AUTOMATIC TRANSAXLE

SECTION AT

CONTENTS

CONTENTS (Cont'd)

CONTENTS (Cont'd)

CONTENTS (Cont'd)

Alphabetical & P No. Index for DTC

NFAT0001

ALPHABETICAL INDEX FOR DTC

NFAT0001S01

Check if the vehicle is a model with EURO-OBD system or not by the “Type approval number” on the identification plate. Refer to GI-40, “IDENTIFICATION PLATE”.

Type approval number	Model
Available	With EURO-OBD system
Not available (blank)	Without EURO-OBD system

Items (CONSULT-II screen terms)	DTC	Reference page
	CONSULT-II GST*1	
A/T 1ST GR FNCTN	P0731	AT-144
A/T 2ND GR FNCTN	P0732	AT-150
A/T 3RD GR FNCTN	P0733	AT-156
A/T 4TH GR FNCTN	P0734	AT-162
ATF TEMP SEN/CIRC	P0710	AT-128
ENGINE SPEED SIG	P0725	AT-139
L/PRESS SOL/CIRC	P0745	AT-176
O/R CLTCH SOL/CIRC	P1760	AT-201
PNP SW/CIRC	P0705	AT-122
SFT SOL A/CIRC*2	P0750	AT-182
SFT SOL B/CIRC*2	P0755	AT-187
TCC SOLENOID/CIRC	P0740	AT-171
TP SEN/CIRC A/T*2	P1705	AT-192
VEH SPD SEN/CIR AT*3	P0720	AT-134

*1: These numbers are prescribed by SAE J2012.

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

*3: The MI 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

=NFAT0001S02

Check if the vehicle is a model with EURO-OBD system or not by the "Type approval number" on the identification plate. Refer to GI-40, "IDENTIFICATION PLATE".

Type approval number	Model
Available	With EURO-OBD system
Not available (blank)	Without EURO-OBD system

DTC CONSULT-II GST*1	Items (CONSULT-II screen terms)	Reference page
P0705	PNP SW/CIRC	AT-122
P0710	ATF TEMP SEN/CIRC	AT-128
P0720	VEH SPD SEN/CIR AT*3	AT-134
P0725	ENGINE SPEED SIG	AT-139
P0731	A/T 1ST GR FNCTN	AT-144
P0732	A/T 2ND GR FNCTN	AT-150
P0733	A/T 3RD GR FNCTN	AT-156
P0734	A/T 4TH GR FNCTN	AT-162
P0740	TCC SOLENOID/CIRC	AT-171
P0745	L/PRESS SOL/CIRC	AT-176
P0750	SFT SOL A/CIRC*2	AT-182
P0755	SFT SOL B/CIRC*2	AT-187
P1705	TP SEN/CIRC A/T*2	AT-192
P1760	O/R CLTCH SOL/CIRC	AT-201

*1: These numbers are prescribed by SAE J2012.

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

*3: The MI 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”

NFAT0271

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 MODEL A33 is as follows (The composition varies according to the destination and optional equipment.):

- 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), 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), 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. SRS wiring harnesses can be identified with yellow harness connector (and with yellow harness protector or yellow insulation tape before the harness connectors).**

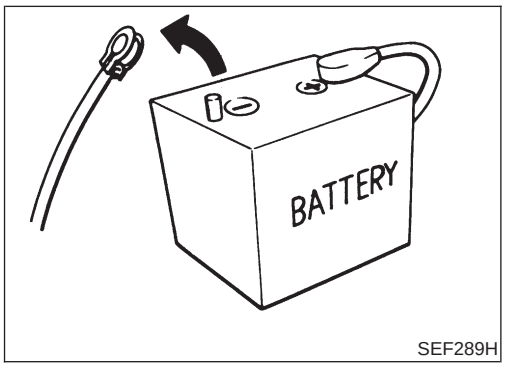
Precautions for On Board Diagnostic (EURO-OBD) System of A/T and Engine — EURO-OBD —

NFAT0003

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

CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect the negative battery terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MI to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MI 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 MI 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 MI to light up due to a malfunction of the EGR system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM or ECM before returning the vehicle to the customer.**

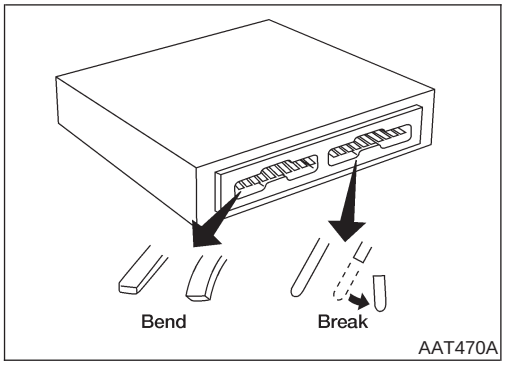


SEF289H

Precautions

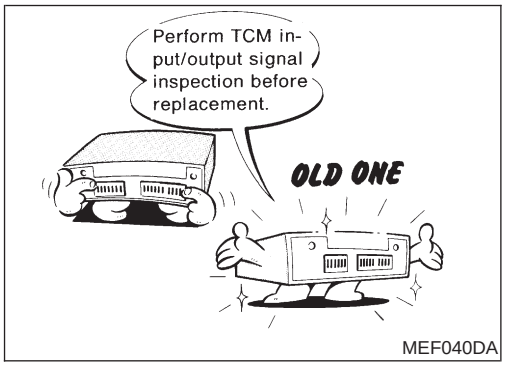
NFAT0004

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



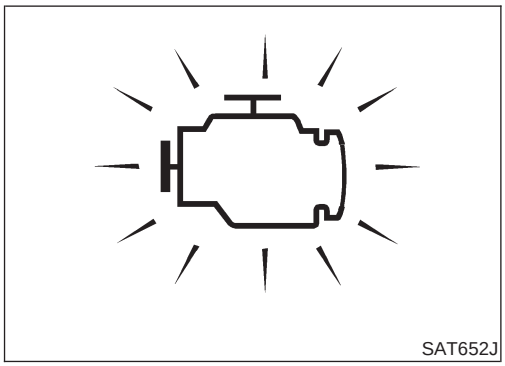
AAT470A

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



MEF040DA

- **Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. Refer to AT-115.**


SAT652J

- **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.
- 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 MA-27, "Changing A/T Fluid" when changing A/T fluid.

Service Notice or Precautions

NFAT0005

FAIL-SAFE

NFAT0005S01

The TCM has an electronic Fail-Safe (limp home mode). This allows the vehicle to be driven even if a major electrical input/output device circuit is damaged.
Under Fail-Safe, the vehicle always runs in third gear, even with a shift lever position of 1, 2 or D. The customer may complain of sluggish or poor acceleration.
When the ignition key is turned ON following Fail-Safe operation, S (SPORT) indicator lamp blinks for about 8 seconds. Refer to "TCM Self-diagnostic Procedure (NO TOOLS)", AT-49 (EURO-OBD) or "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)", AT-60 (EXCEPT FOR EURO-OBD).
The blinking of the S (SPORT) 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-70 (EURO-OBD) or AT-76 (EXCEPT FOR EURO-OBD).
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

NFAT0005S02

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.

EURO-OBD-II SELF-DIAGNOSIS — EURO-OBD —

NFAT0005S04

- A/T self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the S (SPORT) indicator or the malfunction indicator (MI). Refer to the table on AT-41 for the indicator used to display each self-diagnostic result.
- The self-diagnostic results indicated by the MI are automatically stored in both the ECM and TCM memories.

Always perform the procedure "HOW TO ERASE DTC" on AT-38 to complete the repair and avoid unnecessary blinking of the MI.

- The following self-diagnostic items can be detected using ECM self-diagnostic results mode* only when the S (SPORT) indicator lamp does not indicate any malfunctions.

− park/neutral position (PNP) switch

− A/T 1st, 2nd, 3rd, or 4th gear function
*: For details of EURO-OBD, refer to EC-44, "Introduction".

- **Certain systems and components, especially those related to EURO-OBD, may use a new style slide-locking type harness connector.**
For description and how to disconnect, refer to EL-5, "Description".

Wiring Diagrams and Trouble Diagnosis

NFAT0006

When you read wiring diagrams, refer to the following:

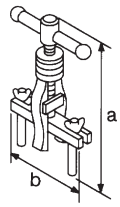
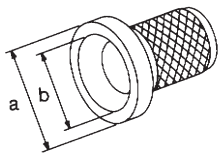
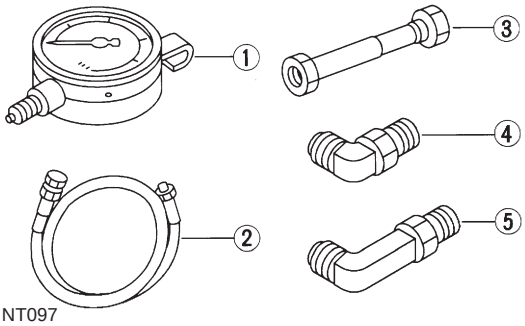
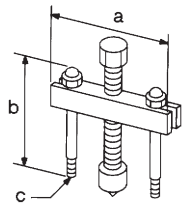
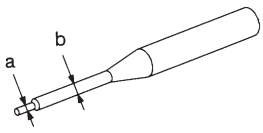
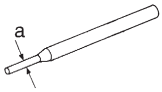
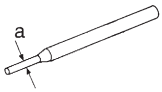
- GI-11, "HOW TO READ WIRING DIAGRAMS"
- EL-9, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

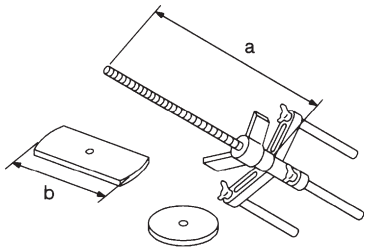
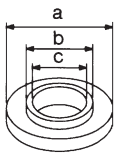
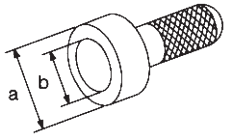
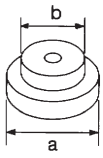
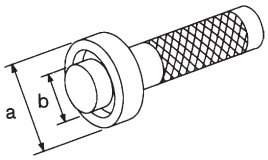
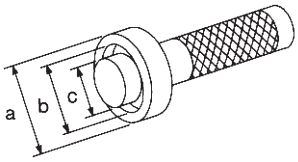
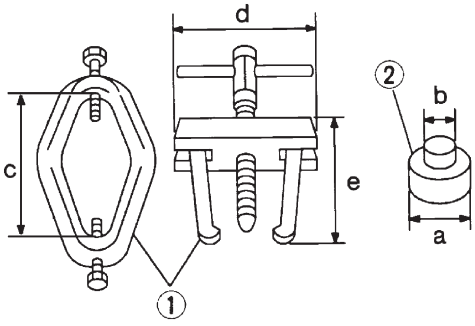
- GI-32, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-21, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT"

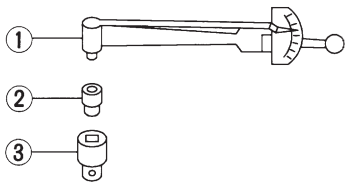
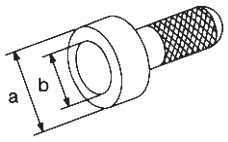
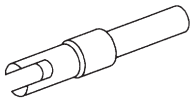
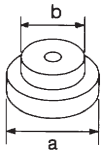
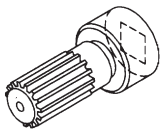
Special Service Tools

NFAT0272

Tool number Tool name	Description	
KV381054S0 Puller	 NT414	● Removing differential side oil seals ● Removing differential side bearing outer race ● Removing idler gear bearing outer race **a: 250 mm (9.84 in)** **b: 160 mm (6.30 in)**
ST33400001 Drift	 NT086	● Installing differential side oil seal F04B and F04W (RH side) ● Installing oil seal on oil pump housing **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**
ST2505S001 Oil pressure gauge set 1 ST25051001 Oil pressure gauge 2 ST25052000 Hose 3 ST25053000 Joint pipe 4 ST25054000 Adapter 5 ST25055000 Adapter	 NT097	● Measuring line pressure
ST27180001 Puller	 NT424	● Removing idler gear **a: 100 mm (3.94 in)** **b: 110 mm (4.33 in)** **c: M8 x 1.25P**
ST23540000 Pin punch	 NT442	● Removing and installing parking rod plate and manual plate pins **a: 2.3 mm (0.091 in) dia.** **b: 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.**
KV32101000 Pin punch	 NT410	● Removing and installing manual shaft retaining pin ● Removing and installing pinion mate shaft lock pin **a: 4 mm (0.16 in) dia.**

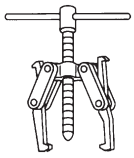
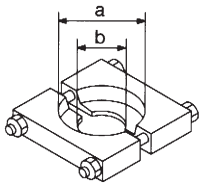
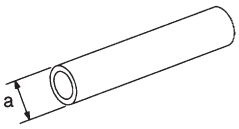
Special Service Tools (Cont'd)

Tool number Tool name	Description	
KV31102400 Clutch spring compressor	 NT423	● Removing and installing clutch return springs ● Installing low and reverse brake piston **a: 320 mm (12.60 in)** **b: 174 mm (6.85 in)**
KV40100630 Drift	 NT107	● Installing reduction gear bearing inner race ● Installing idler gear bearing inner race **a: 67.5 mm (2.657 in) dia.** **b: 44 mm (1.73 in) dia.** **c: 38.5 mm (1.516 in) dia.**
ST30720000 Bearing installer	 NT115	● Installing idler gear bearing outer race **a: 77 mm (3.03 in) dia.** **b: 55.5 mm (2.185 in) dia.**
ST35321000 Drift	 NT073	● Installing output shaft bearing **a: 49 mm (1.93 in) dia.** **b: 41 mm (1.61 in) dia.**
ST33230000 Drift	 NT084	● Installing differential side bearing inner race F04B and F04W (RH side) **a: 51 mm (2.01 in) dia.** **b: 28.5 mm (1.122 in) dia.**
ST33220000 Drift	 NT085	● Selecting differential side bearing adjusting shim (F04W) **a: 37 mm (1.46 in) dia.** **b: 31 mm (1.22 in) dia.** **c: 22 mm (0.87 in) dia.**
ST3306S001 Differential side bearing puller set 1 ST33051001 Puller 2 ST33061000 Adapter	 AMT153	● Removing differential side bearing inner race **a: 38 mm (1.50 in) dia.** **b: 28.5 mm (1.122 in) dia.** **c: 130 mm (5.12 in)** **d: 135 mm (5.31 in)** **e: 100 mm (3.94 in)**

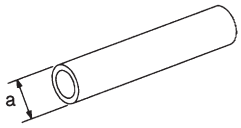
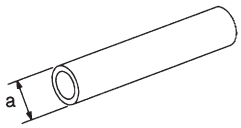
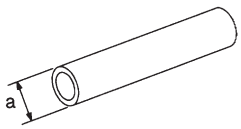
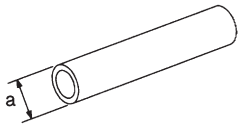
Tool number Tool name	Description
ST3127S000 Preload gauge 1 GG91030000 Torque wrench 2 HT62940000 Socket adapter 3 HT62900000 Socket adapter	 NT124	● Checking differential side bearing preload
ST35271000 Drift	 NT115	● Installing idler gear ● Installing differential side bearing inner race F04W (LH side) **a: 72 mm (2.83 in) dia.** **b: 63 mm (2.48 in) dia.**
KV38107700 Preload adapter	 NT087	● Selecting differential side bearing adjusting shim (F04B) ● Checking differential side bearing preload (F04B)
ST30613000 Drift	 NT073	● Installing differential side bearing inner race F04W (LH side) **a: 72 mm (2.83 in) dia.** **b: 48 mm (1.89 in) dia.**
KV38105210 Preload adapter	 NT075	● Selecting differential side bearing adjusting shim (F04W) ● Checking differential side bearing preload (F04W)

Commercial Service Tools

NFAT0273

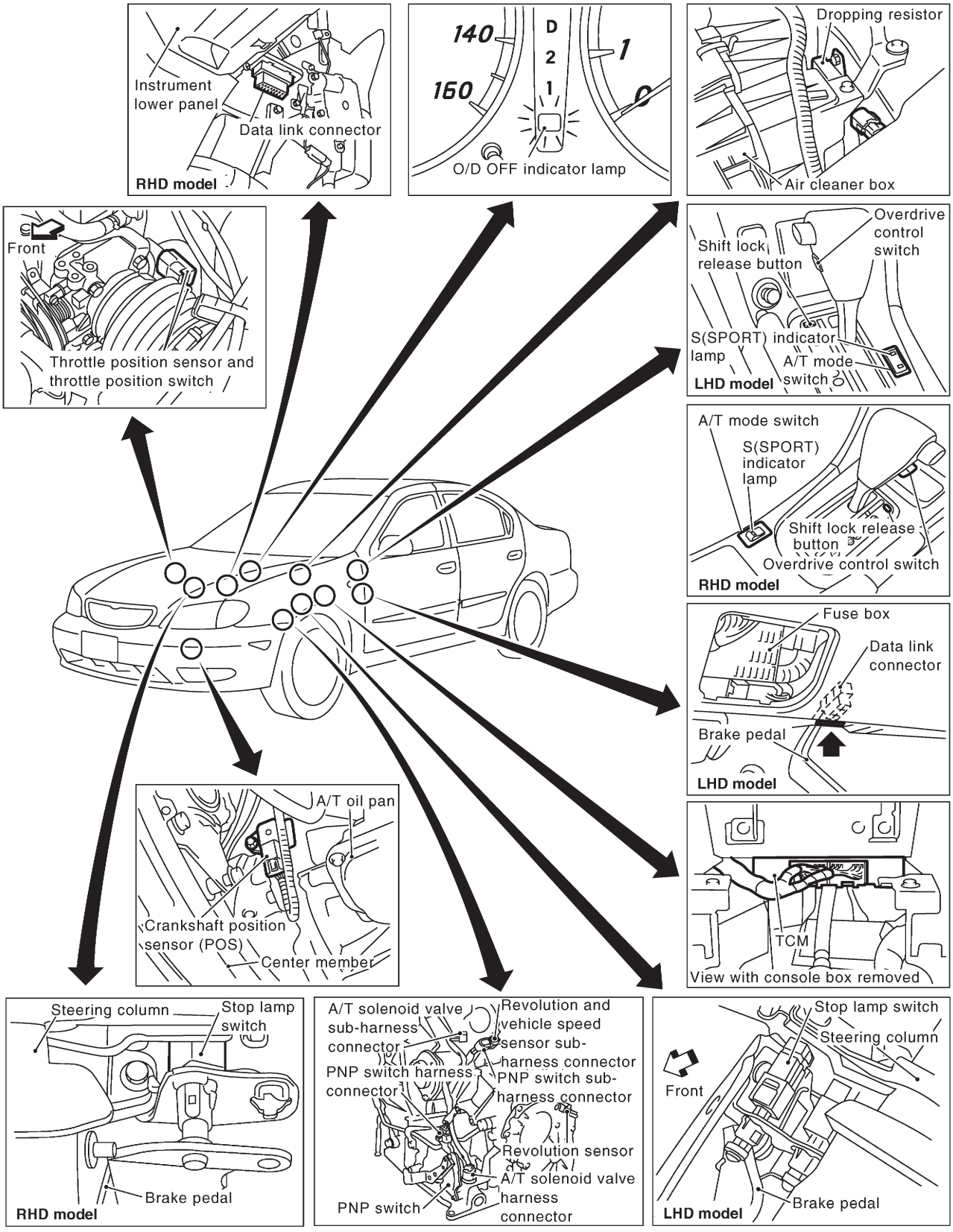
Tool name	Description
Puller	 NT077	● Removing idler gear bearing inner race ● Removing and installing band servo piston snap ring
Puller	 NT411	● Removing reduction gear bearing inner race **a: 60 mm (2.36 in) dia.** **b: 35 mm (1.38 in) dia.**
Drift	 NT083	● Installing differential side oil seal F04W (LH side) **a: 90 mm (3.54 in) dia.**

Commercial Service Tools (Cont'd)

Tool name	Description	
Drift	 NT083	● Installing needle bearing on bearing retainer **a: 36 mm (1.42 in) dia.**
Drift	 NT083	● Removing needle bearing from bearing retainer **a: 33.5 mm (1.319 in) dia.**
Drift	 NT083	● Installing differential side bearing outer race F04B and F04W (RH side) **a: 75 mm (2.95 in) dia.**
Drift	 NT083	● Installing differential side bearing outer race F04W (LH side) **a: 100 mm (3.94 in) dia.**

A/T Electrical Parts Location

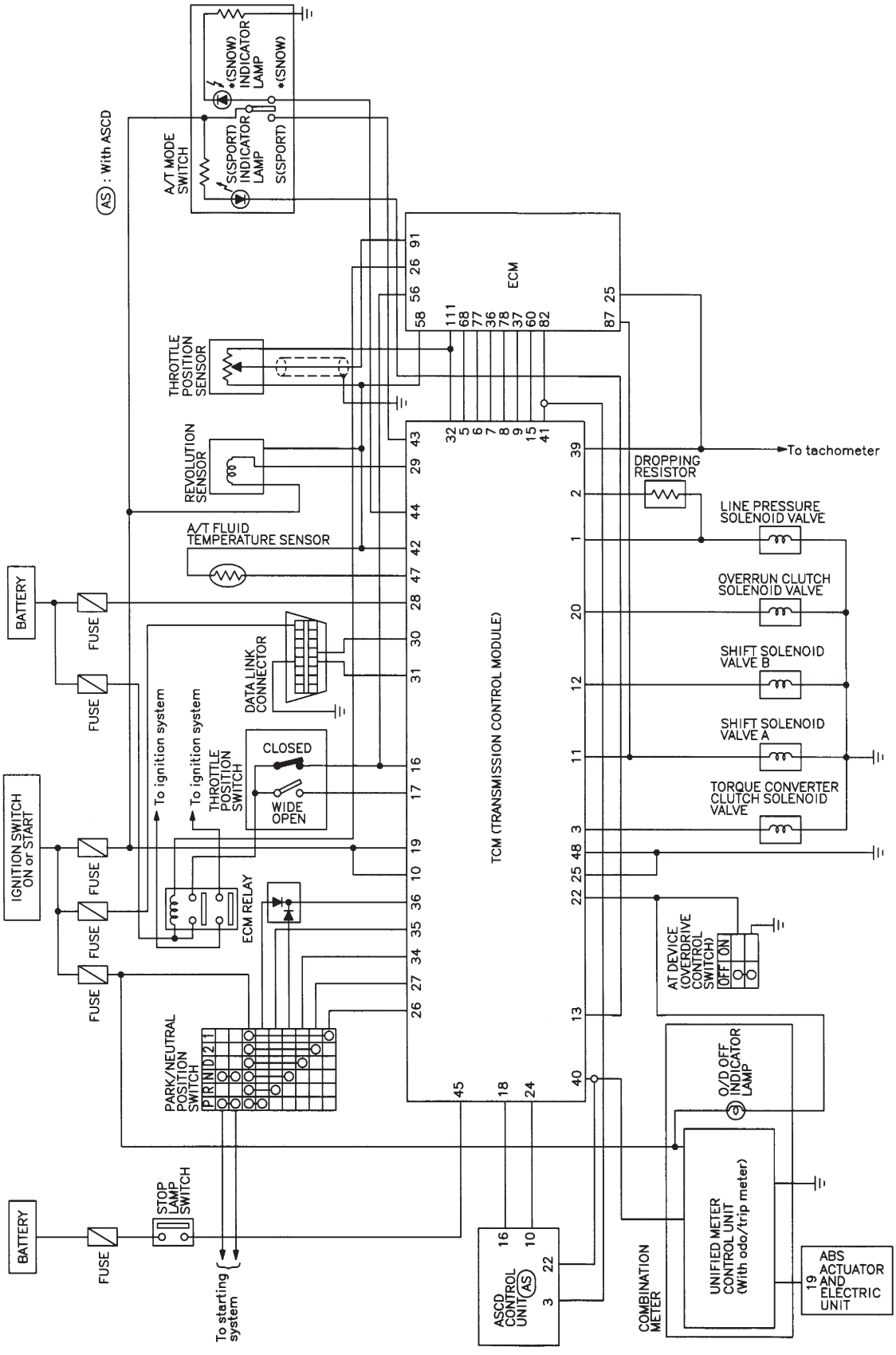
NFAT0274



SAT332K

Circuit Diagram

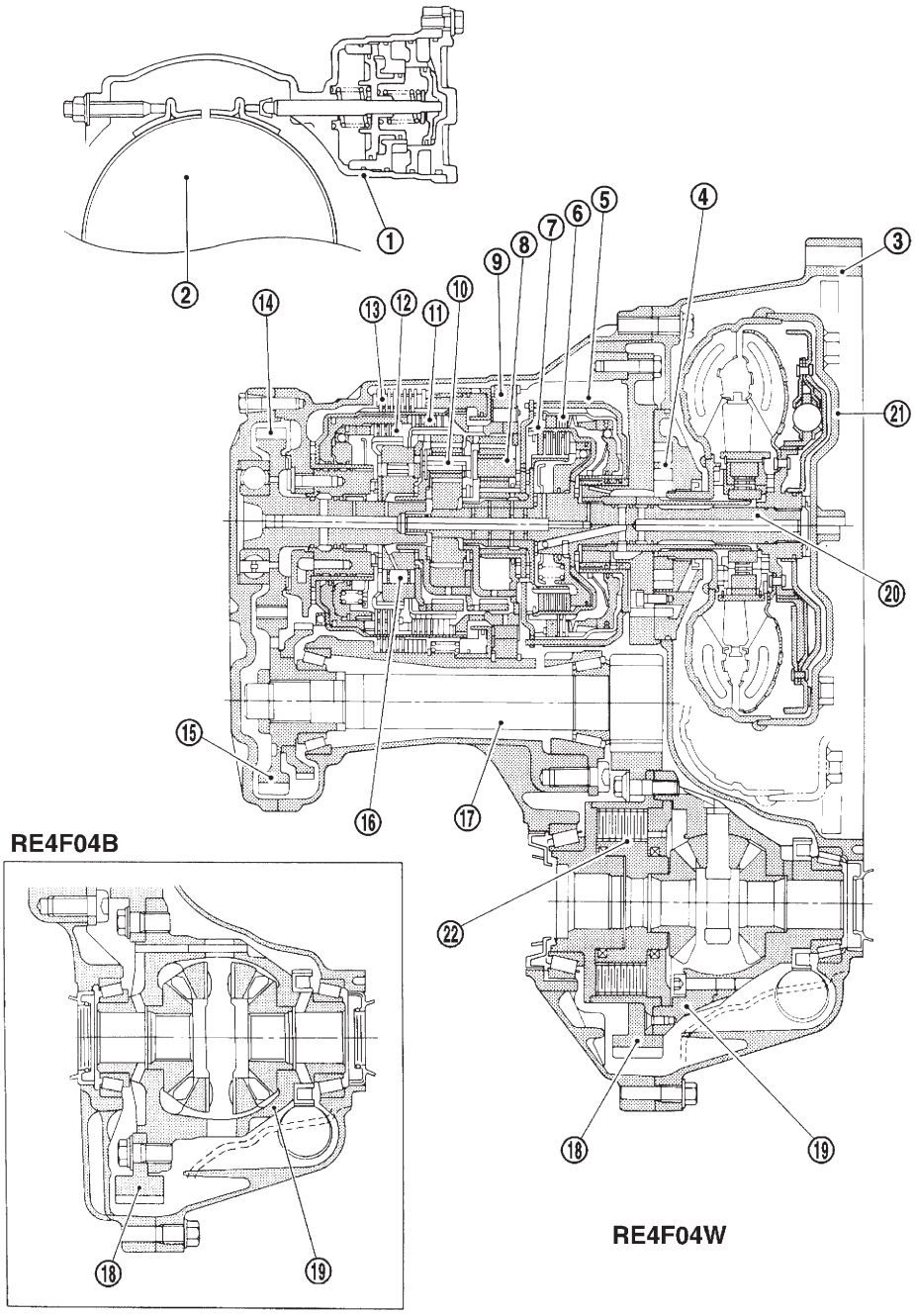
NFAT0275



MAT902A

Cross-sectional View

NFAT0276

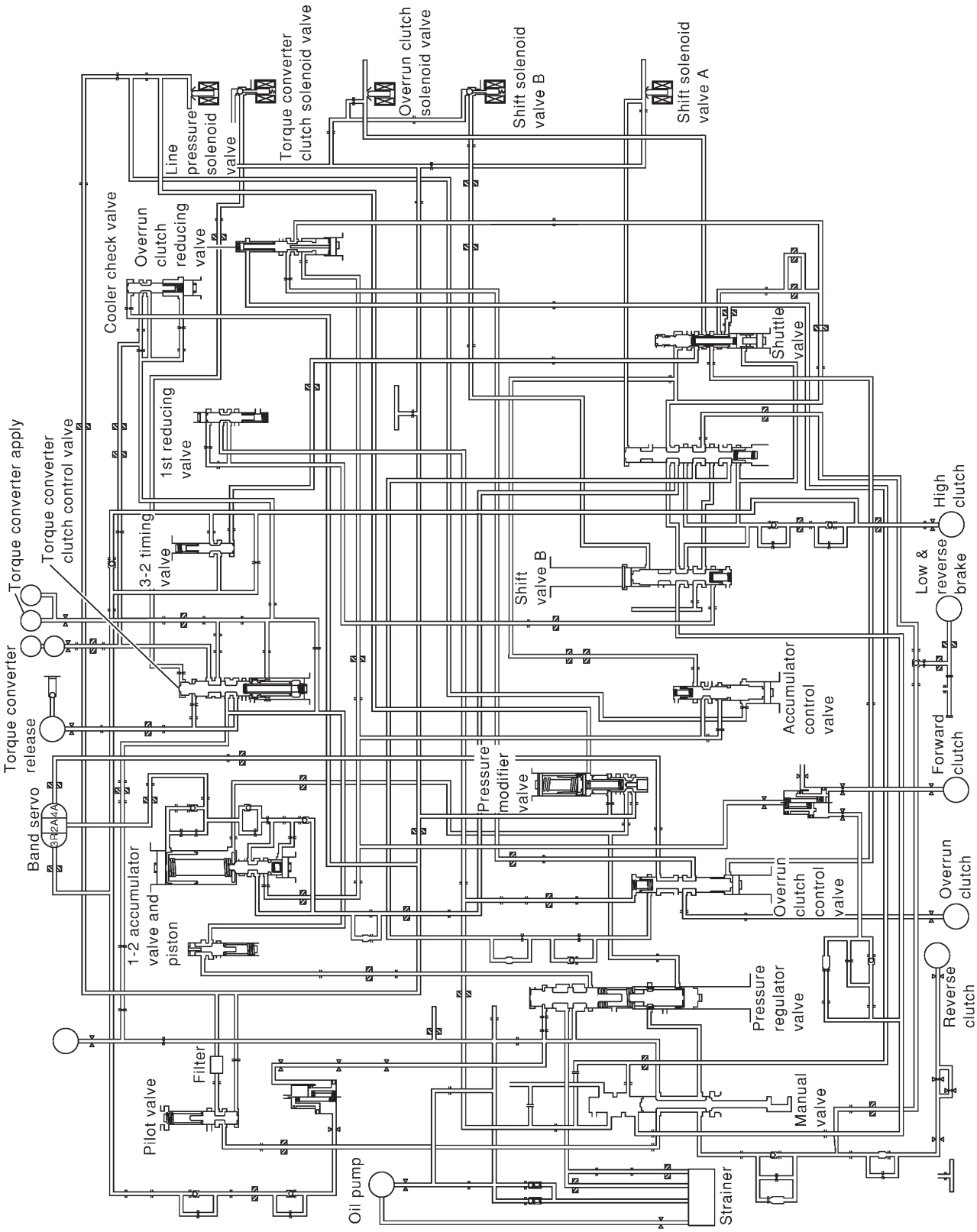


SAT577J

1. Band servo piston
2. Reverse clutch drum
3. Converter housing
4. Oil pump
5. Brake band
6. Reverse clutch
7. High clutch
8. Front planetary gear
9. Low one-way clutch
10. Rear planetary gear
11. Forward clutch
12. Overrun clutch
13. Low & reverse brake
14. Output gear
15. Idler gear
16. Forward one-way clutch
17. Pinion reduction gear
18. Final gear
19. Differential case
20. Input shaft
21. Torque converter

Hydraulic Control Circuit

NFAT0277



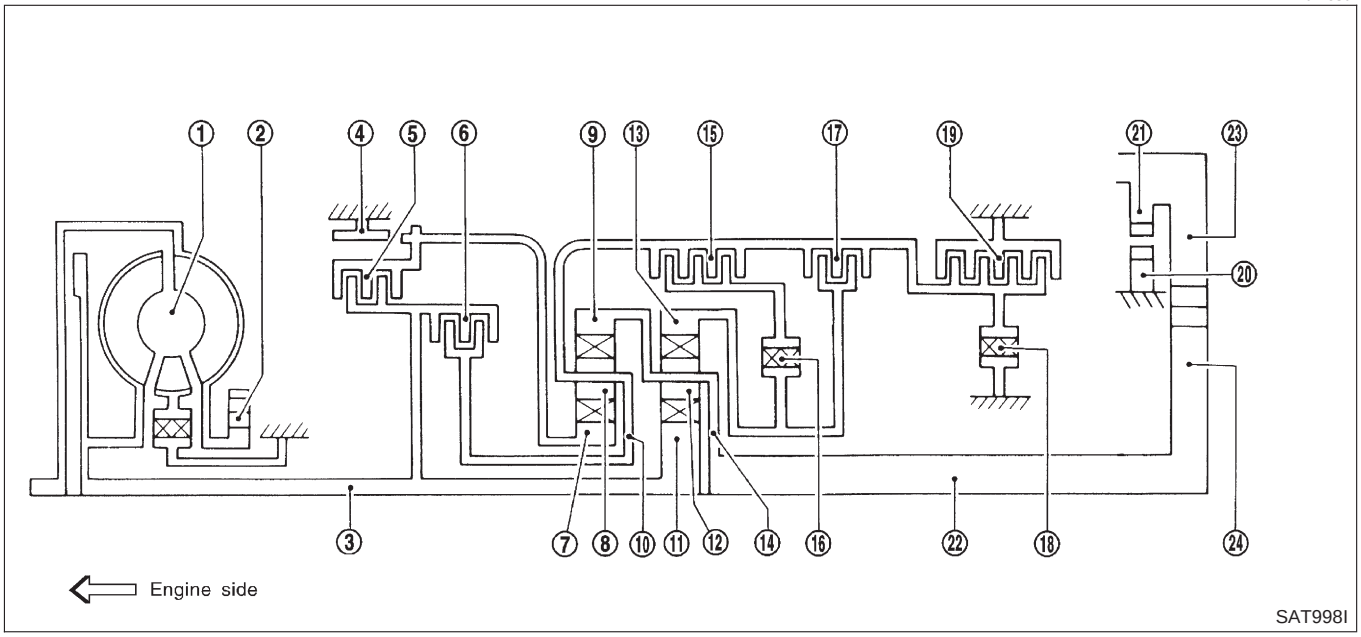
SAT578J

Shift Mechanism

NFAT0278

CONSTRUCTION

NFAT0278S01



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

NFAT0278S02

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

Shift Mechanism (Cont'd)

CLUTCH AND BAND CHART

NFAT0278S03

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

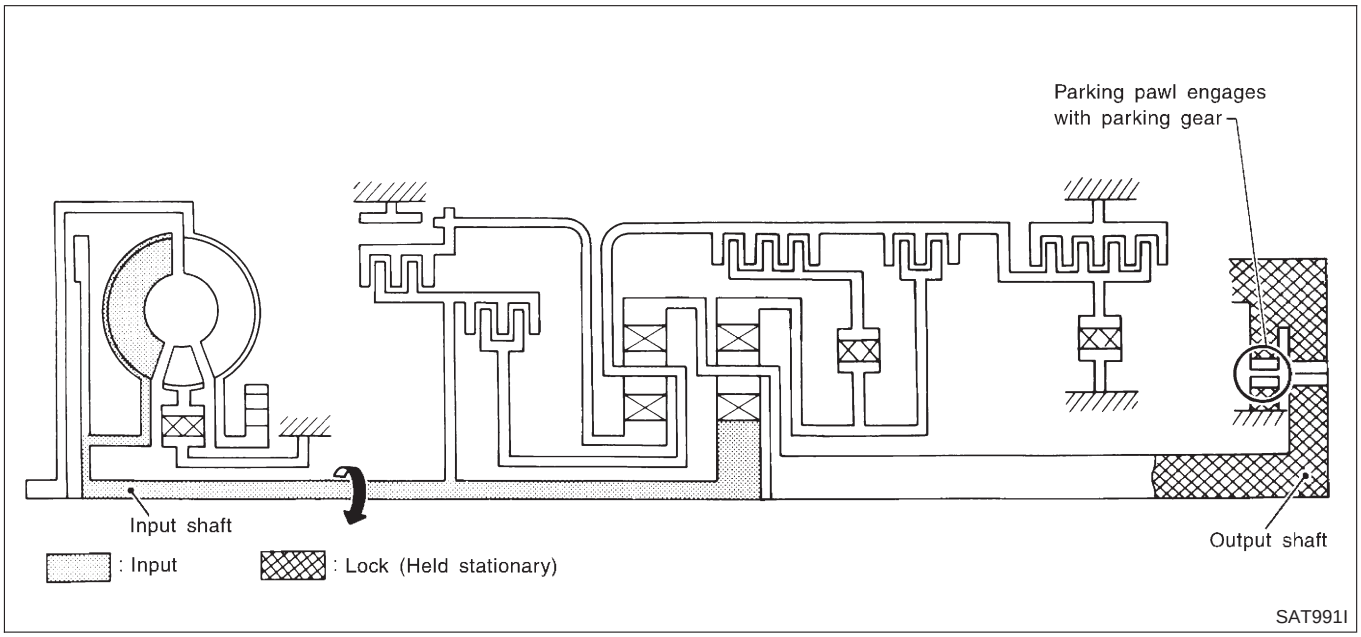
POWER TRANSMISSION

=NFAT0278S04

P and N Positions

NFAT0278S0401

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

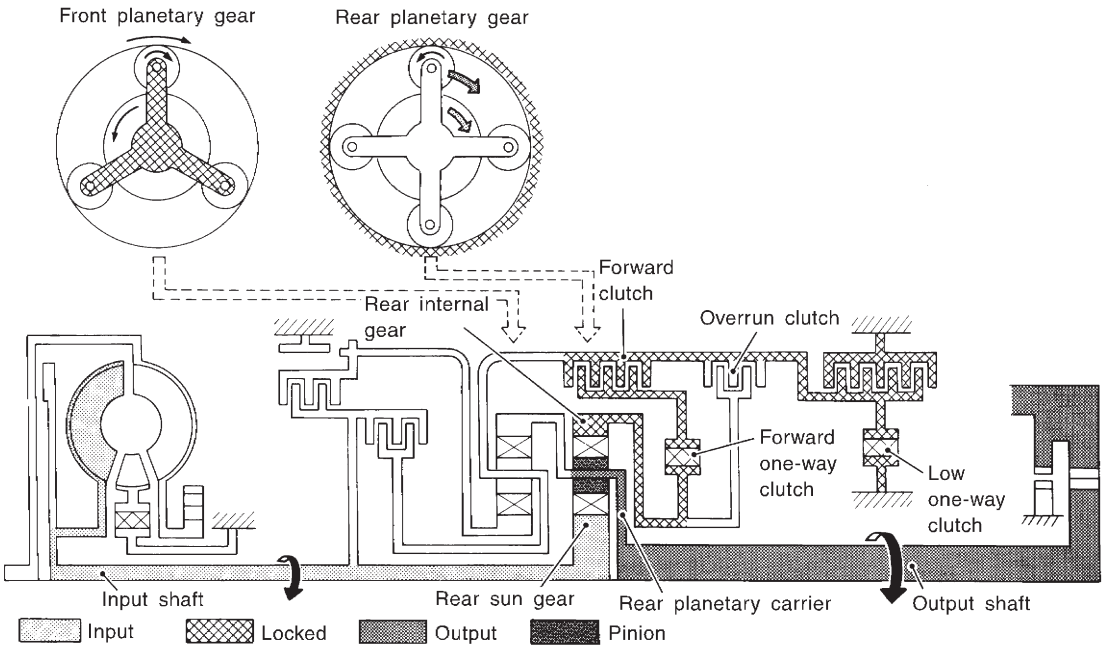


Shift Mechanism (Cont'd)

1_1 Position

=NFAT0278S0402

• **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.



Power flow

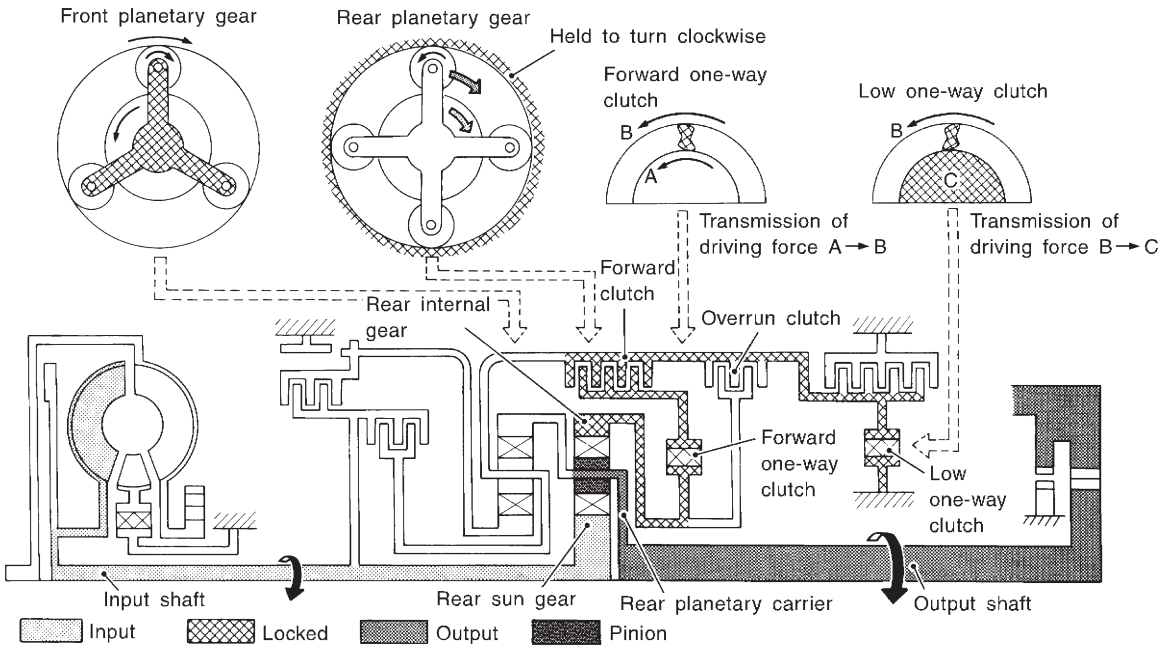
Input shaft
⇩
Rear sun gear
⇩
Rear planetary gear ⇨ Output shaft

AAT537A

D_1 and 2_1 Positions

=NFAT0278S0403

• **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

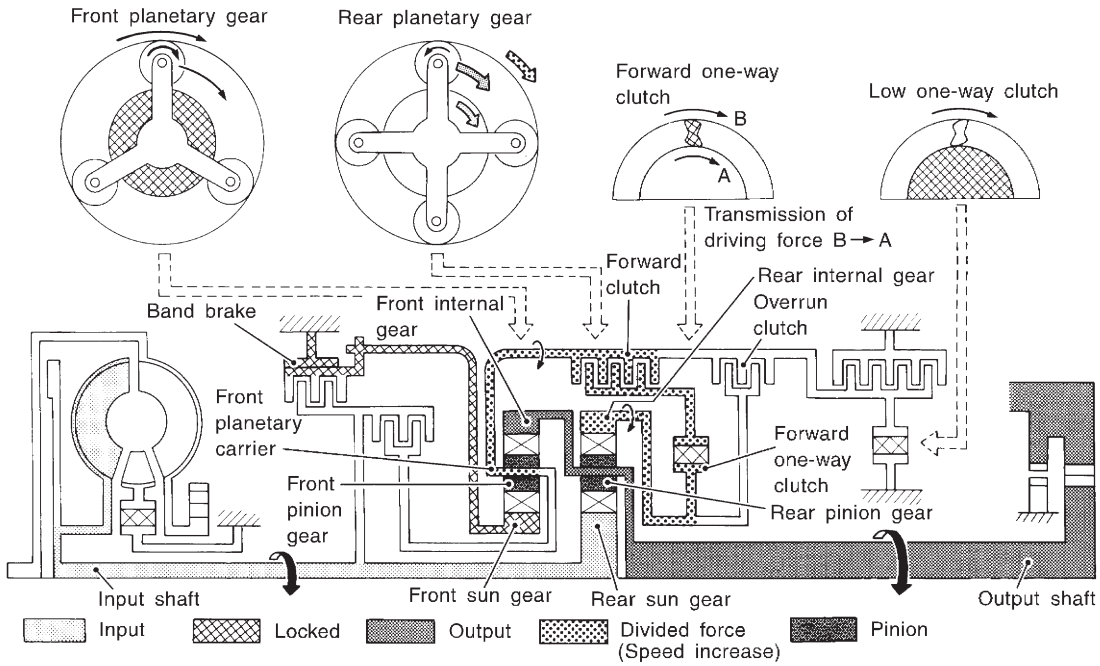
AAT532A

Shift Mechanism (Cont'd)

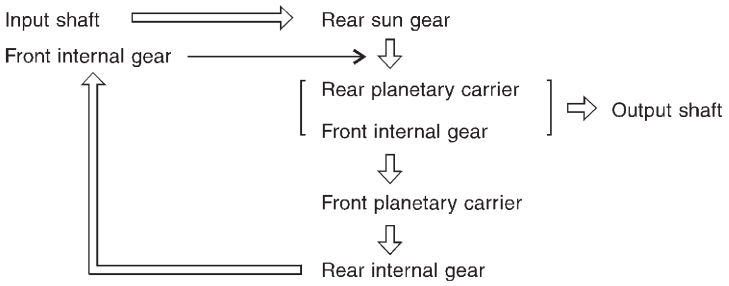
D_2, 2_2 and 1_2 Positions

=NFAT0278S0404

• **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



Power flow

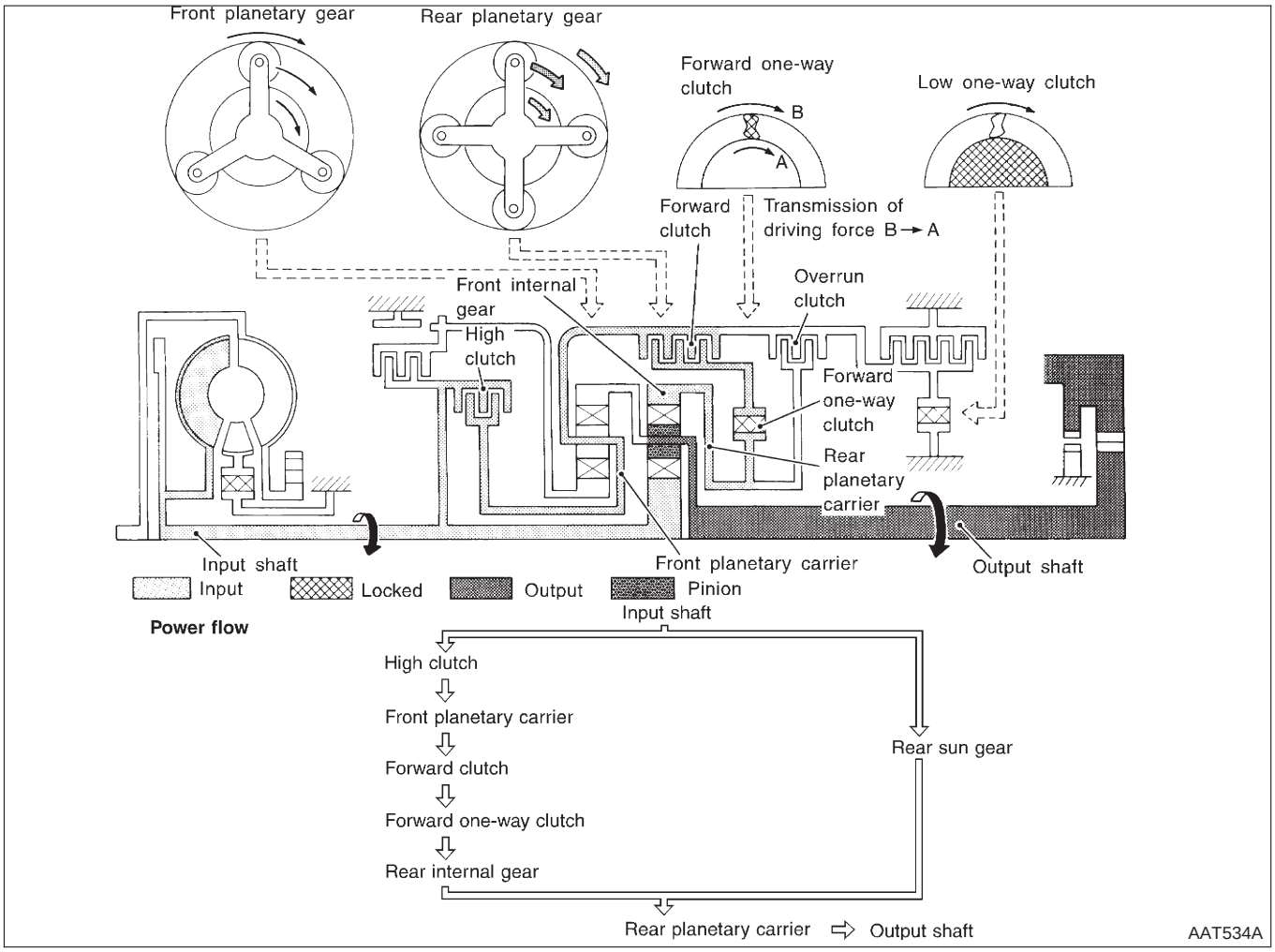


AAT533A

D_3 Position

=NFAT0278S0405

• **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

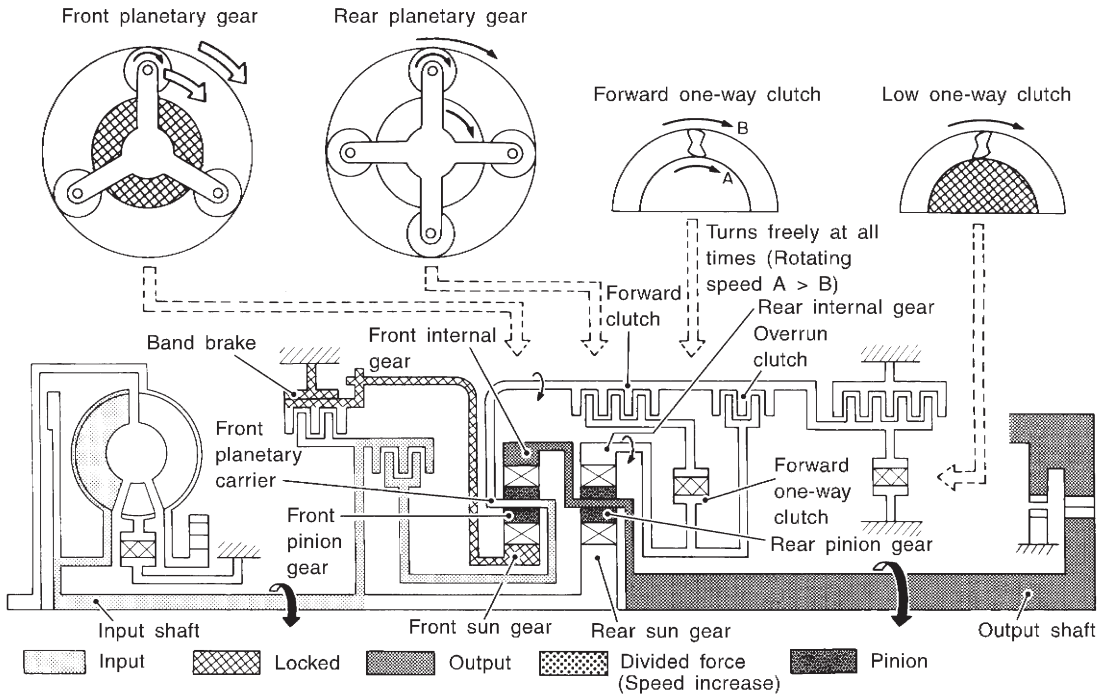


Shift Mechanism (Cont'd)

D_4 (O/D) Position

=NFAT0278S0406

• **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

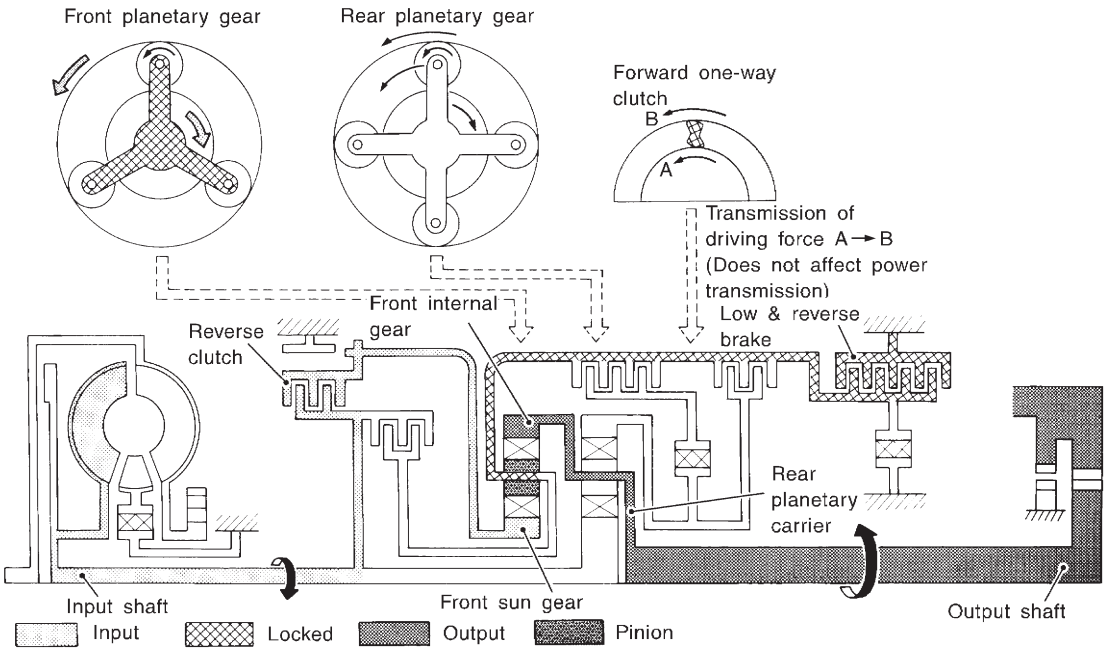
Input shaft
⇩
High clutch
⇩
Front planetary carrier
⇩
Front pinion gear
⇩
Front internal gear
⇩
Rear planetary carrier
⇩
Output shaft

AAT536A

R Position

=NFAT0278S0407

• **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

AAT535A

Control System

=NFAT0279

OUTLINE

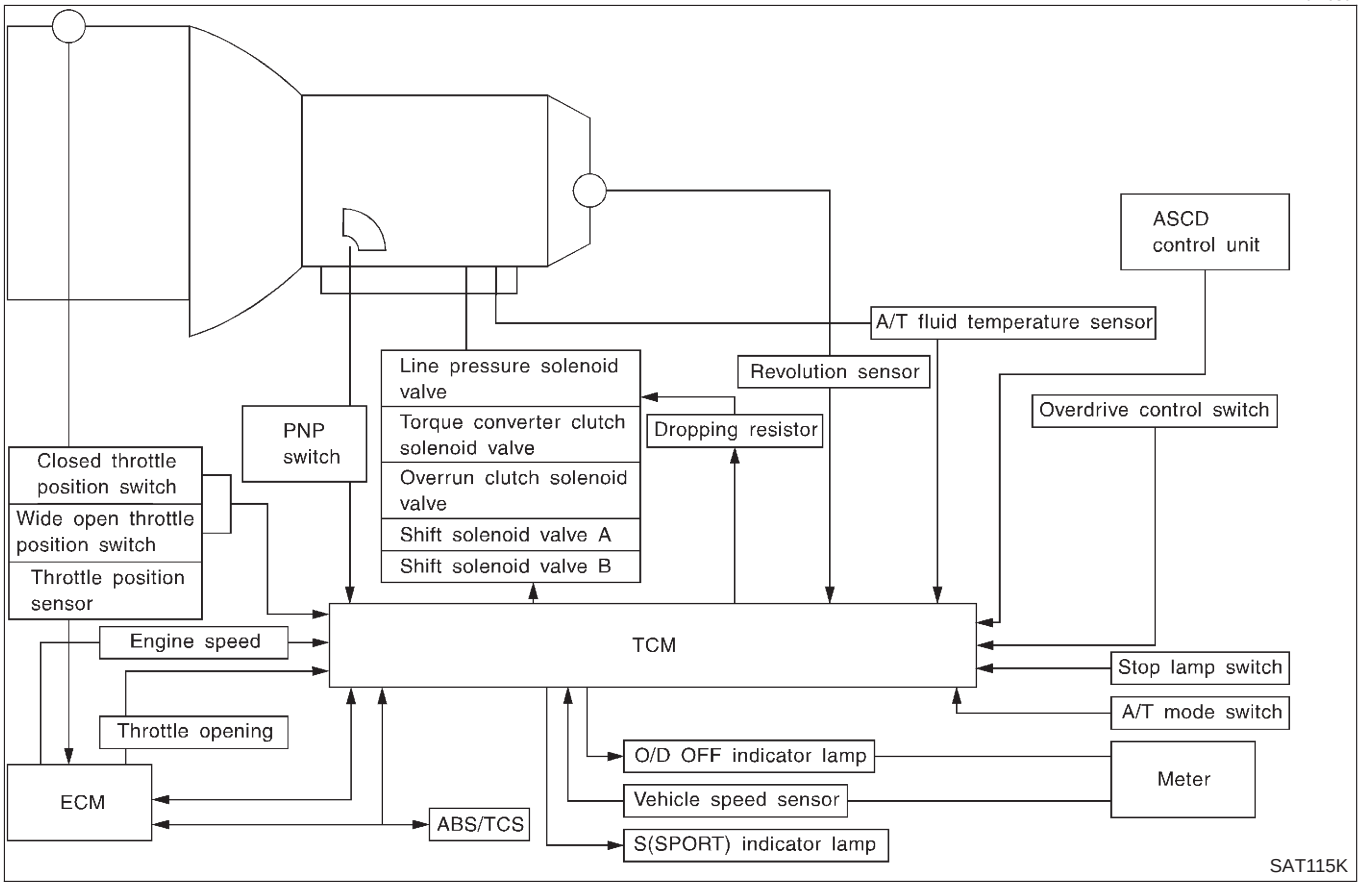
NFAT0279S01

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

SENSORS		TCM		ACTUATORS
Park/neutral position (PNP) switch Throttle position sensor 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 A/T mode 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 S (SPORT) indicator lamp ✻ (SNOW) indicator lamp

CONTROL SYSTEM

NFAT0279S02



TCM FUNCTION

=NFAT0279S03

The function of the TCM is to:

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

INPUT/OUTPUT SIGNAL OF TCM

NFAT0279S04

	Sensors and solenoid valves	Function
Input	Park/neutral position (PNP) switch	Detects select lever position and sends a signal to TCM.
	Throttle position sensor	Detects throttle valve position and sends a signal to TCM.
	Closed throttle position switch	Detects throttle valve's fully-closed position and sends a signal to TCM.
	Wide open throttle position switch	Detects a throttle valve position of greater than 1/2 of full throttle and sends a signal to TCM.
	Engine speed signal	From ECM.
	A/T fluid temperature sensor	Detects transmission fluid temperature and sends a signal to TCM.
	Revolution sensor	Detects output shaft rpm and sends a signal to TCM.
	Vehicle speed sensor	Used as an auxiliary vehicle speed sensor. Sends a signal when revolution sensor (installed on transmission) malfunctions.
	Overdrive control switch	Sends a signal, which prohibits a shift to D_4 (overdrive) position, to the TCM.
	A/T mode switch	Detects S (SPORT), ✻ (SNOW) or AUTO position selected and sends a signal to TCM.
	ASCD control unit	Sends the cruise signal and D_4 (overdrive) cancellation signal from ASCD control unit to TCM.
	Stop lamp switch	Send the lock-up release signal to the TCM at time of D_4 (lock-up).
Output	Shift solenoid valve A/B	Selects shifting point suited to driving conditions in relation to a signal sent from TCM.
	Line pressure solenoid valve	Regulates (or decreases) line pressure suited to driving conditions in relation to a signal sent from TCM.
	Torque converter clutch solenoid valve	Regulates (or decreases) lock-up pressure suited to driving conditions in relation to a signal sent from TCM.
	Overrun clutch solenoid valve	Controls an "engine brake" effect suited to driving conditions in relation to a signal sent from TCM.
	S (SPORT) indicator lamp	Shows TCM faults, when A/T control components malfunction.

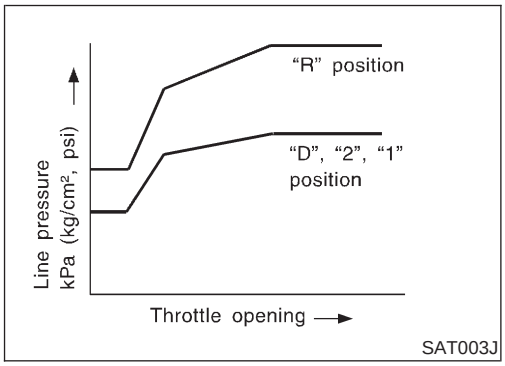
Control Mechanism

=NFAT0280

LINE PRESSURE CONTROL

NFAT0280S01

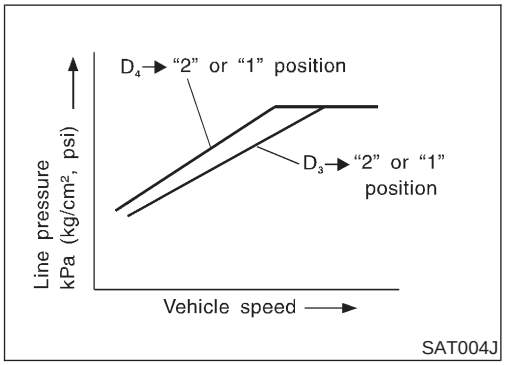
TCM has various line pressure control characteristics to meet the driving conditions.
An ON-OFF duty signal is sent to the line pressure solenoid valve based on TCM characteristics.
Hydraulic pressure on the clutch and brake is electronically controlled through the line pressure solenoid valve to accommodate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



Normal Control

NFAT0280S0101

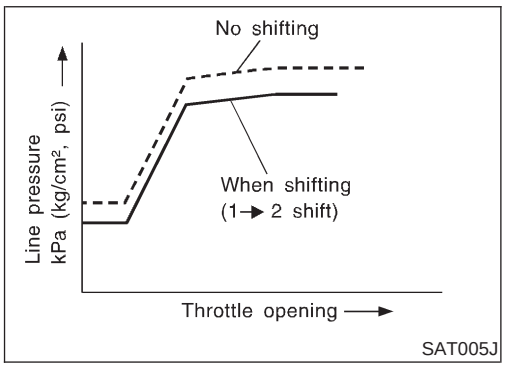
The line pressure to throttle opening characteristics is set for suitable clutch operation.



Back-up Control (Engine brake)

NFAT0280S0102

If the selector lever is shifted to 2 position while driving in D_4 (O/D) 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

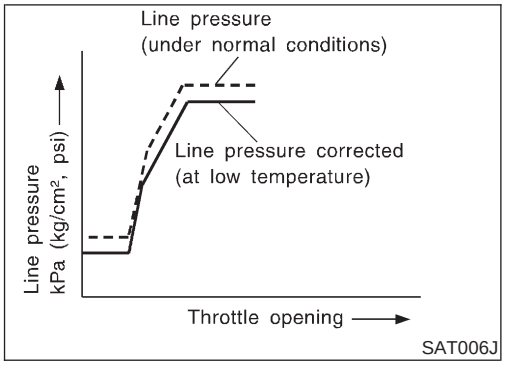
NFAT0280S0103

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.

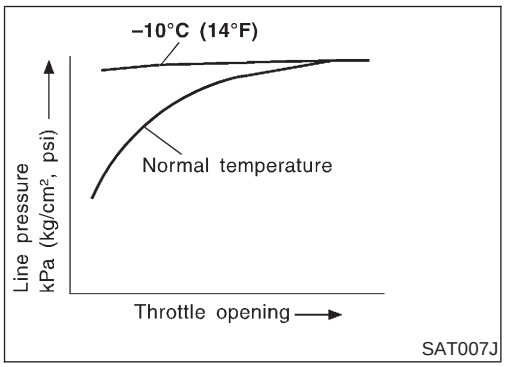
At Low Fluid Temperature

NFAT0280S0104

- 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.

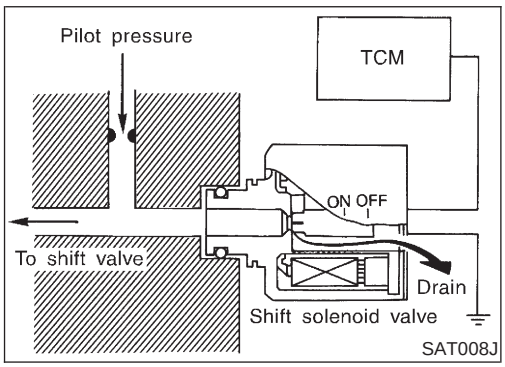


- Line pressure is increased to a maximum irrespective of the throttle opening when fluid temperature drops to −10°C (14°F). This pressure rise is adopted to prevent a delay in clutch and brake operation due to extreme drop of fluid viscosity at low temperature.

SHIFT CONTROL

NFAT0280S02

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

NFAT0280S0201

The TCM 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.

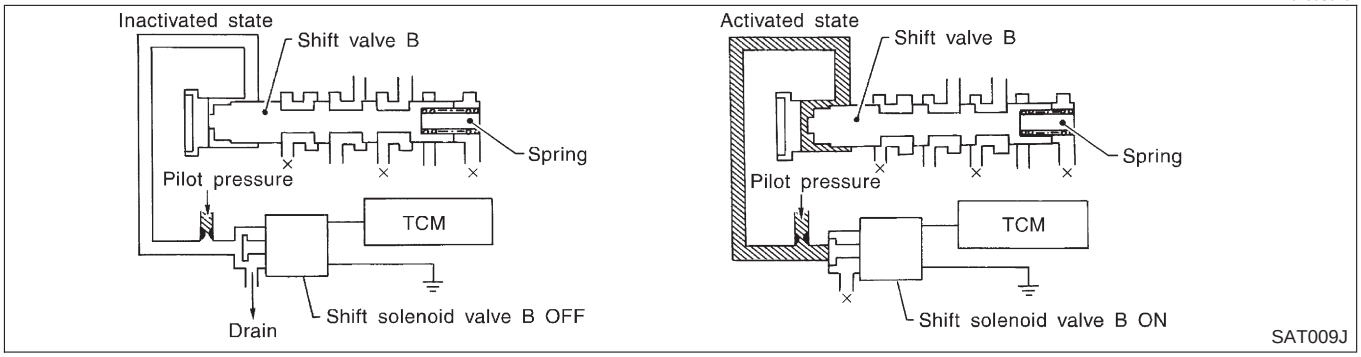
The shift solenoid valve performs simple ON-OFF operation. When set to ON, the drain circuit closes and pilot pressure is applied to the shift valve.

Relation between shift solenoid valves A and B and gear positions

Shift solenoid valve	Gear position				
	D_1, 2_1, 1_1	D_2, 2_2, 1_2	D_3	D_4 (O/D)	N-P
A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	ON (Closed)
B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)

Control of Shift Valves A and B

NFAT0280S0202



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

NFAT0280S03

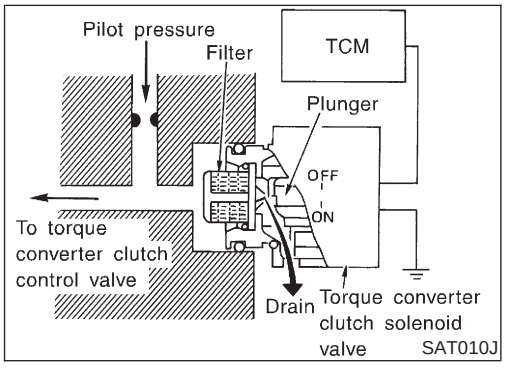
The torque converter clutch piston in the torque converter is locked to eliminate torque converter slip to increase power transmission efficiency. The solenoid valve is controlled by an ON-OFF duty signal sent from the TCM. The signal is converted to an oil pressure signal which controls the lock-up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

Conditions for Lock-up Operation

NFAT0280S0301

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, lock-up is performed.

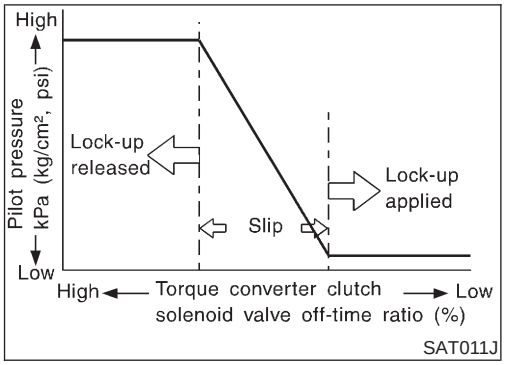
Overdrive control switch	ON	OFF
Selector lever	D position	
Gear position	D_4	D_3
Vehicle speed sensor	More than set value	
Throttle position sensor	Less than set opening	
Closed throttle position switch	OFF	
A/T fluid temperature sensor	More than 40°C (104°F)	



Torque Converter Clutch Solenoid Valve Control

NFAT0280S0302

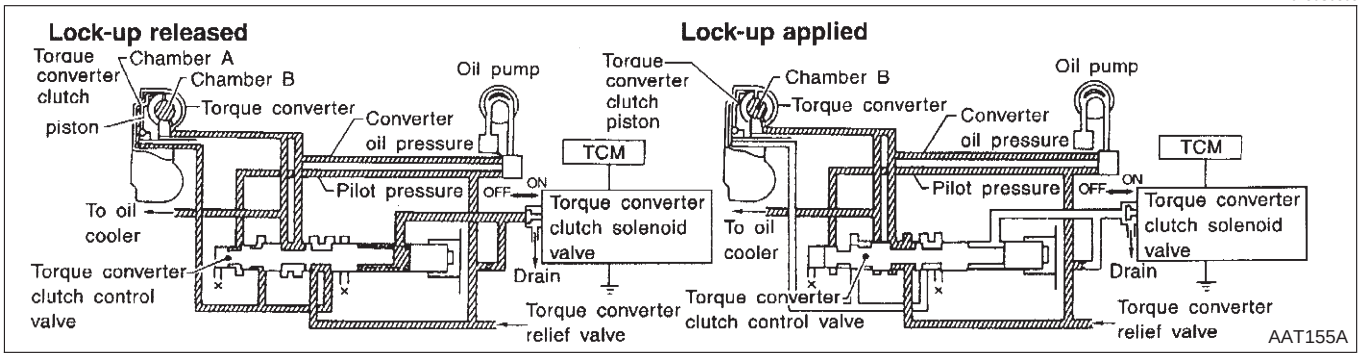
The torque converter clutch solenoid valve is controlled by the TCM. The plunger closes the drain circuit during the OFF period, and opens the circuit during the ON period. If the percentage of OFF-time increases in one cycle, the pilot pressure drain time is reduced and pilot pressure remains high.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

NFAT0280S0303



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)

NFAT0280S04

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.

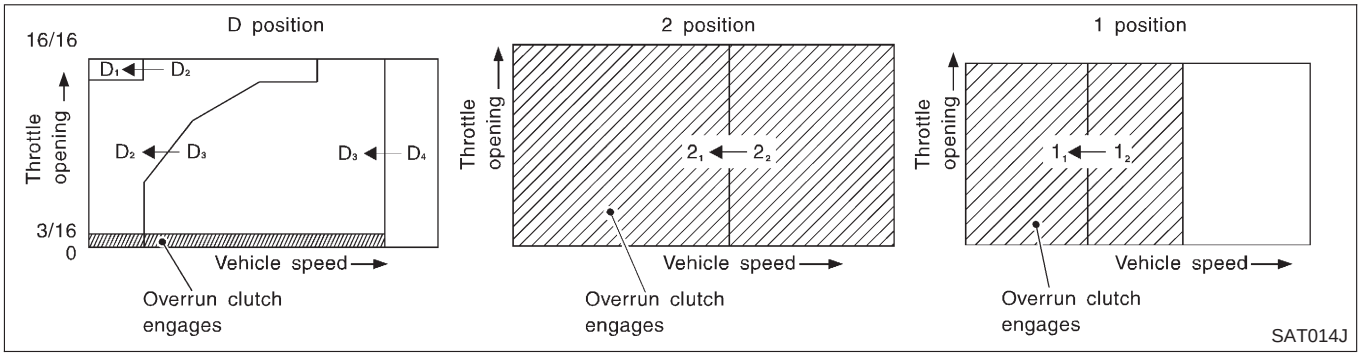
The overrun clutch operates when the engine brake is needed.

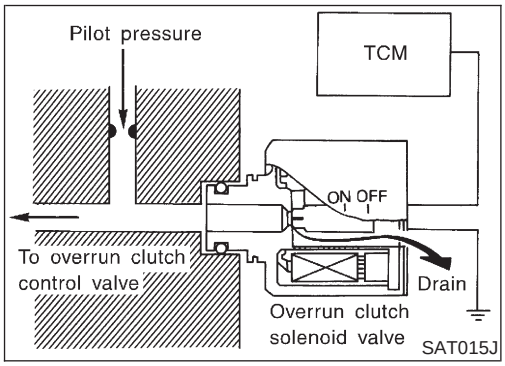
Overrun Clutch Operating Conditions

NFAT0280S0401

	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

Control Mechanism (Cont'd)

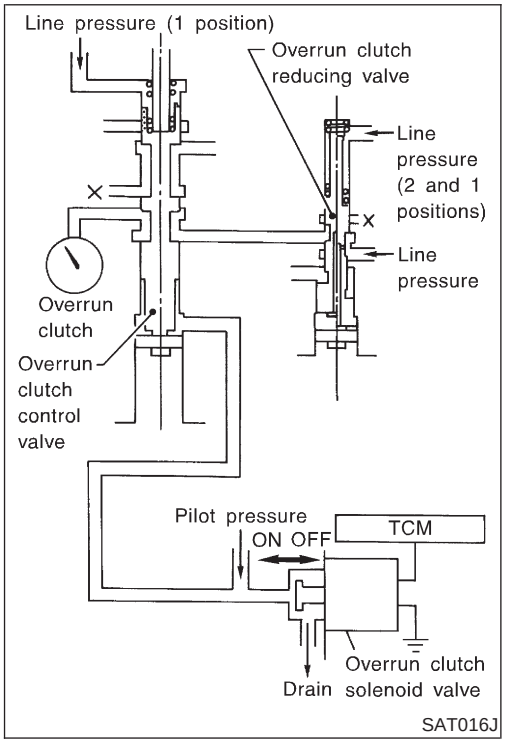




Overrun Clutch Solenoid Valve Control

NFAT0280S0402

The overrun clutch solenoid valve is operated by an ON-OFF signal transmitted by the TCM to provide overrun clutch control (engine brake control).
When this solenoid valve is ON, the pilot pressure drain port closes. When it is OFF, the drain port opens.
During the solenoid valve ON pilot pressure is applied to the end face of the overrun clutch control valve.



Overrun Clutch Control Valve Operation

NFAT0280S0403

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

NFAT0281

FUNCTION OF CONTROL VALVES

NFAT0281S01

Valve name	Function
Pressure regulator valve, plug and sleeve plug	Regulates oil discharged from the oil pump to provide optimum line pressure for all driving conditions.
Pressure modifier valve and sleeve	Used as a signal supplementary valve to the pressure regulator valve. Regulates pressure-modifier pressure (signal pressure) which controls optimum line pressure for all driving conditions.

Valve name	Function
Pilot valve	Regulates line pressure to maintain a constant pilot pressure level which controls lock-up mechanism, overrun clutch, shift timing.
Accumulator control valve	Regulates accumulator back-pressure to pressure suited to driving conditions.
Manual valve	Directs line pressure to oil circuits corresponding to select positions. Hydraulic pressure drains when the shift lever is in Neutral.
Shift valve A	Simultaneously switches three oil circuits using output pressure of shift solenoid valve A to meet driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve B.
Shift valve B	Simultaneously switches two oil circuits using output pressure of shift solenoid valve B in relation to driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve A.
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with application of the brake band in D_4. (Interlocking occurs if the overrun clutch engages during D_4.)
"1" reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when downshifting 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 the pace that oil pressure is released depending on vehicle speed; maximizes the high clutch release timing, and allows for soft down shifting.
Shuttle valve	Determines if the overrun clutch solenoid valve should control the 3-2 timing valve or the overrun clutch control valve and switches between the two.
Cooler check valve	At low speeds and with a small load when little heat is generated, saves the volume of cooler flow, and stores the oil pressure for lock up.

Introduction

NFAT0017

The A/T system has two self-diagnostic systems.
The first is the emission-related on board diagnostic system (EURO-OBD) performed by the TCM (transmission control module) in combination with the ECM. The malfunction is indicated by the MI (malfunction indicator) and is stored as a DTC in the ECM memory but not the TCM memory.
The second is the TCM original self-diagnosis indicated by the O/D OFF indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with EURO-OBD self-diagnostic items. For detail, refer to AT-41.

EURO-OBD Function for A/T System

NFAT0018

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

NFAT0019

ONE TRIP DETECTION LOGIC

NFAT0019S01

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

TWO TRIP DETECTION LOGIC

NFAT0019S02

When a malfunction is sensed during the first test drive, it is stored in the ECM memory as a 1st trip DTC (diagnostic trouble code) or 1st trip freeze frame data. At this point, the MI 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 MI will illuminate. — Second Trip
A/T-related parts for which the MI illuminates during the first or second test drive are listed below.

Items	MI	
	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.

EURO-OBD Diagnostic Trouble Code (DTC)

NFAT0020

HOW TO READ DTC AND 1ST TRIP DTC

NFAT0020S01

DTC and 1st trip DTC can be read by the following methods.
(With CONSULT-II or GST) CONSULT-II or GST (Generic Scan Tool) Examples: P0705, P0710, P0720, P0725, etc.
These DTCs are prescribed by SAE J2012.
(CONSULT-II also displays the malfunctioning component or system.)

- **1st trip DTC No. is the same as DTC No.**
- **Output of the diagnostic trouble code indicates that the indicated circuit has a malfunction. However, in case of the Mode II and GST they do not indicate whether the malfunction is still occurring or occurred in the past and returned to normal.**
  CONSULT-II can identify them as shown below. Therefore, using CONSULT-II (if available) is recommended.

A sample of CONSULT-II display for DTC and 1st trip DTC is shown on the next page. DTC or 1st trip DTC of a malfunction is displayed in “SELF-DIAG RESULTS” 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, 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

NFAT0020S0101

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

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data, and the data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For detail, refer to EC-70, "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. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MI on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

EURO-OBD Diagnostic Trouble Code (DTC) (Cont'd)

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 memory is erased.

HOW TO ERASE DTC

NFAT0020S02

The diagnostic trouble code can be erased by CONSULT-II, GST or ECM 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 or GST is easier and quicker than switching the mode selector on the ECM.**

The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to EURO-OBD. For details, refer to EC-45, "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)

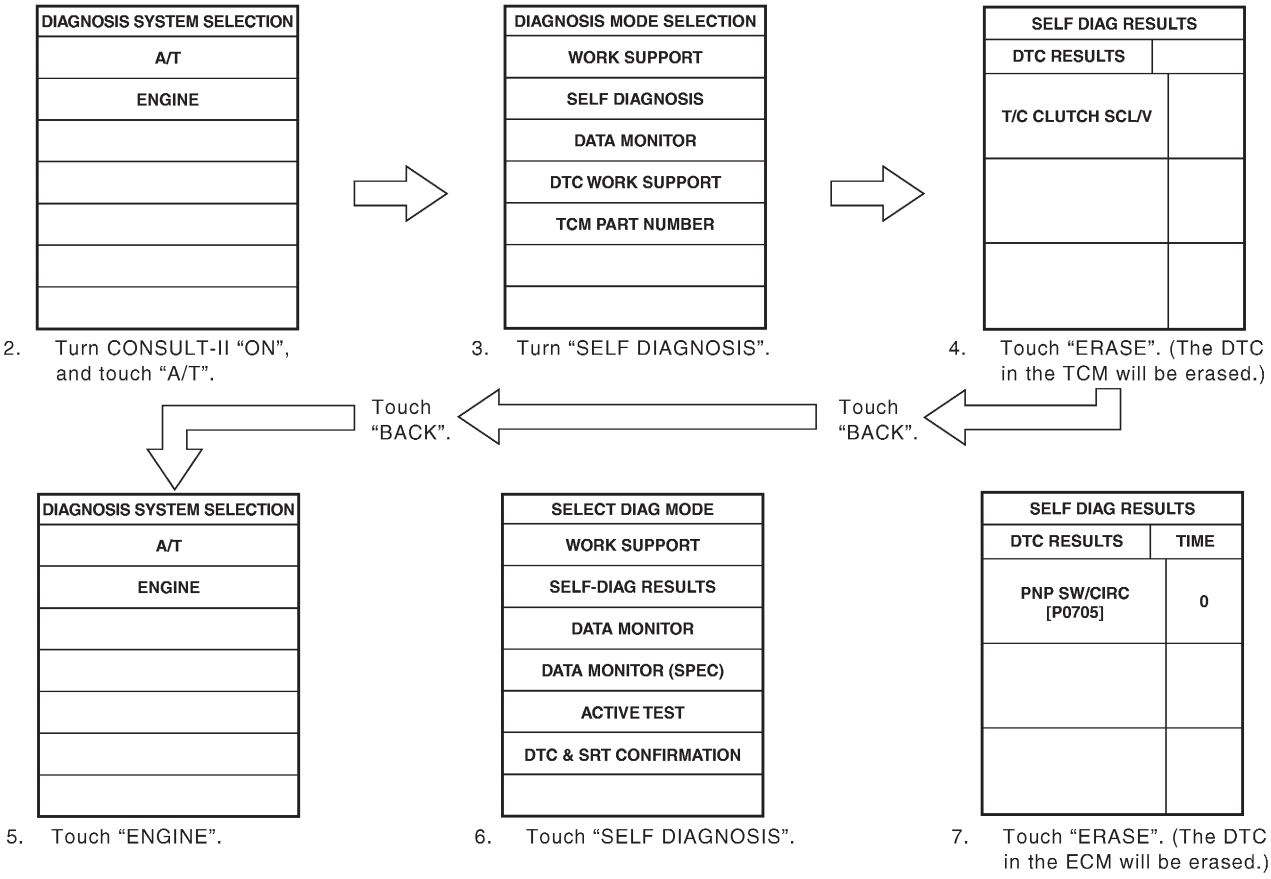
NFAT0020S03

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

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Turn CONSULT-II "ON" and touch "A/T".
3. Touch "SELF-DIAG RESULTS".
4. Touch "ERASE". (The DTC in the TCM will be erased.) Then touch "BACK" twice.
5. Touch "ENGINE".
6. Touch "SELF DIAGNOSIS".
7. Touch "ERASE". (The DTC in the ECM will be erased.)

How to erase DTC (With CONSULT-II)

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.



SAT286K

HOW TO ERASE DTC (WITH GST)

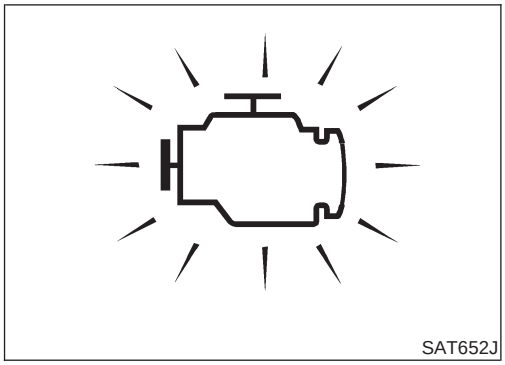
NFAT0020S04

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform "EURO-OBD SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)". Refer to AT-49. (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-84, "DESCRIPTION".

HOW TO ERASE DTC (NO TOOLS)

NFAT0020S05

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)". Refer to AT-49. (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)


SAT652J

Malfunction Indicator (MI)

=NFAT0021

1. The MI will light up when the ignition switch is turned ON without the engine running. This is for checking the lamp.

- If the MI does not light up, refer to EL-145, “Schematic”. (Or see EC-558, “Wirng Diagram”.)

2. When the engine is started, the malfunction indicator should go off.
   If the MI remains on, the on board diagnostic system has detected an engine system malfunction. For detail, refer to EC-44, “Introduction”.

CONSULT-II

NFAT0022

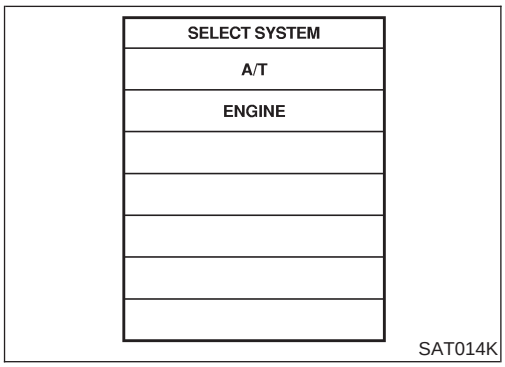
After performing “SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)” (AT-40), place check marks for results on the “Diagnostic Worksheet”, AT-68. Reference pages are provide following the items.

NOTICE:

1) The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
   Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
2) Shift schedule (which implies gear position) displayed on CONSULT-II and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:

- Actual shift schedule has more or less tolerance or allowance,
- Shift schedule indicated in Service Manual refers to the point where shifts start, and
- Gear position displayed on CONSULT-II indicates the point where shifts are completed.

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

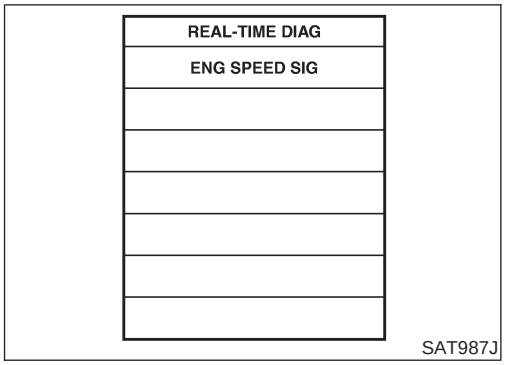


SAT014K

SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)

NFAT0022S01

1. Turn on CONSULT-II and touch “ENGINE” for EURO-OBD detected items or touch “A/T” for TCM self-diagnosis.
   If A/T is not displayed, check TCM power supply and ground circuit. Refer to AT-119. If result is NG, refer to EL-9, “Schematic”.



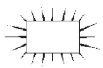
2. Touch "SELF DIAGNOSIS".
Display shows malfunction experienced since the last erasing operation.
CONSULT-II performs "Real Time Diagnosis".
Also, any malfunction detected while in this mode will be displayed at real time.

SELF-DIAGNOSTIC RESULT TEST MODE

NFAT0022S02

Detected items (Screen terms for CONSULT-II, "SELF-DIAG RESULTS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	EURO-OBD (DTC)
"A/T"	"ENGINE"		Available by S (SPORT) indicator lamp or "A/T" on CONSULT-II	Available by malfunction indicator*2, "ENGINE" on CONSULT-II or GST
Park/neutral position (PNP) switch circuit		• TCM does not receive the correct voltage signal (based on the gear position) from the switch.	—	P0705
—	PNP SW/CIRC			
Revolution sensor		• TCM 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 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			
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			
Shift solenoid valve A		• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0750
SHIFT SOLENOID/V A	SFT SOL A/CIRC			
Shift solenoid valve B		• TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0755
SHIFT SOLENOID/V B	SFT SOL B/CIRC			

CONSULT-II (Cont'd)

Detected items (Screen terms for CONSULT-II, "SELF-DIAG RESULTS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	EURO-OBD (DTC)
"A/T"	"ENGINE"		 Available by S (SPORT) indicator lamp or "A/T" on CONSULT-II	 Available by malfunction indicator*2, "ENGINE" on CONSULT-II or GST
Overrun clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P1760
OVERRUN CLUTCH S/V	O/R CLUCH SOL/ CIRC			
T/C clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0740
T/C CLUTCH SOL/V	TCC SOLENOID/ CIRC			
Line pressure solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0745
LINE PRESSURE S/V	L/PRESS SOL/ CIRC			
Throttle position sensor Throttle position switch		● TCM receives an excessively low or high voltage from the sensor.	X	P1705
THROTTLE POSI SEN	TP SEN/CIRC A/T			
Engine speed signal		● TCM does not receive the proper voltage signal from the ECM.	X	P0725
ENGINE SPEED SIG				
A/T fluid temperature sensor		● TCM receives an excessively low or high voltage from the sensor.	X	P0710
BATT/FLUID TEMP SEN	ATF TEMP SEN/ CIRC			
TCM (RAM)		● TCM memory (RAM) is malfunctioning	—	—
CONTROL UNIT (RAM)	—			
TCM (ROM)		● TCM memory (ROM) is malfunctioning	—	—
CONTROL UNIT (ROM)	—			
TCM (EEP ROM)		● TCM memory (EEP ROM) is malfunctioning.	—	—
CONT UNIT (EEP ROM)	—			
Initial start		● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)	X	—
INITIAL START	—			
No failure (NO DTC IS DETECTED FURTHER TESTING MAY BE REQUIRED**)		● No failure has been detected.	X	X

X: Applicable
−: Not applicable
*1: These malfunctions cannot be displayed by MI  if another malfunction is assigned to MI.
*2: Refer to EC-60, "DESCRIPTION".

DATA MONITOR MODE (A/T)

NFAT0022S11

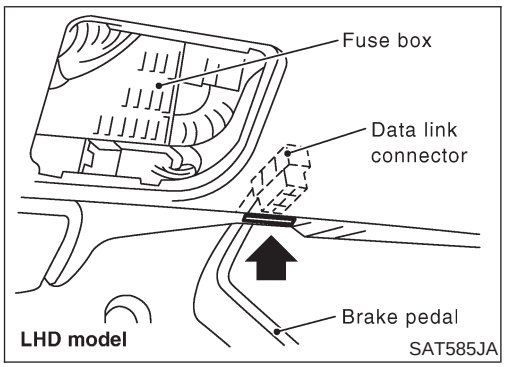
Item	Display	Monitor item		Description	Remarks
		TCM Input signals	Main signals		
Vehicle speed sensor 1 (A/T) (Revolution sensor)	VHCL/S SE·A/T [km/h] or [mph]	X	—	● Vehicle speed computed from signal of revolution sensor is displayed.	When racing engine in N or P with vehicle stationary, CONSULT-II data may not indicate 0 km/h (0 mph).
Vehicle speed sensor 2 (Meter)	VHCL/S SE·MTR [km/h] or [mph]	X	—	● Vehicle speed computed from signal of vehicle speed sensor is displayed.	Vehicle speed display may not be accurate under approx. 10 km/h (6 mph). It may not indicate 0 km/h (0 mph) when vehicle is stationary.
Throttle position sensor	THRTL POS SEN [V]	X	—	● Throttle position sensor signal voltage is displayed.	
A/T fluid temperature sensor	FLUID TEMP SE [V]	X	—	● A/T fluid temperature sensor signal voltage is displayed. ● Signal voltage lowers as fluid temperature rises.	
Battery voltage	BATTERY VOLT [V]	X	—	● Source voltage of TCM is displayed.	
Engine speed	ENGINE SPEED [rpm]	X	X	● Engine speed, computed from engine speed signal, is displayed.	Engine speed display may not be accurate under approx. 800 rpm. It may not indicate 0 rpm even when engine is not running.
Overdrive control switch A/T check switch	OVERDRIVE SW [ON/OFF]	X	—	● ON/OFF state computed from signal of overdrive control SW is displayed.	
Park/neutral position (PNP) switch	PN POSI SW [ON/OFF]	X	—	● ON/OFF state computed from signal of PN 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.

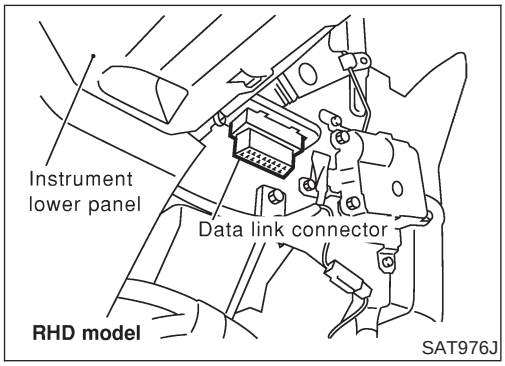
CONSULT-II (Cont'd)

Item	Display	Monitor item		Description	Remarks
		TCM Input signals	Main signals		
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.
A/T mode switch [S (SPORT)]	POWER SHIFT SW [ON/OFF]	X	—	● ON/OFF state computed from signal of S (SPORT) mode SW is displayed.	
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.	
A/T mode switch [✻ (SNOW)]	HOLD SW [ON/OFF]	X	—	● ON/OFF state computed from signal of ✻ (SNOW) mode SW is displayed.	
Gear position	GEAR	—	X	● Gear position data used for computation by TCM, is displayed.	
Selector lever position	SLCT LVR POSI	—	X	● Selector lever position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	—	X	● Vehicle speed data, used for computation by TCM, is displayed.	
Throttle position	THROTTLE POSI [/8]	—	X	● Throttle position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Stop lamp switch	BRAKE SW [ON/OFF]	X	—	● ON/OFF status is displayed. ON ... Brake pedal is depressed. OFF ... Brake pedal is released.	
Line pressure duty	LINE PRES DTY [%]	—	X	● Control value of line pressure solenoid valve, computed by TCM from each input signal, is displayed.	

Item	Display	Monitor item		Description	Remarks
		TCM Input signals	Main signals		
Torque converter clutch solenoid valve duty	TCC S/V DUTY [%]	—	X	● Control value of torque converter clutch solenoid valve, computed by TCM from each input signal, is displayed.	
Shift solenoid valve A	SHIFT S/V A [ON/OFF]	—	X	● Control value of shift solenoid valve A, computed by TCM from each input signal, is displayed.	Control value of solenoid is displayed even if solenoid circuit is disconnected. The OFF signal is displayed if solenoid circuit is shorted.
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	—	X	● Control value of shift solenoid valve B, computed by TCM from each input signal, is displayed.	
Overrun clutch solenoid valve	OVERRUN/C S/V [ON/OFF]	—	X	● Control value of overrun clutch solenoid valve computed by TCM from each input signal is displayed.	
Self-diagnosis display lamp [S (SPORT) indicator lamp]	SELF-D DP LMP [ON/OFF]	—	X	● Control status of S (SPORT) indicator lamp is displayed.	

X: Applicable
—: Not applicable





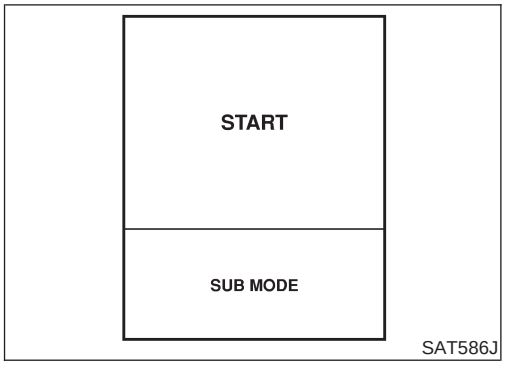
DTC WORK SUPPORT MODE WITH CONSULT-II

NFAT0022S04

CONSULT-II Setting Procedure

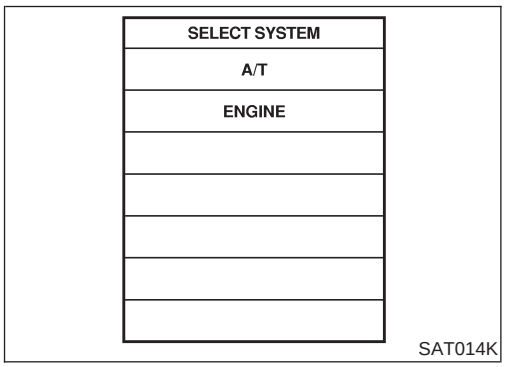
NFAT0022S0401

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



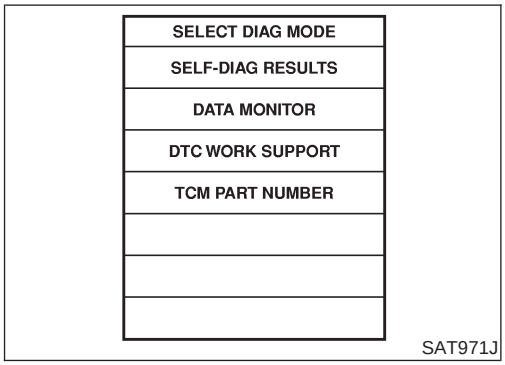
SAT586J

3. Turn ignition switch ON.
4. Touch “START”.



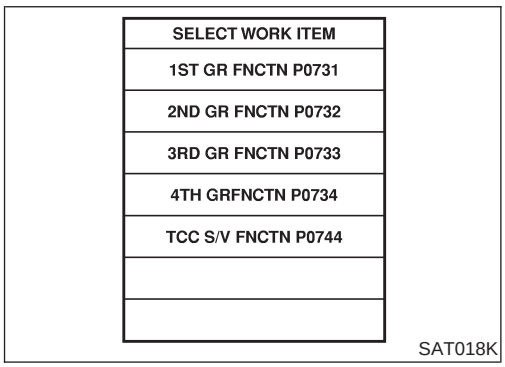
SAT014K

5. Touch “A/T”.



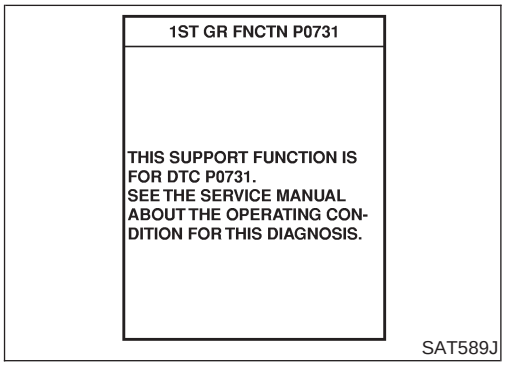
SAT971J

6. Touch “DTC WORK SUPPORT”.



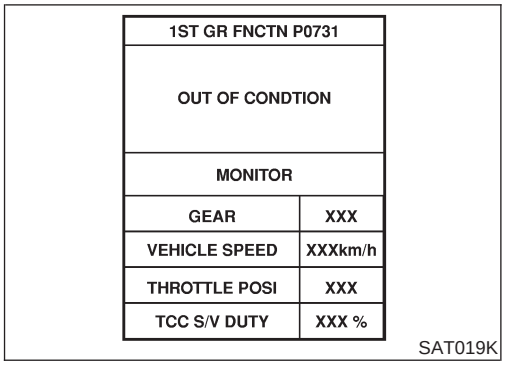
SAT018K

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



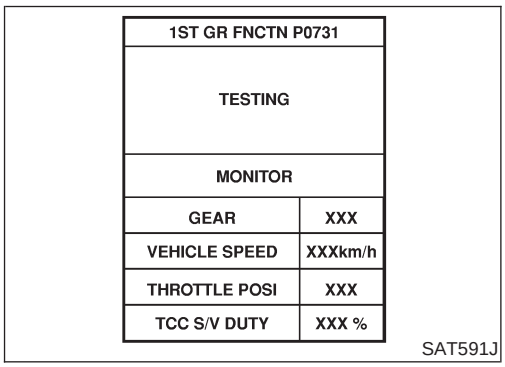
SAT589J

8. Touch “START”.



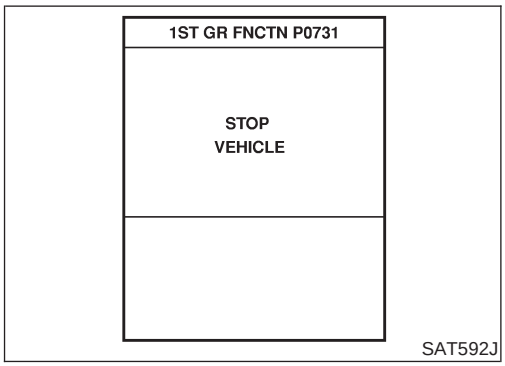
SAT019K

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



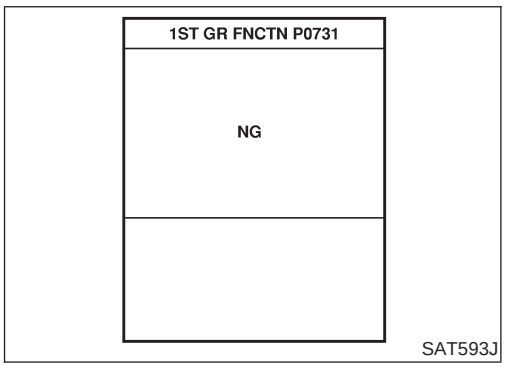
SAT591J

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

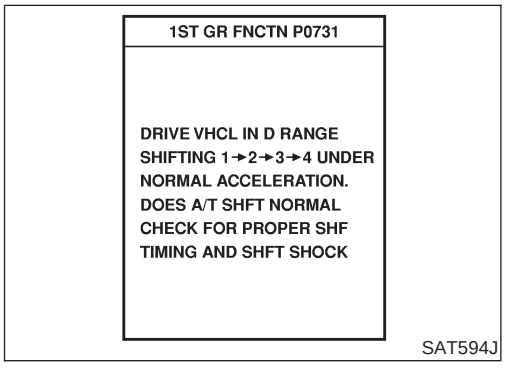


SAT592J

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

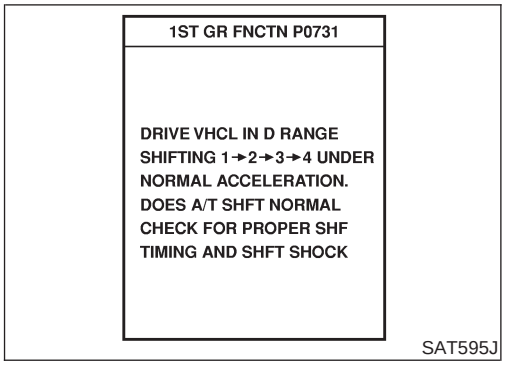


SAT593J

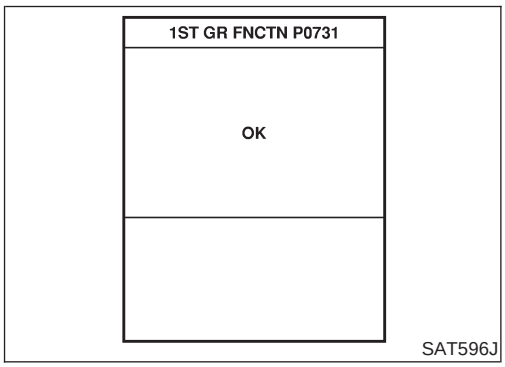


SAT594J

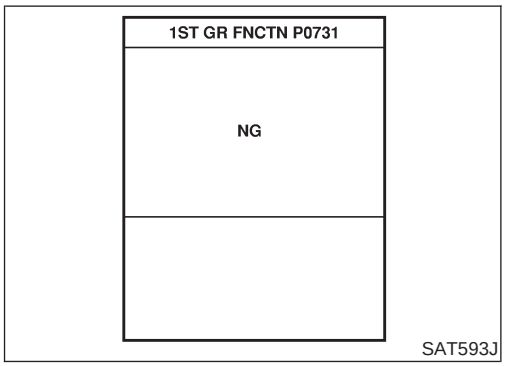
11. Perform test drive to check gear shift feeling in accordance with instructions displayed.



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

NFAT0022S05

DTC work support item	Description	Check item
1ST GR FNCTN P0731	Following items for "A/T 1st gear function (P0731)" can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve A ● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
2ND GR FNCTN P0732	Following items for "A/T 2nd gear function (P0732)" can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
3RD GR FNCTN P0733	Following items for "A/T 3rd gear function (P0733)" can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve A ● Each clutch ● Hydraulic control circuit

DTC work support item	Description	Check item
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

Diagnostic Procedure Without CONSULT-II

NFAT0023

EURO-OBD SELF-DIAGNOSTIC PROCEDURE (WITH GST)

NFAT0023S01

Refer to EC-84, "DESCRIPTION".

EURO-OBD SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

NFAT0023S02

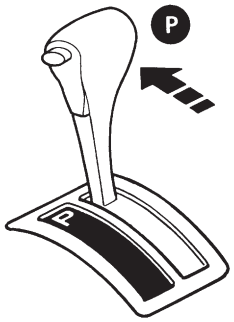
Refer to EC-60, "DESCRIPTION".

TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

NFAT0023S03

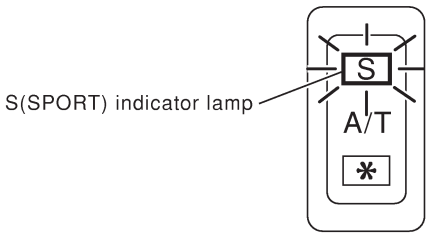
1 CHECK S (SPORT) INDICATOR LAMP

1. Move selector lever to P position.
   Start engine and warm it up to normal engine operating temperature.
2. Turn ignition switch to OFF position.
3. Wait 5 seconds.
4. Turn ignition switch to ON position.
   (Do not start engine.)



SAT163C

5. Does S (SPORT) indicator lamp come on for about 2 seconds?



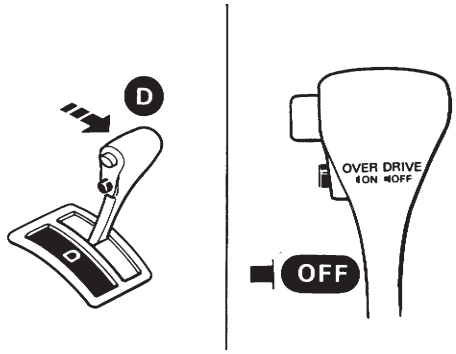
SAT116K

Yes or No

Yes	▶	GO TO 2.
No	▶	Stop procedure. Perform "1. S (SPORT) Indicator Lamp Does Not Come On", AT-281 before proceeding.

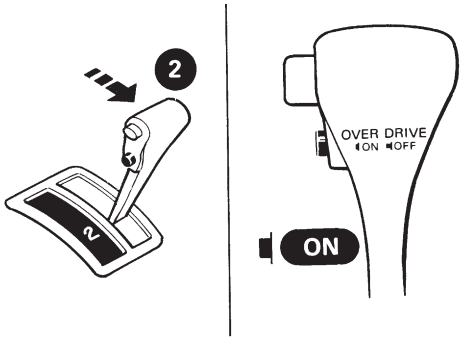
2	JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch to OFF position.
2. Set A/T mode switch to AUTO position.
3. Push and hold shift lock release button.
4. Move selector lever from P to D position.
5. Set overdrive control switch in OFF position.
6. Turn ignition switch to ON position.
   (Do not start engine.)
   (If O/D OFF indicator lamp comes off, refer to "Step 3 and 4" on AT-323).



SAT653E

7. Move selector lever to 2 position.
8. Set overdrive control switch in ON position.

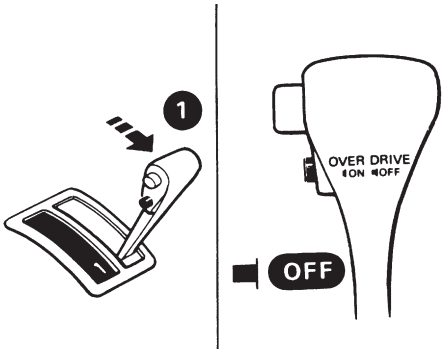


SAT978F

▶	GO TO 3.

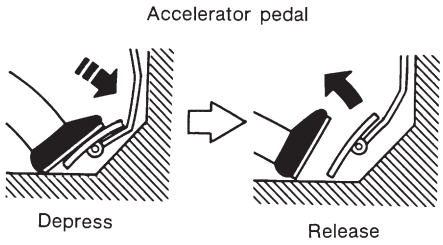
3	JUDGEMENT PROCEDURE STEP 2

1. Move selector lever to 1 position.
2. Set overdrive control switch in OFF position.



SAT781B

3. Depress accelerator pedal fully and release it.

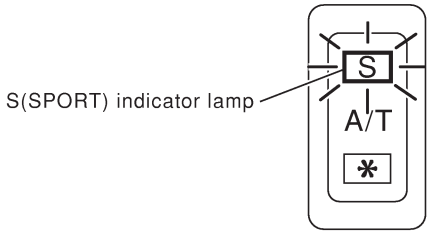


SAT981F

▶	GO TO 4.

4	CHECK SELF-DIAGNOSIS CODE

Check S (SPORT) indicator lamp.
Refer to JUDGEMENT OF SELF-DIAGNOSIS CODE, AT-52.



SAT116K

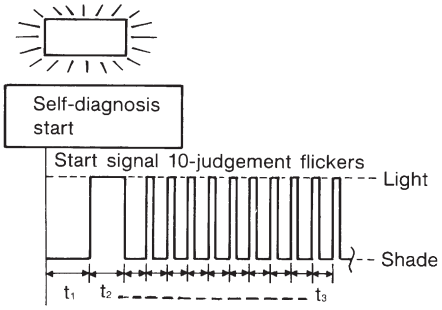
▶	DIAGNOSIS END

JUDGEMENT OF SELF-DIAGNOSIS CODE

NFAT0023S05

S (SPORT) indicator lamp:

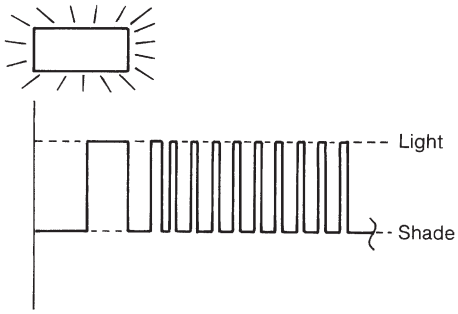
All judgement flickers are same.



SAT819H

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

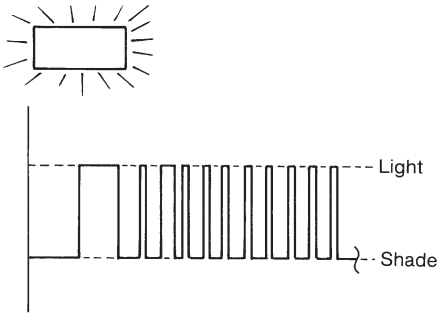
1st judgement flicker is longer than others.



SAT794H

Revolution sensor circuit is short-circuited or disconnected.
⇒ **Go to DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR), AT-134.**

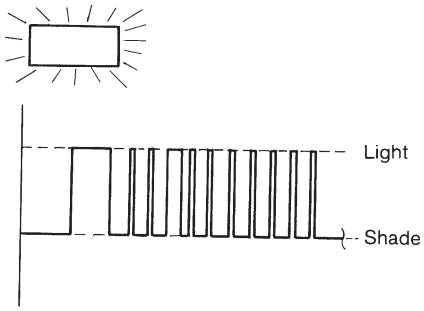
2nd judgement flicker is longer than others.



SAT795H

Vehicle speed sensor circuit is short-circuited or disconnected.
⇒ **Go to DTC VEHICLE SPEED SENSOR·MTR, AT-213.**

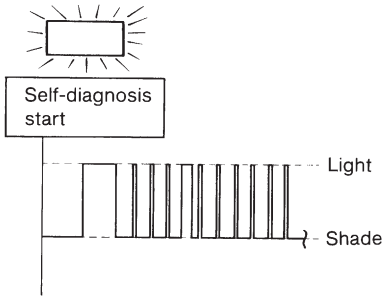
3rd judgement flicker is longer than others.



SAT796H

Throttle position sensor circuit is short-circuited or disconnected.
⇒ **Go to DTC P1705 THROTTLE POSITION SENSOR, AT-192.**

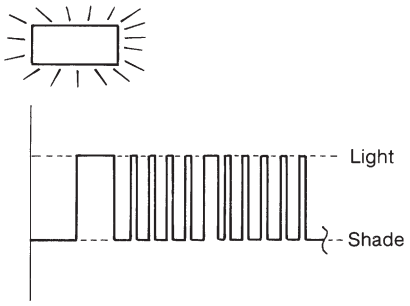
4th judgement flicker is longer than others.



SAT797H

Shift solenoid valve A circuit is short-circuited or disconnected.
⇒ **Go to DTC P0750 SHIFT SOLENOID VALVE A, AT-182.**

5th judgement flicker is longer than others.

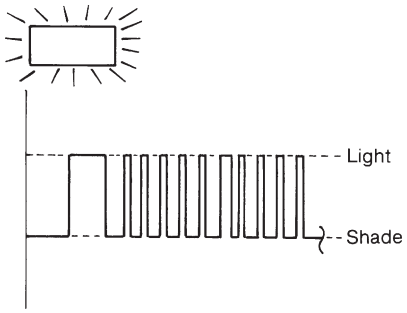


SAT798H

Shift solenoid valve B circuit is short-circuited or disconnected.
⇒ **Go to DTC P0755 SHIFT SOLENOID VALVE B, AT-187.**

S (SPORT) indicator lamp:

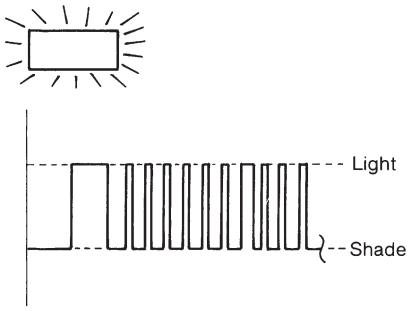
6th judgement flicker is longer than others.



SAT799H

Overrun clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to DTC P1760 OVERRUN CLUTCH SOLENOID VALVE, AT-201.**

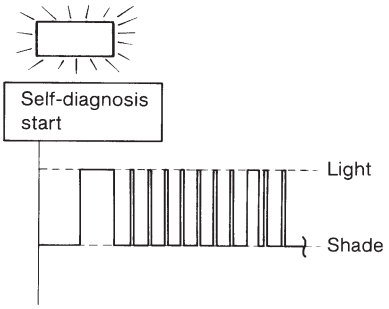
7th judgement flicker is longer than others.



SAT800H

Torque converter clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE, AT-171.**

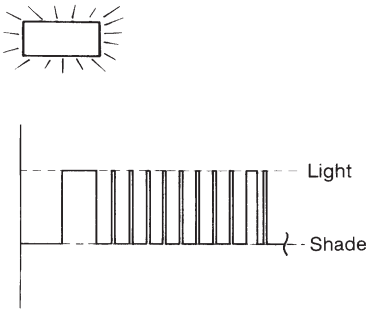
8th judgement flicker is longer than others.



SAT801H

A/T fluid temperature sensor is disconnected or TCM power source circuit is damaged.
⇒ **Go to DTC BATT/FLUID TEMP SEN (A/T FLUID TEMPERATURE SENSOR AND TCM POWER SOURCE), AT-207.**

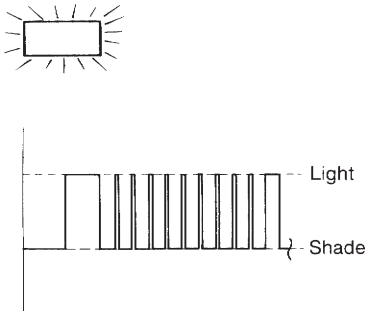
9th judgement flicker is longer than others.



SAT802H

Engine speed signal circuit is short-circuited or disconnected.
⇒ **Go to DTC P0725 ENGINE SPEED SIGNAL, AT-139.**

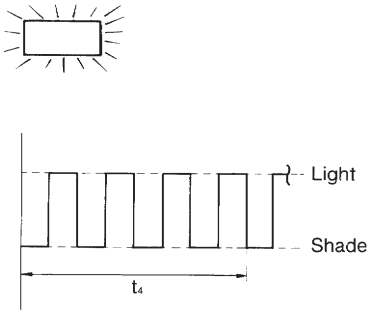
10th judgement flicker is longer than others.



SAT803H

Line pressure solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to DTC P0745 LINE PRESSURE SOLENOID VALVE, AT-176.**

Flickers as shown below.

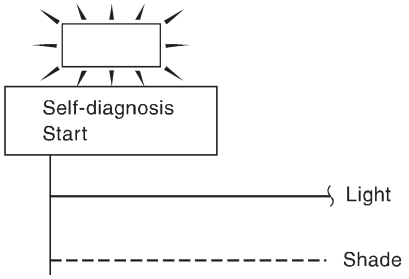


SAT804H

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

S (SPORT) indicator lamp:

Lamp comes off.



SAT809J

PNP switch, overdrive control switch, A/T check switch or throttle position switch circuit is disconnected or TCM is damaged.
⇒ **Go to 24. TCM Self-diagnosis Does Not Activate (PNP, OVERDRIVE CONTROL, A/T MODE AND THROTTLE POSITION SWITCHES), AT-323.**

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

CONSULT-II

NFAT0282

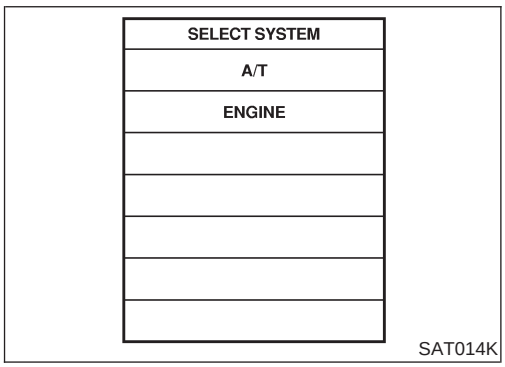
After performing “SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)” (AT-55), place check marks for results on the “Diagnostic Worksheet”, AT-75. Reference pages are provide following the items.

NOTICE:

1) The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
   Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
2) Shift schedule (which implies gear position) displayed on CONSULT-II and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:

- Actual shift schedule has more or less tolerance or allowance,
- Shift schedule indicated in Service Manual refers to the point where shifts start, and
- Gear position displayed on CONSULT-II indicates the point where shifts are completed.

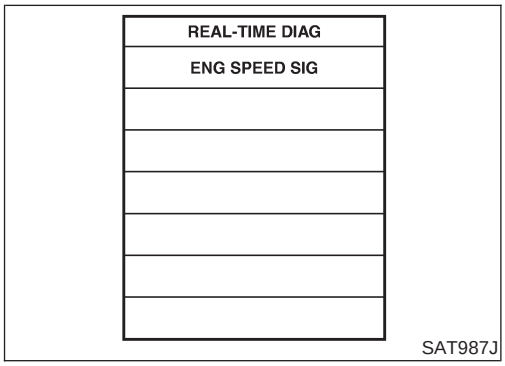
3) Shift solenoid valve “A” or “B” is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).
4) Additional CONSULT-II information can be found in the Operation Manual supplied with the CONSULT-II unit.



SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)

NFAT0282S01

1. Turn on CONSULT-II and touch “A/T” for TCM self-diagnosis.
   If A/T is not displayed, check TCM power supply and ground circuit. Refer to AT-119. If result is NG, refer to EL-9, “Schematic”.



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.

CONSULT-II (Cont'd)

SELF-DIAGNOSTIC RESULT TEST MODE

NFAT0282S02

Detected items (Screen terms for CONSULT-II, "SELF-DIAG RESULTS" test mode)		Malfunction is detected when ...	Remarks
Item	Display		
No failure (NO DTC IS DETECTED FURTHER TESTING MAY BE REQUIRED**)		● No failure has been detected.	
Initial start		● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)	
INITIAL START	—		
Revolution sensor	VHCL SPEED SEN·A/T	● TCM does not receive the proper voltage signal from the sensor.	
Vehicle speed sensor (Meter)	VHCL SPEED SEN·MTR	● TCM does not receive the proper voltage signal from the sensor.	
Throttle position sensor Throttle position switch	THROTTLE POSI SEN	● TCM receives an excessively low or high voltage from the sensor.	
Shift solenoid valve A	SHIFT SOLENOID/V A	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
Shift solenoid valve B	SHIFT SOLENOID/V B	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
Overrun clutch solenoid valve	OVERRUN CLUTCH S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
T/C clutch solenoid valve	T/C CLUTCH SOL/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
A/T fluid temperature sensor	BATT/FLUID TEMP SEN	● TCM receives an excessively low or high voltage from the sensor.	To be displayed in case of abnormality and when no recording is made.
Engine speed signal	ENGINE SPEED SIG	● TCM does not receive the proper voltage signal from the ECM.	
Line pressure solenoid valve	LINE PRESSURE S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
TCM (RAM)	CONTROL UNIT (RAM)	● TCM memory (RAM) is malfunctioning.	
TCM (ROM)	CONTROL UNIT (ROM)	● TCM memory (ROM) is malfunctioning.	
TCM (EEP ROM)	CONT UNIT (EEP ROM)	● TCM memory (EEP ROM) is malfunctioning.	

DATA MONITOR MODE (A/T)

NFAT0282S03

Item	Display	Monitor item		Description	Remarks
		TCM Input signals	Main signals		
Vehicle speed sensor 1 (A/T) (Revolution sensor)	VHCL/S SE·A/T [km/h] or [mph]	X	—	● Vehicle speed computed from signal of revolution sensor is displayed.	When racing engine in N or P with vehicle stationary, CONSULT-II data may not indicate 0 km/h (0 mph).

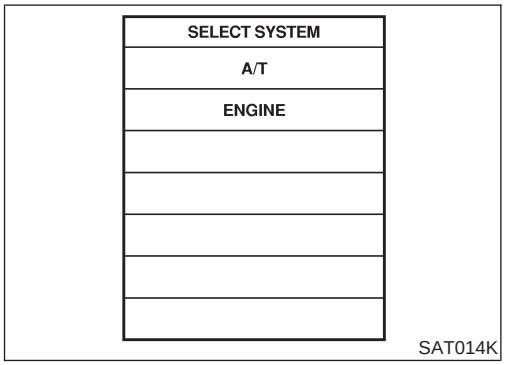
Item	Display	Monitor item		Description	Remarks
		TCM Input signals	Main signals		
Vehicle speed sensor 2 (Meter)	VHCL/S SE·MTR [km/h] or [mph]	X	—	● Vehicle speed computed from signal of vehicle speed sensor is displayed.	Vehicle speed display may not be accurate under approx. 10 km/h (6 mph). It may 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 is displayed.	
Engine speed	ENGINE SPEED [rpm]	X	X	● Engine speed, computed from engine speed signal, is displayed.	Engine speed display may not be accurate under approx. 800 rpm. It may not indicate 0 rpm even when engine is not running.
Overdrive control switch	OVERDRIVE SW [ON/OFF]	X	—	● ON/OFF state computed from signal of overdrive control SW is displayed.	
Park/neutral position (PNP) switch	PN POSI SW [ON/OFF]	X	—	● ON/OFF state computed from signal of PN 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.

CONSULT-II (Cont'd)

Item	Display	Monitor item		Description	Remarks
		TCM Input signals	Main signals		
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.
A/T mode switch [S (SPORT)]	POWER SHIFT SW [ON/OFF]	X	—	● ON/OFF state computed from signal of S (SPORT) mode SW is displayed.	
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.	
A/T mode switch [✻ (SNOW)]	HOLD SW [ON/OFF]	X	—	● ON/OFF state computed from signal of ✻ (SNOW) mode SW is displayed.	
Gear position	GEAR	—	X	● Gear position data used for computation by TCM, is displayed.	
Selector lever position	SLCT LVR POSI	—	X	● Selector lever position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	—	X	● Vehicle speed data, used for computation by TCM, is displayed.	
Throttle position	THROTTLE POSI [/8]	—	X	● Throttle position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Stop lamp switch	BRAKE SW [ON/OFF]	X	—	● ON/OFF status is displayed. ON ... Brake pedal is depressed. OFF ... Brake pedal is released.	
Line pressure duty	LINE PRES DTY [%]	—	X	● Control value of line pressure solenoid valve, computed by TCM from each input signal, is displayed.	
Torque converter clutch solenoid valve duty	TCC S/V DUTY [%]	—	X	● Control value of torque converter clutch solenoid valve, computed by TCM from each input signal, is displayed.	

Item	Display	Monitor item		Description	Remarks
		TCM Input signals	Main signals		
Shift solenoid valve A	SHIFT S/V A [ON/OFF]	—	X	● Control value of shift solenoid valve A, computed by TCM from each input signal, is displayed.	Control value of solenoid is displayed even if solenoid circuit is disconnected. The OFF signal is displayed if solenoid circuit is shorted.
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	—	X	● Control value of shift solenoid valve B, computed by TCM from each input signal, is displayed.	
Overrun clutch solenoid valve	OVERRUN/C S/V [ON/OFF]	—	X	● Control value of overrun clutch solenoid valve computed by TCM from each input signal is displayed.	
Self-diagnosis display lamp [S (SPORT) indicator lamp]	SELF-D DP LMP [ON/OFF]	—	X	● Control status of S (SPORT) indicator lamp is displayed.	

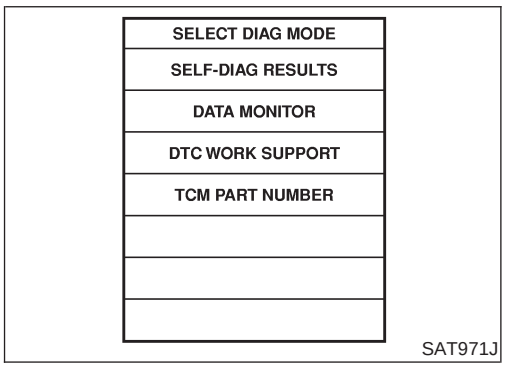
X: Applicable
—: Not applicable



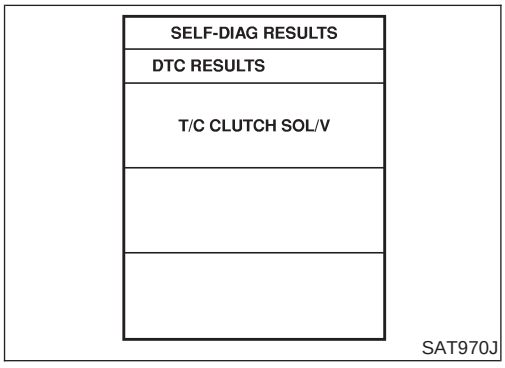
HOW TO ERASE SELF-DIAGNOSTIC RESULTS (WITH CONSULT-II)

NFAT0282S04

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait for at least 5 seconds and then turn it "ON" again.
2. Turn CONSULT-II "ON", and touch "A/T".



3. Touch "SELF DIAG RESULTS".



4. Touch "ERASE". (The self-diagnostic results will be erased.)

Diagnostic Procedure Without CONSULT-II

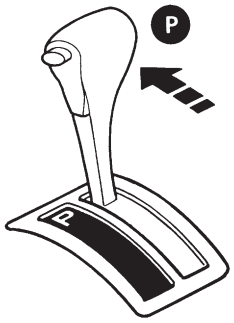
NFAT0283

⊠ SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)

NFAT0283S01

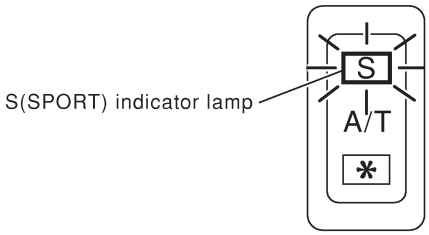
1	CHECK S (SPORT) INDICATOR LAMP

1. Move selector lever to P position.
   Start engine and warm it up to normal engine operating temperature.
2. Turn ignition switch to OFF position.
3. Wait 5 seconds.
4. Turn ignition switch to ON position.
   (Do not start engine.)



SAT163C

5. Does S (SPORT) indicator lamp come on for about 2 seconds?



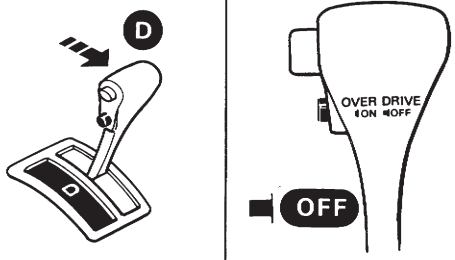
SAT116K

Yes or No

Yes	▶	GO TO 2.
No	▶	Stop procedure. Perform “1. S (SPORT), O/D OFF, A/T CHECK or POWER Indicator Lamp Does Not Come On”, AT-281 before proceeding.

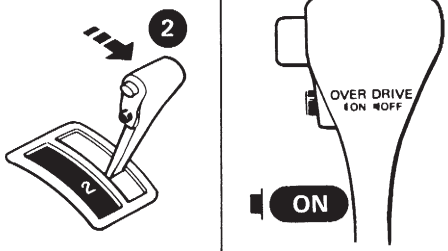
2	JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch to OFF position.
2. Set A/T mode switch to AUTO position.
3. Push and hold shift lock release button.
4. Move selector lever from P to D position.
5. Turn ignition switch to ON position.
   (Do not start engine.)
6. Set overdrive control switch in OFF position. (If O/D OFF indicator lamp comes off, refer to "Step 3 and 4" on AT-323).



SAT653E

7. Move selector lever to 2 position.
8. Set overdrive control switch in ON position.

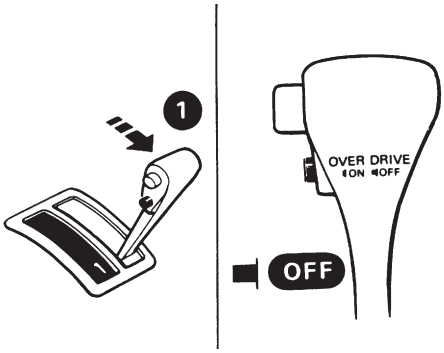


SAT780B

►	GO TO 3.

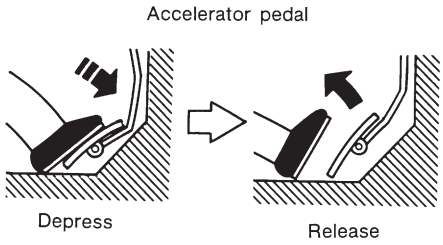
3	JUDGEMENT PROCEDURE STEP 2

1. Move selector lever to 1 position.
2. Set overdrive control switch in OFF position.



SAT781B

3. Depress accelerator pedal fully and release it.

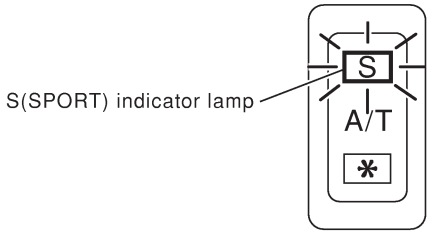


SAT981F

▶	GO TO 4.

4	CHECK SELF-DIAGNOSIS CODE

Check S (SPORT) indicator lamp.
Refer to JUDGEMENT OF SELF-DIAGNOSIS CODE, AT-63.



SAT116K

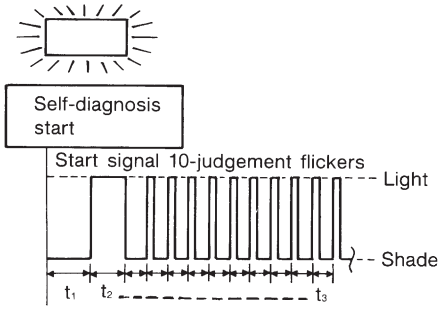
▶	DIAGNOSIS END

JUDGEMENT OF SELF-DIAGNOSIS CODE

NFAT0283S02

S (SPORT) indicator lamp:

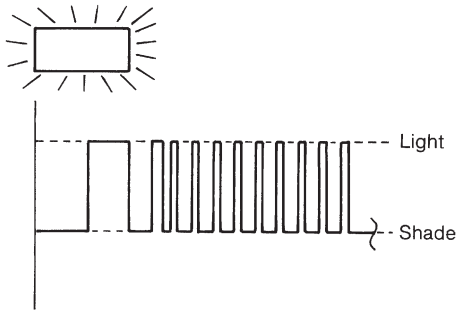
All judgement flickers are same.



SAT819H

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

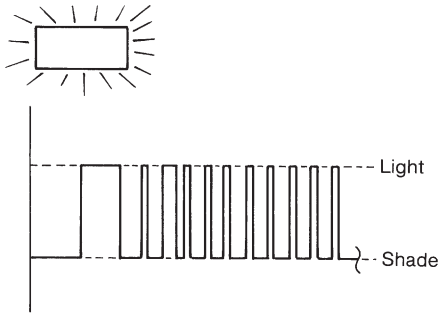
1st judgement flicker is longer than others.



SAT794H

Revolution sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR), AT-218.**

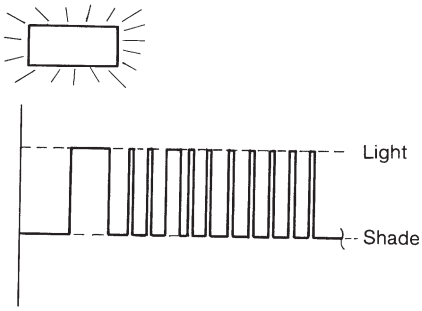
2nd judgement flicker is longer than others.



SAT795H

Vehicle speed sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·MTR, AT-223.**

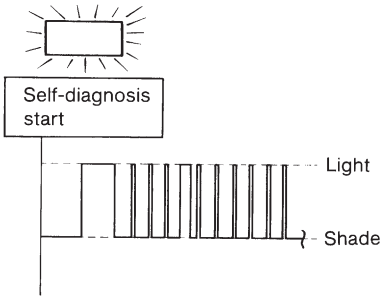
3rd judgement flicker is longer than others.



SAT796H

Throttle position sensor circuit is short-circuited or disconnected.
⇒ **Go to THROTTLE POSITION SENSOR, AT-228.**

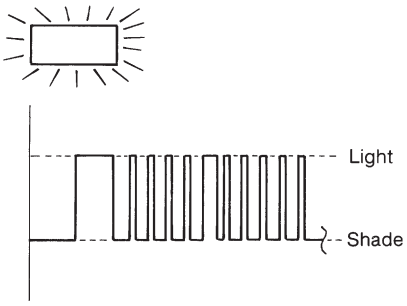
4th judgement flicker is longer than others.



SAT797H

Shift solenoid valve A circuit is short-circuited or disconnected.
⇒ **Go to SHIFT SOLENOID VALVE A, AT-236.**

5th judgement flicker is longer than others.

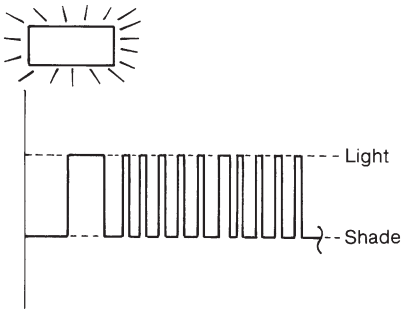


SAT798H

Shift solenoid valve B circuit is short-circuited or disconnected.
⇒ **Go to SHIFT SOLENOID VALVE B, AT-241.**

S (SPORT) indicator lamp:

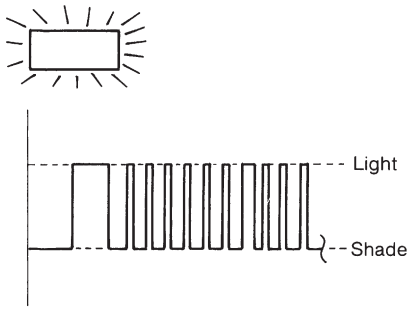
6th judgement flicker is longer than others.



SAT799H

Overrun clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to OVERRUN CLUTCH SOLENOID VALVE, AT-246.**

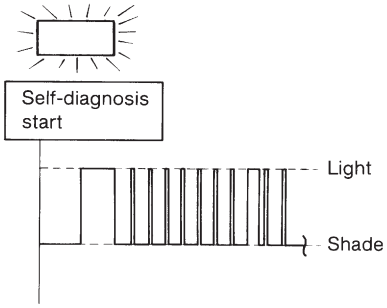
7th judgement flicker is longer than others.



SAT800H

Torque converter clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to TORQUE CONVERTER CLUTCH SOLENOID VALVE, AT-251.**

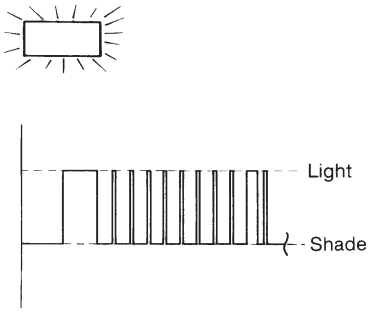
8th judgement flicker is longer than others.



SAT801H

A/T fluid temperature sensor is disconnected or TCM power source circuit is damaged.
⇒ **Go to A/T FLUID TEMPERATURE SENSOR AND TCM POWER SOURCE, AT-256.**

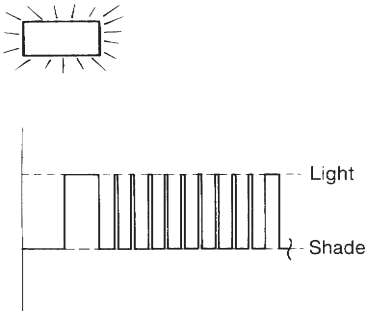
9th judgement flicker is longer than others.



SAT802H

Engine speed signal circuit is short-circuited or disconnected.
⇒ **Go to ENGINE SPEED SIGNAL, AT-263.**

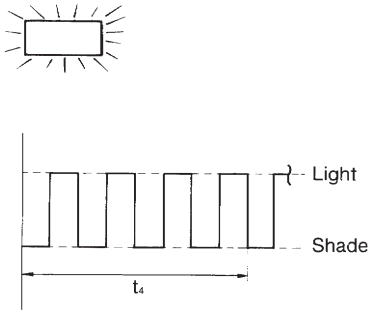
10th judgement flicker is longer than others.



SAT803H

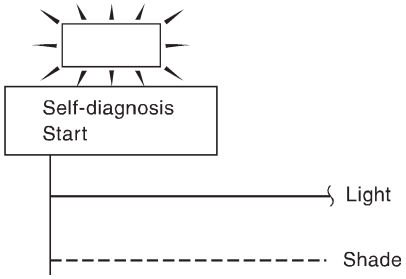
Line pressure solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to LINE PRESSURE SOLENOID VALVE, AT-267.**

Flickers as shown below.



SAT804H

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

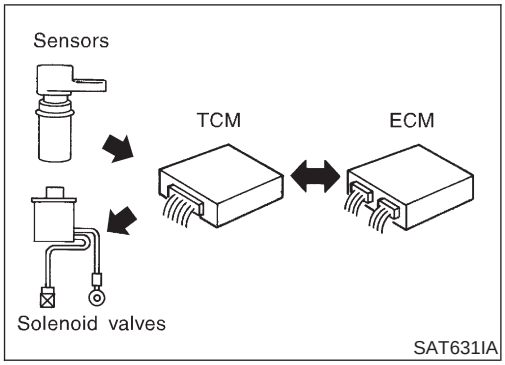
S (SPORT) indicator lamp:	
Lamp comes off.  SAT809J PNP switch, overdrive control switch, A/T check switch or throttle position switch circuit is disconnected or TCM is damaged. ⇒ **Go to 24. TCM Self-diagnosis Does Not Activate (PNP, OVERDRIVE CONTROL, A/T MODE AND THROTTLE POSITION SWITCHES), AT-323.**	

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

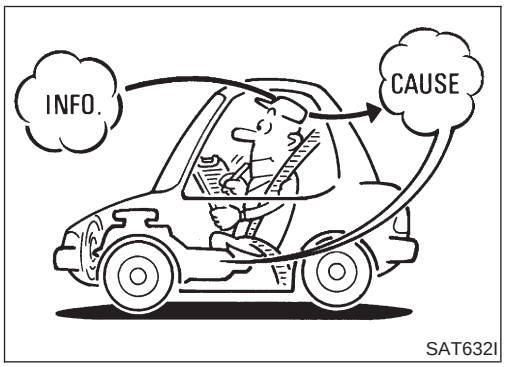
⊗ HOW TO ERASE SELF-DIAGNOSTIC RESULTS (WITHOUT CONSULT-II)

NFAT0283S03

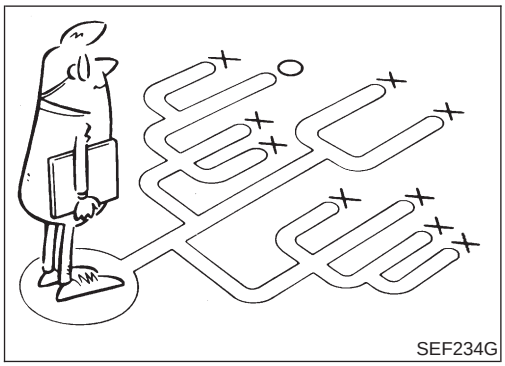
1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait for at least 5 seconds and then turn it "ON" again.
2. Perform "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)''. Refer to AT-60.
3. Turn ignition switch "OFF". (The self-diagnostic results will be erased.)



SAT631IA



SAT632I


SEF234G

Introduction

NFAT0024

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

The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the EURO-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-70.

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 “DIAGNOSITC WORKSHEET” like the example (AT-67) 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

=NFAT0024S01

Information from Customer

NFAT0024S0101

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 ( )	
S (SPORT) indicator lamp	Blinks for about 8 seconds.	
	□ Continuously lit	□ Not lit
Malfunction indicator (MI)	□ Continuously lit	□ Not lit

Diagnostic Worksheet

=NFAT0024S0102

1.	□ Read the Fail-safe and listen to customer complaints.			AT-9
2.	□ CHECK A/T FLUID			AT-78
		□ Leakage (Follow specified procedure) □ Fluid condition □ Fluid level		
3.	□ Perform STALL TEST and LINE PRESSURE TEST.			AT-78, 82
		□ 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	
		□ Pressure test — Suspected parts:		
4.	□ Perform all ROAD TEST and mark required procedures.			AT-83
	4-1.	Check before engine is started.		AT-84
		□ SELF-DIAGNOSTIC PROCEDURE - Mark detected items.		
		□ Park/neutral position (PNP) switch, AT-122. □ A/T fluid temperature sensor, AT-128. □ Vehicle speed sensor·A/T (Revolution sensor), AT-134. □ Engine speed signal, AT-139. □ Torque converter clutch solenoid valve, AT-171. □ Line pressure solenoid valve, AT-176. □ Shift solenoid valve A, AT-182. □ Shift solenoid valve B, AT-187. □ Throttle position sensor, AT-192. □ Overrun clutch solenoid valve, AT-201. □ Park/neutral position (PNP), overdrive control, A/T mode and throttle position switches, AT-323. □ A/T fluid temperature sensor and TCM power source, AT-206. □ Vehicle speed sensor·MTR, AT-213. □ Control unit (RAM), Control unit (ROM), AT-273. □ Control unit (EEP ROM), AT-275. □ Battery □ Others		
	4-2.	Check at idle		AT-85
		□ 1. S (SPORT) Indicator Lamp Does Not Come On, AT-281. □ 2. S (SPORT) or ✻ (SNOW) Indicator Lamp Does Not Come On, AT-283. □ 3. O/D OFF Indicator Lamp Does Not Come On, AT-284. □ 4. S (SPORT) Indicator Lamp Does Not Come On, AT-284. □ 5. Engine Cannot Be Started In P and N Position, AT-286. □ 6. In P Position, Vehicle Moves Forward or Backward When Pushed, AT-287. □ 7. In N Position, Vehicle Moves, AT-288. □ 8. Large Shock. N → R Position, AT-291. □ 9. Vehicle Does Not Creep Backward In R Position, AT-293. □ 10. Vehicle Does Not Creep Forward In D, 2 or 1 Position, AT-297.		

4.	4-3.	Cruise test	AT-88 AT-92
		Part-1	
		□ 11. Vehicle Cannot Be Started From D_1, AT-300. □ 12. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$, AT-303. □ 13. A/T Does Not Shift: $D_2 \rightarrow D_3$, AT-306. □ 14. A/T Does Not Shift: $D_3 \rightarrow D_4$, AT-309. □ 15. A/T Does Not Perform Lock-up, AT-312. □ 16. A/T Does Not Hold Lock-up Condition, AT-314. □ 17. Lock-up Is Not Released, AT-316. □ 18. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$), AT-317.	
		Part-2	AT-96
		□ 19. Vehicle Does Not Start From D_1, AT-319. □ 12. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$, AT-303. □ 13. A/T Does Not Shift: $D_2 \rightarrow D_3$, AT-306. □ 14. A/T Does Not Shift: $D_3 \rightarrow D_4$, AT-309.	
		Part-3	AT-98
		□ 20. A/T Does Not Shift: $D_4 \rightarrow D_3$ When Overdrive Control Switch ON → OFFAT-320. □ 18. Engine Speed Does Not Return To Idle (Engine Brake In D_3), AT-317. □ 21. A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever D → 2 Position, AT-321. □ 18. Engine Speed Does Not Return To Idle (Engine Brake In 2_2), AT-317. □ 22. A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever 2 → 1 Position, AT-283. □ 23. Vehicle Does Not Decelerate By Engine Brake, AT-323. □ SELF-DIAGNOSTIC PROCEDURE — Mark detected items.	
		□ Park/neutral position (PNP) switch, AT-122. □ A/T fluid temperature sensor, AT-128. □ Vehicle speed sensor·A/T (Revolution sensor), AT-134. □ Engine speed signal, AT-139. □ Torque converter clutch solenoid valve, AT-171. □ Line pressure solenoid valve, AT-176. □ Shift solenoid valve A, AT-182. □ Shift solenoid valve B, AT-187. □ Throttle position sensor, AT-192. □ Overrun clutch solenoid valve, AT-201. □ Park/neutral position (PNP), overdrive control, A/T mode and throttle position switches, AT-323. □ A/T fluid temperature sensor and TCM power source, AT-206. □ Vehicle speed sensor·MTR, AT-213. □ Control unit (RAM), Control unit (ROM), AT-273. □ Control unit (EEP ROM), AT-275. □ Battery □ Others	
5.	□ For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.		AT-41
6.	□ Perform all ROAD TEST and re-mark required procedures.		AT-83
7.	□ Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items. Refer to EC-45, "Emission-related Diagnostic Information".		EC-45
		□ DTC (P0731) A/T 1st gear function, AT-144. □ DTC (P0732) A/T 2nd gear function, AT-150. □ DTC (P0733) A/T 3rd gear function, AT-156. □ DTC (P0734) A/T 4th gear function, AT-162.	
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-102 AT-115
9.	□ Erase DTC from TCM and ECM memories.		AT-38

Work Flow

NFAT0025

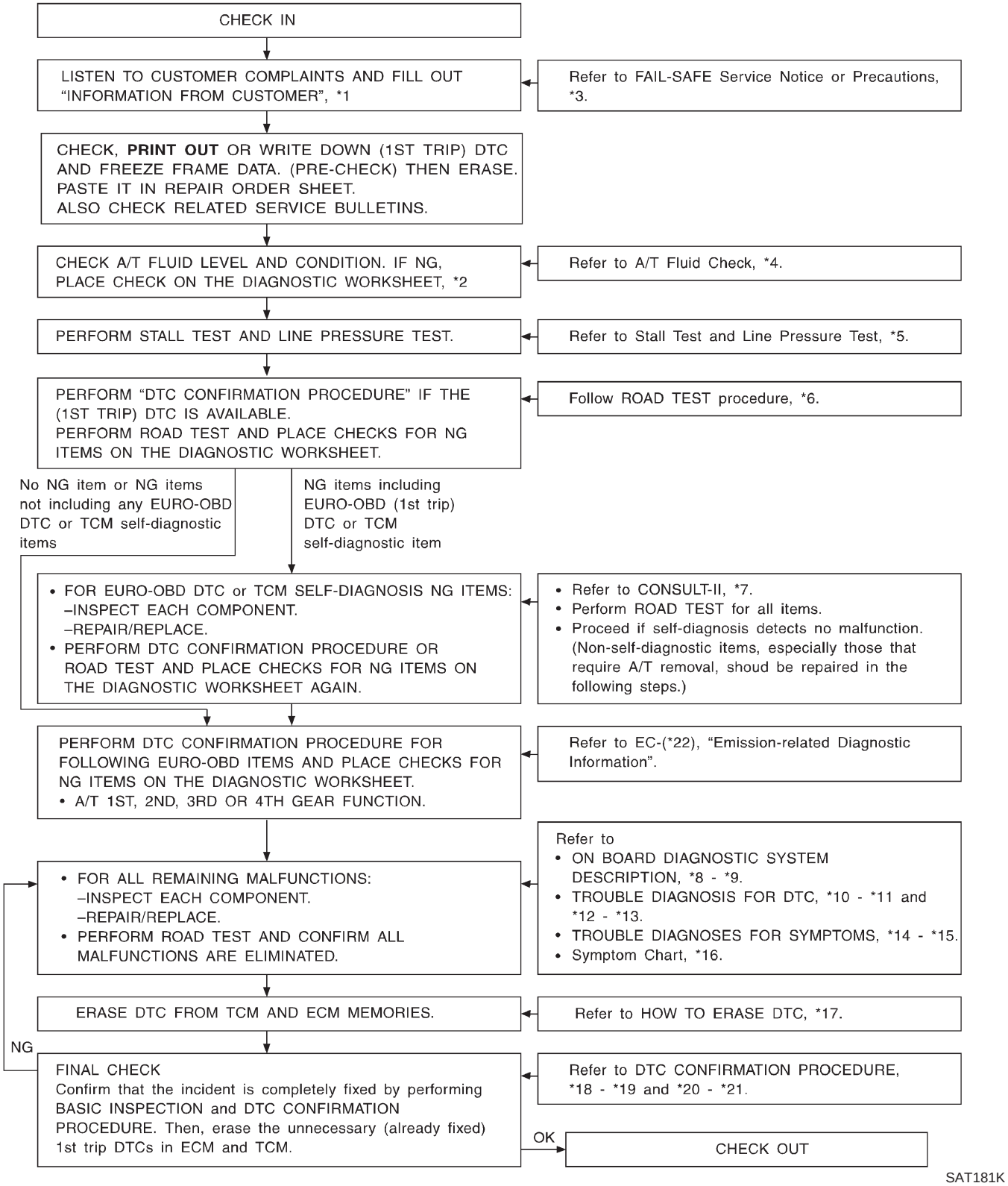
HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

NFAT0025S01

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-67) and “Diagnostic Worksheet” (AT-68), to perform the best troubleshooting possible.

WORK FLOW CHART

=NFAT0025S02

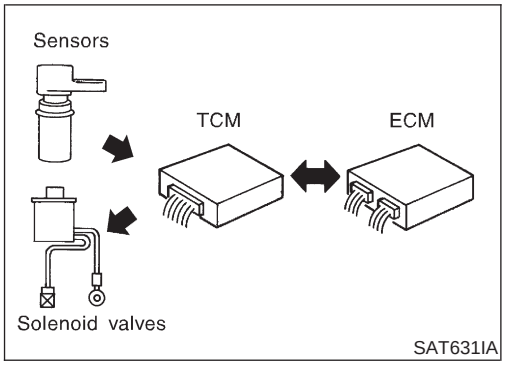


SAT181K

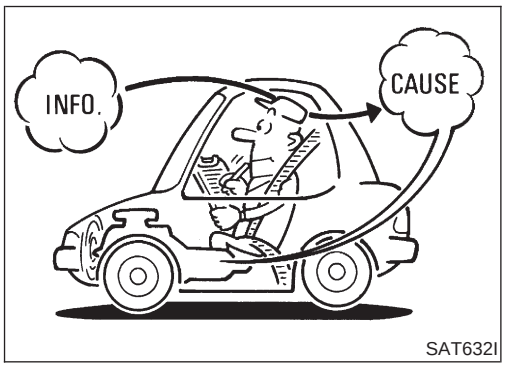
*1: AT-67
*2: AT-68
*3: AT-9
*4: AT-78
*5: AT-78, AT-82
*6: AT-83
*7: AT-40
*8: AT-36
*9: AT-52
*10: AT-122
*11: AT-213
*12: AT-273
*13: AT-275
*14: AT-281
*15: AT-323
*16: AT-102
*17: AT-38
*18: AT-123

Work Flow (Cont'd)

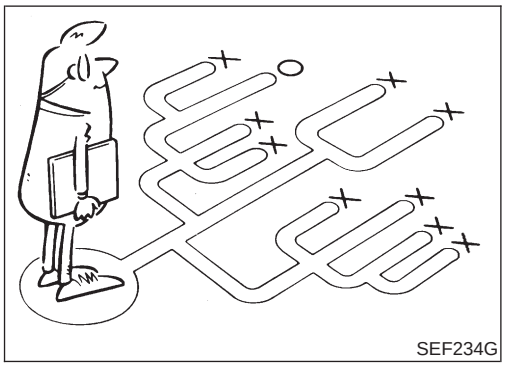
*19: AT-214
*20: AT-273
*21: AT-275
*22: EC-45



SAT631IA



SAT632I


SEF234G

Introduction

NFAT0284

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

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 a circuit tester connected should be performed. Follow the “Work Flow”. Refer to AT-76.

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 “DIAGNOSITC WORKSHEET” like the example (AT-74) 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

=NFAT0284S01

Information from Customer

NFAT0284S0101

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 ( )	
S (SPORT) indicator lamp	Blinks for about 8 seconds.	
	□ Continuously lit	□ Not lit

Diagnostic Worksheet

=NFAT0284S0102

1.	□ Read the Fail-safe and listen to customer complaints.			AT-9
2.	□ CHECK A/T FLUID			AT-78
		□ Leakage (Follow specified procedure) □ Fluid condition □ Fluid level		
3.	□ Perform STALL TEST and LINE PRESSURE TEST.			AT-78, 82
		□ 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	
		□ Pressure test — Suspected parts:		
4.	□ Perform all ROAD TEST and mark required procedures.			AT-83
	4-1.	Check before engine is started.		AT-84
		□ SELF-DIAGNOSTIC PROCEDURE - Mark detected items.		
		□ Vehicle speed sensor·A/T (Revolution sensor), AT-218. □ Vehicle speed sensor·MTR, AT-223. □ Throttle position sensor, AT-228. □ Shift solenoid valve A, AT-236. □ Shift solenoid valve B, AT-241. □ Overrun clutch solenoid valve, AT-246. □ Torque converter clutch solenoid valve, AT-251. □ A/T fluid temperature sensor and TCM power source, AT-256. □ Engine speed signal, AT-263. □ Line pressure solenoid valve, AT-267. □ Park/neutral position (PNP), overdrive control, A/T mode and throttle position switches, AT-323. □ Control unit (RAM), Control unit (ROM), AT-273. □ Control unit (EEP ROM), AT-275. □ Battery □ Others		
	4-2.	Check at idle		AT-85
		□ 1. S (SPORT) Indicator Lamp Does Not Come On, AT-281. □ 2. S (SPORT) or ✻ (SNOW) Indicator Lamp Does Not Come On, AT-283. □ 3. O/D OFF Indicator Lamp Does Not Come On, AT-284. □ 4. S (SPORT) Indicator Lamp Does Not Come On, AT-284. □ 5. Engine Cannot Be Started In P and N Position, AT-286. □ 6. In P Position, Vehicle Moves Forward or Backward When Pushed, AT-287. □ 7. In N Position, Vehicle Moves, AT-288. □ 8. Large Shock. N → R Position, AT-291. □ 9. Vehicle Does Not Creep Backward In R Position, AT-293. □ 10. Vehicle Does Not Creep Forward In D, 2 or 1 Position, AT-297.		

4.	4-3.	Cruise test	AT-88, AT-92
		Part-1	
		□ 11. Vehicle Cannot Be Started From D_1, AT-300. □ 12. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$, AT-303. □ 13. A/T Does Not Shift: $D_2 \rightarrow D_3$, AT-306. □ 14. A/T Does Not Shift: $D_3 \rightarrow D_4$, AT-309. □ 15. A/T Does Not Perform Lock-up, AT-312. □ 16. A/T Does Not Hold Lock-up Condition, AT-314. □ 17. Lock-up Is Not Released, AT-316. □ 18. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$), AT-317.	
		Part-2	AT-96
		□ 19. Vehicle Does Not Start From D_1, AT-319. □ 12. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$, AT-303. □ 13. A/T Does Not Shift: $D_2 \rightarrow D_3$, AT-306. □ 14. A/T Does Not Shift: $D_3 \rightarrow D_4$, AT-309.	
		Part-3	AT-98
		□ 20. A/T Does Not Shift: $D_4 \rightarrow D_3$ When Overdrive Control Switch ON → OFF, AT-320. □ 18. Engine Speed Does Not Return To Idle (Engine Brake In D_3), AT-317. □ 21. A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever D → 2 Position, AT-321. □ 18. Engine Speed Does Not Return To Idle (Engine Brake In 2_2), AT-317. □ 22. A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever 2 → 1 Position, AT-322. □ 23. Vehicle Does Not Decelerate By Engine Brake, AT-323. □ SELF-DIAGNOSTIC PROCEDURE — Mark detected items.	
		□ Vehicle speed sensor·A/T (Revolution sensor), AT-218. □ Vehicle speed sensor·MTR, AT-223. □ Throttle position sensor, AT-228. □ Shift solenoid valve A, AT-236. □ Shift solenoid valve B, AT-241. □ Overrun clutch solenoid valve, AT-246. □ Torque converter clutch solenoid valve, AT-251. □ A/T fluid temperature sensor and TCM power source, AT-256. □ Engine speed signal, AT-263. □ Line pressure solenoid valve, AT-267. □ Park/neutral position (PNP), overdrive control, A/T mode and throttle position switches, AT-323. □ Control unit (RAM), Control unit (ROM), AT-273. □ Control unit (EEP ROM), AT-275. □ Battery □ Others	
5.	□ For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.		AT-56
6.	□ Perform all ROAD TEST and re-mark required procedures.		AT-83
7.	□ 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-102, AT-115
8.	□ Erase DTC from TCM memory.		AT-65

Work Flow

NFAT0285

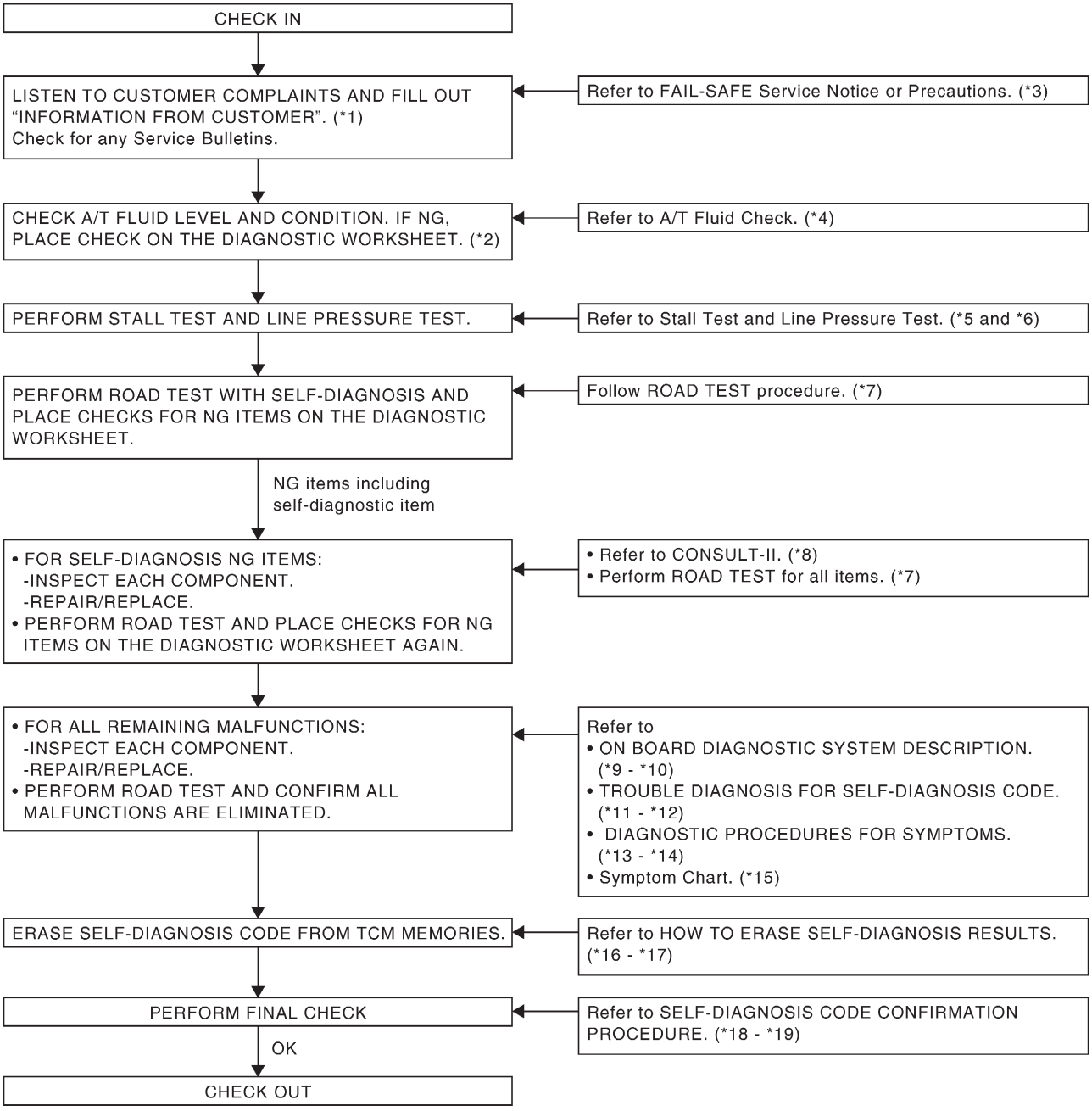
HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

NFAT0285S01

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-74) and “Diagnostic Worksheet” (AT-75), to perform the best troubleshooting possible.

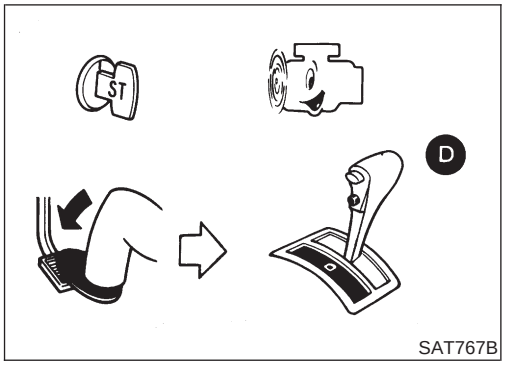
WORK FLOW CHART

=NFAT0285S02



SAT731JC

*1: AT-74
*2: AT-75
*3: AT-9
*4: AT-78
*5: AT-78
*6: AT-82
*7: AT-83
*8: AT-55
*9: AT-55
*10: AT-63
*11: AT-218
*12: AT-275
*13: AT-281
*14: AT-323
*15: AT-102
*16: AT-59
*17: AT-65
*18: AT-219
*19: AT-275



SAT767B

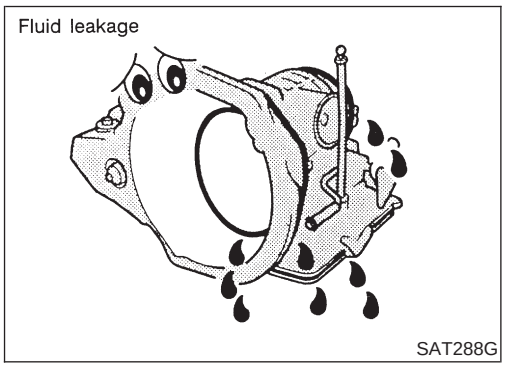
A/T Fluid Check

NFAT0286

FLUID LEAKAGE CHECK

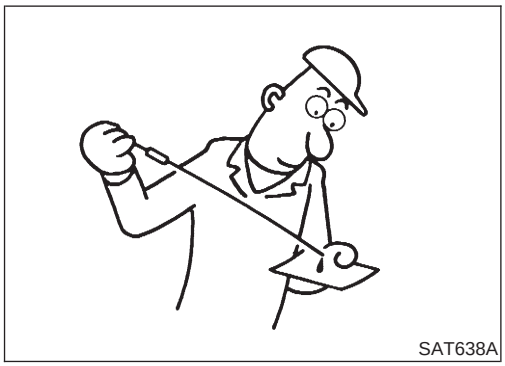
NFAT0286S01

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

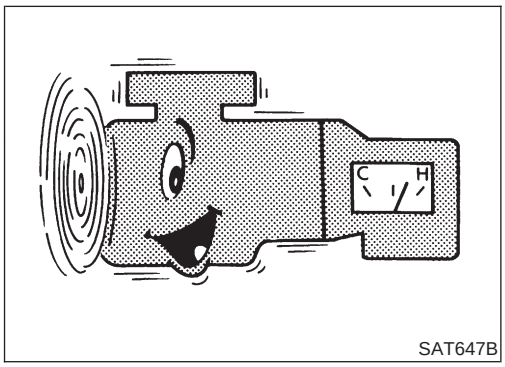
NFAT0286S02

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

NFAT0286S03

Refer to MA-26, “Checking A/T Fluid”.



SAT647B

Stall Test

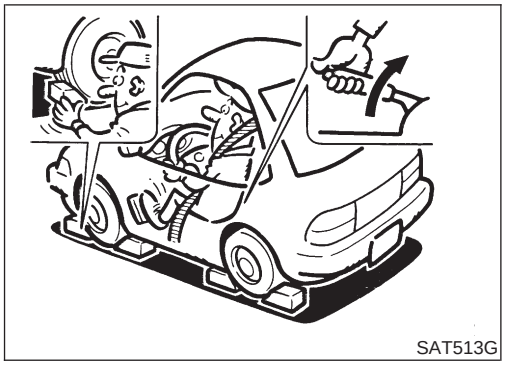
NFAT0287

STALL TEST PROCEDURE

NFAT0287S01

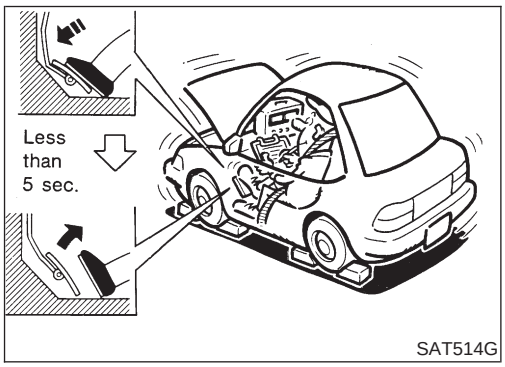
1. Check A/T fluid and engine oil levels. If necessary, add fluid and oil.
2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

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


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.**

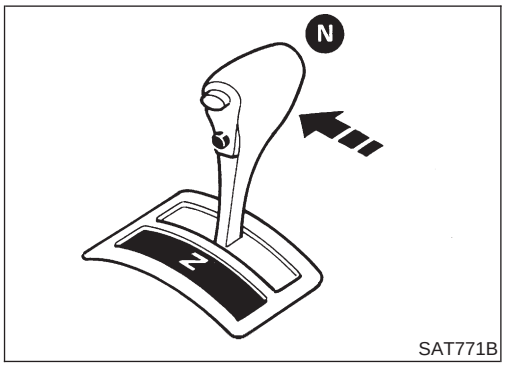


SAT514G

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:
Refer to SDS, AT-451.



SAT771B

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

- **Run engine at idle for at least one minute.**

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

JUDGEMENT OF STALL TEST

NFAT0287S02

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 CHART" shown in AT-71 (EURO-OBD) or AT-77 (EXCEPT FOR EURO-OBD).

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:

Stall Test (Cont'd)

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

CAUTION:

Be careful since automatic fluid temperature increases abnormally.

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

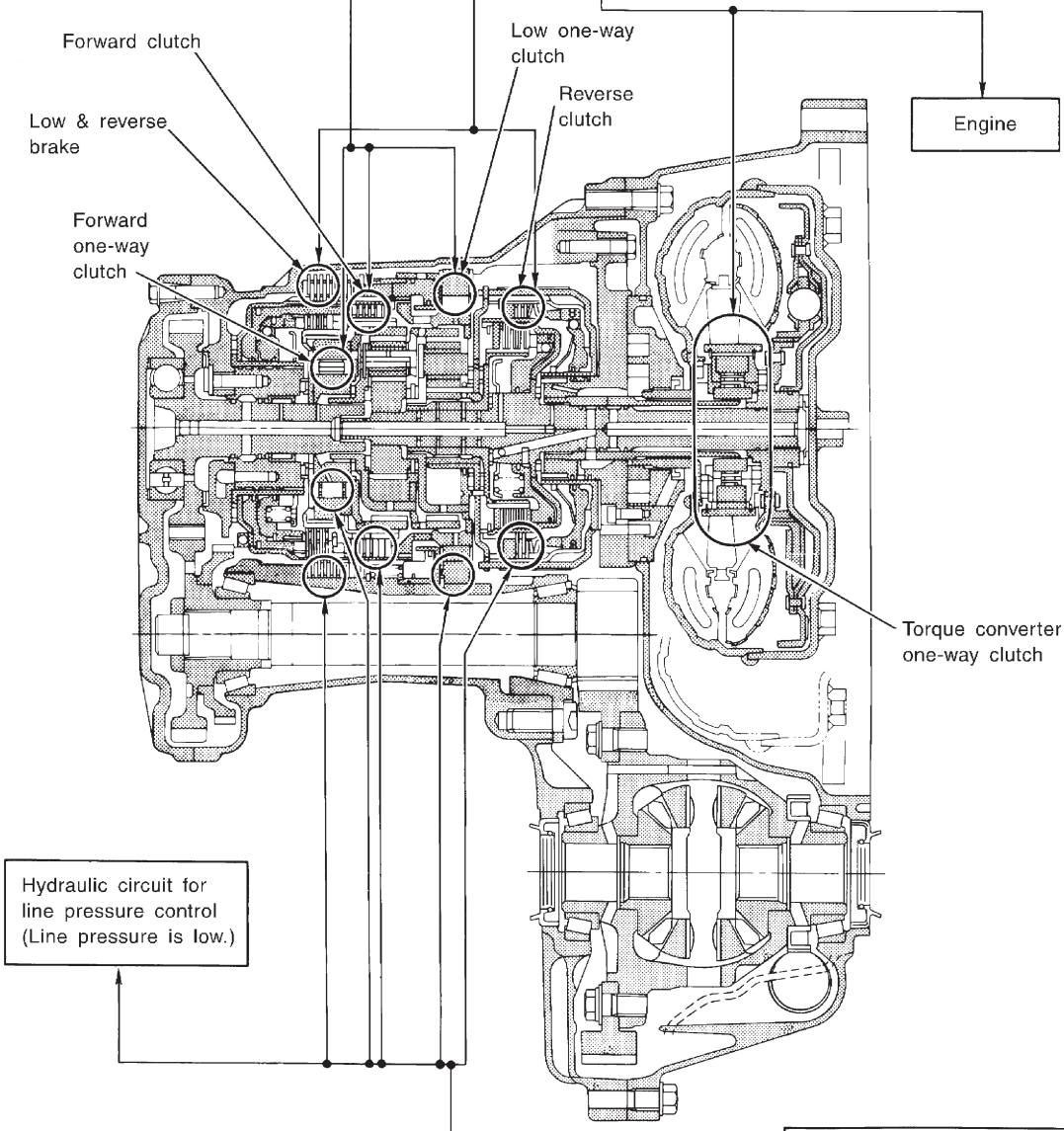
Stall revolution less than specifications:

- 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.

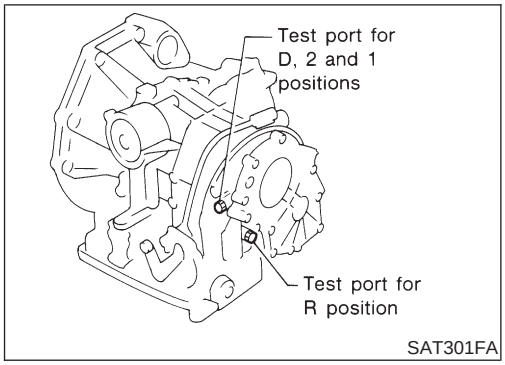
Damaged components



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

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

SAT600J



SAT301FA

Line Pressure Test

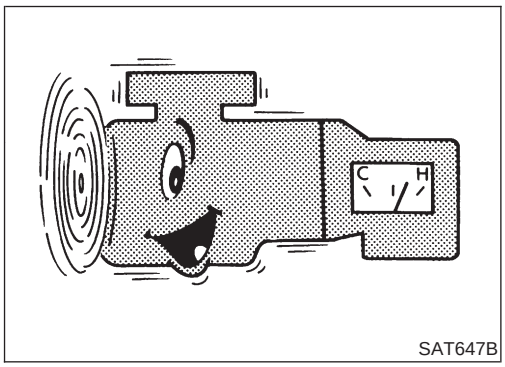
NFAT0288

LINE PRESSURE TEST PORTS

NFAT0288S01

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

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



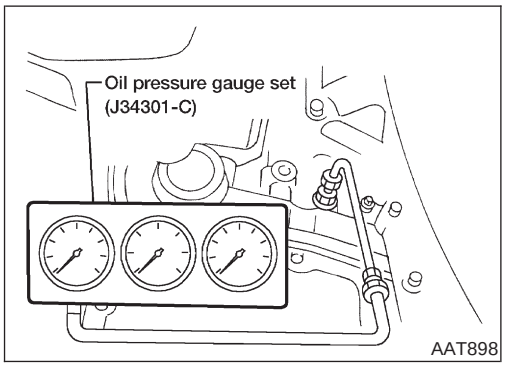
SAT647B

LINE PRESSURE TEST PROCEDURE

NFAT0288S02

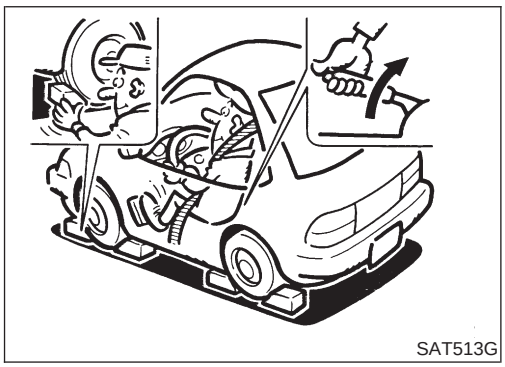
1. Check A/T fluid and engine oil levels. If necessary, add fluid and oil.
2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

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

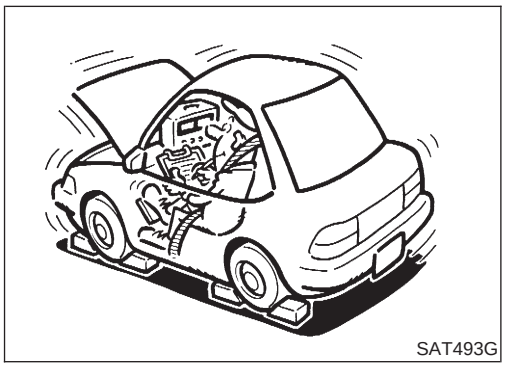


AAT898

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

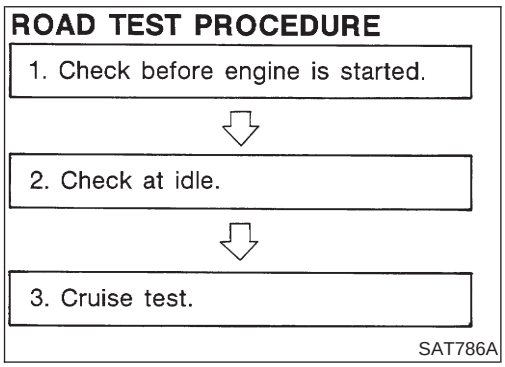
5. Start engine and measure line pressure at idle and stall speed.
- **When measuring line pressure at stall speed, follow the stall test procedure.**

  Line pressure: Refer to SDS, AT-451.

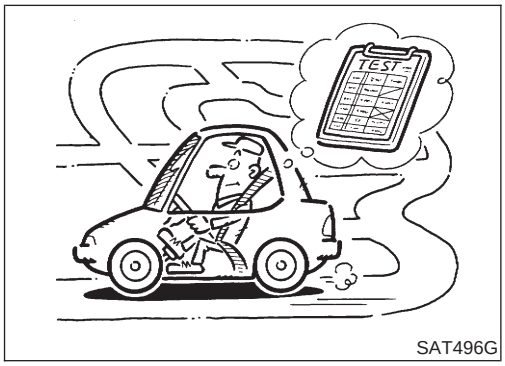
JUDGEMENT OF LINE PRESSURE TEST

NFAT0288S03

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-20.
	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

NFAT0289

NFAT0289S01

- 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-36 to AT-52 (EURO-OBD) or AT-55 to AT-63 (EXCEPT FOR EURO-OBD) and "TROUBLE DIAGNOSES FOR SYMPTOMS", AT-277 to AT-323.

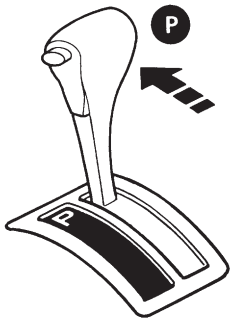
Road Test (Cont'd)

1. CHECK BEFORE ENGINE IS STARTED

=NFAT0289S02

1	CHECK S (SPORT) INDICATOR LAMP

1. Park vehicle on flat surface.
2. Move selector lever to P position.



SAT163C

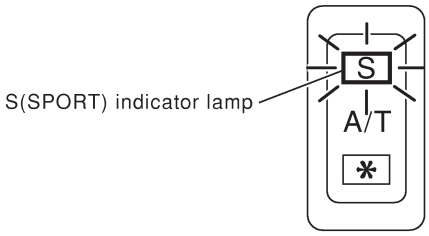
3. Turn ignition switch to OFF position. Wait at least 5 seconds.
4. Turn ignition switch to ON position. (Do not start engine.)
5. Does S (SPORT) indicator lamp come on for about 2 seconds?

Yes or No

Yes	▶	GO TO 2.
No	▶	Stop ROAD TEST. Go to "1. S (SPORT) Indicator Lamp Does Not Come On", AT-281.

2	CHECK S (SPORT) INDICATOR LAMP

Does S (SPORT) indicator lamp flicker for about 8 seconds?



SAT116K

Yes or No

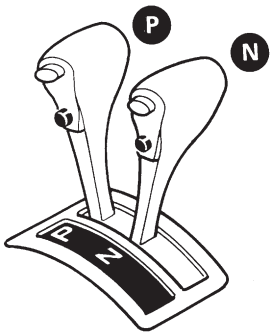
Yes	▶	Perform self-diagnosis and check NG items on the DIAGNOSTIC WORKSHEET, EURO-OBD: AT-68, EXCEPT FOR EURO-OBD: AT-75. EURO-OBD: Refer to TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-49. EXCEPT FOR EURO-OBD: Refer to SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60.
No	▶	1. Turn ignition switch to OFF position. 2. Perform self-diagnosis and note NG items. EURO-OBD: Refer to TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-49. EXCEPT FOR EURO-OBD: Refer to SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60. 3. Go to "2. CHECK AT IDLE", AT-85.

2. CHECK AT IDLE

NFAT0289S03

1	CHECK ENGINE START

1. Park vehicle on flat surface.
2. Move selector lever to P position.



SAT769B

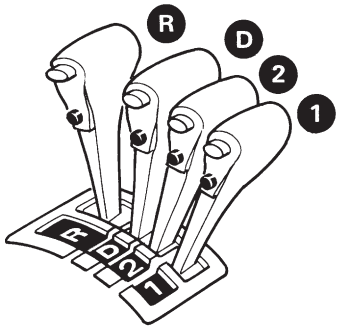
3. Turn ignition switch to OFF position.
4. Turn ignition switch to START position.
5. Is engine started?

Yes or No

Yes	▶	GO TO 2.
No	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "5. Engine Cannot Be Started In P and N Position", AT-286. Continue ROAD TEST.

2	CHECK ENGINE START

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



SAT770B

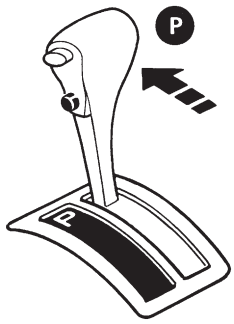
3. Turn ignition switch to START position.
4. Is engine started?

Yes or No

Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Mark the box on the DIAGNOSTIC WORKSHEET. Go to "5. Engine Cannot Be Started In P and N Position", AT-286. Continue ROAD TEST.
No	▶	GO TO 3.

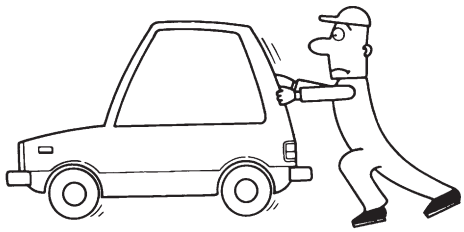
3	CHECK VEHICLE MOVE

1. Move selector lever to P position.



SAT768B

2. Turn ignition switch to OFF position.
3. Release parking brake.
4. Push vehicle forward or backward.



SAT796A

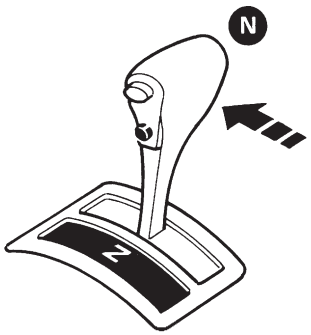
5. Does vehicle move when it is pushed forward or backward?
6. Apply parking brake.

Yes or No

Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "6. In P Position, Vehicle Moves Forward Or Backward When Pushed", AT-287. Continue ROAD TEST.
No	▶	GO TO 4.

4	CHECK VEHICLE MOVE

1. Start engine.
2. Move selector lever to N position.



SAT771B

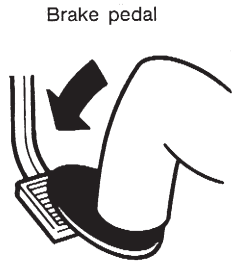
3. Release parking brake.
4. Does vehicle move forward or backward?

Yes or No

Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "7. In N Position, Vehicle Moves", AT-288. Continue ROAD TEST.
No	▶	GO TO 5.

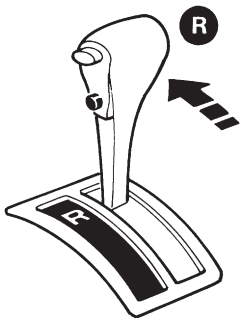
5	CHECK SHIFT LOCK

1. Apply foot brake.



SAT797A

2. Move 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 "8. Large Shock N → R Position", AT-291. Continue ROAD TEST.
No	▶	GO TO 6.

6	CHECK VEHICLE MOVE

1. Release foot brake for several seconds.

SAT799A

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

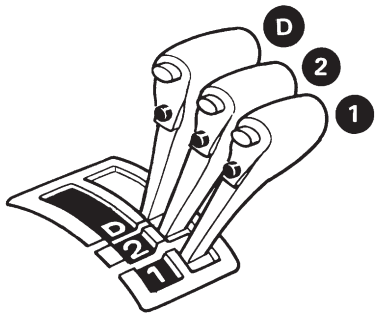
Yes or No

Yes	▶	GO TO 7.
No	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "9. Vehicle Does Not Creep Backward In R Position", AT-293. Continue ROAD TEST.

Road Test (Cont'd)

7	CHECK VEHICLE MOVE

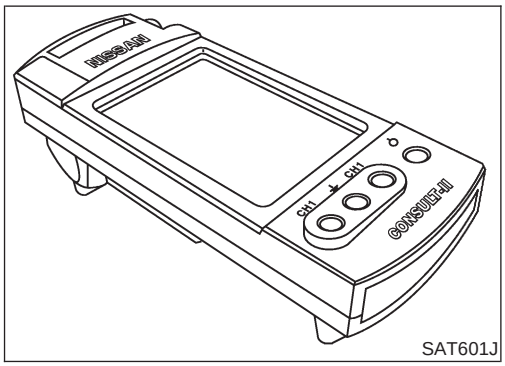
1. Move selector lever to D, 2 and 1 positions and check if vehicle creeps forward.



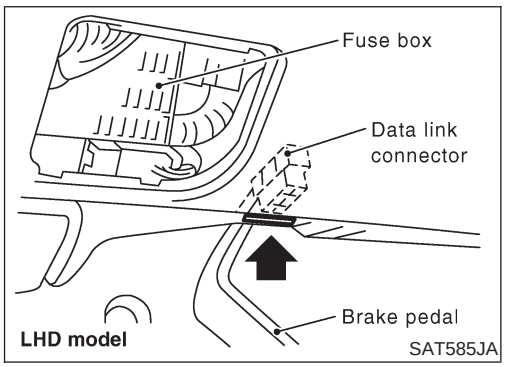
SAT773B

2. Does vehicle creep forward in all three positions?

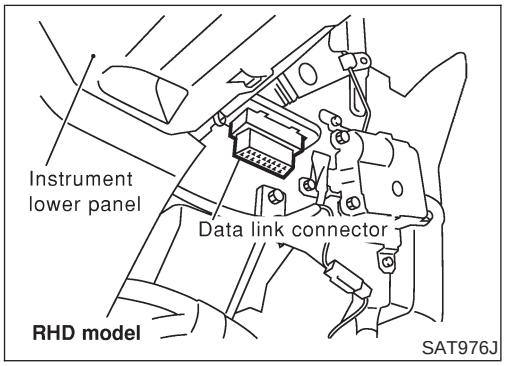
Yes or No		
Yes	▶	Go to 3. CRUISE TEST, AT-88.
No	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "10. Vehicle Does Not Creep Forward In D, 2 Or 1 Position", AT-297. Continue ROAD TEST.



SAT601J



SAT585JA



SAT976J

3. CRUISE TEST

NFAT0289S04

- Check all items listed in Parts 1 through 3.

With CONSULT-II

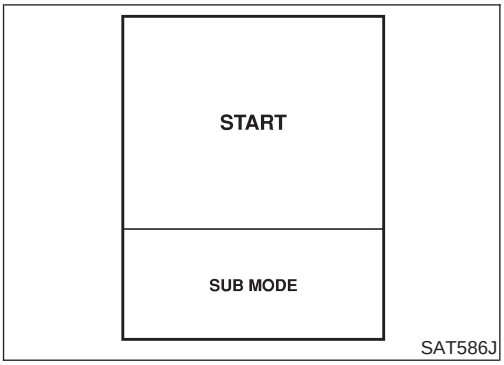
NFAT0289S0401

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

CONSULT-II Setting Procedure

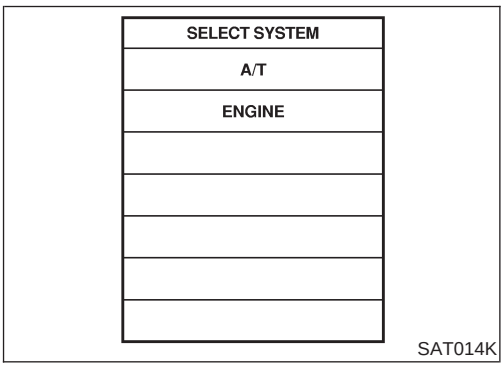
NFAT0289S0402

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



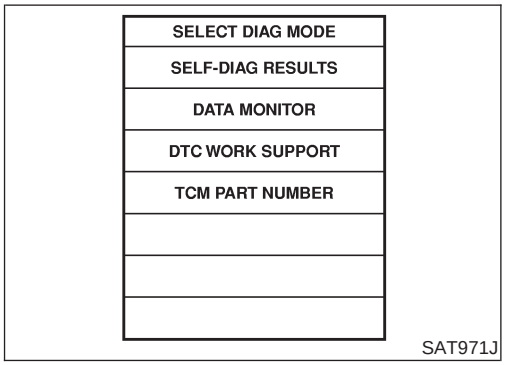
SAT586J

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



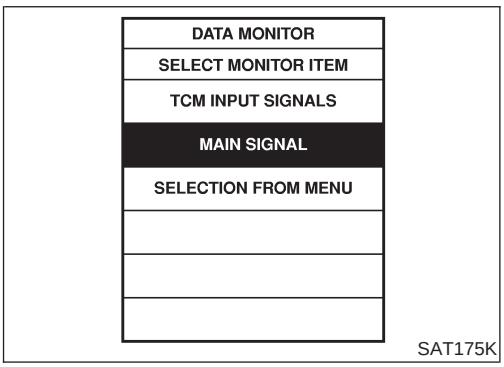
SAT014K

5. Touch "A/T".



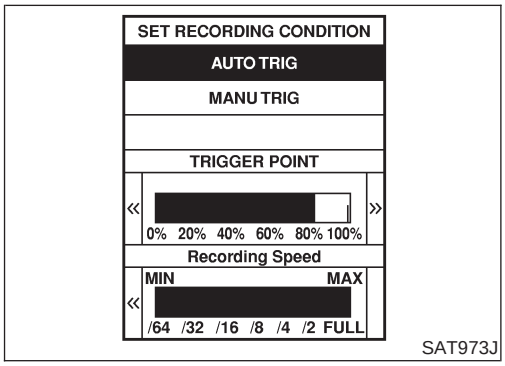
SAT971J

6. Touch "DATA MONITOR".



SAT175K

7. Touch "MAIN SIGNALS" or "TCM INPUT SIGNALS".
8. Select "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".

DATA MONITOR	
MONITOR	NO DTC
ENGINE SPEED	XXX rpm
GEAR	XXX
SLCT LVR POSI	N/P
VEHICLE SPEED	XXX km/h
THROTTLE POSI	XXX
LINE PRES DTY	XX%
TCC S/V DUTY	XX%
SHIFT S/V A	XX
SHIFT S/V B	XX

SAT134K

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

DATA MONITOR		
Recording Data	X%	DTC DETECTED
ENGINE SPEED	XXX rpm	
GEAR	XXX	
SLCT LVR POSI	N/P	
VEHICLE SPEED	XXX km/h	
THROTTLE POSI	XXX	
LINE PRES DTY	XX%	
TCC S/V DUTY	XX%	
SHIFT S/V A	XX	
SHIFT S/V B	XX	

SAT135K

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

REAL-TIME DIAG
ENG SPEED SIG

SAT987J

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

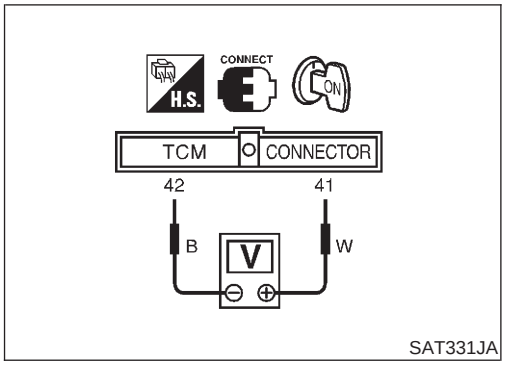
STORE	
SYSTEM	SAVE REC DATA

SAT974J

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.



SAT331JA

Without CONSULT-II

NFAT0289S0403

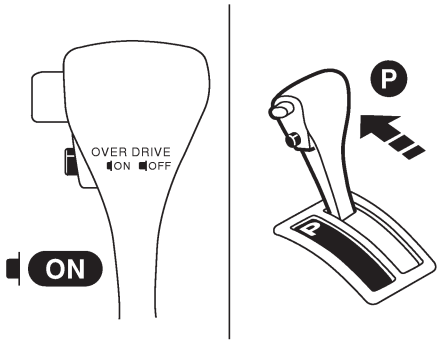
- Throttle position sensor can be checked by voltage across terminals 41 and 42 of TCM.

Cruise Test — Part 1

=NFAT0289S0404

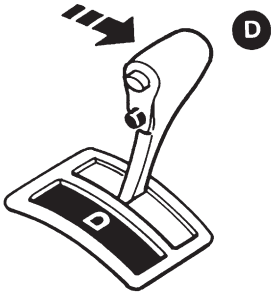
1	CHECK STARTING GEAR (D_1) POSITION

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 selector lever to P position.



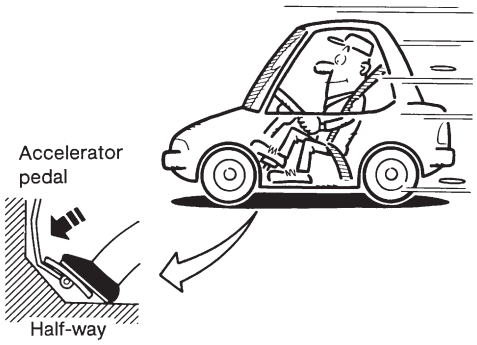
SAT118K

5. Start engine.
6. Move selector lever to D position.



SAT775B

7. Accelerate vehicle by constantly depressing accelerator pedal half-way.



SAT495G

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

Yes or No

Yes	▶	GO TO 2.
No	▶	Go to "11. Vehicle Cannot Be Started From D_1", AT-300. Continue ROAD TEST.

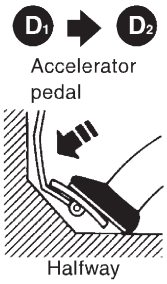
2	CHECK SHIFT UP (D_1 TO D_2)

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-450.



SAT954I

Yes or No

Yes	▶	GO TO 3.
No	▶	Go to "12. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$", AT-303. Continue ROAD TEST.

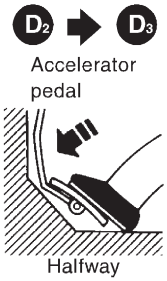
3	CHECK SHIFT UP (D_2 TO D_3)

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-450.



SAT955I

Yes or No

Yes	▶	GO TO 4.
No	▶	Go to "13. A/T Does Not Shift: $D_2 \rightarrow D_3$", AT-306. Continue ROAD TEST.

Road Test (Cont'd)

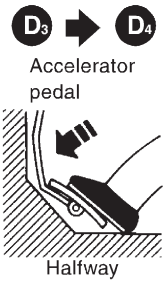
4	CHECK SHIFT UP (D_3 TO D_4)

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-450.



SAT956I

Yes or No

Yes	▶	GO TO 5.
No	▶	Go to "14. A/T Does Not Shift: $D_3 \rightarrow D_4$", AT-309. Continue ROAD TEST.

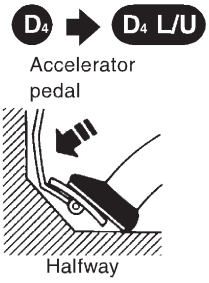
5	CHECK LOCK-UP (D_4 TO D_4L/U)

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-450.



SAT957I

Yes or No

Yes	▶	GO TO 6.
No	▶	Go to "15. A/T Does Not Perform Lock-up", AT-312. Continue ROAD TEST.

6	CHECK HOLD LOCK-UP

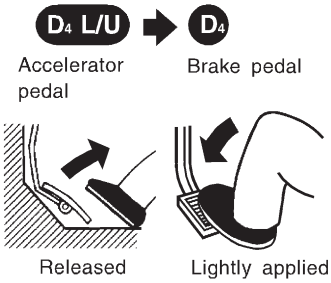
Does A/T hold lock-up condition for more than 30 seconds?

Yes or No

Yes	▶	GO TO 7.
No	▶	Go to "16. A/T Does Not Hold Lock-up Condition", AT-314.

7	CHECK SHIFT DOWN (D_4L/U TO D_4)

1. Release accelerator pedal.



SAT958I

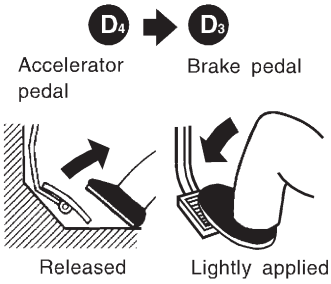
2. Is lock-up released when accelerator pedal is released?

Yes or No

Yes	▶	GO TO 8.
No	▶	Go to "17. Lock-up Is Not Released", AT-316. Continue ROAD TEST.

8	CHECK SHIFT DOWN (D_4 TO D_3)

1. Decelerate vehicle by applying foot brake lightly.



SAT959I

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.

Yes or No

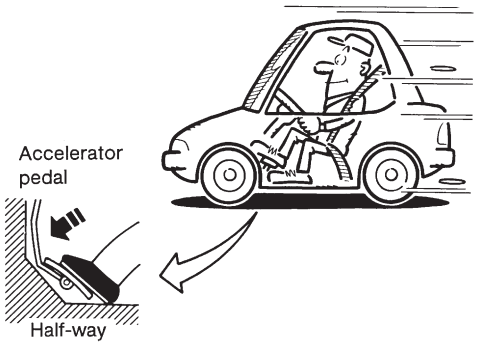
Yes	▶	1. Stop vehicle. 2. Go to "Cruise Test — Part 2", AT-96.
No	▶	Go to "18. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)", AT-317. Continue ROAD TEST.

Cruise Test — Part 2

=NFAT0289S0405

1	CHECK STARTING GEAR (D_1) POSITION

1. Confirm overdrive control switch is in ON position.
2. Confirm selector lever is in D position.
3. Accelerate vehicle by half throttle again.



SAT495G

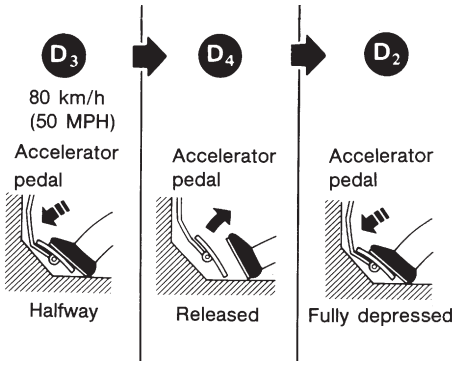
4. Does vehicle start from D_1?
   Ⓜ **Read gear position.**

Yes or No

Yes	▶	GO TO 2.
No	▶	Go to "19. Vehicle Does Not Start From D_1", AT-319. 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.



SAT404H

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.**

Yes or No

Yes	▶	GO TO 3.
No	▶	Go to "12. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$", AT-303. Continue ROAD TEST.

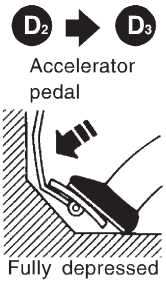
3	CHECK SHIFT UP (D_2 TO D_3)

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-450.



SAT960I

Yes or No

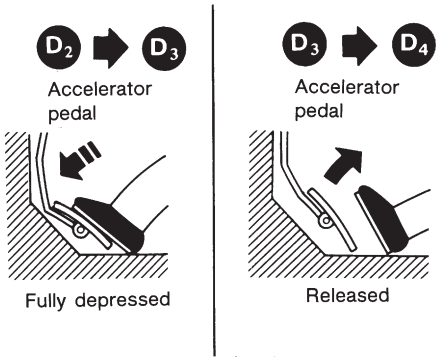
Yes	▶	GO TO 4.
No	▶	Go to "13. A/T Does Not Shift: $D_2 \rightarrow D_3$", AT-306. Continue ROAD TEST.

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

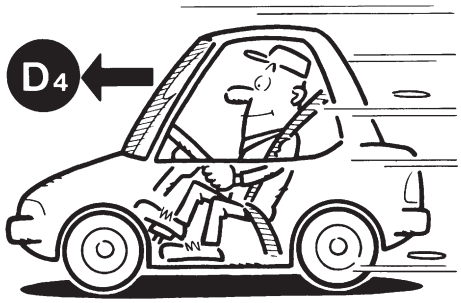
Yes	▶	1. Stop vehicle. 2. Go to "CRUISE TEST — Part 3", AT-98.
No	▶	Go to "14. A/T Does Not Shift: $D_3 \rightarrow D_4$", AT-309. Continue ROAD TEST.

Cruise Test — Part 3

=NFAT0289S0406

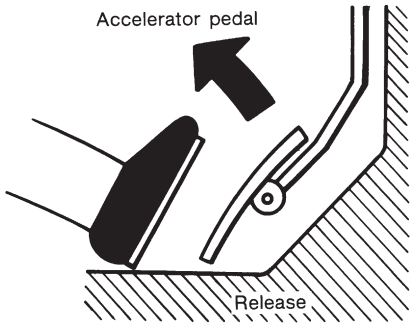
1	VEHICLE SPEED (D_4) POSITION

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

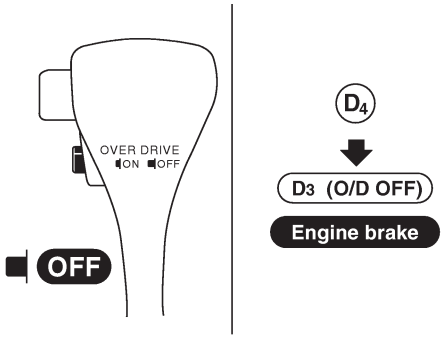
4. Release accelerator pedal.



SAT813A

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

   Read gear position and vehicle speed.



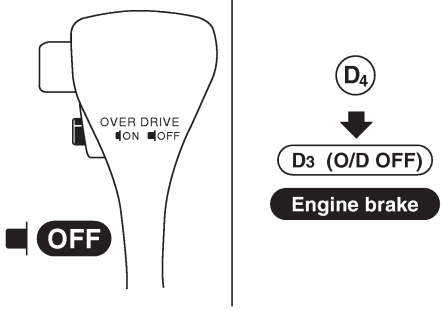
SAT119K

Yes or No

Yes	▶	GO TO 2.
No	▶	Go to "20. A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch ON → OFF, AT-320. Continue ROAD TEST.

2	CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?



SAT119K

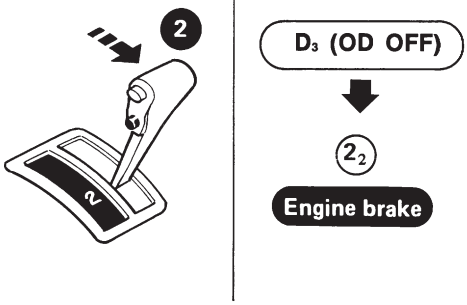
Yes or No

Yes	▶	GO TO 3.
No	▶	Go to "18. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)", AT-317. Continue ROAD TEST.

3	CHECK SHIFT DOWN (D_3 TO D_2)

1. Move 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.



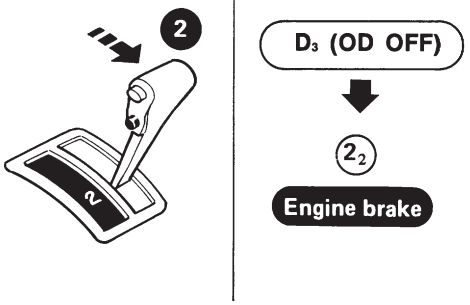
SAT791GA

Yes or No

Yes	▶	GO TO 4.
No	▶	Go to "21. A/T Does Not Shift: $D_3 \rightarrow D_2$, When Selector Lever D → 2 Position", AT-321. Continue ROAD TEST.

4	CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?



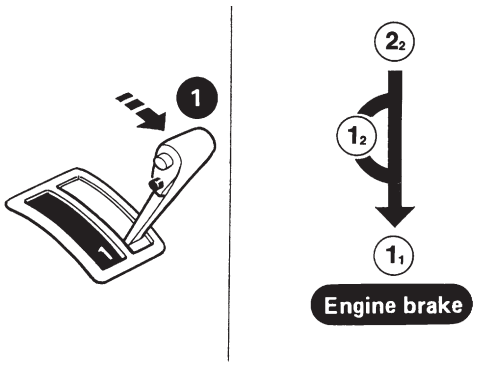
SAT791GA

Yes or No

Yes	▶	GO TO 5.
No	▶	Go to "18. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)", AT-317. Continue ROAD TEST.

5	CHECK SHIFT DOWN (2_2 TO 1_1)

1. Move 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.**



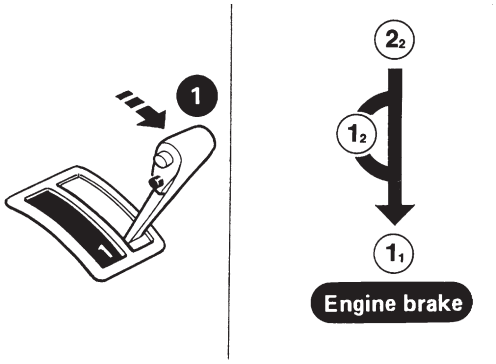
SAT778B

Yes or No

Yes	▶	GO TO 6.
No	▶	Go to "22. A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever 2 $\rightarrow$ 1 Position", AT-322. Continue ROAD TEST.

6	CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?



SAT778B

Yes or No

Yes ▶	1. Stop vehicle. 2. Perform self-diagnosis. EURO-OBD: Refer to TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-49 or SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60.
No ▶	Go to "23. Vehicle Does Not Decelerate By Engine Brake", AT-323. Continue ROAD TEST.

Symptom Chart

NFAT0030

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

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
No Lock-up Engagement/ TCC Inoperative	Torque converter is not locked up.	ON vehicle	1. Throttle position sensor (Adjustment)	EC-151	
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-134, 213	AT-218, 223
			3. Park/neutral position (PNP) switch adjustment	AT-347	
			4. Engine speed signal	AT-139	AT-263
			5. A/T fluid temperature sensor	AT-128	AT-256
			6. Line pressure test	AT-82	
			7. Torque converter clutch solenoid valve	AT-171	AT-251
			8. Control valve assembly	AT-346	
		OFF vehicle	9. Torque converter	AT-357	
	Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-78	
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Line pressure test	AT-82	
			4. Torque converter clutch solenoid valve	AT-171	AT-251
			5. Line pressure solenoid valve	AT-176	AT-267
			6. Control valve assembly	AT-346	
		OFF vehicle	7. Torque converter	AT-357	
	Lock-up point is extremely high or low. AT-312	ON vehicle	1. Throttle position sensor (Adjustment)	EC-151	
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-134, 213	AT-218, 223
			3. Torque converter clutch solenoid valve	AT-171	AT-251
			4. Control valve assembly	AT-346	

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
Shift Shock	Sharp shock in shifting from N to D position.	ON vehicle	1. Engine idling rpm	EC-333	EC-477
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Line pressure test	AT-82	
			4. A/T fluid temperature sensor	AT-128	AT-256
			5. Engine speed signal	AT-139	AT-263
			6. Line pressure solenoid valve	AT-176	AT-267
			7. Control valve assembly	AT-346	
			8. Accumulator N-D	AT-346	
		OFF vehicle	9. Forward clutch	AT-401	
Shift Shock	Too sharp a shock in change from D_1 to D_2.	ON vehicle	1. Throttle position sensor (Adjustment)	EC-151	
			2. Line pressure test	AT-82	
			3. Accumulator servo release	AT-346	
			4. Control valve assembly	AT-346	
			5. A/T fluid temperature sensor	AT-128	AT-256
		OFF vehicle	6. Brake band	AT-418	
	Too sharp a shock in change from D_2 to D_3.	ON vehicle	1. Throttle position sensor (Adjustment)	EC-151	
			2. Line pressure test	AT-82	
			3. Control valve assembly	AT-346	
		OFF vehicle	4. High clutch	AT-396	
			5. Brake band	AT-418	
	Too sharp a shock in change from D_3 to D_4.	ON vehicle	1. Throttle position sensor (Adjustment)	EC-151	
			2. Line pressure test	AT-82	
			3. Control valve assembly	AT-346	
		OFF vehicle	4. Brake band	AT-418	
			5. Overrun clutch	AT-401	
	Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Throttle position sensor (Adjustment)	EC-151	
			2. Line pressure test	AT-82	
			3. Overrun clutch solenoid valve	AT-201	AT-246
			4. Control valve assembly	AT-346	
	Large shock changing from 1_2 to 1_1 in 1 position.	ON vehicle	1. Control valve assembly	AT-346	
		ON vehicle	2. Low & reverse brake	AT-406	

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
Improper Shift Timing	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-303, 306, 309	ON vehicle	1. Throttle position sensor (Adjustment)	EC-151	
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-134, 213	AT-218, 223
			3. Shift solenoid valve A	AT-182	AT-236
			4. Shift solenoid valve B	AT-187	AT-241
	Gear change directly from D_1 to D_3 occurs.	ON vehicle	1. Fluid level	AT-78	
			2. Accumulator servo release	AT-346	
		OFF vehicle	3. Brake band	AT-418	
	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-151	
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-134, 213	AT-218, 223
	Kickdown does not operate when depressing pedal in D_4 within kickdown vehicle speed.	ON vehicle	1. Throttle position sensor (Adjustment)	EC-151	
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-134, 213	AT-218, 223
			3. Shift solenoid valve A	AT-182	AT-236
			4. Shift solenoid valve B	AT-187	AT-241
Improper Shift Timing	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-134, 213	AT-218, 223
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Shift solenoid valve A	AT-182	AT-236
			4. Shift solenoid valve B	AT-187	AT-241
	Gear change from 2_2 to 2_3 in 2 position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-347	
	Gear change from 1_1 to 1_2 in 1 position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-347	
			2. Control cable adjustment	AT-348	

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
No Down Shift	Failure to change gear from D_4 to D_3.	ON vehicle	1. Fluid level	AT-78	
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Overrun clutch solenoid valve	AT-201	AT-246
			4. Shift solenoid valve A	AT-182	AT-236
			5. Line pressure solenoid valve	AT-176	AT-267
			6. Control valve assembly	AT-346	
		OFF vehicle	7. Low & reverse brake	AT-406	
			8. Overrun clutch	AT-401	
	Failure to change gear from D_3 to D_2 or from D_4 to D_2.	ON vehicle	1. Fluid level	AT-78	
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Shift solenoid valve A	AT-182	AT-236
			4. Shift solenoid valve B	AT-187	AT-241
			5. Control valve assembly	AT-346	
		OFF vehicle	6. High clutch	AT-396	
			7. Brake band	AT-418	
	Failure to change gear from D_2 to D_1 or from D_3 to D_1.	ON vehicle	1. Fluid level	AT-78	
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Shift solenoid valve A	AT-182	AT-236
			4. Shift solenoid valve B	AT-187	AT-241
			5. Control valve assembly	AT-346	
		OFF vehicle	6. Low one-way clutch	AT-352	
			7. High clutch	AT-396	
			8. Brake band	AT-78	

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
No Down Shift	Failure to change from D_3 to 2_2 when changing lever into 2 position. AT-317	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-347	
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Overrun clutch solenoid valve	AT-201	AT-246
			4. Shift solenoid valve B	AT-187	AT-241
			5. Shift solenoid valve A	AT-182	AT-236
			6. Control valve assembly	AT-346	
			7. Control cable adjustment	AT-348	
		OFF vehicle	8. Brake band	AT-418	
			9. Overrun clutch	AT-401	
	Does not change from 1_2 to 1_1 in 1 position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-347	
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-134, 213	AT-218, 223
			3. Shift solenoid valve A	AT-182	AT-236
			4. Control valve assembly	AT-346	
			5. Overrun clutch solenoid valve	AT-201	AT-246
		OFF vehicle	6. Overrun clutch	AT-401	
			7. Low & reverse brake	AT-406	
No Up Shift	Failure to change gear from D_1 to D_2.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-347	
			2. Control cable adjustment	AT-348	
			3. Shift solenoid valve A	AT-182	AT-236
			4. Control valve assembly	AT-346	
			5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-134, 213	AT-218, 223
		OFF vehicle	6. Brake band	AT-418	
	Failure to change gear from D_2 to D_3.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-347	
			2. Control cable adjustment	AT-348	
			3. Shift solenoid valve B	AT-187	AT-241
			4. Control valve assembly	AT-346	
			5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-134, 213	AT-218, 223
		OFF vehicle	6. High clutch	AT-396	
			7. Brake band	AT-418	

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
No Up Shift	Failure to change gear from D_3 to D_4.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-347	
			2. Control cable adjustment	AT-348	
			3. Shift solenoid valve A	AT-182	AT-236
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-134, 213	AT-218, 223
			5. A/T fluid temperature sensor	AT-128	AT-256
		OFF vehicle	6. Brake band	AT-418	
	A/T does not shift to D_4 when driving with overdrive control switch ON.	ON vehicle	1. Throttle position sensor (Adjustment)	EC-151	
			2. Park/neutral position (PNP) switch adjustment	AT-347	
			3. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-134, 213	AT-218, 223
			4. Shift solenoid valve A	AT-182	AT-236
			5. Overrun clutch solenoid valve	AT-201	AT-246
			6. Control valve assembly	AT-346	
			7. A/T fluid temperature sensor	AT-128	AT-256
			8. Line pressure solenoid valve	AT-176	AT-267
		OFF vehicle	9. Brake band	AT-418	
			10. Overrun clutch	AT-401	
Slips/Will Not Engage	Vehicle will not run in R position (but runs in D, 2 and 1 positions). Clutch slips. Very poor acceleration. AT-293	ON vehicle	1. Control cable adjustment	AT-348	
			2. Line pressure test	AT-82	
			3. Line pressure solenoid valve	AT-176	AT-267
			4. Control valve assembly	AT-346	
		OFF vehicle	5. Reverse clutch	AT-393	
			6. High clutch	AT-396	
			7. Forward clutch	AT-401	
			8. Overrun clutch	AT-401	
			9. Low & reverse brake	AT-406	
	Vehicle will not run in D and 2 positions (but runs in 1 and R positions).	ON vehicle	1. Control cable adjustment	AT-348	
		OFF vehicle	2. Low one-way clutch	AT-352	

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
Slips/Will Not Engage	Vehicle will not run in D, 1, 2 positions (but runs in R position). Clutch slips. Very poor acceleration. AT-297	ON vehicle	1. Fluid level	AT-78	
			2. Line pressure test	AT-82	
			3. Line pressure solenoid valve	AT-176	AT-267
			4. Control valve assembly	AT-346	
			5. Accumulator N-D	AT-346	
		OFF vehicle	6. Reverse clutch	AT-393	
			7. High clutch	AT-396	
			8. Forward clutch	AT-401	
			9. Forward one-way clutch	AT-409	
			10. Low one-way clutch	AT-352	
	Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-78	
			2. Control cable adjustment	AT-348	
			3. Throttle position sensor (Adjustment)	EC-151	
			4. Line pressure test	AT-82	
			5. Line pressure solenoid valve	AT-176	AT-267
			6. Control valve assembly	AT-346	
			7. Accumulator N-D	AT-346	
		OFF vehicle	8. Forward clutch	AT-401	
			9. Reverse clutch	AT-393	
			10. Low & reverse brake	AT-406	
			11. Oil pump	AT-374	
			12. Torque converter	AT-357	
	No creep at all. AT-293, 297	ON vehicle	1. Fluid level	AT-78	
			2. Line pressure test	AT-82	
			3. Control valve assembly	AT-346	
		OFF vehicle	4. Forward clutch	AT-401	
			5. Oil pump	AT-374	
			6. Torque converter	AT-357	
	Almost no shock or clutches slipping in change from D_1 to D_2.	ON vehicle	1. Fluid level	AT-78	
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Line pressure test	AT-82	
			4. Accumulator servo release	AT-346	
			5. Control valve assembly	AT-346	
		OFF vehicle	6. Brake band	AT-418	

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
Slips/Will Not Engage	Almost no shock or slipping in change from D_2 to D_3 .	ON vehicle	1. Fluid level	AT-78	
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Line pressure test	AT-82	
			4. Control valve assembly	AT-346	
		OFF vehicle	5. High clutch	AT-396	
			6. Forward clutch	AT-401	
	Almost no shock or slipping in change from D_3 to D_4 .	ON vehicle	1. Fluid level	AT-78	
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Line pressure test	AT-82	
			4. Control valve assembly	AT-346	
		OFF vehicle	5. High clutch	AT-396	
			6. Brake band	AT-418	
	Races extremely fast or slips in changing from D_4 to D_3 when depressing pedal.	ON vehicle	1. Fluid level	AT-78	
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Line pressure test	AT-82	
			4. Line pressure solenoid valve	AT-176	AT-267
			5. Control valve assembly	AT-346	
		OFF vehicle	6. High clutch	AT-396	
			7. Forward clutch	AT-401	
	Races extremely fast or slips in changing from D_4 to D_2 when depressing pedal.	ON vehicle	1. Fluid level	AT-78	
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Line pressure test	AT-82	
			4. Line pressure solenoid valve	AT-176	AT-267
			5. Shift solenoid valve A	AT-182	AT-236
			6. Control valve assembly	AT-346	
		OFF vehicle	7. Brake band	AT-418	
			8. Forward clutch	AT-401	

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
Slips/Will Not Engage	Races extremely fast or slips in changing from D_3 to D_2 when depressing pedal.	ON vehicle	1. Fluid level	AT-78	
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Line pressure test	AT-82	
			4. Line pressure solenoid valve	AT-176	AT-267
			5. Control valve assembly	AT-346	
			6. A/T fluid temperature sensor	AT-128	AT-256
		OFF vehicle	7. Brake band	AT-418	
			8. Forward clutch	AT-401	
			9. High clutch	AT-396	
	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-78	
			2. Throttle position sensor (Adjustment)	EC-151	
			3. Line pressure test	AT-82	
			4. Line pressure solenoid valve	AT-176	AT-267
			5. Control valve assembly	AT-346	
		OFF vehicle	6. Forward clutch	AT-401	
			7. Forward one-way clutch	AT-409	
			8. Low one-way clutch	AT-352	
	Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-78	
			2. Control cable adjustment	AT-348	
			3. Line pressure test	AT-82	
			4. Line pressure solenoid valve	AT-176	AT-267
		OFF vehicle	5. Oil pump	AT-374	
			6. High clutch	AT-396	
			7. Brake band	AT-418	
			8. Low & reverse brake	AT-406	
			9. Torque converter	AT-357	
			10. Parking components	AT-429	

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
NOT USED	Engine cannot be started in P and N positions. AT-286	ON vehicle	1. Ignition switch and starter	EL-9, and SC-12	
			2. Control cable adjustment	AT-348	
			3. Park/neutral position (PNP) switch adjustment	AT-347	
	Engine starts in positions other than P and N. AT-286	ON vehicle	1. Control cable adjustment	AT-348	
			2. Park/neutral position (PNP) switch adjustment	AT-347	
	Transaxle noise in P and N positions.	ON vehicle	1. Fluid level	AT-78	
			2. Line pressure test	AT-82	
			3. Throttle position sensor (Adjustment)	EC-151	
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-134, 213	AT-220, 223
			5. Engine speed signal	AT-139	AT-263
		OFF vehicle	6. Oil pump	AT-374	
			7. Torque converter	AT-357	
	Vehicle moves when changing into P position or parking gear does not disengage when shifted out of P position. AT-287	ON vehicle	1. Control cable adjustment	AT-348	
		OFF vehicle	2. Parking components	AT-429	
	Vehicle runs in N position. AT-288	ON vehicle	1. Control cable adjustment	AT-348	
		OFF vehicle	2. Forward clutch	AT-401	
			3. Reverse clutch	AT-393	
			4. Overrun clutch	AT-401	
	Vehicle braked when shifting into R position.	ON vehicle	1. Fluid level	AT-78	
			2. Control cable adjustment	AT-348	
			3. Line pressure test	AT-82	
			4. Line pressure solenoid valve	AT-176	AT-267
			5. Control valve assembly	AT-346	
		OFF vehicle	6. High clutch	AT-396	
			7. Brake band	AT-418	
			8. Forward clutch	AT-401	
			9. Overrun clutch	AT-401	

Symptom Chart (Cont'd)

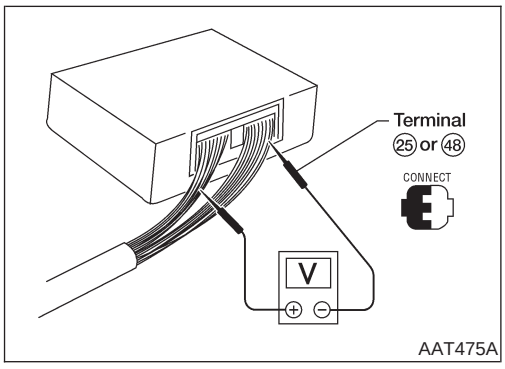
Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
NOT USED	Excessive creep.	ON vehicle	1. Engine idling rpm	EC-333	EC-477
	Engine stops when shifting lever into R, D, 2 and 1.	ON vehicle	1. Engine idling rpm	EC-333	EC-477
			2. Torque converter clutch solenoid valve	AT-171	AT-251
			3. Control valve assembly	AT-346	
		OFF vehicle	4. Torque converter	AT-357	
	Vehicle braked by gear change from D_1 to D_2.	ON vehicle	1. Fluid level	AT-78	
		OFF vehicle	2. Reverse clutch	AT-393	
			3. Low & reverse brake	AT-406	
			4. High clutch	AT-396	
			5. Low one-way clutch	AT-352	
	Vehicle braked by gear change from D_2 to D_3.	ON vehicle	1. Fluid level	AT-78	
		OFF vehicle	2. Brake band	AT-418	
	Vehicle braked by gear change from D_3 to D_4.	ON vehicle	1. Fluid level	AT-78	
		OFF vehicle	2. Overrun clutch	AT-401	
			3. Forward one-way clutch	AT-409	
			4. Reverse clutch	AT-393	
	Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-78	
			2. Park/neutral position (PNP) switch adjustment	AT-347	
			3. Shift solenoid valve A	AT-182	AT-236
			4. Shift solenoid valve B	AT-187	AT-241
			5. Control valve assembly	AT-346	
		OFF vehicle	6. Reverse clutch	AT-393	
			7. High clutch	AT-396	
			8. Brake band	AT-418	
			9. Low & reverse brake	AT-406	
			10. Oil pump	AT-374	
			11. Torque converter	AT-357	

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
NOT USED	Transaxle noise in D, 2, 1 and R positions.	ON vehicle	1. Fluid level	AT-78	
		ON vehicle	2. Torque converter	AT-357	
	Engine brake does not operate in "1" position. AT-319	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-347	
			2. Control cable adjustment	AT-348	
			3. Throttle position sensor (Adjustment)	EC-151	
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-134, 213	AT-220, 223
			5. Shift solenoid valve A	AT-182	AT-236
			6. Control valve assembly	AT-346	
			7. Overrun clutch solenoid valve	AT-201	AT-246
		OFF vehicle	8. Overrun clutch	AT-401	
			9. Low & reverse brake	AT-406	
	Transaxle overheats.	ON vehicle	1. Fluid level	AT-78	
			2. Engine idling rpm	EC-333	EC-477
			3. Throttle position sensor (Adjustment)	EC-151	
			4. Line pressure test	AT-82	
			5. Line pressure solenoid valve	AT-176	AT-267
			6. Control valve assembly	AT-346	
		OFF vehicle	7. Oil pump	AT-374	
			8. Reverse clutch	AT-393	
			9. High clutch	AT-396	
			10. Brake band	AT-418	
			11. Forward clutch	AT-401	
			12. Overrun clutch	AT-401	
			13. Low & reverse brake	AT-406	
			14. Torque converter	AT-357	

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				EURO-OBD	EXCEPT FOR EURO-OBD
NOT USED	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-78	
		OFF vehicle	2. Reverse clutch	AT-393	
			3. High clutch	AT-396	
			4. Brake band	AT-418	
			5. Forward clutch	AT-401	
			6. Overrun clutch	AT-401	
			7. Low & reverse brake	AT-406	
	Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-78	
		OFF vehicle	2. Torque converter	AT-357	
			3. Oil pump	AT-374	
			4. Reverse clutch	AT-393	
			5. High clutch	AT-396	
			6. Brake band	AT-418	
			7. Forward clutch	AT-401	
			8. Overrun clutch	AT-401	
			9. Low & reverse brake	AT-406	
	Engine is stopped at R, D, 2 and 1 positions.	ON vehicle	1. Fluid level	AT-78	
			2. Torque converter clutch solenoid valve	AT-171	AT-251
			3. Shift solenoid valve B	AT-187	AT-241
			4. Shift solenoid valve A	AT-182	AT-236
			5. Control valve assembly	AT-346	



TCM Terminals and Reference Value

NFAT0031

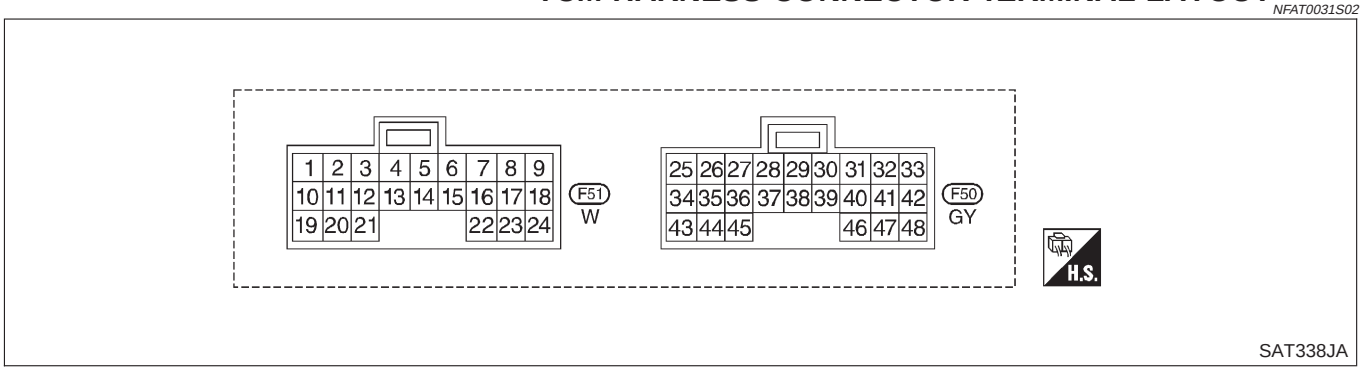
PREPARATION

NFAT0031S01

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

TCM HARNESS CONNECTOR TERMINAL LAYOUT

NFAT0031S02



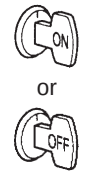
TCM INSPECTION TABLE

NFAT0031S03

(Data are reference values.)

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	G/R	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	W/B	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V
3	G/B	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V
5*	BR	DT1	 or 	—	—
6*	GY	DT2		—	—
7*	Y	DT3		—	—
8*	LG	DT5		—	—
9*	OR	DT4		—	—
10	R/Y	Power source		When turning ignition switch to ON.	Battery voltage
				When turning ignition switch to OFF.	0V
11	R/Y	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.)	0V
12	LG/B	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.)	0V

TCM Terminals and Reference Value (Cont'd)

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
13	W	S (SPORT) indicator lamp		When setting overdrive control, A/T check or A/T mode [S (SPORT)] switch in OFF position.	0V
				When setting overdrive control switch, A/T check or A/T mode [S (SPORT)] in ON position.	Battery voltage
15	BR/W	ATCK		—	—
16	GY/L	Closed throttle position switch (in throttle position switch)		When releasing accelerator pedal after warming up engine.	Battery voltage
				When depressing accelerator pedal after warming up engine.	0V
17	P	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.	0V
18	Y	ASCD cruise switch		When ASCD cruise is being performed. ("CRUISE" lamp comes on.)	Battery voltage
				When ASCD cruise is not being performed. ("CRUISE" lamp does not comes on.)	0V
19	R/Y	Power source	Same as No. 10		
20	BR/Y	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	0V
22	G/Y	Overdrive control or A/T check switch		When setting overdrive control or A/T check switch in ON position	Battery voltage
				When setting overdrive control or A/T check switch in OFF position	0V
24	L	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	—	—	—
26	PU/W	PNP switch 1 position		When setting selector lever to 1 position.	Battery voltage
				When setting selector lever to other positions.	0V
27	P/B	PNP switch 2 position		When setting selector lever to 2 position.	Battery voltage
				When setting selector lever to other positions.	0V
28	Y/R	Power source (Memory back-up)		When turning ignition switch to OFF.	Battery voltage
				When turning ignition switch to ON.	Battery voltage

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
29	W	Revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	450 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
30**	BR/Y	Data link connector		—	—
31**	P	Data link connector		—	—
32	R	Throttle position sensor (Power source)		Ignition switch ON.	4.5 - 5.5V
				Ignition switch OFF.	0V
34	Y/PU	PNP switch D position		When setting selector lever to D position.	Battery voltage
				When setting selector lever to other positions.	0V
35	G/W	PNP switch R position		When setting selector lever to R position.	Battery voltage
				When setting selector lever to other positions.	0V
36	R/G	PNP switch P or N position		When setting selector lever to P or N position.	Battery voltage
				When setting selector lever to other positions.	0V
39	W/G	Engine speed signal		Refer to EC-114, "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	W	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Throttle position sensor (Ground)	—	—	—
43	PU	A/T mode switch (POWER, S (SPORT))		When setting A/T mode switch in POWER, S (SPORT) position.	Battery voltage
				When setting A/T mode switch in other positions.	0V

TCM Terminals and Reference Value (Cont'd)

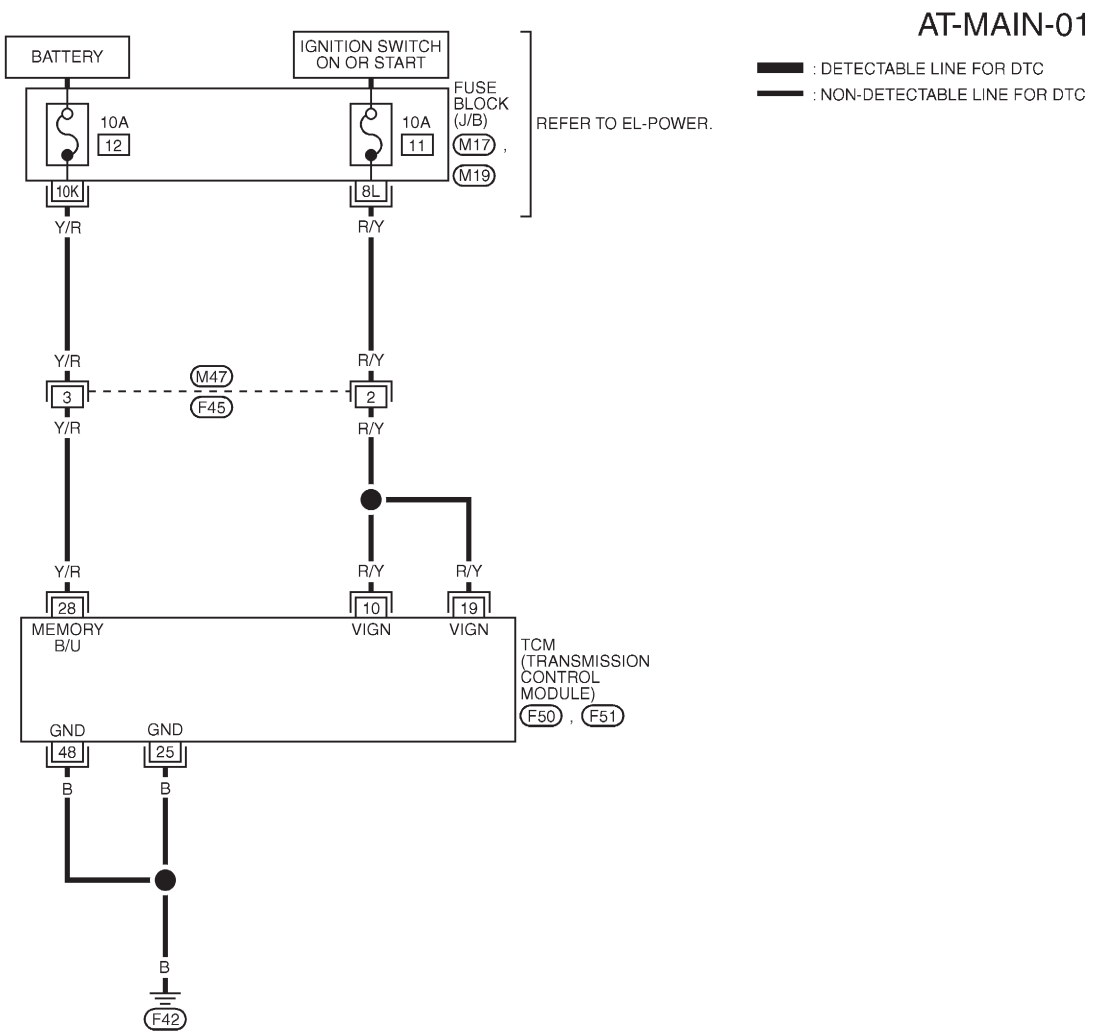
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
44	G/Y	A/T mode switch ✻ (SNOW)		When setting A/T mode switch in ✻ (SNOW) position.	
				When setting A/T mode switch in other positions.	
45	R/G	Stop lamp switch		When depressing brake pedal	Battery voltage
				When releasing brake pedal	0V
47	G	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V
48	B	Ground	—	—	—

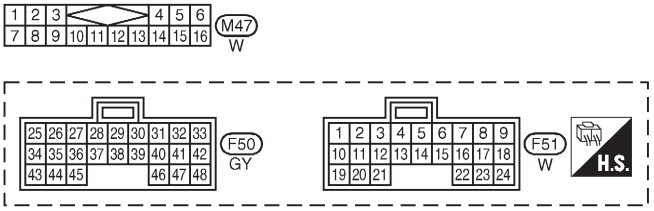
*: These terminals are connected to the ECM.

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

Wiring Diagram — AT — MAIN

NFAT0290





REFER TO THE FOLLOWING.
M17 , M19 - FUSE BLOCK - JUNCTION BOX (J/B)

MAT856A

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

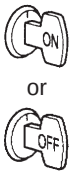
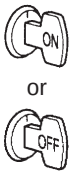
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
10	R/Y	POWER SOURCE	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	0V
19	R/Y	POWER SOURCE	SAME AS NO. 10	
25	B	GROUND	—	—
28	Y/R	POWER SOURCE (MEMOLY BACK-UP)	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	BATTERY VOLTAGE
48	B	GROUND	—	—

SAT338K

Wiring Diagram — AT — MAIN (Cont'd)

TCM TERMINALS AND REFERENCE VALUE

=NFAT0290S01

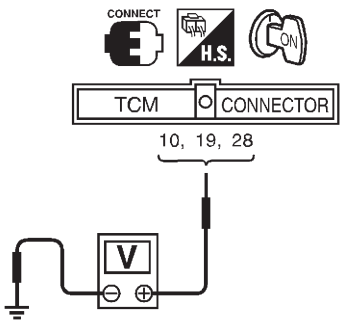
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
10	R/Y	Power source		When turning ignition switch to ON.	Battery voltage
				When turning ignition switch to OFF.	0V
19	R/Y	Power source		Same as No. 10	
25	B	Ground	—	—	—
28	Y/R	Power source (Memory back-up)		When turning ignition switch to OFF.	Battery voltage
				When turning ignition switch to ON.	Battery voltage
48	B	Ground	—	—	—

Diagnostic Procedure

NFAT0291

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

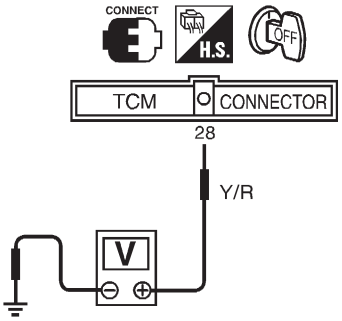
SAT611J

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

SAT612J

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)
- Ignition switch and 10A fuse [No. 11, 12, located in the fuse block (J/B)]
  Refer to EL-9, "Schematic".

OK or NG

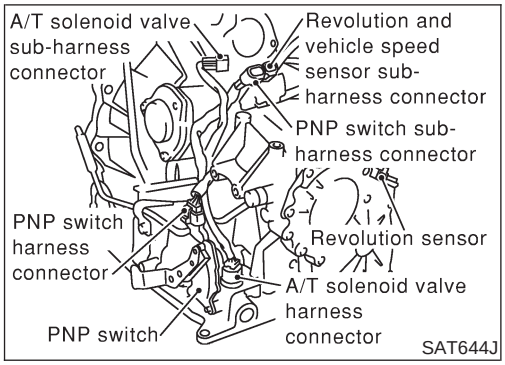
OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.

4	CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between TCM terminals 25, 48 and ground. Refer to wiring diagram — AT — MAIN.
   Continuity should exist.
   If OK, check harness for short to ground and short to power.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.



Description

NFAT0034

- The park/neutral position (PNP) switch includes a transmission range switch.
- The transmission range switch detects the selector lever position and sends a signal to the TCM.

TCM TERMINALS AND REFERENCE VALUE

NFAT0034S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
26	PU/W	PNP switch 1 position		When setting selector lever to 1 position.	Battery voltage
				When setting selector lever to other positions.	0V
27	P/B	PNP switch 2 position		When setting selector lever to 2 position.	Battery voltage
				When setting selector lever to other positions.	0V
34	Y/PU	PNP switch D position		When setting selector lever to D position.	Battery voltage
				When setting selector lever to other positions.	0V
35	G/W	PNP switch R position		When setting selector lever to R position.	Battery voltage
				When setting selector lever to other positions.	0V
36	R/G	PNP switch P or N position		When setting selector lever to P or N position.	Battery voltage
				When setting selector lever to other positions.	0V

On Board Diagnosis Logic

NFAT0201

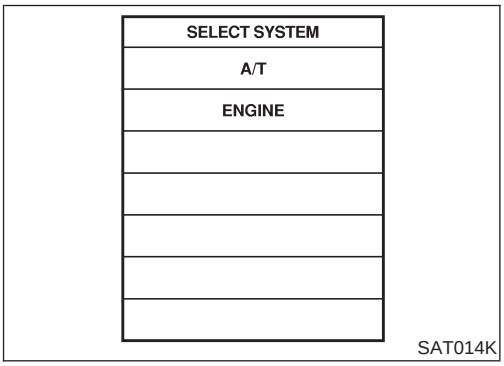
Diagnostic trouble code PNP SW/CIRC with CONSULT-II or P0705 without CONSULT-II is detected when TCM does not receive the correct voltage signal from the switch based on the gear position.

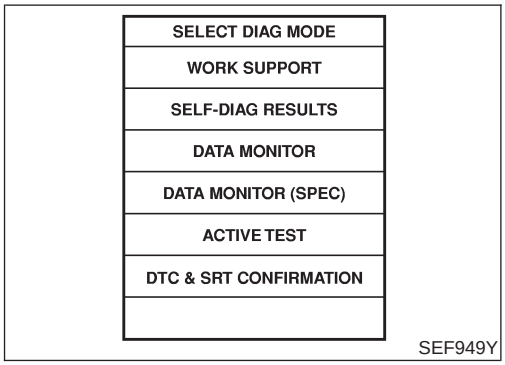
Possible Cause

NFAT0202

Check the following items.

- Harness or connectors
  (The park/neutral position (PNP) switch circuit is open or shorted.)
- Park/neutral position (PNP) switch





Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0203

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

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

WITH CONSULT-II

NFAT0203S01

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 (O/D ON or OFF)

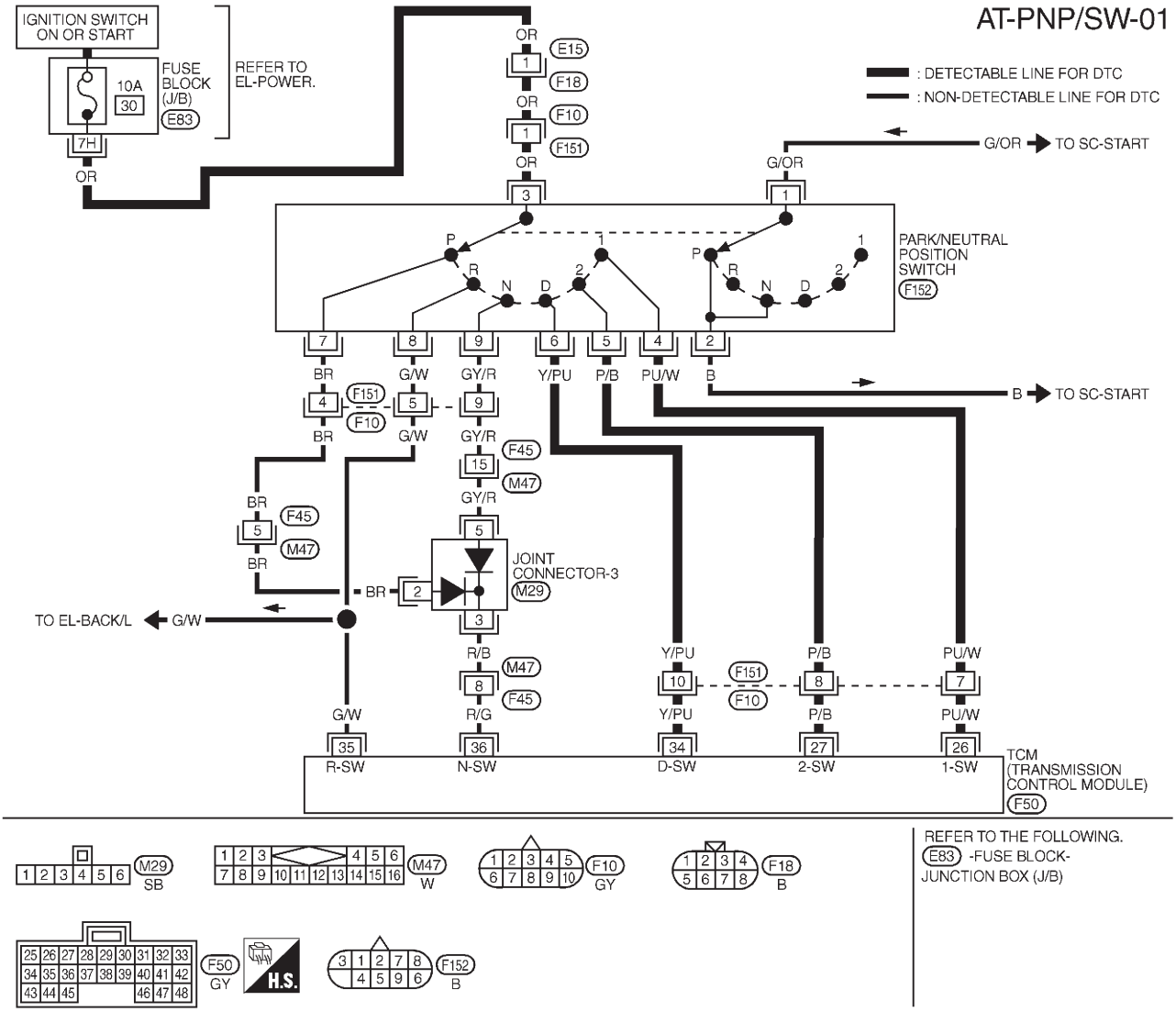
WITH GST

NFAT0203S02

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — PNP/SW

NFAT0035



MAT948A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
26	PU/W	PNP SWITCH 1 POSITION	WHEN IGN ON AND SELECTOR LEVER 1 POSITION	BATTERY VOLTAGE
			WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	0V
27	P/B	PNP SWITCH 2 POSITION	WHEN IGN ON AND SELECTOR LEVER 2 POSITION	BATTERY VOLTAGE
			WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	0V
34	Y/PU	PNP SWITCH D POSITION	WHEN IGN ON AND SELECTOR LEVER D POSITION	BATTERY VOLTAGE
			WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	0V
35	G/W	PNP SWITCH R POSITION	WHEN IGN ON AND SELECTOR LEVER R POSITION	BATTERY VOLTAGE
			WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	0V
36	R/G	PNP SWITCH P OR N POSITION	WHEN IGN ON AND SELECTOR LEVER P POSITION	BATTERY VOLTAGE
			WHEN IGN ON AND SELECTOR LEVER OTHER POSITIONS	0V

SAT339K

Diagnostic Procedure

NFAT0036

1	INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 6.

2	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (With CONSULT-II)

With CONSULT-II

1. Turn ignition switch to ON position.
   (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out P, R, N, 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

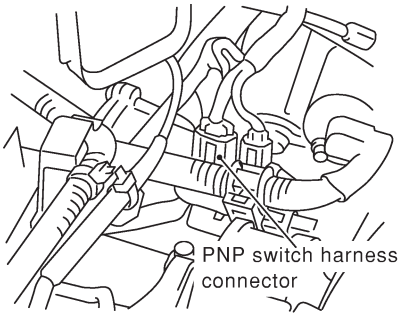
OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 3.

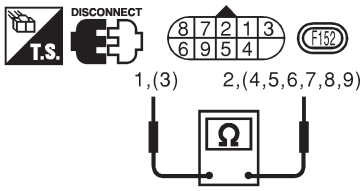
3	DETECT MALFUNCTIONING ITEM

Check the following item:

- Park/neutral position (PNP) switch
  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.



View with air cleaner box removed



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	

SAT615J

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

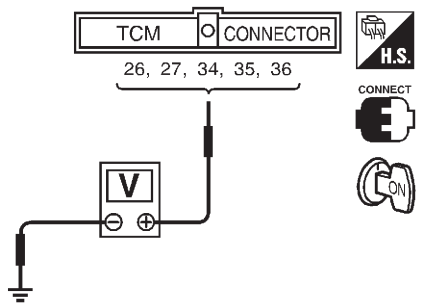
4	CHECK MANUAL CONTROL CABLE ADJUSTMENT	
Check PNP switch again with manual control cable disconnected from manual shaft of A/T assembly. Refer to test group 2.		
OK or NG		
OK	▶	Adjust manual control cable. Refer to AT-348.
NG	▶	Repair or replace PNP switch.

5	DETECT MALFUNCTIONING ITEM	
Check the following items: ● Harness for short or open between ignition switch and park/neutral position (PNP) switch (Main harness) ● Harness for short or open between park/neutral position (PNP) switch and TCM (Main harness) ● Joint connector-3 M29 ● Ignition switch and 10A fue [No. 30, located in the fuse block (J/B)] Refer to EL-9, "Schematic".		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

6	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (Without CONSULT-II)	

Without CONSULT-II

1. Turn ignition switch to ON position. (Do not start engine.)
2. Check voltage between TCM terminals 26, 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**

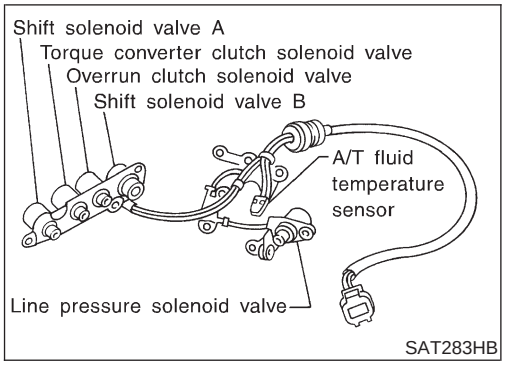
SAT840J

OK or NG

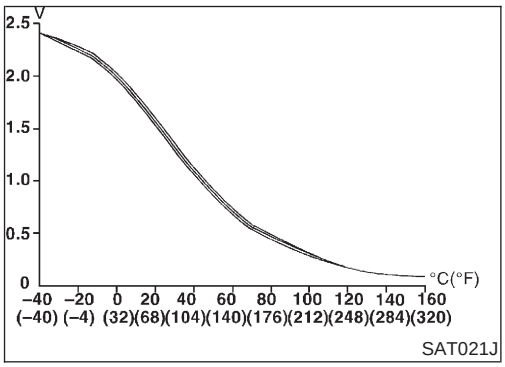
OK	▶	GO TO 7.
NG	▶	GO TO 5.

7	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-123.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 8.

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



SAT283HB



SAT021J

Description

NFAT0037

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

NFAT0037S01

Remarks: Specification data are reference values.

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

TCM TERMINALS AND REFERENCE VALUE

NFAT0037S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
42	B	Throttle position sensor (Ground)	—	—	—
47	G	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V

On Board Diagnosis Logic

NFAT0204

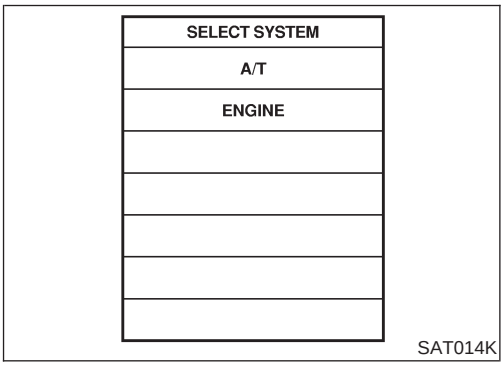
Diagnostic trouble code ATF TEMP SEN/CIRC with CONSULT-II or P0710 without CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

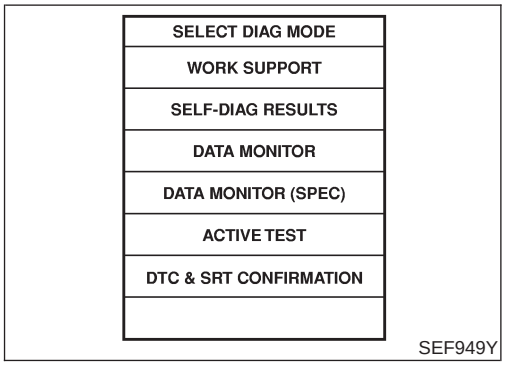
Possible Cause

NFAT0205

Check the following items.

- Harness or connectors
  (The sensor circuit is open or shorted.)
- A/T fluid temperature sensor





Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0206

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

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

WITH CONSULT-II

NFAT0206S01

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

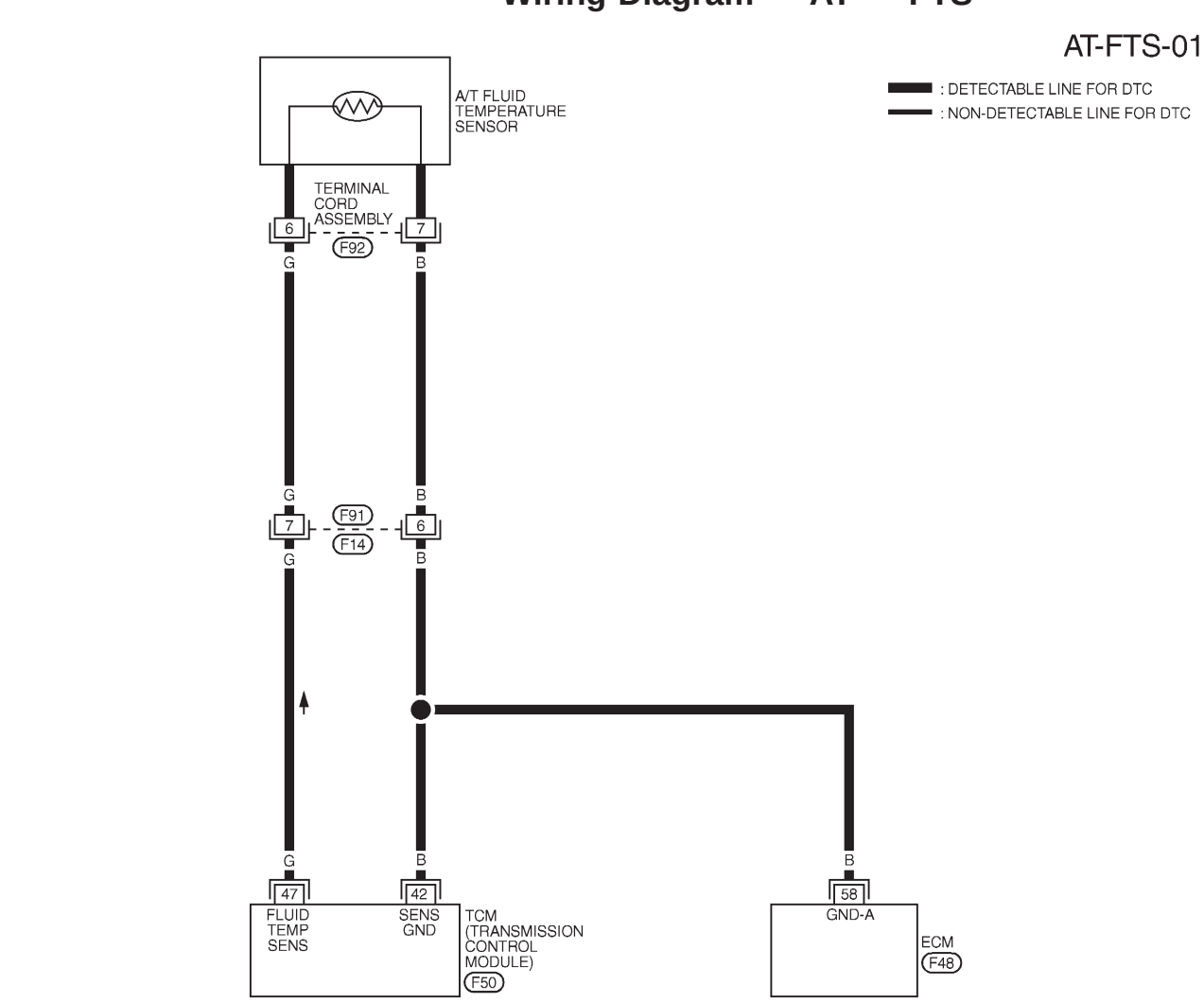
WITH GST

NFAT0206S02

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — FTS

NFAT0038



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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
42	B	THROTTLE POSITION SENSOR (GROUND)	—	—
47	G	A/T FLUID TEMPERATURE SENSOR	WHEN IGN ON AND ATF TEMPERTURE IS 20°C (68°F)	1.5V
			WHEN IGN ON AND ATF TEMPERTURE IS 80°C (176°F)	0.5V

SAT340K

Diagnostic Procedure

=NFAT0039

1	INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 6.

2	CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (With CONSULT-II)

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “FLUID TEMP SE”.

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

SAT614J

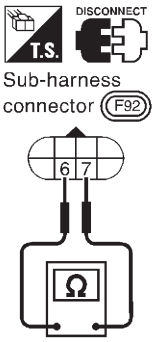
Voltage:
Cold [20°C (68°F)] → Hot [80°C (176°F)]:
Approximately 1.5V → 0.5V

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 3.

3	CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

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



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

SAT616J

4. Reinstall any part removed.

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 5.

4	DETECT MALFUNCTIONING ITEM

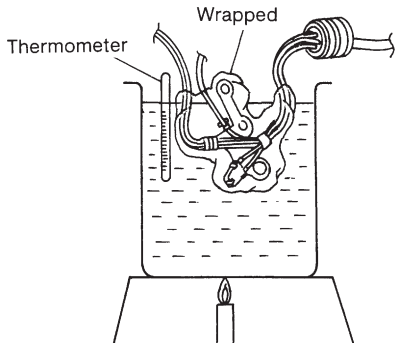
Check the following items:
- Harness for short to ground or short to power or open between TCM, ECM and terminal cord assembly (Main harness)
- Ground circuit for ECM
  Refer to EC-127, "WIRING DIAGRAM".

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

5	DETECT MALFUNCTIONING ITEM

1. Remove oil pan, refer to AT-346.
2. Check the following items:
- A/T fluid temperature sensor
  Check resistance between two terminals while changing temperature as shown at below.



SAT298F

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

MTBL0210

- Harness of terminal cord assembly for short or open

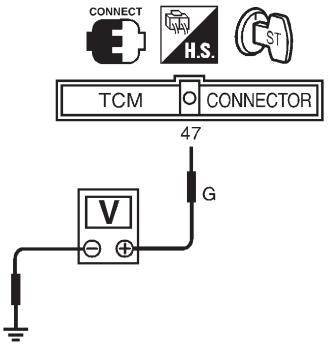
OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

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

Without CONSULT-II

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



SAT335J

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

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 3.

7	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-129.

OK or NG

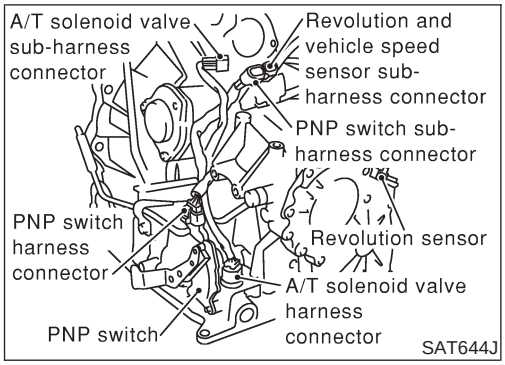
OK	▶	**INSPECTION END**
NG	▶	GO TO 8.

8	CHECK TCM INSPECTION

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

OK or NG

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



Description

NFAT0040

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.

TCM TERMINALS AND REFERENCE VALUE

NFAT0040S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard
29	W	Revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	450 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
42	B	Throttle position sensor (Ground)	—	—	—

On Board Diagnosis Logic

NFAT0207

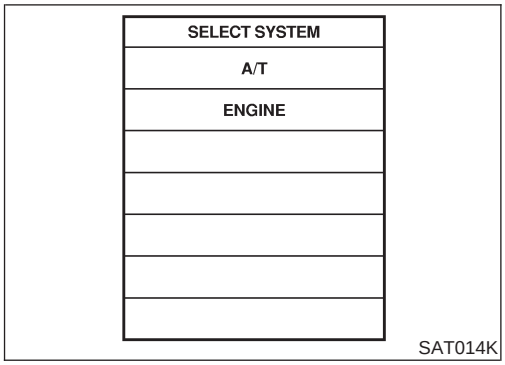
Diagnostic trouble code VEH SPD SEN/CIR AT with CONSULT-II or P0720 without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

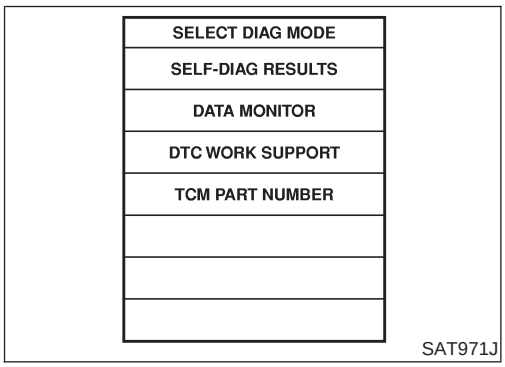
NFAT0208

Check the following items.

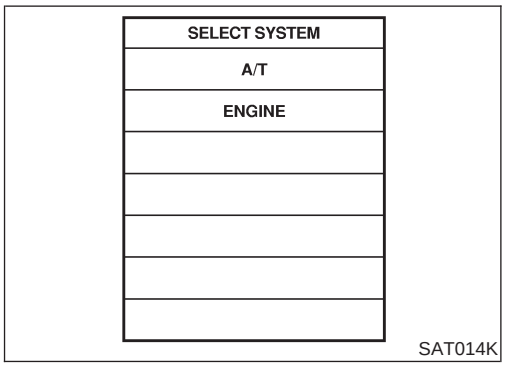
- Harness or connectors
  (The sensor circuit is open or shorted.)
- Revolution sensor



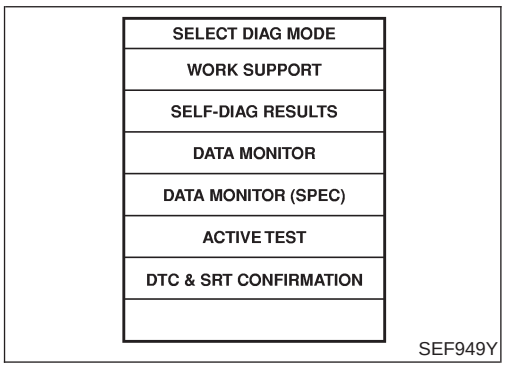
SAT014K



SAT971J



SAT014K



SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0209

CAUTION:

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

NOTE:

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

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

WITH CONSULT-II

NFAT0209S01

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.
   If the check result is NG, go to "DIAGNOSTIC PROCEDURE", AT-214.
   If the check result is OK, go to following step.
3) Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
4) Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL SPEED SE: 30 km/h (19 MPH) or more
   THRTL POS SEN: More than 1.2V
   Selector lever: D position (O/D ON)
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
   If the check result is NG, go to "DIAGNOSTIC PROCEDURE", AT-137.
   If the check result is OK, go to following step.
5) Maintain the following conditions for at least 5 consecutive seconds.
   CMPS·RPM (REF): 3,500 rpm or more
   THRTL POS SEN: More than 1.2V
   Selector lever: D position (O/D ON)
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

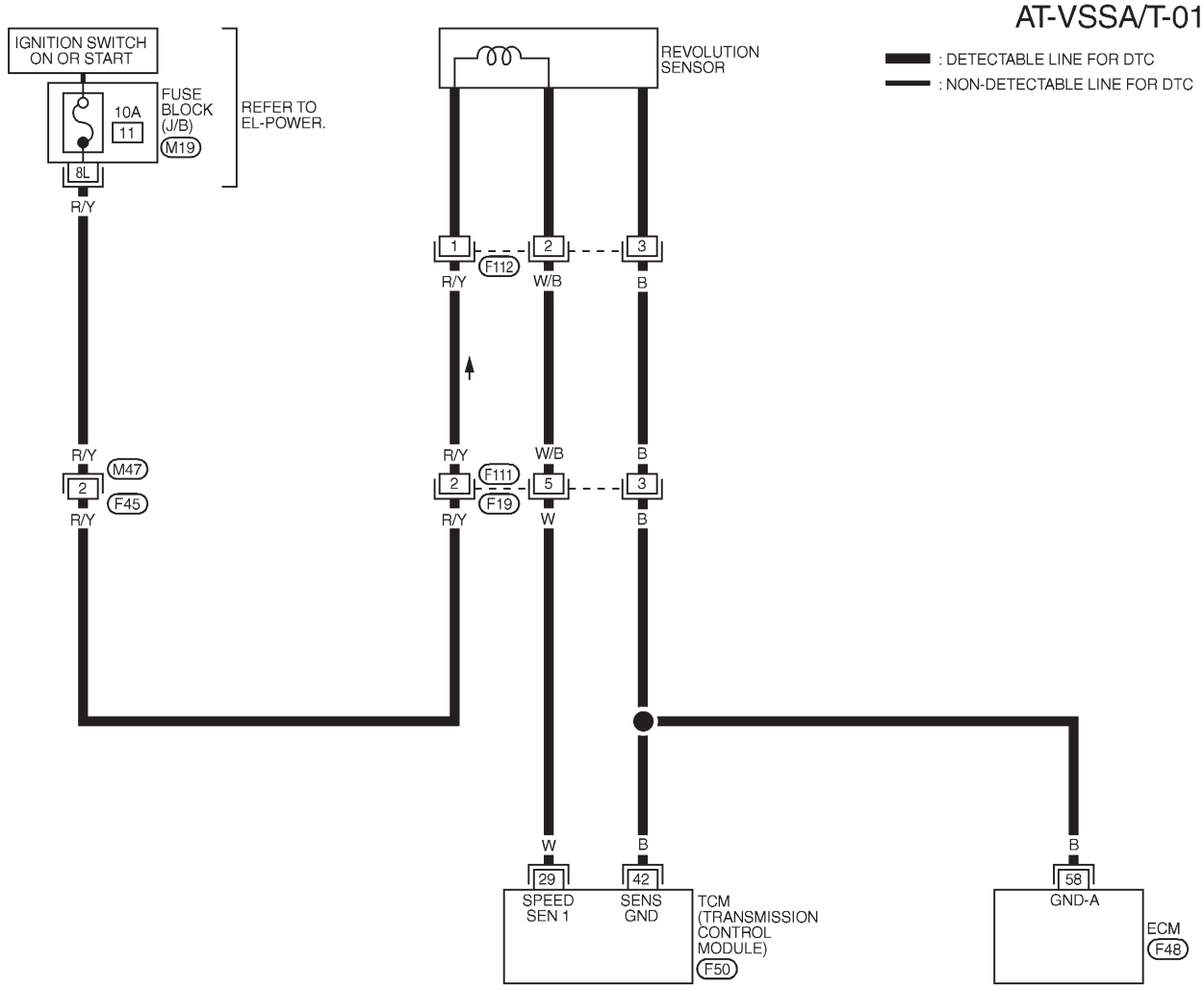
WITH GST

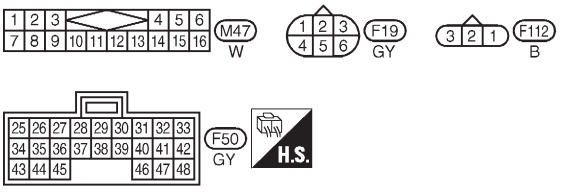
NFAT0209S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — VSSA/T

NFAT0041





REFER TO THE FOLLOWING.
M19 - FUSE BLOCK - JUNCTION BOX (J/B)
F48 - ELECTRICAL UNITS

MAT858A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
29	W	REVOLUTION SENSOR	WHEN MOVING AT 20 KM/H (12 MPH), USE THE CONSULT-II PULSE FREQUENCY MEASURING FUNCTION. *1 CAUTION: CONNECT THE DIAGNOSIS DATA LINK CABLE TO THE VEHICLE DIAGNOSIS CONNECTOR. *1: A CIRCUIT TESTER CANNOT BE USED TO TEST THIS ITEM.	450 HZ
			WHEN VEHICLE PARKS.	UNDER 1.3V OR OVER 4.5V
42	B	THROTTLE POSITION SENSOR (GROUND)	—	—

SAT341K

Diagnostic Procedure

NFAT0042

1	CHECK INPUT SIGNAL (With CONSULT-II)

With CONSULT-II

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

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

SAT614J

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK REVOLUTION SENSOR (With CONSULT-II)

With CONSULT-II

1. Start engine.

Condition	Judgement standard (Approx.)
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. *1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	450 Hz
When vehicle parks.	Under 1.3V or over 4.5V

MTBL0628

- Harness for short or open between TCM, ECM and revolution sensor (Main harness)

OK or NG

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

3	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-135.

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

NFAT0043

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

TCM TERMINALS AND REFERENCE VALUE

NFAT0043S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
39	W/G	Engine speed signal		When engine runs at idle speed.	0.6V
				When engine runs at 3,000 rpm.	2.2V

On Board Diagnosis Logic

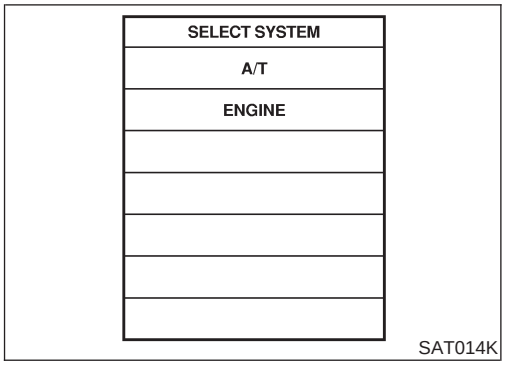
NFAT0210

Diagnostic trouble code ENGINE SPEED SIG with CONSULT-II or P0725 without CONSULT-II is detected when TCM does not receive the proper voltage signal from ECM.

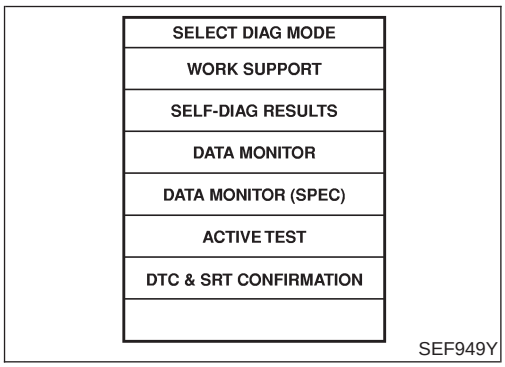
Possible Cause

NFAT0211

Check harness or connectors. (The sensor circuit is open or shorted.)



SAT014K



SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0212

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

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

WITH CONSULT-II

NFAT0212S01

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

WITH GST

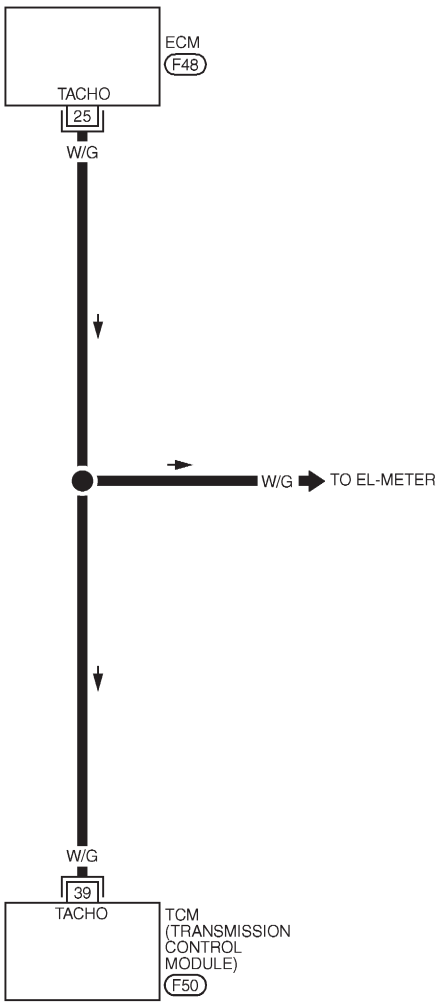
NFAT0212S02

Follow the procedure “With CONSULT-II”.

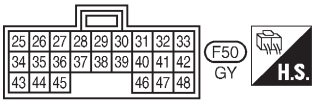
Wiring Diagram — AT — ENGSS

NFAT0044

AT-ENGSS-01



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



REFER TO THE FOLLOWING.
F48 - ELECTRICAL UNITS

MAT807A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
39	W/G	ENGINE SPEED SIGNAL.	WHEN ENGINE RUNS AT IDLE SPEED	0.6 V
			WHEN ENGINE RUNS AT 3,000 RPM	2.2 V

SAT342K

Diagnostic Procedure

NFAT0045

1	CHECK DTC WITH ECM

- Check P code with CONSULT-II “ENGINE”.
  Turn ignition switch ON and select “SELF-DIAGNOSTIC RESULTS” mode for “ENGINE” with CONSULT-II.
  Refer to EC-60, “DESCRIPTION”.

OK or NG

OK (with CONSULT-II)	▶	GO TO 2.
OK (without CONSULT-II)	▶	GO TO 4.
NG	▶	Check ignition signal circuit for engine control. Refer to EC-369, “Component Description”.

2	CHECK INPUT SIGNAL (With CONSULT-II)

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “ENGINE SPEED”.
   Check engine speed changes according to throttle position.

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 6.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
  Refer to EC-369, “Component Description”.

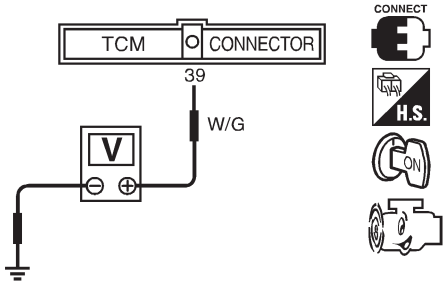
OK or NG

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

4	CHECK INPUT SIGNAL (Without CONSULT-II)

Without CONSULT-II

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



SAT520JA

Voltage:
0.6 (Idle speed) - 2.2V (3,000 rpm)

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
  Refer to EC-369, "Component Description".

OK or NG

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

6	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-140.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 7.

7	CHECK TCM INSPECTION

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

OK or NG

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

Description

NFAT0046

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the S (SPORT) 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)

TCM TERMINALS AND REFERENCE VALUE

NFAT0046S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	R/Y	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.)	0V
12	LG/B	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.)	0V

On Board Diagnosis Logic

NFAT0213

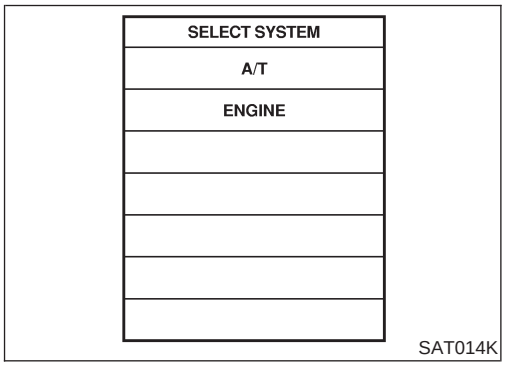
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is higher than the position (1st) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when either shift solenoid valve A is stuck open or shift solenoid valve B is stuck open.
Gear positions supposed by TCM are as follows.
In case of gear position with no malfunctions: **1**, 2, 3 and 4 positions
In case of gear position with shift solenoid valve A stuck open: **2***, 2, 3 and 3 positions
In case of gear position with shift solenoid valve B stuck open: **4***, 3, 3 and 4 positions to each gear position above
*: P0731 is detected.
Diagnostic trouble code A/T 1ST GR FNCTN with CONSULT-II or P0731 without CONSULT-II is detected when A/T cannot be shifted to the 1st gear position even if electrical circuit is good.

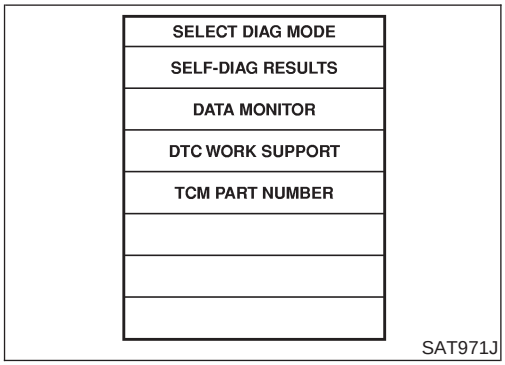
Possible Cause

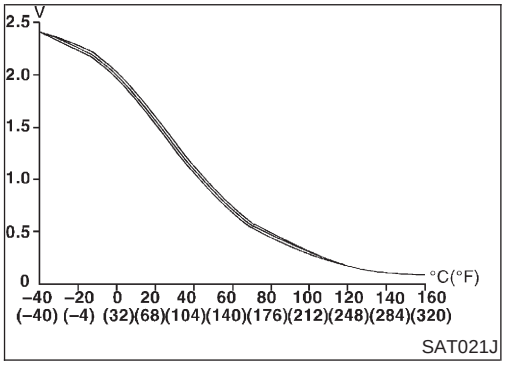
NFAT0214

Check the following items.

- Shift solenoid valve A
- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit







Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0215

CAUTION:

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

NOTE:

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

TESTING CONDITION:

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

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

WITH CONSULT-II

NFAT0215S01

1) Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2) Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3) Select “1ST GR FNCTN P0731” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.
4) Accelerate vehicle to 20 to 25 km/h (12 to 16 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   Selector lever: D position (O/D ON)
   - **Check that “GEAR” shows “2” after releasing pedal.**
5) Depress accelerator pedal to WOT (more than 7.0/8 of “THROTTLE POSI”) quickly from a speed of 20 to 25 km/h (12 to 16 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to “DIAGNOSTIC PROCEDURE”, AT-148.
   If “STOP VEHICLE” appears on CONSULT-II screen, go to the following step.
   - **Check that “GEAR” shows “1” when depressing accelerator pedal to WOT.**
   - **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “ENGINE”. In case**

a 1st trip DTC other than P0731 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".

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

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

8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
Refer to "DIAGNOSTIC PROCEDURE", AT-148.
Refer to shift schedule, AT-450.

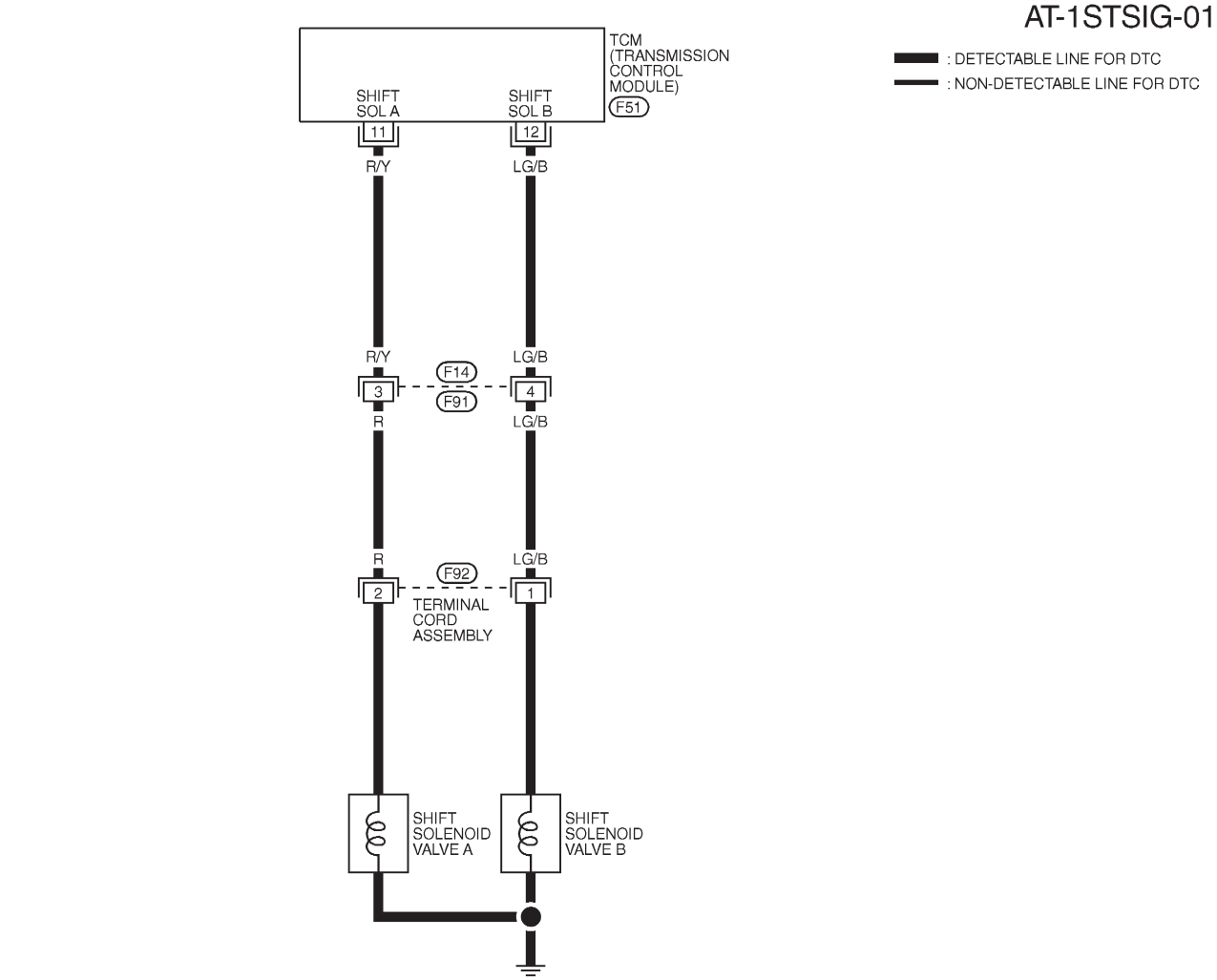
WITH GST

NFAT0215S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 1ST

NFAT0047



MAT808A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

SAT343K

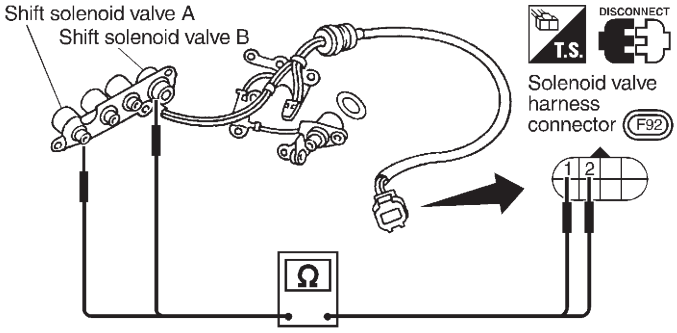
Diagnostic Procedure

NFAT0048

1	CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-346.
- Shift solenoid valve A
- Shift solenoid valve B

2. Check resistance between two terminals.



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

SAT043KA

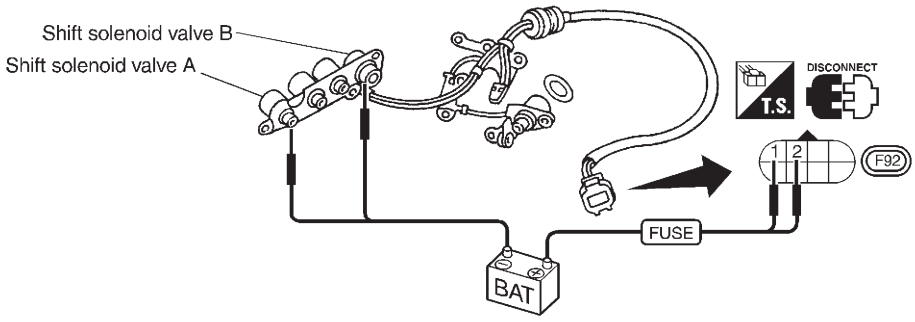
OK or NG

OK	▶	GO TO 2.
NG	▶	Repair or replace damaged parts.

2	CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
- Shift solenoid valve A
- Shift solenoid valve B

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



SAT044K

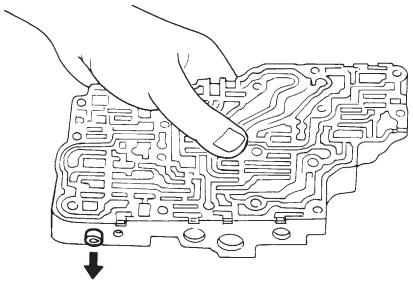
OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace shift solenoid valve assembly.

3	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to "Control Valve Assembly", AT-378.
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 assembly.

4	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-145.

OK or NG

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

Description

NFAT0049

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the S (SPORT) 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)

TCM TERMINALS AND REFERENCE VALUE

NFAT0049S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
12	LG/B	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.)	0V

On Board Diagnosis Logic

NFAT0216

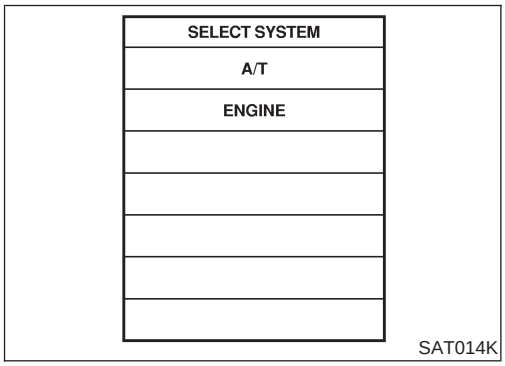
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is higher than the position (2nd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve B is stuck open.
Gear positions supposed by TCM are as follows.
In case of gear position with no malfunctions: 1, **2**, 3 and 4 positions
In case of gear position with shift solenoid valve B stuck open: 4, **3***, 3 and 4 positions to each gear position above
*: P0732 is detected.
Diagnostic trouble code A/T 2ND GR FNCTN with CONSULT-II or P0732 without CONSULT-II is detected when A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.

Possible Cause

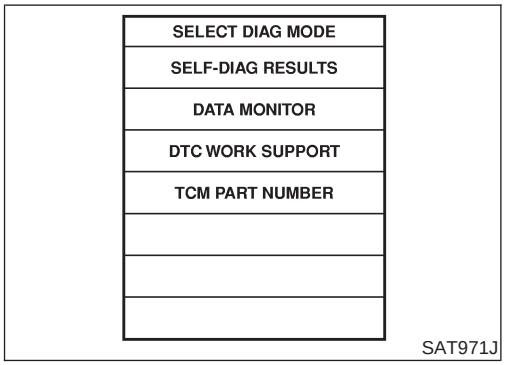
NFAT0217

Check the following items.

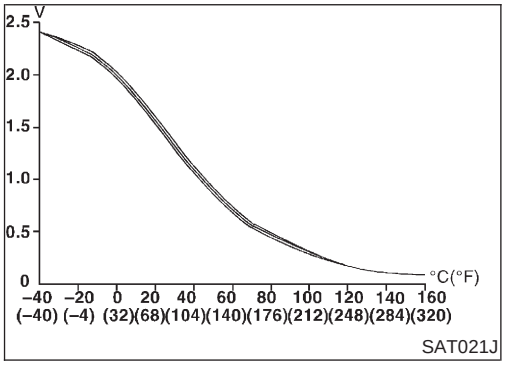
- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit



SAT014K



SAT971J



SAT021J

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0218

CAUTION:

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

NOTE:

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

TESTING CONDITION:

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

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

WITH CONSULT-II

NFAT0218S01

1) Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2) Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3) Select "2ND GR FNCTN P0732" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
4) Accelerate vehicle to 63 to 68 km/h (39 to 42 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8
   Selector lever: D position (O/D ON)
   - **Check that "GEAR" shows "3" or "4" after releasing pedal.**
5) Depress accelerator pedal to WOT (more than 7.0/8 of "THROTTLE POSI") quickly from a speed of 63 to 68 km/h (39 to 42 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETE". (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to "DIAGNOSTIC PROCEDURE", AT-154.
   If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.
   - **Check that "GEAR" shows "2" when depressing accelerator pedal to WOT.**
   - **If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS" for "ENGINE". In case a 1st trip DTC other than P0732 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".**

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

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

8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
Refer to "DIAGNOSTIC PROCEDURE", AT-154.
Refer to shift schedule, AT-450.

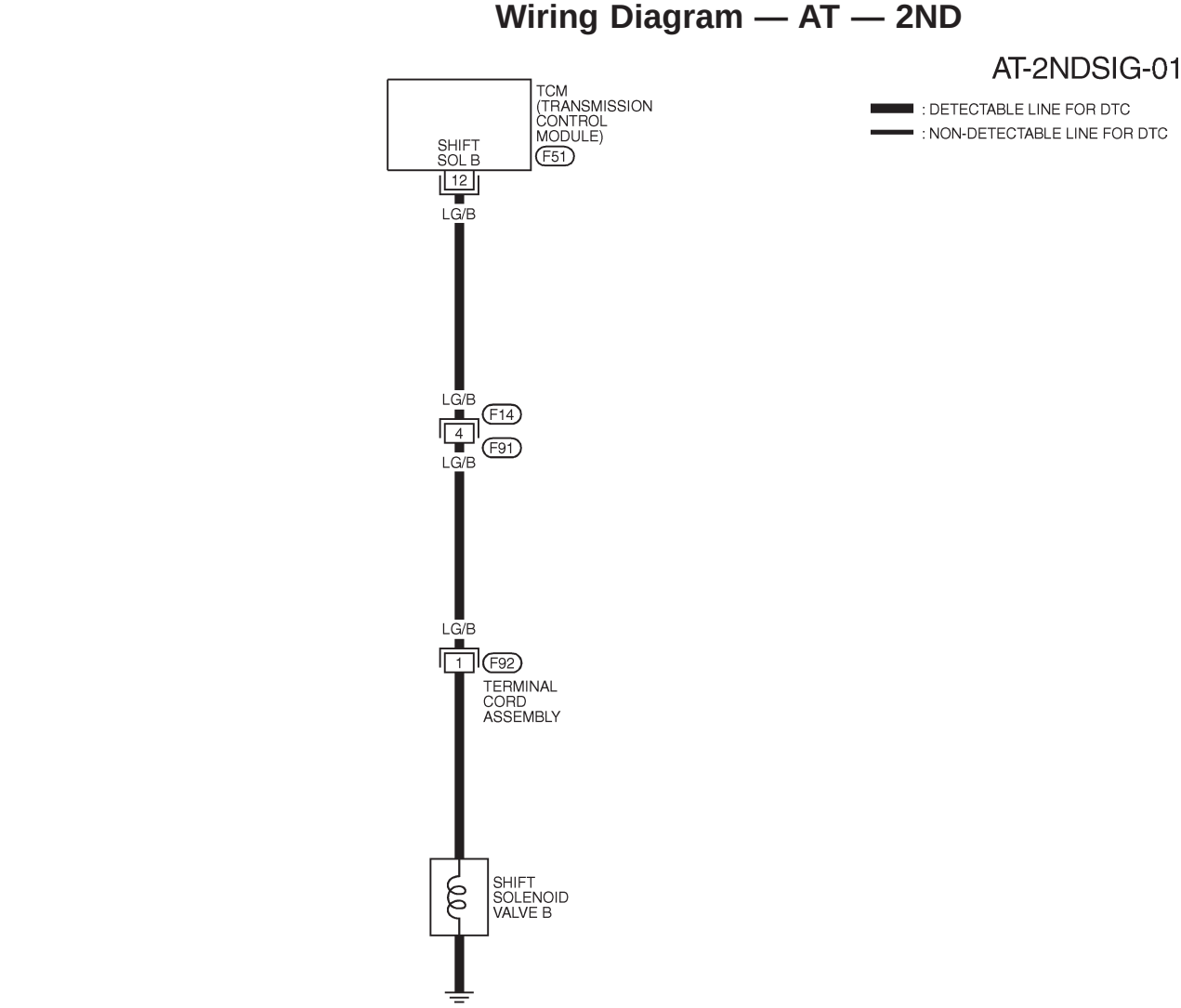
WITH GST

NFAT0218S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 2ND

NFAT0050



MAT809A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

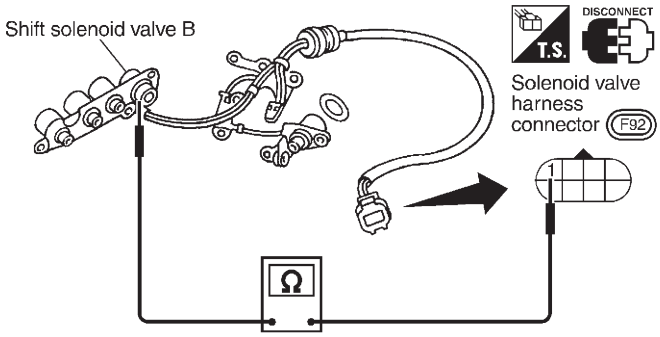
SAT344K

Diagnostic Procedure

NFAT0051

1	CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-346.
- Shift solenoid valve B
2. Check resistance to the terminal and ground.



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

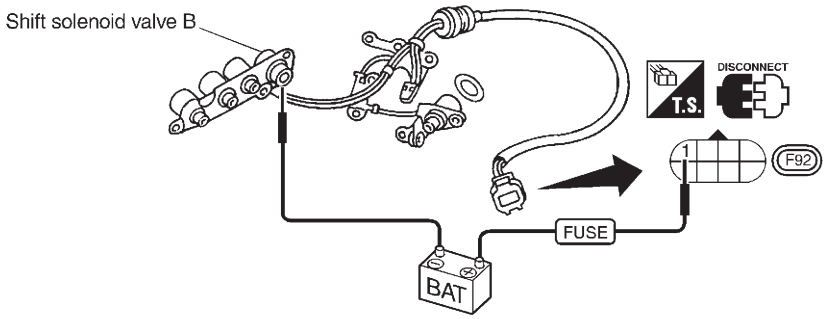
SAT045KA

OK or NG

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

2	CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
- Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



SAT036K

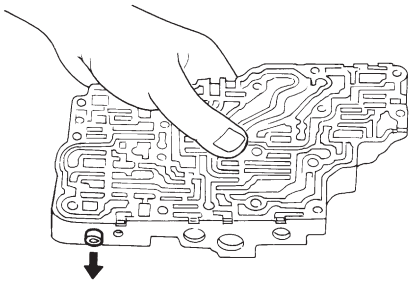
OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace shift solenoid valve assembly.

3	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to "Control Valve Assembly", AT-378.
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 assembly.

4	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-151.

OK or NG

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

Description

NFAT0052

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the S (SPORT) 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)

TCM TERMINALS AND REFERENCE VALUE

NFAT0052S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	R/Y	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.)	0V

On Board Diagnosis Logic

NFAT0219

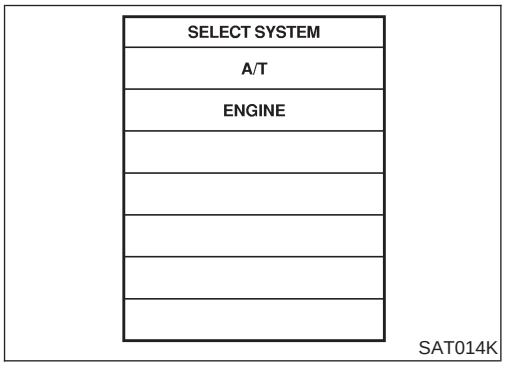
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is higher than the position (3rd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve A is stuck closed.
Gear positions supposed by TCM are as follows.
In case of gear position with no malfunctions: 1, 2, **3** and 4 positions
In case of gear position with shift solenoid valve A stuck closed: 1, 1, **4*** and 4 positions to each gear position above
*: P0733 is detected.
Diagnostic trouble code A/T 3RD GR FNCTN with CONSULT-II or P0733 without CONSULT-II is detected when A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.

Possible Cause

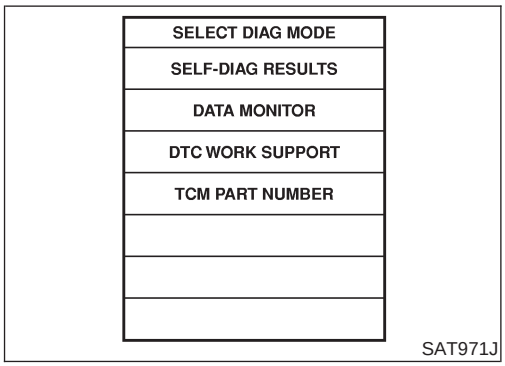
NFAT0220

Check the following items.

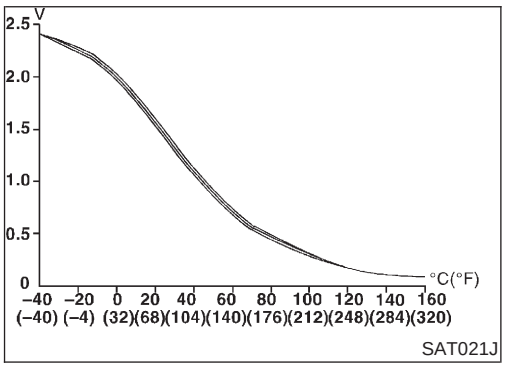
- Shift solenoid valve A
- Each clutch
- Hydraulic control circuit



SAT014K



SAT971J



SAT021J

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0221

CAUTION:

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

NOTE:

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

TESTING CONDITION:

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

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

WITH CONSULT-II

NFAT0221S01

1) Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2) Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3) Select “3RD GR FNCTN P0733” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.
4) Accelerate vehicle to 80 to 95 km/h (50 to 59 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   Selector lever: D position (OD “ON”)
   - **Check that “GEAR” shows “4” after releasing pedal.**
5) Depress accelerator pedal steadily with 3.5/8 - 4.5/8 of “THROTTLE POSI” from a speed of 80 to 95 km/h (50 to 59 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to “DIAGNOSTIC PROCEDURE”, AT-160.
   If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.
   - **Check that “GEAR” shows “3” when depressing accelerator pedal with 3.5/8 - 4.5/8 of “THROTTLE POSI”.**
   - **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “ENGINE”. In case**

a 1st trip DTC other than P0733 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".

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

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

8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
Refer to "DIAGNOSTIC PROCEDURE", AT-160.
Refer to shift schedule, AT-450.

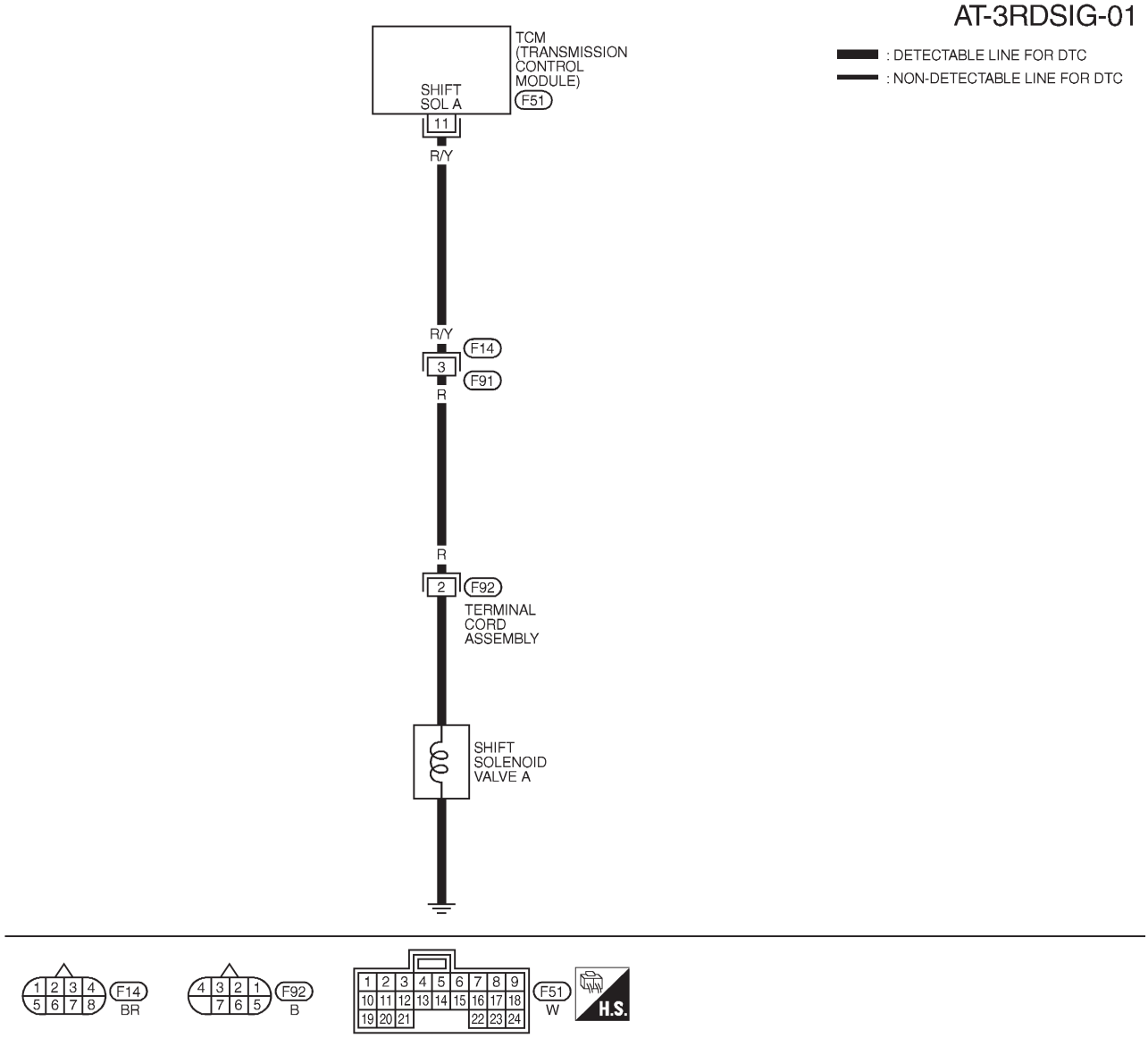
WITH GST

NFAT0221S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 3RD

NFAT0053



MAT810A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V

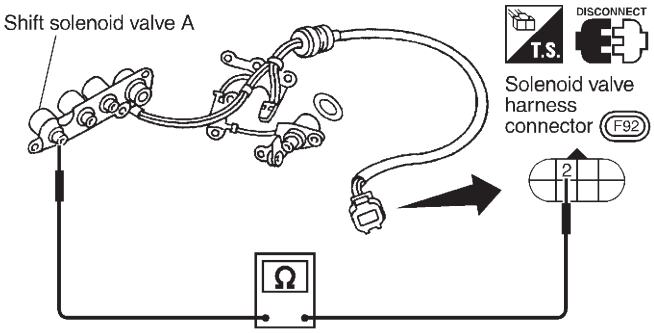
SAT345K

Diagnostic Procedure

NFAT0054

1 CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-346.
- Shift solenoid valve A
2. Check resistance to the terminal and ground.



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

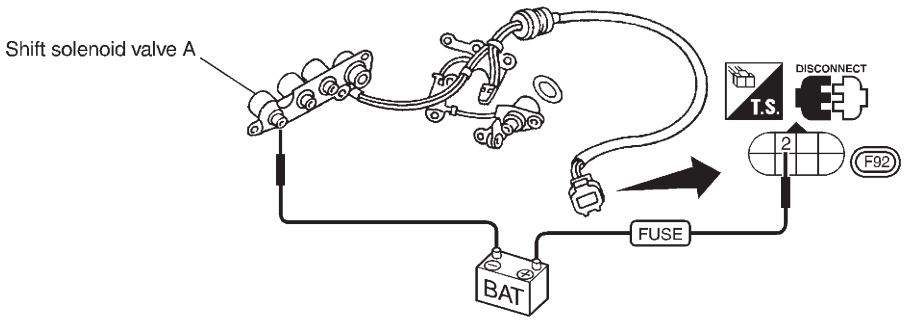
SAT046KA

OK or NG

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

2 CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
- Shift solenoid valve A
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



SAT035K

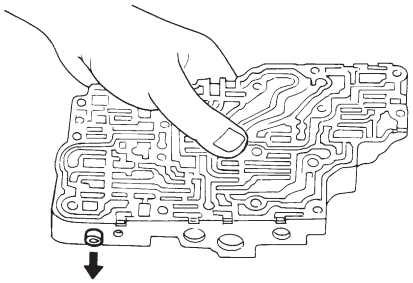
OK or NG

OK	▶	GO TO 3.
NG	▶	Repair or replace shift solenoid valve assembly.

3	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to "Control Valve Assembly", AT-378.
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 assembly.

4	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-157.

OK or NG

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

Description

NFAT0055

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the S (SPORT) 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

NFAT0055S01

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%

TCM TERMINALS AND REFERENCE VALUE

NFAT0055S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	G/R	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	W/B	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V
11	R/Y	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.)	0V
12	LG/B	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.)	0V

On Board Diagnosis Logic

NFAT0222

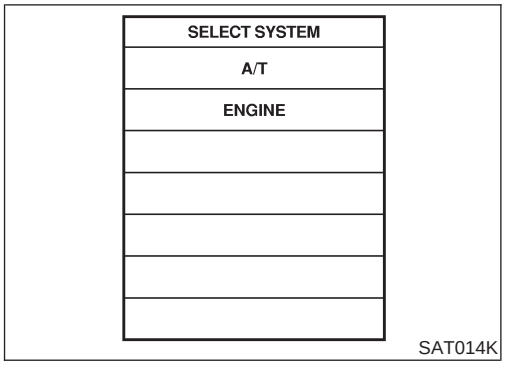
This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when shift solenoid valve B is stuck closed.
Gear positions supposed by TCM are as follows.
In case of gear position with no malfunctions: 1, 2, 3 and **4** positions
In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and **1*** positions to each gear position above
*: P0734 is detected.
Diagnostic trouble code A/T 4TH GR FNCTN with CONSULT-II or P0734 without CONSULT-II is detected when A/T cannot be shifted to the 4th gear position even if electrical circuit is good.

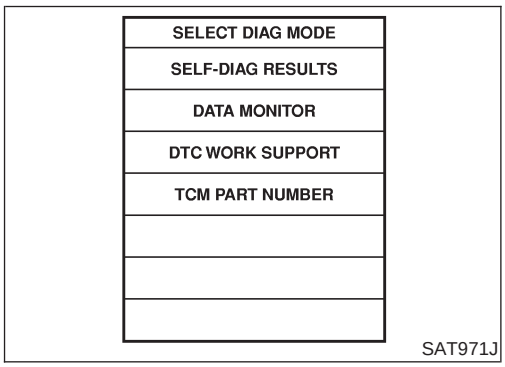
Possible Cause

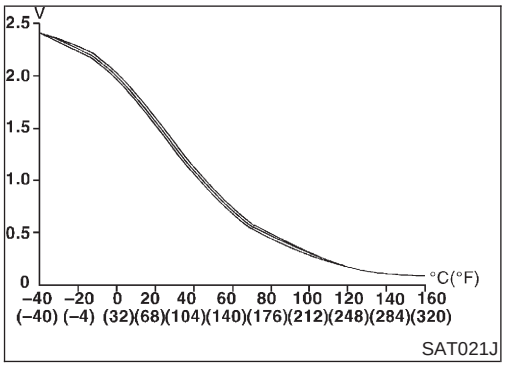
NFAT0223

Check the following items.

- Shift solenoid valve A
- Shift solenoid valve B
- Line pressure solenoid valve
- Each clutch
- Hydraulic control circuit







Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0224

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If conducting this "DTC CONFIRMATION PROCEDURE" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**
- **Be careful not to rev engine into the red zone on the tachometer.**

NOTE:

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

TESTING CONDITION:

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

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

WITH CONSULT-II

NFAT0224S01

1) Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2) Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3) Select "4TH GR FNCTN P0734" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
4) Accelerate vehicle to 60 to 70 km/h (37 to 43 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 5.5/8 (at all times during step 4)
   Selector lever: D position (O/D ON)
   - **Check that "GEAR" shows "3" after releasing pedal.**
5) Depress accelerator pedal steadily with 1.0/8 - 2.0/8 of "THROTTLE POSI" from a speed of 60 to 70 km/h (37 to 43 MPH) until "TESTING" has turned to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to "DIAGNOSTIC PROCEDURE", AT-167.
   If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.
   - **Check that "GEAR" shows "4" when depressing accelerator pedal with 1.0/8 - 2.0/8 of "THROTTLE POSI".**
   - **If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS" for "ENGINE". In case a 1st trip DTC other than P0734 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".**
6) Stop vehicle.
7) Follow the instruction displayed. (Check for normal shifting referring to the table below.)

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

8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
Refer to "DIAGNOSTIC PROCEDURE", AT-167.
Refer to shift schedule, AT-450.

WITH GST

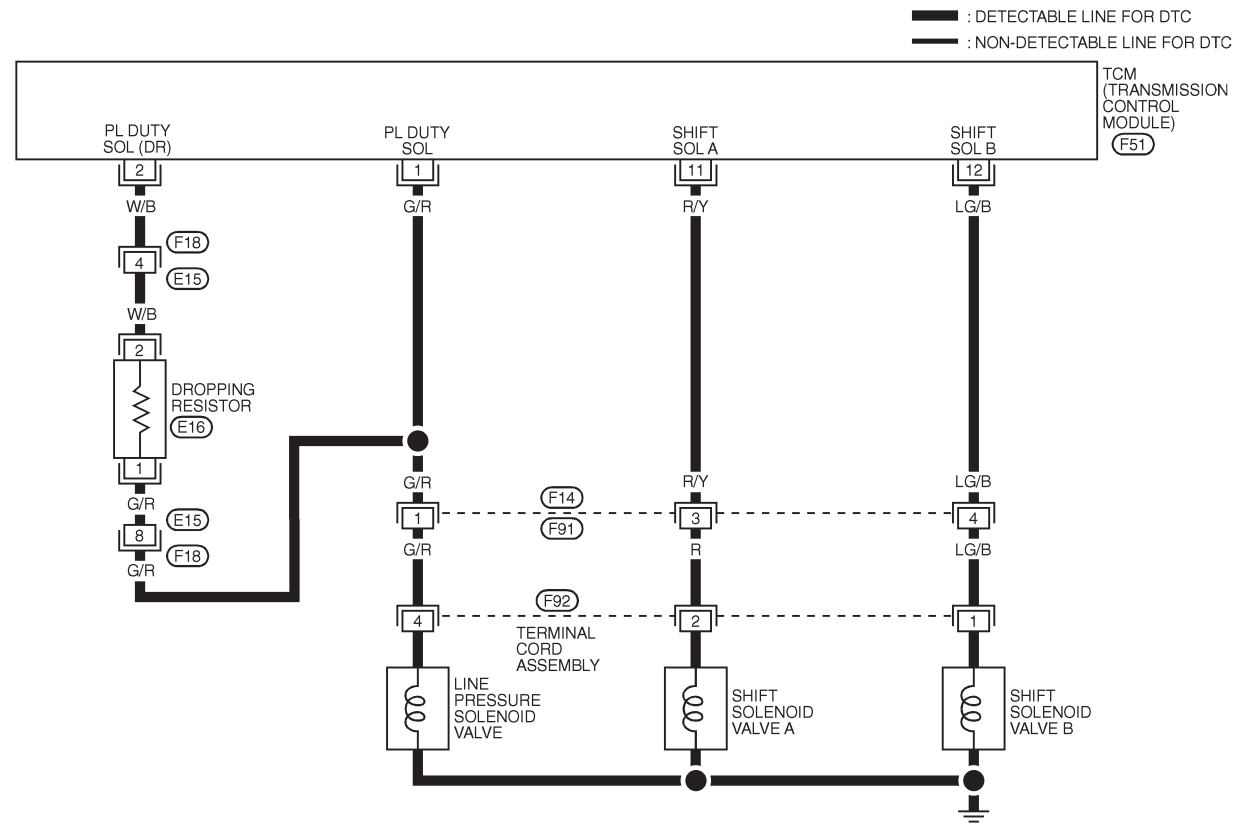
NFAT0224S02

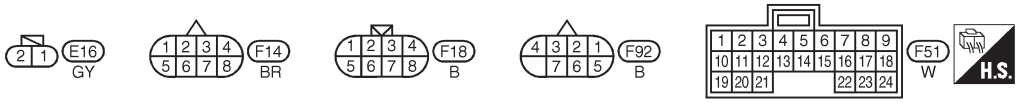
Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — 4TH

NFAT0056

AT-4THSIG-01





MAT811A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
1	G/R	LINE PRESSURE SOLENOID VALVE	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	1.5 - 3.0V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
2	W/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	4 - 14V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOLTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

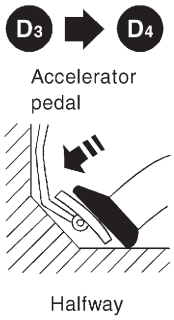
SAT346K

Diagnostic Procedure

NFAT0057

1	CHECK SHIFT UP (D_3 TO D_4)

During “Cruise test − Part 1” (AT-92), does A/T shift from D_3 to D_4 at the specified speed?



SAT988H

Yes or No

Yes	▶	GO TO 11.
No	▶	GO TO 2.

2	CHECK LINE PRESSURE

Perform line pressure test.
Refer to AT-82.

Engine speed rpm	Line pressure kPa (bar, kg/cm², psi)	
	D, 2 and 1 positions	R position
Idle	500 (5.00, 5.1, 73)	775 (7.75, 7.9, 112)
Stall	1,226 (12.26, 12.5, 178)	1,912 (19.12, 19.5, 277)

MTBL0469

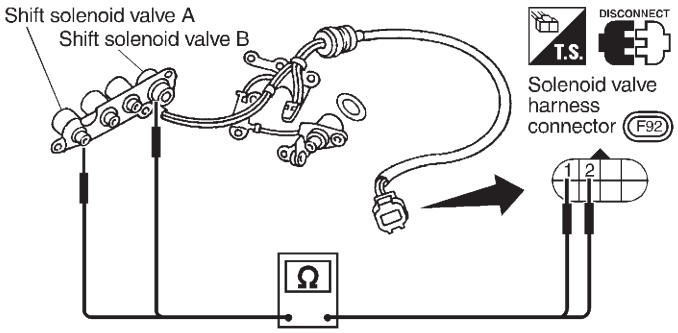
OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 7.

3	CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-346.
- Shift solenoid valve A
- Shift solenoid valve B

2. Check resistance between two terminals.



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

SAT043KA

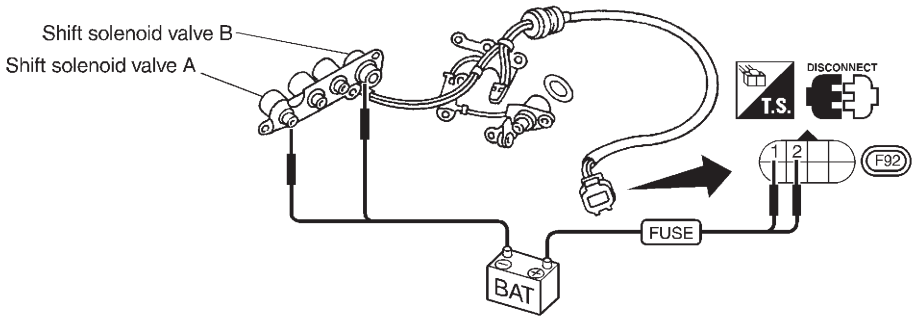
OK or NG

OK	▶	GO TO 5.
NG	▶	Replace solenoid valve assembly.

4	CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
- Shift solenoid valve A
- Shift solenoid valve B

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



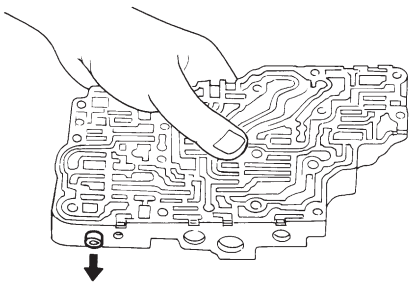
SAT044K

OK or NG

OK	▶	GO TO 5.
NG	▶	Replace solenoid valve assembly.

5	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-378.
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 6.
NG	▶	Repair control valve.

6	CHECK SHIFT UP (D_3 TO D_4)

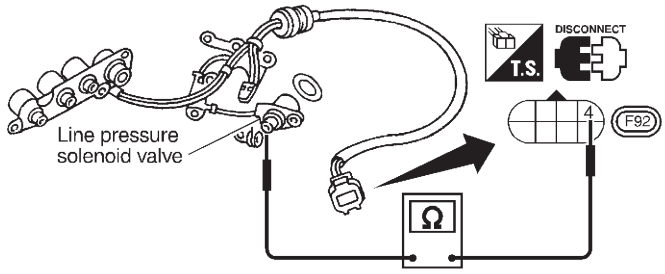
Does A/T shift from D_3 to D_4 at the specified speed?

OK or NG

OK	▶	GO TO 11.
NG	▶	Check control valve again. Repair or replace control valve assembly.

7	CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-346.
- Line pressure solenoid valves
2. Check resistance to the terminal and ground.



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

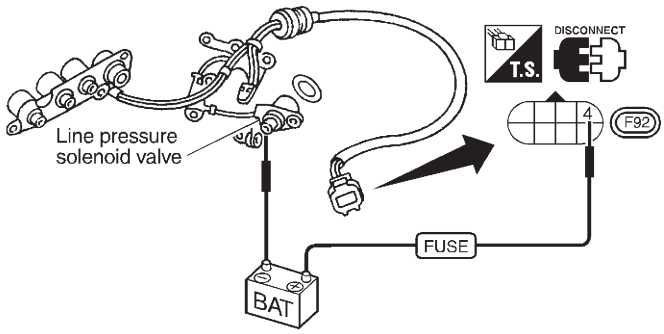
SAT625J

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace solenoid valve assembly.

8	CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
- Line pressure solenoid valves
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



SAT626J

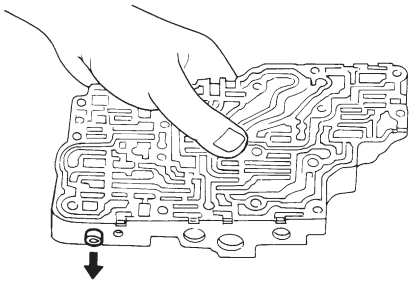
OK or NG

OK	▶	GO TO 9.
NG	▶	Replace solenoid valve assembly.

9	CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-378.
2. Check line pressure circuit valves for sticking.

- Pressure regulator valve
- Pilot valve
- Pressure modifier valve



SAT367H

OK or NG

OK	▶	GO TO 10.
NG	▶	Repair control valve.

10	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

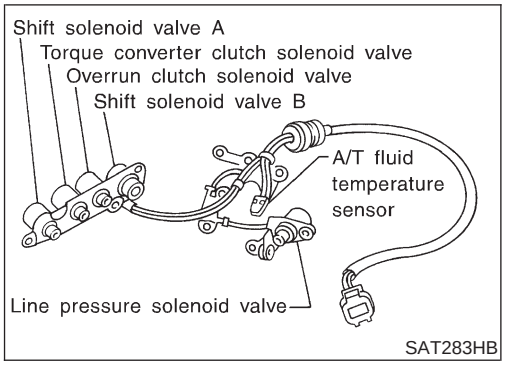
OK	▶	GO TO 11.
NG	▶	Check control valve again. Repair or replace control valve assembly.

11	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-164.

OK or NG

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



Description

NFAT0058

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

NFAT0058S01

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%

TCM TERMINALS AND REFERENCE VALUE

NFAT0058S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
3	G/B	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V

On Board Diagnosis Logic

NFAT0225

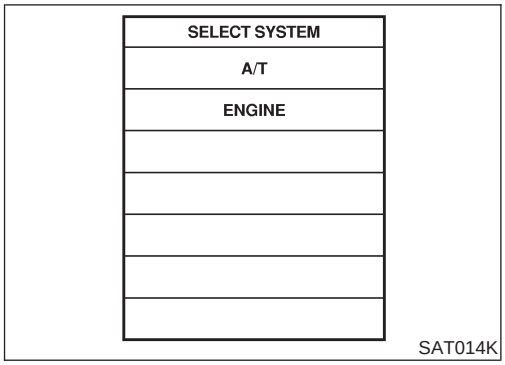
Diagnostic trouble code TCC SOLENOID/CIRC with CONSULT-II or P0740 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

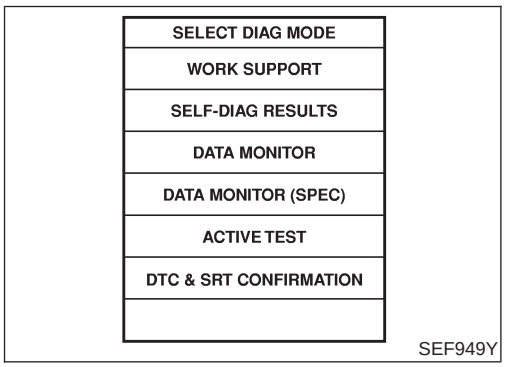
NFAT0226

Check the following items.

- Torque converter clutch solenoid valve
- Harness or connectors
  (The solenoid circuit is open or shorted.)



SAT014K



SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0227

NOTE:

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

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

WITH CONSULT-II

NFAT0227S01

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

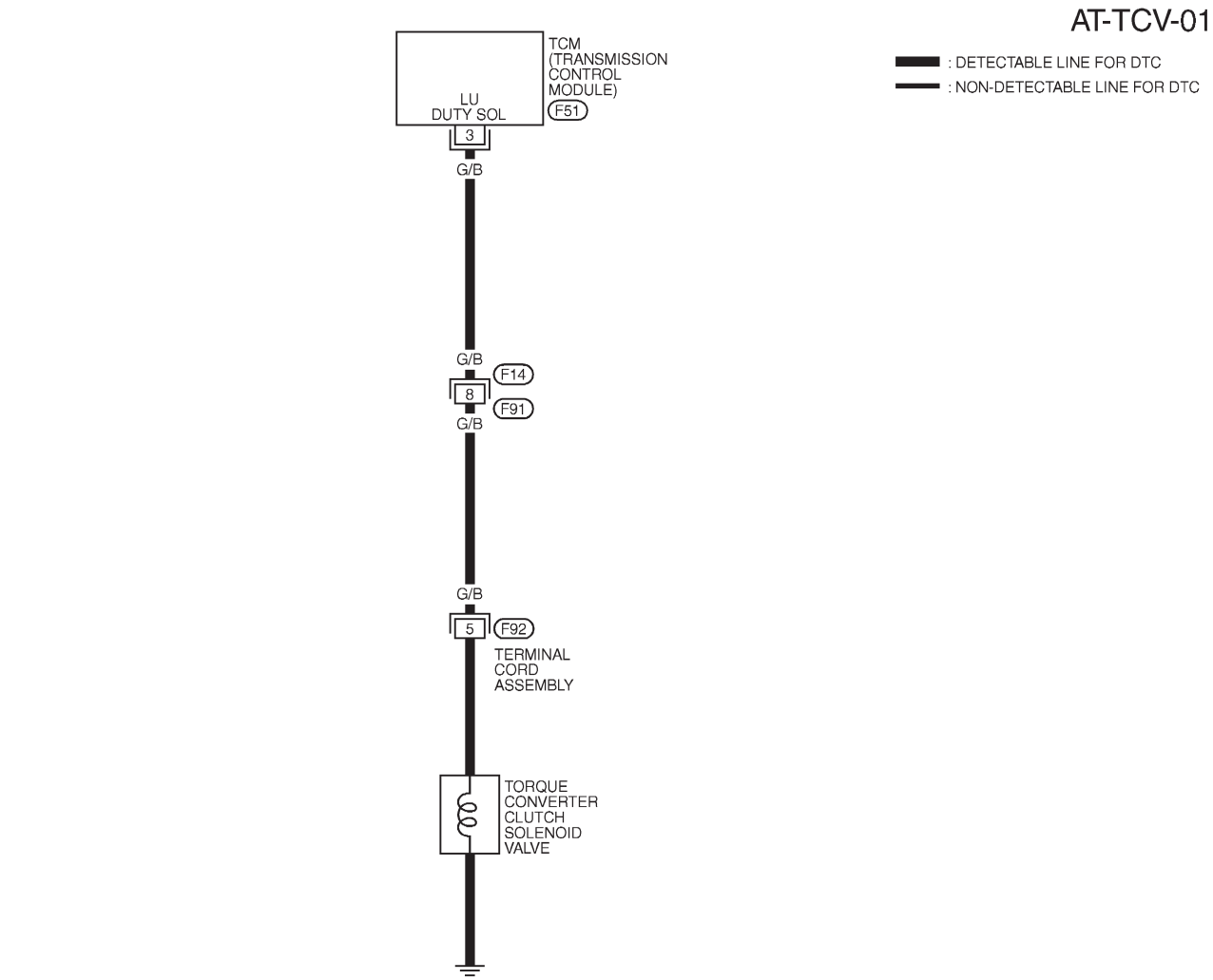
WITH GST

NFAT0227S02

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — TCV

NFAT0059



MAT812A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
3	G/B	TORQUE CONVERTER CLUTCH SOLENOID VALVE	VEHICLE STARTS AND A/T PERFORMS LOCK-UP	8 - 15V
			VEHICLE STARTS AND A/T DOES NOT PERFORM LOCK-UP	0V

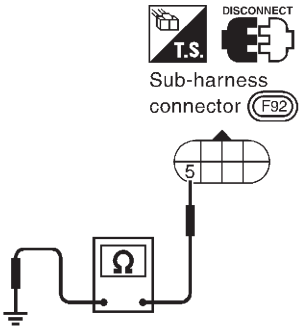
SAT347K

Diagnostic Procedure

NFAT0060

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 (Approx.)

SAT627JB

OK or NG

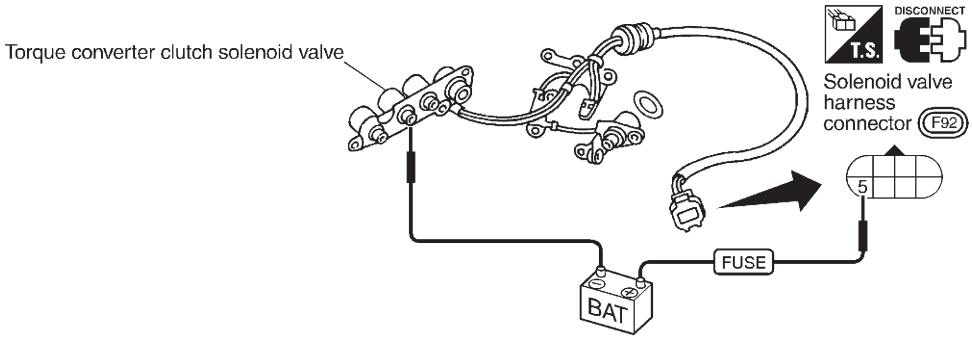
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK VALVE OPERATION

1. Remove oil pan. Refer to AT-346.
2. Check the following items:

- Torque converter clutch solenoid valve

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



SAT037K

- Harness of terminal cord assembly for short or open

OK or NG

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

3	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between sub-harness connector terminal 5 and TCM harness connector terminal 3. Refer to wiring diagram — AT — TCV.

   Continuity should exist.

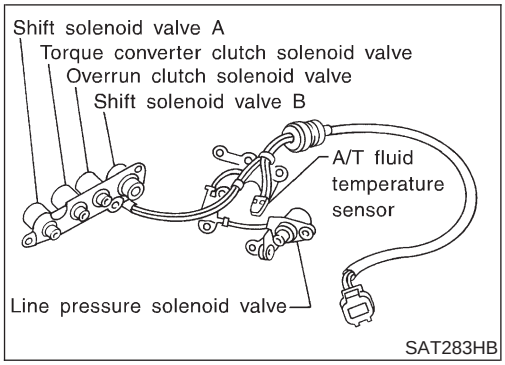
   If OK, check harness for short to ground and short to power.
4. Reinstall any part removed.

OK or NG

OK	▶	GO TO 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-172. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

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



Description

NFAT0064

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

NFAT0064S01

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.

TCM TERMINALS AND REFERENCE VALUE

NFAT0064S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	G/R	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	W/B	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V

On Board Diagnosis Logic

NFAT0231

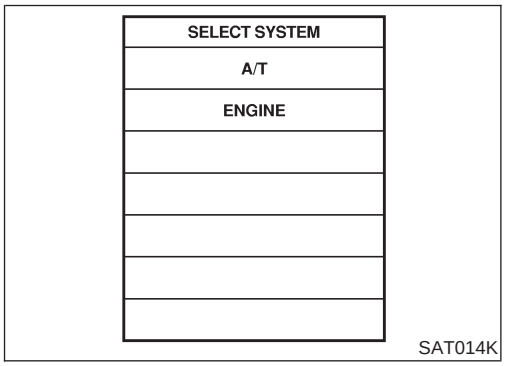
Diagnostic trouble code L/PRESS SOL/CIRC with CONSULT-II or P0745 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

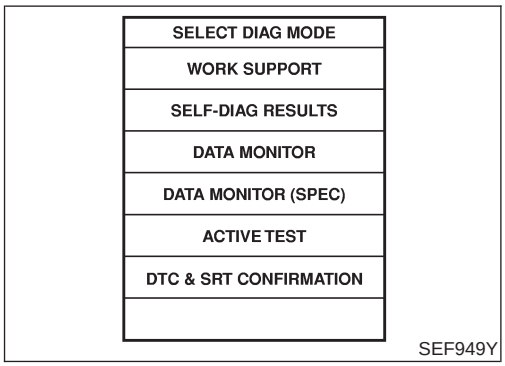
NFAT0232

Check the following items.

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



SAT014K



SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0233

NOTE:

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

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

WITH CONSULT-II

NFAT0233S01

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.

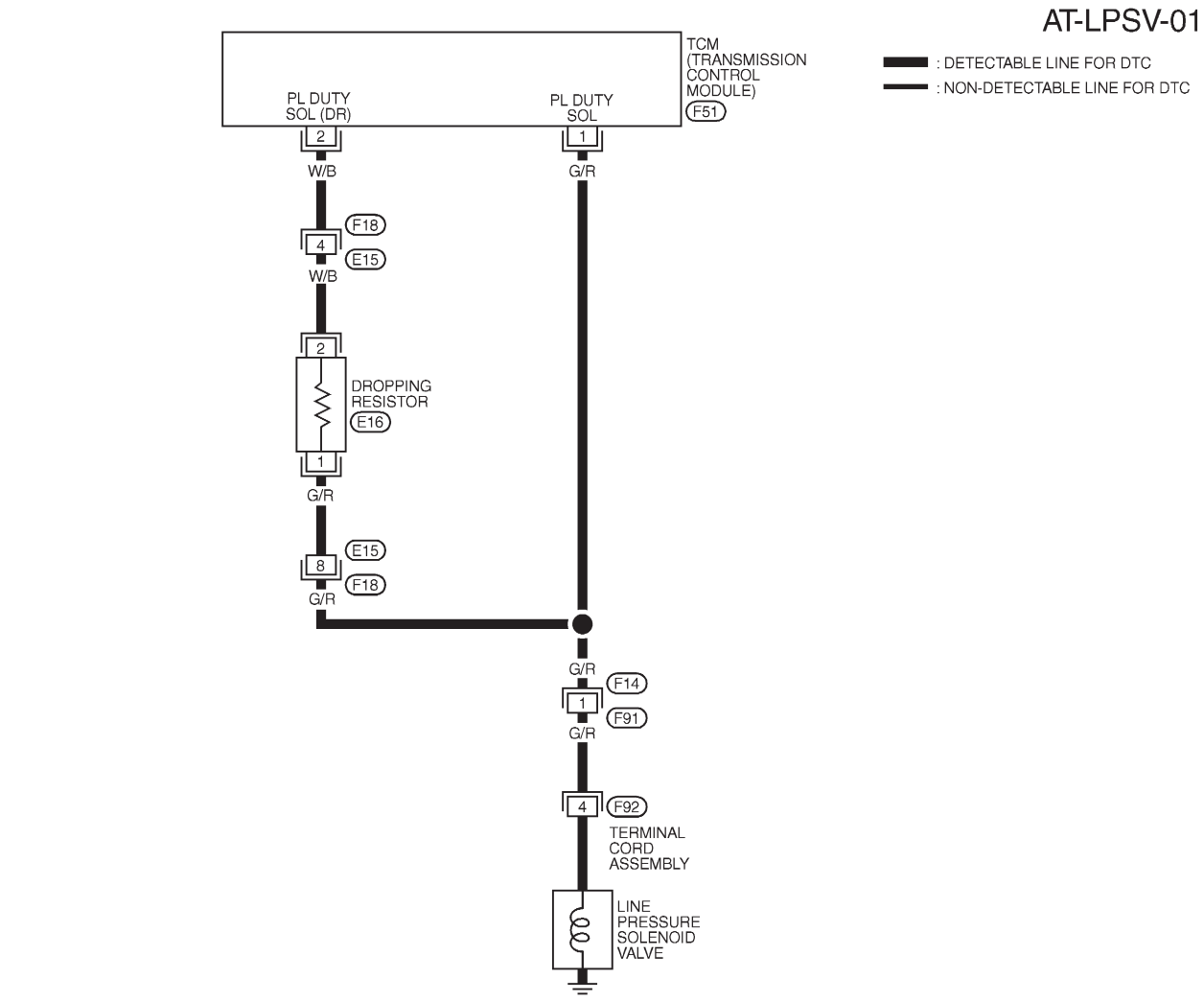
WITH GST

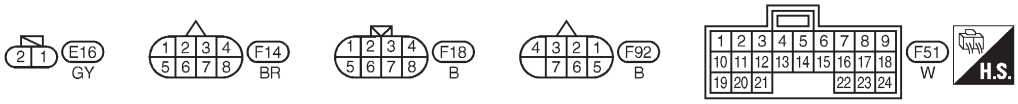
NFAT0233S02

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — LPSV

NFAT0065





MAT814A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
1	G/R	LINE PRESSURE SOLENOID VALVE	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	1.5 - 3.0V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
2	W/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	4 - 14V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V

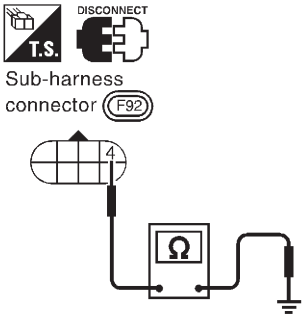
SAT348K

Diagnostic Procedure

NFAT0066

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 - 5 Ω

SAT630J

OK or NG

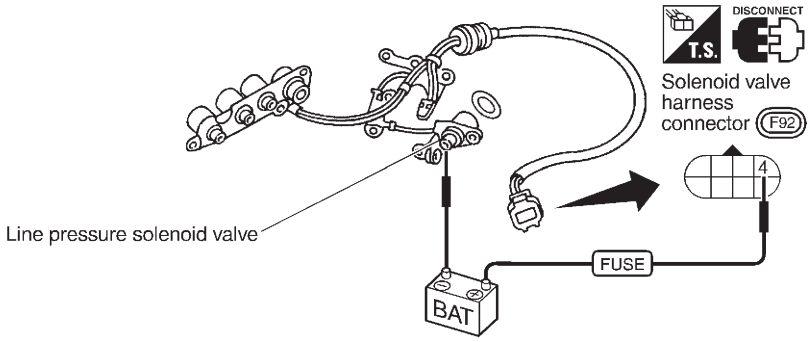
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:

- Line pressure solenoid valve

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



SAT038K

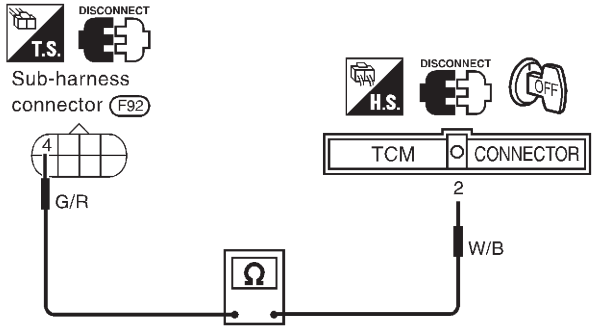
- Harness of terminal cord assembly for short or open

OK or NG

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

3	CHECK POWER SOURCE AND DROPPING RESISTOR CIRCUIT

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



Resistance: 10 - 15 Ω

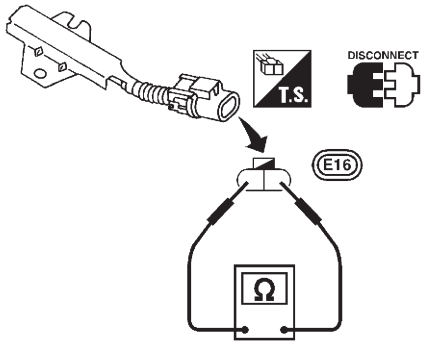
SAT631JB

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING ITEM

Check the following items:
- Dropping resistor
- Check resistance between two terminals.



SAT933IB

Resistance:
10 - 15Ω

- Harness for short or open between TCM terminal 2 and terminal cord assembly (Main harness)

OK or NG

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

5	CHECK POWER SOURCE CIRCUIT

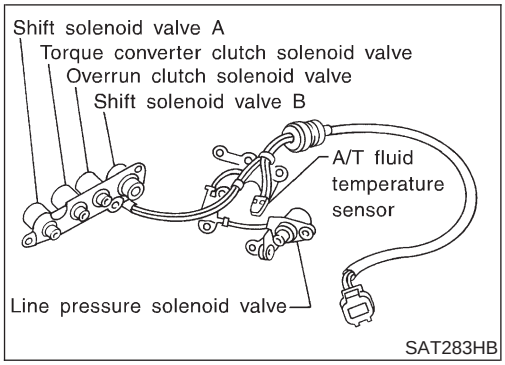
1. Turn ignition switch to OFF position.
2. Check continuity between sub-harness connector terminal 4 and TCM harness connector terminal 1. Refer to wiring diagram — AT — LPSV.
   Continuity should exist.
   If OK, check harness for short to ground and short to power.
3. Reinstall any part removed.

OK or NG

OK	▶	GO TO 6.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-177.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 7.

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



Description

NFAT0067

Shift solenoid valves A and B are turned ON or OFF by the TCM in response to signals sent from the park/neutral position (PNP) switch, vehicle speed and 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)

TCM TERMINALS AND REFERENCE VALUE

NFAT0067S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	R/Y	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.)	0V

On Board Diagnosis Logic

NFAT0234

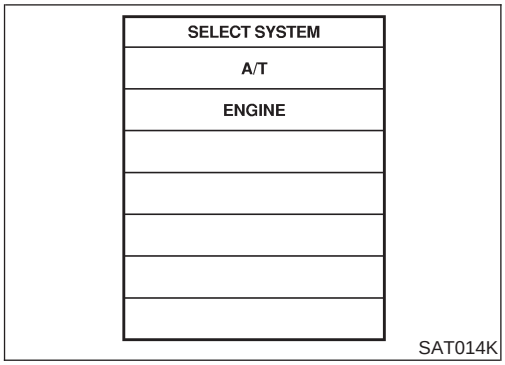
Diagnostic trouble code SFT SOL A/CIRC with CONSULT-II or P0750 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

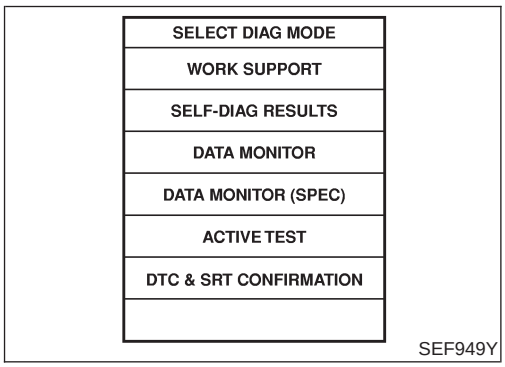
NFAT0235

Check the following items.

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



SAT014K



SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0236

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

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

WITH CONSULT-II

NFAT0236S01

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”).

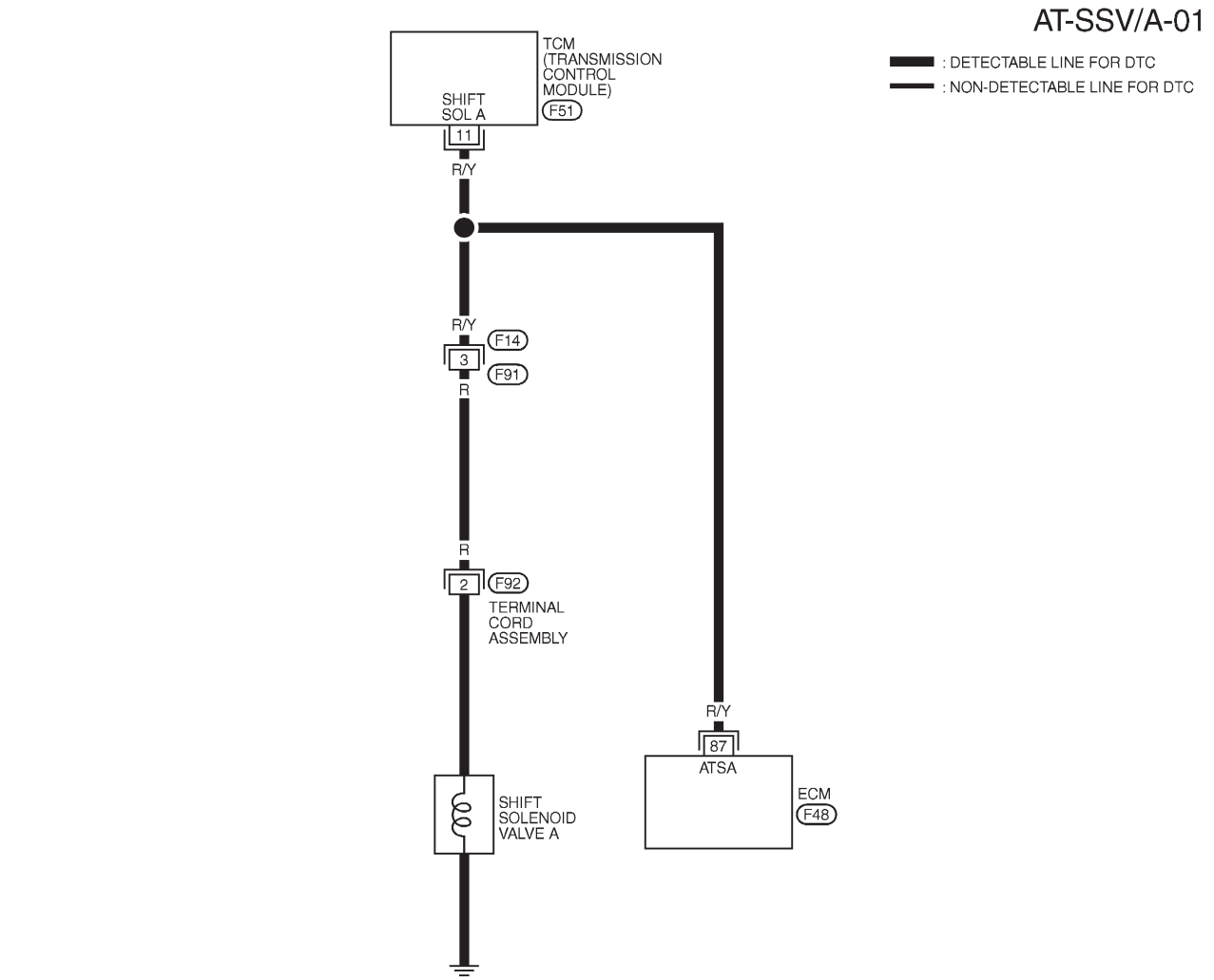
WITH GST

NFAT0236S02

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/A

NFAT0068



MAT872A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V

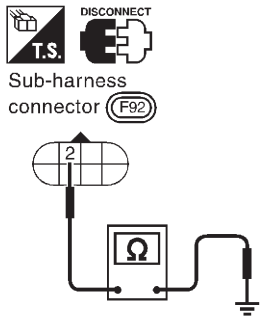
SAT349K

Diagnostic Procedure

NFAT0069

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

SAT632JB

OK or NG

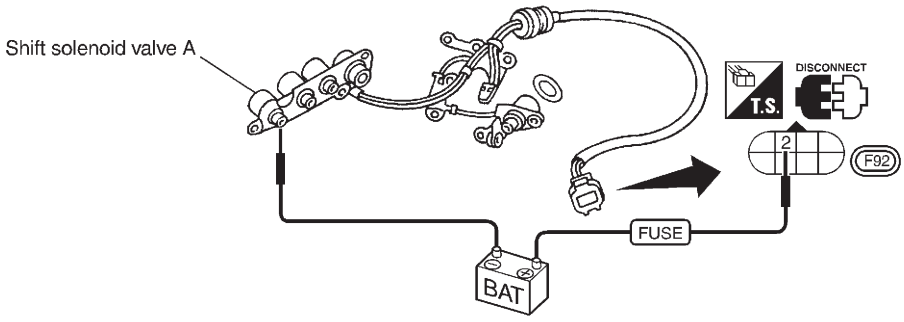
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:

- Shift solenoid valve A
- Operation check

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



SAT035K

- Harness of terminal cord assembly for short or open

OK or NG

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

3	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between sub-harness connector terminal 2 and TCM harness connector terminal 11. Refer to wiring diagram — AT — SSV/A.

   Continuity should exist.

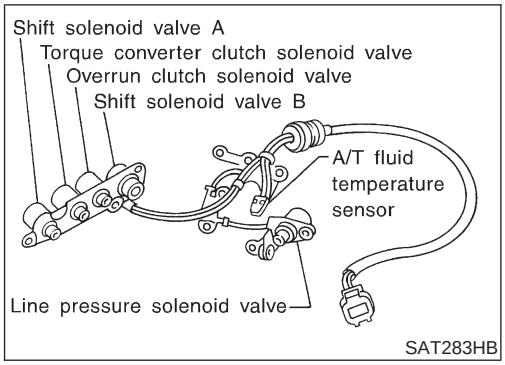
   If OK, check harness for short to ground and short to power.
4. Reinstall any part removed.

OK or NG

OK	▶	GO TO 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-183. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

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



Description

NFAT0070

Shift solenoid valves A and B are turned ON or OFF" by the TCM in response to signals sent from the park/neutral position (PNP) switch, vehicle speed and 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)

TCM TERMINALS AND REFERENCE VALUE

NFAT0070S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
12	LG/B	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.)	0V

On Board Diagnosis Logic

NFAT0237

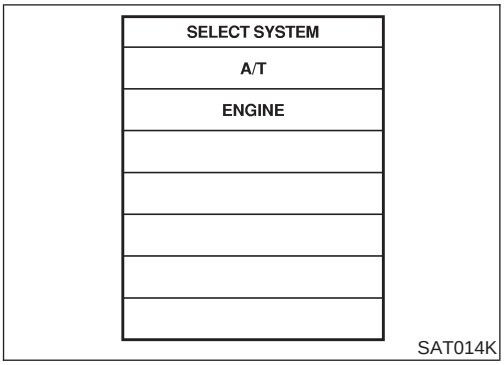
Diagnostic trouble code SFT SOL B/CIRC with CONSULT-II or P0755 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

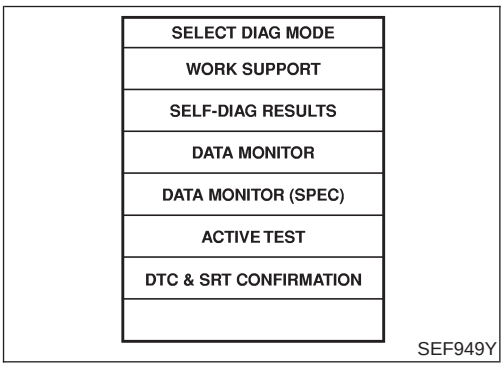
NFAT0239

Check the following items.

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Shift solenoid valve B



SAT014K



SEF949Y

Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0238

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

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

WITH CONSULT-II

NFAT0238S01

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”).

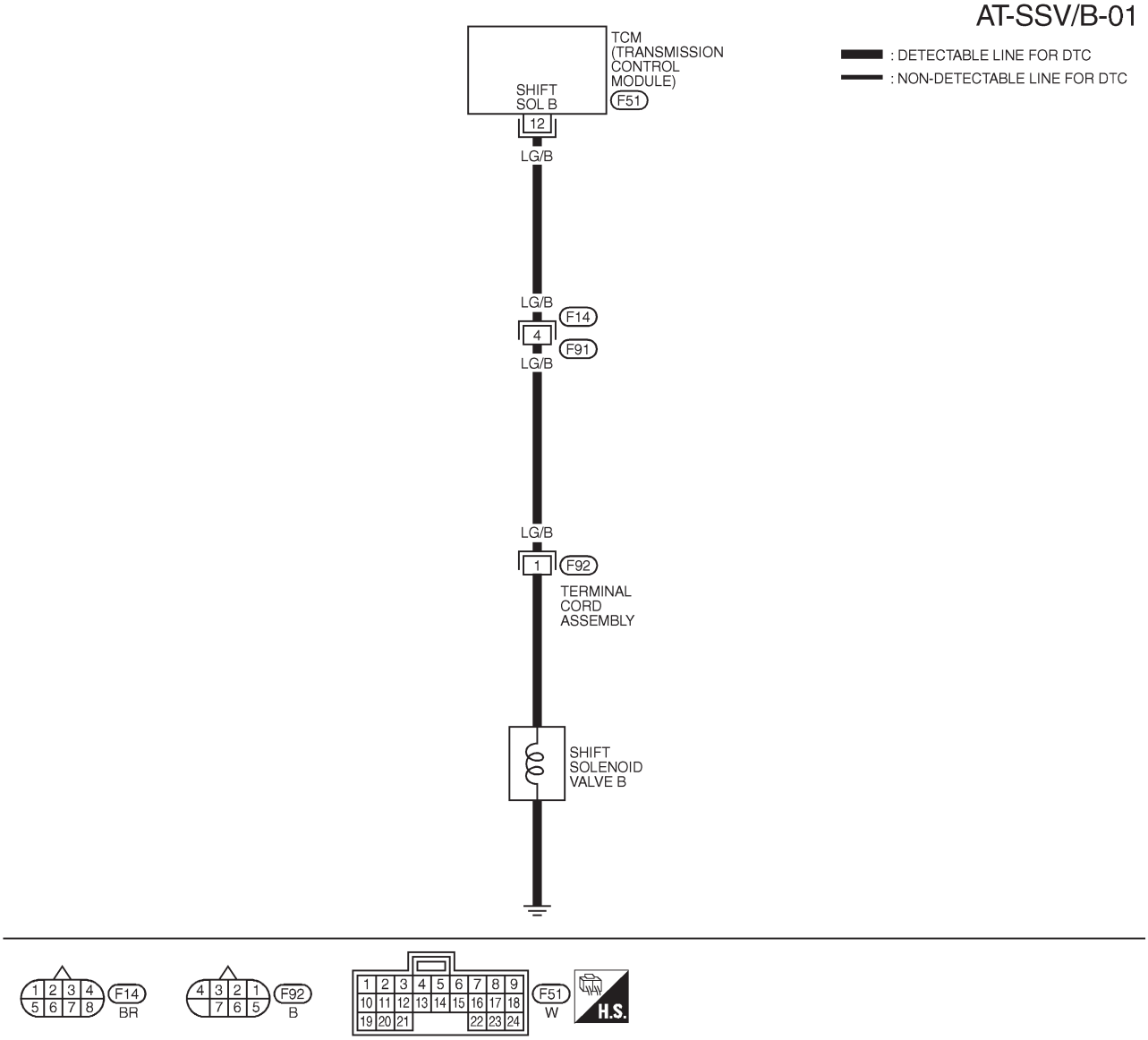
WITH GST

NFAT0238S02

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/B

NFAT0071



MAT816A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

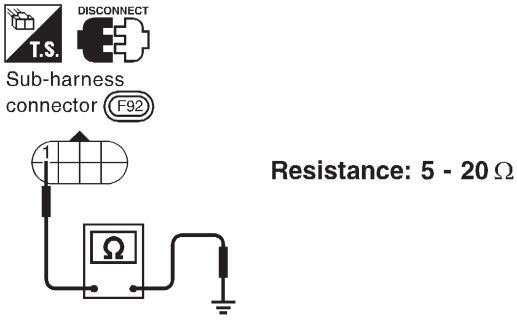
SAT350K

Diagnostic Procedure

NFAT0072

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 - 20 Ω

SAT633JC

OK or NG

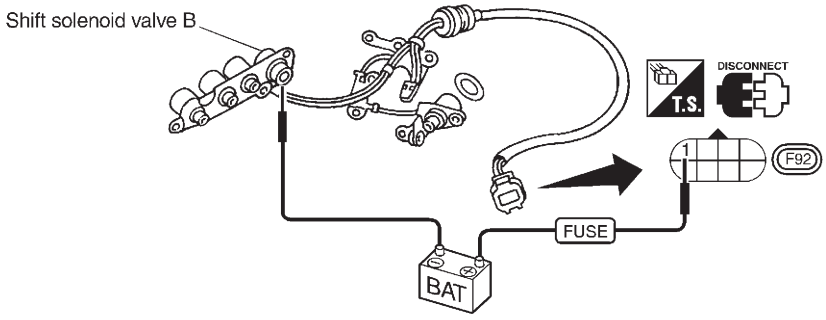
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:

- Shift solenoid valve B
- Operation check

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



SAT036K

- Harness of terminal cord assembly for short or open

OK or NG

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

3	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between sub-harness connector terminal 1 and TCM harness connector terminal 12. Refer to wiring diagram — AT — SSV/B.

   Continuity should exist.

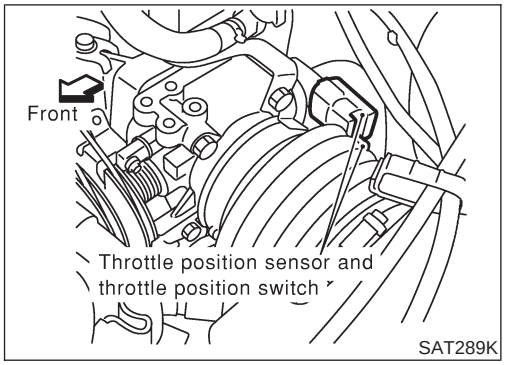
   If OK, check harness for short to ground and short to power.
4. Reinstall any part removed.

OK or NG

OK	▶	GO TO 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-188.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

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



Description

NFAT0073

- 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

NFAT0073S01

Remarks: Specification data are reference values.

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

TCM TERMINALS AND REFERENCE VALUE

NFAT0073S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
16	GY/L	Closed throttle position switch (in throttle position switch)		When releasing accelerator pedal after warming up engine.	Battery voltage
				When depressing accelerator pedal after warming up engine.	0V
17	P	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.	0V
32	R	Throttle position sensor (Power source)		Ignition switch ON.	4.5 - 5.5V
				Ignition switch OFF.	0V
41	W	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Throttle position sensor (Ground)	—	—	—

On Board Diagnosis Logic

NFAT0240

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

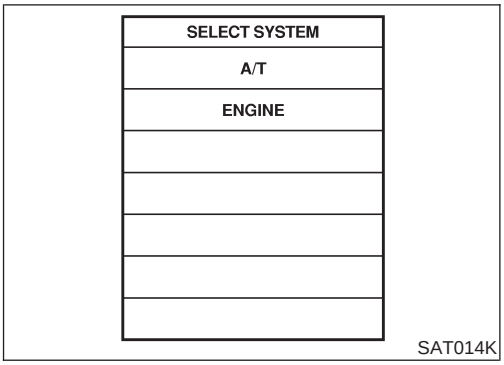
Possible Cause

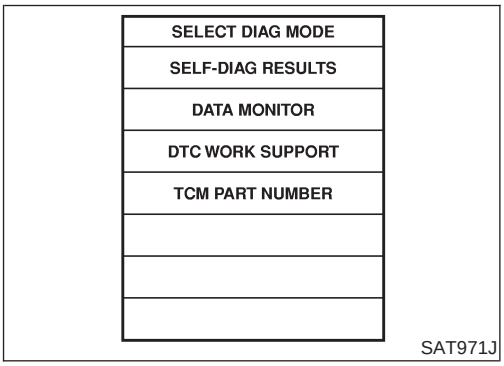
NFAT0241

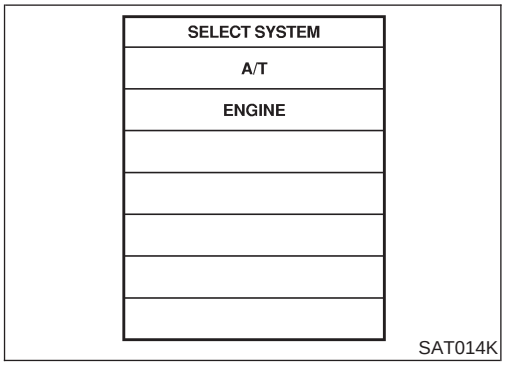
Check the following items.

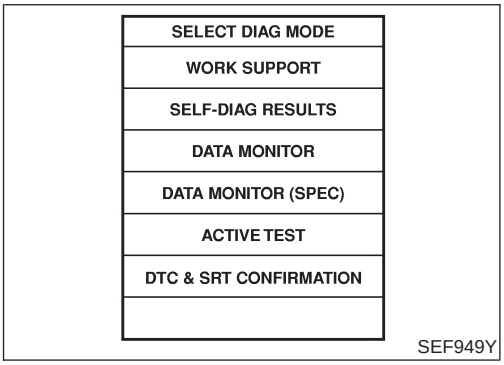
- Harness or connectors
  (The sensor circuit is open or shorted.)
- Throttle position sensor
- Throttle position switch

Possible Cause (Cont'd)









Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0242

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

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

WITH CONSULT-II

NFAT0242S01

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

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

If the check result is NG, go to "DIAGNOSTIC PROCEDURE", AT-196.
If the check result is OK, go to following step.

2) Turn ignition switch ON and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
3) Start engine and maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.
VHCL SPEED SE: 10 km/h (6 MPH) or more
THRTL POS SEN: Approximately 3V or less
Selector lever: D position (O/D ON)
If the check result is NG, go to "DIAGNOSTIC PROCEDURE", AT-196.
If the check result is OK, go to following step.
4) Maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.
VHCL SPEED SE: 10 km/h (6 MPH) or more
Accelerator pedal: Wide open throttle
Selector lever: D position (O/D ON)

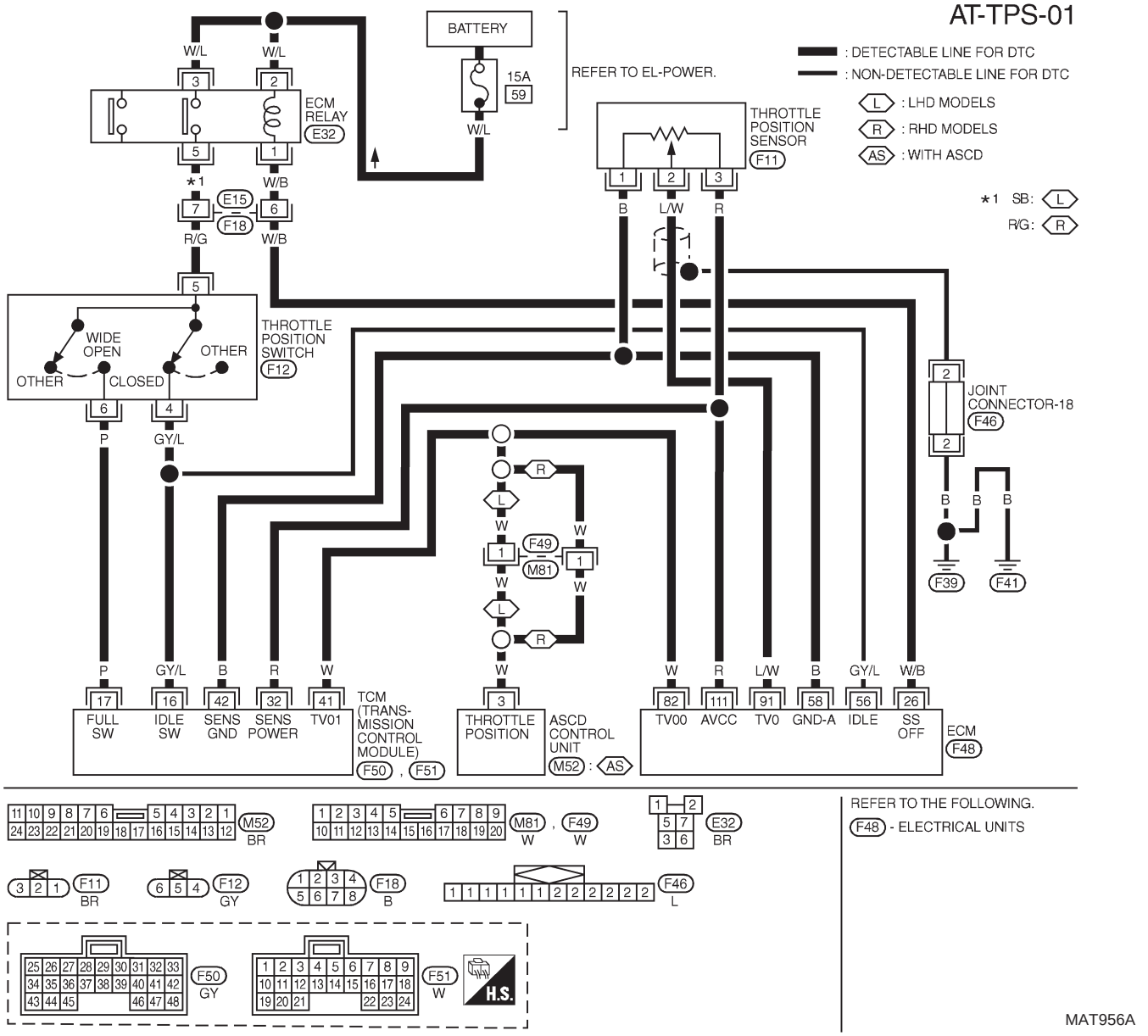
WITH GST

NFAT0242S02

Follow the procedure "With CONSULT-II".

Wiring Diagram — AT — TPS

NFAT0074



MAT956A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
16	GY/L	CLOSED THROTTLE POSITION SWITCH	WHEN IGN ON AND ACCELERATOR PEDAL IS RELEASED	BATTERY VOLTAGE
			WHEN IGN ON AND ACCELERATOR PEDAL IS DEPRESSED	0V
17	P	WIDE OPEN THROTTLE POSITION SWITCH	WHEN IGN ON AND ACCELERATOR PEDAL IS RELEASED	0V
			WHEN IGN ON AND ACCELERATOR PEDAL IS DEPRESSED	BATTERY VOLTAGE
32	R	THROTTLE POSITION SENSOR (POWER SORCE)	WHEN IGN ON	4.5 - 5.5V
			WHEN IGN OFF	0V
41	W	THROTTLE POSITION SENSOR	WHEN IGN ON AND ACCELERATOR PEDAL IS DEPRESSED SLOWLY AFTER WARMING UP ENGINE (VOLTAGE RISES GRADUALLY IN RESPONSE TO THROTLE POSITION.)	FULLY-CLOSED THROTTLE: 0.5V FULLY-OPEN THROTTLE: 4V
42	B	THROTTLE POSITION SENSOR (GROUND)	—	—

SAT351K

Diagnostic Procedure

NFAT0075

1	CHECK DTC WITH ECM

- Check P code with CONSULT-II “ENGINE”.
  Turn ignition switch ON and select “SELF-DIAG RESULTS” mode for “ENGINE” with CONSULT-II.

Refer to EC-60, “DESCRIPTION”.

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-151, “Description”.

2	CHECK INPUT SIGNAL (With CONSULT-II)

With CONSULT-II

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

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

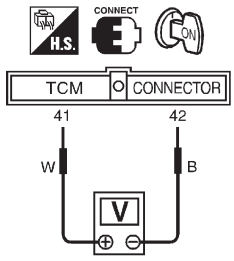
OK or NG

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



SAT349JA

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

OK or NG

OK	▶	GO TO 6.
NG	▶	Check harness for short or open between ECM and TCM regarding throttle position sensor circuit. (Main harness)

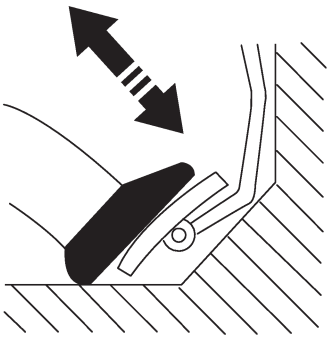
4	CHECK THROTTLE POSITION SWITCH CIRCUIT (With CONSULT-II)

With CONSULT-II

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

SAT646J

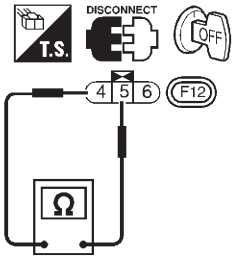
OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

Check the following items:
- Throttle position switch.

a. Closed throttle position switch (idle position)
i. Check continuity between terminals 4 and 5.

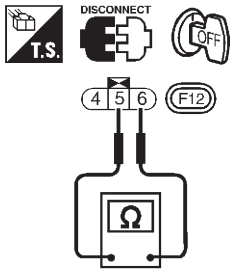


Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

SAT634J

ii. To adjust closed throttle position switch, refer to EC-333, "Component Description".

b. Wide open throttle position switch
i. Check continuity between terminals 5 and 6.



Accelerator pedal condition	Continuity
Released	No
Depressed	Yes

SAT635J

- 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)

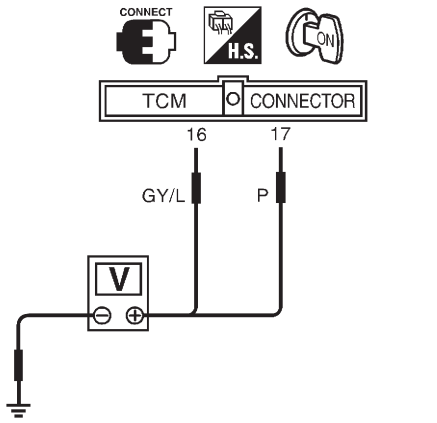
OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

6	CHECK THROTTLE POSITION 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 16, 17 and ground while depressing, and releasing accelerator pedal slowly.
   (After warming up engine)



SAT350JA

Accelerator pedal condition	Voltage (Approx.)	
	Terminal No. 16	Terminal No. 17
Released	Battery voltage	0V
Fully depressed	0V	Battery voltage

MTBL0629

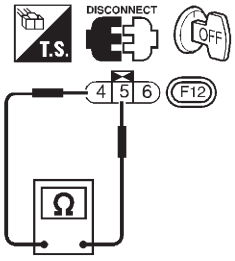
OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING ITEM

Check the following items:
- Throttle position switch.

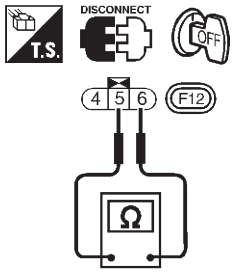
a. Closed throttle position switch (idle position)
i. Check continuity between terminals 4 and 5.



Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

SAT634J

ii. To adjust closed throttle position switch, refer to EC-333, "Component Description".
b. Wide open throttle position switch
i. Check continuity between terminals 5 and 6.



Accelerator pedal condition	Continuity
Released	No
Depressed	Yes

SAT635J

- 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)

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

8	CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-194.

OK or NG

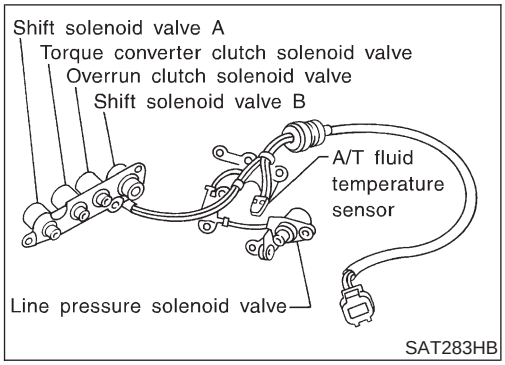
OK	▶	**INSPECTION END**
NG	▶	GO TO 9.

9	CHECK TCM INSPECTION

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

OK or NG

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



Description

NFAT0076

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

TCM TERMINALS AND REFERENCE VALUE

NFAT0076S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
20	BR/Y	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	1V or less

On Board Diagnosis Logic

NFAT0243

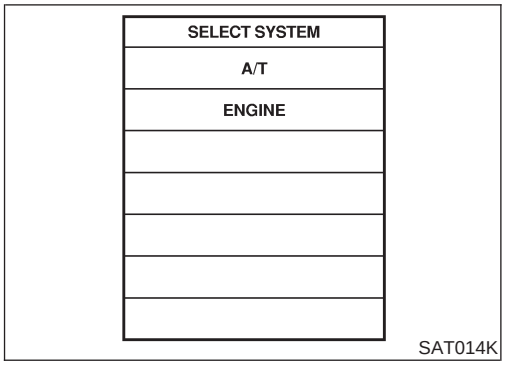
Diagnostic trouble code O/R CLTCH SOL/CIRC with CONSULT-II or P1760 without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

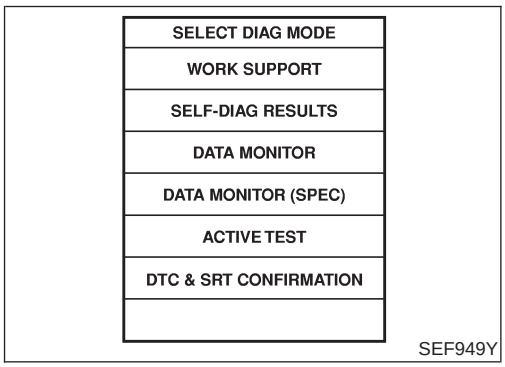
Possible Cause

NFAT0244

Check the following items.

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Overrun clutch solenoid valve





Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0245

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

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

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

WITH CONSULT-II

NFAT0245S01

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

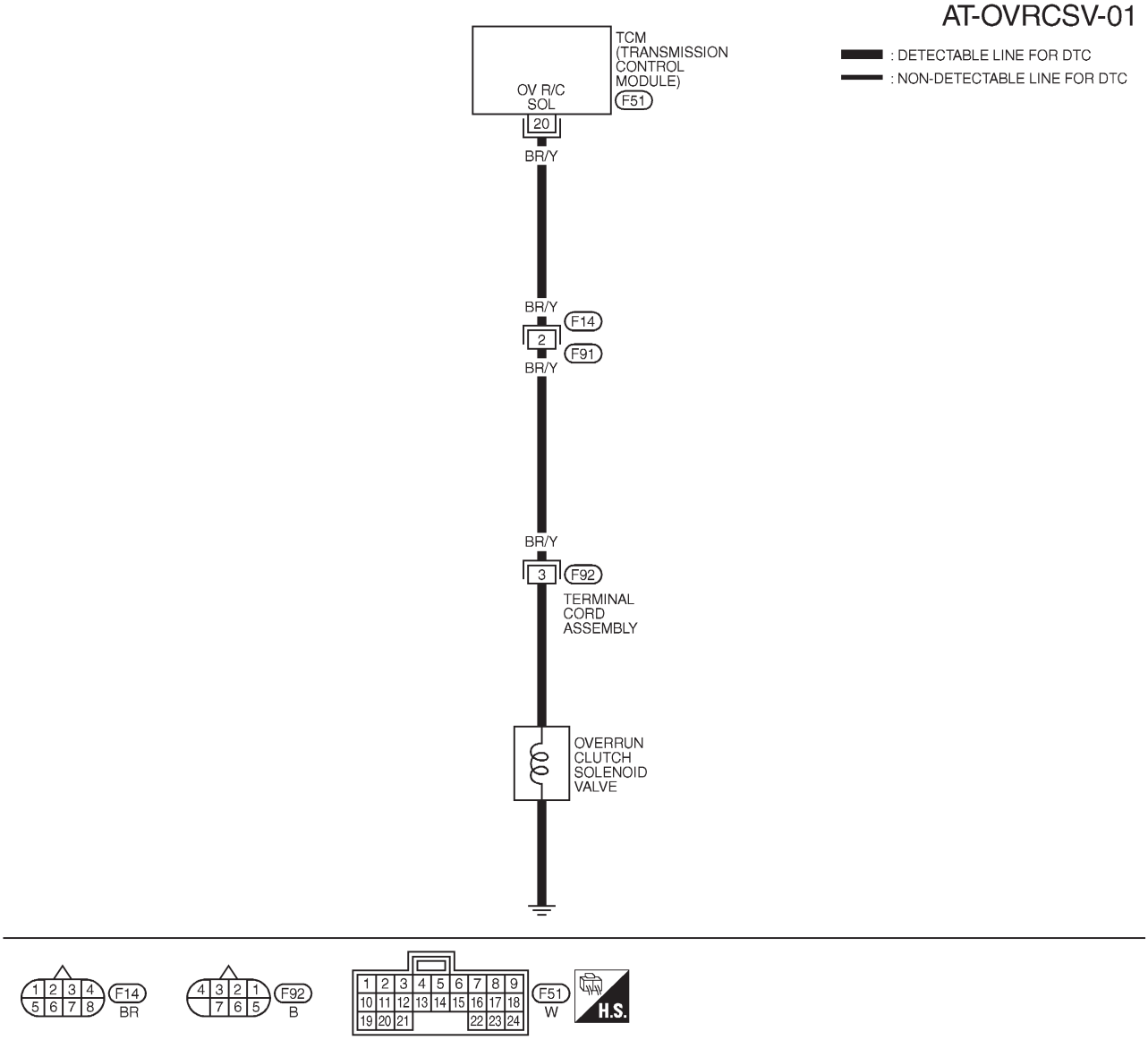
WITH GST

NFAT0245S02

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — OVRCSV

NFAT0077



MAT818A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
20	BR/Y	OVERRUN CLUTCH SOLENOID VALVE	WHEN VEHICLE STARTS AND OVERRUN CLUTCH S/V OPERATES	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND OVERRUN CLUTCH S/V DOES NOT OPERATE	0V

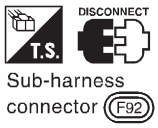
SAT352K

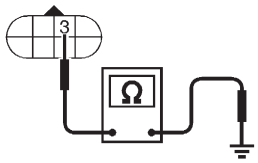
Diagnostic Procedure

NFAT0078

1	CHECK VLAVE 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

SAT637JB

OK or NG

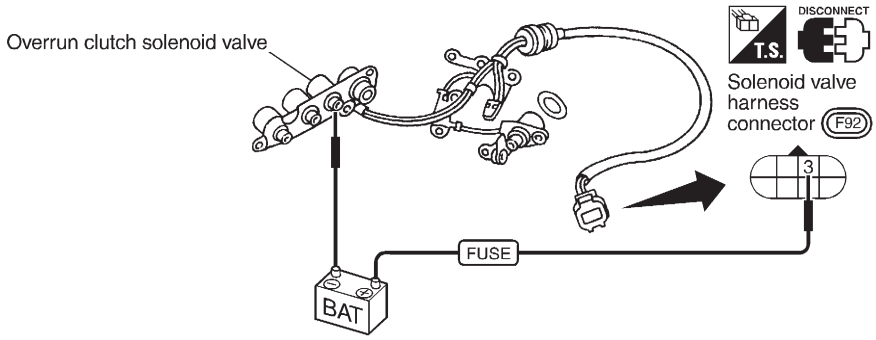
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:

- Overrun clutch solenoid valve
- Operation check

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



SAT638J

- Harness of terminal cord assembly for short or open

OK or NG

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

3	CHECK POWER SOURCE CIRCUIT

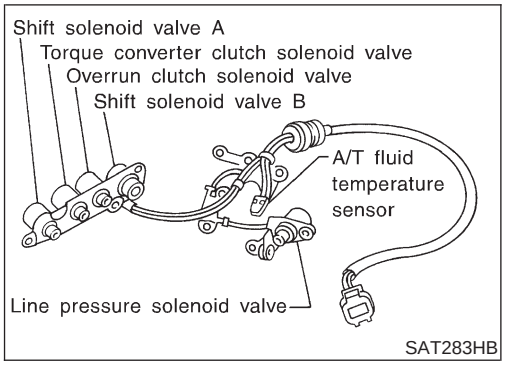
1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between sub-harness connector terminal 3 and TCM harness connector terminal 20. Refer to wiring diagram — AT — OVRCVS.
   Continuity should exist.
   If OK, check harness for short to ground and short to power.
4. Reinstall any part removed.

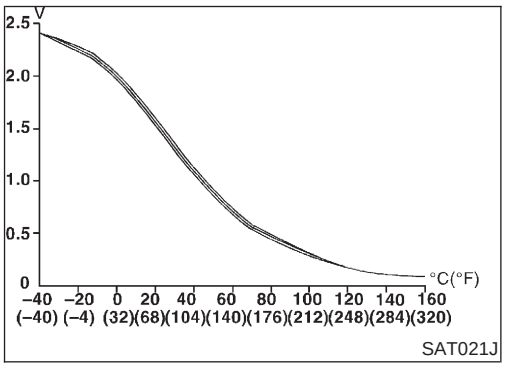
OK or NG

OK	▶	GO TO 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-202. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

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





Description

NFAT0079

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

NFAT0079S01

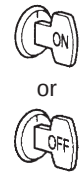
Remarks: Specification data are reference values.

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

TCM TERMINALS AND REFERENCE VALUE

NFAT0079S02

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
10	R/Y	Power source		When turning ignition switch to ON.	Battery voltage
				When turning ignition switch to OFF.	0V
19	R/Y	Power source		Same as No. 10	
28	Y/R	Power source (Memory back-up)		When turning ignition switch to OFF.	Battery voltage
				When turning ignition switch to ON.	Battery voltage
42	B	Throttle position sensor (Ground)	—	—	—
47	G	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V

On Board Diagnosis Logic

NFAT0246

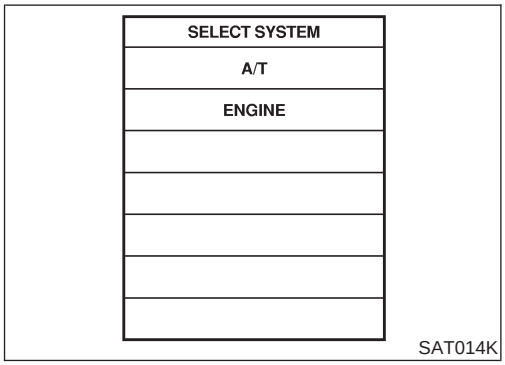
Diagnostic trouble code BATT/FLUID TEMP SEN with CONSULT-II or 8th judgement flicker without CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

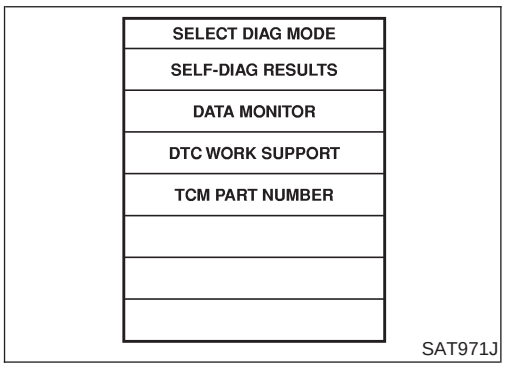
Possible Cause

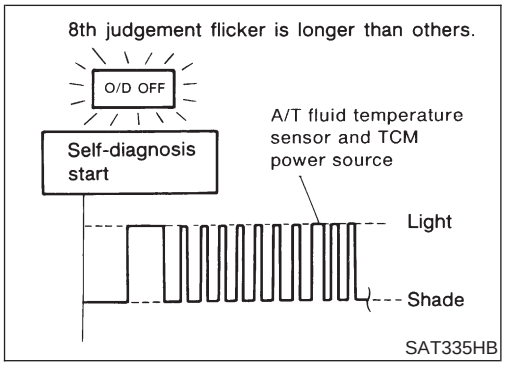
NFAT0247

Check the following items.

- Harness or connectors
  (The sensor circuit is open or shorted.)
- A/T fluid temperature sensor







Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0248

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

WITH CONSULT-II

NFAT0248S01

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).

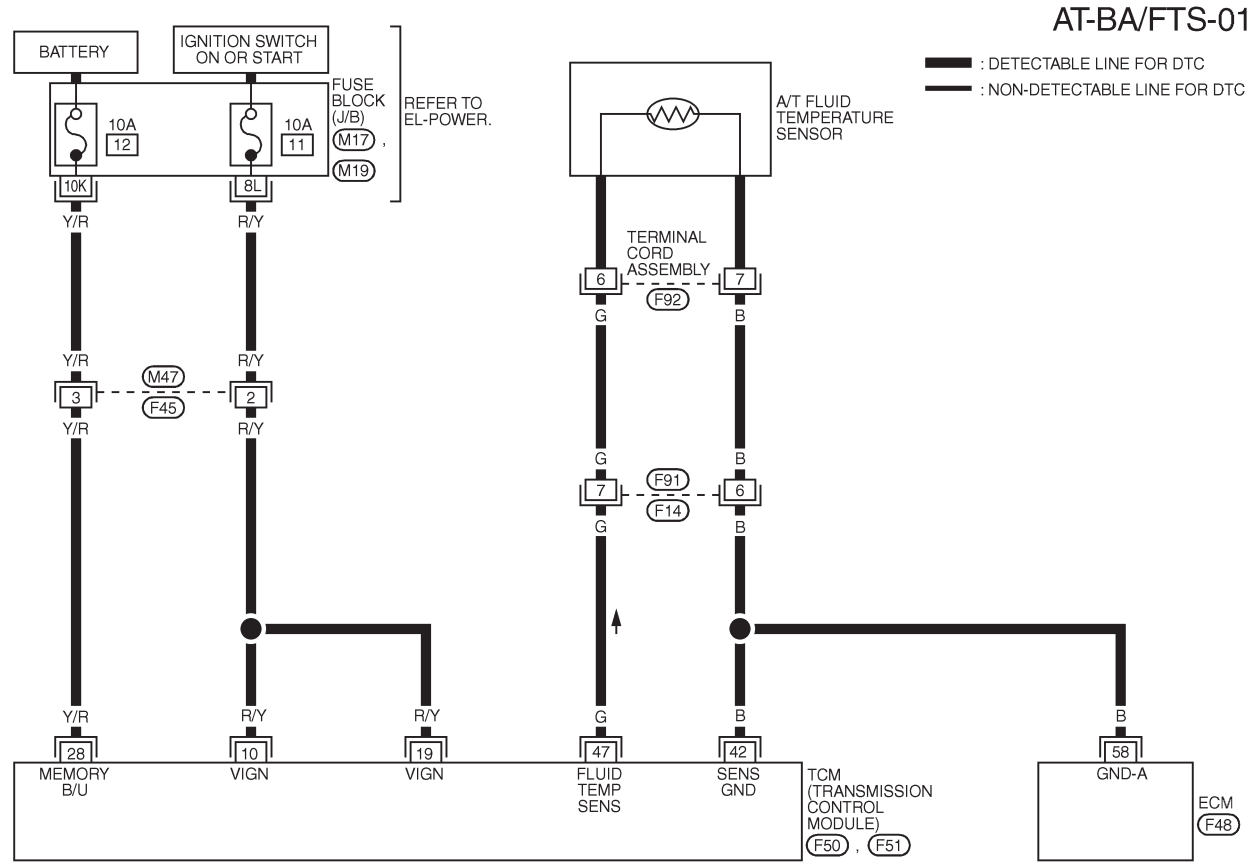
WITHOUT CONSULT-II

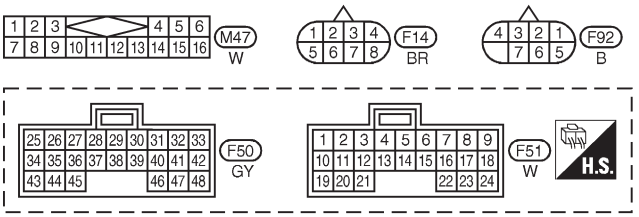
NFAT0248S02

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 SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-49.

Wiring Diagram — AT — BA/FTS

NFAT0080





REFER TO THE FOLLOWING.
M17, M19 - FUSE BLOCK - JUNCTION BOX (J/B)
F48 - ELECTRICAL UNITS

MAT863A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
10	R/Y	POWER SORCE	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	0V
19	R/Y	POWER SORCE	SAME AS NO. 10	
28	Y/R	POWER SORCE (MEMORY BACK-UP)	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	BATTERY VOLTAGE
42	B	THROTTLE POSITION SENSOR (GROUND)	—	—
47	G	A/T FLUID TEMPERATURE SENSOR	WHEN IGN ON AND ATF TEMPERATURE IS 20°C (68°F)	1.5V
			WHEN IGN ON AND ATF TEMPERATURE IS 80°C (176°F)	0.5V

SAT353K

Diagnostic Procedure

NFAT0081

1	CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (With CONSULT-II)

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “FLUID TEMP SE”.

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

SAT614J

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

OK or NG

OK	▶	GO TO 9.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING ITEM

Check the following items:

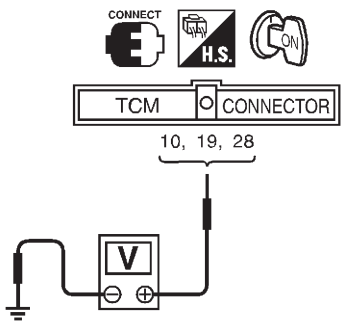
- Harness for short or open between TCM, ECM and terminal cord assembly (Main harness)
- Ground circuit for ECM
  Refer to EC-127, “WIRING DIAGRAM”.

OK or NG

OK	▶	GO TO 9.
NG	▶	Repair or replace damged parts.

3	CHECK TCM POWER SOURCE STEP 1

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



Voltage:
Battery voltage

SAT611J

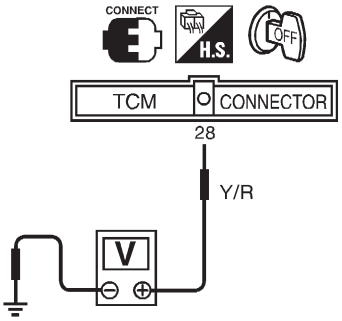
OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 5.

Diagnostic Procedure (Cont'd)

4	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

SAT612J

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

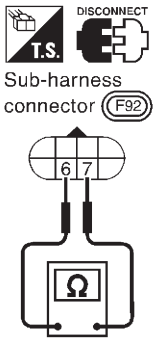
Check the following items:
- Harness for short or open between ignition switch and TCM (Main harness)
- Ignition switch and 10A fuse [No. 11, 12, located in the fuse block (J/B)]
  Refer to EL-9, "Schematic".

OK or NG

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

6	CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

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



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

SAT616J

4. Reinstall any part removed.

OK or NG

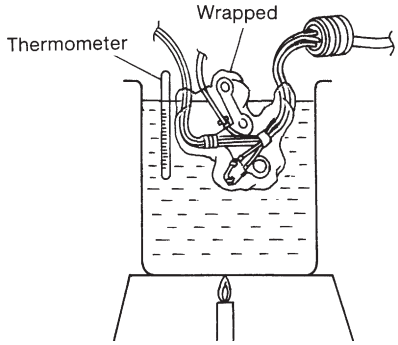
OK (without CONSULT-II)	▶	GO TO 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING ITEM

1. Remove oil pan. Refer to AT-346.
2. Check the following items:

● A/T fluid temperature sensor

i. Check resistance between two terminals while changing temperature as shown below.



SAT298F

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

MTBL0210

● Harness of terminal cord assembly for short or open

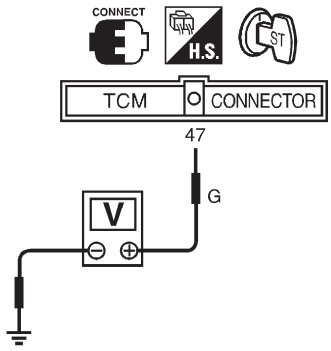
OK or NG

OK (without CONSULT-II)	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

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

Without CONSULT-II

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



SAT354J

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

3. Turn ignition switch to OFF position.
4. Disconnect TCM harness connector.
5. Check resistance between terminal 42 and ground. Refer to wiring diagram — AT — BA/FTS.

Continuity should exist.

OK or NG

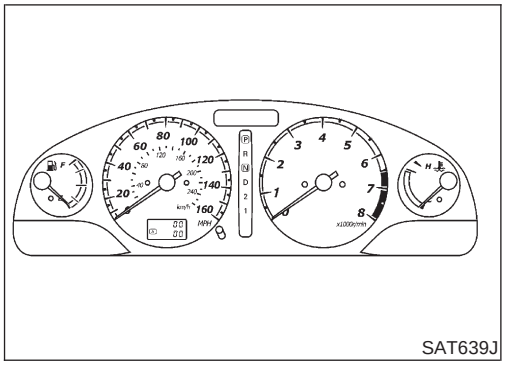
OK	▶	GO TO 10.
NG	▶	GO TO 9.

Diagnostic Procedure (Cont'd)

9	DETECT MALFUNCTIONING ITEM	
Check the following items: ● Harness for short or open between TCM, ECM and terminal cord assembly (Main harness) ● Ground circuit for ECM Refer to EC-127, "WIRING DIAGRAM".		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Repair or replace damaged parts.

10	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-207.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 11.

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


SAT639J

Description

NFAT0082

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.

TCM TERMINALS AND REFERENCE VALUE

NFAT0082S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
40	PU/R	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 1V and more than 4.5V

On Board Diagnosis Logic

NFAT0249

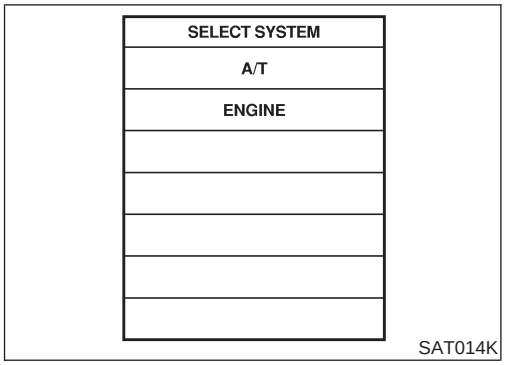
Diagnostic trouble code VHCL SPEED SEN·MTR with CONSULT-II or 2nd judgement flicker without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

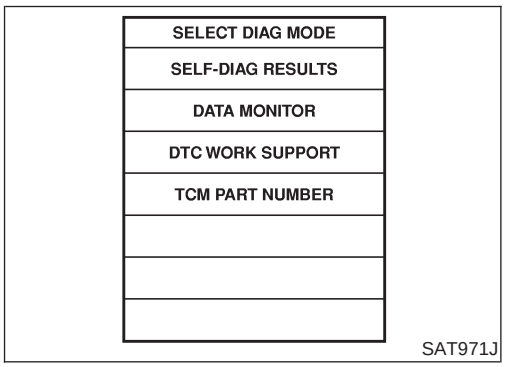
Possible Cause

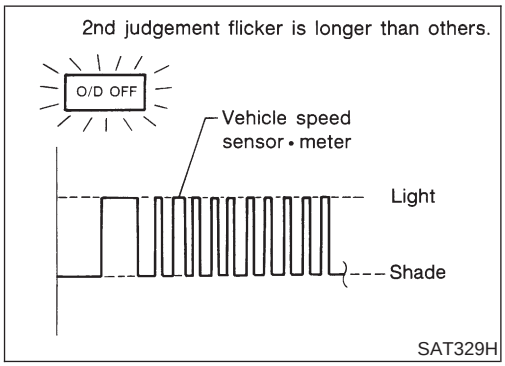
NFAT0250

Check the following items.

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







Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0251

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If conducting this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

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

WITH CONSULT-II

NFAT0251S01

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).

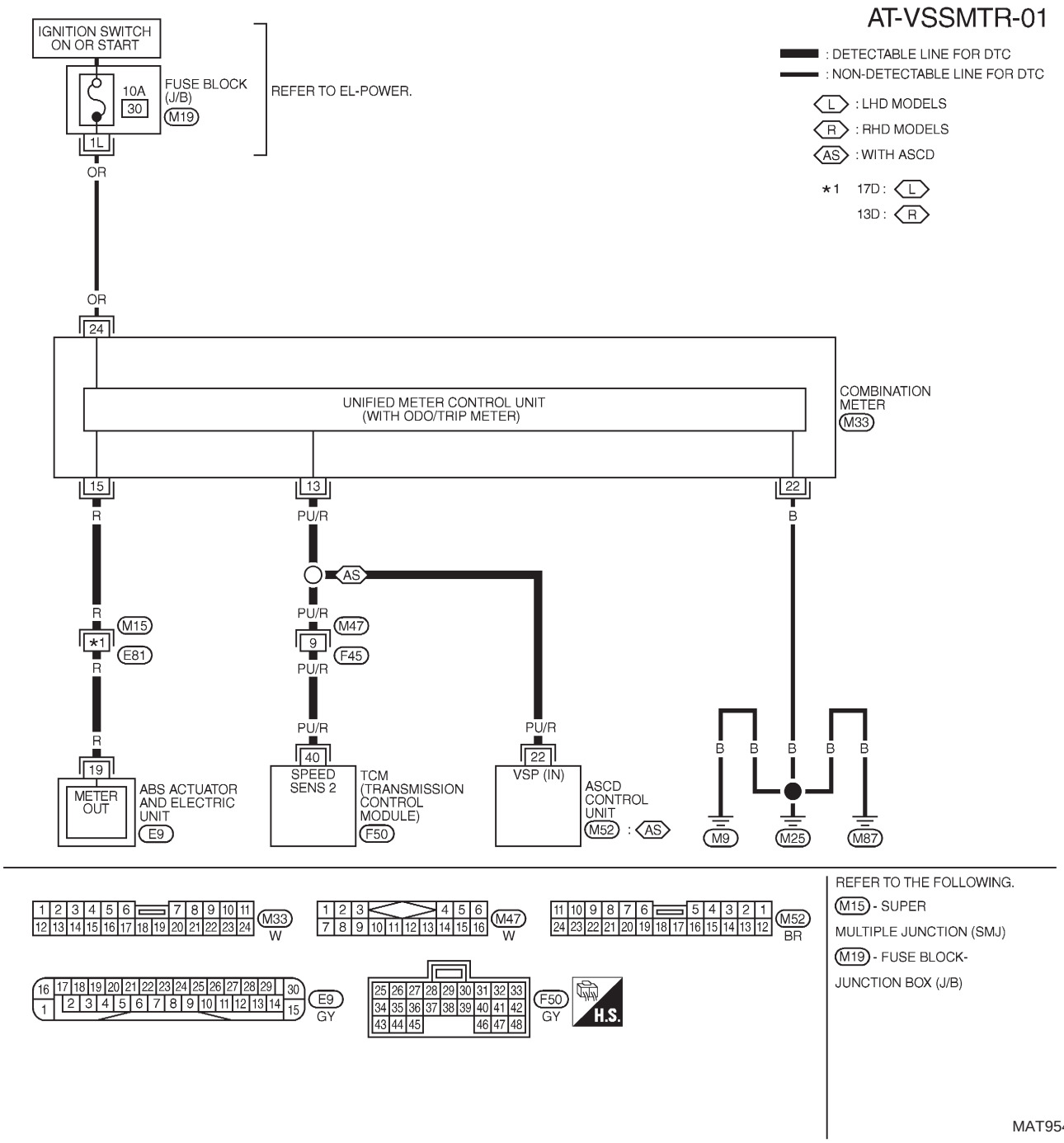
WITHOUT CONSULT-II

NFAT0251S02

1) Start engine.
2) Drive vehicle under the following conditions:
   Selector lever in D and vehicle speed higher than 25 km/h (16 MPH).
3) Perform self-diagnosis.
   Refer to TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-49.

Wiring Diagram — AT — VSSMTR

NFAT0083



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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
40	PU/R	VEHICLE SPEED SENSOR	WHEN MOVING VEHICLE AT 2 TO 3 KM/H (1 TO 2 MPH) FOR 1 M (3 FT)	VOLTAGE VARIES BETWEEN LESS THAN 1V AND MORE THAN 4.5 V

SAT354K

Diagnostic Procedure

NFAT0084

1 CHECK INPUT SIGNAL

With CONSULT-II

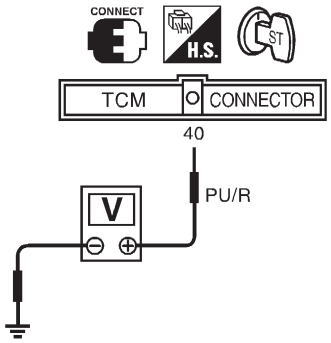
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·MTR” while driving.
   Check the value changes according to driving speed.

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

SAT614J

Without CONSULT-II

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



SAT356JA

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

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2 DETECT MALFUNCTIONING ITEM

Check the following items:

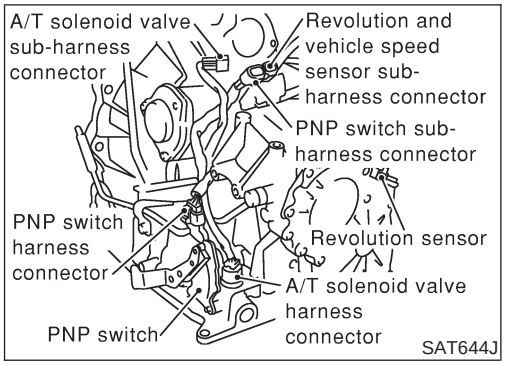
- Vehicle speed sensor and ground circuit for vehicle speed sensor
  Refer to EL-123, “Component Parts and Harness Connector Location”.
- Harness for short or open between TCM and vehicle speed sensor (Main harness)

OK or NG

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

3	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-214.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 4.

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



Description

NFAT0292

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.

TCM TERMINALS AND REFERENCE VALUE

NFAT0292S01

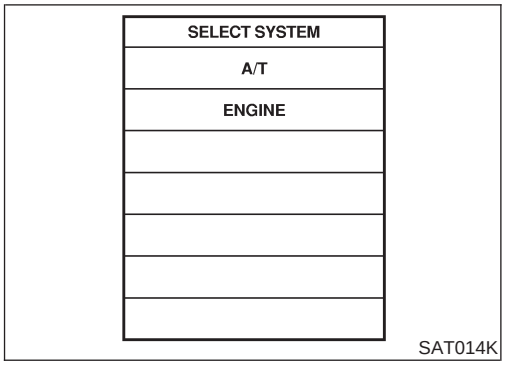
Remarks: Specification data are reference values.

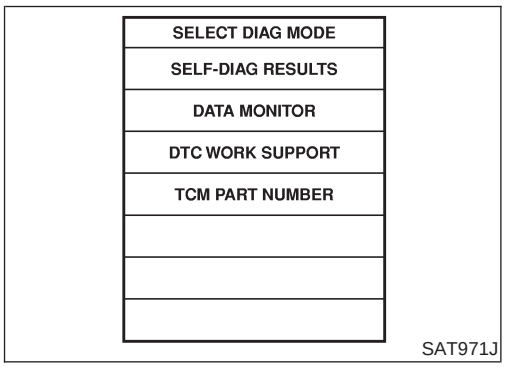
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
29	W	Revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	450 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
42	B	Throttle position sensor (Ground)	—	—	—

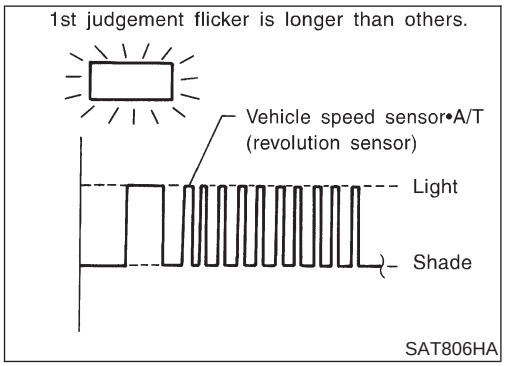
ON BOARD DIAGNOSIS LOGIC

NFAT0292S02

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: VHCL SPEED SEN·A/T	TCM does not receive the proper voltage signal from the sensor.	• Harness or connectors (The sensor circuit is open or shorted.) • Revolution sensor
: 1st judgement flicker		







SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

NFAT0292S03

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

With CONSULT-II

NFAT0292S0301

1) Start engine.
2) Select "SELF-DIAG RESULTS" mode with CONSULT-II.
3) Drive vehicle under the following conditions:
   Selector lever in "D" position, vehicle speed higher than 30 km/h (19 MPH), throttle opening greater than 1/8 of the full throttle position and driving for more than 5 seconds.

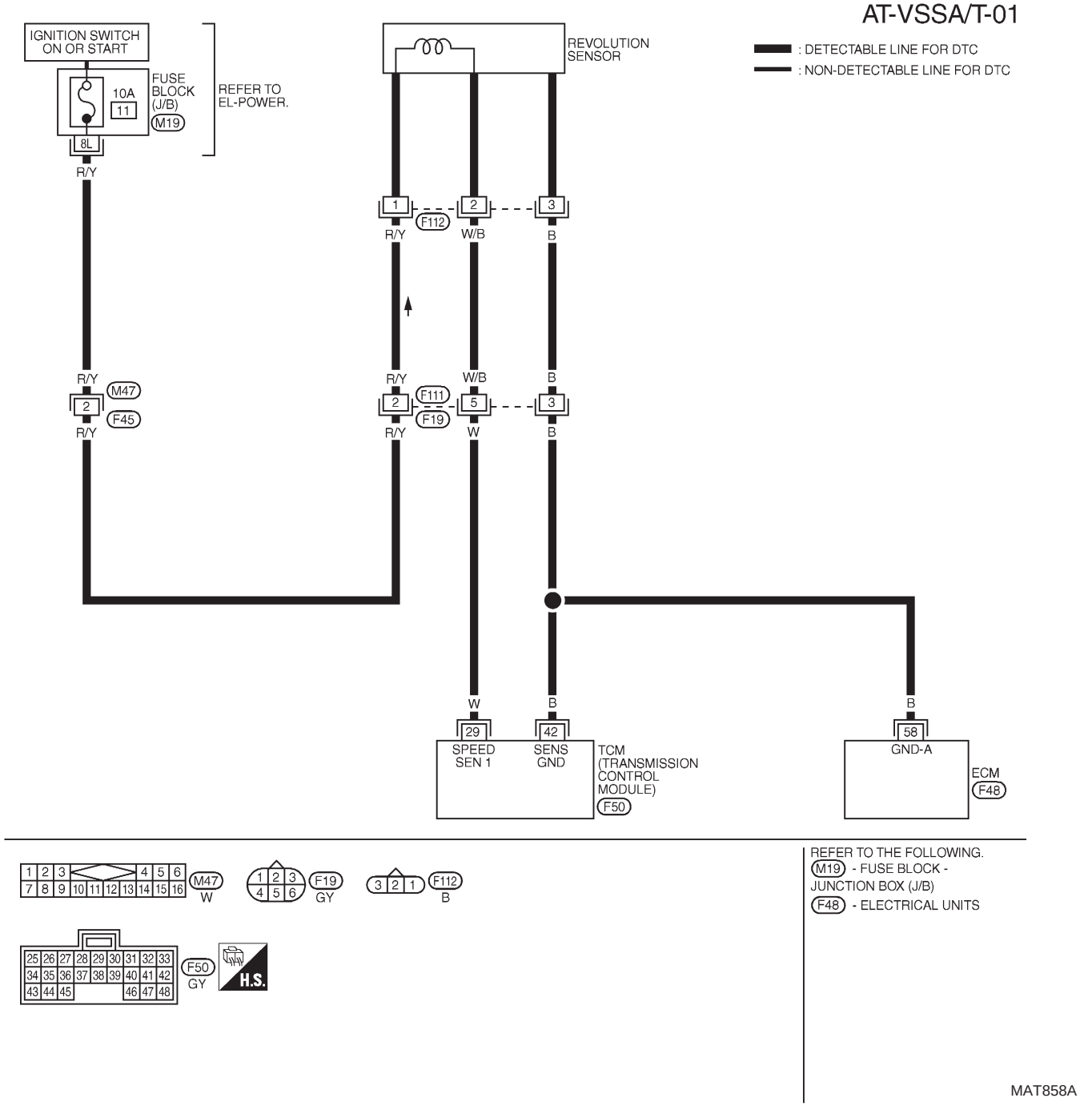
Without CONSULT-II

NFAT0292S0302

1) Start engine.
2) Drive vehicle under the following conditions:
   Selector lever in "D" position, vehicle speed higher than 30 km/h (19 MPH), throttle opening greater than 1/8 of the full throttle position and driving for more than 5 seconds.
3) Perform self-diagnosis.
   Refer to SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60.

Wiring Diagram — AT — VSSA/T

NFAT0293



MAT858A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
29	W	REVOLUTION SENSOR	WHEN MOVING AT 20 KM/H (12 MPH), USE THE CONSULT-II PULSE FREQUENCY MEASURING FUNCTION. *1 CAUTION: CONNECT THE DIAGNOSIS DATA LINK CABLE TO THE VEHICLE DIAGNOSIS CONNECTOR. *1: A CIRCUIT TESTER CANNOT BE USED TO TEST THIS ITEM.	450 HZ
			WHEN VEHICLE PARKS.	UNDER 1.3V OR OVER 4.5V
42	B	THROTTLE POSITION SENSOR (GROUND)	—	—

SAT341K

Diagnostic Procedure

NFAT0294

1	CHECK INPUT SIGNAL (With CONSULT-II)

With CONSULT-II

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

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

SAT614J

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK REVOLUTION SENSOR (With CONSULT-II)

With CONSULT-II

1. Start engine.

Condition	Judgement standard (Approx.)
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. *1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	450 Hz
When vehicle parks.	Under 1.3V or over 4.5V

MTBL0628

- Harness for short or open between TCM, ECM and revolution sensor (Main harness)

OK or NG

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

3	CHECK DTC

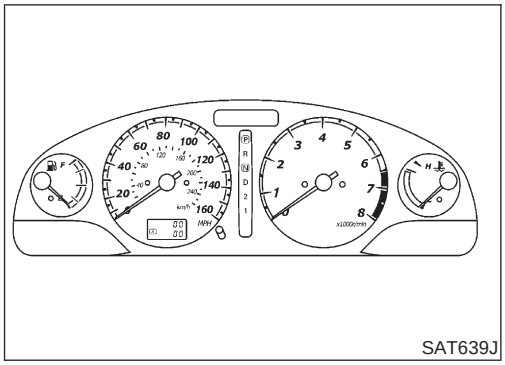
Perform Self-diagnosis Code confirmation procedure, AT-219.

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.


SAT639J

Description

NFAT0295

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.

TCM TERMINALS AND REFERENCE VALUE

NFAT0295S01

Remarks: Specification data are reference values.

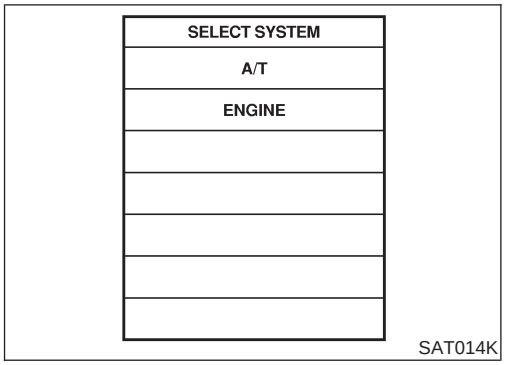
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
40	PU/R	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 1V and more than 4.5V

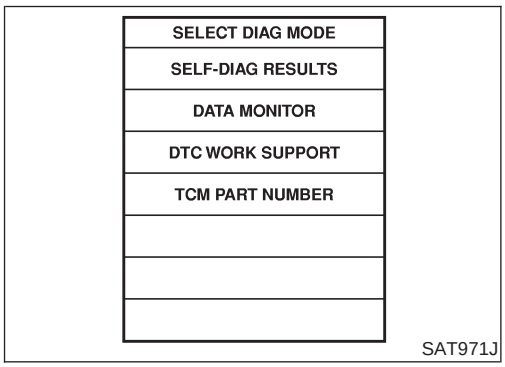
ON BOARD DIAGNOSIS LOGIC

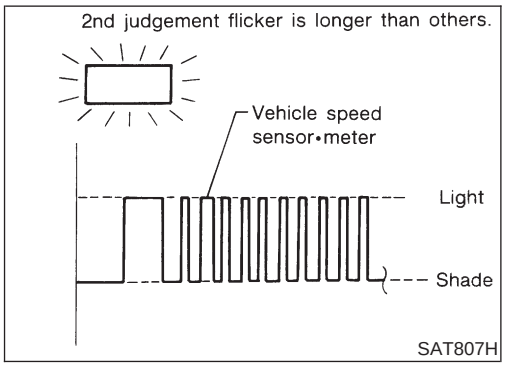
NFAT0295S02

Diagnostic trouble code	Malfunction is detected when ...	Check item (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		

Description (Cont'd)







SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

NFAT0295S03

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

With CONSULT-II

NFAT0295S0301

1) Start engine.
2) Select "SELF-DIAG RESULTS" mode with CONSULT-II.
3) Drive vehicle under the following conditions:
   Selector lever in "D" position and vehicle speed higher than 20 km/h (12 MPH).

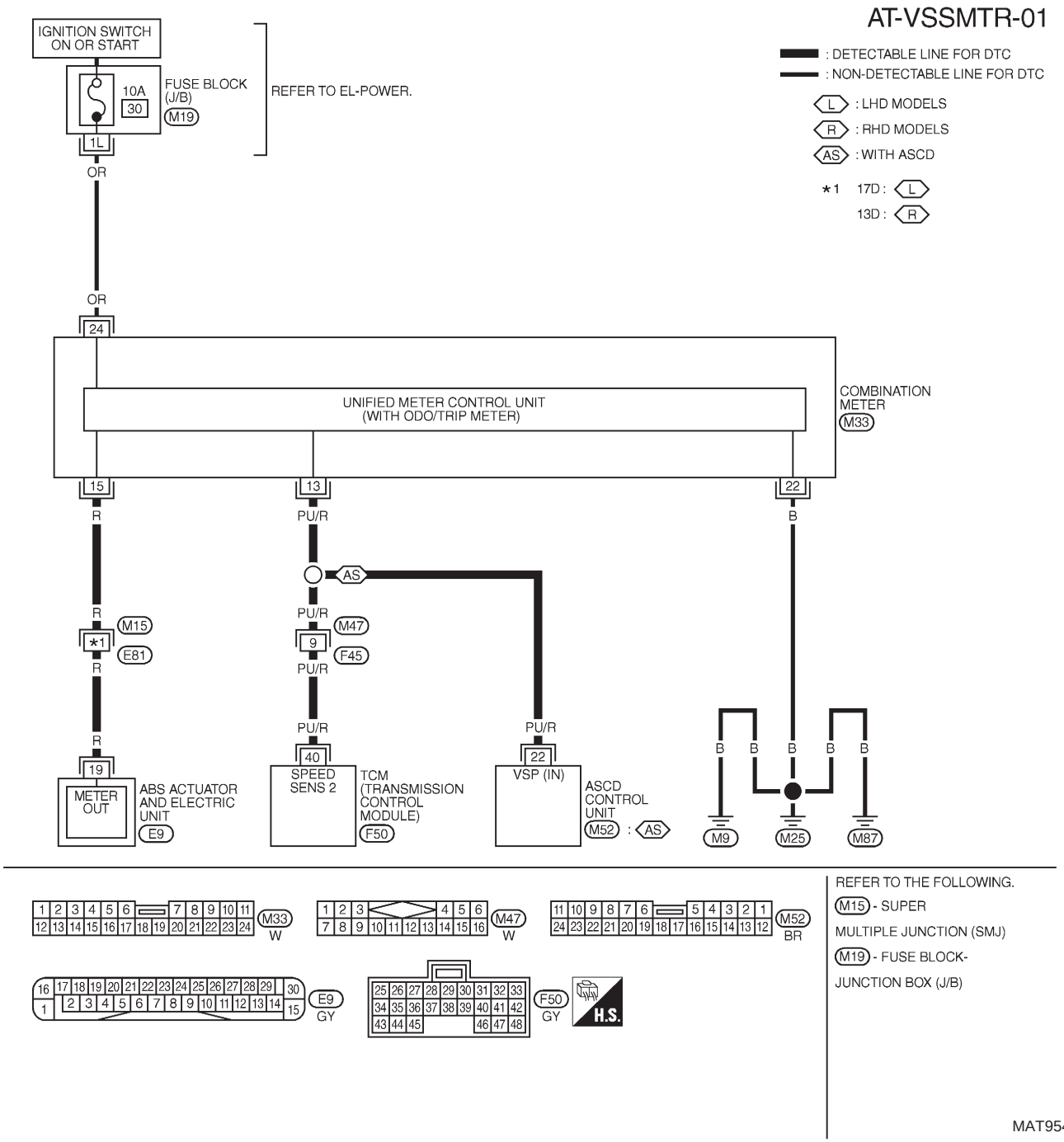
Without CONSULT-II

NFAT0295S0302

1) Start engine.
2) Drive vehicle under the following conditions:
   Selector lever in "D" position and vehicle speed higher than 20 km/h (12 MPH).
3) Perform self-diagnosis.
   Refer to SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60.

Wiring Diagram — AT — VSSMTR

NFAT0296



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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
40	PU/R	VEHICLE SPEED SENSOR	WHEN MOVING VEHICLE AT 2 TO 3 KM/H (1 TO 2 MPH) FOR 1 M (3 FT)	VOLTAGE VARIES BETWEEN LESS THAN 1V AND MORE THAN 4.5 V

SAT354K

Diagnostic Procedure

NFAT0297

1 CHECK INPUT SIGNAL

With CONSULT-II

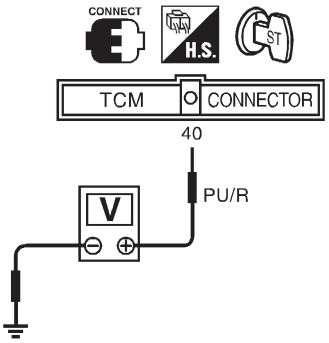
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·MTR” while driving.
   Check the value changes according to driving speed.

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

SAT614J

Without CONSULT-II

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



SAT356JA

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

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

2 DETECT MALFUNCTIONING ITEM

Check the following items:

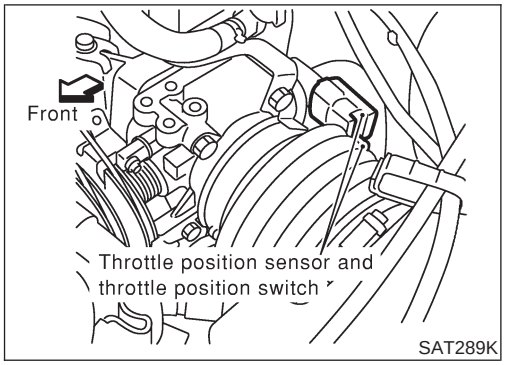
- Vehicle speed sensor and ground circuit for vehicle speed sensor
  Refer to EL-123, “Component Parts and Harness Connector Location”.
- Harness for short or open between TCM and vehicle speed sensor (Main harness)

OK or NG

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

3	CHECK DTC
Perform Self-diagnosis Code confirmation procedure, AT-224.	
OK or NG	
OK ▶	**INSPECTION END**
NG ▶	GO TO 4.

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



Description

NFAT0298

- 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

NFAT0298S01

Remarks: Specification data are reference values.

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

TCM TERMINALS AND REFERENCE VALUE

NFAT0298S02

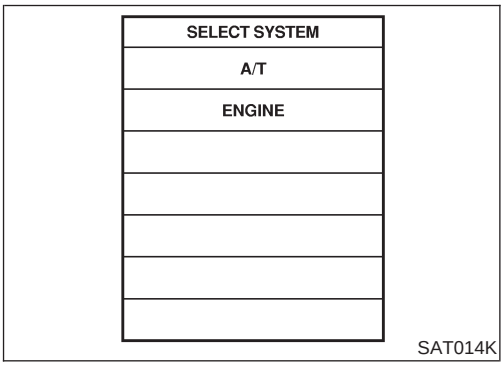
Remarks: Specification data are reference values.

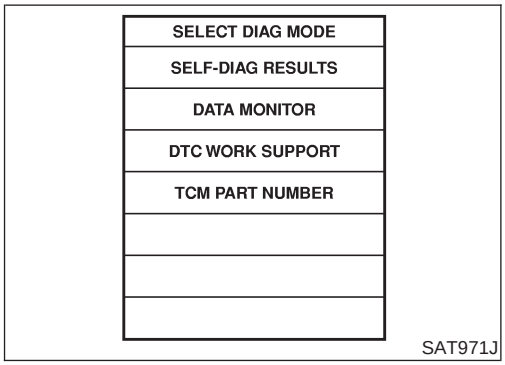
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
16	GY/L	Closed throttle position switch (in throttle position switch)		When releasing accelerator pedal after warming up engine.	Battery voltage
				When depressing accelerator pedal after warming up engine.	0V
17	P	Wide open throttle 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.	0V
32	R	Throttle position sensor (Power source)		Ignition switch ON.	4.5 - 5.5V
				Ignition switch OFF.	0V
41	W	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Throttle position sensor (Ground)	—	—	—

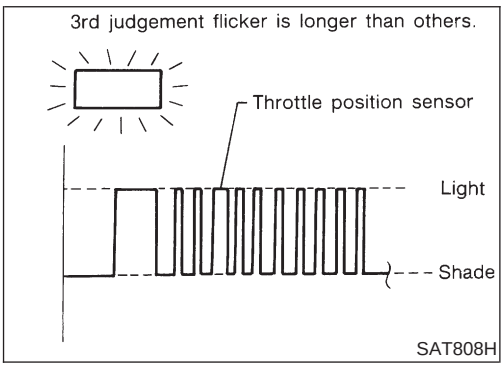
ON BOARD DIAGNOSIS LOGIC

=NFAT0298S03

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: THROTTLE POSI SEN	TCM receives an excessively low or high voltage from the sensor.	• Harness or connectors (The solenoid circuit is open or shorted.) • Throttle position sensor • Throttle position switch
: 3rd judgement flicker		







SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

NFAT0298S04

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

With CONSULT-II

NFAT0298S0401

1) Start engine.
2) Select "SELF-DIAG RESULTS" mode with CONSULT-II.
3) Drive vehicle under the following conditions:
   Selector lever in "D" position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/2 of the full throttle position and driving for more than 3 seconds.

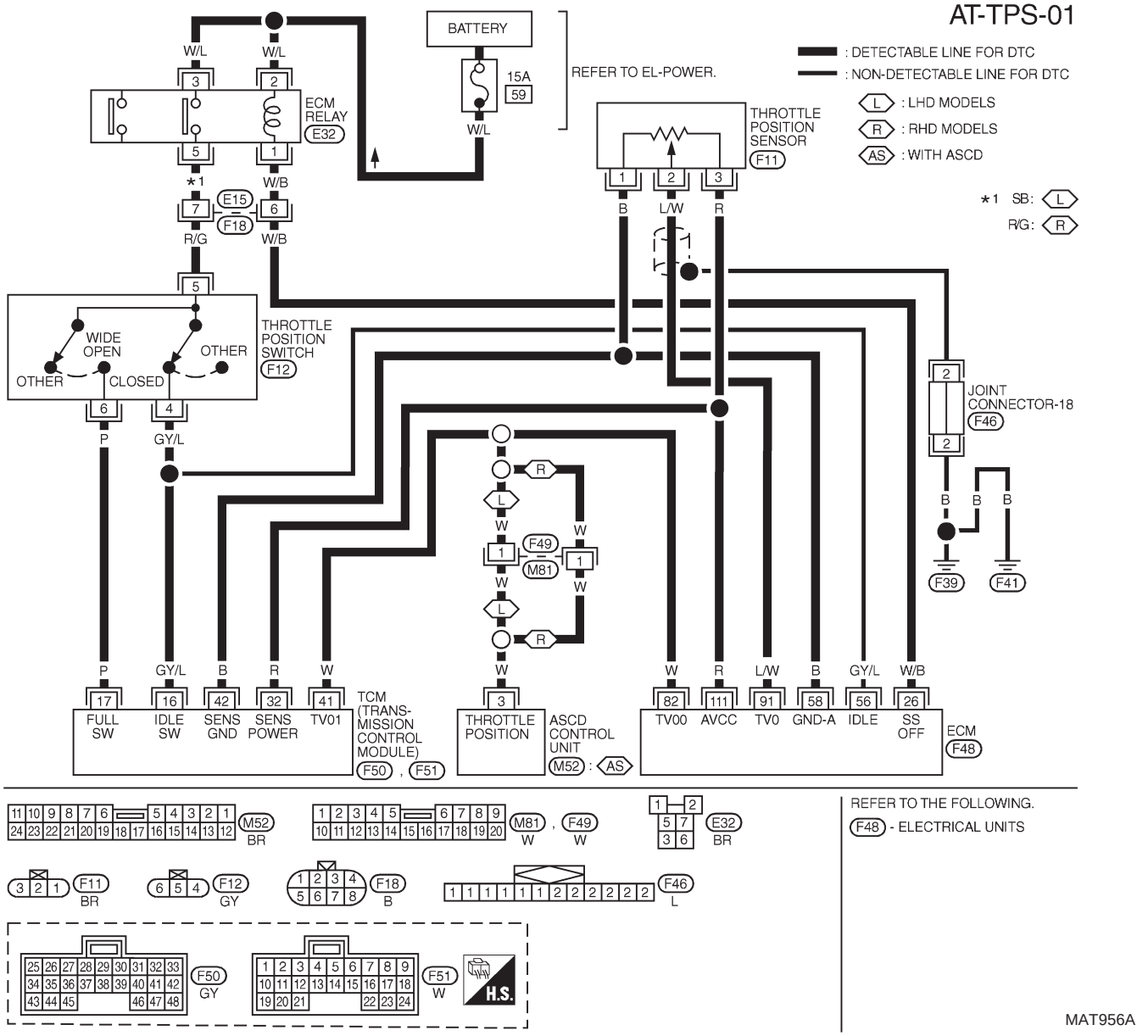
Without CONSULT-II

NFAT0298S0402

1) Start engine.
2) Drive vehicle under the following conditions:
   Selector lever in "D" position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/2 of the full throttle position and driving for more than 3 seconds.
3) Perform self-diagnosis.
   Refer to SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60.

Wiring Diagram — AT — TPS

NFAT0299



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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
16	GY/L	CLOSED THROTTLE POSITION SWITCH	WHEN IGN ON AND ACCELERATOR PEDAL IS RELEASED	BATTERY VOLTAGE
			WHEN IGN ON AND ACCELERATOR PEDAL IS DEPRESSED	0V
17	P	WIDE OPEN THROTTLE POSITION SWITCH	WHEN IGN ON AND ACCELERATOR PEDAL IS RELEASED	0V
			WHEN IGN ON AND ACCELERATOR PEDAL IS DEPRESSED	BATTERY VOLTAGE
32	R	THROTTLE POSITION SENSOR (POWER SORCE)	WHEN IGN ON	4.5 - 5.5V
			WHEN IGN OFF	0V
41	W	THROTTLE POSITION SENSOR	WHEN IGN ON AND ACCELERATOR PEDAL IS DEPRESSED SLOWLY AFTER WARMING UP ENGINE (VOLTAGE RISES GRADUALLY IN RESPONSE TO THROTLE POSITION.)	FULLY-CLOSED THROTTLE: 0.5V FULLY-OPEN THROTTLE: 4V
42	B	THROTTLE POSITION SENSOR (GROUND)	—	—

SAT351K

Diagnostic Procedure

NFAT0300

1	CHECK DTC WITH ECM

- Check P code with CONSULT-II “ENGINE”.
  Turn ignition switch ON and select “SELF-DIAG RESULTS” mode for “ENGINE” with CONSULT-II.

Refer to EC-60, “DESCRIPTION”.

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-151, “Description”.

2	CHECK INPUT SIGNAL (With CONSULT-II)

With CONSULT-II

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

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

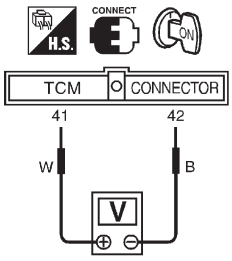
OK	▶	GO TO 4.
NG	▶	Check harness for short or open between ECM and TCM regarding throttle position sensor circuit. (Main harness)

Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL (Without CONSULT-II)

Without CONSULT-II

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



SAT349JA

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

OK or NG

OK	▶	GO TO 6.
NG	▶	Check harness for short or open between ECM and TCM regarding throttle position sensor circuit. (Main harness)

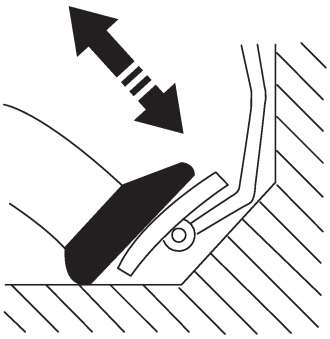
4	CHECK THROTTLE POSITION SWITCH CIRCUIT (With CONSULT-II)

With CONSULT-II

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

SAT646J

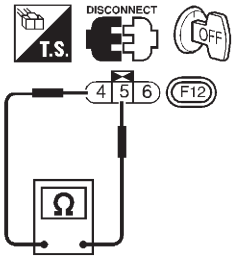
OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

Check the following items:
- Throttle position switch.

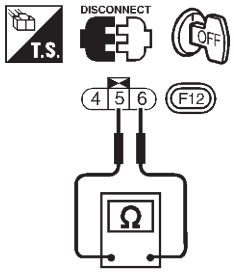
a. Closed throttle position switch (idle position)
i. Check continuity between terminals 4 and 5.



Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

SAT634J

ii. To adjust closed throttle position switch, refer to EC-477, "Component Description".
b. Wide open throttle position switch
i. Check continuity between terminals 5 and 6.



Accelerator pedal condition	Continuity
Released	No
Depressed	Yes

SAT635J

- 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)

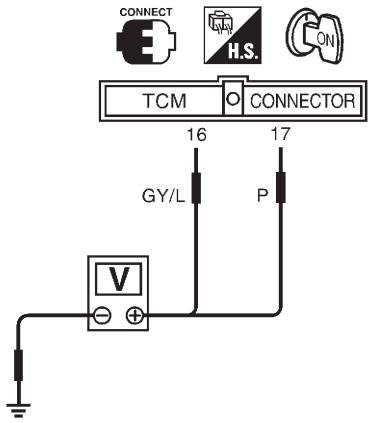
OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

6	CHECK THROTTLE POSITION 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 16, 17 and ground while depressing, and releasing accelerator pedal slowly.
   (After warming up engine)



SAT350JA

Accelerator pedal condition	Voltage (Approx.)	
	Terminal No. 16	Terminal No. 17
Released	Battery voltage	0V
Fully depressed	0V	Battery voltage

MTBL0629

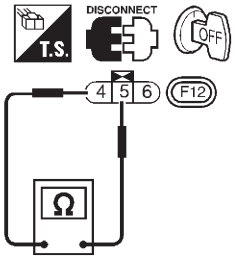
OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING ITEM

Check the following items:
- Throttle position switch.

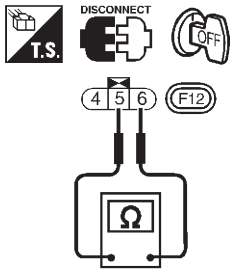
a. Closed throttle position switch (idle position)
i. Check continuity between terminals 4 and 5.



Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

SAT634J

ii. To adjust closed throttle position switch, refer to EC-477, "Component Description".
b. Wide open throttle position switch
i. Check continuity between terminals 5 and 6.



Accelerator pedal condition	Continuity
Released	No
Depressed	Yes

SAT635J

- 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)

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

8	CHECK DTC

Perform Self-diagnosis Code confirmation procedure, AT-229.

OK or NG

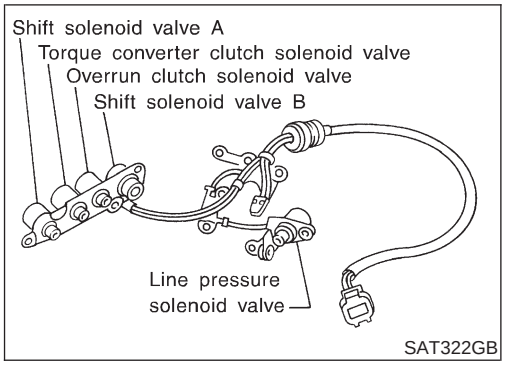
OK	▶	**INSPECTION END**
NG	▶	GO TO 9.

9	CHECK TCM INSPECTION

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

OK or NG

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



Description

NFAT0301

Shift solenoid valves A and B are turned ON or OFF by the TCM in response to signals sent from the park/neutral position (PNP) switch, vehicle speed and 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)

TCM TERMINALS AND REFERENCE VALUE

NFAT0301S01

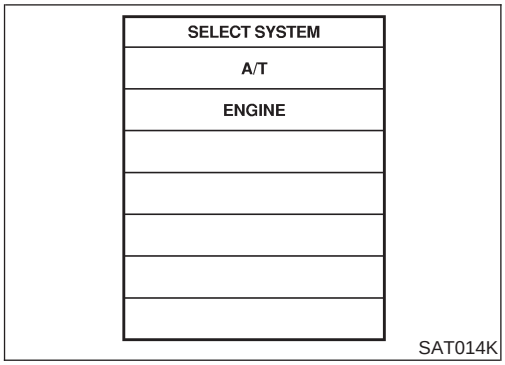
Remarks: Specification data are reference values.

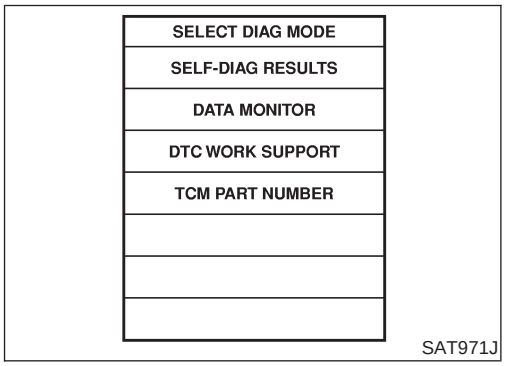
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
11	R/Y	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in D_1 or D_4.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in D_2 or D_3.)	0V

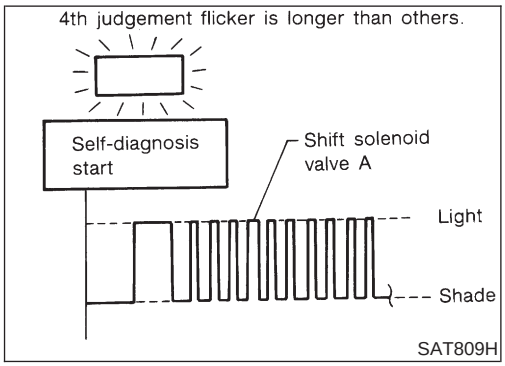
ON BOARD DIAGNOSIS LOGIC

NFAT0301S02

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: SHIFT SOLENOID/V A	TCM detects an improper voltage drop when it tires to operate the solenoid valve.	• Harness or connectors (The solenoid circuit is open or shorted.) • Shift solenoid valve A
: 4th judgement flicker		







SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

NFAT0301S03

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

With CONSULT-II

NFAT0301S0301

1) Start engine.
2) Select "SELF-DIAG RESULTS" mode with CONSULT-II.
3) Drive vehicle in $D_1 \rightarrow D_2$ position.

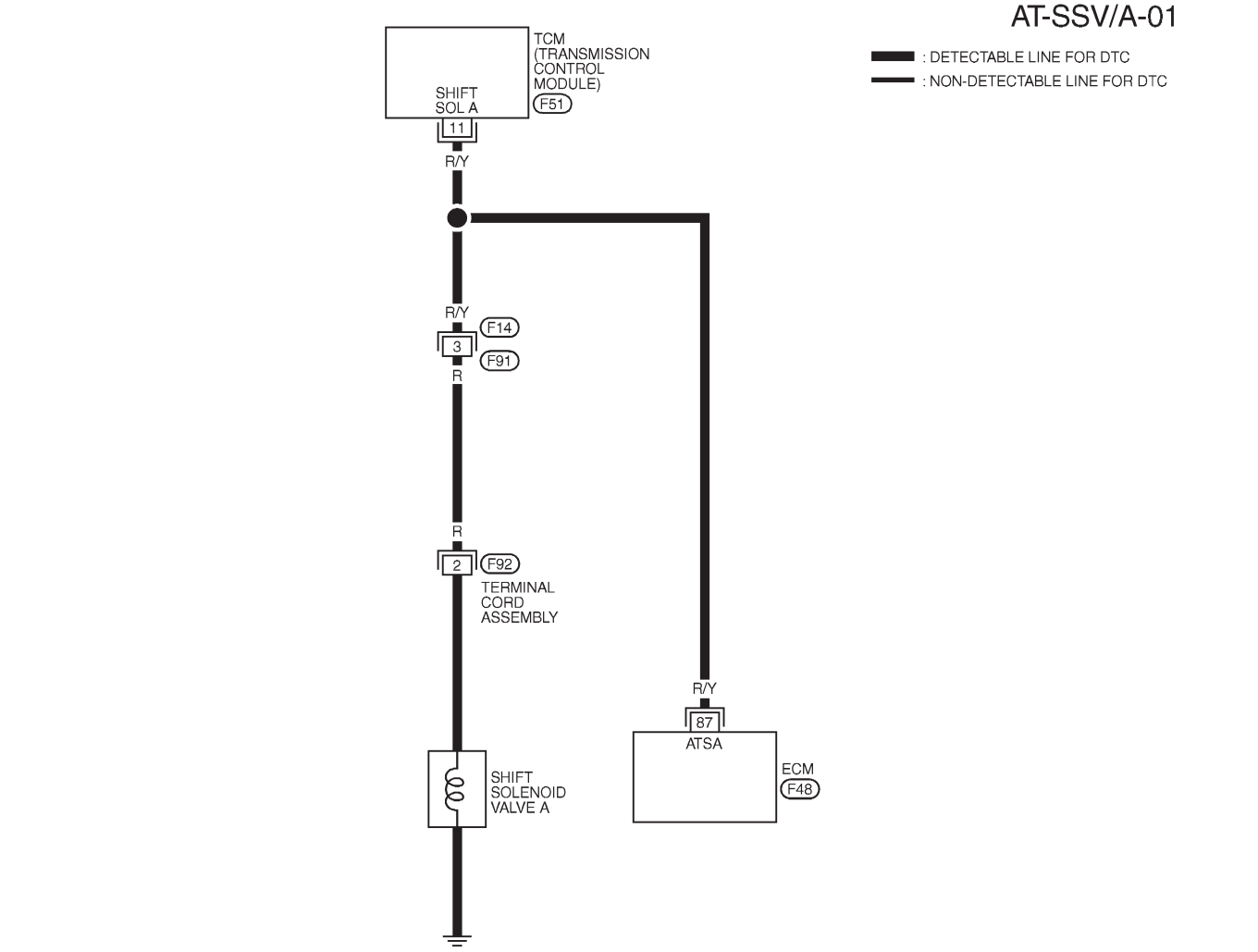
Without CONSULT-II

NFAT0301S0302

1) Start engine.
2) Drive vehicle in $D_1 \rightarrow D_2$ position.
3) Perform self-diagnosis.
   Refer to SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60.

Wiring Diagram — AT — SSV/A

NFAT0302



MAT872A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V

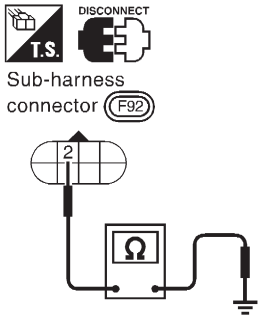
SAT349K

Diagnostic Procedure

NFAT0303

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 - 30Ω (Approx.)

SAT632JA

OK or NG

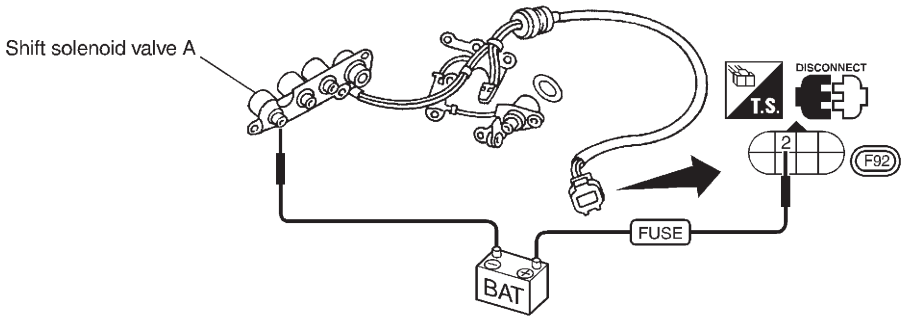
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:

- Shift solenoid valve A
- Operation check

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



SAT035K

- Harness of terminal cord assembly for short or open

OK or NG

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

3	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between sub-harness connector terminal 2 and TCM harness connector terminal 11. Refer to wiring diagram — AT — SSV/A.
   Continuity should exist.
   If OK, check harness for short to ground and short to power.
4. Reinstall any part removed.

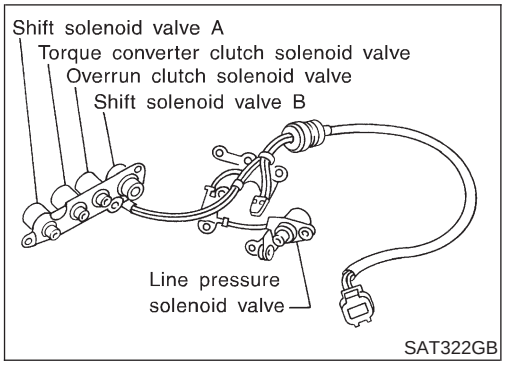
OK or NG

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

Diagnostic Procedure (Cont'd)

4	CHECK DTC	
Perform Self-diagnosis Code confirmation procedure, AT-237.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

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



Description

NFAT0304

Shift solenoid valves A and B are turned ON or OFF" by the TCM in response to signals sent from the park/neutral position (PNP) switch, vehicle speed and 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)

TCM TERMINALS AND REFERENCE VALUE

NFAT0304S01

Remarks: Specification data are reference values.

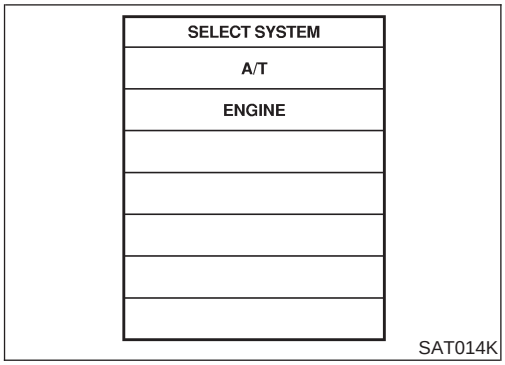
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
12	LG/B	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in D_1 or D_2.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in D_3 or D_4.)	0V

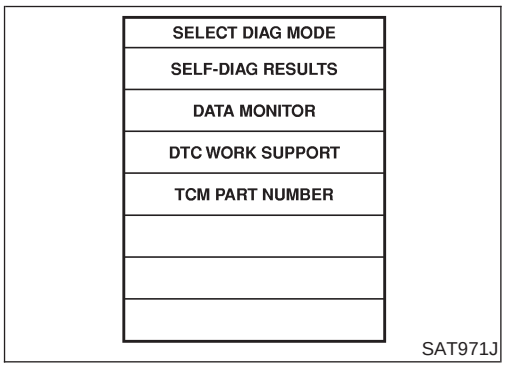
ON BOARD DIAGNOSIS LOGIC

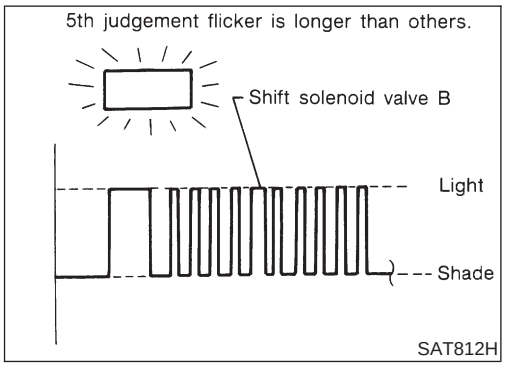
NFAT0304S02

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: SHIFT SOLENOID/V B	TCM detects an improper voltage drop when it tires to operate the solenoid valve.	• Harness or connectors (The solenoid circuit is open or shorted.) • Shift solenoid valve B
: 5th judgement flicker		

Description (Cont'd)







SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

NFAT0304S03

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

With CONSULT-II

NFAT0304S0301

1) Start engine.
2) Select "SELF-DIAG RESULTS" mode with CONSULT-II.
3) Drive vehicle in $D_1 \rightarrow D_2 \rightarrow D_3$ position.

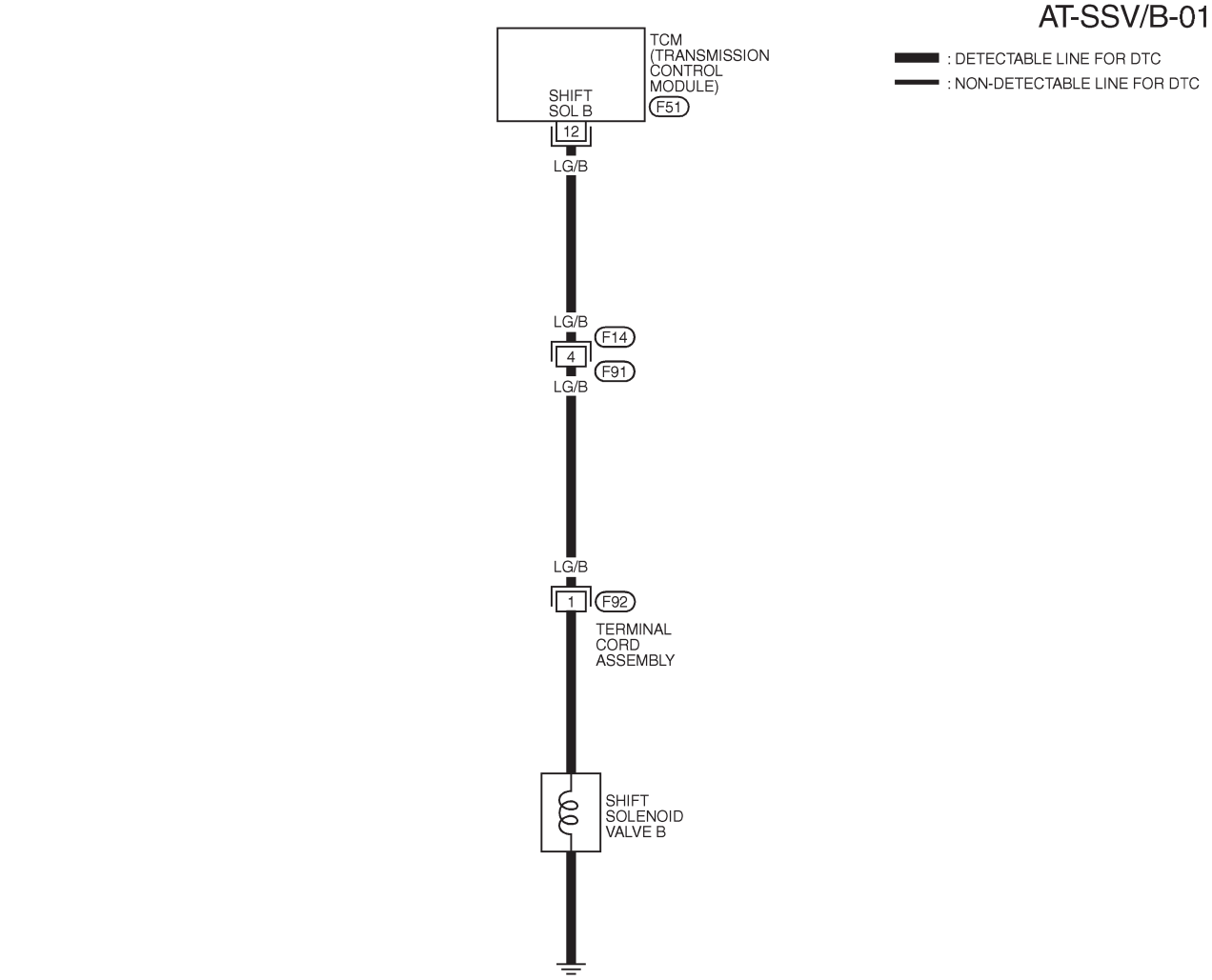
Without CONSULT-II

NFAT0304S0302

1) Start engine.
2) Drive vehicle in $D_1 \rightarrow D_2 \rightarrow D_3$ position.
3) Perform self-diagnosis.
   Refer to SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60.

Wiring Diagram — AT — SSV/B

NFAT0305



MAT816A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
12	LG/B	SHIFT SOLENOID VALVE B	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B OPERATES (WHEN DRIVING IN D1 OR D2)	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE B DOES NOT OPERATE (WHEN DRIVING IN D3 OR D4)	0V

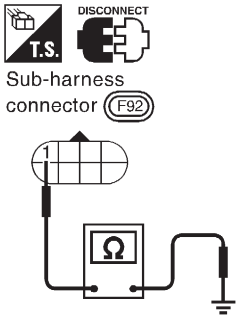
SAT350K

Diagnostic Procedure

NFAT0306

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 - 20 Ω

SAT633JC

OK or NG

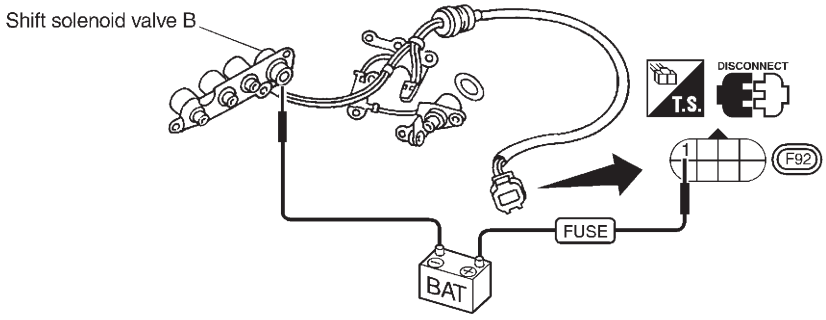
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:

- Shift solenoid valve B
- Operation check

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



SAT036K

- Harness of terminal cord assembly for short or open

OK or NG

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

3	CHECK POWER SOURCE CIRCUIT

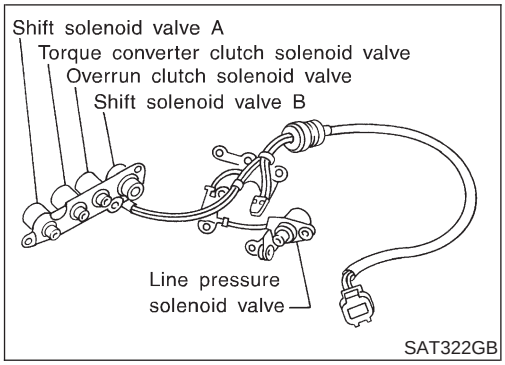
1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between sub-harness connector terminal 1 and TCM harness connector terminal 12. Refer to wiring diagram — AT — SSV/B.
   Continuity should exist.
   If OK, check harness for short to ground and short to power.
4. Reinstall any part removed.

OK or NG

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

4	CHECK DTC	
Perform Self-diagnosis Code confirmation procedure, AT-242.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

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



Description

NFAT0307

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

TCM TERMINALS AND REFERENCE VALUE

NFAT0307S01

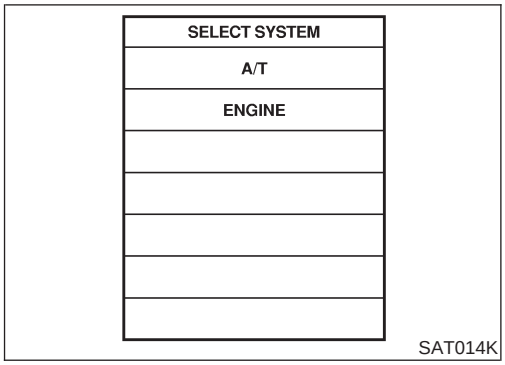
Remarks: Specification data are reference values.

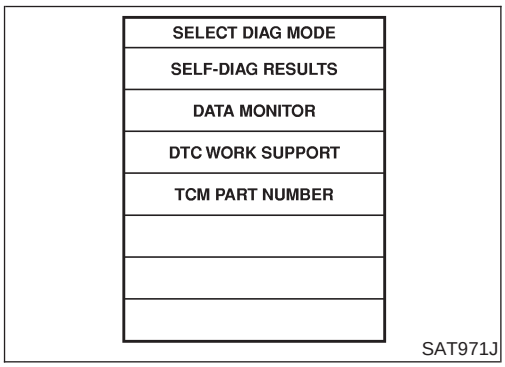
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
20	BR/Y	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	0V

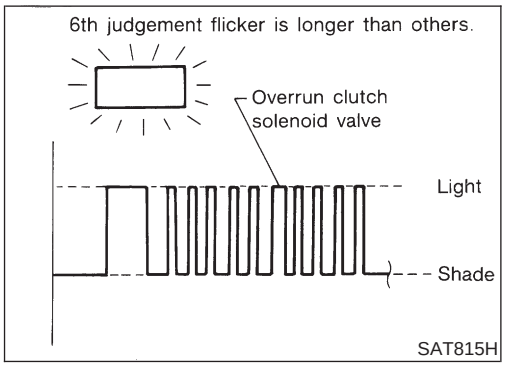
ON BOARD DIAGNOSIS LOGIC

NFAT0307S02

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: OVERRUN CLUTCH S/V	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
: 6th judgement flicker		







SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

NFAT0307S03

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

With CONSULT-II

NFAT0307S0301

1) Start engine.
2) Select "SELF-DIAG RESULTS" mode with CONSULT-II.
3) Drive vehicle under the following conditions:
   Selector lever in "D" position, overdrive control switch in "OFF" position and vehicle speed higher than 10 km/h (6 MPH).

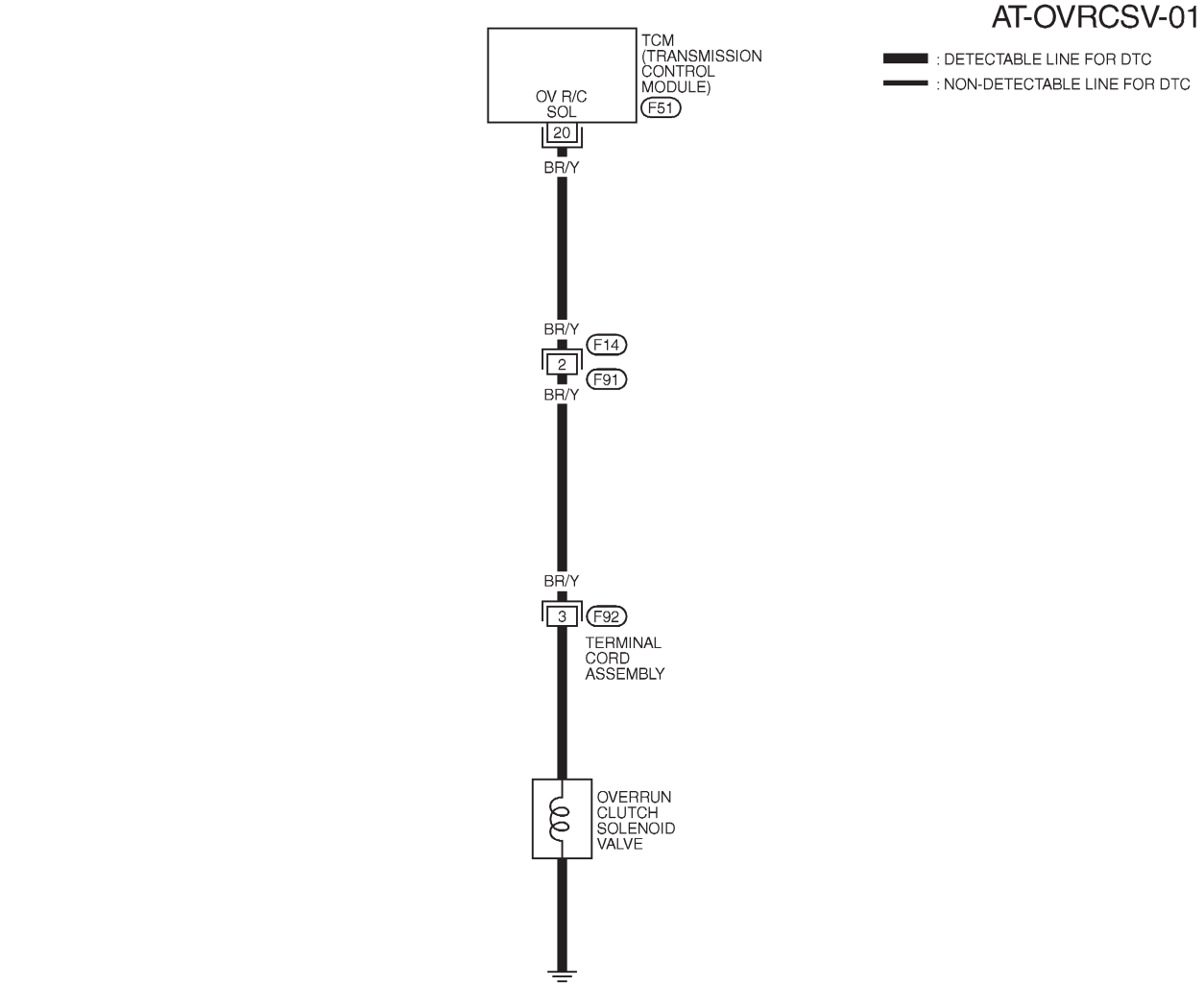
Without CONSULT-II

NFAT0307S0302

1) Start engine.
2) Drive vehicle under the following conditions:
   Selector lever in "D" position, overdrive control switch in "OFF" position and vehicle speed higher than 10 km/h (6 MPH).
3) Perform self-diagnosis.
   Refer to SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60.

Wiring Diagram — AT — OVRCSV

NFAT0308



MAT818A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
20	BR/Y	OVERRUN CLUTCH SOLENOID VALVE	WHEN VEHICLE STARTS AND OVERRUN CLUTCH S/V OPERATES	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND OVERRUN CLUTCH S/V DOES NOT OPERATE	0V

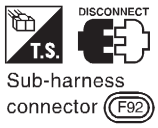
SAT352K

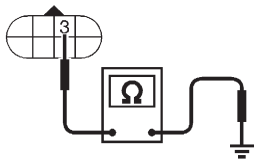
Diagnostic Procedure

NFAT0309

1	CHECK VLAVE 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 - 30 Ω (Approx.)

SAT637JA

OK or NG

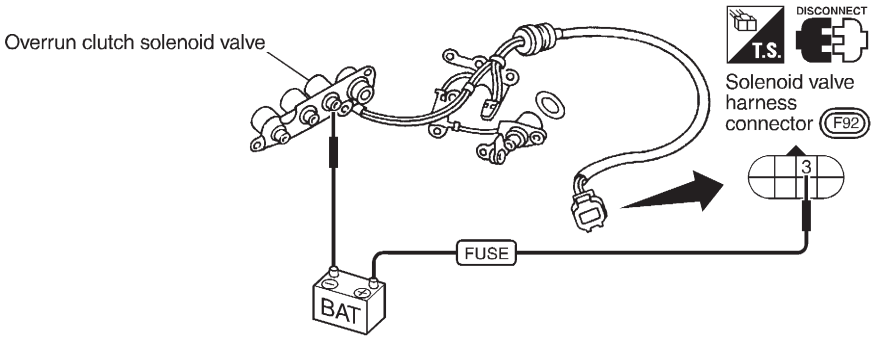
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:

- Overrun clutch solenoid valve
- Operation check

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



SAT638J

- Harness of terminal cord assembly for short or open

OK or NG

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

3	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between sub-harness connector terminal 3 and TCM harness connector terminal 20. Refer to wiring diagram — AT — OVRCVS.

   Continuity should exist.

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

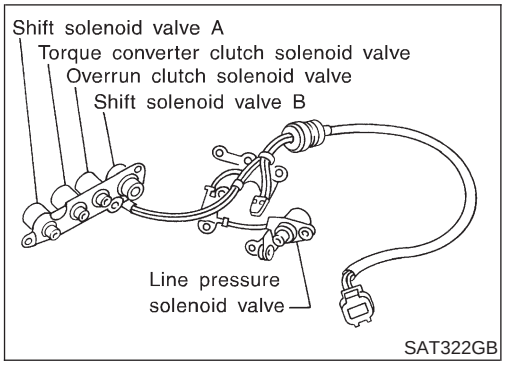
OK or NG

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

Diagnostic Procedure (Cont'd)

4	CHECK DTC	
Perform Self-diagnosis Code confirmation procedure, AT-247.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

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



Description

NFAT0310

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

NFAT0310S01

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%

TCM TERMINALS AND REFERENCE VALUE

NFAT0310S02

Remarks: Specification data are reference values.

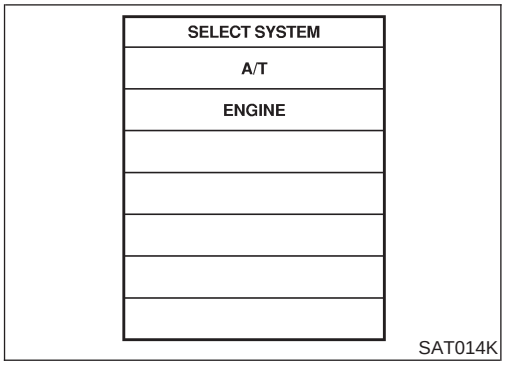
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
3	G/B	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V

ON BOARD DIAGNOSIS LOGIC

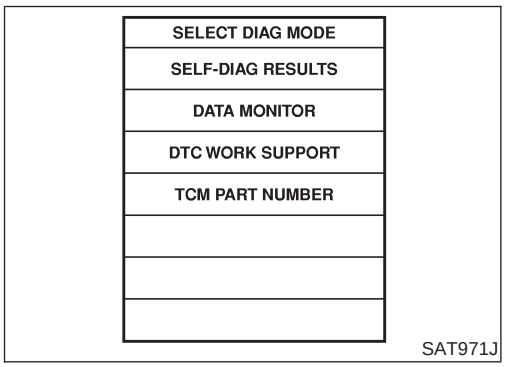
NFAT0310S03

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: T/C CLUTCH SOL/V : 7th judgement flicker	TCM detects an improper voltage drop when it tires to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Torque converter clutch solenoid valve

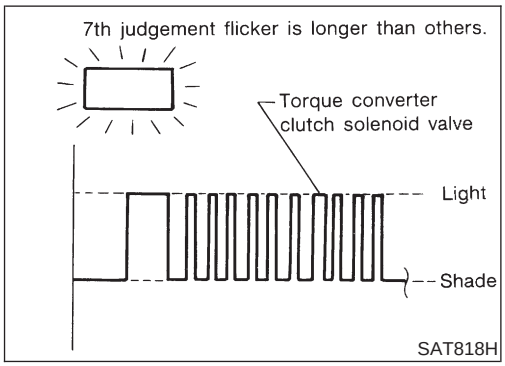
Description (Cont'd)



SAT014K



SAT971J



SAT818H

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

NFAT0310S04

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

With CONSULT-II

NFAT0310S0401

1) Start engine.
2) Select "SELF-DIAG RESULTS" mode with CONSULT-II.
3) Drive vehicle in $D_1 \rightarrow D_2 \rightarrow D_3 \rightarrow D_4 \rightarrow D_4$ lock-up position.

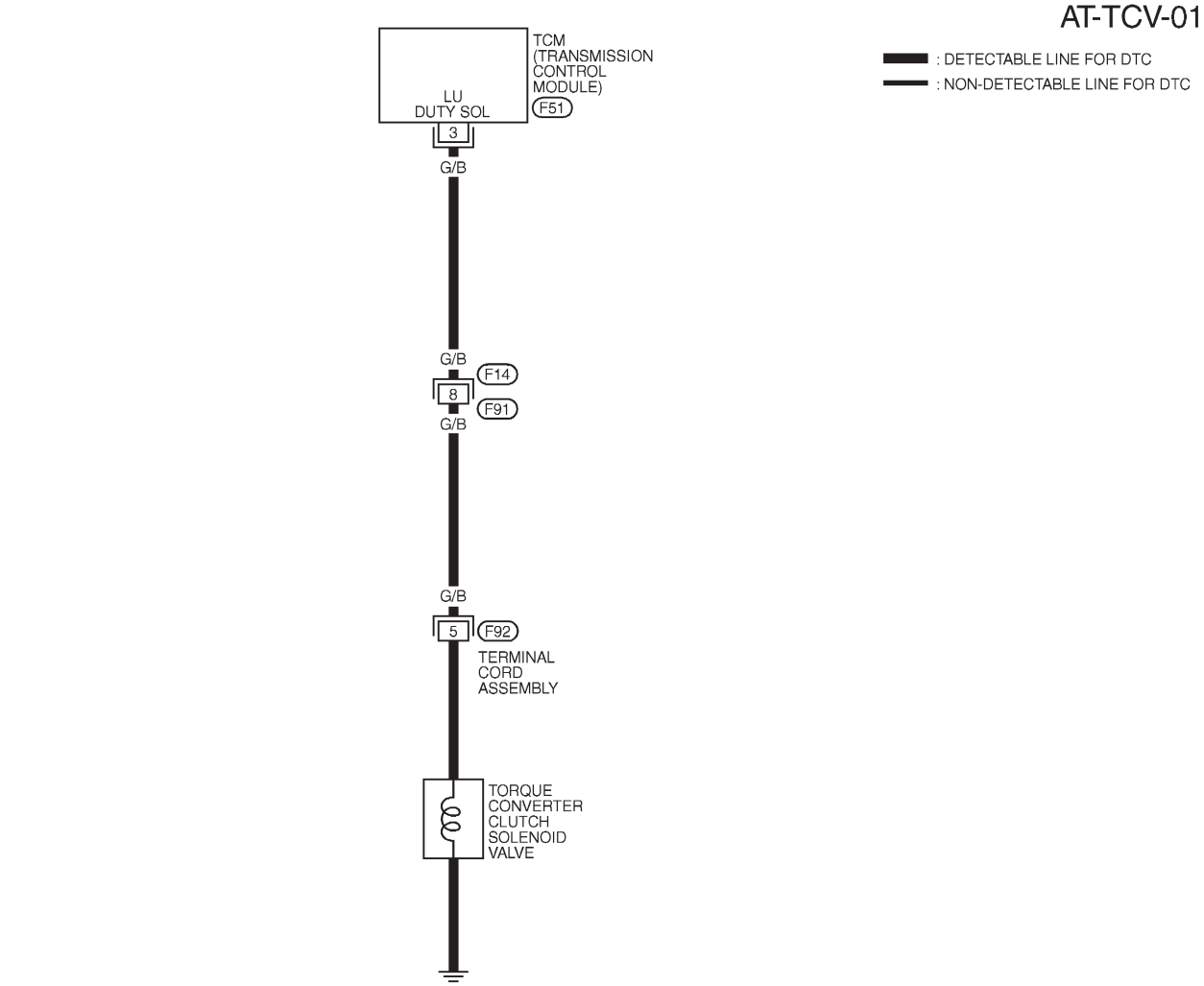
Without CONSULT-II

NFAT0310S0402

1) Start engine.
2) Drive vehicle in $D_1 \rightarrow D_2 \rightarrow D_3 \rightarrow D_4 \rightarrow D_4$ lock-up position.
3) Perform self-diagnosis.
   Refer to SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60.

Wiring Diagram — AT — TCV

NFAT0311



MAT812A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
3	G/B	TORQUE CONVERTER CLUTCH SOLENOID VALVE	VEHICLE STARTS AND A/T PERFORMS LOCK-UP	8 - 15V
			VEHICLE STARTS AND A/T DOES NOT PERFORM LOCK-UP	0V

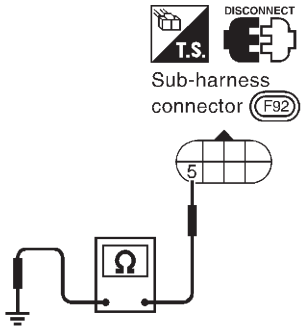
SAT347K

Diagnostic Procedure

NFAT0312

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 (Approx.)

SAT627JB

OK or NG

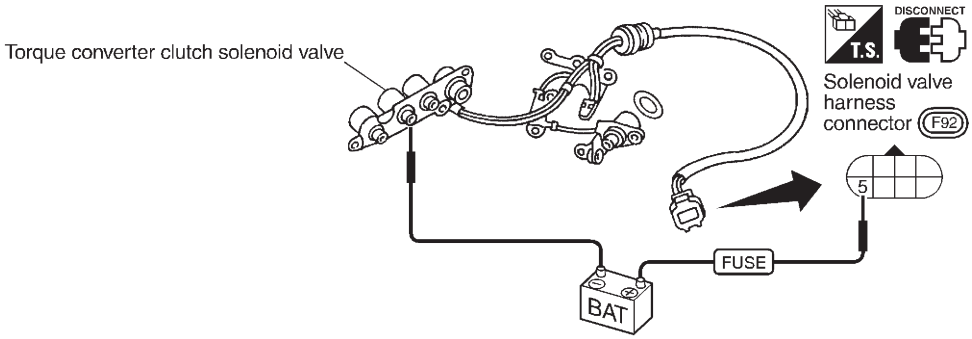
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK VALVE OPERATION

1. Remove oil pan. Refer to AT-346.
2. Check the following items:

- Torque converter clutch solenoid valve

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



SAT037K

- Harness of terminal cord assembly for short or open

OK or NG

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

3	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between sub-harness connector terminal 5 and TCM harness connector terminal 3. Refer to wiring diagram — AT — TCV.

   Continuity should exist.

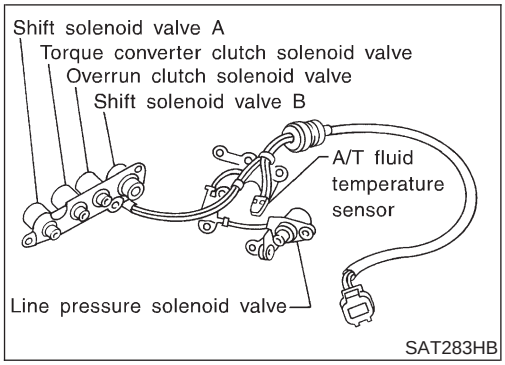
   If OK, check harness for short to ground and short to power.
4. Reinstall any part removed.

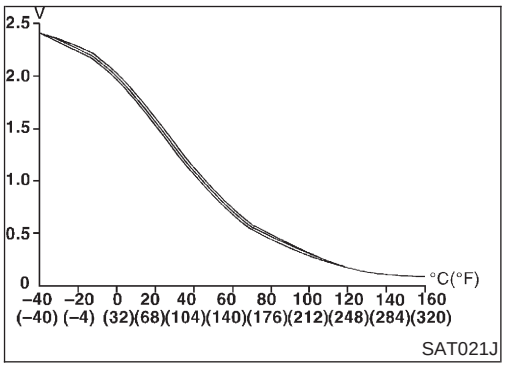
OK or NG

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

4	CHECK DTC	
Perform Self-diagnosis Code confirmation procedure, AT-252.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

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





Description

NFAT0313

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

NFAT0313S01

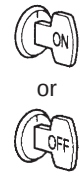
Remarks: Specification data are reference values.

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

TCM TERMINALS AND REFERENCE VALUE

NFAT0313S02

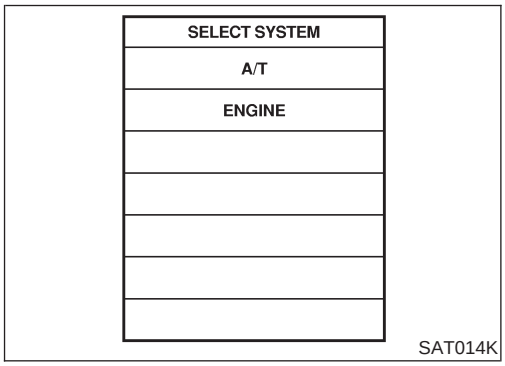
Remarks: Specification data are reference values.

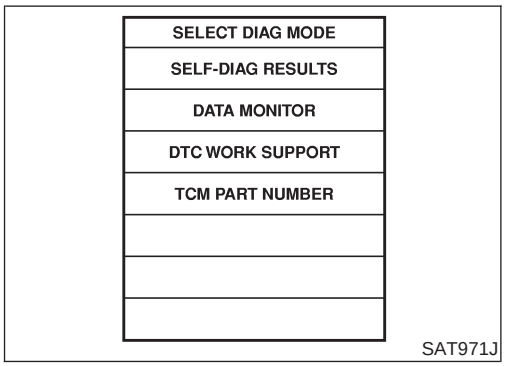
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
10	R/Y	Power source		When turning ignition switch to ON.	Battery voltage
				When turning ignition switch to OFF.	0V
19	R/Y	Power source		Same as No. 10	
28	Y/R	Power source (Memory back-up)		When turning ignition switch to OFF.	Battery voltage
				When turning ignition switch to ON.	Battery voltage
42	B	Throttle position sensor (Ground)	—	—	—
47	G	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V

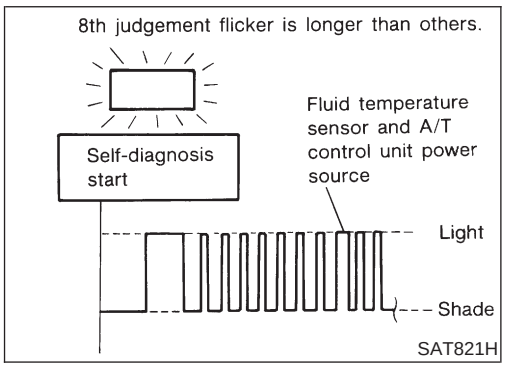
ON BOARD DIAGNOSIS LOGIC

NFAT0313S03

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: BATT/FLUID TEMP SEN : 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







SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

NFAT0313S04

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

With CONSULT-II

NFAT0313S0401

1) Start engine.
2) Select "SELF-DIAG RESULTS" mode with CONSULT-II.
3) Drive vehicle under the following conditions:
   Selector lever in "D" position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/8 of the full open position, engine speed higher than 450 rpm and driving for more than 10 minutes.

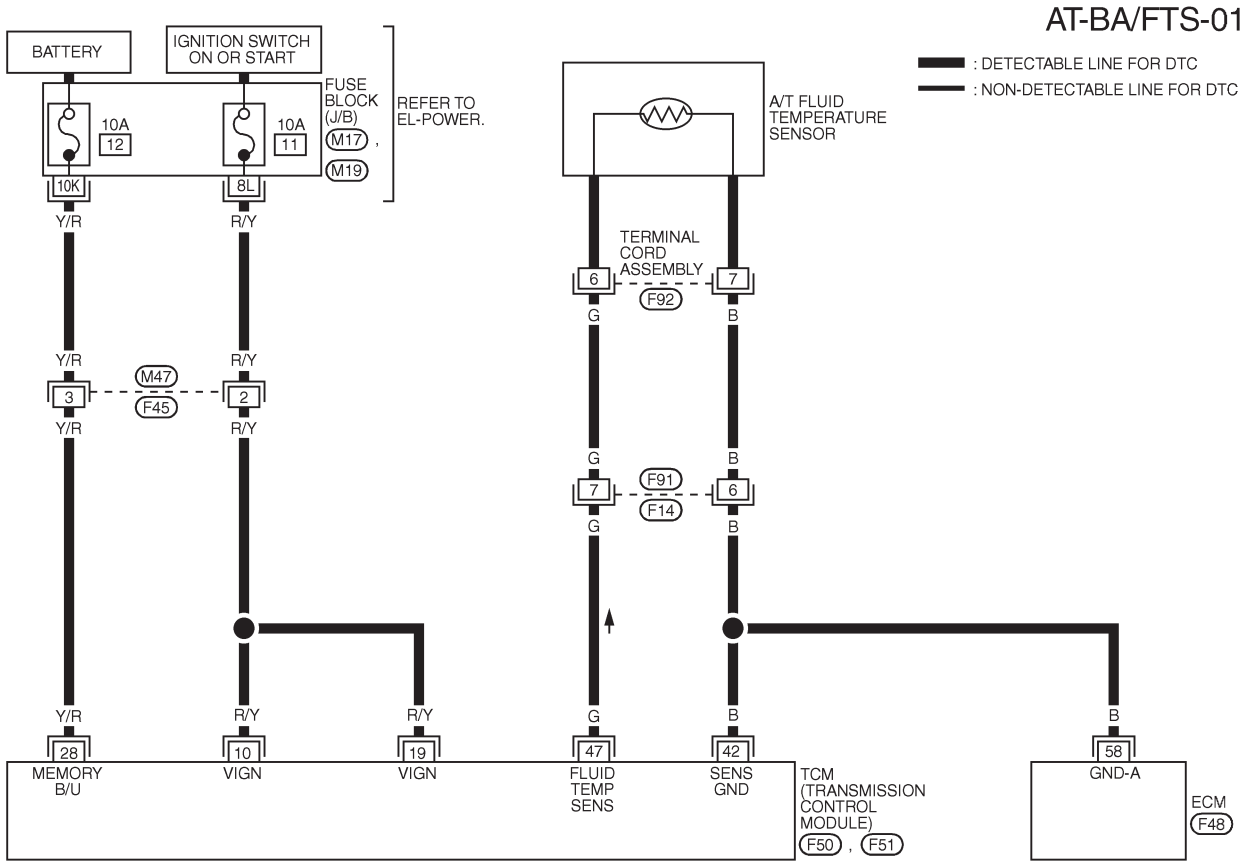
Without CONSULT-II

NFAT0313S0402

1) Start engine.
2) Drive vehicle under the following conditions:
   Selector lever in "D" position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/8 of the full open position, engine speed higher than 450 rpm and driving for more than 10 minutes.
3) Perform self-diagnosis.
   Refer to SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60.

Wiring Diagram — AT — BA/FTS

NFAT0314



REFER TO THE FOLLOWING.
M17, M19 - FUSE BLOCK - JUNCTION BOX (J/B)
F48 - ELECTRICAL UNITS

MAT863A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
10	R/Y	POWER SORCE	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	0V
19	R/Y	POWER SORCE	SAME AS NO. 10	
28	Y/R	POWER SORCE (MEMORY BACK-UP)	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	BATTERY VOLTAGE
42	B	THROTTLE POSITION SENSOR (GROUND)	—	—
47	G	A/T FLUID TEMPERATURE SENSOR	WHEN IGN ON AND ATF TEMPERATURE IS 20°C (68°F)	1.5V
			WHEN IGN ON AND ATF TEMPERATURE IS 80°C (176°F)	0.5V

SAT353K

Diagnostic Procedure

NFAT0315

1	CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (With CONSULT-II)

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “FLUID TEMP SE”.

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

SAT614J

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

OK or NG

OK	▶	GO TO 9.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING ITEM

Check the following items:

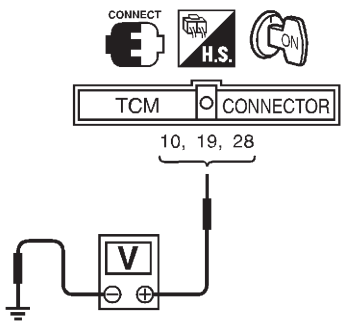
- Harness for short or open between TCM, ECM and terminal cord assembly (Main harness)
- Ground circuit for ECM
  Refer to EC-127, “WIRING DIAGRAM”.

OK or NG

OK	▶	GO TO 9.
NG	▶	Repair or replace damged parts.

3	CHECK TCM POWER SOURCE STEP 1

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



Voltage:
Battery voltage

SAT611J

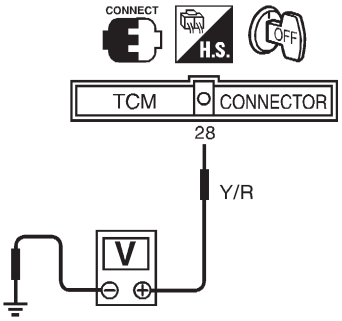
OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 5.

Diagnostic Procedure (Cont'd)

4	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

SAT612J

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

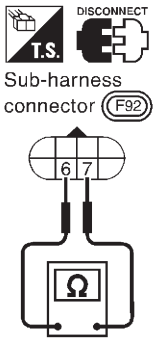
Check the following items:
- Harness for short or open between ignition switch and TCM (Main harness)
- Ignition switch and 10A fuse [No. 11, 12, located in the fuse block (J/B)]
  Refer to EL-9, "Schematic".

OK or NG

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

6	CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

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



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

SAT616J

4. Reinstall any part removed.

OK or NG

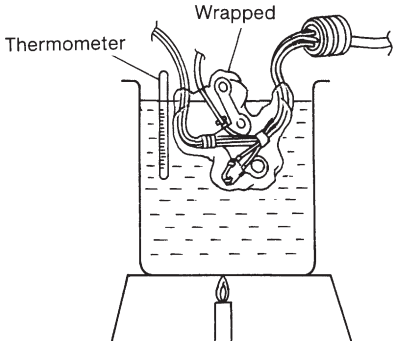
OK (without CONSULT-II)	▶	GO TO 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING ITEM

1. Remove oil pan. Refer to AT-346.
2. Check the following items:

- A/T fluid temperature sensor

i. Check resistance between two terminals while changing temperature as shown below.



SAT298F

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

MTBL0210

- Harness of terminal cord assembly for short or open

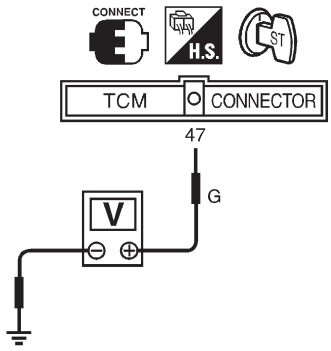
OK or NG

OK (without CONSULT-II)	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

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

Without CONSULT-II

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



SAT354J

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

3. Turn ignition switch to OFF position.
4. Disconnect TCM harness connector.
5. Check resistance between terminal 42 and ground. Refer to wiring diagram — AT — BA/FTS.

Continuity should exist.

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 9.

Diagnostic Procedure (Cont'd)

9	DETECT MALFUNCTIONING ITEM
Check the following items: ● Harness for short or open between TCM, ECM and terminal cord assembly (Main harness) ● Ground circuit for ECM Refer to EC-127, "WIRING DIAGRAM".	
OK or NG	
OK ▶	GO TO 10.
NG ▶	Repair or replace damaged parts.

10	CHECK DTC
Perform Self-diagnosis Code confirmation procedure, AT-257.	
OK or NG	
OK ▶	**INSPECTION END**
NG ▶	GO TO 11.

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

Description

NFAT0316

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

TCM TERMINALS AND REFERENCE VALUE

NFAT0316S01

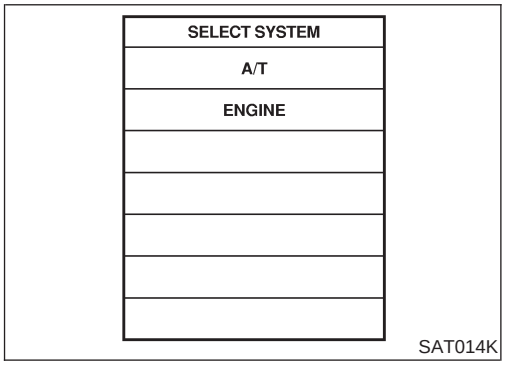
Remarks: Specification data are reference values.

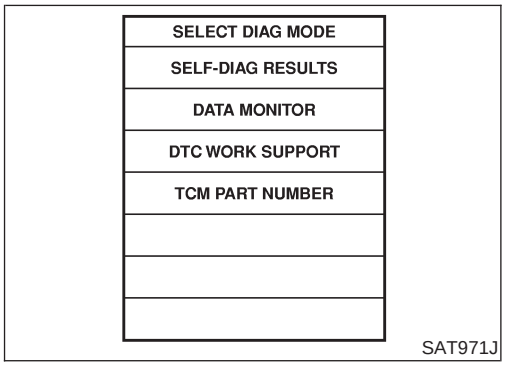
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
39	W/G	Engine speed signal		When engine runs at idle speed.	0.6V
				When engine runs at 3,000 rpm.	2.2V

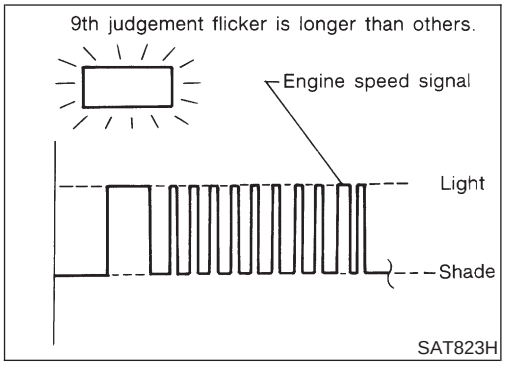
ON BOARD DIAGNOSIS LOGIC

NFAT0316S02

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: ENGINE SPEED SIG	TCM does not receive the proper voltage signal from ECM.	● Harness or connectors (The sensor circuit is open or shorted.)
: 9th judgement flicker		







SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

NFAT0316S03

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

With CONSULT-II

NFAT0316S0301

1) Start engine.
2) Select “SELF-DIAG RESULTS” mode with CONSULT-II.
3) Drive vehicle under the following conditions:
   Selector lever in “D” position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/8 of the full throttle position and driving for more than 10 seconds.

Without CONSULT-II

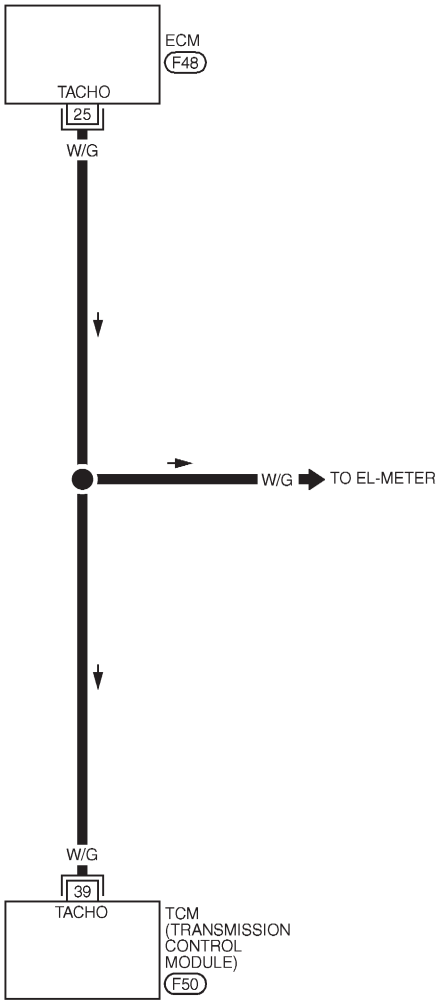
NFAT0316S0302

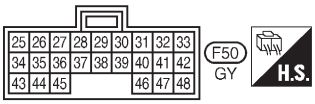
1) Start engine.
2) Drive vehicle under the following conditions:
   Selector lever in “D” position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/8 of the full throttle position and driving for more than 10 seconds.
3) Perform self-diagnosis.
   Refer to SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60.

Wiring Diagram — AT — ENGSS

NFAT0317

AT-ENGSS-01





REFER TO THE FOLLOWING.
F48 - ELECTRICAL UNITS

MAT807A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
39	W/G	ENGINE SPEED SIGNAL.	WHEN ENGINE RUNS AT IDLE SPEED	0.6 V
			WHEN ENGINE RUNS AT 3,000 RPM	0.5 V

SAT363K

Diagnostic Procedure

NFAT0318

1	CHECK DTC WITH ECM

- Check P code with CONSULT-II “ENGINE”.
  Turn ignition switch ON and select “SELF-DIAGNOSTIC RESULTS” mode for “ENGINE” with CONSULT-II.
  Refer to EC-60, “DESCRIPTION”.

OK or NG

OK (with CONSULT-II)	▶	GO TO 2.
OK (without CONSULT-II)	▶	GO TO 4.
NG	▶	Check ignition signal circuit for engine control. Refer to EC-369, “Component Description”.

2	CHECK INPUT SIGNAL (With CONSULT-II)

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “ENGINE SPEED”.
   Check engine speed changes according to throttle position.

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 6.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
  Refer to EC-369, “Component Description”.

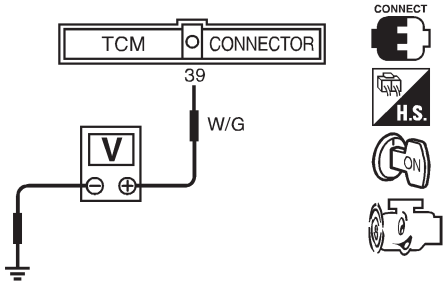
OK or NG

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

4	CHECK INPUT SIGNAL (Without CONSULT-II)

Without CONSULT-II

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



SAT520JA

Voltage:
0.6 (Idle speed) - 2.2V (4,000 rpm)

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
  Refer to EC-369, "Component Description".

OK or NG

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

6	CHECK DTC

Perform Self-diagnosis Code confirmation procedure, AT-263.

OK or NG

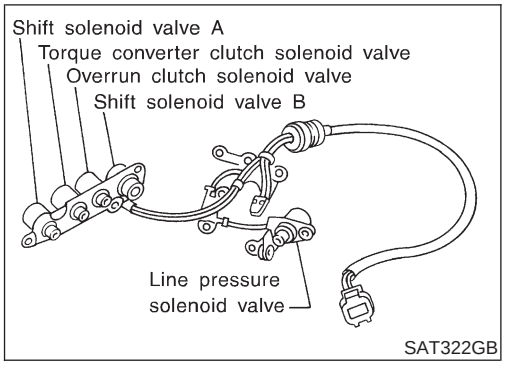
OK	▶	**INSPECTION END**
NG	▶	GO TO 7.

7	CHECK TCM INSPECTION

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

OK or NG

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



Description

NFAT0319

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

NFAT0319S01

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.

TCM TERMINALS AND REFERENCE VALUE

NFAT0319S02

Remarks: Specification data are reference values.

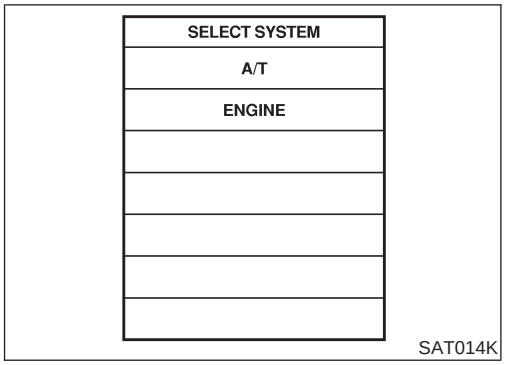
Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	G/R	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	W/B	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V

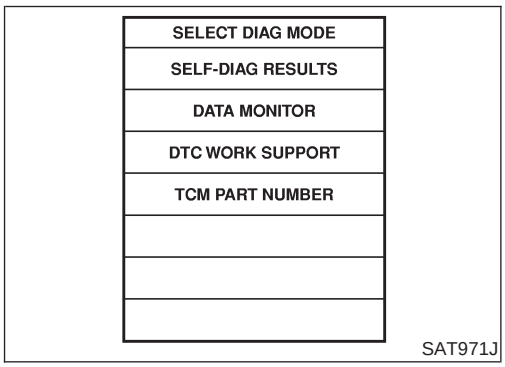
ON BOARD DIAGNOSIS LOGIC

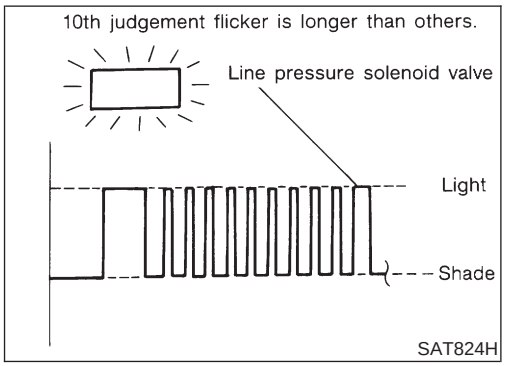
NFAT0319S03

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: LINE PRESSURE S/V	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
: 10th judgement flicker		

Description (Cont'd)







SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

NFAT0319S04

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

With CONSULT-II

NFAT0319S0401

1) Start engine.
2) Select "SELF-DIAG RESULTS" mode with CONSULT-II.
3) With brake pedal depressed, shift the lever from "P" → "N" → "D" → "N" → "P" positions.

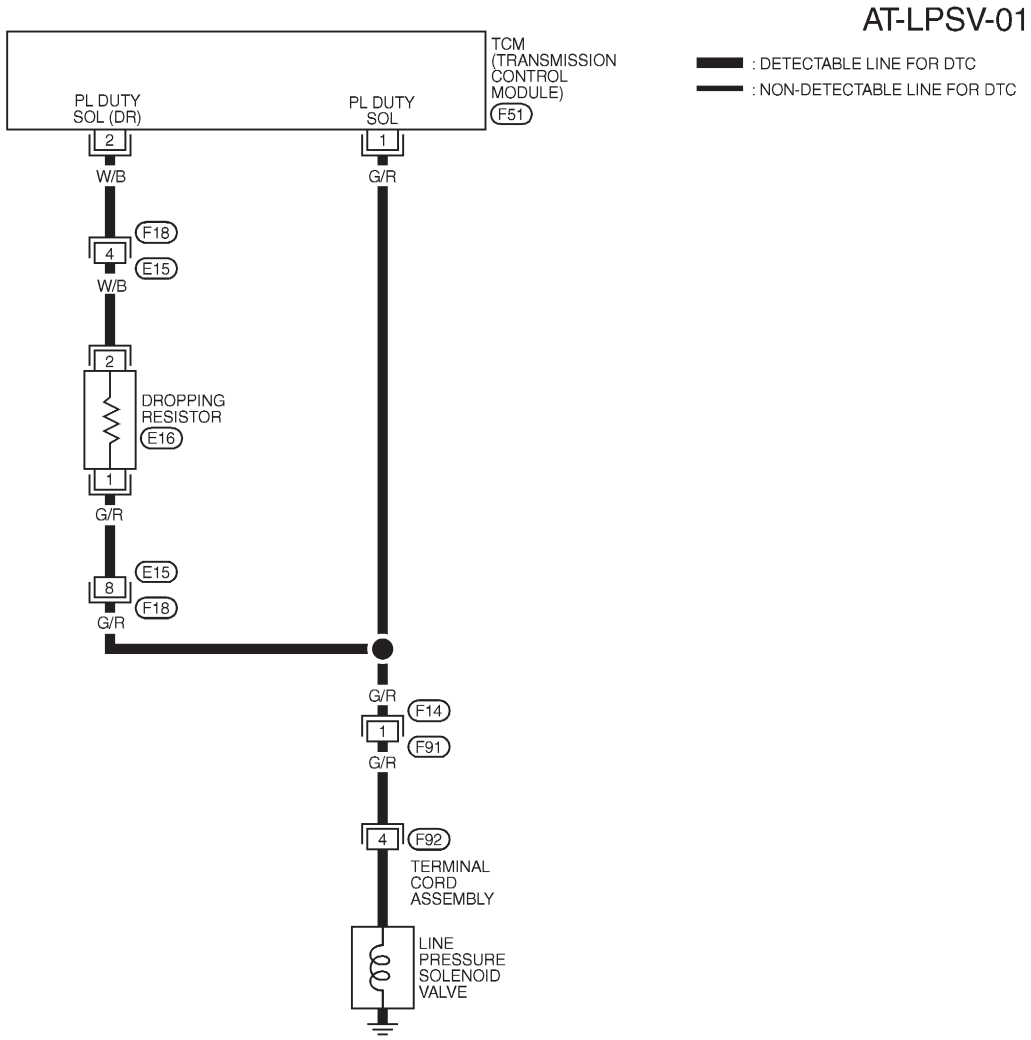
Without CONSULT-II

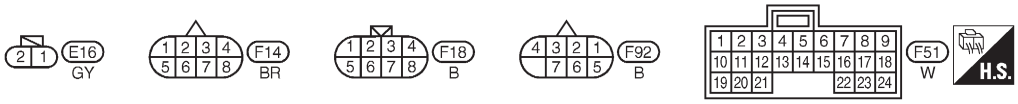
NFAT0319S0402

1) Start engine.
2) With brake pedal depressed, shift the lever from "P" → "N" → "D" → "N" → "P" positions.
3) Perform self-diagnosis.
   Refer to SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II), AT-60.

Wiring Diagram — AT — LPSV

NFAT0320





MAT814A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
1	G/R	LINE PRESSURE SOLENOID VALVE	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	1.5 - 3.0V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
2	W/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	4 - 14V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V

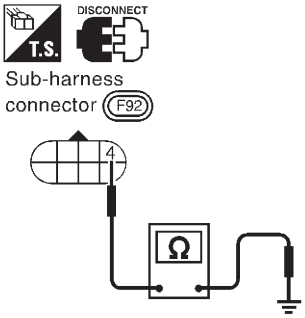
SAT348K

Diagnostic Procedure

NFAT0321

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 (Approx.)

SAT630JA

OK or NG

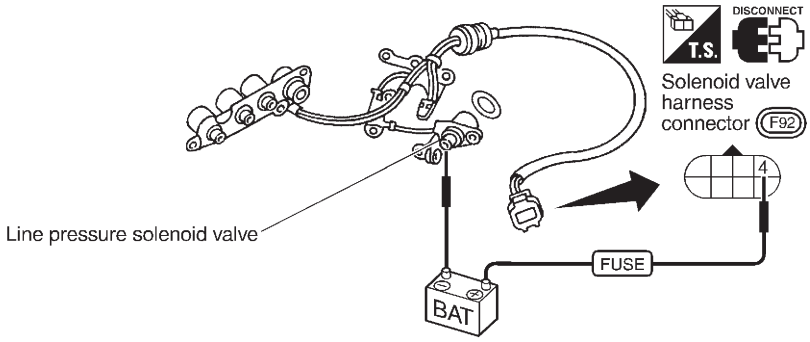
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:

- Line pressure solenoid valve

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



SAT038K

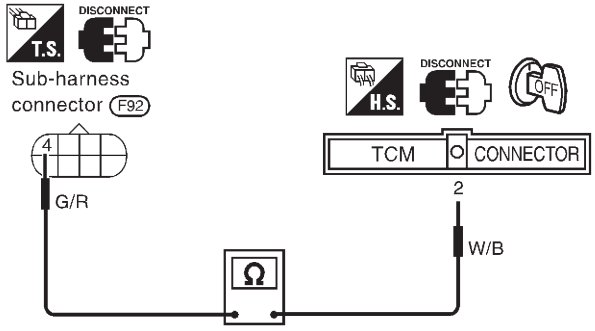
- Harness of terminal cord assembly for short or open

OK or NG

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

3	CHECK POWER SOURCE AND DROPPING RESISTOR CIRCUIT

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



Resistance: 10 - 15 Ω

SAT631JB

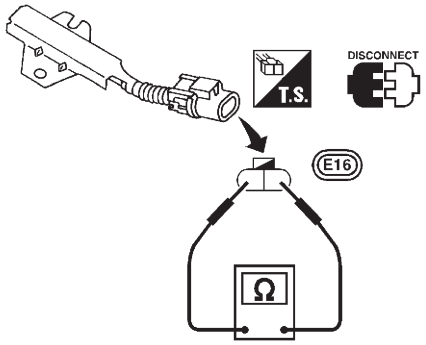
OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING ITEM

Check the following items:

- Dropping resistor
- Check resistance between two terminals.



SAT933IB

Resistance:
10 - 15Ω (Approx.)

- Harness for short or open between TCM terminal 2 and terminal cord assembly (Main harness)

OK or NG

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

5	CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Check continuity between sub-harness connector terminal 4 and TCM harness connector terminal 1. Refer to wiring diagram — AT — LPSV.
   Continuity should exist.
   If OK, check harness for short to ground and short to power.
3. Reinstall any part removed.

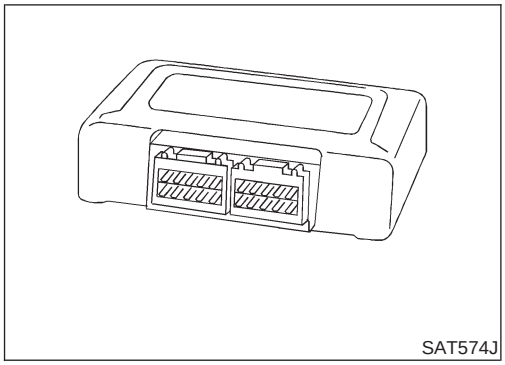
OK or NG

OK	▶	GO TO 6.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

Diagnostic Procedure (Cont'd)

6	CHECK DTC	
Perform Self-diagnosis Code confirmation procedure, AT-268. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	GO TO 7.

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



SAT574J

Description

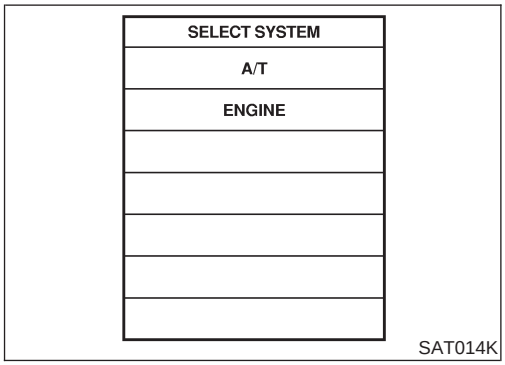
NFAT0322

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

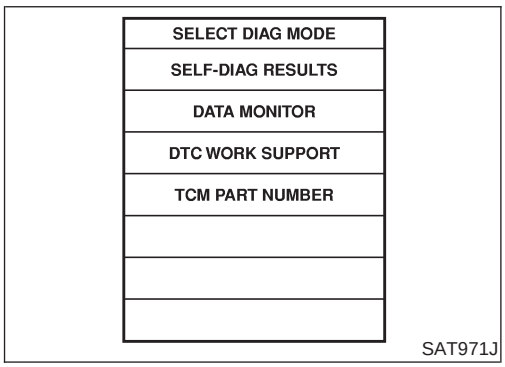
ON BOARD DIAGNOSIS LOGIC

NFAT0322S01

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: CONTROL UNIT (RAM) : CONTROL UNIT (ROM)	TCM memory (RAM) or (ROM) is malfunctioning.	TCM



SAT014K



SAT971J

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

NFAT0322S02

NOTE:

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

With CONSULT-II

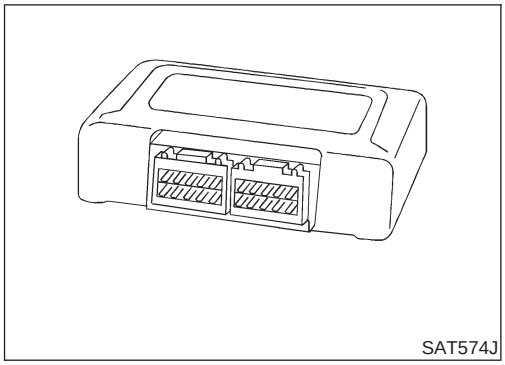
NFAT0322S0201

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

NFAT0323

1	INSPECTION START	
With CONSULT-II 1. Turn ignition switch ON and select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II. 2. Touch “ERASE”. 3. Perform “Self-diagnosis Code Confirmation Procedure”, AT-273. 4. Is the “CONTROL UNIT (RAM)” or “CONTROL UNIT (ROM)” displayed again? **Yes or No**		
Yes	▶	Replace TCM.
No	▶	**INSPECTION END**



SAT574J

Description

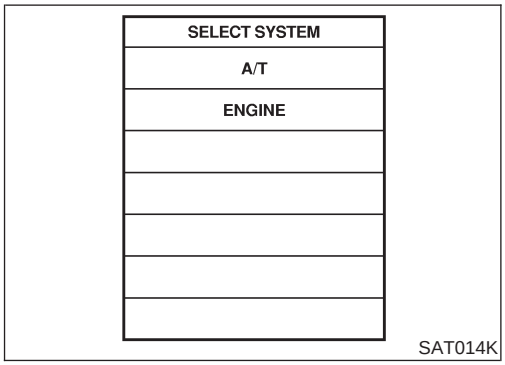
NFAT0324

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

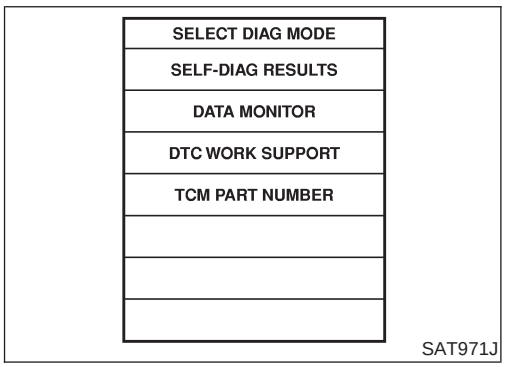
ON BOARD DIAGNOSIS LOGIC

NFAT0324S01

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



SAT014K



SAT971J

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

NFAT0324S02

NOTE:

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

With CONSULT-II

NFAT0324S0201

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.

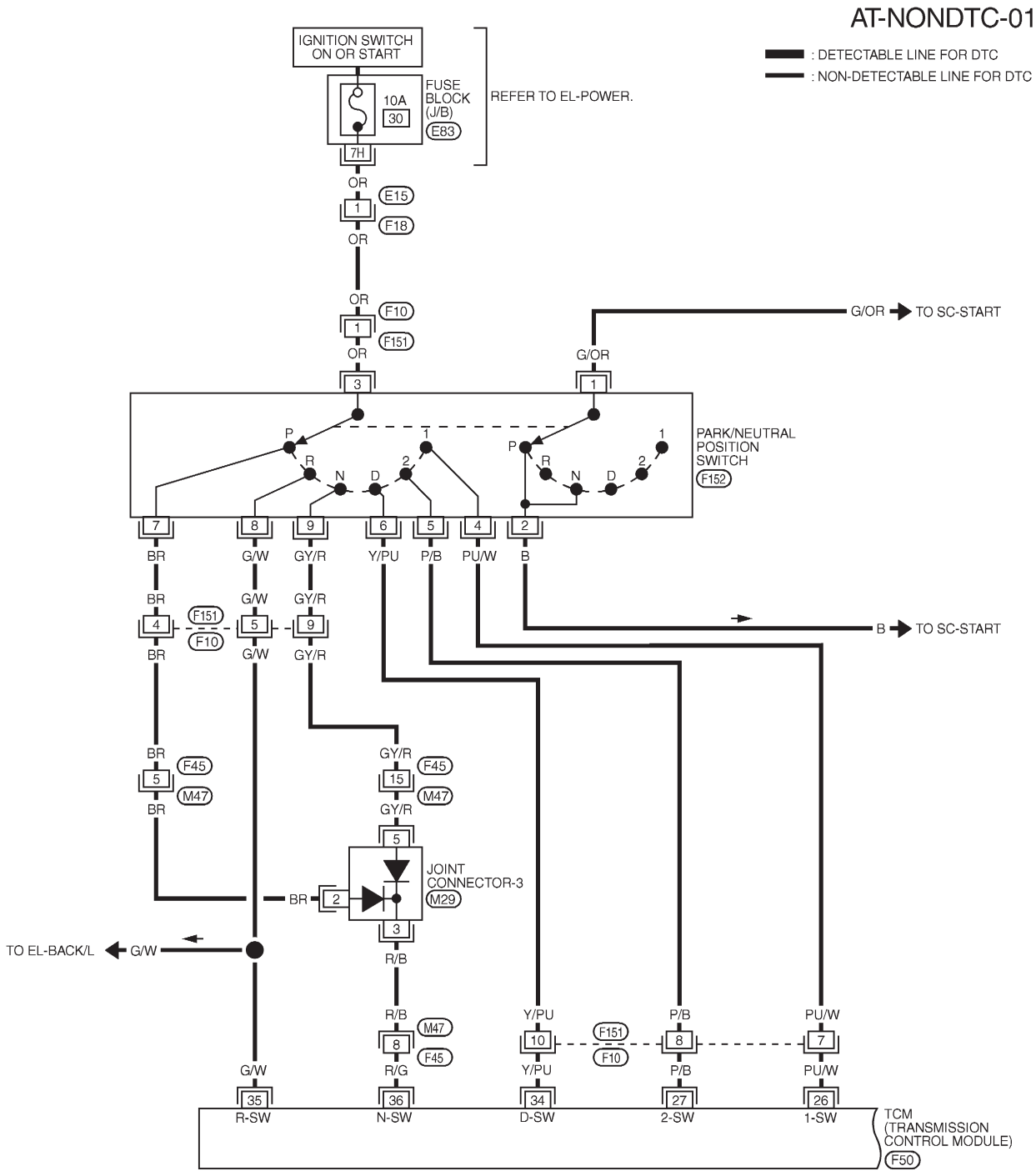
Diagnostic Procedure

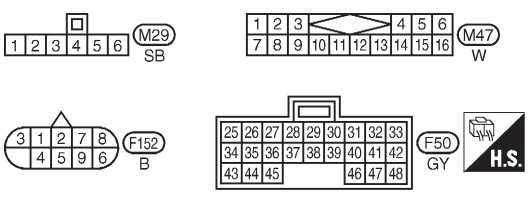
=NFAT0325

1	CHECK DTC	
With CONSULT-II 1. Turn ignition switch “ON” and select “SELF-DIAG RESULTS” 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 to “OFF” position for 10 seconds. 6. Perform “Self-diagnosis Code Confirmation Procedure”, AT-275. **Is the “CONT UNIT (EEP ROM)” displayed again?**		
Yes	▶	Replace TCM.
No	▶	**INSPECTION END**

Wiring Diagram — AT — NONDTC

NFAT0326

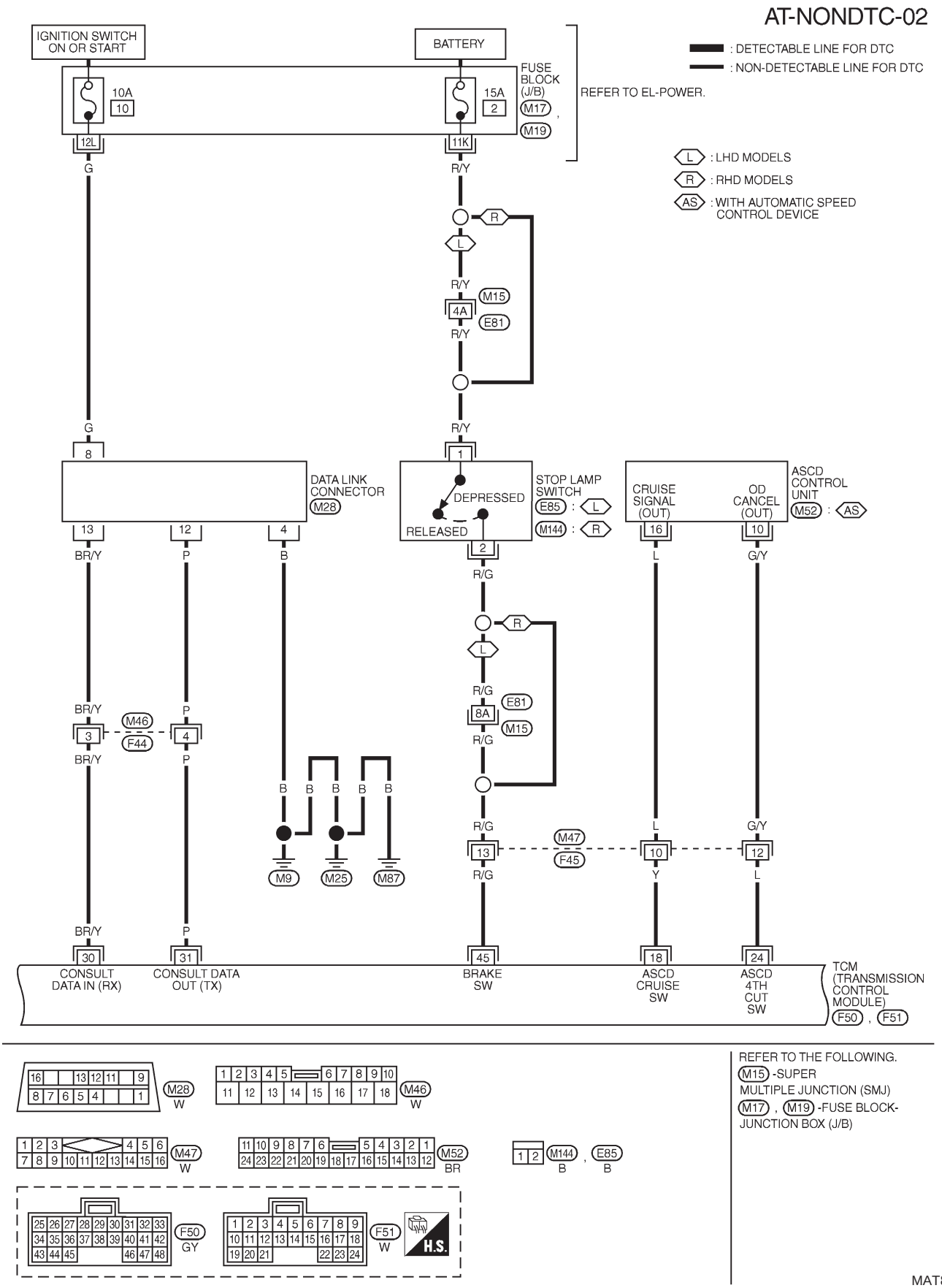


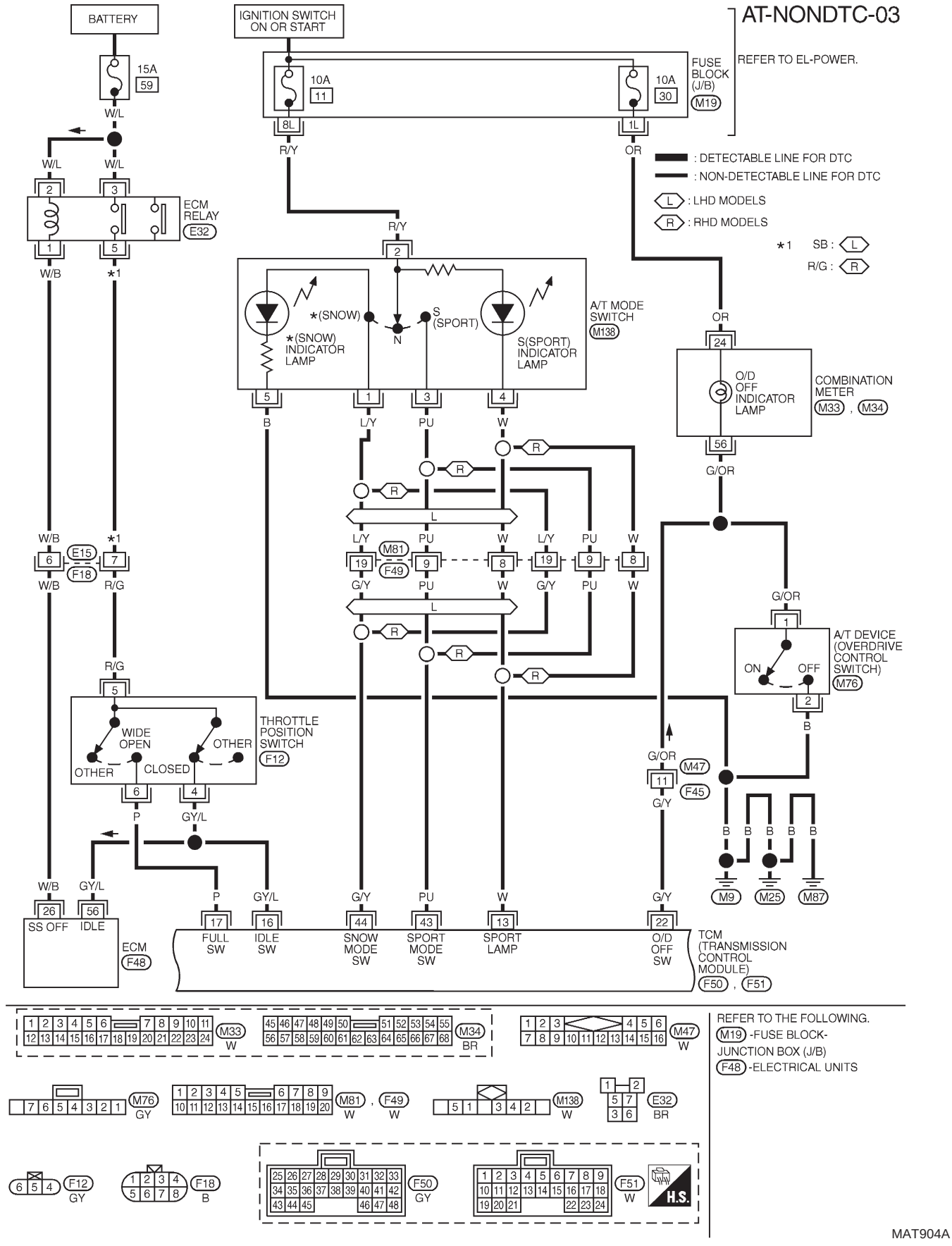


REFER TO THE FOLLOWING.
E83 - FUSE BLOCK - JUNCTION BOX (J/B)

MAT903A

Wiring Diagram — AT — NONDTC (Cont'd)

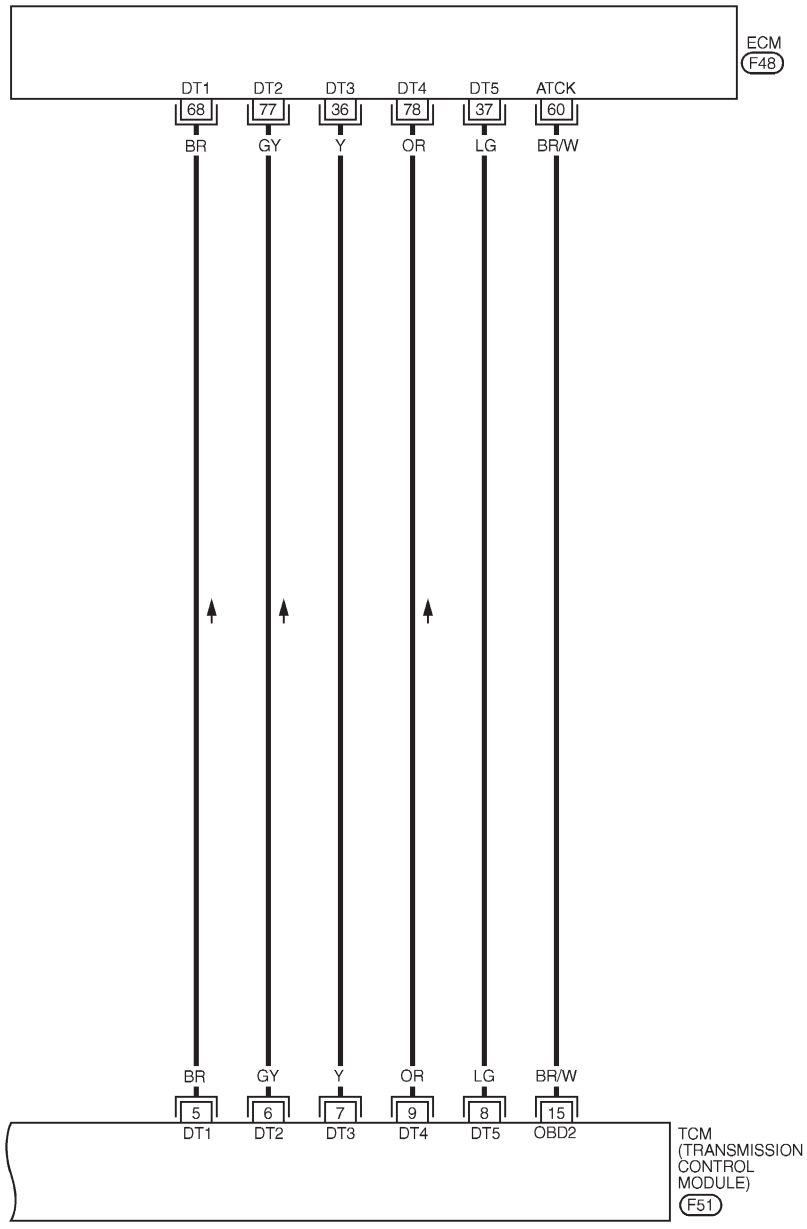


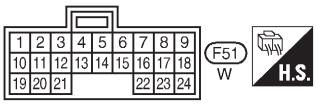

AT-NONDTC-03
REFER TO EL-POWER.
BATTERY
IGNITION SWITCH ON OR START
15A 59
10A 11
10A 30
FUSE BLOCK (J/B) M19
W/L
R/Y
OR
: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC
L : LHD MODELS
R : RHD MODELS
*1 SB : L
R/G : R
ECM RELAY E32
W/B
*1
A/T MODE SWITCH M138
*(SNOW)
S (SPORT)
N
*(SNOW) INDICATOR LAMP
S(SPORT) INDICATOR LAMP
B
L/Y
PU
W
O/D OFF INDICATOR LAMP
COMBINATION METER M33 , M34
G/OR
L
R
E15
F18
M81
F49
G/Y
A/T DEVICE (OVERDRIVE CONTROL SWITCH) M76
ON
OFF
THROTTLE POSITION SWITCH F12
WIDE OPEN
CLOSED
OTHER
P
GY/L
G/OR M47
F45
G/Y
B
M9
M25
M87
SS OFF
IDLE
ECM F48
FULL SW
IDLE SW
SNOW MODE SW
SPORT MODE SW
SPORT LAMP
O/D OFF SW
TCM (TRANSMISSION CONTROL MODULE) F50 , F51
REFER TO THE FOLLOWING.
M19 -FUSE BLOCK- JUNCTION BOX (J/B)
F48 -ELECTRICAL UNITS
M33 W
M34 BR
M47 W
M76 GY
M81 W , F49 W
M138 W
E32 BR
F12 GY
F18 B
F50 GY
F51 W
H.S.

MAT904A

AT-NONDTC-04

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





REFER TO THE FOLLOWING.
F48 - ELECTRICAL UNITS

MAT905A

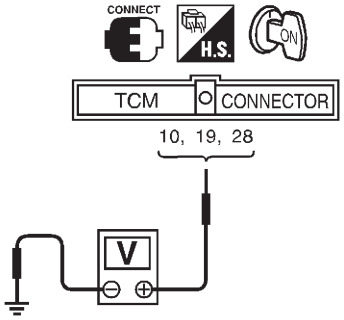
1. S (SPORT) Indicator Lamp Does Not Come On

NFAT0327

SYMPTOM:
S (SPORT) 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

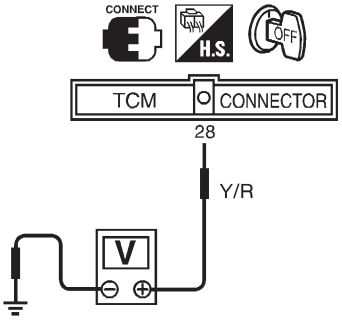
SAT611J

OK or NG

OK	▶	GO TO 2.
NG	▶	GO TO 3.

2	CHECK POWER SOURCE STEP 2

1. Turn ignition switch to OFF position.
2. Check voltage between TCM terminal 28 and ground.



Voltage:
Battery voltage

SAT612J

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM

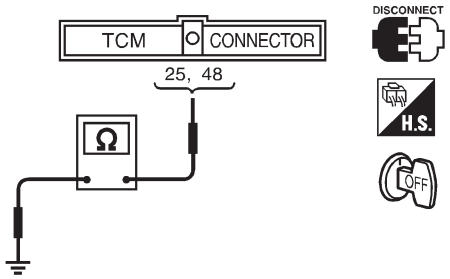
Check the following items:
- Harness for short or open between ignition switch and TCM (Main harness)
  Refer to “Wiring Diagram — AT — MAIN” in AT-119.
- Ignition switch and 10A fuse [No. 11, 12, located in the fue block (J/B)] Refer to EL-9, “Schematic”.

OK or NG

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

4	CHECK TCM GROUND CIRCUIT

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



SAT515J

Continuity should exist.

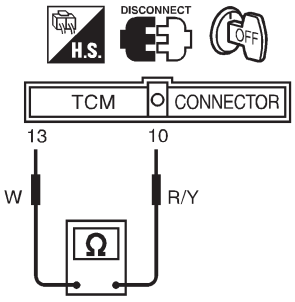
If OK, check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors. Refer to "Wiring Diagram — AT — MAIN" in AT-119.

5	CHECK LAMP CIRCUIT

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



SAT360JB

Resistance:
50 - 100Ω

3. Reinstall any part removed.

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness and 10A fuse [No. 11, located in the fuse block (J/B)] for short or open between ignition switch and S (SPORT) indicator lamp (Main harness)
  Refer to EL-9, "Schematic".
- Harness for short or open between S (SPORT) indicator lamp and TCM

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

7	CHECK SYMPTOM
Check again. **OK or NG**	
OK ▶	**INSPECTION END**
NG ▶	GO TO 8.

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

2. S (SPORT) or ✳ (SNOW) Indicator Lamp Does Not Come On

NFAT0328

— With A/T mode switch —
SYMPTOM:
S (SPORT) or ✳ (SNOW) indicator lamp does not come on when turning A/T mode switch in the appropriate position.

1	CHECK SYMPTOM
Is "1. S (SPORT) or ✳ (SNOW) Indicator Lamp Come On" OK? **Yes or No**	
Yes ▶	GO TO 2.
No ▶	Go to 1. S (SPORT) Indicator Lamp Come On, AT-281.

2	DETECT MALFUNCTIONING ITEM
Check the following items: ● A/T mode switch (Refer to AT-323.) ● Harness continuity between ignition switch and A/T mode switch ● Harness continuity between A/T mode switch and TCM ● Ignition switch (Refer to EL-9, "Schematic".) **OK or NG**	
OK ▶	**INSPECTION END**
NG ▶	Repair or replace damaged parts.

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

NFAT0329

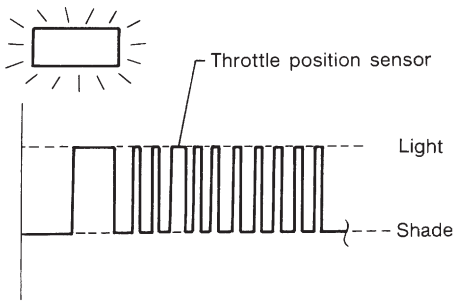
— With A/T mode switch —
SYMPTOM:
O/D OFF indicator lamp does not come on when setting overdrive control switch to OFF position.

1	DETECT MALFUNCTIONING ITEM	
Check the following items: ● Overdrive control switch (Refer to AT-323.) ● Harness continuity between ignition switch and O/D OFF indicator lamp ● Ignition switch (Refer to EL-9, “Schematic”.)		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.

4. S (SPORT) Indicator Lamp Does Not Come On

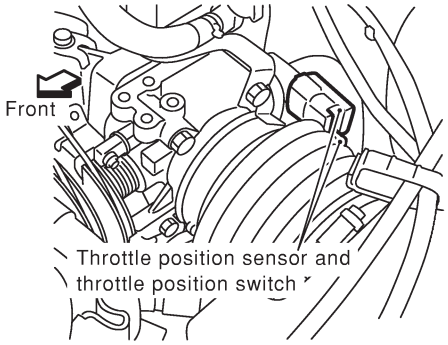
NFAT0330

— With A/T mode switch —
SYMPTOM:
S (SPORT) indicator lamp does not come on for about 3 seconds when depressing and releasing accelerator pedal fully.

1	CHECK SELF-DIAGNOSTIC RESULTS	
Does self-diagnosis show damage to throttle position sensor circuit? 3rd judgement flicker is longer than others.  SAT808H		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Check damaged circuit. Refer to AT-192 (EURO-OBD) or AT-228 (EXCEPT FOR EURO-OBD).

2	CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to EC-151, "DTC P0120 Throttle Position Sensor".



SAT289K

OK or NG

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

3	CHECK TCM INSPECTION

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

OK or NG

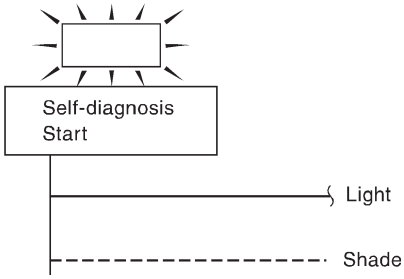
OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.

5. Engine Cannot Be Started In P and N Position

=NFAT0331

SYMPTOM:

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

1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT
With CONSULT-II Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?	
Without CONSULT-II Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?  SAT809J	
Yes or No	
Yes ▶	Check park/neutral position (PNP) switch circuit. Refer to AT-323.
No ▶	GO TO 2.

2	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH
Check for short or open of park/neutral position (PNP) switch harness connector terminals 1 and 2. Refer to AT-323.	
OK or NG	
OK ▶	GO TO 3.
NG ▶	Repair or replace park/neutral position (PNP) switch.

3	CHECK STARTING SYSTEM
Check starting system. Refer to SC-12, “System Description”.	
OK or NG	
OK ▶	**INSPECTION END**
NG ▶	Repair or replace damaged parts.

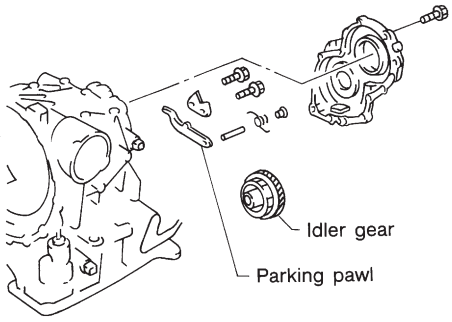
6. In P Position, Vehicle Moves Forward or Backward When Pushed

=NFAT0332

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 “Overhaul” and “Assembly”, AT-352, 429.



SAT282F

OK or NG

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

7. In N Position, Vehicle Moves

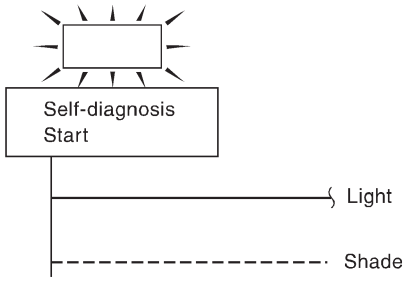
=NFAT0333

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

1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?



SAT809J

Yes or No

Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to AT-323.
No	▶	GO TO 2.

2	CHECK CONTROL LINKAGE

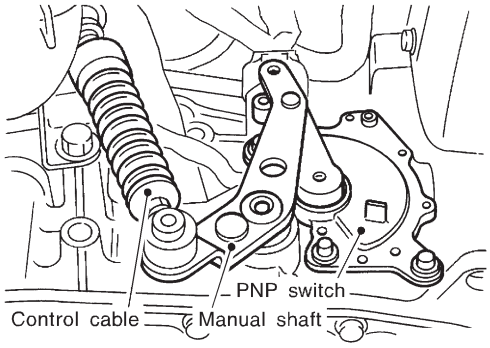
Check control cable. Refer to AT-348.

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	ADJUST CONTROL CABLE

Adjust control cable.



SAT023JA

	▶	Refer to AT-348.

4	CHECK A/T FLUID LEVEL

Check A/T fluid level again.

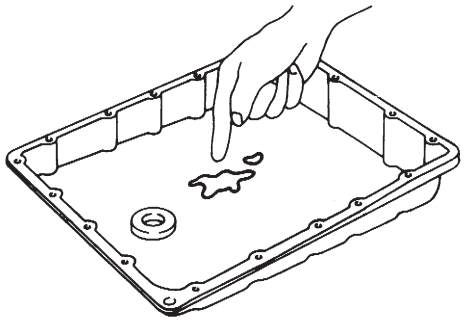
SAT638A

OK or NG

OK	▶	GO TO 5.
NG	▶	Refill ATF.

5	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING ITEM

1. Disassemble A/T.
2. Check the following items:

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

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

7	CHECK SYMPTOM

Check again.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 8.

7. In N Position, Vehicle Moves (Cont'd)

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

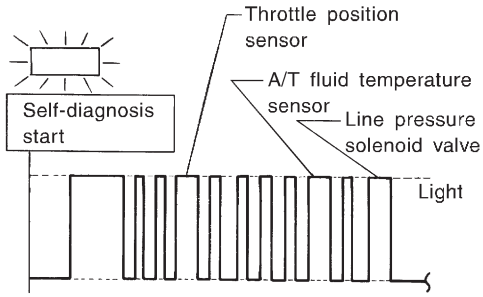
8. Large Shock. N → R Position

=NFAT0334

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?



SAT831HA

Yes or No

Yes	▶	GO TO 2.
No	▶	GO TO 3.

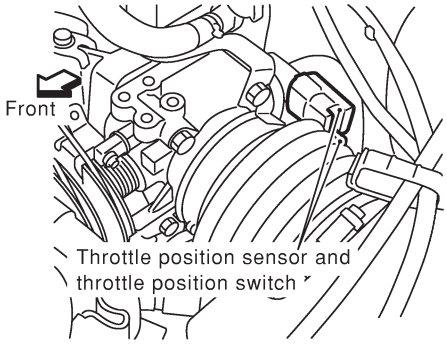
2	CHECK DAMAGED CIRCUIT

Check damaged circuit.

	▶	Refer to AT-128, 176, 192 (EURO-OBD) or AT-228, 256, 267 (EXCEPT FOR EURO-OBD).

3	CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to EC-151, “Description”.



SAT289K

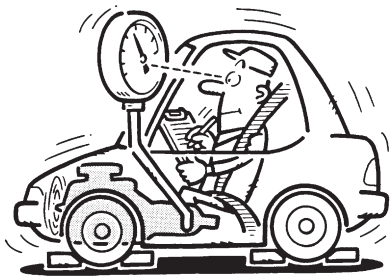
OK or NG

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

8. Large Shock. N → R Position (Cont'd)

4	CHECK LINE PRESSURE

Check line pressure at idle with selector lever in D position. Refer to "LINE PRESSURE TEST", AT-82.



SAT494G

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:

- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve

OK or NG

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

6	CHECK SYMPTOM

Check again.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 7.

7	CHECK TCM INSPECTION

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

OK or NG

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

9. Vehicle Does Not Creep Backward In R Position

=NFAT0335

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

1	CHECK A/T FLUID LEVEL

Check A/T fluid level again.

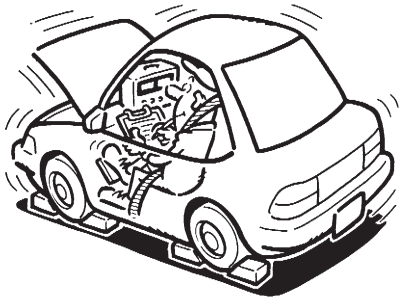
SAT638A

OK or NG

OK	▶	GO TO 2.
NG	▶	Refill ATF.

2	CHECK STALL REVOLUTION

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



SAT493G

OK or NG

OK	▶	GO TO 5.
OK in 1 position, NG in R position	▶	GO TO 3.
NG in both 1 and R positions	▶	GO TO 4.

3	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "ON-VEHICLE SERVICE", AT-346.
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following items:
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly

OK or NG

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

4	DETECT MALFUNCTIONING ITEM

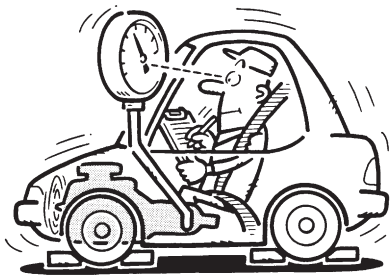
1. Remove control valve assembly. Refer to "ON-VEHICLE SERVICE", AT-346.
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following items:
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly
- Low & reverse brake assembly
- Low one-way clutch

OK or NG

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

5	CHECK LINE PRESSURE

Check line pressure at idle with selector lever in R position. Refer to "LINE PRESSURE TEST", AT-82.



SAT494G

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING ITEM

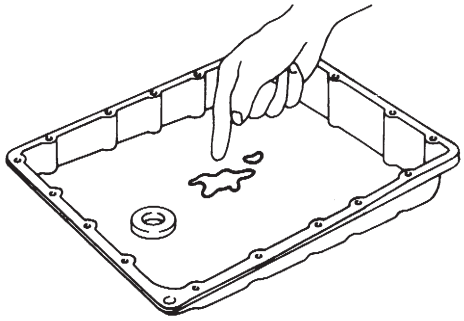
1. Remove control valve assembly. Refer to "ON-VEHICLE SERVICE", AT-346.
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following item:
- Oil pump assembly

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

7	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 9.
NG	▶	GO TO 8.

8	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to "ON-VEHICLE SERVICE", AT-346.
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following items:
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly
- Low & reverse brake assembly
- Low one-way clutch

OK or NG

OK	▶	GO TO 9.
NG	▶	Repair or replace damaged parts.

9	CHECK SYMPTOM	
Check again. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	GO TO 10.

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

10. Vehicle Does Not Creep Forward in D, 2 or 1 Position

=NFAT0336

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.

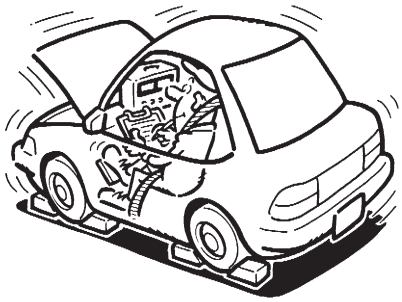
SAT638A

OK or NG

OK	▶	GO TO 2.
NG	▶	Refill ATF.

2	CHECK STALL REVOLUTION

Check stall revolution with selector lever in D position. Refer to “STALL TEST”, AT-78.



SAT493G

OK or NG

OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM

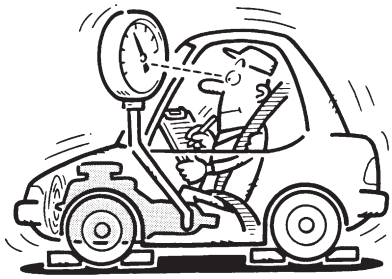
1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following items:
- Oil pump assembly
- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- Low & reverse brake assembly
- Torque converter

OK or NG

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

4	CHECK LINE PRESSURE

Check line pressure at idle with selector lever in D position. Refer to "LINE PRESSURE TEST", AT-82.



SAT494G

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

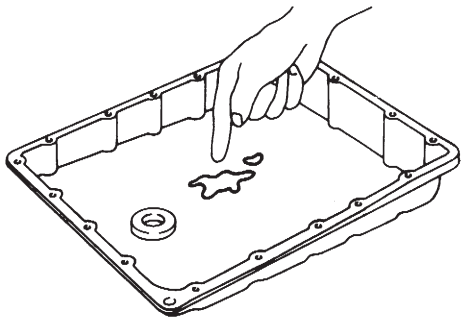
1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following item:
- Oil pump assembly

OK or NG

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

6	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following items:
- Oil pump assembly
- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- Low & reverse brake assembly
- Torque converter

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

8	CHECK SYMPTOM

Check again.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 9.

9	CHECK TCM INSPECTION

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

OK or NG

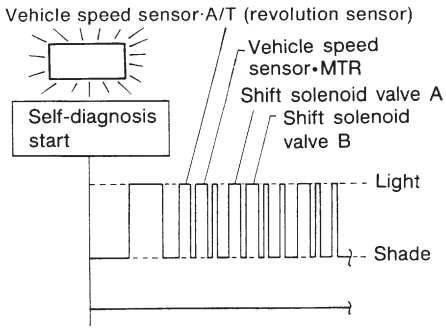
OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.

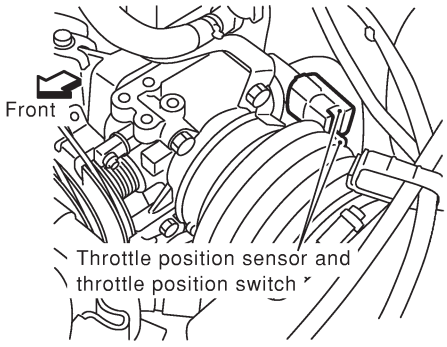
11. Vehicle Cannot Be Started From D_1

=NFAT0337

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

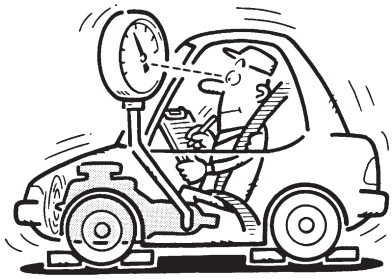
1	CHECK SYMPTOM	
Is “9. Vehicle Does Not Creep Backward In R Position” OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to “9. Vehicle Does Not Creep Backward In R Position”, AT-293.

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 AT-134, 182, 187, 213 (EURO-OBD) or AT-218, 223, 236, 241 (EXCEPT FOR EURO-OBD).
No	▶	GO TO 3.

3	CHECK THROTTLE POSITION SENSOR	
Check throttle position sensor. Refer to EC-151, “Description”.		
 SAT289K		
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-82.



SAT494G

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:
- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following items:
- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- High clutch assembly
- Torque converter
- Oil pump assembly

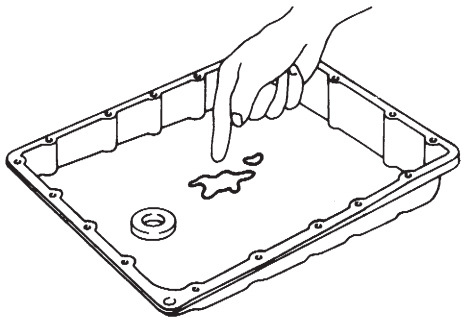
OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

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

6	CHECK A/T FLUID CONDITION

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



SAT171B

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 5.

7	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace damage parts.

8	CHECK SYMPTOM

Check again.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 9.

9	CHECK TCM INSPECTION

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

OK or NG

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

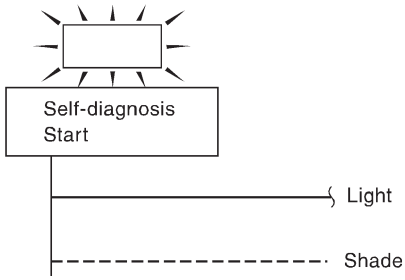
12. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$

=NFAT0338

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 “10. Vehicle Does Not Creep Forward In D, 2 Or 1 Position” and “11. Vehicle Cannot Be Started From D_1” OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to “10. Vehicle Does Not Creep Forward In D, 2 Or 1 Position” and “11. Vehicle Cannot Be Started From D_1”, AT-297, AT-300.

2	CHECK SELF-DIAGNOSTIC RESULTS	
With CONSULT-II Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?		
Without CONSULT-II Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?		
Yes or No		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to AT-323.
No	▶	GO TO 3.

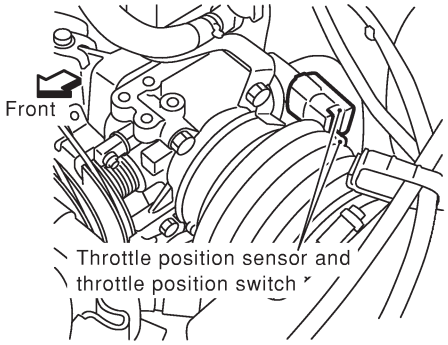


SAT809J

3	CHECK VEHICLE SPEED SENSOR·A/T AND VEHICLE SPEED SENSOR·MTR CIRCUIT	
Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-134, 213 (EURO-OBD) or AT-218, 223 (EXCEPT FOR EURO-OBD).		
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-151, "Description".



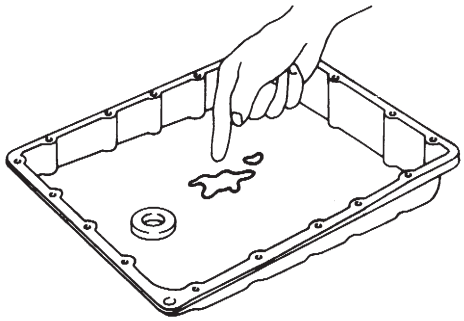
SAT289K

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 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-346.
2. Check the following items:
- Shift valve A
- Shift solenoid valve A
- Pilot valve
- Pilot filter
3. Disassemble A/T.
4. Check the following items:
- Servo piston assembly
- Brake band
- Oil pump assembly

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

7	DETECT MALFUNCTIONING ITEM	
1. Remove control valve. Refer to AT-346. 2. Check the following items: ● Shift valve A ● Shift solenoid valve A ● Pilot valve ● Pilot filter		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.

8	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 9.

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

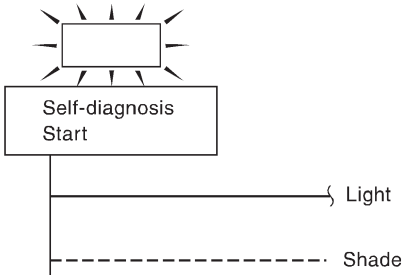
13. A/T Does Not Shift: $D_2 \rightarrow D_3$

=NFAT0339

SYMPTOM:
A/T does not shift from D_2 to D_3 at the specified speed.

1	CHECK SYMPTOM	
Are 10. Vehicle Does Not Creep Forward In D, 2 Or 1 Position and 11. Vehicle Cannot Be Started From D_1 OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to 10. Vehicle Does Not Creep Forward In D, 2 Or 1 Position and 11. Vehicle Cannot Be Started From D_1, AT-297, AT-300.

2	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT	
With CONSULT-II Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?		
Without CONSULT-II Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?		

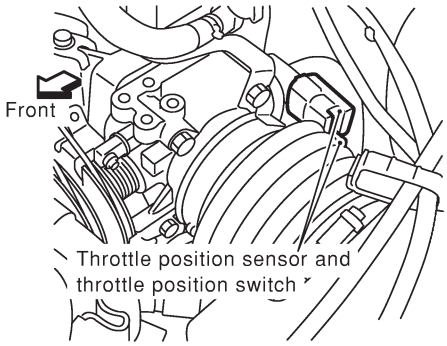


SAT809J

Yes or No

Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to AT-323.
No	▶	GO TO 3.

3	CHECK THROTTLE POSITION SENSOR	
Check throttle position sensor. Refer to EC-151, “Description”.		



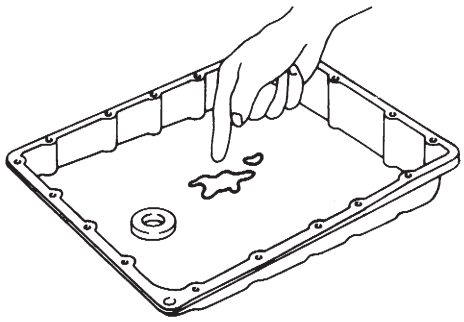
SAT289K

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 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:
- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter
3. Disassemble A/T.
4. Check the following items:
- Servo piston assembly
- High clutch assembly
- Oil pump assembly

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

6	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:
- Shift valve B
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

7	CHECK SYMPTOM

Check again.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 8.

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

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

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

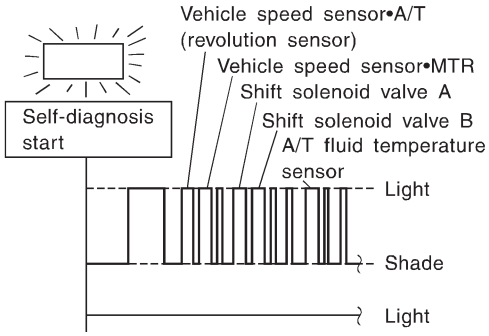
=NFAT0340

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 “10. Vehicle Does Not Creep Forward In D, 2 Or 1 Position” and “11. Vehicle Cannot Be Started From D_1” OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to “10. Vehicle Does Not Creep Forward In D, 2 Or 1 Position” and “11. Vehicle Cannot Be Started From D_1”, AT-297, AT-300.

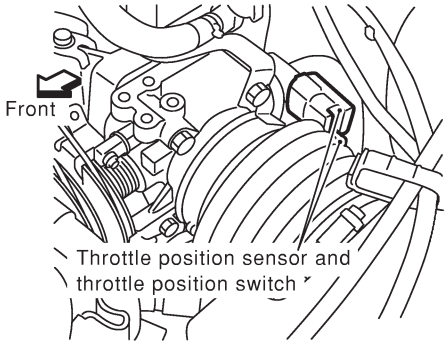
2	CHECK SELF-DIAGNOSTIC RESULTS	
With CONSULT-II Does self-diagnosis, after cruise test, show damage to any of the following circuits? ● Park/neutral position (PNP) switch ● Overdrive control switch ● A/T fluid temperature sensor ● Vehicle speed sensor·A/T (revolution sensor) ● Shift solenoid valve A or B ● Vehicle speed sensor·MTR		
Yes or No		
Yes	▶	Check damaged circuit. Refer to AT-128, 134, 182, 187, 213 (EURO-OBD) or AT-218, 223, 236, 241, 256 (EXCEPT FOR EURO-OBD).
No	▶	GO TO 3.



SAT833HB

3	CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to EC-151, "Description".



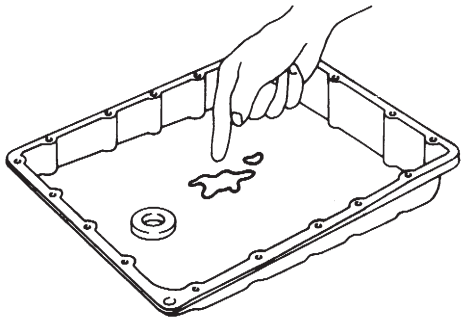
SAT289K

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 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:
- Shift valve B
- Overrun clutch control valve
- Shift solenoid valve B
- Pilot valve
- Pilot filter
3. Disassemble A/T.
4. Check the following items:
- Servo piston assembly
- Brake band
- Torque converter
- Oil pump assembly

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

6	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to AT-346. 2. Check the following items: ● Shift valve B ● Overrun clutch control valve ● Shift solenoid valve B ● Pilot valve ● Pilot filter		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

7	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 8.

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

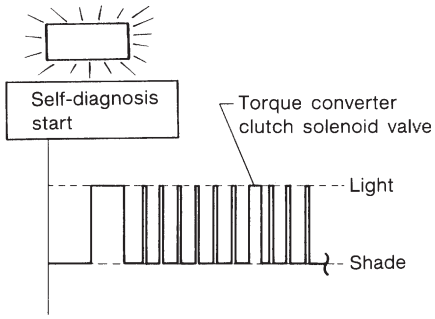
15. A/T Does Not Perform Lock-up

=NFAT0341

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?



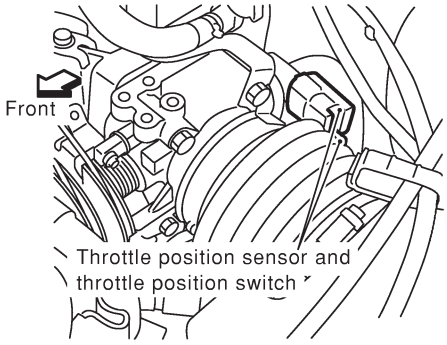
SAT844H

Yes or No

Yes	▶	Check torque converter clutch solenoid valve circuit. Refer to AT-172 (EURO-OBD) or AT-251 (EXCEPT FOR EURO-OBD).
No	▶	GO TO 2.

2	CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to EC-151, “Description”.



SAT289K

OK or NG

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

3	DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-346.
2. Check following items:

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

OK or NG

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

4	CHECK SYMPTOM	
Check again. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	GO TO 5.

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

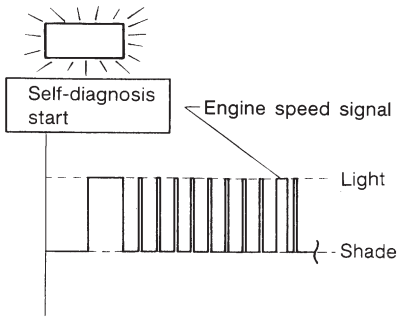
16. A/T Does Not Hold Lock-up Condition

=NFAT0342

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

1	CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to engine speed signal circuit after cruise test?



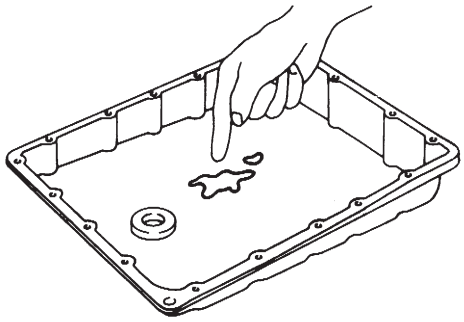
SAT835H

Yes or No

Yes	▶	Check engine speed signal circuit. Refer to AT-139 (EURO-OBD) or AT-263 (EXCEPT FOR EURO-OBD).
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 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:
- Torque converter clutch control valve
- Pilot valve
- Pilot filter
3. Disassemble A/T.
4. Check torque converter and oil pump assembly.

OK or NG

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

4	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to AT-346. 2. Check the following items: ● Torque converter clutch control valve ● Pilot valve ● Pilot filter		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace damaged parts.

5	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	GO TO 6.

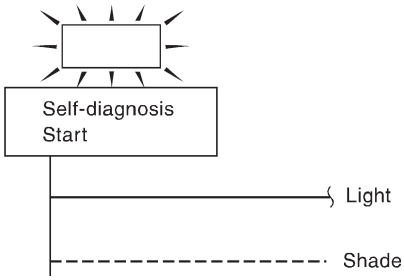
6	CHECK TCM INSPECTION	
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.		
OK or NG		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace damaged parts.

17. Lock-up Is Not Released

=NFAT0343

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

1	CHECK THROTTLE POSITION SWITCH CIRCUIT
With CONSULT-II Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to closed throttle position switch circuit?	
Without CONSULT-II Does self-diagnosis show damage to closed throttle position switch circuit?	



SAT809J

Yes or No

Yes	▶	Check closed throttle position switch circuit. Refer to AT-323.
No	▶	GO TO 2.

2	CHECK SYMPTOM
Check again. **OK or NG**	
OK ▶	**INSPECTION END**
NG ▶	GO TO 3.

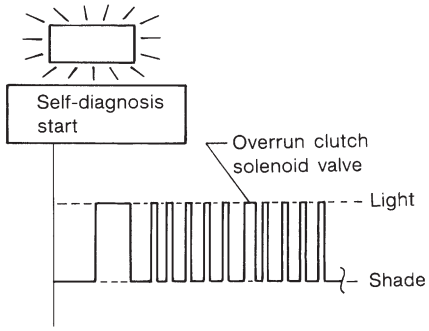
3	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector. **OK or NG**	
OK ▶	**INSPECTION END**
NG ▶	Repair or replace damaged parts.

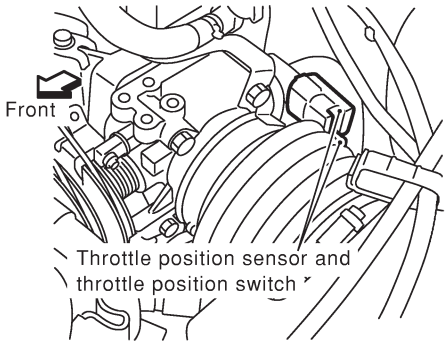
18. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)

=NFAT0344

SYMPTOM:

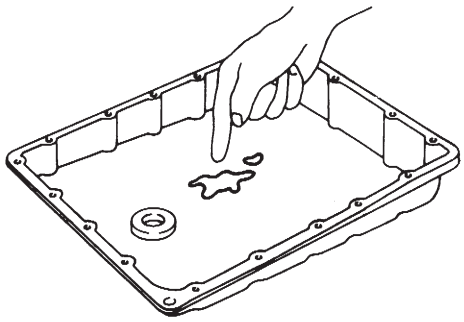
- **Engine speed does not smoothly return to idle when A/T shifts from D_4 to D_3.**
- **Vehicle does not decelerate by engine brake when turning overdrive control switch OFF.**
- **Vehicle does not decelerate by engine brake when shifting A/T from D to 2 position.**

1	CHECK SELF-DIAGNOSTIC RESULTS	
Does self-diagnosis show damage to overrun clutch solenoid valve circuit after cruise test?  SAT836H **Yes or No**		
Yes	▶	Check overrun clutch solenoid valve circuit. Refer to AT-201 (EURO-OBD) or AT-246 (EXCEPT FOR EURO-OBD).
No	▶	GO TO 2.

2	CHECK THROTTLE POSITION SENSOR	
Check throttle position sensor. Refer to EC-151, “Description”.  SAT289K **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 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:
- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve
3. Disassemble A/T.
4. Check the following items:
- Overrun clutch assembly
- Oil pump assembly

OK or NG

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

5	DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-346.
2. Check the following items:
- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

OK or NG

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

6	CHECK SYMPTOM

Check again.

OK or NG

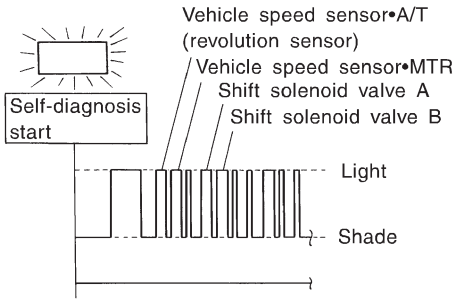
OK	▶	**INSPECTION END**
NG	▶	GO TO 7.

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

19. Vehicle Does Not Start From D_1

NFAT0345

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?  SAT832HB **Yes or No**	
Yes ▶	Check damaged circuit. Refer to AT-134, 182, 187, 213 (EURO-OBD) or AT-218, 223, 236, 241 (EXCEPT FOR EURO-OBD).
No ▶	GO TO 2.

2	CHECK SYMPTOM
Check again. **OK or NG**	
OK ▶	Go to 11. Vehicle Cannot Be Started From D_1, AT-300.
NG ▶	GO TO 3.

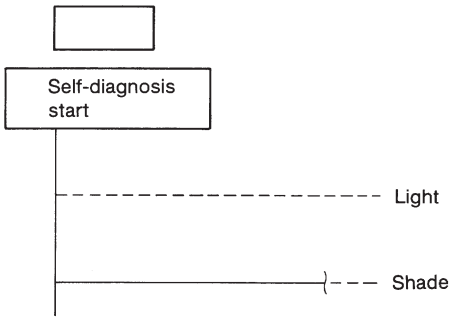
3	CHECK TCM INSPECTION
1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector. **OK or NG**	
OK ▶	**INSPECTION END**
NG ▶	Repair or replace damaged parts.

20. A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch ON $\rightarrow$ OFF

=NFAT0346

SYMPTOM:

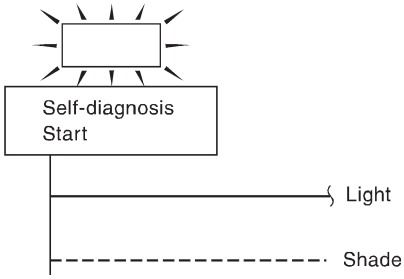
A/T does not shift from D_4 to D_3 when changing overdrive control switch to OFF position.

1	CHECK OVERDRIVE SWITCH CIRCUIT	
With CONSULT-II Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to overdrive control switch circuit? **Without CONSULT-II** Does self-diagnosis show damage to overdrive control switch circuit?  SAT146BA **Yes or No**		
Yes	▶	Check overdrive control switch circuit. Refer to AT-323.
No	▶	Go to 13. A/T Does Not Shift: $D_2 \rightarrow D_3$, AT-306.

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

=NFAT0347

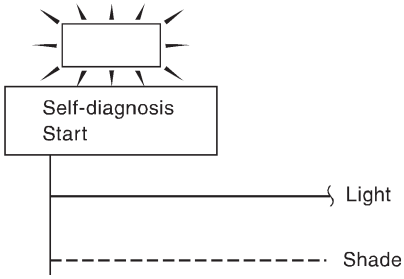
SYMPTOM:
A/T does not shift from D_3 to 2_2 when changing selector lever from D to 2 position.

1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT	
With CONSULT-II Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit? **Without CONSULT-II** Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?  SAT809J **Yes or No**		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to AT-323.
No	▶	Go to 12. A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$, AT-303.

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

=NFAT0348

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

1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT	
With CONSULT-II Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit? **Without CONSULT-II** Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?  SAT809J **Yes or No**		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to AT-323.
No	▶	GO TO 2.

2	CHECK SYMPTOM	
Check again. **OK or NG**		
OK	▶	**INSPECTION END**
NG	▶	GO TO 3.

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

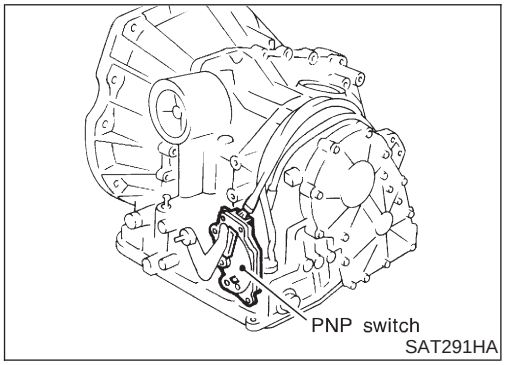
23. Vehicle Does Not Decelerate By Engine Brake

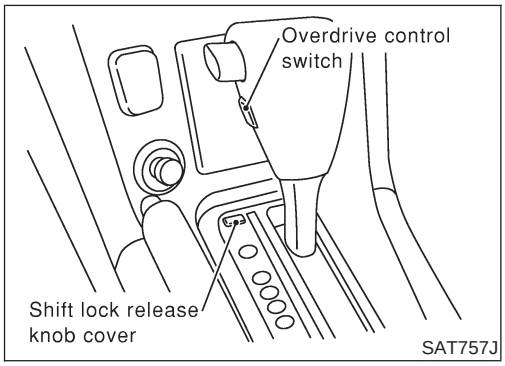
=NFAT0349

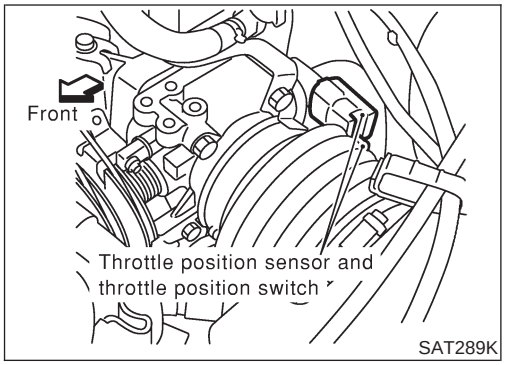
SYMPTOM:

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

1	CHECK SYMPTOM	
Is “9. Vehicle Does Not Creep Backward In R Position” OK?		
Yes or No		
Yes	▶	Go to “18. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)”, AT-317.
No	▶	Go to “9. Vehicle Does Not Creep Backward In R Position”, AT-293.







24. TCM Self-diagnosis Does Not Activate (PNP, Overdrive Control, A/T Mode and Throttle Position Switches Circuit Checks)

NFAT0350

SYMPTOM:

O/D OFF, A/T CHECK or POWER indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

NFAT0350S01

- Park/neutral position (PNP) switch
  The park/neutral (PNP) switch assembly includes a transmission range switch. The transmission range switch detects the selector lever position and sends a signal to the TCM.
- Overdrive control switch and A/T mode switch
  Detects the 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

=NFAT0350S02

NOTE:
The diagnostic procedure includes inspections for the overdrive control and throttle position switch circuits.

1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (With CONSULT-II)

With CONSULT-II

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

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

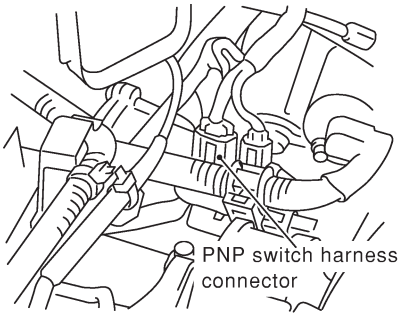
OK (With CONSULT-II)	▶	GO TO 5. (With overdrive control switch)
OK (Without CONSULT-II)	▶	GO TO 7. (With overdrive control switch)
OK (With CONSULT-II)	▶	GO TO 9. (With A/T mode switch)
OK (Without CONSULT-II)	▶	GO TO 10. (With A/T mode switch)
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING ITEM

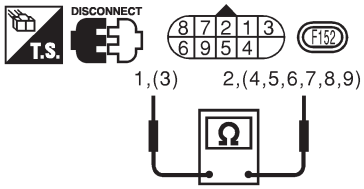
Check the following items:

- Park/neutral position (PNP) switch

a. 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.



View with air cleaner box removed



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	

SAT615J

b. If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step a.
c. If OK on step b, adjust manual control cable. Refer to AT-348.
d. If NG on step b, remove park/neutral position (PNP) switch from A/T and check continuity of park/neutral position (PNP) switch terminals. Refer to step a.
e. If OK on step d, adjust park/neutral position (PNP) switch. Refer to AT-347.
f. If NG on step d, replace park/neutral position (PNP) switch.

- Harness for short or open between ignition switch and park/neutral position (PNP) switch (Main harness)
- Harness for short or open between park/neutral position (PNP) switch and TCM (Main harness)

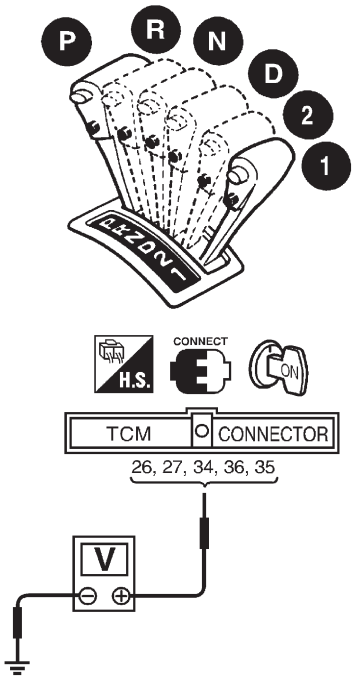
OK or NG

OK (With CONSULT-II) ▶	GO TO 5. (With overdrive control switch)
OK (Without CONSULT-II) ▶	GO TO 7. (With overdrive control switch)
OK (With CONSULT-II) ▶	GO TO 9. (With A/T mode switch)
OK (Without CONSULT-II) ▶	GO TO 10. (With A/T mode switch)
NG ▶	Repair or replace damaged parts.

3	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (Without CONSULT-II)

Without CONSULT-II

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



SAT361J

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**

MTBL0119

OK or NG

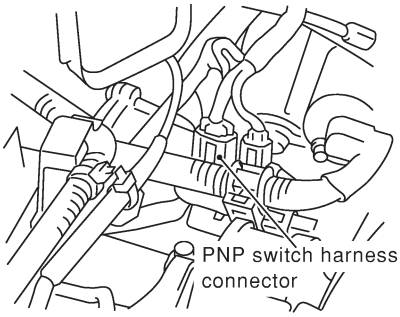
OK (With CONSULT-II)	▶	GO TO 5. (With overdrive control switch)
OK (Without CONSULT-II)	▶	GO TO 7. (With overdrive control switch)
OK (With CONSULT-II)	▶	GO TO 9. (With A/T mode switch)
OK (Without CONSULT-II)	▶	GO TO 10. (With A/T mode switch)
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING ITEM

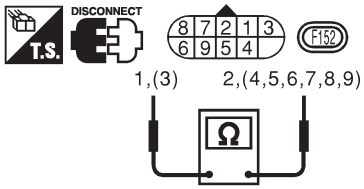
Check the following items:

- Park/neutral position (PNP) switch

a. 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.



View with air cleaner box removed



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	

SAT615J

b. If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step a.
c. If OK on step b, adjust manual control cable. Refer to AT-348.
d. If NG on step b, remove park/neutral position (PNP) switch from A/T and check continuity of park/neutral position (PNP) switch terminals. Refer to step a.
e. If OK on step d, adjust park/neutral position (PNP) switch. Refer to AT-347.
f. If NG on step d, replace park/neutral position (PNP) switch.

- Harness for short or open between ignition switch and park/neutral position (PNP) switch (Main harness)
- Harness for short or open between park/neutral position (PNP) switch and TCM (Main harness)

OK or NG

OK (With CONSULT-II) ▶	GO TO 5. (With overdrive control switch)
OK (Without CONSULT-II) ▶	GO TO 7. (With overdrive control switch)
OK (With CONSULT-II) ▶	GO TO 9. (With A/T mode switch)
OK (Without CONSULT-II) ▶	GO TO 10. (With A/T mode switch)
NG ▶	Repair or replace damaged parts.

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

With CONSULT-II

1. Turn ignition switch to “ON” position.
   (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “OVERDRIVE SW”.
   Check the signal of the overdrive control switch is indicated properly.
   (Overdrive control switch “ON” displayed on CONSULT-II means overdrive “OFF”.)

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

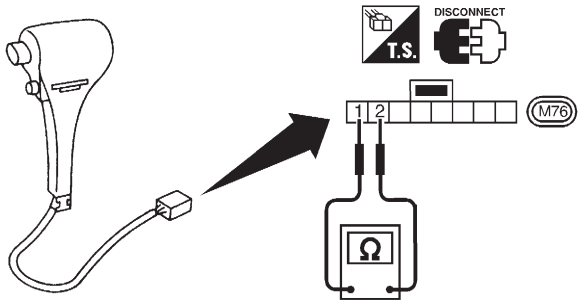
OK (With CONSULT-II)	▶	GO TO 12.
OK (Without CONSULT-II)	▶	GO TO 14.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING ITEM

Check the following items:

- Overdrive control switch.

a. Check continuity between two terminals.



Switch position	Continuity
ON	No
OFF	Yes

SAT642J

- Harness for short or open between TCM and overdrive control switch (Main harness)
- Harness of ground circuit for overdrive control switch (Main harness) for short or open

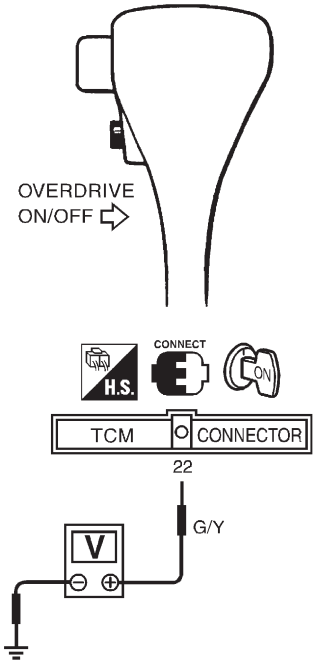
OK or NG

OK (With CONSULT-II)	▶	GO TO 12.
OK (Without CONSULT-II)	▶	GO TO 14.
NG	▶	Repair or replace damaged parts.

7	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.



SAT362J

Switch position	Voltage (Approx.)
ON	Battery voltage
OFF	0V

MTBL0630

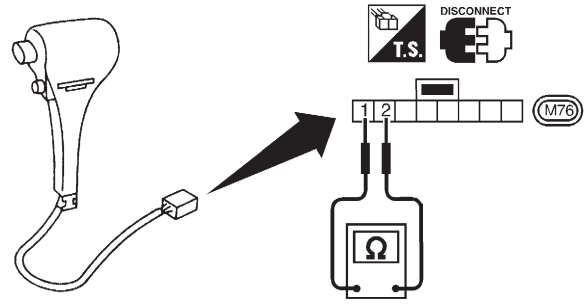
OK or NG

OK (With CONSULT-II)	▶	GO TO 12.
OK (Without CONSULT-II)	▶	GO TO 14.
NG	▶	GO TO 8.

8	DETECT MALFUNCTIONING ITEM

Check the following items:
- Overdrive control switch.

a. Check continuity between two terminals.



Switch position	Continuity
ON	No
OFF	Yes

SAT642J

- Harness for short or open between TCM and overdrive control switch (Main harness)
- Harness of ground circuit for overdrive control switch (Main harness) for short or open

OK or NG

OK	▶	GO TO 14.
NG	▶	Repair or replace damaged parts.

9	CHECK A/T MODE SWITCH CIRCUIT (With CONSULT-II)

With CONSULT-II

1. Turn ignition switch to “ON” position. (Do not start engine.)
2. Select “TCM INPUT SIGNALS”.
3. Read out “POWER SHIFT SW [S (SPORT)]”, “HOLD SW [(SNOW)]”. Make sure the selector lever switch position is indicated properly.

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

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

SAT988J

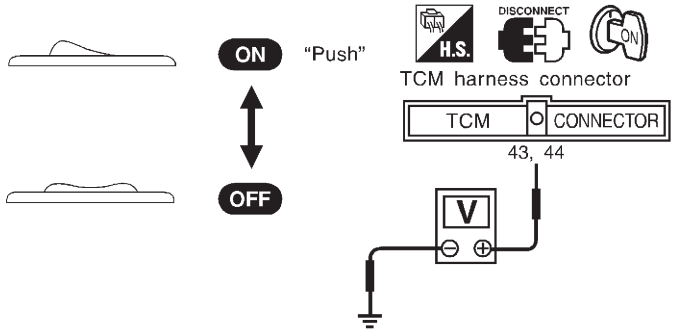
OK or NG

OK (With CONSULT-II)	▶	GO TO 12.
OK (Without CONSULT-II)	▶	GO TO 14.
NG	▶	GO TO 11.

10	CHECK A/T MODE 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 43, 44 and ground when A/T mode switch is “ON” S (SPORT), ✻ (SNOW) and “OFF”.



Switch position	Voltage (Approx.)
ON (S or ✻ position)	Battery voltage
OFF	0V

SAT365K

OK or NG

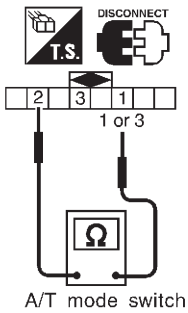
OK (With CONSULT-II)	▶	GO TO 12.
OK (Without CONSULT-II)	▶	GO TO 14.
NG	▶	GO TO 11.

11	DETECT MALFUNCTIONING ITEM

Check the following items:

- A/T mode switch

a. Check continuity between two terminals.



Switch position	Continuity
ON (S or ✻ position)	Yes
Other positions	No

SAT121K

- Harness for short or open between TCM and A/T mode switch (Main harness)
- Harness of ground circuit for A/T mode switch (Main harness) for short or open

OK or NG

OK (With CONSULT-II)	▶	GO TO 12.
OK (Without CONSULT-II)	▶	GO TO 14.
NG	▶	Repair or replace damaged parts.

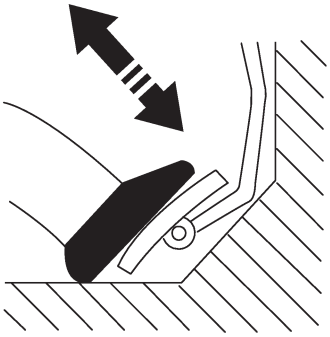
12	CHECK THROTTLE POSITION SWITCH CIRCUIT (With CONSULT-II)

With CONSULT-II

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

SAT646J

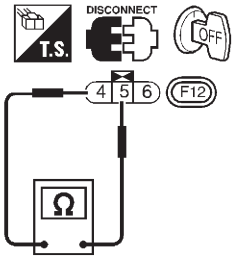
OK or NG

OK	▶	GO TO 16.
NG	▶	GO TO 13.

13	DETECT MALFUNCTIONING ITEM

Check the following items:
- Throttle position switch
- Closed throttle position switch (idle position)

a. Check continuity between terminals 4 and 5.



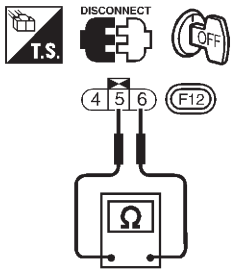
Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

SAT634J

b. To adjust closed throttle position switch, refer to EC-333 (EURO-OBD) or EC-477 (EXCEPT FOR EURO-OBD), “Component Description”.

- Wide open throttle position switch

a. Check continuity between terminals 5 and 6.



Accelerator pedal condition	Continuity
Released	No
Depressed	Yes

SAT635J

- 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)

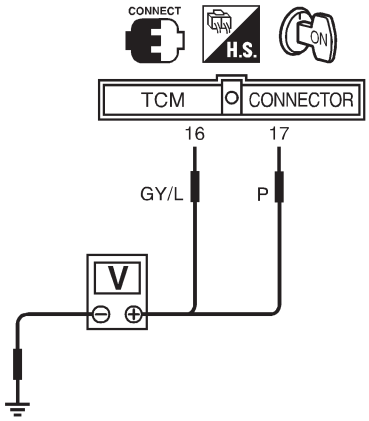
OK or NG

OK	▶	GO TO 16.
NG	▶	Repair or replace damaged parts.

14	CHECK THROTTLE POSITION 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 16, 17 and ground while depressing, and releasing accelerator pedal slowly.
   (After warming up engine)



SAT363JA

Accelerator pedal condition	Voltage (Approx.)	
	Terminal No. 16	Terminal No. 17
Released	Battery voltage	0V
Fully depressed	0V	Battery voltage

MTBL0629

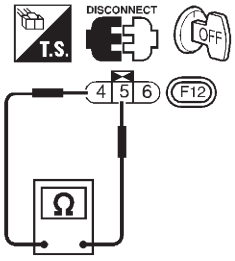
OK or NG

OK	▶	GO TO 16.
NG	▶	GO TO 15.

15	DETECT MALFUNCTIONING ITEM

Check the following items:
- Throttle position switch

a. Closed throttle position switch (idle position)
i. Check continuity between terminals 4 and 5.

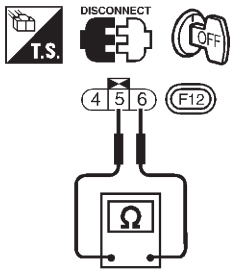


Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

SAT634J

ii. To adjust closed throttle position switch, refer to EC-333 (EURO-OBD) or EC-477 (EXCEPT FOR EURO-OBD), “Component Description”.

b. Wide open throttle position switch
i. Check continuity between terminals 5 and 6.



Accelerator pedal condition	Continuity
Released	No
Depressed	Yes

SAT635J

- 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)

OK or NG

OK	▶	GO TO 16.
NG	▶	Repair or replace damaged parts.

16	CHECK DTC

Perform Diagnostic procedure, AT-324.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 17.

17	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.

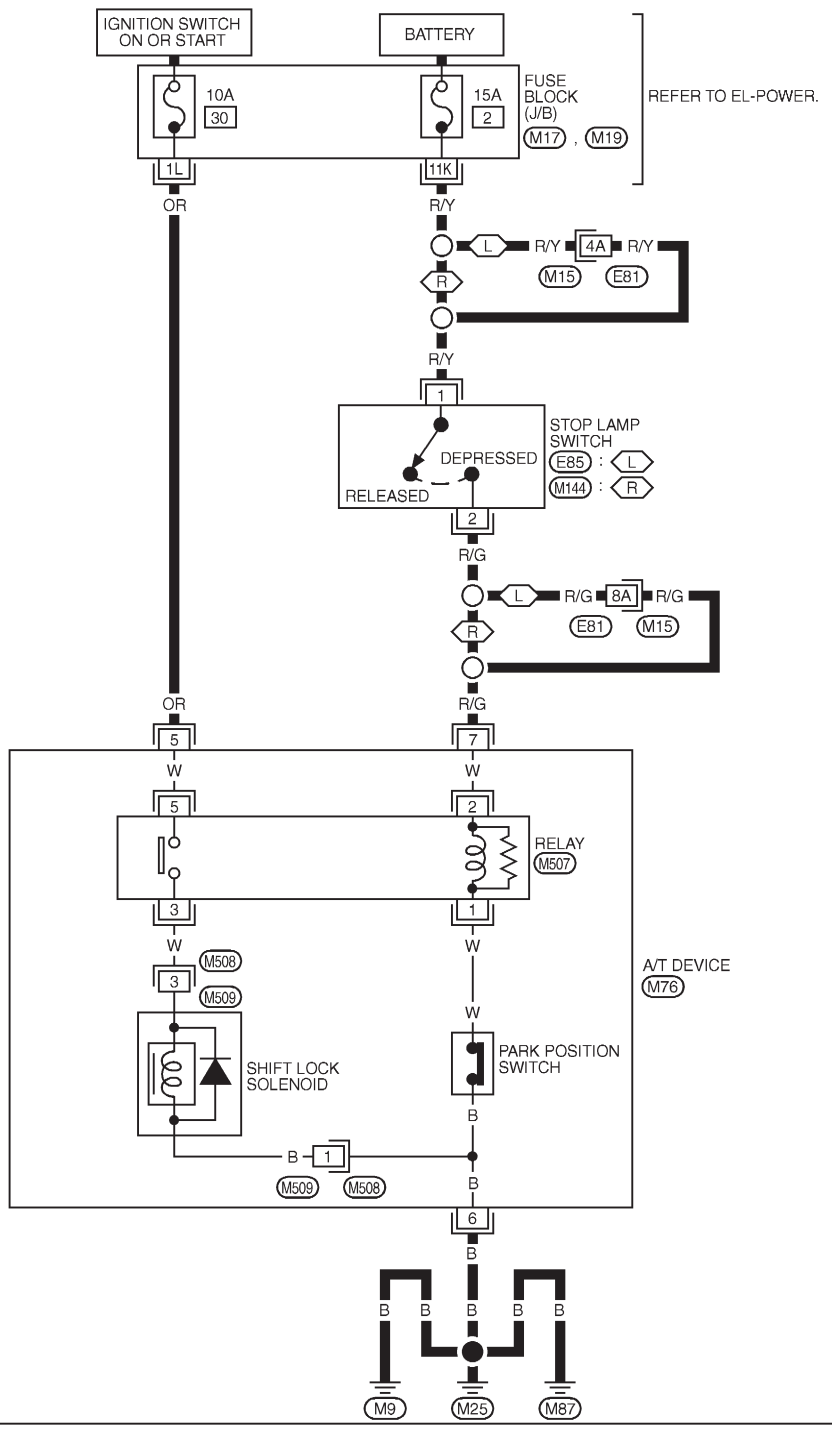
Description

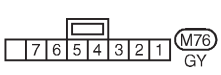
NFAT0351

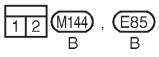
- The mechanical key interlock mechanism also operates as a shift lock:
  With the key switch turned to ON, the selector lever cannot be shifted from P (parking) to any other position unless the brake pedal is depressed.
  With the key removed, the selector lever cannot be shifted from P to any other 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, respectively.

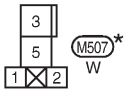
Wiring Diagram — SHIFT —

NFAT0352









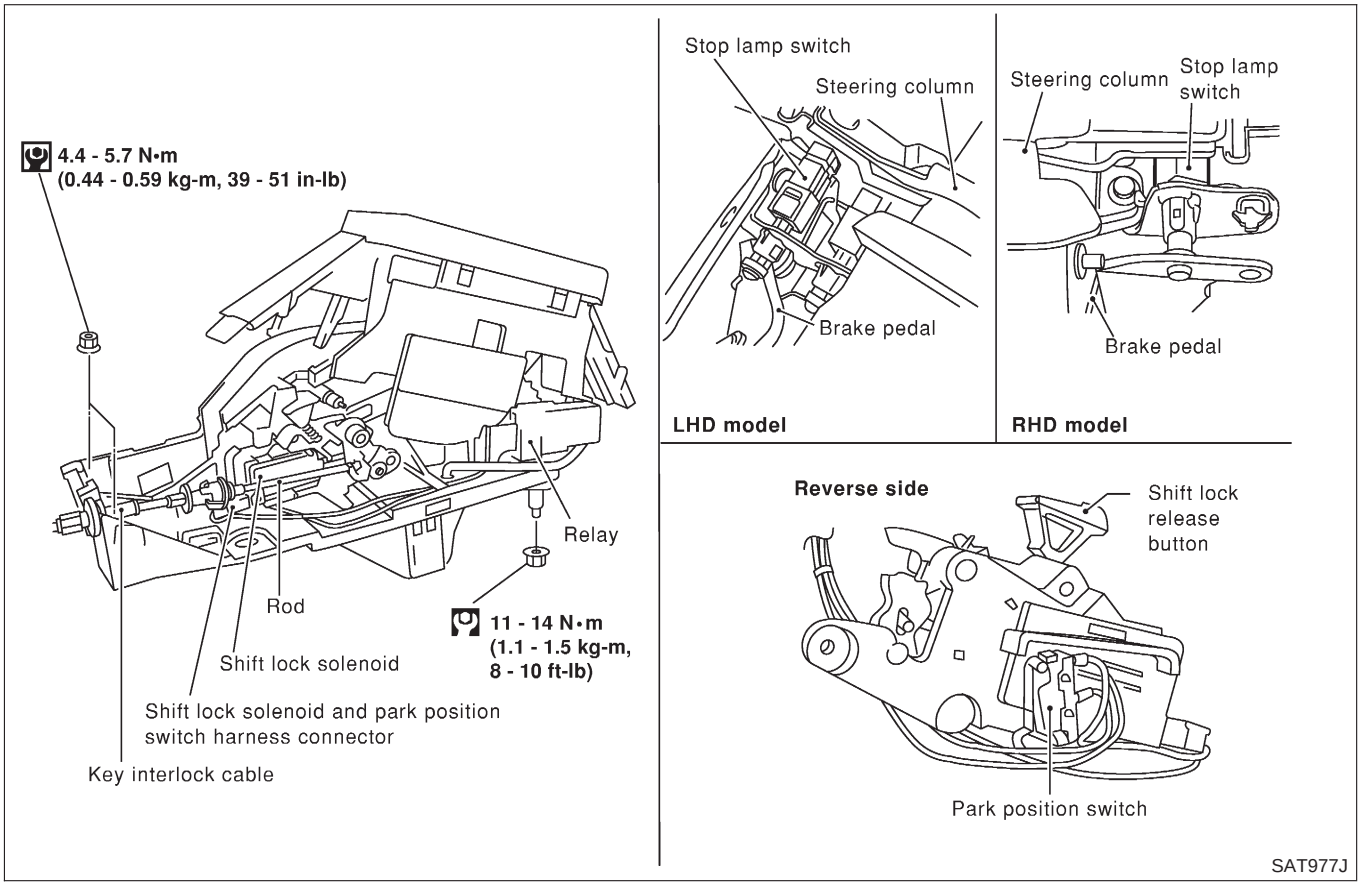
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
M17 , M19 -FUSE BLOCK-JUNCTION BOX (J/B)

*THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", EL SECTION.

MAT869A

Shift Lock System Electrical Parts Location

NFAT0353



Diagnostic Procedure

NFAT0354

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.**

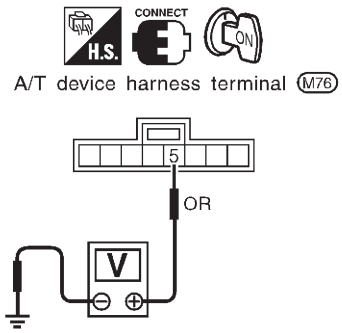
SYMPTOM 2:

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 damaged. **OK or NG**		
OK	▶	GO TO 2.
NG	▶	Repair key interlock cable. Refer to “Key Interlock Cable”, AT-342.

2	CHECK SELECTOR LEVER POSITION
Check selector lever position for damage.	
OK or NG	
OK ▶	GO TO 3.
NG ▶	Check selector lever. Refer to "ON-VEHICLE SERVICE — Park/Neutral Position (PNP) Switch and Control Cable Adjustment", AT-347, AT-348.

3	CHECK POWER SOURCE
1. Turn ignition switch to ON position. (Do not start engine.) 2. Check voltage between A/T device harness terminal 5 and ground.	



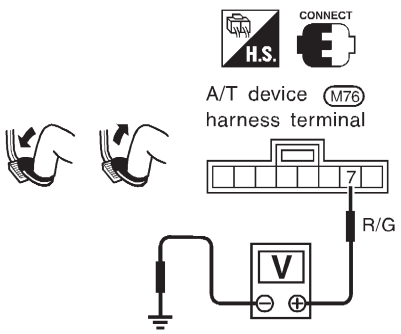
Voltage:
Battery voltage

SAT758J

OK or NG	
OK ▶	GO TO 5.
NG ▶	GO TO 4.

4	DETECT MALFUNCTIONING ITEM
Check the following items: 1. Harness for short or open between ignition switch and A/T device harness terminal 5 2. Ignition switch and 10A [No. 30, located in the fuse block (J/B)] Refer to EL-9, "Schematic".	
OK or NG	
OK ▶	GO TO 5.
NG ▶	Repair or replace damaged parts.

5	CHECK INPUT SIGNAL A/T DEVICE
Turn ignition switch to OFF position. ● Check voltage between A/T device harness terminal 7 and ground.	



Brake pedal	Voltage
Released	0V
Depressed	Battery voltage

SAT184K

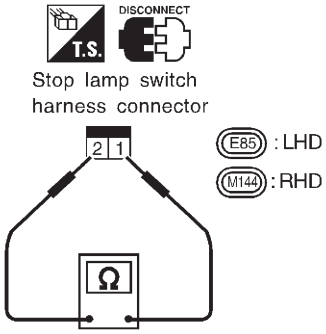
OK or NG	
OK ▶	GO TO 7.
NG ▶	GO TO 6.

Diagnostic Procedure (Cont'd)

6	DETECT MALFUNCTIONING ITEM

Check the following items:
1. Harness for short or 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. 15A fuse [No. 2, located in the fuse block (J/B)]
4. Stop lamp switch

a. Check continuity between terminals 1 and 2.



Condition	Continuity
When brake pedal is depressed	Yes
When brake pedal is released	No

SAT990J

Check stop lamp switch after adjusting brake pedal — refer to BR-12, "Adjustment".

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

7	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. Refer to wiring diagram — SHIFT —.
   Continuity should exist.
   If OK, check harness for short to ground and short to power.

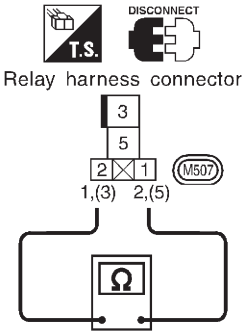
OK or NG

OK	▶	GO TO 8.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK RELAY CIRCUIT

1. Turn ignition switch to ON and OFF position.

● Check continuity between terminals 1, 2, 3 and 5.



Condition	Terminal No.	Ignition SW	Continuity
When selector lever is set in "P" position and breake pedal depressed	1 – 2	ON or OFF	Approx. 100±25Ω
	3 – 5	ON	Yes
		OFF	No

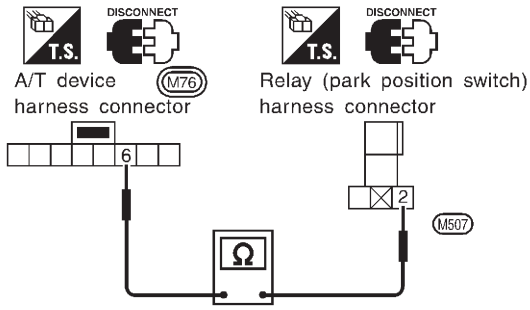
SAT775JA

Yes or No

Yes	▶	GO TO 9.
No	▶	Replace relay.

9	CHECK PARK POSITION SWITCH

- Check continuity between A/T device harness terminal 6 and relay (park position switch) harness terminal 2.



Condition	Continuity
When selector lever is set in "P" position and selector lever button is released	Yes
Except above	No

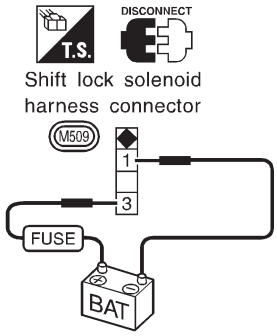
SAT185K

OK or NG

OK	▶	GO TO 10.
NG	▶	Replace park position switch.

10	CHECK SHIFT LOCK SOLENOID

- Check operation by applying battery voltage shift lock solenoid harness terminals 1 and 3.



SAT762J

OK or NG

OK	▶	GO TO 11.
NG	▶	Replace shift lock solenoid.

11	CHECK SHIFT LOCK OPERATION

1. Reconnect shift lock harness connector.
2. Turn ignition switch from OFF to ON position. (Do not start engine.)
3. Recheck shift lock operation.

OK or NG

OK	▶	**INSPECTION END**
NG	▶	GO TO 12.

12	CHECK A/T DEVICE INSPECTION

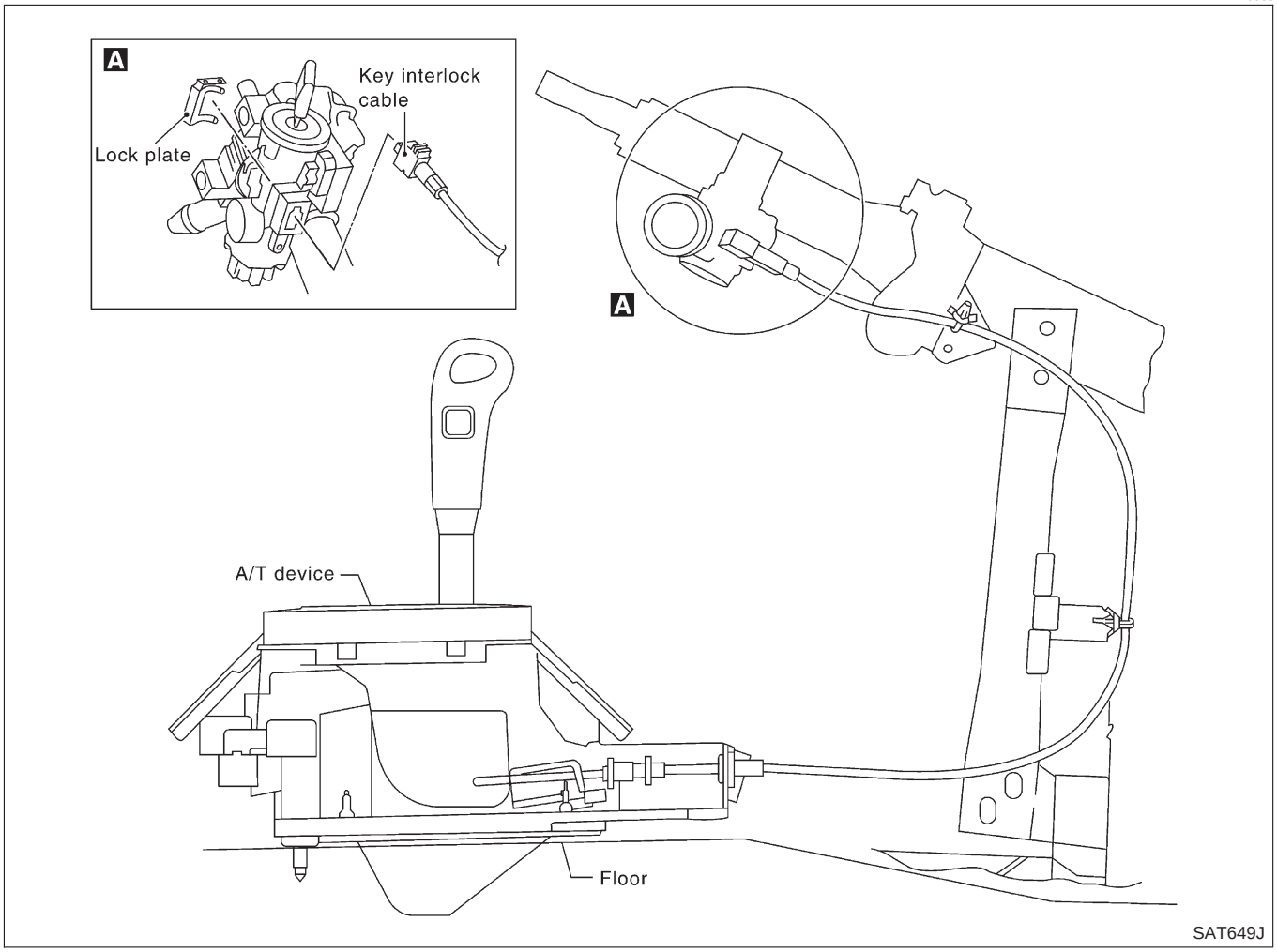
1. Perform A/T device input/output signal inspection test.
2. If NG, recheck harness connector connection.

OK or NG

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

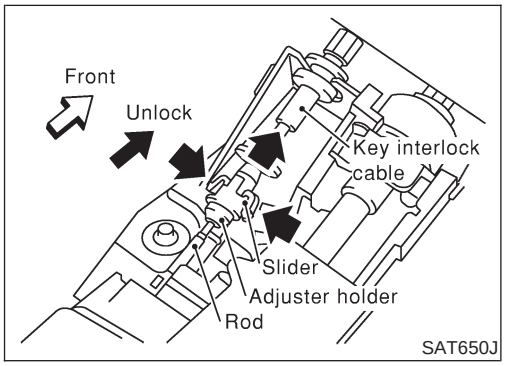
Key Interlock Cable

NFAT0355



CAUTION:

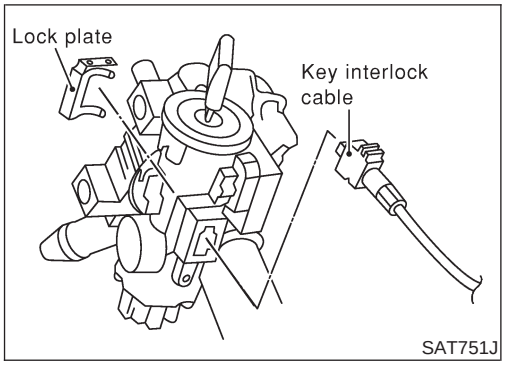
- **Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.**
- **After installing key interlock cable to control device, make sure that casing cap and bracket are firmly secured in their positions. If casing cap can be removed with an external load of less than 39.2 N (4.0 kg, 8.8 lb), replace key interlock cable with new one.**



REMOVAL

NFAT0355S01

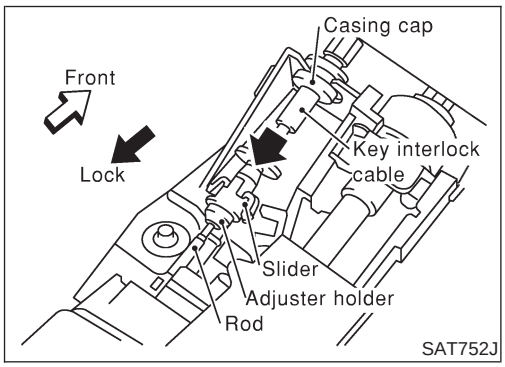
Unlock slider from adjuster holder and remove rod from cable.



INSTALLATION

NFAT0355S02

1. Set key interlock cable to steering lock assembly and install lock plate.
2. Clamp cable to steering column and fix to control cable with band.
3. Set control lever to P position.

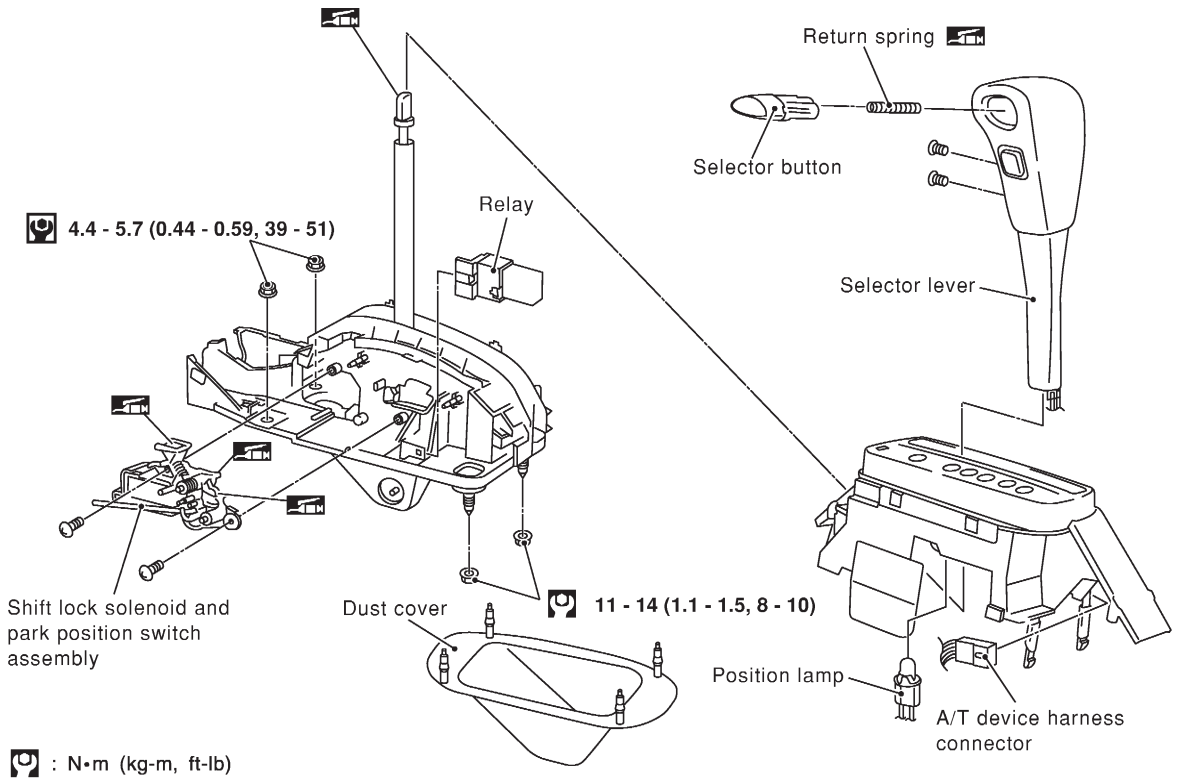


4. Insert rod into adjuster holder.
5. Install casing cap to bracket.
6. Move slider in order to fix adjuster holder to rod.

Control Device

NFAT0356

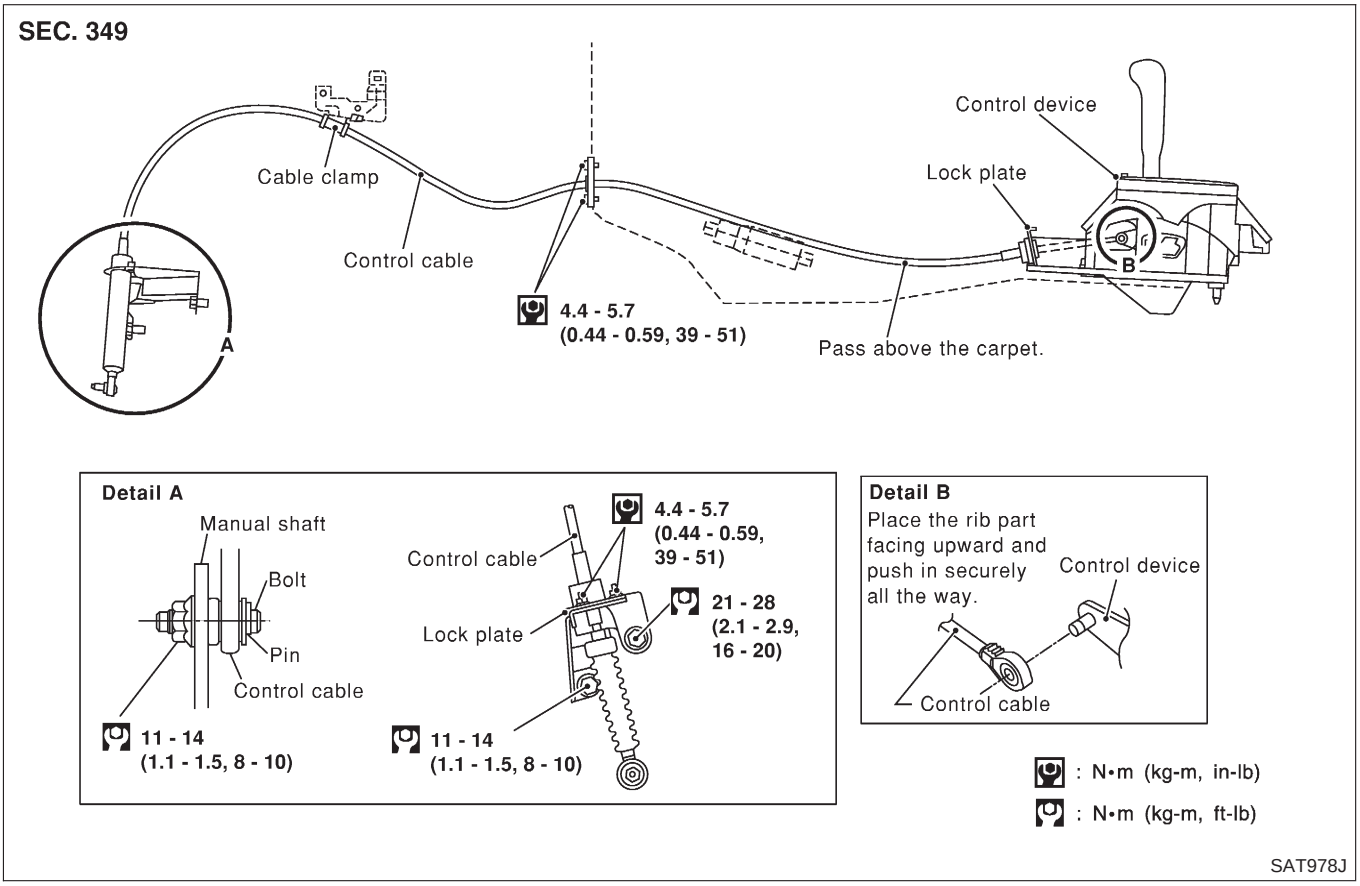
SEC. 349



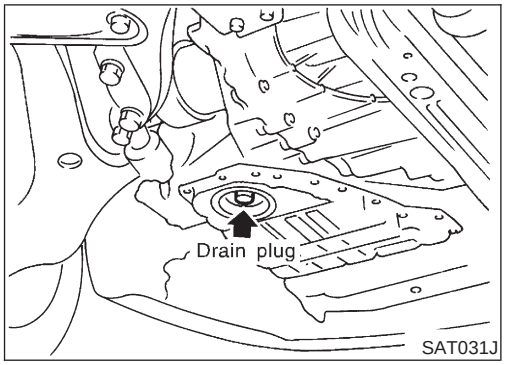
Control Cable

NFAT0357

SEC. 349



SAT978J



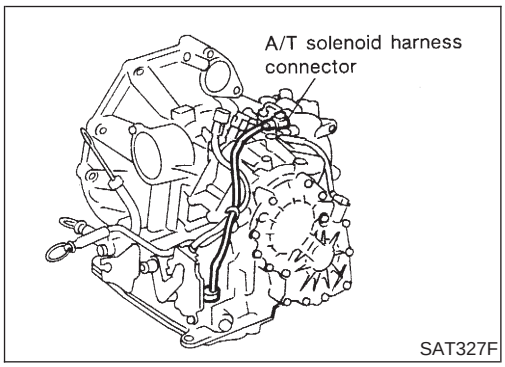
Control Valve Assembly and Accumulators

NFAT0358

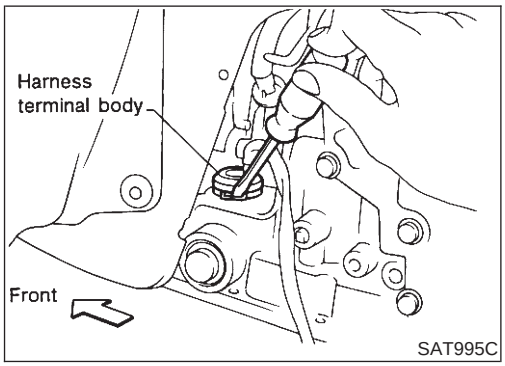
REMOVAL

NFAT0358S01

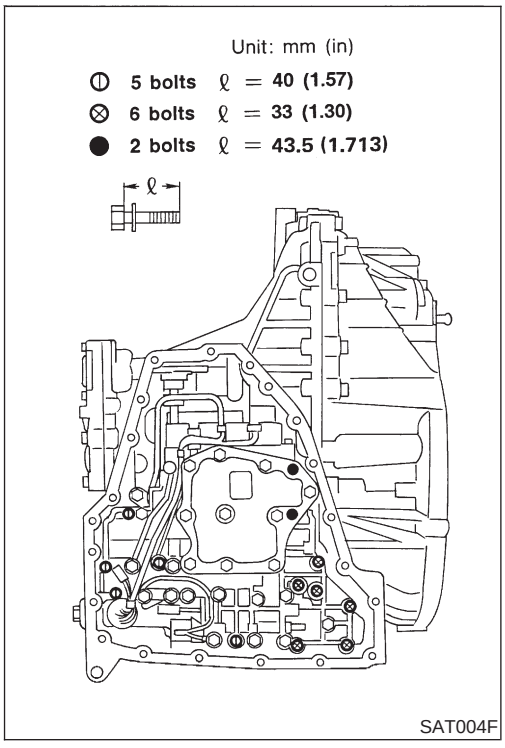
1. Drain ATF from transaxle.
2. Remove oil pan and gasket.



3. Disconnect A/T solenoid harness connector.



4. Remove stopper ring from terminal cord assembly harness terminal body.
5. Remove terminal cord assembly harness from transmission case by pushing on terminal body.

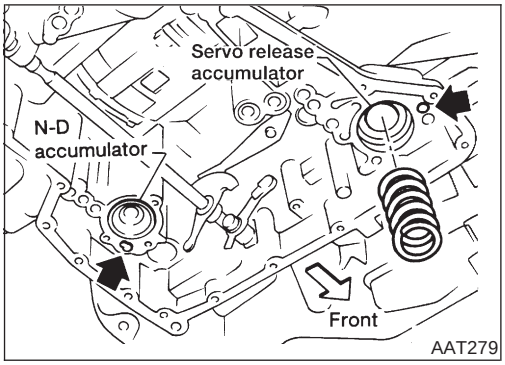


6. Remove control valve assembly by removing fixing bolts **I**, **X** and ●.

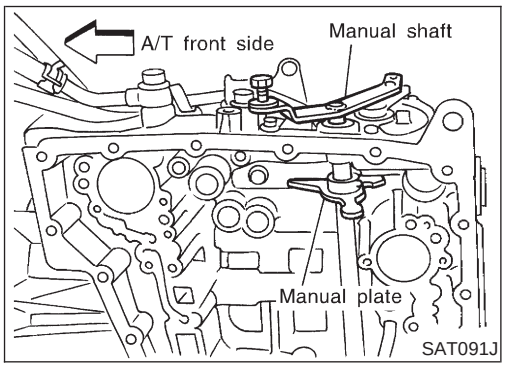
Bolt length, number and location are shown in the illustration.

- **Be careful not to drop manual valve and servo release accumulator return spring.**

7. Disassemble and inspect control valve assembly if necessary. Refer to AT-378.



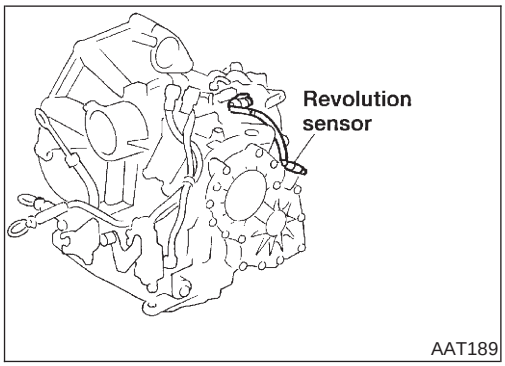
8. Remove servo release and N-D accumulators by applying compressed air if necessary.
- **Hold each piston with a rag.**



INSTALLATION

NFAT0358S02

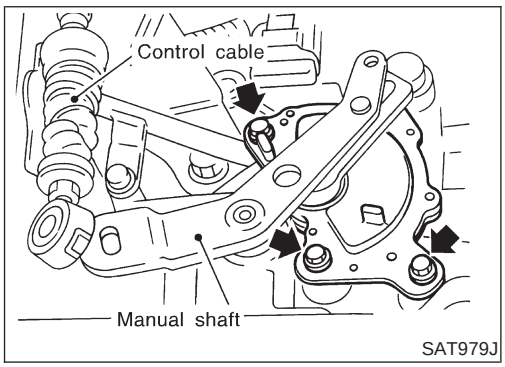
- **Set manual shaft in Neutral, then align manual plate with groove in manual valve.**
- **After installing control valve assembly, make sure that selector lever can be moved to all positions.**



Revolution Sensor Replacement

NFAT0359

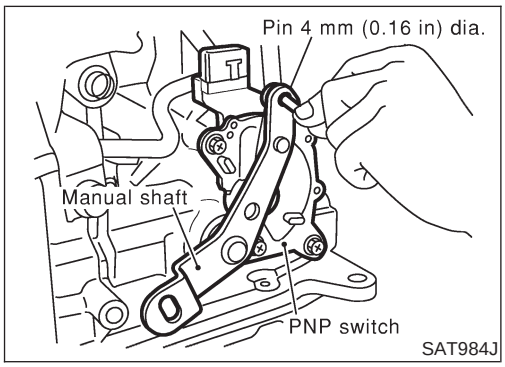
1. Remove under cover.
2. Remove revolution sensor from A/T.
3. Reinstall any part removed.
- **Always use new sealing parts.**



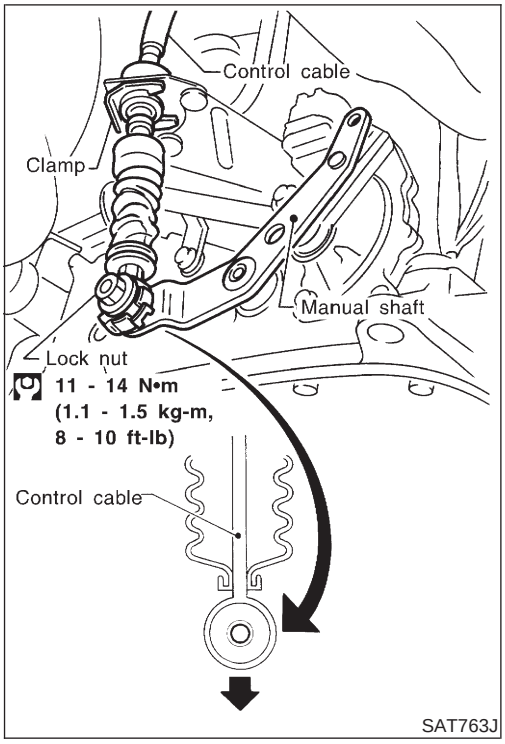
Park/Neutral Position (PNP) Switch Adjustment

NFAT0360

1. Remove control cable from manual shaft.
2. Set manual shaft in N position.
3. Loosen park/neutral position (PNP) switch fixing bolts.



4. Insert pin into adjustment holes in both park/neutral position (PNP) switch and manual shaft as near vertical as possible.
5. Reinstall any part removed.
6. Check continuity of park/neutral position (PNP) switch. Refer to AT-323.



Control Cable Adjustment

NFAT0361

Move selector lever from the P position to the 1 position. You should be able to feel the detents in each position. If the detents cannot be felt or the pointer indicating the position is improperly aligned, the control cable needs adjustment.

1. Place selector lever in P position.
2. Loosen control cable lock nut and place manual shaft in P position.

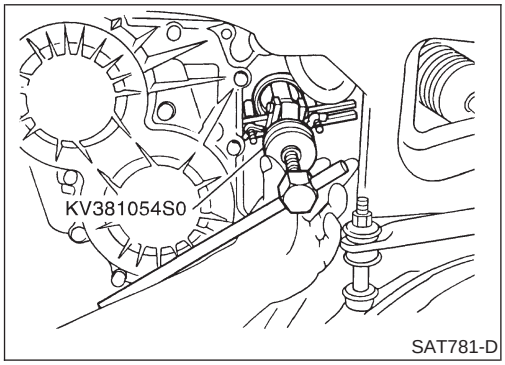
CAUTION:

Turn wheels more than 1/4 rotations and apply the park lock.

3. Push control cable in the direction of the arrow shown in the illustration by specified force.

   Specified force: 4.9 - 9.8 N (0.5 - 1.0 kg, 1.1 - 2.2 lb)
4. Tighten control cable lock nut.
5. Move selector lever from P to 1 position again. Make sure that selector lever moves smoothly.

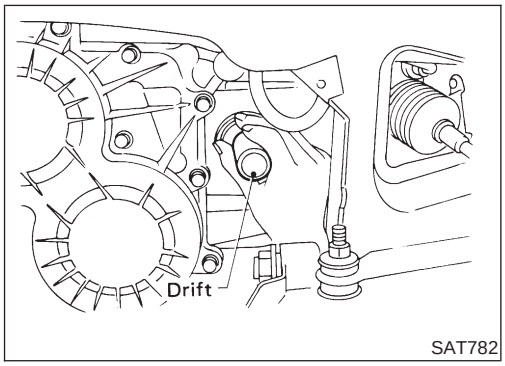
- **Make sure that the starter operates when the selector lever is placed in the N or P position.**
- **Make sure that the transmission is locked properly when the selector lever is placed in the P position.**



Differential Side Oil Seal Replacement

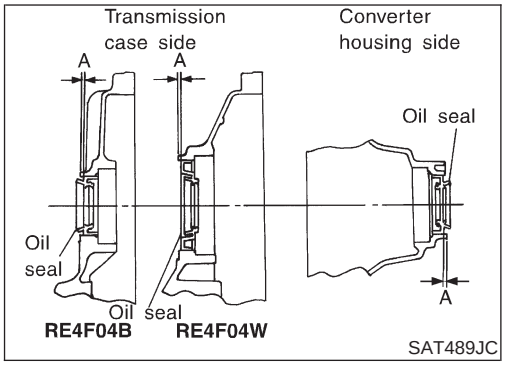
NFAT0362

1. Remove drive shaft assembly. Refer to AX-9, “Components”.
2. Remove oil seal.



3. Install oil seal.

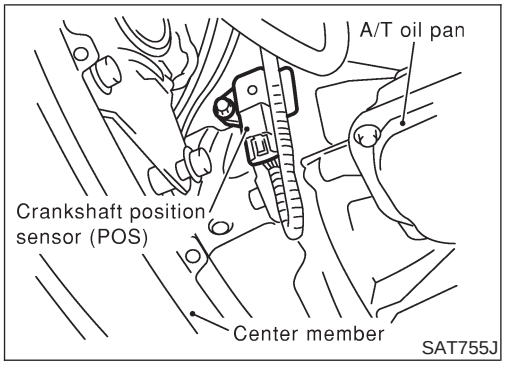
- **Apply ATF before installing.**

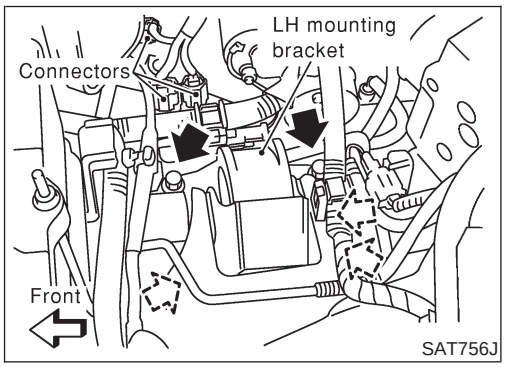


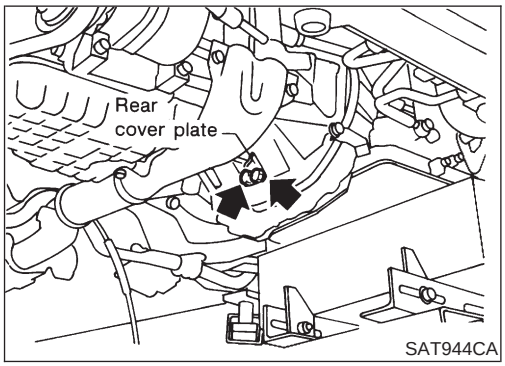
- **Install oil seals so dimension A is within specification**

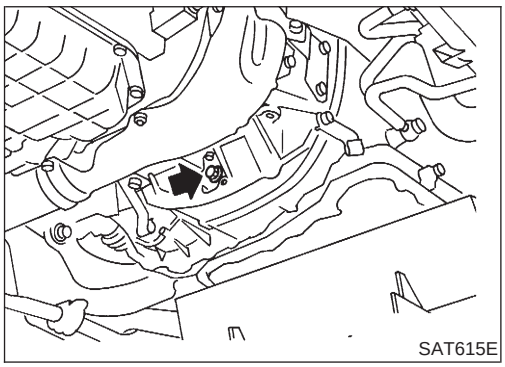
  A: −0.5 mm (−0.02 in) to 0.5 mm (0.02 in)

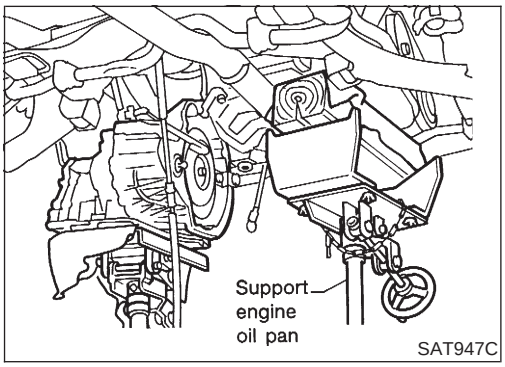
4. Reinstall any part removed.











Removal

NFAT0363

CAUTION:

When removing the transaxle assembly from engine, first remove the crankshaft position sensor (POS) from the assembly.

Be careful not to damage sensor edge.

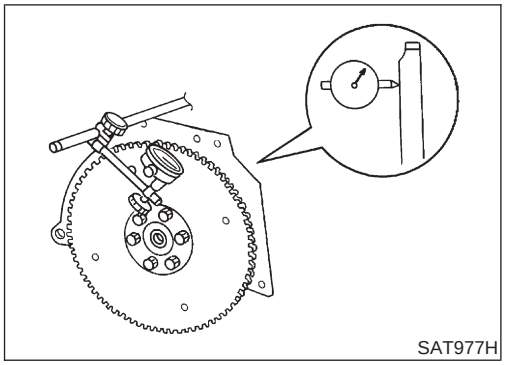
1. Remove battery and bracket.
2. Remove air cleaner and resonator.
3. Disconnect terminal cord assembly harness connector and park/neutral position (PNP) switch harness connectors.
4. Disconnect harness connectors of revolution sensor, ground and vehicle speed sensor.
5. Remove crankshaft position sensor (POS) from transaxle.
6. Remove LH mounting bracket from transaxle and body.
7. Support transaxle with a jack.
8. Disconnect control cable at transaxle side.
9. Drain ATF.
10. Remove drive shafts. Refer to AX-9, “Components”.
11. Disconnect fluid cooler piping.
12. Remove starter motor from transaxle.
13. Support engine by placing a jack under oil pan.

- **Do not place jack under oil pan drain plug.**

14. Remove center member.
15. Remove rear cover plate and bolts securing torque converter to drive plate.

- **Rotate crankshaft for access to securing bolts.**

16. Support transaxle with a jack.
17. Remove bolts fixing A/T to engine.
18. Lower transaxle while supporting it with a jack.


SAT977H

Installation

NFAT0364

- Drive plate runout

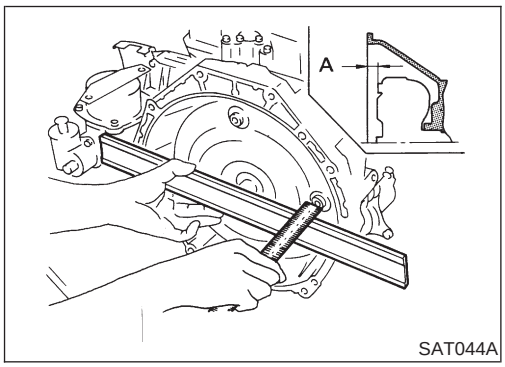
CAUTION:

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

Maximum allowable runout:

Refer to EM-68, “Flywheel/Drive Plate Runout”.

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

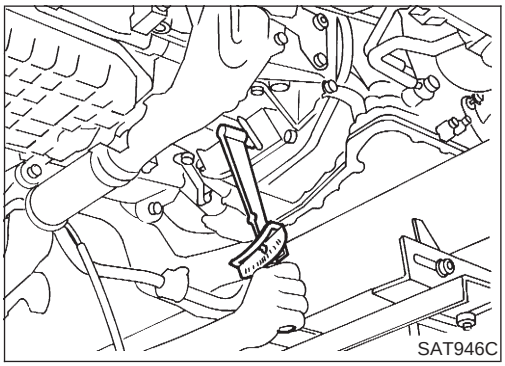


SAT044A

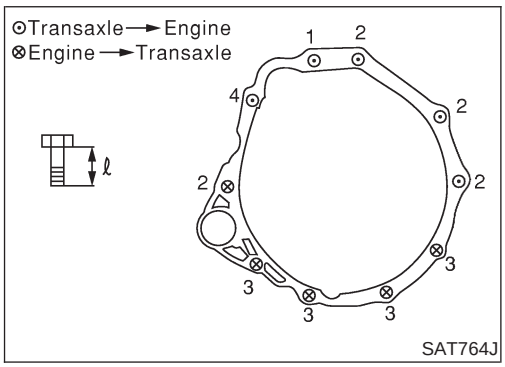
- When connecting torque converter to transaxle, measure distance “A” to be certain that they are correctly assembled.

Distance “A”:

14 mm (0.55 in) or more


SAT946C

- Install bolts fixing converter to drive plate.
- **With converter installed, rotate crankshaft several turns to check that transaxle rotates freely without binding.**



SAT764J

- Tighten bolts securing transaxle.
- Tighten LH mounting bracket bolts to the specified torque. Refer to EM-56, “Removal and Installation”.
- Tighten center member bolts to the specified torque. Refer to EM-56, “Removal and Installation”.
- Tighten rear plate cover bolts to the specified torque. Refer to EM-12, “Components”.

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	ℓ mm (in)
1	70 - 79 (7.1 - 8.1, 52 - 58)	65 (2.56)
2	70 - 79 (7.1 - 8.1, 52 - 58)	52 (2.05)
3	70 - 79 (7.1 - 8.1, 52 - 58)	40 (1.57)
4	78 - 98 (7.9 - 10.0, 58 - 72)	124 (4.88)

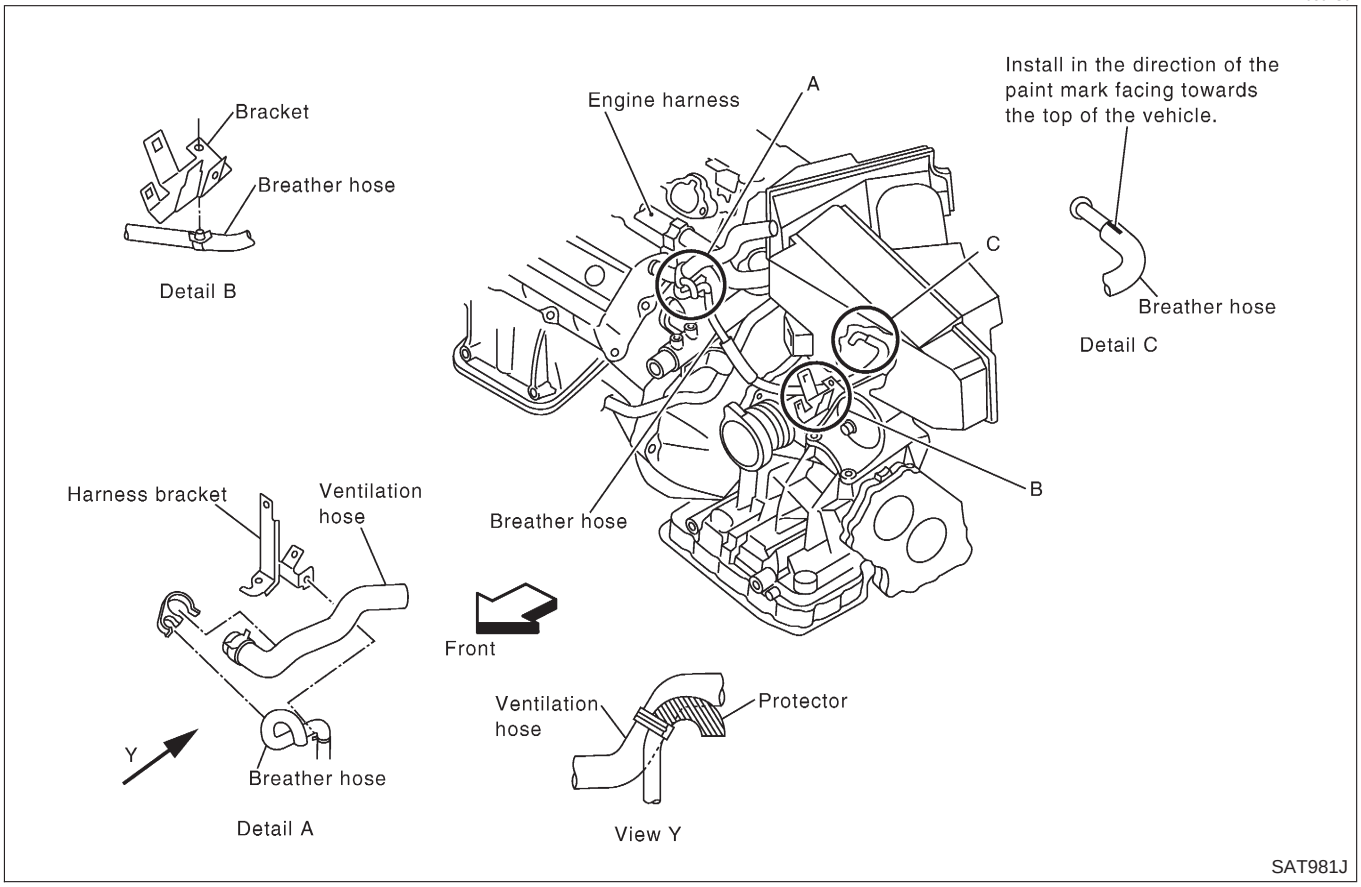
- Reinstall any part removed.


SAT638A

- Check fluid level in transaxle.
- Move selector lever through all positions to be sure that transaxle operates correctly.
  With parking brake applied, rotate engine at idling. Move selector lever through N to D, to 2, to 1 and to R position. A slight shock should be felt by hand gripping selector each time transaxle is shifted.
- Perform road test. Refer to AT-83.

AIR BREATHER HOSE

NFAT0364S01

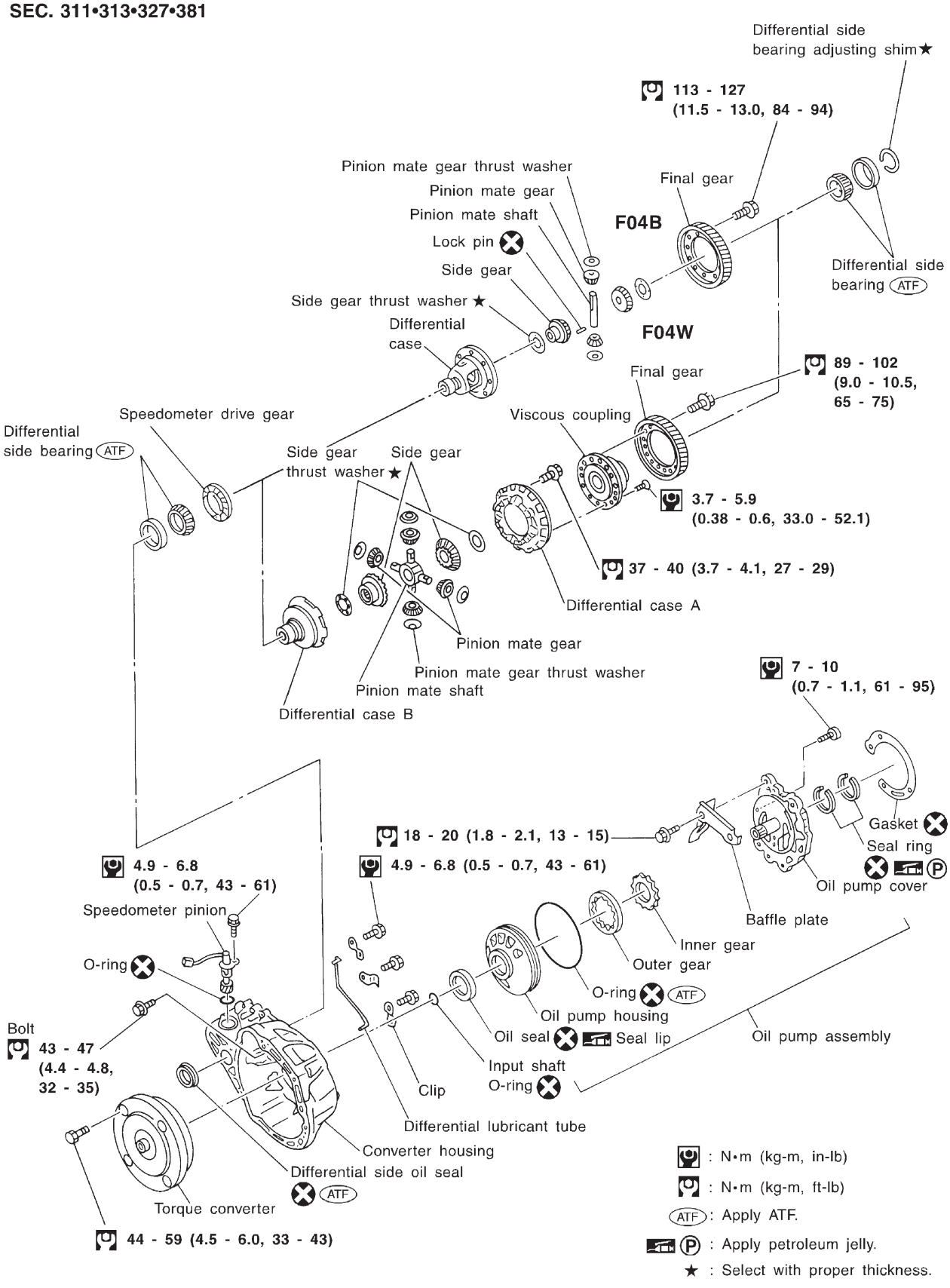


SAT981J

Components

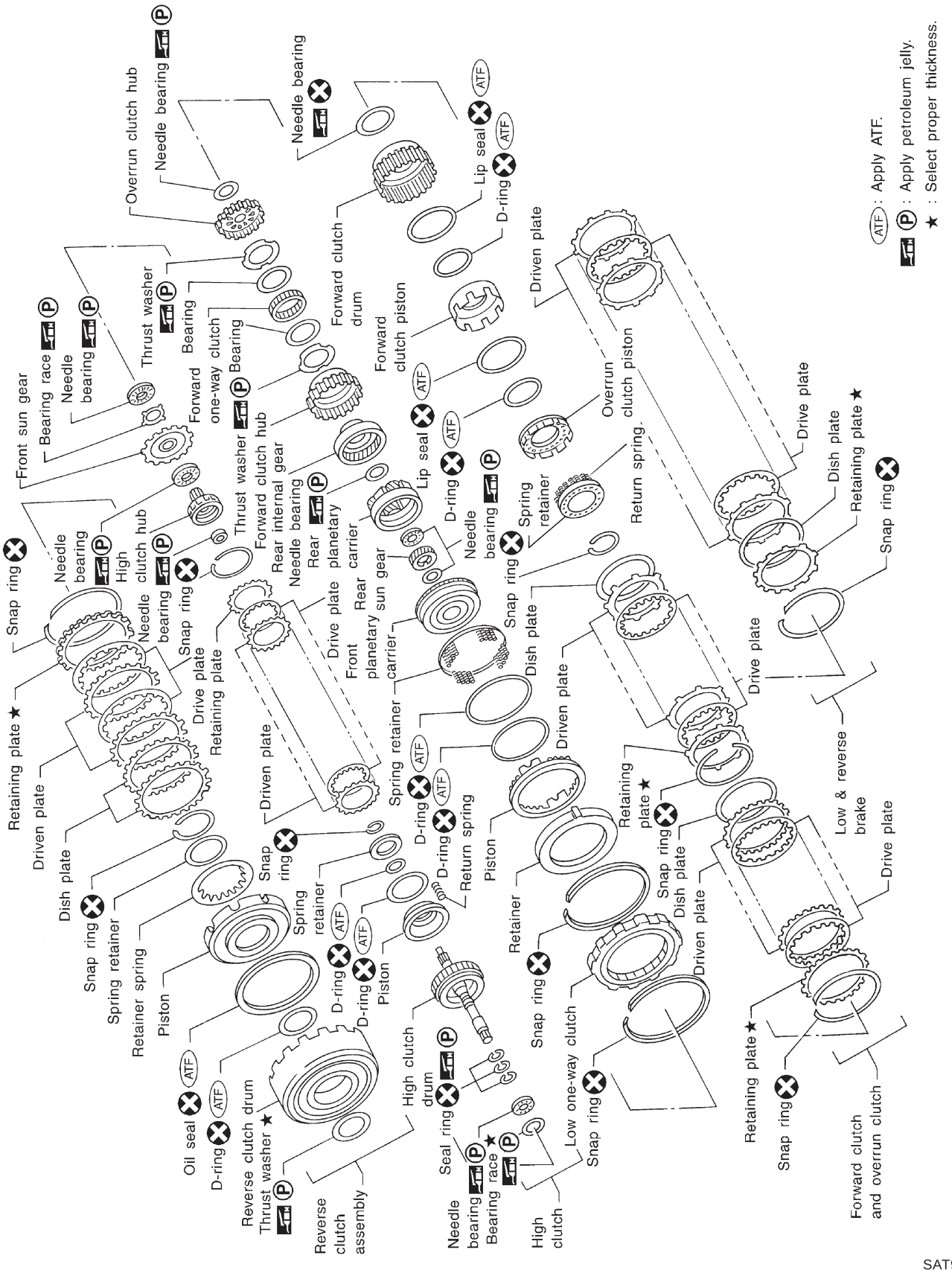
NFAT0365

SEC. 311•313•327•381



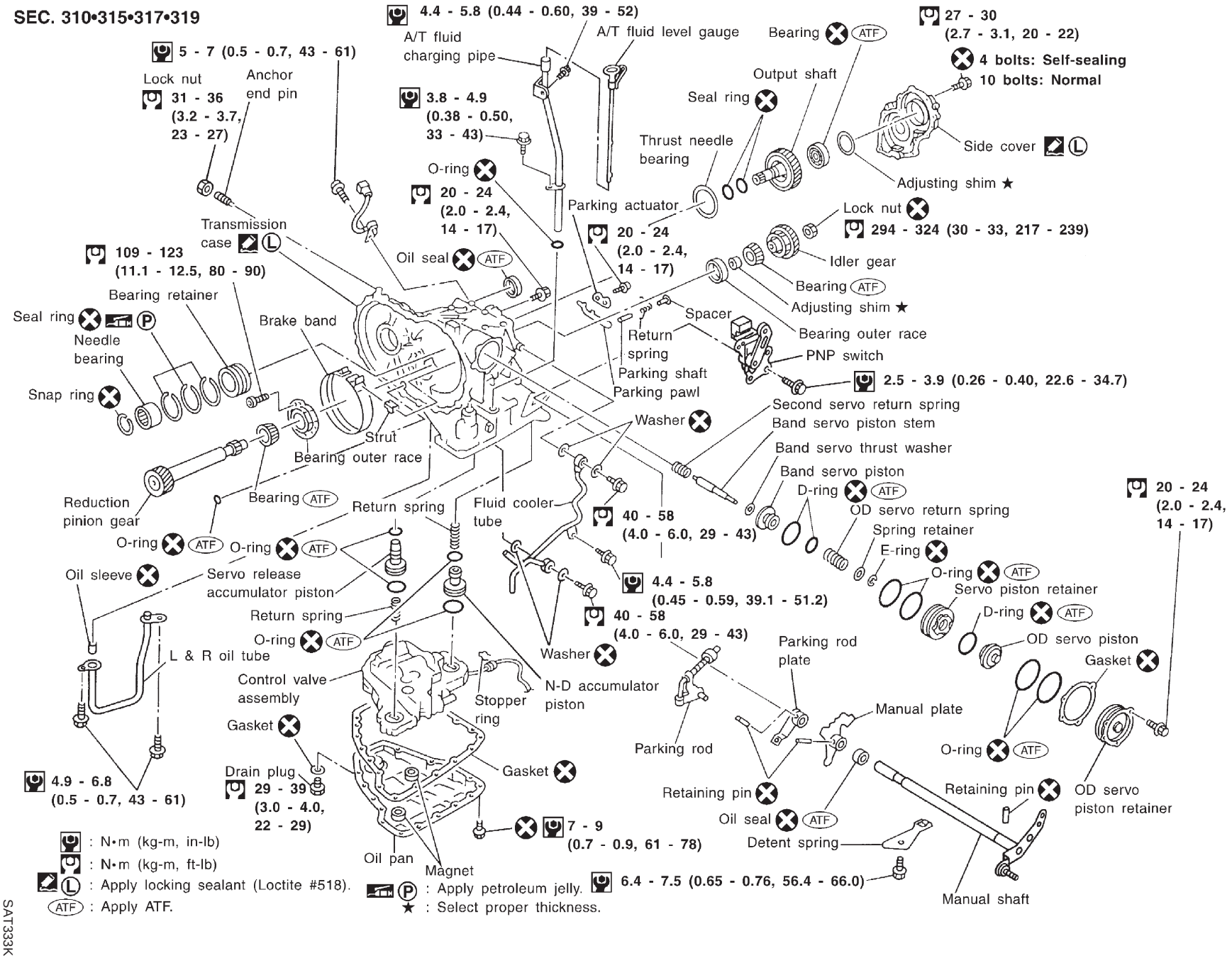
SAT765J

SEC. 315



SAT949IA

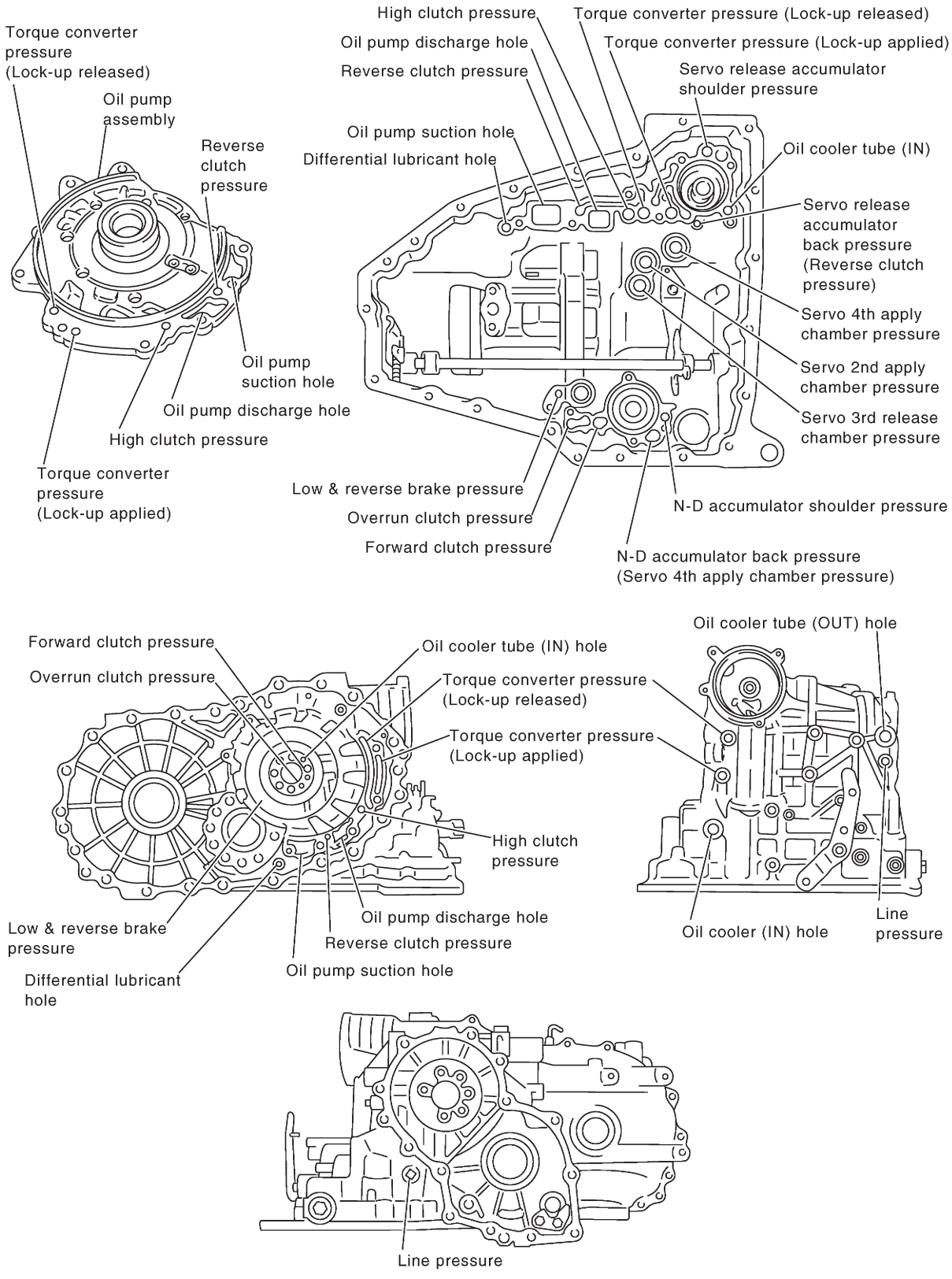
SEC. 310•315•317•319



SAT333K

Oil Channel

NFAT0366



SAT983J

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

NFAT0367

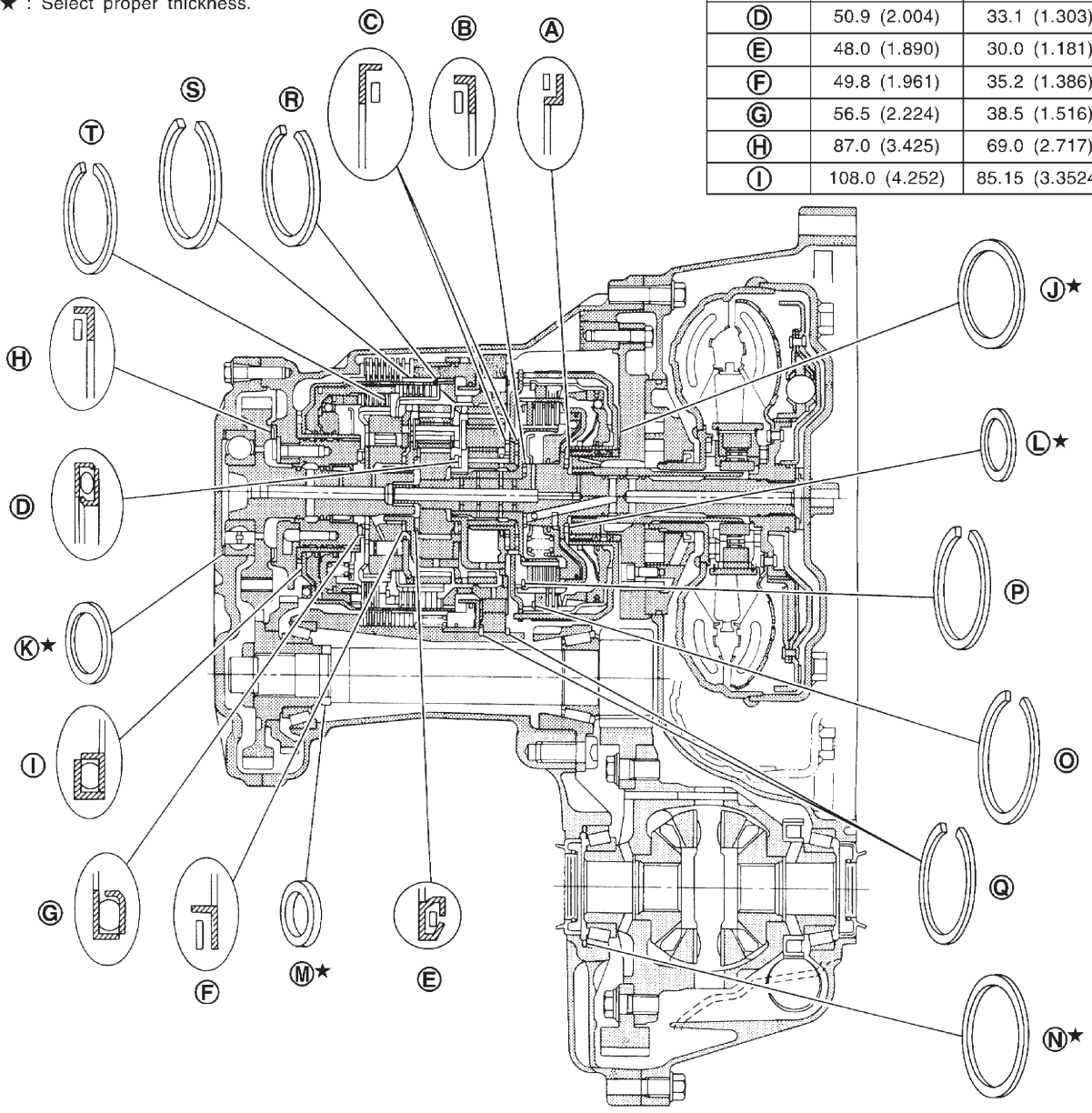
Outer diameter of thrust washers

Item number	Outer diameter mm (in)
Ⓙ★	76.0 (2.992)
Ⓚ★	80.0 (3.150)

★ : Select proper thickness.

Outer and inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)
Ⓐ	49.1 (1.933)	35.2 (1.386)
Ⓑ	42.0 (1.654)	23.1 (0.909)
Ⓒ	70.0 (2.756)	50.0 (1.969)
Ⓓ	50.9 (2.004)	33.1 (1.303)
Ⓔ	48.0 (1.890)	30.0 (1.181)
Ⓕ	49.8 (1.961)	35.2 (1.386)
Ⓖ	56.5 (2.224)	38.5 (1.516)
Ⓗ	87.0 (3.425)	69.0 (2.717)
Ⓘ	108.0 (4.252)	85.15 (3.3524)



Outer & inner diameter of bearing races, adjusting shims and adjusting spacer

Item number	Outer diameter mm (in)	Inner diameter mm (in)
Ⓛ★	51.0 (2.008)	36.0 (1.417)
Ⓜ★	38.0 (1.496)	28.1 (1.106)
Ⓝ★	75.0 (2.953)	68.0 (2.677)
	98.0 (3.858)	91.0 (3.583)

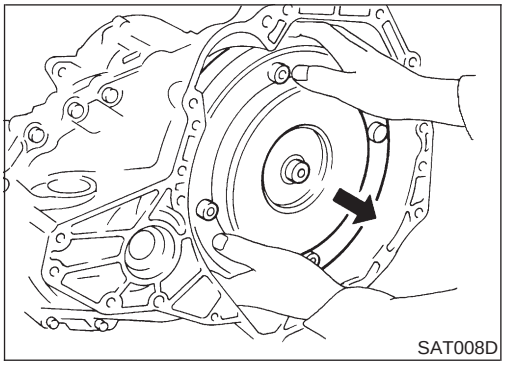
★ : Select proper thickness.

Outer diameter of snap rings

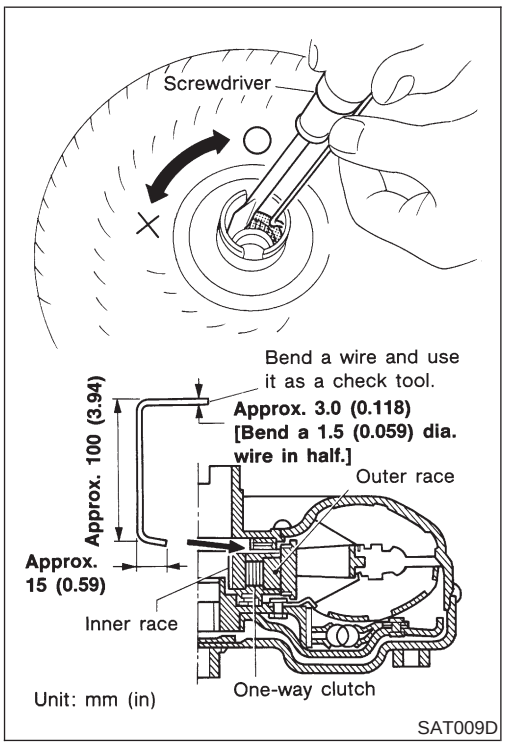
Item number	Outer diameter mm (in)
Ⓞ	150 (5.91)
Ⓟ	119.1 (4.689)
Ⓠ	182.8 (7.197)
Ⓡ	144.8 (5.701)
Ⓢ	173.8 (6.843)
Ⓣ	133.9 (5.272)

SAT767J

DISASSEMBLY



1. Drain ATF through drain plug.
2. Remove torque converter.

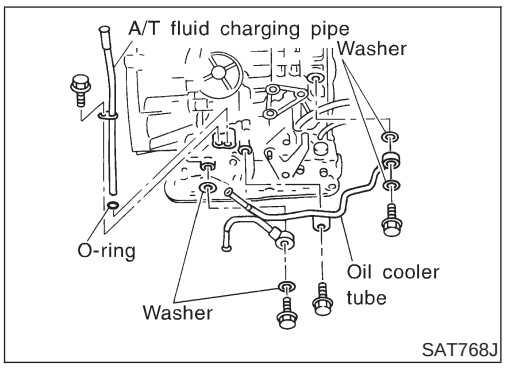


3. Check torque converter one-way clutch using check tool as shown at left.

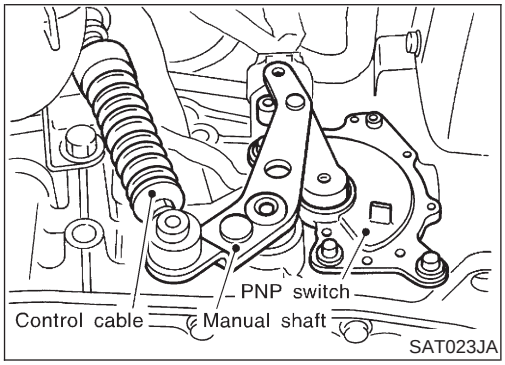
a. Insert check tool into the groove of bearing support built into one-way clutch outer race.

b. When fixing bearing support with check tool, rotate one-way clutch spline using screwdriver.

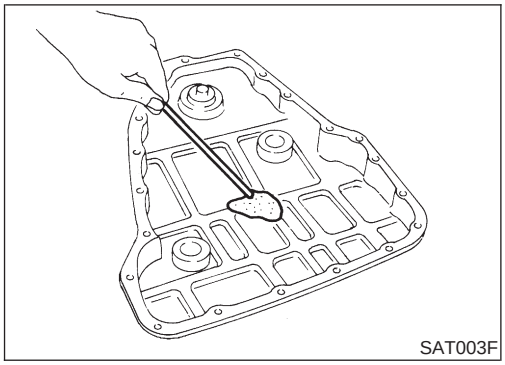
c. Check that inner race rotates clockwise only. If not, replace torque converter assembly.



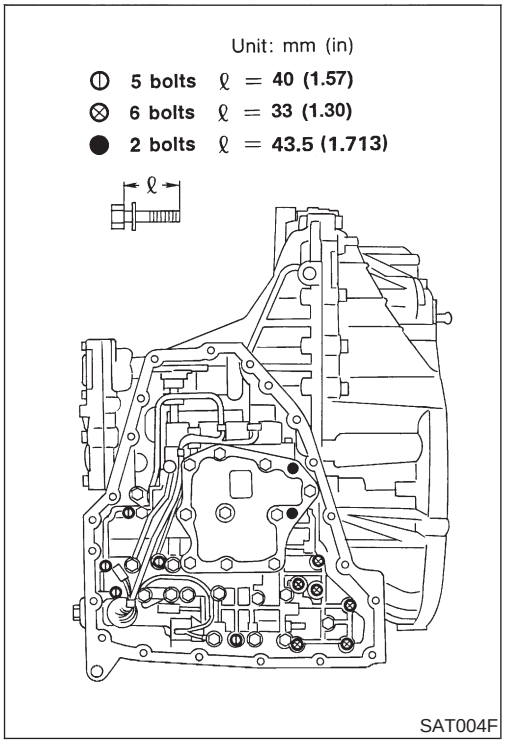
4. Remove A/T fluid charging pipe and fluid cooler tube.



5. Set manual shaft to position P.
6. Remove park/neutral position (PNP) switch.


SAT003F

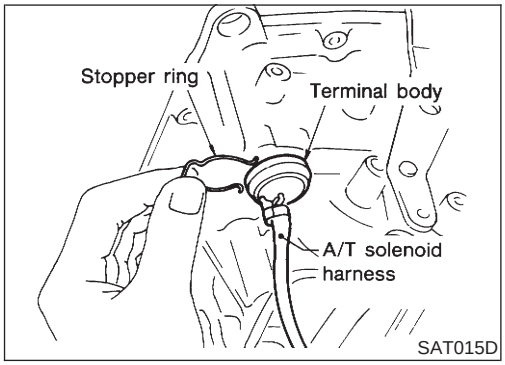
7. Remove oil pan and oil pan gasket.
- **Do not reuse oil pan bolts.**
8. Check foreign materials in oil pan to help determine causes of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.
- **If frictional material is detected, replace radiator after repair of A/T. Refer to LC-18, "Removal and Installation".**



SAT004F

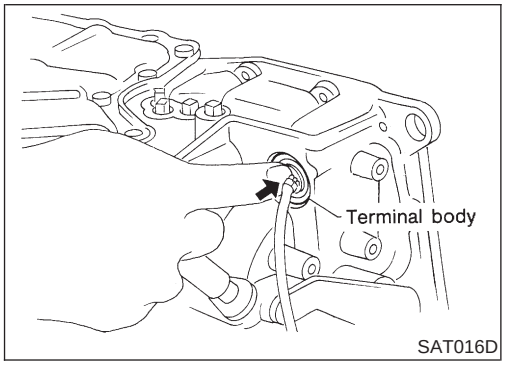
9. Remove control valve assembly according to the following procedures.

a. Remove control valve assembly mounting bolts **I**, **X** and ●.



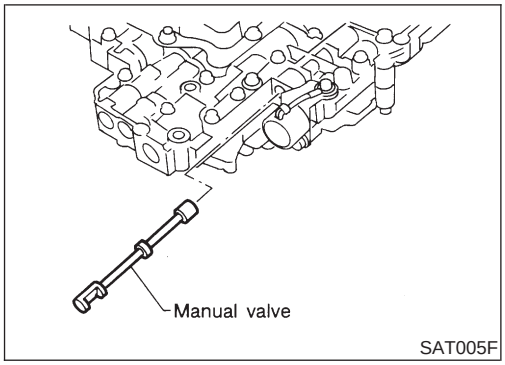
SAT015D

b. Remove stopper ring from terminal body.

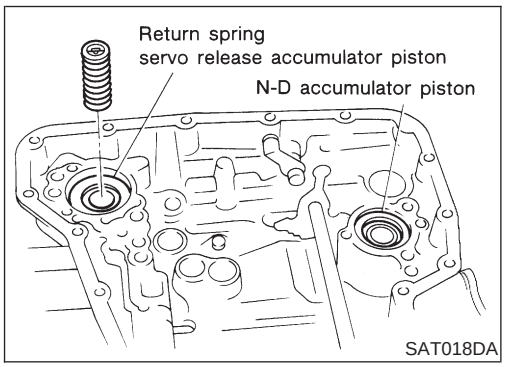


SAT016D

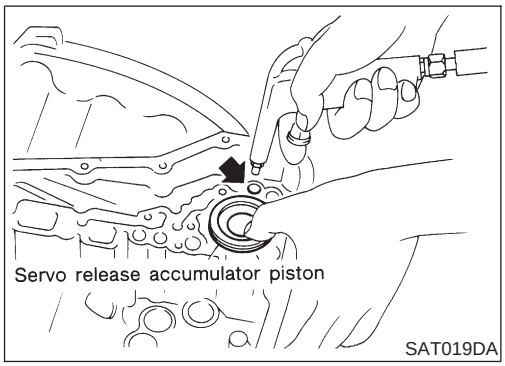
c. Push terminal body into transmission case and draw out solenoid harness.



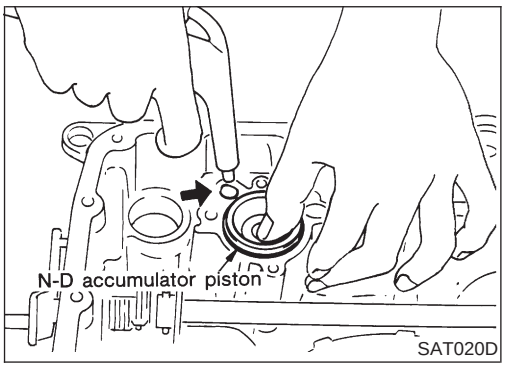
10. Remove manual valve from control valve assembly.



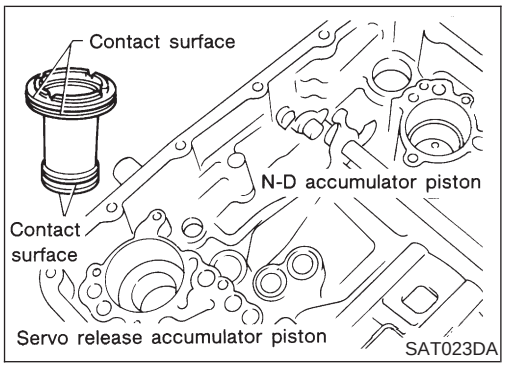
11. Remove return spring from servo release accumulator piston.



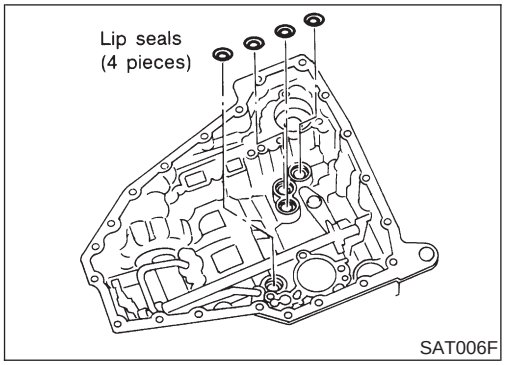
12. Remove servo release accumulator piston with compressed air.
13. Remove O-rings from servo release accumulator piston.



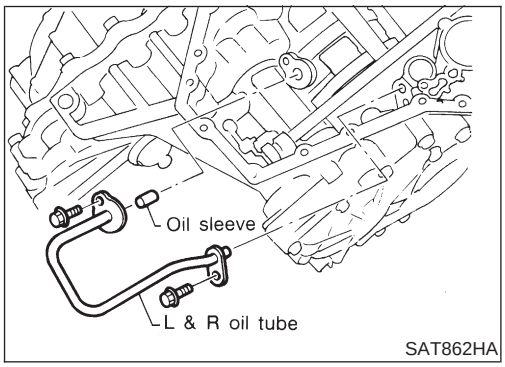
14. Remove N-D accumulator piston and return spring with compressed air.
15. Remove O-rings from N-D accumulator piston.



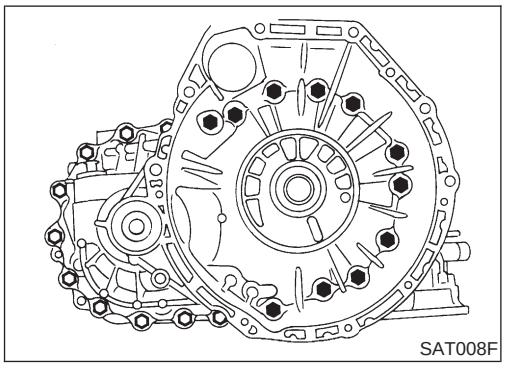
16. Check accumulator pistons and contact surface of transmission case for damage.
17. Check accumulator return springs for damage and free length.



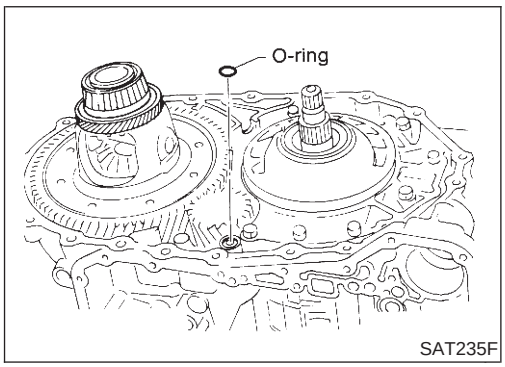
18. Remove lip seals.



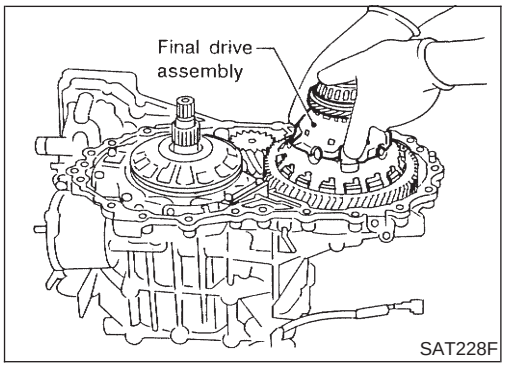
19. Remove L & R oil tube and oil sleeve.



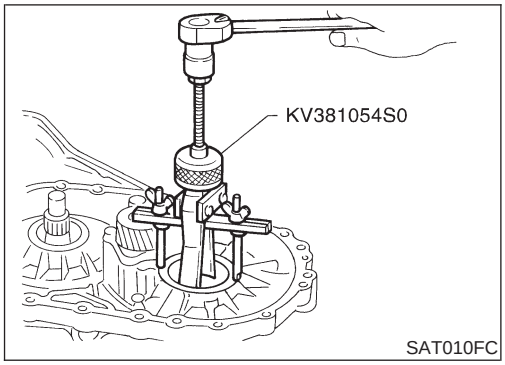
20. Remove converter housing according to the following procedures.
a. Remove converter housing mounting bolts.
b. Remove converter housing by tapping it lightly.



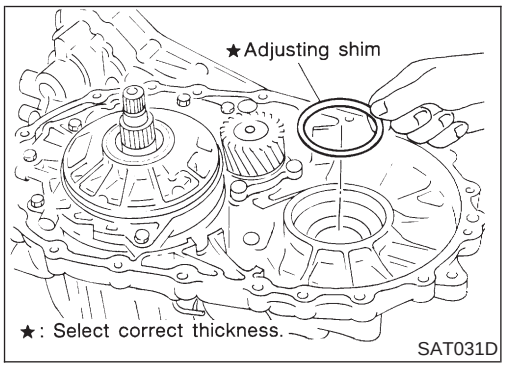
c. Remove O-ring from differential oil port.



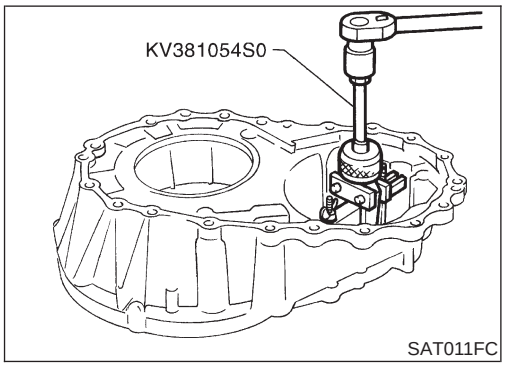
21. Remove final drive assembly from transmission case.



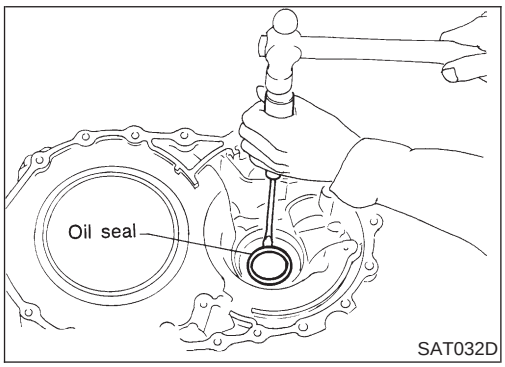
22. Remove differential side bearing outer race and side bearing adjusting shim from transmission case.



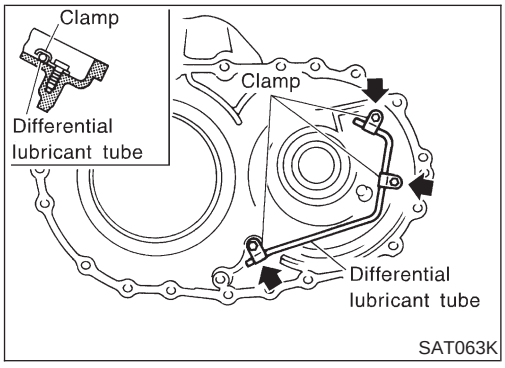
23. Remove differential side bearing adjusting shim from transmission case.



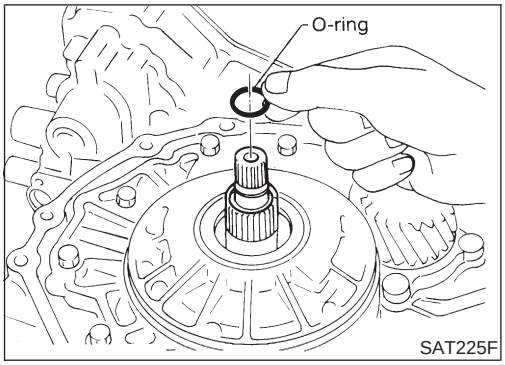
24. Remove differential side bearing outer race from converter housing.



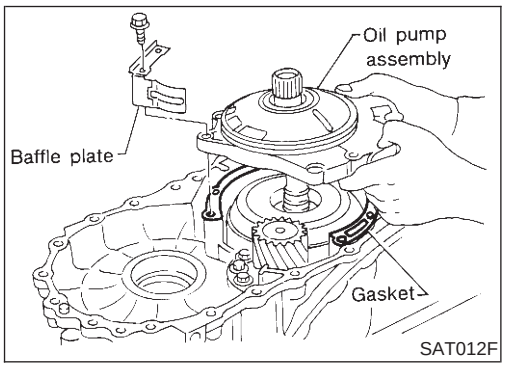
25. Remove oil seal with screwdriver from converter housing.
- **Be careful not to damage case.**



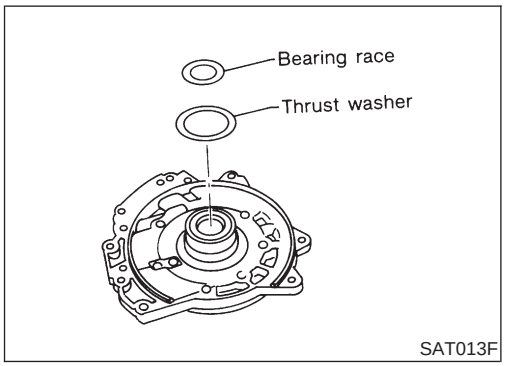
26. Remove differential lubricant tube from converter housing.



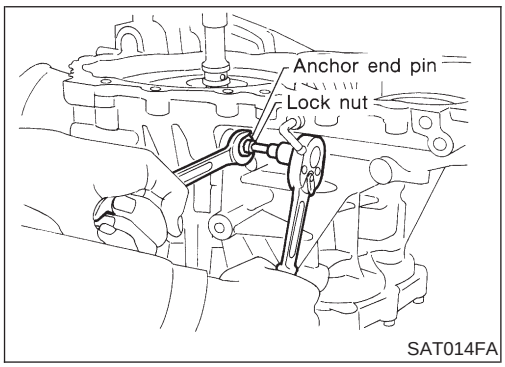
27. Remove oil pump according to the following procedures.
a. Remove O-ring from input shaft.



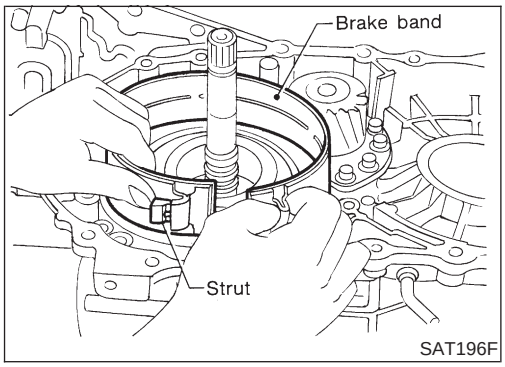
b. Remove oil pump assembly, baffle plate and gasket from transmission case.



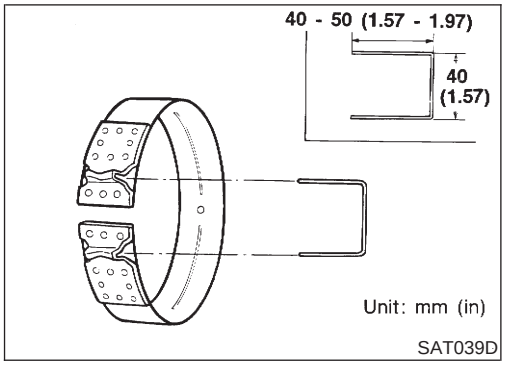
c. Remove thrust washer and bearing race from oil pump assembly.



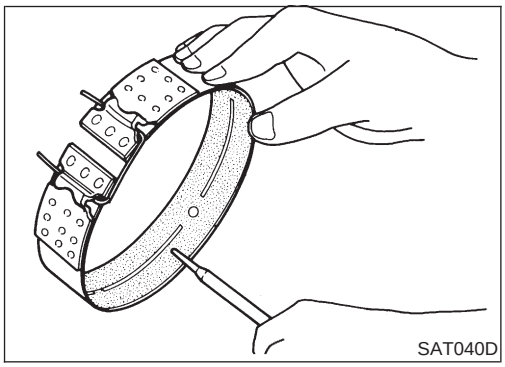
28. Remove brake band according to the following procedures.
a. Loosen lock nut, then back off anchor end pin.
- **Do not reuse anchor end pin.**



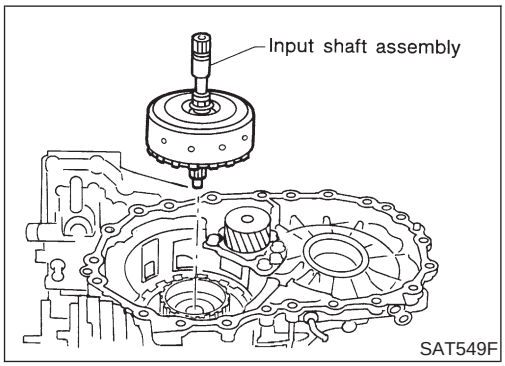
b. Remove brake band and strut from transmission case.



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

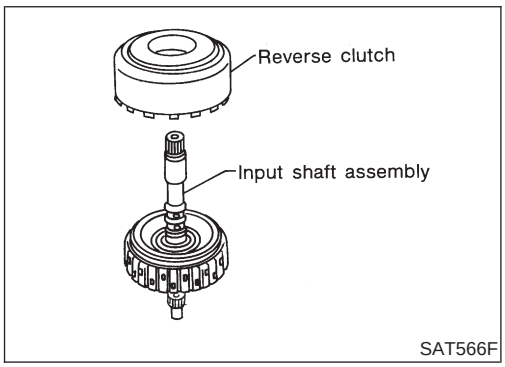


c. Check brake band facing for damage, cracks, wear or burns.

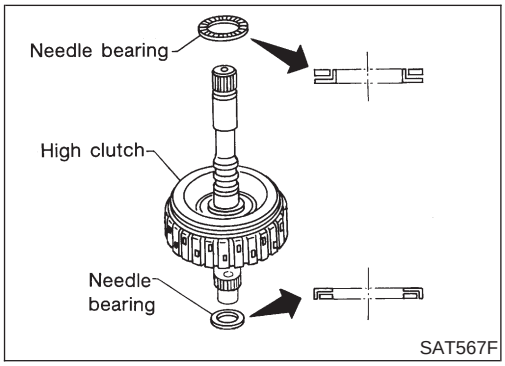


29. Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures.

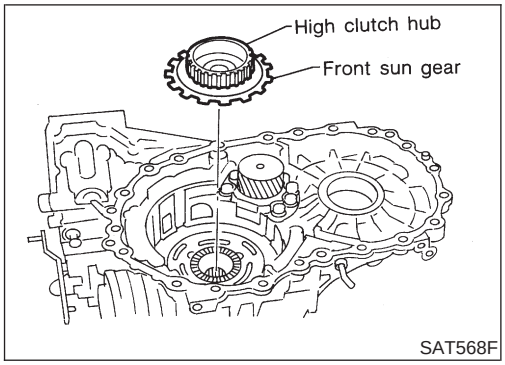
a. Remove input shaft assembly (high clutch) with reverse clutch.



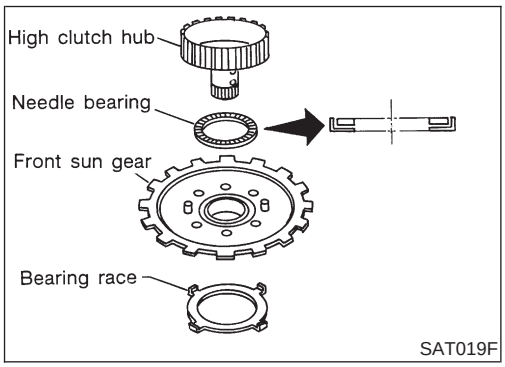
b. Remove input shaft assembly (high clutch) from reverse clutch.



c. Remove needle bearings from high clutch drum and check for damage or wear.

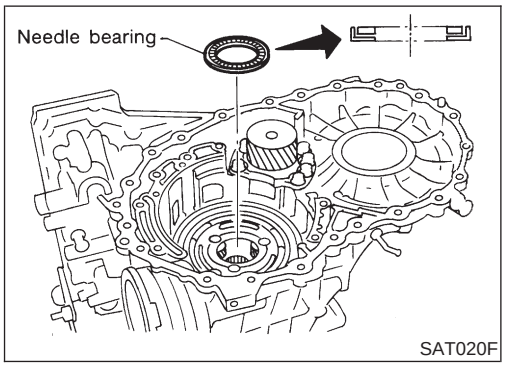


d. Remove high clutch hub and front sun gear from transmission case.

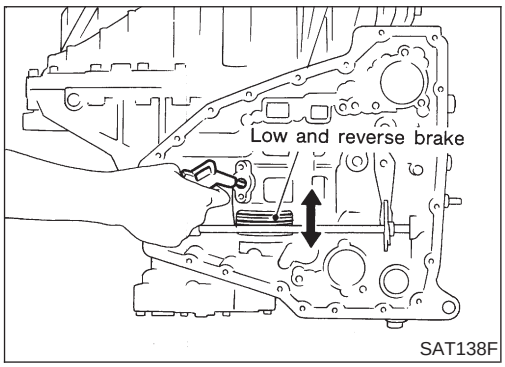


e. Remove front sun gear and needle bearing from high clutch hub and check for damage or wear.

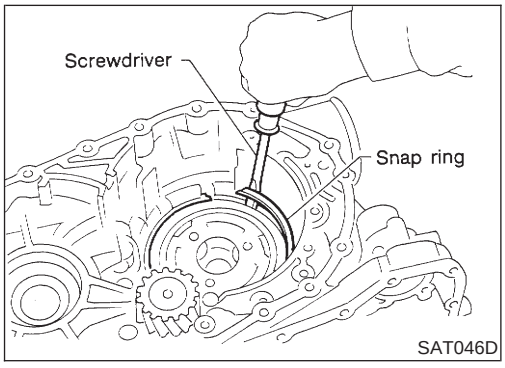
f. Remove bearing race from front sun gear and check for damage or wear.



30. Remove needle bearing from transmission case and check for damage or wear.

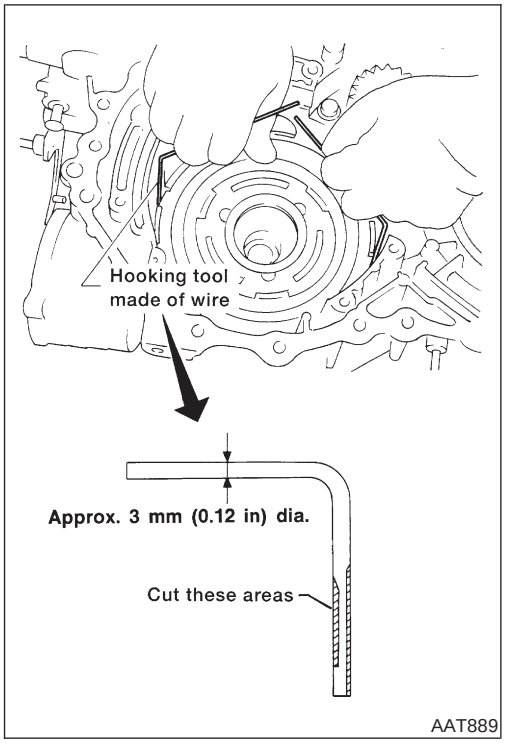


31. Apply compressed air and check to see that low and reverse brake operates.

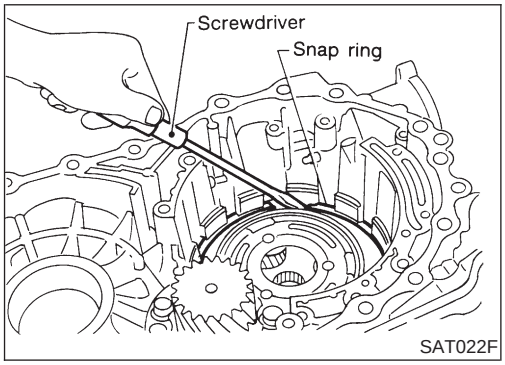


32. Remove low one-way clutch and front planetary carrier assembly according to the following procedures.

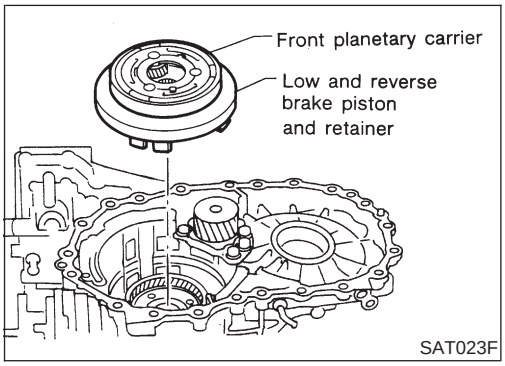
a. Remove snap ring with flat-bladed screwdriver.



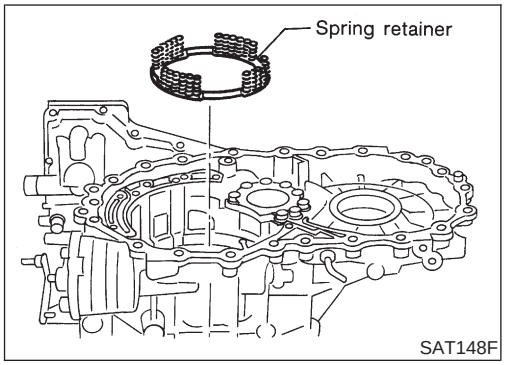
b. Remove low one-way clutch with a hook made of wire.



c. Remove snap ring with flat-bladed screwdriver.

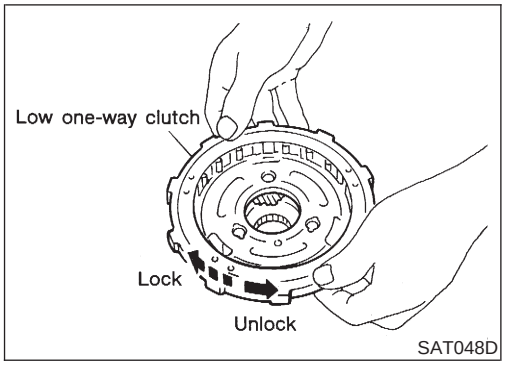


d. Remove front planetary carrier with low and reverse brake piston and retainer.

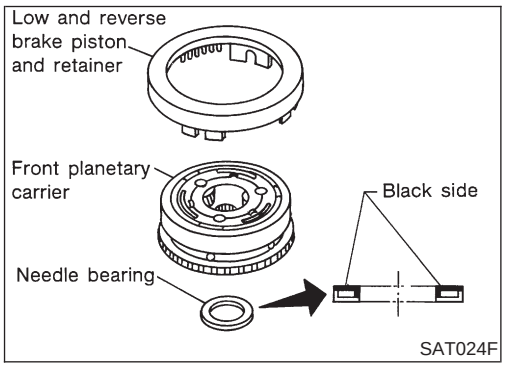


e. Remove low and reverse brake spring retainer.

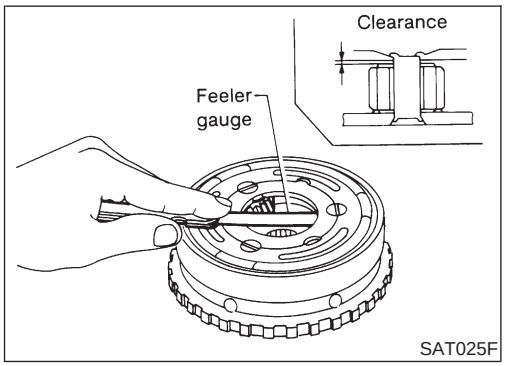
- **Do not remove return springs from spring retainer.**



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



g. Remove needle bearing, low and reverse brake piston and retainer from front planetary carrier.



h. Check front planetary carrier, low one-way clutch and needle bearing for damage or wear.

i. Check clearance between planetary gears and planetary carrier with feeler gauge.

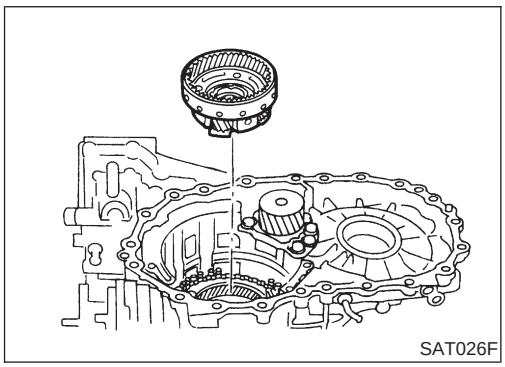
Standard clearance:

0.20 - 0.70 mm (0.0079 - 0.0276 in)

Allowable limit:

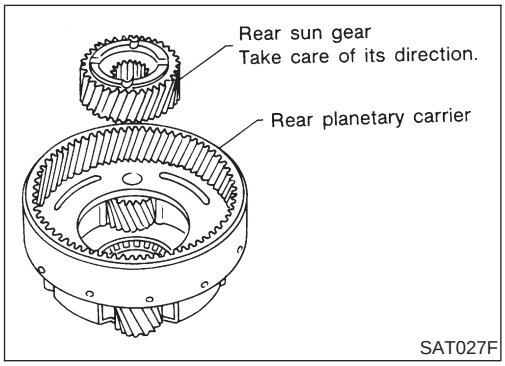
0.80 mm (0.0315 in)

Replace front planetary carrier if the clearance exceeds allowable limit.

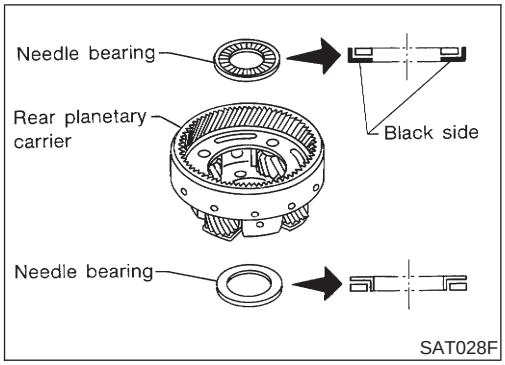


33. Remove rear planetary carrier assembly and rear sun gear according to the following procedures.

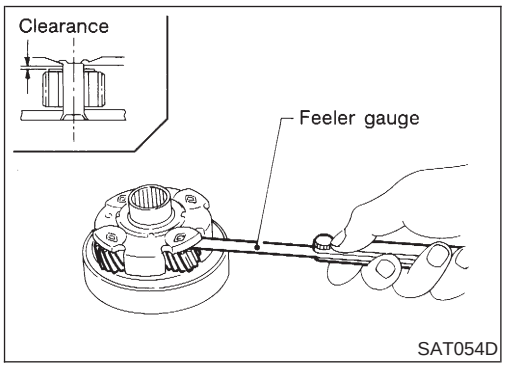
a. Remove rear planetary carrier assembly from transmission case.



b. Remove rear sun gear from rear planetary carrier.



c. Remove needle bearings from rear planetary carrier assembly.



d. Check rear planetary carrier, rear sun gear and needle bearings for damage or wear.

e. Check clearance between pinion washer and rear planetary carrier with feeler gauge.

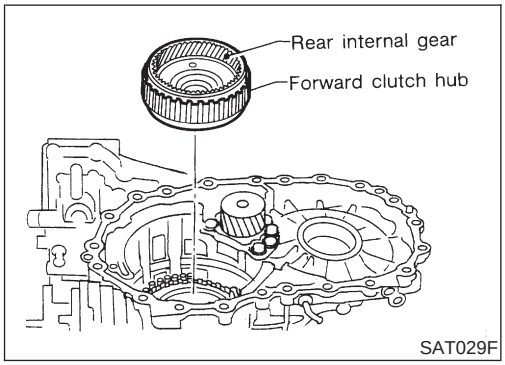
Standard clearance:

0.20 - 0.70 mm (0.0079 - 0.0276 in)

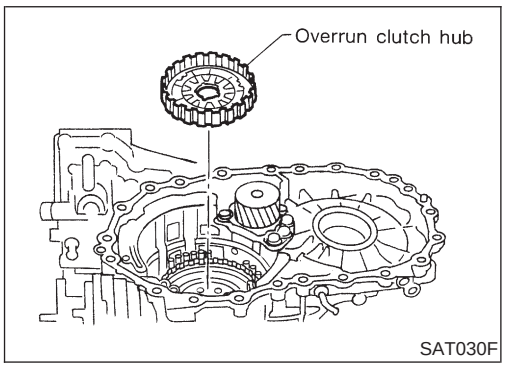
Allowable limit:

0.80 mm (0.0315 in)

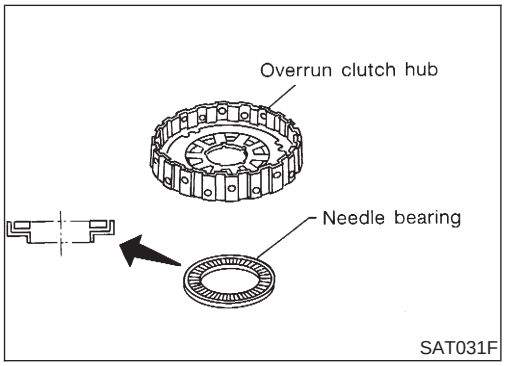
Replace rear planetary carrier if the clearance exceeds allowable limit.



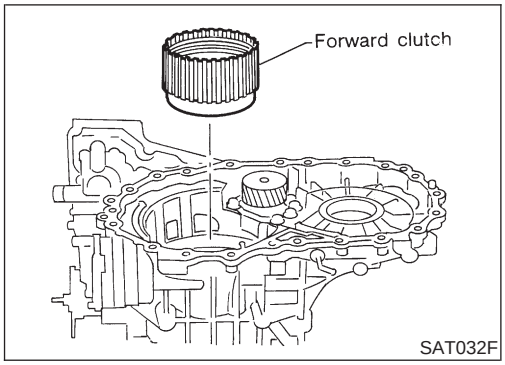
34. Remove rear internal gear and forward clutch hub from transmission case.



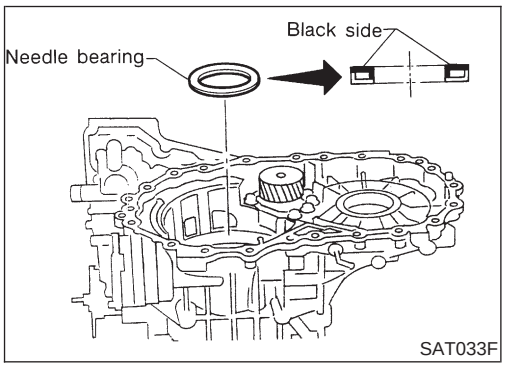
35. Remove overrun clutch hub from transmission case.



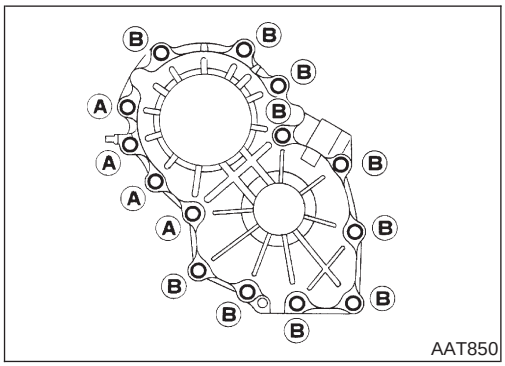
36. Remove needle bearing from overrun clutch hub and check for damage or wear.



37. Remove forward clutch assembly from transmission case.



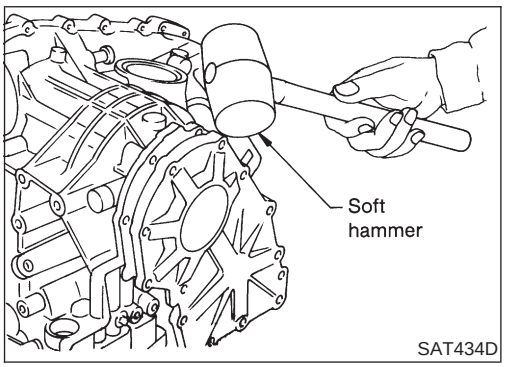
38. Remove needle bearing from transmission case.



39. Remove output shaft assembly according to the following procedures.

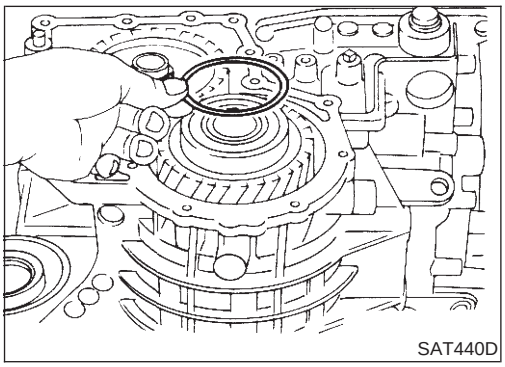
a. Remove side cover bolts.

- **Do not mix bolts A and B.**
- **Always replace bolts A as they are self-sealing bolts.**

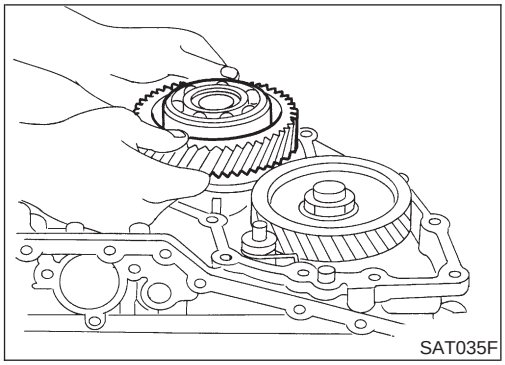


b. Remove side cover by lightly tapping it with a soft hammer.

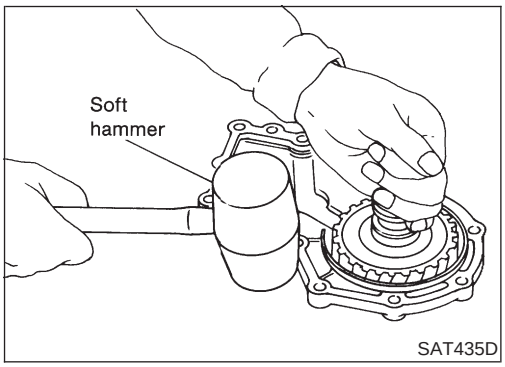
- **Be careful not to drop output shaft assembly. It might come out when removing side cover.**



c. Remove adjusting shim.

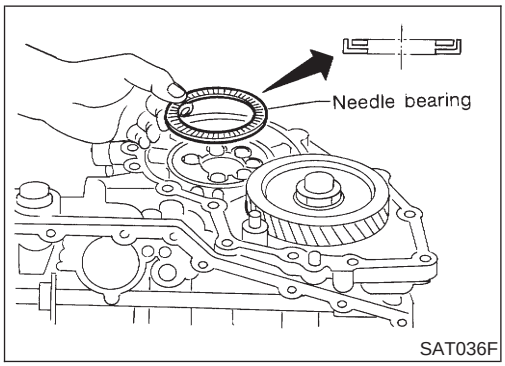

SAT035F

d. Remove output shaft assembly.



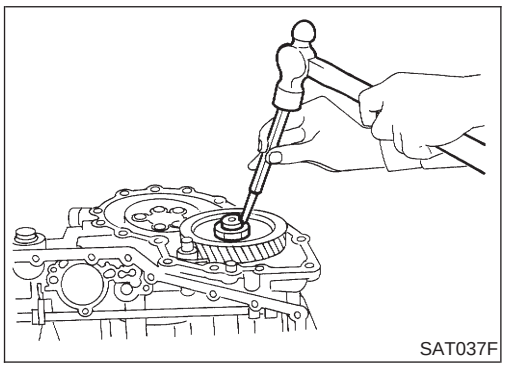
SAT435D

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

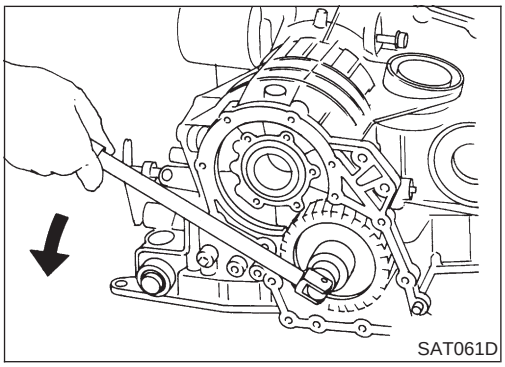


SAT036F

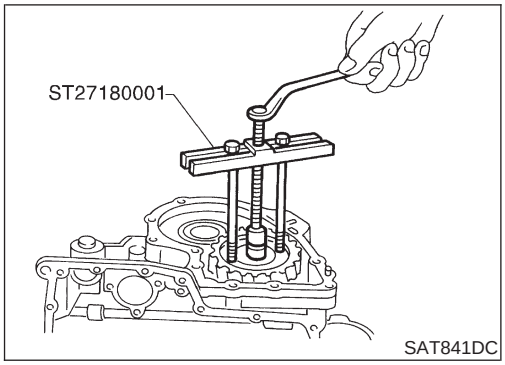
e. Remove needle bearing.


SAT037F

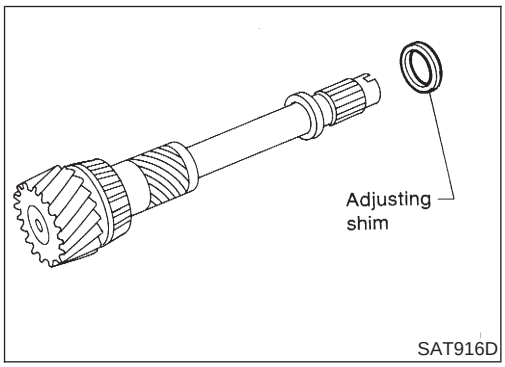
40. Disassemble reduction pinion gear according to the following procedures.
a. Set manual shaft to position P to fix idler gear.
b. Unlock idler gear lock nut using a pin punch.


SAT061D

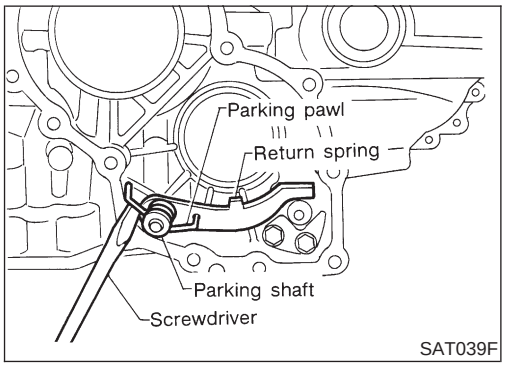
c. Remove idler gear lock nut.
- **Do not reuse idler gear lock nut.**



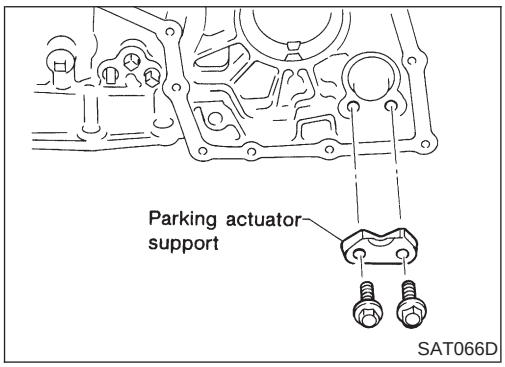
d. Remove idler gear with puller.



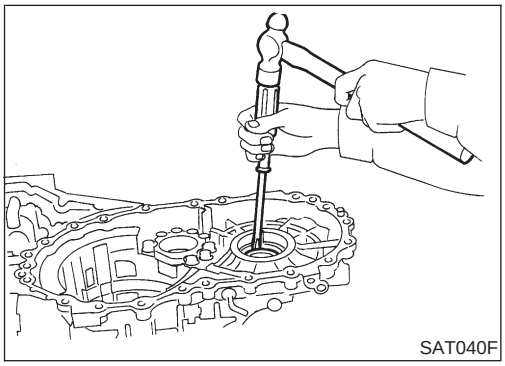
e. Remove reduction pinion gear.
f. Remove adjusting shim from reduction pinion gear.



41. Remove return spring from parking shaft with screwdriver.
42. Draw out parking shaft and remove parking pawl from transmission case.
43. Check parking pawl and shaft for damage or wear.



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

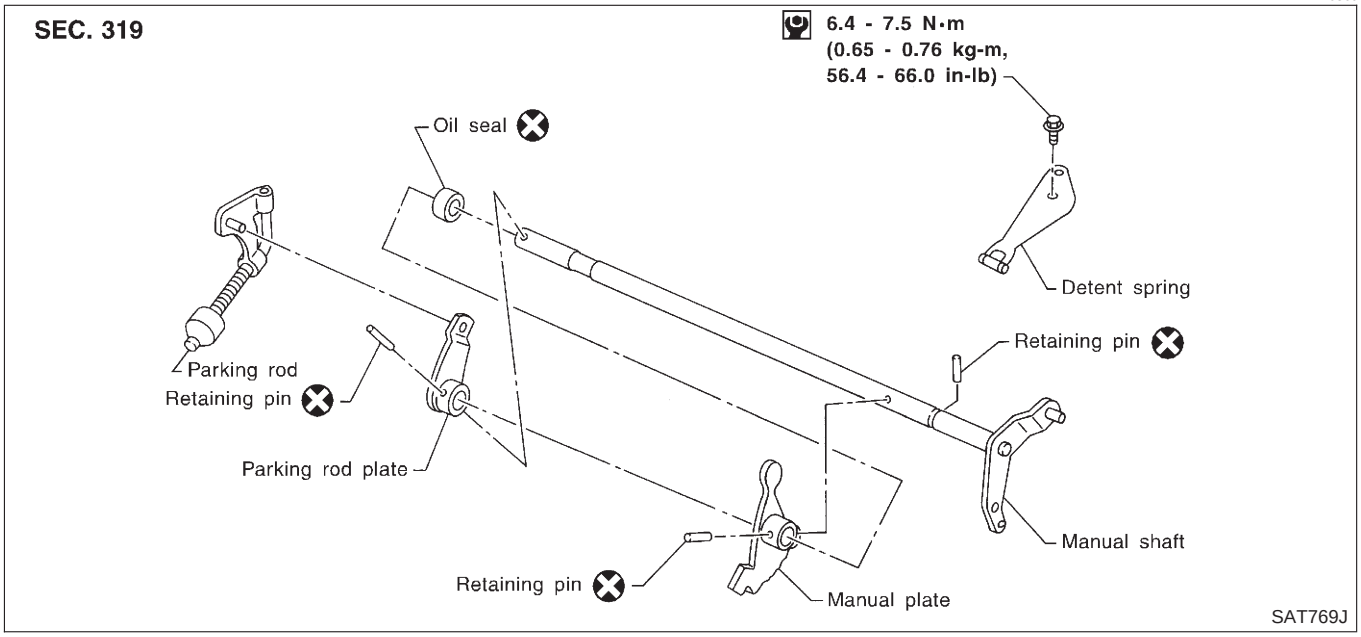


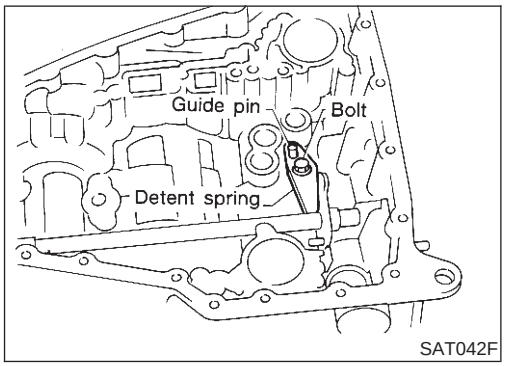
46. Remove side oil seal with screwdriver from transmission case.

Manual Shaft

COMPONENTS

NFAT0369

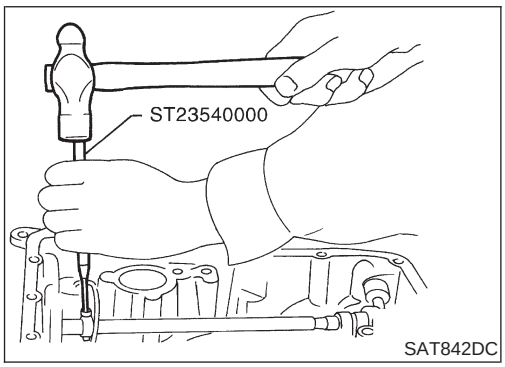




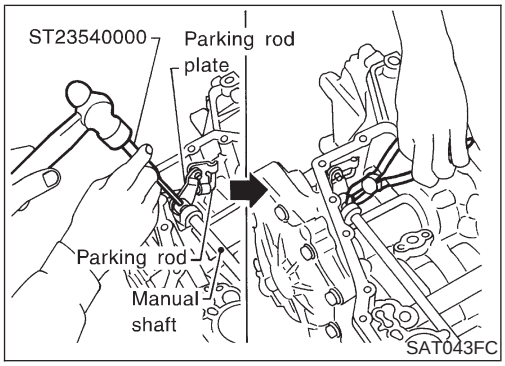
REMOVAL

NFAT0370

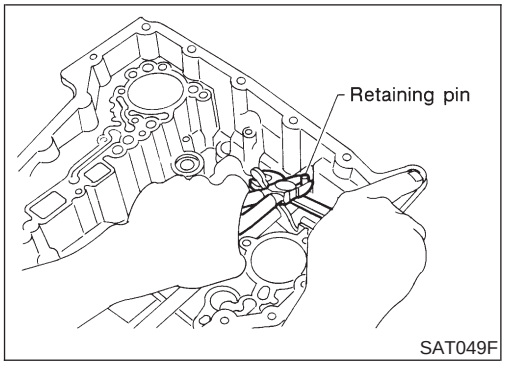
1. Remove detent spring from transmission case.



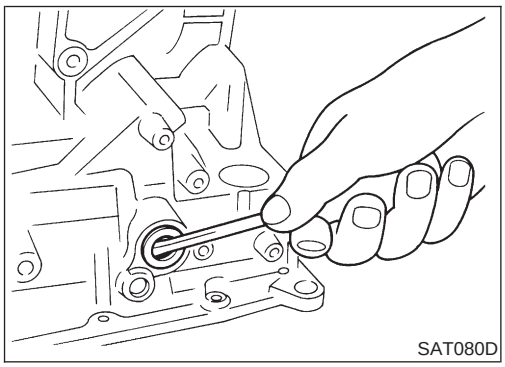
2. Drive out manual plate retaining pin.



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



6. Pull out manual shaft retaining pin.
7. Remove manual shaft and manual plate from transmission case.



8. Remove manual shaft oil seal.

INSPECTION

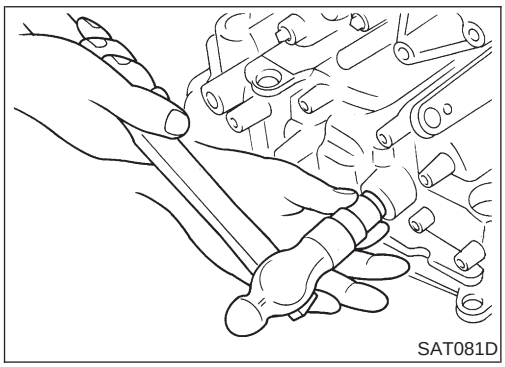
NFAT0371

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

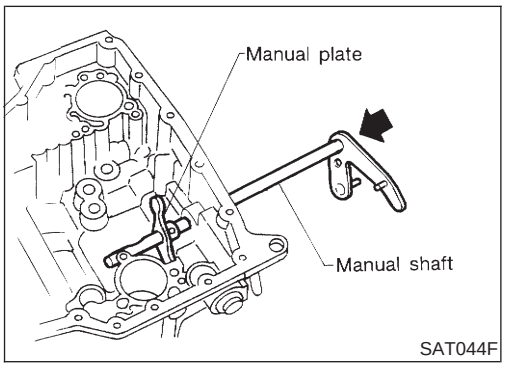
INSTALLATION

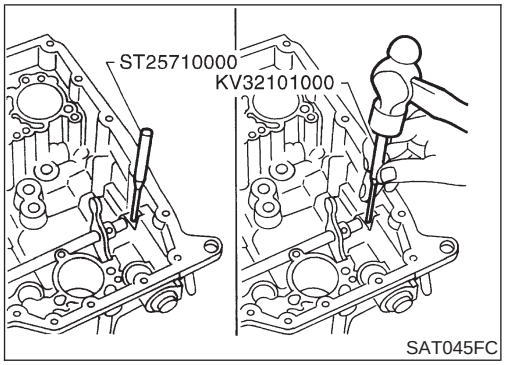
NFAT0372

1. Install manual shaft oil seal.
- **Apply ATF to outer surface of oil seal.**

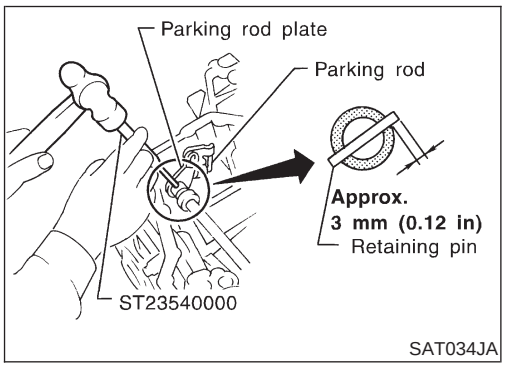


2. Install manual shaft and manual plate.



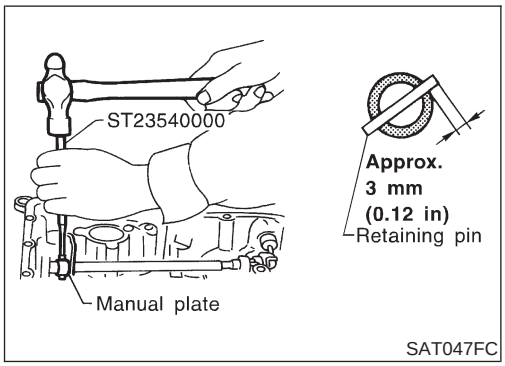


3. Align groove of manual shaft and hole of transmission case.
4. Install manual shaft retaining pin up to bottom of hole.



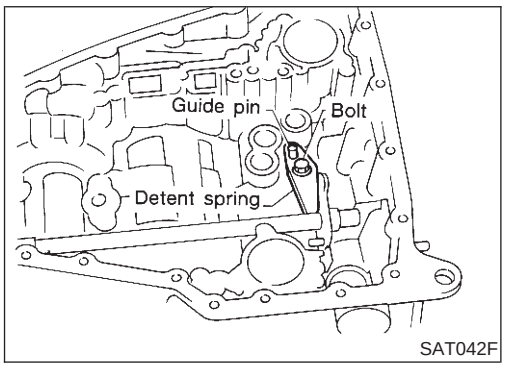
5. Install parking rod to parking rod plate.
6. Set parking rod assembly onto manual shaft and drive retaining pin.

- **Both ends of pin should protrude.**



7. Drive manual plate retaining pin.

- **Both ends of pin should protrude.**

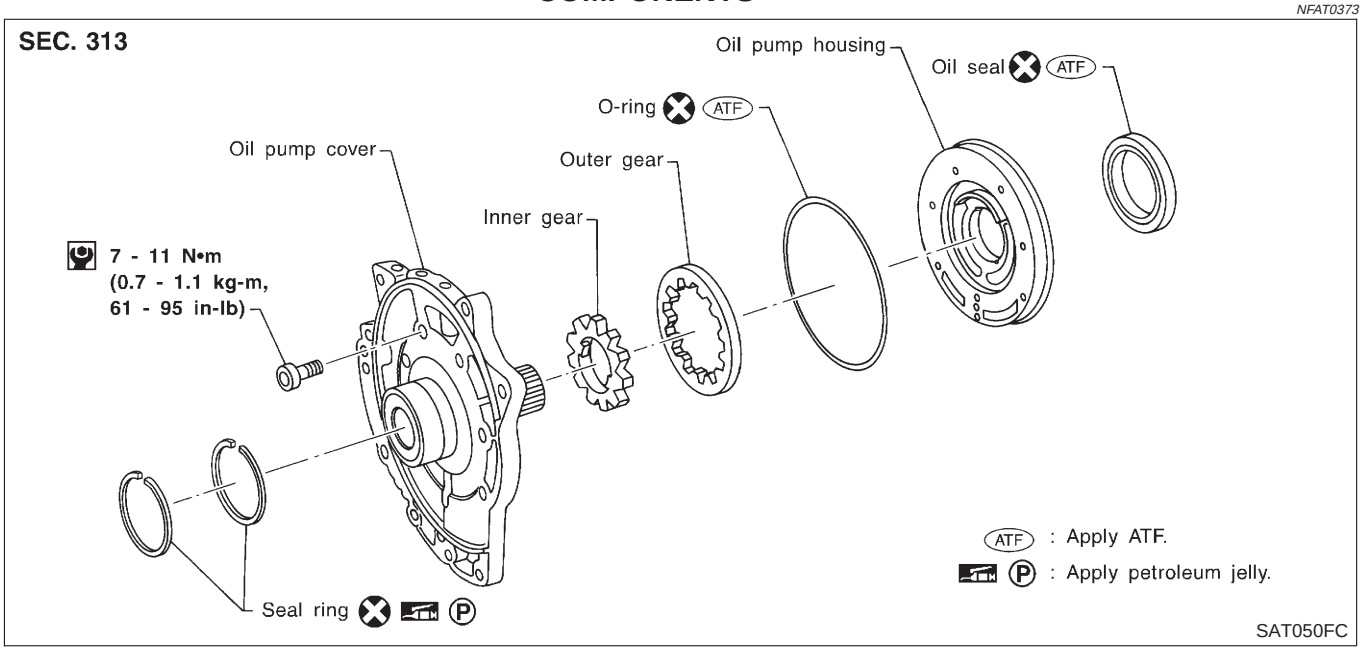


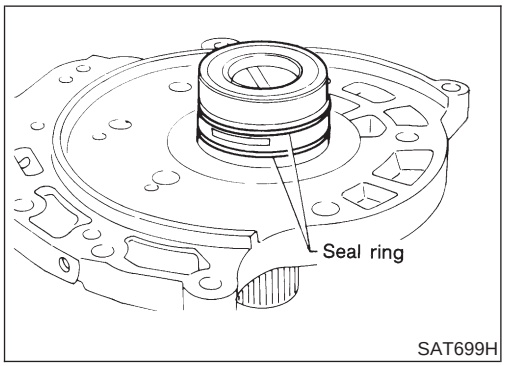
8. Install detent spring. Tighten detent spring bolts to the specified torque. Refer to AT-371.

Oil Pump

COMPONENTS

NFAT0373

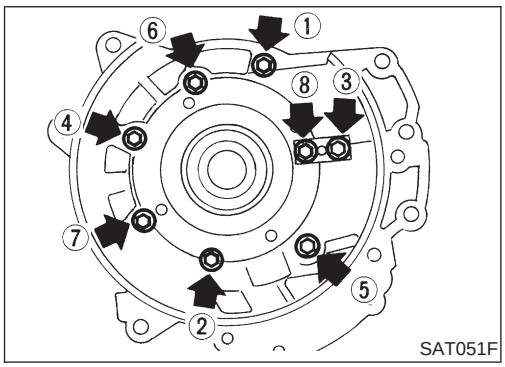




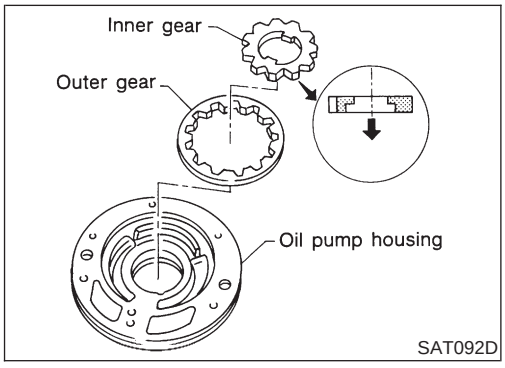
DISASSEMBLY

NFAT0374

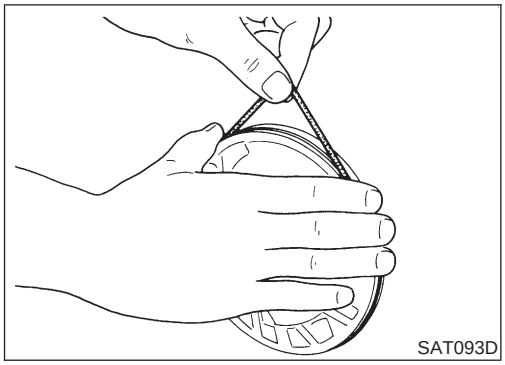
1. Remove seal rings.



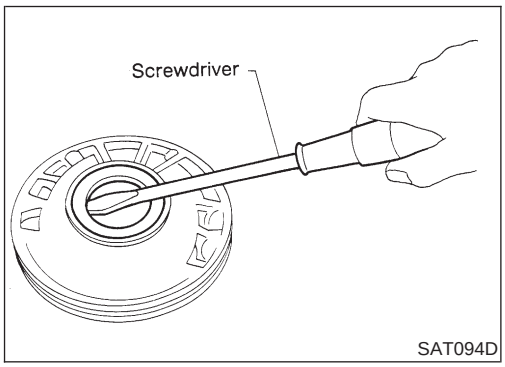
2. Loosen bolts in a crisscross pattern and remove oil pump cover.



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


SAT093D

4. Remove O-ring from oil pump housing.



SAT094D

5. Remove oil pump housing oil seal.

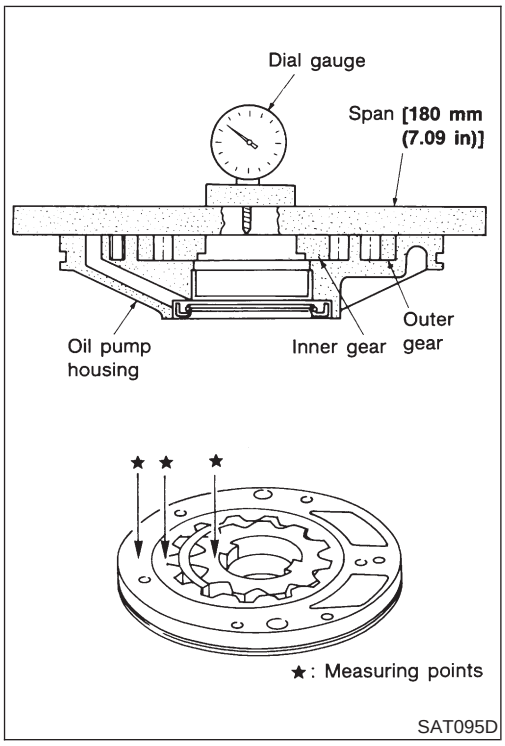
INSPECTION

NFAT0375

Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear

NFAT0375S01

- Check for wear or damage.



SAT095D

Side Clearances

NFAT0375S02

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

  Standard clearance:

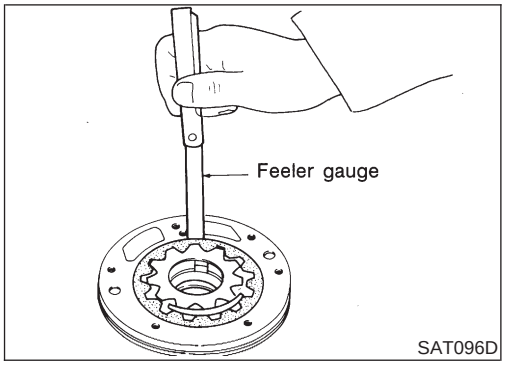
  0.030 - 0.050 mm (0.0012 - 0.0020 in)

- If clearance is less than standard, select inner and outer gear as a set so that clearance is within specifications.

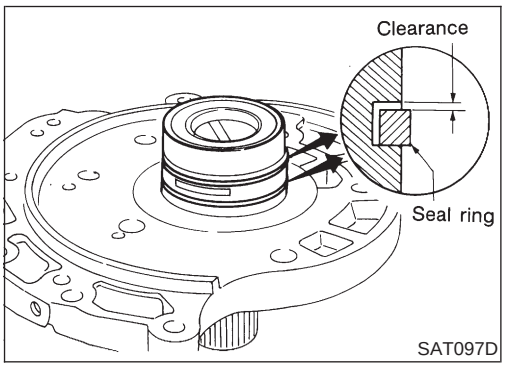
  Inner and outer gear:

  Refer to SDS, AT-457.

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



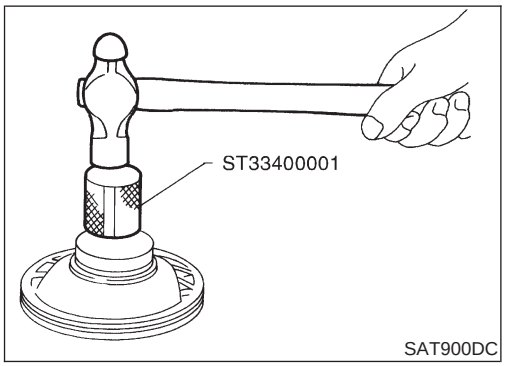
- Measure clearance between outer gear and oil pump housing.
  Standard clearance:
  0.111 - 0.181 mm (0.0044 - 0.0071 in)
  Allowable limit:
  0.181 mm (0.0071 in)
- If not within allowable limit, replace whole oil pump assembly except oil pump cover.



Seal Ring Clearance

NFAT0375S03

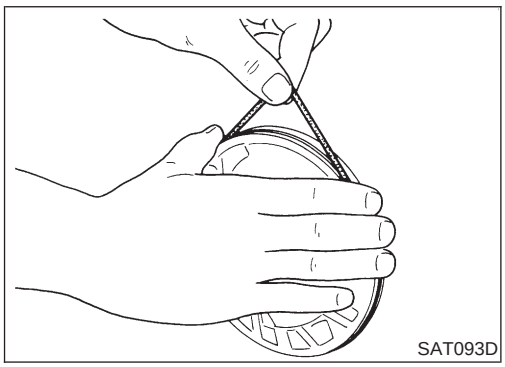
- Measure clearance between seal ring and ring groove.
  Standard clearance:
  0.10 - 0.25 mm (0.0039 - 0.0098 in)
  Allowable limit:
  0.25 mm (0.0098 in)
- If not within allowable limit, replace oil pump cover assembly.



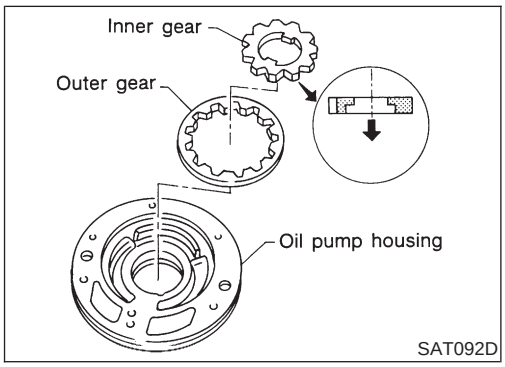
ASSEMBLY

NFAT0376

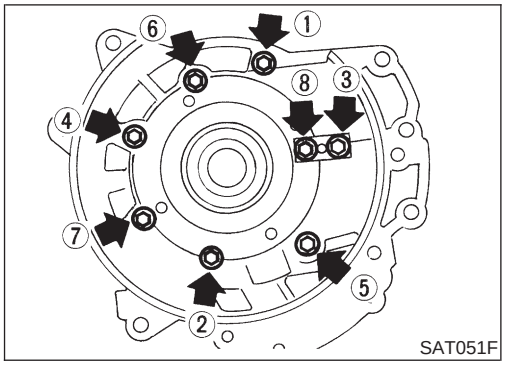
1. Install oil seal on oil pump housing.



2. Install O-ring on oil pump housing.
- **Apply ATF to O-ring.**



3. Install inner and outer gears on oil pump housing.
- **Be careful of direction of inner gear.**

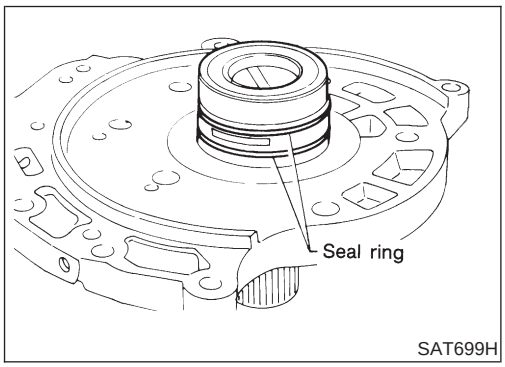


SAT051F

4. Install oil pump cover on oil pump housing.

a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.

b. Tighten bolts in a crisscross pattern. Tighten oil pump cover bolts to the specified torque. Refer to AT-374.



SAT699H

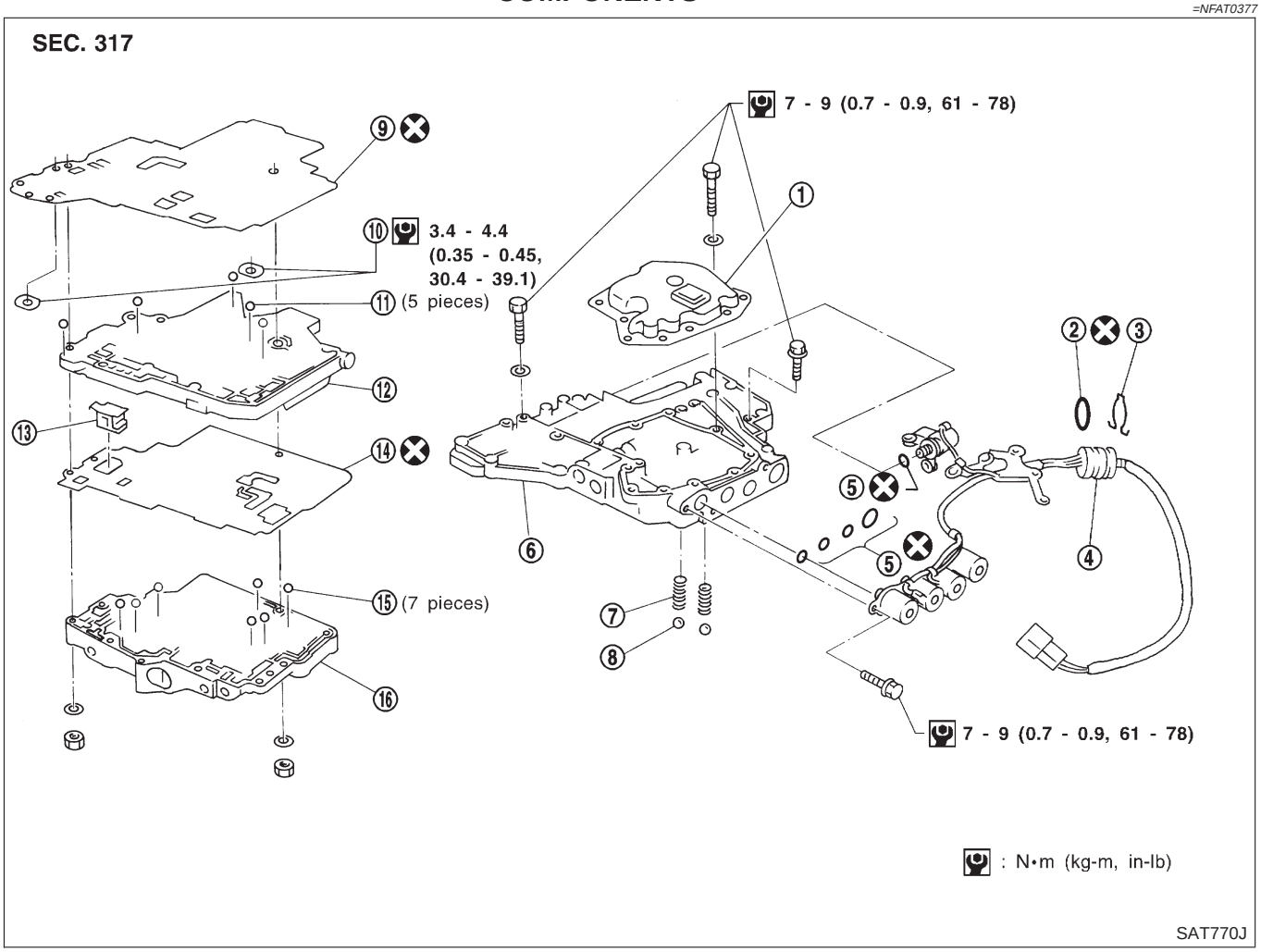
5. Install new seal rings carefully after packing ring groove with petroleum jelly.

- **Do not spread gap of seal ring excessively while installing. The ring may be deformed.**

Control Valve Assembly

COMPONENTS

=NFAT0377



1. Oil strainer
2. O-ring
3. Stopper ring
4. Terminal body
5. O-rings
6. Control valve lower body
7. Oil cooler relief valve spring
8. Check ball
9. Separating plate
10. Support plate
11. Steel ball
12. Control valve inter body
13. Pilot filter
14. Separating plate
15. Steel ball
16. Control valve upper body

DISASSEMBLY

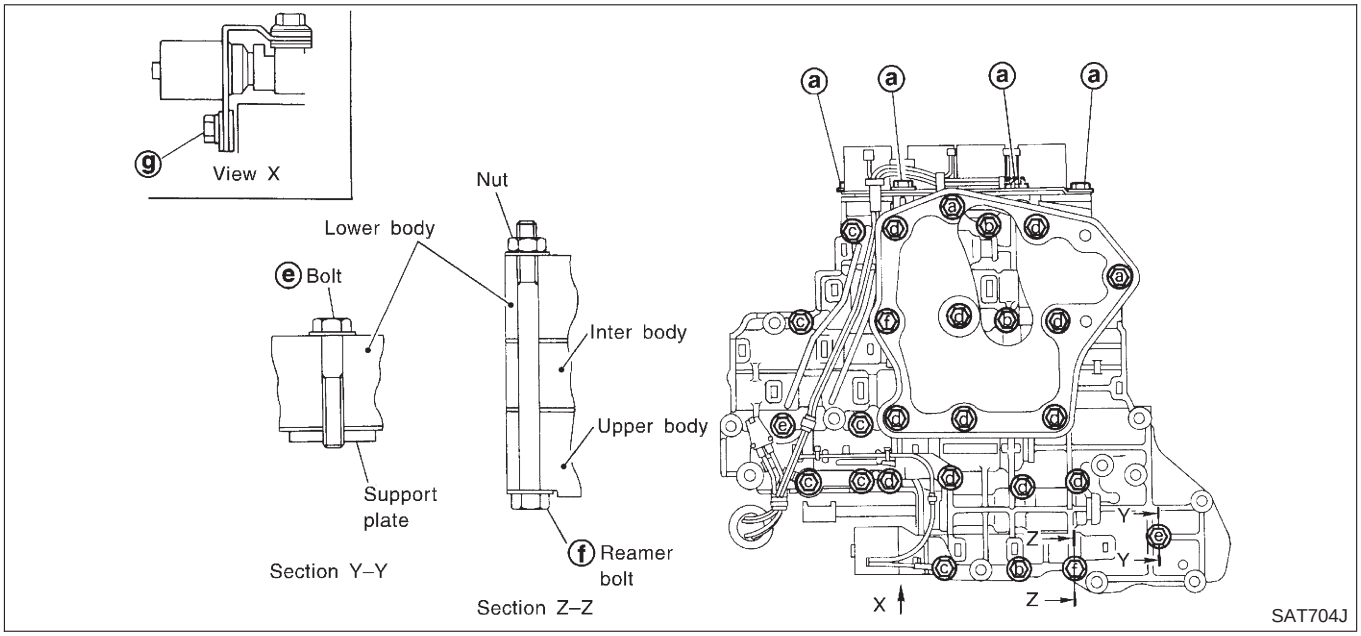
NFAT0378

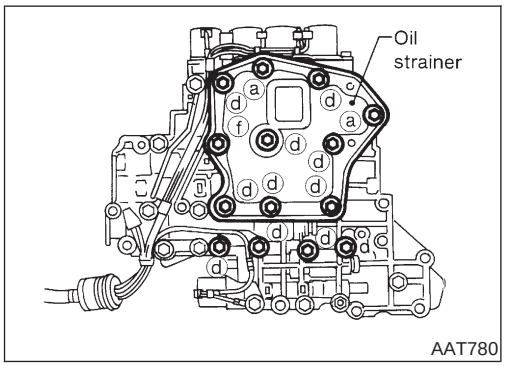
Disassemble upper, inter and lower bodies.

Bolt length, number and location:

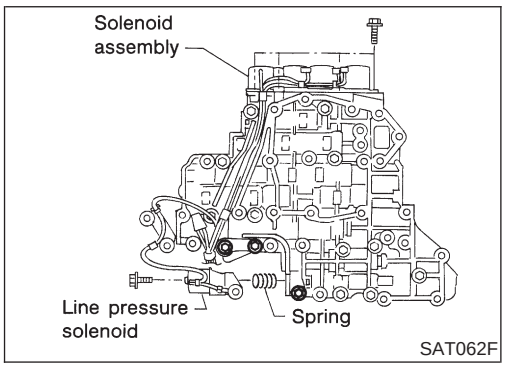
Bolt symbol	a	b	c	d	e	f	g
Bolt length "ℓ" mm (in) 	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

f: Reamer bolt and nut.

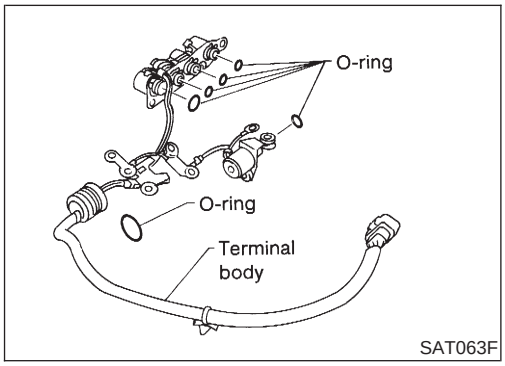




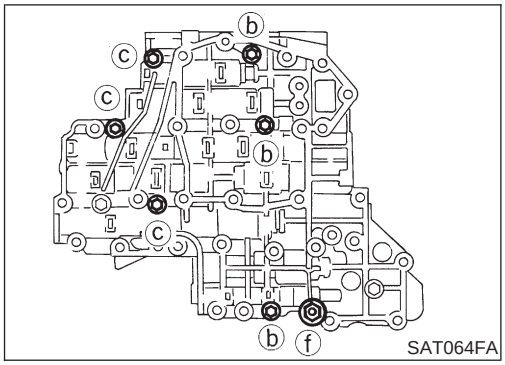
1. Remove bolts **a**, **d** and nut **f** and remove oil strainer from control valve assembly.



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

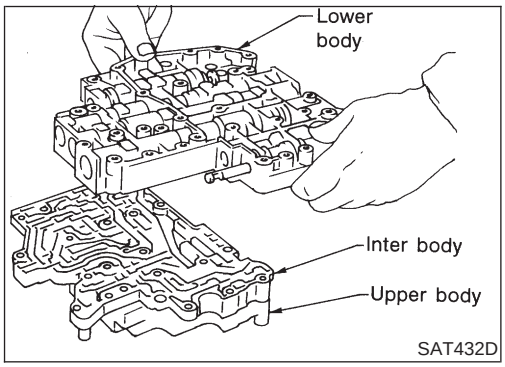


3. Remove O-rings from solenoid valves and terminal body.



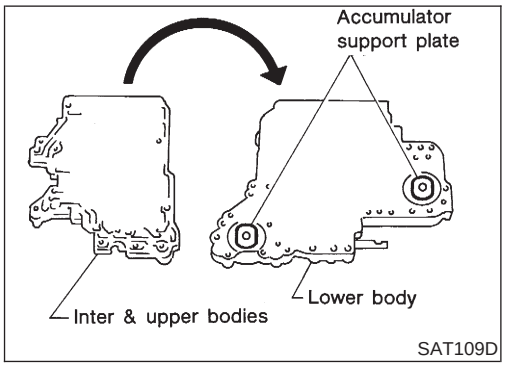
SAT064FA

4. Place upper body facedown, and remove bolts **b**, **c** and nut **f**.



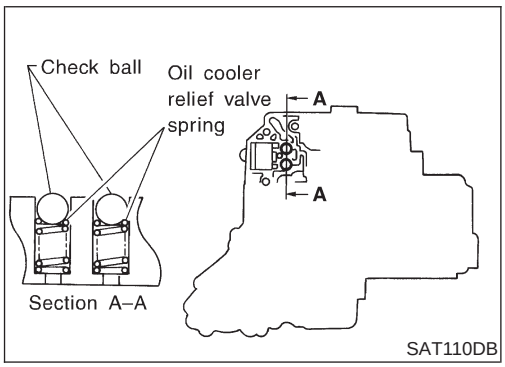
SAT432D

5. Remove inter body from lower body.



SAT109D

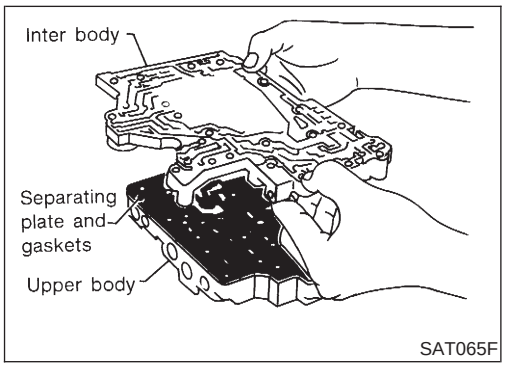
6. Turn over lower body, and remove accumulator support plate.



SAT110DB

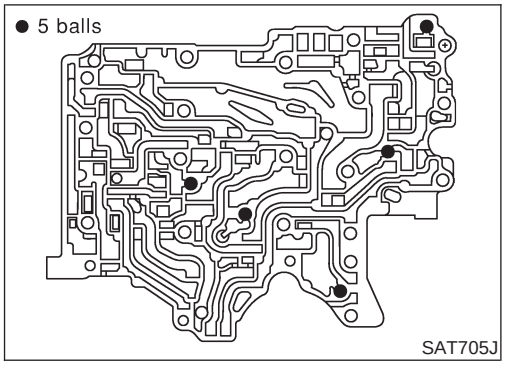
7. Remove bolts **e**, separating plate and separating gasket from lower body.
8. Remove check balls and oil cooler relief valve springs from lower body.

- **Be careful not to lose check balls and oil cooler relief valve springs.**

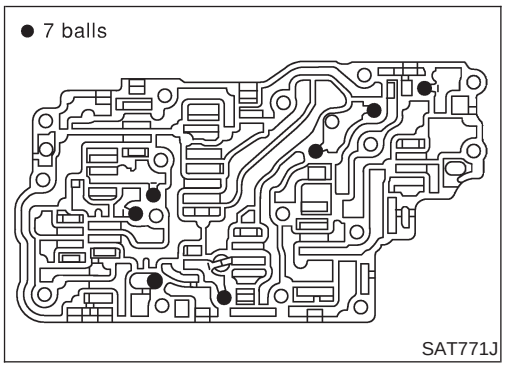


SAT065F

9. Remove inter body from upper body.



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



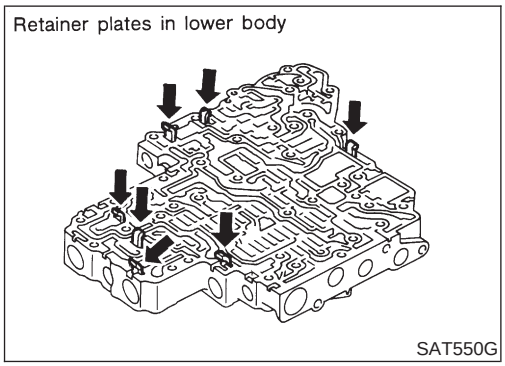
11. Check to see that steel balls are properly positioned in upper body and then remove them.
- **Be careful not to lose steel balls.**

INSPECTION

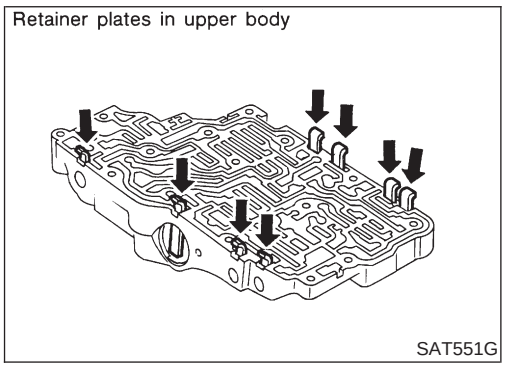
NFAT0379

Lower and Upper Bodies

NFAT0379S01



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

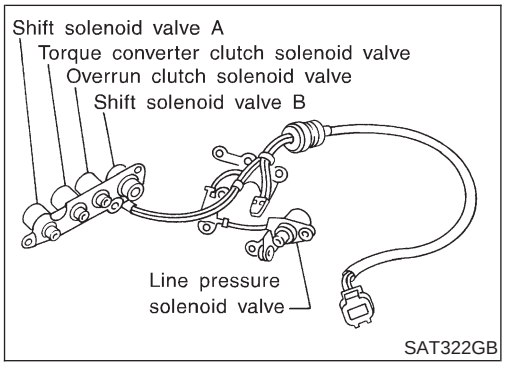


- Check to see that retainer plates are properly positioned in upper body.
- **Be careful not to lose these parts.**

Oil Strainer

NFAT0379S02

- Check wire netting of oil strainer for damage.



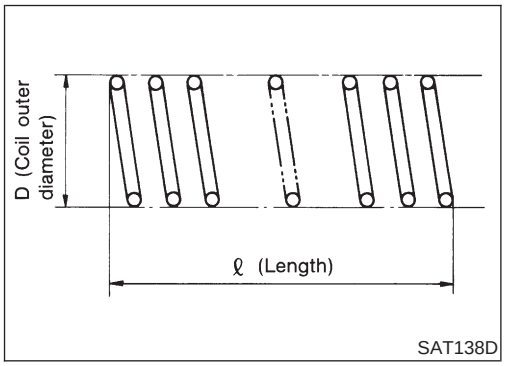
Shift Solenoid Valves "A" and "B", Line Pressure Solenoid Valve, Torque Converter Clutch Solenoid Valve and Overrun Clutch Solenoid Valve

NFAT0379S03

- Measure resistance.
- For shift solenoid valve A, refer to AT-182 (EURO-OBD) or AT-236 (EXCEPT FOR EURO-OBD).
- For shift solenoid valve B, refer to AT-187 (EURO-OBD) or AT-241 (EXCEPT FOR EURO-OBD).
- For line pressure solenoid valve, refer to AT-176 (EURO-OBD) or AT-267 (EXCEPT FOR EURO-OBD).
- For torque converter clutch solenoid valve, refer to AT-171

(EURO-OBD) or AT-251 (EXCEPT FOR EURO-OBD).

- For overrun clutch solenoid valve, refer to AT-201 (EURO-OBD) or AT-246 (EXCEPT FOR EURO-OBD).



Oil Cooler Relief Valve Spring

NFAT0379S04

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

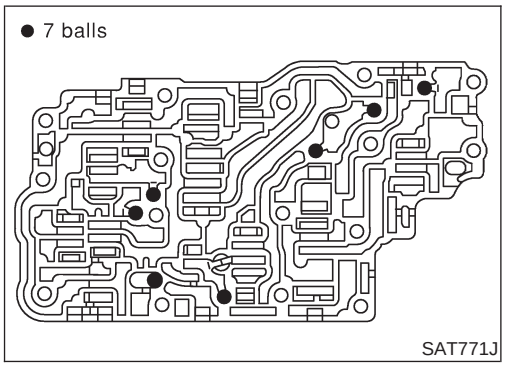
Inspection standard:
Refer to SDS, AT-452.

ASSEMBLY

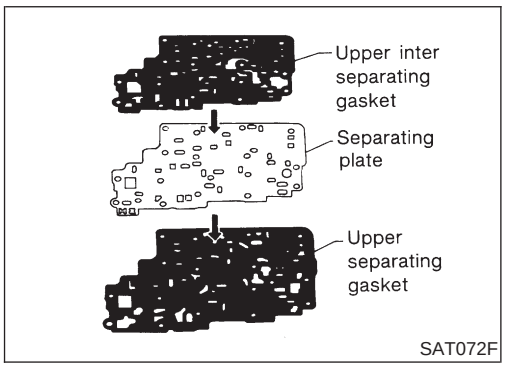
NFAT0380

1. Install upper, inter and lower body.

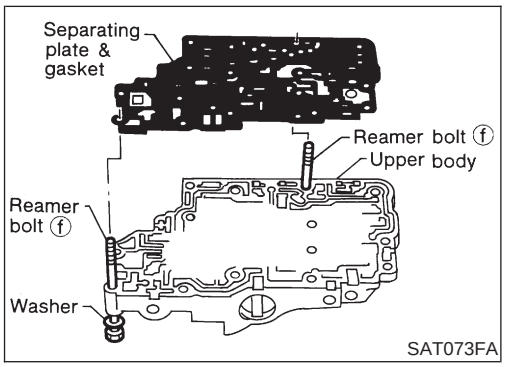
a. Place oil circuit of upper body face up. Install steel balls in their proper positions.

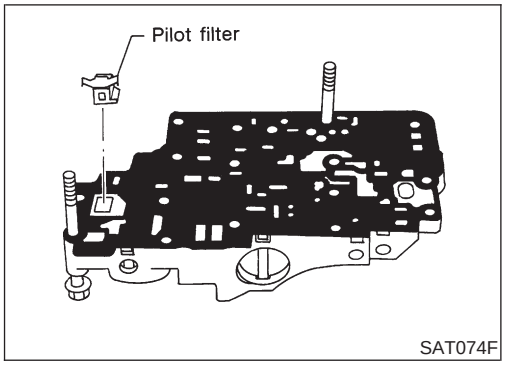


b. Install upper separating gasket, upper inter separating gasket and upper separating plate in order shown in illustration.

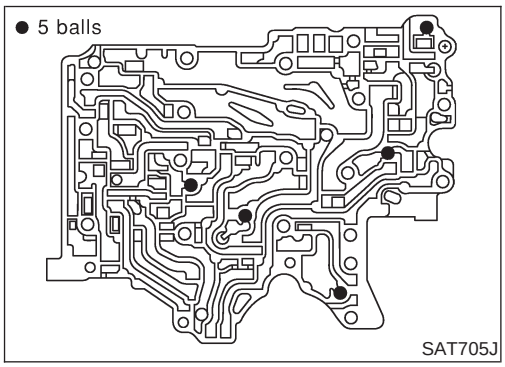


c. Install reamer bolts **f** from bottom of upper body. Using reamer bolts as guides, install separating plate and gaskets as a set.

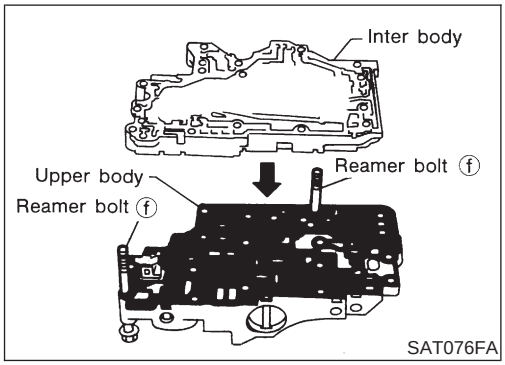




d. Install pilot filter.

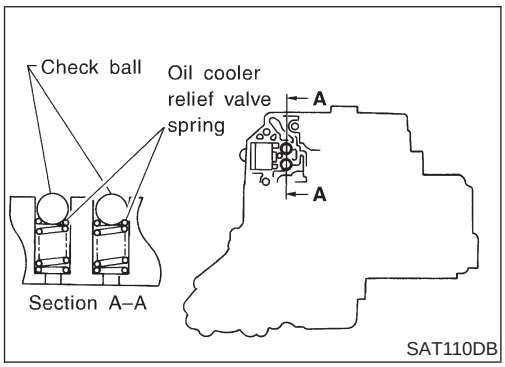


e. Place lower body as shown in illustration (side of inter body face up). Install steel balls in their proper positions.

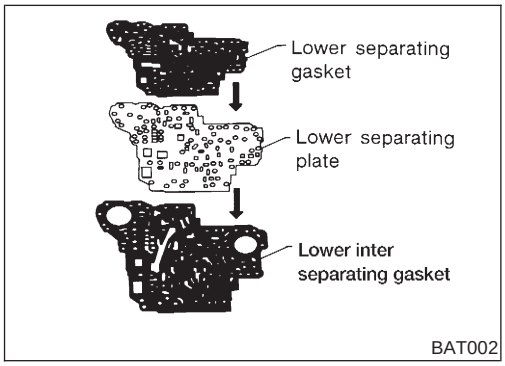


f. Install inter body on upper body using reamer bolts **f** as guides.

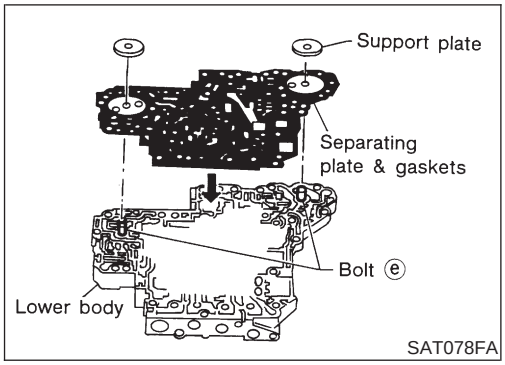
- **Be careful not to dislocate or drop steel balls.**



g. Install check balls and oil cooler relief valve springs in their proper positions in lower body.

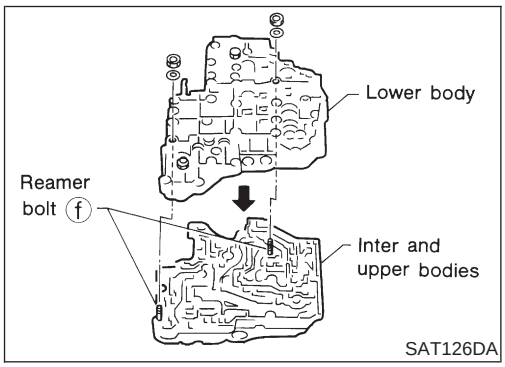


h. Install lower separating gasket, lower inter separating gasket and lower separating plate in order shown in illustration.

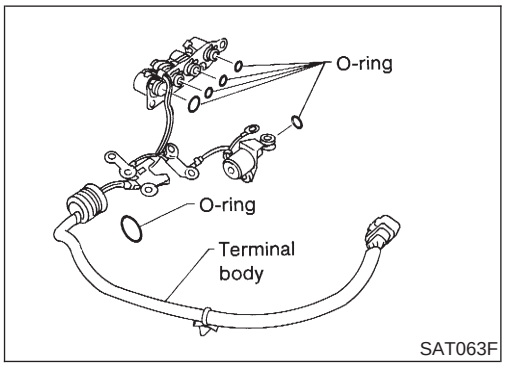


i. Install bolts **e** from bottom of lower body. Using bolts **e** as guides, install separating plate and gaskets as a set.

j. Temporarily install support plates on lower body.



k. Install lower body on inter body using reamer bolts **f** as guides and tighten reamer bolts **f** slightly.



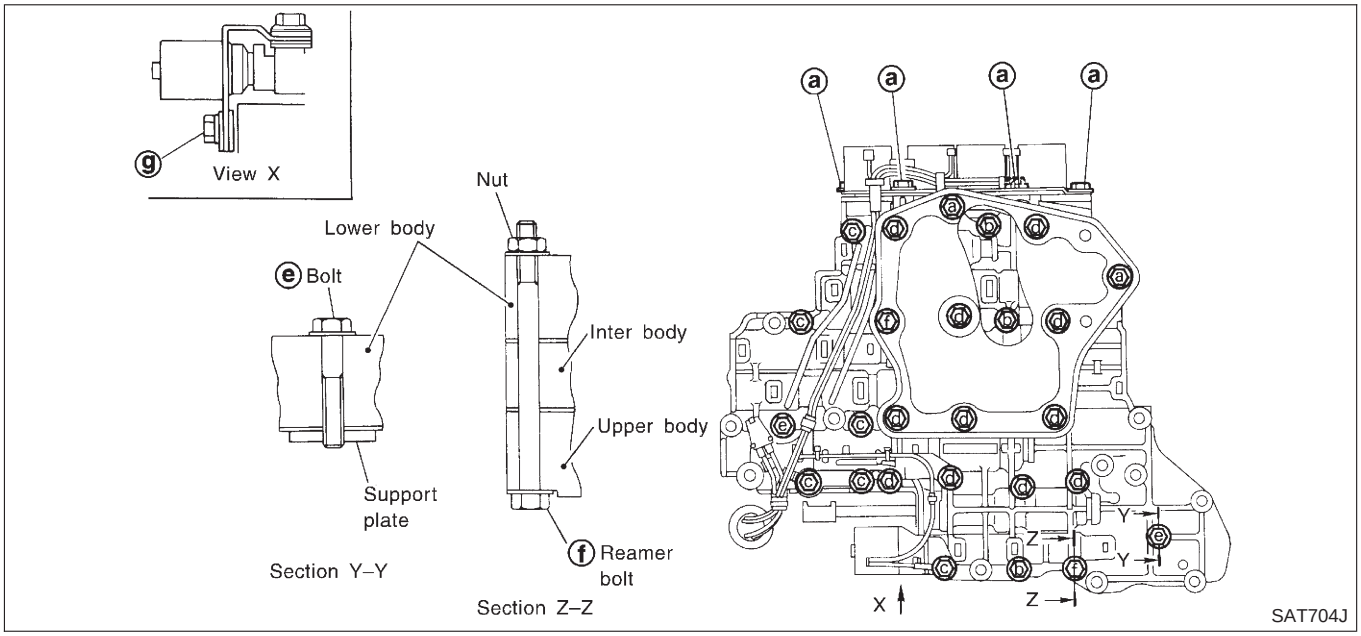
2. Install O-rings to solenoid valves and terminal body.

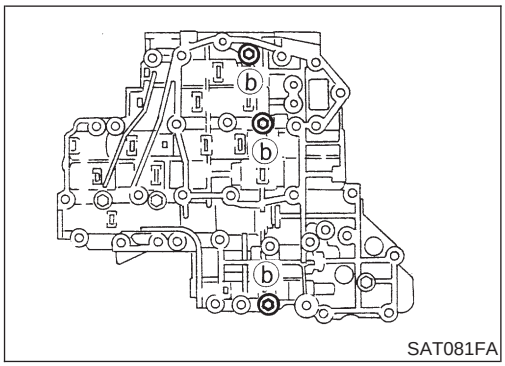
- **Apply ATF to O-rings.**

3. Install and tighten bolts.

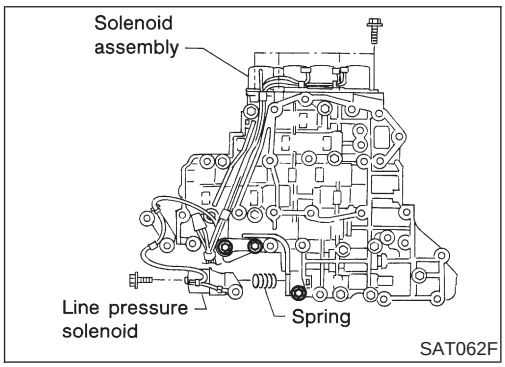
Bolt length, number and location:

Bolt symbol	a	b	c	d	e	f	g
Bolt length "ℓ" mm (in) 	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

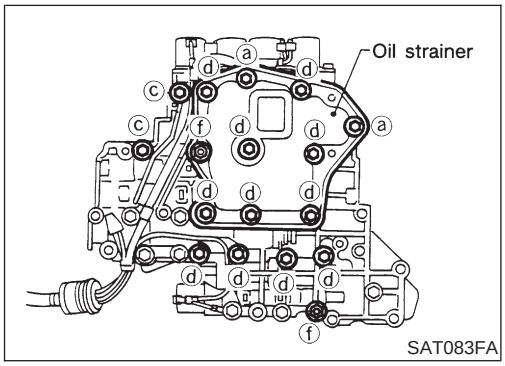




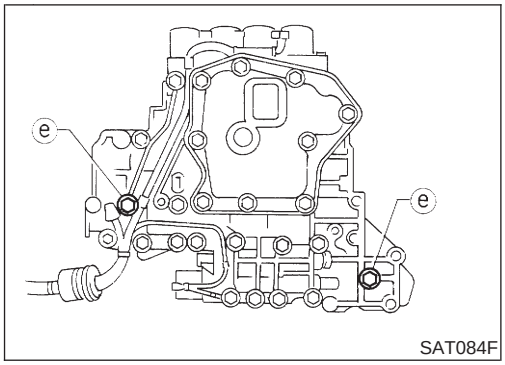
a. Install and tighten bolts **b** to specified torque.
: 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



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



c. Set oil strainer, then tighten bolts **a**, **c**, **d** and nuts **f** to specified torque.
: 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



d. Tighten bolts **e** to specified torque.

: 3.4 - 4.4 N·m (0.35 - 0.45 kg-m, 30.4 - 39.1 in-lb)

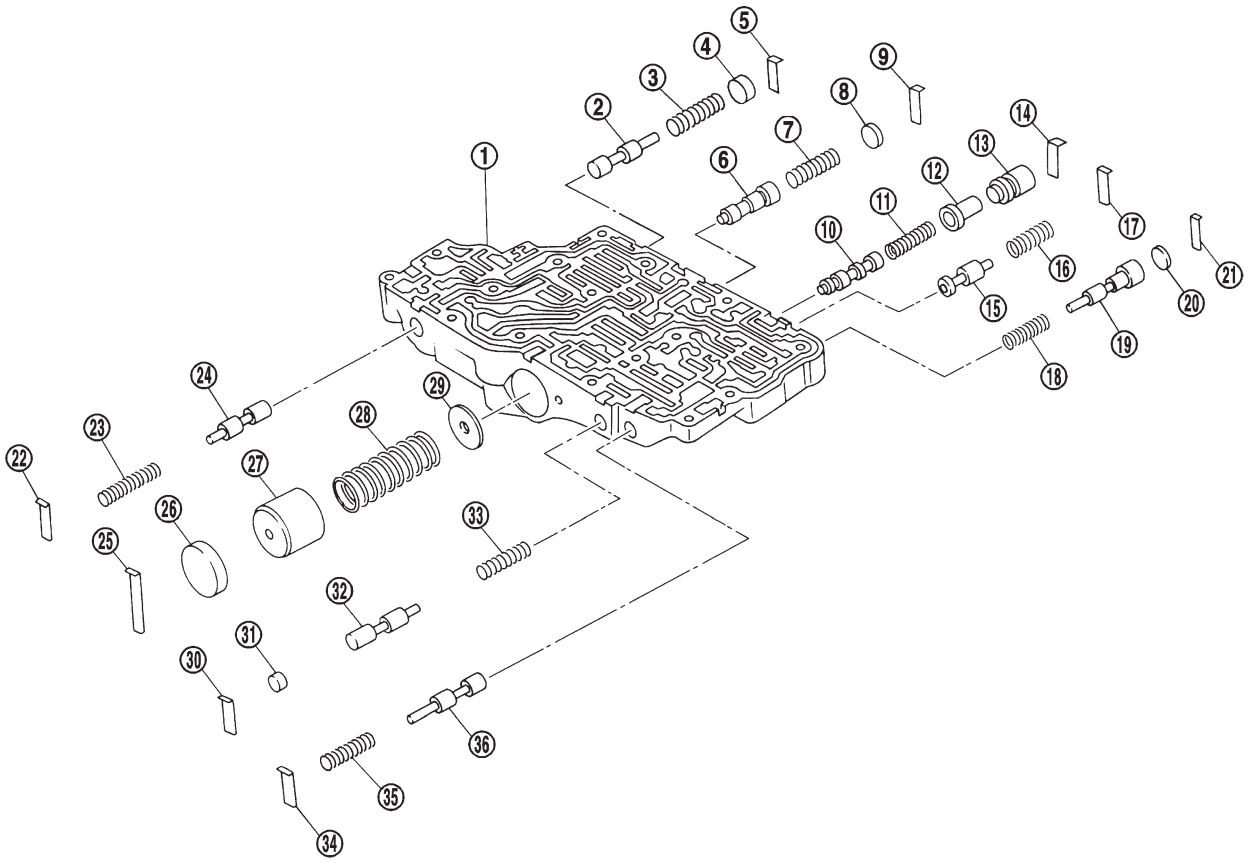
Control Valve Upper Body

COMPONENTS

=NFAT0381

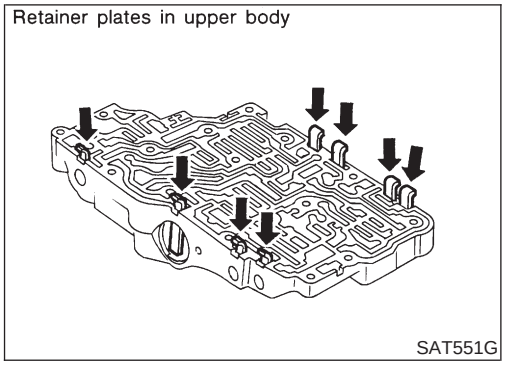
Apply ATF to all components before installation.

SEC. 317



SAT772J

1. Upper body
2. Cooler check valve
3. Return spring
4. Plug
5. Retainer plate
6. 1-2 accumulator valve
7. Return spring
8. Plug
9. Retainer plate
10. Torque converter clutch control valve
11. Return spring
12. Torque converter clutch control plug
13. Torque converter clutch control sleeve
14. Retainer plate
15. Torque converter relief valve
16. Return spring
17. Retainer plate
18. Return spring
19. Overrun clutch reducing valve
20. Plug
21. Retainer plate
22. Retainer plate
23. Return spring
24. Pilot valve
25. Retainer plate
26. Plug
27. 1-2 accumulator piston
28. Return spring
29. 1-2 accumulator retainer plate
30. Retainer plate
31. Plug
32. 1st reducing valve
33. Return spring
34. Retainer plate
35. Return spring
36. 3-2 timing valve

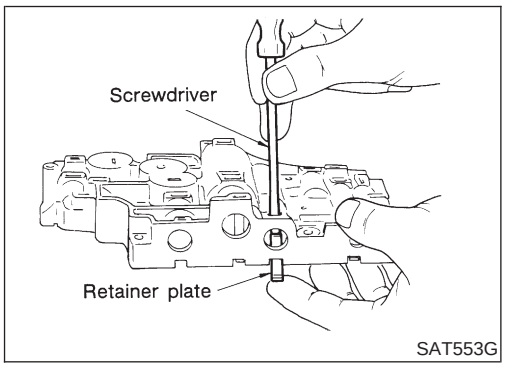


DISASSEMBLY

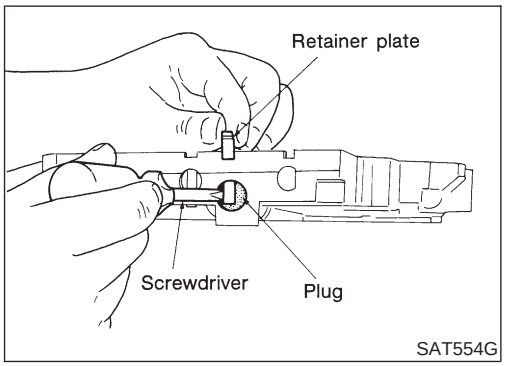
NFAT0382

1. Remove valves at retainer plates.

- **Do not use a magnetic pick-up tool.**

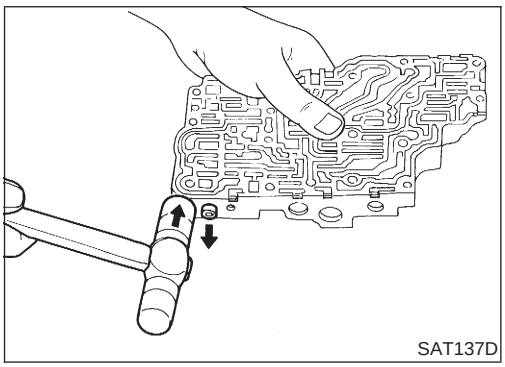


a. Use a screwdriver to remove retainer plates.



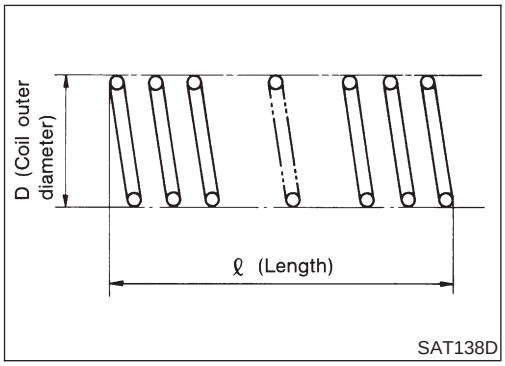
b. Remove retainer plates while holding spring, plugs or sleeves.

- **Remove plugs slowly to prevent internal parts from jumping out.**



c. Place mating surface of valve body face down, and remove internal parts.

- **If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.**
- **Be careful not to drop or damage valves and sleeves.**



INSPECTION

NFAT0383

Valve Spring

NFAT0383S01

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

  Inspection standard:

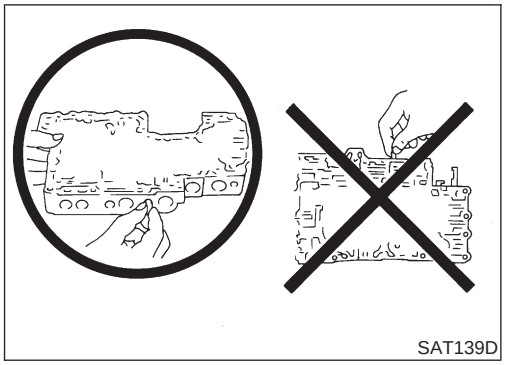
  Refer to SDS, AT-452.

- Replace valve springs if deformed or fatigued.

Control Valves

NFAT0383S02

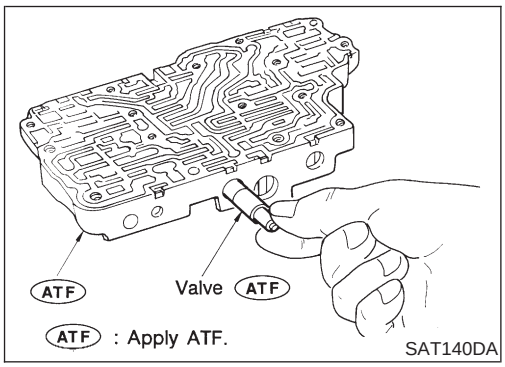
- Check sliding surfaces of valves, sleeves and plugs.


SAT139D

ASSEMBLY

NFAT0384

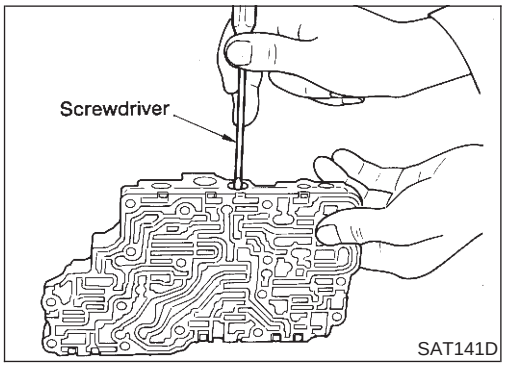
- **Lay control valve body down when installing valves. Do not stand the control valve body upright.**



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.**



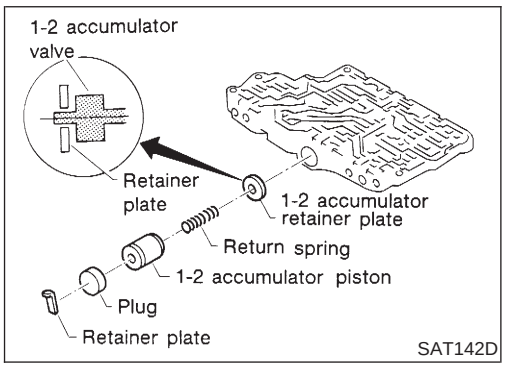
SAT141D

- Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.

1-2 Accumulator Valve

NFAT0384S01

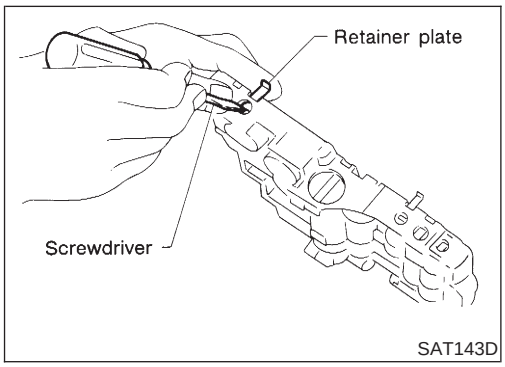
- Install 1-2 accumulator valve. Align 1-2 accumulator retainer plate from opposite side of control valve body.
- Install return spring, 1-2 accumulator piston and plug.



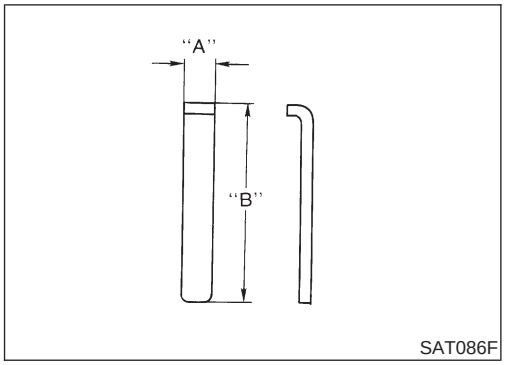
SAT142D

1. Install retainer plates

- While pushing plug or return spring, install retainer plate.



SAT143D



SAT086F

Retainer Plate (Upper body)

NFAT0384S02

Unit: mm (in)

No.	Name of control valve	Width A	Length B
22	Pilot valve	6.0 (0.236)	21.5 (0.846)
30	1st reducing valve		
17	Torque converter relief valve		
34	3-2 timing valve		
9	1-2 accumulator valve		38.5 (1.516)
25	1-2 accumulator piston		
21	Overrun clutch reducing valve		24.0 (0.945)
5	Cooler check valve		
14	Torque converter clutch control valve		28.0 (1.102)

- Install proper retainer plates.
  Refer to "Control Valve Upper Body", AT-387.

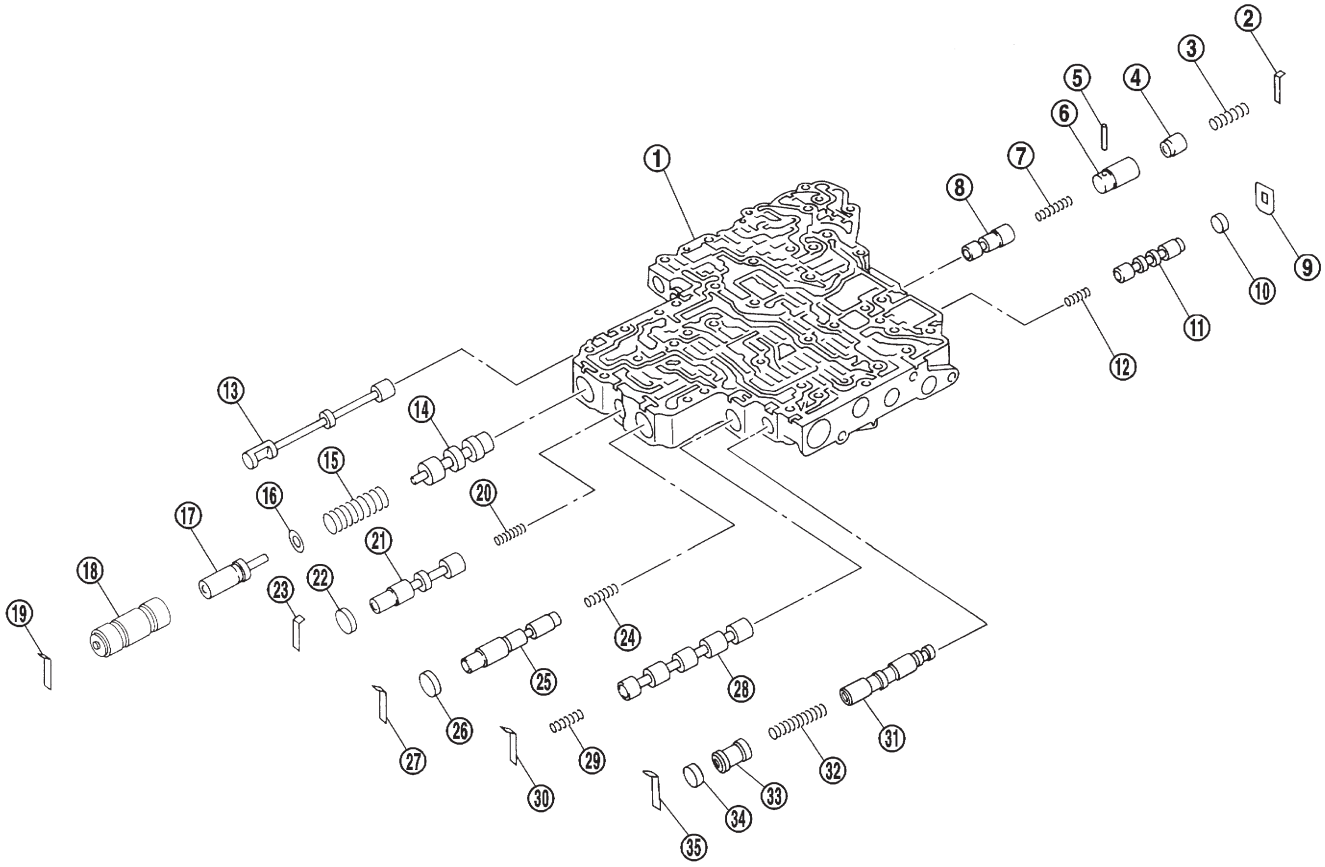
Control Valve Lower Body

COMPONENTS

=NFAT0385

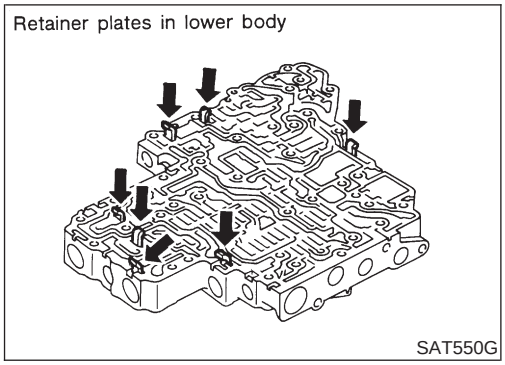
Apply ATF to all components before installation.

SEC. 317



SAT773J

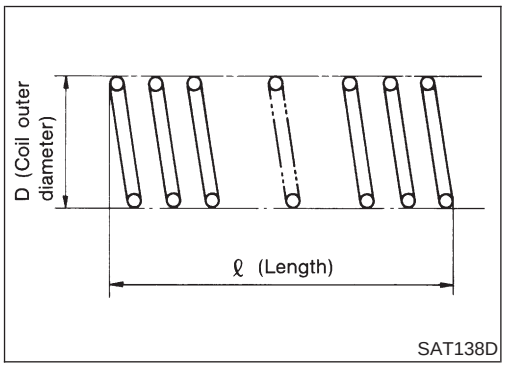
1. Lower body
2. Retainer plate
3. Return spring
4. Piston
5. Parallel pin
6. Sleeve
7. Return spring
8. Pressure modifier valve
9. Retainer plate
10. Plug
11. Shift valve B
12. Return spring
13. Manual valve
14. Pressure regulator valve
15. Return spring
16. Spring seat
17. Plug
18. Sleeve
19. Retainer plate
20. Return spring
21. Overrun clutch control valve
22. Plug
23. Retainer plate
24. Return spring
25. Accumulator control valve
26. Plug
27. Retainer plate
28. Shift valve A
29. Return spring
30. Retainer plate
31. Shuttle valve
32. Return spring
33. Plug
34. Plug
35. Retainer plate



DISASSEMBLY

NFAT0386

- Remove valves at retainer plate.
  For removal procedures, refer to "DISASSEMBLY", "Control Valve Upper Body", AT-388.



INSPECTION

NFAT0387

Valve Springs

NFAT0387S01

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

  Inspection standard:

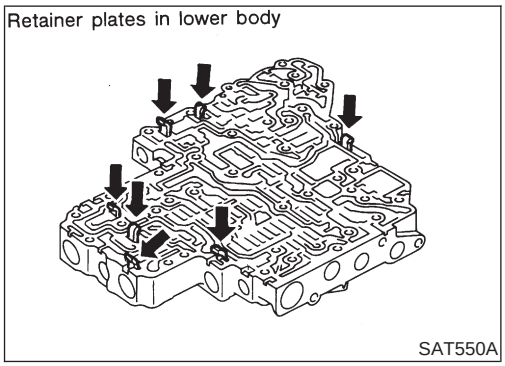
  Refer to SDS, AT-452.

- Replace valve springs if deformed or fatigued.

Control Valves

NFAT0387S02

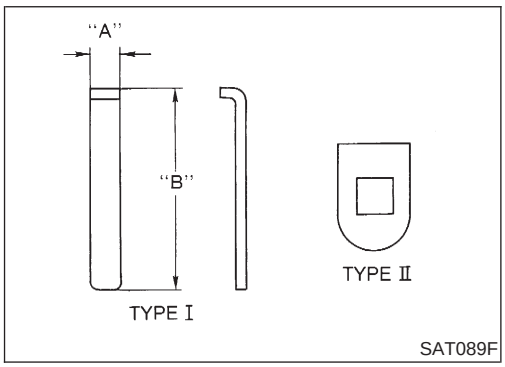
- Check sliding surfaces of control valves, sleeves and plugs for damage.



ASSEMBLY

NFAT0388

- Install control valves.
  For installation procedures, refer to "ASSEMBLY", "Control Valve Upper Body", AT-389.



Retainer Plate (Lower body)

NFAT0388S01

Unit: mm (in)

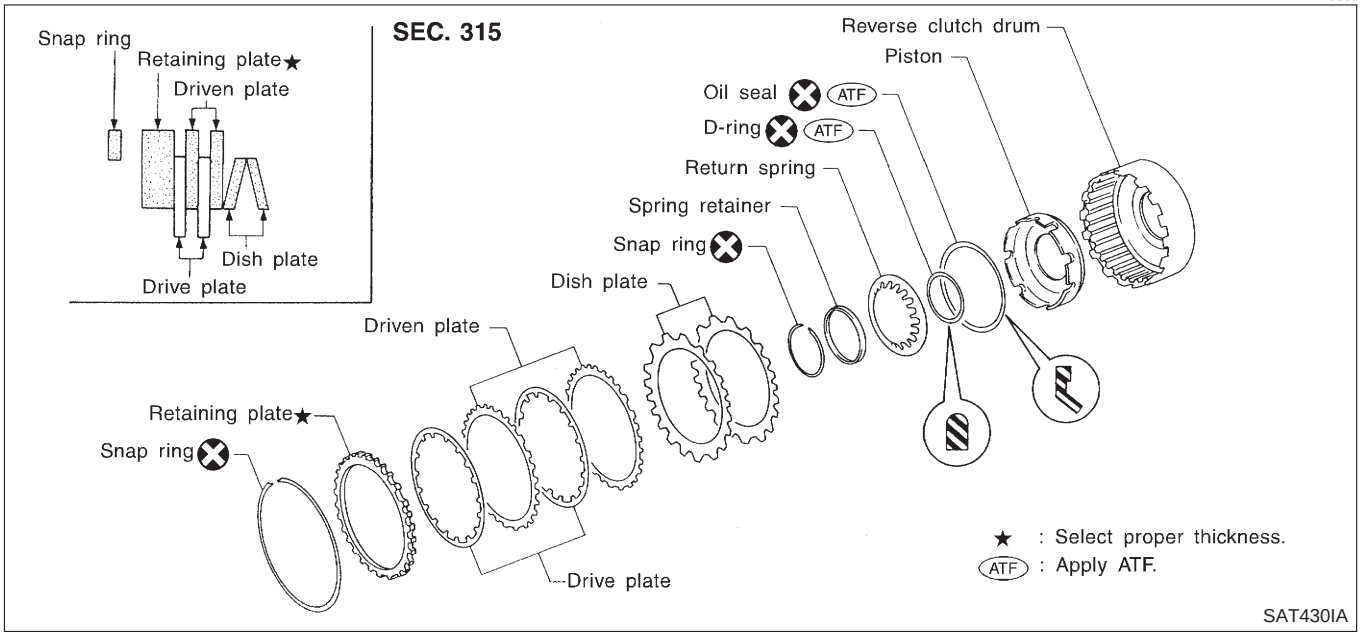
No.	Name of control valve and plug	Width A	Length B	Type
19	Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
27	Accumulator control valve			
30	Shift valve A			
23	Overrun clutch control valve			
2	Pressure modifier valve			
35	Shuttle valve			
9	Shift valve B	—	—	II

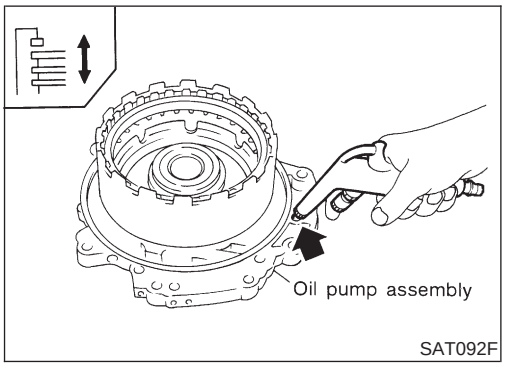
- Install proper retainer plates.
  Refer to "Control Valve Lower Body", AT-391.

Reverse Clutch

COMPONENTS

NFAT0389





DISASSEMBLY

NFAT0390

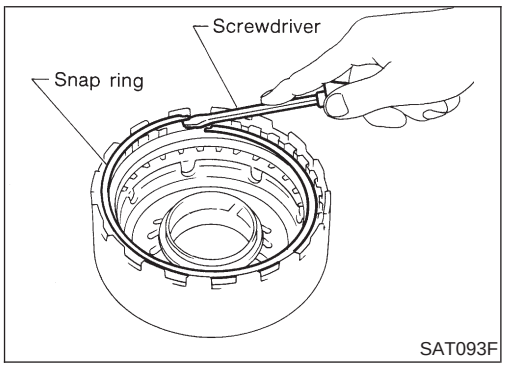
1. Check operation of reverse clutch

a. Install seal ring onto drum support of oil pump cover and install reverse clutch assembly. Apply compressed air to oil hole.

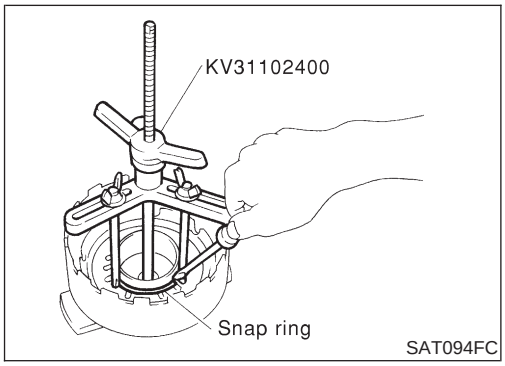
b. Check to see that retaining plate moves to snap ring.

c. If retaining plate does not contact snap ring:

- D-ring might be damaged.
- Oil seal might be damaged.
- Fluid might be leaking past piston check ball.



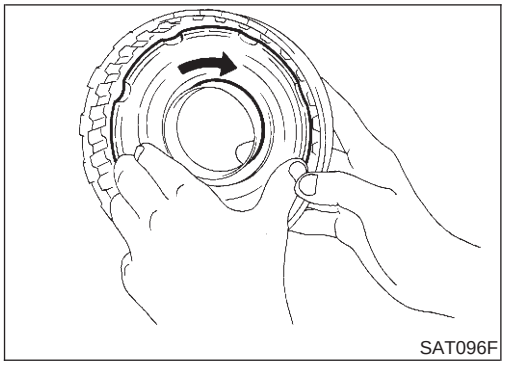
2. Remove snap ring.
3. Remove drive plates, driven plates, retaining plate, and dish plates.



4. Set Tool on spring retainer and remove snap ring from reverse clutch drum while compressing return springs.

- **Set Tool directly over springs.**
- **Do not expand snap ring excessively.**

5. Remove spring retainer and return springs.


SAT096F

6. Remove piston from reverse clutch drum by turning it.
7. Remove D-ring and oil seal from piston.

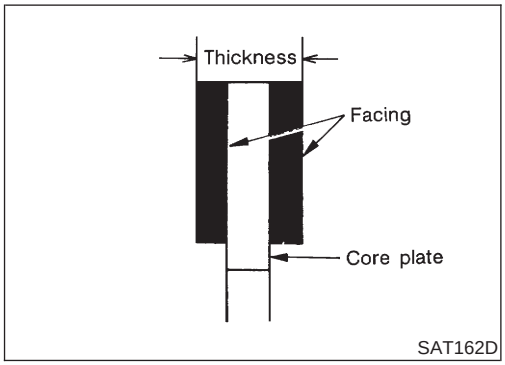
INSPECTION

NFAT0391

Reverse Clutch Snap Ring, Spring Retainer and Return Springs

NFAT0391S01

- Check for deformation, fatigue or damage.
  If necessary, replace.



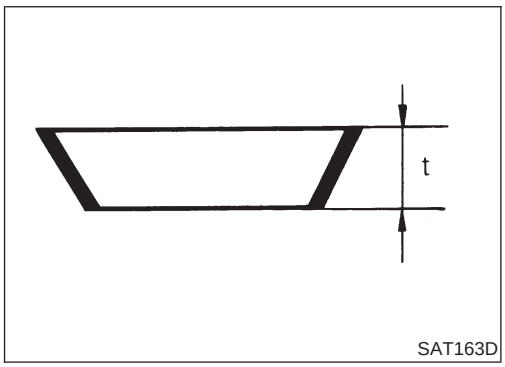
SAT162D

Reverse Clutch Drive Plates

NFAT0391S02

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

  Thickness of drive plate:
  Standard value: 1.6 mm (0.063 in)
  Wear limit: 1.4 mm (0.055 in)
- If not within wear limit, replace.



SAT163D

Reverse Clutch Dish Plates

NFAT0391S03

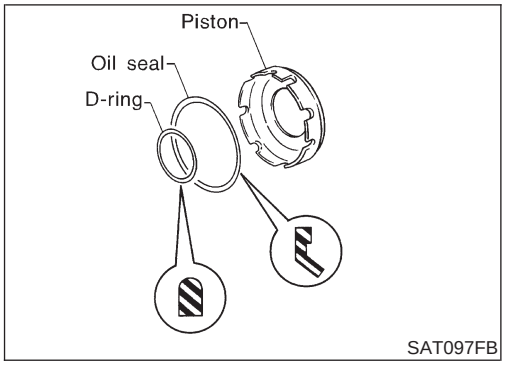
- Check for deformation or damage.
- Measure thickness of dish plate.

  Thickness of dish plate: 3.08 mm (0.1213 in)
- If deformed or fatigued, replace.

Reverse Clutch Piston

NFAT0391S04

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.

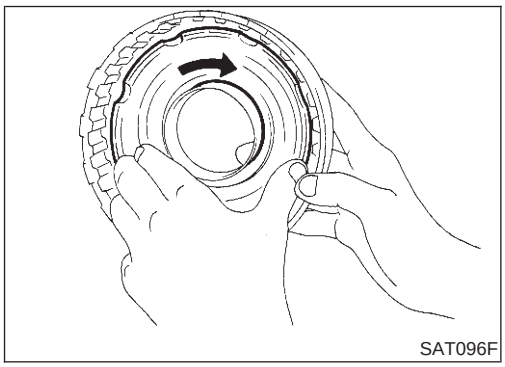


SAT097FB

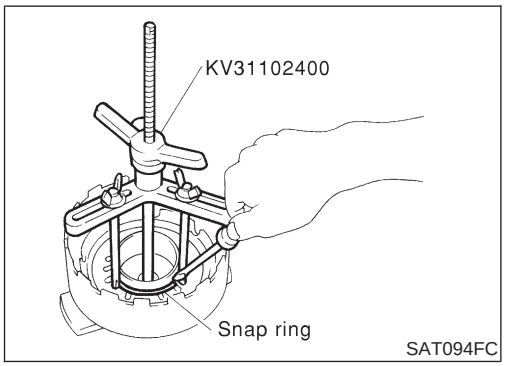
ASSEMBLY

NFAT0392

1. Install D-ring and oil seal on piston.
- **Take care with the direction of oil seal.**
- **Apply ATF to both parts.**

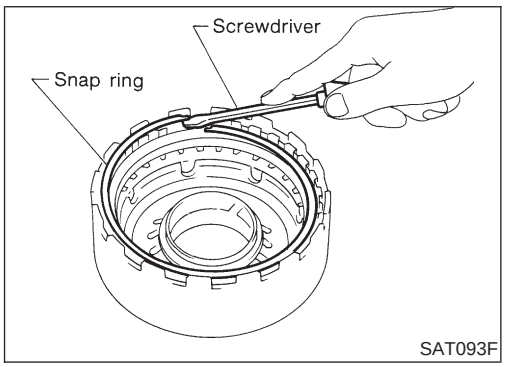

SAT096F

2. Install piston assembly by turning it slowly.
- **Apply ATF to inner surface of drum.**



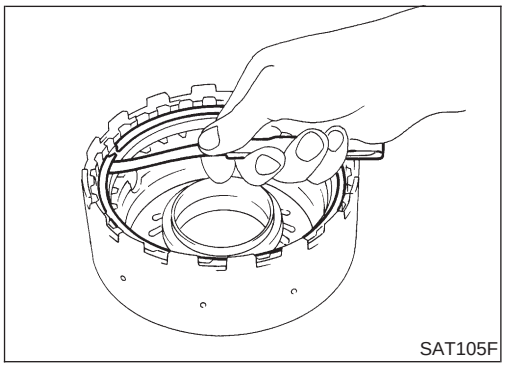
SAT094FC

3. Install return springs and spring retainer on piston.
4. Set Tool on spring retainer and install snap ring while compressing return springs.
- **Set Tool directly over return springs.**



SAT093F

5. Install drive plates, driven plates, retaining plate and dish plates.
- **Take care with order of plates.**
6. Install snap ring.


SAT105F

7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

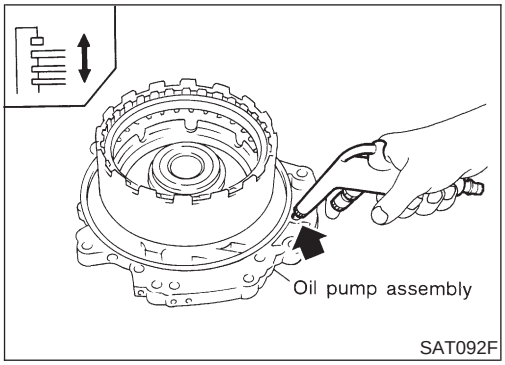
Specified clearance:

Standard 0.5 - 0.8 mm (0.020 - 0.031 in)

Allowable limit 1.2 mm (0.047 in)

Retaining plate:

Refer to SDS, AT-453.

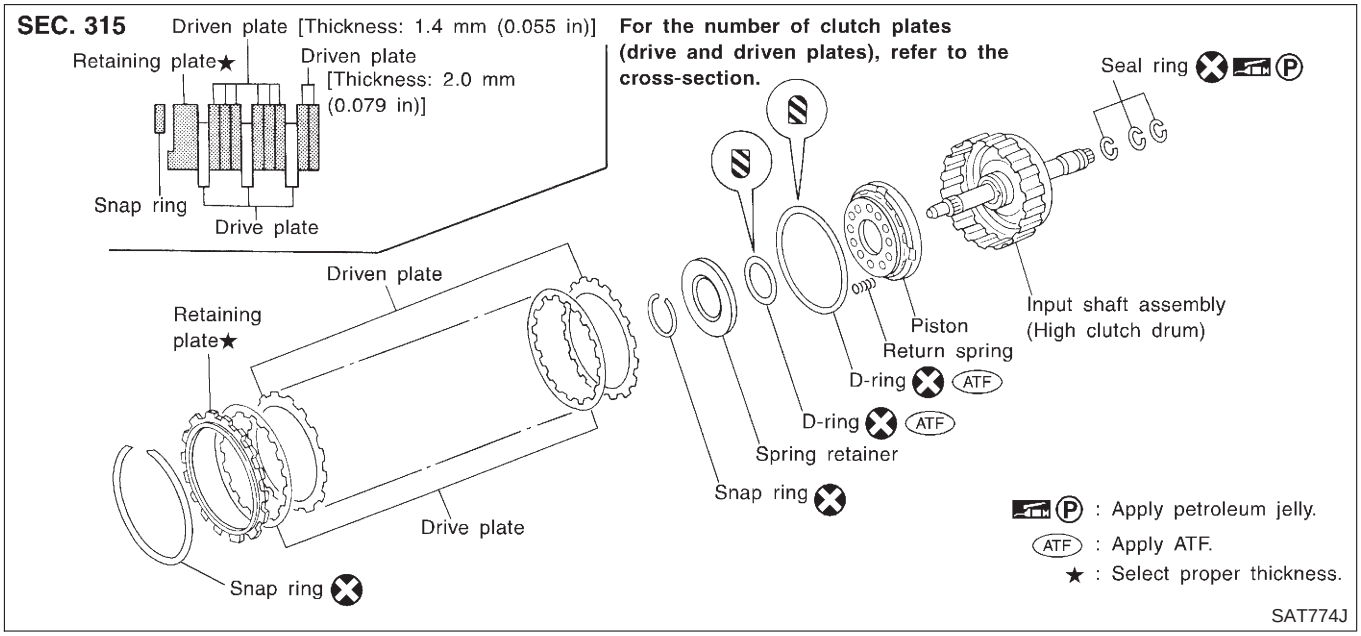


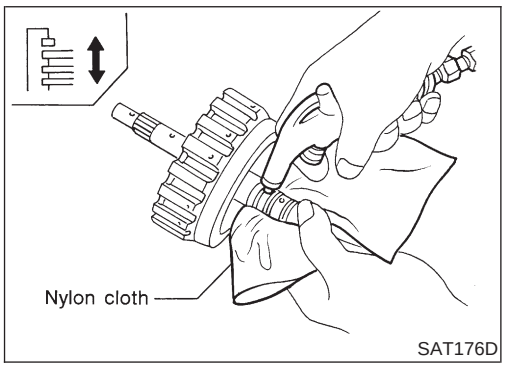
8. Check operation of reverse clutch.
   Refer to "DISASSEMBLY", "Reverse Clutch", AT-393.

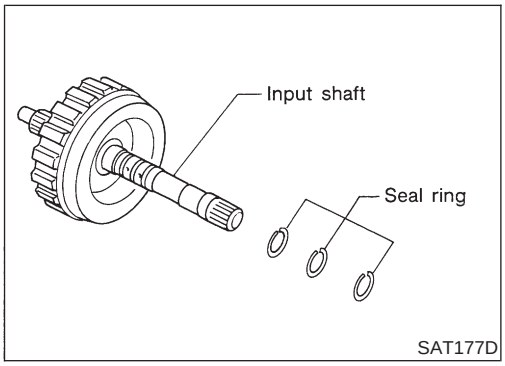
High Clutch

COMPONENTS

NFAT0393







DISASSEMBLY

NFAT0394

1. Check operation of high clutch.

a. Apply compressed air to oil hole of input shaft with nylon cloth.

- **Stop up hole on opposite side of input shaft with nylon cloth.**

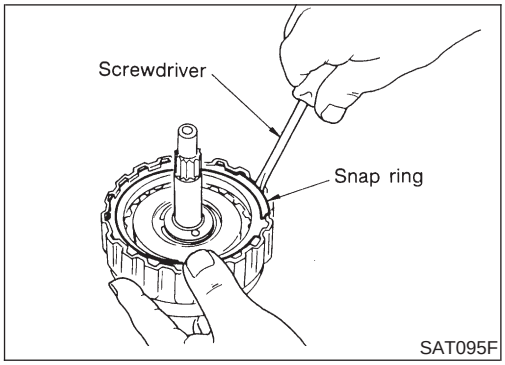
b. Check to see that retaining plate moves to snap ring.

c. If retaining plate does not contact snap ring:

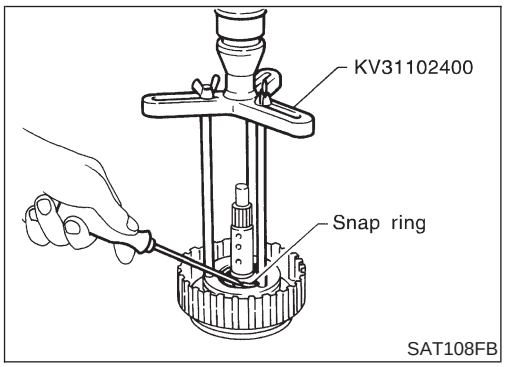
- D-ring might be damaged.
- Oil seal might be damaged.
- Fluid might be leaking past piston check ball.

2. Remove seal rings from input shaft.

- **Always replace when removed.**

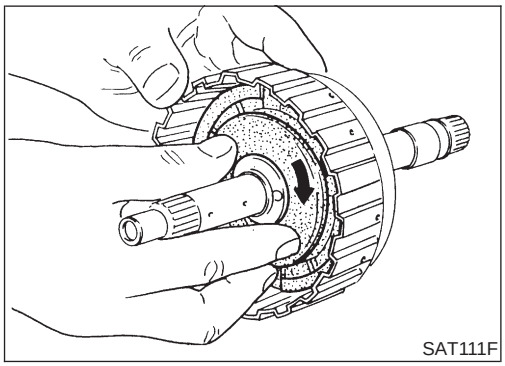


3. Remove snap ring.
4. Remove drive plates, driven plates and retaining plate.

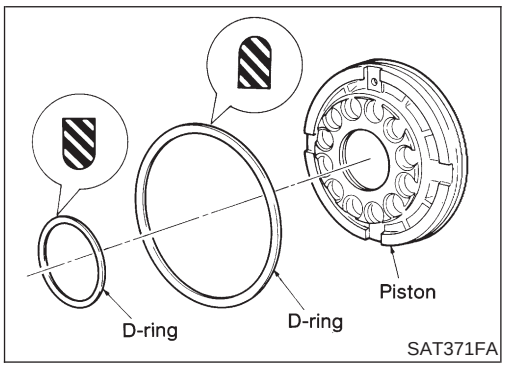


5. Set Tool on spring retainer and remove snap ring from high clutch drum while compressing return springs.
- **Set Tool directly over springs.**
- **Do not expand snap ring excessively.**

6. Remove spring retainer and return springs.



7. Remove piston from high clutch drum by turning it.



8. Remove D-rings from piston.

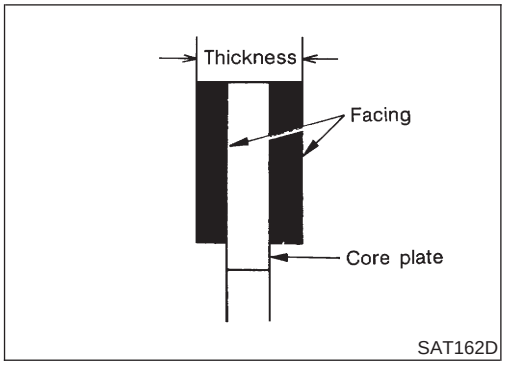
INSPECTION

NFAT0395

High Clutch Snap Ring, Spring Retainer and Return Springs

NFAT0395S01

- Check for deformation, fatigue or damage.
  If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**



High Clutch Drive Plates

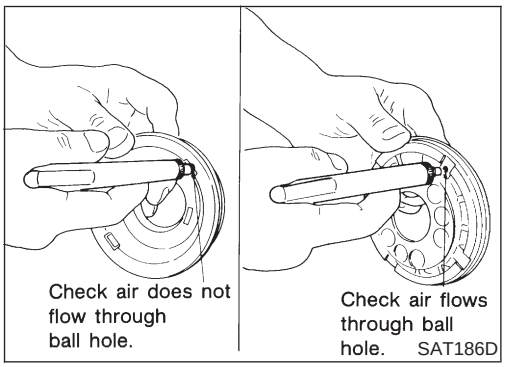
NFAT0395S02

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

  Thickness of drive plate:

  Standard value 1.6 mm (0.063 in)

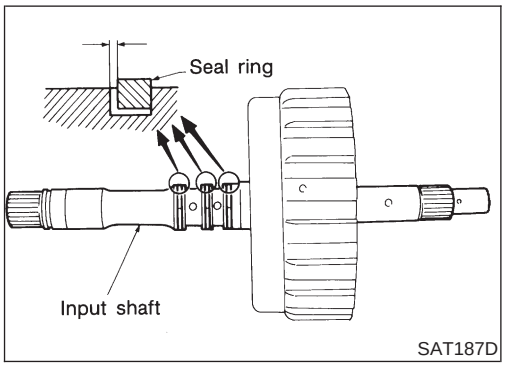
  Wear limit 1.4 mm (0.055 in)
- If not within wear limit, replace.



High Clutch Piston

NFAT0395S03

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.



Seal Ring Clearance

NFAT0395S04

- Install new seal rings onto input shaft.
- Measure clearance between seal ring and ring groove.

  Standard clearance:

  0.08 - 0.23 mm (0.0031 - 0.0091 in)

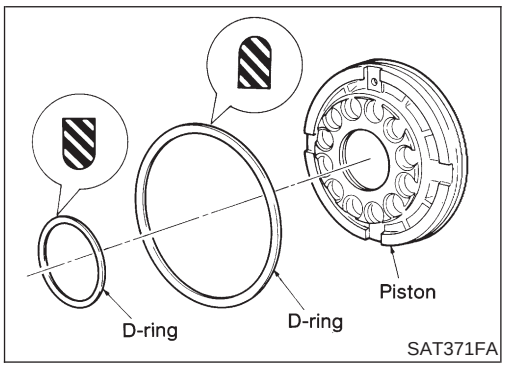
  Allowable limit:

  0.23 mm (0.0091 in)
- If not within allowable limit, replace input shaft assembly.

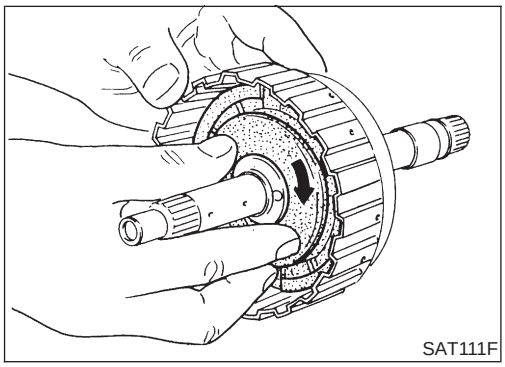
ASSEMBLY

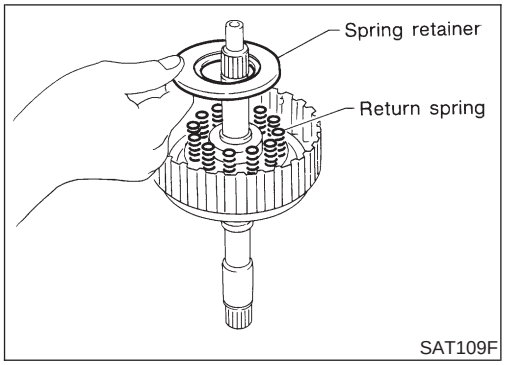
NFAT0396

1. Install D-rings on piston.
- **Apply ATF to both parts.**

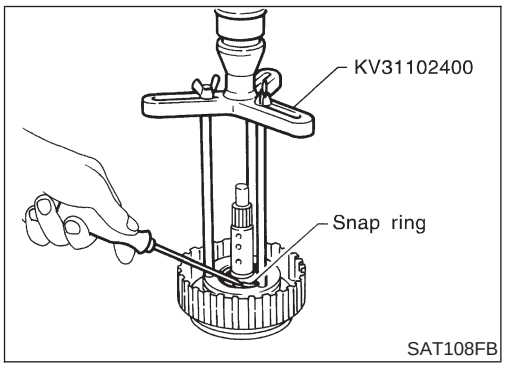


2. Install piston assembly by turning it slowly.
- **Apply ATF to inner surface of drum.**



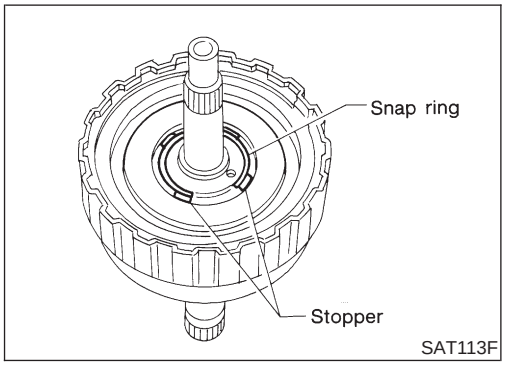


3. Install return springs and spring retainer on piston.

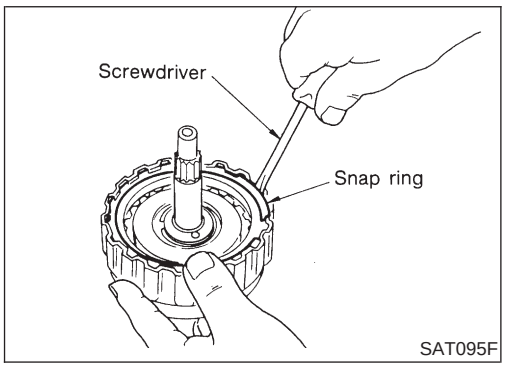


4. Set Tool on spring retainer and install snap ring while compressing return springs.

- **Set Tool directly over return springs.**



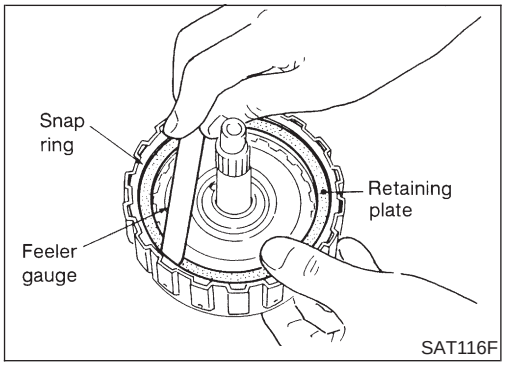
- **Do not align snap ring gap with spring retainer stopper.**



5. Install drive plates, driven plates and retaining plate.

- **Take care with the order and direction of plates.**

6. Install snap ring.



7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

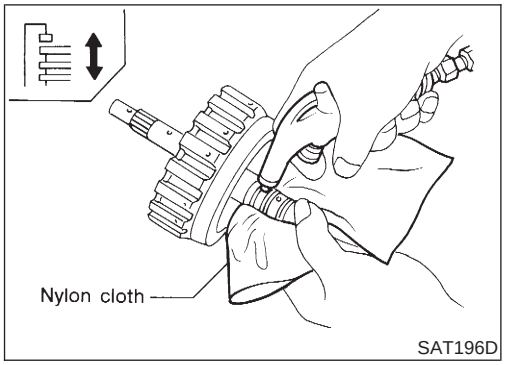
Specified clearance:

Standard 1.8 - 2.2 mm (0.071 - 0.087 in)

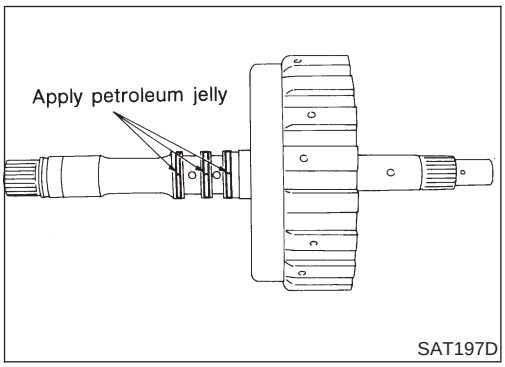
Allowable limit 2.8 mm (0.110 in)

Retaining plate:

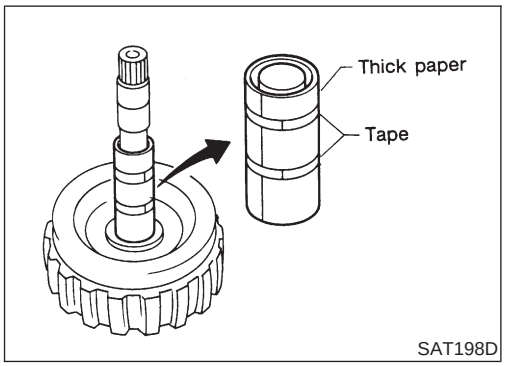
Refer to SDS, AT-453.



8. Check operation of high clutch.
   Refer to “DISASSEMBLY”, “High Clutch”, AT-396.



9. Install seal rings to input shaft.
- **Apply petroleum jelly to seal rings.**
- **Always replace when removed.**

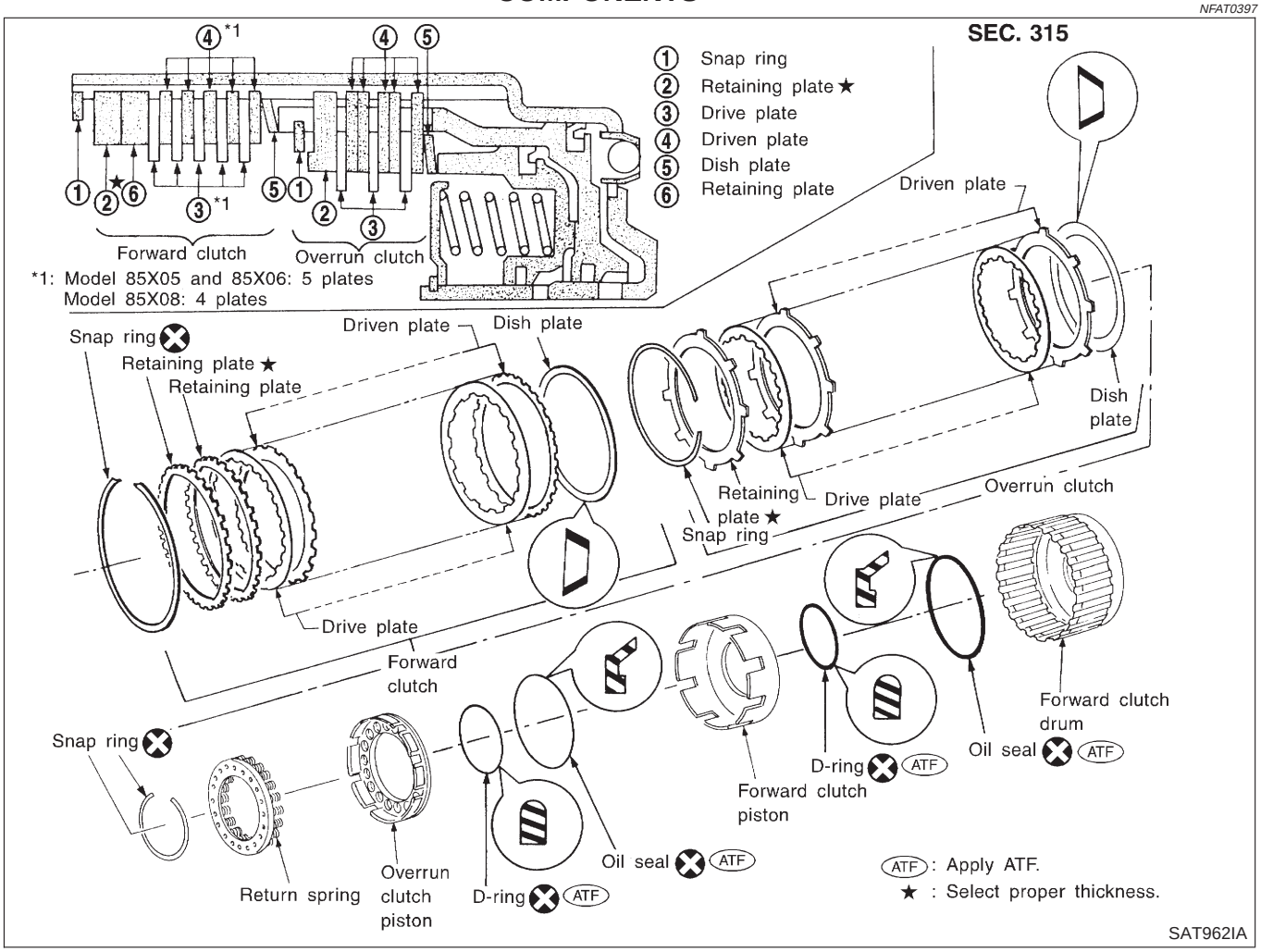


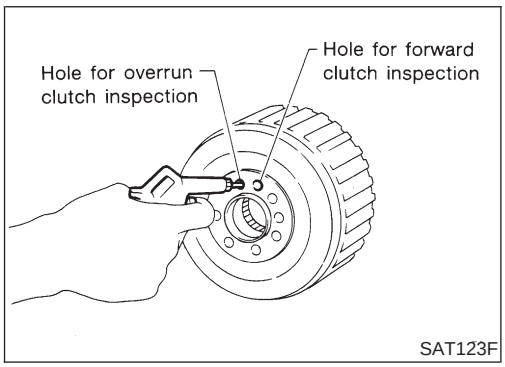
- **Roll paper around seal rings to prevent seal rings from spreading.**

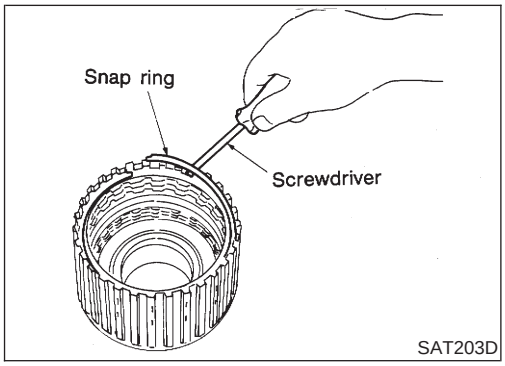
Forward and Overrun Clutches

COMPONENTS

NFAT0397





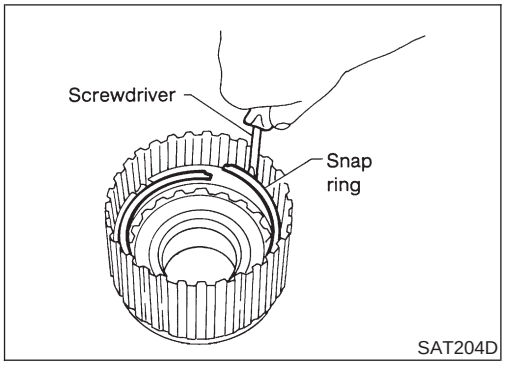


DISASSEMBLY

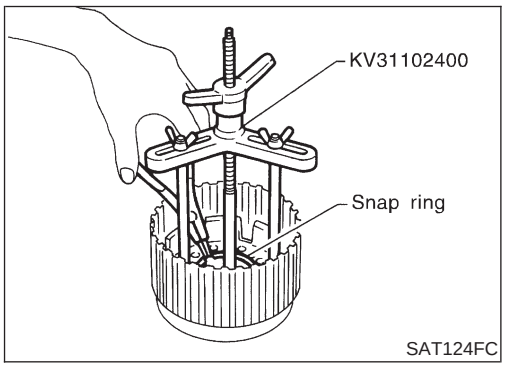
NFAT0398

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.

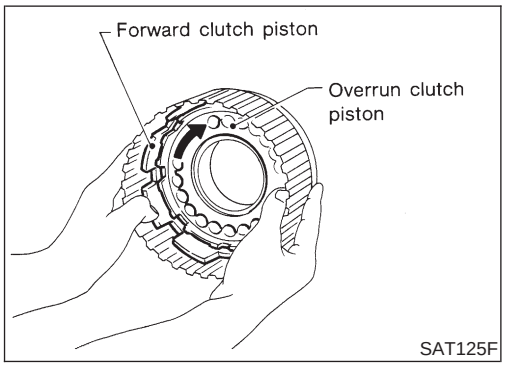


4. Remove snap ring for overrun clutch.
5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.

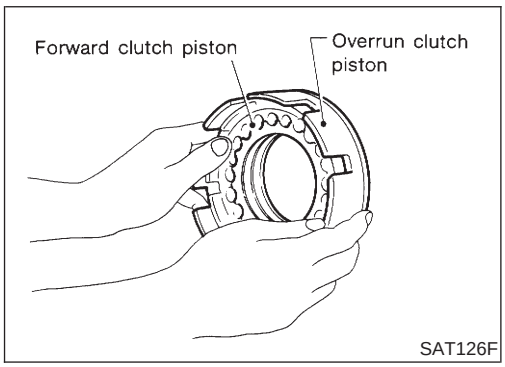


6. Set Tool on spring retainer and remove snap ring from forward clutch drum while compressing return springs.
- **Set Tool directly over return springs.**
- **Do not expand snap ring excessively.**

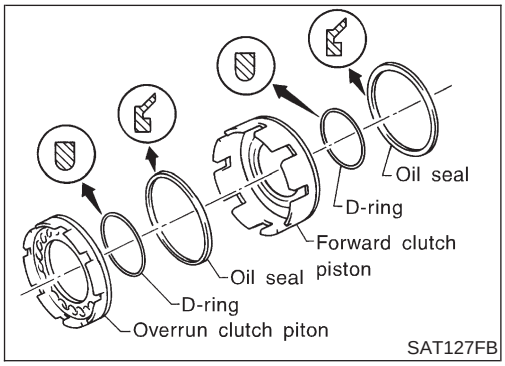
7. Remove spring retainer and return springs.
- **Do not remove return springs from spring retainer.**



8. Remove forward clutch piston with overrun clutch piston from forward clutch drum by turning it.



9. Remove overrun clutch piston from forward clutch piston by turning it.



10. Remove D-rings and oil seals from forward clutch piston and overrun clutch piston.

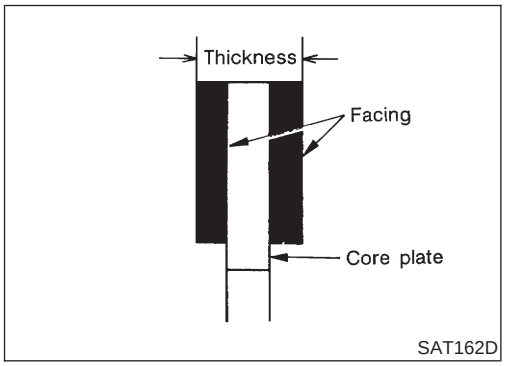
INSPECTION

NFAT0399

Snap Rings, Spring Retainer and Return Springs

NFAT0399S01

- Check for deformation, fatigue or damage.
- Replace if necessary.
- **When replacing spring retainer and return springs, replace them as a set.**



Forward Clutch and Overrun Clutch Drive Plates

NFAT0399S02

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

  Thickness of drive plate:

  Forward clutch

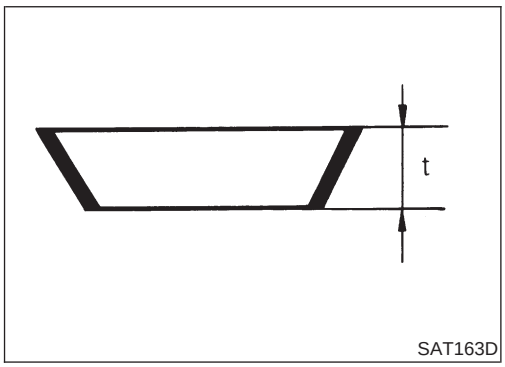
  Standard value: 1.6 mm (0.063 in)

  Wear limit: 1.4 mm (0.055 in)

  Overrun clutch

  Standard value: 1.6 mm (0.063 in)

  Wear limit: 1.4 mm (0.055 in)
- If not within wear limit, replace.



Forward Clutch and Overrun Clutch Dish Plates

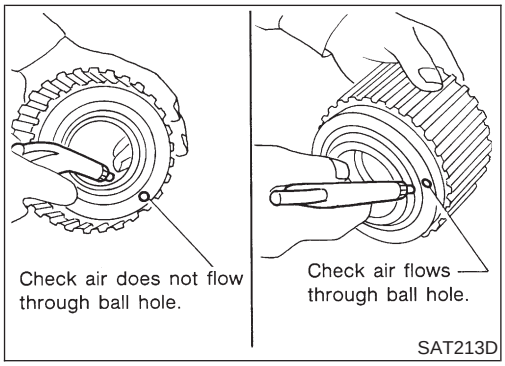
NFAT0399S03

- Check for deformation or damage.
- Measure thickness of dish plate.

  Thickness of dish plate:

  Forward clutch 2.7 mm (0.106 in)

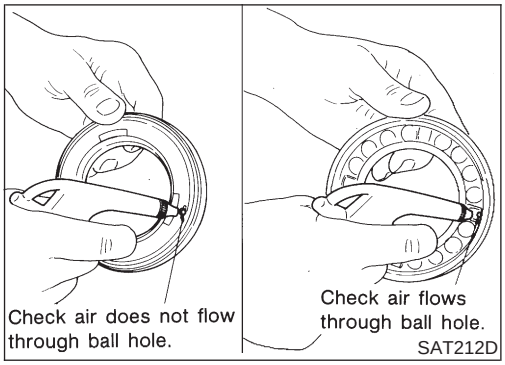
  Overrun clutch 2.7 mm (0.106 in)
- If deformed or fatigued, replace.



Forward Clutch Drum

NFAT0399S04

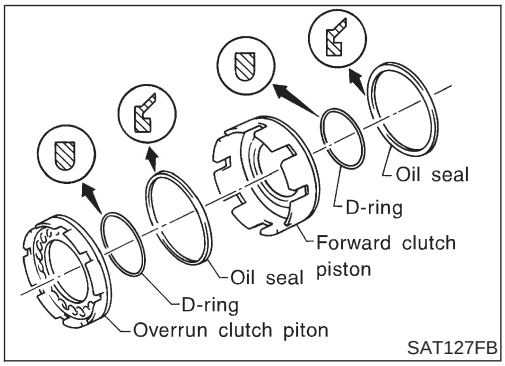
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole from outside of forward clutch drum. Make sure air leaks past ball.
- Apply compressed air to oil hole from inside of forward clutch drum. Make sure there is no air leakage.



Overrun Clutch Piston

NFAT0399S05

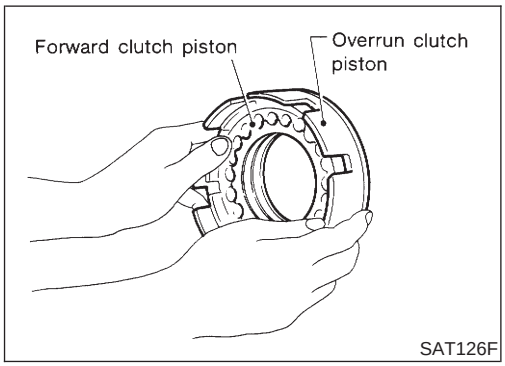
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side. Make sure that air leaks past ball.



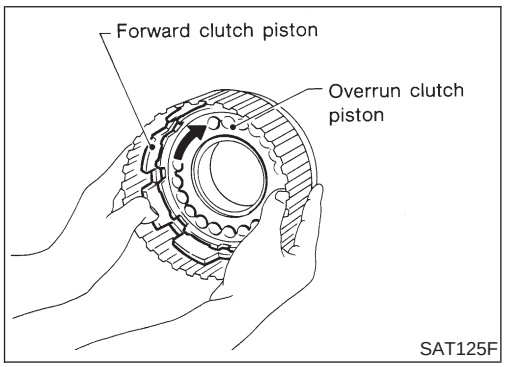
ASSEMBLY

NFAT0400

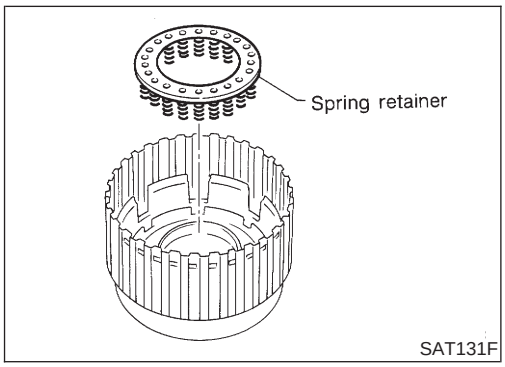
1. Install D-rings and oil seals on forward clutch piston and overrun clutch piston.
- **Take care with direction of oil seal.**
- **Apply ATF to both parts.**



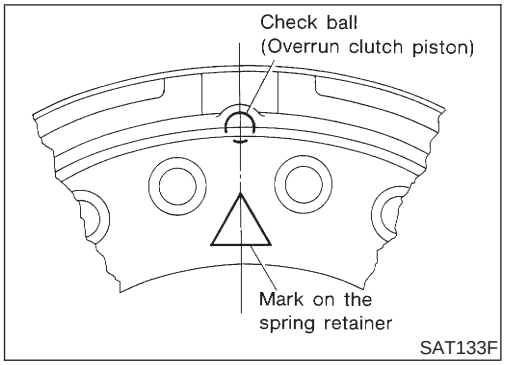
2. Install overrun clutch piston assembly on forward clutch piston by turning it slowly.
- **Apply ATF to inner surface of forward clutch piston.**



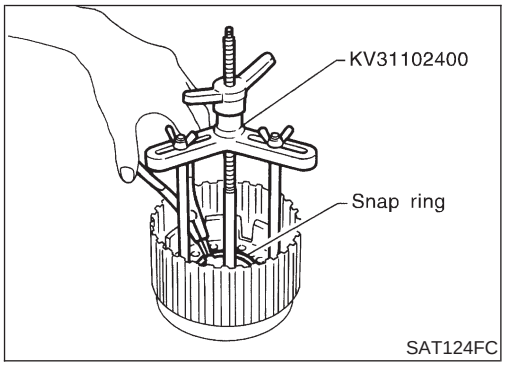
3. Install forward clutch piston assembly on forward clutch drum by turning it slowly.
- **Apply ATF to inner surface of drum.**



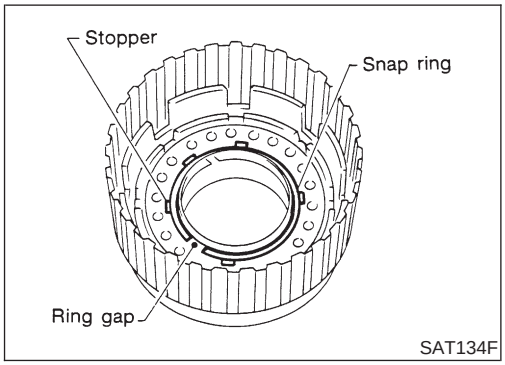
4. Install return spring on overrun clutch piston.



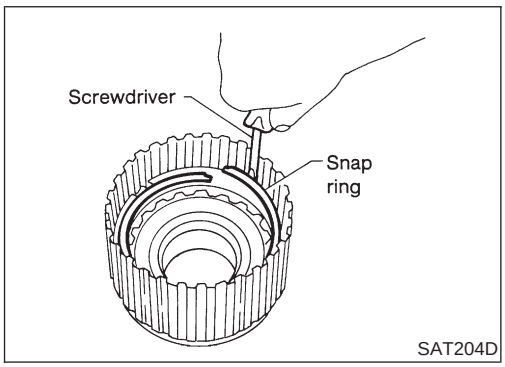
- Align the mark on spring retainer with check ball in overrun clutch piston.



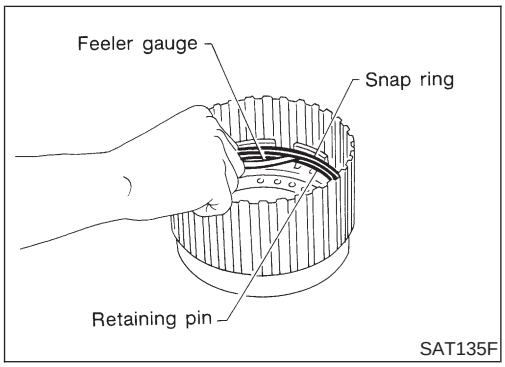
5. Set Tool on spring retainer and install snap ring while compressing return springs.
- **Set Tool directly over return springs.**



- **Do not align snap ring gap with spring retainer stopper.**



6. Install drive plates, driven plates, retaining plate and dish plate for overrun clutch.
- **Take care with order of plates.**
7. Install snap ring for overrun clutch.



8. Measure clearance between overrun clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate.

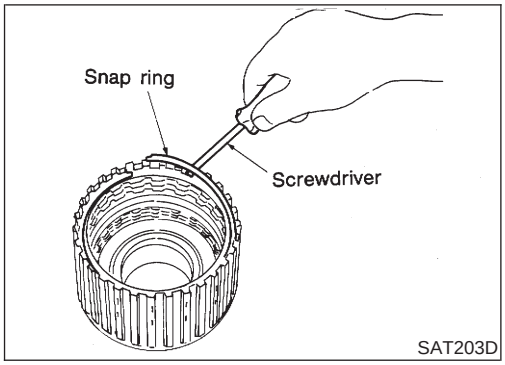
Specified clearance:

Standard 0.7 - 1.1 mm (0.028 - 0.043 in)

Allowable limit 1.7 mm (0.067 in)

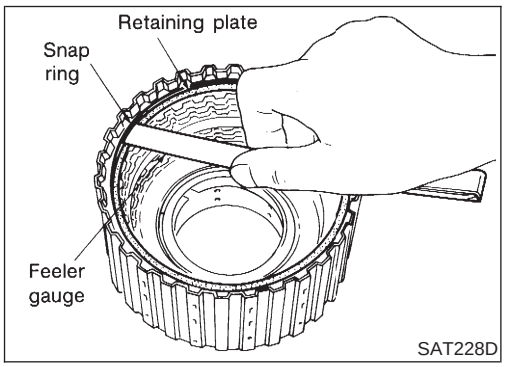
Overrun clutch retaining plate:

Refer to SDS, AT-454.



9. Install drive plates, driven plates, retaining plate and dish plate for forward clutch.
- **Take care with order of plates.**

10. Install snap ring for forward clutch.



11. Measure clearance between forward clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate.

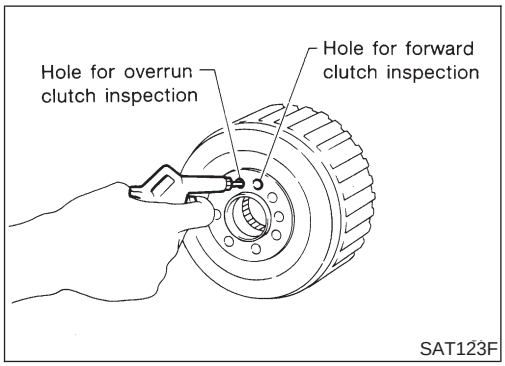
Specified clearance:

Standard 0.45 - 0.85 mm (0.0177 - 0.0335 in)

Allowable limit 1.85 mm (0.0728 in)

Forward clutch retaining plate:

Refer to SDS, AT-454.



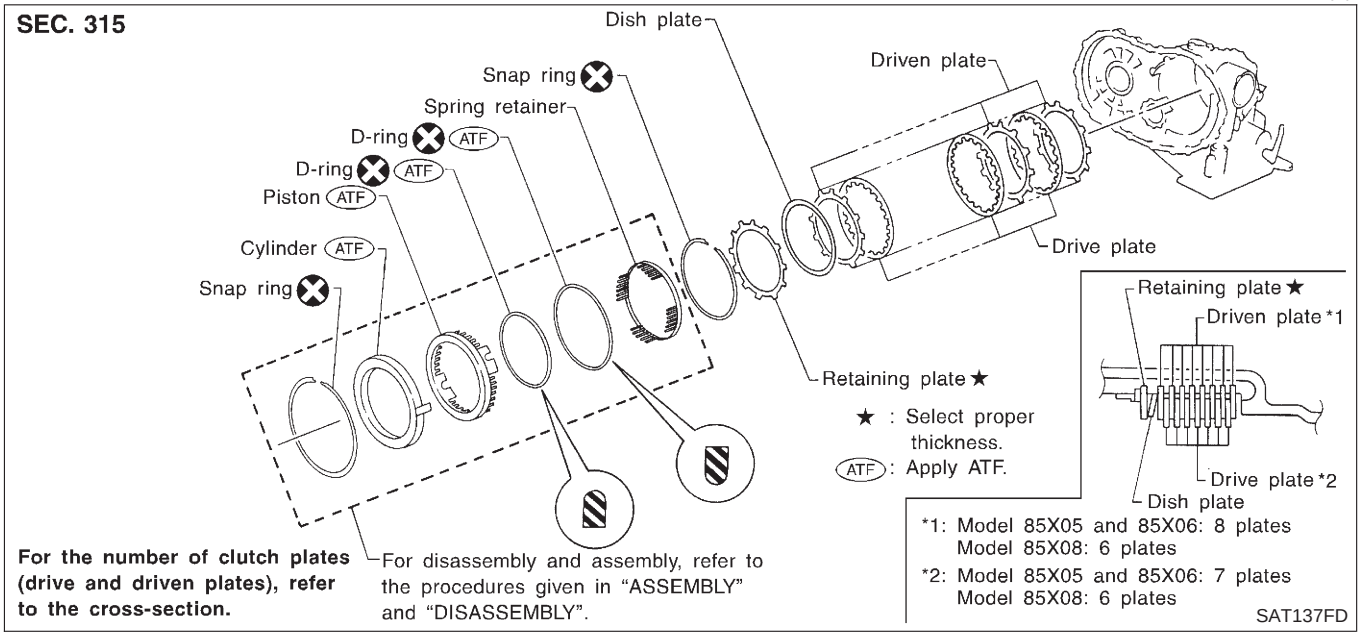
12. Check operation of forward clutch.
Refer to "DISASSEMBLY", "Forward Clutch and Overrun Clutch", AT-401.

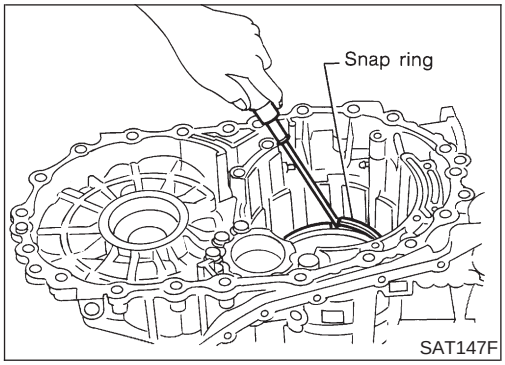
13. Check operation of overrun clutch.
Refer to "DISASSEMBLY", "Forward Clutch and Overrun Clutch", AT-401.

Low & Reverse Brake

COMPONENTS

NFAT0401





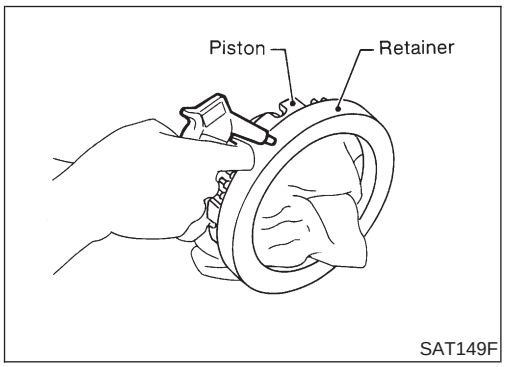
DISASSEMBLY

NFAT0402

1. Check operation of low & reverse brake.

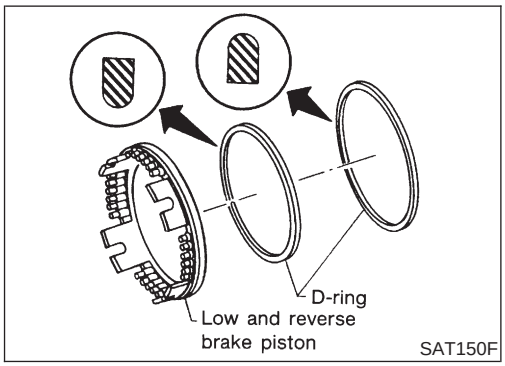
a. Apply compressed air to oil hole of transmission case.
b. Check to see that retaining plate moves to snap ring.
c. If retaining plate does not contact snap ring:

- D-ring might be damaged.
- Fluid might be leaking past piston check ball.



2. In order to remove piston, apply compressed air to oil hole of retainer while holding piston.

- **Apply air gradually and allow piston to come out evenly.**



3. Remove D-rings from piston.

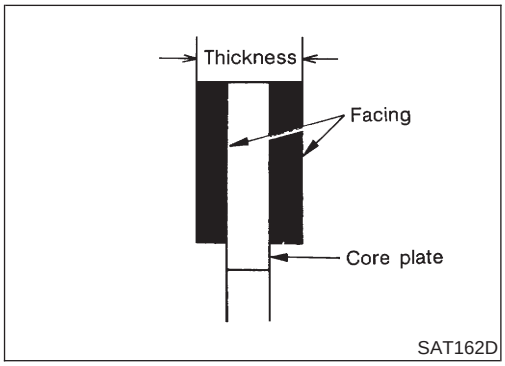
INSPECTION

NFAT0403

Low and Reverse Brake Snap Ring, Spring Retainer and Return Springs

NFAT0403S01

- Check for deformation, fatigue or damage.
  If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**



Low and Reverse Brake Drive Plate

NFAT0403S02

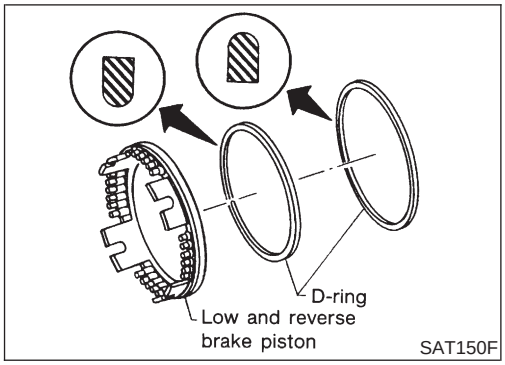
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

  Thickness of drive plate:
  Standard value 1.8 mm (0.071 in)
  Wear limit 1.6 mm (0.063 in)

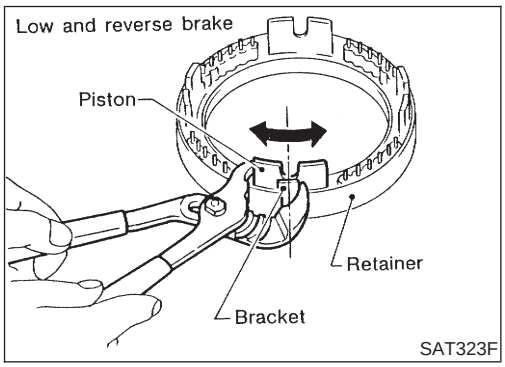
- If not within wear limit, replace.

ASSEMBLY

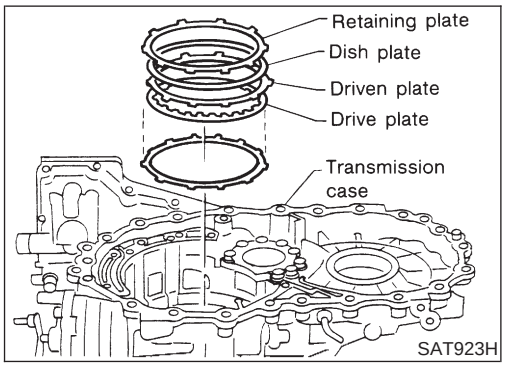
NFAT0404



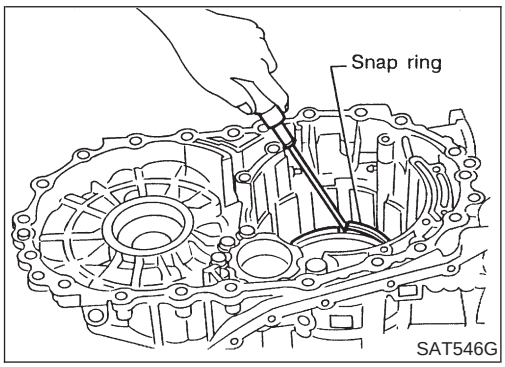
1. Install D-rings on piston.
- **Apply ATF to both parts.**



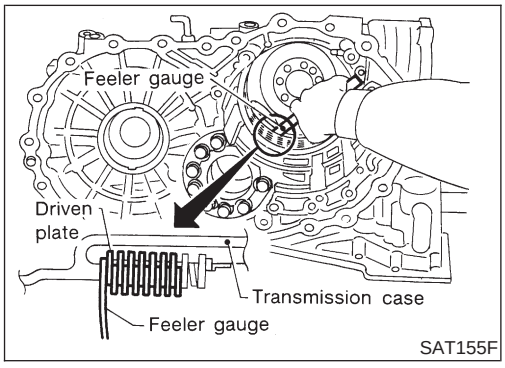
2. Set and align piston with retainer.
- **This operation is required in order to engage the protrusions of piston to return springs correctly.**
Further procedures are given in "ASSEMBLY".



3. Install driven plates, drive plates, retaining plate and dish plate on transmission case.
- **Take care with order of plates and direction of dish plate.**



4. Install snap ring.



5. Measure clearance between driven plate and transmission case. If not within allowable limit, select proper retaining plate. (front side)

Specified clearance:

Standard 1.7 - 2.1 mm (0.067 - 0.083 in)

Allowable limit 3.3 mm (0.130 in)

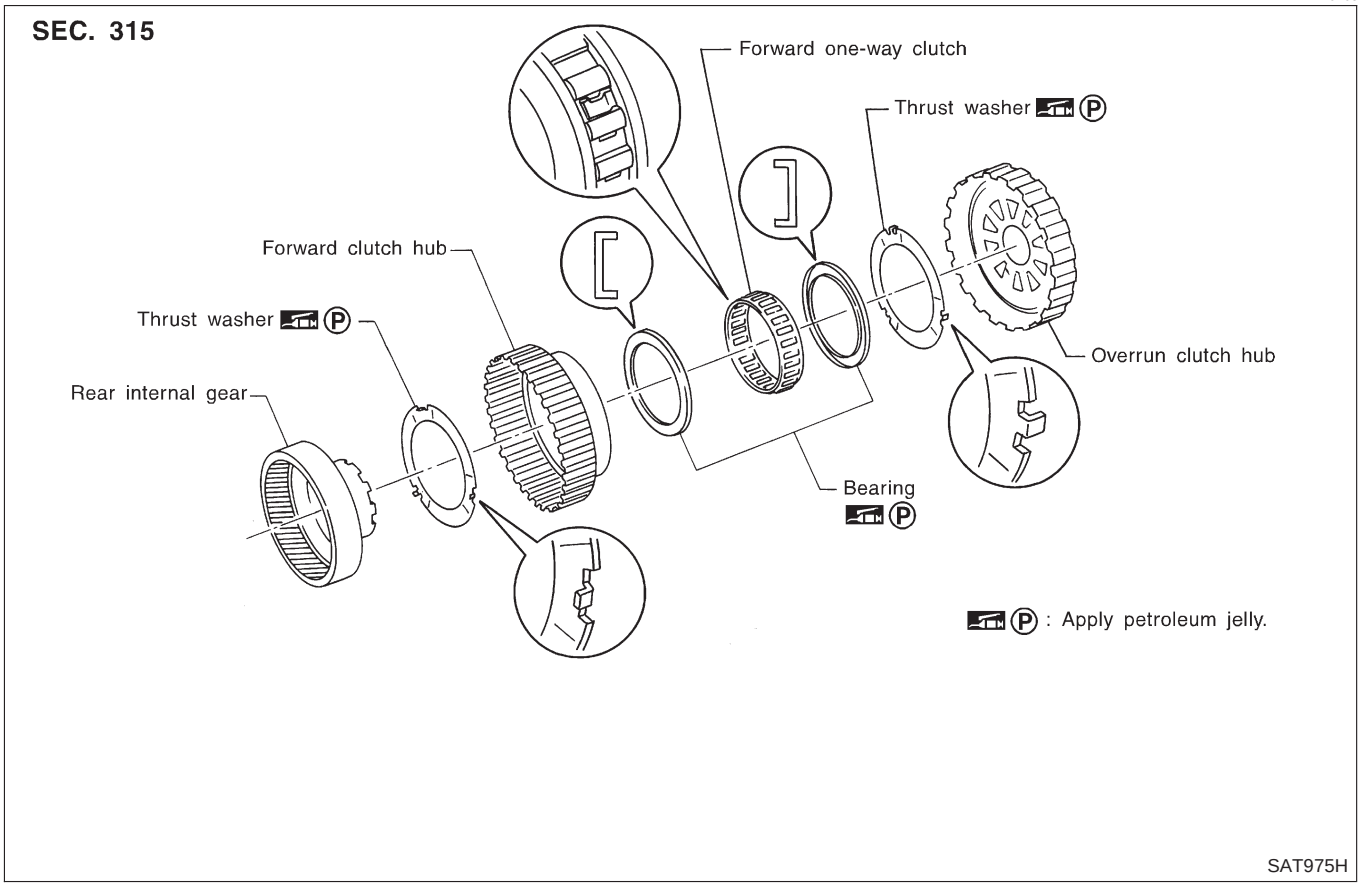
Retaining plate:

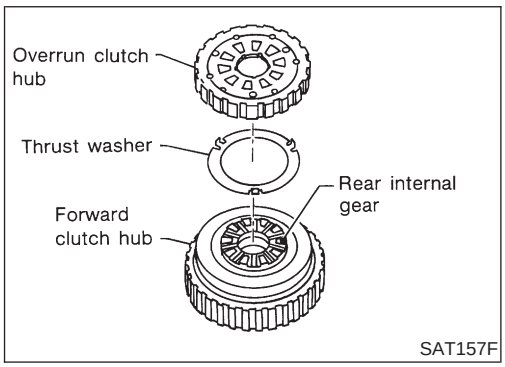
Refer to SDS, AT-455.

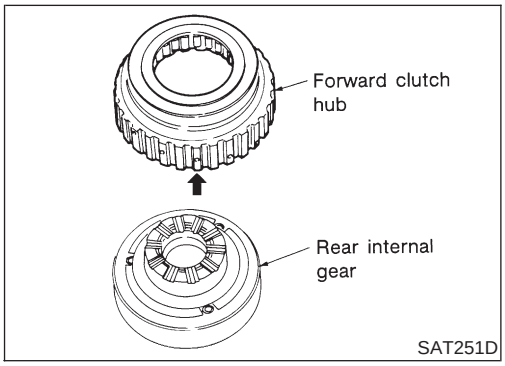
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

COMPONENTS

NFAT0405





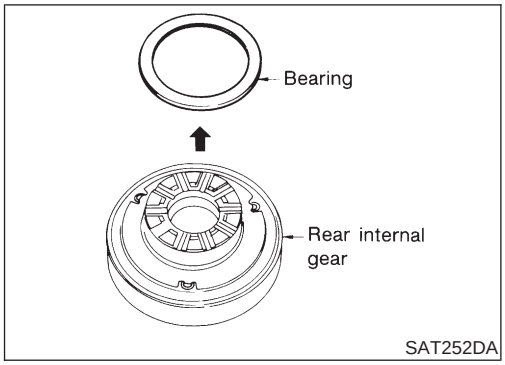


DISASSEMBLY

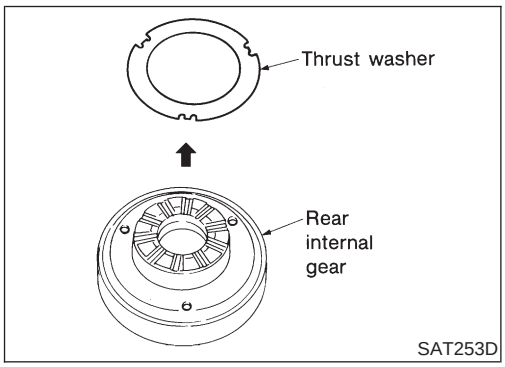
NFAT0406

1. Remove overrun clutch hub and thrust washer from forward clutch hub.

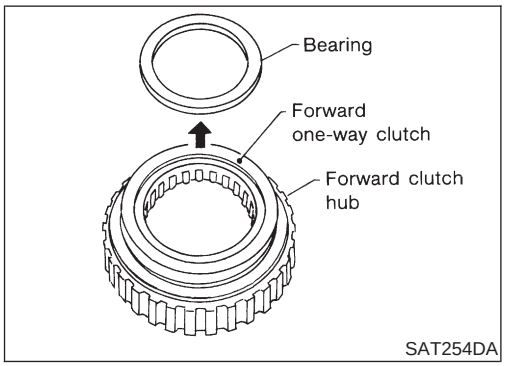
2. Remove forward clutch hub from rear internal gear.



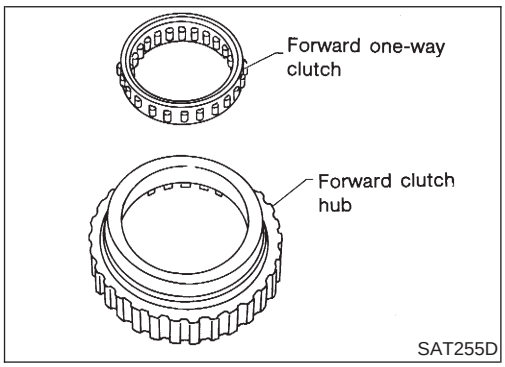
3. Remove bearing from rear internal gear.



4. Remove thrust washer from rear internal gear.



5. Remove bearing from forward one-way clutch.



6. Remove forward one-way clutch from forward clutch hub.

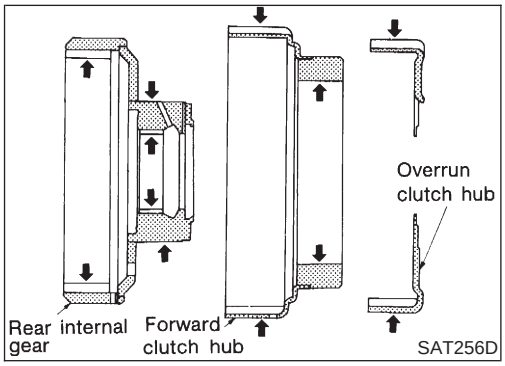
INSPECTION

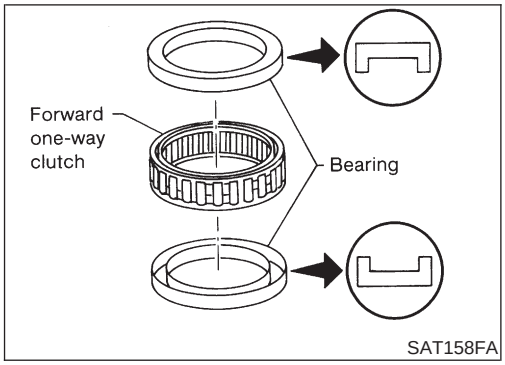
NFAT0407

Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

NFAT0407S01

- Check rubbing surfaces for wear or damage.





Bearings and Forward One-way Clutch

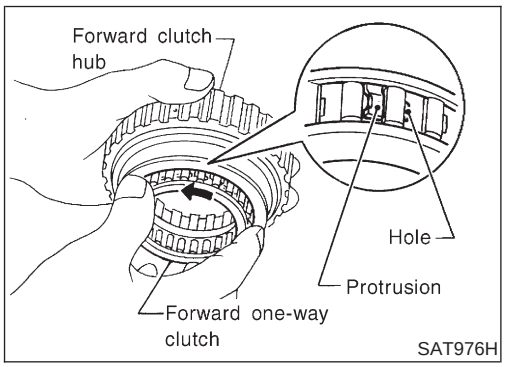
NFAT0407S02

- Check bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.

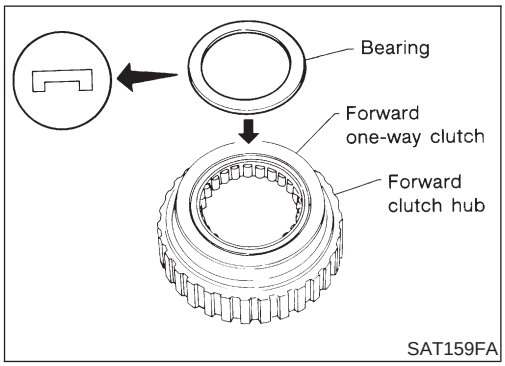
ASSEMBLY

NFAT0408

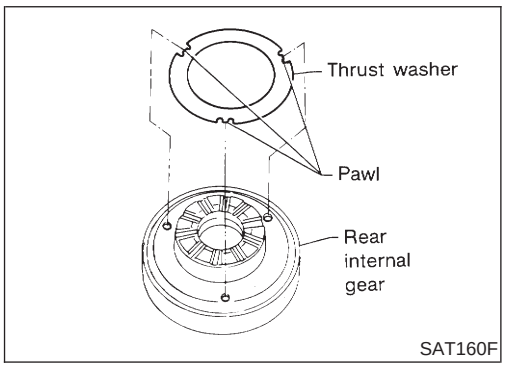
1. Install forward one-way clutch on forward clutch.
- **Take care with the direction of forward one-way clutch.**



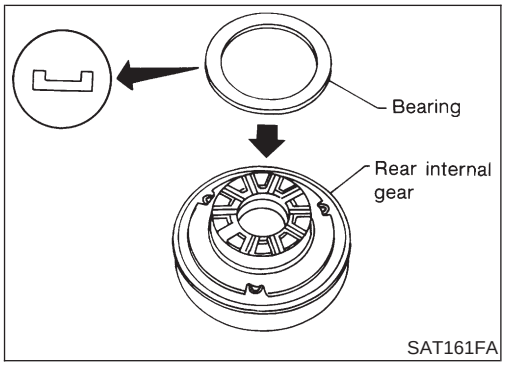
2. Install bearing on forward one-way clutch.
- **Apply petroleum jelly to bearing.**

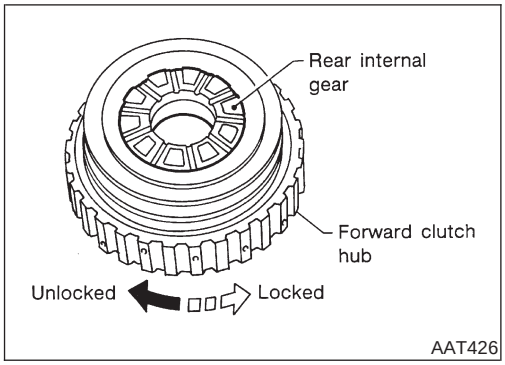


3. Install thrust washer on rear internal gear.
- **Apply petroleum jelly to thrust washer.**
- **Align hooks of thrust washer with holes of rear internal gear.**



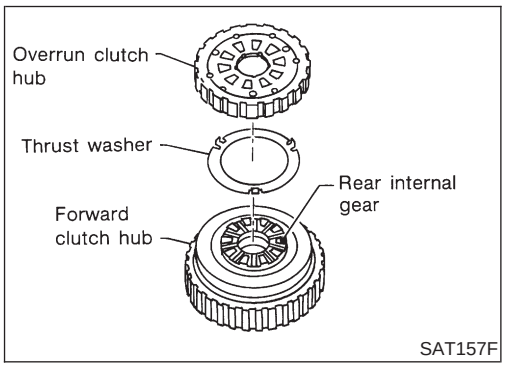
4. Install bearing on rear internal gear.
- **Apply petroleum jelly to bearing.**





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.**



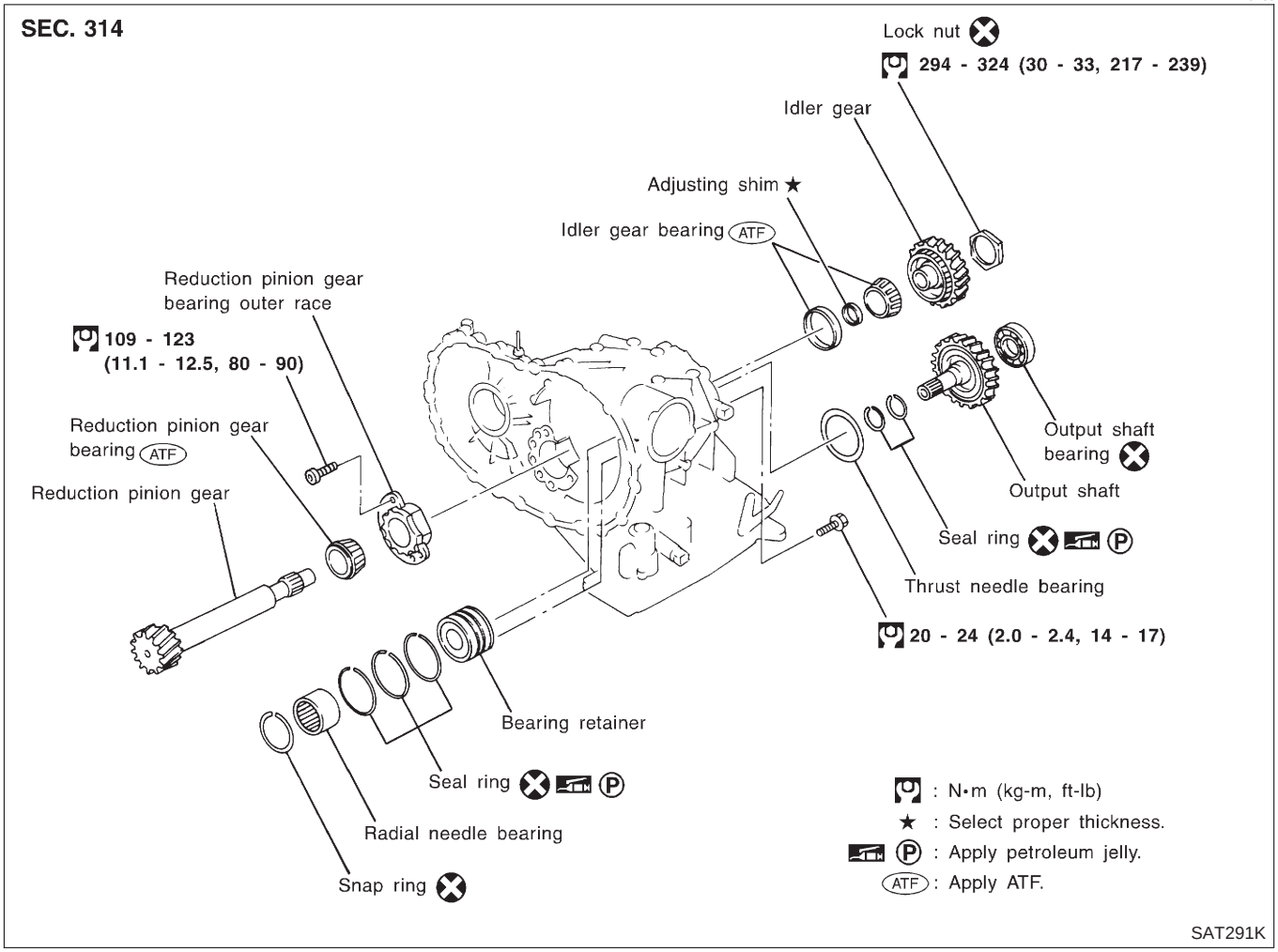
6. Install thrust washer and overrun clutch hub.

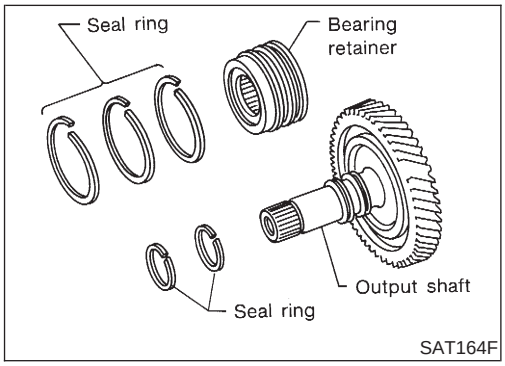
- **Apply petroleum jelly to thrust washer.**
- **Align hooks of thrust washer with holes of overrun clutch hub.**
- **Align projections of rear internal gear with holes of overrun clutch hub.**

Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer

COMPONENTS

NFAT0409

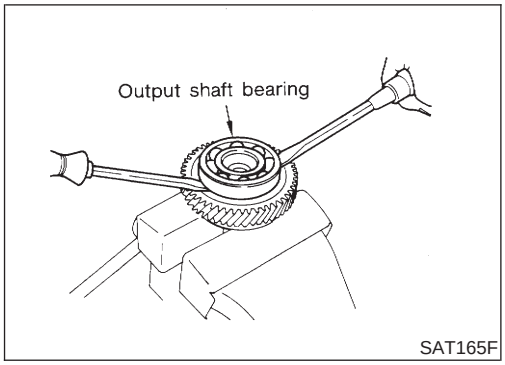




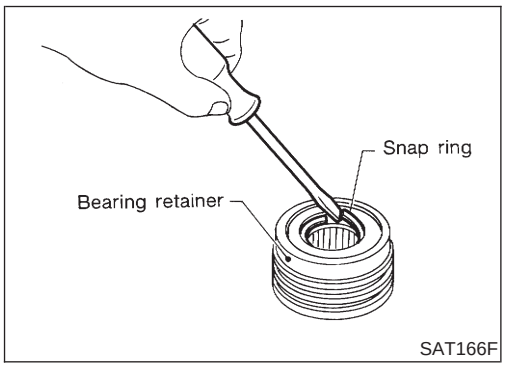
DISASSEMBLY

NFAT0410

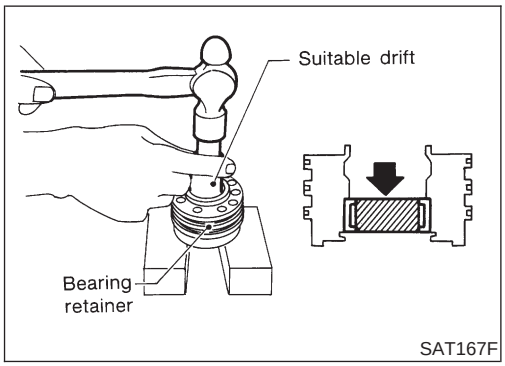
1. Remove seal rings from output shaft and bearing retainer.



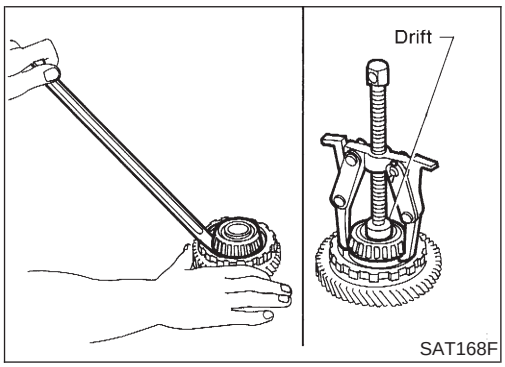
2. Remove output shaft bearing with screwdrivers.
- **Always replace bearing with a new one when removed.**
- **Do not damage output shaft.**



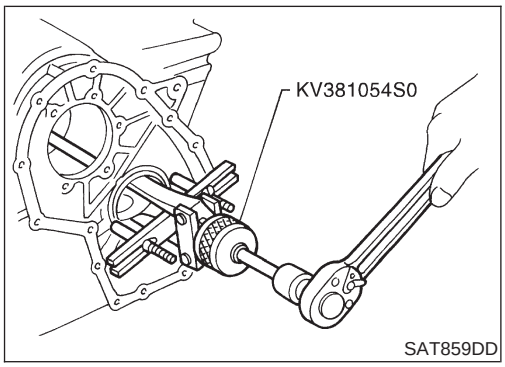
3. Remove snap ring from bearing retainer.



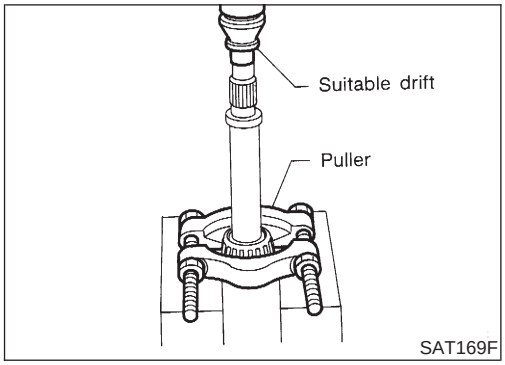
4. Remove needle bearing from bearing retainer.



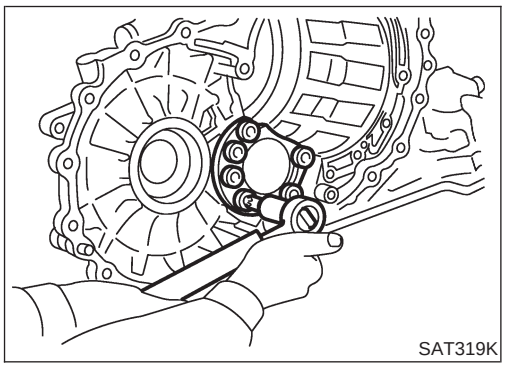
5. Remove idler gear bearing inner race from idler gear.



6. Remove idler gear bearing outer race from transmission case.



7. Press out reduction pinion gear bearing inner race from reduction pinion gear.



8. Remove reduction pinion gear bearing outer race from transmission case.

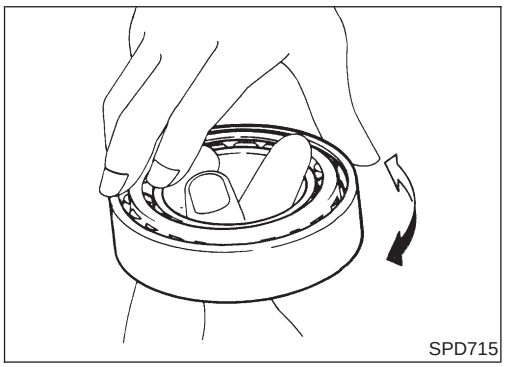
INSPECTION

NFAT0411

Output Shaft, Idler Gear and Reduction Pinion Gear

NFAT0411S01

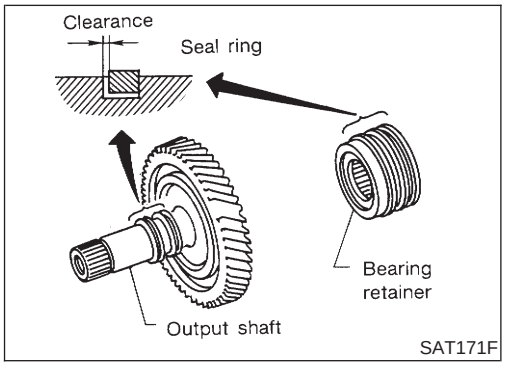
- Check shafts for cracks, wear or bending.
- Check gears for wear, chips and cracks.



Bearing

NFAT0411S02

- 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

NFAT0411S03

- Install new seal rings to output shaft.
- Measure clearance between seal ring and ring groove of output shaft.

  Standard clearance:

  0.10 - 0.25 mm (0.0039 - 0.0098 in)

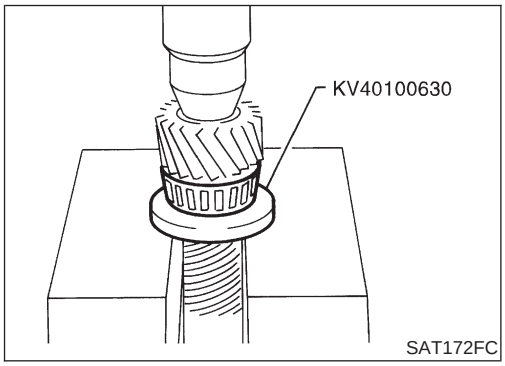
  Allowable limit:

  0.25 mm (0.0098 in)
- If not within allowable limit, replace output shaft.
- Install new seal rings to bearing retainer.

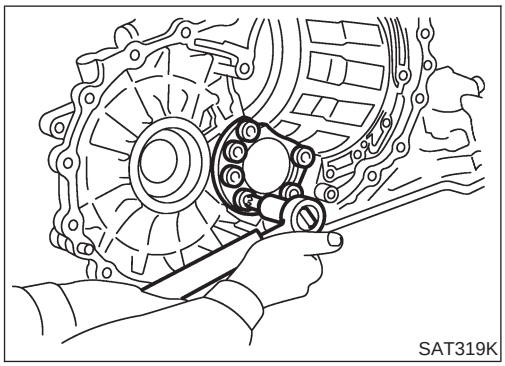
- Measure clearance between seal ring and ring groove of bearing retainer.
  Standard clearance:
  0.10 - 0.30 mm (0.0039 - 0.0118 in)
  Allowable limit:
  0.30 mm (0.0118 in)
- If not within allowable limit, replace bearing retainer.

ASSEMBLY

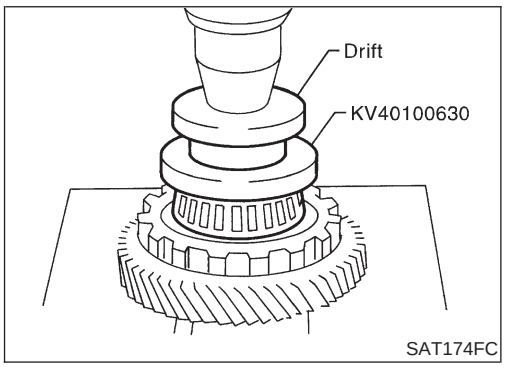
NFAT0412



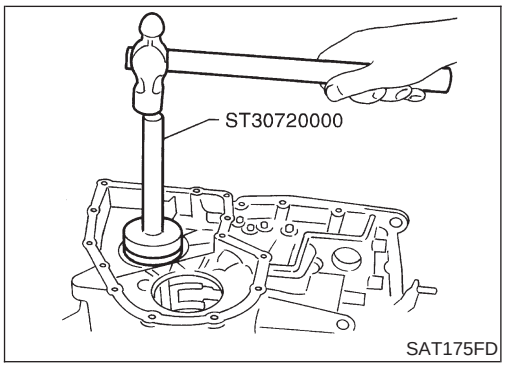
1. Press reduction pinion gear bearing inner race on reduction pinion gear.



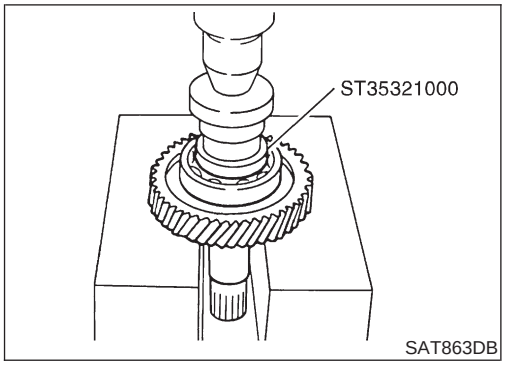
2. Install reduction pinion gear bearing outer race on transmission case.
   : 109 - 123 N·m (11.1 - 12.5 kg-m, 80 - 90 ft-lb)



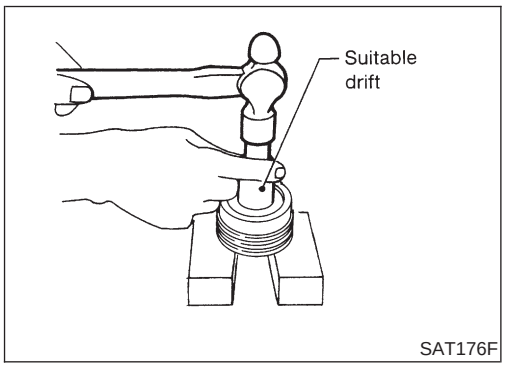
3. Press idler gear bearing inner race on idler gear.



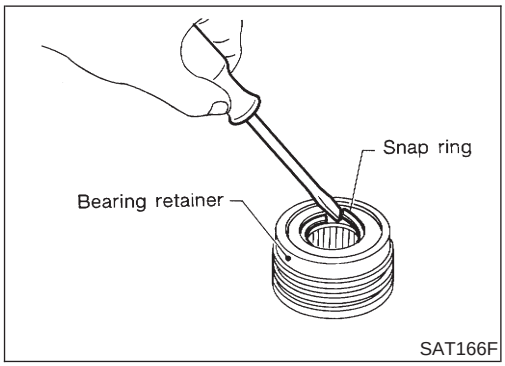
4. Install idler gear bearing outer race on transmission case.



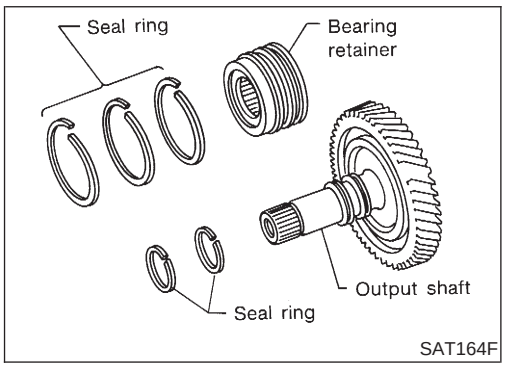
5. Press output shaft bearing on output shaft.



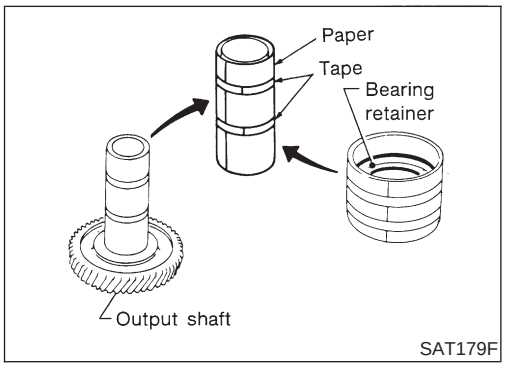
6. Press needle bearing on bearing retainer.



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.

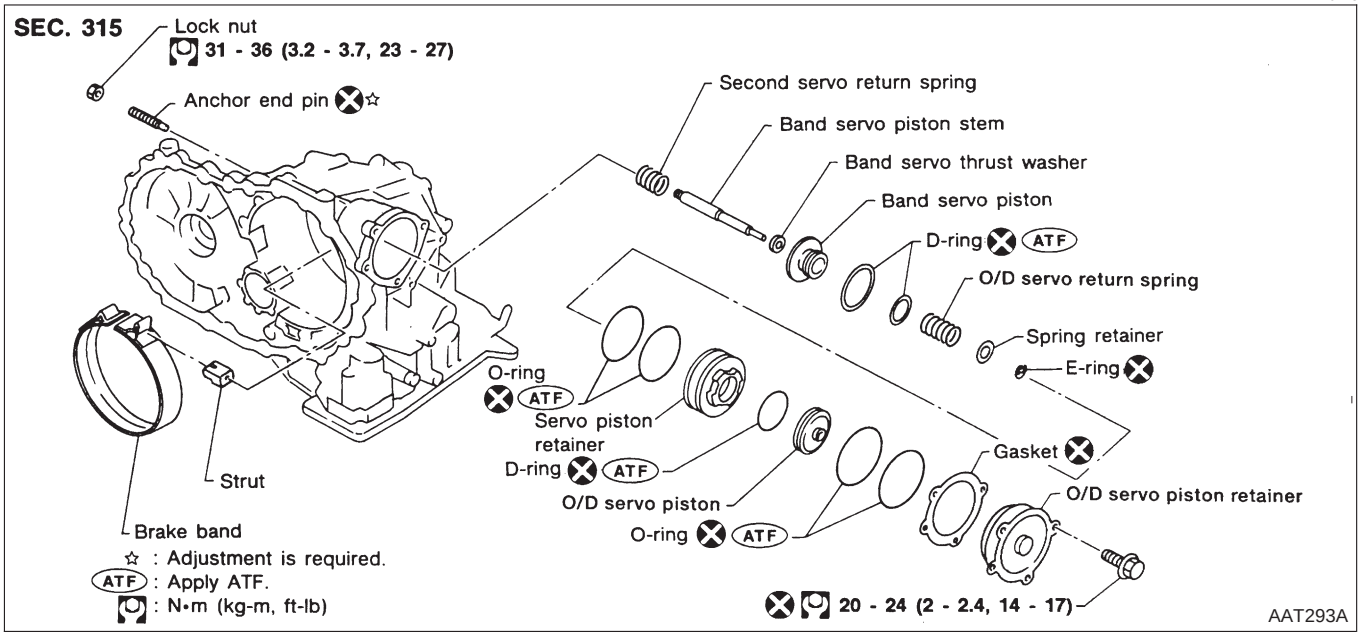


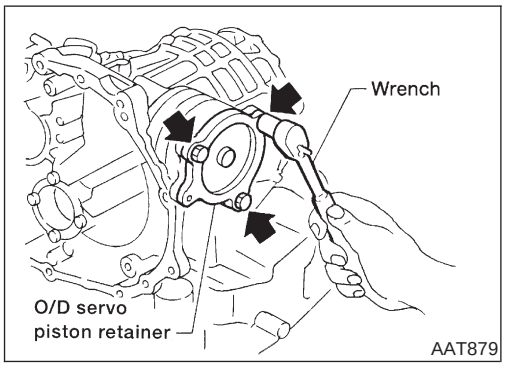
- **Roll paper around seal rings to prevent seal rings from spreading.**

Band Servo Piston Assembly

COMPONENTS

NFAT0413

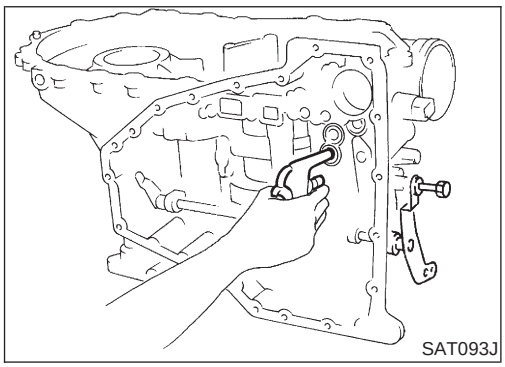




DISASSEMBLY

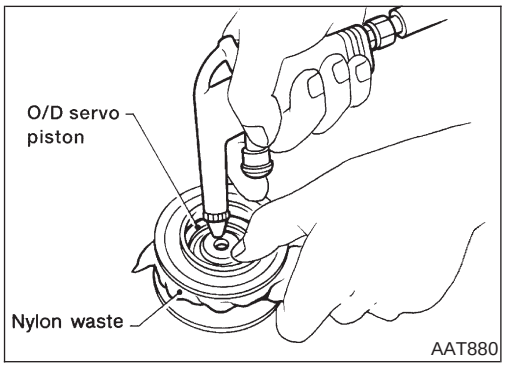
NFAT0414

1. Remove band servo piston fixing bolts.



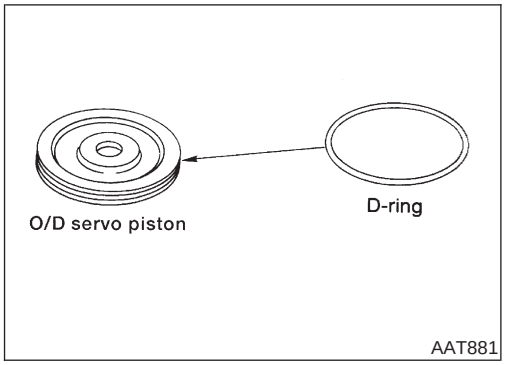
2. Apply compressed air to oil hole in transmission case to remove O/D servo piston retainer and band servo piston assembly.

- **Hold band servo piston assembly with a rag or nylon waste.**

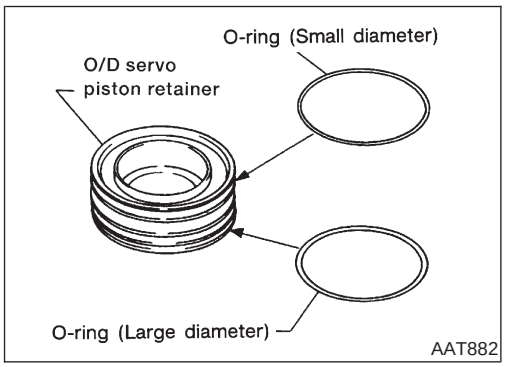


3. Apply compressed air to oil hole in O/D servo piston retainer to remove O/D servo piston from retainer.

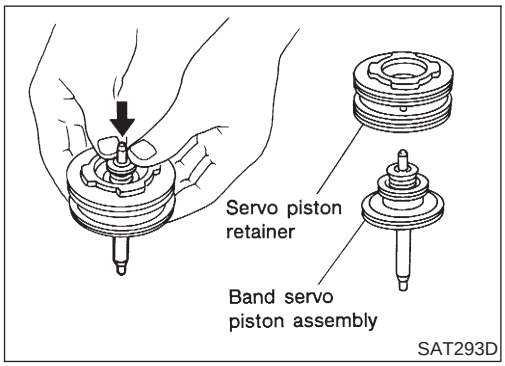
- **Hold O/D band servo piston while applying compressed air.**



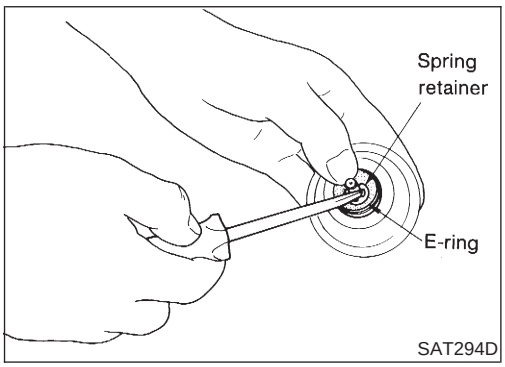
4. Remove D-ring from O/D servo piston.



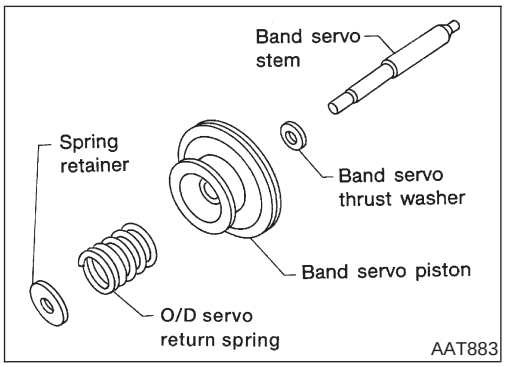
5. Remove O-rings from O/D servo piston retainer.



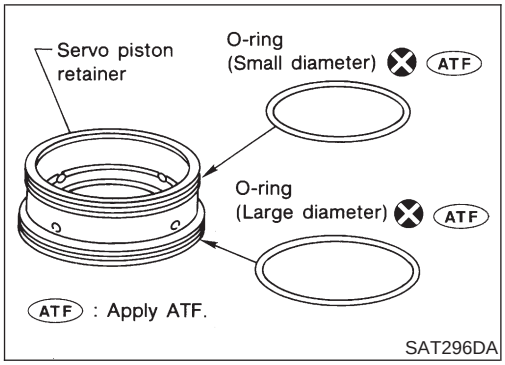
6. Remove band servo piston assembly from servo piston retainer by pushing it forward.



7. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.

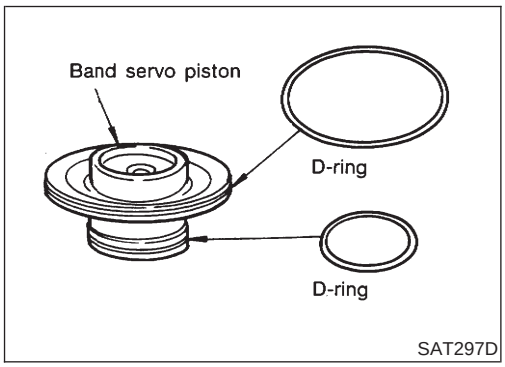


8. Remove O/D servo return spring, band servo thrust washer and band servo piston stem from band servo piston.



SAT296DA

9. Remove O-rings from servo piston retainer.



SAT297D

10. Remove D-rings from band servo piston.

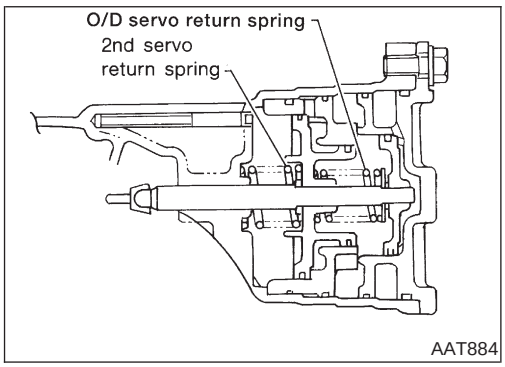
INSPECTION

NFAT0415

Pistons, Retainers and Piston Stem

NFAT0415S01

- Check frictional surfaces for abnormal wear or damage.



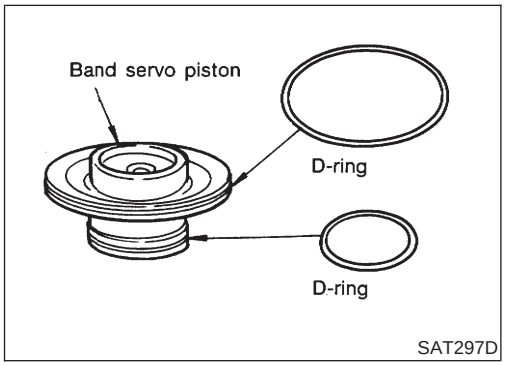
AAT884

Return Springs

NFAT0415S02

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

Inspection standard:
Refer to SDS, AT-458.



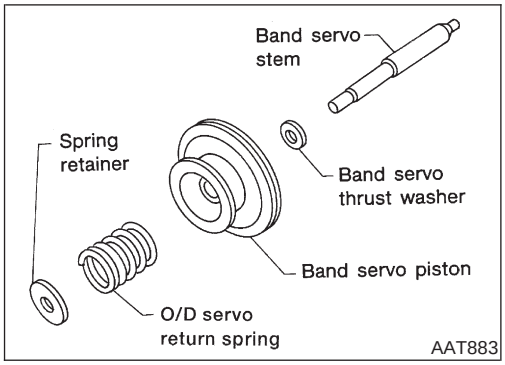
SAT297D

ASSEMBLY

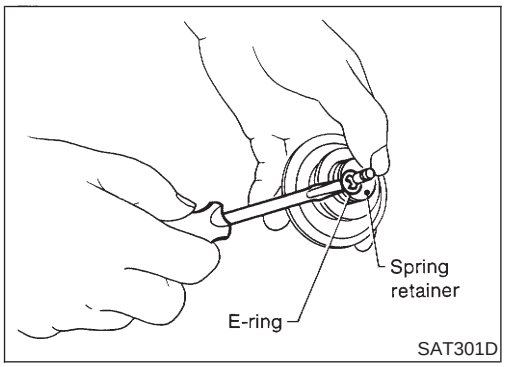
NFAT0416

1. Install D-rings to servo piston retainer.

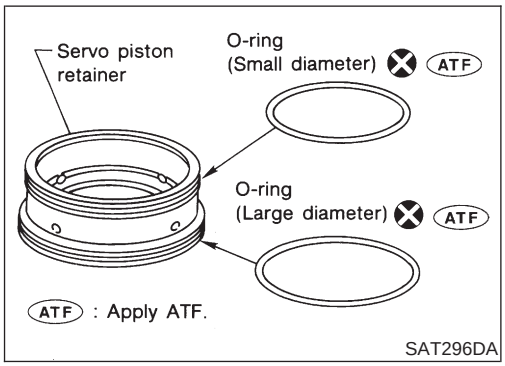
- **Apply ATF to D-rings.**
- **Pay attention to position of each O-ring.**



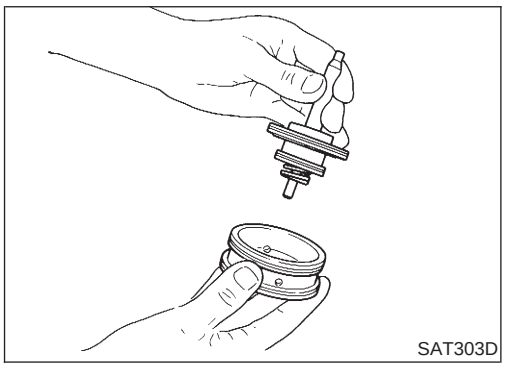
2. Install band servo piston stem, band servo thrust washer, O/D servo return spring and spring retainer to band servo piston.



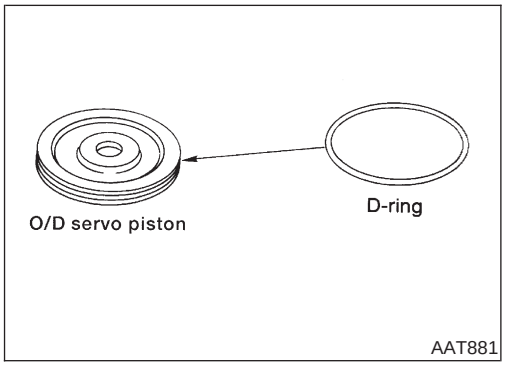
3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.



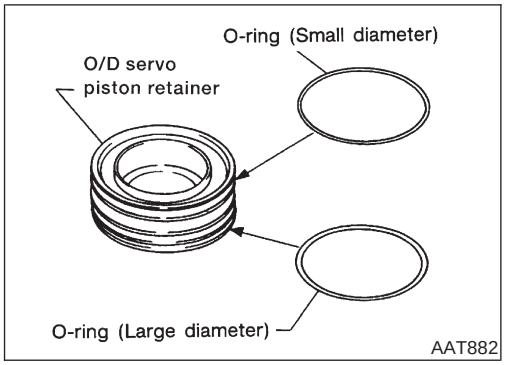
4. Install O-rings to servo piston retainer.
- **Apply ATF to O-rings.**
- **Pay attention to position of each O-ring.**



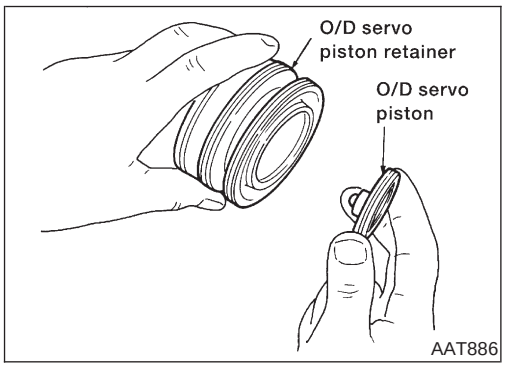
5. Install band servo piston assembly to servo piston retainer by pushing it inward.



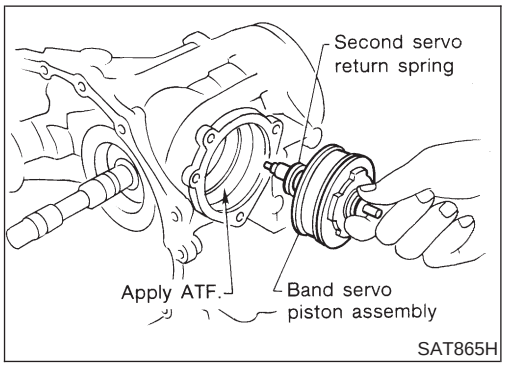
6. Install D-ring to O/D servo piston.
- **Apply ATF to D-ring.**



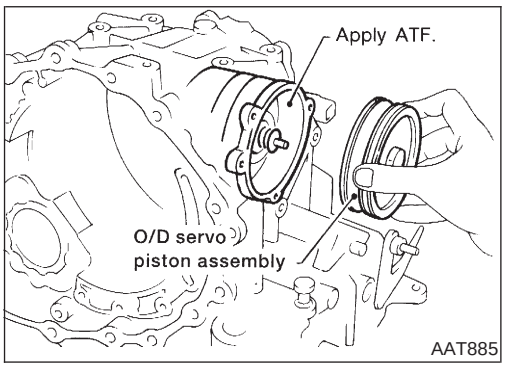
7. Install O-rings to O/D servo piston retainer.
- **Apply ATF to O-rings.**
- **Pay attention to position of each O-ring.**



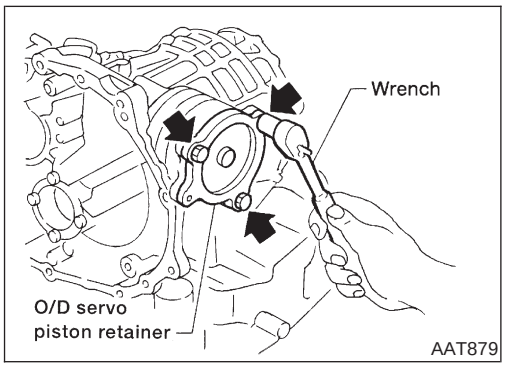
8. Install O/D servo piston to O/D servo piston retainer.



9. Install band servo piston assembly and 2nd servo return spring to transmission case.
- **Apply ATF to O-ring of band servo piston and transmission case.**



10. Install O/D servo piston assembly to transmission case.
- **Apply ATF to O-ring of band servo piston and transmission case.**

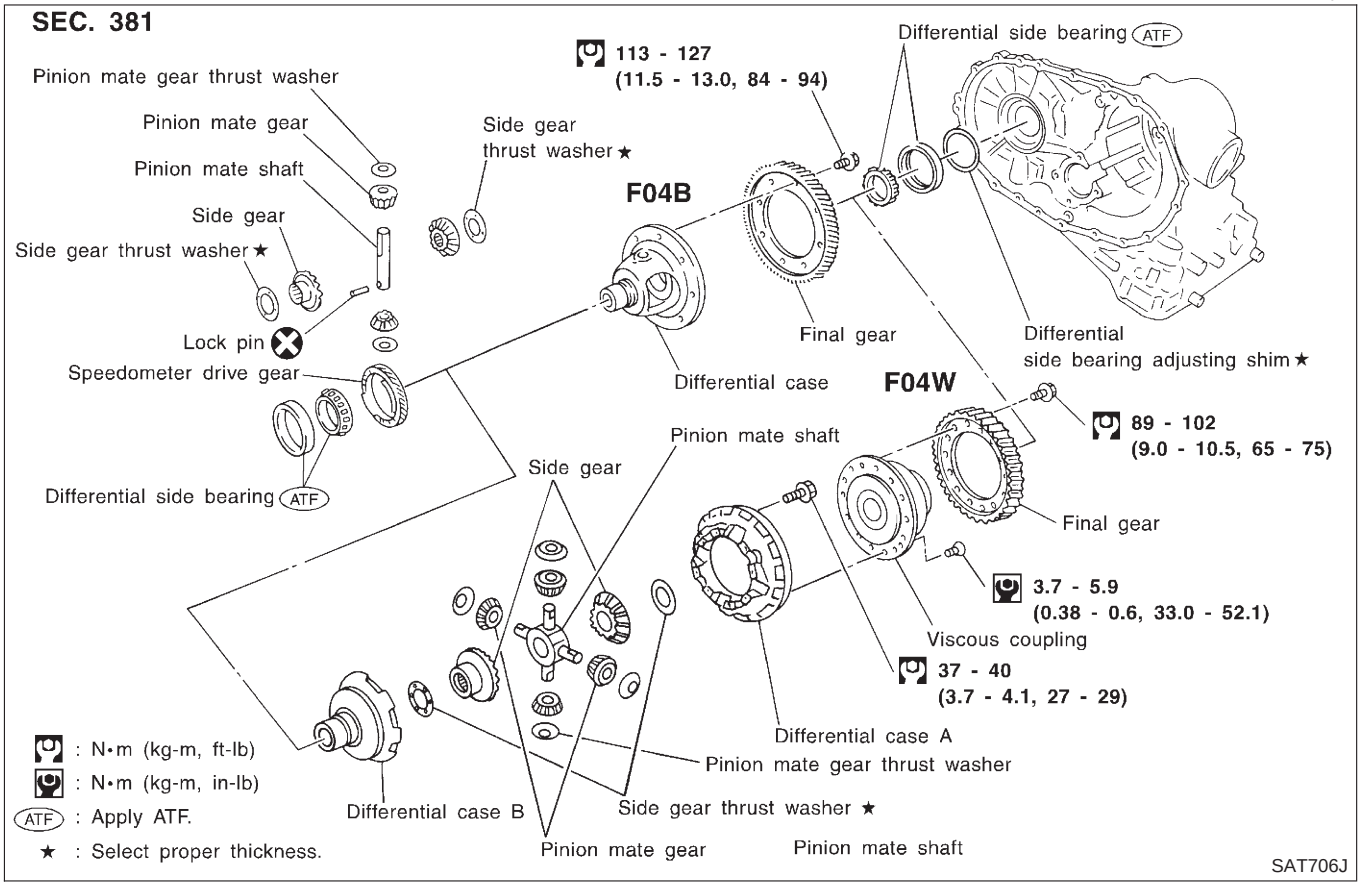


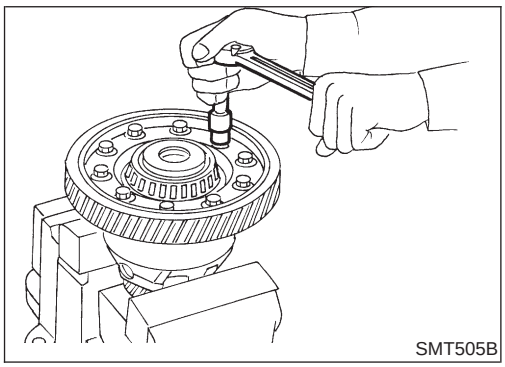
11. Install O/D servo piston retainer to transmission case. Refer to AT-418.

Final Drive

COMPONENTS

NFAT0417

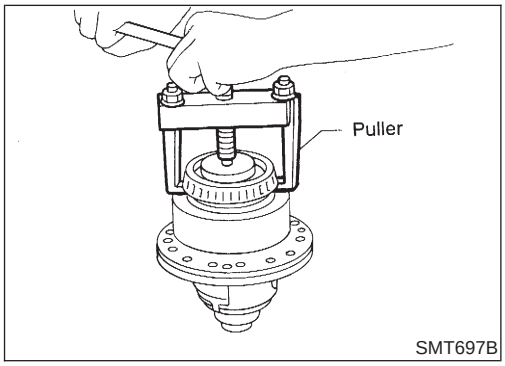




DISASSEMBLY

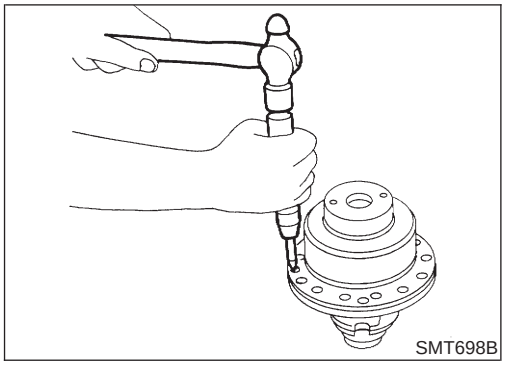
NFAT0418

1. Remove final gear.

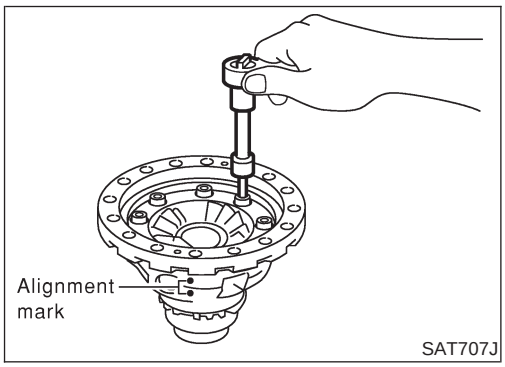


2. Press out differential side bearings.

- **Be careful not to mix up the right and left bearings.**

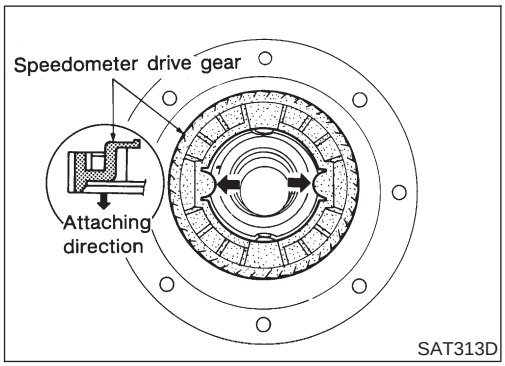

SMT698B

3. Remove viscous coupling — RE4F04W.
a. Remove viscous coupling.



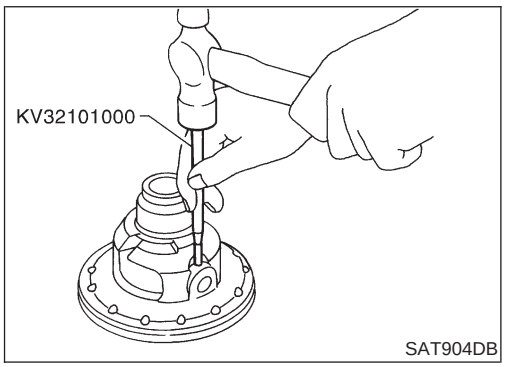
SAT707J

b. Make alignment marks with paint on differential cases A and B.
c. Remove the bolts holding the differential cases, and remove the pinion mate gears and side gears.



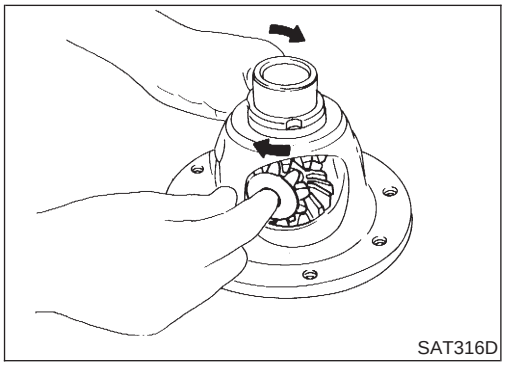
SAT313D

4. Remove speedometer drive gear.

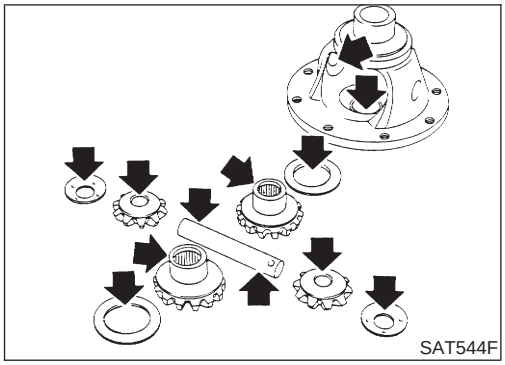


SAT904DB

5. Drive out pinion mate shaft lock pin.


SAT316D

6. Draw out pinion mate shaft lock pin.
7. Remove pinion mate gears and side gears.


SAT544F

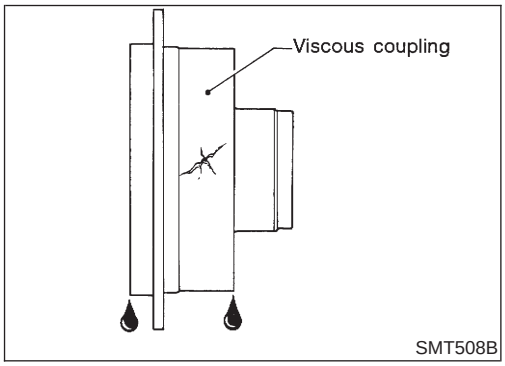
INSPECTION

NFAT0419

Gear, Washer, Shaft and Case

NFAT0419S01

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.

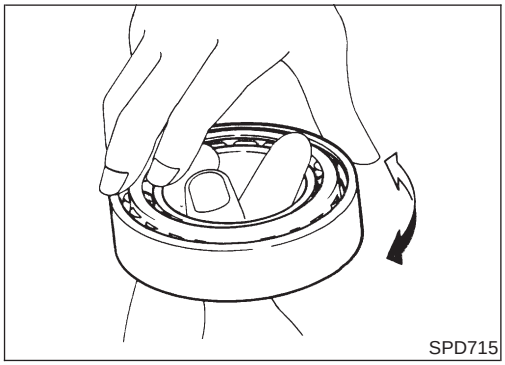


SMT508B

Viscous Coupling — RE4F04W

NFAT0419S02

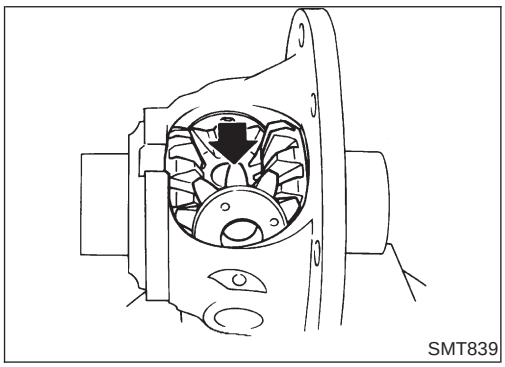
- Check case for cracks.
- Check silicone oil for leakage.


SPD715

Bearings

NFAT0419S03

- 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.**

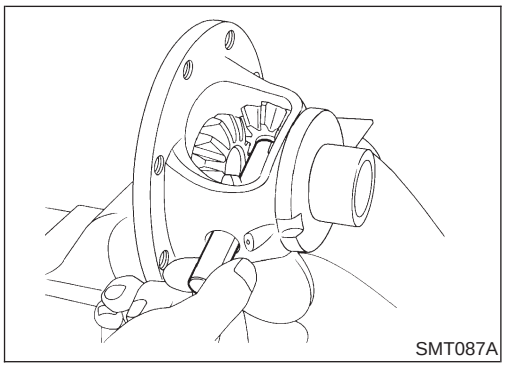

SMT839

ASSEMBLY

NFAT0420

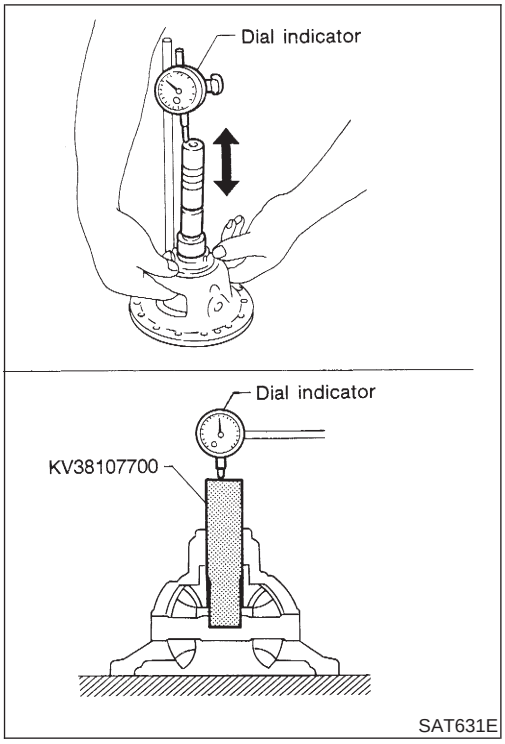
1. Attach side gear thrust washers to side gears, then install pinion mate thrust washers and pinion mate gears in place.

- **Apply ATF to any parts.**


SMT087A

2. Insert pinion mate shaft.

- **When inserting, be careful not to damage pinion mate thrust washers.**

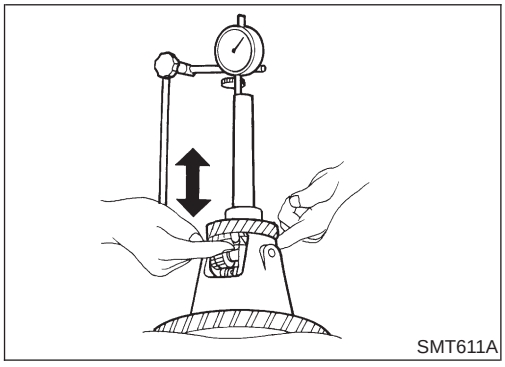


— RE4F04B —

NFAT0420S01

1. Measure clearance between side gear and differential case with washers following the procedure below:

a. Set Tool and dial indicator on side gear.



b. Move side gear up and down to measure dial indicator deflection. Always measure indicator deflection on both side gears.

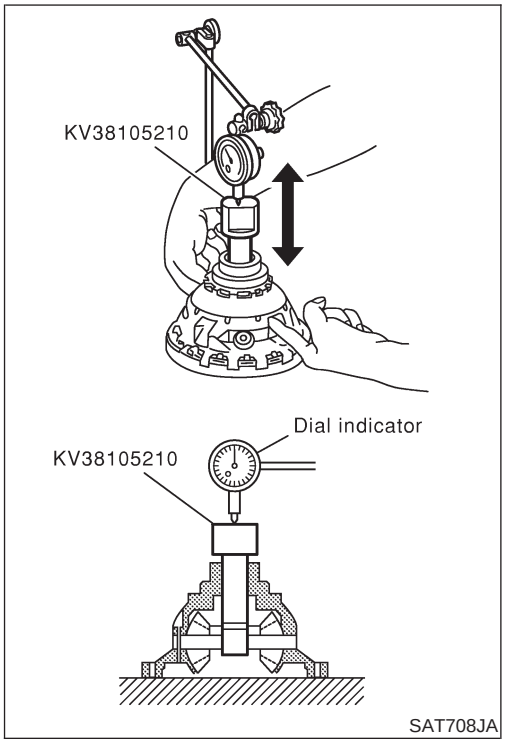
Clearance between side gear and differential case with washer:

0.1 - 0.2 mm (0.004 - 0.008 in)

c. If not within specification, adjust clearance by changing thickness of differential side gear thrust washers.

Differential side gear thrust washers:

Refer to SDS, AT-455.



— RE4F04W —

NFAT0420S02

Differential Case Side

NFAT0420S0201

1. Measure clearance between side gear and differential case & viscous coupling 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.

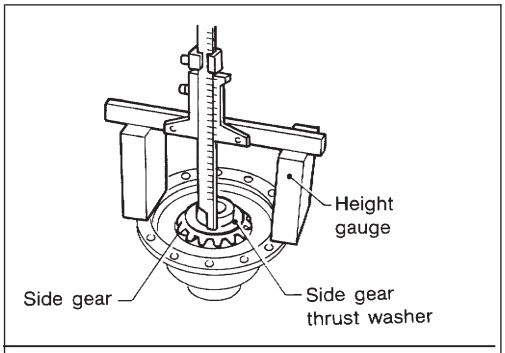
Clearance between side gear and differential case with washers:

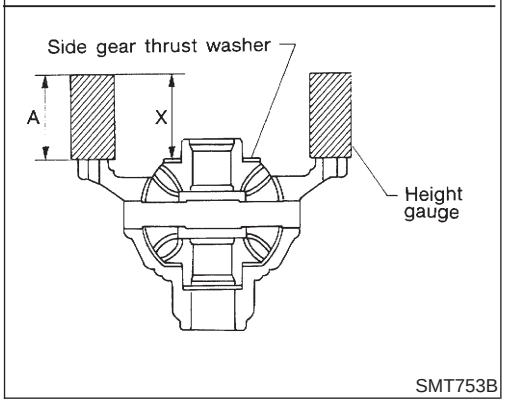
0.1 - 0.2 mm (0.004 - 0.008 in)

c. If not within specification adjust clearance by changing thickness of side gear thrust washer.

Differential side gear thrust washers for differential case side:

Refer to SDS, AT-455.





SMT753B

Viscous Coupling Side

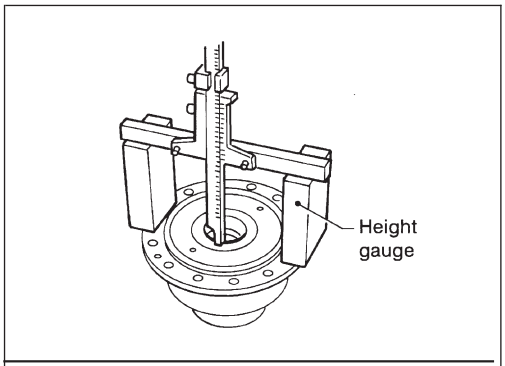
NFAT0420S0202

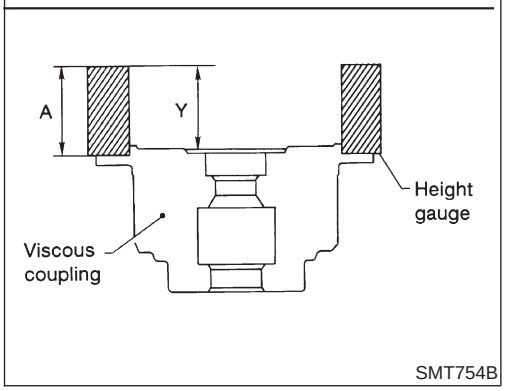
1. Measure clearance between side gear and differential case & viscous coupling with washers using the following procedure:

a. Place side gear and thrust washer on pinion mate gears installed on differential case.

b. Measure dimension X.

- **Measure dimension X in at least two places.**





SMT754B

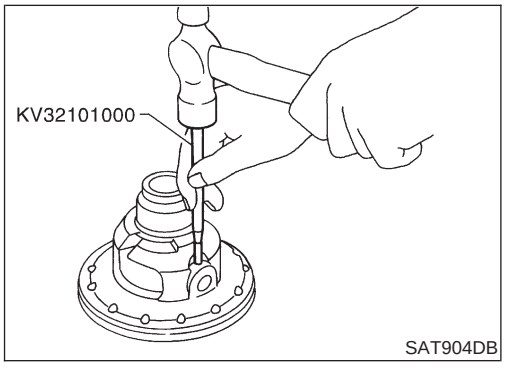
c. Measure dimension Y.

- **Measure dimension Y in at least two places.**

Clearance between side gear and viscous coupling
= X + Y − 2A: 0.1 - 0.2 mm (0.004 - 0.008 in)
A: Height of gauge

d. If not within specification, adjust clearance by changing thickness of side gear thrust washer.

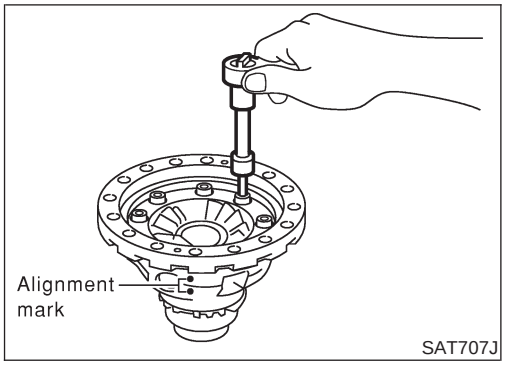
Differential side gear thrust washers for viscous coupling side:
Refer to SDS, AT-455.



SAT904DB

3. Install lock pin.

- **Make sure that lock pin is flush with case.**



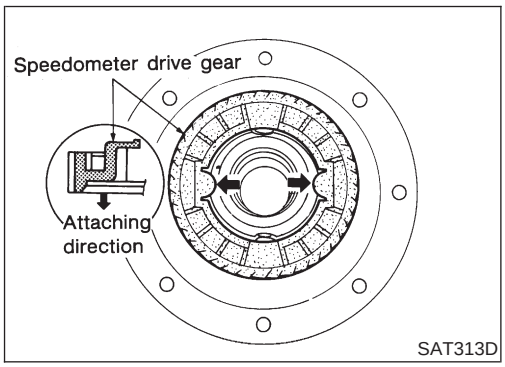
4. Install viscous coupling — RE4F04W.

a. After choosing the side gear washer, tighten down differential cases A and B. Tighten bolts to the specified torque. Refer to AT-423.

CAUTION:

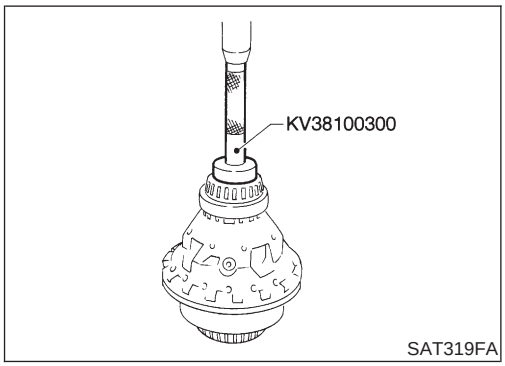
Make sure that A and B alignment marks are positioned correctly.

b. Install viscous coupling.

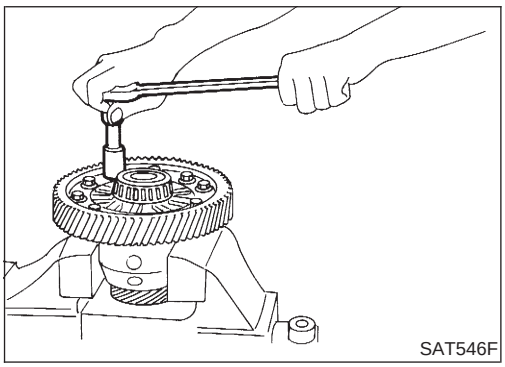


5. Install speedometer drive gear on differential case.

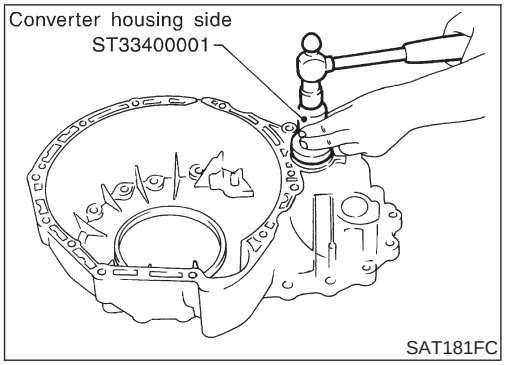
- **Align the projection of speedometer drive gear with the groove of differential case.**



6. Press on differential side bearings.



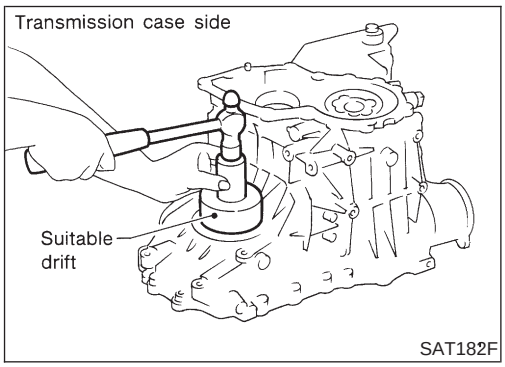
7. Install final gear and tighten fixing bolts in a crisscross pattern. Tighten final gear bolts to the specified torque. Refer to AT-423.

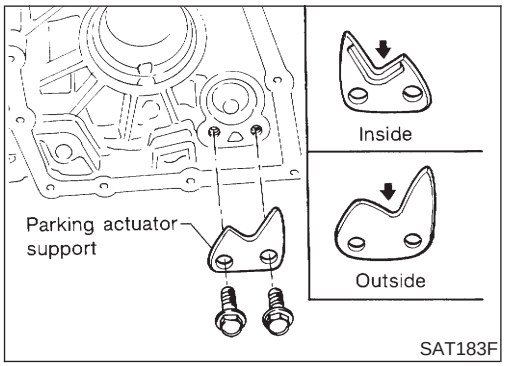


Assembly (1)

NFAT0421

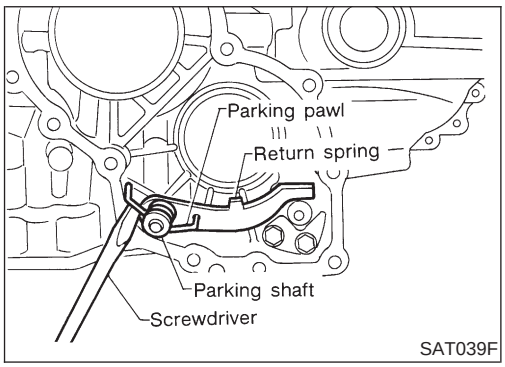
1. Install differential side oil seals on transmission case and converter housing.



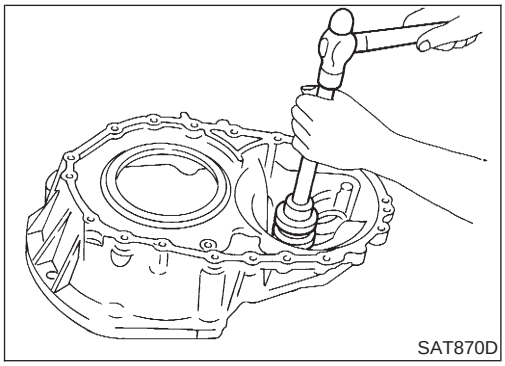


2. Install parking actuator support to transmission case. Tighten parking actuator support bolts to the specified torque. Refer to AT-352.

- **Pay attention to direction of parking actuator support.**



3. Install parking pawl on transmission case and fix it with parking shaft.
4. Install return spring.



Adjustment (1)

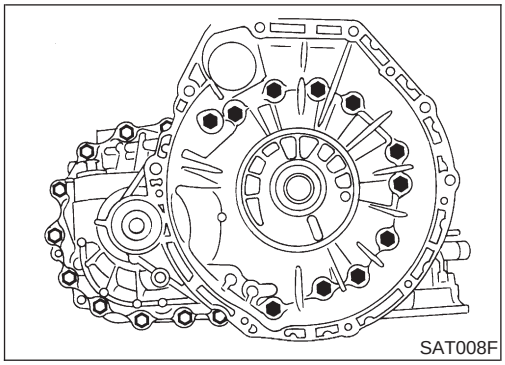
NFAT0422

DIFFERENTIAL SIDE BEARING PRELOAD

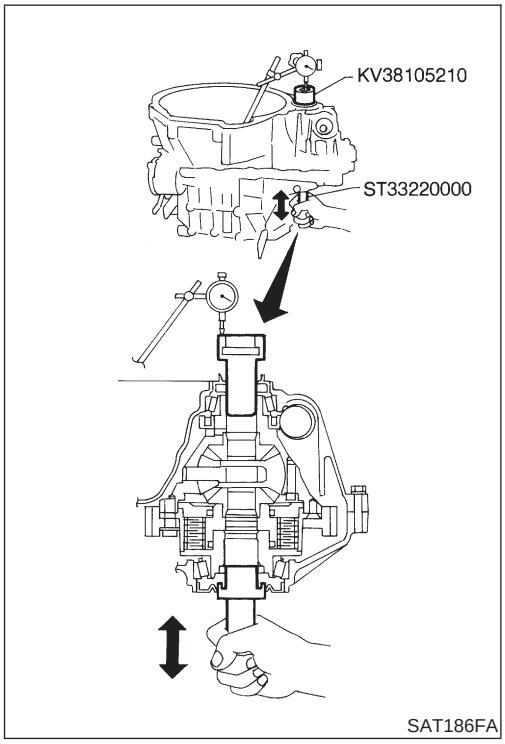
NFAT0422S01

1. Install differential side bearing outer race without adjusting shim on transmission case.
2. Install differential side bearing outer race on converter housing.

Adjustment (1) (Cont'd)

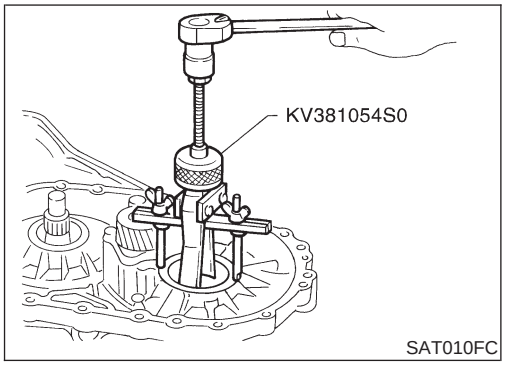

SAT008F

3. Place final drive assembly on transmission case.
4. Install transmission case on converter housing. Tighten transmission case fixing bolts to the specified torque. Refer to AT-352.



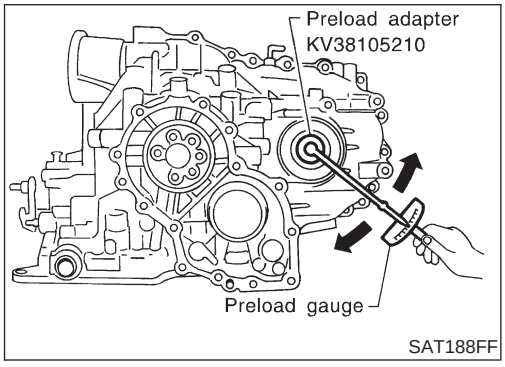
SAT186FA

5. Attach dial indicator on differential case at converter housing side.
6. Insert Tool into differential side gear from transmission case side.
7. Move Tool up and down and measure dial indicator deflection.
8. Select proper thickness of differential side bearing adjusting shim(s).
   Suitable shim thickness = Dial indicator deflection + Specified bearing preload
   Differential side bearing preload adjusting shim:
   Refer to SDS, AT-456.
   Bearing preload:
   0.05 - 0.09 mm (0.0020 - 0.0035 in)



SAT010FC

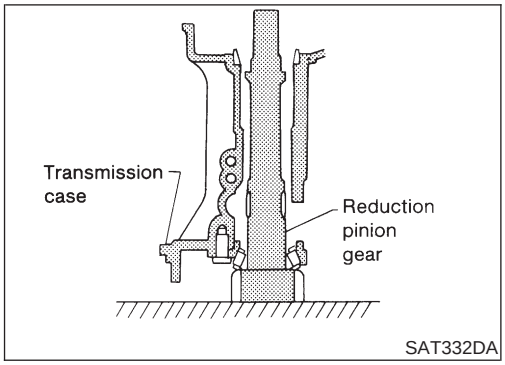
9. Remove converter housing from transmission case.
10. Remove final drive assembly from transmission case.
11. Remove differential side bearing outer race from transmission case.
12. Reinstall differential side bearing outer race and shim(s) selected from SDS table on transmission case.
13. Reinstall converter housing on transmission case and tighten transmission case fixing bolts to the specified torque. Refer to AT-352.



SAT188FF

14. Insert Tool and measure turning torque of final drive assembly.

- **Turn final drive assembly in both directions several times to seat bearing rollers correctly.**
  Turning torque of final drive assembly (New bearing):
  0.78 - 1.37 N·m (8.0 - 14.0 kg-cm, 6.9 - 12.2 in-lb)
- **When old bearing is used again, turning torque will be slightly less than the above.**
- **Make sure torque is close to the specified range.**
  Preload adapter:
  RE4F04B-KV38107700
  RE4F04W-KV38105210



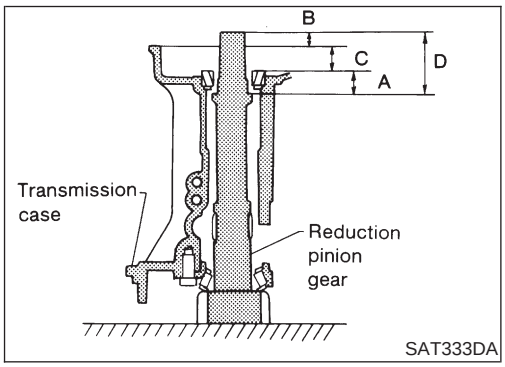
SAT332DA

REDUCTION PINION GEAR BEARING PRELOAD

NFAT0422S02

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.



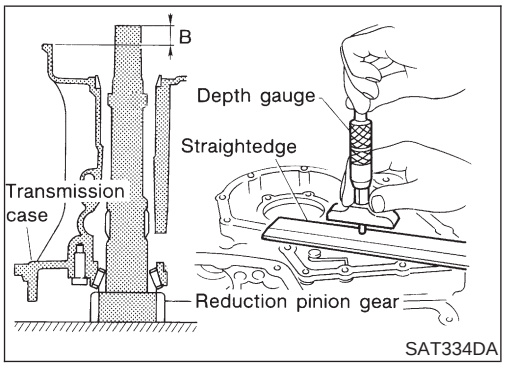
SAT333DA

b. Place idler gear bearing on transmission case.

c. Measure dimensions "B" "C" and "D" and calculate dimension "A".

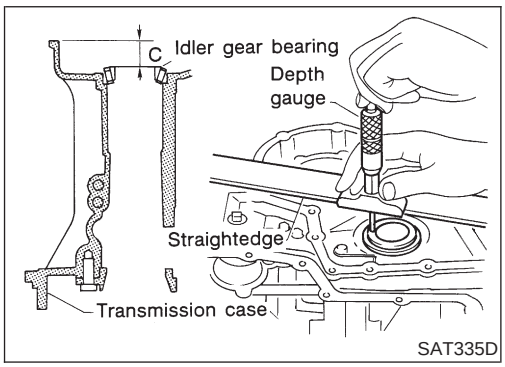
A = D − (B + C)

"A": Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.



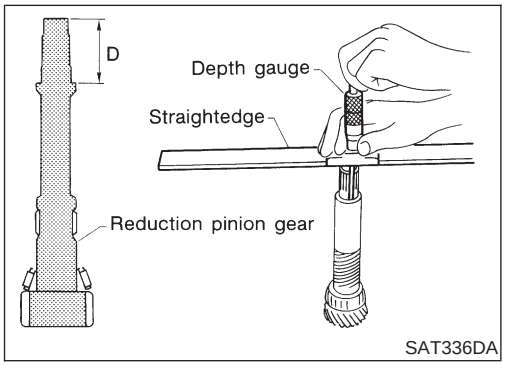
SAT334DA

- Measure dimension "B" between the end of reduction pinion gear and the surface of transmission case.
- **Measure dimension "B" in at least two places.**



SAT335D

- 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.**

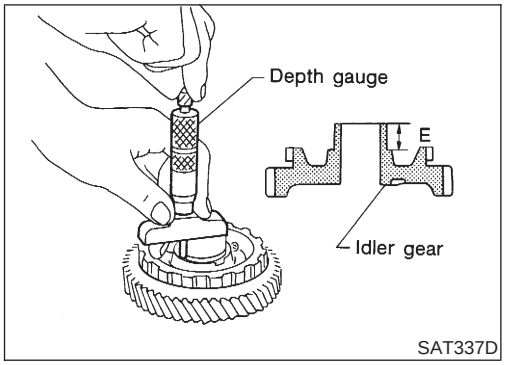


SAT336DA

- 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)

Adjustment (1) (Cont'd)

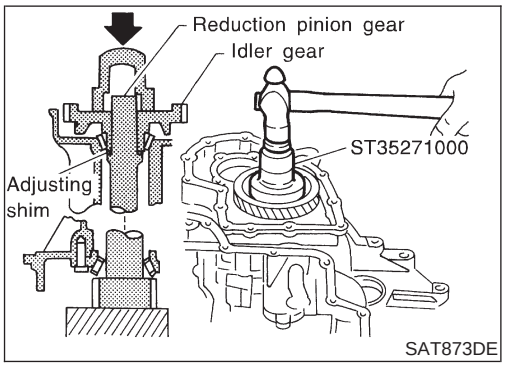


d. Measure dimension "E" between the end of idler gear and the idler gear bearing inner race mating surface of idler gear.

- **Measure dimension "E" in at least two places.**

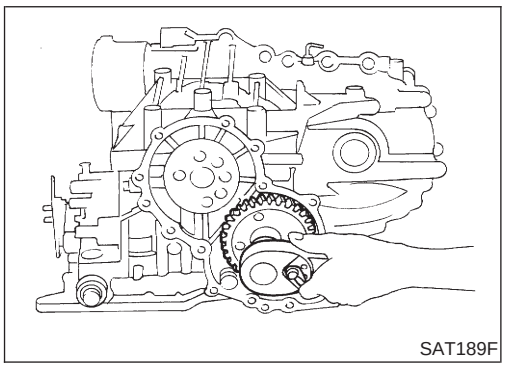
e. Select proper thickness of reduction pinion gear bearing adjusting shim.

Proper shim thickness = A − E − 0.05 mm (0.0020 in)*
(* ... Bearing preload)
Reduction pinion gear bearing adjusting shim:
Refer to SDS, AT-457.



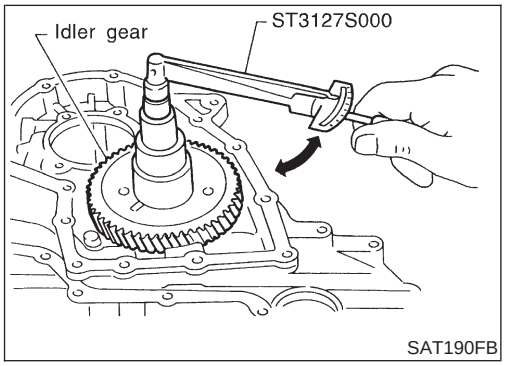
3. Install reduction gear and reduction gear bearing adjusting shim selected in step 2-e on transmission case.
4. Press idler gear bearing inner race on idler gear.
5. Press idler gear on reduction gear.

- **Press idler gear until idler gear fully contacts adjusting shim.**



6. Tighten idler gear lock nut to the specified torque. Refer to AT-352.

- **Lock idler gear with parking pawl when tightening lock nut.**

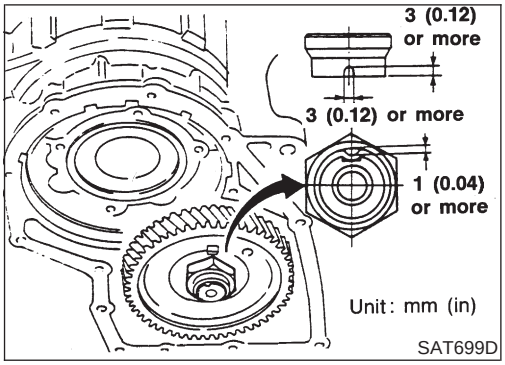


7. Measure turning torque of reduction pinion gear.

- **When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.**

Turning torque of reduction pinion gear:
0.05 - 0.39 N·m (0.5 - 4.0 kg-cm, 0.43 - 3.47 in-lb)

- **If turning torque is out of specification, decrease or increase thickness of reduction pinion gear bearing adjusting shim.**



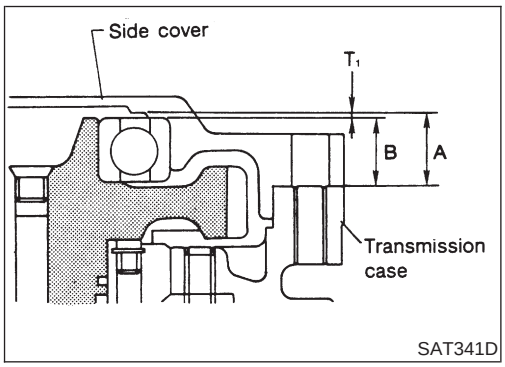
SAT699D

8. After properly adjusting turning torque, clinch idler gear lock nut as shown.

OUTPUT SHAFT END PLAY

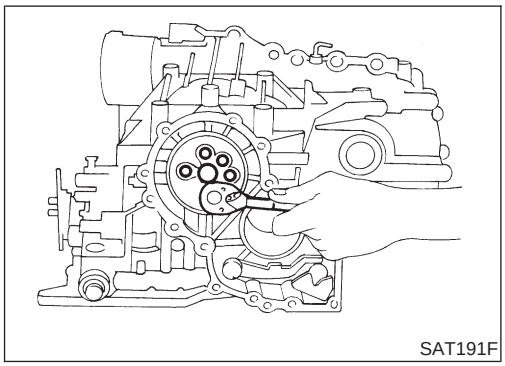
NFAT0422S03

- 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.

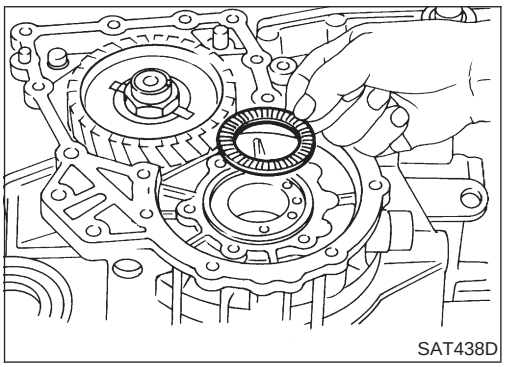


SAT341D

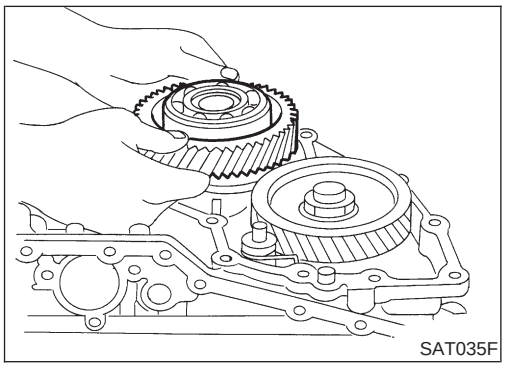
1. Install bearing retainer for output shaft.


SAT191F

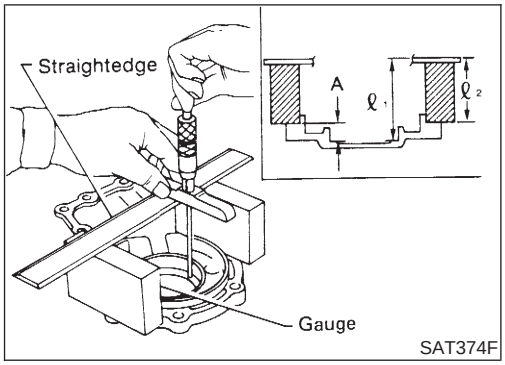
2. Install output shaft thrust needle bearing on bearing retainer.


SAT438D

3. Install output shaft on transmission case.


SAT035F

Adjustment (1) (Cont'd)



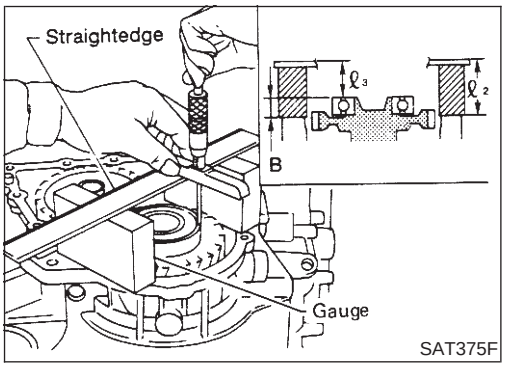
4. Measure dimensions "ℓ_1" and "ℓ_2" at side cover and then calculate dimension "A".

- **Measure dimension "ℓ_1" and "ℓ_2" in at least two places.**

"A": Distance between transmission case fitting surface and adjusting shim mating surface.

$A = \ell_1 - \ell_2$

ℓ_2: Height of gauge



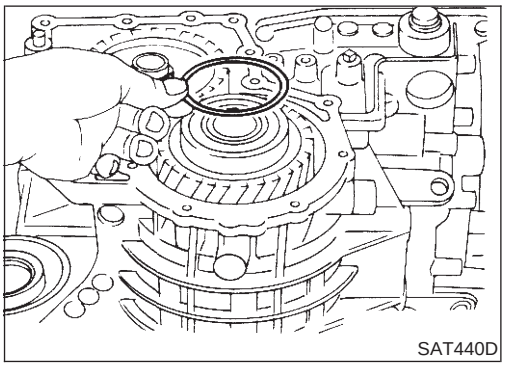
5. Measure dimensions "ℓ_2" and "ℓ_3" and then calculate dimension "B".

- **Measure "ℓ_2" and "ℓ_3" in at least two places.**

"B": Distance between the end of output shaft bearing outer race and the side cover fitting surface of transmission case.

$B = \ell_2 - \ell_3$

ℓ_2: Height of gauge



6. Select proper thickness of adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications.

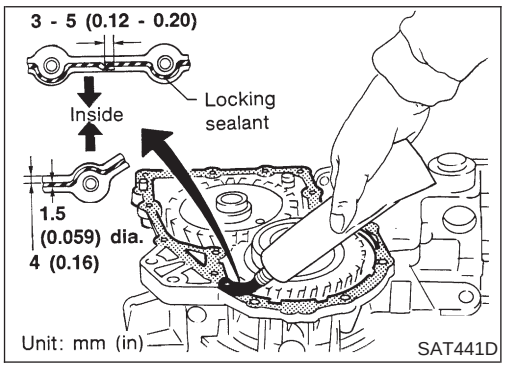
Output shaft end play (A − B):

0 - 0.15 mm (0 - 0.0059 in)

Output shaft adjusting shims:

Refer to SDS, AT-459.

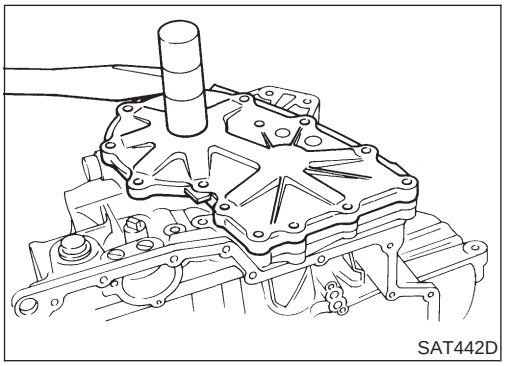
7. Install adjusting shim on output shaft bearing.



Assembly (2)

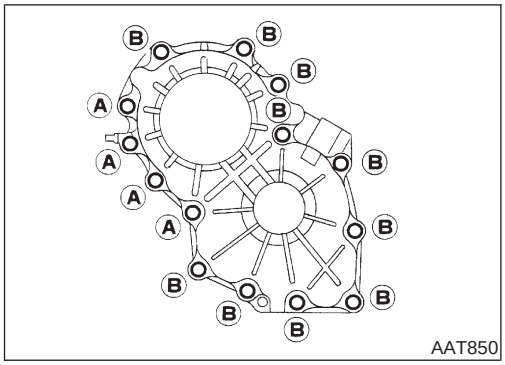
NFAT0423

1. Apply locking sealant (Loctite #518) to transmission case as shown in illustration.

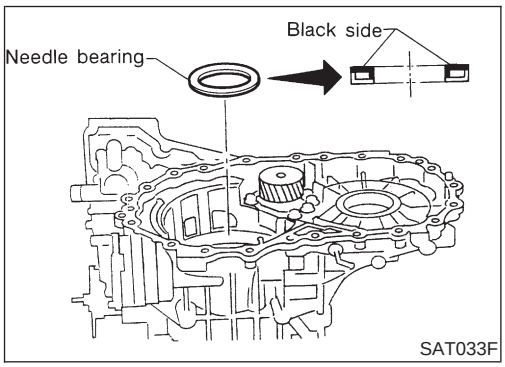


2. Set side cover on transmission case.

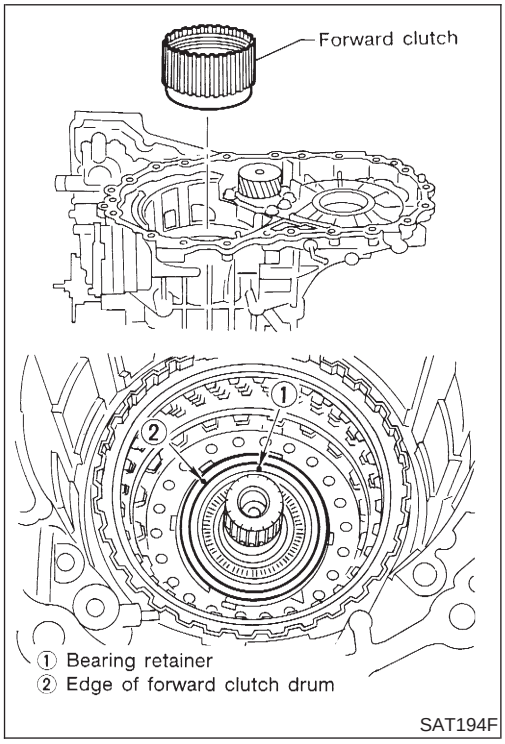
- **Apply locking sealant to the mating surface of transmission case.**



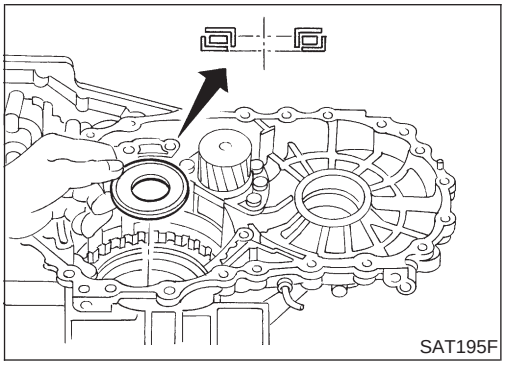
3. Tighten side cover fixing bolts to specified torque. Refer to AT-352.
- **Do not mix bolts A and B.**
- **Always replace bolts A as they are self-sealing bolts.**



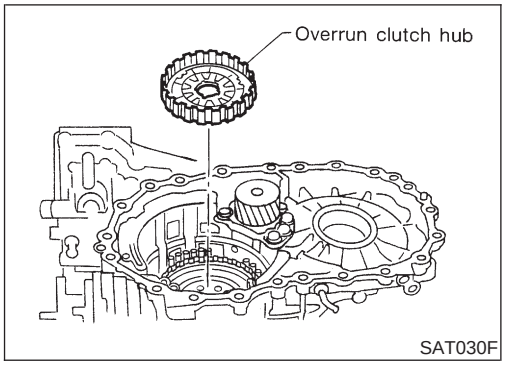
4. Remove paper rolled around bearing retainer.
5. Install thrust washer on bearing retainer.
- **Apply petroleum jelly to thrust washer.**



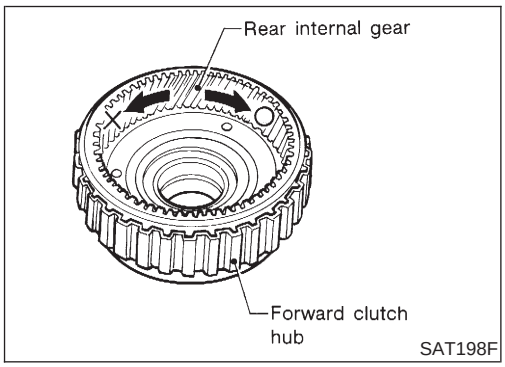
6. Install forward clutch assembly.
- **Align teeth of low & reverse brake drive plates before installing.**
- **Make sure that bearing retainer seal rings are not spread.**
- **If forward clutch assembly is correctly seated, points 1 and 2 are at almost same level.**



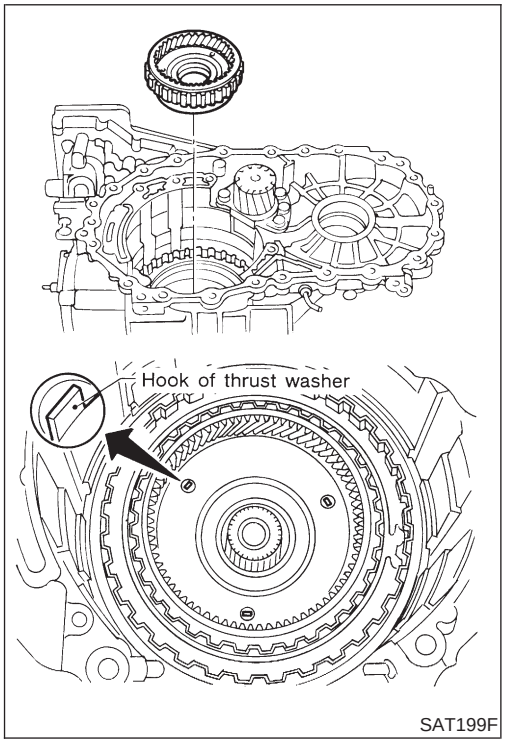
7. Install thrust needle bearing on bearing retainer.
- **Apply petroleum jelly to thrust needle bearing.**
- **Pay attention to direction of thrust needle bearing.**



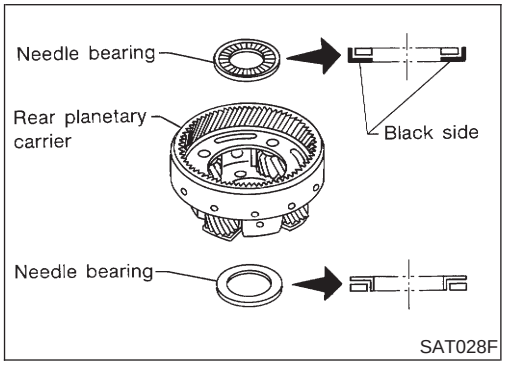
8. Install overrun clutch hub.
- **Apply petroleum jelly to thrust washers.**
- **Align teeth of overrun clutch drive plates before installing.**



9. Hold forward clutch hub and turn rear internal gear.
   Check overrun clutch hub for correct directions of lock and unlock.
- **If not shown as illustrated, check installed direction of forward one-way clutch.**

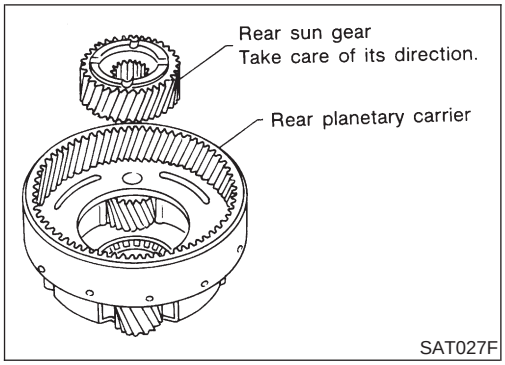


10. Install forward clutch hub and rear internal gear assembly.
- **Align teeth of forward clutch drive plates before installing.**
- **Check that three hooks of thrust washer are correctly aligned after installing.**



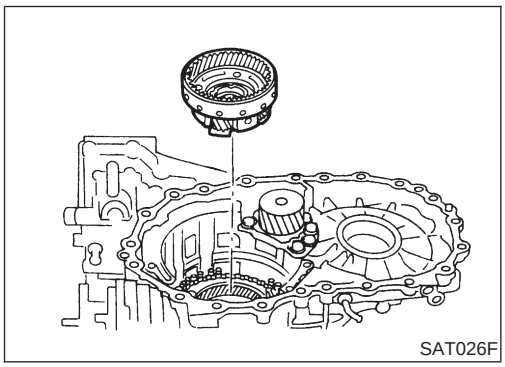
11. Install rear planetary carrier assembly and rear sun gear according to the following procedures.

a. Install needle bearings on rear planetary carrier.
- **Apply petroleum jelly to needle bearings.**
- **Pay attention to direction of needle bearings.**

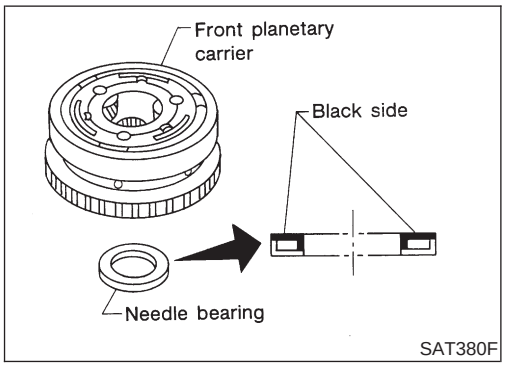


b. Install rear sun gear on rear planetary carrier.

- **Pay attention to direction of rear sun gear.**

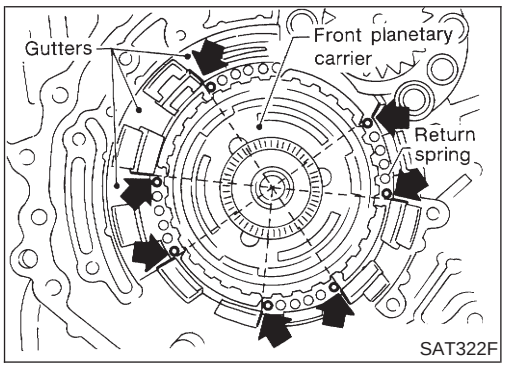


c. Install rear planetary carrier on transmission case.



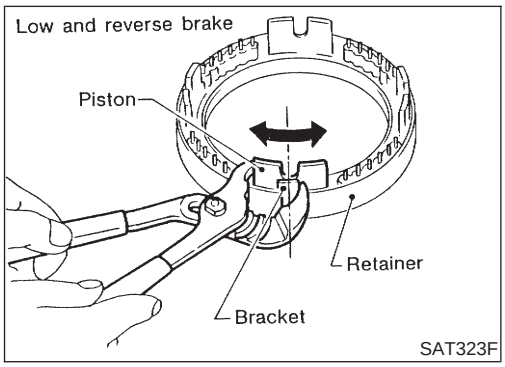
12. Install thrust needle bearing on front planetary carrier, then install them together on transmission case.

- **Apply petroleum jelly to thrust needle bearing.**
- **Pay attention to direction of thrust needle bearing.**

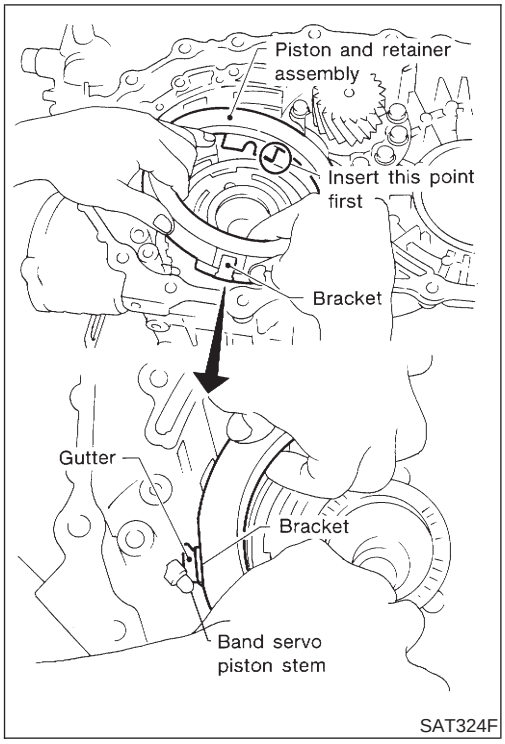


13. Install low and reverse brake piston according to the following procedures.

a. Set and align return springs to transmission case gutters as shown in illustration.

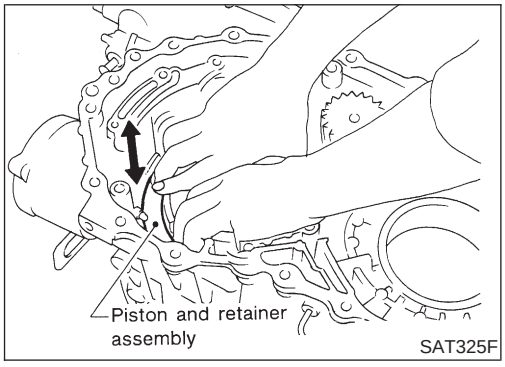


b. Set and align piston with retainer.



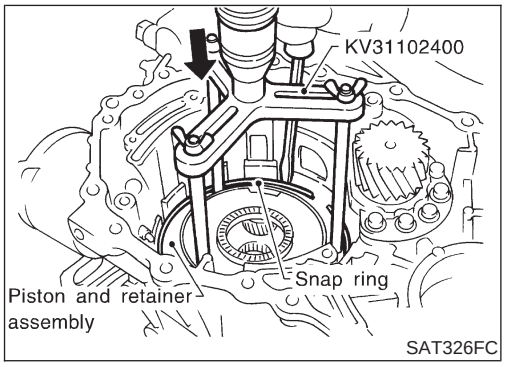
c. Install piston and retainer assembly on the transmission case.

- **Align bracket to specified gutter as indicated in illustration.**

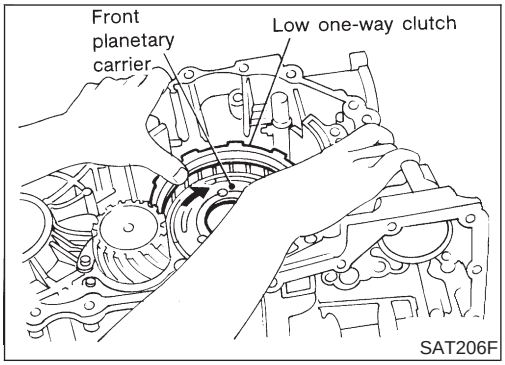


d. Check that each protrusion of piston is correctly set to corresponding return spring as follows.

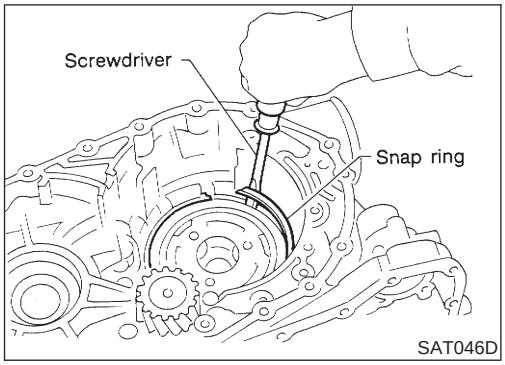
- **Push piston and retainer assembly evenly and confirm they move smoothly.**
- **If they can not move smoothly, remove piston and retainer assembly and align return spring correctly as instructed in step "a".**



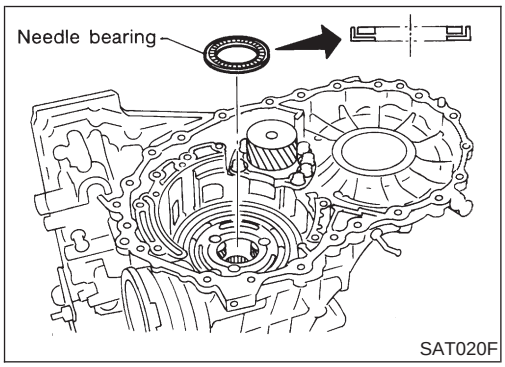
e. Push down piston and retainer assembly and install snap ring.



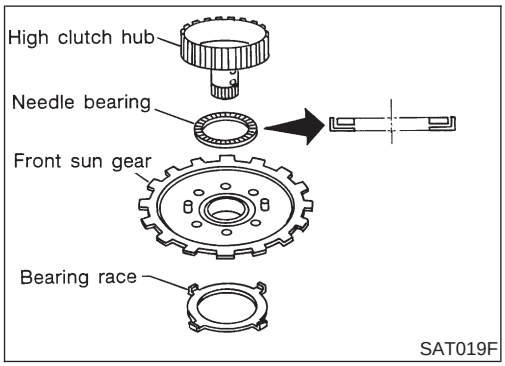
14. Install low one-way clutch to front planetary carrier by turning carrier in the direction of the arrow shown.



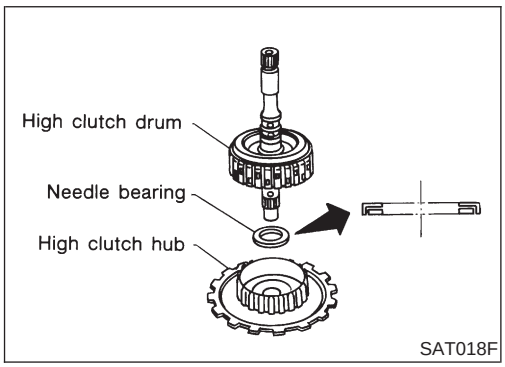
15. Install snap ring with screwdriver.
- **Forward clutch and bearing must be correctly installed for snap ring to fit into groove of transmission case.**



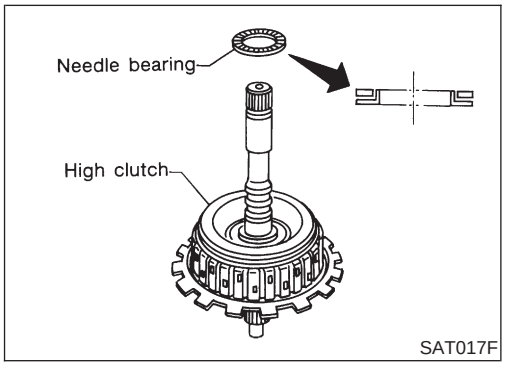
16. Install needle bearing on transmission case.
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**



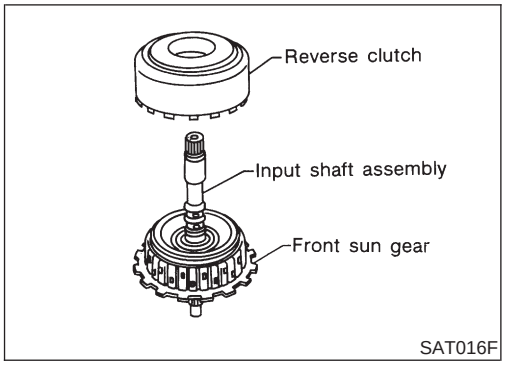
17. Install bearing race, needle bearing and high clutch hub on front sun gear.
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**



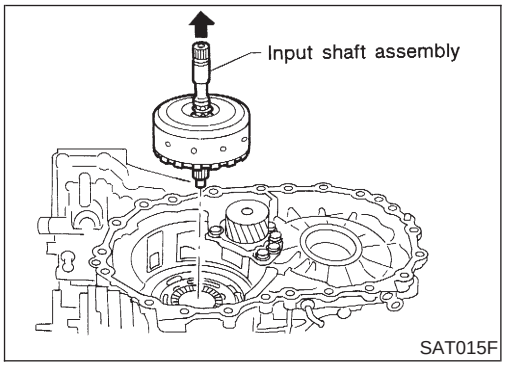
18. Install needle bearing and high clutch drum on high clutch hub.



19. Install needle bearing on high clutch drum.
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**



20. Remove paper rolled around input shaft.
21. Install input shaft assembly in reverse clutch.
- **Align teeth of reverse clutch drive plates before installing.**



22. Install reverse clutch assembly on transmission case.
- **Align teeth of high clutch drive plates before installing.**

Adjustment (2)

NFAT0424

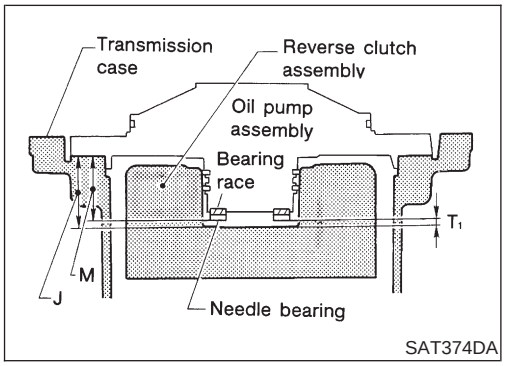
When any parts listed below are replaced, adjust total end play and reverse clutch end play.

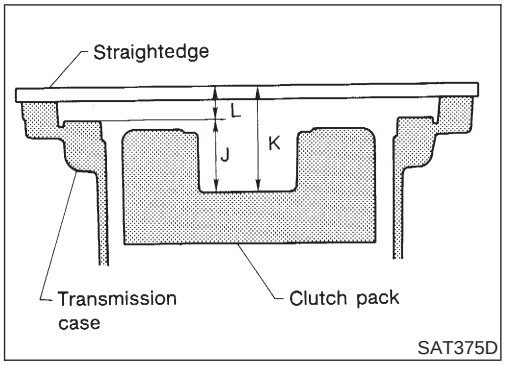
Part name	Total end play	Reverse clutch end play
Transmission case	●	●
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
High clutch drum	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●

TOTAL END PLAY

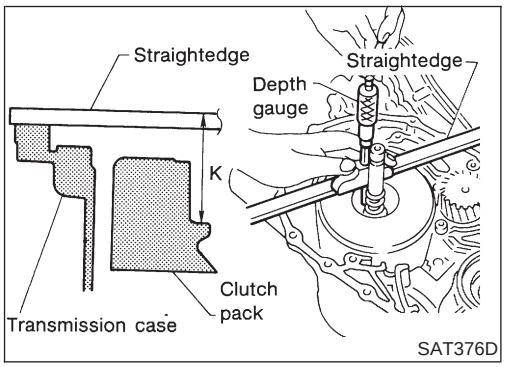
NFAT0424S01

- 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.

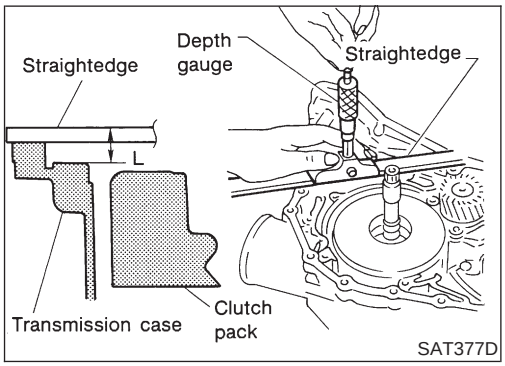




1. Measure dimensions "K" and "L" and then calculate dimension "J".



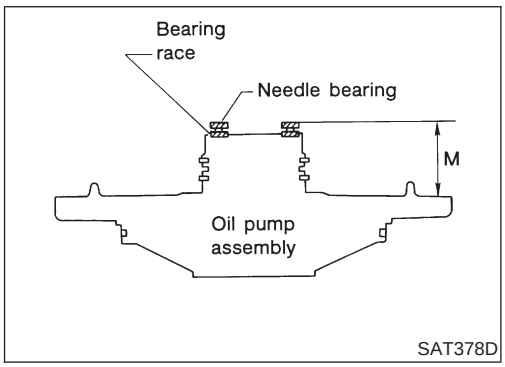
a. Measure dimension "K".



b. Measure dimension "L".

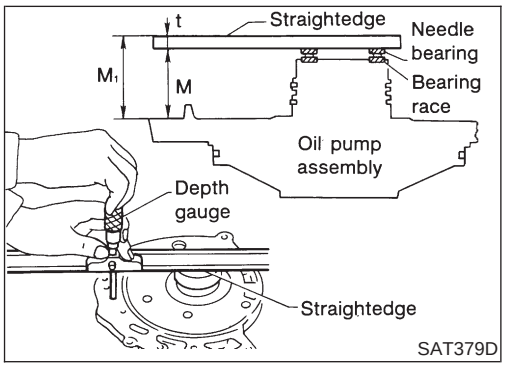
c. Calculate dimension "J".
"J": Distance between oil pump fitting surface of transmission case and needle bearing mating surface of high clutch drum.

$$J = K - L$$



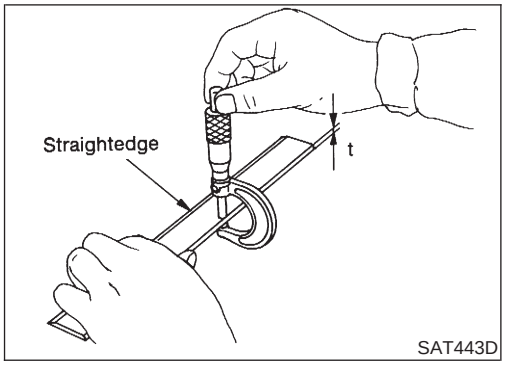
2. Measure dimension "M".

a. Place bearing race and needle bearing on oil pump assembly.



b. Measure dimension "M".
"M": Distance between transmission case fitting surface of oil pump cover and needle bearing on oil pump cover.
"M_1": Indication of gauge.

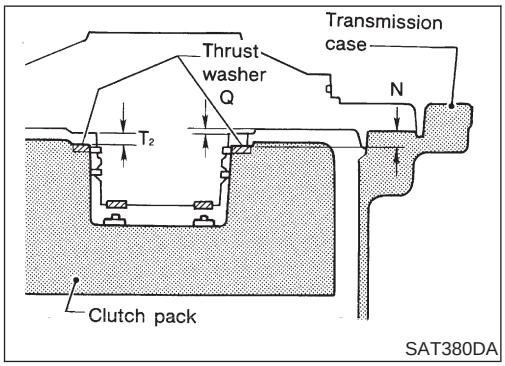
Adjustment (2) (Cont'd)



c. Measure thickness of straightedge "t".
$M = M_1 - t$

3. Adjust total end play "T_1".
$T_1 = J - M$
Total end play "T_1":
0.25 - 0.55 mm (0.0098 - 0.0217 in)

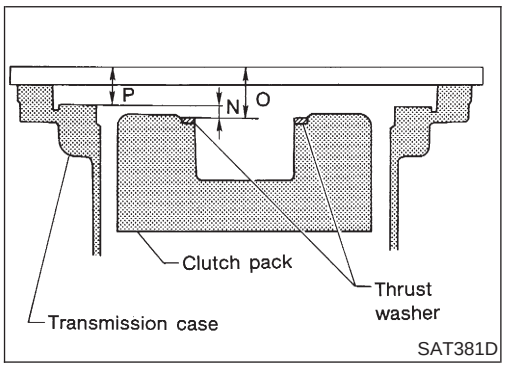
- Select proper thickness of bearing race so that total end play is within specifications.
Bearing races: Refer to SDS, AT-459.



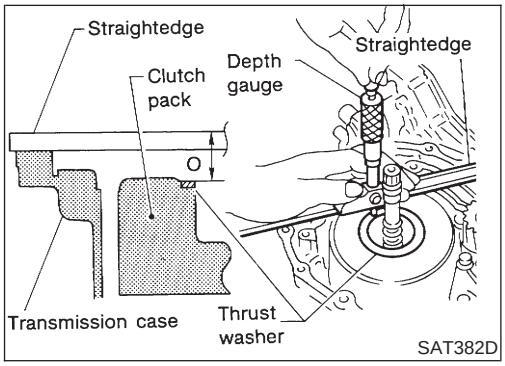
REVERSE CLUTCH END PLAY

NFAT0424S02

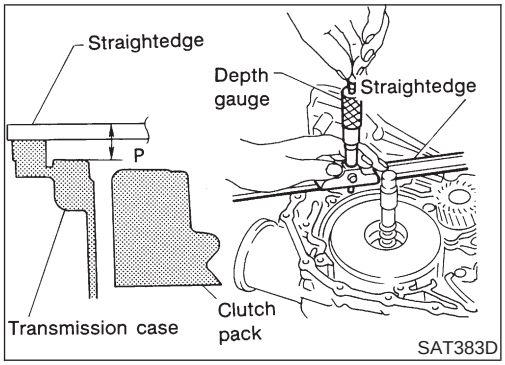
- Measure clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specification.



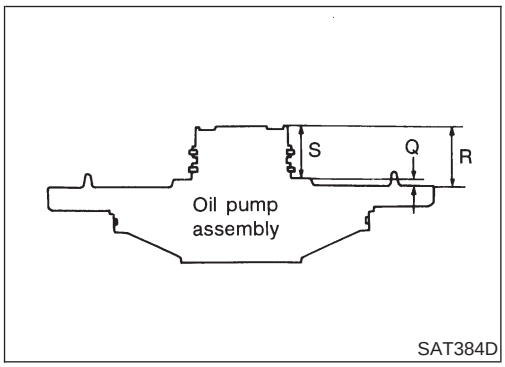
1. Measure dimensions "O" and "P" and then calculate dimension "N".



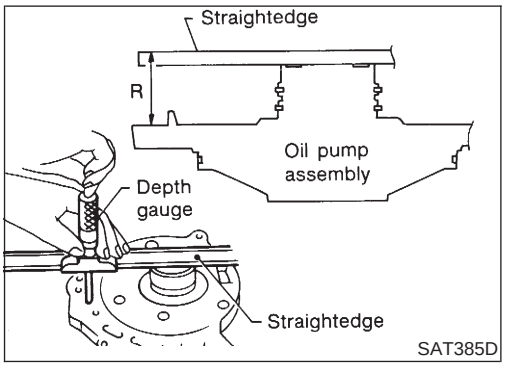
a. Place thrust washer on reverse clutch drum.
b. Measure dimension "O".



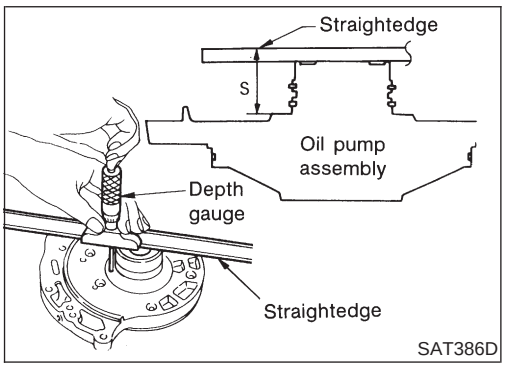
c. Measure dimension "P".
d. Calculate dimension "N".
"N": Distance between oil pump fitting surface of transmission case and thrust washer on reverse clutch drum.
N = O − P



2. Measure dimensions "R" and "S" and then calculate dimension "Q".



a. Measure dimension "R".



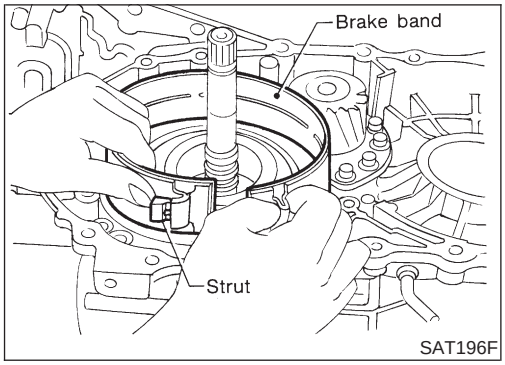
b. Measure dimension "S".
c. Calculate dimension "Q".
"Q": Distance between transmission case fitting surface and thrust washer mating surface.
Q = R − S

3. Adjust reverse clutch end play "T_2".
T_2 = N − Q
Reverse clutch end play:
0.55 - 0.90 mm (0.0217 - 0.0354 in)

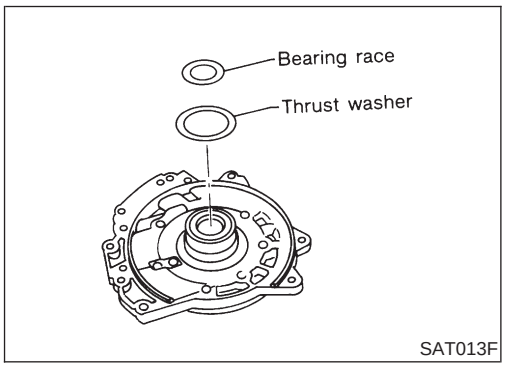
- Select proper thickness of thrust washer so that reverse clutch end play is within specifications.
Thrust washer: Refer to SDS, AT-459.

Assembly (3)

NFAT0425



1. Install anchor end pin and lock nut on transmission case.
2. Place brake band on outside of reverse clutch drum. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.

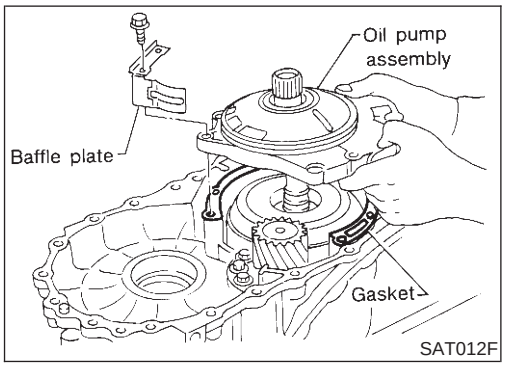


3. Place bearing race selected in total end play adjustment step on oil pump cover.

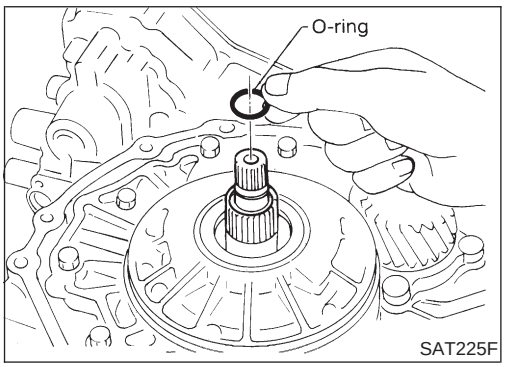
- **Apply petroleum jelly to bearing race.**

4. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.

- **Apply petroleum jelly to thrust washer.**

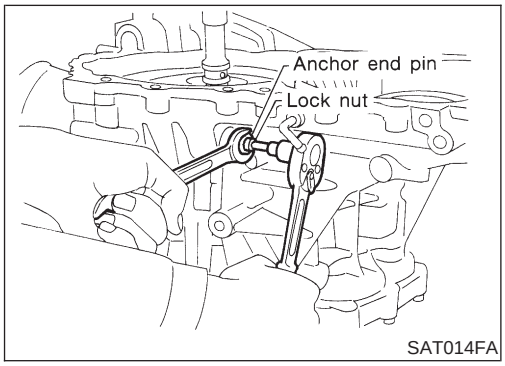


5. Install oil pump assembly, baffle plate and gasket on transmission case.
6. Tighten oil pump fixing bolts to the specified torque.



7. Install O-ring to input shaft.

- **Apply ATF to O-ring.**



8. Adjust brake band.

a. Tighten anchor end pin to the specified torque.

Anchor end pin:

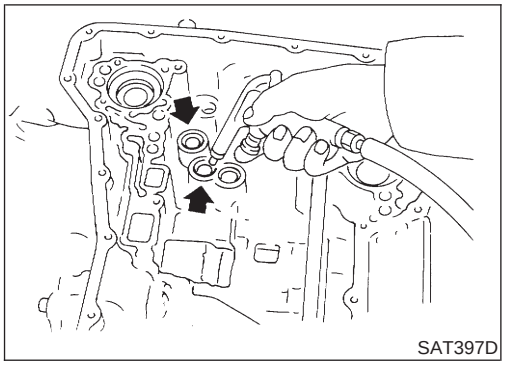
Refer to SDS, AT-455.

b. Back off anchor end pin two and a half turns.

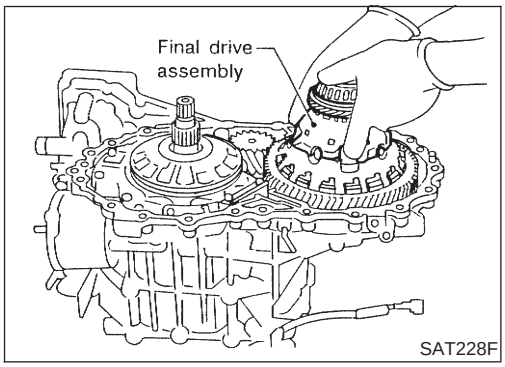
c. While holding anchor end pin, tighten lock nut.

Lock nut:

Refer to SDS, AT-455.

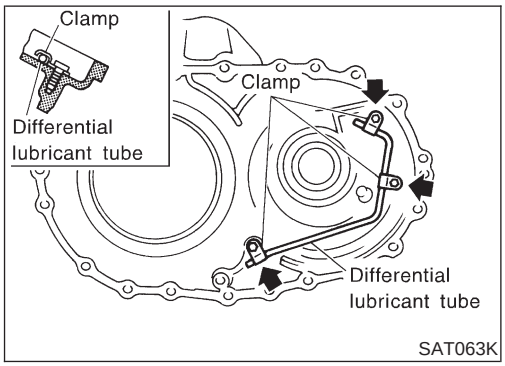

SAT397D

9. Apply compressed air to oil holes of transmission case and check operation of brake band.



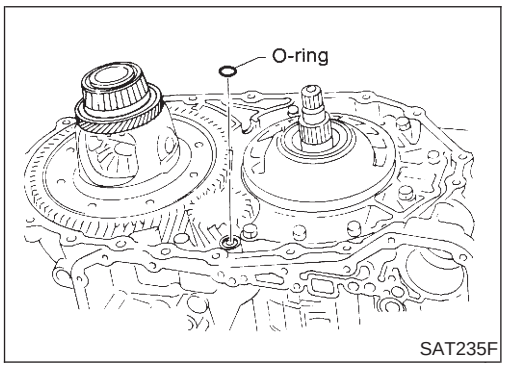
SAT228F

10. Install final drive assembly on transmission case.



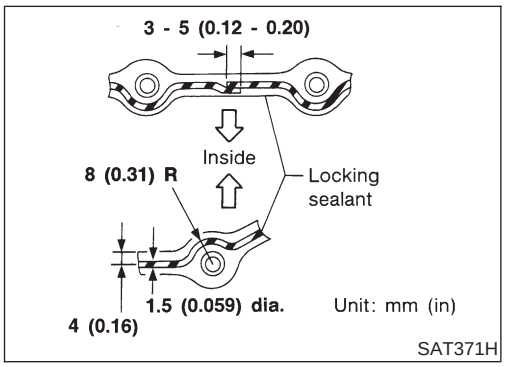
SAT063K

11. Install differential lubricant tube on converter housing. Tighten differential lubricant tube bolts to the specified torque. Refer to AT-352.



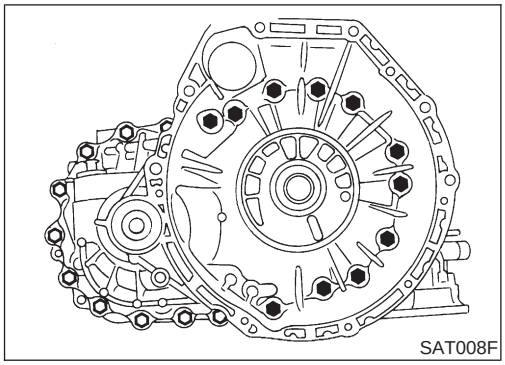
SAT235F

12. Install O-ring on differential oil port of transmission case.

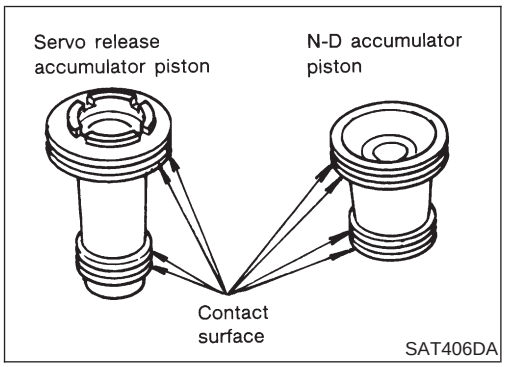


SAT371H

13. Install converter housing on transmission case.
- **Apply locking sealant (Loctite #518) to mating surface of converter housing.**


SAT008F

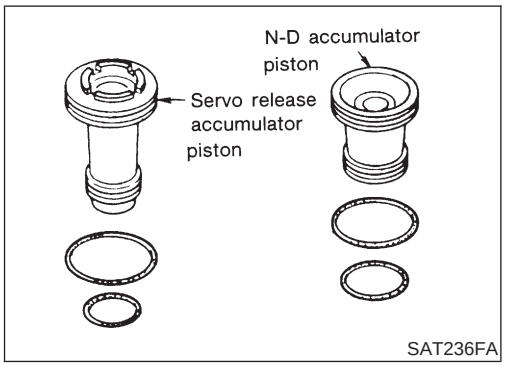
- **Tighten converter housing bolts to the specified torque. Refer to AT-352.**



SAT406DA

14. Install accumulator piston.

a. Check contact surface of accumulator piston for damage.

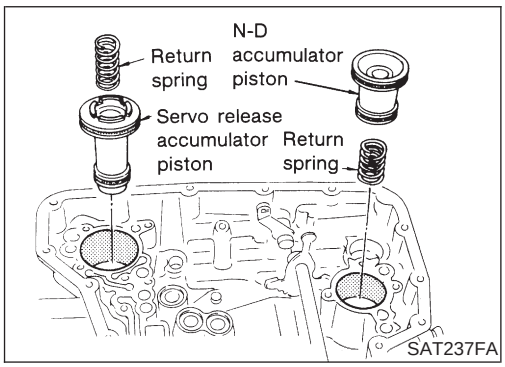


SAT236FA

b. Install O-rings on accumulator piston.

- **Apply ATF to O-rings.**

Accumulator piston O-rings:
Refer to SDS, AT-452.

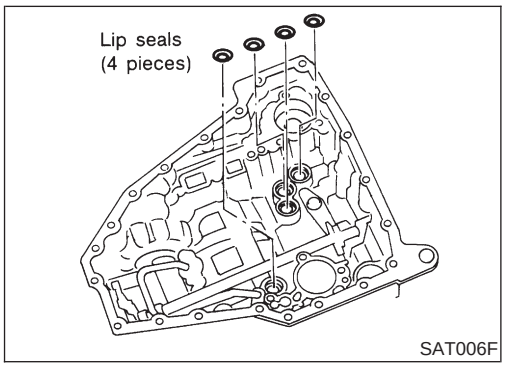


SAT237FA

c. Install accumulator pistons and return springs on transmission case.

- **Apply ATF to inner surface of transmission case.**

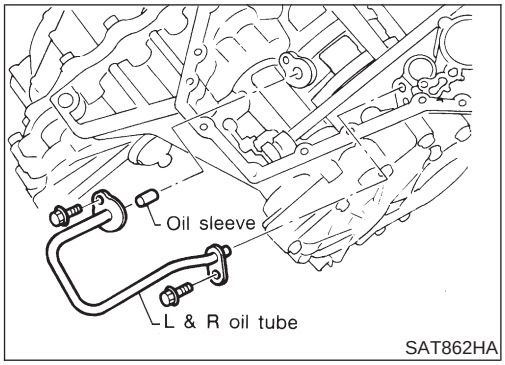
Return springs:
Refer to SDS, AT-452.



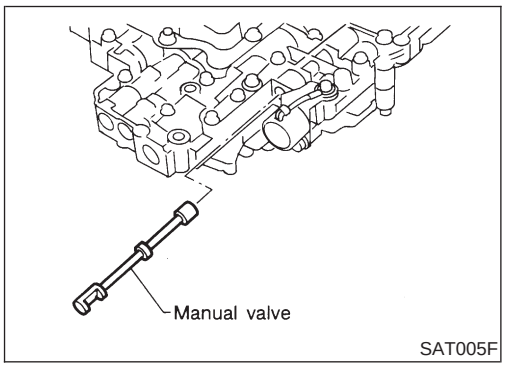
SAT006F

15. Install lip seals for band servo oil holes on transmission case.

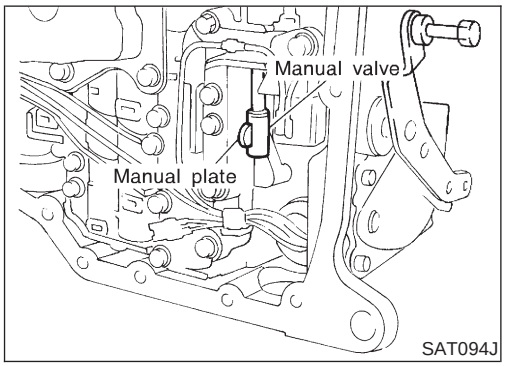
- **Apply petroleum jelly to lip seals.**



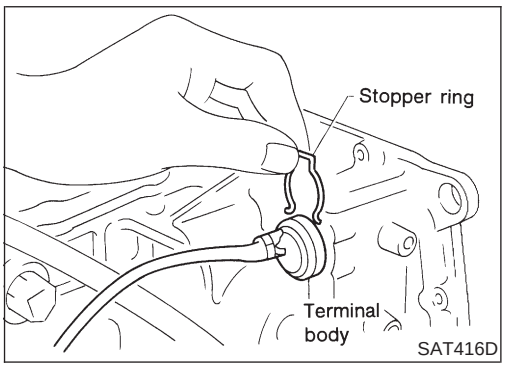
16. Install L & R oil tube and oil sleeve. Tighten L & R oil tube bolts to the specified torque. Refer to AT-352.



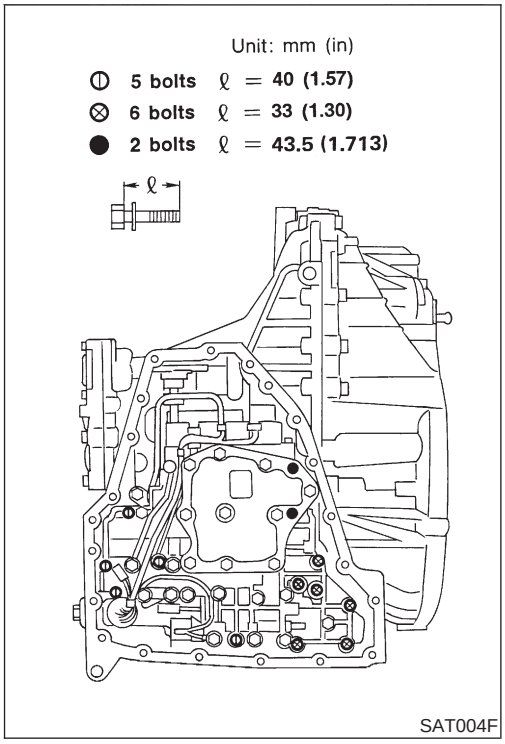
17. Install control valve assembly.
a. Insert manual valve into control valve assembly.
- **Apply ATF to manual valve.**



b. Set manual shaft in Neutral position.
c. Install control valve assembly on transmission case while aligning manual valve with manual plate.



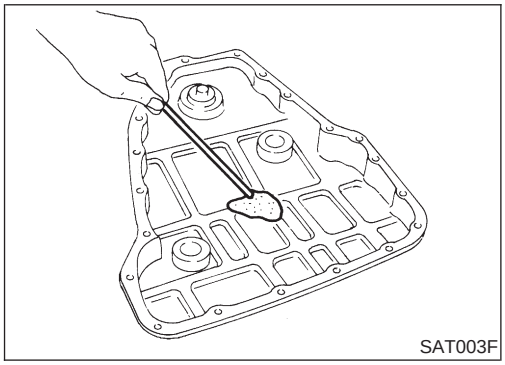
d. Pass solenoid harness through transmission case and install terminal body on transmission case by pushing it.
e. Install stopper ring to terminal body.



f. Tighten bolts **I**, **X** and ●.

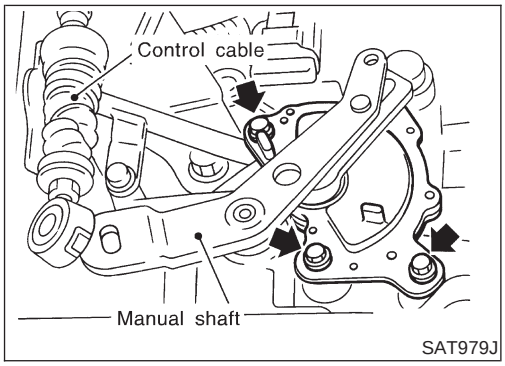
Bolt length, number and location:

Bolt	I	X	●
Bolt length "ℓ" ℓ mm (in)	40.0 (1.57)	33.0 (1.30)	43.5 (1.713)
Number of bolts	5	6	2

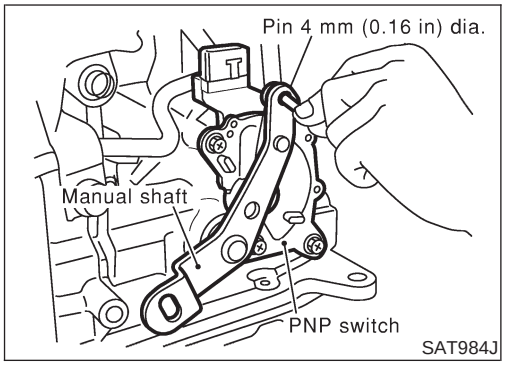


18. Install oil pan.
a. Attach a magnet to oil pan.
b. Install new oil pan gasket on transmission case.
c. Install oil pan on transmission case.
- **Always replace oil pan bolts as they are self-sealing bolts.**
- **Tighten four bolts in a criss-cross pattern to prevent dislocation of gasket.**

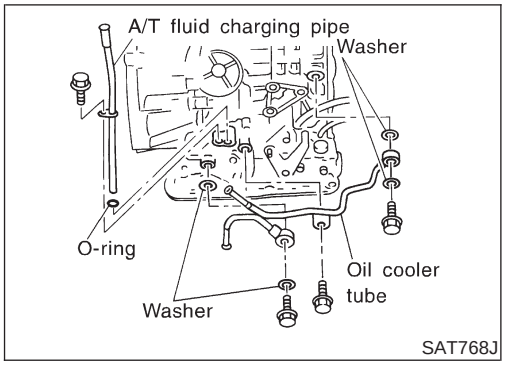
d. Tighten oil pan bolts and drain plug to the specified torque. Refer to AT-352.



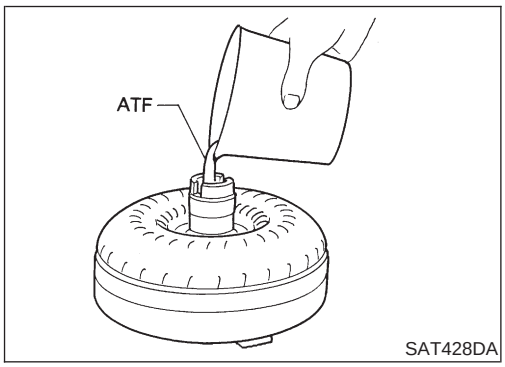
19. Install park/neutral position (PNP) switch.
a. Set manual shaft in P position.
b. Temporarily install park/neutral position (PNP) switch on manual shaft.
c. Move selector lever to N position.



d. Use a 4 mm (0.16 in) pin for this adjustment.
i. Insert the pin straight into the manual shaft adjustment hole.
ii. Rotate park/neutral position (PNP) switch until the pin can also be inserted straight into hole in park/neutral position (PNP) switch.
e. Tighten park/neutral position (PNP) switch fixing bolts. Refer to AT-352.
f. Remove pin from adjustment hole after adjusting park/neutral position (PNP) switch.



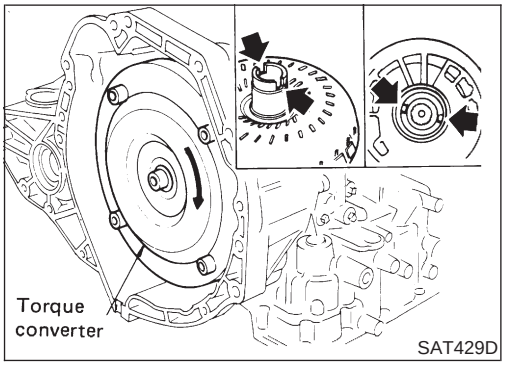
20. Install A/T fluid charging pipe and fluid cooler tube to transmission case. Tighten A/T fluid charging pipe and fluid cooler tube bolts to the specified torque. Refer to AT-352.



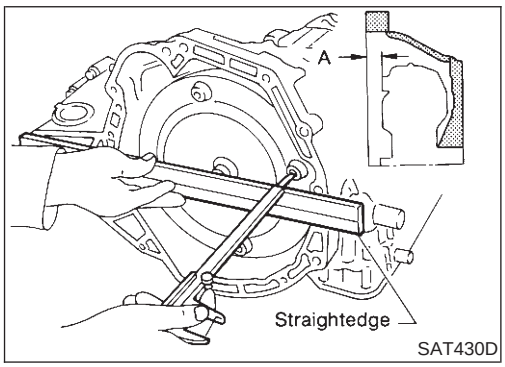
21. Install torque converter.

a. Pour ATF into torque converter.

- **Approximately 1 liter (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:

Refer to SDS, AT-460.

General Specifications

NFAT0426

Engine		VQ20DE	VQ30DE
Automatic transaxle model		RE4F04B	RE4F04W
Automatic transaxle assembly	Model code number	85X08	85X06
Transaxle gear ratio	1st	2.785	
	2nd	1.545	
	3rd	1.000	
	4th	0.694	
	Reverse	2.272	
	Final drive	4.425	3.789
Recommended fluid		Genuine Nissan ATF or equivalent*1	
Fluid capacity ℓ (Imp qt)		9.4 (8-1/4)	

*1: Refer to MA-13, “Fluids and Lubricants”.

Shift Schedule

NFAT0427

VEHICLE SPEED WHEN SHIFTING GEARS THROTTLE POSITION — Model VQ20DE —

NFAT0427S01

NFAT0427S0101

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	46 - 54 (29 - 34)	87 - 95 (54 - 59)	147 - 155 (91 - 96)	143 - 151 (89 - 94)	73 - 81 (45 - 50)	35 - 43 (22 - 27)	46 - 54 (29 - 34)
	Power	46 - 54 (29 - 34)	87 - 95 (54 - 59)	147 - 155 (91 - 96)	143 - 151 (89 - 94)	73 - 81 (45 - 50)	35 - 43 (22 - 27)	46 - 54 (29 - 34)
Half throttle	Comfort	28 - 36 (17 - 22)	51 - 59 (32 - 37)	116 - 124 (72 - 77)	63 - 71 (39 - 44)	35 - 43 (22 - 27)	5 - 13 (3 - 8)	46 - 54 (29 - 34)
	Power	36 - 44 (22 - 27)	68 - 76 (42 - 47)	120 - 128 (75 - 80)	106 - 114 (66 - 71)	54 - 62 (34 - 39)	5 - 13 (3 - 8)	46 - 54 (29 - 34)

— Model VQ30DE —

NFAT0427S0103

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	58 - 66 (36 - 41)	108 - 116 (67 - 72)	169 - 177 (105 - 110)	165 - 173 (103 - 108)	92 - 100 (57 - 62)	41 - 49 (25 - 30)	58 - 66 (36 - 41)
	Power	58 - 66 (36 - 41)	108 - 116 (67 - 72)	169 - 177 (105 - 110)	165 - 173 (103 - 108)	92 - 100 (57 - 62)	41 - 49 (25 - 30)	58 - 66 (36 - 41)
Half throttle	Comfort	42 - 50 (26 - 31)	82 - 90 (51 - 56)	132 - 140 (82 - 87)	71 - 79 (44 - 49)	32 - 40 (20 - 25)	5 - 13 (3 - 8)	58 - 66 (36 - 41)
	Power	45 - 53 (28 - 33)	84 - 92 (52 - 57)	137 - 145 (85 - 90)	119 - 127 (74 - 79)	65 - 73 (40 - 45)	5 - 13 (3 - 8)	58 - 66 (36 - 41)

VEHICLE SPEED WHEN PERFORMING AND RELEASING LOCK-UP — Model VQ20DE and VQ30DE —

=NFAT0427S02

NFAT0427S0201

Throttle position	Overdrive control switch (Shift position)	Shift pattern	Vehicle speed km/h (MPH)	
			Lock-up "ON"	Lock-up "OFF"
1/8	ON [D_4]	Comfort	56 - 64 (35 - 40)	53 - 61 (33 - 38)
		Power	56 - 64 (35 - 40)	53 - 61 (33 - 38)

Stall Revolution

NFAT0428

Engine	Stall revolution rpm
VQ20DE	2,200 - 2,600
VQ30DE	2,150 - 2,450

Line Pressure

NFAT0429

Engine model	Engine speed rpm	Line pressure kPa (bar, kg/cm^2, psi)	
		D, 2 and 1 positions	R position
VQ20DE	Idle	500 (5.00, 5.1, 73)	779 (7.79, 7.94, 113)
	Stall	1,206 (12.06, 12.3, 175)	1,873 (18.73, 19.1, 272)
VQ30DE	Idle	500 (5.00, 5.1, 73)	779 (7.79, 7.94, 113)
	Stall	1,236 (12.36, 12.6, 179)	1,922 (19.22, 19.6, 279)

Control Valves

CONTROL VALVE AND PLUG RETURN SPRINGS

NFAT0430

NFAT0430S01

Unit: mm (in)

Parts			Item		
			Part No.*	Free length	Outer diameter
Upper body	23	Pilot valve spring	31742-3AX03	38.98 (1.5346)	8.9 (0.350)
	7	1-2 accumulator valve spring	31742-3AX00	20.5 (0.807)	6.95 (0.2736)
	28	1-2 accumulator piston spring	31742-3AX08	55.26 (2.1756)	19.6 (0.772)
	33	1st reducing valve spring	31742-80X05	27.0 (1.063)	7.0 (0.276)
	35	3-2 timing valve spring	31736-01X00	23.0 (0.906)	6.65 (0.2618)
	18	Overrun clutch reducing valve spring	31742-80X15	37.5 (1.476)	6.9 (0.272)
	16	Torque converter relief valve spring	31742-80X07	31.0 (1.220)	9.0 (0.354)
	11	Torque converter clutch control valve	31742-85X00	56.98 (2.2433)	6.5 (0.256)
	3	Cooler check valve spring	31742-85X01	29.4 (1.157)	6.0 (0.236)
Lower body	15	Pressure regulator valve spring	31742-80X13	45.0 (1.772)	15.0 (0.591)
	20	Overrun clutch control valve spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	24	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)
	32	Shuttle valve spring	31762-41X04	51.0 (2.008)	5.65 (0.2224)
	12	Shift valve B spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	7	Pressure modifier valve spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
	3		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)

*: Always check with the Parts Department for the latest parts information.

Accumulator

O-RING

NFAT0431

NFAT0431S01

Unit: mm (in)

Accumulator	Inner diameter (Small)	Inner diameter (Large)
Servo release accumulator	26.9 (1.059)	44.2 (1.740)
N-D accumulator	34.6 (1.362)	39.4 (1.551)

RETURN SPRING

NFAT0431S02

Unit: mm (in)

Accumulator	Part number*	Free length	Outer diameter
Servo release accumulator	31605-80X00	52.5 (2.067)	20.1 (0.791)
N-D accumulator	31605-31X15	43.5 (1.713)	28.0 (1.102)

*: Always check with the Parts Department for the latest parts information.

Clutch and Brakes

NFAT0432

REVERSE CLUTCH

NFAT0432S01

Model code number		85X08	85X05	85X06
Number of drive plates		2		
Number of driven plates		2		
Drive plate thickness mm (in)	Standard	1.6 (0.063)		
	Allowable limit	1.4 (0.055)		
Clearance mm (in)	Standard	0.5 - 0.8 (0.020 - 0.031)		
	Allowable limit	1.2 (0.047)		

Thickness of retaining plates	Thickness mm (in)	Part number*
	6.6 (0.260)	31537-80X05
	6.8 (0.268)	31537-80X06
	7.0 (0.276)	31537-80X07
	7.2 (0.283)	31537-80X08
	7.4 (0.291)	31537-80X09
	7.6 (0.299)	31537-80X20
	7.8 (0.307)	31537-80X21

*: Always check with the Parts Department for the latest parts information.

HIGH CLUTCH

NFAT0432S02

Model code number		85X08	85X05	85X06
Number of drive plates		3		
Number of driven plates		7 + 1		
Drive plate thickness mm (in)	Standard	1.6 (0.063)		
	Allowable limit	1.4 (0.055)		
Clearance mm (in)	Standard	1.8 - 2.2 (0.071 - 0.087)		
	Allowable limit	2.8 (0.110)		

Thickness of retaining plates	Thickness mm (in)	Part number*
	3.2 (0.126)	31537-81X11
	3.4 (0.134)	31537-81X12
	3.6 (0.142)	31537-81X13
	3.8 (0.150)	31537-81X14
	4.0 (0.157)	31537-81X15

*: Always check with the Parts Department for the latest parts information.

Clutch and Brakes (Cont'd)

FORWARD CLUTCH

NFAT0432S03

Model code number		85X08	85X05	85X06
Number of drive plates		4	5	
Number of driven plates		4	5	
Drive plate thickness mm (in)	Standard	1.6 (0.063)		
	Allowable limit	1.4 (0.055)		
Clearance mm (in)	Standard	0.45 - 0.85 (0.0177 - 0.0335)		
	Allowable limit	1.85 (0.0728)		

Thickness of retaining plates	Thickness mm (in)	Part number*
	3.2 (0.126)	31537-80X76*1
	3.4 (0.134)	31537-80X75
	3.6 (0.142)	31537-80X70
	3.8 (0.150)	31537-80X71
	4.0 (0.157)	31537-80X72
	4.2 (0.165)	31537-80X73
	4.4 (0.173)	31537-80X74

*1: Model 85X05 and 85X06 only.

*: Always check with the Parts Department for the latest parts information.

OVERRUN CLUTCH

NFAT0432S04

Model code number		85X08	85X05	85X06
Number of drive plates		3		
Number of driven plates		5		
Drive plate thickness mm (in)	Standard	1.6 (0.063)		
	Allowable limit	1.4 (0.055)		
Clearance mm (in)	Standard	0.7 - 1.1 (0.028 - 0.043)		
	Allowable limit	1.7 (0.067)		

Thickness of retaining plates	Thickness mm (in)	Part number*
	3.0 (0.118)	31537-80X65
	3.2 (0.126)	31537-80X66
	3.4 (0.134)	31537-80X67
	3.6 (0.142)	31537-80X68
	3.8 (0.150)	31537-80X69

*: Always check with the Parts Department for the latest parts information.

LOW & REVERSE BRAKE

NFAT0432S05

Model code number		85X08	85X05	85X06
Number of drive plates		6	7	
Number of driven plates		6	8	
Drive plate thickness mm (in)	Standard	1.8 (0.071)		
	Allowable limit	1.6 (0.063)		
Clearance mm (in)	Standard	1.7 - 2.1 (0.067 - 0.083)		
	Allowable limit	3.3 (0.130)		

Thickness of retaining plates	Thickness mm (in)	Part number*
	2.0 (0.079)	31667-80X00
	2.2 (0.087)	31667-80X01
	2.4 (0.094)	31667-80X02
	2.6 (0.102)	31667-80X03
	2.8 (0.110)	31667-80X04
	3.0 (0.118)	31667-80X05
	3.2 (0.126)	31667-80X06
	3.4 (0.134)	31667-80X07
	5.4 (0.213)	31667-80X08*1

*1: Model 85X08 only.

*: Always check with the Parts Department for the latest parts information.

BRAKE BAND

NFAT0432S06

Anchor end pin tightening torque N·m (kg-m, in-lb)	3.9 - 5.9 (0.4 - 0.6, 35 - 52)
Number of returning revolutions for anchor end pin	2.5
Lock nut tightening torque N·m (kg-m, ft-lb)	31 - 36 (3.2 - 3.7, 23 - 27)

Final Drive

NFAT0433

DIFFERENTIAL SIDE GEAR CLEARANCE

NFAT0433S01

Clearance between side gear and differential case with washer mm (in)	0.1 - 0.2 (0.004 - 0.008)

DIFFERENTIAL SIDE GEAR THRUST WASHERS

RE4F04B

NFAT0433S02

NFAT0433S0201

Thickness mm (in)	Part number*
0.75 (0.0295)	38424-81X00
0.80 (0.0315)	38424-81X01
0.85 (0.0335)	38424-81X02
0.90 (0.0354)	38424-81X03
0.95 (0.0374)	38424-81X04

*: Always check with the Parts Department for the latest parts information.

RE4F04W

NFAT0433S0202

	Thickness mm (in)	Part number*
Viscous coupling side	0.43 - 0.45 (0.0169 - 0.0177)	38424-51E10
	0.52 - 0.54 (0.0205 - 0.0213)	38424-51E11
	0.61 - 0.63 (0.0240 - 0.0248)	38424-51E12
	0.70 - 0.72 (0.0276 - 0.0283)	38424-51E13
	0.79 - 0.81 (0.0311 - 0.0319)	38424-51E14
Differential case side	0.75 - 0.80 (0.0295 - 0.0315)	38424-E3000
	0.80 - 0.85 (0.0315 - 0.0335)	38424-E3001
	0.85 - 0.90 (0.0335 - 0.0354)	38424-E3002
	0.90 - 0.95 (0.0354 - 0.0374)	38424-E3003

*: Always check with the Parts Department for the latest parts information.

Final Drive (Cont'd)

DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS

NFAT0433S03

RE4F04B

NFAT0433S0301

Thickness mm (in)	Part number*
0.48 (0.0189)	31438-80X00
0.52 (0.0205)	31438-80X01
0.56 (0.0220)	31438-80X02
0.60 (0.0236)	31438-80X03
0.64 (0.0252)	31438-80X04
0.68 (0.0268)	31438-80X05
0.72 (0.0283)	31438-80X06
0.76 (0.0299)	31438-80X07
0.80 (0.0315)	31438-80X08
0.84 (0.0331)	31438-80X09
0.88 (0.0346)	31438-80X10
0.92 (0.0362)	31438-80X11

*: Always check with the Parts Department for the latest parts information.

RE4F04W

NFAT0433S0302

Thickness mm (in)	Part number*
0.36 (0.0142)	38753-56E00
0.40 (0.0157)	38753-56E01
0.44 (0.0173)	38753-56E02
0.48 (0.0189)	38753-56E03
0.52 (0.0205)	38753-56E04
0.56 (0.0220)	38753-56E05
0.60 (0.0236)	38753-56E06
0.64 (0.0252)	38753-56E07
0.68 (0.0268)	38753-56E08
0.72 (0.0283)	38753-56E09
0.76 (0.0299)	38753-56E10
0.80 (0.0315)	38753-56E11
0.84 (0.0331)	38753-56E12
0.88 (0.0346)	38753-56E13
0.92 (0.0362)	38753-56E14
0.12 (0.0047)	38753-56E15
0.16 (0.0063)	38753-56E16
0.20 (0.0079)	38753-56E17
0.24 (0.0094)	38753-56E18
0.28 (0.0110)	38753-56E19
0.32 (0.0126)	38753-56E20

*: Always check with the Parts Department for the latest parts information.

BEARING PRELOAD

NFAT0433S04

Differential side bearing preload mm (in)	0.05 - 0.09 (0.0020 - 0.0035)

TURNING TORQUE

NFAT0433S05

Turning torque of final drive assembly N·m (kg-cm, in-lb)	0.78 - 1.37 (8.0 - 14.0, 6.9 - 12.2)

CLUTCH AND BRAKE RETURN SPRINGS

NFAT0433S06

Unit: mm (in)

Parts	Part number*	Free length	Outer diameter
Forward clutch (Overrun clutch) (22 pcs)	31505-80X02	21.4 (0.843)	10.3 (0.406)
High clutch (12 pcs)	31505-80X05	22.5 (0.886)	10.8 (0.425)
Low & reverse brake (24 pcs)	31505-80X07	24.1 (0.949)	6.6 (0.260)

*: Always check with the Parts Department for the latest parts information.

Planetary Carrier and Oil Pump

NFAT0434

PLANETARY CARRIER

NFAT0434S01

Clearance between planetary carrier and pinion washer mm (in)	Standard	0.20 - 0.70 (0.0079 - 0.0276)
	Allowable limit	0.80 (0.0315)

OIL PUMP

NFAT0434S02

Oil pump side clearance mm (in)		0.030 - 0.050 (0.0012 - 0.0020)	
Thickness of inner gears and outer gears		Inner gear	
		Thickness mm (in)	Part number*
		11.99 - 12.0 (0.4720 - 0.4724) 11.98 - 11.99 (0.4717 - 0.4720) 11.97 - 11.98 (0.4713 - 0.4717)	31346-80X00 31346-80X01 31346-80X02
		Outer gear	
		Thickness mm (in)	Part number*
		11.99 - 12.0 (0.4720 - 0.4724) 11.98 - 11.99 (0.4717 - 0.4720) 11.97 - 11.98 (0.4713 - 0.4717)	31347-80X00 31347-80X01 31347-80X02
Clearance between oil pump housing and outer gear mm (in)	Standard	0.111 - 0.181 (0.0044 - 0.0071)	
	Allowable limit	0.181 (0.0071)	
Oil pump cover seal ring clearance mm (in)	Standard	0.10 - 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

NFAT0435

Input shaft seal ring clearance mm (in)	Standard	0.08 - 0.23 (0.0031 - 0.0091)
	Allowable limit	0.23 (0.0091)

Reduction Pinion Gear

NFAT0436

TURNING TORQUE

NFAT0436S01

Turning torque of reduction pinion gear N·m (kg-cm, in-lb)	0.05 - 0.39 (0.5 - 4.0, 0.43 - 3.47)

REDUCTION PINION GEAR BEARING ADJUSTING SHIMS

NFAT0436S02

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
1	5.00 (0.1969)	31439-81X00	39	5.76 (0.2268)	31439-81X69
2	5.02 (0.1976)	31439-81X01	40	5.78 (0.2276)	31439-81X70
3	5.04 (0.1984)	31439-81X02	41	5.80 (0.2283)	31439-81X71
4	5.06 (0.1992)	31439-81X03	42	5.82 (0.2291)	31439-81X72
5	5.08 (0.2000)	31439-81X04	43	5.84 (0.2299)	31439-81X73
6	5.10 (0.2008)	31439-81X05	44	5.86 (0.2307)	31439-81X74
7	5.12 (0.2016)	31439-81X06	45	5.88 (0.2315)	31439-81X75
8	5.14 (0.2024)	31439-81X07	46	5.90 (0.2323)	31439-81X76
9	5.16 (0.2031)	31439-81X08	47	5.92 (0.2331)	31439-81X77
10	5.18 (0.2039)	31439-81X09	48	5.94 (0.2339)	31439-81X78
11	5.20 (0.2047)	31439-81X10	49	5.96 (0.2346)	31439-81X79

Reduction Pinion Gear (Cont'd)

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
12	5.22 (0.2055)	31439-81X11	50	5.98 (0.2354)	31439-81X80
13	5.24 (0.2063)	31439-81X12	51	6.00 (0.2362)	31439-81X81
14	5.26 (0.2071)	31439-81X13	52	4.50 (0.1772)	31439-83X00
15	5.28 (0.2079)	31439-81X14	53	4.52 (0.1780)	31439-83X01
16	5.30 (0.2087)	31439-81X15	54	4.54 (0.1787)	31439-83X02
17	5.32 (0.2094)	31439-81X16	55	4.56 (0.1795)	31439-83X03
18	5.34 (0.2102)	31439-81X17	56	4.58 (0.1803)	31439-83X04
19	5.36 (0.2110)	31439-81X18	57	4.60 (0.1811)	31439-83X05
20	5.38 (0.2118)	31439-81X19	58	4.62 (0.1819)	31439-83X06
21	5.40 (0.2126)	31439-81X20	59	4.64 (0.1827)	31439-83X07
22	5.42 (0.2134)	31439-81X21	60	4.66 (0.1835)	31439-83X08
23	5.44 (0.2142)	31439-81X22	61	4.68 (0.1843)	31439-83X09
24	5.46 (0.2150)	31439-81X23	62	4.70 (0.1850)	31439-83X10
25	5.48 (0.2157)	31439-81X24	63	4.72 (0.1858)	31439-83X11
26	5.50 (0.2165)	31439-81X46	64	4.74 (0.1866)	31439-83X12
27	5.52 (0.2173)	31439-81X47	65	4.76 (0.1874)	31439-83X13
28	5.54 (0.2181)	31439-81X48	66	4.78 (0.1882)	31439-83X14
29	5.56 (0.2189)	31439-81X49	67	4.80 (0.1890)	31439-83X15
30	5.58 (0.2197)	31439-81X60	68	4.82 (0.1898)	31439-83X16
31	5.60 (0.2205)	31439-81X61	69	4.84 (0.1906)	31439-83X17
32	5.62 (0.2213)	31439-81X62	70	4.86 (0.1913)	31439-83X18
33	5.64 (0.2220)	31439-81X63	71	4.88 (0.1921)	31439-83X19
34	5.66 (0.2228)	31439-81X64	72	4.90 (0.1929)	31439-83X20
35	5.68 (0.2236)	31439-81X65	73	4.92 (0.1937)	31439-83X21
36	5.70 (0.2244)	31439-81X66	74	4.94 (0.1945)	31439-83X22
37	5.72 (0.2252)	31439-81X67	75	4.96 (0.1953)	31439-83X23
38	5.74 (0.2260)	31439-81X68	76	4.98 (0.1961)	31439-83X24

*: Always check with the Parts Department for the latest parts information.

Band Servo

RETURN SPRING

NFAT0437

NFAT0437S01

Unit: mm (in)

Return spring	Part number*	Free length	Outer diameter
2nd servo return spring	31605-31X20	32.5 (1.280)	25.9 (1.020)
OD servo return spring	31605-80X07	31.0 (1.220)	62.6 (2.465)

*: Always check with the Parts Department for the latest parts information.

Output Shaft

SEAL RING CLEARANCE

NFAT0438

NFAT0438S01

Output shaft seal ring clearance mm (in)	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

END PLAY

NFAT0438S02

Output shaft end play mm (in)	0 - 0.15 (0 - 0.0059)

OUTPUT SHAFT ADJUSTING SHIMS

NFAT0438S03

Thickness mm (in)	Part number*
0.80 (0.0315)	31438-80X60
0.84 (0.0331)	31438-80X61
0.88 (0.0346)	31438-80X62
0.92 (0.0362)	31438-80X63
0.96 (0.0378)	31438-80X64
1.00 (0.0394)	31438-80X65
1.04 (0.0409)	31438-80X66
1.08 (0.0425)	31438-80X67
1.12 (0.0441)	31438-80X68
1.16 (0.0457)	31438-80X69
1.20 (0.0472)	31438-80X70

*: Always check with the Parts Department for the latest parts information.

Bearing Retainer

NFAT0439

SEAL RING CLEARANCE

NFAT0439S01

Bearing retainer seal ring clearance mm (in)	Standard	0.10 - 0.30 (0.0039 - 0.0118)
	Allowable limit	0.30 (0.0118)

Total End Play

NFAT0440

Total end play mm (in)	0.25 - 0.55 (0.0098 - 0.0217)

BEARING RACE FOR ADJUSTING TOTAL END PLAY

NFAT0440S01

Thickness mm (in)	Part number*
0.8 (0.031)	31435-80X00
1.0 (0.039)	31435-80X01
1.2 (0.047)	31435-80X02
1.4 (0.055)	31435-80X03
1.6 (0.063)	31435-80X04
1.8 (0.071)	31435-80X05
2.0 (0.079)	31435-80X06
0.9 (0.035)	31435-80X09
1.1 (0.043)	31435-80X10
1.3 (0.051)	31435-80X11
1.5 (0.059)	31435-80X12
1.7 (0.067)	31435-80X13
1.9 (0.075)	31435-80X14

*: Always check with the Parts Department for the latest parts information.

Reverse Clutch End Play

NFAT0441

Reverse clutch end play mm (in)	0.55 - 0.90 (0.0217 - 0.0354)

THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH DRUM END PLAY

NFAT0441S01

Thickness mm (in)	Part number*
0.80 (0.0315)	31508-80X13
0.95 (0.0374)	31508-80X14
1.10 (0.0433)	31508-80X15
1.25 (0.0492)	31508-80X16
1.40 (0.0551)	31508-80X17
1.55 (0.0610)	31508-80X18
1.70 (0.0669)	31508-80X19
1.85 (0.0728)	31508-80X20

*: Always check with the Parts Department for the latest parts information.

Removal and Installation

NFAT0442

Unit: mm (in)

Distance between end of converter housing and torque converter	14 (0.55)

Shift Solenoid Valves

NFAT0443

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

Solenoid Valves

NFAT0444

Solenoid valves	Resistance (Approx.) Ω	Terminal No.
Shift solenoid valve A	20 - 30	2
Shift solenoid valve B	5 - 20	1
Overrun clutch solenoid valve	20 - 30	3
Line pressure solenoid valve	2.5 - 5	4
Torque converter clutch solenoid valve	5 - 20	5

A/T Fluid Temperature Sensor

NFAT0445

Remarks: Specification data are reference values.

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

Revolution Sensor

NFAT0446

Condition	Judgement standard (Approx.)
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	450 Hz
When vehicle parks.	Under 1.3V or over 4.5V

Dropping Resistor

NFAT0447

Resistance (Approx.)	10 - 15Ω