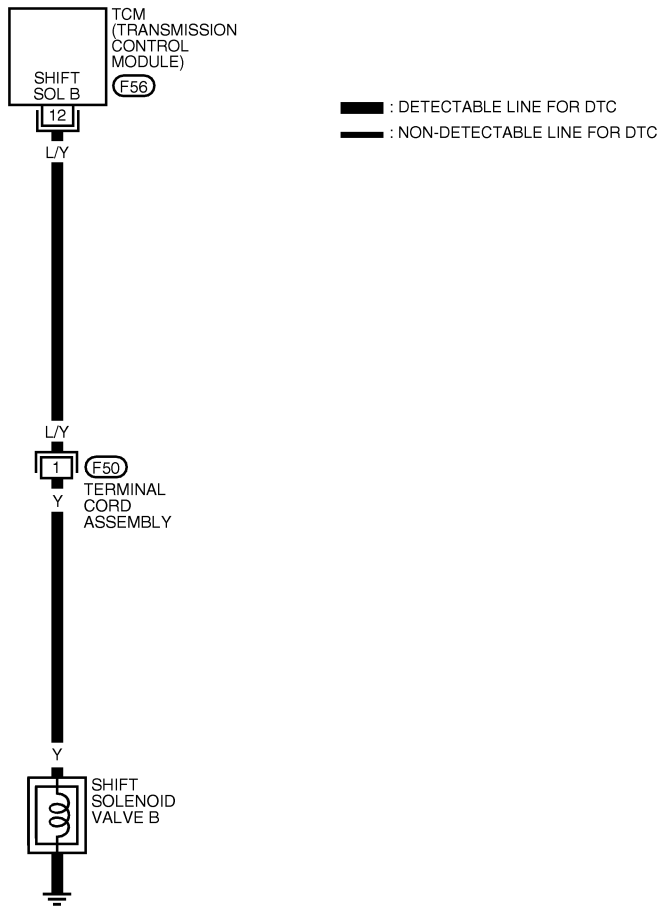
With GST

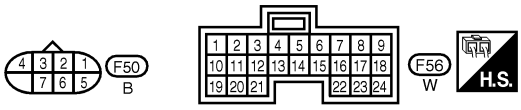
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/B

NIAT0083

AT-SSV/B-01





WAT126

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	1V OR LESS

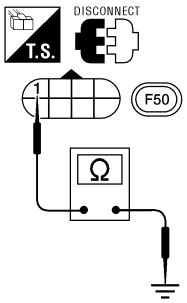
LAT260

Diagnostic Procedure

NIAT0084

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.



Resistance:
5 - 20Ω

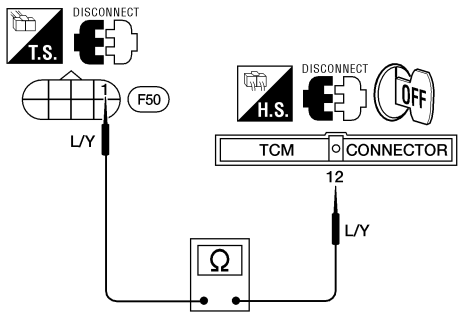
LAT188

OK or NG

OK	▶	GO TO 2.
NG	▶	1. Remove control valve assembly. Refer to “REMOVAL”, AT-433. 2. Check the following items: ● Shift solenoid valve B Refer to “Component Inspection”, AT-190. ● 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.



Continuity should exist.

LAT189

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

4. Reinstall any part removed.

OK or NG

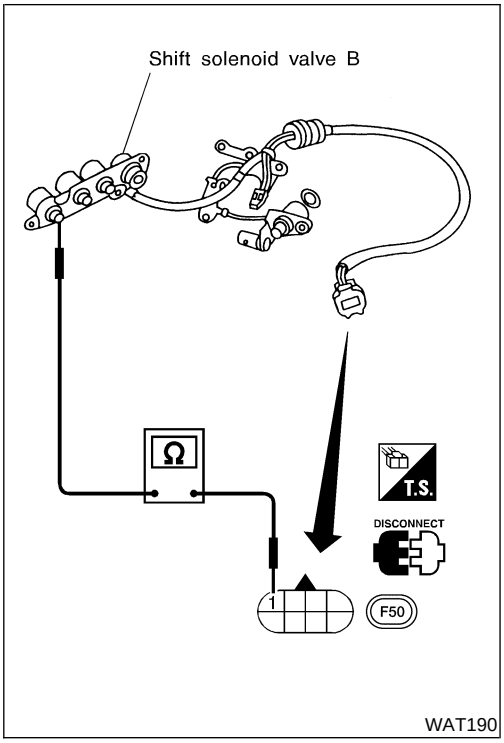
OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK DTC

Perform “DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE”, AT-187.

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

NIAT0085

SHIFT SOLENOID VALVE B

NIAT0085S01

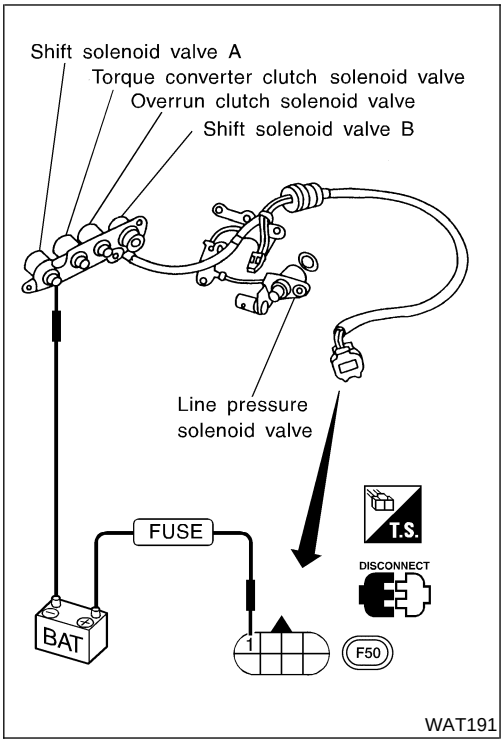
- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0085S0101

- Check resistance between two terminals.

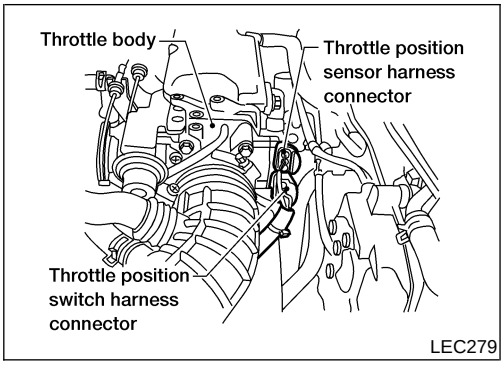
Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve B	1	Ground	5 - 20Ω



Operation Check

NIAT0085S0102

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



Description

NIAT0086

- Throttle position sensor
  The throttle position sensor detects the throttle valve position and sends a signal to the TCM.
- Throttle position switch
  Consists of a wide open throttle position switch and a closed throttle position switch.
  The wide open throttle position switch sends a signal to the TCM when the throttle valve is open at least 1/2 of the full throttle position. The closed throttle position switch sends a signal to the TCM when the throttle valve is fully closed.

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NIAT0086S01

Remarks: Specification data are reference values.

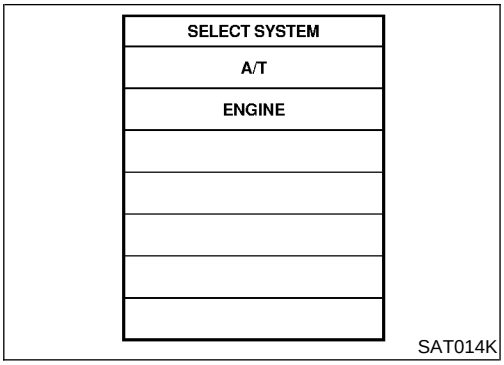
Monitor item	Condition	Specification
Throttle position sensor	Fully-closed throttle	Approximately 0.5V
	Fully-open throttle	Approximately 4V

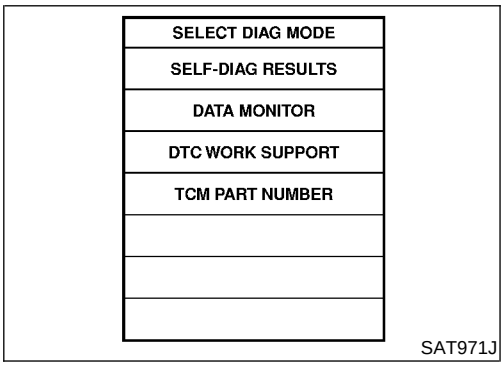
ON BOARD DIAGNOSIS LOGIC

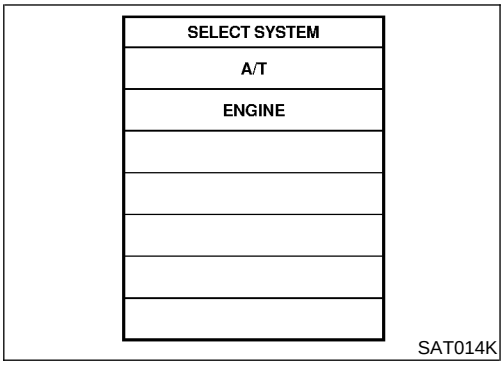
NIAT0086S03

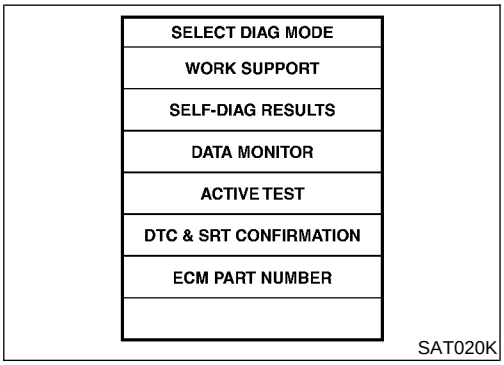
Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
(OBD) : TP SEN/CIRC A/T (CST) : P1705	TCM receives an excessively low or high voltage from the sensor.	• Harness or connectors (The sensor circuit is open or shorted.) • Throttle position sensor • Throttle position switch

Description (Cont'd)









DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0086S04

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) Apply vacuum to the throttle opener, then check the following. Refer to steps from 1 to 5 of "Preparation", "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
2) Turn ignition switch "ON" and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3) Check the following.

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 "Diagnostic Procedure", AT-194.
If the check result is OK, go to following step.

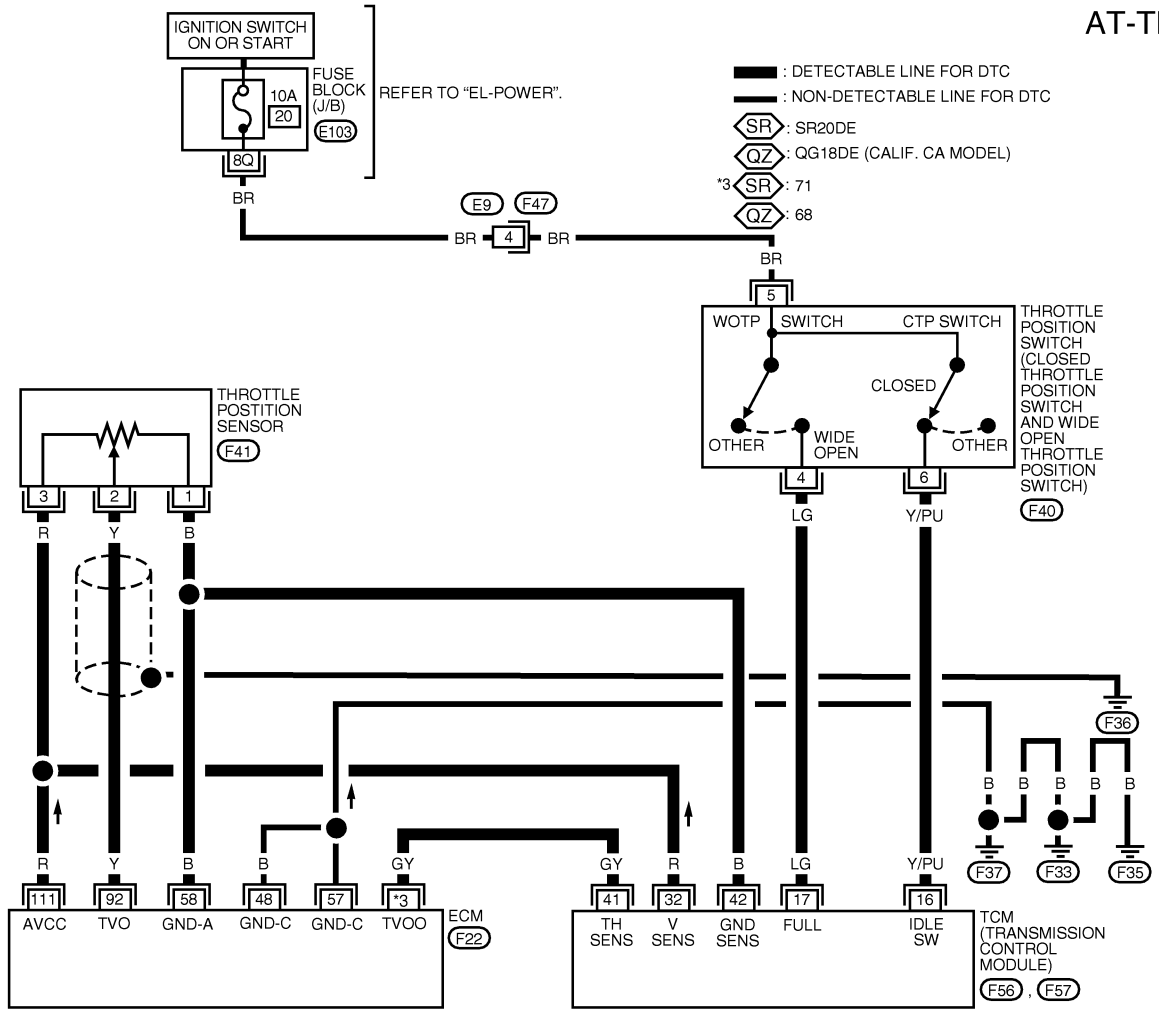
4) Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
5) Start engine and maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.
VHCL SPEED SE: 10 km/h (6 MPH) or more
THRTL POS SEN: Approximately 3V or less
Selector lever: D position (OD "ON")
If the check result is NG, go to "Diagnostic Procedure", AT-194.
If the check result is OK, go to following step.
6) 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 (OD "ON")

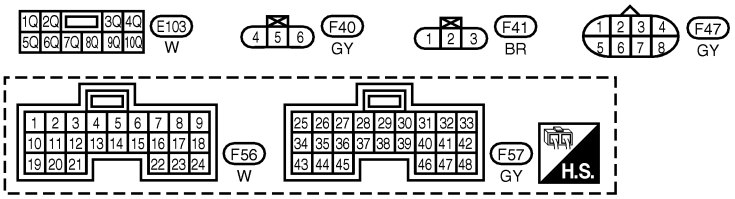
With GST

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — TPS

=NIAT0087





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT127

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TEMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
16	Y/PU	CLOSED THROTTLE POSITION SWITCH	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	BATTERY VOLTAGE
			WHEN DEPRESSING ACCLERATOR PEDAL (ENGINE WARM)	1V OR LESS
17	LG	WIDE OPEN THROTTLE POSITION SWITCH	WHEN DEPRESSING ACCLERATOR PEDAL MORE THAN HALF-WAY (ENGINE WARM)	BATTERY VOLTAGE
			WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	1V OR LESS
32	B/W	THROTTLE POSITION SENSOR (POWER SOURCE)	WHEN TURNING IGNITION SWITCH TO "ON"	4.5 - 5.5V
			WHEN TURNING IGNITION SWITCH TO "OFF"	1V OR LESS
41	GY	THROTTLE POSITION SENSOR	WHEN DEPRESSING ACCELERATOR PEDAL SLOWLY (ENGINE WARM)	CLOSED: APPROX 0.5V OPEN : APPROX 4V
42	B	GROUND (THROTTLE POSITION SENSOR)	—	1V OR LESS

LAT266

Diagnostic Procedure

NIAT0088

1	CHECK DTC WITH ECM
Perform diagnostic test mode II (self-diagnostic results) for engine control. Refer to ***EC-772*** [QG18DE (Calif. CA Model)], ***EC-1440*** (SR20DE), “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 circuit for engine control. Refer to ***EC-875*** [QG18DE (Calif. CA Model)], ***EC-1540*** (SR20DE), “DTC P0120 THROTTLE POSITION SENSOR”.

2	CHECK INPUT SIGNAL (WITH CONSULT-II)

With CONSULT-II

1. Apply vacuum to the throttle opener then check the following. Refer to steps 1 through 5 of “TCM/PCM Self-diagnostic Procedure (No Tools)”, AT-52.
2. Turn ignition switch to “ON” position.
   (Do not start engine.)
3. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
4. Read out the value of “THRTL POS SEN”.

Voltage:
Fully-closed throttle:
Approximately 0.5V
Fully-open throttle:
Approximately 4V

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

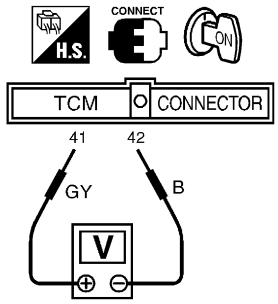
OK or NG	
OK ▶	GO TO 4.
NG ▶	Check harness for short or open between ECM and TCM regarding throttle position sensor circuit. (Main harness)

3	CHECK INPUT SIGNAL (WITHOUT CONSULT-II)	

Without CONSULT-II

1. Apply vacuum to the throttle opener then check the following. Refer to steps 1 through 5 of "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
2. Turn ignition switch to "ON" position.
   (Do not start engine.)
3. 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)



SAT453J

OK or NG

OK	▶	GO TO 5.
NG	▶	Check harness for short or open between ECM and TCM regarding throttle position sensor circuit. (Main harness)

Diagnostic Procedure (Cont'd)

4	CHECK THROTTLE POSITION SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Apply vacuum to the throttle opener, then check the following. Refer to steps 1 through 5 of "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
2. Turn ignition switch to "ON" position.
   (Do not start engine.)
3. Select "ECU INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
4. Read out "CLOSED THL/SW" and "W/O THRL/P-SW" depressing and releasing accelerator pedal.
   Check the signal of throttle position switch is indicated properly.

Accelerator pedal condition	Data monitor	
	CLOSED THL/SW	W/O THRL/P-SW
Released	ON	OFF
Fully depressed	OFF	ON

MTBL0011

DATA MONITOR	
MONITORING	
POWERSHIFT SW	OFF
CLOSED THL/SW	OFF
W/O THRL/P-SW	OFF
HOLD SW	OFF
BRAKE SW	ON

SAT702J

OK or NG

OK	▶	GO TO 6.
NG	▶	**Check the following items:** ● Throttle position switch — Refer to "Component Inspection", AT-198. ● Harness for short or open between ignition switch and throttle position switch (Main harness) ● Harness for short or open between throttle position switch and TCM (Main harness)

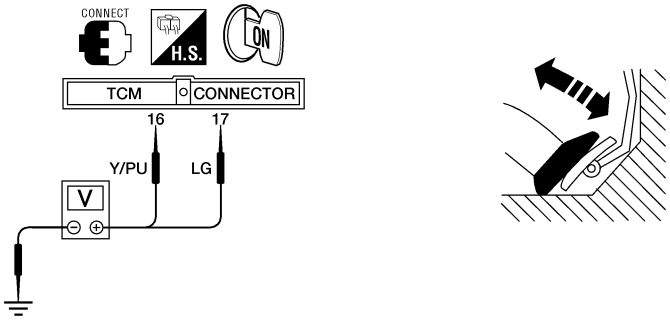
5	CHECK THROTTLE POSITION SWITCH CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

1. Apply vacuum to the throttle opener, then check the following. Refer to steps 1 through 5 of "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
2. Turn ignition switch to "ON" position.
   (Do not start engine.)
3. Check voltage between TCM terminals 16, 17 and ground while depressing, and releasing accelerator pedal slowly.
   (After warming up engine)

Accelerator pedal condition	Voltage	
	Terminal No. 16	Terminal No. 17
Released	Battery voltage	1V or less
Fully depressed	1V or less	Battery voltage

MTBL0137



LAT192

OK or NG

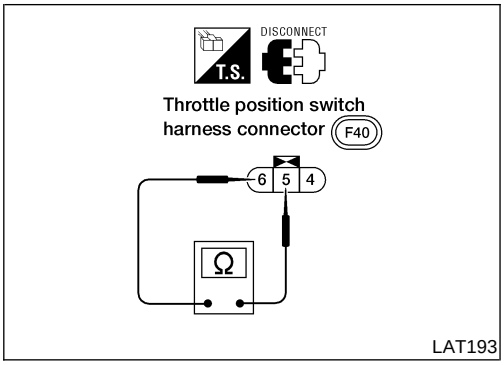
OK	▶	GO TO 6.
NG	▶	**Check the following items:** ● Throttle position switch — Refer to "Component Inspection", AT-198. ● Harness for short or open between ignition switch and throttle position switch (Main harness) ● Harness for short or open between throttle position switch and TCM (Main harness)

6	CHECK DTC

Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-192.

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

=NIAT0089

THROTTLE POSITION SWITCH

NIAT0089S01

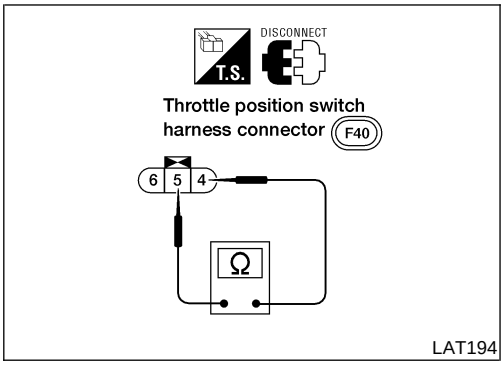
Closed Throttle Position Switch (Idle position)

NIAT0089S0101

- Check continuity between terminals 5 and 6.
  [Refer to “TCM/PCM Self-diagnostic Procedure (No Tools)”, AT-52.]

Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

- To adjust closed throttle position switch, refer to ***EC-1117*** [QG18DE (Calif. CA Model)], ***EC-1785*** (SR20DE), “DTC P0510 CLOSED THROTTLE POSITION SWITCH”.

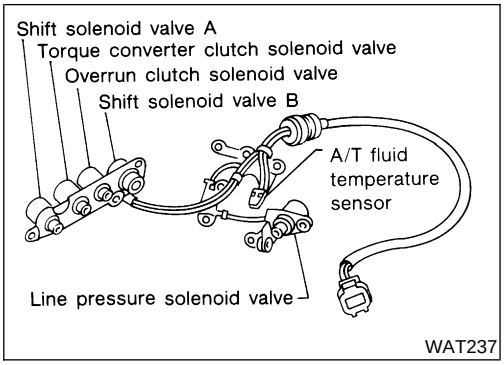


Wide Open Throttle Position Switch

NIAT0089S0102

- Check continuity between terminals 4 and 5.

Accelerator pedal condition	Continuity
Released	No
Depressed	Yes



Description

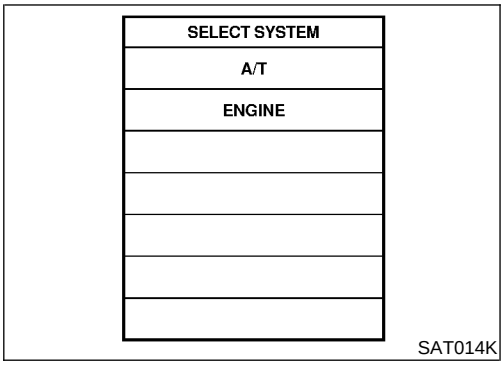
NIAT0090

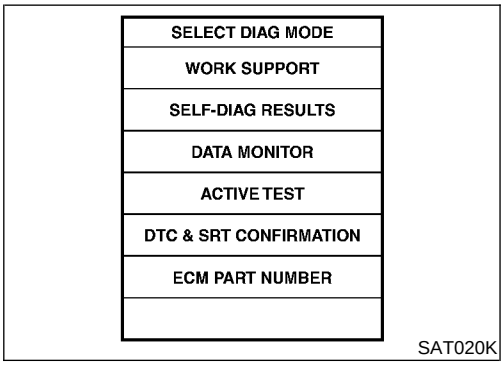
The overrun clutch solenoid valve is activated by the TCM in response to signals sent from the inhibitor switch, overdrive control switch, vehicle speed and throttle position sensors. The overrun clutch operation will then be controlled.

ON BOARD DIAGNOSIS LOGIC

NIAT0090S02

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





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0090S03

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").

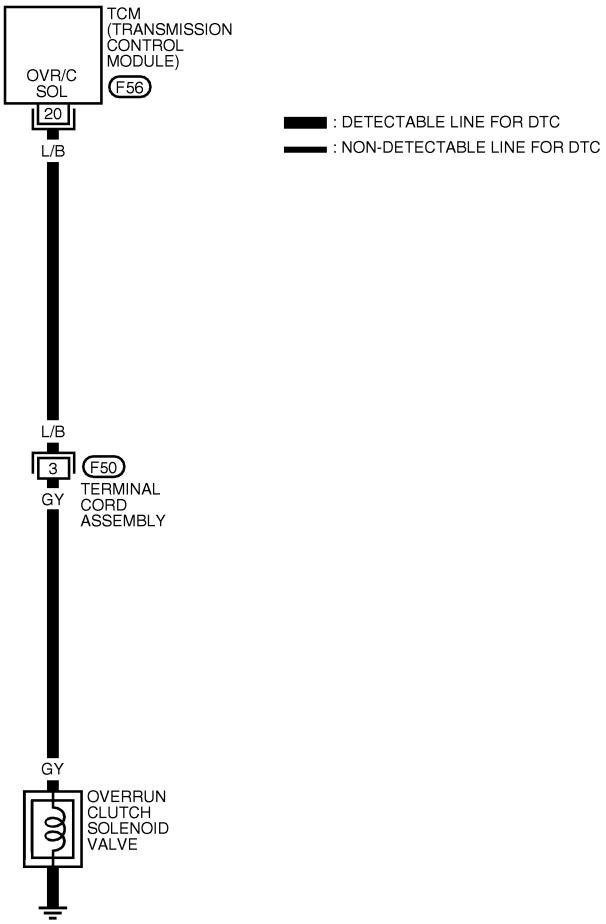
With GST

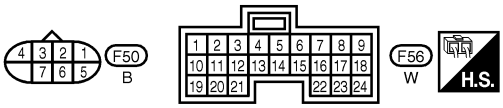
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — OVRCSV

=NIAT0091

AT-OVRCSV-01





WAT128

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND 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	1V OR LESS

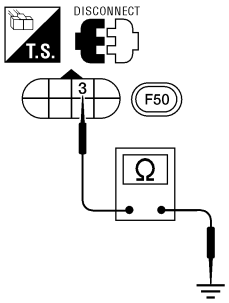
LAT267

Diagnostic Procedure

NIAT0092

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.



Resistance:
20 - 30Ω

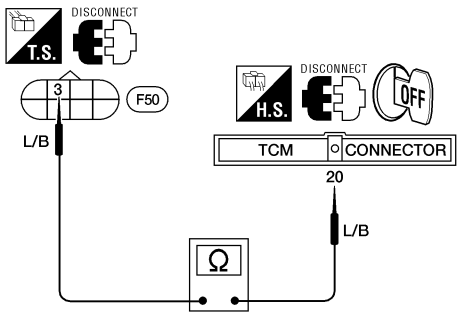
LAT195

OK or NG

OK	▶	GO TO 2.
NG	▶	1. Remove control valve assembly. Refer to “REMOVAL”, AT-433. 2. Check the following items: ● Overrun clutch solenoid valve Refer to “Component Inspection”, AT-202. ● 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.



Continuity should exist.

LAT196

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

4. Reinstall any part removed.

OK or NG

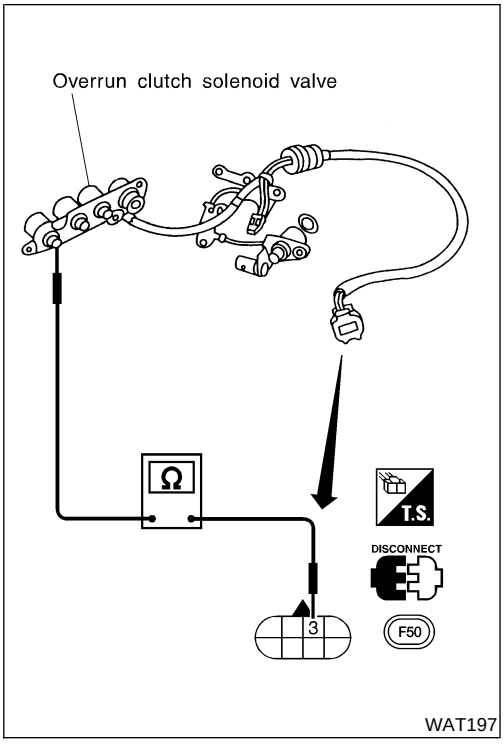
OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK DTC

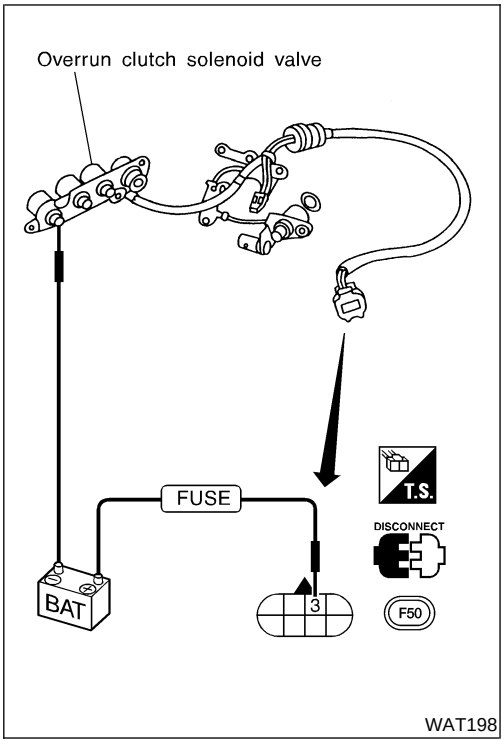
Perform “DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE”, AT-199.

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.



WAT197



WAT198

Component Inspection

NIAT0093

OVERRUN CLUTCH SOLENOID VALVE

NIAT0093S01

- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0093S0101

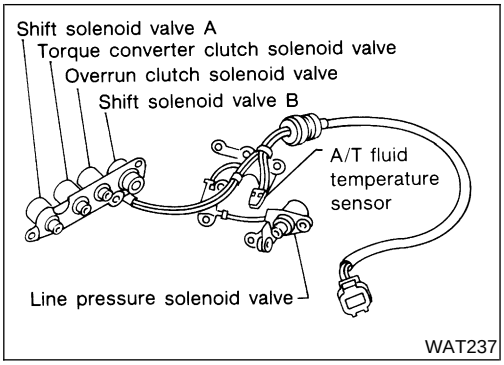
- Check resistance between two terminals.

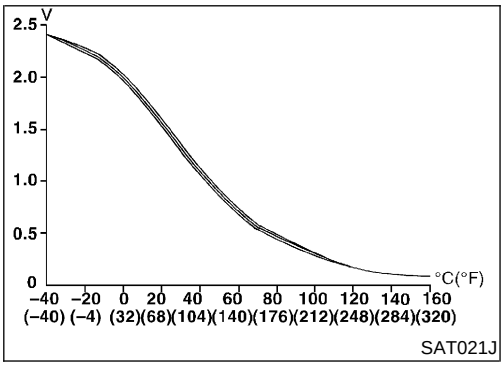
Solenoid valve	Terminal No.		Resistance (Approx.)
Overrun clutch solenoid valve	3	Ground	20 - 30Ω

Operation Check

NIAT0093S0102

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





Description

NIAT0094

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

NIAT0094S01

Remarks: Specification data are reference values.

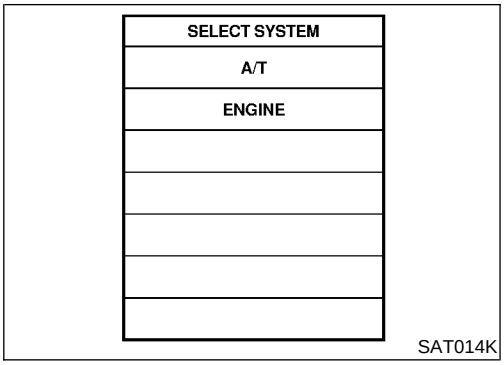
Monitor item	Condition	Specification
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	Approximately 1.5V ↓ Approximately 0.5V

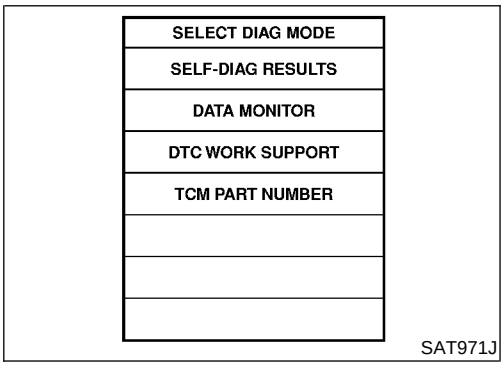
ON BOARD DIAGNOSIS LOGIC

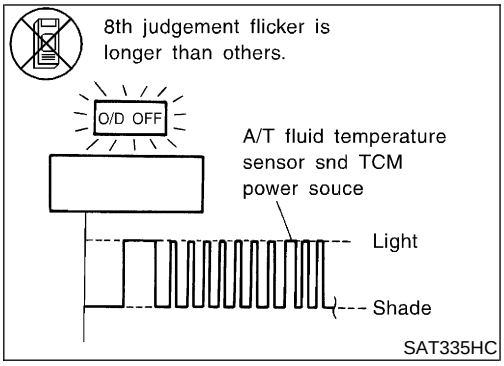
NIAT0094S03

Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
(P) : BATT/FLUID TEMP SEN (8) : 8th judgement flicker	TCM receives an excessively low or high voltage from the sensor.	• Harness or connectors (The sensor circuit is open or shorted.) • A/T fluid temperature sensor

Description (Cont'd)







DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0094S04

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

With CONSULT-II

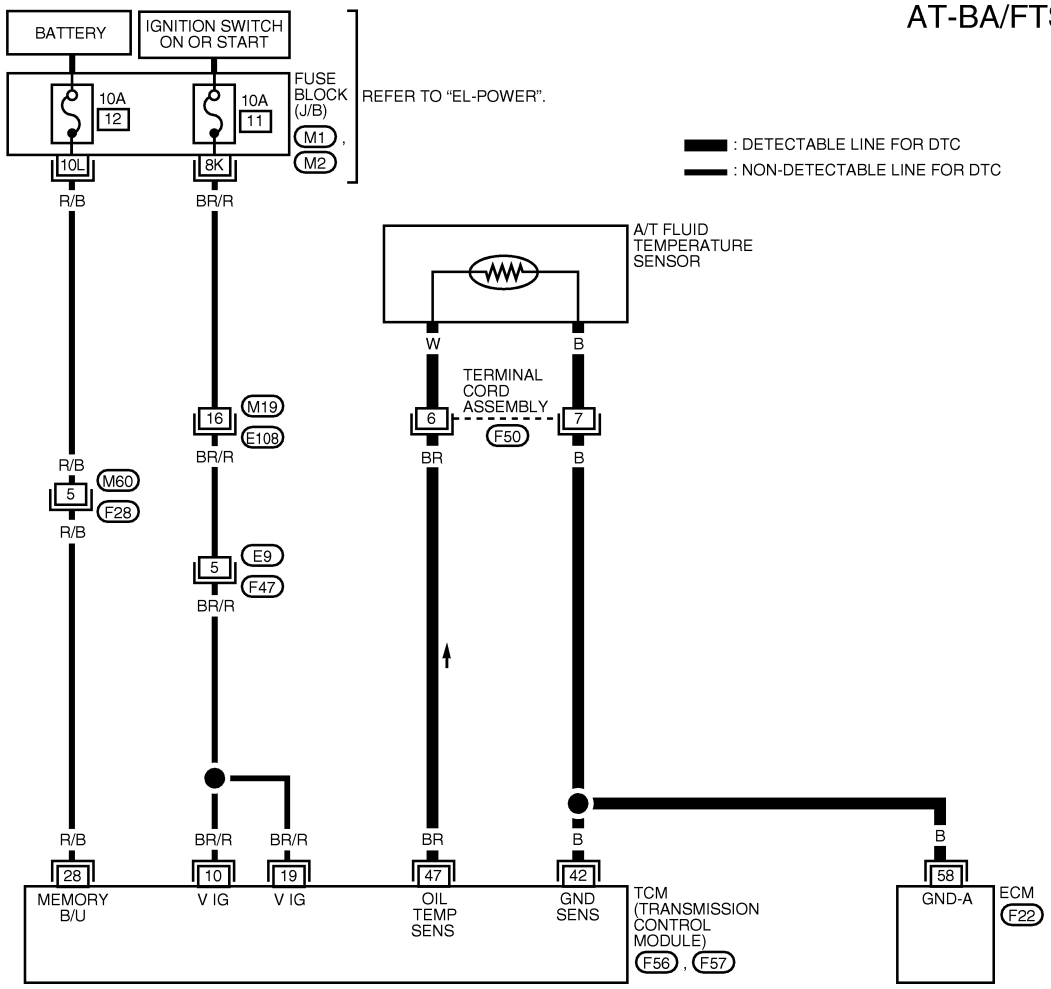
1) Start engine.
2) Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3) Drive vehicle under the following conditions:
   Selector lever in "D", vehicle speed higher than 20 km/h (12 MPH).

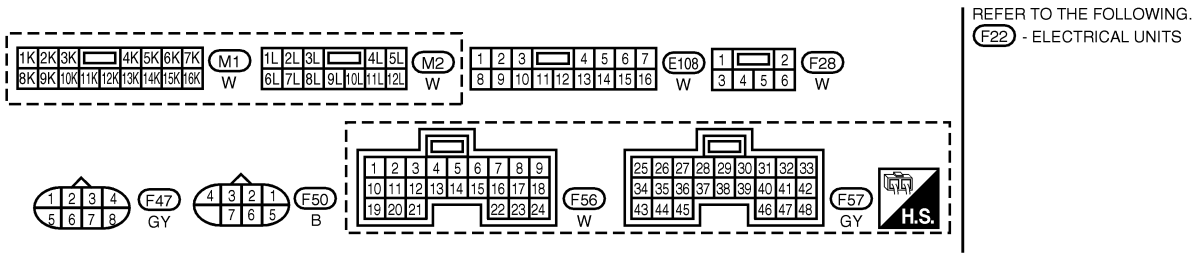
Without CONSULT-II

1) Start engine.
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 TCM/PCM Self-diagnostic Procedure (No Tools), AT-52.

Wiring Diagram — AT — BA/FTS

NIAT0095





WAT129

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN 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"	1V OR LESS
19	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH TO "OFF"	1V OR LESS
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	GROUND (A/T FLUID TEMPERATURE SENSOR)	—	1V OR LESS
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

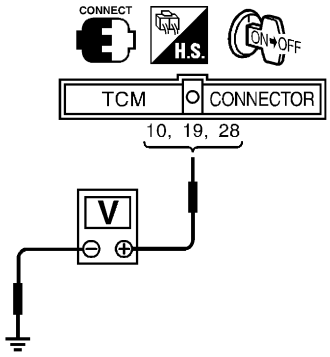
LAT268

Diagnostic Procedure

NIAT0096

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



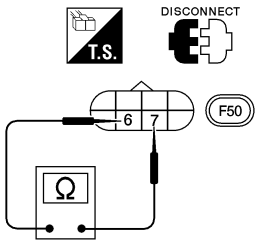
SAT461J

OK or NG

OK	▶	GO TO 2.
NG	▶	**Check the following items:** ● Harness for short or open between ignition switch and TCM (Main harness) ● Ignition switch and fuse Refer to ***EL-9***, “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 in engine compartment.
3. Check resistance between terminals 6 and 7 when A/T is cold.



LAT200

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 “Component Inspection”, AT-209. ● 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 "ECU INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "FLUID TEMP SE".

Voltage:

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

Approximately 1.5V → 0.5V

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 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-843*** [QG18DE (Calif. CA Model)], ***EC-1509*** (SR20DE), "TROUBLE DIAGNOSIS FOR POWER SUPPLY".

Diagnostic Procedure (Cont'd)

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

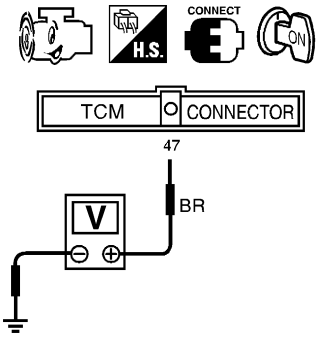
Without CONSULT-II

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

Voltage:

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

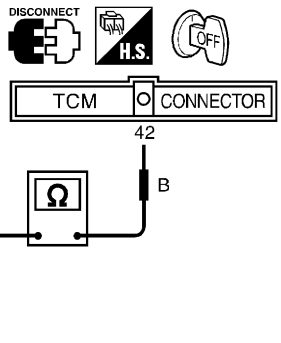
Approximately 1.5V → 0.5V



SAT463J

3. Turn ignition switch to "OFF" position.
4. Disconnect TCM harness connector.
5. Check resistance between terminal 42 and ground.

Continuity should exist.



SAT464J

OK or NG

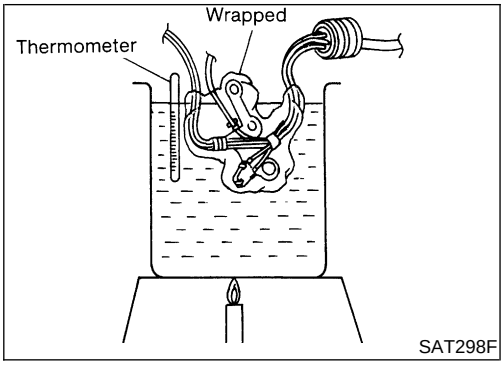
OK	▶	GO TO 5.
NG	▶	**Check the following items:** ● Harness for short or open between TCM, ECM and terminal cord assembly (Main harness) ● Ground circuit for ECM Refer to ***EC-843*** [QG18DE (Calif. CA Model)], ***EC-1509*** (SR20DE), "TROUBLE DIAGNOSIS FOR POWER SUPPLY".

5	CHECK DTC

Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-204.

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

NIAT0097

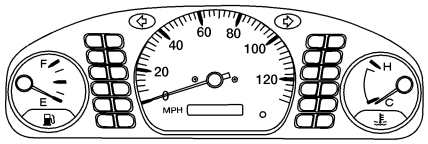
A/T FLUID TEMPERATURE SENSOR

NIAT0097S01

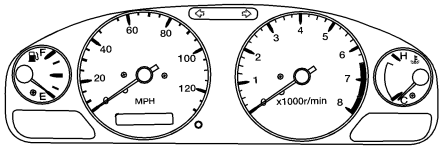
- Refer to “REMOVAL”, AT-433.
- Check resistance between two terminals while changing temperature as shown at left.

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

Without tachometer



With tachometer



LAT199

Description

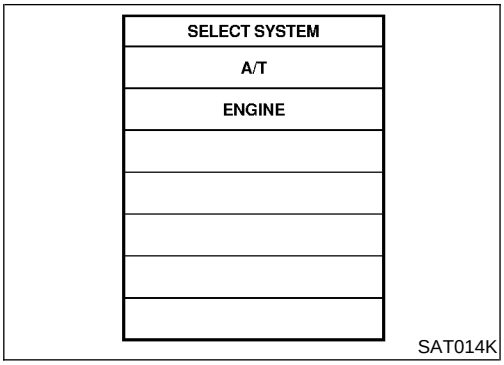
NIAT0098

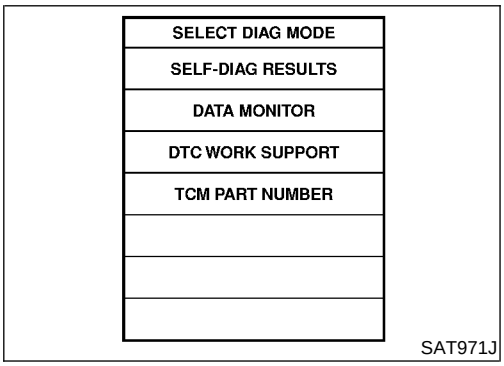
The vehicle speed sensor·MTR is built into the speedometer assembly. The sensor functions as an auxiliary device to the revolution sensor when it is malfunctioning. The TCM will then use a signal sent from the vehicle speed sensor·MTR.

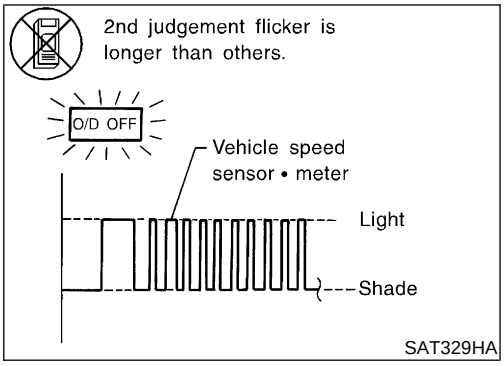
ON BOARD DIAGNOSIS LOGIC

NIAT0098S02

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







DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0098S03

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

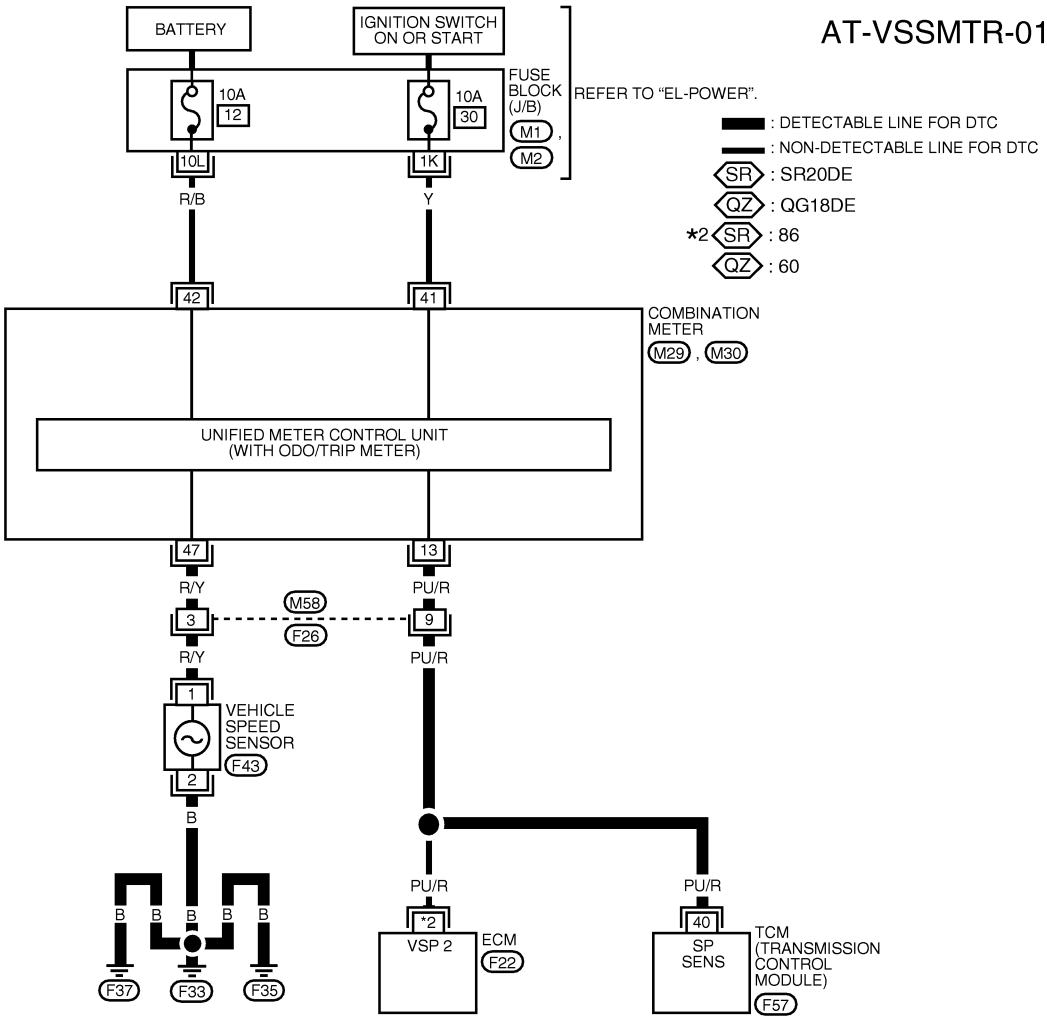
1) Turn ignition switch "ON" and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2) Start engine and accelerate vehicle from 0 to 25 km/h (0 to 16 MPH).

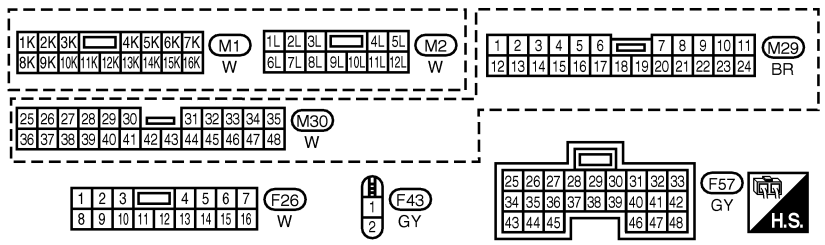
Without CONSULT-II

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/PCM Self-diagnostic Procedure (No Tools)", AT-52.

Wiring Diagram — AT — VSSMTR

NIAT0099





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT130

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

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 (3 ft) OR MORE	VOLTAGE VARIES FROM GREATER THAN 1V TO LESS THAN 4.5V

LAT269

Diagnostic Procedure

NIAT0100

1	CHECK INPUT SIGNAL

With CONSULT-II

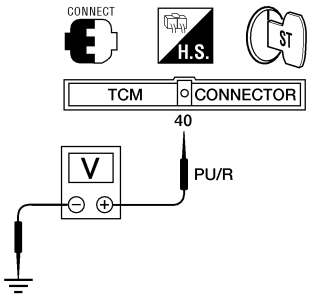
1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·MTR” while driving.
   Check the value changes according to driving speed.

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.



Voltage:
Voltage varies between less than 1V and more than 4.5V.

LAT201

OK or NG

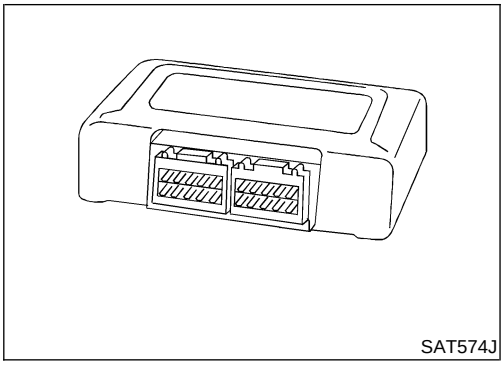
OK	▶	GO TO 2.
NG	▶	**Check the following items:** ● Vehicle speed sensor and ground circuit for vehicle speed sensor Refer to ***EL-85***, “METERS AND GAUGES”. ● Harness for short or open between TCM and vehicle speed sensor (Main harness)

2	CHECK DTC

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

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.



SAT574J

Description

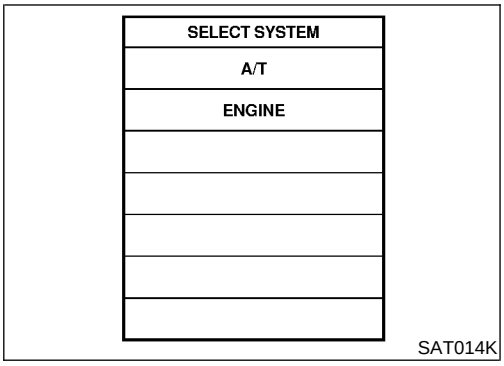
NIAT0101

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

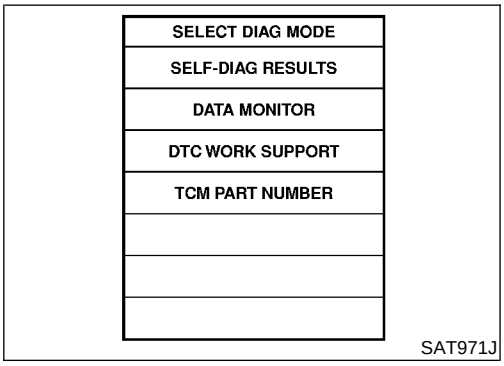
ON BOARD DIAGNOSIS LOGIC

NIAT0101S01

Diagnostic Trouble Code No.	Malfunction is detected when	Check Item (Possible Cause)
(P) : CONTROL UNIT (RAM), CONTROL UNIT (ROM)	TCM memory (RAM) or (ROM) is malfunctioning.	● TCM



SAT014K



SAT971J

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0101S02

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.

(P) 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.

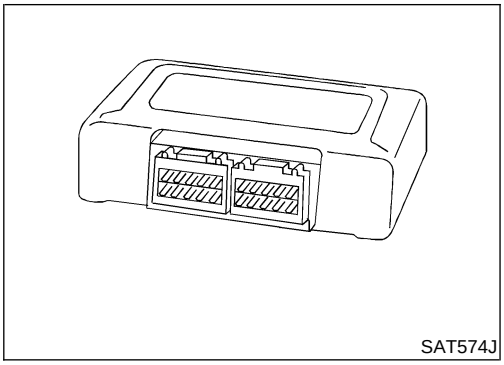
Diagnostic Procedure

NIAT0102

1	INSPECTION START (WITH CONSULT-II)
(P) 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.

2	CHECK DTC	
PERFORM DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE. See above.		
	▶	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**


SAT574J

Description

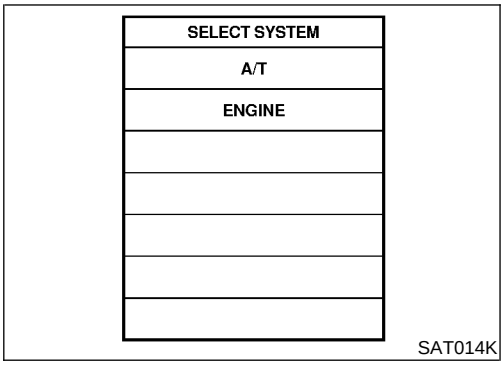
NIAT0103

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

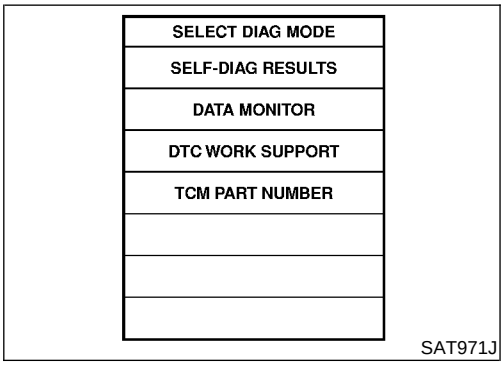
ON BOARD DIAGNOSIS LOGIC

NIAT0103S01

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
Ⓑ : CONT UNIT (EEP ROM)	TCM memory (EEP ROM) is malfunctioning.	● TCM



SAT014K



SAT971J

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0103S02

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.

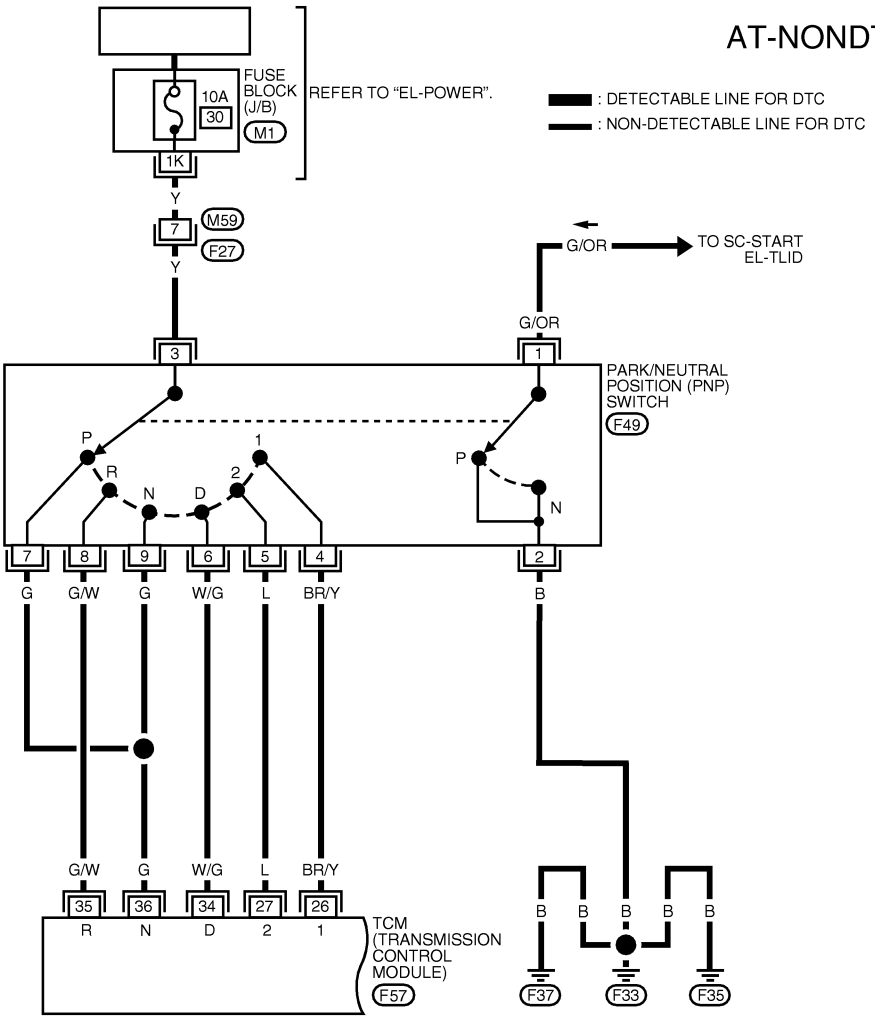
Diagnostic Procedure

NIAT0104

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 “DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE”, AT-216. **Is the “CONT UNIT (EEP ROM)” displayed again?**		
Yes	▶	Replace TCM.
No	▶	**INSPECTION END**

Wiring Diagram — AT — NONDTC

NIAT0105



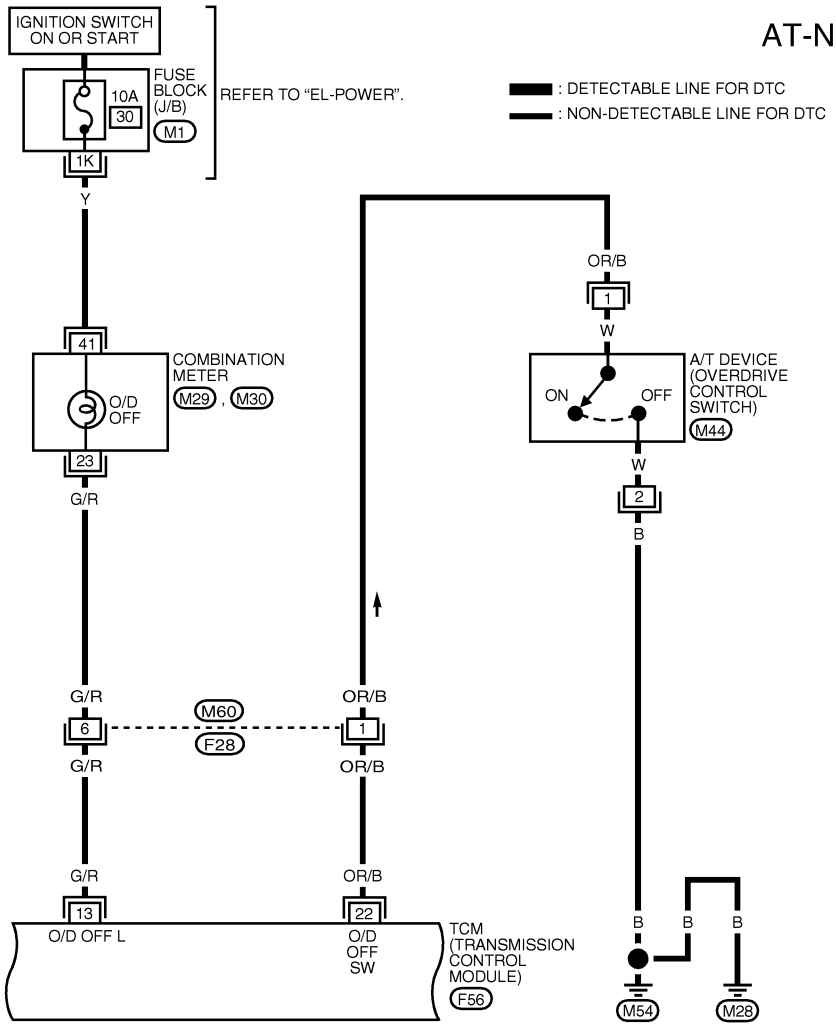
WAT131

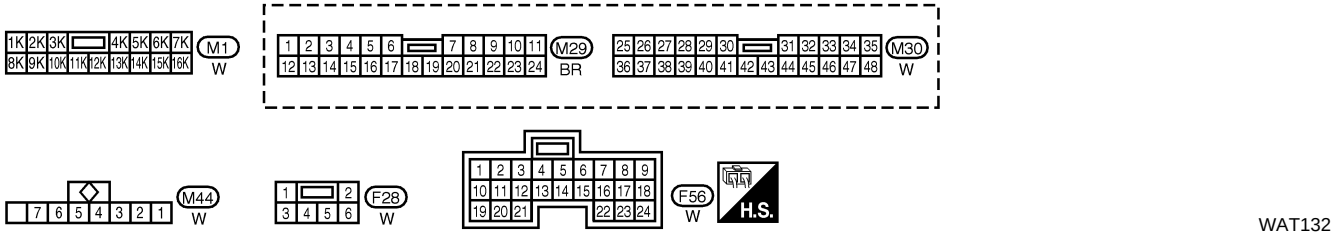
TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROND

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	1V OR LESS
27	L	PNP SWITCH "2" POSITION	WHEN SETTING SELECTOR LEVER TO "2" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
34	W/G	PNP SWITCH "D" POSITION	WHEN SETTING SELECTOR LEVER TO "D" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
35	G/W	PNP SWITCH "R" POSITION	WHEN SETTING SELECTOR LEVER TO "R" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
36	G	PNP SWITCH "N" OR "P" POSITION	WHEN SETTING SELECTOR LEVER TO "N" OR "P" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS

LAT270

AT-NONDTC-02





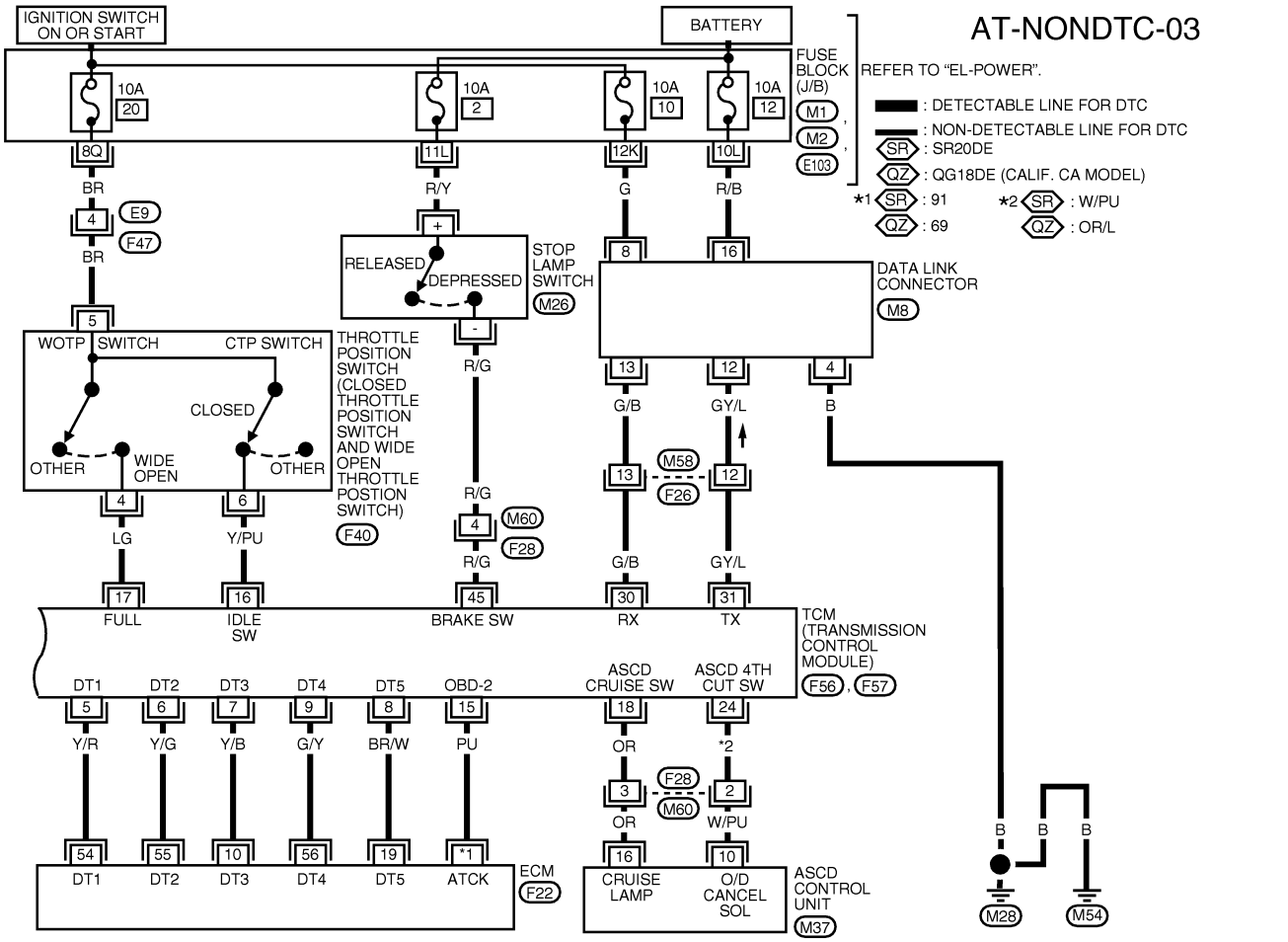
WAT132

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
13	G/R	O/D OFF INDICATOR LAMP	WHEN SETTING OVERDRIVE CONTROL SWITCH "OFF"	1V OR LESS
			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"	1V OR LESS

LAT271

Wiring Diagram — AT — NONDTC (Cont'd)

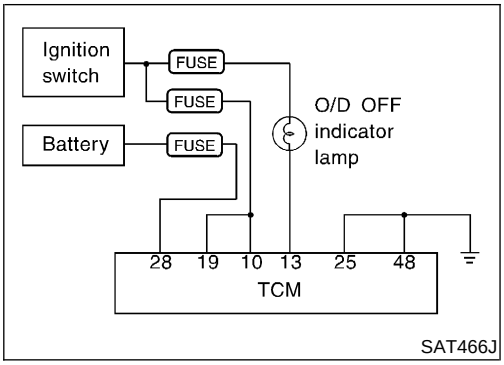


WAT133

TRANSMISSION CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
5	Y/R	—	—	—
6	Y/G	—	—	—
7	Y/B	—	—	—
8	BR/W	—	—	—
9	G/Y	—	—	—
15	PU	—	—	—
16	Y/PU	CLOSED THROTTLE POSITION SWITCH	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	BATTERY VOLTAGE
			WHEN DEPRESSING ACCELERATOR PEDAL (ENGINE WARM)	1V OR LESS
17	LG	WIDE OPEN THROTTLE POSITION SWITCH	WHEN DEPRESSING ACCELERATOR PEDAL > 1/2 (WARM)	BATTERY VOLTAGE
			WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	1V OR LESS
18	OR	ASCD CRUISE SWITCH	WHEN ASCD CRUISE IS BEING PERFORMED	BATTERY VOLTAGE
			WHEN ASCD CRUISE IS NOT BEING PERFORMED	1V OR LESS
24	W/PU	ASCD OD CUT SIGNAL	WHEN "ACCEL" SET SWITCH ON ASCD CRUISE IS IN "D " 4	5 - 10V
			WHEN "ACCEL" SET SWITCH ON ASCD CRUISE IS IN "D " 3	LESS THAN 2V
30	G/B	—	—	—
31	GY/L	—	—	—
45	R/G	STOP LAMP SWITCH	WHEN DEPRESSING BRAKE PEDAL	BATTERY VOLTAGE
			WHEN RELEASING BRAKE PEDAL	1V OR LESS

LAT272



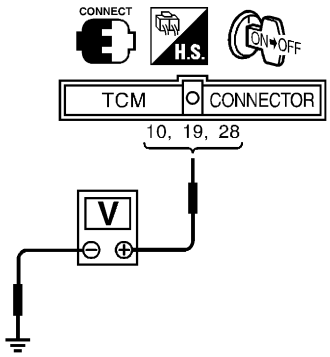
1. O/D OFF Indicator Lamp Does Not Come On

=NIAT0106

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

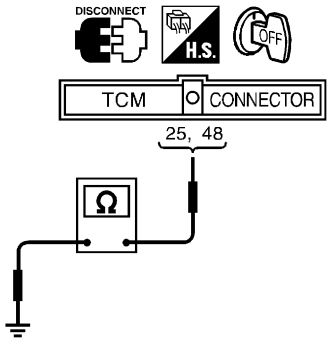
OK or NG

OK	▶	GO TO 2.
NG	▶	**Check the following items:** ● Harness for short or open between ignition switch and TCM (Main harness) Refer to “Wiring Diagram — AT — MAIN”, AT-112. ● Ignition switch and fuse Refer to ***EL-9***, “POWER SUPPLY ROUTING”.

1. O/D OFF Indicator Lamp Does Not Come On (Cont'd)

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.



SAT468J

Continuity should exist.

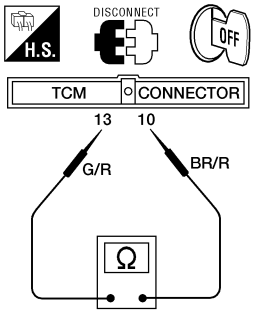
If OK, check harness for short to ground and short to power.

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 "Wiring Diagram — AT — MAIN", AT-112.

3	CHECK LAMP CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Check resistance between TCM terminals 13 and 10.



Resistance:
50 - 100 Ω

LAT202

3. Reinstall any part removed.

OK or NG

OK	▶	GO TO 4.
NG	▶	**Check the following items:** ● O/D OFF indicator lamp. Refer to ***EL-85***, "METERS AND GAUGES". ● Harness and fuse for short or open between ignition switch and O/D OFF indicator lamp (Main harness) Refer to ***EL-9***, "POWER SUPPLY ROUTING". ● Harness for short or open between O/D OFF indicator lamp and TCM.

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.

2. Engine Cannot Be Started In “P” and “N” Position

=NIAT0107

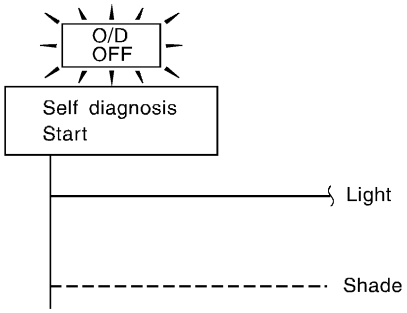
SYMPTOM:

- **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 “ECU INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to PNP switch circuit?



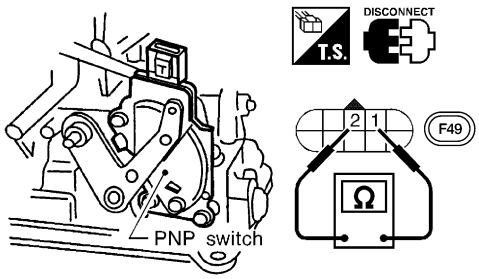
SAT367J

Yes or No

Yes	▶	Check PNP switch circuit. Refer to “DTC P0705”, AT-115.
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 “Component Inspection”, AT-119.



WAT203

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace PNP switch.

3	CHECK STARTING SYSTEM

Check starting system. Refer to ***SC-6***, “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

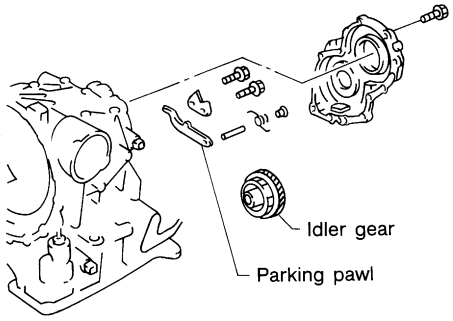
=NIAT0108

SYMPTOM:

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

1	CHECK PARKING COMPONENTS

Check parking components. Refer to “Parking Pawl Components”, AT-439.



SAT282F

OK or NG

OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.

4. In “N” Position, Vehicle Moves

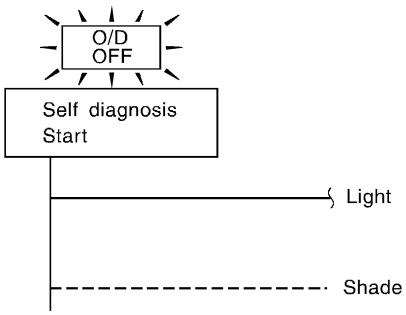
=NIAT0109

SYMPTOM:
Vehicle moves forward or backward when selecting “N” position.

1	CHECK PNP SWITCH CIRCUIT

With CONSULT-II
Does “ECU INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to inhibitor switch circuit?



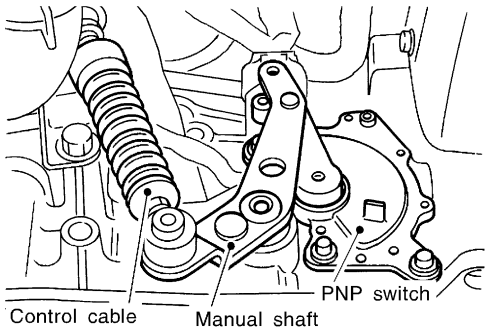
SAT367J

Yes or No

Yes	▶	Check PNP switch circuit. Refer to “DTC P0705”, AT-115.
No	▶	GO TO 2.

2	CHECK CONTROL CABLE

Check control cable. Refer to “Control Cable Adjustment”, AT-434.



SAT023JB

OK or NG

OK	▶	GO TO 3.
NG	▶	Adjust control cable. Refer to “Control Cable Adjustment”, AT-434.

3	CHECK A/T FLUID LEVEL

Check A/T fluid level again.

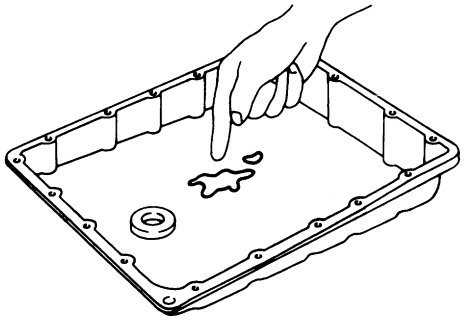
SAT638A

OK or NG

OK	▶	GO TO 4.
NG	▶	Refill ATF.

4	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 5.
NG	▶	1. Disassemble A/T. 2. Check the following items: ● Forward clutch assembly ● Overrun clutch assembly ● Reverse clutch assembly

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.

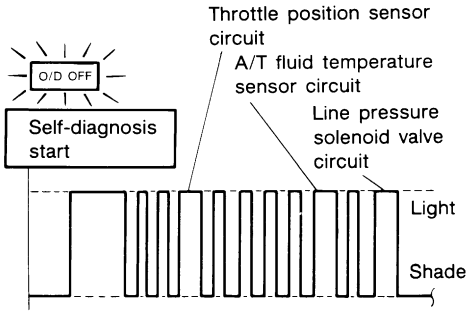
5. Large Shock. “N” → “R” Position

=NIAT0110

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 circuit?



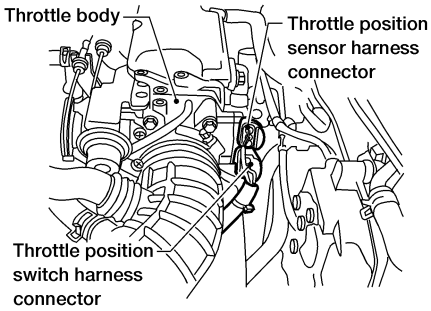
SAT345HA

Yes or No

Yes	▶	Check damaged circuit. Refer to “DTC P0710, P0745 or P1705”, AT-120, 178 or 191.
No	▶	GO TO 2.

2	CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to ***EC-875*** [QG18DE (Calif. CA Model)], ***EC-1540*** (SR20DE), “DTC P0120 THROTTLE POSITION SENSOR”.



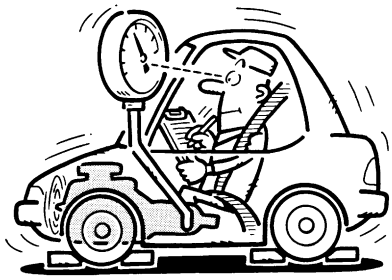
LEC279

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace throttle position sensor.

3	CHECK LINE PRESSURE

Check line pressure at idle with selector lever in "D" position. Refer to "Line Pressure Test", AT-72.



SAT494G

OK or NG

OK	▶	GO TO 4.
NG	▶	1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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

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.

6. Vehicle Does Not Creep Backward In “R” Position

=NIAT0111

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

1	CHECK A/T FLUID LEVEL

Check A/T fluid level again.

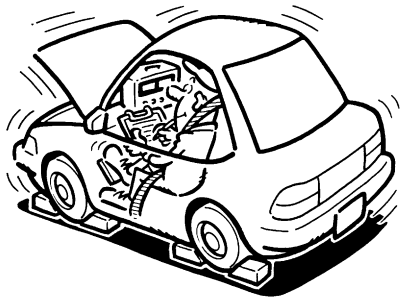
SAT638A

OK or NG

OK	▶	GO TO 2.
NG	▶	Refill ATF.

2	CHECK STALL TEST

Check stall revolution with selector lever in “1” and “R” positions.



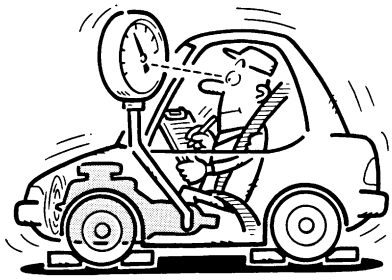
SAT493G

OK or NG

OK	▶	GO TO 3.
OK in “1” position, NG in “R” position	▶	1. Remove control valve assembly. Refer to “REMOVAL”, AT-433. 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
NG in both “1” and “R” positions	▶	GO TO 6.

3	CHECK LINE PRESSURE

Check line pressure at idle with selector lever in "R" position. Refer to "Line Pressure Test", AT-72.



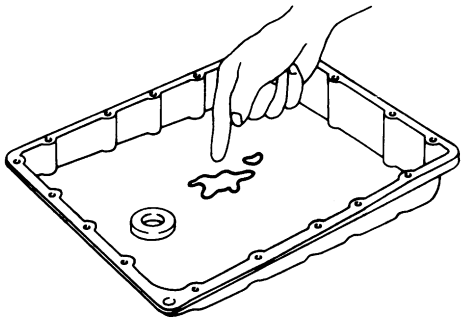
SAT494G

OK or NG

OK	▶	GO TO 4.
NG	▶	1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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

4	CHECK A/T FLUID CONDITION

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



SAT171B

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. Vehicle Does Not Creep Backward In "R" Position (Cont'd)

6	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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.

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

=NIAT0112

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.

SAT638A

OK or NG

OK	▶	GO TO 2.
NG	▶	Refill ATF.

2	CHECK STALL TEST

Check stall revolution with selector lever in “D” position. Refer to “Stall Test”, AT-68.

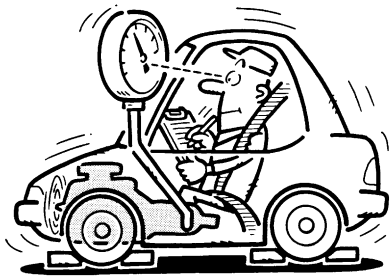
SAT493G

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 6.

3	CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to “Line Pressure Test ”, AT-72.



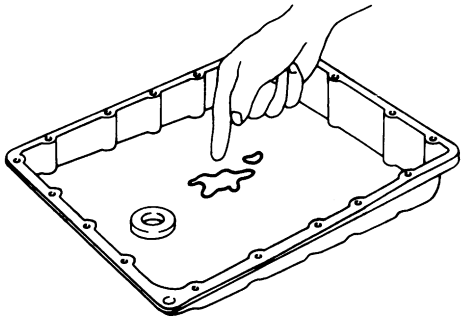
SAT494G

OK or NG

OK	▶	GO TO 4.
NG	▶	1. Remove control valve assembly. Refer to “REMOVAL”, AT-433. 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

4	CHECK A/T FLUID CONDITION

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



SAT171B

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. Remove control valve assembly. Refer to “REMOVAL”, AT-433. 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 5.
NG	▶	Repair or replace damaged parts.

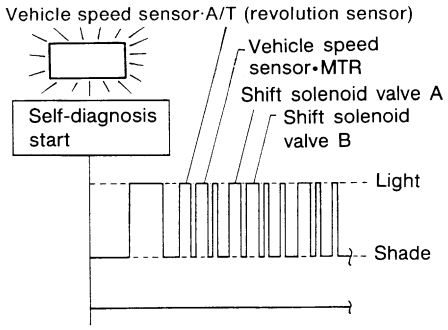
8. Vehicle Cannot Be Started From D_1

=NIAT0113

SYMPTOM:
Vehicle cannot be started from D_1 on Cruise Test — Part 1.

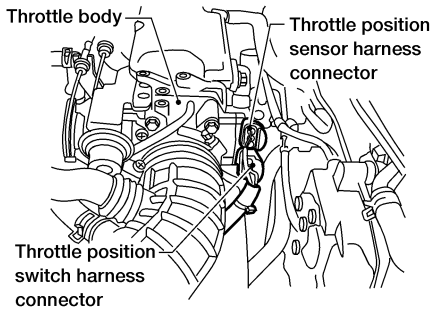
1	CHECK SYMPTOM	
Is “6. Vehicle Does Not Creep Backward In R Position” OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to “6. Vehicle Does Not Creep Backward In R Position”, AT-230.

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 “DTC P0720, P0750, P0755 or VHCL SPEED SEN·MTR”, AT-126, 183, 187 or 210.
No	▶	GO TO 3.



SAT934FB

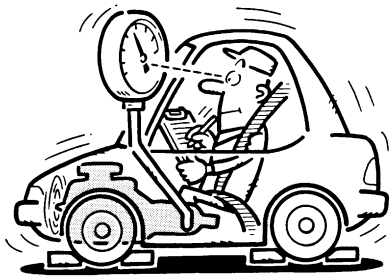
3	CHECK THROTTLE POSITION SENSOR	
Check throttle position sensor. Refer to ***EC-875*** [QG18DE (Calif. CA Model)], ***EC-1540*** (SR20DE), “DTC P0120 THROTTLE POSITION SENSOR”.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace throttle position sensor.



LEC279

4	CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in "D" position. Refer to "Line Pressure Test", AT-72.



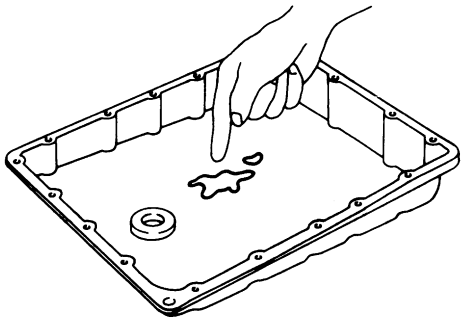
SAT494G

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.



SAT171B

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 8.

6	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "REMOVAL", AT-433.
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.

8. Vehicle Cannot Be Started From D_1 (Cont'd)

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 "REMOVAL", AT-433. 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 7.
NG ▶	Repair or replace damaged parts.

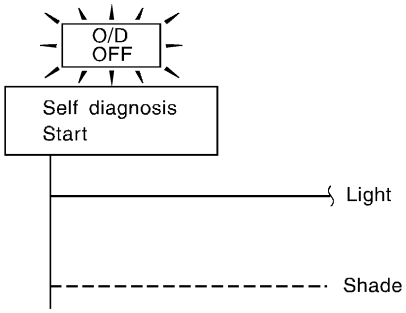
9. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$

=NIAT0114

SYMPTOM:
A/T does not shift from D_1 to D_2 at the specified speed.
A/T does not shift from D_4 to D_2 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 D_1 " OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position" and "8. Vehicle Cannot Be Started From D_1", AT-233, 236.

2	CHECK PNP SWITCH CIRCUIT	
With CONSULT-II Does "ECU INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit?		
Without CONSULT-II Does self-diagnosis show damage to PNP switch circuit?		



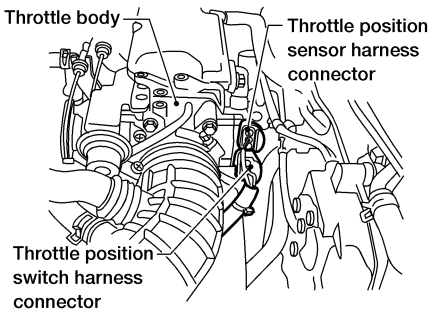
SAT367J

Yes or No		
Yes	▶	Check PNP switch circuit. Refer to "DTC P0705", AT-115.
No	▶	GO TO 3.

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 "DTC P0720 and VHCL SPEED SEN·MTR", AT-126, AT-210.		
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

Check throttle position sensor. Refer to ***EC-875*** [QG18DE (Calif. CA Model)], ***EC-1540*** (SR20DE), "DTC P0120 THROTTLE POSITION SENSOR".



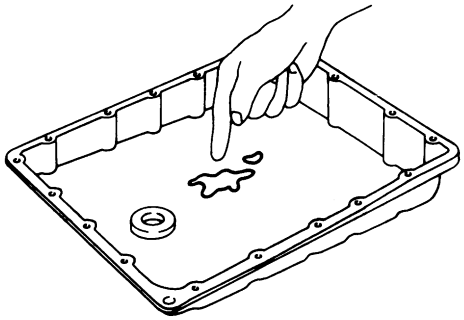
LEC279

OK or NG

OK	▶	GO TO 5.
NG	▶	Repair or replace throttle position sensor.

5	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 8.

6	DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to "REMOVAL", AT-433.
2. Check the following items:
- Shift valve A
- Shift solenoid valve A
- 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 "REMOVAL", AT-433. 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 7.
NG	▶	Repair or replace damaged parts.

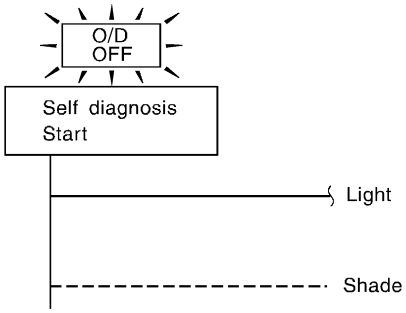
10. A/T Does Not Shift: $D_2 \rightarrow D_3$

=NIAT0115

SYMPTOM:
A/T does not shift from D_2 to D_3 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 D_1 ” OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to “7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position” and “8. Vehicle Cannot Be Started From D_1”, AT-233, 236.

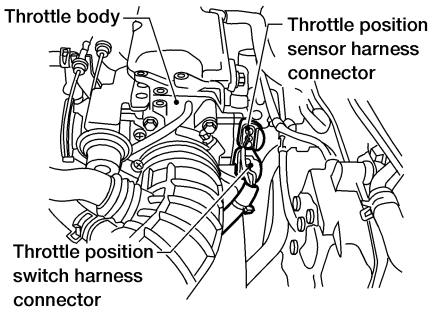
2	CHECK PNP SWITCH CIRCUIT	
With CONSULT-II Does “ECU INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?		
Without CONSULT-II Does self-diagnosis show damage to PNP switch circuit?		



SAT367J

Yes or No		
Yes	▶	Check PNP switch circuit. Refer to “DTC P0705”, AT-115.
No	▶	GO TO 3.

3	CHECK THROTTLE POSITION SENSOR	
Check throttle position sensor. Refer to ***EC-875*** [QG18DE (Calif. CA Model)], ***EC-1540*** (SR20DE), “DTC P0120 THROTTLE POSITION SENSOR”.		

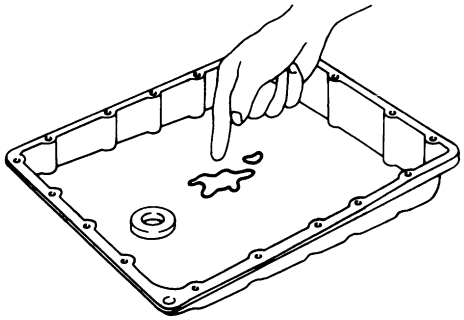


LEC279

OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace throttle position sensor.

4	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 7.

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "REMOVAL", AT-433.
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.

10. A/T Does Not Shift: $D_2 \rightarrow D_3$ (Cont'd)

7	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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 6.
NG	▶	Repair or replace damaged parts.

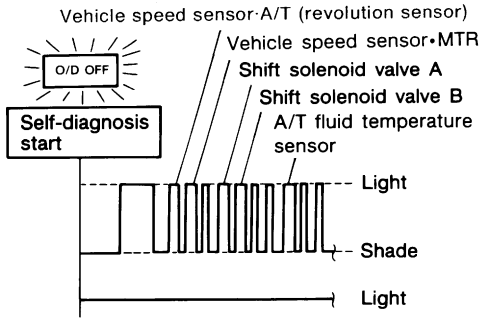
11. A/T Does Not Shift: $D_3 \rightarrow D_4$

=NIAT0116

SYMPTOM:

- **A/T does not shift from D_3 to D_4 at the specified speed.**
- **A/T must be warm before D_3 to D_4 shift will occur.**

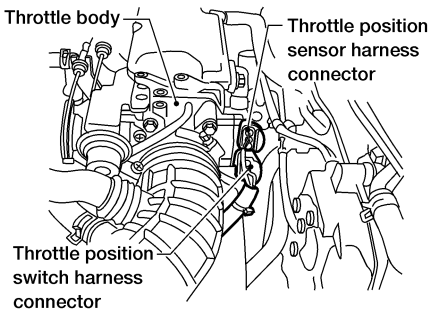
1	CHECK SYMPTOM	
Are "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position" and "8. Vehicle Cannot Be Started From D_1 " OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position" and "8. Vehicle Cannot Be Started From D_1", AT-233, 236.

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  SAT363HC		
Yes or No		
Yes	▶	Check damaged circuit. Refer to "DTC P0705, P0710, P0720, P0750, P0755 or VHCL SPEED SEN·MTR", AT-115, 120, 126, 183, 187 or 210.
No	▶	GO TO 3.

11. A/T Does Not Shift: $D_3 \rightarrow D_4$ (Cont'd)

3	CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to ***EC-875*** [QG18DE (Calif. CA Model)], ***EC-1540*** (SR20DE), "DTC P0120 THROTTLE POSITION SENSOR".



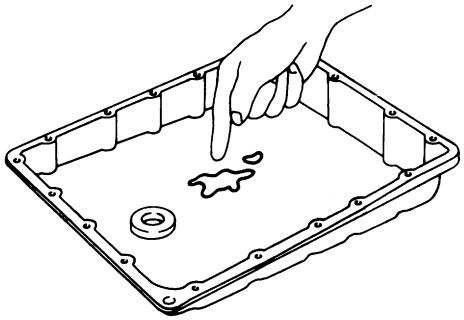
LEC279

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair or replace throttle position sensor.

4	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 7.

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "REMOVAL", AT-433.
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 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 "REMOVAL", AT-433. 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 6.
NG	▶	Repair or replace damaged parts.

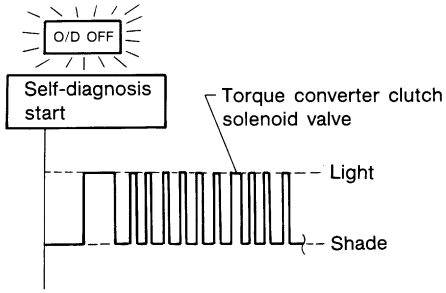
12. A/T Does Not Perform Lock-up

=NIAT0117

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?



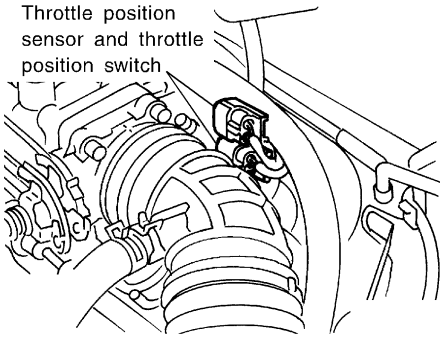
SAT346H

Yes or No

Yes	▶	Check torque converter clutch solenoid valve circuit. Refer to “DTC P0740”, AT-163.
No	▶	GO TO 2.

2	CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to ***EC-875*** [QG18DE (Calif. CA Model)], ***EC-1540*** (SR20DE), “DTC P0120 THROTTLE POSITION SENSOR”.



SAT413J

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace throttle position sensor.

3	DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to “REMOVAL”, AT-433.
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	▶	1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

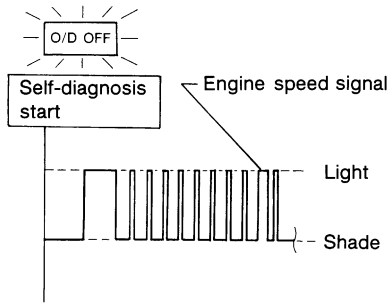
13. A/T Does Not Hold Lock-up Condition

=NIAT0118

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?



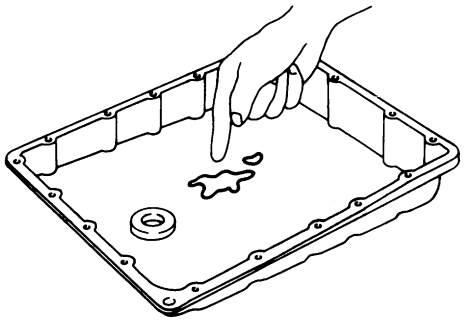
SAT347H

Yes or No

Yes	▶	Check engine speed signal circuit. Refer to “DTC P0725”, AT-131.
No	▶	GO TO 2.

2	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 5.

3	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to “REMOVAL”, AT-433.
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.

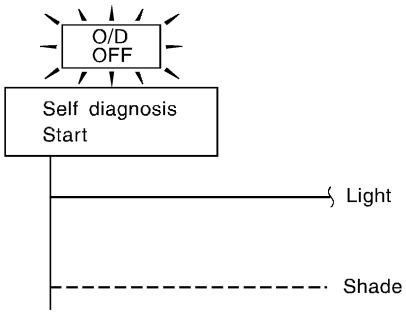
4	CHECK SYMPTOM	
Check again. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

5	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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

=NIAT0119

SYMPTOM:
Lock-up is not released when accelerator pedal is released.

1	CHECK THROTTLE POSITION SWITCH CIRCUIT
With CONSULT-II Does “ECU 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?  SAT367J **Yes or No**	
Yes ▶	Check closed throttle position switch circuit. Refer to “DTC P0705”, AT-115.
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 $D_4 \rightarrow D_3$)

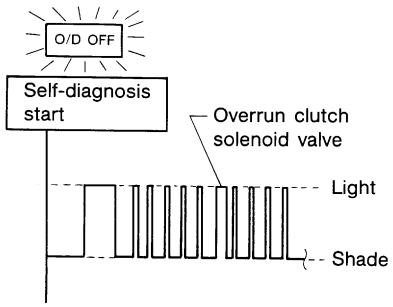
=NIAT0120

SYMPTOM:

- **Engine speed does not smoothly return to idle when A/T shifts from D_4 to D_3.**
- **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?



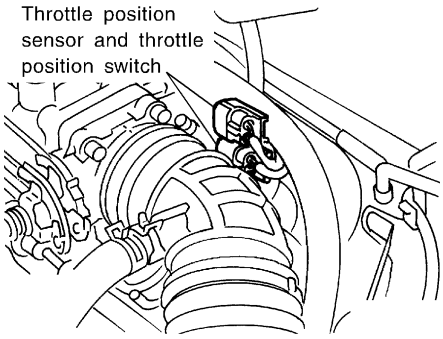
SAT348H

Yes or NO

Yes	▶	Check overrun clutch solenoid valve circuit. Refer to "DTC P1760", AT-199.
No	▶	GO TO 2.

2	CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to ***EC-875*** [QG18DE (Calif. CA Model)], ***EC-1540*** (SR20DE), "DTC P0120 THROTTLE POSITION SENSOR".



SAT413J

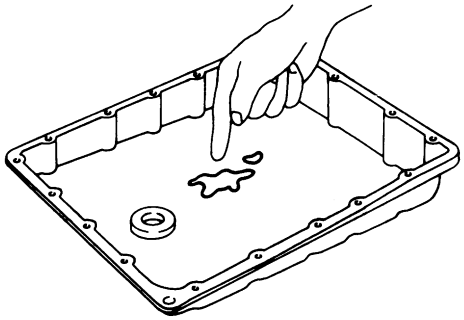
OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace throttle position sensor.

15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$) (Cont'd)

3	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 6.

4	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "REMOVAL", AT-433.
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 "REMOVAL", AT-433.
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

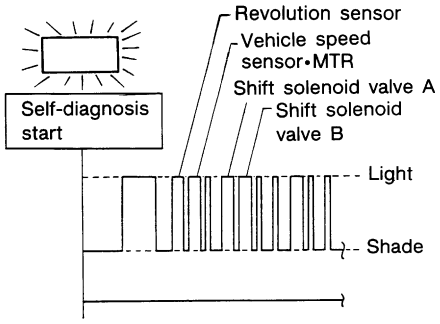
OK or NG

OK	▶	GO TO 5.
NG	▶	Repair or replace damaged parts.

16. Vehicle Does Not Start From D_1

NIAT0121

SYMPTOM:
Vehicle does not start from D_1 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?  SAT934FA **Yes or No**		
Yes	▶	Check damaged circuit. Refer to “DTC P0720, P0750, P0755 or VHCL SPEED SEN·MTR”, AT-126, 183, 187 or 210.
No	▶	GO TO 2.

2	CHECK SYMPTOM	
Check again. **OK or NG**		
OK	▶	Go to “8. Vehicle Cannot Be Started From D_1”, AT-236.
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: $D_4 \rightarrow D_3$, When Overdrive Control Switch "ON" → "OFF"

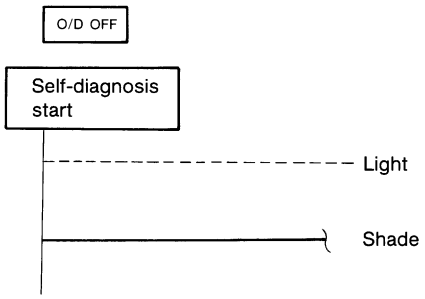
=NIAT0122

SYMPTOM:
A/T does not shift from D_4 to D_3 when changing overdrive control switch to "OFF" position.

1	CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II
Does "ECU 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?



SAT344H

Yes or No

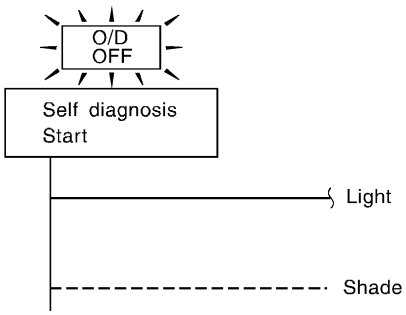
Yes	▶	Check overdrive control switch circuit. Refer to "DIAGNOSTIC PROCEDURE", AT-260.
No	▶	Go to "10. A/T Does Not Shift: $D_2 \rightarrow D_3$", AT-242.

18. A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" → "2" Position

=NIAT0123

SYMPTOM:
A/T does not shift from D_3 to 2_2 when changing selector lever from "D" to "2" position.

1	CHECK PNP SWITCH CIRCUIT
With CONSULT-II Does "ECU INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit?	
Without CONSULT-II Does self-diagnosis show damage to PNP switch circuit?	



SAT367J

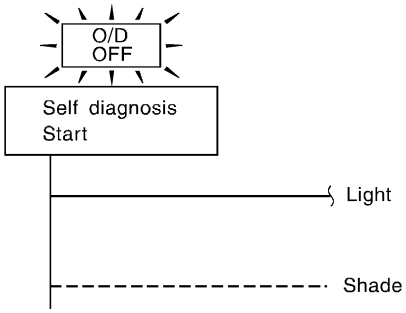
Yes or No

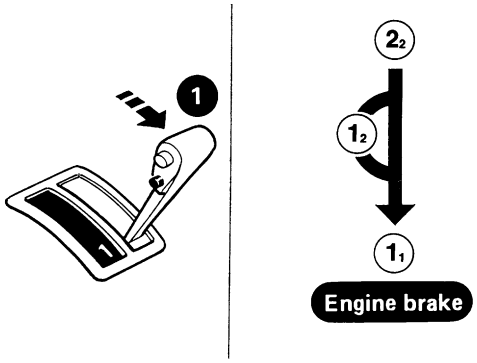
Yes	▶	Check PNP switch circuit. Refer to "DTC P0705", AT-115.
No	▶	Go to "9. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$", AT-239.

19. A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever "2" → "1" Position

=NIAT0124

SYMPTOM:
A/T does not shift from 2_2 to 1_1 when changing selector lever from "2" to "1" position.

1	CHECK PNP SWITCH CIRCUIT	
With CONSULT-II Does "ECU INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit? **Without CONSULT-II** Does self-diagnosis show damage to PNP switch circuit?  SAT367J **Yes or No**		
Yes	▶	Check PNP switch circuit. Refer to "DTC P0705", AT-115.
No	▶	GO TO 2.

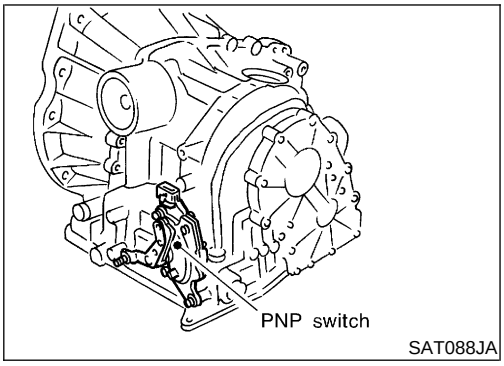
2	CHECK SYMPTOM	
Check again.  SAT778B **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

20. Vehicle Does Not Decelerate By Engine Brake

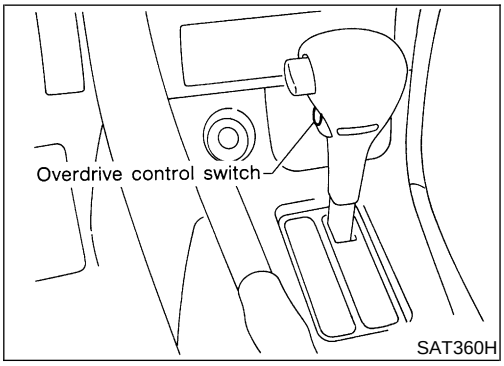
=NIAT0125

SYMPTOM:
Vehicle does not decelerate by engine brake when shifting from 2_2 (1_2) to 1_1.

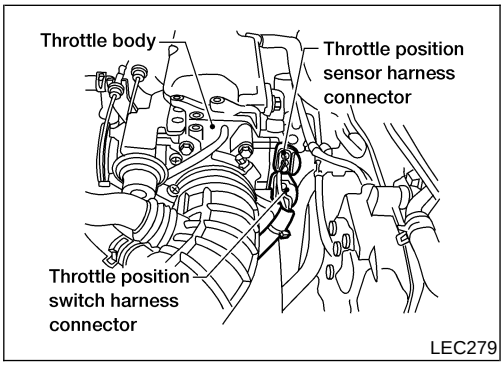
1	CHECK SYMPTOM	
Is “6. Vehicle Does Not Creep Backward In R Position” OK?		
Yes or No		
Yes	▶	Go to “15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)”, AT-253.
No	▶	Go to “6. Vehicle Does Not Creep Backward In R Position”, AT-230.



SAT088JA



SAT360H



LEC279

21. TCM Self-diagnosis Does Not Activate (PNP, Overdrive Control and Throttle Position Switches Circuit Checks)

NIAT0126

SYMPTOM:
O/D OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

NIAT0126S01

- PNP switch
  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.
- Overdrive control switch
  Detects the overdrive control switch position (ON or OFF) and sends a signal to the TCM.
- Throttle position switch
  Consists of a wide open throttle position switch and a closed throttle position switch.
  The wide open throttle position switch sends a signal to the TCM when the throttle valve is open at least 1/2 of the full throttle position. The closed throttle position switch sends a signal to the TCM when the throttle valve is fully closed.

DIAGNOSTIC PROCEDURE

NIAT0126S02

1	CHECK PNP SWITCH CIRCUIT (With CONSULT-II)	

With CONSULT-II

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

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

SAT701J

OK or NG

OK	▶	GO TO 3.
NG	▶	**Check the following items:** ● PNP switch (Refer to "Component Inspection", AT-265.) ● 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) ● Diode (P, N positions)

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.

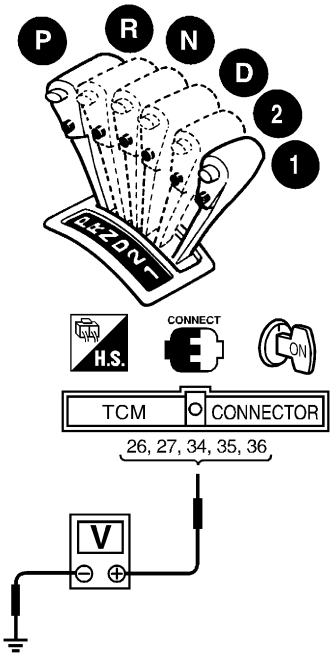
Voltage:

B: Battery voltage

0: 0V

Lever position	Terminals				
	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**

MTBL0138



SAT470J

OK or NG

OK	▶	GO TO 4.
NG	▶	**Check the following items:** ● PNP switch (Refer to "Component Inspection", AT-265.) ● 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) ● Diode (P, N positions)

3	CHECK OVERDRIVE CONTROL SWITCH CIRCUIT (With CONSULT-II)

With CONSULT-II

1. Turn ignition switch to "ON" position.
   (Do not start engine.)
2. Select "ECU 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".)

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

SAT645J

OK or NG

OK	▶	GO TO 5.
NG	▶	**Check the following items:** ● Overdrive control switch (Refer to "Component Inspection", AT-265.) ● 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

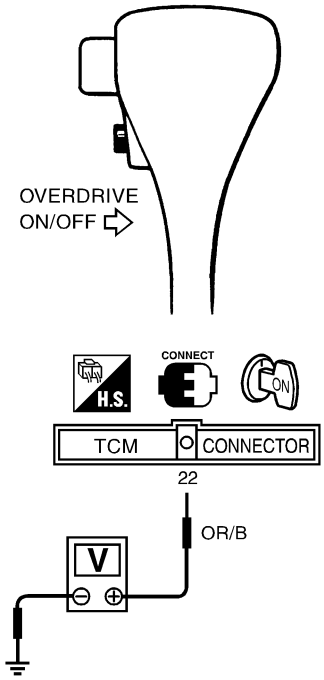
4	CHECK OVERDRIVE CONTROL SWITCH CIRCUIT (Without CONSULT-II)

Without CONSULT-II

1. Turn ignition switch to "ON" position.
   (Do not start engine.)
2. Check voltage between TCM terminal 22 and ground when overdrive control switch is "ON" and "OFF".

Voltage:

Switch position "ON":
Battery voltage
Switch position "OFF":
1V or less



SAT471JA

OK or NG

OK	▶	GO TO 6.
NG	▶	**Check the following items:** ● Overdrive control switch (Refer to "Component Inspection", AT-265.) ● 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

5 **CHECK THROTTLE POSITION SWITCH CIRCUIT (With CONSULT-II)**

With CONSULT-II

1. Apply vacuum to the throttle opener, then check the following. Refer to step 1 through 5 of "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
2. Turn ignition switch to "ON" position.
   (Do not start engine.)
3. Select "ECU INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
4. Read out "CLOSED THL/SW" and "W/O THRL/P-SW" depressing and releasing accelerator pedal.
   Check the signal of throttle position switch is indicated properly.

Accelerator pedal condition	Data monitor	
	CLOSED THL/SW	W/O THRL/P-SW
Released	ON	OFF
Fully depressed	OFF	ON

MTBL0011

DATA MONITOR	
MONITORING	
POWERSHIFT SW	OFF
CLOSED THL/SW	OFF
W/O THRL/P-SW	OFF
HOLD SW	OFF
BRAKE SW	ON

SAT702J

OK or NG

OK	▶	GO TO 7.
NG	▶	**Check the following items:** ● Throttle position switch — Refer to "Component Inspection", AT-265. ● Harness for short or open between ignition switch and throttle position switch (Main harness) ● Harness for short or open between throttle position switch and TCM (Main harness)

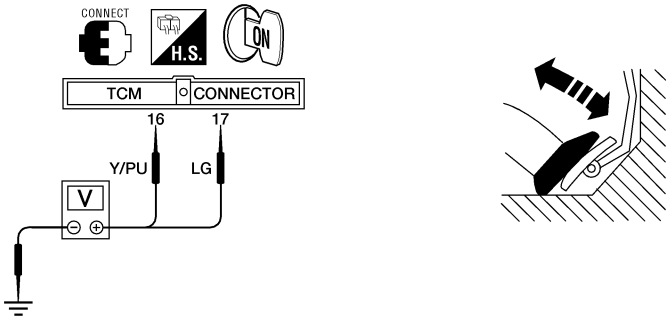
6	CHECK THROTTLE POSITION SWITCH CIRCUIT (Without CONSULT-II)

Without CONSULT-II

1. Apply vacuum to the throttle opener, then check the following. Refer to step 1 through 5 of "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
2. Turn ignition switch to "ON" position. (Do not start engine.)
3. Check voltage between TCM terminals 16, 17 and ground while depressing, and releasing accelerator pedal slowly. (After warming up engine)

Accelerator pedal condition	Voltage	
	Terminal No. 16	Terminal No. 17
Released	Battery voltage	1V or less
Fully depressed	1V or less	Battery voltage

MTBL0137



LAT192

OK or NG

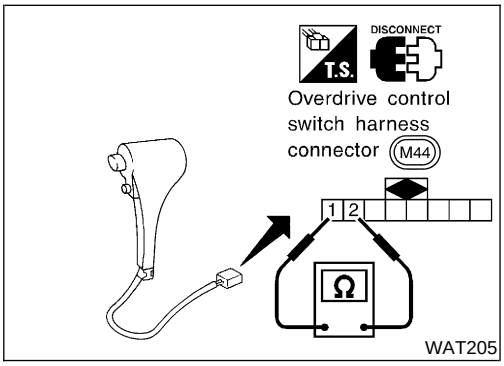
OK	▶	GO TO 7.
NG	▶	**Check the following items:** ● Throttle position switch — Refer to "Component Inspection", AT-265. ● Harness for short or open between ignition switch and throttle position switch (Main harness) ● Harness for short or open between throttle position switch and TCM (Main harness)

7	CHECK DTC

Perform "DIAGNOSTIC PROCEDURE", AT-260

OK or NG

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



WAT205

COMPONENT INSPECTION

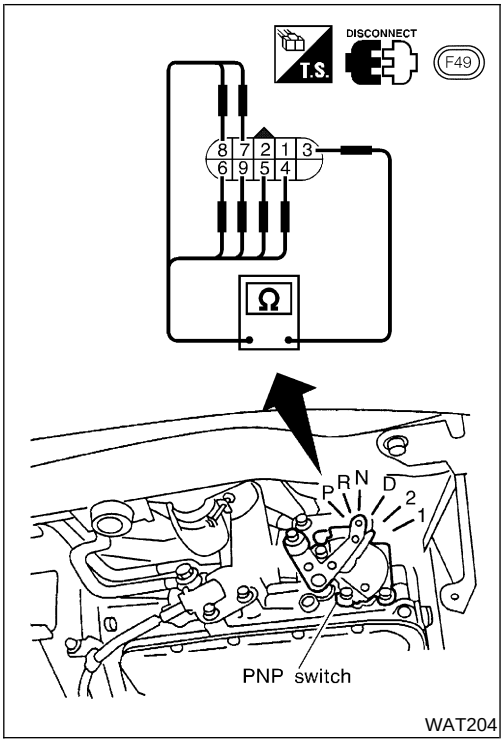
Overdrive Control Switch

NIAT0126S03

NIAT0126S0301

- Check continuity between terminals 1 and 2.

Switch position	Continuity
RELEASED	No
DEPRESSED	Yes

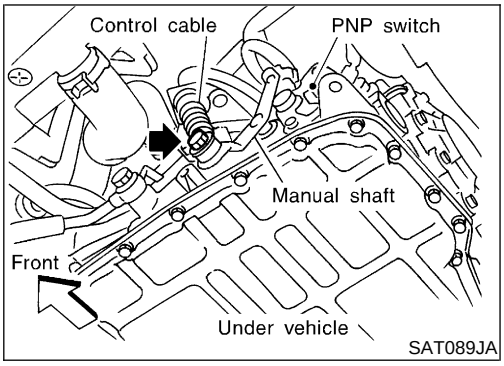


PNP Switch

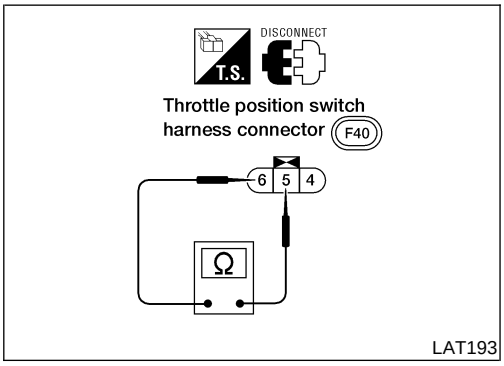
NIAT0126S0302

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 "Control Cable Adjustment", AT-434.
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 "Park/Neutral Position (PNP) Switch Adjustment", AT-434.
6. If NG on step 4, replace PNP switch.



Throttle Position Switch

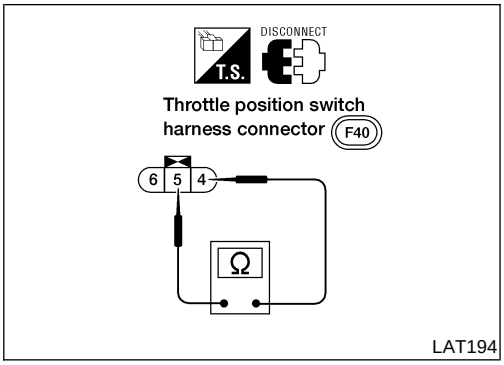
NIAT0126S0303

Closed throttle position switch (idle position)

- Check continuity between terminals 5 and 6.
  Refer to "Preparation", "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.

Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

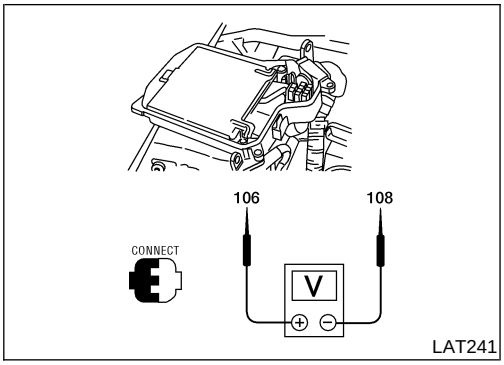
- To adjust closed throttle position switch, refer to ***EC-1117*** [QG18DE (Calif. CA Model)], ***EC-1785*** (SR20DE), "DTC P0510 CLOSED THROTTLE POSITION SWITCH".



Wide open throttle position switch

- Check continuity between terminals 4 and 5.

Accelerator pedal condition	Continuity
Released	No
Depressed	Yes



PCM Terminals and Reference Value

NIAT0134

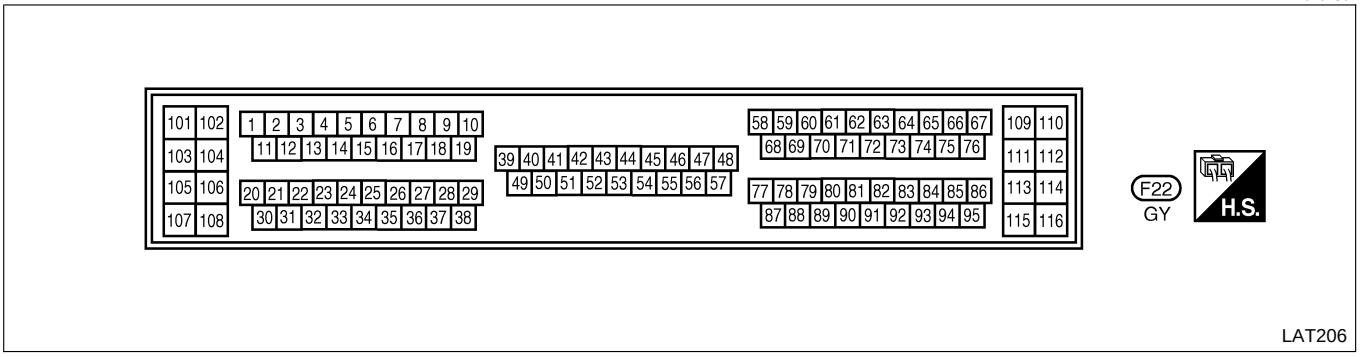
PREPARATION — QG18DE (EXCEPT CALIF. CA MODEL)

NIAT0134S01

- Measure voltage between each terminal and terminal 106 or 108 by following “PCM INSPECTION TABLE”.

PCM HARNESS CONNECTOR TERMINAL LAYOUT

NIAT0134S02

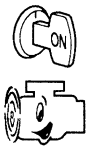


PCM INSPECTION TABLE

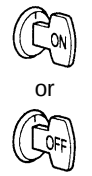
(Data are reference values.)

NIAT0134S03

Terminal No.	Wire color	Item	Condition		Judgement standard
10	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.	0.5V or less
19	P/B	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	5 - 14V
				When depressing accelerator pedal fully after warming up engine.	0.5V or less
24	L/B	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	1V or less
25	G/R	O/D OFF indicator lamp		When setting overdrive control switch in “OFF” position.	1V or less
				When setting overdrive control switch in “ON” position.	Battery voltage

Terminal No.	Wire color	Item	Condition		Judgement standard
26	L/W	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in "D_1" or "D_4".)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in "D_2" or "D_3".)	1V or less
27	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in "D_1" or "D_2".)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in "D_3" or "D_4".)	1V or less
29	Y/G	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	1V or less
32	L/OR	Engine speed signal		Refer to ***EC-157***, "PCM Inspection Table".	—
40	Y/PU	Closed throttle position switch (in throttle position switch)		When releasing accelerator pedal after warming up engine. Refer to "TCM/PCM SELF-DIAGNOSTIC PROCEDURE (No tools)", AT-52.	Battery voltage
				When depressing accelerator pedal after warming up engine. Refer to "TCM/PCM SELF-DIAGNOSTIC PROCEDURE (No tools)", AT-52.	1V or less
42	G/OR	PNP switch "N" or "P" position		When setting selector lever to "N" or "P" position.	Battery voltage
				When setting selector lever to other positions.	1V or less
47	R/G	Stop lamp switch		When depressing brake pedal.	Battery voltage
				When releasing brake pedal.	1V or less
48	B	Ground		—	1V or less
52 *2	G/B	—		—	—
54	OR	ASCD cruise switch		When ASCD cruise is being performed. ("CRUISE" light comes on.)	Battery voltage
				When ASCD cruise is not being performed. ("CRUISE" light does not comes on.)	1V or less

PCM Terminals and Reference Value (Cont'd)

Terminal No.	Wire color	Item	Condition		Judgement standard
55	W/PU	ASCD OD cut signal		When "ACCEL" set switch on ASCD cruise is in "D_4" position.	5 - 8V
				When "ACCEL" set switch on ASCD cruise is in "D_3" position.	1V or less
56	OR/B	Overdrive control switch		When setting overdrive control switch in "ON" position	Battery voltage
				When setting overdrive control switch in "OFF" position	1V or less
57	B	Ground		—	1V or less
58	B	Throttle position sensor (Ground)		—	1V or less
60	G/W	PNP switch "R" position		When setting selector lever to "R" position.	Battery voltage
				When setting selector lever to other positions.	1V or less
67	W/L	Power source (Memory back-up)		When turning ignition switch to "OFF".	Battery voltage
				When turning ignition switch to "ON".	Battery voltage
68	BR/Y	PNP switch "1" position		When setting selector lever to "1" position.	Battery voltage
				When setting selector lever to other positions.	1V or less
69	B/W	PNP switch "2" position		When setting selector lever to "2" position.	Battery voltage
				When setting selector lever to other positions.	1V or less
76	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
77	LG	Wide open throttle position switch (in throttle position switch)		When depressing accelerator pedal more than halfway after warming up engine.	Battery voltage
				When releasing accelerator pedal after warming up engine.	1V or less
78	W/G	PNP switch "D" position		When setting selector lever to "D" position.	Battery voltage
				When setting selector lever to other positions.	1V or less

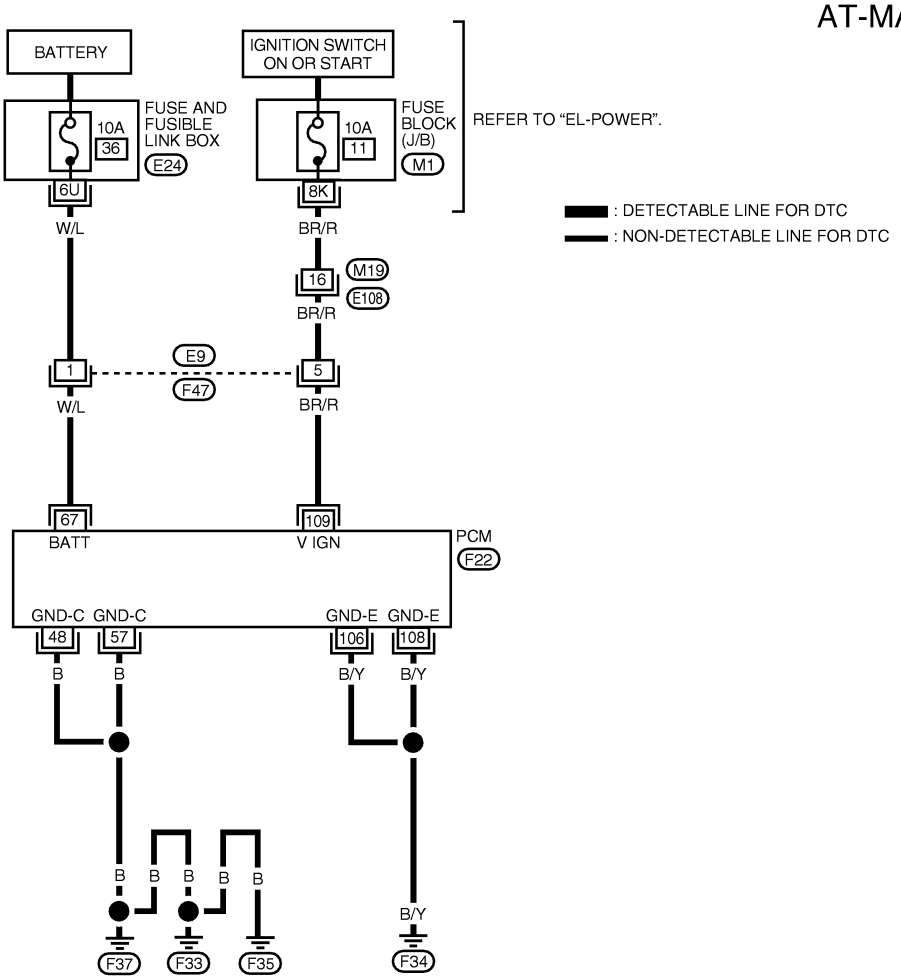
Terminal No.	Wire color	Item	Condition		Judgement standard
86	PU/R	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 1V and more than 4.5V
91	BR	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	Approximately 1.5V
				When ATF temperature is 80°C (176°F).	Approximately 0.5V
92	Y	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: Approximately 0.5V Fully-open throttle: Approximately 4V
106	B/Y	Ground		—	1V or less
108	B/Y	Ground		—	1V or less
109	BR/R	Power source		When turning ignition switch to "ON".	Battery voltage
				When turning ignition switch to "OFF".	1V or less
111	R	Throttle position sensor (Power source)		—	4.5 - 5.5V
113 *2	GY/L	—		—	—

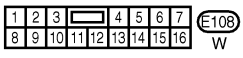
*2: These terminals are connected to the Data link connector.

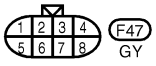
Wiring Diagram — AT — MAIN

NIAT0135

AT-MAIN-01







REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT092

POWERTRAIN CONTROL UNIT TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
48	B	GROUND	—	1V OR LESS
57	B	GROUND	—	1V OR LESS
67	W/L	POWER SOURCE (MEMORY BACK-UP)	WHEN TURNING IGNITION SWITCH "OFF"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH "ON"	BATTERY VOLTAGE
106	B/Y	GROUND	—	1V OR LESS
108	B/Y	GROUND	—	1V OR LESS
109	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH "ON"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH "OFF"	1V OR LESS

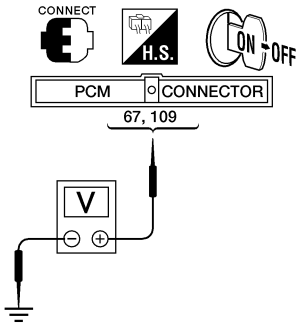
LAT273

Diagnostic Procedure

NIAT0329

1	CHECK PCM POWER SOURCE STEP 1

1. Turn ignition switch to ON position.
   (Do not start engine.)
2. Check voltage between PCM terminals 67, 109, and ground.



Battery voltage should exist.

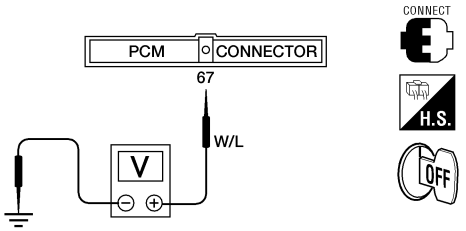
LAT223

OK or NG

OK	▶	GO TO 2.
NG	▶	GO TO 3.

2	CHECK PCM POWER SOURCE STEP 2

1. Turn ignition switch to OFF position.
2. Check voltage between PCM terminal 67 and ground.



Voltage:
Battery voltage

LAT252

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 PCM terminals 67 and 109 (Main harness)
- Fuse
- Ignition switch
  Refer to ***EL-9***, “POWER SUPPLY ROUTING”.

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.

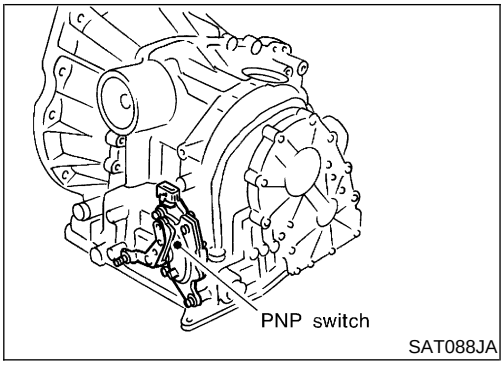
Diagnostic Procedure (Cont'd)

4	CHECK PCM GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect PCM harness connector.
3. Check continuity between PCM terminals 48, 57, 106, 108 and ground. Refer to wiring diagram, AT-272.
   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.



SAT088JA

Description

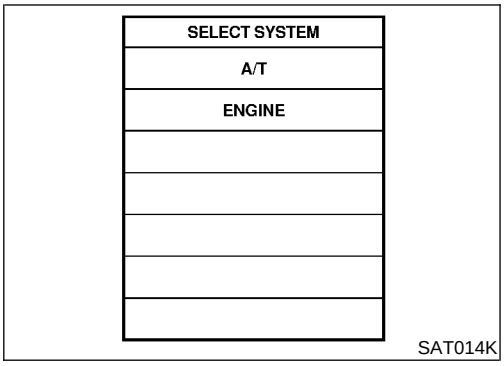
NIAT0136

- The PNP switch assembly includes a transmission range switch.
- The transmission range switch detects the A/T selector lever position and sends a signal to the PCM.

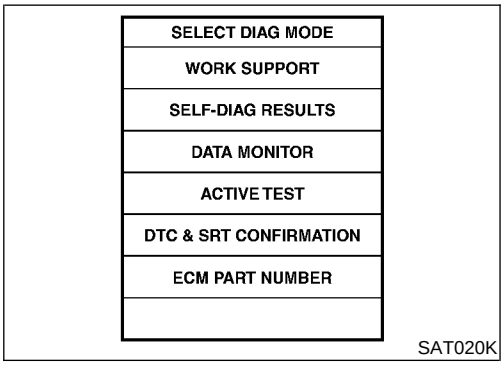
ON BOARD DIAGNOSIS LOGIC

NIAT0136S02

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



SAT014K



SAT020K

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0136S03

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

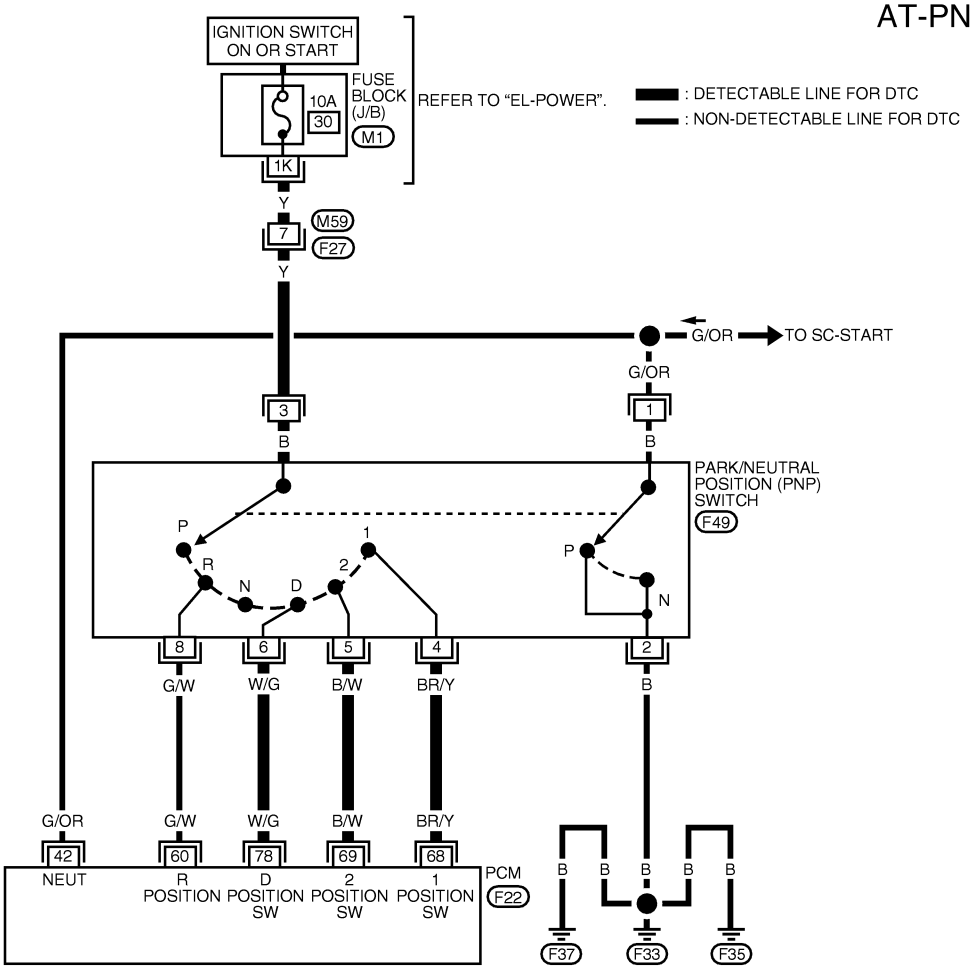
With GST

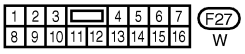
Follow the procedure "With CONSULT-II".

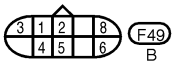
Wiring Diagram — AT — PNP/SW

NIAT0137

AT-PNP/SW-01







REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT093

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
42	G/OR	PNP SWITCH "N" OR "P" POSITION	WHEN SETTING SELECTOR LEVER TO "N" OR "P" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
60	G/W	PNP SWITCH "R" POSITION	WHEN SETTING SELECTOR LEVER TO "R" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
68	BR/Y	PNP SWITCH "1" POSITION	WHEN SETTING SELECTOR LEVER TO "1" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
69	B/W	PNP SWITCH "2" POSITION	WHEN SETTING SELECTOR LEVER TO "2" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
78	W/G	PNP SWITCH "D" POSITION	WHEN SETTING SELECTOR LEVER TO "D" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS

LAT274

Diagnostic Procedure

NIAT0138

1	CHECK PNP SWITCH CIRCUIT (With CONSULT-II)	

With CONSULT-II

1. Turn ignition switch to “ON” position.
   (Do not start engine.)
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “PN”, “R”, “D”, “2” and “1” position switches moving A/T selector lever to each position.
   Check the signal of the selector lever position is indicated properly.

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

SAT701J

OK or NG

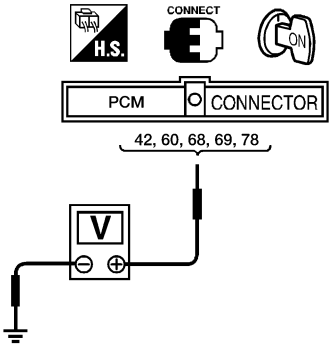
OK	▶	GO TO 3.
NG	▶	**Check the following items:** ● PNP switch Refer to “Component Inspection”, AT-279. ● Harness for short or open between ignition switch and PNP switch (Main harness) ● Harness for short or open between PNP switch and PCM (Main harness) ● Ignition switch and fuse Refer to ***EL-9***, “POWER SUPPLY ROUTING”. ● Diode (P, N positions)

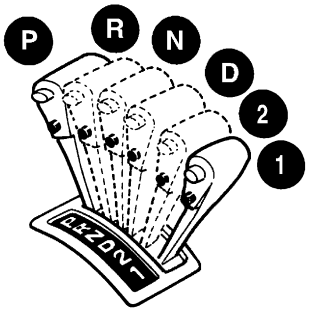
Diagnostic Procedure (Cont'd)

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 PCM terminals 42, 60, 68, 69, 78 and ground while moving A/T selector lever through each position.





Lever position	Terminal No.				
	42	60	78	69	68
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

B: Battery voltage
0: 0V

WAT207

OK or NG

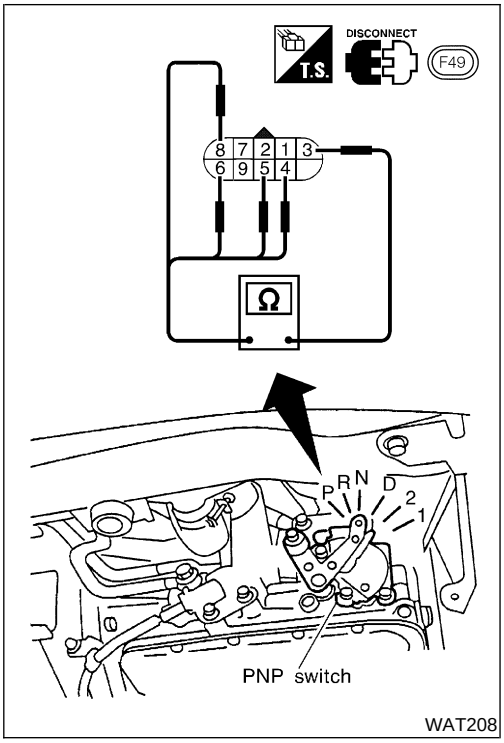
OK	▶	GO TO 3.
NG	▶	**Check the following items:** ● PNP switch Refer to "Component Inspection", AT-279. ● Harness for short or open between ignition switch and PNP switch (Main harness) ● Harness for short or open between PNP switch and PCM (Main harness) ● Ignition switch and fuse Refer to ***EL-9***, "POWER SUPPLY ROUTING". ● Diode (P, N positions)

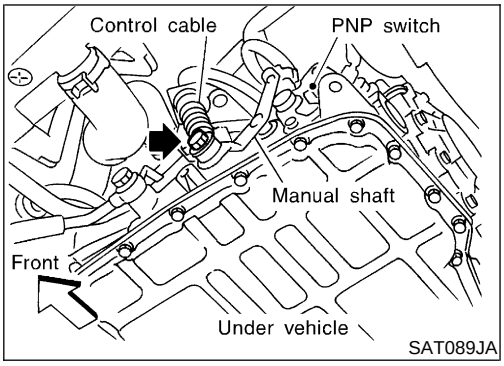
3	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-275.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.





Component Inspection

NIAT0139

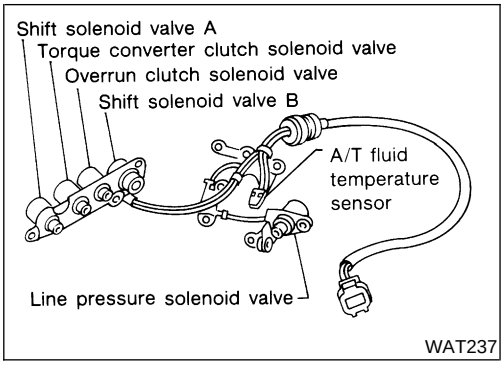
PARK/NEUTRAL POSITION SWITCH

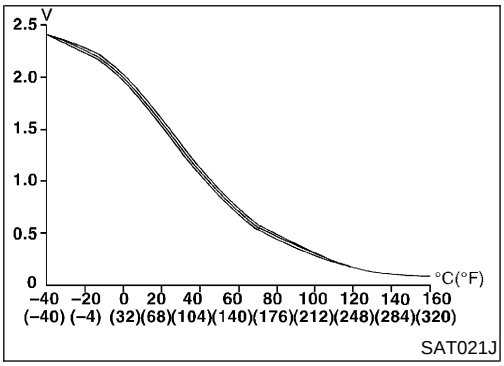
NIAT0139S01

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

Lever position	Terminal No.	
P	—	1 — 2
R	3 — 8	—
N	—	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 “Control Cable Adjustment”, AT-434.
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 “Park/Neutral Position (PNP) Switch Adjustment”, AT-434.
6. If NG on step 4, replace PNP switch.





Description

NIAT0140

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

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NIAT0140S01

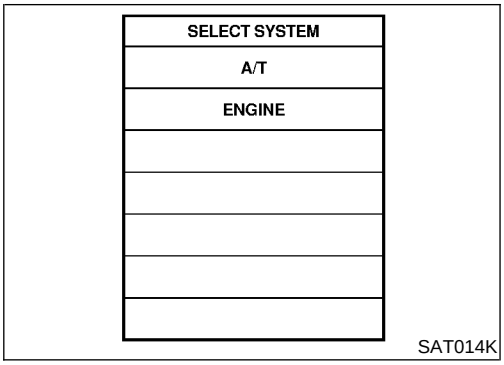
Remarks: Specification data are reference values.

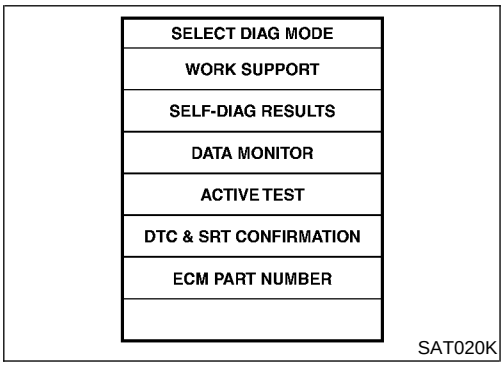
Monitor item	Condition	Specification
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	Approximately 1.5V ↓ Approximately 0.5V

ON BOARD DIAGNOSIS LOGIC

NIAT0140S03

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





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0140S04

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 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")

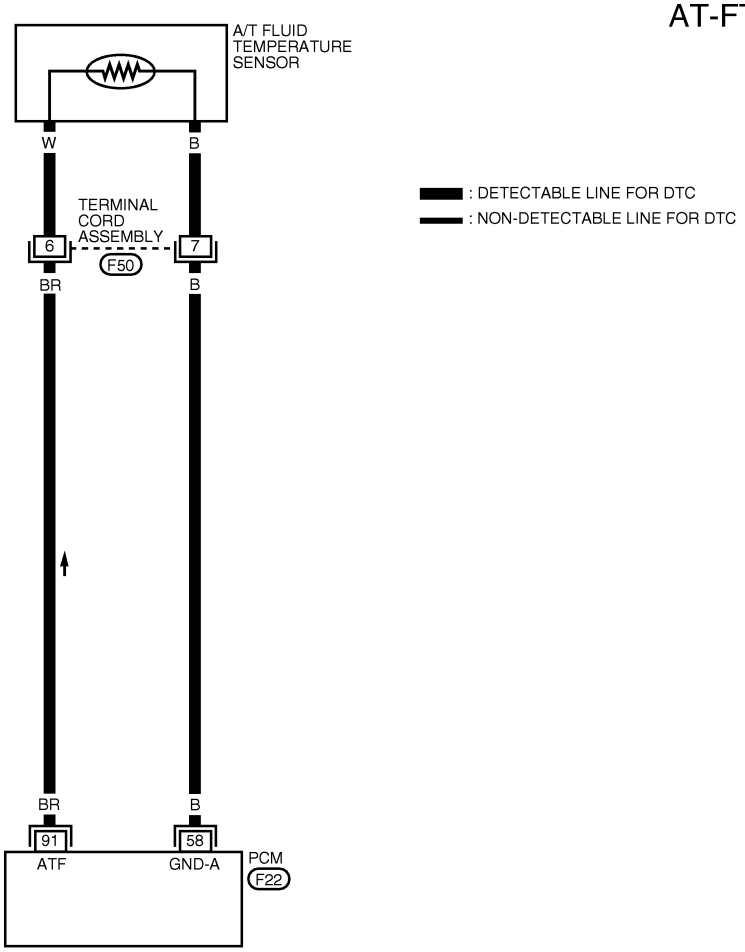
With GST

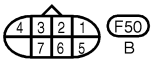
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — FTS

NIAT0141

AT-FTS-01





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT095

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	THROTTLE POSITION SENSOR (GROUND)	—	1V OR LESS
91	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

LAT276

Diagnostic Procedure

NIAT0142

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 “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “FLUID TEMP SE”.

Voltage:

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

Approximately 1.5V → 0.5V

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

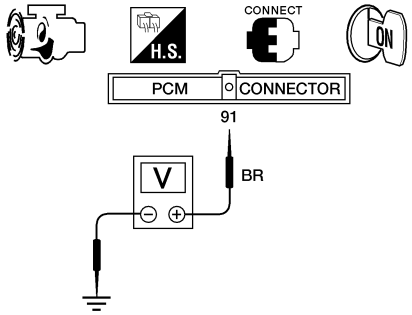
OK ▶	GO TO 4.
NG ▶	GO TO 5.

Diagnostic Procedure (Cont'd)

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

Without CONSULT-II

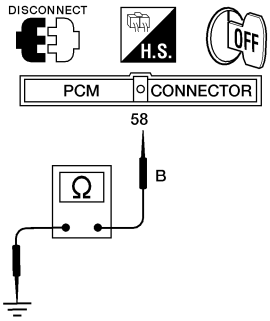
1. Start engine.
2. Check voltage between PCM terminal 91 and ground while warming up A/T.



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

LAT209

3. Turn ignition switch to "OFF" position.
4. Disconnect PCM harness connector.
5. Check continuity between terminal 58 and ground.



Continuity should exist.

LAT210

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

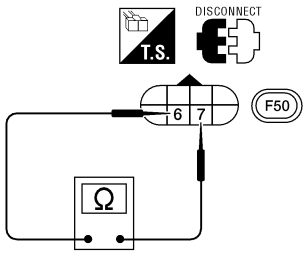
Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-281.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM 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.



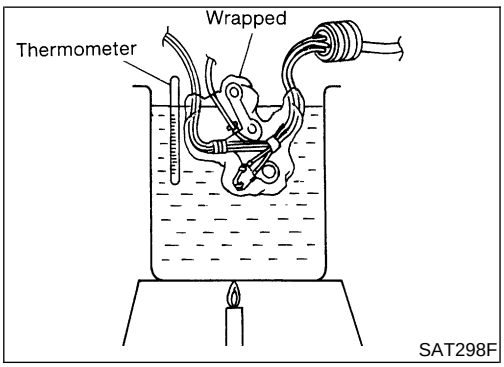
Resistance:
Cold [20°C (68°F)
Approximately 2.5 kΩ

LAT160

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 "Component Inspection", AT-285. ● Harness of terminal cord assembly for short or open



Component Inspection

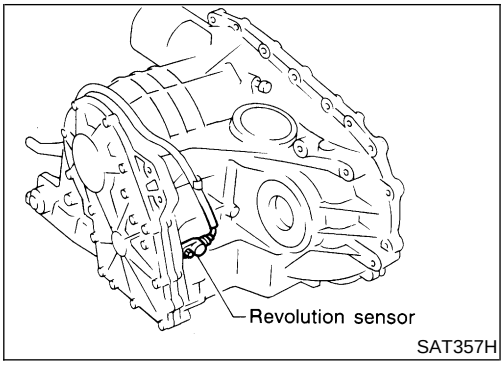
NIAT0143

A/T FLUID TEMPERATURE SENSOR

NIAT0143S01

- For removal, refer to "REMOVAL", AT-433.
- Check resistance between two terminals while changing temperature as shown at left.

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



Description

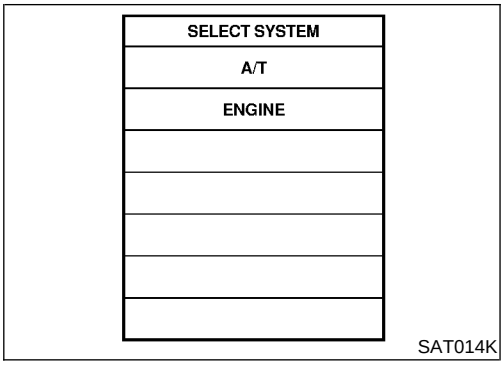
NIAT0144

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 PCM which converts it into vehicle speed.

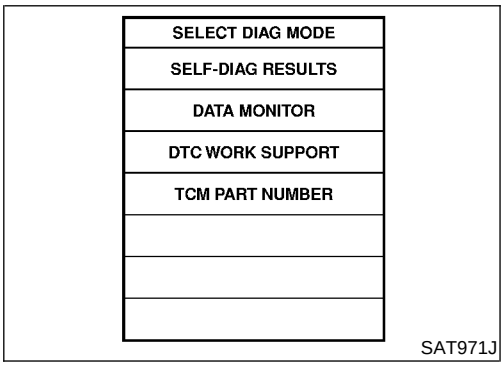
ON BOARD DIAGNOSIS LOGIC

NIAT0144S02

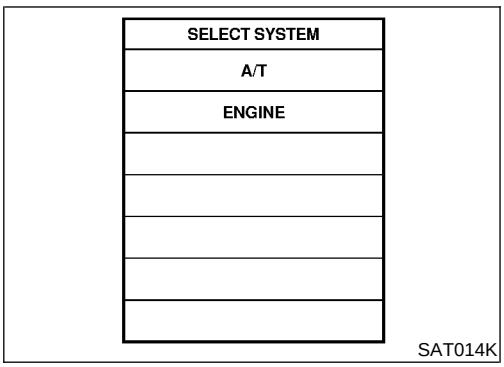
Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
: VEH SPD SEN/CIR AT	PCM does not receive the proper voltage signal from the sensor.	• Harness or connectors (The sensor circuit is open or shorted.) • Revolution sensor
: P0720		



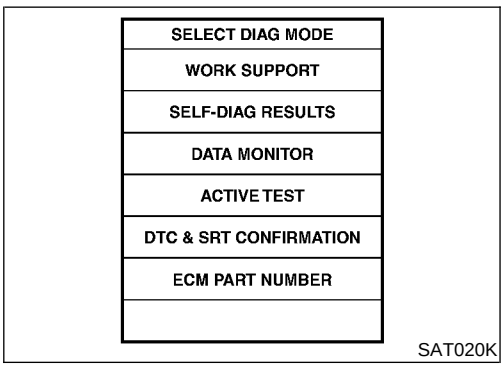
SAT014K



SAT971J



SAT014K



SAT020K

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0144S03

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 "DIAGNOSTIC PROCEDURE", AT-369.
   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 "DIAGNOSTIC PROCEDURE", AT-289.
   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.

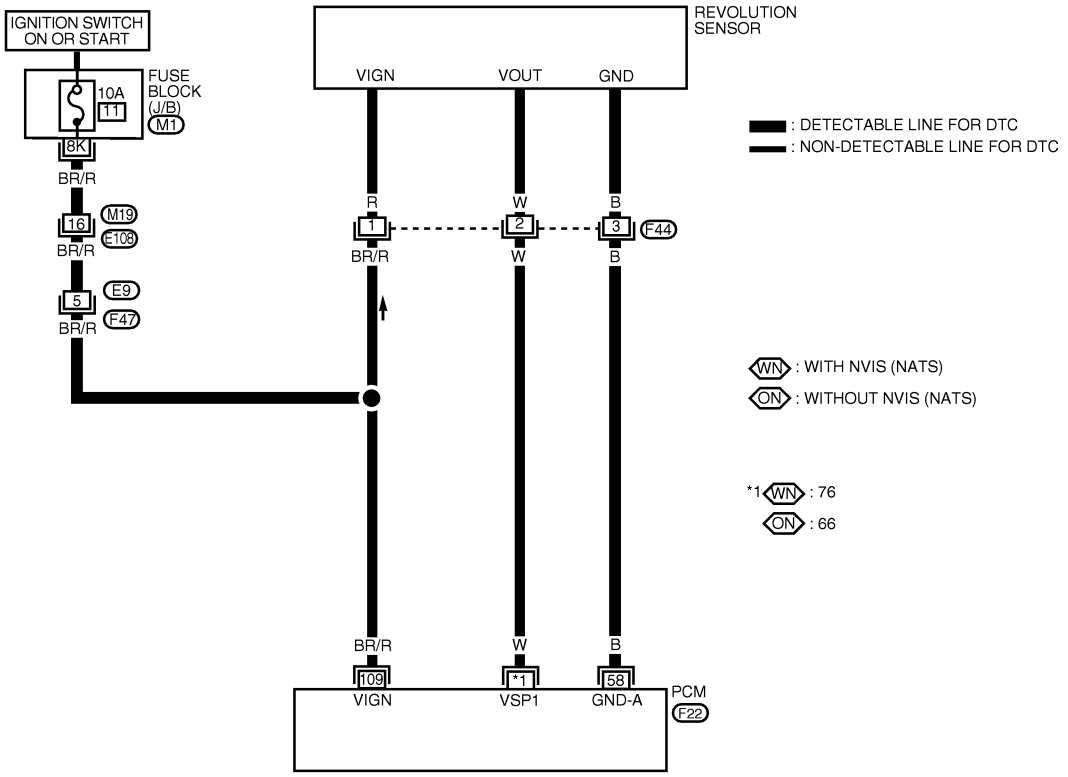
With GST

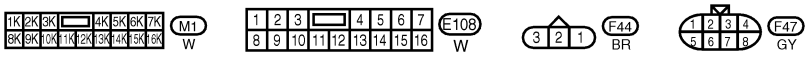
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — VSSA/T

NIAT0145

AT-VSSA/T-01





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT094

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	THROTTLE POSITION SENSOR (GROUND)	—	1V OR LESS
*1	W	REVOLUTION SENSOR	WHEN MOVING AT 20 KM/H (12 MPH), USE THE CONSULT-II PULSE FREQUENCY MEASURING FUNCTION	150 Hz
109	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH TO "OFF"	1V OR LESS

WN : WITH NVIS (NATS)
ON : WITHOUT NVIS (NATS)
*1 WN : 76
ON : 66

LAT275

Diagnostic Procedure

NIAT0146

1	CHECK INPUT SIGNAL (With CONSULT-II)

With CONSULT-II

1. Start engine.
2. Select “ECU 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)

Without CONSULT-II

1. Start engine.

Condition	Judgement standard using "PCM TERMINALS AND REFERENCE VALUE"
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

LAT239

- Harness for short or open between PCM and revolution sensor (Main harness). Refer to wiring diagram, AT-288.

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.

3	CHECK DTC

Perform “DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE”, AT-287.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 4.

Diagnostic Procedure (Cont'd)

4	CHECK PCM INSPECTION	
1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.

Description

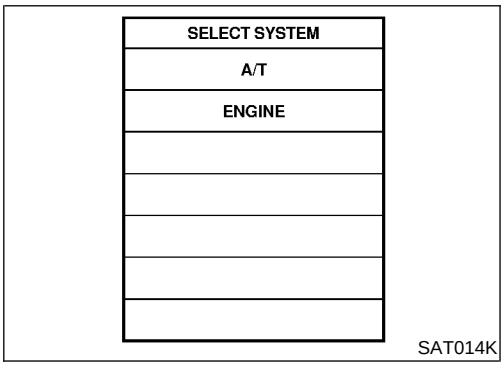
NIAT0148

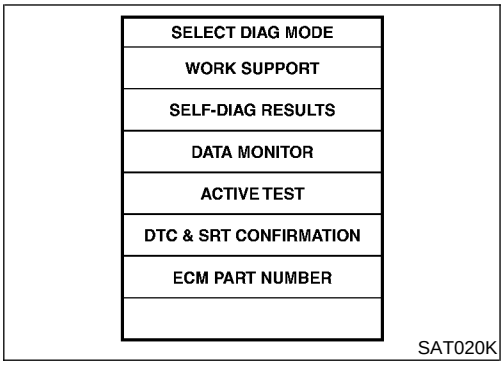
The engine speed signal is sent from the tachometer to the PCM.

ON BOARD DIAGNOSIS LOGIC

NIAT0148S02

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
(OBD) : ENGINE SPEED SIG (GST) : P0725	PCM does not receive the proper voltage signal from combination meter.	• Harness or connectors (The sensor circuit is open or shorted.)





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0148S03

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")

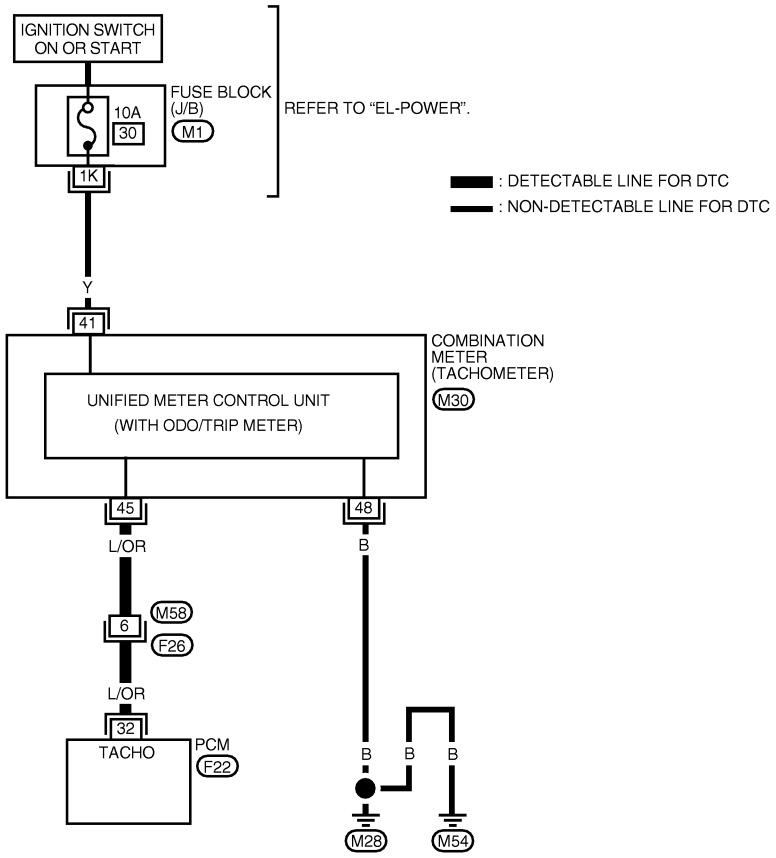
With GST

Follow the procedure "With CONSULT-II".

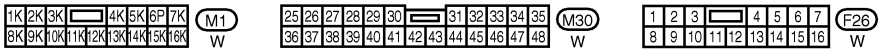
Wiring Diagram — AT — ENGSS

NIAT0149

AT-ENGSS-01



REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS



LAT138

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
32	L/OR	ENGINE SPEED SIGNAL	REFER TO PCM INSPECTION TABLE	—

LAT277

Diagnostic Procedure

NIAT0150

1	CHECK DTC WITH PCM	
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-549***, “DTC P1320 IGNITION SIGNAL”.

2	CHECK INPUT SIGNAL (With CONSULT-II)	
With CONSULT-II 1. Start engine. 2. Select “ECU 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 PCM and tachometer ● Resistor and ignition coil Refer to ***EC-549***, “DTC P1320 IGNITION SIGNAL”.

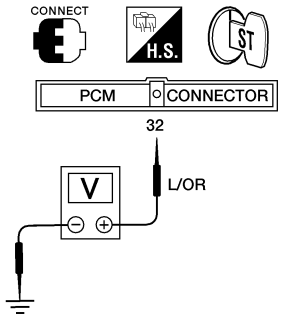
DATA MONITOR	
MONITORING	
ENGINE SPEED	XXX rpm
TURBINE REV	XXX rpm
OVERDRIVE SW	ON
PN POSI SW	OFF
R POSITION SW	OFF

SAT645J

3	CHECK INPUT SIGNAL (Without CONSULT-II)

Without CONSULT-II
1. Start engine.
2. Check voltage between PCM terminal 32 and ground.

Voltage (Idle speed):
Refer to *EC-156*, "PCM Terminal and Reference Value".



LAT212

OK or NG

OK	▶	GO TO 4.
NG	▶	**Check the following items:** ● Harness for short or open between PCM and tachometer ● Resistor and ignition coil Refer to ***EC-549***, "DTC P1320 IGNITION SIGNAL".

4	CHECK DTC

Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-291.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

Description

NIAT0151

- This is an OBD-II self-diagnostic item and not available in PCM 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 PCM. 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

NIAT0151S02

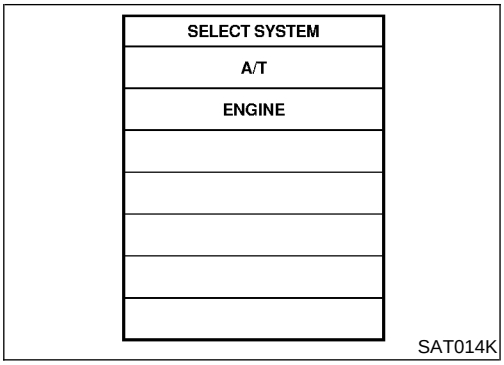
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by PCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from tachometer
C: Gear ratio determined as gear position which PCM supposes
If the actual gear position is higher than the position (1st) supposed by PCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, PCM 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 PCM	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

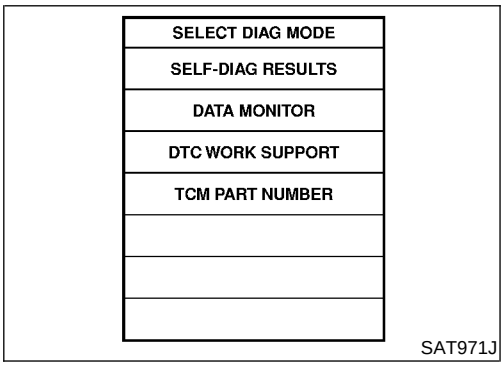
*: P0731 is detected.

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

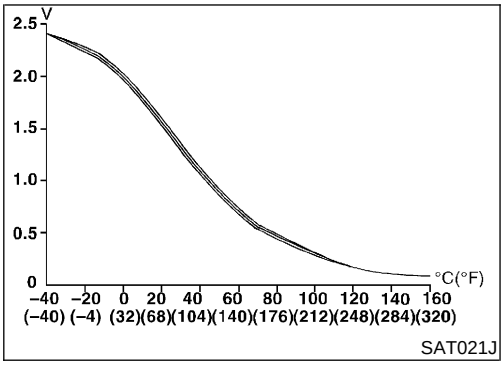
Description (Cont'd)



SAT014K



SAT971J



SAT021J

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0151S03

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 "Diagnostic Procedure", AT-299.
   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

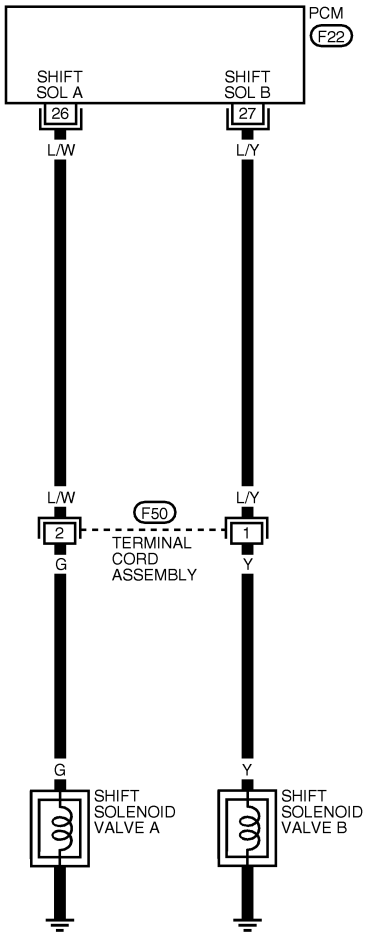
8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "Diagnostic Procedure".)
Refer to "Diagnostic Procedure", AT-299.
Refer to "Shift Schedule", AT-540.

With GST
Follow the procedure "With CONSULT-II".

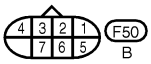
Wiring Diagram — AT — 1ST

=NIAT0152

AT-1STSIG-01



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



REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT096

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
26	L/W	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATE	1V OR LESS
27	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	1V OR LESS

LAT278

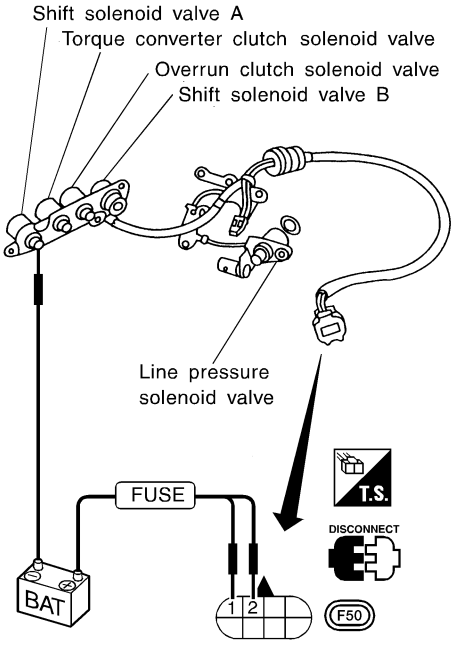
Diagnostic Procedure

NIAT0153

1	CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to “REMOVAL”, AT-433.
2. Check shift solenoid valve operation.
- Shift solenoid valve A
- Shift solenoid valve B

Refer to “Component Inspection”, AT-300.



WAT163

OK or NG

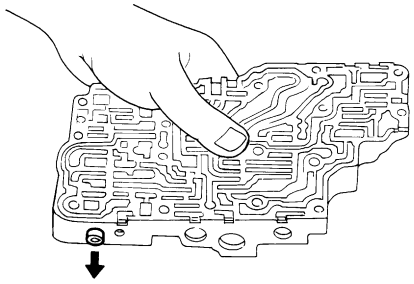
OK	▶	GO TO 2.
NG	▶	Repair or replace shift solenoid valve assembly.

Diagnostic Procedure (Cont'd)

2	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to "Control Valve Assembly", AT-540.
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.



SAT367H

OK or NG

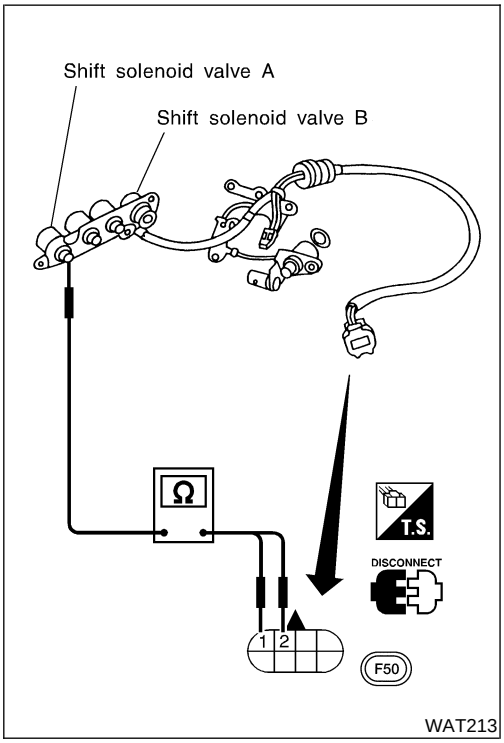
OK	▶	GO TO 3.
NG	▶	Repair control valve assembly.

3	CHECK DTC

Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-296.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	Check control valve again. Repair or replace control valve assembly.



WAT213

Component Inspection

NIAT0154

SHIFT SOLENOID VALVE A AND B

NIAT0154S01

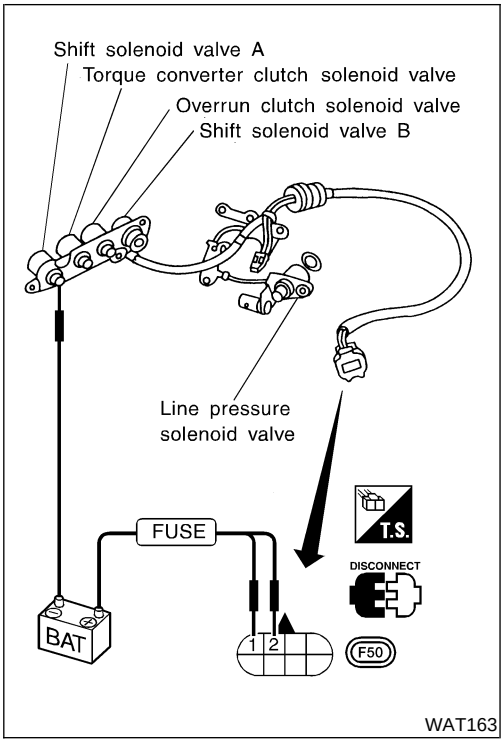
- Refer to "REMOVAL", AT-433.

Resistance Check

NIAT0154S0101

- 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

NIAT0154S0102

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

Description

NIAT0155

- This is an OBD-II self-diagnostic item and not available in PCM 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 PCM. 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

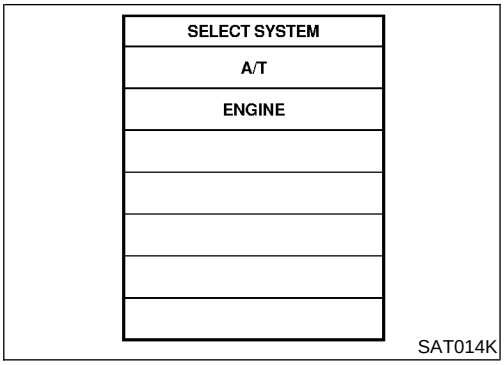
NIAT0155S02

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by PCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from tachometer
C: Gear ratio determined as gear position which PCM supposes
If the actual gear position is higher than the position (2nd) supposed by PCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, PCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve B is stuck open.

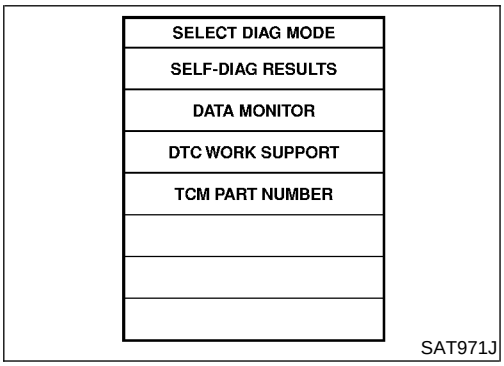
Gear position supposed by PCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve B stuck open	4	3*	3	4

*: P0732 is detected.

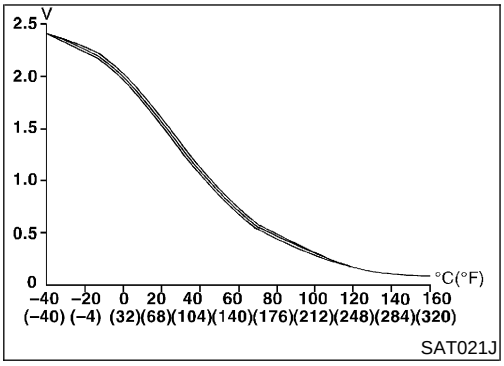
Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
: A/T 2ND GR FNCTN	A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	• Shift solenoid valve B • Each clutch • Hydraulic control circuit
: P0732		



SAT014K



SAT971J



SAT021J

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0155S03

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 "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 "Diagnostic Procedure", AT-306.
   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

Description (Cont'd)

8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "Diagnostic Procedure".)
   Refer to "Diagnostic Procedure", AT-306.
   Refer to "Shift Schedule", AT-540.

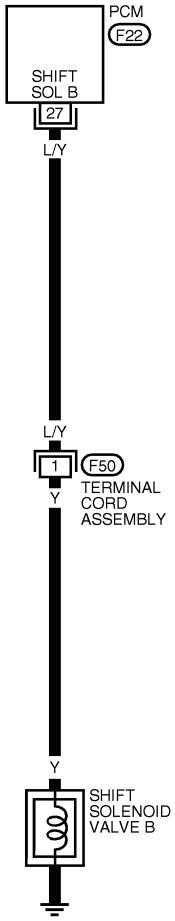
With GST

Follow the procedure "With CONSULT-II".

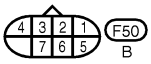
Wiring Diagram — AT — 2ND

=NIAT0156

AT-2NDSIG-01



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



REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT097

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
27	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	1V OR LESS

LAT279

Diagnostic Procedure

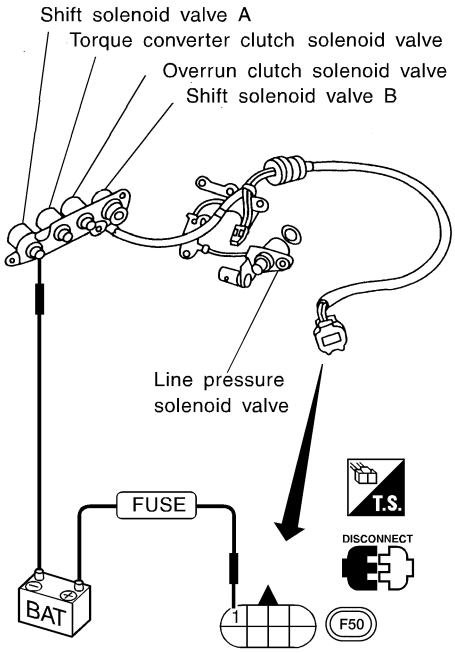
NIAT0157

1	CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to “REMOVAL”, AT-433.
2. Check shift solenoid valve operation.

- Shift solenoid valve B

Refer to “Component Inspection”, AT-307.



WAT164

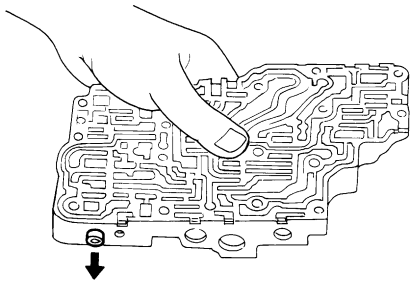
OK or NG

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

2	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to “Control Valve Assembly”, AT-465.
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.

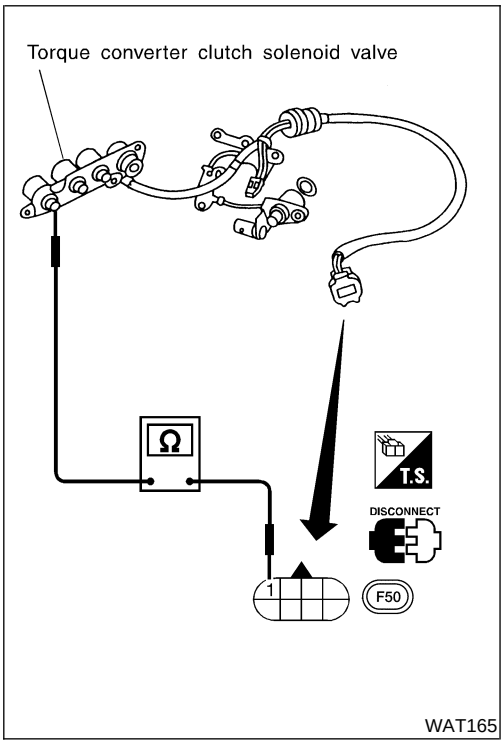


SAT367H

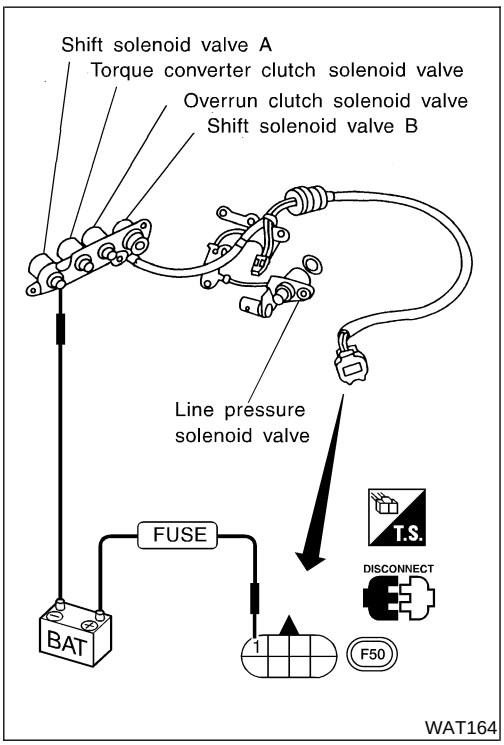
OK or NG

OK	▶	GO TO 3.
NG	▶	Repair control valve assembly.

3	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-303.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Check control valve again. Repair or replace control valve assembly.



WAT165



WAT164

Component Inspection

NIAT0158

SHIFT SOLENOID VALVE B

NIAT0158S01

- Refer to "REMOVAL", AT-433.

Resistance Check

NIAT0158S0101

- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve B	1	Ground	10 - 20Ω

Operation Check

NIAT0158S0102

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

Description

NIAT0159

- This is an OBD-II self-diagnostic item and not available in PCM 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 PCM. 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

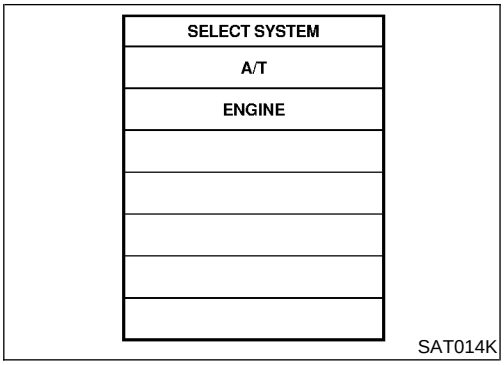
NIAT0159S02

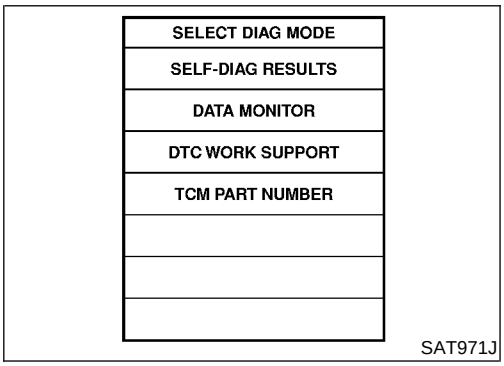
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by PCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from tachometer
C: Gear ratio determined as gear position which PCM supposes
If the actual gear position is higher than the position (3rd) supposed by PCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, PCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve A is stuck closed.

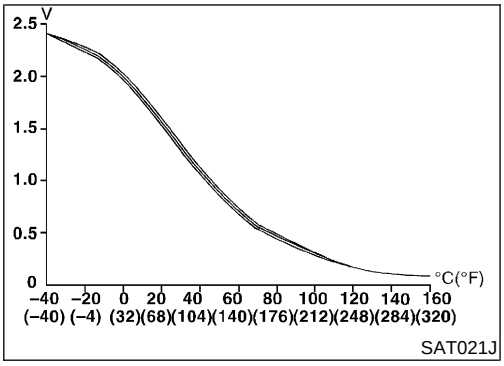
Gear position supposed by PCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve A stuck closed	1	1	4*	4

*: P0733 is detected.

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







DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0159S03

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 "Diagnostic Procedure", AT-312.
   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

Description (Cont'd)

8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "Diagnostic Procedure".)
   Refer to "Diagnostic Procedure", AT-312.
   Refer to "Shift Schedule", AT-540.

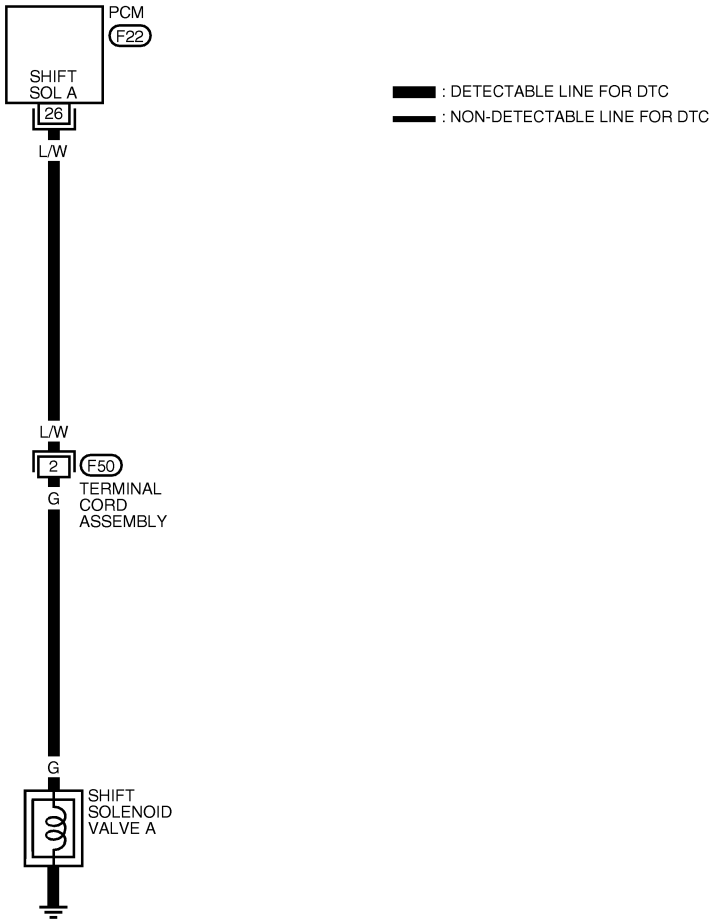
With GST

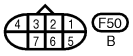
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 3RD

=NIAT0160

AT-3RDSIG-01





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT098

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
26	L/W	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATE	1V OR LESS

LAT280

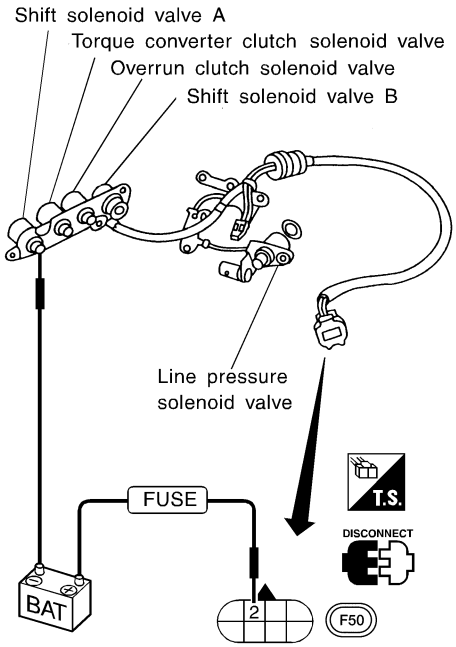
Diagnostic Procedure

NIAT0161

1 CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to “REMOVAL”, AT-433.
2. Check shift solenoid valve operation.

- Shift solenoid valve A
  Refer to “Component Inspection” below.



WAT166

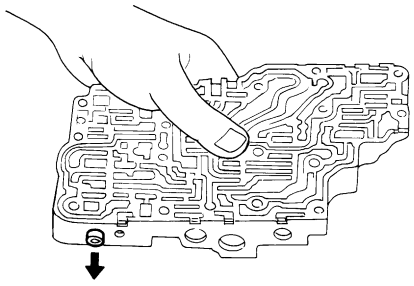
OK or NG

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

2 CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to “Control Valve Assembly”, AT-466.
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.

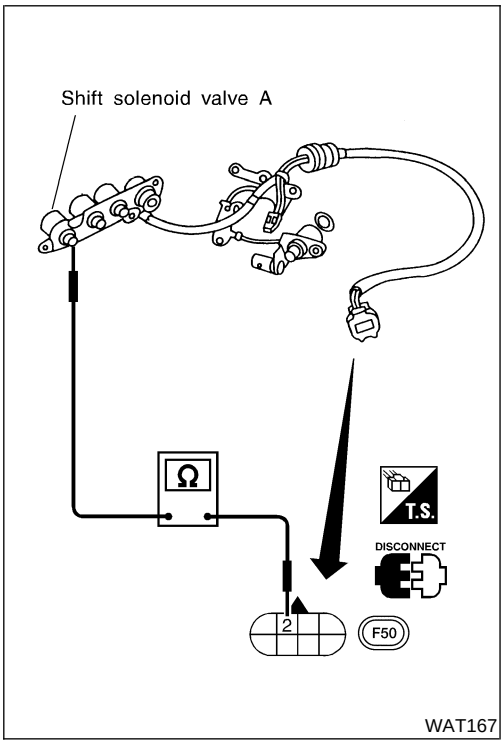


SAT367H

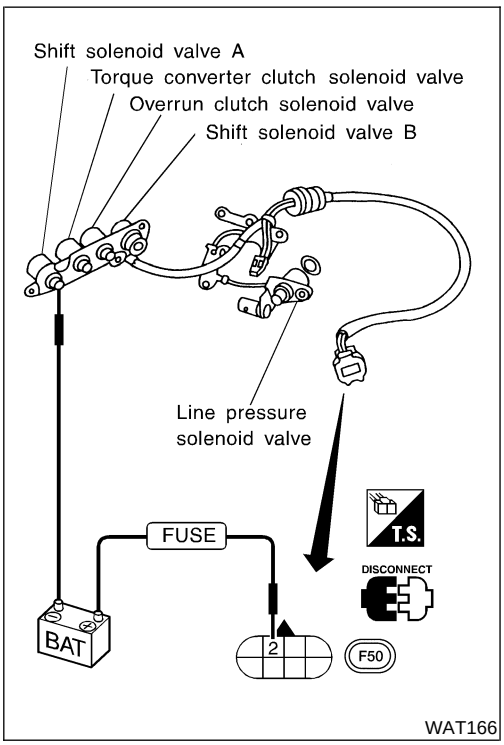
OK or NG

OK	▶	GO TO 3.
NG	▶	Repair control valve assembly.

3	CHECK DTC	
Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-309.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	Check control valve again. Repair or replace control valve assembly.



WAT167



WAT166

Component Inspection

SHIFT SOLENOID VALVE A

NIAT0162

NIAT0162S01

- Refer to "REMOVAL", AT-433.

Resistance Check

NIAT0162S0101

- Check resistance between two terminals.

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

Operation Check

NIAT0162S0102

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

Description

NIAT0163

- This is an OBD-II self-diagnostic item and not available in PCM 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 PCM. 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

NIAT0163S01

Remarks: Specification data are reference values.

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

ON BOARD DIAGNOSTIC LOGIC

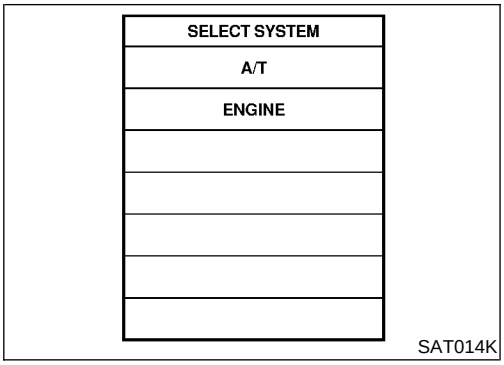
NIAT0163S03

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by PCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from tachometer
C: Gear ratio determined as gear position which PCM supposes
If the actual gear position is much lower than the position (4th) supposed by PCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, PCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve B is stuck closed.

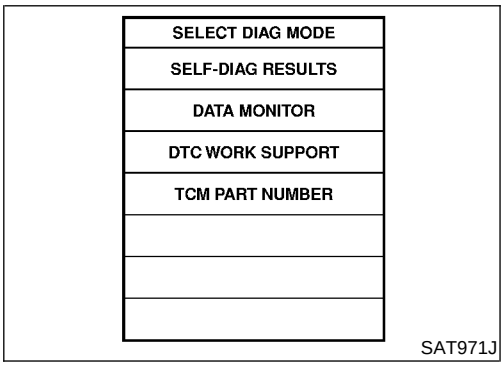
Gear position supposed by PCM	1	2	3	4
In case of gear position with no malfunctions	1	2	3	4
In case of gear position with shift solenoid valve B stuck closed	1	2	2	1*

*: P0734 is detected.

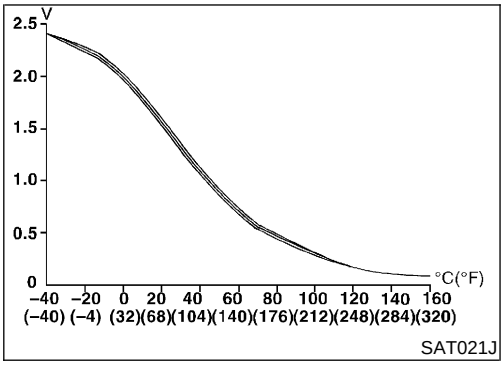
Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
: A/T 4TH GR FNCTN	A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	• Shift solenoid valve A • Shift solenoid valve B • Line pressure solenoid valve • Each clutch • Hydraulic control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



SAT014K



SAT971J



SAT021J

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0163S04

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 "Diagnostic Procedure", AT-318.
   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.)

Description (Cont'd)

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 "Diagnostic Procedure", AT-318.
   Refer to "Shift Schedule", AT-540.

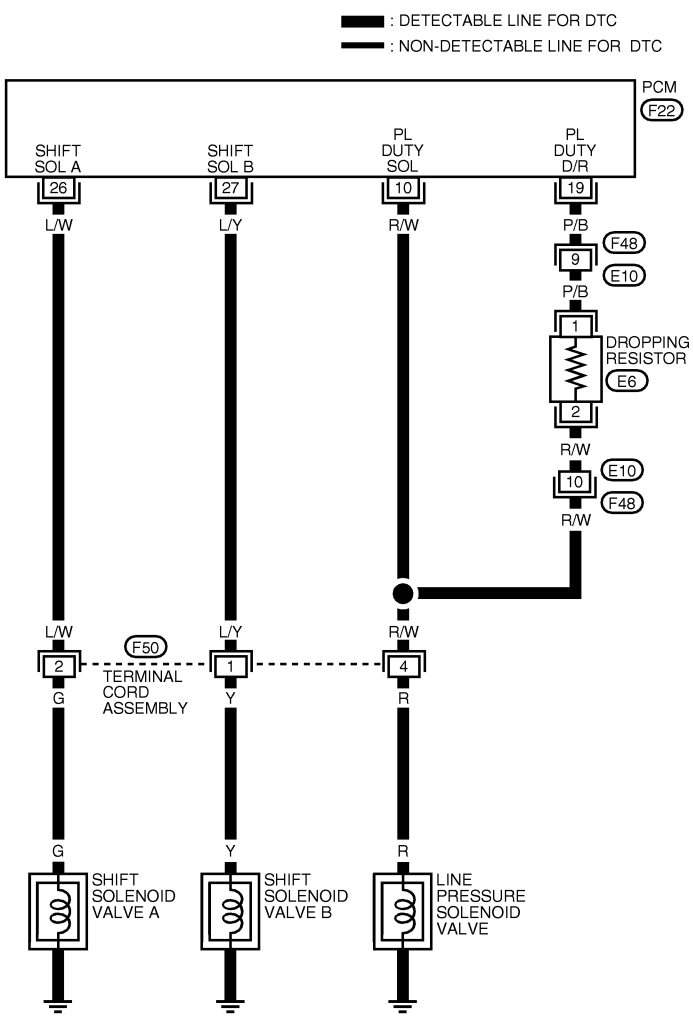
With GST

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 4TH

NIAT0164

AT-4THSIG-01



REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT099

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	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
19	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
26	L/W	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATE	1V OR LESS
27	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	1V OR LESS

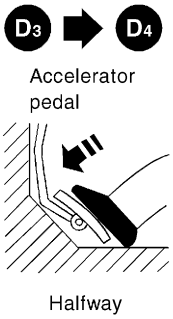
LAT281

Diagnostic Procedure

NIAT0165

1	CHECK SHIFT UP (D_3 TO D_4)

During “Cruise Test − Part 1”, AT-83, does A/T shift from D_3 to D_4 at the specified speed?



SAT988H

Yes or No

Yes	▶	GO TO 9.
No	▶	GO TO 2.

2	CHECK LINE PRESSURE

Perform line pressure test.
Refer to “Line Pressure Test”, AT-72.

Engine speed rpm	Line pressure kPa (kg/cm², 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)

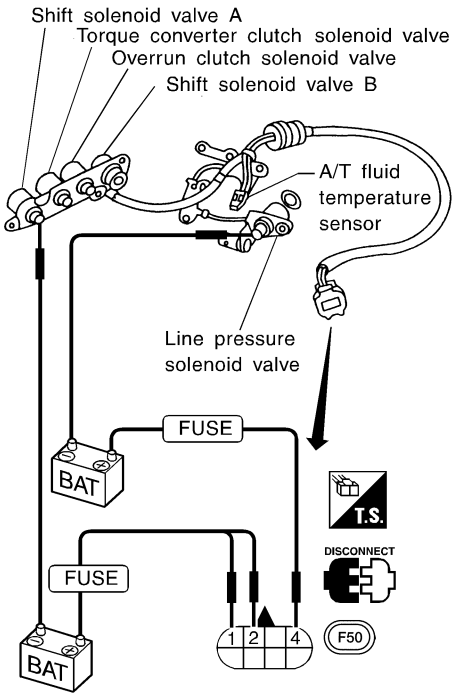
LAT236

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 6.

3	CHECK SOLENOID VALVES

1. Remove control valve assembly.
   Refer to "REMOVAL", AT-433.
2. Refer to "Component Inspection", AT-322.



WAT168

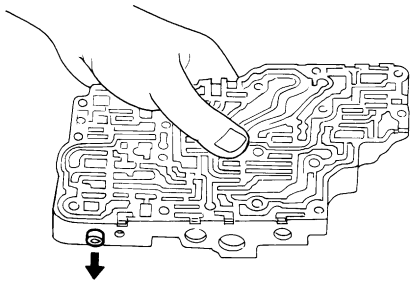
OK or NG

OK	▶	GO TO 4.
NG	▶	Replace solenoid valve assembly.

4	CHECK CONTROL VALVE

1. Disassemble control valve assembly.
   Refer to "Control Valve Assembly", AT-465.
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.



SAT367H

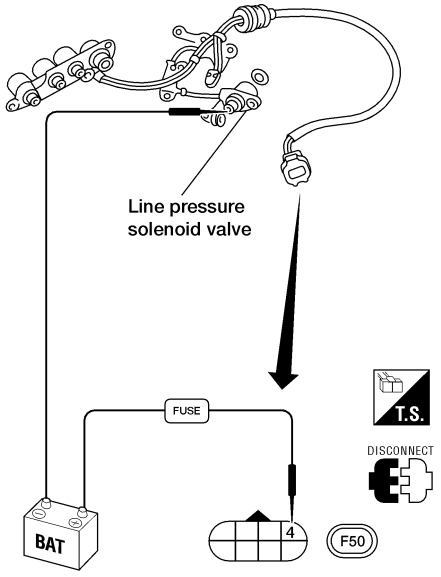
OK or NG

OK	▶	GO TO 5.
NG	▶	Repair control valve.

Diagnostic Procedure (Cont'd)

5	CHECK SHIFT UP (D_3 TO D_4)	
Does A/T shift from D_3 to D_4 at the specified speed?		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Check control valve again. Repair or replace control valve assembly.

6	CHECK LINE PRESSURE SOLENOID VALVE	
1. Remove control valve assembly. Refer to AT-433. 2. Refer to "Component Inspection", AT-322.		



WAT170

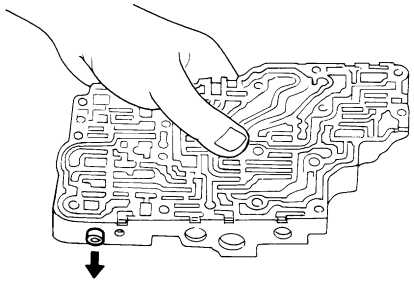
OK or NG

OK	▶	GO TO 7.
NG	▶	Replace solenoid valve assembly.

7	CHECK CONTROL VALVE

1. Disassemble control valve assembly.
   Refer to "Control Valve Assembly", AT-465.
2. Check line pressure circuit valves for sticking.

- Pressure regulator valve
- Pilot valve
- Pressure modifier valve



SAT367H

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair control valve.

8	CHECK SHIFT UP (D_3 TO D_4)

Does A/T shift from D_3 to D_4 at the specified speed?

Yes or No

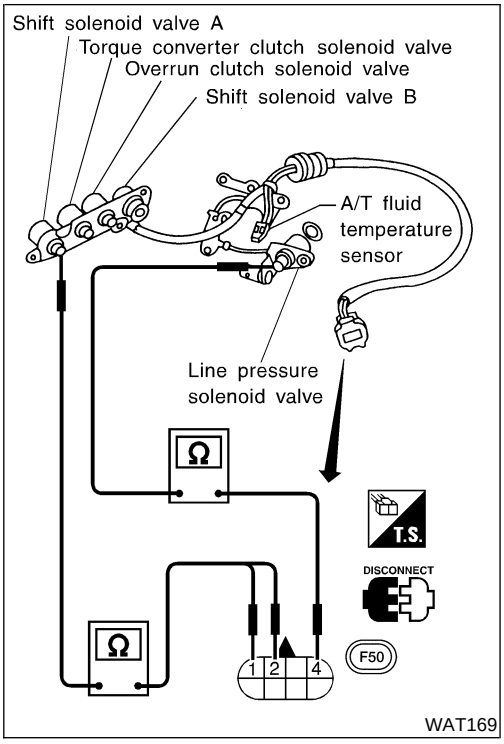
Yes	▶	GO TO 9.
No	▶	Check control valve again. Repair or replace control valve assembly.

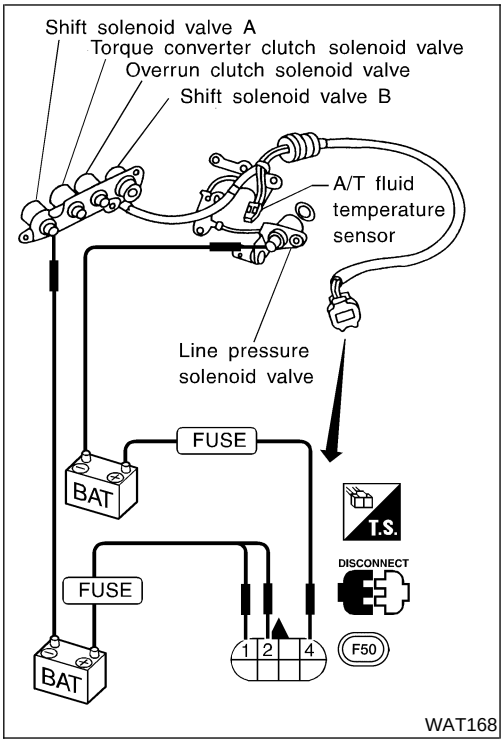
9	CHECK DTC

Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-315.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	Perform "Cruise Test — Part 1", AT-83, again and return to the start point of this test group.





Component Inspection

=NIAT0166

SOLENOID VALVES

NIAT0166S01

- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0166S0101

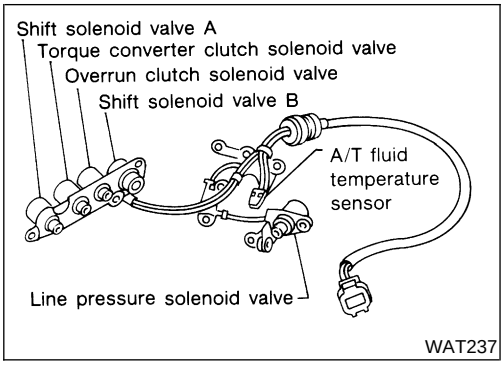
- Check resistance between two terminals.

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

NIAT0166S0102

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



Description

NIAT0167

The torque converter clutch solenoid valve is activated, with the gear in "D_4", by the PCM in response to signals sent from the vehicle speed and throttle position sensors. 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

NIAT0167S01

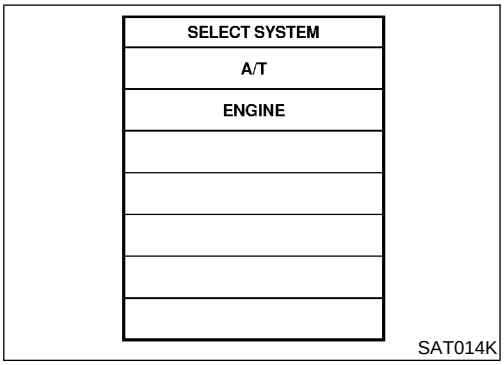
Remarks: Specification data are reference values.

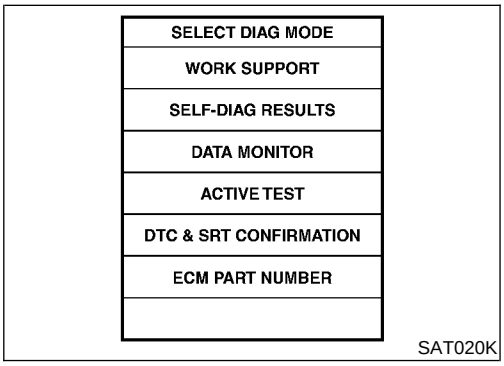
Monitor item	Condition	Specification
Torque converter clutch solenoid valve duty	Lock-up "OFF" ↓ Lock-up "ON"	Approximately 4% ↓ Approximately 94%

ON BOARD DIAGNOSIS LOGIC

NIAT0167S03

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





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0167S04

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

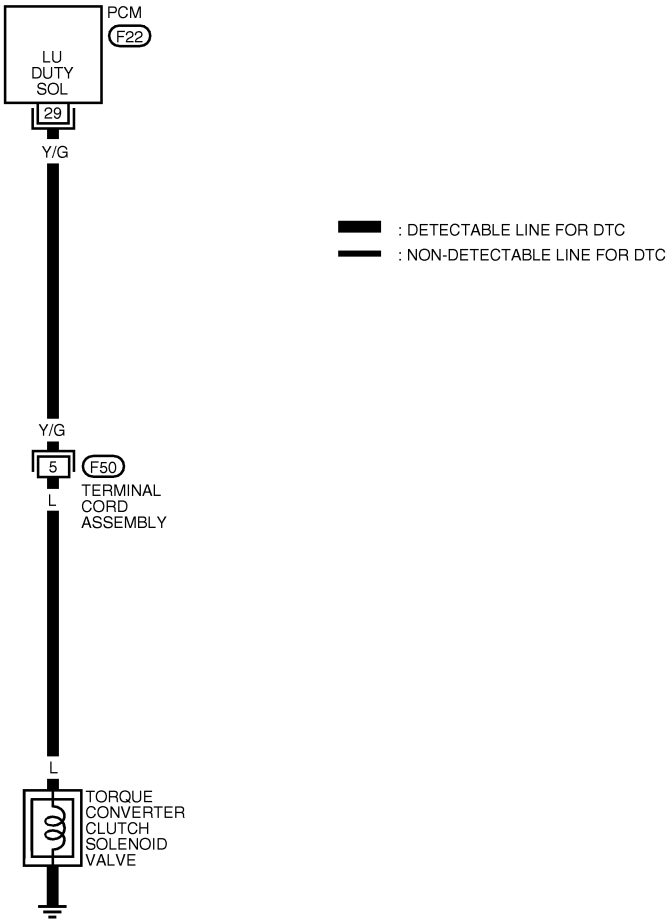
GST With GST

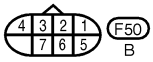
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — TCV

NIAT0168

AT-TCV-01





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT100

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
29	Y/G	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WHEN A/T PERFORMS LOCK-UP	8 - 15V
			WHEN A/T DOES NOT PERFORM LOCK-UP	1V OR LESS

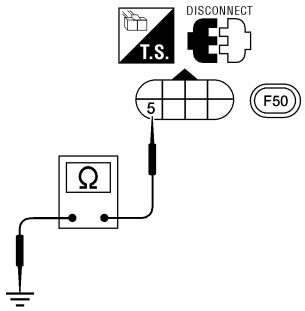
LAT282

Diagnostic Procedure

NIAT0169

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.



Resistance:
5 - 20Ω

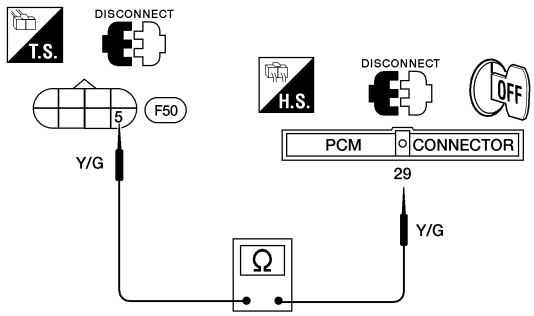
LAT171

OK or NG

OK	▶	GO TO 2.
NG	▶	1. Remove oil pan. Refer to “REMOVAL”, AT-433. 2. Check the following items: ● Torque converter clutch solenoid valve Refer to “Component Inspection”, AT-326. ● Harness of terminal cord assembly for short or open

2	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect PCM harness connector.
3. Check continuity between terminal 5 and PCM harness connector terminal 29.



Continuity should exist.

LAT214

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

4. Reinstall any part removed.

OK or NG

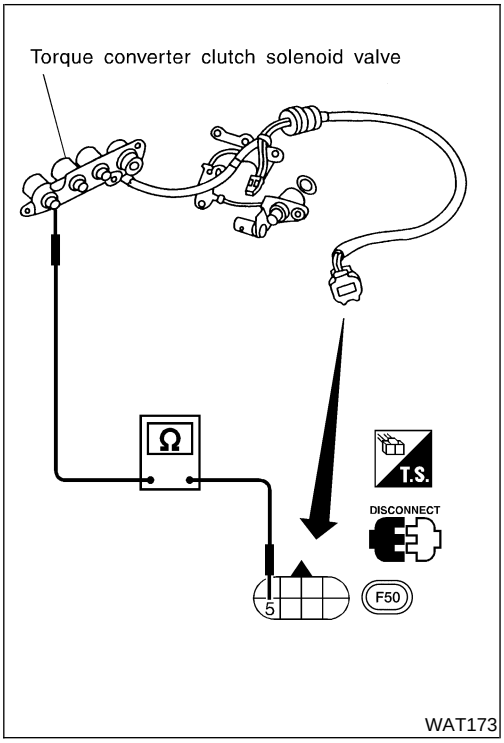
OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK DTC

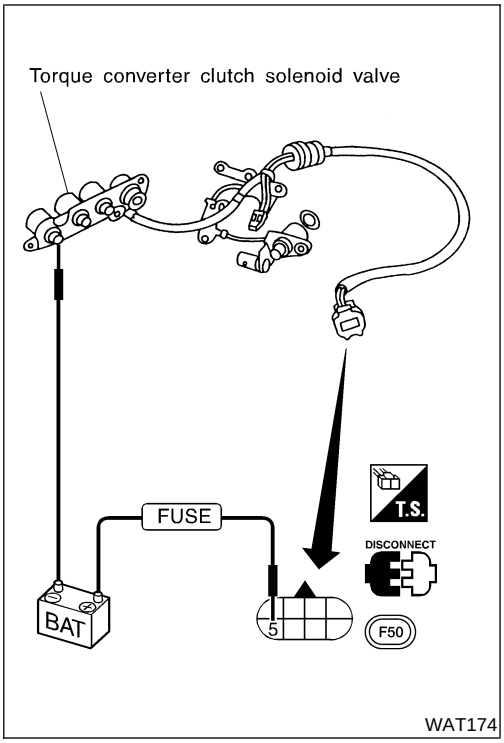
Perform “DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE”, AT-323.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.



WAT173



WAT174

Component Inspection

NIAT0170

TORQUE CONVERTER CLUTCH SOLENOID VALVE

NIAT0170S01

- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0170S0101

- Check resistance between two terminals.

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

Operation Check

NIAT0170S0102

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

Description

NIAT0171

- This is an OBD-II self-diagnostic item and not available in PCM 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 PCM. 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

NIAT0171S01

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Torque converter clutch solenoid valve duty	Lock-up “OFF” ↓ Lock-up “ON”	Approximately 4% ↓ Approximately 94%

Description (Cont'd)

ON BOARD DIAGNOSTIC LOGIC

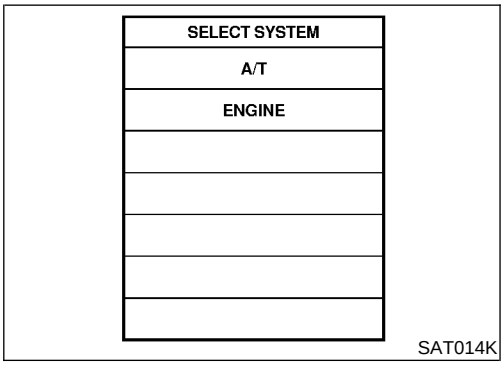
=NIAT0171S03

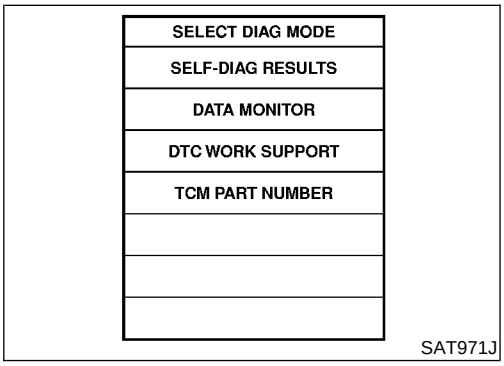
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by PCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from tachometer
C: Gear ratio determined as gear position which PCM supposes
If the actual gear position is much lower than the position (4th) supposed by PCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, PCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve B is stuck closed.

Gear position supposed by PCM	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.	• Torque converter clutch solenoid valve • Line pressure solenoid valve • Each clutch • Hydraulic control circuit





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0171S04

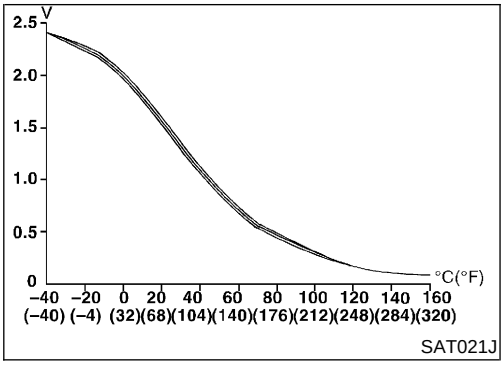
CAUTION:
Always drive vehicle at a safe speed.

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".



4) 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".**
- **For shift schedule, refer to SDS, AT-540.**
- **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".**

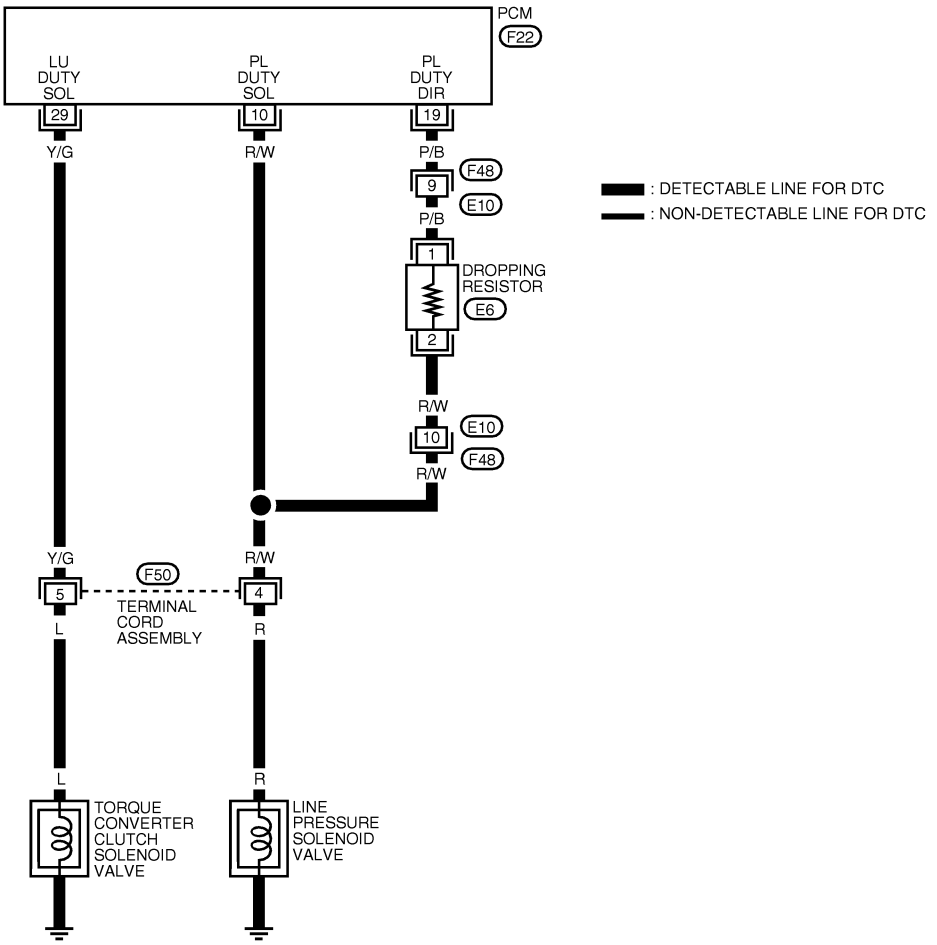
5) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "Diagnostic Procedure".)
Refer to "Diagnostic Procedure", AT-331.
Refer to "Shift Schedule", AT-540.

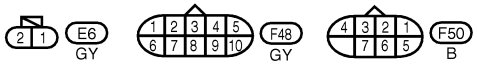
With GST
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — TCCSIG

NIAT0172

AT-TCCSIG-01





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT101

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	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
19	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
29	Y/G	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WHEN A/T PERFORMS LOCK-UP	8 - 14V
			WHEN A/T DOES NOT PERFORM LOCK-UP	1V OR LESS

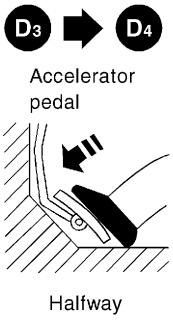
LAT283

Diagnostic Procedure

NIAT0173

1	CHECK SHIFT UP (D_3 TO D_4)

During “Cruise Test − Part 1”, AT-83, does A/T shift from D_3 to D_4 at the specified speed?



SAT988H

Yes or No

Yes	▶	GO TO 10.
No	▶	GO TO 2.

2	CHECK LINE PRESSURE

Perform line pressure test.
Refer to “Line Pressure Test”, AT-72.

Engine speed rpm	Line pressure kPa (kg/cm², 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

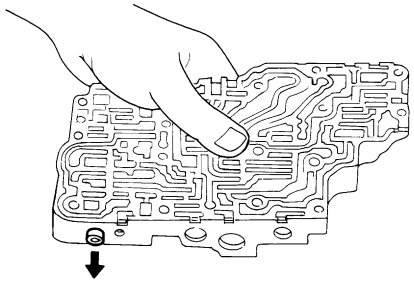
OK	▶	GO TO 3.
NG	▶	GO TO 6.

Diagnostic Procedure (Cont'd)

3	CHECK CONTROL VALVE

1. Disassemble control valve assembly.
   Refer to "Control Valve Assembly", AT-465.
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.



SAT367H

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair control valve.

4	CHECK SHIFT UP (D_3 TO D_4)

Does A/T shift from D_3 to D_4 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

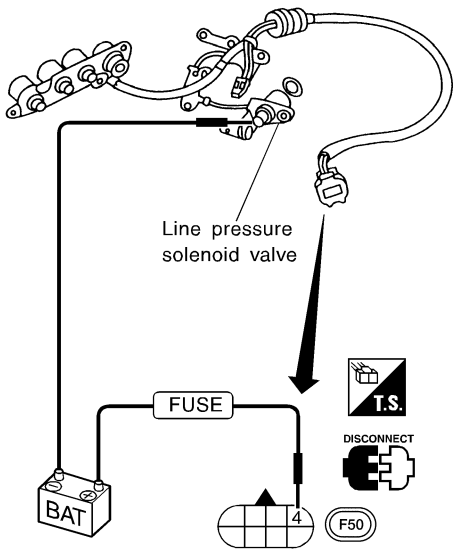
Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-328.

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 "REMOVAL", AT-433.
2. Check line pressure solenoid valve operation.
   Refer to "Component Inspection", AT-337.



WAT175

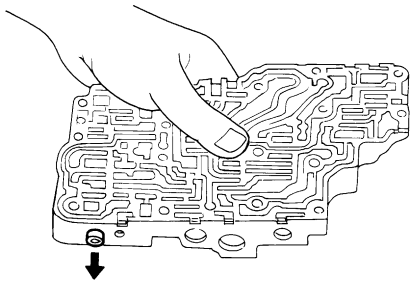
OK or NG

OK	▶	GO TO 7.
NG	▶	Replace solenoid valve assembly.

7	CHECK CONTROL VALVE

1. Disassemble control valve assembly.
   Refer to "Control Valve Assembly", AT-465.
2. Check line pressure circuit valves for sticking.

- Pressure regulator valve
- Pilot valve
- Pressure modifier valve



SAT367H

OK or NG

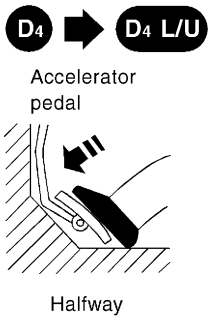
OK	▶	GO TO 8.
NG	▶	Repair control valve.

Diagnostic Procedure (Cont'd)

8	CHECK SHIFT UP (D_3 TO D_4)	
Does A/T shift from D_3 to D_4 at the specified speed?		
Yes or No		
Yes	▶	GO TO 9.
No	▶	Check control valve again. Repair or replace control valve assembly.

9	CHECK DTC	
Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" AT-328.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 10. And check for proper lock-up.

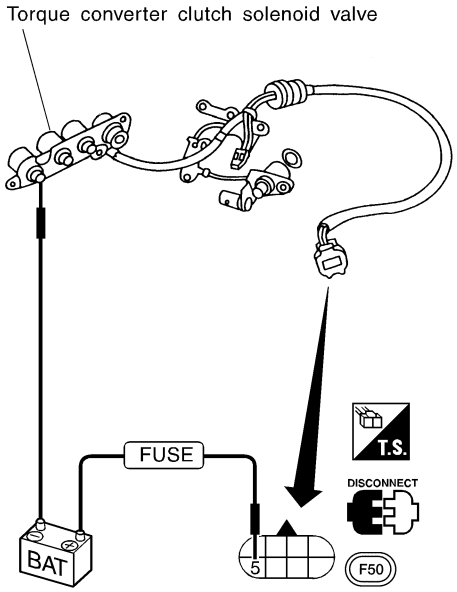
10	CHECK LOCK-UP CONDITION	
During "Cruise Test − Part 1", AT-83, does A/T perform lock-up at the specified speed?		
Yes or No		
Yes	▶	Perform "Cruise Test − Part 1", AT-83, again and return to the start point of this test group.
No	▶	GO TO 11.



SAT989H

11	CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE

1. Remove control valve assembly.
   Refer to AT-433.
2. Check torque converter clutch solenoid valve operation. Refer to "Component Inspection", AT-337.



WAT176

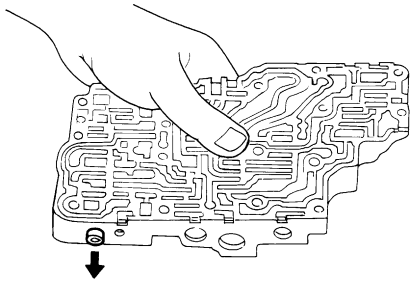
OK or NG

OK	▶	GO TO 12.
NG	▶	Replace solenoid valve assembly.

12	CHECK CONTROL VALVE

1. Disassemble control valve assembly.
   Refer to "Control Valve Assembly", AT-465.
2. Check control valves for sticking.

- Torque converter clutch control valve
- Torque converter clutch relief valve



SAT367H

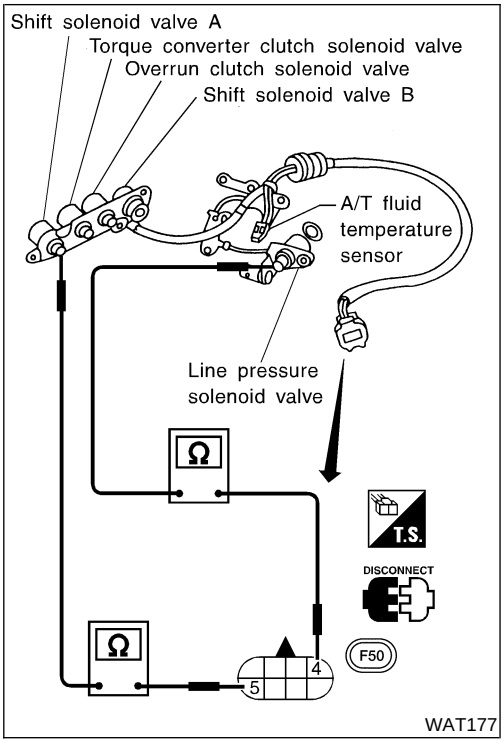
OK or NG

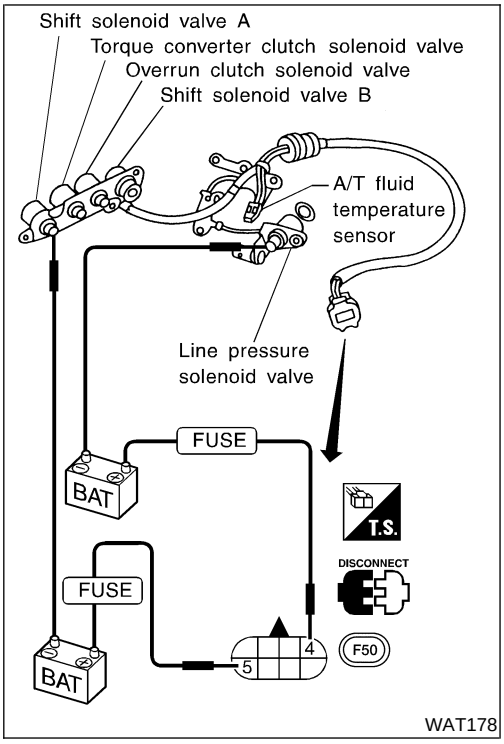
OK	▶	GO TO 13.
NG	▶	Repair control valve.

Diagnostic Procedure (Cont'd)

13	CHECK LOCK-UP CONDITION	
Does A/T perform lock-up at the specified speed?		
Yes or No		
Yes	▶	GO TO 14.
No	▶	Check control valve again. Repair or replace control valve assembly.

14	CHECK DTC	
Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-328.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	Perform "Cruise Test — Part 1", AT-83, again and return to the start point of this test group.





Component Inspection

=NIAT0174

SOLENOID VALVES

NIAT0174S01

- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0174S0101

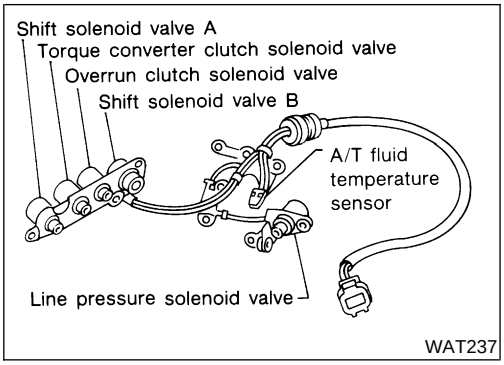
- Check resistance between two terminals.

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

NIAT0174S0102

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



Description

NIAT0175

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

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

NIAT0175S01

Remarks: Specification data are reference values.

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

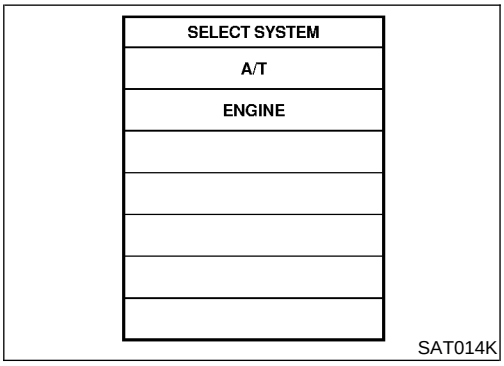
NOTE:

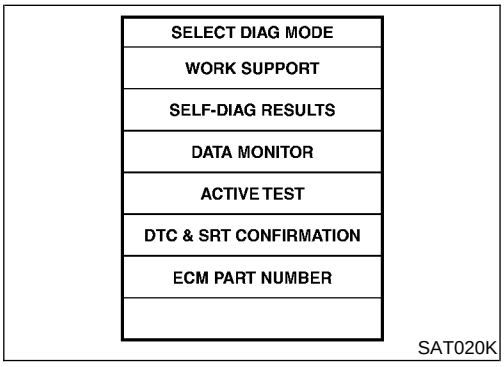
The line pressure duty cycle value is not consistent when the closed throttle position switch is "ON". To confirm the line pressure duty cycle at low pressure, the accelerator (throttle) should be open until the closed throttle position switch is "OFF".

ON BOARD DIAGNOSIS LOGIC

NIAT0175S03

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





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0175S04

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 1 second.

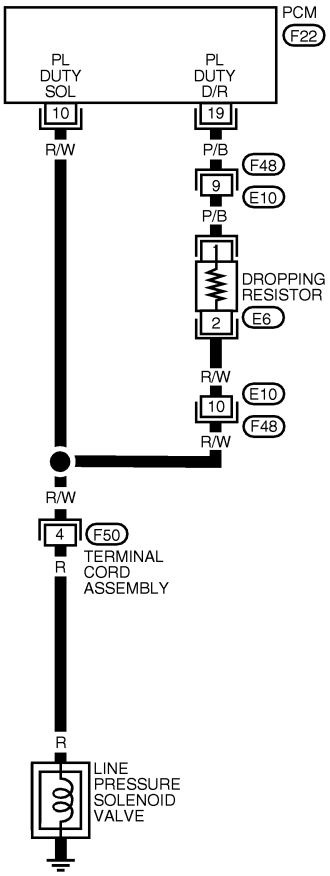
With GST

Follow the procedure "With CONSULT-II".

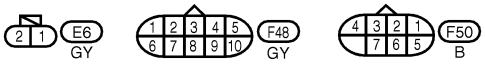
Wiring Diagram — AT — LPSV

NIAT0176

AT-LPSV-01



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



REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT102

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	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
19	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

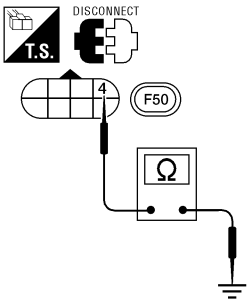
LAT284

Diagnostic Procedure

NIAT0177

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.



Resistance:
2.5 - 5Ω

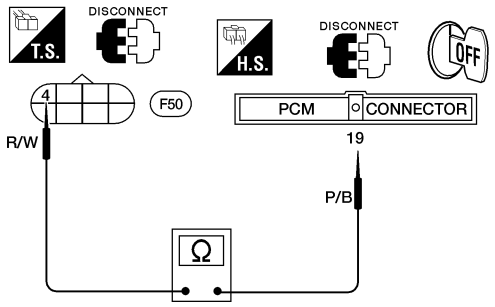
LAT179

OK or NG

OK	▶	GO TO 2.
NG	▶	1. Remove control valve assembly. Refer to AT-433. 2. Check the following items: ● Line pressure solenoid valve Refer to “Component Inspection”, AT-342. ● Harness of terminal cord assembly for short or open

2	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect PCM harness connector.
3. Check resistance between terminal 4 and PCM harness connector terminal 19.



Resistance:
10 - 15 Ω

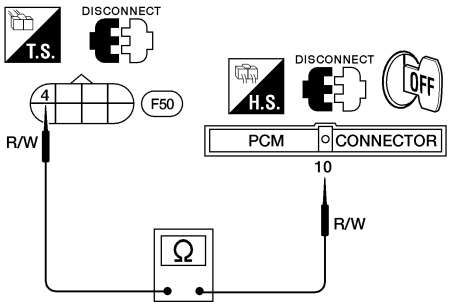
LAT215

OK or NG

OK	▶	GO TO 3.
NG	▶	**Check the following items:** ● Dropping resistor Refer to “Component Inspection”, AT-342. ● Harness for short or open between PCM terminal 19 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 PCM harness connector terminal 10.



Resistance:
0 Ω

LAT216

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

3. Reinstall any part removed.

OK or NG

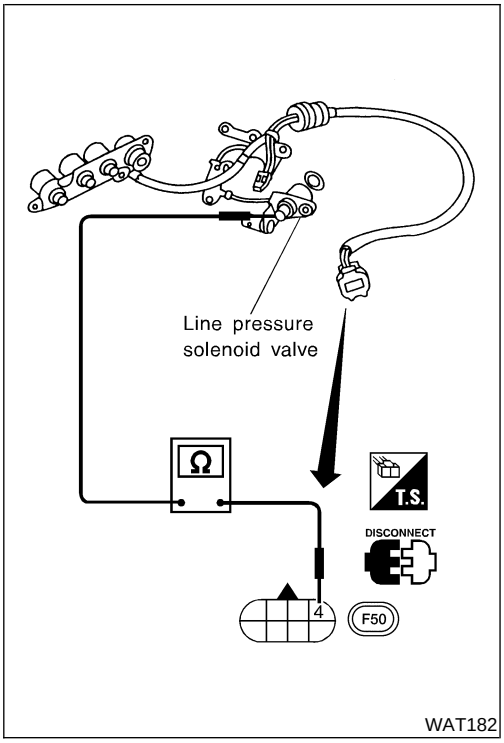
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

4	CHECK DTC

Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-338.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.



WAT182

Component Inspection

=NIAT0178

LINE PRESSURE SOLENOID VALVE

NIAT0178S01

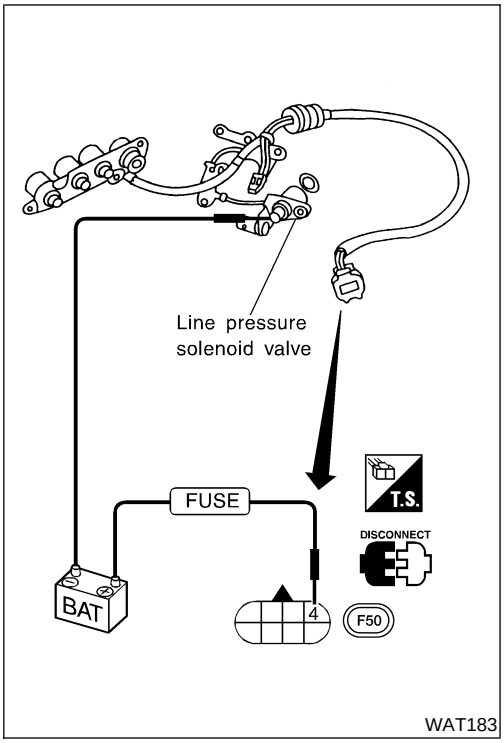
- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0178S0101

- Check resistance between two terminals.

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

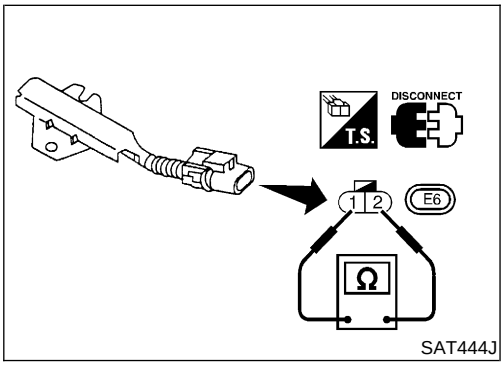


WAT183

Operation Check

NIAT0178S0102

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



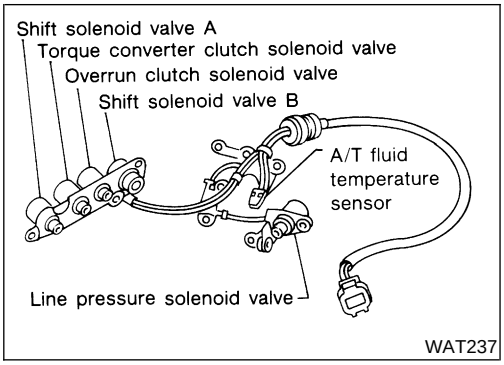
SAT444J

DROPPING RESISTOR

NIAT0178S02

- Check resistance between two terminals.

Resistance:
10 - 15Ω



Description

NIAT0179

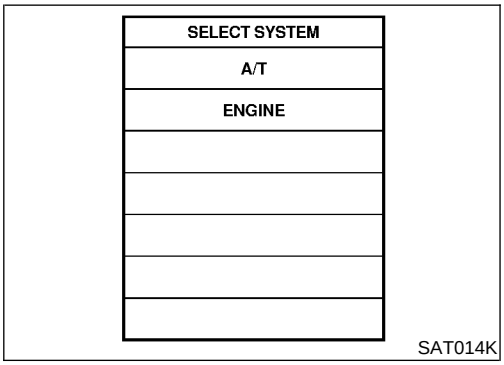
Shift solenoid valves A and B are turned “ON” or “OFF” by the PCM in response to signals sent from the PNP switch, vehicle speed and throttle position sensors. Gears will then be shifted to the optimum position.

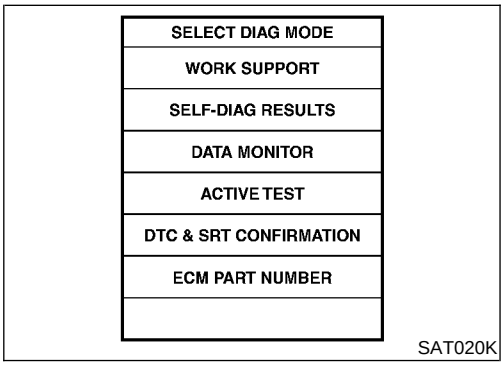
Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

ON BOARD DIAGNOSIS LOGIC

NIAT0179S02

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





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0179S03

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”).

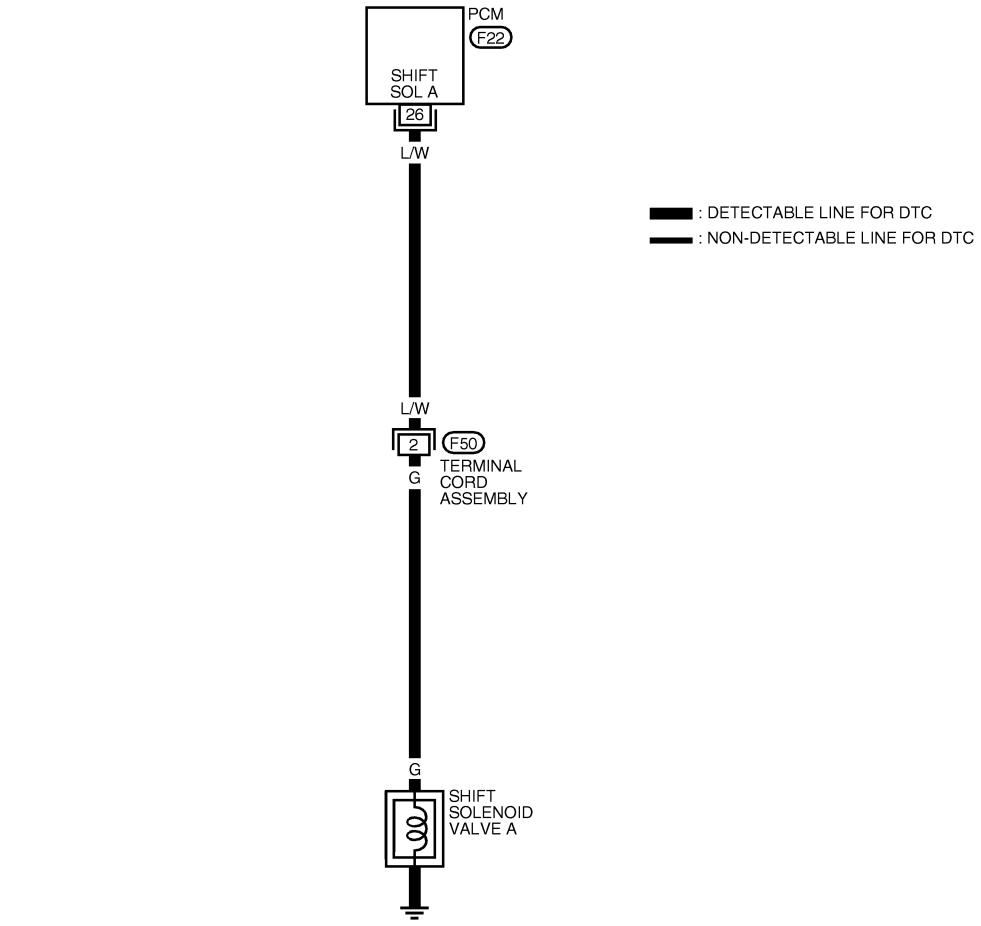
With GST

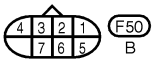
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/A

NIAT0180

AT-SSV/A-01





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT103

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
26	L/W	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A DOES NOT OPERATE	1V OR LESS

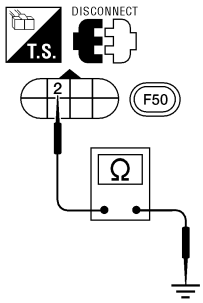
LAT280

Diagnostic Procedure

NIAT0181

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.



Resistance:
20 - 30 Ω

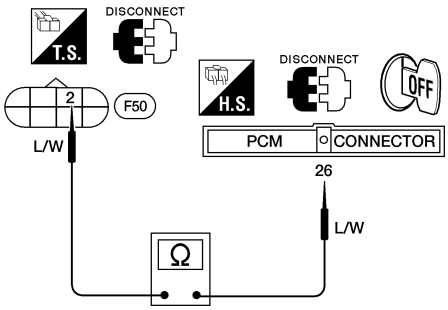
LAT184

OK or NG

OK	▶	GO TO 2.
NG	▶	1. Remove control valve assembly. Refer to “REMOVAL”, AT-433. 2. Check the following items: ● Shift solenoid valve A Refer to “Component Inspection”, AT-346. ● Harness of terminal cord assembly for short or open

2	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect PCM harness connector.
3. Check continuity between terminal 2 and PCM harness connector terminal 26.



Continuity should exist.

LAT217

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

4. Reinstall any part removed.

OK or NG

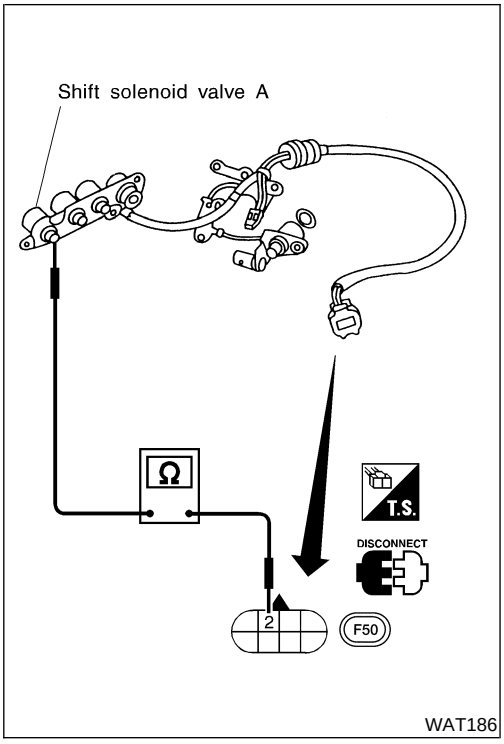
OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK DTC

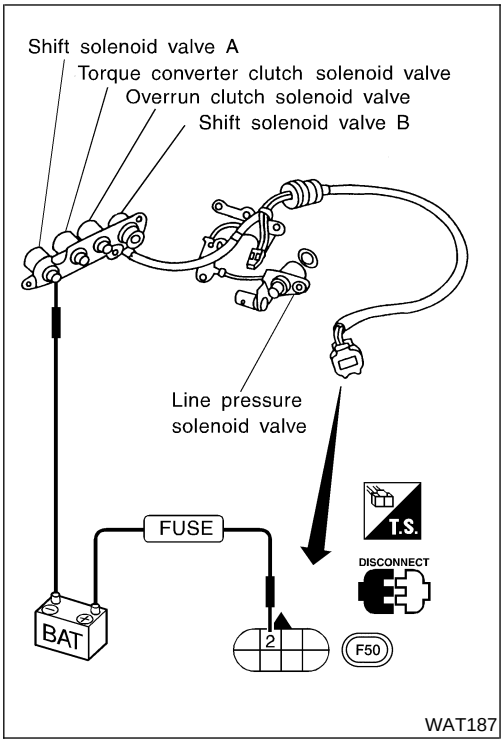
Perform “DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE”, AT-343.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.



WAT186



WAT187

Component Inspection

NIAT0182

SHIFT SOLENOID VALVE A

NIAT0182S01

- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0182S0101

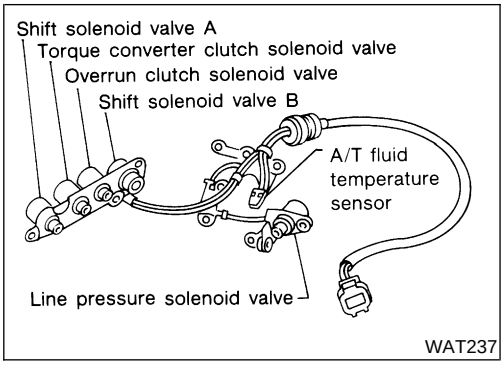
- Check resistance between two terminals.

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

Operation Check

NIAT0182S0102

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



WAT237

Description

NIAT0183

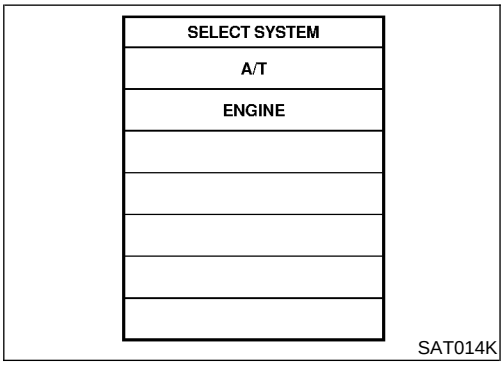
Shift solenoid valves A and B are turned “ON” or “OFF” by the PCM in response to signals sent from the PNP switch, vehicle speed and throttle position sensors. Gears will then be shifted to the optimum position.

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)

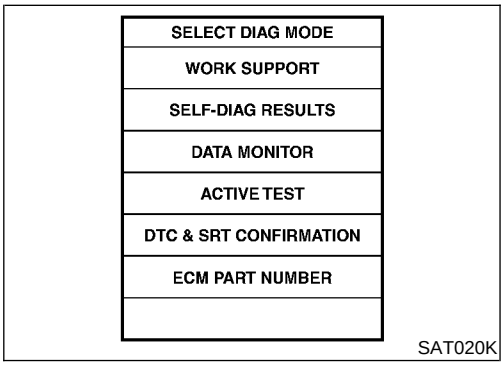
ON BOARD DIAGNOSIS LOGIC

NIAT0183S02

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



SAT014K



SAT020K

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0183S03

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”).

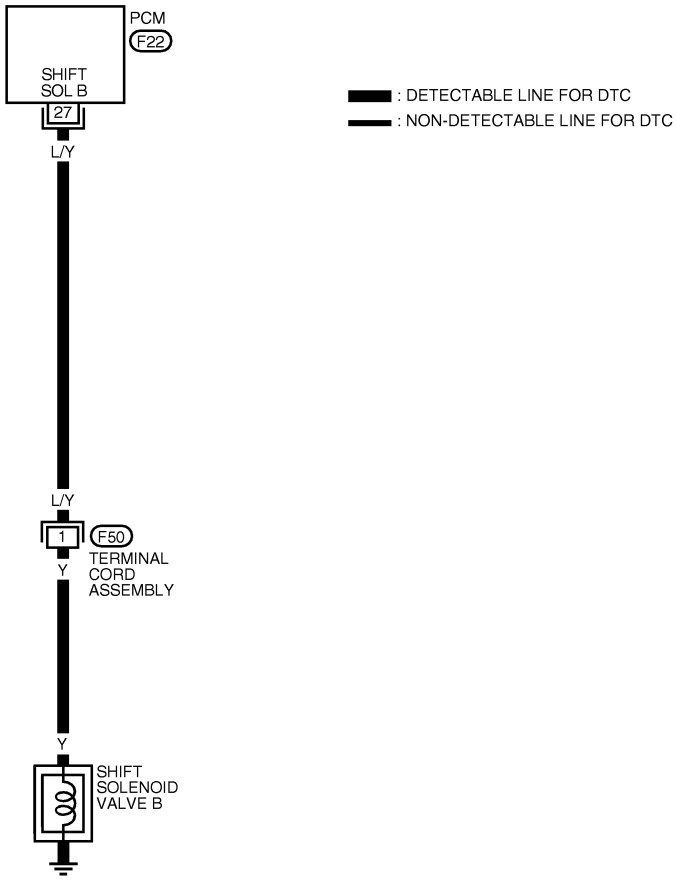
With GST

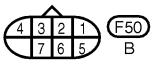
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/B

NIAT0184

AT-SSV/B-01





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT104

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
27	L/Y	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B OPERATES	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B DOES NOT OPERATE	1V OR LESS

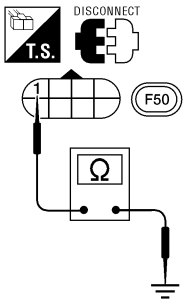
LAT279

Diagnostic Procedure

NIAT0185

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.



Resistance:
5 - 20Ω

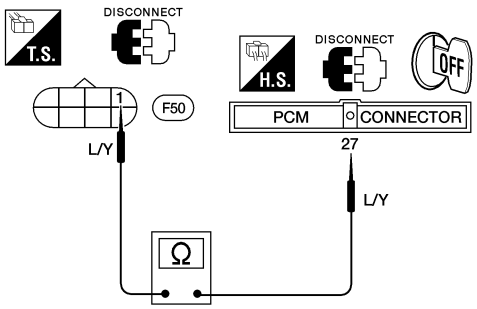
LAT188

OK or NG

OK	▶	GO TO 2.
NG	▶	1. Remove control valve assembly. Refer to “REMOVAL”, AT-433. 2. Check the following items: ● Shift solenoid valve B Refer to “Component Inspection”, AT-350. ● Harness of terminal cord assembly for short or open

2	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect PCM harness connector.
3. Check continuity between terminal 1 and PCM harness connector terminal 27.



Continuity should exist.

LAT218

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

4. Reinstall any part removed.

OK or NG

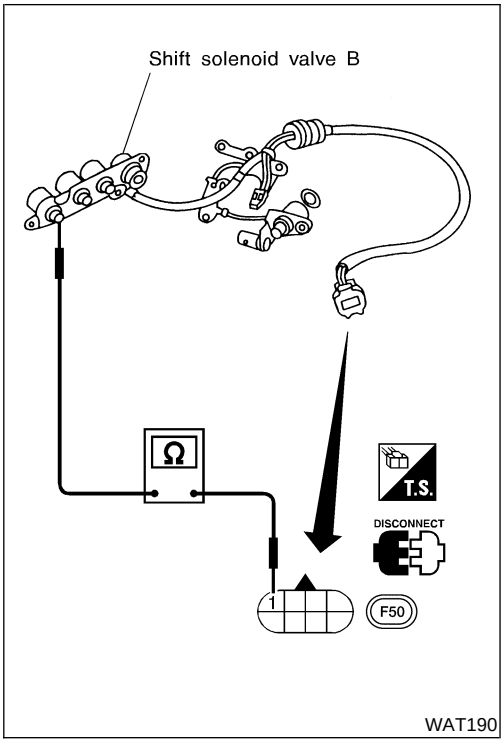
OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK DTC

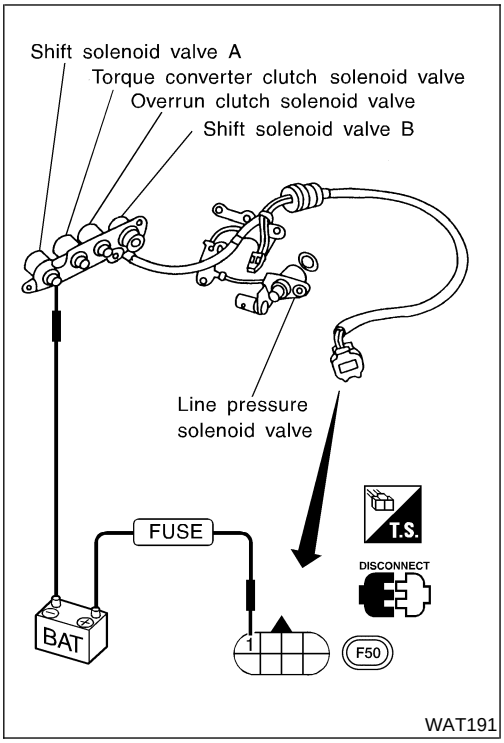
Perform “DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE”, AT-347.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.



WAT190



WAT191

Component Inspection

NIAT0186

SHIFT SOLENOID VALVE B

NIAT0186S01

- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0186S0101

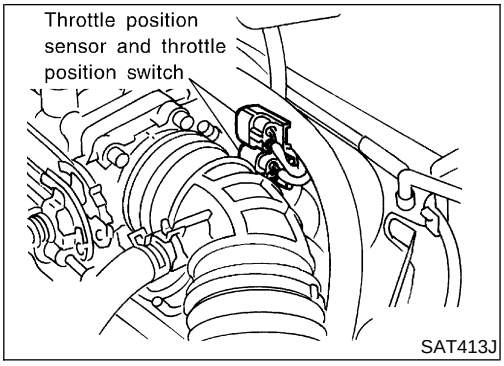
- Check resistance between two terminals.

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

Operation Check

NIAT0186S0102

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



Description

NIAT0187

- Throttle position sensor
  The throttle position sensor detects the throttle valve position and sends a signal to the PCM.
- Throttle position switch
  Consists of a wide open throttle position switch and a closed throttle position switch.
  The wide open throttle position switch sends a signal to the PCM when the throttle valve is open at least 1/2 of the full throttle position. The closed throttle position switch sends a signal to the PCM when the throttle valve is fully closed.

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NIAT0187S01

Remarks: Specification data are reference values.

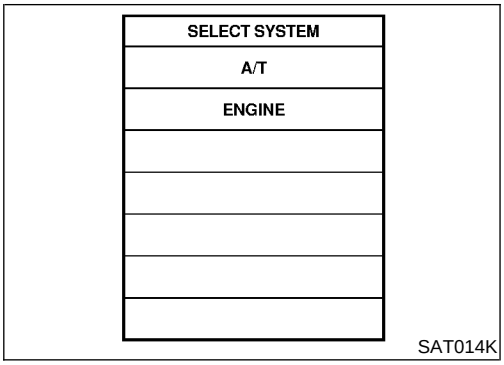
Monitor item	Condition	Specification
Throttle position sensor	Fully-closed throttle	Approximately 0.5V
	Fully-open throttle	Approximately 4V

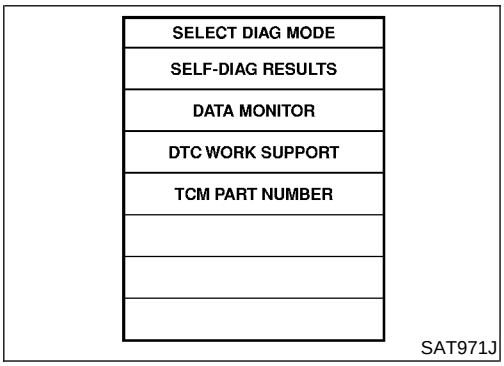
ON BOARD DIAGNOSIS LOGIC

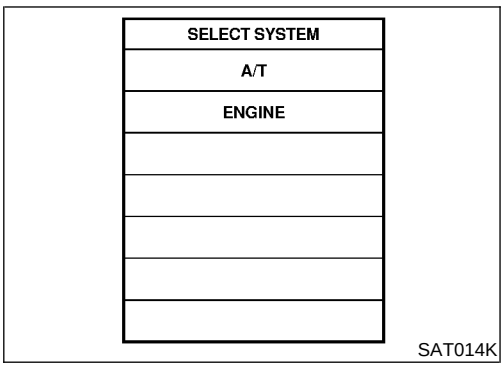
NIAT0187S03

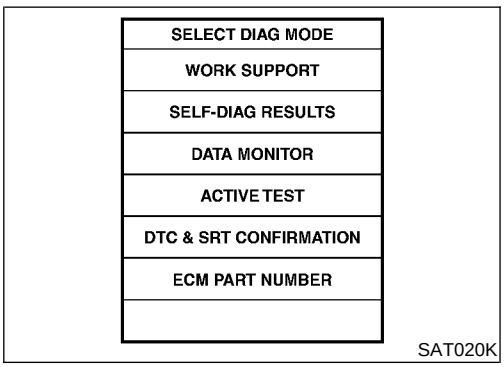
Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
(P) : TP SEN/CIRC A/T	PCM receives an excessively low or high voltage from the sensor.	• Harness or connectors (The sensor circuit is open or shorted.) • Throttle position sensor • Throttle position switch
(CST) : P1705		

Description (Cont'd)









DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0187S04

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) Apply vacuum to the throttle opener, then check the following. Refer to steps from 1 to 5 of "Preparation", "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
2) Turn ignition switch "ON" and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3) Check the following.

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 "Diagnostic Procedure", AT-354.
If the check result is OK, go to following step.

4) Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
5) 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 (OD "ON")
   If the check result is NG, go to "Diagnostic Procedure", AT-354.
   If the check result is OK, go to following step.
6) 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 (OD "ON")

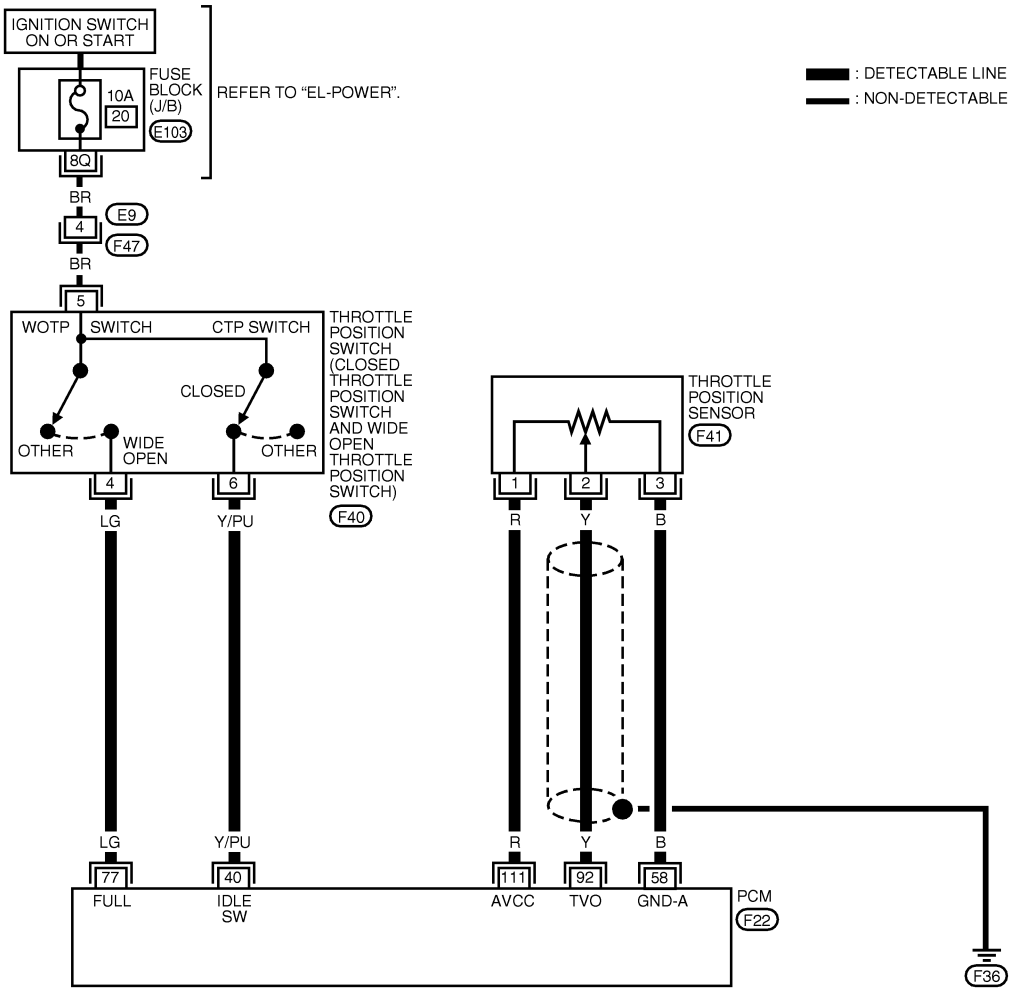
With GST

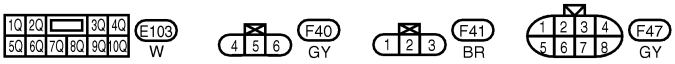
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — TPS

=NIAT0188

AT-TPS-01





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT105

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
40	Y/PU	CLOSED THROTTLE POSITION SWITCH	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	BATTERY VOLTAGE
			WHEN DEPRESSING ACCLERATOR PEDAL (ENGINE WARM)	1V OR LESS
58	B	GROUND (THROTTLE POSITION SENSOR)	—	1V OR LESS
77	LG	WIDE OPEN THROTTLE POSITION SWITCH	WHEN DEPRESSING ACCLERATOR PEDAL MORE THAN HALF-WAY (ENGINE WARM)	BATTERY VOLTAGE
			WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	1V OR LESS
92	Y	THROTTLE POSITION SENSOR	WHEN DEPRESSING ACCELERATOR PEDAL SLOWLY (ENGINE WARM)	CLOSED: APPROX 0.5V OPEN : APPROX 4V
111	R	THROTTLE POSITION SENSOR (POWER SOURCE)	WHEN TURNING IGNITION SWITCH TO "ON"	4.5 - 5.5V
			WHEN TURNING IGNITION SWITCH TO "OFF"	1V OR LESS

LAT285

Diagnostic Procedure

NIAT0189

1	CHECK DTC WITH PCM	
Perform diagnostic test mode II (self-diagnostic results) for engine control. Refer to ***EC-100***, “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 circuit for engine control. Refer to ***EC-201***, “DTC P0120 THROTTLE POSITION SENSOR”.

2	CHECK INPUT SIGNAL (WITH CONSULT-II)	
With CONSULT-II 1. Apply vacuum to the throttle opener then check the following. Referto steps 1 through 5 of “Preparation”, “TCM/PCM Self-diagnostic Procedure (No Tools)”, AT-52. 2. Turn ignition switch to “ON” position. (Do not start engine.) 3. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II. 4. Read out the value of “THRTL POS SEN”. **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 circuit between PCM and throttle position sensor. (Main harness)

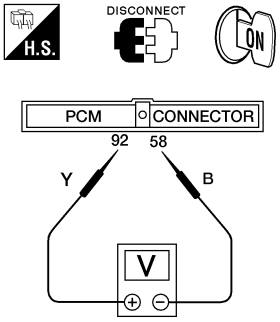
DATA MONITOR	
MONITORING	
VHCL/S SE-A/T	XXX km/h
VHCL/S SE-MTR	XXX km/h
THRTL POS SEN	XXX V
FLUID TEMP SE	XXX V
BATTERY VOLT	XXX V

SAT614J

3	CHECK INPUT SIGNAL (WITHOUT CONSULT-II)

Without CONSULT-II

1. Apply vacuum to the throttle opener then check the following. Refer to steps 1 through 5 of "Preparation", "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
2. Turn ignition switch to "ON" position.
   (Do not start engine.)
3. Check voltage between PCM terminals 92 and 58 while accelerator pedal is depressed slowly.
   (Voltage rises gradually in response to throttle position)



Voltage:
Fully-closed throttle valve:
Approximately 0.5V
Fully-open throttle valve:
Approximately 4V
(Voltage rises gradually in response to throttle position)

LAT219

OK or NG

OK	▶	GO TO 5.
NG	▶	Check harness for short or open circuit between PCM and throttle position sensor. (Main harness)

Diagnostic Procedure (Cont'd)

4	CHECK THROTTLE POSITION SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Apply vacuum to the throttle opener, then check the following. Refer to steps 1 through 5 of "Preparation", "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
2. Turn ignition switch to "ON" position.
   (Do not start engine.)
3. Select "ECU INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
4. Read out "CLOSED THL/SW" and "W/O THRL/P-SW" depressing and releasing accelerator pedal.
   Check the signal of throttle position switch is indicated properly.

Accelerator pedal condition	Data monitor	
	CLOSED THL/SW	W/O THRL/P-SW
Released	ON	OFF
Fully depressed	OFF	ON

MTBL0011

DATA MONITOR	
MONITORING	
POWERSHIFT SW	OFF
CLOSED THL/SW	OFF
W/O THRL/P-SW	OFF
HOLD SW	OFF
BRAKE SW	ON

SAT702J

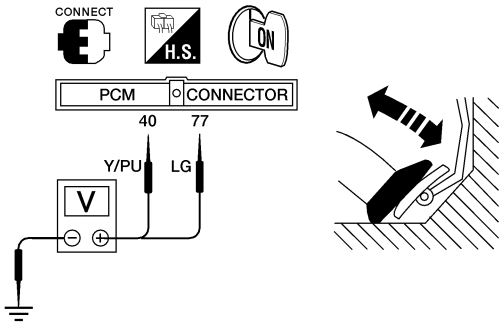
OK or NG

OK	▶	GO TO 6.
NG	▶	**Check the following items:** ● Throttle position switch — Refer to "Component Inspection", AT-358. ● Harness for short or open between ignition switch and throttle position switch (Main harness) ● Harness for short or open between throttle position switch and PCM (Main harness)

5	CHECK THROTTLE POSITION SWITCH CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

1. Apply vacuum to the throttle opener, then check the following. Refer to steps 1 through 5 of "Preparation", "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
2. Turn ignition switch to "ON" position.
   (Do not start engine.)
3. Check voltage between PCM terminals 40, 77 and ground while depressing, and releasing accelerator pedal slowly.
   (After warming up engine)



Accelerator pedal condition	Voltage	
	Terminal No. 40	Terminal No. 77
Released	Battery voltage	1V or less
Fully depressed	1V or less	Battery voltage

LAT220

OK or NG

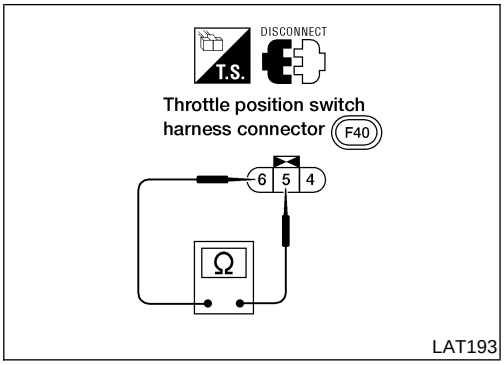
OK	▶	GO TO 6.
NG	▶	**Check the following items:** ● Throttle position switch — Refer to "Component Inspection", AT-358. ● Harness for short or open between ignition switch and throttle position switch (Main harness) ● Harness for short or open between throttle position switch and PCM (Main harness)

6	CHECK DTC

Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-352.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.



Component Inspection

=NIAT0190

THROTTLE POSITION SWITCH

NIAT0190S01

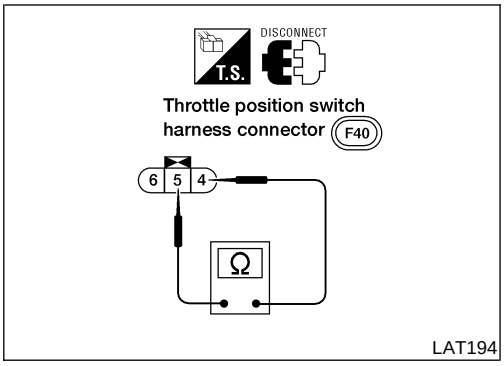
Closed Throttle Position Switch (Idle position)

NIAT0190S0101

- Check continuity between terminals 5 and 6.
  [Refer to “Preparation”, “TCM/PCM Self-diagnostic Procedure (No Tools)”, AT-52.]

Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

- To adjust closed throttle position switch, refer to ***EC-464***, “DTC P0510 CLOSED THROTTLE POSITION SWITCH”.

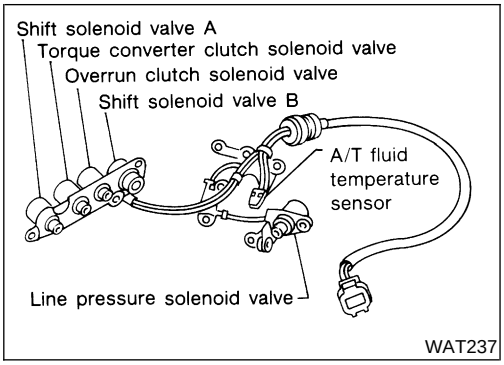


Wide Open Throttle Position Switch

NIAT0190S0102

- Check continuity between terminals 4 and 5.

Accelerator pedal condition	Continuity
Released	No
Depressed	Yes



Description

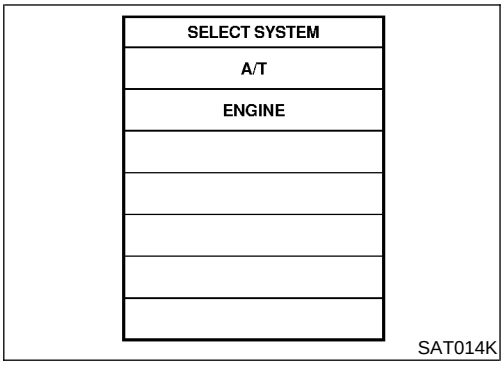
NIAT0191

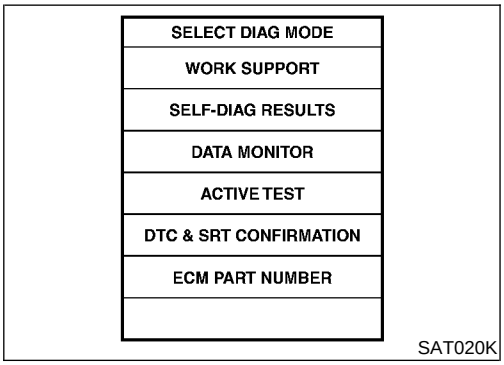
The overrun clutch solenoid valve is activated by the PCM in response to signals sent from the inhibitor switch, overdrive control switch, vehicle speed and throttle position sensors. The overrun clutch operation will then be controlled.

ON BOARD DIAGNOSIS LOGIC

NIAT0191S02

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





DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0191S03

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").

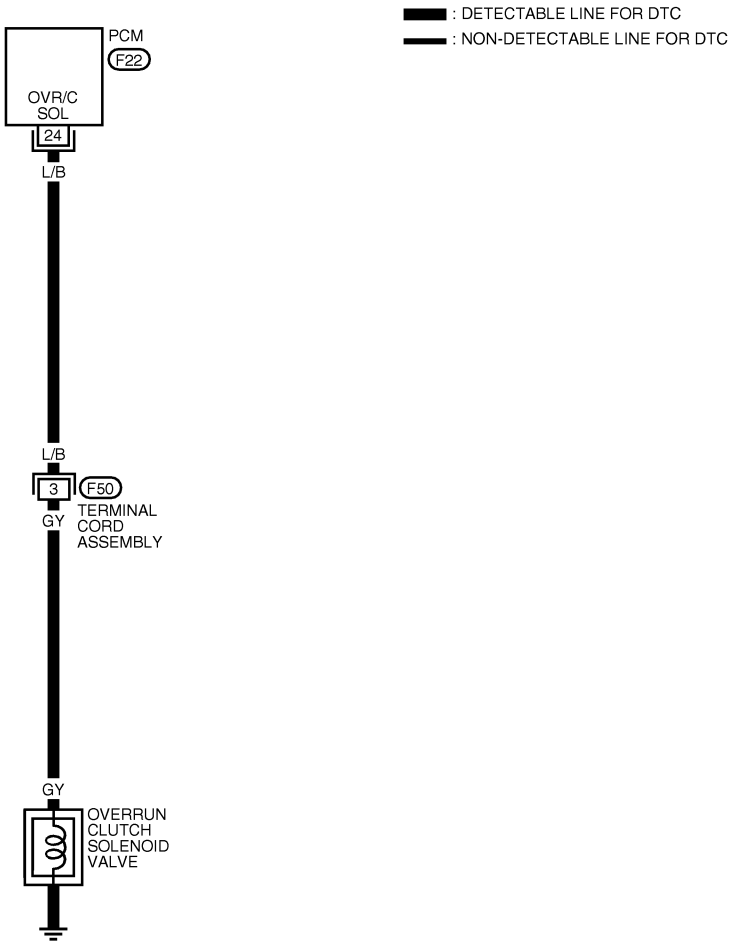
With GST

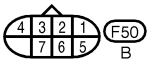
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — OVRCSV

=NIAT0192

AT-OVRCSV-01





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT106

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
24	L/B	OVERRUN CLUTCH SOLENOID VALVE	WHEN OVERRUN CLUTCH SOLENOID VALVE OPERATES	BATTERY VOLTAGE
			WHEN OVERRUN CLUTCH SOLENOID VAVLE DOES NOT OPERATE	1V OR LESS

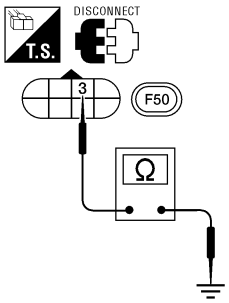
LAT286

Diagnostic Procedure

NIAT0193

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.



Resistance:
20 - 30Ω

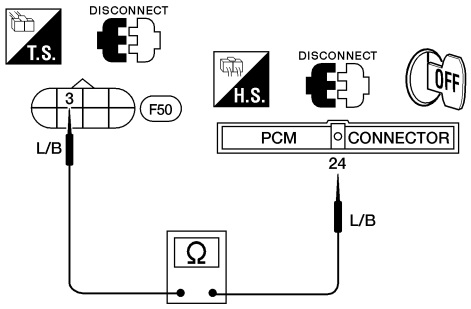
LAT195

OK or NG

OK	▶	GO TO 2.
NG	▶	1. Remove control valve assembly. Refer to “REMOVAL”, AT-433. 2. Check the following items: ● Overrun clutch solenoid valve Refer to “Component Inspection”, AT-362. ● Harness of terminal cord assembly for short or open

2	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to “OFF” position.
2. Disconnect PCM harness connector.
3. Check continuity between terminal 3 and PCM harness connector terminal 24.



Continuity should exist.

LAT221

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

4. Reinstall any part removed.

OK or NG

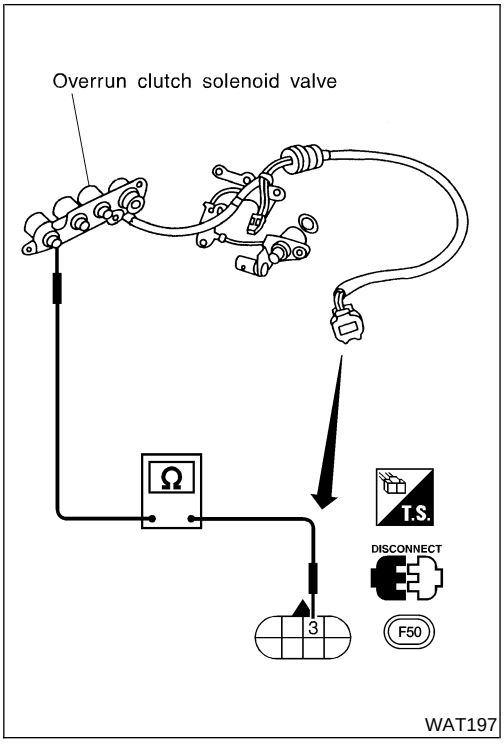
OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK DTC

Perform “DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE”, AT-359.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.



WAT197

Component Inspection

NIAT0194

OVERRUN CLUTCH SOLENOID VALVE

NIAT0194S01

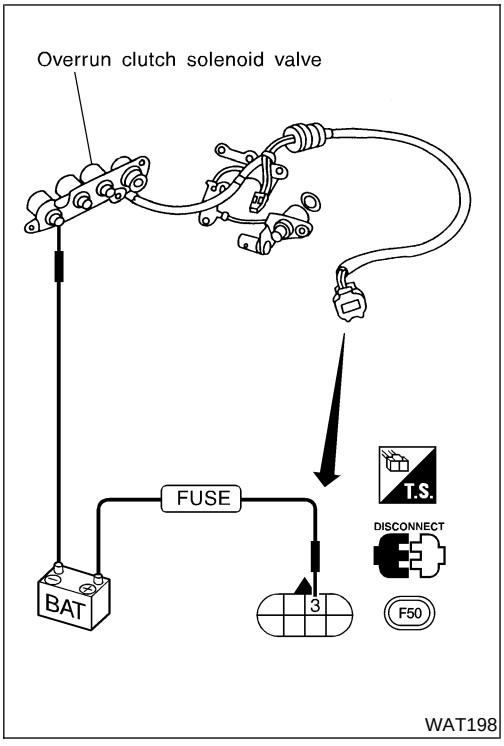
- Refer to “REMOVAL”, AT-433.

Resistance Check

NIAT0194S0101

- Check resistance between two terminals.

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

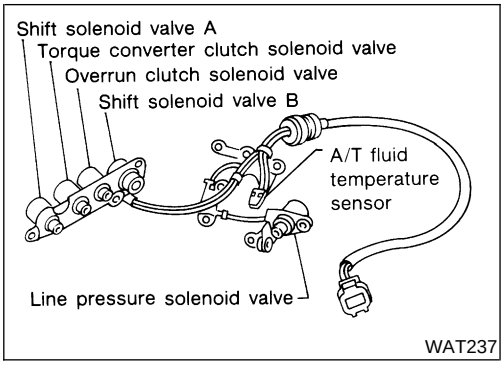


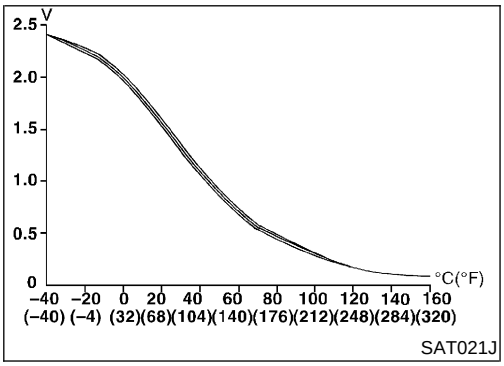
WAT198

Operation Check

NIAT0194S0102

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





Description

NIAT0195

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

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NIAT0195S01

Remarks: Specification data are reference values.

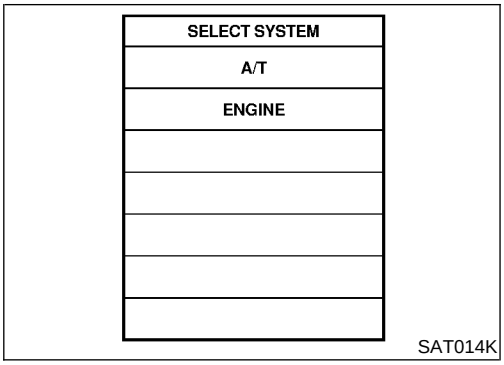
Monitor item	Condition	Specification
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	Approximately 1.5V ↓ Approximately 0.5V

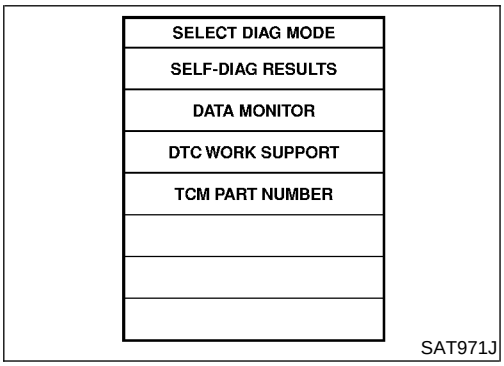
ON BOARD DIAGNOSIS LOGIC

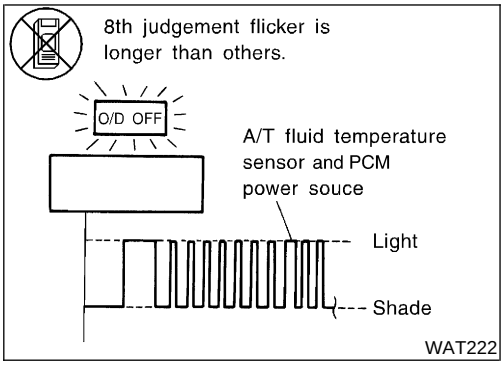
NIAT0195S03

Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
(P) : BATT/FLUID TEMP SEN (8) : 8th judgement flicker	PCM receives an excessively low or high voltage from the sensor.	• Harness or connectors (The sensor circuit is open or shorted.) • A/T fluid temperature sensor

Description (Cont'd)







DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0195S04

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

With CONSULT-II

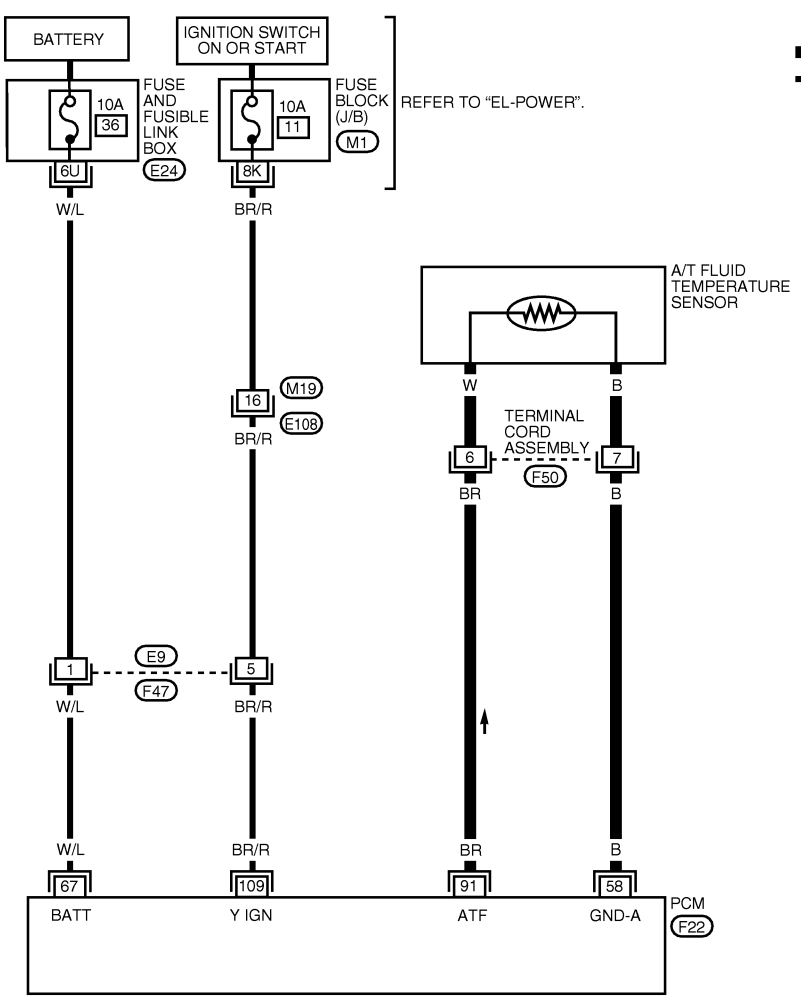
1) Start engine.
2) Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3) Drive vehicle under the following conditions:
   Selector lever in "D", vehicle speed higher than 20 km/h (12 MPH).

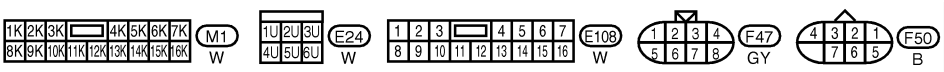
Without CONSULT-II

1) Start engine.
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 "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.

Wiring Diagram — AT — BA/FTS

NIAT0196





REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT107

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	GROUND (A/T FLUID TEMPERATURE SENSOR)	—	—
67	W/L	POWER SOURCE (MEMORY BACK-UP)	WHEN TURNING IGNITION SWITCH TO "OFF"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
91	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
109	BR/R	POWER SOURCE	WHEN TURNING IGNITION SWITCH TO "ON"	BATTERY VOLTAGE
			WHEN TURNING IGNITION SWITCH TO "OFF"	1V OR LESS

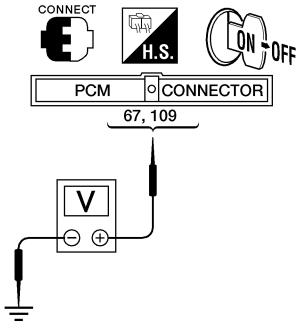
LAT287

Diagnostic Procedure

NIAT0197

1	CHECK TCM POWER SOURCE

1. Turn ignition switch to “ON” position.
   (Do not start engine.)
2. Check voltage between PCM terminals 67, 109 and ground.
3. Turn ignition switch to “OFF” position.
4. Check voltage between PCM terminal 67 and ground.



Battery voltage should exist.

LAT223

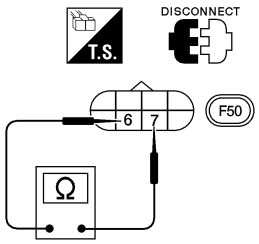
OK or NG

OK	▶	GO TO 2.
NG	▶	**Check the following items:** ● Harness for short or open between ignition switch and PCM (Main harness) ● Ignition switch and fuse Refer to ***EL-9***, “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 in engine compartment.
3. Check resistance between terminals 6 and 7 when A/T is cold.

Resistance:
Cold [20°C (68°F)]
Approximately 2.5 kΩ



LAT200

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 “Component Inspection”, AT-368. ● 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 "ECU INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "FLUID TEMP SE".

Voltage:

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

Approximately 1.5V → 0.5V

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

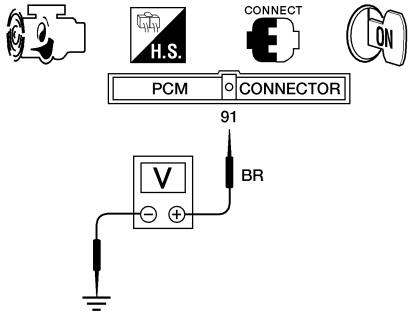
OK	▶	GO TO 5.
NG	▶	**Check the following item:** ● Harness for short or open between PCM and terminal cord assembly (Main harness) ● Ground circuit for PCM Refer to ***EC-170***, "TROUBLE DIAGNOSIS FOR POWER SUPPLY".

Diagnostic Procedure (Cont'd)

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

Without CONSULT-II

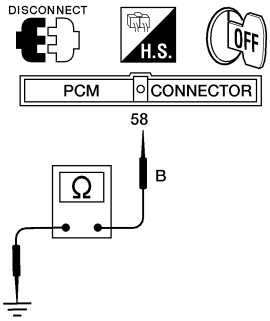
1. Start engine.
2. Check voltage between PCM terminal 91 and ground while warming up A/T.



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

LAT209

3. Turn ignition switch to "OFF" position.
4. Disconnect PCM harness connector.
5. Check resistance between terminal 58 and ground.



Continuity should exist.

LAT210

OK or NG

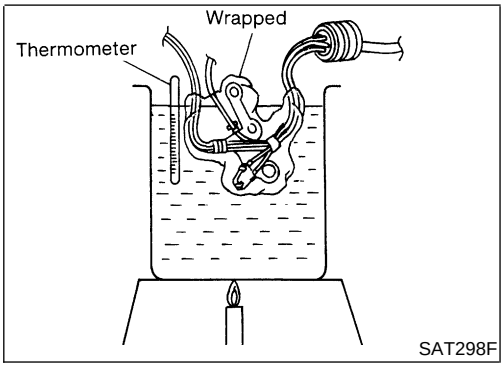
OK	▶	GO TO 5.
NG	▶	**Check the following item:** ● Harness for short or open between PCM and terminal cord assembly (Main harness) ● Ground circuit for PCM Refer to ***EC-170***, "TROUBLE DIAGNOSIS FOR POWER SUPPLY".

5	CHECK DTC

Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-364.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.



Component Inspection

NIAT0198

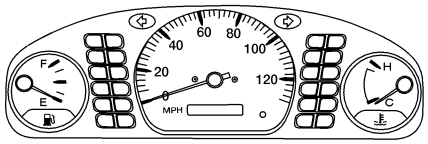
A/T FLUID TEMPERATURE SENSOR

NIAT0198S01

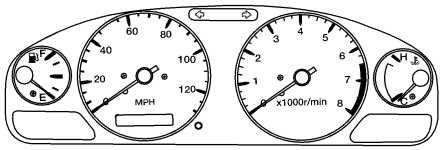
- Refer to "REMOVAL", AT-433.
- Check resistance between two terminals while changing temperature as shown at left.

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

Without tachometer



With tachometer



LAT199

Description

NIAT0199

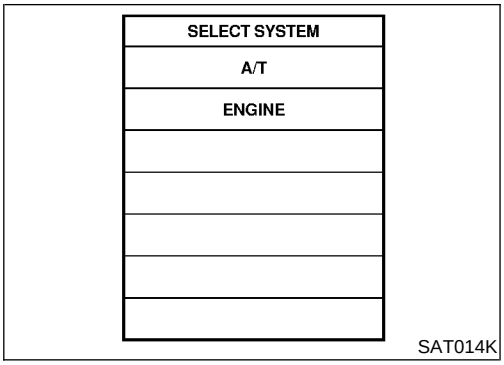
The vehicle speed sensor·MTR is built into the speedometer assembly. The sensor functions as an auxiliary device to the revolution sensor when it is malfunctioning. The PCM will then use a signal sent from the vehicle speed sensor·MTR.

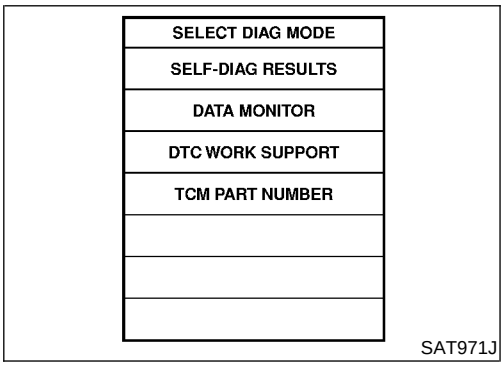
ON BOARD DIAGNOSIS LOGIC

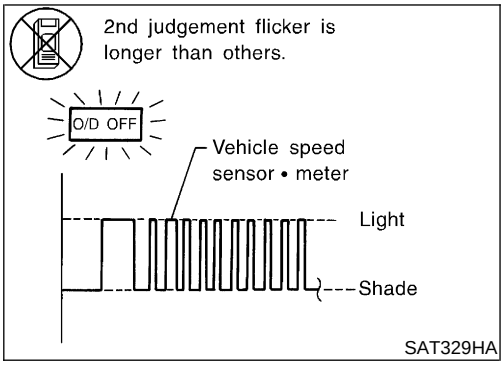
NIAT0199S02

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

Description (Cont'd)







DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0199S03

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).

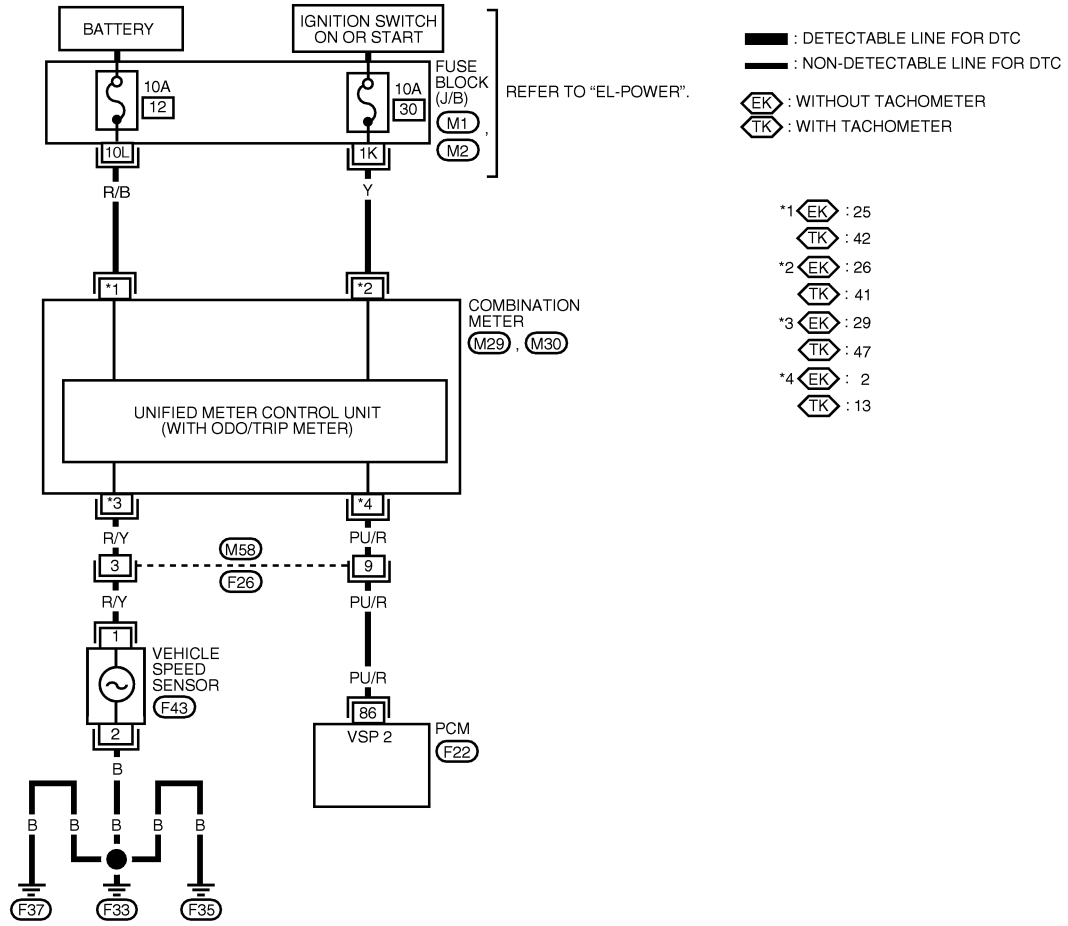
Without CONSULT-II

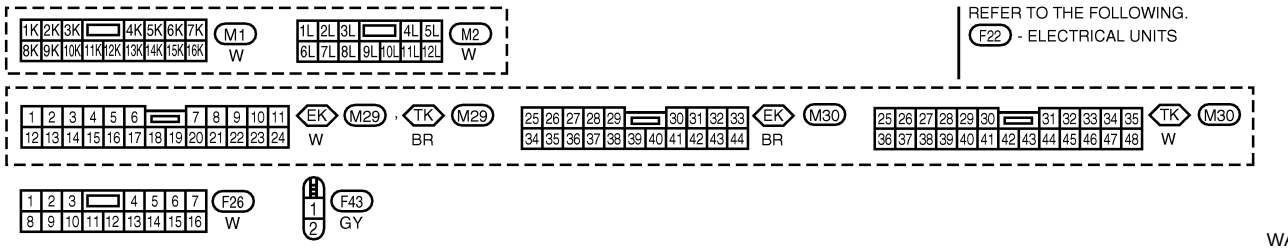
1) Start engine.
2) Drive vehicle under the following conditions:
   Selector lever in "D" and vehicle speed higher than 25 km/h (16 MPH).
3) Perform self-diagnosis.
   Refer to "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.

Wiring Diagram — AT — VSSMTR

NIAT0200

AT-VSSMTR-01





WAT108

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
86	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 FROM GREATER THAN 1V TO LESS THAN 4.5v

LAT288

Diagnostic Procedure

NIAT0201

1 CHECK INPUT SIGNAL

With CONSULT-II

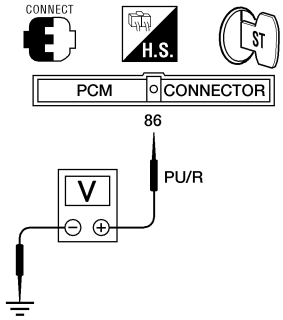
1. Start engine.
2. Select “ECU INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·MTR” while driving.
   Check the value changes according to driving speed.

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 PCM terminal 86 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

LAT224

OK or NG

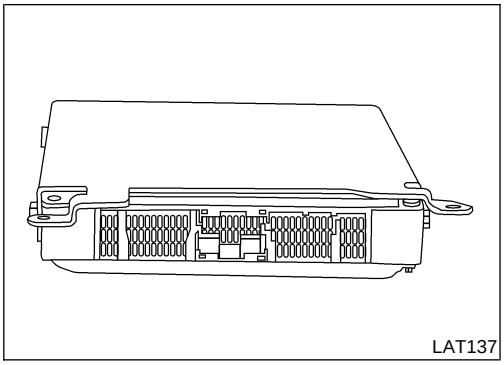
OK	▶	GO TO 2.
NG	▶	**Check the following items:** ● Vehicle speed sensor and ground circuit for vehicle speed sensor Refer to ***EL-85***, “METERS AND GAUGES”. ● Harness for short or open between PCM and vehicle speed sensor (Main harness)

2 CHECK DTC

Perform “DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE”, AT-370.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.


LAT137

Description

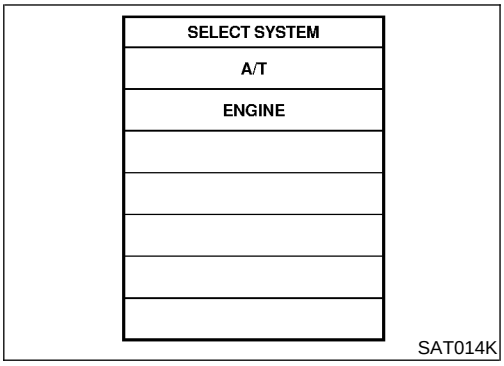
NIAT0202

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

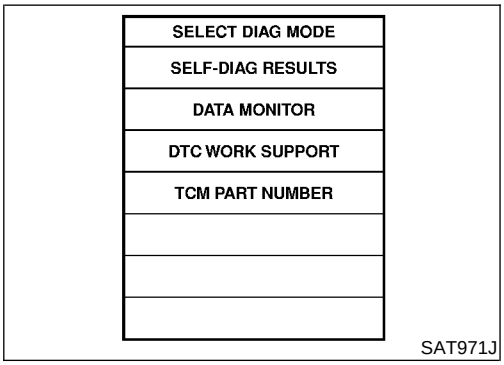
ON BOARD DIAGNOSIS LOGIC

NIAT0202S01

Diagnostic Trouble Code No.	Malfunction is detected when	Check Item (Possible Cause)
Ⓑ : CONTROL UNIT (RAM), CONTROL UNIT (ROM)	PCM memory (RAM) or (ROM) is malfunctioning.	• PCM



SAT014K



SAT971J

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0202S02

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

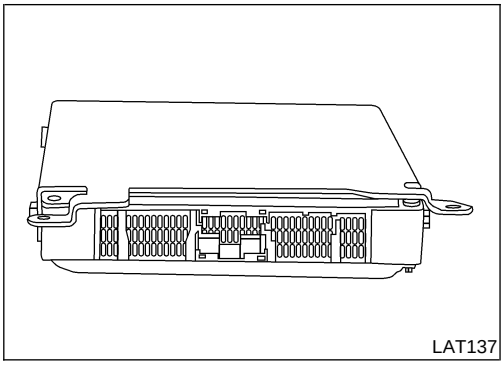
NIAT0203

1	INSPECTION START (WITH CONSULT-II)
Ⓑ **With CONSULT-II** 1. Turn ignition switch "ON" and select "SELF DIAGNOSIS" mode for A/T with CONSULT-II. 2. Touch "ERASE".	
▶	GO TO 2.

Diagnostic Procedure (Cont'd)

2	CHECK DTC	
Perform "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE", AT-373.		
	▶	GO TO 3.

3	CHECK DTC AGAIN	
Is the "CONTROL UNIT (RAM) or CONTROL UNIT (ROM)" displayed again?		
Yes or No		
Yes	▶	Replace PCM.
No	▶	**INSPECTION END**



LAT137

Description

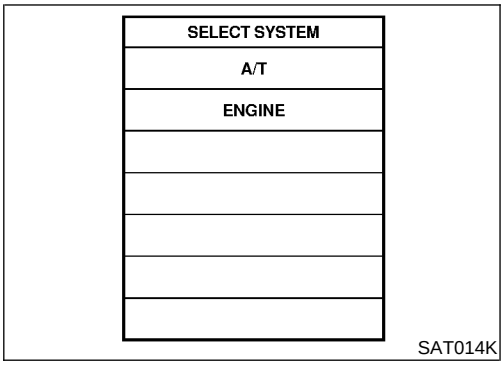
NIAT0204

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

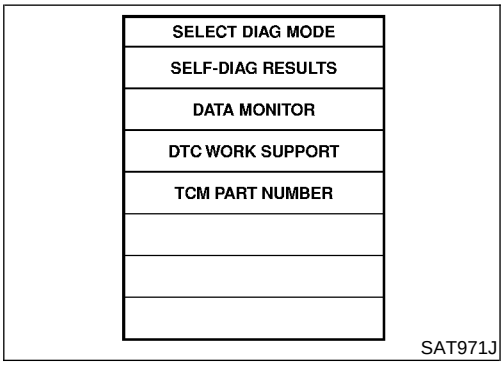
ON BOARD DIAGNOSIS LOGIC

NIAT0204S01

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
Ⓑ : CONT UNIT (EEP ROM)	PCM memory (EEP ROM) is malfunctioning.	• PCM



SAT014K



SAT971J

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NIAT0204S02

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

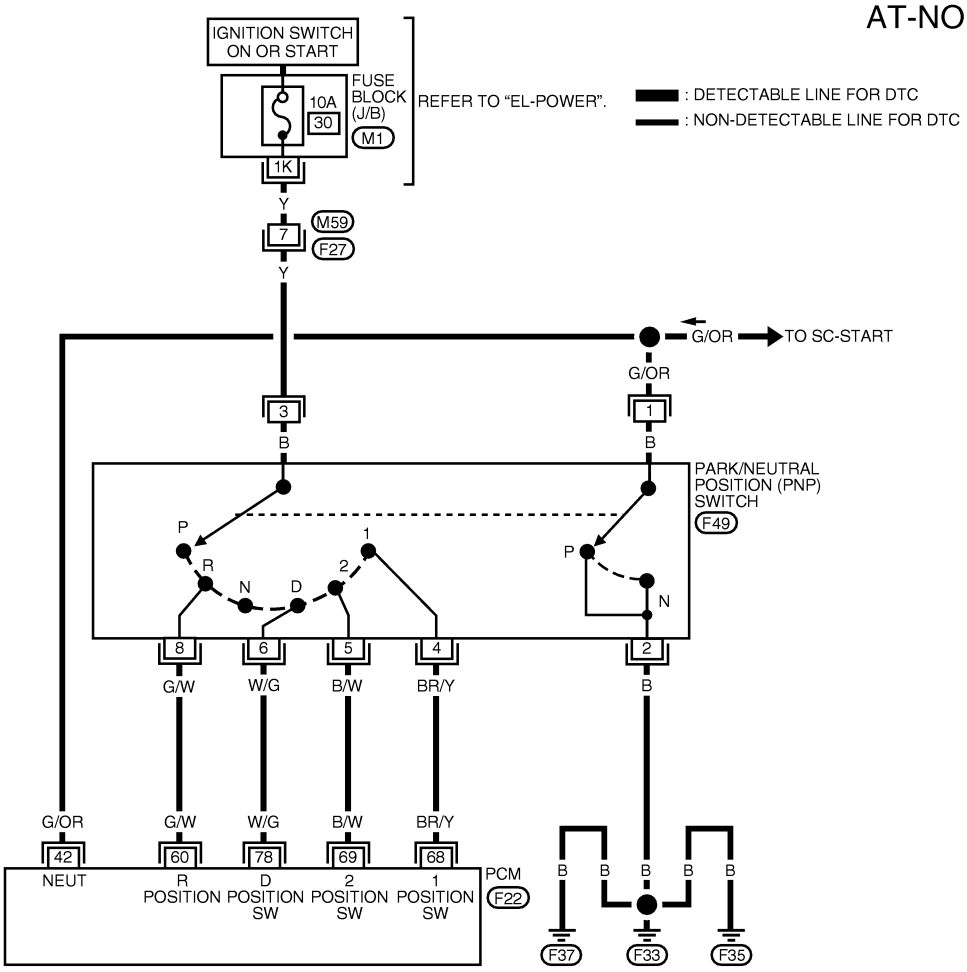
NIAT0205

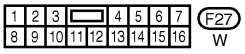
1	CHECK DTC	
With CONSULT-II 1. Turn ignition switch “ON” and select “SELF DIAGNOSIS” mode for A/T with CONSULT-II. 2. Move selector lever to “R” position. 3. Depress accelerator pedal (Full throttle position). 4. Touch “ERASE”. 5. Turn ignition switch “OFF” position for 10 seconds. Perform “DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE”, AT-373. **Is the “CONT UNIT (EEP ROM)” displayed again?**		
Yes	▶	Replace PCM.
No	▶	**INSPECTION END**

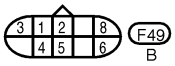
Wiring Diagram — AT — NONDTC

NIAT0206

AT-NONDTC-01







REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS

WAT109

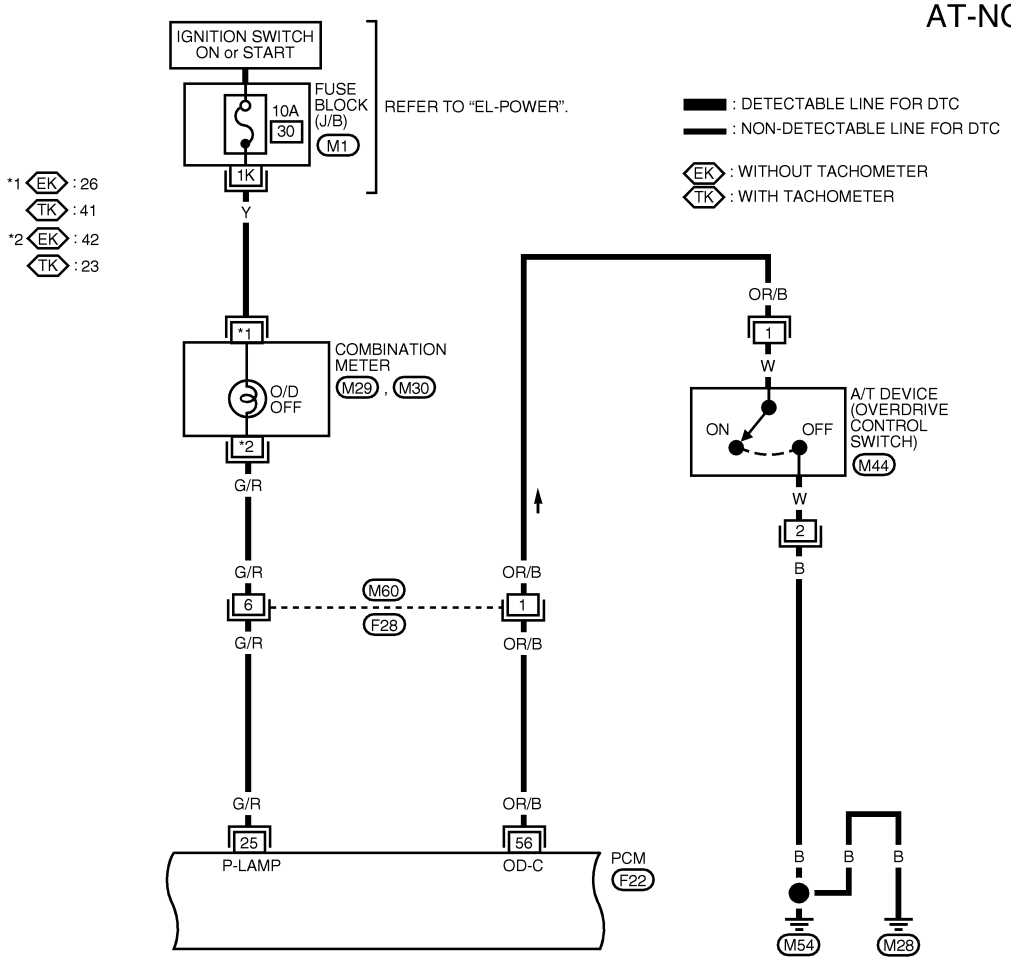
POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

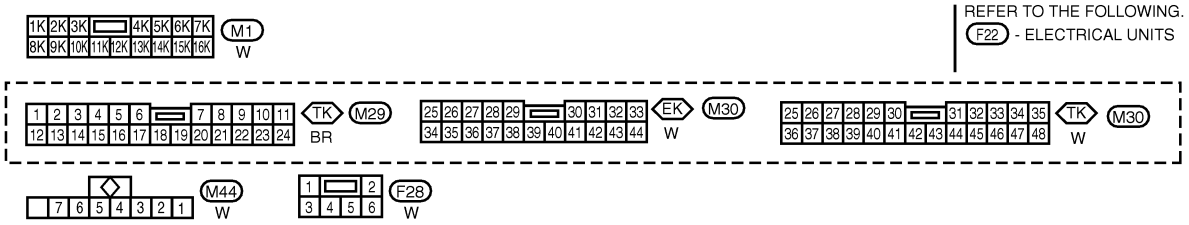
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
42	G/OR	PNP SWITCH "N" OR "P" POSITION	WHEN SETTING SELECTOR LEVER TO "N" OR "P" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
60	G/W	PNP SWITCH "R" POSITION	WHEN SETTING SELECTOR LEVER TO "R" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
68	BR/Y	PNP SWITCH "1" POSITION	WHEN SETTING SELECTOR LEVER TO "1" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
69	B/W	PNP SWITCH "2" POSITION	WHEN SETTING SELECTOR LEVER TO "2" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS
78	W/G	PNP SWITCH "D" POSITION	WHEN SETTING SELECTOR LEVER TO "D" POSITION	BATTERY VOLTAGE
			WHEN SETTING SELECTOR LEVER TO OTHER POSITIONS	1V OR LESS

LAT289

Wiring Diagram — AT — NONDTC (Cont'd)

AT-NONDTC-02



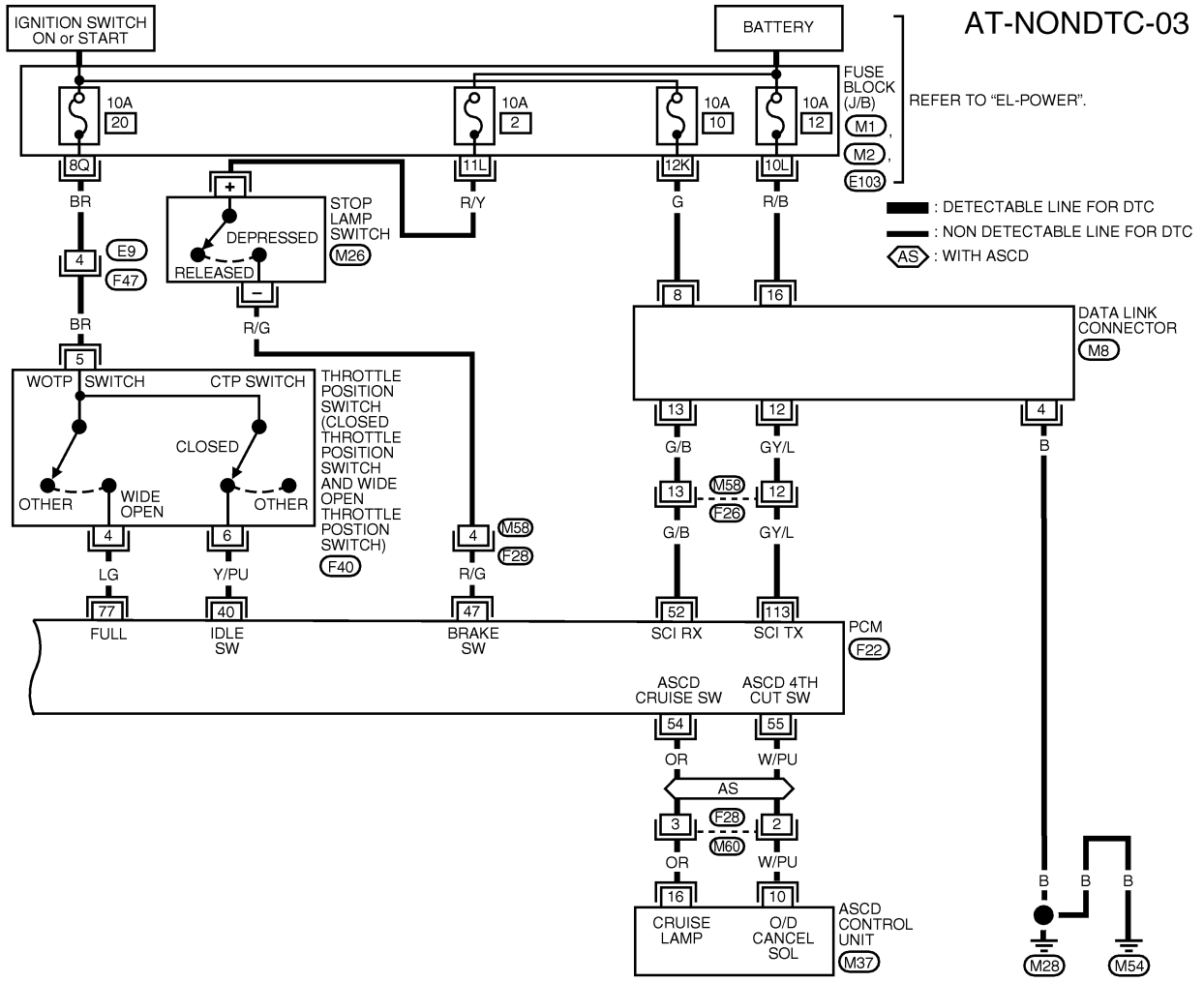


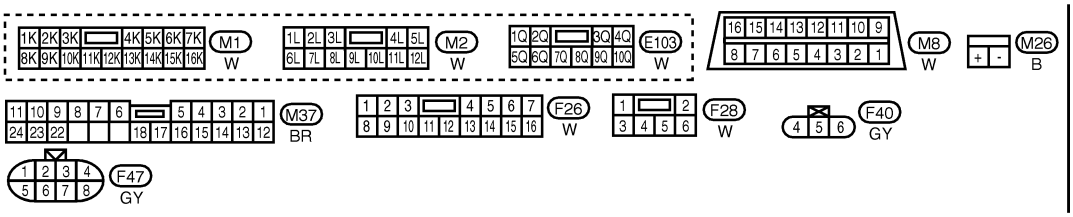
WAT110

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
25	G/R	O/D OFF INDICATOR LAMP	WHEN SETTING OVERDRIVE CONTROL SWITCH "OFF"	1V OR LESS
			WHEN SETTING OVERDRIVE CONTROL SWITCH "ON"	BATTERY VOLTAGE
56	OR/B	OVERDRIVE CONTROL SWITCH	WHEN SETTING OVERDRIVE CONTROL SWITCH "ON"	BATTERY VOLTAGE
			WHEN SETTING OVERDRIVE CONTROL SWITCH "OFF"	1V OR LESS

LAT290



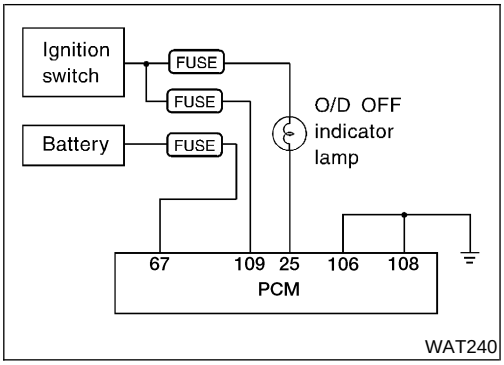


WAT111

POWERTRAIN CONTROL MODULE TERMINALS AND REFERENCE VALUE BETWEEN TERMINAL AND GROUND

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
40	Y/PU	CLOSED THROTTLE POSITION SWITCH	WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	BATTERY VOLTAGE
			WHEN DEPRESSING ACCELERATOR PEDAL (ENGINE WARM)	1V OR LESS
47	R/G	STOP LAMP SWITCH	WHEN DEPRESSING BRAKE PEDAL	BATTERY VOLTAGE
			WHEN RELEASING BRAKE PEDAL	1V OR LESS
52	G/B	—	—	—
54	OR	ASCD CRUISE SWITCH	WHEN ASCD CRUISE IS BEING PERFORMED	BATTERY VOLTAGE
			WHEN ASCD CRUISE IS NOT BEING PERFORMED	1V OR LESS
55	W/PU	ASCD OD CUT SIGNAL	WHEN "ACCEL" SET SWITCH ON ASCD CRUISE IS IN "D_4"	5 - 10V
			WHEN "ACCEL" SET SWITCH ON ASCD CRUISE IS IN "D_3"	LESS THAN 2V
77	LG	WIDE OPEN THROTTLE POSITION SWITCH	WHEN DEPRESSING ACCELERATOR PEDAL GREATER THAN HALF-WAY (ENGINE WARM)	BATTERY VOLTAGE
			WHEN RELEASING ACCELERATOR PEDAL (ENGINE WARM)	1V OR LESS
113	GY/L	—	—	—

LAT291



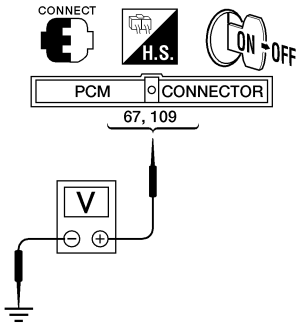
1. O/D OFF Indicator Lamp Does Not Come On

=NIAT0207

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

1	CHECK PCM POWER SOURCE

1. Turn ignition switch to “ON” position.
   (Do not start engine.)
2. Check voltage between PCM terminals 67, 109 and ground.



Battery voltage should exist.

LAT223

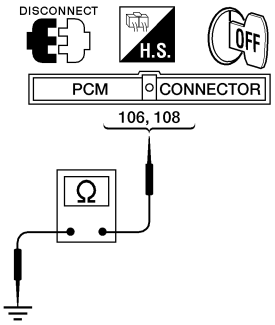
3. Turn ignition switch to “OFF” position.
4. Check voltage between PCM terminal 67 and ground.
   Voltage: Battery voltage

OK or NG

OK	▶	GO TO 2.
NG	▶	**Check the following items:** ● Harness for short or open between ignition switch and PCM (Main harness) Refer to “Wiring Diagram — AT — MAIN”, AT-272. ● Ignition switch and fuse Refer to ***EL-9***, “POWER SUPPLY ROUTING”.

2	CHECK PCM GROUND CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Disconnect PCM harness connector.
3. Check continuity between PCM terminals 106, 108 and ground.



Continuity should exist.

LAT225

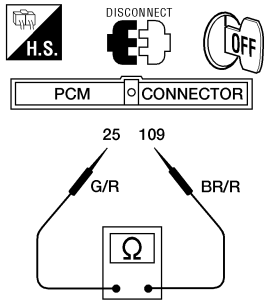
If OK, check harness for short to ground and short to power.

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 "Wiring Diagram — AT — MAIN", AT-272.

3	CHECK LAMP CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Check resistance between PCM terminals 25 and 109.



Resistance:
50 - 100 Ω

LAT226

3. Reinstall any part removed.

OK or NG

OK	▶	GO TO 4.
NG	▶	**Check the following items:** ● O/D OFF indicator lamp. Refer to ***EL-85***, "METERS AND GAUGES". ● Harness and fuse for short or open between ignition switch and O/D OFF indicator lamp (Main harness) Refer to ***EL-9***, "POWER SUPPLY ROUTING". ● Harness for short or open between O/D OFF indicator lamp and PCM.

1. O/D OFF Indicator Lamp Does Not Come On (Cont'd)

4	CHECK SYMPTOM	
Check again. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

2. Engine Cannot Be Started In “P” and “N” Position

=NIAT0208

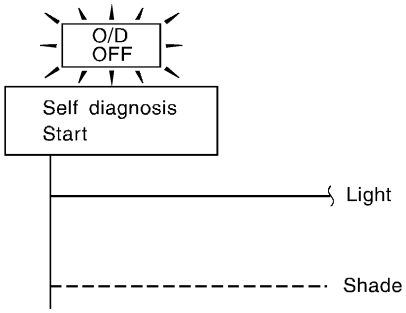
SYMPTOM:

- **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 “ECU INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to PNP switch circuit?



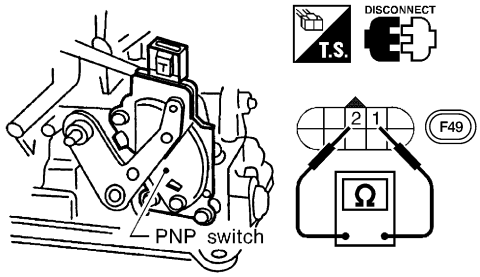
SAT367J

Yes or No

Yes	▶	Check PNP switch circuit. Refer to “DTC P0705”, AT-275.
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 “Component Inspection”, AT-279.



WAT203

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace PNP switch.

3	CHECK STARTING SYSTEM

Check starting system. Refer to ***SC-6***, “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

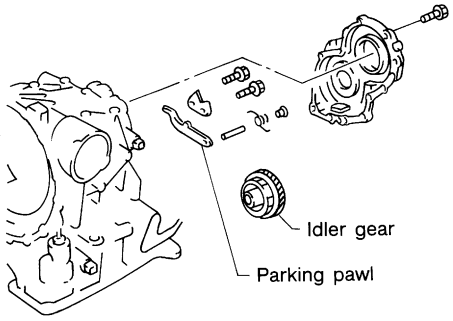
=NIAT0209

SYMPTOM:

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

1	CHECK PARKING COMPONENTS

Check parking components. Refer to “Parking Pawl Components”, AT-439.



SAT282F

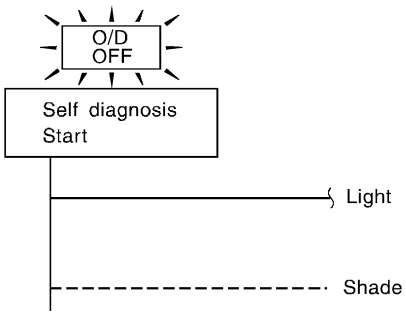
OK or NG

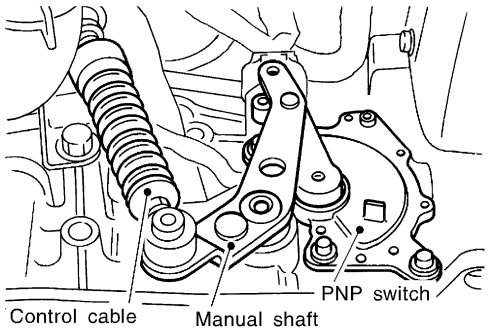
OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.

4. In “N” Position, Vehicle Moves

=NIAT0210

SYMPTOM:
Vehicle moves forward or backward when selecting “N” position.

1	CHECK PNP SWITCH CIRCUIT	
With CONSULT-II Does “ECU INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit? **Without CONSULT-II** Does self-diagnosis show damage to PNP switch circuit?  SAT367J **Yes or No**		
Yes	▶	Check PNP switch circuit. Refer to “DTC P0705”, AT-275.
No	▶	GO TO 2.

2	CHECK CONTROL CABLE	
Check control cable. Refer to AT-434.  SAT023JB **OK or NG**		
OK	▶	GO TO 3.
NG	▶	Adjust control cable. Refer to AT-434.

4. In "N" Position, Vehicle Moves (Cont'd)

3	CHECK A/T FLUID LEVEL

Check A/T fluid level again.

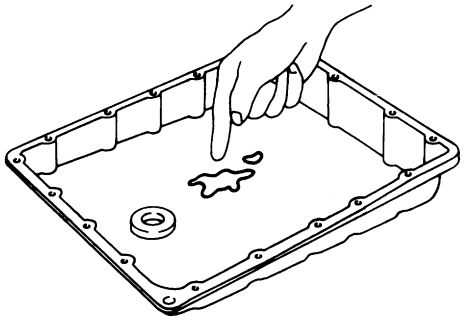
SAT638A

OK or NG

OK	▶	GO TO 4.
NG	▶	Refill ATF.

4	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 5.
NG	▶	1. Disassemble A/T. 2. Check the following items: ● Forward clutch assembly ● Overrun clutch assembly ● Reverse clutch assembly

5	CHECK SYMPTOM

Check again.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

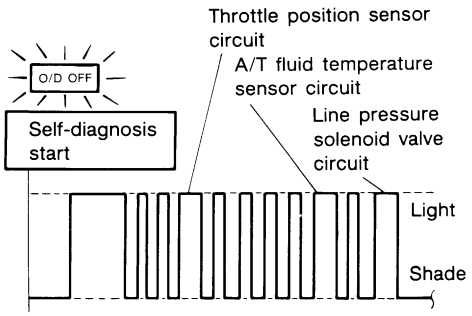
5. Large Shock. “N” → “R” Position

=NIAT0211

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 circuit?



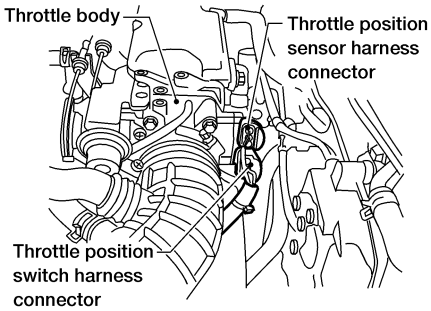
SAT345HA

Yes or No

Yes	▶	Check damaged circuit. Refer to “DTC P0710, P0745 or P1705”, AT-280, 338 or 351.
No	▶	GO TO 2.

2	CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to ***EC-201***, “DTC P0120 THROTTLE POSITION SENSOR”.

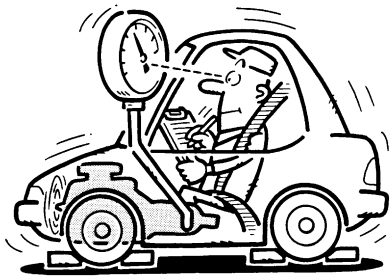


LEC279

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace throttle position sensor.

5. Large Shock. "N" → "R" Position (Cont'd)

3	CHECK LINE PRESSURE	
Check line pressure at idle with selector lever in "D" position. Refer to "Line Pressure Test", AT-72.		
 SAT494G		
OK or NG		
OK	▶	GO TO 4.
NG	▶	1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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

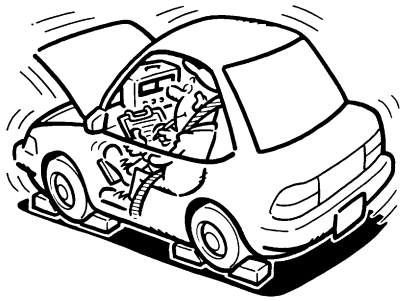
4	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

6. Vehicle Does Not Creep Backward In “R” Position

=NIAT0212

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

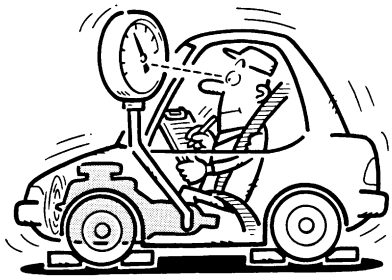
1	CHECK A/T FLUID LEVEL	
Check A/T fluid level again.  SAT638A **OK or NG**		
OK	▶	GO TO 2.
NG	▶	Refill ATF.

2	CHECK STALL TEST	
Check stall revolution with selector lever in “1” and “R” positions.  SAT493G **OK or NG**		
OK	▶	GO TO 3.
OK in “1” position, NG in “R” position	▶	1. Remove control valve assembly. Refer to “REMOVAL”, AT-433. 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
NG in both “1” and “R” positions	▶	GO TO 6.

6. Vehicle Does Not Creep Backward In "R" Position (Cont'd)

3	CHECK LINE PRESSURE

Check line pressure at idle with selector lever in "R" position. Refer to "Line Pressure Test", AT-72.



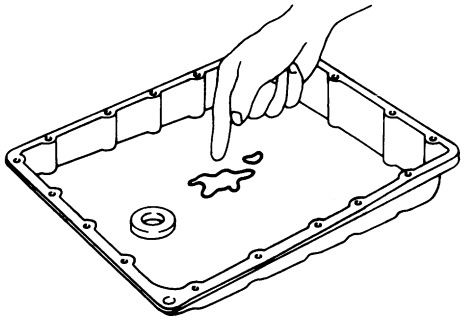
SAT494G

OK or NG

OK	▶	GO TO 4.
NG	▶	1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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

4	CHECK A/T FLUID CONDITION

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



SAT171B

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

6	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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.

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

=NIAT0213

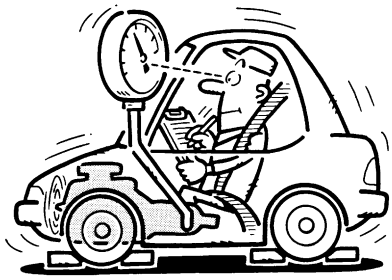
SYMPTOM:
Vehicle does not creep forward when selecting “D”, “2” or “1” position.

1	CHECK A/T FLUID LEVEL	
Check A/T fluid level again.  SAT638A **OK or NG**		
OK	▶	GO TO 2.
NG	▶	Refill ATF.

2	CHECK STALL TEST	
Check stall revolution with selector lever in “D” position. Refer to “Stall Test”, AT-68.  SAT493G **OK or NG**		
OK	▶	GO TO 3.
NG	▶	GO TO 6.

3	CHECK LINE PRESSURE

Check line pressure at idle with selector lever in "D" position. Refer to "Line Pressure Test ", AT-72.



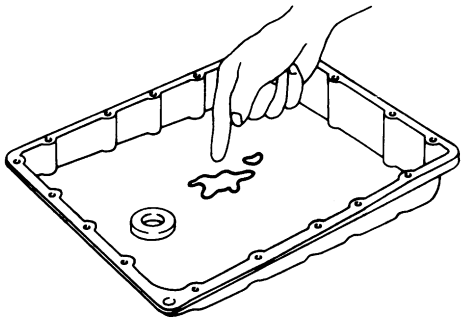
SAT494G

OK or NG

OK	▶	GO TO 4.
NG	▶	1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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

4	CHECK A/T FLUID CONDITION

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



SAT171B

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

7. Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position (Cont’d)

6	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to “REMOVAL”, AT-433. 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 5.
NG	▶	Repair or replace damaged parts.

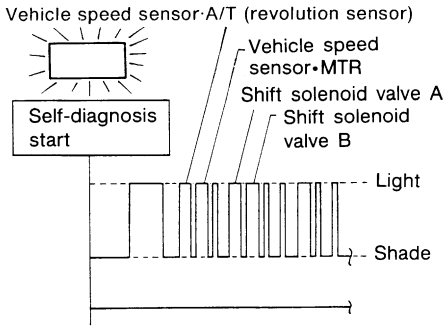
8. Vehicle Cannot Be Started From D_1

=NIAT0214

SYMPTOM:
Vehicle cannot be started from D_1 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 “6. Vehicle Does Not Creep Backward In R Position”, AT-389.

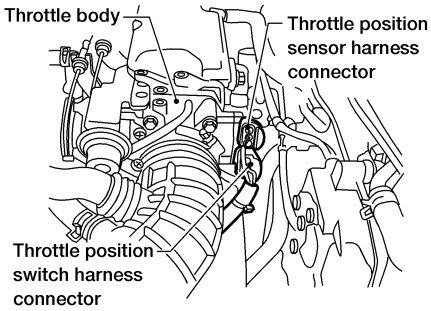
2	CHECK SELF-DIAGNOSTIC RESULTS	
Does self-diagnosis show damage to vehicle speed sensor·A/T (revolution sensor), shift solenoid valve A, B or vehicle speed sensor·MTR after cruise test?		



SAT934FB

Yes or No		
Yes	▶	Check damaged circuit. Refer to “DTC P0720, P0750, P0755 or VHCL SPEED SEN·MTR”, AT-286, 343, 347 or 369.
No	▶	GO TO 3.

3	CHECK THROTTLE POSITION SENSOR	
Check throttle position sensor. Refer to ***EC-201***, “DTC P0120 THROTTLE POSITION SENSOR”.		

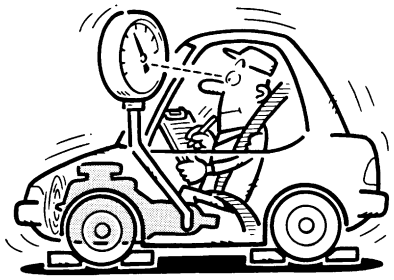


LEC279

OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace throttle position sensor.

4	CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in "D" position. Refer to "Line Pressure Test", AT-72.



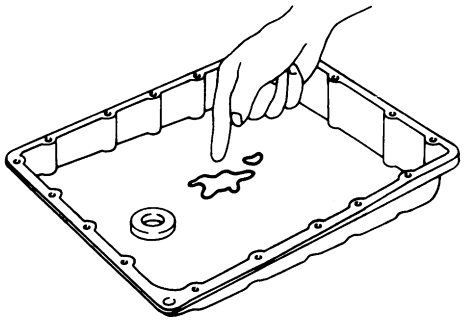
SAT494G

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.



SAT171B

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 8.

6	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "REMOVAL", AT-433.
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 PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

8	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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 7.
NG	▶	Repair or replace damaged parts.

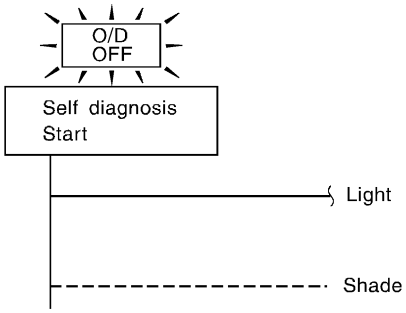
9. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$

=NIAT0215

SYMPTOM:
A/T does not shift from D_1 to D_2 at the specified speed.
A/T does not shift from D_4 to D_2 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 D_1 " OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to "7. Vehicle Does Not Creep Forward In "D", "2" Or "1" Position" and "8. Vehicle Cannot Be Started From D_1", AT-392, 395.

2	CHECK PNP SWITCH CIRCUIT	
With CONSULT-II Does "ECU INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit?		
Without CONSULT-II Does self-diagnosis show damage to PNP switch circuit?		



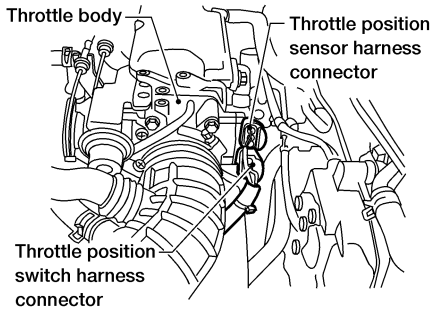
SAT367J

Yes or No		
Yes	▶	Check PNP switch circuit. Refer to "DTC P0705", AT-275.
No	▶	GO TO 3.

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 "DTC P0720 and VHCL SPEED SEN·MTR", AT-286, AT-369.		
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

Check throttle position sensor. Refer to ***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR".



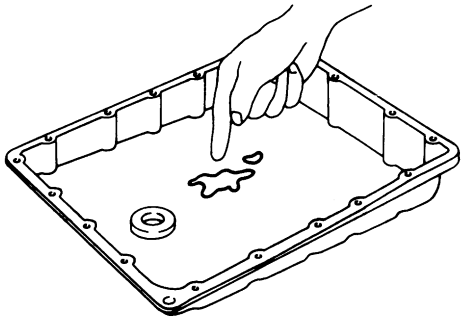
LEC279

OK or NG

OK	▶	GO TO 5.
NG	▶	Repair or replace throttle position sensor.

5	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 8.

6	DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to "REMOVAL", AT-433.
2. Check the following items:
- Shift valve A
- Shift solenoid valve A
- 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 PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

8	DETECT MALFUNCTIONING ITEM	
1. Remove control valve. Refer to "REMOVAL", AT-433. 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 7.
NG	▶	Repair or replace damaged parts.

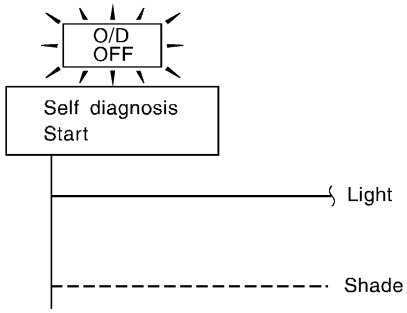
10. A/T Does Not Shift: $D_2 \rightarrow D_3$

=NIAT0216

SYMPTOM:
A/T does not shift from D_2 to D_3 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 D_1 ” OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to “7. Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position” and “8. Vehicle Cannot Be Started From D_1”, AT-392, 395.

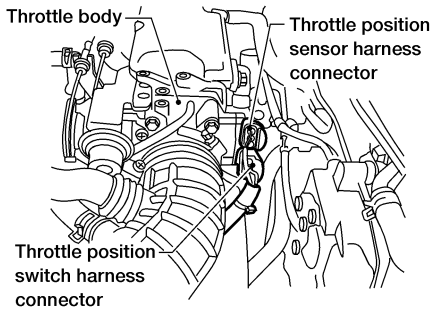
2	CHECK PNP SWITCH CIRCUIT	
With CONSULT-II Does “ECU INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?		
Without CONSULT-II Does self-diagnosis show damage to PNP switch circuit?		



SAT367J

Yes or No		
Yes	▶	Check PNP switch circuit. Refer to “DTC P0705”, AT-275.
No	▶	GO TO 3.

3	CHECK THROTTLE POSITION SENSOR	
Check throttle position sensor. Refer to ***EC-201***, “DTC P0120 THROTTLE POSITION SENSOR”.		



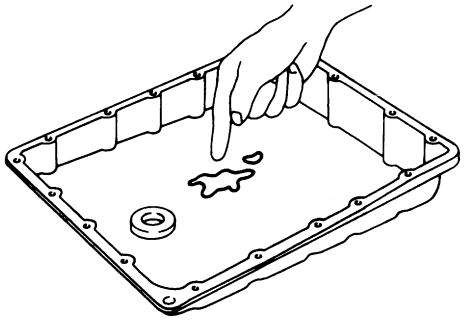
LEC279

OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace throttle position sensor.

10. A/T Does Not Shift: $D_2 \rightarrow D_3$ (Cont'd)

4	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 7.

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "REMOVAL", AT-433.
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 PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

7	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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 6.
NG	▶	Repair or replace damaged parts.

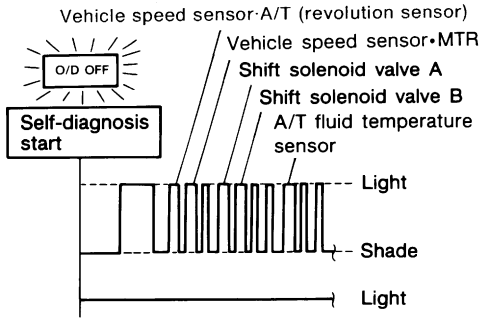
11. A/T Does Not Shift: $D_3 \rightarrow D_4$

=NIAT0217

SYMPTOM:

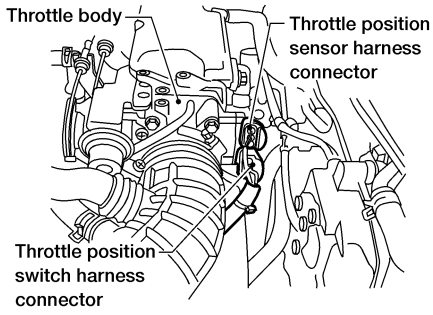
- **A/T does not shift from D_3 to D_4 at the specified speed.**
- **A/T must be warm before D_3 to D_4 shift will occur.**

1	CHECK SYMPTOM	
Are “7. Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position” and “8. Vehicle Cannot Be Started From D_1 ” OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to “7. Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position” and “8. Vehicle Cannot Be Started From D_1”, AT-392, 395.

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  SAT363HC		
Yes or No		
Yes	▶	Check damaged circuit. Refer to “DTC P0705, P0710, P0720, P0750, P0755 or VHCL SPEED SEN·MTR”, AT-275, 280, 286, 343, 347 or 369.
No	▶	GO TO 3.

3	CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to ***EC-201***, "DTC P0120 THROTTLE POSITION SENSOR".



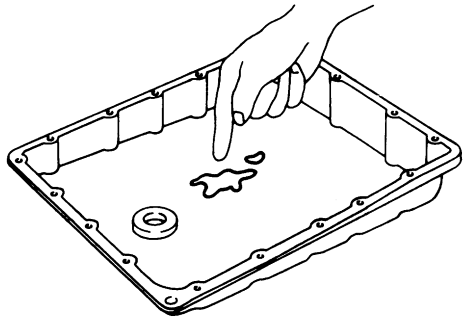
LEC279

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair or replace throttle position sensor.

4	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 7.

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "REMOVAL", AT-433.
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 6.
NG	▶	Repair or replace damaged parts.

11. A/T Does Not Shift: $D_3 \rightarrow D_4$ (Cont'd)

6	CHECK SYMPTOM	
Check again. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

7	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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 6.
NG	▶	Repair or replace damaged parts.

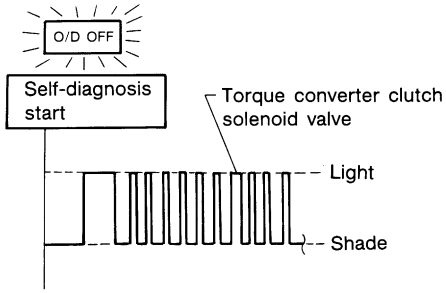
12. A/T Does Not Perform Lock-up

=NIAT0218

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?



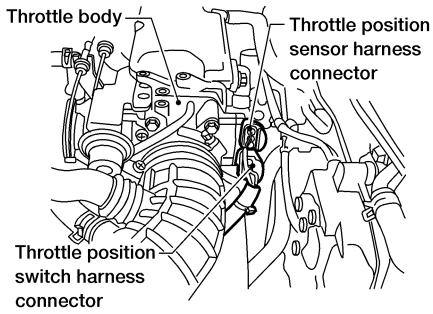
SAT346H

Yes or No

Yes	▶	Check torque converter clutch solenoid valve circuit. Refer to “DTC P0740”, AT-323.
No	▶	GO TO 2.

2	CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to ***EC-201***, “DTC P0120 THROTTLE POSITION SENSOR”.



LEC279

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace throttle position sensor.

3	DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to “REMOVAL”, AT-433.
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.

12. A/T Does Not Perform Lock-up (Cont'd)

4	CHECK SYMPTOM	
Check again. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

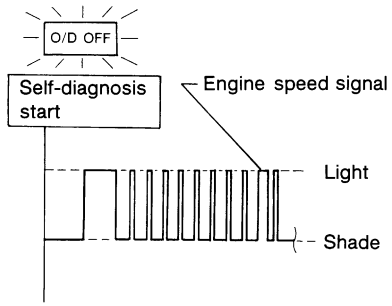
13. A/T Does Not Hold Lock-up Condition

=NIAT0219

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?



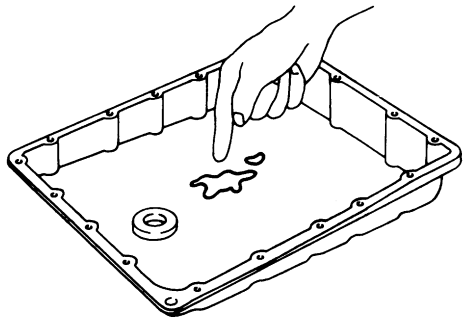
SAT347H

Yes or No

Yes	▶	Check engine speed signal circuit. Refer to “DTC P0725”, AT-291.
No	▶	GO TO 2.

2	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 5.

3	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to “REMOVAL”, AT-433.
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.

13. A/T Does Not Hold Lock-up Condition (Cont'd)

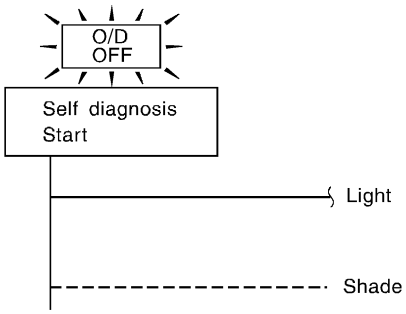
4	CHECK SYMPTOM	
Check again. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

5	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to "REMOVAL", AT-433. 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

=NIAT0220

SYMPTOM:
Lock-up is not released when accelerator pedal is released.

1	CHECK THROTTLE POSITION SWITCH CIRCUIT	
With CONSULT-II Does “ECU 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?  SAT367J		
Yes or No		
Yes	▶	Check closed throttle position switch circuit. Refer to “DTC P0705”, AT-275.
No	▶	GO TO 2.

2	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)

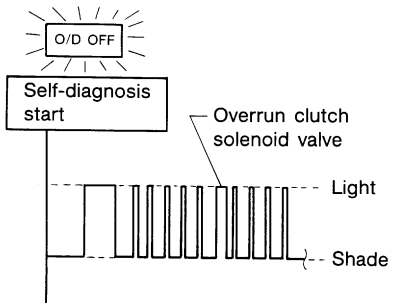
=NIAT0221

SYMPTOM:

- **Engine speed does not smoothly return to idle when A/T shifts from D_4 to D_3.**
- **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?



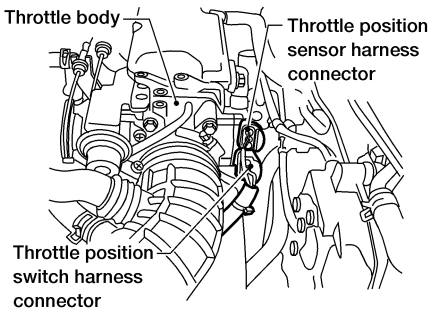
SAT348H

Yes or NO

Yes	▶	Check overrun clutch solenoid valve circuit. Refer to “DTC P1760”, AT-359.
No	▶	GO TO 2.

2	CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to ***EC-201***, “DTC P0120 THROTTLE POSITION SENSOR”.



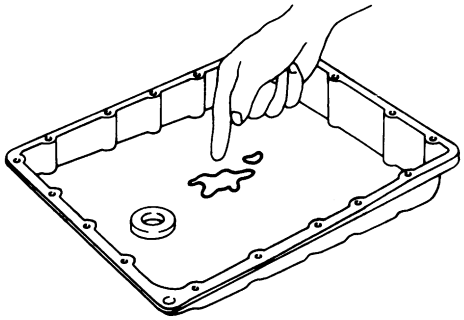
LEC279

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace throttle position sensor.

3	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 6.

4	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "REMOVAL", AT-433.
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 PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

6	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "REMOVAL", AT-433.
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

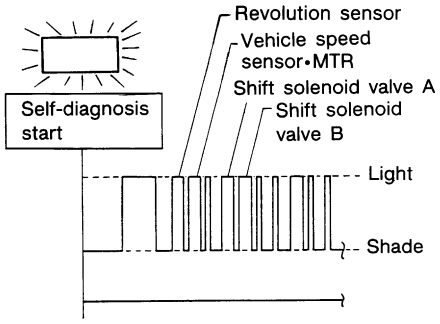
OK or NG

OK	▶	GO TO 5.
NG	▶	Repair or replace damaged parts.

16. Vehicle Does Not Start From D_1

NIAT0222

SYMPTOM:
Vehicle does not start from D_1 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?  SAT934FA		
Yes or No		
Yes	▶	Check damaged circuit. Refer to “DTC P0720, P0750, P0755 or VHCL SPEED SEN·MTR”, AT-286, 343, 347 or 369.
No	▶	GO TO 2.

2	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	Go to 8. Vehicle Cannot Be Started From D_1, AT-395.
NG	▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

17. A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch "ON" → "OFF"

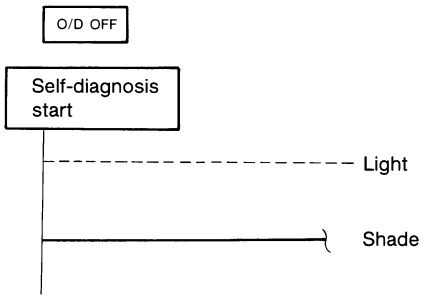
=NIAT0223

SYMPTOM:
A/T does not shift from D_4 to D_3 when changing overdrive control switch to "OFF" position.

1	CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II
Does "ECU 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?



SAT344H

Yes or No

Yes	▶	Check overdrive control switch circuit. Refer to "DIAGNOSTIC PROCEDURE", AT-419.
No	▶	Go to "10. A/T Does Not Shift: $D_2 \rightarrow D_3$", AT-401.

18. A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" $\rightarrow$ "2" Position

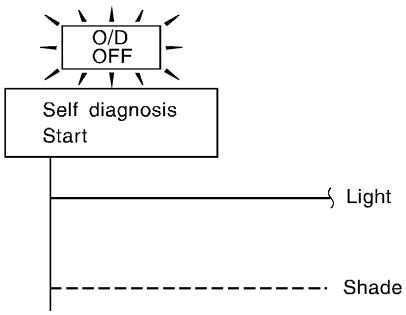
=NIAT0224

SYMPTOM:
A/T does not shift from D_3 to 2_2 when changing selector lever from "D" to "2" position.

1	CHECK PNP SWITCH CIRCUIT

With CONSULT-II
Does "ECU INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to PNP switch circuit?



SAT367J

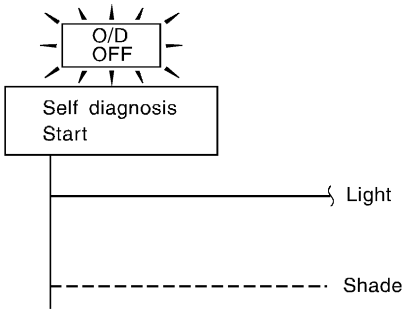
Yes or No

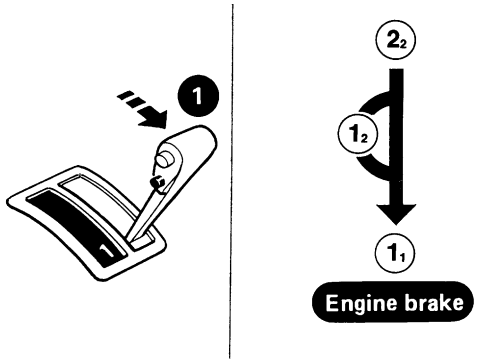
Yes	▶	Check PNP switch circuit. Refer to "DTC P0705", AT-275.
No	▶	Go to "9. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$", AT-398.

19. A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever "2" → "1" Position

=NIAT0225

SYMPTOM:
A/T does not shift from 2_2 to 1_1 when changing selector lever from "2" to "1" position.

1	CHECK PNP SWITCH CIRCUIT
With CONSULT-II Does "ECU INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit?	
Without CONSULT-II Does self-diagnosis show damage to PNP switch circuit?  SAT367J	
Yes or No	
Yes ▶	Check PNP switch circuit. Refer to "DTC P0705", AT-275.
No ▶	GO TO 2.

2	CHECK SYMPTOM
Check again.  SAT778B	
OK or NG	
OK ▶	**INSPECTION END**
NG ▶	1. Perform PCM input/output signal inspection. 2. If NG, recheck PCM pin terminals for damage or loose connection with harness connector.

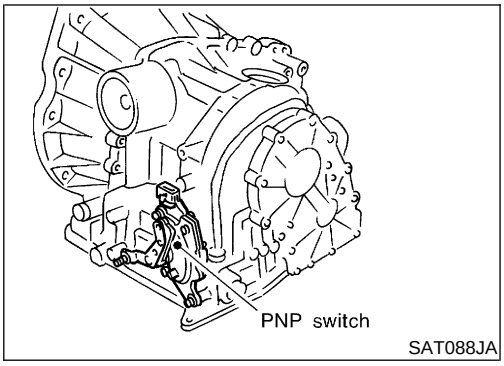
20. Vehicle Does Not Decelerate By Engine Brake

=NIAT0226

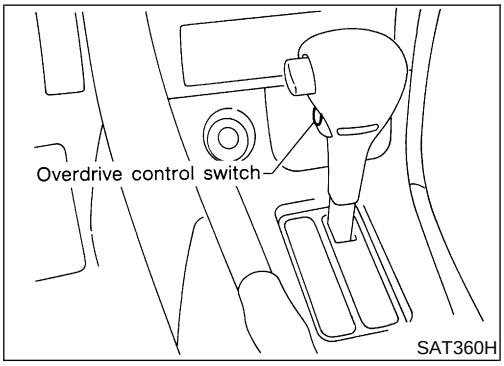
SYMPTOM:

Vehicle does not decelerate by engine brake when shifting from 2_2 (1_2) to 1_1.

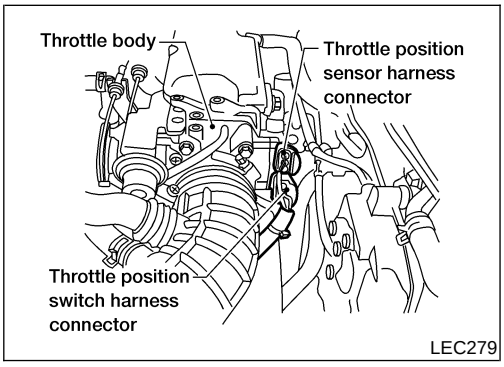
1	CHECK SYMPTOM	
Is “6. Vehicle Does Not Creep Backward In “R” Position” OK?		
Yes or No		
Yes	▶	Go to “15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)”, AT-412.
No	▶	Go to “6. Vehicle Does Not Creep Backward In “R” Position”, AT-389.



SAT088JA



SAT360H



LEC279

21. PCM Self-diagnosis Does Not Activate (PNP, Overdrive Control and Throttle Position Switches Circuit Checks)

NIAT0227

SYMPTOM:

O/D OFF indicator lamp does not come on in PCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

NIAT0227S01

- PNP switch
  The PNP switch assembly includes a transmission range switch. The transmission range switch detects the selector lever position and sends a signal to the PCM.
- Overdrive control switch
  Detects the overdrive control switch position (ON or OFF) and sends a signal to the PCM.
- Throttle position switch
  Consists of a wide open throttle position switch and a closed throttle position switch.
  The wide open throttle position switch sends a signal to the PCM when the throttle valve is open at least 1/2 of the full throttle position. The closed throttle position switch sends a signal to the PCM when the throttle valve is fully closed.

DIAGNOSTIC PROCEDURE

NIAT0227S02

1 CHECK PNP SWITCH CIRCUIT (With CONSULT-II)

With CONSULT-II

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

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

SAT701J

OK or NG

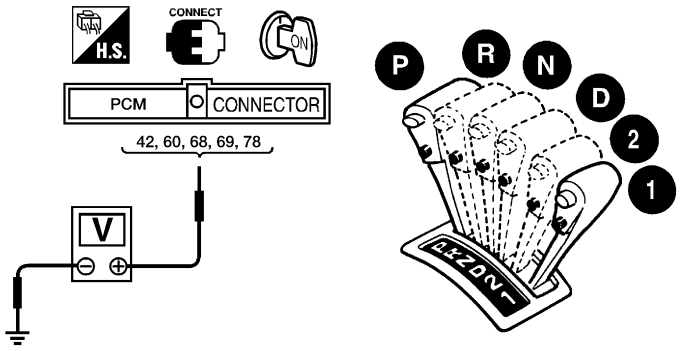
OK	▶	GO TO 3.
NG	▶	**Check the following items:** ● PNP switch (Refer to "Component Inspection", AT-422.) ● Harness for short or open between ignition switch and PNP switch (Main harness) ● Harness for short or open between PNP switch and PCM (Main harness) ● Diode (P, N positions)

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 PCM terminals 42, 60, 68, 69, 78 and ground while moving selector lever through each position.

Voltage:
B: Battery voltage
0: 0V



Lever position	Terminal No.				
	42	60	78	69	68
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

B: Battery voltage
0: 0V

WAT207

OK or NG

OK	▶	GO TO 4.
NG	▶	**Check the following items:** ● PNP switch (Refer to "Component Inspection", AT-422.) ● Harness for short or open between ignition switch and PNP switch (Main harness) ● Harness for short or open between PNP switch and PCM (Main harness) ● Diode (P, N positions)

3	CHECK OVERDRIVE CONTROL SWITCH CIRCUIT (With CONSULT-II)

With CONSULT-II

1. Turn ignition switch to "ON" position.
   (Do not start engine.)
2. Select "ECU 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".)

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

SAT645J

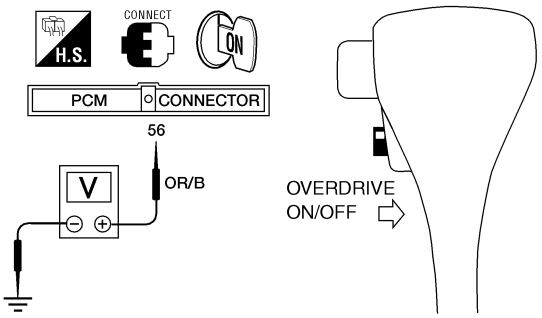
OK or NG

OK	▶	GO TO 5.
NG	▶	**Check the following items:** ● Overdrive control switch (Refer to "Component Inspection", AT-422.) ● Harness for short or open between PCM and overdrive control switch (Main harness) ● Harness of ground circuit for overdrive control switch (Main harness) for short or open

4	CHECK OVERDRIVE CONTROL SWITCH CIRCUIT (Without CONSULT-II)

Without CONSULT-II

1. Turn ignition switch to "ON" position.
   (Do not start engine.)
2. Check voltage between PCM terminal 56 and ground when overdrive control switch is "ON" and "OFF".



Voltage:
Switch position "ON":
Battery voltage
Switch position "OFF":
1V or less

LAT227

OK or NG

OK	▶	GO TO 6.
NG	▶	**Check the following items:** ● Overdrive control switch (Refer to "Component Inspection", AT-422.) ● Harness for short or open between PCM and overdrive control switch (Main harness) ● Harness of ground circuit for overdrive control switch (Main harness) for short or open

5 **CHECK THROTTLE POSITION SWITCH CIRCUIT (With CONSULT-II)**

With CONSULT-II

1. Apply vacuum to the throttle opener, then check the following. Refer to step 1 through 5 of "Preparation", "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
2. Turn ignition switch to "ON" position.
   (Do not start engine.)
3. Select "ECU INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
4. Read out "CLOSED THL/SW" and "W/O THRL/P-SW" depressing and releasing accelerator pedal.
   Check the signal of throttle position switch is indicated properly.

Accelerator pedal condition	Data monitor	
	CLOSED THL/SW	W/O THRL/P-SW
Released	ON	OFF
Fully depressed	OFF	ON

MTBL0011

DATA MONITOR	
MONITORING	
POWERSHIFT SW	OFF
CLOSED THL/SW	OFF
W/O THRL/P-SW	OFF
HOLD SW	OFF
BRAKE SW	ON

SAT702J

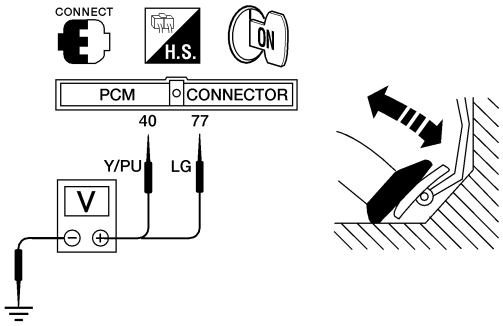
OK or NG

OK	▶	GO TO 7.
NG	▶	**Check the following items:** ● Throttle position switch — Refer to "Component Inspection", AT-422. ● Harness for short or open between ignition switch and throttle position switch (Main harness) ● Harness for short or open between throttle position switch and PCM (Main harness)

6	CHECK THROTTLE POSITION SWITCH CIRCUIT (Without CONSULT-II)

Without CONSULT-II

1. Apply vacuum to the throttle opener, then check the following. Refer to step 1 through 5 of "Preparation", "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.
2. Turn ignition switch to "ON" position.
   (Do not start engine.)
3. Check voltage between PCM terminals 40, 77 and ground while depressing, and releasing accelerator pedal slowly.
   (After warming up engine)



Accelerator pedal condition	Voltage	
	Terminal No. 40	Terminal No. 77
Released	Battery voltage	1V or less
Fully depressed	1V or less	Battery voltage

LAT220

OK or NG

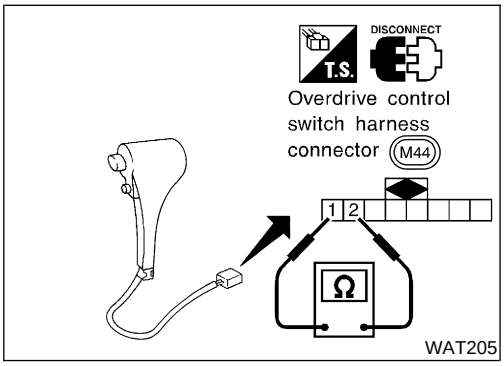
OK	▶	GO TO 7.
NG	▶	**Check the following items:** ● Throttle position switch — Refer to "Component Inspection", AT-422. ● Harness for short or open between ignition switch and throttle position switch (Main harness) ● Harness for short or open between throttle position switch and PCM (Main harness)

7	CHECK DTC

Perform "DIAGNOSTIC PROCEDURE", AT-419.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	● Perform PCM input/output signal inspection. ● If NG, recheck PCM pin terminals for damage or loose connection with harness connector.



COMPONENT INSPECTION

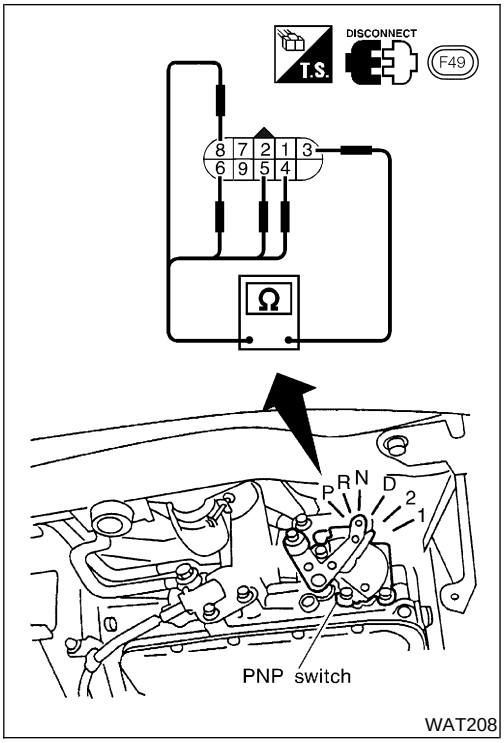
Overdrive Control Switch

NIAT0227S03

NIAT0227S0301

- Check continuity between terminals 1 and 2.

Switch position	Continuity
RELEASED	No
DEPRESSED	Yes



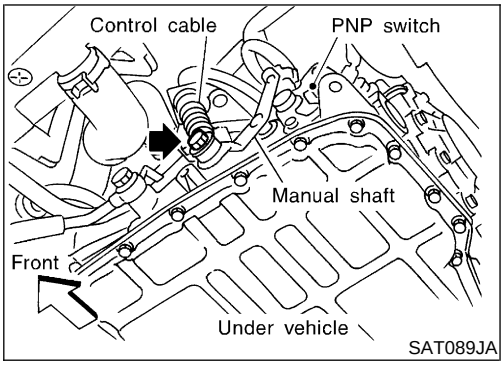
WAT208

PNP Switch

NIAT0227S0302

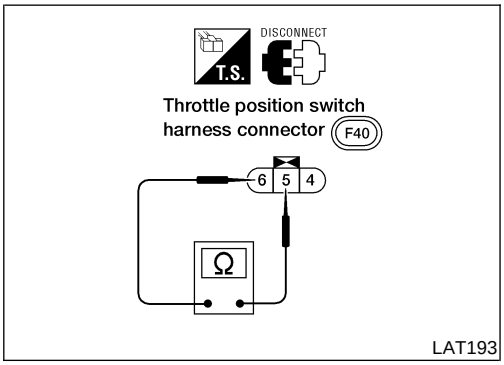
1. Check continuity between terminals 1 and 2 and between terminals 3 and 4, 5, 6, 8 while moving manual shaft through each position.

Lever position	Terminal No.	
P	—	1 — 2
R	3 — 8	
N	—	1 — 2
D	3 — 6	
2	3 — 5	
1	3 — 4	



SAT089JA

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 "Control Cable Adjustment", AT-434.
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 "Park/Neutral Position (PNP) Switch Adjustment", AT-434.
6. If NG on step 4, replace PNP switch.



LAT193

Throttle Position Switch

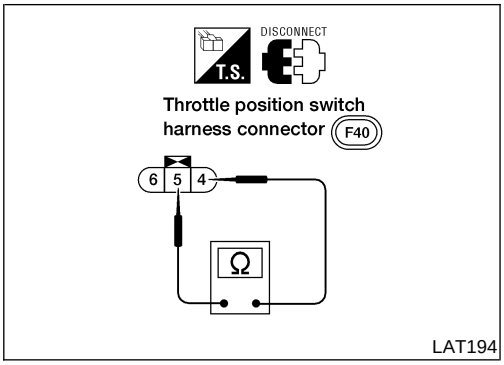
NIAT0227S0303

Closed throttle position switch (idle position)

- Check continuity between terminals 5 and 6.
  Refer to "Preparation", "TCM/PCM Self-diagnostic Procedure (No Tools)", AT-52.

Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

- To adjust closed throttle position switch, refer to ***EC-464***, "DTC P0510 CLOSED THROTTLE POSITION SWITCH".



Wide open throttle position switch

- Check continuity between terminals 4 and 5.

Accelerator pedal condition	Continuity
Released	No
Depressed	Yes

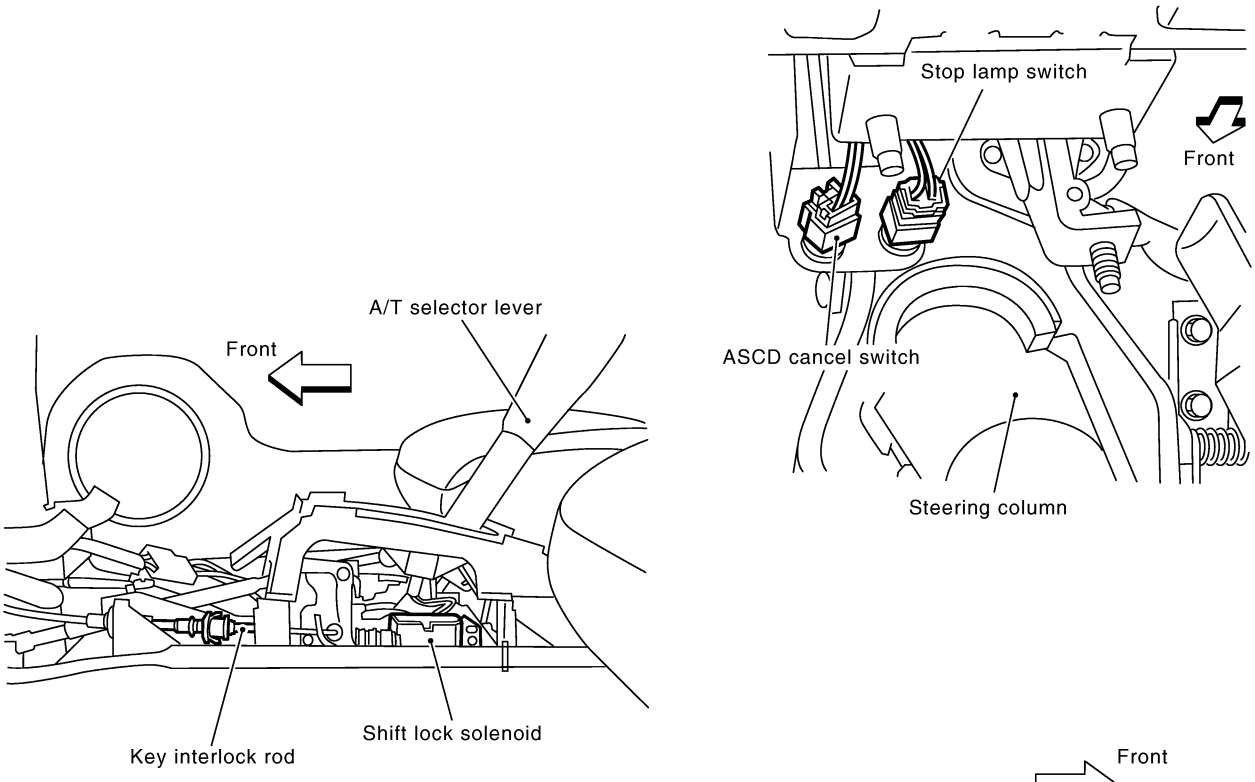
Description

NIAT0127

- 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

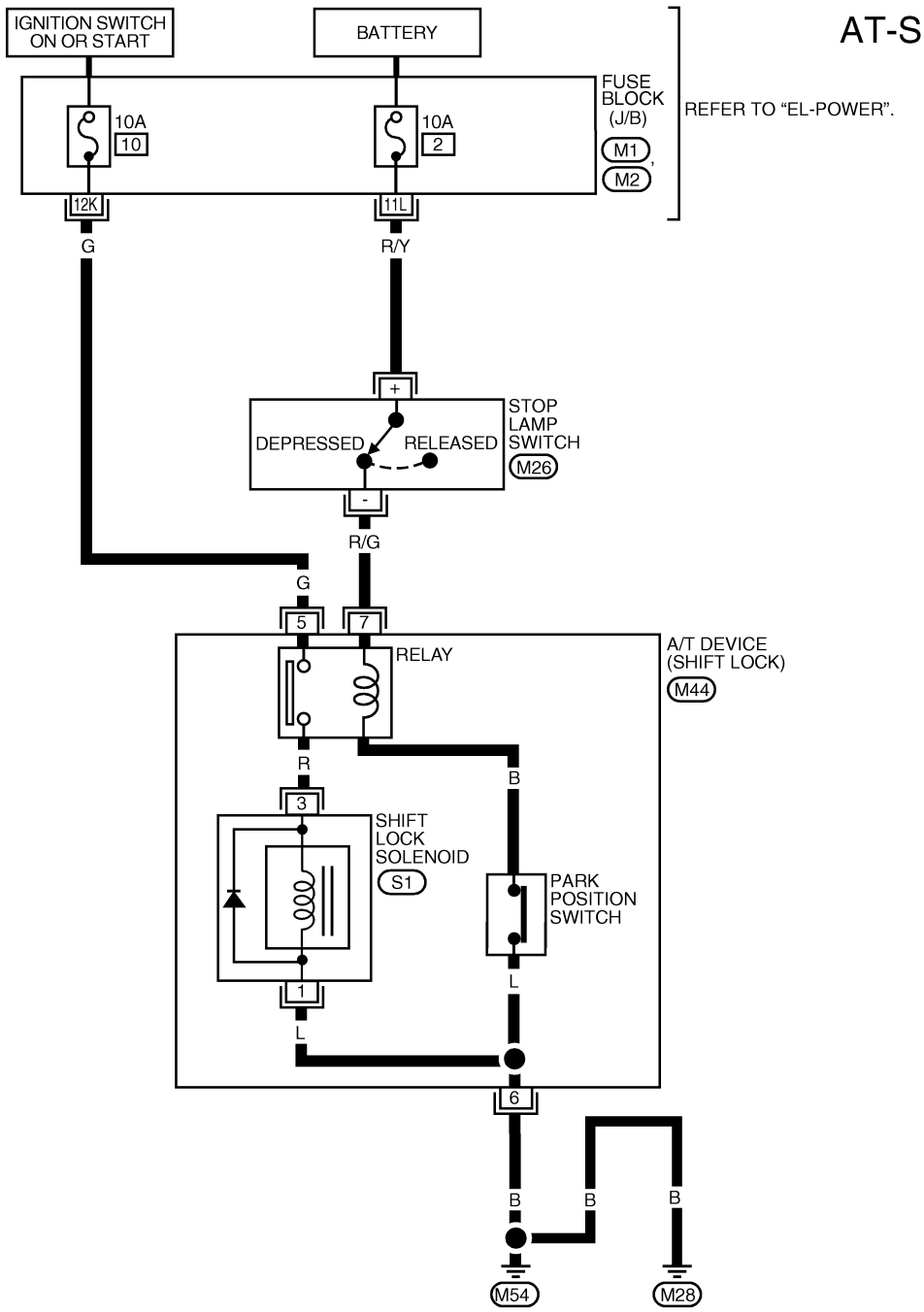
NIAT0128

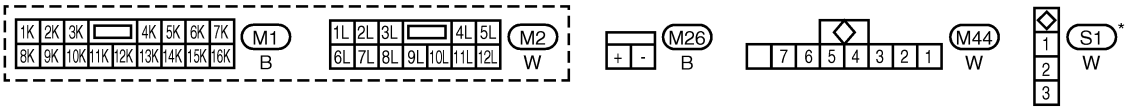


SAT862J

Wiring Diagram — SHIFT —

NIAT0129





★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF EL SECTION.

WAT134

Diagnostic Procedure

NIAT0130

SYMPTOM 1:

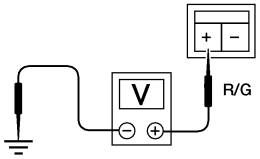
- **Selector lever cannot be moved from “P” position with key in ON position and brake pedal applied.**
- **Selector lever can be moved from “P” position with key in ON position and brake pedal released.**
- **Selector lever can be moved from “P” position when key is removed from key cylinder.**

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 “Components”, AT-431.

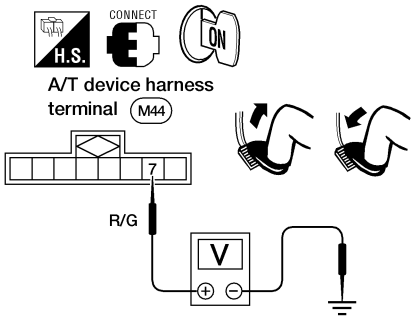
2	CHECK SELECTOR LEVER POSITION	
Check selector lever position for damage. **OK or NG**		
OK	▶	GO TO 3.
NG	▶	Check selector lever. Refer to “Control Cable Adjustment”, AT-434.

3	CHECK POWER SOURCE	
1. Turn ignition switch to “ON” position. (Do not start engine.) 2. Check voltage between stop lamp switch harness terminal + and ground.  Stop lamp switch harness terminal (M26) **Voltage:** **Battery voltage**  LAT228 **OK or NG**		
OK	▶	GO TO 4.
NG	▶	**Check the following items:** 1. Harness for short or open between battery and stop lamp switch harness terminal + 2. 10A fuse No. 2 [located in the fuse block (J/B)] 3. Ignition switch (Refer to ***EL-9***, “POWER SUPPLY ROUTING”.)

Diagnostic Procedure (Cont'd)

4	CHECK INPUT SIGNAL (A/T DEVICE)

Turn ignition switch to "ON" position.
(Do not start engine.)
- Check voltage between A/T device harness terminal 7 and ground.



Voltage:
Brake pedal depressed:
0V
Brake pedal released:
Battery voltage

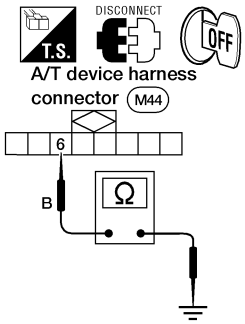
LAT229

OK or NG

OK	▶	GO TO 5.
NG	▶	**Check the following items:** 1. Harness for short and open between battery and stop lamp switch harness connector 1. 2. Harness for short or open between stop lamp switch harness connector 2 and A/T device harness connector 7. 3. Fuse 4. Stop lamp switch (Refer to "Component Check", AT-430.)

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 terminal 6 and ground.
   If OK, check harness for short to ground and short to power.



Continuity should exist.

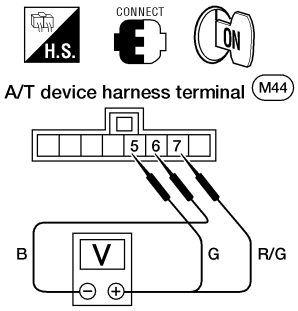
LAT230

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 RELAY CIRCUIT

1. Turn ignition switch to ON.
- Check voltage between terminal 7 - 6 and 5 - 6.



Condition	Ignition switch	Terminal No.	Voltage
When selector lever is set in "P" position and depressed brake pedal.	ON	7 - 6	Battery voltage
		5 - 6	Battery voltage

LAT231

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace A/T device.

7	CHECK PARK POSITION SWITCH

Refer to "A/T DEVICE CHECK", AT-430.

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace A/T device.

8	CHECK SHIFT LOCK SOLENOID

Refer to "A/T DEVICE CHECK", AT-430.

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace A/T device.

9	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	▶	1. Perform A/T device input/output signal inspection test. 2. If NG, recheck harness connector connection.

A/T DEVICE CHECK

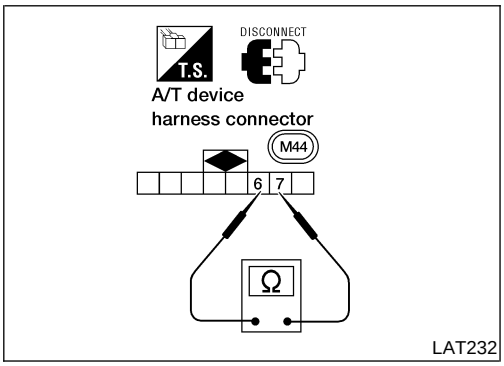
=NIAT0130S01

1. Shift Lock Solenoid

NIAT0130S0101

- Check operation sound.
  When ignition switch is turned to "ON" position and selector lever is set in "P" position.

Brake pedal	Operation sound
Depressed	No
Released	Yes



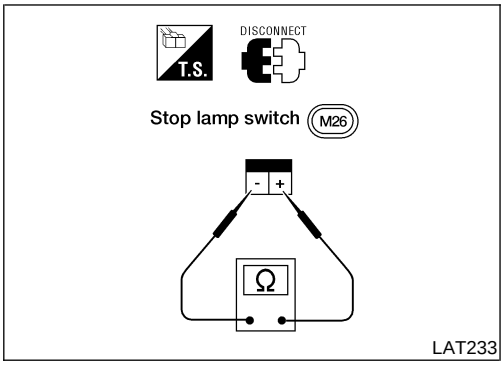
LAT232

2. Park Position Switch

NIAT0130S0102

- Check resistance between A/T device harness terminal 6 and 7.

Condition	Resistance
When selector lever is set in "P" position and selector lever button is released	111Ω
Except above	0Ω



LAT233

STOP LAMP SWITCH

NIAT0130S02

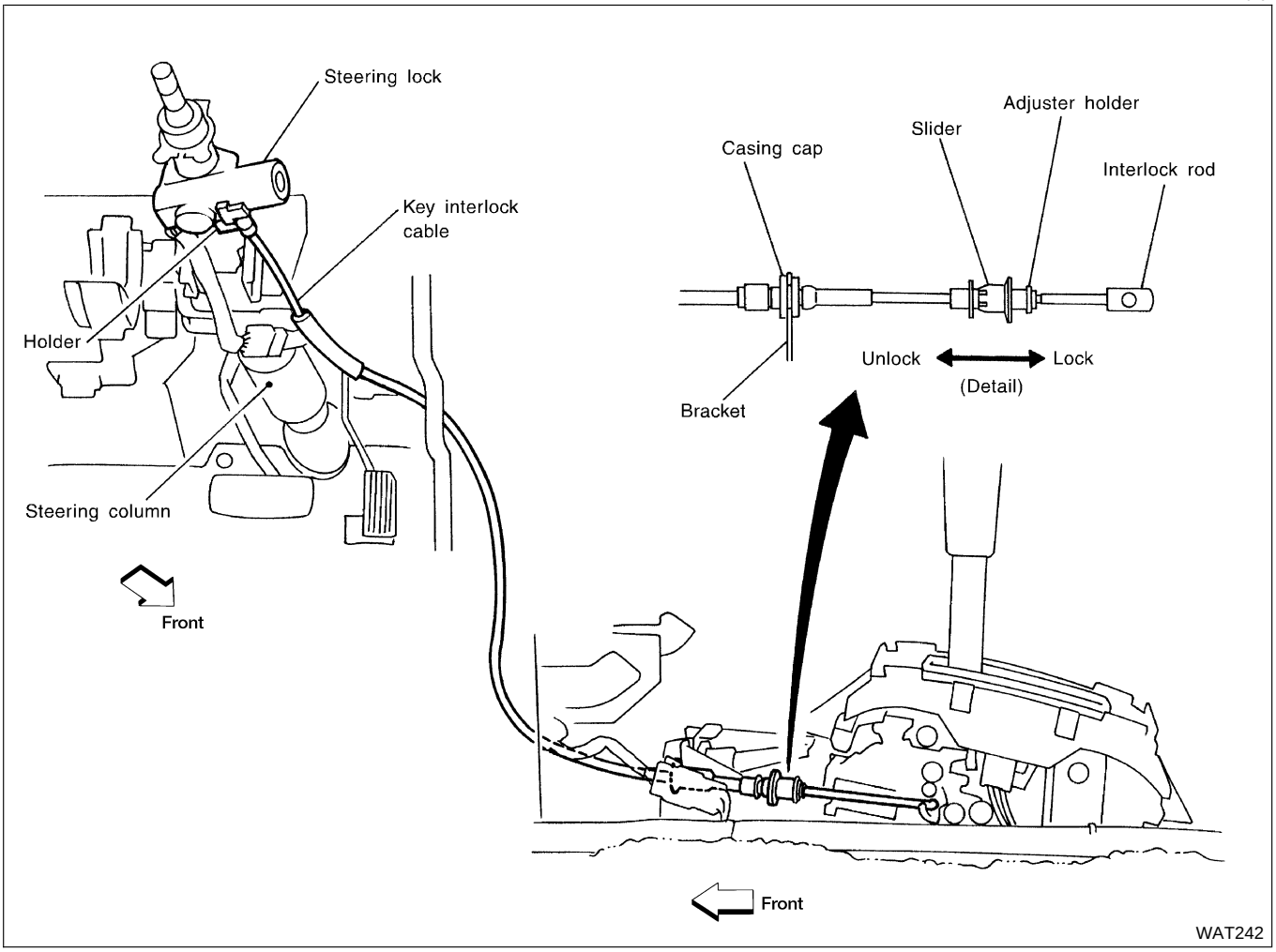
- Check continuity between terminals + and −.

Condition	Continuity
When brake pedal is depressed	No
When brake pedal is released	Yes

Check stop lamp switch after adjusting brake pedal — refer to *BR-12*, "BRAKE PEDAL AND BRACKET" .

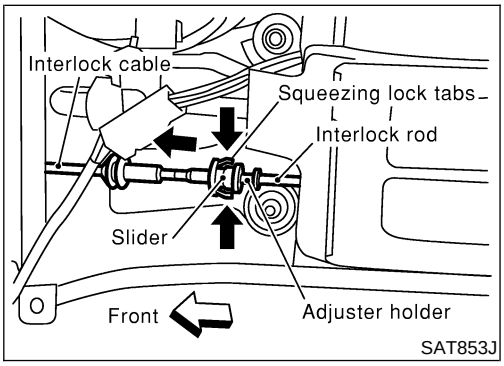
Components

NIAT0131



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.**

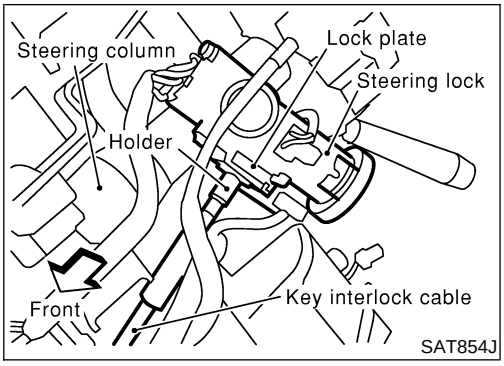


Removal

NIAT0132

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

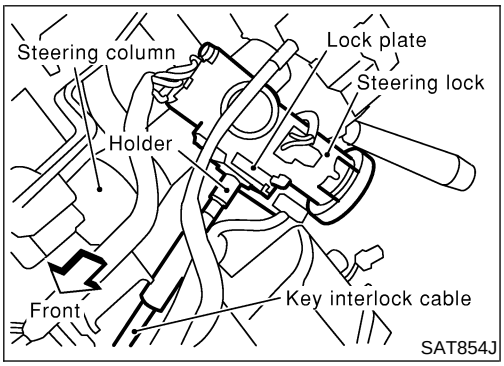
Removal (Cont'd)



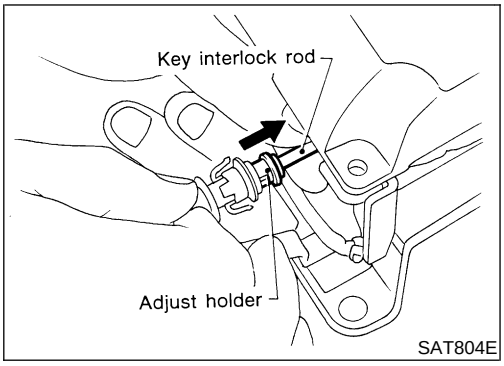
2. Remove lock plate from steering lock assembly and remove key interlock cable.

Installation

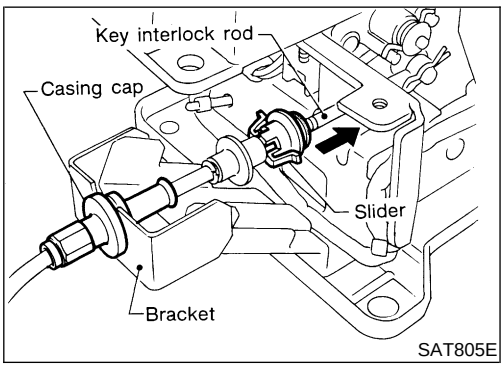
NIAT0133



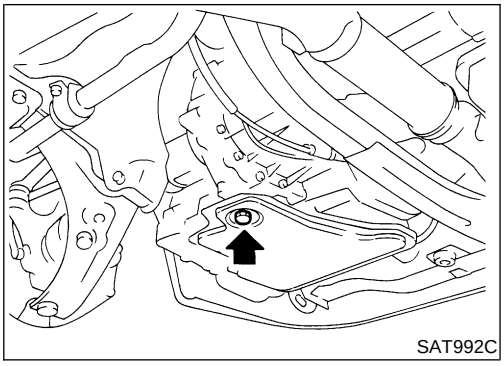
1. Turn ignition key to lock position.
2. Set A/T selector lever to P position.
3. Set key interlock cable to steering lock assembly and install lock plate.
4. Clamp cable to steering column and attach to control cable with band.



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.


SAT992C

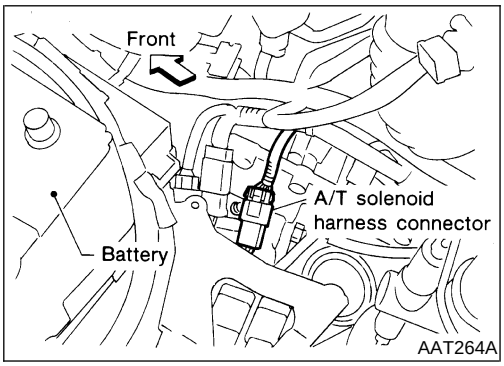
Control Valve Assembly and Accumulators

NIAT0235

REMOVAL

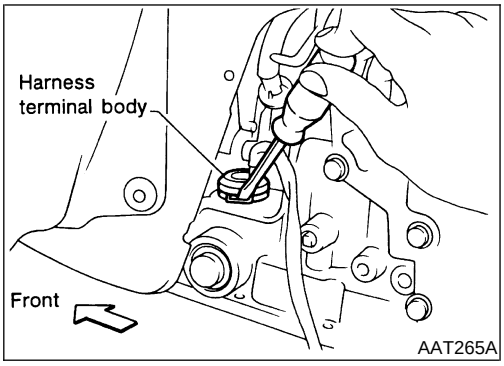
NIAT0235S01

1. Drain ATF from transaxle.
2. Remove oil pan and gasket.



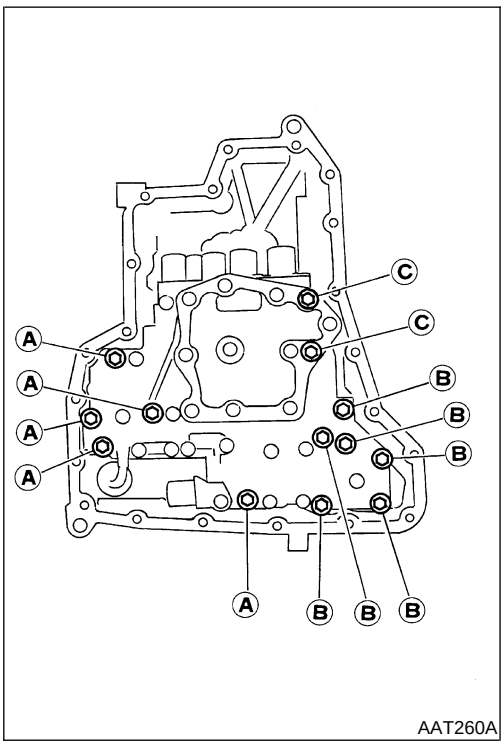
AAT264A

3. Disconnect A/T solenoid valve harness connector.



AAT265A

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



AAT260A

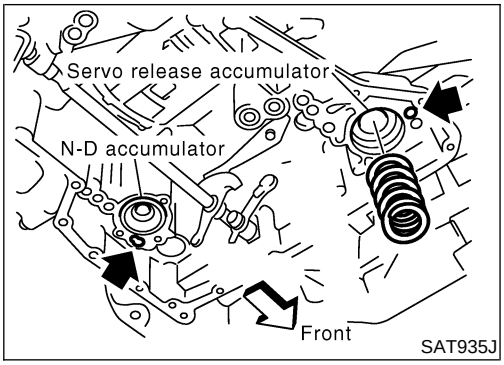
6. Remove control valve assembly by removing fixing bolts.

Bolt length, number and location:

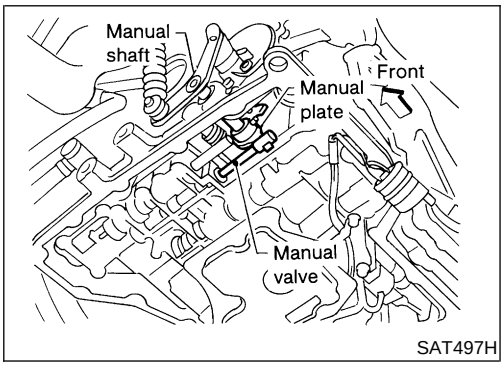
Bolt symbol	A	B	C
Bolt length "ℓ"	40.0 mm (1.575 in)	33.0 mm (1.299 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2

- **Be careful not to drop manual valve and servo release accumulator return springs.**

7. Disassemble and inspect control valve assembly if necessary. Refer to "COMPONENTS", AT-465.



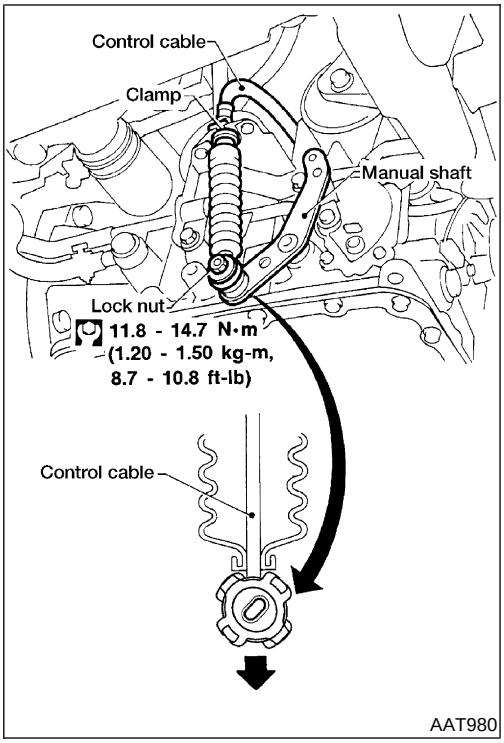
8. Remove servo release and N-D accumulators by applying compressed air if necessary.
- **Hold each piston with a clean, lint-free towel.**



INSTALLATION

NIAT0235S02

- **Tighten fixing bolts 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.**

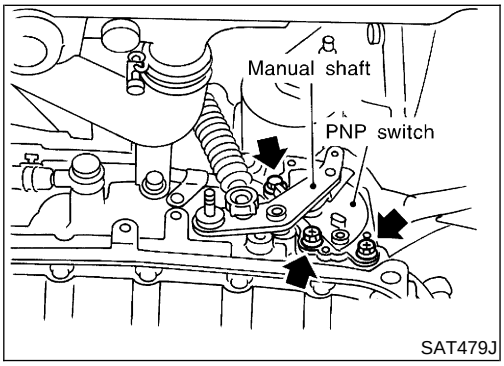


Control Cable Adjustment

NIAT0236

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.

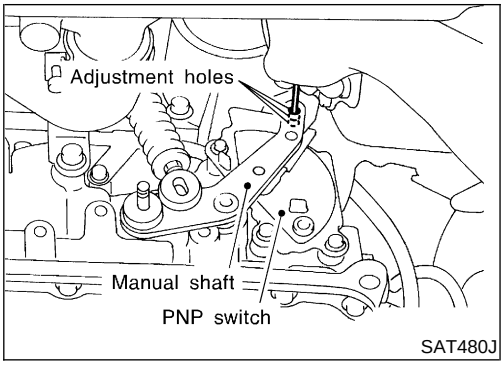
1. Place selector lever in "P" position.
2. Loosen control cable lock nut and place manual shaft in "P" position.
3. Push control cable, by specified force, in the direction of the arrow shown in the illustration.
   Specified force: 9.8 N (1.0 kg, 2.2 lb)
4. Release control cable in the opposite direction 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

NIAT0237

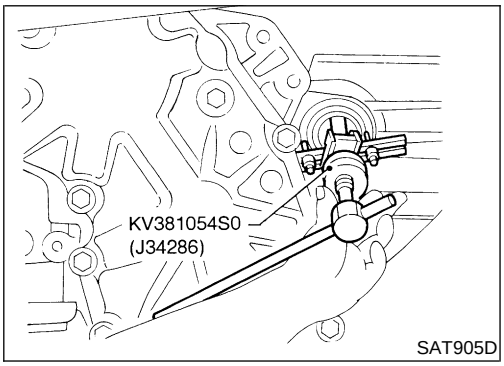
1. Remove control cable end from manual shaft.
2. Set manual shaft in "N" position.
3. Loosen PNP switch fixing bolts.



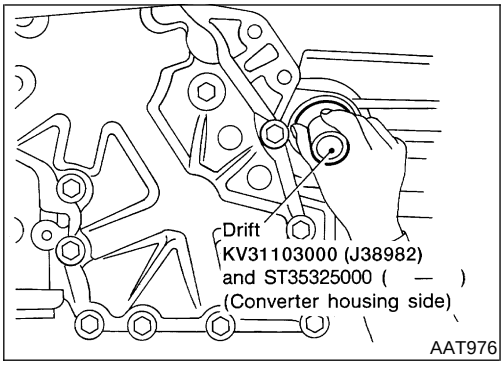
4. Use a 4 mm (0.157 in) pin for this adjustment.
a. Insert the pin straight into the manual shaft adjustment hole.
b. Rotate PNP switch until the pin can also be inserted straight into hole in PNP switch.
5. Tighten PNP switch fixing bolts.
6. Remove pin from adjustment hole after adjusting PNP switch.
7. Reinstall any part removed.
8. Adjust control cable. Refer to "Control Cable Adjustment", AT-434.
9. Check continuity of PNP switch. Refer to "Component Inspection", AT-119.

Differential Side Oil Seal Replacement

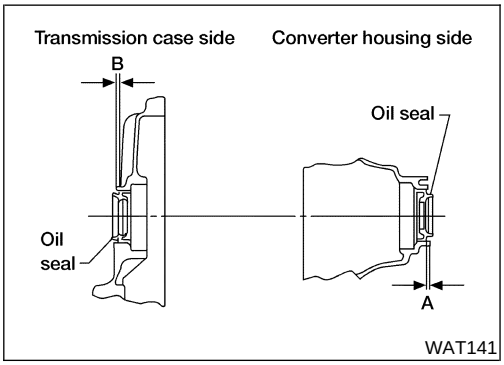
NIAT0238



1. Remove drive shaft assemblies using Tool. Refer to ***AX-10***, "DRIVE SHAFT".
2. Remove oil seals.



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

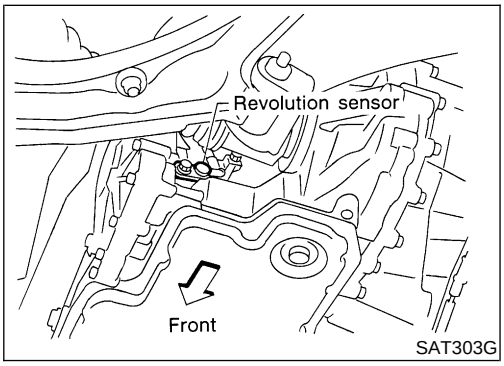


- **Install oil seals so that dimensions "A" and "B" are within specifications.**

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.

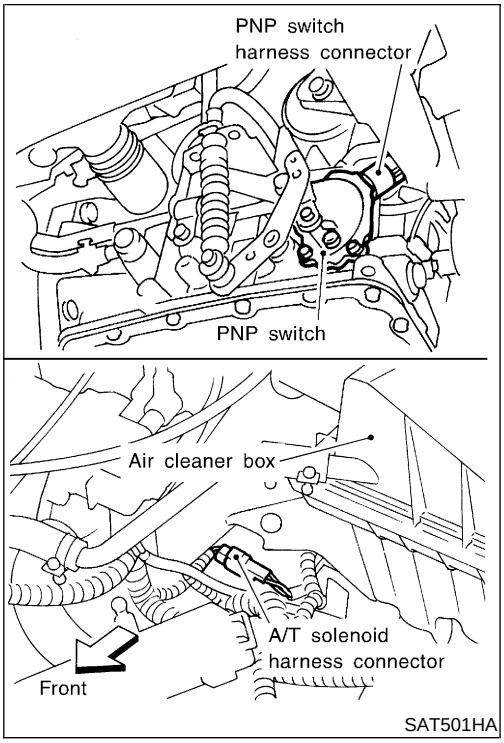


Revolution Sensor Replacement

NIAT0239

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.



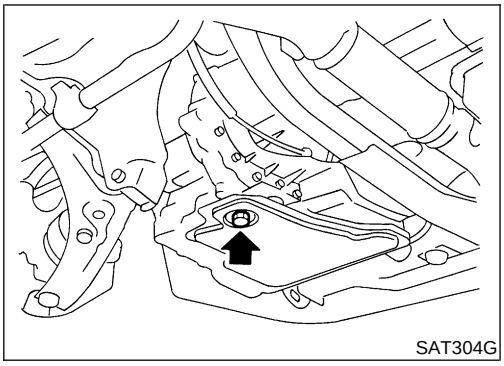
Removal

NIAT0240

CAUTION:

Before separating transaxle from engine, remove the crankshaft position sensor (POS) 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. Remove crankshaft position sensor (POS) from transaxle (SR20DE).

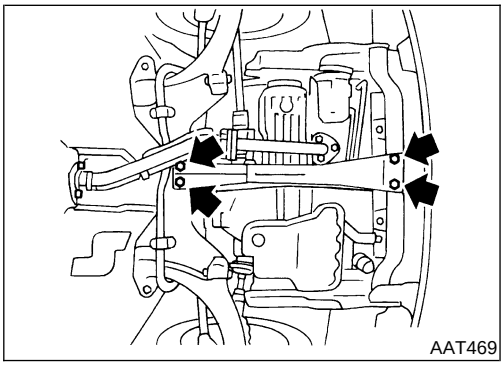


5. Drain ATF from transaxle.
6. Disconnect control cable from transaxle.
7. Disconnect oil cooler hoses.
8. Remove drive shafts. Refer to ***AX-10***, “DRIVE SHAFT”.
9. Remove the intake manifold support bracket. Refer to ***EM-12*** (QG18DE), ***EM-84*** (SR20DE), “OUTER COMPONENT PARTS”.
10. Remove starter motor from transaxle.

Tighten bolts to specified torque.

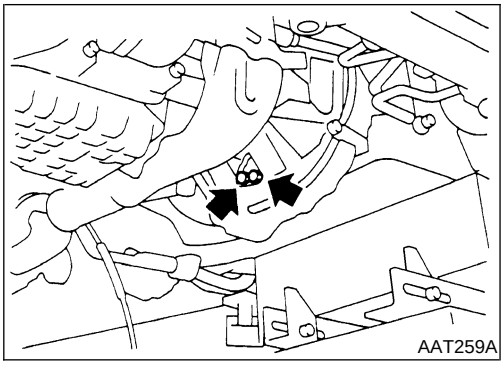
: 33.3 - 46.1 N·m (3.4 - 4.7 kg-m, 25 - 34 ft-lb)

11. Remove upper bolts fixing transaxle to engine.
12. Support transaxle with a jack.



13. Remove center member.

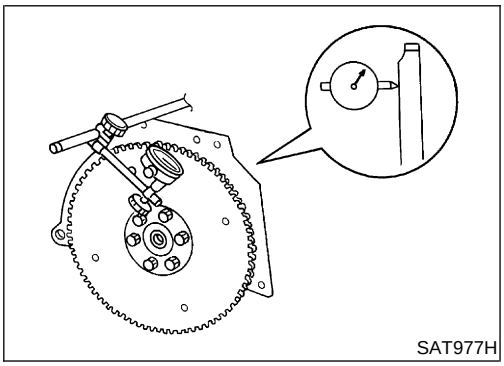
- Tighten center member fixing bolts to specified torque, Refer to ***EM-49*** (QG18DE), ***EM-127*** (SR20DE), “Removal and Installation”.


AAT259A

14. Remove rear plate cover.
15. Remove torque converter bolts.
    Rotate crankshaft to gain access to securing bolts.
16. Remove rear transaxle to engine bracket. Refer to ***EM-49*** (QG18DE), ***EM-127*** (SR20DE), "Removal and Installation".
17. Support engine with a jack.
18. Remove rear transaxle mount. Refer to ***EM-49*** (QG18DE), ***EM-127*** (SR20DE), "Removal and Installation".
19. Remove lower bolts fixing transaxle to engine.
20. Lower transaxle while supporting it with a jack.

Installation

NIAT0241


SAT977H

1. Check drive plate runout.

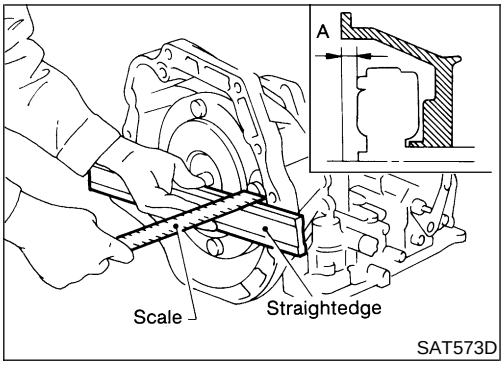
CAUTION:

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

Maximum allowable runout:

Refer to *EM-76* (QG18DE), *EM-153* (SR20DE), "FLYWHEEL/DRIVE PLATE RUNOUT".

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

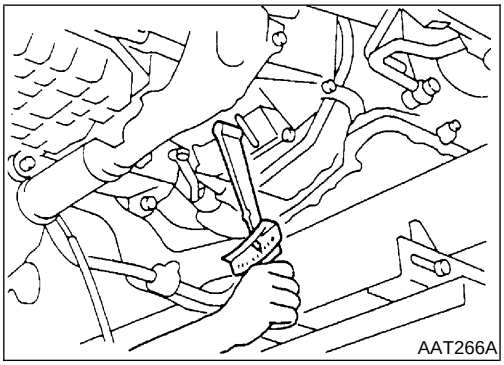


SAT573D

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

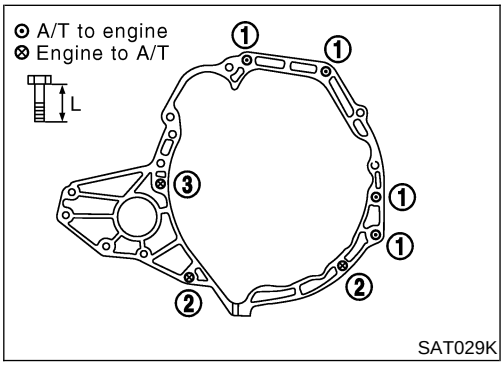
Distance "A":

15.9 mm (0.626 in) or more


AAT266A

3. Install torque converter to drive plate.

- **With converter installed, rotate crankshaft several turns to check that transaxle rotates freely without binding.**



SAT029K

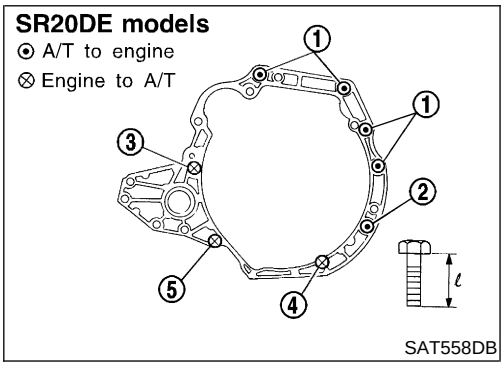
4. Tighten bolts fixing transaxle.

QG18DE Model

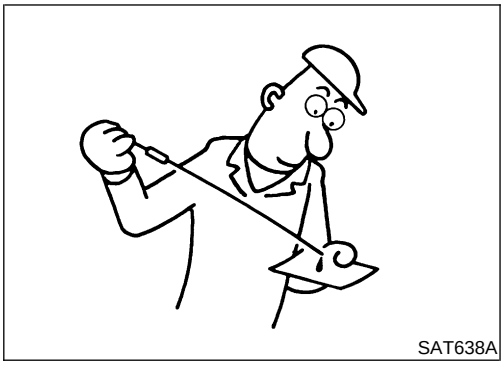
Bolt No.	Tightening torque N·m (kg-m, ft-lb)	Bolt length "ℓ" mm (in)
1	30 - 40 (3.1 - 4.1, 23 - 29)	50 (1.97)
2*1	16 - 20 (1.6 - 2.1, 12 - 15)	25 (0.98)
3	31 - 40 (3.1 - 4.1, 23 - 29)	30 (1.18)
4*2	30 - 40 (3.1 - 4.1, 23 - 29)	16 (0.63)

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	Bolt length "ℓ" mm (in)
5*2	16 - 20 (1.6 - 2.1, 12 - 15)	20 (0.79)

*1: With gusset to A/T
*2: With gusset to cylinder block



SAT558DB


SAT638A

SR20DE Model

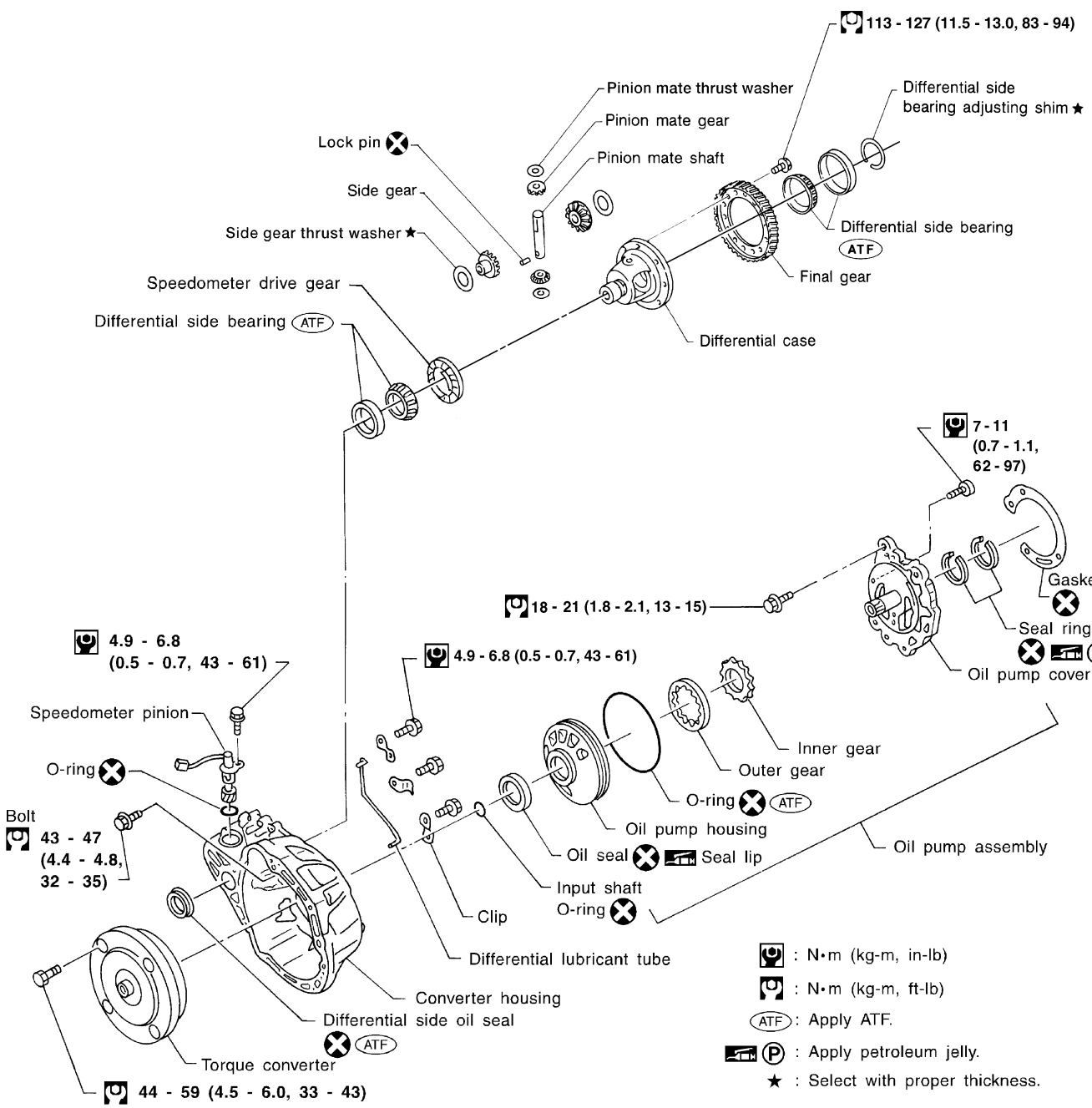
Bolt No.	Tightening torque N·m (kg-m, ft-lb)	Bolt length "ℓ" mm (in)
1	70 - 79 (7.1 - 8.1, 51 - 59)	55 (2.17)
2	70 - 79 (7.1 - 8.1, 51 - 59)	50 (1.97)
3	70 - 79 (7.1 - 8.1, 51 - 59)	65 (2.56)
4	16 - 21 (1.6 - 2.1, 12 - 15)	35 (1.38)
5	16 - 21 (1.6 - 2.1, 12 - 15)	45 (1.77)

5. Reinstall any part removed.
6. Adjust control cable. Refer to "Control Cable Adjustment", AT-434.
7. Check continuity of PNP switch. Refer to "PARK NEUTRAL POSITION SWITCH", AT-279.
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 "Road Test", AT-73.

Components

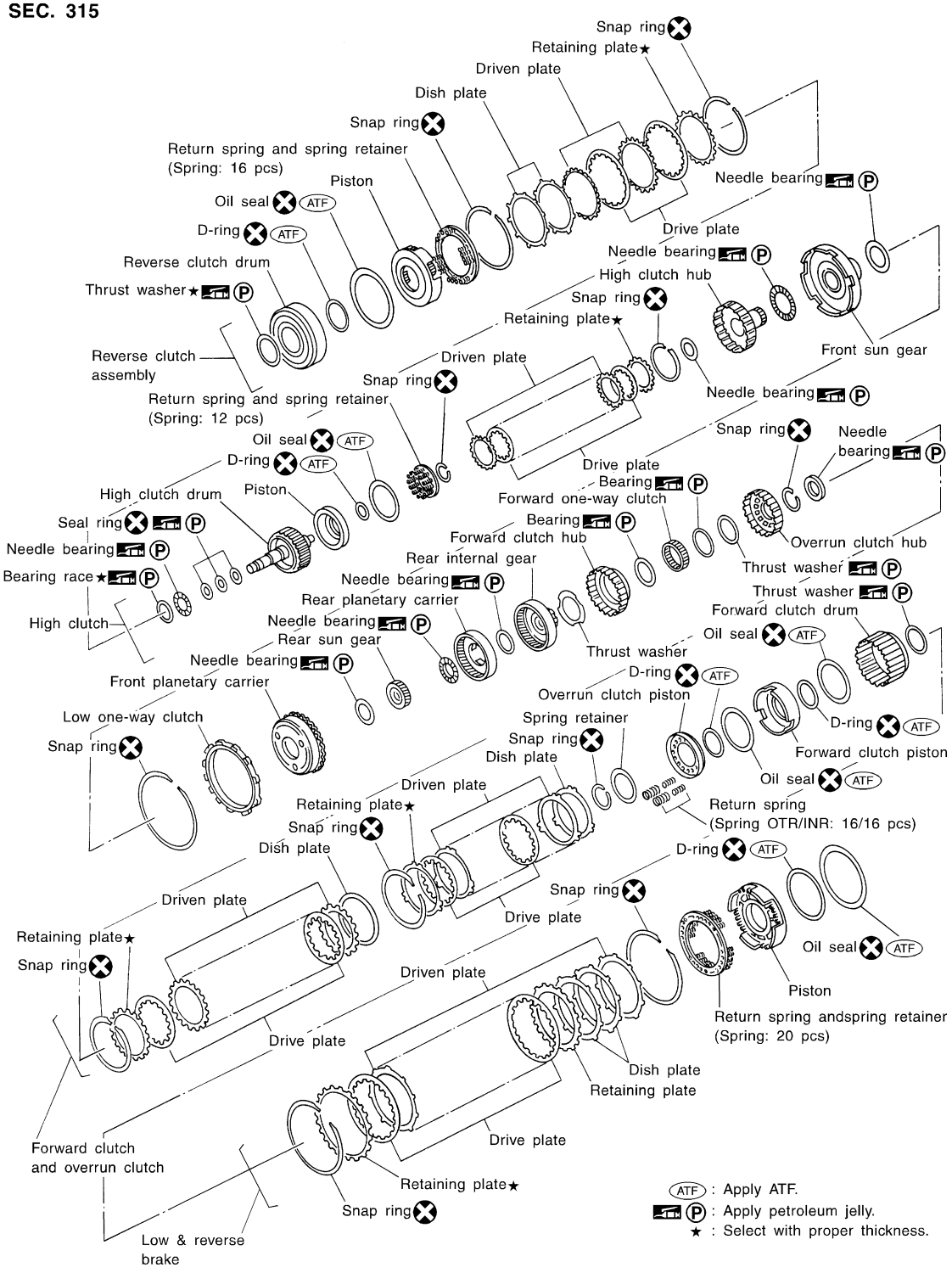
NIAT0242

SEC. 311•313•327•381



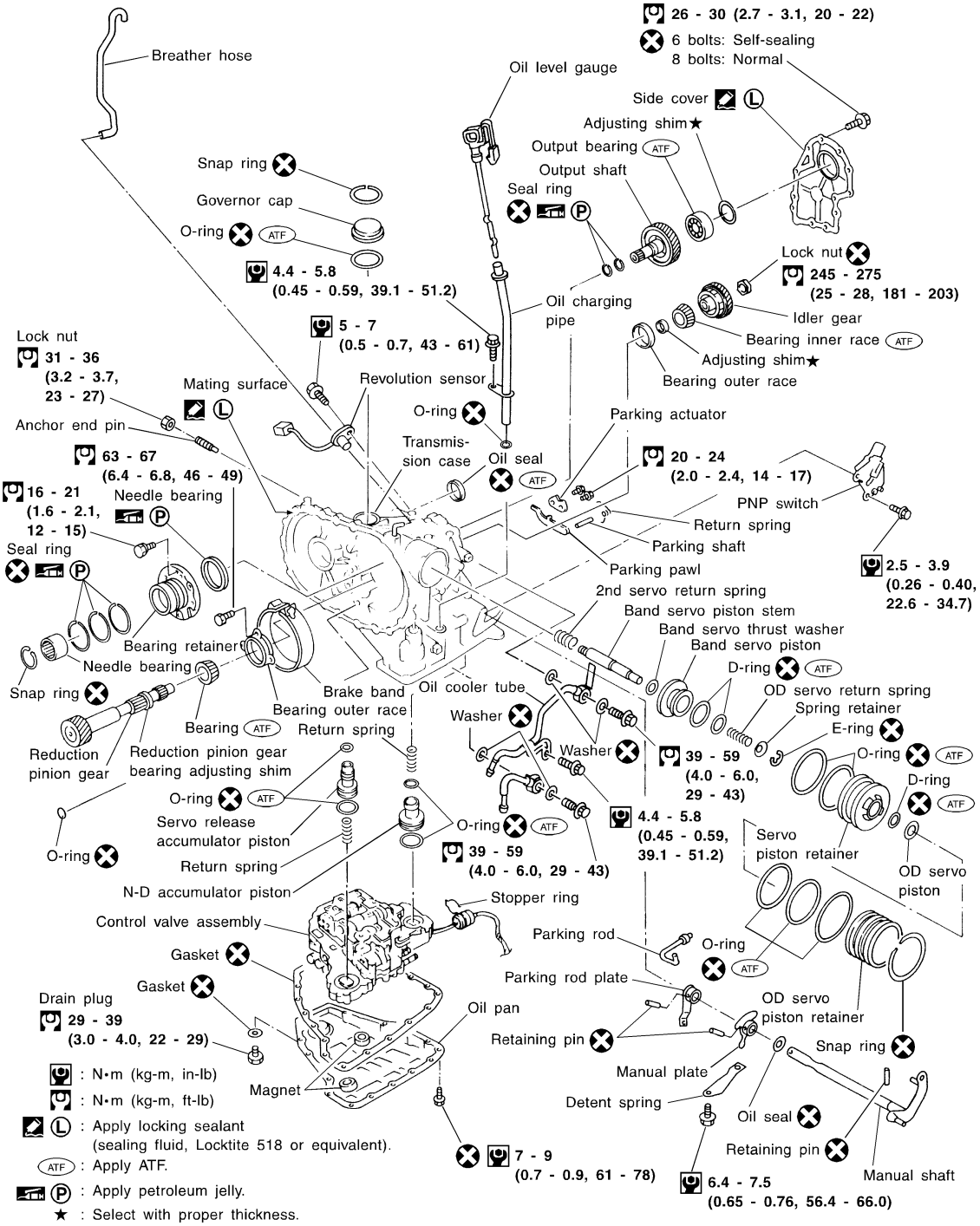
WAT140

SEC. 315



SAT936J

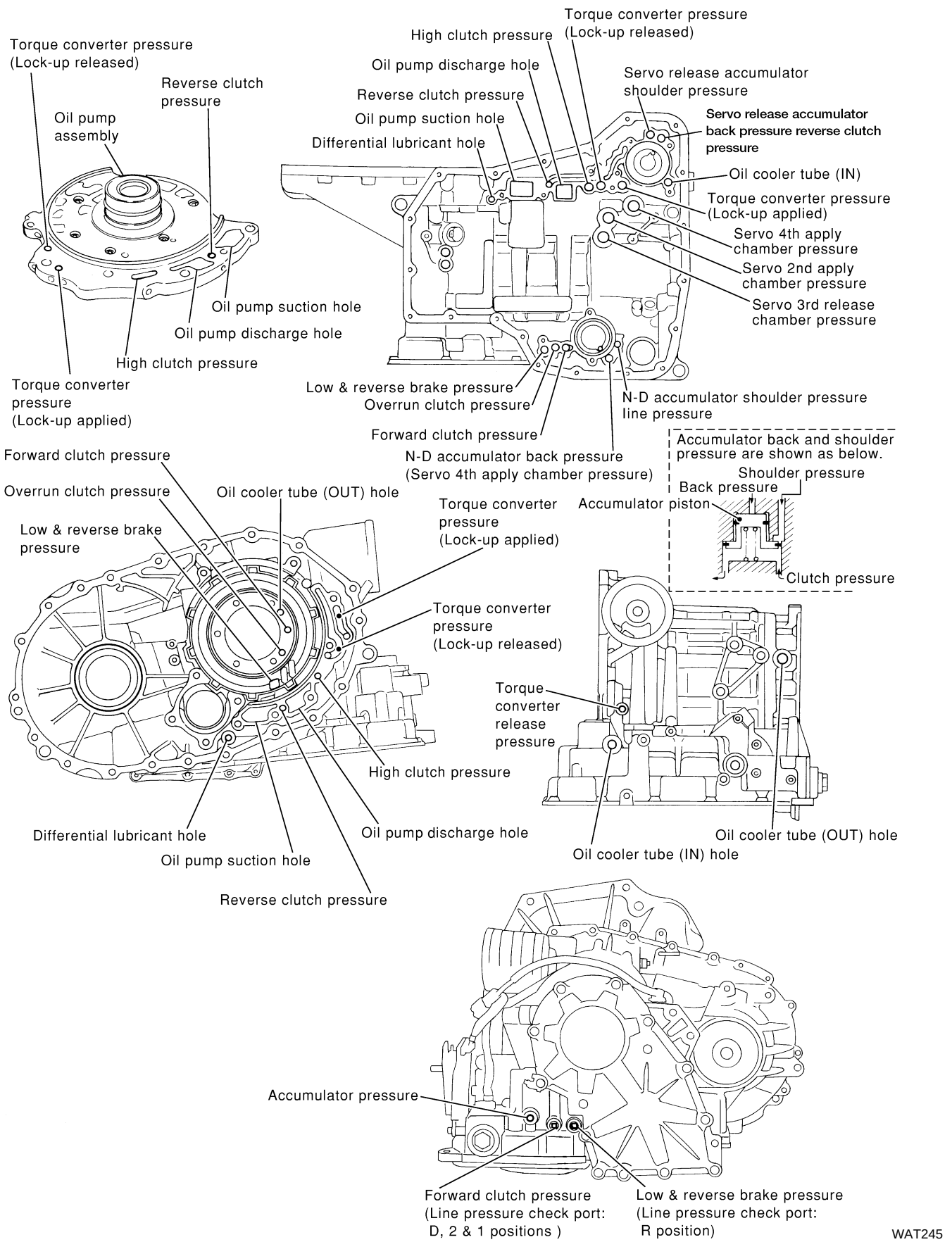
SEC. 310•315•317•319



WAT244

Oil Channel

NIAT0243



WAT245

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

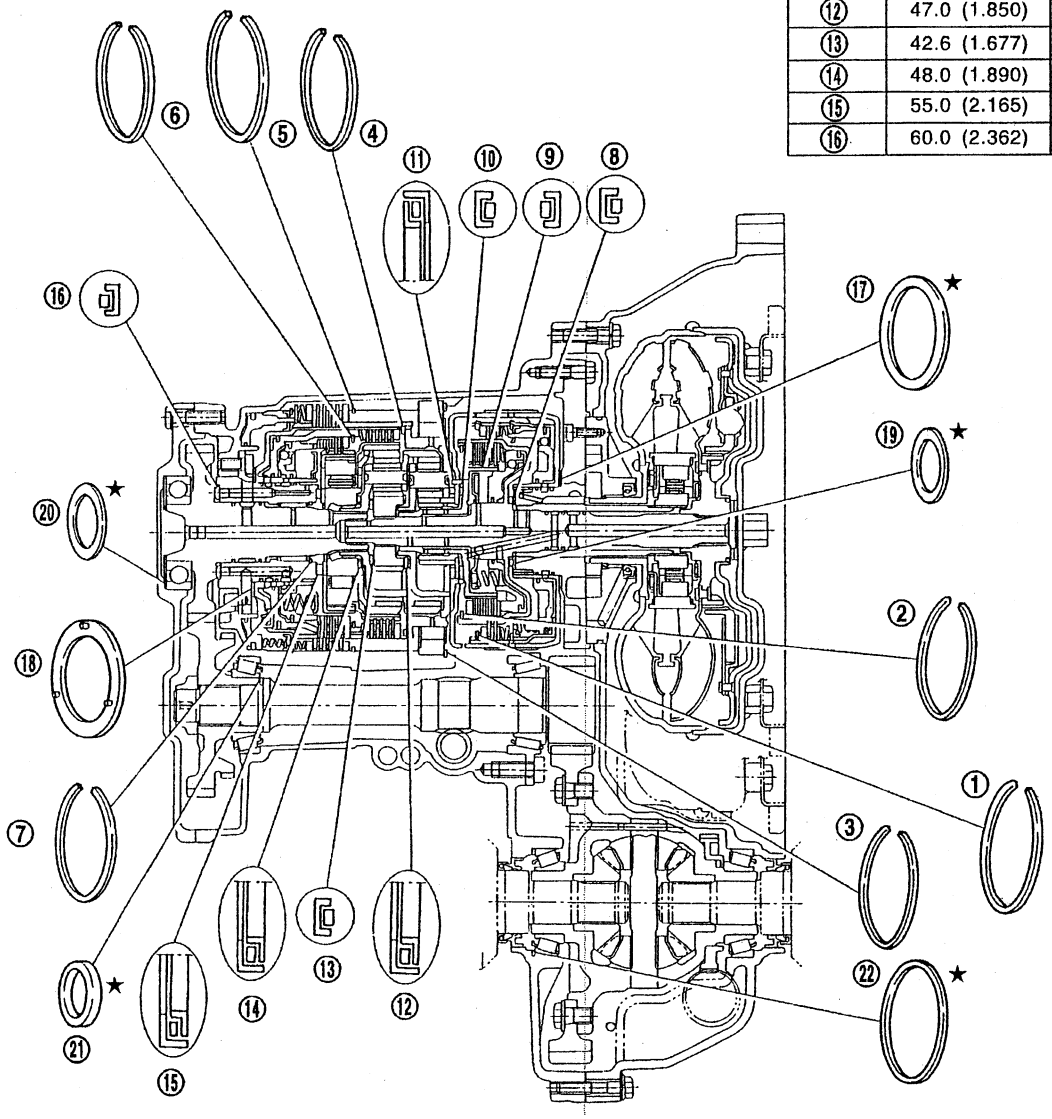
NIAT0244

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

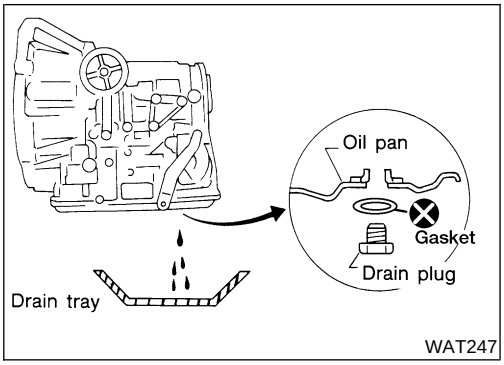
Item number	Outer diameter mm (in)	Inner diameter mm (in)
⑲	48.0 (1.890)	33.0 (1.299)
⑳	72.0 (2.835)	61.0 (2.402)
㉑	34.5 (1.358)	26.1 (1.028)
㉒	68.0 (2.677)	60.0 (2.362)

Outer diameter of snap rings

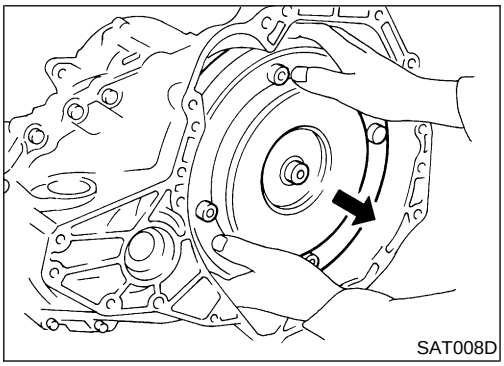
Item number	Outer diameter mm (in)
①	142.0 (5.59)
②	113.0 (4.45)
③	162.4 (6.39)
④	135.4 (5.33)
⑤	162.3 (6.39)
⑥	126.0 (4.96)
⑦	40.5 (1.594)

WAT246

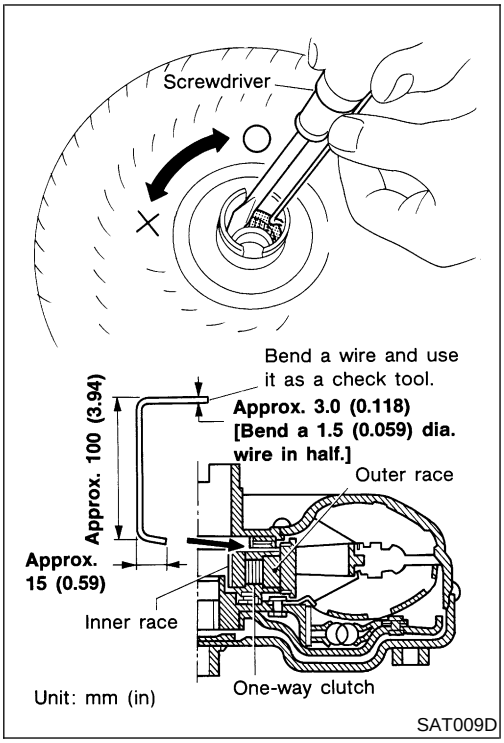
DISASSEMBLY



1. Drain ATF through drain plug.



2. Remove torque converter.

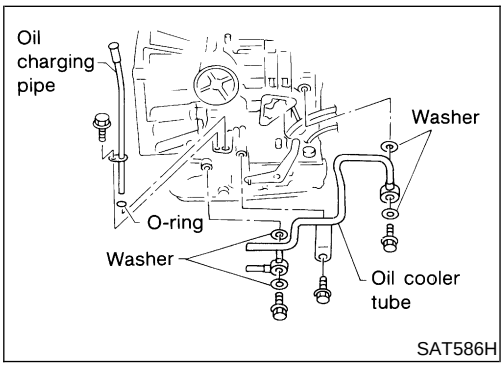


3. Check torque converter one-way clutch using check tool as shown at left.

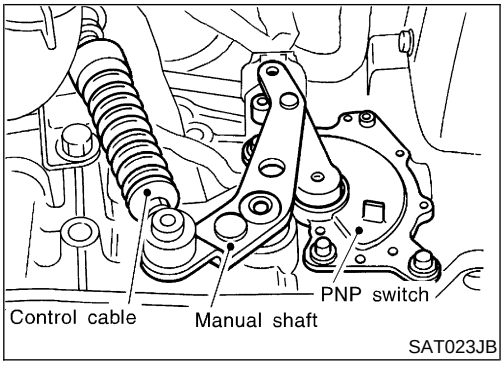
a. Insert check tool into the groove of bearing support built into one-way clutch outer race.

b. While fixing bearing support with check tool, rotate one-way clutch spline using flat-bladed screwdriver.

c. Check inner race rotates clockwise only. If not, replace torque converter assembly.

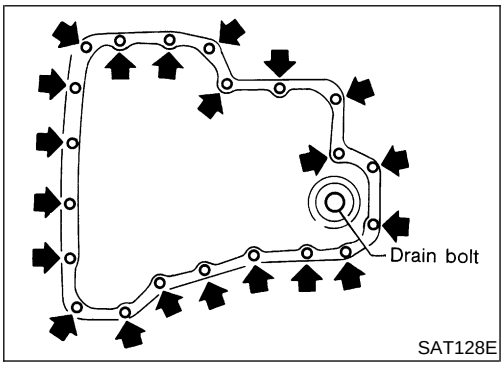


4. Remove oil charging pipe and oil cooler tube.



SAT023JB

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



SAT128E

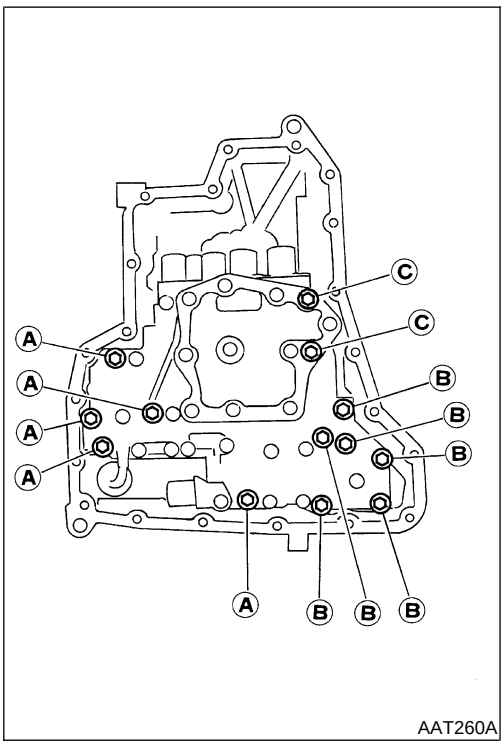
7. Remove oil pan and oil pan gasket.

- **Do not reuse oil pan 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.

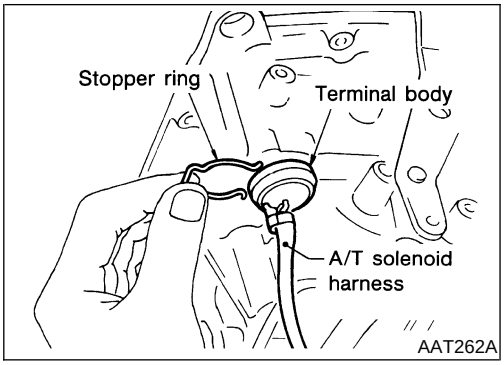
- **If frictional material is detected, replace radiator after repair of A/T. Refer to *LC-15* (QG18DE), *LC-33* (SR20DE), “Radiator”.**

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

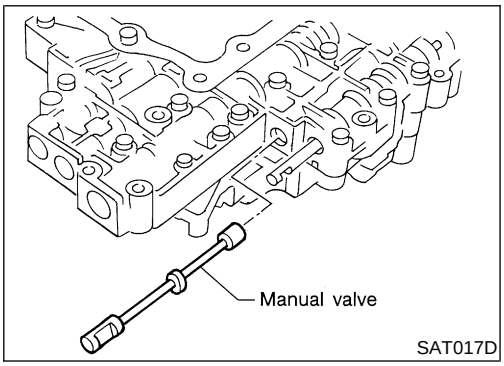


AAT260A

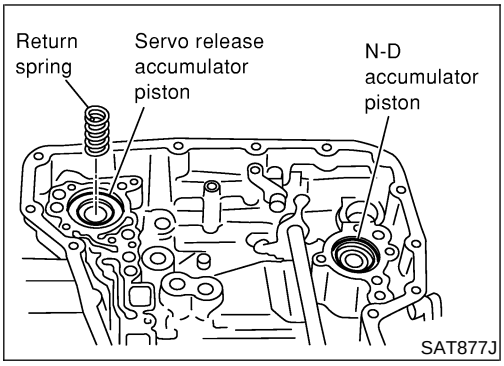
a. Remove control valve assembly mounting bolts A, B and C.



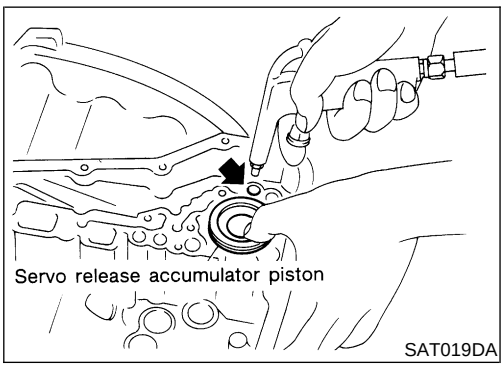
b. Remove stopper ring from terminal body.
c. Push terminal body into transmission case and draw out solenoid harness.



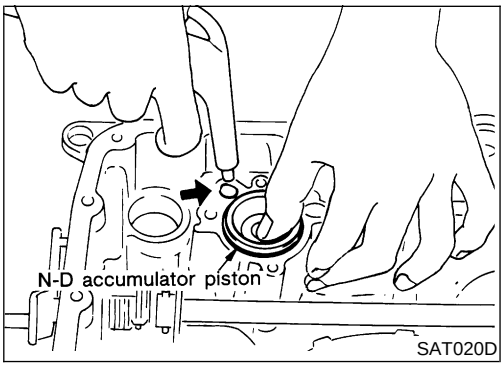
10. Remove manual valve from control valve assembly as a precaution.



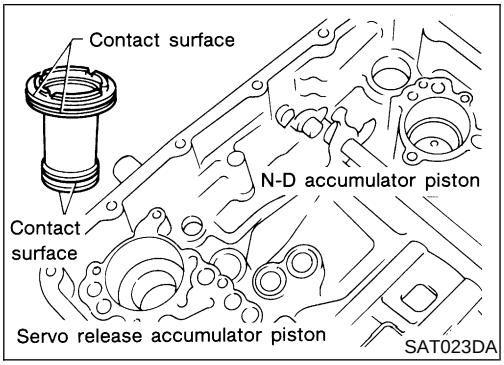
11. Remove return spring from servo release accumulator piston.



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



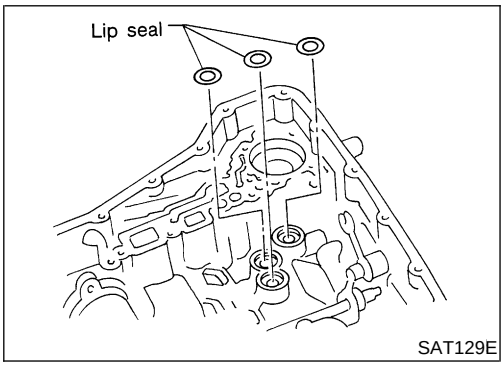
14. Remove N-D accumulator piston and return spring with compressed air.
15. Remove O-rings from N-D accumulator piston.



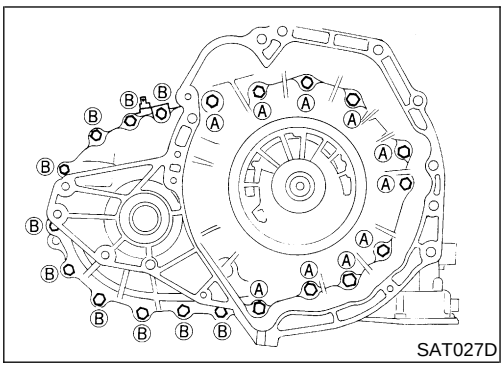
16. Check accumulator pistons and contact surface of transmission case for damage.
17. Check accumulator return springs for damage and free length.

Return springs:

Refer to “RETURN SPRING”, AT-549.

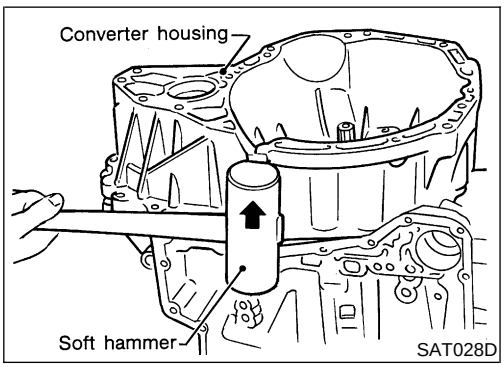


18. Remove lip seals from band servo oil port.

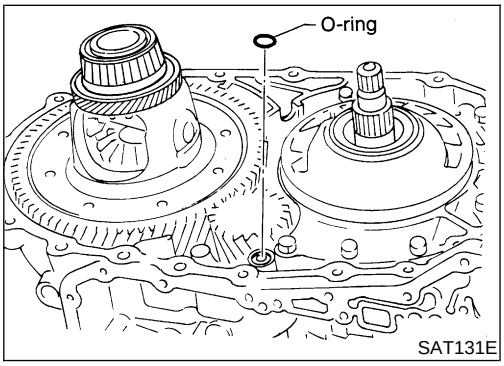


19. Remove converter housing according to the following procedures.

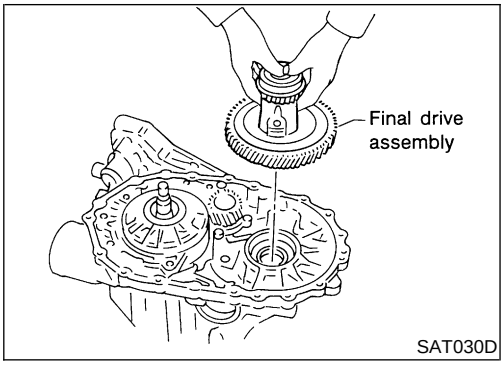
a. Remove converter housing mounting bolts A and B.



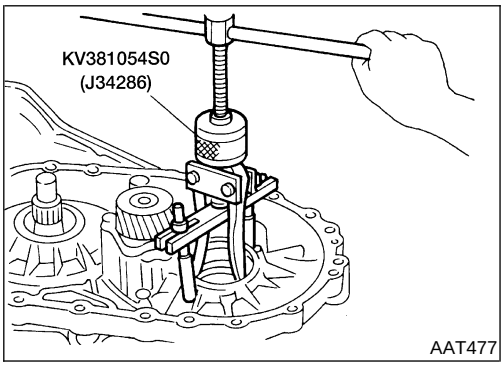
b. Remove converter housing.



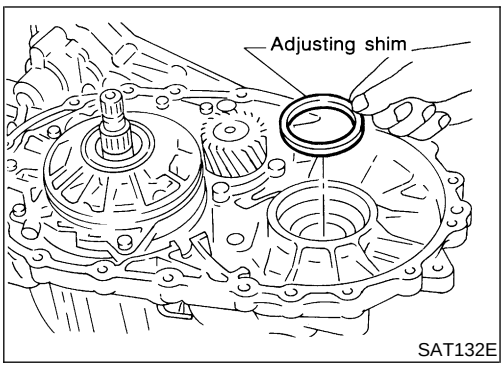
c. Remove O-ring from differential oil port.



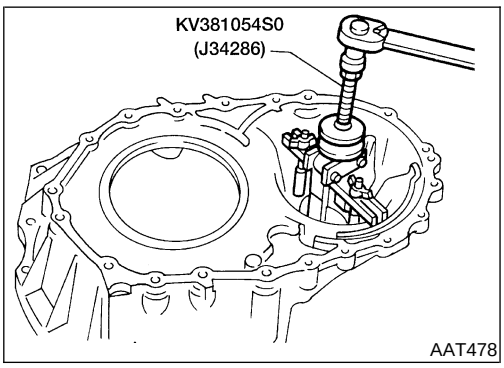
20. Remove final drive assembly from transmission case.



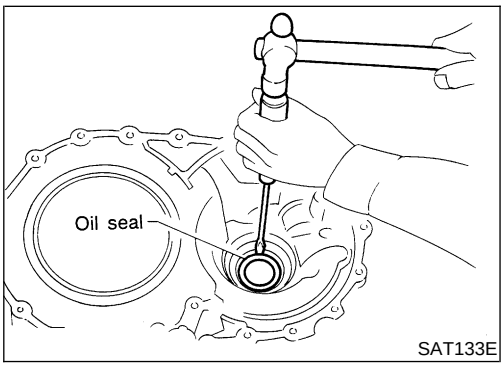
21. Remove differential side bearing outer race from transmission case using Tool.



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

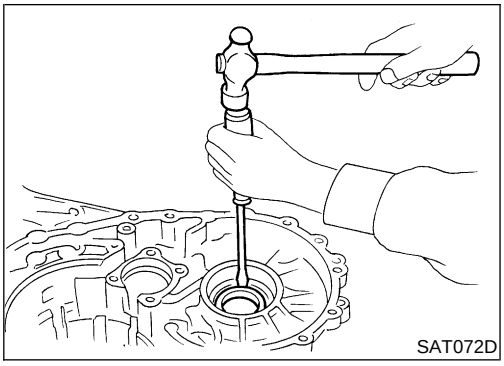


23. Remove differential side bearing outer race from converter housing using Tool.

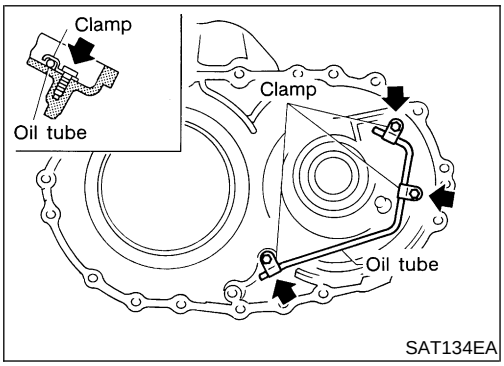


24. Remove oil seal from converter housing using a screwdriver.

- **Be careful not to damage case.**

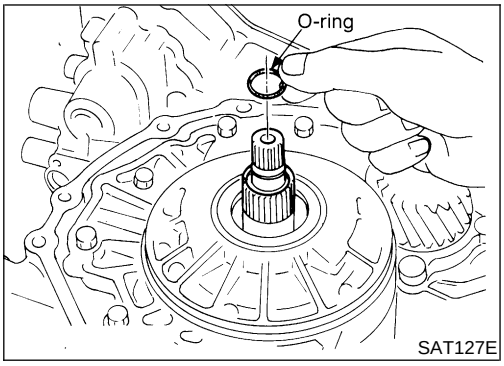

SAT072D

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



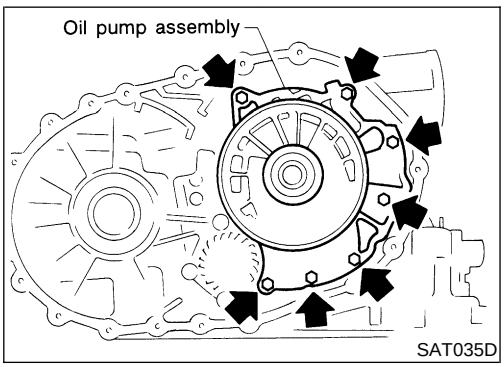
SAT134EA

26. Remove oil tube from converter housing.



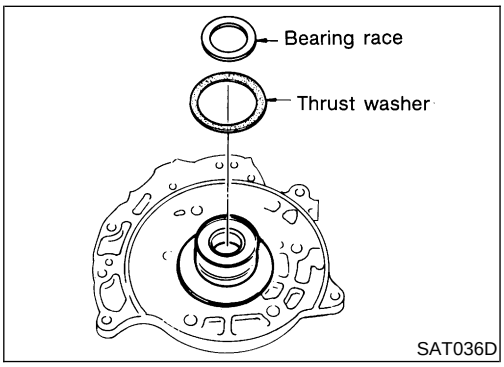
SAT127E

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



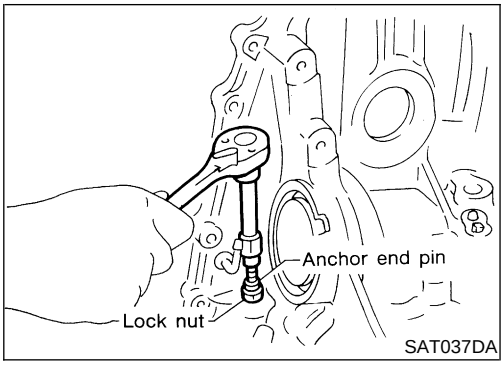
SAT035D

b. Remove oil pump assembly from transmission case.



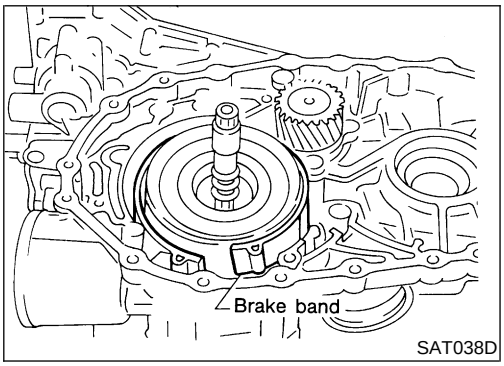
SAT036D

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

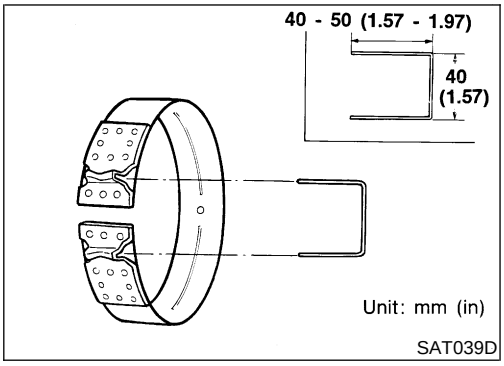


28. Remove brake band according to the following procedures.
a. Loosen lock nut, then back off anchor end pin.

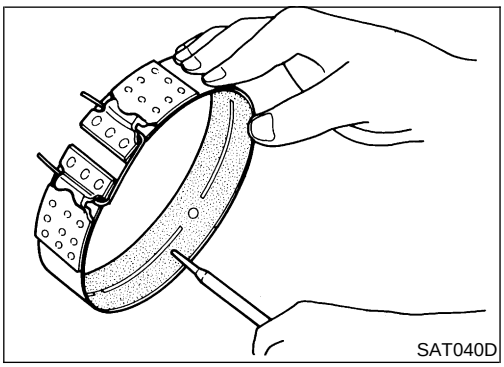
- **Do not reuse anchor end pin.**



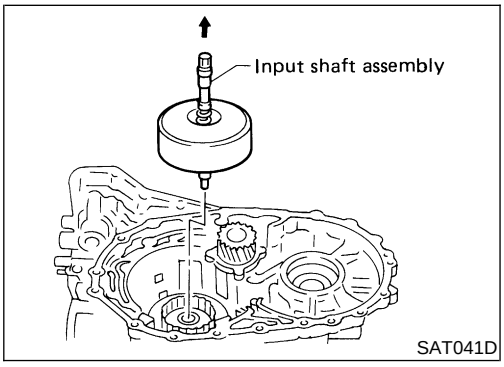
b. Remove brake band from transmission case.



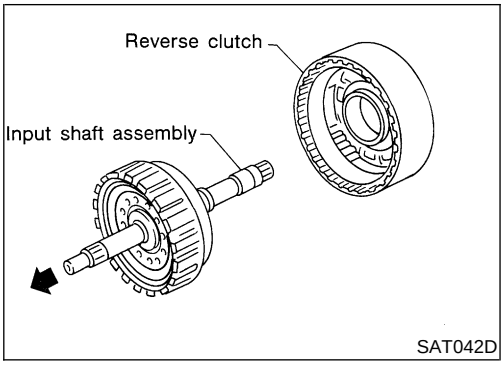
- **To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing the brake band, always secure it with a clip as shown in the figure at left.**
  Leave the clip in position after removing the brake band.



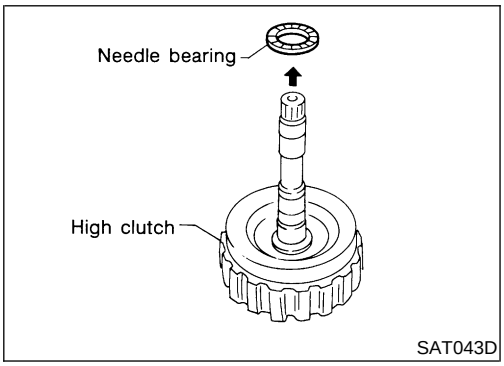
c. Check brake band facing for damage, cracks, wear or burns.



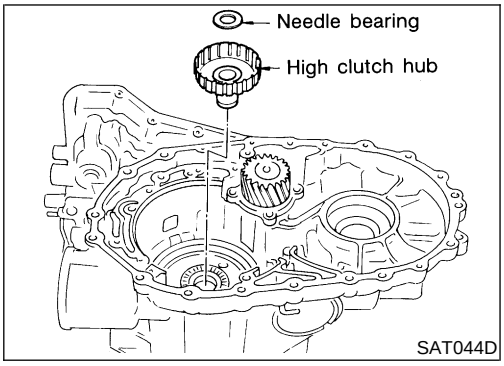
29. Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures.
a. Remove input shaft assembly (high clutch) with reverse clutch.



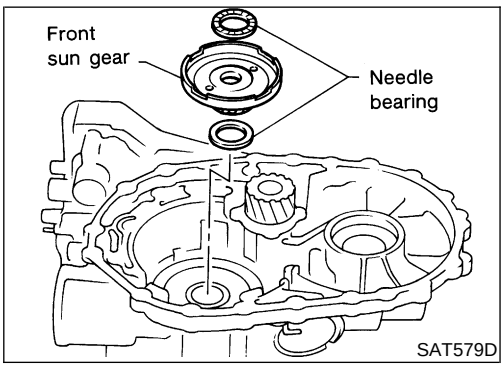
b. Remove input shaft assembly (high clutch) from reverse clutch.



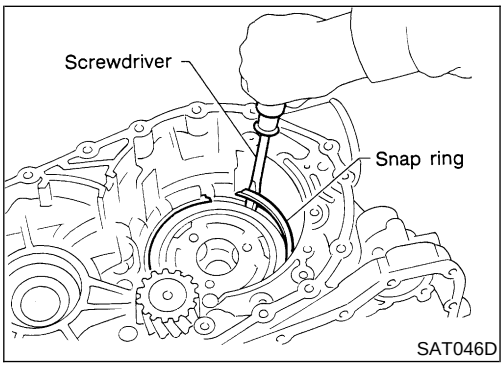
c. Remove needle bearing from high clutch drum.
d. Check input shaft assembly and needle bearing for damage or wear.



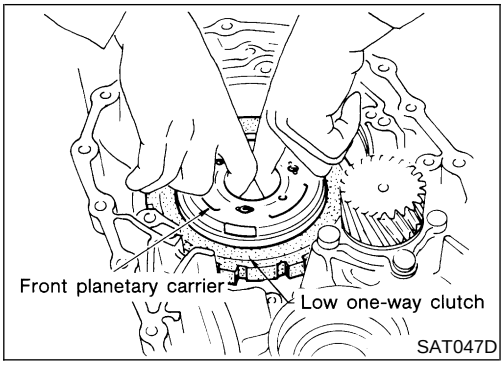
30. Remove high clutch hub and needle bearing from transmission case.
31. Check high clutch hub and needle bearing for damage or wear.



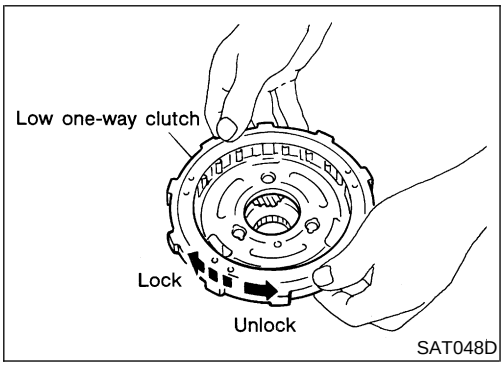
32. Remove front sun gear and needle bearings from transmission case.
33. Check front sun gear and needle bearings for damage or wear.



34. Remove front planetary carrier assembly and low one-way clutch according to the following procedures.
a. Remove snap ring using a screwdriver.

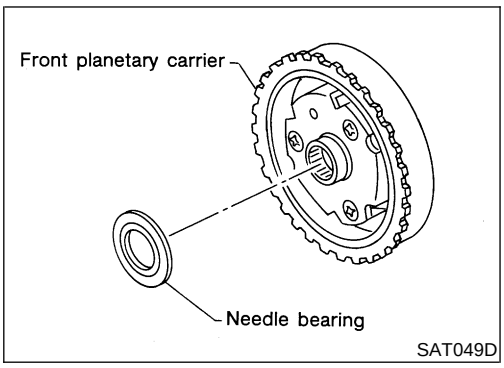


b. Remove front planetary carrier with low one-way clutch.

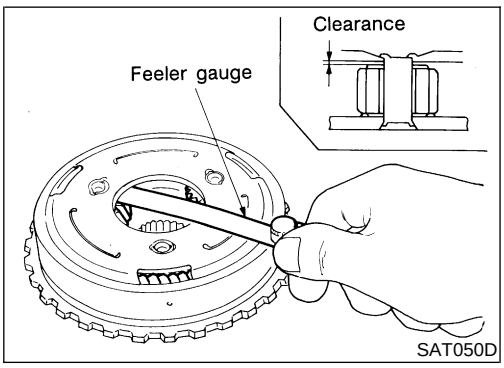


c. Check that low one-way clutch rotates in the direction of the arrow and locks in the opposite direction.

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.

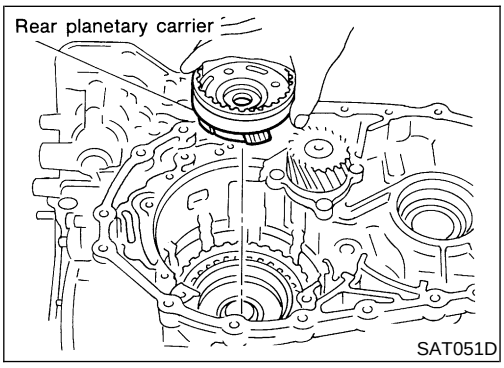
Standard clearance:

0.15 - 0.70 mm (0.0059 - 0.0276 in)

Allowable limit:

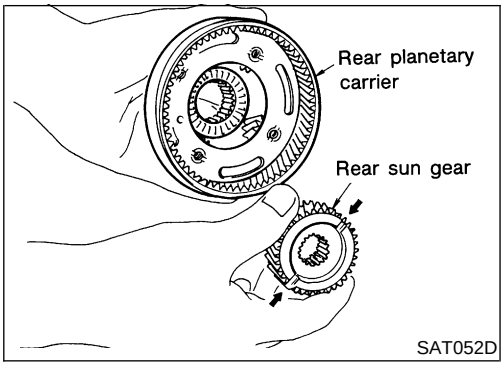
0.80 mm (0.0315 in)

Replace front planetary carrier if the clearance exceeds allowable limit.

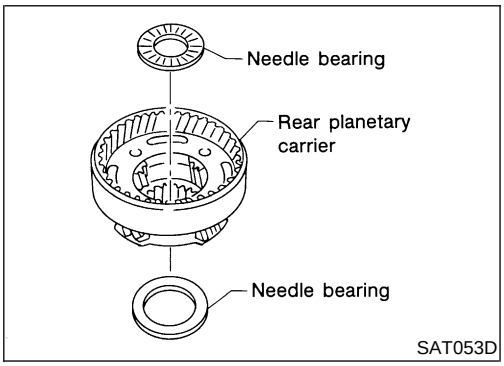


35. Remove rear planetary carrier assembly and rear sun gear according to the following procedures.

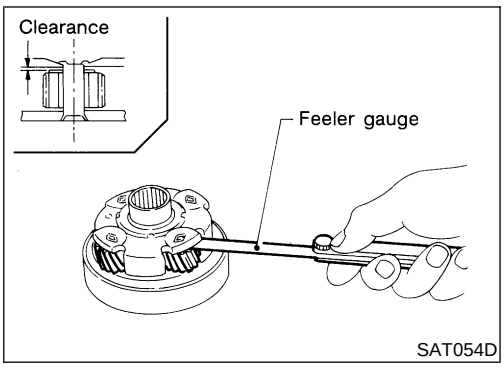
a. Remove rear planetary carrier assembly from transmission case.



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.

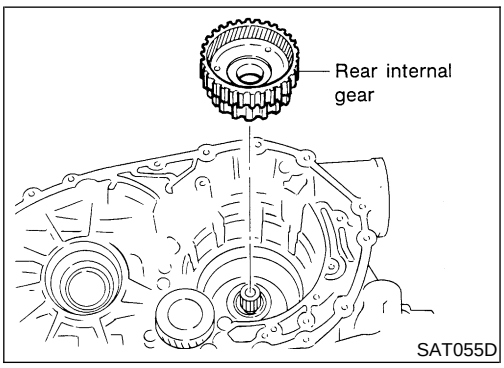
Standard clearance:

0.15 - 0.70 mm (0.0059 - 0.0276 in)

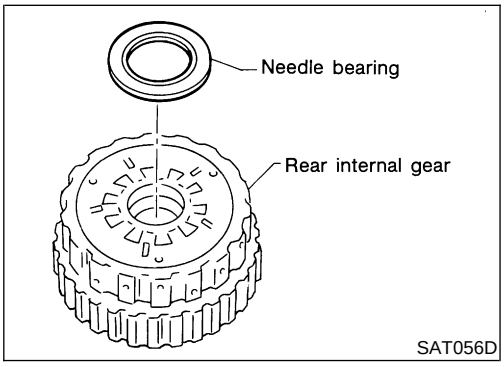
Allowable limit:

0.80 mm (0.0315 in)

Replace rear planetary carrier if the clearance exceeds allowable limit.

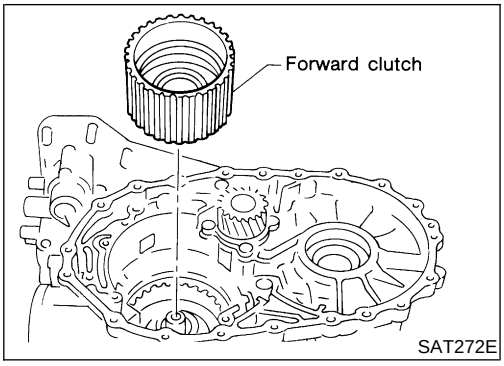


36. Remove rear internal gear from transmission case.

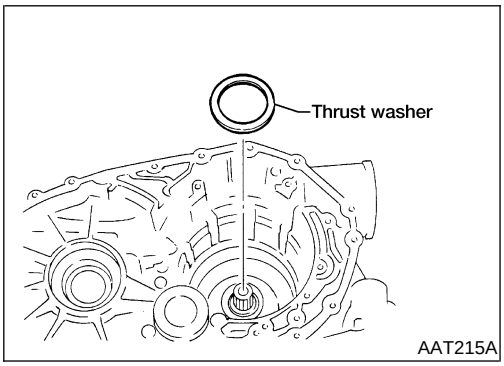


37. Remove needle bearing from rear internal gear.

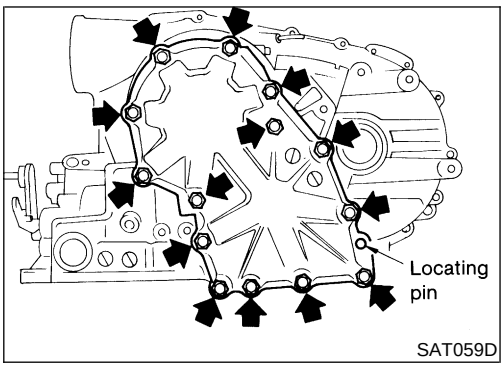
- Check needle bearing for damage or wear.



38. Remove forward clutch assembly from transmission case.

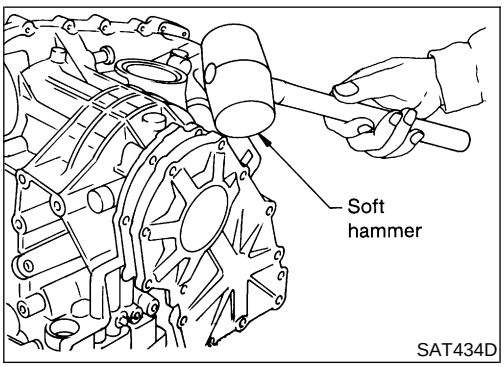


39. Remove thrust washer from transmission case.



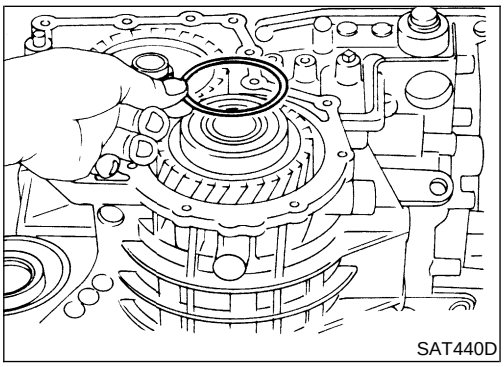
40. Remove output shaft assembly according to the following procedures.

a. Remove side cover bolts.

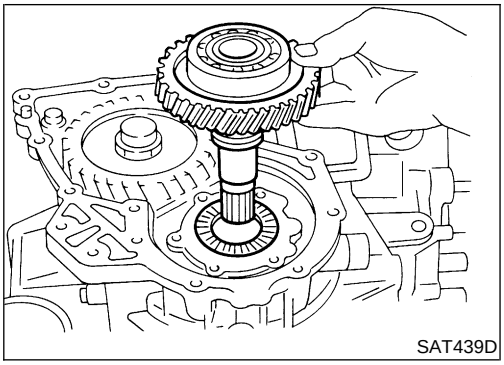


b. Remove side cover by lightly tapping it with a soft hammer.

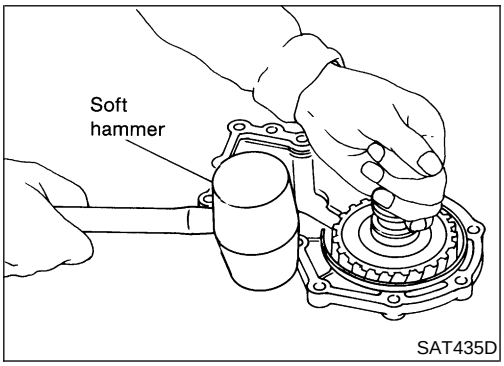
- **Be careful not to drop output shaft assembly. It might come out when removing side cover.**



c. Remove adjusting shim.

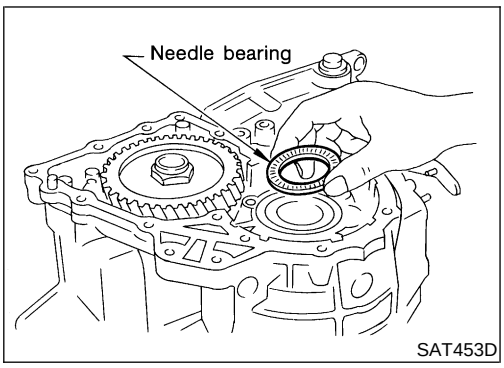

SAT439D

d. Remove output shaft assembly.



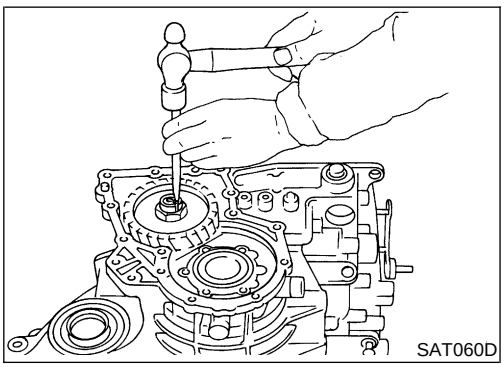
SAT435D

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

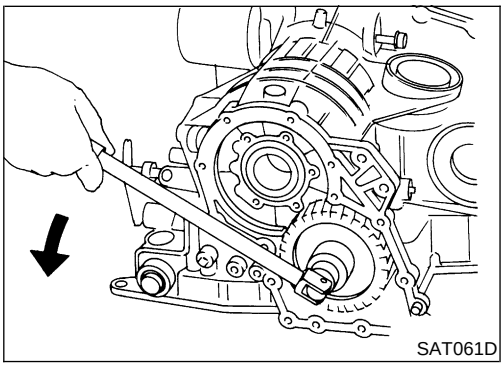


SAT453D

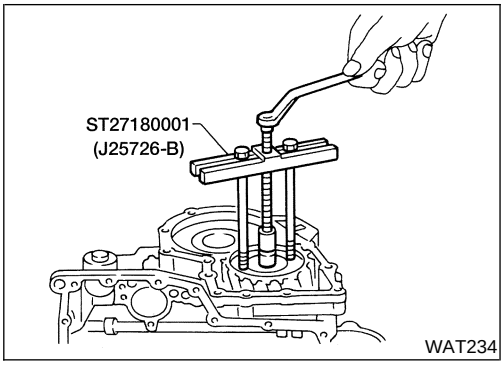
e. Remove needle bearing.


SAT060D

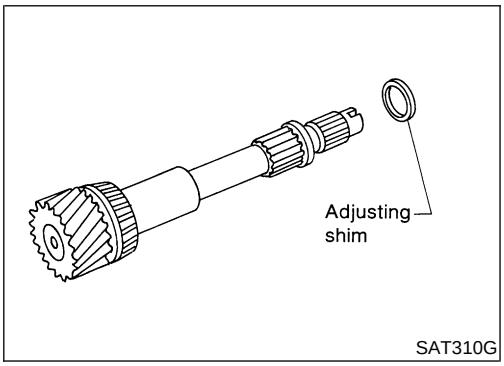
41. Disassemble reduction pinion gear according to the following procedures.
a. Set manual shaft to position “P” to fix idler gear.
b. Unlock idler gear lock nut using a pin punch.


SAT061D

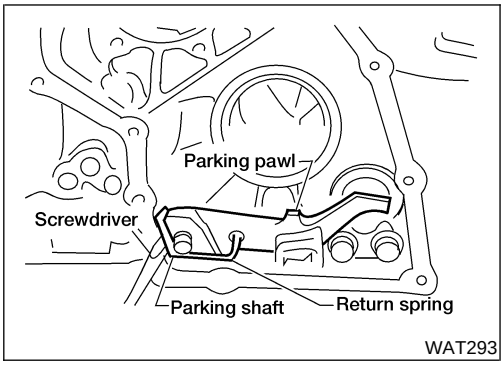
c. Remove idler gear lock nut.
- **Do not reuse idler gear lock nut.**



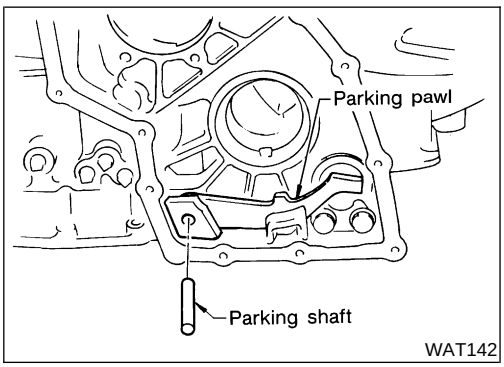
d. Remove idler gear with puller using Tool.



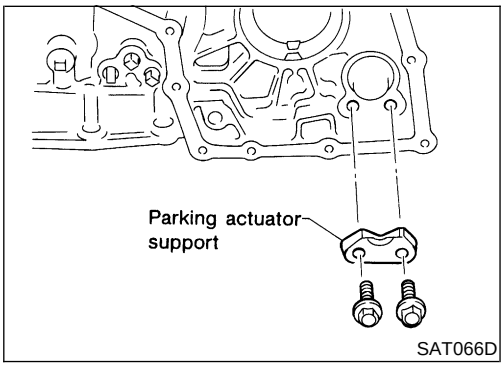
e. Remove reduction pinion gear.
f. Remove adjusting shim from reduction pinion gear.



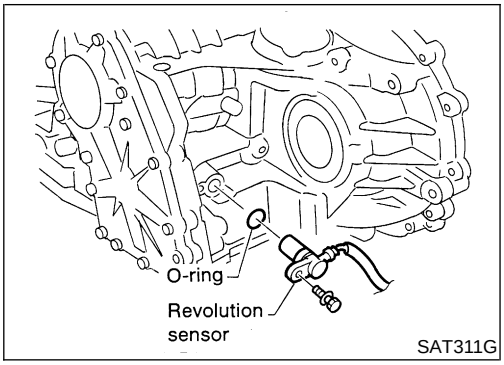
42. Remove return spring from parking shaft using a screwdriver.



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.

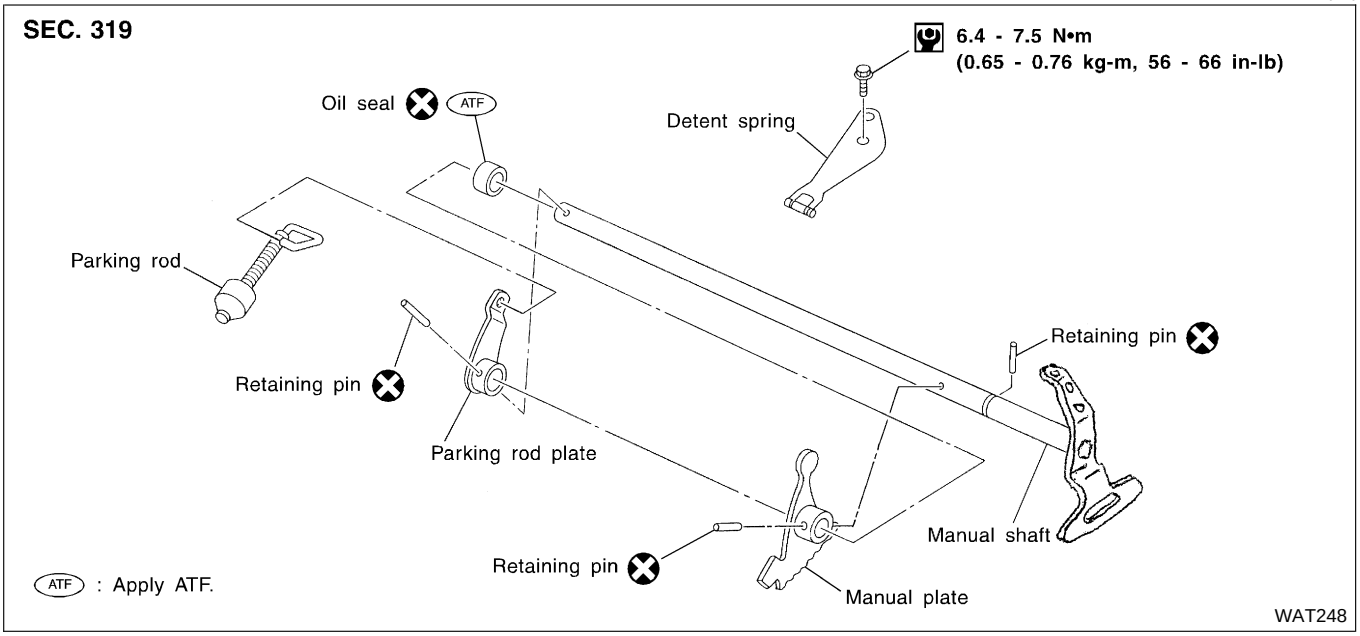


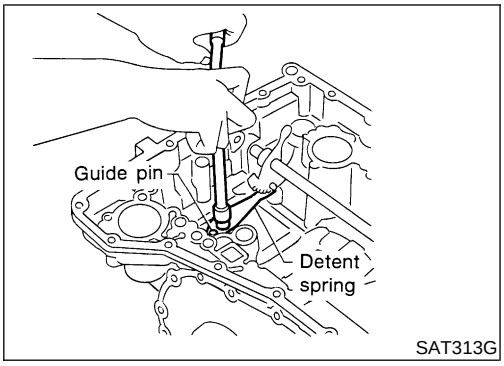
46. Remove revolution sensor from transmission case.

Manual Shaft

COMPONENTS

NIAT0246

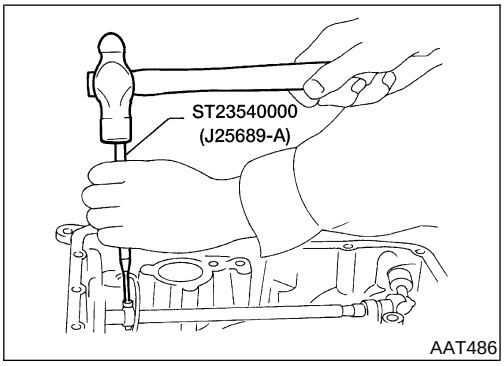




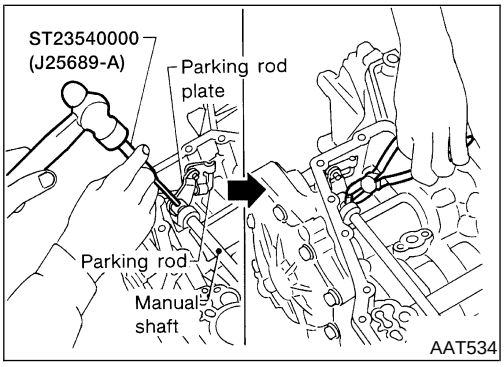
REMOVAL

NIAT0247

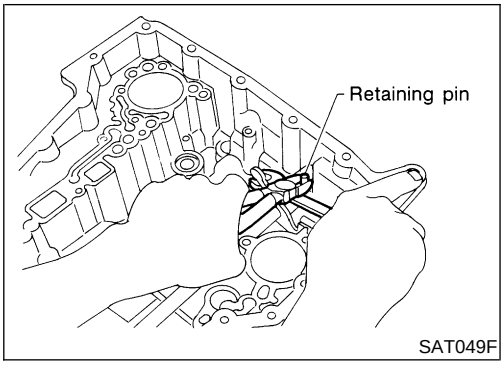
1. Remove detent spring from transmission case.



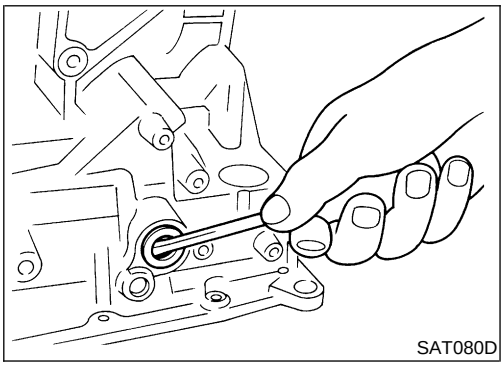
2. Drive out manual plate retaining pin using Tool.



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.

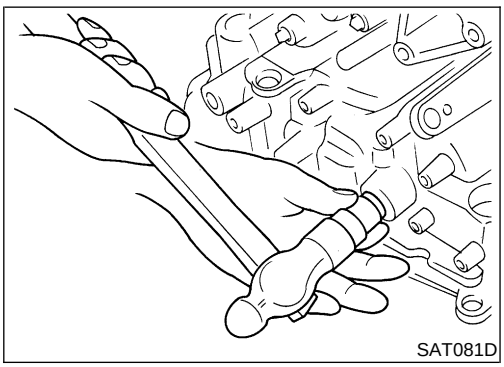


8. Remove manual shaft oil seal.

INSPECTION

NIAT0248

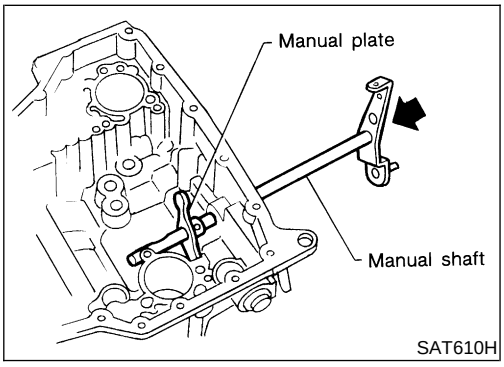
- Check component parts for wear or damage. Replace if necessary.



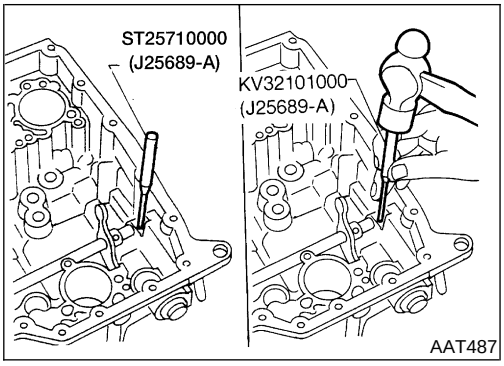
INSTALLATION

NIAT0249

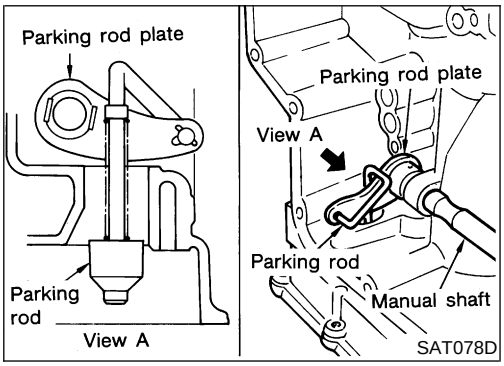
1. Install manual shaft oil seal using a suitable tool.
- **Apply ATF to outer surface of oil seal.**



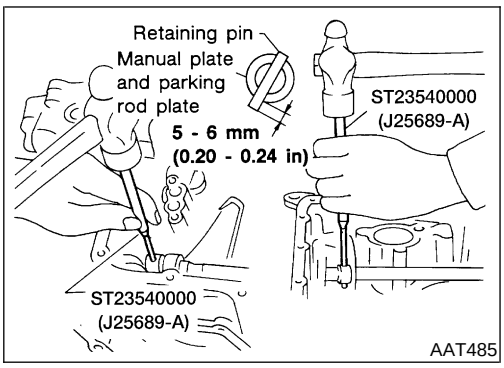
2. Install manual shaft and manual plate.



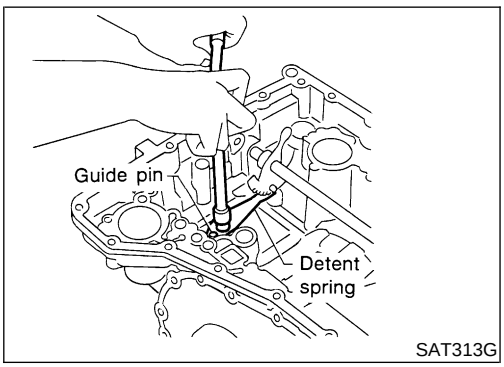
3. Align groove of manual shaft and hole of transmission case.
4. Install manual shaft retaining pin using Tool.



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.

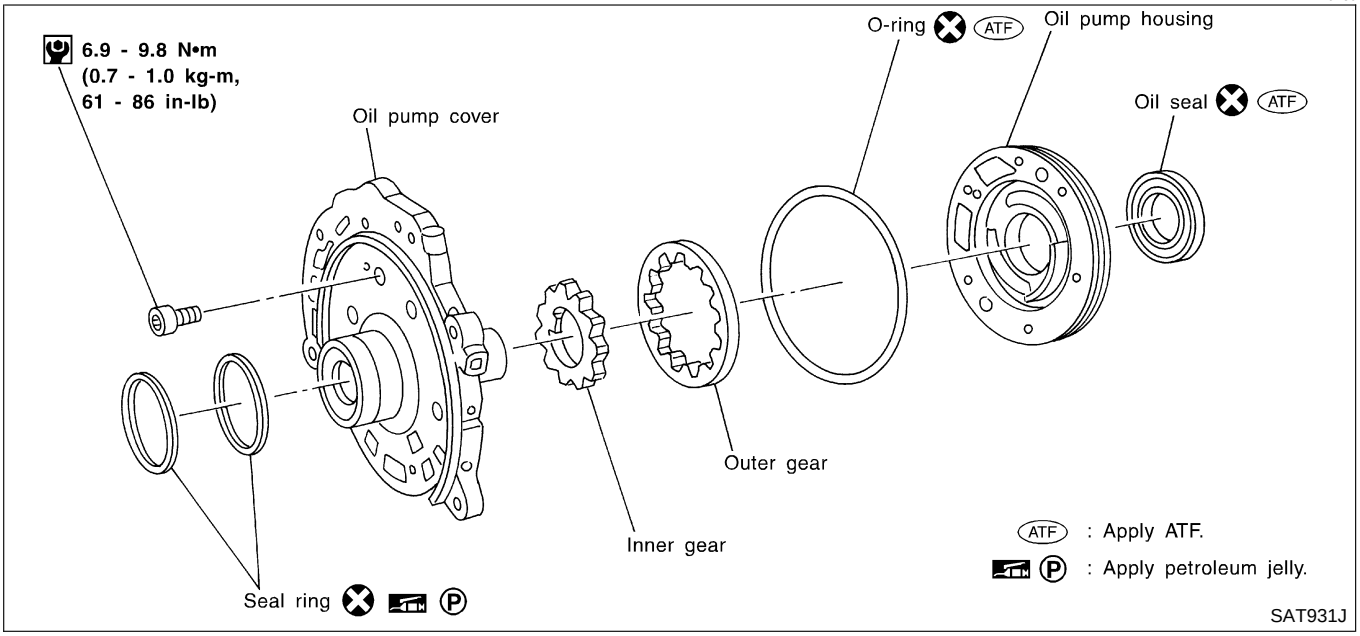


8. Install detent spring.
   : 6.4 - 7.5 N·m (0.65 - 0.76 kg-m, 56.4 - 66.0 in-lb)

Oil Pump

COMPONENTS

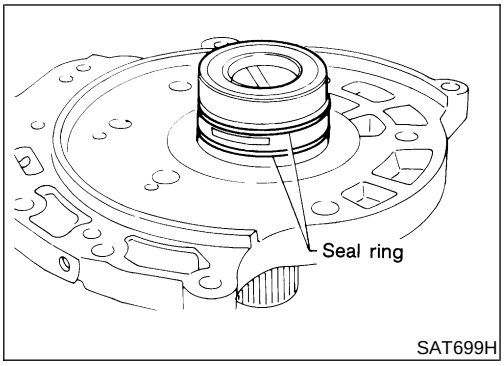
NIAT0250



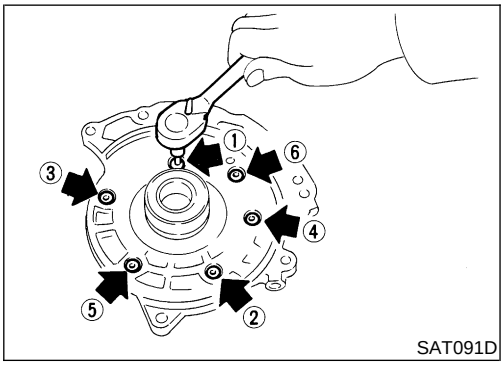
DISASSEMBLY

NIAT0251

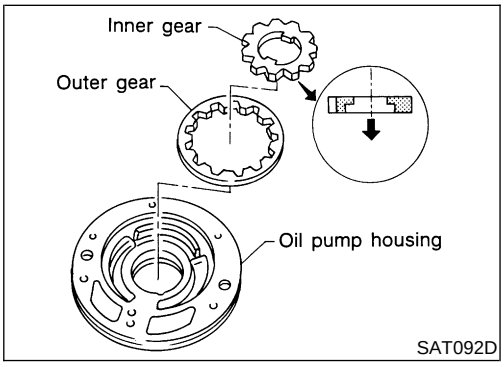
1. Remove seal rings.

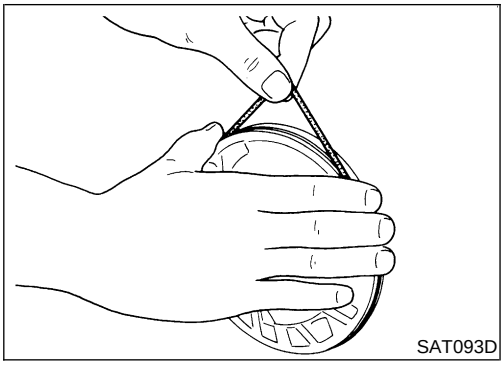


2. Loosen bolts in numerical order and remove oil pump cover.

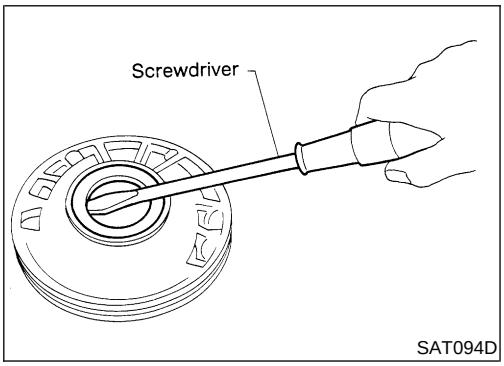


3. Remove inner and outer gear from oil pump housing.




SAT093D

4. Remove O-ring from oil pump housing.



SAT094D

5. Remove oil pump housing oil seal.

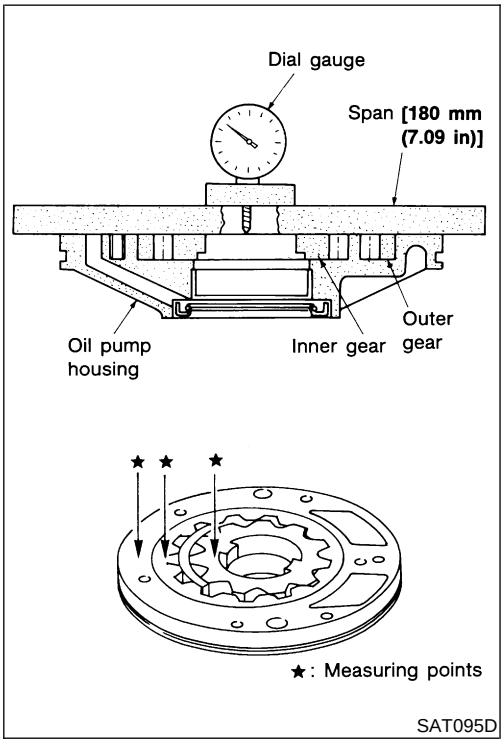
INSPECTION

NIAT0252

Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear

NIAT0252S01

- Check for wear or damage.



SAT095D

Side Clearances

NIAT0252S02

- 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:

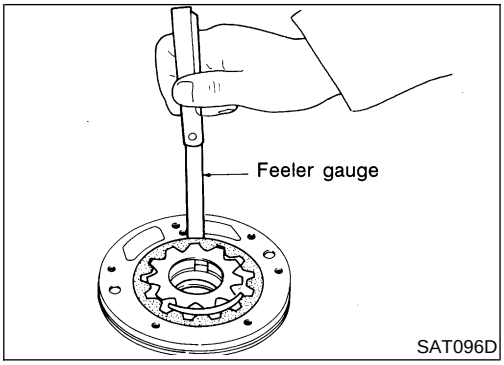
  0.02 - 0.04 mm (0.0008 - 0.0016 in)

- 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 "Oil Pump", AT-544.

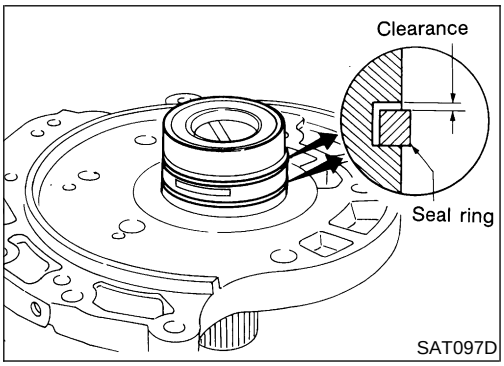
- If clearance is more than standard, replace whole oil pump assembly except oil pump cover.



- 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

NIAT0252S03

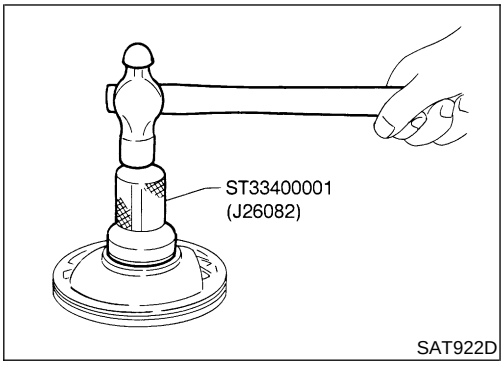


- Install new seal rings onto oil pump cover.
- Measure clearance between seal ring and ring groove.
  Standard clearance:
  0.1 - 0.25 mm (0.0039 - 0.0098 in)
  Allowable limit:
  0.25 mm (0.0098 in)
- If not within allowable limit, replace oil pump cover assembly.

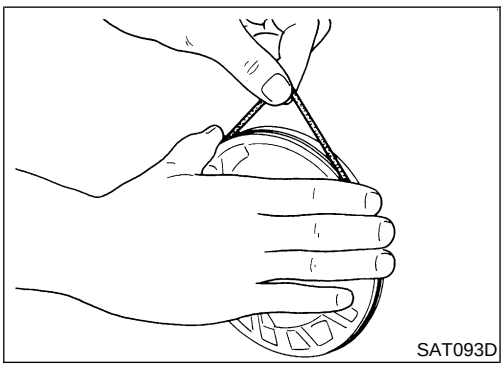
ASSEMBLY

NIAT0253

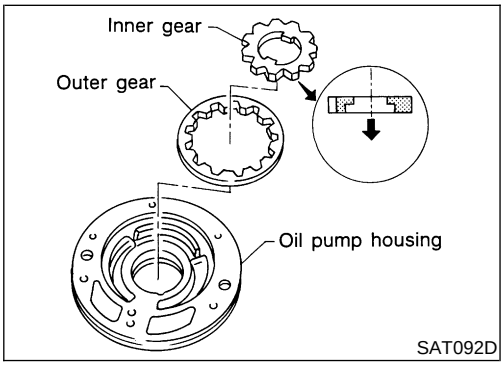
1. Install oil seal on oil pump housing using Tool.

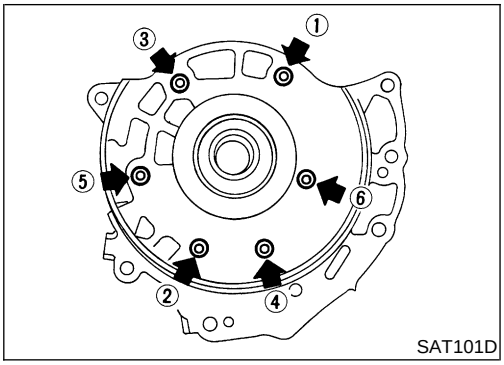


2. Install O-ring on oil pump housing.
- **Apply ATF to O-ring.**



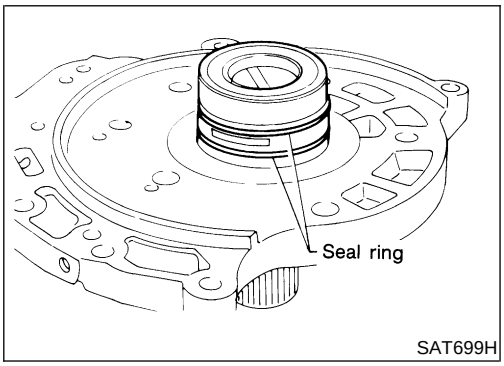
3. Install inner and outer gears on oil pump housing.
- **Take care with the direction of the inner gear.**





SAT101D

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



SAT699H

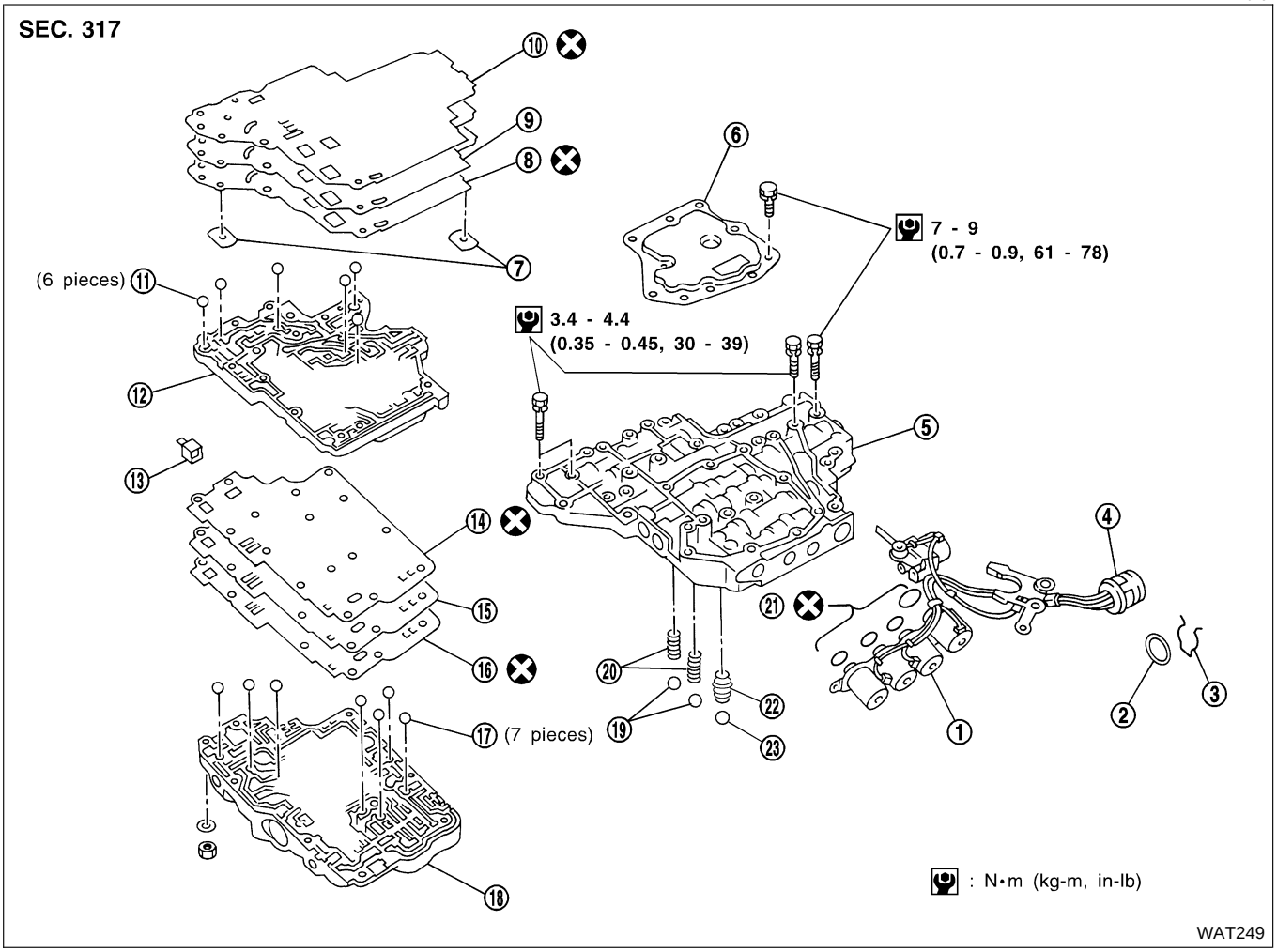
5. Install new seal rings carefully after packing ring groove with petroleum jelly.

- **Do not spread gap of seal ring excessively while installing. It may deform the ring.**

Control Valve Assembly

COMPONENTS

=NIAT0254



1. Solenoid valve assembly
2. O-ring
3. Clip
4. Terminal cord assembly
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

DISASSEMBLY

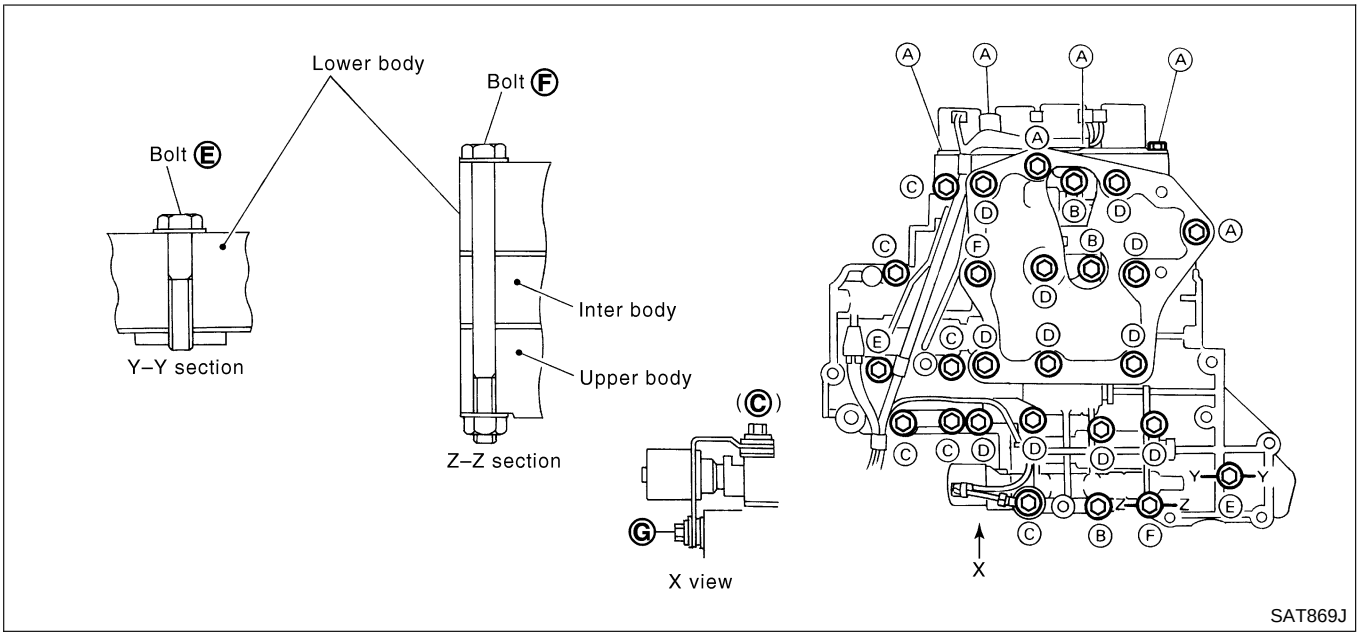
=NIAT0255

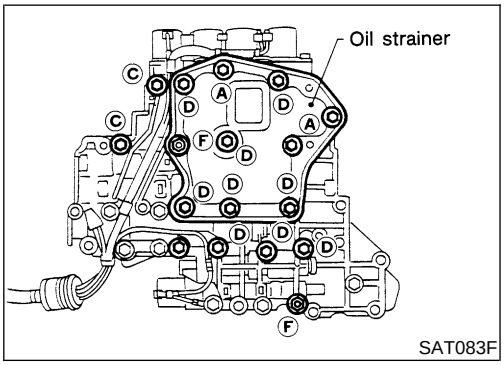
- Disassemble upper, inter and lower bodies.

Bolt length, number and location:

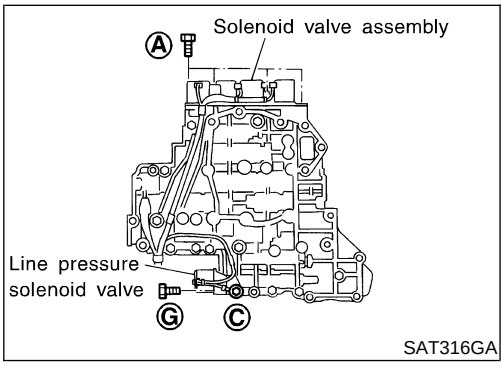
Bolt symbol	A	B	C	D	E	F	G
Bolt length "ℓ"	13.5 mm (0.531 in)	58.0 mm (2.283 in)	40.0 mm (1.575 in)	66.0 mm (2.598 in)	33.0 mm (1.299 in)	78.0 mm (3.071 in)	18.0 mm (0.709 in)
Number of bolts	6	3	6	11	2	2	1

F: Reamer bolt with nut



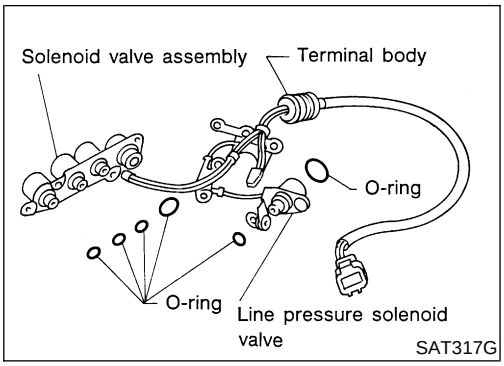


1. Remove bolts A, D and F, and remove oil strainer from control valve assembly.

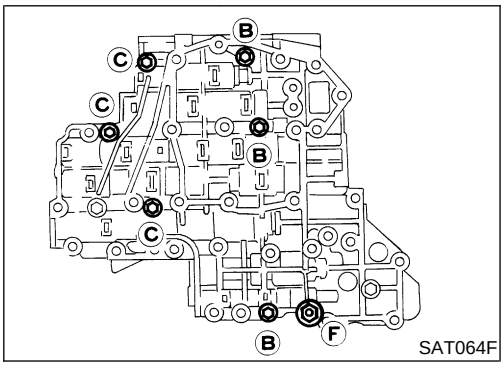


2. Remove solenoid valve assembly and line pressure solenoid valve from control valve assembly.

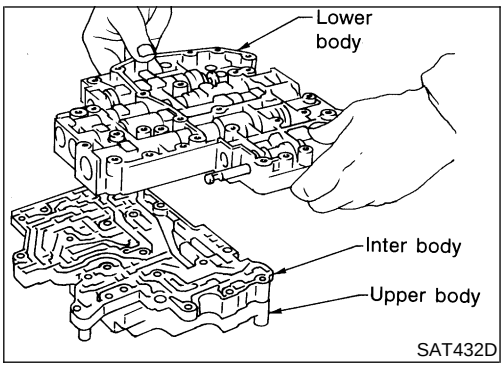
- **Be careful not to lose the line pressure solenoid valve spring.**



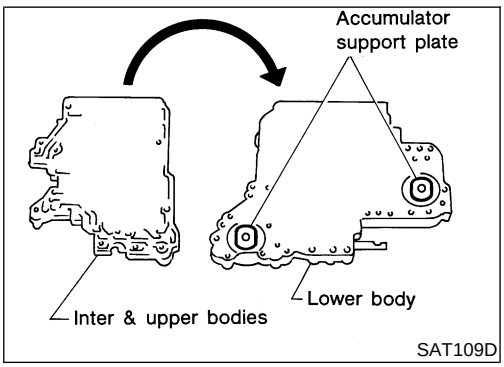
3. Remove O-rings from solenoid valves and terminal body.



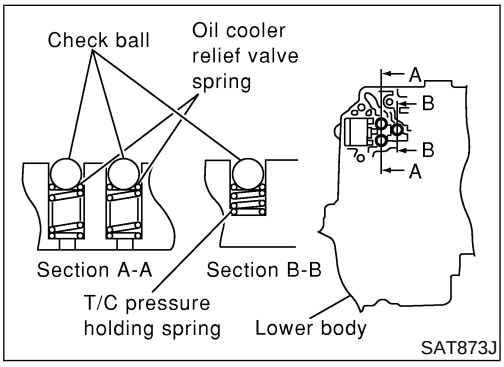
4. Place upper body face down, and remove bolts B, C and F.



5. Remove lower body from inter body.

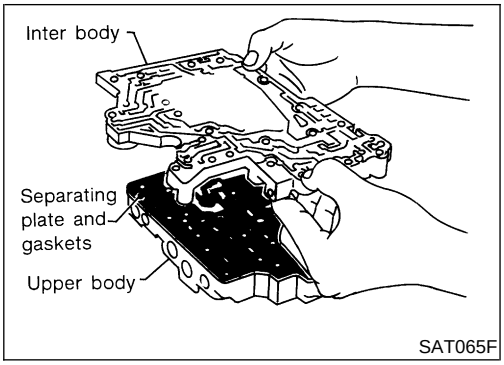


6. Turn over lower body, and accumulator support plates.



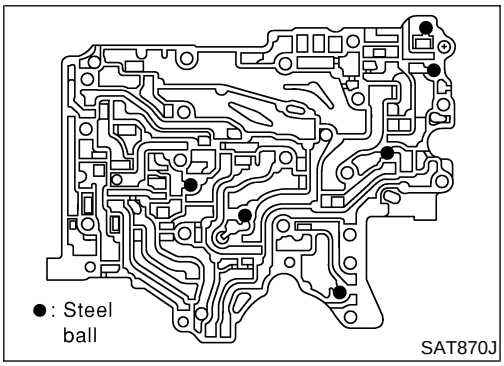
7. Remove bolts E, separating plate and separating gaskets from lower body.
8. Remove check balls, oil cooler relief valve springs and T/C pressure holding spring from lower body.

- **Be careful not to lose steel balls and relief valve springs.**



SAT065F

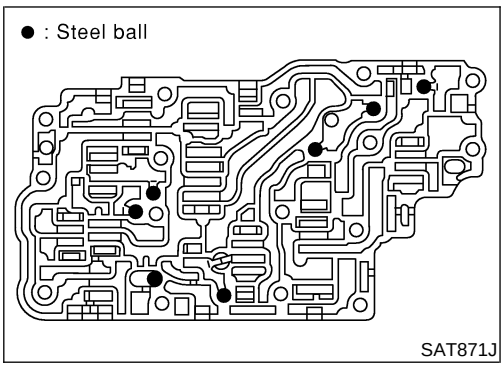
9. Remove inter body from upper body.
10. Remove pilot filter, separating plate and gaskets from upper body.



SAT870J

11. Check to see that steel balls are properly positioned in inter body and then remove them.

- **Be careful not to lose steel balls.**



SAT871J

12. Check to see that steel balls are properly positioned in upper body and then remove them.

- **Be careful not to lose steel balls.**

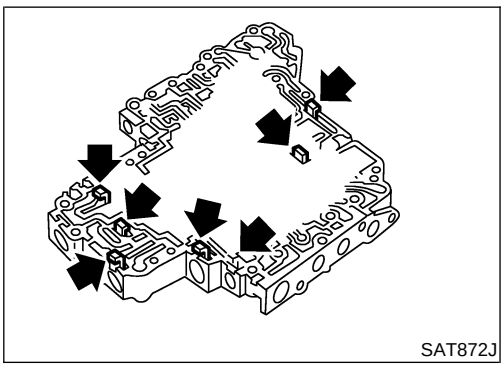
INSPECTION

NIAT0256

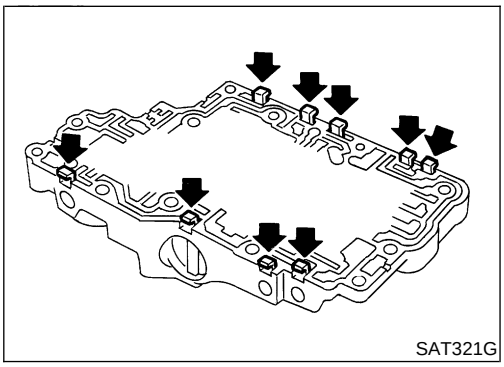
Lower and Upper Bodies

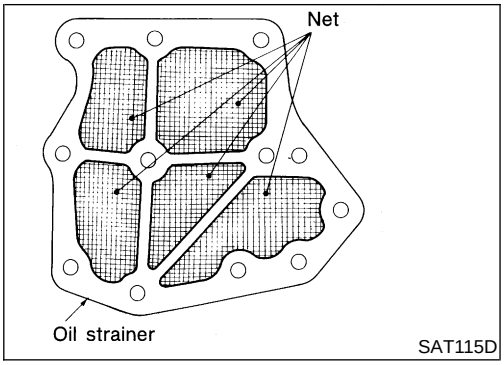
NIAT0256S01

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


SAT872J

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

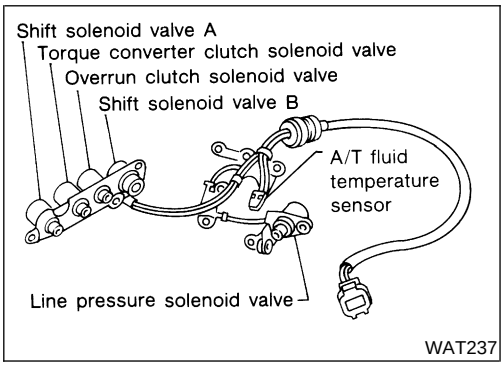

SAT321G



Oil Strainer

NIAT0256S02

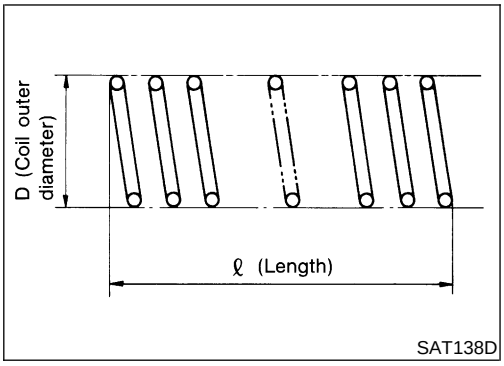
- Check wire netting of oil strainer for damage.



Shift Solenoid Valves A and B, Line Pressure Solenoid valve, Torque Converter Clutch Solenoid Valve and Overrun Clutch Solenoid Valve

NIAT0256S03

- Refer to "Resistance Check", AT-322, 326 and 362.



Oil Cooler Relief Valve Spring

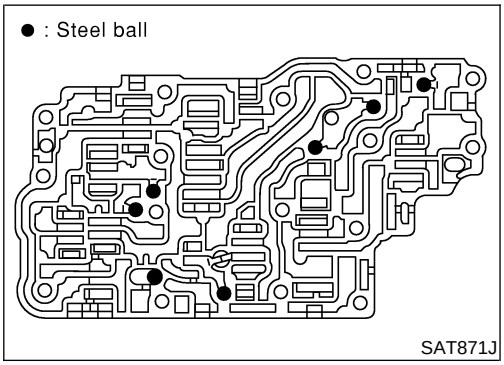
NIAT0256S04

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

Inspection standard:

Unit: mm (in)

Part No.	ℓ	D
31872 31X00	17.0 (0.669)	8.0 (0.315)

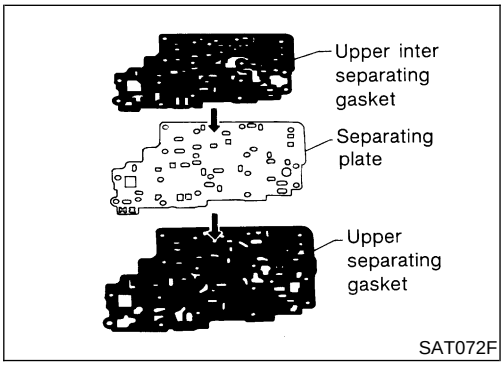


ASSEMBLY

NIAT0257

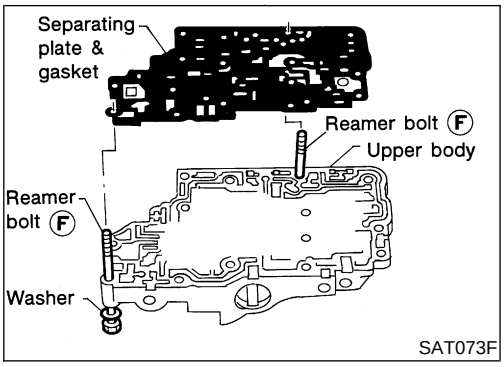
1. Install upper, inter and lower body.

a. Place oil circuit of upper body face up. Install steel balls in their proper positions.

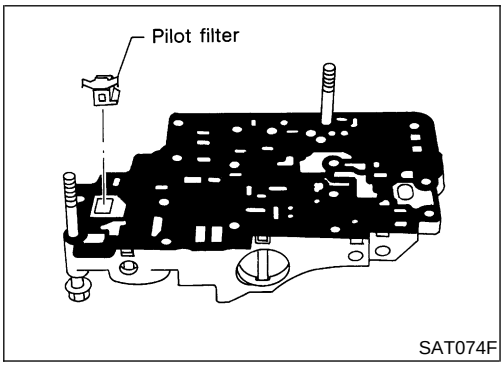


b. Install upper separating gasket, upper inter separating gasket and upper separating plate in order shown in illustration.

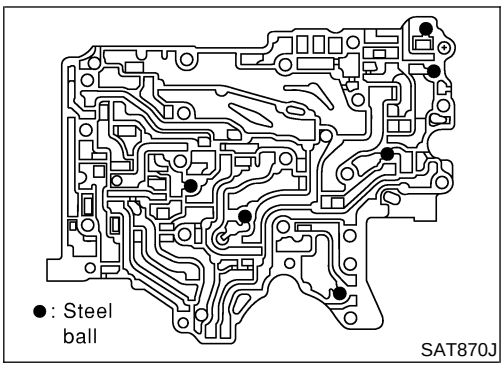
- **Always use new gaskets.**



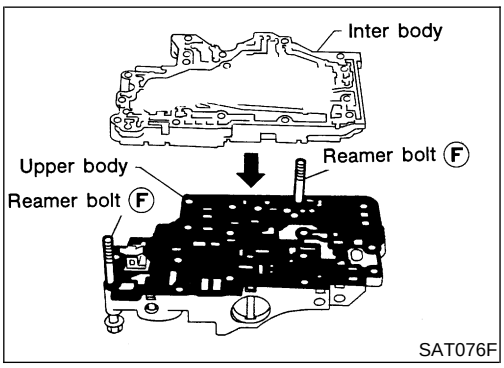
c. Install reamer bolts **F** from bottom of upper body. Using reamer bolts as guides, install separating plate and gaskets as a set.



d. Install pilot filter.

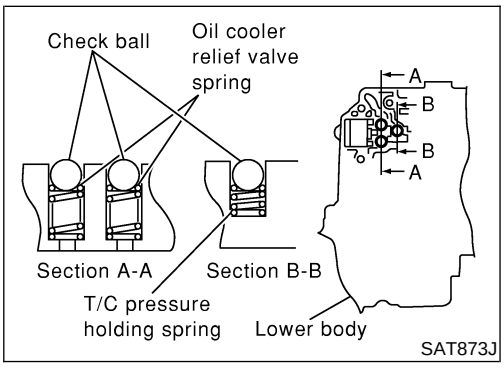


e. Place inter body as shown in the illustration. Install steel balls in their proper positions.

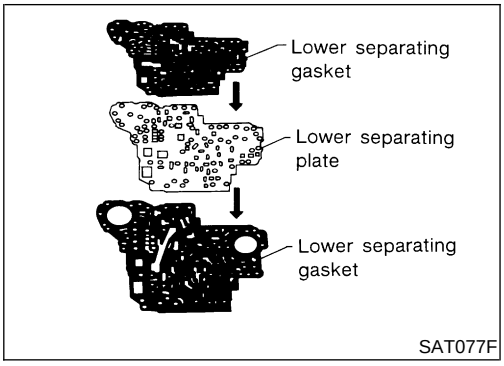


f. Install inter body on upper body using reamer bolts **F** as guides.

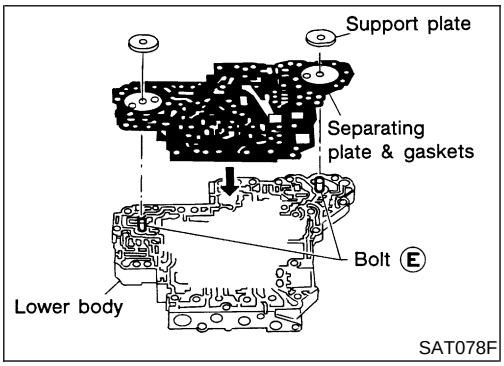
- **Be careful not to dislocate or drop steel balls.**



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

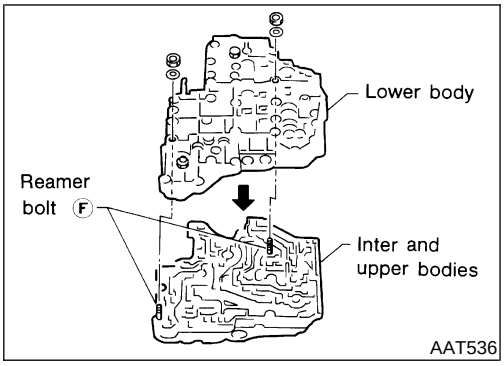


h. Install lower separating gasket, inter separating gasket and lower separating plate in order shown in the illustration.

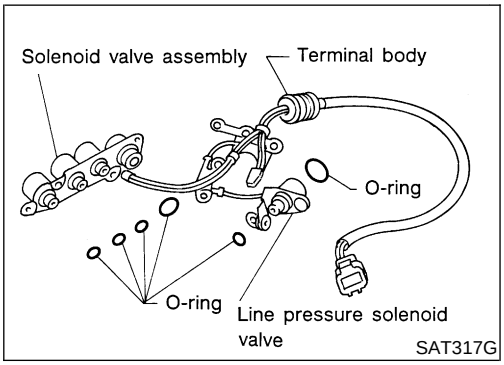


i. Install bolts **E** from bottom of lower body. Using bolts **E** as guides, install separating plate and gaskets as a set.

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.

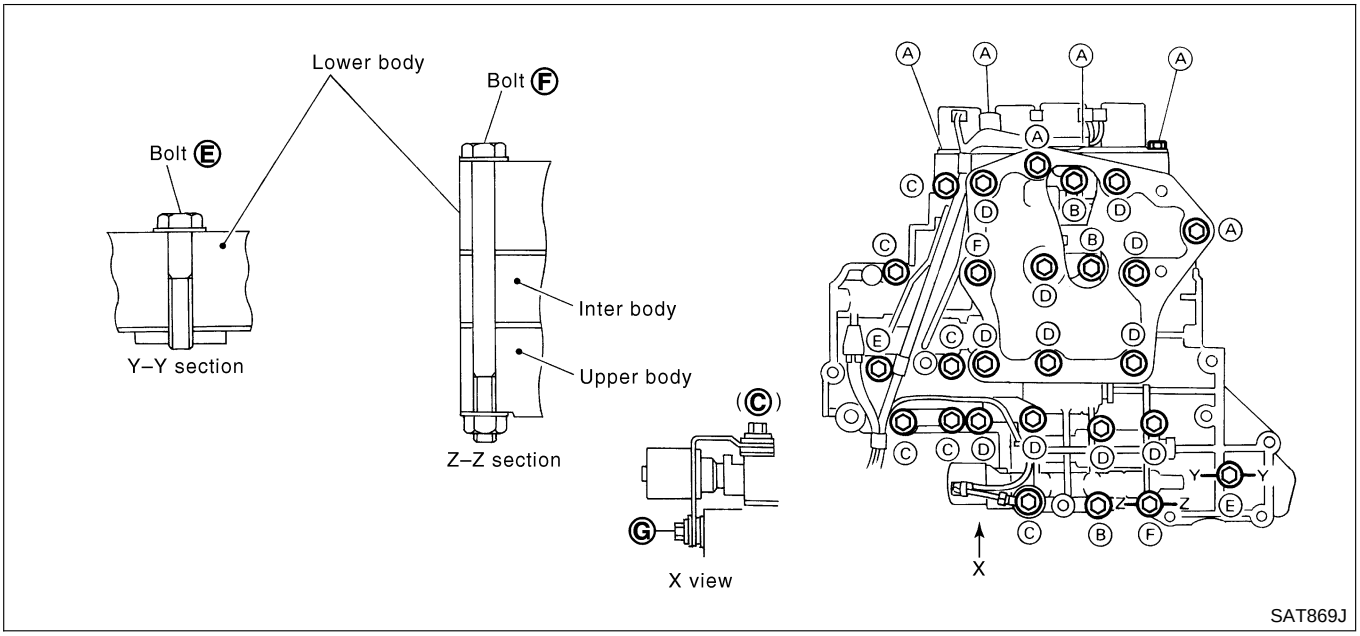
- **Apply ATF to O-rings.**

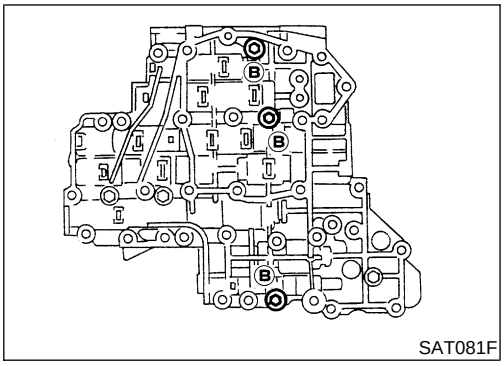
3. Install and tighten bolts.

Bolt length, number and location:

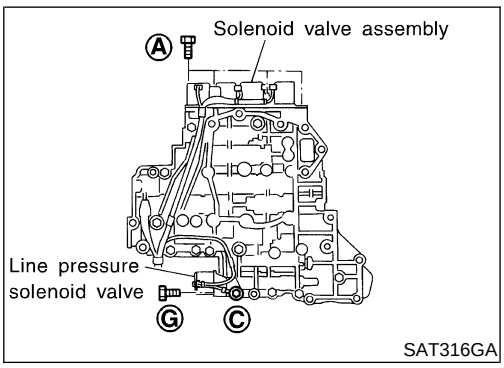
Bolt symbol	A	B	C	D	E	F	G
Bolt length "ℓ"	13.5 mm (0.531 in)	58.0 mm (2.283 in)	44.0 mm (1.732 in)	66.0 mm (2.598 in)	33.0 mm (1.299 in)	78.0 mm (3.071 in)	18.0 mm (0.709 in)
Number of bolts	6	3	6	11	2	2	1

F: Reamer bolt with nut

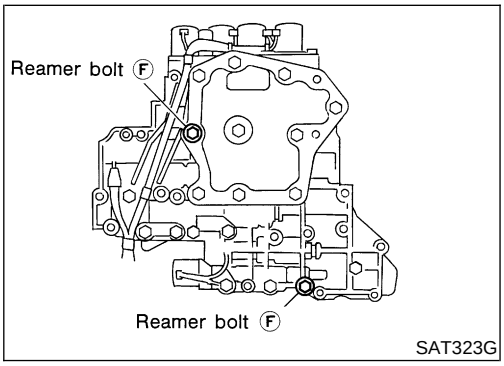




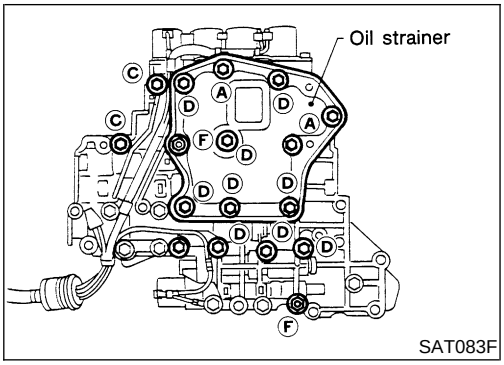
a. Install and tighten bolts **B** to specified torque.
: 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



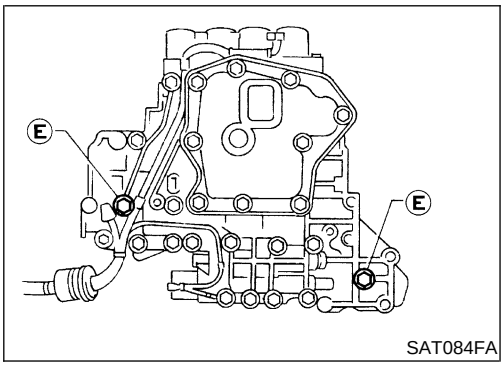
b. Install solenoid valve assembly and line pressure solenoid valve to lower body.



c. Remove reamer bolts **F** and set oil strainer on control valve assembly.
d. Reinstall reamer bolts **F** from lower body side.



e. Tighten bolts **A**, **C**, **D** and **F** to specified torque.
: 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



f. Tighten bolts **E** to specified torque.
: 3.4 - 4.4 N·m (0.35 - 0.45 kg-m, 30.4 - 39.1 in-lb)

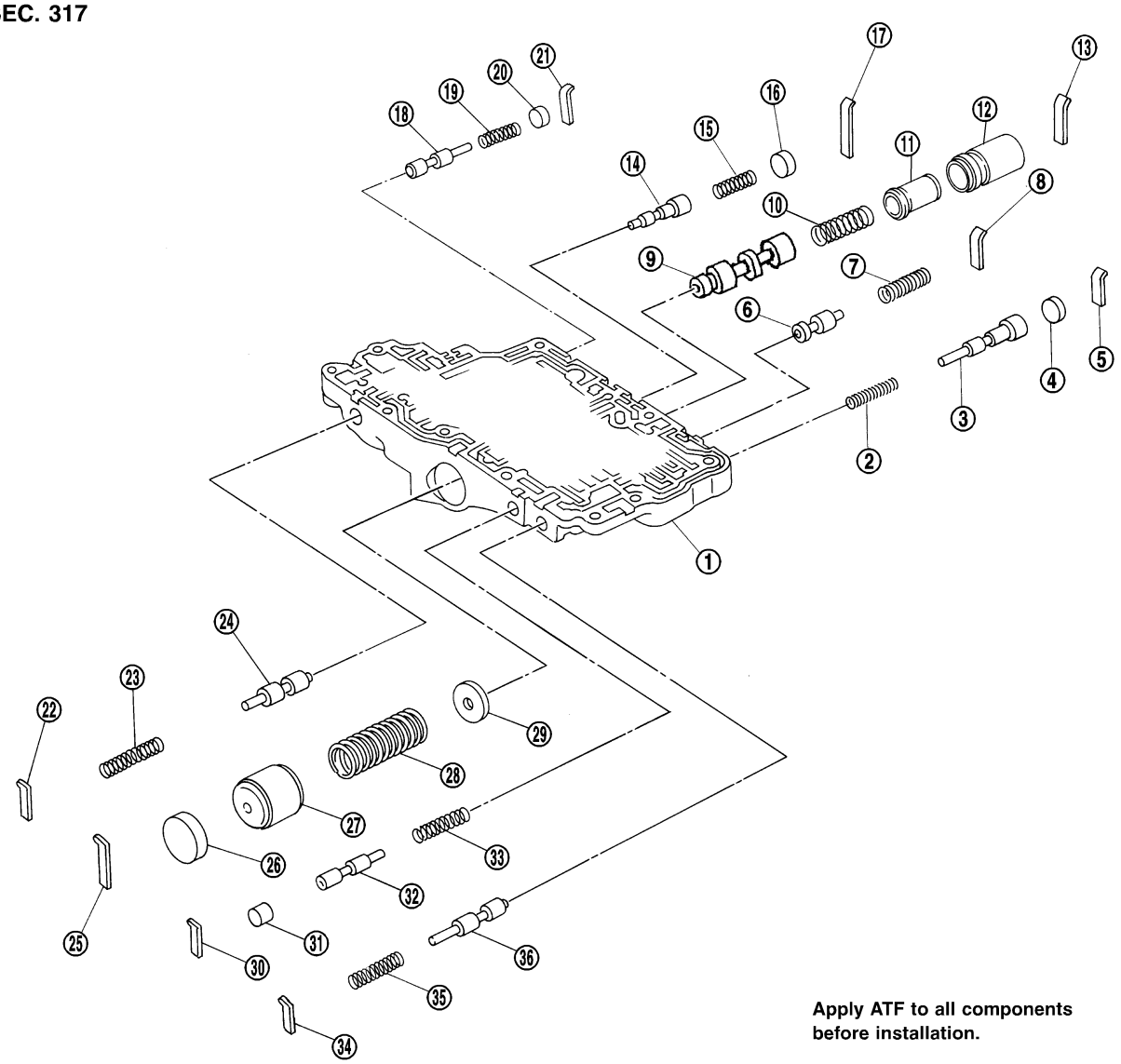
Control Valve Upper Body

COMPONENTS

=NIAT0258

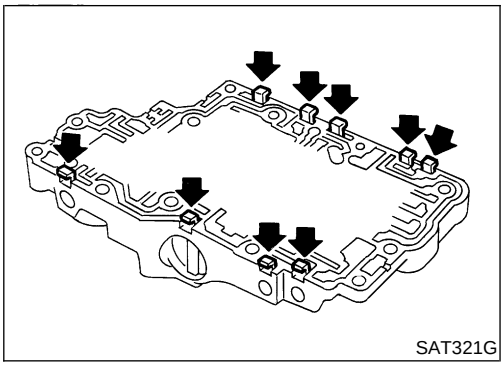
Numbers preceding valve springs correspond with those shown in “CONTROL VALVE AND PLUG RETURN SPRINGS” table on page AT-542.

SEC. 317



WAT250

1. Control valve upper body
2. Overrun clutch reducing valve spring
3. Overrun clutch reducing valve
4. Plug
5. Retainer plate
6. Torque converter relief valve
7. Torque converter relief valve spring
8. Retainer plate
9. Torque converter clutch control valve
10. Return spring
11. Plug
12. Sleeve
13. Retainer plate
14. 1-2 accumulator valve
15. 1-2 accumulator valve spring
16. Plug
17. Retainer plate
18. Cooler check valve
19. Cooler check valve spring
20. Plug
21. Retainer plate
22. Retainer plate
23. Pilot valve spring
24. Pilot valve
25. Retainer plate
26. Plug
27. 1-2 accumulator piston
28. 1-2 accumulator piston spring
29. 1-2 accumulator retainer plate
30. Retainer plate
31. Plug
32. 1st reducing valve
33. 1st reducing valve spring
34. Retainer plate
35. Return spring
36. 3-2 timing valve spring

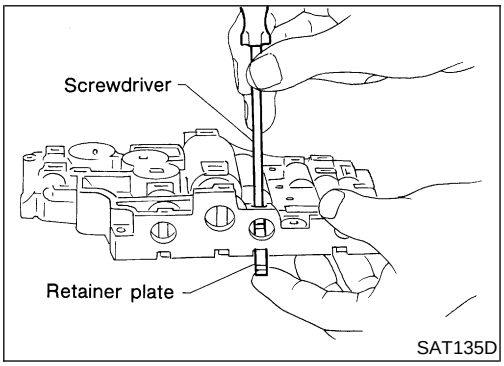

SAT321G

DISASSEMBLY

NIAT0259

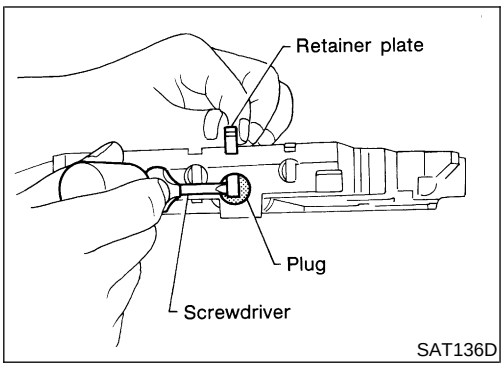
1. Remove valves at retainer plates.

- **Do not use a magnetic "hand".**



SAT135D

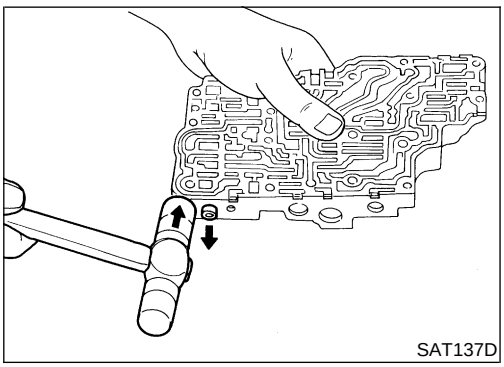
a. Use a screwdriver to remove retainer plates.



SAT136D

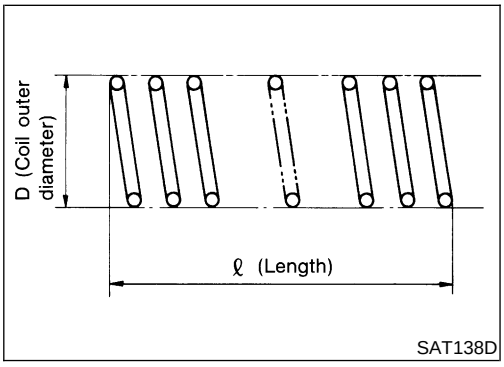
b. Remove retainer plates while holding spring, plugs or sleeves.

- **Remove plugs slowly to prevent internal parts from jumping out.**


SAT137D

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.**



SAT138D

INSPECTION

NIAT0260

Valve Spring

NIAT0260S01

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

  Inspection standard:

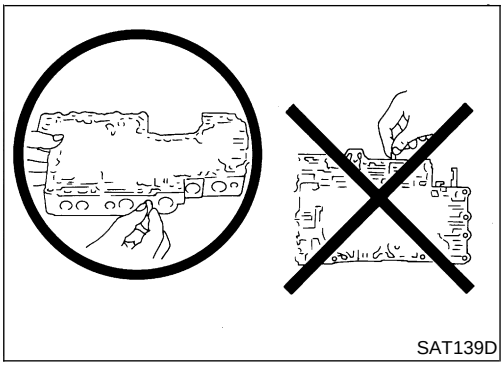
  Refer to "CONTROL VALVE AND PLUG RETURN SPRINGS", AT-542.

- Replace valve springs if deformed or fatigued.

Control Valves

NIAT0260S02

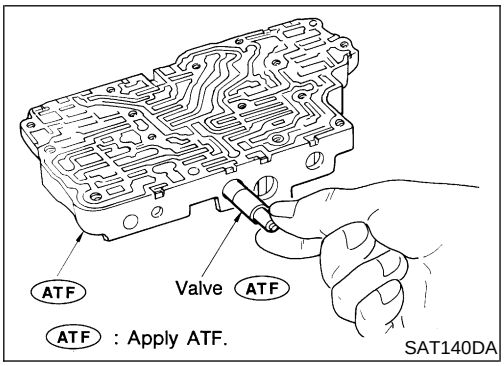
- Check sliding surfaces of valves, sleeves and plugs.


SAT139D

ASSEMBLY

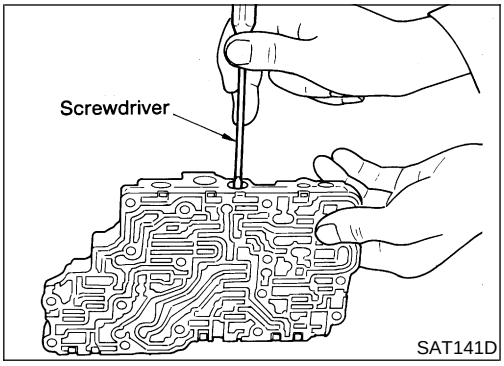
NIAT0261

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



SAT140DA

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.**



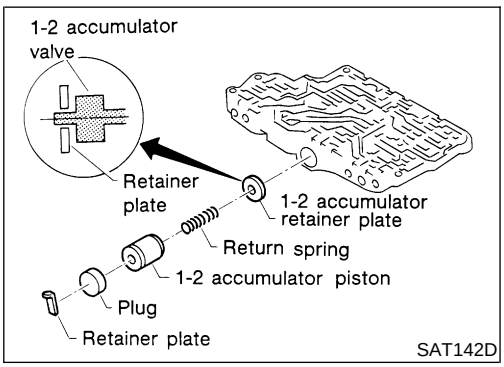
SAT141D

- Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.

1-2 Accumulator Valve

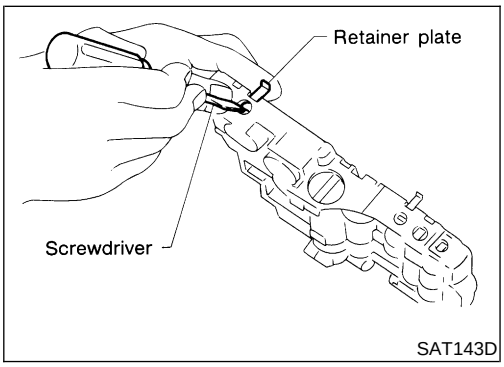
NIAT0261S01

- 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.

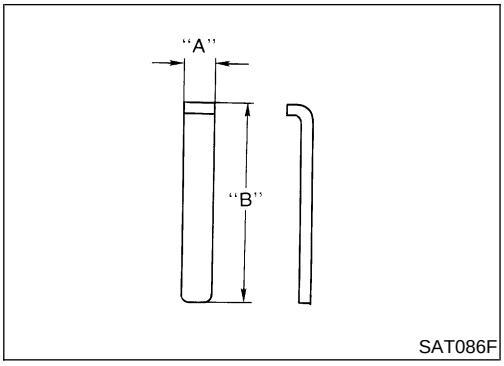


SAT142D

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



SAT143D



SAT086F

Retainer Plate (for control valve upper body)

NIAT0261S02

Refer to "Control Valve Upper Body", AT-474.

Unit: mm (in)

Name of valve and piston	No.	Length A	Length B
Pilot valve	22	6.0 (0.236)	21.5 (0.846)
1-2 accumulator valve	17		40.5 (1.575)
1-2 accumulator piston	25		
1st reducing valve	30		21.5 (0.846)
Overrun clutch reducing valve	5		24.0 (0.945)
Torque converter relief valve	8		21.5 (0.846)
Torque converter clutch control valve	13		28.0 (1.102)
3-2 timing valve	34		21.5 (0.846)
Cooler check valve	21		24.0 (0.945)

- Install proper retainer plates.

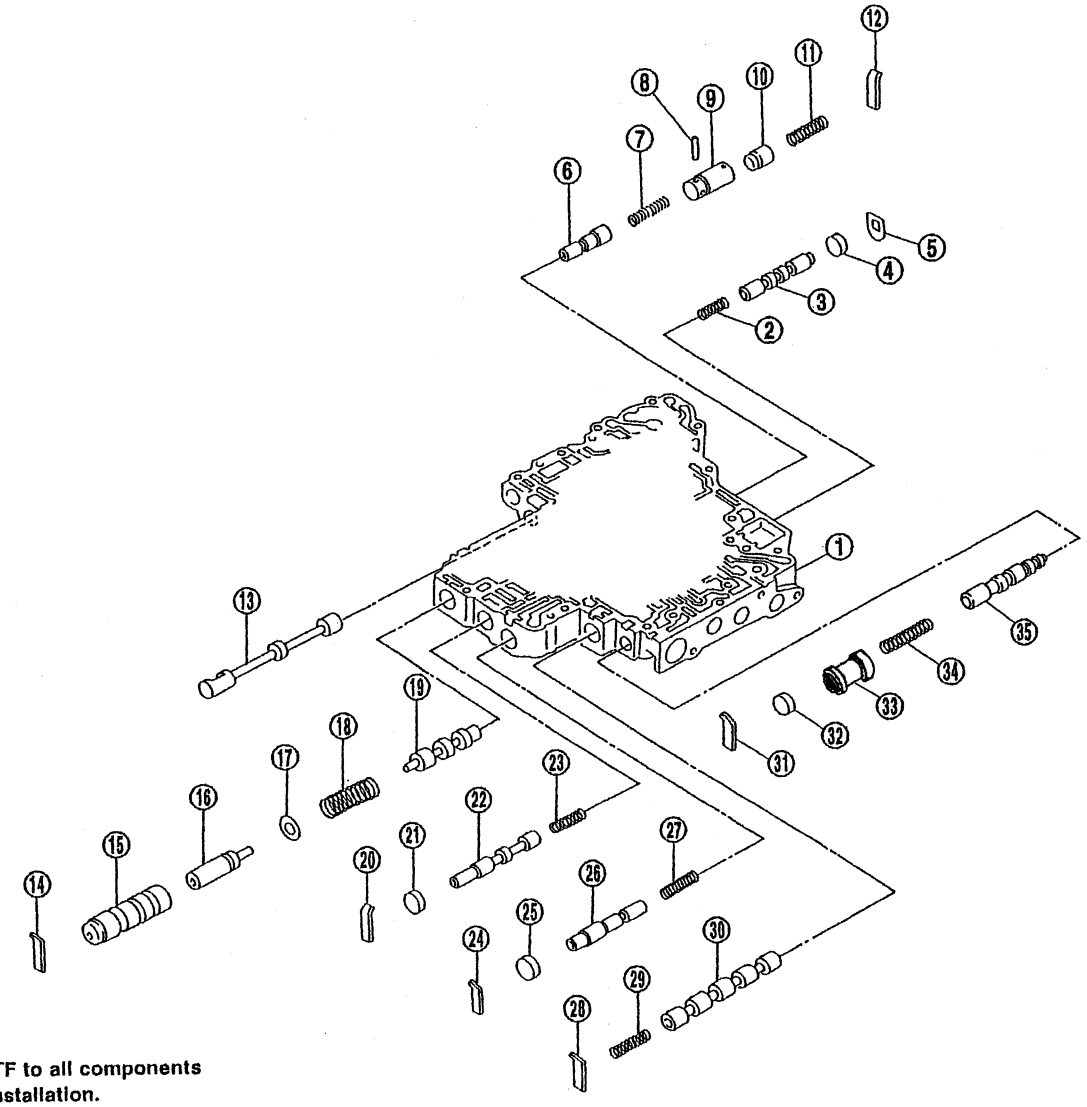
Control Valve Lower Body

COMPONENTS

=NIAT0262

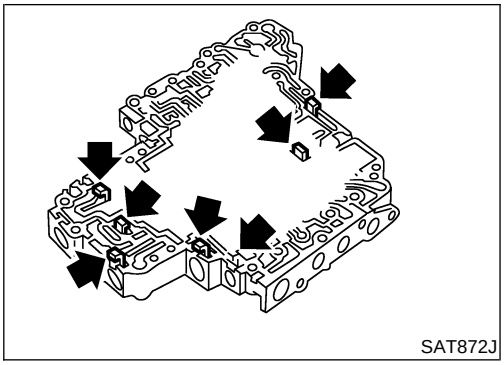
Numbers preceding valve springs correspond with those shown in “CONTROL VALVE AND PLUG RETURN SPRINGS” table on page AT-542.

SEC. 317



WAT251

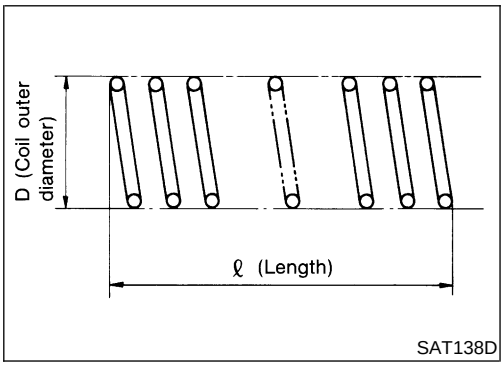
1. Control valve lower body
2. Shift valve B spring
3. Shift valve B
4. Plug
5. Retainer plate
6. Pressure modifier valve
7. Pressure modifier valve spring
8. Parallel pin
9. Sleeve
10. Piston
11. Pressure modifier valve spring
12. Retainer plate
13. Manual valve
14. Retainer plate
15. Sleeve
16. Plug
17. Spring seat
18. Pressure regulator valve spring
19. Pressure regulator valve
20. Retainer plate
21. Plug
22. Overrun clutch control valve
23. Overrun clutch control valve spring
24. Retainer plate
25. Plug
26. Accumulator control valve
27. Accumulator control valve spring
28. Retainer plate
29. Shift valve A spring
30. Shift valve A
31. Retainer plate
32. Plug
33. Plug
34. Shuttle valve spring
35. Shuttle control valve


SAT872J

DISASSEMBLY

NIAT0263

Remove valves at retainer plate.
For removal procedures, refer to "DISASSEMBLY", AT-466.



SAT138D

INSPECTION

NIAT0264

Valve Springs

NIAT0264S01

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

  Inspection standard:

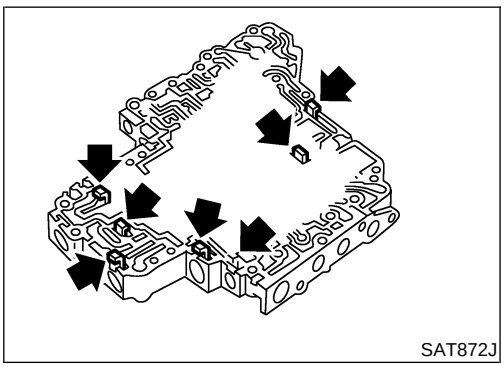
  Refer to "CONTROL VALVE AND PLUG RETURN SPRINGS", AT-542.

- Replace valve springs if deformed or fatigued.

Control Valves

NIAT0264S02

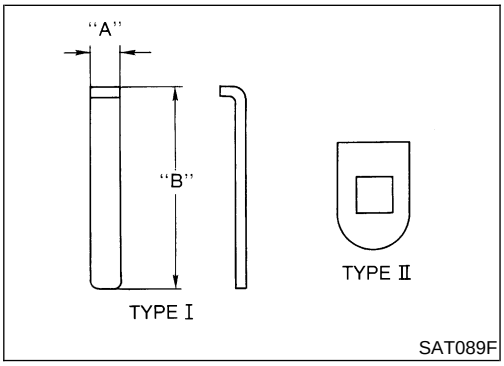
- Check sliding surfaces of control valves, sleeves and plugs for damage.


SAT872J

ASSEMBLY

NIAT0265

- Install control valves.
  For installation procedures, refer to "ASSEMBLY", AT-469.



SAT089F

Retainer Plate (for control valve lower body)

NIAT0265S01

Refer to "Control Valve Lower Body", AT-478.

Unit: mm (in)

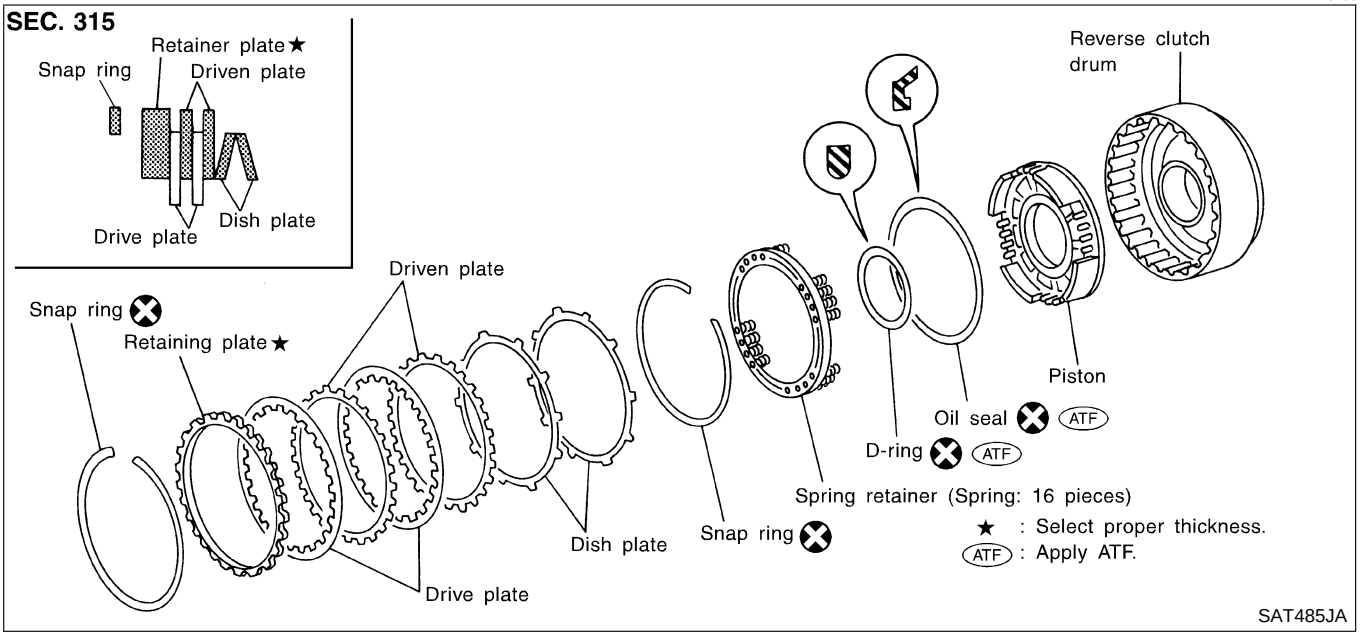
Name of control valve	No.	Length A	Length B	Type
Pressure regulator valve	14	6.0 (0.236)	28.0 (1.102)	I
Accumulator control valve	24			
Shift valve A	28			
Overrun clutch control valve	20			
Pressure modifier valve	12			
Shuttle control valve	31			
Shift valve B	5	—	—	II

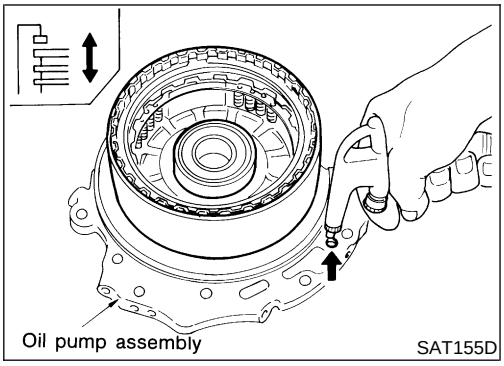
- Install proper retainer plates.

Reverse Clutch

COMPONENTS

=NIAT0266





DISASSEMBLY

NIAT0267

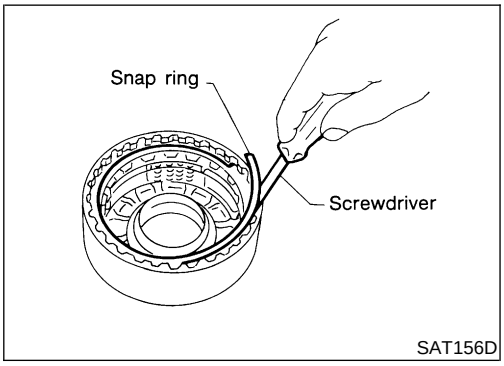
1. Check operation of reverse clutch.

a. Install seal ring onto drum support of oil pump cover and install reverse clutch assembly. Apply compressed air to oil hole.

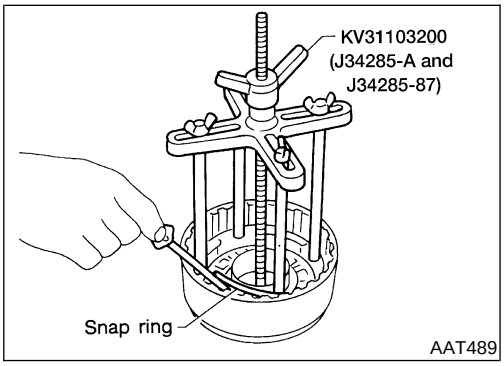
b. Check to see that retaining plate moves to snap ring.

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.



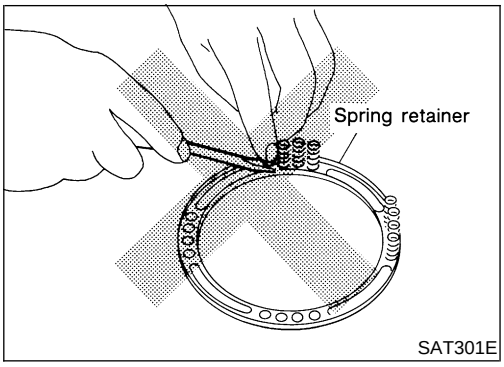
2. Remove snap ring.
3. Remove drive plates, driven plates, retaining plate, and dish plates.



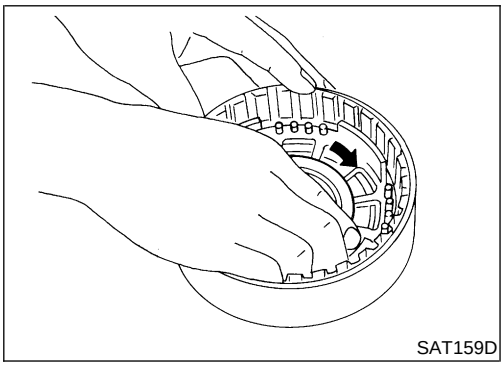
4. Set Tool on spring retainer and remove snap ring from reverse clutch drum while compressing return springs.

- **Set Tool directly above springs.**
- **Do not expand snap ring excessively.**

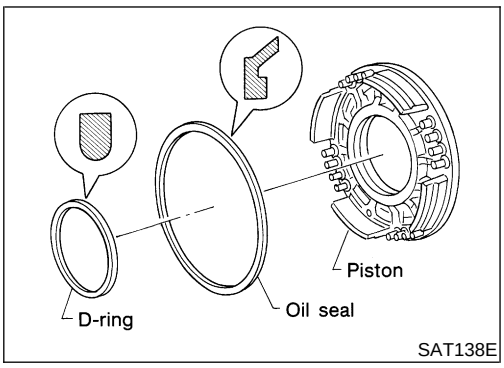
5. Remove spring retainer and return springs.



- **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.

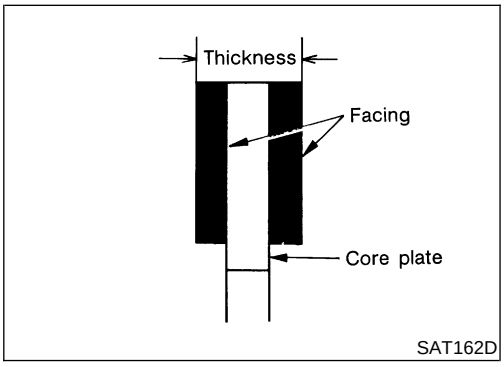
INSPECTION

NIAT0268

Reverse Clutch Snap Ring, Spring Retainer and Return Springs

NIAT0268S01

- Check for deformation, fatigue or damage.
- Replace if necessary.
- **When replacing spring retainer and return springs, replace them as a set.**



Reverse Clutch Drive Plates

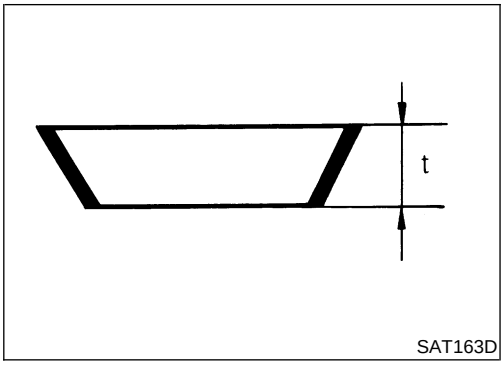
NIAT0268S02

- 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.



SAT163D

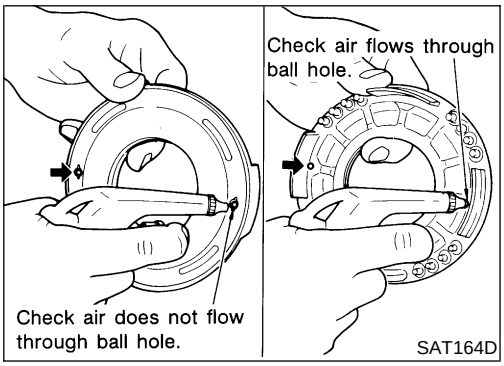
Reverse Clutch Dish Plates

NIAT0268S03

- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate "t": 2.8 mm (0.110 in)

- If deformed or fatigued, replace.

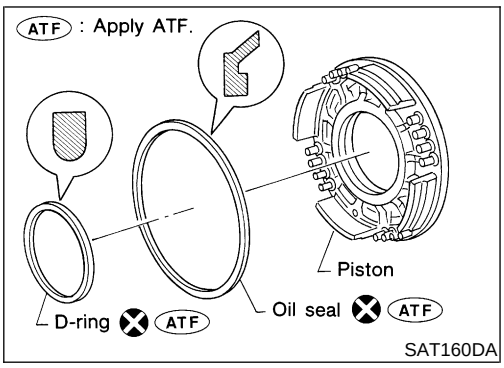


SAT164D

Reverse Clutch Piston

NIAT0268S04

- 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.



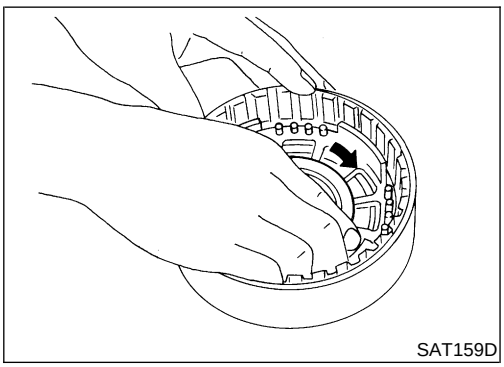
SAT160DA

ASSEMBLY

NIAT0269

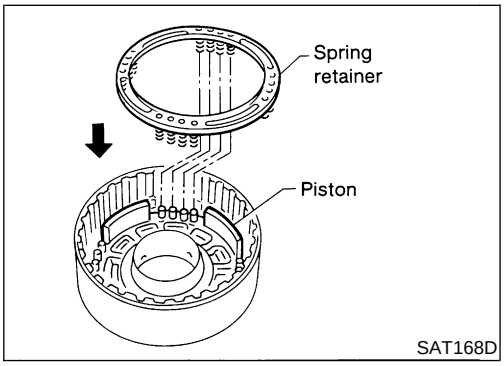
1. Install D-ring and oil seal on piston.

- **Take care with the direction of the oil seal.**
- **Apply ATF to both parts.**


SAT159D

2. Install piston assembly by turning it slowly.

- **Apply ATF to inner surface of drum.**

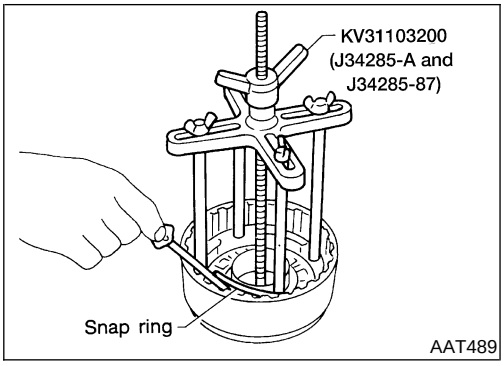


SAT168D

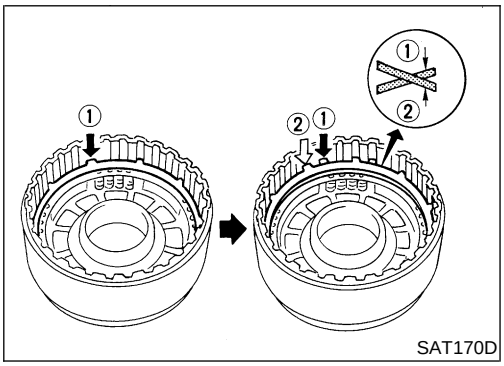
3. Install return springs and spring retainer on piston.

Return spring:

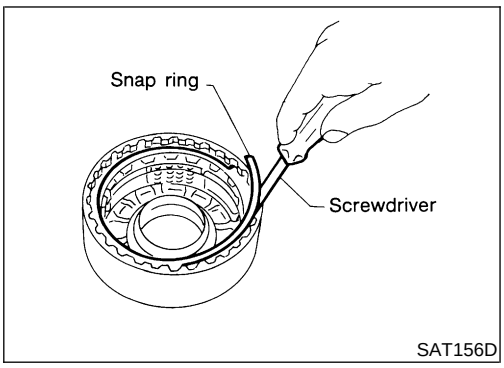
Refer to "Clutch and Brake Return Spring", AT-544.



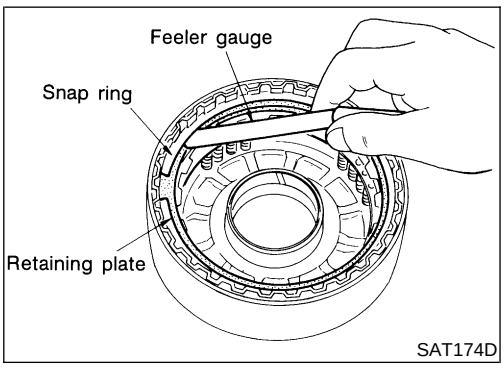
4. Set Tool on spring retainer and install snap ring while compressing return springs.
- **Set Tool directly above return springs.**



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.**



6. Install snap ring.



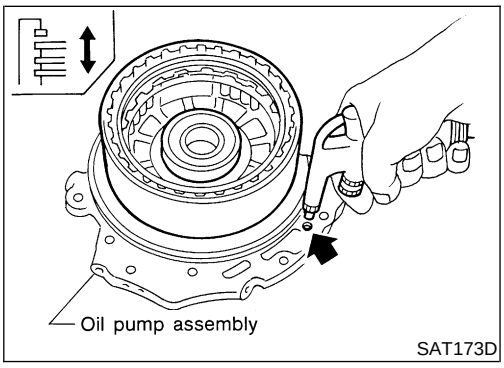
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

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 "REVERSE CLUTCH", AT-542.



8. Check operation of reverse clutch.
Refer to "Reverse Clutch", AT-481.

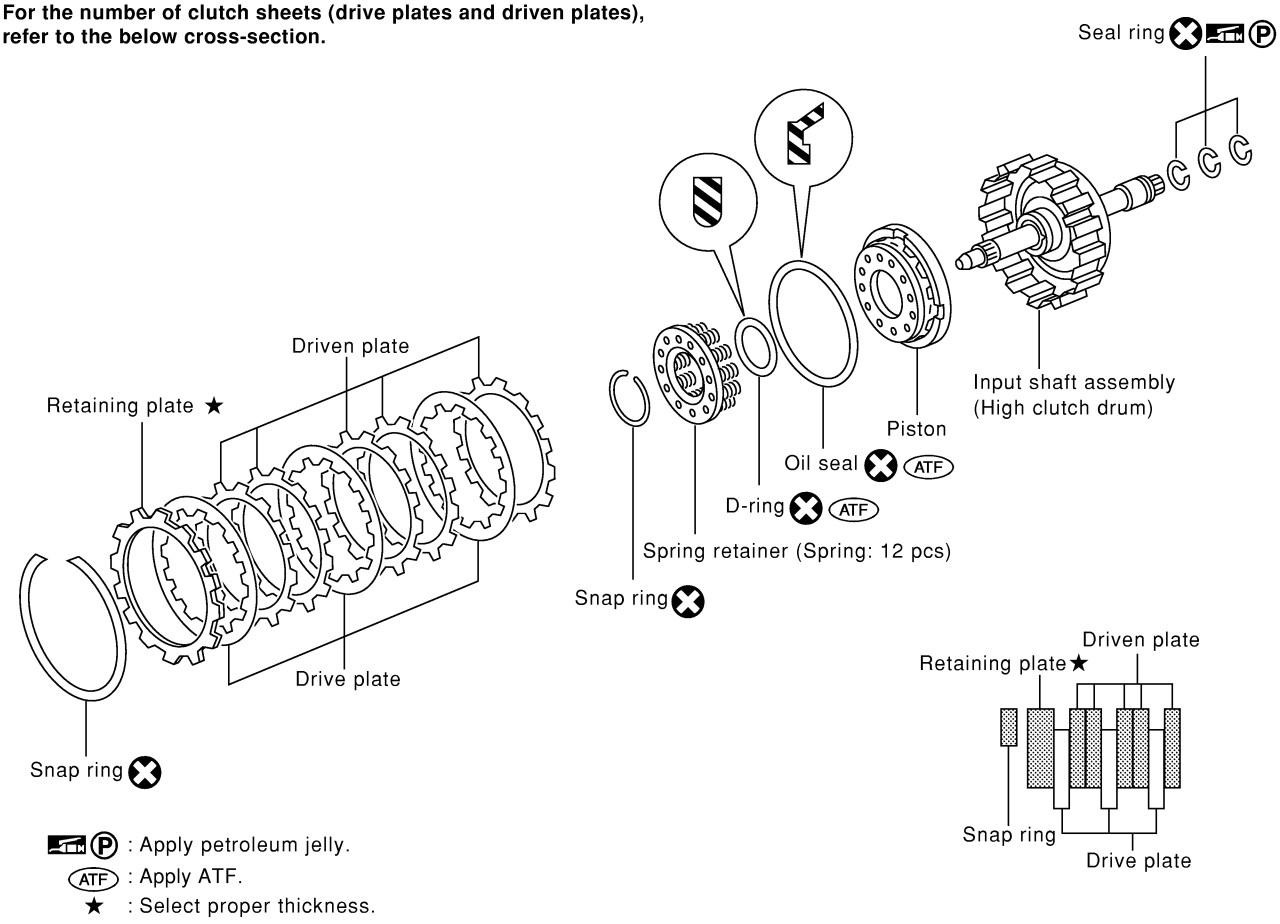
High Clutch

COMPONENTS

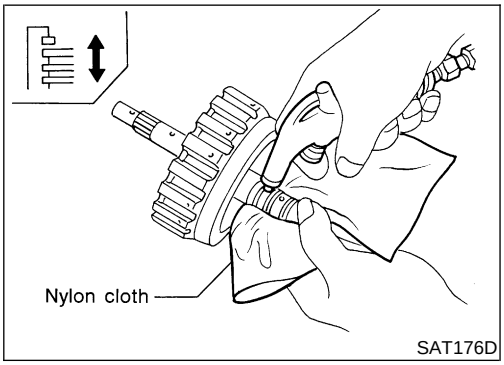
=NIAT0270

SEC. 315

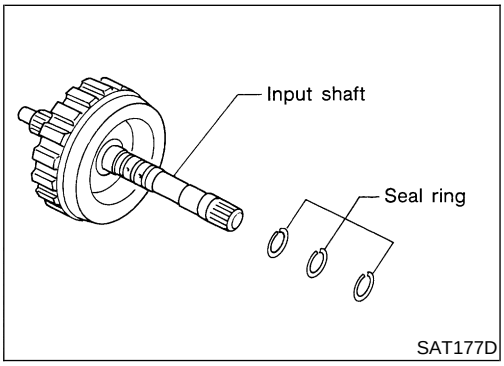
For the number of clutch sheets (drive plates and driven plates), refer to the below cross-section.



SAT874J



SAT176D



SAT177D

DISASSEMBLY

NIAT0271

1. Check operation of high clutch.

a. Apply compressed air to oil hole of input shaft.

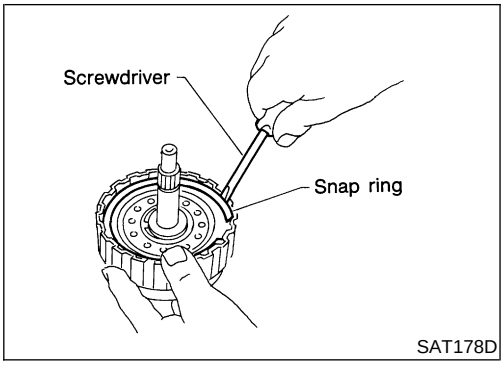
- **Stop up a hole on opposite side of input shaft.**

b. Check to see that retaining plate moves to snap ring.

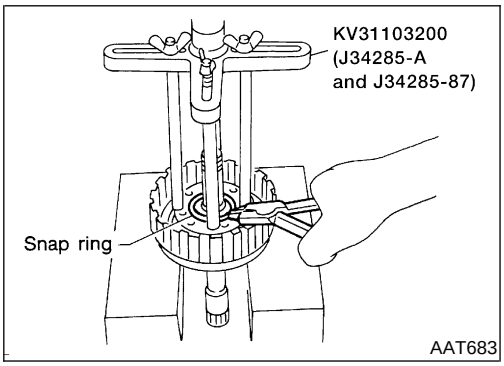
c. If retaining plate does not contact snap ring:

- D-ring might be damaged.
- Oil seal might be damaged.
- Fluid might be leaking past piston check ball.

2. Remove seal rings from input shaft.



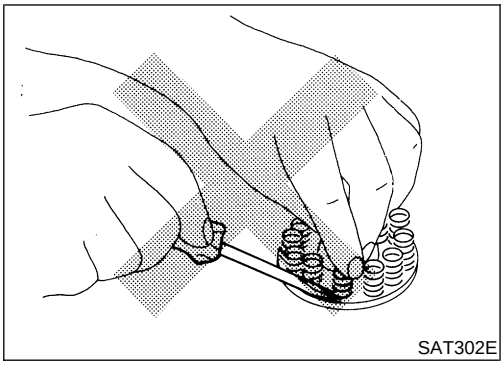
3. Remove snap ring.
4. Remove drive plates, driven plates and retaining plate.



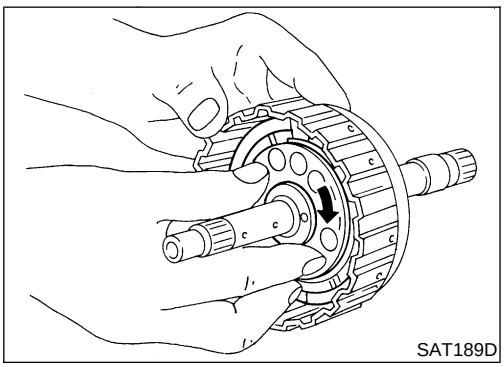
5. Set Tool on spring retainer and remove snap ring from high clutch drum while compressing return springs.

- **Set Tool directly above springs.**
- **Do not expand snap ring excessively.**

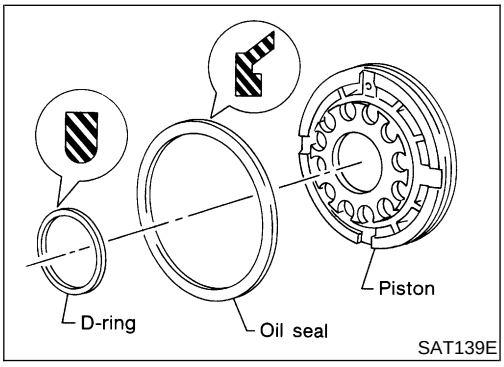
6. Remove spring retainer and return springs.



- **Do not remove return spring from spring retainer.**



7. Remove piston from high clutch drum by turning it.



8. Remove D-ring and oil seal from piston.

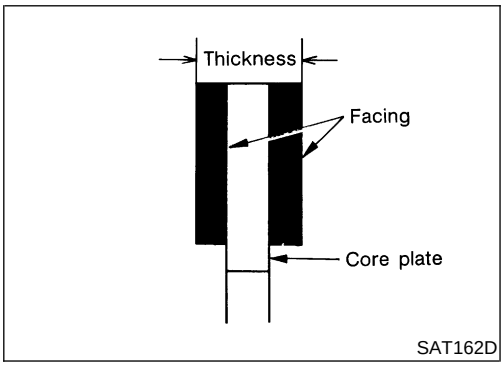
INSPECTION

NIAT0272

Reverse Clutch Snap Ring, Spring Retainer and Return Springs

NIAT0272S01

- Check for deformation, fatigue or damage.
- Replace if necessary.
- **When replacing spring retainer and return springs, replace them as a set.**



SAT162D

High Clutch Drive Plates

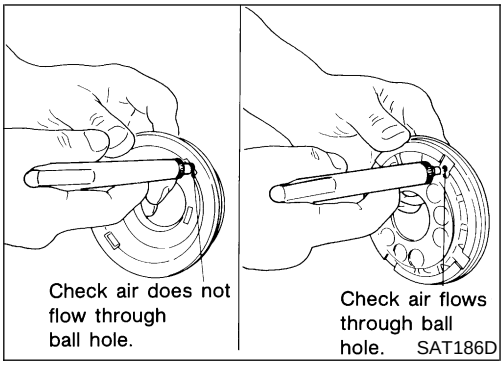
NIAT0272S02

- 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.

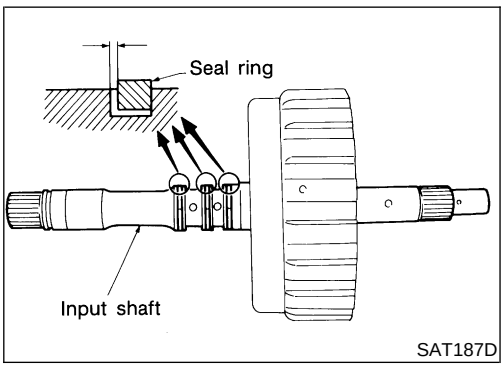


SAT186D

High Clutch Piston

NIAT0272S03

- 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.



SAT187D

Seal Ring Clearance

NIAT0272S04

- 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:

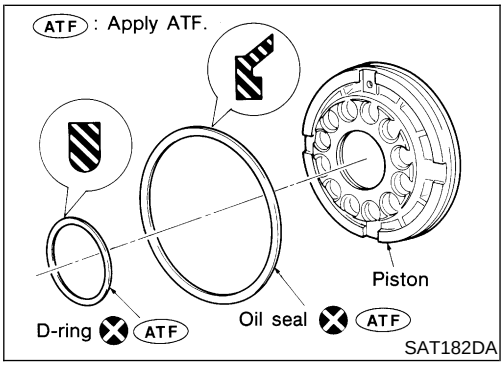
  0.23 mm (0.0091 in)
- If not within wear limit, replace input shaft assembly.

ASSEMBLY

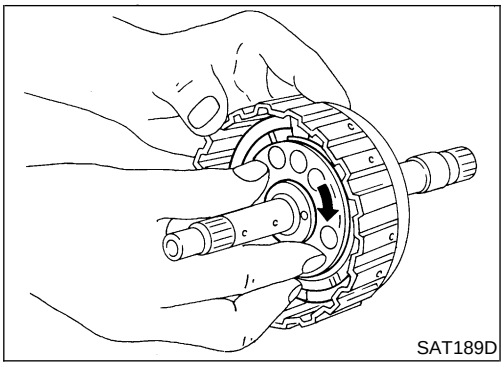
NIAT0273

1. Install D-ring and oil seal on piston.

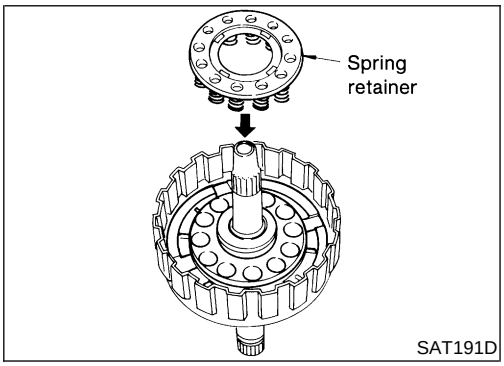
- **Take care with the direction of the oil seal.**
- **Apply ATF to both parts.**



SAT182DA


SAT189D

2. Install piston assembly by turning it slowly.
- **Apply ATF to inner surface of drum.**

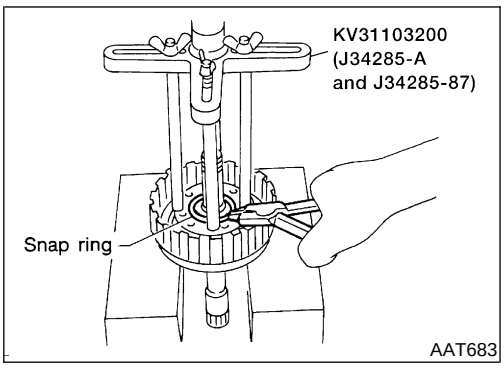


SAT191D

3. Install return springs and spring retainer on piston.

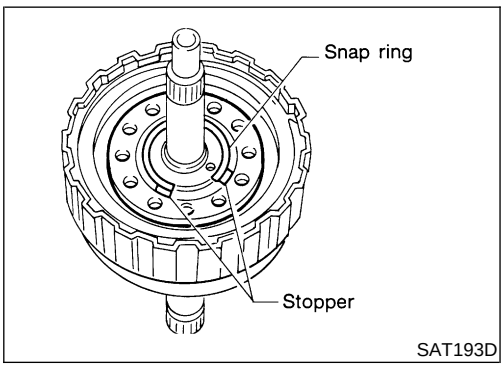
Return spring:

Refer to "Clutch and Brake Return Spring", AT-544.



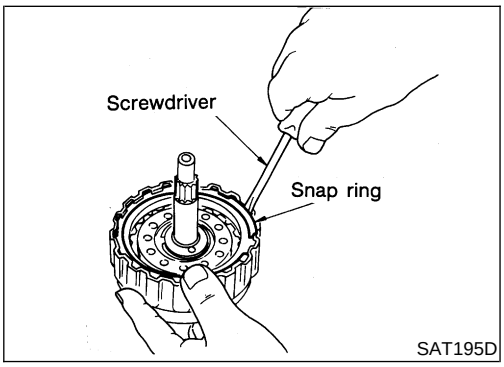
AAT683

4. Set Tool on spring retainer and install snap ring while compressing return springs.
- **Set Tool directly above return springs.**



SAT193D

- **Do not align snap ring gap with spring retainer stopper.**

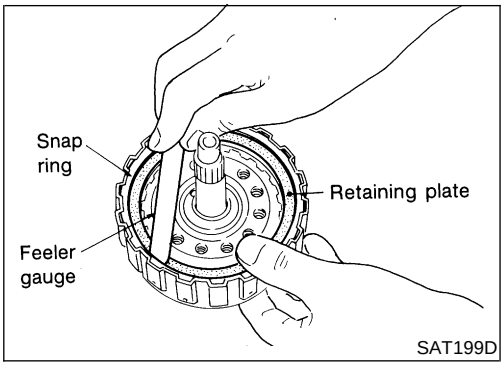


SAT195D

5. Install drive plates, driven plates and retaining plate.

Take care with the order and direction of plates.

6. Install snap ring.



SAT199D

7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

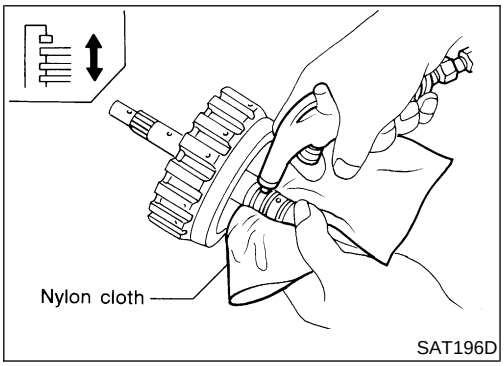
Specified clearance:

Standard: 1.4 - 1.8 mm (0.055 - 0.071 in)

Allowable limit: 2.4 mm (0.094 in)

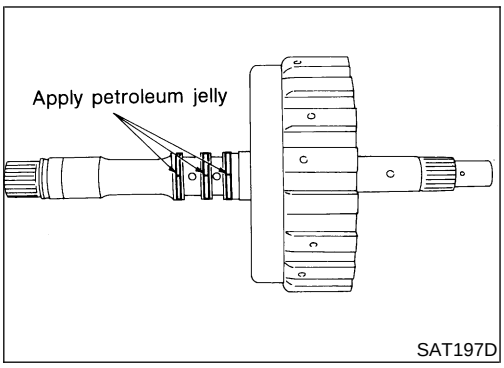
Retaining plate:

Refer to "HIGH CLUTCH", AT-543.



SAT196D

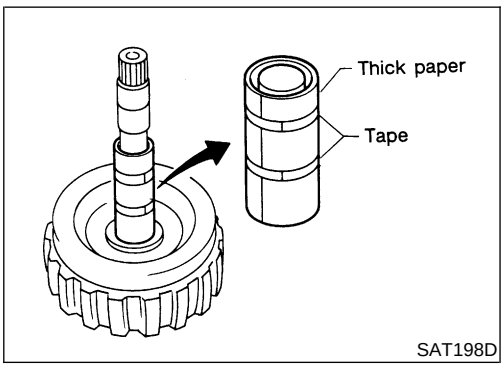
8. Check operation of high clutch.
Refer to "High Clutch", AT-485.



SAT197D

9. Install seal rings to input shaft.

- **Apply petroleum jelly to seal rings.**



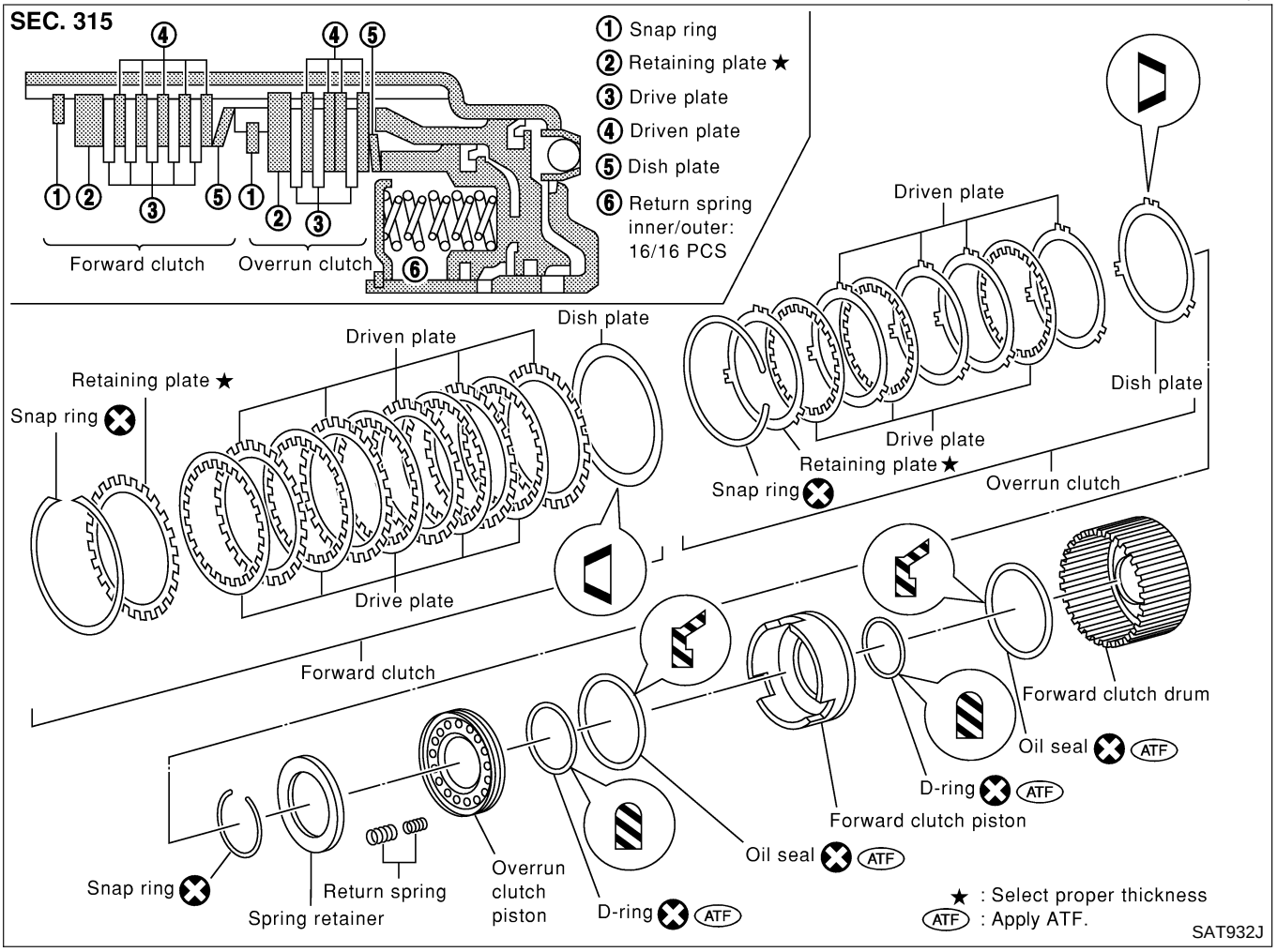
SAT198D

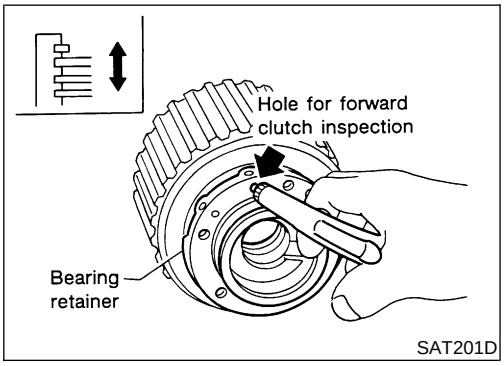
- **Roll paper around seal rings to prevent seal rings from spreading.**

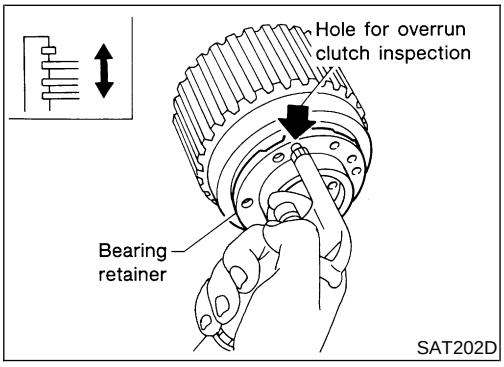
Forward Clutch and Overrun Clutch

COMPONENTS

NIAT0274







DISASSEMBLY

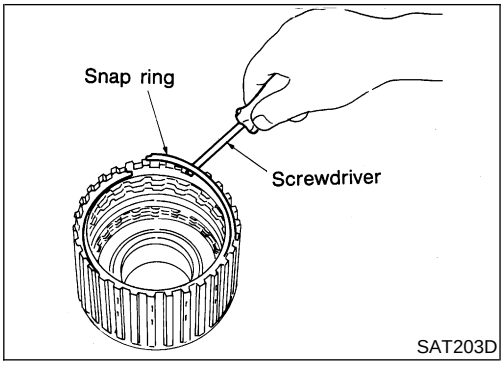
NIAT0275

1. Check operation of forward clutch and overrun clutch.

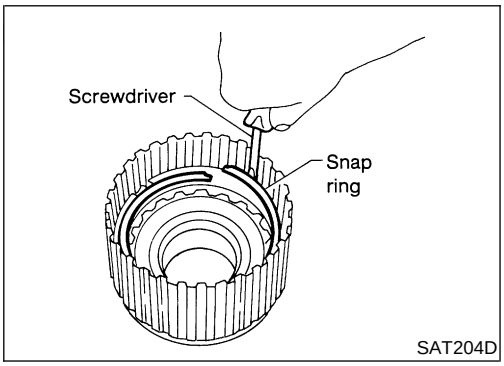
a. Install bearing retainer on forward clutch drum.
b. Apply compressed air to oil hole of forward clutch drum.
c. Check to see that retaining plate moves to snap ring.

d. If retaining plate does not contact snap ring:

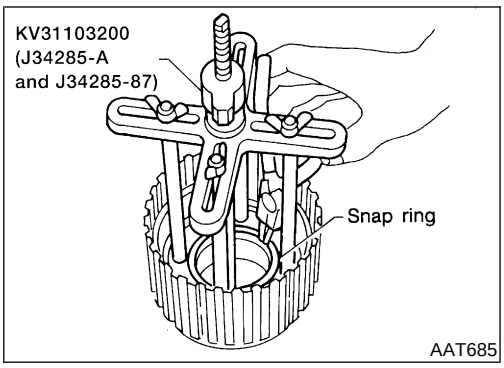
- D-ring might be damaged.
- Oil seal might be damaged.
- Fluid might be leaking past piston check ball.



2. Remove snap ring for forward clutch.
3. Remove drive plates, driven plates, retaining plate and dish plate for forward clutch.

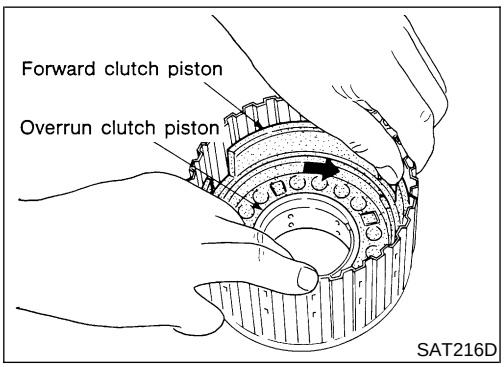


4. Remove snap ring for overrun clutch.
5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.

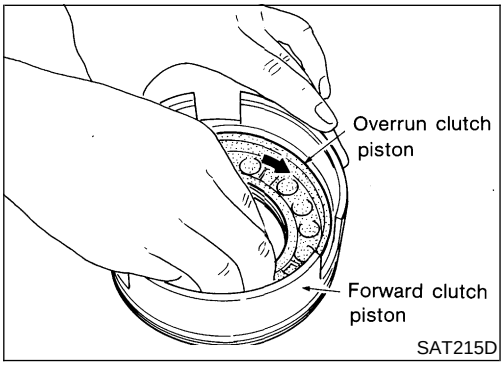


6. Set Tool on spring retainer and remove snap ring from forward clutch drum while compressing return springs.
- **Set Tool directly above return springs.**
- **Do not expand snap ring excessively.**

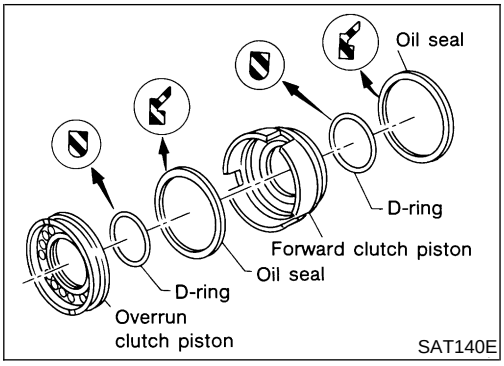
7. Remove spring retainer and return springs.



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.

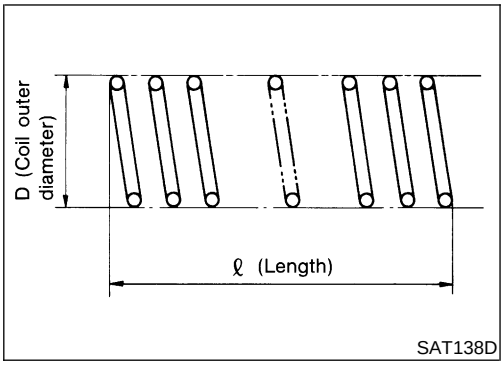
INSPECTION

NIAT0276

Snap Rings and Spring Retainer

NIAT0276S01

- Check for deformation, fatigue or damage.



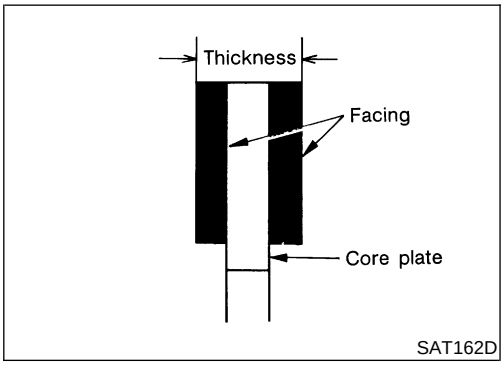
Forward Clutch and Overrun Clutch Return Springs

NIAT0276S02

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

  Inspection standard:

  Refer to SDS, AT-544.
- Replace if deformed or fatigued.



Forward Clutch and Overrun Clutch Drive Plates

NIAT0276S03

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

  Thickness of drive plate:

  Forward clutch

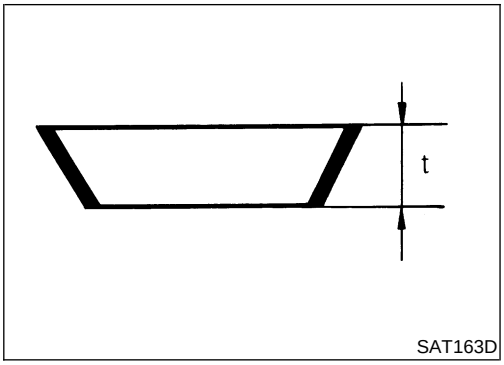
  Standard value: 1.8 mm (0.071 in)

  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.



SAT163D

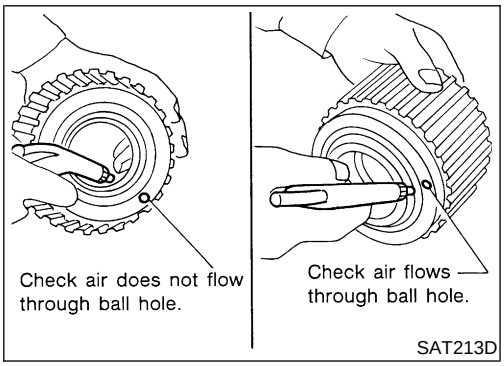
Forward Clutch and Overrun Clutch Dish Plates

NIAT0276S04

- 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.

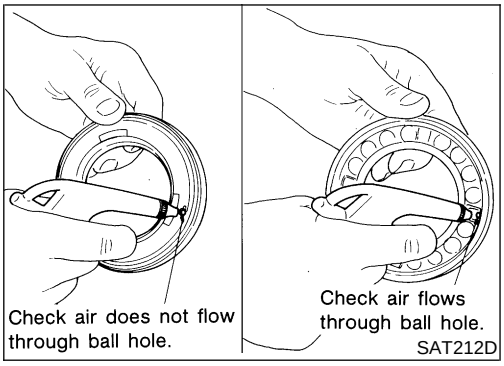


SAT213D

Forward Clutch Drum

NIAT0276S05

- 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.

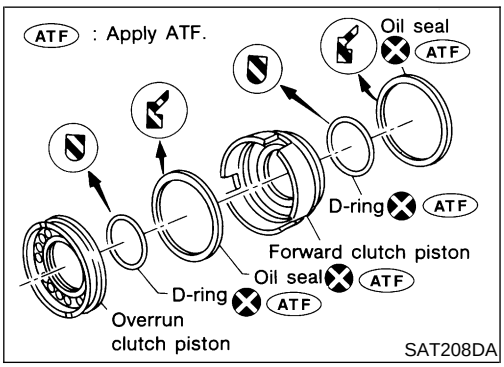


SAT212D

Overrun Clutch Piston

NIAT0276S06

- 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.



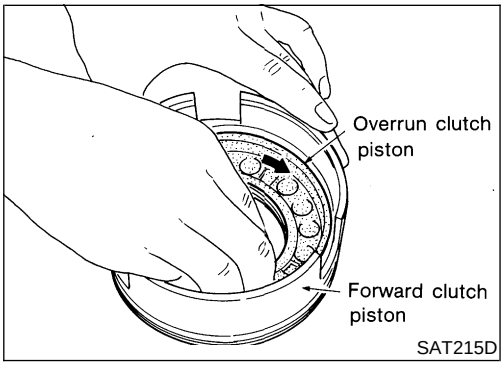
SAT208DA

ASSEMBLY

NIAT0277

1. Install D-rings and oil seals on forward clutch piston and overrun clutch piston.

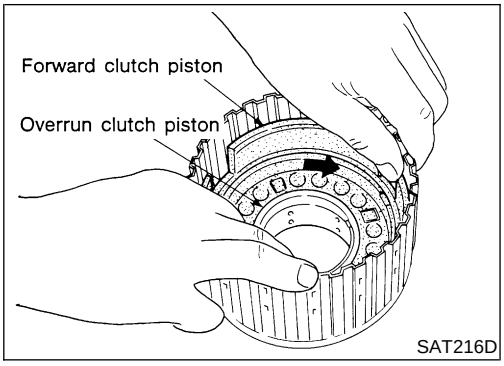
- **Take care with direction of oil seal.**
- **Apply ATF to both parts.**



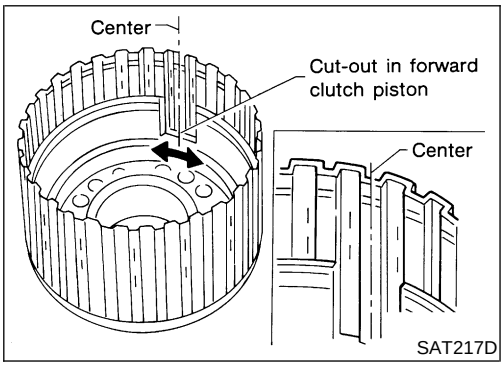
SAT215D

2. Install overrun clutch piston assembly on forward clutch piston while turning it slowly.

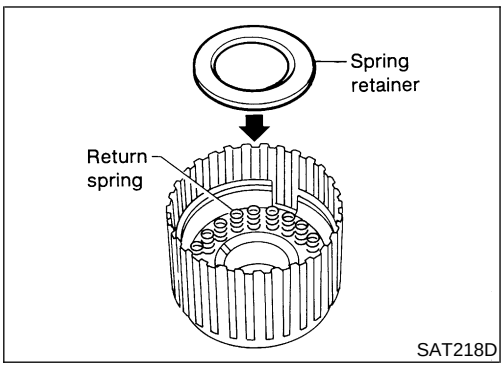
- **Apply ATF to inner surface of forward clutch piston.**



3. Install forward clutch piston assembly on forward clutch drum while turning it slowly.
- **Apply ATF to inner surface of drum.**



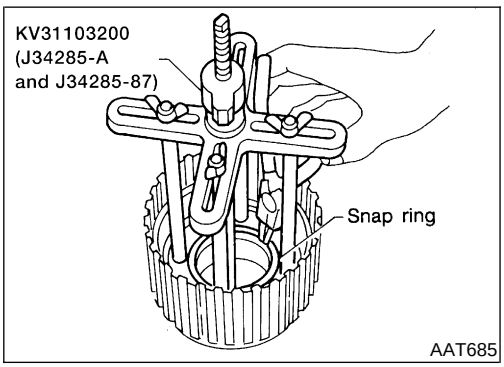
4. Align notch in forward clutch piston with groove in forward clutch drum.



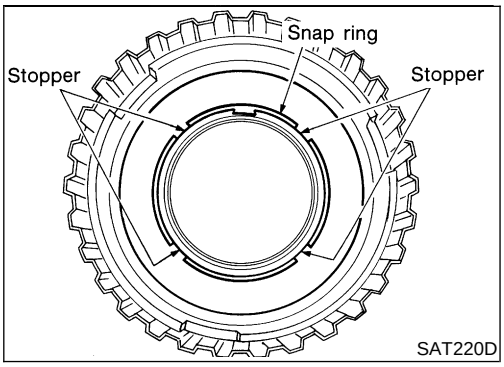
5. Install return spring on piston.
6. Install spring retainer on return springs.

Return spring:

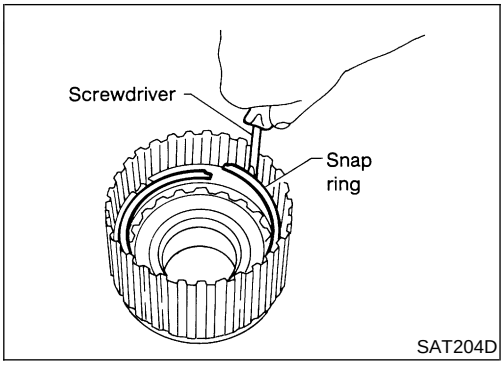
Refer to "Clutch and Brake Return Spring", AT-544.



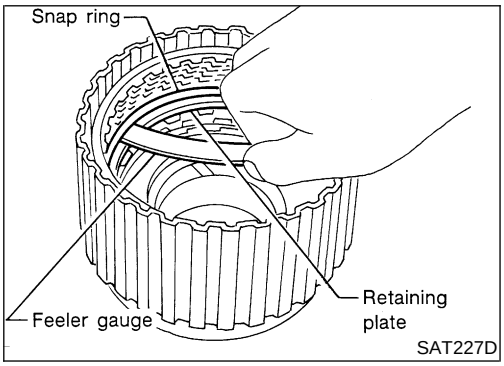
7. Set Tool on spring retainer and install snap ring while compressing return springs.
- **Set Tool directly above return springs.**



- **Do not align snap ring gap with spring retainer stopper.**

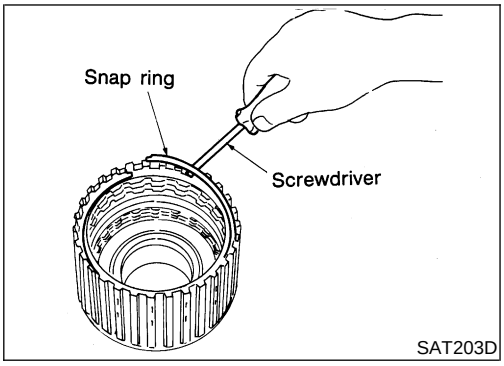


8. Install drive plates, driven plates, retaining plate and dish plate for overrun clutch.
9. Install snap ring for overrun clutch.



10. Measure clearance between overrun clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate.

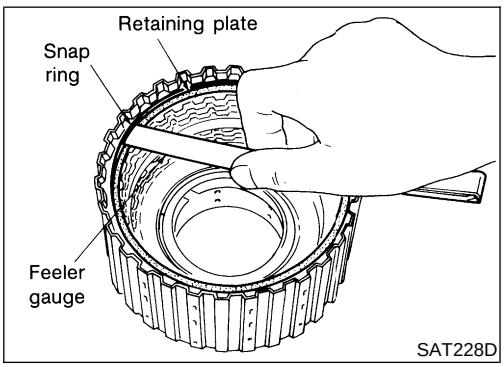
Specified clearance:
Standard: 1.0 - 1.4 mm (0.039 - 0.055 in)
Allowable limit: 2.0 mm (0.079 in)
Overrun clutch retaining plate:
Refer to SDS, AT-543.



11. Install drive plates, driven plates, retaining plate and dish plate for forward clutch.

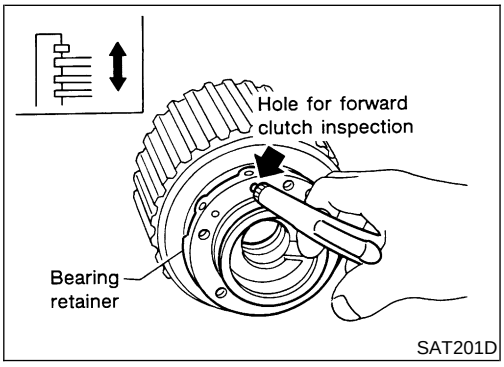
Take care with the order and direction of plates.

12. Install snap ring for forward clutch.

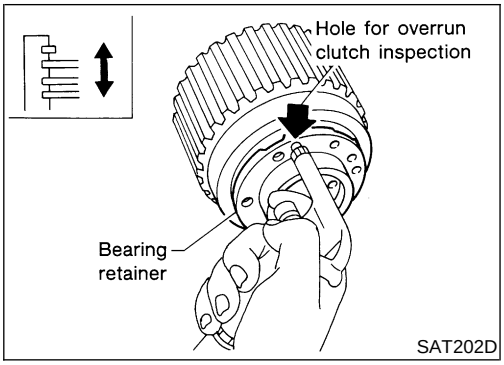


13. Measure clearance between forward clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate.

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 "FORWARD CLUTCH", AT-543.



14. Check operation of forward clutch.
Refer to "Forward Clutch and Overrun Clutch", AT-490.

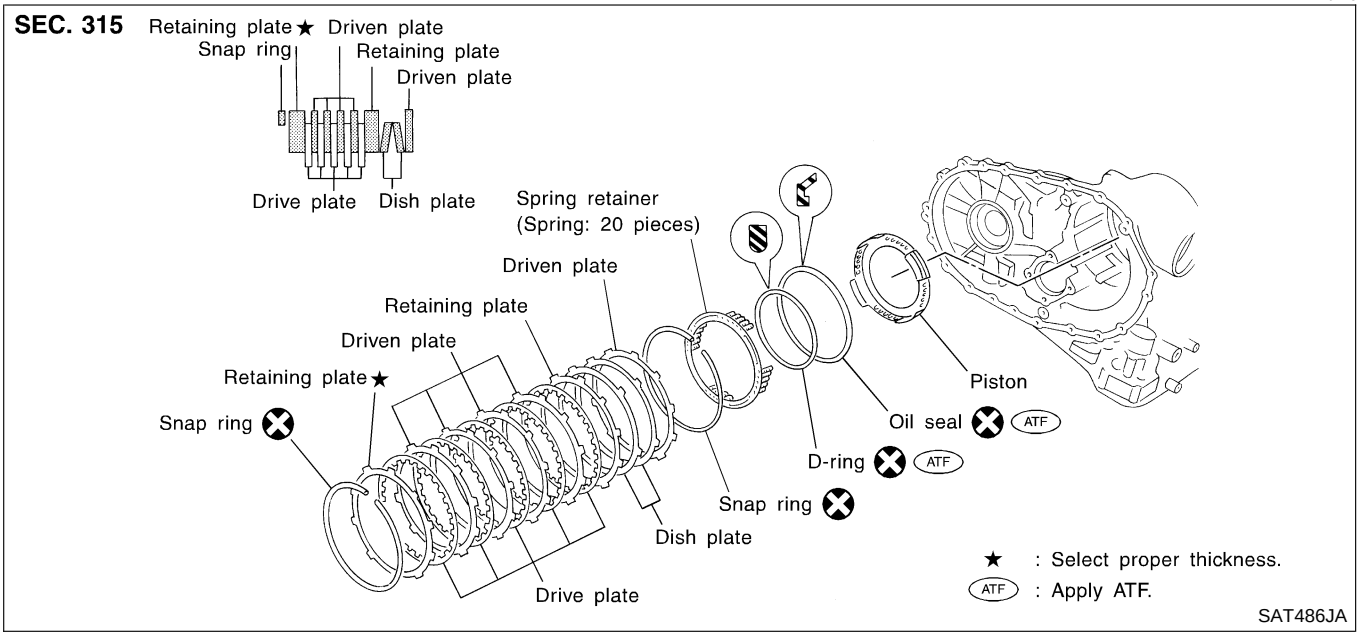


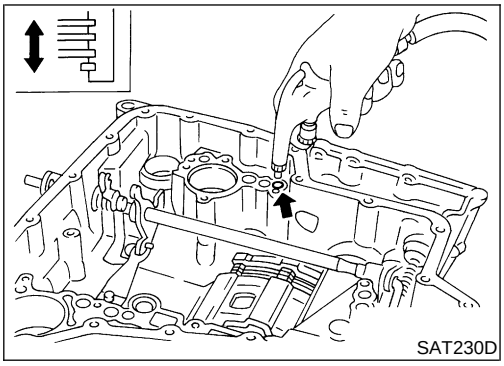
15. Check operation of overrun clutch.
    Refer to "Forward Clutch and Overrun Clutch", AT-490.

Low & Reverse Brake

COMPONENTS

=NIAT0278





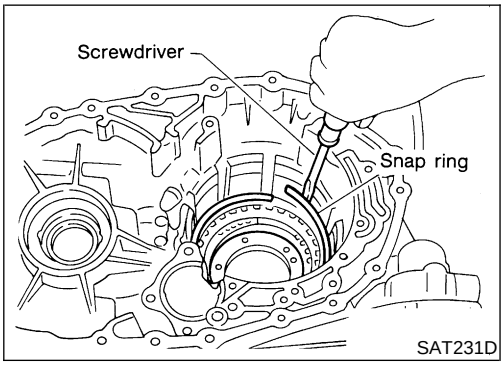
DISASSEMBLY

NIAT0279

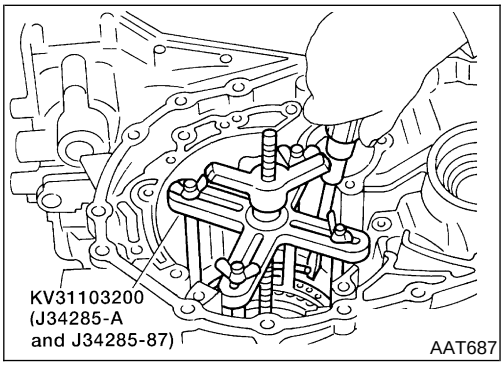
1. Check operation of low & reverse brake.

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.



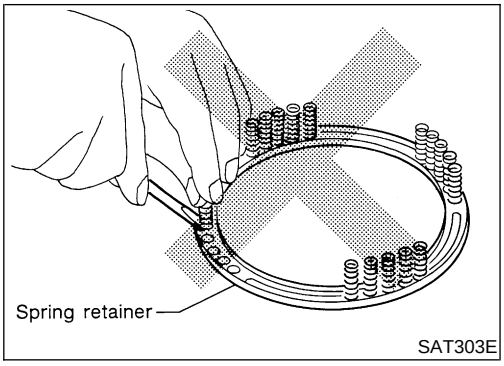
2. Stand transmission case.
3. Remove snap ring.
4. Remove drive plates, driven plates, retaining plate from transmission case.



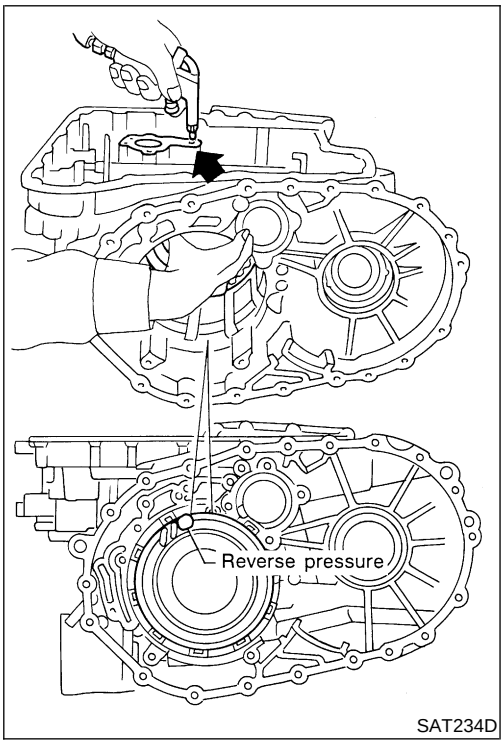
5. Set Tool on spring retainer and remove snap ring while compressing return springs.

- **Set Tool directly above return springs.**
- **Do not expand snap ring excessively.**

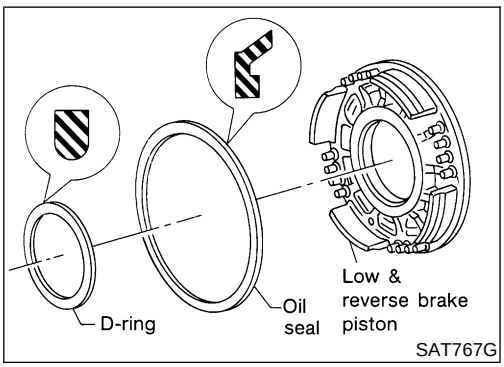
6. Remove spring retainer and return springs.



- **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.



9. Remove D-ring and oil seal from piston.

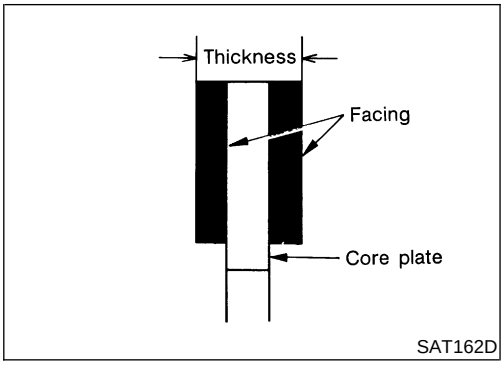
INSPECTION

NIAT0280

Low & Reverse Clutch Snap Ring, Spring Retainer and Return Springs

NIAT0280S01

- 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

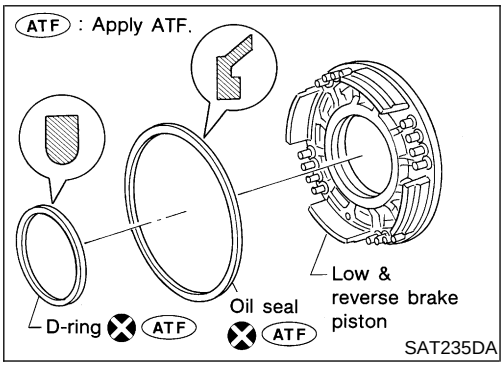
NIAT0280S02

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

  Thickness of drive plate:

  Standard value: 2.0 mm (0.079 in)

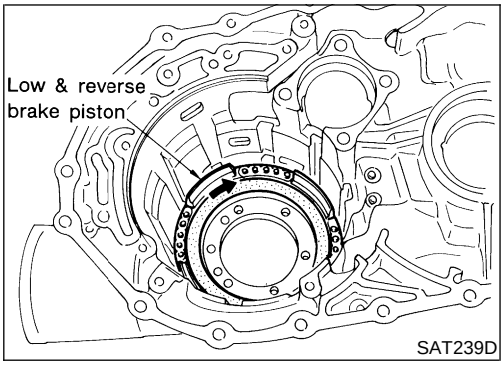
  Wear limit: 1.8 mm (0.071 in)
- If not within wear limit, replace.



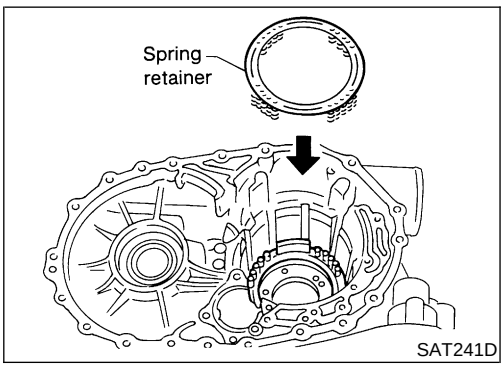
ASSEMBLY

NIAT0281

1. Install D-ring and oil seal on piston.
- **Take care with the direction of the oil seal.**
- **Apply ATF to both parts.**



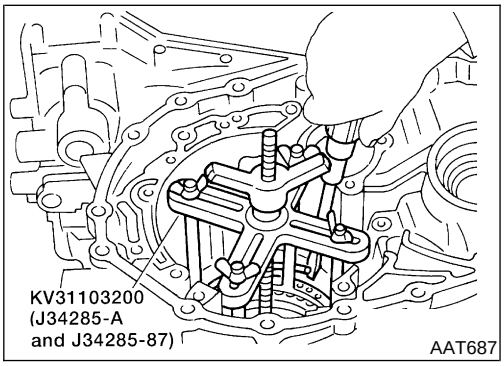
2. Stand transmission case.
3. Install piston assembly on transmission case while turning it slowly.
- **Apply ATF to inner surface of transmission case.**



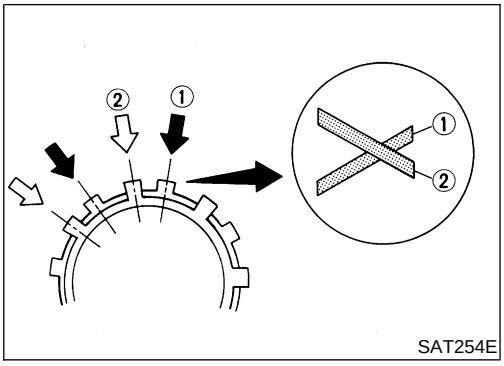
4. Install return springs and spring retainer on piston.

   Return spring:

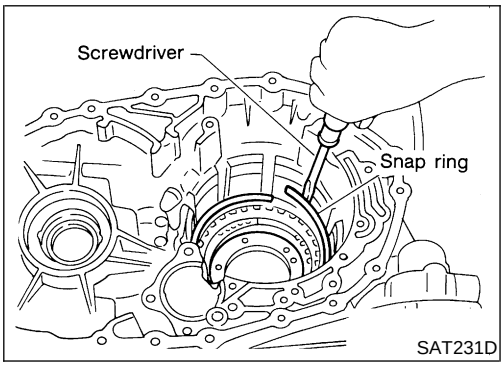
   Refer to "Clutch and Brake Return Spring", AT-544.



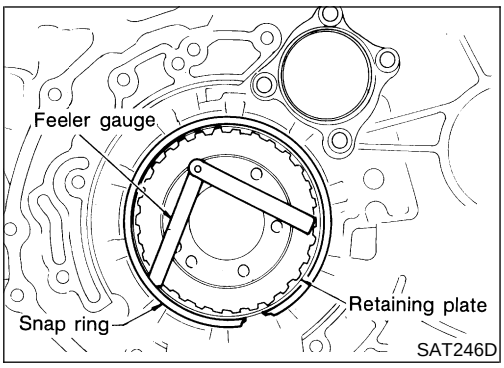
5. Install snap ring while compressing return springs.
- **Set Tool directly above return springs.**



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.**

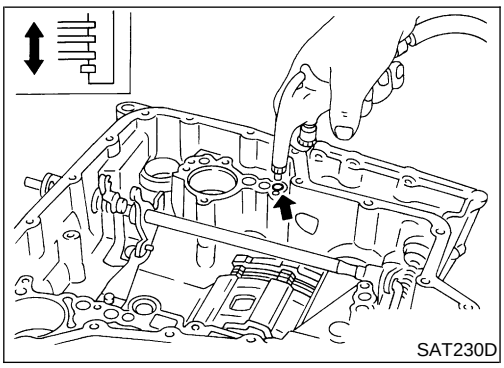


7. Install snap ring.



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 "LOW AND REVERSE BRAKE", AT-544.

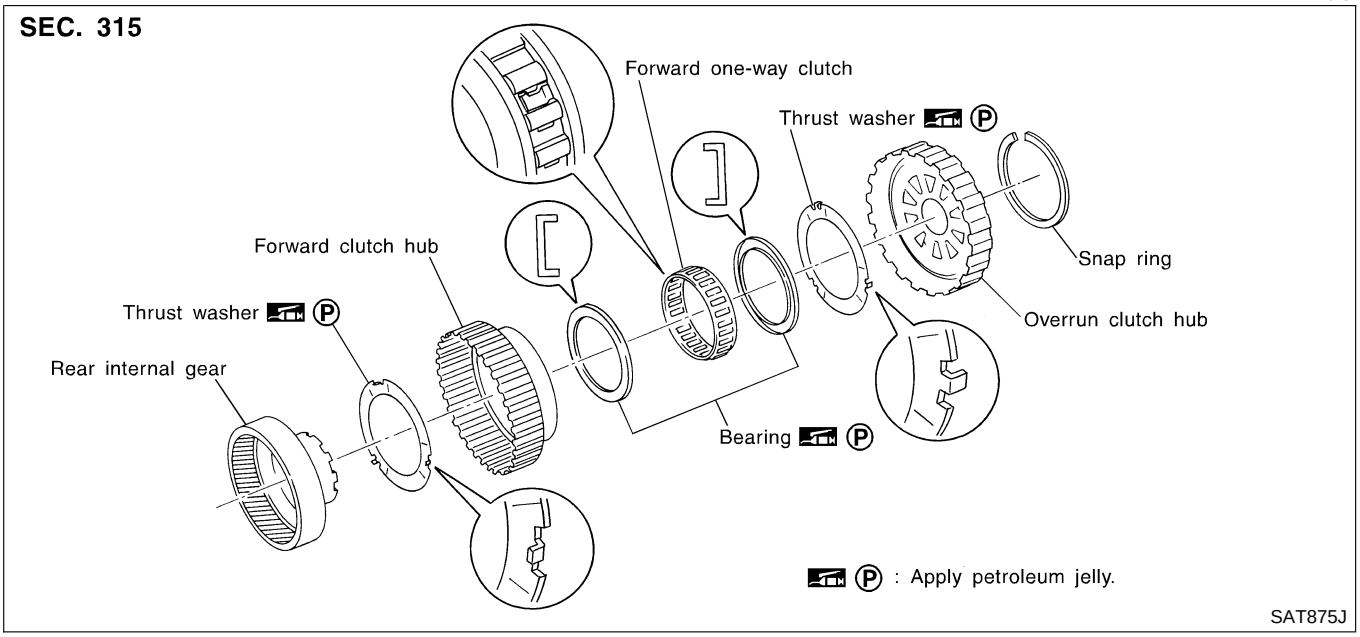


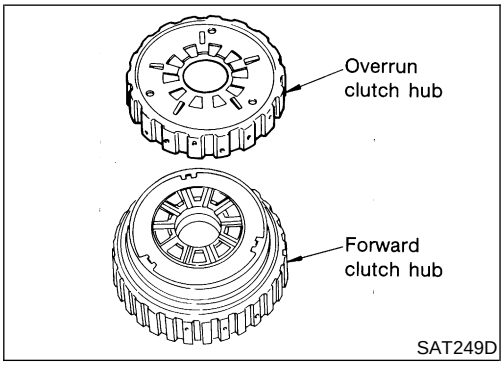
9. Check operation of low and reverse brake.
Refer to "DISASSEMBLY", AT-497.

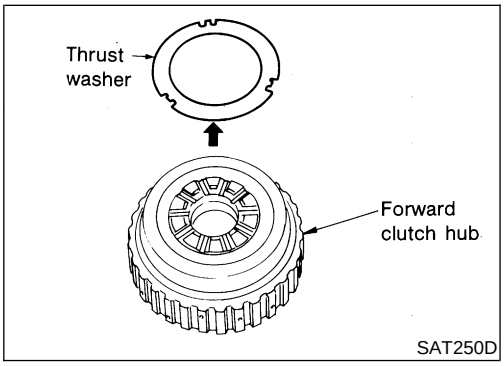
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

COMPONENTS

NIAT0282



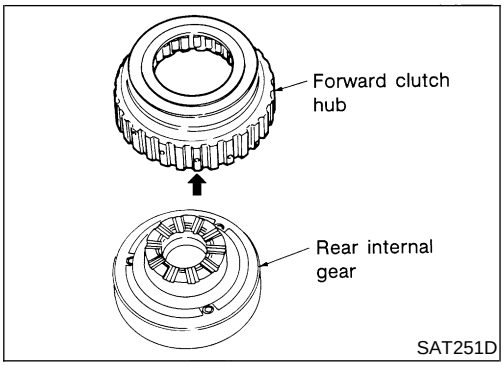




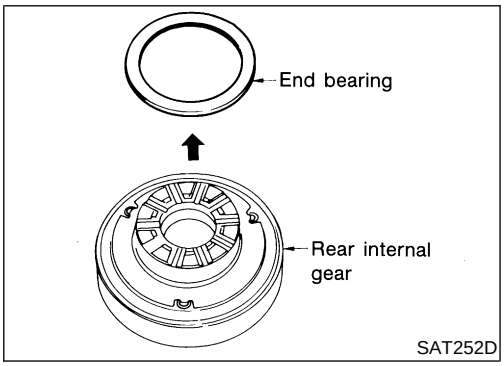
DISASSEMBLY

NIAT0283

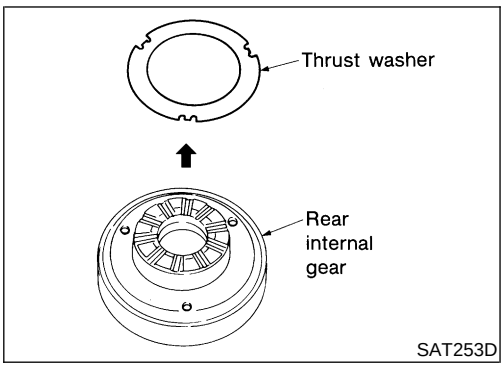
1. Remove snap ring from overrun clutch hub.
2. Remove overrun clutch hub from forward clutch hub.
3. Remove thrust washer from forward clutch hub.



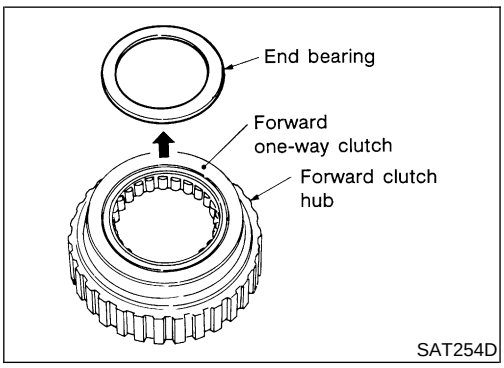
4. Remove forward clutch hub from rear internal gear.



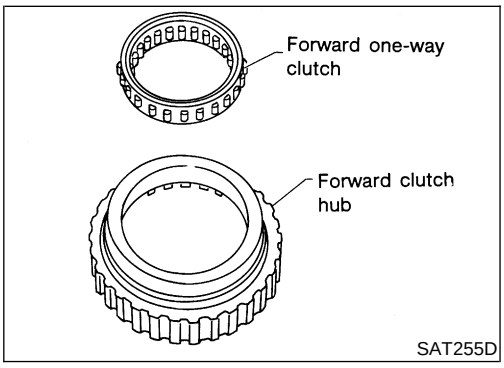
5. Remove end bearing from rear internal gear.



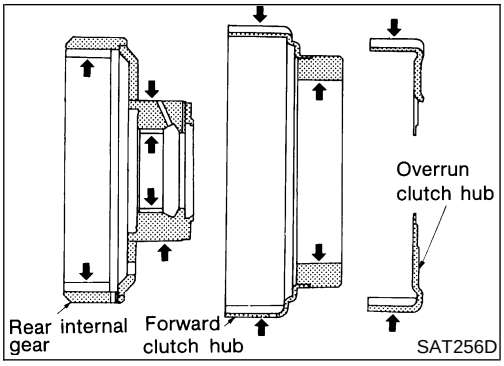
6. Remove thrust washer from rear internal gear.



7. Remove end bearing from forward one-way clutch.



8. Remove one-way clutch from forward clutch hub.



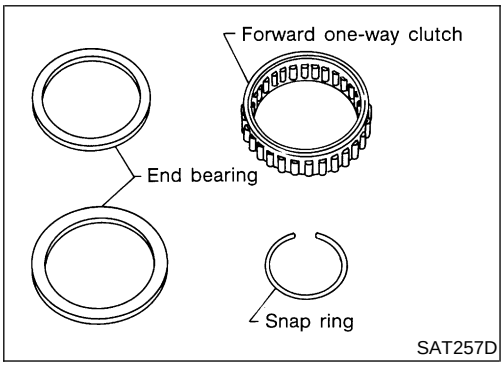
INSPECTION

NIAT0284

Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

NIAT0284S01

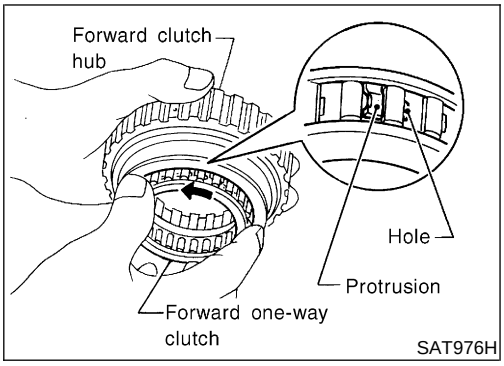
- Check rubbing surfaces for wear or damage.



Snap Ring, End Bearings and Forward One-way Clutch

NIAT0284S02

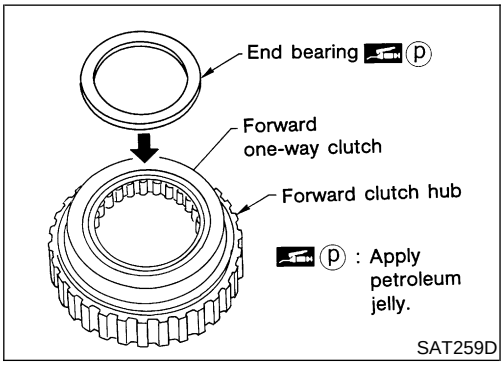
- Check snap ring and end bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.



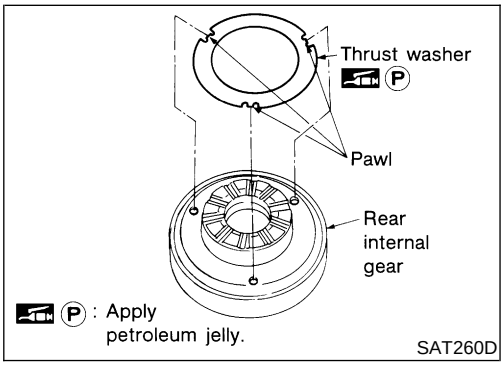
ASSEMBLY

NIAT0285

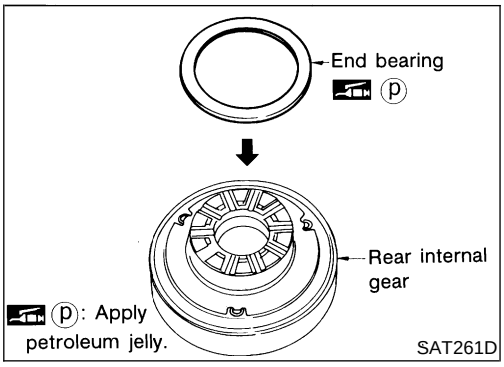
1. Install forward one-way clutch on forward clutch.
- **Take care with the direction of forward one-way clutch.**



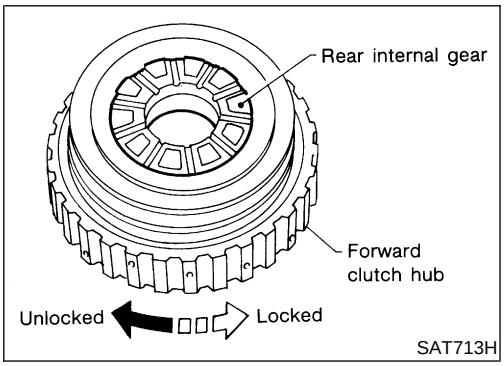
2. Install end bearing on forward one-way clutch.
- **Apply petroleum jelly to end bearing.**



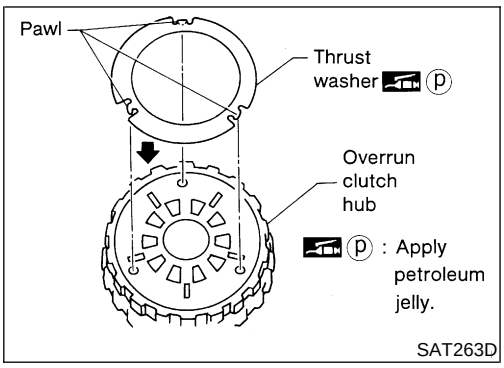
3. Install thrust washer on rear internal gear.
- **Apply petroleum jelly to thrust washer.**
- **Align pawls of thrust washer with holes of rear internal gear.**



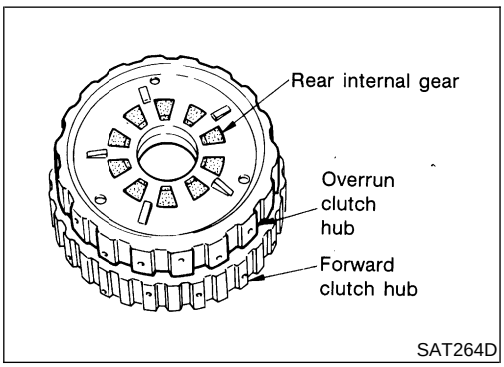
4. Install end bearing on rear internal gear.
- **Apply petroleum jelly to end bearing.**



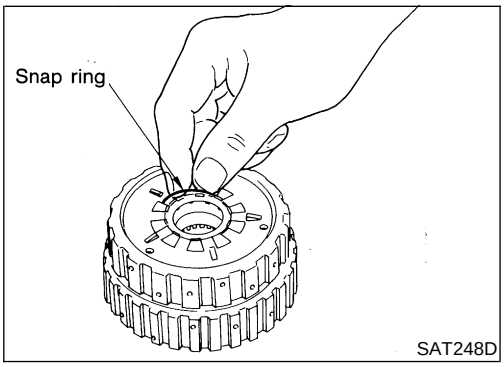
5. Install forward clutch hub on rear internal gear.
- **Check operation of forward one-way clutch.**
  Hold rear internal gear and turn forward clutch hub. Check forward clutch hub for correct locking and unlocking directions.
- **If not as shown in illustration, check installation direction of forward one-way clutch.**



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.**

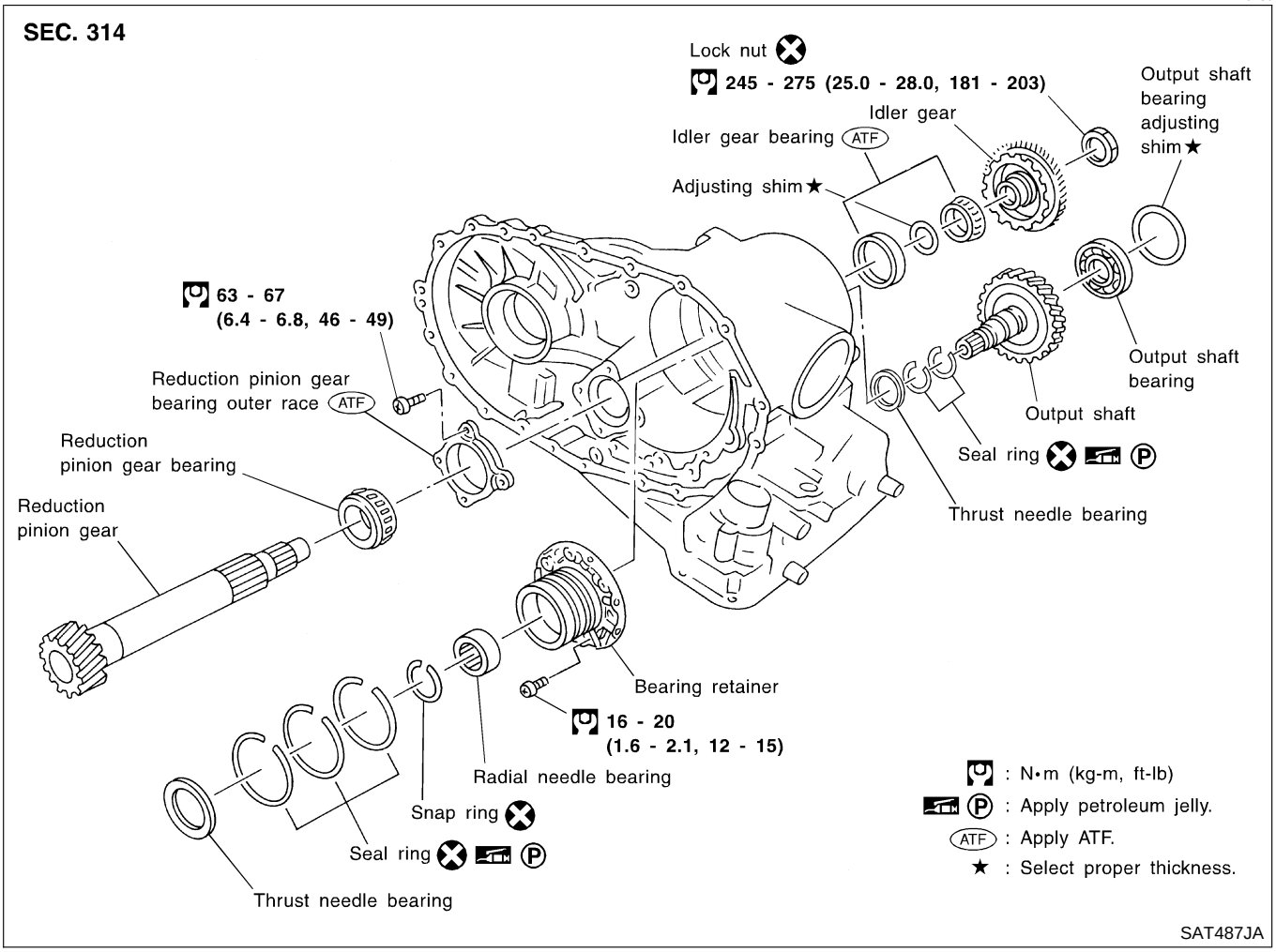


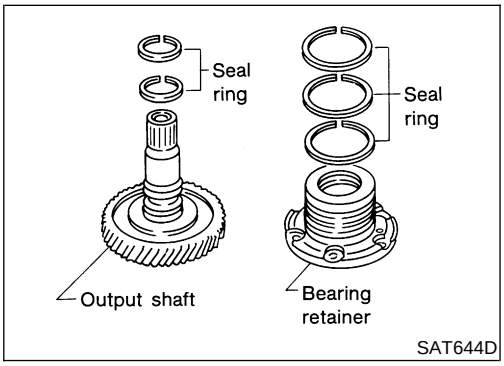
8. Install snap ring to groove of rear internal gear.

Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer

COMPONENTS

NIAT0286

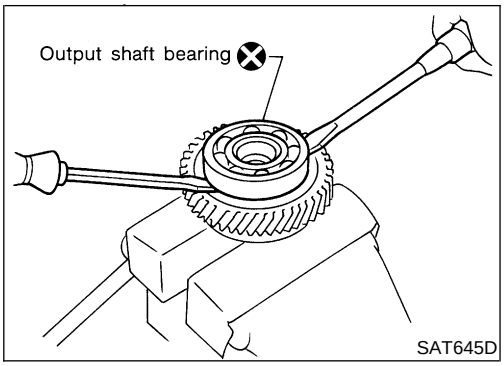




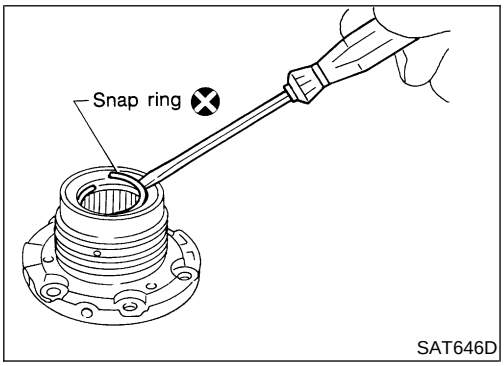
DISASSEMBLY

NIAT0287

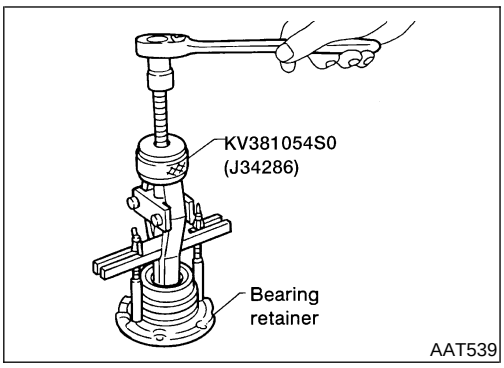
1. Remove seal rings from output shaft and bearing retainer.



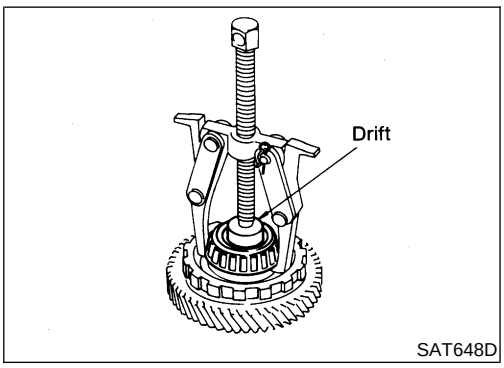
2. Remove output shaft bearing with screwdrivers.
- **Always replace bearing with a new one when removed.**
- **Do not damage output shaft.**



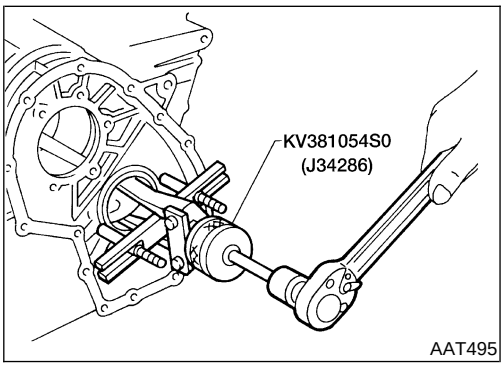
3. Remove snap ring from bearing retainer.



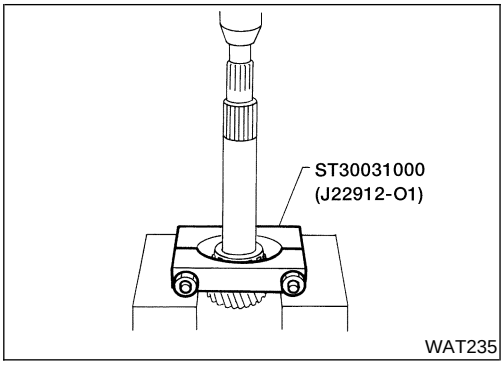
4. Remove needle bearing from bearing retainer.



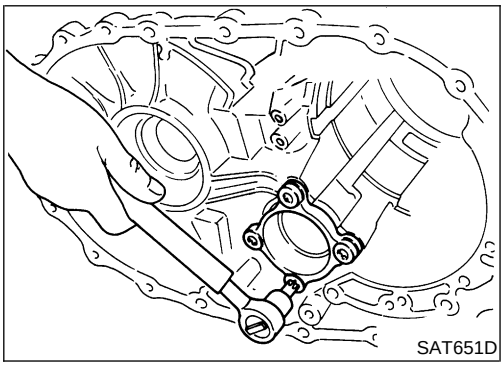
5. Remove idler gear bearing inner race from idler gear.



6. Remove idler gear bearing outer race from transmission case.



7. Press out reduction pinion gear bearing from reduction pinion gear.



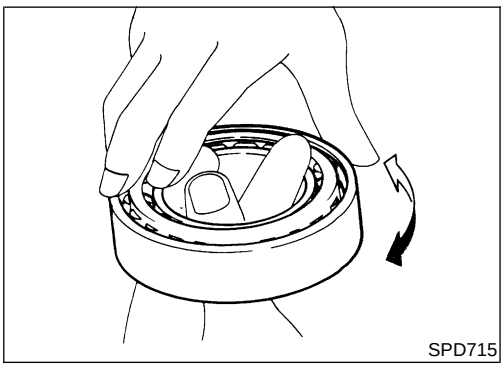
8. Remove reduction pinion gear bearing outer race from transmission case.

INSPECTION

Output Shaft, Idler Gear and Reduction Pinion Gear

NIAT0288
NIAT0288S01

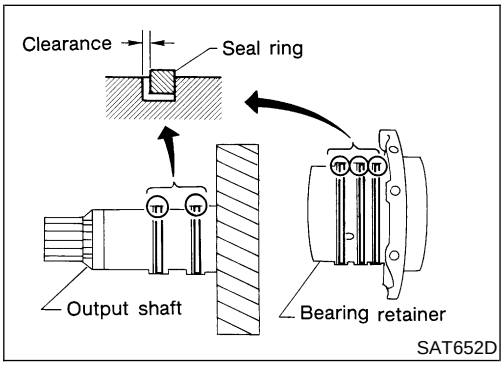
- Check shafts for cracks, wear or bending.
- Check gears for wear, chips and cracks.



Bearing

NIAT0288S02

- 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

NIAT0288S03

- 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)

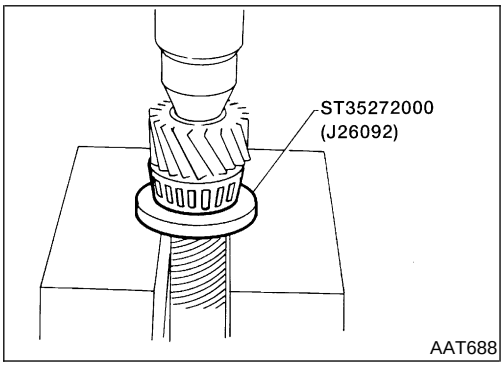
  Allowable limit:

  0.25 mm (0.0098 in)
- If not within allowable limit, replace bearing retainer.

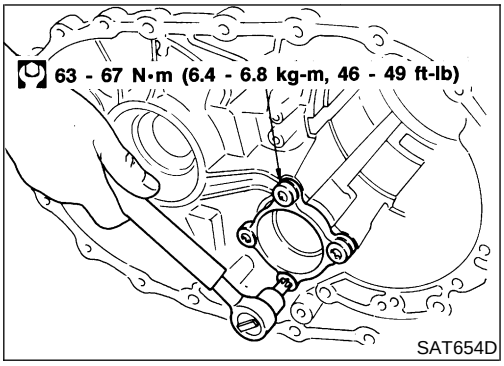
ASSEMBLY

NIAT0289

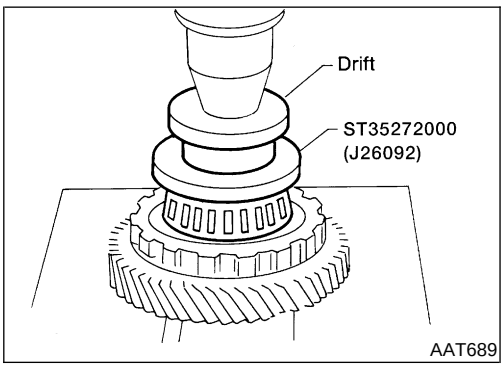
1. Press reduction pinion gear bearing on reduction pinion gear.



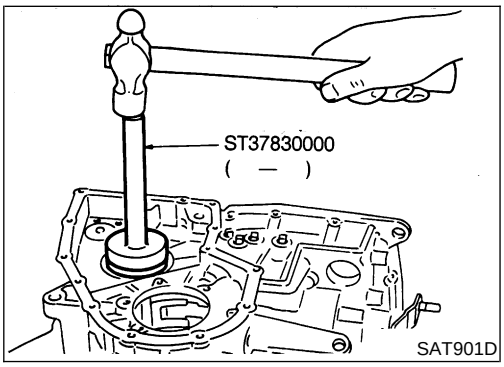
2. Install reduction pinion gear bearing outer race on transmission case.

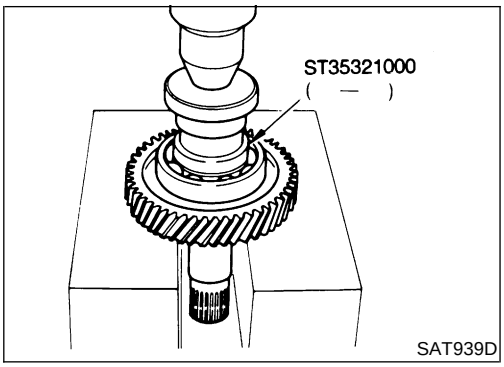


3. Press idler gear bearing inner race on idler gear.

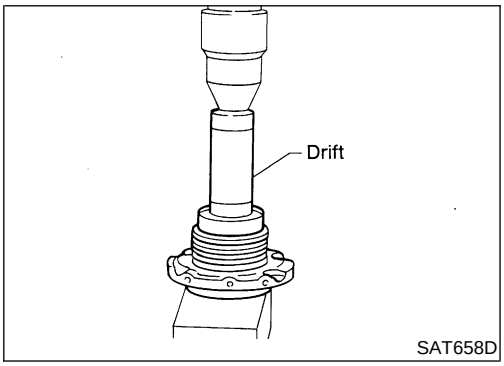


4. Install idler gear bearing outer race on transmission case.

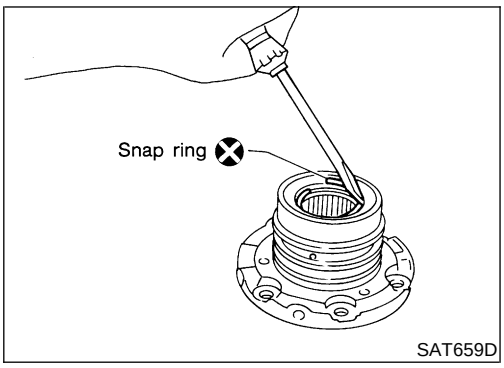




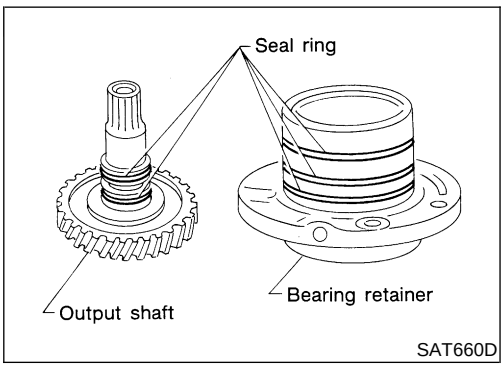
5. Press output shaft bearing on output shaft.



6. Press needle bearing on bearing retainer.

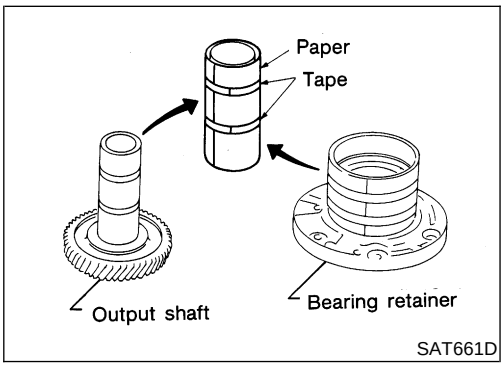


7. Install snap ring to bearing retainer.



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.

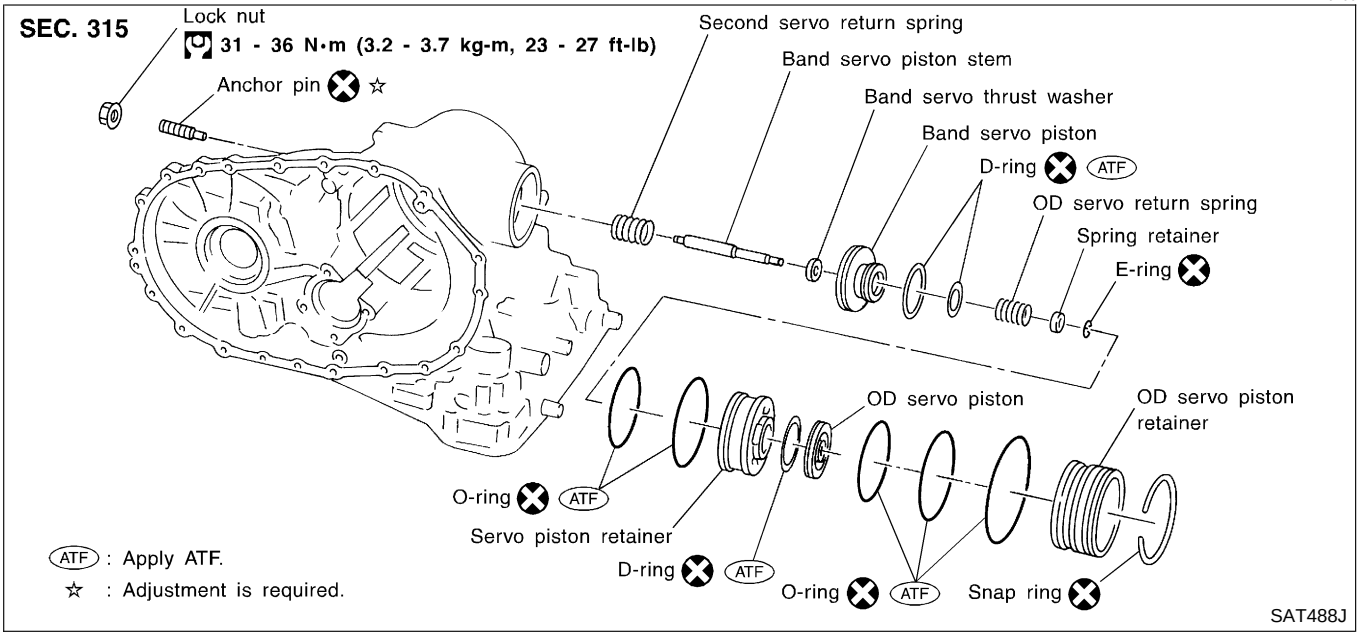


- **Roll paper around seal rings to prevent seal rings from spreading.**

Band Servo Piston Assembly

COMPONENTS

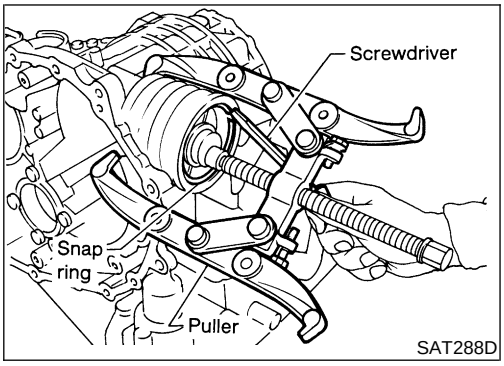
NIAT0290



DISASSEMBLY

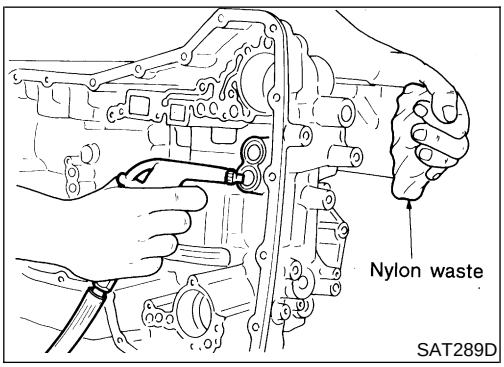
NIAT0291

1. Remove band servo piston snap ring.



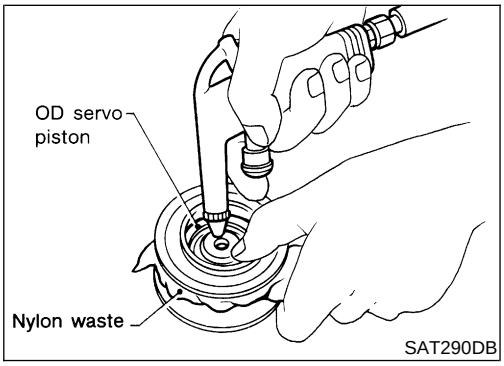
2. Apply compressed air to oil hole in transmission case to remove OD servo piston retainer and band servo piston assembly.

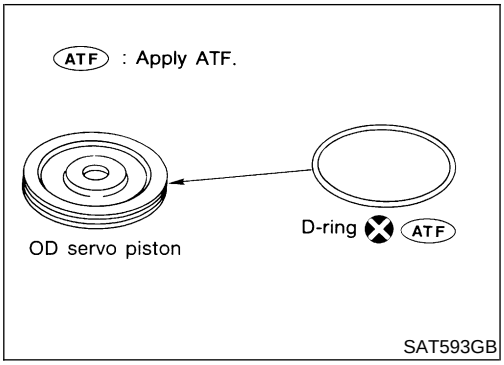
- **Hold band servo piston assembly with a rag or nylon waste.**



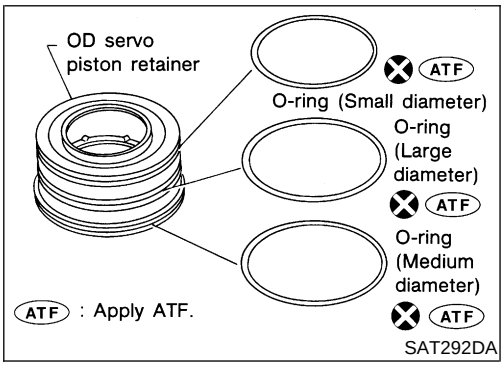
3. Apply compressed air to oil hole in OD servo piston retainer to remove OD servo piston from retainer.

- **Hold OD servo piston while applying compressed air.**

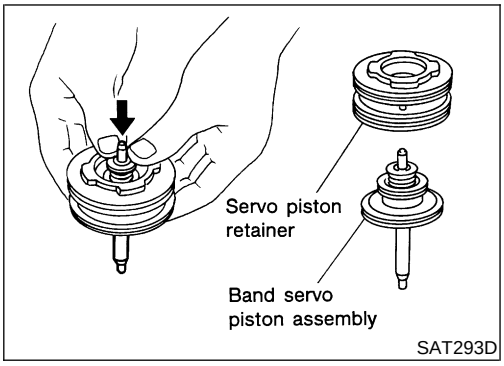




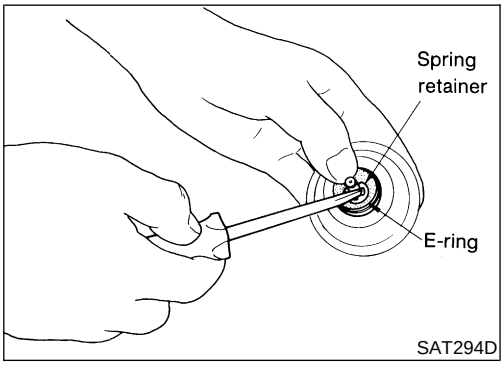
4. Remove D-ring from OD servo piston.



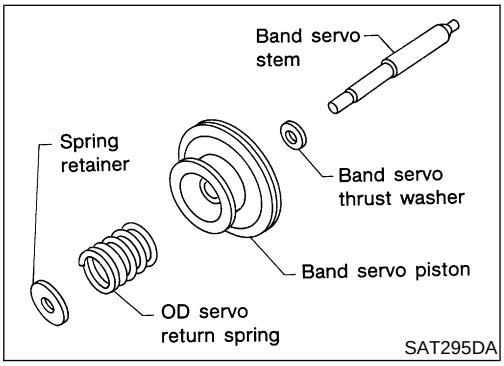
5. Remove O-rings from OD servo piston retainer.



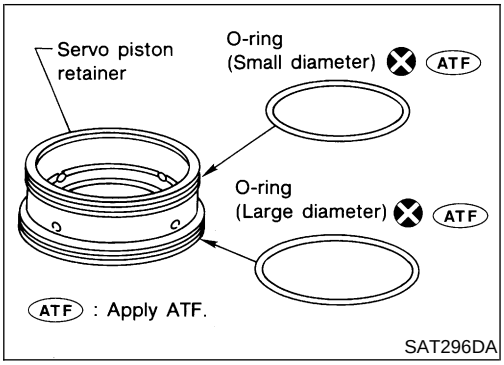
6. Remove band servo piston assembly from servo piston retainer by pushing it forward.



7. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.

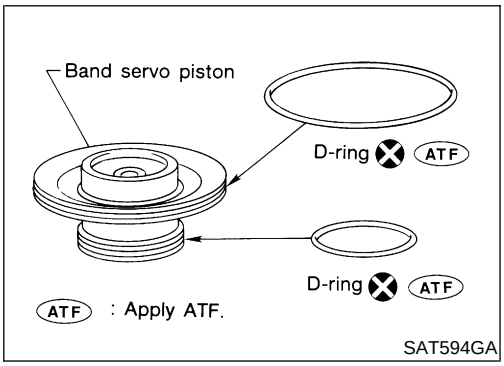


8. Remove OD servo return spring, band servo thrust washer and band servo piston stem from band servo piston.



SAT296DA

9. Remove O-rings from servo piston retainer.



SAT594GA

10. Remove D-rings from band servo piston.

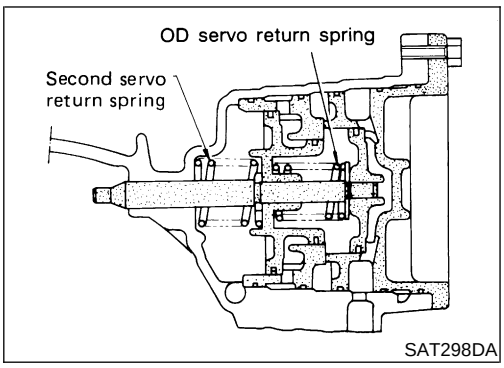
INSPECTION

NIAT0292

Pistons, Retainers and Piston Stem

NIAT0292S01

- Check frictional surfaces for abnormal wear or damage.



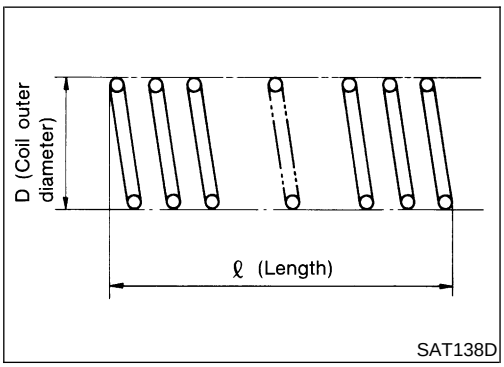
SAT298DA

Return Springs

NIAT0292S02

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

Band servo inspection standard:
Refer to "Band Servo", AT-549.



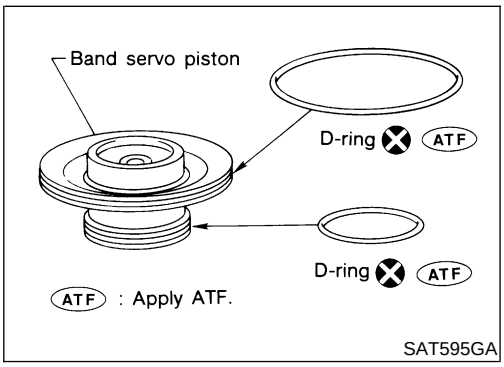
SAT138D

ASSEMBLY

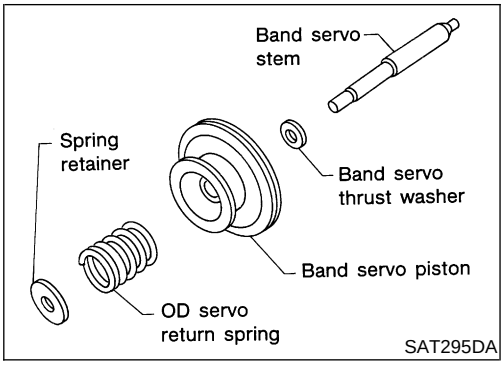
NIAT0293

1. Install D-rings to band servo piston retainer.

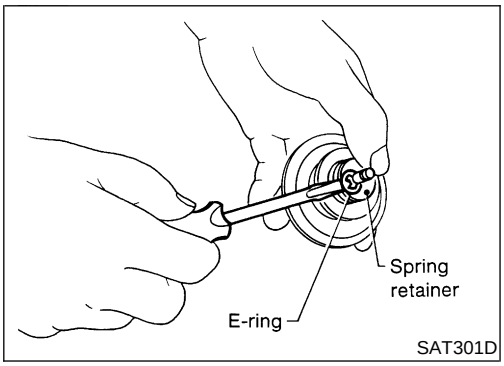
- **Apply ATF to D-rings.**
- **Pay attention to position of each D-ring.**



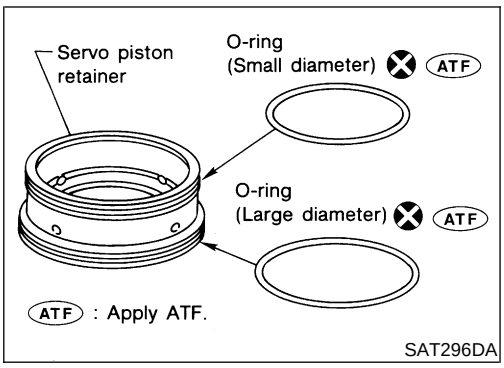
SAT595GA



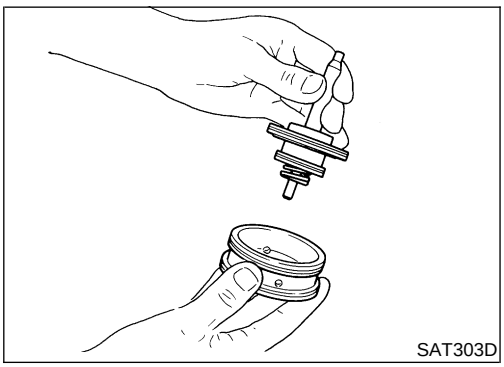
2. Install band servo piston stem, band servo thrust washer, OD servo return spring and spring retainer to band servo piston.



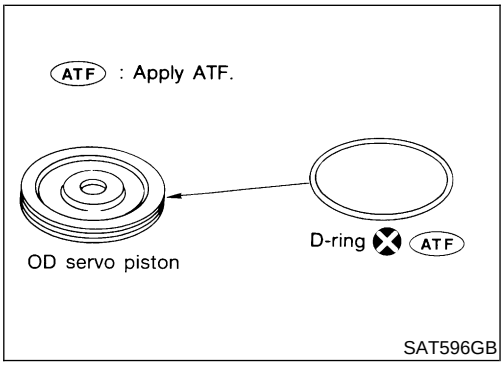
3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.



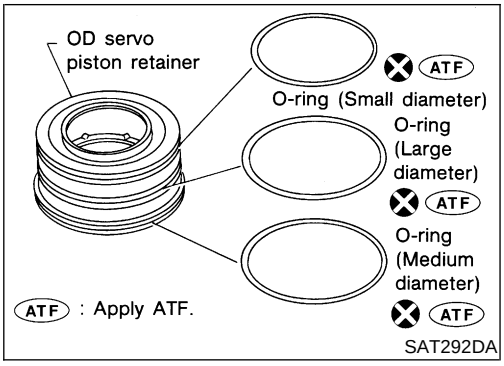
4. Install O-rings to servo piston retainer.
- **Apply ATF to O-rings.**
- **Pay attention to the positions of the O-rings.**



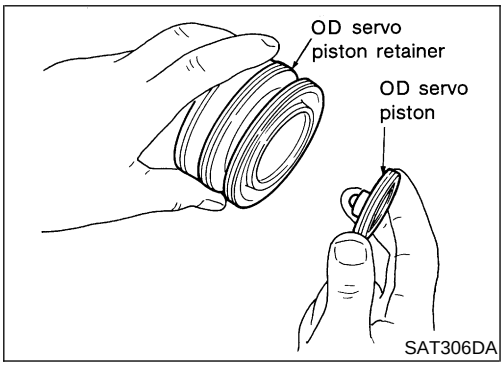
5. Install band servo piston assembly to servo piston retainer by pushing it inward.



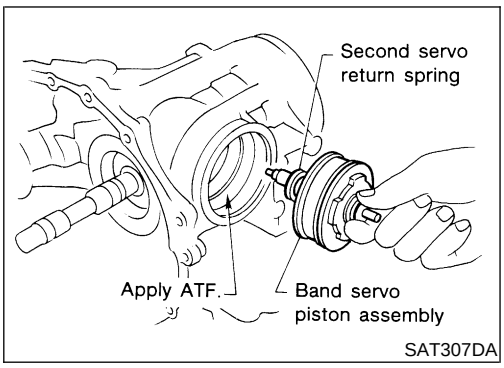
6. Install D-ring to OD servo piston.
- **Apply ATF to D-ring.**



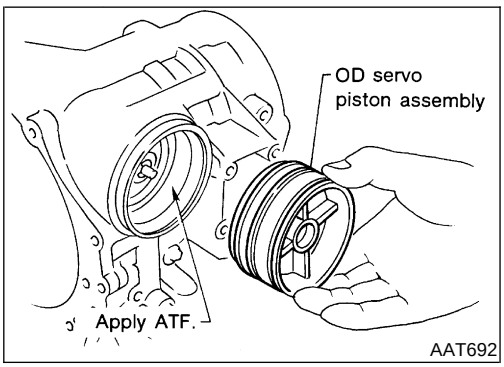
7. Install O-rings to OD servo piston retainer.
- **Apply ATF to O-rings.**
- **Pay attention to the positions of the O-rings.**



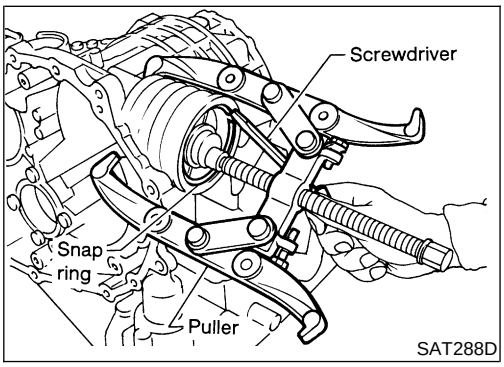
8. Install OD servo piston to OD servo piston retainer.



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.**

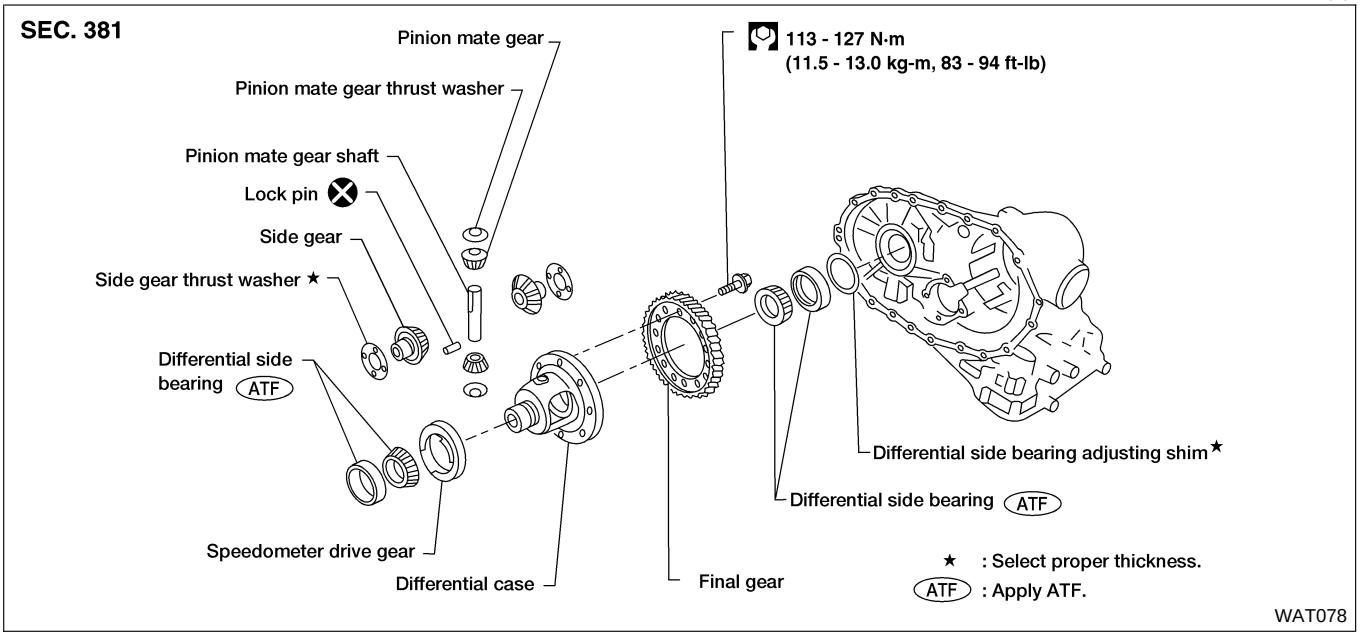


11. Install band servo piston snap ring to transmission case.

Final Drive

COMPONENTS

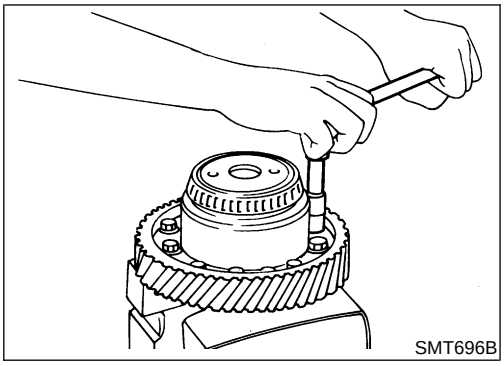
NIAT0294



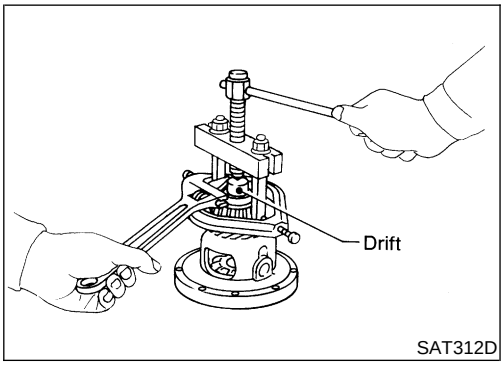
DISASSEMBLY

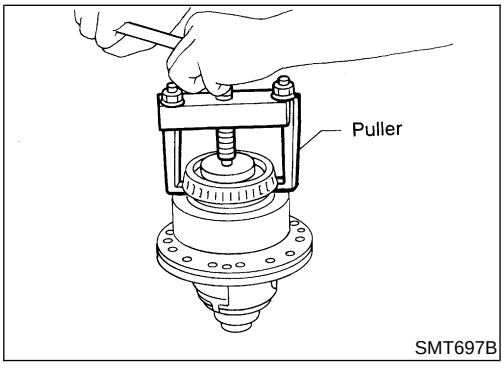
NIAT0295

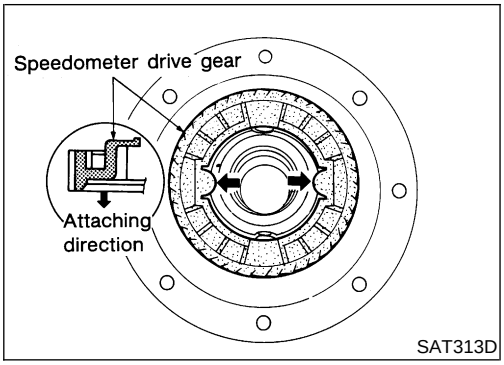
1. Remove final gear.



2. Press out differential side bearings.

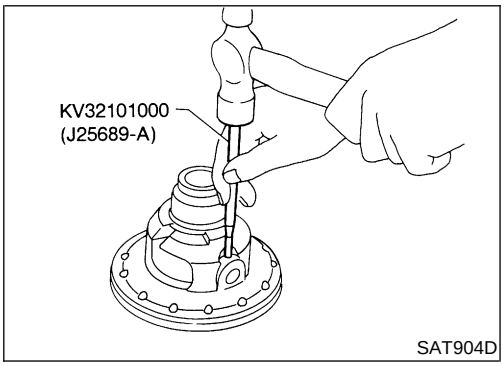






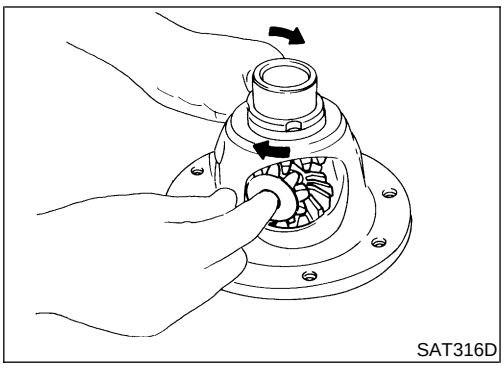
SAT313D

3. Remove speedometer drive gear.

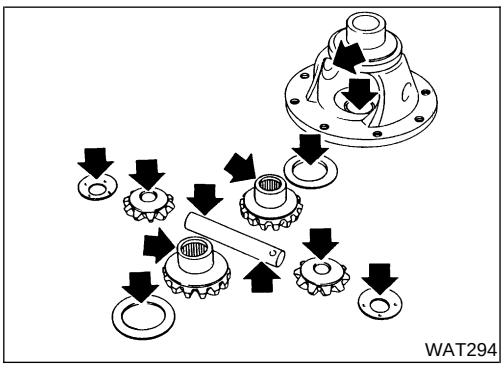


SAT904D

4. Drive out pinion mate shaft lock pin.


SAT316D

5. Draw out pinion mate shaft from differential case.
6. Remove pinion mate gears and side gears.


WAT294

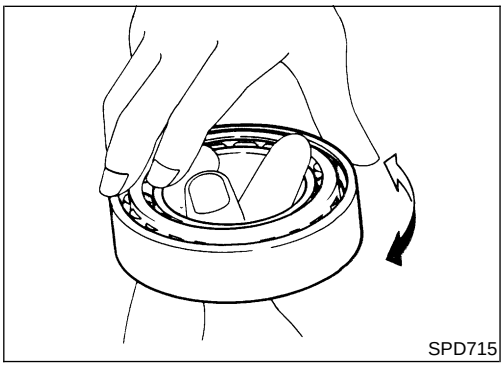
INSPECTION

NIAT0296

Gear, Washer, Shaft and Case

NIAT0296S01

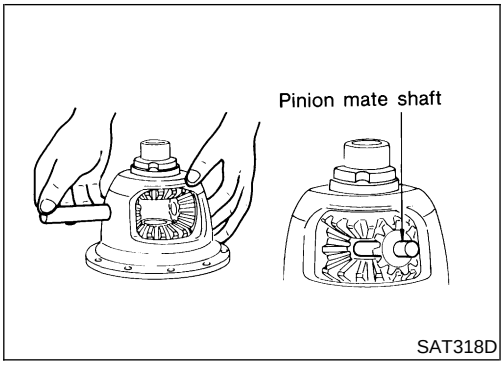
- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.


SPD715

Bearings

NIAT0296S03

- 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.**



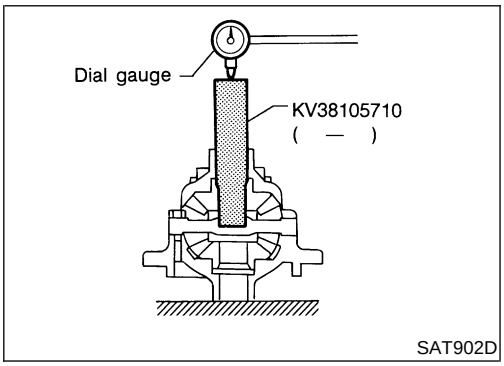
SAT318D

ASSEMBLY

NIAT0297

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.**



SAT902D

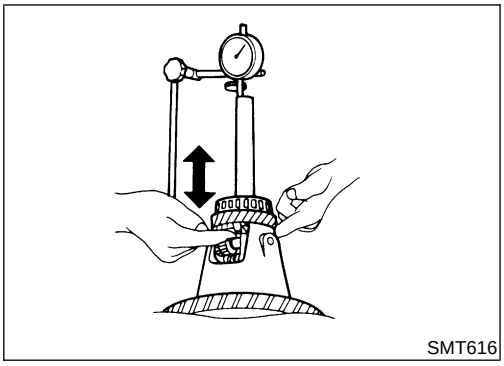
3. Measure clearance between side gear and differential case with washers using the following procedure.

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:

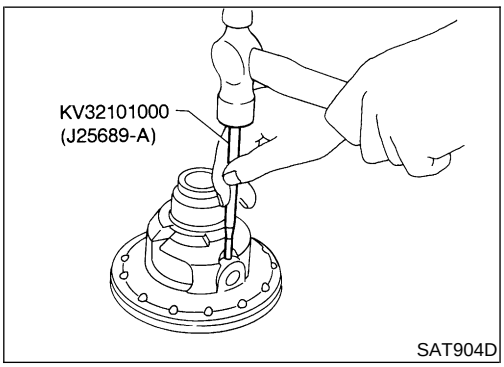
0.1 - 0.2 mm (0.004 - 0.008 in)


SMT616

c. If not within specification adjust clearance by changing thickness of side gear thrust washers.

Side gear thrust washer:

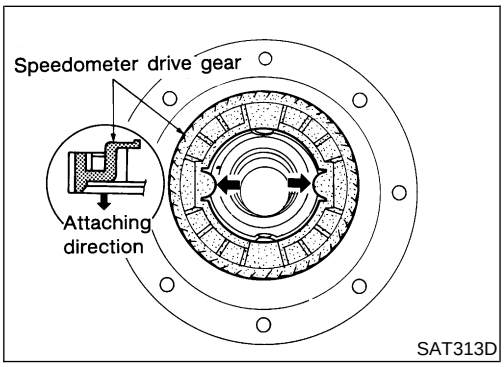
Refer to SDS, AT-545.



SAT904D

4. Install lock pin.

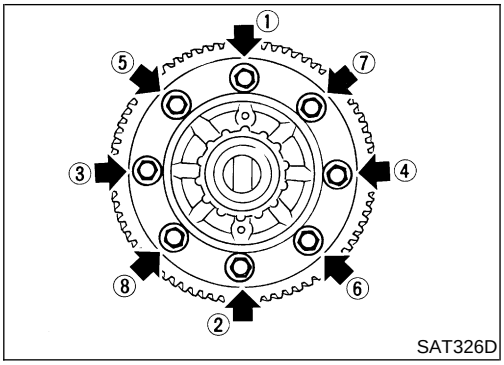
- **Make sure that lock pin is flush with case.**



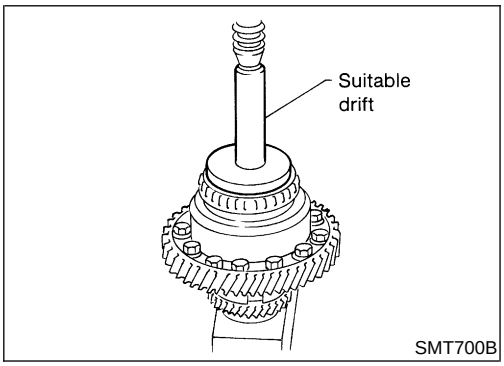
SAT313D

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)



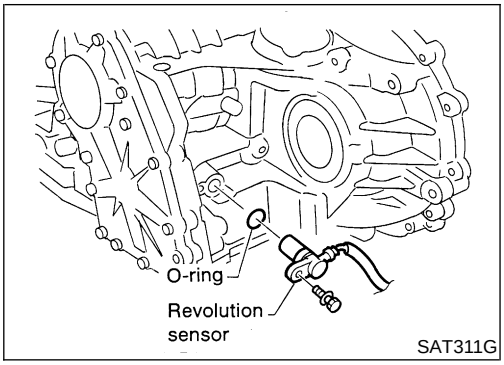
7. Press on differential side bearings.

Assembly (1)

NIAT0298

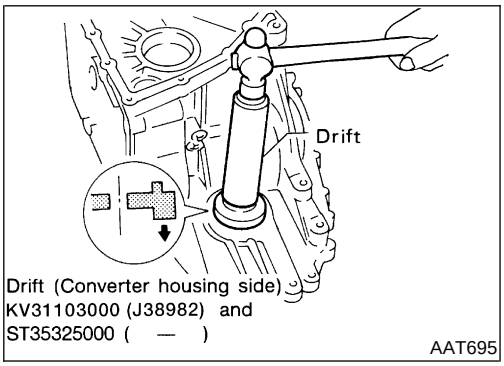
1. Install revolution sensor onto transmission case.

Always use new sealing parts.



SAT311G

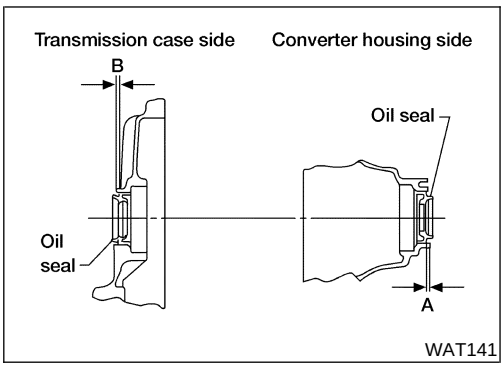
2. Install differential side oil seals on transmission case and converter housing, so that “A” and “B” are within specifications.



AAT695

Unit: mm (in)

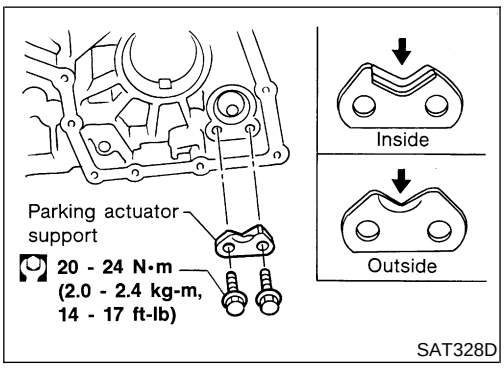
A	B
5.5 - 6.5 (0.217 - 0.256)	−0.5 to 0.5 (−0.020 to 0.020)



WAT141

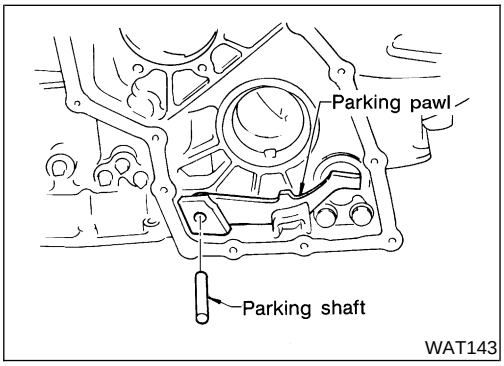
3. Install parking actuator support to transmission case.

- **Pay attention to direction of parking actuator support.**

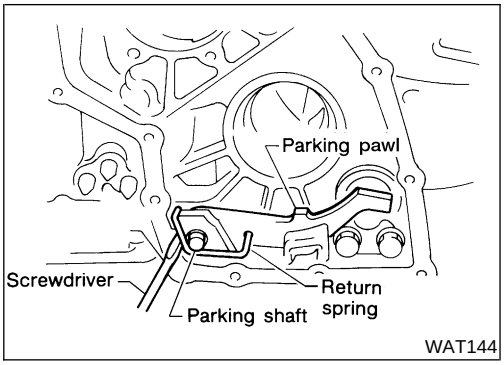


SAT328D

4. Install parking pawl on transmission case and fix it with parking shaft.



WAT143



5. Install return spring.

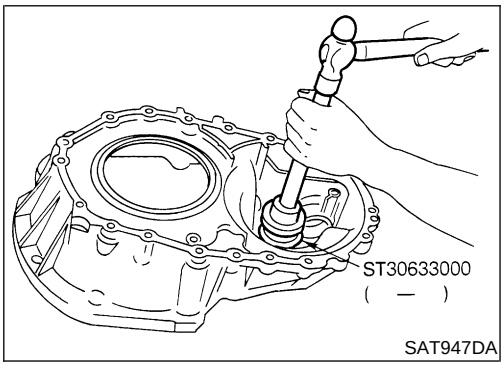
Adjustment (1)

NIAT0299

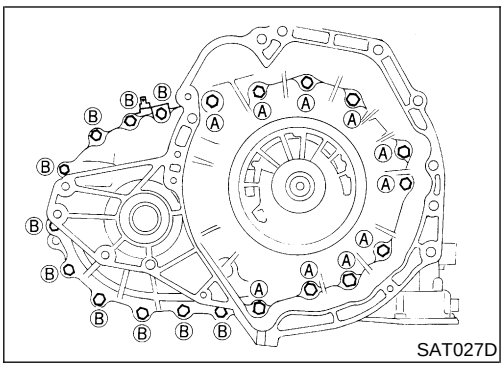
DIFFERENTIAL SIDE BEARING PRELOAD

NIAT0299S01

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.

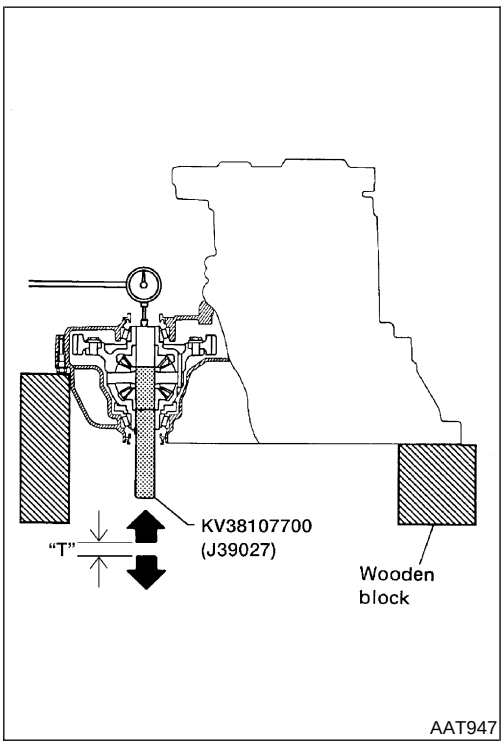
Differential side bearing preload "T":

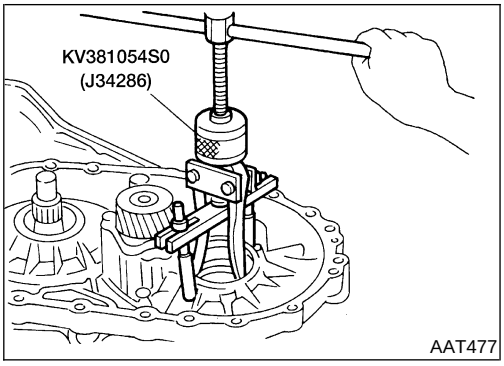
0.04 - 0.09 mm (0.0016 - 0.0035 in)

8. Select proper thickness of differential side bearing adjusting shim(s) using SDS table as a guide.

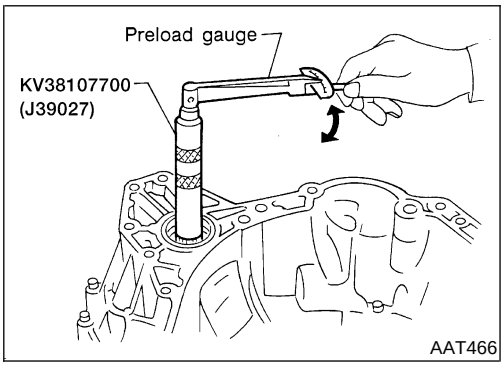
Differential side bearing adjusting shim:

Refer to "DIFFERENTIAL SIDE BEARING ADJUSTING SHIM", AT-545.





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

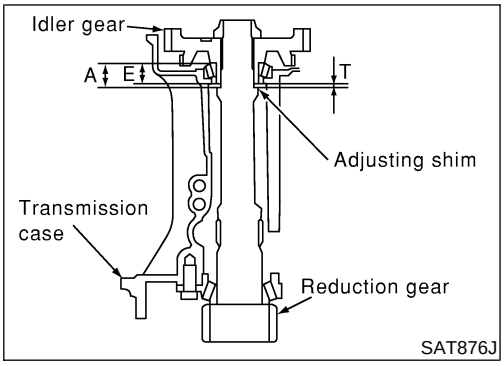
NIAT0299S02

- Be sure to remove final drive assembly before doing this procedure.
- Using caliper and straightedge, calculate a dimension "T" (adjuster shim thickness) in the left figure by the following formula. And adjust the inspection standard for pre-load (rotating slide torque) as shown below.

  T = A – E

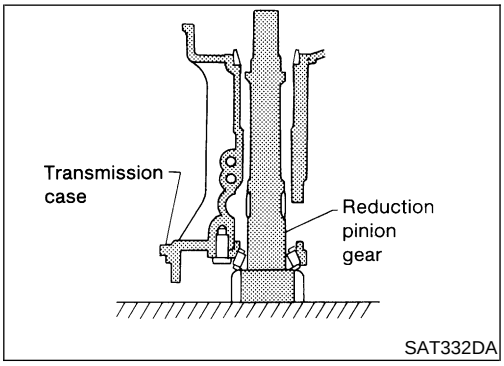
  Inspection standard for preload:

  0.1 - 0.69 N·m (1.1 - 7.0 kg-cm, 0.95 - 6.08 in-lb)



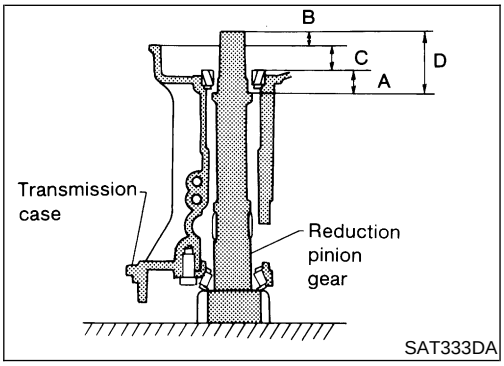
1. Remove transmission case and final drive assembly from converter housing.
2. Select proper thickness of reduction pinion gear bearing adjusting shim using the following procedures.

a. Place reduction pinion gear on transmission case as shown.



b. Place idler gear bearing on transmission case.

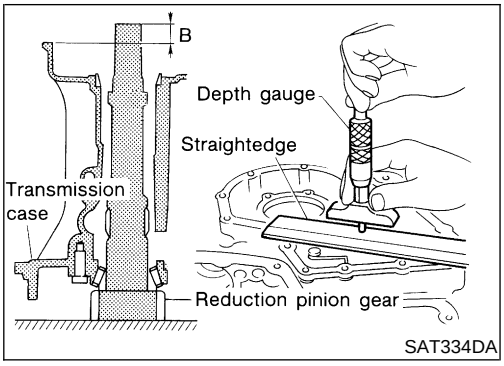
c. Measure dimensions "B", "C" and "D" and calculate dimension "A".



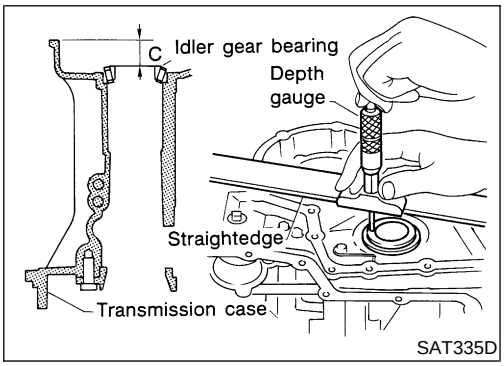
A = D − (B + C)

"A": Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.

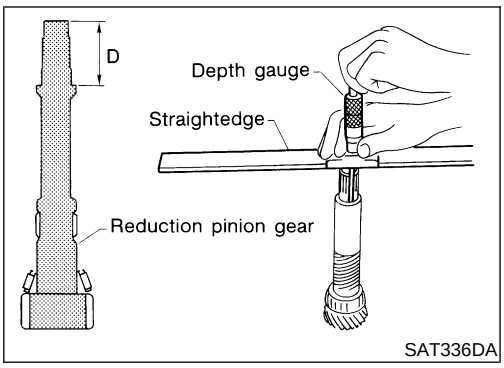
Adjustment (1) (Cont'd)



- Measure dimension "B" between the end of reduction pinion gear and the surface of transmission case.
- **Measure dimension "B" in at least two places.**

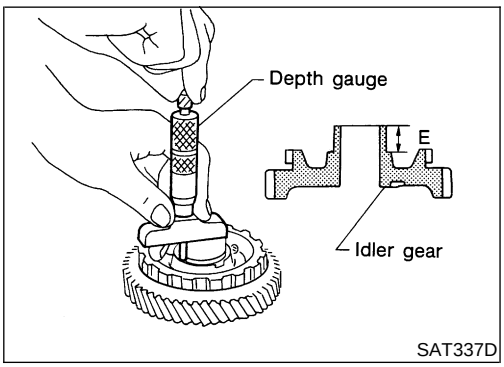


- Measure dimension "C" between the surface of idler gear bearing inner race and the surface of transmission case.
- **Measure dimension "C" in at least two places.**



- 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.**

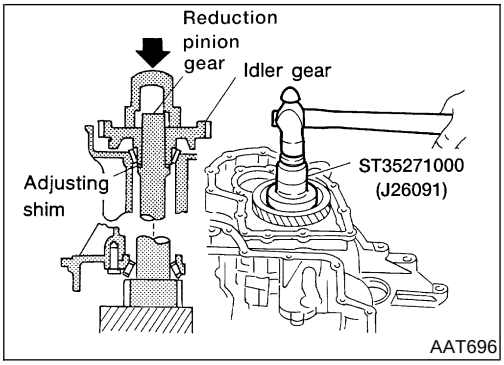
e. Calculate "T" and select proper thickness of reduction pinion gear bearing adjusting shim using SDS table as a guide.

T = A − E – 0.05 mm (0.0020 in)*

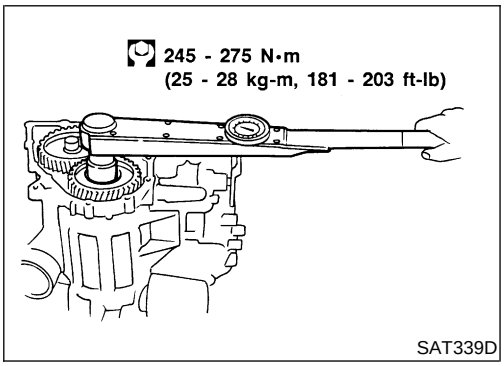
Reduction pinion gear bearing adjusting shim:

Refer to "REDUCTION PINION GEAR BEARING ADJUSTING SHIM", AT-547.

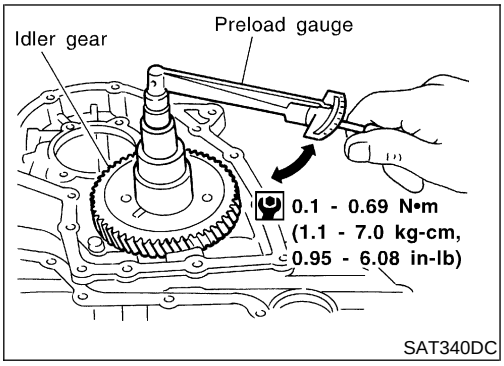
*: Bearing preload



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.**

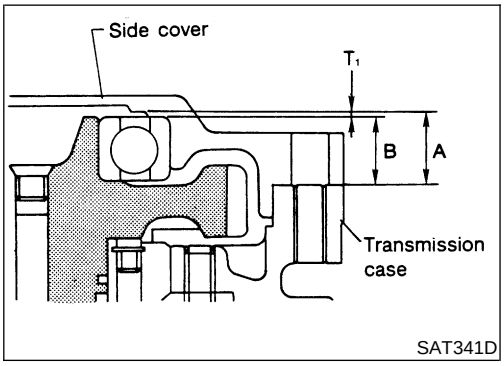


6. Tighten idler gear lock nut to the specified torque.
- **Lock idler gear with parking pawl when tightening lock nut.**



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.**

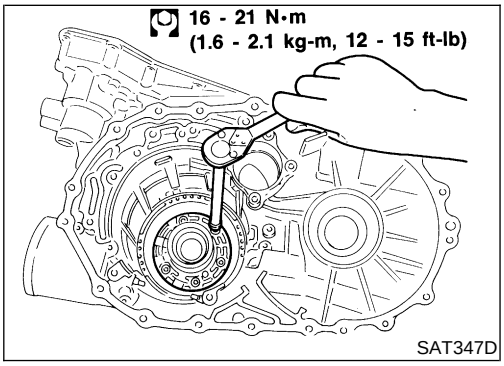
Turning torque of reduction pinion gear:
0.1 - 0.69 N·m (1.1 - 7.0 kg-cm, 0.95 - 6.08 in-lb)



OUTPUT SHAFT END PLAY

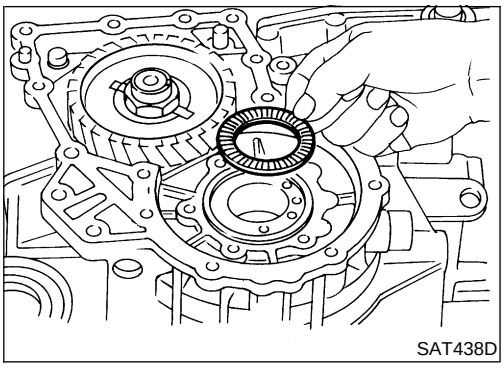
NIAT0299S03

- 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.

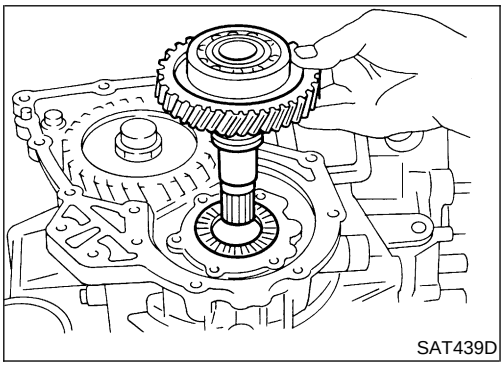


1. Install bearing retainer for output shaft.

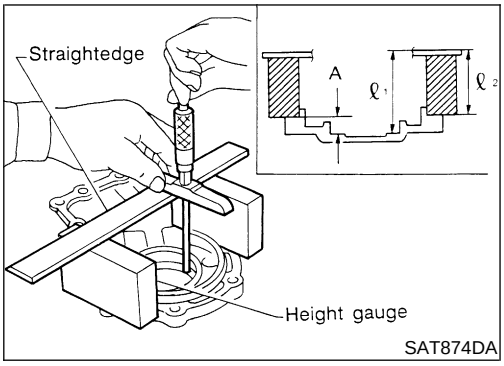
Adjustment (1) (Cont'd)


SAT438D

2. Install output shaft thrust needle bearing on bearing retainer.


SAT439D

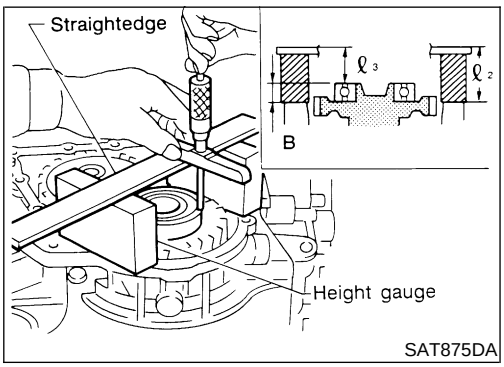
3. Install output shaft on transmission case.



SAT874DA

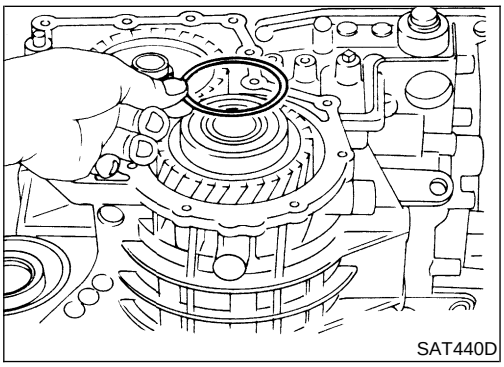
4. Measure dimensions "ℓ_1" and "ℓ_2" at side cover and then calculate dimension "A".

- **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

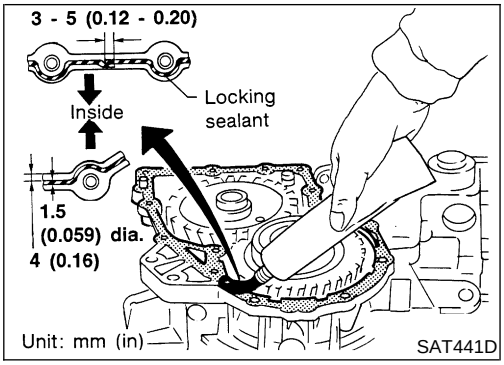


SAT875DA

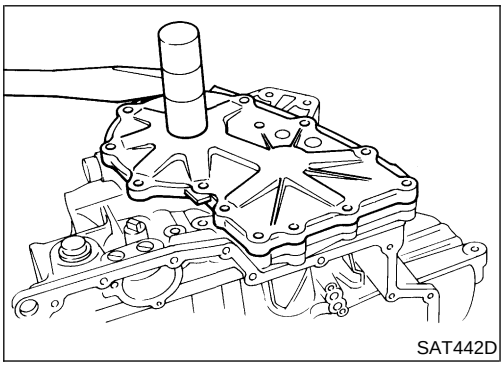
5. Measure dimensions "ℓ_2" and "ℓ_3" and then calculate dimension "B".
   Measure "ℓ_2" and "ℓ_3" in at least two places.
   "B": Distance between the end of output shaft bearing outer race and the side cover fitting surface of transmission case
   $B = \ell_2 - \ell_3$
   ℓ_2: Height of gauge


SAT440D

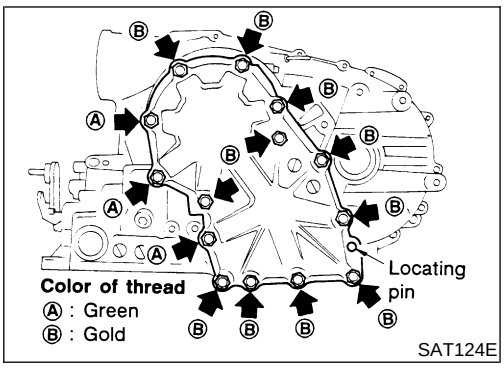
6. Select proper thickness of adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications.
   Output shaft end play (A − B):
   0 - 0.5 mm (0 - 0.020 in)
   Output shaft end play adjusting shim:
   Refer to "Output Shaft", AT-548.
7. Install adjusting shim on output shaft bearing.



8. Apply locking sealant (Locktite 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.**

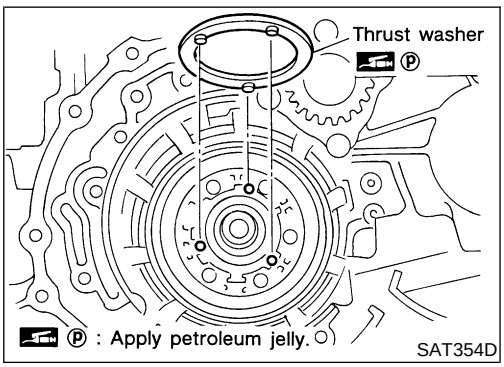


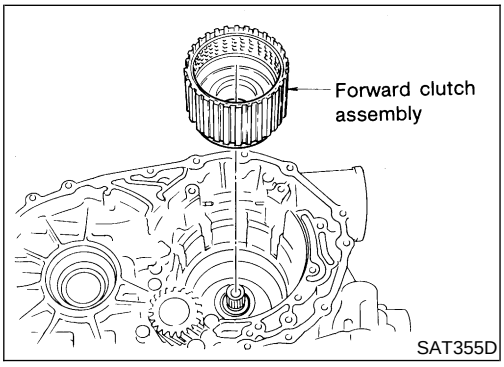
10. Tighten side cover fixing bolts to specified torque.
: 26 - 30 N·m (2.7 - 3.1 kg-m, 20 - 22 ft-lb)
- **Do not mix bolts A and B.**
- **Always replace bolts A as they are self-sealing bolts.**

Assembly (2)

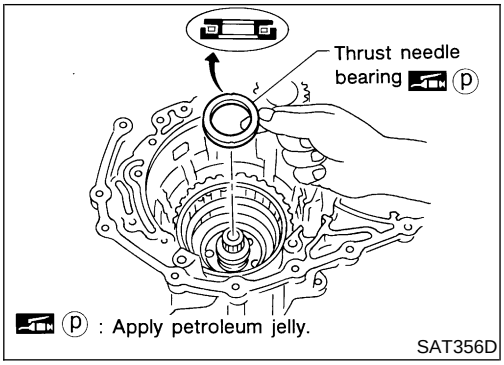
NIAT0300

1. Remove paper rolled around bearing retainer.
2. Install thrust washer on bearing retainer.
- **Apply petroleum jelly to thrust washer.**

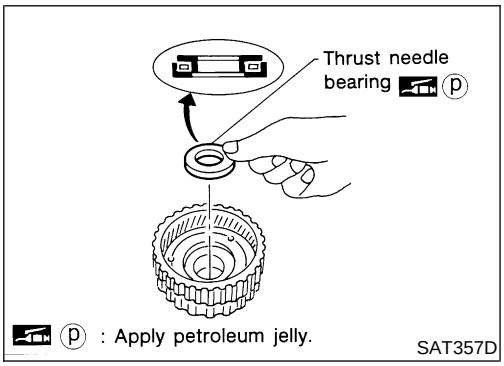




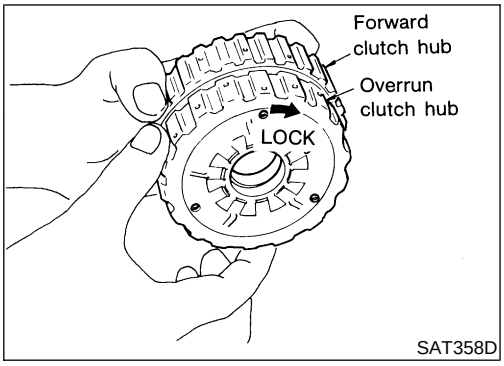
3. Install forward clutch assembly.
- **Align teeth of low & reverse brake drive plates before installing.**
- **Make sure that bearing retainer seal rings are not spread.**



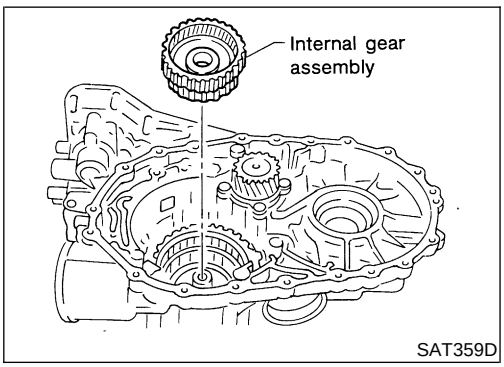
4. Install thrust needle bearing on bearing retainer.
- **Apply petroleum jelly to thrust bearing.**
- **Pay attention to direction of thrust needle bearing.**



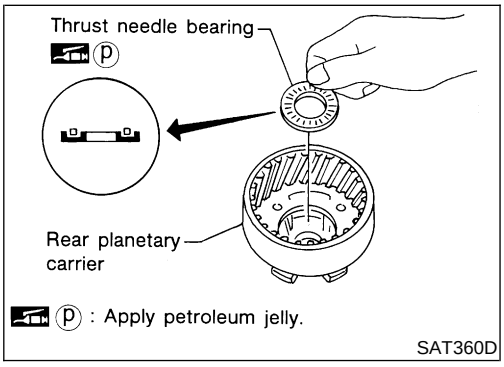
5. Install thrust needle bearing on rear internal gear.
- **Apply petroleum jelly to thrust needle bearing.**
- **Pay attention to direction of thrust needle bearing.**



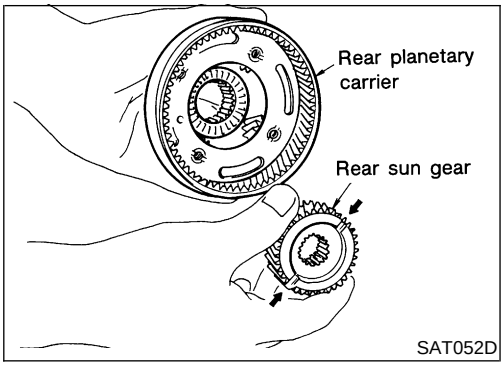
6. Hold forward clutch hub and turn overrun clutch hub. Check overrun clutch hub for directions of lock and unlock.
- If not as shown in illustration, check installed direction of forward one-way clutch.



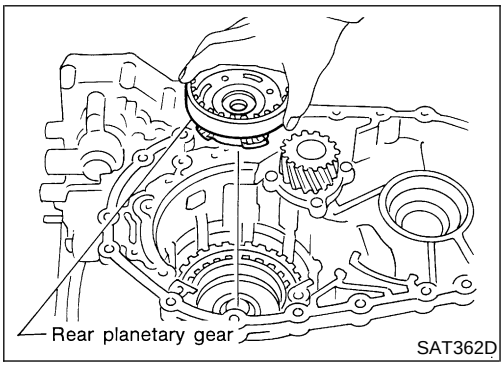
7. Install rear internal gear assembly.
- **Align teeth of forward clutch and overrun clutch drive plate.**



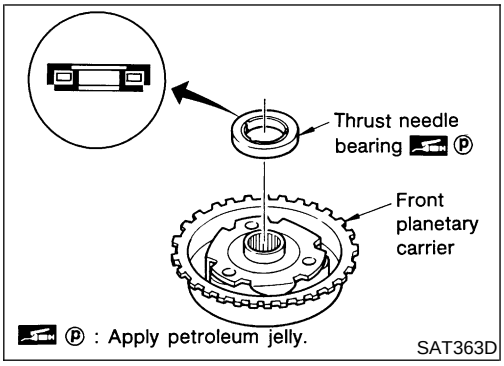
8. Install needle bearing on rear planetary carrier.
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**



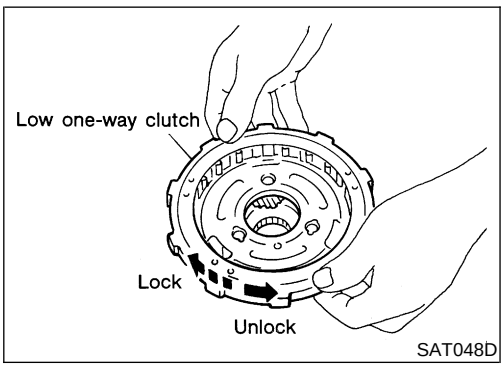
9. Install rear sun gear on rear planetary carrier.
- **Pay attention to direction of rear sun gear.**



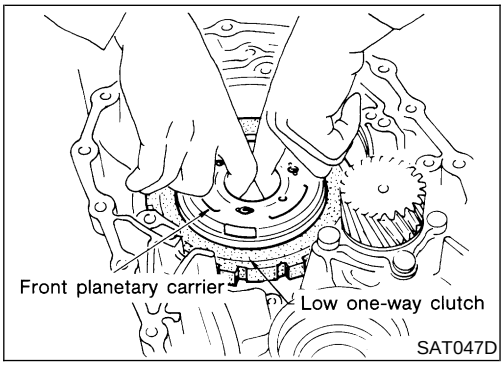
10. Install rear planetary carrier on transmission case.



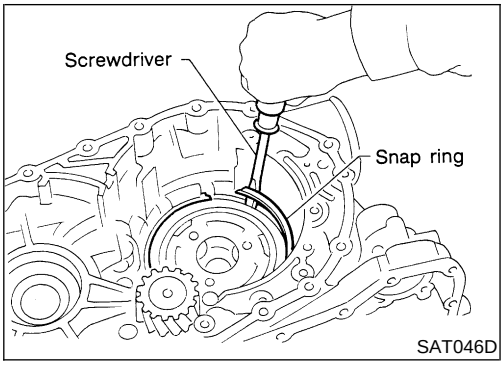
11. Install thrust needle bearing on front planetary carrier.
- **Apply petroleum jelly to thrust needle bearing.**
- **Pay attention to direction of thrust needle bearing.**



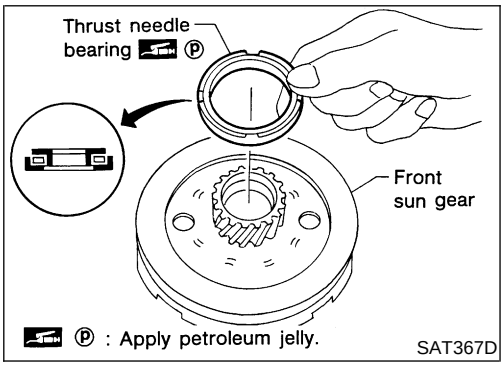
12. Install low one-way clutch to front planetary carrier by turning it in the direction of the arrow as shown.
13. While holding front planetary carrier, turn low one-way clutch. Check low one-way clutch for correct directions of lock and unlock.



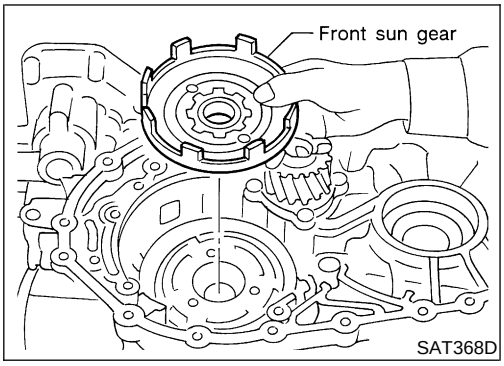
14. Install front planetary carrier assembly on transmission case.



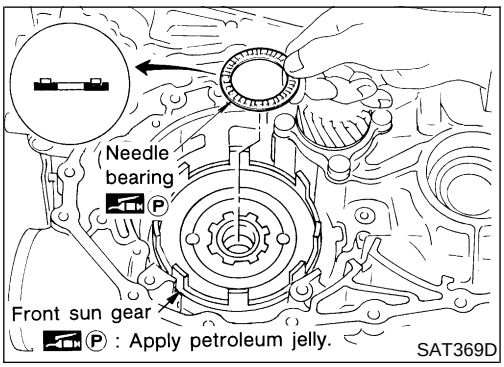
15. Install snap ring with screwdriver.
- **Forward clutch and bearings must be correctly installed for snap ring to fit groove of transmission case.**



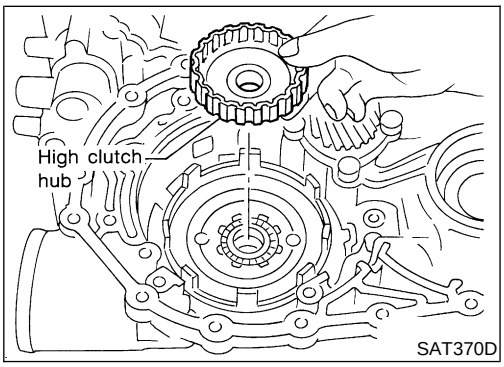
16. Install needle bearing on front sun gear.
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**



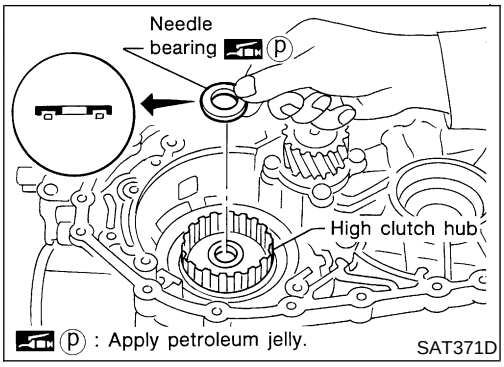
17. Install front sun gear on front planetary carrier.



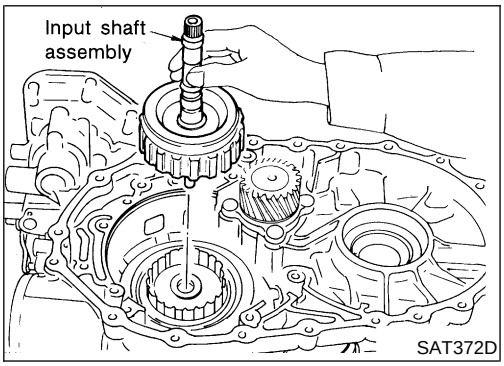
18. Install needle bearing on front sun gear.
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**



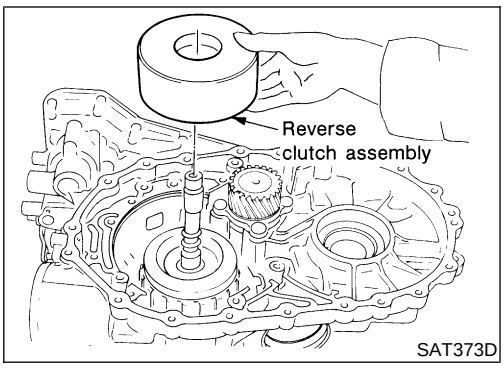
19. Install high clutch hub on front sun gear.



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.**

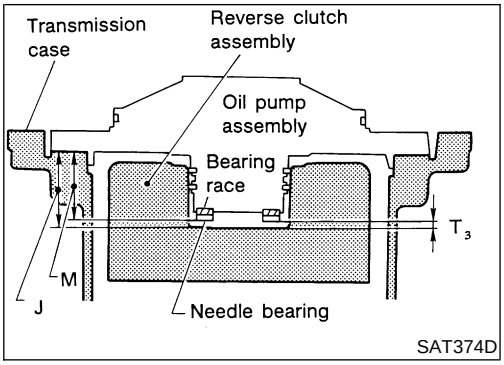
Adjustment (2)

NIAT0301

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	—	●

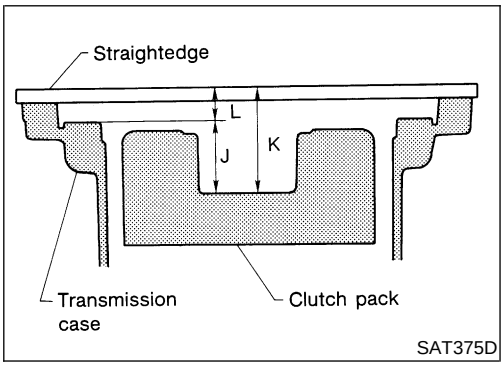
Adjustment (2) (Cont'd)



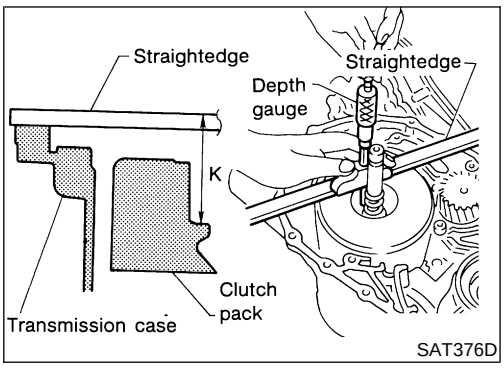
TOTAL END PLAY

NIAT0301S01

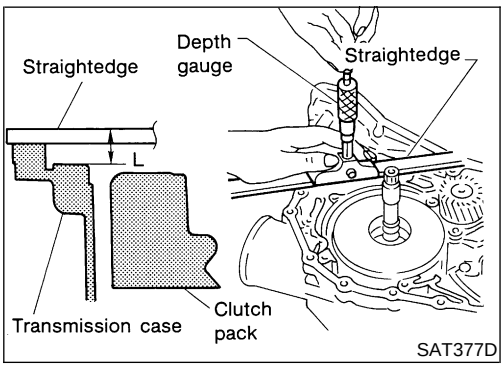
- Measure clearance between reverse clutch drum and needle bearing for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



1. Measure dimensions "K" and "L" and then calculate dimension "J".



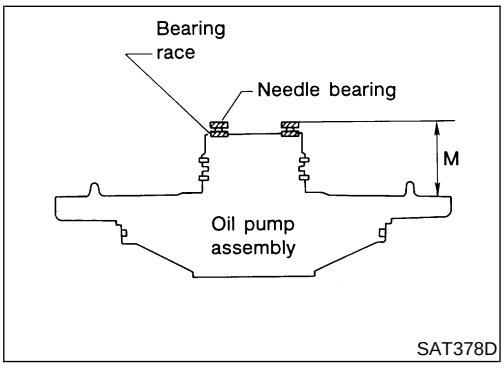
a. Measure dimension "K".



b. Measure dimension "L".

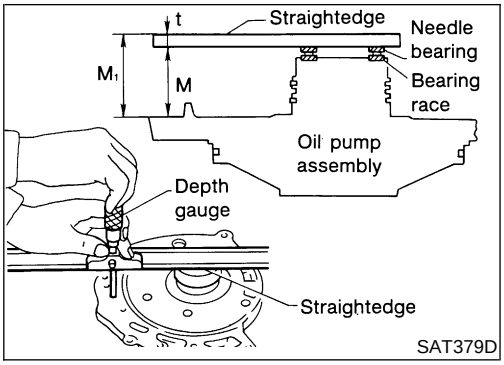
c. Calculate dimension "J".
"J": Distance between oil pump fitting surface of transmission case and needle bearing mating surface of high clutch drum

J = K − L

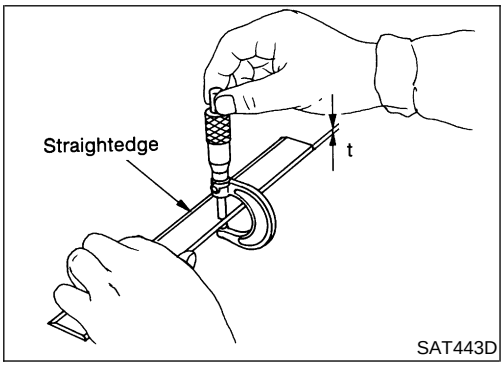


2. Measure dimension "M".

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
"M_1": Indication of gauge



c. Measure thickness of straightedge "t".
$M = M_1 - t$

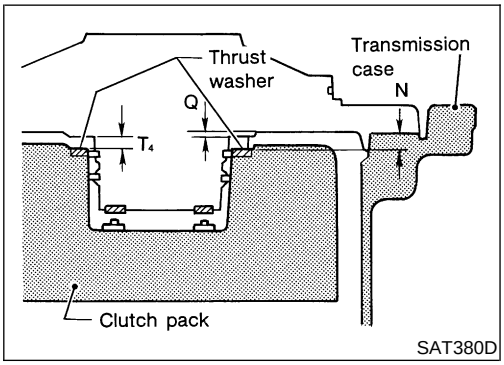
3. Adjust total end play "T_3".
$T_3 = J - M$
Total end play "T_3":
0.25 - 0.55 mm (0.0098 - 0.0217 in)

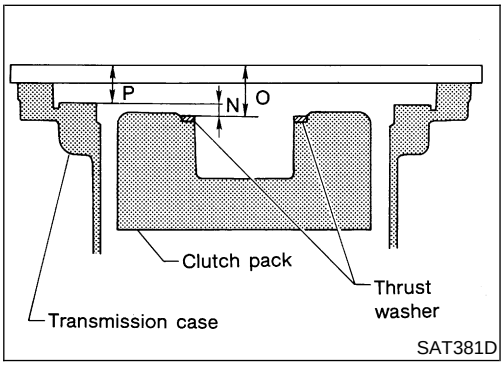
- Select proper thickness of bearing race so that total end play is within specifications.
Bearing races: Refer to "Total End Play", AT-549.

REVERSE CLUTCH END PLAY

NIAT0301S02

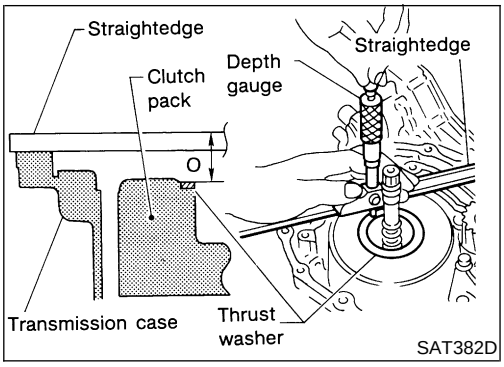
- Measure clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specifications.



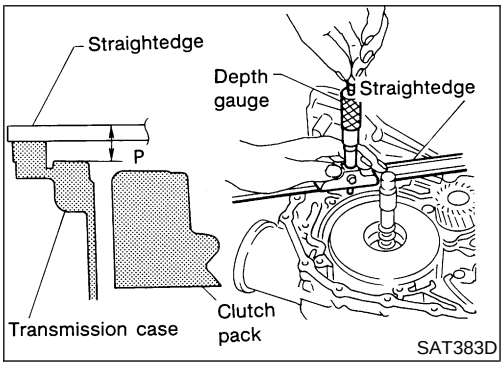


1. Measure dimensions "O" and "P" and then calculate dimension "N".

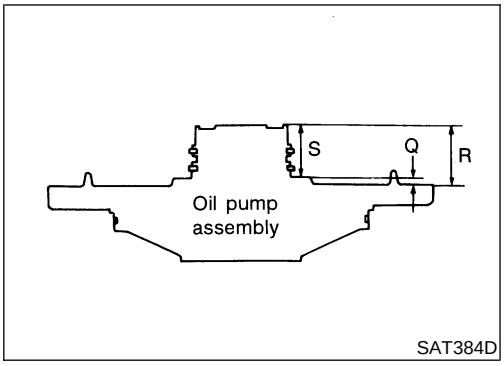
Adjustment (2) (Cont'd)



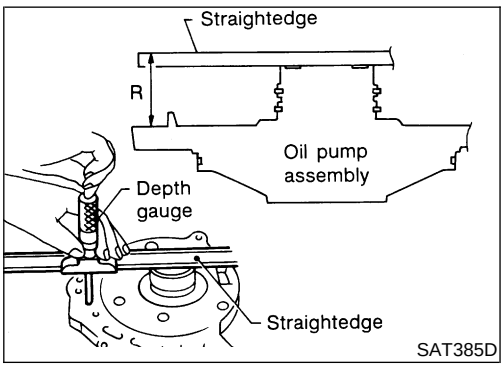
a. Place thrust washer on reverse clutch drum.
b. Measure dimension "O".



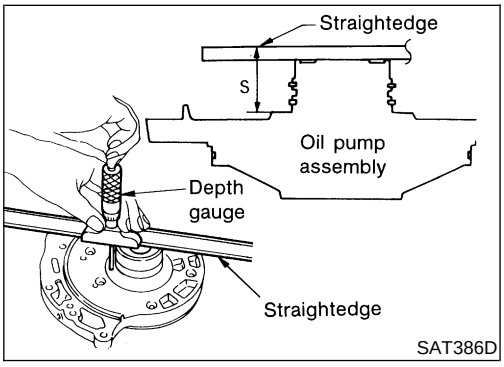
c. Measure dimension "P".
d. Calculate dimension "N".
"N": Distance between oil pump fitting surface of transmission case and thrust washer on reverse clutch drum
N = O − P



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 "T_4".

T_4 = N − Q

Reverse clutch end play:

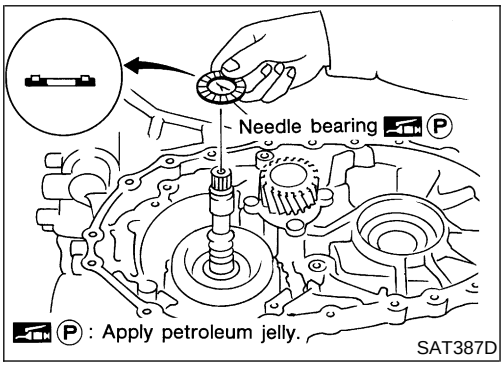
0.65 - 1.00 mm (0.0256 - 0.0394 in)

- Select proper thickness of thrust washer so that reverse clutch end play is within specifications.

Thrust washer: Refer to "Reverse Clutch End Play", AT-549.

Assembly (3)

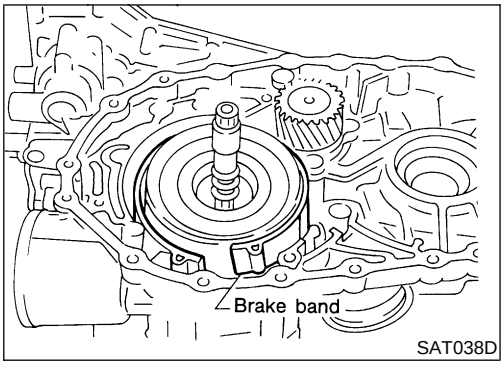
NIAT0302



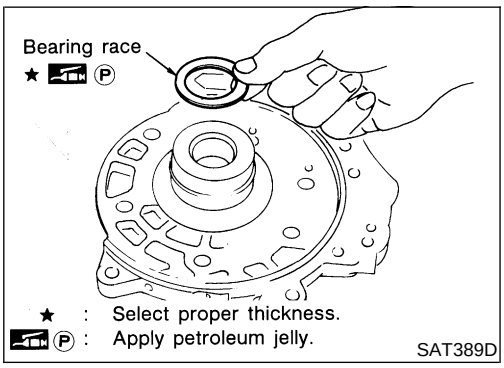
1. Remove reverse clutch assembly and install needle bearing on high clutch assembly.

- **Pay attention to direction of needle bearing.**

2. Install reverse clutch assembly.

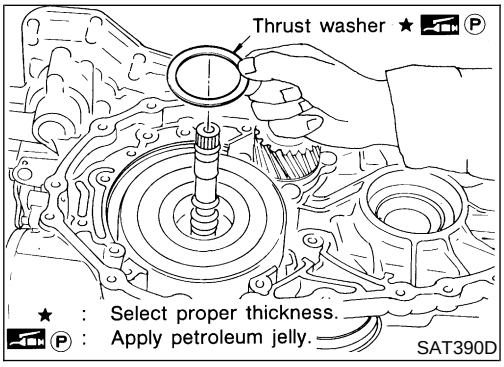


3. Install anchor end pin and lock nut on transmission case.
4. Place brake band on outside of reverse clutch drum. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.



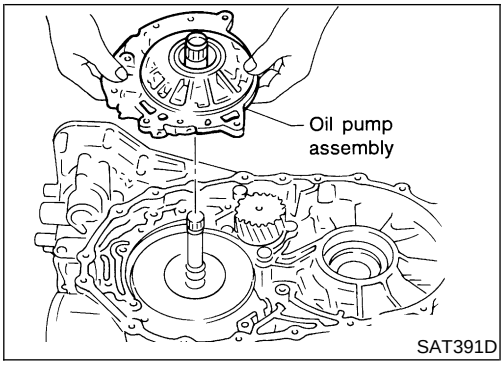
5. Place bearing race selected in total end play adjustment step on oil pump cover.

- **Apply petroleum jelly to bearing race.**

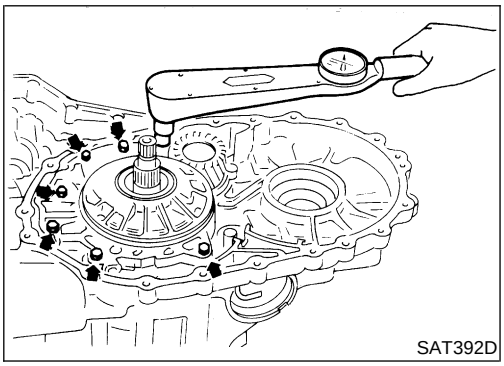


6. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.

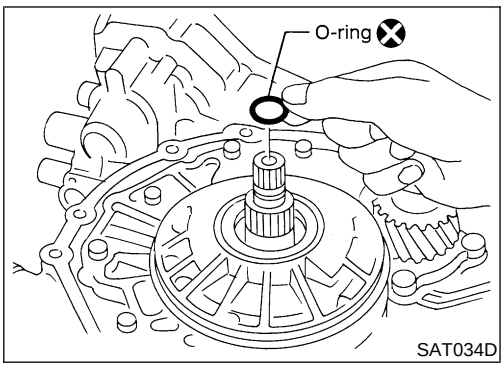
- **Apply petroleum jelly to thrust washer.**



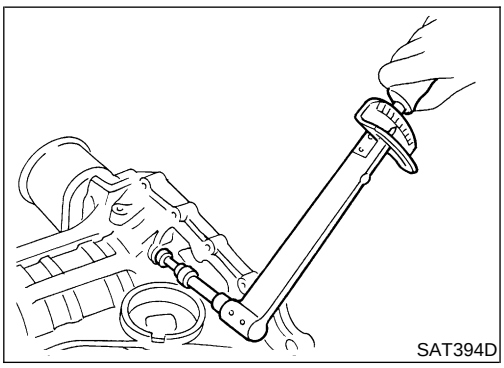
7. Install oil pump assembly on transmission case.



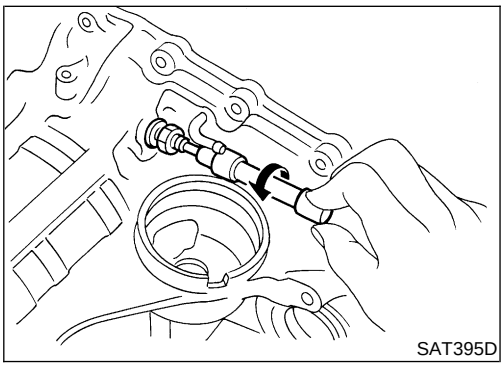
8. Tighten oil pump fixing bolts to specified torque.
   : 18 - 21 N·m (1.8 - 2.1 kg-m, 13 - 15 ft-lb)



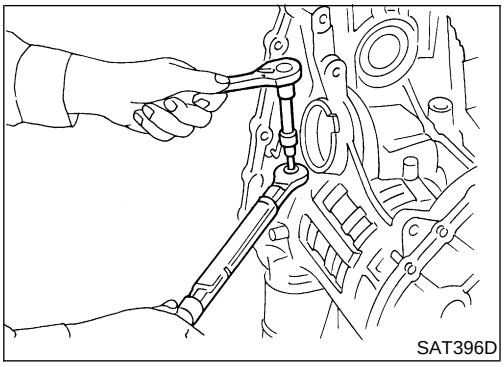
9. Install O-ring to input shaft.
- **Apply ATF to O-ring.**



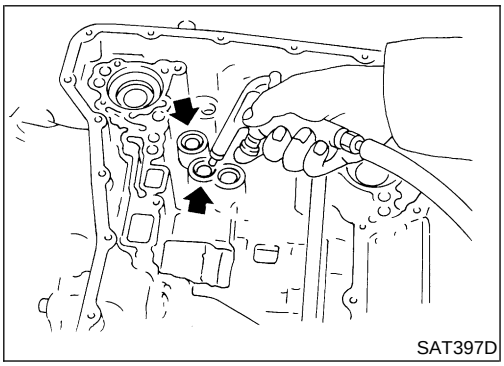
10. Adjust brake band.
a. Tighten anchor end pin to specified torque.
   Anchor end pin:
   : 3.9 - 5.9 N·m (0.4 - 0.6 kg-m, 35 - 52 in-lb)



b. Back off anchor end pin two and a half turns.


SAT396D

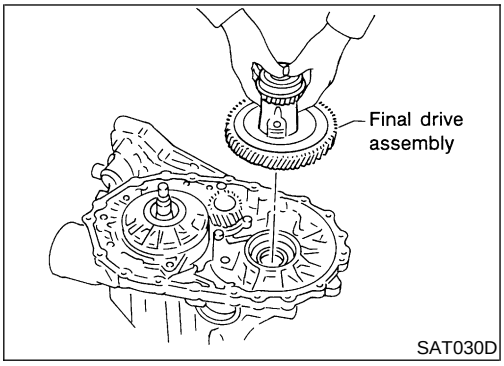
c. While holding anchor end pin, tighten lock nut.


SAT397D

11. Apply compressed air to oil holes of transmission case and check operation of brake band.

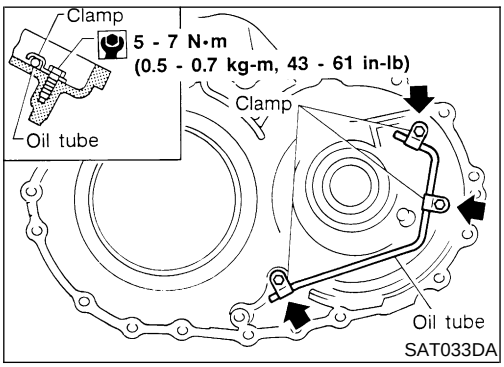
Assembly (4)

NIAT0303



SAT030D

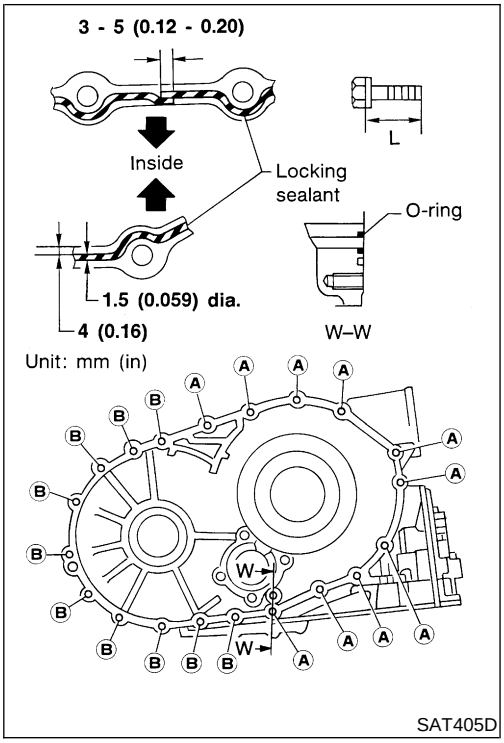
1. Install final drive assembly on transmission case.



SAT033DA

2. Install oil tube on converter housing.

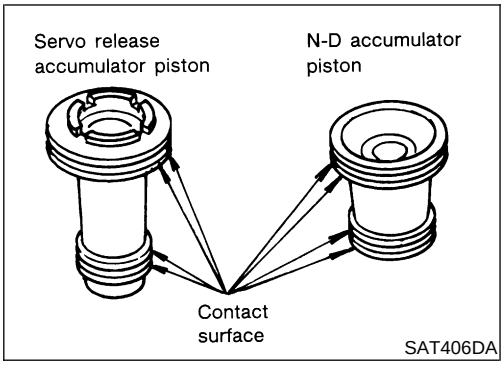
Assembly (4) (Cont'd)



3. Install O-ring on differential oil port of transmission case.
4. Install converter housing on transmission case.

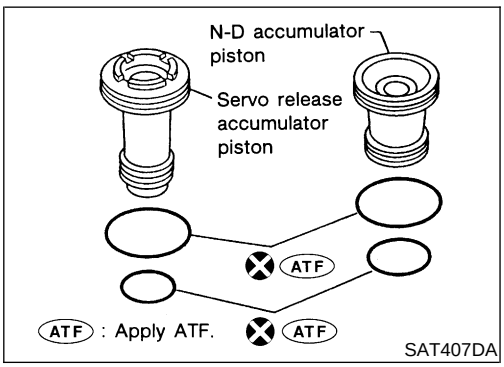
- **Apply locking sealant to mating surface of converter housing.**

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.

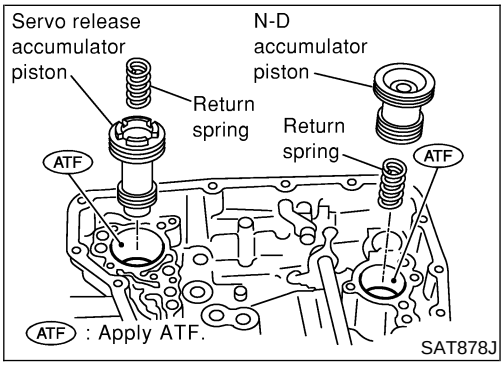


b. Install O-rings on accumulator piston.

- Apply ATF to O-rings.

Accumulator piston O-rings:

Refer to "Accumulator", AT-549.

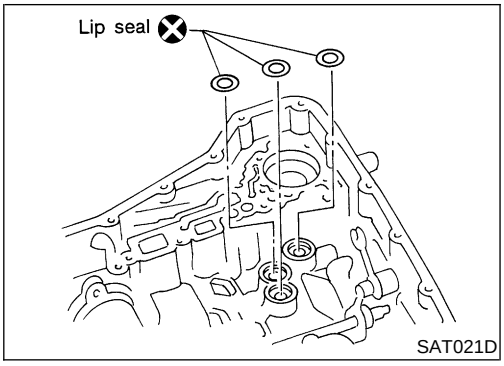


c. Install accumulator pistons and return springs on transmission case.

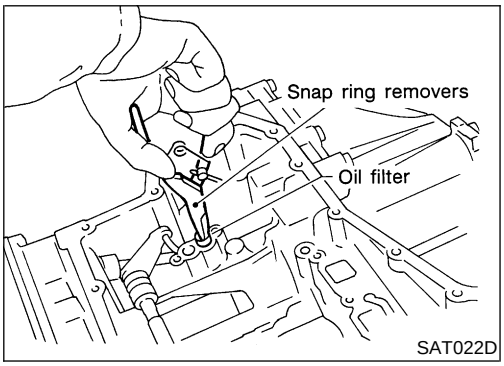
- **Apply ATF to inner surface of transmission case.**

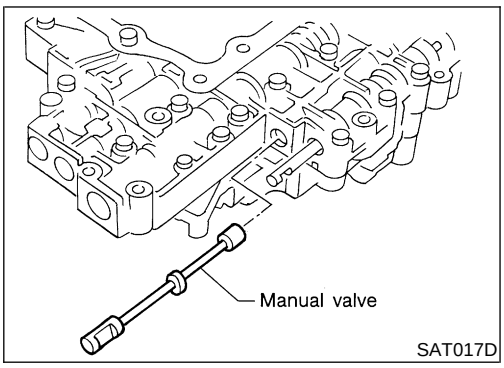
Return springs:

Refer to "Accumulator", AT-549.



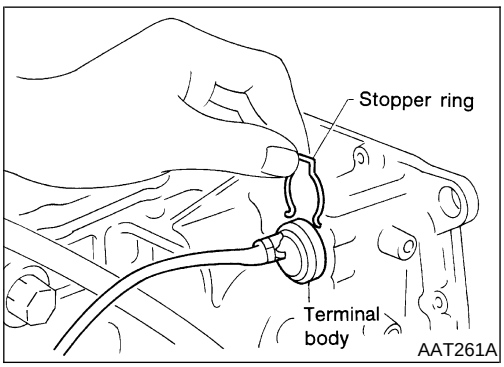
6. Install lip seals for band servo oil holes on transmission case.
- **Apply petroleum jelly to lip seals.**





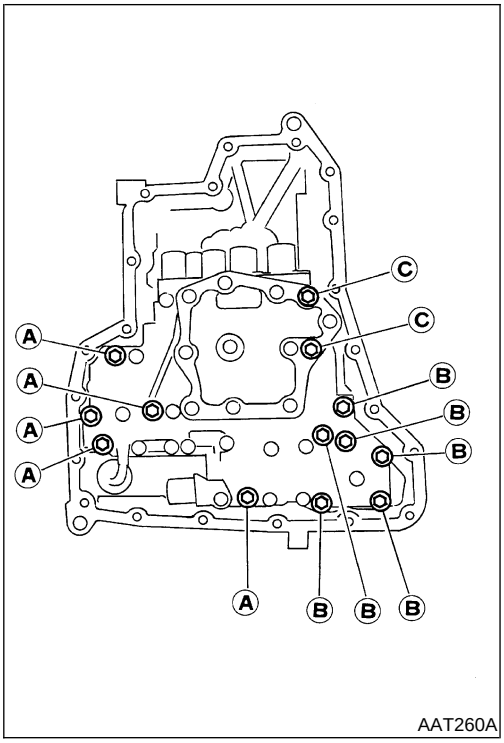
7. Install control valve assembly.

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.



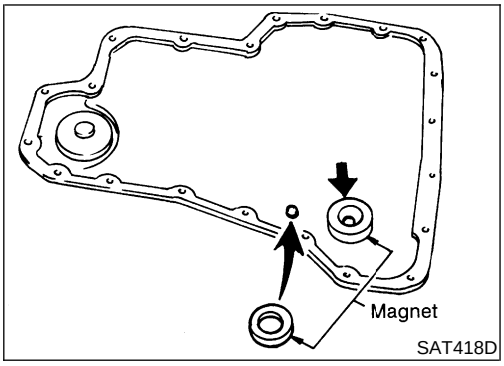
AAT260A

d. Tighten bolts **A**, **B** and **C**.

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

Bolt length, number and location

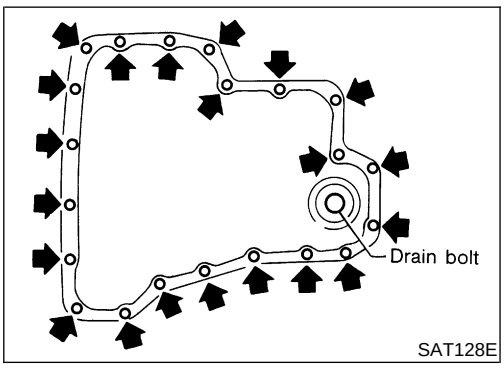
Bolt symbol	A	B	C
Bolt length "ℓ"	40.0 mm (1.575 in)	33.0 mm (1.299 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2



SAT418D

8. Install oil pan.

a. Attach magnet to oil pan.



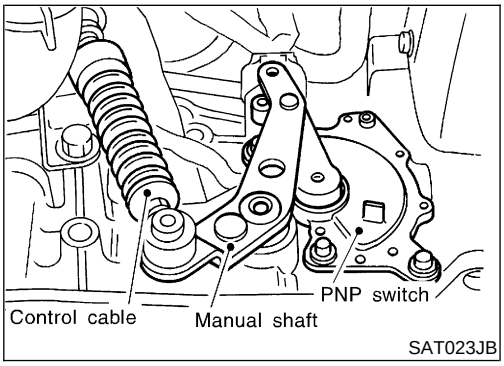
SAT128E

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.



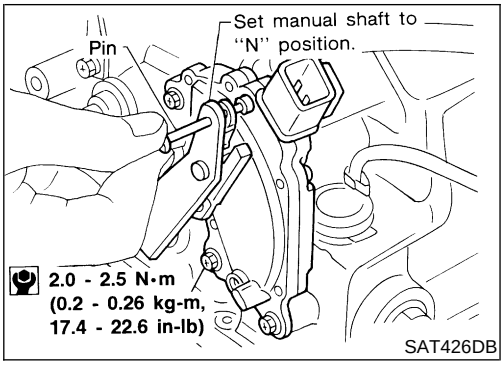
SAT023JB

9. Install PNP switch.

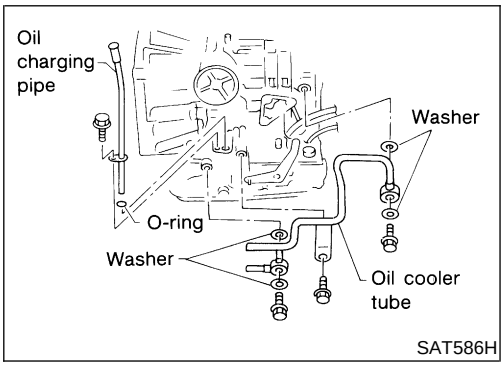
a. Set manual shaft in "P" position.

b. Temporarily install PNP switch on manual shaft.

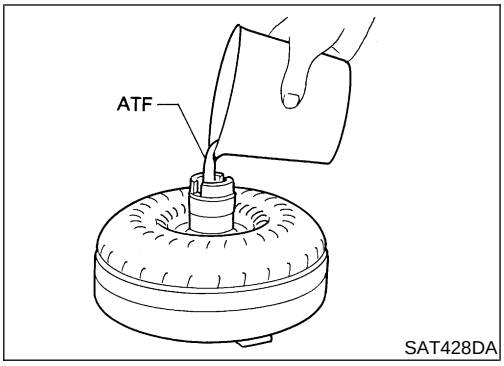
c. Move selector lever to "N" position.



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.

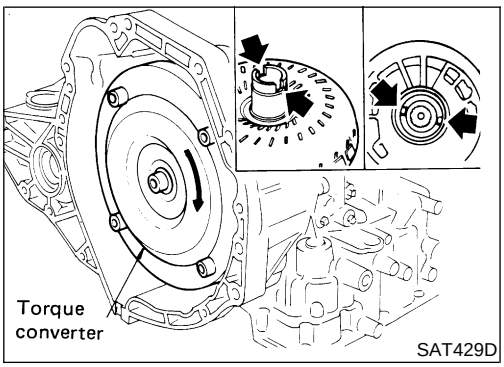


10. Install oil charging pipe and oil cooler tube to transmission case.

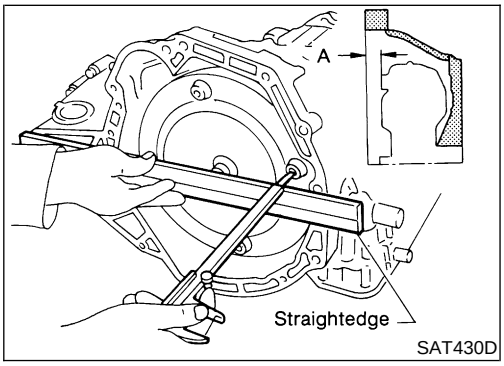


11. Install torque converter.
a. Pour ATF into torque converter.

- **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.**



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":
15.9 mm (0.626 in) or more

General Specifications

NIAT0304

Engine		QG18DE	SR20DE
Automatic transaxle model		RE4F03B	
Automatic transaxle assembly	Model code number	3AX60	3AX11
Transaxle gear ratio	1st	2.861	
	2nd	1.562	
	3rd	1.000	
	4th	0.698	
	Reverse	2.310	
	Final drive	3.827	4.072
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

NIAT0305

VEHICLE SPEED WHEN SHIFTING GEARS

NIAT0305S01

QG18DE (Calif. CA Model)

Throttle position	Shift pattern	Vehicle speed km/h (MPH)						
		$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$	$1_2 \rightarrow 1_1$
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)

SR20DE

Throttle position	Shift pattern	Vehicle speed km/h (MPH)						
		$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$	$1_2 \rightarrow 1_1$
Full throttle	Comfort	51 - 59 (32 - 37)	97 - 105 (60 - 65)	153 - 161 (95 - 100)	149 - 157 (93 - 98)	87 - 95 (54 - 59)	41 - 49 (25 - 30)	51 - 59 (32 - 37)
Half throttle	Comfort	33 - 41 (21 - 25)	58 - 66 (36 - 41)	121 - 129 (75 - 80)	72 - 80 (45 - 50)	34 - 42 (21 - 26)	9 - 17 (6 - 11)	51 - 59 (32 - 37)

QG18DE (Except Calif. CA Model)

Throttle position	Shift pattern	Vehicle speed km/h (MPH)						
		$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$	$1_2 \rightarrow 1_1$
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

NIAT0305S02

QG18DE (Calif. CA Model)

Throttle opening	OD switch	Shift pattern	Vehicle speed km/h (MPH)	
			Lock-up ON	Lock-up OFF
2/8	ON (D_4)	Comfort	97 - 105 (60 - 65)	63 - 71 (39 - 44)
	OFF (D_3)	Comfort	86 - 94 (53 - 58)	83 - 91 (52 - 57)

SR20DE

Throttle opening	OD switch	Shift pattern	Vehicle speed km/h (MPH)	
			Lock-up ON	Lock-up OFF
2/8	ON (D_4)	Comfort	105 - 113 (65 - 70)	74 - 82 (46 - 51)
	OFF (D_3)	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 (D_4)	Comfort	94 - 102 (58 - 63)	61 - 69 (38 - 43)
	OFF (D_3)	Comfort	86 - 94 (53 - 58)	83 - 91 (52 - 57)

Stall Revolution

NIAT0306

Engine model	Stall revolution rpm
QG18DE	2,350 - 2,800
SR20DE	2,350 - 2,850

Line Pressure

NIAT0307

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

NIAT0308

CONTROL VALVE AND PLUG RETURN SPRINGS

NIAT0308S01

Unit: mm (in)

	No.	Parts	Part No.*	Free length	Outer diameter
Upper body Refer to "Control Valve Upper Body", AT-474.	35	3-2 timing valve spring	31736-01X00	23.0 (0.906)	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 "Control Valve Lower Body", AT-478.	34	Shuttle 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	31742-3AX07	9.0 (0.354)	7.3 (0.287)

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

Clutch, Brake and Brake Band

NIAT0309

REVERSE CLUTCH

NIAT0309S01

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) 4.6 (0.181) 4.8 (0.189) 5.0 (0.197) 5.2 (0.205)	31537-31X00 31537-31X01 31537-31X02 31537-31X03 31537-31X04

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

HIGH CLUTCH

=NIAT0309S02

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) 5.0 (0.197) 5.2 (0.205) 5.4 (0.213) 5.6 (0.220) 5.8 (0.228) 6.0 (0.236)	31537-32X05 31537-32X06 31537-32X07 31537-32X08 31537-32X09 31537-32X10 31537-32X11

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

FORWARD CLUTCH

NIAT0309S03

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) 3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173) 4.6 (0.181)	31537-31X60 31537-31X61 31537-31X62 31537-31X63 31537-31X64 31537-31X65

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

OVERRUN CLUTCH

NIAT0309S04

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) 3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173)	31567-31X79 31567-31X80 31567-31X81 31567-31X82 31567-31X83

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

LOW & REVERSE BRAKE

NIAT0309S05

Number of drive plates		5	
Number of driven plates		4 + 1	
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) 3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173) 4.6 (0.181)	31667-31X16 31667-31X17 31667-31X18 31667-31X19 31667-31X20 31667-31X21

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

BRAKE BAND

NIAT0309S06

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

NIAT0310

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

NIAT0311

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) 9.98 - 9.99 (0.3929 - 0.3933) 9.97 - 9.98 (0.3925 - 0.3929)	31346-31X00 31346-31X01 31346-31X02
		Outer gear	
		Thickness mm (in)	Part number*
		9.99 - 10.00 (0.3933 - 0.3937) 9.98 - 9.99 (0.3929 - 0.3933) 9.97 - 9.98 (0.3925 - 0.3929)	31347-31X00 31347-31X01 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

NIAT0312

Unit: mm (in)

Input shaft seal ring clearance	Standard	0.08 - 0.23 (0.0031 - 0.0091)
	Allowable limit	0.23 (0.0091)

Planetary Carrier

NIAT0313

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

NIAT0314

DIFFERENTIAL SIDE GEAR CLEARANCE

NIAT0314S01

Clearance between side gear and differential case with washer	0.1 - 0.2 mm (0.004 - 0.008 in)

DIFFERENTIAL SIDE GEAR THRUST WASHERS

NIAT0314S02

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

NIAT0314S04

Differential side bearing preload “T”	0.04 - 0.09 mm (0.0016 - 0.0035 in)

TURNING TORQUE

NIAT0314S05

Turning torque of final drive assembly	0.49 - 1.08 N·m (5.0 - 11.0 kg-cm, 4.3 - 9.5 in-lb)

DIFFERENTIAL SIDE BEARING ADJUSTING SHIMS

NIAT0314S06

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.

TABLE FOR SELECTING DIFFERENTIAL SIDE BEARING ADJUSTING SHIMS

NIAT0314S08

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

NIAT0315

BEARING PRELOAD

NIAT0315S01

Reduction pinion gear bearing preload	0.05 mm (0.0020 in)

TURNING TORQUE

NIAT0315S02

Turning torque of reduction pinion gear	0.1 - 0.69 N·m (1.1 - 7.0 kg-cm, 0.95 - 6.08 in-lb)

REDUCTION PINION GEAR BEARING ADJUSTING SHIMS

NIAT0315S03

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.

Reduction Pinion Gear (Cont'd)

TABLE FOR SELECTING REDUCTION PINION GEAR BEARING ADJUSTING SHIM

NIAT0315S04

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

NIAT0316

SEAL RING CLEARANCE

NIAT0316S01

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

NIAT0316S02

Output shaft end play	0 - 0.5 mm (0 - 0.020 in)

OUTPUT SHAFT END PLAY ADJUSTING SHIMS

NIAT0316S03

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

NIAT0317

SEAL RING CLEARANCE

NIAT0317S01

Unit: mm (in)

Bearing retainer seal ring clearance	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

Total End Play

NIAT0318

Total end play "T_3"	0.25 - 0.55 mm (0.0098 - 0.0217 in)

BEARING RACE FOR ADJUSTING TOTAL END PLAY

NIAT0318S01

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

NIAT0319

Reverse clutch end play "T_4"	0.65 - 1.00 mm (0.0256 - 0.0394 in)

THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH END PLAY

NIAT0319S01

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

NIAT0320

O-RING

NIAT0320S01

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

NIAT0320S02

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

NIAT0321

RETURN SPRING

NIAT0321S01

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

NIAT0322

Unit: mm (in)

Distance between end of converter housing and torque converter	15.9 (0.626) or more

Shift Solenoid Valves

NIAT0323

Gear	Solenoid A	Solenoid B
1st	ON	ON
2nd	OFF	ON
3rd	OFF	OFF
4th	ON	OFF

Resistance

NIAT0324

Solenoid valve	Resistance	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

ATF Temp. Sensor

NIAT0325

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

Revolution Sensor

NIAT0326

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

NIAT0327

Resistance	10 - 15Ω