

# AUTOMATIC TRANSAXLE

## SECTION AT

### CONTENTS

<b>TROUBLE DIAGNOSIS - INDEX</b> .....	5	<b>TROUBLE DIAGNOSIS - GENERAL</b>	
Alphabetical & P No. Index for DTC .....	5	<b>DESCRIPTION</b> .....	86
<b>PRECAUTIONS</b> .....	7	Symptom Chart.....	86
Supplemental Restraint System (SRS) "AIR		TCM Terminals and Reference Value.....	97
BAG" and "SEAT BELT PRE-TENSIONER" .....	7	<b>CAN COMMUNICATION</b> .....	100
Precautions for On Board Diagnostic (OBD)		System Description.....	100
System of A/T and Engine.....	7	<b>TROUBLE DIAGNOSIS FOR POWER SUPPLY</b> .....	101
Precautions .....	7	Wiring Diagram - AT - MAIN.....	101
Service Notice or Precautions .....	9	Diagnostic Procedure .....	102
Wiring Diagrams and Trouble Diagnosis .....	10	<b>DTC P0705 PARK/NEUTRAL POSITION SWITCH</b> ...	104
<b>PREPARATION</b> .....	11	Description .....	104
Special Service Tools .....	11	On Board Diagnosis Logic.....	104
Commercial Service Tools .....	14	Possible Cause.....	105
<b>OVERALL SYSTEM</b> .....	15	Diagnostic Trouble Code (DTC) Confirmation	
A/T Electrical Parts Location .....	15	Procedure .....	105
Circuit Diagram .....	16	Wiring Diagram - AT - PNP/SW.....	106
Cross-sectional View .....	17	Diagnostic Procedure .....	107
Hydraulic Control Circuit.....	18	<b>DTC P0710 A/T FLUID TEMPERATURE SENSOR</b>	
Shift Mechanism .....	19	<b>CIRCUIT</b> .....	110
Control System .....	28	Description .....	110
Control Mechanism.....	30	On Board Diagnosis Logic.....	110
Control Valve .....	34	Possible Cause.....	111
<b>ON BOARD DIAGNOSTIC SYSTEM</b>		Diagnostic Trouble Code (DTC) Confirmation	
<b>DESCRIPTION</b> .....	36	Procedure .....	111
Introduction .....	36	Wiring Diagram - AT - FTS.....	112
OBD-II Function for A/T System.....	36	Diagnostic Procedure .....	113
One or Two Trip Detection Logic of OBD-II .....	36	<b>DTC P0720 VEHICLE SPEED SENSOR.A/T</b>	
OBD-II Diagnostic Trouble Code (DTC) .....	36	<b>(REVOLUTION SENSOR)</b> .....	116
Malfunction Indicator Lamp (MIL).....	40	Description .....	116
CONSULT-II .....	40	On Board Diagnosis Logic.....	116
Diagnostic Procedure Without CONSULT-II .....	51	Possible Cause.....	116
<b>TROUBLE DIAGNOSIS - INTRODUCTION</b> .....	57	Diagnostic Trouble Code (DTC) Confirmation	
Introduction .....	57	Procedure .....	117
Work Flow.....	61	Wiring Diagram - AT - VSSA/T.....	118
<b>TROUBLE DIAGNOSIS - BASIC INSPECTION</b> .....	63	Diagnostic Procedure .....	119
A/T Fluid Check .....	63	<b>DTC P0725 ENGINE SPEED SIGNAL</b> .....	121
Stall Test .....	63	Description .....	121
Line Pressure Test.....	67	On Board Diagnosis Logic.....	121
Road Test.....	68	Possible Cause.....	121

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX



# CONTENTS (Cont'd)

Diagnostic Trouble Code (DTC) Confirmation	122	Diagnostic Procedure .....	162
Procedure .....	122	<b>DTC P0745 LINE PRESSURE SOLENOID VALVE ...</b>	168
Wiring Diagram - AT - ENGSS .....	123	Description .....	168
Diagnostic Procedure .....	124	On Board Diagnosis Logic.....	168
<b>DTC P0731 A/T 1ST GEAR FUNCTION .....</b>	126	Possible Cause.....	169
Description .....	126	Diagnostic Trouble Code (DTC) Confirmation	
On Board Diagnosis Logic.....	126	Procedure .....	169
Possible Cause .....	127	Wiring Diagram - AT - LPSV.....	170
Diagnostic Trouble Code (DTC) Confirmation		Diagnostic Procedure .....	171
Procedure .....	127	<b>DTC P0750 SHIFT SOLENOID VALVE A .....</b>	174
Wiring Diagram - AT - 1ST .....	129	Description .....	174
Diagnostic Procedure .....	130	On Board Diagnosis Logic.....	174
<b>DTC P0732 A/T 2ND GEAR FUNCTION.....</b>	132	Possible Cause.....	174
Description .....	132	Diagnostic Trouble Code (DTC) Confirmation	
On Board Diagnosis Logic.....	132	Procedure .....	175
Possible Cause .....	133	Wiring Diagram - AT - SSV/A .....	176
Diagnostic Trouble Code (DTC) Confirmation		Diagnostic Procedure .....	177
Procedure .....	133	<b>DTC P0755 SHIFT SOLENOID VALVE B .....</b>	179
Wiring Diagram - AT - 2ND.....	135	Description .....	179
Diagnostic Procedure .....	136	On Board Diagnosis Logic.....	179
<b>DTC P0733 A/T 3RD GEAR FUNCTION .....</b>	138	Possible Cause.....	179
Description .....	138	Diagnostic Trouble Code (DTC) Confirmation	
On Board Diagnosis Logic.....	138	Procedure .....	180
Possible Cause .....	139	Wiring Diagram - AT - SSV/B .....	181
Diagnostic Trouble Code (DTC) Confirmation		Diagnostic Procedure .....	182
Procedure .....	139	<b>DTC P1705 ACCELERATOR PEDAL POSITION</b>	
Wiring Diagram - AT - 3RD.....	141	<b>SENSOR (THROTTLE POSITION SENSOR).....</b>	184
Diagnostic Procedure .....	142	Description .....	184
<b>DTC P0734 A/T 4TH GEAR FUNCTION .....</b>	144	On Board Diagnosis Logic.....	185
Description .....	144	Possible Cause.....	185
On Board Diagnosis Logic.....	145	Diagnostic Trouble Code (DTC) Confirmation	
Possible Cause .....	145	Procedure .....	186
Diagnostic Trouble Code (DTC) Confirmation		Wiring Diagram - AT - TPS.....	187
Procedure .....	146	Diagnostic Procedure .....	188
Wiring Diagram - AT - 4TH.....	148	<b>DTC P1760 OVERRUN CLUTCH SOLENOID</b>	
Diagnostic Procedure .....	149	<b>VALVE.....</b>	191
<b>DTC P0740 TORQUE CONVERTER CLUTCH</b>		Description .....	191
<b>SOLENOID VALVE.....</b>	153	On Board Diagnosis Logic.....	191
Description .....	153	Possible Cause.....	191
On Board Diagnosis Logic.....	153	Diagnostic Trouble Code (DTC) Confirmation	
Possible Cause .....	153	Procedure .....	192
Diagnostic Trouble Code (DTC) Confirmation		Wiring Diagram - AT - OVRCSV.....	193
Procedure .....	154	Diagnostic Procedure .....	194
Wiring Diagram - AT - TCV.....	155	<b>DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP</b>	
Diagnostic Procedure .....	156	<b>SENSOR CIRCUIT AND TCM POWER SOURCE) ....</b>	196
<b>DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP) ....</b>	158	Description .....	196
Description .....	158	On Board Diagnosis Logic.....	197
On Board Diagnosis Logic.....	158	Possible Cause.....	197
Possible Cause .....	159	Diagnostic Trouble Code (DTC) Confirmation	
Diagnostic Trouble Code (DTC) Confirmation		Procedure .....	197
Procedure .....	159	Wiring Diagram - AT - BA/FTS .....	198
Wiring Diagram - AT - TCCSIG .....	161	Diagnostic Procedure .....	199



# CONTENTS (Cont'd)

<b>DTC VEHICLE SPEED SENSOR.MTR</b> .....	203	
Description .....	203	
On Board Diagnosis Logic.....	203	
Possible Cause .....	203	
Diagnostic Trouble Code (DTC) Confirmation Procedure .....	204	
Wiring Diagram - AT - VSSMTR.....	205	
Diagnostic Procedure .....	206	
<b>DTC U1000 CAN COMMUNICATION LINE</b> .....	208	
Description .....	208	
On Board Diagnosis Logic.....	208	
Possible Cause .....	208	
Diagnostic Trouble Code (DTC) Confirmation Procedure .....	209	
Wiring Diagram - AT - CAN .....	210	
Diagnostic Procedure .....	211	
<b>DTC POWER TRAIN REVOLUTION SENSOR</b> .....	212	
Description .....	212	
On Board Diagnosis Logic.....	212	
Diagnostic Trouble Code (DTC) Confirmation Procedure .....	213	
Wiring Diagram - AT - P/T SEN-01 .....	214	
Diagnostic Procedure .....	215	
Component Inspection.....	216	
<b>DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)</b> .....	217	
Description .....	217	
On Board Diagnosis Logic.....	217	
Possible Cause .....	217	
Diagnostic Trouble Code (DTC) Confirmation Procedure .....	217	
Diagnostic Procedure .....	218	
<b>DTC CONTROL UNIT (EEP ROM)</b> .....	219	
Description .....	219	
On Board Diagnosis Logic.....	219	
Possible Cause .....	219	
Diagnostic Trouble Code (DTC) Confirmation Procedure .....	219	
Diagnostic Procedure .....	220	
<b>TROUBLE DIAGNOSES FOR SYMPTOMS</b> .....	221	
Wiring Diagram - AT - NONDTC .....	221	
1. A/T CHECK Indicator Lamp Does Not Come On .....	223	
2. Engine Cannot Be Started In P and N Position..	226	
3. In P Position, Vehicle Moves Forward or Backward When Pushed .....	227	
4. In N Position, Vehicle Moves .....	228	
5. Large Shock. N -> R Position .....	231	
6. Vehicle Does Not Creep Backward In R Position .....	233	
7. Vehicle Does Not Creep Forward in D, 2nd or 1st Position .....	237	
8. Vehicle Cannot Be Started From D <sub>1</sub> .....	240	GI
9. A/T Does Not Shift: D <sub>1</sub> -> D <sub>2</sub> or Does Not Kickdown: D <sub>4</sub> -> D <sub>2</sub> .....	243	MA
10. A/T Does Not Shift: D <sub>2</sub> -> D <sub>3</sub> .....	246	
11. A/T Does Not Shift: D <sub>3</sub> -> D <sub>4</sub> .....	249	EM
12. A/T Does Not Perform Lock-up .....	252	
13. A/T Does Not Hold Lock-up Condition .....	254	
14. Lock-up Is Not Released.....	256	LC
15. Engine Speed Does Not Return To Idle (Light Braking D <sub>4</sub> -> D <sub>3</sub> ).....	257	EC
16. Vehicle Does Not Start From D <sub>1</sub> .....	260	FE
17. A/T Does Not Shift: D <sub>4</sub> -> D <sub>3</sub> , When 3rd Position Switch ON -> OFF .....	261	CL
18. A/T Does Not Shift: D <sub>3</sub> -> D <sub>2</sub> , When Selector Lever D -> 2nd Position .....	262	
19. A/T Does Not Shift: D <sub>2</sub> -> D <sub>1</sub> , When Selector Lever 2nd -> 1st Position .....	263	MT
20. Vehicle Does Not Decelerate By Engine Brake.....	264	
21. TCM Self-diagnosis Does Not Activate [PNP & 3rd Position Switches, and APPS (TPS)* Circuit Checks].....	264	AT
<b>A/T SHIFT LOCK SYSTEM</b> .....	271	
Description .....	271	AX
Shift Lock System Electrical Parts Location.....	271	
Wiring Diagram - SHIFT -.....	272	SU
Shift Lock Control Unit Reference Values.....	273	BR
Component Inspection.....	274	ST
<b>SHIFT CONTROL SYSTEM</b> .....	276	RS
Control Cable.....	276	
<b>ON-VEHICLE SERVICE</b> .....	277	BT
Control Valve Assembly and Accumulators .....	277	
Revolution Sensor Replacement .....	278	HA
Park/Neutral Position (PNP) Switch Adjustment .....	278	
Control Cable Adjustment.....	279	SC
Differential Side Oil Seal Replacement .....	279	
<b>REMOVAL AND INSTALLATION</b> .....	280	
Removal.....	280	
Installation.....	281	
<b>OVERHAUL</b> .....	283	
Components.....	283	EL
Oil Channel.....	286	
Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings .....	287	IDX
<b>DISASSEMBLY</b> .....	288	
<b>REPAIR FOR COMPONENT PARTS</b> .....	302	
Manual Shaft.....	302	
Oil Pump.....	305	
Control Valve Assembly .....	309	
Control Valve Upper Body .....	317	
Control Valve Lower Body .....	321	
Reverse Clutch .....	323	



# CONTENTS (Cont'd)

High Clutch .....	326	Control Valves.....	377
Forward and Overrun Clutches .....	331	Accumulator .....	377
Low & Reverse Brake.....	336	Clutch and Brakes .....	378
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub.....	339	Final Drive.....	380
Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer.....	343	Planetary Carrier and Oil Pump .....	381
Band Servo Piston Assembly .....	348	Input Shaft .....	382
Final Drive.....	353	Reduction Pinion Gear .....	382
<b>ASSEMBLY</b> .....	357	Band Servo.....	383
Assembly (1).....	357	Output Shaft.....	383
Adjustment (1) .....	357	Bearing Retainer.....	384
Assembly (2).....	362	Total End Play.....	384
Adjustment (2) .....	368	Reverse Clutch End Play .....	384
Assembly (3).....	370	Removal and Installation .....	385
<b>SERVICE DATA AND SPECIFICATIONS (SDS)</b> .....	376	Shift Solenoid Valves.....	385
General Specifications.....	376	Solenoid Valves .....	385
Shift Schedule.....	376	A/T Fluid Temperature Sensor.....	385
Stall Revolution.....	376	Revolution Sensor (For Speed Sensor) .....	385
Line Pressure.....	377	Dropping Resistor .....	385
		Power Train Revolution Sensor.....	385



# TROUBLE DIAGNOSIS — INDEX

Alphabetical & P No. Index for DTC

## Alphabetical & P No. Index for DTC

NFAT0001

NFAT0001S01

### ALPHABETICAL INDEX FOR DTC

Items (CONSULT-II screen terms)	DTC	Reference page
	CONSULT-II GST*1	
A/T 1ST GR FNCTN	P0731	AT-126
A/T 2ND GR FNCTN	P0732	AT-132
A/T 3RD GR FNCTN	P0733	AT-138
A/T 4TH GR FNCTN	P0734	AT-144
A/T TCC S/V FNCTN	P0744	AT-158
ATF TEMP SEN/CIRC	P0710	AT-110
CAN COMM CIRCUIT	U1000	AT-208
ENGINE SPEED SIG	P0725	AT-121
L/PRESS SOL/CIRC	P0745	AT-168
O/R CLTCH SOL/CIRC	P1760	AT-191
PNP SW/CIRC	P0705	AT-104
SFT SOL A/CIRC*2	P0750	AT-174
SFT SOL B/CIRC*2	P0755	AT-179
TCC SOLENOID/CIRC	P0740	AT-153
TP SEN/CIRC A/T*2	P1705	AT-184
VEH SPD SEN/CIR AT*3	P0720	AT-116

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

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

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



# TROUBLE DIAGNOSIS — INDEX

Alphabetical & P No. Index for DTC (Cont'd)

## P NO. INDEX FOR DTC

=NFAT0001S02

DTC	Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*1		
P0705	PNP SW/CIRC	AT-104
P0710	ATF TEMP SEN/CIRC	AT-110
P0720	VEH SPD SEN/CIR AT*3	AT-116
P0725	ENGINE SPEED SIG	AT-121
P0731	A/T 1ST GR FNCTN	AT-126
P0732	A/T 2ND GR FNCTN	AT-132
P0733	A/T 3RD GR FNCTN	AT-138
P0734	A/T 4TH GR FNCTN	AT-144
P0740	TCC SOLENOID/CIRC	AT-153
P0744	A/T TCC S/V FNCTN	AT-158
P0745	L/PRESS SOL/CIRC	AT-168
P0750	SFT SOL A/CIRC*2	AT-174
P0755	SFT SOL B/CIRC*2	AT-179
P1705	TP SEN/CIRC A/T*2	AT-184
P1760	O/R CLTCH SOL/CIRC	AT-191
U1000	CAN COMM CIRCUIT	AT-208

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

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

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



## PRECAUTIONS

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

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

NFAT0002

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:

- 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, crash zone sensor, 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 by yellow harness connector.

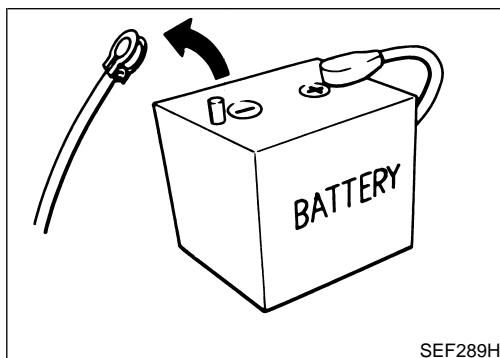
### Precautions for On Board Diagnostic (OBD) System of A/T and Engine

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 MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to an open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Be sure to route and secure the harnesses properly after work. Interference of the harness with a bracket, etc. may cause the MIL to light up due to a short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to a malfunction of the EGR system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM or ECM before returning the vehicle to the customer.



SEF289H

### Precautions

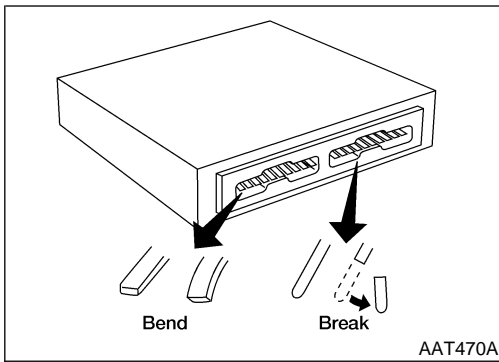
NFAT0004

- 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.

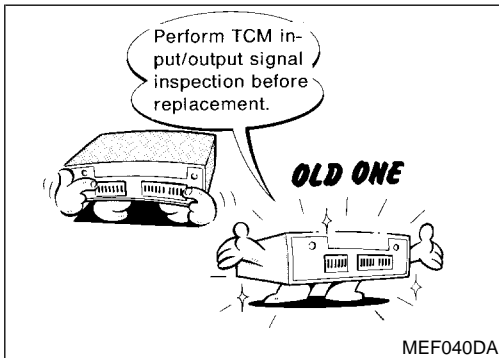


## PRECAUTIONS

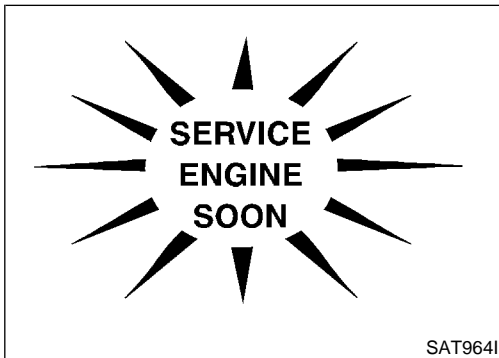
### Precautions (Cont'd)



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



- Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. (See page AT-97.)



- 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



# PRECAUTIONS

Precautions (Cont'd)

parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.

- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
  - Replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to "ATF COOLER SERVICE" (Refer to AT-10).
  - 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-21, "Changing A/T Fluid" when changing A/T fluid.

GI

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EM

LC

EC

FE

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MT

## Service Notice or Precautions

NFAT0005

NFAT0005S01

### FAIL-SAFE

The TCM has an electronic Fail-Safe (limp home mode). This allows the vehicle to be driven even if a major electrical input/output device circuit is damaged.

Under Fail-Safe, the vehicle always runs in third gear, even with a shift lever position of 1st, 2nd or D. The customer may complain of sluggish or poor acceleration.

When the ignition key is turned ON following Fail-Safe operation, A/T CHECK indicator lamp blinks for about 8 seconds. [For "TCM Self-diagnostic Procedure (No Tools)", refer to AT-51.]

The blinking of the A/T CHECK indicator lamp for about 8 seconds will appear only once and be cleared. The customer may resume normal driving conditions.

Always follow the "Work Flow" (Refer to AT-61).

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.

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX



# PRECAUTIONS

*Service Notice or Precautions (Cont'd)*

- Transaxle malfunction did not display evidence of damaged or worn internal parts, steel particles or clutch plate lining material in unit and inside the fluid filter.
- Vehicle has been exposed to high mileage (only). The exception may be where the torque converter clutch dampener plate lining has seen excess wear by vehicles operated in heavy and/or constant traffic, such as taxi, delivery or police use.

## ATF COOLER SERVICE

If A/T fluid contains frictional material (clutches, bands, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of A/T. Refer to LC-20, "Radiator".

NFAT0005S03

## OBD-II SELF-DIAGNOSIS

- A/T self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the A/T CHECK indicator lamp or the malfunction indicator lamp (MIL). Refer to the table on AT-42 for the indicator used to display each self-diagnostic result.
- The self-diagnostic results indicated by the MIL are automatically stored in both the ECM and TCM memories.

NFAT0005S04

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

- The following self-diagnostic items can be detected using ECM self-diagnostic results mode\* only when the A/T CHECK indicator lamp does not indicate any malfunctions.
  - park/neutral position (PNP) switch
  - A/T 1st, 2nd, 3rd, or 4th gear function
  - A/T TCC S/V function (lock-up).

\*: For details of OBD-II, refer to EC-75, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION".

- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector.**

**For description and how to disconnect, refer to EL-6, "Description".**

## Wiring Diagrams and Trouble Diagnosis

When you read wiring diagrams, refer to the following:

- GI-11, "HOW TO READ WIRING DIAGRAMS"
- EL-10, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- GI-35, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-24, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT"

NFAT0006




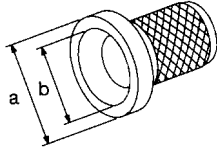
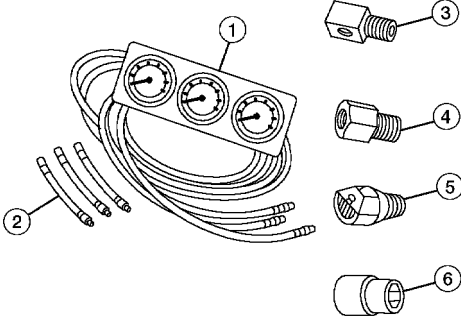
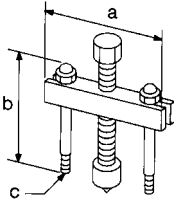
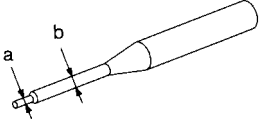
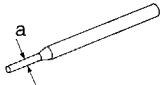
# PREPARATION

Special Service Tools

## Special Service Tools

NFAT0007

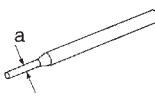
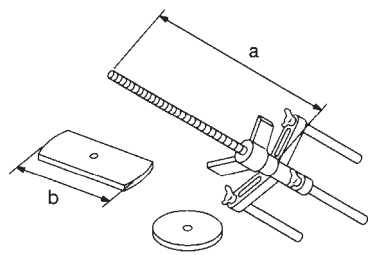
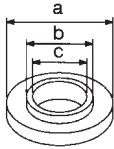
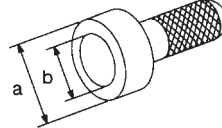
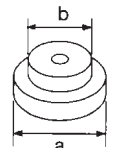
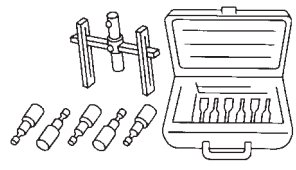
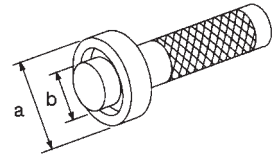
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
KV381054S0 (J34286) Puller	 <ul style="list-style-type: none"> <li>Removing differential side oil seals</li> <li>Removing differential side bearing outer race</li> <li>Removing idler gear bearing outer race</li> <li>a: 250 mm (9.84 in)</li> <li>b: 160 mm (6.30 in)</li> </ul>	GI MA EM LC EC FE CL
NT414		
ST33400001 (J26082) Drift	 <ul style="list-style-type: none"> <li>Installing differential side oil seal</li> <li>Installing oil seal on oil pump housing</li> <li>a: 60 mm (2.36 in) dia.</li> <li>b: 47 mm (1.85 in) dia.</li> </ul>	FE CL
NT086		
(J34301-C) Oil pressure gauge set 1 (J34301-1) Oil pressure gauge 2 (J34301-2) Hoses 3 (J34298) Adapter 4 (J34282-2) Adapter 5 (790-301-1230-A) 60° Adapter 6 (J34301-15) Square socket	 <ul style="list-style-type: none"> <li>Measuring line pressure</li> </ul>	MT AT AX SU BR
AAT896		
ST27180001 (J25726-A) Puller	 <ul style="list-style-type: none"> <li>Removing idler gear</li> <li>a: 100 mm (3.94 in)</li> <li>b: 110 mm (4.33 in)</li> <li>c: M8 x 1.25P</li> </ul>	ST RS
NT424		
ST23540000 (J25689-A) Pin punch	 <ul style="list-style-type: none"> <li>Removing and installing parking rod plate and manual plate pins</li> <li>a: 2.3 mm (0.091 in) dia.</li> <li>b: 4 mm (0.16 in) dia.</li> </ul>	BT HA
NT442		
ST25710000 (J25689-A) Pin punch	 <ul style="list-style-type: none"> <li>Aligning groove of manual shaft and hole of transmission case</li> <li>a: 2 mm (0.08 in) dia.</li> </ul>	SC EL IDX
NT410		



# PREPARATION

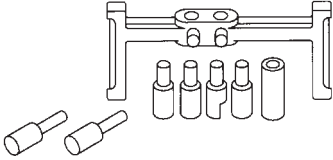
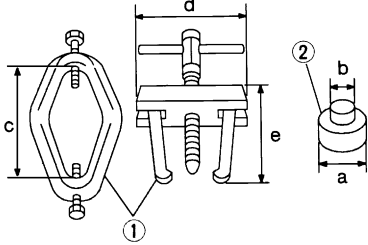
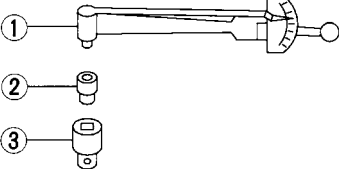
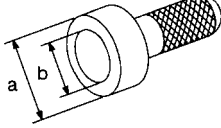
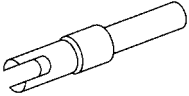
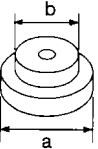
## Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description
KV32101000 (J25689-A) Pin punch	 <ul style="list-style-type: none"> <li>● Removing and installing manual shaft retaining pin</li> <li>● Removing and installing pinion mate shaft lock pin</li> </ul> <p><b>a: 4 mm (0.16 in) dia.</b></p> <p>NT410</p>
KV31102400 (J34285 and J34285-87) Clutch spring compressor	 <ul style="list-style-type: none"> <li>● Removing and installing clutch return springs</li> <li>● Installing low and reverse brake piston</li> </ul> <p><b>a: 320 mm (12.60 in)</b> <b>b: 174 mm (6.85 in)</b></p> <p>NT423</p>
KV40100630 (J26092) Drift	 <ul style="list-style-type: none"> <li>● Installing reduction gear bearing inner race</li> <li>● Installing idler gear bearing inner race</li> </ul> <p><b>a: 67.5 mm (2.657 in) dia.</b> <b>b: 44 mm (1.73 in) dia.</b> <b>c: 38.5 mm (1.516 in) dia.</b></p> <p>NT107</p>
ST30720000 (J25405 and J34331) Bearing installer	 <ul style="list-style-type: none"> <li>● Installing idler gear bearing outer race</li> </ul> <p><b>a: 77 mm (3.03 in) dia.</b> <b>b: 55.5 mm (2.185 in) dia.</b></p> <p>NT115</p>
ST35321000 ( — ) Drift	 <ul style="list-style-type: none"> <li>● Installing output shaft bearing</li> </ul> <p><b>a: 49 mm (1.93 in) dia.</b> <b>b: 41 mm (1.61 in) dia.</b></p> <p>NT073</p>
(J34291-A) Shim setting gauge set	 <ul style="list-style-type: none"> <li>● Selecting oil pump cover bearing race and oil pump thrust washer</li> <li>● Selecting side gear thrust washer</li> </ul> <p>NT101</p>
ST33230000 (J25805-01) Drift	 <ul style="list-style-type: none"> <li>● Installing differential side bearing inner race</li> </ul> <p><b>a: 51 mm (2.01 in) dia.</b> <b>b: 28.5 mm (1.122 in) dia.</b></p> <p>NT084</p>



# PREPARATION

Special Service Tools (Cont'd)

Tool number (Kent-Moore No.) Tool name	Description	
(J34290) Shim selecting tool set	 <ul style="list-style-type: none"> <li>Selecting differential side bearing adjusting shim</li> </ul>	GI MA EM
NT080		
ST3306S001 (J22888-D) Differential side bearing puller set 1 ST33051001 (J22888-D) Puller 2 ST33061000 (J8107-2) Adapter	 <ul style="list-style-type: none"> <li>Removing differential side bearing inner race</li> <li>a: 38 mm (1.50 in) dia.</li> <li>b: 28.5 mm (1.122 in) dia.</li> <li>c: 130 mm (5.12 in)</li> <li>d: 135 mm (5.31 in)</li> <li>e: 100 mm (3.94 in)</li> </ul>	LC EC FE CL
AMT153		
ST3127S000 (J25765-A) Preload gauge 1 GG91030000 (J25765-A) Torque wrench 2 HT62940000 ( — ) Socket adapter 3 HT62900000 ( — ) Socket adapter	 <ul style="list-style-type: none"> <li>Checking differential side bearing preload</li> </ul>	MT AT AX SU
NT124		
ST35271000 (J26091) Drift	 <ul style="list-style-type: none"> <li>Installing idler gear</li> <li>a: 72 mm (2.83 in) dia.</li> <li>b: 63 mm (2.48 in) dia.</li> </ul>	BR ST
NT115		
(J39713) Preload adapter	 <ul style="list-style-type: none"> <li>Selecting differential side bearing adjusting shim</li> <li>Checking differential side bearing preload</li> </ul>	RS BT
NT087		
ST30613000 (J25742-3) Drift	 <ul style="list-style-type: none"> <li>a: 72 mm (2.83 in) dia.</li> <li>b: 48 mm (1.89 in) dia.</li> </ul>	HA SC
NT073		

EL

IDX

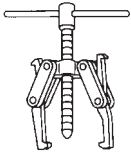
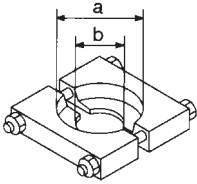
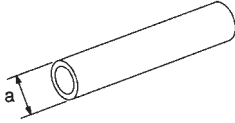
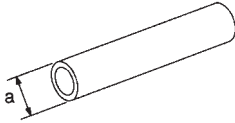
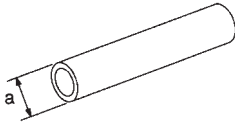


# PREPARATION

Commercial Service Tools

## Commercial Service Tools

NFAT0008

Tool name	Description
Puller	 <ul style="list-style-type: none"> <li>● Removing idler gear bearing inner race</li> <li>● Removing and installing band servo piston snap ring</li> </ul> <p>NT077</p>
Puller	 <ul style="list-style-type: none"> <li>● Removing reduction gear bearing inner race</li> </ul> <p><b>a: 60 mm (2.36 in) dia.</b> <b>b: 35 mm (1.38 in) dia.</b></p> <p>NT411</p>
Drift	 <ul style="list-style-type: none"> <li>● Installing needle bearing on bearing retainer</li> </ul> <p><b>a: 36 mm (1.42 in) dia.</b></p> <p>NT083</p>
Drift	 <ul style="list-style-type: none"> <li>● Removing needle bearing from bearing retainer</li> </ul> <p><b>a: 33.5 mm (1.319 in) dia.</b></p> <p>NT083</p>
Drift	 <ul style="list-style-type: none"> <li>● Installing differential side bearing outer race</li> </ul> <p><b>a: 75 mm (2.95 in) dia.</b></p> <p>NT083</p>

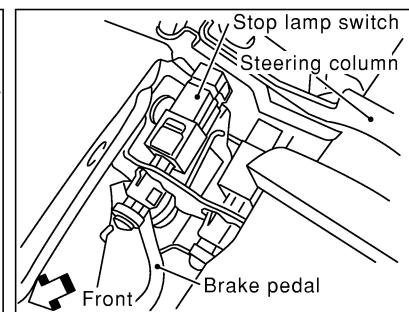
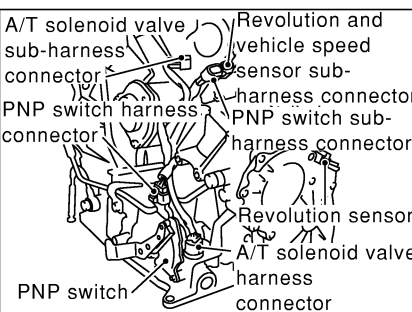
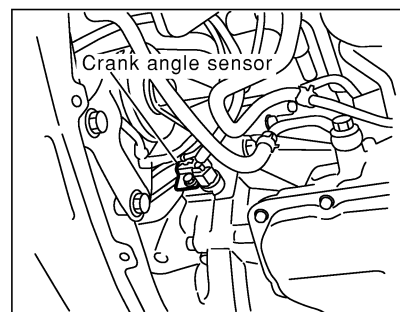
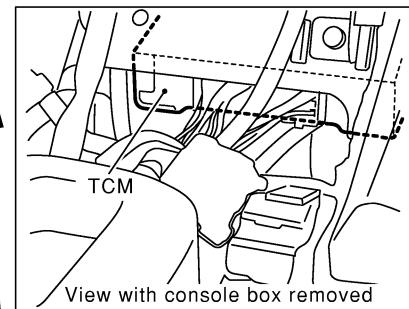
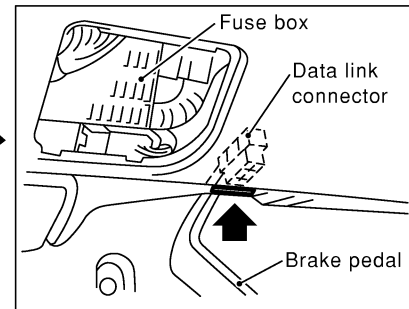
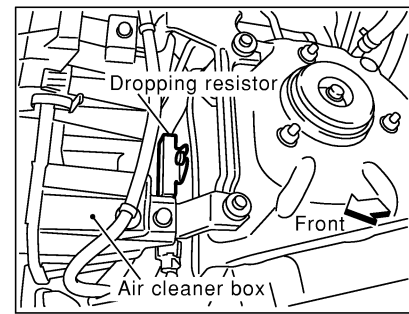
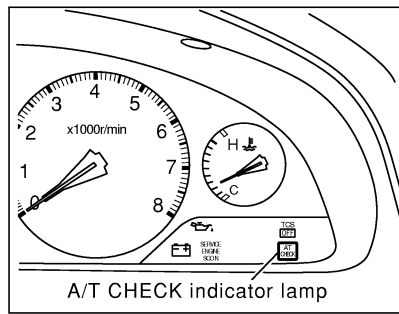
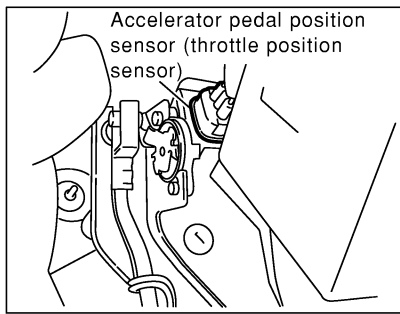


# OVERALL SYSTEM

A/T Electrical Parts Location

## A/T Electrical Parts Location

NFAT0009



GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
**AT**  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

SAT487KA

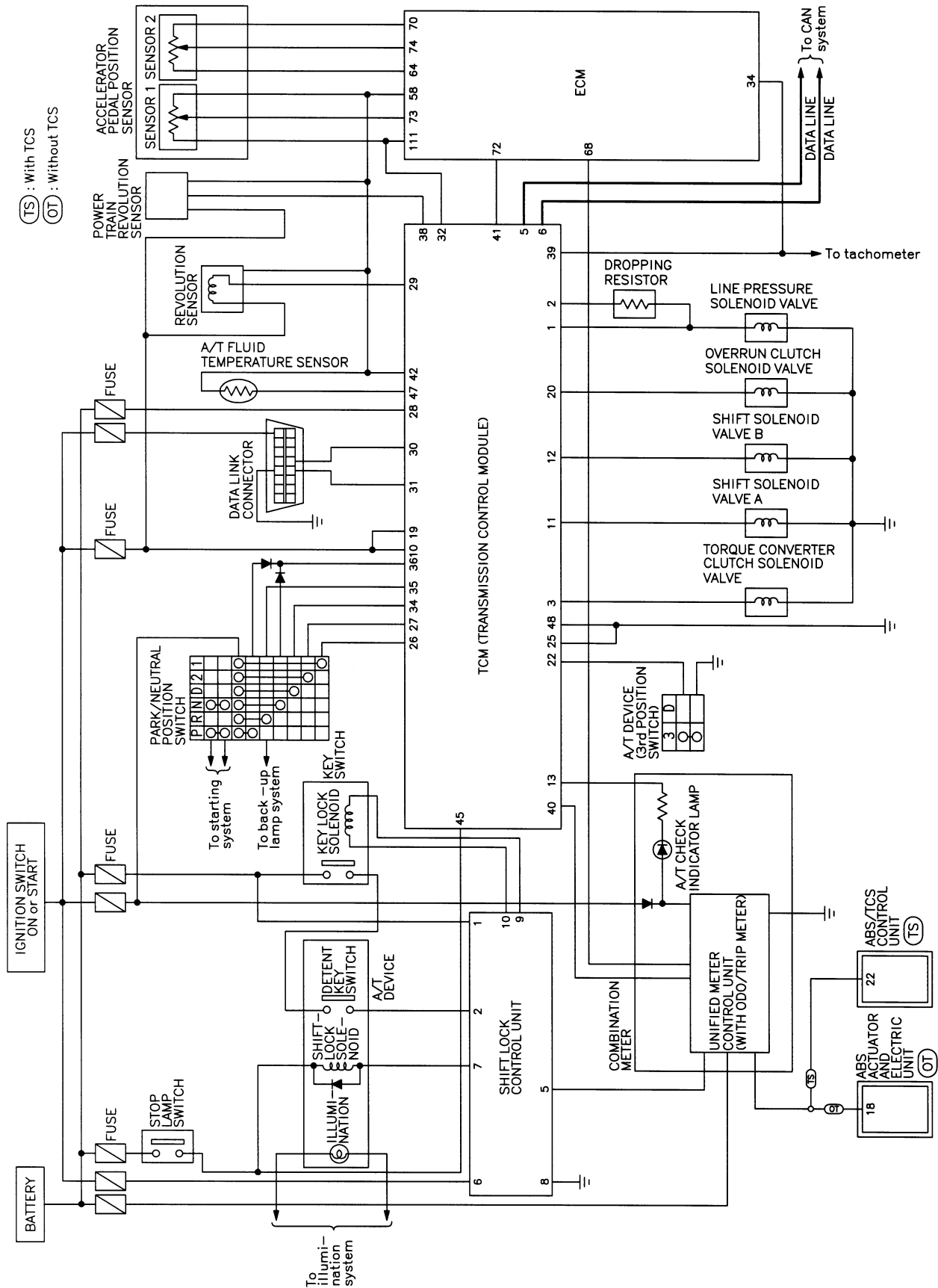


# OVERALL SYSTEM

Circuit Diagram

## Circuit Diagram

NFAT0010



MAT264B

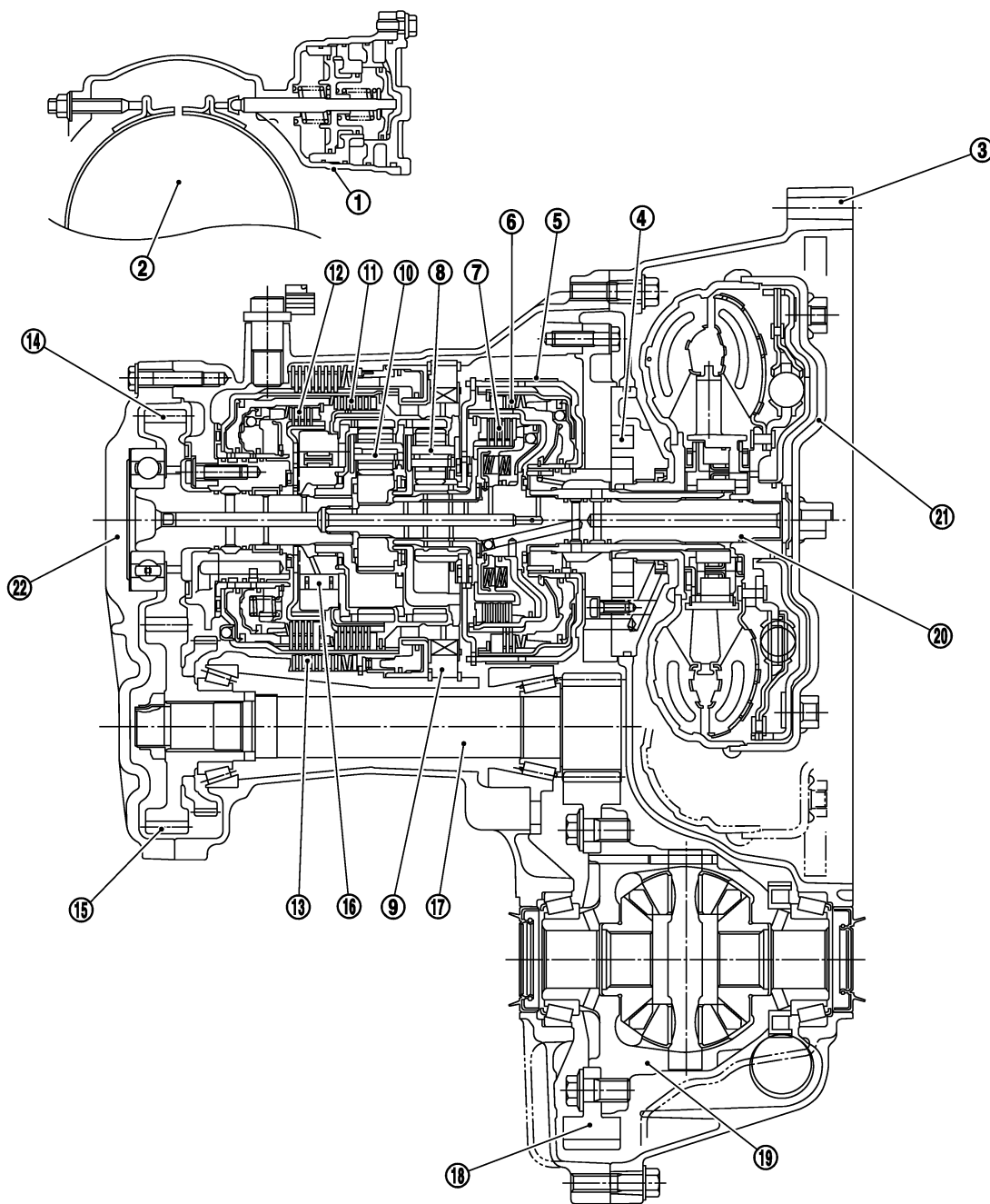


# OVERALL SYSTEM

Cross-sectional View

## Cross-sectional View

NFAT0011



SAT488K

- |                         |                         |                            |
|-------------------------|-------------------------|----------------------------|
| 1. Band servo piston    | 9. Low one-way clutch   | 16. Forward one-way clutch |
| 2. Reverse clutch drum  | 10. Rear planetary gear | 17. Pinion reduction gear  |
| 3. Converter housing    | 11. Forward clutch      | 18. Final gear             |
| 4. Oil pump             | 12. Overrun clutch      | 19. Differential case      |
| 5. Brake band           | 13. Low & reverse brake | 20. Input shaft            |
| 6. Reverse clutch       | 14. Output gear         | 21. Torque converter       |
| 7. High clutch          | 15. Idler gear          | 22. Side cover             |
| 8. Front planetary gear |                         |                            |

GI

MA

EM

LC

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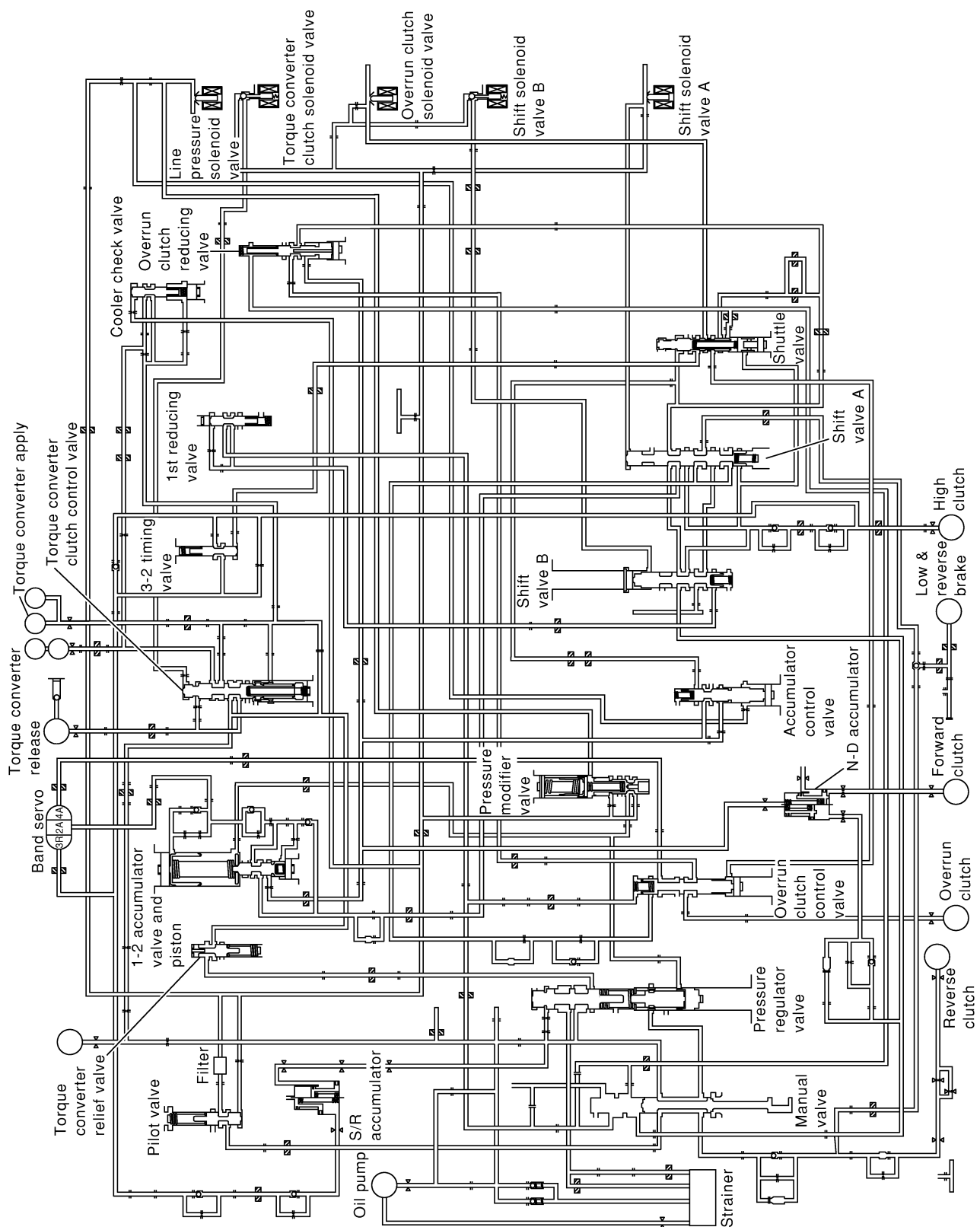
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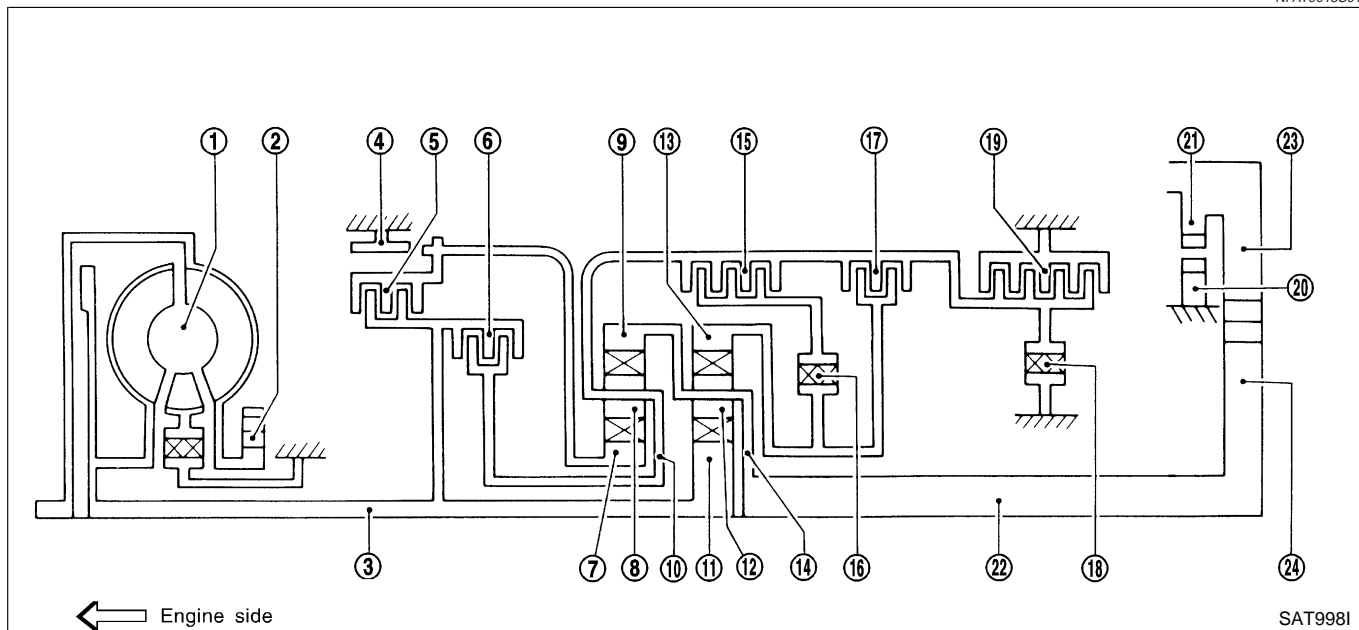


## Shift Mechanism

## CONSTRUCTION

NFAT0013

NFAT0013S01



SAT9981

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

## FUNCTION OF CLUTCH AND BRAKE

NFAT0013S02

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



# OVERALL SYSTEM

Shift Mechanism (Cont'd)

## CLUTCH AND BAND CHART

NFAT0013S03

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

\*1: Operates when selector lever is set in 3rd 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 selector lever is set in 3rd position.

○: Operates

A: Operates when throttle opening is less than 3.0/16, activating engine brake.

B: Operates during "progressive" acceleration.

C: Operates but does not affect power transmission.

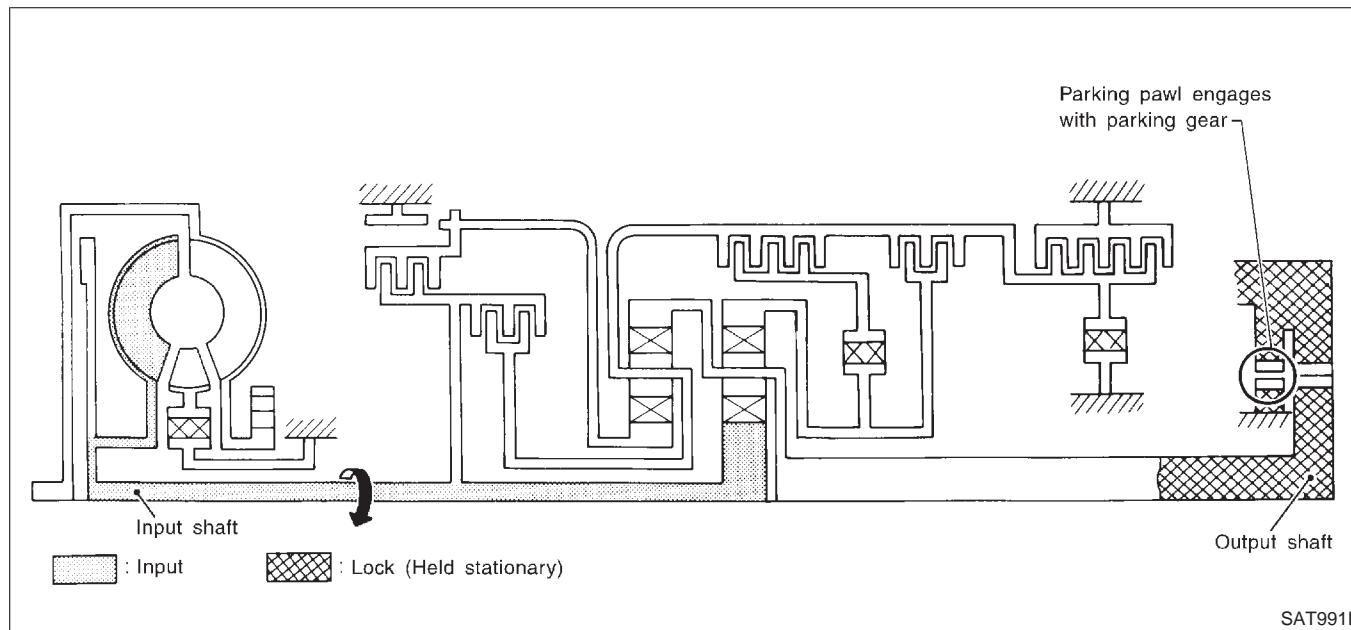
D: Operates when throttle opening is less than 3.0/16, but does not affect engine brake.



## POWER TRANSMISSION

### P and N Positions

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





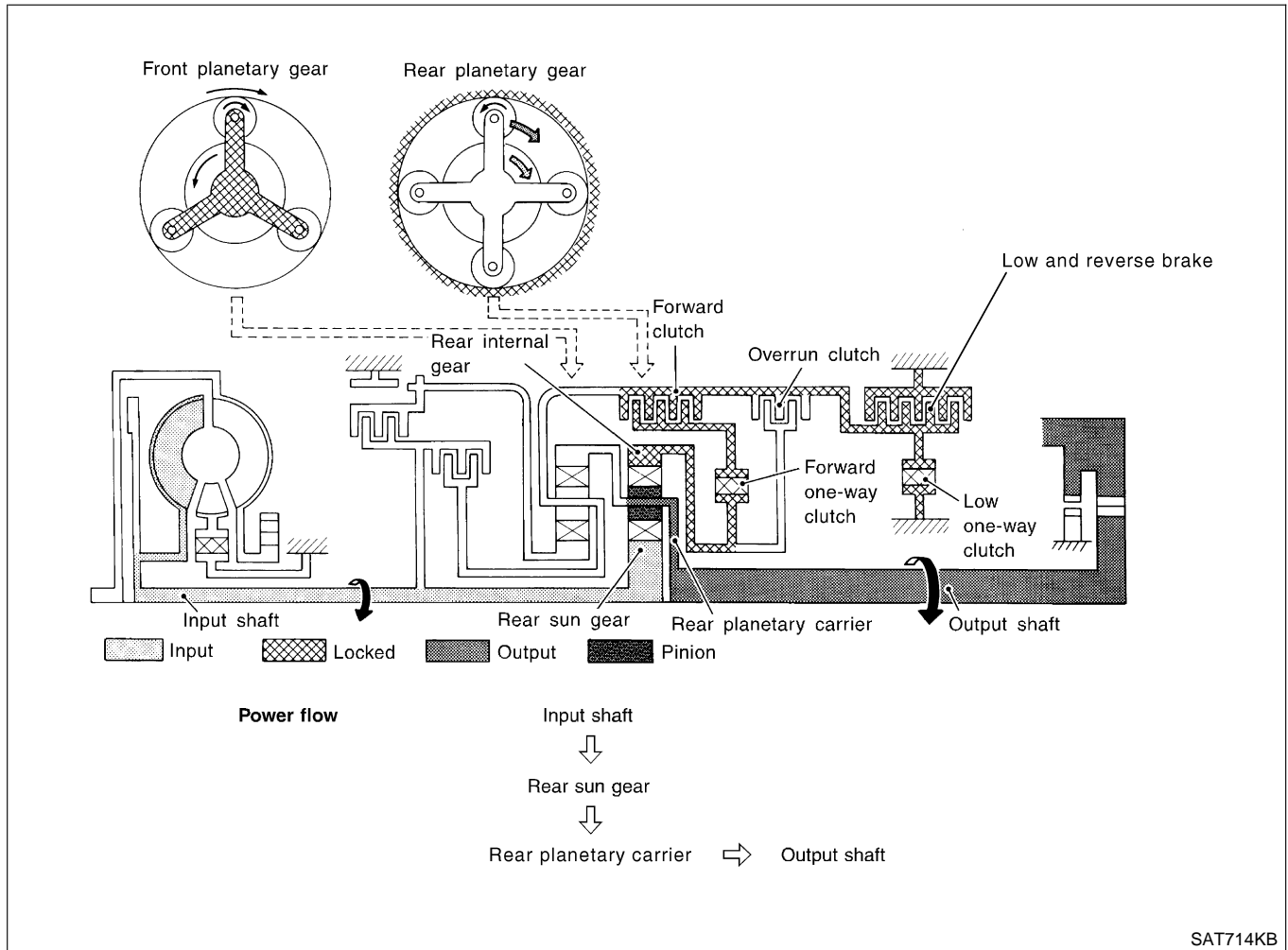
# OVERALL SYSTEM

Shift Mechanism (Cont'd)

## 1<sub>1</sub> Position

=NFAT0013S0402

<ul style="list-style-type: none"> <li>• Forward clutch</li> <li>• Forward one-way clutch</li> <li>• Overrun clutch</li> <li>• Low and reverse brake</li> </ul>	<p>As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake.</p> <p>This is different from that of D<sub>1</sub> and 2<sub>1</sub>.</p>
Engine brake	Overrun clutch always engages, therefore engine brake can be obtained when decelerating.



SAT714KB



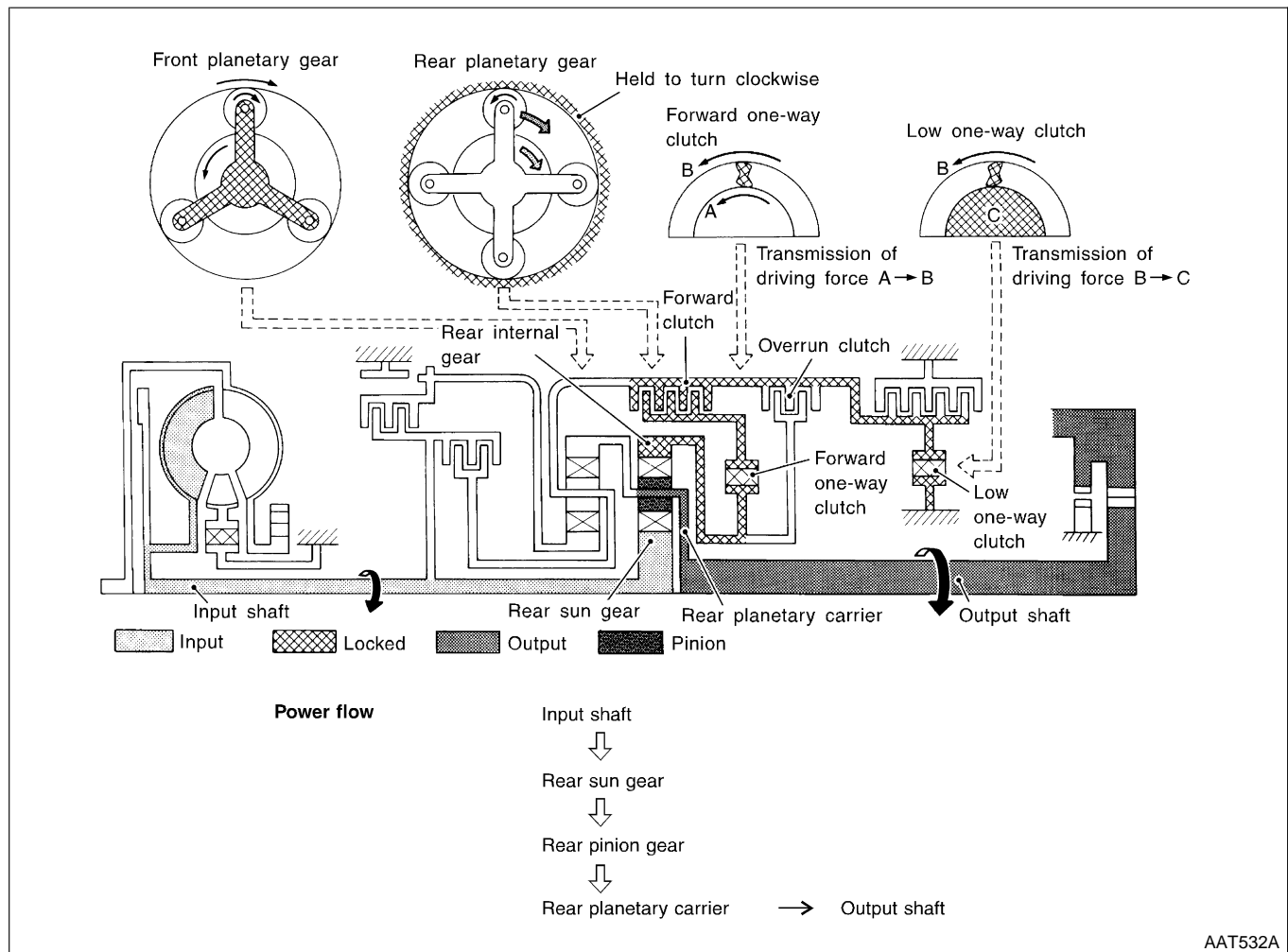
# OVERALL SYSTEM

Shift Mechanism (Cont'd)

## D<sub>1</sub> and 2<sub>1</sub> Positions

=NFAT0013S0403

<ul style="list-style-type: none"> <li>• Forward one-way clutch</li> <li>• Forward clutch</li> <li>• Low one-way clutch</li> </ul>	Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches.
<b>Overrun clutch</b> engagement conditions (Engine brake)	D <sub>1</sub> : Selector lever is set in 3rd position and throttle opening is less than 3.0/16 2 <sub>1</sub> : Always engaged At D <sub>1</sub> and 2 <sub>1</sub> positions, engine brake is not activated due to free turning of low one-way clutch.



AAT532A



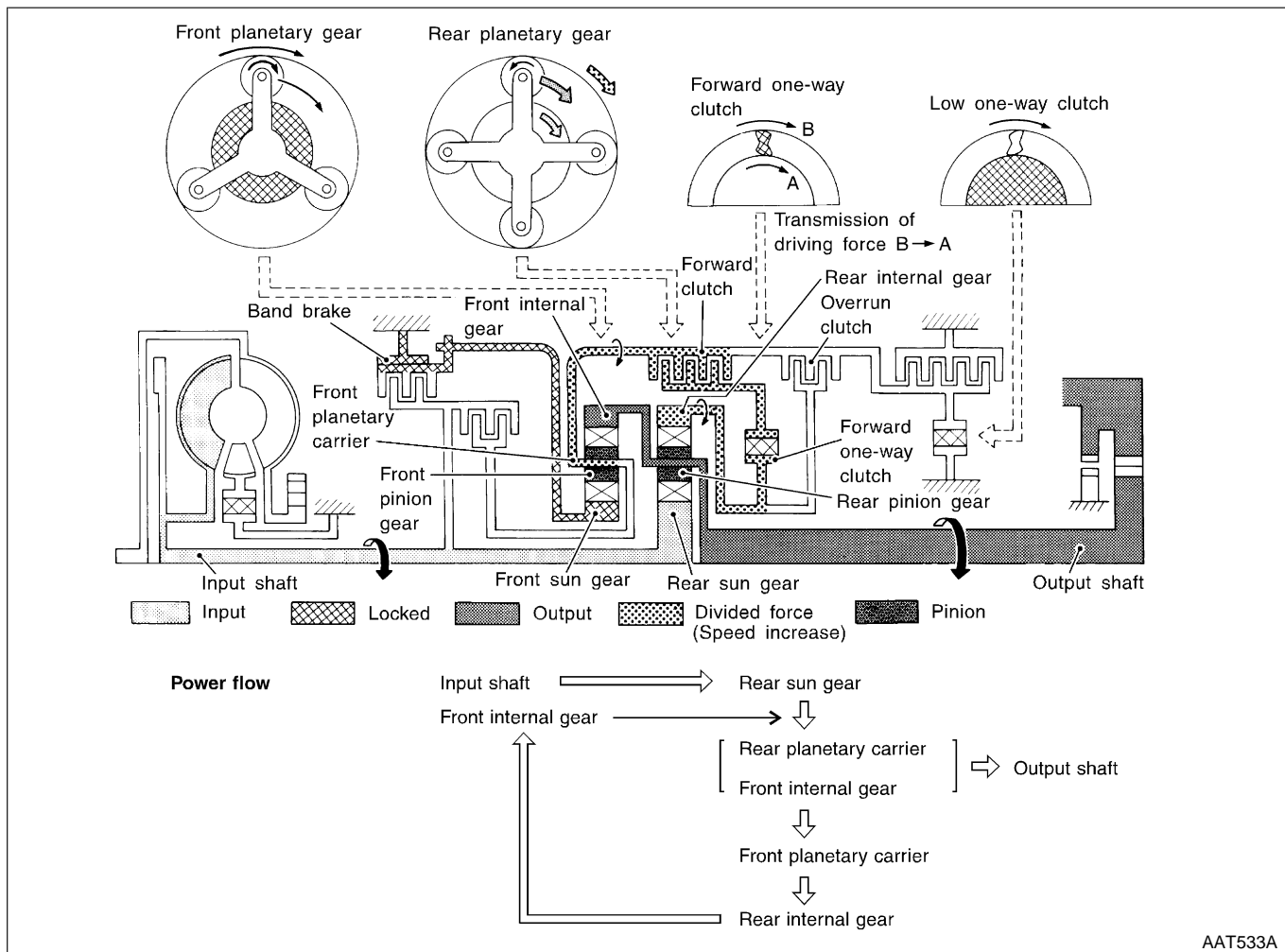
# OVERALL SYSTEM

Shift Mechanism (Cont'd)

## D<sub>2</sub>, 2<sub>2</sub> and 1<sub>2</sub> Positions

=NFAT0013S0404

<ul style="list-style-type: none"> <li>• Forward clutch</li> <li>• Forward one-way clutch</li> <li>• Brake band</li> </ul>	<p>Rear sun gear drives rear planetary carrier and combined front internal gear. Front internal gear now rotates around front sun gear accompanying front planetary carrier.</p> <p>As front planetary carrier transfers the power to rear internal gear through forward clutch and forward one-way clutch, this rotation of rear internal gear increases the speed of rear planetary carrier compared with that of the 1st speed.</p>
<p><b>Overrun clutch</b> engagement conditions</p>	<p>D<sub>2</sub>: Selector lever is set in 3rd position and throttle opening is less than 3.0/16</p> <p>2<sub>2</sub> and 1<sub>2</sub>: Always engaged</p>





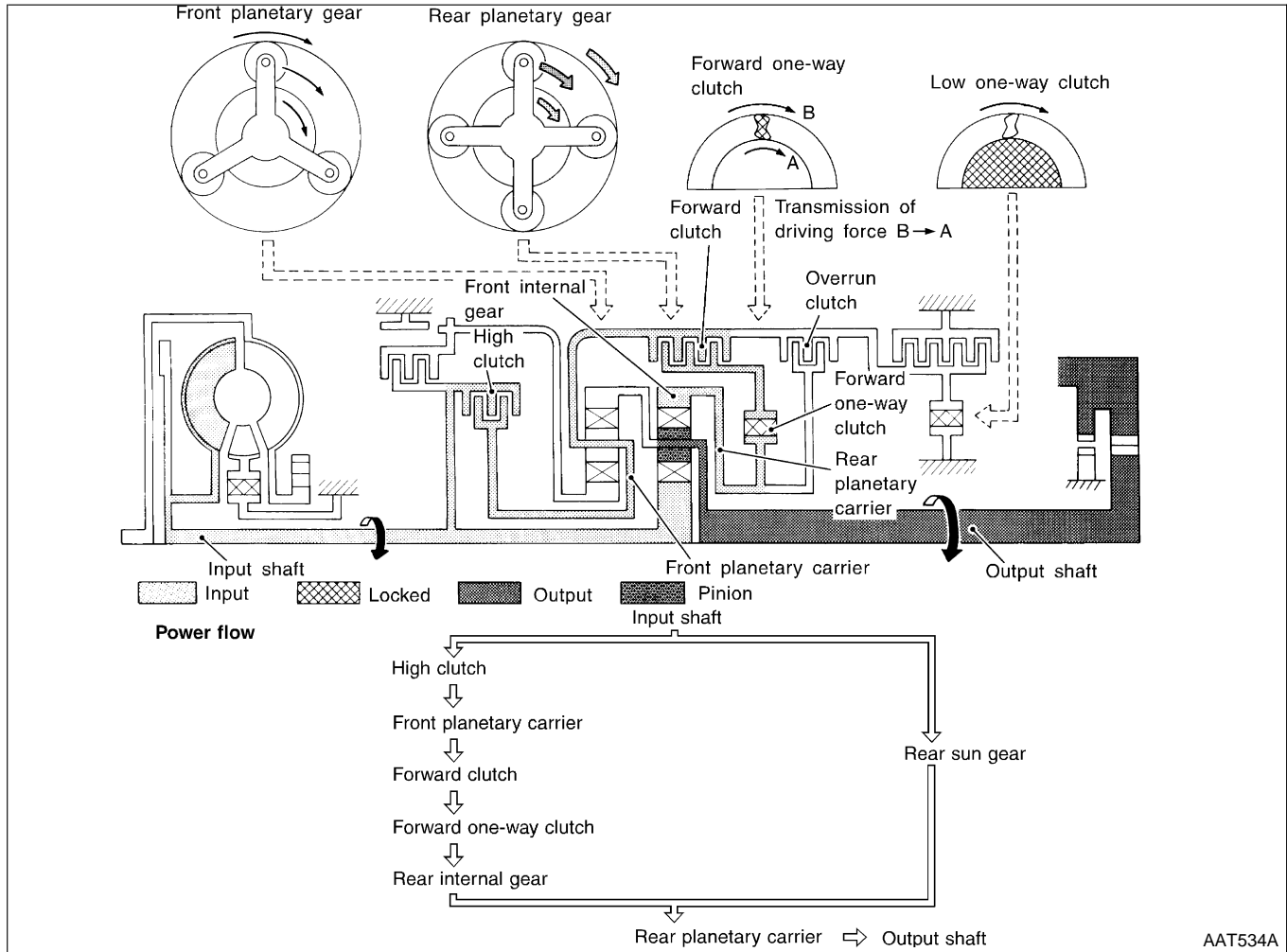
# OVERALL SYSTEM

Shift Mechanism (Cont'd)

## D<sub>3</sub>, 2<sub>3</sub> and 1<sub>3</sub> Position

=NFAT0013S0405

<ul style="list-style-type: none"> <li>• High clutch</li> <li>• Forward clutch</li> <li>• Forward one-way clutch</li> </ul>	<p>Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch.</p> <p>This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.</p>
<p><b>Overrun clutch</b> engagement conditions</p>	<p>D<sub>3</sub>: Selector lever is set in 3rd position and throttle opening is less than 3.0/16</p> <p>2<sub>3</sub> and 1<sub>3</sub>: Always engaged</p>



AAT534A



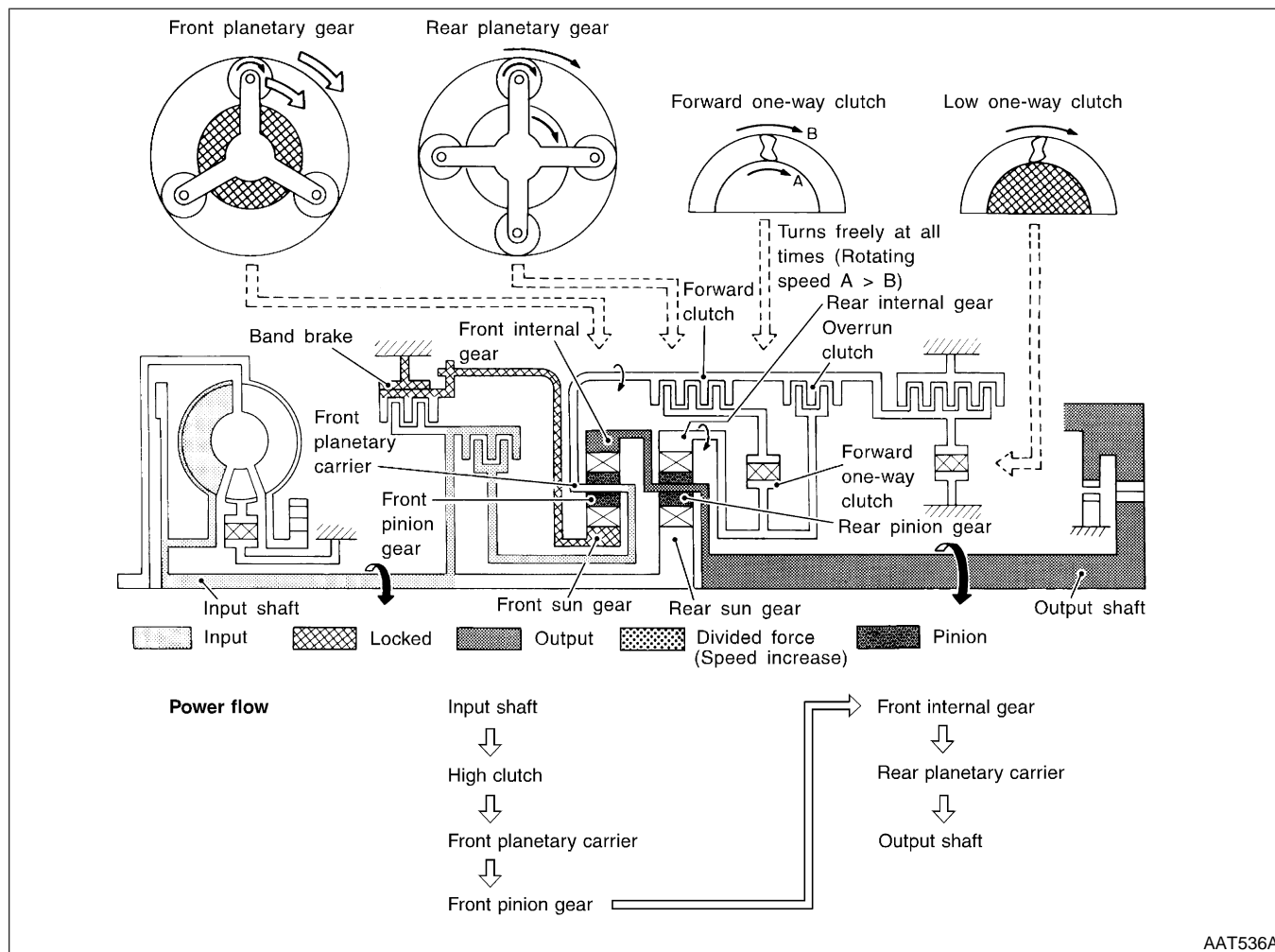
# OVERALL SYSTEM

Shift Mechanism (Cont'd)

## D<sub>4</sub> Position

=NFAT0013S0406

<ul style="list-style-type: none"> <li>• <b>High clutch</b></li> <li>• <b>Brake band</b></li> <li>• <b>Forward clutch</b> (Does not affect power transmission.)</li> </ul>	<p>Input power is transmitted to front carrier through high clutch. This front carrier turns around the sun gear which is fixed by brake band and makes front internal gear (output) turn faster.</p>
Engine brake	At D <sub>4</sub> position, there is no one-way clutch in the power transmission line and engine brake can be obtained when decelerating.



AAT536A



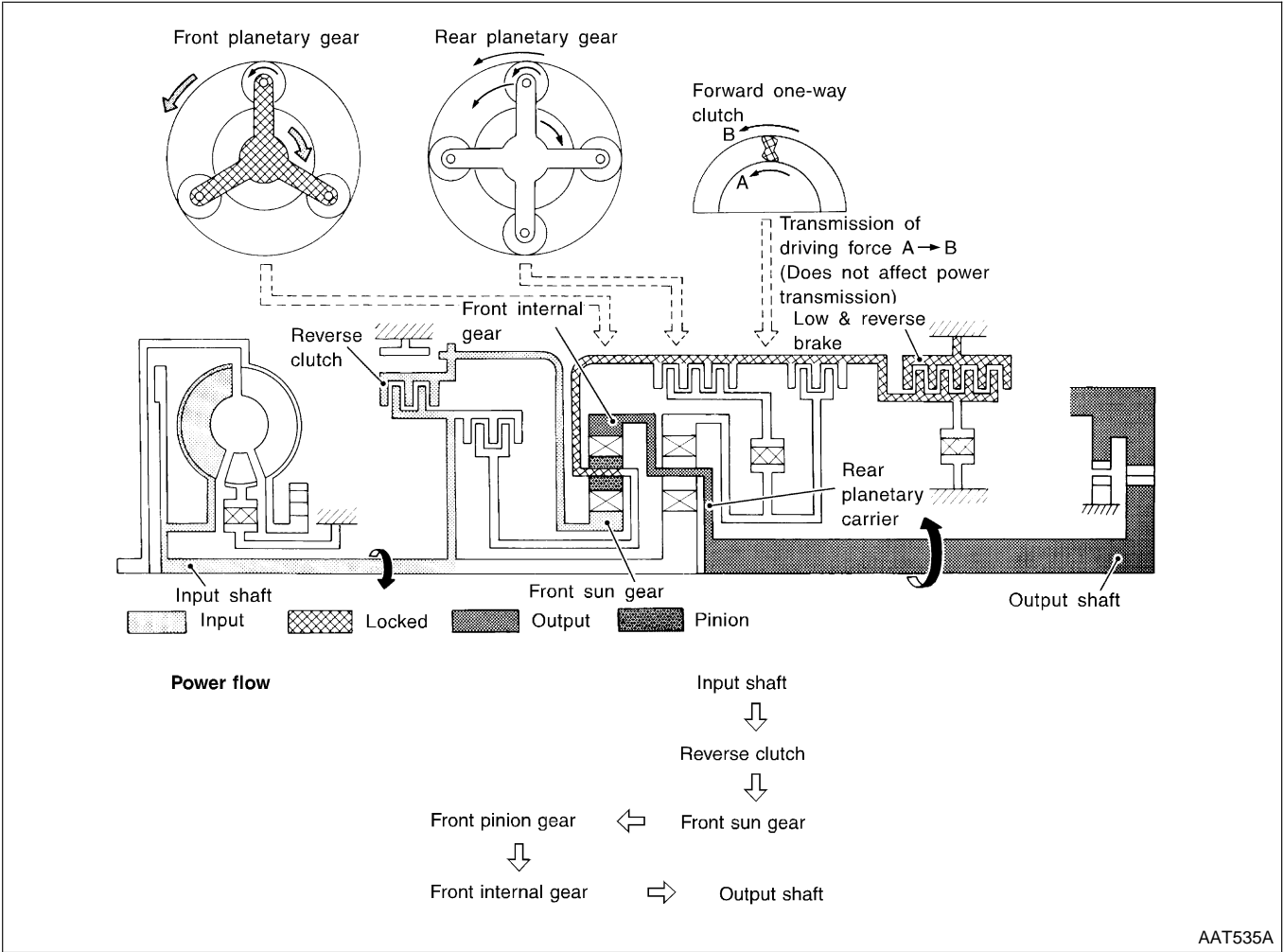
OVERALL SYSTEM

Shift Mechanism (Cont'd)

R Position

=NFAT0013SD407

<ul style="list-style-type: none"><li>● Reverse clutch</li><li>● Low and reverse brake</li></ul>	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.





# OVERALL SYSTEM

Control System

## Control System

=NFAT0014

### OUTLINE

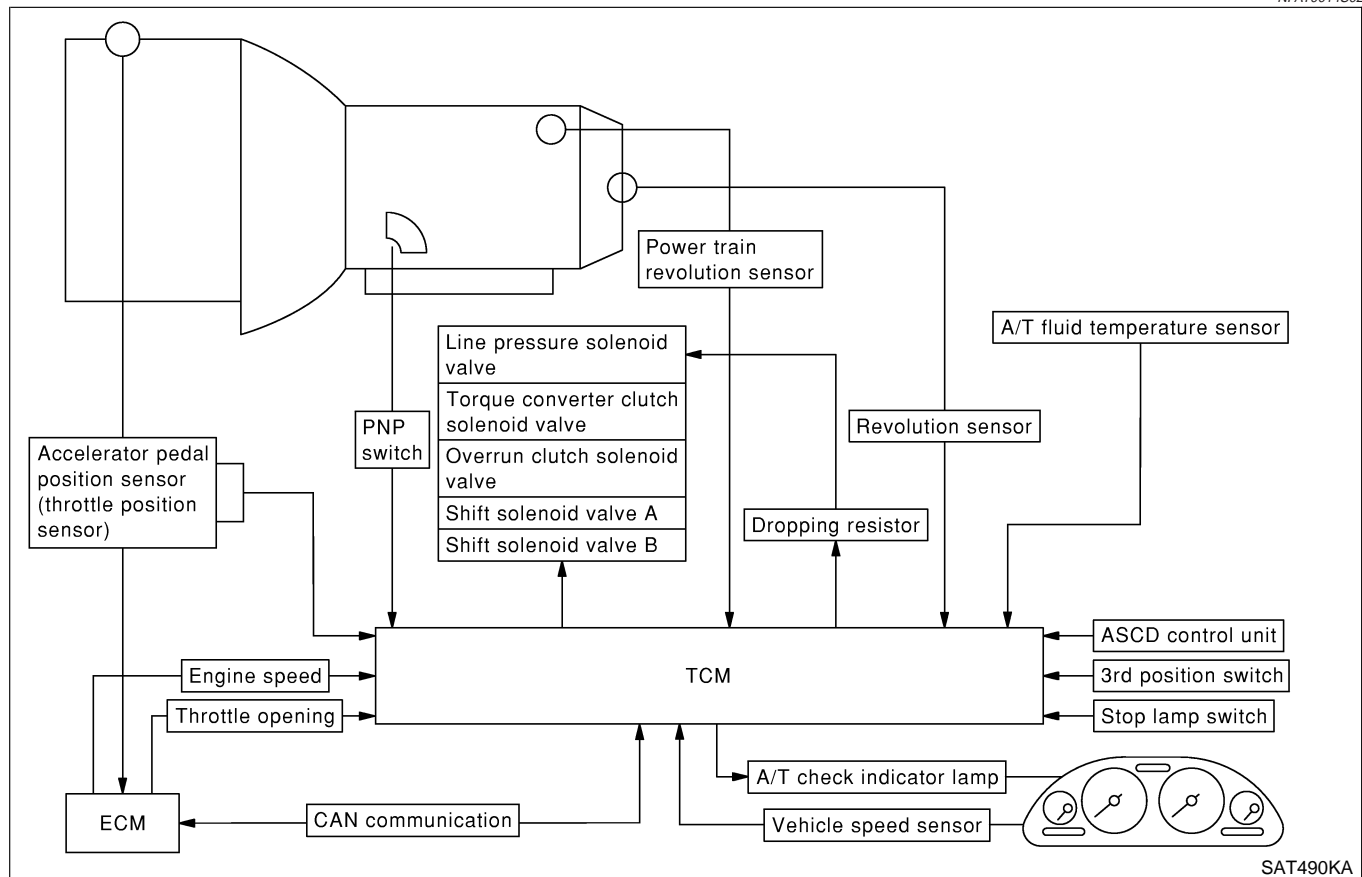
NFAT0014S01

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 Accelerator pedal position sensor (throttle position sensor) Engine speed signal A/T fluid temperature sensor Revolution sensor (VHCL/S SE-1) Vehicle speed sensor (VHCL/S SE-2) 3rd position switch ASCD control unit Stop lamp switch Power train revolution sensor	▶	Shift control Line pressure control Lock-up control Overrun clutch control Timing control Fail-safe control Self-diagnosis CAN communication line control	▶	Shift solenoid valve A Shift solenoid valve B Overrun clutch solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve A/T CHECK indicator lamp

### CONTROL SYSTEM

NFAT0014S02





# OVERALL SYSTEM

Control System (Cont'd)

## TCM FUNCTION

=NFAT0014S03

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

NFAT0014S04

	Sensors and solenoid valves	Function
Input	Park/neutral position (PNP) switch	Detects select lever position and sends a signal to TCM.
	Accelerator pedal position sensor (throttle position sensor)	Detects accelerator pedal position as throttle valve position signal, and sends a signal from ECM to TCM.
	Engine speed signal	From ECM.
	A/T fluid temperature sensor	Detects transmission fluid temperature and sends a signal to TCM.
	Revolution sensor (VHCL/S SE-1)	Detects output shaft rpm and sends a signal to TCM.
	Vehicle speed sensor (VHCL/S SE-2)	Used as an auxiliary vehicle speed sensor. Sends a signal when revolution sensor (installed on transmission) malfunctions.
	3rd position switch	Sends a signal, which prohibits a shift to D position, to the TCM.
	Power train revolution sensor	Detects forward clutch drum rpm and sends a signal to TCM.
	Stop lamp switch	Send the lock-up release signal to the TCM at time of D <sub>4</sub> (lock-up).
	CAN communication	In CAN communication, control units are connected to 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring.
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.
	A/T CHECK indicator lamp	Shows TCM faults, when A/T control components malfunction.



## Control Mechanism

### LINE PRESSURE CONTROL

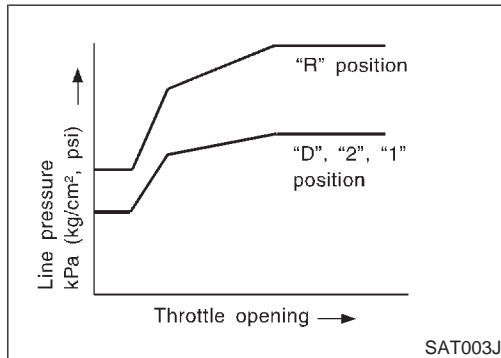
~NFAT0015

NFAT0015S01

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

An ON-OFF duty signal is sent to the line pressure solenoid valve based on TCM characteristics.

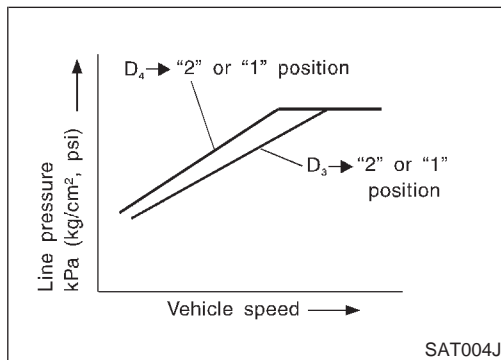
Hydraulic pressure on the clutch and brake is electronically controlled through the line pressure solenoid valve to accommodate engine torque. This results in smooth shift operation.



### Normal Control

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

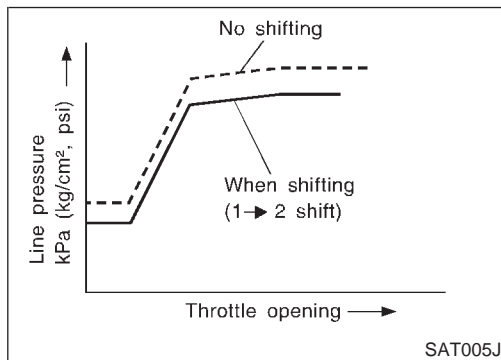
NFAT0015S0101



### Back-up Control (Engine brake)

If the selector lever is shifted to 2nd position while driving in D<sub>4</sub> (O/D) or D<sub>3</sub>, 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.

NFAT0015S0102



### During Shift Change

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

NFAT0015S0103

### At Low Fluid Temperature

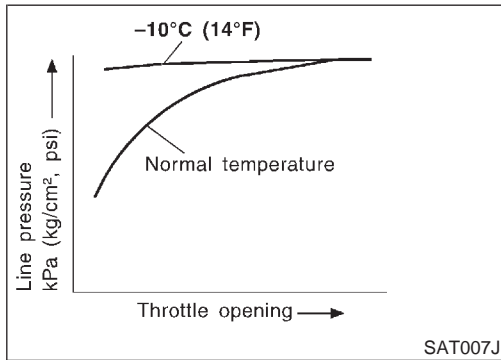
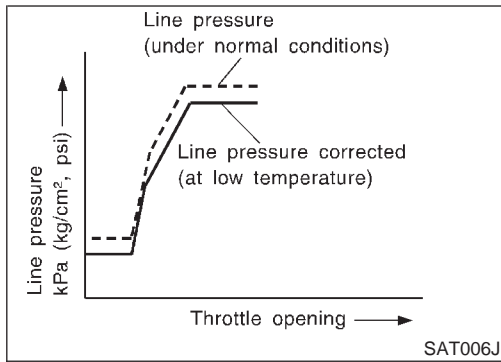
- Fluid viscosity and frictional characteristics of the clutch facing change with fluid temperature. Clutch engaging or band-contacting pressure is compensated for, according to fluid temperature, to stabilize shifting quality.

NFAT0015S0104



# OVERALL SYSTEM

Control Mechanism (Cont'd)



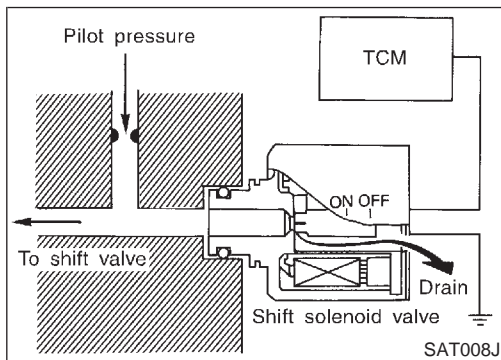
- The line pressure is reduced below 60°C (140°F) to prevent shifting shock due to low viscosity of automatic transmission fluid when temperature is low.

- 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

NFAT0015S02

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

NFAT0015S0201

The TCM activates shift solenoid valves A and B according to signals from the accelerator pedal position sensor (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 <sub>1</sub> , 2 <sub>1</sub> , 1 <sub>1</sub>	D <sub>2</sub> , 2 <sub>2</sub> , 1 <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub> (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)

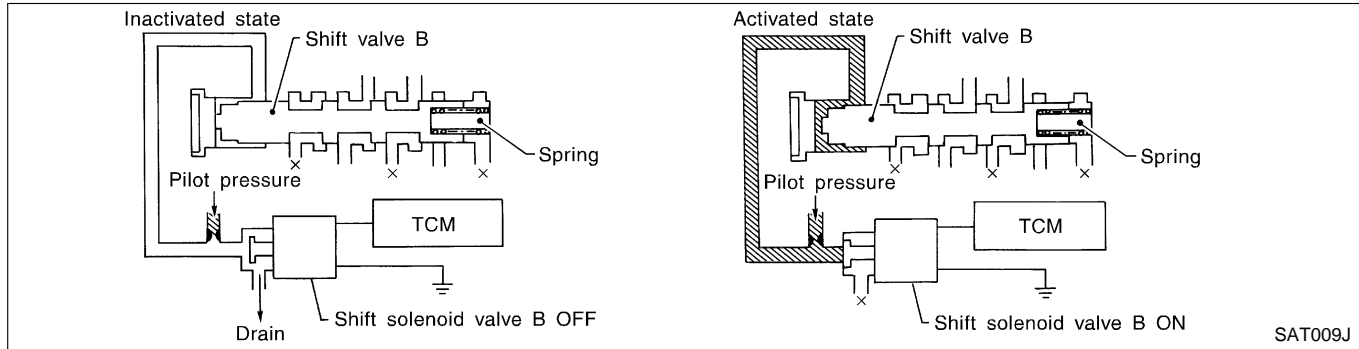


# OVERALL SYSTEM

Control Mechanism (Cont'd)

## Control of Shift Valves A and B

NFAT0015S0202



SAT009J

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

NFAT0015S03

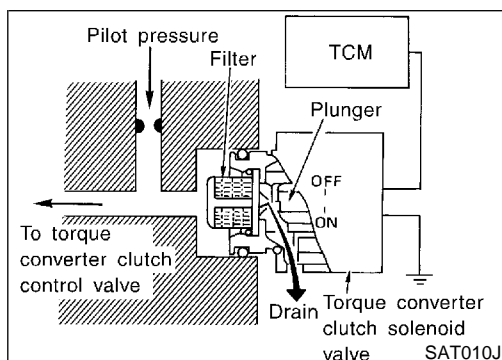
The torque converter clutch piston in the torque converter is locked to eliminate torque converter slip to increase power transmission efficiency. The solenoid valve is controlled by an ON-OFF duty signal sent from the TCM. The signal is converted to an oil pressure signal which controls the lock-up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

## Conditions for Lock-up Operation

NFAT0015S0301

When vehicle is driven in 3rd or 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.

Selector lever	D position	3rd position
Gear position	D <sub>4</sub>	D <sub>3</sub>
Vehicle speed sensor	More than set value	
Accelerator pedal position sensor (Throttle position sensor)	Less than set opening	
Closed throttle position switch	OFF	
A/T fluid temperature sensor	More than 40°C (104°F)	



SAT010J

## Torque Converter Clutch Solenoid Valve Control

NFAT0015S0302

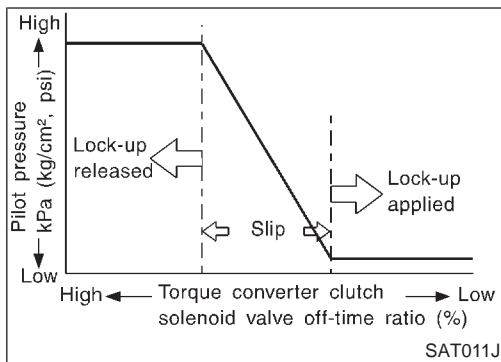
The torque converter clutch solenoid valve is controlled by the TCM. The plunger closes the drain circuit during the OFF period, and opens the circuit during the ON period. If the percentage of OFF-time increases in one cycle, the pilot pressure drain time is reduced and pilot pressure remains high.

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



# OVERALL SYSTEM

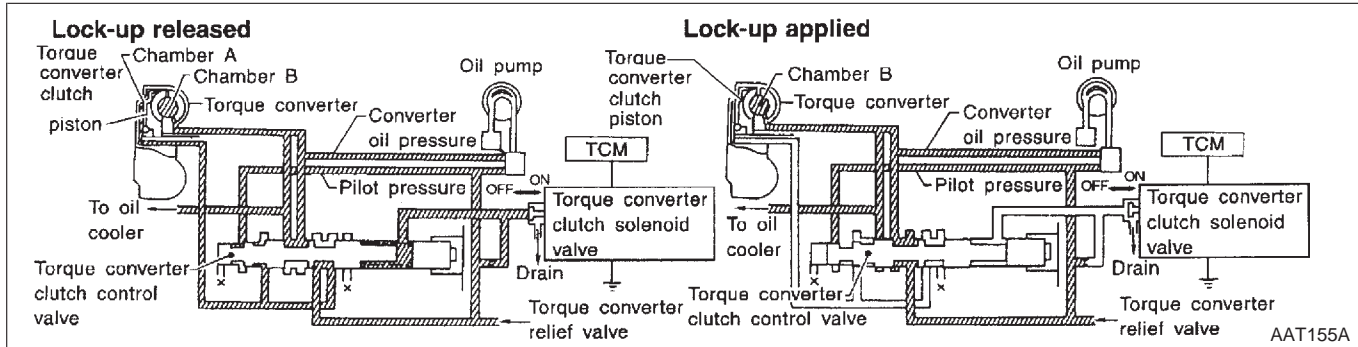
Control Mechanism (Cont'd)



OFF-time INCREASING  
↓  
Amount of drain DECREASING  
↓  
Pilot pressure HIGH  
↓  
Lock-up RELEASING

## Torque Converter Clutch Control Valve Operation

NFAT0015S0303



### 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)

NFAT0015S04

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

The overrun clutch operates when the engine brake is needed.

### Overrun Clutch Operating Conditions

NFAT0015S0401

Selector lever position	Gear position	Throttle opening
D position	D <sub>1</sub> , D <sub>2</sub> , D <sub>3</sub> gear position	Less than 3.0/16
2nd position	2 <sub>1</sub> , 2 <sub>2</sub> gear position	At any position
1st position	1 <sub>1</sub> , 1 <sub>2</sub> gear position	







# OVERALL SYSTEM

Control Valve (Cont'd)

Valve name	Function	
Pilot valve	Regulates line pressure to maintain a constant pilot pressure level which controls lock-up mechanism, overrun clutch, shift timing.	GI
Accumulator control valve	Regulates accumulator back-pressure to pressure suited to driving conditions.	MA
Manual valve	Directs line pressure to oil circuits corresponding to select positions. Hydraulic pressure drains when the shift lever is in Neutral.	EM
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.	LC
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.	EC
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with application of the brake band in D <sub>4</sub> . (Interlocking occurs if the overrun clutch engages during D <sub>4</sub> .)	FE
"1" reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when downshifting from the 1st position 1 <sub>2</sub> to 1 <sub>1</sub> .	CL
Overrun clutch reducing valve	Reduces oil pressure directed to the overrun clutch and prevents engine-brake shock. In 1st and 2nd positions, line pressure acts on the overrun clutch reducing valve to increase the pressure-regulating point, with resultant engine brake capability.	MT
Torque converter relief valve	Prevents an excessive rise in torque converter pressure.	AT
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.	AX
1-2 accumulator valve and piston	Dampens the shock encountered when 2nd gear band servo contracts, and provides smooth shifting.	SU
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.	BR
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.	ST
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.	RS
		BT
		HA
		SC
		EL
		IDX



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

## Introduction

### Introduction

NFAT0017

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

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

The second is the TCM original self-diagnosis indicated by the A/T CHECK indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For detail, refer to AT-42.

### OBD-II Function for A/T System

NFAT0018

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

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

### One or Two Trip Detection Logic of OBD-II

NFAT0019

#### ONE TRIP DETECTION LOGIC

NFAT0019S01

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

#### TWO TRIP DETECTION LOGIC

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 MIL will not illuminate. — First Trip  
If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MIL will illuminate. — Second Trip

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

Items	MIL	
	One trip detection	Two trip detection
Shift solenoid valve A — DTC: P0750	X	
Shift solenoid valve B — DTC: P0755	X	
Throttle position sensor or switch — DTC: P1705	X	
Except above		X

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



### OBD-II Diagnostic Trouble Code (DTC)

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 in the following page. DTC or 1st trip DTC of a malfunction is displayed in “SELF DIAGNOSIS” mode for “ENGINE” with CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

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

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

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-101, "CONSULT-II".

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

## OBD-II 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

The diagnostic trouble code can be erased by CONSULT-II, GST or ECM DIAGNOSTIC TEST MODE as described following. NFAT0020S02

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

The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to OBD-II. For details, refer to EC-76, "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)

- If a DTC is displayed for both ECM and TCM, it needs to be erased for both ECM and TCM. NFAT0020S03
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.)



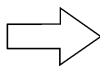
# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

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

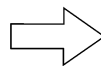
## How to erase DTC (With CONSULT-II)

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

SELECT SYSTEM
A/T
ENGINE



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

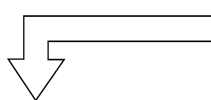


SELF DIAG RESULTS
DTC RESULTS
T/C CLUTCH SOL/V [P0740]

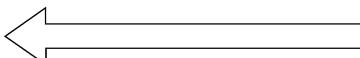
2. Turn CONSULT-II "ON", and touch "A/T".

3. Touch "SELF DIAG-RESULTS".

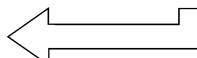
4. Touch "ERASE". (The DTC in the TCM will be erased.)



Touch  
"BACK".



Touch  
"BACK".



SELECT SYSTEM
A/T
ENGINE

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

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

5. Touch "ENGINE".

6. Touch "SELF DIAG-RESULTS".

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

SCIA5586E

## HOW TO ERASE DTC (WITH GST)

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 "OBD-II SELF-DIAGNOSTIC PROCEDURE (No Tools)". Refer to AT-51. (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-115, "Generic Scan Tool (GST)".

## HOW TO ERASE DTC (NO TOOLS)

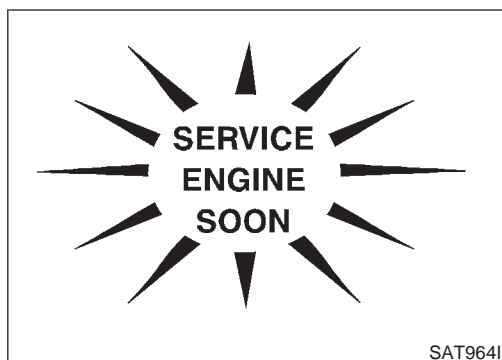
NFAT0020S05

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-51. (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

## Malfunction Indicator Lamp (MIL)



## Malfunction Indicator Lamp (MIL)

=NFAT0021

1. The malfunction indicator lamp will light up when the ignition switch is turned ON without the engine running. This is for checking the lamp.
  - If the malfunction indicator lamp does not light up, refer to EL-136, "WARNING LAMPS".  
[Or see EC-92, "Malfunction indicator lamp (MIL)" and EC-101, "CONSULT-II".]
2. When the engine is started, the malfunction indicator lamp should go off.  
If the lamp remains on, the on board diagnostic system has detected an emission-related (OBD-II) malfunction. For detail, refer to EC-75, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION".

## CONSULT-II

NFAT0022

After performing "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" (AT-41), place check marks for results on the "Diagnostic Worksheet", AT-59. 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.



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

## FUNCTION

=NFAT0022S11

Diagnostic test mode	Function	Reference page
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-II.	—
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	Refer to AT-41
Data monitor	Input/Output data in the ECM can be read.	Refer to AT-44
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.	—
Function test	Performed by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".	—
DTC work support	Select the operating condition to confirm Diagnostic Trouble Codes.	Refer to AT-47
TCM part number	TCM part number can be read.	—

GI

MA

EM

LC

EC

FE

CL

MT

<b>SELECT SYSTEM</b>
A/T
<b>ENGINE</b>

SAT014K

<b>REAL-TIME DIAG</b>
<b>ENG SPEED SIG</b>

SAT987J

## Ⓢ SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)

NFAT0022S01

1. Turn on CONSULT-II and touch "ENGINE" for OBD-II detected items or touch "A/T" for TCM self-diagnosis.  
If A/T is not displayed, check TCM power supply and ground circuit. Refer to AT-97. If result is NG, refer to EL-10, "POWER SUPPLY ROUTING".

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.

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX





# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

## SELF-DIAGNOSTIC RESULT TEST MODE



NFAT0022S02

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		 Available by A/T CHECK indicator lamp or "A/T" on CONSULT-II	 Available by malfunction indicator lamp*2, "ENGINE" on CON- SULT-II or GST
Park/neutral position (PNP) switch circuit		<ul style="list-style-type: none"> <li>TCM does not receive the correct voltage signal (based on the gear position) from the switch.</li> </ul>	—	P0705
—	PNP SW/CIRC			
Revolution sensor		<ul style="list-style-type: none"> <li>TCM does not receive the proper voltage signal from the sensor.</li> </ul>	X	P0720
VHCL SPEED SEN-A/T	VEH SPD SEN/CIR AT			
Vehicle speed sensor (Meter)		<ul style="list-style-type: none"> <li>TCM does not receive the proper voltage signal from the sensor.</li> </ul>	X	—
VHCL SPEED SEN-MTR	—			
A/T 1st gear function		<ul style="list-style-type: none"> <li>A/T cannot be shifted to the 1st gear position even if electrical circuit is good.</li> </ul>	—	P0731*1
—	A/T 1ST GR FNCTN			
A/T 2nd gear function		<ul style="list-style-type: none"> <li>A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.</li> </ul>	—	P0732*1
—	A/T 2ND GR FNCTN			
A/T 3rd gear function		<ul style="list-style-type: none"> <li>A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.</li> </ul>	—	P0733*1
—	A/T 3RD GR FNCTN			
A/T 4th gear function		<ul style="list-style-type: none"> <li>A/T cannot be shifted to the 4th gear position even if electrical circuit is good.</li> </ul>	—	P0734*1
—	A/T 4TH GR FNCTN			
A/T TCC S/V function (lock-up)		<ul style="list-style-type: none"> <li>A/T cannot perform lock-up even if electrical circuit is good.</li> </ul>	—	P0744*1
—	A/T TCC S/V FNCTN			
Shift solenoid valve A		<ul style="list-style-type: none"> <li>TCM detects an improper voltage drop when it tries to operate the solenoid valve.</li> </ul>	X	P0750
SHIFT SOLENOID/V A	SFT SOL A/CIRC			
Shift solenoid valve B		<ul style="list-style-type: none"> <li>TCM detects an improper voltage drop when it tries to operate the solenoid valve.</li> </ul>	X	P0755
SHIFT SOLENOID/V B	SFT SOL B/CIRC			
Overrun clutch solenoid valve		<ul style="list-style-type: none"> <li>TCM detects an improper voltage drop when it tries to operate the solenoid valve.</li> </ul>	X	P1760
OVERRUN CLUTCH S/V	O/R CLUCH SOL/CIRC			
T/C clutch solenoid valve		<ul style="list-style-type: none"> <li>TCM detects an improper voltage drop when it tries to operate the solenoid valve.</li> </ul>	X	P0740
T/C CLUTCH SOL/V	TCC SOLENOID/CIRC			
Line pressure solenoid valve		<ul style="list-style-type: none"> <li>TCM detects an improper voltage drop when it tries to operate the solenoid valve.</li> </ul>	X	P0745
LINE PRESSURE S/V	L/PRESS SOL/CIRC			



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		 Available by A/T CHECK indicator lamp or "A/T" on CONSULT-II	 Available by malfunction indicator lamp*2, "ENGINE" on CONSULT-II or GST
Accelerator pedal position sensor (throttle position sensor)		<ul style="list-style-type: none"> <li>TCM receives an excessively low or high voltage from the sensor.</li> </ul>	X	P1705
THROTTLE POSI SEN	TP SEN/CIRC A/T			
Engine speed signal		<ul style="list-style-type: none"> <li>TCM does not receive the proper voltage signal from the ECM.</li> </ul>	X	P0725
ENGINE SPEED SIG				
A/T fluid temperature sensor		<ul style="list-style-type: none"> <li>TCM receives an excessively low or high voltage from the sensor.</li> </ul>	X	P0710
BATT/FLUID TEMP SEN	ATF TEMP SEN/CIRC			
Engine control		<ul style="list-style-type: none"> <li>The ECM-A/T communication line is open or shorted.</li> </ul>	X	U1000
CAN COMM LINE	—			
Power train revolution sensor		<ul style="list-style-type: none"> <li>TCM does not receive the proper voltage signal from the sensor.</li> </ul>	X	—
TURBINE REV	—			
TCM (RAM)		<ul style="list-style-type: none"> <li>TCM memory (RAM) is malfunctioning</li> </ul>	—	—
CONTROL UNIT (RAM)	—			
TCM (ROM)		<ul style="list-style-type: none"> <li>TCM memory (ROM) is malfunctioning</li> </ul>	—	—
CONTROL UNIT (ROM)	—			
TCM (EEP ROM)		<ul style="list-style-type: none"> <li>TCM memory (EEP ROM) is malfunctioning.</li> </ul>	—	—
CONT UNIT (EEP ROM)	—			
Initial start		<ul style="list-style-type: none"> <li>This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)</li> </ul>	X	—
INITIAL START	—			
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED**)		<ul style="list-style-type: none"> <li>No failure has been detected.</li> </ul>	X	X

X: Applicable

—: Not applicable

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

\*2: Refer to EC-92, "Malfunction Indicator Lamp (MIL)".



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

## DATA MONITOR MODE (A/T)

NFAT0022S03

Item	Display	SELECT MONITOR ITEM			Description	Remarks
		TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU		
ASCD OD cut signal	ASCD-OD CUT [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> <li>Status of ASCD OD release signal is displayed. ON ... OD released OFF ... OD not released</li> </ul>	<ul style="list-style-type: none"> <li>This is displayed even when no ASCD is mounted.</li> </ul>
Kickdown switch	KICKDOWN SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> <li>ON/OFF status, computed from signal of kickdown SW, is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>This is displayed even when no kickdown switch is equipped.</li> </ul>
Closed throttle position switch	CLOSED THL/SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> <li>ON/OFF status, computed from signal of closed throttle position SW, is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>This means closed throttle position signal input via CAN communication line.</li> </ul>
When open throttle position switch	W/O THRL/P-SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> <li>ON/OFF status, computed from signal of wide open throttle position SW, is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>This means wide open throttle position signal input via CAN communication line.</li> </ul>
Stop lamp switch	BRAKE SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> <li>ON/OFF status is displayed. ON ... Brake pedal is depressed. OFF ... Brake pedal is released.</li> </ul>	
Selector lever position	SLCT LVR POSI	—	X	▼	<ul style="list-style-type: none"> <li>Selector lever position data, used for computation by TCM, is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>A specific value used for control is displayed if fail-safe is activated due to error.</li> </ul>
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	—	X	▼	<ul style="list-style-type: none"> <li>Vehicle speed data, used for computation by TCM, is displayed.</li> </ul>	
Throttle position (accelerator pedal position sensor)	THROTTLE POSI [/8]	—	X	▼	<ul style="list-style-type: none"> <li>Throttle position data, used for computation by TCM, is displayed.</li> </ul>	<ul style="list-style-type: none"> <li>A specific value used for control is displayed if fail-safe is activated due to error.</li> </ul>
Gear position	GEAR	—	X	▼	<ul style="list-style-type: none"> <li>Gear position data used for computation by TCM, is displayed.</li> </ul>	
Line pressure duty	LINE PRES DTY [%]	—	X	▼	<ul style="list-style-type: none"> <li>Control value of line pressure solenoid valve, computed by TCM from each input signal, is displayed.</li> </ul>	
Torque converter clutch solenoid valve duty	TCC S/V DUTY [%]	—	X	▼	<ul style="list-style-type: none"> <li>Control value of torque converter clutch solenoid valve, computed by TCM from each input signal, is displayed.</li> </ul>	



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Item	Display	SELECT MONITOR ITEM			Description	Remarks
		TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU		
Shift solenoid valve A	SHIFT S/V A [ON/OFF]	—	X	▼	<ul style="list-style-type: none"> <li>Control value of shift solenoid valve A, computed by TCM from each input signal, is displayed.</li> </ul>	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	▼	<ul style="list-style-type: none"> <li>Control value of shift solenoid valve B, computed by TCM from each input signal, is displayed.</li> </ul>	
Vehicle speed sensor 1 (A/T) (Revolution sensor)	VHCL/S SE-A/T [km/h] or [mph]	X	—	▼	<ul style="list-style-type: none"> <li>Vehicle speed computed from signal of revolution sensor is displayed.</li> </ul>	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	—	▼	<ul style="list-style-type: none"> <li>Vehicle speed computed from signal of vehicle speed sensor is displayed.</li> </ul>	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.
Accelerator pedal position sensor (throttle position sensor)	THRTL POS SEN [V]	X	—	▼	<ul style="list-style-type: none"> <li>Accelerator pedal position sensor (throttle position sensor) signal voltage is displayed.</li> </ul>	
A/T fluid temperature sensor	FLUID TEMP SE [V]	X	—	▼	<ul style="list-style-type: none"> <li>A/T fluid temperature sensor signal voltage is displayed.</li> <li>Signal voltage lowers as fluid temperature rises.</li> </ul>	
Battery voltage	BATTERY VOLT [V]	X	—	▼	<ul style="list-style-type: none"> <li>Source voltage of TCM is displayed.</li> </ul>	
Engine speed	ENGINE SPEED [rpm]	X	X	▼	<ul style="list-style-type: none"> <li>Engine speed, computed from engine speed signal, is displayed.</li> </ul>	Engine speed display may not be accurate under approx. 800 rpm. It may not indicate 0 rpm even when engine is not running.
Power train revolution sensor	TURBINE REV	X	—	▼	<ul style="list-style-type: none"> <li>This sensor checks the changing speed then perform the oil pressure control and the torque down control.</li> </ul>	
3rd position switch	OVERDRIVE SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> <li>ON/OFF state computed from signal of 3rd position SW is displayed.</li> </ul>	

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# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Item	Display	SELECT MONITOR ITEM			Description	Remarks
		TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU		
PN position (PNP) switch	PN POSI SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> <li>ON/OFF state computed from signal of PN position SW is displayed.</li> </ul>	
R position switch	R POSITION SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> <li>ON/OFF state computed from signal of R position SW is displayed.</li> </ul>	
D position switch	D POSITION SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> <li>ON/OFF state computed from signal of D position SW is displayed.</li> </ul>	
2nd position switch	2 POSITION SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> <li>ON/OFF status, computed from signal of 2nd position SW, is displayed.</li> </ul>	
1st position switch	1 POSITION SW [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> <li>ON/OFF status, computed from signal of 1st position SW, is displayed.</li> </ul>	
ASCD cruise signal	ASCD-CRUISE [ON/OFF]	X	—	▼	<ul style="list-style-type: none"> <li>Status of ASCD cruise signal is displayed. ON ... Cruising state OFF ... Normal running state</li> </ul>	
Overrun clutch solenoid valve	OVERRUN/C S/V [ON/OFF]	—	X	▼	<ul style="list-style-type: none"> <li>Control value of overrun clutch solenoid valve computed by TCM from each input signal is displayed.</li> </ul>	
Self-diagnosis display lamp (A/T CHECK indicator lamp)	SELF-D DP LMP [ON/OFF]	—	X	▼	<ul style="list-style-type: none"> <li>Control status of A/T CHECK indicator lamp is displayed.</li> </ul>	
Torque converter slip ratio	TC SLIP RATIO [0.000]	—	—	▼	<ul style="list-style-type: none"> <li>Ratio of engine revolution to input shaft revolution of torque converter</li> </ul>	
Torque converter slip speed	TC SLIP SPEED [rpm]	—	—	▼	Difference in revolution between input shaft revolution and input shaft revolution of torque converter	Display doesn't indicate 0 rpm even if engine is stopped. But this isn't malfunction.
Voltage [V]		—	—	▼	Value measured by voltage probe is displayed.	

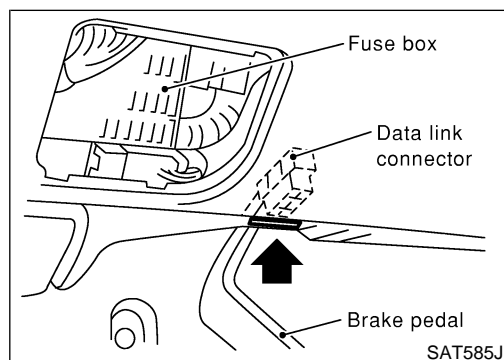


# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

Item	Display	SELECT MONITOR ITEM			Description	Remarks
		TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU		
Frequency [Hz]		—	—	▼	Value measured by pulse probe is displayed. If measurement is impossible, “#” sign is displayed. “#” sign is also displayed at the final data value until the measurement result is obtained.	
DUTY-HI		—	—	▼	Duty cycle value for measurement probe is displayed.	
DUTY-LOW		—	—	▼		
PLS WIDTH-HI		—	—	▼	Measured pulse width of measurement probe is displayed.	
PLS WIDTH-LOW		—	—	▼		

X: Applicable    —: Not applicable    ▼: Option



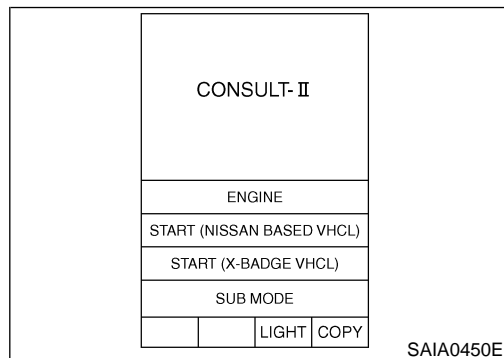
## DTC WORK SUPPORT MODE WITH CONSULT-II

### CONSULT-II Setting Procedure

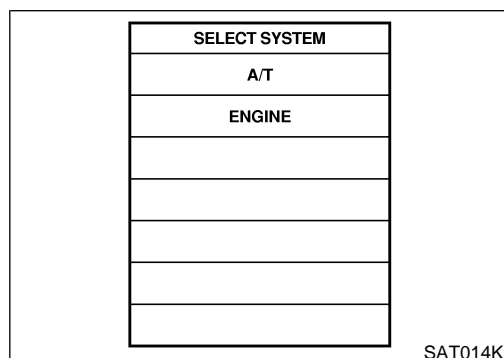
NFAT0022S04

NFAT0022S0401

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



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



5. Touch “A/T”.



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

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

SCIA5358E

6. Touch "DTC WORK SUPPORT".

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

SAT018K

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

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

SAT589J

8. Touch "START".

1ST GR FNCTN P0731	
OUT OF CONDION	
MONITOR	
GEAR	XXX
VEHICLE SPEED	XXXkm/h
THROTTLE POSI	XXX
TCC S/V DUTY	XXX %

SAT019K

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

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

SAT591J

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



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)

1ST GR FNCTN P0731
STOP VEHICLE

SAT592J

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

1ST GR FNCTN P0731
NG

SAT593J

1ST GR FNCTN P0731
DRIVE VHCL IN D RANGE SHIFTING 1→2→3→4 UNDER NORMAL ACCELERATION. DOES A/T SHFT NORMAL CHECK FOR PROPER SHF TIMING AND SHFT SHOCK

SAT594J

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

1ST GR FNCTN P0731
DRIVE VHCL IN D RANGE SHIFTING 1→2→3→4 UNDER NORMAL ACCELERATION. DOES A/T SHFT NORMAL CHECK FOR PROPER SHF TIMING AND SHFT SHOCK

SAT595J

12. Touch "YES" or "NO".

GI

MA

EM

LC

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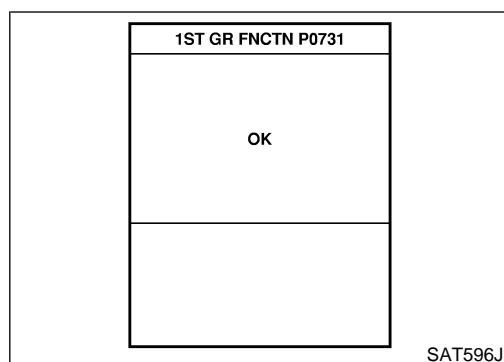
EL

IDX

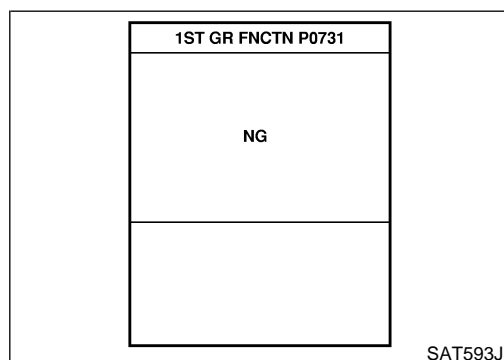


# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT-II (Cont'd)



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	<p>Following items for "A/T 1st gear function (P0731)" can be confirmed.</p> <ul style="list-style-type: none"> <li>Self-diagnosis status (whether the diagnosis is being conducted or not)</li> <li>Self-diagnosis result (OK or NG)</li> </ul>	<ul style="list-style-type: none"> <li>Shift solenoid valve A</li> <li>Shift solenoid valve B</li> <li>Each clutch</li> <li>Hydraulic control circuit</li> </ul>
2ND GR FNCTN P0732	<p>Following items for "A/T 2nd gear function (P0732)" can be confirmed.</p> <ul style="list-style-type: none"> <li>Self-diagnosis status (whether the diagnosis is being conducted or not)</li> <li>Self-diagnosis result (OK or NG)</li> </ul>	<ul style="list-style-type: none"> <li>Shift solenoid valve B</li> <li>Each clutch</li> <li>Hydraulic control circuit</li> </ul>
3RD GR FNCTN P0733	<p>Following items for "A/T 3rd gear function (P0733)" can be confirmed.</p> <ul style="list-style-type: none"> <li>Self-diagnosis status (whether the diagnosis is being conducted or not)</li> <li>Self-diagnosis result (OK or NG)</li> </ul>	<ul style="list-style-type: none"> <li>Shift solenoid valve A</li> <li>Each clutch</li> <li>Hydraulic control circuit</li> </ul>
4TH GR FNCTN P0734	<p>Following items for "A/T 4th gear function (P0734)" can be confirmed.</p> <ul style="list-style-type: none"> <li>Self-diagnosis status (whether the diagnosis is being conducted or not)</li> <li>Self-diagnosis result (OK or NG)</li> </ul>	<ul style="list-style-type: none"> <li>Shift solenoid valve A</li> <li>Shift solenoid valve B</li> <li>Overrun clutch solenoid valve</li> <li>Line pressure solenoid valve</li> <li>Each clutch</li> <li>Hydraulic control circuit</li> </ul>
TCC S/V FNCTN P0744	<p>Following items for "A/T TCC S/V function (lock-up) (P0744)" can be confirmed.</p> <ul style="list-style-type: none"> <li>Self-diagnosis status (whether the diagnosis is being conducted or not)</li> <li>Self-diagnosis result (OK or NG)</li> </ul>	<ul style="list-style-type: none"> <li>Torque converter clutch solenoid valve</li> <li>Each clutch</li> <li>Hydraulic control circuit</li> </ul>



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Diagnostic Procedure Without CONSULT-II

## Diagnostic Procedure Without CONSULT-II

**OBD-II SELF-DIAGNOSTIC PROCEDURE (WITH GST)** NFAT0023  
NFAT0023S01

Refer to EC-115, "Generic Scan Tool (GST)".

**OBD-II SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)**

Refer to EC-92, "Malfunction Indicator Lamp (MIL)".

## TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

NFAT0023S03

1	CHECK A/T CHECK INDICATOR LAMP
	<p>1. Move selector lever to P position. Start engine and warm it up to normal engine operating temperature.</p> <p>2. Turn ignition switch to OFF position.</p> <p>3. Wait 5 seconds.</p> <p>4. Turn ignition switch to ON position. (Do not start engine.)</p> <div> </div> <p>5. Does A/T CHECK indicator lamp come on for about 2 seconds?</p> <div> </div> <p style="text-align: right;">SAT491K</p> <p style="text-align: right;">SAT492K</p> <p style="text-align: center;"><b>Yes or No</b></p>
Yes	<p>▶ GO TO 2.</p>
No	<p>▶ Stop procedure. Perform "1. A/T CHECK Indicator Lamp Does Not Come On", AT-223 before proceeding.</p>



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Diagnostic Procedure Without CONSULT-II (Cont'd)

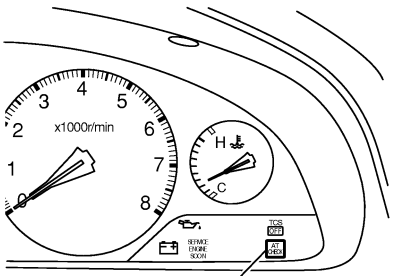
2	JUDGEMENT PROCEDURE STEP 1
	<div><ol style="list-style-type: none"><li>1. Turn ignition switch to OFF position.</li><li>2. Turn ignition switch to ACC position.</li><li>3. Depress and hold accelerator pedal fully. Depress brake pedal, then move selector lever from P to D position.</li><li>4. Turn ignition switch to ON position. (Do not start engine.)</li></ol></div> <div></div> <div>SAT493K</div> <div><ol style="list-style-type: none"><li>5. Wait 3 seconds.</li><li>6. Move selector lever to 2nd position.</li><li>7. Release brake pedal.</li></ol></div> <div></div> <div>SAT494K</div>
▶	GO TO 3.

3	JUDGEMENT PROCEDURE STEP 2
	<div><ol style="list-style-type: none"><li>1. Move selector lever to 1st position.</li><li>2. Depress brake pedal.</li><li>3. Depress accelerator pedal fully and release it.</li><li>4. The A/T CHECK indicator lamp will begin to flash ON and OFF.</li></ol></div> <div></div> <div>SAT495K</div>
▶	GO TO 4.



ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Diagnostic Procedure Without CONSULT-II (Cont'd)

4	CHECK SELF-DIAGNOSTIC CODE
<div>Check A/T CHECK indicator lamp. Refer to JUDGEMENT OF SELF-DIAGNOSIS CODE, AT-54.</div> <div><p>A/T CHECK indicator lamp</p></div> <div>SAT492K</div>	
▶	DIAGNOSIS END

GI

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# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

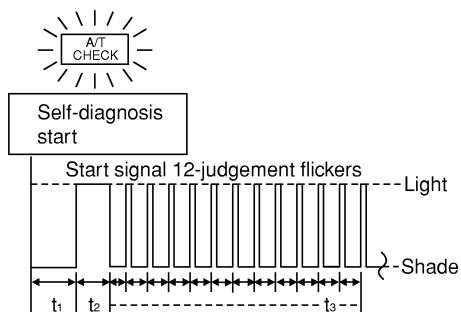
Diagnostic Procedure Without CONSULT-II (Cont'd)

## JUDGEMENT OF SELF-DIAGNOSIS CODE

=NFAT0023S04

A/T CHECK indicator lamp:

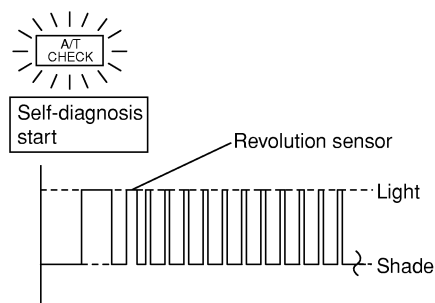
All judgement flickers are the same.



SAT518K

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

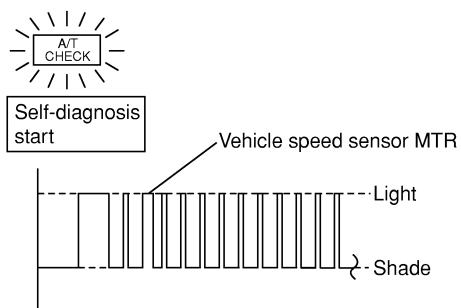
1st judgement flicker is longer than others.



SAT543K

Revolution sensor circuit is short-circuited or disconnected.  
⇒ Go to **VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)**, AT-116.

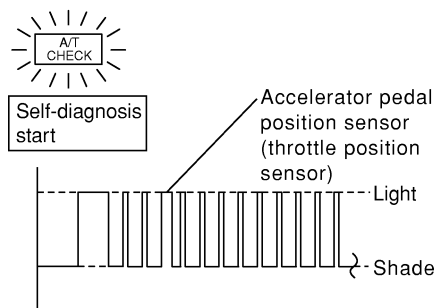
2nd judgement flicker is longer than others.



SAT544K

Vehicle speed sensor circuit is short-circuited or disconnected.  
⇒ Go to **VEHICLE SPEED SENSOR·MTR**, AT-203.

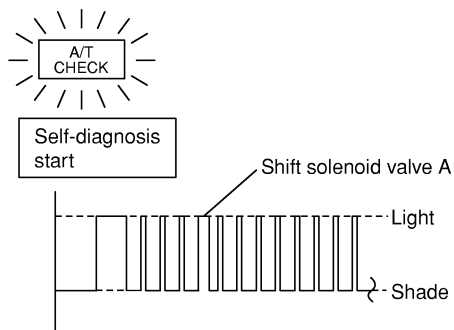
3rd judgement flicker is longer than others.



SAT545KB

Accelerator pedal position sensor (throttle position sensor) circuit is short-circuited or disconnected.  
⇒ **GO TO ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)**, AT-184.

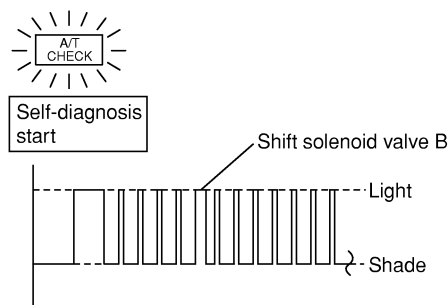
4th judgement flicker is longer than others.



SAT546K

Shift solenoid valve A circuit is short-circuited or disconnected.  
⇒ Go to **SHIFT SOLENOID VALVE A**, AT-174.

5th judgement flicker is longer than others.



SAT547K

Shift solenoid valve B circuit is short-circuited or disconnected.  
⇒ Go to **SHIFT SOLENOID VALVE B**, AT-179.

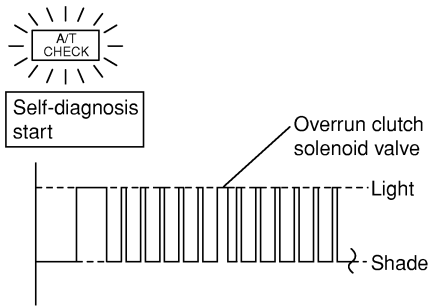


# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Diagnostic Procedure Without CONSULT-II (Cont'd)

A/T CHECK indicator lamp:

6th judgement flicker is longer than others.

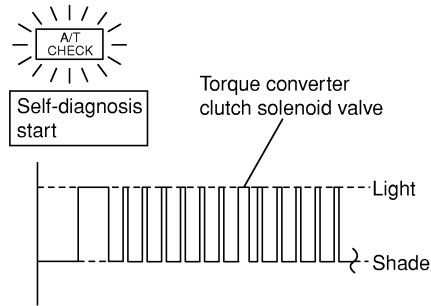


SAT548K

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

⇒ Go to **OVERRUN CLUTCH SOLENOID VALVE, AT-191.**

7th judgement flicker is longer than others.

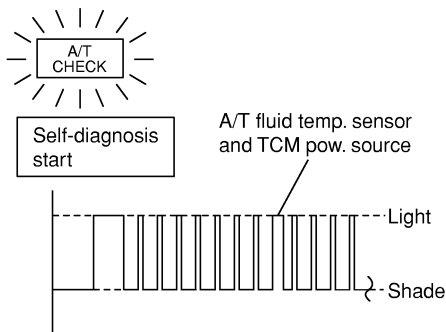


SAT549K

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

⇒ Go to **TORQUE CONVERTER CLUTCH SOLENOID VALVE, AT-153.**

8th judgement flicker is longer than others.

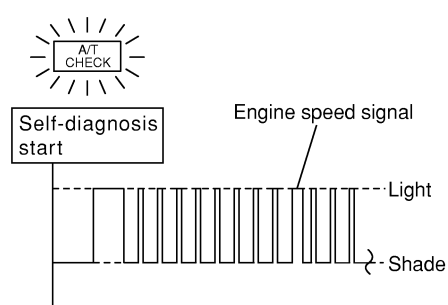


SAT550K

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-196.**

9th judgement flicker is longer than others.

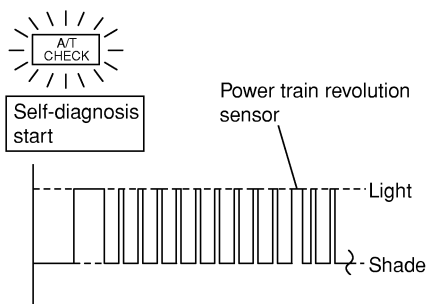


SAT551K

Engine speed signal circuit is short-circuited or disconnected.

⇒ Go to **ENGINE SPEED SIGNAL, AT-121.**

10th judgement flicker is longer than others.

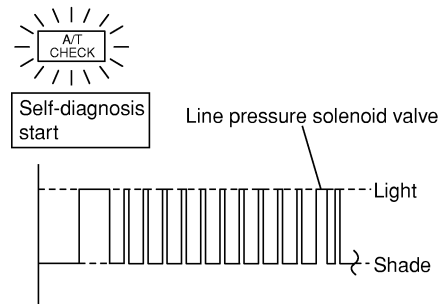


SAT552K

Power train revolution circuit is short-circuited or disconnected.

⇒ Go to **POWER TRAIN REVOLUTION SENSOR, AT-212.**

11th judgement flicker is longer than others.



SAT553K

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

⇒ Go to **LINE PRESSURE SOLENOID VALVE, AT-168.**

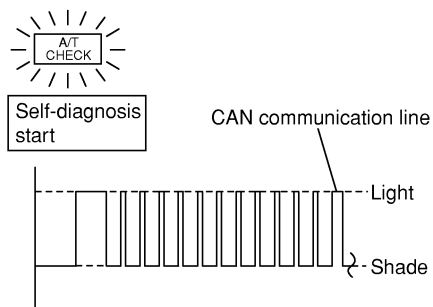


# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Diagnostic Procedure Without CONSULT-II (Cont'd)

A/T CHECK indicator lamp:

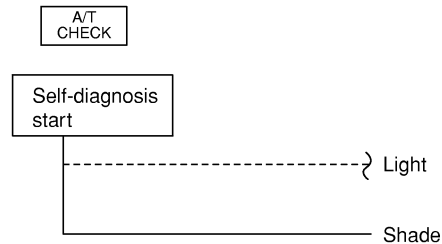
12th judgement flicker is longer than others.



SAT554K

The ECM-A/T communication line is open or shorted.  
⇒ **Go to CAN COMMUNICATION LINE, AT-208.**

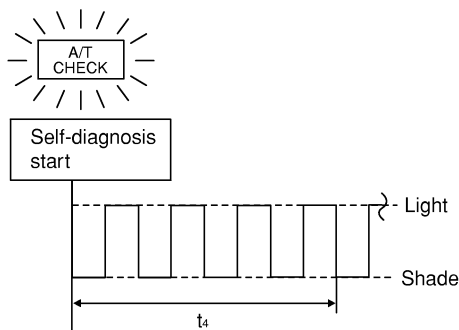
Lamp comes off.



SAT555K

Park/neutral position (PNP) switch, 3rd position switch or accelerator pedal position sensor (throttle position sensor) circuit is disconnected or TCM is damaged.  
⇒ **Go to 21. TCM Self-diagnosis Does Not Activate [Park/neutral position (PNP) & 3rd position switches, and accelerator pedal position sensor (Throttle Position Sensor) Circuit Checks], AT-264.**

Flickers as shown below.

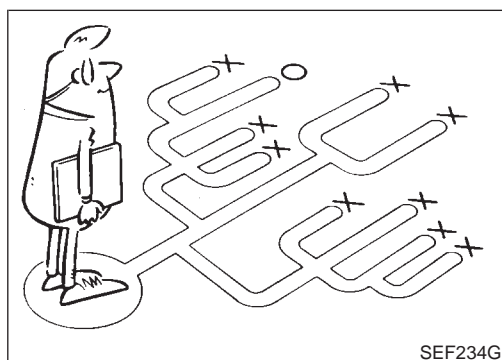
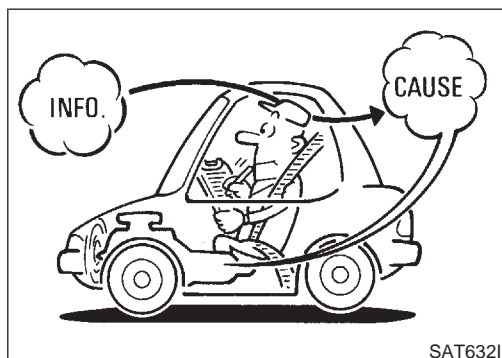
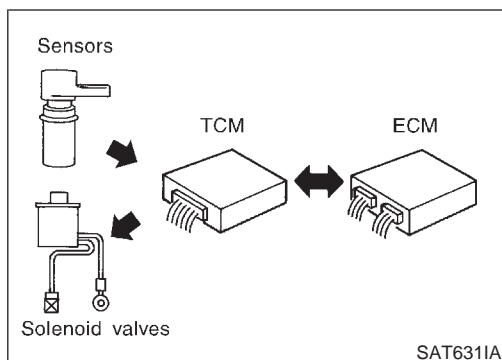


SAT556K

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.)

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





## Introduction

NFAT0024

The TCM receives a signal from the vehicle speed sensor, electric throttle control actuator (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 OBD-related parts of the A/T system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.

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

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

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

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "DIAGNOSTIC WORKSHEET" like the example (AT-58) should be used.

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

**Also check related Service bulletins for information.**

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# TROUBLE DIAGNOSIS — INTRODUCTION

Introduction (Cont'd)

## DIAGNOSTIC WORKSHEET

### Information from Customer

=NFAT0024S01

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	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent ( times a day)	
Symptoms	<input type="checkbox"/> Vehicle does not move. ( <input type="checkbox"/> Any position <input type="checkbox"/> Particular position)	
	<input type="checkbox"/> No up-shift ( <input type="checkbox"/> 1st → 2nd <input type="checkbox"/> 2nd → 3rd <input type="checkbox"/> 3rd → O/D)	
	<input type="checkbox"/> No down-shift ( <input type="checkbox"/> O/D → 3rd <input type="checkbox"/> 3rd → 2nd <input type="checkbox"/> 2nd → 1st)	
	<input type="checkbox"/> Lockup malfunction	
	<input type="checkbox"/> Shift point too high or too low.	
	<input type="checkbox"/> Shift shock or slip ( <input type="checkbox"/> N → D <input type="checkbox"/> Lockup <input type="checkbox"/> Any drive position)	
	<input type="checkbox"/> Noise or vibration	
	<input type="checkbox"/> No kickdown	
	<input type="checkbox"/> No pattern select	
	<input type="checkbox"/> Others ( )	
A/T CHECK indicator lamp	Blinks for about 8 seconds.	
	<input type="checkbox"/> Continuously lit	<input type="checkbox"/> Not lit
Malfunction indicator lamp (MIL)	<input type="checkbox"/> Continuously lit	<input type="checkbox"/> Not lit



# TROUBLE DIAGNOSIS — INTRODUCTION

Introduction (Cont'd)

## Diagnostic Worksheet

=NFAT0024S0102

1.	<input type="checkbox"/> Read the Fail-safe and listen to customer complaints.	AT-9	GI
2.	<input type="checkbox"/> CHECK A/T FLUID	AT-63	MA
	<input type="checkbox"/> Leakage (Follow specified procedure) <input type="checkbox"/> Fluid condition <input type="checkbox"/> Fluid level		EM
3.	<input type="checkbox"/> Perform STALL TEST and LINE PRESSURE TEST.	AT-63, 67	LC
	<input type="checkbox"/> Stall test — Mark possible damaged components/others.		EC
	<div> <input type="checkbox"/> Torque converter one-way clutch  <input type="checkbox"/> Reverse clutch  <input type="checkbox"/> Forward clutch  <input type="checkbox"/> Overrun clutch  <input type="checkbox"/> Forward one-way clutch           </div> <div> <input type="checkbox"/> Low &amp; reverse brake  <input type="checkbox"/> Low one-way clutch  <input type="checkbox"/> Engine  <input type="checkbox"/> Line pressure is low  <input type="checkbox"/> Clutches and brakes except high clutch and brake band are OK           </div>		FE
	<input type="checkbox"/> Line pressure test — Suspected parts:		
4.	<input type="checkbox"/> Perform all ROAD TEST and mark required procedures.	AT-68	CL
4-1.	Check before engine is started.	AT-69	MT
	<input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE - Mark detected items.		AT
	<input type="checkbox"/> Park/neutral position (PNP) switch, AT-104. <input type="checkbox"/> A/T fluid temperature sensor, AT-110. <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-116. <input type="checkbox"/> Engine speed signal, AT-121. <input type="checkbox"/> Power train revolution sensor, AT-212. <input type="checkbox"/> Torque converter clutch solenoid valve, AT-153. <input type="checkbox"/> Line pressure solenoid valve, AT-168. <input type="checkbox"/> Shift solenoid valve A, AT-174. <input type="checkbox"/> Shift solenoid valve B, AT-179. <input type="checkbox"/> Accelerator pedal position sensor (throttle position sensor), AT-184. <input type="checkbox"/> Overrun clutch solenoid valve, AT-191. <input type="checkbox"/> Park/neutral position (PNP) & 3rd position switches, and accelerator pedal position sensor (throttle position sensor), AT-264. <input type="checkbox"/> A/T fluid temperature sensor and TCM power source, AT-196. <input type="checkbox"/> Vehicle speed sensor-MTR, AT-203. <input type="checkbox"/> CAN communication line, AT-208. <input type="checkbox"/> Control unit (RAM), Control unit (ROM), AT-217. <input type="checkbox"/> Control unit (EEP ROM), AT-219. <input type="checkbox"/> Battery <input type="checkbox"/> Others		AX
4-2.	Check at idle	AT-70	SU
	<input type="checkbox"/> 1. A/T CHECK Indicator Lamp Does Not Come On, AT-223. <input type="checkbox"/> 2. Engine Cannot Be Started In P and N Positions, AT-226. <input type="checkbox"/> 3. In P Position, Vehicle Moves Forward or Backward When Pushed, AT-227. <input type="checkbox"/> 4. In N Position, Vehicle Moves, AT-228. <input type="checkbox"/> 5. Large Shock. N → R Position, AT-231. <input type="checkbox"/> 6. Vehicle Does Not Creep Backward In R Position, AT-233. <input type="checkbox"/> 7. Vehicle Does Not Creep Forward In D, 2nd or 1st Position, AT-237.		BR
			ST
			RS
			BT
			HA
			SC

EL

IDX



# TROUBLE DIAGNOSIS — INTRODUCTION

## Introduction (Cont'd)

4.	4-3.	Cruise test	AT-73 AT-76
		Part-1	
		<input type="checkbox"/> 8. Vehicle Cannot Be Started From D <sub>1</sub> , AT-240. <input type="checkbox"/> 9. A/T Does Not Shift: D <sub>1</sub> → D <sub>2</sub> or Does Not Kickdown: D <sub>4</sub> → D <sub>2</sub> , AT-243. <input type="checkbox"/> 10. A/T Does Not Shift: D <sub>2</sub> → D <sub>3</sub> , AT-246. <input type="checkbox"/> 11. A/T Does Not Shift: D <sub>3</sub> → D <sub>4</sub> , AT-249. <input type="checkbox"/> 12. A/T Does Not Perform Lock-up, AT-252. <input type="checkbox"/> 13. A/T Does Not Hold Lock-up Condition, AT-254. <input type="checkbox"/> 14. Lock-up Is Not Released, AT-256. <input type="checkbox"/> 15. Engine Speed Does Not Return To Idle (Light Braking D <sub>4</sub> → D <sub>3</sub> ), AT-257.	
		Part-2	AT-80
		<input type="checkbox"/> 16. Vehicle Does Not Start From D <sub>1</sub> , AT-260. <input type="checkbox"/> 9. A/T Does Not Shift: D <sub>1</sub> → D <sub>2</sub> or Does Not Kickdown: D <sub>4</sub> → D <sub>2</sub> , AT-243. <input type="checkbox"/> 10. A/T Does Not Shift: D <sub>2</sub> → D <sub>3</sub> , AT-246. <input type="checkbox"/> 11. A/T Does Not Shift: D <sub>3</sub> → D <sub>4</sub> , AT-249.	
		Part-3	AT-82
		<input type="checkbox"/> 17. A/T Does Not Shift: D <sub>4</sub> → D <sub>3</sub> When selector lever is set in D → 3rd Position, AT-261. <input type="checkbox"/> 15. Engine Speed Does Not Return To Idle (Engine Brake In D <sub>3</sub> ), AT-257. <input type="checkbox"/> 18. A/T Does Not Shift: D <sub>3</sub> → 2 <sub>2</sub> , When Selector Lever D → 2nd Position, AT-262. <input type="checkbox"/> 15. Engine Speed Does Not Return To Idle (Engine Brake In 2 <sub>2</sub> ), AT-257. <input type="checkbox"/> 19. A/T Does Not Shift: 2 <sub>2</sub> → 1 <sub>1</sub> , When Selector Lever 2nd → 1st Position, AT-263. <input type="checkbox"/> 20. Vehicle Does Not Decelerate By Engine Brake, AT-264. <input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE — Mark detected items.	
		<input type="checkbox"/> Park/neutral position (PNP) switch, AT-104. <input type="checkbox"/> A/T fluid temperature sensor, AT-110. <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-116. <input type="checkbox"/> Engine speed signal, AT-121. <input type="checkbox"/> Power train revolution sensor, AT-212. <input type="checkbox"/> Torque converter clutch solenoid valve, AT-153. <input type="checkbox"/> Line pressure solenoid valve, AT-168. <input type="checkbox"/> Shift solenoid valve A, AT-174. <input type="checkbox"/> Shift solenoid valve B, AT-179. <input type="checkbox"/> Accelerator pedal position sensor (throttle position sensor), AT-184. <input type="checkbox"/> Overrun clutch solenoid valve, AT-191. <input type="checkbox"/> Park/neutral position (PNP) & 3rd position switches, and accelerator pedal position sensor (throttle position sensor), AT-264. <input type="checkbox"/> A/T fluid temperature sensor and TCM power source, AT-196. <input type="checkbox"/> Vehicle speed sensor-MTR, AT-203. <input type="checkbox"/> CAN communication line, AT-208. <input type="checkbox"/> Control unit (RAM), Control unit (ROM), AT-217. <input type="checkbox"/> Control unit (EEP ROM), AT-219. <input type="checkbox"/> Battery <input type="checkbox"/> Others	
5.		<input type="checkbox"/> For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.	AT-42
6.		<input type="checkbox"/> Perform all ROAD TEST and re-mark required procedures.	AT-68
7.		<input type="checkbox"/> Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items. Refer to EC-76, "Emission-related Diagnostic Information".	EC-76
		<input type="checkbox"/> DTC (P0731) A/T 1st gear function, AT-126. <input type="checkbox"/> DTC (P0732) A/T 2nd gear function, AT-132. <input type="checkbox"/> DTC (P0733) A/T 3rd gear function, AT-138. <input type="checkbox"/> DTC (P0734) A/T 4th gear function, AT-144. <input type="checkbox"/> DTC (P0744) A/T TCC S/V function (lock-up), AT-158.	
8.		<input type="checkbox"/> Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.)	AT-86 AT-97
9.		<input type="checkbox"/> Erase DTC from TCM and ECM memories.	AT-38



Work Flow

HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

NFAT0025

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-58) and “Diagnostic Worksheet” (AT-59), to perform the best troubleshooting possible.

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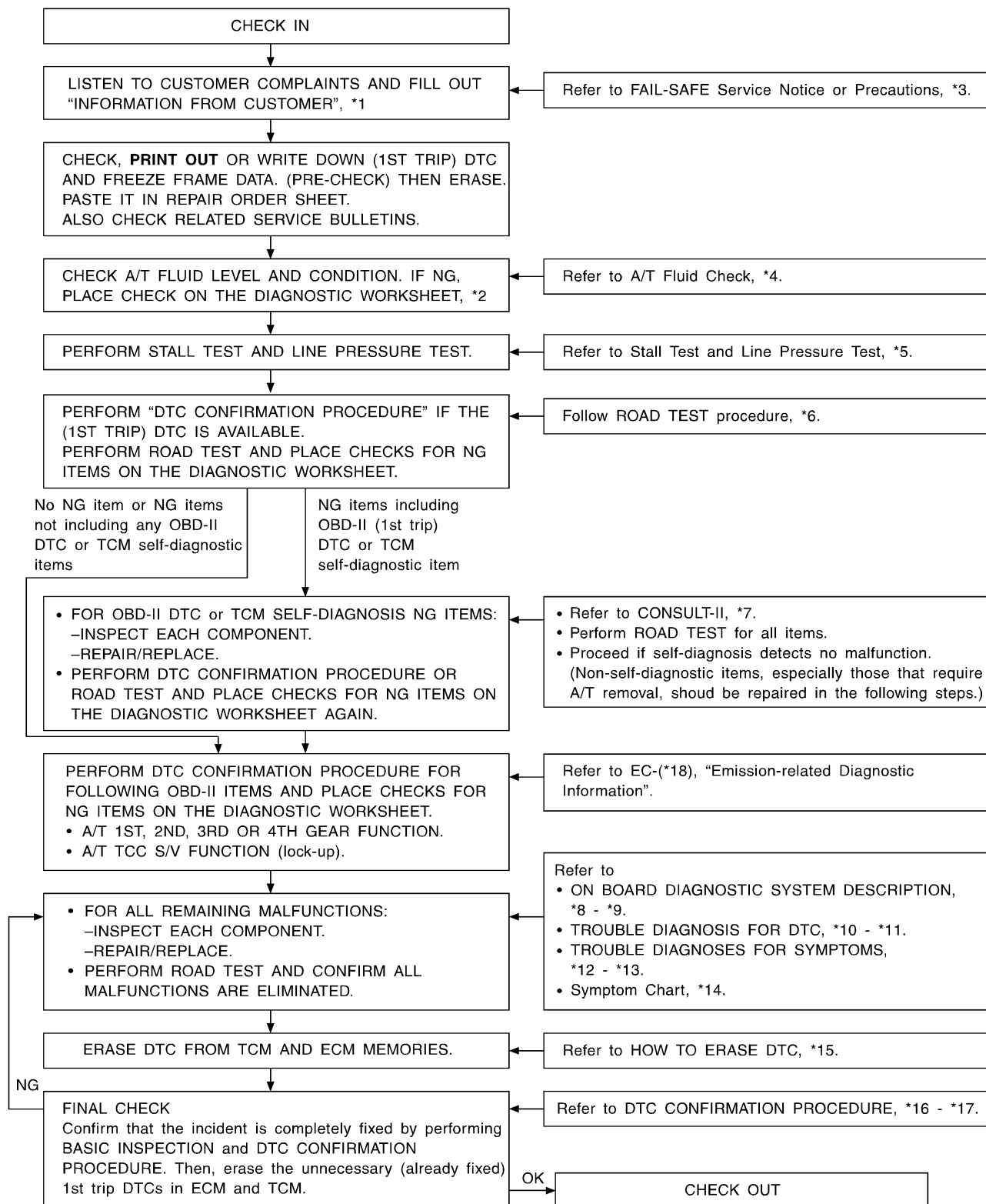


# TROUBLE DIAGNOSIS — INTRODUCTION

Work Flow (Cont'd)

## WORK FLOW CHART

=NFAT0025S02



SAT086JI

\*1: AT-58

\*2: AT-59

\*3: AT-9

\*4: AT-63

\*5: AT-63, 63

\*6: AT-68

\*7: AT-40

\*8: AT-36

\*9: AT-54

\*10: AT-105

\*11: AT-219

\*12: AT-221

\*13: AT-264

\*14: AT-86

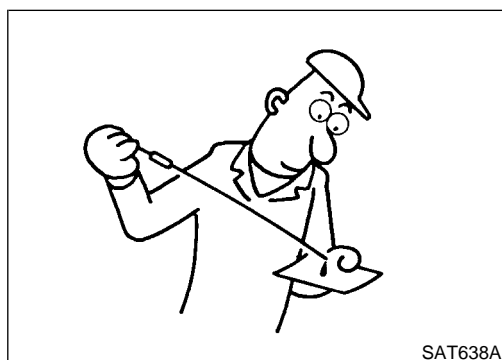
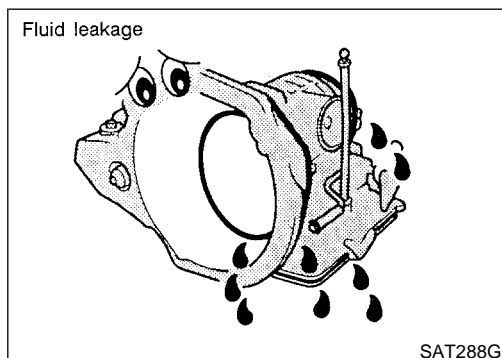
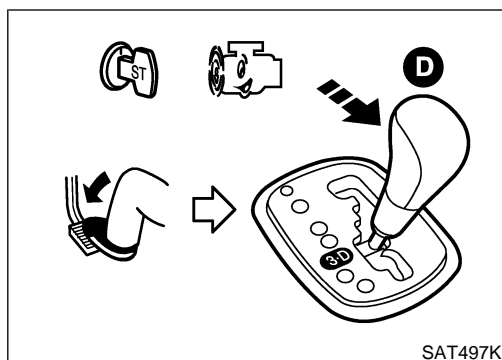
\*15: AT-38

\*16: AT-105

\*17: AT-219

\*18: EC-76





## A/T Fluid Check

### FLUID LEAKAGE CHECK

NFAT0026

NFAT0026S01

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

4. Check for fresh leakage.

### FLUID CONDITION CHECK

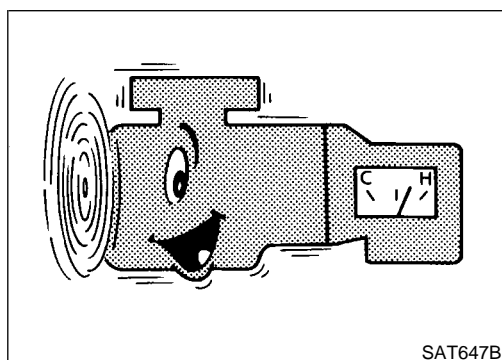
NFAT0026S02

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

NFAT0026S03

Refer to MA-21, "Checking A/T Fluid".



## Stall Test

### STALL TEST PROCEDURE

NFAT0027

NFAT0027S01

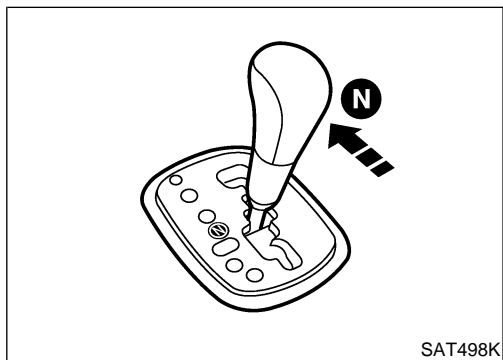
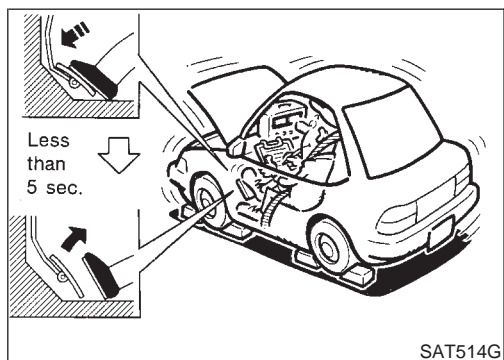
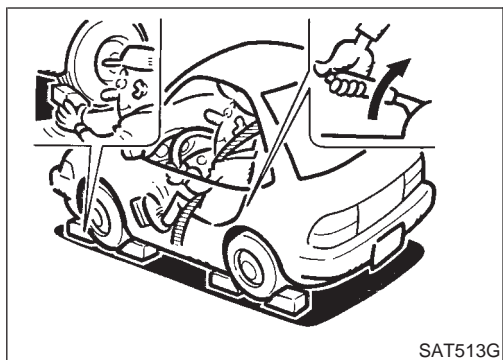
1. Check A/T fluid and engine oil levels. If necessary, add fluid and oil.
2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

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



# TROUBLE DIAGNOSIS — BASIC INSPECTION

## Stall Test (Cont'd)



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

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

**Stall revolution:**  
**2,550 - 3,050 rpm**

8. Move selector lever to N position.
9. Cool off ATF.
  - Run engine at idle for at least one minute.
10. Repeat steps 5 through 9 with selector lever in 2nd , 1st and R positions.

## JUDGEMENT OF STALL TEST

NFAT0027S02

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-62.

### NOTE:

Stall revolution is too high in D, 3rd, 2nd or 1st 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 selector lever set to 3rd position.
  - 1st and 2nd gears in 2nd 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 1st position. .... Low & reverse brake slippage
- Engine brake functions in 1st position. .... Reverse clutch slippage

### Stall revolution within specifications:

- Vehicle does not achieve speed of more than 80 km/h (50



MPH). ..... One-way clutch seizure in torque converter housing

**CAUTION:**  
**Be careful since automatic fluid temperature increases abnormally.**

- Slippage occurs in 3rd and 4th gears in D position. .... High clutch slippage
- 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 2nd position, and 1st gear in 1st position. .... Overrun clutch slippage

**Stall revolution less than specifications:**

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

GI  
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IDX



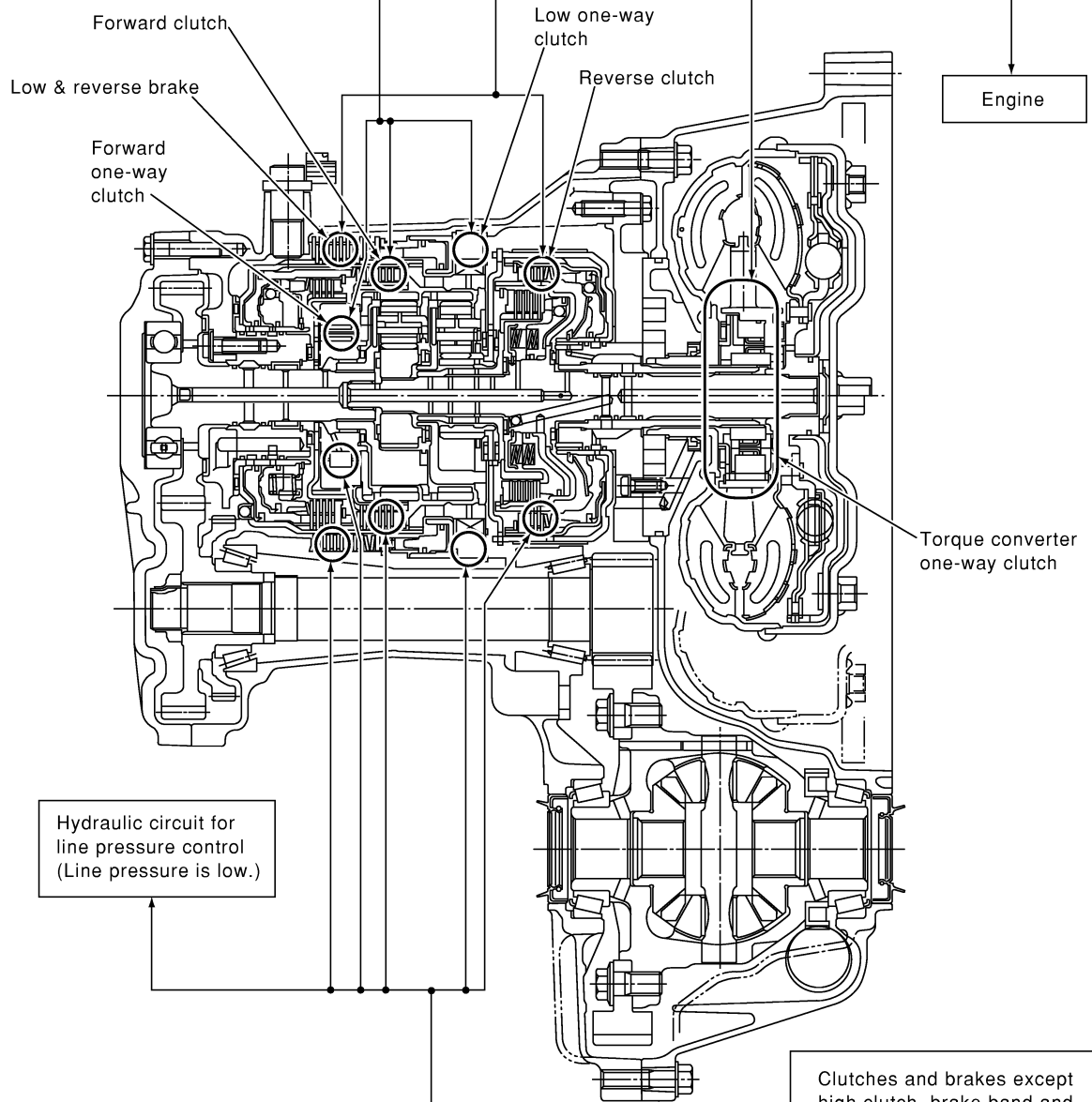
# TROUBLE DIAGNOSIS — BASIC INSPECTION

Stall Test (Cont'd)

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

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

Damaged components

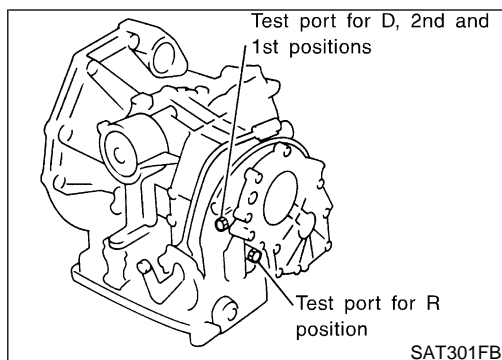


D	H	O
2	H	O
1	H	O
R	H	O
Selector lever position	Judgement	

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

SAT499K





## Line Pressure Test

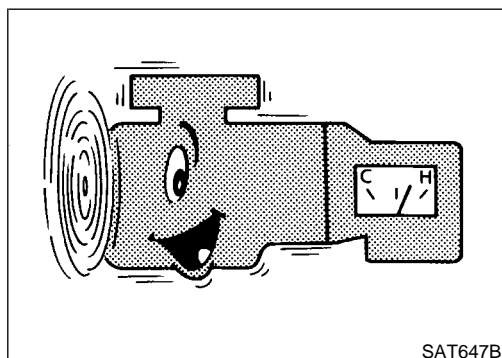
### LINE PRESSURE TEST PORTS

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

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

NFAT0028

NFAT0028S01



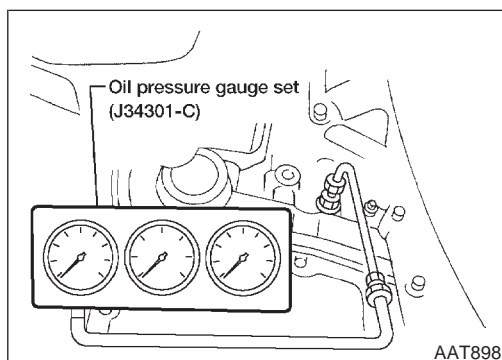
### LINE PRESSURE TEST PROCEDURE

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

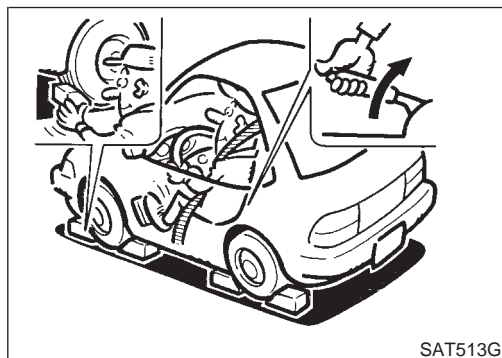
**ATF operating temperature:**

**50 - 80°C (122 - 176°F)**

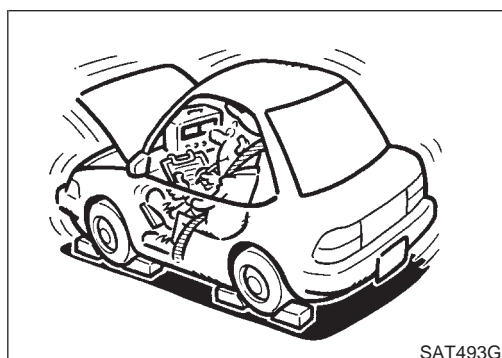
NFAT0028S02



3. Install pressure gauge to corresponding line pressure port.



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



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

**Line pressure: Refer to SDS, AT-377.**

GI

MA

EM

LC

EC

FE

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MT

AT

AX

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BR

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RS

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HA

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EL

IDX



# TROUBLE DIAGNOSIS — BASIC INSPECTION

Line Pressure Test (Cont'd)

## JUDGEMENT OF LINE PRESSURE TEST

NFAT0028S03

	Judgement	Suspected parts
At idle	Line pressure is low in all positions.	<ul style="list-style-type: none"> <li>Oil pump wear</li> <li>Control piston damage</li> <li>Pressure regulator valve or plug sticking</li> <li>Spring for pressure regulator valve damaged</li> <li>Fluid pressure leakage between oil strainer and pressure regulator valve</li> <li>Clogged strainer</li> </ul>
	Line pressure is low in particular position.	<ul style="list-style-type: none"> <li>Fluid pressure leakage between manual valve and particular clutch</li> <li>For example, line pressure is: <ul style="list-style-type: none"> <li>Low in R and 1st positions, but</li> <li>Normal in D and 2nd positions.</li> </ul> Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to "CLUTCH AND BAND CHART", AT-20.</li> </ul>
	Line pressure is high.	<ul style="list-style-type: none"> <li>Maladjustment of accelerator pedal position sensor (throttle position sensor)</li> <li>A/T fluid temperature sensor damaged</li> <li>Line pressure solenoid valve sticking</li> <li>Short circuit of line pressure solenoid valve circuit</li> <li>Pressure modifier valve sticking</li> <li>Pressure regulator valve or plug sticking</li> <li>Open in dropping resistor circuit</li> </ul>
At stall speed	Line pressure is low.	<ul style="list-style-type: none"> <li>Maladjustment of accelerator pedal position sensor (throttle position sensor)</li> <li>Line pressure solenoid valve sticking</li> <li>Short circuit of line pressure solenoid valve circuit</li> <li>Pressure regulator valve or plug sticking</li> <li>Pressure modifier valve sticking</li> <li>Pilot valve sticking</li> </ul>

### ROAD TEST PROCEDURE

1. Check before engine is started.



2. Check at idle.



3. Cruise test.

SAT786A

### Road Test DESCRIPTION

NFAT0029

NFAT0029S01

- 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:
  - Check before engine is started
  - Check at idle
  - 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" and "TROUBLE DIAGNOSES FOR SYMPTOMS", AT-36 to AT-54 and AT-221 to AT-264.

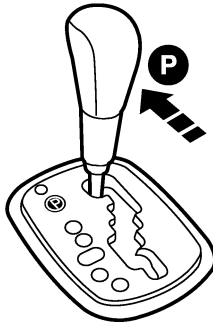


SAT496G

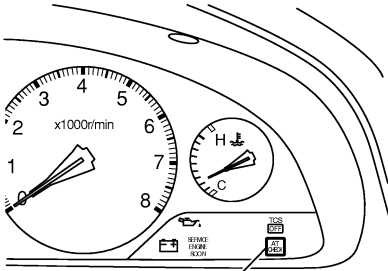


## 1. CHECK BEFORE ENGINE IS STARTED

=NFAT0029S02

1	CHECK A/T CHECK INDICATOR LAMP							
<div>1. Park vehicle on flat surface.</div> <div>2. Move selector lever to P position.</div> <div></div> <div>SAT491K</div> <div>3. Turn ignition switch to OFF position. Wait at least 5 seconds.</div> <div>4. Turn ignition switch to ON position. (Do not start engine.)</div> <div>5. Does A/T CHECK indicator lamp come on for about 2 seconds?</div> <div>Yes or No</div> <table><tr><td>Yes</td><td>▶</td><td>GO TO 2.</td></tr><tr><td>No</td><td>▶</td><td>Stop ROAD TEST. Go to “1. A/T CHECK Indicator Lamp Does Not Come On”, AT-223.</td></tr></table>			Yes	▶	GO TO 2.	No	▶	Stop ROAD TEST. Go to “1. A/T CHECK Indicator Lamp Does Not Come On”, AT-223.
Yes	▶	GO TO 2.						
No	▶	Stop ROAD TEST. Go to “1. A/T CHECK Indicator Lamp Does Not Come On”, AT-223.						

SAT491K

2	CHECK A/T CHECK INDICATOR LAMP	
Does A/T CHECK indicator lamp flicker for about 8 seconds?		
<div></div> <div>A/T CHECK indicator lamp</div>		
SAT492K		
Yes or No		
Yes	▶	Perform self-diagnosis and check NG items on the DIAGNOSTIC WORKSHEET, AT-58. Refer to TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-51.
No	▶	<div>1. Turn ignition switch to OFF position.</div> <div>2. Perform self-diagnosis and note NG items. Refer to TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-51.</div> <div>3. Go to “2. CHECK AT IDLE”, AT-70.</div>

SAT492K



# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

## 2. CHECK AT IDLE

NFAT0029S03

<b>1</b>	<b>CHECK ENGINE START</b>	
<p>1. Park vehicle on flat surface. 2. Move selector lever to P position.</p> <div> <p>A line drawing of a selector lever with a knob. The lever is shown in two positions: 'P' (Park) and 'N' (Neutral). The 'P' position is indicated by a dashed line and a circle with 'P'. The 'N' position is indicated by a solid line and a circle with 'N'. The lever is mounted on a base with several buttons and a small lever.</p> </div> <p>3. Turn ignition switch to OFF position. 4. Turn ignition switch to START position. 5. Is engine started?</p> <p style="text-align: right;">SAT502K</p>		
<b>Yes or No</b>		
Yes	▶	GO TO 2.
No	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "2. Engine Cannot Be Started In P and N Position", AT-226. Continue ROAD TEST.

<b>2</b>	<b>CHECK ENGINE START</b>	
<p>1. Turn ignition switch to ACC position. 2. Move selector lever to D, 1st, 2nd or R position.</p> <div> <p>A line drawing of a selector lever with a knob. The lever is shown in four positions: 'R' (Reverse), 'D' (Drive), '2' (2nd gear), and '1' (1st gear). Each position is indicated by a dashed line and a circle with the corresponding letter or number. The lever is mounted on a base with several buttons and a small lever.</p> </div> <p>3. Turn ignition switch to START position. 4. Is engine started?</p> <p style="text-align: right;">SAT503K</p>		
<b>Yes or No</b>		
Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Mark the box on the DIAGNOSTIC WORKSHEET. Go to "2. Engine Cannot Be Started In P and N Position", AT-226. Continue ROAD TEST.
No	▶	GO TO 3.



# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

<b>3</b>	<b>CHECK VEHICLE MOVE</b>							
<p>1. Move selector lever to P position.</p> <div> </div> <div> <p>SAT491K</p> </div> <p>2. Turn ignition switch to OFF position.</p> <p>3. Release parking brake.</p> <p>4. Push vehicle forward or backward.</p> <div> </div> <div> <p>SAT796A</p> </div> <p>5. Does vehicle move when it is pushed forward or backward?</p> <p>6. Apply parking brake.</p> <p style="text-align: center;"><b>Yes or No</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Yes</td> <td style="width: 5%; text-align: center;">▶</td> <td>Mark the box on the DIAGNOSTIC WORKSHEET. Go to "3. In P Position, Vehicle Moves Forward Or Backward When Pushed", AT-227. Continue ROAD TEST.</td> </tr> <tr> <td>No</td> <td style="text-align: center;">▶</td> <td>GO TO 4.</td> </tr> </table>			Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "3. In P Position, Vehicle Moves Forward Or Backward When Pushed", AT-227. Continue ROAD TEST.	No	▶	GO TO 4.
Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "3. In P Position, Vehicle Moves Forward Or Backward When Pushed", AT-227. Continue ROAD TEST.						
No	▶	GO TO 4.						


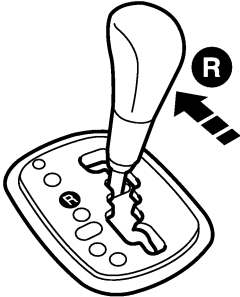
<b>4</b>	<b>CHECK VEHICLE MOVE</b>							
<p>1. Start engine.</p> <p>2. Move selector lever to N position.</p> <div> </div> <div> <p>SAT498K</p> </div> <p>3. Release parking brake.</p> <p>4. Does vehicle move forward or backward?</p> <p style="text-align: center;"><b>Yes or No</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Yes</td> <td style="width: 5%; text-align: center;">▶</td> <td>Mark the box on the DIAGNOSTIC WORKSHEET. Go to "4. In N Position, Vehicle Moves", AT-228. Continue ROAD TEST.</td> </tr> <tr> <td>No</td> <td style="text-align: center;">▶</td> <td>GO TO 5.</td> </tr> </table>			Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "4. In N Position, Vehicle Moves", AT-228. Continue ROAD TEST.	No	▶	GO TO 5.
Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "4. In N Position, Vehicle Moves", AT-228. Continue ROAD TEST.						
No	▶	GO TO 5.						

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# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

<b>5</b>	<b>CHECK SHIFT LOCK</b>	
1. Apply foot brake.		
<div style="text-align: center;">  </div>		
2. Move selector lever to R position.		
<div style="text-align: center;">  </div>		
3. Is there large shock when changing from N to R position?		
<b>Yes or No</b>		
Yes	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "5. Large Shock N → R Position", AT-231. Continue ROAD TEST.
No	▶	GO TO 6.

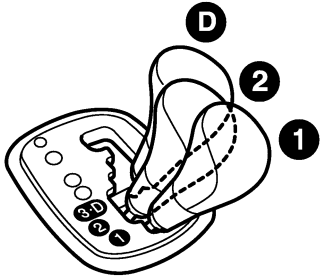
SAT797A

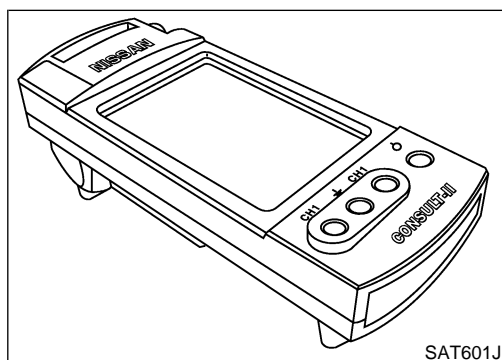
SAT506K

<b>6</b>	<b>CHECK VEHICLE MOVE</b>	
1. Release foot brake for several seconds.		
<div style="text-align: center;">  </div>		
For several seconds		
2. Does vehicle creep backward when foot brake is released?		
<b>Yes or No</b>		
Yes	▶	GO TO 7.
No	▶	Mark the box on the DIAGNOSTIC WORKSHEET. Go to "6. Vehicle Does Not Creep Backward In R Position", AT-233. Continue ROAD TEST.

SAT799A



<b>7</b>	<b>CHECK VEHICLE MOVE</b>
<p>1. Move selector lever to D, 2nd and 1st positions and check if vehicle creeps forward.</p> <div style="text-align: center;">  </div>	
<p>2. Does vehicle creep forward in all three positions?</p> <p style="text-align: right;">SAT507K</p>	
Yes or No	
Yes	▶ Go to 3. CRUISE TEST, AT-73.
No	▶ Mark the box on the DIAGNOSTIC WORKSHEET. Go to "7. Vehicle Does Not Creep Forward In D, 2nd Or 1st Position", AT-237. Continue ROAD TEST.



### 3. CRUISE TEST

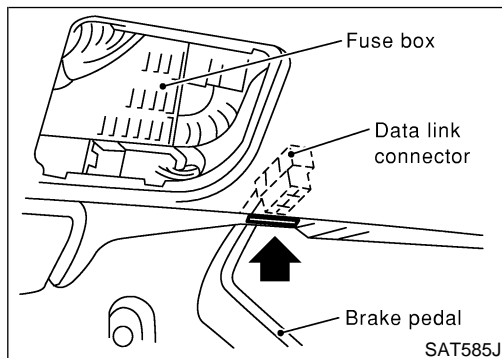
NFAT0029S04

- Check all items listed in Parts 1 through 3.

#### With CONSULT-II

NFAT0029S0401

- 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

NFAT0029S0402

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

CONSULT-II	
ENGINE	
START (NISSAN BASED VHCL)	
START (X-BADGE VHCL)	
SUB MODE	
LIGHT	COPY

SAIA0450E

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



# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

SELECT SYSTEM
A/T
ENGINE

SAT014K

5. Touch "A/T".

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

SCIA5358E

6. Touch "DATA MONITOR".

DATA MONITOR
SELECT MONITOR ITEM
TCM INPUT SIGNALS
MAIN SIGNAL
SELECTION FROM MENU

SAT175K

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

8. See "Numerical Display", "Barchart Display" or "Line Graph Display".

SET RECORDING CONDITION
AUTO TRIG
MANU TRIG
TRIGGER POINT
<< [Progress Bar] >>
0% 20% 40% 60% 80% 100%
Recording Speed
MIN [Progress Bar] MAX
<< [Progress Bar] >>
/64 /32 /16 /8 /4 /2 FULL

SAT973J

9. Touch "SETTING" to set 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

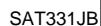
11. When performing cruise test, touch "RECORD".



### Road Test (Cont'd)

SAT135K

**AT**

SAT987JSAT974JSAT975J

17. Continue cruise test part 2 and 3.

NFAT0029S0403

- IDX

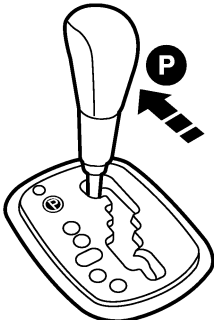
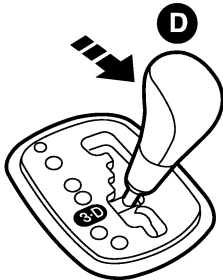
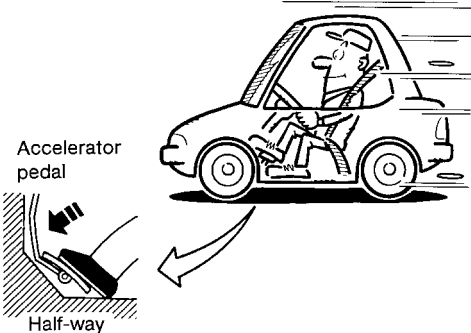


# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

## Cruise Test — Part 1


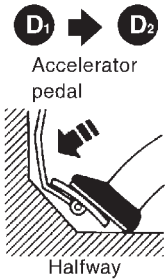
=NFAT0029S0404


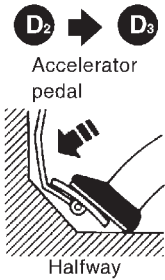
1	<b>CHECK STARTING GEAR (D<sub>1</sub>) POSITION</b>
<p>1. Drive vehicle for approx. 10 minutes to warm engine oil and ATF up to operating temperature.  <b>ATF operating temperature:</b>  <b>50 - 80°C (122 - 176°F)</b></p> <p>2. Park vehicle on flat surface.  3. Set selector lever is in D position.  4. Move selector lever to P position.</p>	
	
<p>5. Start engine.  6. Move selector lever to D position.</p>	
	
<p>7. Accelerate vehicle by constantly depressing accelerator pedal half-way.</p>	
	
<p>8. Does vehicle start from D<sub>1</sub>?  <input type="checkbox"/> <b>Read gear position.</b></p>	
Yes or No	
Yes	▶ GO TO 2.
No	▶ Go to "8. Vehicle Cannot Be Started From D <sub>1</sub> ", AT-240. Continue ROAD TEST.



# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)


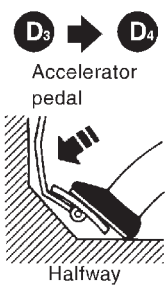
<b>2</b>	<b>CHECK SHIFT UP (D<sub>1</sub> TO D<sub>2</sub>)</b>	
<p>Does A/T shift from D<sub>1</sub> to D<sub>2</sub> at the specified speed?</p> <p> <b>Read gear position, throttle opening and vehicle speed.</b>  <b>Specified speed when shifting from D<sub>1</sub> to D<sub>2</sub>:</b>  <b>Refer to Shift schedule, AT-376.</b></p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT954I</p> <p style="text-align: center;"><b>Yes or No</b></p>		
Yes	▶	GO TO 3.
No	▶	Go to "9. A/T Does Not Shift: D <sub>1</sub> → D <sub>2</sub> Or Does Not Kickdown: D <sub>4</sub> → D <sub>2</sub> ", AT-243. Continue ROAD TEST.

<b>3</b>	<b>CHECK SHIFT UP (D<sub>2</sub> TO D<sub>3</sub>)</b>	
<p>Does A/T shift from D<sub>2</sub> to D<sub>3</sub> at the specified speed?</p> <p> <b>Read gear position, throttle position and vehicle speed.</b>  <b>Specified speed when shifting from D<sub>2</sub> to D<sub>3</sub>:</b>  <b>Refer to Shift schedule, AT-376.</b></p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT955I</p> <p style="text-align: center;"><b>Yes or No</b></p>		
Yes	▶	GO TO 4.
No	▶	Go to "10. A/T Does Not Shift: D <sub>2</sub> → D <sub>3</sub> ", AT-246. Continue ROAD TEST.


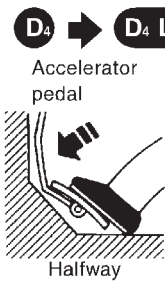


# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

<b>4</b>	<b>CHECK SHIFT UP (D<sub>3</sub> TO D<sub>4</sub>)</b>	
<p>Does A/T shift from D<sub>3</sub> to D<sub>4</sub> at the specified speed?</p> <p> <b>Read gear position, throttle position and vehicle speed.</b>  <b>Specified speed when shifting from D<sub>3</sub> to D<sub>4</sub>:</b>  <b>Refer to shift schedule, AT-376.</b></p> <div style="text-align: center;">  <p>Accelerator pedal</p> <p>Halfway</p> </div> <p><b>Yes or No</b></p>		
Yes	▶	GO TO 5.
No	▶	Go to "11. A/T Does Not Shift: D <sub>3</sub> → D <sub>4</sub> ", AT-249. Continue ROAD TEST.

SAT956I

<b>5</b>	<b>CHECK LOCK-UP (D<sub>4</sub> TO D<sub>4</sub>L/U)</b>	
<p>Does A/T perform lock-up at the specified speed?</p> <p> <b>Read vehicle speed, throttle position when lock-up duty becomes 94%.</b>  <b>Specified speed when lock-up occurs:</b>  <b>Refer to Shift schedule, AT-376.</b></p> <div style="text-align: center;">  <p>Accelerator pedal</p> <p>Halfway</p> </div> <p><b>Yes or No</b></p>		
Yes	▶	GO TO 6.
No	▶	Go to "12. A/T Does Not Perform Lock-up", AT-252. Continue ROAD TEST.

SAT957I

<b>6</b>	<b>CHECK HOLD LOCK-UP</b>	
<p>Does A/T hold lock-up condition for more than 30 seconds?</p> <p style="text-align: center;"><b>Yes or No</b></p>		
Yes	▶	GO TO 7.
No	▶	Go to "13. A/T Does Not Hold Lock-up Condition", AT-254.



# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

<b>7</b>	<b>CHECK SHIFT DOWN (D<sub>4</sub>L/U TO D<sub>4</sub>)</b>	
<p>1. Release accelerator pedal.</p> <div style="text-align: center;"> <p>Accelerator pedal      Brake pedal</p> <p>Released      Lightly applied</p> </div> <p style="text-align: right;">SAT958I</p>		
<p>2. Is lock-up released when accelerator pedal is released?</p> <p style="text-align: center;"><b>Yes or No</b></p>		
Yes	▶	GO TO 8.
No	▶	Go to "14. Lock-up Is Not Released", AT-256. Continue ROAD TEST.

<b>8</b>	<b>CHECK SHIFT DOWN (D<sub>4</sub> TO D<sub>3</sub>)</b>	
<p>1. Decelerate vehicle by applying foot brake lightly.</p> <div style="text-align: center;"> <p>Accelerator pedal      Brake pedal</p> <p>Released      Lightly applied</p> </div> <p style="text-align: right;">SAT959I</p>		
<p>2. Does engine speed return to idle smoothly when A/T is shifted from D<sub>4</sub> to D<sub>3</sub>?</p> <p>📖 <b>Read gear position and engine speed.</b></p> <p style="text-align: center;"><b>Yes or No</b></p>		
Yes	▶	<p>1. Stop vehicle.</p> <p>2. Go to "Cruise Test — Part 2", AT-80.</p>
No	▶	Go to "15. Engine Speed Does Not Return To Idle (Light Braking D <sub>4</sub> → D <sub>3</sub> )", AT-257. Continue ROAD TEST.

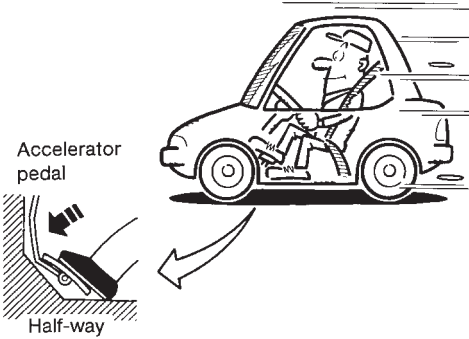


# TROUBLE DIAGNOSIS — BASIC INSPECTION

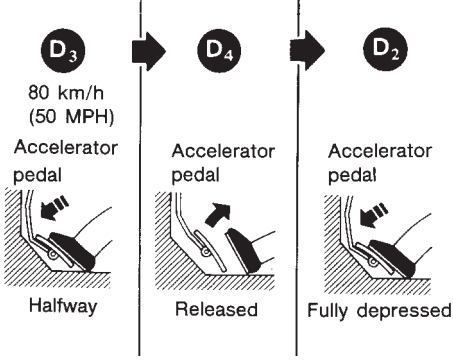
Road Test (Cont'd)

## Cruise Test — Part 2

=NFAT0029S0405

<b>1</b>	<b>CHECK STARTING GEAR (D<sub>1</sub>) POSITION</b>
<p>1. Confirm selector lever is in D position.</p> <p>2. Accelerate vehicle by half throttle again.</p>	
	
<p>3. Does vehicle start from D<sub>1</sub>?</p> <p><input type="checkbox"/> <b>Read gear position.</b></p>	
<b>Yes or No</b>	
Yes	▶ GO TO 2.
No	▶ Go to "16. Vehicle Does Not Start From D <sub>1</sub> ", AT-260. Continue ROAD TEST.

SAT495G


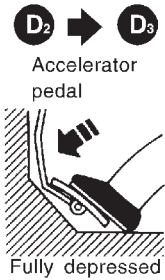
<b>2</b>	<b>CHECK SHIFT UP AND SHIFT DOWN (D<sub>3</sub> TO D<sub>4</sub> TO D<sub>2</sub>)</b>
<p>1. Accelerate vehicle to 80 km/h (50 MPH) as shown in illustration.</p> <p>2. Release accelerator pedal and then quickly depress it fully.</p>	
	
<p>3. Does A/T shift from D<sub>4</sub> to D<sub>2</sub> as soon as accelerator pedal is depressed fully?</p> <p><input type="checkbox"/> <b>Read gear position and throttle position.</b></p>	
<b>Yes or No</b>	
Yes	▶ GO TO 3.
No	▶ Go to "9. A/T Does Not Shift: D <sub>1</sub> → D <sub>2</sub> Or Does Not Kickdown: D <sub>4</sub> → D <sub>2</sub> ", AT-243. Continue ROAD TEST.


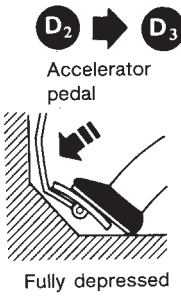
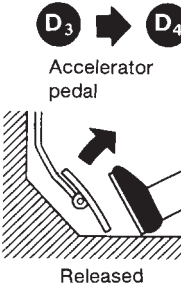
SAT404H



# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

<b>3</b>	<b>CHECK SHIFT UP (D<sub>2</sub> TO D<sub>3</sub>)</b>	
<p>Does A/T shift from D<sub>2</sub> to D<sub>3</sub> at the specified speed?</p> <p> <b>Read gear position, throttle position and vehicle speed.</b>  <b>Specified speed when shifting from D<sub>2</sub> to D<sub>3</sub>:</b>  <b>Refer to Shift schedule, AT-376.</b></p> <div style="text-align: center;">  </div> <p style="text-align: right;">SAT960I</p>		
<b>Yes or No</b>		
Yes	►	GO TO 4.
No	►	Go to "10. A/T Does Not Shift: D <sub>2</sub> → D <sub>3</sub> ", AT-246. Continue ROAD TEST.

<b>4</b>	<b>CHECK SHIFT UP (D<sub>3</sub> TO D<sub>4</sub>) AND ENGINE BRAKE</b>	
<p>Release accelerator pedal after shifting from D<sub>2</sub> to D<sub>3</sub>.  Does A/T shift from D<sub>3</sub> to D<sub>4</sub> and does vehicle decelerate by engine brake?</p> <p> <b>Read gear position, throttle position and vehicle speed.</b></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <p style="text-align: right;">SAT405H</p>		
<b>Yes or No</b>		
Yes	►	<ol style="list-style-type: none"> <li>1. Stop vehicle.</li> <li>2. Go to "CRUISE TEST — Part 3", AT-82.</li> </ol>
No	►	Go to "11. A/T Does Not Shift: D <sub>3</sub> → D <sub>4</sub> ", AT-249. Continue ROAD TEST.



# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

## Cruise Test — Part 3

=NFAT0029S0406

1	VEHICLE SPEED (D <sub>4</sub> ) POSITION
<div> <p>1. Confirm selector lever is in D position.</p> <p>2. Accelerate vehicle using half-throttle to D<sub>4</sub>.</p> </div> <div> </div> <div> <p>3. Release accelerator pedal.</p> </div> <div> </div> <div> <p>4. Set selector lever sets in 3rd position while driving in D<sub>4</sub>.</p> <p>5. Does A/T shift from D<sub>4</sub> to D<sub>3</sub>?</p> </div> <div> <p> Read gear position and vehicle speed.</p> </div> <div> <div> <div>(Selector lever position)</div> </div> <div> <div>(Gear position)</div> <div> <div>D<sub>4</sub></div> <div>↓</div> <div>3<sub>3</sub></div> </div> <div>Engine brake</div> </div> </div> <div> <p>Yes or No</p> </div>	
Yes	▶ GO TO 2.
No	▶ Go to "17. A/T Does Not Shift: D <sub>4</sub> → D <sub>3</sub> , When selector lever D → 3rd position, AT-261. Continue ROAD TEST.

SAT812A

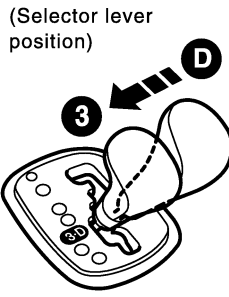
SAT813A

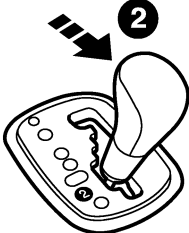
SAT510K



# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

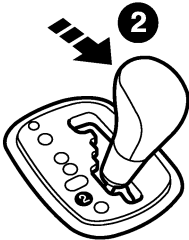
2 CHECK ENGINE BRAKE		
Does vehicle decelerate by engine brake?		
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>(Selector lever position)</p>  </div> <div style="text-align: center;"> <p>(Gear position)</p> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">D<sub>4</sub></div> <p>↓</p> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">3<sub>3</sub></div> <p>Engine brake</p> </div> </div> <p style="text-align: right;">SAT510K</p>		
Yes or No		
Yes	▶	GO TO 3.
No	▶	Go to "15. Engine Speed Does Not Return To Idle (Light Braking D <sub>4</sub> → D <sub>3</sub> )", AT-257. Continue ROAD TEST.


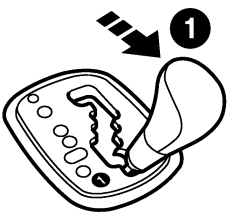
3 CHECK SHIFT DOWN (D <sub>3</sub> TO D <sub>2</sub> )		
1. Move selector lever from 3rd to 2nd position while driving in D <sub>3</sub> . 2. Does A/T shift from D <sub>3</sub> to 2 <sub>2</sub> ? ⓘ Read gear position.		
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>2</p>  </div> <div style="text-align: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">3<sub>3</sub></div> <p>↓</p> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">2<sub>2</sub></div> <p>Engine brake</p> </div> </div> <p style="text-align: right;">SAT512K</p>		
Yes or No		
Yes	▶	GO TO 4.
No	▶	Go to "18. A/T Does Not Shift: D <sub>3</sub> → D <sub>2</sub> , When Selector Lever 3rd → 2nd Position", AT-262. Continue ROAD TEST.



# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

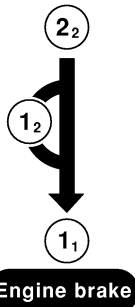
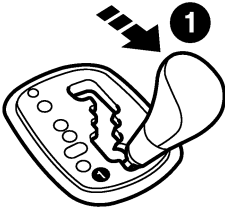
4	CHECK ENGINE BRAKE	
Does vehicle decelerate by engine brake?		
<div><div></div><div><div><div>3<sub>3</sub></div><div>↓</div><div>2<sub>2</sub></div><div>Engine brake</div></div></div></div> <div>Yes or No</div>		
Yes	▶	GO TO 5.
No	▶	Go to “15. Engine Speed Does Not Return To Idle (Light Braking D <sub>4</sub> → D <sub>3</sub> )”, AT-257. Continue ROAD TEST.

5	CHECK SHIFT DOWN (2 <sub>2</sub> TO 1 <sub>1</sub> )	
<div>1. Move selector lever from 2nd to 1st position while driving in 2<sub>2</sub>.</div> <div>2. Does A/T shift from 2<sub>2</sub> to 1<sub>1</sub> position?</div> <div> <b>Read gear position.</b></div> <div><div></div><div><div><div>2<sub>2</sub></div><div>↓</div><div>1<sub>2</sub></div><div>↓</div><div>1<sub>1</sub></div><div>Engine brake</div></div></div><div>Yes or No</div></div>		
Yes	▶	GO TO 6.
No	▶	Go to “19. A/T Does Not Shift: 2 <sub>2</sub> → 1 <sub>1</sub> , When Selector Lever 2nd → 1st Position”, AT-263. Continue ROAD TEST.



# TROUBLE DIAGNOSIS — BASIC INSPECTION

Road Test (Cont'd)

6	CHECK ENGINE BRAKE	
Does vehicle decelerate by engine brake?		
<div></div>		
Yes or No		
Yes	►	1. Stop vehicle. 2. Perform self-diagnosis. Refer to TCM Self-diagnostic Procedure (No Tools), AT-51.
No	►	Go to “20. Vehicle Does Not Decelerate By Engine Brake”, AT-264. Continue ROAD TEST.

GI

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IDX



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

## 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
No Lock-up Engagement/TCC Inoperative	Torque converter is not locked up.	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203
			3. Park/neutral position (PNP) switch adjustment	AT-278
			4. Engine speed signal	AT-121
			5. A/T fluid temperature sensor	AT-196
			6. Line pressure test	AT-67
			7. Torque converter clutch solenoid valve	AT-153
			8. Control valve assembly	AT-277
		OFF vehicle	9. Torque converter	AT-280
	Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			3. Line pressure test	AT-67
			4. Torque converter clutch solenoid valve	AT-153
			5. Line pressure solenoid valve	AT-168
			6. Control valve assembly	AT-277
		OFF vehicle	7. Torque converter	AT-280
	Lock-up point is extremely high or low. AT-252	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203
			3. Torque converter clutch solenoid valve	AT-153
			4. Control valve assembly	AT-277
Shift Shock	Sharp shock in shifting from N to D position.	ON vehicle	1. Engine idling rpm	AT-68
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			3. Line pressure test	AT-67
			4. A/T fluid temperature sensor	AT-196
			5. Engine speed signal	AT-121
			6. Line pressure solenoid valve	AT-168
			7. Control valve assembly	AT-277
			8. Accumulator N-D	AT-277
		OFF vehicle	9. Forward clutch	AT-331



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
Shift Shock	Too sharp a shock in change from D <sub>1</sub> to D <sub>2</sub> .	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302	GI
			2. Line pressure test	AT-67	MA
			3. Accumulator servo release	AT-277	EM
			4. Control valve assembly	AT-277	EM
			5. A/T fluid temperature sensor	AT-196	
		OFF vehicle	6. Brake band	AT-280	LC
	Too sharp a shock in change from D <sub>2</sub> to D <sub>3</sub> .	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302	EC
			2. Line pressure test	AT-67	
			3. Control valve assembly	AT-277	FE
		OFF vehicle	4. High clutch	AT-326	
			5. Brake band	AT-280	CL
	Too sharp a shock in change from D <sub>3</sub> to D <sub>4</sub> .	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302	MT
			2. Line pressure test	AT-67	
			3. Control valve assembly	AT-277	AT
		OFF vehicle	4. Brake band	AT-280	
			5. Overrun clutch	AT-331	AX
	Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302	SU
			2. Line pressure test	AT-67	
			3. Overrun clutch solenoid valve	AT-191	BR
			4. Control valve assembly	AT-277	
	Large shock changing from 1 <sub>2</sub> to 1 <sub>1</sub> in 1st position.	ON vehicle	1. Control valve assembly	AT-277	ST
		OFF vehicle	2. Low & reverse brake	AT-336	RS
Improper Shift Timing	Too high a gear change point from D <sub>1</sub> to D <sub>2</sub> , from D <sub>2</sub> to D <sub>3</sub> , from D <sub>3</sub> to D <sub>4</sub> . AT-243, 246, 249	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302	BT
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203	HA
			3. Shift solenoid valve A	AT-174	
			4. Shift solenoid valve B	AT-179	SC
	Gear change directly from D <sub>1</sub> to D <sub>3</sub> occurs.	ON vehicle	1. Fluid level	AT-63	
			2. Accumulator servo release	AT-277	EL
		OFF vehicle	3. Brake band	AT-280	
	Too high a change point from D <sub>4</sub> to D <sub>3</sub> , from D <sub>3</sub> to D <sub>2</sub> , from D <sub>2</sub> to D <sub>1</sub> .	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302	IDX
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203	



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
Improper Shift Timing	Kickdown does not operate when depressing pedal in D <sub>4</sub> within kick-down vehicle speed.	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203
			3. Shift solenoid valve A	AT-174
			4. Shift solenoid valve B	AT-179
	Kickdown operates or engine overruns when depressing pedal in D <sub>4</sub> beyond kick-down vehicle speed limit.	ON vehicle	1. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			3. Shift solenoid valve A	AT-174
			4. Shift solenoid valve B	AT-179
	Gear change from 2 <sub>2</sub> to 2 <sub>3</sub> in 2nd position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278
	Gear change from 1 <sub>1</sub> to 1 <sub>2</sub> in 1st position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278
			2. Control cable adjustment	AT-279
No Down Shift	Failure to change gear from D <sub>4</sub> to D <sub>3</sub> .	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			3. Overrun clutch solenoid valve	AT-191
			4. Shift solenoid valve A	AT-174
			5. Line pressure solenoid valve	AT-168
			6. Control valve assembly	AT-277
		OFF vehicle	7. Low & reverse brake	AT-336
			8. Overrun clutch	AT-331
	Failure to change gear from D <sub>3</sub> to D <sub>2</sub> or from D <sub>4</sub> to D <sub>2</sub> .	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			3. Shift solenoid valve A	AT-174
			4. Shift solenoid valve B	AT-179
			5. Control valve assembly	AT-277
		OFF vehicle	6. High clutch	AT-326
			7. Brake band	AT-336



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
No Down Shift	Failure to change gear from D <sub>2</sub> to D <sub>1</sub> or from D <sub>3</sub> to D <sub>1</sub> .	ON vehicle	1. Fluid level	AT-63	GI
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302	MA
			3. Shift solenoid valve A	AT-174	EM
			4. Shift solenoid valve B	AT-179	
			5. Control valve assembly	AT-277	
		OFF vehicle	6. Low one-way clutch	AT-280	LC
			7. High clutch	AT-326	
			8. Brake band	AT-280	EC
	Failure to change from D <sub>3</sub> to 2 <sub>2</sub> when changing lever into 2nd position. AT-257	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278	FE
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302	CL
			3. Overrun clutch solenoid valve	AT-191	MT
			4. Shift solenoid valve B	AT-179	
			5. Shift solenoid valve A	AT-174	
			6. Control valve assembly	AT-277	<b>AT</b>
			7. Control cable adjustment	AT-279	
		OFF vehicle	8. Brake band	AT-280	AX
			9. Overrun clutch	AT-331	
	Does not change from 1 <sub>2</sub> to 1 <sub>1</sub> in 1st position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278	SU
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203	BR
			3. Shift solenoid valve A	AT-174	
			4. Control valve assembly	AT-277	ST
			5. Overrun clutch solenoid valve	AT-191	
		OFF vehicle	6. Overrun clutch	AT-331	RS
			7. Low & reverse brake	AT-336	
No Up Shift	Failure to change gear from D <sub>1</sub> to D <sub>2</sub> .	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278	BT
			2. Control cable adjustment	AT-279	HA
			3. Shift solenoid valve A	AT-174	
			4. Control valve assembly	AT-277	SC
			5. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203	EL
		OFF vehicle	6. Brake band	AT-280	

IDX



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

## Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
No Up Shift	Failure to change gear from D <sub>2</sub> to D <sub>3</sub> .	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278
			2. Control cable adjustment	AT-279
			3. Shift solenoid valve B	AT-179
			4. Control valve assembly	AT-277
			5. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203
		OFF vehicle	6. High clutch	AT-326
			7. Brake band	AT-280
	Failure to change gear from D <sub>3</sub> to D <sub>4</sub> .	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278
			2. Control cable adjustment	AT-279
			3. Shift solenoid valve A	AT-174
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203
			5. A/T fluid temperature sensor	AT-196
		OFF vehicle	6. Brake band	AT-280
	A/T does not shift to D <sub>4</sub> when driving with selector lever from 3rd to D position.	ON vehicle	1. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			2. Park/neutral position (PNP) switch adjustment	AT-278
			3. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203
			4. Shift solenoid valve A	AT-174
			5. Overrun clutch solenoid valve	AT-191
			6. Control valve assembly	AT-277
			7. A/T fluid temperature sensor	AT-196
			8. Line pressure solenoid valve	AT-168
		OFF vehicle	9. Brake band	AT-280
			10. Overrun clutch	AT-331
Slips/Will Not Engage	Vehicle will not run in R position (but runs in D, 2nd and 1st positions). Clutch slips. Very poor acceleration. AT-233	ON vehicle	1. Control cable adjustment	AT-279
			2. Line pressure test	AT-67
			3. Line pressure solenoid valve	AT-168
			4. Control valve assembly	AT-277
		OFF vehicle	5. Reverse clutch	AT-323
			6. High clutch	AT-326
			7. Forward clutch	AT-331
			8. Overrun clutch	AT-331
			9. Low & reverse brake	AT-336



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
Slips/Will Not Engage	Vehicle will not run in D and 2nd positions (but runs in 1st and R positions).	ON vehicle	1. Control cable adjustment	AT-279	GI
		OFF vehicle	2. Low one-way clutch	AT-280	MA
	Vehicle will not run in D, 1st, 2nd positions (but runs in R position). Clutch slips. Very poor acceleration. AT-237	ON vehicle	1. Fluid level	AT-63	EM
			2. Line pressure test	AT-67	
			3. Line pressure solenoid valve	AT-168	LC
			4. Control valve assembly	AT-277	
			5. Accumulator N-D	AT-277	EC
		OFF vehicle	6. Reverse clutch	AT-323	
			7. High clutch	AT-326	FE
			8. Forward clutch	AT-331	
			9. Forward one-way clutch	AT-280	CL
			10. Low one-way clutch	AT-280	
	Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-63	MT
			2. Control cable adjustment	AT-279	
			3. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302	AT
			4. Line pressure test	AT-67	AX
			5. Line pressure solenoid valve	AT-168	
			6. Control valve assembly	AT-277	SU
			7. Accumulator N-D	AT-277	
		OFF vehicle	8. Forward clutch	AT-331	BR
			9. Reverse clutch	AT-323	
			10. Low & reverse brake	AT-336	ST
			11. Oil pump	AT-305	
			12. Torque converter	AT-280	RS
	No creep at all. AT-233, 237	ON vehicle	1. Fluid level	AT-63	
			2. Line pressure test	AT-67	BT
			3. Control valve assembly	AT-277	HA
		OFF vehicle	4. Forward clutch	AT-331	
			5. Oil pump	AT-305	SC
			6. Torque converter	AT-280	
					EL
					IDX



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

## Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
Slips/Will Not Engage	Almost no shock or clutches slipping in change from D <sub>1</sub> to D <sub>2</sub> .	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			3. Line pressure test	AT-67
			4. Accumulator servo release	AT-277
			5. Control valve assembly	AT-277
		OFF vehicle	6. Brake band	AT-280
	Almost no shock or slipping in change from D <sub>2</sub> to D <sub>3</sub> .	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			3. Line pressure test	AT-67
			4. Control valve assembly	AT-277
		OFF vehicle	5. High clutch	AT-326
			6. Forward clutch	AT-331
	Almost no shock or slipping in change from D <sub>3</sub> to D <sub>4</sub> .	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			3. Line pressure test	AT-67
			4. Control valve assembly	AT-277
		OFF vehicle	5. High clutch	AT-326
			6. Brake band	AT-280
	Races extremely fast or slips in changing from D <sub>4</sub> to D <sub>3</sub> when depressing pedal.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			3. Line pressure test	AT-67
			4. Line pressure solenoid valve	AT-168
			5. Control valve assembly	AT-277
		OFF vehicle	6. High clutch	AT-326
			7. Forward clutch	AT-331
	Races extremely fast or slips in changing from D <sub>4</sub> to D <sub>2</sub> when depressing pedal.	ON vehicle	1. Fluid level	AT-63
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			3. Line pressure test	AT-67
			4. Line pressure solenoid valve	AT-168
			5. Shift solenoid valve A	AT-174
			6. Control valve assembly	AT-277
		OFF vehicle	7. Brake band	AT-280
			8. Forward clutch	AT-331



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
Slips/Will Not Engage	Races extremely fast or slips in changing from D <sub>3</sub> to D <sub>2</sub> when depressing pedal.	ON vehicle	1. Fluid level	AT-63	GI
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302	MA
			3. Line pressure test	AT-67	
			4. Line pressure solenoid valve	AT-168	EM
			5. Control valve assembly	AT-277	
			6. A/T fluid temperature sensor	AT-196	LC
		OFF vehicle	7. Brake band	AT-280	
			8. Forward clutch	AT-331	EC
			9. High clutch	AT-326	
	Races extremely fast or slips in changing from D <sub>4</sub> or D <sub>3</sub> to D <sub>1</sub> when depressing pedal.	ON vehicle	1. Fluid level	AT-63	FE
			2. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302	CL
			3. Line pressure test	AT-67	
			4. Line pressure solenoid valve	AT-168	MT
			5. Control valve assembly	AT-277	
		OFF vehicle	6. Forward clutch	AT-331	AT
			7. Forward one-way clutch	AT-280	
			8. Low one-way clutch	AT-280	AX
	Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-63	
			2. Control cable adjustment	AT-279	SU
			3. Line pressure test	AT-67	
			4. Line pressure solenoid valve	AT-168	BR
		OFF vehicle	5. Oil pump	AT-305	
			6. High clutch	AT-326	ST
			7. Brake band	AT-280	
			8. Low & reverse brake	AT-336	RS
			9. Torque converter	AT-280	
			10. Parking components	AT-302	BT
NOT USED	Engine cannot be started in P and N positions. AT-226	ON vehicle	1. Ignition switch and starter	EL-11, and SC-10	HA
			2. Control cable adjustment	AT-279	
			3. Park/neutral position (PNP) switch adjustment	AT-278	SC
	Engine starts in positions other than P and N. AT-226	ON vehicle	1. Control cable adjustment	AT-279	EL
			2. Park/neutral position (PNP) switch adjustment	AT-278	IDX



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

## Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
NOT USED	Transaxle noise in P and N positions.	ON vehicle	1. Fluid level	AT-63
			2. Line pressure test	AT-67
			3. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203
			5. Engine speed signal	AT-121
		OFF vehicle	6. Oil pump	AT-305
			7. Torque converter	AT-280
	Vehicle moves when changing into P position or parking gear does not disengage when shifted out of P position. AT-227	ON vehicle	1. Control cable adjustment	AT-279
		OFF vehicle	2. Parking components	AT-302
	Vehicle runs in N position. AT-228	ON vehicle	1. Control cable adjustment	AT-279
		OFF vehicle	2. Forward clutch	AT-331
			3. Reverse clutch	AT-323
			4. Overrun clutch	AT-331
	Vehicle braked when shifting into R position.	ON vehicle	1. Fluid level	AT-63
			2. Control cable adjustment	AT-279
			3. Line pressure test	AT-67
			4. Line pressure solenoid valve	AT-168
			5. Control valve assembly	AT-277
		OFF vehicle	6. High clutch	AT-326
			7. Brake band	AT-280
			8. Forward clutch	AT-331
			9. Overrun clutch	AT-331
	Excessive creep.	ON vehicle	1. Engine idling rpm	AT-68
	Engine stops when shifting lever into R, D, 2nd and 1st position.	ON vehicle	1. Engine idling rpm	AT-68
			2. Torque converter clutch solenoid valve	AT-153
			3. Control valve assembly	AT-277
		OFF vehicle	4. Torque converter	AT-280
	Vehicle braked by gear change from D <sub>1</sub> to D <sub>2</sub> .	ON vehicle	1. Fluid level	AT-63
		OFF vehicle	2. Reverse clutch	AT-323
			3. Low & reverse brake	AT-336
			4. High clutch	AT-326
			5. Low one-way clutch	AT-280



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page	
NOT USED	Vehicle braked by gear change from D <sub>2</sub> to D <sub>3</sub> .	ON vehicle	1. Fluid level	AT-63	GI
		OFF vehicle	2. Brake band	AT-280	
	Vehicle braked by gear change from D <sub>3</sub> to D <sub>4</sub> .	ON vehicle	1. Fluid level	AT-63	MA
		OFF vehicle	2. Overrun clutch	AT-331	EM
			3. Forward one-way clutch	AT-280	
			4. Reverse clutch	AT-323	LC
	Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-63	
			2. Park/neutral position (PNP) switch adjustment	AT-278	EC
			3. Shift solenoid valve A	AT-174	
			4. Shift solenoid valve B	AT-179	FE
			5. Control valve assembly	AT-277	
		OFF vehicle	6. Reverse clutch	AT-323	CL
			7. High clutch	AT-326	
			8. Brake band	AT-280	MT
			9. Low & reverse brake	AT-336	AT
			10. Oil pump	AT-305	
			11. Torque converter	AT-280	AX
	Transaxle noise in D, 2nd, 1st and R positions.	ON vehicle	1. Fluid level	AT-63	
		ON vehicle	2. Torque converter	AT-280	SU
	Engine brake does not operate in "1st" position. AT-260	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-278	BR
			2. Control cable adjustment	AT-279	
			3. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302	ST
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-116, 203	RS
			5. Shift solenoid valve A	AT-174	
			6. Control valve assembly	AT-277	BT
			7. Overrun clutch solenoid valve	AT-191	
		OFF vehicle	8. Overrun clutch	AT-331	HA
			9. Low & reverse brake	AT-336	SC
					EL
					IDX



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

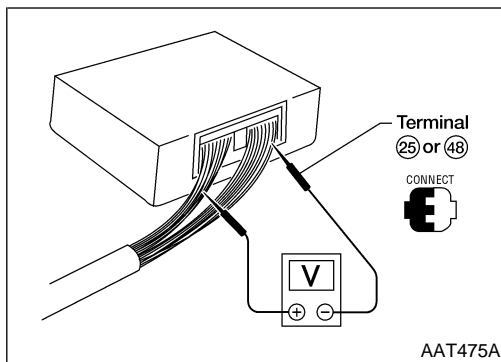
Symptom Chart (Cont'd)

Items	Symptom	Condition	Diagnostic Item	Reference Page
NOT USED	Transaxle overheats.	ON vehicle	1. Fluid level	AT-63
			2. Engine idling rpm	AT-68
			3. Accelerator pedal position sensor (throttle position sensor) adjustment	EC-302
			4. Line pressure test	AT-67
			5. Line pressure solenoid valve	AT-168
			6. Control valve assembly	AT-277
		OFF vehicle	7. Oil pump	AT-305
			8. Reverse clutch	AT-323
			9. High clutch	AT-326
			10. Brake band	AT-280
			11. Forward clutch	AT-331
			12. Overrun clutch	AT-331
			13. Low & reverse brake	AT-336
			14. Torque converter	AT-280
	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-63
		OFF vehicle	2. Reverse clutch	AT-323
			3. High clutch	AT-326
			4. Brake band	AT-280
			5. Forward clutch	AT-331
			6. Overrun clutch	AT-331
			7. Low & reverse brake	AT-336
	Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-63
		OFF vehicle	2. Torque converter	AT-278
			3. Oil pump	AT-305
			4. Reverse clutch	AT-323
			5. High clutch	AT-326
			6. Brake band	AT-280
			7. Forward clutch	AT-331
			8. Overrun clutch	AT-331
			9. Low & reverse brake	AT-336
	Engine is stopped at R, D, 2nd and 1st positions.	ON vehicle	1. Fluid level	AT-63
			2. Torque converter clutch solenoid valve	AT-153
			3. Shift solenoid valve B	AT-179
			4. Shift solenoid valve A	AT-174
			5. Control valve assembly	AT-277



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

TCM Terminals and Reference Value



## TCM Terminals and Reference Value

NFAT0031

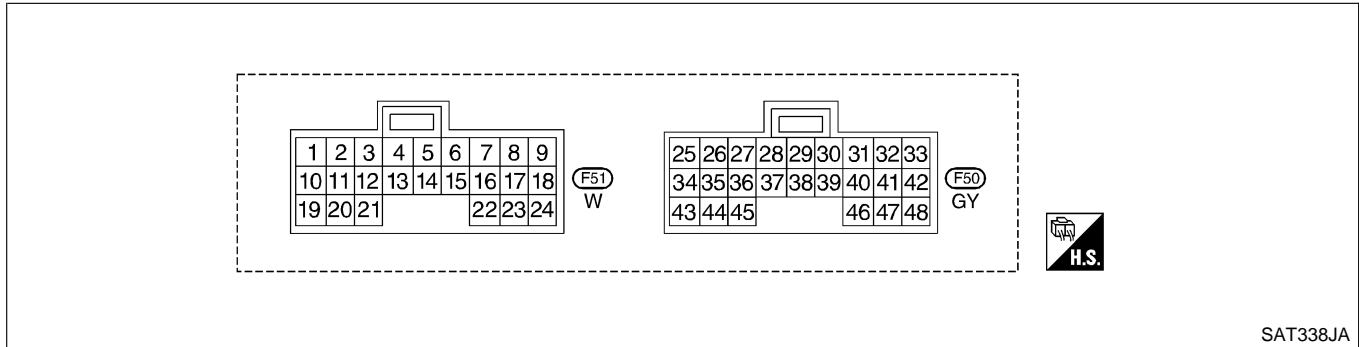
### PREPARATION

NFAT0031S01

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

## TCM HARNESS CONNECTOR TERMINAL LAYOUT


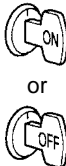
NFAT0031S02



## TCM INSPECTION TABLE

(Data are reference values.)






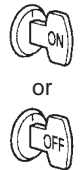

NFAT0031S03

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	L	CAN (high)	—	—	—
6	R	CAN (low)	—	—	—
10	R/Y	Power source		When turning ignition switch to ON.	Battery voltage
				When turning ignition switch to OFF.	0V



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION









TCM Terminals and Reference Value (Cont'd)

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 <sub>1</sub> or D <sub>4</sub> .)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in D <sub>2</sub> or D <sub>3</sub> .)	0V
12	LG/B	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in D <sub>1</sub> or D <sub>2</sub> .)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in D <sub>3</sub> or D <sub>4</sub> .)	0V
13	G/Y	A/T CHECK indicator lamp		When AT CHECK indicator lamp is ON.	0V
				When AT CHECK indicator lamp is OFF.	Battery voltage
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	3rd position switch		When the selector lever is in a position other than 3rd position.	Battery voltage
				When the selector lever is in 3rd position.	0V
25	B	Ground	—	—	0V
26	PU/W	PNP switch 1st position		When setting selector lever to 1st position.	Battery voltage
				When setting selector lever to other positions.	0V
27	P/B	PNP switch 2nd position		When setting selector lever to 2nd 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
29	W	Revolution sensor (VHCL/S SEN)		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 <b>CAUTION:</b> <b>Connect the diagnosis data link cable to the vehicle diagnosis connector.</b> *1: A circuit tester cannot be used to test this item.	450 Hz
				When vehicle parks.	0V



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

TCM Terminals and Reference Value (Cont'd)

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)	
30*	BR/Y	Data link connector (RX)		—	—	GI
31*	P	Data link connector (TX)		—	—	MA
32	R	Sensor power		Ignition switch ON. Ignition switch OFF.	4.5 - 5.5V 0V	EM
34	Y/PU	PNP switch D position		When setting selector lever to D position.	Battery voltage	LC
				When setting selector lever to other positions.	0V	EC
35	G/W	PNP switch R position		When setting selector lever to R position.	Battery voltage	FE
				When setting selector lever to other positions.	0V	CL
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	
38	PU	Power train revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 <b>CAUTION:</b> <b>Connect the diagnosis data link cable to the vehicle diagnosis connector.</b> *1: A circuit tester cannot be used to test this item.	240 Hz	MT
				When vehicle parks.	Under 1.3V or over 4.5V	AT
39	W/G	Engine speed signal (TACHO)		Refer to EC-139, "ECM INSPECTION TABLE".		AX
						SU
40	PU/R	Vehicle speed sensor (MTR)		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Intermittently changes between approx. 0V and approx. 4.5V	BR
						ST
41	W	Accelerator pedal position sensor (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	RS
42	B	Sensor ground		—	0V	BT
45	R/G	Stop lamp switch		When depressing brake pedal	Battery voltage	HA
				When releasing brake pedal	0V	SC
47	G	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F). When ATF temperature is 80°C (176°F).	1.5V 0.5V	EL
48	B	Ground	—	—	0V	IDX

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



# CAN COMMUNICATION

System Description

## System Description

NFAT0283

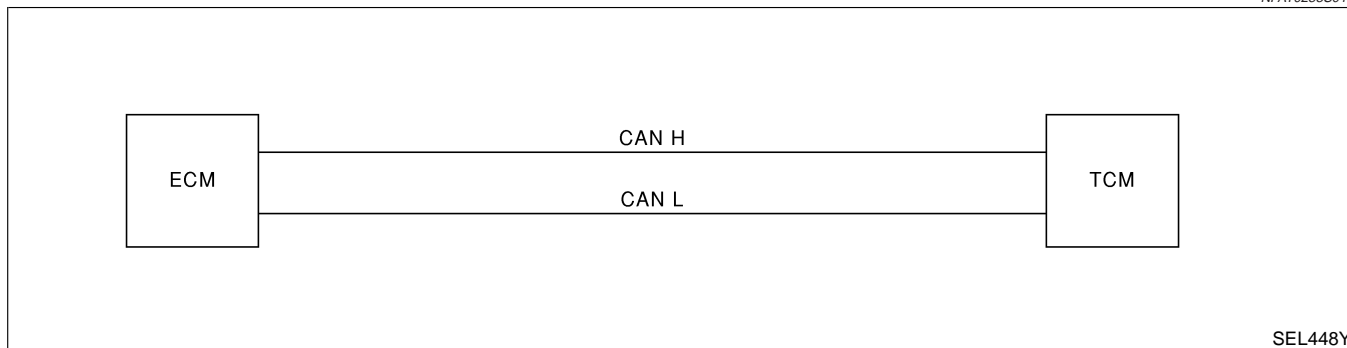
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information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

### FOR A/T MODELS

NFAT0283S01

#### System Diagram

NFAT0283S0101



SEL448Y

#### Input/Output Signal Chart

NFAT0283S0102

T: Transmit R: Receive

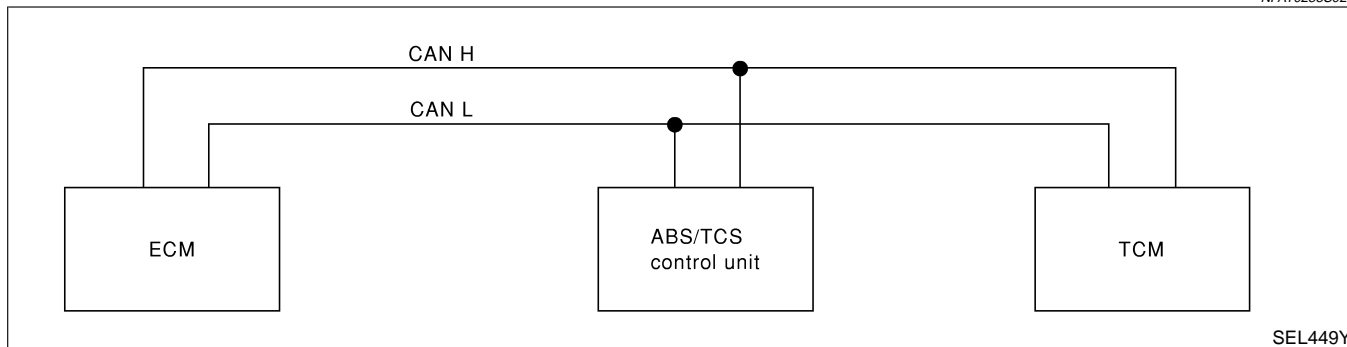
Signals	ECM	TCM
Accelerator pedal position (throttle position) signal	T	R
Output shaft revolution signal	R	T

### FOR TCS MODELS

NFAT0283S02

#### System Diagram

NFAT0283S0201



SEL449Y

#### Input/Output Signal Chart

NFAT0283S0202

T: Transmit R: Receive

Signals	ECM	ABS/TCS control unit	TCM
Accelerator pedal position (throttle position) signal	T	R	R
Output shaft revolution signal	R		T



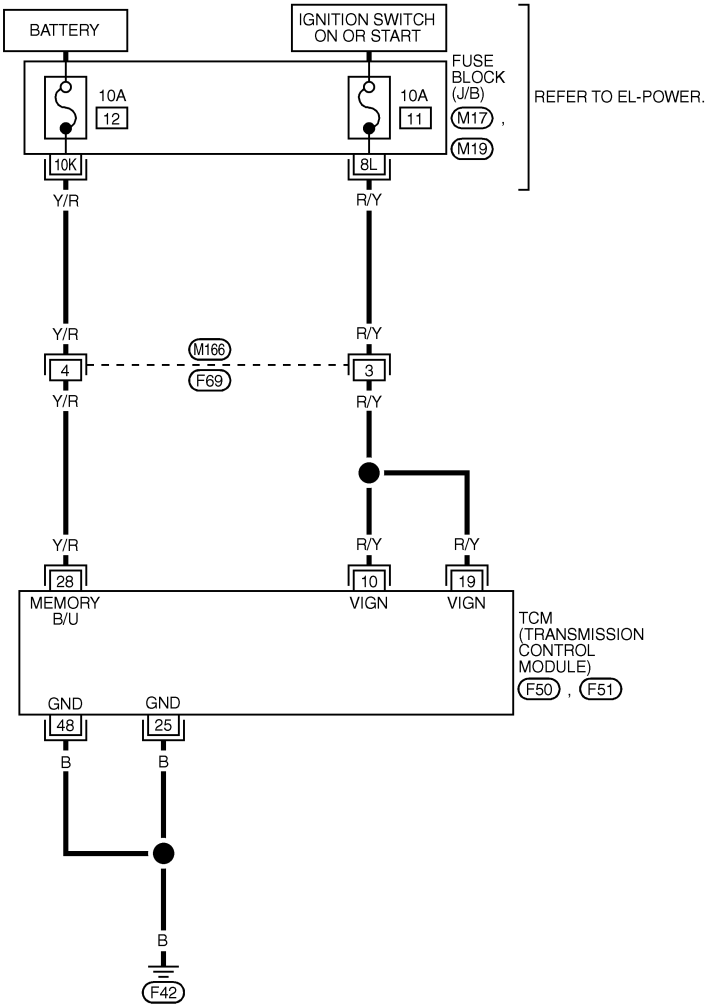
TROUBLE DIAGNOSIS FOR POWER SUPPLY

Wiring Diagram — AT — MAIN

Wiring Diagram — AT — MAIN

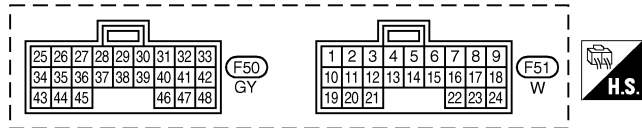
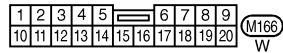
NFAT0032

AT-MAIN-01



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

REFER TO EL-POWER.



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

MAT061B

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

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

SAT292KB







# TROUBLE DIAGNOSIS FOR POWER SUPPLY

Wiring Diagram — AT — MAIN (Cont'd)

## TCM TERMINALS AND REFERENCE VALUE

=NFAT0032S01

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

## Diagnostic Procedure

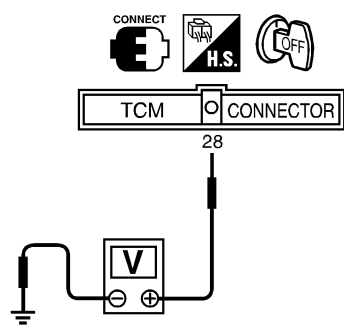
NFAT0033

1	CHECK TCM POWER SOURCE STEP 1	
<div>1. Turn ignition switch to ON position. (Do not start engine.)</div> <div>2. Check voltage between TCM harness connectors F50, 51 terminals 10 (R/Y), 19 (R/Y), 28 (Y/R) and ground.</div> <div><div><div><div>CONNECT</div><div></div></div><div><div>H.S.</div><div></div></div><div><div>ON</div><div></div></div></div><div><div><div>TCM</div><div>CONNECTOR</div></div><div>10, 19, 28</div><div></div></div><div><div>Voltage:</div><div>Battery voltage</div></div><div>SAT611J</div><div>OK or NG</div></div>		
OK	▶	GO TO 2.
NG	▶	GO TO 3.



# TROUBLE DIAGNOSIS FOR POWER SUPPLY

Diagnostic Procedure (Cont'd)

2		CHECK TCM POWER SOURCE STEP 2
		<p>1. Turn ignition switch to OFF position.</p> <p>2. Check voltage between TCM harness connector F50 terminal 28 (Y/R) and ground.</p> <div style="text-align: center;">  <p><b>Voltage:</b> <b>Battery voltage</b></p> </div> <p style="text-align: right;">SAT612JF</p> <p style="text-align: center;"><b>OK or NG</b></p>
OK	▶	GO TO 4.
NG	▶	GO TO 3.

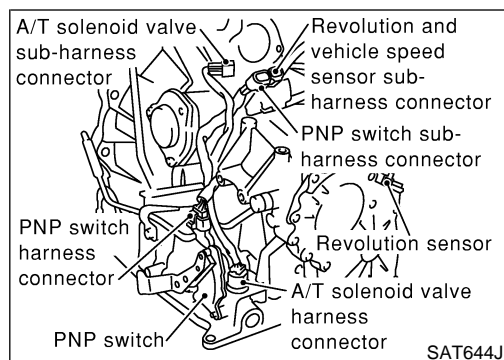
3		DETECT MALFUNCTIONING ITEM
		<p>Check the following items:</p> <ul style="list-style-type: none"> <li>● Harness for short or open between ignition switch and TCM harness connectors F50, F51 terminals 10 (R/Y), 19 (R/Y) and 28 (Y/R) (Main harness)</li> <li>● Fuse</li> <li>● Ignition switch</li> </ul> <p>Refer to EL-10, "POWER SUPPLY ROUTING".</p> <p style="text-align: center;"><b>OK or NG</b></p>
OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.

4		CHECK TCM GROUND CIRCUIT
		<p>1. Turn ignition switch to OFF position.</p> <p>2. Disconnect TCM harness connector.</p> <p>3. Check continuity between TCM harness connector F50 terminals 25 (B), 48 (B) and ground. Refer to wiring diagram — AT — MAIN.</p> <p style="color: blue;"><b>Continuity should exist.</b></p> <p>If OK, check harness for short to ground and short to power.</p> <p style="text-align: center;"><b>OK or NG</b></p>
OK	▶	<b>INSPECTION END</b>
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.



# DTC P0705 PARK/NEUTRAL POSITION SWITCH

## Description



## Description

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

NFAT0034

## 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 1st position	When setting selector lever to 1st position.	Battery voltage
			When setting selector lever to other positions.	0V
27	P/B	PNP switch 2nd position	When setting selector lever to 2nd 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

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.

NFAT0201



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

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

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: 3rd or D position**

Ⓢ WITH GST

NFAT0203S02

Follow the procedure “With CONSULT-II”.







# DTC P0705 PARK/NEUTRAL POSITION SWITCH


Diagnostic Procedure

## Diagnostic Procedure

NFAT0036

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 6.

GI  
MA  
EM

2	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (With CONSULT-II)															
	With CONSULT-II															
<div>1. Turn ignition switch to ON position. (Do not start engine.)</div> <div>2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.</div> <div>3. Read out P, R, N, D, 2nd and 1st position switches moving selector lever to each position. Check the signal of the selector lever position is indicated properly.</div>																
<table><tr><th colspan="2">DATA MONITOR</th></tr><tr><th>MONITORING</th><th></th></tr><tr><td>PN POSI SW</td><td>OFF</td></tr><tr><td>R POSITION SW</td><td>OFF</td></tr><tr><td>D POSITION SW</td><td>OFF</td></tr><tr><td>2 POSITION SW</td><td>ON</td></tr><tr><td>1 POSITION SW</td><td>OFF</td></tr></table>			DATA MONITOR		MONITORING		PN POSI SW	OFF	R POSITION SW	OFF	D POSITION SW	OFF	2 POSITION SW	ON	1 POSITION SW	OFF
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.														

LC  
EC  
FE  
CL  
MT  
AT

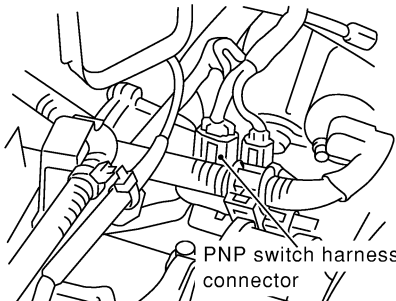
3

DETECT MALFUNCTIONING ITEM

Check the following item:



● Park/neutral position (PNP) switch

Check continuity between terminals 1 (G/OR) and 2 (B) and between terminals 3 (OR) and 4 (PU/W) , 5 (P/B), 6 (Y/PU), 7 (BR), 8 (G/W), 9 (GY/R) while moving manual shaft through each position.



PNP switch harness connector

View with air cleaner box removed

8

7

2

1

3

6


9

5

4

1,(3)

2,(4,5,6,7,8,9)



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.

AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX



# DTC P0705 PARK/NEUTRAL POSITION SWITCH

Diagnostic Procedure (Cont'd)

4	CHECK MANUAL CONTROL CABLE ADJUSTMENT	
Check PNP switch again with manual control cable disconnected from manual shaft of A/T assembly. Refer to test group 1.		
OK or NG		
OK	▶	Adjust manual control cable. Refer to AT-279.
NG	▶	Repair or replace PNP switch.

5	DETECT MALFUNCTIONING ITEM	
Check the following items:		
<ul style="list-style-type: none"><li>● Harness for short or open between ignition switch and park/neutral position (PNP) switch (Main harness)</li><li>● Harness for short or open between park/neutral position (PNP) switch and TCM (Main harness)</li><li>● Fuse</li><li>● Joint connector-3 M29</li><li>● Ignition switch</li></ul>		
Refer to EL-10, "POWER SUPPLY ROUTING".		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

6

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

⊗

Without CONSULT-II

1. Turn ignition switch to ON position. (Do not start engine.)

2. Check voltage between TCM harness connector F50 terminals 26 (PU/W), 27 (P/B), 34 (Y/PU), 35 (G/W), 36 (R/G) and ground while moving selector lever through each position.

TCM

CONNECTOR

26, 27, 34, 35, 36

V

⊖ ⊕

⏚

H.S.

CONNECT

+

ON

Voltage:

B: Battery voltage

0: 0V

Lever position	Terminal No.				
	36	35	34	27	26
P, N	<b>B</b>	0	0	0	0
R	0	<b>B</b>	0	0	0
D	0	0	<b>B</b>	0	0
2	0	0	0	<b>B</b>	0
1	0	0	0	0	<b>B</b>

SAT840J

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 5.

7	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-105.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 8.



# DTC P0705 PARK/NEUTRAL POSITION SWITCH

Diagnostic Procedure (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.

GI

MA

EM

LC

EC

FE

CL

MT

**AT**

AX

SU

BR

ST

RS

BT

HA

SC

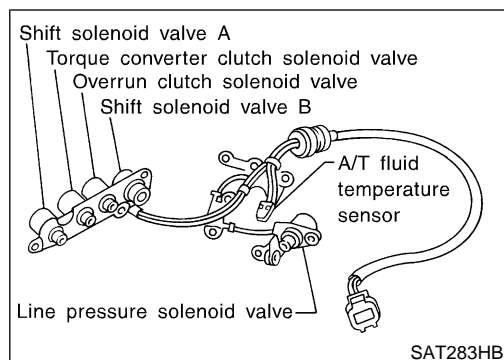
EL

IDX



# DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

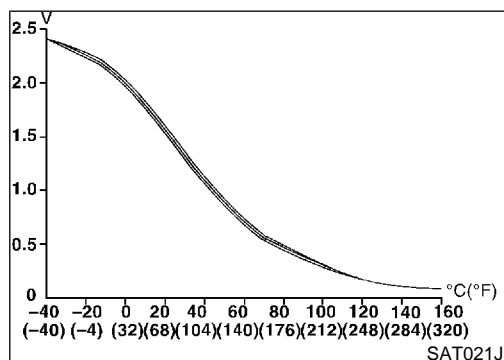
## Description



## Description

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

NFAT0037



## CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

NFAT0037S01

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

## TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

NFAT0037S02

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
42	B	Sensor ground	—	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

## On Board Diagnosis Logic

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

NFAT0204



**Possible Cause**

Check the following items.

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

NFAT0205

GI

MA

EM

LC

EC

FE

CL

MT

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

**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**

**Ⓔ WITH GST**

NFAT0206S02

Follow the procedure "With CONSULT-II".

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX



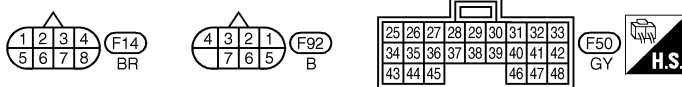
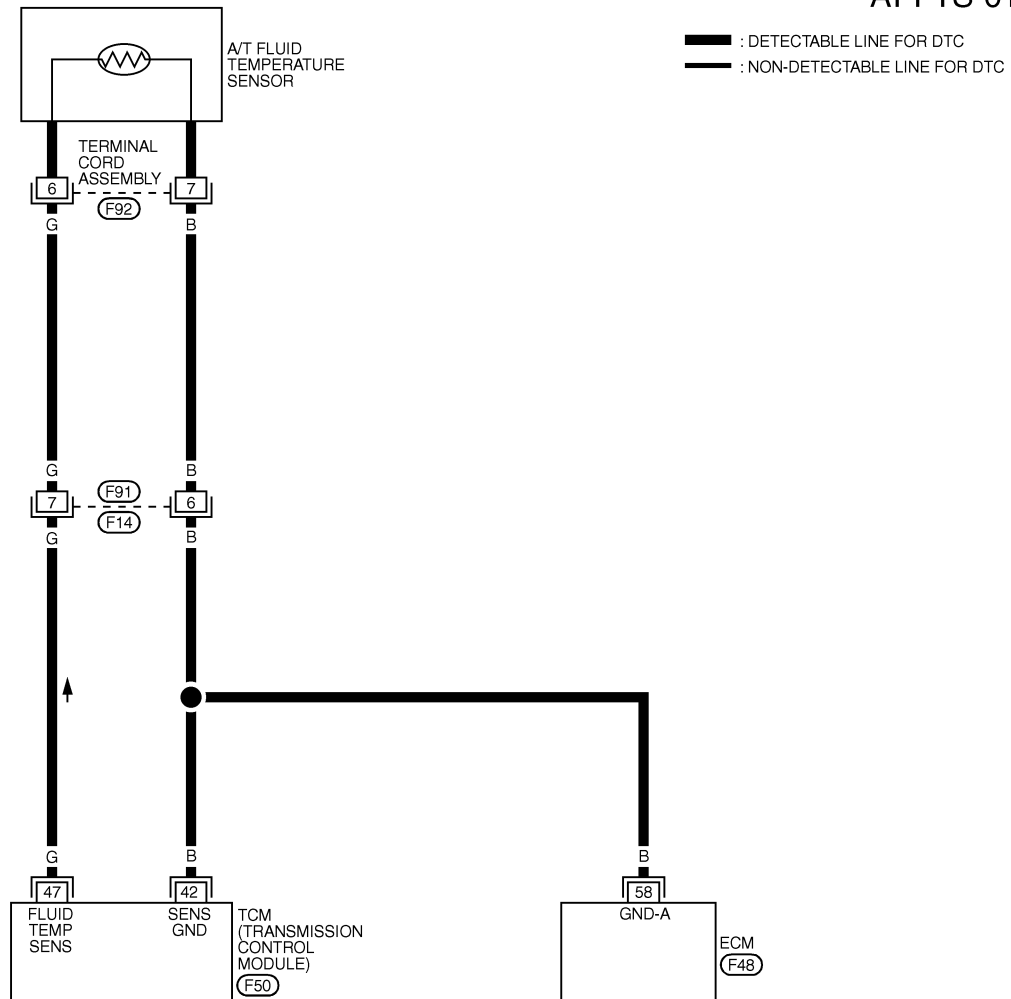
# DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

Wiring Diagram — AT — FTS

## Wiring Diagram — AT — FTS

NFAT0038

AT-FTS-01



REFER TO THE FOLLOWING.  
 (F48) - ELECTRICAL UNITS

MAT805A

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
42	B	SENSOR GROUND	—	0V
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

SAT591KA




# DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

Diagnostic Procedure



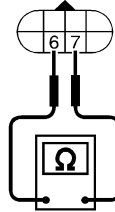
## Diagnostic Procedure

=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)															
<div> With CONSULT-II</div> <div>1. Start engine.</div> <div>2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.</div> <div>3. Read out the value of "FLUID TEMP SE".</div>																
<table><tr><th colspan="2">DATA MONITOR</th></tr><tr><th>MONITORING</th><th></th></tr><tr><td>VHCL/S SE-A/T</td><td>XXX km/h</td></tr><tr><td>VHCL/S SE-MTR</td><td>XXX km/h</td></tr><tr><td>THRTL POS SEN</td><td>XXX V</td></tr><tr><td>FLUID TEMP SE</td><td>XXX V</td></tr><tr><td>BATTERY VOLT</td><td>XXX V</td></tr></table>			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
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																
<div>Voltage:</div> <div>Cold [20°C (68°F)] → Hot [80°C (176°F)]:</div> <div>Approximately 1.5V → 0.5V</div>																
OK or NG																
OK	▶	GO TO 7.														
NG	▶	GO TO 3.														

SAT614J

3	CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY	
<div>1. Turn ignition switch to OFF position.</div> <div>2. Disconnect terminal cord assembly connector in engine compartment.</div> <div>3. Check resistance between terminals 6 (G) and 7 (B) when A/T is cold.</div>		
<div><div><div><div></div><div></div></div><div>Sub-harness connector (F92)</div></div><div></div><div><div>Resistance:</div><div>Cold [20°C (68°F)]</div><div>Approximately 2.5 kΩ</div></div></div>		
<div>4. Reinstall any part removed.</div>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 5.

SAT616J



## DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING ITEM	
Check the following items: <ul style="list-style-type: none"><li>● Harness for short to ground or short to power or open between TCM, ECM and terminal cord assembly (Main harness)</li><li>● Ground circuit for ECM</li></ul> Refer to EC-155, "TROUBLE DIAGNOSIS FOR POWER SUPPLY".		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

5

DETECT MALFUNCTIONING ITEM

1. Remove oil pan, refer to AT-277.

2. Check the following items:

● A/T fluid temperature sensor

Check resistance between A/T fluid temperature sensor harness connector F92 terminals 6 (G) and 7 (B) while changing temperature as shown at below.

The diagram illustrates a testing procedure. A rectangular container is partially filled with a liquid, indicated by horizontal dashed lines. A thermometer is placed vertically in the liquid. A sensor, labeled 'Wrapped', is also submerged. The sensor's wiring is connected to a terminal block. A small flame, representing a heat source like a candle, is positioned below the container to heat the liquid.

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

● Harness of terminal cord assembly for short or open

OK or NG




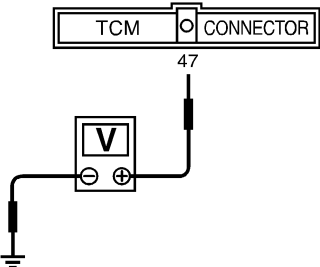
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

MTBL0210



# DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

Diagnostic Procedure (Cont'd)

6	CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (Without CONSULT-II)	
<div>⊗ Without CONSULT-II</div> <div>1. Start engine.</div> <div>2. Check voltage between TCM harness connector F50 terminal 47 (G) and ground while warming up A/T.</div> <div><div><div>CONNECT</div><div></div><div></div><div></div></div><div><div>TCM</div><div>CONNECTOR</div></div><div>47</div><div></div></div> <div><div>Voltage:</div><div>Cold [20°C (68°F)] → Hot [80°C (176°F)]:</div><div>Approximately 1.5V → 0.5V</div></div> <div>OK or NG</div>		
OK	▶	GO TO 7.
NG	▶	GO TO 3.

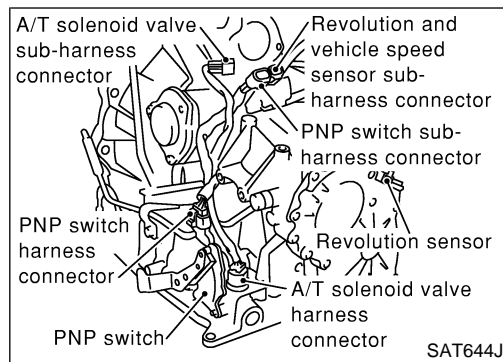
7	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-111.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 8.

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



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

## Description



## Description


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

NFAT0040

## TCM TERMINALS AND REFERENCE VALUE

NFAT0040S01

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 <b>CAUTION:</b> 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.	0V
42	B	Sensor ground	—	0V

## 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



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

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

SCIA5358E

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

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

- Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- Drive vehicle and check for an increase of "VHCL/S SE-MTR" value.  
If the check result is NG, go to "DIAGNOSTIC PROCEDURE", AT-204.  
If the check result is OK, go to following step.
- Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
- 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**  
**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-119.  
If the check result is OK, go to following step.
- Maintain the following conditions for at least 5 consecutive seconds.  
**CMPS-RPM (REF): 3,500 rpm or more**  
**THRTL POS SEN: More than 1.2V**  
**Selector lever: D position**  
**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".



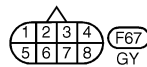
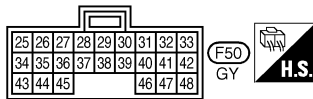
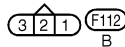
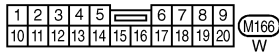
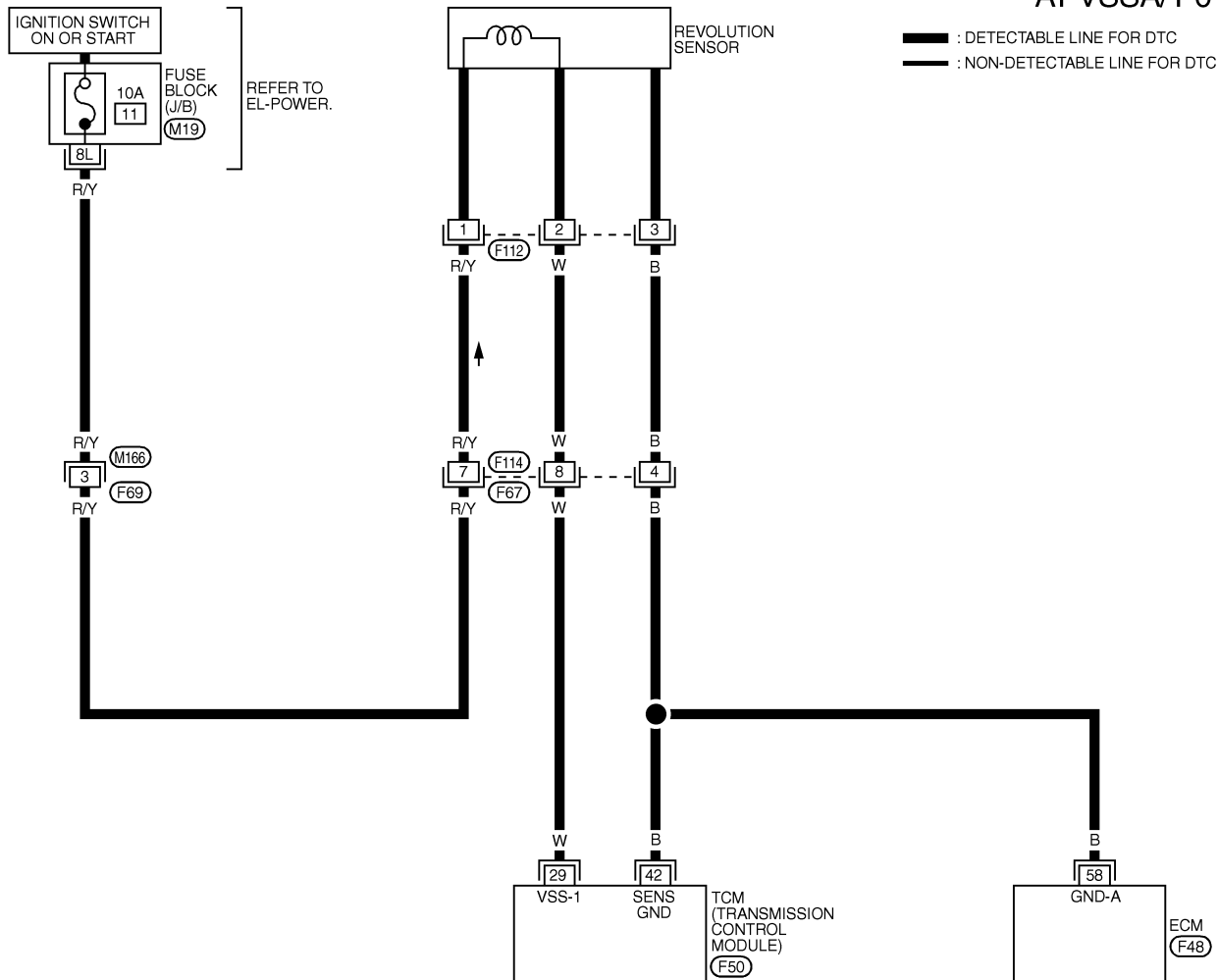
# DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

Wiring Diagram — AT — VSSA/T

## Wiring Diagram — AT — VSSA/T

NFAT0041

### AT-VSSA/T-01



REFER TO THE FOLLOWING.

(M19) - FUSE BLOCK - JUNCTION BOX (J/B)

(F48) - ELECTRICAL UNITS

MAT063B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (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
42	B	SENSOR GROUND	WHEN VEHICLE PARKS.	0V
				0V

SAT679K





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

Diagnostic Procedure

## Diagnostic Procedure

NFAT0042

1	CHECK INPUT SIGNAL (With CONSULT-II)														
<p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"><li>Start engine.</li><li>Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.</li><li>Read out the value of "VHCL/S SE-A/T" while driving. Check the value changes according to driving speed.</li></ol> <table border="1"><thead><tr><th colspan="2">DATA MONITOR</th></tr><tr><th>MONITORING</th><th></th></tr></thead><tbody><tr><td>VHCL/S SE-A/T</td><td>XXX km/h</td></tr><tr><td>VHCL/S SE-MTR</td><td>XXX km/h</td></tr><tr><td>THRTL POS SEN</td><td>XXX V</td></tr><tr><td>FLUID TEMP SE</td><td>XXX V</td></tr><tr><td>BATTERY VOLT</td><td>XXX V</td></tr></tbody></table> <p style="text-align: right;">SAT614J</p> <p style="text-align: center;"><b>OK or NG</b></p>		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
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														
OK	▶ GO TO 3.														
NG	▶ GO TO 2.														

2	CHECK REVOLUTION SENSOR (With CONSULT-II)						
<p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"><li>Start engine.</li></ol> <table border="1"><thead><tr><th>Condition</th><th>Judgement standard (Approx.)</th></tr></thead><tbody><tr><td>When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. *1 <b>CAUTION:</b> Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.</td><td>450 Hz</td></tr><tr><td>When vehicle parks.</td><td>0V</td></tr></tbody></table> <p style="text-align: right;">MTBL1182</p> <ul style="list-style-type: none"><li>Harness for short or open between TCM, ECM and revolution sensor (Main harness)</li><li>Harness for short or open between ignition switch and revolution sensor</li></ul> <p style="text-align: center;"><b>OK or NG</b></p>		Condition	Judgement standard (Approx.)	When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. *1 <b>CAUTION:</b> 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.	0V
Condition	Judgement standard (Approx.)						
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. *1 <b>CAUTION:</b> 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.	0V						
OK	▶ GO TO 3.						
NG	▶ Repair or replace damaged parts.						

3	CHECK DTC
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-117.	
<b>OK or NG</b>	
OK	▶ <b>INSPECTION END</b>
NG	▶ GO TO 4.



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

Diagnostic Procedure (Cont'd)

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



# DTC P0725 ENGINE SPEED SIGNAL

Description

## Description


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

NFAT0043

## 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		Refer to EC-139, "ECM INSPECTION TABLE".

## On Board Diagnosis Logic

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

NFAT0210

## Possible Cause

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

NFAT0211



# DTC P0725 ENGINE SPEED SIGNAL

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

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**



### WITH GST

NFAT0212S02

Follow the procedure "With CONSULT-II".



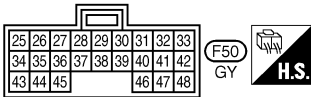
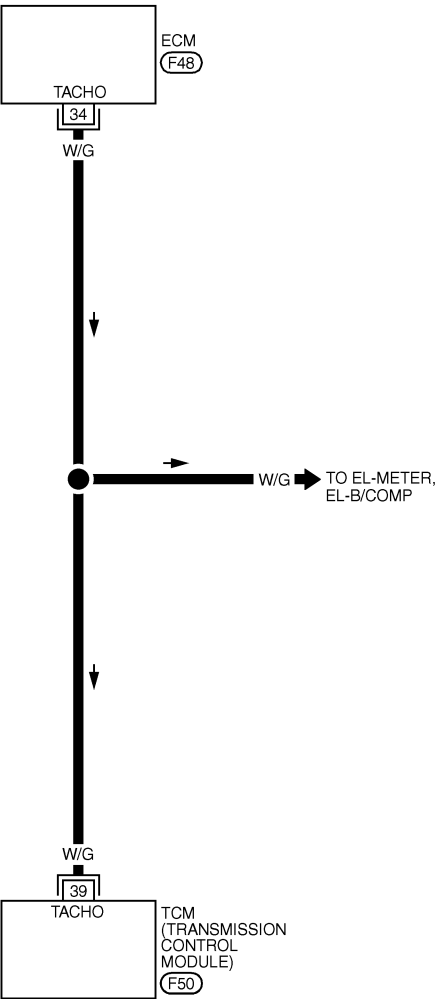
DTC P0725 ENGINE SPEED SIGNAL

Wiring Diagram — AT — ENGSS

Wiring Diagram — AT — ENGSS

NFAT0044

AT-ENGSS-01



REFER TO THE FOLLOWING.  
(F48) - ELECTRICAL UNITS

MAT064B

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
39	W/G	ENGINE SPEED SIGNAL.	REFER TO EC section, "ECM INSPECTION TABLE".	




# DTC P0725 ENGINE SPEED SIGNAL

Diagnostic Procedure

## Diagnostic Procedure

NFAT0045

<b>1</b>	<b>CHECK DTC WITH ECM</b>
<ul style="list-style-type: none"><li>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-92, "MALFUNCTION Indicator Lamp (MIL)".</li></ul> <p style="text-align: center;"><b>OK or NG</b></p>	
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-705, "DTC Ignition Signal".

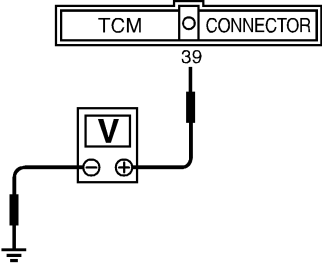

<b>2</b>	<b>CHECK INPUT SIGNAL (With CONSULT-II)</b>														
<p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"><li>Start engine.</li><li>Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.</li><li>Read out the value of "ENGINE SPEED". Check engine speed changes according to throttle position.</li></ol> <table border="1"><thead><tr><th colspan="2">DATA MONITOR</th></tr><tr><th>MONITORING</th><th></th></tr></thead><tbody><tr><td>ENGINE SPEED</td><td>XXX rpm</td></tr><tr><td>TURBINE REV</td><td>XXX rpm</td></tr><tr><td>OVERDRIVE SW</td><td>ON</td></tr><tr><td>PN POSI SW</td><td>OFF</td></tr><tr><td>R POSITION SW</td><td>OFF</td></tr></tbody></table> <p style="text-align: right;">SAT645J</p> <p style="text-align: center;"><b>OK or NG</b></p>		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															
ENGINE SPEED	XXX rpm														
TURBINE REV	XXX rpm														
OVERDRIVE SW	ON														
PN POSI SW	OFF														
R POSITION SW	OFF														
OK ►	GO TO 6.														
NG ►	GO TO 3.														

<b>3</b>	<b>DETECT MALFUNCTIONING ITEM</b>
<p>Check the following items:</p> <ul style="list-style-type: none"><li>Harness for short or open between TCM and ECM</li><li>Resistor and ignition coil Refer to EC-705, "DTC Ignition Signal".</li></ul> <p style="text-align: center;"><b>OK or NG</b></p>	
OK ►	GO TO 6.
NG ►	Repair or replace damaged parts.



# DTC P0725 ENGINE SPEED SIGNAL

Diagnostic Procedure (Cont'd)

4	CHECK INPUT SIGNAL (Without CONSULT-II)
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> <li>Start engine.</li> <li>Check voltage between TCM harness connector F50 terminal 39 (W/G) and ground.</li> </ol>	
<div style="display: flex; align-items: center; justify-content: space-around;">  <div style="text-align: center;"> <p>CONNECT</p>  </div> </div> <p style="text-align: right;">SAT520JD</p> <p><b>Voltage:</b> 0.6 (Idle speed) - 2.2V (3,000 rpm)</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 6.
NG	▶ GO TO 5.

5	DETECT MALFUNCTIONING ITEM
<p>Check the following items:</p> <ul style="list-style-type: none"> <li>Harness for short or open between TCM and ECM</li> <li>Resistor and ignition coil</li> </ul> <p>Refer to EC-705, "DTC Ignition Signal".</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 6.
NG	▶ Repair or replace damaged parts.

6	CHECK DTC
<p>Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-122.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ INSPECTION END
NG	▶ GO TO 7.

7	CHECK TCM INSPECTION
<ol style="list-style-type: none"> <li>Perform TCM input/output signal inspection.</li> <li>If NG, recheck TCM pin terminals for damage or loose connection with harness connector.</li> </ol> <p style="text-align: center;">OK or NG</p>	
OK	▶ INSPECTION END
NG	▶ Repair or replace damaged parts.



# DTC P0731 A/T 1ST GEAR FUNCTION

## Description

### Description

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis. NFAT0046
- This malfunction will not be detected while the A/T CHECK 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 <sub>1</sub> or D <sub>4</sub> .)	Battery voltage
			When shift solenoid valve A does not operate. (When driving in D <sub>2</sub> or D <sub>3</sub> .)	0V
12	LG/B	Shift solenoid valve B	When shift solenoid valve B operates. (When driving in D <sub>1</sub> or D <sub>2</sub> .)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in D <sub>3</sub> or D <sub>4</sub> .)	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

Check the following items.

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

NFAT0214

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

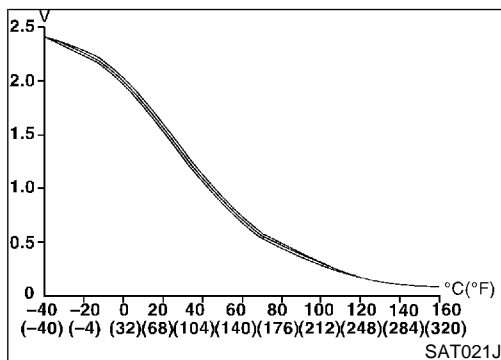
IDX

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

SCIA5358E



## 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**

- 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-130.  
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



## DTC P0731 A/T 1ST GEAR FUNCTION

Diagnostic Trouble Code (DTC) Confirmation Procedure (Cont'd)

**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-130.  
Refer to shift schedule, AT-376.



### WITH GST

Follow the procedure “With CONSULT-II”.

NFAT0215S02



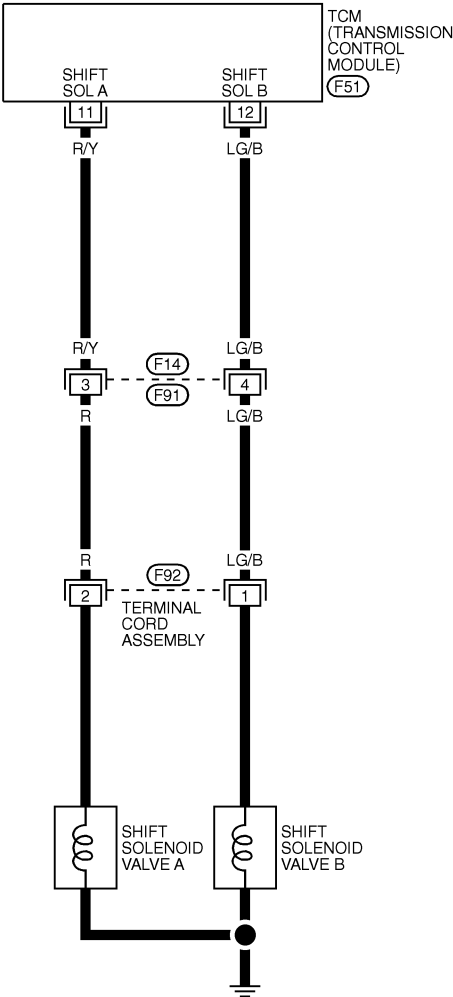
DTC P0731 A/T 1ST GEAR FUNCTION

Wiring Diagram — AT — 1ST

Wiring Diagram — AT — 1ST

NFAT0047

AT-1STSIG-01



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

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

MAT808A

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

SAT297KA

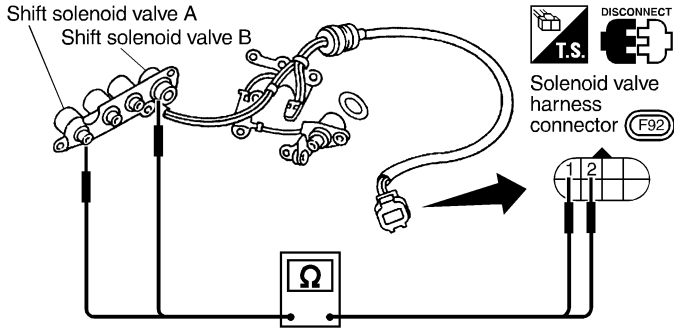


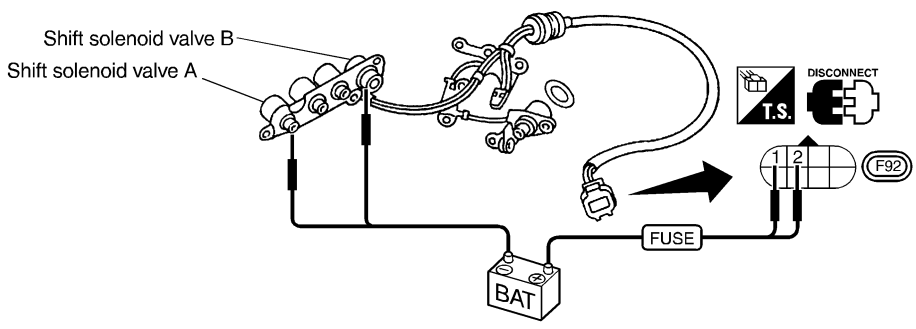
# DTC P0731 A/T 1ST GEAR FUNCTION

Diagnostic Procedure

## Diagnostic Procedure

NFAT0048

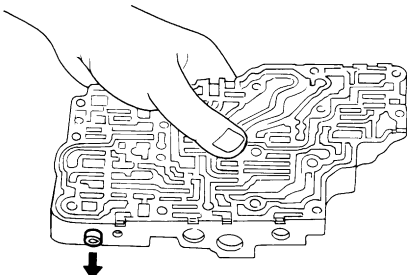
1	CHECK SHIFT SOLENOID VALVE RESISTANCE									
<p>1. Remove control valve assembly. Refer to AT-277.</p> <ul style="list-style-type: none"><li>• Shift solenoid valve A</li><li>• Shift solenoid valve B</li></ul> <p>2. Check resistance between two terminals.</p>										
<div><table border="1"><thead><tr><th>Solenoid valve</th><th>Terminal No. (Wire color)</th><th>Resistance (Approx.)</th></tr></thead><tbody><tr><td>Shift solenoid valve A</td><td>2 (R)</td><td>20 - 30 Ω</td></tr><tr><td>Shift solenoid valve B</td><td>1 (LG/B)</td><td>5 - 20 Ω</td></tr></tbody></table></div>		Solenoid valve	Terminal No. (Wire color)	Resistance (Approx.)	Shift solenoid valve A	2 (R)	20 - 30 Ω	Shift solenoid valve B	1 (LG/B)	5 - 20 Ω
Solenoid valve	Terminal No. (Wire color)	Resistance (Approx.)								
Shift solenoid valve A	2 (R)	20 - 30 Ω								
Shift solenoid valve B	1 (LG/B)	5 - 20 Ω								
SAT043KB										
OK or NG										
OK	▶ GO TO 2.									
NG	▶ Repair or replace damaged parts.									

2	CHECK SHIFT SOLENOID VALVE OPERATION
<p>1. Remove control valve assembly. Refer to AT-277.</p> <ul style="list-style-type: none"><li>• Shift solenoid valve A</li><li>• Shift solenoid valve B</li></ul> <p>2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</p>	
<div></div>	
SAT044K	
OK or NG	
OK	▶ GO TO 3.
NG	▶ Repair or replace shift solenoid valve assembly.



# DTC P0731 A/T 1ST GEAR FUNCTION

Diagnostic Procedure (Cont'd)

3	CHECK CONTROL VALVE	
<div>1. Disassemble control valve assembly. Refer to “Control Valve Assembly”, AT-277.</div> <div>2. Check to ensure that:</div> <div><ul style="list-style-type: none"><li>● Valve, sleeve and plug slide along valve bore under their own weight.</li><li>● Valve, sleeve and plug are free from burrs, dents and scratches.</li><li>● Control valve springs are free from damage, deformation and fatigue.</li><li>● Hydraulic line is free from obstacles.</li></ul></div> <div></div> <div>SAT367H</div> <div>OK or NG</div>		
OK	▶	GO TO 4.
NG	▶	Repair control valve assembly.

4	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-127.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Check transaxle inner parts (clutch, brake, etc.).



# DTC P0732 A/T 2ND GEAR FUNCTION

Description

## Description


- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis. NFAT0049
- This malfunction will not be detected while the A/T CHECK 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 <sub>1</sub> or D <sub>2</sub> .)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in D <sub>3</sub> or D <sub>4</sub> .)	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

Check the following items.

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

NFAT0217

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

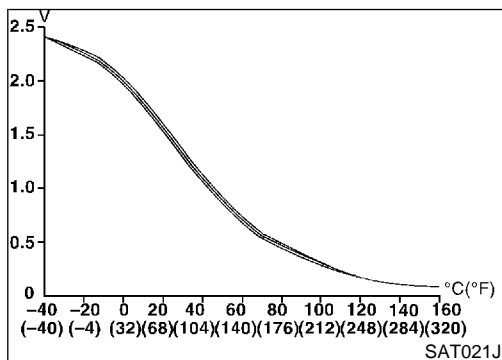
IDX

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

SCIA5358E



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 45 to 50 km/h (28 to 31 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 45 to 50 km/h (28 to 31 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-136.

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



## DTC P0732 A/T 2ND GEAR FUNCTION

Diagnostic Trouble Code (DTC) Confirmation Procedure (Cont'd)

**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-136.  
Refer to shift schedule, AT-376.



### WITH GST

Follow the procedure “With CONSULT-II”.

NFAT0218S02



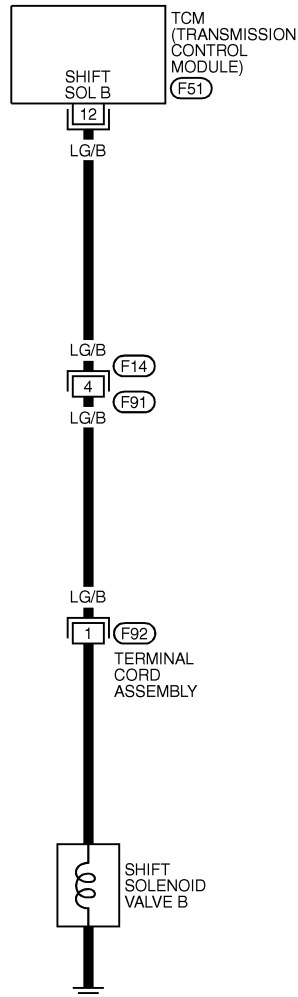
# DTC P0732 A/T 2ND GEAR FUNCTION

Wiring Diagram — AT — 2ND

## Wiring Diagram — AT — 2ND

NFAT0050

AT-2NDSIG-01



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

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

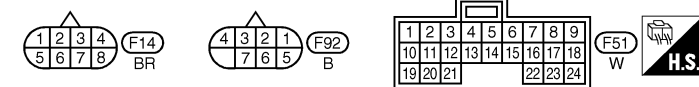
MAT809A

HA

SC

EL

IDX



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

SAT298KA

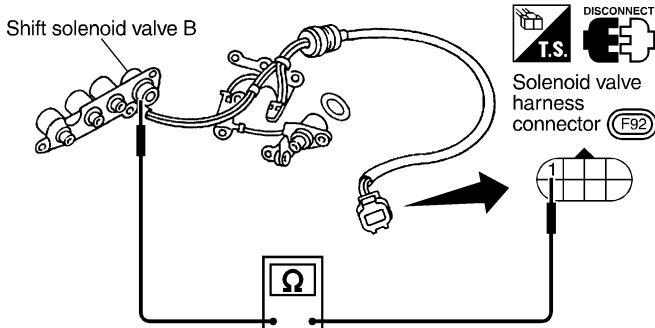


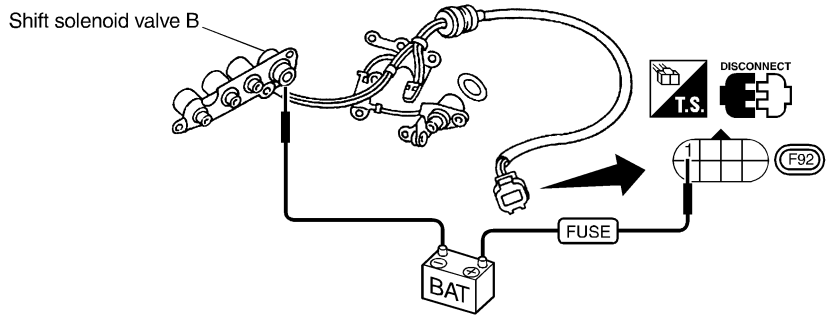
# DTC P0732 A/T 2ND GEAR FUNCTION

Diagnostic Procedure

## Diagnostic Procedure

NFAT0051

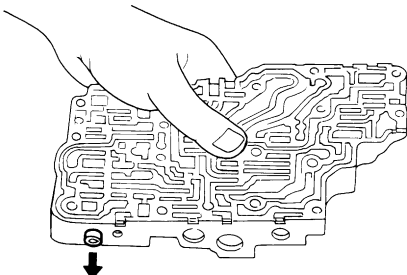
<b>1</b>	<b>CHECK SHIFT SOLENOID VALVE RESISTANCE</b>						
<p>1. Remove control valve assembly. Refer to AT-277.</p> <ul style="list-style-type: none"> <li>Shift solenoid valve B</li> </ul> <p>2. Check resistance to the terminal and ground.</p>							
<div style="display: flex; align-items: center;">  <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <thead> <tr> <th>Solenoid valve</th> <th>Terminal No. (Wire color)</th> <th>Resistance (Approx.)</th> </tr> </thead> <tbody> <tr> <td>Shift solenoid valve B</td> <td>1 (LG/B)    Ground</td> <td>5 - 20 Ω</td> </tr> </tbody> </table> </div>		Solenoid valve	Terminal No. (Wire color)	Resistance (Approx.)	Shift solenoid valve B	1 (LG/B)    Ground	5 - 20 Ω
Solenoid valve	Terminal No. (Wire color)	Resistance (Approx.)					
Shift solenoid valve B	1 (LG/B)    Ground	5 - 20 Ω					
SAT045KB							
<b>OK or NG</b>							
OK	▶ GO TO 2.						
NG	▶ Repair or replace shift solenoid valve assembly.						

<b>2</b>	<b>CHECK SHIFT SOLENOID VALVE OPERATION</b>
<p>1. Remove control valve assembly. Refer to AT-277.</p> <ul style="list-style-type: none"> <li>Shift solenoid valve B</li> </ul> <p>2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</p>	
<div style="display: flex; align-items: center;">  </div>	
SAT036K	
<b>OK or NG</b>	
OK	▶ GO TO 3.
NG	▶ Repair or replace shift solenoid valve assembly.



# DTC P0732 A/T 2ND GEAR FUNCTION

Diagnostic Procedure (Cont'd)

3	CHECK CONTROL VALVE	
<div>1. Disassemble control valve assembly. Refer to “Control Valve Assembly”, AT-309.</div> <div>2. Check to ensure that:</div> <div><ul style="list-style-type: none"><li>● Valve, sleeve and plug slide along valve bore under their own weight.</li><li>● Valve, sleeve and plug are free from burrs, dents and scratches.</li><li>● Control valve springs are free from damage, deformation and fatigue.</li><li>● Hydraulic line is free from obstacles.</li></ul></div> <div></div> <div>SAT367H</div> <div>OK or NG</div>		
OK	▶	GO TO 4.
NG	▶	Repair control valve assembly.

4	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-133.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Check transaxle inner parts (clutch, brake, etc.).



# DTC P0733 A/T 3RD GEAR FUNCTION

## Description

### Description


- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis. NFAT0052
- This malfunction will not be detected while the A/T CHECK 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 <sub>1</sub> or D <sub>4</sub> .)	Battery voltage
			When shift solenoid valve A does not operate. (When driving in D <sub>2</sub> or D <sub>3</sub> .)	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 =  $A \times C/B$

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

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

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

Gear positions supposed by TCM are as follows.

In case of gear position with no malfunctions: 1, 2, **3** and 4 positions

In case of gear position with shift solenoid valve A stuck closed: 1, 1, **4\*** and 4 positions to each gear position above

\*: P0733 is detected.

Diagnostic trouble code A/T 3RD GR FNCTN with CONSULT-II or P0733 without CONSULT-II is detected when A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.



## Possible Cause

Check the following items.

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

NFAT0220

GI

MA

EM

LC

EC

NFAT0221

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

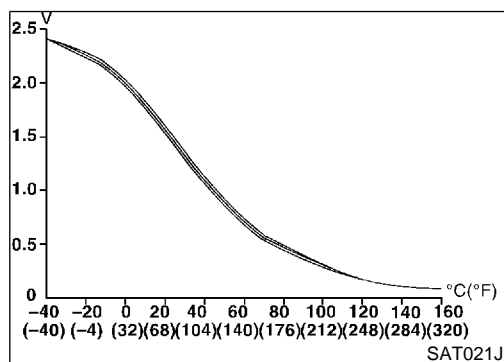
IDX

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

SCIA5358E



## Diagnostic Trouble Code (DTC) Confirmation Procedure

## CAUTION:

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

## NOTE:

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

## TESTING CONDITION:

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

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

## WITH CONSULT-II

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

**FLUID TEMP SEN: 0.4 - 1.5V**

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

- 3) Select "3RD GR FNCTN P0733" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
- 4) Accelerate vehicle to 60 to 75 km/h (37 to 47 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**

- 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 60 to 75 km/h (37 to 47 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-142.  
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



## DTC P0733 A/T 3RD GEAR FUNCTION

Diagnostic Trouble Code (DTC) Confirmation Procedure (Cont'd)

**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-142.  
Refer to shift schedule, AT-376.



### WITH GST

Follow the procedure “With CONSULT-II”.

NFAT0221S02



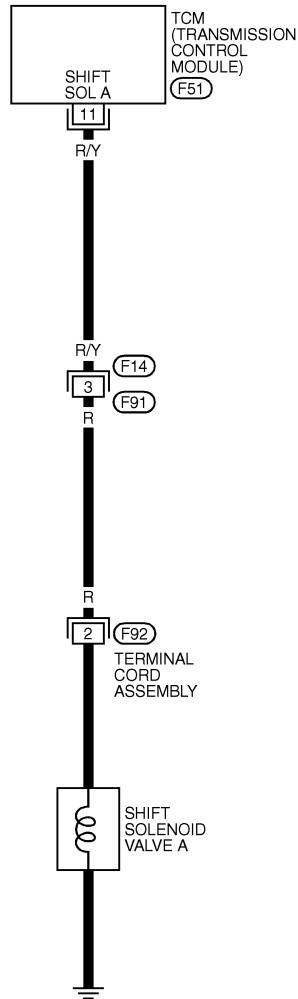
# DTC P0733 A/T 3RD GEAR FUNCTION

Wiring Diagram — AT — 3RD

## Wiring Diagram — AT — 3RD

NFAT0053

AT-3RDSIG-01



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

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

MAT810A

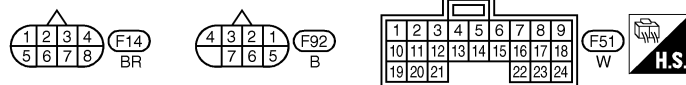
HA

SC

EL

IDX

SAT299KA



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



# DTC P0733 A/T 3RD GEAR FUNCTION

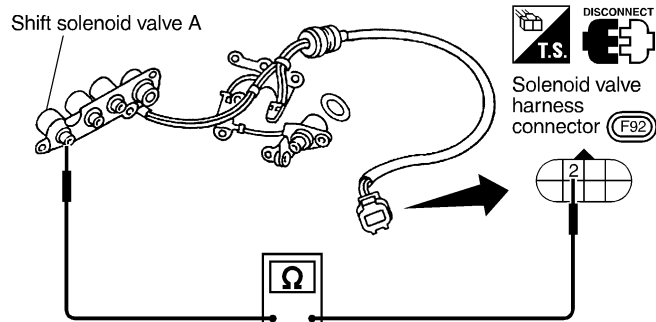
Diagnostic Procedure

## Diagnostic Procedure

NFAT0054

### 1 CHECK SHIFT SOLENOID VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-277.
  - Shift solenoid valve A
2. Check resistance to the terminal and ground.



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

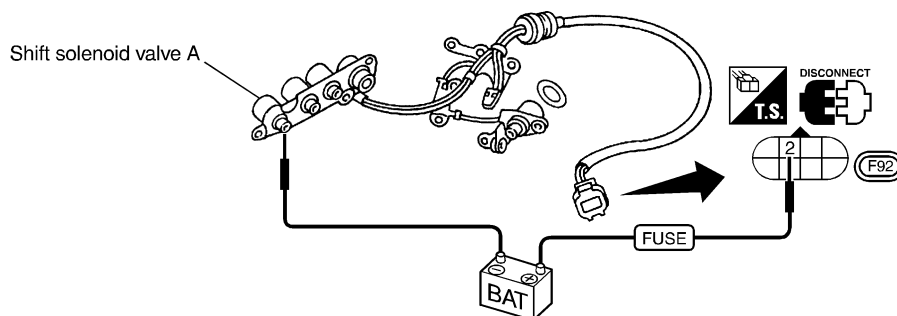
SAT046KB

OK or NG

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

### 2 CHECK SHIFT SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-277.
  - Shift solenoid valve A
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



SAT035K

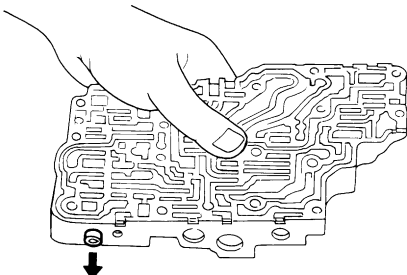
OK or NG

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



# DTC P0733 A/T 3RD GEAR FUNCTION

Diagnostic Procedure (Cont'd)

3	CHECK CONTROL VALVE	
<div>1. Disassemble control valve assembly. Refer to “Control Valve Assembly”, AT-309.</div> <div>2. Check to ensure that:</div> <div><ul style="list-style-type: none"><li>● Valve, sleeve and plug slide along valve bore under their own weight.</li><li>● Valve, sleeve and plug are free from burrs, dents and scratches.</li><li>● Control valve springs are free from damage, deformation and fatigue.</li><li>● Hydraulic line is free from obstacles.</li></ul></div> <div></div> <div>SAT367H</div> <div>OK or NG</div>		
OK	▶	GO TO 4.
NG	▶	Repair control valve assembly.

4	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-139.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Check transaxle inner parts (clutch, brake, etc.).



# DTC P0734 A/T 4TH GEAR FUNCTION

## Description

### Description

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis. NFAT0055
- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or line pressure is low as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

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

### CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.




NFAT0055S01

Monitor item	Condition	Specification
Torque converter clutch solenoid valve duty	Lock-up OFF	Approximately 4%
	↓ Lock-up ON	↓ Approximately 94%
Line pressure solenoid valve duty	Small throttle opening (Low line pressure)	Approximately 24%
	↓ Large throttle opening (High line pressure)	↓ Approximately 95%

### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

NFAT0055S02

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 <sub>1</sub> or D <sub>4</sub> .)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in D <sub>2</sub> or D <sub>3</sub> .)	0V
12	LG/B	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in D <sub>1</sub> or D <sub>2</sub> .)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in D <sub>3</sub> or D <sub>4</sub> .)	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 =  $A \times C/B$

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes  
If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction.

This malfunction will be caused when shift solenoid valve A is stuck open or 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 A stuck open: 2, 2, 3 and 3\* 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.

And also, this malfunction will be caused when line pressure is lower than normal same as line pressure solenoid valve stuck open.

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



# DTC P0734 A/T 4TH GEAR FUNCTION

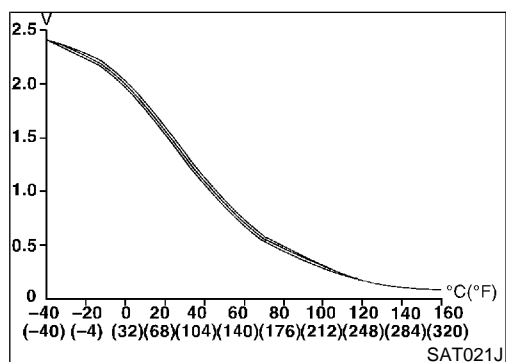
Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

SCIA5358E



## 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 55 to 65 km/h (34 to 40 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**

- 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 55 to 65 km/h (34 to 40 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-149.  
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.)



# DTC P0734 A/T 4TH GEAR FUNCTION

Diagnostic Trouble Code (DTC) Confirmation Procedure (Cont'd)

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

- 8) Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)  
Refer to "DIAGNOSTIC PROCEDURE", AT-149.  
Refer to shift schedule, AT-376.



## WITH GST

Follow the procedure "With CONSULT-II".

NFAT0224S02

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX



# DTC P0734 A/T 4TH GEAR FUNCTION

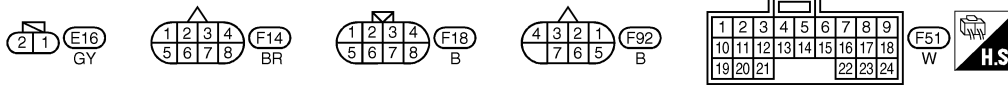
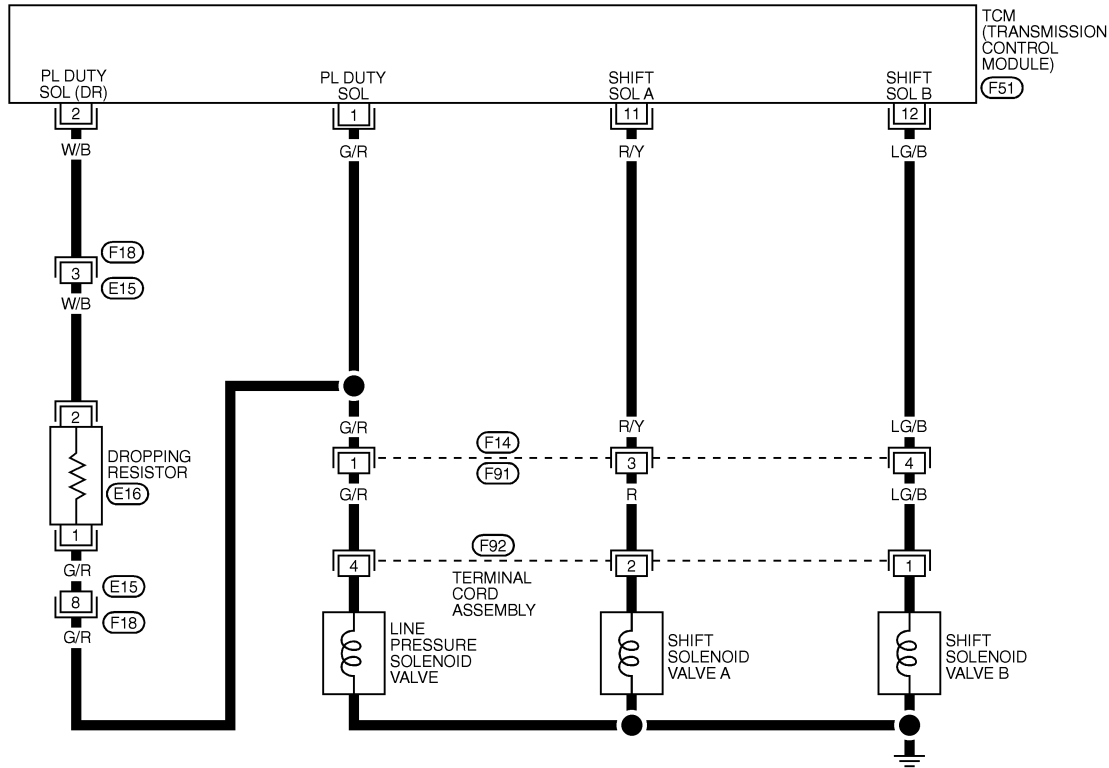
Wiring Diagram — AT — 4TH

## Wiring Diagram — AT — 4TH

NFAT0056

AT-4THSIG-01

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



MAT065B

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

SAT300KA



## Diagnostic Procedure

NFAT0057

<b>1</b>	<b>CHECK SHIFT UP (D<sub>3</sub> TO D<sub>4</sub>)</b>	
During "Cruise test – Part 1" (AT-76), does A/T shift from D <sub>3</sub> to D <sub>4</sub> at the specified speed?		
<p>Accelerator pedal</p> <p>Halfway</p>		
SAT988H		
<b>Yes or No</b>		
Yes	▶	GO TO 11.
No	▶	GO TO 2.

<b>2</b>	<b>CHECK LINE PRESSURE</b>												
Perform line pressure test. Refer to AT-67.													
<table border="1"> <thead> <tr> <th rowspan="2">Engine speed rpm</th><th colspan="2">Line pressure kPa (kg/cm<sup>2</sup>, psi)</th></tr> <tr> <th>D, 2 and 1 positions</th><th>R position</th></tr> </thead> <tbody> <tr> <td>Idle</td><td>500 (5.1, 73)</td><td>778 (7.9, 113)</td></tr> <tr> <td>Stall</td><td>1,233 (12.6, 179)</td><td>1,918 (19.6, 278)</td></tr> </tbody> </table>			Engine speed rpm	Line pressure kPa (kg/cm <sup>2</sup> , psi)		D, 2 and 1 positions	R position	Idle	500 (5.1, 73)	778 (7.9, 113)	Stall	1,233 (12.6, 179)	1,918 (19.6, 278)
Engine speed rpm	Line pressure kPa (kg/cm <sup>2</sup> , psi)												
	D, 2 and 1 positions	R position											
Idle	500 (5.1, 73)	778 (7.9, 113)											
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)											
MTBL1183													
<b>OK or NG</b>													
OK	▶	GO TO 3.											
NG	▶	GO TO 7.											

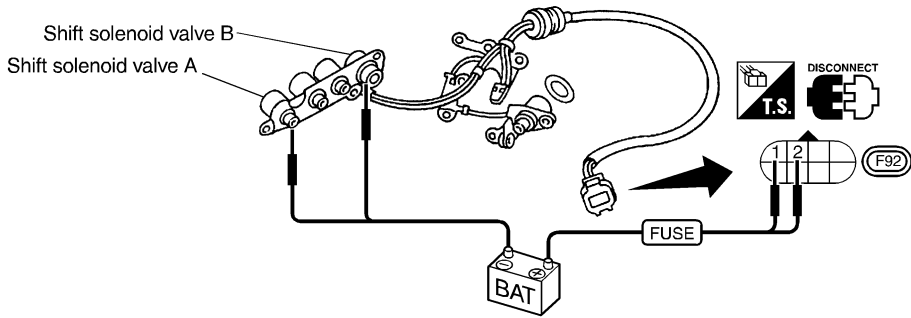
<b>3</b>	<b>CHECK SHIFT SOLENOID VALVE RESISTANCE</b>	
1. Remove control valve assembly. Refer to AT-277. • Shift solenoid valve A • Shift solenoid valve B 2. Check resistance between two terminals.		
SAT043KB		
<b>OK or NG</b>		
OK	▶	GO TO 5.
NG	▶	Replace shift solenoid valve assembly.

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

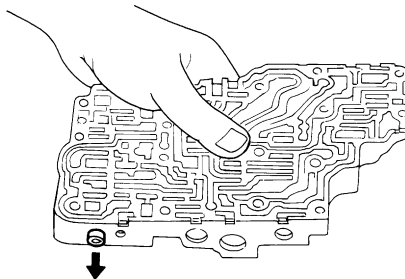


# DTC P0734 A/T 4TH GEAR FUNCTION

Diagnostic Procedure (Cont'd)

4	CHECK SHIFT SOLENOID VALVE OPERATION	
<div>1. Remove control valve assembly. Refer to AT-277.</div> <div><div>● Shift solenoid valve A</div><div>● Shift solenoid valve B</div></div> <div>2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</div>		
<div><div><div><div>Shift solenoid valve B</div><div>Shift solenoid valve A</div></div></div></div>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace shift solenoid valve assembly.

SAT044K

5	CHECK CONTROL VALVE	
<div>1. Disassemble control valve assembly. Refer to AT-309.</div> <div>2. Check to ensure that:</div> <div><ul style="list-style-type: none"><li>● Valve, sleeve and plug slide along valve bore under their own weight.</li><li>● Valve, sleeve and plug are free from burrs, dents and scratches.</li><li>● Control valve springs are free from damage, deformation and fatigue.</li><li>● Hydraulic line is free from obstacles.</li></ul></div> <div></div> <div>OK or NG</div>		
OK	▶	GO TO 6.
NG	▶	Repair control valve.

SAT367H

6	CHECK SHIFT UP (D <sub>3</sub> TO D <sub>4</sub> )	
Does A/T shift from D <sub>3</sub> to D <sub>4</sub> at the specified speed?		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Check transaxle inner parts (clutch, brake, etc.).



# DTC P0734 A/T 4TH GEAR FUNCTION

Diagnostic Procedure (Cont'd)

7

CHECK SOLENOID VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-277.

- Line pressure solenoid valves

2. Check resistance to the terminal and ground.

Solenoid valve	Terminal No. (Wire color)		Resistance (Approx.)
Line pressure solenoid valve	4 (G/R)	Ground	2.5 - 5Ω

OK or NG

SAT625JA

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

8

CHECK SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-277.

- Line pressure solenoid valves

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

OK or NG

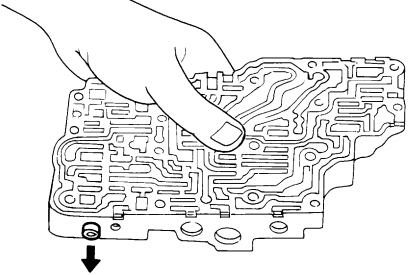
SAT626J

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



## DTC P0734 A/T 4TH GEAR FUNCTION

Diagnostic Procedure (Cont'd)

<b>9</b>	<b>CHECK CONTROL VALVE</b>	
<p>1. Disassemble control valve assembly. Refer to AT-309.</p> <p>2. Check line pressure circuit valves for sticking.</p> <ul style="list-style-type: none"><li>● Pressure regulator valve</li><li>● Pilot valve</li><li>● Pressure modifier valve</li></ul>		
		
SAT367H		
<b>OK or NG</b>		
OK	▶	GO TO 10.
NG	▶	Repair control valve.

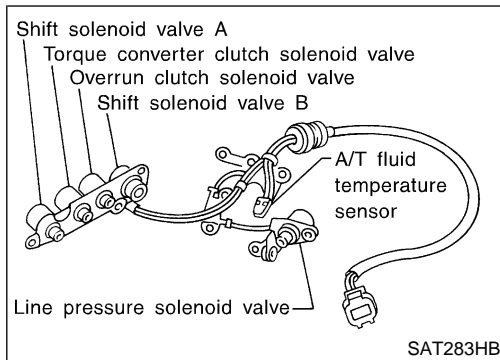
<b>10</b>	<b>CHECK SHIFT UP (D<sub>3</sub> TO D<sub>4</sub>)</b>	
Does A/T shift from D <sub>3</sub> to D <sub>4</sub> at the specified speed?		
<b>OK or NG</b>		
OK	▶	GO TO 11.
NG	▶	Check transaxle inner parts (clutch, brake, etc.).

<b>11</b>	<b>CHECK DTC</b>	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-146.		
<b>OK or NG</b>		
OK	▶	<b>INSPECTION END</b>
NG	▶	Perform "Cruise test — Part 1" again and return to the start point of this test group.



# DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Description



## Description

NFAT0058

The torque converter clutch solenoid valve is activated, with the gear in D<sub>4</sub>, 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 2.0/8) 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	Approximately 4%
	↓ Lock-up ON	↓ 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.)



# DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

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. (Do not start engine.)
- 2) Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II and wait at least 1 second.
- 3) Start engine and maintain the following conditions for at least 5 consecutive seconds.

**VHCL SPEED SE: 80 km/h (50 MPH) or more**

**THROTTLE POSI: 0.5/8 - 1.0/8**

**Selector lever: D position**

**Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.**

### WITH GST

NFAT0227S02

Follow the procedure "With CONSULT-II".



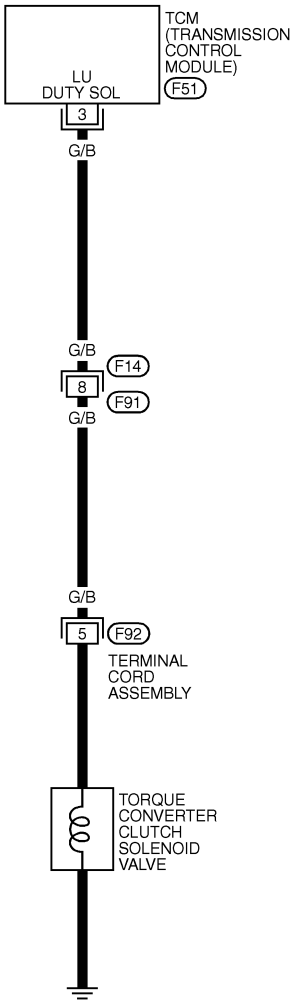
DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Wiring Diagram — AT — TCV

Wiring Diagram — AT — TCV

NFAT0059

AT-TCV-01



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

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

MAT812A

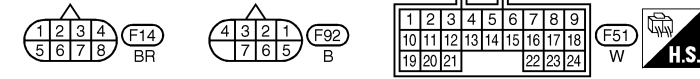
HA

SC

EL

IDX

SAT305KA



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

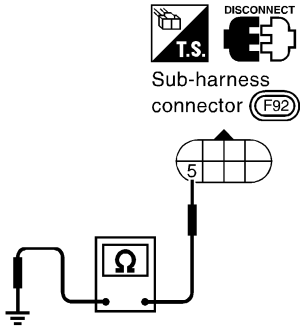


# DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

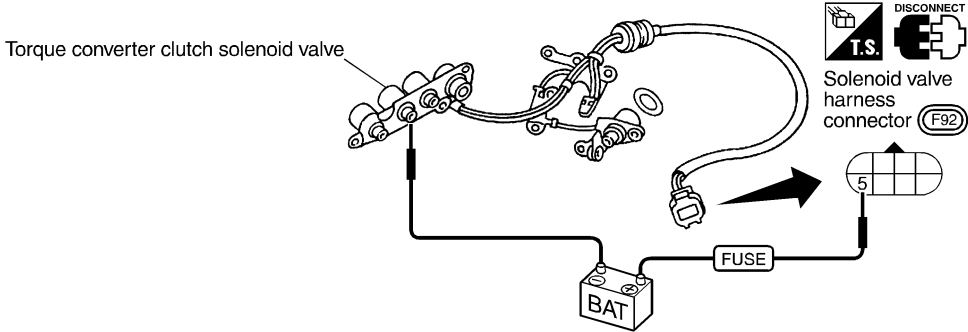
Diagnostic Procedure

## Diagnostic Procedure

NFAT0060

<b>1</b>	<b>CHECK SOLENOID VALVE RESISTANCE</b>
<ol style="list-style-type: none"><li>Turn ignition switch to OFF position.</li><li>Disconnect terminal cord assembly connector in engine compartment.</li><li>Check resistance between terminal 5 (G/B) and ground.</li></ol> <div><p>Resistance: 5 - 20Ω (Approx.)</p></div> <p>OK or NG</p>	
OK	GO TO 3.
NG	GO TO 2.

SAT627JB

<b>2</b>	<b>CHECK SOLENOID VALVE OPERATION</b>
<ol style="list-style-type: none"><li>Remove oil pan. Refer to AT-277.</li><li>Check the following items:<ul style="list-style-type: none"><li>Torque converter clutch solenoid valve</li></ul><ol style="list-style-type: none"><li>Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</li></ol></li></ol> <div><p>Torque converter clutch solenoid valve</p></div> <p>OK or NG</p>	
<ul style="list-style-type: none"><li>Harness of terminal cord assembly for short or open</li></ul>	
OK	GO TO 3.
NG	Repair or replace damaged parts.

SAT037K

<b>3</b>	<b>CHECK POWER SOURCE CIRCUIT</b>
<ol style="list-style-type: none"><li>Turn ignition switch to OFF position.</li><li>Disconnect TCM harness connector.</li><li>Check continuity between sub-harness connector terminal 5 (G/B) and TCM harness connector F51 terminal 3 (G/B). Refer to wiring diagram — AT — TCV. <b>Continuity should exist.</b> If OK, check harness for short to ground and short to power.</li><li>Reinstall any part removed.</li></ol> <p>OK or NG</p>	
OK	GO TO 4.
NG	Repair open circuit or short to ground or short to power in harness or connectors.



# DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

Diagnostic Procedure (Cont'd)

4	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-154.		
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.

GI

MA

EM

LC

EC

FE

CL

MT

**AT**

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX



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

Description

## Description

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis. NFAT0061
- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position or the torque converter clutch does not lock up as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

## CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.




NFAT0061S01

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

Remarks: Specification data are reference values.

NFAT0061S02

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

## On Board Diagnosis Logic

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows: NFAT0228

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.



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

On Board Diagnosis Logic (Cont'd)

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

Gear positions supposed by TCM are as follows.

In case of gear position with no malfunctions: 1, 2, 3 and 4 positions

In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and 1\* positions to each gear position above

\*: P0744 is detected.

Diagnostic trouble code A/T TCC S/V FNCTN with CONSULT-II or P0744 without CONSULT-II is detected when A/T cannot perform lock-up even if electrical circuit is good.

Possible Cause

Check the following items.

- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- Each clutch
- Hydraulic control circuit

Diagnostic Trouble Code (DTC) Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

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

WITH CONSULT-II

1) Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.

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

FLUID TEMP SEN: 0.4 - 1.5V

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

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

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

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

Selector lever: D position

TCC S/V DUTY: More than 94%

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

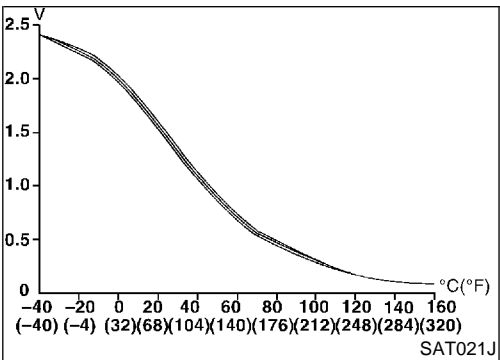
- Check that "GEAR" shows "4".
- For shift schedule, refer to SDS, AT-376.
- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS". In case a 1st trip DTC

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

SCIA5358E



SAT021J



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

Diagnostic Trouble Code (DTC) Confirmation Procedure (Cont'd)

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other than P0744 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.

- 5) Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.)  
Refer to “DIAGNOSTIC PROCEDURE”, AT-162.  
Refer to shift schedule, AT-376.



### WITH GST

Follow the procedure “With CONSULT-II”.

NFAT0230S02



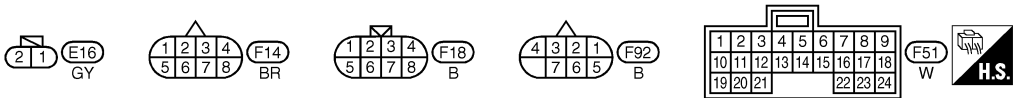
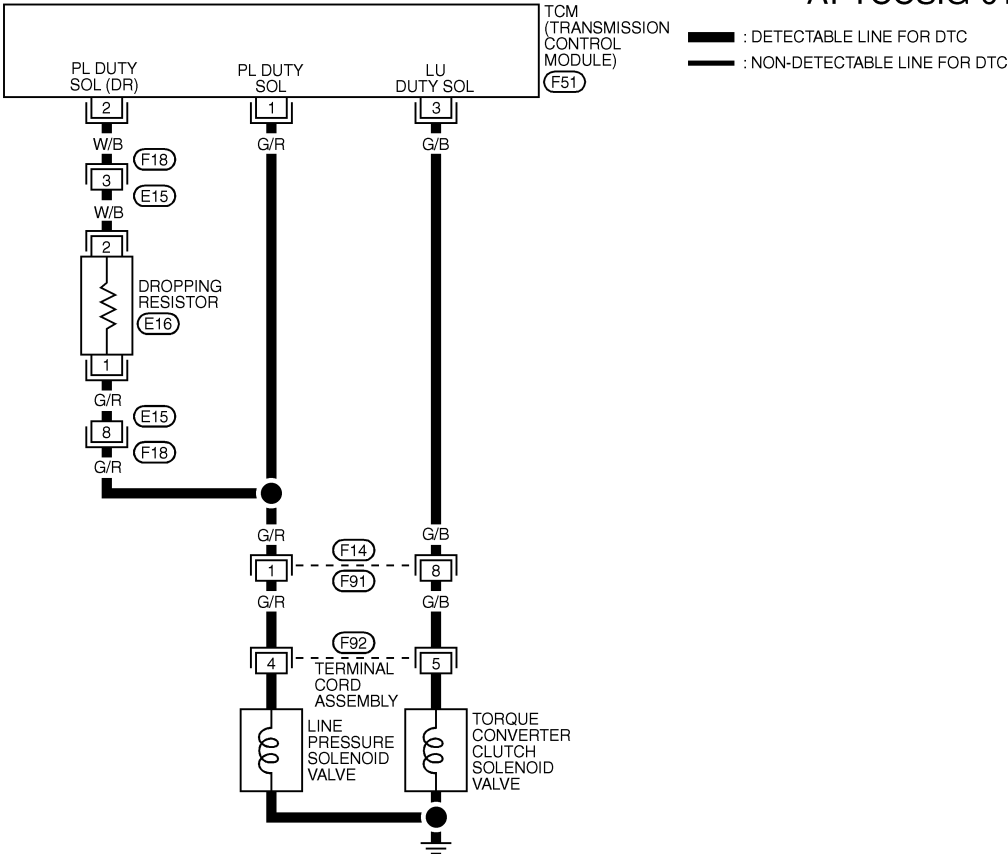
DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

Wiring Diagram — AT — TCCSIG

Wiring Diagram — AT — TCCSIG

=NFAT0062

AT-TCCSIG-01



MAT066B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (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
3	G/B	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WHEN VEHICLE STARTS AND A/T PERFORMS LOCK-UP	8 - 15V
			WHEN VEHICLE STARTS AND A/T DOES NOT PERFORM LOCK-UP	0V

SAT306KA

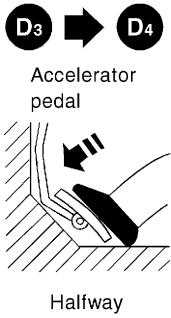


# DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

Diagnostic Procedure

## Diagnostic Procedure

NFAT0063

<b>1</b>	<b>CHECK SHIFT UP (D<sub>3</sub> TO D<sub>4</sub>)</b>
During "Cruise test — Part 1" (AT-76), does A/T shift from D <sub>3</sub> to D <sub>4</sub> at the specified speed?	
<div style="text-align: center;"><p>Accelerator pedal</p><p>Halfway</p></div>	
<b>Yes or No</b>	
Yes	▶ GO TO 11.
No	▶ GO TO 2.

SAT988H

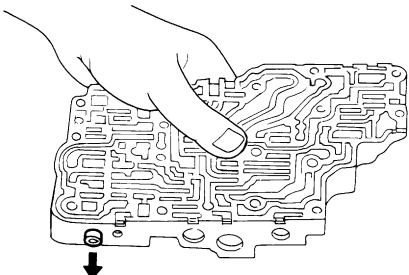
<b>2</b>	<b>CHECK LINE PRESSURE</b>											
Perform line pressure test. Refer to AT-67.												
<table border="1" style="margin-left: auto; margin-right: auto;"><thead><tr><th rowspan="2">Engine speed rpm</th><th colspan="2">Line pressure kPa (kg/cm<sup>2</sup>, psi)</th></tr><tr><th>D, 2 and 1 positions</th><th>R position</th></tr></thead><tbody><tr><td>Idle</td><td>500 (5.1, 73)</td><td>778 (7.9, 113)</td></tr><tr><td>Stall</td><td>1,233 (12.6, 179)</td><td>1,918 (19.6, 278)</td></tr></tbody></table>		Engine speed rpm	Line pressure kPa (kg/cm <sup>2</sup> , psi)		D, 2 and 1 positions	R position	Idle	500 (5.1, 73)	778 (7.9, 113)	Stall	1,233 (12.6, 179)	1,918 (19.6, 278)
Engine speed rpm	Line pressure kPa (kg/cm <sup>2</sup> , psi)											
	D, 2 and 1 positions	R position										
Idle	500 (5.1, 73)	778 (7.9, 113)										
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)										
<b>OK or NG</b>												
OK	▶ GO TO 3.											
NG	▶ GO TO 6.											

MTBL1183



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

Diagnostic Procedure (Cont'd)

3	CHECK CONTROL VALVE	
<div>1. Disassemble control valve assembly. Refer to AT-309.</div> <div>2. Check to ensure that:</div> <div><ul style="list-style-type: none"><li>● Valve, sleeve and plug slide along valve bore under their own weight.</li><li>● Valve, sleeve and plug are free from burrs, dents and scratches.</li><li>● Control valve springs are free from damage, deformation and fatigue.</li><li>● Hydraulic line is free from obstacles.</li></ul></div> <div></div> <div>SAT367H</div> <div>OK or NG</div>		
OK	▶	GO TO 4.
NG	▶	Repair control valve.

SAT367H

4	CHECK SHIFT UP (D <sub>3</sub> TO D <sub>4</sub> )	
Does A/T shift from D <sub>3</sub> to D <sub>4</sub> at the specified speed?		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Check control valve again. Repair or replace control valve assembly.

5	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-159.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 11. Check for proper lock-up.

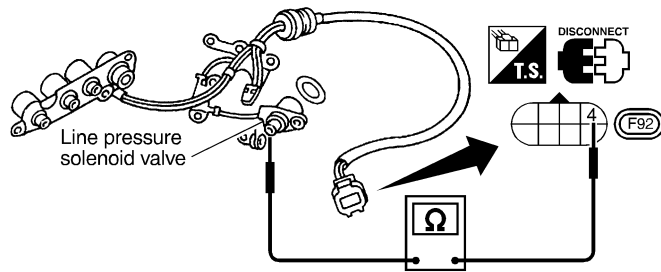


# DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

Diagnostic Procedure (Cont'd)

## 6 CHECK SOLENOID VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-277.
  - Line pressure solenoid valve
2. Check resistance to the terminal and ground.



Solenoid valve	Terminal No. (Wire color)		Resistance (Approx.)
Line pressure solenoid valve	4 (G/R)	Ground	2.5 - 5Ω

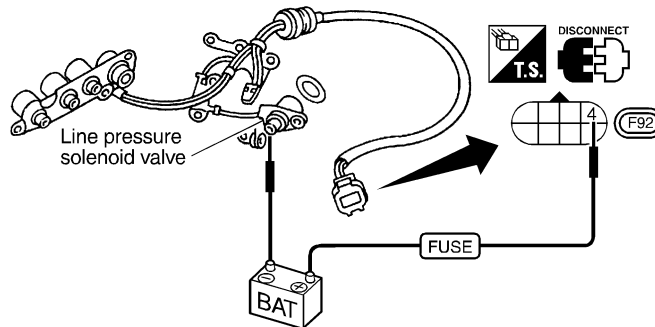
SAT625JA

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace solenoid valve assembly.

## 7 CHECK SOLENOID VALVE OPERATION

1. Remove control valve assembly. Refer to AT-309.
  - Line pressure solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



SAT626J

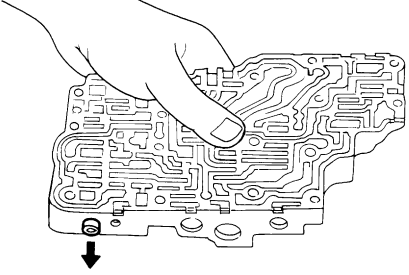
OK or NG

OK	▶	GO TO 8.
NG	▶	Replace solenoid valve assembly.



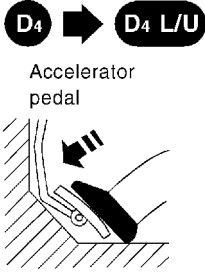
# DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

Diagnostic Procedure (Cont'd)

<b>8</b>	<b>CHECK CONTROL VALVE</b>	
1. Disassemble control valve assembly. Refer to AT-309. 2. Check line pressure circuit valves for sticking. <ul style="list-style-type: none"> <li>● Pressure regulator valve</li> <li>● Pilot valve</li> <li>● Pressure modifier valve</li> </ul>		
		
SAT367H		
<b>OK or NG</b>		
OK	▶	GO TO 9.
NG	▶	Repair control valve.

<b>9</b>	<b>CHECK SHIFT UP (D<sub>3</sub> TO D<sub>4</sub>)</b>	
Does A/T shift from D <sub>3</sub> to D <sub>4</sub> at the specified speed?		
<b>OK or NG</b>		
OK	▶	GO TO 10.
NG	▶	Check control valve again. Repair or replace control valve assembly.

<b>10</b>	<b>CHECK DTC</b>	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-159.		
<b>OK or NG</b>		
OK	▶	<b>INSPECTION END</b>
NG	▶	GO TO 11. Check for proper lock-up.

<b>11</b>	<b>CHECK LOCK-UP</b>	
During "Cruise test — Part 1" (AT-76), does A/T perform lock-up at the specified speed?		
		
Halfway		
SAT989H		
<b>Yes or No</b>		
Yes	▶	Perform "Cruise test — Part 1" again and return to the start point of this test group.
No	▶	GO TO 12.



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

Diagnostic Procedure (Cont'd)

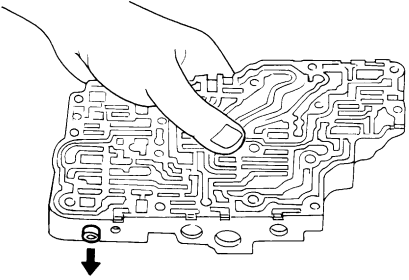
<b>12</b>	<b>CHECK SOLENOID VALVE RESISTANCE</b>							
<p>1. Remove control valve assembly. Refer to AT-277.</p> <ul style="list-style-type: none"> <li>● Torque converter clutch solenoid valve</li> </ul> <p>2. Check resistance to the terminal and ground.</p>								
<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex: 1;"> </div> <div style="flex: 1;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Solenoid valve</th> <th style="padding: 5px;">Terminal No. (Wire color)</th> <th style="padding: 5px;">Resistance (Approx.)</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Torque converter clutch solenoid valve</td> <td style="padding: 5px;">5 (G/B)      Ground</td> <td style="padding: 5px;">5 - 20Ω</td> </tr> </tbody> </table> </div> </div>			Solenoid valve	Terminal No. (Wire color)	Resistance (Approx.)	Torque converter clutch solenoid valve	5 (G/B)      Ground	5 - 20Ω
Solenoid valve	Terminal No. (Wire color)	Resistance (Approx.)						
Torque converter clutch solenoid valve	5 (G/B)      Ground	5 - 20Ω						
SAT047KB								
<b>OK or NG</b>								
OK	▶	GO TO 14.						
NG	▶	Replace solenoid valve assembly.						

<b>13</b>	<b>CHECK SOLENOID VALVE OPERATION</b>	
<p>1. Remove control valve assembly. Refer to AT-277.</p> <ul style="list-style-type: none"> <li>● Torque converter clutch solenoid valve</li> </ul> <p>2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</p>		
<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="flex: 1;"> </div> <div style="flex: 1;"> </div> </div>		
SAT037K		
<b>OK or NG</b>		
OK	▶	GO TO 14.
NG	▶	Replace solenoid valve assembly.



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

Diagnostic Procedure (Cont'd)

<b>14</b>	<b>CHECK CONTROL VALVE</b>
<p>1. Disassemble control valve assembly. Refer to AT-309.</p> <p>2. Check control valves for sticking.</p> <ul style="list-style-type: none"><li>• Torque converter clutch control valve</li><li>• Torque converter clutch relief valve</li></ul>	
	
SAT367H	
<b>OK or NG</b>	
OK	▶ GO TO 15.
NG	▶ Repair control valve.

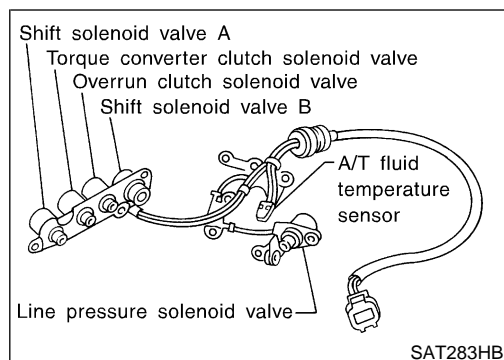
<b>15</b>	<b>CHECK LOCK-UP</b>
Does A/T perform lock-up at the specified speed?	
<b>Yes or No</b>	
Yes	▶ GO TO 16.
No	▶ Check control valve again. Repair or replace control valve assembly.

<b>16</b>	<b>CHECK DTC</b>
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-159.	
<b>OK or NG</b>	
OK	▶ <b>INSPECTION END</b>
NG	▶ Perform "Cruise test — Part 1" again and return to the start point of this test group.



# DTC P0745 LINE PRESSURE SOLENOID VALVE

## Description



## 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)	Approximately 24%
	↓ Large throttle opening (High line pressure)	↓ 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

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

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 5 seconds.

WITH GST

NFAT0233S02

Follow the procedure “With CONSULT-II”.



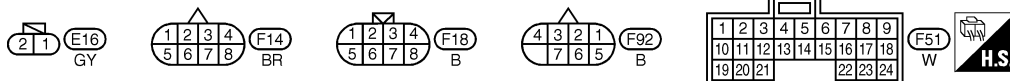
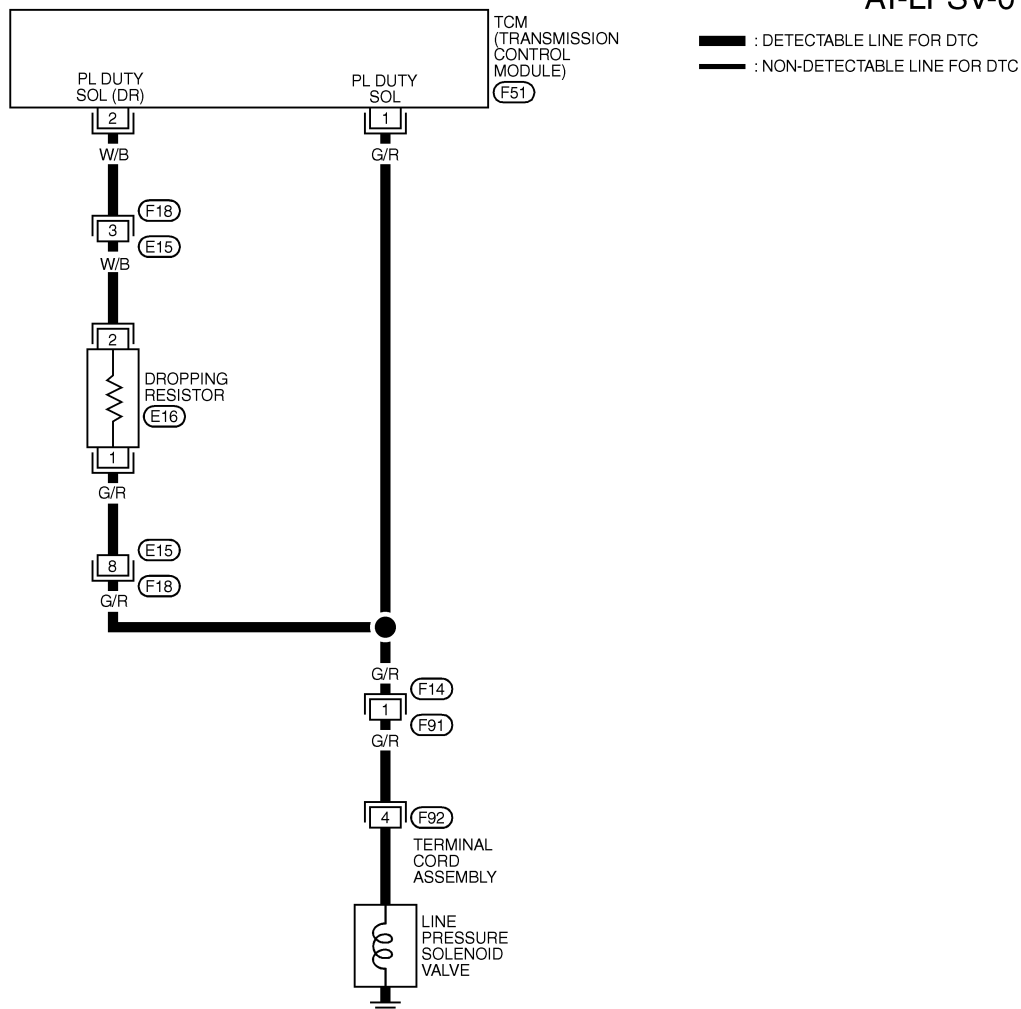
# DTC P0745 LINE PRESSURE SOLENOID VALVE

Wiring Diagram — AT — LPSV

## Wiring Diagram — AT — LPSV

NFAT0065

AT-LPSV-01



MAT067B

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

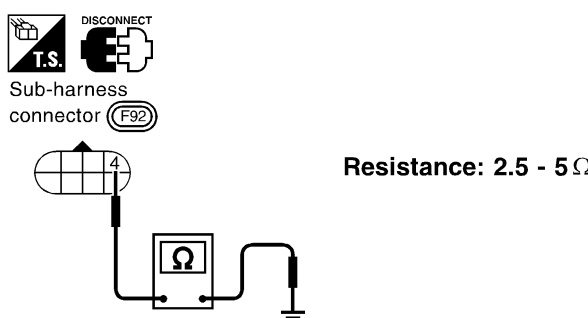
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
1	G/R	LINE PRESSURE SOLENOID VALVE	WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS RELEASED	1.5 - 3.0V
			WHEN VEHICLE STARTS AND ACCELERATOR PEDAL IS DEPRESSED	0V
2	W/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN VEHICLE STARTS AND ACCELERATOR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

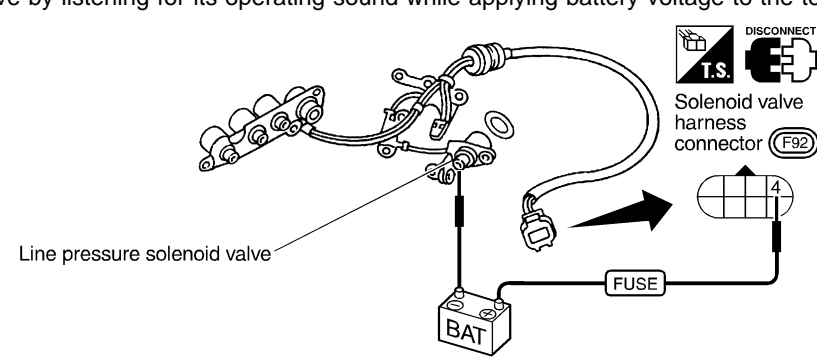
SAT307KA



## Diagnostic Procedure

NFAT0066

<b>1</b>	<b>CHECK SOLENOID VALVE RESISTANCE</b>	
1. Turn ignition solenoid switch to OFF position. 2. Disconnect terminal harness assembly connector in engine compartment. 3. Check resistance between terminal 4 (G/R) and ground.		
		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

<b>2</b>	<b>CHECK SOLENOID VALVE OPERATION</b>	
1. Remove control valve assembly. Refer to AT-277. 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.		
		
● Harness of terminal cord assembly for short or open  <b>OK or NG</b>		
OK	▶	GO TO 3.
NG	▶	Repair or replace damaged parts.



# DTC P0745 LINE PRESSURE SOLENOID VALVE

Diagnostic Procedure (Cont'd)

3	CHECK POWER SOURCE AND DROPPING RESISTOR CIRCUIT
<ol style="list-style-type: none"> <li>Turn ignition switch to OFF position.</li> <li>Disconnect TCM harness connector.</li> <li>Check resistance between terminal 4 (G/R) and TCM harness connector F51 terminal 2 (W/B).</li> </ol>	
<div style="display: flex; align-items: center; justify-content: space-between;"> <div> <p style="text-align: center;"><b>Resistance: 10 - 15 Ω</b></p> <p style="text-align: center;"><b>OK or NG</b></p> </div> <div> <p><b>Resistance: 10 - 15 Ω</b></p> </div> <div style="text-align: right;"> <p>SAT631JC</p> </div> </div>	
OK	▶ GO TO 5.
NG	▶ GO TO 4.

4	DETECT MALFUNCTIONING ITEM
<p>Check the following items:</p> <ul style="list-style-type: none"> <li>• Dropping resistor</li> <li>• Check resistance between two terminals.</li> </ul>	
<div style="display: flex; align-items: center; justify-content: space-between;"> <div> <p style="text-align: center;"><b>Resistance:</b> <b>10 - 15 Ω</b></p> </div> <div style="text-align: right;"> <p>SAT933IB</p> </div> </div>	
<ul style="list-style-type: none"> <li>• Harness for short or open between TCM harness connector F50 terminal 2 (W/B) and terminal cord assembly (Main harness)</li> </ul> <p style="text-align: center;"><b>OK or NG</b></p>	
OK	▶ GO TO 5.
NG	▶ Repair or replace damaged parts.

5	CHECK POWER SOURCE CIRCUIT
<ol style="list-style-type: none"> <li>Turn ignition switch to OFF position.</li> <li>Check continuity between sub-harness connector terminal 4 (G/R) and TCM harness connector F50 terminal 1 (G/R). Refer to wiring diagram — AT — LPSV. <b>Continuity should exist.</b> If OK, check harness for short to ground and short to power.</li> <li>Reinstall any part removed.</li> </ol>	
<p><b>OK or NG</b></p>	
OK	▶ GO TO 6.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.



# DTC P0745 LINE PRESSURE SOLENOID VALVE

Diagnostic Procedure (Cont'd)

<b>6</b>	<b>CHECK DTC</b>	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-169.		
<b>OK or NG</b>		
OK	▶	<b>INSPECTION END</b>
NG	▶	GO TO 7.

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

GI

MA

EM

LC

EC

FE

CL

MT

**AT**

AX

SU

BR

ST

RS

BT

HA

SC

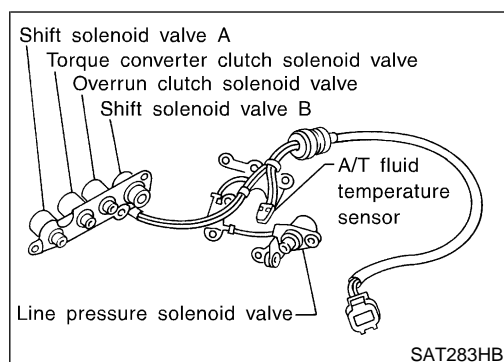
EL

IDX



# DTC P0750 SHIFT SOLENOID VALVE A

## Description



## Description

Shift solenoid valves A and B are turned ON or OFF by the TCM in response to signals sent from the park/neutral position (PNP) switch, vehicle speed and electric throttle control actuator (throttle position sensors). Gears will then be shifted to the optimum position.


NFAT0067

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 <sub>1</sub> or D <sub>4</sub> .)	Battery voltage
			When shift solenoid valve A does not operate. (When driving in D <sub>2</sub> or D <sub>3</sub> .)	0V

## On Board Diagnosis Logic

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.

NFAT0234

## Possible Cause

Check the following items.

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

NFAT0235



# DTC P0750 SHIFT SOLENOID VALVE A

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

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".

GI

MA

EM

LC

EC

FE

CL

MT

AT

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RS

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IDX



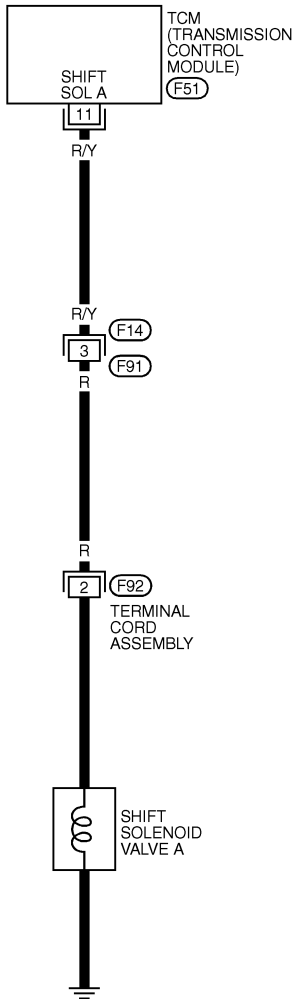
DTC P0750 SHIFT SOLENOID VALVE A

Wiring Diagram — AT — SSV/A

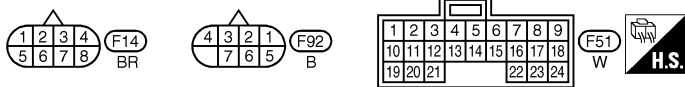
Wiring Diagram — AT — SSV/A

NFAT0068

AT-SSV/A-01



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



MAT815A

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

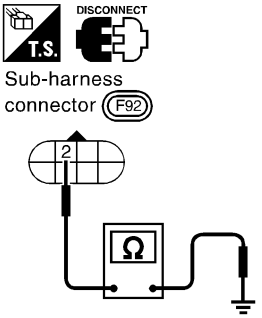
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A OPERATES (WHEN DRIVING IN D1 OR D4)	BATTERY VOTAGE
			WHEN VEHICLE STARTS AND SHIFT SOLENOID VALVE A DOES NOT OPERATE (WHEN DRIVING IN D2 OR D3)	0V

SAT308KA

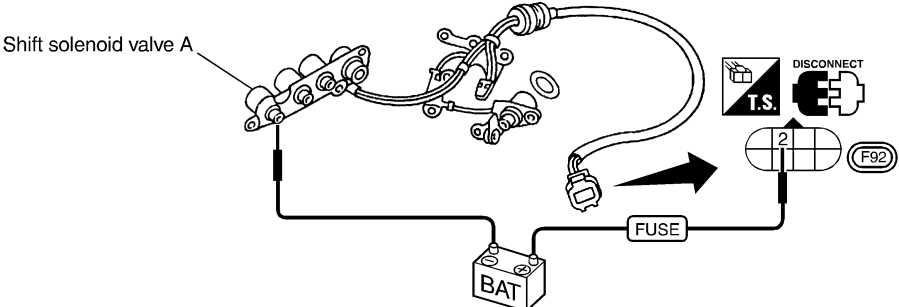


## Diagnostic Procedure

NFAT0069

<b>1</b>	<b>CHECK SHIFT SOLENOID VALVE RESISTANCE</b>	
1. Turn ignition switch to OFF position. 2. Disconnect terminal cord assembly connector in engine compartment. 3. Check resistance between terminal 2 (R) and ground.		
 <p>Resistance: 20 - 30 Ω</p> <p>OK or NG</p>		
OK		GO TO 3.
NG		GO TO 2.

SAT632JB

<b>2</b>	<b>CHECK SHIFT SOLENOID VALVE OPERATION</b>	
1. Remove control valve assembly. Refer to AT-277. 2. Check the following items: <ul style="list-style-type: none"> <li>• Shift solenoid valve A</li> <li>• Operation check</li> </ul> i. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.		
 <p>• Harness of terminal cord assembly for short or open</p> <p>OK or NG</p>		
OK		GO TO 3.
NG		Repair or replace damaged parts.

SAT035K

<b>3</b>	<b>CHECK POWER SOURCE CIRCUIT</b>	
1. Turn ignition switch to OFF position. 2. Disconnect TCM harness connector. 3. Check continuity between sub-harness connector terminal 2 (R) and TCM harness connector F51 terminal 11 (R/Y). Refer to wiring diagram — AT — SSV/A. <b>Continuity should exist.</b> 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.



## DTC P0750 SHIFT SOLENOID VALVE A

Diagnostic Procedure (Cont'd)

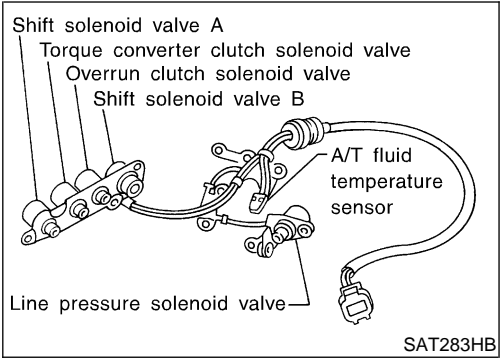
<b>4</b>	<b>CHECK DTC</b>
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-175.	
<b>OK or NG</b>	
OK	▶ <b>INSPECTION END</b>
NG	▶ GO TO 5.

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



DTC P0755 SHIFT SOLENOID VALVE B

Description



Description

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


NFAT0070

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 <sub>1</sub> or D <sub>2</sub> .)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in D <sub>3</sub> or D <sub>4</sub> .)	0V

On Board Diagnosis Logic

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

NFAT0237

Possible Cause

Check the following items.

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

NFAT0239



# DTC P0755 SHIFT SOLENOID VALVE B

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

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".



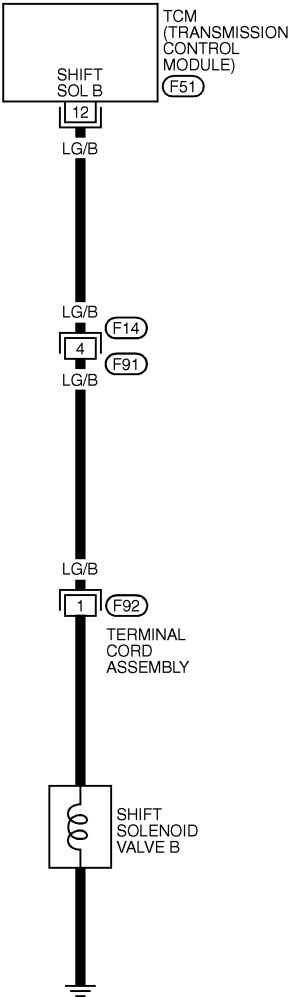
DTC P0755 SHIFT SOLENOID VALVE B

Wiring Diagram — AT — SSV/B

Wiring Diagram — AT — SSV/B

NFAT0071

AT-SSV/B-01



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

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

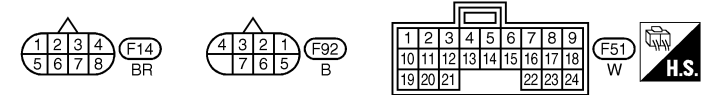
HA

SC

EL

IDX

MAT816A



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

SAT309KA

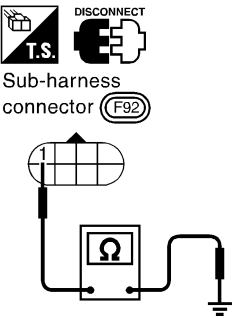


# DTC P0755 SHIFT SOLENOID VALVE B

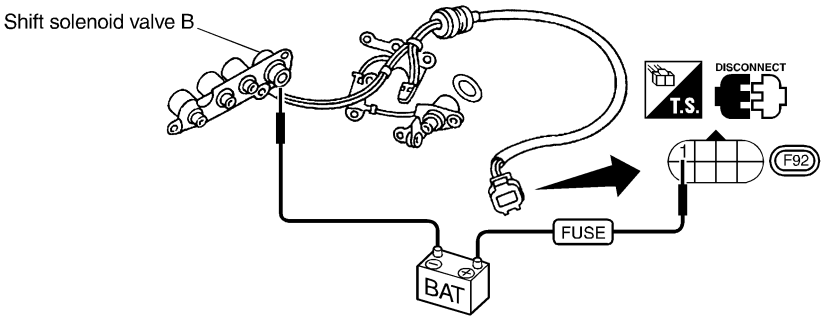
Diagnostic Procedure

## Diagnostic Procedure

NFAT0072

1	CHECK SHIFT SOLENOID VALVE RESISTANCE
<ol style="list-style-type: none"> <li>Turn ignition switch to OFF position.</li> <li>Disconnect terminal harness assembly connector in engine compartment.</li> <li>Check resistance between terminal 1 (LG/B) and ground.</li> </ol>	
 <p>Resistance: 5 - 20 Ω</p> <p>OK or NG</p>	
OK	GO TO 3.
NG	GO TO 2.

SAT633JC

2	CHECK SHIFT SOLENOID VALVE OPERATION
<ol style="list-style-type: none"> <li>Remove control valve assembly. Refer to AT-277.</li> <li>Check the following items: <ul style="list-style-type: none"> <li>Shift solenoid valve B</li> <li>Operation check</li> </ul> </li> <li>Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</li> </ol>	
 <p>Shift solenoid valve B</p> <p>OK or NG</p>	
<ul style="list-style-type: none"> <li>Harness of terminal cord assembly for short or open</li> </ul>	
OK	GO TO 3.
NG	Repair or replace damaged parts.

SAT036K

3	CHECK POWER SOURCE CIRCUIT
<ol style="list-style-type: none"> <li>Turn ignition switch to OFF position.</li> <li>Disconnect TCM harness connector.</li> <li>Check continuity between sub-harness connector terminal 1 (LG/B) and TCM harness connector F51 terminal 12 (LG/B). Refer to wiring diagram — AT — SSV/B. <b>Continuity should exist.</b></li> <li>If OK, check harness for short to ground and short to power.</li> <li>Reinstall any part removed.</li> </ol>	
OK or NG	
OK	GO TO 4.
NG	Repair open circuit or short to ground or short to power in harness or connectors.



DTC P0755 SHIFT SOLENOID VALVE B

Diagnostic Procedure (Cont'd)

4	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-180.		
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.

GI

MA

EM

LC

EC

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CL

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AT

AX

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BR

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RS

BT

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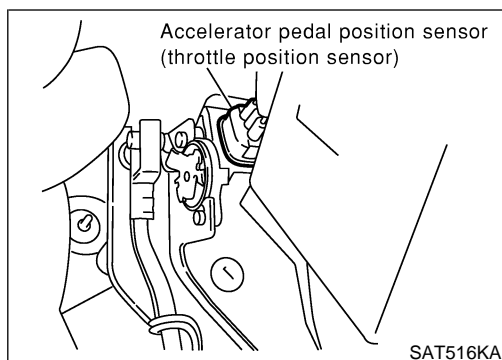
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IDX



# DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

## Description



## Description

NFAT0073

The accelerator pedal position sensor (throttle position sensor) is part of the system that controls throttle position. Accelerator pedal position signal is sent to the ECM. And the signal is also sent to TCM as throttle valve position signal.

## CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NFAT0073S01



Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Accelerator pedal position sensor (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.)
32	R	Sensor power		Ignition switch ON.	4.5 - 5.5V
				Ignition switch OFF.	0V
41	W	Accelerator pedal position sensor (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	Sensor ground	—	—	0V



DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

On Board Diagnosis Logic

On Board Diagnosis Logic

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

NFAT0240

GI

MA

EM

LC

Possible Cause

Check the following items.

NFAT0241

EC

- Harness or connectors  
(The sensor circuit is open or shorted.)
- Accelerator pedal position sensor (throttle position sensor)

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX



# DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

## Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

SCIA5358E

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

## 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	Accelerator pedal position sensor (THRTL POS SEN)
Fully released	Approx. 0.5V
Partially depressed	Approx. 0.5 - 4V
Fully depressed	Approx. 4V

If the check result is NG, go to "DIAGNOSTIC PROCEDURE", AT-188.

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 (accelerator pedal position sensor):**  
**Approximately 3V or less**

**Selector lever: D position**

If the check result is NG, go to "DIAGNOSTIC PROCEDURE", AT-188.

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**

### WITH GST

NFAT0242S02

Follow the procedure "With CONSULT-II".



DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Wiring Diagram — AT — TPS

Wiring Diagram — AT — TPS

NFAT0074

AT-TPS-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

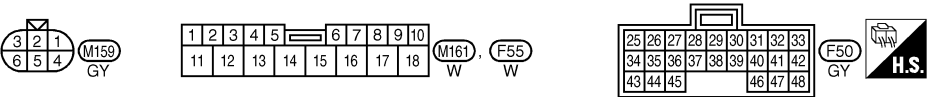
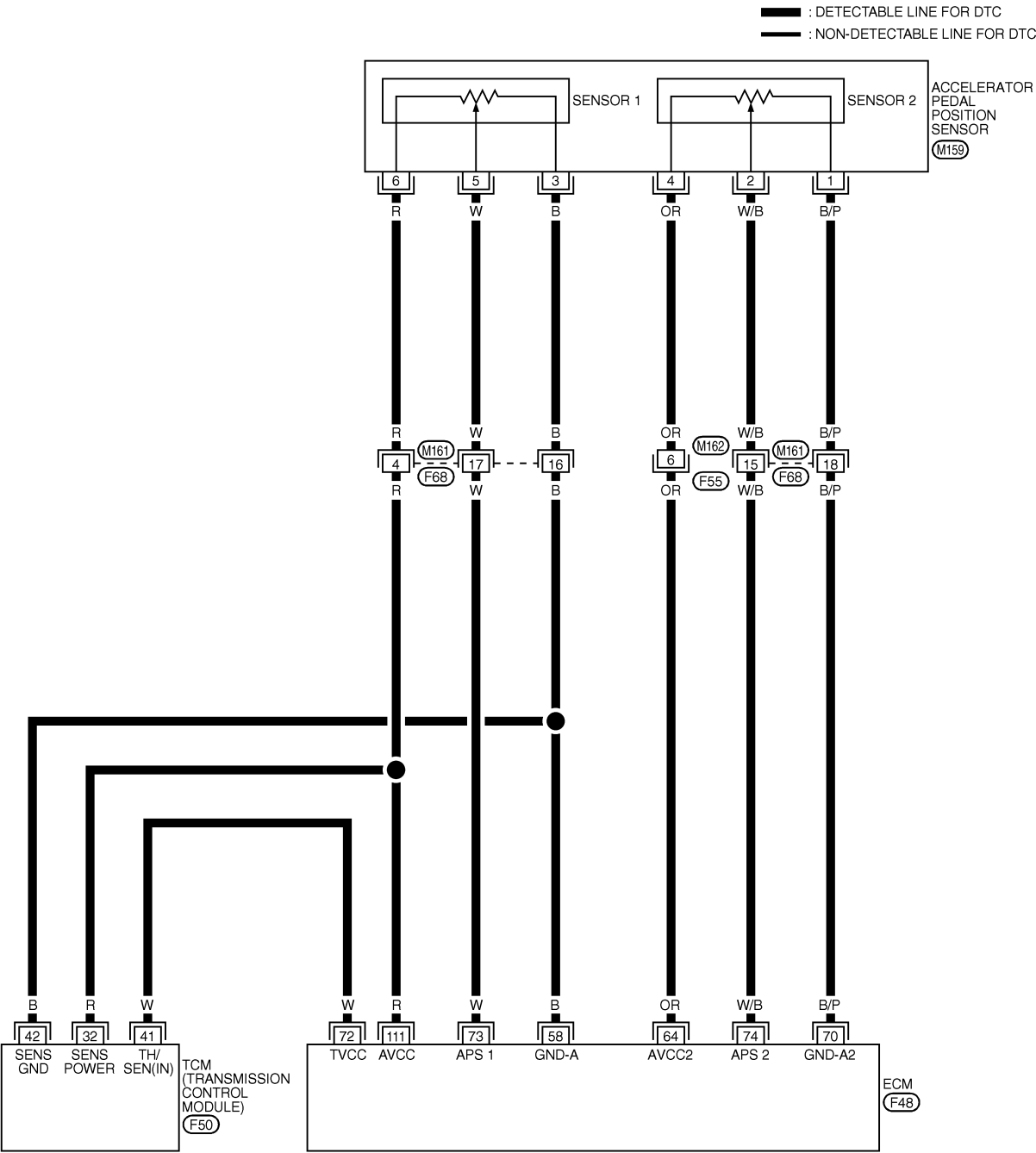
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REFER TO THE FOLLOWING.  
(F48) -ELECTRICAL UNITS



# DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Wiring Diagram — AT — TPS (Cont'd)

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

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

SAT310KC

## Diagnostic Procedure


NFAT0075

1	CHECK DTC WITH ECM		
<ul style="list-style-type: none"><li>● 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-92, “Malfunction Indicator Lamp (MIL)”.</li></ul>			
OK or NG			
OK (with CONSULT-II)	▶	GO TO 2.	
OK (without CONSULT-II)	▶	GO TO 3.	
NG	▶	Check accelerator pedal position sensor (throttle position sensor) circuit for engine control. Refer to EC-302, “DTC P0226 APP sensor (throttle position sensor)”.	



# DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Diagnostic Procedure (Cont'd)

2	CHECK INPUT SIGNAL (With CONSULT-II)															
<div> With CONSULT-II</div> <div>1. Turn ignition switch to ON position. (Do not start engine.)</div> <div>2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.</div> <div>3. Read out the value of "THRTL POS SEN".</div> <div><div>Voltage:</div><div>Fully-closed throttle: Approximately 0.5V</div><div>Fully-open throttle: Approximately 4V</div></div> <div><table><tr><th colspan="2">DATA MONITOR</th></tr><tr><th colspan="2">MONITORING</th></tr><tr><td>VHCL/S SE-A/T</td><td>XXX km/h</td></tr><tr><td>VHCL/S SE-MTR</td><td>XXX km/h</td></tr><tr><td>THRTL POS SEN</td><td>XXX V</td></tr><tr><td>FLUID TEMP SE</td><td>XXX V</td></tr><tr><td>BATTERY VOLT</td><td>XXX V</td></tr></table></div> <div>SAT614J</div> <div>OK or NG</div>			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
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															
OK	▶	GO TO 4.														
NG	▶	Check harness for short or open between ECM and TCM regarding accelerator pedal position sensor (throttle position sensor) circuit. (Main harness)														

3	CHECK INPUT SIGNAL (Without CONSULT-II)	
<div><div><div></div><div>Without CONSULT-II</div></div><div><div>1. Turn ignition switch to ON position. (Do not start engine.)</div><div>2. Check voltage between TCM harness connector F50 terminals 41 (W) and 42 (B) while accelerator pedal is depressed slowly.</div></div></div>		
<div><div><div><div><div></div><div>H.S.</div></div><div><div>CONNECT</div><div></div></div><div><div></div><div>ON</div></div></div><div><div><div>TCM</div><div>CONNECTOR</div></div><div><div>41</div><div>42</div></div><div><div>V</div><div><div></div><div></div></div></div></div></div></div>		
<div><div>Voltage:</div><div>Fully-closed throttle valve:</div><div>Approximately 0.5V</div><div>Fully-open throttle valve:</div><div>Approximately 4V</div><div>(Voltage rises gradually in response to throttle position.)</div></div>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Check harness for short or open between ECM and TCM regarding accelerator pedal position sensor (throttle position sensor) circuit. (Main harness)



# DTC P1705 ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)

Diagnostic Procedure (Cont'd)

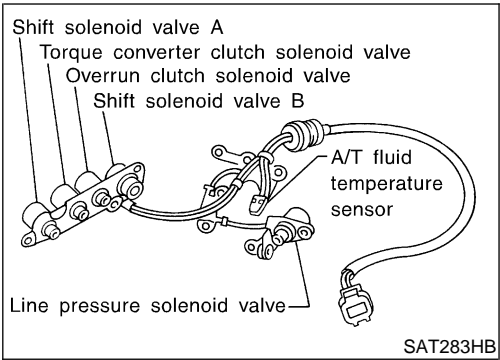
<b>4</b>	<b>CHECK DTC</b>
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-186.	
<b>OK or NG</b>	
OK	▶ <b>INSPECTION END</b>
NG	▶ GO TO 5.

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



DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

Description




Description

The overrun clutch solenoid valve is activated by the TCM in response to signals sent from the park/neutral position (PNP) switch, 3rd position switch, vehicle speed and accelerator pedal position sensor (throttle position sensors). The overrun clutch operation will then be controlled.

TCM TERMINALS AND REFERENCE VALUE

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

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

Possible Cause

Check the following items.

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



# DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION

SEF949Y

## 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.
- 4) Release accelerator pedal completely with 3rd position.



### WITH GST

NFAT0245S02

Follow the procedure "With CONSULT-II".



DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

Wiring Diagram — AT — OVRCSV

Wiring Diagram — AT — OVRCSV

NFAT0077

AT-OVRCSV-01

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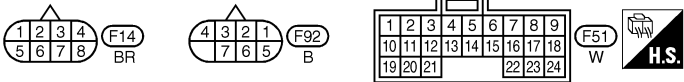
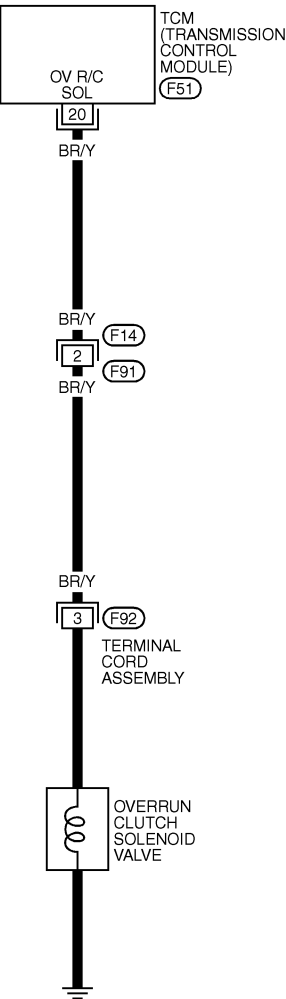
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MAT818A

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

SAT311KA

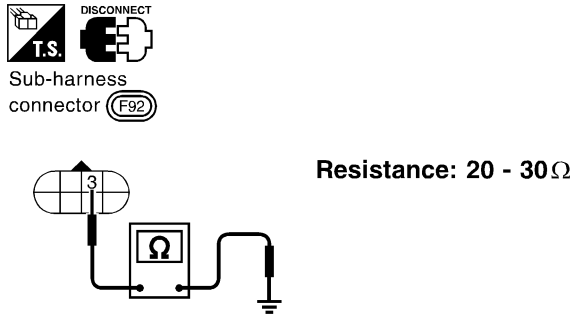


# DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

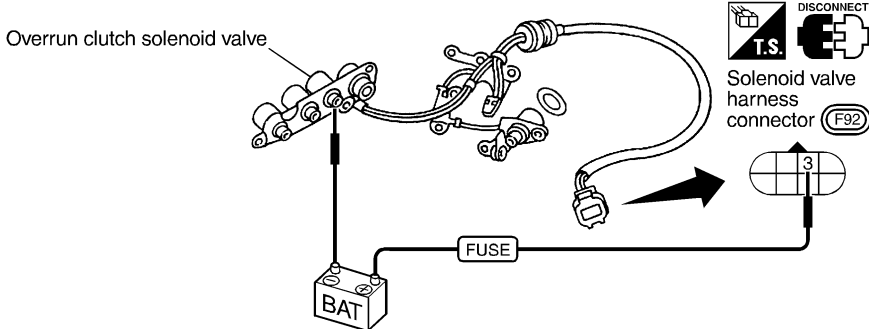
Diagnostic Procedure

## Diagnostic Procedure

NFAT0078

<b>1</b>	<b>CHECK SOLENOID VALVE RESISTANCE</b>
<ol style="list-style-type: none"><li>Turn ignition switch to OFF position.</li><li>Disconnect terminal harness assembly connector in engine compartment.</li><li>Check resistance between terminal 3 (BR/Y) and ground.</li></ol>	
 <p>Sub-harness connector (F92)</p> <p>Resistance: 20 - 30 Ω</p> <p>OK or NG</p>	
OK	GO TO 3.
NG	GO TO 2.

SAT637JB

<b>2</b>	<b>CHECK SOLENOID VALVE OPERATION</b>
<ol style="list-style-type: none"><li>Remove control valve assembly. Refer to AT-277.</li><li>Check the following items:<ul style="list-style-type: none"><li>Overrun clutch solenoid valve</li><li>Operation check</li></ul></li><li>Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.</li></ol>	
 <p>Overrun clutch solenoid valve</p> <p>Solenoid valve harness connector (F92)</p> <p>BAT</p> <p>FUSE</p> <p>OK or NG</p>	
<ul style="list-style-type: none"><li>Harness of terminal cord assembly for short or open</li></ul>	
OK	GO TO 3.
NG	Repair or replace damaged parts.

SAT638J

<b>3</b>	<b>CHECK POWER SOURCE CIRCUIT</b>
<ol style="list-style-type: none"><li>Turn ignition switch to OFF position.</li><li>Disconnect TCM harness connector.</li><li>Check continuity between sub-harness connector terminal 3 (BR/Y) and TCM harness connector F51 terminal 20 (BR/Y). Refer to wiring diagram — AT — OVRCVS. <b>Continuity should exist.</b> If OK, check harness for short to ground and short to power.</li><li>Reinstall any part removed.</li></ol>	
OK or NG	
OK	GO TO 4.
NG	Repair open circuit or short to ground or short to power in harness or connectors.



DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

Diagnostic Procedure (Cont'd)

4	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-192.		
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.

GI

MA

EM

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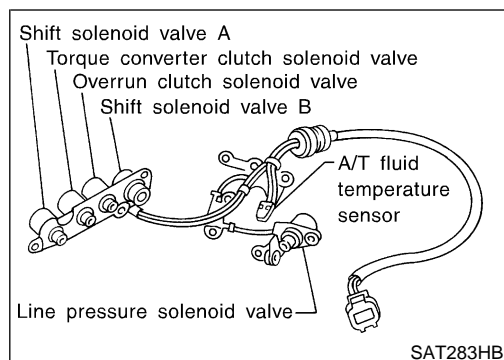
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IDX



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

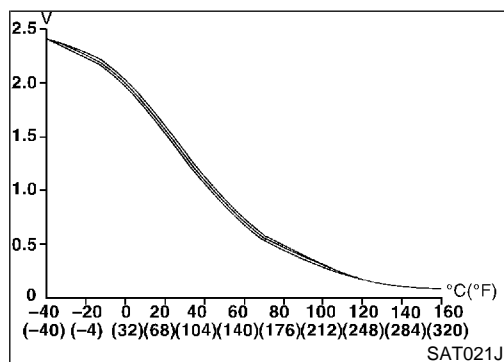
## Description



## Description

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

NFAT0079



## 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)]	1.5V	2.5 kΩ
	Hot [80°C (176°F)]	0.5V	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	Sensor ground	—	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



On Board Diagnosis Logic

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

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

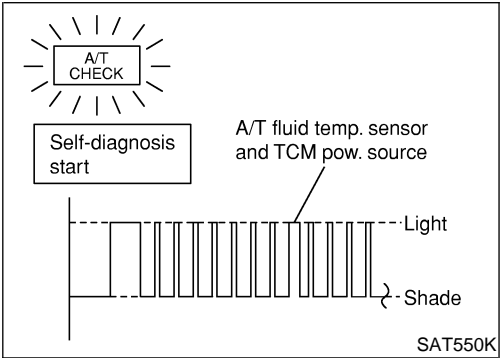
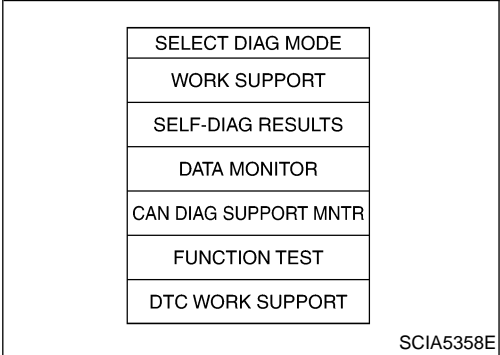
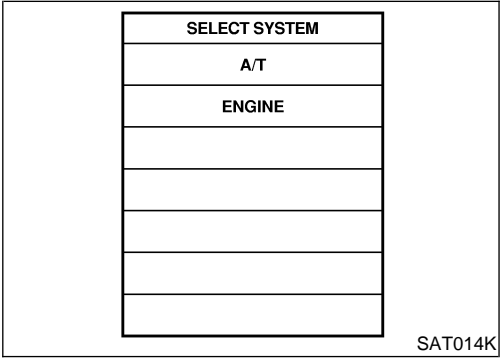
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

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

WITHOUT CONSULT-II

- 1) Start engine.
- 2) Drive vehicle under the following conditions:  
Selector lever in D, vehicle speed higher than 20 km/h (12 MPH).
- 3) Perform self-diagnosis.  
Refer to TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-51.





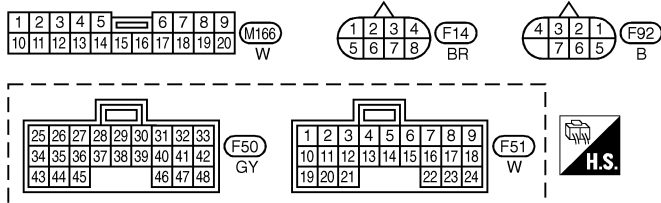
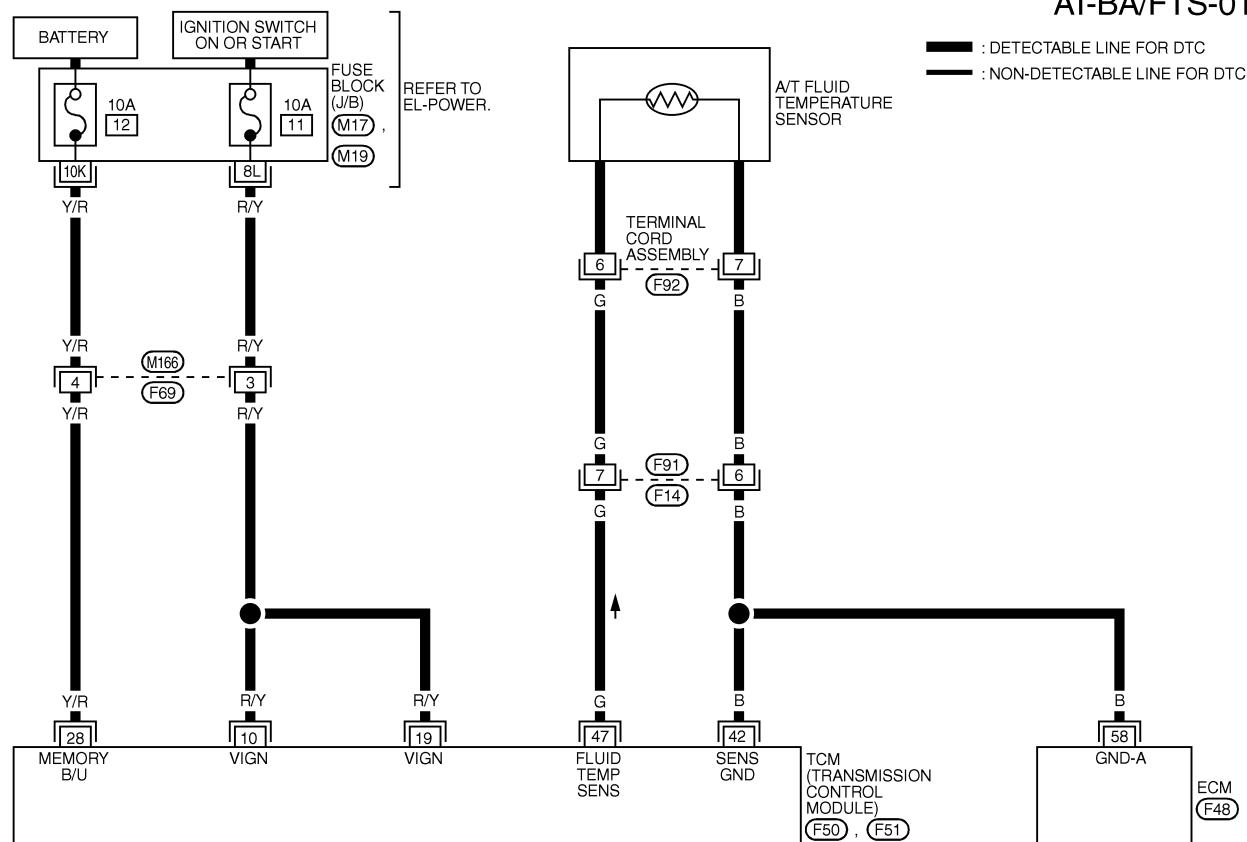
# DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

Wiring Diagram — AT — BA/FTS

## Wiring Diagram — AT — BA/FTS

NFAT0080

AT-BA/FTS-01



REFER TO THE FOLLOWING.

- (M17), (M19) - FUSE BLOCK - JUNCTION BOX (J/B)
- (F48) - ELECTRICAL UNITS

MAT069B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND (B) 25 OR 48 (B) (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	
28	Y/R	POWER SOURCE (MEMORY BACK-UP)	WHEN IGN ON	BATTERY VOLTAGE
			WHEN IGN OFF	BATTERY VOLTAGE
42	B	SENSOR GROUND	—	0V
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

SAT599KA




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

Diagnostic Procedure

## Diagnostic Procedure

NFAT0081

1	CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (With CONSULT-II)																				
<p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"><li>1. Start engine.</li><li>2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.</li><li>3. Read out the value of "FLUID TEMP SE".</li></ol> <table border="1"><thead><tr><th colspan="2">DATA MONITOR</th></tr><tr><th>MONITORING</th><th></th></tr></thead><tbody><tr><td>VHCL/S SE-A/T</td><td>XXX km/h</td></tr><tr><td>VHCL/S SE-MTR</td><td>XXX km/h</td></tr><tr><td>THRTL POS SEN</td><td>XXX V</td></tr><tr><td>FLUID TEMP SE</td><td>XXX V</td></tr><tr><td>BATTERY VOLT</td><td>XXX V</td></tr></tbody></table> <p><b>Voltage:</b> Cold [20°C (68°F)] → Hot [80°C (176°F)]: Approximately 1.5V → 0.5V</p> <p style="text-align: right;">SAT614J</p> <p style="text-align: center;">OK or NG</p> <table border="1"><tbody><tr><td>OK</td><td>▶</td><td>GO TO 9.</td></tr><tr><td>NG</td><td>▶</td><td>GO TO 2.</td></tr></tbody></table>		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	OK	▶	GO TO 9.	NG	▶	GO TO 2.
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																				
OK	▶	GO TO 9.																			
NG	▶	GO TO 2.																			

GI

MA

EM

LC

EC

FE

CL

MT

AT

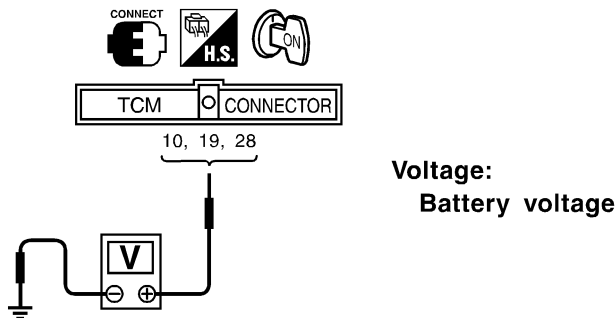
2	DETECT MALFUNCTIONING ITEM						
<p>Check the following items:</p> <ul style="list-style-type: none"><li>● Harness for short or open between TCM, ECM and terminal cord assembly (Main harness)</li><li>● Ground circuit for ECM</li></ul> <p>Refer to EC-155, "TROUBLE DIAGNOSIS FOR POWER SUPPLY".</p> <p style="text-align: center;">OK or NG</p> <table border="1"><tbody><tr><td>OK</td><td>▶</td><td>GO TO 9.</td></tr><tr><td>NG</td><td>▶</td><td>Repair or replace damaged parts.</td></tr></tbody></table>		OK	▶	GO TO 9.	NG	▶	Repair or replace damaged parts.
OK	▶	GO TO 9.					
NG	▶	Repair or replace damaged parts.					

AX

SU

BR

ST

3	CHECK TCM POWER SOURCE STEP 1						
<ol style="list-style-type: none"><li>1. Turn ignition switch to ON position. (Do not start engine.)</li><li>2. Check voltage between TCM harness connectors F50, F51 terminals 10 (R/Y), 19 (R/Y), 28 (Y/R) and ground.</li></ol> <div><p style="text-align: right;">SAT611J</p><p style="text-align: center;">OK or NG</p><table border="1"><tbody><tr><td>OK</td><td>▶</td><td>GO TO 4.</td></tr><tr><td>NG</td><td>▶</td><td>GO TO 5.</td></tr></tbody></table></div>		OK	▶	GO TO 4.	NG	▶	GO TO 5.
OK	▶	GO TO 4.					
NG	▶	GO TO 5.					

RS

BT

HA

SC




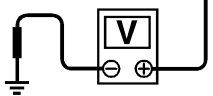
EL

IDX

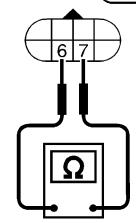


# DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

Diagnostic Procedure (Cont'd)

4	CHECK TCM POWER SOURCE STEP 2	
<div>1. Turn ignition switch to OFF position.</div> <div>2. Check voltage between TCM harness connector F50 terminal 28 (Y/R) and ground.</div> <div><div><div><div>CONNECT</div><div></div></div><div><div>DISCONNECT</div><div></div></div><div><div>T.S.</div><div></div></div></div><div><div>TCM</div><div>CONNECTOR</div></div><div>28</div><div></div><div><b>Voltage:</b> <b>Battery voltage</b></div><div>SAT612JG</div><div>OK or NG</div></div>		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

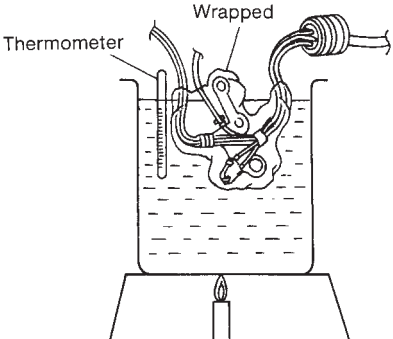
5	DETECT MALFUNCTIONING ITEM	
<div>Check the following items:</div> <div><ul style="list-style-type: none"><li>● Harness for short or open between ignition switch and TCM (Main harness)</li><li>● Ignition switch and fuse</li></ul></div> <div>Refer to EL-10, "POWER SUPPLY ROUTING".</div> <div>OK or NG</div>		
OK	▶	GO TO 6.
NG	▶	Repair or replace damaged parts.

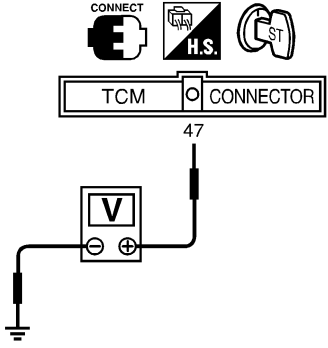
6	CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY	
<div>1. Turn ignition switch to OFF position.</div> <div>2. Disconnect terminal harness assembly connector in engine compartment.</div> <div>3. Check resistance between terminals 6 (G) and 7 (B) when A/T is cold.</div> <div><div><div><div><div></div><div>T.S.</div></div><div><div>DISCONNECT</div><div></div></div></div><div>Sub-harness connector (F92)</div><div></div><div><b>Resistance:</b> <b>Cold [20°C (68°F)]</b> <b>Approximately 2.5 kΩ</b></div></div><div>4. Reinstall any part removed.</div><div>OK or NG</div></div>		
OK (without CONSULT-II)	▶	GO TO 8.
NG	▶	GO TO 7.



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

Diagnostic Procedure (Cont'd)

7	DETECT MALFUNCTIONING ITEM						
	<p>1. Remove oil pan. Refer to AT-277.</p> <p>2. Check the following items:</p> <ul style="list-style-type: none"> <li>● A/T fluid temperature sensor</li> </ul> <p>i. Check resistance between two terminals while changing temperature as shown below.</p> <div>  <table border="1"> <thead> <tr> <th>Temperature °C (°F)</th><th>Resistance</th></tr> </thead> <tbody> <tr> <td>20 (68)</td><td>Approximately 2.5 kΩ</td></tr> <tr> <td>80 (176)</td><td>Approximately 0.3 kΩ</td></tr> </tbody> </table> </div> <p style="text-align: right;">SAT298F</p> <p>● Harness of terminal harness assembly for short or open</p> <p style="text-align: right;">MTBL0210</p> <p style="text-align: center;"><b>OK or NG</b></p>	Temperature °C (°F)	Resistance	20 (68)	Approximately 2.5 kΩ	80 (176)	Approximately 0.3 kΩ
Temperature °C (°F)	Resistance						
20 (68)	Approximately 2.5 kΩ						
80 (176)	Approximately 0.3 kΩ						
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)
	<p>⊗ <b>Without CONSULT-II</b></p> <p>1. Start engine.</p> <p>2. Check voltage between TCM harness connector F50 terminal 47 (G) and ground while warming up A/T.</p> <div>  </div> <p style="text-align: right;">SAT354JB</p> <p><b>Voltage:</b>  Cold [20°C (68°F)] → Hot [80°C (176°F)]:  Approximately 1.5V → 0.5V</p> <p>3. Turn ignition switch to OFF position.</p> <p>4. Disconnect TCM harness connector.</p> <p>5. Check resistance between TCM harness connector F50 terminal 42 (B) and ground. Refer to wiring diagram — AT — BA/FTS.</p> <p><b>Continuity should exist.</b></p> <p style="text-align: center;"><b>OK or NG</b></p>
OK	▶ GO TO 10.
NG	▶ GO TO 9.



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

Diagnostic Procedure (Cont'd)

9	DETECT MALFUNCTIONING ITEM	
Check the following items: <ul style="list-style-type: none"><li>● Harness for short or open between TCM, ECM and terminal cord assembly (Main harness)</li><li>● Ground circuit for ECM</li></ul> Refer to EC-155, "TROUBLE DIAGNOSIS FOR POWER SUPPLY".		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Repair or replace damaged parts.

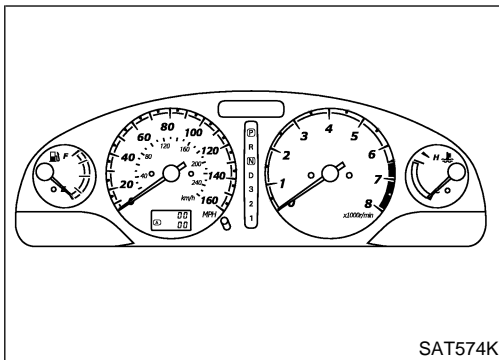
10	CHECK DTC	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-197.		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 11.

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



# DTC VEHICLE SPEED SENSOR-MTR

Description



## Description


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

NFAT0082

## 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	 <p>When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.</p>	Intermittently changes between approx. 0V and approx. 4.5V

## On Board Diagnosis Logic

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.

NFAT0249

## Possible Cause

NFAT0250

Check the following items.

- Harness or connectors (The sensor circuit is open or shorted.)
- Combination meter
- ABS actuator and electric unit (without TCS) or ABS/TCS control unit (with TCS)



# DTC VEHICLE SPEED SENSOR-MTR

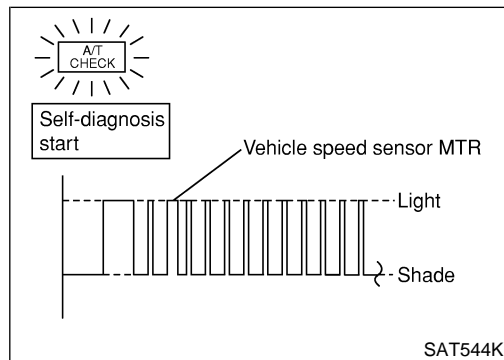
Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

SCIA5358E



## 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-51.



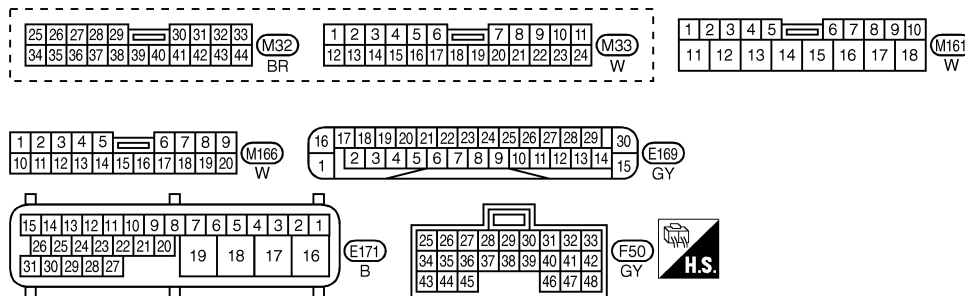
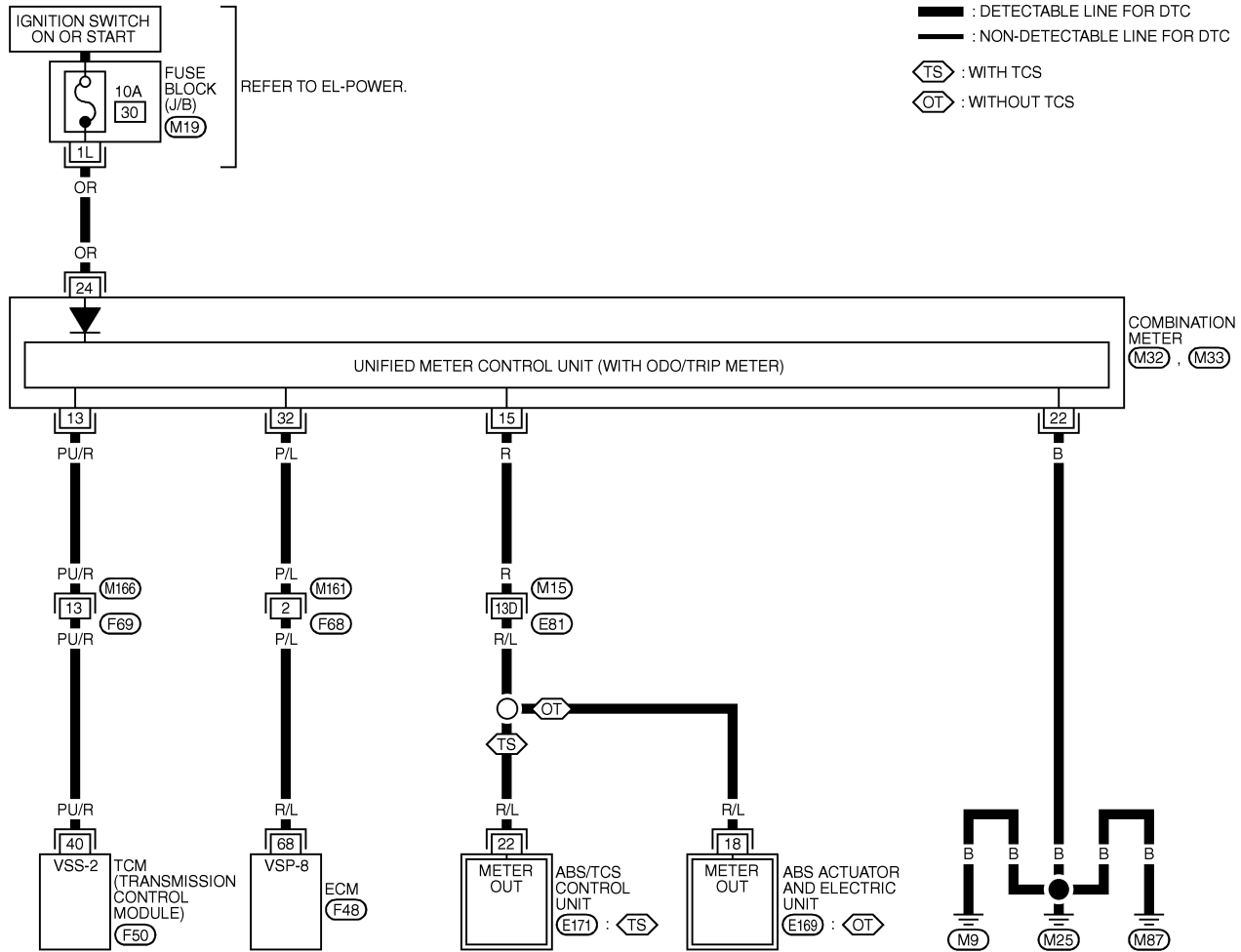
# DTC VEHICLE SPEED SENSOR-MTR

Wiring Diagram — AT — VSSMTR

## Wiring Diagram — AT — VSSMTR

NFAT0083

### AT-VSSMTR-01



REFER TO THE FOLLOWING.

- (M15) - SUPER MULTIPLE JUNCTION (SMJ)
- (M19) - FUSE BLOCK - JUNCTION BOX (J/B)
- (F48) - ELECTRICAL UNITS

MAT282B

TCM TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 25 (B) OR 48 (B) (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)	INTERMITTENTLY CHANGES BETWEEN Approx. 0V AND Approx. 4.5V



# DTC VEHICLE SPEED SENSOR-MTR

Diagnostic Procedure

## Diagnostic Procedure

NFAT0084

### 1 CHECK INPUT SIGNAL

#### With CONSULT-II

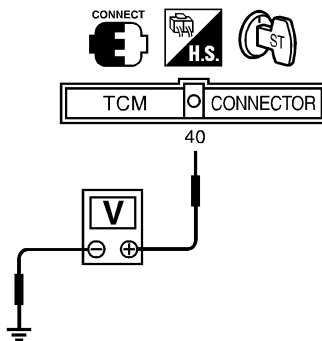
1. Start engine.
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "VHCL/S SE-MTR" while driving.  
Check the value changes according to driving speed.

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 harness connector F50 terminal 40 (PU/R) and ground while driving at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.



SAT356JB

Voltage:  
0V

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

### 2 DETECT MALFUNCTIONING ITEM

Check the following items:

- Combination meter  
Refer to EL-117, "METERS AND GAUGES".
- Harness for short or open between TCM and combination meter
- ABS actuator and electric unit (without TCS) or ABS/TCS control unit (with TCS)  
Refer to BR-48, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" (Without TCS) or BR-95, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" (With TCS).
- Harness for short or open between combination meter and ABS actuator and electric unit (without TCS), or ABS/TCS control unit (with TCS).

OK or NG

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



# DTC VEHICLE SPEED SENSOR-MTR

Diagnostic Procedure (Cont'd)

<b>3</b>	<b>CHECK DTC</b>	
Perform Diagnostic Trouble Code (DTC) confirmation procedure, AT-204.		
<b>OK or NG</b>		
OK	▶	<b>INSPECTION END</b>
NG	▶	GO TO 4.

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

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**AT**

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IDX



# DTC U1000 CAN COMMUNICATION LINE

## Description

### Description

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

NFAT0252

### TCM TERMINALS AND REFERENCE VALUE

NFAT0252S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
5	L	CAN (high)	—	—	—
6	R	CAN (low)	—	—	—

\*: This terminal is connected to the ECM.

### On Board Diagnosis Logic

Diagnostic trouble code CAN COMM CIRCUIT or U1000 with CONSULT-II or 12th judgement flicker without CONSULT-II is detected when the ECM-A/T communication line is open or shorted.

NFAT0253

### Possible Cause

Check harness or connector.  
(CAN communication line is open or shorted.)

NFAT0254



# DTC U1000 CAN COMMUNICATION LINE

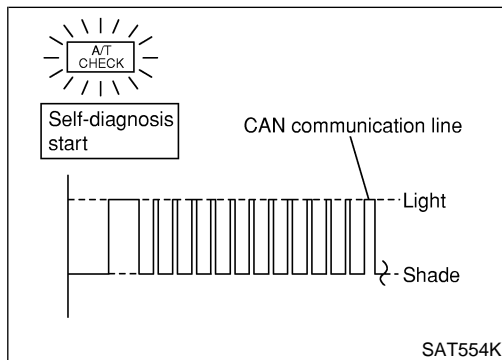
Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

SCIA5358E



## Diagnostic Trouble Code (DTC) Confirmation Procedure

After the repair, perform the following procedure to confirm the malfunction is eliminated. NFAT0255

### WITH CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- 3) Wait at least 6 seconds or start engine and wait for at least 6 seconds.

### WITHOUT CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Wait at least 6 seconds or start engine and wait at least 6 seconds.
- 3) Perform self-diagnosis.  
Refer to TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS), AT-51.

GI

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# DTC U1000 CAN COMMUNICATION LINE

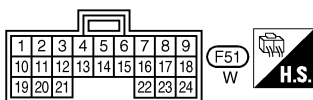
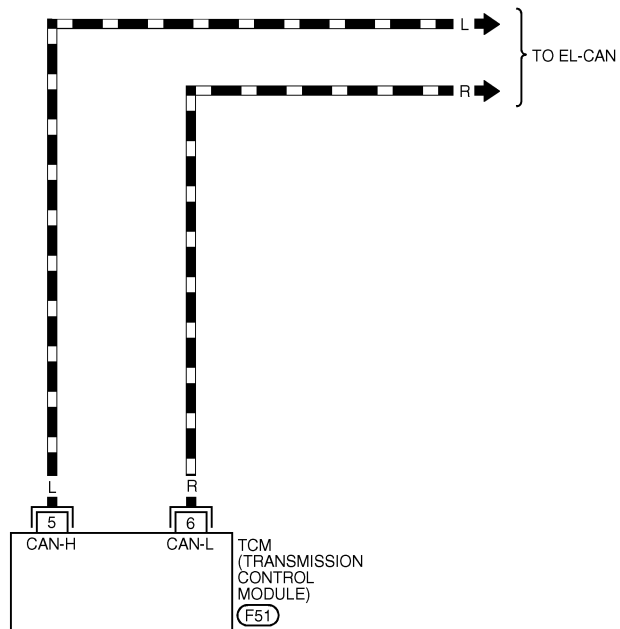
Wiring Diagram — AT — CAN

## Wiring Diagram — AT — CAN

NFAT0256

AT-CAN-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- ▬ : DATA LINE



MAT266B



# DTC U1000 CAN COMMUNICATION LINE

Wiring Diagram — AT — CAN (Cont'd)


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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC) (Approx.)
5	L	CAN (HIGH)	—	0V
6	R	CAN (LOW)	—	0V

SAT594KA

## Diagnostic Procedure

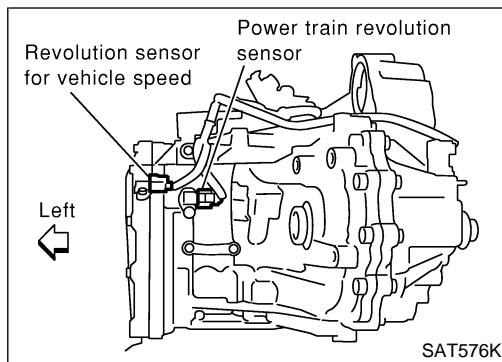
NFAT0257

1	<b>CHECK CAN COMMUNICATION CIRCUIT</b>																													
<p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"><li>Turn ignition switch to "ON" position. (Do not start engine.)</li><li>Select "SELF-DIAG RESULTS" mode for "A/T" with CONSULT-II.</li><li>The "CAN COMM CIRCUIT" is detected.</li></ol> <div><table><tr><td colspan="4">SELF-DIAG RESULTS</td></tr><tr><td colspan="4">DTC RESULTS</td></tr><tr><td colspan="4">CAN COMM CIRCUIT [U1000]</td></tr><tr><td colspan="4"></td></tr><tr><td colspan="4"></td></tr><tr><td colspan="2">ERASE</td><td colspan="2">PRINT</td></tr><tr><td>MODE</td><td>BACK</td><td>LIGHT</td><td>COPY</td></tr></table></div> <p>PCIA0061E</p>			SELF-DIAG RESULTS				DTC RESULTS				CAN COMM CIRCUIT [U1000]												ERASE		PRINT		MODE	BACK	LIGHT	COPY
SELF-DIAG RESULTS																														
DTC RESULTS																														
CAN COMM CIRCUIT [U1000]																														
ERASE		PRINT																												
MODE	BACK	LIGHT	COPY																											
<b>Yes or No?</b>																														
Yes	▶	Print out CONSULT-II screen, go to EL-430 and EL-436, "CAN SYSTEM".																												
No	▶	INSPECTION END																												



# DTC POWER TRAIN REVOLUTION SENSOR

## Description



## Description



NFAT0272

The power train revolution sensor detects forward clutch drum rpm (revolutions per minute). It is located on the input side of the automatic transmission. The vehicle speed sensor A/T (Revolution sensor) is located on the output side of the automatic transmission. With the two sensors, input and output shaft rpms are accurately detected. The result is optimal shift timing during deceleration and improved shifting.

## TCM TERMINALS AND REFERENCE VALUE



NFAT0272S01

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
38	PU	Power train revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 <b>CAUTION:</b> Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	240 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
42	B	Sensor ground		—	0V

## On Board Diagnosis Logic

NFAT0279

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
 : TURBINE REV	TCM does not receive the proper voltage signal from the sensor.	<ul style="list-style-type: none"> <li>• Harness or connectors (The sensor circuit is open or shorted.)</li> <li>• Power train revolution sensor</li> </ul>
 : 10th judgement flicker		



# DTC POWER TRAIN REVOLUTION SENSOR

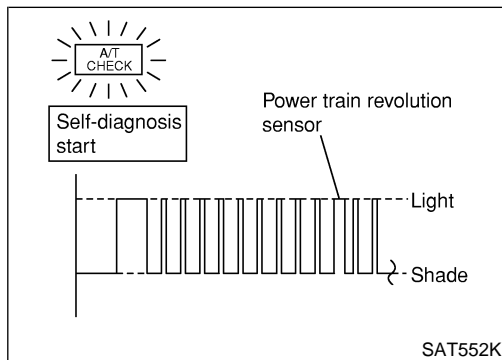
Diagnostic Trouble Code (DTC) Confirmation Procedure

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

SCIA5358E



## Diagnostic Trouble Code (DTC) Confirmation Procedure

=NFAT0277

### CAUTION:

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

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

### WITH CONSULT-II

NFAT0277S01

- Start engine.
- Select “DATA MONITOR” mode for “A/T” with CONSULT-II.
- Drive vehicle under the following conditions:  
Selector lever in “D”, vehicle speed higher than 40 km/h (25 MPH), engine speed higher than 1,500 rpm, throttle opening greater than 1.0/8 of the full throttle position and driving for more than 5 seconds.

### NO TOOLS

NFAT0277S02

- Start engine.
- Drive vehicle under the following conditions:  
Selector lever in “D”, vehicle speed higher than 40 km/h (25 MPH), engine speed higher than 1,500 rpm, throttle opening greater than 1.0/8 of the full throttle position and driving for more than 5 seconds.
- Perform self-diagnosis.  
Refer to “TCM SELF-DIAGNOSTIC PROCEDURE (No Tools)”, AT-51.



# DTC POWER TRAIN REVOLUTION SENSOR

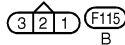
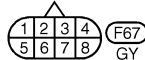
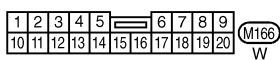
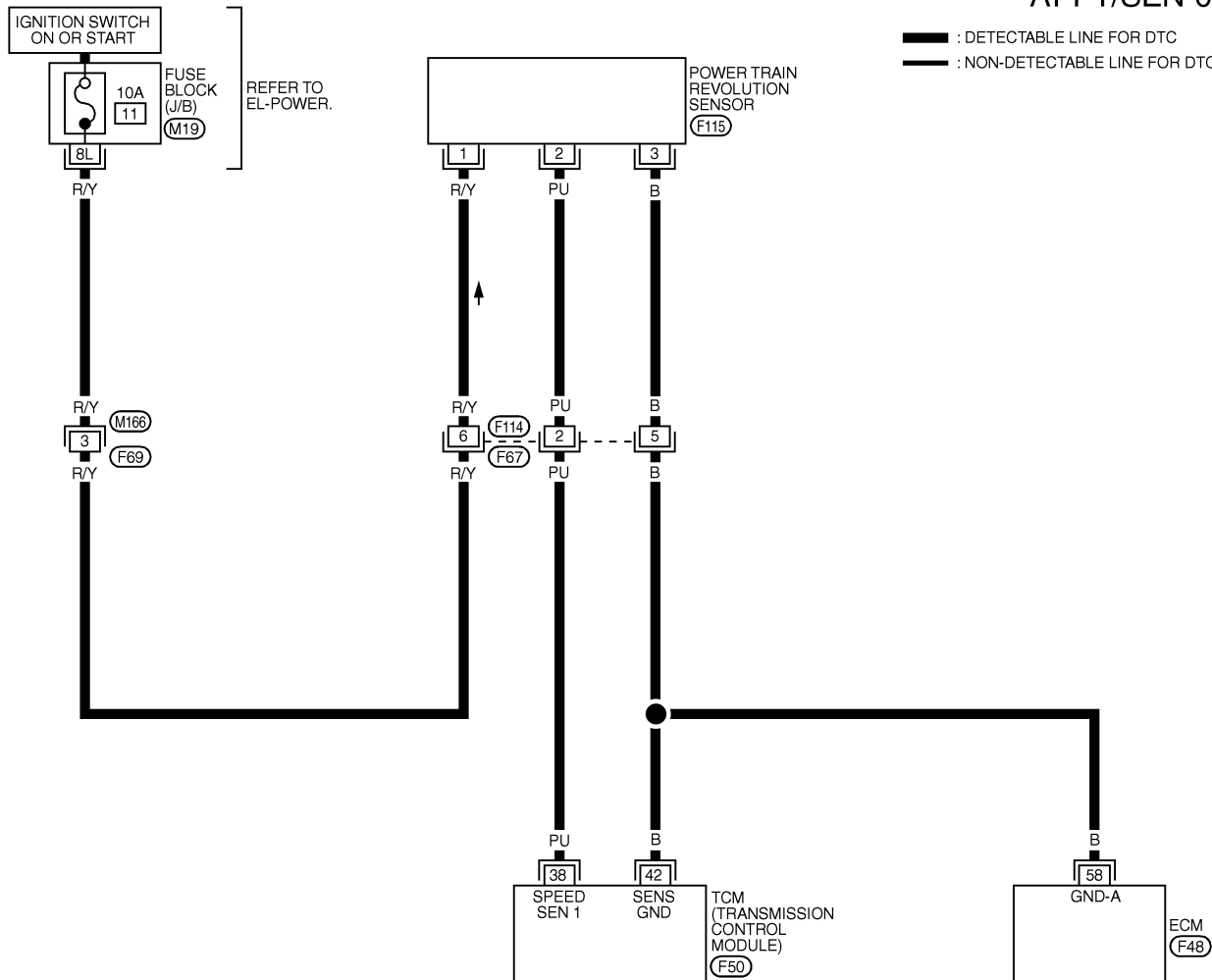
Wiring Diagram — AT — P/T SEN-01

## Wiring Diagram — AT — P/T SEN-01

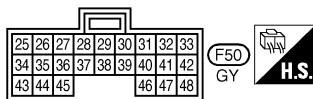
NFAT0276

### AT-PT/SEN-01

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



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



MAT075B

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


TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)(Approx.)
38	PU	POWER TRAIN 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. WHEN VEHICLE PARKS.	240 Hz UNDER 1.3V OR OVER 4.5V 0V
42	B	SENSOR GROUND	—	0V


SAT595KA



## Diagnostic Procedure

NFAT0274

<b>1</b>	<b>CHECK INPUT SIGNAL</b>															
<p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Start engine.</li> <li>Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.</li> <li>Read out the value of "TURBINE REV". Check the value changes according to engine speed.</li> </ol> <p><b>NOTE:</b> "TURBINE REV" in "TCM INPUT SIGNALS" means power train revolution sensor.</p> <table border="1"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITORING</th> <th></th> </tr> </thead> <tbody> <tr> <td>ENGINE SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>TURBINE REV</td> <td>XXX rpm</td> </tr> <tr> <td>OVERDRIVE SW</td> <td>ON</td> </tr> <tr> <td>PN POSI SW</td> <td>OFF</td> </tr> <tr> <td>R POSITION SW</td> <td>OFF</td> </tr> </tbody> </table> <p style="text-align: right;">SAT740J</p> <p style="text-align: center;"><b>OK or NG</b></p>			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																
ENGINE SPEED	XXX rpm															
TURBINE REV	XXX rpm															
OVERDRIVE SW	ON															
PN POSI SW	OFF															
R POSITION SW	OFF															
OK	▶	GO TO 3.														
NG	▶	GO TO 2.														

<b>2</b>	<b>CHECK REVOLUTION SENSOR (With CONSULT-II)</b>							
<p> <b>With CONSULT-II</b></p> <ol style="list-style-type: none"> <li>Start engine.</li> </ol> <table border="1"> <thead> <tr> <th>Condition</th> <th>Judgement standard (Approx.)</th> </tr> </thead> <tbody> <tr> <td>When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. *1 <b>CAUTION:</b> Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.</td> <td>240 Hz</td> </tr> <tr> <td>When vehicle parks.</td> <td>Under 1.3V or over 4.5V</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL1177</p> <p>● Harness for short or open between TCM, ECM and revolution sensor (Main harness)</p> <p style="text-align: center;"><b>OK or NG</b></p>			Condition	Judgement standard (Approx.)	When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. *1 <b>CAUTION:</b> Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	240 Hz	When vehicle parks.	Under 1.3V or over 4.5V
Condition	Judgement standard (Approx.)							
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. *1 <b>CAUTION:</b> Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	240 Hz							
When vehicle parks.	Under 1.3V or over 4.5V							
OK	▶	GO TO 3.						
NG	▶	Repair or replace damaged parts.						

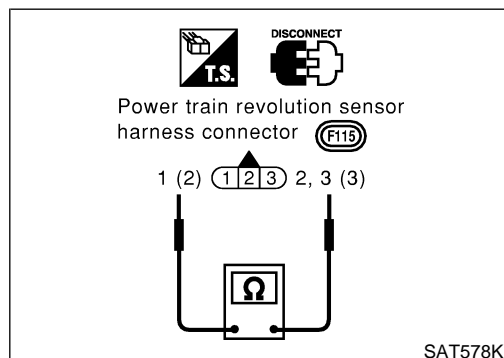
<b>3</b>	<b>CHECK DTC</b>	
Perform "Diagnostic Trouble Code (DTC) confirmation procedure", AT-213.		
<b>OK or NG</b>		
OK	▶	<b>INSPECTION END</b>
NG	▶	GO TO 4.



# DTC POWER TRAIN REVOLUTION SENSOR

Diagnostic Procedure (Cont'd)

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



## Component Inspection

### POWER TRAIN REVOLUTION SENSOR

NFAT0275

NFAT0275S01

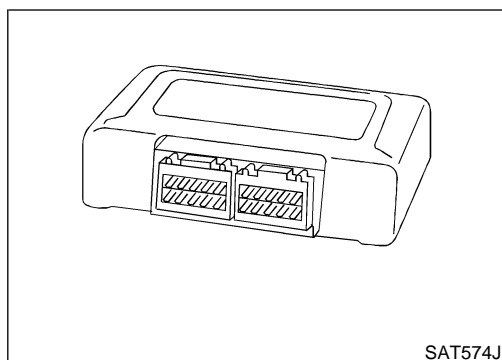
- Check resistance between terminals 1 (R/Y), 2 (PU) and 3 (B).

Terminal No.		Resistance (Approx.)
1 (R/Y)	2 (PU)	No continuity
1 (R/Y)	3 (B)	No continuity
2 (PU)	3 (B)	2.4 - 2.8 kΩ



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

Description



## Description

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

NFAT0085

GI

MA

EM

LC

## On Board Diagnosis Logic

Diagnostic trouble code CONTROL UNIT (RAM), CONTROL UNIT (ROM) with CONSULT-II is detected when TCM memory (RAM) or (ROM).

NFAT0258

EC

FE

CL

MT

## Possible Cause

Check TCM.

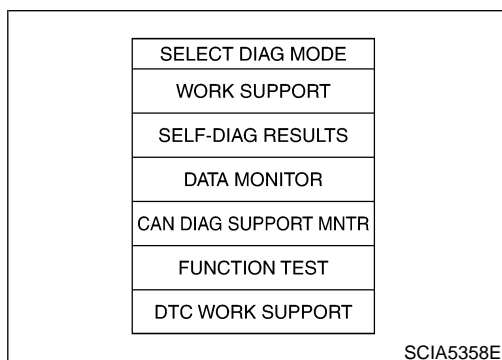
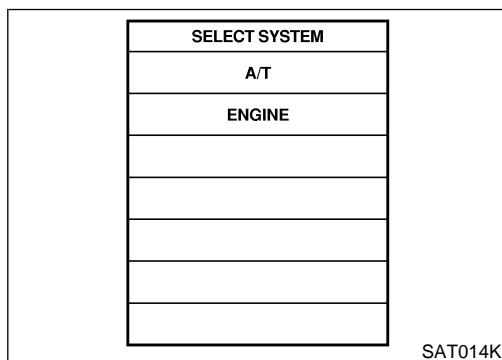
NFAT0269

AT

AX

SU

BR



## Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0259

### 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.

ST

RS

BT

### WITH CONSULT-II

NFAT0259S01

- 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.

HA

SC

EL

IDX



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

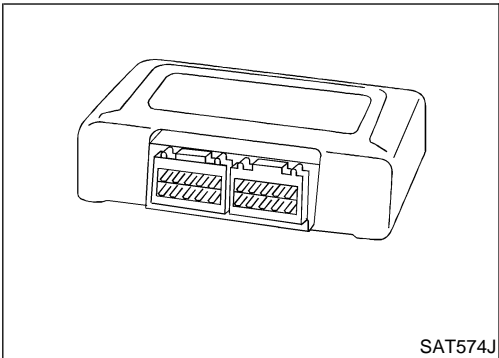
Diagnostic Procedure

## Diagnostic Procedure

NFAT0086

1	INSPECTION START	
<div>Ⓢ With CONSULT-II</div> <div>1. Turn ignition switch ON and select "SELF DIAGNOSIS" mode for A/T with CONSULT-II.</div> <div>2. Touch "ERASE".</div> <div>3. Perform "Diagnostic Trouble Code (DTC) Confirmation Procedure", AT-217.</div> <div>4. Is the "CONTROL UNIT (RAM)" or "CONTROL UNIT (ROM)" displayed again?</div> <div>Yes or No</div>		
Yes	▶	Replace TCM.
No	▶	INSPECTION END





Description

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

NFAT0199

GI

MA

EM

LC

On Board Diagnosis Logic

Diagnostic trouble code CONTROL UNIT (EEP ROM) with CONSULT-II is detected when TCM memory (EEP ROM) is malfunctioning.

NFAT0260

EC

FE

CL

MT

Possible Cause

Check TCM.

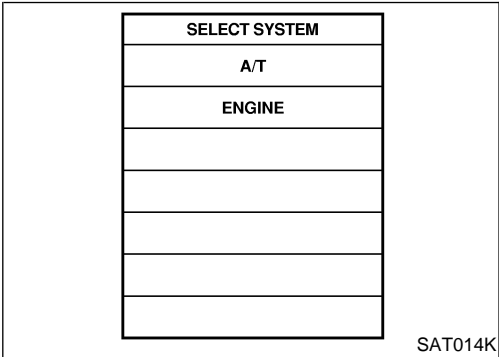
NFAT0270

AT

AX

SU

BR



Diagnostic Trouble Code (DTC) Confirmation Procedure

NFAT0261

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.

ST

RS

BT

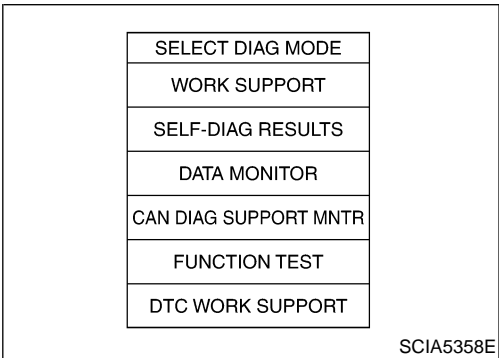
WITH CONSULT-II

NFAT0261S01

- 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.

HA

SC



EL

IDX




# DTC CONTROL UNIT (EEP ROM)

Diagnostic Procedure

## Diagnostic Procedure

=NFAT0200

1	CHECK DTC	
<div> With CONSULT-II</div> <div><div>1. Turn ignition switch “ON” and select “SELF DIAGNOSIS” mode for A/T with CONSULT-II.</div><div>2. Move selector lever to “R” position.</div><div>3. Depress accelerator pedal (Full throttle position).</div><div>4. Touch “ERASE”.</div><div>5. Turn ignition switch to “OFF” position for 10 seconds.</div><div>6. Perform “Diagnostic Trouble Code (DTC) Confirmation Procedure”, AT-219.</div></div>		
Is the “CONT UNIT (EEP ROM)” displayed again?		
Yes	▶	Replace TCM.
No	▶	INSPECTION END



TROUBLE DIAGNOSES FOR SYMPTOMS

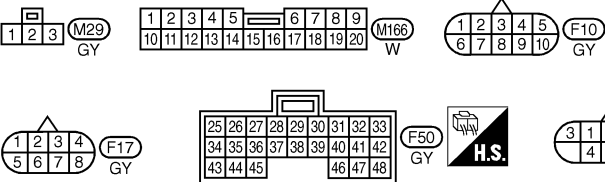
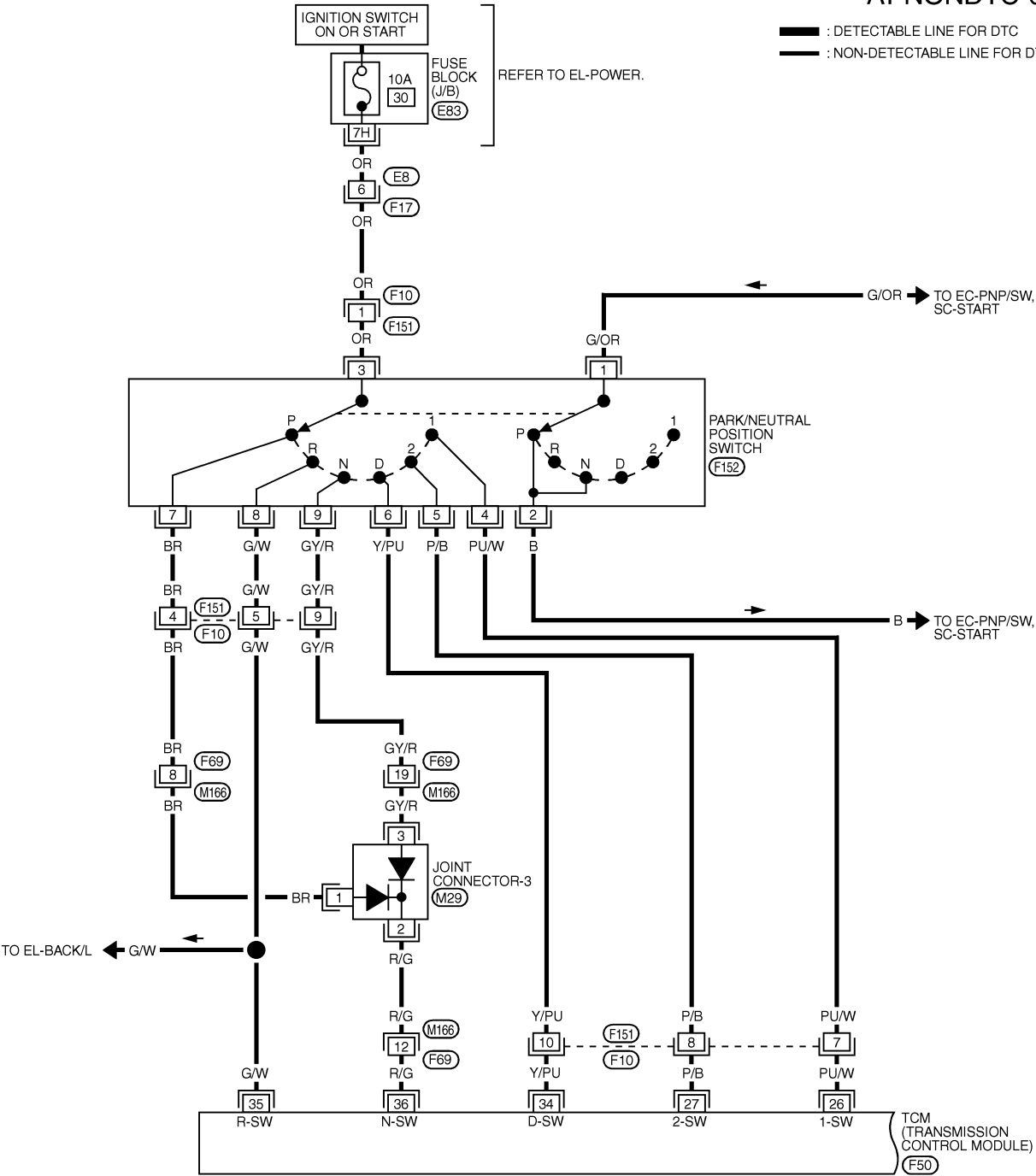
Wiring Diagram — AT — NONDTC

Wiring Diagram — AT — NONDTC

NFAT0087

AT-NONDTC-01

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



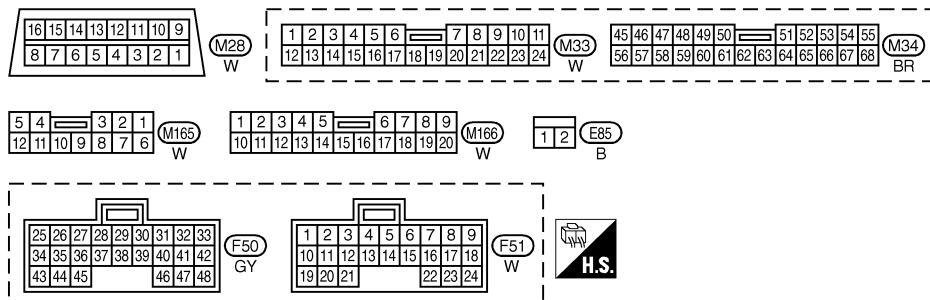
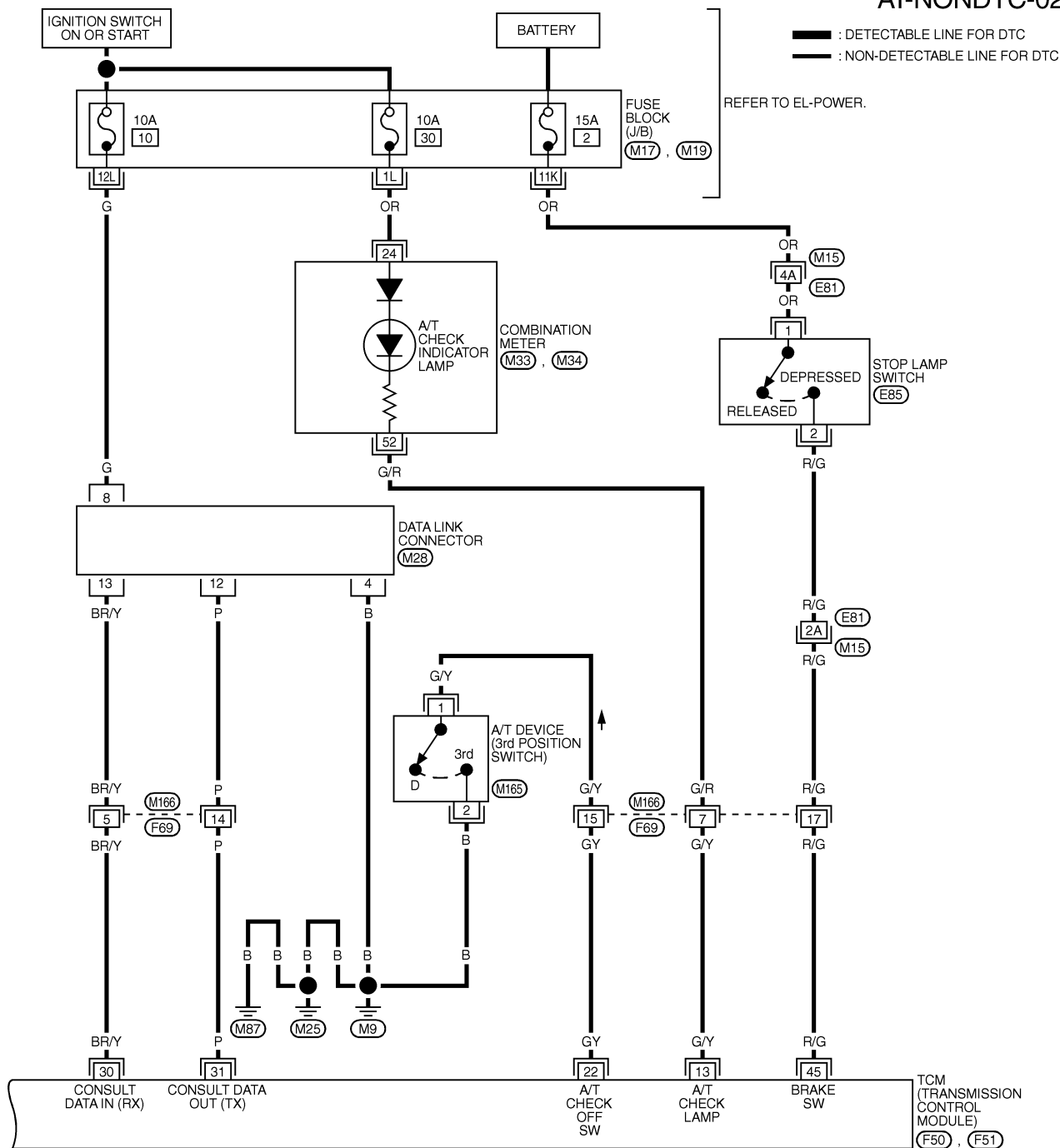
REFER TO THE FOLLOWING.  
(E83) - FUSE BLOCK-JUNCTION BOX (J/B)



# TROUBLE DIAGNOSES FOR SYMPTOMS

Wiring Diagram — AT — NONDTC (Cont'd)

AT-NONDTC-02



REFER TO THE FOLLOWING.  
(M15) - SUPER  
MULTIPLE JUNCTION (SMJ)  
(M17, M19) - FUSE BLOCK-JUNCTION BOX (J/B)

MAT267B



# TROUBLE DIAGNOSES FOR SYMPTOMS




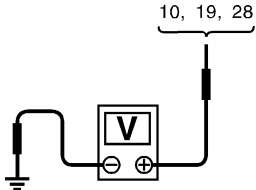
1. A/T CHECK Indicator Lamp Does Not Come On




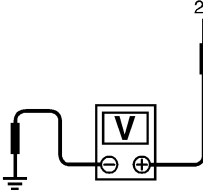
## 1. A/T CHECK Indicator Lamp Does Not Come On

NFAT0088

### SYMPTOM:

A/T CHECK indicator lamp does not come on for about 2 seconds when turning ignition switch to ON.

1	CHECK TCM POWER SOURCE	
<div>1. Turn ignition switch to ON position. (Do not start engine.)</div> <div>2. Check voltage between TCM harness connectors F50, F51 terminals 10 (R/Y), 19 (R/Y), 28 (Y/R) and ground.</div>		
<div><div><div><div>CONNECT</div><div></div></div><div><div>H.S.</div><div></div></div><div><div>ON</div><div></div></div></div><div><div>TCM</div><div>CONNECTOR</div></div><div><div>10, 19, 28</div><div></div></div></div> <div><div>Voltage:</div><div>Battery voltage</div></div>		
OK or NG		
OK	▶	GO TO 2.
NG	▶	GO TO 3.

2	CHECK POWER SOURCE STEP 2	
<div>1. Turn ignition switch to OFF position.</div> <div>2. Check voltage between TCM harness connector F50 terminal 28 (Y/R) and ground.</div> <div><div><div><div>CONNECT</div><div></div></div><div><div>H.S.</div><div></div></div><div><div>OFF</div><div></div></div></div><div><div>TCM</div><div>○</div><div>CONNECTOR</div></div><div>28</div><div></div><div><div>Voltage:</div><div>Battery voltage</div></div><div>OK or NG</div><div>SAT612JG</div></div>		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING ITEM	
Check the following items: <ul style="list-style-type: none"><li>● Harness for short or open between ignition switch and TCM (Main harness) Refer to “Wiring Diagram — AT — MAIN” in AT-101.</li><li>● Ignition switch and fuse Refer to EL-10, “POWER SUPPLY ROUTING”.</li></ul>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.







# TROUBLE DIAGNOSES FOR SYMPTOMS

1. A/T CHECK Indicator Lamp Does Not Come On (Cont'd)

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.

GI

MA

EM

LC

EC

FE

CL

MT

**AT**

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX



## TROUBLE DIAGNOSES FOR SYMPTOMS



### 2. Engine Cannot Be Started In P and N Position

#### 2. Engine Cannot Be Started In P and N Position

=NFAT0089

##### 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	<b>CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT</b>	
<div><div></div><div><b>With CONSULT-II</b></div></div> <div>Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?</div>		
<div><div></div><div><b>Without CONSULT-II</b></div></div> <div>Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?</div> <div><div><div>A/T CHECK</div><div>Self-diagnosis start</div><div><div><div></div><div>Light</div></div><div><div></div><div>Shade</div></div></div></div></div>		
SAT555K		
<b>Yes or No</b>		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to “DTC P0705”, AT-104.
No	▶	GO TO 2.

2	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH	
Check for short or open of park/neutral position (PNP) switch harness connector F152 terminals 1 (G/OR) and 2 (B). Refer to AT-106.		
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-10, "System Description".		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Repair or replace damaged parts.



TROUBLE DIAGNOSES FOR SYMPTOMS

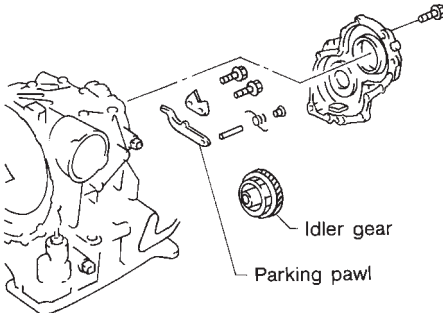
3. In P Position, Vehicle Moves Forward or Backward When Pushed

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

=NFAT0090

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-283, 357.		
<div></div>		
OK or NG		
OK	▶	INSPECTION END
NG	▶	Repair or replace damaged parts.



# TROUBLE DIAGNOSES FOR SYMPTOMS



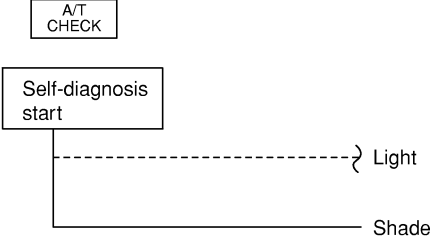
## 4. In N Position, Vehicle Moves

### 4. In N Position, Vehicle Moves

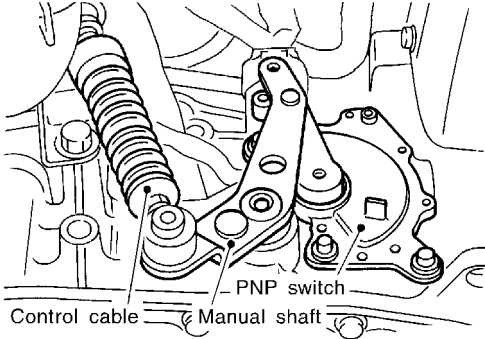
=NFAT0091

#### SYMPTOM:

Vehicle moves forward or backward when selecting N position.

<b>1</b>	<b>CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT</b>	
<p> <b>With CONSULT-II</b> Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?</p>		
<p> <b>Without CONSULT-II</b> Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?</p>		
<div style="text-align: center;">  </div>		
SAT555K		
<b>Yes or No</b>		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to "DTC P0705", AT-104.
No	▶	GO TO 2.


<b>2</b>	<b>CHECK CONTROL LINKAGE</b>	
Check control cable. Refer to AT-279.		
<b>OK or NG</b>		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

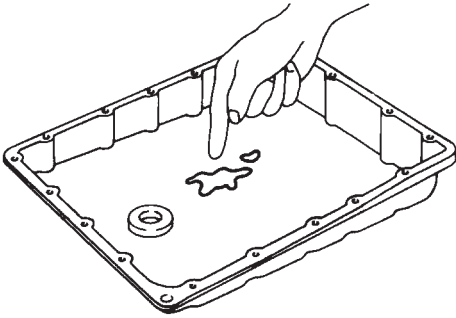
<b>3</b>	<b>ADJUST CONTROL CABLE</b>	
Adjust control cable.		
		
SAT023JA		
	▶	Refer to AT-279.



# TROUBLE DIAGNOSES FOR SYMPTOMS

4. In N Position, Vehicle Moves (Cont'd)

<b>4</b>	<b>CHECK A/T FLUID LEVEL</b>	
Check A/T fluid level again.		
		
SAT638A		
<b>OK or NG</b>		
OK	▶	GO TO 5.
NG	▶	Refill ATF.

<b>5</b>	<b>CHECK A/T FLUID CONDITION</b>	
1. Remove oil pan. 2. Check A/T fluid condition.		
		
SAT171B		
<b>OK or NG</b>		
OK	▶	GO TO 7.
NG	▶	GO TO 6.

<b>6</b>	<b>DETECT MALFUNCTIONING ITEM</b>	
1. Disassemble A/T. 2. Check the following items: <ul style="list-style-type: none"> <li>● Forward clutch assembly</li> <li>● Overrun clutch assembly</li> <li>● Reverse clutch assembly</li> </ul>		
<b>OK or NG</b>		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

<b>7</b>	<b>CHECK SYMPTOM</b>	
Check again.		
<b>OK or NG</b>		
OK	▶	<b>INSPECTION END</b>
NG	▶	GO TO 8.

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX



## TROUBLE DIAGNOSES FOR SYMPTOMS

### 4. In N Position, Vehicle Moves (Cont'd)

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



### 5. Large Shock. $N \rightarrow R$ Position

*=NFAT0092*

GI

MA

## EM

LC



FE

CL

MT

**AT**

## AX

SU

BR

## ST

RS



HA

SC

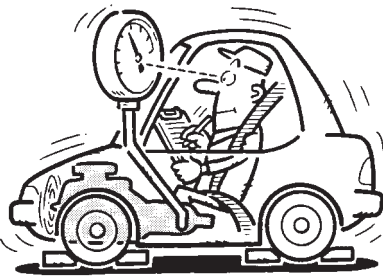
EL

# INDEX



## TROUBLE DIAGNOSES FOR SYMPTOMS

### 5. 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-67.		
		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM	
<div>1. Remove control valve assembly. Refer to AT-277.</div> <div>2. Check the following items:</div> <div><div>● Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)</div><div>● Line pressure solenoid valve</div></div>		
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.



TROUBLE DIAGNOSES FOR SYMPTOMS


6. Vehicle Does Not Creep Backward In R Position

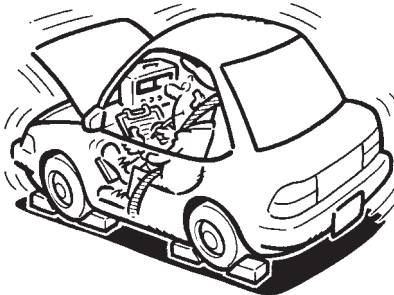
6. Vehicle Does Not Creep Backward In R Position

=NFA70093

SYMPTOM:

Vehicle does not creep backward when selecting R position.

1	CHECK A/T FLUID LEVEL	
Check A/T fluid level again.		
		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Refill ATF.

2	CHECK STALL REVOLUTION	
Check stall revolution with selector lever in 1st and R positions.		
		
OK or NG		
OK (Refer to “Stall test”, AT-63.)	▶	GO TO 5.
OK in 1st position, NG in R position	▶	GO TO 3.
NG in both 1st and R positions	▶	GO TO 4.

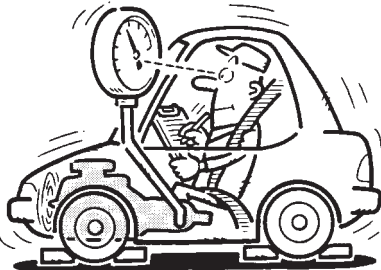


## TROUBLE DIAGNOSES FOR SYMPTOMS

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

3 DETECT MALFUNCTIONING ITEM		
1. Remove control valve assembly. Refer to "ON-VEHICLE SERVICE", AT-277. 2. Check the following items: <ul style="list-style-type: none"> <li>● Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)</li> <li>● Line pressure solenoid valve</li> </ul> 3. Disassemble A/T. 4. Check the following items: <ul style="list-style-type: none"> <li>● Oil pump assembly</li> <li>● Torque converter</li> <li>● Reverse clutch assembly</li> <li>● High clutch assembly</li> </ul>		
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-277. 2. Check the following items: <ul style="list-style-type: none"> <li>● Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)</li> <li>● Line pressure solenoid valve</li> </ul> 3. Disassemble A/T. 4. Check the following items: <ul style="list-style-type: none"> <li>● Oil pump assembly</li> <li>● Torque converter</li> <li>● Reverse clutch assembly</li> <li>● High clutch assembly</li> <li>● Low &amp; reverse brake assembly</li> <li>● Low one-way clutch</li> </ul>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace damaged parts.

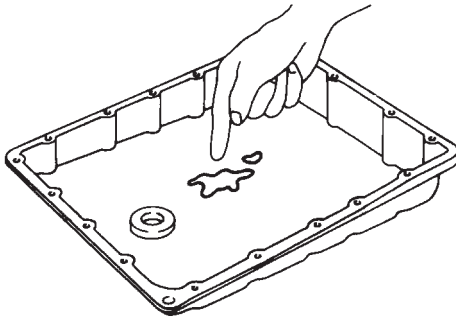
5 CHECK LINE PRESSURE		
Check line pressure at idle with selector lever in R position. Refer to "LINE PRESSURE TEST", AT-67.		
		
SAT494G		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 6.



# TROUBLE DIAGNOSES FOR SYMPTOMS

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

6	DETECT MALFUNCTIONING ITEM	
<div>1. Remove control valve assembly. Refer to “ON-VEHICLE SERVICE”, AT-277.</div> <div>2. Check the following items:</div> <div><div>● Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)</div><div>● Line pressure solenoid valve</div></div> <div>3. Disassemble A/T.</div> <div>4. Check the following item:</div> <div><div>● Oil pump assembly</div></div>		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

7	CHECK A/T FLUID CONDITION	
<div>1. Remove oil pan.</div> <div>2. Check A/T fluid condition.</div> <div></div> <div>SAT171B</div>		
OK or NG		
OK	▶	GO TO 9.
NG	▶	GO TO 8.

8	DETECT MALFUNCTIONING ITEM	
<div>1. Remove control valve assembly. Refer to “ON-VEHICLE SERVICE”, AT-277.</div> <div>2. Check the following items:<ul style="list-style-type: none"><li>● Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)</li><li>● Line pressure solenoid valve</li></ul></div> <div>3. Disassemble A/T.</div> <div>4. Check the following items:<ul style="list-style-type: none"><li>● Oil pump assembly</li><li>● Torque converter</li><li>● Reverse clutch assembly</li><li>● High clutch assembly</li><li>● Low &amp; reverse brake assembly</li><li>● Low one-way clutch</li></ul></div> <div>OK or NG</div>		
OK	▶	GO TO 9.
NG	▶	Repair or replace damaged parts.



## TROUBLE DIAGNOSES FOR SYMPTOMS

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

<b>9</b>	<b>CHECK SYMPTOM</b>
Check again.	
OK or NG	
OK	▶ <b>INSPECTION END</b>
NG	▶ GO TO 10.

<b>10</b>	<b>CHECK TCM INSPECTION</b>
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	▶ <b>INSPECTION END</b>
NG	▶ Repair or replace damaged parts.



TROUBLE DIAGNOSES FOR SYMPTOMS


7. Vehicle Does Not Creep Forward in D, 2nd or 1st Position

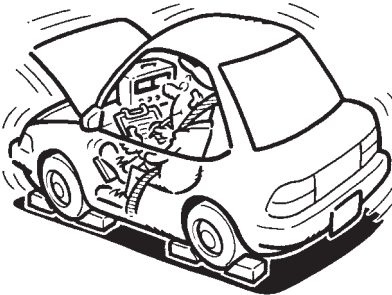
7. Vehicle Does Not Creep Forward in D, 2nd or 1st Position

=NFA70094

SYMPTOM:

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

1	CHECK A/T FLUID LEVEL	
Check A/T fluid level again.		
<div></div>		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Refill ATF.

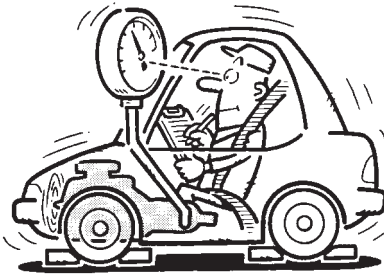
2	CHECK STALL REVOLUTION	
Check stall revolution with selector lever in D position. Refer to "STALL TEST", AT-63.		
		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.



## TROUBLE DIAGNOSES FOR SYMPTOMS

### 7. Vehicle Does Not Creep Forward in D, 2nd or 1st Position (Cont'd)

<b>3</b>	<b>DETECT MALFUNCTIONING ITEM</b>
1. Remove control valve assembly. Refer to AT-277. 2. Check the following items: <ul style="list-style-type: none"> <li>● Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)</li> <li>● Line pressure solenoid valve</li> </ul> 3. Disassemble A/T. 4. Check the following items: <ul style="list-style-type: none"> <li>● Oil pump assembly</li> <li>● Forward clutch assembly</li> <li>● Forward one-way clutch</li> <li>● Low one-way clutch</li> <li>● Low &amp; reverse brake assembly</li> <li>● Torque converter</li> </ul>	
<b>OK or NG</b>	
OK	▶ GO TO 4.
NG	▶ Repair or replace damaged parts.

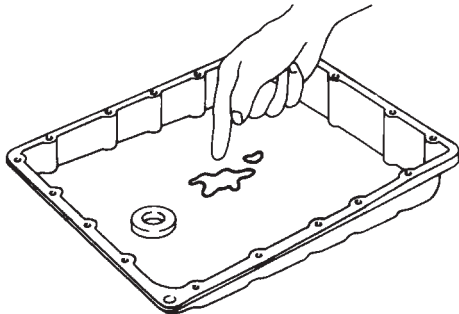
<b>4</b>	<b>CHECK LINE PRESSURE</b>
Check line pressure at idle with selector lever in D position. Refer to "LINE PRESSURE TEST", AT-67.	
	
SAT494G	
<b>OK or NG</b>	
OK	▶ GO TO 6.
NG	▶ GO TO 5.

<b>5</b>	<b>DETECT MALFUNCTIONING ITEM</b>
1. Remove control valve assembly. Refer to AT-277. 2. Check the following items: <ul style="list-style-type: none"> <li>● Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)</li> <li>● Line pressure solenoid valve</li> </ul> 3. Disassemble A/T. 4. Check the following item: <ul style="list-style-type: none"> <li>● Oil pump assembly</li> </ul>	
<b>OK or NG</b>	
OK	▶ GO TO 6.
NG	▶ Repair or replace damaged parts.



# TROUBLE DIAGNOSES FOR SYMPTOMS

7. Vehicle Does Not Creep Forward in D, 2nd or 1st Position (Cont'd)

6	CHECK A/T FLUID CONDITION	
<div>1. Remove oil pan.</div> <div>2. Check A/T fluid condition.</div>		
<div></div>		
SAT171B		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING ITEM	
<div>1. Remove control valve assembly. Refer to AT-277.</div> <div>2. Check the following items:<div><div>● Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)</div><div>● Line pressure solenoid valve</div></div></div> <div>3. Disassemble A/T.</div> <div>4. Check the following items:<div><div>● Oil pump assembly</div><div>● Forward clutch assembly</div><div>● Forward one-way clutch</div><div>● Low one-way clutch</div><div>● Low &amp; reverse brake assembly</div><div>● Torque converter</div></div></div> <div>OK or NG</div>		
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.



# TROUBLE DIAGNOSES FOR SYMPTOMS

## 8. Vehicle Cannot Be Started From D<sub>1</sub>

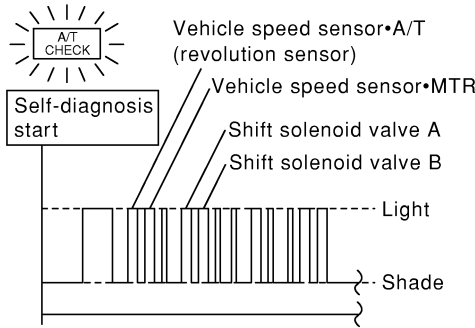
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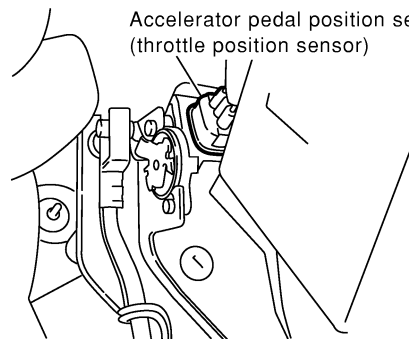
### 8. Vehicle Cannot Be Started From D<sub>1</sub>

#### SYMPTOM:

Vehicle cannot be started from D<sub>1</sub> on Cruise test — Part 1.

<b>1</b>	<b>CHECK SYMPTOM</b>
Is "6. Vehicle Does Not Creep Backward In R Position" OK?	
<b>Yes or No</b>	
Yes	▶ GO TO 2.
No	▶ Go to "6. Vehicle Does Not Creep Backward In R Position", AT-233.

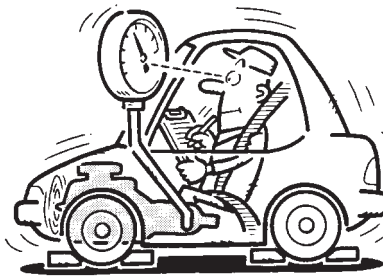
<b>2</b>	<b>CHECK SELF-DIAGNOSTIC RESULTS</b>
Does self-diagnosis show damage to vehicle speed sensor-A/T (revolution sensor), shift solenoid valve A, B or vehicle speed sensor-MTR after cruise test?	
 <p style="text-align: right;">SAT583K</p>	
<b>Yes or No</b>	
Yes	▶ Check damaged circuit. Refer to "DTC P0720, P0750, P0755 or VHCL SPEED SEN-MTR", AT-116, 174, 179 or 203.
No	▶ GO TO 3.

<b>3</b>	<b>CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)</b>
Check accelerator pedal position sensor (throttle position sensor). Refer to EC-302, "DTC P0226 APP SENSOR (throttle position sensor)".	
 <p style="text-align: right;">SAT516KA</p>	
<b>OK or NG</b>	
OK	▶ GO TO 4.
NG	▶ Repair or replace accelerator pedal position sensor (throttle position sensor).



# TROUBLE DIAGNOSES FOR SYMPTOMS

8. Vehicle Cannot Be Started From D<sub>1</sub> (Cont'd)

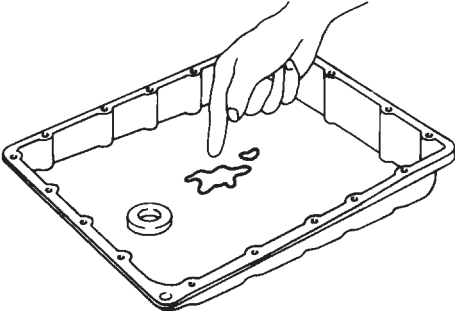
4	CHECK LINE PRESSURE	
Check line pressure at stall point with selector lever in D position. Refer to "LINE PRESSURE TEST", AT-67.		
		
SAT494G		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM	
<div>1. Remove control valve assembly. Refer to AT-277.</div> <div>2. Check the following items:<ul style="list-style-type: none"><li>● Shift valve A</li><li>● Shift valve B</li><li>● Shift solenoid valve A</li><li>● Shift solenoid valve B</li><li>● Pilot valve</li><li>● Pilot filter</li></ul></div> <div>3. Disassemble A/T.</div> <div>4. Check the following items:<ul style="list-style-type: none"><li>● Forward clutch assembly</li><li>● Forward one-way clutch</li><li>● Low one-way clutch</li><li>● High clutch assembly</li><li>● Torque converter</li><li>● Oil pump assembly</li></ul></div> <div>OK or NG</div>		
OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.



# TROUBLE DIAGNOSES FOR SYMPTOMS

## 8. Vehicle Cannot Be Started From D<sub>1</sub> (Cont'd)

6	CHECK A/T FLUID CONDITION	
<div>1. Remove oil pan.</div> <div>2. Check A/T fluid condition.</div>		
<div></div>		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 5.

SAT171B

7	DETECT MALFUNCTIONING ITEM	
<div>1. Remove control valve assembly. Refer to AT-277.</div> <div>2. Check the following items:</div> <div><ul style="list-style-type: none"><li>● Shift valve A</li><li>● Shift valve B</li><li>● Shift solenoid valve A</li><li>● Shift solenoid valve B</li><li>● Pilot valve</li><li>● Pilot filter</li></ul></div> <div>OK or NG</div>		
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.



# TROUBLE DIAGNOSES FOR SYMPTOMS

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

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

=NFAT0096

### SYMPTOM:

A/T does not shift from  $D_1$  to  $D_2$  at the specified speed.

A/T does not shift from  $D_4$  to  $D_2$  when depressing accelerator pedal fully at the specified speed.

1	CHECK SYMPTOM	
Are “7. Vehicle Does Not Creep Forward In D, 2nd Or 1st Position” and “8. Vehicle Cannot Be Started From D <sub>1</sub> ” OK?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Go to “7. Vehicle Does Not Creep Forward In D, 2nd Or 1st Position” and “8. Vehicle Cannot Be Started From D <sub>1</sub> ”, AT-237, AT-240.

2	CHECK SELF-DIAGNOSTIC RESULTS	
<div><div><div><div><div><div></div><div>With CONSULT-II</div></div><div>Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?</div></div></div><div><div><div><div><div><div></div><div>Without CONSULT-II</div></div><div>Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?</div></div></div><div><div><div><div><div><div>A/T CHECK</div></div><div><div><div>Self-diagnosis start</div><div><div><div><div></div><div>Light</div></div><div><div><div></div><div>Shade</div></div></div></div></div></div></div></div></div></div></div></div></div></div></div>		
SAT555K		
Yes or No		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to "DTC P0705", AT-104.
No	▶	GO TO 3.

3	CHECK VEHICLE SPEED SENSOR-A/T AND VEHICLE SPEED SENSOR-MTR CIRCUIT	
Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to “DTC P0720 and VHCL SPEED SEN-MTR”, AT-116, AT-203.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.



## TROUBLE DIAGNOSES FOR SYMPTOMS

9. A/T Does Not Shift:  $D_1 \rightarrow D_2$  or Does Not Kickdown:  $D_4 \rightarrow D_2$  (Cont'd)

4	<b>CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)</b>	
	<p>Check accelerator pedal position sensor (throttle position sensor). Refer to EC-302, "DTC P0226 APP SENSOR (throttle position sensor)".</p> <div> <p>Accelerator pedal position sensor (throttle position sensor)</p> </div> <p style="text-align: right;">SAT516KA</p> <p style="text-align: center;"><b>OK or NG</b></p>	
OK	▶	GO TO 5.
NG	▶	Repair or replace accelerator pedal position sensor (throttle position sensor).

5	<b>CHECK A/T FLUID CONDITION</b>	
	<p>1. Remove oil pan. 2. Check A/T fluid condition.</p> <div> </div> <p style="text-align: right;">SAT171B</p> <p style="text-align: center;"><b>OK or NG</b></p>	
OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	<b>DETECT MALFUNCTIONING ITEM</b>	
	<p>1. Remove control valve. Refer to AT-277. 2. Check the following items:</p> <ul style="list-style-type: none"> <li>● Shift valve A</li> <li>● Shift solenoid valve A</li> <li>● Pilot valve</li> <li>● Pilot filter</li> </ul> <p>3. Disassemble A/T. 4. Check the following items:</p> <ul style="list-style-type: none"> <li>● Servo piston assembly</li> <li>● Brake band</li> <li>● Oil pump assembly</li> </ul> <p style="text-align: center;"><b>OK or NG</b></p>	
OK	▶	GO TO 8.
NG	▶	Repair or replace damaged parts.



# TROUBLE DIAGNOSES FOR SYMPTOMS

9. A/T Does Not Shift:  $D_1 \rightarrow D_2$  or Does Not Kickdown:  $D_4 \rightarrow D_2$  (Cont'd)

7	DETECT MALFUNCTIONING ITEM	
<div>1. Remove control valve. Refer to AT-277.</div> <div>2. Check the following items:</div> <div><ul style="list-style-type: none"><li>● Shift valve A</li><li>● Shift solenoid valve A</li><li>● Pilot valve</li><li>● Pilot filter</li></ul></div> <div>OK or NG</div>		
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.

GI

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# TROUBLE DIAGNOSES FOR SYMPTOMS

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



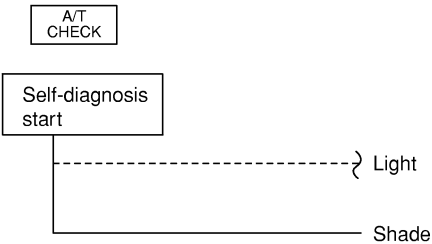
## 10. A/T Does Not Shift: $D_2 \rightarrow D_3$

=NFAT0097

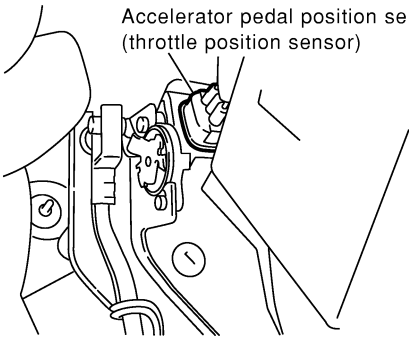
### SYMPTOM:

A/T does not shift from  $D_2$  to  $D_3$  at the specified speed.

<b>1</b>	<b>CHECK SYMPTOM</b>
Are 7. Vehicle Does Not Creep Forward In D, 2nd Or 1st Position and 8. Vehicle Cannot Be Started From $D_1$ OK?	
<b>Yes or No</b>	
Yes	▶ GO TO 2.
No	▶ Go to 7. Vehicle Does Not Creep Forward In D, 2nd Or 1st Position and 8. Vehicle Cannot Be Started From $D_1$ , AT-237, AT-240.

<b>2</b>	<b>CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT</b>
<p> <b>With CONSULT-II</b> Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?</p> <p> <b>Without CONSULT-II</b> Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?</p>	
<div style="text-align: center;">  </div>	
<b>Yes or No</b>	
Yes	▶ Check park/neutral position (PNP) switch circuit. Refer to "DTC P0705", AT-104.
No	▶ GO TO 3.

SAT555K

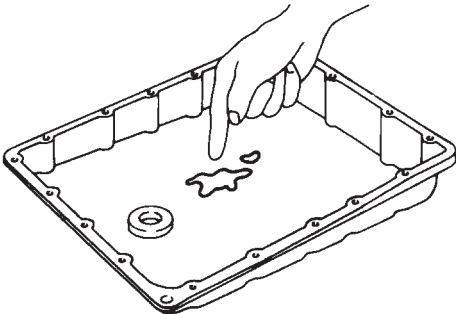
<b>3</b>	<b>CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)</b>
Check accelerator pedal position sensor (throttle position sensor). Refer to EC-302, "DTC P0226 APP SENSOR (throttle position sensor)".	
<div style="text-align: center;">  </div>	
<b>OK or NG</b>	
OK	▶ GO TO 4.
NG	▶ Repair or replace accelerator pedal position sensor (throttle position sensor).

SAT516KA



# TROUBLE DIAGNOSES FOR SYMPTOMS

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

4	CHECK A/T FLUID CONDITION	
<div>1. Remove oil pan.</div> <div>2. Check A/T fluid condition.</div> <div></div> <div>SAT171B</div> <div>OK or NG</div>		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

SAT171B

5	DETECT MALFUNCTIONING ITEM	
<div>1. Remove control valve assembly. Refer to AT-277.</div> <div>2. Check the following items:</div> <div><ul style="list-style-type: none"><li>● Shift valve B</li><li>● Shift solenoid valve B</li><li>● Pilot valve</li><li>● Pilot filter</li></ul></div> <div>3. Disassemble A/T.</div> <div>4. Check the following items:</div> <div><ul style="list-style-type: none"><li>● Servo piston assembly</li><li>● High clutch assembly</li><li>● Oil pump assembly</li></ul></div> <div>OK or NG</div>		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.

6	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to AT-277. 2. Check the following items: <ul style="list-style-type: none"><li>● Shift valve B</li><li>● Shift solenoid valve B</li><li>● Pilot valve</li><li>● Pilot filter</li></ul>		
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.



## TROUBLE DIAGNOSES FOR SYMPTOMS

10. 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.



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

*=NFAT0098*

## GI

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EMEC

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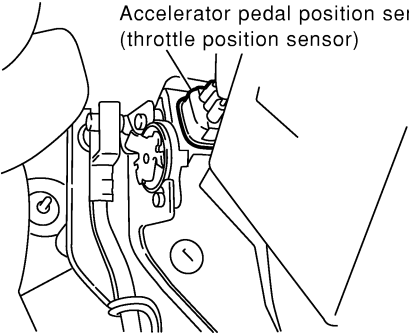
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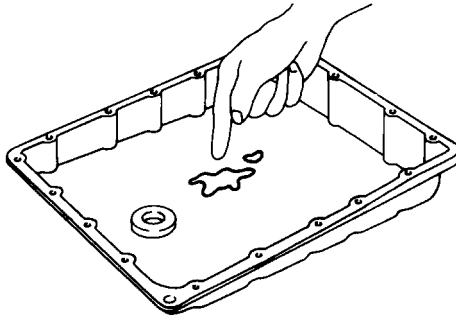
INDEX



# TROUBLE DIAGNOSES FOR SYMPTOMS

11. A/T Does Not Shift: D<sub>3</sub> → D<sub>4</sub> (Cont'd)

3	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)	
Check accelerator pedal position sensor (throttle position sensor). Refer to EC-302, "DTC P0226 APP SENSOR (throttle position sensor)".		
<div><p>Accelerator pedal position sensor (throttle position sensor)</p></div> <div>SAT516KA</div>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace accelerator pedal position sensor (throttle position sensor).

4	CHECK A/T FLUID CONDITION	
<div>1. Remove oil pan.</div> <div>2. Check A/T fluid condition.</div> <div></div> <div>SAT171B</div> <div>OK or NG</div>		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING ITEM	
<div>1. Remove control valve assembly. Refer to AT-277.</div> <div>2. Check the following items:</div> <div><ul style="list-style-type: none"><li>● Shift valve B</li><li>● Overrun clutch control valve</li><li>● Shift solenoid valve B</li><li>● Pilot valve</li><li>● Pilot filter</li></ul></div> <div>3. Disassemble A/T.</div> <div>4. Check the following items:</div> <div><ul style="list-style-type: none"><li>● Servo piston assembly</li><li>● Brake band</li><li>● Torque converter</li><li>● Oil pump assembly</li></ul></div> <div>OK or NG</div>		
OK	▶	GO TO 7.
NG	▶	Repair or replace damaged parts.



# TROUBLE DIAGNOSES FOR SYMPTOMS

11. A/T Does Not Shift: D<sub>3</sub> → D<sub>4</sub> (Cont'd)

6	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to AT-277. 2. Check the following items: <ul style="list-style-type: none"><li>● Shift valve B</li><li>● Overrun clutch control valve</li><li>● Shift solenoid valve B</li><li>● Pilot valve</li><li>● Pilot filter</li></ul>		
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.

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# TROUBLE DIAGNOSES FOR SYMPTOMS

## 12. A/T Does Not Perform Lock-up

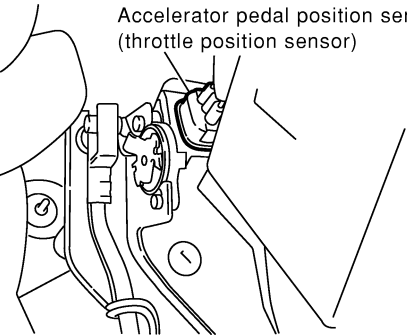
=NFAT0099

### 12. A/T Does Not Perform Lock-up

#### SYMPTOM:

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

1	CHECK SELF-DIAGNOSTIC RESULTS	
Does self-diagnosis show damage to torque converter clutch solenoid valve circuit after cruise test?		
<div><div><div>A/T CHECK</div></div><div>Self-diagnosis start</div><div>Torque converter clutch solenoid valve</div><div><div>Light</div><div>Shade</div></div></div>		
SAT549K		
Yes or No		
Yes	▶	Check torque converter clutch solenoid valve circuit. Refer to “DTC P0740”, AT-153.
No	▶	GO TO 2.

2	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)	
Check accelerator pedal position sensor (throttle position sensor). Refer to EC-302, "DTC P0226 APP SENSOR (throttle position sensor)".		
<div><p>Accelerator pedal position sensor (throttle position sensor)</p></div>		
SAT516KA		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace accelerator pedal position sensor (throttle position sensor).

3	DETECT MALFUNCTIONING ITEM	
<div>1. Remove control valve. Refer to AT-277.</div> <div>2. Check following items:</div> <div><ul style="list-style-type: none"><li>● Torque converter clutch control valve</li><li>● Torque converter relief valve</li><li>● Torque converter clutch solenoid valve</li><li>● Pilot valve</li><li>● Pilot filter</li></ul></div> <div>OK or NG</div>		
OK	▶	GO TO 4.
NG	▶	Repair or replace damaged parts.



# TROUBLE DIAGNOSES FOR SYMPTOMS

12. A/T Does Not Perform Lock-up (Cont'd)

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.

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# TROUBLE DIAGNOSES FOR SYMPTOMS

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

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

=NFAT0100

#### SYMPTOM:

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

<b>1</b>	<b>CHECK SELF-DIAGNOSTIC RESULTS</b>
<p>Does self-diagnosis show damage to engine speed signal circuit after cruise test?</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SAT551K</p>	
<b>Yes or No</b>	
Yes	▶ Check engine speed signal circuit. Refer to "DTC P0725", AT-121.
No	▶ GO TO 2.

<b>2</b>	<b>CHECK A/T FLUID CONDITION</b>
<p>1. Remove oil pan. 2. Check A/T fluid condition.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SAT171B</p>	
<b>OK or NG</b>	
OK	▶ GO TO 4.
NG	▶ GO TO 3.

<b>3</b>	<b>DETECT MALFUNCTIONING ITEM</b>
<p>1. Remove control valve assembly. Refer to AT-277. 2. Check the following items:</p> <ul style="list-style-type: none"> <li>● Torque converter clutch control valve</li> <li>● Pilot valve</li> <li>● Pilot filter</li> </ul> <p>3. Disassemble A/T. 4. Check torque converter and oil pump assembly.</p> <p style="text-align: right;">OK or NG</p>	
OK	▶ GO TO 5.
NG	▶ Repair or replace damaged parts.



# TROUBLE DIAGNOSES FOR SYMPTOMS

13. A/T Does Not Hold Lock-up Condition (Cont'd)

4	DETECT MALFUNCTIONING ITEM	
1. Remove control valve assembly. Refer to AT-277. 2. Check the following items: <ul style="list-style-type: none"><li>● Torque converter clutch control valve</li><li>● Pilot valve</li><li>● Pilot filter</li></ul>		
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.

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# TROUBLE DIAGNOSES FOR SYMPTOMS



## 14. Lock-up Is Not Released

=NFAT0101

## 14. Lock-up Is Not Released

### SYMPTOM:

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

<b>1</b>	<b>CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR) CIRCUIT</b>
<p> <b>With CONSULT-II</b> Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to accelerator pedal position sensor (throttle position sensor) circuit?</p>	
<p> <b>Without CONSULT-II</b> Does self-diagnosis show damage to accelerator pedal position sensor (throttle position sensor) circuit?</p> <div style="text-align: center; margin-top: 20px;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">A/T CHECK</div>  <div style="border: 1px solid black; padding: 2px; display: inline-block;">Self-diagnosis start</div>  <div style="display: flex; justify-content: center; align-items: center; gap: 50px; margin-top: 10px;"> <div style="border-top: 1px dashed black; width: 150px;"></div> <div style="text-align: right;">Light</div> </div> <div style="display: flex; justify-content: center; align-items: center; gap: 50px; margin-top: 10px;"> <div style="border-top: 1px solid black; width: 150px;"></div> <div style="text-align: right;">Shade</div> </div> </div> <p style="text-align: right; margin-top: 20px;">SAT555K</p>	
<b>Yes or No</b>	
Yes	▶ Check accelerator pedal position sensor (throttle position sensor) circuit. Refer to "DTC P1705", AT-184.
No	▶ GO TO 2.

<b>2</b>	<b>CHECK SYMPTOM</b>
Check again.	
<b>OK or NG</b>	
OK	▶ <b>INSPECTION END</b>
NG	▶ GO TO 3.

<b>3</b>	<b>CHECK TCM INSPECTION</b>
<p>1. Perform TCM input/output signal inspection. 2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.</p>	
<b>OK or NG</b>	
OK	▶ <b>INSPECTION END</b>
NG	▶ Repair or replace damaged parts.



TROUBLE DIAGNOSES FOR SYMPTOMS

15. Engine Speed Does Not Return To Idle (Light Braking D<sub>4</sub> → D<sub>3</sub>)

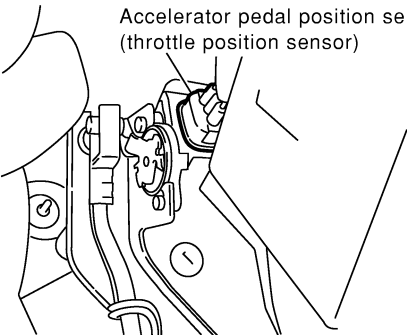
15. Engine Speed Does Not Return To Idle (Light Braking D<sub>4</sub> → D<sub>3</sub>)

=NFAT0102

SYMPTOM:

- Engine speed does not smoothly return to idle when A/T shifts from D<sub>4</sub> to D<sub>3</sub>.
- Vehicle does not decelerate by engine brake when turning A/T selector lever D to 3rd position.
- Vehicle does not decelerate by engine brake when shifting A/T from D to 2nd position.

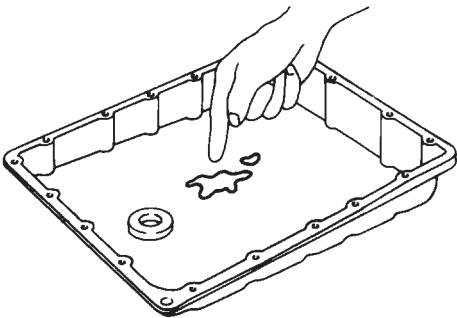
1	CHECK SELF-DIAGNOSTIC RESULTS	
Does self-diagnosis show damage to overrun clutch solenoid valve circuit after cruise test?		
<div><div><div>A/T CHECK</div></div><div>Self-diagnosis start</div><div><div>Overrun clutch solenoid valve</div><div>Light</div><div>Shade</div></div></div>		
SAT548K		
Yes or No		
Yes	▶	Check overrun clutch solenoid valve circuit. Refer to “DTC P1760”, AT-192.
No	▶	GO TO 2.

2	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)	
Check accelerator pedal position sensor (throttle position sensor). Refer to EC-302, "DTC P0226 APP SENSOR (throttle position sensor)".		
<div><p>Accelerator pedal position sensor (throttle position sensor)</p></div> <div>SAT516KA</div>		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace accelerator pedal position sensor (throttle position sensor).



## TROUBLE DIAGNOSES FOR SYMPTOMS

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

<b>3</b>	<b>CHECK A/T FLUID CONDITION</b>
1. Remove oil pan. 2. Check A/T fluid condition.	
	
SAT171B	
<b>OK or NG</b>	
OK	▶ GO TO 5.
NG	▶ GO TO 4.

<b>4</b>	<b>DETECT MALFUNCTIONING ITEM</b>
1. Remove control valve assembly. Refer to AT-277. 2. Check the following items: <ul style="list-style-type: none"> <li>● Overrun clutch control valve</li> <li>● Overrun clutch reducing valve</li> <li>● Overrun clutch solenoid valve</li> </ul> 3. Disassemble A/T. 4. Check the following items: <ul style="list-style-type: none"> <li>● Overrun clutch assembly</li> <li>● Oil pump assembly</li> </ul>	
<b>OK or NG</b>	
OK	▶ GO TO 6.
NG	▶ Repair or replace damaged parts.

<b>5</b>	<b>DETECT MALFUNCTIONING ITEM</b>
1. Remove control valve assembly. Refer to AT-277. 2. Check the following items: <ul style="list-style-type: none"> <li>● Overrun clutch control valve</li> <li>● Overrun clutch reducing valve</li> <li>● Overrun clutch solenoid valve</li> </ul>	
<b>OK or NG</b>	
OK	▶ GO TO 6.
NG	▶ Repair or replace damaged parts.

<b>6</b>	<b>CHECK SYMPTOM</b>
Check again.	
<b>OK or NG</b>	
OK	▶ <b>INSPECTION END</b>
NG	▶ GO TO 7.



# TROUBLE DIAGNOSES FOR SYMPTOMS

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

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.

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# TROUBLE DIAGNOSES FOR SYMPTOMS

16. Vehicle Does Not Start From D<sub>1</sub>

## 16. Vehicle Does Not Start From D<sub>1</sub>

=NFAT0103

### SYMPTOM:

Vehicle does not start from D<sub>1</sub> 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?		
<div><div><div>A/T CHECK</div><div>Self-diagnosis start</div></div><div><div>Vehicle speed sensor•A/T (revolution sensor)</div><div>Vehicle speed sensor•MTR</div><div>Shift solenoid valve A</div><div>Shift solenoid valve B</div><div>Light</div><div>Shade</div></div></div> <div>SAT583K</div>		
Yes or No		
Yes	▶	Check damaged circuit. Refer to “DTC P0720, P0750, P0755 or VHCL SPEED SEN-MTR”, AT-116, 174, 179 or 203.
No	▶	GO TO 2.

2	CHECK SYMPTOM	
Check again.		
OK or NG		
OK	▶	Go to 8. Vehicle Cannot Be Started From D <sub>1</sub> , AT-240.
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.



TROUBLE DIAGNOSES FOR SYMPTOMS

17. A/T Does Not Shift: D<sub>4</sub> → D<sub>3</sub>, When 3rd Position Switch ON → OFF

17. A/T Does Not Shift: D<sub>4</sub> → D<sub>3</sub>, When 3rd Position Switch ON → OFF

=NFA70104

SYMPTOM:

A/T does not shift from D<sub>4</sub> to D<sub>3</sub> when changing selector lever from D to 3rd position.

1	CHECK 3RD POSITION SWITCH CIRCUIT	
<div><div><div></div></div><div>With CONSULT-II</div><div>Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to 3rd position switch circuit?</div></div>		
<div><div><div></div></div><div>Without CONSULT-II</div><div>Does self-diagnosis show damage to 3rd position switch circuit?</div></div> <div><div><div>A/T CHECK</div><div><div>Self-diagnosis start</div><div><div><div></div></div><div>Light</div></div><div><div></div><div>Shade</div></div></div></div></div>		
SAT555K		
Yes or No		
Yes	<div></div>	Check 3rd position switch circuit. Refer to 21. TCM Self-diagnosis Does Not Activate [PNP & 3rd Position Switches, and APPS (TPS) Circuit Checks], AT-264.
No	<div></div>	Go to 10. A/T Does Not Shift: D <sub>2</sub> → D <sub>3</sub> , AT-246.



# TROUBLE DIAGNOSES FOR SYMPTOMS

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

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

=NFAT0105

### SYMPTOM:

A/T does not shift from  $D_3$  to  $2_2$  when changing selector lever from D to 2nd position.

1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT	
<div><div><div></div><div>With CONSULT-II</div></div><div>Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to park/neutral position (PNP) switch circuit?</div></div>		
<div><div><div></div><div>Without CONSULT-II</div></div><div>Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?</div></div> <div><div><div>A/T CHECK</div><div>Self-diagnosis start</div><div><div><div></div><div>Light</div></div><div><div></div><div>Shade</div></div></div></div></div>		
SAT555K		
Yes or No		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to "DTC P0705", AT-104.
No	▶	Go to 9. A/T Does Not Shift: D <sub>1</sub> → D <sub>2</sub> Or Does Not Kickdown: D <sub>4</sub> → D <sub>2</sub> , AT-243.



TROUBLE DIAGNOSES FOR SYMPTOMS



19. A/T Does Not Shift: 2<sub>2</sub> → 1<sub>1</sub>, When Selector Lever 2nd → 1st Position

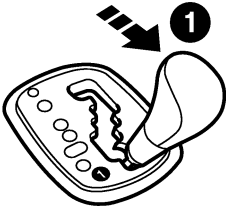
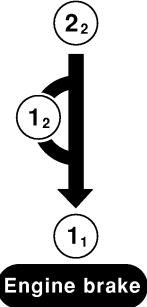
19. A/T Does Not Shift: 2<sub>2</sub> → 1<sub>1</sub>, When Selector Lever 2nd → 1st Position

=NFA70106

SYMPTOM:

A/T does not shift from 2<sub>2</sub> to 1<sub>1</sub> when changing selector lever from 2nd to 1st position.

1	CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT	
	<b>With CONSULT-II</b> Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?	
	<b>Without CONSULT-II</b> Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?	
<div><div>A/T CHECK</div><div>Self-diagnosis start</div><div><div>Light</div><div>Shade</div></div></div>		
SAT555K		
Yes or No		
Yes	▶	Check park/neutral position (PNP) switch circuit. Refer to “DTC P0705”, AT-104.
No	▶	GO TO 2.

2	CHECK SYMPTOM	
Check again.		
<div><div></div><div></div></div> <div>OK or NG</div> <div>SAT514K</div>		
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.



## TROUBLE DIAGNOSES FOR SYMPTOMS

### 20. Vehicle Does Not Decelerate By Engine Brake

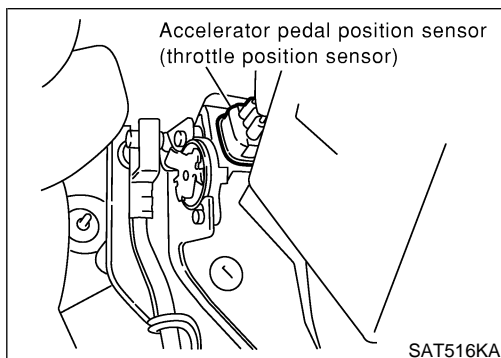
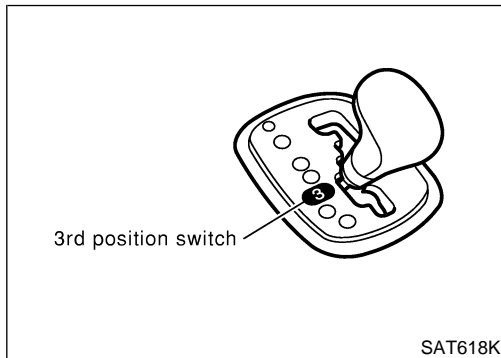
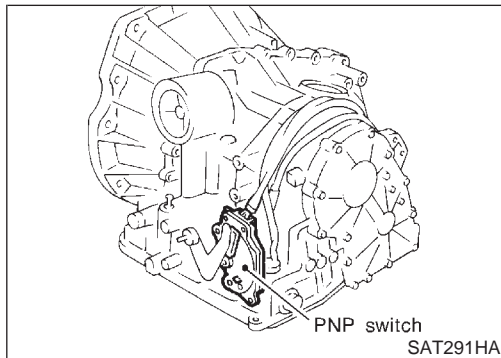
#### 20. Vehicle Does Not Decelerate By Engine Brake

=NFAT0107

##### SYMPTOM:

Vehicle does not decelerate by engine brake when shifting from 2<sub>2</sub> (1<sub>2</sub>) to 1<sub>1</sub>.

1	CHECK SYMPTOM	
Is “6. Vehicle Does Not Creep Backward In R Position” OK?		
Yes or No		
Yes	▶	Go to “15. Engine Speed Does Not Return To Idle (Light Braking D <sub>4</sub> → D <sub>3</sub> )”, AT-257.
No	▶	Go to “6. Vehicle Does Not Creep Backward In R Position”, AT-233.



#### 21. TCM Self-diagnosis Does Not Activate [PNP & 3rd Position Switches, and APPS (TPS)\* Circuit Checks]

NFAT0108

##### SYMPTOM:

A/T CHECK indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

\*: Accelerator pedal position sensor (throttle position sensor)

##### DESCRIPTION

NFAT0108S01

- Park/neutral position (PNP) switch  
The park/neutral (PNP) switch includes a transmission range switch. The transmission range switch detects the selector lever position and sends a signal to the TCM.
- 3rd position switch  
Detects the 3rd position and sends a signal to the TCM.
- Accelerator pedal position sensor (throttle position sensor)  
ECM judges throttle opening based on a signal from accelerator pedal position sensor, and sends the signal via CAN communication to TCM.







21. TCM Self-diagnosis Does Not Activate [PNP & 3rd Position Switches, and APPS (TPS)\* Circuit Checks] (Cont'd)

 **Without CONSULT-II**

- 

SAT588K

MTBL0119

OK	▶	GO TO 7.
NG	▶	GO TO 4.







## 21. TCM Self-diagnosis Does Not Activate [PNP & 3rd Position Switches, and APPS (TPS)\* Circuit Checks] (Cont'd)

Check the following items:

- 
- The diagram illustrates the connection of the M165 module to the control unit. It shows a wiring diagram with a 12-pin connector, a switch, and a continuity table.
- Wiring Diagram:**
- The control unit has a 12-pin connector with pins numbered 1 to 12.
  - The M165 module has a 12-pin connector with pins numbered 1 to 12.
  - The wiring diagram shows the following connections:
    - Pin 1 of the control unit to Pin 1 of the M165 module.
    - Pin 2 of the control unit to Pin 2 of the M165 module.
    - Pin 3 of the control unit to Pin 3 of the M165 module.
    - Pin 4 of the control unit to Pin 4 of the M165 module.
    - Pin 5 of the control unit to Pin 5 of the M165 module.
    - Pin 6 of the control unit to Pin 6 of the M165 module.
    - Pin 7 of the control unit to Pin 7 of the M165 module.
    - Pin 8 of the control unit to Pin 8 of the M165 module.
    - Pin 9 of the control unit to Pin 9 of the M165 module.
    - Pin 10 of the control unit to Pin 10 of the M165 module.
    - Pin 11 of the control unit to Pin 11 of the M165 module.
    - Pin 12 of the control unit to Pin 12 of the M165 module.
- Continuity Table:**
- | Switch position | Continuity |
|-----------------|------------|
| D               | No         |
| 3rd             | Yes        |

- Harness for short or open between TCM and 3rd position switch (Main harness)
- Harness of ground circuit for 3rd position switch (Main harness) for short or open

OK		GO TO 9.
----	---	----------

NG	▶	Repair or replace damaged parts.
----	---	----------------------------------



TROUBLE DIAGNOSES FOR SYMPTOMS

21. TCM Self-diagnosis Does Not Activate [PNP & 3rd Position Switches, and APPS (TPS)\* Circuit Checks] (Cont'd)

7

CHECK 3RD 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 harness connector F50 terminal 22 (GY) and ground when 3rd position switch is ON and OFF.

3

D

H.S.

CONNECT

+

+

TCM

CONNECTOR

22

V

+

-

Switch position

Voltage

D

Battery voltage

3rd

1V or less

Terminal No.

Wire color

Item

Condition

22

G/Y

3rd position switch

When the selector lever is in a position other than 3rd position: Battery voltage

When the selector lever is in 3rd position: 1V or less

OK or NG

OK

▶

GO TO 9.

NG

▶

GO TO 8.

SAT617K

MTBL1184

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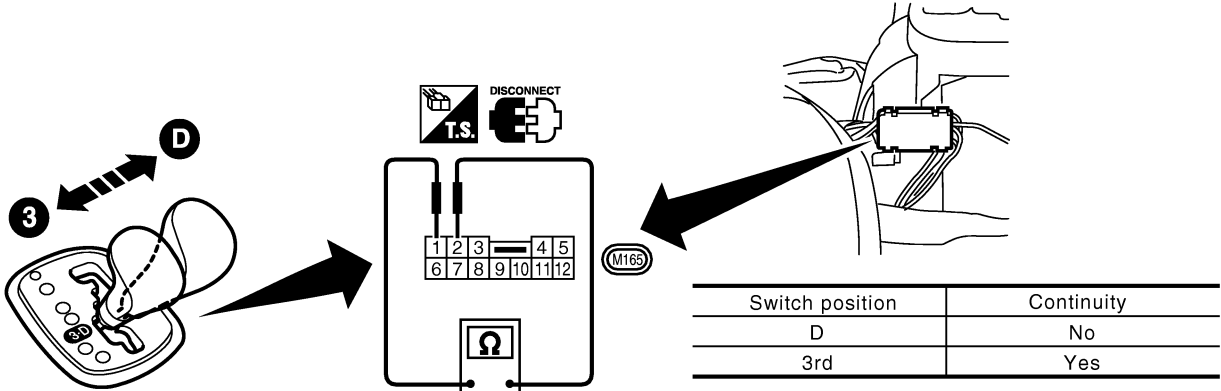
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AT-269



## TROUBLE DIAGNOSES FOR SYMPTOMS

21. TCM Self-diagnosis Does Not Activate [PNP & 3rd Position Switches, and APPS (TPS)\* Circuit Checks] (Cont'd)

8	DETECT MALFUNCTIONING ITEM						
	<p>Check the following items:</p> <ul style="list-style-type: none"> <li>3rd position switch.</li> <li>a. Check continuity between A/T device (3rd positions witch) harness connector M165 terminals 1 (G/Y) and 2 (B).</li> </ul> <div style="text-align: center;">  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Switch position</th><th>Continuity</th></tr> </thead> <tbody> <tr> <td>D</td><td>No</td></tr> <tr> <td>3rd</td><td>Yes</td></tr> </tbody> </table> </div> <p style="text-align: right;">SAT616K</p> <ul style="list-style-type: none"> <li>Harness for short or open between TCM and 3rd position switch (Main harness)</li> <li>Harness of ground circuit for 3rd position switch (Main harness) for short or open</li> </ul> <p style="text-align: center;"><b>OK or NG</b></p>	Switch position	Continuity	D	No	3rd	Yes
Switch position	Continuity						
D	No						
3rd	Yes						
OK	▶ GO TO 9.						
NG	▶ Repair or replace damaged parts.						

9	CHECK ACCELERATOR PEDAL POSITION SENSOR (THROTTLE POSITION SENSOR)
	Check accelerator pedal position sensor (throttle position sensor) circuit (with CONSULT-II)
OK	▶ <b>INSPECTION END</b>
NG	▶ Repair or replace damaged parts.



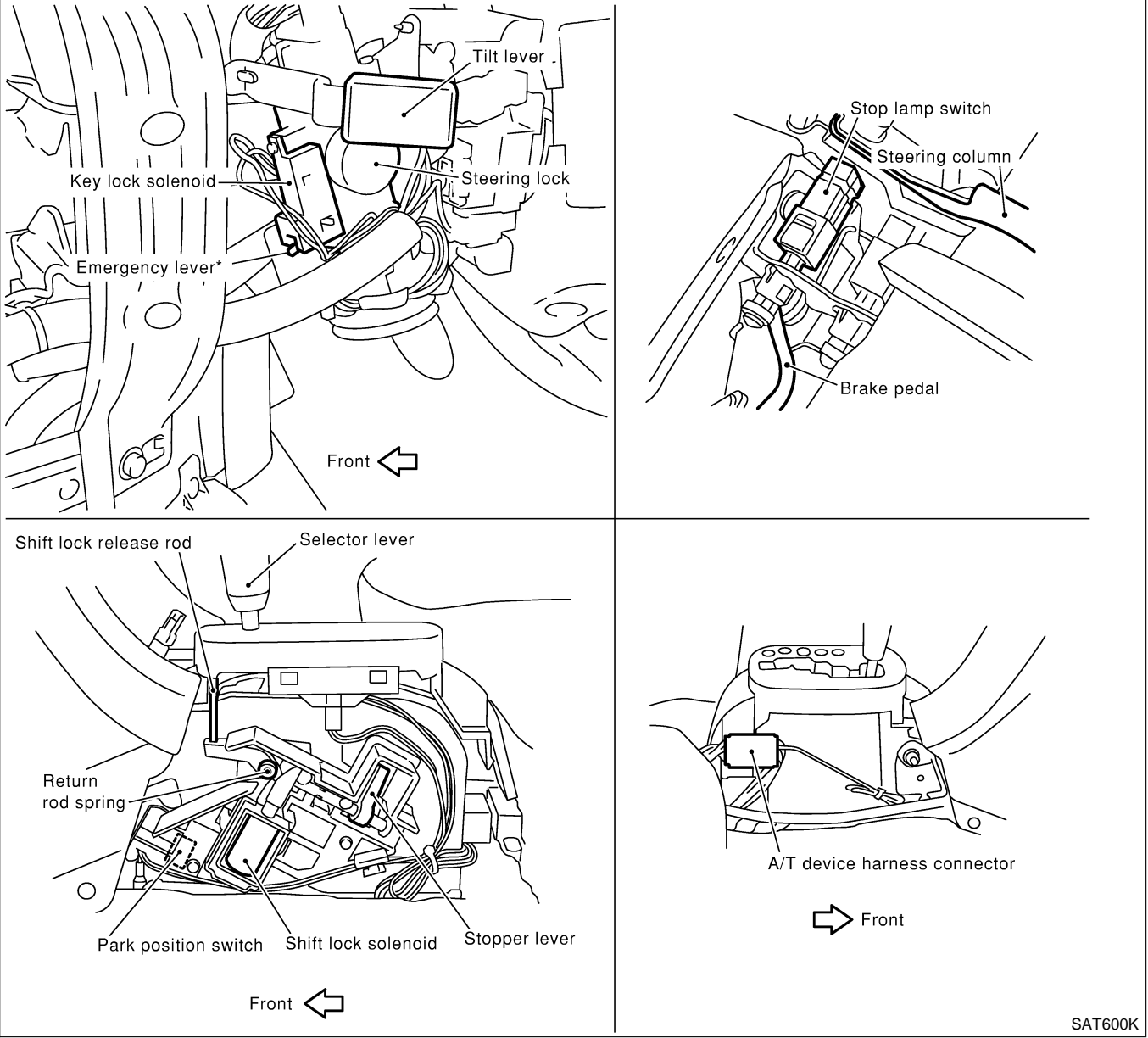
Description

NFAT0109

- 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.

Shift Lock System Electrical Parts Location

NFAT0111



\*: This emergency lever insures that when battery is off ignition key cannot be removed. In the situation like this, by operating this lever, ignition key can be removed.



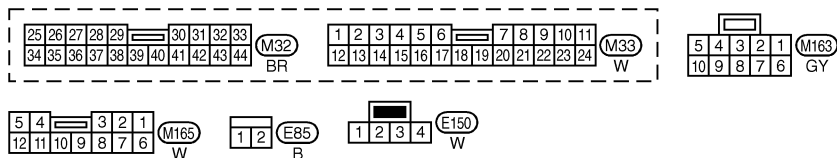
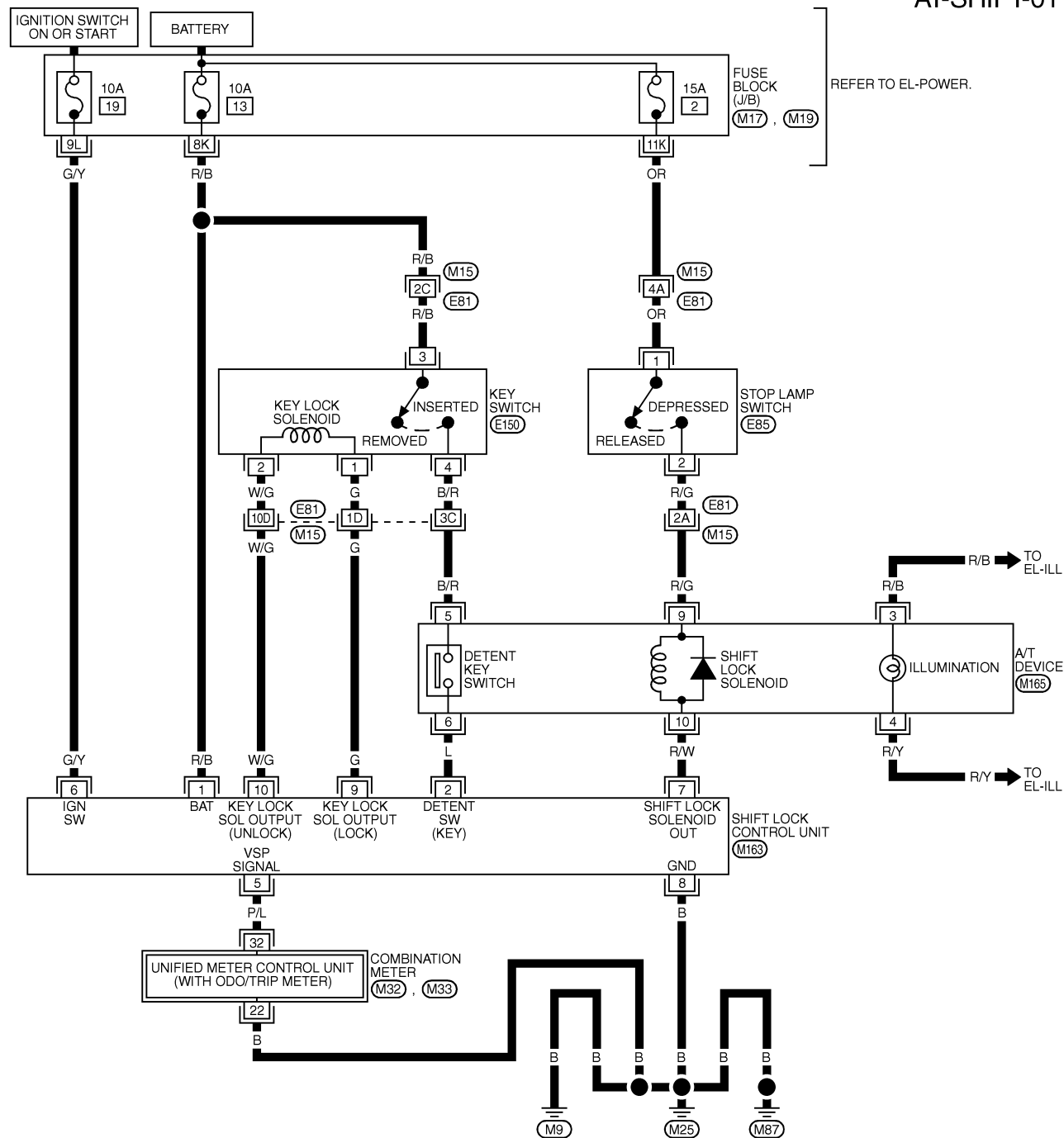
# A/T SHIFT LOCK SYSTEM

Wiring Diagram — SHIFT —

## Wiring Diagram — SHIFT —

NFAT0110

AT-SHIFT-01



REFER TO THE FOLLOWING.  
 (M15) - SUPER  
 MULTIPLE JUNCTION (SMJ)  
 (M17) , (M19) - FUSE BLOCK-  
 JUNCTION BOX (J/B)

MAT268B



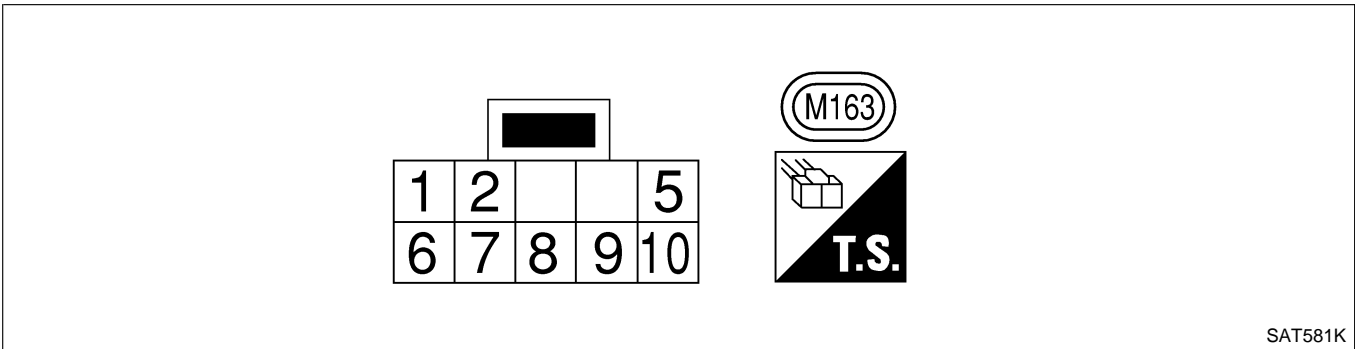
# A/T SHIFT LOCK SYSTEM

Shift Lock Control Unit Reference Values

## Shift Lock Control Unit Reference Values SHIFT LOCK HARNESS CONNECTOR TERMINAL LAYOUT

NFAT0281

NFAT0281S01



SAT581K

## SHIFT LOCK CONTROL UNIT INSPECTION TABLE

NFAT0281S02

Data are reference values.

Terminal No.		Item	Condition	Judgement standard
(+)	(-)			
1 (R/B)	8 (B)	Power source	IGN SW: "ON"	Battery voltage
			IGN SW: "OFF"	
2 (L)	8 (B)	Detention SW (for key)	The position when the key is inserted and the selector lever is set to a position other than the "P" position.	Battery voltage
			Except the above	Approx. 0V
5 (P/L)	8 (B)	Vehicle speed signal	When the vehicle speed is 20 km/h (12 MPH).	Approx. 28 Hz
			When the vehicle speed is 0 km/h (0 MPH).	No pulse
6 (G/Y)	8 (B)	IGN signal	IGN SW: "ON"	Battery voltage
			IGN SW: "OFF"	Approx. 0V
7 (R/W)	8 (B)	Shift lock solenoid	When the brake pedal is depressed.	Battery voltage
			When IGN SW is ON and the vehicle speed is 8 km/h (5 MPH) or less.	Approx. 0V
8 (B)	—	Ground	IGN SW: "ON"	Approx. 0V
10 (W/G)	8 (B)	Key lock signal	When the selector lever is set to a position other than the "P" position and the ignition switch is turned from "ON" to "OFF".	-12 voltage for approx. 30 msec.
			Except the above	Approx. 0V
10 (W/G)	8 (B)	Key unlock signal	At the moment selector is set to the "P" position from any position other than "P". The unlock signal generates only once after the lock signal is output.	Battery voltage for approx. 150 msec.
			Except the above	Approx. 0V

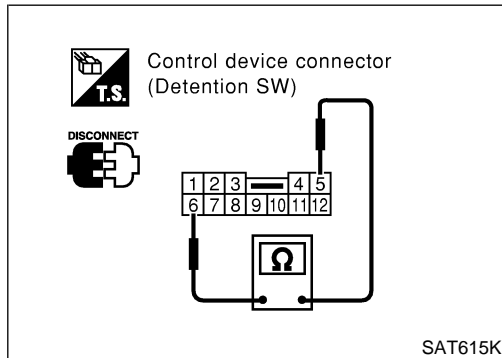
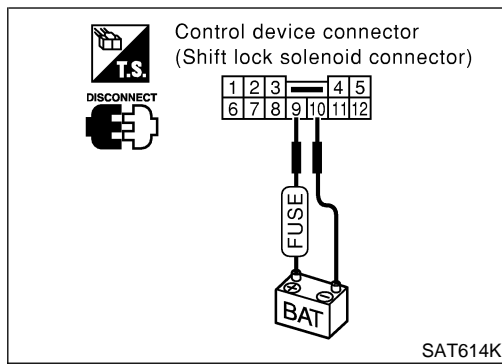
### CAUTION:

Confirm that the pointer swings only momentarily because the output time is so short. If the inspection is done with an oscilloscope, it should be observed that the power source voltage lasts for 3.5 to 10 ms.



# A/T SHIFT LOCK SYSTEM

## Component Inspection



## Component Inspection

NFAT0280

### SHIFT LOCK SOLENOID

NFAT0280S01

- Check operation by applying battery voltage to control device connector.

#### CAUTION:

Be sure to apply the voltage of the correct polarity to the respective terminals. Otherwise, the part may be damaged.

Connector No.	Terminal No.
M165	9 (R/G) (Battery voltage) - 10 (R/W) (Ground)

## DETENTION SWITCH

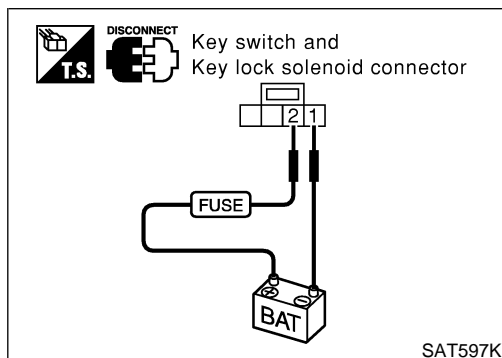
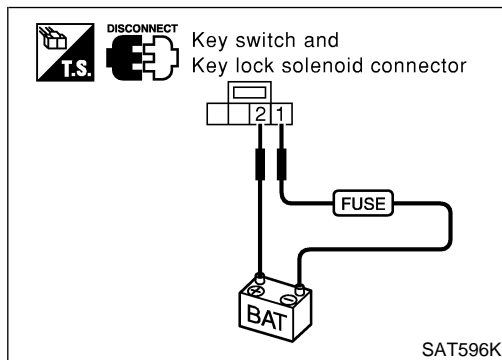
NFAT0280S02

### For Key:

NFAT0280S0201

- Check continuity between terminals of the control device connector.

Condition	Connector No.	Terminal No.	Continuity
The position when the selector lever is set to a position other than the "P" position, or when it is shifted from the "R" to the "P" position	M165	5 (B/R) - 6 (L)	Yes
Except the above			No



## KEY LOCK SOLENOID

NFAT0280S03

### Key Lock

NFAT0280S0301

- Check operation by applying battery voltage to key switch and key lock solenoid connector.

#### CAUTION:

Be careful not to cause burnout of the harness.

Connector No.	Terminal No.
E150	1 (G) (Battery voltage) - 2 (W/G) (Ground)

### Key Unlock

NFAT0280S0302

- Check operation by applying battery voltage to key switch and key lock solenoid connector.

#### CAUTION:

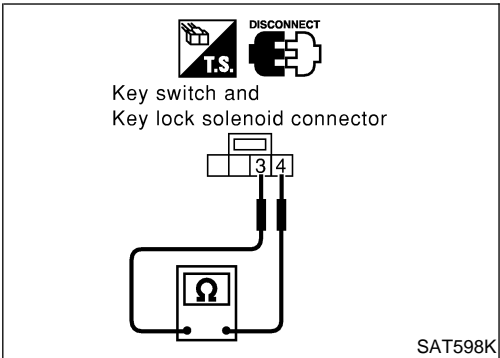
Be careful not to cause burnout of the harness.

Connector No.	Terminal No.
E150	2 (W/G) (Battery voltage) - 1 (G) (Ground)



A/T SHIFT LOCK SYSTEM

Component Inspection (Cont'd)

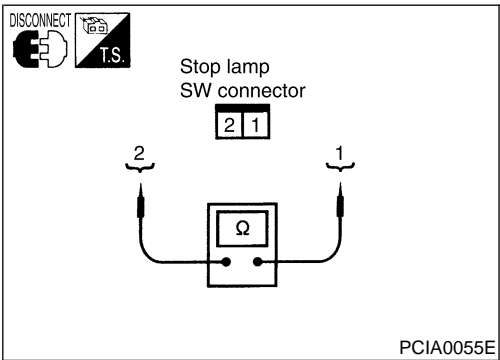


KEY SWITCH

- Check continuity between terminals of the key switch and key lock solenoid connector.

NFAT0280S04

Condition	Connector No.	Terminal No.	Continuity
Key inserted	E150	3 (R/B) - 4 (B/R)	Yes
Key withdrawn			No



STOP LAMP SWITCH

- Check continuity between terminals of the stop lamp switch connector.

NFAT0280S05

Condition	Connector No.	Terminal No.	Continuity
When brake pedal is depressed	E85	1 (OR) - 2 (R/G)	Yes
When brake pedal is released			No

Check stop lamp switch after adjusting brake pedal. Refer to BR-12, "BRAKE PEDAL".

GI

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RS

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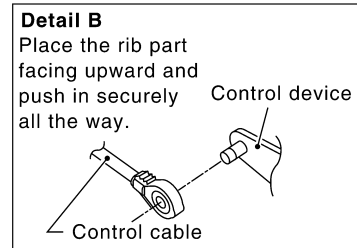
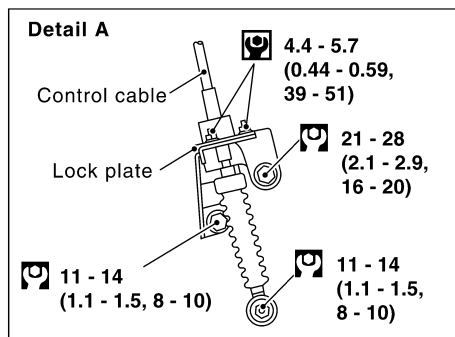
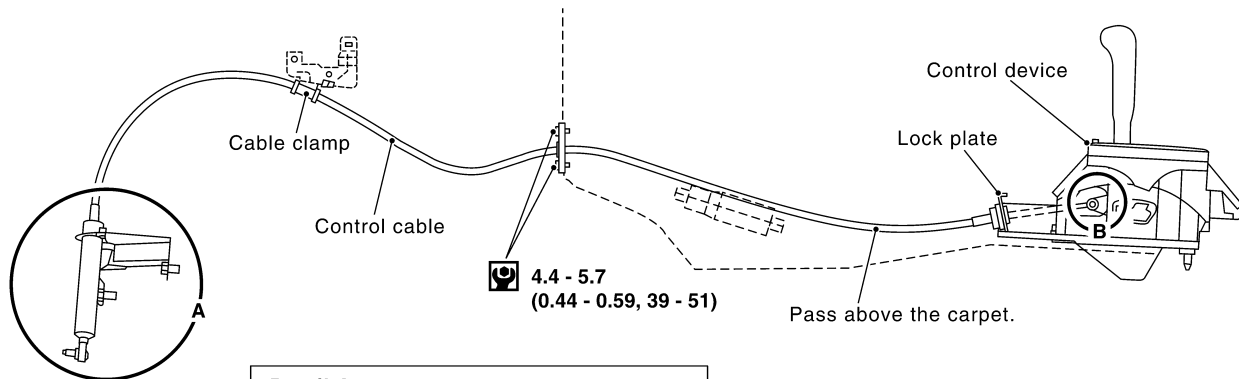
# SHIFT CONTROL SYSTEM

Control Cable

## Control Cable

NFAT0263

### SEC. 349



: N•m (kg-m, in-lb)

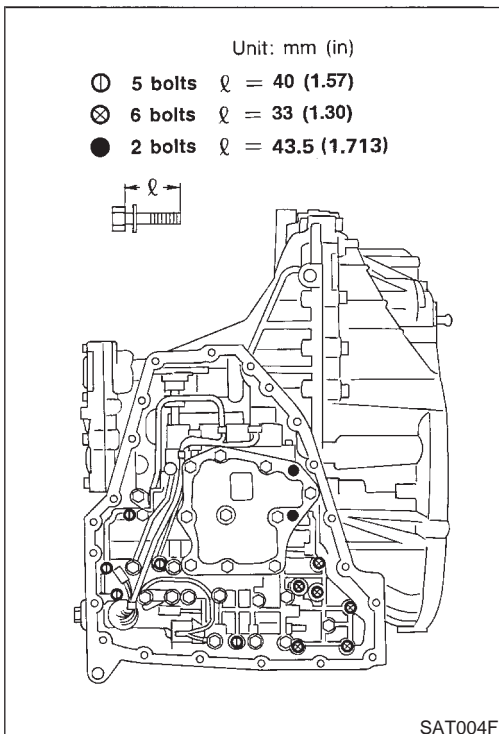
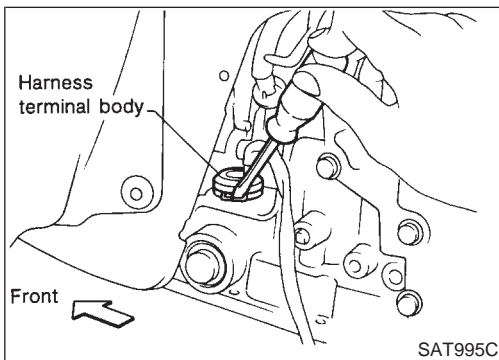
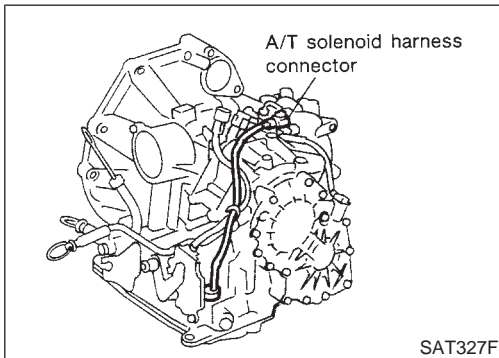
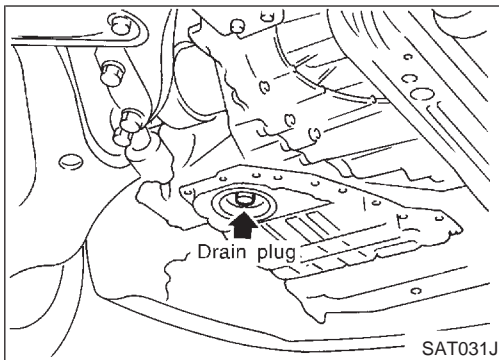
: N•m (kg-m, ft-lb)

SAT754J



NFAT0114

NFAT0114S01



### Control Valve Assembly and Accumulators

#### REMOVAL

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-309.

GI

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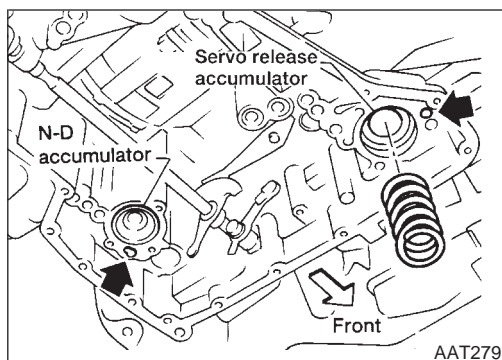
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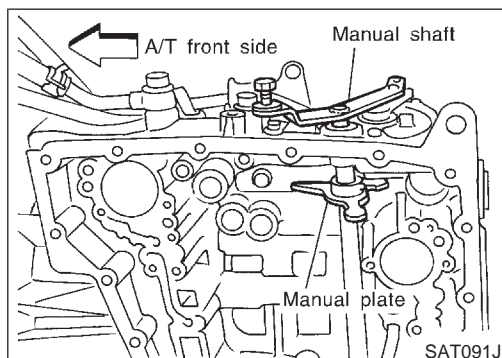


## ON-VEHICLE SERVICE

### Control Valve Assembly and Accumulators (Cont'd)



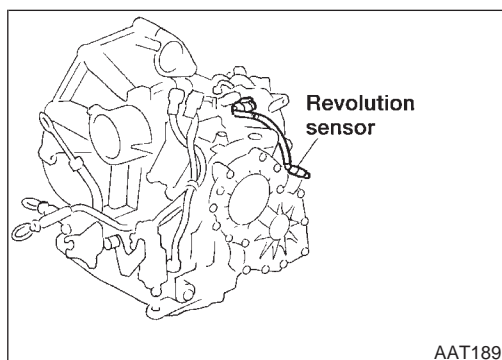
8. Remove servo release and N-D accumulators by applying compressed air if necessary.
- **Hold each piston with a rag.**



### INSTALLATION

- **Set manual shaft in Neutral, then align manual plate with groove in manual valve.**
- **After installing control valve assembly, make sure that selector lever can be moved to all positions.**

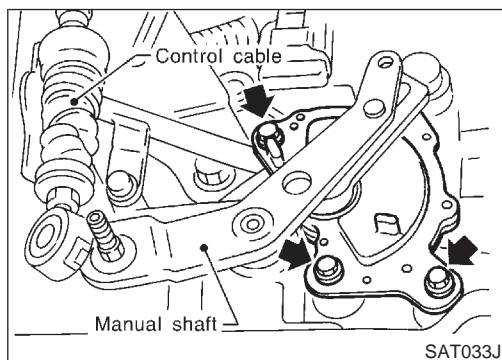
NFAT0114S02



### Revolution Sensor Replacement

1. Remove under cover.
2. Remove revolution sensor from A/T.
3. Reinstall any part removed.
- **Always use new sealing parts.**

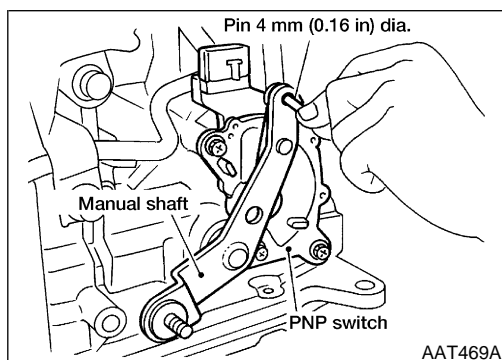
NFAT0115



### Park/Neutral Position (PNP) Switch Adjustment

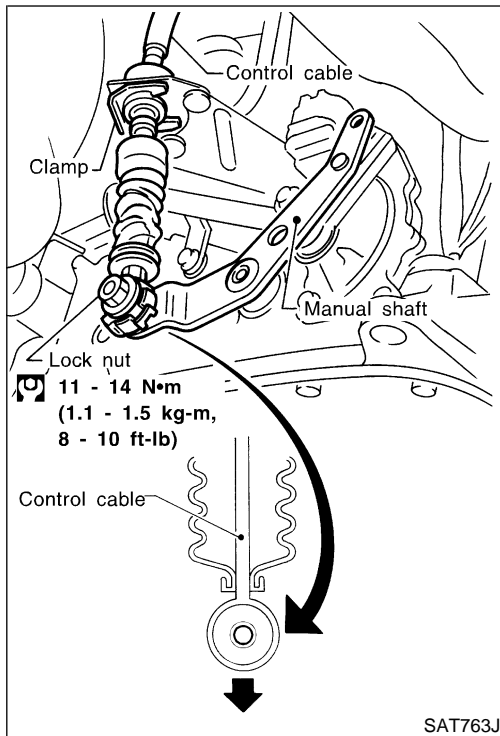
1. Remove control cable from manual shaft.
2. Set manual shaft in N position.
3. Loosen park/neutral position (PNP) switch fixing bolts.

NFAT0116



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-104.





## Control Cable Adjustment

NFAT0117

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.

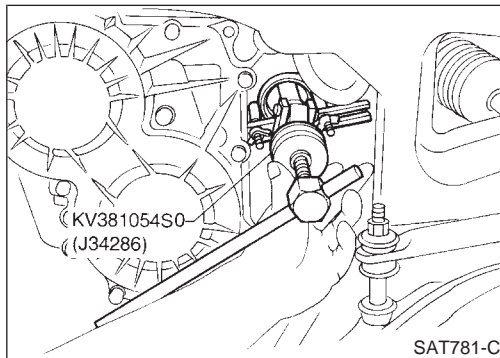
### CAUTION:

**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)**

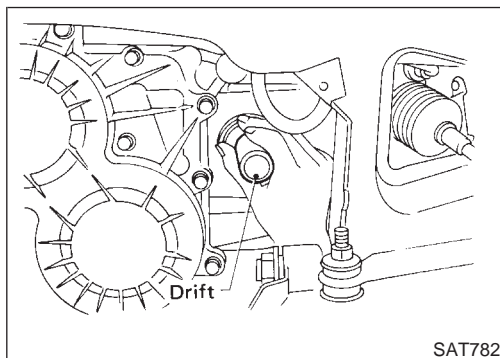
4. Tighten control cable lock nut.
  5. Move selector lever from P to 1 position again. Make sure that selector lever moves smoothly.
- Make sure that the starter operates when the selector lever is placed in the N or P position.
  - Make sure that the transmission is locked properly when the selector lever is placed in the P position.



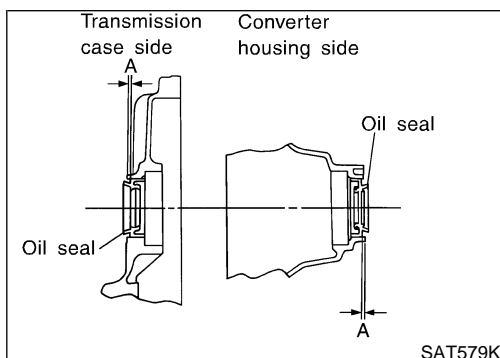
## Differential Side Oil Seal Replacement

NFAT0118

1. Remove drive shaft assembly. Refer to AX-9, "Drive Shaft".
2. Remove oil seal.



3. Install oil seal.
- Apply ATF before installing.



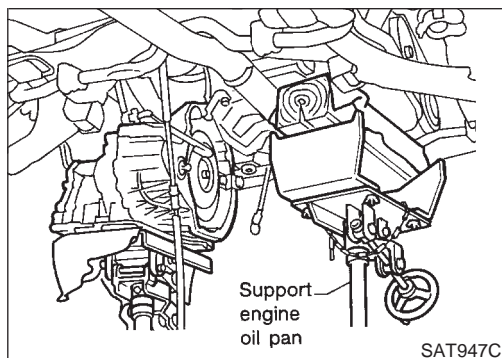
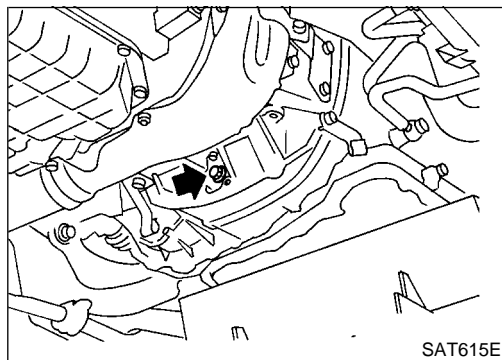
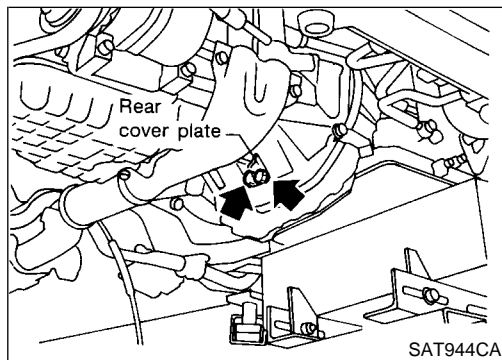
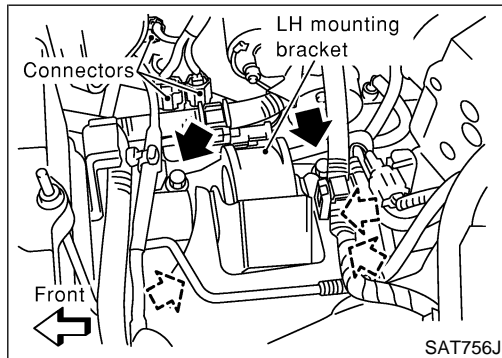
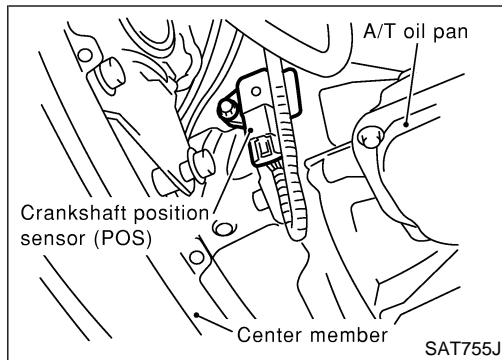
- Install oil seals so dimension A is within specification  
**A: -0.5 mm (-0.02 in) to 0.5 mm (0.02 in)**
4. Reinstall any part removed.



# REMOVAL AND INSTALLATION

## Removal

NFAT0119



## Removal

### CAUTION:

When removing the transaxle assembly from engine, first remove the crankshaft position sensor (POS) from the assembly.

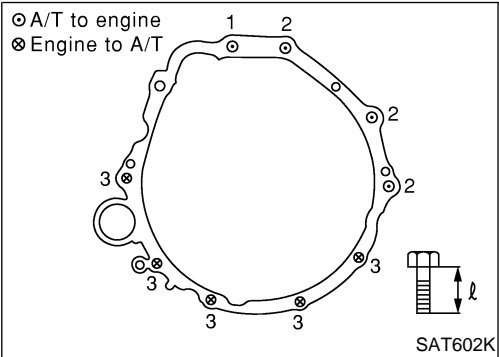
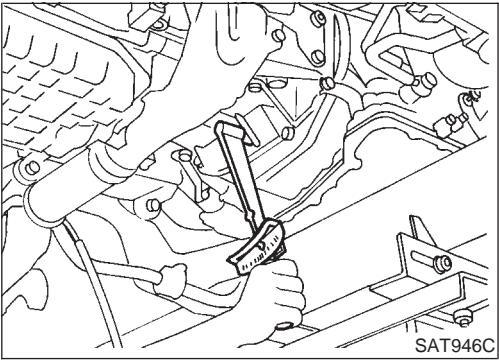
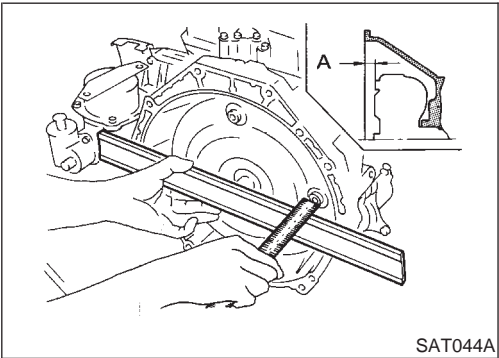
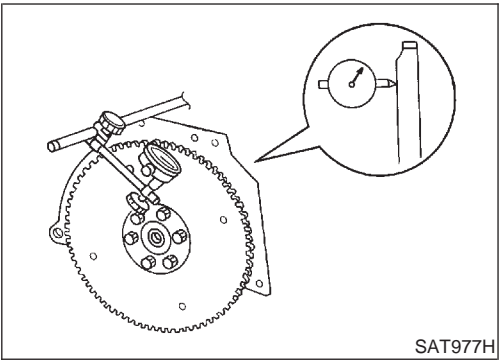
Be careful not to damage sensor edge.

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. Disconnect control cable at transaxle side.
  8. Drain ATF.
  9. Remove exhaust front tube.
  10. Remove drive shafts. Refer to AX-9, "Drive Shaft".
  11. Disconnect fluid cooler hoses.
  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.



NFAT0120



Installation

- Drive plate runout

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

**Maximum allowable runout:**

**Refer to EM-75, "Drive Plate Runout".**

- If this runout is outside the standard, replace drive plate and ring gear.

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

**Distance "A":**

**14 mm (0.55 in) or more**

- Install bolts fixing converter to drive plate.
- **With converter installed, rotate crankshaft several turns to check that transaxle rotates freely without binding.**

- Tighten bolts securing transaxle.
- Tighten LH mounting bracket bolts to the specified torque. Refer to EM-62, "Removal and Installation".
- Tighten center member bolts to the specified torque. Refer to EM-62, "Removal and Installation".
- Tighten rear plate cover bolts to the specified torque. Refer to EM-14, "OIL PAN".

Bolt No.	Tightening torque N·m (kg·m, ft·lb)	ℓ mm (in)
1	69.6 - 79.4 (7.1 - 8.0, 52 - 58)	65 (2.56)
2	69.6 - 79.4 (7.1 - 8.0, 52 - 58)	52 (2.05)
3	69.6 - 79.4 (7.1 - 8.0, 52 - 58)	40 (1.57)

- Reinstall any part removed.



## REMOVAL AND INSTALLATION

*Installation (Cont'd)*

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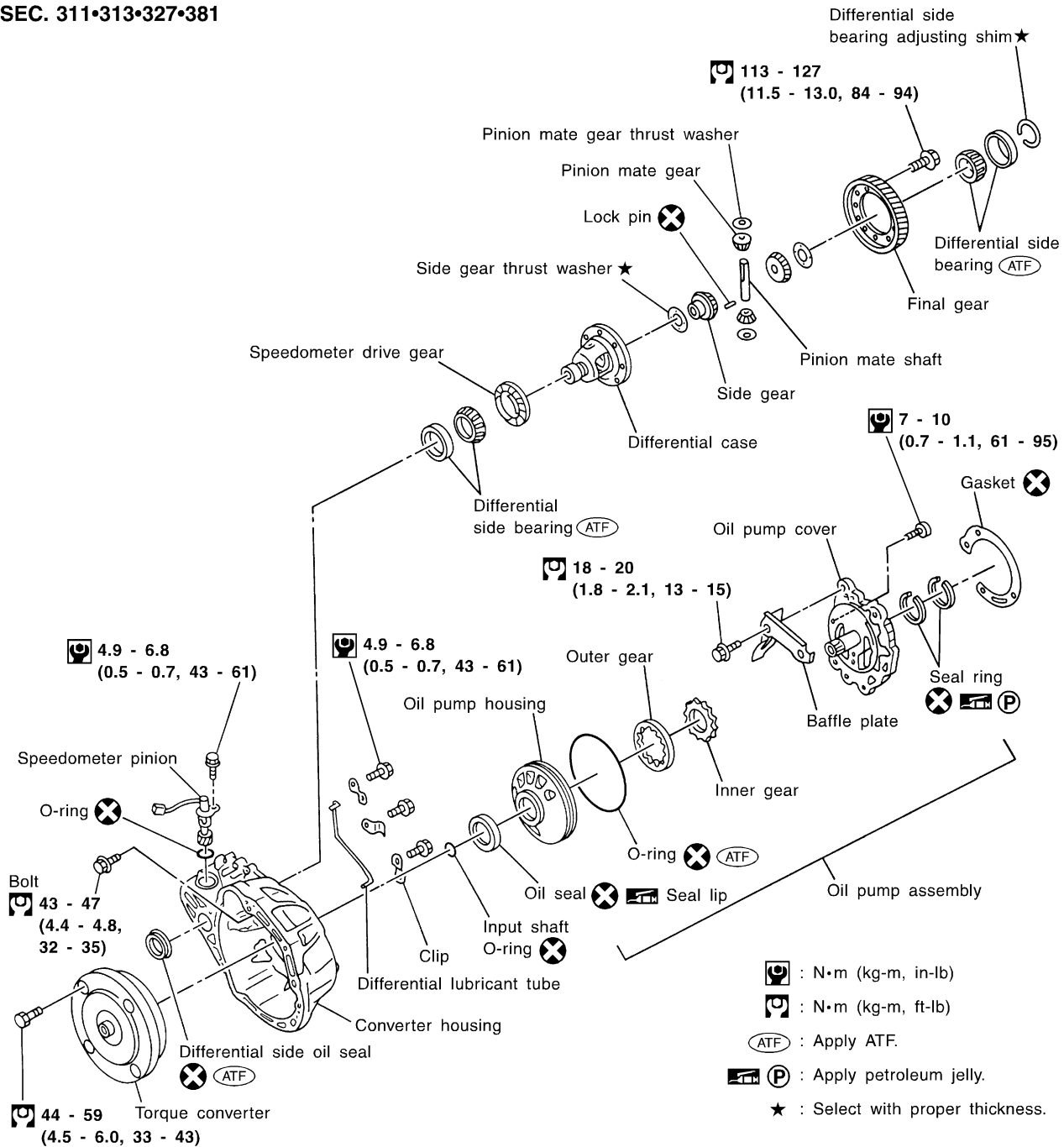
- Check fluid level in transaxle.
- Move selector lever through all positions to be sure that transaxle operates correctly.  
With parking brake applied, rotate engine at idling. Move selector lever through N to D, to 3, to 2, to 1 and to R position. A slight shock should be felt by hand gripping selector each time transaxle is shifted.
- Perform road test. Refer to AT-68.



## Components

NFAT0121

SEC. 311•313•327•381




GI  
MA  
EM  
LC  
EC  
FE  
CL  
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AX  
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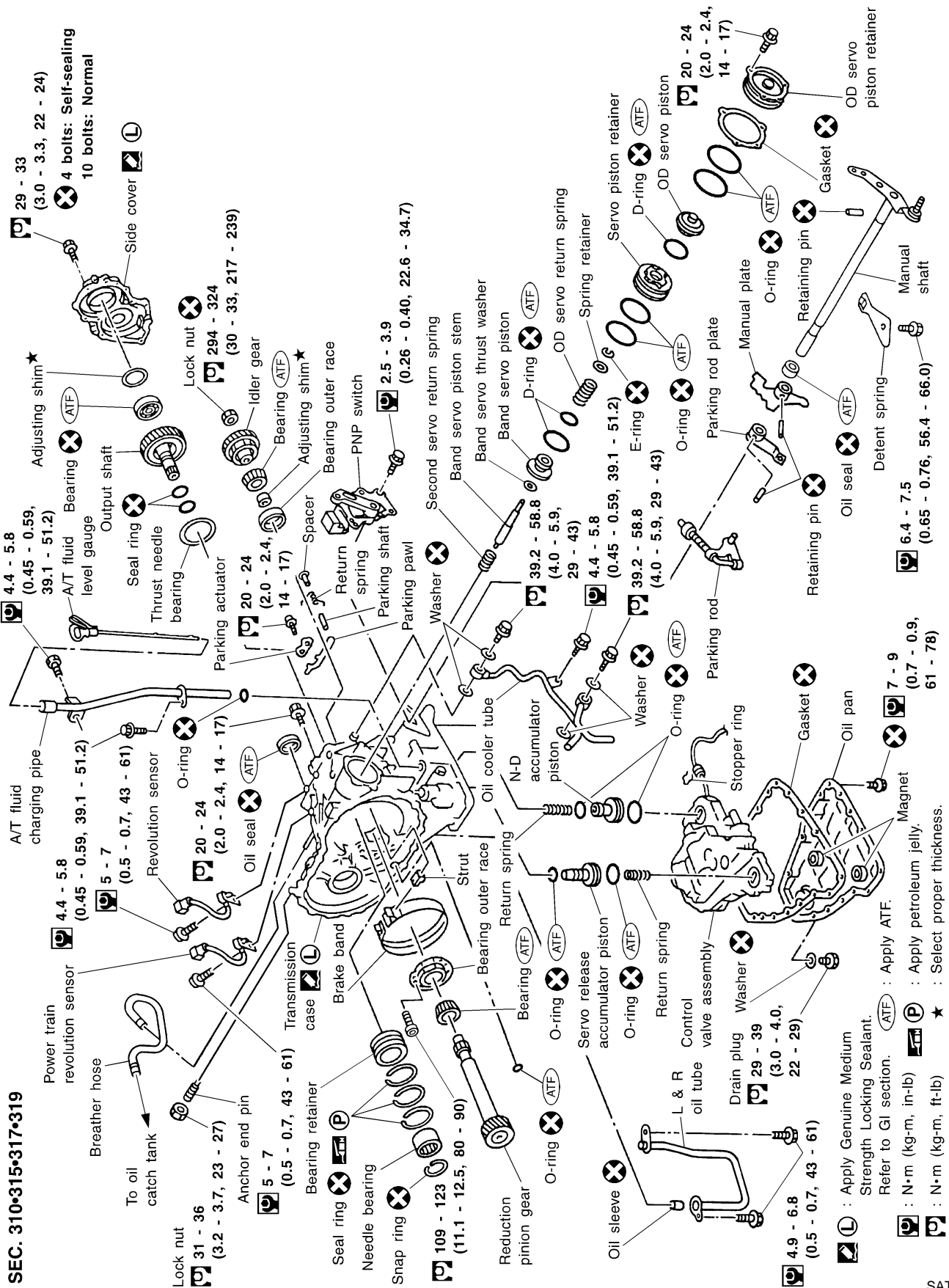
ATF: Apply ATF.

 **P** : Apply petroleum jelly.

★ : Select proper thickness.



## SEC. 310-315-317-319



Ⓛ : Apply Genuine Medium Strength Locking Sealant. Refer to GI section.

Ⓜ : Apply ATF.

Ⓜ : N·m (kg-m, in-lb)

Ⓜ : N·m (kg-m, ft-lb) ★ : Select proper thickness.

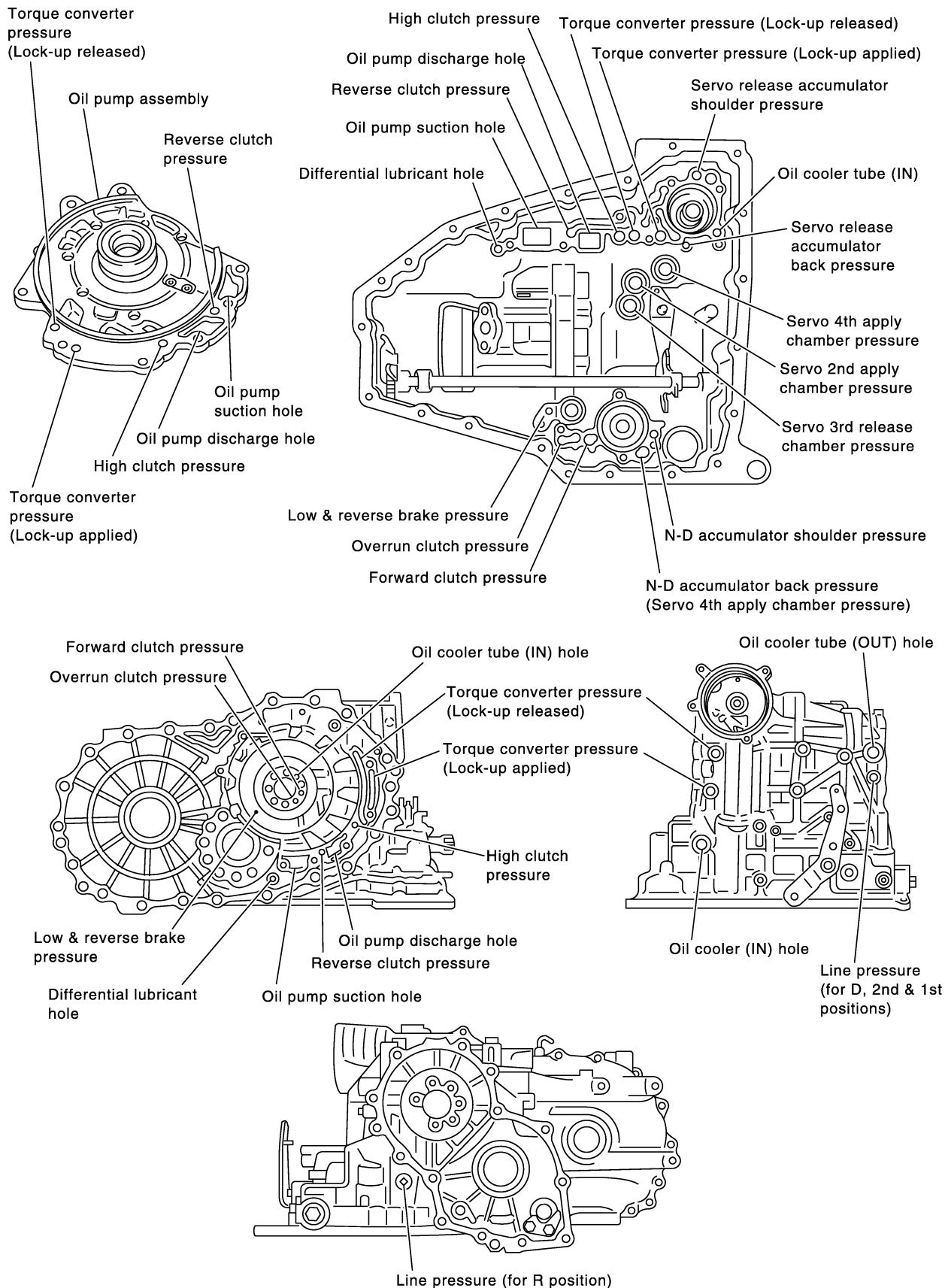


# OVERHAUL

Oil Channel

## Oil Channel

NFAT0122



SAT573K



# OVERHAUL

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

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

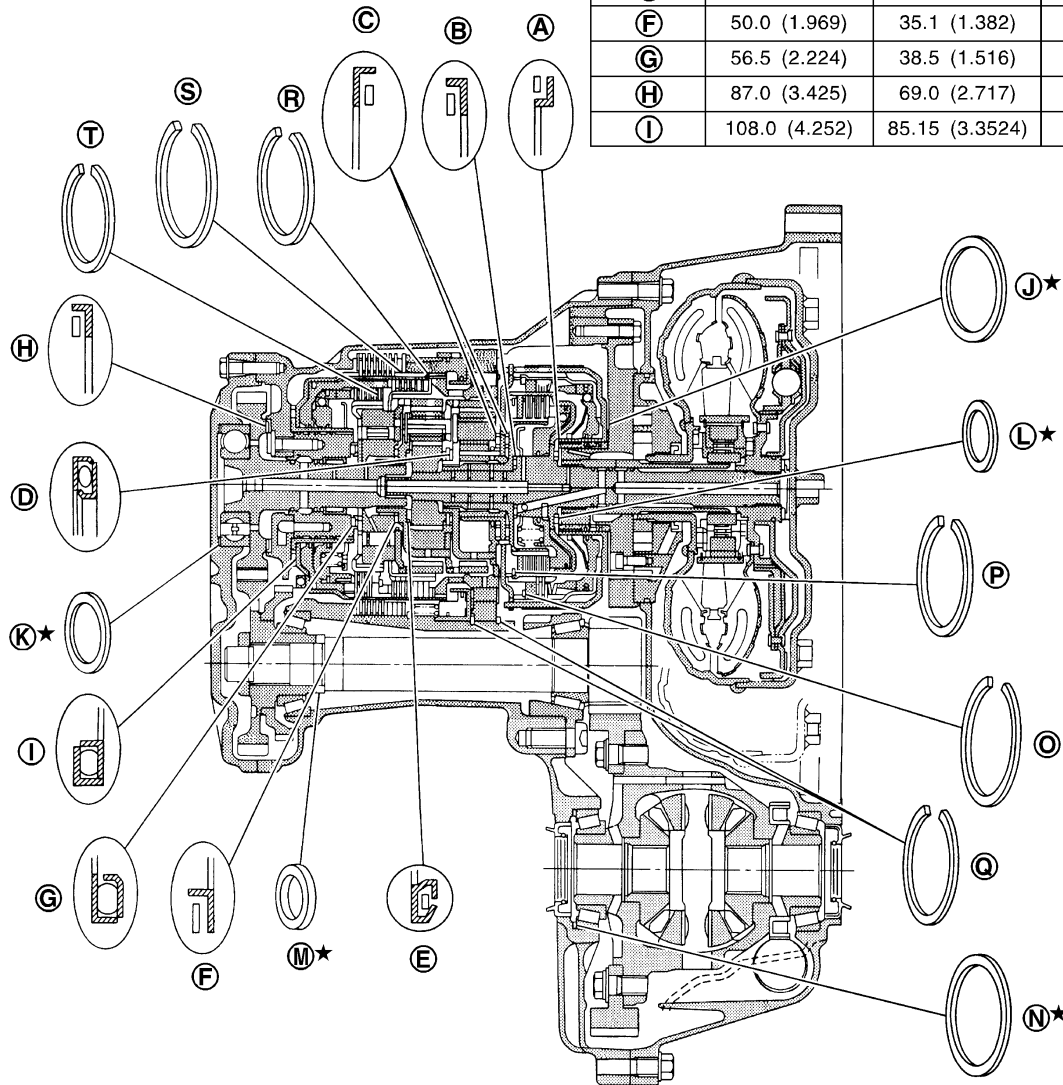
NFAT0123

Outer diameter of thrust washers

Item number	Outer diameter mm (in)	Parts number*
<b>(J)★</b>	76.0 (2.992)	31508 80X13 - 31508 80X20
<b>(K)★</b>	80.0 (3.150)	31438 80X60 - 31438 80X70

Outer and inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
<b>(A)</b>	50.0 (1.969)	35.1 (1.382)	31407 80X10
<b>(B)</b>	42.0 (1.654)	23.7 (0.933)	31407 80X01
<b>(C)</b>	70.0 (2.756)	50.0 (1.969)	31407 80X09
<b>(D)</b>	51.0 (2.008)	33.1 (1.303)	31407 80X02
<b>(E)</b>	48.0 (1.890)	30.0 (1.181)	31407 80X03
<b>(F)</b>	50.0 (1.969)	35.1 (1.382)	31407 80X10
<b>(G)</b>	56.5 (2.224)	38.5 (1.516)	31407 80X08
<b>(H)</b>	87.0 (3.425)	69.0 (2.717)	31407 80X07
<b>(I)</b>	108.0 (4.252)	85.15 (3.3524)	31407 80X06



Outer & inner diameter of bearing races, adjusting shims and adjusting spacer

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
<b>(L)★</b>	51.0 (2.008)	36.0 (1.417)	31435 80X00 - 31439 80X14
<b>(M)★</b>	38.0 (1.496)	28.1 (1.106)	31439 85X01 - 31439 85X06 31439 83X11 - 31439 83X24 31439 81X00 - 31439 81X24 31439 81X46 - 31439 81X49 31439 81X60 - 31439 81X74
<b>(N)★</b>	75.0 (2.953)	67.0 (2.638)	31438 80X00 - 31439 80X11

★ : Select proper thickness.

\* : Always check with the Parts Department for the latest parts information.

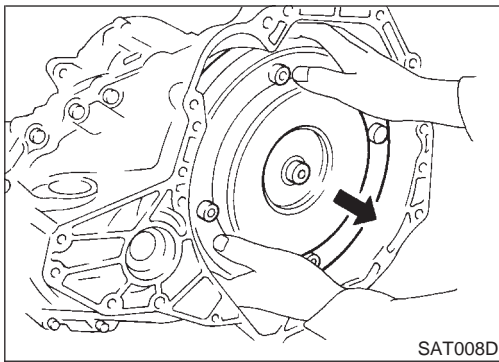
Outer diameter of snap rings

Item number	Outer diameter mm (in)	Parts number*
<b>(O)</b>	150 (5.91)	31506 80X13
<b>(P)</b>	119.1 (4.689)	31506 80X06
<b>(Q)</b>	182.8 (7.197)	31506 80X08
<b>(R)</b>	144.8 (5.701)	31506 80X03
<b>(S)</b>	173.8 (6.843)	31506 80X09
<b>(T)</b>	133.9 (5.272)	31506 80X01

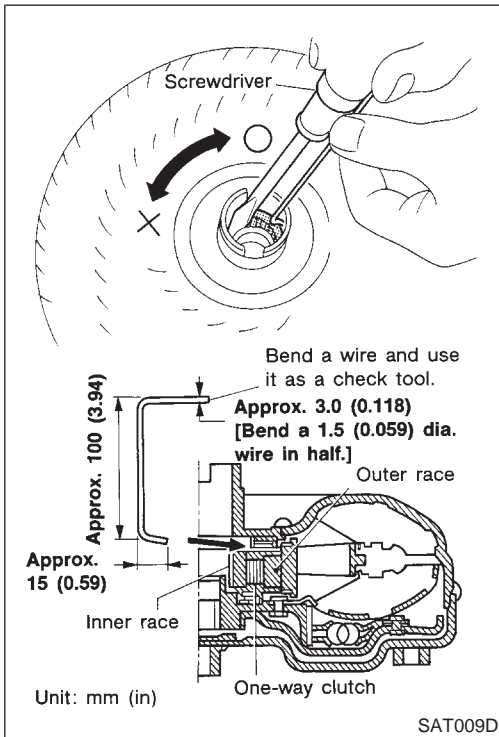
SAT565K



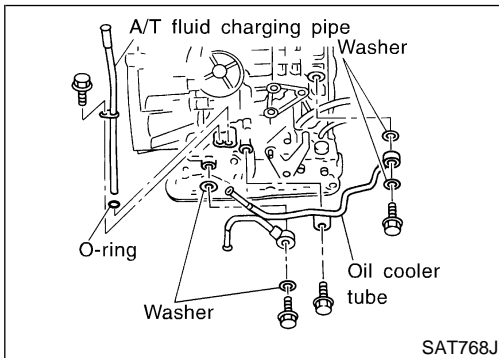
## DISASSEMBLY



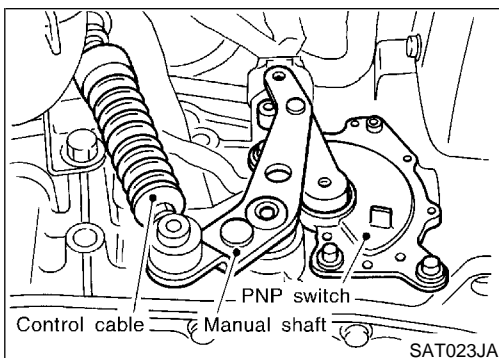
1. Drain ATF through drain plug.
2. Remove torque converter.



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.



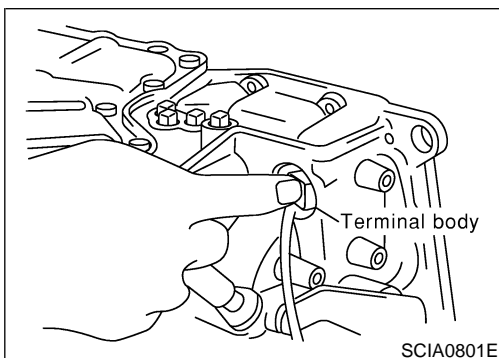
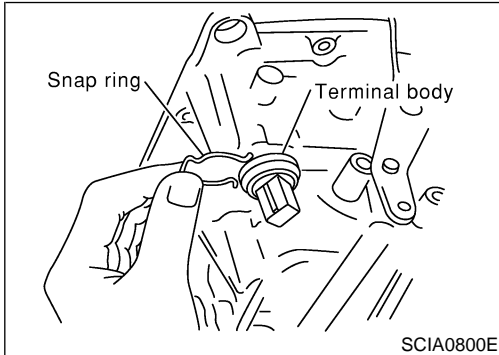
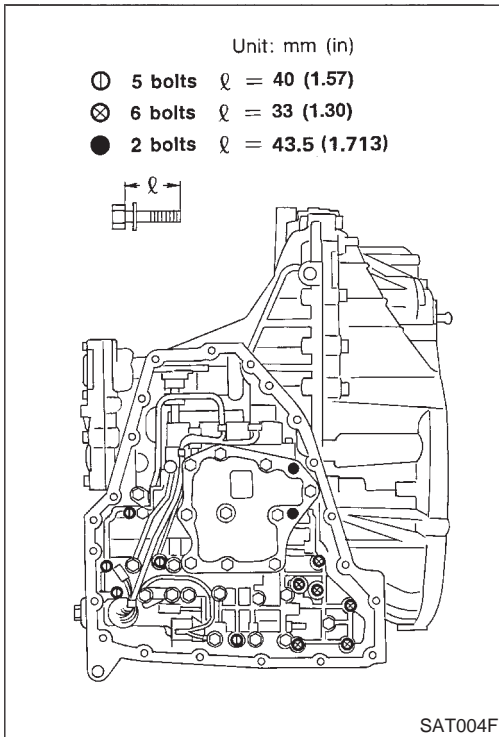
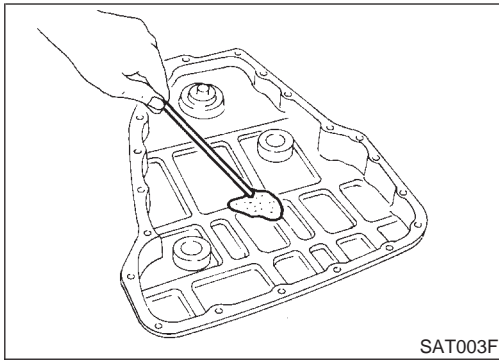
4. Remove A/T fluid charging pipe and fluid cooler tube.



5. Set manual shaft to position P.
6. Remove park/neutral position (PNP) switch.



## DISASSEMBLY

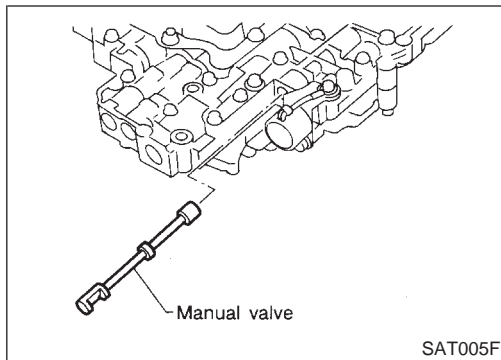


7. Remove oil pan and oil pan gasket.
  - **Do not reuse oil pan bolts.**
8. Check foreign materials in oil pan to help determine causes of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film 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-20, "Radiator".**
9. Remove control valve assembly according to the following procedures.
  - a. Remove control valve assembly mounting bolts I, X and ●.
  - b. Remove snap ring from terminal body.
  - c. Push terminal body into transmission case and draw out solenoid harness.

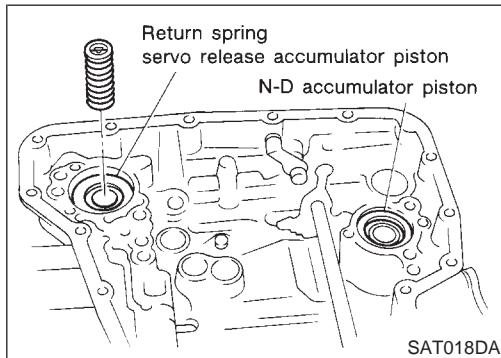
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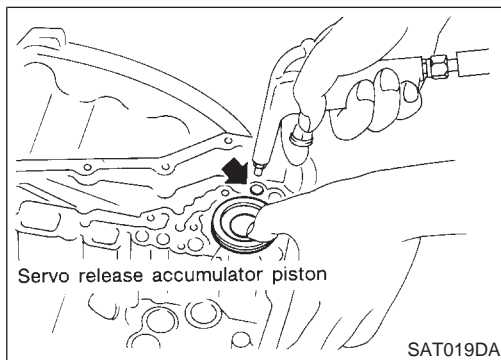
## DISASSEMBLY



10. Remove manual valve from control valve assembly.

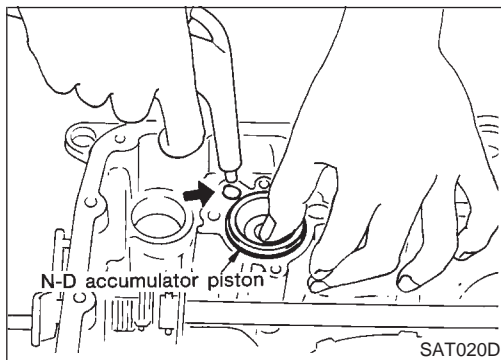


11. Remove return spring from servo release accumulator piston.



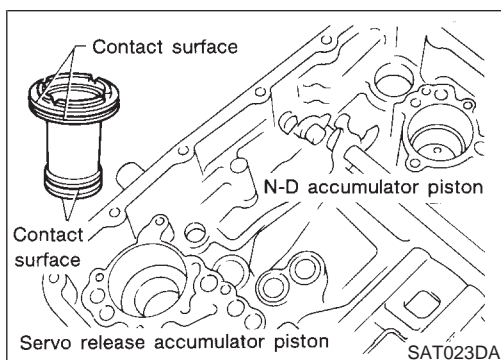
12. Remove servo release accumulator piston with compressed air.

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.

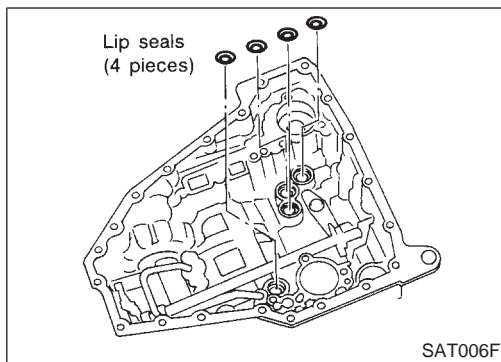


16. Check accumulator pistons and contact surface of transmission case for damage.

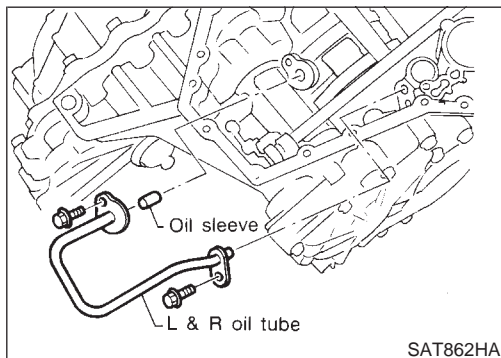
17. Check accumulator return springs for damage and free length.



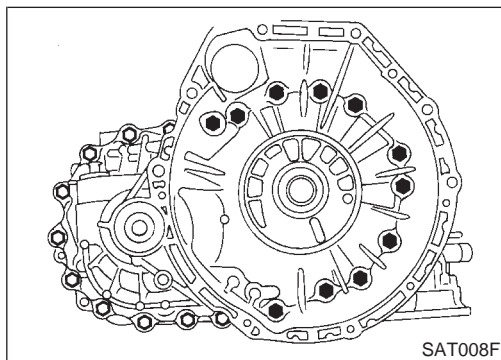
# DISASSEMBLY



18. Remove lip seals.

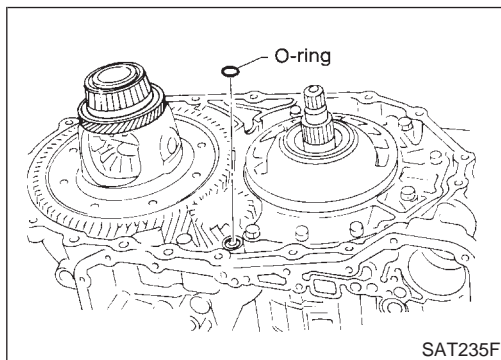


19. Remove L & R oil tube and oil sleeve.

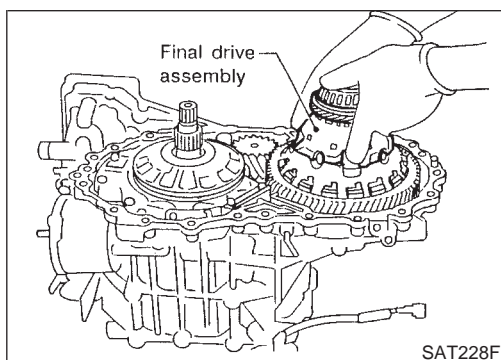


20. Remove converter housing according to the following procedures.

- a. Remove converter housing mounting bolts.
- b. Remove converter housing by tapping it lightly.



c. Remove O-ring from differential oil port.

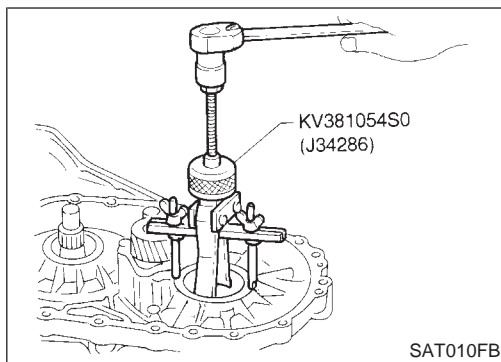


21. Remove final drive assembly from transmission case.

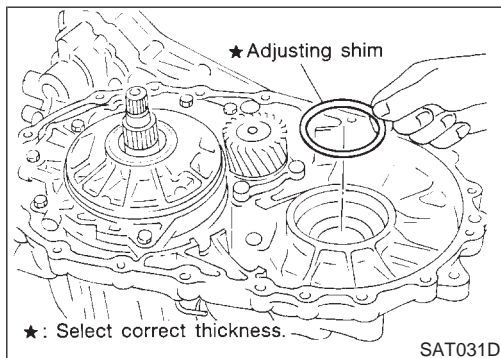
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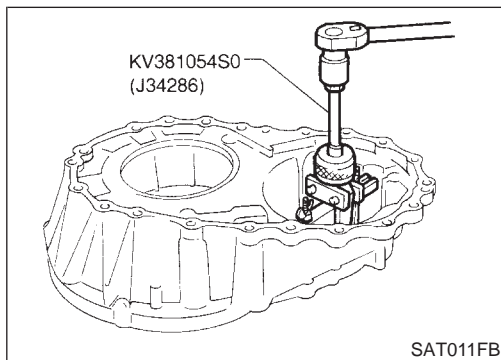
## DISASSEMBLY



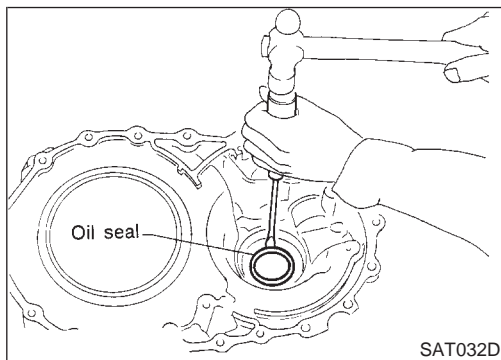
22. Remove differential side bearing outer race and side bearing adjusting shim from transmission case.



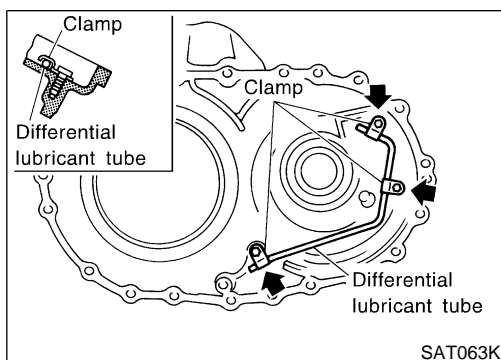
23. Remove differential side bearing adjusting shim from transmission case.



24. Remove differential side bearing outer race from converter housing.



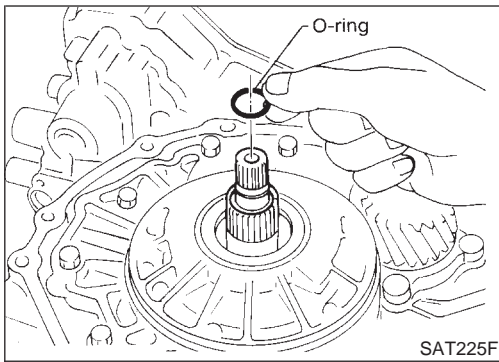
25. Remove oil seal with screwdriver from converter housing.
- **Be careful not to damage case.**



26. Remove differential lubricant tube from converter housing.

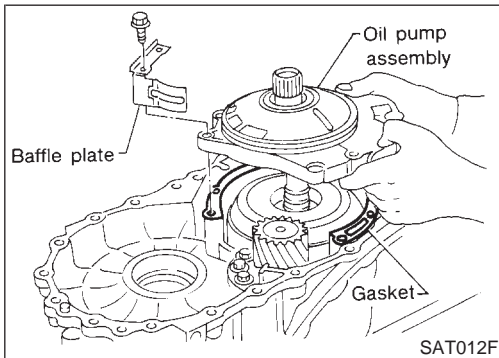


## DISASSEMBLY

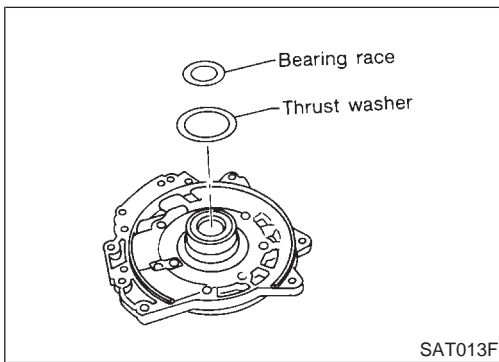


27. Remove oil pump according to the following procedures.

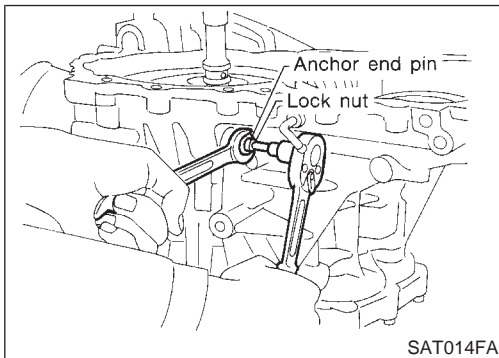
a. Remove O-ring from input shaft.



b. Remove oil pump assembly, baffle plate and gasket from transmission case.



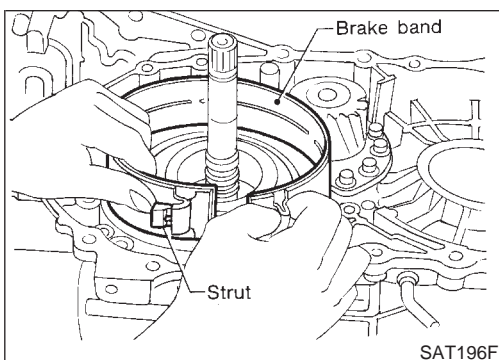
c. Remove thrust washer and bearing race from oil pump assembly.



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.**

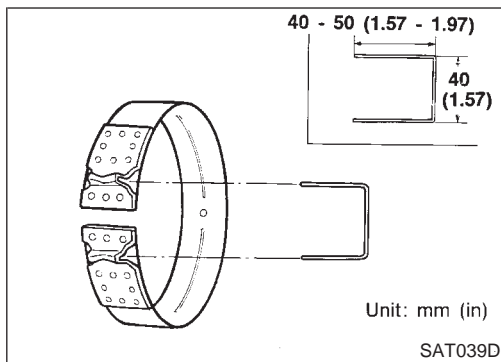


b. Remove brake band and strut from transmission case.

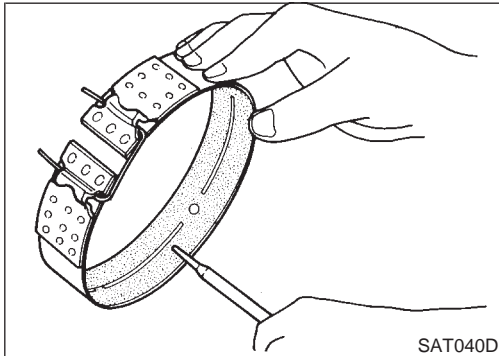
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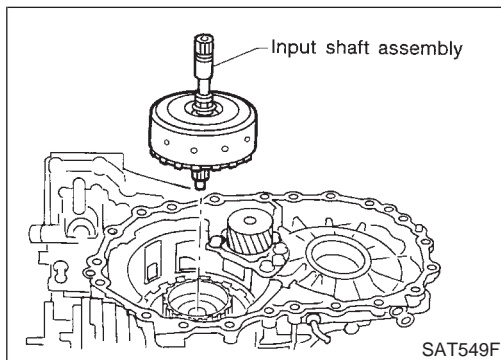
## DISASSEMBLY



- 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.

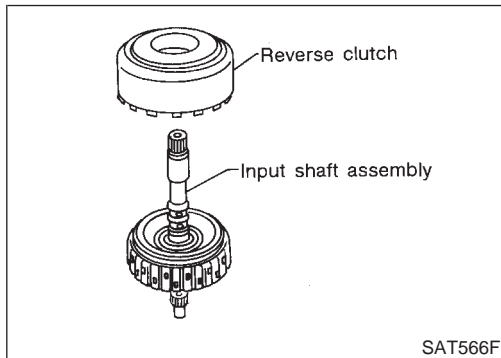


- Check brake band facing for damage, cracks, wear or burns.

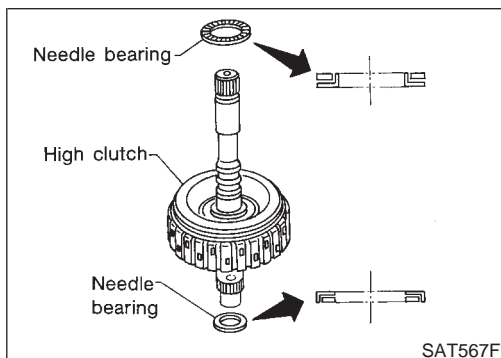


- Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures.

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



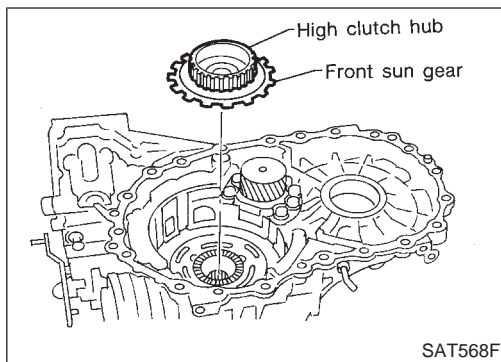
- Remove input shaft assembly (high clutch) from reverse clutch.



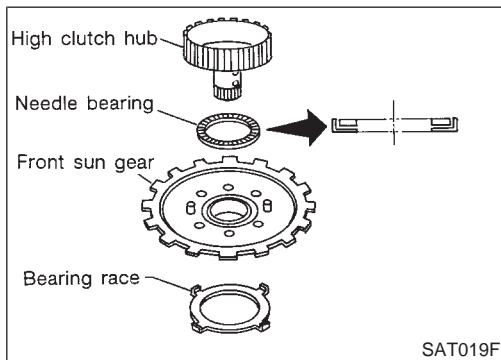
- Remove needle bearings from high clutch drum and check for damage or wear.



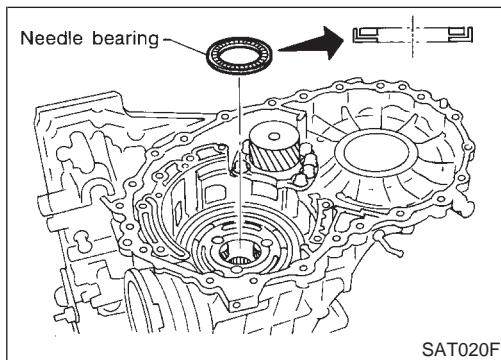
## DISASSEMBLY



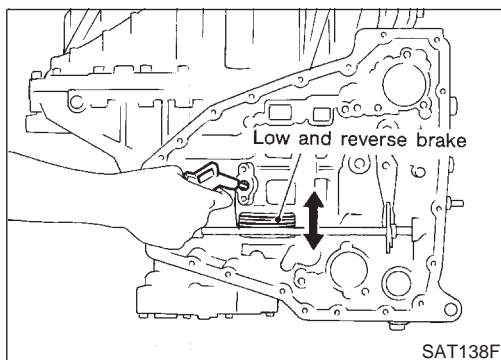
- d. Remove high clutch hub and front sun gear from transmission case.



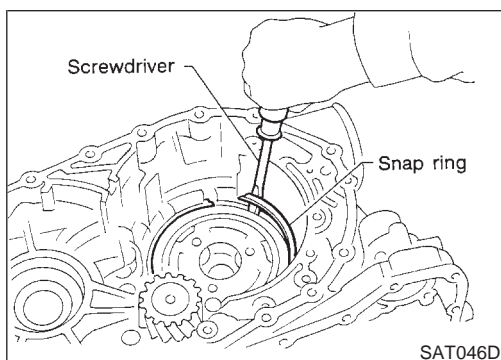
- e. Remove front sun gear and needle bearing from high clutch hub and check for damage or wear.  
f. Remove bearing race from front sun gear and check for damage or wear.



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.

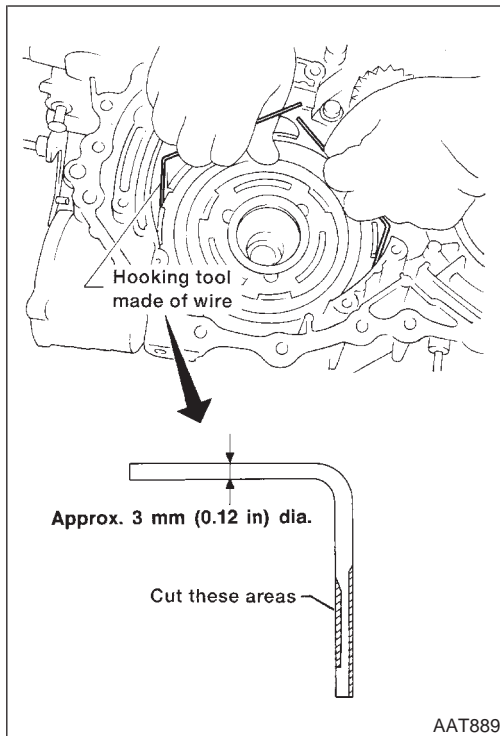


32. Remove low one-way clutch and front planetary carrier assembly according to the following procedures.  
a. Remove snap ring with flat-bladed screwdriver.

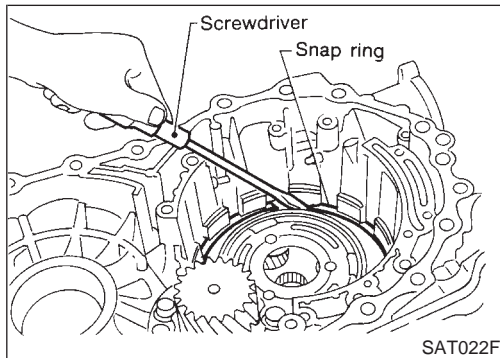
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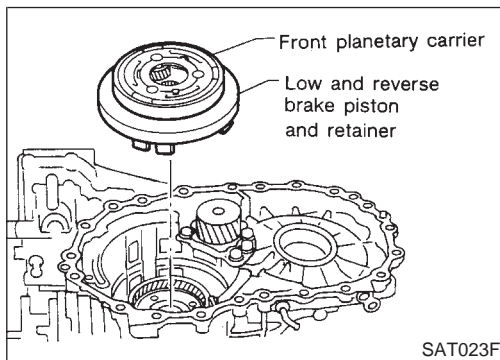
## DISASSEMBLY



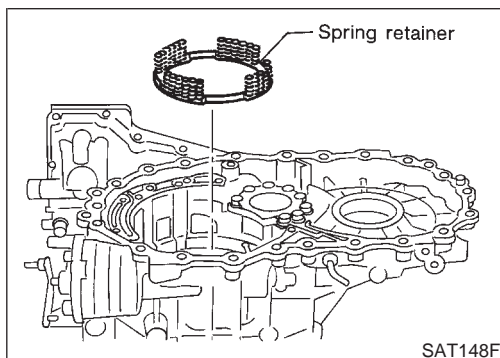
- b. Remove low one-way clutch with a hook made of wire.



- c. Remove snap ring with flat-bladed screwdriver.



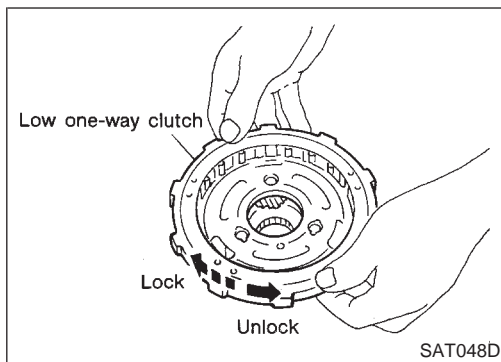
- d. Remove front planetary carrier with low and reverse brake piston and retainer.



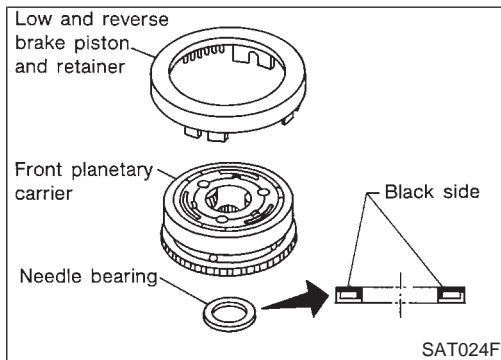
- e. Remove low and reverse brake spring retainer.  
● Do not remove return springs from spring retainer.



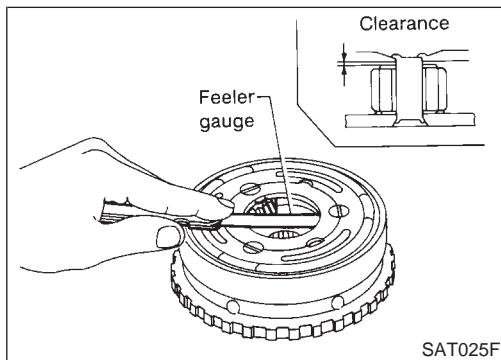
## DISASSEMBLY



- 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.

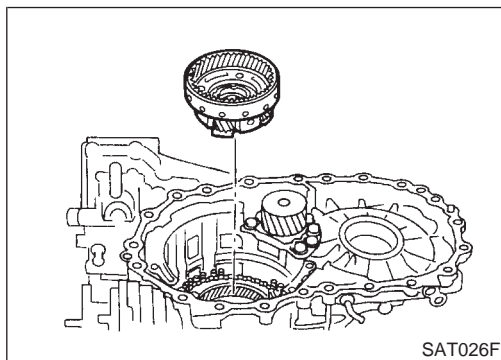
**Standard clearance:**

**0.20 - 0.70 mm (0.0079 - 0.0276 in)**

**Allowable limit:**

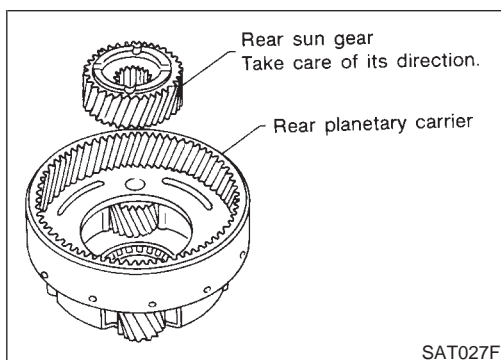
**0.80 mm (0.0315 in)**

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.

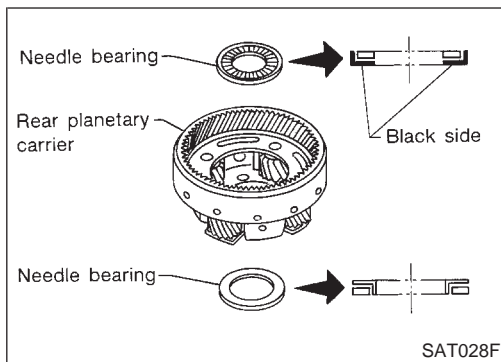
- a. Remove rear planetary carrier assembly from transmission case.



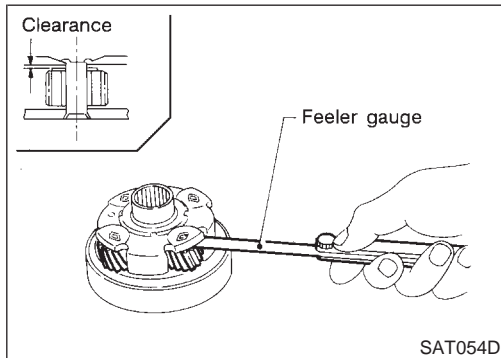
- b. Remove rear sun gear from rear planetary carrier.



## DISASSEMBLY



- 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.

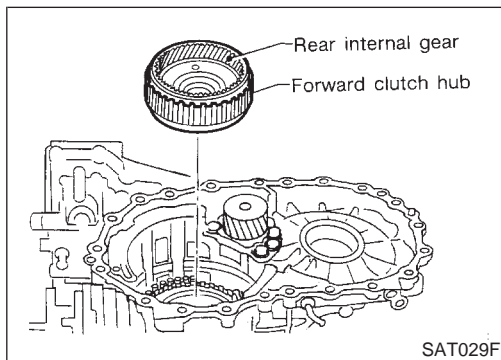
**Standard clearance:**

**0.20 - 0.70 mm (0.0079 - 0.0276 in)**

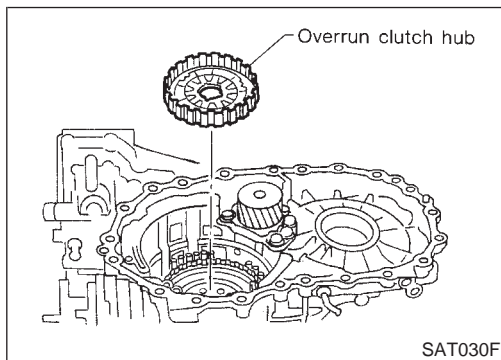
**Allowable limit:**

**0.80 mm (0.0315 in)**

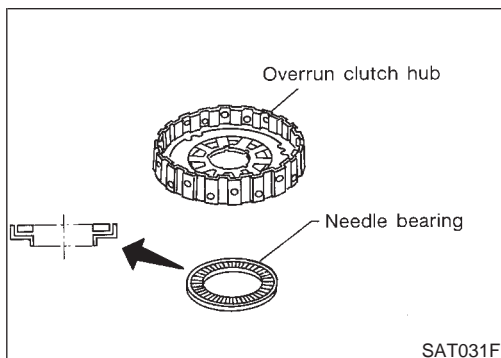
Replace rear planetary carrier if the clearance exceeds allowable limit.



34. Remove rear internal gear and forward clutch hub from transmission case.



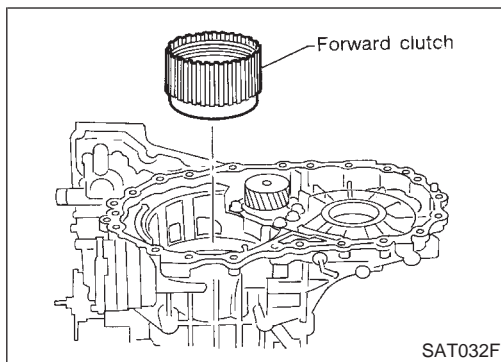
35. Remove overrun clutch hub from transmission case.



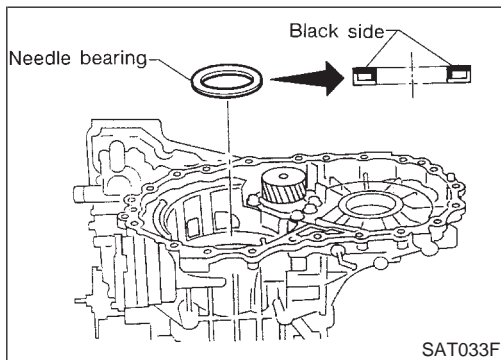
36. Remove needle bearing from overrun clutch hub and check for damage or wear.



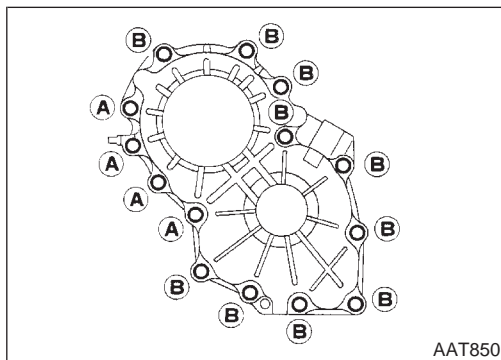
## DISASSEMBLY



37. Remove forward clutch assembly from transmission case.



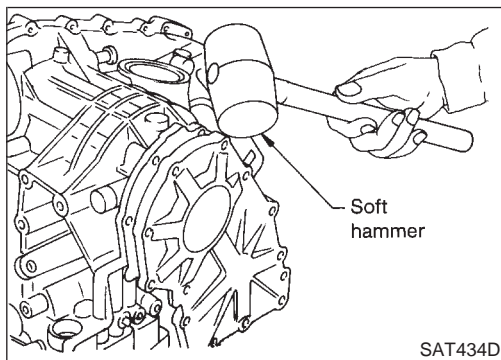
38. Remove needle bearing from transmission case.



39. Remove output shaft assembly according to the following procedures.

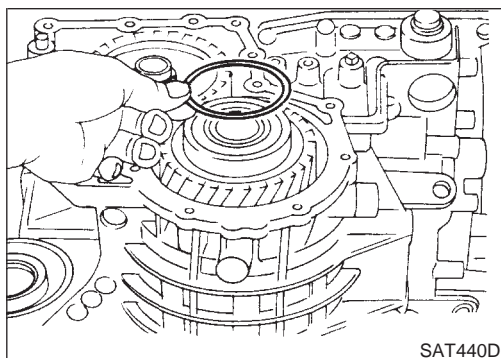
a. Remove side cover bolts.

- **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.**

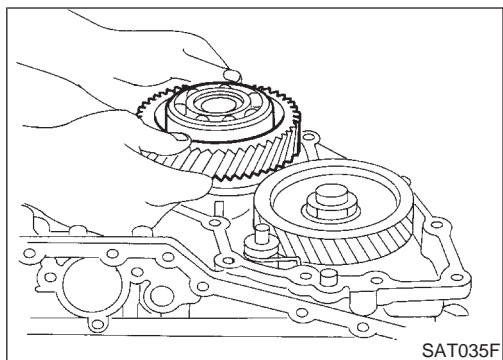


c. Remove adjusting shim.

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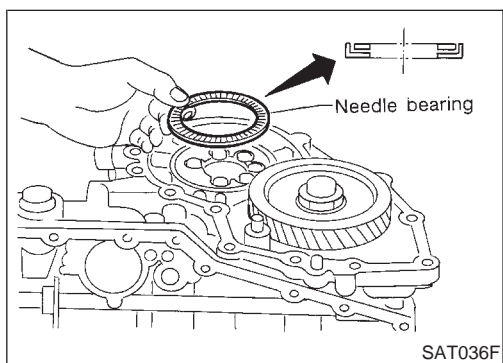
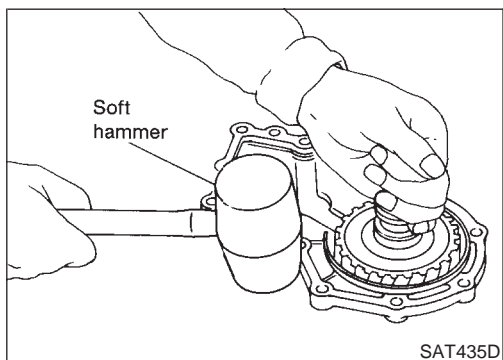


## DISASSEMBLY

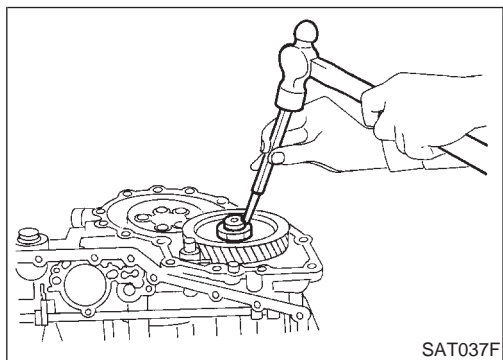


d. Remove output shaft assembly.

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

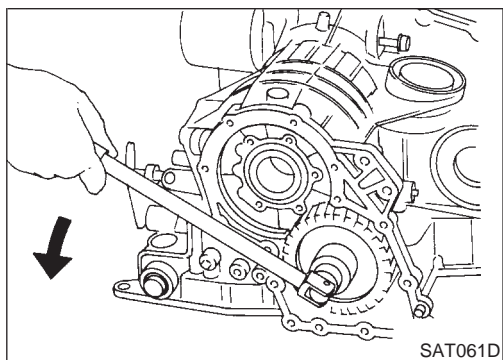


e. Remove needle bearing.



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

- a. Set manual shaft to position P to fix idler gear.
- b. Unlock idler gear lock nut using a pin punch.

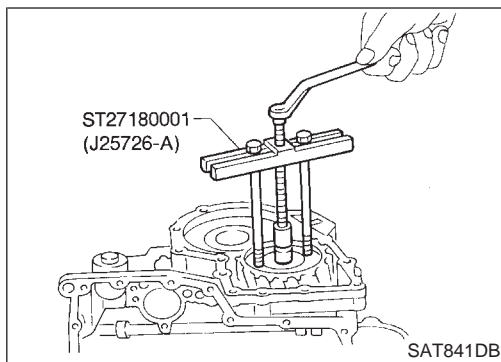


c. Remove idler gear lock nut.

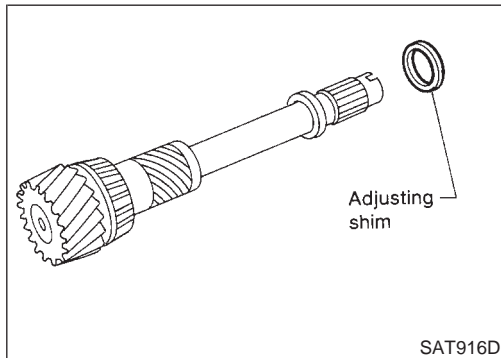
- **Do not reuse idler gear lock nut.**



# DISASSEMBLY

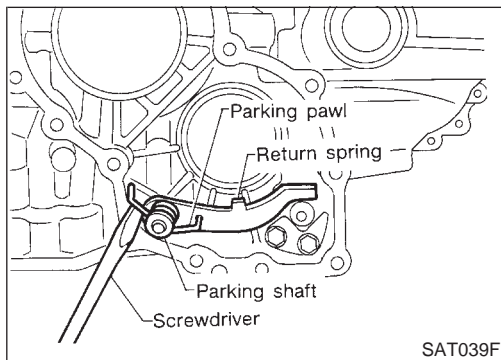


d. Remove idler gear with puller.



e. Remove reduction pinion gear.

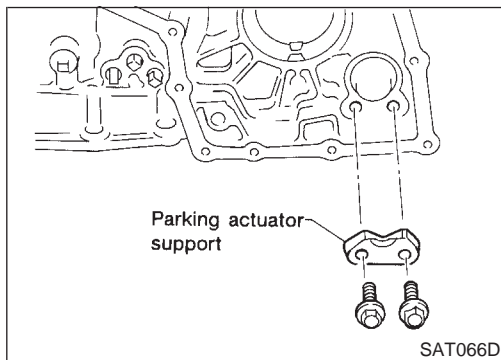
f. Remove adjusting shim from reduction pinion gear.



41. Remove return spring from parking shaft with screwdriver.

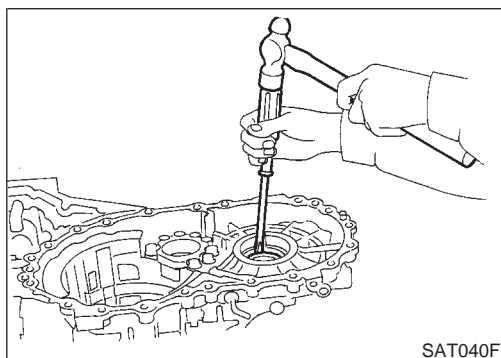
42. Draw out parking shaft and remove parking pawl from transmission case.

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.

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# REPAIR FOR COMPONENT PARTS

Manual Shaft

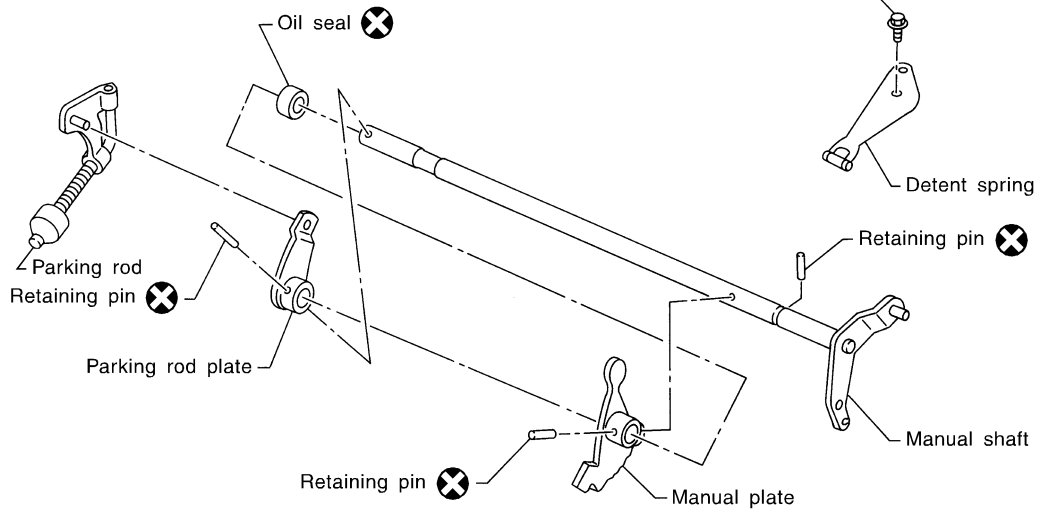
## Manual Shaft COMPONENTS

NFAT0125

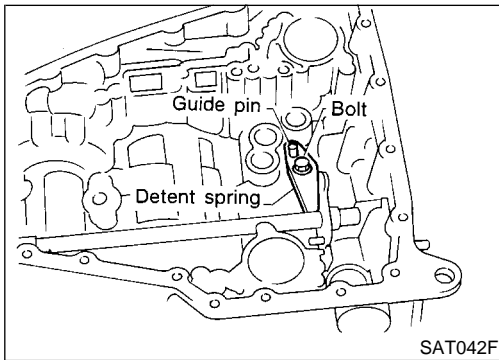
SEC. 319



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



SAT769J

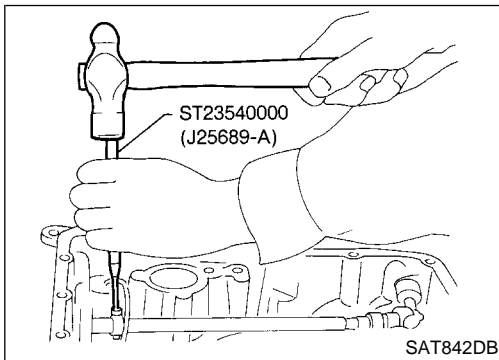


SAT042F

### REMOVAL

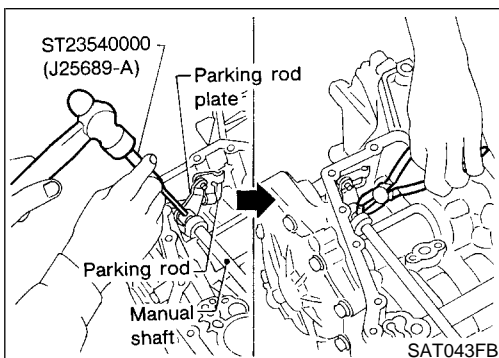
NFAT0126

1. Remove detent spring from transmission case.



SAT842DB

2. Drive out manual plate retaining pin.



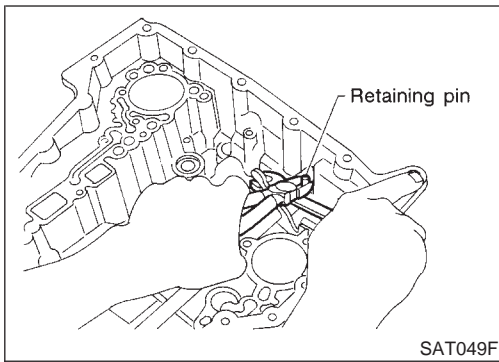
SAT043FB

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.



# REPAIR FOR COMPONENT PARTS

Manual Shaft (Cont'd)



6. Pull out manual shaft retaining pin.
7. Remove manual shaft and manual plate from transmission case.

GI

MA

EM

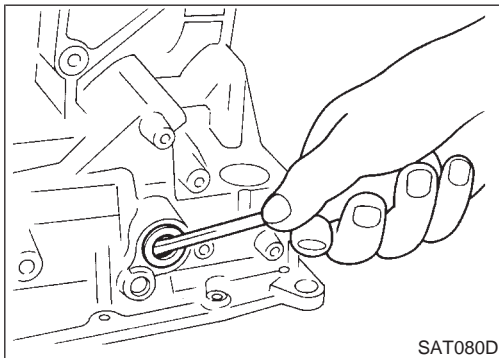
LC

EC

FE

CL

MT



8. Remove manual shaft oil seal.

## INSPECTION

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

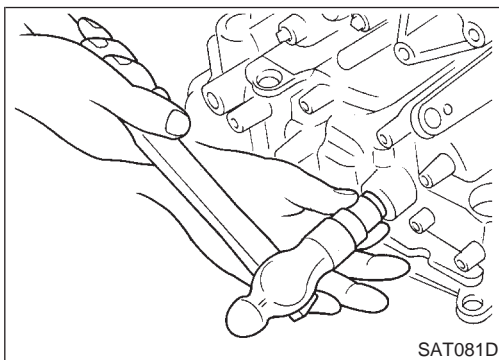
NFAT0127

AT

AX

SU

BR



## INSTALLATION

1. Install manual shaft oil seal.
- Apply ATF to outer surface of oil seal.

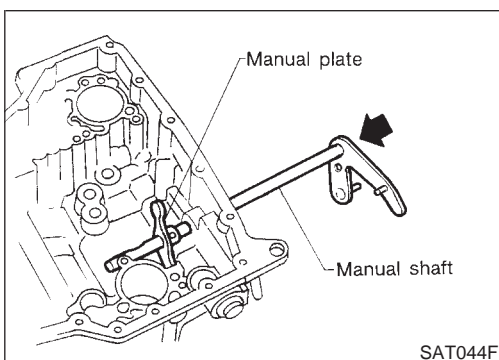
NFAT0128

ST

RS

BT

HA



2. Install manual shaft and manual plate.

SC

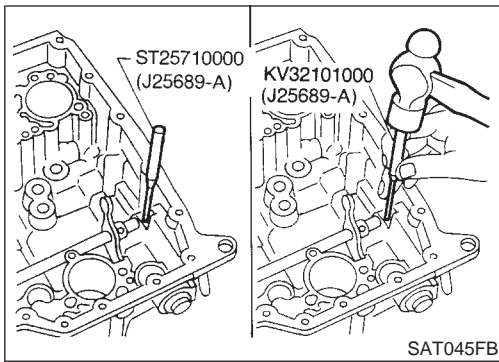
EL

IDX

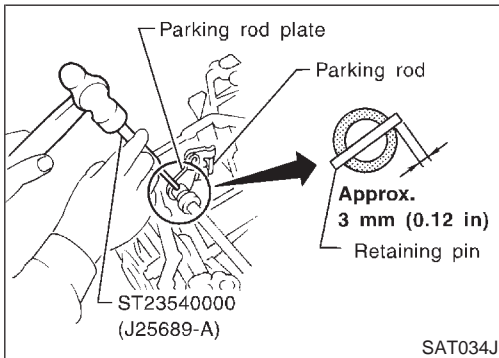


## REPAIR FOR COMPONENT PARTS

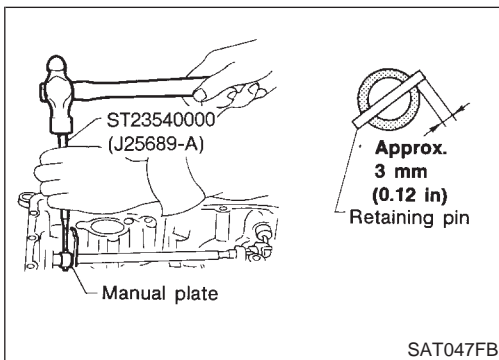
### Manual Shaft (Cont'd)



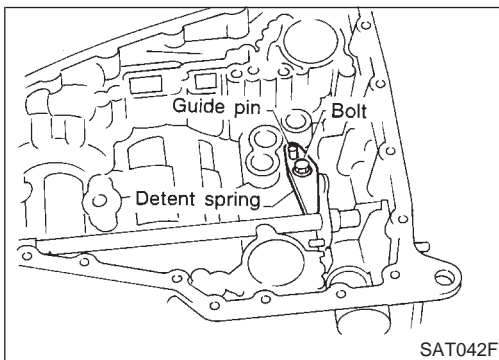
3. Align groove of manual shaft and hole of transmission case.
4. Install manual shaft retaining pin up to bottom of hole.



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.



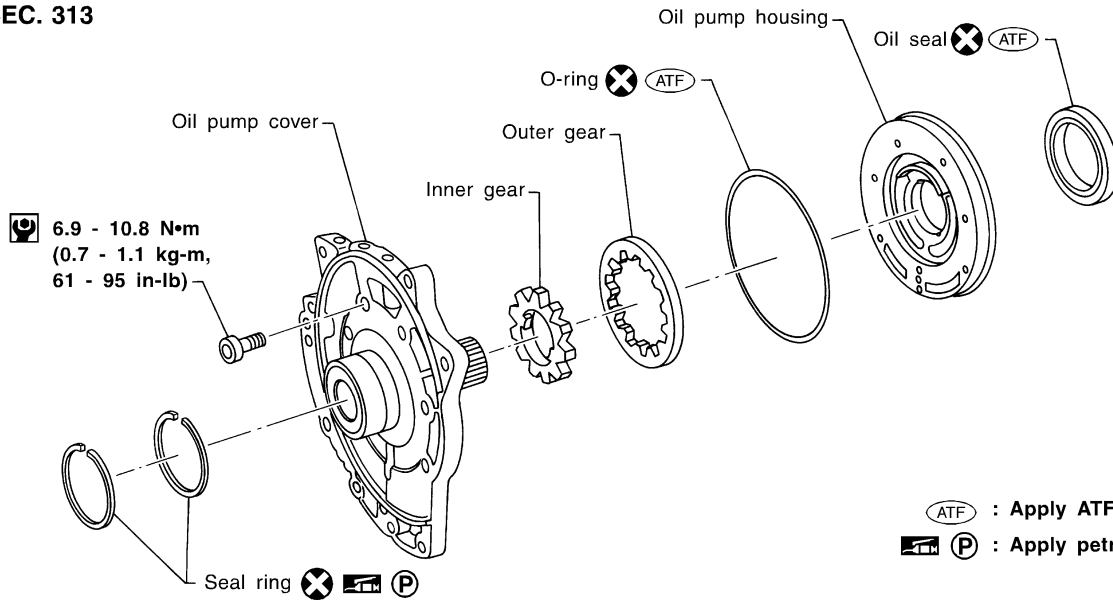
8. Install detent spring. Tighten detent spring bolts to the specified torque. Refer to AT-302.



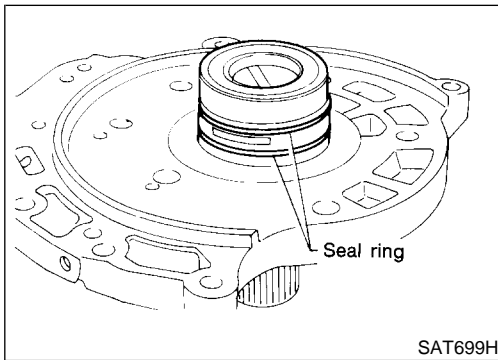
## Oil Pump COMPONENTS

NFAT0129

### SEC. 313



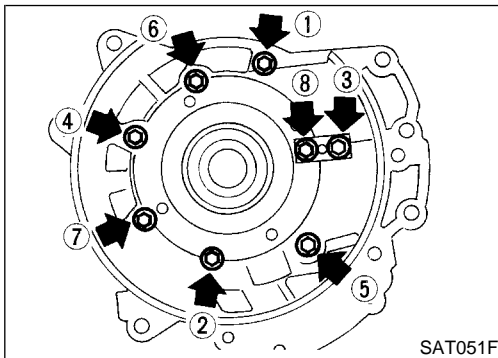
SAT050FD



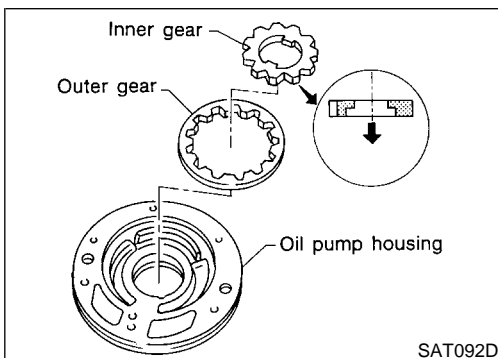
### DISASSEMBLY

NFAT0130

1. Remove seal rings.



2. Loosen bolts in a crisscross pattern and remove oil pump cover.

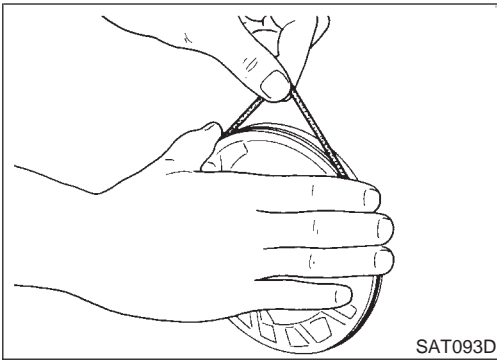


3. Remove inner and outer gear from oil pump housing.

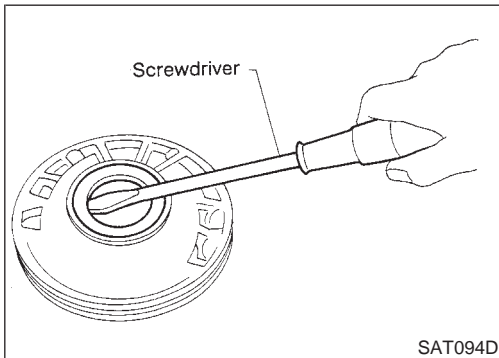


## REPAIR FOR COMPONENT PARTS

### Oil Pump (Cont'd)



4. Remove O-ring from oil pump housing.



5. Remove oil pump housing oil seal.

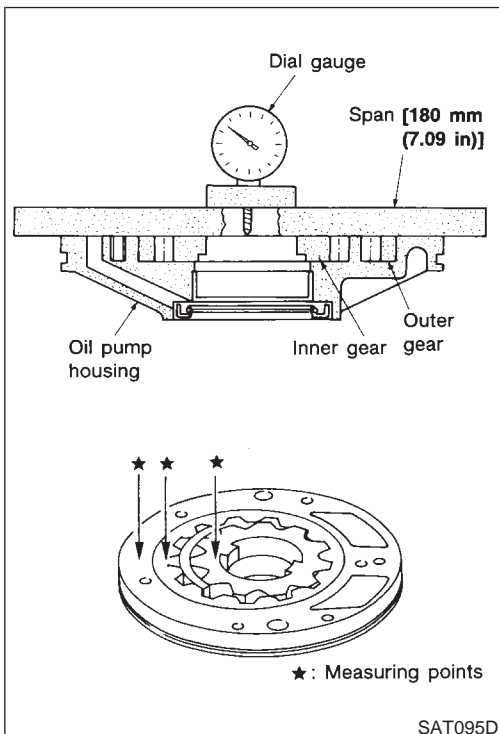
### INSPECTION

#### Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear

NFAT0131

- Check for wear or damage.

NFAT0131S01



### Side Clearances

NFAT0131S02

- 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)**

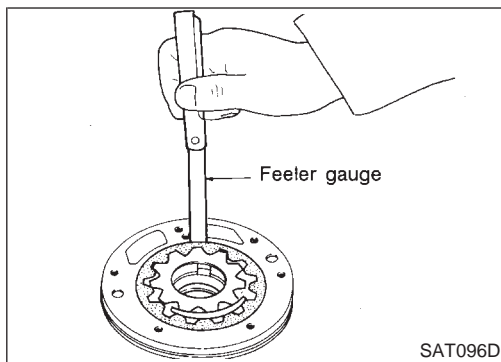
- If clearance is less than standard, select inner and outer gear as a set so that clearance is within specifications.

#### Inner and outer gear:

**Refer to SDS, AT-382.**

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





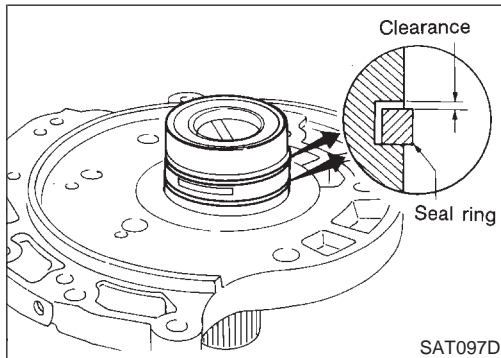
- Measure clearance between outer gear and oil pump housing.  
**Standard clearance:**  
**0.111 - 0.181 mm (0.0044 - 0.0071 in)**  
**Allowable limit:**  
**0.181 mm (0.0071 in)**
- If not within allowable limit, replace whole oil pump assembly except oil pump cover.

GI

MA

EM

LC



## Seal Ring Clearance

- Measure clearance between seal ring and ring groove.  
**Standard clearance:**  
**0.1 - 0.25 mm (0.0039 - 0.0098 in)**  
**Allowable limit:**  
**0.25 mm (0.0098 in)**
- If not within allowable limit, replace oil pump cover assembly.

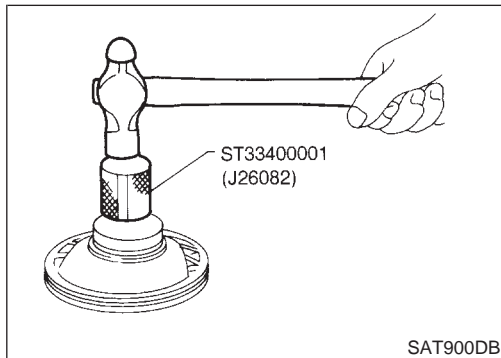
NFAT0131S03

EC

FE

CL

MT



## ASSEMBLY

1. Install oil seal on oil pump housing.

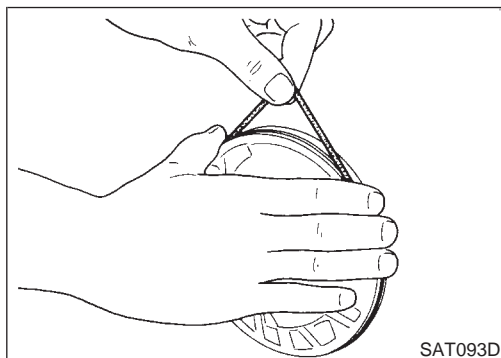
NFAT0132

AT

AX

SU

BR



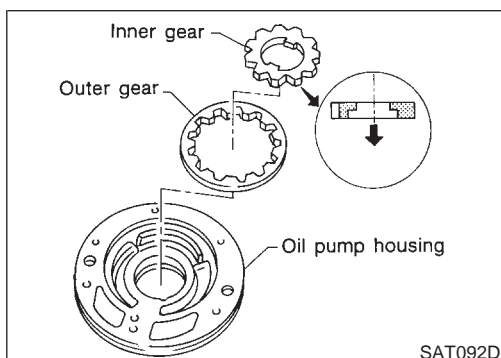
2. Install O-ring on oil pump housing.
  - **Apply ATF to O-ring.**

ST

RS

BT

HA



3. Install inner and outer gears on oil pump housing.
  - **Be careful of direction of inner gear.**

SC

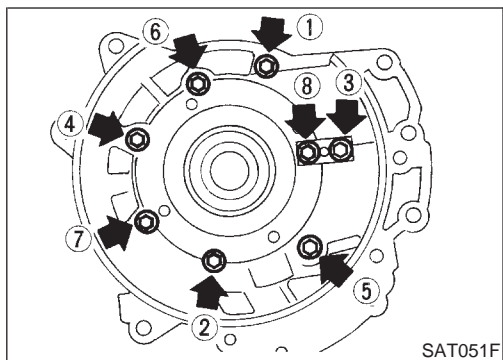
EL

IDX

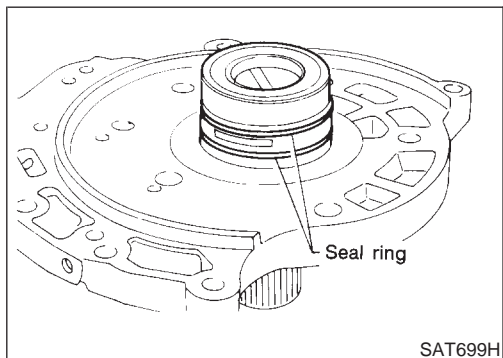


## REPAIR FOR COMPONENT PARTS

### Oil Pump (Cont'd)



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-305.



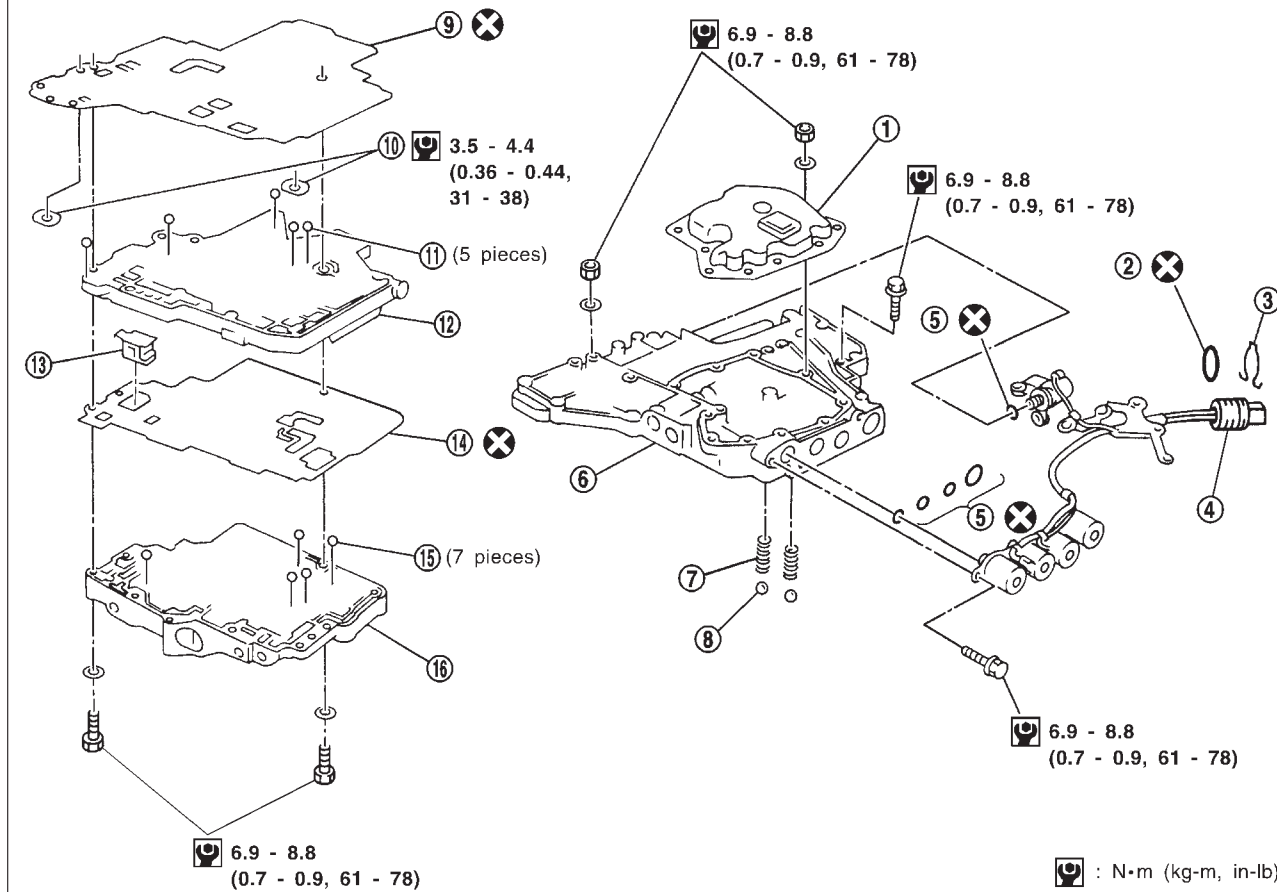
5. Install new seal rings carefully after packing ring groove with petroleum jelly.
  - **Do not spread gap of seal ring excessively while installing. The ring may be deformed.**



## Control Valve Assembly COMPONENTS

=NFAT0133

SEC. 317



SAT537K

- |                             |                                   |                              |
|-----------------------------|-----------------------------------|------------------------------|
| 1. Oil strainer             | 7. Oil cooler relief valve spring | 12. Control valve inter body |
| 2. O-ring                   | 8. Check ball                     | 13. Pilot filter             |
| 3. Snap ring                | 9. Separating plate               | 14. Separating plate         |
| 4. Terminal body            | 10. Support plate                 | 15. Steel ball               |
| 5. O-rings                  | 11. Steel ball                    | 16. Control valve upper body |
| 6. Control valve lower body |                                   |                              |

### DISASSEMBLY

Disassemble upper, inter and lower bodies.

NFAT0134

**Bolt length, number and location:**

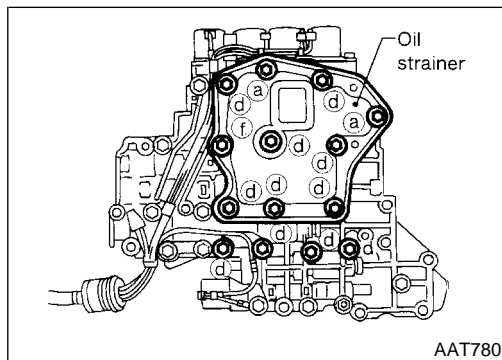
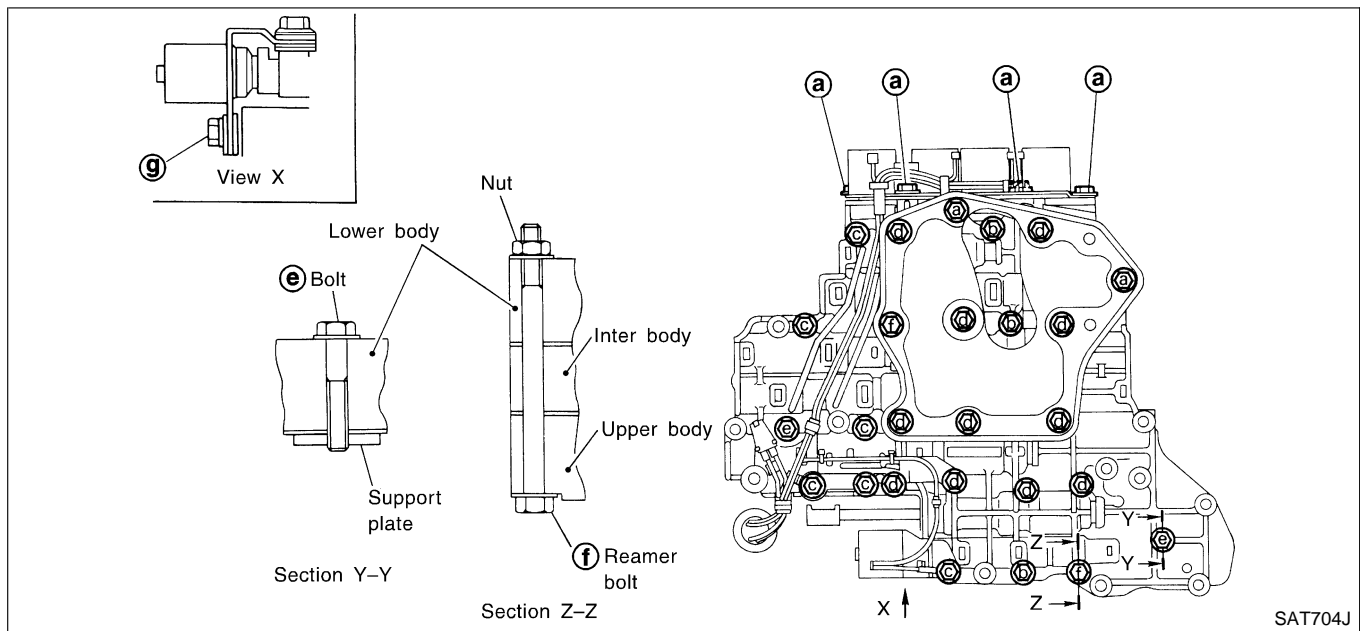
Bolt symbol	a	b	c	d	e	f	g
Bolt length "ℓ" mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

f: Reamer bolt and nut.

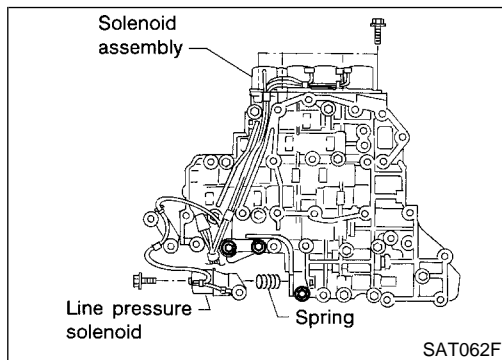


# REPAIR FOR COMPONENT PARTS

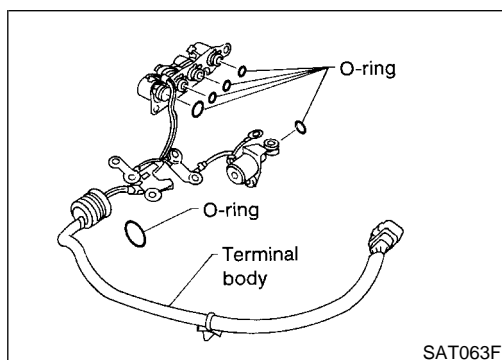
## Control Valve Assembly (Cont'd)



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.

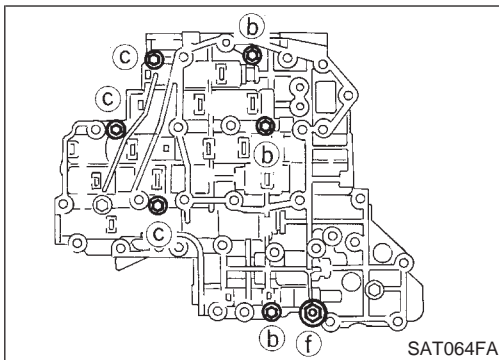


3. Remove O-rings from solenoid valves and terminal body.

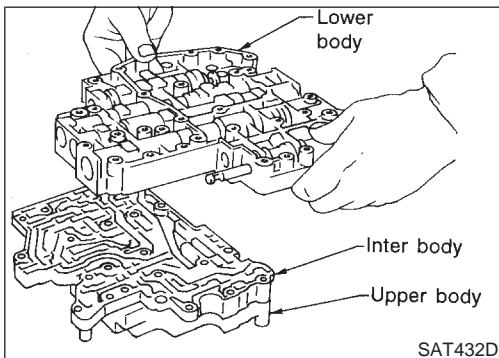


# REPAIR FOR COMPONENT PARTS

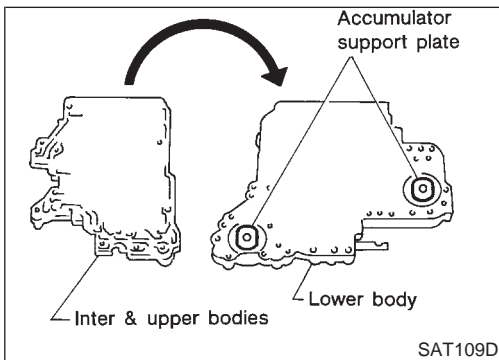
Control Valve Assembly (Cont'd)



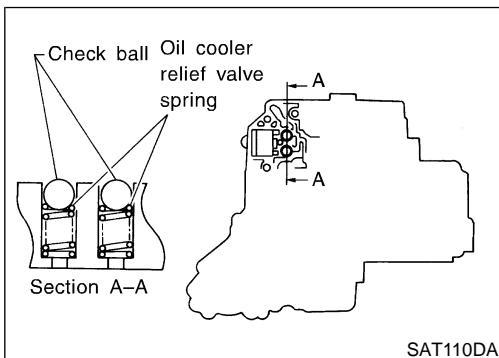
4. Place upper body facedown, and remove bolts **b**, **c** and nut **f**.



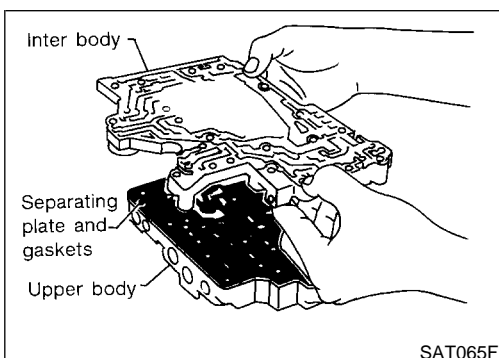
5. Remove inter body from lower body.



6. Turn over lower body, and remove accumulator support plate.



7. Remove bolts **e**, separating plate and separating gasket from lower body.
8. Remove check balls and oil cooler relief valve springs from lower body.
- **Be careful not to lose check balls and oil cooler relief valve springs.**



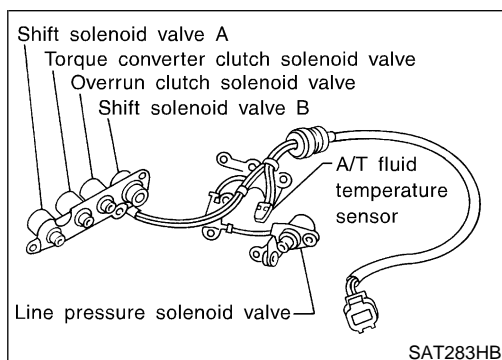
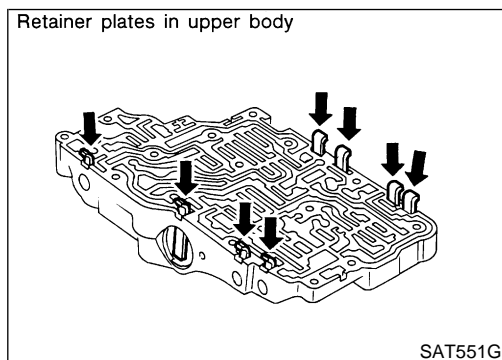
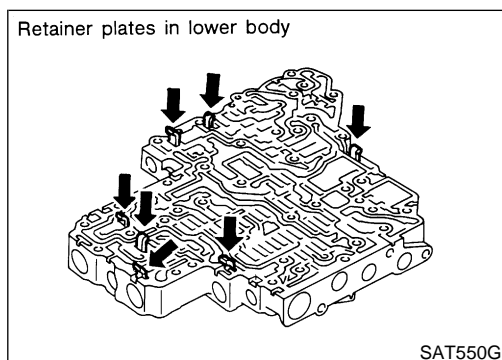
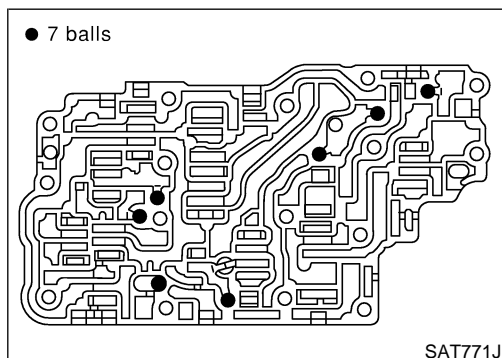
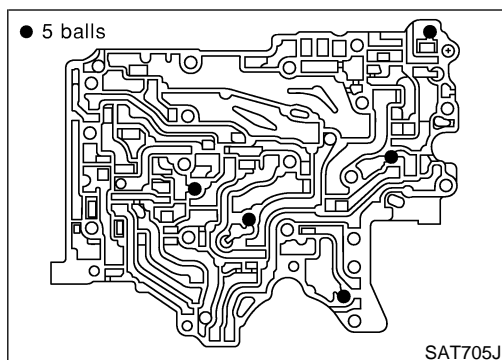
9. Remove inter body from upper body.

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX



# REPAIR FOR COMPONENT PARTS

## Control Valve Assembly (Cont'd)



10. Check to see that steel balls are properly positioned in inter body and then remove them.

- **Be careful not to lose steel balls.**

11. Check to see that steel balls are properly positioned in upper body and then remove them.

- **Be careful not to lose steel balls.**

## INSPECTION

### Lower and Upper Bodies

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

NFAT0135

NFAT0135S01

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

- **Be careful not to lose these parts.**

### Oil Strainer

- Check wire netting of oil strainer for damage.

NFAT0135S02

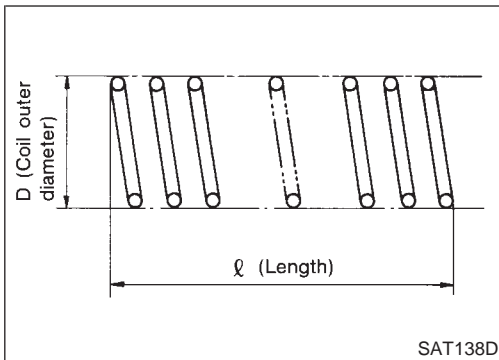
### Shift Solenoid Valves "A" and "B", Line Pressure Solenoid Valve, Torque Converter Clutch Solenoid Valve and Overrun Clutch Solenoid Valve

- Measure resistance.
- For shift solenoid valve A, refer to AT-174.
- For shift solenoid valve B, refer to AT-179.
- For line pressure solenoid valve, refer to AT-168.
- For torque converter clutch solenoid valve, refer to AT-153.
- For overrun clutch solenoid valve, refer to AT-191.

NFAT0135S03



NFAT0135S04



## Oil Cooler Relief Valve Spring

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

**Inspection standard:**

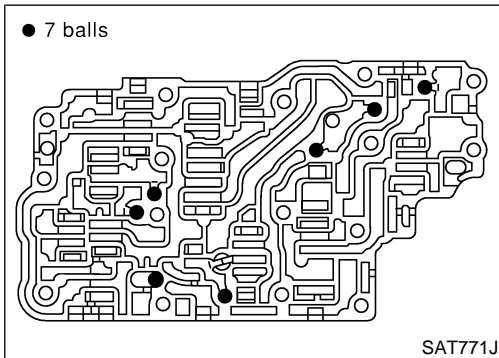
**Refer to SDS, AT-377.**

GI

MA

EM

LC



## ASSEMBLY

NFAT0136

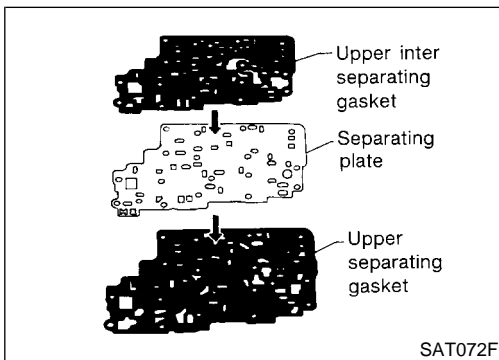
1. Install upper, inter and lower body.
  - a. Place oil circuit of upper body face up. Install steel balls in their proper positions.

EC

FE

CL

MT



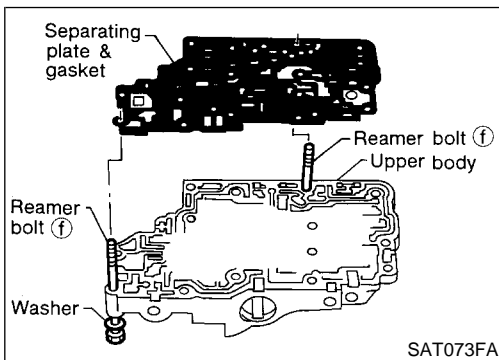
- b. Install upper separating gasket, upper inter separating gasket and upper separating plate in order shown in illustration.

AT

AX

SU

BR



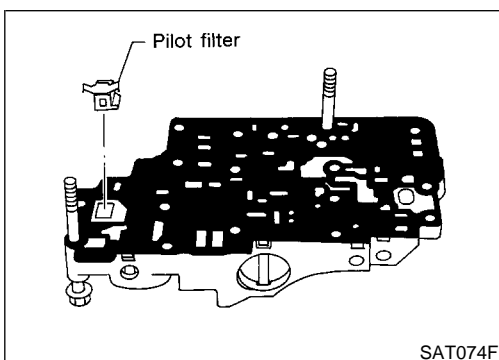
- c. Install reamer bolts f from bottom of upper body. Using reamer bolts as guides, install separating plate and gaskets as a set.

ST

RS

BT

HA



- d. Install pilot filter.

SC

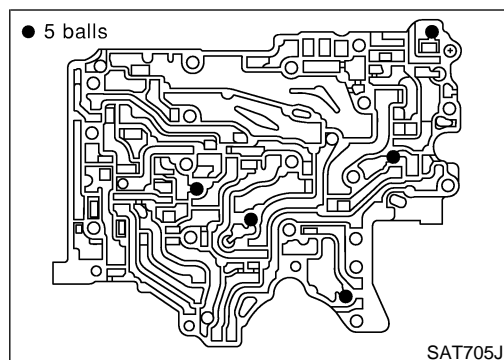
EL

IDX

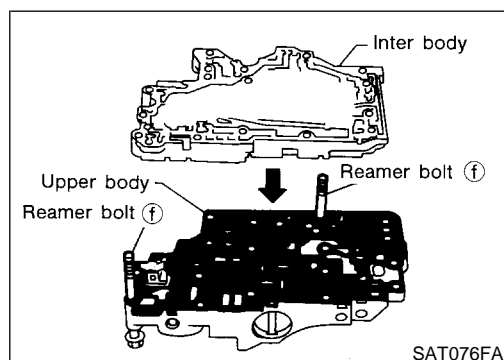


## REPAIR FOR COMPONENT PARTS

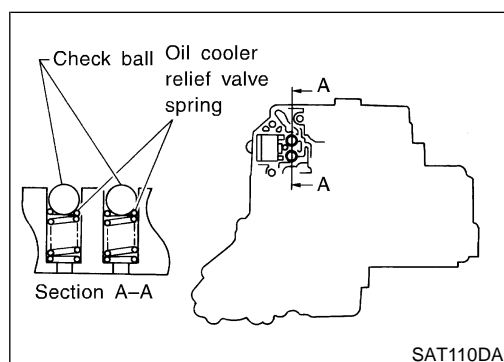
### Control Valve Assembly (Cont'd)



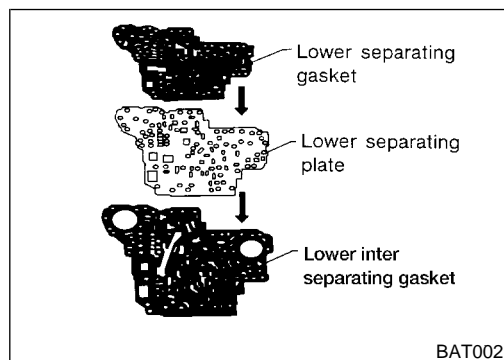
- e. Place lower body as shown in illustration (side of inter body face up). Install steel balls in their proper positions.



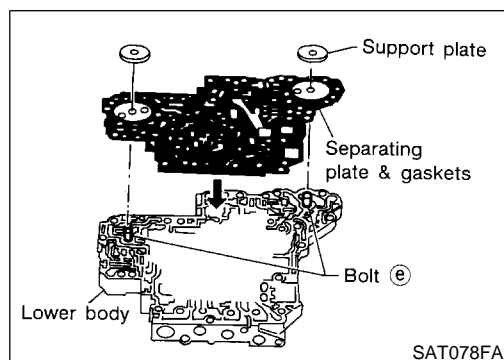
- f. Install inter body on upper body using reamer bolts f as guides.
- **Be careful not to dislocate or drop steel balls.**



- 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.

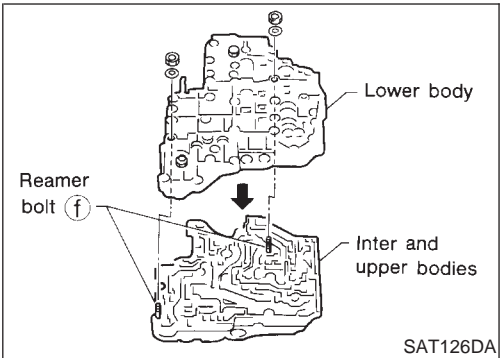


- i. Install bolts e from bottom of lower body. Using bolts e as guides, install separating plate and gaskets as a set.
- j. Temporarily install support plates on lower body.

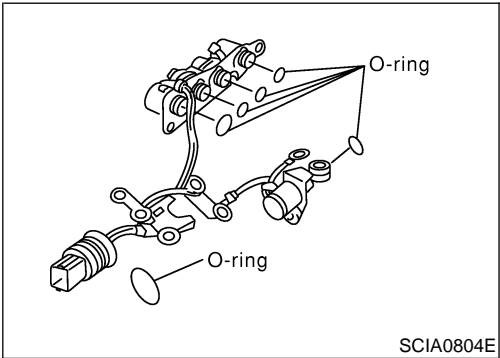


REPAIR FOR COMPONENT PARTS

Control Valve Assembly (Cont'd)




- k. Install lower body on inter body using reamer bolts f as guides and tighten reamer bolts f slightly.

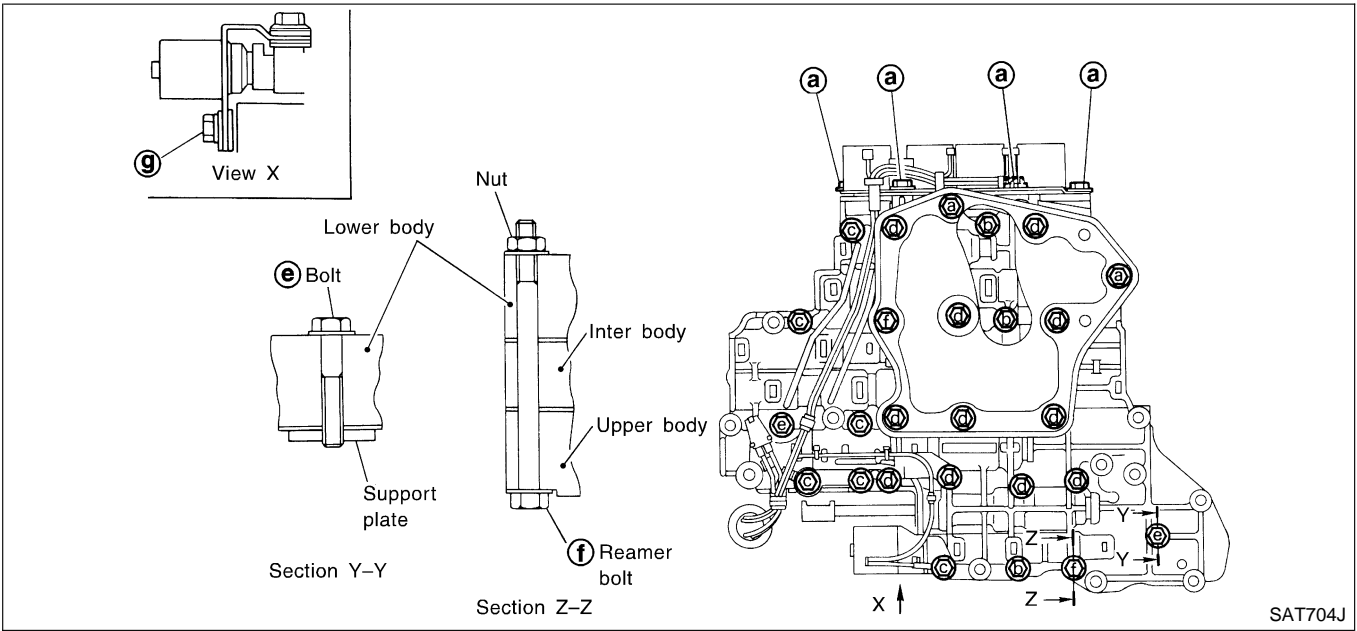


2. Install O-rings to solenoid valves and terminal body.
- Apply ATF to O-rings.

3. Install and tighten bolts.

**Bolt length, number and location:**

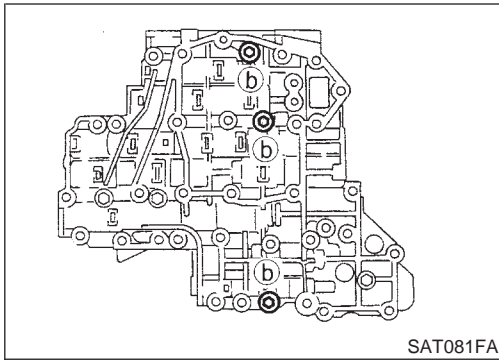
Bolt symbol	a	b	c	d	e	f	g
Bolt length "ℓ" mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
							
Number of bolts	6	3	6	11	2	2	1



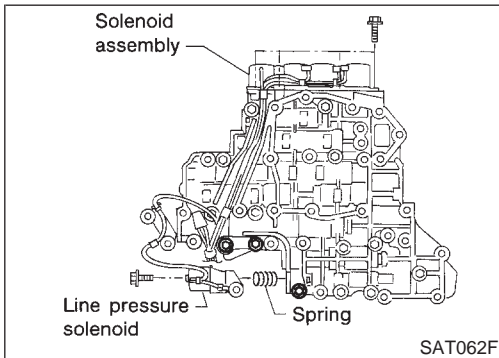


## REPAIR FOR COMPONENT PARTS

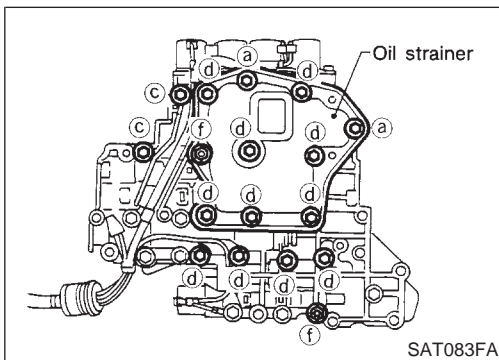
### Control Valve Assembly (Cont'd)



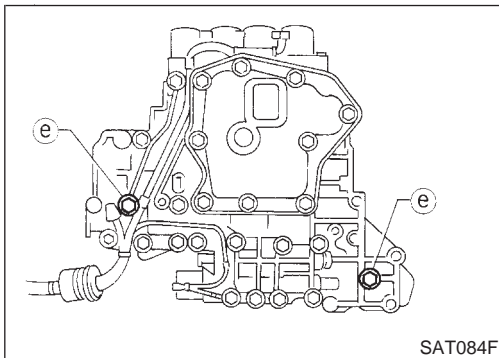
- a. Install and tighten bolts **b** to specified torque.  
🔧 : 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



- 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

Apply ATF to all components before installation.

=NFAT0137

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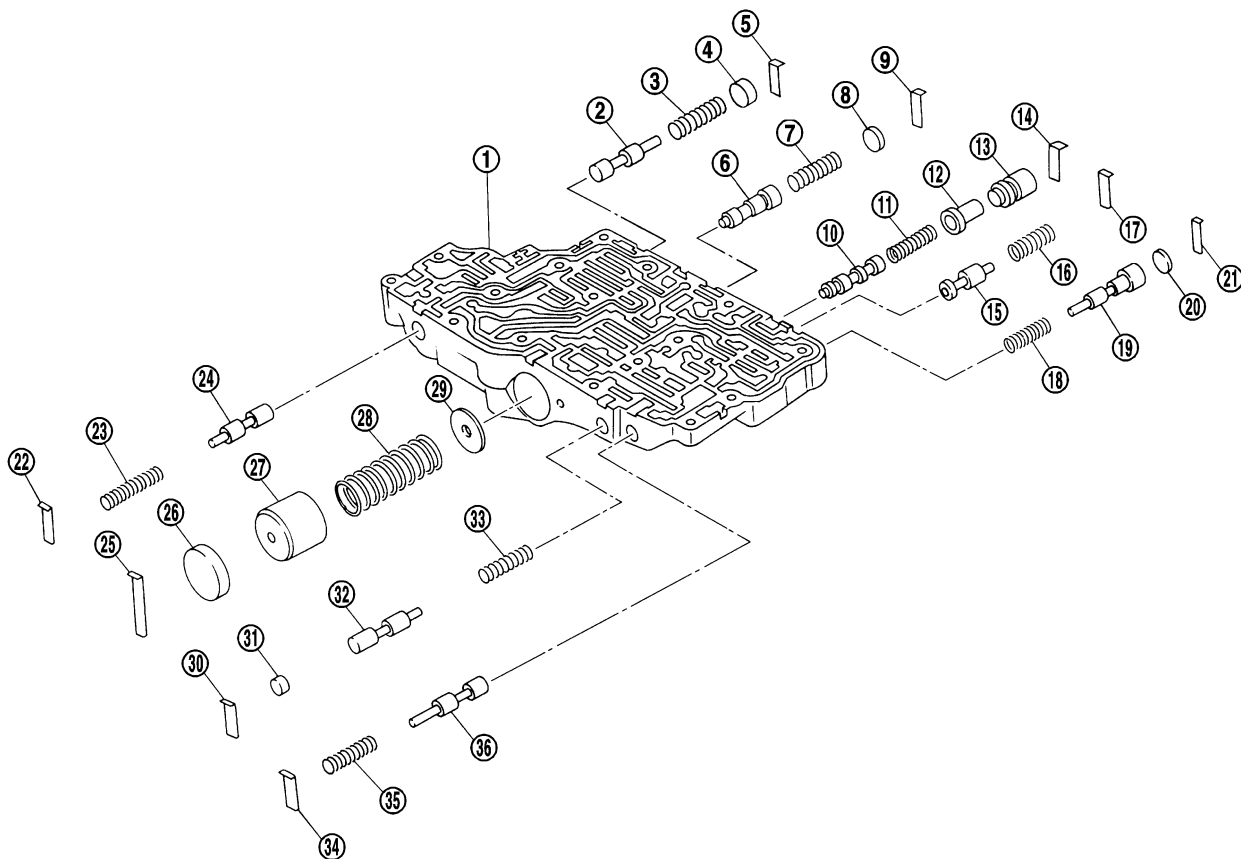
HA

SC

EL

IDX

### SEC. 317



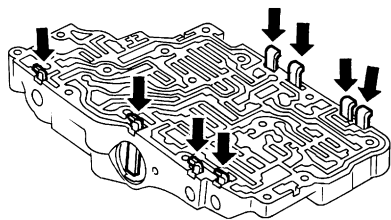
- |   |  |                                    |
|---|--|------------------------------------|
| 1. Upper body                             | 13. Torque converter clutch control sleeve | 25. Retainer plate                 |
| 2. Cooler check valve                     | 14. Retainer plate                         | 26. Plug                           |
| 3. Return spring                          | 15. Torque converter relief valve          | 27. 1-2 accumulator piston         |
| 4. Plug                                   | 16. Return spring                          | 28. Return spring                  |
| 5. Retainer plate                         | 17. Retainer plate                         | 29. 1-2 accumulator retainer plate |
| 6. 1-2 accumulator valve                  | 18. Return spring                          | 30. Retainer plate                 |
| 7. Return spring                          | 19. Overrun clutch reducing valve          | 31. Plug                           |
| 8. Plug                                   | 20. Plug                                   | 32. 1st reducing valve             |
| 9. Retainer plate                         | 21. Retainer plate                         | 33. Return spring                  |
| 10. Torque converter clutch control valve | 22. Retainer plate                         | 34. Retainer plate                 |
| 11. Return spring                         | 23. Return spring                          | 35. Return spring                  |
| 12. Torque converter clutch control plug  | 24. Pilot valve                            | 36. 3-2 timing valve               |



# REPAIR FOR COMPONENT PARTS

## Control Valve Upper Body (Cont'd)

Retainer plates in upper body



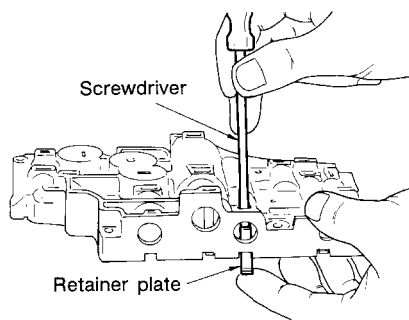
SAT551G

## DISASSEMBLY

NFAT0138

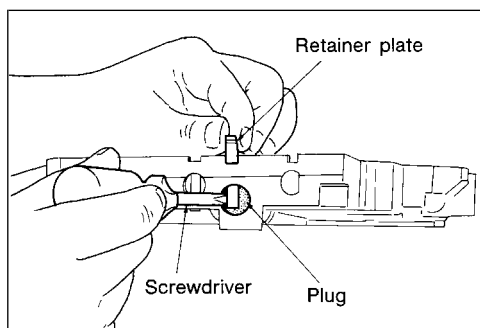
1. Remove valves at retainer plates.
  - Do not use a magnetic pick-up tool.

- a. Use a screwdriver to remove retainer plates.



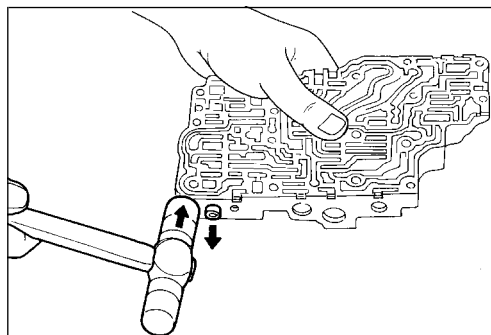
SAT553G

- b. Remove retainer plates while holding spring, plugs or sleeves.
  - Remove plugs slowly to prevent internal parts from jumping out.



SAT554G

- 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.



SAT137D

## INSPECTION

NFAT0139

### Valve Spring

NFAT0139S01

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

**Inspection standard:**

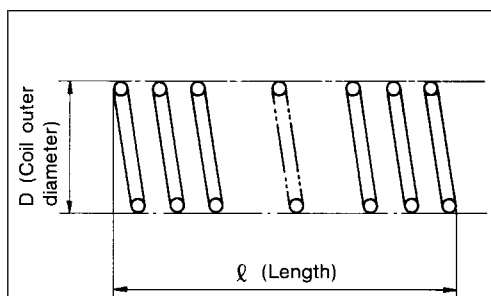
**Refer to SDS, AT-377.**

- Replace valve springs if deformed or fatigued.

### Control Valves

NFAT0139S02

- Check sliding surfaces of valves, sleeves and plugs.

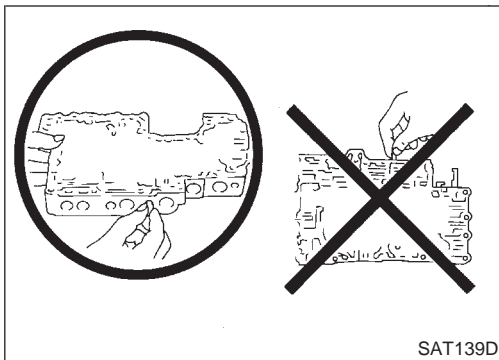


SAT138D



# REPAIR FOR COMPONENT PARTS

Control Valve Upper Body (Cont'd)



SAT139D

## ASSEMBLY

NFAT0140

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

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

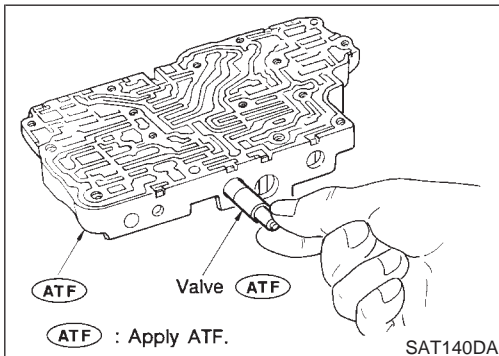
BT

HA

SC

EL

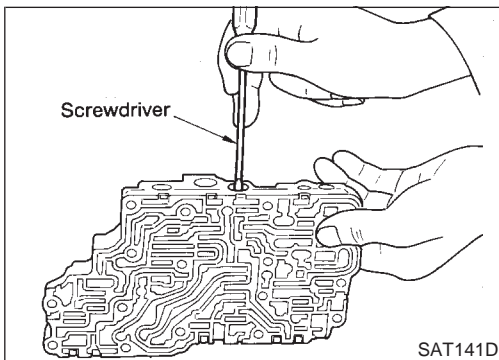
IDX



SAT140DA

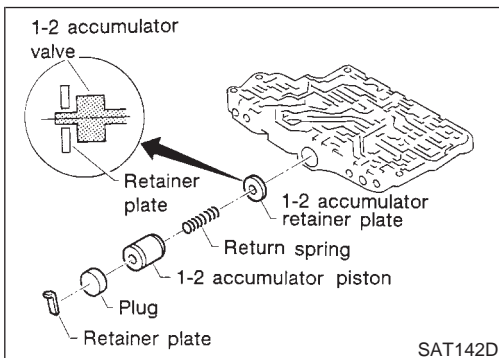
1. Lubricate the control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.

- 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.

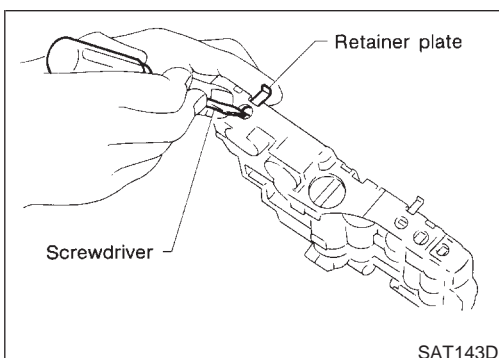


SAT142D

## 1-2 Accumulator Valve

NFAT0140S01

- 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.



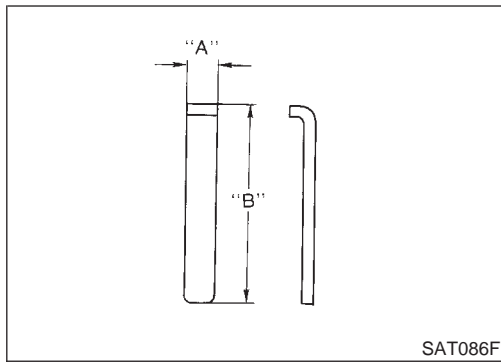
SAT143D

1. Install retainer plates.
- While pushing plug or return spring, install retainer plate.



# REPAIR FOR COMPONENT PARTS

Control Valve Upper Body (Cont'd)



## Retainer Plate (Upper body)

NFAT0140S02  
Unit: mm (in)

No.	Name of control valve	Width A	Length B
22	Pilot valve	6.0 (0.236)	21.5 (0.846)
30	1st reducing valve		
34	3-2 timing valve		
17	Torque converter relief valve		38.5 (1.516)
9	1-2 accumulator valve		
25	1-2 accumulator piston valve		
21	Overrun clutch reducing valve		24.0 (0.945)
5	Cooler check valve		28.0 (1.102)
14	Torque converter clutch control valve		

- Install proper retainer plates.  
Refer to "Control Valve Upper Body", AT-317.

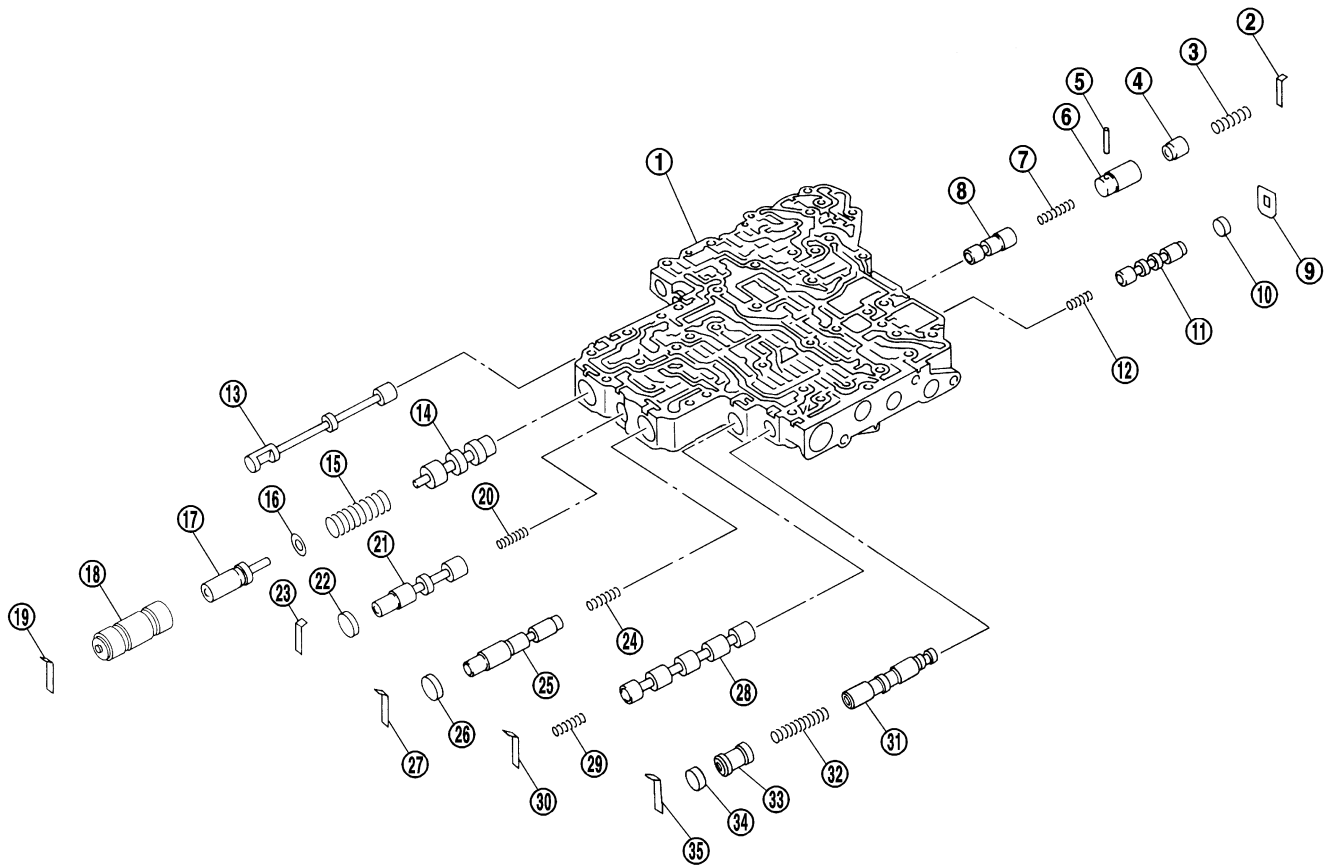


## Control Valve Lower Body COMPONENTS

Apply ATF to all components before installation.

=NFAT0141

SEC. 317



- |                            |                                  |                               |
|----------------------------|----------------------------------|-------------------------------|
| 1. Lower body              | 13. Manual valve                 | 25. Accumulator control valve |
| 2. Retainer plate          | 14. Pressure regulator valve     | 26. Plug                      |
| 3. Return spring           | 15. Return spring                | 27. Retainer plate            |
| 4. Piston                  | 16. Spring seat                  | 28. Shift valve A             |
| 5. Parallel pin            | 17. Plug                         | 29. Return spring             |
| 6. Sleeve                  | 18. Sleeve                       | 30. Retainer plate            |
| 7. Return spring           | 19. Retainer plate               | 31. Shuttle valve             |
| 8. Pressure modifier valve | 20. Return spring                | 32. Return spring             |
| 9. Retainer plate          | 21. Overrun clutch control valve | 33. Plug                      |
| 10. Plug                   | 22. Plug                         | 34. Plug                      |
| 11. Shift valve B          | 23. Retainer plate               | 35. Retainer plate            |
| 12. Return spring          | 24. Return spring                |                               |

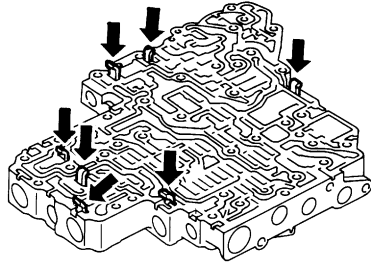
SAT773J



# REPAIR FOR COMPONENT PARTS

## Control Valve Lower Body (Cont'd)

Retainer plates in lower body



SAT550G

## DISASSEMBLY

NFAT0142

- Remove valves at retainer plate.  
For removal procedures, refer to "DISASSEMBLY", "Control Valve Upper Body", AT-318.

## INSPECTION

NFAT0143

### Valve Springs

NFAT0143S01

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

**Inspection standard:**

**Refer to SDS, AT-377.**

- Replace valve springs if deformed or fatigued.

### Control Valves

NFAT0143S02

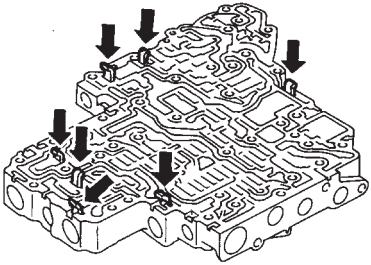
- Check sliding surfaces of control valves, sleeves and plugs for damage.

## ASSEMBLY

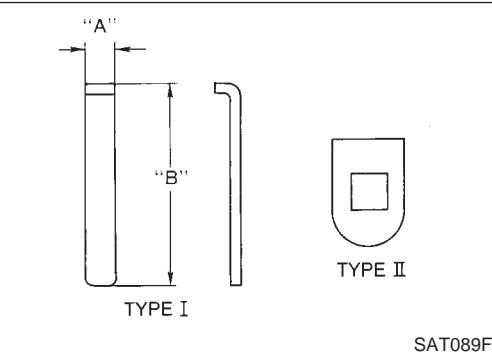
NFAT0144

- Install control valves.  
For installation procedures, refer to "ASSEMBLY", "Control Valve Upper Body", AT-319.

Retainer plates in lower body



SAT550A



SAT089F

## Retainer Plate (Lower body)

NFAT0144S01  
Unit: mm (in)

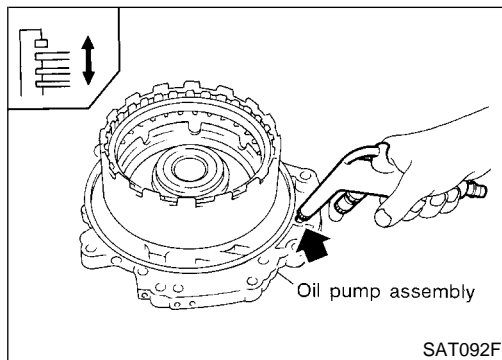
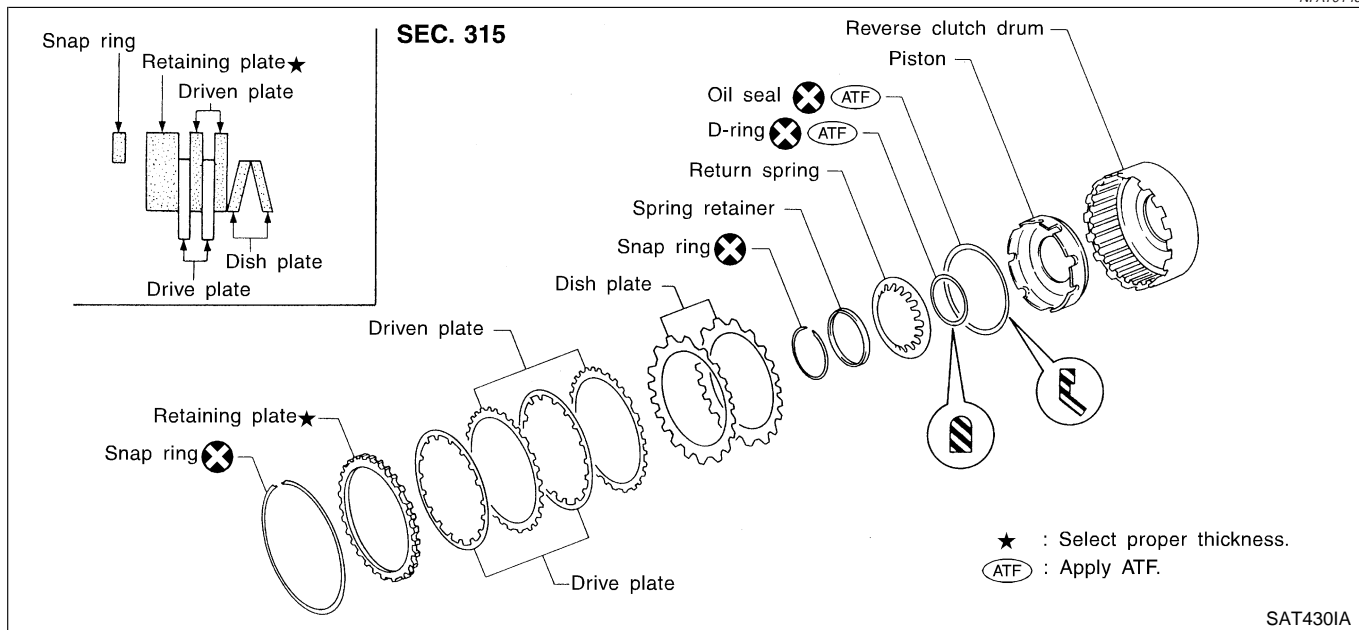
No.	Name of control valve and plug	Width A	Length B	Type
19	Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
27	Accumulator control valve			
30	Shift valve A			
23	Overrun clutch control valve			
2	Pressure modifier valve			
35	Shuttle valve	—	—	II
9	Shift valve B			

- Install proper retainer plates.  
Refer to "Control Valve Lower Body", AT-321.



## Reverse Clutch COMPONENTS

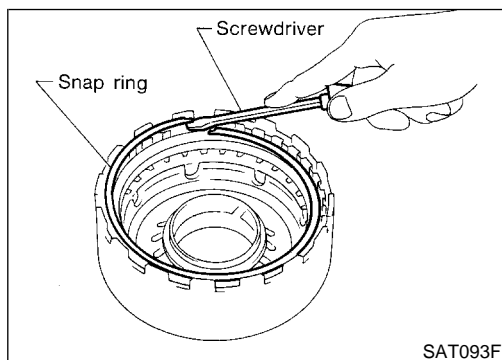
NFAT0145



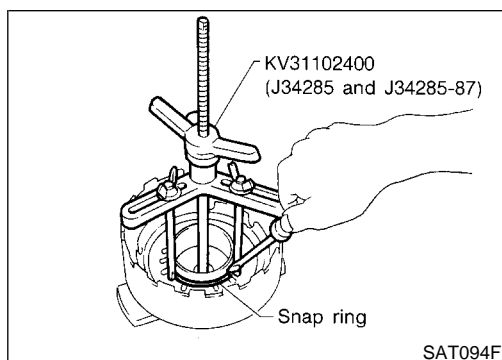
### DISASSEMBLY

NFAT0146

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.

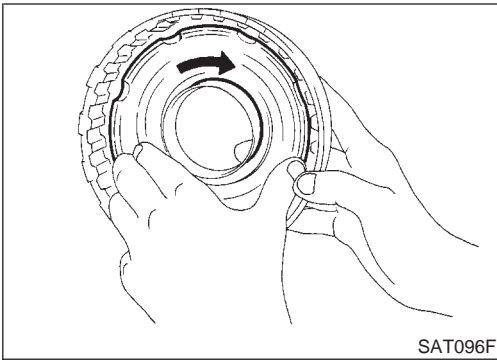


4. Set Tool on spring retainer and remove snap ring from reverse clutch drum while compressing return springs.
  - **Set Tool directly over springs.**
  - **Do not expand snap ring excessively.**
5. Remove spring retainer and return springs.



## REPAIR FOR COMPONENT PARTS

### Reverse Clutch (Cont'd)



6. Remove piston from reverse clutch drum by turning it.
7. Remove D-ring and oil seal from piston.

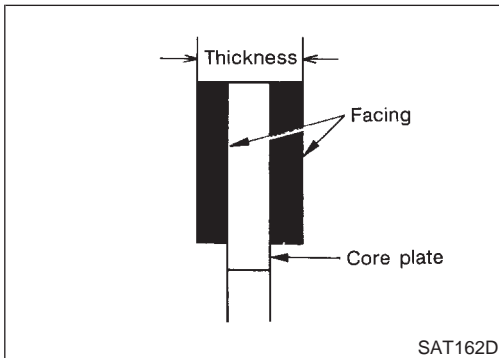
### INSPECTION

#### Reverse Clutch Snap Ring, Spring Retainer and Return Springs

NFAT0147

NFAT0147S01

- Check for deformation, fatigue or damage. If necessary, replace.



#### Reverse Clutch Drive Plates

NFAT0147S02

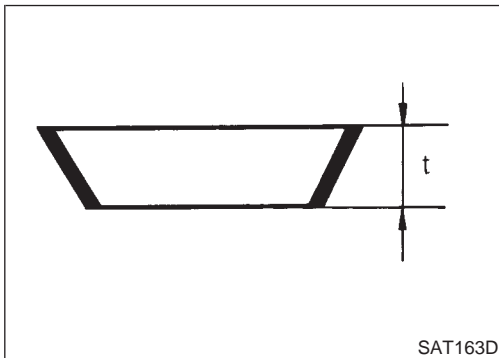
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

**Thickness of drive plate:**

**Standard value: 1.6 mm (0.063 in)**

**Wear limit: 1.4 mm (0.055 in)**

- If not within wear limit, replace.



#### Reverse Clutch Dish Plates

NFAT0147S03

- Check for deformation or damage.
- Measure thickness of dish plate.

**Thickness of dish plate: 3.08 mm (0.1213 in)**

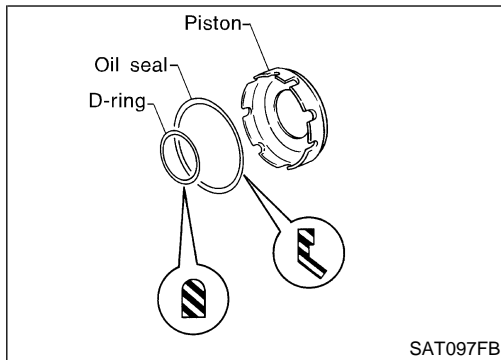
- If deformed or fatigued, replace.

#### Reverse Clutch Piston

NFAT0147S04

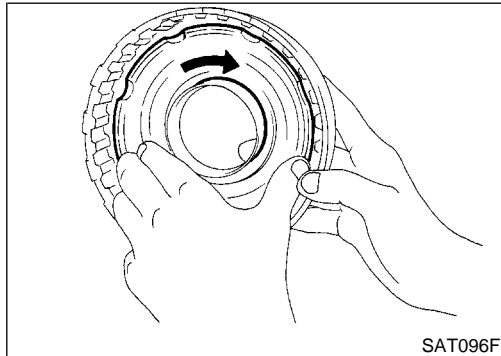
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.



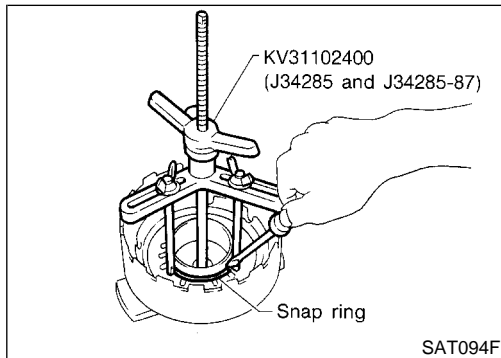


## ASSEMBLY

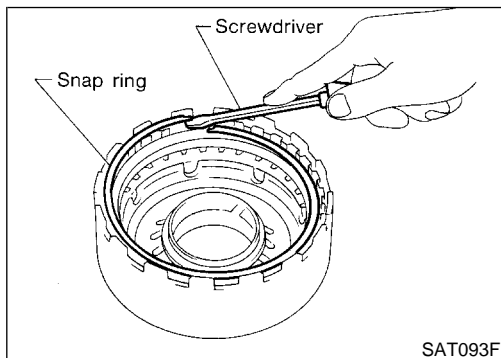
1. Install D-ring and oil seal on piston.
  - Take care with the direction of oil seal.
  - Apply ATF to both parts.



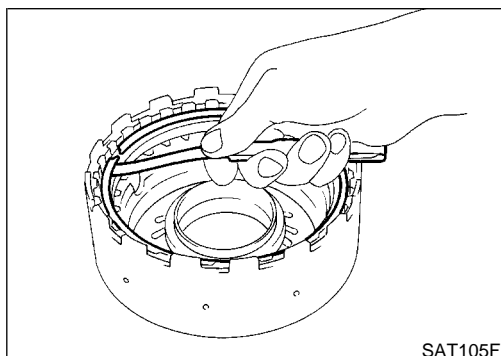
2. Install piston assembly by turning it slowly.
  - Apply ATF to inner surface of drum.



3. Install return springs and spring retainer on piston.
4. Set Tool on spring retainer and install snap ring while compressing return springs.
  - Set Tool directly over return springs.



5. Install drive plates, driven plates, retaining plate and dish plates.
  - Take care with order of plates.
6. Install snap ring.



7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

### Specified clearance:

Standard 0.5 - 0.8 mm (0.020 - 0.031 in)

Allowable limit 1.2 mm (0.047 in)

### Retaining plate:

Refer to SDS, AT-378.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

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BR

ST

RS

BT

HA

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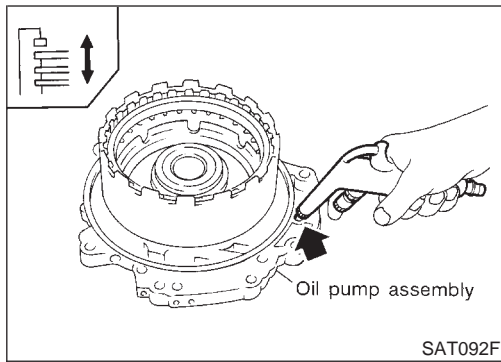
EL

IDX



## REPAIR FOR COMPONENT PARTS

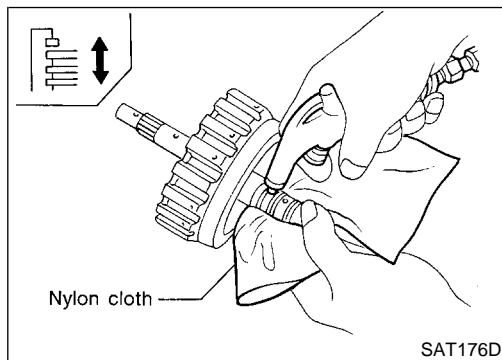
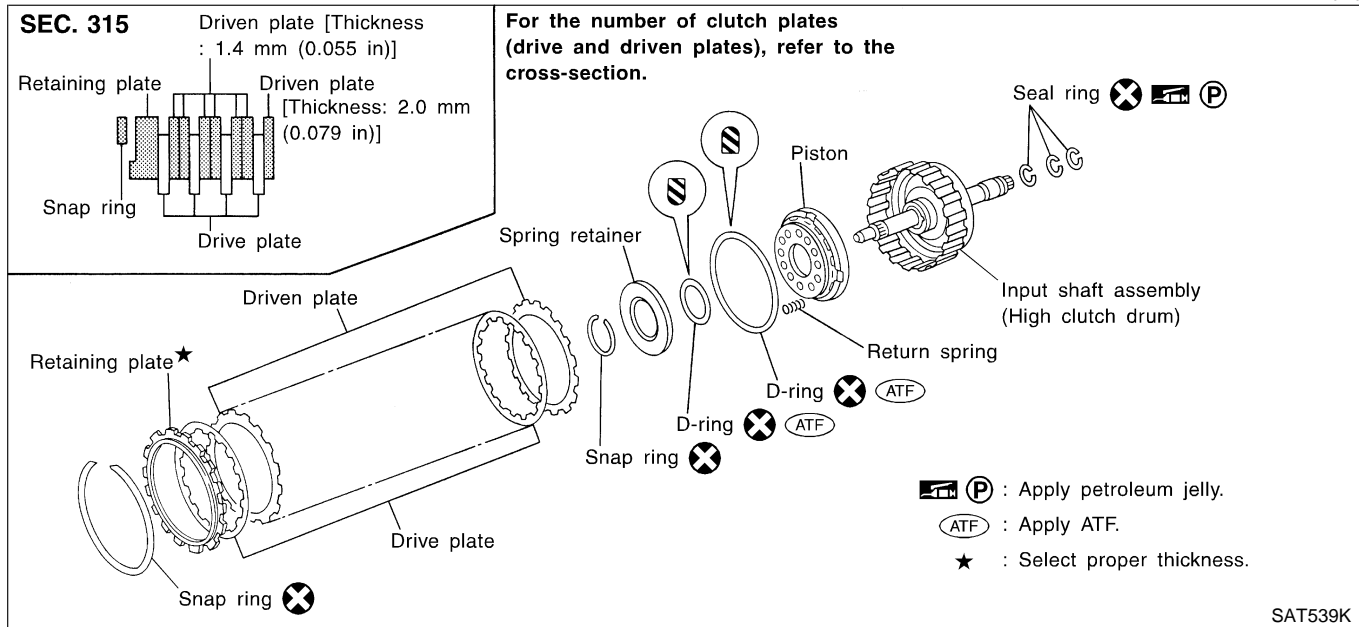
### Reverse Clutch (Cont'd)



8. Check operation of reverse clutch.  
Refer to "DISASSEMBLY", "Reverse Clutch", AT-323.

## High Clutch COMPONENTS

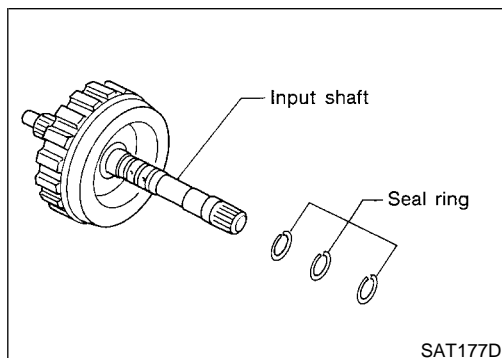
NFAT0149



## DISASSEMBLY

NFAT0150

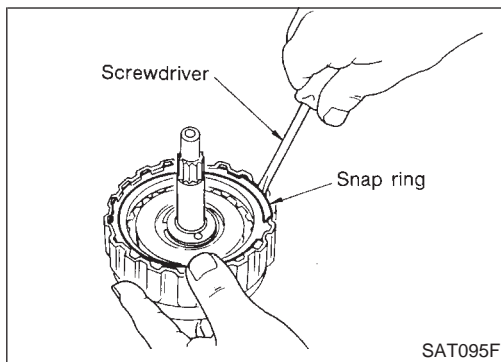
1. Check operation of high clutch.
  - a. Apply compressed air to oil hole of input shaft with nylon cloth.
    - **Stop up hole on opposite side of input shaft with nylon cloth.**
  - b. Check to see that retaining plate moves to snap ring.
  - c. If retaining plate does not contact snap ring:
    - 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.**



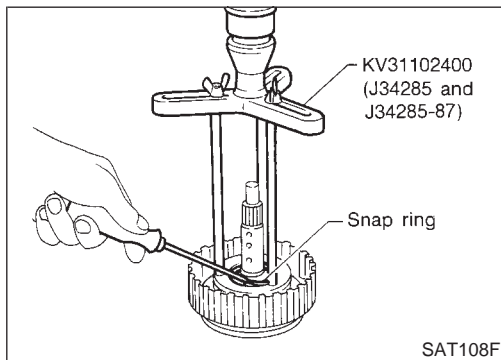


# REPAIR FOR COMPONENT PARTS

High Clutch (Cont'd)



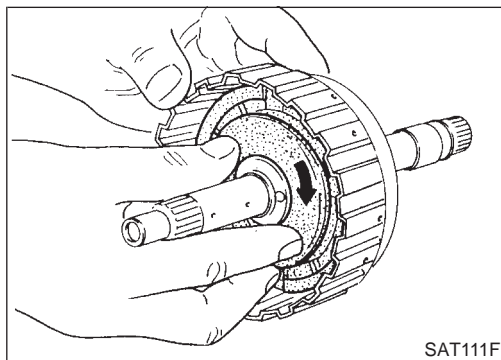
3. Remove snap ring.
4. Remove drive plates, driven plates and retaining plate.



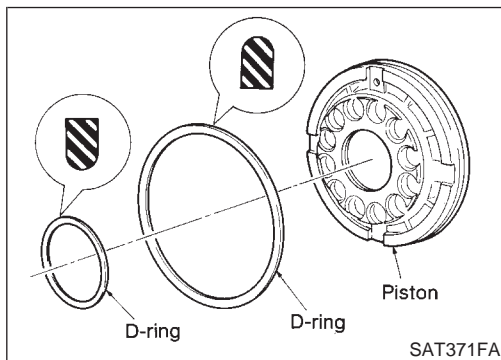
5. Set Tool on spring retainer and remove snap ring from high clutch drum while compressing return springs.

- **Set Tool directly over springs.**
- **Do not expand snap ring excessively.**

6. Remove spring retainer and return springs.



7. Remove piston from high clutch drum by turning it.



8. Remove D-rings from piston.

## INSPECTION

### High Clutch Snap Ring, Spring Retainer and Return Springs

- Check for deformation, fatigue or damage. If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**

GI

MA

EM

LC

EC

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AX

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RS

BT

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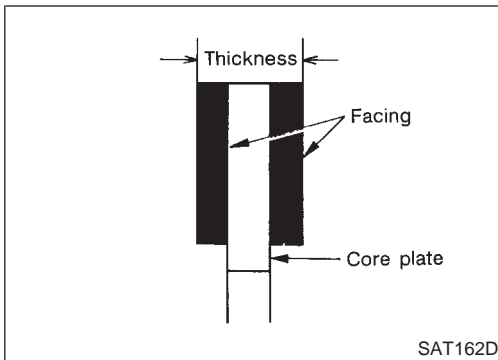
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# REPAIR FOR COMPONENT PARTS

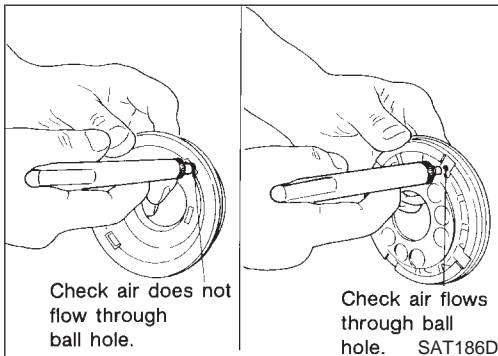
## High Clutch (Cont'd)



### High Clutch Drive Plates

NFAT0151S02

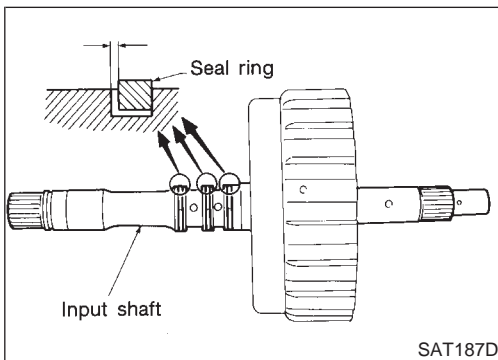
- Check facing for burns, cracks or damage.
- Measure thickness of facing.  
**Thickness of drive plate:**  
**Standard value 1.6 mm (0.063 in)**  
**Wear limit 1.4 mm (0.055 in)**
- If not within wear limit, replace.



### High Clutch Piston

NFAT0151S03

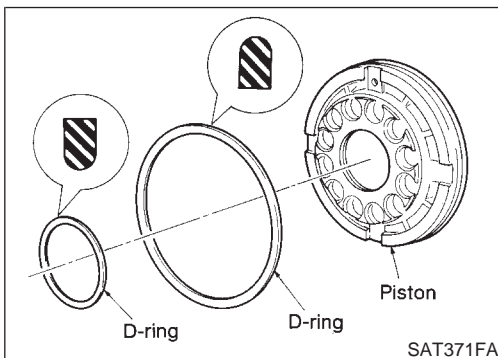
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.



### Seal Ring Clearance

NFAT0151S04

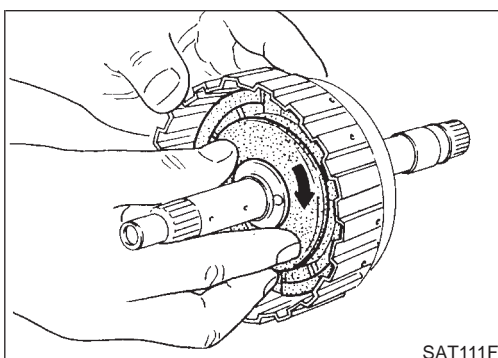
- Install new seal rings onto input shaft.
- Measure clearance between seal ring and ring groove.  
**Standard clearance:**  
**0.08 - 0.23 mm (0.0031 - 0.0091 in)**  
**Allowable limit:**  
**0.23 mm (0.0091 in)**
- If not within allowable limit, replace input shaft assembly.



### ASSEMBLY

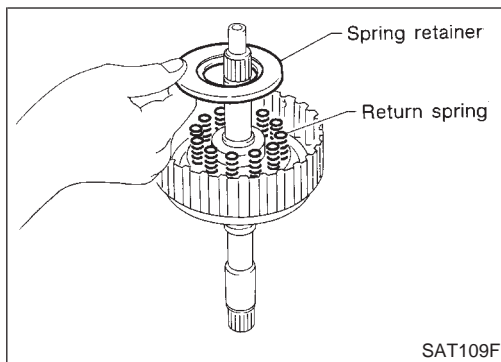
NFAT0152

1. Install D-rings on piston.
- **Apply ATF to both parts.**



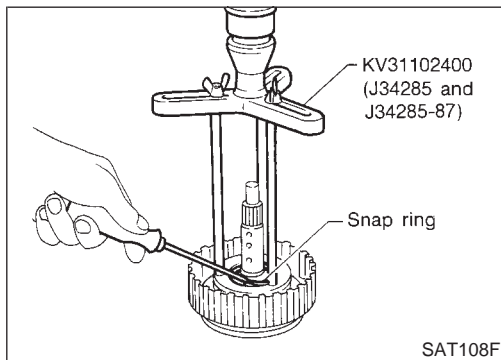
2. Install piston assembly by turning it slowly.
- **Apply ATF to inner surface of drum.**





SAT109F

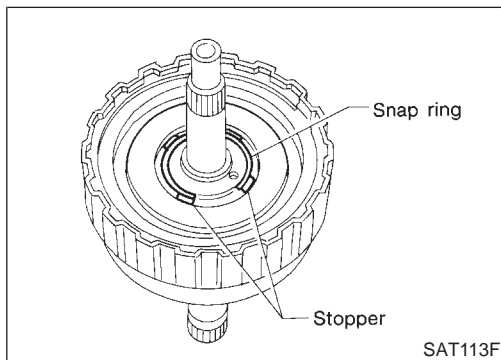
3. Install return springs and spring retainer on piston.



SAT108F

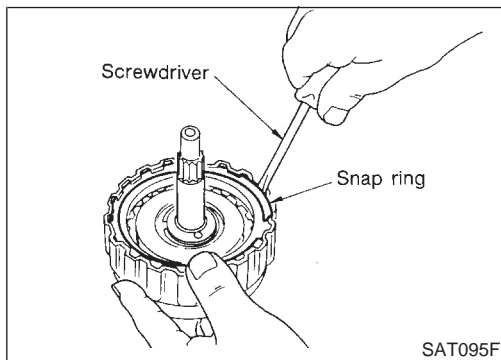
4. Set Tool on spring retainer and install snap ring while compressing return springs.

- **Set Tool directly over return springs.**



SAT113F

- **Do not align snap ring gap with spring retainer stopper.**

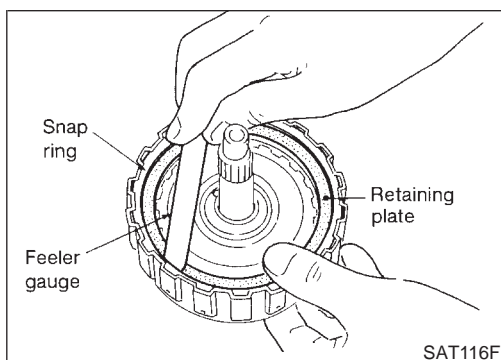


SAT095F

5. Install drive plates, driven plates and retaining plate.

- **Take care with the order and direction of plates.**

6. Install snap ring.



SAT116F

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-378.**

GI

MA

EM

LC

EC

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CL

MT

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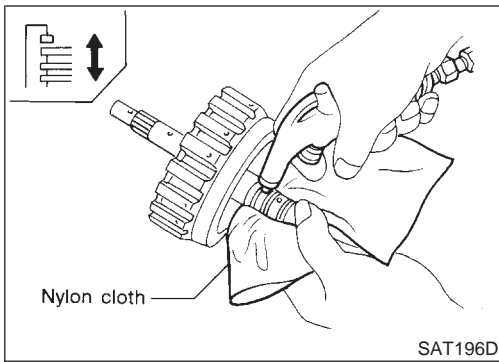
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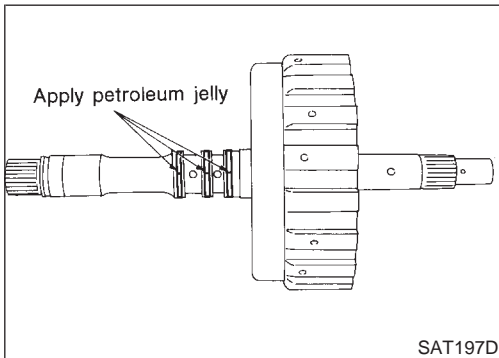


## REPAIR FOR COMPONENT PARTS

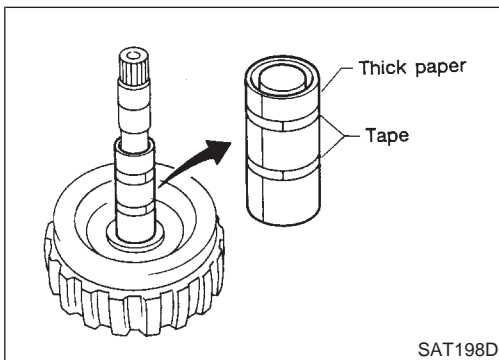
### High Clutch (Cont'd)



8. Check operation of high clutch.  
Refer to "DISASSEMBLY", "High Clutch", AT-326.



9. Install seal rings to input shaft.
  - **Apply petroleum jelly to seal rings.**
  - **Always replace when removed.**

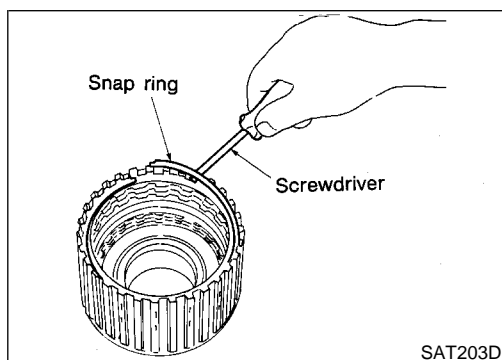
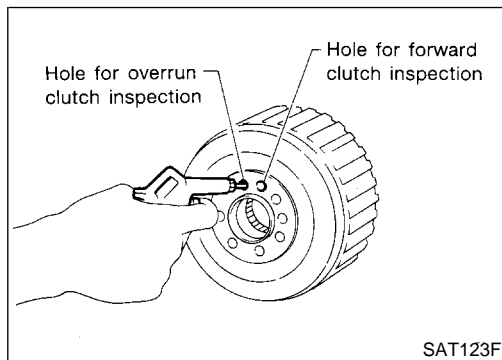
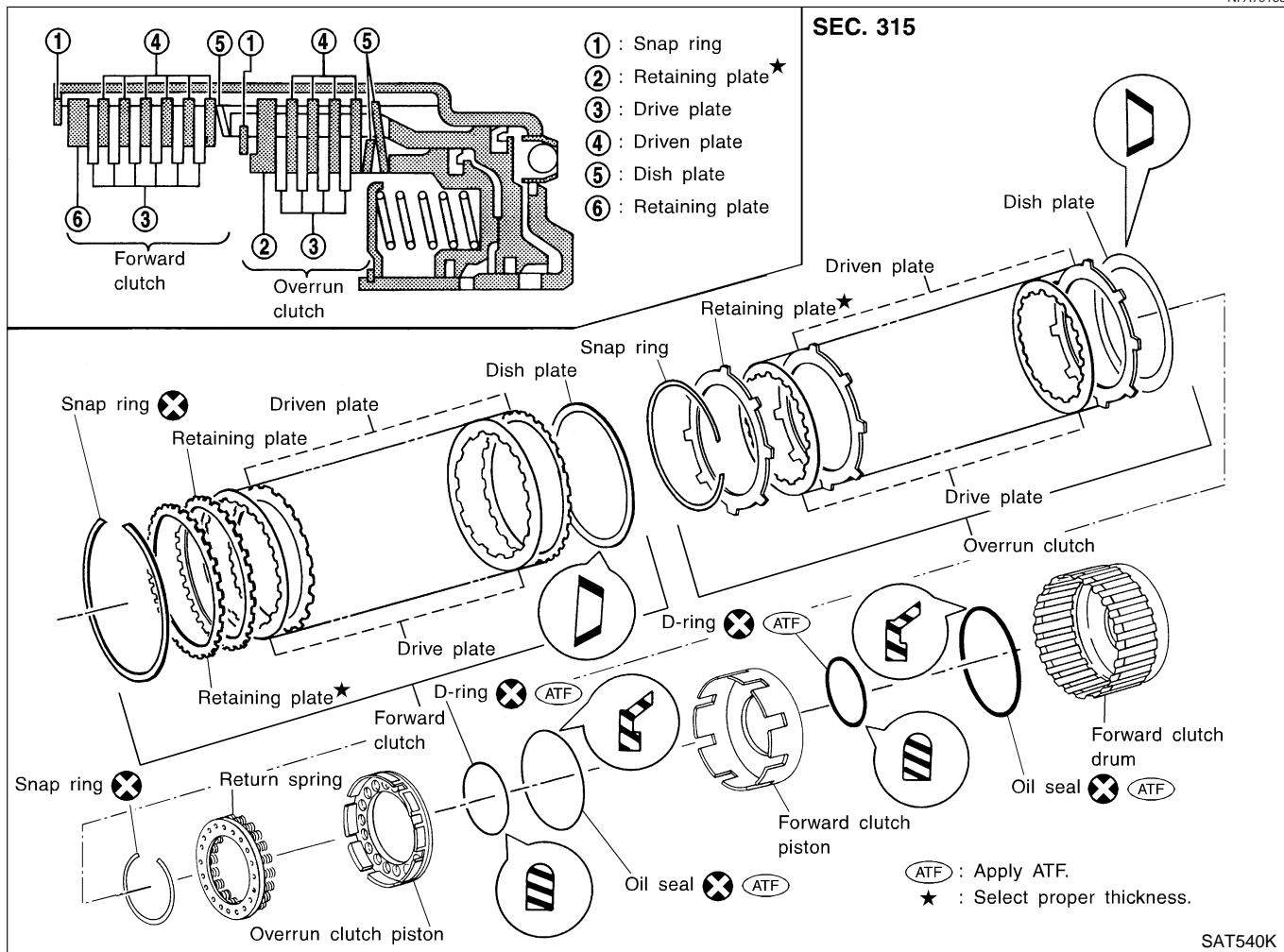


- **Roll paper around seal rings to prevent seal rings from spreading.**



## Forward and Overrun Clutches COMPONENTS

NFAT0153



### DISASSEMBLY

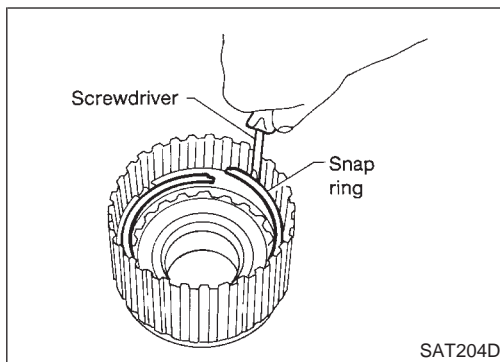
NFAT0154

- Check operation of forward clutch and overrun clutch.
  - Install bearing retainer on forward clutch drum.
  - Apply compressed air to oil hole of forward clutch drum.
  - Check to see that retaining plate moves to snap ring.
  - 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.
- Remove snap ring for forward clutch.
- Remove drive plates, driven plates, retaining plate and dish plate for forward clutch.

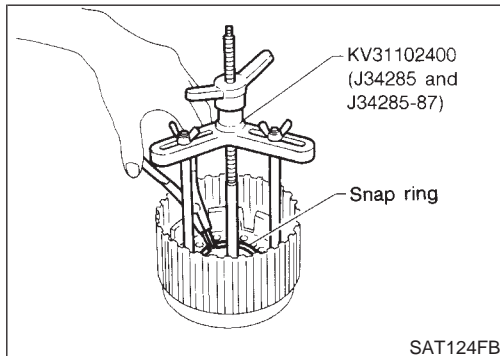


## REPAIR FOR COMPONENT PARTS

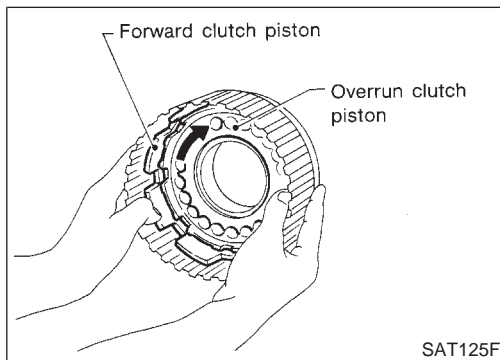
### Forward and Overrun Clutches (Cont'd)



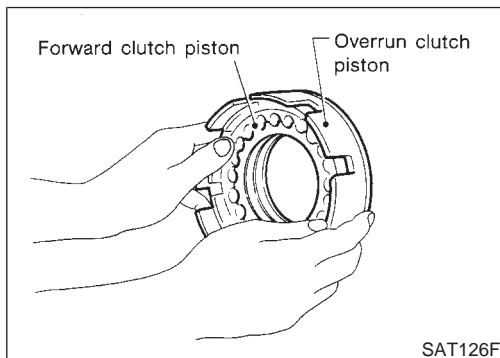
4. Remove snap ring for overrun clutch.
5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.



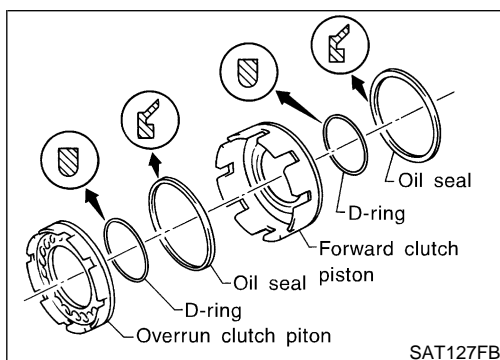
6. Set Tool on spring retainer and remove snap ring from forward clutch drum while compressing return springs.
  - **Set Tool directly over return springs.**
  - **Do not expand snap ring excessively.**
7. Remove spring retainer and return springs.
  - **Do not remove return springs from spring retainer.**



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

### Snap Rings, Spring Retainer and Return Springs

NFAT0155

NFAT0155S01

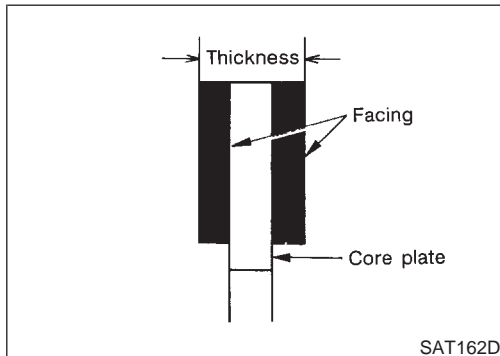
- Check for deformation, fatigue or damage.
- Replace if necessary.
- **When replacing spring retainer and return springs, replace them as a set.**

GI

MA

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LC



SAT162D

### Forward Clutch and Overrun Clutch Drive Plates

NFAT0155S02

- 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.

EC

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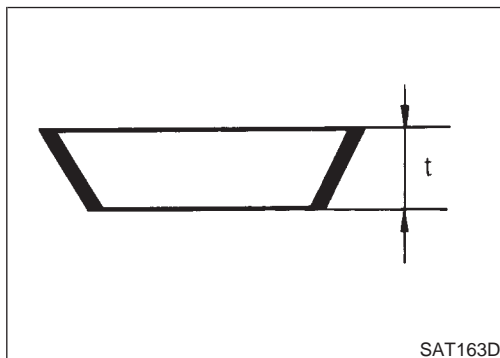
MT

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SAT163D

### Forward Clutch and Overrun Clutch Dish Plates

NFAT0155S03

- 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)

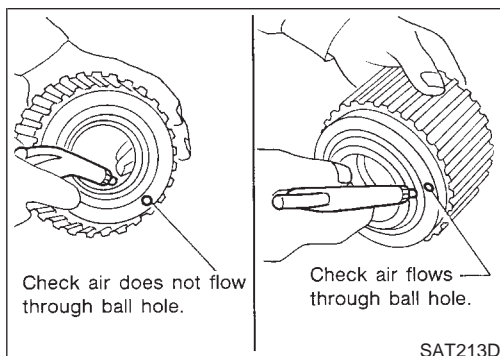
- If deformed or fatigued, replace.

ST

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SAT213D

### Forward Clutch Drum

NFAT0155S04

- 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.

SC

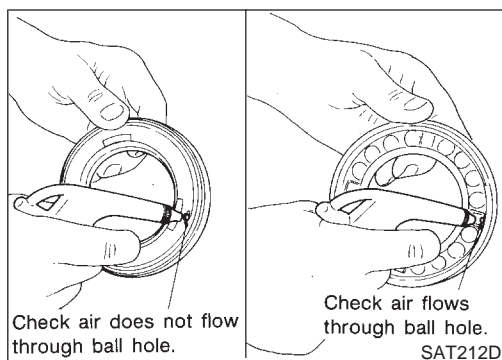
EL

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## REPAIR FOR COMPONENT PARTS

### Forward and Overrun Clutches (Cont'd)



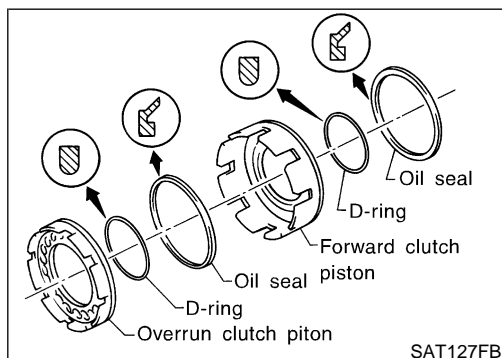
### Overrun Clutch Piston

NFAT0155S05

- 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.

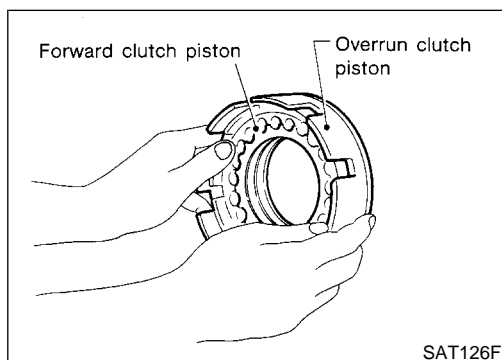
### ASSEMBLY

NFAT0156



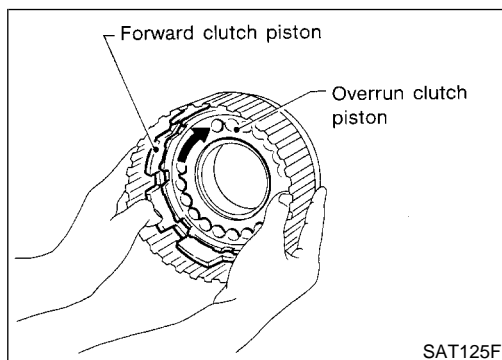
1. Install D-rings and oil seals on forward clutch piston and overrun clutch piston.

- Take care with direction of oil seal.
- Apply ATF to both parts.



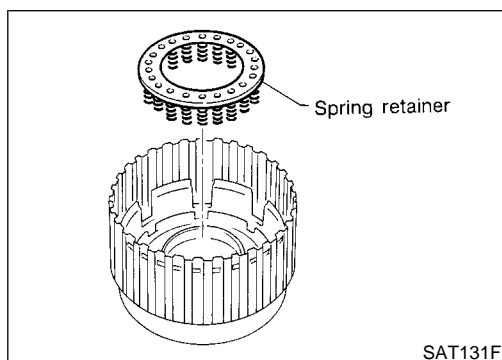
2. Install overrun clutch piston assembly on forward clutch piston by turning it slowly.

- 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.

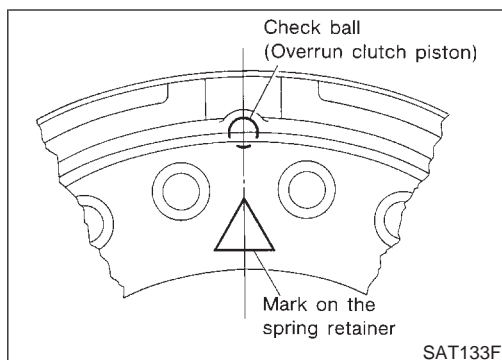


4. Install return spring on overrun clutch piston.

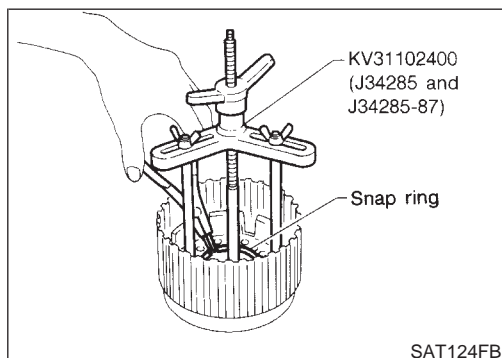


# REPAIR FOR COMPONENT PARTS

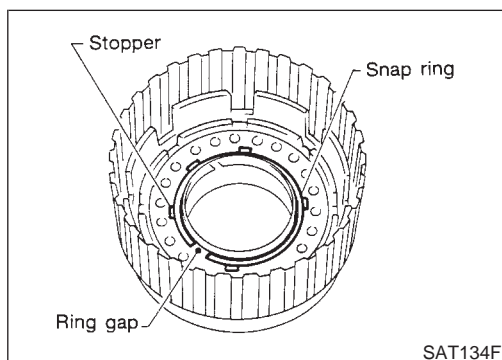
Forward and Overrun Clutches (Cont'd)



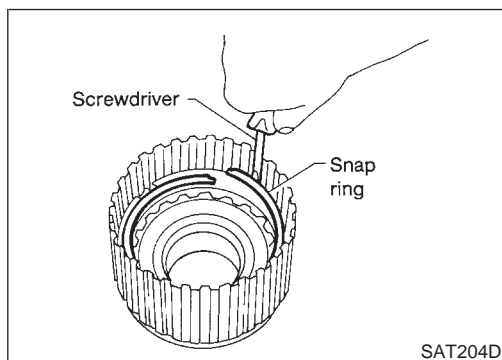
- Align the mark on spring retainer with check ball in overrun clutch piston.



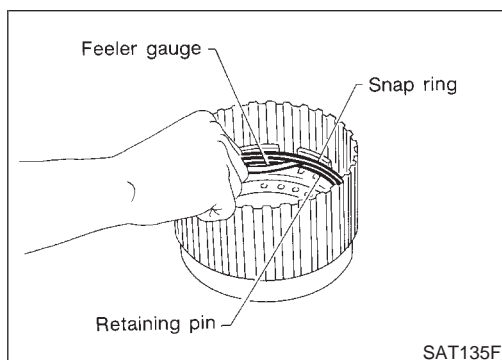
- Set Tool on spring retainer and install snap ring while compressing return springs.
- Set Tool directly over return springs.**



- Do not align snap ring gap with spring retainer stopper.**



- Install drive plates, driven plates, retaining plate and dish plate for overrun clutch.
- Take care with order of plates.**
- Install snap ring for overrun clutch.



- 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-379.**

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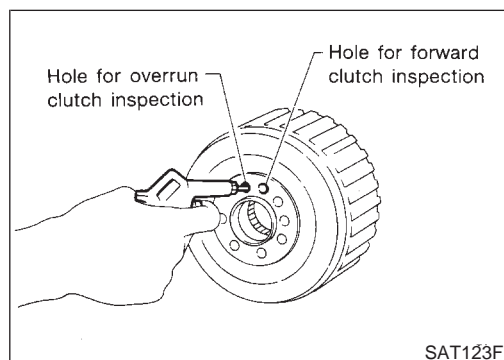
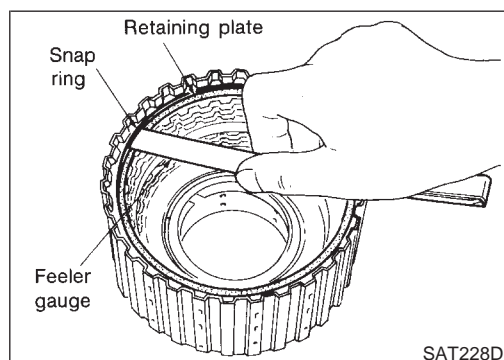
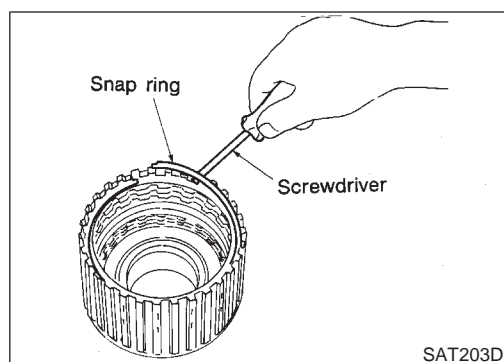
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## REPAIR FOR COMPONENT PARTS

### Forward and Overrun Clutches (Cont'd)



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-379.**

12. Check operation of forward clutch.

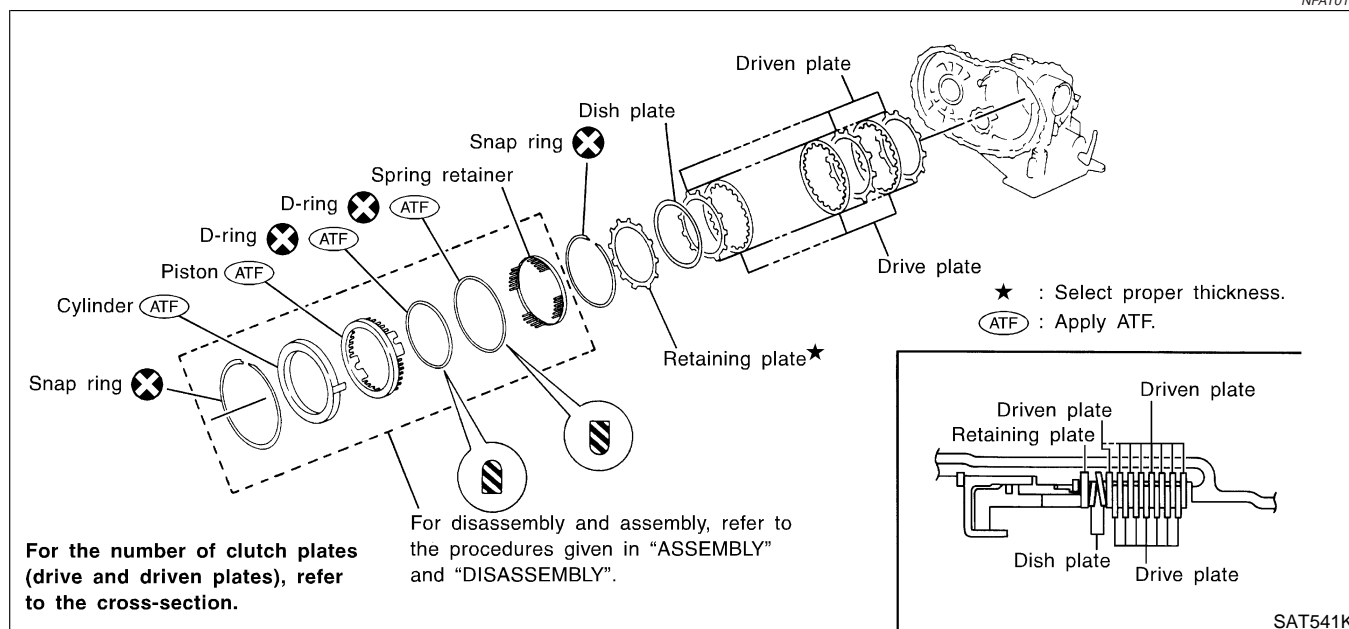
Refer to "DISASSEMBLY", "Forward Clutch and Overrun Clutch", AT-331.

13. Check operation of overrun clutch.

Refer to "DISASSEMBLY", "Forward Clutch and Overrun Clutch", AT-331.

## Low & Reverse Brake COMPONENTS

NFAT0157

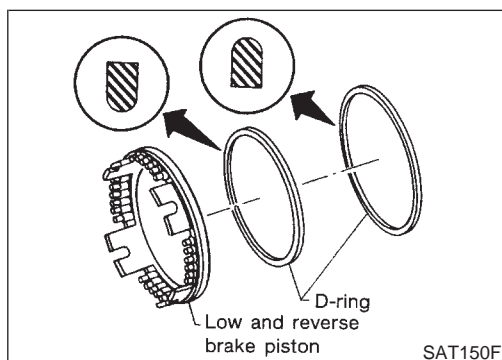
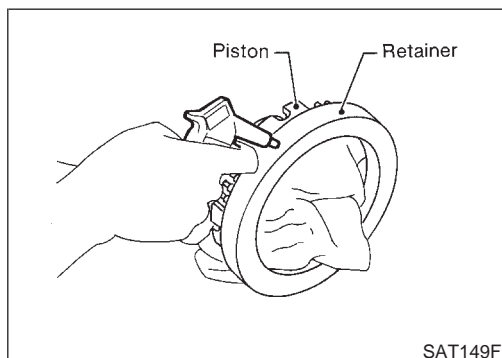
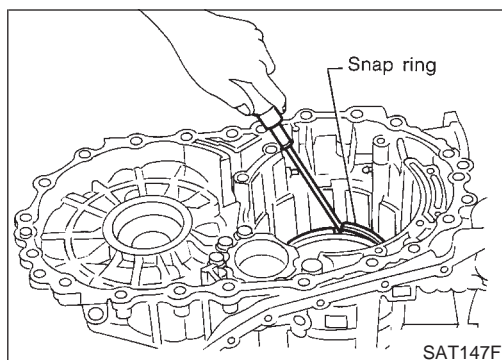


SAT541K



# REPAIR FOR COMPONENT PARTS

Low & Reverse Brake (Cont'd)



## DISASSEMBLY

NFAT0158

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.

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## INSPECTION

NFAT0159

### Low and Reverse Brake Snap Ring, Spring Retainer and Return Springs

NFAT0159S01

- Check for deformation, fatigue or damage. If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**

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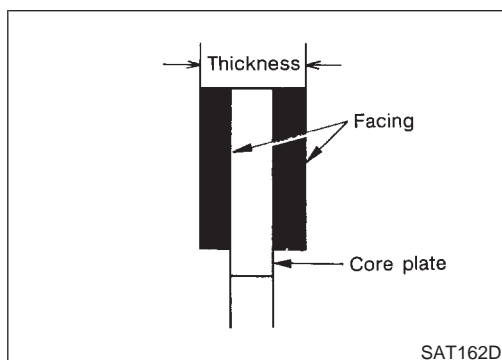
NFAT0159S02

### Low and Reverse Brake Drive Plate

- Check facing for burns, cracks or damage.
- Measure thickness of facing.
  - Thickness of drive plate:**
  - Standard value 1.8 mm (0.071 in)**
  - Wear limit 1.6 mm (0.063 in)**
- If not within wear limit, replace.

EL

IDX

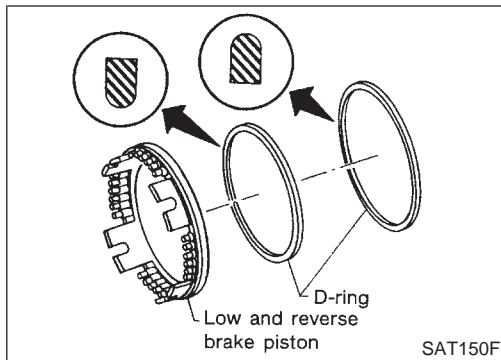




# REPAIR FOR COMPONENT PARTS

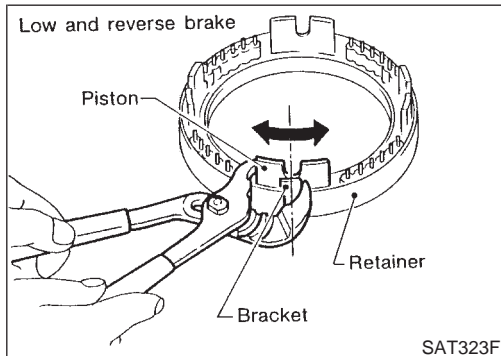
## Low & Reverse Brake (Cont'd)

NFAT0160

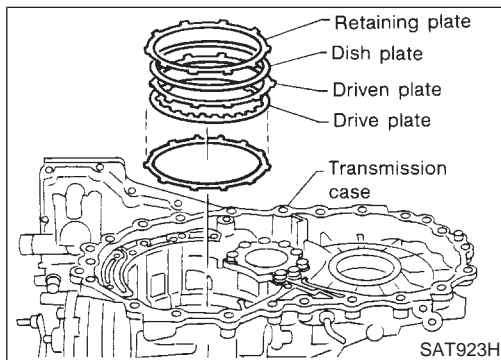


### ASSEMBLY

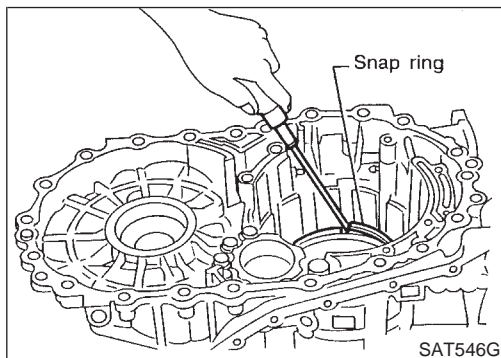
1. Install D-rings on piston.
- Apply ATF to both parts.



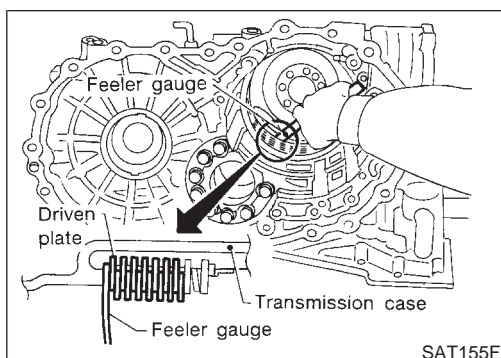
2. Set and align piston with retainer.
- This operation is required in order to engage the protrusions of piston to return springs correctly. Further procedures are given in "ASSEMBLY".



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-380.



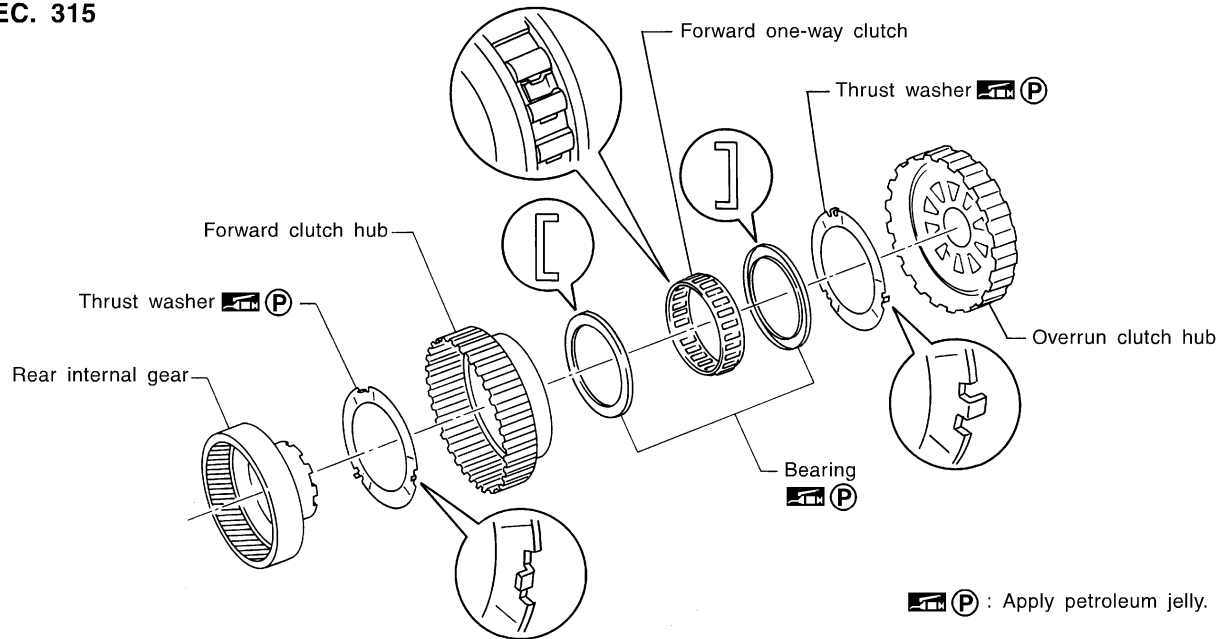
# REPAIR FOR COMPONENT PARTS

Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

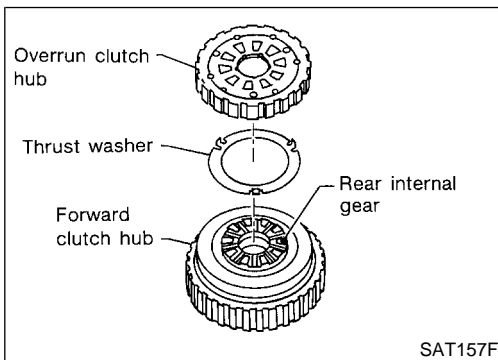
## Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub COMPONENTS

NFAT0161

### SEC. 315



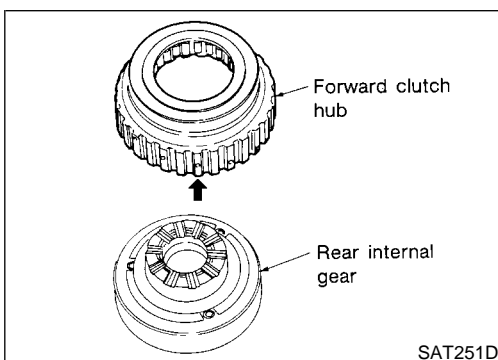
SAT975H



### DISASSEMBLY

NFAT0162

1. Remove overrun clutch hub and thrust washer from forward clutch hub.

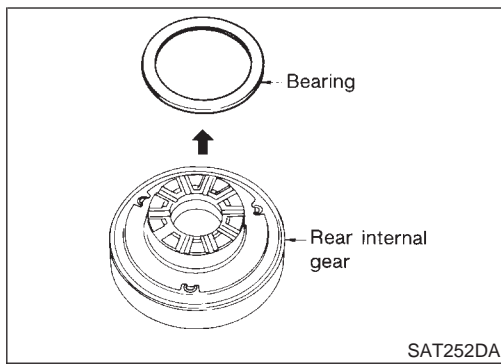


2. Remove forward clutch hub from rear internal gear.

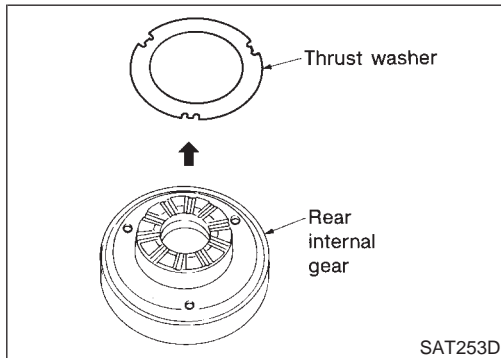


## REPAIR FOR COMPONENT PARTS

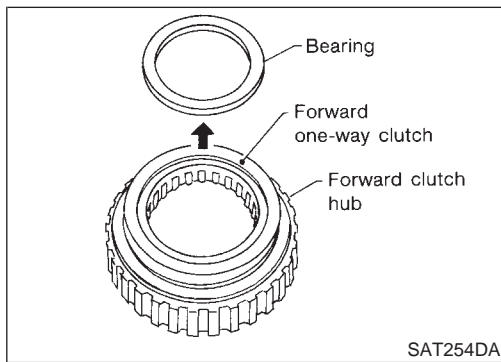
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub (Cont'd)



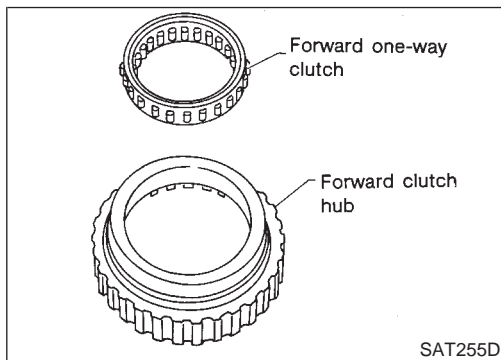
3. Remove bearing from rear internal gear.



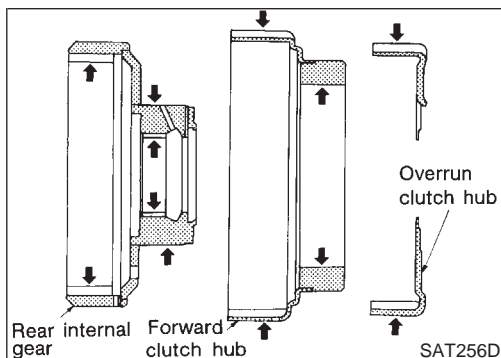
4. Remove thrust washer from rear internal gear.



5. Remove bearing from forward one-way clutch.



6. Remove forward one-way clutch from forward clutch hub.



### INSPECTION

#### Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

- Check rubbing surfaces for wear or damage.

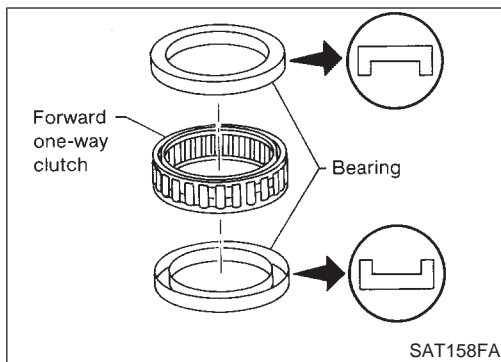
NFAT0163

NFAT0163S01



# REPAIR FOR COMPONENT PARTS

Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub (Cont'd)



## Bearings and Forward One-way Clutch

NFAT0163S02

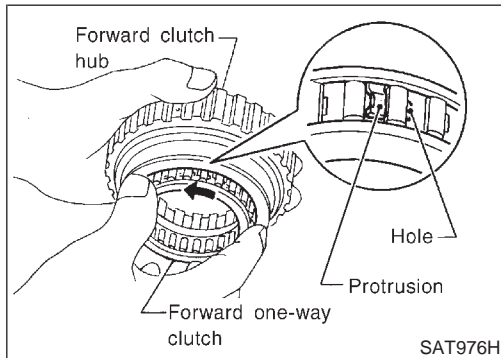
- Check bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.

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## ASSEMBLY

NFAT0164

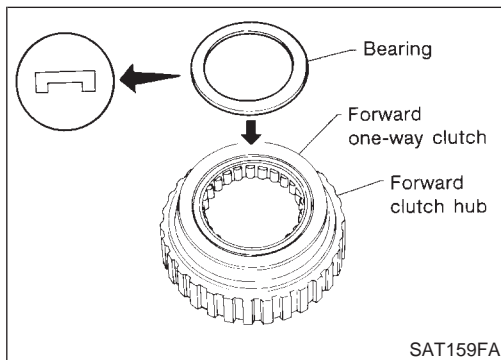
1. Install forward one-way clutch on forward clutch.
- Take care with the direction of forward one-way clutch.

EC

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2. Install bearing on forward one-way clutch.

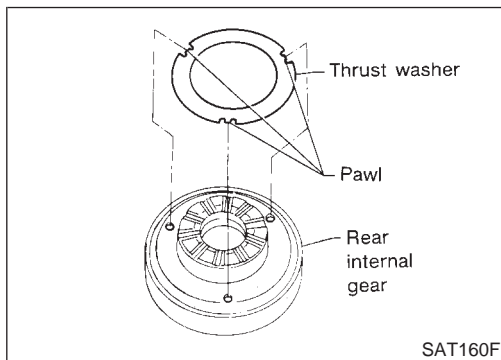
- Apply petroleum jelly to bearing.

AT

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3. Install thrust washer on rear internal gear.

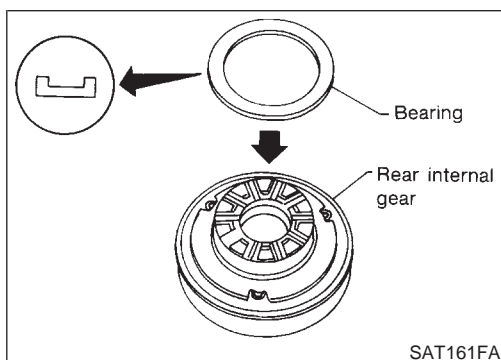
- Apply petroleum jelly to thrust washer.
- Align hooks of thrust washer with holes of rear internal gear.

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4. Install bearing on rear internal gear.

- Apply petroleum jelly to bearing.

SC

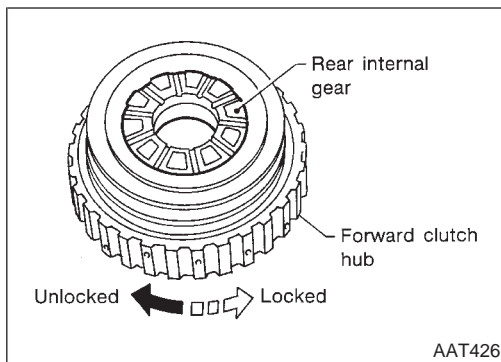
EL

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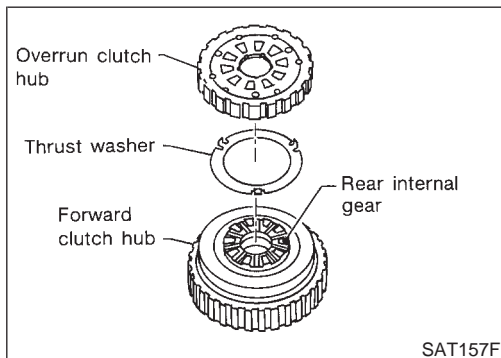


## REPAIR FOR COMPONENT PARTS

*Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub (Cont'd)*



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.**



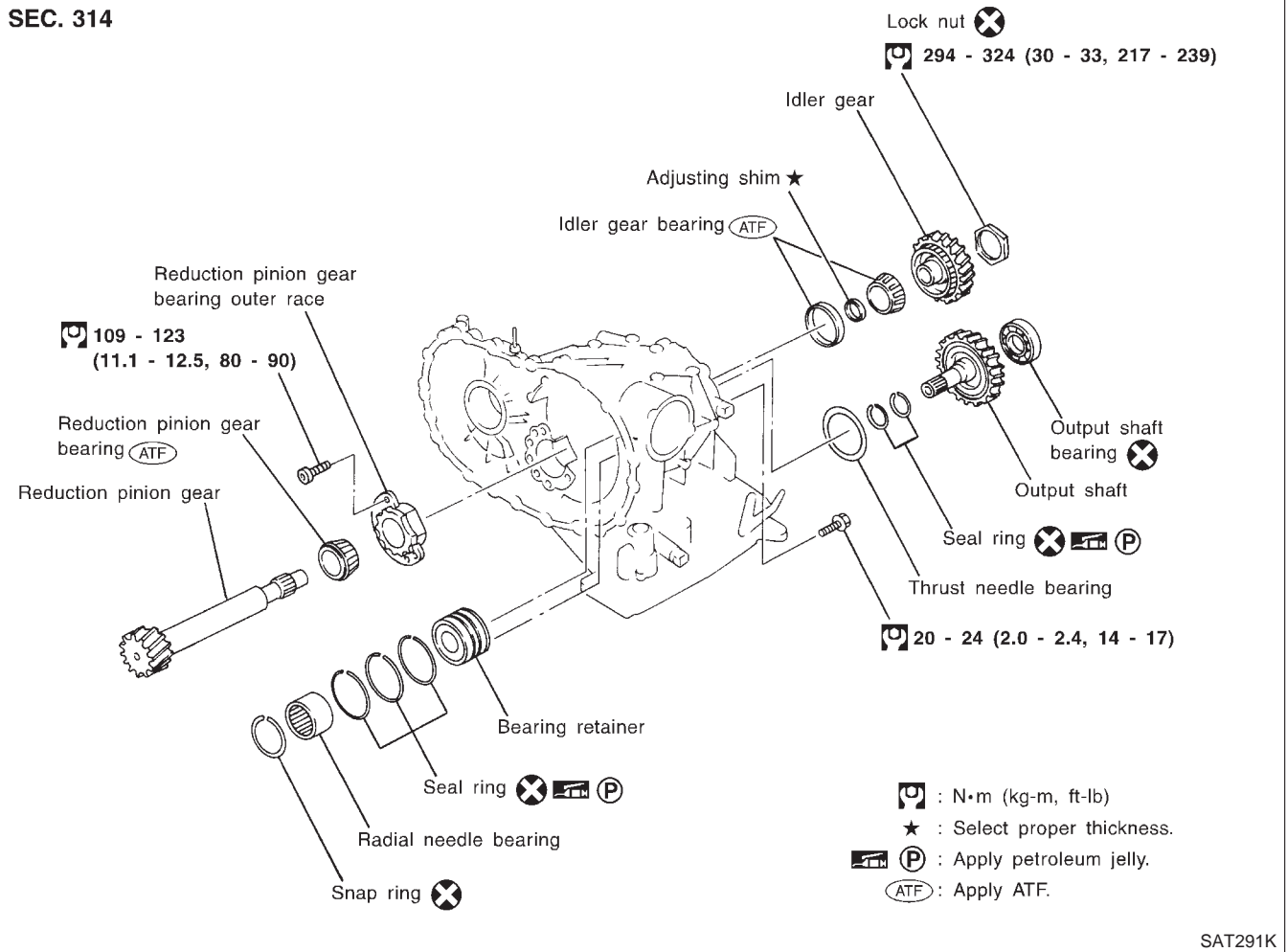
# REPAIR FOR COMPONENT PARTS

Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer

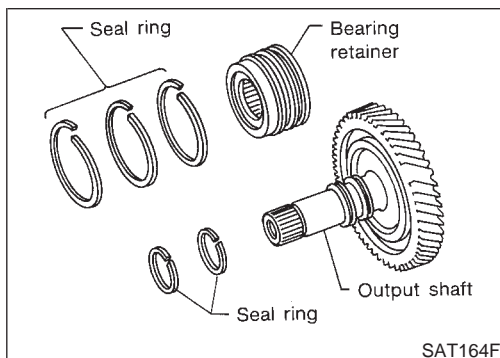
## Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer COMPONENTS

NFAT0165

### SEC. 314



SAT291K



SAT164F

### DISASSEMBLY

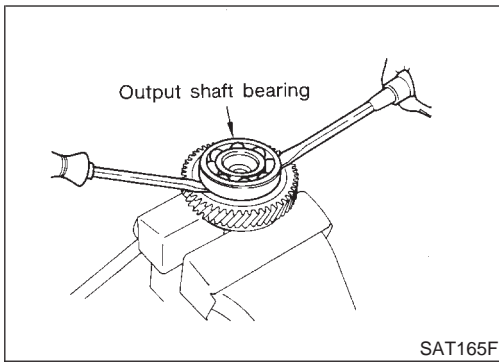
1. Remove seal rings from output shaft and bearing retainer.

NFAT0166

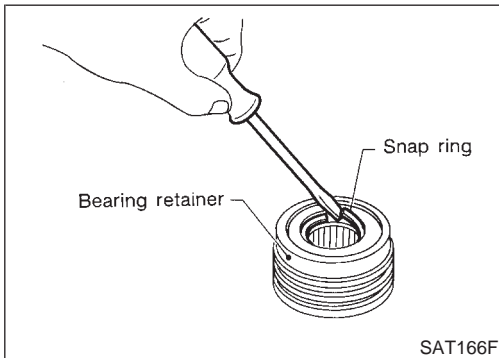


## REPAIR FOR COMPONENT PARTS

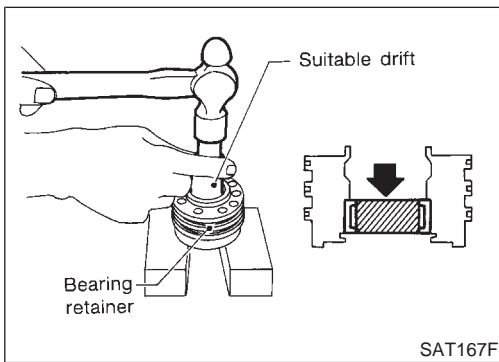
Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer (Cont'd)



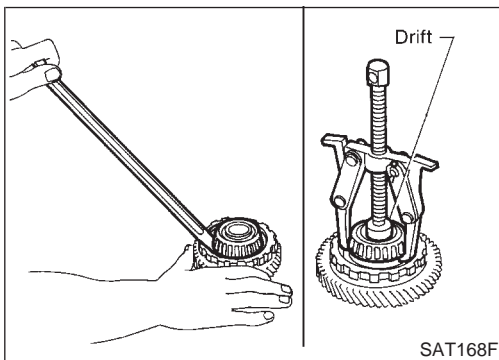
2. Remove output shaft bearing with screwdrivers.
  - Always replace bearing with a new one when removed.
  - Do not damage output shaft.



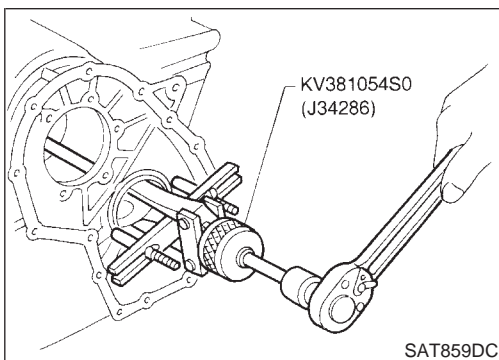
3. Remove snap ring from bearing retainer.



4. Remove needle bearing from bearing retainer.



5. Remove idler gear bearing inner race from idler gear.

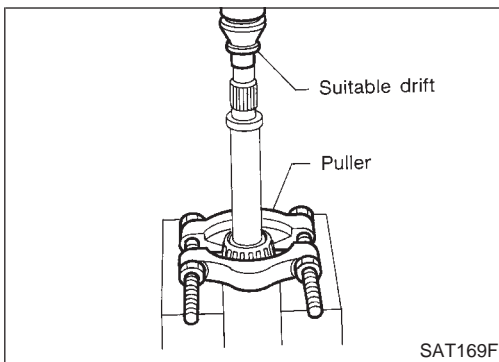


6. Remove idler gear bearing outer race from transmission case.

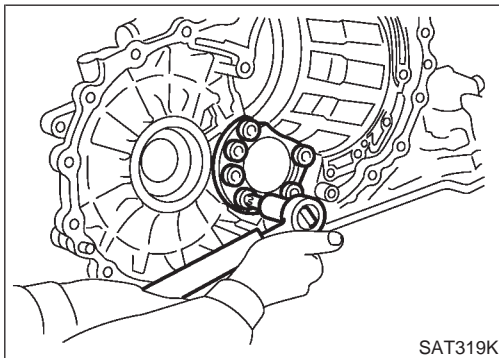


# REPAIR FOR COMPONENT PARTS

Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer (Cont'd)



7. Press out reduction pinion gear bearing inner race from reduction pinion gear.



8. Remove reduction pinion gear bearing outer race from transmission case.

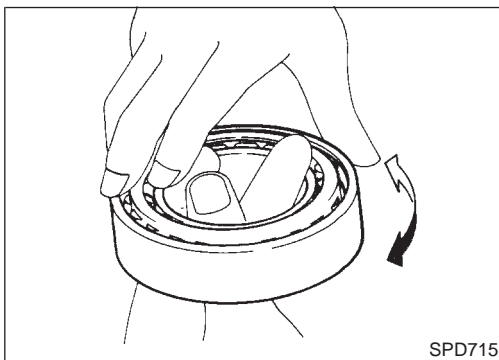
## INSPECTION

### Output Shaft, Idler Gear and Reduction Pinion Gear

NFAT0167

NFAT0167S01

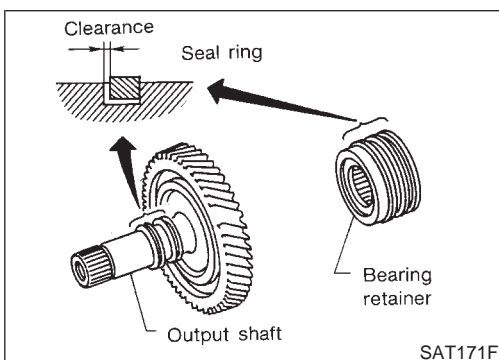
- Check shafts for cracks, wear or bending.
- Check gears for wear, chips and cracks.



## Bearing

NFAT0167S02

- 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

NFAT0167S03

- 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.

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## REPAIR FOR COMPONENT PARTS

Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer (Cont'd)

- Measure clearance between seal ring and ring groove of bearing retainer.

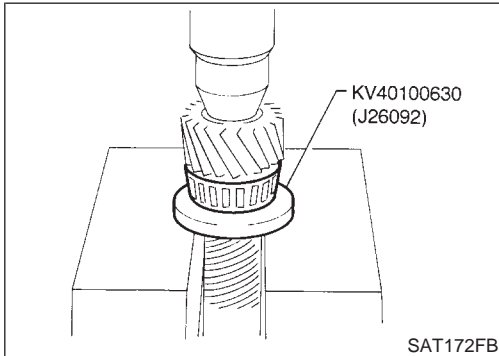
**Standard clearance:**

**0.10 - 0.30 mm (0.0039 - 0.0118 in)**

**Allowable limit:**

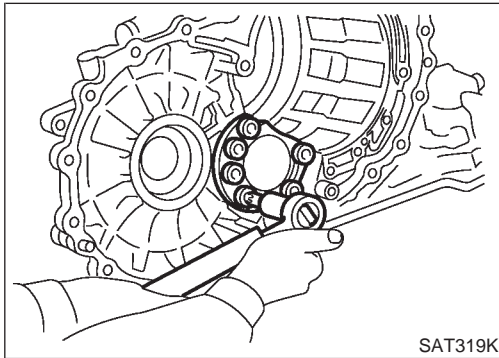
**0.30 mm (0.0118 in)**

- If not within allowable limit, replace bearing retainer.



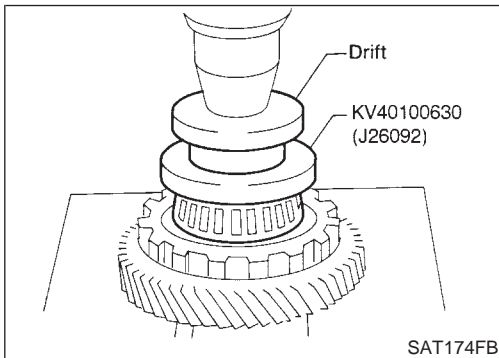
### ASSEMBLY

1. Press reduction pinion gear bearing inner race on reduction pinion gear. NFA70168

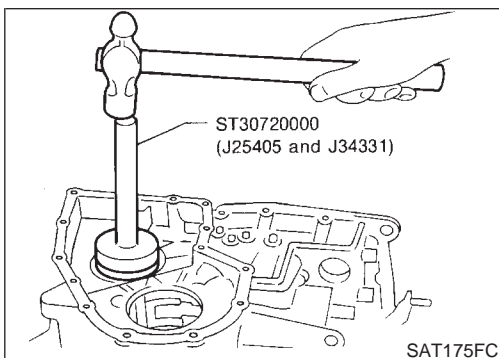


2. Install reduction pinion gear bearing outer race on transmission case.

**⚙️ : 109 - 123 N·m (11.1 - 12.5 kg·m, 80 - 90 ft·lb)**



3. Press idler gear bearing inner race on idler gear.

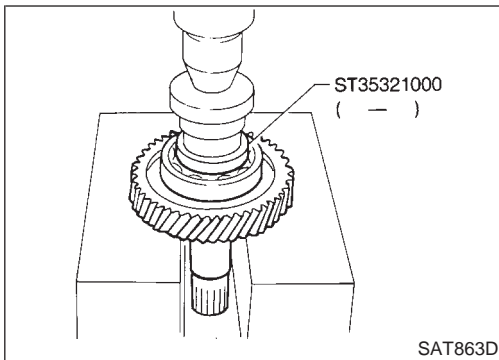


4. Install idler gear bearing outer race on transmission case.

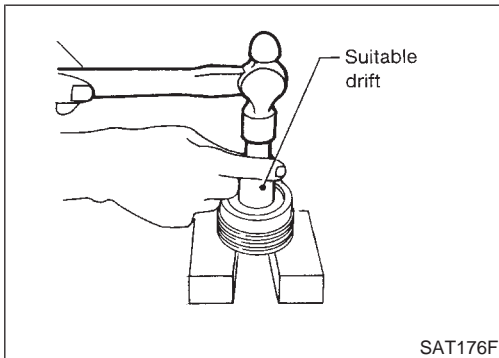


## REPAIR FOR COMPONENT PARTS

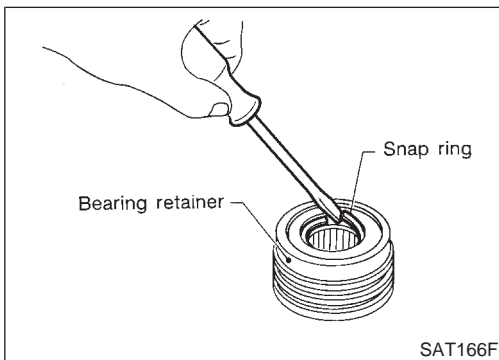
Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer (Cont'd)



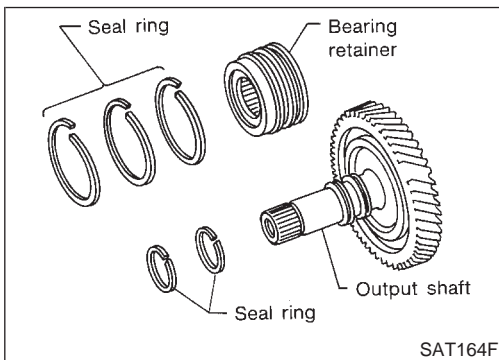
5. Press output shaft bearing on output shaft.



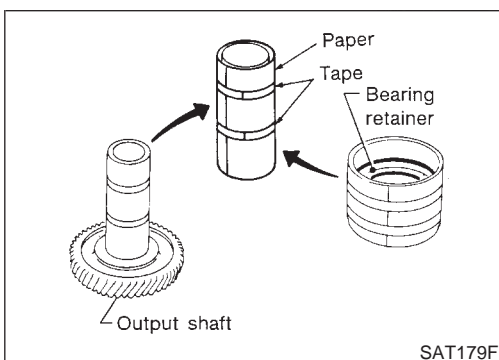
6. Press needle bearing on bearing retainer.



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.

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

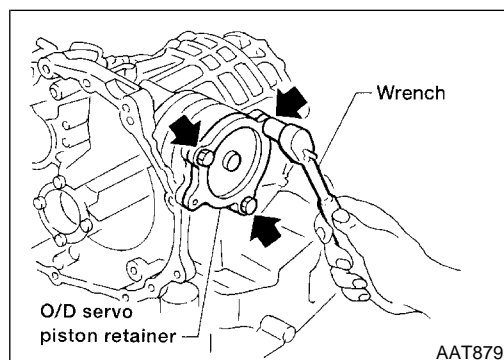
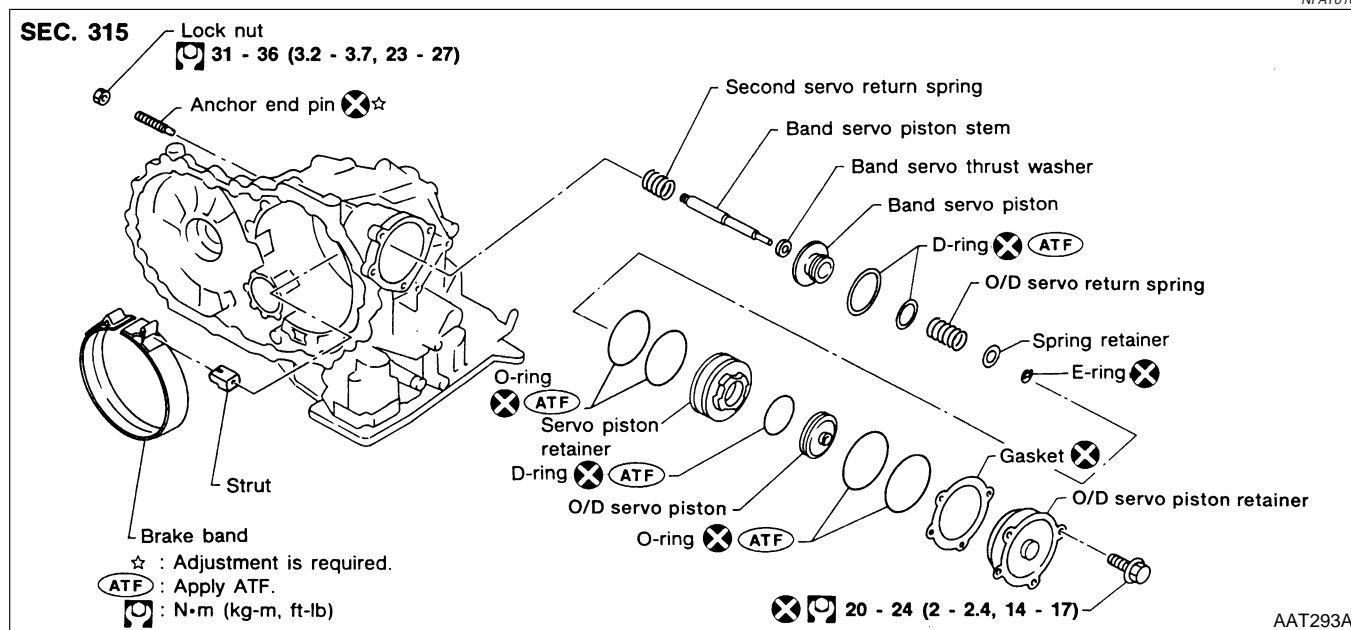


# REPAIR FOR COMPONENT PARTS

Band Servo Piston Assembly

## Band Servo Piston Assembly COMPONENTS

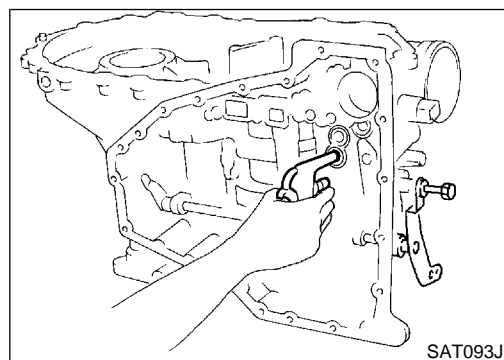
NFAT0169



### DISASSEMBLY

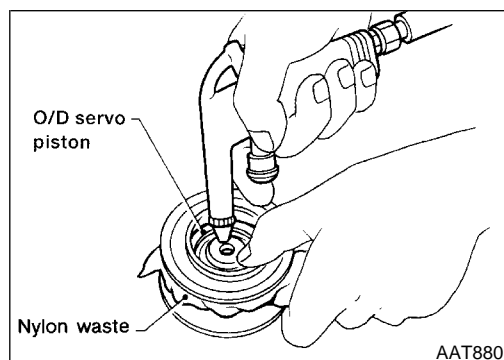
NFAT0170

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.



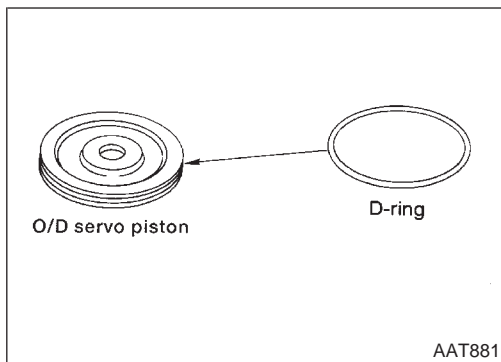
3. Apply compressed air to oil hole in O/D servo piston retainer to remove O/D servo piston from retainer.

- Hold O/D band servo piston while applying compressed air.

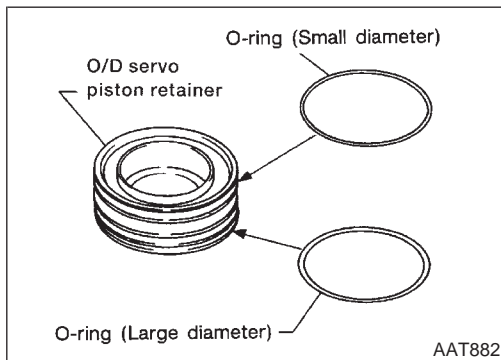


# REPAIR FOR COMPONENT PARTS

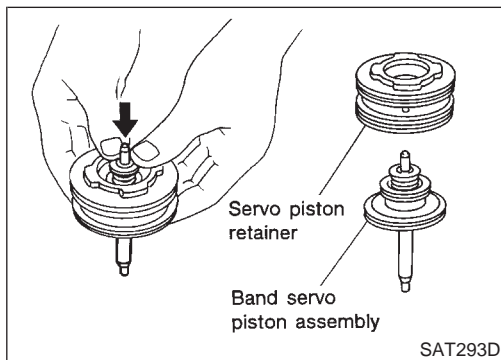
Band Servo Piston Assembly (Cont'd)



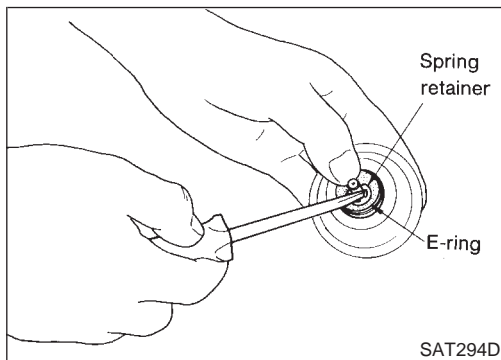
- Remove D-ring from O/D servo piston.



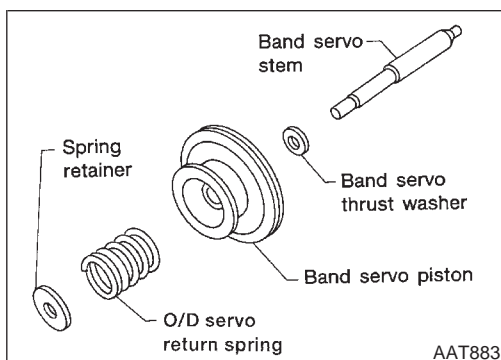
- Remove O-rings from O/D servo piston retainer.



- Remove band servo piston assembly from servo piston retainer by pushing it forward.



- Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.



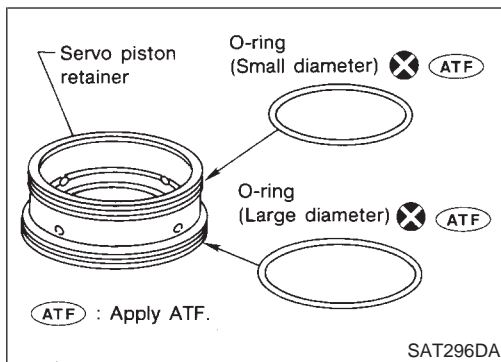
- Remove O/D servo return spring, band servo thrust washer and band servo piston stem from band servo piston.

GI  
MA  
EM  
LC  
EC  
FE  
CL  
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AT  
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BR  
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RS  
BT  
HA  
SC  
EL  
IDX

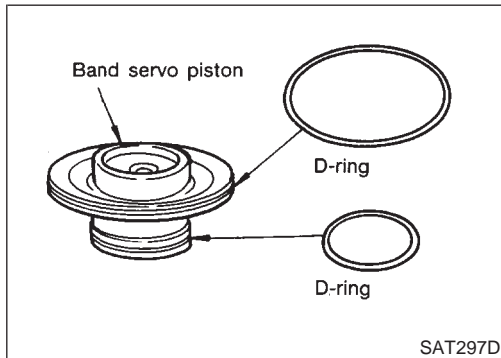


# REPAIR FOR COMPONENT PARTS

## Band Servo Piston Assembly (Cont'd)



9. Remove O-rings from servo piston retainer.



10. Remove D-rings from band servo piston.

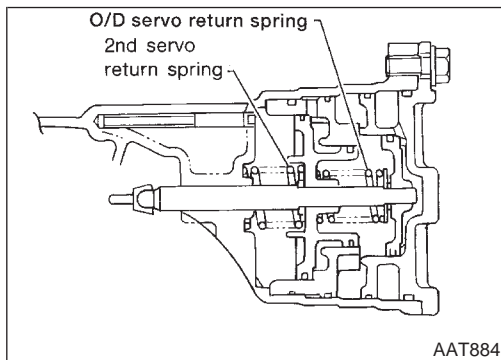
## INSPECTION

### Pistons, Retainers and Piston Stem

- Check frictional surfaces for abnormal wear or damage.

NFAT0171

NFAT0171S01



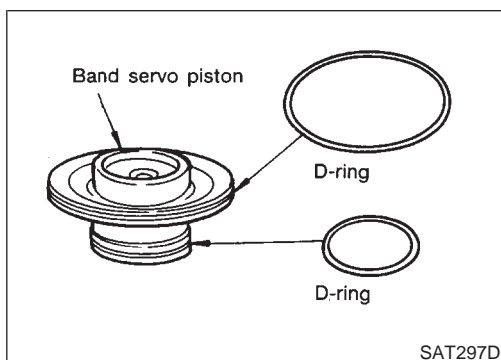
## Return Springs

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

**Inspection standard:**

**Refer to SDS, AT-383.**

NFAT0171S02



## ASSEMBLY

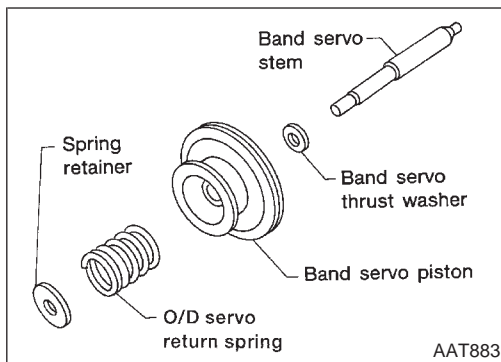
1. Install D-rings to servo piston retainer.
- **Apply ATF to D-rings.**
  - **Pay attention to position of each O-ring.**

NFAT0172



# REPAIR FOR COMPONENT PARTS

Band Servo Piston Assembly (Cont'd)



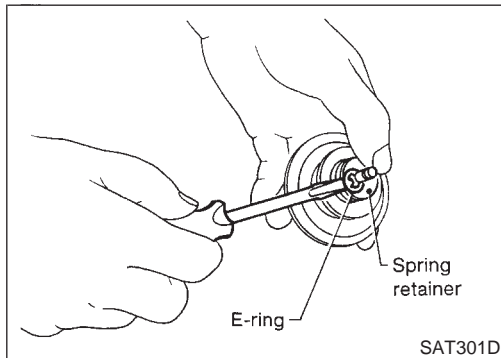
2. Install band servo piston stem, band servo thrust washer, O/D servo return spring and spring retainer to band servo piston.

GI

MA

EM

LC



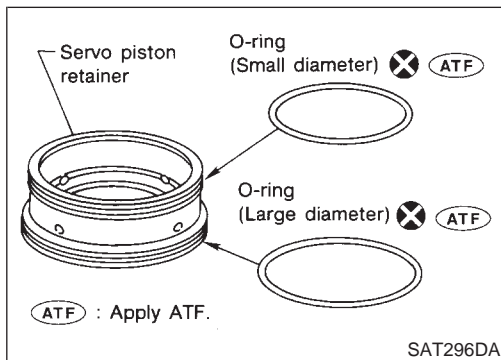
3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.

EC

FE

CL

MT



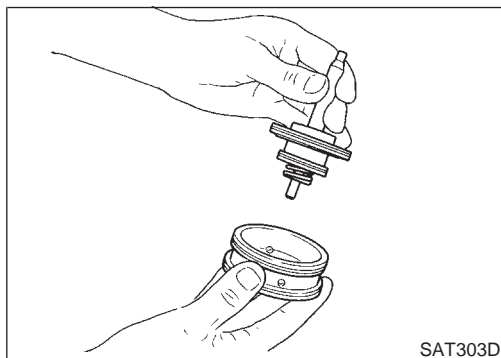
4. Install O-rings to servo piston retainer.
  - **Apply ATF to O-rings.**
  - **Pay attention to position of each O-ring.**

AT

AX

SU

BR



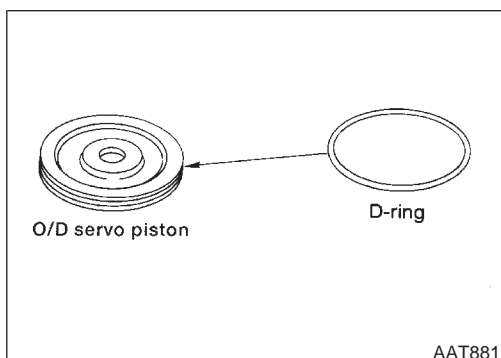
5. Install band servo piston assembly to servo piston retainer by pushing it inward.

ST

RS

BT

HA



6. Install D-ring to O/D servo piston.
  - **Apply ATF to D-ring.**

SC

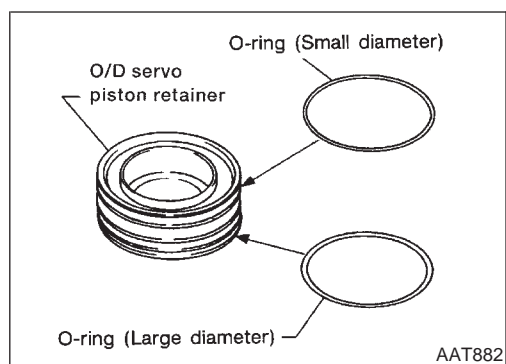
EL

IDX

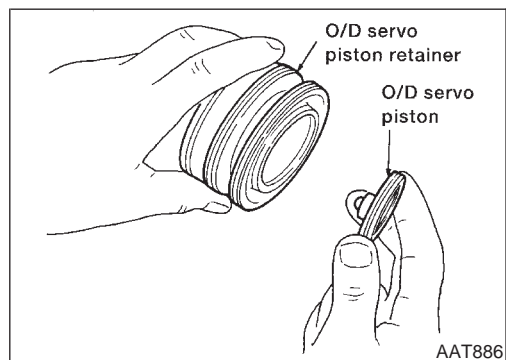


## REPAIR FOR COMPONENT PARTS

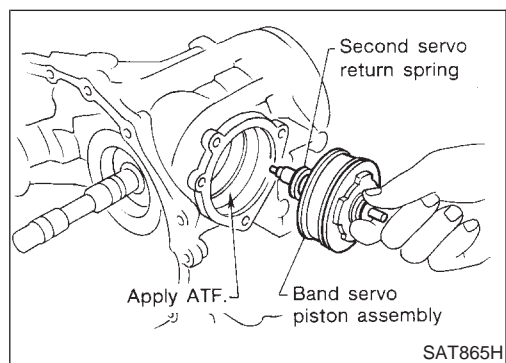
### Band Servo Piston Assembly (Cont'd)



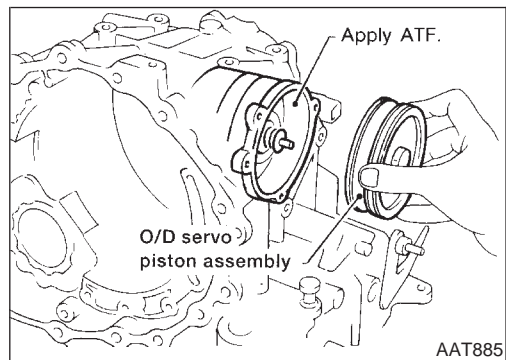
7. Install O-rings to O/D servo piston retainer.
  - **Apply ATF to O-rings.**
  - **Pay attention to position of each O-ring.**



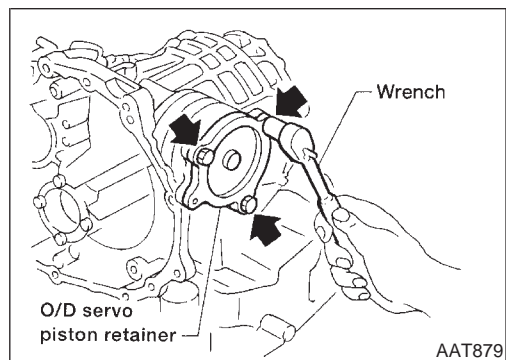
8. Install O/D servo piston to O/D servo piston retainer.



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.**

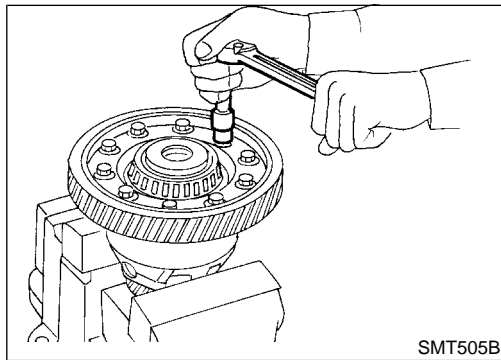
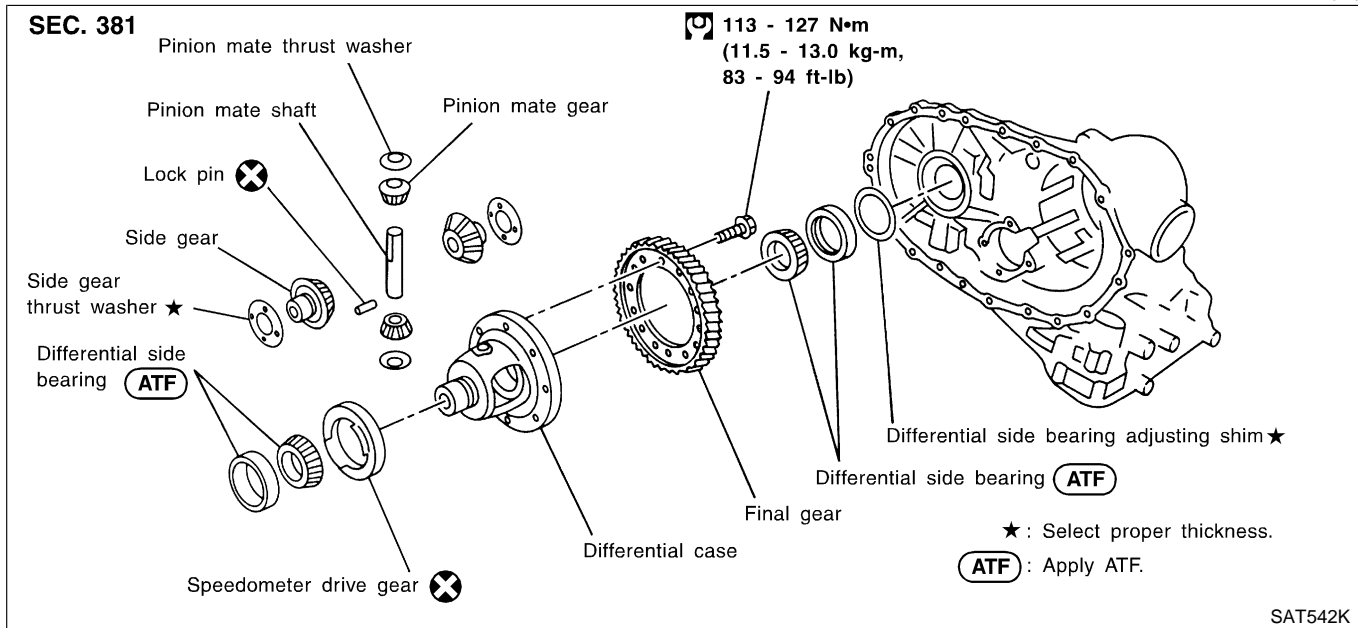


11. Install O/D servo piston retainer to transmission case. Refer to AT-348.



## Final Drive COMPONENTS

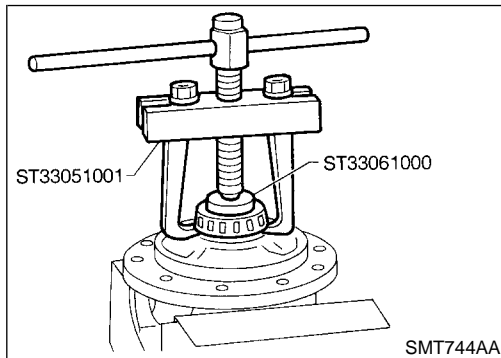
NFAT0173



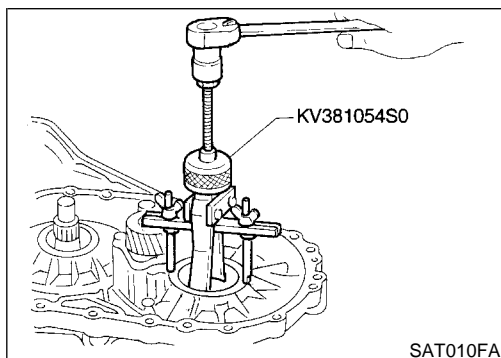
### DISASSEMBLY

NFAT0174

1. Remove final gear.



2. Press out differential side bearings.
  - Be careful not to mix up the right and left bearings.

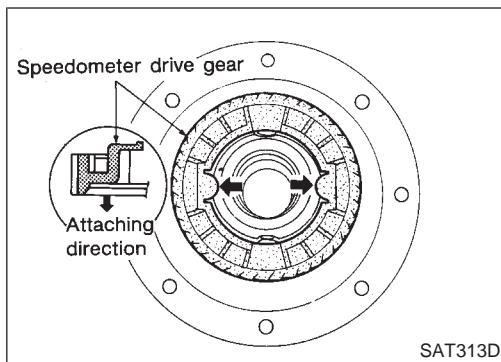


3. Remove differential side bearing outer race, and side bearing adjusting shim from transmission case.

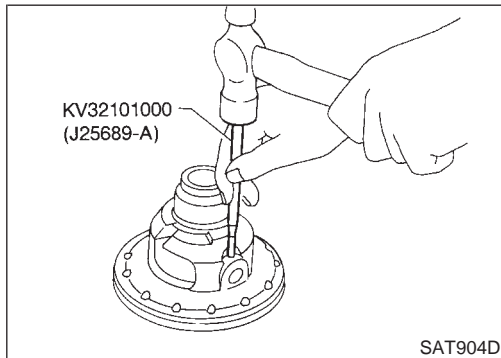


## REPAIR FOR COMPONENT PARTS

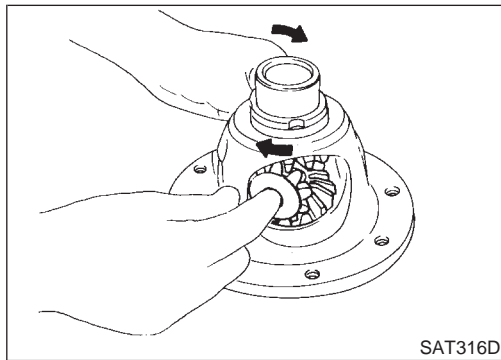
Final Drive (Cont'd)



4. Remove speedometer drive gear.

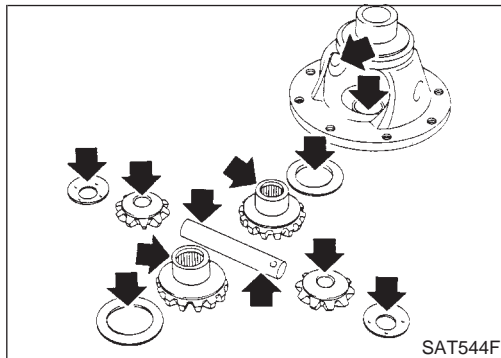


5. Drive out pinion mate shaft lock pin.



6. Draw out pinion mate shaft lock pin.

7. Remove pinion mate gears and side gears.



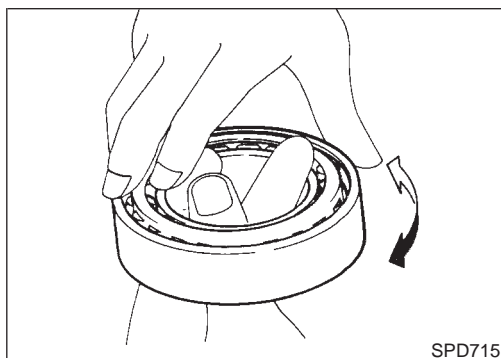
### INSPECTION

#### Gear, washer, shaft and case

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.

NFAT0175

NFAT0175S01

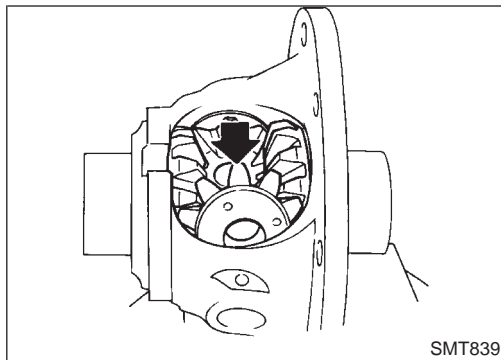


### Bearings

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- When replacing taper roller bearing, replace outer and inner race as a set.

NFAT0175S03





## ASSEMBLY

1. Attach side gear thrust washers to side gears, then install pinion mate thrust washers and pinion mate gears in place.

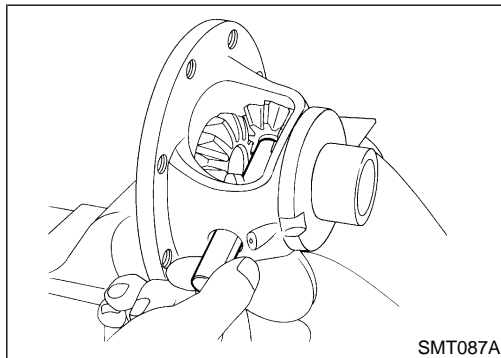
NFAT0176

GI

MA

EM

LC



2. Insert pinion mate shaft.

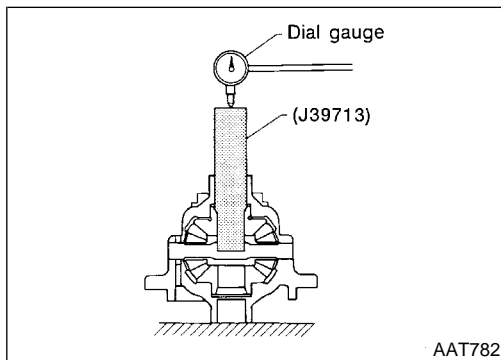
- When inserting, be careful not to damage pinion mate thrust washers.

EC

FE

CL

MT



3. Measure clearance between side gear and differential case with washers following the procedure below:

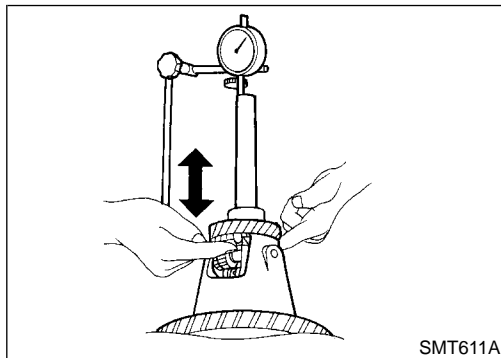
- a. Set Tool and dial indicator on side gear.

AT

AX

SU

BR



- b. Move side gear up and down to measure dial indicator deflection. Always measure indicator deflection on both side gears.

ST

**Clearance between side gear and differential case with washers:**

RS

**0.1 - 0.2 mm (0.004 - 0.008 in)**

BT

HA

- c. If not within specification, adjust clearance by changing thickness of side gear thrust washers.

SC

**Side gear thrust washer:**

EL

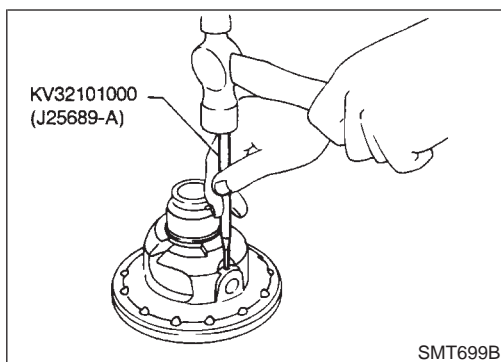
**Refer to SDS, AT-380.**

IDX

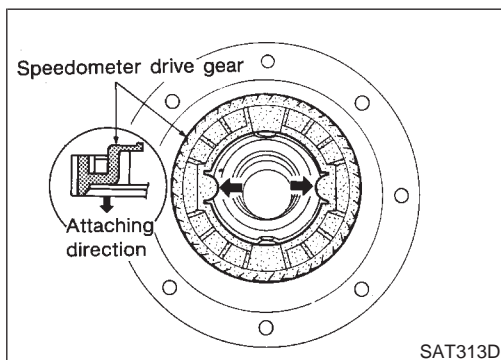


## REPAIR FOR COMPONENT PARTS

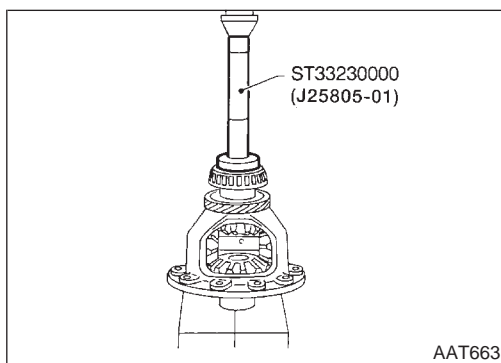
### Final Drive (Cont'd)



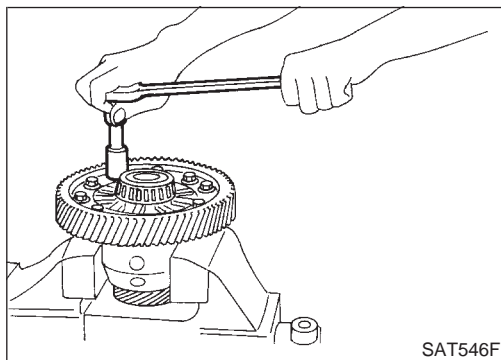
4. Install lock pin.
  - **Make sure that lock pin is flush with case.**



5. Install speedometer drive gear on differential case.
  - **Align the projection of speedometer drive gear with the groove of differential case.**

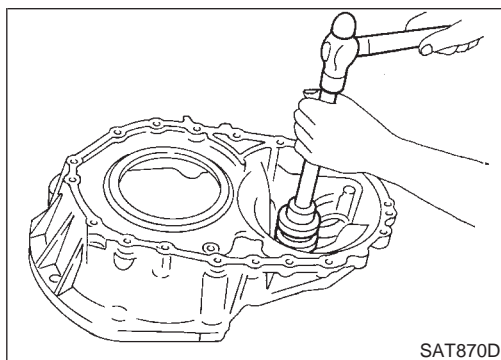
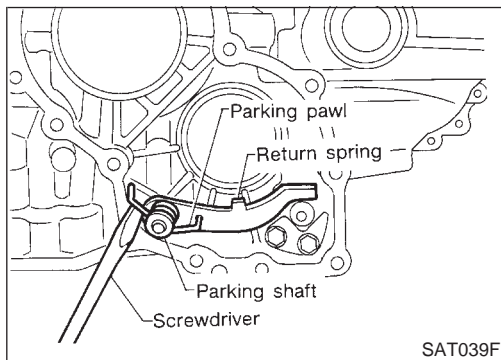
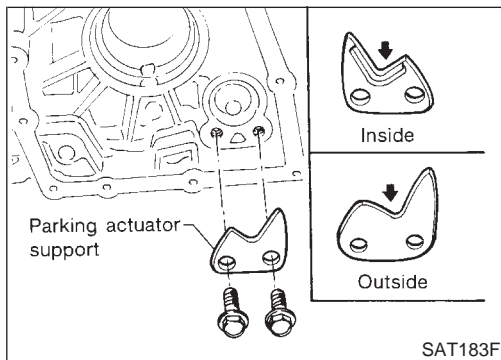
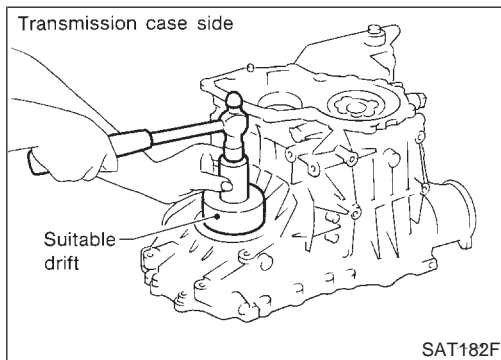
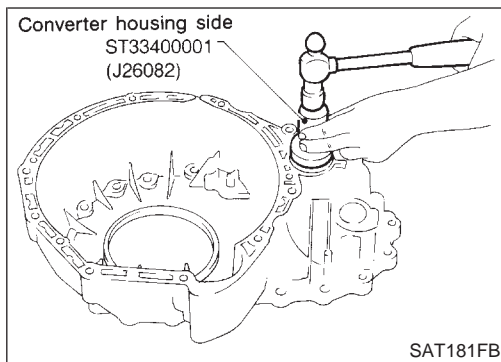


6. Press on differential side bearings.



7. Install final gear and tighten fixing bolts in a crisscross pattern.





## Assembly (1)

NFAT0177

1. Install differential side oil seals on transmission case and converter housing.

GI

MA

EM

LC

EC

FE

CL

MT

2. Install parking actuator support to transmission case. Tighten parking actuator support bolts to the specified torque. Refer to AT-283.

AT

- Pay attention to direction of parking actuator support.

AX

SU

BR

3. Install parking pawl on transmission case and fix it with parking shaft.
4. Install return spring.

ST

RS

BT

HA

SC

NFAT0178

## Adjustment (1)

### DIFFERENTIAL SIDE BEARING PRELOAD

NFAT0178S01

1. Install differential side bearing outer race without adjusting shim on transmission case.
2. Install differential side bearing outer race on converter housing.

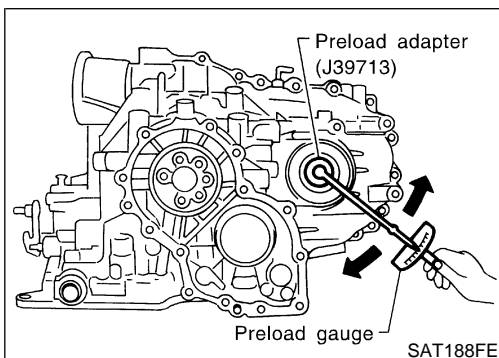
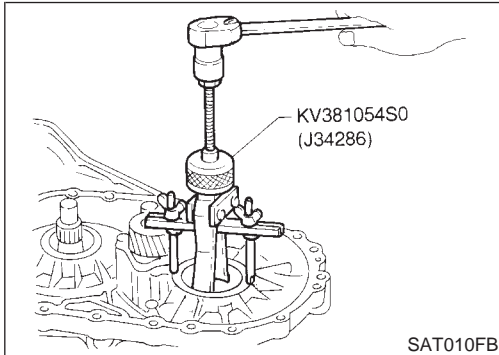
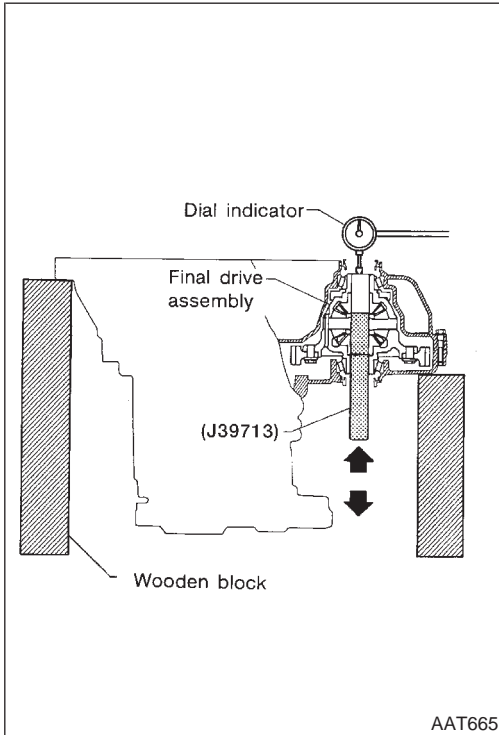
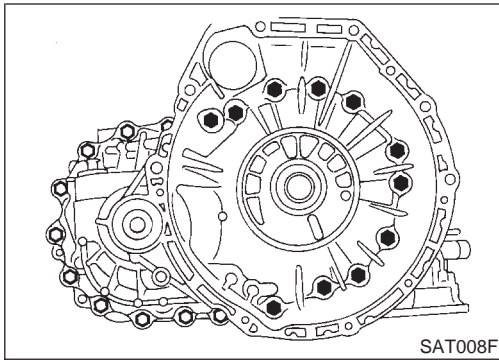
EL

IDX



# ASSEMBLY

## Adjustment (1) (Cont'd)



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-283.

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-381.**

**Bearing preload:**

**0.05 - 0.09 mm (0.0020 - 0.0035 in)**

9. Remove converter housing from transmission case.
10. Remove final drive assembly from transmission case.
11. Remove differential side bearing outer race from transmission case.
12. Reinstall differential side bearing outer race and shim(s) selected from SDS table on transmission case.
13. Reinstall converter housing on transmission case and tighten transmission case fixing bolts to the specified torque. Refer to AT-283.

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):**

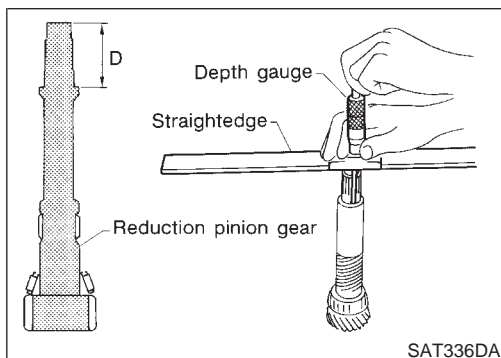
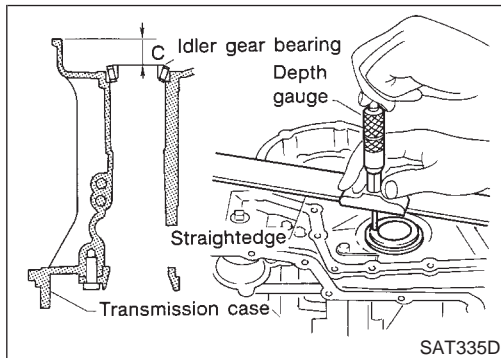
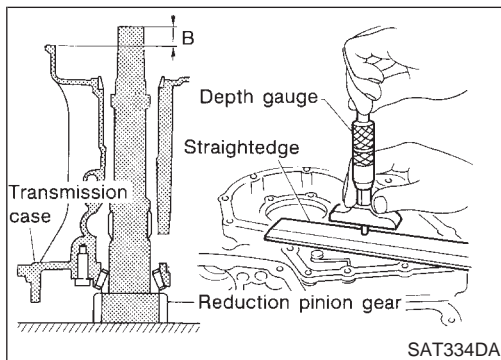
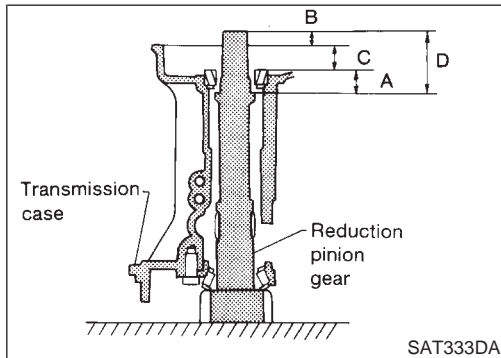
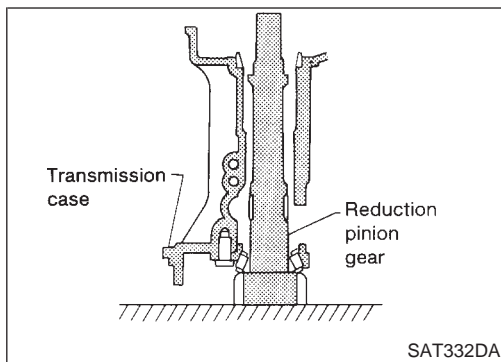
**0.78 - 1.37 N·m (8.0 - 14.0 kg-cm, 6.9 - 12.2 in-lb)**

- **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-(J39713)**





## REDUCTION PINION GEAR BEARING PRELOAD

NFAT0178S02

1. Remove transmission case and final drive assembly from converter housing.
2. Select proper thickness of reduction pinion gear bearing adjusting shim using the following procedures.
- a. Place reduction pinion gear on transmission case as shown.

- b. Place idler gear bearing on transmission case.
- c. Measure dimensions "B" "C" and "D" and calculate dimension "A".

$$A = D - (B + C)$$

"A": Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.

- Measure dimension "B" between the end of reduction pinion gear and the surface of transmission case.
- Measure dimension "B" in at least two places.

- Measure dimension "C" between the surface of idler gear bearing inner race and the surface of transmission case.
- Measure dimension "C" in at least two places.

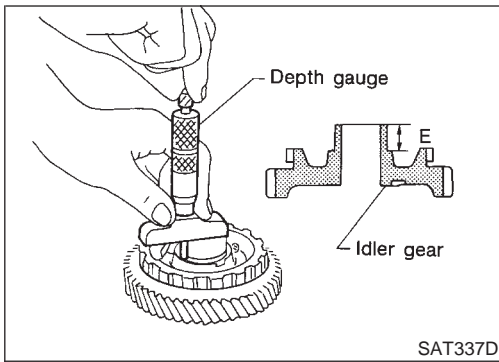
- Measure dimension "D" between the end of reduction pinion gear and the adjusting shim mating surface of reduction pinion gear.
- Measure dimension "D" in at least two places.
- Calculate dimension "A".

$$A = D - (B + C)$$



# ASSEMBLY

## 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.**

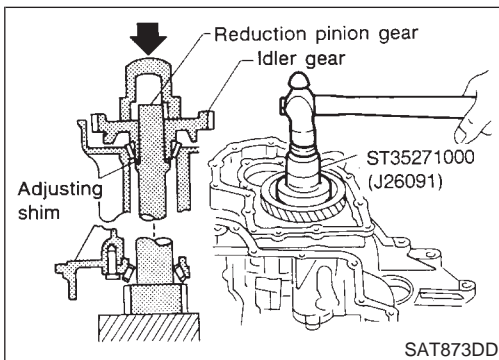
- e. Select proper thickness of reduction pinion gear bearing adjusting shim.

**Proper shim thickness = A – E – 0.05 mm (0.0020 in)\***

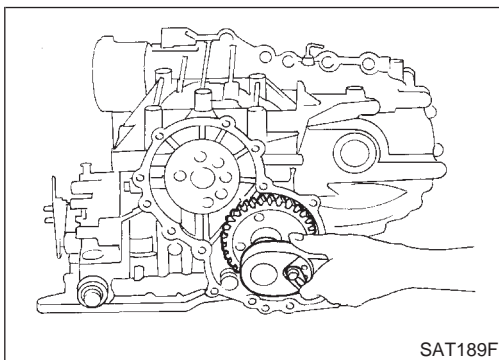
**(\* ... Bearing preload)**

**Reduction pinion gear bearing adjusting shim:**

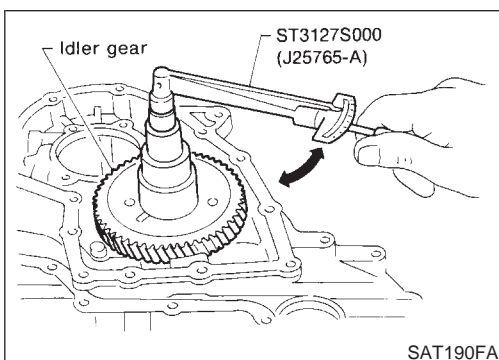
**Refer to SDS, AT-382.**



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-343.
- **Lock idler gear with parking pawl when tightening lock nut.**



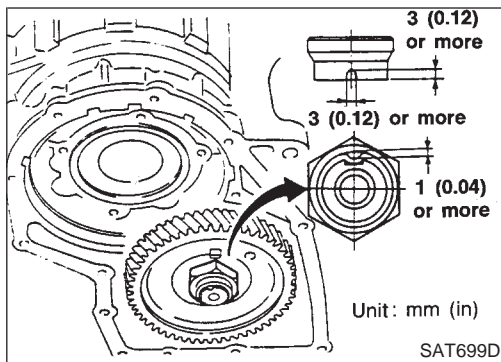
7. Measure turning torque of reduction pinion gear.
- **When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.**

**Turning torque of reduction pinion gear:**

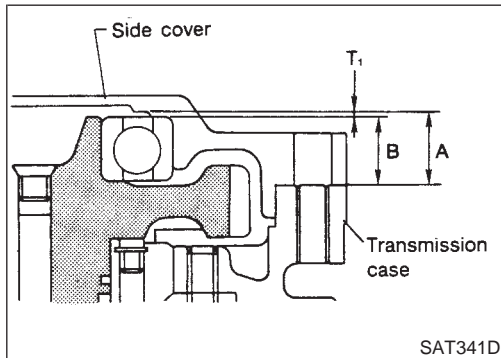
**0.05 - 0.39 N·m (0.5 - 4.0 kg·cm, 0.43 - 3.47 in·lb)**

- **If turning torque is out of specification, decrease or increase thickness of reduction pinion gear bearing adjusting shim.**





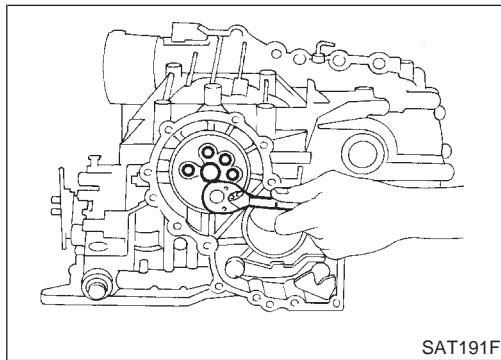
8. After properly adjusting turning torque, clinch idler gear lock nut as shown.



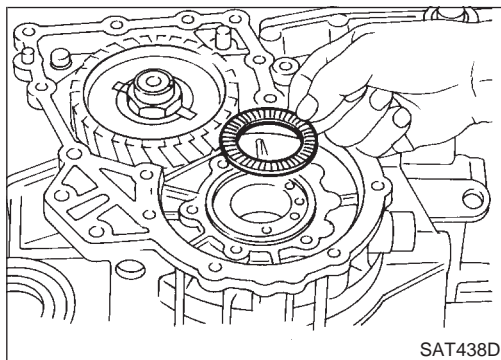
## OUTPUT SHAFT END PLAY

NFAT0178S03

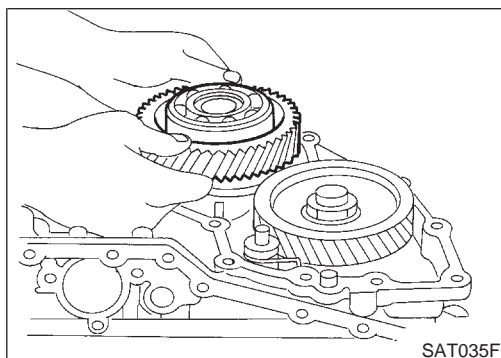
- Measure clearance between side cover and the end of the output shaft bearing.
- Select proper thickness of adjusting shim so that clearance is within specifications.



1. Install bearing retainer for output shaft.



2. Install output shaft thrust needle bearing on bearing retainer.

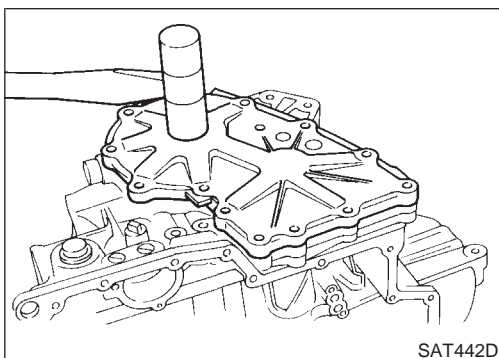
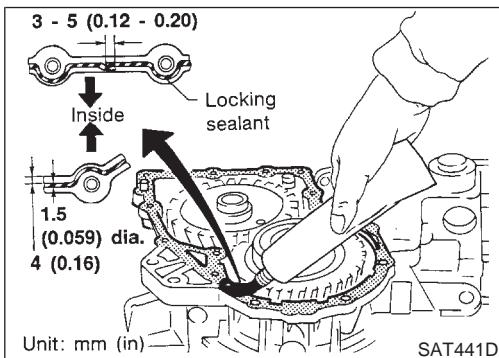
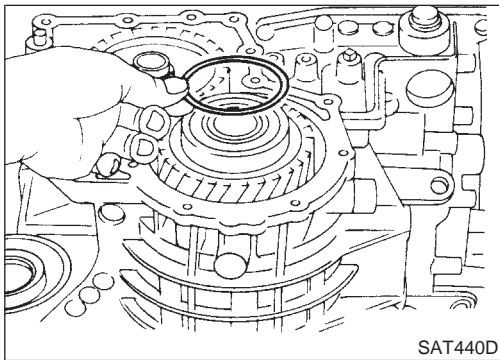
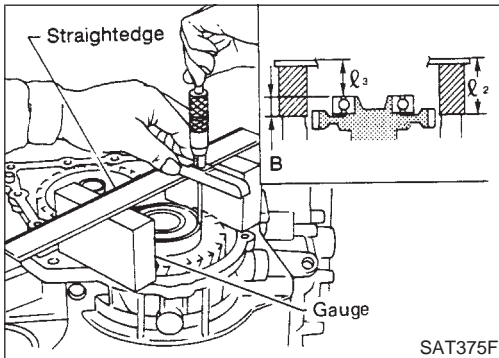
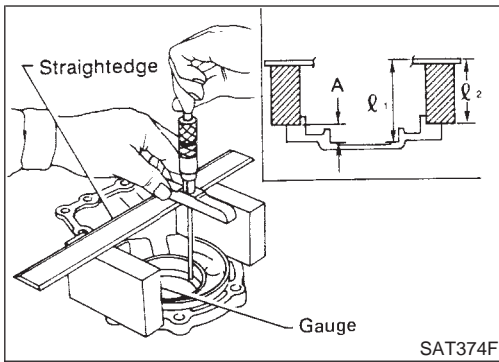


3. Install output shaft on transmission case.



# ASSEMBLY

## 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.

$$A = l_1 - l_2$$

$l_2$ : 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.

$$B = l_2 - l_3$$

$l_2$ : Height of gauge
6. Select proper thickness of adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications.
 

Output shaft end play (A - B):

0 - 0.15 mm (0 - 0.0059 in)

Output shaft end play adjusting shims:

Refer to SDS, AT-384.
7. Install adjusting shim on output shaft bearing.

## Assembly (2)

1. Apply Genuine Medium Strength Locking Sealant\* to transmission case as shown in illustration.
 

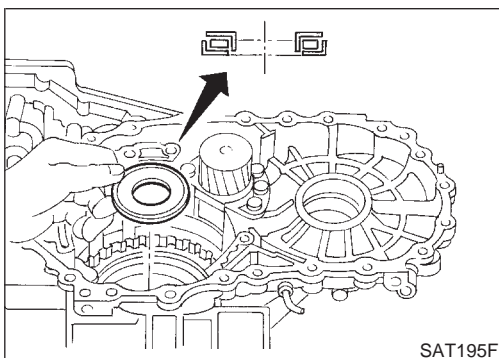
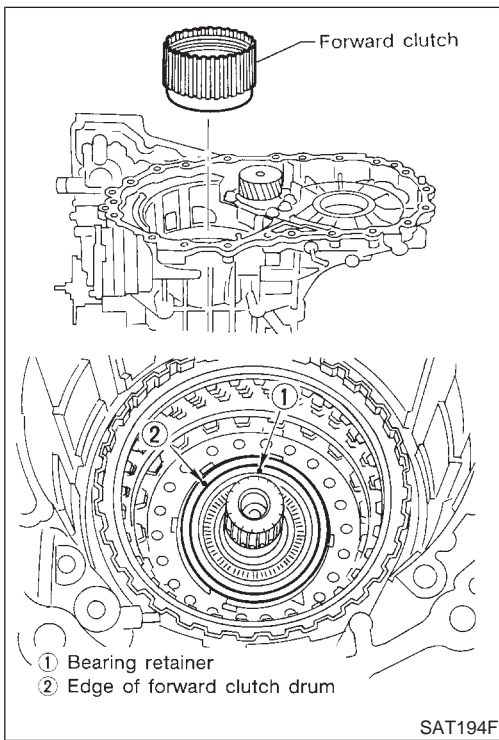
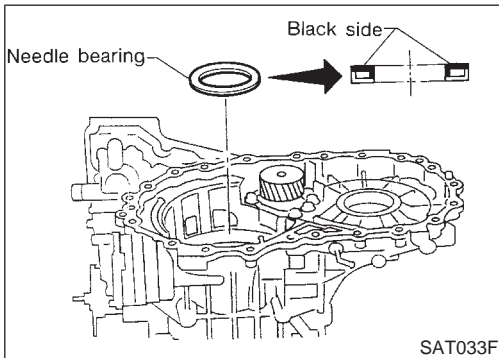
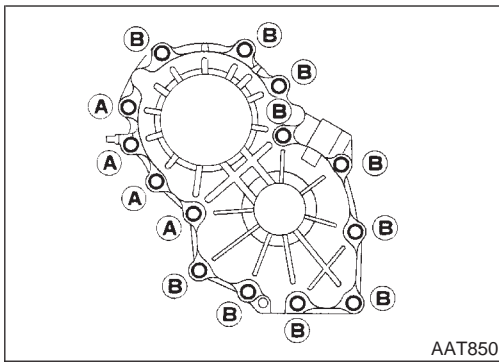
\*: Refer to GI section.
2. Set side cover on transmission case.
  - Apply locking sealant to the mating surface of transmission case.

NFAT0179



# ASSEMBLY

Assembly (2) (Cont'd)



3. Tighten side cover fixing bolts to specified torque. Refer to AT-283.

- 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.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

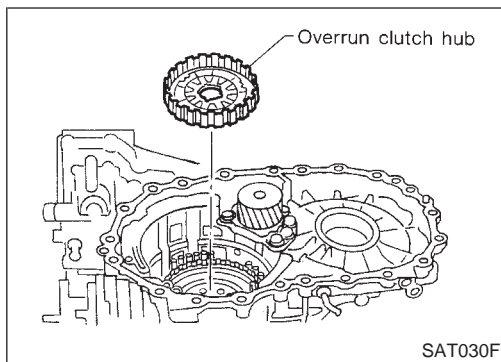
EL

IDX

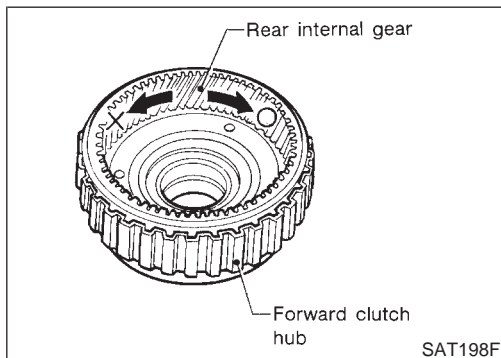


# ASSEMBLY

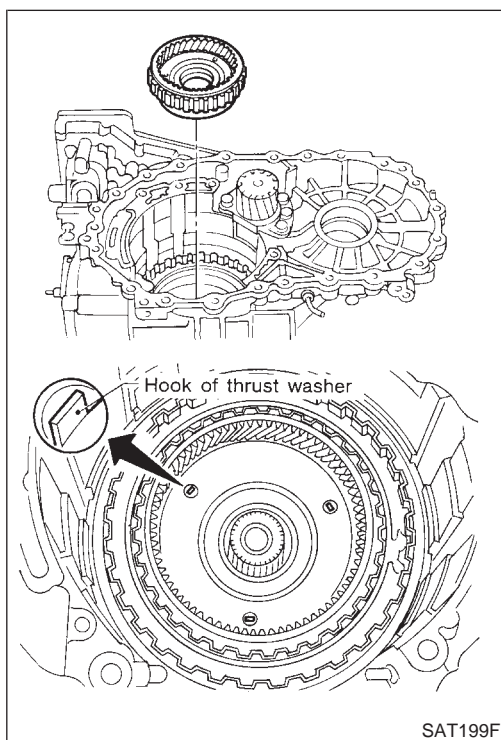
## Assembly (2) (Cont'd)



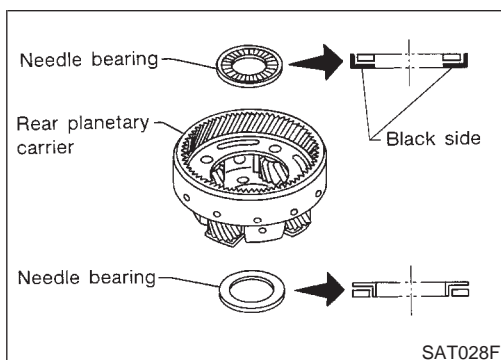
8. Install overrun clutch hub.
  - Apply petroleum jelly to thrust washers.
  - Align teeth of overrun clutch drive plates before installing.



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.

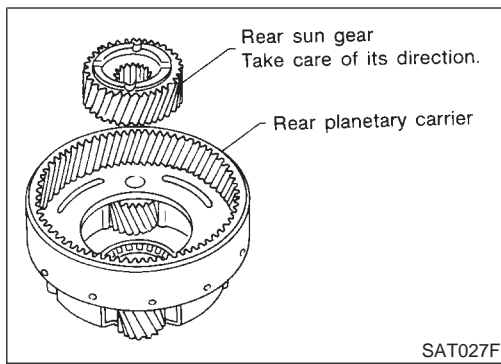


11. Install rear planetary carrier assembly and rear sun gear according to the following procedures.
  - a. Install needle bearings on rear planetary carrier.
    - Apply petroleum jelly to needle bearings.
    - Pay attention to direction of needle bearings.

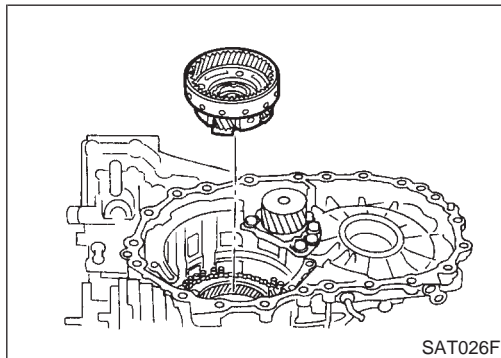


# ASSEMBLY

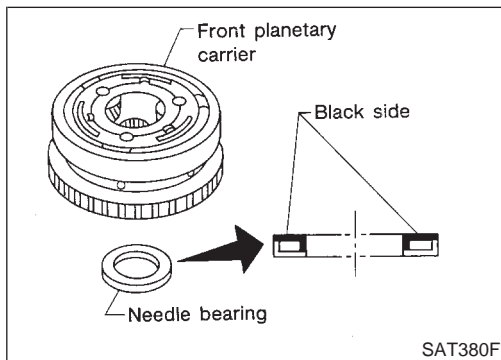
Assembly (2) (Cont'd)



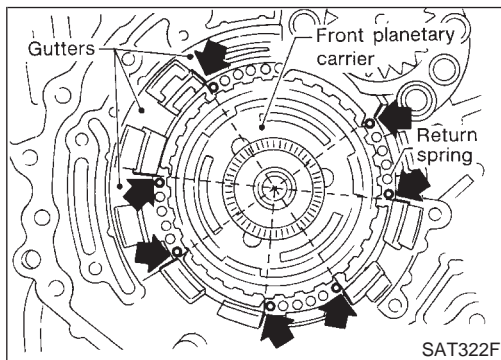
- b. Install rear sun gear on rear planetary carrier.
- **Pay attention to direction of rear sun gear.**



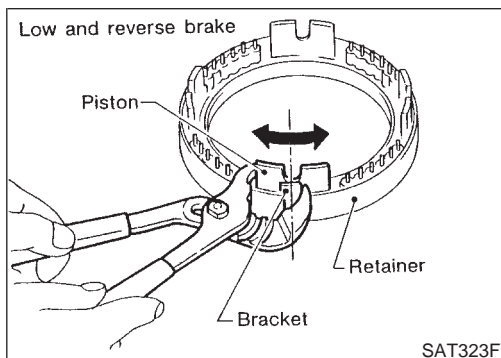
- c. Install rear planetary carrier on transmission case.



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.



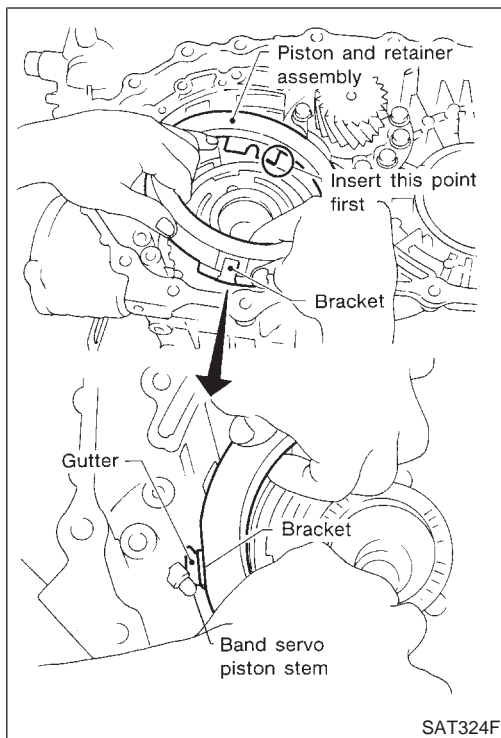
- b. Set and align piston with retainer.

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

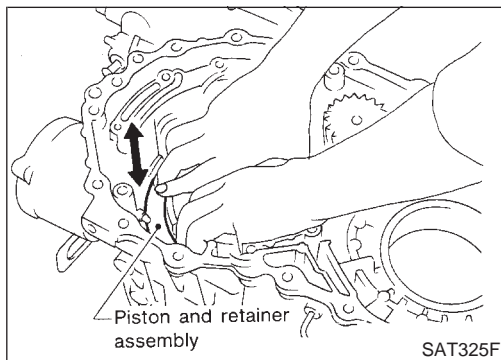


# ASSEMBLY

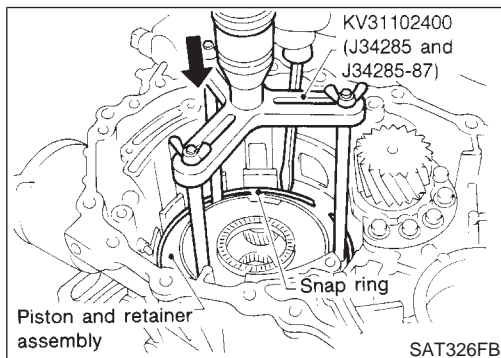
## Assembly (2) (Cont'd)



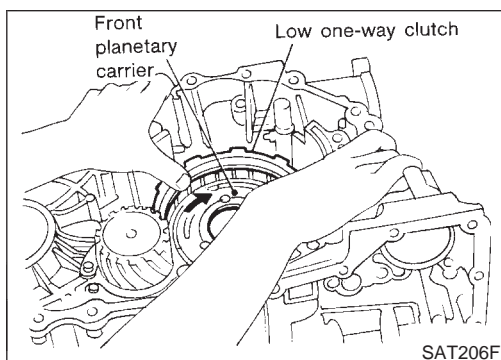
- c. Install piston and retainer assembly on the transmission case.
- **Align bracket to specified gutter as indicated in illustration.**



- 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.

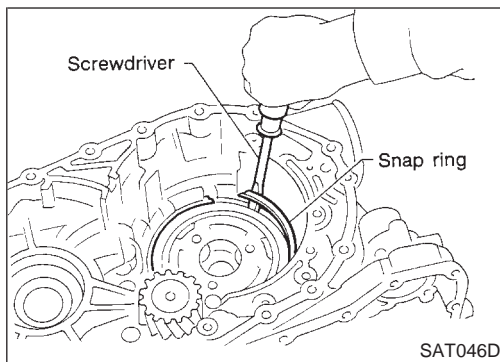


14. Install low one-way clutch to front planetary carrier by turning carrier in the direction of the arrow shown.



# ASSEMBLY

Assembly (2) (Cont'd)



15. Install snap ring with screwdriver.

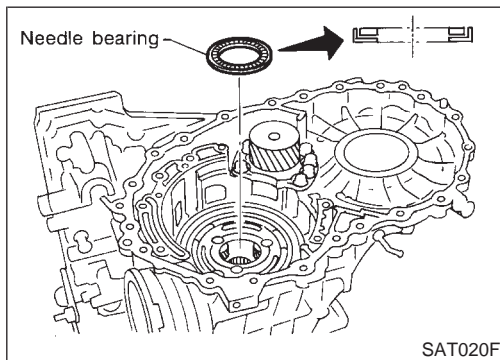
- **Forward clutch and bearing must be correctly installed for snap ring to fit into groove of transmission case.**

GI

MA

EM

LC



16. Install needle bearing on transmission case.

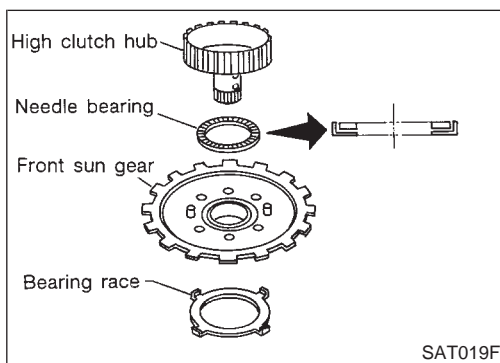
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**

EC

FE

CL

MT



17. Install bearing race, needle bearing and high clutch hub on front sun gear.

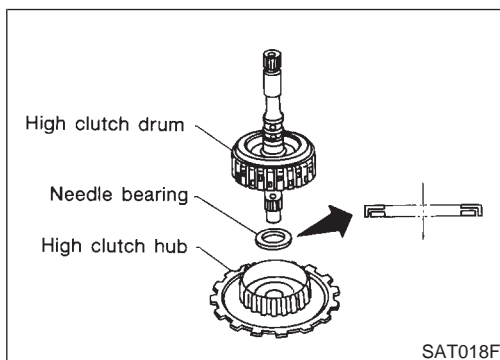
- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**

AT

AX

SU

BR



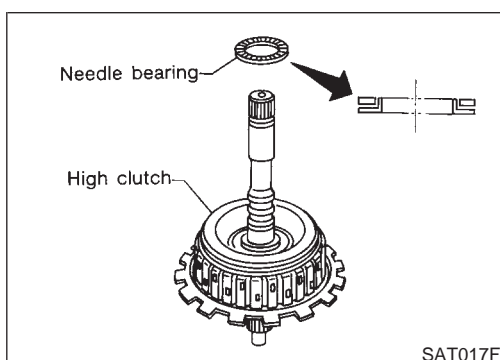
18. Install needle bearing and high clutch drum on high clutch hub.

ST

RS

BT

HA



19. Install needle bearing on high clutch drum.

- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**

SC

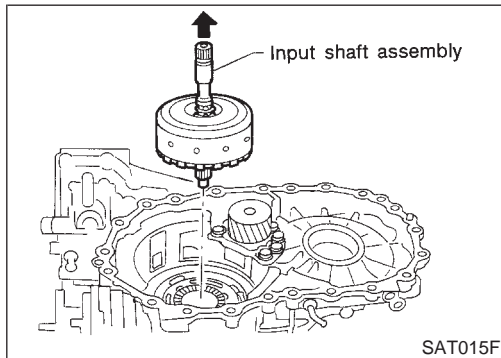
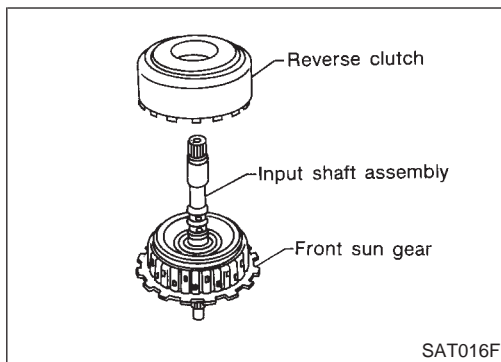
EL

IDX



# ASSEMBLY

## Assembly (2) (Cont'd)



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.

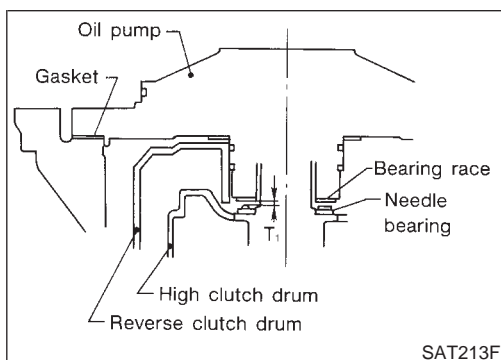
- **Align teeth of high clutch drive plates before installing.**

## Adjustment (2)

NFAT0180

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

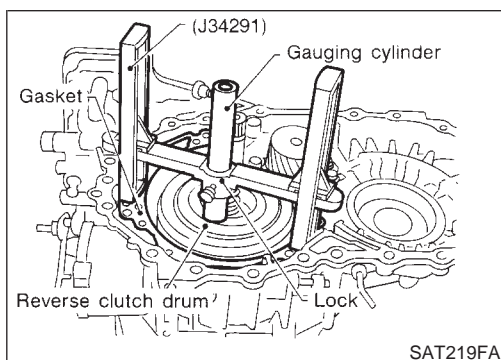
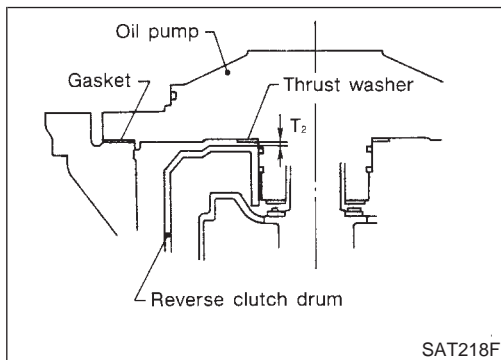
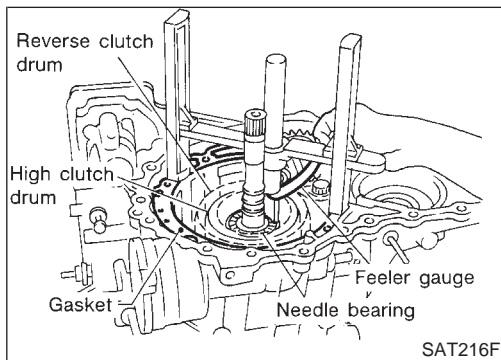
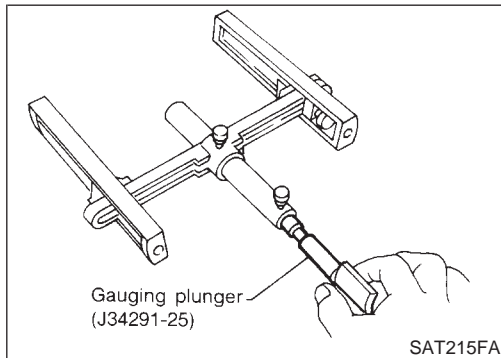
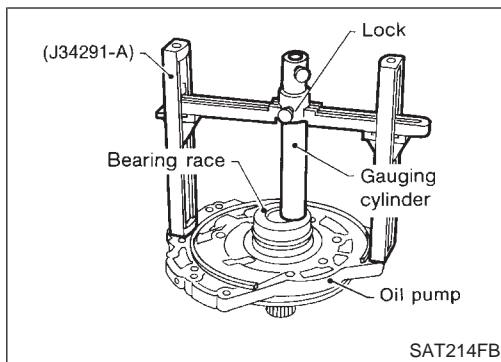
NFAT0180S01

1. Adjust total end play "T<sub>1</sub>".



# ASSEMBLY

Adjustment (2) (Cont'd)



a. With original bearing race installed, place Tool onto oil pump. The long ends of legs should be placed firmly on machined surface of oil pump assembly. The gauging cylinder should rest on top of bearing race. Lock gauging cylinder in place with set screw.

b. Install gauging plunger into cylinder.

c. With needle bearing installed on high clutch drum, place Tool legs on machined surface of transmission case (with gasket). Then allow plunger to rest on needle bearing.

d. Measure gap between cylinder and plunger. This measurement should give exact total end play.

**Total end play "T<sub>1</sub>":**

**0.25 - 0.55 mm (0.0098 - 0.0217 in)**

• If end play is out of specification, decrease or increase thickness of bearing race as necessary.

**Available bearing race for adjusting total end play:**

**Refer to SDS, AT-384.**

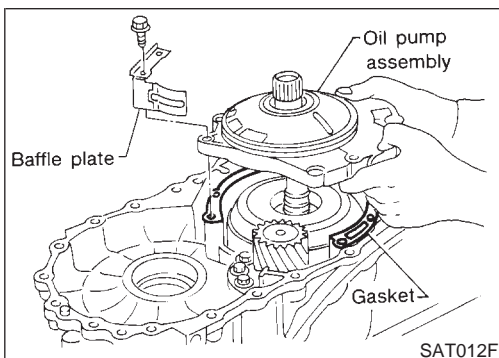
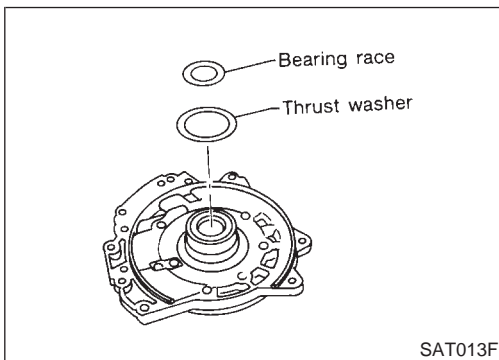
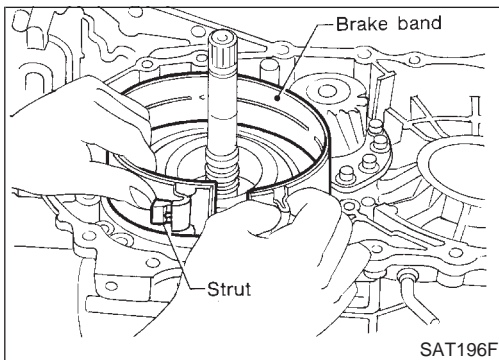
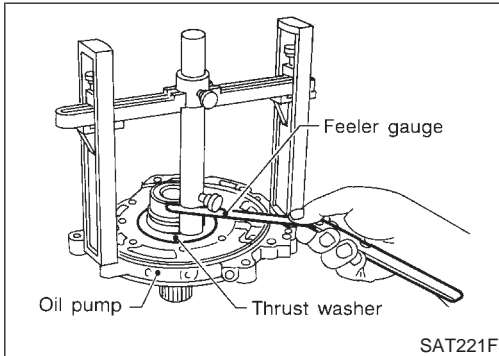
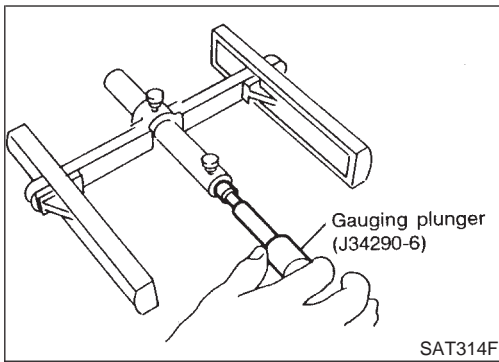
2. Adjust reverse clutch drum end play "T<sub>2</sub>".

a. Place Tool on machined surface of transmission case (with gasket). Then allow gauging cylinder to rest on reverse clutch drum. Lock cylinder in place with set screw.



# ASSEMBLY

## Adjustment (2) (Cont'd)



- b. Install gauging plunger into cylinder.
- c. With original thrust washer installed on oil pump, place Tool legs onto machined surface of oil pump assembly. Then allow plunger to rest on thrust washer.
- d. Measure gap between cylinder and plunger with feeler gauge. This measurement should give exact reverse clutch drum end play.

### Reverse clutch drum end play "T<sub>2</sub>":

**0.55 - 0.90 mm (0.0217 - 0.0354 in)**

- If end play is out of specification, decrease or increase thickness of thrust washer as necessary.

### Available thrust washer for adjusting reverse clutch drum end play:

**Refer to SDS, AT-384.**

## Assembly (3)

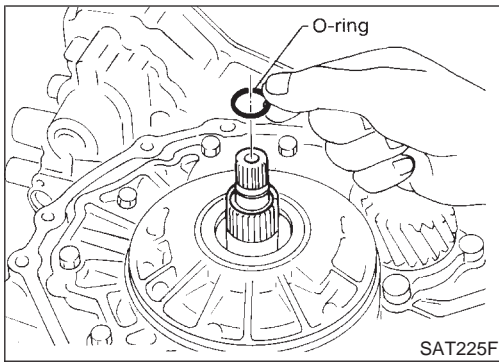
NFAT0181

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.

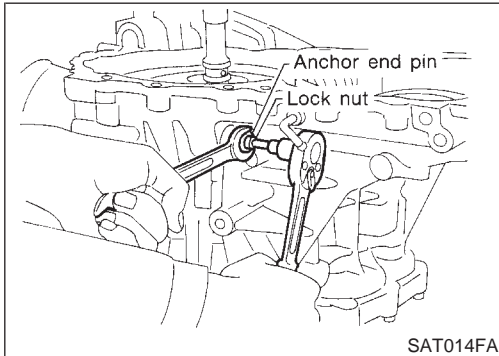
3. Place bearing race selected in total end play adjustment step on oil pump cover.
- **Apply petroleum jelly to bearing race.**
4. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.
- **Apply petroleum jelly to thrust washer.**

5. Install oil pump assembly, baffle plate and gasket on transmission case.
6. Tighten oil pump fixing bolts to the specified torque.





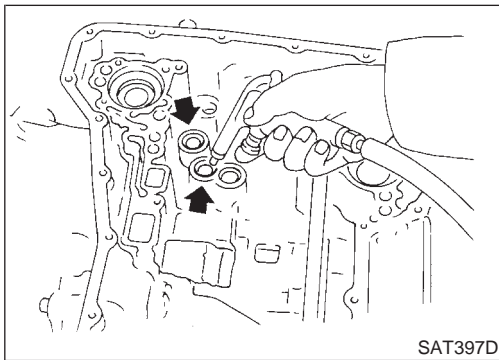
7. Install O-ring to input shaft.
  - **Apply ATF to O-ring.**



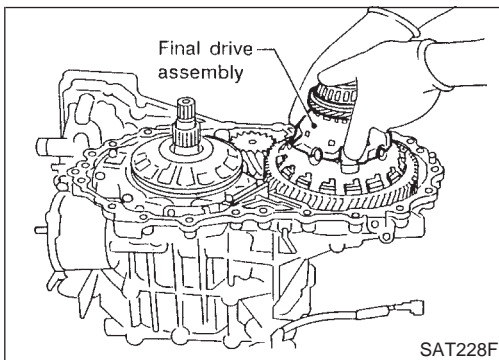
8. Adjust brake band.
  - a. Tighten anchor end pin to the specified torque.
 

**Anchor end pin:**  
**Refer to SDS, AT-380.**
  - b. Back off anchor end pin two and a half turns.
  - c. While holding anchor end pin, tighten lock nut.
 

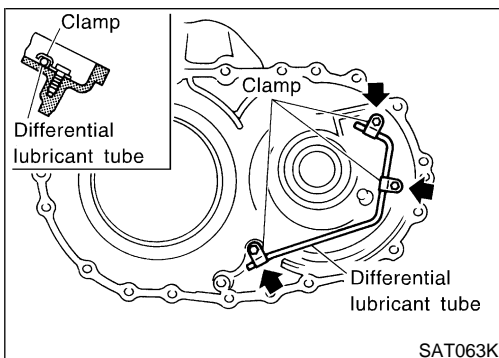
**Lock nut:**  
**Refer to SDS, AT-380.**



9. Apply compressed air to oil holes of transmission case and check operation of brake band.



10. Install final drive assembly on transmission case.



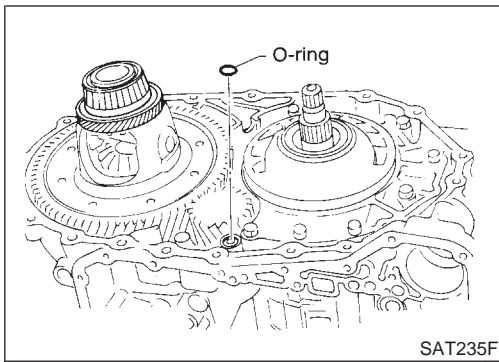
11. Install differential lubricant tube on converter housing. Tighten differential lubricant tube bolts to the specified torque. Refer to AT-283.

GI  
MA  
EM  
LC  
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**AT**  
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SC  
EL  
IDX

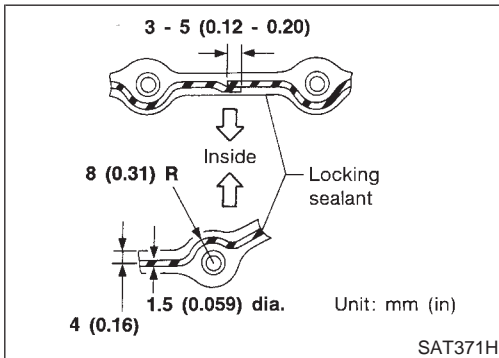


# ASSEMBLY

## Assembly (3) (Cont'd)

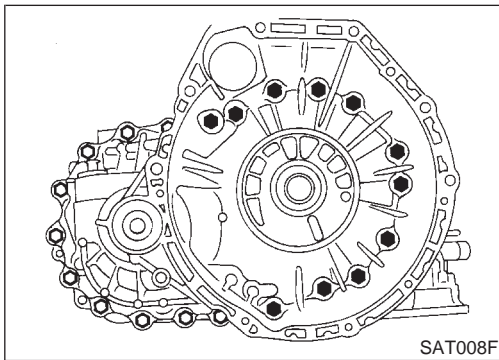


12. Install O-ring on differential oil port of transmission case.

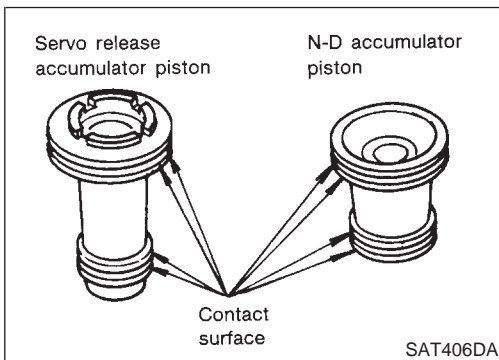


13. Install converter housing on transmission case.

- Apply locking sealant (Loctite #518) to mating surface of converter housing.

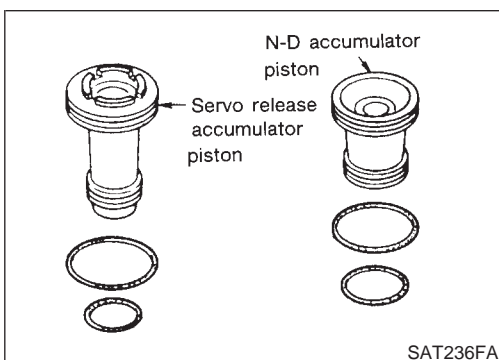


- Tighten converter housing bolts to the specified torque. Refer to AT-283.



14. Install accumulator piston.

- a. Check contact surface of accumulator piston for damage.



b. Install O-rings on accumulator piston.

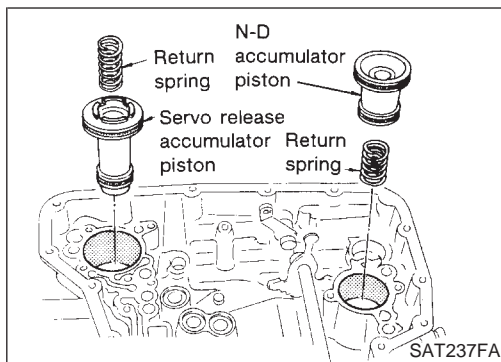
- Apply ATF to O-rings.

**Accumulator piston O-rings:**  
Refer to SDS, AT-377.



# ASSEMBLY

Assembly (3) (Cont'd)

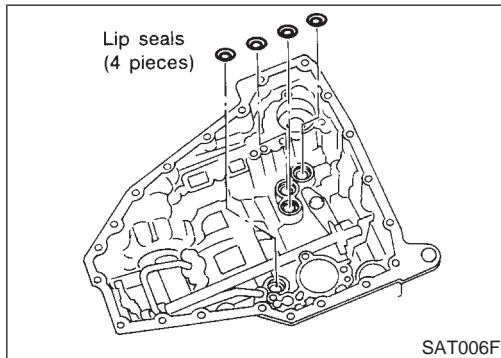


- c. Install accumulator pistons and return springs on transmission case.

- **Apply ATF to inner surface of transmission case.**

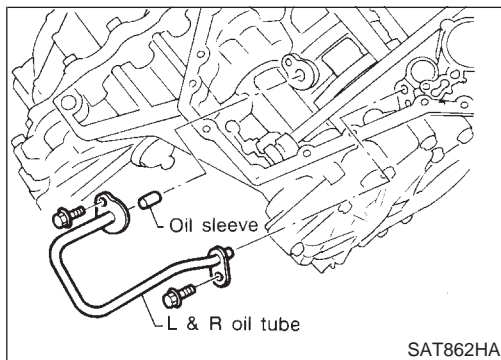
**Return springs:**

**Refer to SDS, AT-378.**

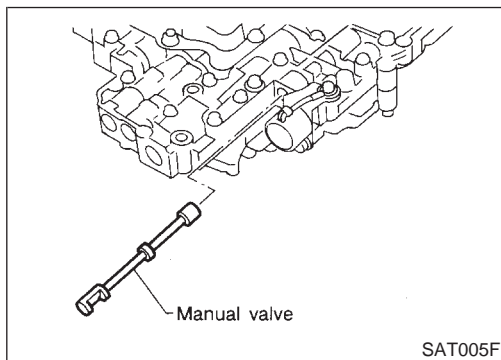


15. Install lip seals for band servo oil holes on transmission case.

- **Apply petroleum jelly to lip seals.**



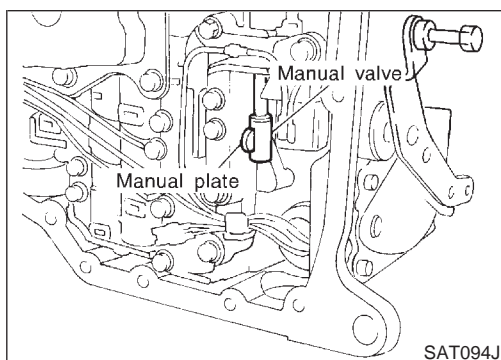
16. Install L & R oil tube and oil sleeve. Tighten L & R oil tube bolts to the specified torque. Refer to AT-283.



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.

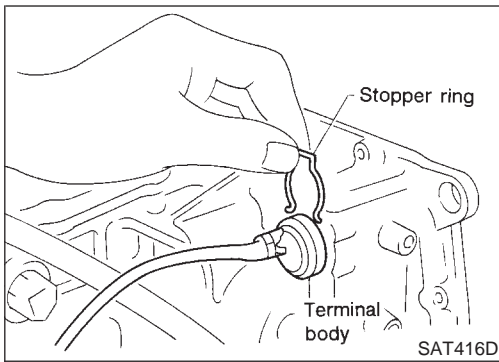
- c. Install control valve assembly on transmission case while aligning manual valve with manual plate.

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
AX  
SU  
BR  
ST  
RS  
BT  
HA  
SC  
EL  
IDX

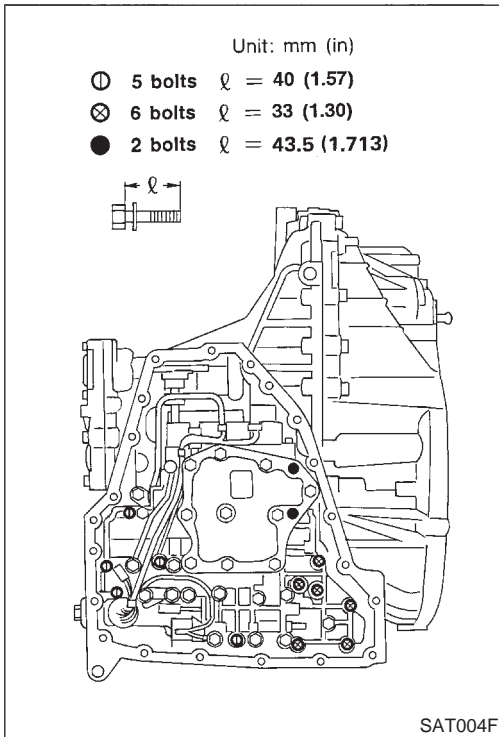


# ASSEMBLY

## Assembly (3) (Cont'd)




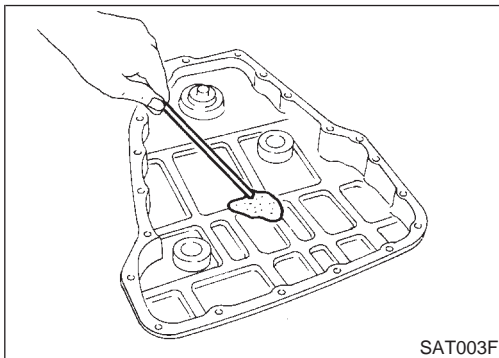
- d. Pass solenoid harness through transmission case and install terminal body on transmission case by pushing it.
- e. Install stopper ring to terminal body.



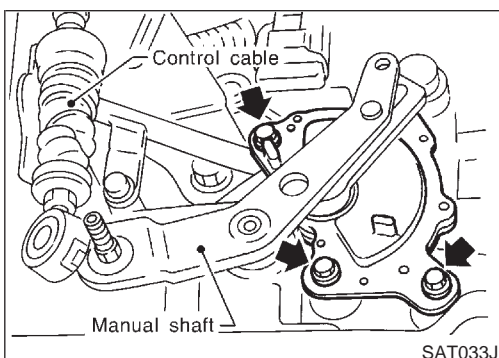
- f. Tighten bolts I, X and ●.

### Bolt length, number and location:

Bolt	I	X	●
Bolt length "ℓ"  ℓ mm (in)	40 (1.57)	33 (1.30)	43.5 (1.713)
Number of bolts	5	6	2



18. Install oil pan.
  - a. Attach a magnet to oil pan.
  - b. Install new oil pan gasket on transmission case.
  - c. Install oil pan on transmission case.
    - **Always replace oil pan bolts as they are self-sealing bolts.**
    - **Tighten four bolts in a criss-cross pattern to prevent dislocation of gasket.**
  - d. Tighten oil pan bolts and drain plug to the specified torque. Refer to AT-283.

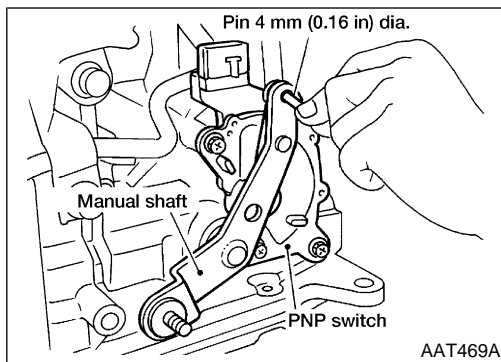


19. Install park/neutral position (PNP) switch.
  - a. Set manual shaft in P position.
  - b. Temporarily install park/neutral position (PNP) switch on manual shaft.
  - c. Move selector lever to N position.

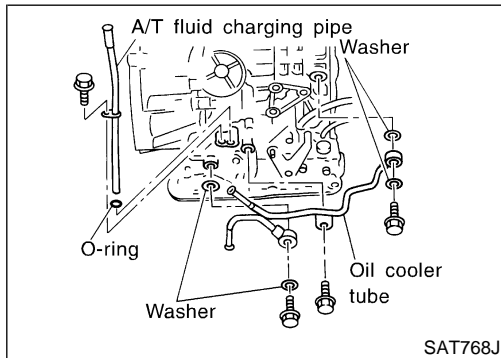


# ASSEMBLY

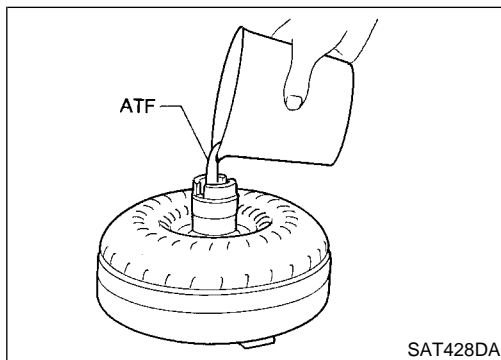
Assembly (3) (Cont'd)



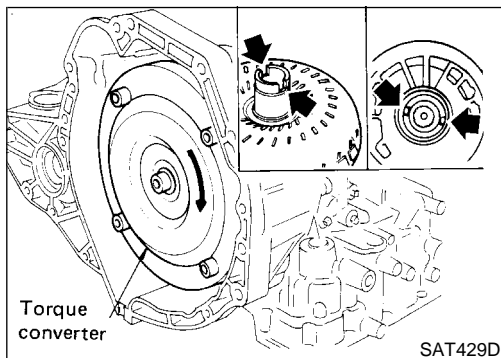
- d. Use a 4 mm (0.16 in) pin for this adjustment.
  - i. Insert the pin straight into the manual shaft adjustment hole.
  - ii. Rotate park/neutral position (PNP) switch until the pin can also be inserted straight into hole in park/neutral position (PNP) switch.
- e. Tighten park/neutral position (PNP) switch fixing bolts. Refer to AT-283.
- f. Remove pin from adjustment hole after adjusting park/neutral position (PNP) switch.



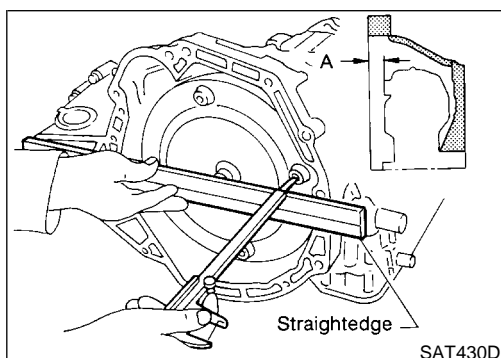
20. Install A/T fluid charging pipe and fluid cooler tube to transmission case. Tighten A/T fluid charging pipe and fluid cooler tube bolts to the specified torque. Refer to AT-283.



21. Install torque converter.
  - a. Pour ATF into torque converter.
    - **Approximately 1 liter (1-1/8 US qt, 7/8 Imp qt) of fluid is required for a new torque converter.**
    - **When reusing old torque converter, add the same amount of fluid as was drained.**



- b. Install torque converter while aligning notches of torque converter with notches of oil pump.



- c. Measure distance "A" to check that torque converter is in proper position.

**Distance A:**

**Refer to SDS, AT-385.**



# SERVICE DATA AND SPECIFICATIONS (SDS)

## General Specifications

General Specifications			NFAT0182
Engine		VQ35DE	
Automatic transaxle model		RE4F04B	
Automatic transaxle assembly	Model code number	88X04	
Transaxle gear ratio	1st	2.785	
	2nd	1.545	
	3rd	1.000	
	4th	0.694	
	Reverse	2.272	
	Final drive	3.789	
Recommended fluid		Nissan Matic "D" (Continental U.S. and Alaska) or Canada Nissan Automatic Transmission Fluid (Canada)*1	
Fluid capacity ℓ (US qt, Imp qt)		8.5 (9, 7-1/2)	

\*1: Refer to MA-11, "Fluids and Lubricants".

## Shift Schedule

### VEHICLE SPEED WHEN SHIFTING GEARS THROTTLE POSITION

Throttle position	Shift pattern	Vehicle speed km/h (MPH)					
		D <sub>1</sub> → D <sub>2</sub>	D <sub>2</sub> → D <sub>3</sub>	D <sub>3</sub> → D <sub>4</sub>	D <sub>4</sub> → D <sub>3</sub>	D <sub>3</sub> → D <sub>2</sub>	D <sub>2</sub> → D <sub>1</sub>
Full throttle	Comfort	59 - 67 (37 - 42)	110 - 118 (68 - 73)	173 - 181 (108 - 112)	169 - 177 (105 - 110)	100 - 108 (62 - 67)	41 - 49 (25 - 30)
	Auto power	59 - 67 (37 - 42)	110 - 118 (68 - 73)	173 - 181 (108 - 112)	169 - 177 (105 - 110)	100 - 108 (62 - 67)	41 - 49 (25 - 30)
Half throttle	Comfort	45 - 53 (28 - 33)	77 - 85 (48 - 53)	133 - 141 (83 - 88)	84 - 92 (52 - 57)	46 - 54 (29 - 34)	15 - 23 (9 - 14)
	Auto power	45 - 53 (28 - 33)	77 - 85 (48 - 53)	134 - 142 (83 - 88)	121 - 129 (75 - 80)	54 - 62 (34 - 39)	16 - 24 (10 - 15)

### VEHICLE SPEED WHEN PERFORMING AND RELEASING LOCK-UP

Unit: km/h (MPH)

Throttle position	Selector lever position	Shift pattern	Vehicle speed Km/h (MPH)	
			Lock-up "ON"	Lock-up "OFF"
2.0/8	D position	Comfort	99 - 107 (62 - 66)	62 - 70 (39 - 43)
		Auto Power	99 - 107 (62 - 66)	62 - 70 (39 - 43)
	3rd position	Comfort	86 - 94 (53 - 58)	83 - 91 (52 - 57)
		Auto Power	86 - 94 (53 - 58)	83 - 91 (52 - 57)

#### NOTE:

- Lock-up vehicle speed indicates the speed in D<sub>4</sub> position.
- Perform lock-up inspection after warming up engine.
- Lock-up vehicle speed may vary depending on the driving conditions and circumstances.

## Stall Revolution

Engine	Stall revolution rpm
VQ35DE	2,550 - 3,050



# SERVICE DATA AND SPECIFICATIONS (SDS)

Line Pressure

## Line Pressure

NFAT0185

Engine speed rpm	Line pressure kPa (kg/cm <sup>2</sup> , psi)	
	D, 2nd and 1st positions	R position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)

## Control Valves

NFAT0186

### CONTROL VALVE AND PLUG RETURN SPRINGS

NFAT0186S01  
Unit: mm (in)

Parts			Item		
			Part No.*	Free length	Outer diameter
Upper body	23	Pilot valve spring	31742-3AX03	38.98 (1.535)	8.9 (0.350)
	7	1-2 accumulator valve spring	31742-3AX00	20.5 (0.807)	6.95 (0.274)
	28	1-2 accumulator piston spring	31742-3AX09	55.66 (2.191)	19.6 (0.772)
	33	1st reducing valve spring	31742-85X05	26.0 (1.024)	7.0 (0.276)
	35	3-2 timing valve spring	31736-01X00	23.0 (0.906)	6.65 (0.262)
	18	Overrun clutch reducing valve spring	31742-80X15	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 (2.243)	6.5 (0.256)
	3	Cooler check valve spring	31742-85X01	29.4 (1.157)	6.0 (0.236)
Lower body	15	Pressure regulator valve spring	31742-80X13	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 (0.222)
	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 (0.670)	8.0 (0.315)

\*: Always check with the Parts Department for the latest parts information.

## Accumulator

NFAT0187

### O-RING

NFAT0187S01  
Unit: mm (in)

Accumulator	Part No.*	Inner diameter (Small)	Part No.*	Inner diameter (Large)
Servo release accumulator	31526-41X03	26.9 (1.059)	31526-41X02	44.2 (1.740)
N-D accumulator	31526-31X08	34.6 (1.362)	31672-21X00	39.4 (1.551)

\*: Always check with the Parts Department for the latest parts information.



# SERVICE DATA AND SPECIFICATIONS (SDS)

Accumulator (Cont'd)

## RETURN SPRING

=NFAT0187S02  
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	31605-85X01	45.01 (1.772)	28.0 (1.102)

\*: Always check with the Parts Department for the latest parts information.

## Clutch and Brakes

NFAT0188

## REVERSE CLUTCH

NFAT0188S01

Model code number		88X04	
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

NFAT0188S02

Model code number		88X04	
Number of drive plates		4	
Number of driven plates		6 + 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*
		3.0 (0.118)	31537-81X10
		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.



# SERVICE DATA AND SPECIFICATIONS (SDS)

Clutch and Brakes (Cont'd)

## FORWARD CLUTCH

NFAT0188S03

Model code number		88X04	
Number of drive plates		6	
Number of driven plates		6	
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
		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

\*: Always check with the Parts Department for the latest parts information.

## OVERRUN CLUTCH

NFAT0188S04

Model code number		88X04	
Number of drive plates		4	
Number of driven plates		4	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Clearance mm (in)	Standard	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.



# SERVICE DATA AND SPECIFICATIONS (SDS)

Clutch and Brakes (Cont'd)

## LOW & REVERSE BRAKE

NFAT0188S05

Model code number		88X04	
Number of drive plates		7	
Number of driven plates		7	
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

\*: Always check with the Parts Department for the latest parts information.

## BRAKE BAND

NFAT0188S06

Anchor end pin tightening torque N-m (kg-m, in-lb)	4.0 - 5.8 (0.41 - 0.59, 36 - 51)
Number of returning revolutions for anchor end pin	2.5
Lock nut tightening torque N-m (kg-m, ft-lb)	32 - 36 (3.2 - 3.7, 23 - 27)

## CLUTCH AND BRAKE RETURN SPRINGS

NFAT0188S07  
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 (10 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.

## Final Drive

### DIFFERENTIAL SIDE GEAR CLEARANCE

NFAT0189

NFAT0189S01

Clearance between side gear and differential case with washer mm (in)	0.1 - 0.2 (0.004 - 0.008)
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### DIFFERENTIAL SIDE GEAR THRUST WASHERS

NFAT0189S02

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.



# SERVICE DATA AND SPECIFICATIONS (SDS)

Final Drive (Cont'd)

## DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS

NFAT0189S03

Thickness mm (in)	Part number*
0.48 (0.0189)	31438-80X00
0.52 (0.0205)	31438-80X01
0.56 (0.0220)	31438-80X02
0.60 (0.0236)	31438-80X03
0.64 (0.0252)	31438-80X04
0.68 (0.0268)	31438-80X05
0.72 (0.0283)	31438-80X06
0.76 (0.0299)	31438-80X07
0.80 (0.0315)	31438-80X08
0.84 (0.0331)	31438-80X09
0.88 (0.0346)	31438-80X10
0.92 (0.0362)	31438-80X11

\*: Always check with the Parts Department for the latest parts information.

## BEARING PRELOAD

NFAT0189S04

Differential side bearing preload mm (in)	0.05 - 0.09 (0.0020 - 0.0035)
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## TURNING TORQUE

NFAT0189S05

Turning torque of final drive assembly N·m (kg·cm, in·lb)	0.78 - 1.37 (8.0 - 14.0, 6.9 - 12.2)
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## CLUTCH AND BRAKE RETURN SPRINGS

NFAT0189S06  
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 (10 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

NFAT0190

## PLANETARY CARRIER

NFAT0190S01

Clearance between planetary carrier and pinion washer mm (in)	Standard	0.20 - 0.70 (0.0079 - 0.0276)
	Allowable limit	0.80 (0.0315)



# SERVICE DATA AND SPECIFICATIONS (SDS)

Planetary Carrier and Oil Pump (Cont'd)

## OIL PUMP

NFAT0190S02

Oil pump side clearance mm (in)		0.030 - 0.050 (0.0012 - 0.0020)	
Thickness of inner gears and outer gears		Inner gear	
		Thickness mm (in)	Part number*
		11.99 - 12.0 (0.4720 - 0.4724)	31346-80X00
		11.98 - 11.99 (0.4717 - 0.4720)	31346-80X01
		11.97 - 11.98 (0.4713 - 0.4717)	31346-80X02
		Outer gear	
		Thickness mm (in)	Part number*
		11.99 - 12.0 (0.4720 - 0.4724)	31347-80X00
		11.98 - 11.99 (0.4717 - 0.4720)	31347-80X01
		11.97 - 11.98 (0.4713 - 0.4717)	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	0.1 - 0.25 (0.0039 - 0.0098)	
	Allowable limit	0.25 (0.0098)	

\*: Always check with the Parts Department for the latest parts information.

## Input Shaft

NFAT0191

## SEAL RING CLEARANCE

NFAT0191S01

Input shaft seal ring clearance mm (in)	Standard	0.08 - 0.23 (0.0031 - 0.0091)
	Allowable limit	0.23 (0.0091)

## SEAL RING

NFAT0191S02

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
26.01 (1.024)	22.4 (0.882)	1.971 (0.078)	31525-80X02

\*: Always check with the Parts Department for the latest Parts information.

## Reduction Pinion Gear

NFAT0192

## TURNING TORQUE

NFAT0192S01

Turning torque of reduction pinion gear N·m (kg-cm, in-lb)	0.05 - 0.39 (0.5 - 4.0, 0.43 - 3.47)
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## REDUCTION PINION GEAR BEARING ADJUSTING SHIMS

NFAT0192S02

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
1	5.00 (0.1969)	31439-81X00	30	5.58 (0.2197)	31439-81X60
2	5.02 (0.1976)	31439-81X01	31	5.60 (0.2205)	31439-81X61
3	5.04 (0.1984)	31439-81X02	32	5.62 (0.2213)	31439-81X62
4	5.06 (0.1992)	31439-81X03	33	5.64 (0.2220)	31439-81X63
5	5.08 (0.2000)	31439-81X04	34	5.66 (0.2228)	31439-81X64
6	5.10 (0.2008)	31439-81X05	35	5.68 (0.2236)	31439-81X65
7	5.12 (0.2016)	31439-81X06	36	5.70 (0.2244)	31439-81X66
8	5.14 (0.2024)	31439-81X07	37	5.72 (0.2252)	31439-81X67
9	5.16 (0.2031)	31439-81X08	38	5.74 (0.2260)	31439-81X68
10	5.18 (0.2039)	31439-81X09	39	5.76 (0.2268)	31439-81X69
11	5.20 (0.2047)	31439-81X10	40	5.78 (0.2276)	31439-81X70



# SERVICE DATA AND SPECIFICATIONS (SDS)

Reduction Pinion Gear (Cont'd)

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
12	5.22 (0.2055)	31439-81X11	41	5.80 (0.2283)	31439-81X71
13	5.24 (0.2063)	31439-81X12	42	5.82 (0.2291)	31439-81X72
14	5.26 (0.2071)	31439-81X13	43	5.84 (0.2299)	31439-81X73
15	5.28 (0.2079)	31439-81X14	44	5.86 (0.2307)	31439-81X74
16	5.30 (0.2087)	31439-81X15	45	4.72 (0.1858)	31439-83X11
17	5.32 (0.2094)	31439-81X16	46	4.74 (0.1866)	31439-83X12
18	5.34 (0.2102)	31439-81X17	47	4.76 (0.1874)	31439-83X13
19	5.36 (0.2110)	31439-81X18	48	4.78 (0.1882)	31439-83X14
20	5.38 (0.2118)	31439-81X19	49	4.80 (0.1890)	31439-83X15
21	5.40 (0.2126)	31439-81X20	50	4.82 (0.1898)	31439-83X16
22	5.42 (0.2134)	31439-81X21	51	4.84 (0.1906)	31439-83X17
23	5.44 (0.2142)	31439-81X22	52	4.86 (0.1913)	31439-83X18
24	5.46 (0.2150)	31439-81X23	53	4.88 (0.1921)	31439-83X19
25	5.48 (0.2157)	31439-81X24	54	4.90 (0.1929)	31439-83X20
26	5.50 (0.2165)	31439-81X46	55	4.92 (0.1937)	31439-83X21
27	5.52 (0.2173)	31439-81X47	56	4.94 (0.1945)	31439-83X22
28	5.54 (0.2181)	31439-81X48	57	4.96 (0.1953)	31439-83X23
29	5.56 (0.2189)	31439-81X49	58	4.98 (0.1961)	31439-83X24

\*: Always check with the Parts Department for the latest parts information.

## Band Servo

### RETURN SPRING

NFAT0193

NFAT0193S01  
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)
O/D servo return spring	31605-80X07	62.6 (2.465)	31.7 (1.248)

\*: Always check with the Parts Department for the latest parts information.

## Output Shaft

### SEAL RING CLEARANCE

NFAT0194

NFAT0194S01

Output shaft seal ring clearance mm (in)	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

### SEAL RING

NFAT0194S04

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
33.711 (1.3272)	30.2 (1.189)	1.951 (0.0768)	31525-80X09

\*: Always check with the Parts Department for the latest Parts information.

### END PLAY

NFAT0194S02

Output shaft end play mm (in)	0 - 0.15 (0 - 0.0059)
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# SERVICE DATA AND SPECIFICATIONS (SDS)

Output Shaft (Cont'd)

## OUTPUT SHAFT ADJUSTING SHIMS

NFAT0194S03

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

NFAT0195

## SEAL RING CLEARANCE

NFAT0195S01

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

NFAT0196

Total end play mm (in)	0.25 - 0.55 (0.0098 - 0.0217)
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## BEARING RACE FOR ADJUSTING TOTAL END PLAY

NFAT0196S01

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

NFAT0197

Reverse clutch end play mm (in)	0.55 - 0.90 (0.0217 - 0.0354)
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## THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH DRUM END PLAY

NFAT0197S01

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.



# SERVICE DATA AND SPECIFICATIONS (SDS)

Removal and Installation

## Removal and Installation

NFAT0198  
Unit: mm (in)

Distance between end of converter housing and torque converter	14 (0.55)
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## Shift Solenoid Valves

NFAT0264

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

NFAT0265

Solenoid valves	Resistance (Approx.) $\Omega$	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

NFAT0266

Remarks: Specification data are reference values.

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

## Revolution Sensor (For Speed Sensor)

NFAT0267

Condition	Judgement standard
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 <b>CAUTION:</b> Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	450 Hz (Approx.)
When vehicle parks.	0V

## Dropping Resistor

NFAT0268

Resistance	Approx. 12 $\Omega$
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## Power Train Revolution Sensor

NFAT0271

Condition	Judgement standard
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 <b>CAUTION:</b> Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	240 Hz (Approx.)
When vehicle parks.	Under 1.3V or over 4.5V



## NOTES