

SECTION **AT**  
AUTOMATIC TRANSMISSION

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

ECS007H

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system may include seat belt switch inputs and dual stage front air bag modules. If equipped with dual stage front air bag modules, the SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

The vehicle may be equipped with a passenger air bag deactivation switch. Because no rear seat exists where a rear-facing child restraint can be placed, the switch is designed to turn off the passenger air bag so that a rear-facing child restraint can be used in the front passenger seat. The switch is located in the center of the instrument panel, near the ashtray. When the switch is turned to the ON position, the passenger air bag is enabled and could inflate for certain types of collision. When the switch is turned to the OFF position, the passenger air bag is disabled and will not inflate. A passenger air bag OFF indicator on the instrument panel lights up when the passenger air bag is switched OFF. The driver air bag always remains enabled and is not affected by the passenger air bag deactivation switch.

**WARNING:**

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**
- **The vehicle may be equipped with a passenger air bag deactivation switch which can be operated by the customer. When the passenger air bag is switched OFF, the passenger air bag is disabled and will not inflate. When the passenger air bag is switched ON, the passenger air bag is enabled and could inflate for certain types of collision. After SRS maintenance or repair, make sure the passenger air bag deactivation switch is in the same position (ON or OFF) as when the vehicle arrived for service.**

**Precautions**

ECS007I

1. Before proceeding with disassembly, thoroughly clean the outside of the transmission. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
2. Disassembly should be done in a clean work area.
3. Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transmission.
4. Place disassembled parts in order for easier and proper assembly.
5. All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
6. Gaskets, seals and O-rings should be replaced any time the transmission is disassembled.
7. The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place removed parts in order, on a parts rack, so they can be put back in the valve body in the same positions and sequences. Care will also prevent springs and small parts from becoming scattered or lost.
8. Properly installed valves, sleeves, plugs, etc. will slide along their bores in the valve body under their own weight.
9. Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold small bearings and washers in place during assembly. Do not use grease.
10. Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.

# PRECAUTIONS

[RL4R01A]

11. If A/T fluid contains frictional material (clutches, bands, etc.) or if an A/T is repaired, overhauled, or replaced, inspect and clean the A/T oil cooler mounted in the radiator or replace radiator. Flush cooler lines using cleaning solvent and compressed air after repair. Check Service Bulletins for latest A/T oil cooler cleaning procedure. For radiator replacement refer to [CO-30, "RADIATOR"](#) .
12. After overhaul, refill the transmission with new ATF.
13. When the A/T drain plug is removed, only some of the fluid is drained. Old A/T fluid will remain in torque converter and ATF cooling system.  
Always follow the procedures when changing A/T fluid. Refer to [MA-38, "Changing A/T Fluid"](#) .

## Service Notice or Precautions TORQUE CONVERTER SERVICE

ECS0071J

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

## ATF COOLER SERVICE

If A/T fluid contains frictional material (clutches, bands, etc.) or if an A/T is repaired, overhauled, or replaced, inspect and clean the A/T oil cooler mounted in the radiator or replace radiator. Flush cooler lines using cleaning solvent and compressed air after repair. Check Service Bulletins for latest A/T oil cooler cleaning procedure. For radiator replacement refer to [CO-30, "RADIATOR"](#) .

## Wiring Diagrams and Trouble Diagnosis

ECS0071K

When you read wiring diagrams, refer to the following:

- Refer to [GI-13, "How to Read Wiring Diagrams"](#) .
- Refer to [PG-9, "POWER SUPPLY ROUTING"](#) for power distribution circuit.

When you perform trouble diagnosis, refer to the following:

- Refer to [GI-9, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#) .
- Refer to [GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident"](#) .

## PREPARATION

### Special Service Tools

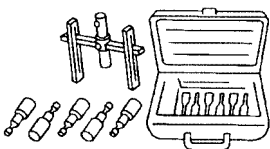
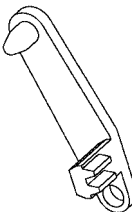
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
(J-34301-C) Oil pressure gauge set 1 (J34301-1) Oil pressure gauge 2 (J-34301-2) Hose 3 (J-34298) Joint pipe 4 (J-34282-2) Adapter 5 (790-301-1230-A) 60° Adapter 6 (J-34301-15) Square socket		Measuring line pressure and governor pressure
ST07870000 (J-37068) Transmission case stand	<p style="text-align: center;">NT421</p>	Disassembling and assembling A/T <b>a: 182 mm (7.17 in)</b> <b>b: 282 mm (11.10 in)</b> <b>c: 230 mm (9.06 in)</b> <b>d: 100 mm (3.94 in)</b>
KV31102100 (J-37065) Torque converter one-way clutch check tool	<p style="text-align: center;">NT098</p>	Checking one-way clutch in torque converter
ST25850000 (J-25721-A) Sliding hammer	<p style="text-align: center;">NT422</p>	Removing oil pump assembly <b>a: 179 mm (7.05 in)</b> <b>b: 70 mm (2.76 in)</b> <b>c: 40 mm (1.57 in) dia.</b> <b>d: M12 x 1.75P</b>
KV31102400 (J-34285 and J-34285-87) Clutch spring compressor	<p style="text-align: center;">NT423</p>	Removing and installing clutch return springs <b>a: 320 mm (12.60 in)</b> <b>b: 174 mm (6.85 in)</b>
ST33200000 (J-26082) Drift	<p style="text-align: center;">NT091</p>	Installing oil pump housing oil seal Installing rear oil seal <b>a: 60 mm (2.36 in) dia.</b> <b>b: 44.5 mm (1.752 in) dia.</b>

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# PREPARATION

[RL4R01A]

Tool number (Kent-Moore No.) Tool name	Description	
(J-34291) Shim setting gauge set	 <p>NT101</p>	Selecting oil pump cover bearing race and oil pump thrust washer
(J-45499) Ring gear stopper	 <p>LBIA0362E</p>	Removing and Installing A/T assembly



# OVERALL SYSTEM

[RL4R01A]

## OVERALL SYSTEM

### Circuit Diagram

PFP:00000

ECS0071M

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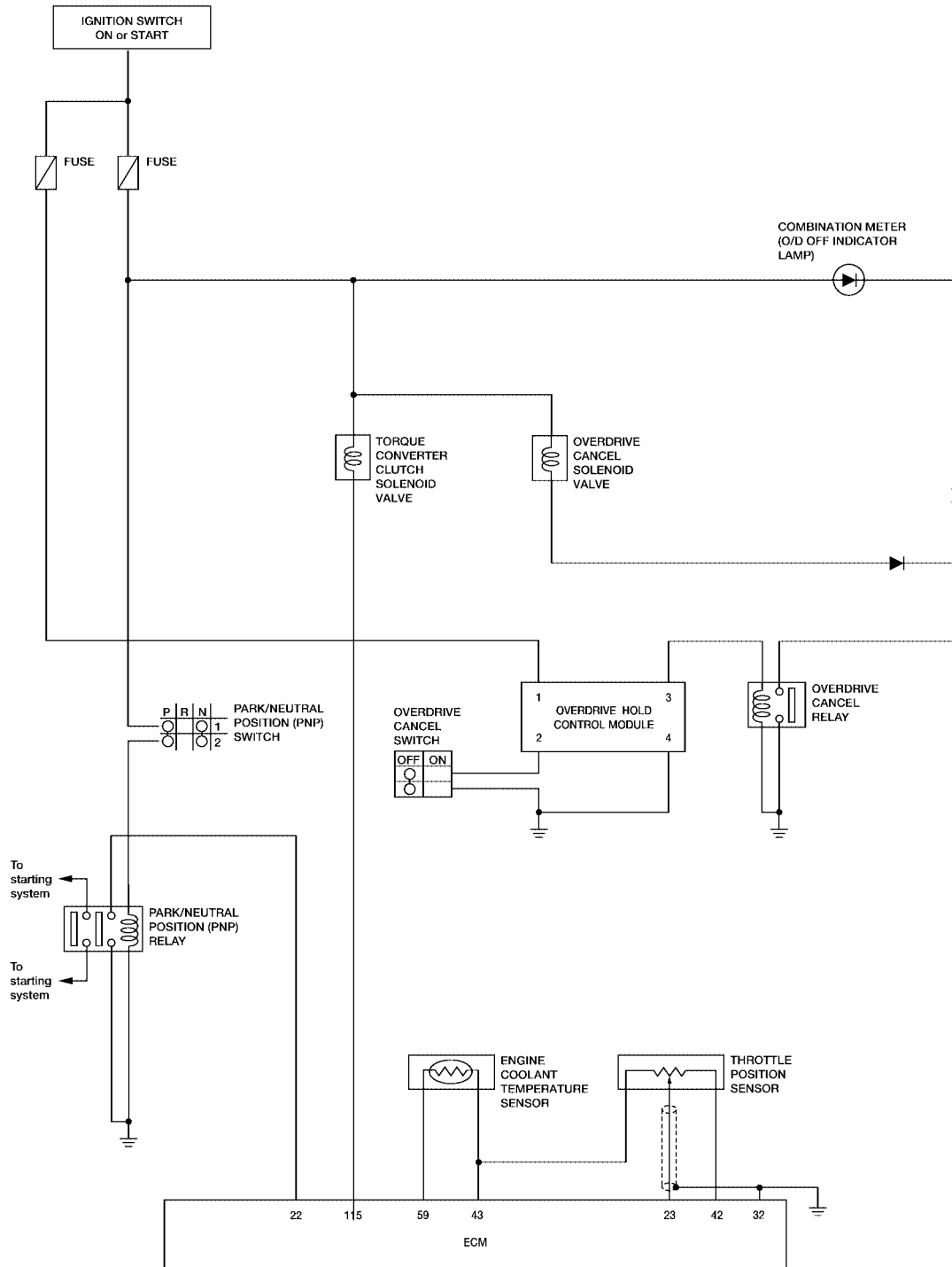
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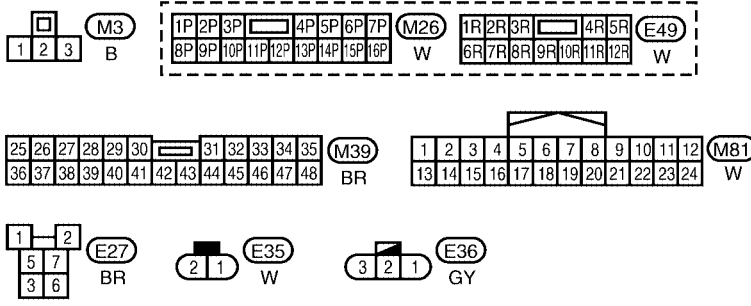
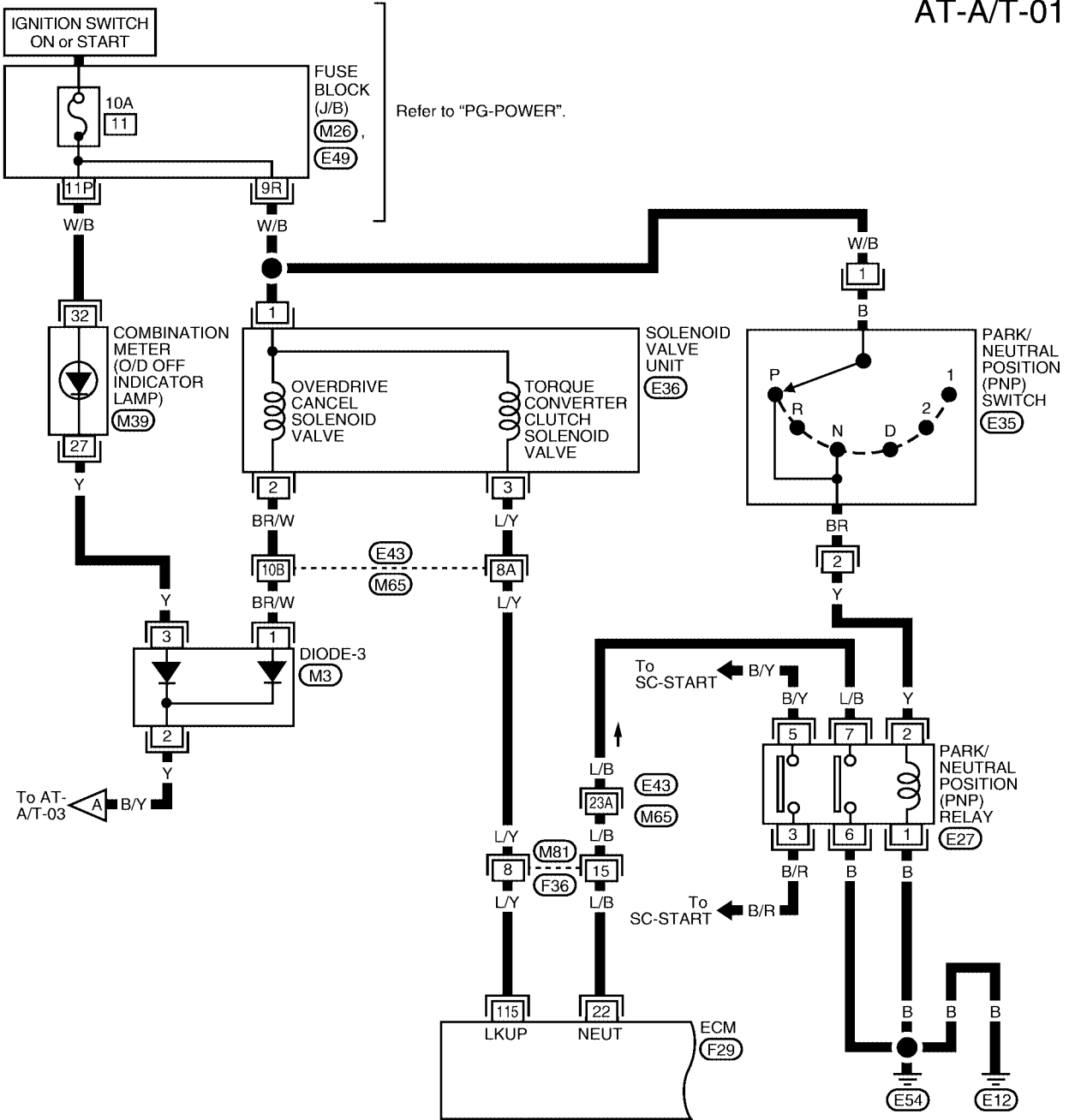
# OVERALL SYSTEM

[RL4R01A]

ECS0071N

## Wiring Diagram

AT-A/T-01



Refer to the following.  
 (E43) - SUPER  
 MULTIPLE JUNCTION (SMJ)  
 (F29) - ELECTRICAL UNITS

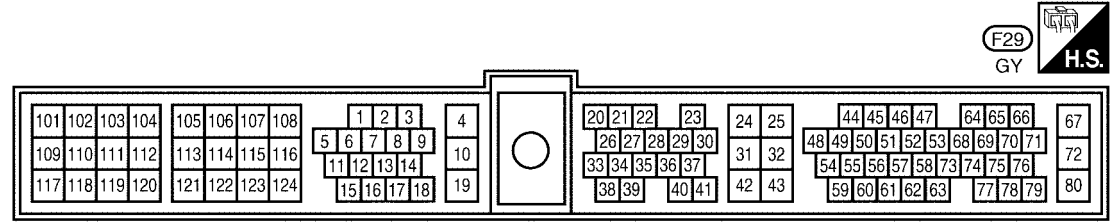
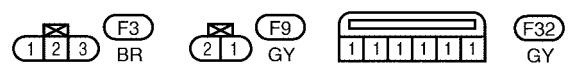
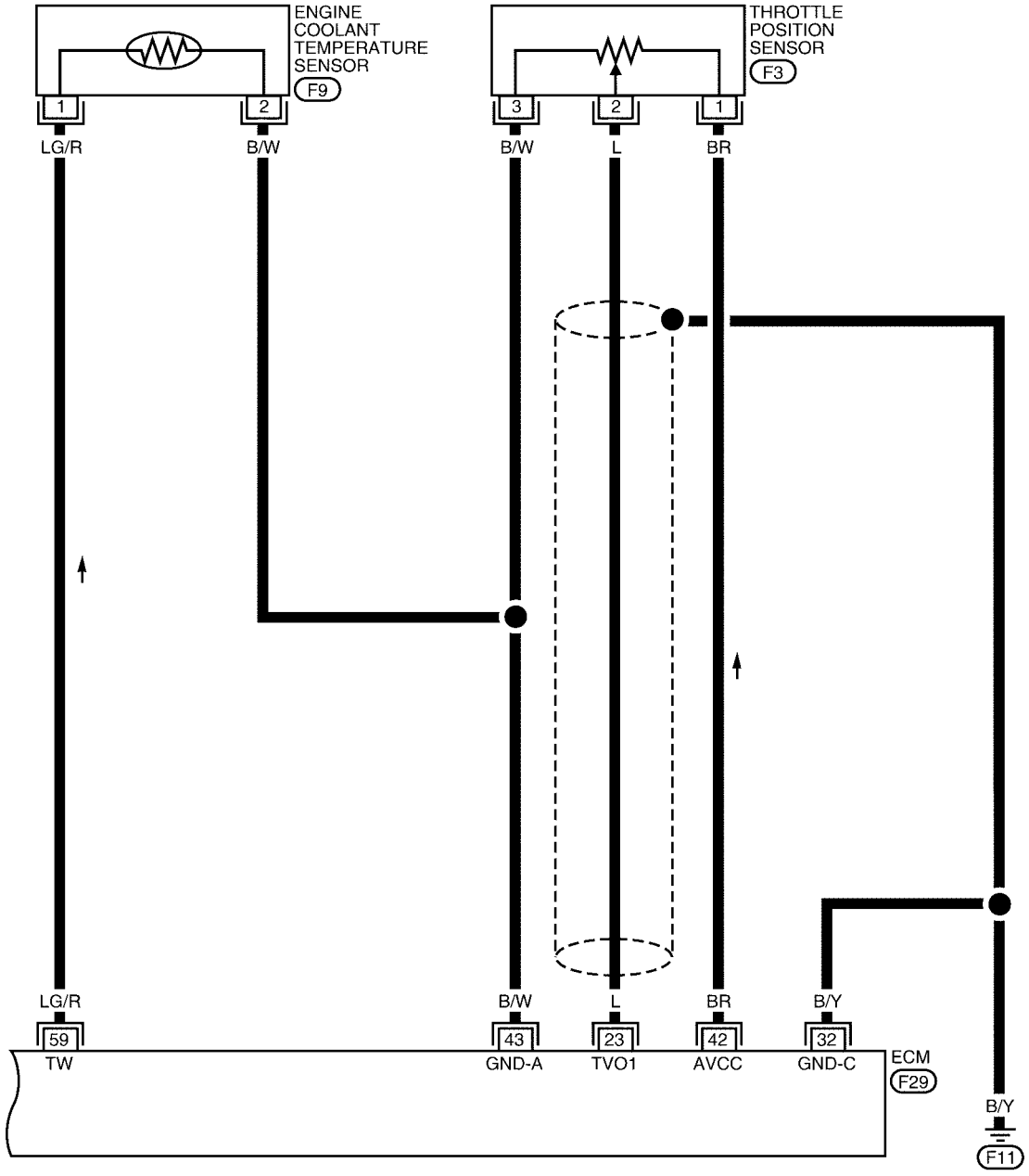
WCWA0145E

# OVERALL SYSTEM

[RL4R01A]

AT-A/T-02

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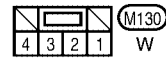
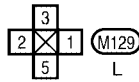
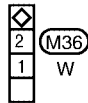
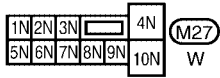
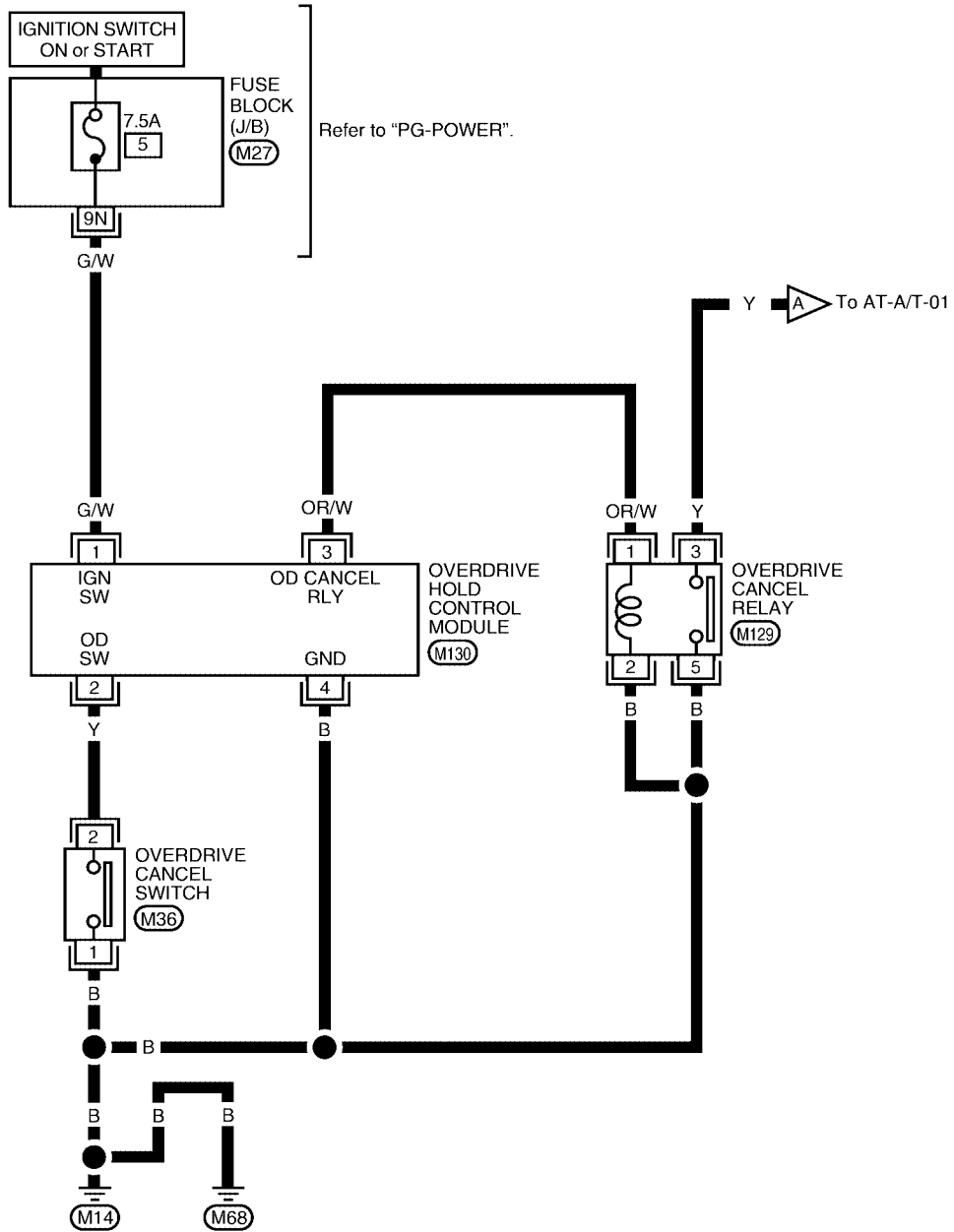


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# OVERALL SYSTEM

[RL4R01A]

AT-A/T-03

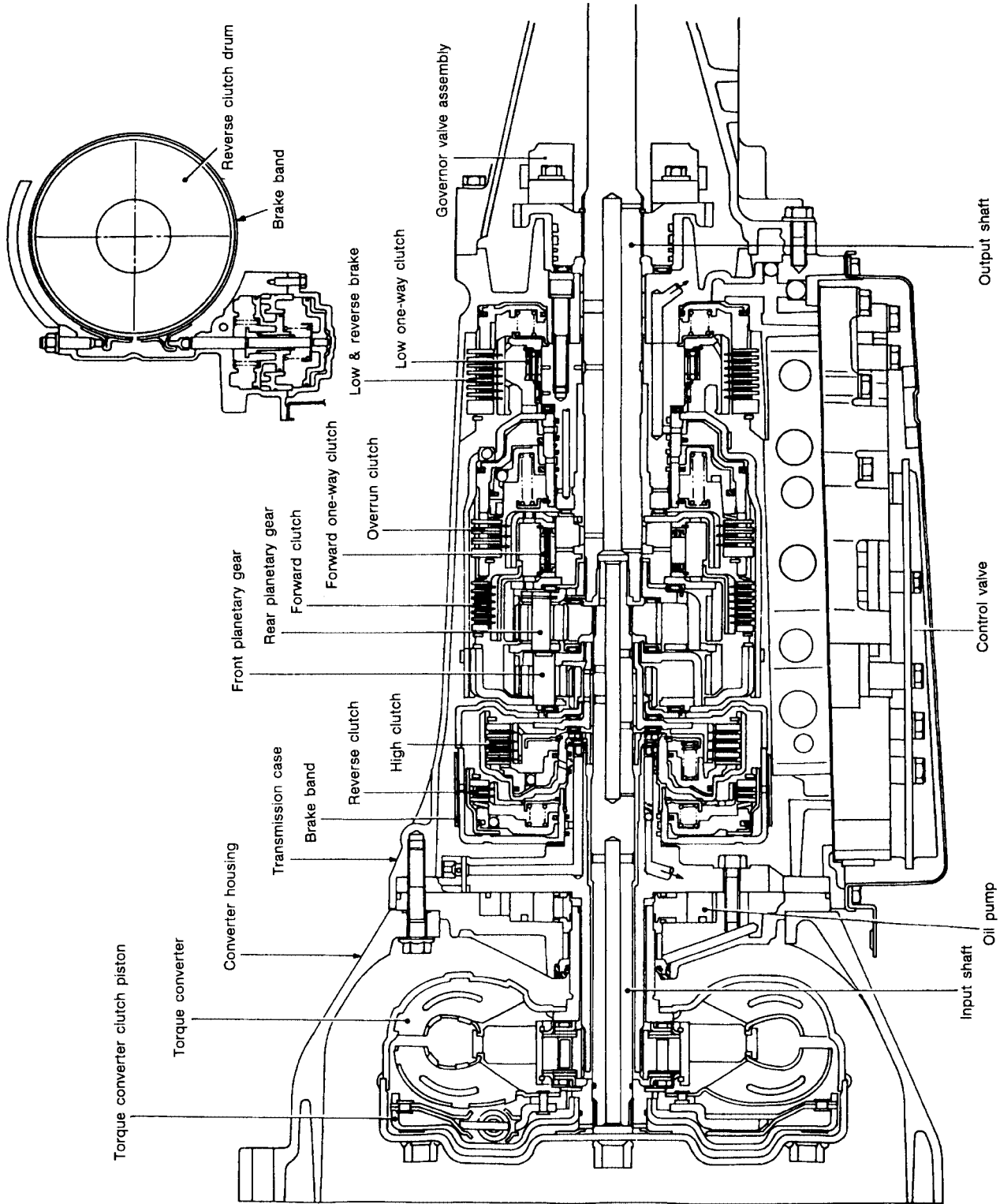


# OVERALL SYSTEM

[RL4R01A]

## Cross-sectional View

ECS00710



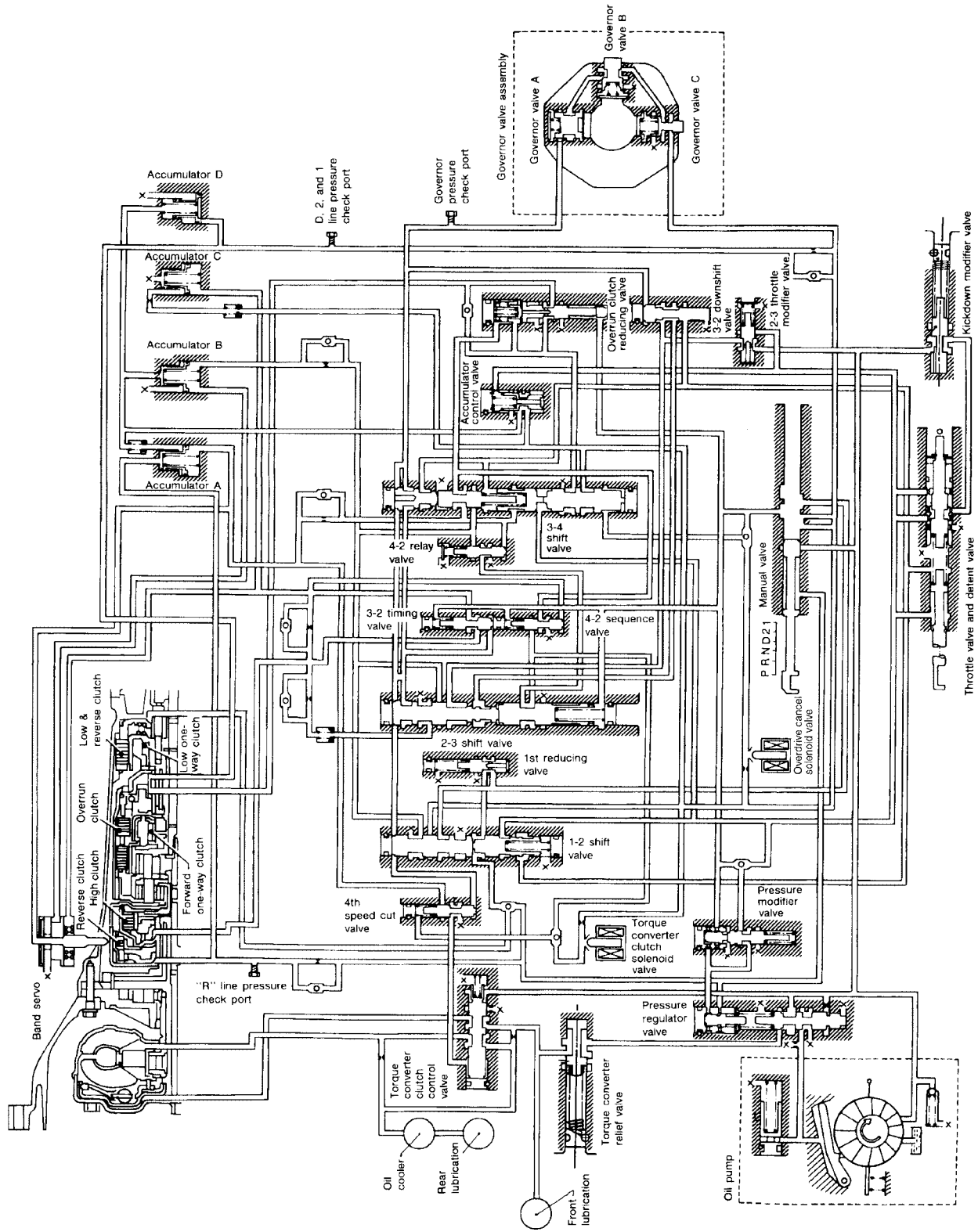
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# OVERALL SYSTEM

[RL4R01A]

## Hydraulic Control Circuits

ECS0071P



WCIA0157E

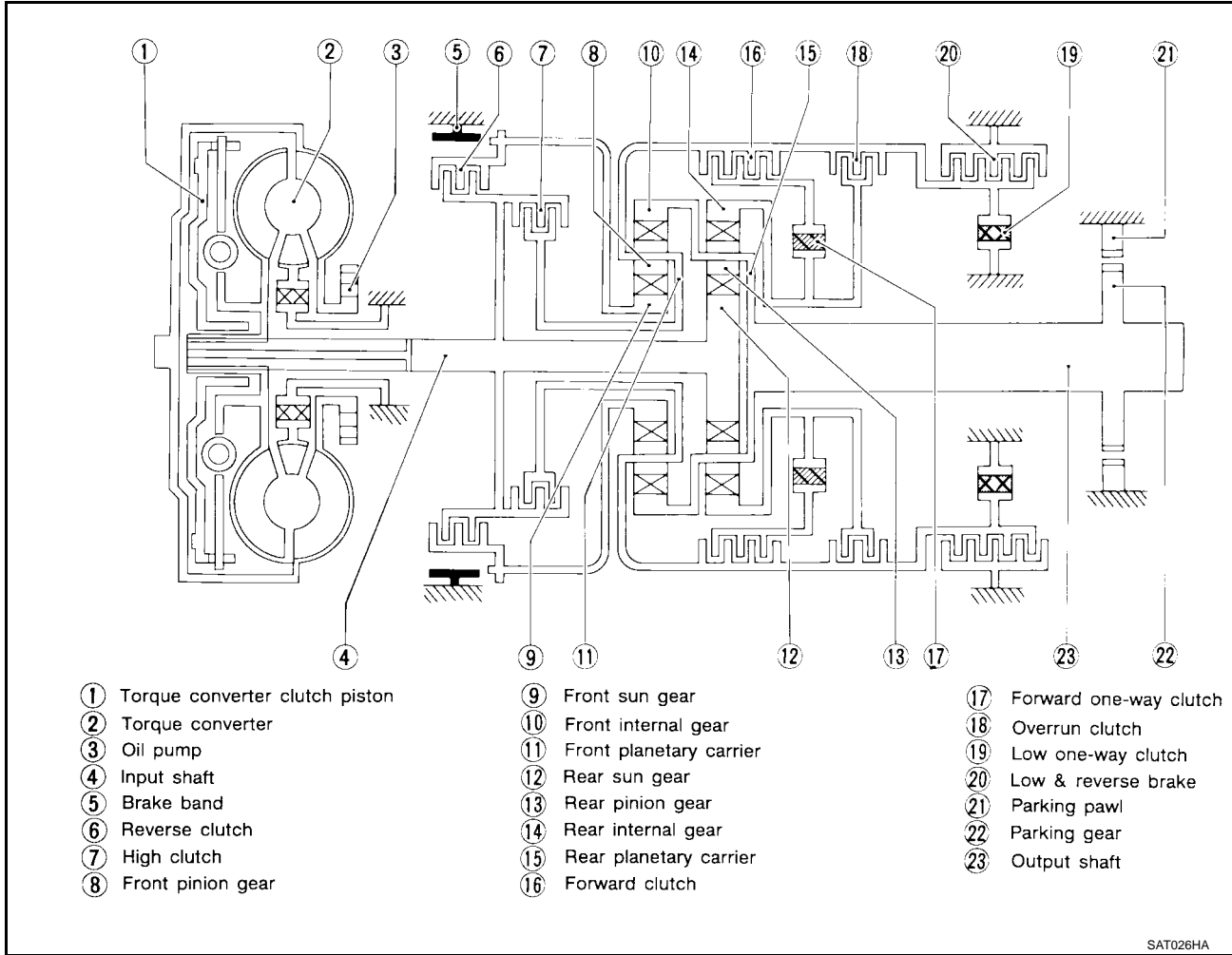
Shift Mechanism

The automatic transmission uses compact, dual planetary gear systems to improve power-transmission efficiency, simplify construction and reduce weight.

It also employs an optimum shift control and superwide gear ratios to improve starting performance and acceleration during medium and high-speed operation.

Two one-way clutches are also employed: one is used for the forward clutch, and the other for the low clutch. These one-way clutches, combined with four accumulators, reduce shifting shock to a minimum.

CONSTRUCTION



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# OVERALL SYSTEM

[RL4R01A]

## FUNCTION OF CLUTCH AND BRAKE

Clutch and brake components	Abbr.	Function
Reverse clutch <b>6</b>	R/C	To transmit input power to front sun gear <b>9</b> .
High clutch <b>7</b>	H/C	To transmit input power to front planetary carrier <b>11</b> .
Forward clutch <b>16</b>	F/C	To connect front planetary carrier <b>11</b> with forward one-way clutch <b>17</b> .
Overrun clutch <b>18</b>	O/C	To connect front planetary carrier <b>11</b> with rear internal gear <b>14</b> .
Brake band <b>5</b>	B/B	To lock front sun gear <b>9</b> .
Forward one-way clutch <b>17</b>	F/O.C	When forward clutch <b>16</b> is engaged, to stop rear internal gear <b>14</b> from rotating in opposite direction.
Low one-way clutch <b>19</b>	L/O.C	At D1 position, to prevent rear internal gear <b>14</b> from rotating in opposite direction.
Low & reverse brake <b>20</b>	L & R/B	To lock rear internal gear <b>14</b> (2, 12 and 11 ), to lock front planetary carrier <b>11</b> (R position).

## CLUTCH AND BAND CHART

Shift position	Reverse clutch <b>6</b>	High clutch <b>7</b>	Forward clutch <b>16</b>	Overrun clutch <b>18</b>	Band servo			Forward one-way clutch <b>17</b>	Low one-way clutch <b>19</b>	Low & reverse brake <b>20</b>	Lock-up	Remarks
					2nd apply	3rd release	4th apply					
P												PARK POSITION
R	○									○		REVERSE POSITION
N												NEUTRAL POSITION
D*4	1st		○	D				B	B			Automatic shift 1 ↔ 2 ↔ 3 ↔ 4
	2nd		○	*1A	○			B				
	3rd		○	○	A	*2C	C	B				
	4th		○	C		*3C	C	○			○	
2	1st		○	D				B	B			Automatic shift 1 ↔ 2
	2nd		○	○	○			B				
1	1st		○	○				B		○		Locks (held stationary) in 1st speed 1 ← 2
	2nd		○	○	○			B				

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

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

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

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

○ : Operates.

A: Operates when throttle opening is less than 3/16, activating engine brake.

B: Operates during "progressive" acceleration.

C: Operates but does not affect power-transmission.

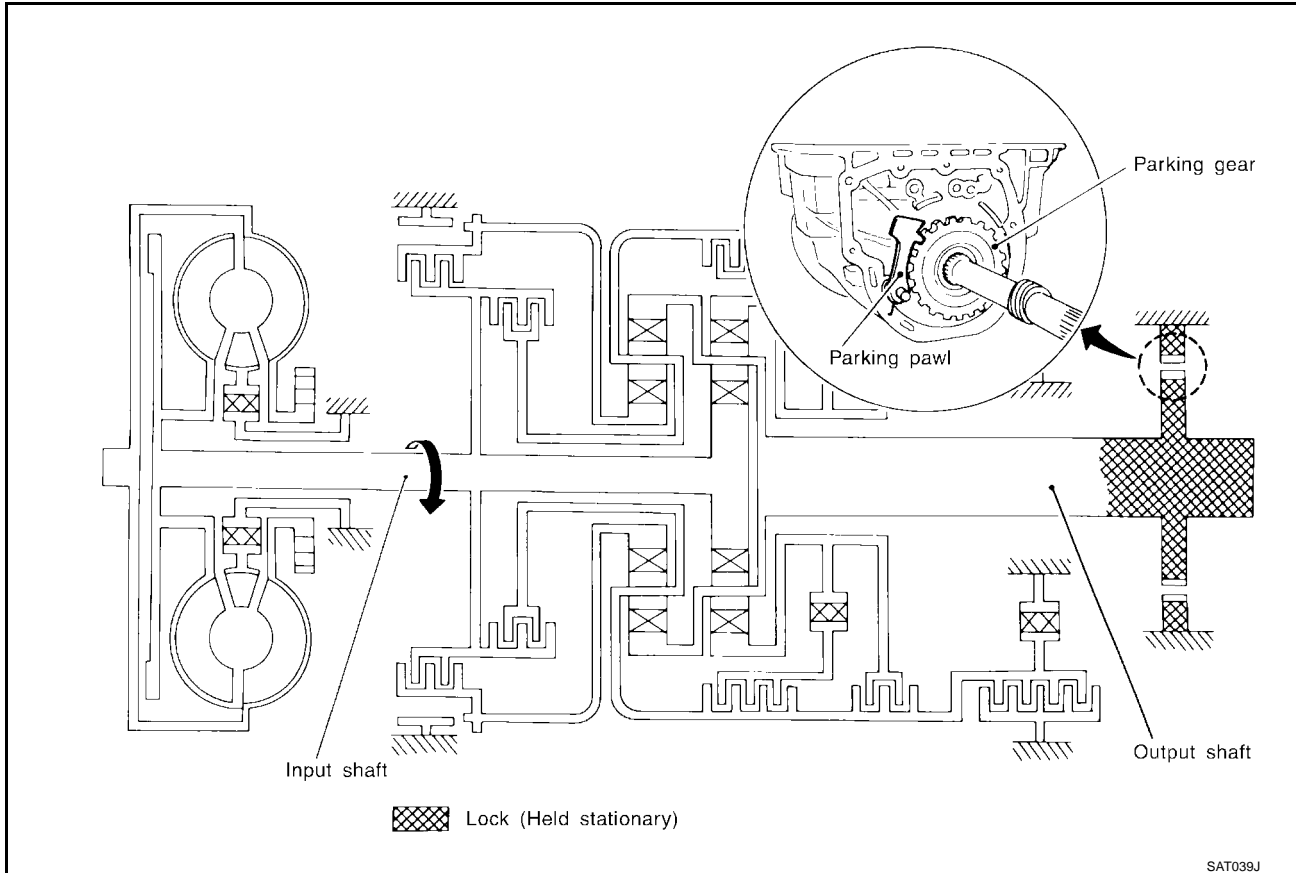
D: Operates when throttle opening is less than 3/16, but does not affect engine brake.



**POWER TRANSMISSION**

**“N” and “P” Positions**

- “N” position  
No control members operate. Power from the input shaft is not transmitted to the output shaft because the clutches do not operate.
- “P” position  
Similar to the “N” position, no control members operate. The parking pawl interconnected with the select lever engages with the parking gear to mechanically hold the output shaft so that the powertrain is locked.

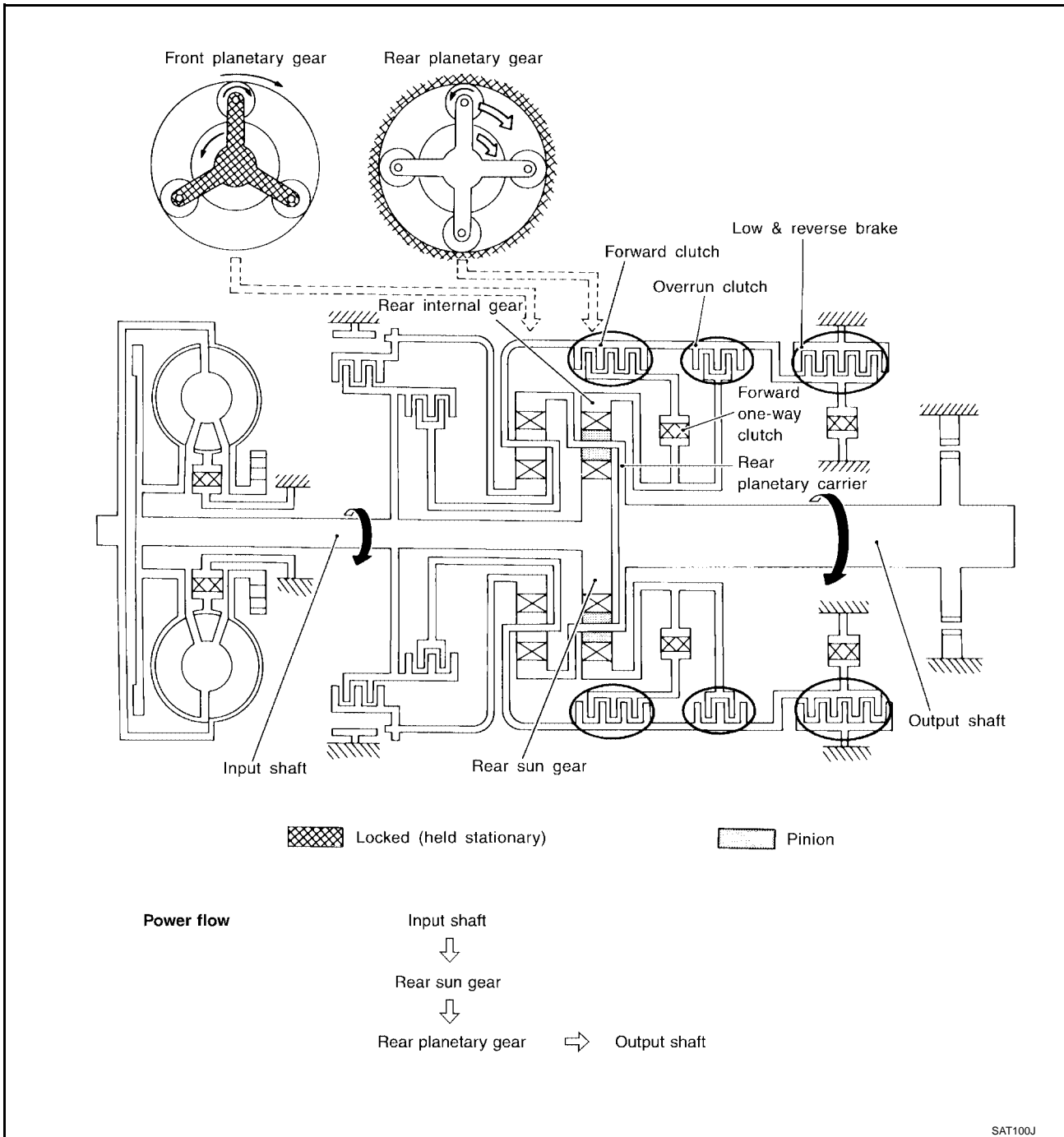


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# OVERALL SYSTEM

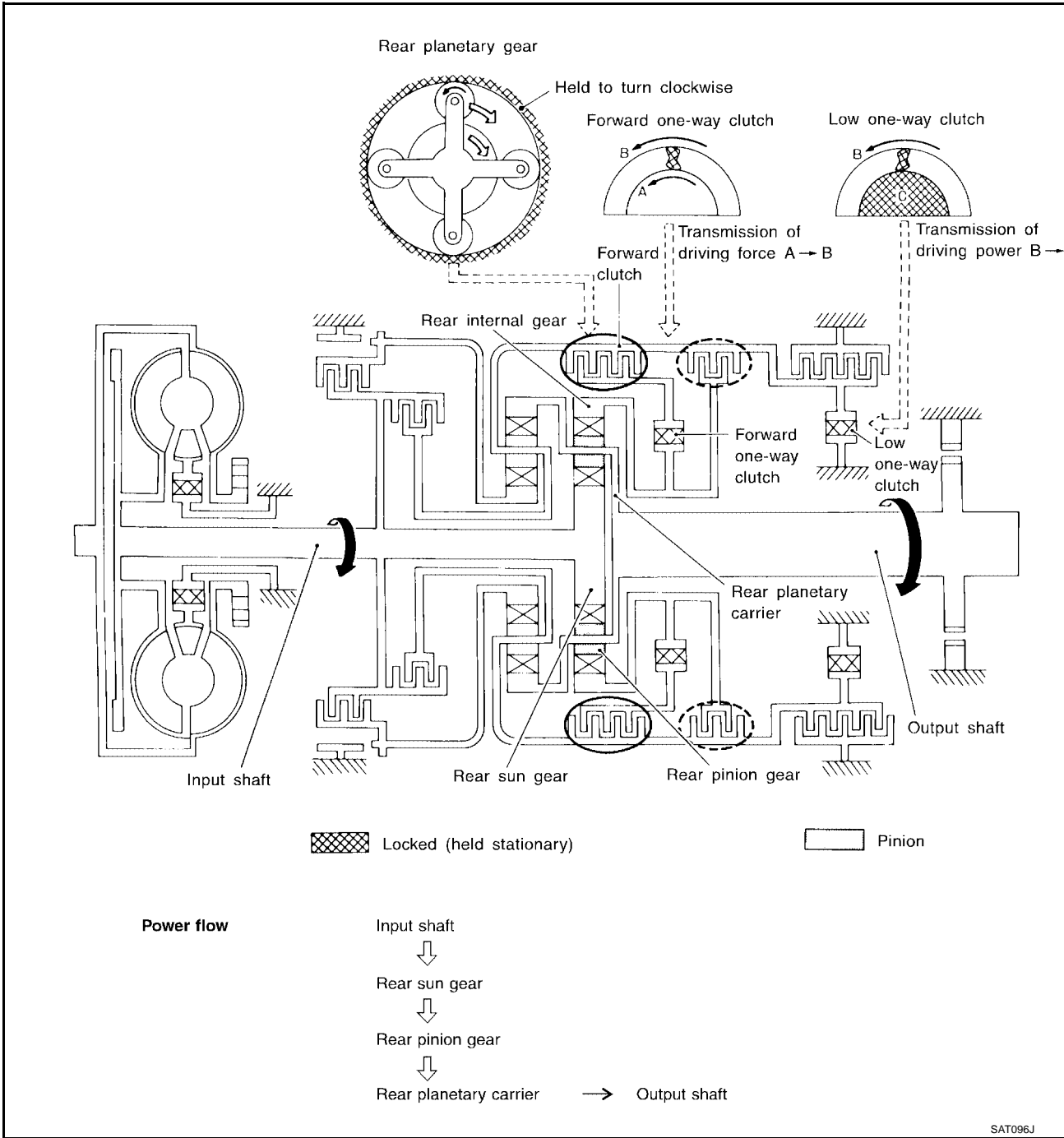
[RL4R01A]

## "11" Position



<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. This is different from that of D1 and 21 .</p>
<p>Engine brake</p>	<p>Overrun clutch always engages, therefore engine brake can be obtained when decelerating.</p>

“D1 ” and “21 ” Positions



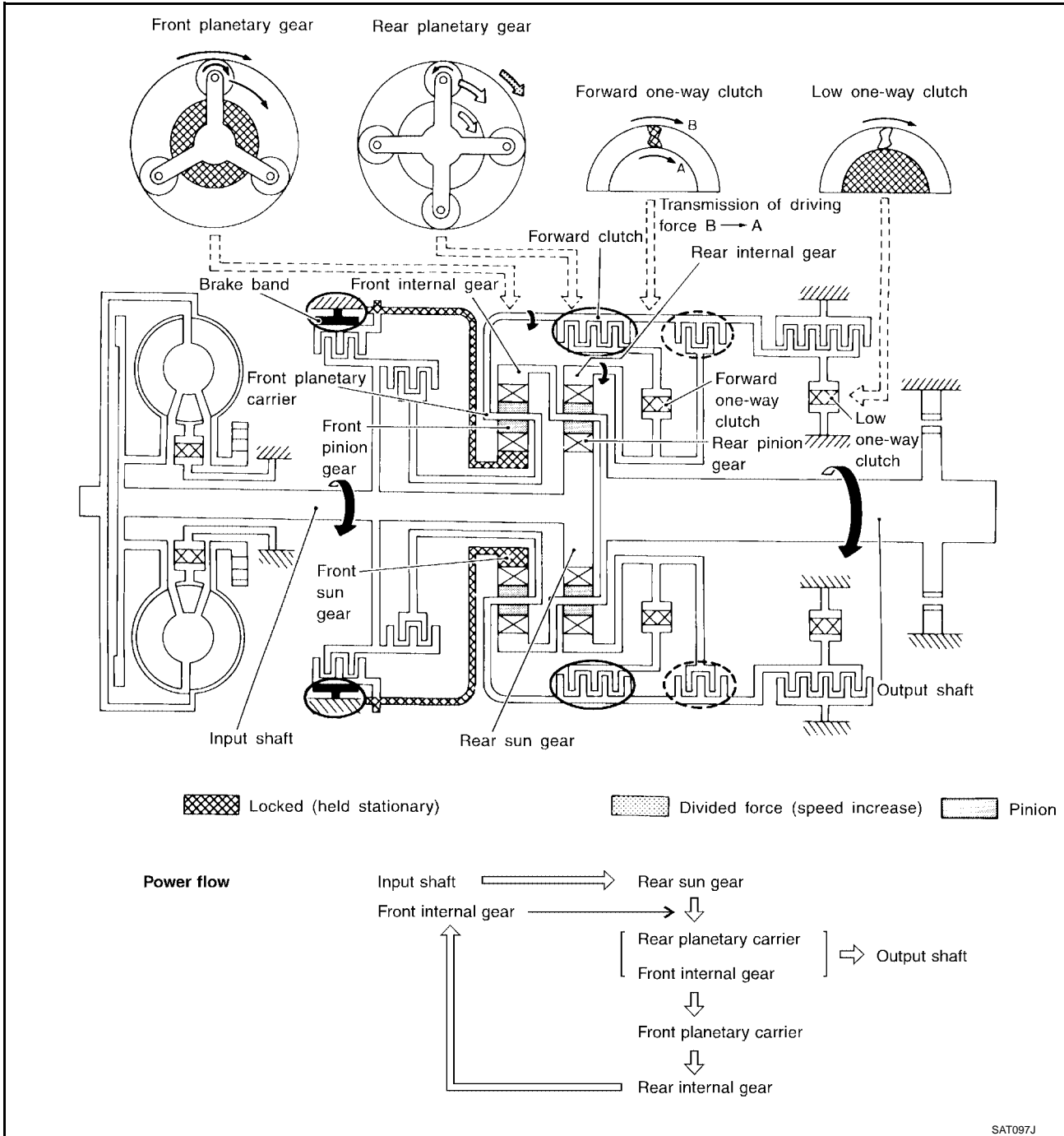
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<ul style="list-style-type: none"> <li>● Forward one-way clutch</li> <li>● Forward clutch</li> <li>● Low one-way clutch</li> </ul>	<p>Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches (Start-up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

# OVERALL SYSTEM

[RL4R01A]

## “D2”, “22” and “12” Positions



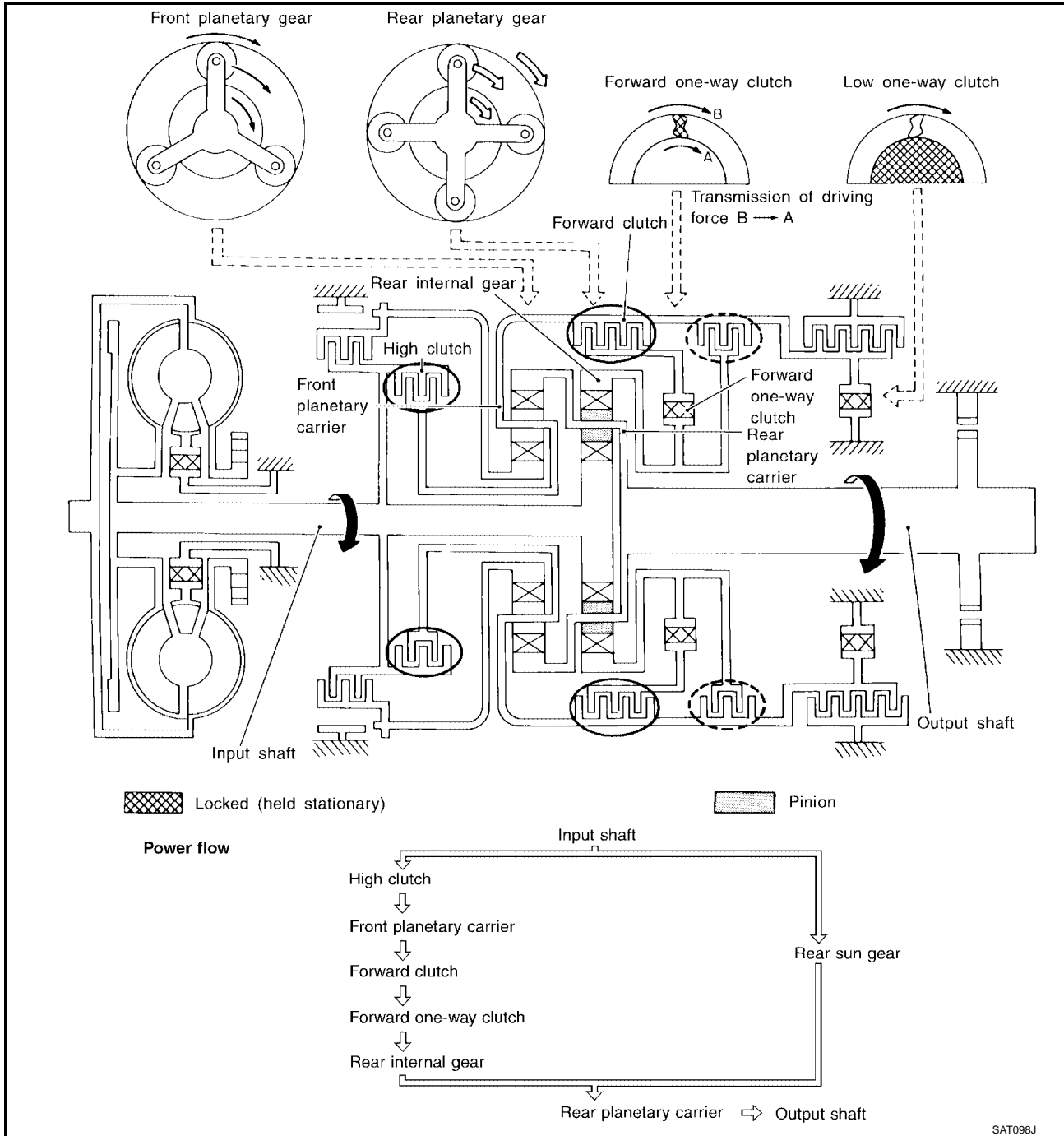
SAT097J

<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. 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 engagement conditions</b></p>	<p>D2 : Overdrive control switch “OFF” and throttle opening is less than 3/16                  22 : Throttle opening less than 3/16                  12 : Always engaged</p>

# OVERALL SYSTEM

[RL4R01A]

## "D3" Position



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- High clutch
- Forward clutch
- Forward one-way clutch

Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch.  
This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.

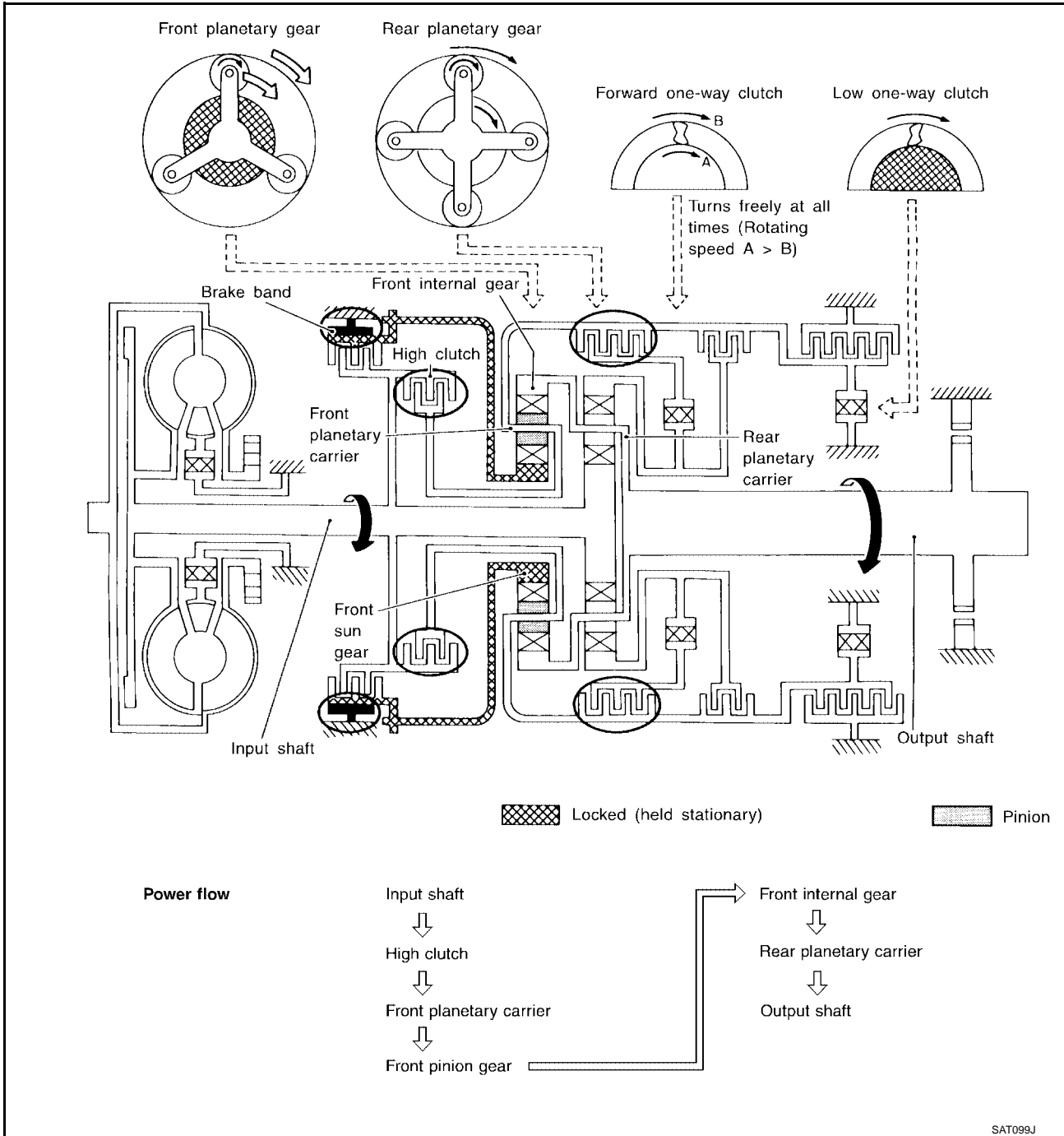
**Overrun clutch**  
engagement conditions

D3 : Overdrive control switch "OFF" and throttle opening is less than 3/16  
Throttle opening less than 3/16

# OVERALL SYSTEM

[RL4R01A]

## “D4” (O/D) Position



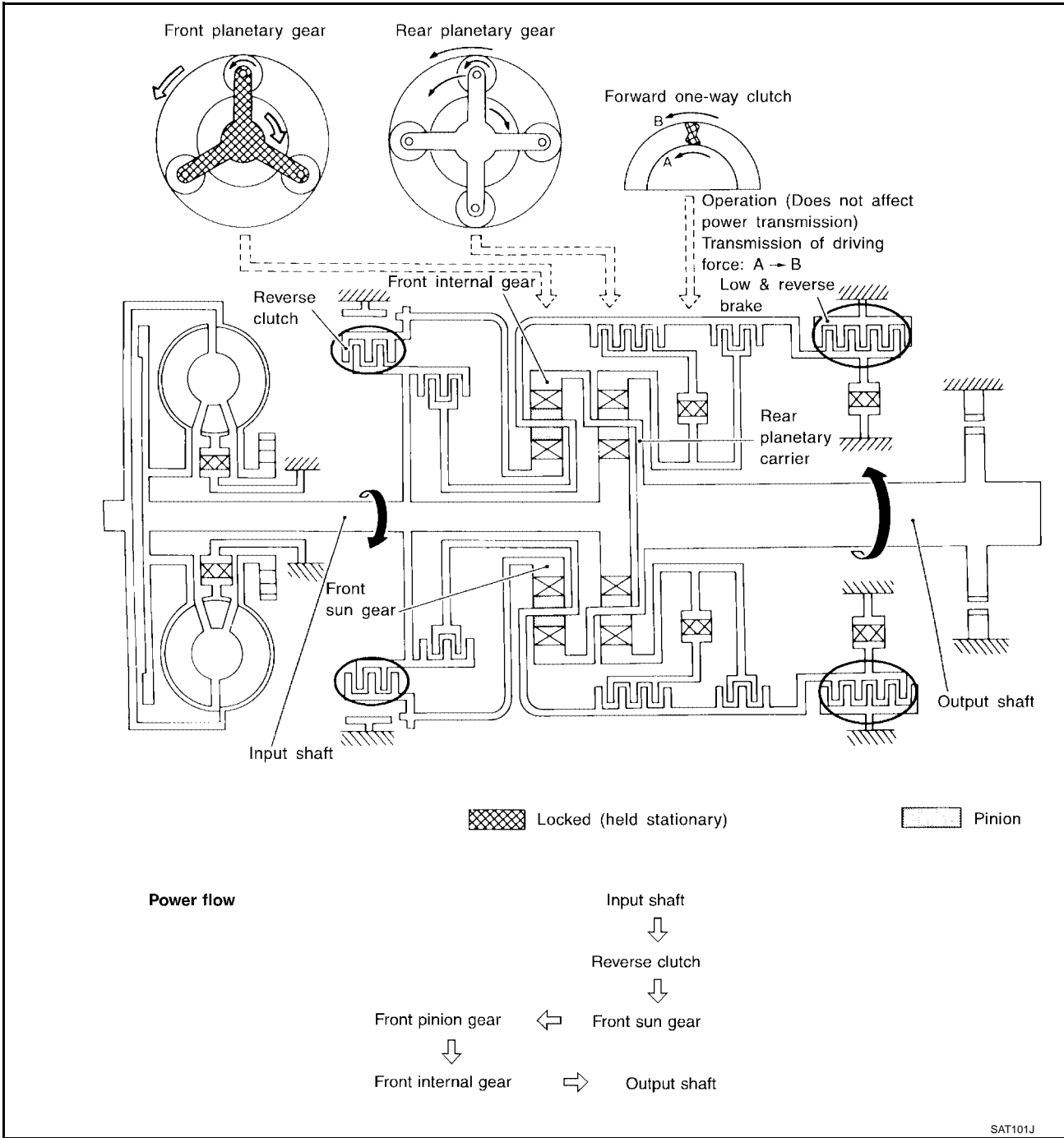
- **High clutch**
- **Brake band**
- **Forward clutch** (Does not affect power transmission)

Input power is transmitted to front carrier through high clutch. This front carrier turns around the sun gear, which is fixed by brake band, and makes front internal gear (output) turn faster.

Engine brake

At D4 position, there is no one-way clutch in the power transmission line and engine brake can be obtained when decelerating.

“R” Position



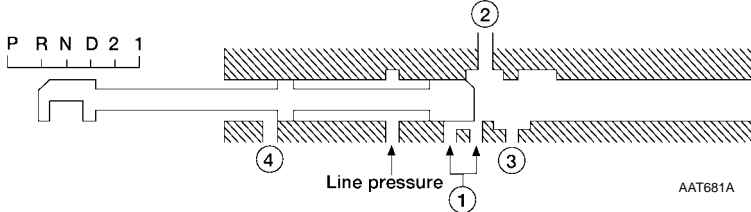
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<ul style="list-style-type: none"> <li>● Reverse clutch</li> <li>● Low and reverse brake</li> </ul>	<p>Front planetary carrier is stationary because of the operation of low and reverse brake. Input power is transmitted to front sun gear through reverse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

# OVERALL SYSTEM

[RL4R01A]

## FUNCTION OF CONTROL VALVES

Valve Name	Function																																						
Pressure regulator valve	Optimally controls oil under pressure discharged from oil pump in response to driving conditions.																																						
Throttle valve	Regulates line pressure to throttle pressure corresponding with throttle opening.																																						
Detent valve	Activates throttle valve via spring in response to changes in throttle opening, thereby regulating throttle pressure.																																						
Pressure modifier valve	Serves as an auxiliary signal valve of pressure regulator valve to control line pressure in response to driving conditions.																																						
Accumulator control valve	Regulates accumulator pressure to pressure corresponding with driving conditions.																																						
Manual valve	Directs line pressure to each oil circuit selected by the selector lever position.																																						
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Position</th> <th colspan="4">Circuit</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>P</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>R</td> <td></td> <td></td> <td></td> <td>○</td> </tr> <tr> <td>N</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>D</td> <td>○</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>○</td> <td>○</td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>○</td> <td>○</td> <td>○</td> <td></td> </tr> </tbody> </table> 	Position	Circuit				1	2	3	4	P					R				○	N					D	○				2	○	○			1	○	○	○
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<ul style="list-style-type: none"> <li>● 1-2 shift valve</li> <li>● 2-3 shift valve</li> <li>● 3-4 shift valve</li> </ul>	Provides automatic shift control in response to driving conditions, such as vehicle speed, throttle opening, etc. Shift control is accomplished by activating or deactivating the clutch, brakes, brake bands, etc.																																						
2-3 throttle modifier valve	Controls line pressure to provide optimum shifting point (2nd → 3rd) during partial-open throttle. (2-3 throttle modulator pressure)																																						
3-2 downshift valve	Delivers throttle pressure in a direction that overcomes 2-3 shift valve's governor pressure while shifting from "3rd" to "2nd" in the "D" position.																																						
Kickdown modifier valve	Controls line pressure to provide optimum shifting points (1st → 2nd) and (2nd → 3rd) during kickdowns. (Kickdown modifier pressure)																																						
4-2 relay valve	Operates in conjunction with the 4-2 sequence valve to prevent downshifting from 4th to 3rd, then to 2nd while directly shifting from 4th to 2nd.																																						
4-2 sequence valve	Prevents 4th band servo "apply" pressure from draining during direct shifting from 4th to 2nd before high clutch "apply" pressure and band servo "release" pressure in the same oil circuit are drained.																																						
3-2 timing valve	Engine speed increases in a short period of time at low engine speeds when accelerator is depressed during downshifts from D3 to D2. However, it takes longer for the engine to increase speed at high engine speeds. The 3-2 timing valve serves to delay the band servo "release" draining speed (At this point, the transmission is tentatively set in Neutral) during downshifts from D3 to D2 at speeds greater than those in the specifications, thereby providing smooth shifting.																																						
1st reducing valve	Controls low & reverse brake "apply" pressure to relief shocks caused by engine brakes while shifting from 2nd to 1st in the 1 position.																																						



# OVERALL SYSTEM

[RL4R01A]

Valve Name	Function
Overrun clutch reducing valve	Controls pressure that operates the overrun clutch to relief shocks caused during engine braking. Line pressure acts on the overrun clutch reducing valve in the 1st or 2nd position to increase the pressure-regulating point with resultant high engine braking capabilities.
4th speed cut valve	Determines lock-up speed while operating in 4th gear.
<ul style="list-style-type: none"><li>● Torque converter clutch control valve</li><li>● Torque converter clutch solenoid valve</li></ul>	Activates or deactivates lock-up system.
Torque converter relief valve	Prevents abnormal increase of converter oil pressure.

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TROUBLE DIAGNOSIS — BASIC INSPECTION

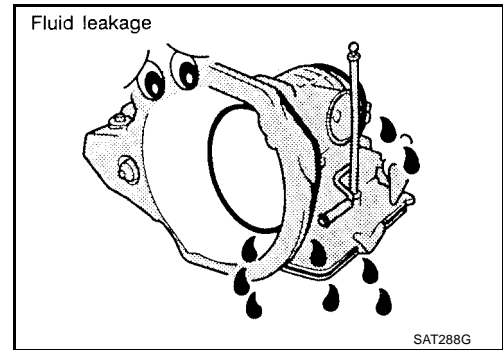
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ECS0071R

**A/T Fluid Check**

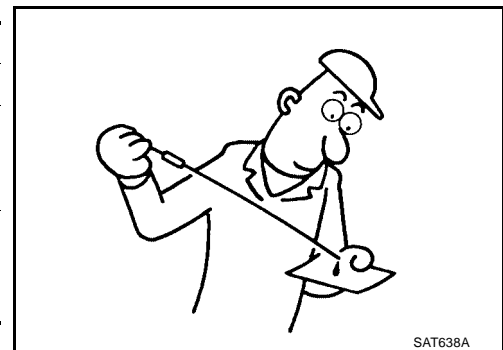
**FLUID LEAKAGE CHECK**

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



**FLUID CONDITION CHECK**

Fluid color	Suspected problem
Dark or black with burned odor	Wear of frictional material
Milky pink	Water contamination <ul style="list-style-type: none"> <li>● Road water entering through filler tube or breather</li> </ul>
Varnished fluid, light to dark brown and tacky	Oxidation <ul style="list-style-type: none"> <li>● Over or under filling</li> <li>● Overheating</li> </ul>



**FLUID LEVEL CHECK**

Refer to [MA-37, "Checking A/T Fluid"](#) .

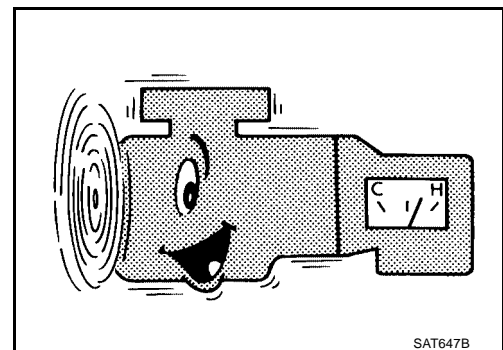
**Stall Test**

**STALL TEST PROCEDURE**

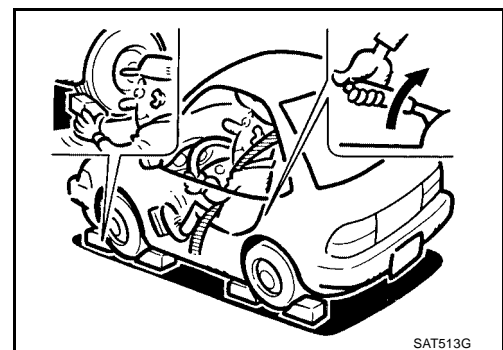
1. Check A/T fluid and engine oil levels. If necessary, add fluid and oil.
2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

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

ECS0071S



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 put a mark on point of specified engine speed on indicator.

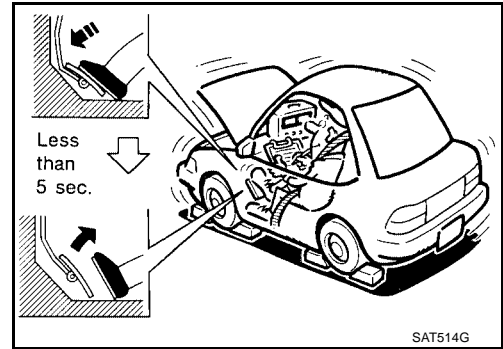


# TROUBLE DIAGNOSIS — BASIC INSPECTION

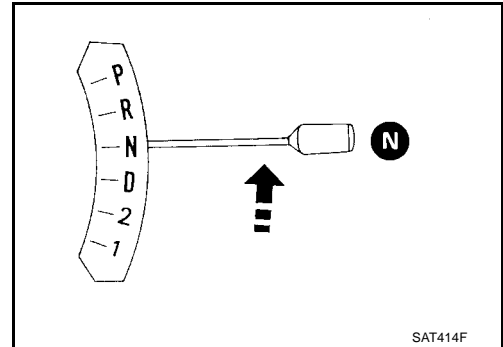
[RL4R01A]

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

**Stall revolution standard : 2,100 - 2,300 rpm**



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

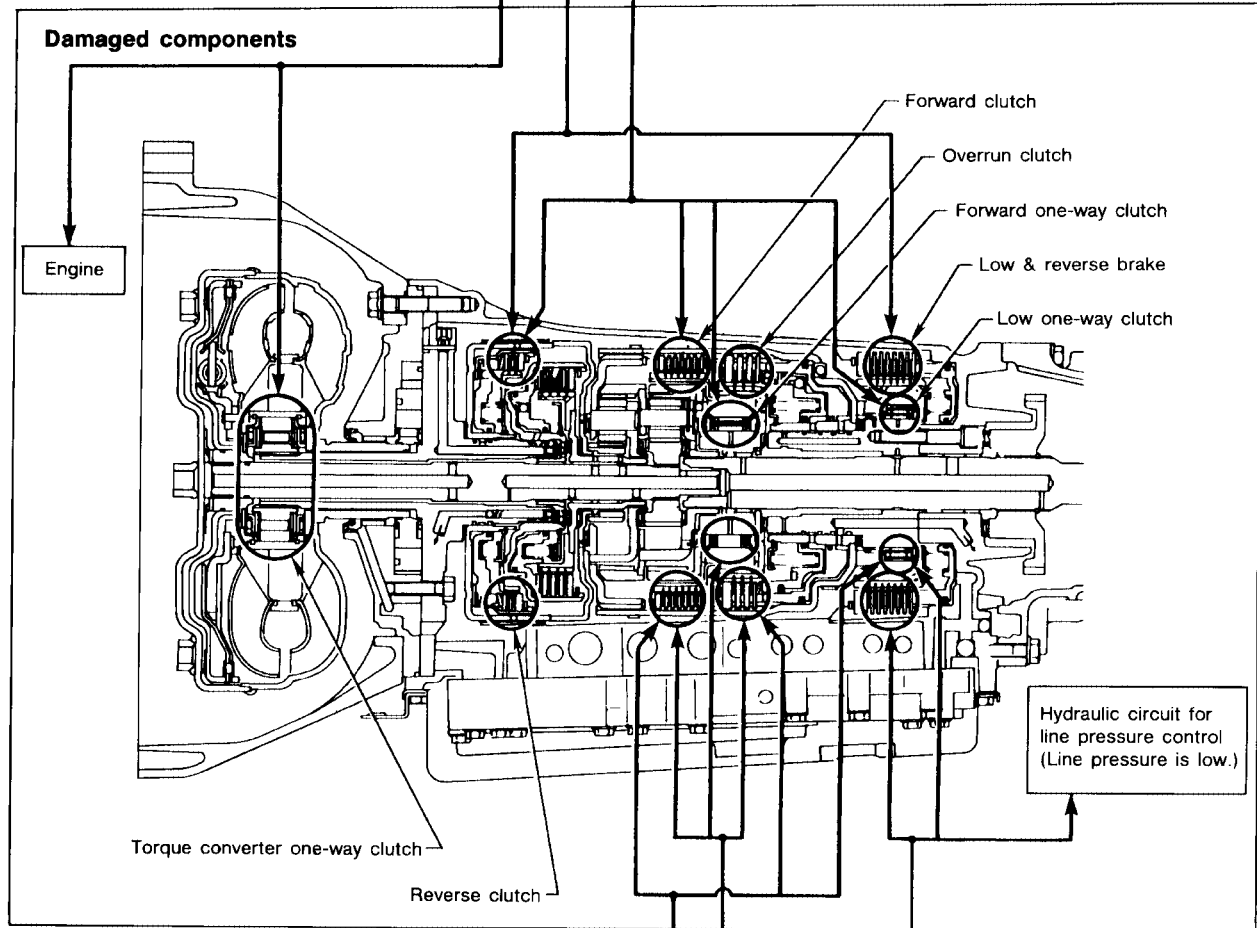


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## JUDGEMENT OF STALL TEST

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

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



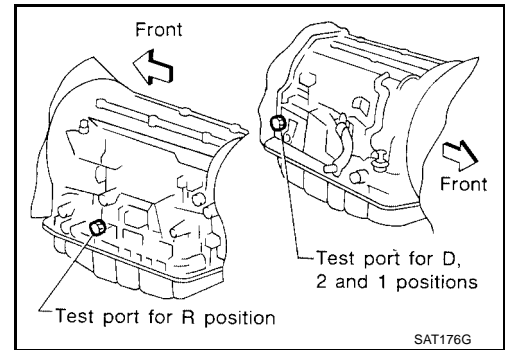
D	H	H	H	O
2	H	H	H	O
1	O	H	H	O
R	O	O	H	O
Selector lever position	Judgement			

ECS0071T

**Line Pressure Test**  
**LINE PRESSURE TEST PORTS**

Location of line pressure test ports are shown in illustration.

- Line pressure plugs are hexagon-headed bolts.
- Always replace line pressure plugs as they are self-sealing bolts.

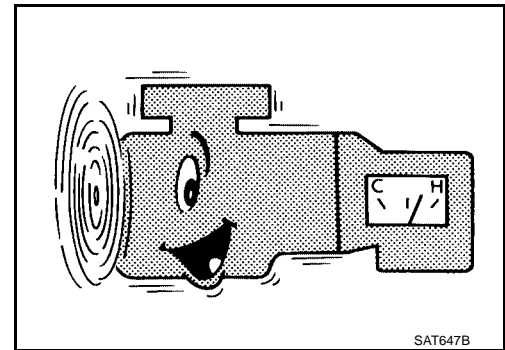


SAT176G

**LINE PRESSURE TEST PROCEDURE**

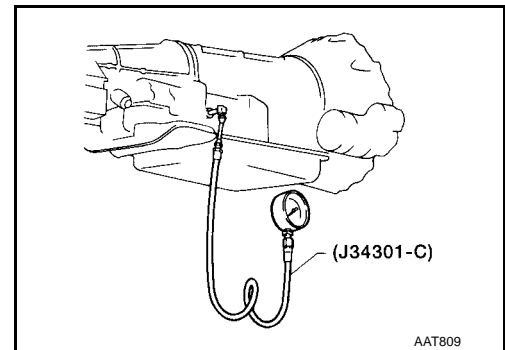
1. Check A/T fluid and engine oil levels. If necessary, add fluid and oil.
2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

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



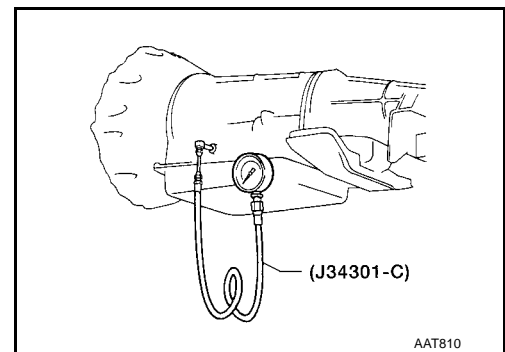
SAT647B

3. Install pressure gauge to line pressure port.



AAT809

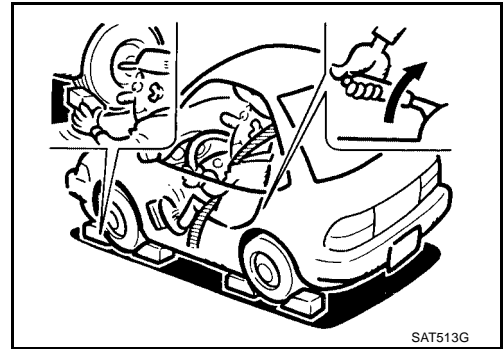
- D, 2 and 1 positions —
- R position —



AAT810

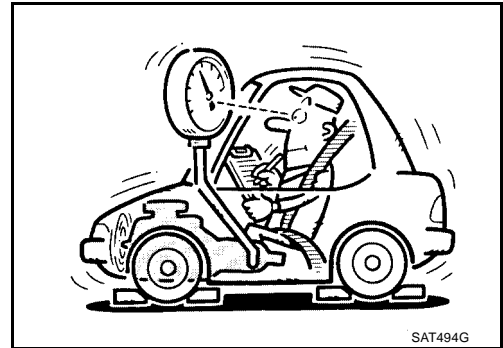
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4. Set parking brake and block wheels.
- Continue to depress brake pedal fully while performing line pressure test at stall speed.



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 [AT-150, "Line Pressure"](#) .



## JUDGEMENT OF LINE PRESSURE TEST

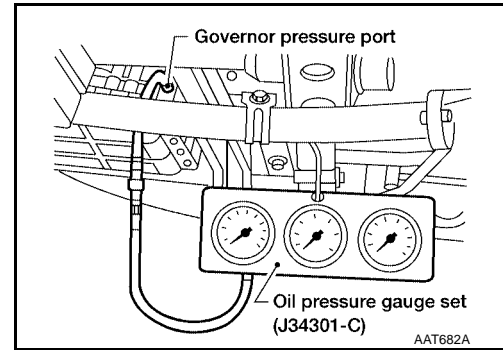
Judgement		Suspected parts
At idle	Line pressure is low in all positions.	<ul style="list-style-type: none"> <li>● Oil pump wear</li> <li>● Control piston damage</li> <li>● Pressure regulator valve or plug sticking</li> <li>● Spring for pressure regulator valve damaged</li> <li>● Fluid pressure leakage 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 1 positions, but</li> <li>— Normal in D and 2 positions.</li> </ul>                             Therefore, fluid leakage exists at or around low &amp; reverse brake circuit.                              Refer to <a href="#">AT-152, "Clutch and Brakes"</a> .                         </li> </ul>
	Line pressure is high.	<ul style="list-style-type: none"> <li>● Maladjustment of throttle position sensor</li> <li>● 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> </ul>
At stall speed	Line pressure is low.	<ul style="list-style-type: none"> <li>● Maladjustment of throttle position sensor</li> <li>● Control piston damaged</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>

## Governor Pressure Testing

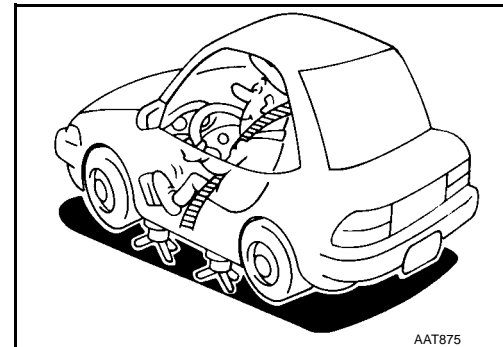
1. Check A/T and engine fluid levels. If necessary, add fluid.
2. Drive vehicle for approx. 10 minutes or until engine oil and ATF reach operating temperature.

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

3. Install pressure gauge to governor pressure port.



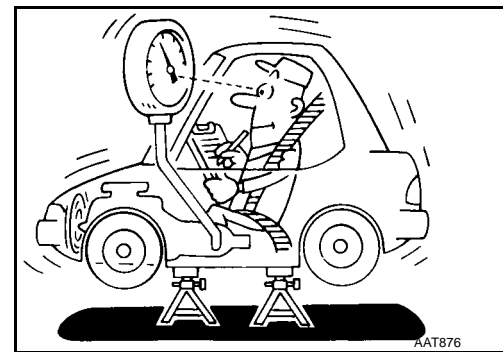
4. Jack up front and rear wheels.
  5. Set selector lever in D position and gradually depress accelerator pedal.
- **Be careful of rotating wheels.**



- **Governor pressure is not generated when vehicle is stopped.**
- **Governor pressure rises gradually in response to vehicle speed.**

**Governor pressure : Refer to [AT-150, "Governor Pressure"](#) .**

If not, check governor valve assembly. Refer to [AT-101, "GOVERNOR VALVE ASSEMBLY"](#) .



ECS007IU

## Road Test

Perform road tests using symptom chart. Refer to [AT-33, "Symptom Chart"](#) .

### P POSITION

1. Place selector lever in P position and start the engine. Stop the engine and repeat the procedure in all positions, including N position.
2. Stop vehicle on a slight upgrade and place selector lever in P position. Release parking brake to make sure vehicle remains locked.

### R POSITION

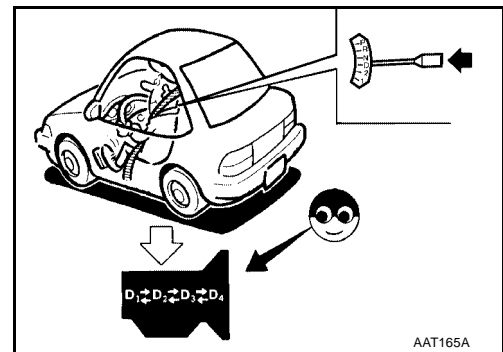
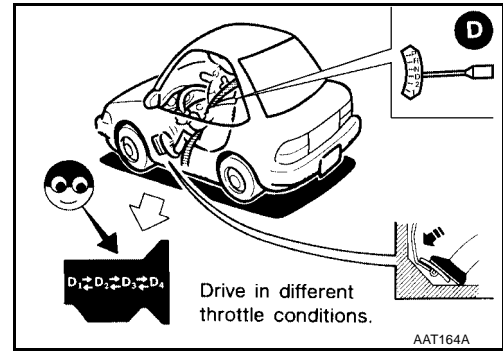
1. Manually move selector lever from P or R, and note shift quality.
2. Drive vehicle in reverse long enough to detect slippage or other abnormalities.

### N POSITION

1. Manually move selector lever from R and D to N and note shift quality.
2. Release parking brake with selector lever in N position. Lightly depress accelerator pedal to make sure vehicle does not move. (When vehicle is new or soon after clutches have been replaced, vehicle may move slightly. This is not a problem.)

**D POSITION**

1. Manually shift selector lever from N to D position, and note shift quality.
2. Using the shift schedule as a reference, drive vehicle in D position. Record, on Symptom Chart, respective vehicle speeds at which up-shifting and down-shifting occur. These speeds are to be read at three different throttle positions light, half and full. Also determine the timing at which shocks are encountered during shifting and which clutches are engaged.
3. Determine whether lock-up properly occurs while driving vehicle in proper gear position and at proper speeds.
4. Check to determine if shifting to overdrive gear cannot be made while overdrive control switch is OFF.
5. Drive vehicle at 65 to 80 km/h (40 to 50 MPH) with half to light throttle position (D3 position). Fully depress accelerator pedal to make sure transmission downshifts from 3rd to 2nd gear.
6. Drive vehicle at 35 to 45 km/h (22 to 28 MPH) with half to light throttle position (D2 position). Fully depress accelerator pedal to make sure transmission downshifts from 2nd to 1st gear.



**2 POSITION**

1. Shift to 2 position and make sure vehicle starts in 1st gear.
2. Increase vehicle speed to make sure transmission upshifts from 1st to 2nd gear.
3. Further increase vehicle speed. Make sure transmission does not upshift to 3rd gear.
4. Drive vehicle at 35 to 45 km/h (22 to 28 MPH) with throttle at half to light position (22 position). Fully depress accelerator pedal to make sure transmission downshifts from 2nd to 1st gear.
5. Drive vehicle at idle in 2 position to make sure that transmission downshifts to 1st gear.
6. Move selector lever to D position and drive vehicle at 40 to 50 km/h (25 to 31 MPH). Then, move selector lever to 2 position to make sure transmission downshifts to 2nd gear.

**1 POSITION**

1. Place selector lever in 1 position and accelerate. Make sure transmission does not shift from 1st to 2nd gear although vehicle speed increases.
2. While driving vehicle in 1 position, release accelerator pedal to make sure that engine compression acts as a brake.
3. Place selector lever in D or 2 position and drive vehicle at 20 to 30 km/h (12 to 19 MPH). Then move selector lever to 1 position to make sure transmission downshifts to 1st gear.



# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RL4R01A]

## TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

PFP:00000

### Symptom Chart

ECS007IV

Numbers are arranged in order of the inspection.

Perform inspections starting with number one and work up.

Numbers in the OFF VEHICLE columns indicate that the transmission must be removed from the vehicle to perform the inspection.

\*: Valve suspected to be malfunctioning

Symptom	Condition	Diagnostic Item
Sharp shocks in shifting from N to D position	ON VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Engine idling speed 4. Line pressure 5. Throttle wire 6. Accumulator N-D 7. Accumulator 3-4 (N-R) 8. Control valve * Pressure regulator valve * Pressure modifier valve * Accumulator control valve * Throttle valve & detent valve * Kickdown modifier valve
	OFF VEHICLE	9. Reverse clutch
Shift shocks	ON VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 5. Accumulator 1-2 6. Accumulator 2-3 7. Control valve * Pressure regulator valve * Pressure modifier valve * Accumulator control valve
		1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 5. Accumulator 3-4 (N-R) 6. Control valve * 4th speed cut valve * Pressure regulator valve * Pressure modifier valve
	OFF VEHICLE	7. Brake band 8. Overrun clutch
		1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 5. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * Overrun clutch reducing valve
	OFF VEHICLE	6. Brake band 7. High clutch
		1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 5. Control valve * Pressure regulator valve * Pressure modifier valve * 1st reducing valve
OFF VEHICLE	6. Low one-way clutch	

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RL4R01A]

Symptom	Condition	Diagnostic Item	
Shift slippage when upshifting	When shifting from 1st to 2nd	ON VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 5. Accumulator 1-2 6. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * Kickdown modifier valve
		OFF VEHICLE	7. Brake band
	When shifting from 2nd to 3rd	ON VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 5. Accumulator 2-3 6. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * Kickdown modifier valve
		OFF VEHICLE	7. Brake band 8. High clutch
	When shifting from 3rd to 4th	ON VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 5. Accumulator 3-4 (N-R) 6. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * Kickdown modifier valve
		OFF VEHICLE	7. Brake band 8. High clutch

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RL4R01A]

Symptom	Condition	Diagnostic Item		
Shift slippage with accelerator pedal depressed	When shifting from 4th to 2nd.	ON VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Governor pressure 5. Throttle wire 6. Accumulator N-D 7. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * Kickdown modifier valve * 4-2 sequence valve 8. Accumulator 3-4 (N-R) 9. Accumulator 1-2 10. Accumulator 2-3 11. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2	A B <b>AT</b> D E F
		OFF VEHICLE	12. Torque converter 13. Fluid pump 14. Reverse clutch 15. High clutch 16. Forward clutch 17. Forward one-way clutch 18. Overrun clutch 19. Low one-way clutch 20. Low & reverse clutch 21. Brake band	G H
	When shifting from 4th to 3rd.	ON VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 5. Accumulator 1-2 6. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * Kickdown modifier valve 7. Accumulator 2-3 8. Accumulator 3-4 (N-R)	I J K L
		OFF VEHICLE	9. Fluid pump 10. High clutch 11. Brake band 12. Overrun clutch 13. Low & reverse clutch	M

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RL4R01A]

Symptom	Condition	Diagnostic Item
Shift slippage with accelerator pedal depressed	ON VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Governor pressure 5. Throttle wire 6. Accumulator 2-3 7. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * Kickdown modifier valve * 3-2 timing valve 8. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2
	OFF VEHICLE	9. High clutch 10. Brake band 11. Forward one-way clutch
Poor power/acceleration	ON VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 5. Accumulator 2-3 6. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * Kickdown modifier valve
	OFF VEHICLE	7. High clutch 8. Forward clutch
	ON VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 5. Governor pressure 6. Accumulator 2-3 7. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * Kickdown modifier valve * 3-2 timing valve 8. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2
No engine braking	ON VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 5. Accumulator 2-3 6. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * Overrun clutch reducing valve
	OFF VEHICLE	7. Overrun clutch

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RL4R01A]

Symptom	Condition	Diagnostic Item
No engine braking	ON VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 5. Accumulator 2-3 6. Overdrive control switch, overdrive hold control module (if equipped), overdrive cancel relay (if equipped), and wiring 7. Overdrive cancel solenoid valve 8. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * Overrun clutch reducing valve
		9. Overrun clutch
	OFF VEHICLE	1. Fluid level and fluid quality 2. Control linkage 3. Line pressure 4. Throttle wire 6. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * 1st reducing valve
		7. Overrun clutch 8. Low & reverse clutch
Shift quality	ON VEHICLE	1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * 2-3 throttle modifier valve 6. Governor valve * Primary governor valve * Secondary governor valve <b>1</b> * Secondary governor valve <b>2</b>
		1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * 2-3 shift valve * 2-3 throttle modifier valve 6. Governor valve * Primary governor valve * Secondary governor valve <b>1</b> * Secondary governor valve <b>2</b>
	ON VEHICLE	1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * 1st reducing valve 6. Governor valve * Primary governor valve * Secondary governor valve <b>1</b> * Secondary governor valve <b>2</b>
		1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * 1st reducing valve 6. Governor valve * Primary governor valve * Secondary governor valve <b>1</b> * Secondary governor valve <b>2</b>

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# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RL4R01A]

	Symptom	Condition	Diagnostic Item
Shift quality	Too high a gear change point from 2nd to 1st in 1 position.	ON VEHICLE	1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * 1st reducing valve 6. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2
	Failure to change gear from 4th to 2nd with accelerator pedal depressed.	ON VEHICLE	1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * 4-2 relay valve * 4-2 sequence valve 6. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2
	Failure to change gear from 3rd to 2nd with accelerator pedal depressed.	ON VEHICLE	1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * 3-2 downshift valve 6. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2
	Failure to change gear from 1st to 2nd in D and 2 position.	ON VEHICLE	1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * 1-2 shift valve 6. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2
	Vehicle does not start from 1st in D and 2 position.	ON VEHICLE	1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * 1-2 shift valve 6. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RL4R01A]

Symptom	Condition	Diagnostic Item
Shift quality	Failure to change gear to 3rd to 4th in D position.	ON VEHICLE  1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Overdrive control switch, overdrive hold control module (if equipped), overdrive cancel relay (if equipped), and wiring 6. Overdrive cancel solenoid valve 7. Control valve * 2-3 shift valve * 3-4 shift valve 8. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2
	Changes gear to 1st directly when selector lever is set from D to 1 position.	ON VEHICLE  1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * 1st reducing valve 6. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2
	Changes gear to 2nd in 1 position.	ON VEHICLE  1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * 1st reducing valve 6. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2
	Too high or low a change point when lock-up operates.	ON VEHICLE  1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * Pressure regulator valve * Pressure modifier valve * Throttle valve & detent valve * Kickdown modifier valve 6. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2

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# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[RL4R01A]

Symptom	Condition	Diagnostic Item
Lock-up quality	Lock-up point is extremely high or low.	ON VEHICLE 1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * 4th speed cut valve * Pressure regulator valve * Pressure modifier valve * Torque converter clutch control valve * Throttle valve & detent valve 6. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2
	Torque converter does not lock-up.	ON VEHICLE 1. Fluid level and fluid quality 2. Line pressure 3. Governor pressure 4. Throttle wire 5. Control valve * 4th speed cut valve * Torque converter clutch control valve 6. Governor valve * Primary governor valve * Secondary governor valve 1 * Secondary governor valve 2
	Lock-up is not released when accelerator pedal is released.	OFF VEHICLE 7. Torque converter ON VEHICLE 1. Fluid level and fluid quality 2. Torque converter clutch solenoid valve
Engine does not start in P and N positions, or engine starts in positions other than P and N positions.	ON VEHICLE	1. Ignition switch and starter motor 2. Control linkage 3. PNP switch and wiring
Vehicle moves with selector lever in P position.	ON VEHICLE	1. Control linkage
	OFF VEHICLE	2. Parking components



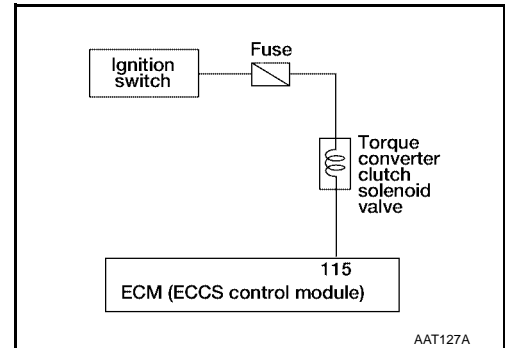
## DTC P1775 TORQUE CONVERTER CLUTCH SOLENOID

PF3:31940

### Diagnostic Procedure

ECS0071W

When the malfunction indicator lamp indicates DTC P1775, refer to [EC-530, "DTC P1775 TCC SOLENOID VALVE"](#).



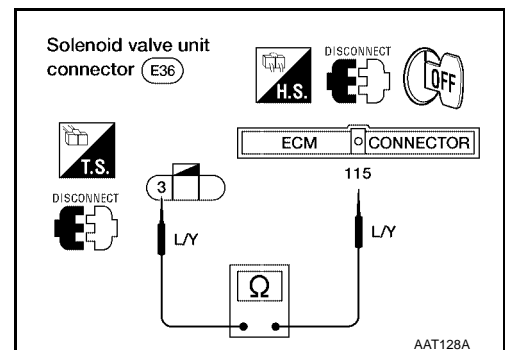
### 1. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector and torque converter clutch solenoid valve harness connector.
3. Check resistance between solenoid valve unit harness connector E36 terminal 3 and ECM harness connector F29 terminal 115.

**Resistance : Approximately 0Ω**

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace harness between ECM and torque converter clutch solenoid valve.



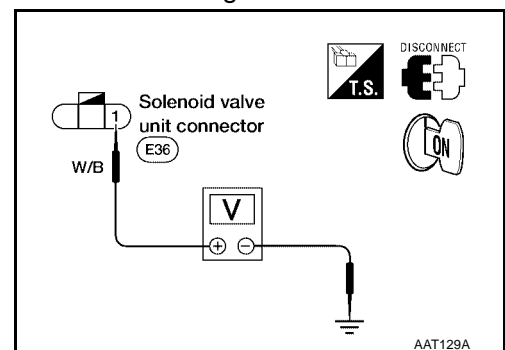
### 2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between solenoid valve unit harness connector E36 terminal 1 and ground.

**Voltage : Battery voltage**

OK or NG

- OK >> GO TO 4.
- NG >> GO TO 3.



## 3. DETECT MALFUNCTIONING ITEM

Check the following items:

- Ignition switch and fuse  
Refer to [PG-9, "POWER SUPPLY ROUTING"](#) .
- Harness continuity between fuse and torque converter clutch solenoid valve.

OK or NG

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

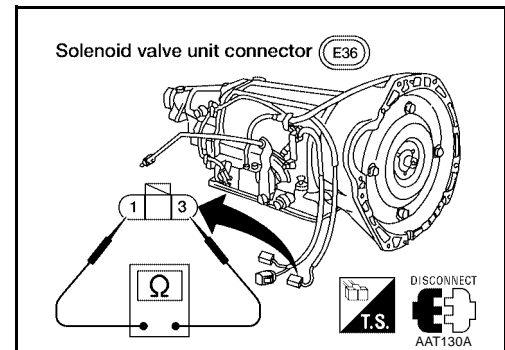
## 4. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE (RESISTANCE)

Check resistance between solenoid valve unit connector E36 terminals 1 and 3.

**Resistance : Approximately 25Ω**

OK or NG

- OK >> GO TO 5.  
 NG >> Replace torque converter clutch solenoid valve.

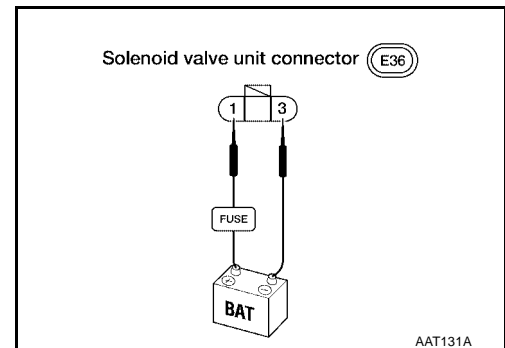


## 5. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE (OPERATION)

1. Remove torque converter clutch solenoid valve. Refer to [AT-62, "Removal"](#) .
2. Check torque converter clutch solenoid valve operation.

OK or NG

- OK >> GO TO 6.  
 NG >> Replace torque converter clutch solenoid valve.

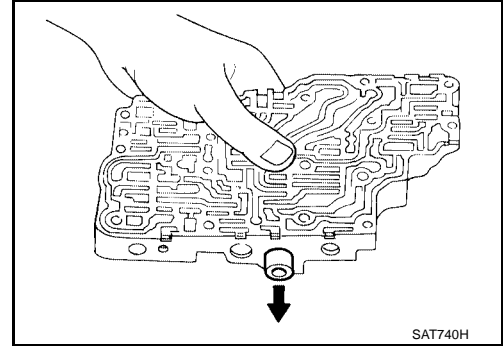


## 6. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-88, "CONTROL VALVE ASSEMBLY"](#) .
2. Check torque converter clutch control valve.
  - Valve, and sleeve slide along valve bore under their own weight.
  - Valve, and sleeve are free from burrs, dents and scratches.
  - Control valve springs are free from damage, deformation and fatigue.
  - Hydraulic line is free from obstacles.

OK or NG

- OK >> GO TO 7.
- NG >> Repair control valve.



## 7. CHECK MALFUNCTION

Is malfunction eliminated?

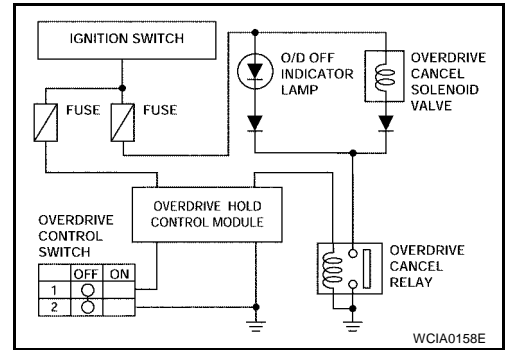
Yes or No

- Yes >> **INSPECTION END.**
- No >> Check control valve again. Repair or replace control valve assembly.

**TROUBLE DIAGNOSES**

**Component Inspection**

**OVERDRIVE CONTROL SWITCH AND OVERDRIVE CANCEL SOLENOID VALVE**



**1. CHECK O/D OFF INDICATOR LAMP CIRCUIT**

1. Turn ignition switch ON.  
(Do not start engine).
2. Press and release overdrive control switch.

**Resistance : Approximately 25Ω**

OK or NG

- OK >> GO TO 5.
- NG >> GO TO 2.

**2. CHECK OVERDRIVE CANCEL RELAY**

Refer to [AT-50, "OVERDRIVE CANCEL RELAY"](#)

OK or NG

- OK >> GO TO 3.
- NG >> Replace overdrive cancel relay.

**3. DETECT MALFUNCTIONING ITEM**

**Check the following items:**

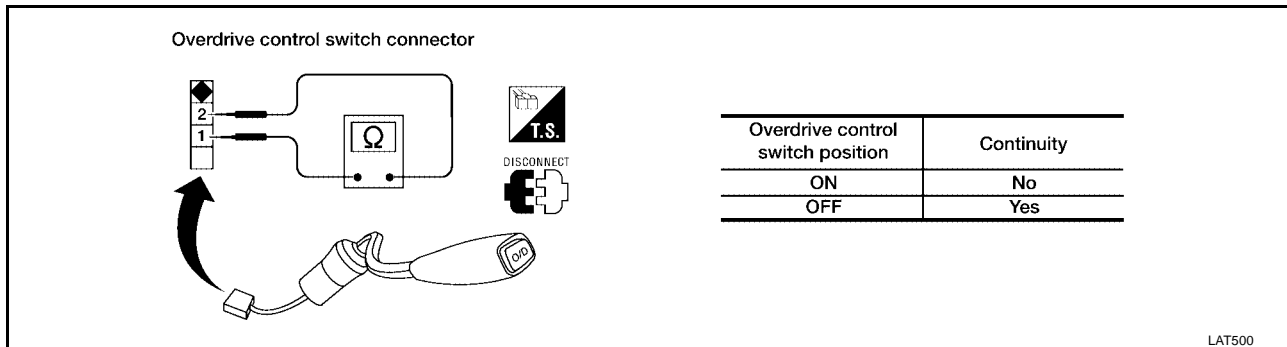
- O/D OFF indicator lamp  
Refer to [DI-25, "WARNING LAMPS"](#) .
- Ignition switch and fuse for overdrive hold control module and overdrive cancel solenoid  
Refer to [PG-9, "POWER SUPPLY ROUTING"](#) .

OK or NG

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

## 4. CHECK OVERDRIVE CONTROL SWITCH

Check continuity between overdrive control switch terminals 1 and 2.



OK or NG

OK >> GO TO 5.

NG >> Replace overdrive control switch.

## 5. CHECK OVERDRIVE CANCEL SOLENOID VALVE CIRCUIT

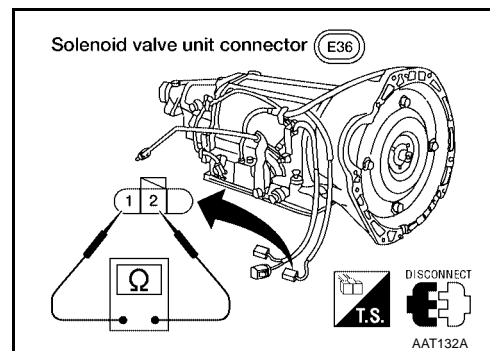
Check resistance between overdrive cancel solenoid valve terminals 1 and 2.

**Resistance : Approximately 25Ω**

OK or NG

OK >> GO TO 6.

NG >> Replace overdrive cancel solenoid valve.



## 6. DETECT MALFUNCTIONING ITEM

Check the following items:

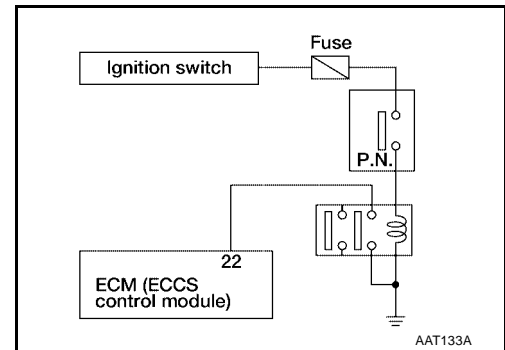
1. Harness continuity between fuse and overdrive cancel solenoid valve
2. Harness continuity between fuse and overdrive hold control module
3. Harness continuity between overdrive cancel solenoid valve and overdrive cancel relay
4. Condition of diode
5. Harness continuity between overdrive hold control module and overdrive cancel relay
6. Harness continuity between overdrive hold control module and overdrive control switch
7. Harness continuity between overdrive hold control module and ground

OK or NG

OK >> Replace overdrive hold control module.

NG >> Repair or replace damaged parts.

## PARK/NEUTRAL POSITION (PNP) SWITCH



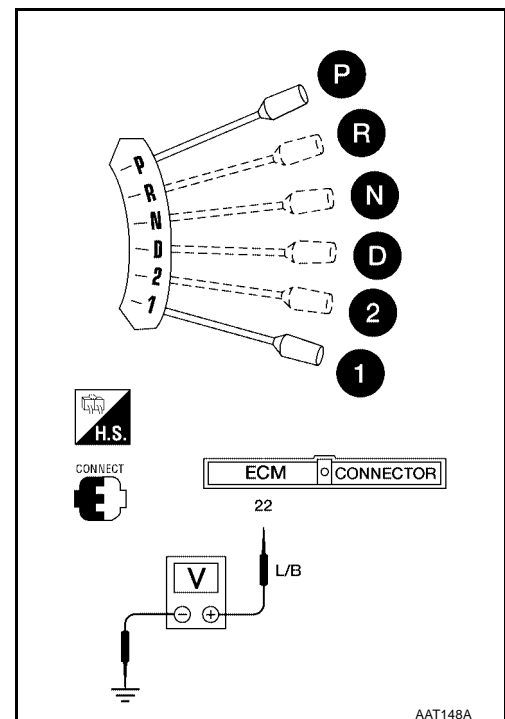
### 1. CHECK PNP SWITCH CIRCUIT STEP 1

1. Turn ignition switch ON.  
(Do not start engine).
2. Check voltage between ECM harness connector F29 terminal 22 and ground while moving selector lever through each position.

**P, N position : 0V**  
**R, D, 2, 1 position : Approximately 5V**

OK or NG

OK >> **INSPECTION END.**  
 NG >> GO TO 2.



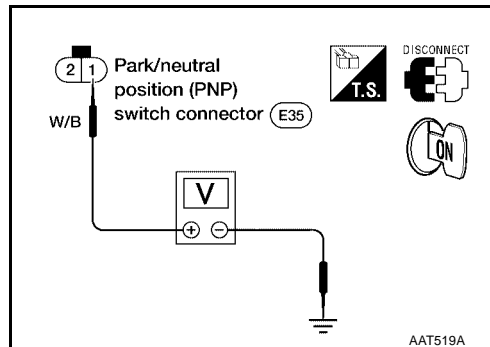
**2. CHECK POWER SUPPLY FOR PNP SWITCH**

1. Disconnect PNP switch harness connector.
2. Turn ignition switch ON.  
(Do not start engine).

Do approximately 12 volts exist between PNP switch harness connector E35 terminal 1 and body ground?

Yes or No

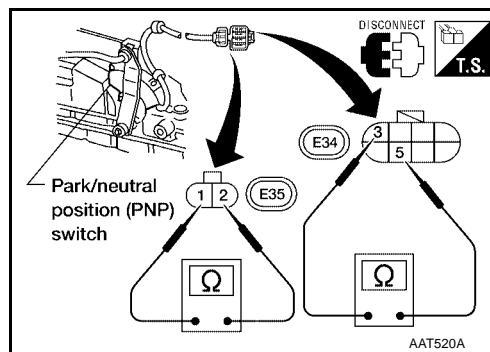
- Yes >> GO TO 3.
- No >> Check 10A fuse (No. 11, located in the fuse block), harness and connector. Refer to [PG-9, "POWER SUPPLY ROUTING"](#).



**3. CHECK PNP SWITCH**

- Check continuity in N and P positions.
- With manual lever held in each position, turn manual shaft 1.5° in both directions (When manual lever is in each position, continuity normally exists within 1.5° range). If continuity does not exist equally in either direction, properly adjust PNP switch. Refer to [AT-60, "Park/Neutral Position \(PNP\) Switch Adjustment"](#).

Position	Terminal No.			
	1	2	3	5
Park/neutral position	○	○		



OK or NG

- OK >> GO TO 4.
- NG >> Replace PNP switch.

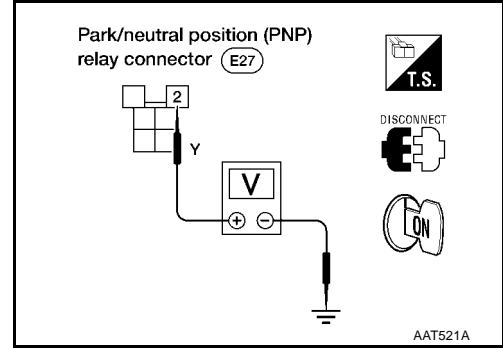
**4. CHECK POWER SUPPLY FOR PNP RELAY**

1. Reconnect PNP switch harness connector.
2. Turn ignition switch ON.
3. Disconnect PNP relay harness connector.
4. Put selector lever in P or N position.

Do approximately 12 volts exist between PNP relay harness connector E27 terminal 2 and body ground?

Yes or No

- Yes >> GO TO 6.  
 No >> GO TO 5.



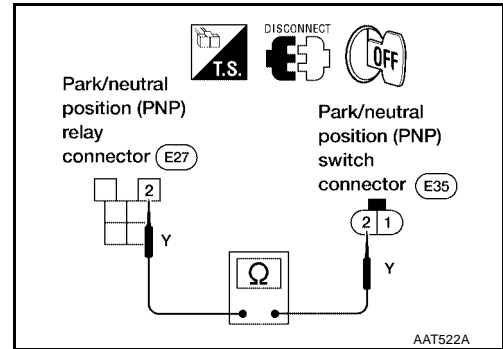
**5. CHECK PNP SWITCH CIRCUIT STEP 2**

1. Turn ignition switch OFF.
2. Disconnect PNP switch harness connector E35. Check circuit continuity between PNP switch harness connector E35 terminal 2 and PNP relay harness connector E27 terminal 2.

**Continuity should exist.**

OK or NG

- OK >> GO TO 6.  
 NG >> Repair harness or connector.



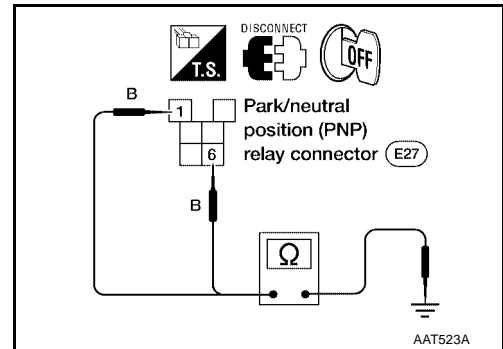
**6. CHECK BODY GROUND CIRCUIT FOR PNP RELAY**

1. Turn ignition switch OFF.
2. Does continuity exist between PNP relay E27 terminals (1, 6) and body ground?

**Continuity should exist.**

OK or NG

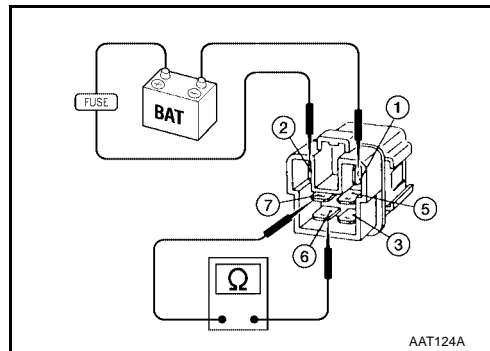
- OK >> GO TO 7.  
 NG >> Repair harness or connector.





**7. CHECK PNP RELAY**

Check continuity between terminals 6 and 7.



Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

MTBL0198

OK or NG

- OK >> GO TO 8.
- NG >> Replace PNP relay.

**8. CHECK PNP SWITCH CIRCUIT STEP 3**

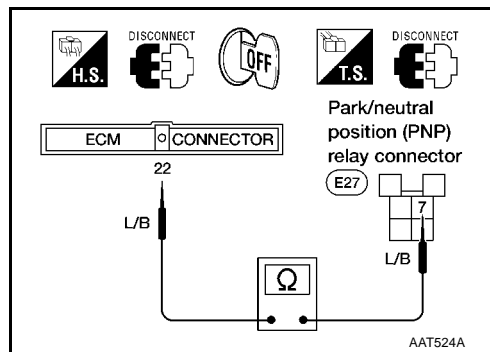
1. Turn ignition switch OFF.
2. Check circuit continuity between ECM harness connector F27 terminal 22 and PNP relay harness connector E27 terminal 7.

**Continuity should exist.**

If OK, check harness for short.

OK or NG

- OK >> Replace ECM.
- NG >> Repair harness or connector.

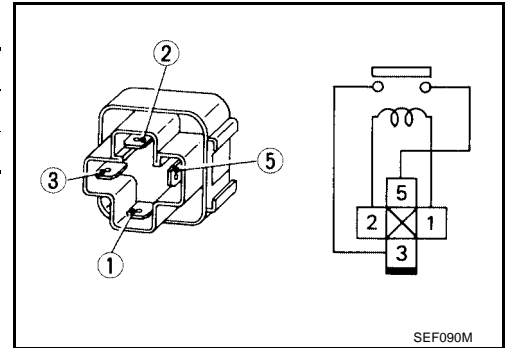


## Electrical Component Inspection OVERDRIVE CANCEL RELAY

Check continuity between terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.



## A/T SHIFT LOCK SYSTEM

PFP:34950

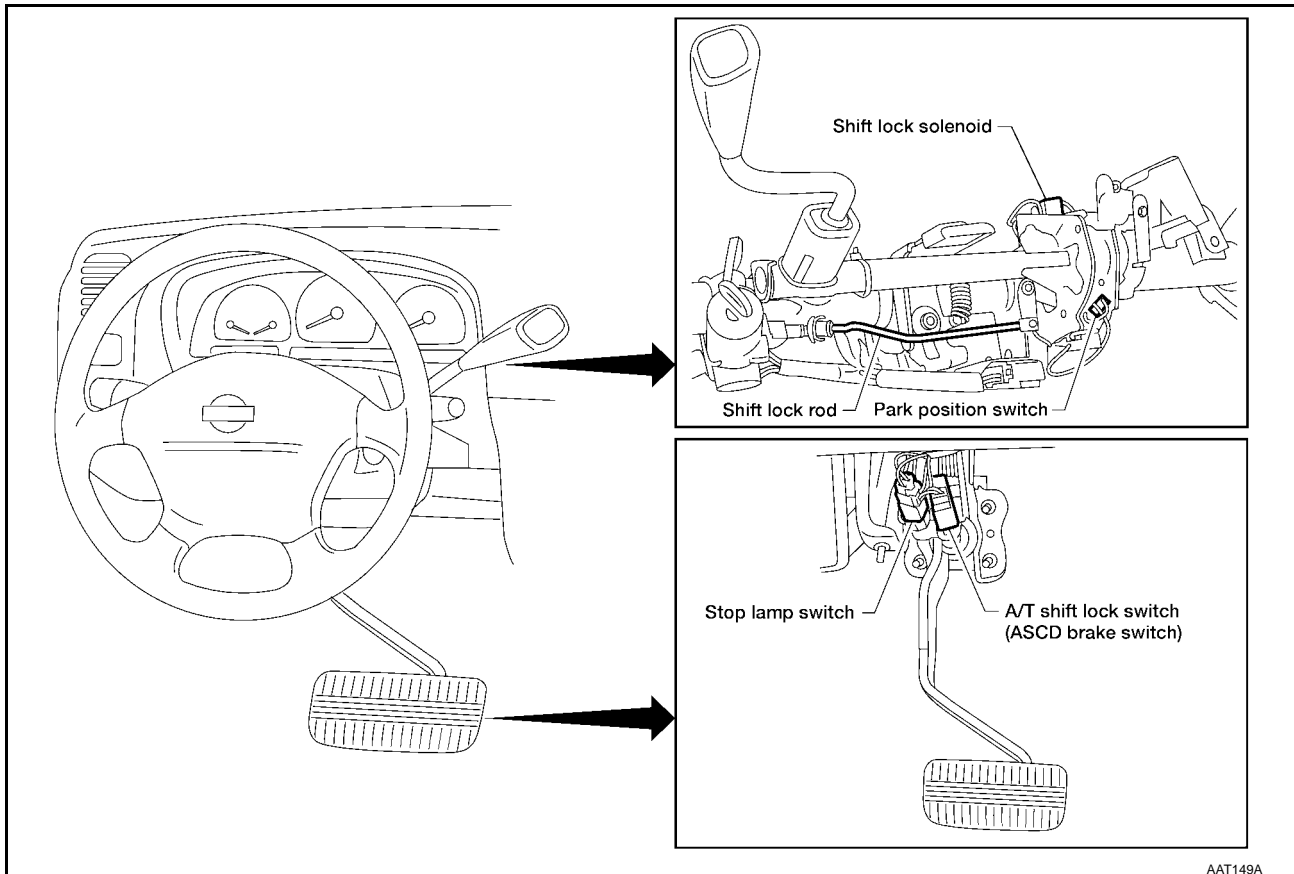
ECS007J2

### Description

- The mechanical key interlock mechanism also operates as a shift lock:  
With the key switch turned to ON, the selector lever cannot be shifted from P (Park) 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

ECS007J0



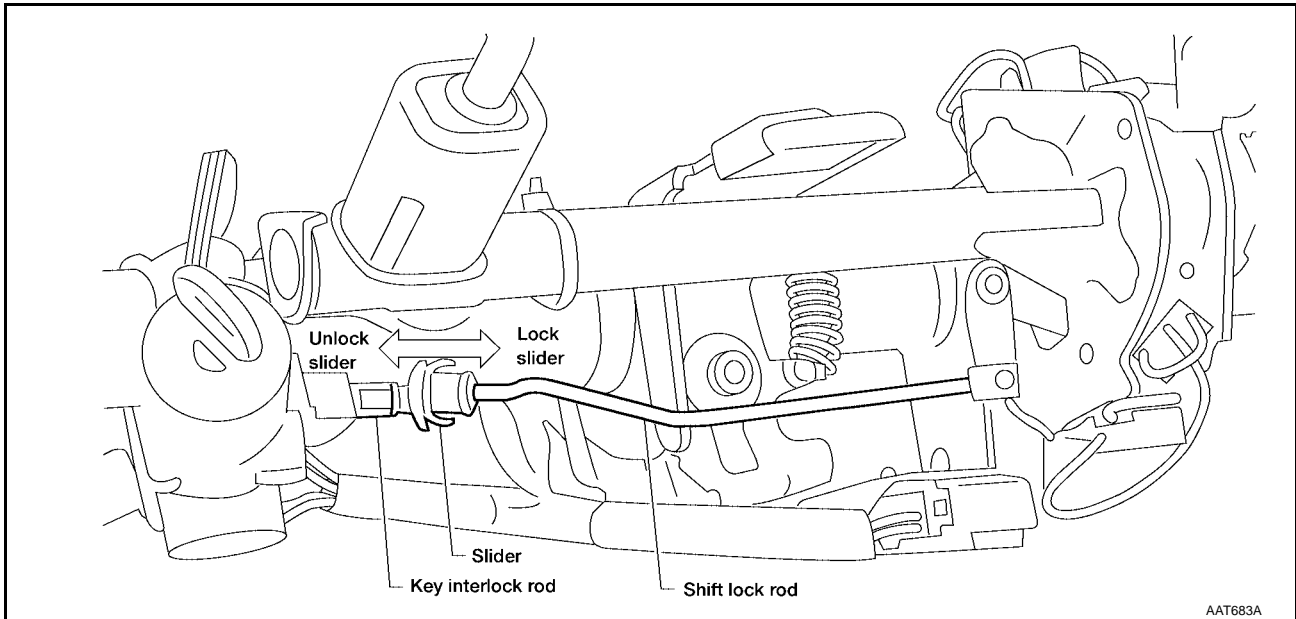
AAT149A

### Removal and Installation SHIFT LOCK SOLENOID

ECS007J1

1. Remove lower instrument cover LH and knee protector.
2. Remove steering column covers.
3. Disconnect A/T device connector.
4. Remove two screws and two nuts attaching steering column.
5. Disconnect shift lock rod.
6. Remove shift control cable.
7. Remove two bolts attaching shift control tube and remove shift control tube.
8. Remove two screws from shift lock solenoid and two screws from park position switch.

## SHIFT LOCK ROD



### Removal

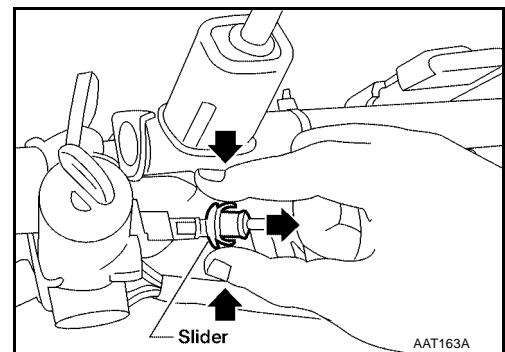
1. Turn ignition key to ACC position.
2. Unlock slider by squeezing lock tabs.
3. Remove shift lock rod from key interlock rod.

### Installation and Adjustment

1. Place selector lever in P (Park) position.
2. Turn ignition key to ACC position.
3. Insert shift lock rod into slider.
4. Grab key interlock rod and push toward shift lock rod to adjust.

### Do not hold shift lock rod.

5. Lock slider into position.
6. Test shift lock operation.



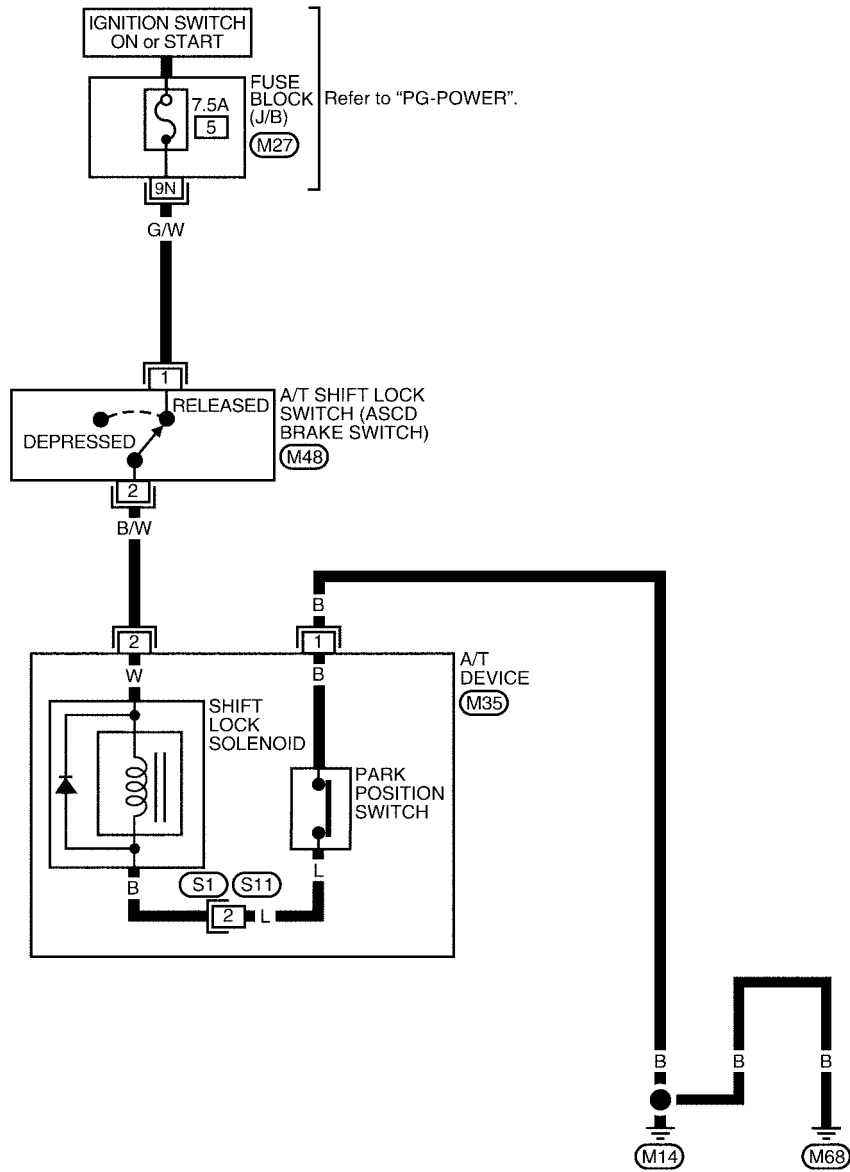
# A/T SHIFT LOCK SYSTEM

[RL4R01A]

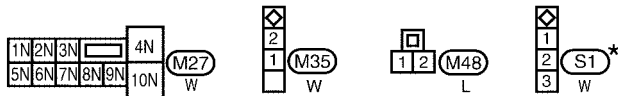
## Wiring Diagram

ECS007J2

### AT-SHIFT-01



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



\* : This connector is not shown in "HARNESS LAYOUT" of PG section.

## Diagnostic Procedure

### SYMPTOM 1:

- Selector lever cannot be moved from P position with key in ON position and brake pedal applied.
- Selector lever can be moved from P position with key in ON position and brake pedal released.
- Selector lever can be moved from P position when key is removed from key cylinder.

### SYMPTOM 2:

- Ignition key cannot be removed when selector lever is set to P position.
- Ignition key can be removed when selector lever is set to any position except P.

## 1. CHECK SHIFT LOCK ROD

Check shift lock rod for damage.

OK or NG

- OK >> GO TO 2.
- NG >> Repair shift lock rod. Refer to [AT-52, "SHIFT LOCK ROD"](#) .

## 2. CHECK SELECTOR LEVER POSITION

Check selector lever position indicator and selector lever for damage.

OK or NG

- OK >> GO TO 3.
- NG >> Check selector lever. Refer to [AT-60, "Park/Neutral Position \(PNP\) Switch Adjustment"](#) and [AT-61, "Control Cable Adjustment"](#) .

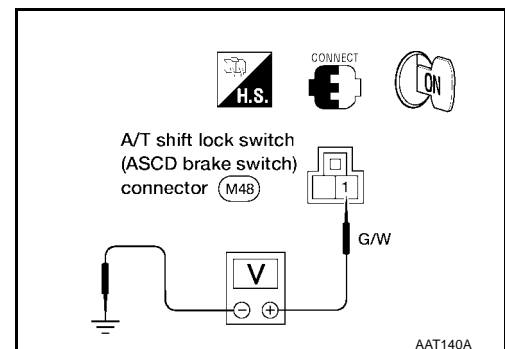
## 3. CHECK POWER SOURCE

1. Turn ignition switch ON.  
(Do not start engine.)
2. Check voltage between A/T shift lock switch (ASCD brake switch) harness connector M48 terminal 1 and ground.

**Voltage : Battery voltage**

OK or NG

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



## 4. DETECT MALFUNCTIONING ITEM

**Check the following items:**

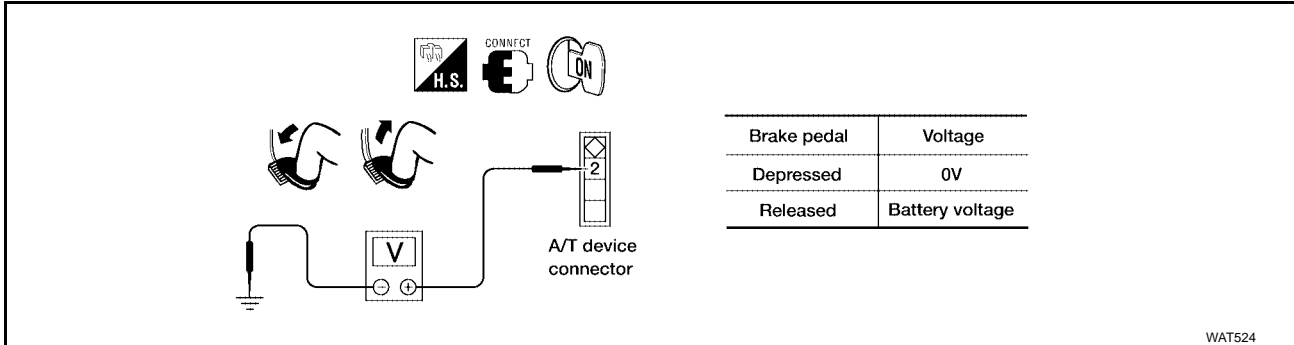
- 7.5A fuse (No. 5, located in the fuse block)
- Harness for short or open between fuse and A/T shift lock switch (ASCD brake switch) harness connector terminal 1
- Ignition switch. Refer to [PG-14, "IGNITION POWER SUPPLY — IGNITION SW. IN ON AND/OR START"](#) .

OK or NG

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

## 5. CHECK INPUT SIGNAL [A/T SHIFT LOCK SWITCH (ASCD BRAKE SWITCH)]

1. Turn ignition switch ON.  
(Do not start engine.)
2. Check voltage between A/T device harness connector M35, terminal 2 (B/W) and ground.



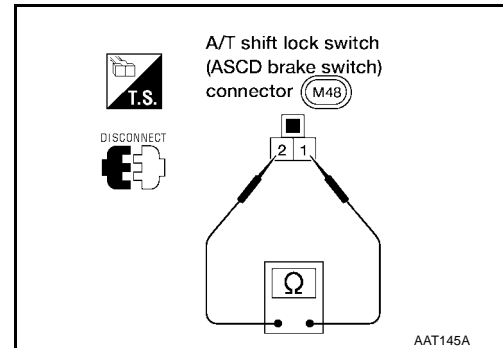
OK or NG

- OK >> GO TO 7.
- NG >> GO TO 6.

## 6. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between A/T device harness connector M35 terminal 2 and A/T shift lock switch (ASCD brake switch) harness connector terminal 2
- A/T shift lock switch (ASCD brake switch)  
Check continuity between terminals 1 and 2



Condition	Continuity
When brake pedal is depressed	No
When brake pedal is released	Yes

Check A/T shift lock switch (ASCD brake switch) after adjusting brake pedal. Refer to [BR-7](#), "[BRAKE PEDAL AND BRACKET](#)".

MTBL0208

OK or NG

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

## 7. CHECK GROUND CIRCUIT

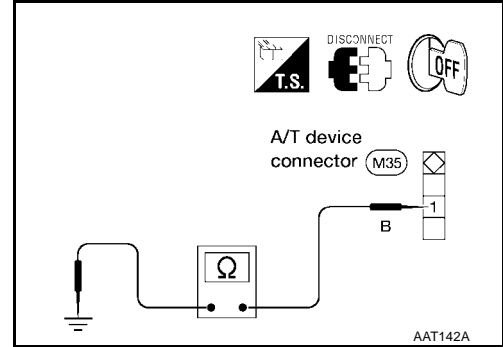
1. Turn ignition switch OFF.
2. Disconnect A/T device harness connector.
3. Check continuity between A/T device harness connector M35 terminal 1 and ground.

**Continuity should exist.**

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

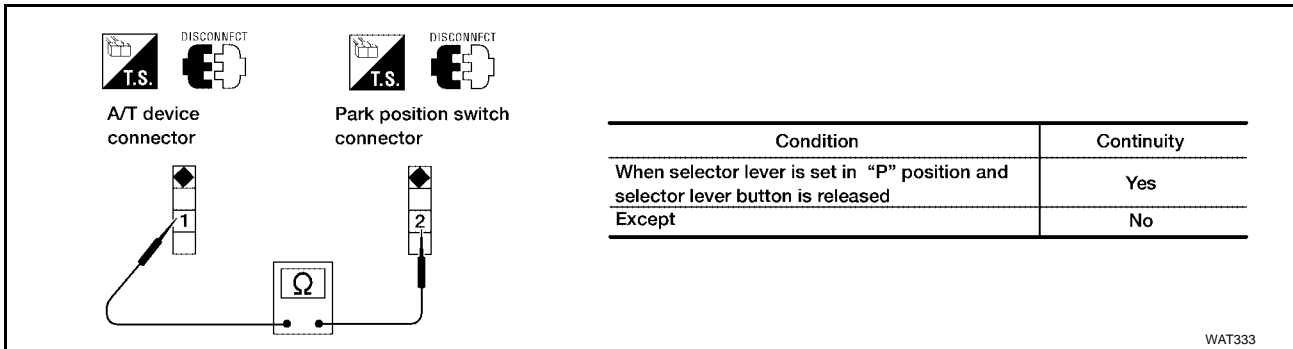
OK or NG

- OK >> GO TO 8.  
 NG >> Repair harness or connector.



## 8. CHECK PARK POSITION SWITCH

- Check continuity between A/T device harness connector M35 terminal 1 (B) and park position switch harness connector S1 terminal 2 (L).

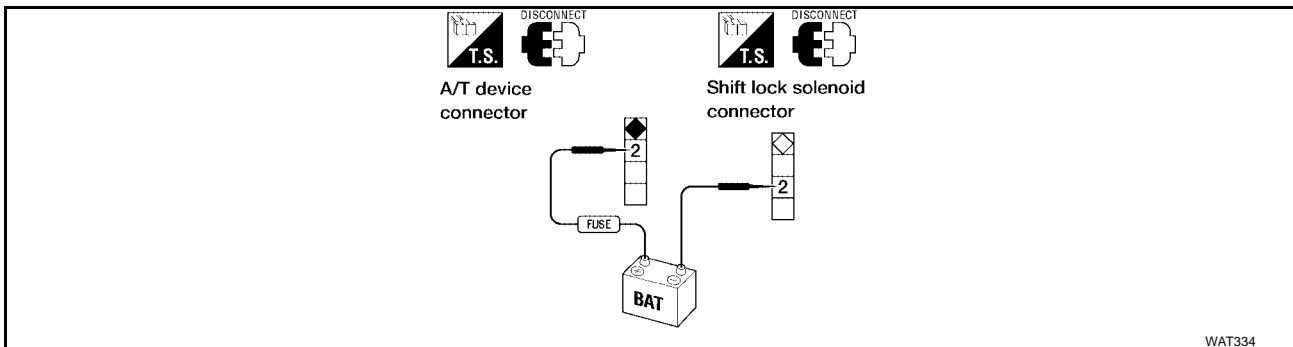


OK or NG

- OK >> GO TO 9.  
 NG >> Replace park position switch.

## 9. CHECK SHIFT LOCK SOLENOID

- Check operation by applying battery voltage to A/T device connector M35 terminal 2 (B/W) and shift lock solenoid harness connector S1 terminal 2 (B).



OK or NG

- OK >> GO TO 10.  
 NG >> Replace shift lock solenoid.



**10. CHECK SHIFT LOCK OPERATION**

1. Reconnect A/T device harness connector.
2. Turn ignition switch from OFF to ON position. (Do not start engine.)
3. Recheck shift lock operation.

OK or NG

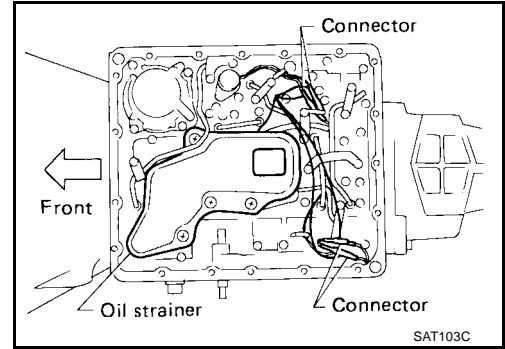
- OK >> **INSPECTION END.**
- NG >> 1. Perform A/T device input/output signal inspection test.  
2. If NG, recheck harness connector connection.

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

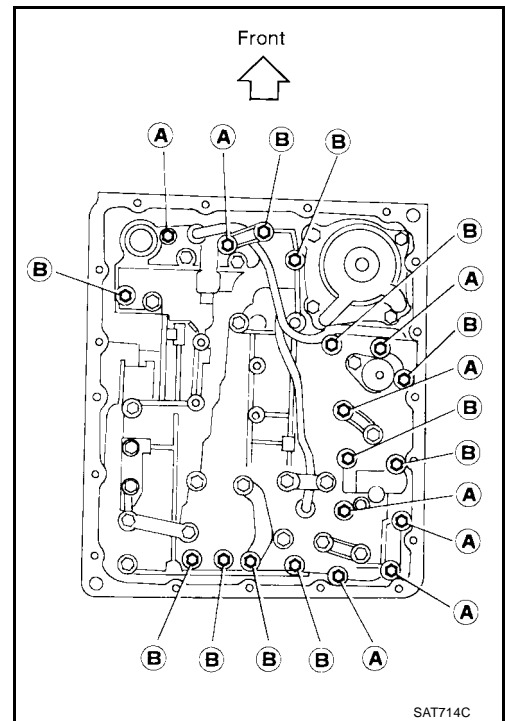
**ON-VEHICLE SERVICE**

**Control Valve Assembly and Accumulators  
REMOVAL**

1. Drain ATF from drain plug.
2. Remove oil pan and gasket.
3. Remove oil strainer.
4. Disconnect harness connector.



5. Remove control valve assembly by removing fixing bolts.



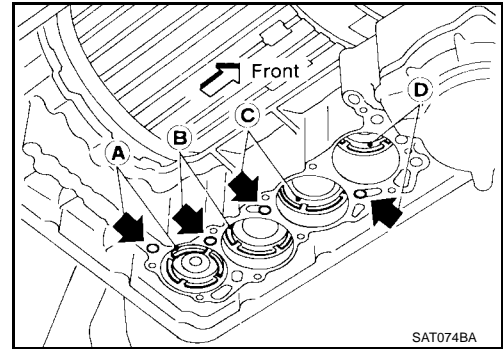
**Bolt length and location**

Bolt symbol	$\ell$ mm (in)
A	33 (1.30)
B	45 (1.77)

● **Be careful not to drop manual valve out of valve body.**

6. Remove solenoids and valves from valve body if necessary.
7. Remove terminal cord assembly if necessary.

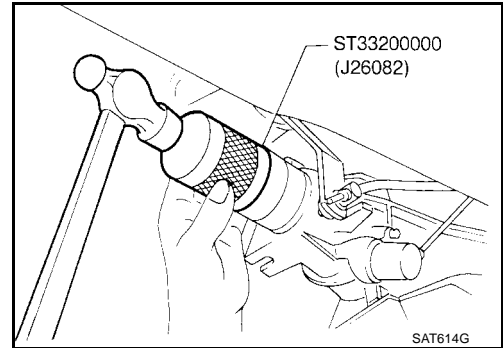
8. Remove accumulators **A**, **B**, **C** and **D** by applying compressed air if necessary.
  - **Hold each piston with a rag.**
9. Reinstall any part removed.
  - **Always use new sealing parts.**
  - **Always replace oil pan bolts as they are self-sealing bolts.**
  - **After installing control valve assembly, make sure that selector lever can be moved to all positions.**



ECS007J5

### Rear Oil Seal Replacement

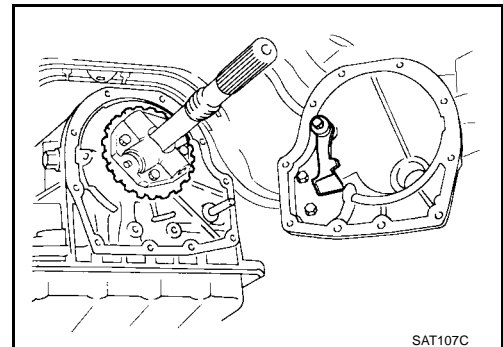
1. Remove propeller shaft from vehicle. Refer to [PR-8, "Removal and Installation"](#).
2. Remove rear oil seal.
3. Install rear oil seal.
  - **Apply ATF before installing.**
4. Reinstall any part removed.



ECS007J6

### Parking Components Inspection

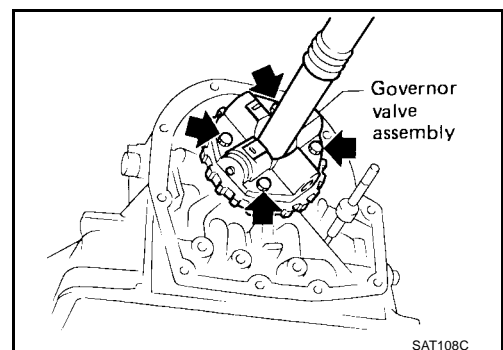
1. Remove propeller shaft from vehicle. Refer to [PR-8, "Removal and Installation"](#).
2. Support A/T assembly with a jack.
3. Remove rear engine mounting member.
4. Remove rear extension from transmission case.
5. Replace parking components if necessary.
6. Reinstall any part removed.
  - **Always use new sealing parts.**



ECS007J7

### Governor Valve

1. Remove propeller shaft from vehicle. Refer to [PR-8, "Removal and Installation"](#).
2. Support A/T assembly with a jack.
3. Remove rear engine mounting member from A/T assembly.
4. Remove rear extension from transmission case.
5. Remove governor valve assembly.
6. Inspect and repair governor valve assembly. Refer to [AT-101, "Inspection"](#).

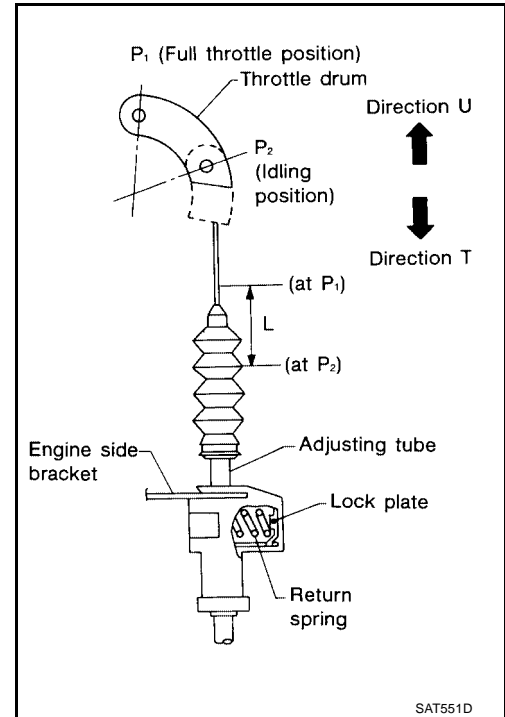


## Throttle Wire Adjustment

1. Turn ignition switch OFF.
2. While pressing lock plate, move adjusting tube in Direction T.
3. Release lock plate. (Adjusting tube is locked at this time.)
4. Move throttle drum from P<sub>2</sub> (Idling position) to P<sub>1</sub> (Full throttle position) quickly and release.
5. Ensure that throttle wire stroke "L" is within the specified range, between full throttle and idle.

**Throttle wire stroke "L" : 39 - 43 mm (1.54 - 1.69 in)**

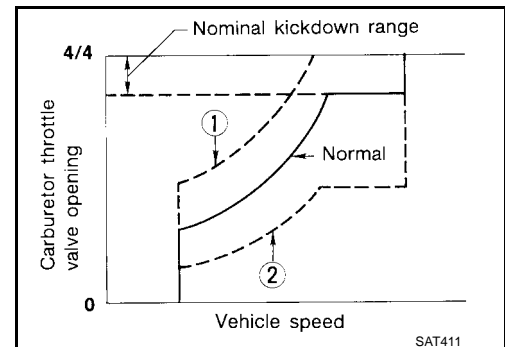
- **Adjust throttle wire stroke after accelerator wire is installed and adjusted.**
- **When connecting throttle wire to throttle drum, do not use tools. Manually hook wire.**



- **Put mark on throttle wire for measuring wire stroke.**

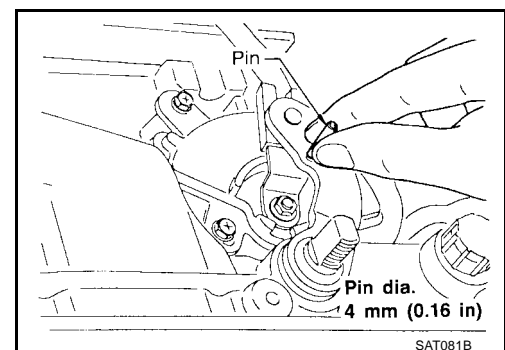
If throttle wire stroke is improperly adjusted, the following problems may arise.

- When the throttle drum fully-open position P<sub>1</sub> is too far toward Direction T, the shift schedule will be as shown by **2** in the figure, and the kickdown range will greatly increase.
- When the throttle drum fully-open position P<sub>1</sub> is too far toward Direction U, the shift schedule will be as shown by **1** in the figure, and kickdown will not occur.



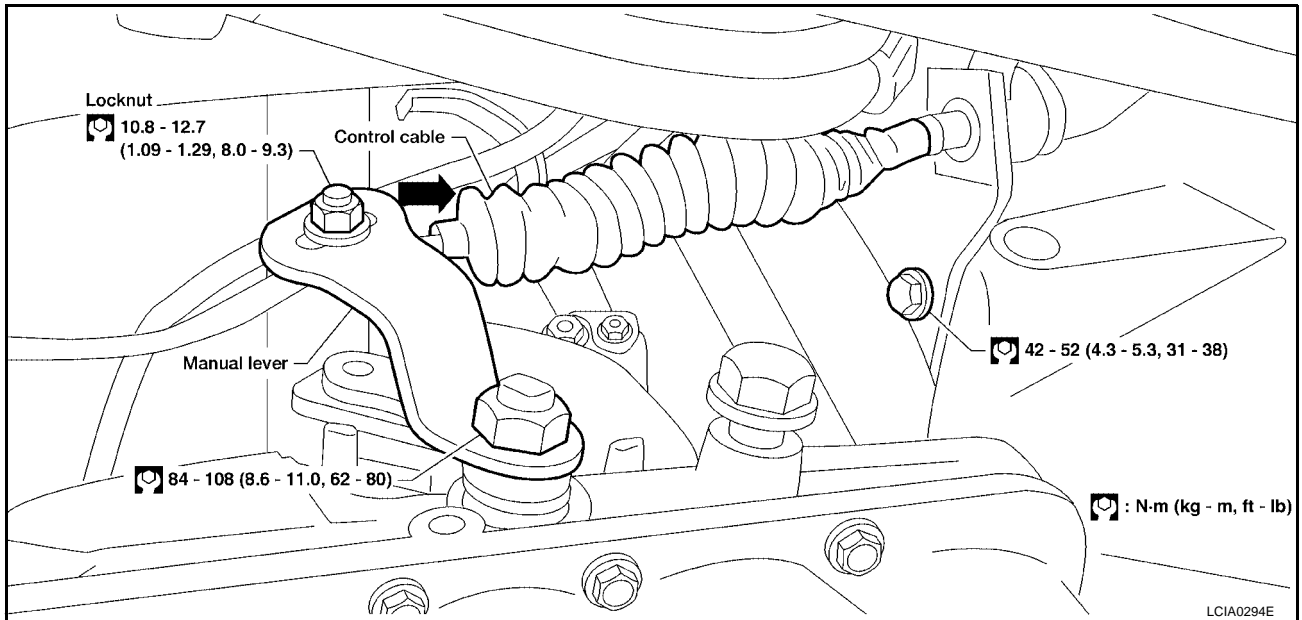
## Park/Neutral Position (PNP) Switch Adjustment

1. Remove control linkage and manual lever from manual shaft.
2. Set manual shaft in N position.
3. Loosen PNP switch fixing bolts.
4. Insert pin into adjustment holes in both PNP switch and manual as near vertical as possible.
5. Tighten PNP switch fixing bolts.
6. Remove pin.
7. Reinstall any part removed.
8. Adjust control linkage. Refer to [AT-61, "Control Cable Adjustment"](#).
9. Check continuity of PNP switch. Refer to [AT-46, "PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#).



## Control Cable Adjustment

ECS007JA



Move the selector lever from the P position to 1 position. You should be able to feel the detents in each position.

If the detents cannot be felt, the linkage needs adjustment.

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

**Specified force : 19.6 N (2.0 kg, 4.4 lb)**

4. Return control cable in the opposite direction of the arrow for 1.0 mm (0.039 in).
  5. Tighten control cable lock nut.
  6. Move selector lever from P to 1 position again. Make sure that selector lever moves smoothly.
  7. Apply grease to contacting areas of selector lever and control cable. Install any part removed.
- **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.**

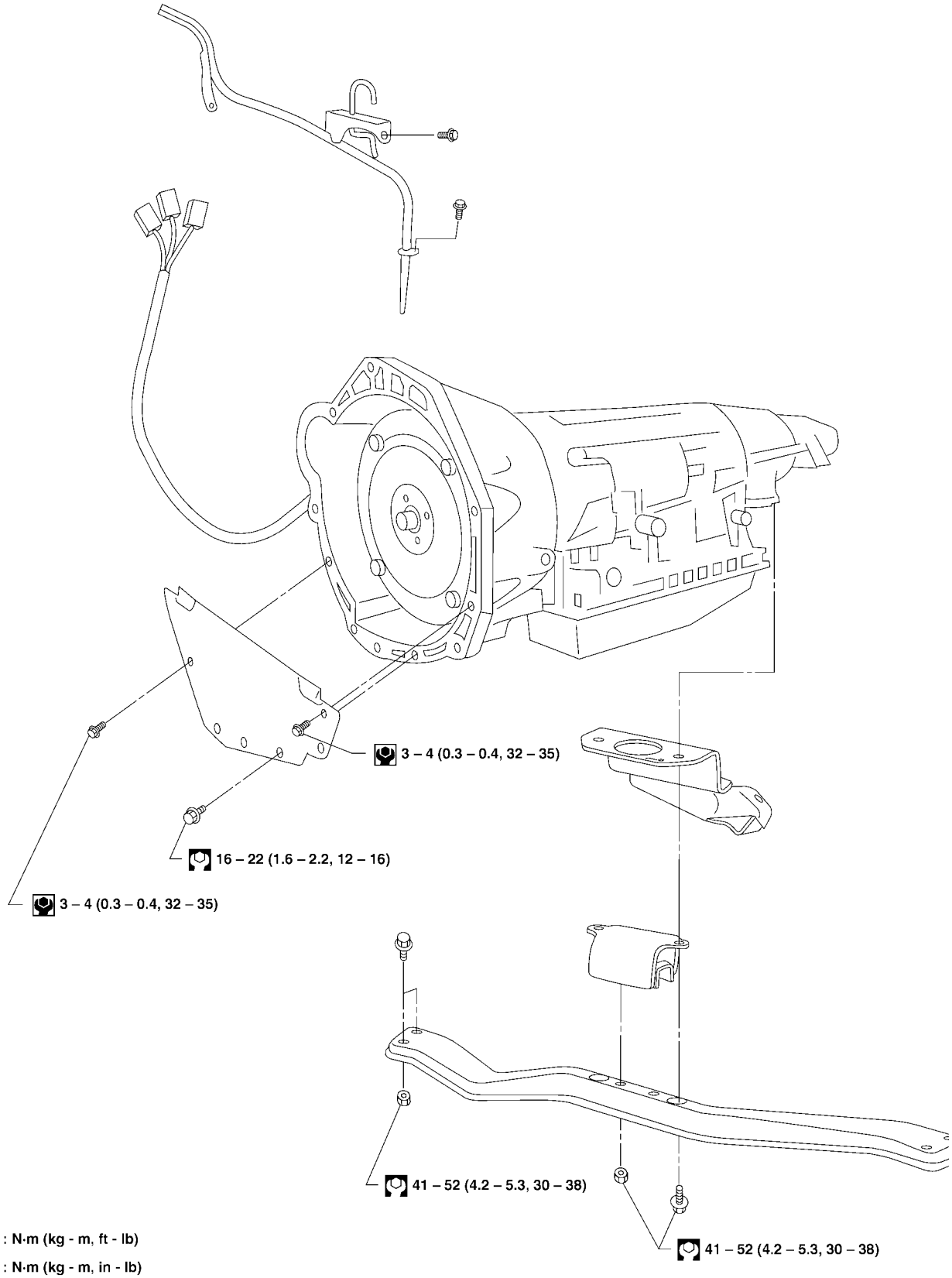
### REMOVAL AND INSTALLATION

PF0:00000

#### Removal

ECS007JB

SEC. 112 • 200 • 310



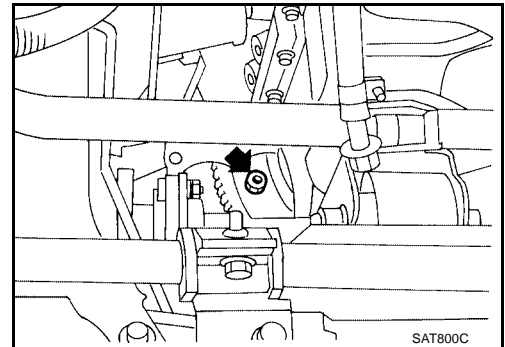
**CAUTION:**

Before separating the A/T assembly from engine, first remove the crankshaft position sensor (OBD) from the assembly. Be careful not to damage sensor edge.

**NOTE:**

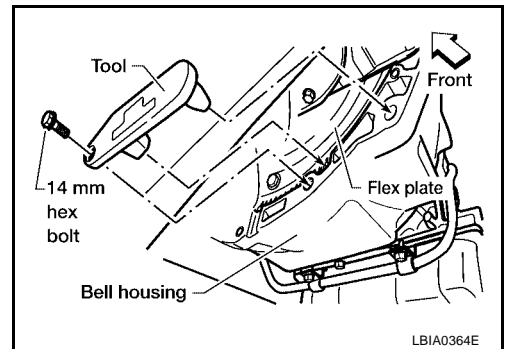
To prevent oil spills, drain the A/T fluid before removing A/T assembly, Refer to [MA-38, "Changing A/T Fluid"](#) or insert plug into rear oil seal after removing propeller shaft.

1. Disconnect battery negative terminal.
2. Remove fluid charging pipe from A/T assembly and plug opening.
3. Remove oil cooler pipe from A/T assembly and plug opening.
4. Remove A/T vent hose.
5. Remove propeller shaft.  
Refer to [PR-8, "Removal and Installation"](#) .
- **Be careful not to damage spline, sleeve yoke and rear oil seal.**
6. Remove A/T control cable from manual shaft.
7. Disconnect A/T harness connectors and vehicle speed sensor harness connector.
8. Disconnect throttle wire from A/T assembly.
9. Remove the starter motor. Refer to [SC-25, "Removal and Installation"](#) .
10. Remove the rear plate
11. Remove bolts securing torque converter to drive plate.  
● **Rotate crankshaft to gain access to securing bolts.**

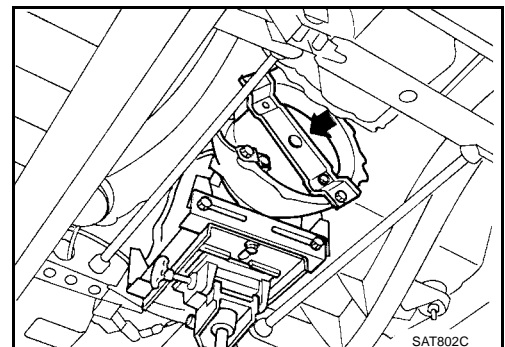


- If necessary, install tool to keep crankshaft from rotating

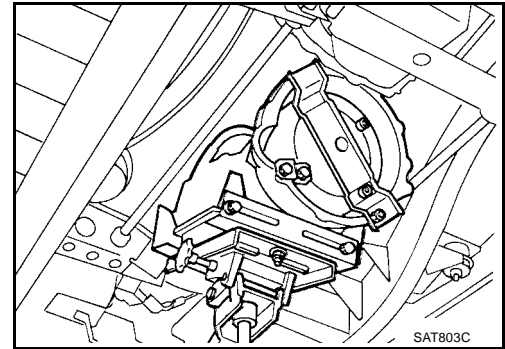
**Tool number** : — **J-45499**



12. Support A/T assembly with a jack.
13. Remove rear mounting bracket from body and A/T assembly. Refer to [EM-47, "REMOVAL"](#) .
14. Remove bolts securing A/T assembly to engine.
15. Pull A/T assembly backwards.  
● **Secure torque converter to prevent it from dropping.**  
● **Secure A/T assembly to a jack.**



16. Slant and lower A/T assembly.



ECS007JC

## Installation

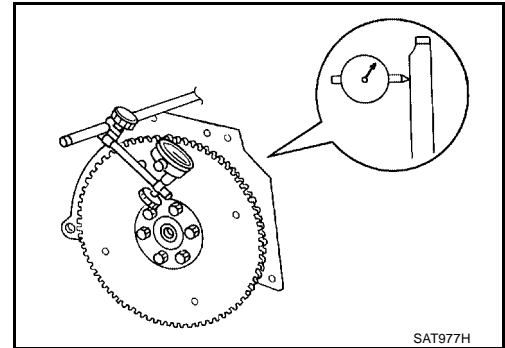
1. Check drive plate runout.

**CAUTION:**

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

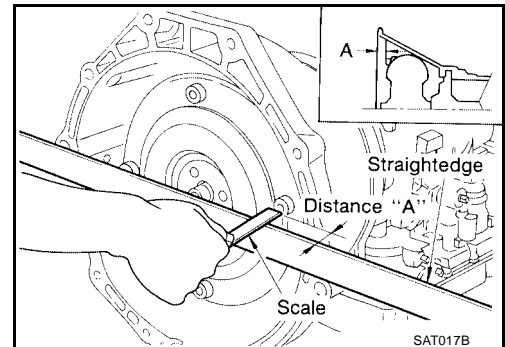
**Maximum allowable runout** : Refer to [EM-58, "FLY-WHEEL/DRIVE PLATE RUNOUT"](#).

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



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

**Distance "A"** : 26.0 mm (1.024 in) or more

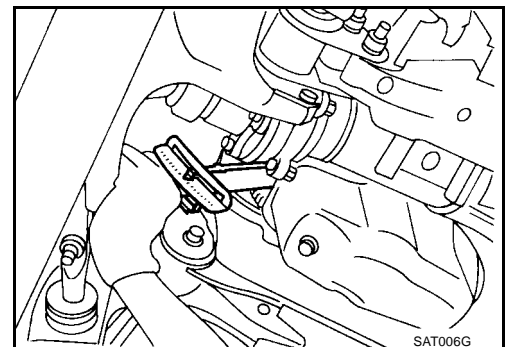


3. Install converter to drive plate.

- Rotate crankshaft to gain access to securing bolts.
- If necessary, install tool to keep crankshaft from rotating.

**Tool number** : — J-45499

- With converter installed, rotate crankshaft several turns to check that transmission rotates freely without binding.





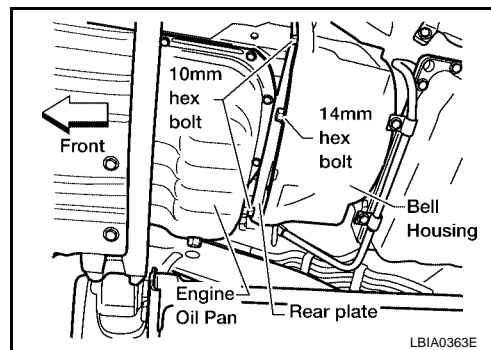
# REMOVAL AND INSTALLATION

[RL4R01A]

4. Install the rear plate.

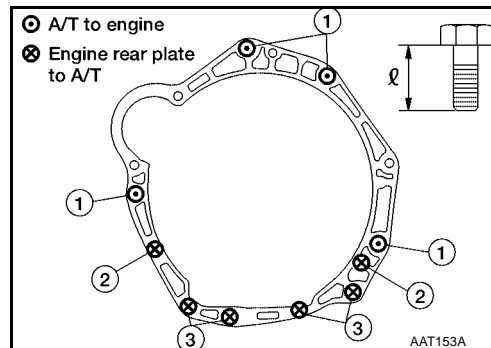
**Rear plate bolts**

- 10 mm**                      **3-4 Nm (0.3-0.4 kg-m, 32-35 in-lb)**
- 14 mm**                      **16-22 Nm (1.6 2.2kg-m, 12-16 ft-lb)**



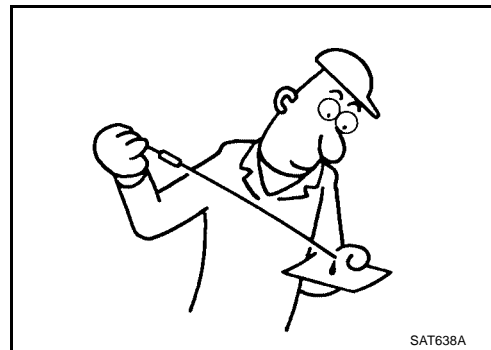
5. Tighten bolts securing transmission.

Bolt No.	Tightening torque N-m (kg-m, ft-lb)	Bolt length "ℓ" mm (in)
1	39 - 49 (4.0 - 5.0, 29 - 36)	43 (1.69)
2	3 - 4 (0.3 - 0.4, 2.2 - 2.9)	16 (0.63)
3	16 - 22 (1.6 - 2.2, 12 - 16)	16 (0.63)



6. Installation of the remaining components is in the reverse order of removal.

7. Adjust control cable. Refer to [AT-61, "Control Cable Adjustment"](#) .
8. Adjust throttle wire. Refer to [AT-60, "Throttle Wire Adjustment"](#) .
9. Adjust PNP switch. Refer to [AT-60, "Park/Neutral Position \(PNP\) Switch Adjustment"](#) .
10. Refill transmission with ATF and check fluid level.
11. Move selector lever through all positions to be sure that transmission operates correctly.  
With parking brake applied, allow engine to idle. Move selector lever through N to D, to 2, to 1 and to R. A slight shock should be felt through hand gripping the selector each time the transmission is shifted.
12. Perform road test. Refer to [AT-31, "Road Test"](#) .



## OVERHAUL Components

### SEC. 311•313•315

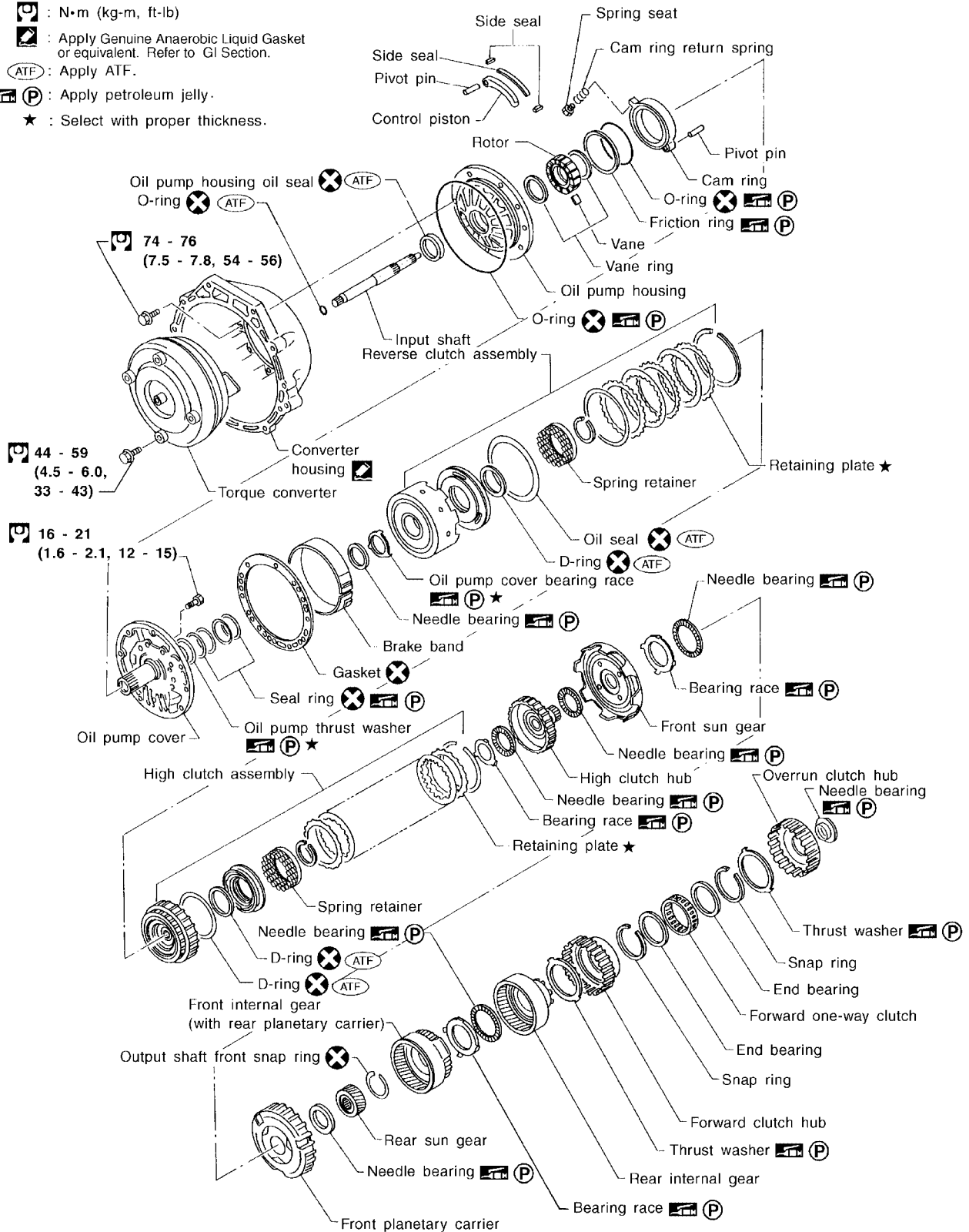
: N·m (kg-m, ft-lb)

: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI Section.

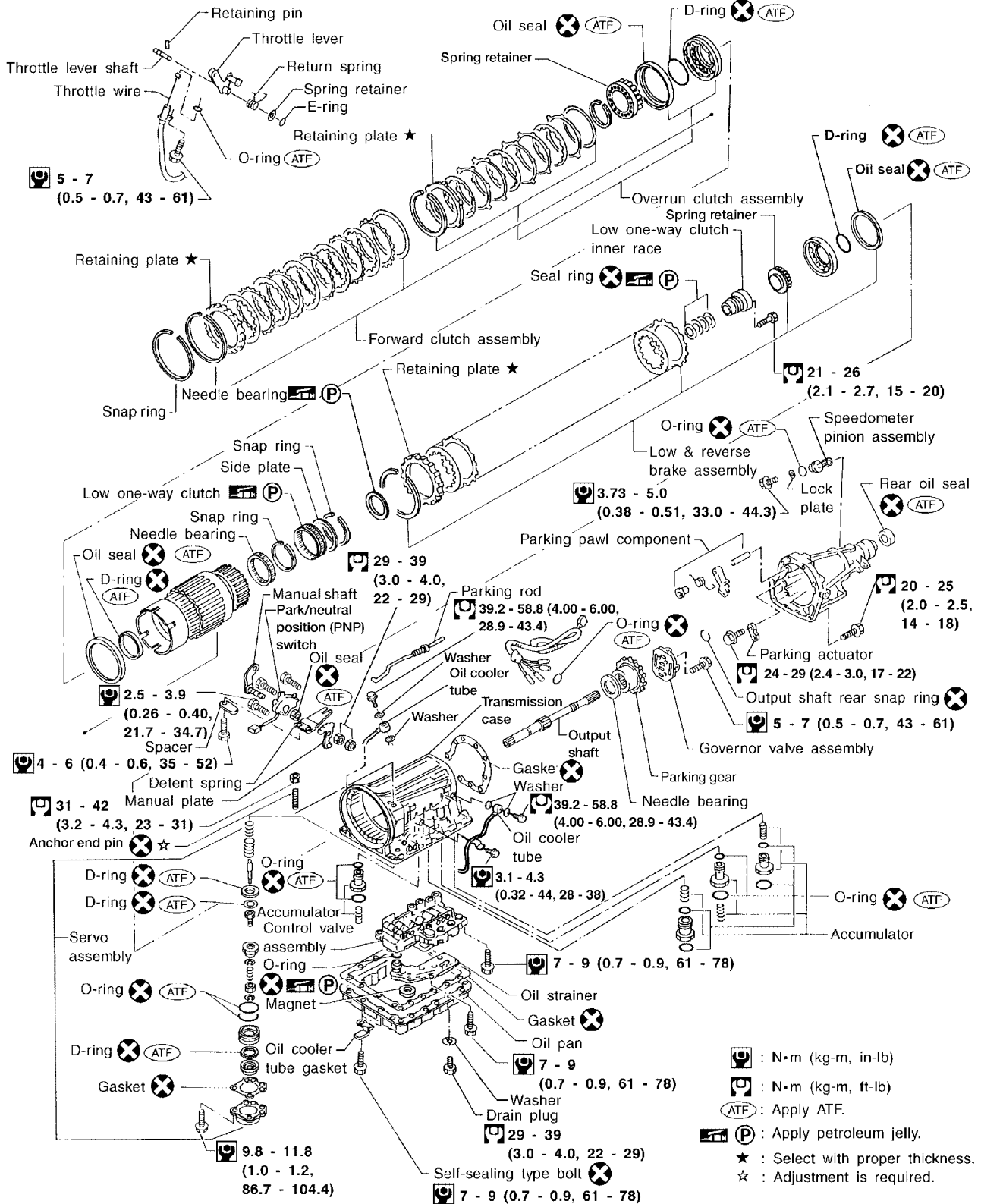
: Apply ATF.

(P) : Apply petroleum jelly.

★ : Select with proper thickness.

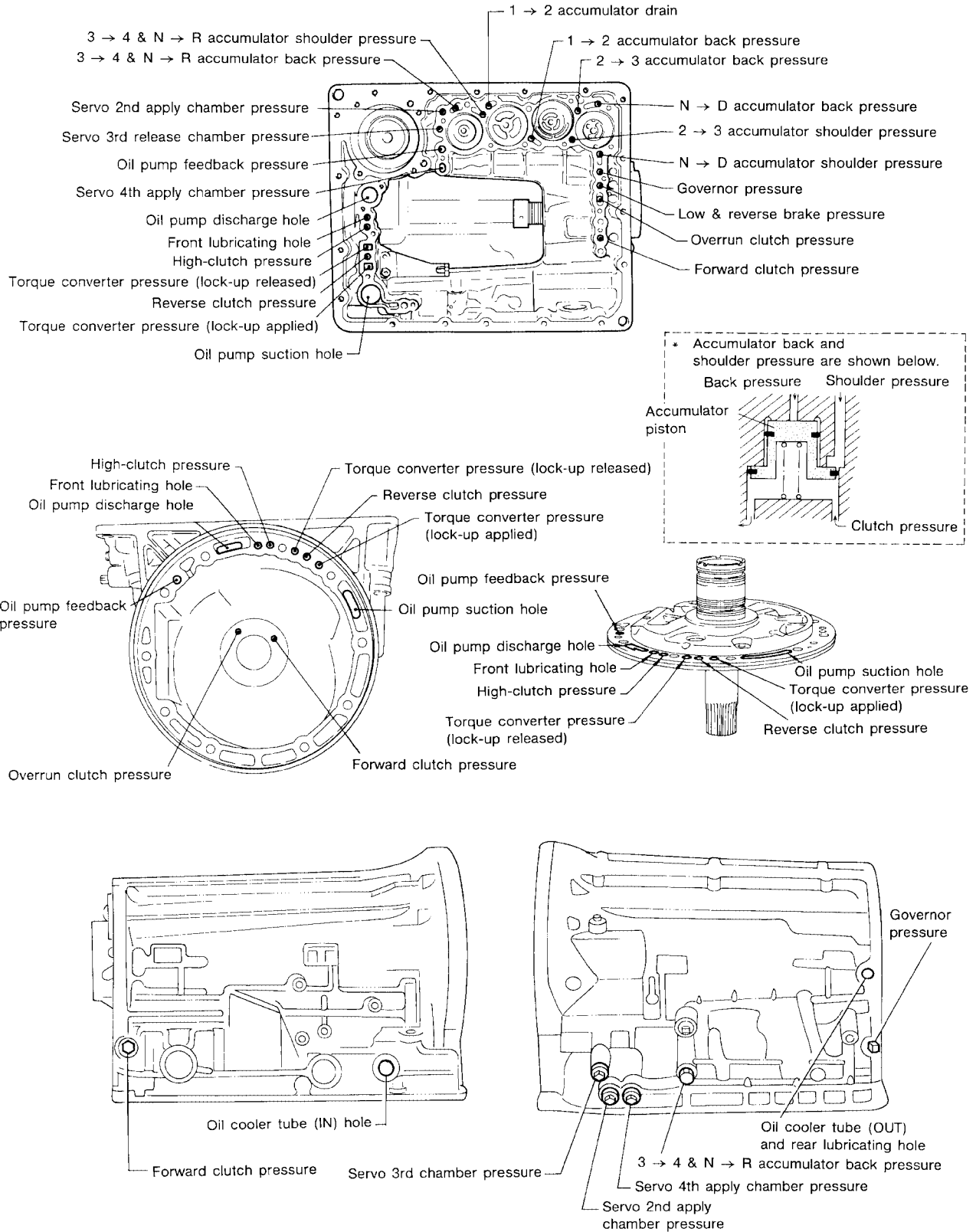


### SEC. 311•315•317



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## Oil Channel



### Locations of Needle Bearings, Thrust Washers and Snap Rings

Outer diameter of snap rings

Item number	Outer diameter mm (in)
②	161.0 (6.34)
③	140.1 (5.52)
④	156.4 (6.16)
⑥	142.0 (5.59)
⑦	159.2 (6.27)

Thrust washers

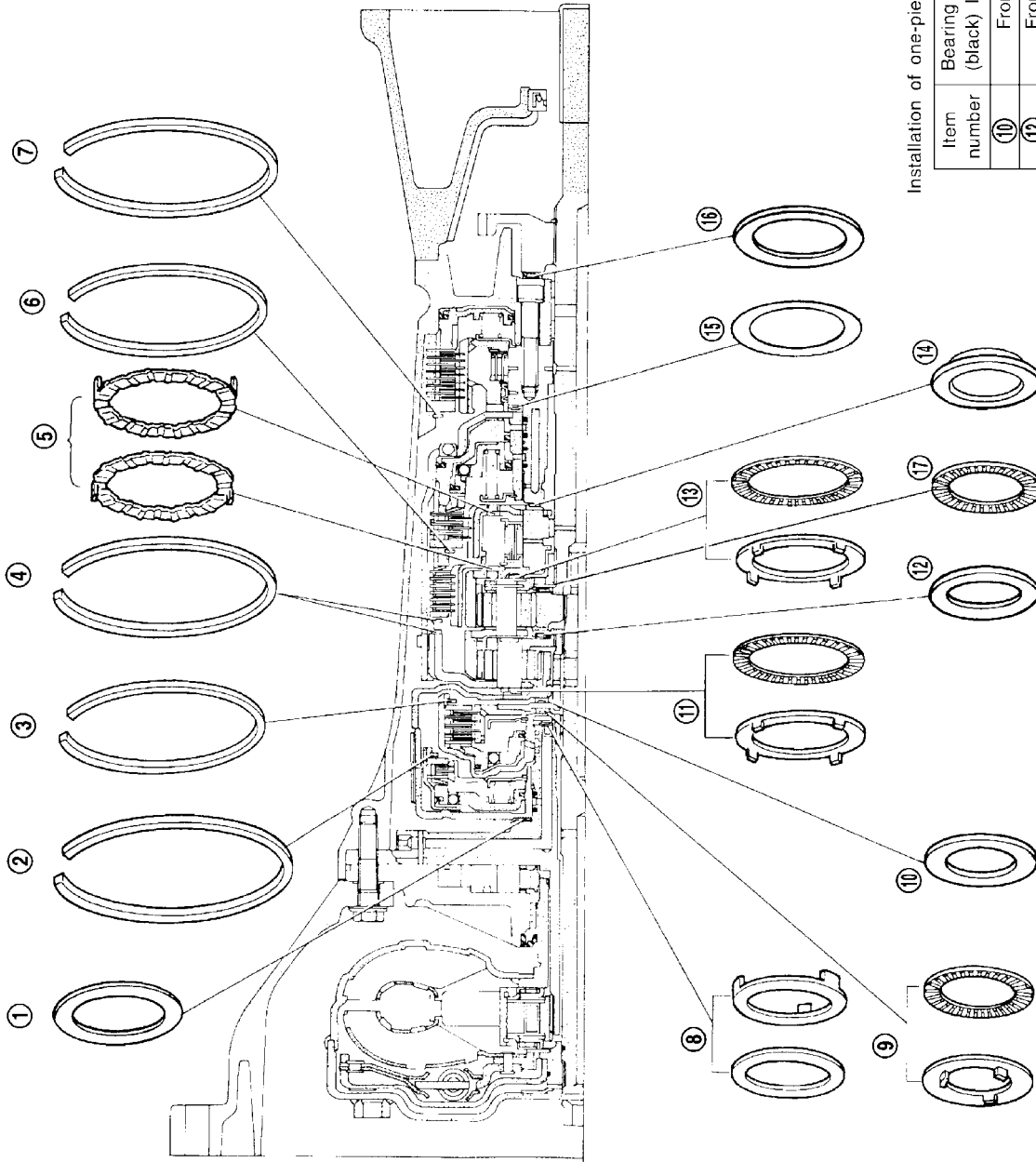
Item number	Color
①	Black
⑤	White

Outer diameter of needle bearings

Item number	Outer diameter mm (in)
⑧	47 (1.85)
⑨	53 (2.09)
⑪	78 (3.07)
⑫	53 (2.09)
⑬	78 (3.07)
⑭	57 (2.24)
⑮	78.1 (3.075)
⑯	64 (2.52)
⑰	53 (2.09)

Inner diameter of bearing races

Item number	Outer diameter mm (in)
⑪	58 (2.315)
⑬	58 (2.315)



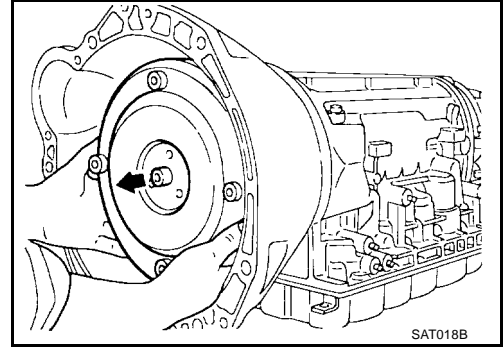
Installation of one-piece bearings

Item number	Bearing race (black) location
⑩	Front
⑫	Front
⑮	Rear side
⑯	Rear side

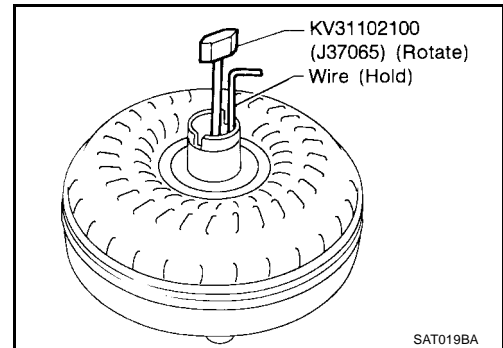
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### Disassembly

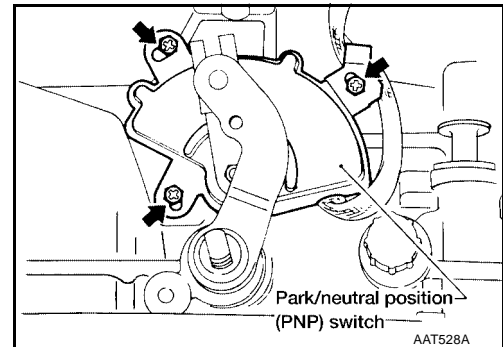
1. Removing torque converter by holding it firmly and turning while pulling straight out.



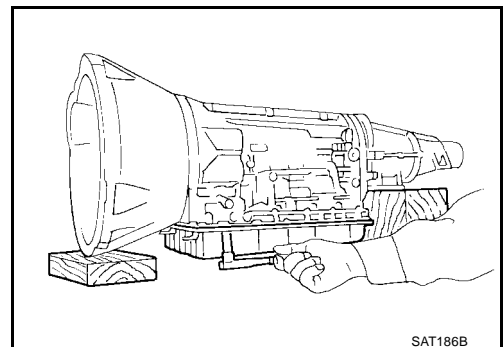
2. Check torque converter one-way clutch.
  - a. Insert Tool into spline of one-way clutch inner race.
  - b. Hook bearing support unitized with one-way clutch outer race with suitable wire.
  - c. Check that one-way clutch inner race rotates only clockwise with Tool while holding bearing support with wire.



3. Remove PNP switch from transmission case.



4. Separate the oil pan and transmission case.
  - a. Drain ATF from drain plug.
  - b. Raise oil pan by placing wooden blocks under converter housing and adapter case.
  - c. Remove oil pan and gasket.
    - Always place oil pan straight down so that foreign particles inside will not move.
    - Always replace oil pan bolts as they are self-sealing bolts.

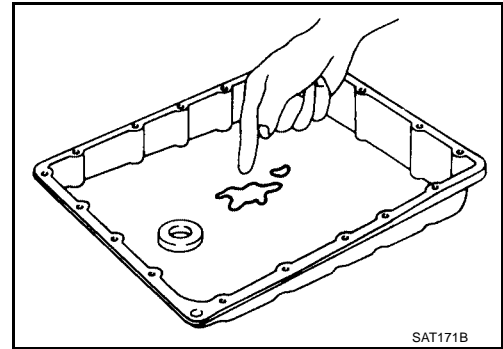


# OVERHAUL

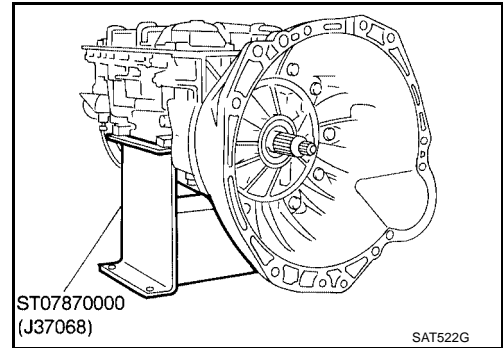
[RL4R01A]

5. Check foreign materials in oil pan to help determine cause of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish buildup. Varnish can cause valves, servo, and clutches to stick and may inhibit pump pressure.

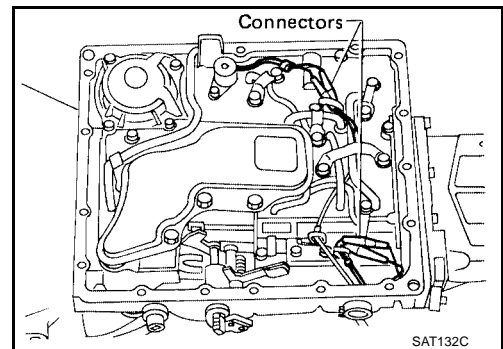
- If frictional material is detected, replace radiator after repair of A/T. Refer to [CO-14, "RADIATOR"](#).



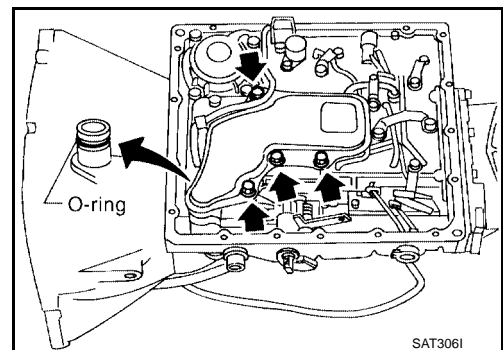
6. Place transmission into Tool with the control valve facing up.



7. Remove torque converter clutch solenoid valve and overdrive cancel solenoid valve connectors.



8. Remove oil strainer.
  - a. Remove oil strainer from control valve assembly. Then remove O-ring from oil strainer.

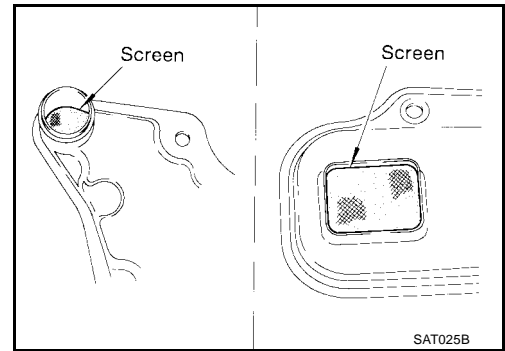


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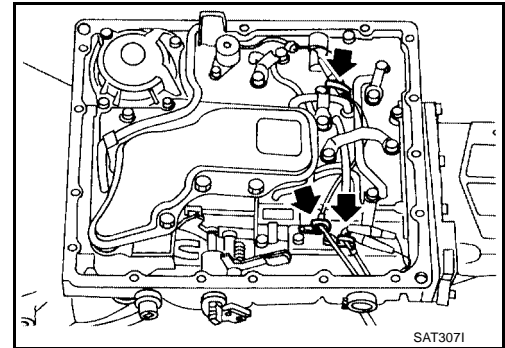
[RL4R01A]

b. Check oil strainer screen for damage.




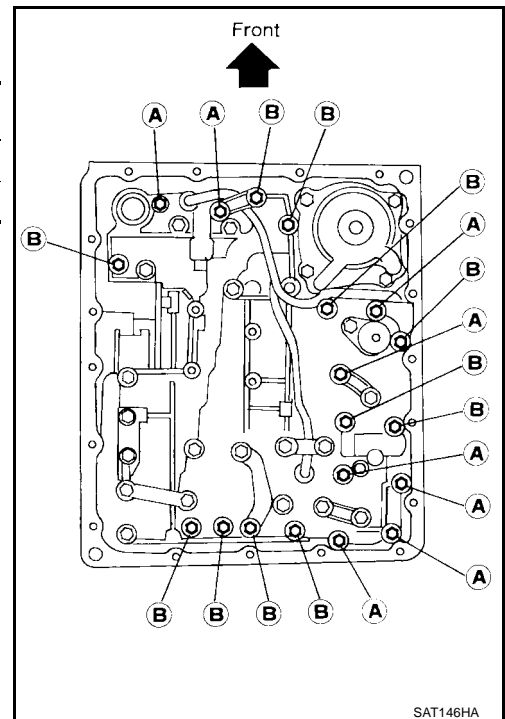
9. Remove control valve assembly.

a. Straighten terminal clips to free terminal cords, then remove terminal clips.

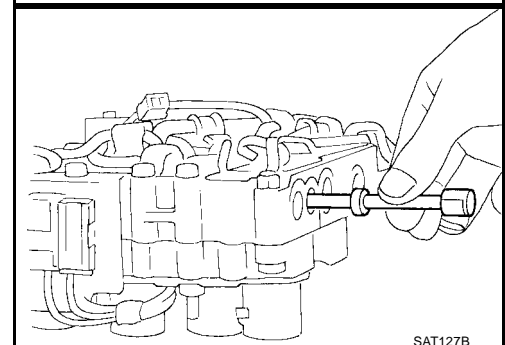


b. Remove bolts **A** and **B**, and remove control valve assembly from transmission.

Bolt	$l$ mm (in) 
<b>A</b>	33 (1.30)
<b>B</b>	45 (1.77)



c. Remove manual valve from control valve assembly.

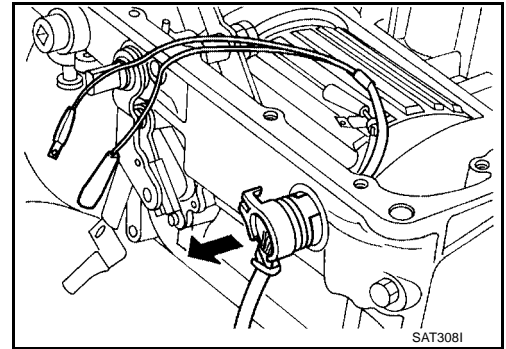




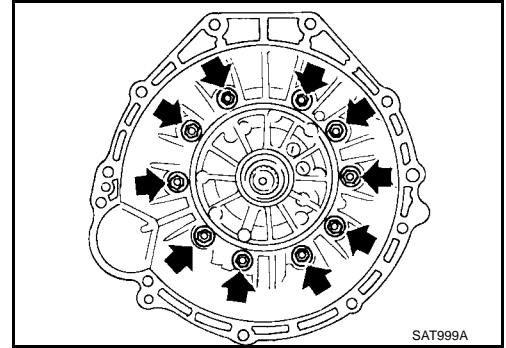
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[RL4R01A]

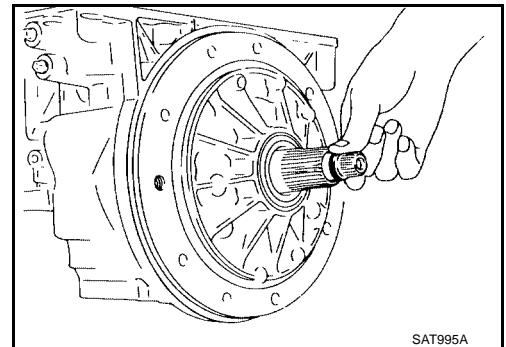
10. Remove terminal cord assembly from transmission case while pushing on stopper.
- Be careful not to damage cord.
  - Do not remove terminal cord assembly unless it is damaged.



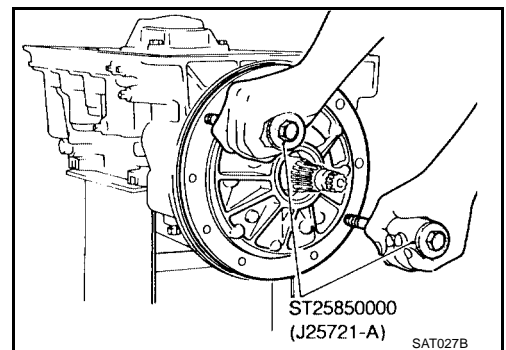
11. Remove converter housing.
- Remove converter housing bolts.
  - Remove traces of sealant.
- Be careful not to scratch converter housing.



12. Remove O-ring from input shaft.



13. Remove oil pump assembly.
- Attach Tool to oil pump assembly and extract it evenly from transmission case.

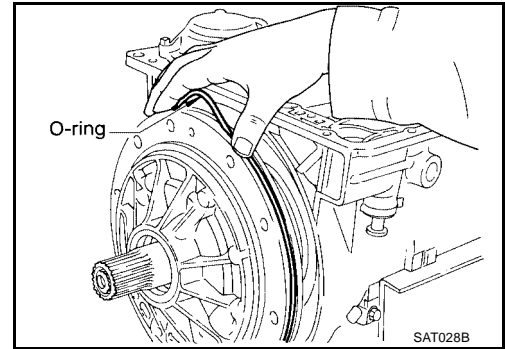


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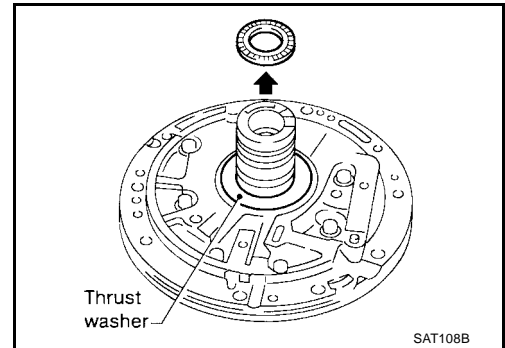
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[RL4R01A]

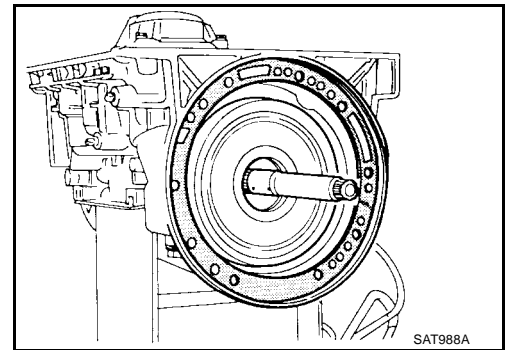
- b. Remove O-ring from oil pump assembly.
- c. Remove traces of sealant from oil pump housing.
  - **Be careful not to scratch pump housing.**



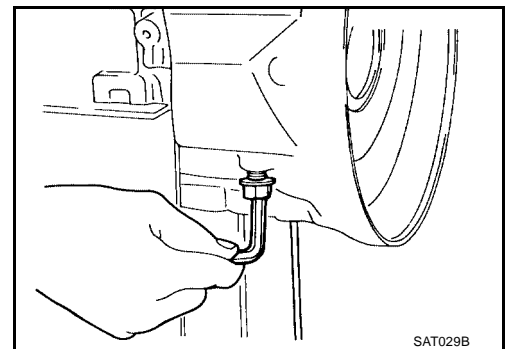
- d. Remove needle bearing and thrust washer from oil pump assembly.



- 14. Remove input shaft and oil pump gasket.



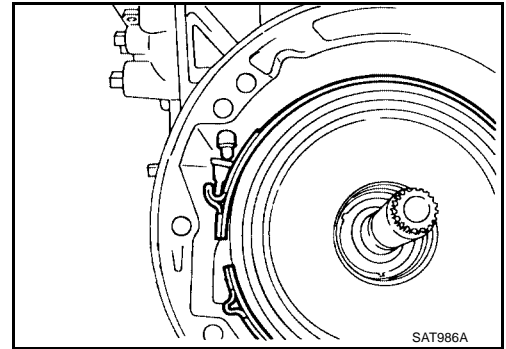
- 15. Remove brake band and band strut.
  - a. Loosen lock nut and remove band servo anchor end pin from transmission case.



# OVERHAUL

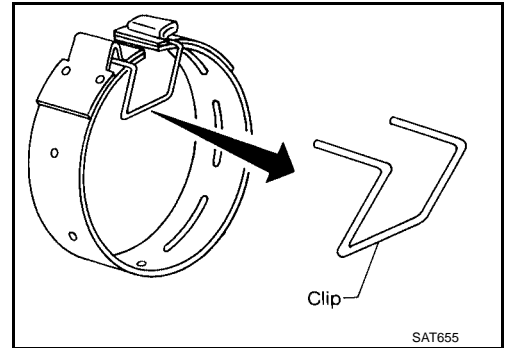
[RL4R01A]

- b. Remove brake band and band strut from transmission case.



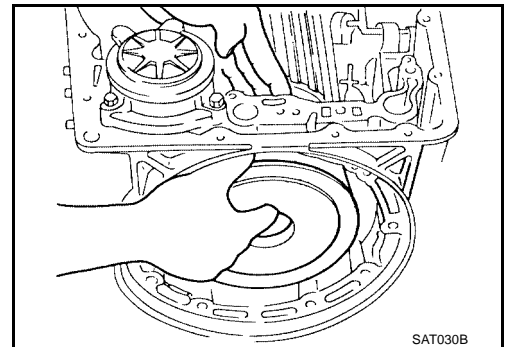
- To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing the brake band, always secure it with a clip as shown in the figure at left. Leave the clip in position after removing the brake band.

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

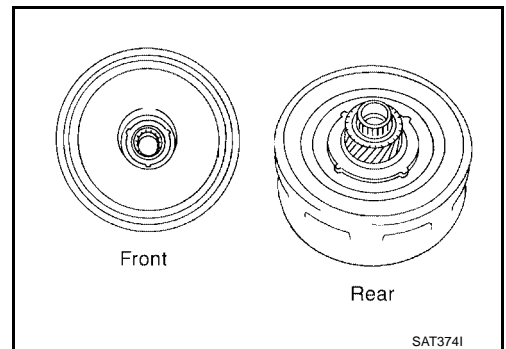


16. Remove front side clutch and gear components.

- a. Remove clutch pack (reverse clutch, high clutch and front sun gear) from transmission case.



- b. Remove front bearing race from clutch pack.  
c. Remove rear bearing race from clutch pack.

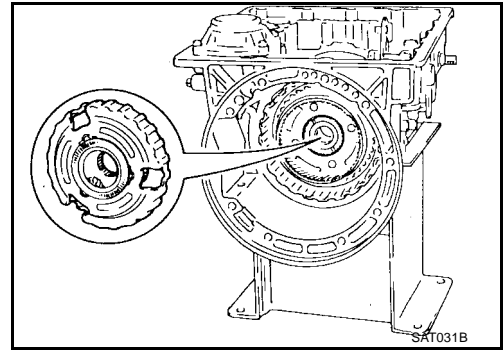


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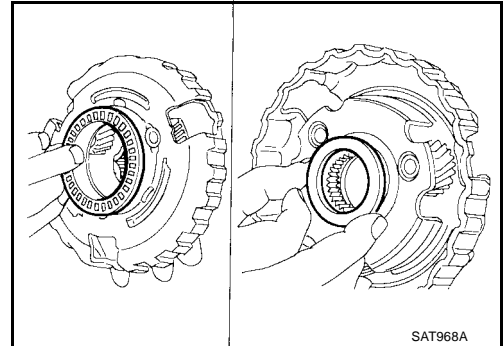
[RL4R01A]

d. Remove front planetary carrier from transmission case.

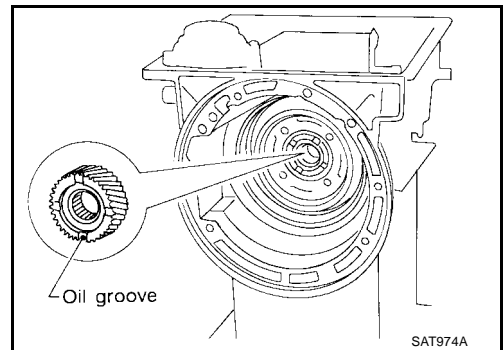


e. Remove front needle bearing from front planetary carrier.

f. Remove rear bearing from front planetary carrier.



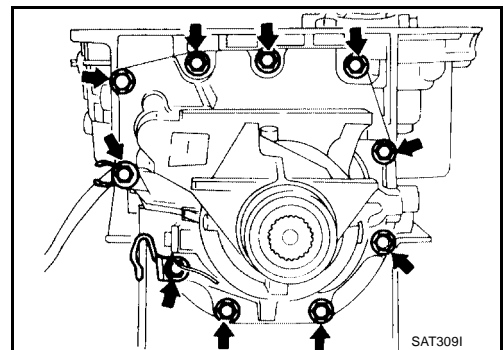
g. Remove rear sun gear from transmission case.



17. Remove rear extension case.

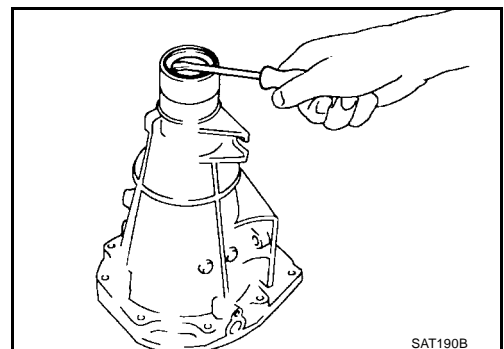
a. Remove rear extension case from transmission case.

b. Remove rear extension gasket from transmission case.



c. Remove oil seal from rear extension case.

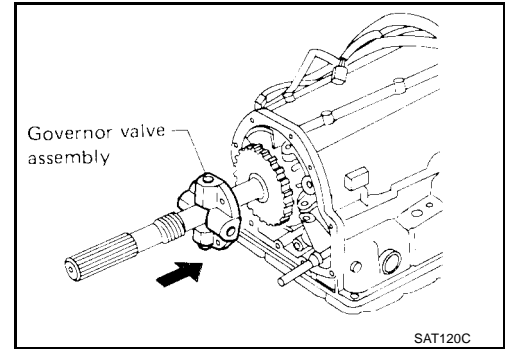
● Do not remove oil seal unless it is to be replaced.



# OVERHAUL

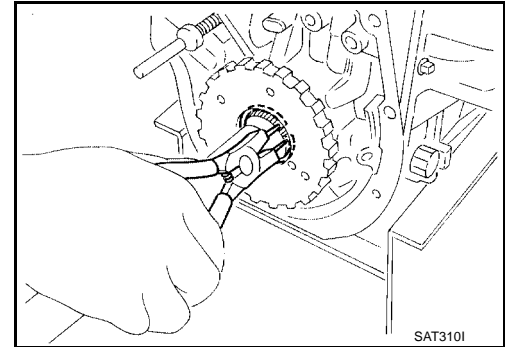
[RL4R01A]

18. Remove output shaft and parking gear.
  - a. Remove governor valve assembly.



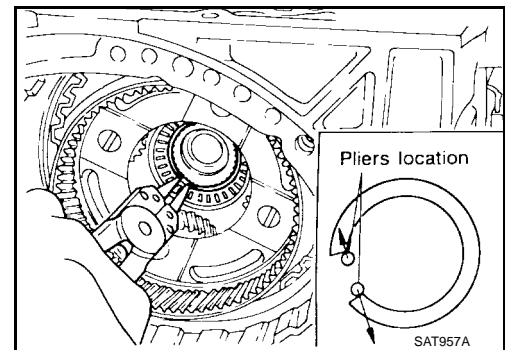
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- b. Remove rear snap ring from output shaft.



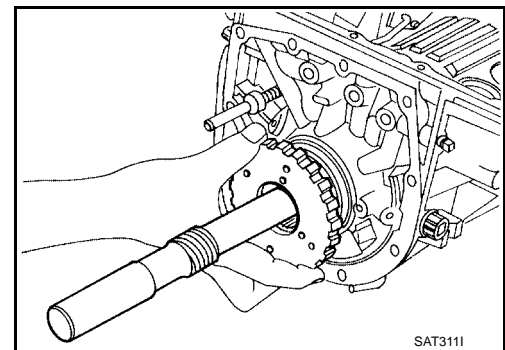
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- c. Slowly push output shaft all the way forward.
    - **Do not use excessive force.**
  - d. Remove snap ring from output shaft.



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- e. Remove output shaft and parking gear as a unit from transmission case.



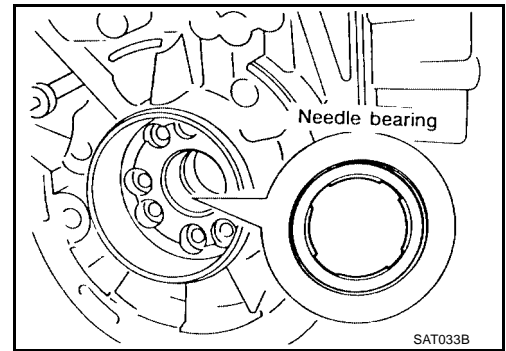
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- f. Remove parking gear from output shaft.

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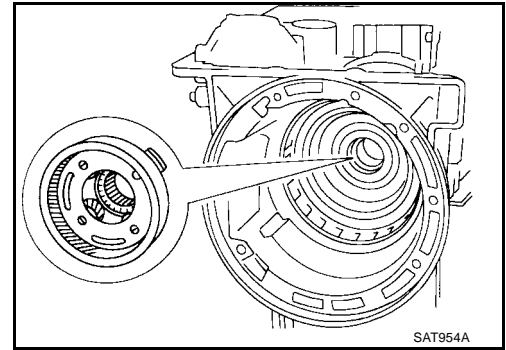
[RL4R01A]

- g. Remove needle bearing from transmission case.

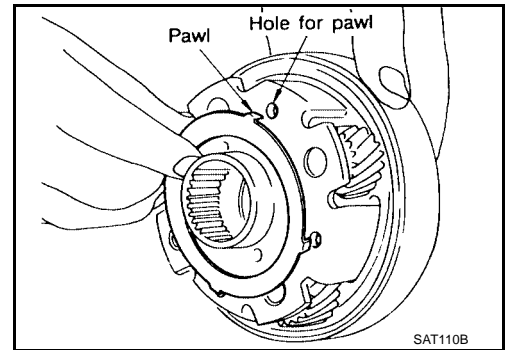


19. Remove rear side clutch and gear components.

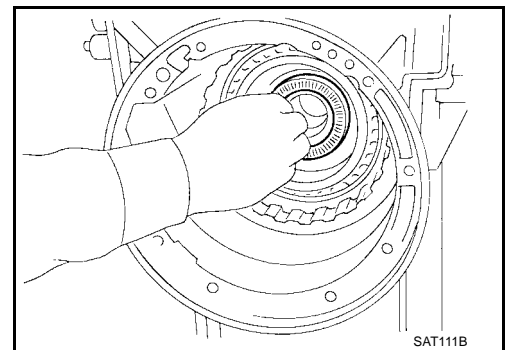
- a. Remove front internal gear.



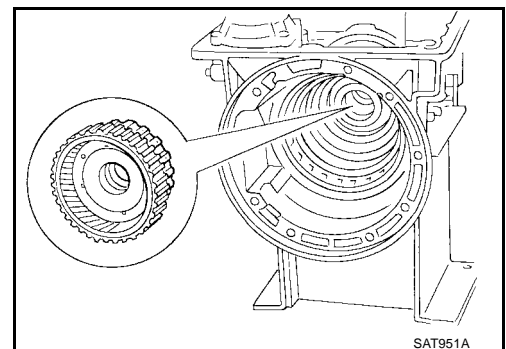
- b. Remove bearing race from front internal gear.



- c. Remove needle bearing from rear internal gear.



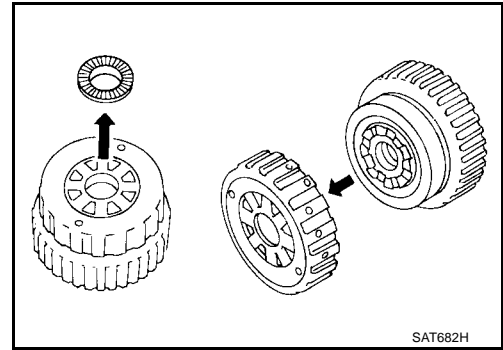
- d. Remove rear internal gear, forward clutch hub and overrun clutch hub as a set from transmission case.



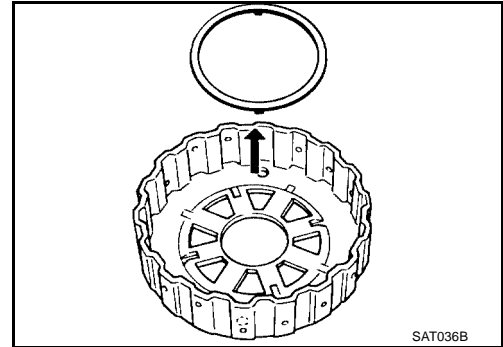
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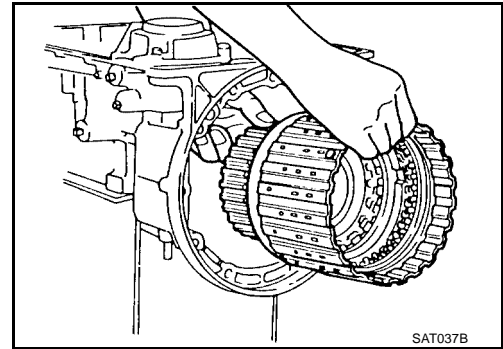
- e. Remove needle bearing from overrun clutch hub.
- f. Remove overrun clutch hub from rear internal gear and forward clutch hub.



- g. Remove thrust washer from overrun clutch hub.

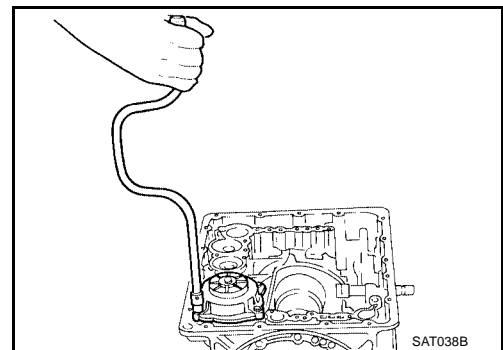


- h. Remove forward clutch assembly from transmission case.



- 20. Remove band servo and accumulator components.

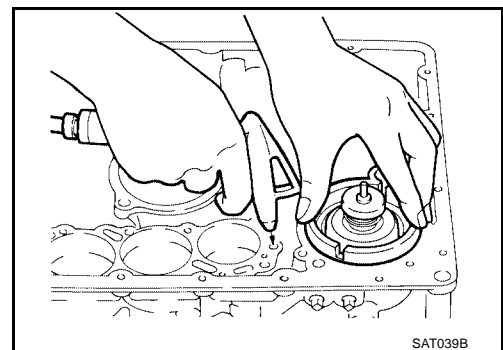
- a. Remove band servo retainer from transmission case.



- b. Apply compressed air to oil hole until band servo piston comes out of transmission case.

- **Hold piston with a rag and gradually direct air to oil hole.**

- c. Remove return springs.

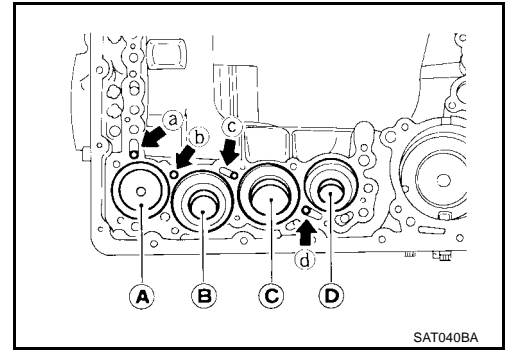


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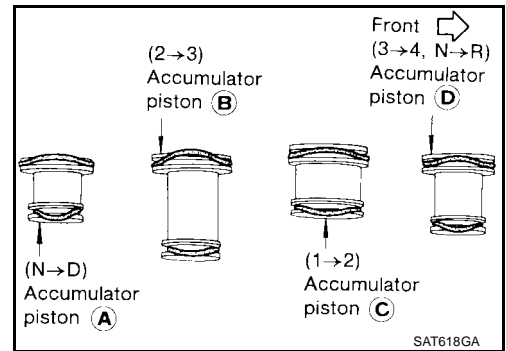
[RL4R01A]

- d. Remove springs from accumulator pistons **A** , **B** , **C** and **D** .
- e. Apply compressed air to each oil hole until piston comes out.
  - **Hold piston with a rag and gradually direct air to oil hole.**



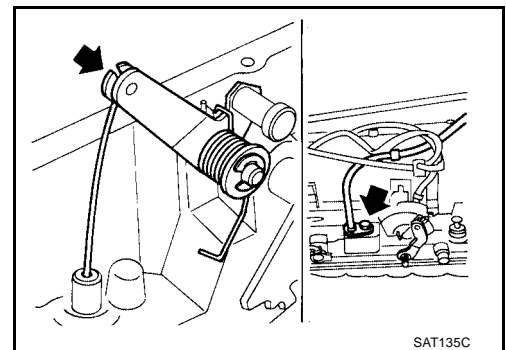
Identification of accumulator pistons	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Identification of oil holes	<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>

- f. Remove O-ring from each piston.

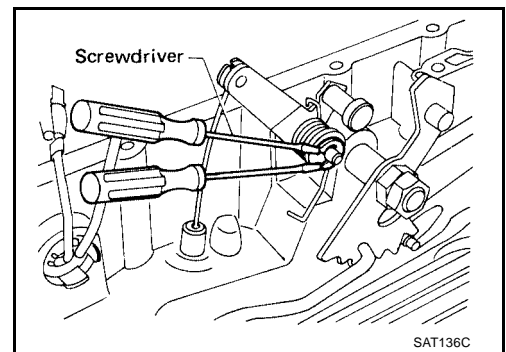


- 21. Remove throttle wire components if necessary.

- a. Remove throttle wire from A/T assembly.



- b. Remove throttle lever shaft E-ring.
- c. Remove return spring.
- d. Remove throttle lever.

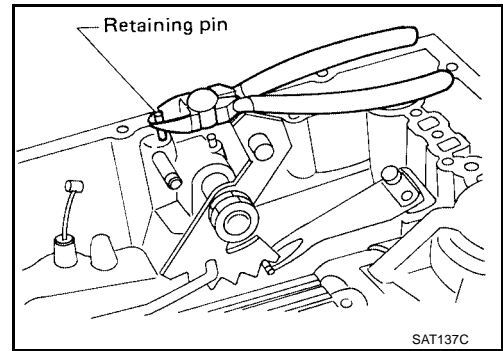




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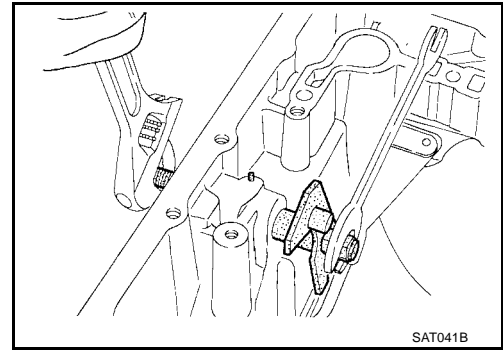
[RL4R01A]

- e. Remove throttle lever shaft retaining pin and throttle lever shaft.

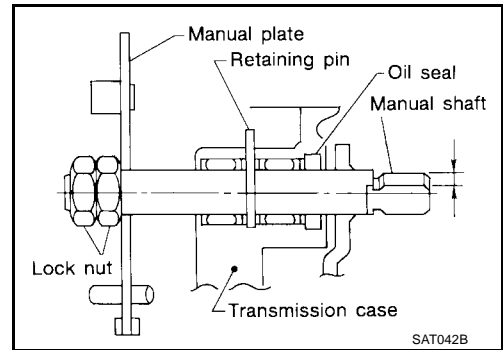


22. Remove manual shaft components, if necessary.

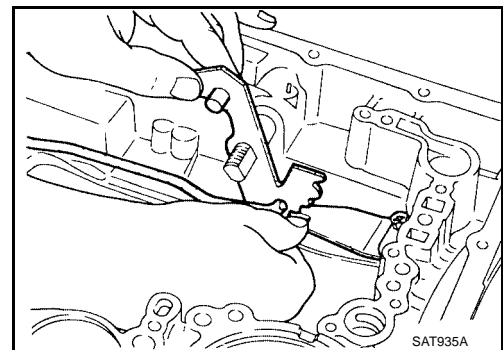
- a. Hold width across flats of manual shaft (outside the transmission case) and remove lock nut from shaft.



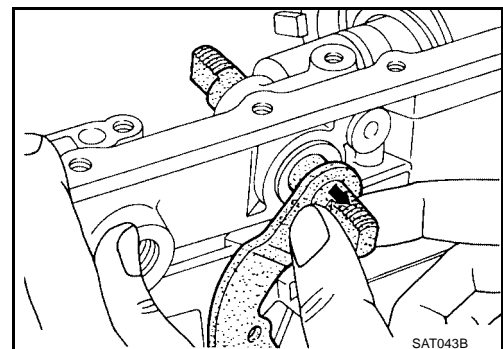
- b. Remove retaining pin from transmission case.



- c. While pushing detent spring down, remove manual plate and parking rod from transmission case.



- d. Remove manual shaft from transmission case.

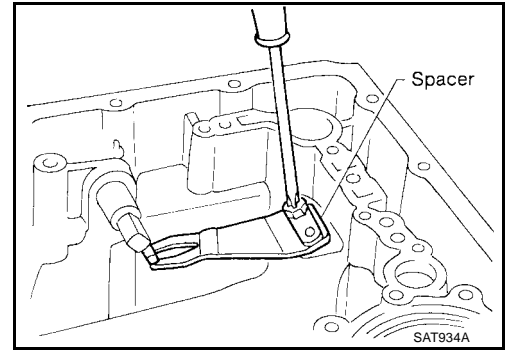


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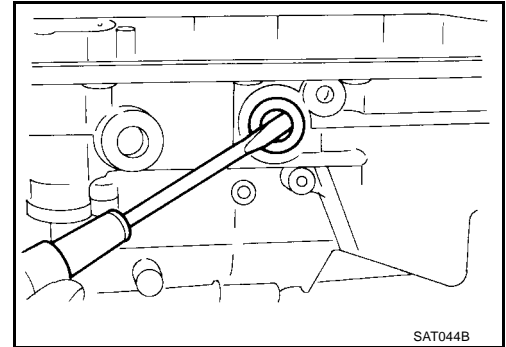
# OVERHAUL

[RL4R01A]

- e. Remove spacer and detent spring from transmission case.



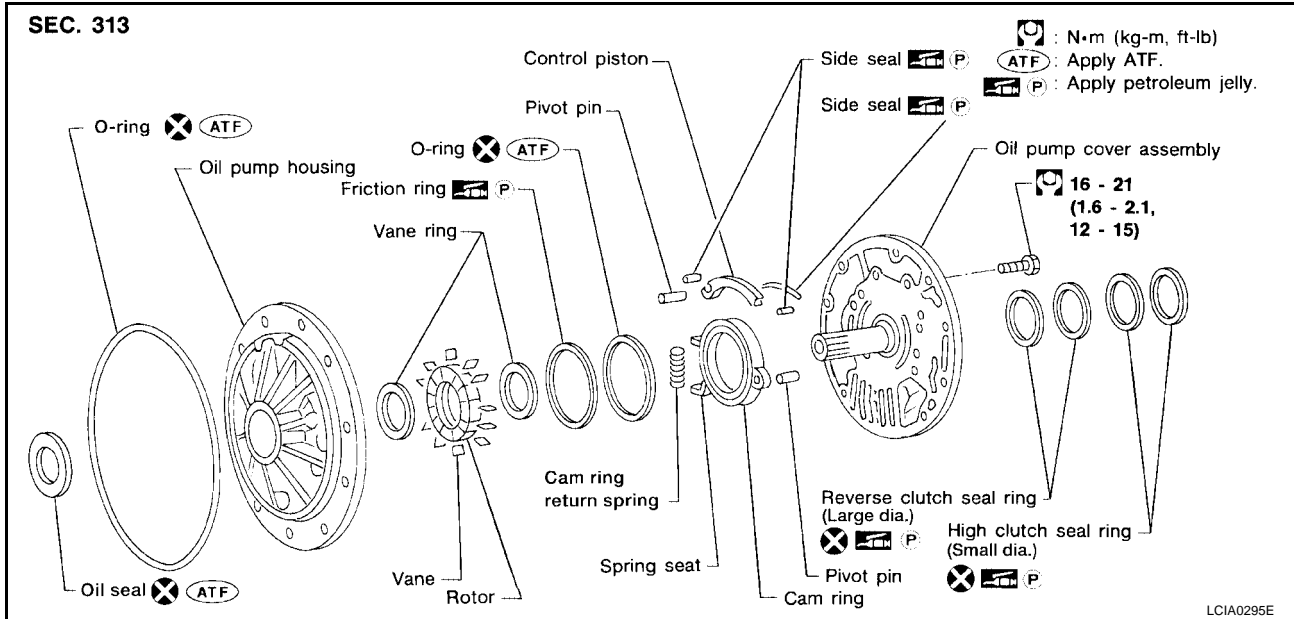
- f. Remove oil seal from transmission case.



## OIL PUMP Components

PFP:15010

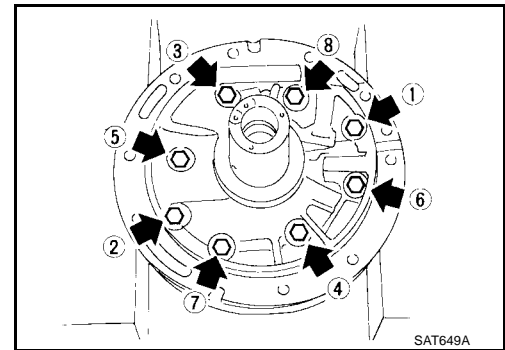
ECS007JH



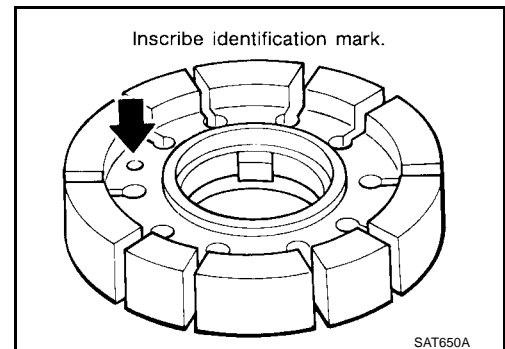
## Disassembly

ECS007JI

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



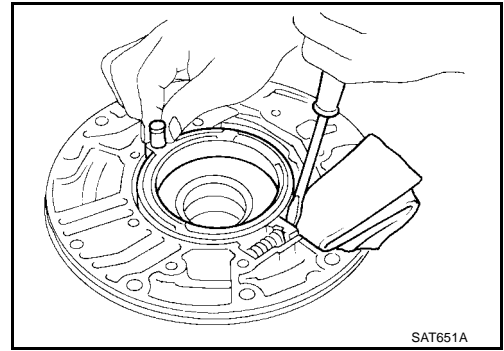
- Remove rotor, vane rings and vanes.
  - Inscribe a mark on back of rotor for identification of fore-aft direction when reassembling rotor. Then remove rotor.



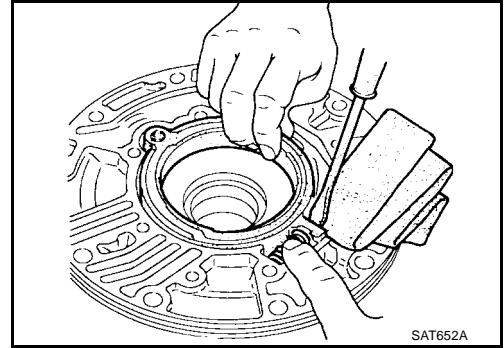
# OIL PUMP

[RL4R01A]

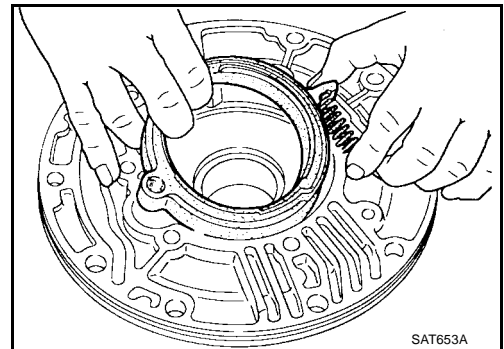
3. While pushing on cam ring, remove pivot pin.
  - Be careful not to scratch oil pump housing.



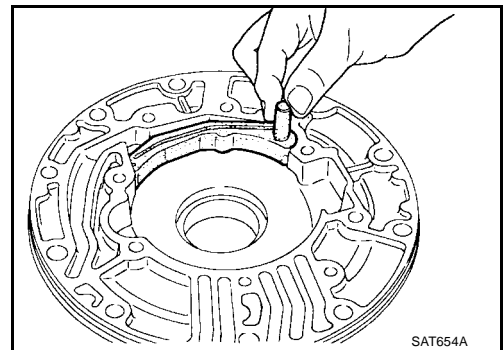
4. While holding cam ring and cam ring return spring, lift out cam ring return spring.
  - Be careful not to damage oil pump housing.
  - Hold cam ring return spring to prevent it from jumping.



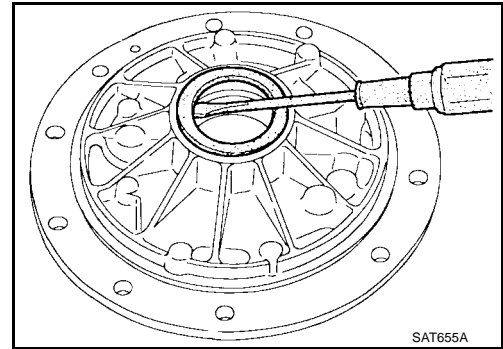
5. Remove cam ring and cam ring return spring from oil pump housing.



6. Remove pivot pin from control piston and remove control piston assembly.



7. Remove oil seal from oil pump housing.
  - Be careful not to scratch oil pump housing.

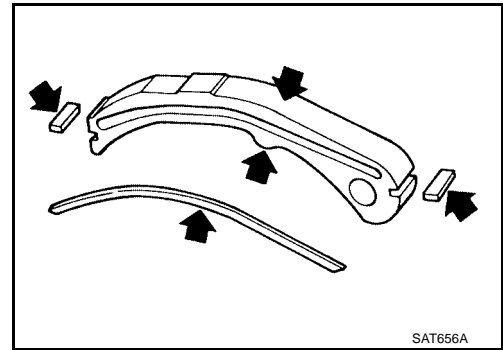


## Inspection

### OIL PUMP COVER, ROTOR, VANES, CONTROL PISTON, SIDE SEALS, CAM RING AND FRICTION RING

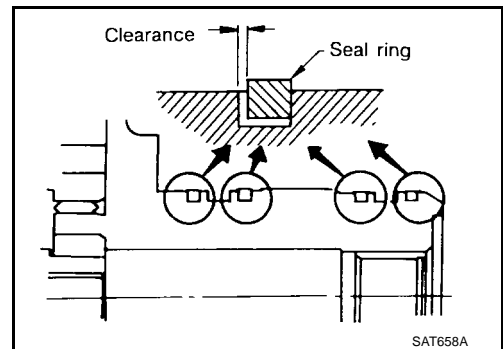
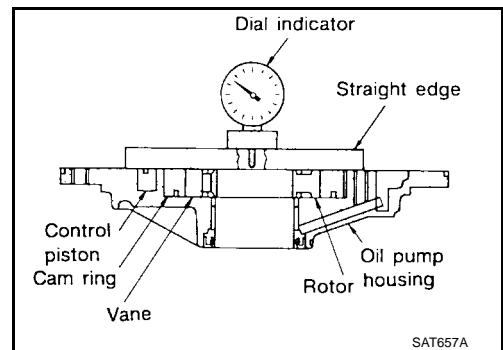
ECS007JJ

- Check for wear and damage.



## SIDE CLEARANCES

- Measure side clearances between end of oil pump housing and cam ring, rotor, vanes and control piston in at least four places along their circumferences. Maximum measured values should be within specified ranges.



- Before measuring side clearance, check that friction rings, O-ring, control piston side seals and cam ring return spring are removed.

**Standard clearance (Cam ring, rotor, vanes and control piston)**

**: Refer to [AT-154, "Oil Pump and Low One-way Clutch"](#) .**

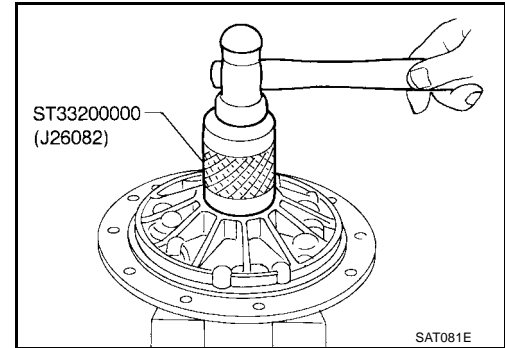
- If not within standard clearance, replace oil pump assembly except oil pump cover assembly.

## SEAL RING CLEARANCE

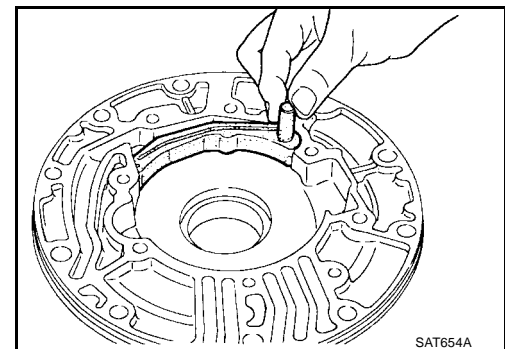
- Measure clearance between seal ring and ring groove.
  - Standard clearance** : 0.10 - 0.25 mm (0.0039 - 0.0098 in)
  - Wear limit** : 0.25 mm (0.0098 in)
- If not within wear limit, replace oil pump cover assembly.

## Assembly

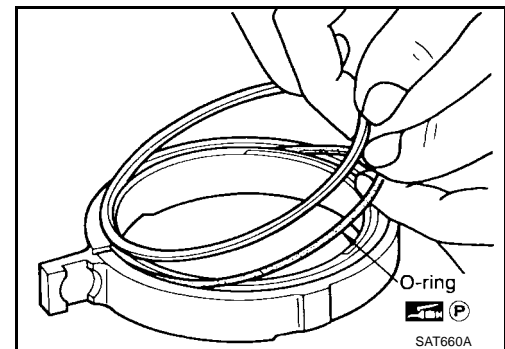
1. Drive oil seal into oil pump housing.
  - Apply ATF to outer periphery and lip surface.



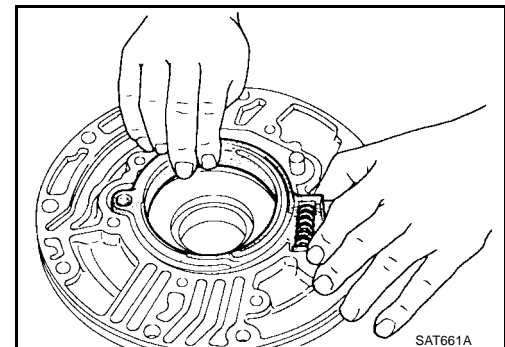
2. Install cam ring in oil pump housing as follows:
  - a. Install side seal on control piston.
    - Pay attention to its direction — black surface faces toward control piston.
    - Apply petroleum jelly to side seal.
  - b. Install control piston on oil pump.



- c. Install O-ring and friction ring on cam ring.
  - Apply petroleum jelly to O-ring.



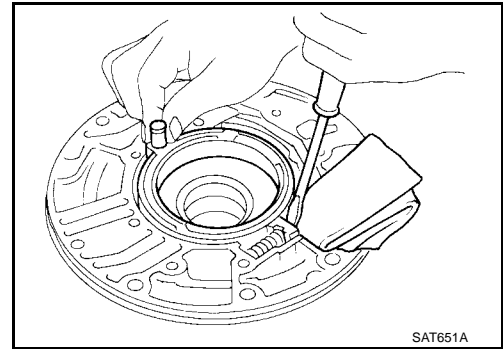
- d. Assemble cam ring, cam ring return spring and spring seat. Install spring by pushing it against pump housing.



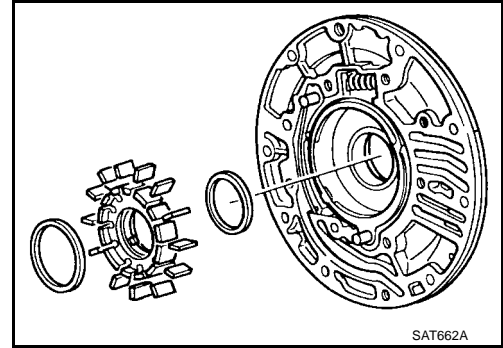
# OIL PUMP

[RL4R01A]

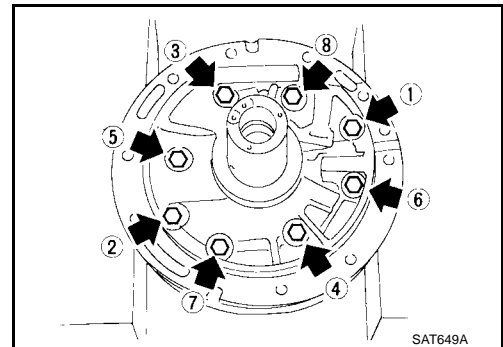
- e. While pushing on cam ring, install pivot pin.



3. Install rotor, vanes and vane rings.  
● Pay attention to direction of rotor.



4. Install oil pump housing and oil pump cover.  
a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly in oil pump housing assembly, then remove masking tape.  
b. Tighten bolts in numerical order as shown.

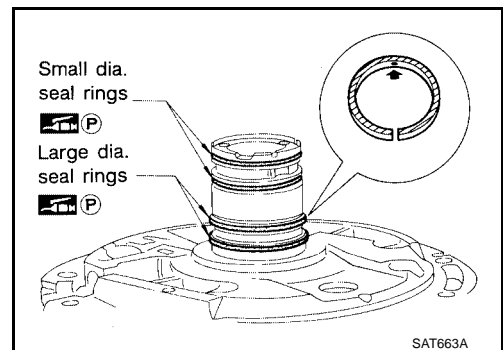


5. Install seal rings carefully after packing ring grooves with petroleum jelly. Press rings down into jelly for a close fit.

- Seal rings come in two different diameters. Check fit carefully in each groove.

**Small dia. seal ring** : No mark  
**Large dia. seal ring** : Yellow mark in area shown by arrow

- Do not spread gap of seal ring excessively while installing. It may deform ring.



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# CONTROL VALVE ASSEMBLY

[RL4R01A]

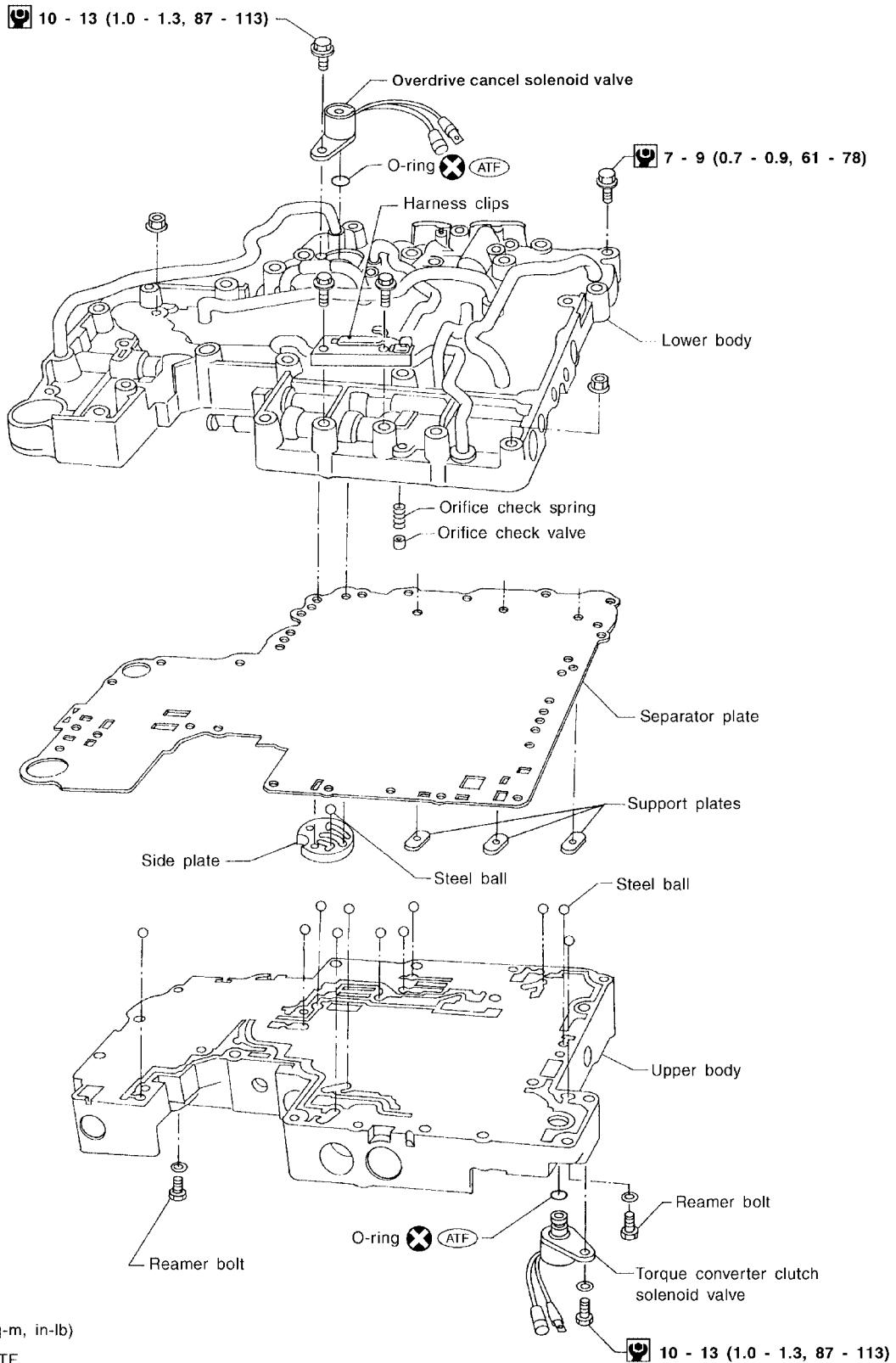
## CONTROL VALVE ASSEMBLY

PF3:31705

### Components

ECS007JL

SEC. 317



: N·m (kg-m, in-lb)  
 : Apply ATF.

LCIA0281E



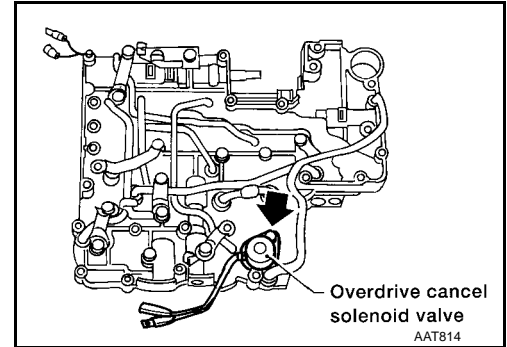
# CONTROL VALVE ASSEMBLY

[RL4R01A]

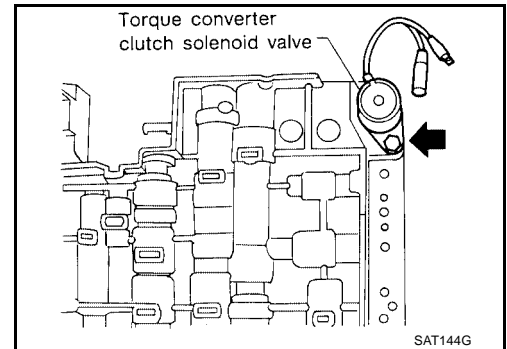
ECS007JM

## Disassembly

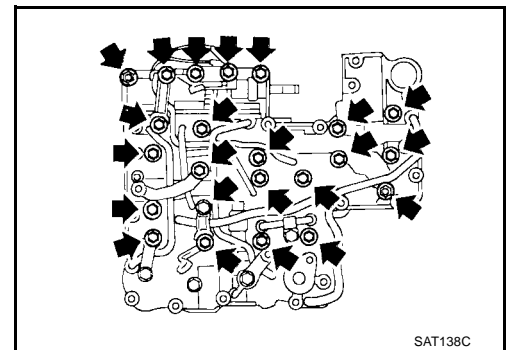
1. Remove solenoids.
  - a. Remove overdrive cancel solenoid valve and side plate from lower body.
  - b. Remove O-ring from solenoid.



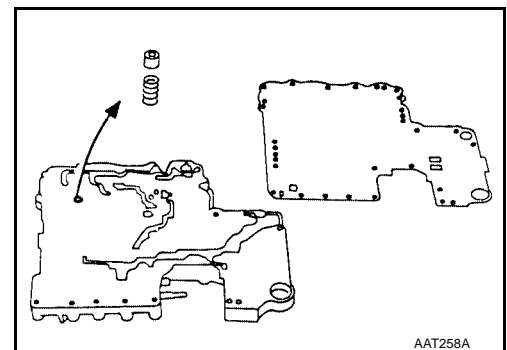
- c. Remove torque converter clutch solenoid valve from upper body.
  - d. Remove O-ring from solenoid valve.



2. Disassemble upper and lower bodies.
  - a. Place upper body facedown, and remove bolts, reamer bolts, side plate and support plates.
  - b. Remove lower body and separator plate as a unit from upper body.
    - **Be careful not to drop orifice check valve, spring and steel balls.**



- c. Place lower body facedown, and remove separator plate.
  - d. Remove orifice check valve and orifice check spring.

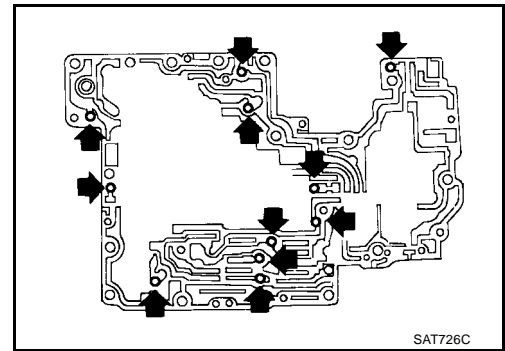


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# CONTROL VALVE ASSEMBLY

[RL4R01A]

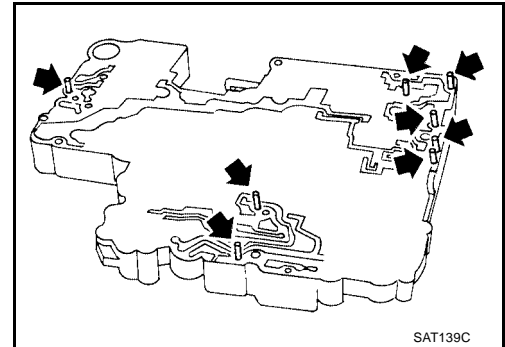
- e. Check to see that steel balls are properly positioned in upper body and side plate, then remove them from upper body.



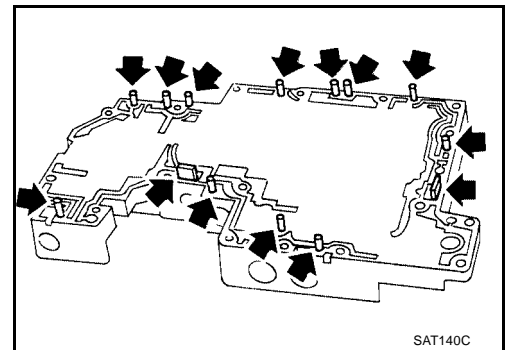
ECS007JN

## Inspection LOWER AND UPPER BODIES

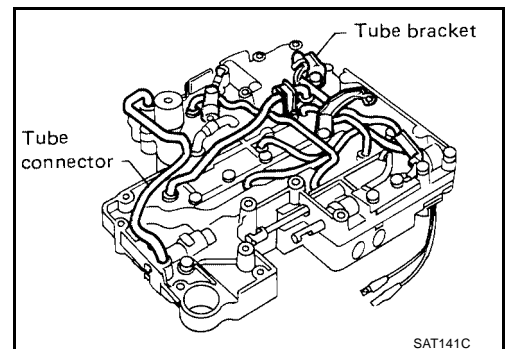
- Check to see that there are pins and retainer plates in lower body.



- Check to see that there are pins and retainer plates in upper body.
- **Be careful not to lose these parts.**

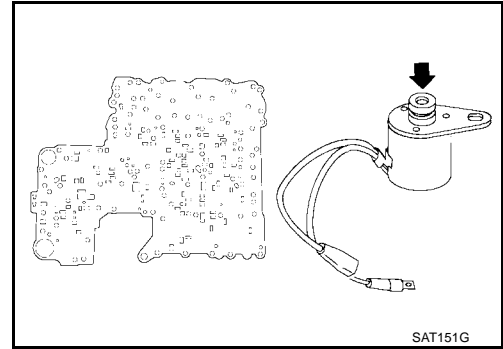


- Check to make sure that oil circuits are clean and free from damage.
- Check tube brackets and tube connectors for damage.



## SEPARATOR PLATES

- Check to make sure that separator plate is free of damage and not deformed and oil holes are clean.



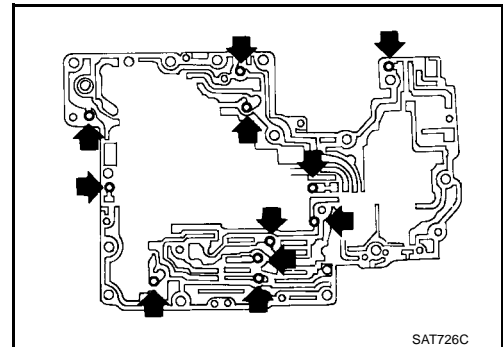
## OVERDRIVE CANCEL SOLENOID VALVE AND TORQUE CONVERTER CLUTCH SOLENOID VALVE

- Check that filter is not clogged or damaged.
- Measure resistance. Refer to [AT-44, "Component Inspection"](#) .

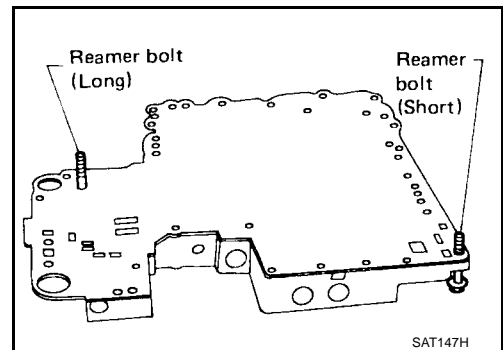
## Assembly

1. Install upper and lower bodies.
  - a. Position upper body with oil circuit facing up. Install steel balls in their proper positions.

ECS007JO

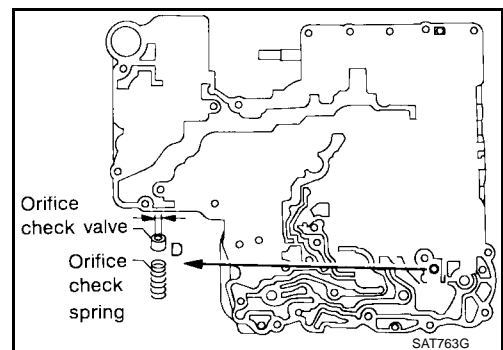


- b. Install reamer bolts from bottom of upper body.



- c. Position lower body with oil circuit facing up. Install orifice check spring, orifice check valve.

**D : 2.0 mm (0.079 in)**

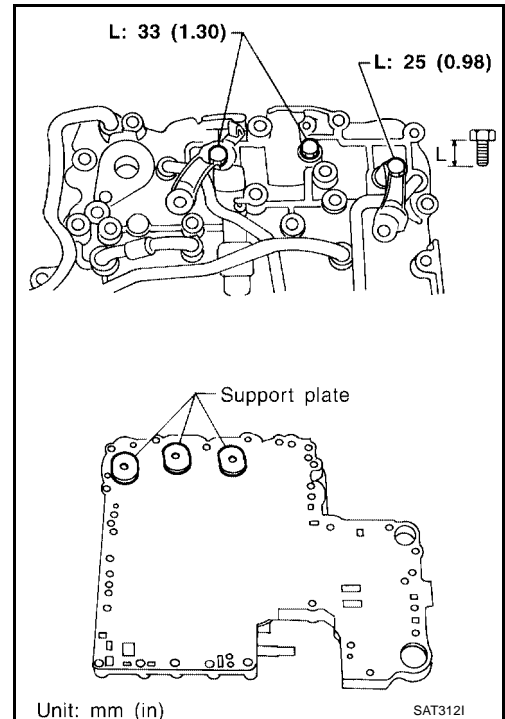


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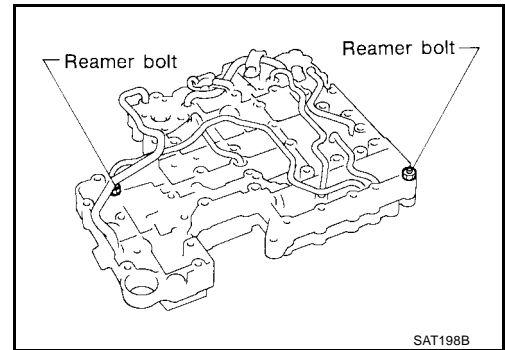
# CONTROL VALVE ASSEMBLY

[RL4R01A]

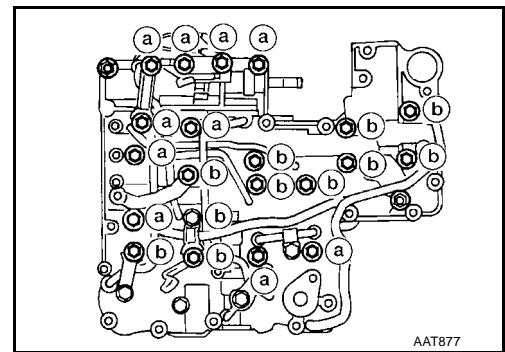
- d. Install separator plate on lower body.
- e. Temporarily install support plates, side plate (with steel ball) and tube brackets.



- f. Temporarily assemble lower and upper bodies, using reamer bolt as a guide.
  - **Be careful not to dislocate or drop steel balls, orifice check spring and orifice check valve.**



- g. Install and temporarily tighten bolts and tube brackets in their proper locations.



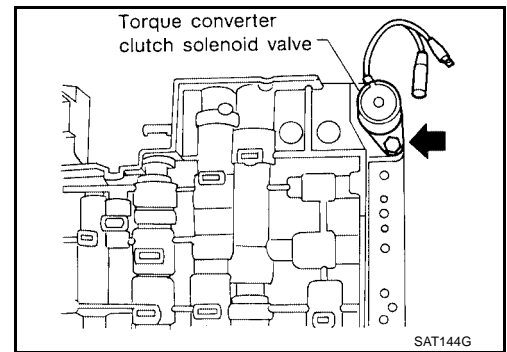
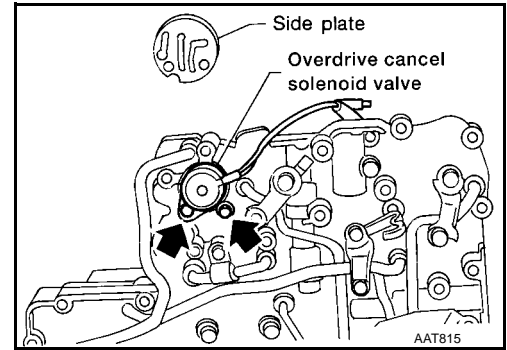
# CONTROL VALVE ASSEMBLY

[RL4R01A]

## Bolt length and location:

	Bolt symbol	
	a	b
<b>Bolt length mm (in)</b>	<b>45 (1.77)</b>	<b>33 (1.30)</b>

2. Install solenoids.
  - a. Attach O-ring and install overdrive cancel solenoid valve and side plate onto lower body.
  - b. Attach O-ring and install torque converter clutch solenoid valve onto upper body.
3. Tighten bolt.



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# CONTROL VALVE UPPER BODY

[RL4R01A]

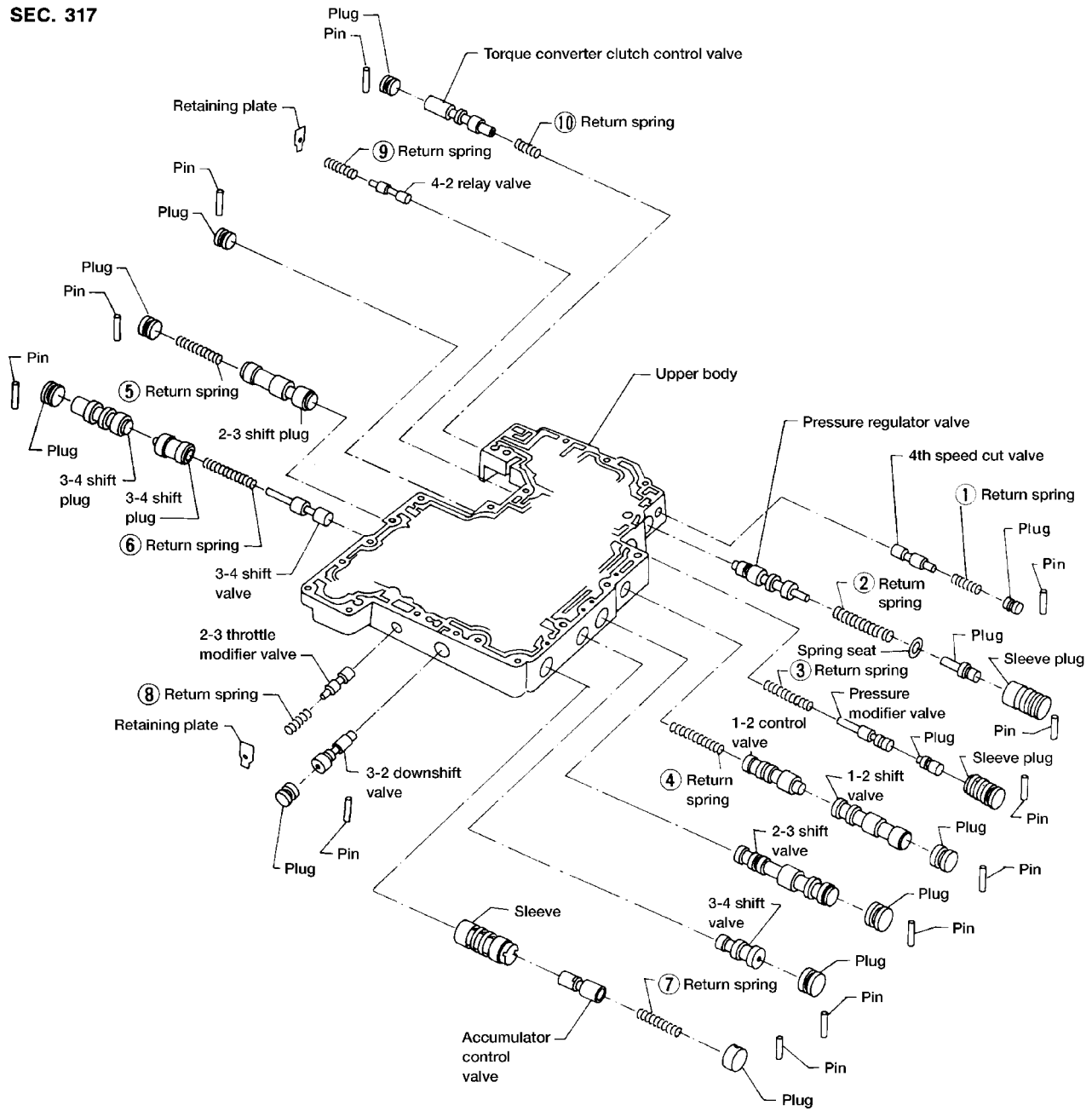
## CONTROL VALVE UPPER BODY

PF3:31711

### Components

ECS007JP

SEC. 317



LCIA0282E

Apply ATF to all components before their installation.

Numbers preceding valve springs correspond with those shown in Return Springs Chart. Refer to [AT-151](#), "[Return Springs](#)".

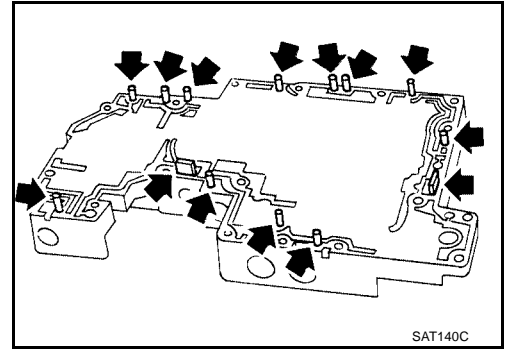
# CONTROL VALVE UPPER BODY

[RL4R01A]

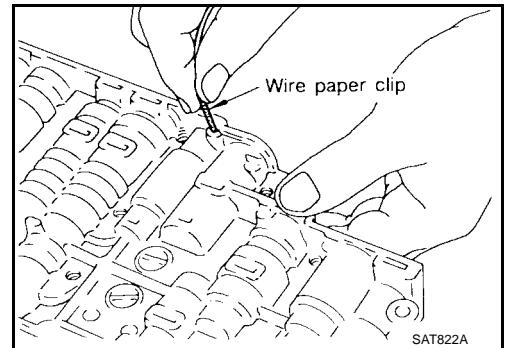
ECS007JQ

## Disassembly

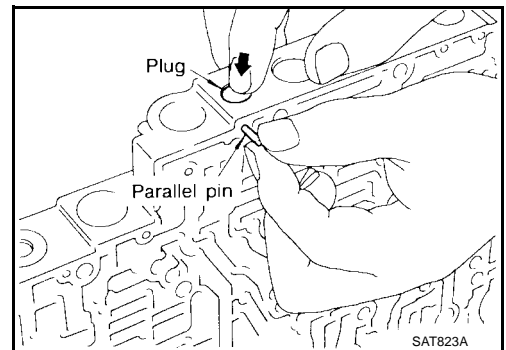
1. Remove valves at parallel pins.
  - Do not use a magnetic pick-up tool.



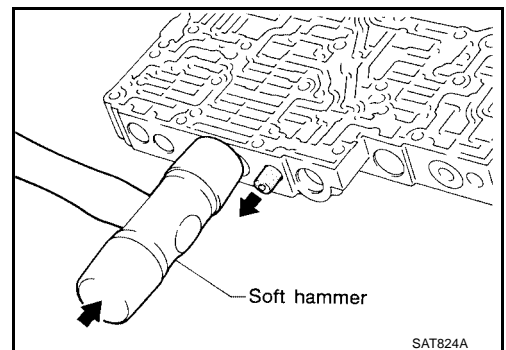
- a. Use a wire paper clip to push out parallel pins.



- b. Remove parallel pins while pressing their corresponding plugs and sleeves.
  - Remove plug slowly to prevent internal parts from jumping out.



- c. Place mating surface of valve facedown, and remove internal parts.
  - If a valve is hard to remove, place valve body facedown and lightly tap it with a soft hammer.
  - Be careful not to drop or damage valves and sleeves.

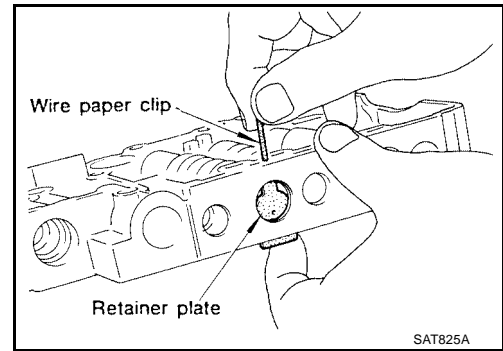


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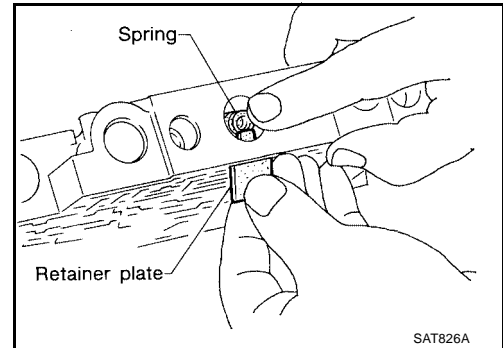
# CONTROL VALVE UPPER BODY

[RL4R01A]

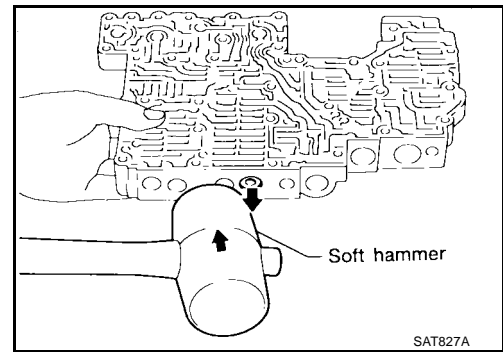
2. Remove valves at retainer plates.
  - a. Pry out retainer plate with wire paper clip.



- b. Remove retainer plates while holding spring.



- c. Place mating surface of valve facedown, and remove internal parts.
    - If a valve is hard to remove, lightly tap valve body with a soft hammer.
    - Be careful not to drop or damage valves, sleeves, etc.

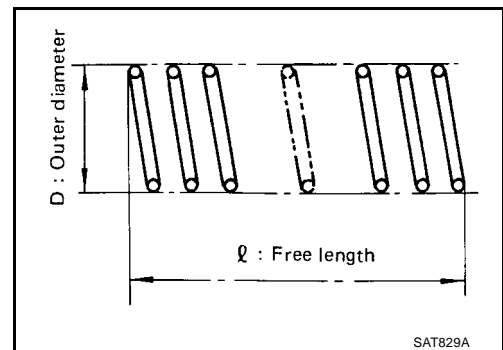


ECS007JR

## Inspection VALVE SPRINGS

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

**Inspection standard** : Refer to [AT-151, "Return Springs"](#) .
- Replace valve springs if deformed or fatigued.



## CONTROL VALVES

- Check sliding surfaces of valves, sleeves and plugs.



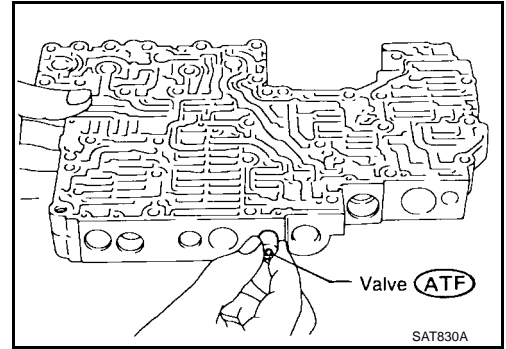
# CONTROL VALVE UPPER BODY

[RL4R01A]

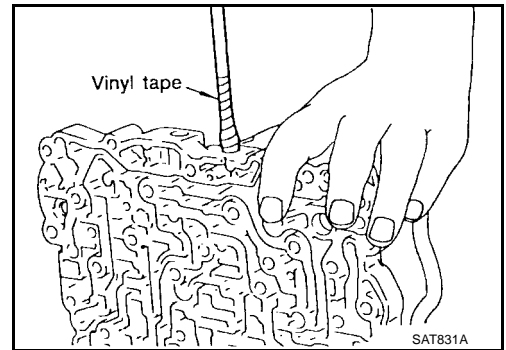
ECS007JS

## Assembly

1. Lubricate the control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.
  - Be careful not to scratch or damage valve body.

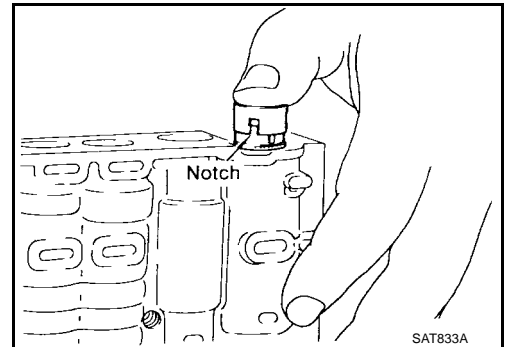


- Wrap a small screwdriver with vinyl tape and use it to insert the valves into proper position.

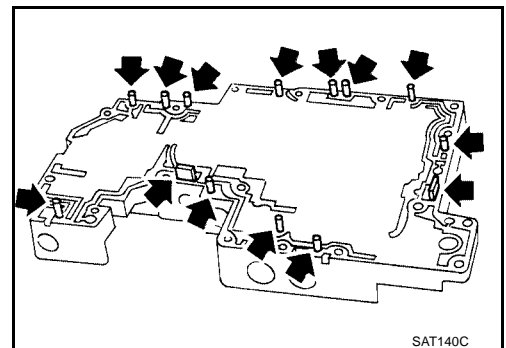


## ACCUMULATOR CONTROL PLUG

- Align protrusion of accumulator control sleeve with notch in plug.
- Align parallel pin groove in plug with parallel pin, and install accumulator control valve.



1. Install parallel pins and retainer plates.

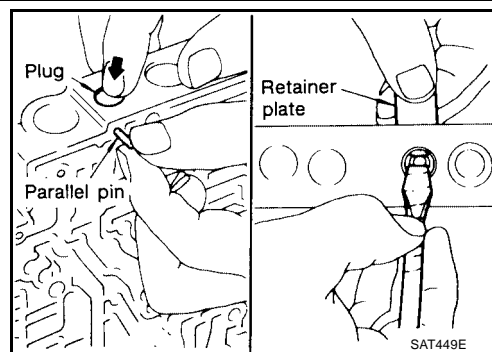


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## CONTROL VALVE UPPER BODY

[RL4R01A]

- While pushing plug, install parallel pin.
- Insert retainer plate while pushing spring.



# CONTROL VALVE LOWER BODY

[RL4R01A]

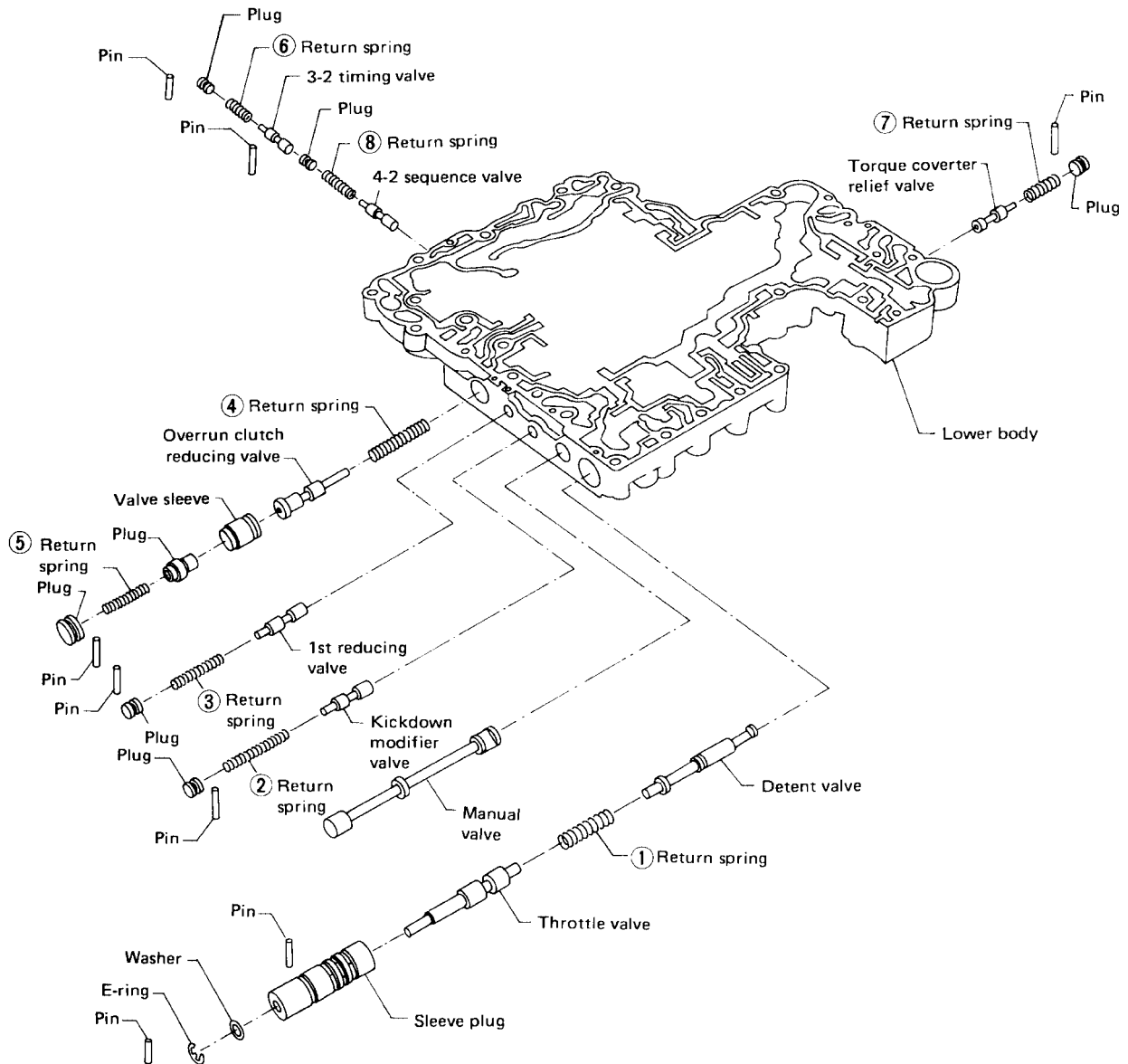
## CONTROL VALVE LOWER BODY

PFP:31713

### Components

ECS007JT

SEC. 317



LCIA0283E

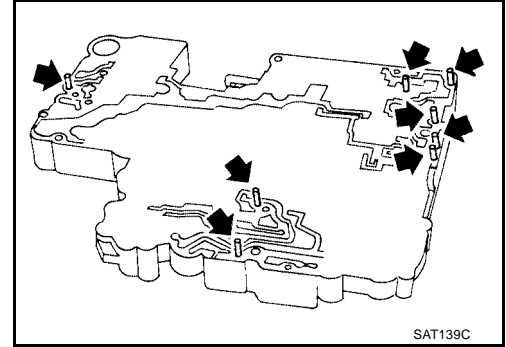
**Apply ATF to all components before their installation.**

Numbers preceding valve springs correspond with those shown in Return Springs Chart in SDS. Refer to [AT-151, "Return Springs"](#).

## Disassembly

ECS007JU

1. Remove valves at parallel pins.
2. Remove valves at retainer plates.  
For removal procedures, refer to [AT-89, "Disassembly"](#) .



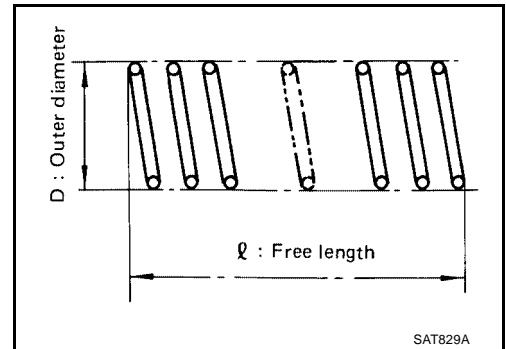
ECS007JV

## Inspection VALVE SPRINGS

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

**Inspection standard** : Refer to [AT-151, "Return Springs"](#) .

- Replace valve springs if deformed or fatigued.



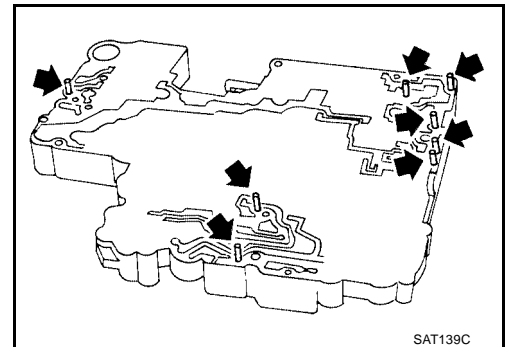
## CONTROL VALVES

- Check sliding surfaces of control valves, sleeves and plugs for damage.

## Assembly

ECS007JW

- Install control valves.  
For installation procedures, refer to [AT-91, "Assembly"](#) .

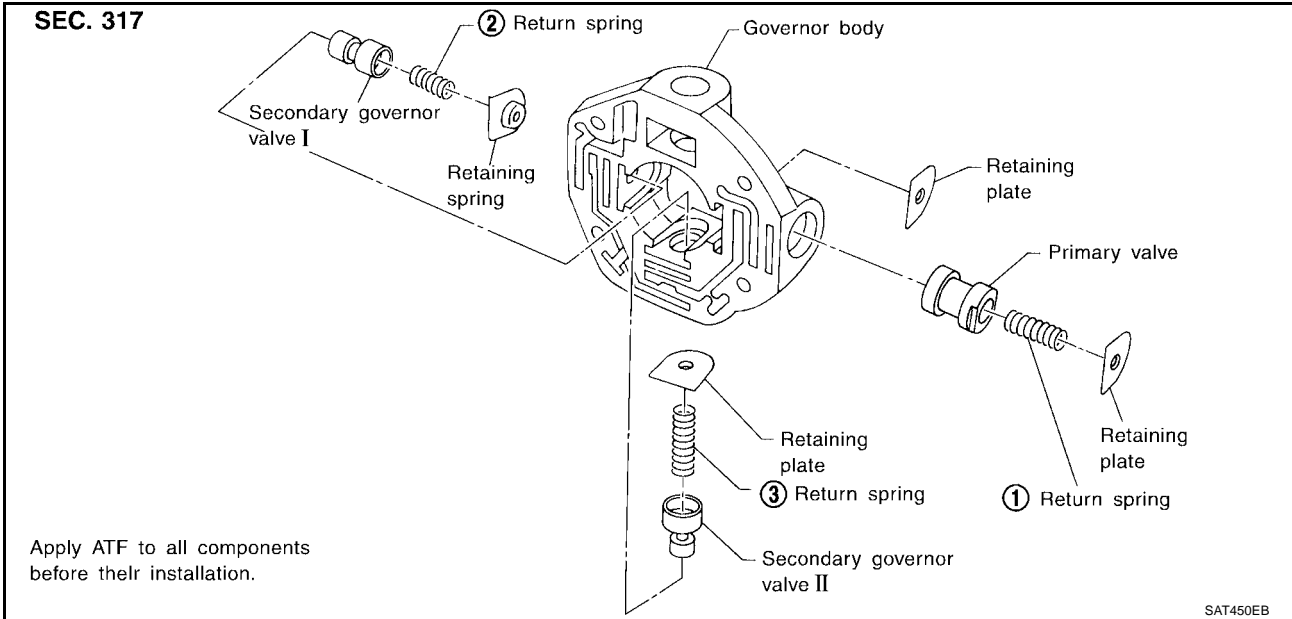


GOVERNOR VALVE ASSEMBLY

PFP:31860

Components

ECS007JX



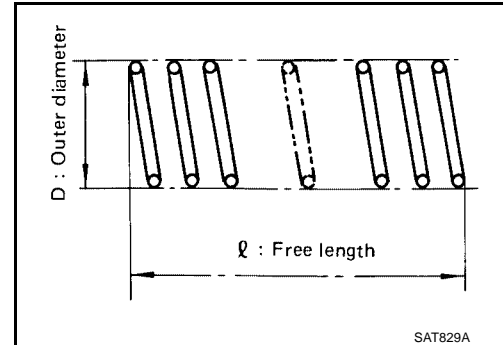
Numbers preceding valve springs correspond with those shown in [AT-151, "Return Springs"](#) .

**Inspection  
VALVE SPRINGS**

ECS007JY

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

**Inspection standard** : Refer to [AT-151, "Return Springs"](#) .



**GOVERNOR VALVES AND VALVE BODY**

- Check governor valves and valve body for indication of burning or scratches.

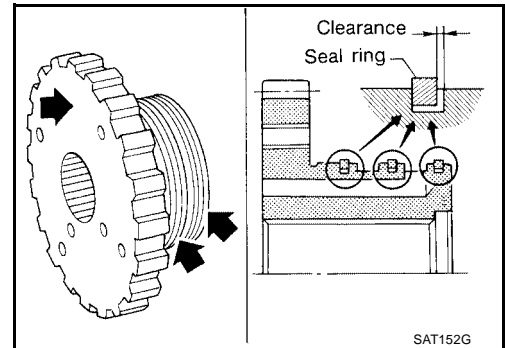
## PARKING GEAR

### Inspection

- Check contacting surface of parking gear and ring groove areas for wear.
- Measure clearance between seal ring and ring groove.

**Standard clearance** : 0.15 - 0.40 mm (0.0059 - 0.0157 in)

**Wear limit** : 0.40 mm (0.0157 in)

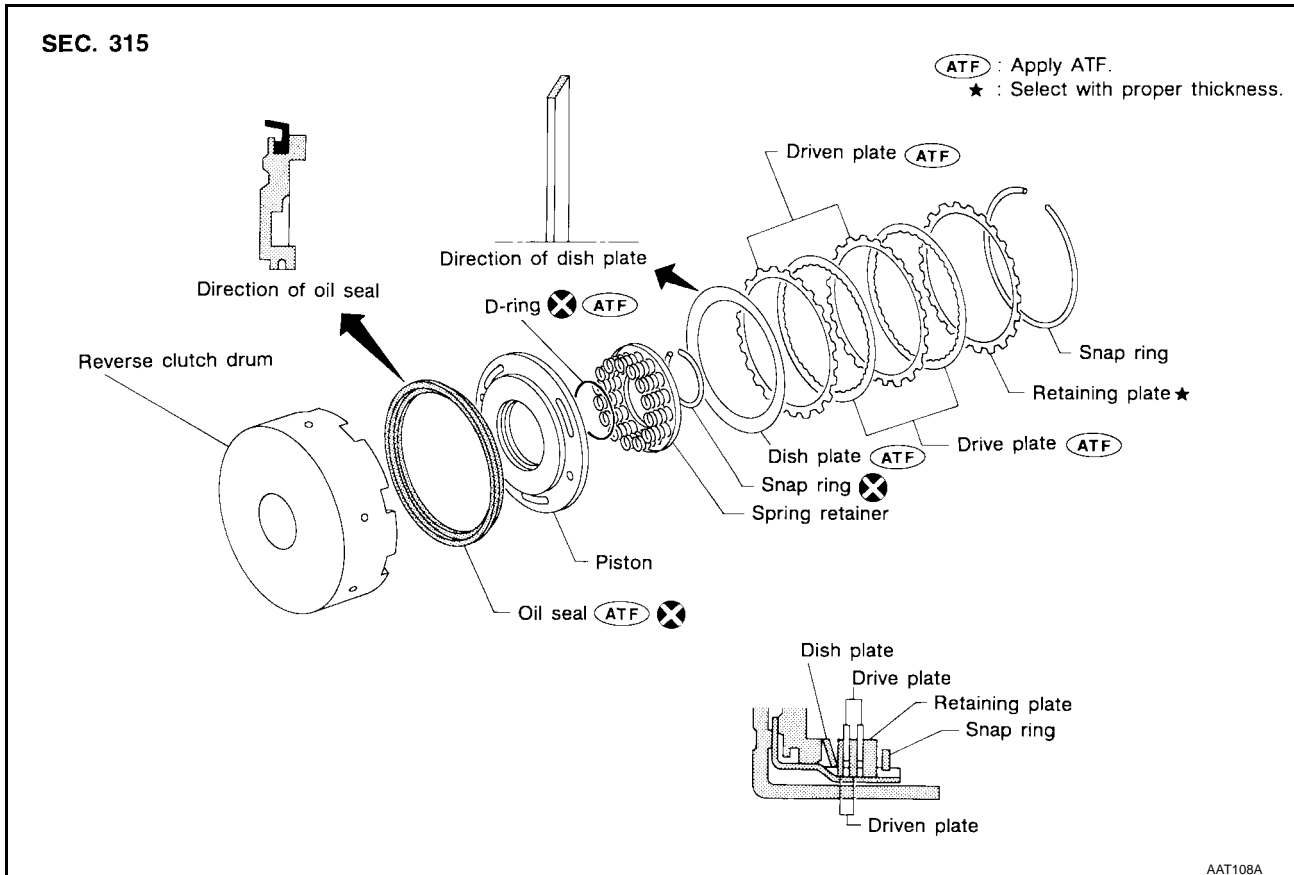


## REVERSE CLUTCH

PFP:31510

### Components

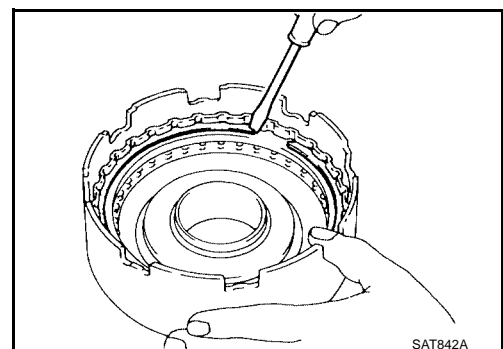
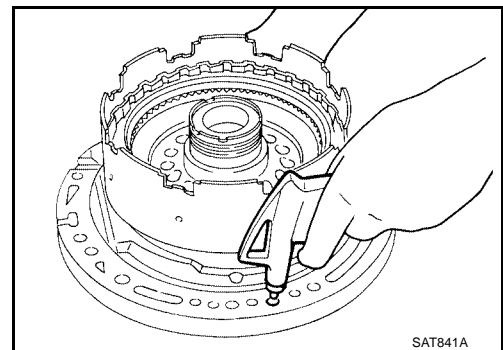
ECS007K0



### Disassembly

ECS007K1

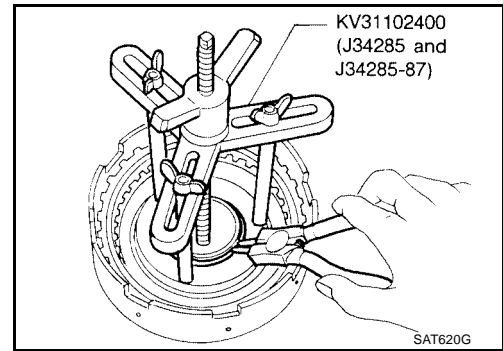
1. Check operation of reverse clutch.
  - a. Install seal ring onto oil pump cover and install reverse clutch. Apply compressed air to oil hole.
  - b. Check to see that retaining plate moves to snap ring.
  - c. If retaining plate does not contact snap ring,
    - D-ring might be damaged.
    - Oil seal might be damaged.
    - Fluid might be leaking past piston check ball.
  
2. Remove snap ring, drive plates, driven plates, retaining plate and dish plate.



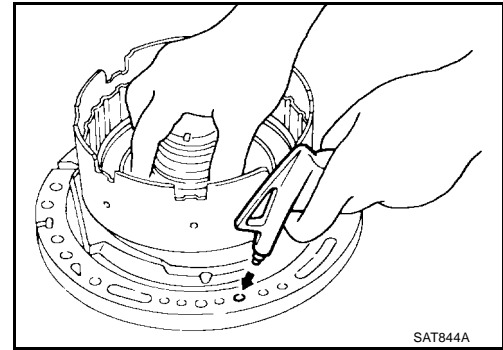
# REVERSE CLUTCH

[RL4R01A]

3. Remove snap ring from clutch drum while compressing clutch springs.
  - **Set Tool** directly over springs.
  - **Do not expand snap ring excessively.**
4. Remove spring retainer and return spring.



5. Install seal ring onto oil pump cover and install reverse clutch drum. While holding piston, gradually apply compressed air to oil hole until piston is removed.
  - **Do not apply compressed air abruptly.**
6. Remove D-ring and oil seal from piston.



ECS007K2

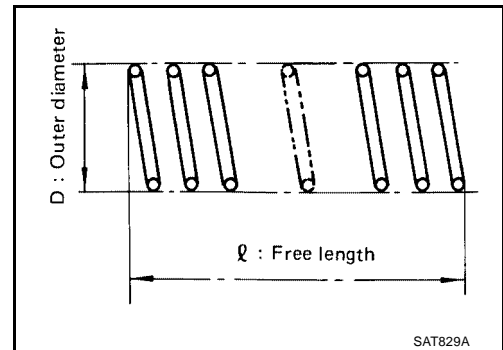
## Inspection REVERSE CLUTCH SNAP RING AND SPRING RETAINER

- Check for deformation, fatigue and damage.

## REVERSE CLUTCH RETURN SPRINGS

- Check for deformation and damage. Also, measure free length and outside diameter.

**Inspection standard** : Refer to [AT-151, "Return Springs"](#) .



## REVERSE CLUTCH DRIVE PLATES

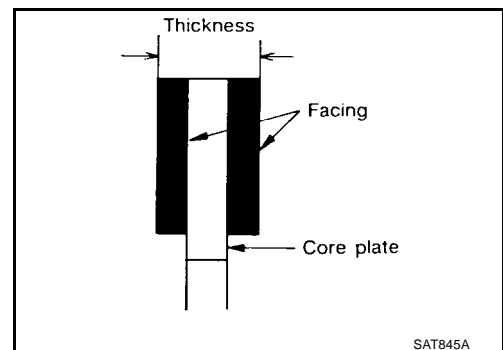
- Check facing for burns, cracks and damage.
- Measure thickness of facing.

**Thickness of drive plate**

**Standard value** : 1.90 - 2.05 mm (0.0748 - 0.0807 in)

**Wear limit** : 1.80 mm (0.0709 in)

- If not within wear limit, replace.



## REVERSE CLUTCH DISH PLATE

- Check for deformation and damage.

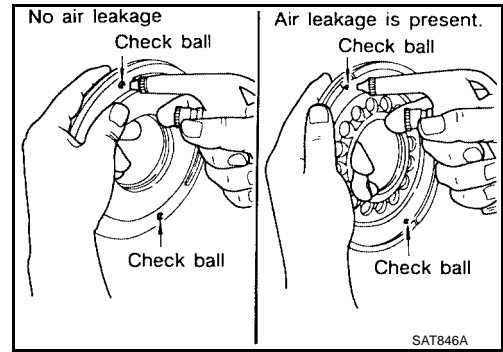


# REVERSE CLUTCH

[RL4R01A]

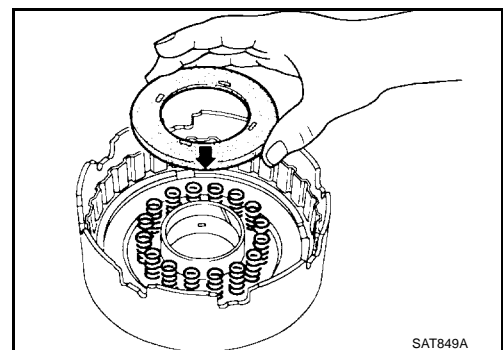
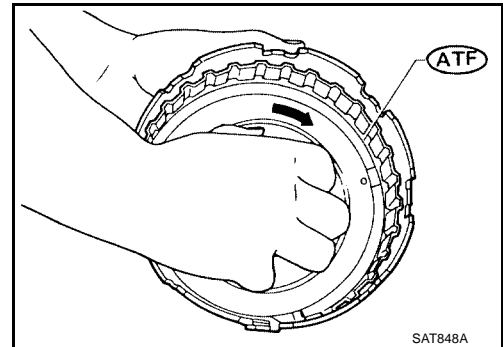
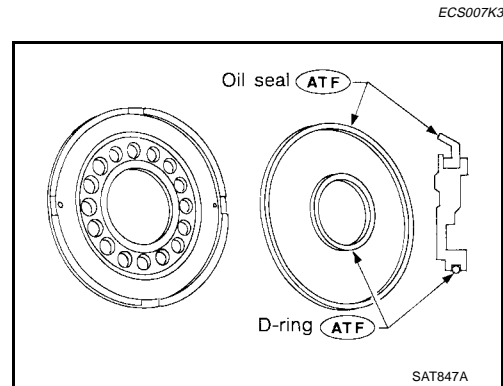
## REVERSE CLUTCH PISTON

- Shake piston to assure that balls are not seized.
- Apply compressed air to check ball oil hole opposite the return spring to assure that there is no air leakage.
- Also apply compressed air to oil hole on return spring side to assure that air leaks past ball.



## Assembly

1. Install D-ring and oil seal on piston.
  - Apply ATF to both parts.
  - Take care with the direction of oil seal.
2. Install piston assembly by turning it slowly and evenly.
  - Apply ATF to inner surface of drum.
3. Install return springs and spring retainer.

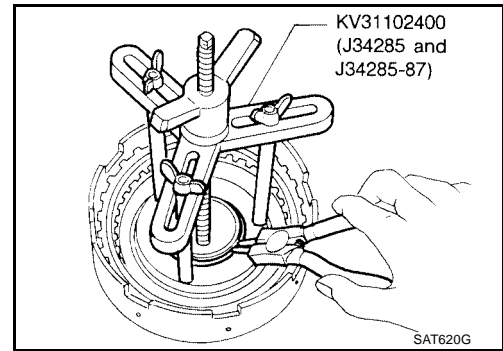


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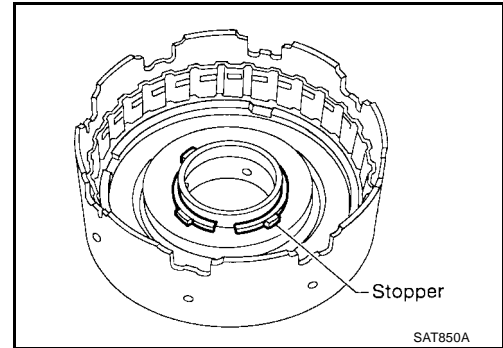
# REVERSE CLUTCH

[RL4R01A]

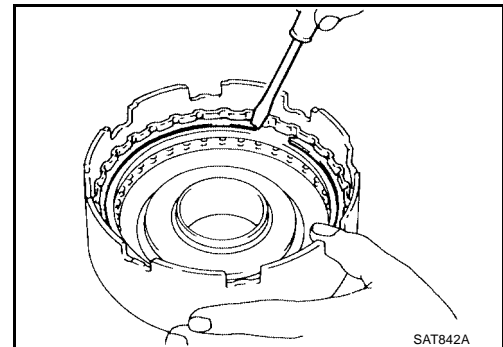
4. Set Tool on spring retainer and install snap ring while compressing clutch springs.



- Do not align snap ring gap with spring retainer stopper.

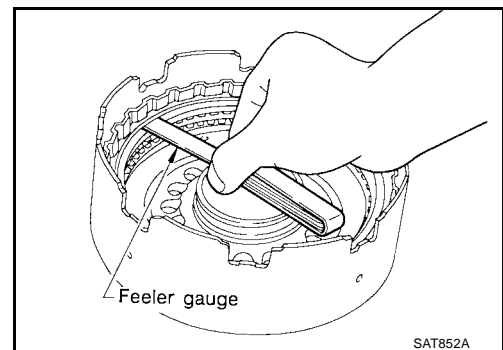


5. Install drive plates, driven plates, retaining plate and dish plate.
6. Install snap ring.



7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

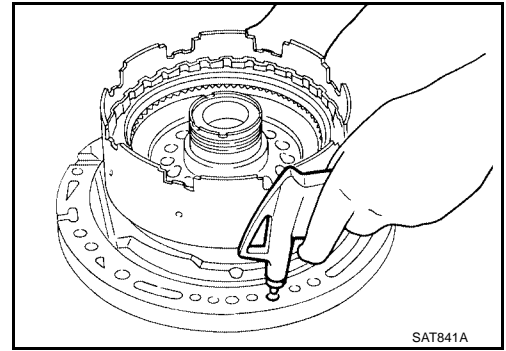
**Specified clearance**  
**Standard** : 0.5 - 0.8 mm (0.020 - 0.031 in)  
**Allowable limit** : 1.2 mm (0.047 in)  
**Retaining plate** : Refer to [AT-104, "Inspection"](#) .



# REVERSE CLUTCH

[RL4R01A]

8. Check operation of reverse clutch.  
Refer to [AT-104, "Inspection"](#) .



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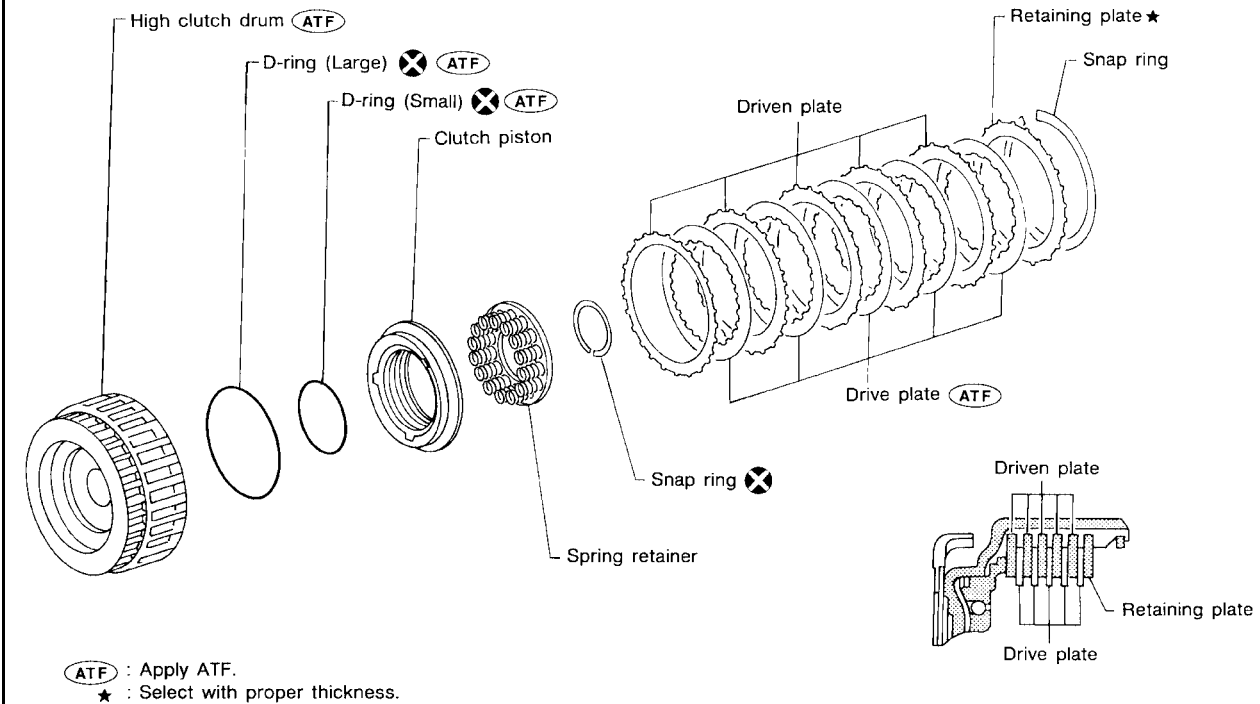
M

## HIGH CLUTCH

### Components

#### SEC. 315

For the number of clutch sheets (drive plate and driven plate), refer to the below cross-section.

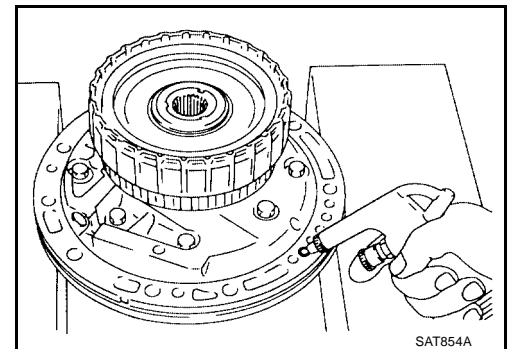


LCIA0284E

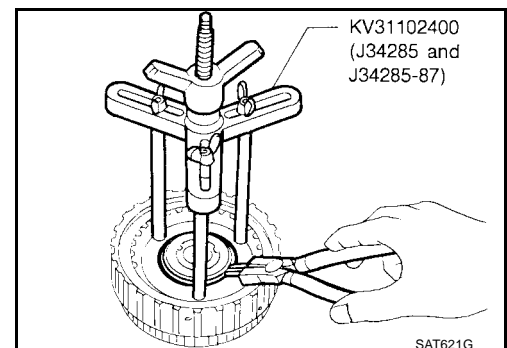
### Disassembly and Assembly

Service procedures for high clutch are essentially the same as those for reverse clutch, with the following exceptions:

- Check of high clutch operation



- Removal and installation of return spring

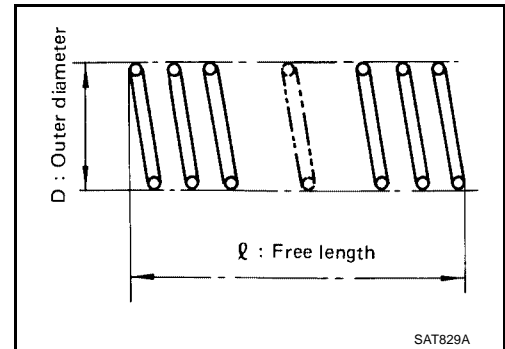


# HIGH CLUTCH

[RL4R01A]

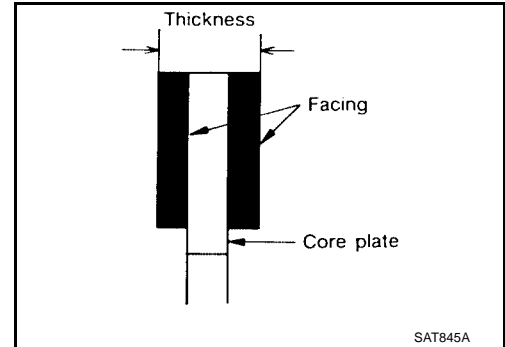
- Inspection of high clutch return springs

**Inspection standard** : Refer to [AT-151, "Return Springs"](#) .



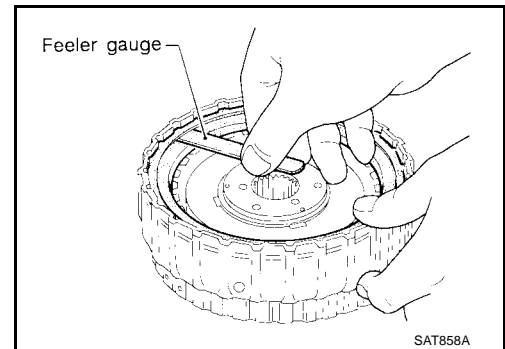
- Inspection of high clutch drive plate

**Thickness of drive plate**  
**Standard** : 1.52 - 1.67 mm (0.0598 - 0.0657 in)  
**Wear limit** : 1.40 mm (0.0551 in)



- Measurement of clearance between retaining plate and snap ring

**Specified clearance**  
**Standard** : 1.8 - 2.2 mm (0.071 - 0.087 in)  
**Allowable limit** : 2.8 mm (0.110 in)  
**Retaining plate** : Refer to [AT-152, "Clutch and Brakes"](#) .



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FORWARD AND OVERRUN CLUTCHES

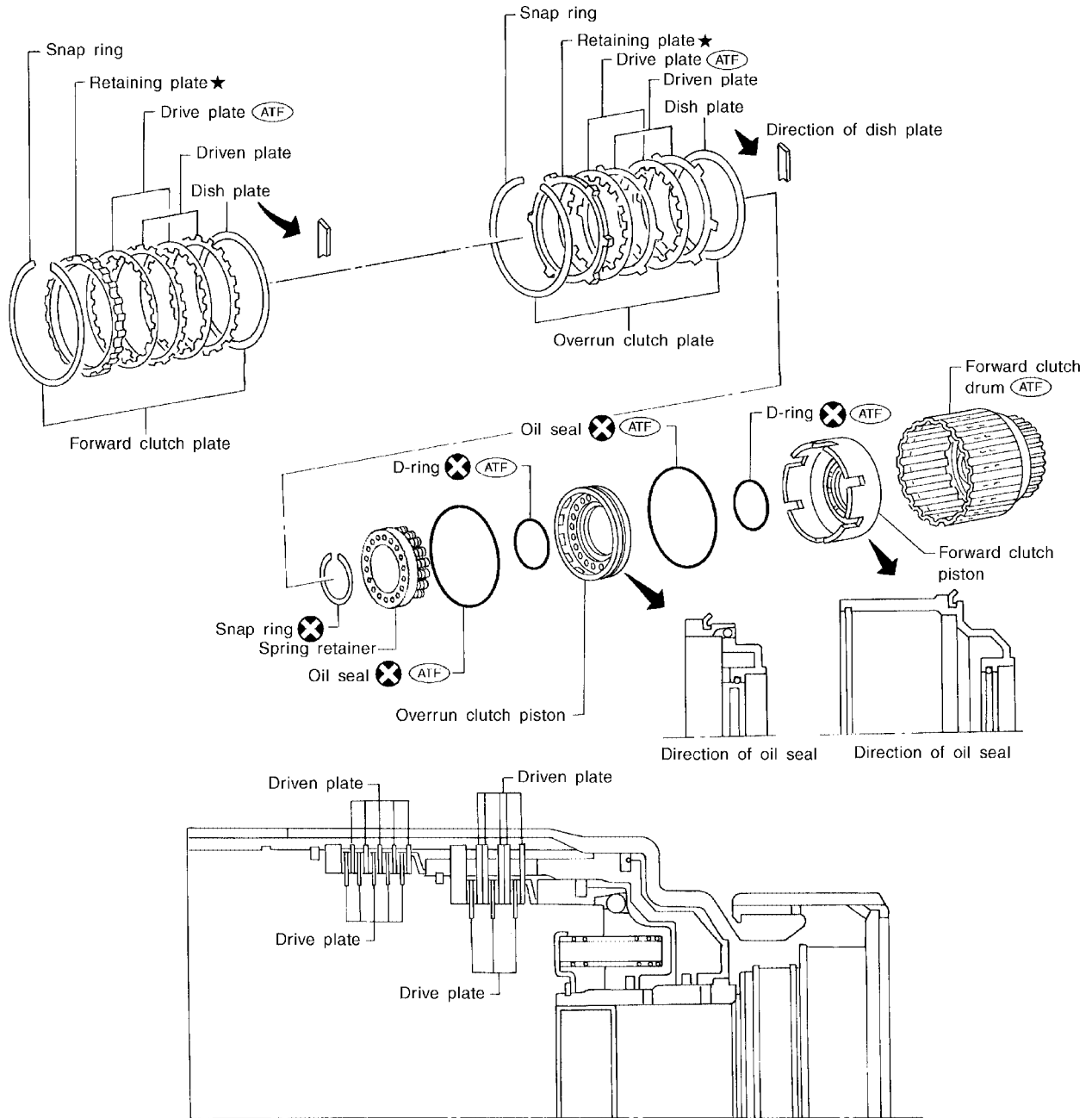
PF3:31570

Components

ECS007K6

SEC. 315

For the number of clutch sheets (drive plate and driven plate), refer to the below cross-section.



(ATF) : Apply ATF.  
 ★ : Select with proper thickness.

# FORWARD AND OVERRUN CLUTCHES

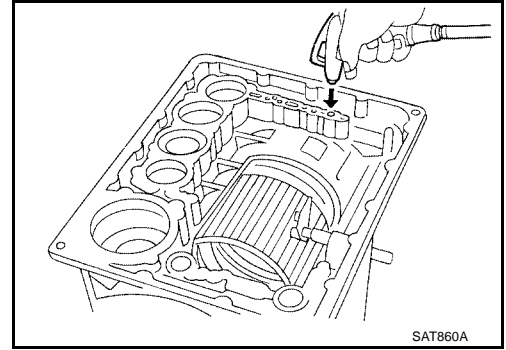
[RL4R01A]

ECS007K7

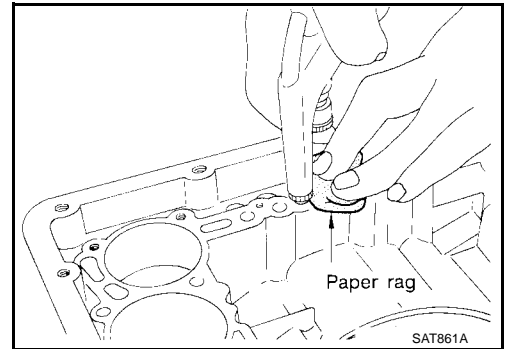
## Disassembly and Assembly

Service procedures for forward and overrun clutches are essentially the same as those for reverse clutch, with the following exceptions:

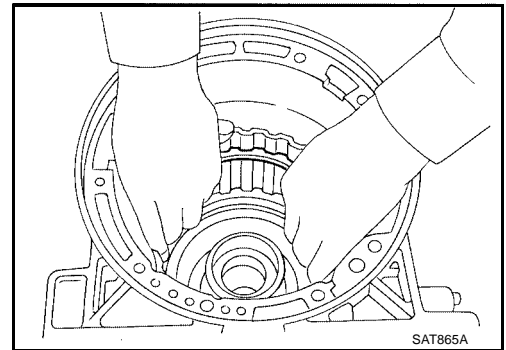
- Check of forward clutch operation



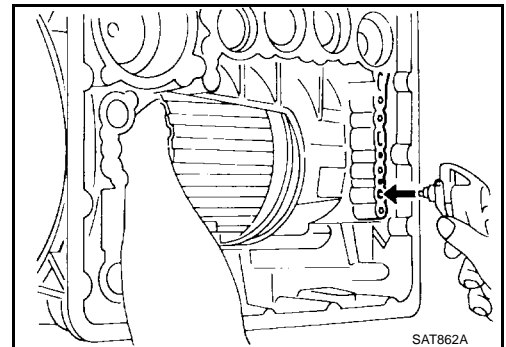
- Check of overrun clutch operation



- Removal of forward clutch drum  
Remove forward clutch drum from transmission case by holding snap ring.



- Removal of forward clutch and overrun clutch pistons
  - While holding overrun clutch piston, gradually apply compressed air to oil hole.

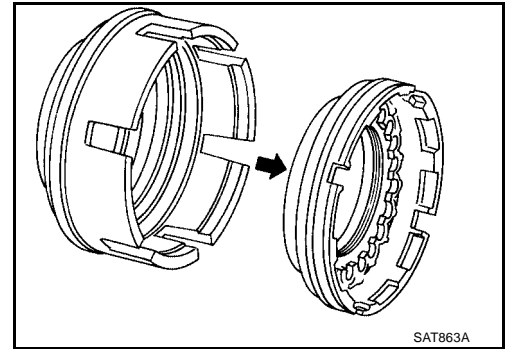


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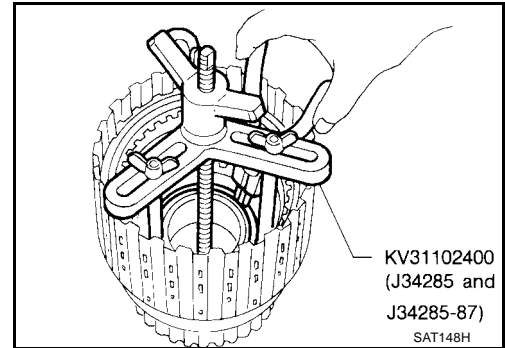
# FORWARD AND OVERRUN CLUTCHES

[RL4R01A]

- Remove overrun clutch from forward clutch.

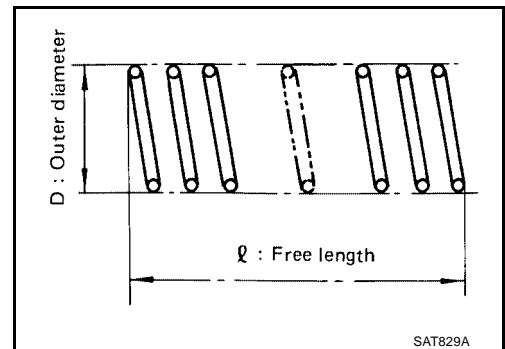


- Removal and installation of return springs



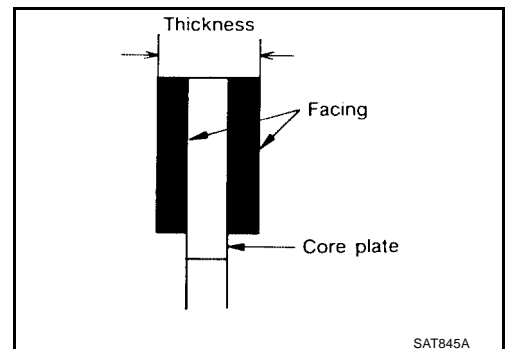
- Inspection of forward clutch and overrun clutch return springs

**Inspection standard** : Refer to [AT-151, "Return Springs"](#) .



- Inspection of forward clutch drive plates

**Thickness of drive plate**  
**Standard** : 1.52 - 1.67 mm (0.0598 - 0.0657 in)  
**Wear limit** : 1.40 mm (0.0551 in)





# FORWARD AND OVERRUN CLUTCHES

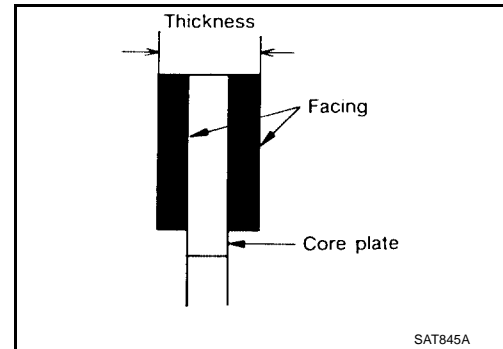
[RL4R01A]

- Inspection of overrun clutch drive plates

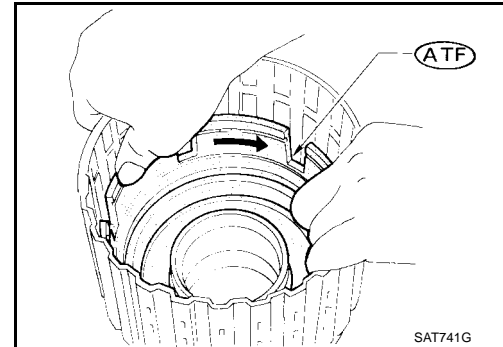
## Thickness of drive plate

**Standard** : 1.90 - 2.05 mm (0.0748 - 0.0807 in)

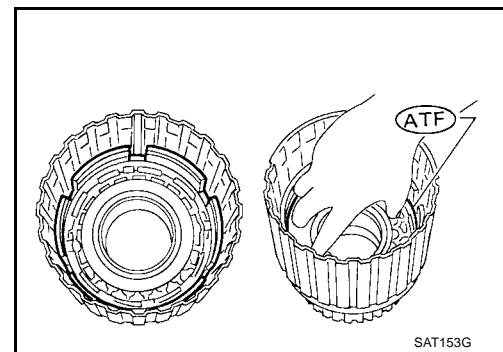
**Wear limit** : 1.80 mm (0.0709 in)



- Installation of forward clutch piston and overrun clutch piston
  - Install forward clutch piston by turning it slowly and evenly.
  - **Apply ATF to inner surface of clutch drum.**



- **Align notch in forward clutch piston with groove in forward clutch drum.**
  - Install overrun clutch by turning it slowly and evenly.
  - **Apply ATF to inner surface of forward clutch piston.**



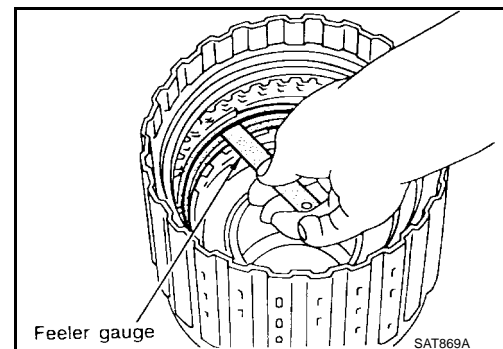
- Measurement of clearance between retaining plate and snap ring of overrun clutch

## Specified clearance

**Standard** : 1.0 - 1.4 mm (0.039 - 0.055 in)

**Allowable limit** : 2.0 mm (0.079 in)

**Retaining plate** : Refer to [AT-153. "OVERRUN CLUTCH"](#) .



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## FORWARD AND OVERRUN CLUTCHES

[RL4R01A]

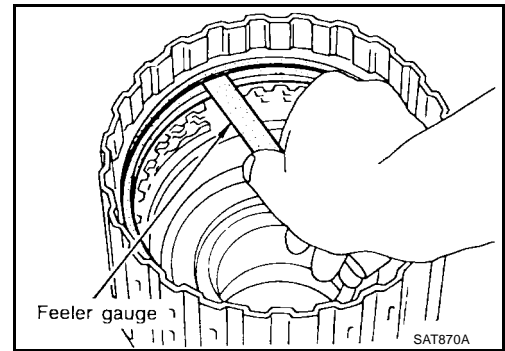
- Measurement of clearance between retaining plate and snap ring of forward clutch

**Specified clearance**

**Standard** : 0.35 - 0.75 mm (0.0138 - 0.0295 in)

**Allowable limit** : 1.85 mm (0.728 in)

**Retaining plate** : Refer to [AT-153, "FORWARD CLUTCH"](#) .

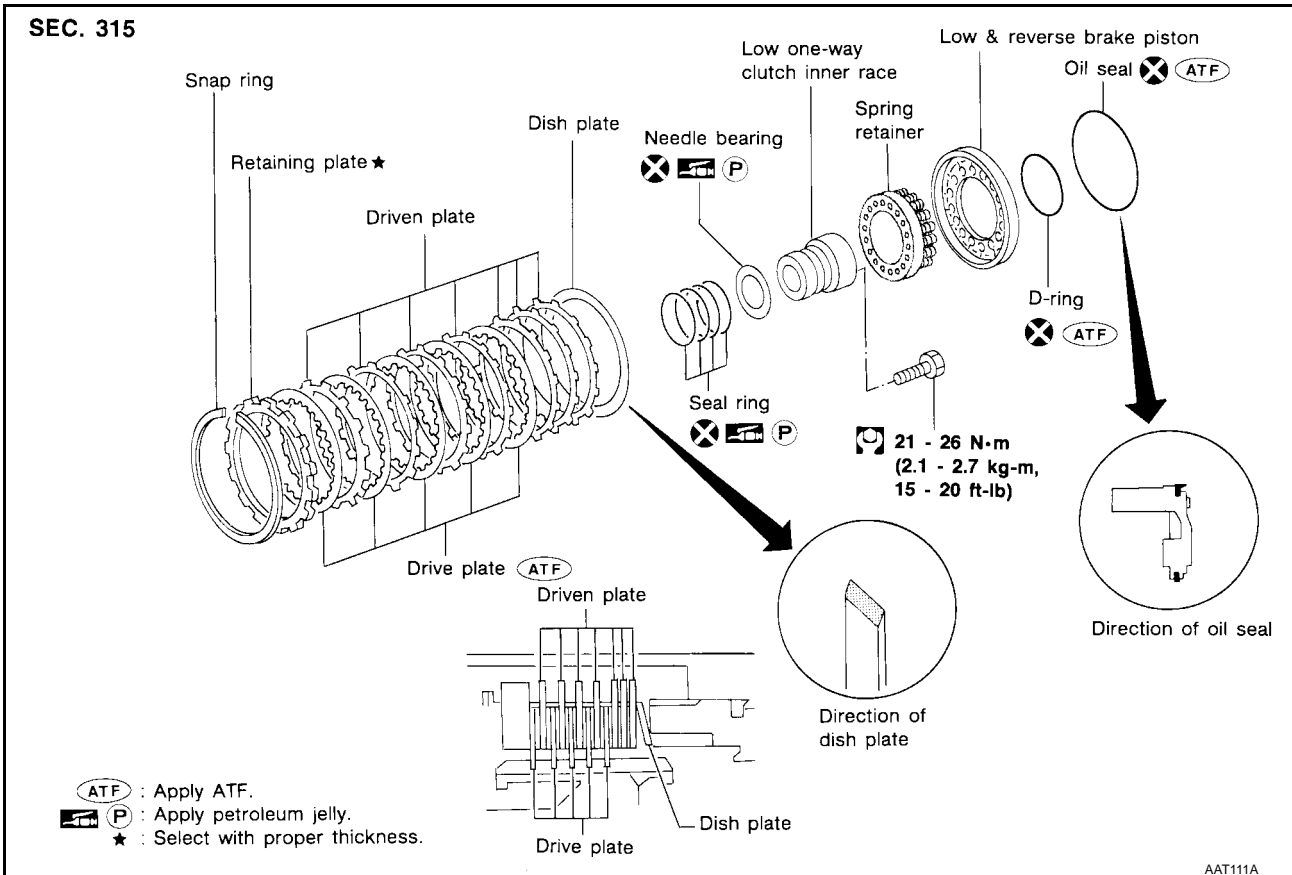


## LOW & REVERSE BRAKE

PF3:31645

### Components

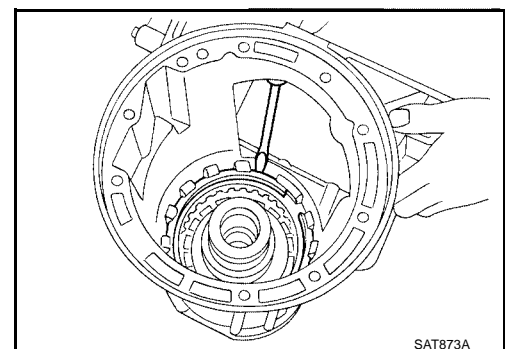
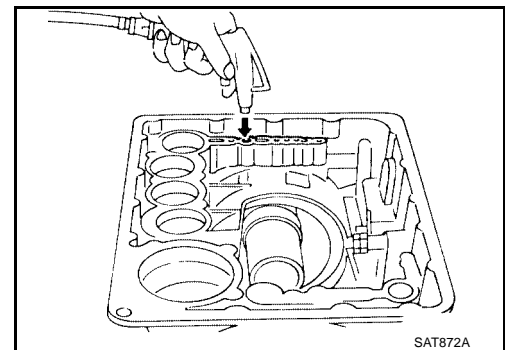
ECS007K8



### Disassembly

ECS007K9

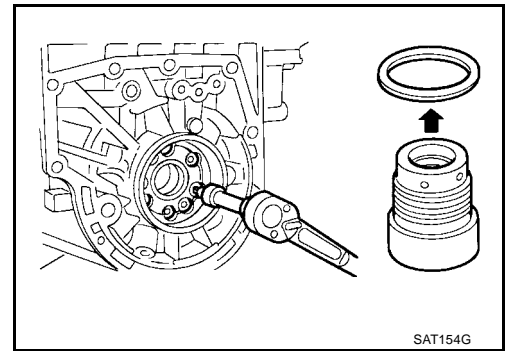
1. Check operation of low and reverse brake.
  - a. Install seal ring onto oil pump cover and install reverse clutch. Apply compressed air to oil hole.
  - b. Check to see that retaining plate moves to snap ring.
  - c. If retaining plate does not contact snap ring:
    - D-ring might be damaged.
    - Oil seal might be damaged.
    - Fluid might be leaking past piston check ball.
  
2. Remove snap ring, low & reverse brake drive plates, driven plates and dish plate.



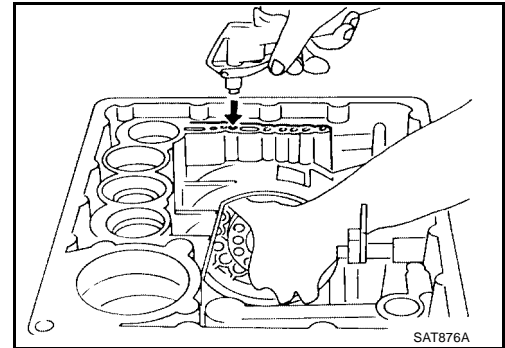
# LOW & REVERSE BRAKE

[RL4R01A]

3. Remove low one-way clutch inner race, spring retainer and return spring from transmission case.
4. Remove seal rings from low one-way clutch inner race.
5. Remove needle bearing from low one-way clutch inner race.



6. Remove low & reverse brake piston using compressed air.
7. Remove oil seal and D-ring from piston.



## Inspection

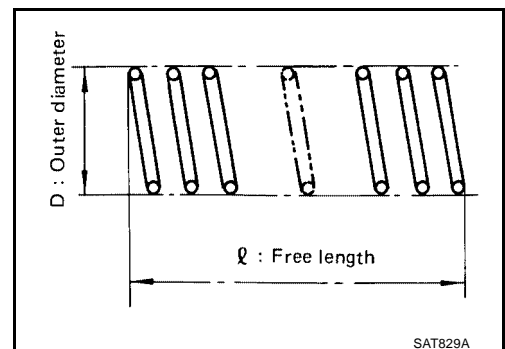
### LOW & REVERSE BRAKE SNAP RING AND SPRING RETAINER

- Check for deformation, or damage.
- Replace if necessary.

### LOW & REVERSE BRAKE RETURN SPRINGS

- Check for deformation or damage. Also measure free length and outside diameter.

**Inspection standard** : Refer to [AT-151, "Return Springs"](#) .



### LOW & REVERSE BRAKE DRIVE PLATES

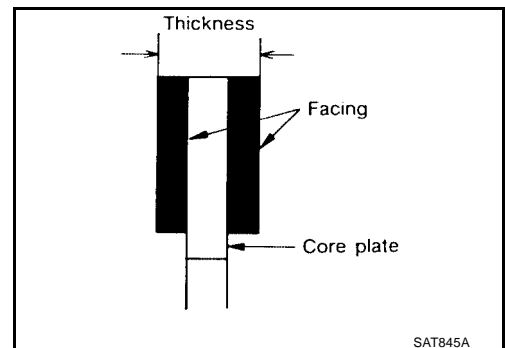
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

**Thickness of drive plate**

**Standard value** : 1.52 - 1.67 mm (0.0598 - 0.0657 in)

**Wear limit** : 1.4 mm (0.055 in)

- If not within wear limit, replace.



### LOW ONE-WAY CLUTCH INNER RACE

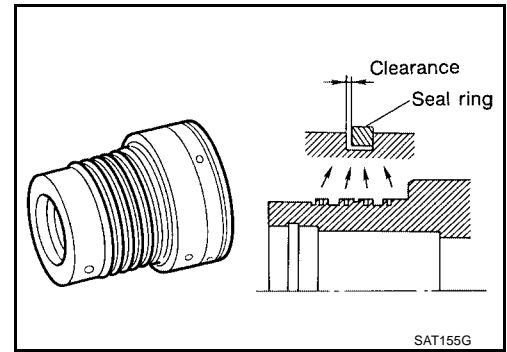
- Check frictional surface of inner race for wear or damage.
- Install new seal rings onto low one-way clutch inner race.
- **Be careful not to expand seal ring gap excessively.**
- Measure seal ring-to-groove clearance.

#### Inspection standard

**Standard value : 0.10 - 0.25 mm (0.0039 - 0.0098 in)**

**Allowable limit : 0.25 mm (0.0098 in)**

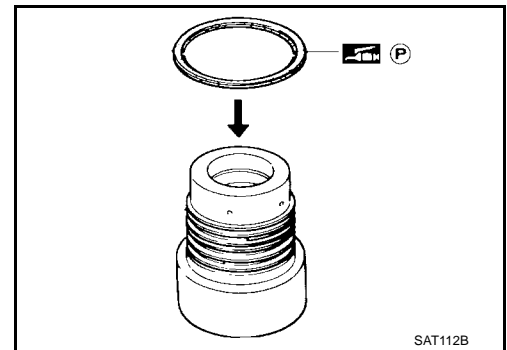
- If not within allowable limit, replace low one-way clutch inner race.



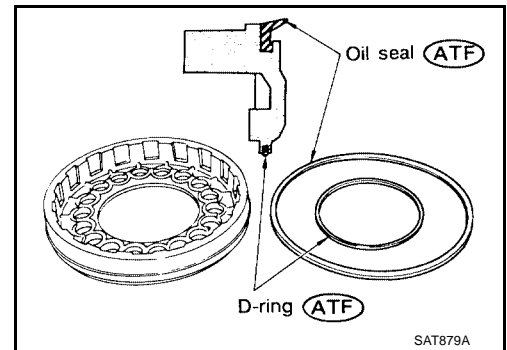
ECS007KB

### Assembly

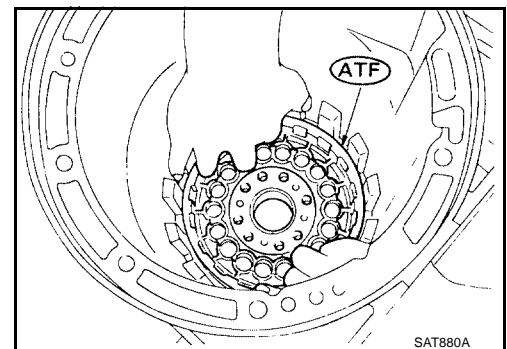
1. Install needle bearing onto one-way clutch inner race.
  - Pay attention to its direction — black surface faces to rear side.
  - Apply petroleum jelly to thrust washers.



2. Install oil seal and D-ring onto piston.
  - Apply ATF to oil seal and D-ring.



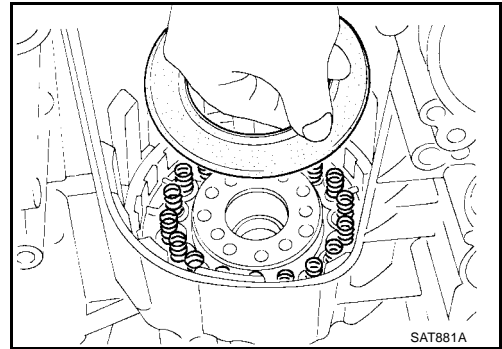
3. Install piston by rotating it slowly and evenly.
  - Apply ATF to inner surface of transmission case.



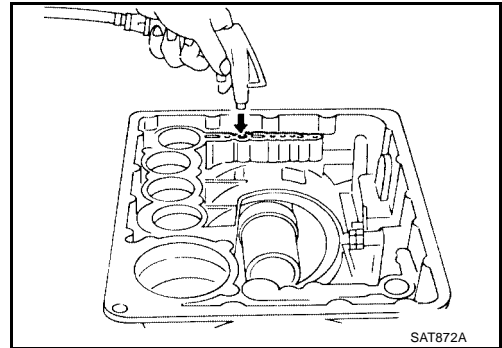
## LOW & REVERSE BRAKE

[RL4R01A]

4. Install return springs, spring retainer and low one-way clutch inner race onto transmission case.
5. Install dish plate, low & reverse brake drive plates, driven plates and retaining plate.
6. Install snap ring on transmission case.



7. Check operation of low & reverse brake clutch piston. Refer to [AT-115, "Disassembly"](#).



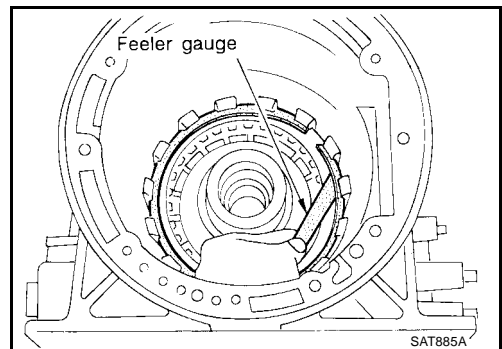
8. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

### Specified clearance

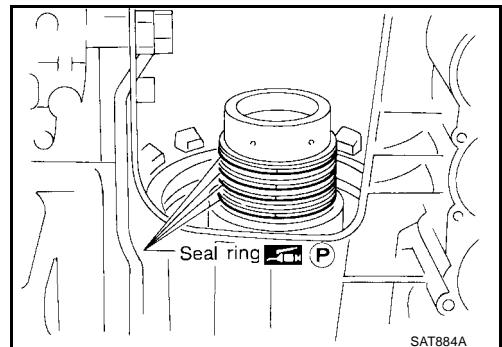
**Standard** : 0.5 - 0.8 mm (0.020 - 0.031 in)

**Allowable limit** : 2.3 mm (0.091 in)

**Retaining plate** : Refer to [AT-153, "LOW & REVERSE BRAKE"](#).



9. Install low one-way clutch inner race seal ring.
  - Apply petroleum jelly to seal ring.
  - Make sure seal rings are pressed firmly into place and held by petroleum jelly.



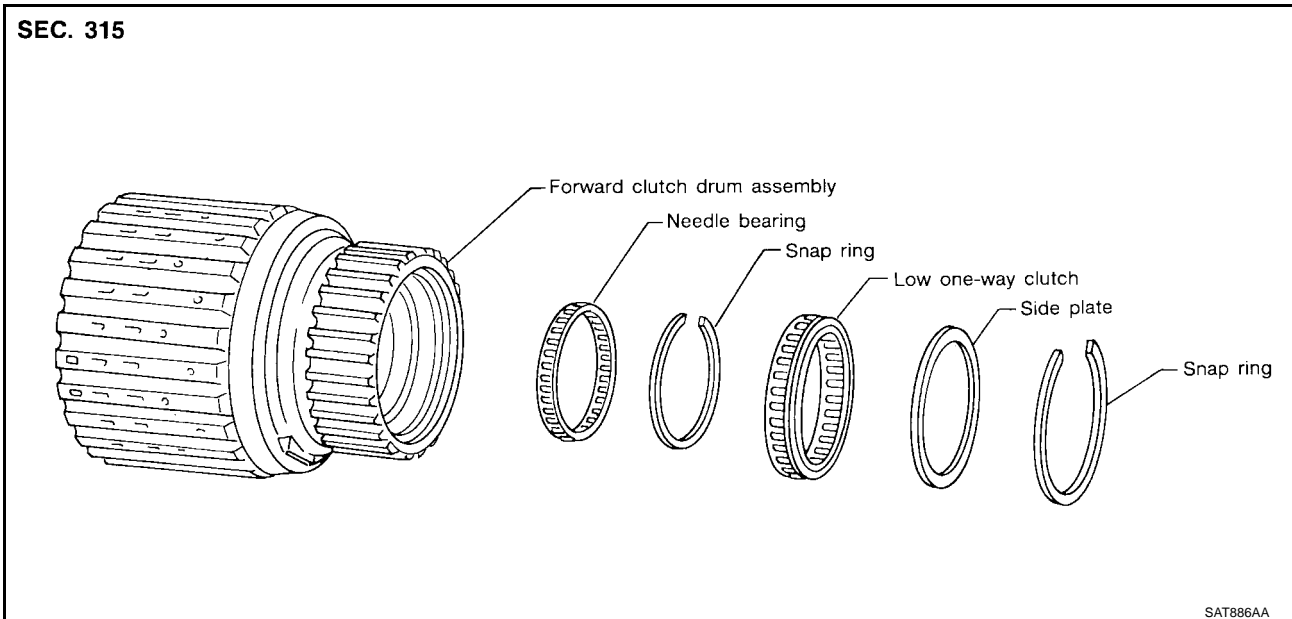
## FORWARD CLUTCH DRUM ASSEMBLY

PF3:31571

### Components

ECS007KC

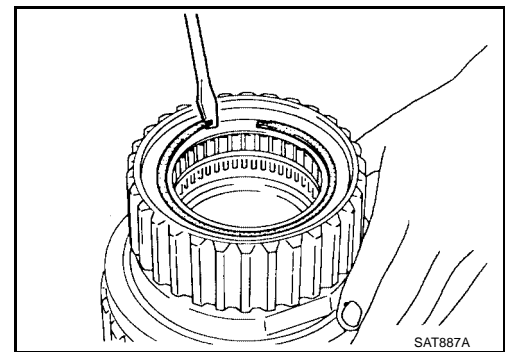
SEC. 315



### Disassembly

ECS007KD

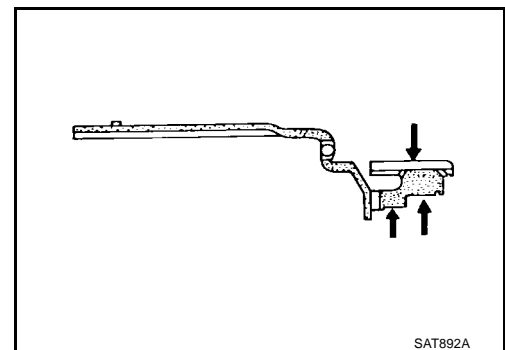
1. Remove snap ring from forward clutch drum.
2. Remove side plate from forward clutch drum.
3. Remove low one-way clutch from forward clutch drum.
4. Remove snap ring from forward clutch drum.
5. Remove needle bearing from forward clutch drum.



### Inspection FORWARD CLUTCH DRUM

ECS007KE

- Check spline portion for wear or damage.
- Check frictional surfaces of low one-way clutch and needle bearing for wear or damage.



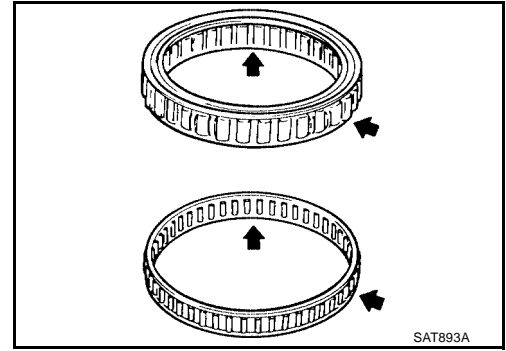
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# FORWARD CLUTCH DRUM ASSEMBLY

[RL4R01A]

## NEEDLE BEARING AND LOW ONE-WAY CLUTCH

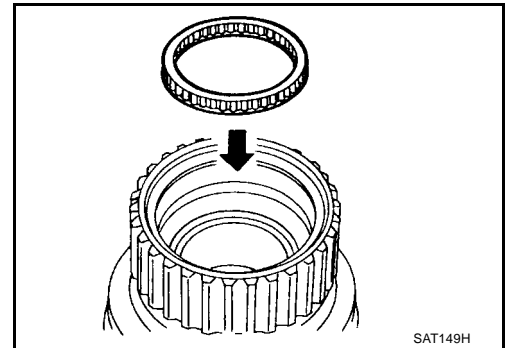
- Check frictional surface for wear or damage.



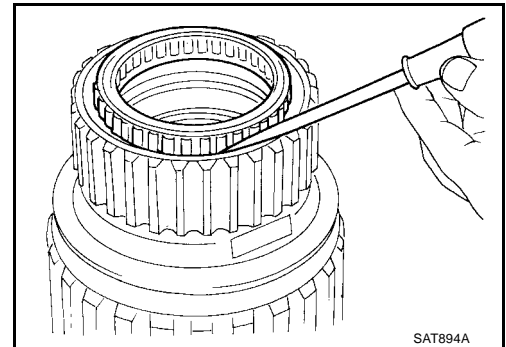
ECS007KF

## Assembly

1. Install needle bearing in forward clutch drum.
2. Install snap ring onto forward clutch drum.

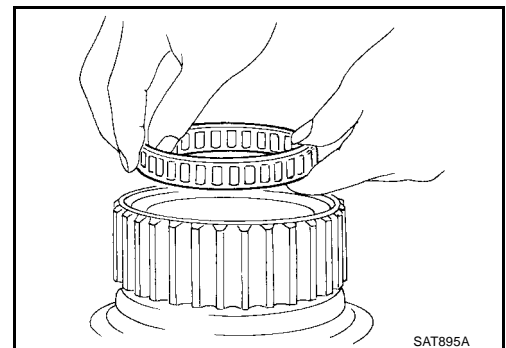


3. Install low one-way clutch onto forward clutch drum by pushing the roller in evenly.



- **Install low one-way clutch with flange facing rearward.**

4. Install side plate onto forward clutch drum.
5. Install snap ring onto forward clutch drum.



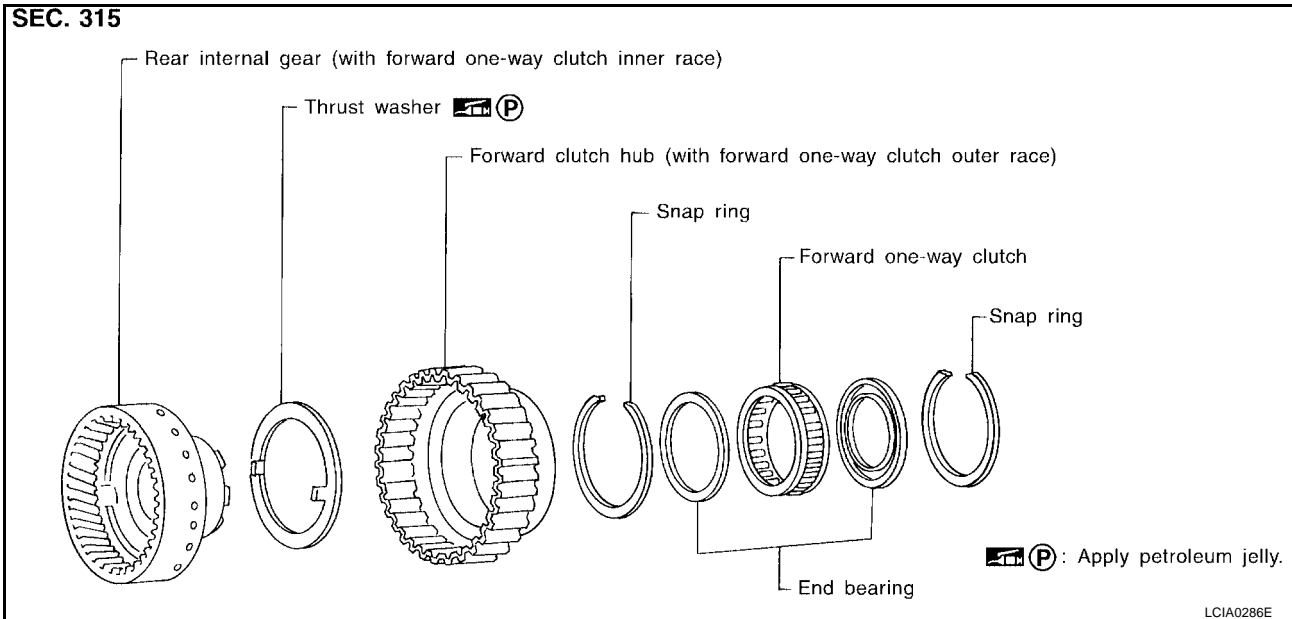


## REAR INTERNAL GEAR AND FORWARD CLUTCH HUB

PF3:31450

### Components

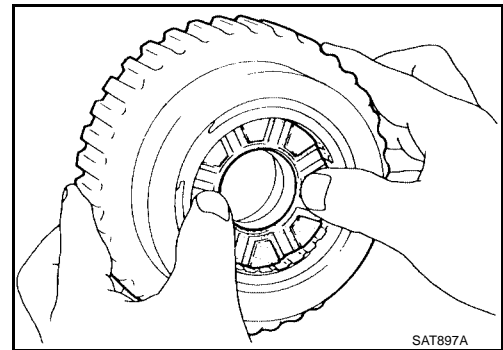
ECS007KG



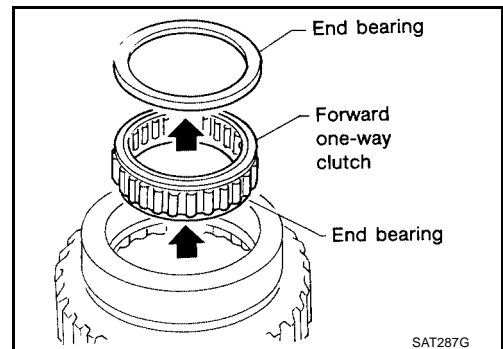
### Disassembly

ECS007KH

1. Remove rear internal gear by pushing forward clutch hub forward.
2. Remove thrust washer from rear internal gear.
3. Remove snap ring from forward clutch hub.
4. Remove end bearing.



5. Remove forward one-way clutch and end bearing as a unit from forward clutch hub.
6. Remove snap ring from forward clutch hub.



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# REAR INTERNAL GEAR AND FORWARD CLUTCH HUB

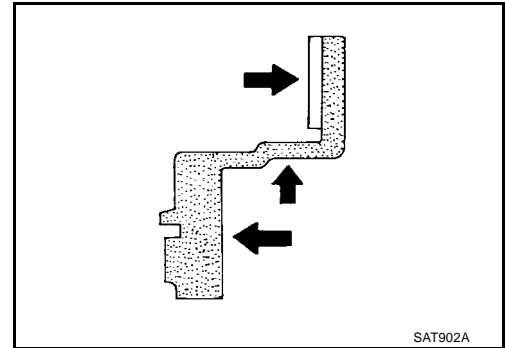
[RL4R01A]

ECS007K1

## Inspection

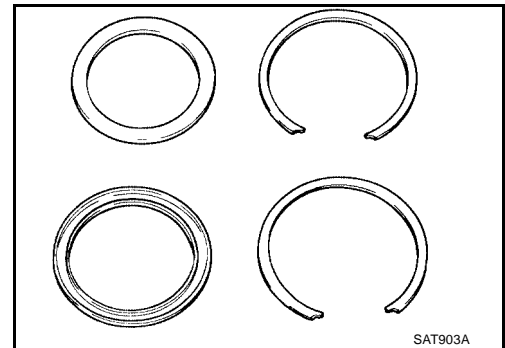
### REAR INTERNAL GEAR AND FORWARD CLUTCH HUB

- Check gear for excessive wear, chips or cracks.
- Check frictional surfaces of forward one-way clutch and thrust washer for wear or damage.
- Check spline for wear or damage.



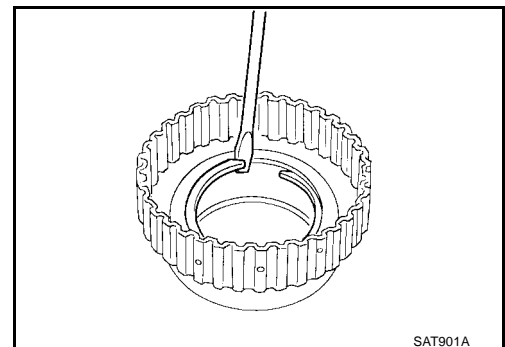
### SNAP RING AND END BEARING

- Check for deformation or damage.



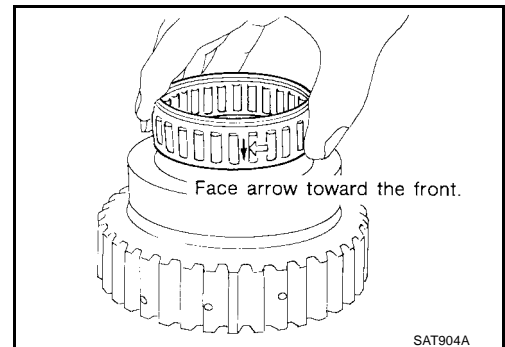
## Assembly

1. Install snap ring onto forward clutch hub.
2. Install end bearing.



ECS007KJ

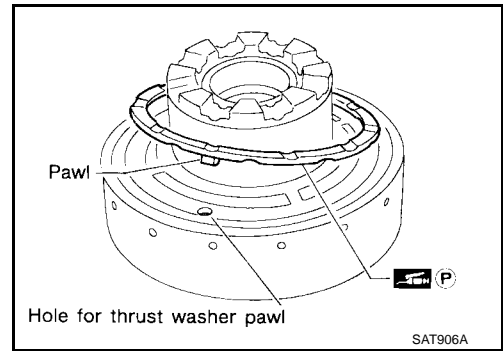
3. Install forward one-way clutch onto clutch hub.
  - Install forward one-way clutch with flange facing rearward.
4. Install end bearing.
5. Install snap ring onto forward clutch hub.



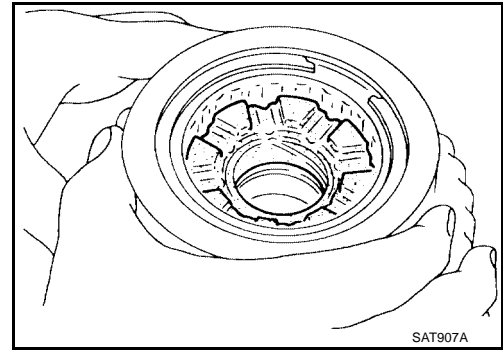
# REAR INTERNAL GEAR AND FORWARD CLUTCH HUB

[RL4R01A]

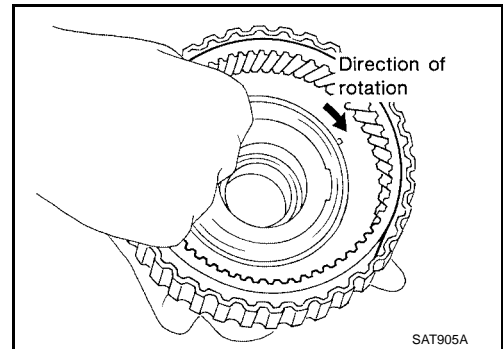
6. Install thrust washer onto rear internal gear.
  - Apply petroleum jelly to thrust washer.
  - Securely insert pawls of thrust washer into holes in rear internal gear.



7. Position forward clutch hub in rear internal gear.



8. After installing, check to assure that forward clutch hub rotates clockwise.



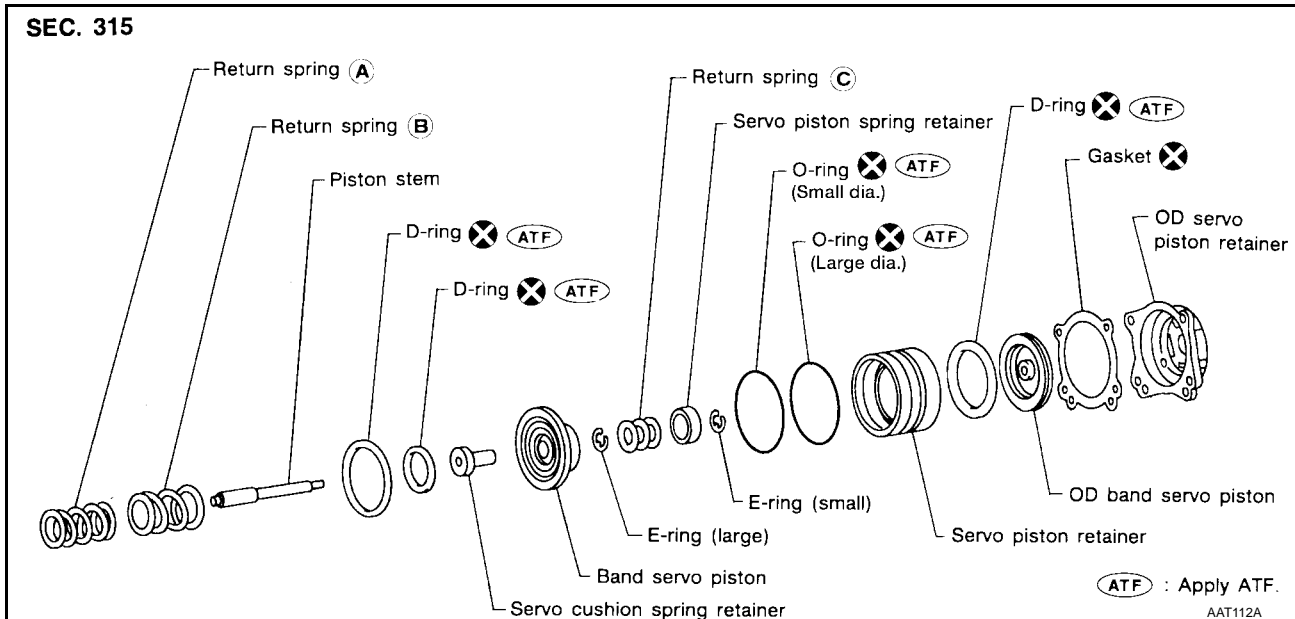
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## BAND SERVO PISTON ASSEMBLY

PFP:31615

### Components

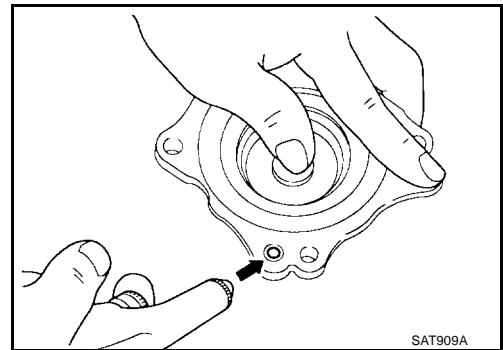
ECS007KK



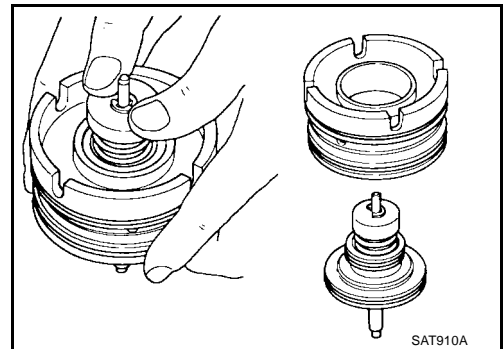
### Disassembly

ECS007KL

1. Block one oil hole in O/D servo piston retainer and the center hole in O/D band servo piston.
2. Apply compressed air to the other oil hole in piston retainer to remove O/D band servo piston from retainer.
3. Remove D-ring from O/D band servo piston.



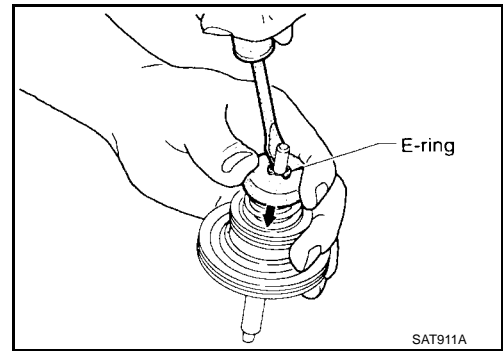
4. Remove band servo piston assembly from servo piston retainer by pushing it forward.



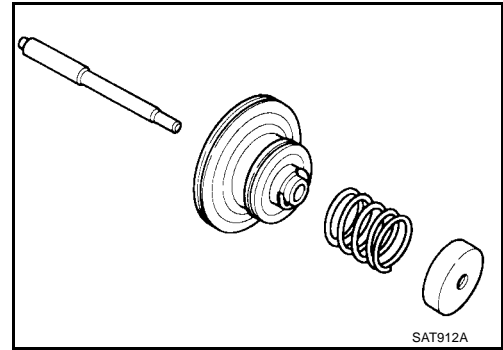
# BAND SERVO PISTON ASSEMBLY

[RL4R01A]

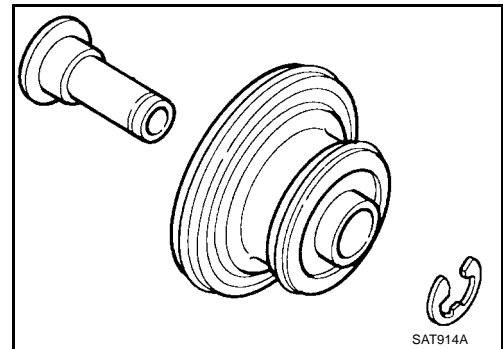
5. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.



6. Remove servo piston spring retainer, return spring C and piston stem from band servo piston.



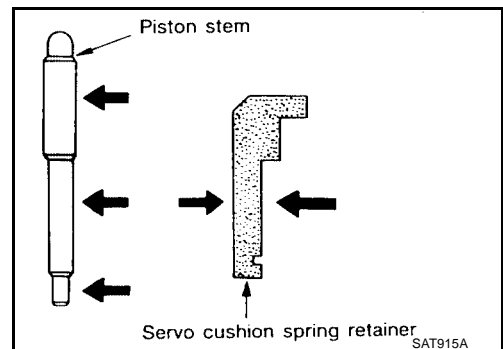
7. Remove E-ring from band servo piston.
8. Remove servo cushion spring retainer from band servo piston.
9. Remove D-rings from band servo piston.
10. Remove O-rings from servo piston retainer.



ECS007KM

## Inspection PISTONS, RETAINERS AND PISTON STEM

- Check frictional surfaces for abnormal wear or damage.

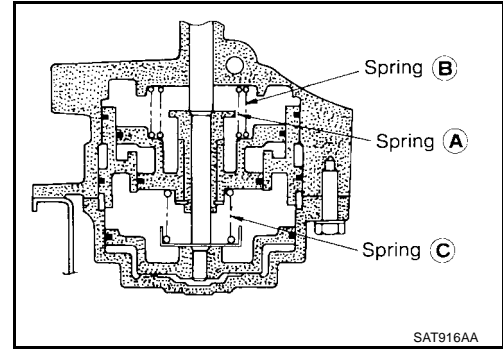


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## RETURN SPRINGS

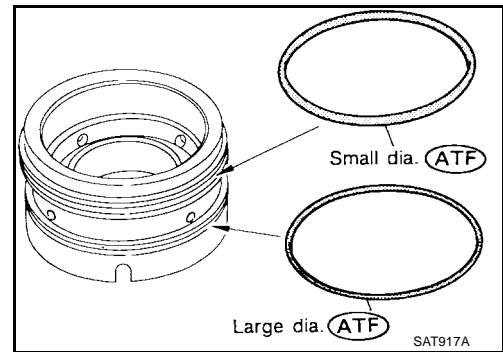
- Check for deformation or damage. Measure free length and outer diameter.

**Inspection standard** : Refer to [AT-151, "Return Springs"](#) .

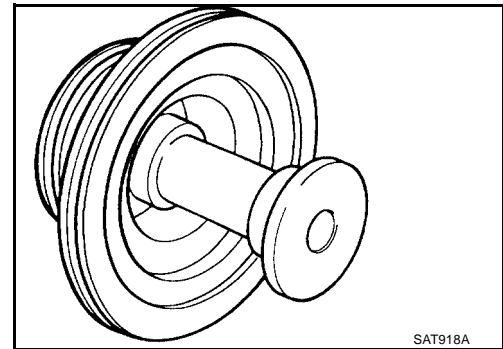


## Assembly

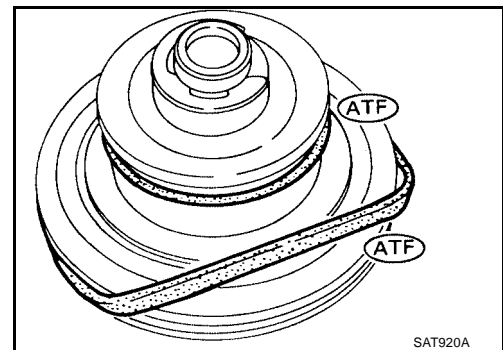
1. Install O-rings onto servo piston retainer.
  - Apply ATF to O-rings.
  - Pay attention to position of each O-ring.



2. Install servo cushion spring retainer onto band servo piston.



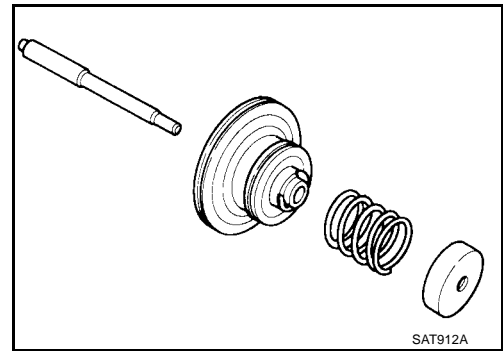
3. Install E-ring onto servo cushion spring retainer.
4. Install D-rings onto band servo piston.
  - Apply ATF to D-rings.



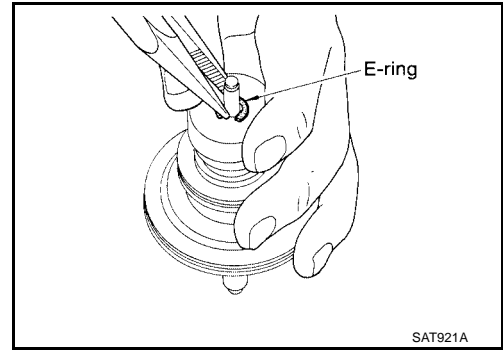
# BAND SERVO PISTON ASSEMBLY

[RL4R01A]

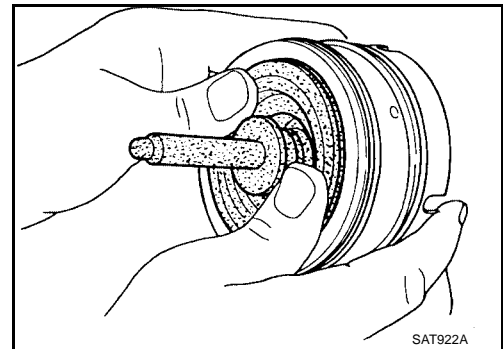
5. Install servo piston spring retainer, return spring C and piston stem onto band servo piston.



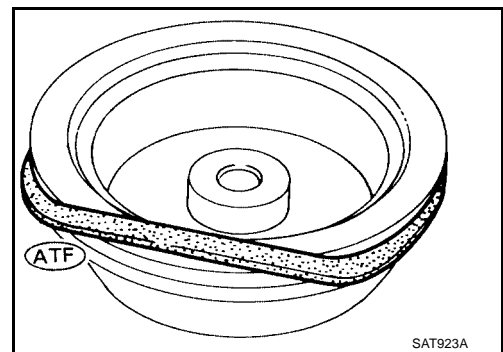
6. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.



7. Install band servo piston assembly onto servo piston retainer by pushing it inward.



8. Install D-ring on O/D band servo piston.  
● **Apply ATF to D-ring.**

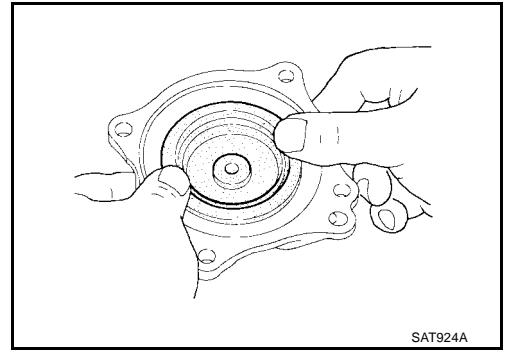


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## BAND SERVO PISTON ASSEMBLY

[RL4R01A]

9. Install O/D band servo piston onto O/D servo piston retainer by pushing it inward.



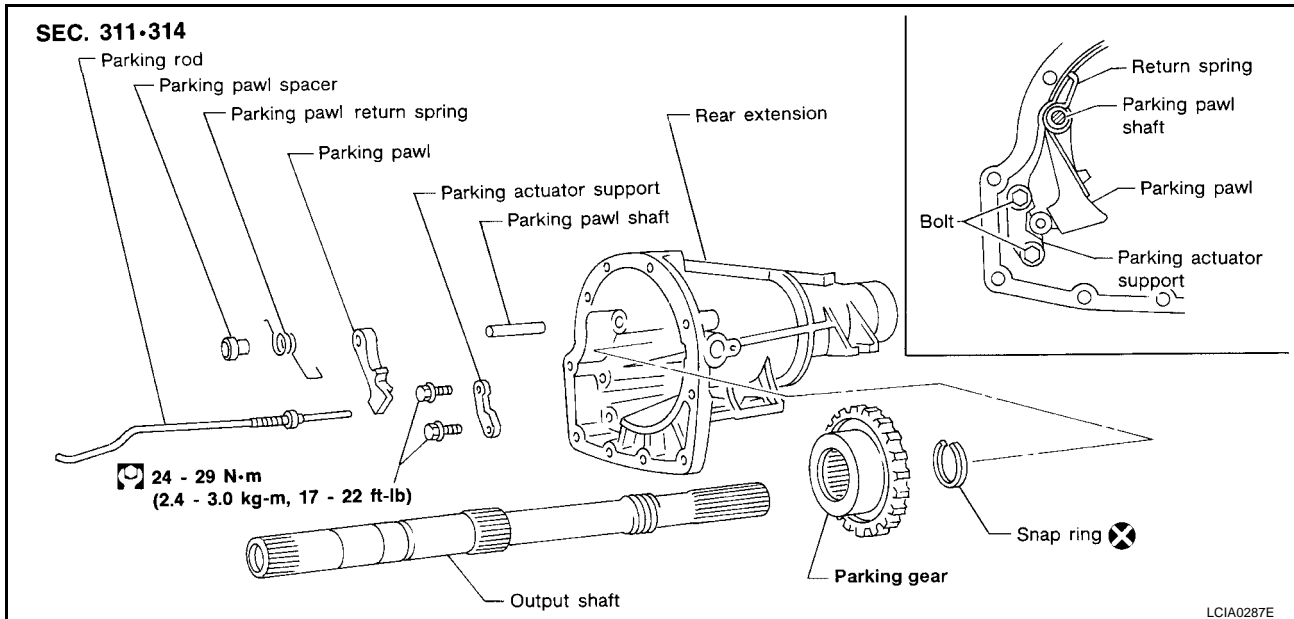


## PARKING PAWL COMPONENTS

PF3:31991

### Components

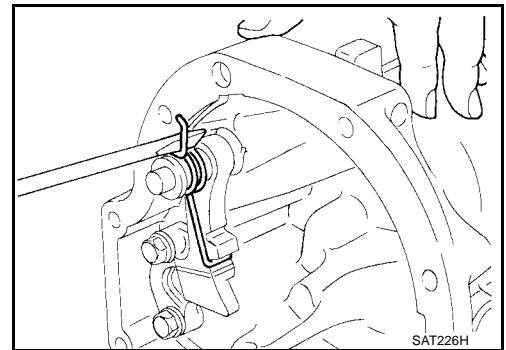
ECS007KO



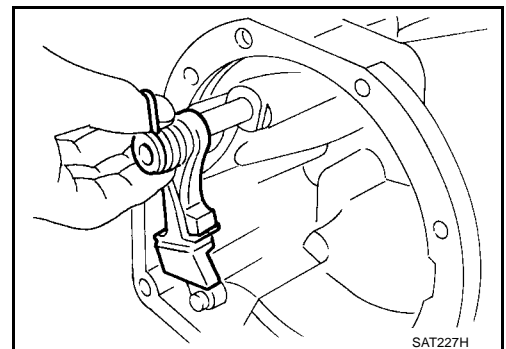
### Disassembly

ECS007KP

1. Slide return spring to the front of rear extension flange.



2. Remove return spring, pawl spacer and parking pawl from rear extension.



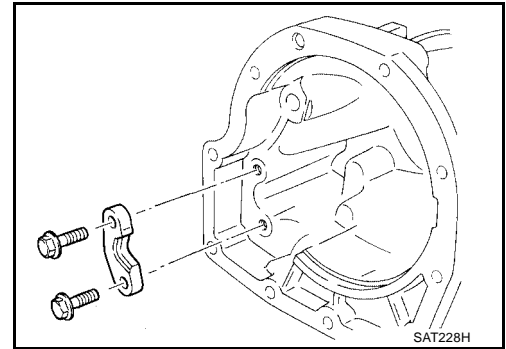
3. Remove parking pawl shaft from rear extension.

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# PARKING PAWL COMPONENTS

[RL4R01A]

4. Remove parking actuator support from rear extension.

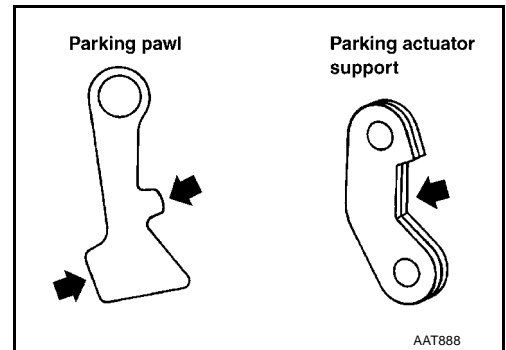


ECS007KQ

## Inspection

### PARKING PAWL AND PARKING ACTUATOR SUPPORT

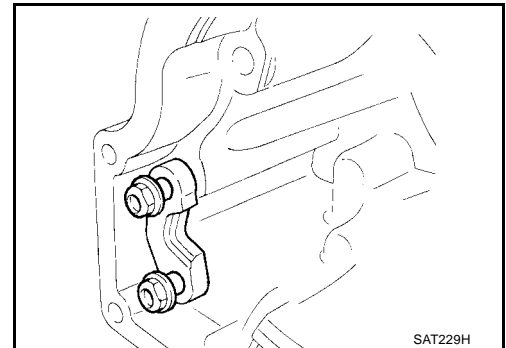
- Check contact surface of parking rod and parking gear for wear.



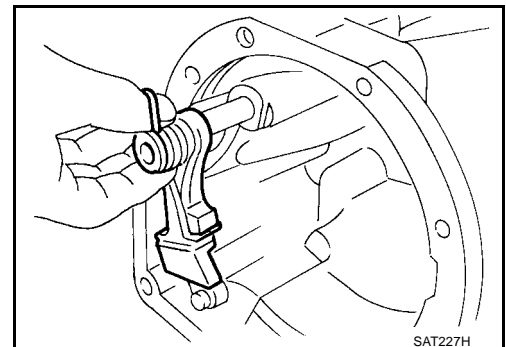
ECS007KR

## Assembly

1. Install parking actuator support onto rear extension.
2. Insert parking pawl shaft into rear extension.



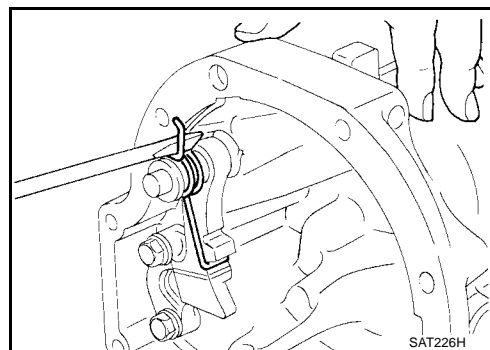
3. Install return spring, pawl spacer and parking pawl onto parking pawl shaft.



# PARKING PAWL COMPONENTS

[RL4R01A]

4. Bend return spring upward and install it onto rear extension.



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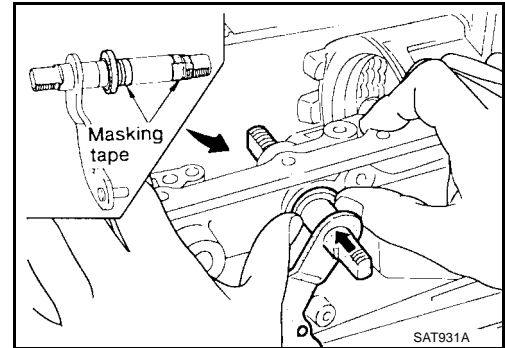
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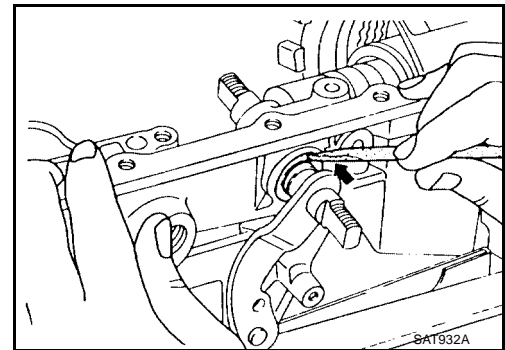
## ASSEMBLY

### Assembly (1)

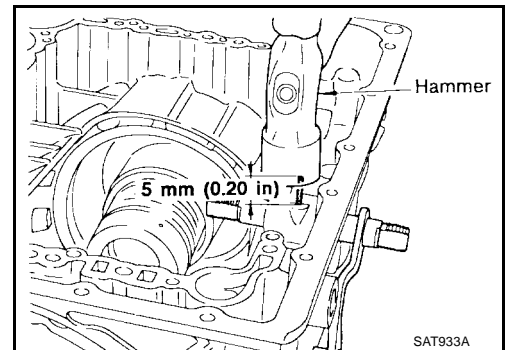
1. Install manual shaft components.
  - a. Install oil seal onto manual shaft.
    - **Apply ATF to oil seal.**
    - **Wrap threads of manual shaft with masking tape.**
  - b. Insert manual shaft and oil seal as a unit into transmission case.
  - c. Remove masking tape.



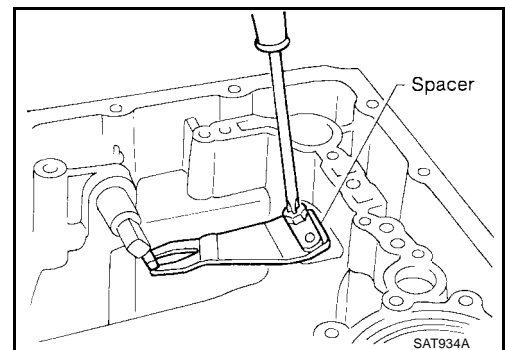
- d. Push oil seal evenly and install it onto transmission case.



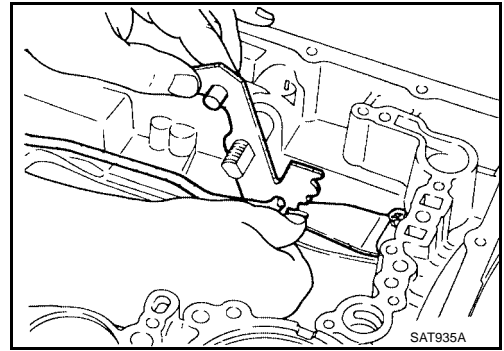
- e. Align groove in shaft with drive pin hole; then drive pin into position as shown in figure at left.



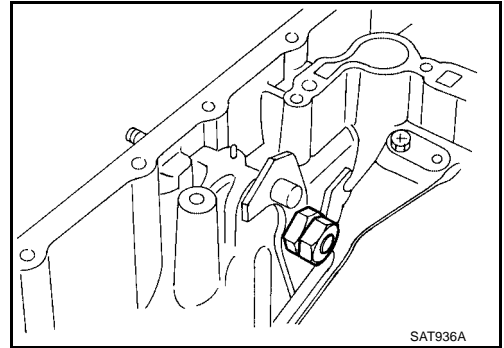
- f. Install detent spring and spacer.



- g. While pushing detent spring down, install manual plate onto manual shaft.

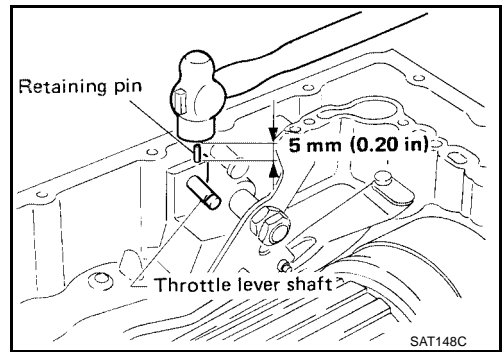


- h. Install lock nuts onto manual shaft.

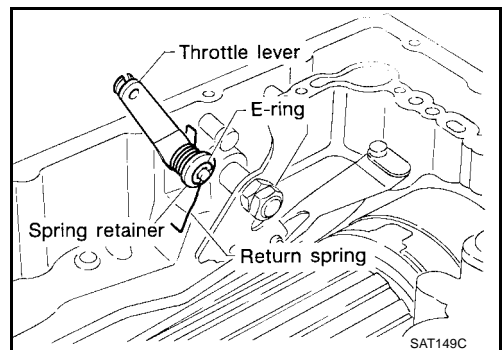


2. Install throttle lever components.

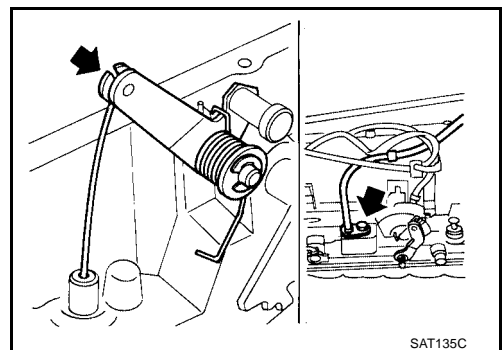
- a. Install throttle lever shaft.  
 b. Align groove in shaft with drive pin hole, then drive pin into position as shown in figure at left.



- c. Install throttle lever, return spring, spring retainer and E-ring.

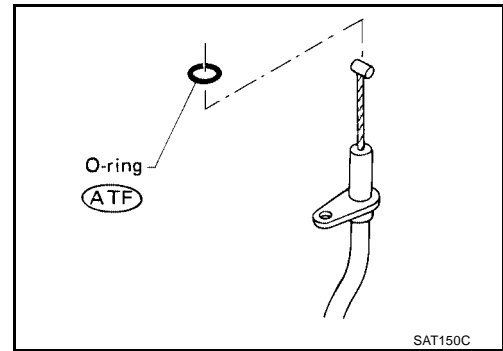


- d. Install throttle wire.



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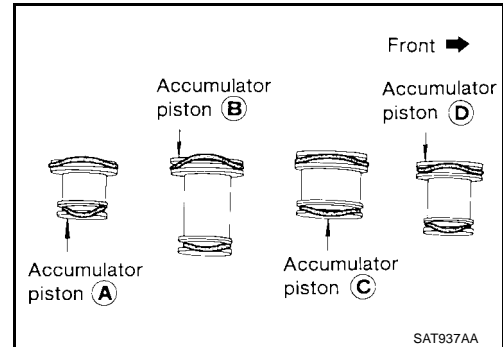
- Apply ATF to O-ring.



3. Install accumulator piston.
  - a. Install O-rings onto accumulator piston.

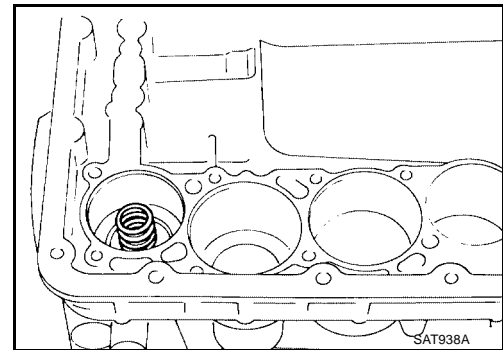
- Apply ATF to O-rings.

**Accumulator piston O-rings** : Refer to [AT-152, "Accumulator O-ring"](#) .

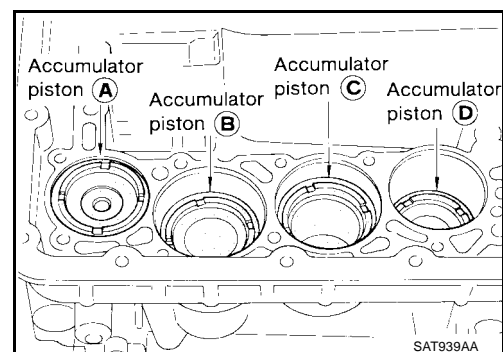


- b. Install return spring for accumulator A onto transmission case.

**Free length of return spring** : Refer to [AT-151, "Return Springs"](#) .

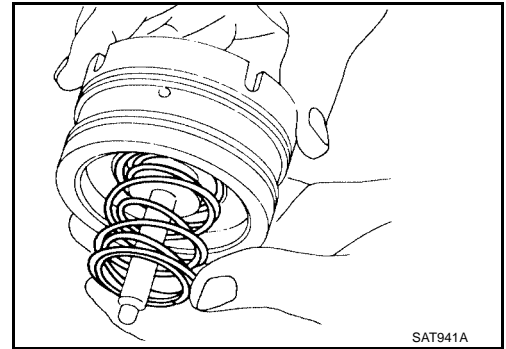


- c. Install accumulator pistons A , B , C and D .

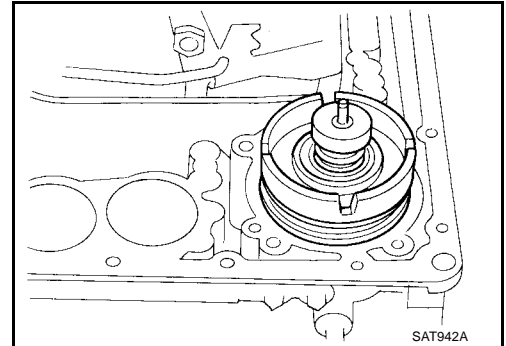


- Apply ATF to transmission case.

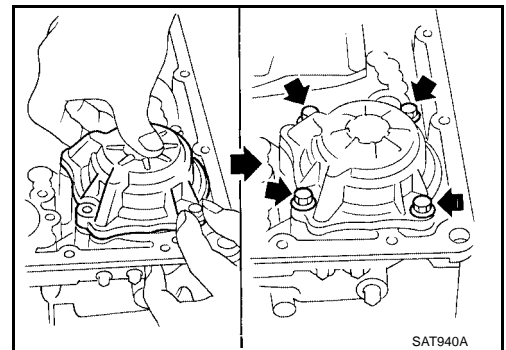
4. Install band servo piston.
- a. Install return springs onto band servo piston.



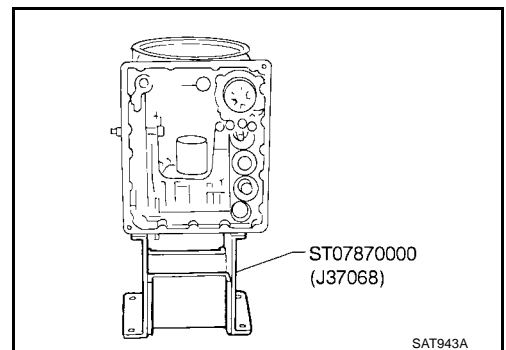
- b. Install band servo piston onto transmission case.
  - **Apply ATF to O-ring of band servo piston and transmission case.**
- c. Install gasket for band servo onto transmission case.



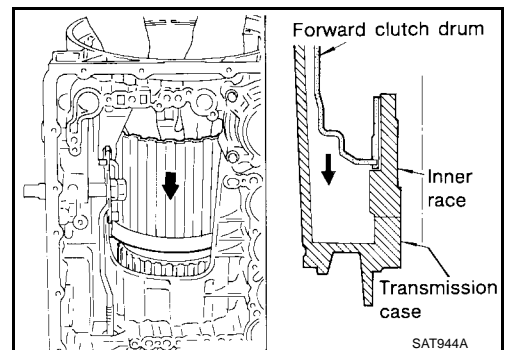
- d. Install O/D servo piston retainer onto transmission case.



5. Install rear side clutch and gear components.
- a. Place transmission case in vertical position.



- b. Slightly lift forward clutch drum assembly and slowly rotate it clockwise until its hub passes fully over the clutch inner race inside transmission case.

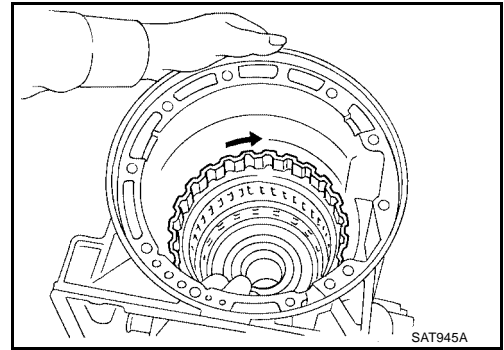


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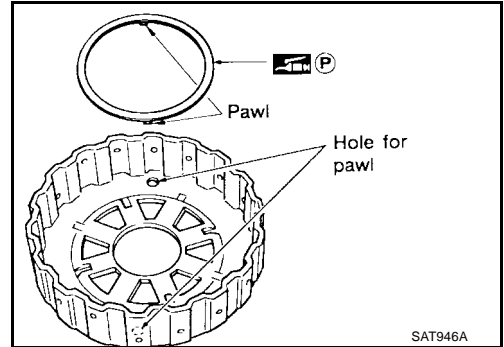
# ASSEMBLY

[RL4R01A]

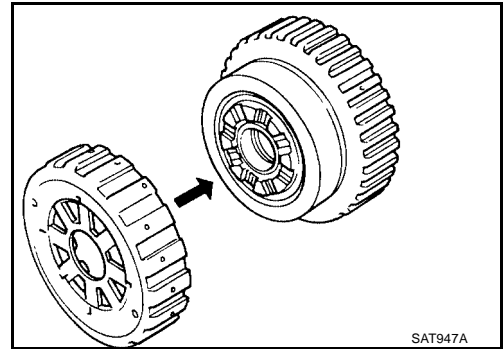
- c. Check to be sure that rotation direction of forward clutch assembly is correct.



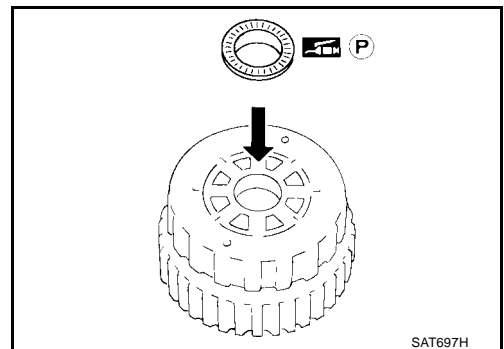
- d. Install thrust washer onto front of overrun clutch hub.
- Apply petroleum jelly to the thrust washer.
  - Insert pawls of thrust washer securely into holes in overrun clutch hub.



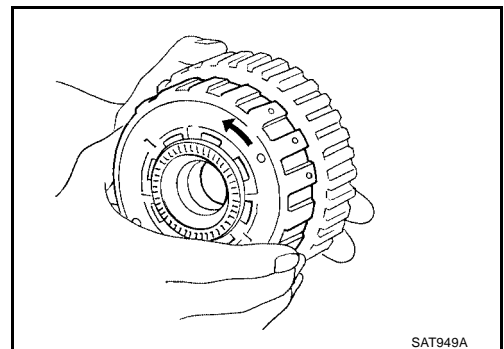
- e. Install overrun clutch hub onto rear internal gear assembly.



- f. Install needle bearing onto rear of overrun clutch hub.
- Apply petroleum jelly to needle bearing.



- g. Check that overrun clutch hub rotates as shown while holding forward clutch hub.

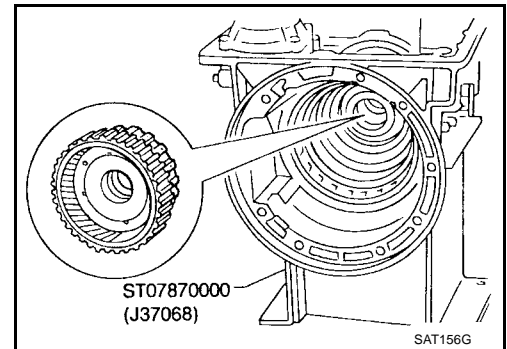




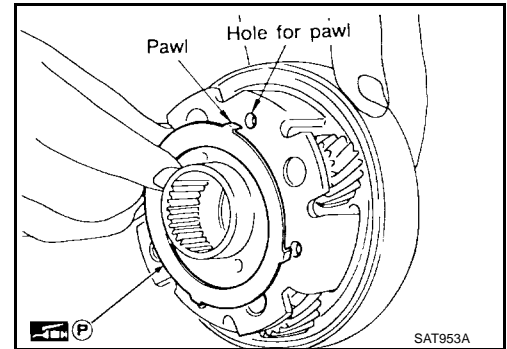
# ASSEMBLY

[RL4R01A]

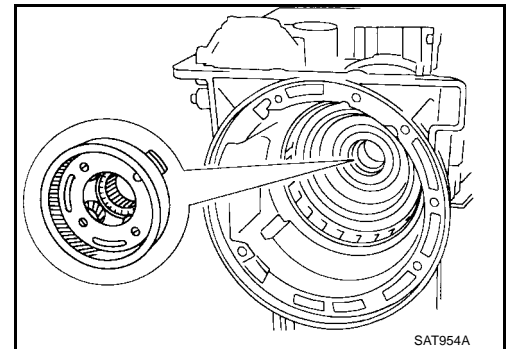
- h. Place transmission case into horizontal position.
- i. Install rear internal gear, forward clutch hub and overrun clutch hub as a unit onto transmission case.



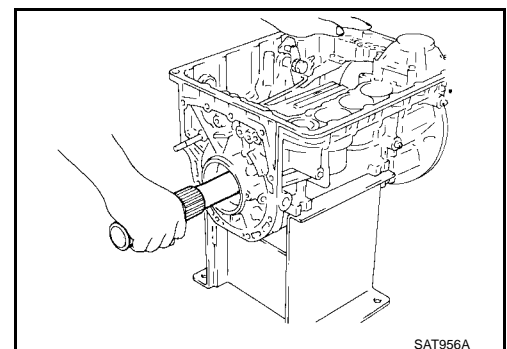
- j. Install needle bearing onto rear internal gear.
  - Apply petroleum jelly to needle bearing.
- k. Install bearing race onto rear of front internal gear.
  - Apply petroleum jelly to bearing race.
  - Securely engage pawls of bearing race with holes in front internal gear.



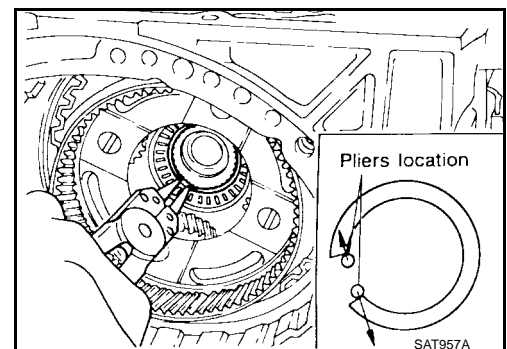
- l. Install front internal gear on transmission case.



- 6. Install output shaft and parking gear.
  - a. Insert output shaft from rear of transmission case while slightly lifting front internal gear.
    - Do not force output shaft against front of transmission case.



- b. Carefully push output shaft against front of transmission case. Install snap ring on front of output shaft.
  - Check to be sure output shaft cannot be removed in rear direction.

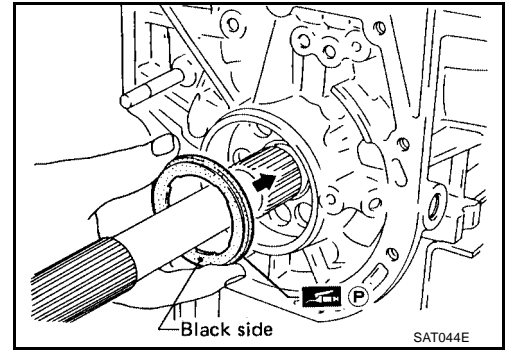


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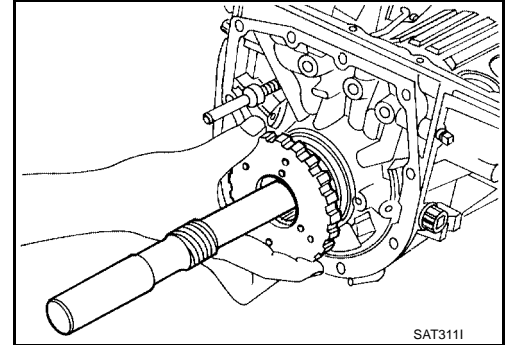
# ASSEMBLY

[RL4R01A]

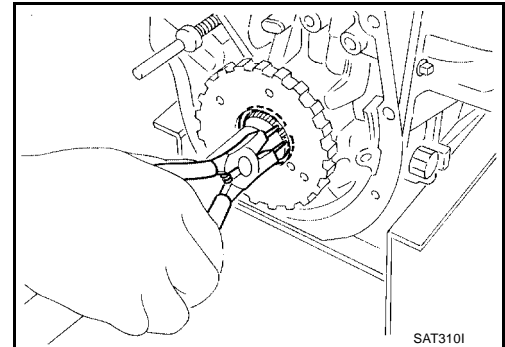
- c. Install needle bearing on transmission case.
- Pay attention to its direction — black side faces the rear.
  - Apply petroleum jelly to needle bearing.



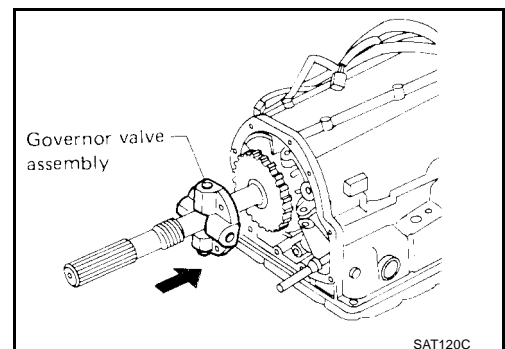
- d. Install parking gear on transmission case.



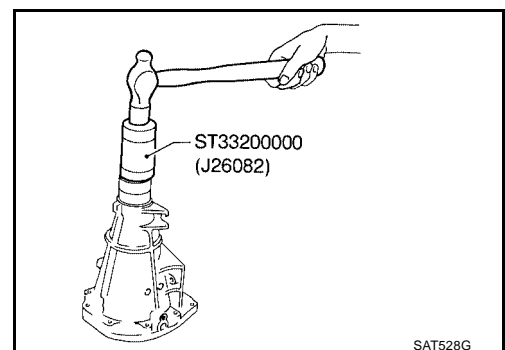
- e. Install snap ring on rear of output shaft.
- Check to be sure output shaft cannot be removed in forward direction.



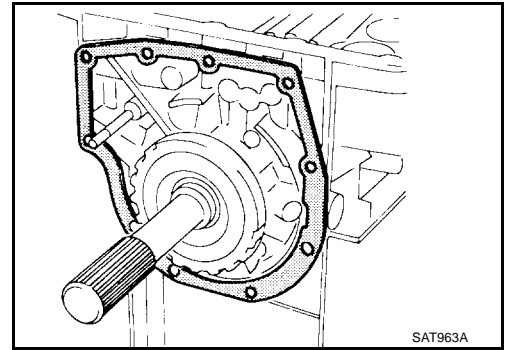
- f. Install governor valve assembly on oil distributor.



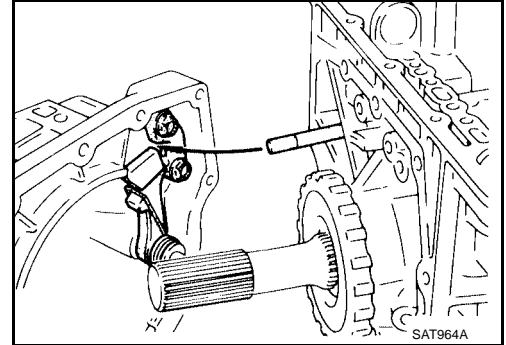
7. Install rear extension case.
- a. Install oil seal on rear extension case.
- Apply ATF to oil seal.



- b. Install rear extension gasket on transmission case.

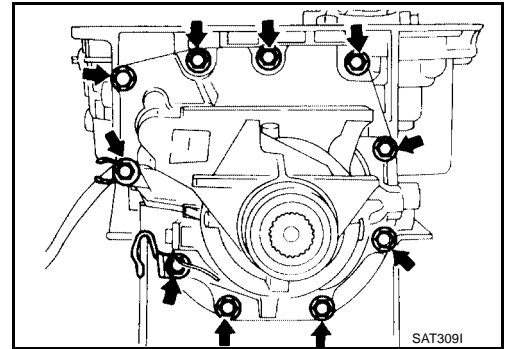


- c. Install parking rod on transmission case.



- d. Install rear extension case on transmission case. Tighten bolts to specified torque.

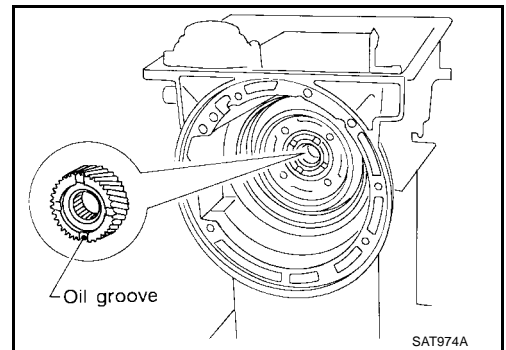
 : 20 - 25 N·m (2.0 - 2.5 kg·m, 14 - 18 ft·lb)



8. Install front side clutch and gear components.

- a. Install rear sun gear on transmission case.

- Pay attention to its direction.



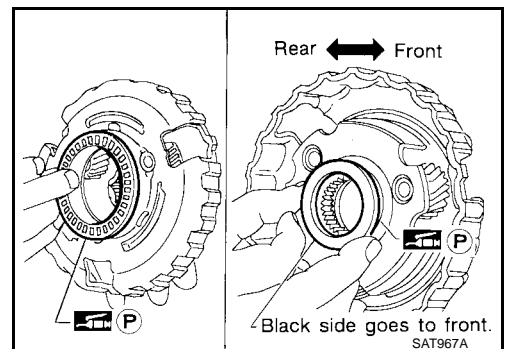
- b. Install needle bearing on front of front planetary carrier.

- Apply petroleum jelly to needle bearing.

- c. Install needle bearing on rear of front planetary carrier.

- Apply petroleum jelly to needle bearing.

- Pay attention to its direction — black side faces the front.

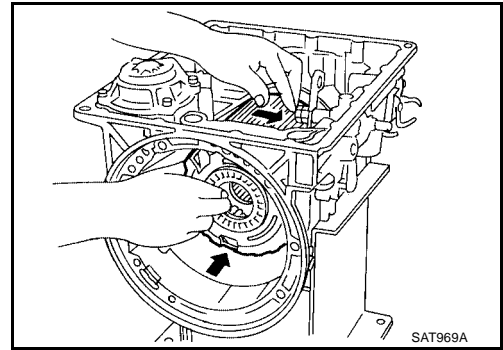


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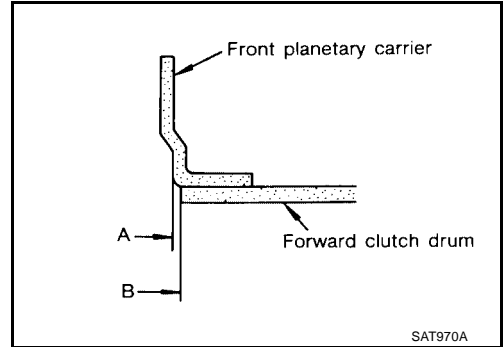
# ASSEMBLY

[RL4R01A]

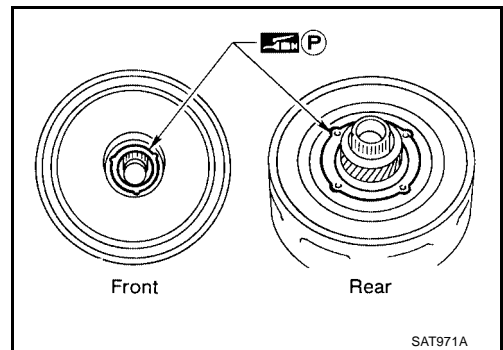
- d. While rotating forward clutch drum clockwise, install front planetary carrier on forward clutch drum.



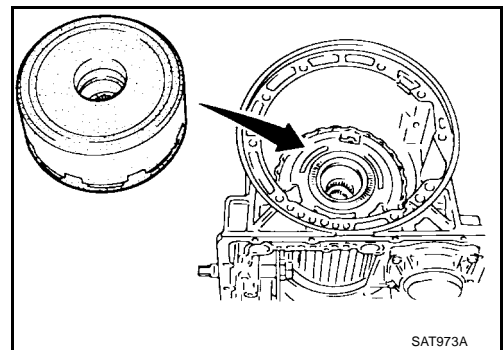
- Check that portion A of front planetary carrier protrudes approximately 2 mm (0.08 in) beyond portion B of forward clutch assembly.



- e. Install bearing races on front and rear of clutch pack.
- Apply petroleum jelly to bearing races.
  - Securely engage pawls of bearing races with holes in clutch pack.
- f. Place transmission case in vertical position.



- g. Install clutch pack into transmission case.



## Adjustment

ECS007KT

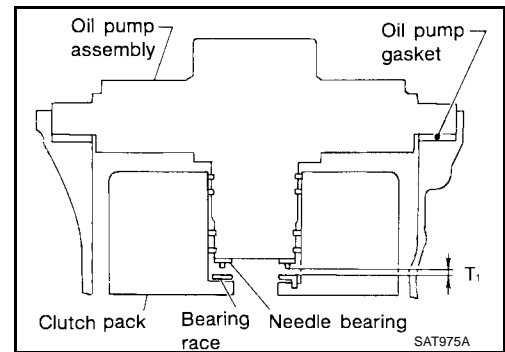
When any parts listed in the following table are replaced, total end play or reverse clutch end play must be adjusted.

Part name	Item	
	Total end play	Reverse clutch end play
Transmission case	●	●
Low one-way clutch inner race	●	●

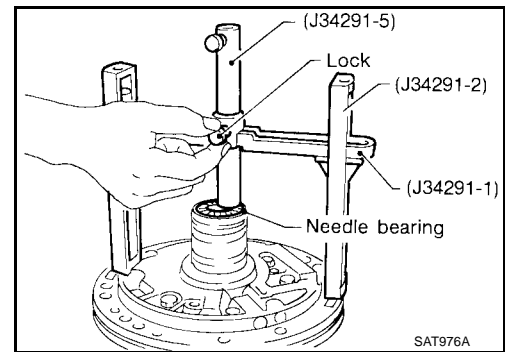
Part name	Item	
	Total end play	Reverse clutch end play
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
High clutch drum	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●

1. Adjust total end play.

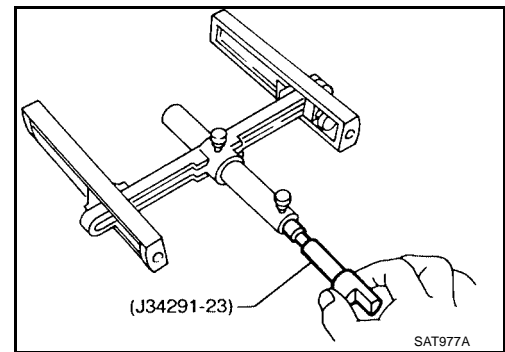
Total end play "T1" : 0.25 - 0.55 mm (0.0098 - 0.0217 in)



a. With original needle bearing installed, place J34291-1 (bridge), J34291-2 (legs) and the J34291-5 (gauging cylinder) onto oil pump. The long ends of legs should be placed firmly on machined surface of oil pump assembly, and gauging cylinder should rest on top of the needle bearing. Lock gauging cylinder in place with set screw.



b. Install J34291-23 (gauging plunger) into gauging cylinder.

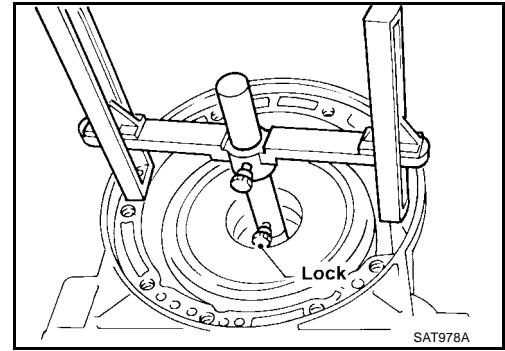


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# ASSEMBLY

[RL4R01A]

- c. With original bearing race installed inside reverse clutch drum, place shim selecting gauge with its legs on machined surface of transmission case (no gasket) and allow gauging plunger to rest on bearing race. Lock gauging plunger in place with set screw.

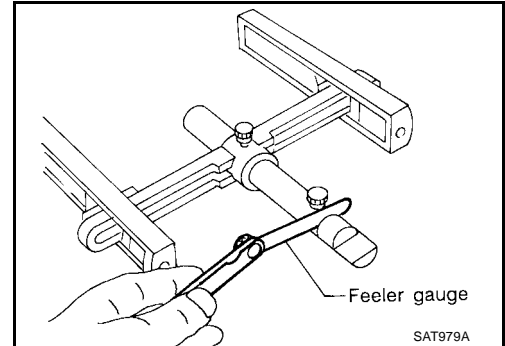


- d. Remove Tool and use feeler gauge to measure gap between gauging cylinder and gauging plunger. This measurement should give exact total end play.

**Total end play "T1" : 0.25 - 0.55 mm (0.0098 - 0.0217 in)**

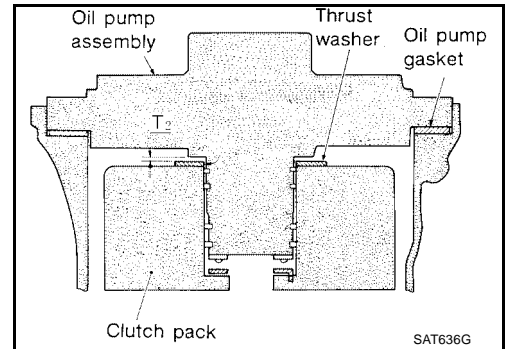
- If end play is out of specification, decrease or increase thickness of oil pump cover bearing race as necessary.

**Available oil pump cover : Refer to [AT-154, "Total bearing race End Play"](#) .**

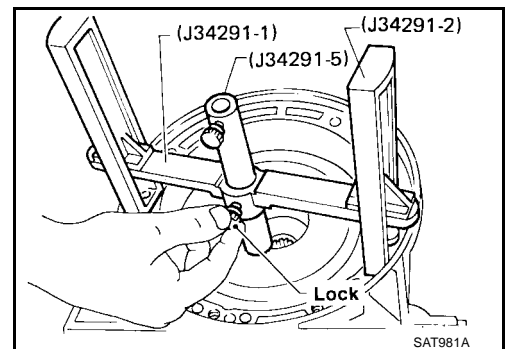


2. Adjust reverse clutch drum end play.

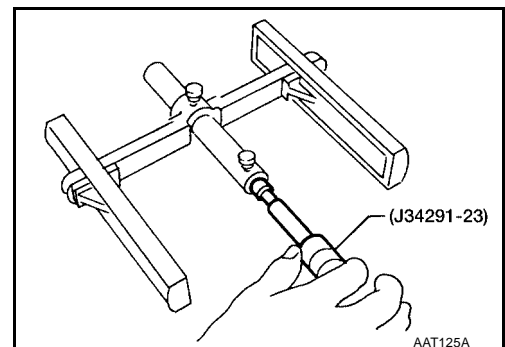
**Reverse clutch drum end play "T2" : 0.55 - 0.90 mm (0.0217 - 0.0354 in)**



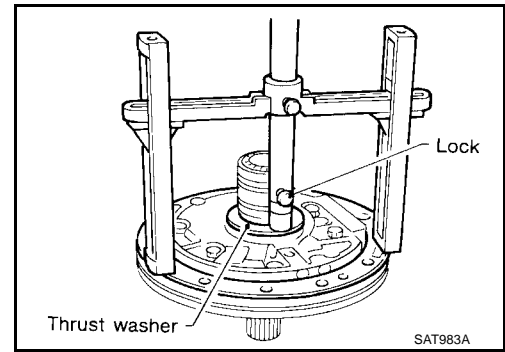
- a. Place J34291-1 (bridge), J34291-2 (legs) and J34291-5 (gauging cylinder) on machined surface of transmission case (no gasket) and allow gauging cylinder to rest on front thrust surface of reverse clutch drum. Lock cylinder in place with set screw.



- b. Install J34291-23 (gauging plunger) into gauging cylinder.



- c. With original thrust washer installed on oil pump, place shim setting gauge legs onto machined surface of oil pump assembly and allow gauging plunger to rest on thrust washer. Lock plunger in place with set screw.

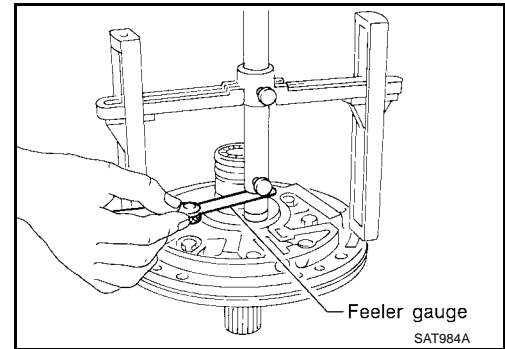


- d. Use feeler gauge to measure gap between gauging plunger and gauging cylinder. This measurement should give you exact reverse clutch drum and play.

**Reverse clutch drum end play "T2"** : 0.55 - 0.90 mm (0.0217 - 0.0354 in)

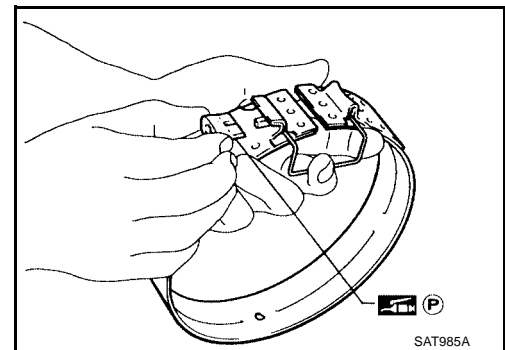
- If end play is out of specification, decrease or increase thickness of oil pump thrust washer as necessary.

**Available oil pump thrust washer** : Refer to [AT-154](#), "[Reverse Clutch Drum End Play](#)".

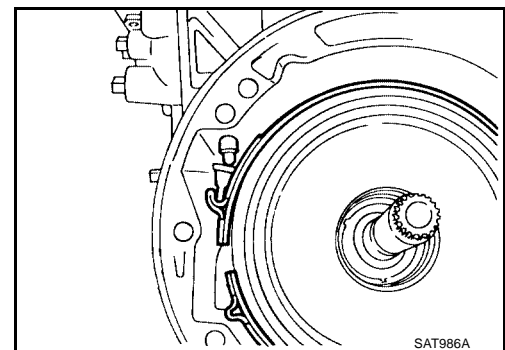


### Assembly (2)

1. Place transmission case into horizontal position.
2. Install brake band and band strut.
- a. Install band strut on brake band.
  - **Apply petroleum jelly to band strut.**



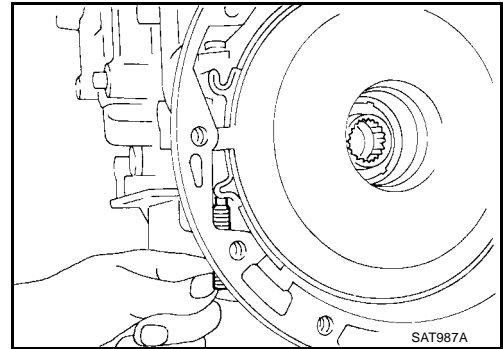
- b. Place brake band around reverse clutch drum, and insert band strut into end of band servo piston stem.



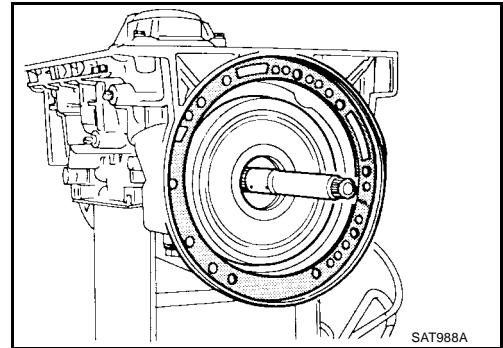
# ASSEMBLY

[RL4R01A]

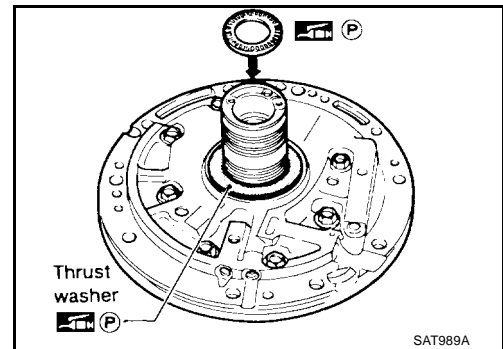
- c. Install anchor end pin on transmission case. Then, tighten anchor end pin just enough so that reverse clutch drum (clutch pack) will not tilt forward.



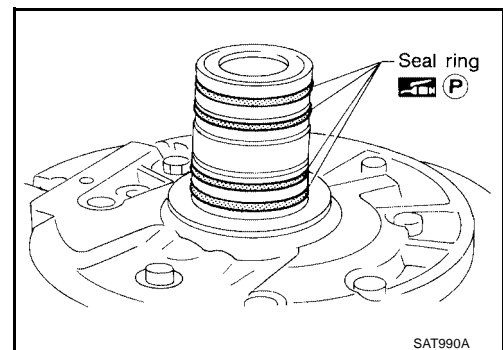
3. Install input shaft on transmission case.  
● Pay attention to its direction — O-ring groove side faces front.



4. Install gasket on transmission case.  
5. Install oil pump assembly.  
a. Install needle bearing on oil pump assembly.  
● Apply petroleum jelly to the needle bearing.  
b. Install selected thrust washer on oil pump assembly.  
● Apply petroleum jelly to thrust washer.



- c. Carefully install seal rings into grooves and press them into the petroleum jelly so that they are a tight fit.

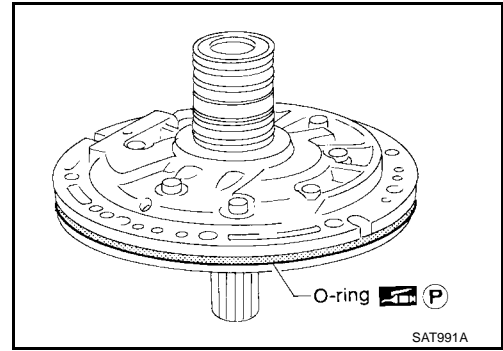




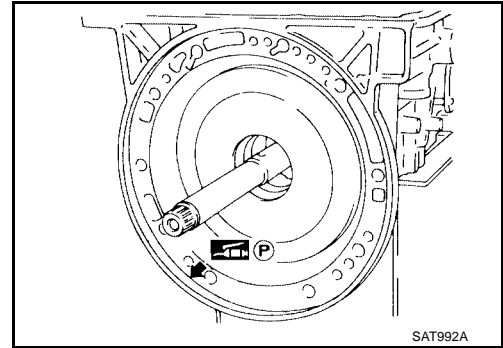
# ASSEMBLY

[RL4R01A]

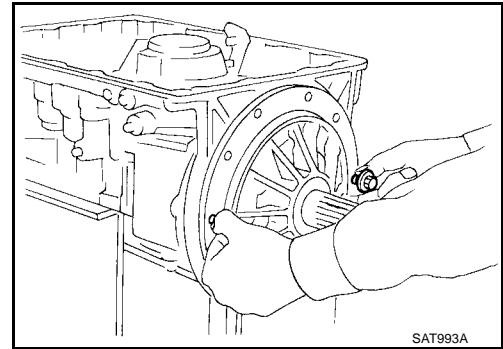
- d. Install O-ring on oil pump assembly.
- Apply petroleum jelly to O-ring.



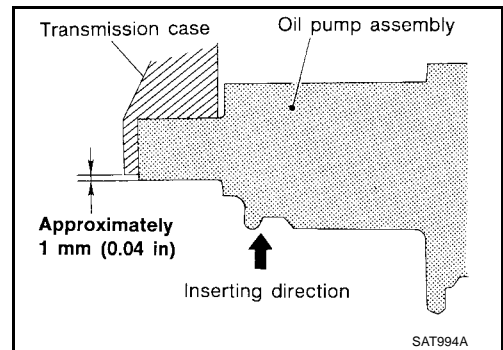
- e. Apply petroleum jelly to mating surface of transmission case and oil pump assembly.



- f. Install oil pump assembly.
- Install two converter housing securing bolts in bolt holes in oil pump assembly as guides.



- Insert oil pump assembly to the specified position in transmission, as shown at left.

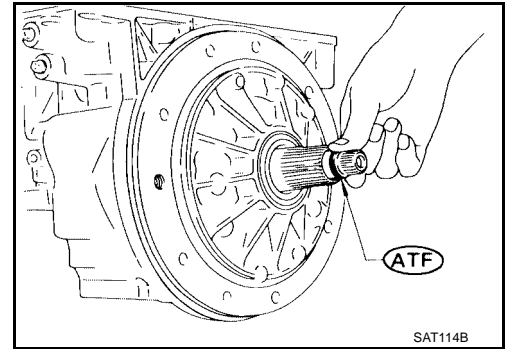


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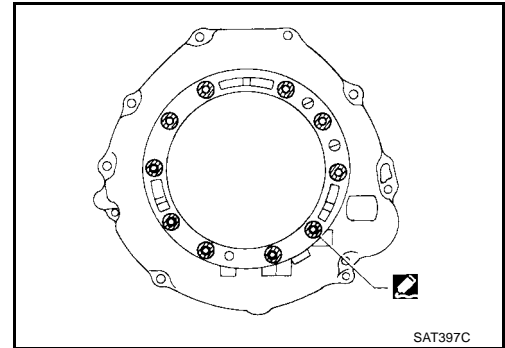
# ASSEMBLY

[RL4R01A]

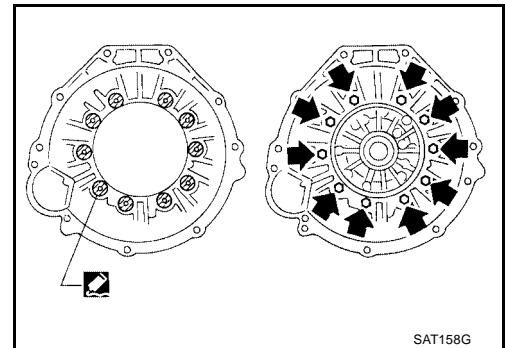
6. Install O-ring on input shaft.
  - Apply ATF to O-rings.



7. Install converter housing.
  - a. Apply Genuine Anaerobic Liquid Gasket or equivalent around bolt holes in converter housing. Refer to [GI-42, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#).
    - Do not apply too much sealant.



- b. Apply Genuine Anaerobic Liquid Gasket or equivalent to seating surfaces of bolts that secure front of converter housing. Refer to [GI-42, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#).
  - c. Install converter housing on transmission case.



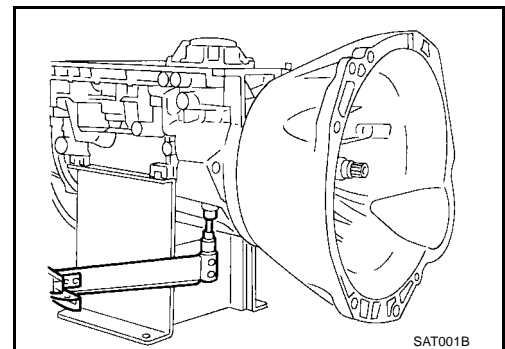
8. Adjust brake band.
  - a. Tighten anchor end pin to specified torque.

## Anchor end pin



: 4 - 6 N·m (0.4 - 0.6 kg·m, 35 - 52 in·lb)

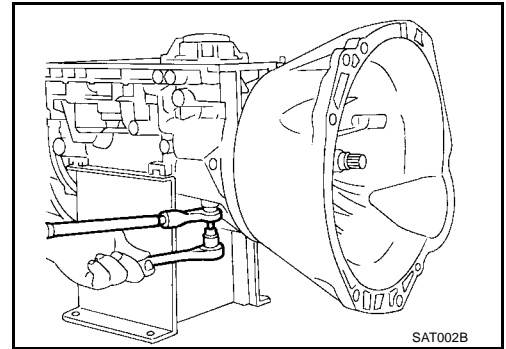
- b. Back off anchor end pin two and a half turns.



# ASSEMBLY

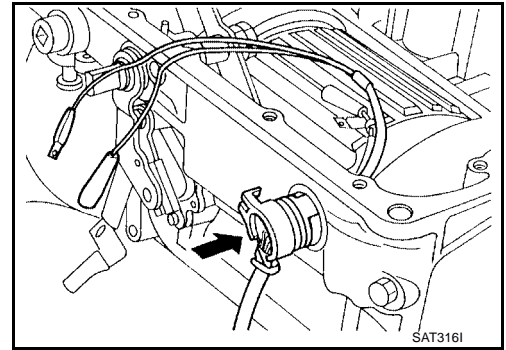
[RL4R01A]

- c. While holding anchor end pin, tighten lock nut.



9. Install terminal cord assembly.

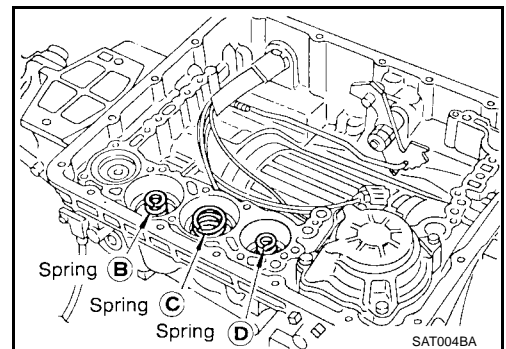
- a. Install O-ring on terminal cord assembly.  
 ● **Apply petroleum jelly to O-ring.**  
 b. Compress terminal cord assembly stopper and install terminal cord assembly on transmission case.



10. Install control valve assembly.

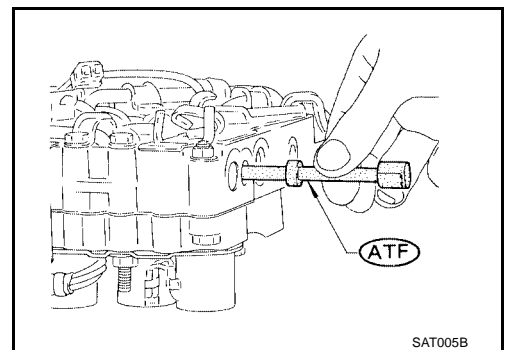
- a. Install accumulator piston return springs **B**, **C** and **D**.

**Free length of return springs** : Refer to [AT-151. "Return Springs"](#).



- b. Install manual valve on control valve.

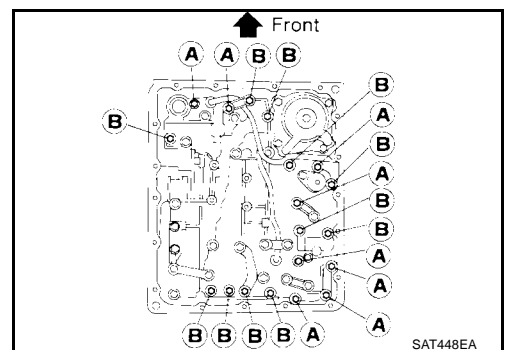
- **Apply ATF to manual valve.**




- c. Install control valve assembly on transmission case.

- d. Install connector tube brackets and tighten bolts **A** and **B**.

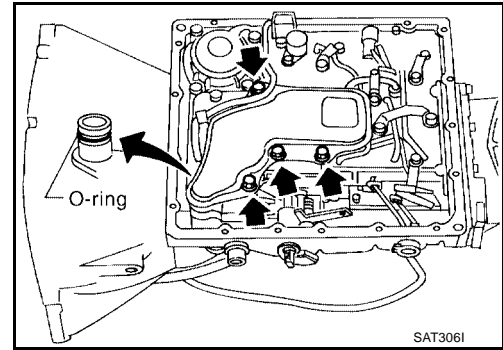
- **Check that terminal assembly harness does not catch.**



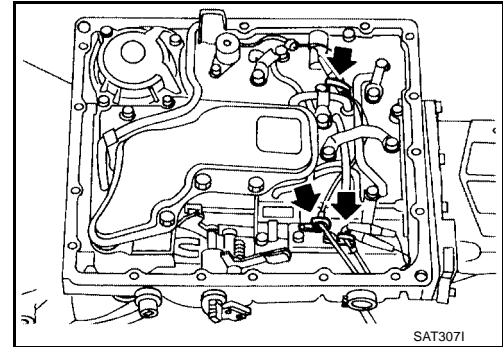
Bolt	ℓ mm (in)	
A	33 (1.30)	
B	45 (1.77)	

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- e. Install O-ring on oil strainer.
  - **Apply petroleum jelly to O-ring.**
- f. Install oil strainer on control valve.

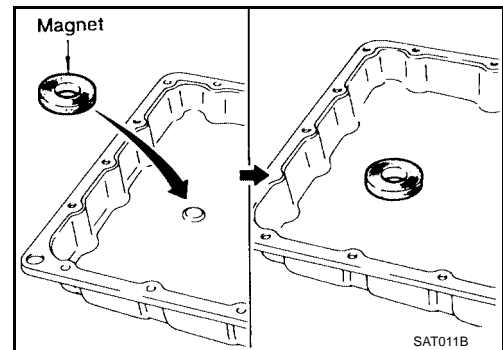


- g. Securely fasten terminal harness with clips.



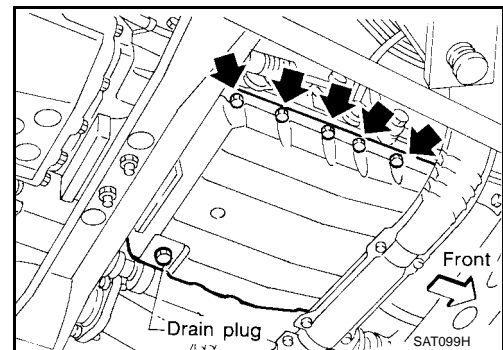
11. Install oil pan.

- a. Attach a magnet to oil pan.

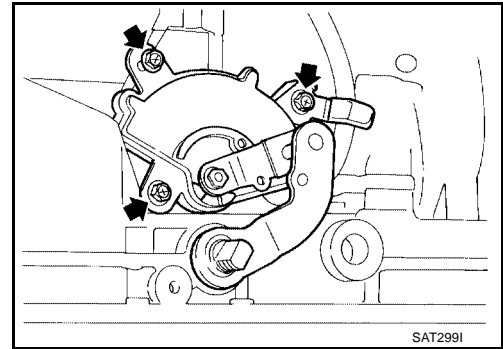


- b. Install new oil pan gasket on transmission case.
- c. Install oil pan and bracket on transmission case.
  - **Always replace oil pan bolts as they are self-sealing bolts.**
  - **Before installing bolts, remove traces of sealant and oil from mating surface and thread holes.**
  - **Tighten four bolts in a crisscross pattern to prevent dislocation of gasket.**

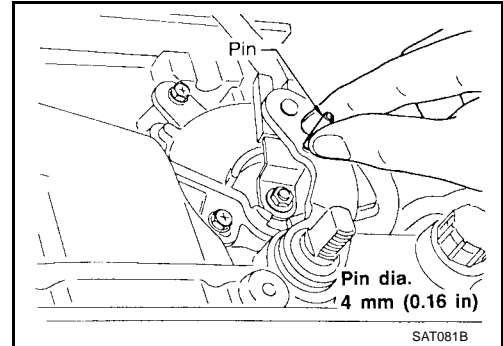
- d. Tighten drain plug.



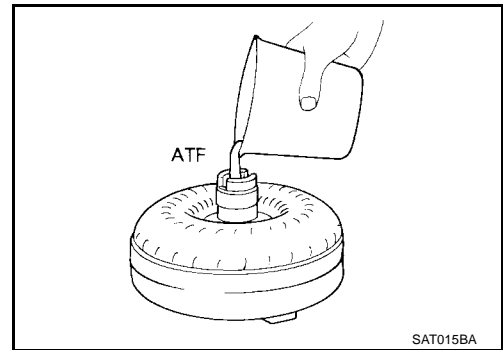
12. Install park/neutral position (PNP) switch.
  - a. Check that manual shaft is in 1 position.
  - b. Temporarily install PNP switch on manual shaft.
  - c. Move manual shaft to N.



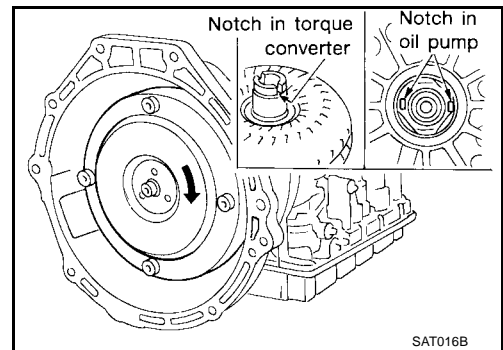
- d. Use a 4 mm (0.16 in) pin for this adjustment.
  - i. Insert the pin straight into the manual shaft adjustment hole.
  - ii. Rotate PNP switch until the pin can also be inserted straight into hole in PNP switch.
- e. Tighten PNP switch fixing bolts.
- f. Remove pin from adjustment hole after adjusting PNP switch.



13. Install torque converter.
  - a. Pour ATF into torque converter.
    - **Approximately 2 liters (2-1/8 US qt, 1-3/4 Imp qt) of fluid are required for a new torque converter.**
    - **When reusing old torque converter, add the same amount of fluid as was drained.**

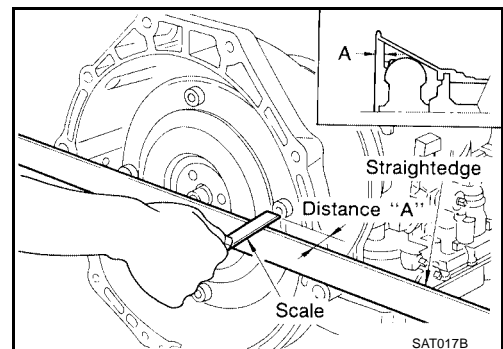


- b. Install torque converter while aligning notches and oil pump.



- c. Measure distance A to check that torque converter is in proper position.

**Distance "A" : 26.0 mm (1.024 in) or more**



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# SERVICE DATA AND SPECIFICATIONS (SDS)

**[RL4R01A]**

## SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

### General Specifications

ECS007KV

Automatic transmission model	RL4R01A	
Transmission model code number	49X11	
Stall torque ratio	2.0 : 1	
Transmission gear ratio	1st	2.785
	2nd	1.545
	Top	1.000
	O/D	0.694
	Reverse	2.272
Recommended fluid	Nissan Matic "D" (Continental U.S. and Alaska) or Genuine Nissan Automatic Transmission Fluid (Canada)*1	
Fluid capacity ℓ (US qt, Imp qt)	7.9 (8-3/8, 7)	

\*1: Refer to ! Hyper-link Error ! .

### Shift Schedule

ECS007KW

#### VEHICLE SPEED WHEN SHIFTING GEARS

Throttle position	Vehicle speed km/h (MPH)						
	D1 → D2	D2 → D3	D3 → D4	D4 → D3	D3 → D2	D2 → D1	12 → 11
Full throttle	46 - 50 (29 - 31)	88 - 96 (55 - 60)	—	126 - 136 (78 - 85)	80 - 88 (50 - 55)	41 - 45 (25 - 28)	41 - 45 (25 - 28)
Half throttle	29 - 33 (18 - 21)	56 - 64 (35 - 40)	105 - 114 (65 - 71)	60 - 70 (37 - 43)	26 - 32 (16 - 20)	12 - 16 (7 - 10)	41 - 45 (25 - 28)

#### VEHICLE SPEED WHEN PERFORMING AND RELEASING LOCK-UP

Throttle position	D4 (O/D ON)	
	Vehicle speed km/h (MPH)	
	Lock-up ON	Lock-up OFF
4/8	105 - 113 (65 - 70)	61 - 69 (38 - 43)
3/8	76 - 84 (47 - 52)	55 - 63 (34 - 39)
2/8	58 - 66 (36 - 41)	55 - 63 (34 - 39)
1/8	58 - 66 (36 - 41)	55 - 63 (34 - 39)

### Stall Revolution

ECS007KX

Stall revolution rpm	2,100 - 2,300
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### Line Pressure

ECS007KY

Engine speed rpm	Line pressure kPa (kg/cm <sup>2</sup> , psi)		
	D position (Overdrive control switch ON and OFF)	2 and 1 positions	R position
Idle	471 - 510 (4.8 - 5.2, 68 - 74)	422 - 461 (4.3 - 4.7, 61 - 67)	736 - 775 (7.5 - 7.9, 107 - 112)
Stall	912 - 991 (9.3 - 10.1, 132 - 144)	883 - 961 (9.0 - 9.8, 128 - 139)	1,442 - 1,520 (14.7 - 15.5, 209 - 220)

### Governor Pressure

ECS007KZ

Vehicle speed	Governor pressure kPa (kg/cm <sup>2</sup> , psi)
0 km/h (0 MPH)	0 (0, 0)
29 km/h (18 MPH)	119.6 - 123.6 (1.22 - 1.26, 17 - 18)

# SERVICE DATA AND SPECIFICATIONS (SDS)

**[RL4R01A]**

Vehicle speed	Governor pressure kPa (kg/cm <sup>2</sup> , psi)
57 km/h (35 MPH)	235.4 - 284.4 (2.40 - 2.90, 34 - 41)
86 km/h (53 MPH)	351.1 - 409.9 (3.58 - 4.18, 51 - 59)

## Return Springs

ECS007L0

Unit: mm (in)

Parts		Item				
		Part No.*	Free length	Outer diameter		
Control valve	Upper body	1	4th speed cut valve spring	31756-48X06	23.5 (0.925)	7.4 (0.2913)
		2	Pressure regulator valve spring	31742-48X23	51.2 (2.016)	12.1 (0.476)
		3	Pressure modifier valve spring	31742-48X13	40.83 (1.6075)	8.0 (0.315)
		4	1-2 shift valve spring	31762-48X00	43.4 (1.709)	6.0 (0.236)
		5	2-3 shift valve spring	31762-48X14	47.4 (1.866)	9.0 (0.354)
		6	3-4 shift valve spring	31762-48X06	44.03 (1.7335)	8.0 (0.315)
		7	Accumulator control valve spring	31742-48X24	30.3 (1.193)	8.0 (0.315)
		—	3-2 downshift valve spring	—	—	—
		8	2-3 throttle modifier valve spring	31742-41X21	33.0 (1.299)	6.5 (0.256)
	9	4-2 relay valve spring	31756-41X00	29.1 (1.146)	6.95 (0.2736)	
	10	Torque converter clutch control valve spring	31742-48X07	20.0 (0.787)	5.45 (0.2146)	
	Lower body	1	Throttle valve & detent valve spring	31802-48X02	34.23 (1.3476)	11.0 (0.433)
		2	Kickdown modifier valve spring	31756-48X12	42.8 (1.685)	7.0 (0.276)
		3	1st reducing valve spring	31756-48X04	34.1 (1.343)	7.0 (0.276)
		4	Overrun clutch reducing valve spring	31742-48X21	33.2 (1.307)	7.7 (0.303)
		5		31742-48X05	31.0 (1.220)	5.2 (0.205)
		6	3-2 timing valve spring	31742-48X15	23.0 (0.906)	7.0 (0.276)
		7	Torque converter relief valve spring	31742-41X23	38.0 (1.496)	9.0 (0.354)
		8	4-2 sequence valve spring	31756-41X00	29.1 (1.146)	6.95 (0.2736)
Governor valve	1	Primary valve spring	31742-48X11	19.1 (0.752)	9.05 (0.3563)	
	2	Secondary governor valve I spring	31742-48X09	30.58 (1.2039)	9.2 (0.362)	
	3	Secondary governor valve II spring	31742-48X10	16.79 (0.6610)	9.0 (0.354)	
Reverse clutch		16 pcs	31521-41X02 (Assembly)	19.7 (0.7756)	11.6 (0.457)	
High clutch		10 pcs	31521-41X03 (Assembly)	24.2 (0.9528)	11.6 (0.457)	
Forward clutch (Overrun clutch)		20 pcs	31521-41X04 (Assembly)	35.77 (1.4083)	9.7 (0.382)	
Low & reverse brake		18 pcs	31655-41X00 (Assembly)	22.3 (0.878)	11.2 (0.4409)	
Band servo	Spring A		31605-41X05	45.6 (1.795)	34.3 (1.350)	
	Spring B		31605-41X00	53.8 (2.118)	40.3 (1.587)	
	Spring C		31605-41X01	29.7 (1.1693)	27.6 (1.087)	

# SERVICE DATA AND SPECIFICATIONS (SDS)

**[RL4R01A]**

Parts		Item		
		Part No.*	Free length	Outer diameter
Accumulator	Accumulator <b>A</b>	31605-41X02	43.0 (1.693)	18.0 (0.709)
	Accumulator <b>B</b>	31605-41X15	66.0 (2.598)	20.8 (0.819)
	Accumulator <b>C</b>	31605-51X01	45.0 (1.772)	29.3 (1.154)
	Accumulator <b>D</b>	31605-41X06	58.4 (2.299)	17.3 (0.681)

\*: Always check with the Parts Department for the latest parts information.

## Accumulator O-ring

ECS007L1

Accumulator	Diameter mm (in)			
	A	B	C	D
Small diameter end	29 (1.14)	32 (1.26)	45 (1.77)	29 (1.14)
Large diameter end	45 (1.77)	50 (1.97)	50 (1.97)	45 (1.77)

## Clutch and Brakes REVERSE CLUTCH

ECS007L2

Code number		49X11	
Number of drive plates		2	
Number of driven plates		2	
Thickness of drive plate mm (in)	Standard	1.90 - 2.05 (0.0748 - 0.0807)	
	Wear limit	1.80 (0.0709)	
Clearance mm (in)	Standard	0.5 - 0.8 (0.020 - 0.031)	
	Allowable limit	1.2 (0.047)	
Thickness of retaining plate	Thickness mm (in)		Part No.*
	4.8 (0.189)		31537-42X02
	5.0 (0.197)		31537-42X03
	5.2 (0.205)		31537-42X04
	5.4 (0.213)		31537-42X05
	5.6 (0.220)		31537-42X06

\*: Always check with the Parts Department for the latest parts information.

## HIGH CLUTCH

Code number		49X11	
Number of drive plates		5	
Number of driven plates		5	
Thickness of drive plate mm (in)	Standard	1.52 - 1.67 (0.0598 - 0.0657)	
	Wear limit	1.40 (0.0551)	
Clearance mm (in)	Standard	1.8 - 2.2 (0.071 - 0.087)	
	Allowable limit	3.2 (0.126)	
Thickness of retaining plate	Thickness mm (in)		Part No.*
	3.4 (0.134)		31537-41X71
	3.6 (0.142)		31537-41X61
	3.8 (0.150)		31537-41X62
	4.0 (0.157)		31537-41X63
	4.2 (0.165)		31537-41X64
	4.4 (0.173)		31537-41X65
	4.6 (0.181)		31537-41X66
4.8 (0.189)		31537-41X67	

\*: Always check with the Parts Department for the latest parts information.



# SERVICE DATA AND SPECIFICATIONS (SDS)

**[RL4R01A]**

## FORWARD CLUTCH

Code number		49X11	
Number of drive plates		5	
Number of driven plates		5	
Thickness of drive plate (in)	mm	Standard	1.52 - 1.67 (0.0598 - 0.0657)
		Wear limit	1.40 (0.0551)
Clearance	mm (in)	Standard	0.35 - 0.75 (0.0138 - 0.0295)
		Allowable limit	1.75 (0.069)
Thickness of retaining plate		Thickness mm (in)	Part No.*
		8.0 (0.315)	31537-41X00
		8.1 (0.319)	31537-42X60
		8.2 (0.323)	31537-41X01
		8.3 (0.327)	31537-42X61
		8.4 (0.331)	31537-41X02
		8.5 (0.335)	31537-42X62
		8.6 (0.339)	31537-41X03
		8.7 (0.343)	31537-42X63
		8.8 (0.346)	31537-41X04
		8.9 (0.350)	31537-42X64
		9.0 (0.354)	31537-41X05
9.1 (0.358)	31537-42X65		
9.2 (0.362)	31537-41X06		

\*: Always check with the Parts Department for the latest parts information.

## OVERRUN CLUTCH

Code number		49X11	
Number of drive plates		3	
Number of driven plates		5	
Thickness of drive plate (in)	mm	Standard	1.90 - 2.05 (0.0748 - 0.0807)
		Wear limit	1.80 (0.0709)
Clearance	mm (in)	Standard	1.0 - 1.4 (0.039 - 0.055)
		Allowable limit	2.0 (0.079)
Thickness of retaining plate		Thickness mm (in)	Part No.*
		4.2 (0.165)	31537-41X80
		4.4 (0.173)	31537-41X81
		4.6 (0.181)	31537-41X82
		4.8 (0.189)	31537-41X83
		5.0 (0.197)	31537-41X84

\*: Always check with the Parts Department for the latest parts information.

## LOW & REVERSE BRAKE

Code number		49X11	
Number of drive plates		5	
Number of driven plates		7	
Thickness of drive plate (in)	mm	Standard	1.52 - 1.67 (0.0598 - 0.0657)
		Wear limit	1.40 (0.0551)
Clearance	mm (in)	Standard	0.5 - 0.8 (0.020 - 0.031)
		Allowable limit	1.8 (0.071)

# SERVICE DATA AND SPECIFICATIONS (SDS)

[RL4R01A]

	Thickness mm (in)	Part No.*
	Thickness of retaining plate	7.2 (0.283) 7.4 (0.291) 7.6 (0.299) 7.8 (0.307) 8.0 (0.315) 8.2 (0.323) 8.4 (0.331) 8.6 (0.339) 8.8 (0.346) 9.0 (0.354) 9.2 (0.362)

\*: Always check with the Parts Department for the latest parts information.

## BRAKE BAND

Code number	49X11
Anchor end pin nut tightening torque N-m (kg-m, ft-lb)	40 - 51 (4.1 - 5.2, 30 - 37)
Anchor end pin tightening torque N-m (kg-m, in-lb)	4 - 6 (0.4 - 0.6, 35 - 52)
Number of returning revolutions for anchor end pin	2.5

## Oil Pump and Low One-way Clutch

ECS007L3

Oil pump clearance mm (in)	Cam ring — oil pump housing	Standard	0.01 - 0.024 (0.0004 - 0.0009)
	Rotor, vanes and control piston — oil pump housing	Standard	0.03 - 0.044 (0.0012 - 0.0017)
Seal ring clearance mm (in)	Standard		0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit		0.25 (0.0098)

## Total End Play

ECS007L4

Total end play "T1 "	0.25 - 0.55 mm (0.0098 - 0.0217 in)	
Thickness of oil pump cover bearing race	Thickness mm (in)	Part No.*
	0.8 (0.031)	31435-41X01
	1.0 (0.039)	31435-41X02
	1.2 (0.047)	31435-41X03
	1.4 (0.055)	31435-41X04
	1.6 (0.063)	31435-41X05
	1.8 (0.071)	31435-41X06
	2.0 (0.079)	31435-41X07

\*: Always check with the Parts Department for the latest parts information.

## Parking Gear

ECS007L5

Seal ring — ring groove clearance mm (in)	Standard	0.15 - 0.20 (0.006 - 0.008)
	Allowable limit	0.20 (0.008)

## Reverse Clutch Drum End Play

ECS007L6

Reverse clutch drum end play "T2 "	0.55 - 0.90 mm (0.0217 - 0.0354 in)	
Thickness of oil pump thrust washer	Thickness mm (in)	Part No.*
	0.9 (0.035)	31528-21X01
	1.1 (0.043)	31528-21X02
	1.3 (0.051)	31528-21X03
	1.5 (0.059)	31528-21X04
	1.7 (0.067)	31528-21X05
	1.9 (0.075)	31528-21X06

\*: Always check with the Parts Department for the latest parts information.

## Removal and Installation

ECS007L7

# SERVICE DATA AND SPECIFICATIONS (SDS)

[RL4R01A]

Manual control cable	Number of returning revolutions for lock nut	1
	Lock nut tightening torque N·m (kg-m, ft-lb)	10.8 - 12.7 (1.09 - 1.29, 8.0 - 9.3)
Distance between end of converter housing and torque converter mm (in)		26.0 (1.024) or more

A

B

AT

D

E

F

G

H

I

J

K

L

M

## TROUBLE DIAGNOSIS — INDEX

Alphabetical & P No. Index for DTC  
ALPHABETICAL INDEX FOR DTC

Items (CONSULT-II screen terms)	DTC	Reference page
	CONSULT-II GST*1	
A/T 1ST GR FNCTN	P0731	<a href="#">AT-270</a>
A/T 2ND GR FNCTN	P0732	<a href="#">AT-276</a>
A/T 3RD GR FNCTN	P0733	<a href="#">AT-281</a>
A/T 4TH GR FNCTN	P0734	<a href="#">AT-286</a>
A/T TCC S/V FNCTN	P0744	<a href="#">AT-298</a>
ATF TEMP SEN/CIRC	P0710	<a href="#">AT-255</a>
ENGINE SPEED SIG	P0725	<a href="#">AT-266</a>
L/PRESS SOL/CIRC	P0745	<a href="#">AT-306</a>
O/R CLTCH SOL/CIRC	P1760	<a href="#">AT-329</a>
PNP SW/CIRC	P0705	<a href="#">AT-249</a>
SFT SOL A/CIRC*2	P0750	<a href="#">AT-311</a>
SFT SOL B/CIRC*2	P0755	<a href="#">AT-316</a>
TCC SOLENOID/CIRC	P0740	<a href="#">AT-293</a>
TP SEN/CIRC A/T*2	P1705	<a href="#">AT-321</a>
VEH SPD SEN/CIR AT*3	P0720	<a href="#">AT-261</a>

- \*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

[RE4R01A]

## P NO. INDEX FOR DTC

DTC	Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*1		
P0705	PNP SW/CIRC	<a href="#">AT-249</a>
P0710	ATF TEMP SEN/CIRC	<a href="#">AT-255</a>
P0720	VEH SPD SEN/CIR AT*3	<a href="#">AT-261</a>
P0725	ENGINE SPEED SIG	<a href="#">AT-266</a>
P0731	A/T 1ST GR FNCTN	<a href="#">AT-270</a>
P0732	A/T 2ND GR FNCTN	<a href="#">AT-276</a>
P0733	A/T 3RD GR FNCTN	<a href="#">AT-281</a>
P0734	A/T 4TH GR FNCTN	<a href="#">AT-286</a>
P0740	TCC SOLENOID/CIRC	<a href="#">AT-293</a>
P0744	A/T TCC S/V FNCTN	<a href="#">AT-298</a>
P0745	L/PRESS SOL/CIRC	<a href="#">AT-306</a>
P0750	SFT SOL A/CIRC*2	<a href="#">AT-311</a>
P0755	SFT SOL B/CIRC*2	<a href="#">AT-316</a>
P1705	TP SEN/CIRC A/T*2	<a href="#">AT-321</a>
P1760	O/R CLTCH SOL/CIRC	<a href="#">AT-329</a>

- \*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**

PFP:00001

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

ECS007L9

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system may include seat belt switch inputs and dual stage front air bag modules. If equipped with dual stage front air bag modules, the SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

The vehicle may be equipped with a passenger air bag deactivation switch. Because no rear seat exists where a rear-facing child restraint can be placed, the switch is designed to turn off the passenger air bag so that a rear-facing child restraint can be used in the front passenger seat. The switch is located in the center of the instrument panel, near the ashtray. When the switch is turned to the ON position, the passenger air bag is enabled and could inflate for certain types of collision. When the switch is turned to the OFF position, the passenger air bag is disabled and will not inflate. A passenger air bag OFF indicator on the instrument panel lights up when the passenger air bag is switched OFF. The driver air bag always remains enabled and is not affected by the passenger air bag deactivation switch.

**WARNING:**

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.
- The vehicle may be equipped with a passenger air bag deactivation switch which can be operated by the customer. When the passenger air bag is switched OFF, the passenger air bag is disabled and will not inflate. When the passenger air bag is switched ON, the passenger air bag is enabled and could inflate for certain types of collision. After SRS maintenance or repair, make sure the passenger air bag deactivation switch is in the same position (ON or OFF) as when the vehicle arrived for service.

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

ECS007LA

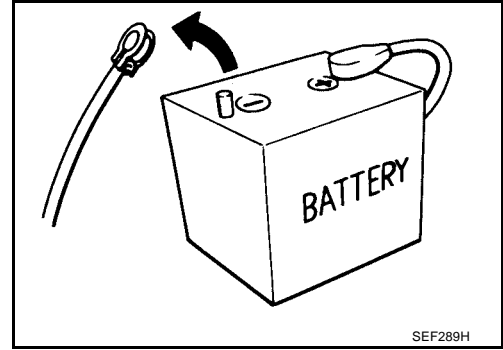
The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

**CAUTION:**

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

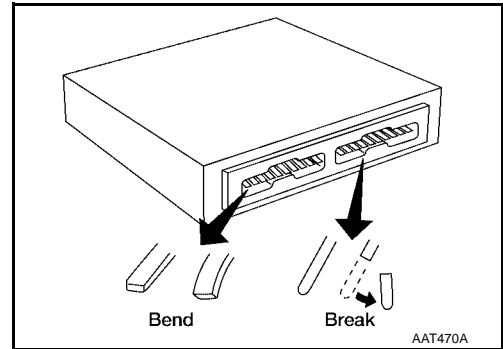
Precautions

- 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.



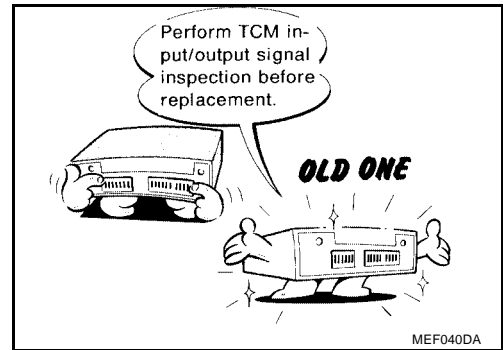
SEF289H

- 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.



AAT470A

- Before replacing TCM, perform TCM input/output signal inspection and determine whether TCM functions properly or not. Refer to [AT-242, "TCM INSPECTION TABLE"](#).



MEF040DA

- 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 transmission. 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.

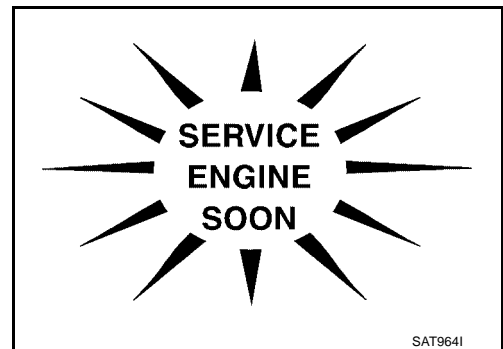
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transmission.

- 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 transmission is disassembled.

- It is very important to perform functional tests whenever they are indicated.



SAT964I

# PRECAUTIONS

[RE4R01A]

- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- Clean or replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to [AT-160, "ATF COOLER SERVICE"](#) .
- After overhaul, refill the transmission with new ATF.
- When the A/T drain plug is removed, only some of the fluid is drained. Old A/T fluid will remain in torque converter and ATF cooling system.  
Always follow the procedures when changing A/T fluid. Refer to [MA-37, "Checking A/T Fluid"](#) .

## Service Notice or Precautions FAIL-SAFE

ECS007LC

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

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

When the ignition key is turned ON following Fail-Safe operation, O/D OFF indicator lamp blinks for about 8 seconds. Refer to [AT-198, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) .

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

Always follow the "Work Flow". Refer to [AT-208, "Work Flow"](#) .

The SELF-DIAGNOSIS results will be as follows:

The first SELF-DIAGNOSIS will indicate damage to the vehicle speed sensor or the revolution sensor.

During the next SELF-DIAGNOSIS, performed after checking the sensor, no damages will be indicated.

## TORQUE CONVERTER SERVICE

The torque converter should be replaced under any of the following conditions:

- External leaks in the hub weld area.
- Converter hub is scored or damaged.
- Converter pilot is broken, damaged or fits poorly into crankshaft.
- Steel particles are found after flushing the cooler and cooler lines.
- Pump is damaged or steel particles are found in the converter.
- Vehicle has TCC shudder and/or no TCC apply. Replace only after all hydraulic and electrical diagnoses have been made (Converter clutch material may be glazed).
- Converter is contaminated with engine coolant containing antifreeze.
- Internal failure of stator roller clutch.
- Heavy clutch debris due to overheating (blue converter).
- Steel particles or clutch lining material found in fluid filter or on magnet when no internal parts in unit are worn or damaged — indicates that lining material came from converter.

The torque converter should not be replaced if:

- The fluid has an odor, is discolored, and there is no evidence of metal or clutch facing particles.
- The threads in one or more of the converter bolt holes are damaged.
- Transmission failure did not display evidence of damaged or worn internal parts, steel particles or clutch plate lining material in unit and inside the fluid filter.
- Vehicle has been exposed to high mileage (only). The exception may be where the torque converter clutch dampener plate lining has seen excess wear by vehicles operated in heavy and/or constant traffic, such as taxi, delivery or police use.

## ATF COOLER SERVICE

If A/T fluid contains frictional material (clutches, bands, etc.) or if an A/T is repaired, overhauled, or replaced, inspect and clean the A/T oil cooler mounted in the radiator or replace radiator. Flush cooler lines using clean-



ing solvent and compressed air after repair. Check Service Bulletins for latest A/T oil cooler cleaning procedure. For radiator replacement refer to [CO-30, "RADIATOR"](#) .

## OBD-II SELF-DIAGNOSIS

- A/T self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the O/D OFF indicator or the malfunction indicator lamp (MIL). Refer to the table on [AT-189](#) for the indicator used to display each self-diagnostic result.

- The self-diagnostic results indicated by the MIL are automatically stored in both the ECM and TCM memories.

**Always perform the procedure "HOW TO ERASE DTC". Refer to [AT-187, "HOW TO ERASE DTC"](#) to complete the repair and avoid unnecessary blinking of the MIL.**

- The following self-diagnostic items can be detected using ECM self-diagnostic results mode\* only when the O/D OFF indicator lamp does not indicate any malfunctions.

- Park/neutral position (PNP) switch
- 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-625, "ON BOARD DIAGNOSTIC \(OBD\) SYSTEM"](#) (VG33E only) or [EC-1229, "ON BOARD DIAGNOSTIC \(OBD\) SYSTEM"](#) (VG33ER only).

- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to [PG-4, "HARNESS CONNECTOR"](#) .**

## Wiring Diagrams and Trouble Diagnosis

ECS007LD

When you read wiring diagrams, refer to the following:

- Refer to [GI-13, "How to Read Wiring Diagrams"](#) .
- Refer to [PG-9, "POWER SUPPLY ROUTING"](#) for power distribution circuit.

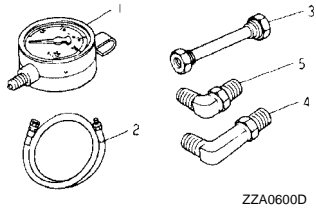
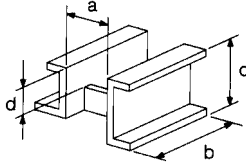
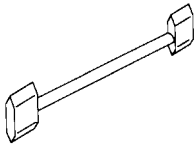
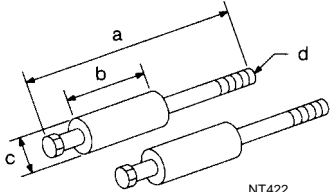
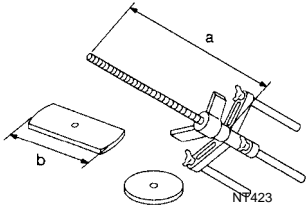
When you perform trouble diagnosis, refer to the following:

- Refer to [GI-9, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#) .
- Refer to [GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident"](#) .

PREPARATION

Special Service Tools

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

Tool number (Kent-Moore No.) Tool name	Description
ST2505S001 (J34301-C) Oil pressure gauge set 1 ST25051001 ( — ) Oil pressure gauge 2 ST25052000 ( — ) Hose 3 ST25053000 ( — ) Joint pipe 4 ST25054000 ( — ) Adapter 5 ST25055000 ( — ) Adapter	Measuring line pressure 
ST07870000 (J37068) Transmission case stand	Disassembling and assembling A/T a: 182 mm (7.17 in) b: 282 mm (11.10 in) c: 230 mm (9.06 in) d: 100 mm (3.94 in) 
KV31102100 (J37065) Torque converter one-way clutch check tool	Checking one-way clutch in torque converter 
ST25850000 (J25721-A) Sliding hammer	Removing oil pump assembly a: 179 mm (7.05 in) b: 70 mm (2.76 in) c: 40 mm (1.57 in) dia. d: M12 x 1.75P 
KV31102400 (J34285 and J34285-87) Clutch spring compressor	Removing and installing clutch return springs a: 320 mm (12.60 in) b: 174 mm (6.85 in) 

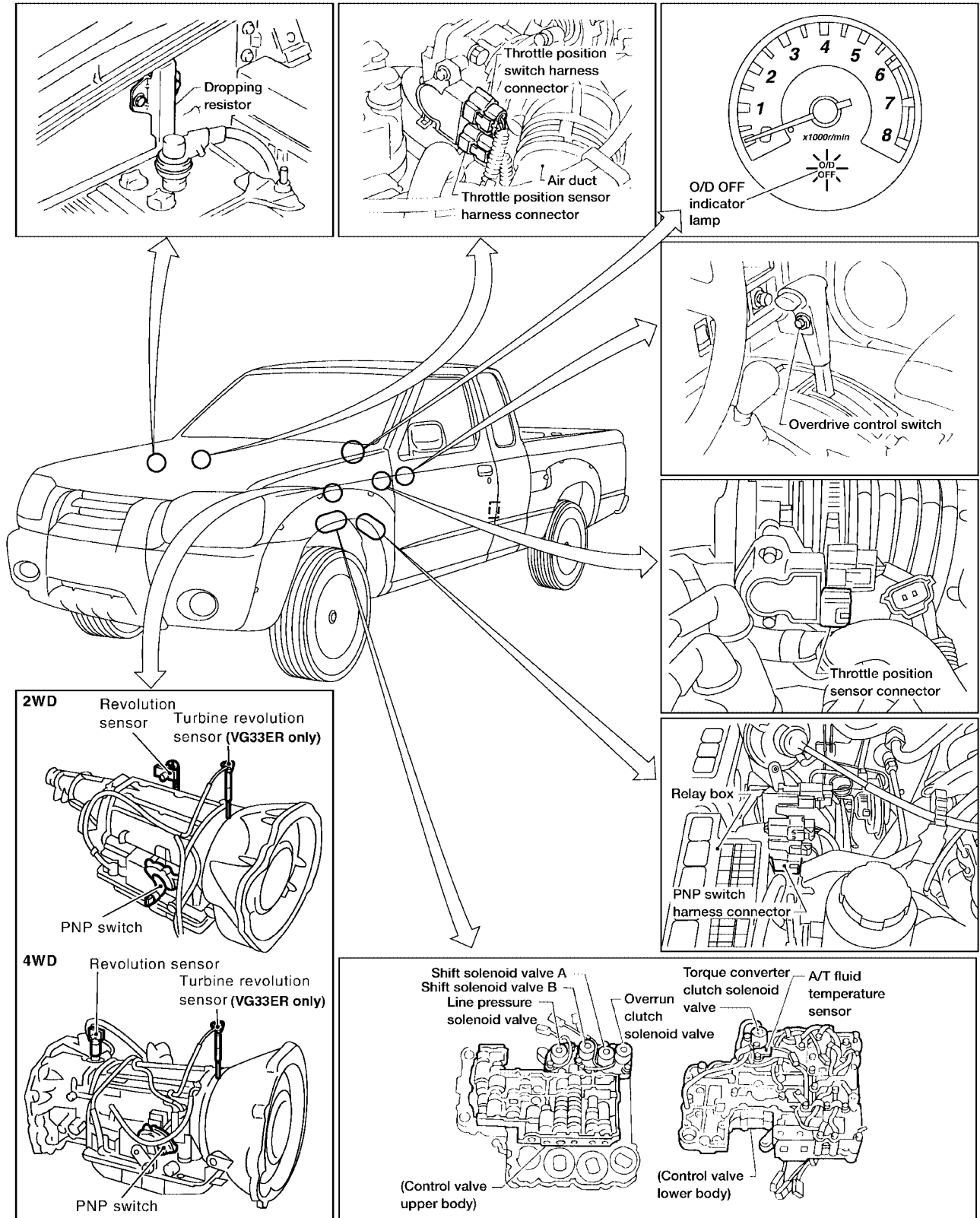
# PREPARATION

[RE4R01A]

Tool number (Kent-Moore No.) Tool name	Description	
ST33200000 (J26082) Drift <div data-bbox="609 262 820 420" style="text-align: center;"> </div> <div data-bbox="852 451 901 472" style="text-align: center;"> <small>NT091</small> </div>	Installing oil pump housing oil seal Installing rear oil seal <b>a: 60 mm (2.36 in) dia.</b> <b>b: 44.5 mm (1.752 in) dia.</b>	A B <b>AT</b>
(J34291) Shim setting gauge set <div data-bbox="633 525 901 672" style="text-align: center;"> </div> <div data-bbox="852 682 901 703" style="text-align: center;"> <small>NT101</small> </div>	Selecting oil pump cover bearing race and oil pump thrust washer	D E F G H I J K L M

OVERALL SYSTEM

A/T Electrical Parts Location

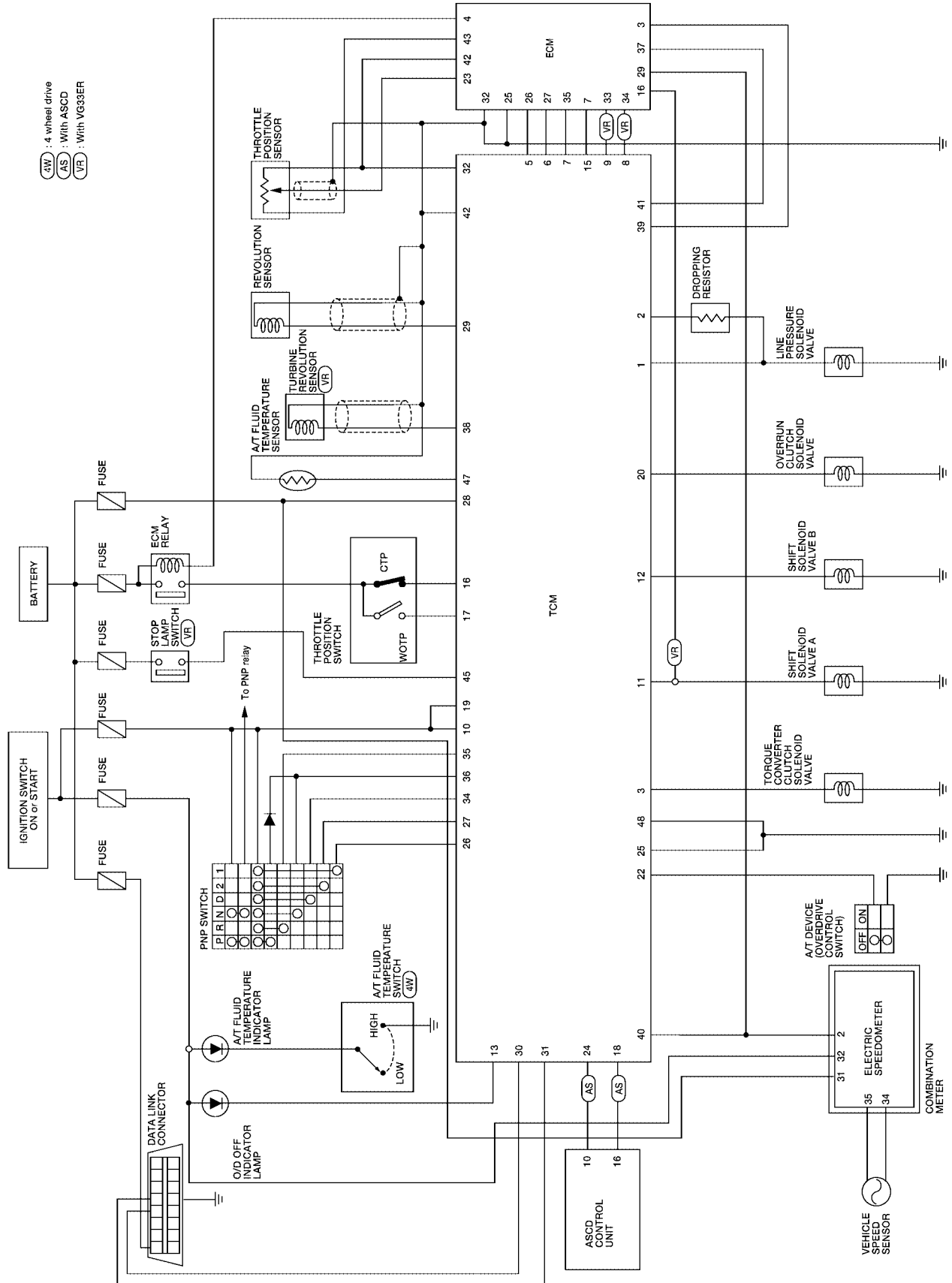


# OVERALL SYSTEM

[RE4R01A]

## Circuit Diagram

ECS007LG



4W : 4 wheel drive  
 AS : With ASCD  
 VR : With VG35ER

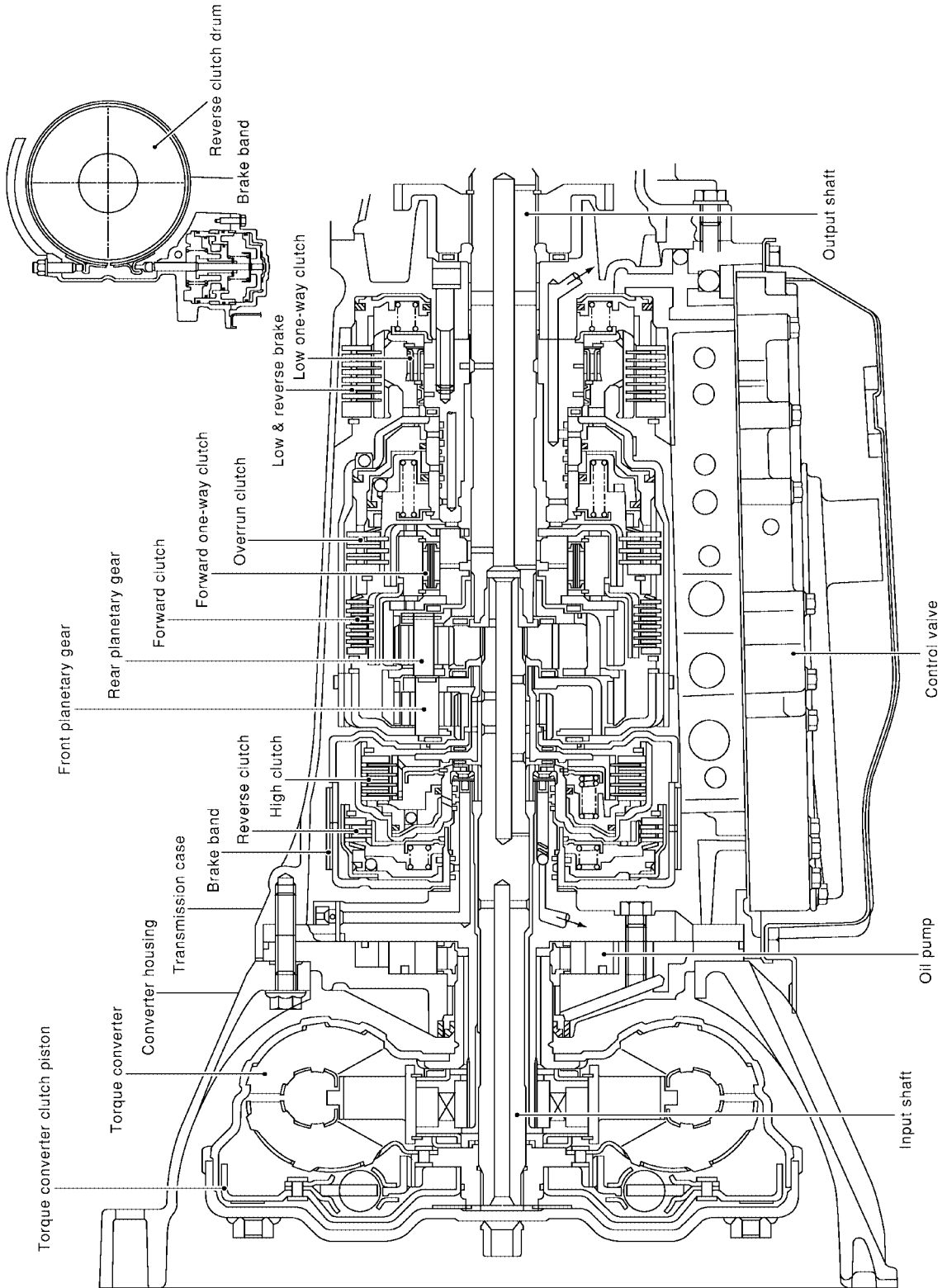
A  
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# OVERALL SYSTEM

[RE4R01A]

## Cross-sectional View

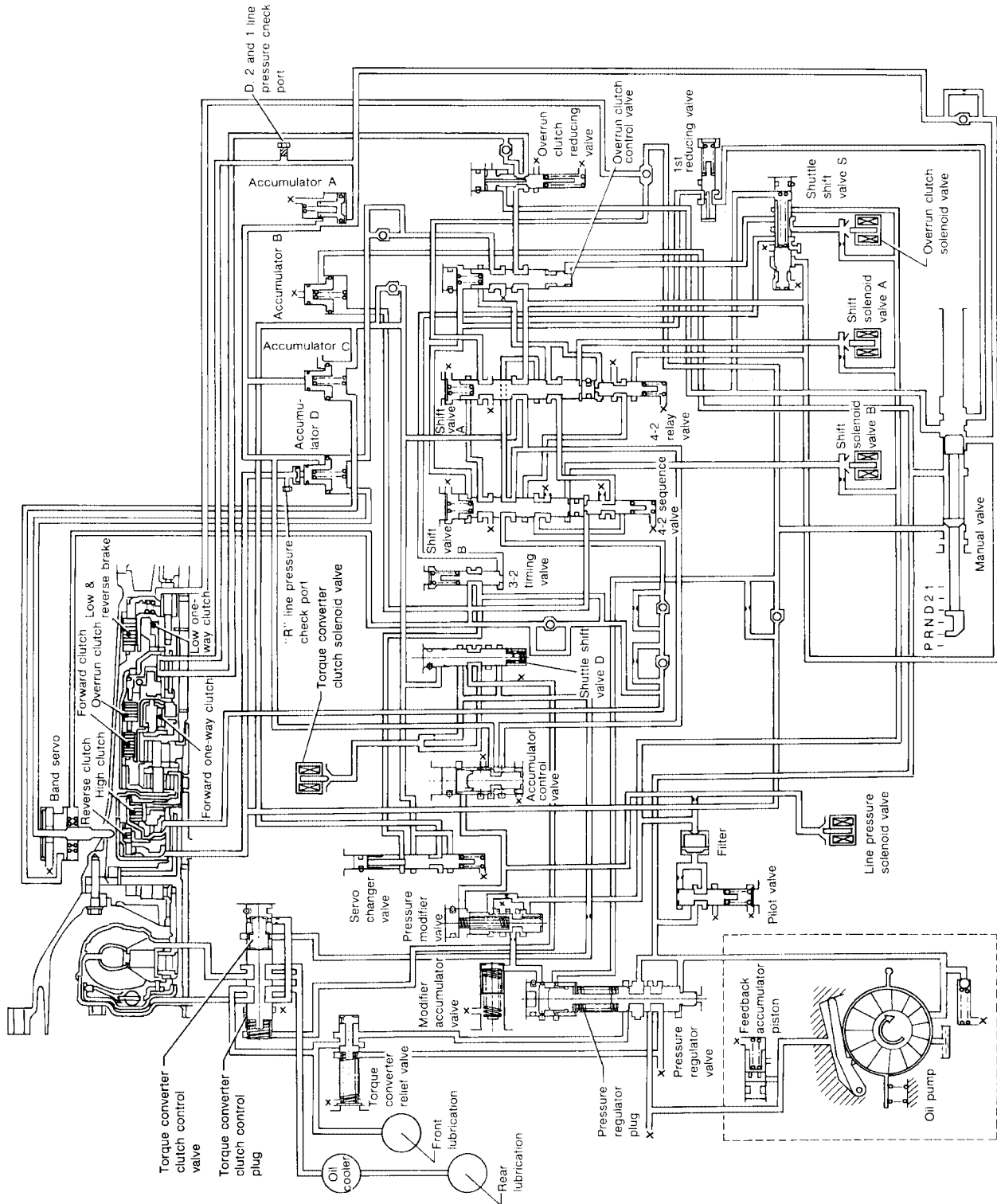
ECS007LH



LCIA0288E

Hydraulic Control Circuit

ECS007LI



A  
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LCIA0264E

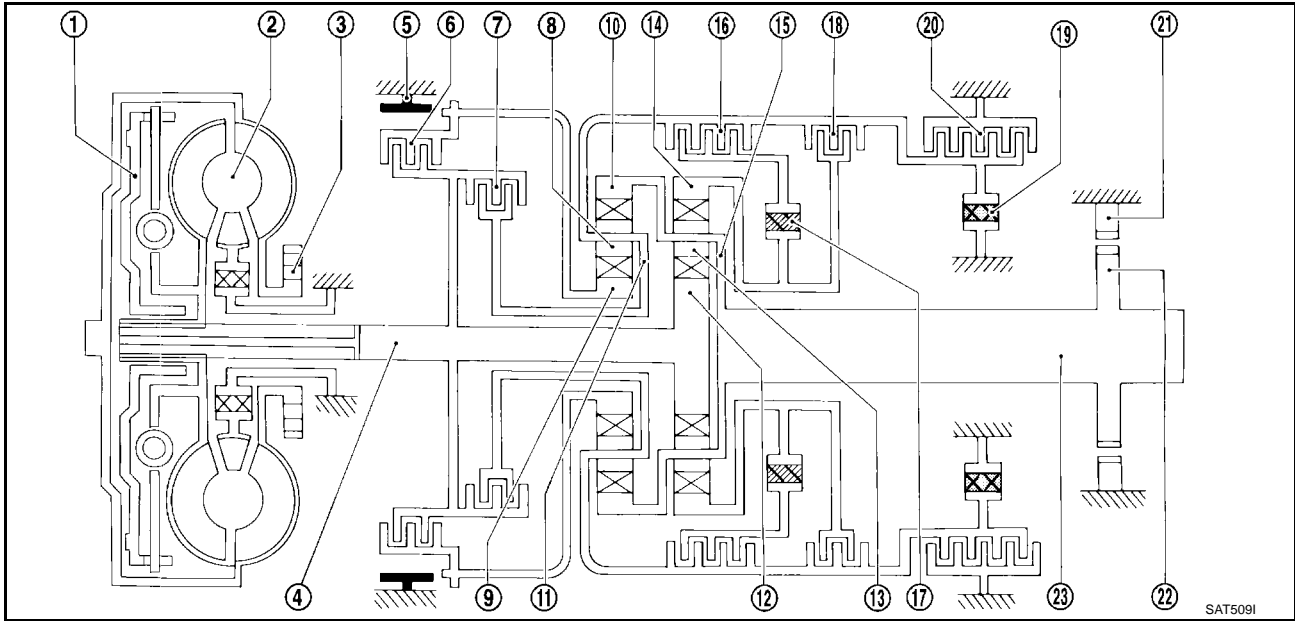
## Shift Mechanism

The automatic transmission uses compact, dual planetary gear systems to improve power-transmission efficiency, simplify construction and reduce weight.

It also employs an optimum shift control and superwide gear ratios. They improve starting performance and acceleration during medium and high-speed operation.

Two one-way clutches are also employed: one is used for the forward clutch and the other for the low clutch. These one-way clutches, combined with four accumulators, reduce shifting shock to a minimum.

## CONSTRUCTION



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



# OVERALL SYSTEM

[RE4R01A]

## FUNCTION OF CLUTCH AND BRAKE

Clutch and brake components	Abbr.	Function
Reverse clutch <b>6</b>	R/C	To transmit input power to front sun gear <b>9</b> .
High clutch <b>7</b>	H/C	To transmit input power to front planetary carrier <b>11</b> .
Forward clutch <b>16</b>	F/C	To connect front planetary carrier <b>11</b> with forward one-way clutch <b>17</b> .
Overrun clutch <b>18</b>	O/C	To connect front planetary carrier <b>11</b> with rear internal gear <b>14</b> .
Brake band <b>5</b>	B/B	To lock front sun gear <b>9</b> .
Forward one-way clutch <b>17</b>	F/O.C	When forward clutch <b>16</b> is engaged, to stop rear internal gear <b>14</b> from rotating in opposite direction against engine revolution.
Low one-way clutch <b>19</b>	L/O.C	To stop front planetary carrier <b>11</b> from rotating in opposite direction against engine revolution.
Low & reverse brake <b>20</b>	L & R/B	To lock front planetary carrier <b>11</b> .

## CLUTCH AND BAND CHART

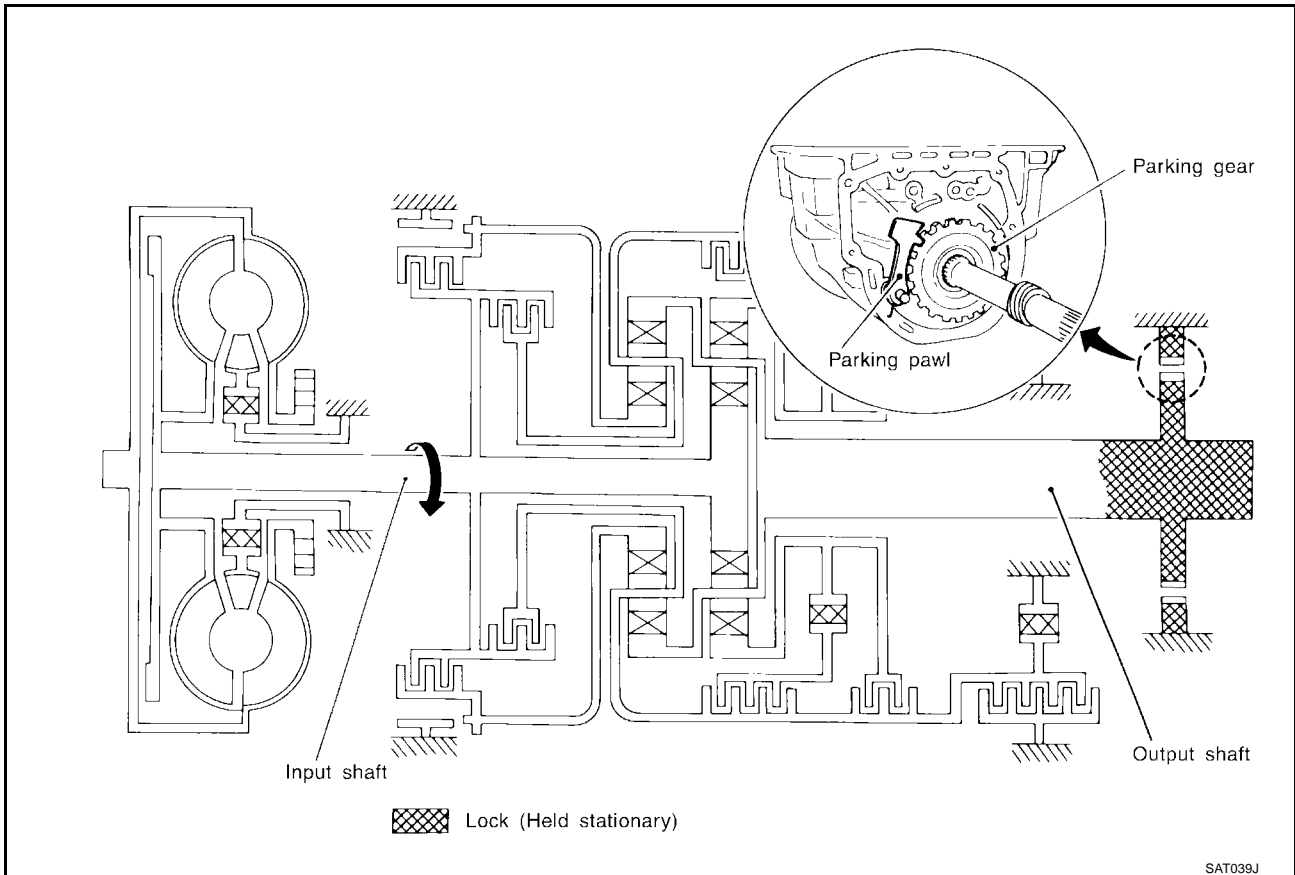
Shift position	Reverse clutch	High clutch	Forward clutch	Overrun clutch	Band servo			Forward one-way clutch	Low one-way clutch	Low & reverse brake	Lock-up	Remarks
					2nd apply	3rd release	4th apply					
P												PARK POSITION
R	○									○		REVERSE POSITION
N												NEUTRAL POSITION
D*4	1st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

- \*1: Operates when overdrive control switch is being set in OFF position.
- \*2: Oil pressure is applied to both 2nd “apply” side and 3rd “release” side of band servo piston. However, brake band does not contract because oil pressure area on the “release” side is greater than that on the “apply” side.
- \*3: Oil pressure is applied to 4th “apply” side in condition \*2 above, and brake band contracts.
- \*4: A/T will not shift to 4th when overdrive control switch is set in OFF position.
- \*5: Operates when overdrive control switch is OFF.
- ○ : Operates.
- A: Operates when throttle opening is less than 3/16, activating engine brake.
- B: Operates during “progressive” acceleration.
- C: Operates but does not affect power transmission.
- D: Operates when throttle opening is less than 3/16, but does not affect engine brake.

## POWER TRANSMISSION

### P and N Positions

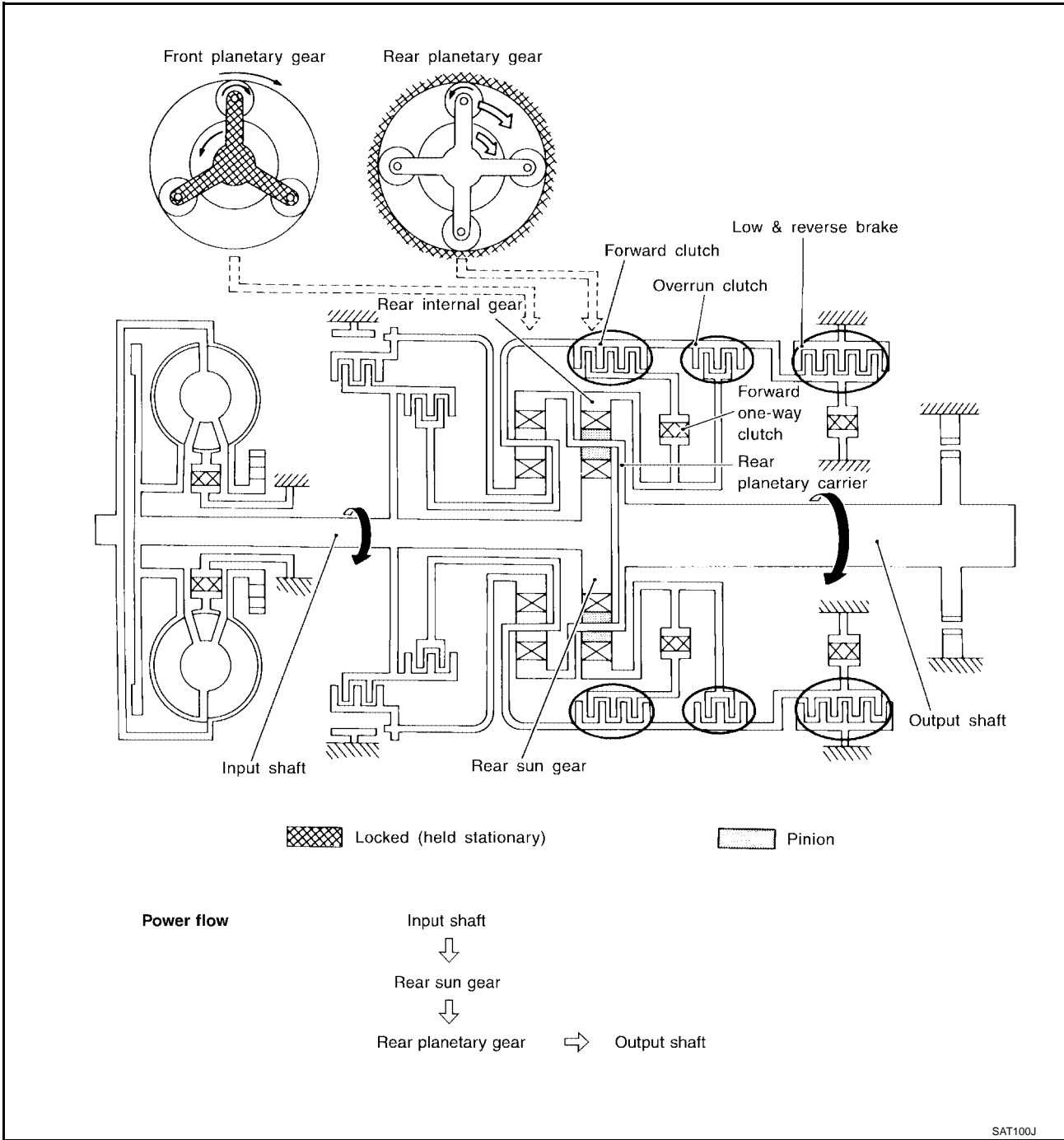
- P position  
Similar to the N position, no control members operate. The parking pawl interconnected with the select lever engages with the parking gear to mechanically hold the output shaft so that the power train is locked.
- N position  
No control members operate. Power from the input shaft is not transmitted to the output shaft since the clutch does not operate.



# OVERALL SYSTEM

[RE4R01A]

## 11 Position



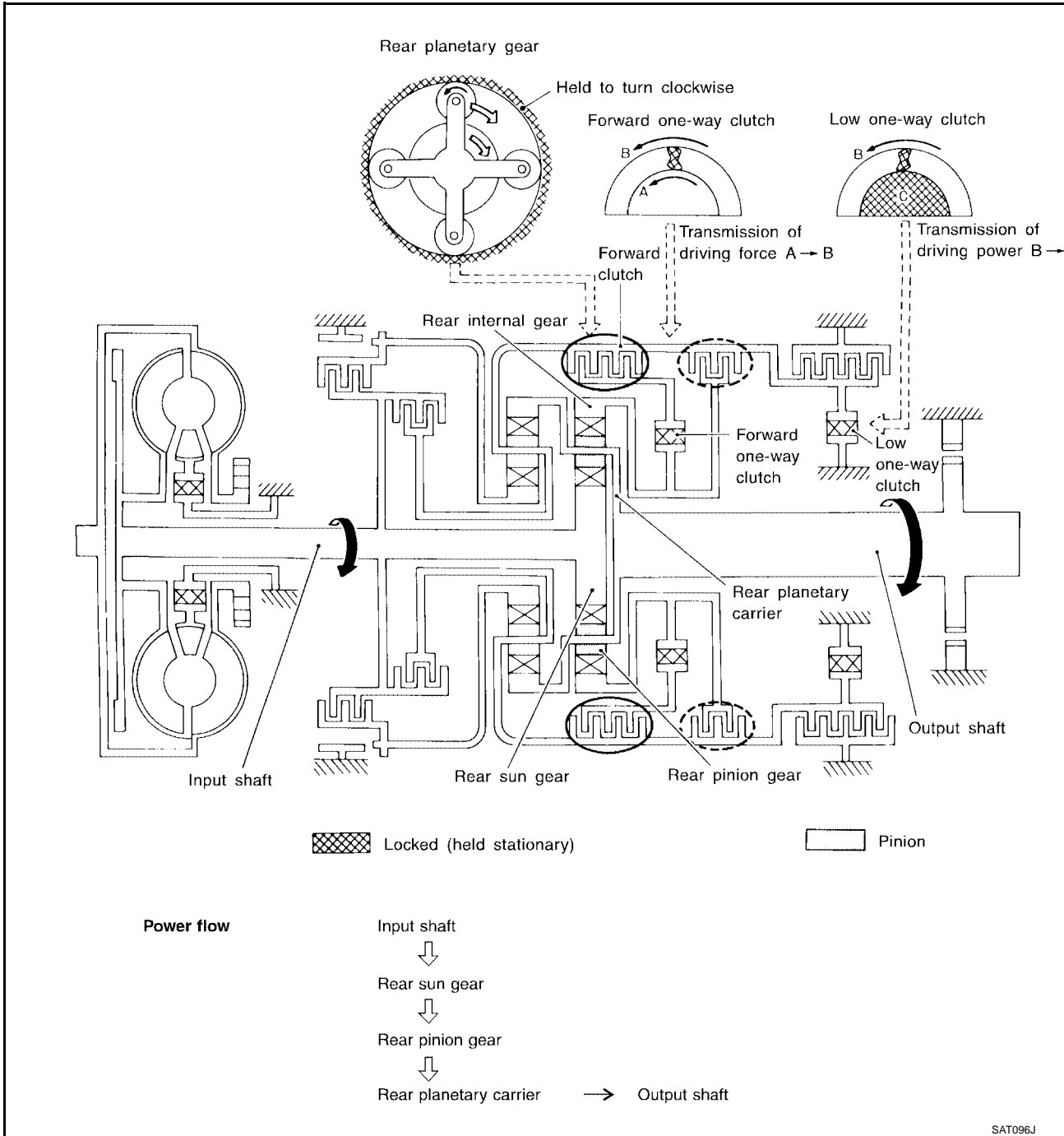
A  
B  
AT  
D  
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L  
M

<p><b>Forward clutch</b>  <b>Forward one-way clutch</b>  <b>Overrun clutch</b>  <b>Low and reverse brake</b></p>	<p>As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake.                  This is different from that of D1 and 21 .</p>
<p>Engine brake</p>	<p>Overrun clutch always engages, therefore engine brake can be obtained when decelerating.</p>

# OVERALL SYSTEM

[RE4R01A]

## D1 and 21 Positions



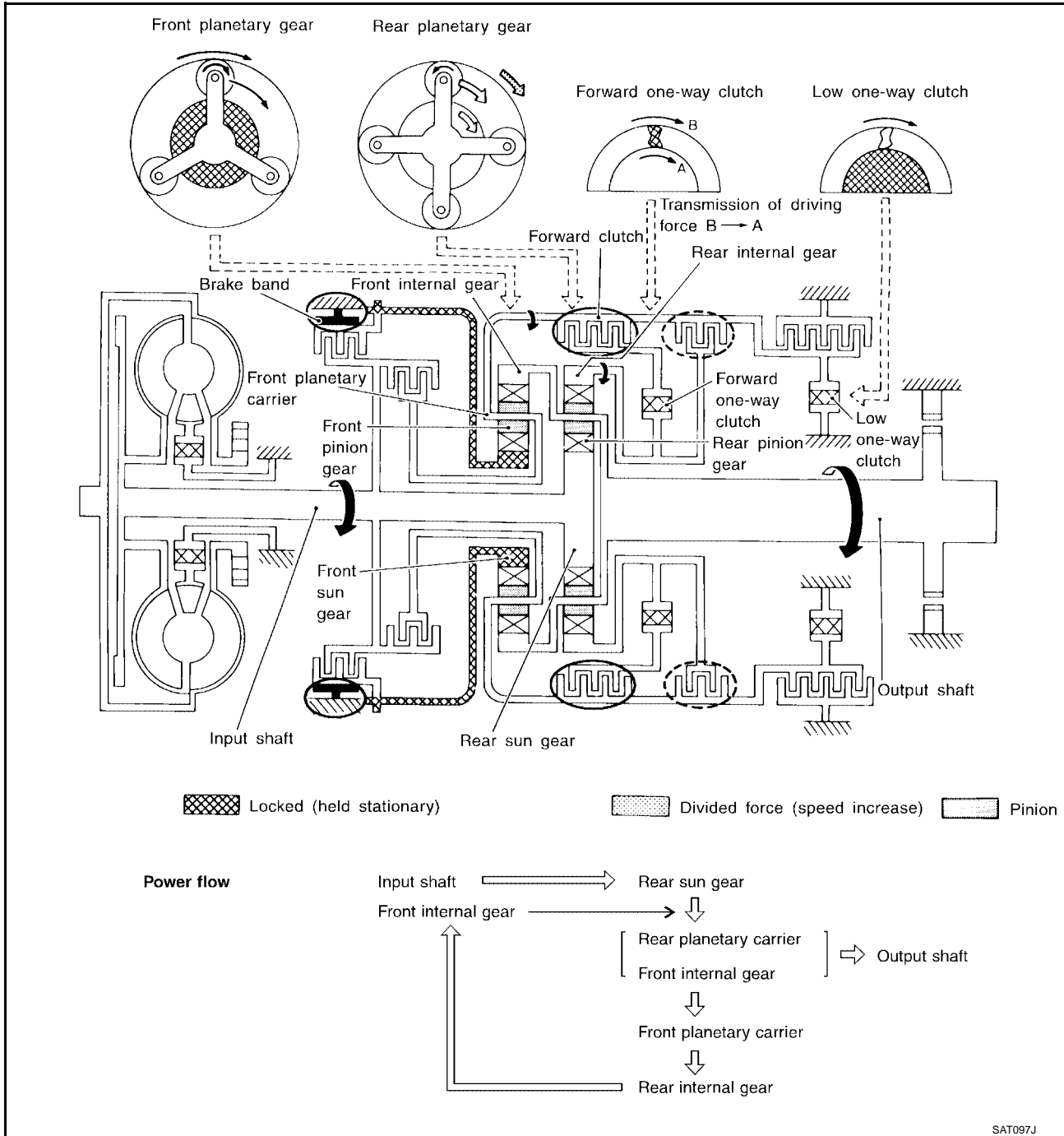
SAT096J

<p><b>Forward one-way clutch</b>  <b>Forward clutch</b>  <b>Low one-way clutch</b></p>	<p>Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches. (Start-up at D1 )</p>
<p><b>Overrun clutch</b>  engagement conditions  (Engine brake)</p>	<p>D1 : Overdrive control switch in OFF  Throttle opening less than 3/16  21 : Throttle opening less than 3/16  At D1 and 21 positions, engine brake is not activated due to free turning of low one-way clutch.</p>

# OVERALL SYSTEM

[RE4R01A]

## D2, 22 and 12 Positions



A  
B  
AT  
D  
E  
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I  
J  
K  
L  
M

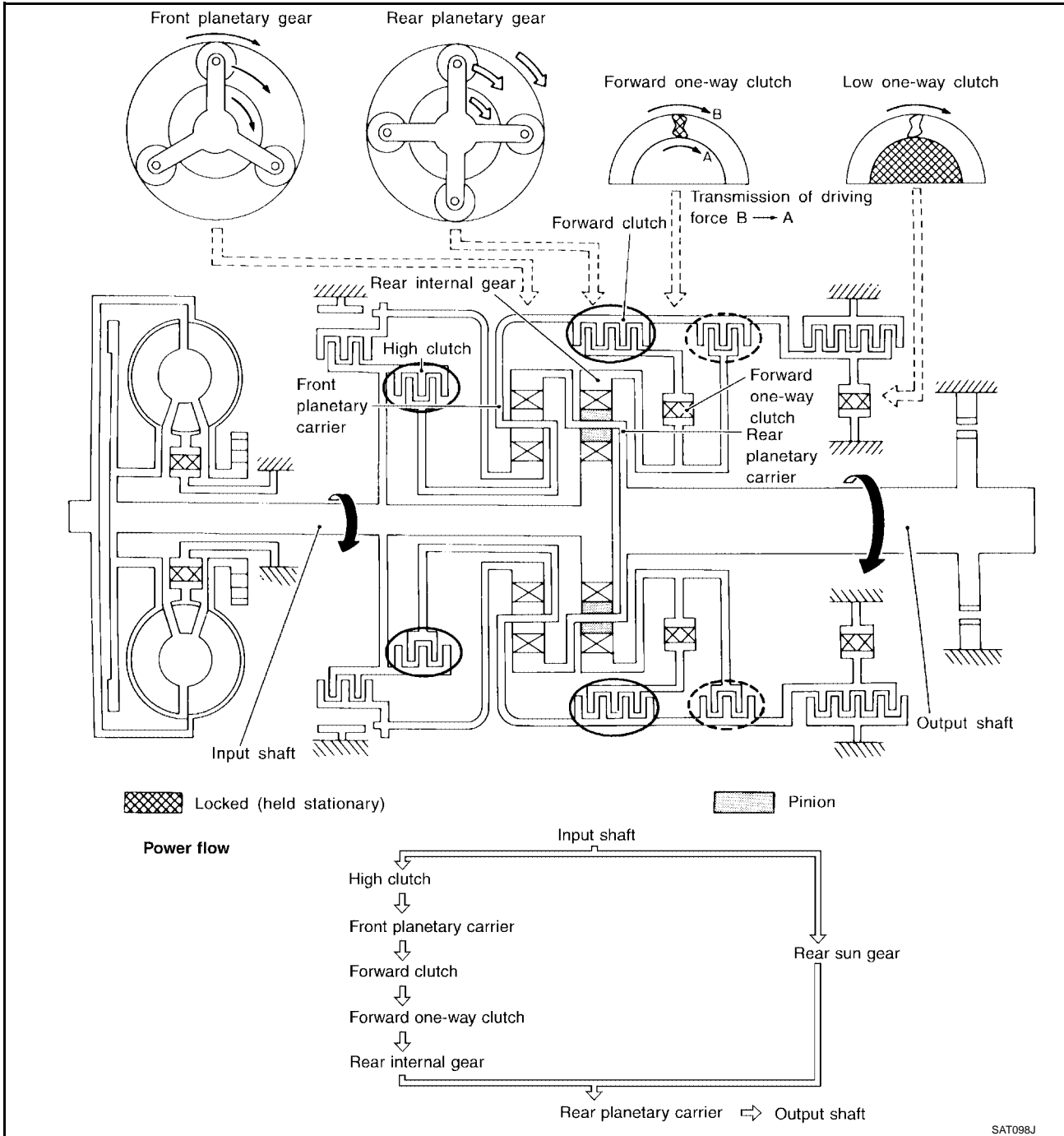
SAT097J

<p><b>Forward clutch</b>  <b>Forward one-way clutch</b>  <b>Brake band</b></p>	<p>Rear sun gear drives rear planetary carrier and combined front internal gear. Front internal gear now rotates around front sun gear accompanying front planetary carrier.          As front planetary carrier transfers the power to rear internal gear through forward clutch and forward one-way clutch, this rotation of rear internal gear increases the speed of rear planetary carrier compared with that of the 1st speed.</p>
<p><b>Overrun clutch</b>          engagement conditions</p>	<p>D2 : Overdrive control switch in OFF          Throttle opening less than 3/16          22 : Throttle opening less than 3/16          12 : Always engaged</p>

# OVERALL SYSTEM

[RE4R01A]

## D3 Position

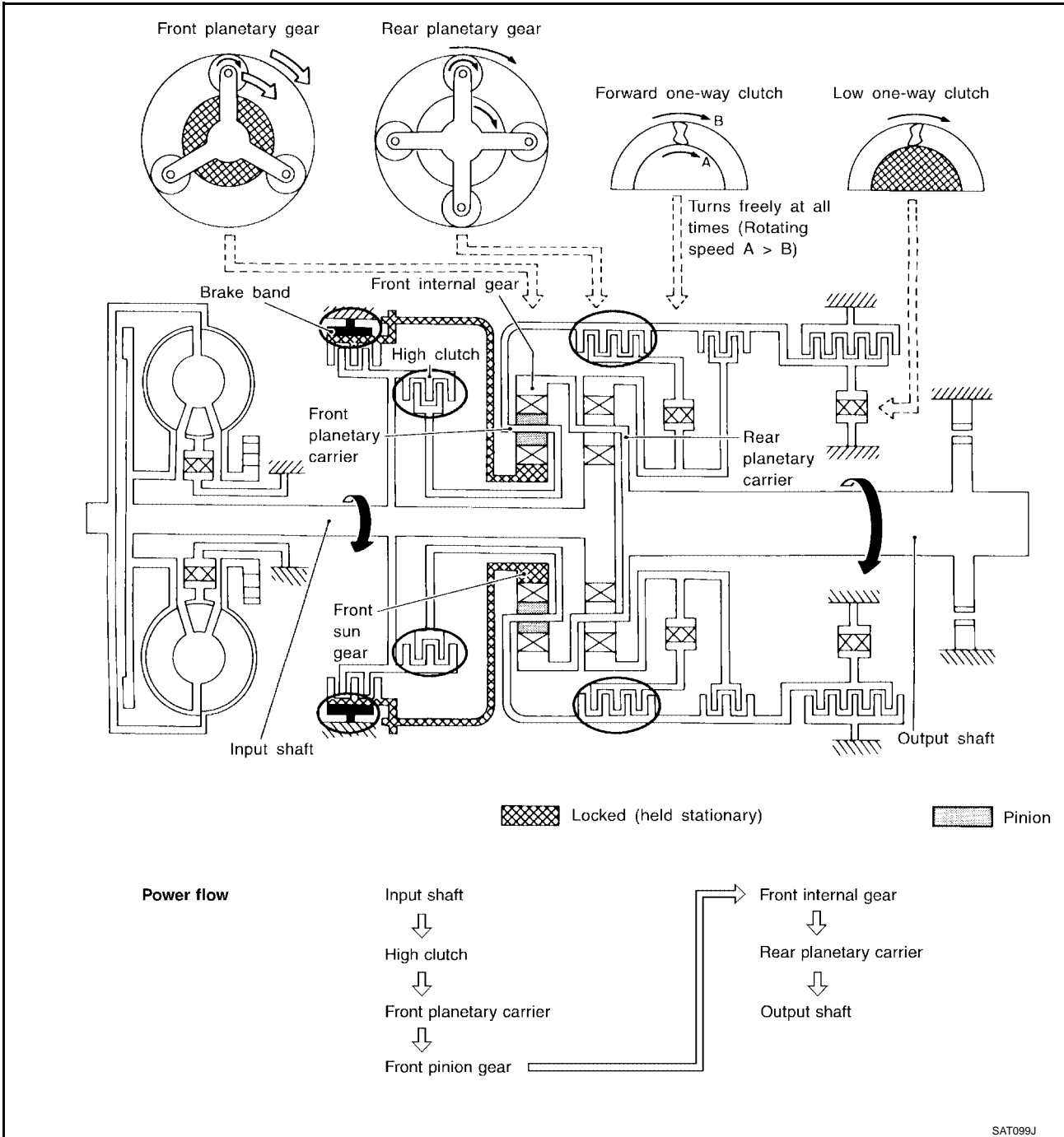


<p><b>High clutch</b>  <b>Forward clutch</b>  <b>Forward one-way clutch</b></p>	<p>Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch.          This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.</p>
<p><b>Overrun clutch engagement conditions</b></p>	<p>D3 : Overdrive control switch in OFF          Throttle opening less than 3/16</p>

# OVERALL SYSTEM

[RE4R01A]

## D4 (O/D) Position



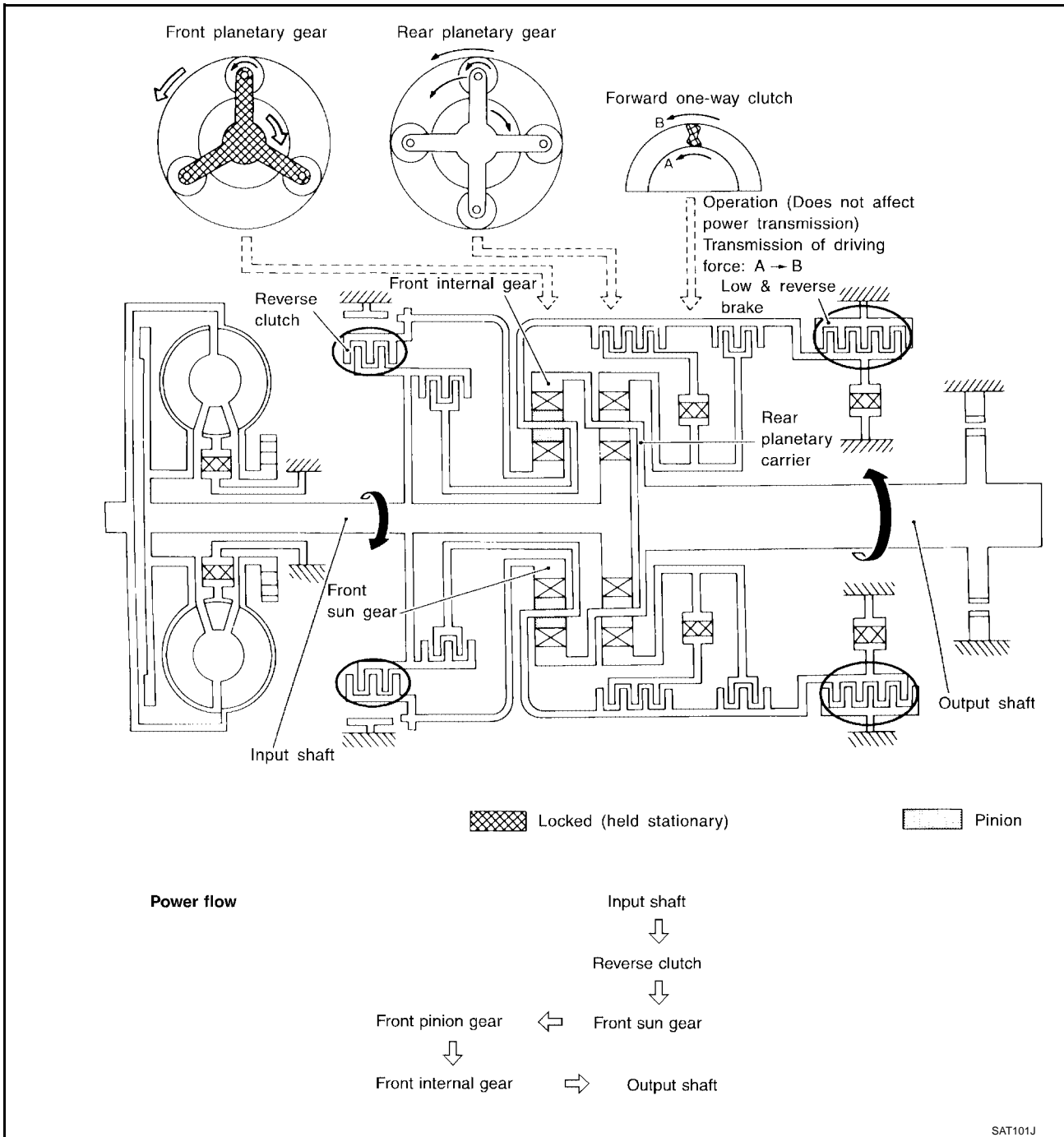
A  
B  
AT  
D  
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J  
K  
L  
M

<p><b>High clutch</b> <b>Brake band</b> <b>Forward clutch</b> (Does not affect power transmission)</p>	<p>Input power is transmitted to front carrier through high clutch. This front planetary carrier turns around the sun gear which is fixed by brake band and makes front internal gear (output) turn faster.</p>
<p>Engine brake</p>	<p>At D4 position, there is no one-way clutch in the power transmission line and engine brake can be obtained when decelerating.</p>

# OVERALL SYSTEM

[RE4R01A]

## R Position



<p><b>Reverse clutch</b> <b>Low and reverse brake</b></p>	<p>Front planetary carrier is stationary because of the operation of low and reverse brake. Input power is transmitted to front sun gear through reverse clutch, which drives front internal gear in the opposite direction.</p>
<p>Engine brake</p>	<p>As there is no one-way clutch in the power transmission line, engine brake can be obtained when decelerating.</p>

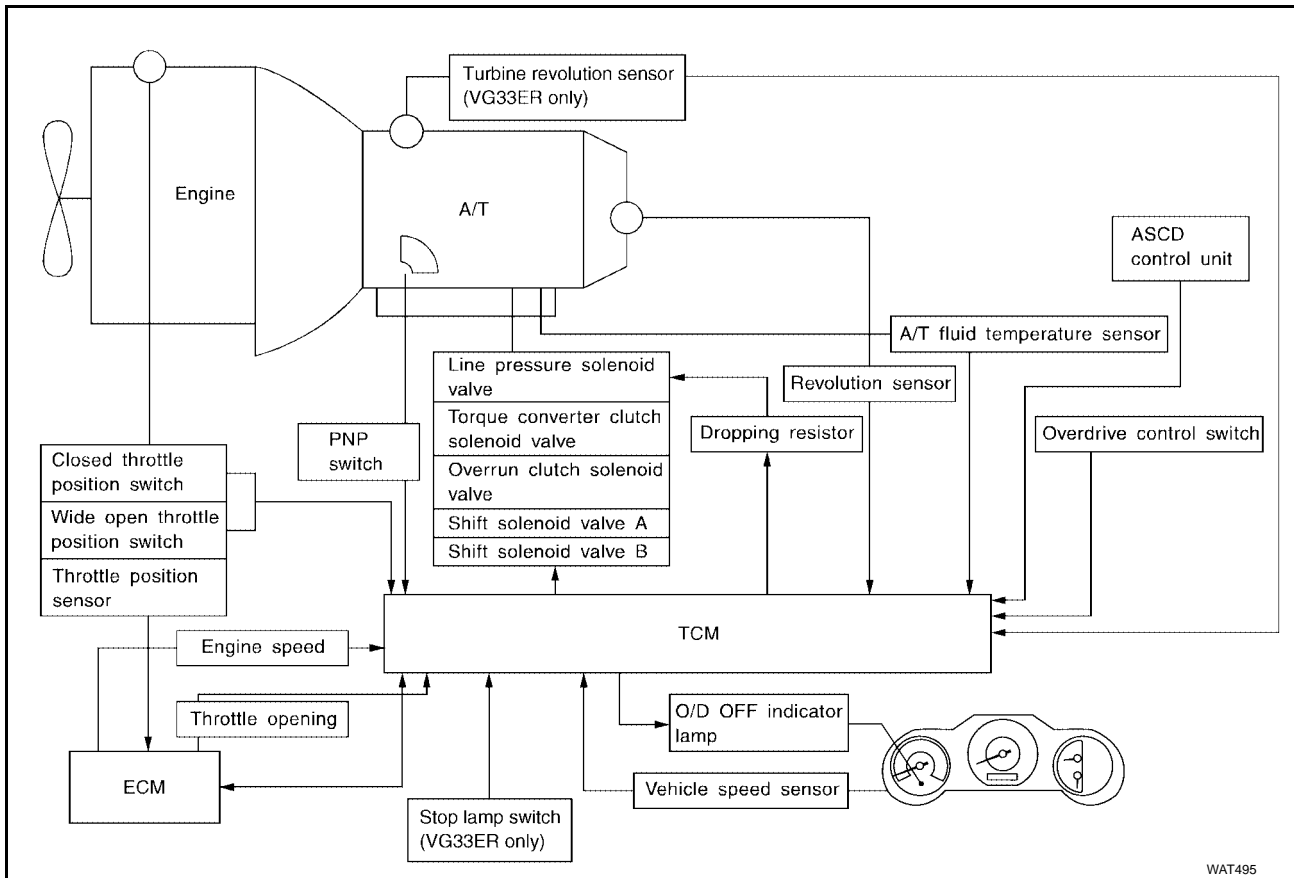


## Control System OUTLINE

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

SENSORS		TCM		ACTUATORS
PNP switch Throttle position sensor Closed throttle position switch Wide open throttle position switch Engine speed signal A/T fluid temperature sensor Revolution sensor Vehicle speed sensor Overdrive control switch ASCD control unit Stop lamp switch (VG33ER only) Turbine revolution sensor (VG33ER only)	▶	Shift control Line pressure control Lock-up control Overrun clutch control Timing control Fail-safe control Self-diagnosis CONSULT-II communication line Duet-EA control	▶	Shift solenoid valve A Shift solenoid valve B Overrun clutch solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve O/D OFF indicator lamp

## CONTROL SYSTEM



WAT495

## TCM FUNCTION

The function of the TCM is to:

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

## INPUT/OUTPUT SIGNAL OF TCM

	Sensors and solenoid valves	Function
Input	PNP switch	Detects select lever position and sends a signal to TCM.
	Throttle position sensor	Detects throttle valve position and sends a signal to TCM.
	Closed throttle position switch	Detects throttle valve's fully-closed position and sends a signal to TCM.
	Wide open throttle position switch	Detects a throttle valve position of greater than 1/2 of full throttle and sends a signal to TCM.
	Engine speed signal	From ECM.
	A/T fluid temperature sensor	Detects transmission fluid temperature and sends a signal to TCM.
	Revolution sensor	Detects output shaft rpm and sends a signal to TCM.
	Vehicle speed sensor	Used as an auxiliary vehicle speed sensor. Sends a signal when revolution sensor (installed on transmission) malfunctions.
	Overdrive control switch	Sends a signal, which prohibits a shift to D4 (overdrive) position, to the TCM.
	ASCD control unit	Sends the cruise signal and D4 (overdrive) cancellation signal from ASCD control unit to TCM.
	Turbine revolution sensor (VG33ER only)	Sends the input shaft revolution signal.
	Stop lamp switch (VG33ER only)	Sends the lock-up release signal to the TCM at the time of D4 (lock-up)
Output	Shift solenoid valve A/B	Selects shifting point suited to driving conditions in relation to a signal sent from TCM.
	Line pressure solenoid valve	Regulates (or decreases) line pressure suited to driving conditions in relation to a signal sent from TCM.
	Torque converter clutch solenoid valve	Regulates (or decreases) lock-up pressure suited to driving conditions in relation to a signal sent from TCM.
	Overrun clutch solenoid valve	Controls an "engine brake" effect suited to driving conditions in relation to a signal sent from TCM.
	O/D OFF indicator lamp	Shows TCM faults, when A/T control components malfunction.

## Control Mechanism LINE PRESSURE CONTROL

ECS007LL

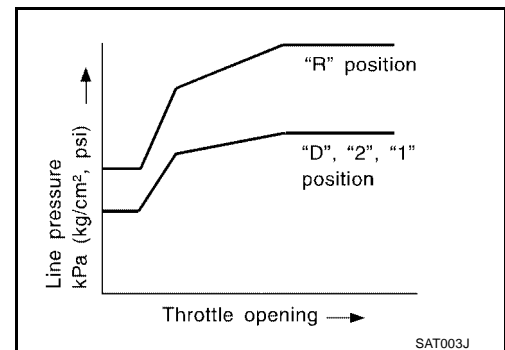
TCM has the various line pressure control characteristics to meet the driving conditions.

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

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

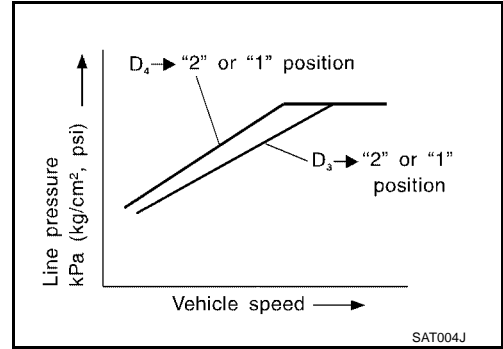
### Normal Control

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



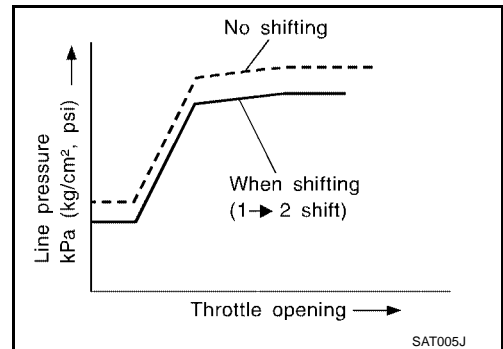
**Back-up Control (Engine brake)**

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



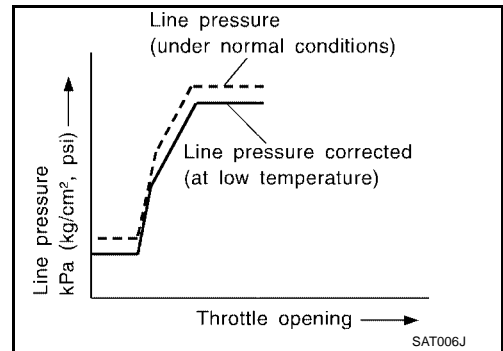
**During Shift Change**

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

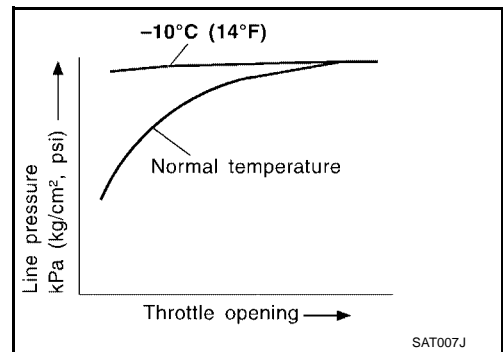


**At Low Fluid Temperature**

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



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



**SHIFT CONTROL**

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

A  
B  
AT

D

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K

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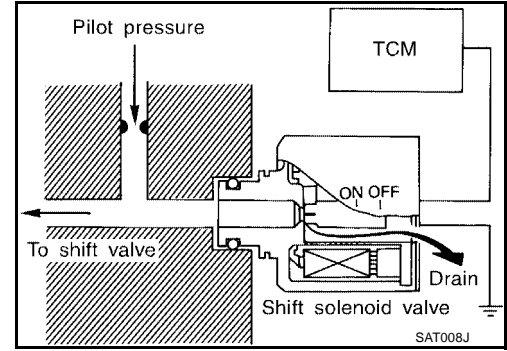
M

**Control of Shift Solenoid Valves A and B**

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

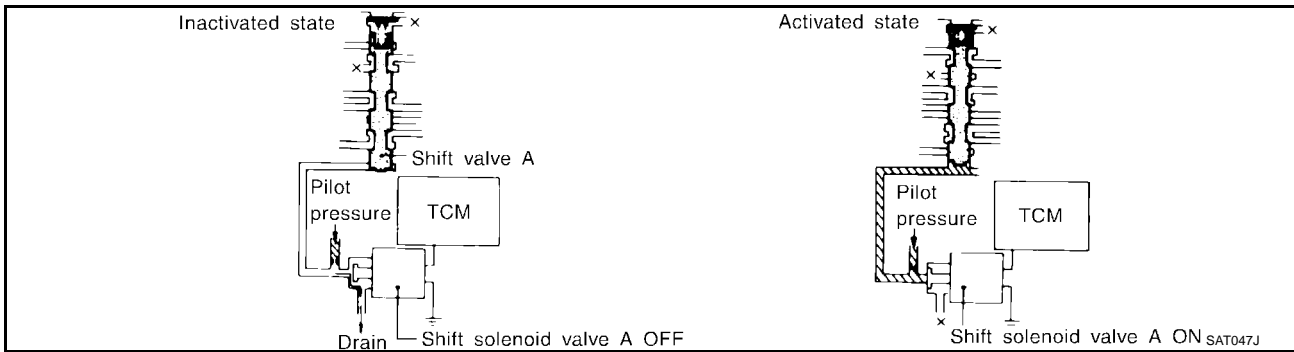
The shift solenoid valve performs simple ON-OFF operation. When set to ON, the drain circuit closes and pilot pressure is applied to the shift valve.

[Relation between shift solenoid valves A and B and gear positions]



Shift solenoid valve	Gear position				
	D1 , 21 , 11	D2 , 22 , 12	D3	D4 (O/D)	N-P
A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)	ON (Closed)
B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)

**Control of Shift Valves A and B**



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

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

**LOCK-UP CONTROL**

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

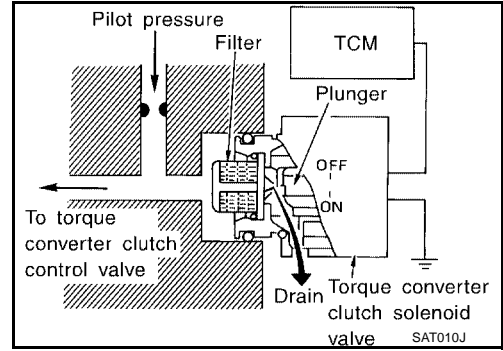
**Conditions for Lock-up Operation**

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

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

**Torque Converter Clutch Solenoid Valve Control**

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



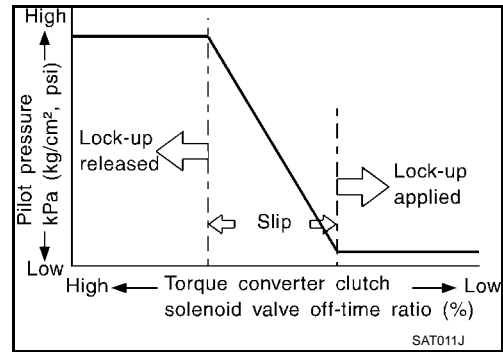
The torque converter clutch piston is designed to slip to adjust the ratio of ON-OFF, thereby reducing lock-up shock.

OFF-time INCREASING

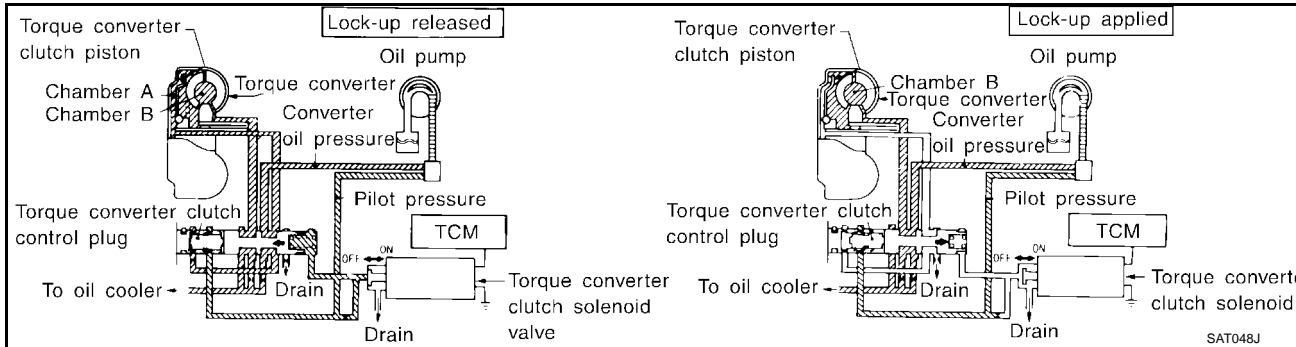
↓  
Amount of drain DECREASING

↓  
Pilot pressure HIGH

↓  
Lock-up RELEASING



**Torque Converter Clutch Control Valve Operation**



**Lock-up Released**

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

**Lock-up Applied**

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

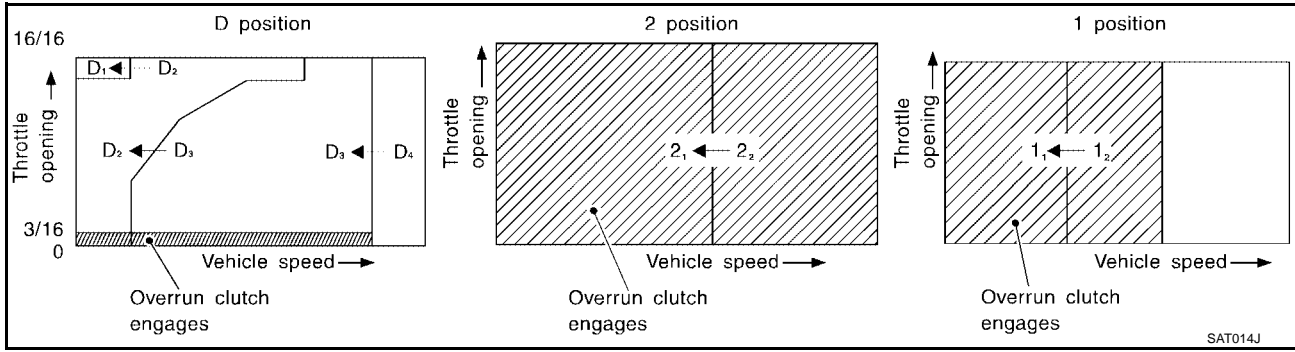
Also smooth lock-up is provided by transient application and release of the lock-up.

**OVERRUN CLUTCH CONTROL (ENGINE BRAKE CONTROL)**

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

The overrun clutch operates when the engine brake is needed.

**Overrun Clutch Operating Conditions**



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

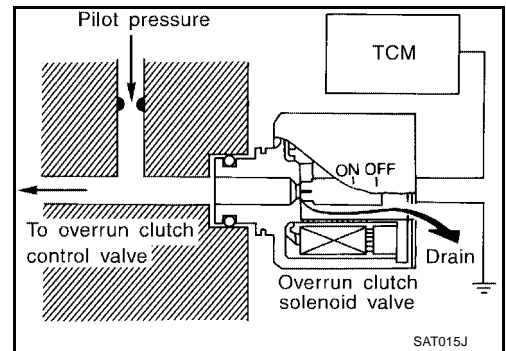
**Overrun Clutch Solenoid Valve Control**

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

When this solenoid valve is ON, the pilot pressure drain port closes.

When it is OFF, the drain port opens.

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

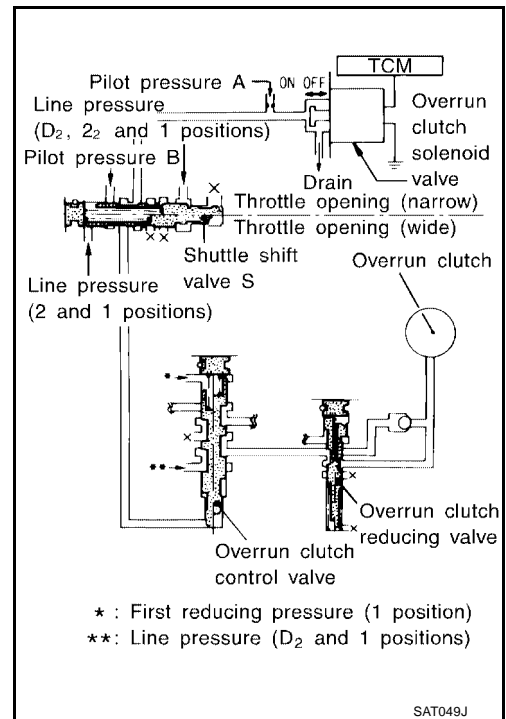


**Overrun Clutch Control Valve Operation**

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

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

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



# OVERALL SYSTEM

[RE4R01A]

ECS007LM

## Control Valve FUNCTION OF CONTROL VALVE

Valve name	Function
<ul style="list-style-type: none"> <li>● Pressure regulator valve</li> <li>● Pressure regulator plug</li> <li>● Pressure regulator sleeve plug</li> </ul>	Regulate oil discharged from the oil pump to provide optimum line pressure for all driving conditions.
Pressure modifier valve	Used as a signal supplementary valve to the pressure regulator valve. Regulates pressure-modifier pressure (signal pressure) which controls optimum line pressure for all driving conditions.
Modifier accumulator piston	Smooths hydraulic pressure regulated by the pressure modifier valve to prevent pulsations.
Pilot valve	Regulates line pressure to maintain a constant pilot pressure level which controls lock-up mechanism, overrun clutch, 3-2 timing required for shifting.
Accumulator control valve Accumulator control sleeve	Regulate accumulator back-pressure to pressure suited to driving conditions.
Manual valve	Directs line pressure to oil circuits corresponding to select positions. Hydraulic pressure drains when the shift lever is in Neutral.
Shift valve A	Simultaneously switches three oil circuits using output pressure of shift solenoid valve A to meet driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve B.
Shift valve B	Simultaneously switches three oil circuits using output pressure of shift solenoid valve B in relation to driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve A.
Shuttle shift valve S	Switches hydraulic circuits to provide 3-2 timing control and overrun clutch control in relation to the throttle opening. Inactivates the overrun clutch to prevent interlocking in 4th gear when the throttle is wide open.
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with application of the brake band in 4th gear. (Interlocking occurs if the overrun clutch engages during D4 gear operation.)
4-2 relay valve	Memorizes that the transmission is in 4th gear. Prevents the transmission from downshifting from 4th gear to 3rd and then to 2nd in combination with 4-2 sequence valve and shift valves A and B when downshifting from 4th to 2nd gear.
4-2 sequence valve	Prevents band servo pressure from draining before high clutch operating pressure and band servo releasing pressure drain (from the same circuit) during downshifting from 4th to 2nd gear.
Servo charger valve	An accumulator and a one-way orifice are used in the 2nd gear band servo oil circuit to dampen shifting shock when shifting from 1st to 2nd gear. To maintain adequate flow rate when downshifting from 4th or 3rd gear to 2nd gear, the servo charger valve directs 2nd gear band servo hydraulic pressure to the circuit without going through the one-way orifice when downshifting from 3rd or a higher gear.
3-2 timing valve	Prevents a late operation of the brake band when shifting selector lever from D to 1 or 2 position while driving in D3 .
1 reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when downshifting from the 1 position 2nd gear to 1st gear.
Overrun clutch reducing valve	Reduces oil pressure directed to the overrun clutch and prevents engine-brake shock. In 1 and 2 positions, line pressure acts on the overrun clutch reducing valve to increase the pressure-regulating point, with resultant engine brake capability.
Torque converter relief valve	Prevents an excessive rise in torque converter pressure.

A

B

AT

D

E

F

G

H

I

J

K

L

M

# OVERALL SYSTEM

[RE4R01A]

Valve name	Function
Torque converter clutch control valve, torque converter clutch control plug and torque converter clutch control sleeve	Activate or inactivate the lock-up function. Also provide smooth lock-up through transient application and release of the lock-up system.
Shuttle shift valve D	Switches hydraulic circuits so that output pressure of the torque converter clutch solenoid valve acts on the lock-up valve in the D position of 2nd, 3rd and 4th gears. (In the D position 1st gear, lock-up is inhibited.) <ul style="list-style-type: none"><li>● Lock-up control is not affected in D position 2nd, 3rd or 4th gears, unless output pressure of the torque converter clutch solenoid valve is generated by a signal from the control unit.</li></ul>



ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

PFP:00000

Introduction

ECS007LN

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

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

The second is the TCM original self-diagnosis indicated by the O/D OFF indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For detail, refer to [AT-190. "SELF-DIAGNOSTIC RESULT TEST MODE"](#).

OBD-II Function for A/T System

ECS007LO

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

ECS007LP

ONE TRIP DETECTION LOGIC

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

TWO TRIP DETECTION LOGIC

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

If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MIL will illuminate. — Second Trip

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

Items	MIL	
	One trip detection	Two trip detection
Shift solenoid valve A — DTC: P0750 (1108)	X	
Shift solenoid valve B — DTC: P0755 (1201)	X	
Throttle position sensor or switch — DTC: P1705 (1206)	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)

ECS007LO

HOW TO READ DTC AND 1ST TRIP DTC

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

- ④ with CONSULT-II or ④ GST) CONSULT-II or GST (Generic Scan Tool) Examples: P0705, P0710, P0720, P0725, etc.  
 These DTCs are prescribed by SAE J2012.  
 (CONSULT-II also displays the malfunctioning component or system.)

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

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4R01A]

A sample of CONSULT-II display for DTC and 1st trip DTC is shown below. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode for "ENGINE" with CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

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

SAT015K

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

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

SAT016K

## Freeze Frame Data and 1st Trip Freeze Frame Data

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-681, "CONSULT-II Function"](#) (VG33E only) or [EC-1284, "CONSULT-II Function"](#) (VG33ER only).

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

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0306 (0701, 0603 - 0608) Fuel Injection System Function — DTC: P0171 (0115), P0172 (0114), P0174 (0209), P0175 (0210)
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.

- **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.**

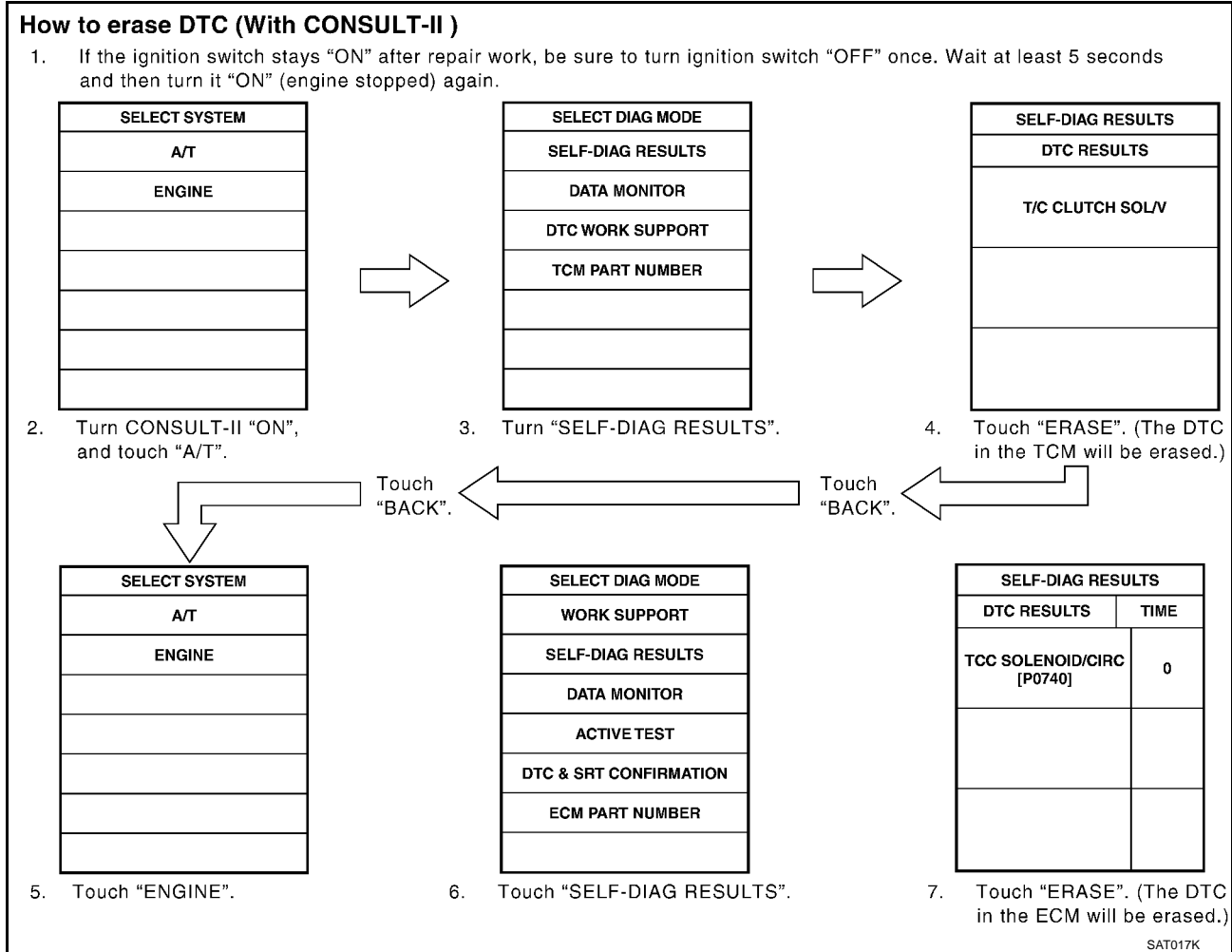
The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to OBD-II. For details, refer to [EC-638, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) (VG33E only) or [EC-1241, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION"](#) (VG33ER only).

- **Diagnostic trouble codes (DTC)**
- **1st trip diagnostic trouble codes (1st trip DTC)**
- **Freeze frame data**
- **1st trip freeze frame data**
- **System readiness test (SRT) codes**
- **Test values**

### HOW TO ERASE DTC (WITH CONSULT-II)

- **If a DTC is displayed for both ECM and TCM, it needs to be erased for both ECM and TCM.**
1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 5 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-DIAG RESULTS".

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



**HOW TO ERASE DTC (WITH GST)**

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 5 seconds and then turn it ON (engine stopped) again.
2. Perform "OBD-II SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)". Refer to [AT-198, "OBD-II SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with Generic Scan Tool (GST). For details, refer to [EC-692, "Generic Scan Tool \(GST\) Function"](#) (VG33E only) or [EC-1294, "Generic Scan Tool \(GST\) Function"](#) (VG33ER only).

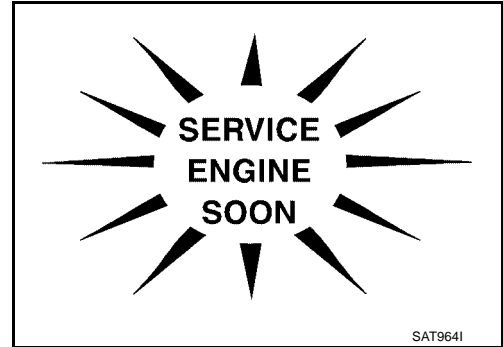
**HOW TO ERASE DTC (NO TOOLS)**

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 5 seconds and then turn it ON (engine stopped) again.
2. Perform "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)". Refer to [AT-198, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)

ECS007LR

**Malfunction Indicator Lamp (MIL)**

1. The malfunction indicator lamp will light up when the ignition switch is turned ON without the engine running. This is for checking the lamp.
  - If the malfunction indicator lamp does not light up, refer to [DI-25, "WARNING LAMPS"](#) or [EC-640, "Malfunction Indicator Lamp \(MIL\)"](#) (VG33E only) or [EC-1243, "Malfunction Indicator Lamp \(MIL\)"](#) (VG33ER only).
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-625, "ON BOARD DIAGNOSTIC \(OBD\) SYSTEM"](#) (VG33E only) or [EC-1229, "ON BOARD DIAGNOSTIC \(OBD\) SYSTEM"](#) (VG33ER only).



**CONSULT-II**

ECS007LS

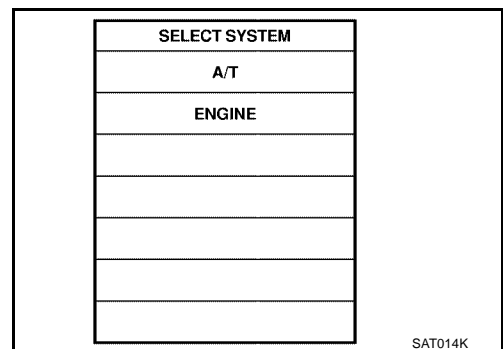
After performing "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" [Refer to [AT-189, "SELF-DIAGNOSTIC PROCEDURE \(WITH CONSULT-II\)"](#) ], place check marks for results on the Diagnostic Worksheet. Refer to [AT-205, "DIAGNOSTIC WORKSHEET"](#) . Reference pages are provided following the items.

**NOTICE:**

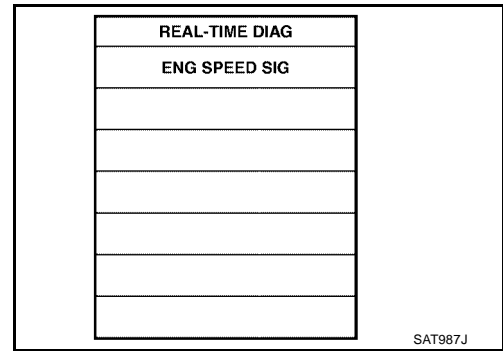
1. The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid). Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
2. Shift schedule (which implies gear position) displayed on CONSULT-II and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:
  - Actual shift schedule has more or less tolerance or allowance,
  - Shift schedule indicated in Service Manual refers to the point where shifts start, and
  - Gear position displayed on CONSULT-II indicates the point where shifts are completed.
3. Shift solenoid valve "A" or "B" is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).
4. Additional CONSULT-II information can be found in the Operation Manual supplied with the CONSULT-II unit.

**Ⓟ SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)**



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-246, "Wiring Diagram — AT — MAIN"](#) . If result is NG, refer to [PG-9, "POWER SUPPLY ROUTING"](#) .



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





## SELF-DIAGNOSTIC RESULT TEST MODE

Detected items (Screen terms for CONSULT-II, "SELF-DIAG RESULTS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		Available by O/D OFF  indicator lamp or "A/T" on CONSULT-II	Available by malfunction indicator lamp*2, "ENGINE" on CONSULT-II or GST 
PNP position switch circuit		● TCM does not receive the correct voltage signal (based on the gear position) from the switch.	—	P0705
—	PNP SW/CIRC			
Revolution sensor		● TCM does not receive the proper voltage signal from the sensor.	X	P0720
VHCL SPEED SEN-A/T	VEH SPD SEN/CIR AT			
Vehicle speed sensor (Meter)		● TCM does not receive the proper voltage signal from the sensor.	X	—
VHCL SPEED SEN-MTR	—			
A/T 1st gear function		● A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	—	P0731*1
—	A/T 1ST GR FNCTN			
A/T 2nd gear function		● A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	—	P0732*1
—	A/T 2ND GR FNCTN			
A/T 3rd gear function		● A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	—	P0733*1
—	A/T 3RD GR FNCTN			
A/T 4th gear function		● A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	—	P0734*1
—	A/T 4TH GR FNCTN			
A/T TCC S/V function (lock-up)		● A/T cannot perform lock-up even if electrical circuit is good.	—	P0744*1
—	A/T TCC S/V FNCTN			
Shift solenoid valve A		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0750
SHIFT SOLENOID/V A	SFT SOL A/CIRC A			
Shift solenoid valve B		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0755
SHIFT SOLENOID/V B	SFT SOL B/CIRC B			
Overrun clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P1760
OVERRUN CLUTCH S/V	O/R CLUCH SOL/ CIRC			

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

**[RE4R01A]**

Detected items (Screen terms for CONSULT-II, "SELF-DIAG RESULTS" test mode)		Malfunction is detected when ...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		Available by O/D OFF 	Available by malfunction indicator lamp*2,  "ENGINE" on CONSULT-II or GST
T/C clutch solenoid valve	TCC SOLENOID/ CIRC	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0740
T/C CLUTCH SOL/V	TCC SOLENOID/ CIRC			
Line pressure solenoid valve	L/PRESS SOL/CIRC	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0745
LINE PRESSURE S/V	L/PRESS SOL/CIRC			
Throttle position sensor	TP SEN/CIRC A/T	● TCM receives an excessively low or high voltage from the sensor.	X	P1705
Throttle position switch	TP SEN/CIRC A/T			
THROTTLE POSI SEN	TP SEN/CIRC A/T			
Engine speed signal	ENGINE SPEED SIG	● TCM does not receive the proper voltage signal from the ECM.	X	P0725
ENGINE SPEED SIG	ENGINE SPEED SIG			
A/T fluid temperature sensor	ATF TEMP SEN/ CIRC	● TCM receives an excessively low or high voltage from the sensor.	X	P0710
BATT/FLUID TEMP SEN	ATF TEMP SEN/ CIRC			
Turbine revolution sensor (VG33ER only)	—	● TCM does not receive the proper voltage signal from the sensor.	X	—
TURBINE REV	—			
TCM (RAM)	—	● TCM memory (RAM) is malfunctioning.	—	—
CONTROL UNIT (RAM)	—			
TCM (ROM)	—	● TCM memory (ROM) is malfunctioning.	—	—
CONTROL UNIT (ROM)	—			
TCM (EEP ROM)	—	● TCM memory (EEP ROM) is malfunctioning.	—	—
CONT UNIT (EEP ROM)	—			
Initial start	—	● This is not a malfunction message (Whenever shutting off a power supply to the control unit, this message appears on the screen).	X	—
INITIAL START	—			
No failure (NO DTC IS DETECTED FURTHER TESTING MAY BE REQUIRED**)	—	● No failure has been detected.	X	X

X: Applicable

—: Not applicable

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

\*2: Refer to [EC-640, "Malfunction Indicator Lamp \(MIL\)"](#) (VG33E only) or [EC-1243, "Malfunction Indicator Lamp \(MIL\)"](#) (VG33ER only).

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4R01A]

## DATA MONITOR MODE (A/T)

Item	Display	Monitor item		Description	Remarks
		TCMinput signals	Main signals		
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 P or N position with vehicle stationary, CONSULT-II data may not indicate 0 km/h (0 mph).
Vehicle speed sensor 2 (Meter)	VHCL/S SE-MTR [km/h] or [mph]	X	—	<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.
Throttle position sensor	THRTL POS SEN [V]	X	—	<ul style="list-style-type: none"> <li>● 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.
Turbine revolution sensor (VG33ER only)	TURBINE REV [rpm]	X	—	<ul style="list-style-type: none"> <li>● Turbine revolution computed from signal of turbine revolution sensor is displayed.</li> </ul>	Error may occur under approx. 800 rpm and will not indicate 0 rpm even if engine is not running.
Overdrive control switch	OVERDRIVE SW [ON/OFF]	X	—	<ul style="list-style-type: none"> <li>● ON/OFF state computed from signal of overdrive control SW is displayed.</li> </ul>	
PN position 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>	
2 position switch	2 POSITION SW [ON/OFF]	X	—	<ul style="list-style-type: none"> <li>● ON/OFF status, computed from signal of 2 position SW, is displayed.</li> </ul>	
1 position switch	1 POSITION SW [ON/OFF]	X	—	<ul style="list-style-type: none"> <li>● ON/OFF status, computed from signal of 1 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>	<ul style="list-style-type: none"> <li>● This is displayed even when no ASCD is mounted.</li> </ul>



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

**[RE4R01A]**

Item	Display	Monitor item		Description	Remarks
		TCM input signals	Main signals		
ASCD - O/D cut signal	ASCD - O/D CUT [ON/OFF]	X	—	<ul style="list-style-type: none"> <li>Status of ASCD O/D release signal is displayed. ON ... O/D released OFF ... O/D 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>	
Wide 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>	
Stop lamp switch (VG33ER only)	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 switch is released.</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>	
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	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>
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>	
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>	

A  
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# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4R01A]

Item	Display	Monitor item		Description	Remarks
		TCM input signals	Main signals		
Overrun clutch solenoid valve	OVERRUN/C S/V [ON/OFF]	—	X	● Control value of overrun clutch solenoid valve computed by TCM from each input signal is displayed.	
Self-diagnosis display lamp (O/D OFF indicator lamp)	SELF-D DP LMP [ON/OFF]	—	X	● Control status of O/D OFF indicator lamp is displayed.	

X: Applicable

—: Not applicable

## DTC WORK SUPPORT MODE WITH CONSULT-II

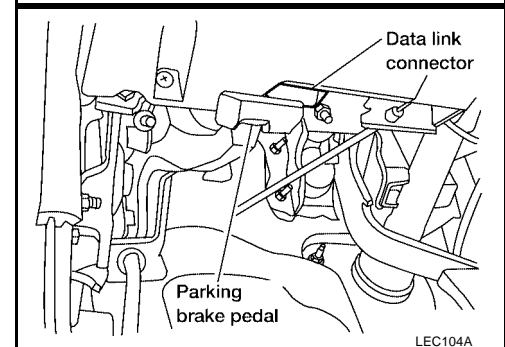
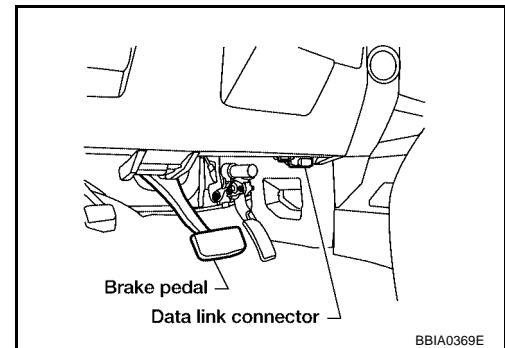
### CONSULT-II Setting Procedure

#### CAUTION:

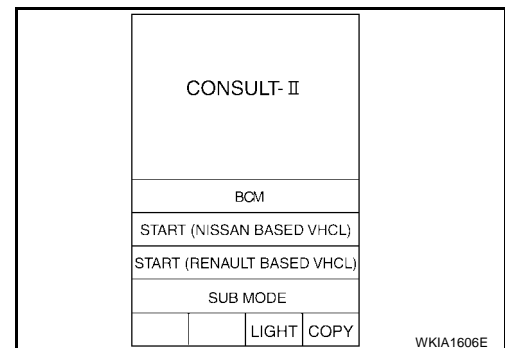
If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

- For details, refer to the separate "CONSULT-II Operations Manual".

1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector. The data link connector is located in instrument lower panel on driver side.
3. Turn ignition switch ON.



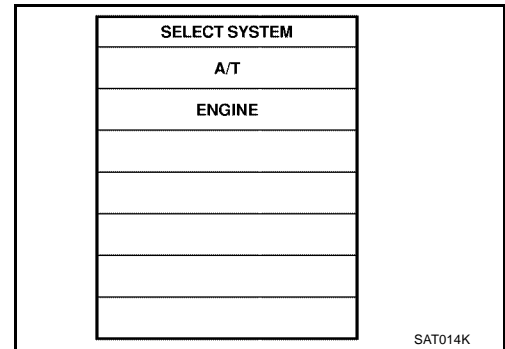
4. Touch "START (NISSAN BASED VHCL)".



# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

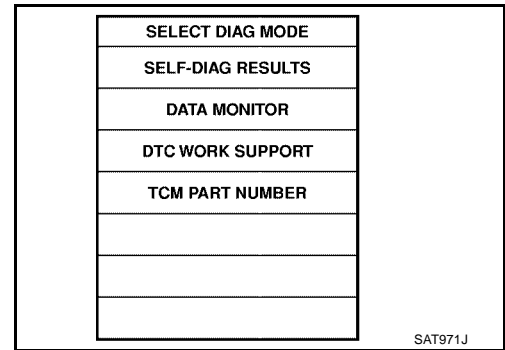
[RE4R01A]

5. Touch "A/T".



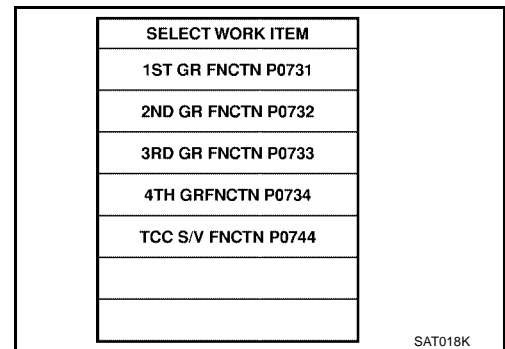
A  
B  
AT

6. Touch "DTC WORK SUPPORT".



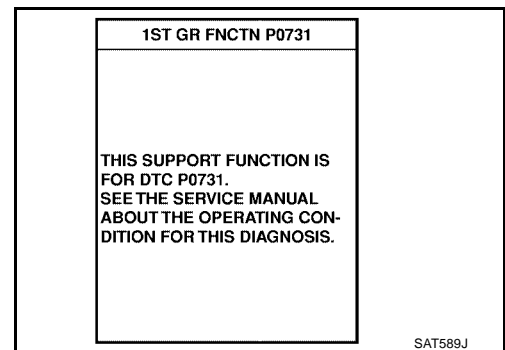
D  
E  
F  
G

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



H  
I  
J  
K

8. Touch "START".



L  
M

# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4R01A]

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

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

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

SAT019K

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

SAT591J

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

1ST GR FNCTN P0731	
STOP VEHICLE	

SAT592J

1ST GR FNCTN P0731	
NG	

SAT593J

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

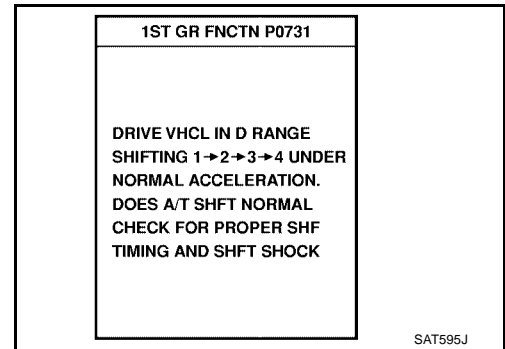
1ST GR FNCTN P0731	
DRIVE VHCL IN D RANGE SHIFTING 1→2→3→4 UNDER NORMAL ACCELERATION. DOES A/T SHFT NORMAL CHECK FOR PROPER SHF TIMING AND SHFT SHOCK	

SAT594J

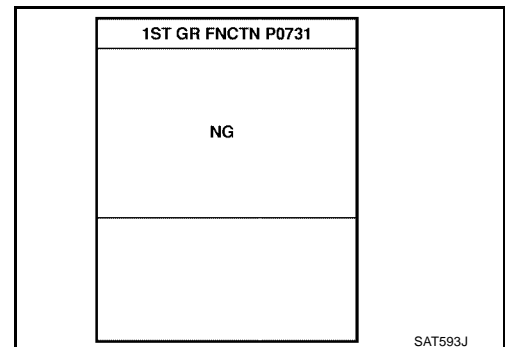
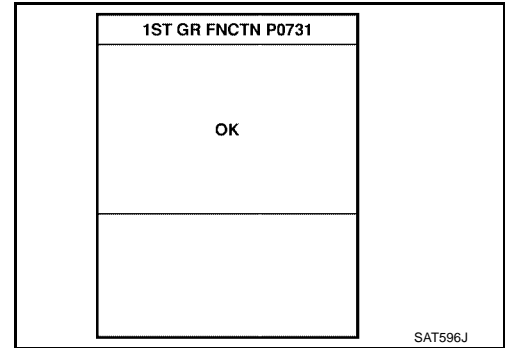
# ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[RE4R01A]

12. Touch "YES" or "NO".



13. CONSULT-II procedure ended.



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

## DTC WORK SUPPORT MODE

DTC work support item	Description	Check 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>

DTC work support item	Description	Check item
4TH GR FNCTN P0734	Following items for "A/T 4th gear function (P0734)" can be confirmed. <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	Following items for "A/T TCC S/V function (lock-up) (P0744)" can be confirmed. <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>

## Diagnostic Procedure Without CONSULT-II

ECS007LT

### OBD-II SELF-DIAGNOSTIC PROCEDURE (WITH GST)

Refer to [EC-692, "Generic Scan Tool \(GST\) Function"](#) (VG33E only) or [EC-1294, "Generic Scan Tool \(GST\) Function"](#) (VG33ER only), .

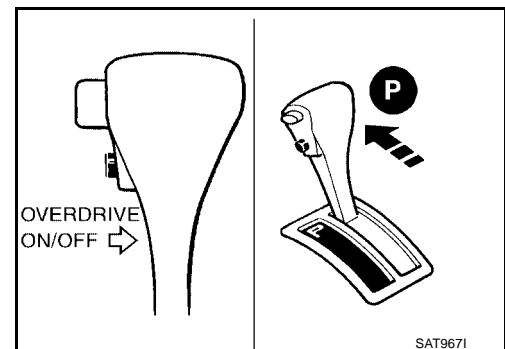
### OBD-II SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

Refer to [EC-640, "Malfunction Indicator Lamp \(MIL\)"](#) (VG33E only) or [EC-1243, "Malfunction Indicator Lamp \(MIL\)"](#) (VG33ER only).

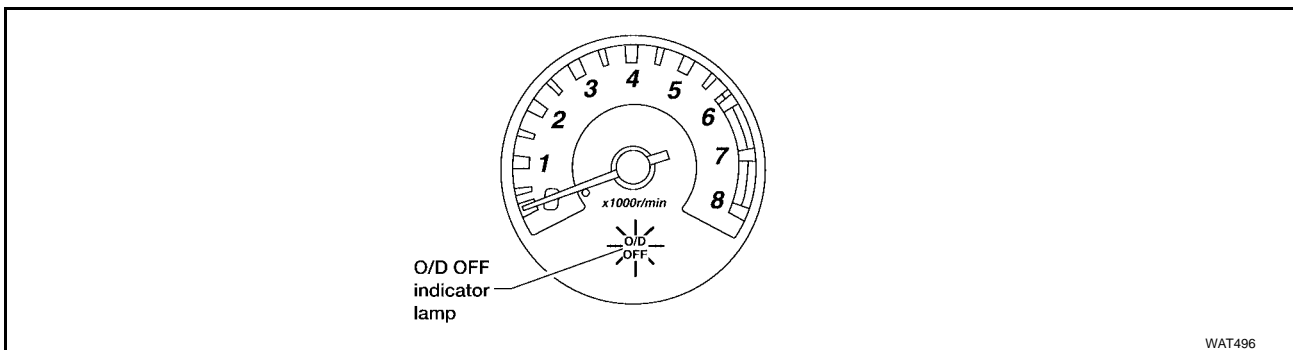
### TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

## 1. CHECK O/D OFF INDICATOR LAMP

1. Selector lever in P position. Start the engine. Warm engine to normal operating temperature.
2. Turn ignition switch to OFF position.
3. Wait at least 5 seconds.
4. Turn ignition switch to ON position (Do not start engine).



5. Does O/D OFF indicator lamp come on for about 2 seconds?

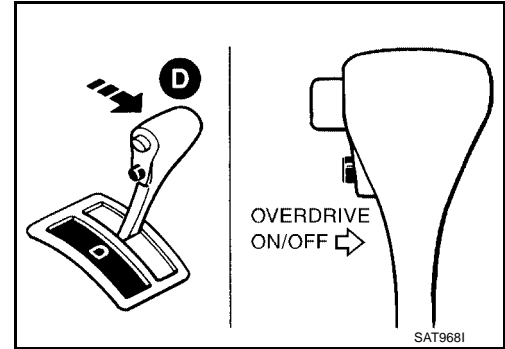


Yes or No

- Yes >> GO TO 2.  
 No >> Go to [AT-356, "1. O/D OFF Indicator Lamp Does Not Come On"](#) .

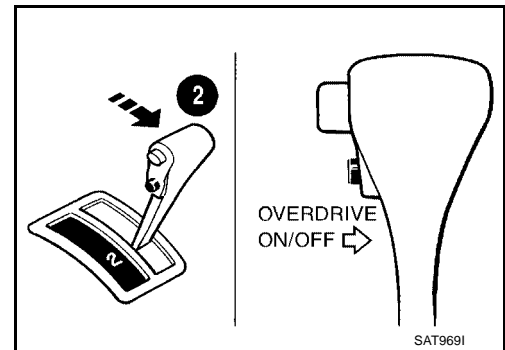
## 2. JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch to OFF position.
2. Depress shift lock release button.
3. Move selector lever from P to D position.
4. Turn ignition switch to ON position. Do not start engine.
5. Depress and hold overdrive control switch in OFF position (the O/D OFF indicator lamp will be ON) until directed to release the switch (If O/D OFF indicator lamp does not come on, go to step 3 on [AT-387](#)).
6. Turn ignition switch to OFF position.
7. Turn ignition switch to ON position (Do not start engine).
8. Release the overdrive control switch (the O/D OFF indicator lamp will be OFF).
  - Wait for more than 2 seconds after ignition switch ON.
9. Move selector lever to 2 position.
10. Depress and release the overdrive control switch (the O/D OFF indicator lamp will be ON).



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

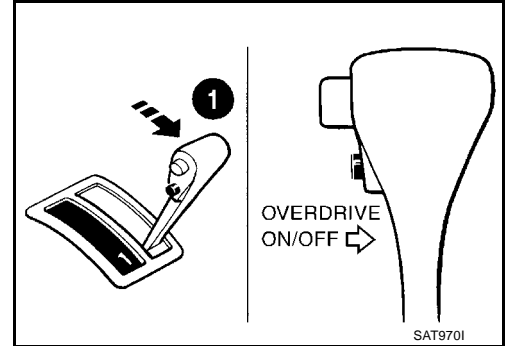
>> GO TO 3.



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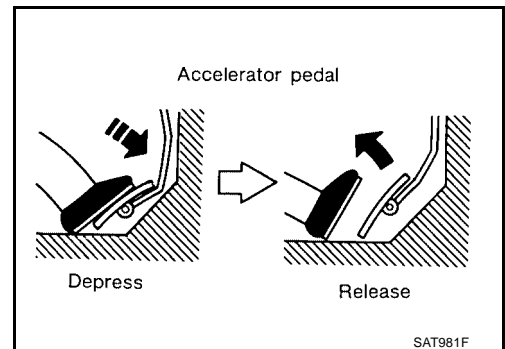
## 3. JUDGEMENT PROCEDURE STEP 2

1. Move selector lever to 1 position.
2. Release the overdrive control switch.
3. Depress and release the overdrive control switch (the O/D OFF indicator lamp will be ON).
4. Depress and release the overdrive control switch (the O/D OFF indicator lamp will be OFF).
5. Depress and hold the overdrive control switch (the O/D OFF indicator lamp will be ON) until directed to release the switch.
6. Depress accelerator pedal fully and release.



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

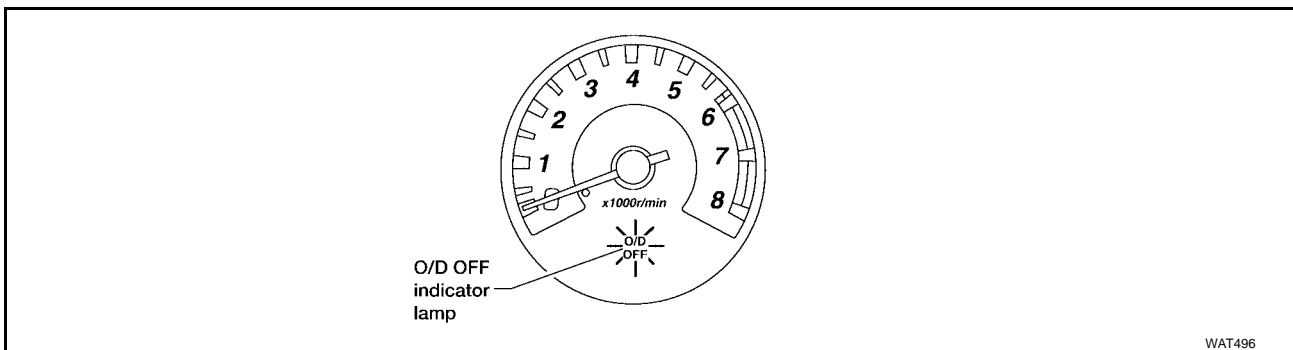
>> GO TO 4.



## 4. CHECK SELF-DIAGNOSIS CODE

Check O/D OFF indicator lamp.

Refer to [AT-201, "JUDGEMENT OF SELF-DIAGNOSIS CODE \(VG33E ONLY\)"](#) or [AT-202, "JUDGEMENT OF SELF-DIAGNOSIS CODE \(VG33ER ONLY\)"](#).



>> DIAGNOSIS END.



## JUDGEMENT OF SELF-DIAGNOSIS CODE (VG33E ONLY)

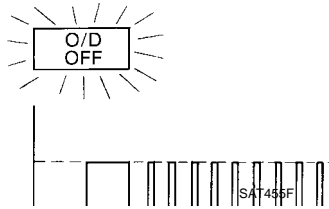
O/D OFF indicator lamp:

<p>All judgement flickers are same.</p> <div style="text-align: center;"> </div> <p>All circuits that can be confirmed by self-diagnosis are OK.</p>	<p>1st judgement flicker is longer than others.</p> <div style="text-align: center;"> </div> <p>Revolution sensor circuit is short-circuited or disconnected.                  ⇒ Go to <a href="#">AT-261, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)"</a> .</p>
<p>2nd judgement flicker is longer than others.</p> <div style="text-align: center;"> </div> <p>Vehicle speed sensor circuit is short-circuited or disconnected.                  ⇒ Go to <a href="#">AT-340, "DTC VEHICLE SPEED SENSOR-MTR"</a> .</p>	<p>3rd judgement flicker is longer than others.</p> <div style="text-align: center;"> </div> <p>Throttle position sensor circuit is short-circuited or disconnected.                  ⇒ Go to <a href="#">AT-321, "DTC P1705 THROTTLE POSITION SENSOR"</a> .</p>
<p>4th judgement flicker is longer than others.</p> <div style="text-align: center;"> </div> <p>Shift solenoid valve A circuit is short-circuited or disconnected.                  ⇒ Go to <a href="#">AT-311, "DTC P0750 SHIFT SOLENOID VALVE A"</a> .</p>	<p>5th judgement flicker is longer than others.</p> <div style="text-align: center;"> </div> <p>Shift solenoid valve B circuit is short-circuited or disconnected.                  ⇒ Go to <a href="#">AT-316, "DTC P0755 SHIFT SOLENOID VALVE B"</a> .</p>
<p>6th judgement flicker is longer than others.</p> <div style="text-align: center;"> </div> <p>Overrun clutch solenoid valve circuit is short-circuited or disconnected.                  ⇒ Go to <a href="#">AT-329, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"</a> .</p>	<p>7th judgement flicker is longer than others.</p> <div style="text-align: center;"> </div> <p>Torque converter clutch solenoid valve circuit is short-circuited or disconnected.                  ⇒ Go to <a href="#">AT-293, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"</a> .</p>
<p>8th judgement flicker is longer than others.</p> <div style="text-align: center;"> </div> <p>A/T fluid temperature sensor is disconnected or TCM power source circuit is damaged.                  ⇒ Go to <a href="#">AT-334, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"</a> .</p>	<p>9th judgement flicker is longer than others.</p> <div style="text-align: center;"> </div> <p>Engine speed signal circuit is short-circuited or disconnected.                  ⇒ Go to <a href="#">AT-266, "DTC P0725 ENGINE SPEED SIGNAL"</a> .</p>

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O/D OFF indicator lamp:

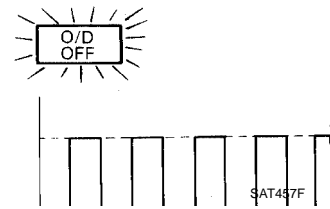
10th judgement flicker is longer than others.



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

⇒ Go to [AT-306. "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#) .

Flickers as shown below.



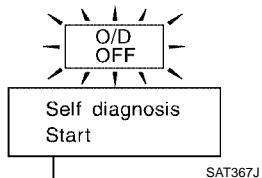
Battery power is low.

Battery has been disconnected for a long time.

Battery is connected conversely.

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

Lamp comes on.



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

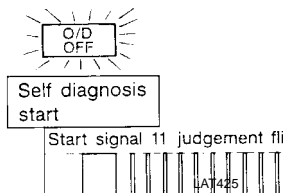
⇒ Go to [AT-387. "21. TCM Self-diagnosis Does Not Activate \(PNP, Overdrive Control and Throttle Position Switches Circuit Checks\)"](#) .

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

## JUDGEMENT OF SELF-DIAGNOSIS CODE (VG33ER ONLY)

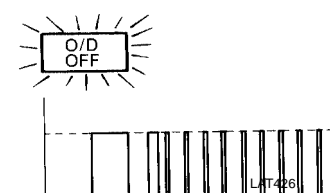
O/D OFF indicator lamp:

All judgement flickers are same.



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

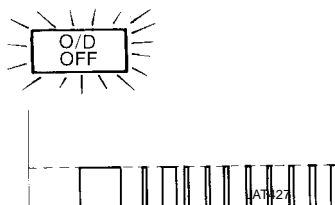
1st judgement flicker is longer than others.



Revolution sensor circuit is short-circuited or disconnected.

⇒ Go to [AT-261. "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) .

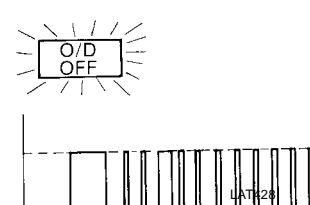
2nd judgement flicker is longer than others.



Vehicle speed sensor circuit is short-circuited or disconnected.

⇒ Go to [AT-340. "DTC VEHICLE SPEED SENSOR-MTR"](#) .

3rd judgement flicker is longer than others.

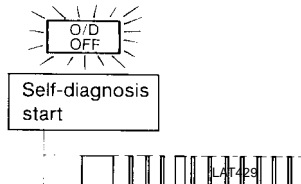


Throttle position sensor circuit is short-circuited or disconnected.

⇒ Go to [AT-321. "DTC P1705 THROTTLE POSITION SENSOR"](#) .

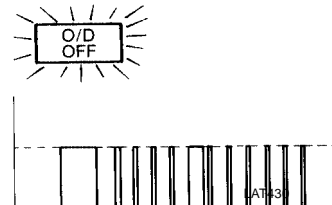
O/D OFF indicator lamp:

4th judgement flicker is longer than others.



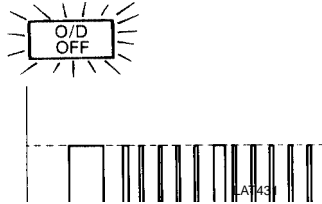
Shift solenoid valve A circuit is short-circuited or disconnected.  
 ⇒ Go to **AT-311. "DTC P0750 SHIFT SOLENOID VALVE A"**.

5th judgement flicker is longer than others.



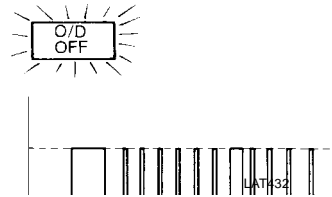
Shift solenoid valve B circuit is short-circuited or disconnected.  
 ⇒ Go to **AT-316. "DTC P0755 SHIFT SOLENOID VALVE B"**.

6th judgement flicker is longer than others.



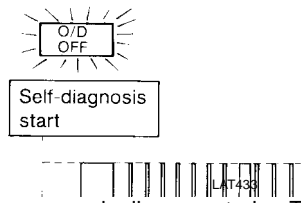
Overrun clutch solenoid valve circuit is short-circuited or disconnected.  
 ⇒ Go to **AT-329. "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"**.

7th judgement flicker is longer than others.



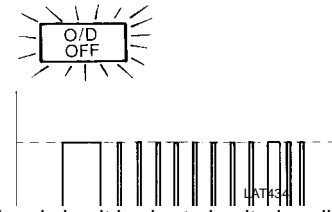
Torque converter clutch solenoid valve circuit is short-circuited or disconnected.  
 ⇒ Go to **AT-293. "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"**.

8th judgement flicker is longer than others.



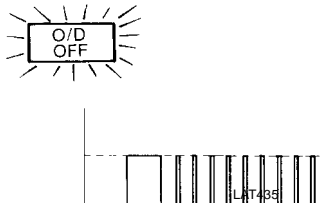
A/T fluid temperature sensor is disconnected or TCM power source circuit is damaged.  
 ⇒ Go to **AT-334. "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"**.

9th judgement flicker is longer than others.



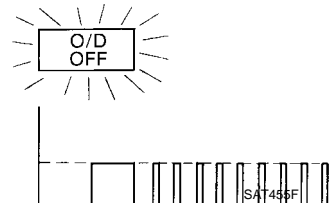
Engine speed signal circuit is short-circuited or disconnected.  
 ⇒ Go to **AT-266. "DTC P0725 ENGINE SPEED SIGNAL"**.

10th judgement flicker is longer than others.



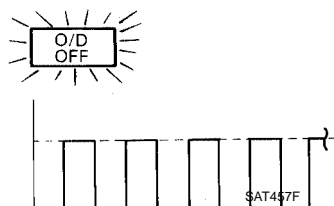
⇒ Go to **AT-344. "DTC TURBINE REVOLUTION SENSOR (VG33ER ONLY)"**.

11th judgement flicker is longer than others.



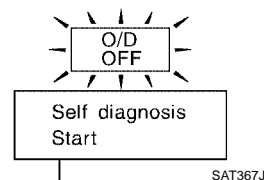
Line pressure solenoid valve circuit is short-circuited or disconnected.  
 ⇒ Go to **AT-306. "DTC P0745 LINE PRESSURE SOLENOID VALVE"**.

Flickers as shown below.



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

Lamp comes on.



PNP switch, overdrive control switch or throttle position switch circuit is disconnected or TCM is damaged.  
 ⇒ Go to **AT-387. "21. TCM Self-diagnosis Does Not Activate (PNP, Overdrive Control and Throttle Position Switches Circuit Checks)"**.

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

## TROUBLE DIAGNOSIS — INTRODUCTION

## Introduction

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

The TCM also communicates with the ECM 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.

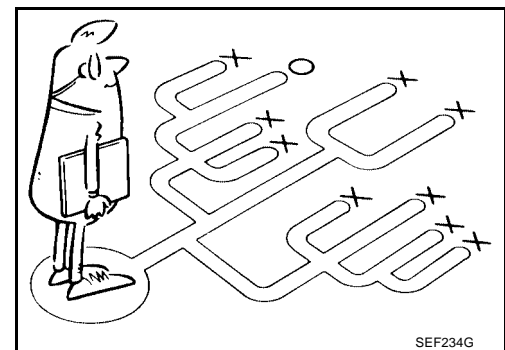
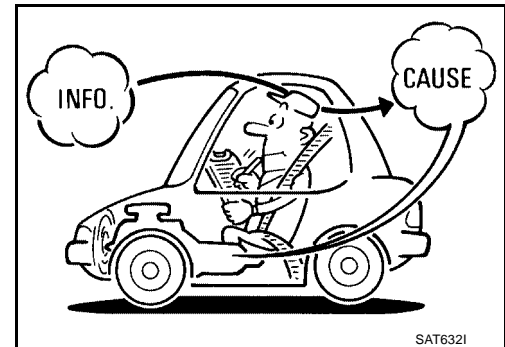
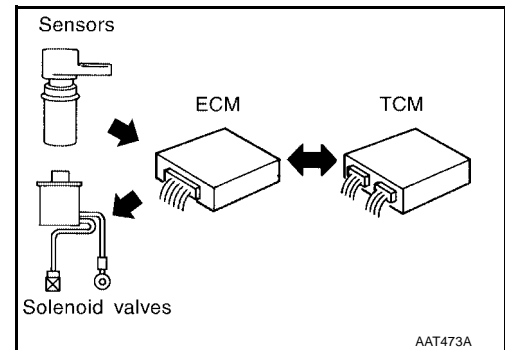
It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

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-208, "Work Flow"](#)

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" should be used. Refer to [AT-205, "DIAGNOSTIC WORKSHEET"](#).

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.**





# TROUBLE DIAGNOSIS — INTRODUCTION

[RE4R01A]

## Diagnostic Worksheet

1.	<input type="checkbox"/> Read the Fail-safe Remarks and listen to customer complaints.	<a href="#">AT-160</a>
2.	<input type="checkbox"/> CHECK A/T FLUID <input type="checkbox"/> Leakage (Follow specified procedure) <input type="checkbox"/> Fluid condition <input type="checkbox"/> Fluid level	<a href="#">AT-211</a>
3.	Perform STALL TEST and LINE PRESSURE TEST. <input type="checkbox"/> Stall test — Mark possible damaged components/others. <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 45%;"> <input type="checkbox"/> Torque converter one-way clutch  <input type="checkbox"/> Reverse clutch  <input type="checkbox"/> Forward clutch  <input type="checkbox"/> Overrun clutch  <input type="checkbox"/> Forward one-way clutch             </div> <div style="width: 45%;"> <input type="checkbox"/> Low &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> </div> <input type="checkbox"/> Line pressure test — Suspected parts:	<a href="#">AT-211</a> , <a href="#">AT-214</a>
4.	<input type="checkbox"/> Perform all ROAD TEST and mark required procedures.	<a href="#">AT-216</a>
4-1.	Check before engine is started. <input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE - Mark detected items. <input type="checkbox"/> PNP switch, <a href="#">AT-249</a> . <input type="checkbox"/> A/T fluid temperature sensor, <a href="#">AT-255</a> . <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), <a href="#">AT-261</a> . <input type="checkbox"/> Engine speed signal, <a href="#">AT-266</a> . <input type="checkbox"/> Torque converter clutch solenoid valve, <a href="#">AT-293</a> . <input type="checkbox"/> Line pressure solenoid valve, <a href="#">AT-306</a> . <input type="checkbox"/> Shift solenoid valve A, <a href="#">AT-311</a> . <input type="checkbox"/> Shift solenoid valve B, <a href="#">AT-316</a> . <input type="checkbox"/> Throttle position sensor, <a href="#">AT-321</a> . <input type="checkbox"/> Overrun clutch solenoid valve, <a href="#">AT-329</a> . <input type="checkbox"/> A/T fluid temperature sensor and TCM power source, <a href="#">AT-334</a> . <input type="checkbox"/> PNP, overdrive control and throttle position switches, <a href="#">AT-353</a> . <input type="checkbox"/> Vehicle speed sensor-MTR, <a href="#">AT-340</a> . <input type="checkbox"/> Turbine revolution sensor (VG33ER only), <a href="#">AT-344</a> . <input type="checkbox"/> Control unit (RAM), control unit (ROM), <a href="#">AT-349</a> . <input type="checkbox"/> Control unit (EEP ROM), <a href="#">AT-351</a> . <input type="checkbox"/> Battery <input type="checkbox"/> Others	<a href="#">AT-217</a>
4-2.	Check at idle <input type="checkbox"/> 1. O/D OFF Indicator Lamp Does Not Come On, <a href="#">AT-356</a> . <input type="checkbox"/> 2. Engine Cannot Be Started In P And N Position, <a href="#">AT-358</a> . <input type="checkbox"/> 3. In P Position, Vehicle Moves Forward Or Backward When Pushed, <a href="#">AT-359</a> . <input type="checkbox"/> 4. In N Position, Vehicle Moves, <a href="#">AT-360</a> . <input type="checkbox"/> 5. Large Shock. N → R Position, <a href="#">AT-362</a> . <input type="checkbox"/> 6. Vehicle Does Not Creep Backward In R Position, <a href="#">AT-364</a> . <input type="checkbox"/> 7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position, <a href="#">AT-367</a> .	<a href="#">AT-218</a>

# TROUBLE DIAGNOSIS — INTRODUCTION

[RE4R01A]

4.	4- 3.	<p>Cruise test</p> <p>Part-1</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 8. Vehicle Cannot Be Started From D1 , <a href="#">AT-369</a> .</li> <li><input type="checkbox"/> 9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , <a href="#">AT-372</a> .</li> <li><input type="checkbox"/> 10. A/T Does Not Shift: D2 →D3 , <a href="#">AT-374</a> .</li> <li><input type="checkbox"/> 11. A/T Does Not Shift: D3 →D4 , <a href="#">AT-376</a> .</li> <li><input type="checkbox"/> 12. A/T Does Not Perform Lock-up, <a href="#">AT-378</a> .</li> <li><input type="checkbox"/> 13. A/T Does Not Hold Lock-up Condition, <a href="#">AT-379</a> .</li> <li><input type="checkbox"/> 14. Lock-up Is Not Released, <a href="#">AT-381</a> .</li> <li><input type="checkbox"/> 15. Engine Speed Does Not Return To Idle (Light Braking D4 → D3 ) , <a href="#">AT-382</a> .</li> </ul> <p>Part-2</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , <a href="#">AT-372</a> .</li> <li><input type="checkbox"/> 10. A/T Does Not Shift: D2 →D3 , <a href="#">AT-374</a> .</li> <li><input type="checkbox"/> 11. A/T Does Not Shift: D3 →D4 , <a href="#">AT-376</a> .</li> <li><input type="checkbox"/> 16. Vehicle Does Not Start From D1 , <a href="#">AT-383</a> .</li> </ul> <p>Part-3</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 17. A/T Does Not Shift: D4 →D3 When Overdrive Control Switch ON → OFF, <a href="#">AT-385</a></li> <li><input type="checkbox"/> 15. Engine Speed Does Not Return To Idle (Light Braking D4 →D3 ) , <a href="#">AT-382</a> .</li> <li><input type="checkbox"/> 18. A/T Does Not Shift: D3 →22 , When Selector Lever D → 2 Position, <a href="#">AT-386</a> .</li> <li><input type="checkbox"/> 15. Engine Speed Does Not Return To Idle (Light Braking D4 →D3 ) , <a href="#">AT-382</a> .</li> <li><input type="checkbox"/> 19. A/T Does Not Shift: 22 →11 , When Selector Lever 2 → 1 Position, <a href="#">AT-387</a> .</li> <li><input type="checkbox"/> 20. Vehicle Does Not Decelerate By Engine Brake, <a href="#">AT-387</a> .</li> <li><input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE — Mark detected items.</li> </ul> <ul style="list-style-type: none"> <li><input type="checkbox"/> PNP switch, <a href="#">AT-249</a> .</li> <li><input type="checkbox"/> A/T fluid temperature sensor, <a href="#">AT-255</a> .</li> <li><input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), <a href="#">AT-261</a> .</li> <li><input type="checkbox"/> Engine speed signal, <a href="#">AT-266</a> .</li> <li><input type="checkbox"/> Torque converter clutch solenoid valve, <a href="#">AT-293</a> .</li> <li><input type="checkbox"/> Line pressure solenoid valve, <a href="#">AT-306</a> .</li> <li><input type="checkbox"/> Shift solenoid valve A, <a href="#">AT-311</a> .</li> <li><input type="checkbox"/> Shift solenoid valve B, <a href="#">AT-316</a> .</li> <li><input type="checkbox"/> Throttle position sensor, <a href="#">AT-321</a> .</li> <li><input type="checkbox"/> Overrun clutch solenoid valve, <a href="#">AT-329</a> .</li> <li><input type="checkbox"/> A/T fluid temperature sensor and TCM power source, <a href="#">AT-334</a> .</li> <li><input type="checkbox"/> PNP, overdrive control and throttle position switches, <a href="#">AT-353</a> .</li> <li><input type="checkbox"/> Vehicle speed sensor-MTR, <a href="#">AT-340</a> .</li> <li><input type="checkbox"/> Turbine revolution sensor (VG33ER only), <a href="#">AT-344</a> .</li> <li><input type="checkbox"/> Control unit (RAM), control unit (ROM), <a href="#">AT-349</a> .</li> <li><input type="checkbox"/> Control unit (EEP ROM), <a href="#">AT-351</a> .</li> <li><input type="checkbox"/> Battery</li> <li><input type="checkbox"/> Battery</li> <li><input type="checkbox"/> Others</li> </ul>	<p><a href="#">AT-219</a> <a href="#">AT-223</a></p> <p><a href="#">AT-226</a></p> <p><a href="#">AT-228</a></p>	<p>A</p> <p>B</p> <p><b>AT</b></p> <p>D</p> <p>E</p> <p>F</p> <p>G</p> <p>H</p> <p>I</p> <p>J</p> <p>K</p> <p>L</p>
5.		<input type="checkbox"/> For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.	<a href="#">AT-190</a>	M
6.		<input type="checkbox"/> Perform all ROAD TEST and re-mark required procedures.	<a href="#">AT-216</a>	
7.		<input type="checkbox"/> Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items. Refer to <a href="#">EC-626</a> , " <a href="#">Emission-related Diagnostic Information</a> " (VG33E only) or <a href="#">EC-1230</a> , " <a href="#">Emission-related Diagnostic Information</a> " (VG33ER only).	<p><a href="#">EC-690</a> (VG33E only) or <a href="#">EC-1292</a> (VG33ER only)</p>	
		<ul style="list-style-type: none"> <li><input type="checkbox"/> DTC (P0731, 1103) A/T 1st gear function, <a href="#">AT-270</a> .</li> <li><input type="checkbox"/> DTC (P0732, 1104) A/T 2nd gear function, <a href="#">AT-276</a> .</li> <li><input type="checkbox"/> DTC (P0733, 1105) A/T 3rd gear function, <a href="#">AT-281</a> .</li> <li><input type="checkbox"/> DTC (P0734, 1106) A/T 4th gear function, <a href="#">AT-286</a> .</li> <li><input type="checkbox"/> DTC (P0744, 1107) A/T TCC S/V function (lock-up), <a href="#">AT-298</a> .</li> </ul>		
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).	<p><a href="#">AT-189</a> <a href="#">AT-230</a></p>	
9.		<input type="checkbox"/> Erase DTC from TCM and ECM memories.	<a href="#">AT-187</a>	

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## Work Flow

ECS007LV

### HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

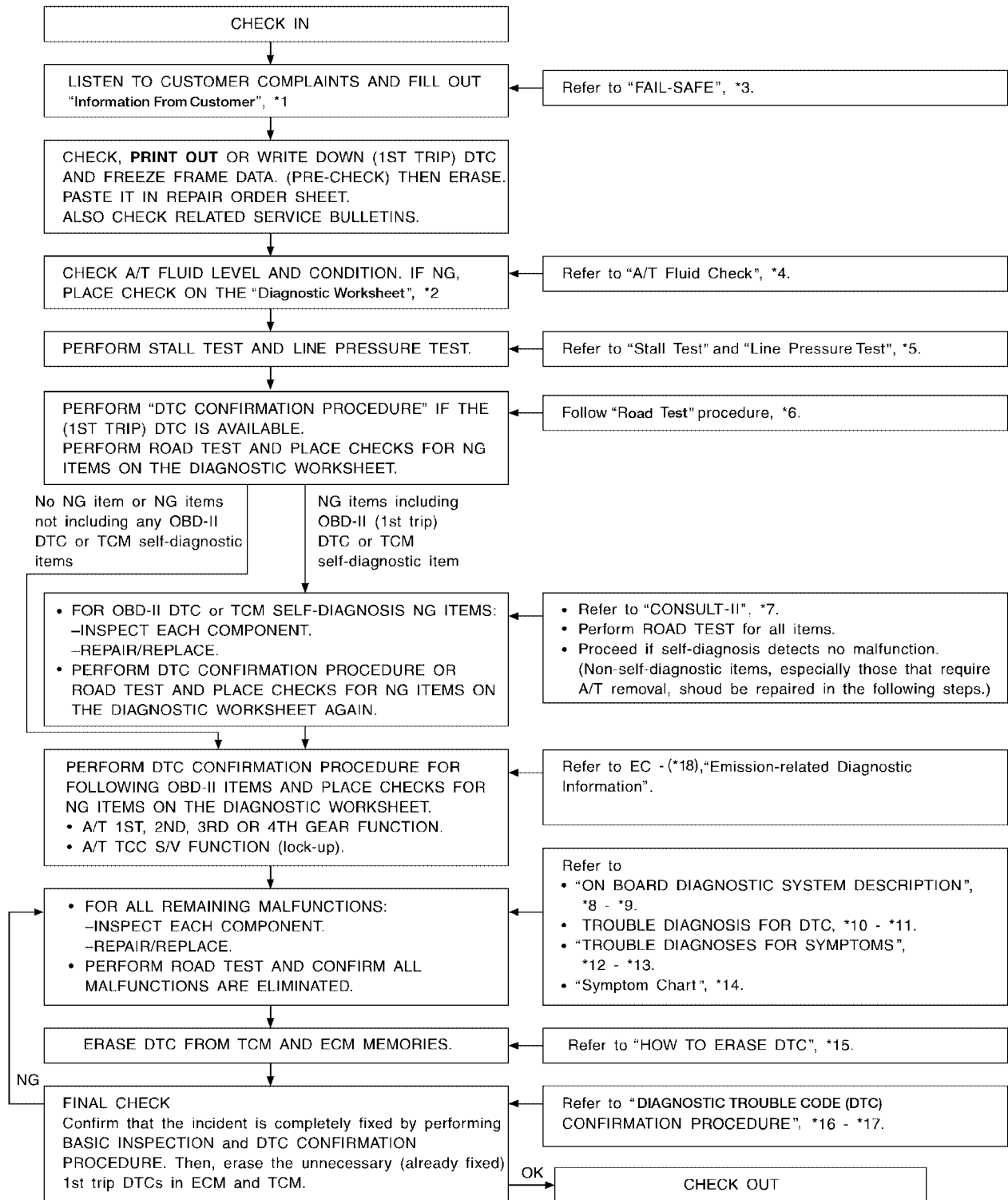
A good understanding of the malfunction conditions can make troubleshooting faster and more accurate.

In general, each customer feels differently about a problem. It is important to fully understand the symptoms or conditions for a customer complaint.

Make good use of the two sheets provided, “Information From Customer”, [AT-205](#) , and “Diagnostic Worksheet”, [AT-206](#) , to perform the best troubleshooting possible.



## WORK FLOW CHART



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

- |                            |                                    |                            |
|----------------------------|------------------------------------|----------------------------|
| *1: <a href="#">AT-205</a> | *2: <a href="#">AT-206</a>         | *3: <a href="#">AT-160</a> |
| *4: <a href="#">AT-211</a> | *5: <a href="#">AT-211, AT-214</a> | *6: <a href="#">AT-216</a> |
| *7: <a href="#">AT-189</a> | *8: <a href="#">AT-185</a>         | *9: <a href="#">AT-198</a> |
| *10 <a href="#">AT-249</a> | *11: <a href="#">AT-351</a>        | *12 <a href="#">AT-353</a> |
| :                          |                                    | :                          |

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# TROUBLE DIAGNOSIS — INTRODUCTION

[RE4R01A]

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\*13 [AT-387](#)

:

\*16 [AT-249](#)

:

\*14 [AT-230](#)

:

\*17 [AT-351](#)

:

\*15 [AT-187](#)

:

\*18 [EC-626](#) (VG33E), [EC-1230](#)  
(VG33ER)

**TROUBLE DIAGNOSIS — BASIC INSPECTION**

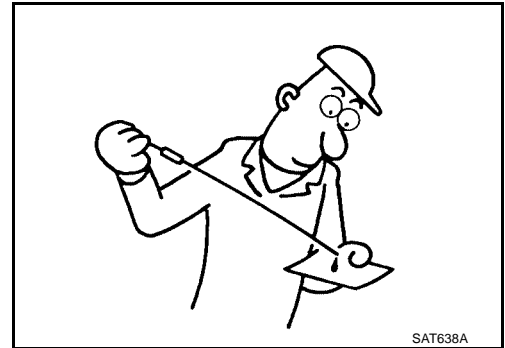
**A/T Fluid Check**

**FLUID LEAKAGE CHECK**

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

**FLUID CONDITION CHECK**

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



**FLUID LEVEL CHECK**

Refer to [MA-37, "Checking A/T Fluid"](#) .

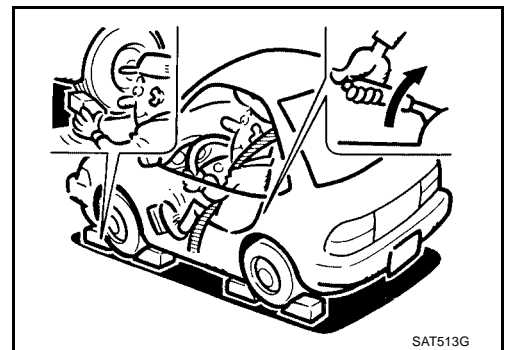
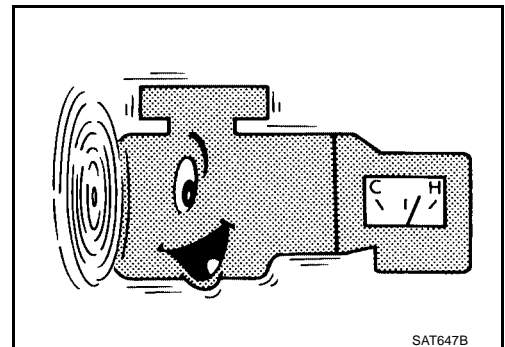
**Stall Test**

**STALL TEST PROCEDURE**

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

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

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



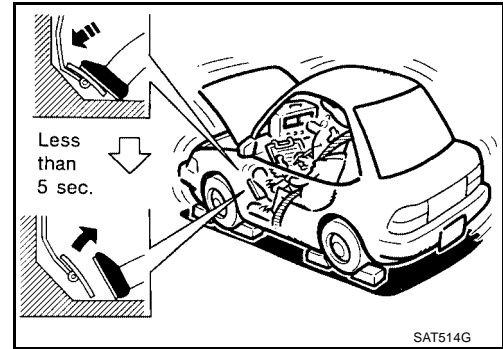
A  
B  
AT  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

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.**

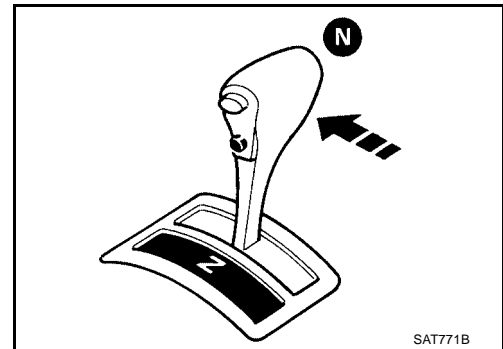
**Stall revolution**

**VG33E : 2,450 - 2,650 rpm**

**VG33ER : 2,420 - 2,620 rpm**



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



**JUDGEMENT OF STALL TEST**

The test result and possible damaged components relating to each result are shown in the illustration. In order to pinpoint the possible damaged components, follow the [WORK FLOW](#). Refer to [AT-208, "Work Flow"](#).

**NOTE:**

Stall revolution is too high in D or 2 position:

- Slippage occurs in 1st gear but not in 2nd and 3rd gears. .... Low one-way clutch slippage
- Slippage occurs at the following gears:  
1st through 3rd gears in D position and engine brake functions.  
1st and 2nd gears in 2 position and engine brake functions with accelerator pedal released (fully closed throttle). .... Forward clutch or forward one-way clutch slippage

Stall revolution is too high in R position:

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

Stall revolution within specifications:

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

**CAUTION:**

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

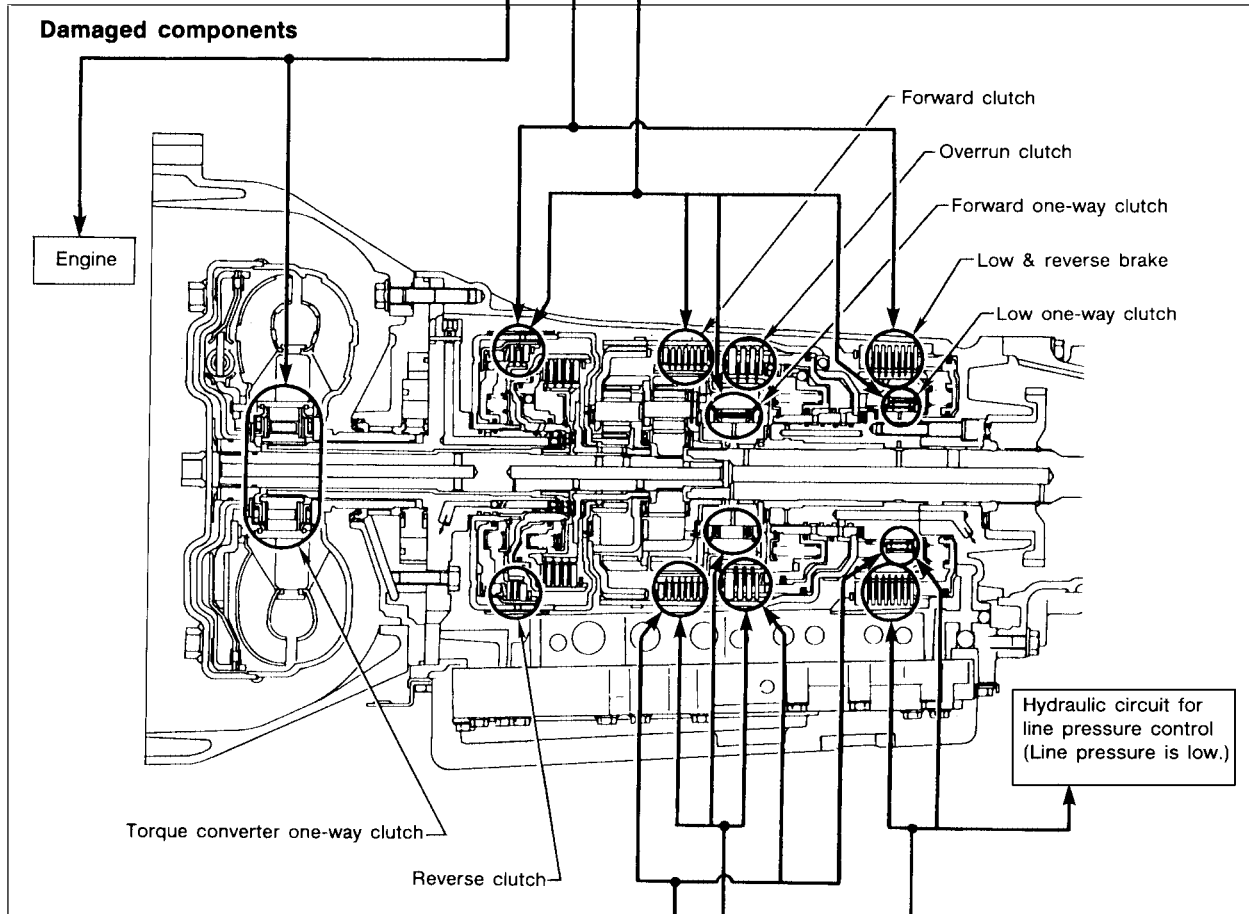
- Slippage occurs in 3rd and 4th gears in D position. .... High clutch slippage
- Slippage occurs in 2nd and 4th gear in D position. .... Brake band slippage

Stall revolution less than specifications:

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

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

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



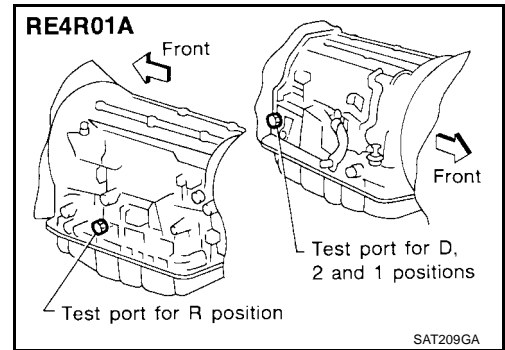
D	H	H	H	O
2	H	H	H	O
1	O	H	H	O
R	O	O	H	O
Selector lever position	Judgement			

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

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

## Line Pressure Test LINE PRESSURE TEST PORTS

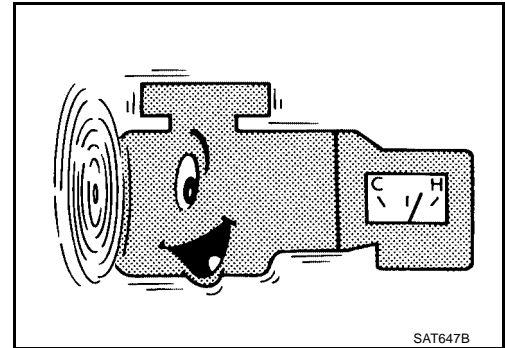
- Location of line pressure test ports.
- Always replace line pressure plugs as they are self-sealing bolts.



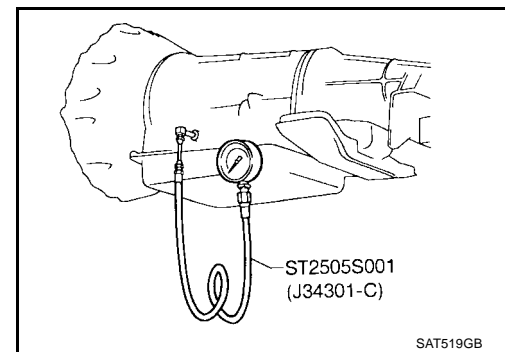
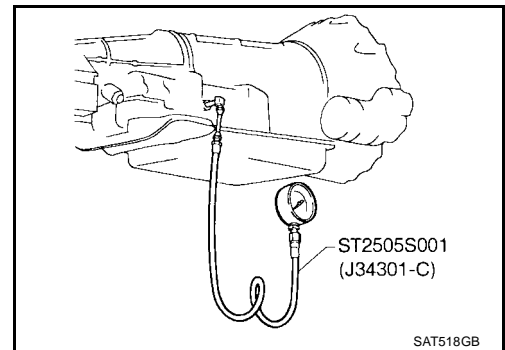
## LINE PRESSURE TEST PROCEDURE

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

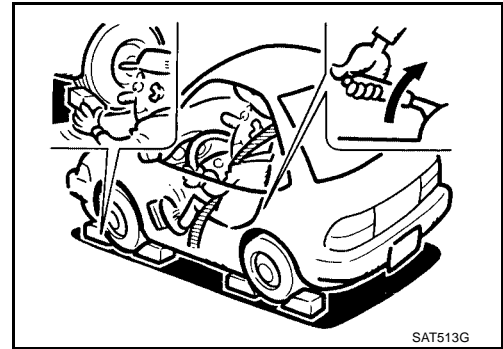
**ATF operating temperature : 50 - 80°C (122 - 176°F)**



3. Install pressure gauge to corresponding line pressure port.

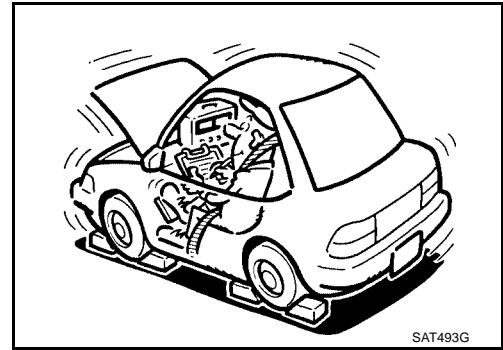


4. Set parking brake and block wheels.
  - Continue to depress brake pedal fully while line pressure test is being performed at stall speed.



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

Line pressure : Refer to [AT-497, "Line Pressure"](#) .



## JUDGEMENT OF LINE PRESSURE TEST

	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 1 positions, but</li> <li>— Normal in D and 2 positions.</li> </ul>                             Then, fluid leakage exists at or around low and reverse brake circuit. Refer to <a href="#">AT-498, "Clutches and Brakes"</a> .                         </li> </ul>
	Line pressure is high.	<ul style="list-style-type: none"> <li>● Maladjustment of throttle position sensor</li> <li>● 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 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 DESCRIPTION

- 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

### ROAD TEST PROCEDURE

1. Check before engine is started.



2. Check at idle.



3. Cruise test.

SAT786A

- Before road test, familiarize yourself with all test procedures and items to check.
- Conduct tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test. Refer to [AT-185, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION"](#) and [AT-353, "TROUBLE DIAGNOSES FOR SYMPTOMS"](#).



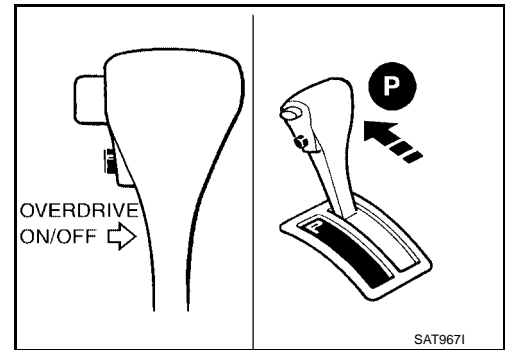
SAT496G



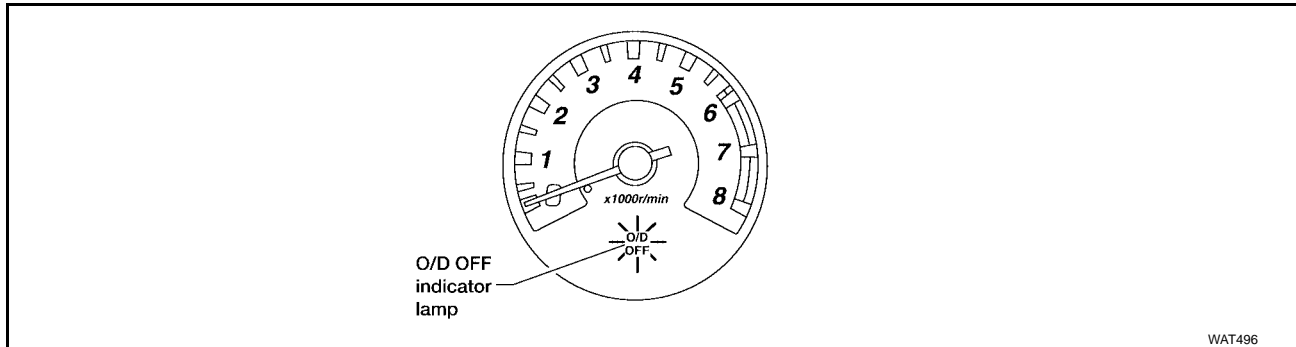
1. CHECK BEFORE ENGINE IS STARTED

1. CHECK O/D OFF INDICATOR LAMP

1. Park vehicle on flat surface.
2. Move selector lever to P position.
3. Turn ignition switch to OFF position.  
Wait at least 5 seconds.
4. Turn ignition switch to ON position. (Do not start engine.)



5. Does O/D OFF indicator lamp come on for about 2 seconds?

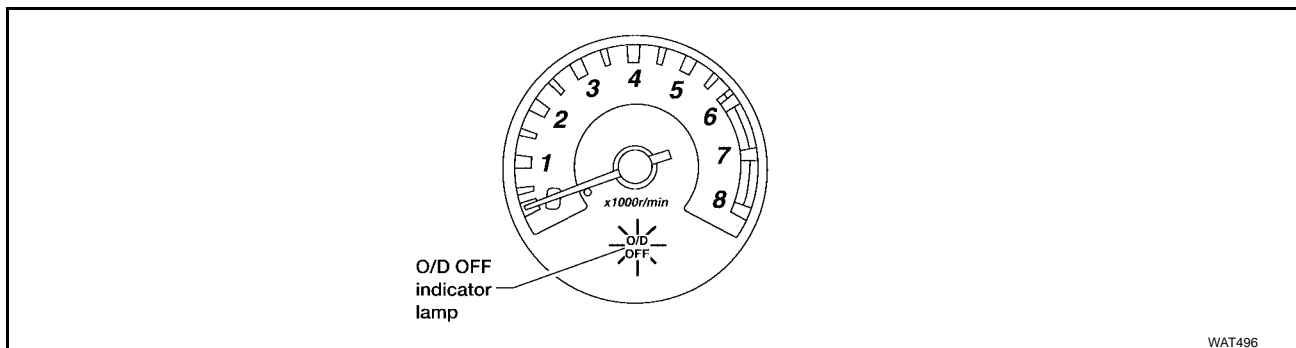


Yes or No

- Yes >> GO TO 2.
- No >> Go to [AT-356, "1. O/D OFF Indicator Lamp Does Not Come On"](#).

2. CHECK O/D OFF INDICATOR LAMP

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



Yes or No

- Yes >> Perform self-diagnosis. Refer to [AT-198, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#)
- No >> GO TO 3.

**3. CHECK NG ITEM**

---

1. Turn ignition switch to OFF position.
2. Perform self-diagnosis and note NG items.  
Refer to [AT-198, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) .

>> Go to [AT-358, "2. Engine Cannot Be Started In P and N Position"](#) .

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

---

1. Park vehicle on flat surface.
2. Turn ignition switch to OFF position.
3. Move selector lever to P or N position.
4. Turn ignition switch to start position.
5. Is engine started?

Yes or No

- Yes >> GO TO 2.  
No >> Go to [AT-358, "2. Engine Cannot Be Started In P and N Position"](#) .

**2. CHECK ENGINE START**

---

1. Turn ignition switch to OFF position.
2. Move selector lever to D, 1, 2 or R position.
3. Turn ignition switch to start position.
4. Is engine started?

Yes or No

- Yes >> Go to [AT-358, "2. Engine Cannot Be Started In P and N Position"](#) .  
No >> GO TO 3.

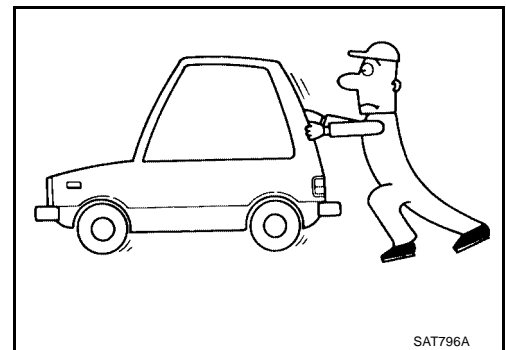
**3. CHECK VEHICLE MOVE**

---

1. Turn ignition switch to OFF position.
2. Move selector lever to P position.
3. Release parking brake.
4. Push vehicle forward or backward.
5. Does vehicle move when it is pushed forward or backward?

Yes or No

- Yes >> Go to [AT-359, "3. In "P" Position, Vehicle Moves Forward Or Backward When Pushed"](#) .  
No >> GO TO 4.



SAT796A

**4. CHECK VEHICLE MOVE**

1. Apply parking brake.
2. Move selector lever to N position.
3. Turn ignition switch to START position and start engine.
4. Release parking brake.
5. Does vehicle move forward or backward?

Yes or No

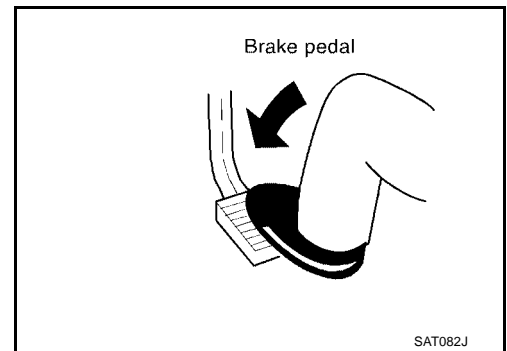
- Yes >> Go to [AT-360, "4. In N Position, Vehicle Moves"](#) .
- No >> GO TO 5.

**5. CHECK SHIFT SHOCK**

1. Apply foot brake.
2. Move selector lever to R position.
3. Is there large shock when changing from N to R position?

Yes or No

- Yes >> Go to [AT-362, "5. Large Shock. N → R Position"](#) .
- No >> GO TO 6.



**6. CHECK VEHICLE REVERSE MOVEMENT**

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

Yes or No

- Yes >> GO TO 7.
- No >> Go to [AT-364, "6. Vehicle Does Not Creep Backward In R Position"](#) .

**7. CHECK VEHICLE FORWARD MOVEMENT**

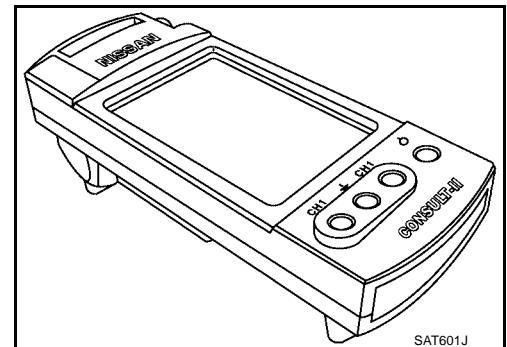
1. Move selector lever to D, 2 and 1 position and check if vehicle creeps forward.
2. Does vehicle creep forward in all three positions?

Yes or No

- Yes >> Go to [AT-219, "3. CRUISE TEST"](#) .
- No >> Go to [AT-367, "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position"](#) .

**3. CRUISE TEST**

- Check all items listed in Parts 1 through 3.

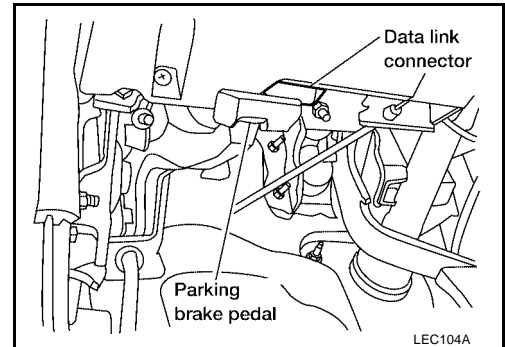


**Ⓟ With CONSULT-II**

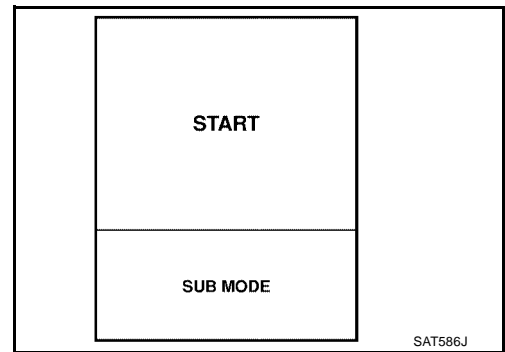
- Using CONSULT-II, conduct a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per “Shift Schedule”.

**CONSULT-II Setting Procedure**

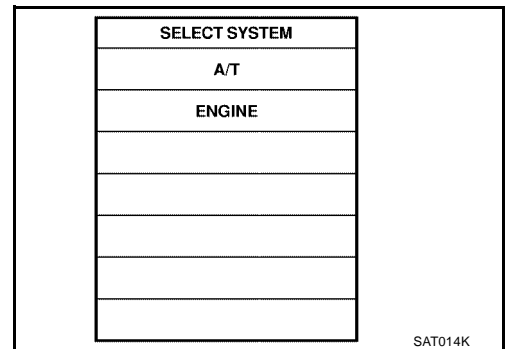
1. Turn ignition switch OFF.
2. Connect “CONSULT-II” to data link connector.  
The data link connector is located in instrument lower panel on driver side.
3. Turn ignition switch ON.



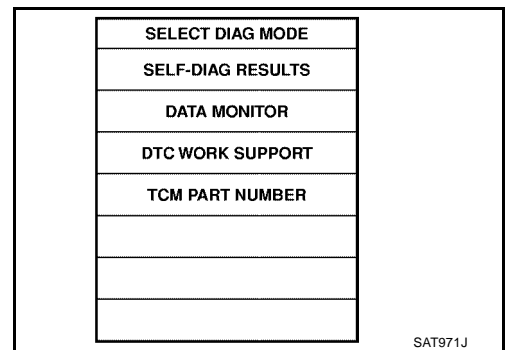
4. Touch “START”.



5. Touch “A/T”.



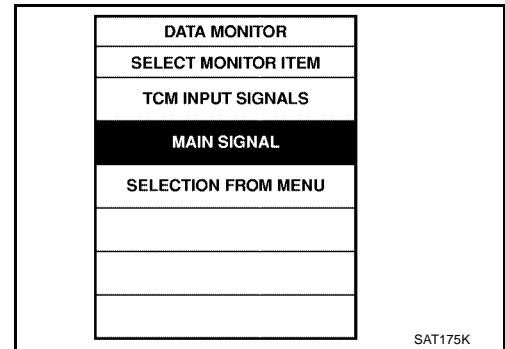
6. Touch “DATA MONITOR”.



# TROUBLE DIAGNOSIS — BASIC INSPECTION

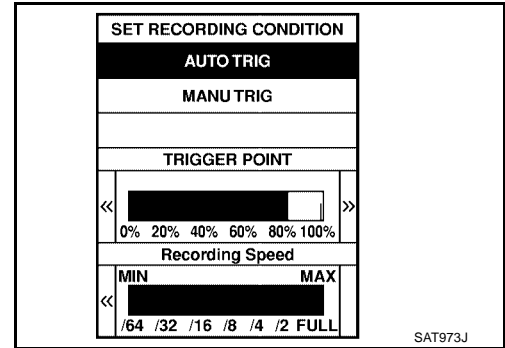
[RE4R01A]

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



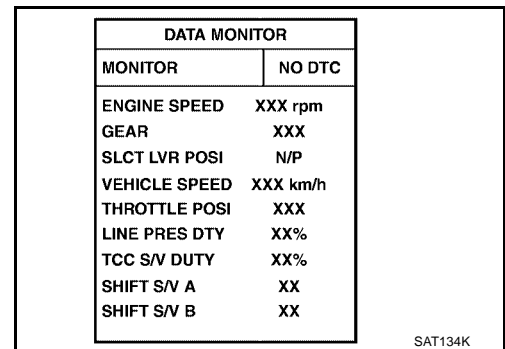
A  
B  
AT

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



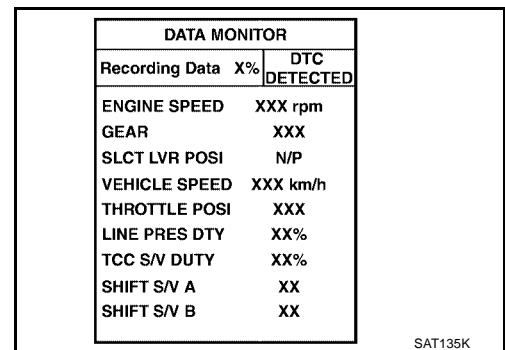
D  
E  
F  
G

11. When performing cruise test touch "STORE DATA".



H  
I  
J  
K

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



L  
M



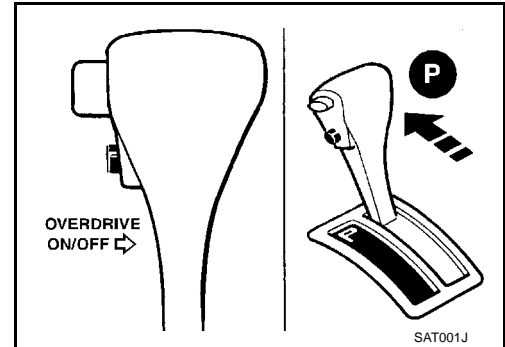
Cruise Test — Part 1

1. CHECK STARTING GEAR (D1 ) POSITION

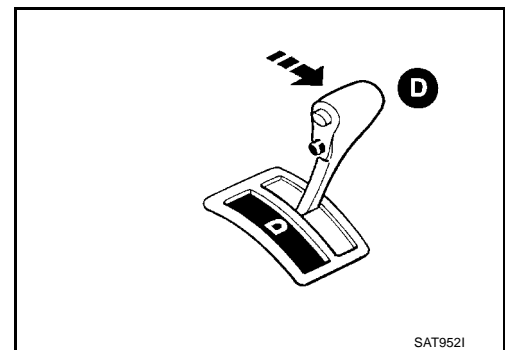
1. Drive vehicle for approx. 10 minutes to warm engine oil and ATF up to operating temperature.

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

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



6. Move selector lever to D position.



7. Accelerate vehicle by constantly depressing accelerator pedal halfway.

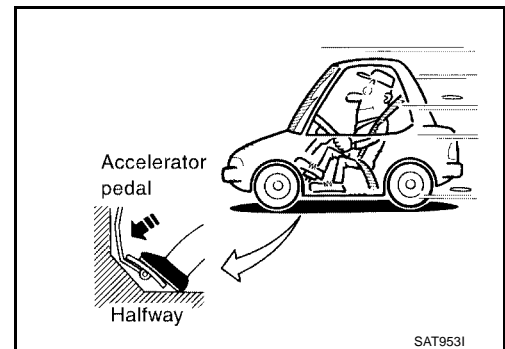
8. Does vehicle start from D1 ?

 **Read gear position.**

Yes or No

Yes >> GO TO 2.

No >> Go to [AT-369, "8. Vehicle Cannot Be Started From D1"](#) .



## 2. CHECK SHIFT UP (D1 TO D2)

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

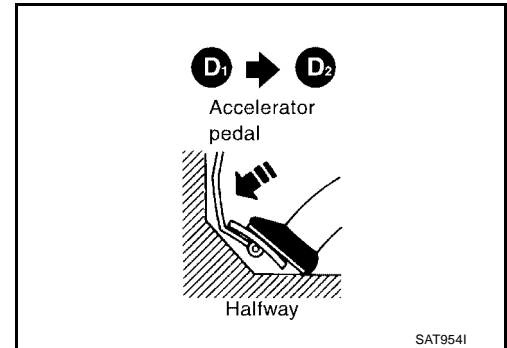
① Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D1 to D2 : Refer to [AT-496, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 3.

No >> Go to [AT-372, "9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2"](#) .



## 3. CHECK SHIFT UP (D2 TO D3)

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

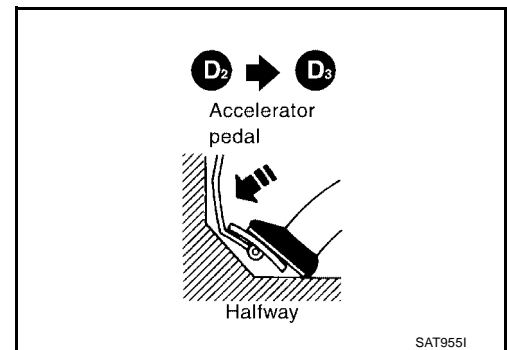
① Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D2 to D3 : Refer to [AT-496, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 4.

No >> Go to [AT-374, "10. A/T Does Not Shift: D2 → D3"](#) .



## 4. CHECK SHIFT UP (D3 TO D4)

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

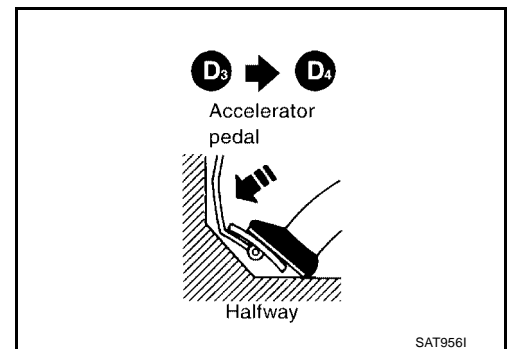
① Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D3 to D4 : Refer to [AT-496, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 5.

No >> Go to [AT-376, "11. A/T Does Not Shift: D3 → D4"](#) .





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

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

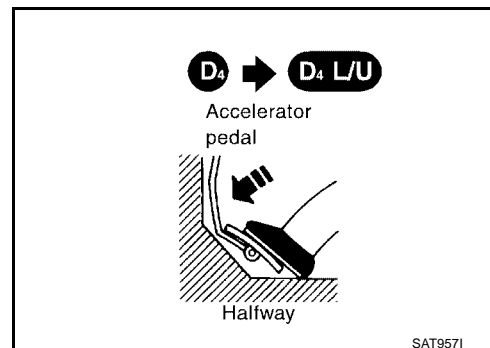
**Read vehicle speed, throttle position when lock-up duty becomes 94%.**

**Specified speed when lock-up occurs** : Refer to [AT-496, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 6.

No >> Go to [AT-378, "12. A/T Does Not Perform Lock-up"](#) .



**6. CHECK HOLD LOCK-UP**

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

Yes or No

Yes >> GO TO 7.

No >> Go to [AT-379, "13. A/T Does Not Hold Lock-up Condition"](#) .

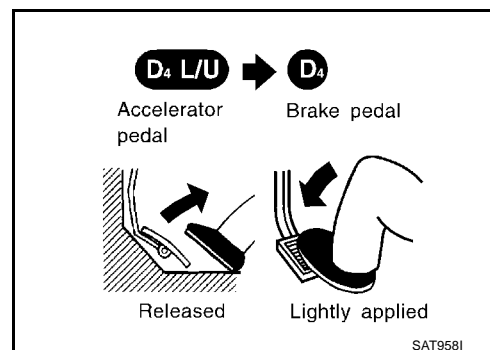
**7. CHECK LOCK-UP OFF (D4 L/U TO D4)**

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

Yes or No

Yes >> GO TO 8.

No >> Go to [AT-381, "14. Lock-up Is Not Released"](#) .



**8. CHECK SHIFT DOWN (D4 TO D3)**

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

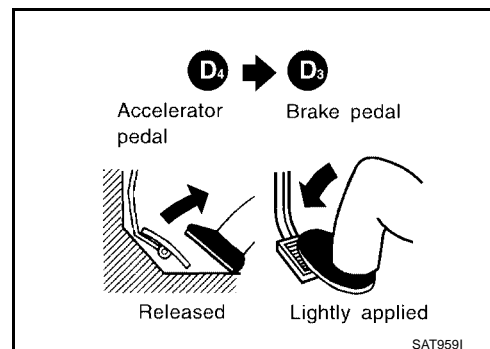
**Read gear position and engine speed.**

Yes or No

Yes >> 1. Stop vehicle.

2. Go to [AT-226, "Cruise Test — Part 2"](#) .

No >> Go to [AT-382, "15. Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) .



Cruise Test — Part 2

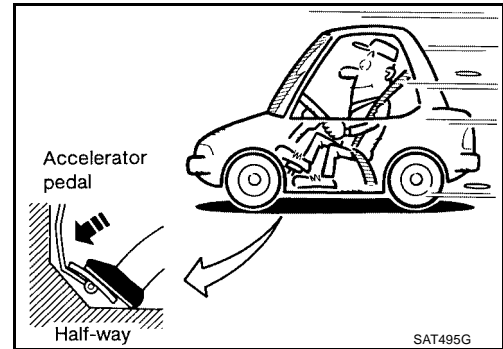
**1. CHECK STARTING GEAR (D1 ) POSITION**

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

Ⓜ **Read gear position.**

Yes or No

- Yes >> GO TO 2.
- No >> Go to [AT-383, "16. Vehicle Does Not Start From D1"](#) .



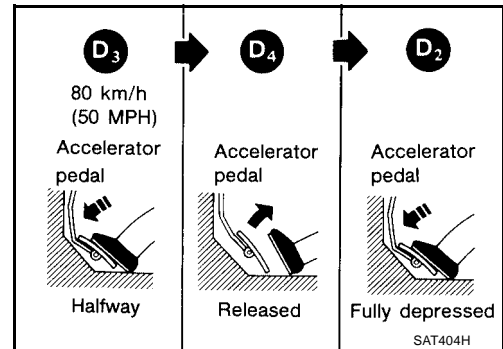
**2. CHECK SHIFT UP AND SHIFT DOWN (D3 TO D4 TO D2 )**

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

Ⓜ **Read gear position and throttle position.**

Yes or No

- Yes >> GO TO 3.
- No >> Go to [AT-372, "9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2"](#) .



**3. CHECK SHIFT UP (D2 TO D3 )**

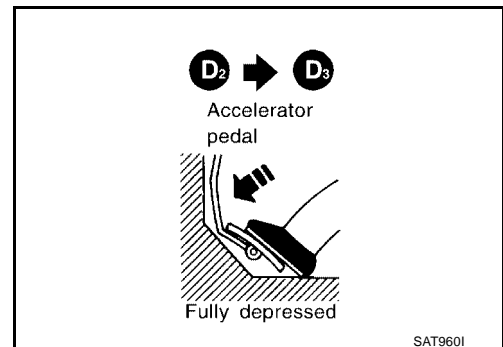
Does A/T shift from D2 to D3 at the specified speed?

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

**Specified speed when shifting from D2 to D3 : Refer to [AT-496, "Shift Schedule"](#) .**

Yes or No

- Yes >> GO TO 4.
- No >> Go to [AT-374, "10. A/T Does Not Shift: D2 → D3"](#) .



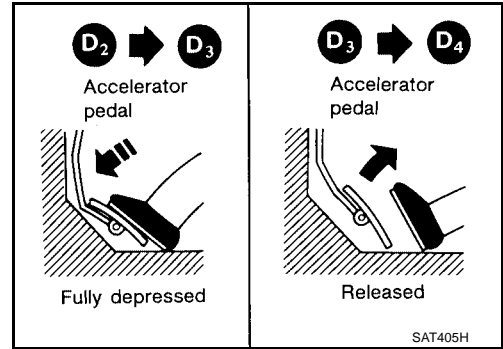
**4. CHECK SHIFT UP (D<sub>3</sub> TO D<sub>4</sub>) AND ENGINE BRAKE**

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?

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

Yes or No

- Yes >> 1. Stop vehicle.  
2. Go to [AT-228, "Cruise Test — Part 3"](#).
- No >> Go to [AT-376, "11. A/T Does Not Shift: D<sub>3</sub> → D<sub>4</sub>"](#).



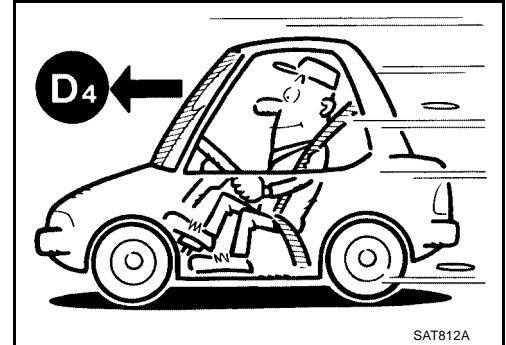
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Cruise Test — Part 3

1. VEHICLE SPEED D4 POSITION

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

>> GO TO 2.



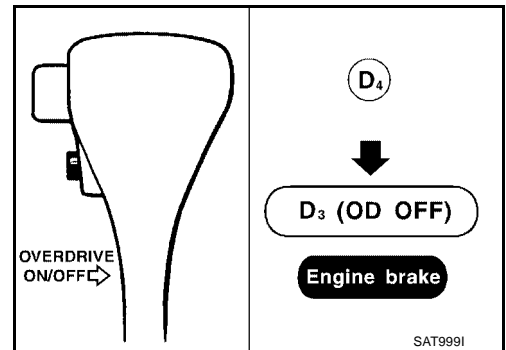
2. CHECK SHIFT DOWN (D4 TO D3 )

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

Read gear position and vehicle speed.

Yes or No

- Yes >> GO TO 3.
- No >> Go to [AT-385, "17. A/T Does Not Shift: D4 → D3 , When Overdrive Control Switch ON → OFF"](#) .

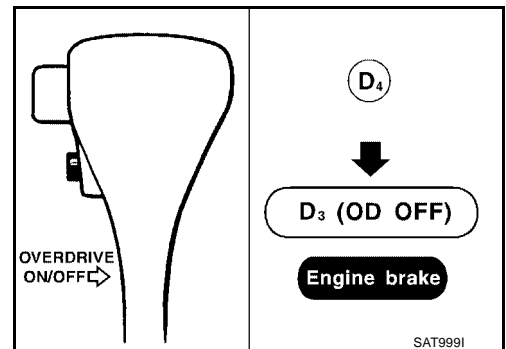


3. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> GO TO 4.
- No >> Go to [AT-382, "15. Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) .



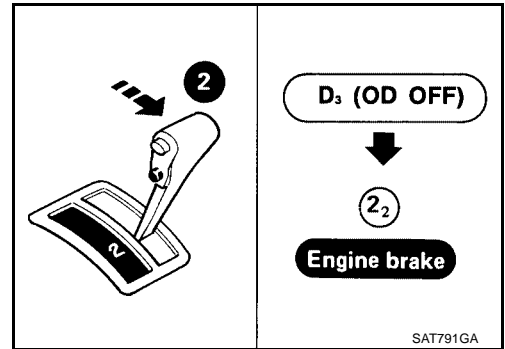
**4. CHECK SHIFT DOWN (D3 TO D2 )**

1. Move selector lever from D to 2 position while driving in D3 (O/D OFF).
2. Does A/T shift from D3 (O/D OFF) to 2<sub>2</sub> ?

 **Read gear position.**

Yes or No

- Yes >> GO TO 5.
- No >> Go to [AT-386, "18. A/T Does Not Shift: D3 → 2<sub>2</sub> , When Selector Lever D → 2 Position"](#) .

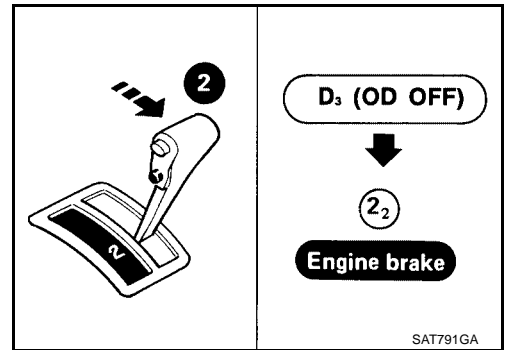


**5. CHECK ENGINE BRAKE**

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> GO TO 6.
- No >> Go to [AT-382, "15. Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) .

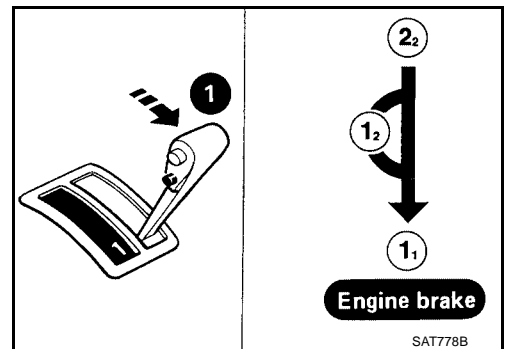


**6. CHECK SHIFT DOWN (2<sub>2</sub> TO 1<sub>1</sub>)**

1. Move selector lever from 2 to 1 position while driving in 2<sub>2</sub> .
2. Does A/T shift from 2<sub>2</sub> to 1<sub>1</sub> position?

Yes or No

- Yes >> GO TO 7.
- No >> Go to [AT-387, "19. A/T Does Not Shift: 2<sub>2</sub> → 1<sub>1</sub> , When Selector Lever 2 → 1 Position"](#) .

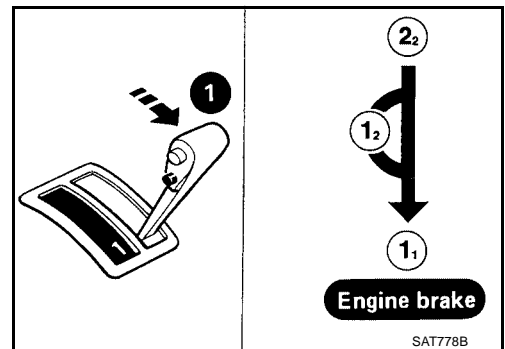


**7. CHECK ENGINE BRAKE**

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> 1. Stop vehicle.  
2. Perform self-diagnosis. Refer to [AT-198, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) .
- No >> Go to [AT-387, "20. Vehicle Does Not Decelerate By Engine Brake"](#) .



# TROUBLE DIAGNOSIS — BASIC INSPECTION

[RE4R01A]

ECS007M0

## Symptom Chart

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

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				VG33E only	VG33ER only
No Lock-up Engagement/ TCC Inoperative	Torque converter is not locked up.	ON vehicle	1. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	<a href="#">AT-261</a> , <a href="#">AT-340</a>	
			3. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>	
			4. Engine speed signal	<a href="#">AT-266</a>	
			5. A/T fluid temperature sensor	<a href="#">AT-255</a>	
			6. Line pressure test	<a href="#">AT-214</a>	
			7. Torque converter clutch solenoid valve	<a href="#">AT-293</a>	
			8. Control valve assembly	<a href="#">AT-431</a>	
	OFF vehicle	9. Torque converter	<a href="#">AT-414</a>		
	Torque converter clutch piston slip.	ON vehicle	1. Fluid level	<a href="#">AT-211</a>	
			2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			3. Line pressure test	<a href="#">AT-255</a>	
			4. Torque converter clutch solenoid valve	<a href="#">AT-255</a>	
			5. Line pressure solenoid valve	<a href="#">AT-306</a>	
			6. Control valve assembly	<a href="#">AT-255</a>	
		OFF vehicle	7. Torque converter	<a href="#">AT-414</a>	
	Lock-up point is extremely high or low. <a href="#">AT-378</a>	ON vehicle	1. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	<a href="#">AT-261</a> , <a href="#">AT-340</a>	
			3. Torque converter clutch solenoid valve	<a href="#">AT-255</a>	
			4. Control valve assembly	<a href="#">AT-255</a>	
Shift Shock	ON vehicle	1. Engine idling rpm	<a href="#">EC-610</a>	<a href="#">EC-1214</a>	
		2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>	
		3. Line pressure test	<a href="#">AT-255</a>		
		4. A/T fluid temperature sensor	<a href="#">AT-255</a>		
		5. Engine speed signal	<a href="#">AT-266</a>		
		6. Line pressure solenoid valve	<a href="#">AT-306</a>		
		7. Control valve assembly	<a href="#">AT-255</a>		
		8. Accumulator N-D	<a href="#">AT-255</a>		
	OFF vehicle	9. Turbine revolution sensor		<a href="#">AT-344</a>	
		10. Forward Clutch	<a href="#">AT-453</a>		

# TROUBLE DIAGNOSIS — BASIC INSPECTION

[RE4R01A]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				VG33E only	VG33ER only
Shift Shock	Too sharp a shock in change from D1 to D2 .	ON vehicle	1. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			2. Line pressure test	<a href="#">AT-255</a>	
			3. Accumulator servo release	<a href="#">AT-255</a>	
			4. Control valve assembly	<a href="#">AT-255</a>	
			5. A/T fluid temperature sensor	<a href="#">AT-255</a>	
		OFF vehicle	6. Brake band	<a href="#">AT-470</a>	
	Too sharp a shock in change from D2 to D3 .	ON vehicle	1. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			2. Line pressure test	<a href="#">AT-255</a>	
			3. Control valve assembly	<a href="#">AT-255</a>	
		OFF vehicle	4. High clutch	<a href="#">AT-450</a>	
			5. Brake band	<a href="#">AT-306</a>	
	Too sharp a shock in change from D3 to D4 .	ON vehicle	1. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			2. Line pressure test	<a href="#">AT-255</a>	
			3. Control valve assembly	<a href="#">AT-255</a>	
		OFF vehicle	4. Brake band	<a href="#">AT-306</a>	
			5. Overrun clutch	<a href="#">AT-306</a>	
	Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			2. Line pressure test	<a href="#">AT-255</a>	
			3. Overrun clutch solenoid valve	<a href="#">AT-329</a>	
			4. Control valve assembly	<a href="#">AT-255</a>	
Large shock changing from 12 to 11 in 1 position.	ON vehicle	1. Control valve assembly	<a href="#">AT-255</a>		
	ON vehicle	2. Low & reverse brake	<a href="#">AT-458</a>		

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# TROUBLE DIAGNOSIS — BASIC INSPECTION

**[RE4R01A]**

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				VG33E only	VG33ER only
Improper Shift Timing	Too high a gear change point from D1 to D2 , from D2 to D3 , from D3 to D4 . <a href="#">AT-372</a> , <a href="#">AT-374</a> , <a href="#">AT-376</a>	ON vehicle	1. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	<a href="#">AT-261</a> , <a href="#">AT-340</a>	
			3. Shift solenoid valve A	<a href="#">AT-311</a>	
			4. Shift solenoid valve B	<a href="#">AT-316</a>	
	Gear change directly from D1 to D3 occurs.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
		OFF vehicle	2. Accumulator servo release	<a href="#">AT-255</a>	
	Too high a change point from D4 to D3 , from D3 to D2 , from D2 to D1 .	ON vehicle	1. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	<a href="#">AT-261</a> , <a href="#">AT-340</a>	
			3. Shift solenoid valve A	<a href="#">AT-311</a>	
			4. Shift solenoid valve B	<a href="#">AT-316</a>	
Kickdown does not operate when depressing pedal in D4 within kick-down vehicle speed.	ON vehicle	1. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>	
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	<a href="#">AT-261</a> , <a href="#">AT-340</a>		
		3. Shift solenoid valve A	<a href="#">AT-311</a>		
		4. Shift solenoid valve B	<a href="#">AT-316</a>		
Improper Shift Timing	Kickdown operates or engine over-runs when depressing pedal in D4 beyond kick-down vehicle speed limit.	ON vehicle	1. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	<a href="#">AT-261</a> , <a href="#">AT-340</a>	
			2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			3. Shift solenoid valve A	<a href="#">AT-311</a>	
			4. Shift solenoid valve B	<a href="#">AT-316</a>	
	Gear change from 22 to 23 in 2 position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>	
	Gear change from 11 to 12 in 1 position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>	
2. Manual control linkage adjustment			<a href="#">AT-405</a>		



# TROUBLE DIAGNOSIS — BASIC INSPECTION

[RE4R01A]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				VG33E only	VG33ER only
No Down Shift	Failure to change gear from D4 to D3 .	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
			2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			3. Overrun clutch solenoid valve	<a href="#">AT-450</a>	
			4. Shift solenoid valve A	<a href="#">AT-311</a>	
			5. Line pressure solenoid valve	<a href="#">AT-306</a>	
			6. Control valve assembly	<a href="#">AT-255</a>	
		OFF vehicle	7. Low & reverse brake	<a href="#">AT-450</a>	
			8. Overrun clutch	<a href="#">AT-306</a>	
	Failure to change gear from D3 to D2 or from D4 to D2 .	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
			2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			3. Shift solenoid valve A	<a href="#">AT-311</a>	
			4. Shift solenoid valve B	<a href="#">AT-316</a>	
			5. Control valve assembly	<a href="#">AT-255</a>	
		OFF vehicle	6. High clutch	<a href="#">AT-450</a>	
			7. Brake band	<a href="#">AT-306</a>	
	Failure to change gear from D2 to D1 or from D3 to D1 .	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
			2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			3. Shift solenoid valve A	<a href="#">AT-311</a>	
			4. Shift solenoid valve B	<a href="#">AT-316</a>	
			5. Control valve assembly	<a href="#">AT-255</a>	
		OFF vehicle	6. Low one-way clutch		
			7. High clutch	<a href="#">AT-450</a>	
			8. Brake band	<a href="#">AT-306</a>	

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# TROUBLE DIAGNOSIS — BASIC INSPECTION

[RE4R01A]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				VG33E only	VG33ER only
No Down Shift	Failure to change from D3 to 22 when changing lever into 2 position. <a href="#">AT-386</a>	ON vehicle	1. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>	
			2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			3. Overrun clutch solenoid valve	<a href="#">AT-450</a>	
			4. Shift solenoid valve B	<a href="#">AT-316</a>	
			5. Shift solenoid valve A	<a href="#">AT-311</a>	
			6. Control valve assembly	<a href="#">AT-255</a>	
			7. Manual control linkage adjustment	<a href="#">AT-405</a>	
		OFF vehicle	8. Brake band	<a href="#">AT-306</a>	
			9. Overrun clutch	<a href="#">AT-306</a>	
		Does not change from 12 to 11 in 1 position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>
2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	<a href="#">AT-261, AT-340</a>				
3. Shift solenoid valve A	<a href="#">AT-311</a>				
4. Control valve assembly	<a href="#">AT-255</a>				
5. Overrun clutch solenoid valve	<a href="#">AT-450</a>				
OFF vehicle	6. Overrun clutch		<a href="#">AT-306</a>		
	7. Low & reverse brake		<a href="#">AT-450</a>		
No Up Shift	Failure to change gear from D1 to D2	ON vehicle	1. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>	
			2. Manual control linkage adjustment	<a href="#">AT-405</a>	
			3. Shift solenoid valve A	<a href="#">AT-311</a>	
			4. Control valve assembly	<a href="#">AT-255</a>	
			5. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	<a href="#">AT-261, AT-340</a>	
		OFF vehicle	6. Brake band	<a href="#">AT-306</a>	
	Failure to change gear from D2 to D3	ON vehicle	1. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>	
			2. Manual control linkage adjustment	<a href="#">AT-405</a>	
			3. Shift solenoid valve B	<a href="#">AT-316</a>	
			4. Control valve assembly	<a href="#">AT-255</a>	
5. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR			<a href="#">AT-261, AT-340</a>		
OFF vehicle	6. High clutch	<a href="#">AT-450</a>			
	7. Brake band	<a href="#">AT-306</a>			

# TROUBLE DIAGNOSIS — BASIC INSPECTION

[RE4R01A]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				VG33E only	VG33ER only
No Up Shift	Failure to change gear from D3 to D4	ON vehicle	1. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>	
			2. Manual control linkage adjustment	<a href="#">AT-405</a>	
			3. Shift solenoid valve A	<a href="#">AT-311</a>	
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	<a href="#">AT-261</a> , <a href="#">AT-340</a>	
			5. A/T fluid temperature sensor	<a href="#">AT-255</a>	
		OFF vehicle	6. Brake band	<a href="#">AT-306</a>	
	A/T does not shift to D4 when driving with overdrive control switch ON.	ON vehicle	1. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			2. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>	
			3. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	<a href="#">AT-261</a> , <a href="#">AT-340</a>	
			4. Shift solenoid valve A	<a href="#">AT-311</a>	
			5. Overrun clutch solenoid valve	<a href="#">AT-450</a>	
			6. Control valve assembly	<a href="#">AT-255</a>	
			7. A/T fluid temperature sensor	<a href="#">AT-255</a>	
			8. Line pressure solenoid valve	<a href="#">AT-306</a>	
		OFF vehicle	9. Brake band	<a href="#">AT-306</a>	
			10. Overrun clutch	<a href="#">AT-306</a>	
Slips/Will Not Engage	Vehicle will not run in R position (but runs in D, 2 and 1 positions). Clutch slips.	ON vehicle	1. Manual control linkage adjustment	<a href="#">AT-405</a>	
			2. Line pressure test	<a href="#">AT-255</a>	
			3. Line pressure solenoid valve	<a href="#">AT-306</a>	
			4. Control valve assembly	<a href="#">AT-255</a>	
	Very poor acceleration. <a href="#">AT-364</a>	OFF vehicle	5. Reverse clutch	<a href="#">AT-306</a>	
			6. High clutch	<a href="#">AT-450</a>	
			7. Forward clutch	<a href="#">AT-306</a>	
			8. Overrun clutch	<a href="#">AT-306</a>	
			9. Low & reverse brake	<a href="#">AT-450</a>	
	Vehicle will not run in D and 2 positions (but runs in 1 and R positions).	ON vehicle	1. Manual control linkage adjustment	<a href="#">AT-405</a>	
OFF vehicle		2. Low one-way clutch	<a href="#">AT-463</a>		

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# TROUBLE DIAGNOSIS — BASIC INSPECTION

[RE4R01A]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				VG33E only	VG33ER only
Slips/Will Not Engage	Vehicle will not run in D, 1, 2 positions (but runs in R position). Clutch slips. Very poor acceleration. <a href="#">AT-367</a>	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
			2. Line pressure test	<a href="#">AT-255</a>	
			3. Line pressure solenoid valve	<a href="#">AT-306</a>	
			4. Control valve assembly	<a href="#">AT-255</a>	
			5. Accumulator N-D	<a href="#">AT-255</a>	
		OFF vehicle	6. Reverse clutch	<a href="#">AT-306</a>	
			7. High clutch	<a href="#">AT-450</a>	
			8. Forward clutch	<a href="#">AT-306</a>	
			9. Forward one-way clutch	<a href="#">AT-306</a>	
			10. Low one-way clutch	<a href="#">AT-306</a>	
	Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
			2. Manual control linkage adjustment	<a href="#">AT-405</a>	
			3. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			4. Line pressure test	<a href="#">AT-255</a>	
			5. Line pressure solenoid valve	<a href="#">AT-306</a>	
			6. Control valve assembly	<a href="#">AT-255</a>	
			7. Accumulator N-D	<a href="#">AT-255</a>	
		OFF vehicle	8. Forward clutch	<a href="#">AT-306</a>	
			9. Reverse clutch	<a href="#">AT-306</a>	
			10. Low & reverse brake	<a href="#">AT-450</a>	
			11. Oil pump	<a href="#">AT-426</a>	
			12. Torque converter	<a href="#">AT-414</a>	
	No creep at all. <a href="#">AT-364</a> , <a href="#">AT-367</a>	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
			2. Line pressure test	<a href="#">AT-255</a>	
			3. Control valve assembly	<a href="#">AT-255</a>	
		OFF vehicle	4. Forward clutch	<a href="#">AT-306</a>	
			5. Oil pump	<a href="#">AT-306</a>	
			6. Torque converter	<a href="#">AT-414</a>	
Almost no shock or clutches slipping in change from D1 to D2 .	ON vehicle	1. Fluid level	<a href="#">AT-414</a>		
		2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>	
		3. Line pressure test	<a href="#">AT-255</a>		
		4. Accumulator servo release	<a href="#">AT-255</a>		
		5. Control valve assembly	<a href="#">AT-255</a>		
	OFF vehicle	6. Brake band	<a href="#">AT-306</a>		

# TROUBLE DIAGNOSIS — BASIC INSPECTION

**[RE4R01A]**

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				VG33E only	VG33ER only
Slips/Will Not Engage	Almost no shock or slipping in change from D2 to D3 .	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
			2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			3. Line pressure test	<a href="#">AT-255</a>	
			4. Control valve assembly	<a href="#">AT-255</a>	
		OFF vehicle	5. High clutch	<a href="#">AT-450</a>	
			6. Forward clutch	<a href="#">AT-306</a>	
	Almost no shock or slipping in change from D3 to D4 .	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
			2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			3. Line pressure test	<a href="#">AT-255</a>	
			4. Control valve assembly	<a href="#">AT-255</a>	
		OFF vehicle	5. High clutch	<a href="#">AT-450</a>	
			6. Brake band	<a href="#">AT-306</a>	
	Races extremely fast or slips in changing from D4 to D3 when depressing pedal.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
			2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
3. Line pressure test			<a href="#">AT-255</a>		
4. Line pressure solenoid valve			<a href="#">AT-306</a>		
5. Control valve assembly			<a href="#">AT-255</a>		
OFF vehicle		6. High clutch	<a href="#">AT-450</a>		
		7. Forward clutch	<a href="#">AT-306</a>		

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# TROUBLE DIAGNOSIS — BASIC INSPECTION

**[RE4R01A]**

Items	Symptom	Condition	Diagnostic Item	Reference Page			
				VG33E only	VG33ER only		
Slips/Will Not Engage	Races extremely fast or slips in changing from D4 to D2 when depressing pedal.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>			
			2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>		
			3. Line pressure test	<a href="#">AT-255</a>			
			4. Line pressure solenoid valve	<a href="#">AT-306</a>			
			5. Shift solenoid valve A	<a href="#">AT-311</a>			
			6. Control valve assembly	<a href="#">AT-255</a>			
		OFF vehicle	7. Brake band	<a href="#">AT-306</a>			
			8. Forward clutch	<a href="#">AT-306</a>			
			Races extremely fast or slips in changing from D3 to D2 when depressing pedal.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
					2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
					3. Line pressure test	<a href="#">AT-255</a>	
					4. Line pressure solenoid valve	<a href="#">AT-306</a>	
	5. Control valve assembly	<a href="#">AT-255</a>					
	6. A/T fluid temperature sensor	<a href="#">AT-255</a>					
	OFF vehicle	7. Brake band	<a href="#">AT-306</a>				
		8. Forward clutch	<a href="#">AT-306</a>				
		9. High clutch	<a href="#">AT-450</a>				
	Races extremely fast or slips in changing from D4 or D3 to D1 when depressing pedal.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>			
			2. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>		
			3. Line pressure test	<a href="#">AT-255</a>			
			4. Line pressure solenoid valve	<a href="#">AT-306</a>			
			5. Control valve assembly	<a href="#">AT-255</a>			
		OFF vehicle	6. Forward clutch	<a href="#">AT-306</a>			
			7. Forward one-way clutch	<a href="#">AT-306</a>			
8. Low one-way clutch			<a href="#">AT-306</a>				
Slips/Will Not Engage	Vehicle will not run in any position.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>			
			2. Manual control linkage adjustment	<a href="#">AT-406</a>			
			3. Line pressure test	<a href="#">AT-255</a>			
			4. Line pressure solenoid valve	<a href="#">AT-306</a>			
		OFF vehicle	5. Oil pump	<a href="#">AT-306</a>			
			6. High clutch	<a href="#">AT-450</a>			
			7. Brake band	<a href="#">AT-306</a>			
			8. Low & reverse brake	<a href="#">AT-450</a>			
			9. Torque converter	<a href="#">AT-414</a>			
			10. Parking pawl components	<a href="#">AT-475</a>			

# TROUBLE DIAGNOSIS — BASIC INSPECTION

[RE4R01A]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				VG33E only	VG33ER only
NOT USED	Engine cannot be started in P and N positions. <a href="#">AT-358</a>	ON vehicle	1. Ignition switch and starter	<a href="#">SC-9</a>	
			2. Manual control linkage adjustment	<a href="#">AT-405</a>	
			3. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>	
	Engine starts in positions other than P and N. <a href="#">AT-358</a>	ON vehicle	1. Manual control linkage adjustment	<a href="#">AT-405</a>	
			2. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>	
	Transmission noise in P and N positions.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
			2. Line pressure test	<a href="#">AT-255</a>	
			3. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	<a href="#">AT-261, AT-340</a>	
			5. Engine speed signal	<a href="#">AT-266</a>	
		OFF vehicle	6. Oil pump	<a href="#">AT-306</a>	
			7. Torque converter	<a href="#">AT-414</a>	
	Vehicle moves when changing into P position or parking gear does not disengage when shifted out of P position. <a href="#">AT-359</a>	ON vehicle	1. Manual control linkage adjustment	<a href="#">AT-405</a>	
		OFF vehicle	2. Parking pawl components	<a href="#">AT-414</a>	
			ON vehicle	1. Manual control linkage adjustment	<a href="#">AT-405</a>
OFF vehicle				2. Forward clutch	<a href="#">AT-306</a>
			3. Reverse clutch	<a href="#">AT-306</a>	
	4. Overrun clutch	<a href="#">AT-306</a>			
NOT USED	ON vehicle	1. Fluid level	<a href="#">AT-414</a>		
		2. Manual control linkage adjustment	<a href="#">AT-405</a>		
		3. Line pressure test	<a href="#">AT-255</a>		
		4. Line pressure solenoid valve	<a href="#">AT-306</a>		
		5. Control valve assembly	<a href="#">AT-255</a>		
	OFF vehicle	6. High clutch	<a href="#">AT-450</a>		
		7. Brake band	<a href="#">AT-306</a>		
		8. Forward clutch	<a href="#">AT-306</a>		
		9. Overrun clutch	<a href="#">AT-306</a>		
Excessive creep.	ON vehicle	1. Engine idling rpm	<a href="#">EC-610</a>	<a href="#">EC-1214</a>	
Engine stops when shifting lever into R, D, 2 and 1.	ON vehicle	1. Engine idling rpm	<a href="#">EC-610</a>	<a href="#">EC-1214</a>	
		2. Torque converter clutch solenoid valve	<a href="#">AT-255</a>		
		3. Control valve assembly	<a href="#">AT-255</a>		
	OFF vehicle	4. Torque converter	<a href="#">AT-414</a>		

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# TROUBLE DIAGNOSIS — BASIC INSPECTION

[RE4R01A]

Items	Symptom	Condition	Diagnostic Item	Reference Page	
				VG33E only	VG33ER only
NOT USED	Vehicle braked by gear change from D1 to D2	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
		OFF vehicle	2. Reverse clutch	<a href="#">AT-306</a>	
			3. Low & reverse brake	<a href="#">AT-450</a>	
			4. High clutch	<a href="#">AT-450</a>	
			5. Low one-way clutch	<a href="#">AT-306</a>	
	Vehicle braked by gear change from D2 to D3	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
		OFF vehicle	2. Brake band	<a href="#">AT-306</a>	
	Vehicle braked by gear change from D3 to D4	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
		OFF vehicle	2. Overrun clutch	<a href="#">AT-306</a>	
			3. Forward one-way clutch	<a href="#">AT-306</a>	
			4. Reverse clutch	<a href="#">AT-306</a>	
	Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
			2. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>	
			3. Shift solenoid valve A	<a href="#">AT-311</a>	
			4. Shift solenoid valve B	<a href="#">AT-316</a>	
5. Control valve assembly			<a href="#">AT-255</a>		
OFF vehicle		6. Reverse clutch	<a href="#">AT-306</a>		
		7. High clutch	<a href="#">AT-450</a>		
		8. Brake band	<a href="#">AT-306</a>		
		9. Low & reverse brake	<a href="#">AT-450</a>		
		10. Oil pump	<a href="#">AT-306</a>		
		11. Torque converter	<a href="#">AT-414</a>		
NOT USED	Transmission noise in D, 2, 1 and R positions.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>	
		ON vehicle	2. Torque converter	<a href="#">AT-414</a>	
	Engine brake does not operate in "1" position. <a href="#">AT-387</a>	ON vehicle	1. Park/neutral position (PNP) switch adjustment	<a href="#">AT-405</a>	
			2. Manual control linkage adjustment	<a href="#">AT-405</a>	
			3. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>
			4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	<a href="#">AT-261</a> , <a href="#">AT-340</a>	
			5. Shift solenoid valve A	<a href="#">AT-311</a>	
			6. Control valve assembly	<a href="#">AT-255</a>	
			7. Overrun clutch solenoid valve	<a href="#">AT-450</a>	
		OFF vehicle	8. Overrun clutch	<a href="#">AT-306</a>	
9. Low & reverse brake			<a href="#">AT-450</a>		



# TROUBLE DIAGNOSIS — BASIC INSPECTION

[RE4R01A]

Items	Symptom	Condition	Diagnostic Item	Reference Page		
				VG33E only	VG33ER only	
NOT USED	Transmission overheats.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>		A
			2. Engine idling rpm	<a href="#">EC-610</a>	<a href="#">EC-1214</a>	B
			3. Throttle position sensor (Adjustment)	<a href="#">EC-652</a>	<a href="#">EC-1255</a>	AT
			4. Line pressure test	<a href="#">AT-255</a>		
			5. Line pressure solenoid valve	<a href="#">AT-306</a>		
			6. Control valve assembly	<a href="#">AT-255</a>		
		OFF vehicle	7. Oil pump	<a href="#">AT-306</a>		D
			8. Reverse clutch	<a href="#">AT-306</a>		
			9. High clutch	<a href="#">AT-450</a>		E
			10. Brake band	<a href="#">AT-306</a>		
			11. Forward clutch	<a href="#">AT-306</a>		
			12. Overrun clutch	<a href="#">AT-306</a>		F
			13. Low & reverse brake	<a href="#">AT-450</a>		
			14. Torque converter	<a href="#">AT-414</a>		G
	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>		
		OFF vehicle	2. Reverse clutch	<a href="#">AT-306</a>		H
			3. High clutch	<a href="#">AT-450</a>		
			4. Brake band	<a href="#">AT-306</a>		I
			5. Forward clutch	<a href="#">AT-306</a>		
			6. Overrun clutch	<a href="#">AT-306</a>		
			7. Low & reverse brake	<a href="#">AT-450</a>		J
	Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>		
		OFF vehicle	2. Torque converter	<a href="#">AT-414</a>		K
			3. Oil pump	<a href="#">AT-306</a>		
			4. Reverse clutch	<a href="#">AT-445</a>		L
			5. High clutch	<a href="#">AT-450</a>		
			6. Brake band	<a href="#">AT-306</a>		M
			7. Forward clutch	<a href="#">AT-306</a>		
8. Overrun clutch			<a href="#">AT-306</a>			
9. Low & reverse brake			<a href="#">AT-450</a>			
Engine is stopped at R, D, 2 and 1 positions.	ON vehicle	1. Fluid level	<a href="#">AT-414</a>			
		2. Torque converter clutch solenoid valve	<a href="#">AT-255</a>			
		3. Shift solenoid valve B	<a href="#">AT-316</a>			
		4. Shift solenoid valve A	<a href="#">AT-311</a>			
		5. Control valve assembly	<a href="#">AT-255</a>			

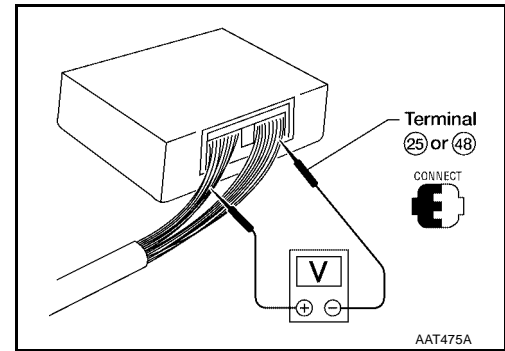
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

PFP:00000

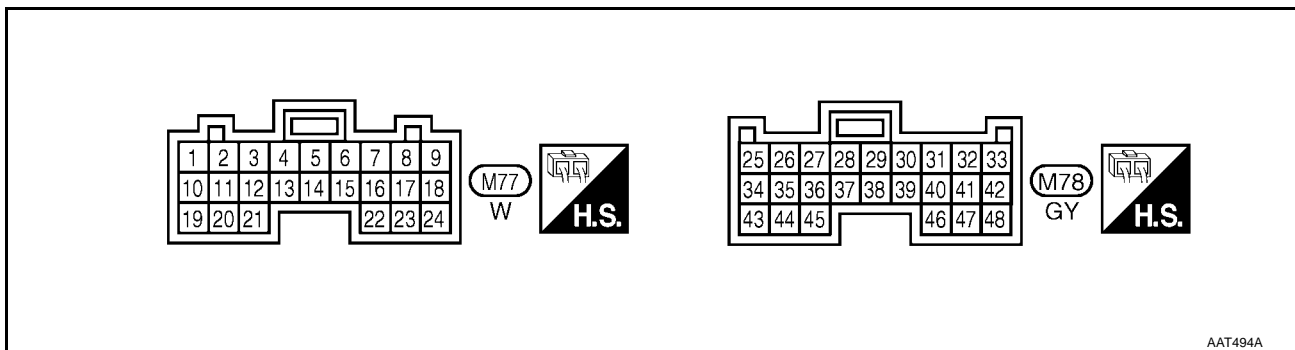
TCM Terminals and Reference Value  
PREPARATION

ECS007M1

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



TCM HARNESS CONNECTOR TERMINAL LAYOUT





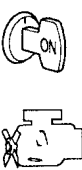



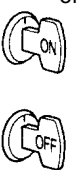



TCM INSPECTION TABLE

(Data are reference values.)

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
1	GY/R	Line pressure solenoid valve	When releasing accelerator pedal after warming up engine.	1.5 - 2.5V
			When depressing accelerator pedal fully after warming up engine.	0V
2	BR/Y	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/OR	Torque converter clutch solenoid valve	When A/T performs lock-up.	Battery voltage
			When A/T does not perform lock-up.	0V
5*1	PU/W	DT1	—	—
6*1	P/B	DT2	—	—
7*1	G/R	DT3	—	—
8*1,*3	R/Y	DT5	—	—
9*1,*3	W/G	DT4	—	—
10	W/R	Power source	When turning ignition switch to ON.	Battery voltage
			When turning ignition switch to OFF.	0V














# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

**[RE4R01A]**

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)		
11	L/W	Shift solenoid valve A		When shift solenoid valve A operates (When driving in D1 or D4 ).	Battery voltage	A
				When shift solenoid valve A does not operate (When driving in D2 or D3 ).	0V	B
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates (When driving in D1 or D2 ).	Battery voltage	AT
				When shift solenoid valve B does not operate (When driving in D3 or D4 ).	0V	D
13	Y	O/D OFF indicator lamp		When setting overdrive control switch in OFF position.	0V	E
				When setting overdrive control switch in ON position.	Battery voltage	F
15*1	Y/G	OBD-II	—	—	—	
16	BR/W	Closed throttle position switch (in throttle position switch)		When releasing accelerator pedal after warming up engine.	Battery voltage	G
				When depressing accelerator pedal after warming up engine.	0V	H
17	OR/B	Wide open throttle position switch (in throttle position switch)		When depressing accelerator pedal more than half-way after warming up engine.	Battery voltage	I
				When releasing accelerator pedal after warming up engine.	0V	J
18	B/Y	ASCD cruise signal		When ASCD cruise is being performed ("CRUISE" light comes on).	Battery voltage	K
				When ASCD cruise is not being performed, ("CRUISE" light does not come on).	0V	L
19	W/R	Power source (Same as No. 10)	or 	When turning ignition switch to ON	Battery voltage	M
				When turning ignition switch to OFF	0V	
20	L/B	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage	
				When overrun clutch shift solenoid valve does not operate.	0V	
22	R	Overdrive control switch		When setting overdrive control switch in OFF position	0V	
				When setting overdrive control switch in ON position	Battery voltage	
24	GY	ASCD O/D cut signal		When ASCD permits O/D.	5 - 8V	
				When ASCD requires O/D to be OFF.	0V	






# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

**[RE4R01A]**

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
25	B/Y	Ground	—	—	0V
26	G/B	PNP switch 1 position		When setting selector lever to 1 position.	Battery voltage
				When setting selector lever to other position.	0V
27	G/W	PNP switch 2 position		When setting selector lever to 2 position.	Battery voltage
				When setting selector lever to other position.	0V
28	R/Y	Power source (Memory back-up)	or  	When turning ignition switch to ON.	Battery voltage
				When turning ignition switch to OFF.	Battery voltage
29	Y	Revolution sensor (Measure in AC range)		When vehicle cruises at 30 km/h (19 MPH).	1V or more Voltage rises gradually in response to vehicle speed.
				When vehicle parks.	0V
30*2	Y/R	DATA LINK CONNECTOR data in	—	—	—
31*2	GY/L	DATA LINK CONNECTOR data out	—	—	—
32	B/W	Throttle position sensor (Power source)	 	Ignition switch ON	4.5 - 5.5V
				Ignition switch OFF	0V
34	L	PNP switch D position		When setting selector lever to D position.	Battery voltage
				When setting selector lever to other position.	0V
35	Y/R	PNP switch R position	 	When setting selector lever to R position.	Battery voltage
				When setting selector lever to other position.	0V
36	G/R	PNP switch P or N position		When setting selector lever to P or N position.	Battery voltage
				When setting selector lever to other position.	0V
38*3	Y	Turbine revolution sensor (measured in AC range)		When engine runs at approximately 1,000 rpm.	1.2V
39	P/L	Engine speed signal		When engine runs at idle speed.	0.5 - 2.5V

# TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

**[RE4R01A]**

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
40	G/B	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1m (3 ft) or more.	Voltage varies between less than 1V and more than 4.5V
41	OR/L	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 - 0.7V Fully-open throttle: 4V
42	BR	Throttle position sensor (Ground)		—	0V
45*3	BR/R	Stop lamp switch	—	When brake pedal is depressed.	Battery voltage
				When brake pedal is released.	0V
47	R/B	A/T fluid temperature sensor	 	When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V
48	B/Y	Ground (Same as No. 25)	—	—	0V

\*1: These terminals are connected to the ECM.

\*2: These terminals are connected to the Data link connector for CONSULT-II.

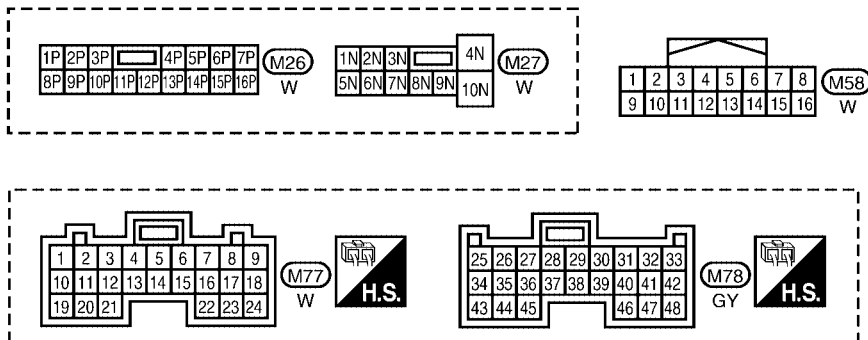
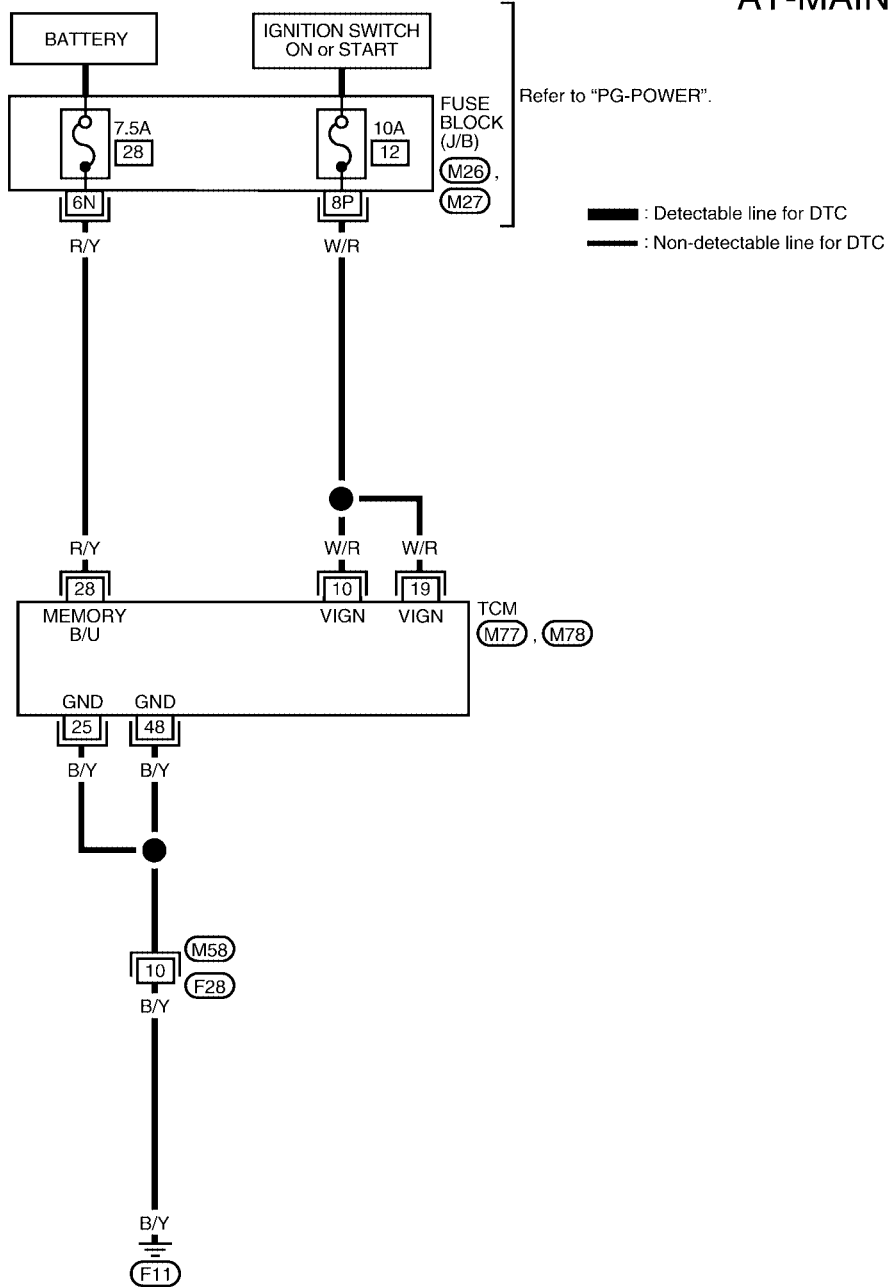
\*3: VG33ER only.

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

## TROUBLE DIAGNOSIS FOR POWER SUPPLY

### Wiring Diagram — AT — MAIN

### AT-MAIN-01










# TROUBLE DIAGNOSIS FOR POWER SUPPLY

[RE4R01A]

## TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

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

## Diagnostic Procedure

ECS007M3

### 1. CHECK TCM POWER SOURCE

- Turn ignition switch to ON position.  
(Do not start engine.)
- Check voltage between TCM harness connectors M77, M78 terminals (10, 19, 28) and ground.

**Voltage : Battery voltage**

- Turn ignition switch to OFF position.
- Check voltage between TCM harness connector M78 terminal 28 and ground.

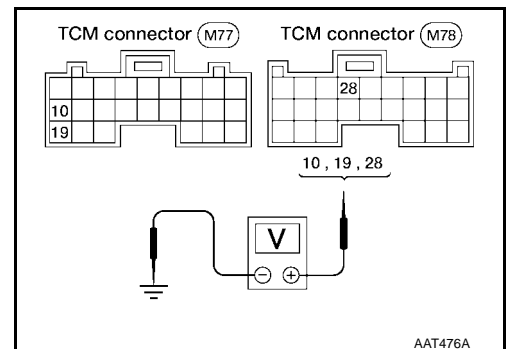
**Voltage : Battery voltage**

OK or NG

OK >> GO TO 2.

NG >> Check the following items:

- Harness for open or short between fuse block J/B harness connectors M26, M27 and TCM harness connectors M77, M78
- Ignition switch and fuse  
Refer to [PG-9, "POWER SUPPLY ROUTING"](#) .



## 2. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between TCM harness connector M78 terminals (25, 48) and ground.

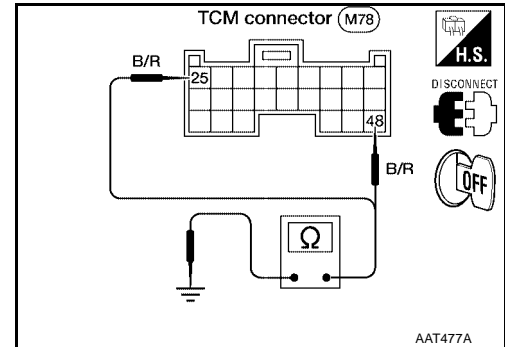
**Continuity should exist.**

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

OK or NG

OK >> **INSPECTION END.**

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





# DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

[RE4R01A]

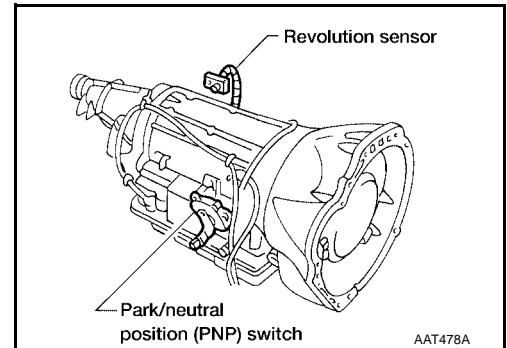
## DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

PF0:32006

### Description

ECS007M4

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



### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
26	G/B	PNP switch 1 position	When setting selector lever to 1 position.	Battery voltage
			When setting selector lever to other positions.	0V
27	G/W	PNP switch 2 position	When setting selector lever to 2 position.	Battery voltage
			When setting selector lever to other positions.	0V
34	L	PNP switch D position	When setting selector lever to D position.	Battery voltage
			When setting selector lever to other positions.	0V
35	Y	PNP switch R position	When setting selector lever to R position.	Battery voltage
			When setting selector lever to other positions.	0V
36	G/R	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	Malfunction is detected when ...	Check item (Possible cause)
P0705 : PNP SW/CIRC P0705 : P0705	TCM does not receive the correct voltage signal from the switch based on the gear position.	<ul style="list-style-type: none"> <li>• Harness or connectors (The PNP switch circuit is open or shorted)</li> <li>• PNP switch</li> </ul>

### DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

#### CAUTION:

Always drive vehicle at a safe speed.

#### NOTE:

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

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

① With CONSULT-II

1. Turn ignition switch ON.

# DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

[RE4R01A]

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

 With GST

- Follow the procedure "With CONSULT-II".

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

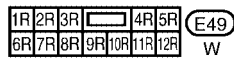
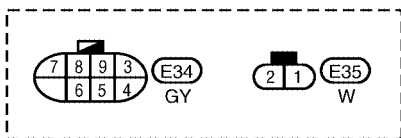
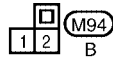
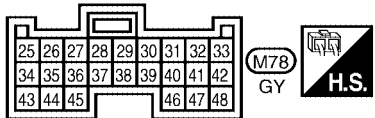
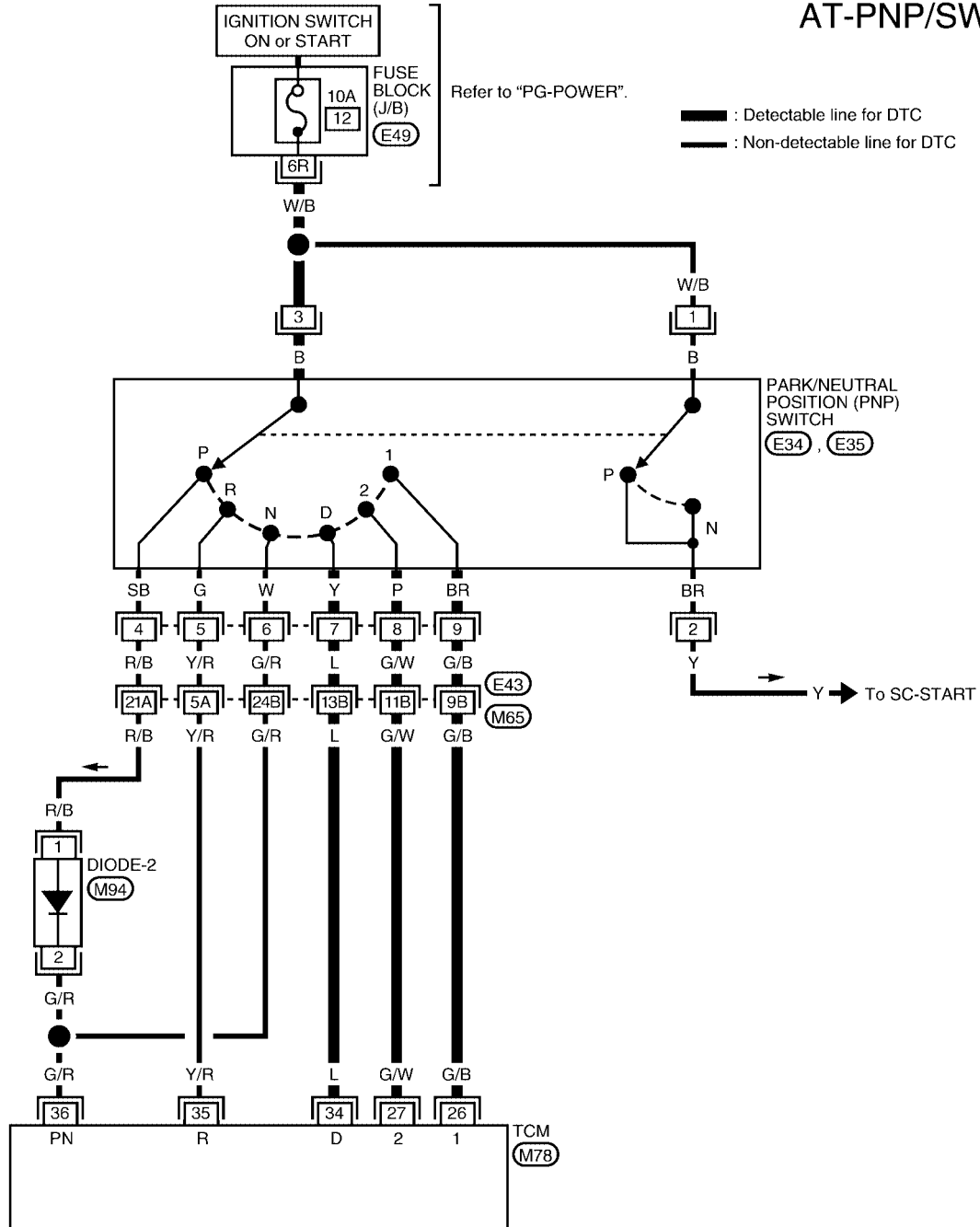
# DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

[RE4R01A]

## Wiring Diagram — AT — PNP/SW

ECS007M5

### AT-PNP/SW-01



Refer to the following.  
 (E43) - SUPER MULTIPLE JUNCTION (SMJ)

WCWA0092E

## Diagnostic Procedure

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

#### With CONSULT-II

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

#### OK or NG

OK >> GO TO 3.

NG >> Check the following items:

- PNP switch  
Refer to [AT-254, "PNP SWITCH"](#) .
- Harness for short or open between ignition switch and PNP switch (Main harness)
- Harness for short or open between PNP switch and TCM (Main harness)
- Diode (P position)

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

SAT701J

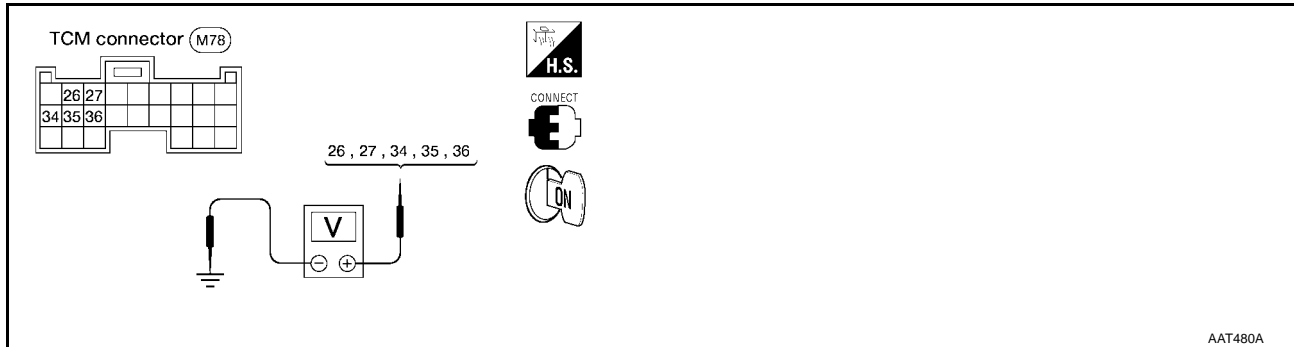
# DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

[RE4R01A]

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

### ⊗ Without CONSULT-II

1. Turn ignition switch to ON position (Do not start engine).
2. Check voltage between TCM harness connector M78 terminals (26, 27, 34, 35, 36) and ground while moving selector lever through each position.



Lever position	Terminals				
	36	35	34	27	26
P, N	B	0	0	0	0
R	0	B	0	0	0
D	0	0	B	0	0
2	0	0	0	B	0
1	0	0	0	0	B

AAT479A

Does battery voltage exist (B) or non-existent (0)?

Yes >> GO TO 3.

No >> Check the following items:

- PNP switch  
Refer to [AT-254, "PNP SWITCH"](#) .
- Harness for short or open between ignition switch and PNP switch
- Harness for short or open between PNP switch connector E34 and TCM connector M78
- Diode (P position)

## 3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-249, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

OK >> **INSPECTION END.**

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

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

# DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

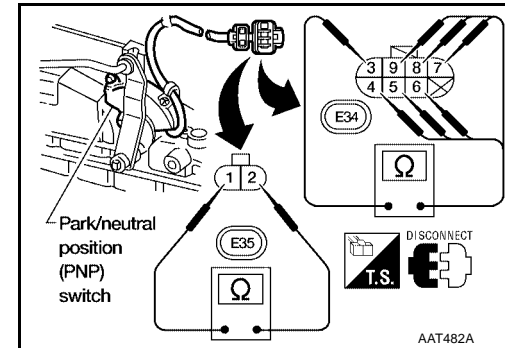
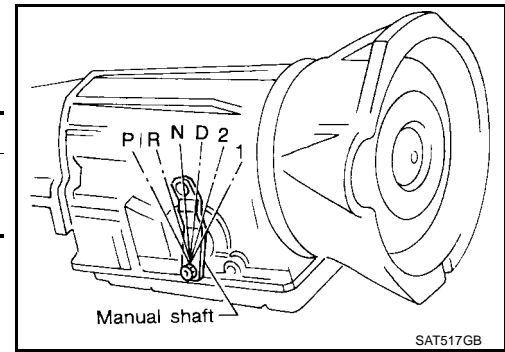
[RE4R01A]

ECS007M7

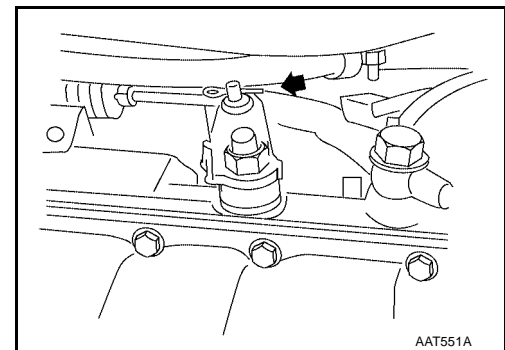
## Component Inspection PNP SWITCH

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

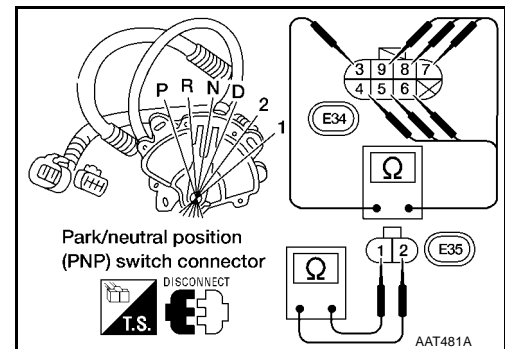
Lever position	P	R	N	D	2	1
Terminal No.	1 - 2	3 - 5	1 - 2	3 - 7	3 - 8	3 - 9
	3 - 4		3 - 6			



2. If NG, check again with manual control linkage disconnected from manual shaft of A/T assembly. Refer to step 1.
3. If OK on step 2, adjust manual control linkage. Refer to [AT-406. "Manual Control Linkage Adjustment"](#).



4. If NG on step 2, remove PNP switch from A/T and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to [AT-405. "Park/Neutral Position \(PNP\) Switch Adjustment"](#).
6. If NG on step 4, replace PNP switch.



# DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[RE4R01A]

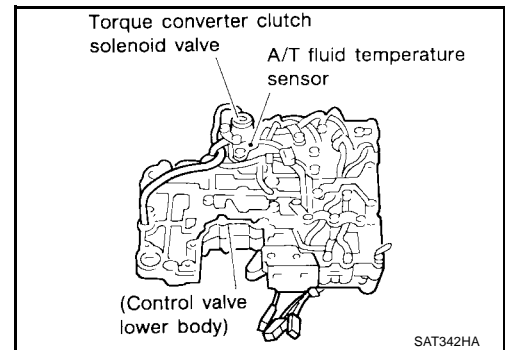
## DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

PF3:31940

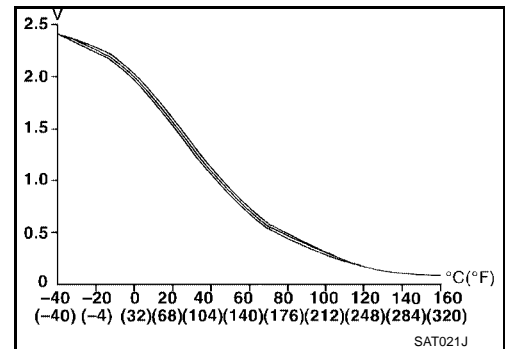
### Description

ECS007M8

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



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



Remarks: Specification data are reference values.

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

### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
42	BR	Throttle position sensor (Ground)	—	—
47	R/B	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	Malfunction is detected when....	Check item (Possible cause)
(P) : ATF TEMP SEN/CIRC (P) : P0710	TCM receives an excessively low or high voltage from the sensor.	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> <li>A/T fluid temperature sensor</li> </ul>

### DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

#### CAUTION:

Always drive vehicle at a safe speed.

#### NOTE:

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

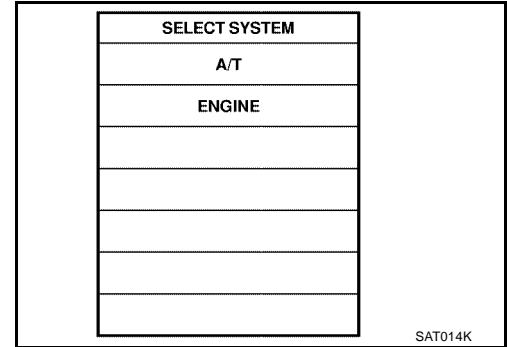
After the repair, perform the following procedure to confirm the malfunction is eliminated.

# DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[RE4R01A]

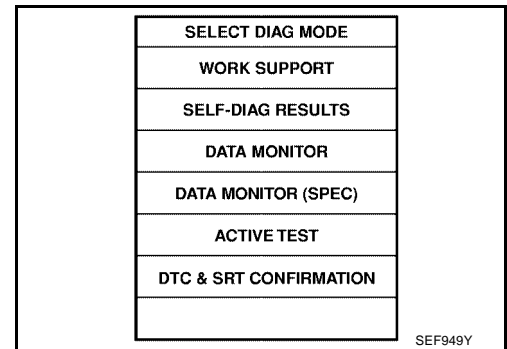
## ④ With CONSULT-II

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



## ④ With GST

- Follow the procedure "With CONSULT-II".





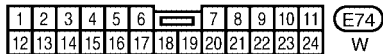
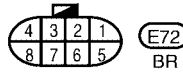
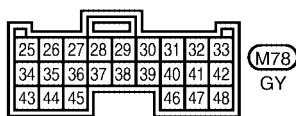
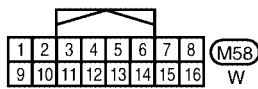
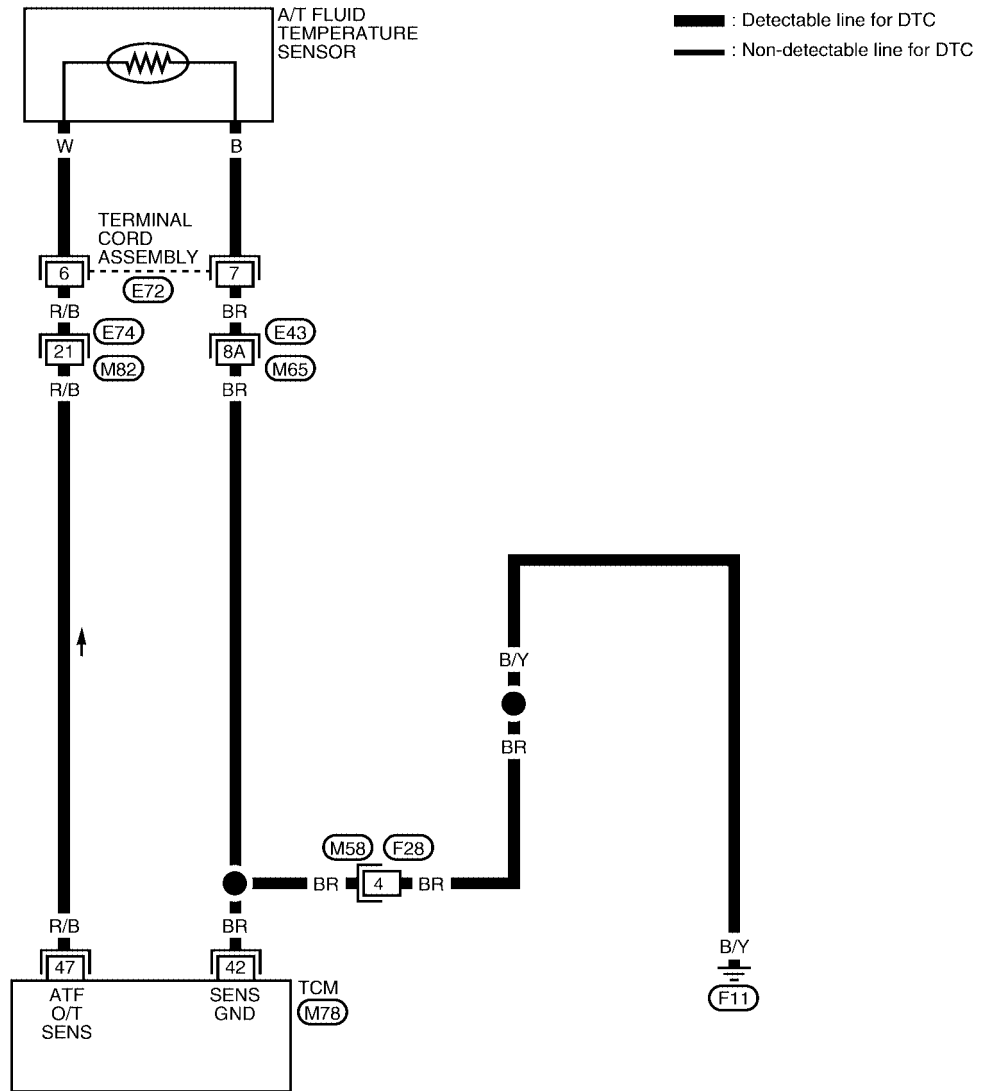
# DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[RE4R01A]

## Wiring Diagram — AT — FTS

ECS007M9

AT-FTS-01



Refer to the following.  
 (M65), (E43) - SUPER  
 MULTIPLE JUNCTION (SMJ)

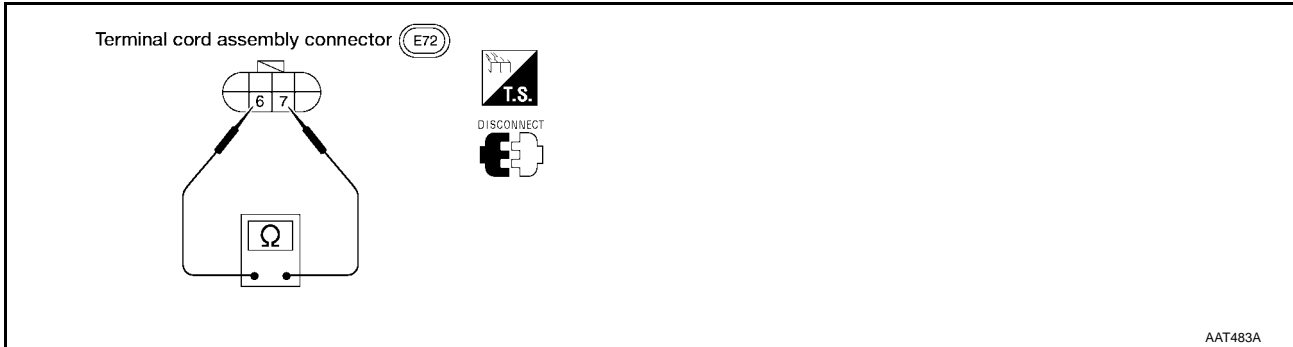
WCWA0147E

**Diagnostic Procedure**

ECS007MA

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

1. Turn ignition switch to OFF position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal cord assembly connector E72 terminals 6 and 7 when A/T is cold [20°C (68°F)].



Is resistance approx. 2.5 kΩ?

Yes >> GO TO 2.

No >> 1. Remove oil pan.

2. Check the following items:

- A/T fluid temperature sensor  
Refer to [AT-260, "A/T FLUID TEMPERATURE SENSOR"](#).
- Harness of terminal cord assembly for short or open

## 2. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR

### With CONSULT-II

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

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

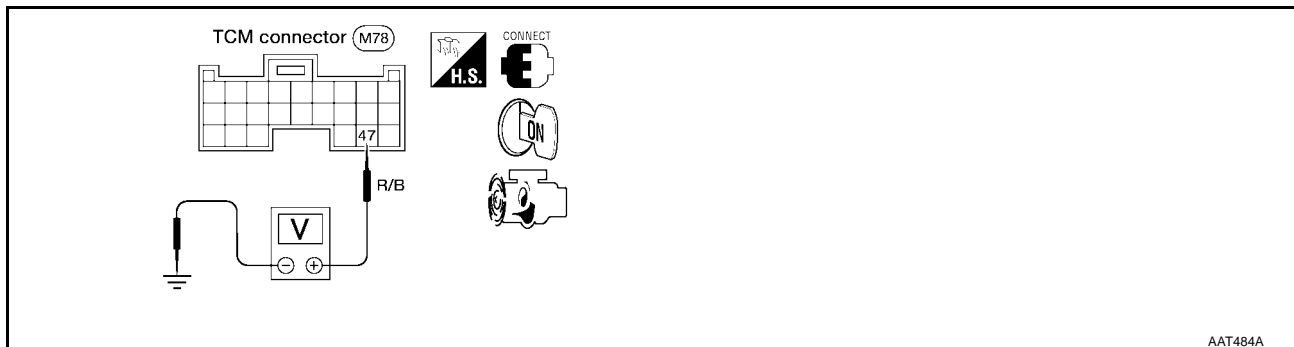
SAT614J

**Voltage**

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

### Without CONSULT-II

1. Start engine.
2. Check voltage between TCM harness connector M78 terminal 47 and ground while warming up A/T.



**Voltage**

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

OK or NG

- OK >> GO TO 3.
- NG >> Check the following item:
  - Harness for short or open between TCM and terminal cord assembly (Main harness)

## 3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-255, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

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

# DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

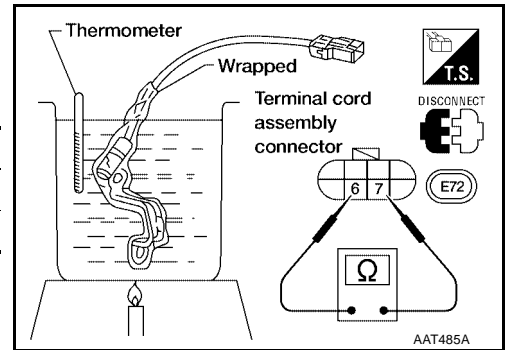
[RE4R01A]

ECS007MB

## Component Inspection A/T FLUID TEMPERATURE SENSOR

- For removal, refer to "AT-407, "Removal" .
- Check resistance between A/T fluid temperature sensor terminals 6 and 7 while changing temperature as shown at left.

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



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

[RE4R01A]

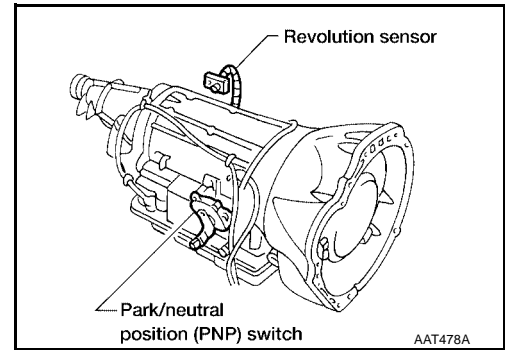
## DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

PF0:32702

### Description



ECS007MC

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





### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
29	Y	Revolution sensor (Measure in AC range)	 When vehicle cruises at 30 km/h (19 MPH).	1V or more Voltage rises gradually in response to vehicle speed.
			When vehicle parks.	0V
42	BR	Throttle position sensor (Ground)		0V

### ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
 : VEH SPD SEN/CIR AT	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>● Revolution sensor</li> </ul>
 : P0720		

### DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

#### CAUTION:

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

#### NOTE:

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

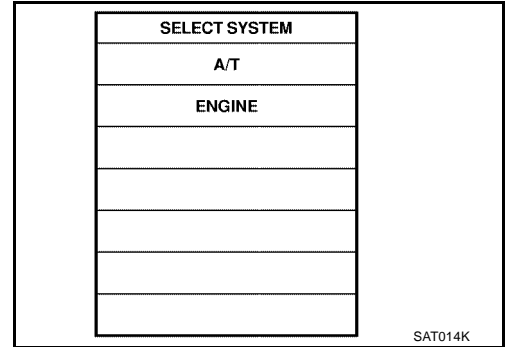
After the repair, perform the following procedure to confirm the malfunction is eliminated.

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

[RE4R01A]

 With CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Drive vehicle and check for an increase of "VHCL/S SE-MTR" value.  
If the check result is NG, go to [AT-264, "Diagnostic Procedure"](#).  
If the check result is OK, go to following step.
3. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
4. Start engine and maintain the following conditions for at least 5 consecutive seconds.  
**VHCL SPEED SE: 30 km/h (19 MPH) or more**  
**THRTL POS SEN: More than 1.2V**

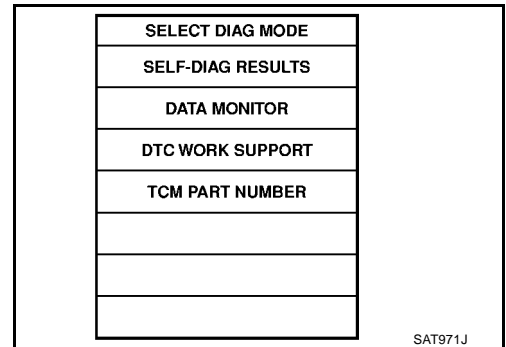


**Selector lever: D position (O/D ON)**

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

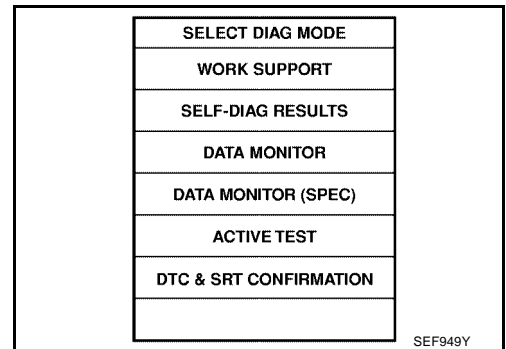
If the check result is NG, go to [AT-264, "Diagnostic Procedure"](#).  
If the check result is OK, go to following step.

5. Maintain the following conditions for at least 5 consecutive seconds.  
**CMPS-RPM (REF): 3,500 rpm or more**  
**THRTL POS SEN: More than 1.2V**  
**Selector lever: D position (O/D ON)**  
**Driving condition: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.**



 With GST

- Follow the procedure "With CONSULT-II".



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

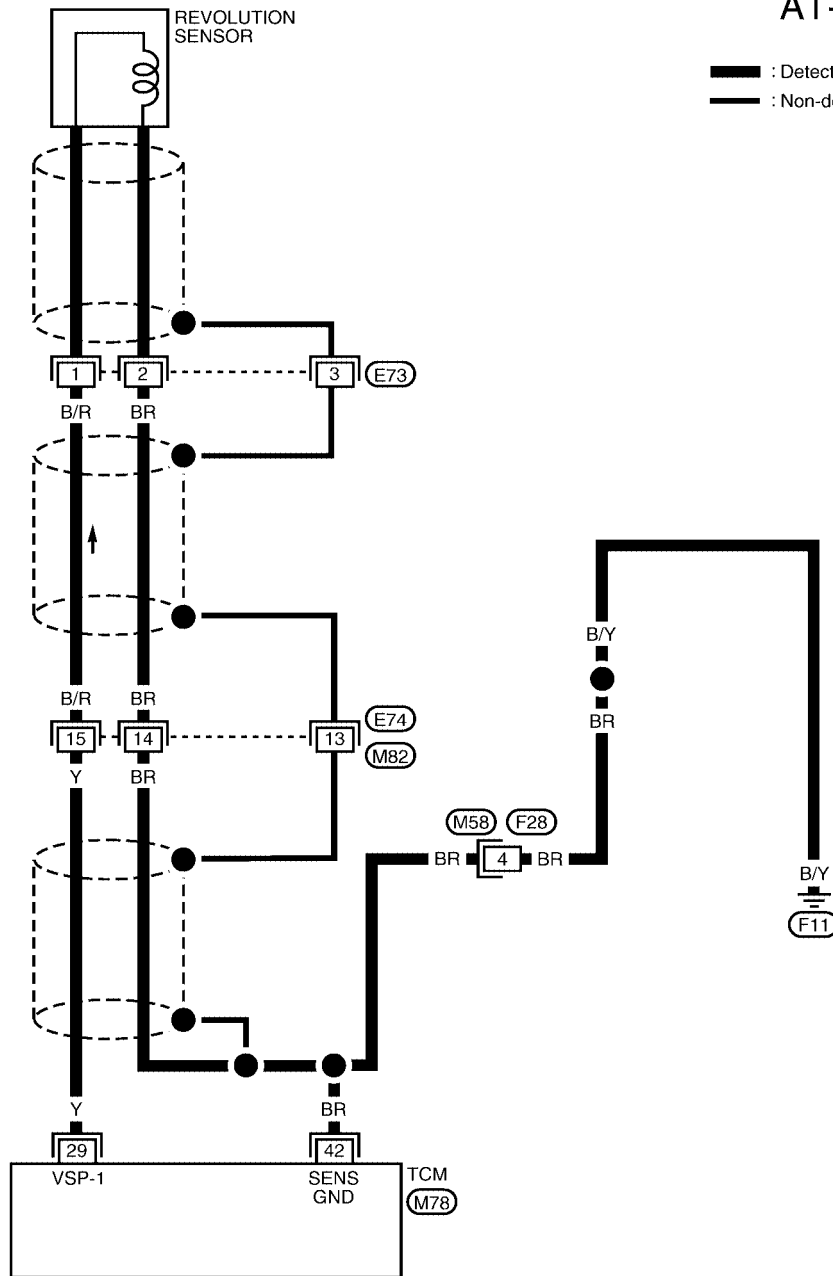
[RE4R01A]

## Wiring Diagram — AT — VSSA/T

ECS007MD

### AT-VSSAT-01

— : Detectable line for DTC  
 - - - : Non-detectable line for DTC



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

## Diagnostic Procedure

ECS007ME

### 1. CHECK REVOLUTION SENSOR

Refer to [AT-265, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace revolution sensor.

### 2. CHECK INPUT SIGNAL

#### ④ With CONSULT-II

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

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

SAT614J

#### ⊗ Without CONSULT-II

1. Start engine.
2. Check voltage between TCM harness connector M78 terminal 29 (Y) and ground while driving.  
(Measure with AC range)

**Voltage**

**At 0 km/h (0 MPH) : 0V**

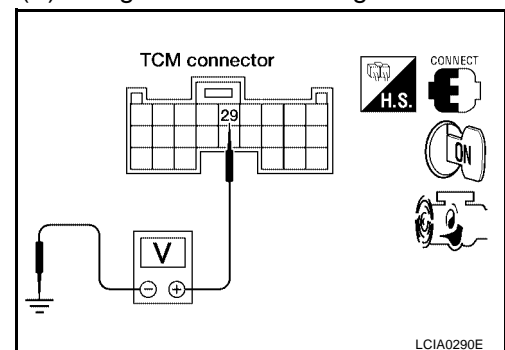
**At 30 km/h (19 MPH) : 1V or more**

**(Voltage rises gradually in response to vehicle speed.)**

OK or NG

- OK >> GO TO 3.
- NG >> Check the following items:

- Harness for short or open between TCM and revolution sensor (Main harness)
- Harness for short or open between revolution sensor harness connector E73 and ECM harness connector M78
- Ground circuit for ECM  
Refer to [AT-246, "TROUBLE DIAGNOSIS FOR POWER SUPPLY"](#) .





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

[RE4R01A]

## 3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-261, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

OK >> **INSPECTION END**

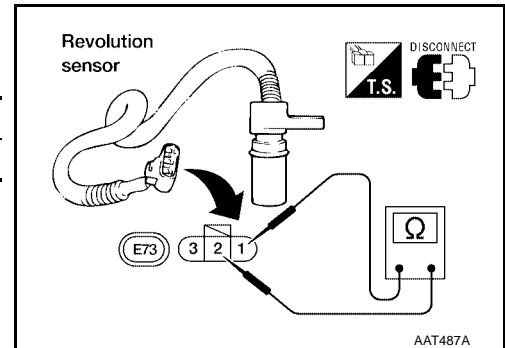
NG >> 1. Perform TCM input/output signal inspection.

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

### Component Inspection REVOLUTION SENSOR

- For removal, refer to [AT-407, "Removal"](#) .
- Check resistance between terminals 1 and 2.

Terminal No.		Resistance
1	2	500 - 650Ω



**DTC P0725 ENGINE SPEED SIGNAL**

**Description**

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

**TCM TERMINALS AND REFERENCE VALUE**

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
39	P/L	Engine speed signal	When engine runs at idle speed.	0.5 - 2.5V

**ON BOARD DIAGNOSIS LOGIC**

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: ENGINE SPEED SIG : P0725	TCM does not receive the proper voltage signal from ECM.	<ul style="list-style-type: none"> <li>Harness or connectors (The sensor circuit is open or shorted)</li> </ul>

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

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

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

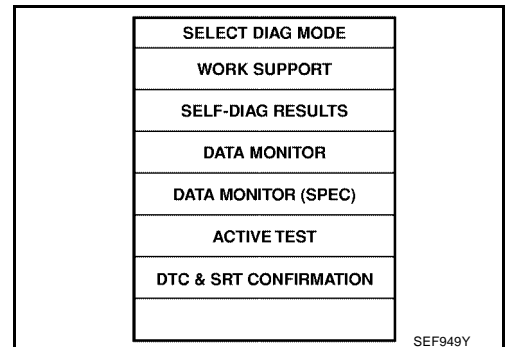
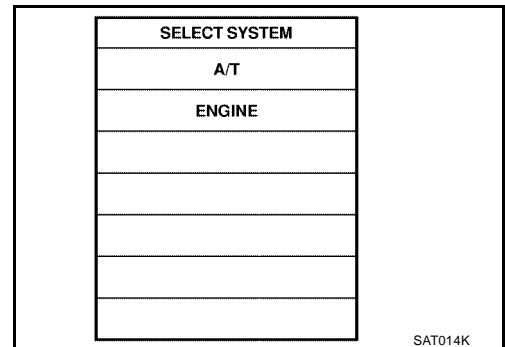
After the repair, perform the following procedure to confirm the malfunction is eliminated.

With CONSULT-II

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

With GST

- Follow the procedure “With CONSULT-II”.



# DTC P0725 ENGINE SPEED SIGNAL

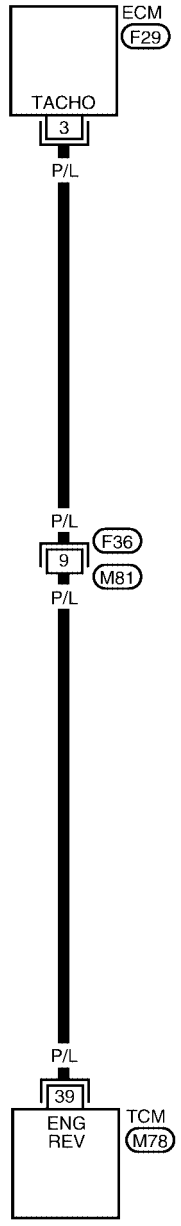
[RE4R01A]

## Wiring Diagram — AT — ENGSS

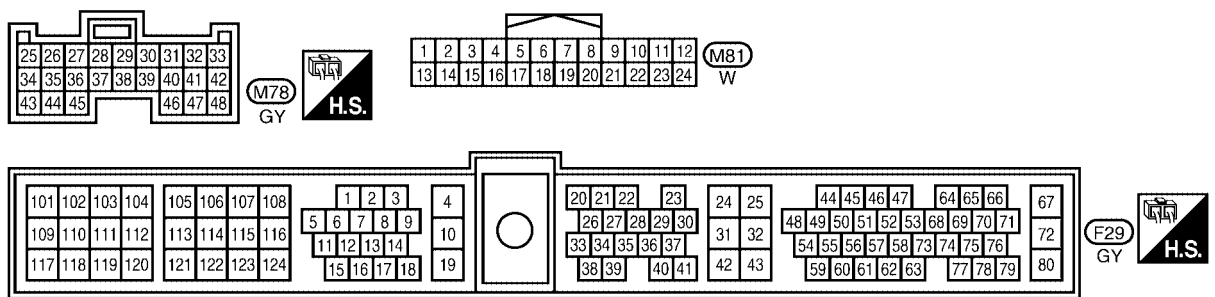
ECS007MH

### AT-ENGSS-01

: Detectable line for DTC  
 : Non-detectable line for DTC



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



WCWA0149E

**Diagnostic Procedure**

**1. CHECK DTC WITH ECM**

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

OK or NG

OK >> GO TO 2.

NG >> Check ignition signal circuit for engine control. Refer to [EC-1142](#) (VG33E only) or [EC-1719](#) (VG33ER only), "IGNITION SIGNAL".

**2. 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 "ENGINE SPEED".  
Check engine speed changes according to throttle position.

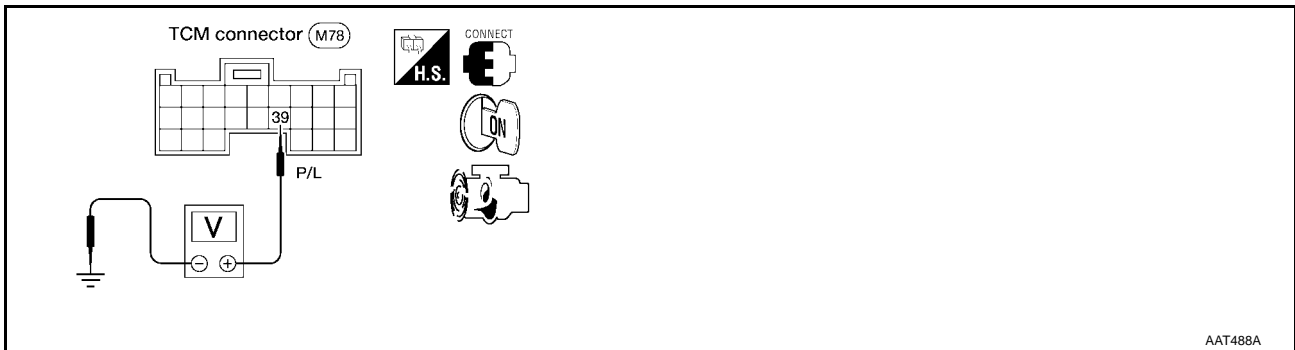
**Without CONSULT-II**

1. Start engine.

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

SAT645J

2. Check voltage between TCM harness connector M78 terminal 39 and ground.



Does battery voltage (idle speed) 0.5 - 2.5V?

Yes >> GO TO 3.

No >> Check the following items:

- Harness for short or open between TCM connector M78 and ECM connector F29
  - Resistor
  - Ignition coil
- Refer to [EC-1142](#) (VG33E only) or [EC-1719](#) (VG33ER only), "IGNITION SIGNAL".

## 3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-266, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

OK >> **INSPECTION END.**

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

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

A

B

AT

D

E

F

G

H

I

J

K

L

M

# DTC P0731 IMPROPER SHIFTING TO 1ST GEAR POSITION

[RE4R01A]

## DTC P0731 IMPROPER SHIFTING TO 1ST GEAR POSITION

PF3:31940

### Description

ECS007MJ

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

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

### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
11	L/W	Shift solenoid valve A	When shift solenoid valve A operates. (When driving in D1 or D4)	Battery voltage
			When shift solenoid valve A does not operate. (When driving in D2 or D3)	0V
12	L/Y	Shift solenoid valve B	When shift solenoid valve B operates. (When driving in D1 or D2)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in D3 or D4)	0V

### ON BOARD DIAGNOSIS LOGIC

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

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

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM



C: Gear ratio determined as gear position which TCM supposes

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

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

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

\*: P0731 is detected.

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
 : A/T 1ST GR FNCTN  : P0731	A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	<ul style="list-style-type: none"> <li>• Shift solenoid valve A</li> <li>• Shift solenoid valve B</li> <li>• Each clutch</li> <li>• Hydraulic control circuit</li> </ul>

# DTC P0731 IMPROPER SHIFTING TO 1ST GEAR POSITION

[RE4R01A]

## DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

### CAUTION:

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

### NOTE:

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

### TESTING CONDITIONS:

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.

④ With CONSULT-II

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

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

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

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

3. Select "1ST GR FNCTN P0731" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".

4. Accelerate vehicle to 17 to 23 km/h (11 to 14 MPH) under the following condition and release the accelerator pedal completely.

**THROTTLE POSI: Less than 1/8 (at all times during step 4)**  
**Selector lever: D position (O/D ON)**

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

5. Depress accelerator pedal to WOT (more than 7/8 of "THROTTLE POSI") quickly from a speed of 17 to 23 km/h (11 to 14 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds)

If the check result NG appears on CONSULT-II screen, go to [AT-274, "Diagnostic Procedure"](#).

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

– Check that "GEAR" shows 1 when depressing accelerator pedal to WOT.

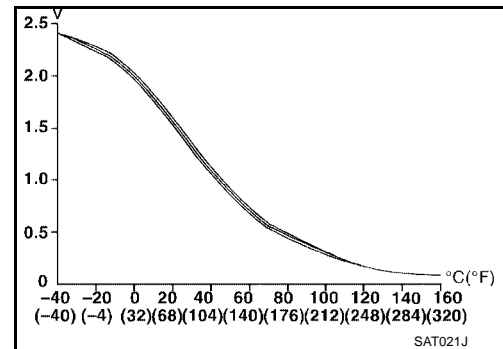
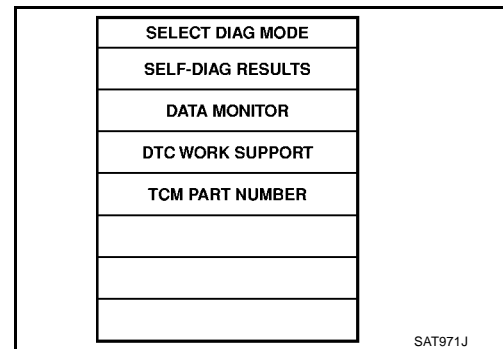
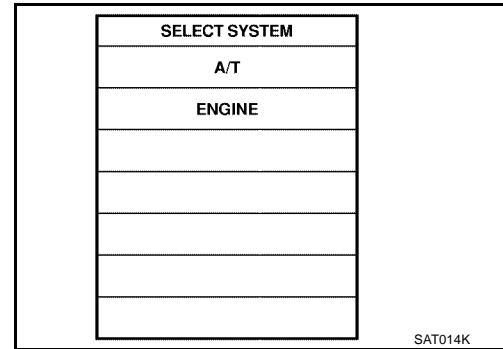
– If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS" for "ENGINE". In case a 1st trip DTC other than P0731 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".

6. Stop vehicle.

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

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

8. Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)  
 Refer to [AT-274, "Diagnostic Procedure"](#).  
 Refer to [AT-496, "Shift Schedule"](#).



## DTC P0731 IMPROPER SHIFTING TO 1ST GEAR POSITION

[RE4R01A]

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With GST

- Follow the procedure "With CONSULT-II".






# DTC P0731 IMPROPER SHIFTING TO 1ST GEAR POSITION

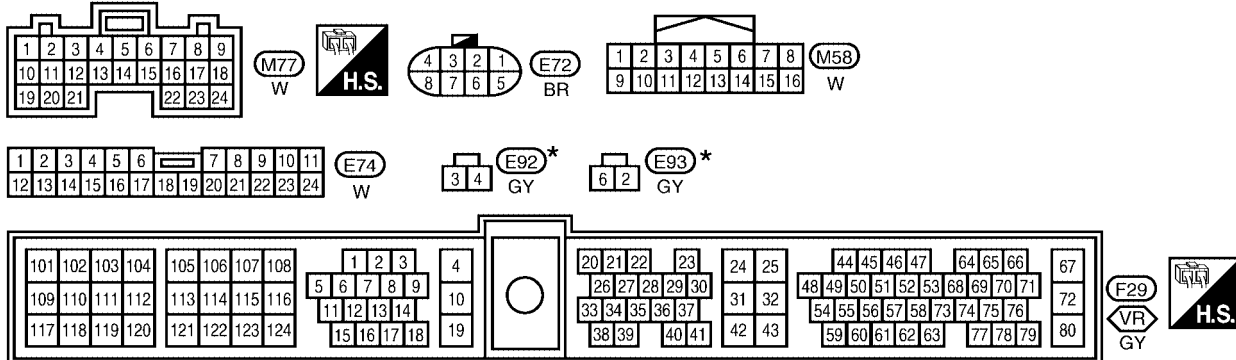
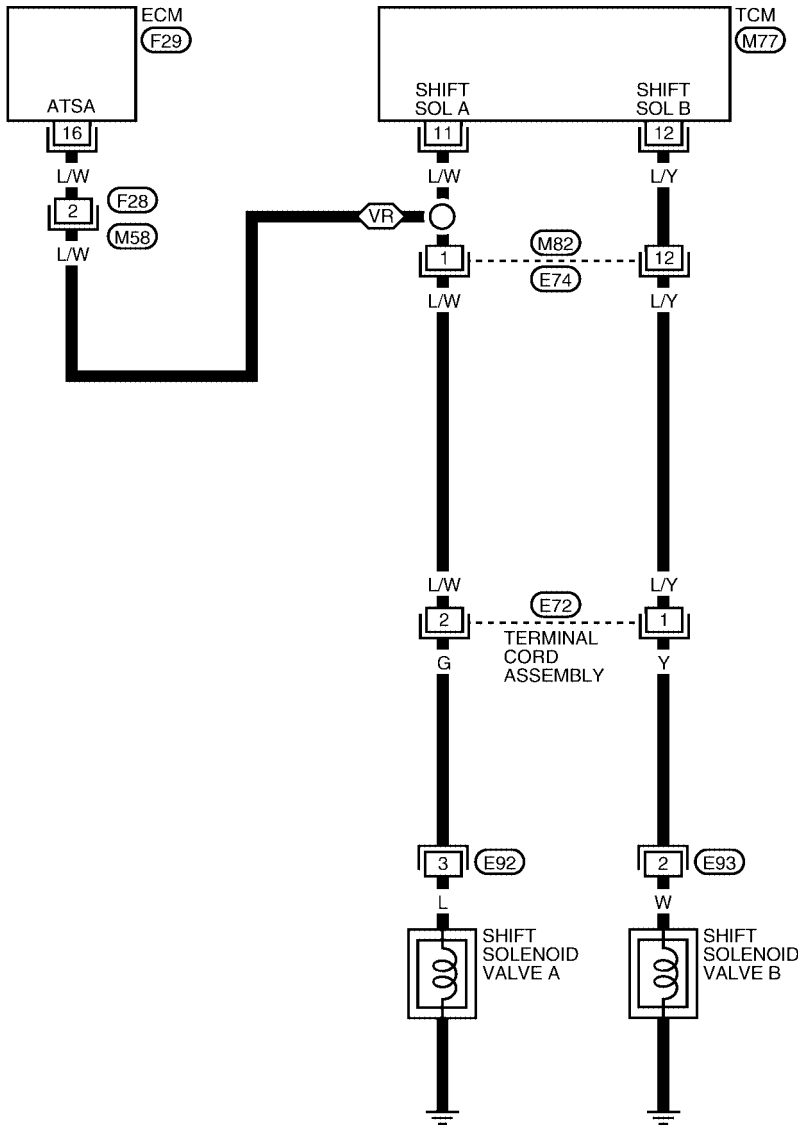
[RE4R01A]

## Wiring Diagram — AT — 1ST

ECS007MK

### AT-1STSIG-01

-  : Detectable line for DTC
-  : Non-detectable line for DTC
-  : With VG33ER



\*: This connector is not shown in "HARNESS LAYOUT" of PG section.

WCWA0150E

## Diagnostic Procedure

### 1. CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to [AT-431, "CONTROL VALVE ASSEMBLY"](#) .
2. Check shift solenoid valve operation.
  - Shift solenoid valve A
  - Shift solenoid valve B

Refer to [AT-275, "Component Inspection"](#) .

#### OK or NG

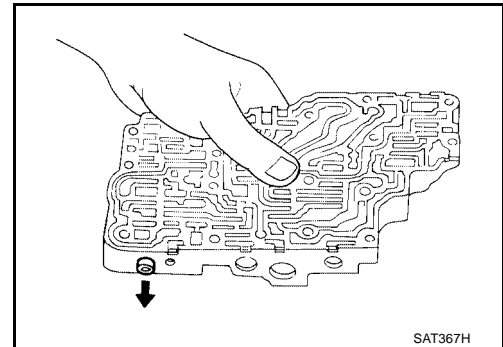
- OK >> GO TO 2.  
NG >> Repair or replace shift solenoid valve assembly.

### 2. CHECK CONTROL VALVE

1. Disassemble control valve assembly.  
Refer to [AT-431, "CONTROL VALVE ASSEMBLY"](#) .
2. Check to ensure that:
  - Valve, sleeve and plug slide along valve bore under their own weight.
  - Valve, sleeve and plug are free from burrs, dents and scratches.
  - Control valve springs are free from damage, deformation and fatigue.
  - Hydraulic line is free from obstacles.

#### OK or NG

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



### 3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-271, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

#### OK or NG

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

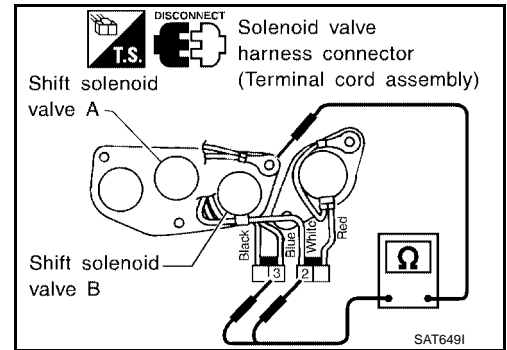
# DTC P0731 IMPROPER SHIFTING TO 1ST GEAR POSITION

[RE4R01A]

ECS007MM

## Component Inspection SHIFT SOLENOID VALVE A AND B

- For removal, refer to [AT-431, "CONTROL VALVE ASSEMBLY"](#).



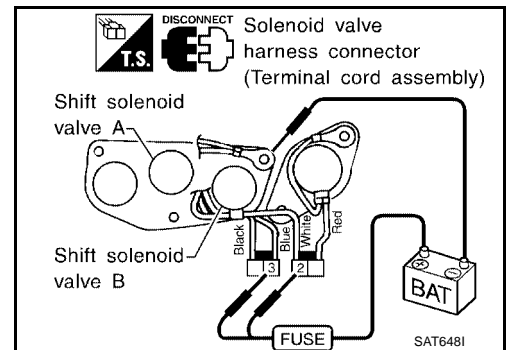
## Resistance Check

- Check resistance between terminals (2 or 3) and ground.

Solenoid valve	Terminal No.	Resistance (Approx.)
Shift solenoid valve A	3	Ground 20 - 40Ω
Shift solenoid valve B	2	

## Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminals (2 or 3) and ground.



# DTC P0732 IMPROPER SHIFTING TO 2ND GEAR POSITION

[RE4R01A]

## DTC P0732 IMPROPER SHIFTING TO 2ND GEAR POSITION

PFP:31940

### Description


ECS007MN

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

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

### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
12	L/Y	Shift solenoid valve B		Battery voltage
			When shift solenoid valve B operates. (When driving in "D1" or "D2")	When shift solenoid valve B does not operate. (When driving in "D3" or "D4")
				0V

### ON BOARD DIAGNOSIS LOGIC

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

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

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

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

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

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

\*: P0732 is detected.

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
ⓘ : A/T 2ND SIGNAL ⓘ : P0732	A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	<ul style="list-style-type: none"> <li>● Shift solenoid valve B</li> <li>● Each clutch</li> <li>● Hydraulic control circuit</li> </ul>

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

**CAUTION:**

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

**NOTE:**

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

**TESTING CONDITIONS:**

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

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

With CONSULT-II

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

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

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

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

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

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

**THROTTLE POSI: Less than 1/8 (at all times during step 4)**

**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 7/8 of “THROTTLE POSI”) quickly from a speed of 50 to 55 km/h (31 to 34 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to [AT-279, "Diagnostic Procedure"](#).

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

- Check that “GEAR” shows 2 when depressing accelerator pedal to WOT.
- If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “ENGINE”. In case a 1st trip DTC other than P0732 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.

6. Stop vehicle.

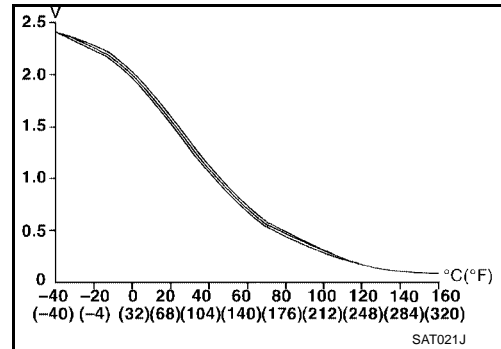
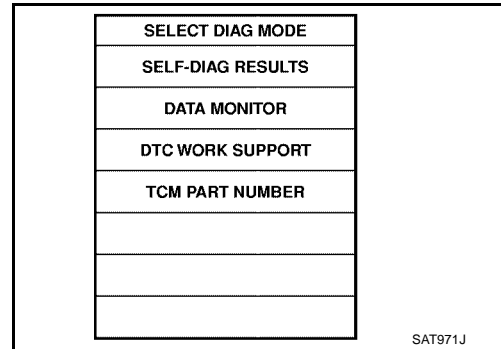
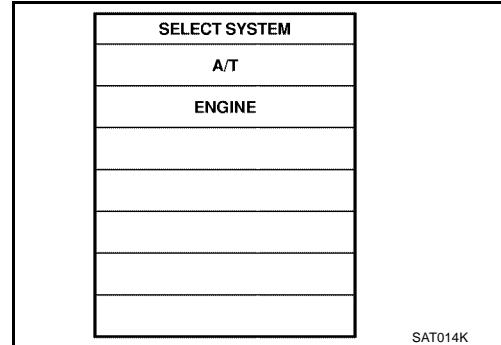
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

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

8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.) Refer to [AT-279, "Diagnostic Procedure"](#). Refer to [AT-496, "Shift Schedule"](#).

With GST

- Follow the procedure “With CONSULT-II”.



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

# DTC P0732 IMPROPER SHIFTING TO 2ND GEAR POSITION

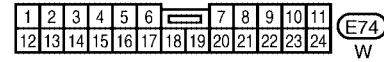
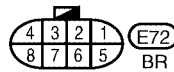
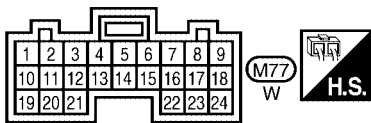
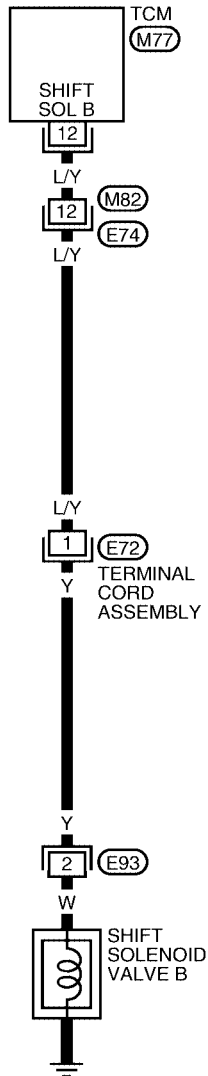
[RE4R01A]

## Wiring Diagram — AT — 2ND

ECS007MO

### AT-2NDSIG-01

: Detectable line for DTC  
 : Non-detectable line for DTC



\* : This connector is not shown in "HARNESS LAYOUT" of PG section.

WCWA0096E

## Diagnostic Procedure

ECS007MP

### 1. CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#) .
2. Check shift solenoid valve operation.
  - Shift solenoid valve B

Refer to [AT-320, "SHIFT SOLENOID VALVE B"](#) .

OK or NG

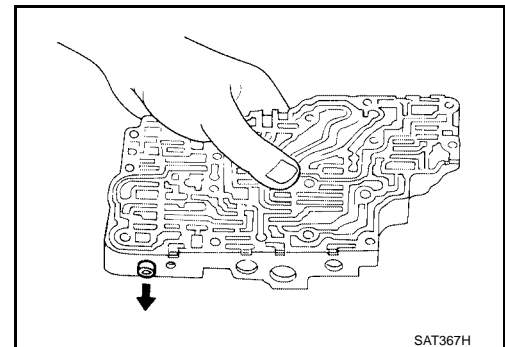
- OK >> GO TO 2.  
 NG >> Repair or replace shift solenoid valve assembly.

### 2. CHECK CONTROL VALVE

1. Disassemble control valve assembly.  
 Refer to [AT-431, "CONTROL VALVE ASSEMBLY"](#) .
2. Check to ensure that:
  - Valve, sleeve and plug slide along valve bore under their own weight.
  - Valve, sleeve and plug are free from burrs, dents and scratches.
  - Control valve springs are free from damage, deformation and fatigue.
  - Hydraulic line is free from obstacles.

OK or NG

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



### 3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-277, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

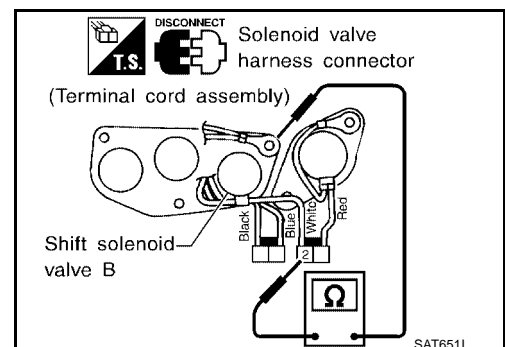
- OK >> **INSPECTION END.**  
 NG >> Check control valve again. Repair or replace control valve assembly.

## Component Inspection

### SHIFT SOLENOID VALVE B

ECS007MQ

- For removal, refer to [AT-402, "REMOVAL"](#) [AT-402, "REMOVAL"](#) .



### Resistance Check

- Check resistance between terminal 2 and ground.

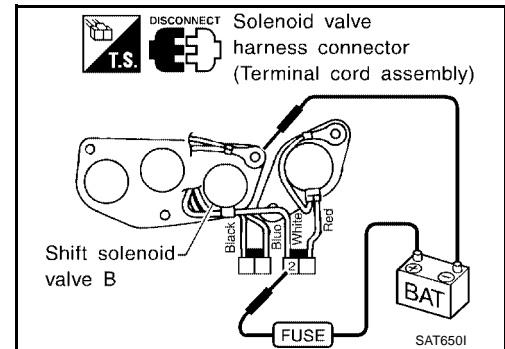
# DTC P0732 IMPROPER SHIFTING TO 2ND GEAR POSITION

[RE4R01A]

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve B	2	Ground	20 - 40Ω

## Operation Check

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





# DTC P0733 IMPROPER SHIFTING TO 3RD GEAR POSITION

[RE4R01A]

## DTC P0733 IMPROPER SHIFTING TO 3RD GEAR POSITION

PF3:31940

### Description


ECS007MR

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

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

### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
11	L/W	Shift solenoid valve A	 When shift solenoid valve A operates. (When driving in D1 or D4 )	Battery voltage
			When shift solenoid valve A does not operate. (When driving in D2 or D3 )	0V

### ON BOARD DIAGNOSIS LOGIC

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

Torque converter slip ratio = A x C/B

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM



C: Gear ratio determined as gear position which TCM supposes

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

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

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

\*: P0733 is detected.

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

## DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

**CAUTION:**

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

**NOTE:**

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

**TESTING CONDITIONS:**

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.

④ With CONSULT-II

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

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

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

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

3. Select “3RD GR FNCTN P0733” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.

4. Accelerate vehicle to 70 to 85 km/h (43 to 53 MPH) under the following condition and release the accelerator pedal completely.

**THROTTLE POSI: Less than 1/8 (at all times during step 4)**

**Selector lever: D position (O/D ON)**

– Check that “GEAR” shows 4 after releasing pedal.

5. Depress accelerator pedal steadily with 3.5/8 - 4.5/8 of “THROTTLE POSI” from a speed of 70 to 85 km/h (43 to 53 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to [AT-284, "Diagnostic Procedure"](#).

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

– Check that “GEAR” shows 3 when depressing accelerator pedal with 3.5/8 - 4.5/8 of “THROTTLE POSI”.

– If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “ENGINE”. In case a 1st trip DTC other than P0733 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.

6. Stop vehicle.

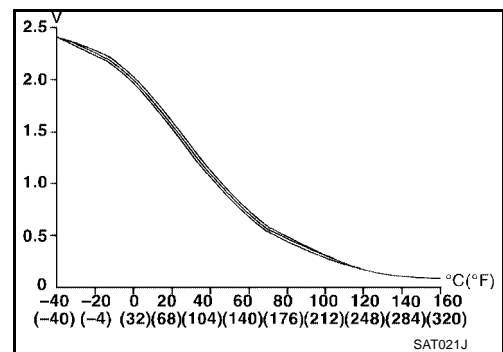
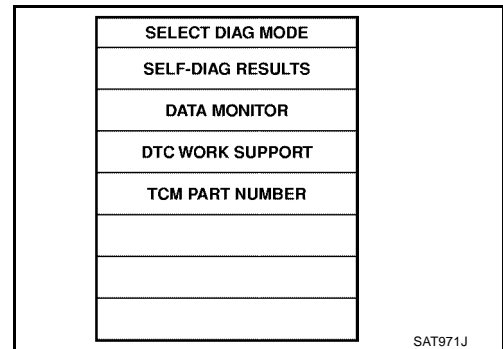
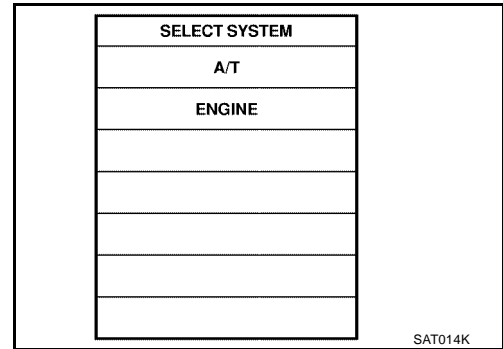
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

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

8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to [AT-284, "Diagnostic Procedure"](#). Refer to [AT-496, "Shift Schedule"](#).)

④ With GST

- Follow the procedure “With CONSULT-II”.






# DTC P0733 IMPROPER SHIFTING TO 3RD GEAR POSITION

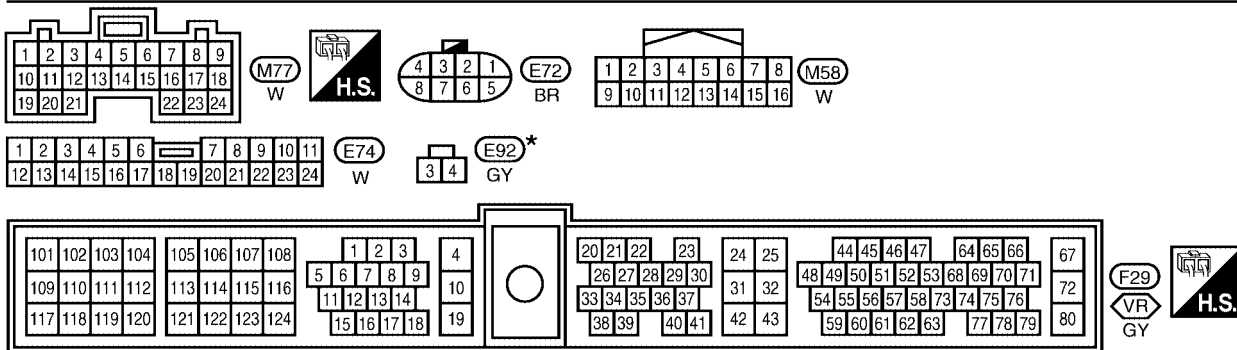
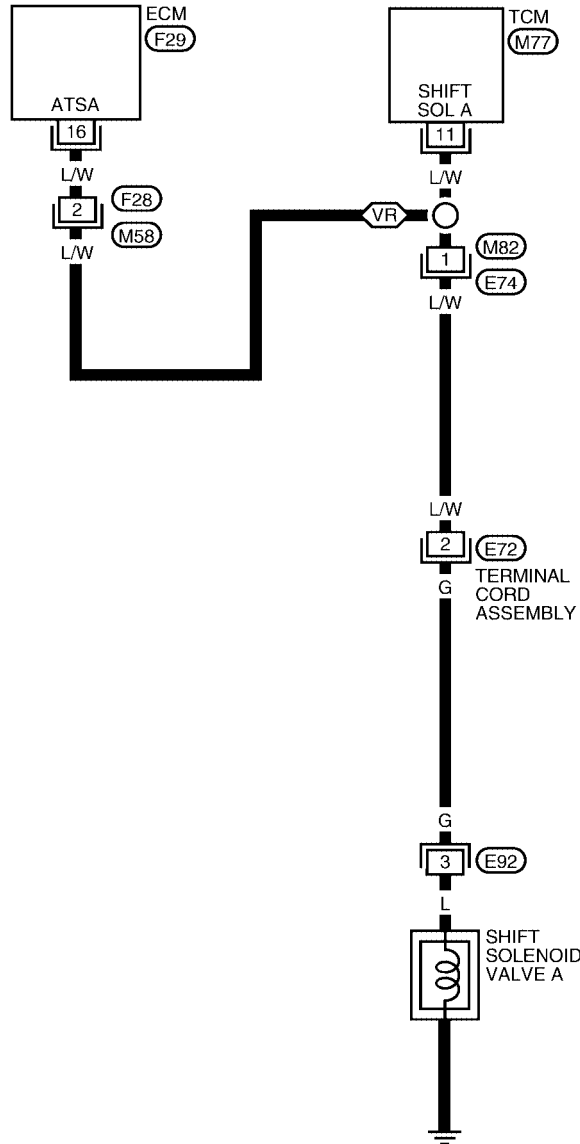
[RE4R01A]

## Wiring Diagram — AT — 3RD

ECS007MS

### AT-3RDSIG-01

-  : Detectable line for DTC
-  : Non-detectable line for DTC
-  : With VG33ER



\* : This connector is not shown in "HARNESS LAYOUT" of PG section.

WCWA0151E

## Diagnostic Procedure

### 1. CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#) .
2. Check shift solenoid valve operation.
  - Shift solenoid valve A

Refer to [AT-315, "SHIFT SOLENOID VALVE A"](#) .

OK or NG

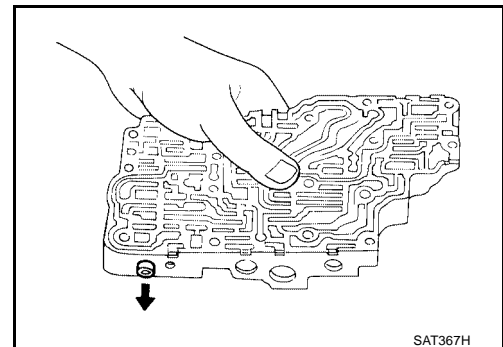
- OK >> GO TO 2.
- NG >> Repair or replace shift solenoid valve assembly.

### 2. CHECK CONTROL VALVE

1. Disassemble control valve assembly.  
Refer to [AT-431, "CONTROL VALVE ASSEMBLY"](#) .
2. Check to ensure that:
  - Valve, sleeve and plug slide along valve bore under their own weight.
  - Valve, sleeve and plug are free from burrs, dents and scratches.
  - Control valve springs are free from damage, deformation and fatigue.
  - Hydraulic line is free from obstacles.

OK or NG

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



### 3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-282, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

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

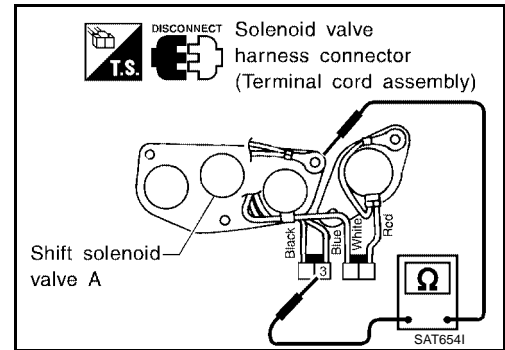
# DTC P0733 IMPROPER SHIFTING TO 3RD GEAR POSITION

[RE4R01A]

ECS007MU

## Component Inspection SHIFT SOLENOID VALVE A

- For removal, refer to [AT-402, "REMOVAL"](#) .



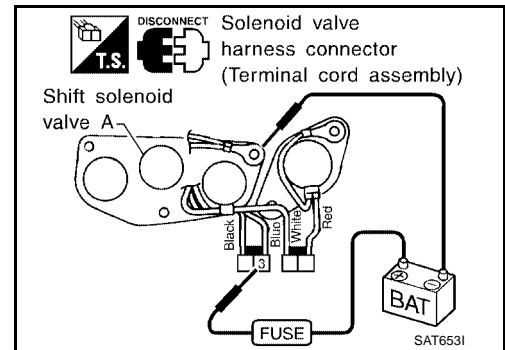
## Resistance Check

- Check resistance between terminal 3 and ground.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	3	Ground	20 - 40Ω

## Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal 3 and ground.



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

# DTC P0734 IMPROPER SHIFTING TO 4TH GEAR POSITION

[RE4R01A]

## DTC P0734 IMPROPER SHIFTING TO 4TH GEAR POSITION

PF3:31940

### Description

ECS007MV

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

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





Remarks: Specification data are reference values.

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

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

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)	
1	GY/R	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 2.5V
				When depressing accelerator pedal fully after warming up engine.	0V
2	BR/Y	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	L/W	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in D1 or D4.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in D2 or D3.)	0V
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in D1 or D2.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in D3 or D4.)	0V

### ON BOARD DIAGNOSIS LOGIC

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

Torque converter slip ratio = A x C/B

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes



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

# DTC P0734 IMPROPER SHIFTING TO 4TH GEAR POSITION

[RE4R01A]

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

\*: P0734 is detected.

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
 : A/T 4TH GR FNCTN  : P0734	A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	<ul style="list-style-type: none"> <li>● Shift solenoid valve A</li> <li>● Shift solenoid valve B</li> <li>● Line pressure solenoid valve</li> <li>● Each clutch</li> <li>● Hydraulic control circuit</li> </ul>

## DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

### CAUTION:

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

### NOTE:

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

### TESTING CONDITIONS:

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

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

 With CONSULT-II

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

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

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

3. Select “4TH GR FNCTN P0734” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.
4. Accelerate vehicle to 50 to 60 km/h (31 to 37 MPH) under the following condition and release the accelerator pedal completely.

**THROTTLE POSI: Less than 5.5/8 (at all times during step 4)**  
**Selector lever: D position (O/D ON)**

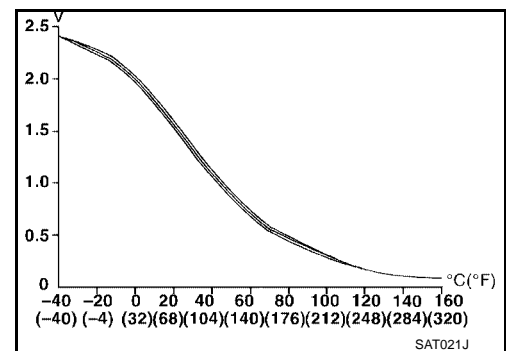
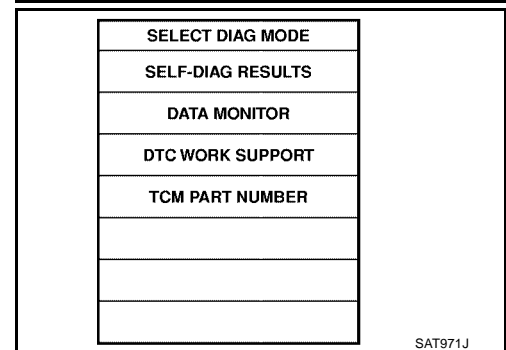
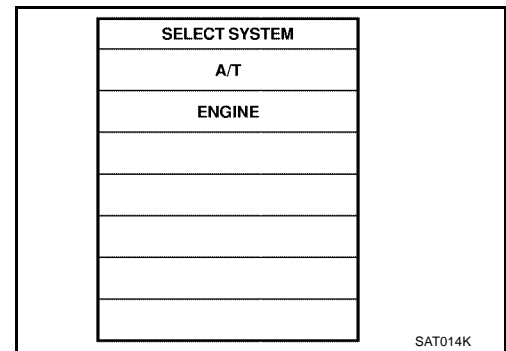
- Check that “GEAR” shows 3 after releasing pedal.
5. Depress accelerator pedal steadily with 1/8 - 2/8 of “THROTTLE POSI” from a speed of 50 to 60 km/h (31 to 37 MPH) until “TESTING” has turned to “STOP VEHICLE” or “COMPLETED”.

(It will take approximately 3 seconds.)

If the check result NG appears on CONSULT-II screen, go to [AT-290, "Diagnostic Procedure"](#).

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

- Check that “GEAR” shows 4 when depressing accelerator pedal with 1/8 - 2/8 of “THROTTLE POSI”.



## DTC P0734 IMPROPER SHIFTING TO 4TH GEAR POSITION

[RE4R01A]

- If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “ENGINE”. In case a 1st trip DTC other than P0734 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.
6. Stop vehicle.
  7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

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

8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to [AT-290, "Diagnostic Procedure"](#) . Refer to [AT-496, "Shift Schedule"](#) .



With GST

- Follow the procedure “With CONSULT-II”.






# DTC P0734 IMPROPER SHIFTING TO 4TH GEAR POSITION

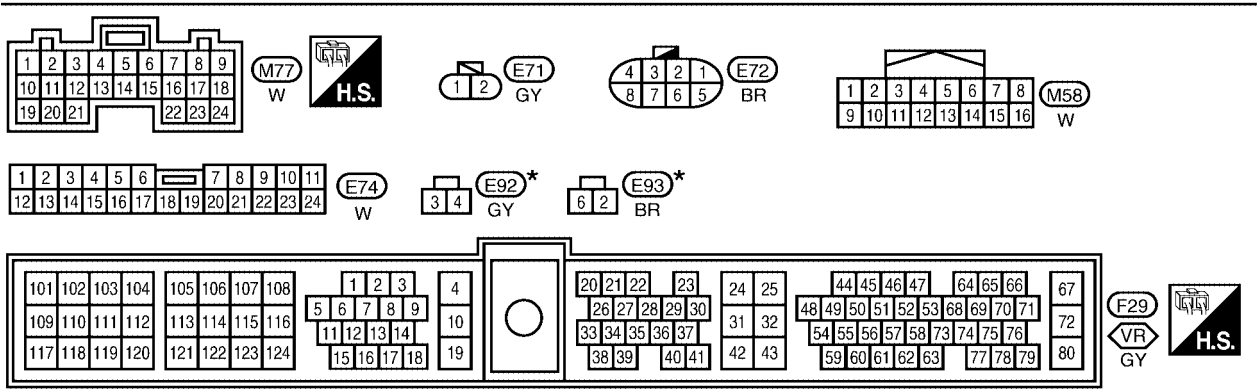
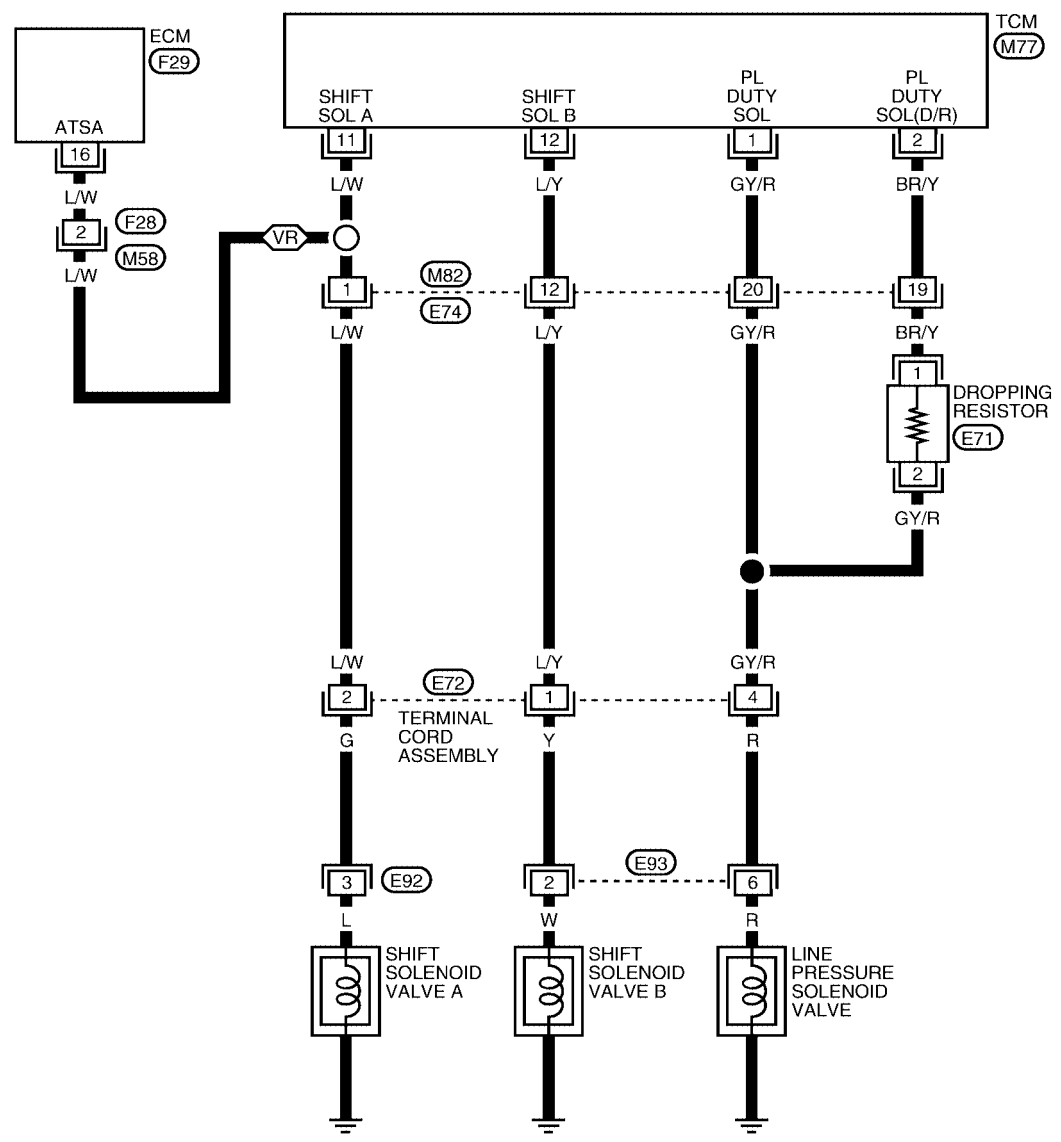
[RE4R01A]

## Wiring Diagram — AT — 4TH

ECS007MW

AT-4THSIG-01

 : Detectable line for DTC  
 : Non-detectable line for DTC  
 : With VG33ER



★: This connector is not shown in "HARNESS LAYOUT" of PG section.

WCWA0152E

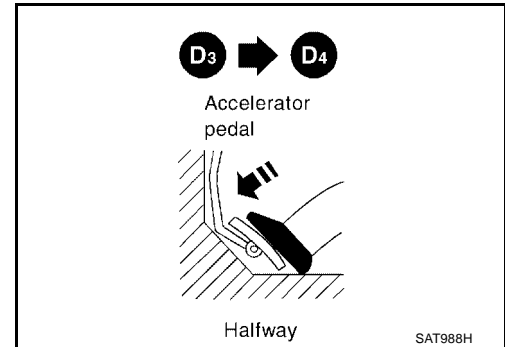
## Diagnostic Procedure

### 1. CHECK SHIFT UP (D<sub>3</sub> TO D<sub>4</sub>)

During [AT-223, "Cruise Test — Part 1"](#), does A/T shift from D<sub>3</sub> to D<sub>4</sub> at the specified speed?

Yes or No

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



### 2. CHECK LINE PRESSURE

Perform line pressure test. Refer to [AT-214, "Line Pressure Test"](#).

OK or NG

- OK >> GO TO 3.  
NG >> GO TO 7.

### 3. CHECK SOLENOID VALVES

- Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#).
- Refer to [AT-315, "SHIFT SOLENOID VALVE A"](#) and [AT-320, "SHIFT SOLENOID VALVE B"](#).

OK or NG

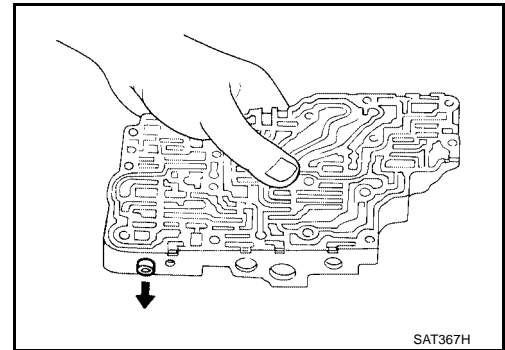
- OK >> GO TO 4.  
NG >> Replace solenoid valve assembly.

### 4. CHECK CONTROL VALVE

- Disassemble control valve assembly. Refer to [AT-431, "CONTROL VALVE ASSEMBLY"](#).
- Check to ensure that:
  - Valve, sleeve and plug slide along valve bore under their own weight.
  - Valve, sleeve and plug are free from burrs, dents and scratches.
  - Control valve springs are free from damage, deformation and fatigue.
  - Hydraulic line is free from obstacles.

OK or NG

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



### 5. CHECK SHIFT UP (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?

Yes or No

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

**6. CHECK LINE PRESSURE SOLENOID VALVE**

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#) .
2. Refer to [AT-310, "LINE PRESSURE SOLENOID VALVE"](#) .

OK or NG

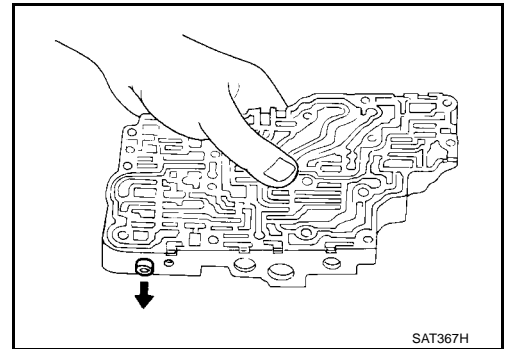
- OK >> GO TO 7.
- NG >> Replace solenoid valve assembly.

**7. CHECK CONTROL VALVE**

1. Disassemble control valve assembly. Refer to [AT-431, "CONTROL VALVE ASSEMBLY"](#) .
2. Check line pressure circuit valves for sticking.
  - Pressure regulator valve
  - Pilot valve
  - Pressure modifier valve

OK or NG

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



**8. CHECK SHIFT UP (D3 TO D4 )**

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

OK or NG

- OK >> GO TO 9.
- NG >> Check control valve again. Repair or replace control valve assembly.

**9. CHECK DTC**

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-287, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

- OK >> **INSPECTION END.**
- NG >> Perform "Cruise Test — Part 1" again and return to the start point of this flow chart.

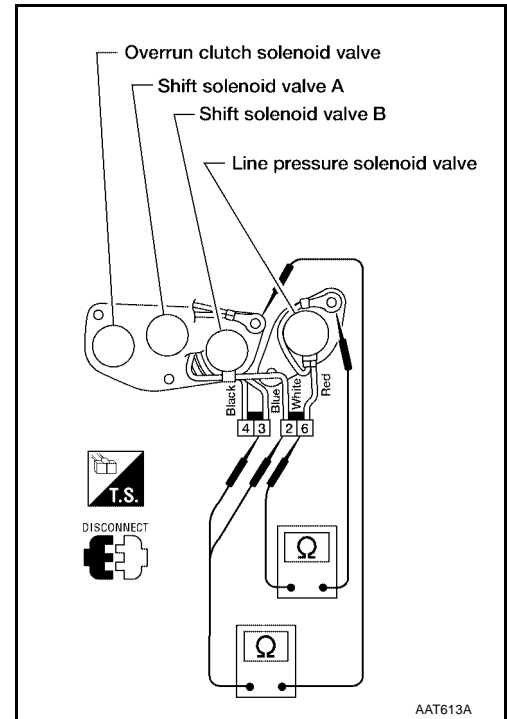
# DTC P0734 IMPROPER SHIFTING TO 4TH GEAR POSITION

[RE4R01A]

ECS007MY

## Component Inspection SOLENOID VALVES

- For removal, refer to [AT-402, "REMOVAL"](#).



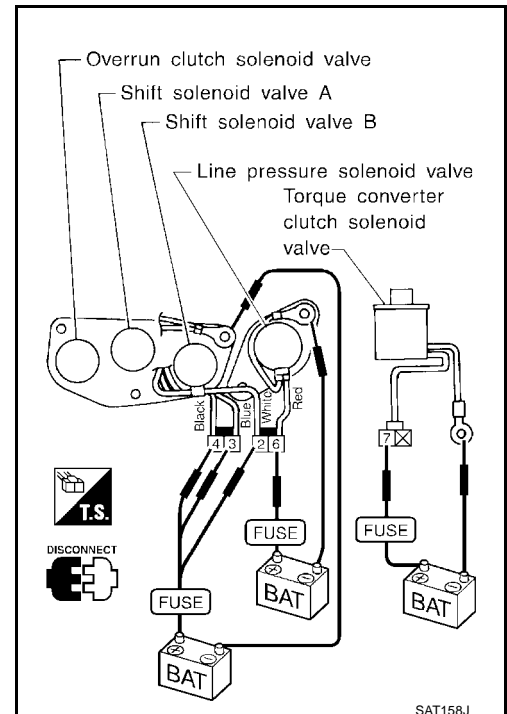
## Resistance Check

- Check resistance between terminals (3, 2, or 6) and ground.

Solenoid valve	Terminal No.	Ground	Resistance (Approx.)
Shift solenoid valve A	3	Ground	20 - 40Ω
Shift solenoid valve B	2		
Line pressure solenoid valve	6		2.5 - 5Ω

## Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminals (3, 2, 4, 6 or 7) and ground.



# DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

[RE4R01A]

## DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

PFP:31940

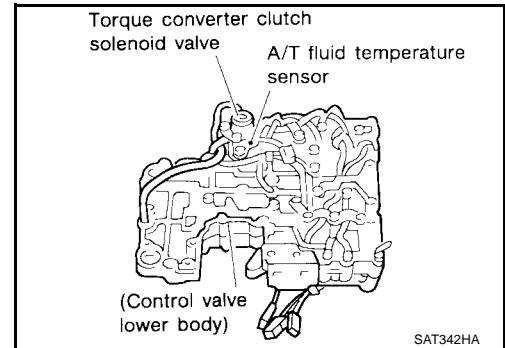
### Description

ECS007MZ

The torque converter clutch solenoid valve is activated, with the gear in D4, by the TCM in response to signals sent from the vehicle speed and throttle position sensors. Lock-up piston operation will then be controlled.

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

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




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

Remarks: Specification data are reference values.



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

### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
3	G/OR	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

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

# DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

[RE4R01A]

## DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

### NOTE:

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

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

 With CONSULT-II

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

 With GST

- Follow the procedure “With CONSULT-II”.

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

# DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

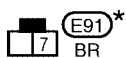
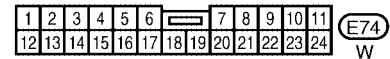
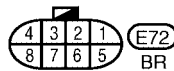
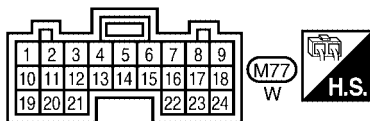
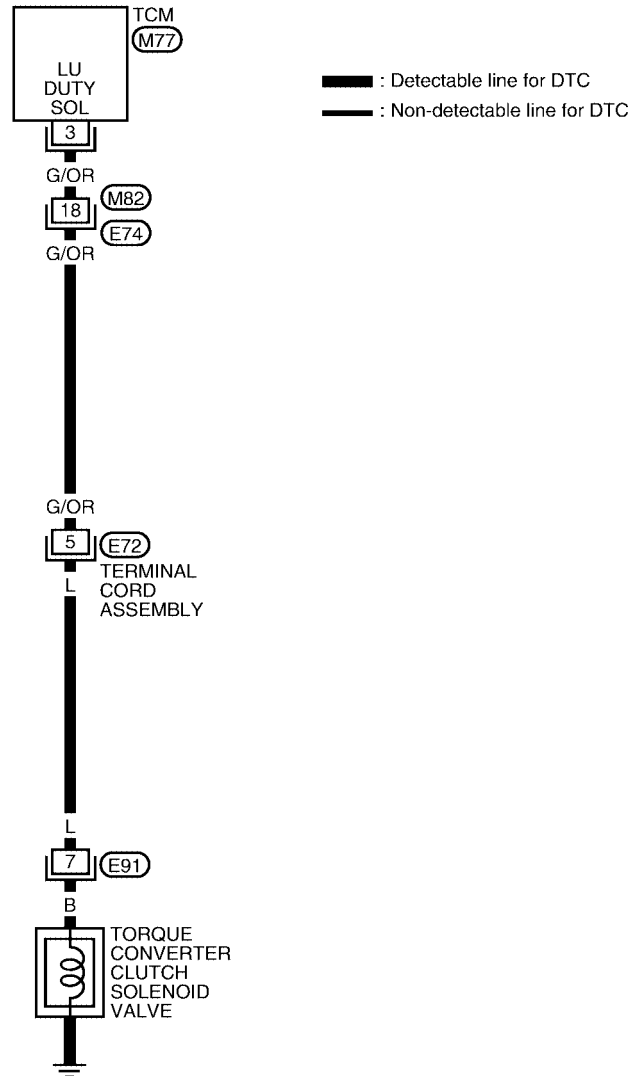
[RE4R01A]

## Wiring Diagram — AT — TCV

ECS007N0

AT-TCV-01

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



★: This connector is not shown in "HARNES LAYOUT" of PG section.

WCWA0099E

## Diagnostic Procedure

---

### 1. CHECK GROUND CIRCUIT

---

1. Turn ignition switch to OFF position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal cord assembly connector E72 terminal 5 and ground. Refer to wiring diagram.

Is resistance approx. 10 - 20  $\Omega$ ?

Yes >> GO TO 2.

No >> 1. Remove oil pan. Refer to [AT-402, "REMOVAL"](#) .

2. Check the following items:

- Torque converter clutch solenoid valve  
Refer to [AT-297, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#) .
- Harness of terminal cord assembly for short or open

### 2. CHECK RESISTANCE

---

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check resistance between terminal cord assembly connector E72 terminal 5 and TCM harness connector M77 terminal 3. Refer to wiring diagrams.

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

Is resistance approx. 0  $\Omega$ ?

Yes >> GO TO 3.

No >> Repair open circuit or short to ground or short to power in harness or connectors.

### 3. CHECK DTC

---

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-294, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

OK >> **INSPECTION END.**

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

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



# DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

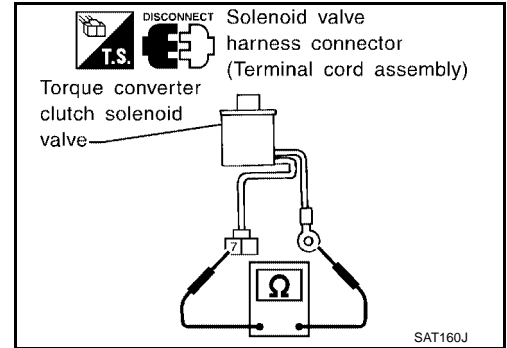
[RE4R01A]

ECS007N2

## Component Inspection

### TORQUE CONVERTER CLUTCH SOLENOID VALVE

- For removal, refer to [AT-402, "REMOVAL"](#).



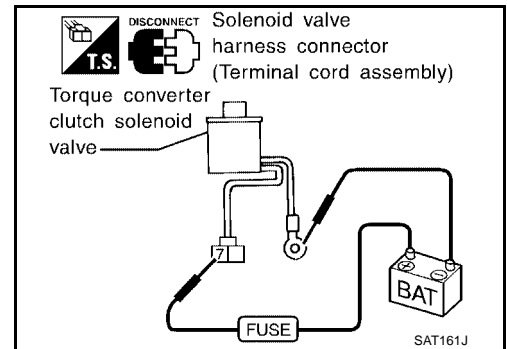
### Resistance Check

- Check resistance between torque converter clutch solenoid valve terminal 7 and ground.

Solenoid valve	Terminal No.		Resistance (Approx.)
Torque converter clutch solenoid valve	7	Ground	10 - 20 $\Omega$

### Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal 7 and ground.



# DTC P0744 IMPROPER LOCK-UP OPERATION

[RE4R01A]

PF3:31940

ECS007N3

## DTC P0744 IMPROPER LOCK-UP OPERATION

### Description

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




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

Remarks: Specification data are reference values.

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

### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
1	GY/R	Line pressure solenoid valve	 When releasing accelerator pedal after warming up engine.	1.5 - 2.5V
			When depressing accelerator pedal fully after warming up engine.	0V
2	BR/Y	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/OR	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:

Torque converter slip ratio = A x C/B

A: Output shaft revolution signal from revolution sensor



B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

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

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

\*: P0744 is detected.

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
 : A/T TCC S/V FNCTN  : P0744	A/T cannot perform lock-up even if electrical circuit is good.	<ul style="list-style-type: none"> <li>● Line pressure solenoid valve</li> <li>● Torque converter clutch solenoid valve</li> <li>● Each clutch</li> <li>● Hydraulic control circuit</li> </ul>

## DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

### CAUTION:

**Always drive vehicle at a safe speed.**

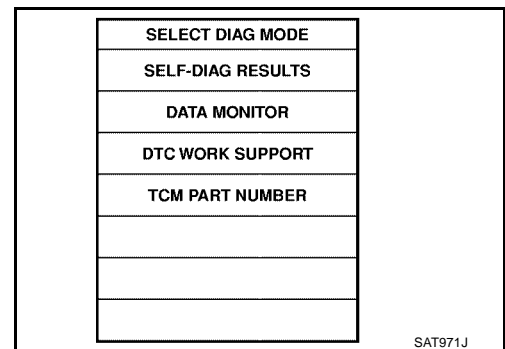
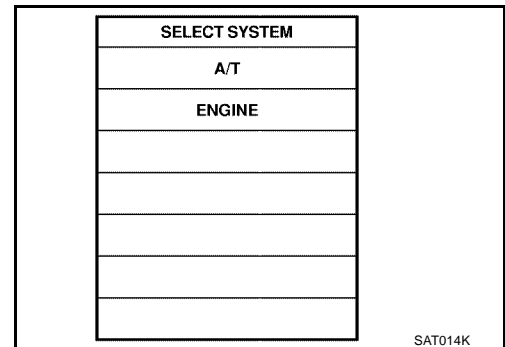
### NOTE:

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

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

 With CONSULT-II

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.  
**FLUID TEMP SEN: 0.4 - 1.5V**  
 If out of range, drive the vehicle to decrease the voltage (warm up the fluid), or stop engine to increase the voltage (cool down the fluid).
3. Select “TCC S/V FNCTN P0744” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.



# DTC P0744 IMPROPER LOCK-UP OPERATION

[RE4R01A]

- Accelerate vehicle to more than 70 km/h (43 MPH) and maintain the following condition continuously until "TESTING" has turned to "COMPLETED". (It will take approximately 30 seconds after "TESTING" shows.)

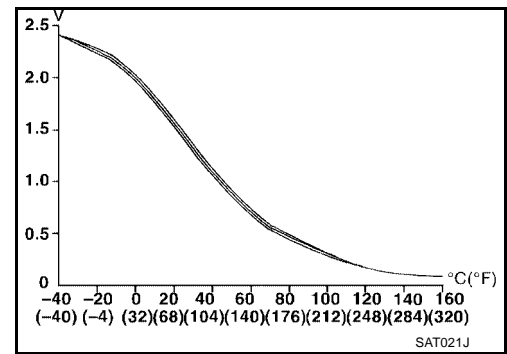
**THROTTLE POSI: 1/8 - 2/8 (at all times during step 4)**

**Selector lever: D position (O/D ON)**

**TCC S/V DUTY: More than 94%**

**VHCL/S SE-A/T: Constant speed of more than 70 km/h (43 MPH)**

- Check that "GEAR" shows 4.
  - For shift schedule, refer to [AT-496, "Shift Schedule"](#).
  - If "TESTING" does not appear on CONSULT II for a long time, select "SELF-DIAG RESULTS". In case a 1st trip DTC other than P0744 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".
- Make sure that "OK" is displayed. (If "NG" is displayed, refer to [AT-302, "Diagnostic Procedure"](#) .)  
Refer to [AT-496, "Shift Schedule"](#) .



 With GST

- Follow the procedure "With CONSULT-II".

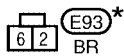
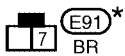
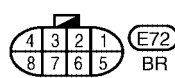
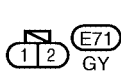
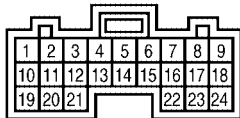
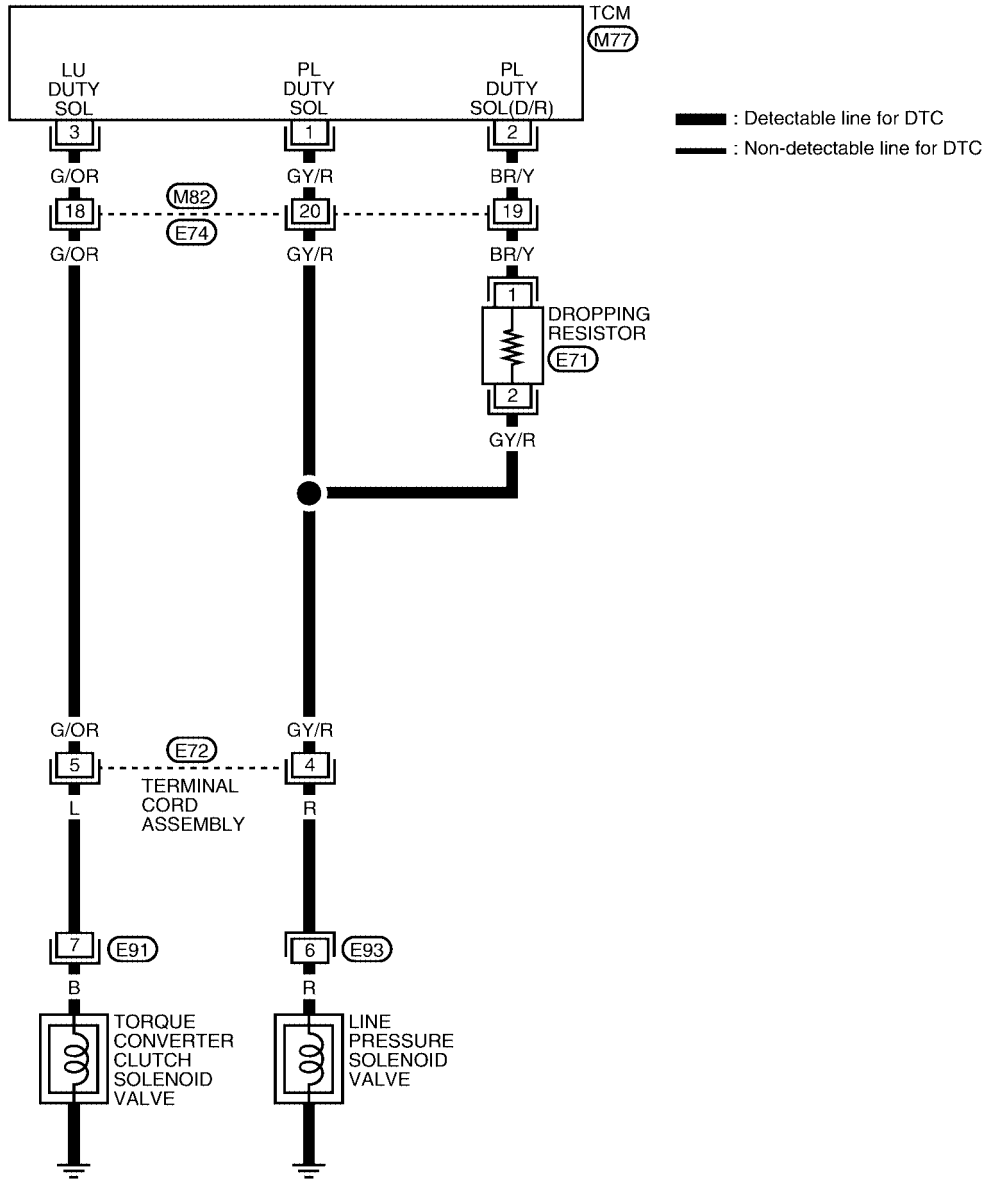
# DTC P0744 IMPROPER LOCK-UP OPERATION

[RE4R01A]

## Wiring Diagram — AT — TCCSIG

ECS007N4

### AT-TCCSIG-01



★: This connector is not shown in "HARNESS LAYOUT" of PG section.

WCWA0100E

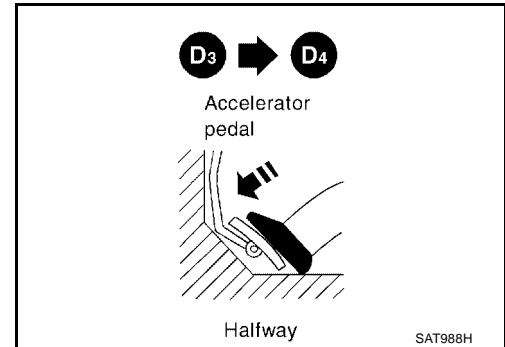
## Diagnostic Procedure

### 1. CHECK SHIFT UP (D<sub>3</sub> TO D<sub>4</sub>)

During [AT-223, "Cruise Test — Part 1"](#), does A/T shift from D<sub>3</sub> to D<sub>4</sub> at the specified speed?

Yes or No

- Yes >> Check for proper lock-up. GO TO 10.  
 No >> GO TO 2.



### 2. CHECK LINE PRESSURE

Perform line pressure test. Refer to [AT-214, "Line Pressure Test"](#).

OK or NG

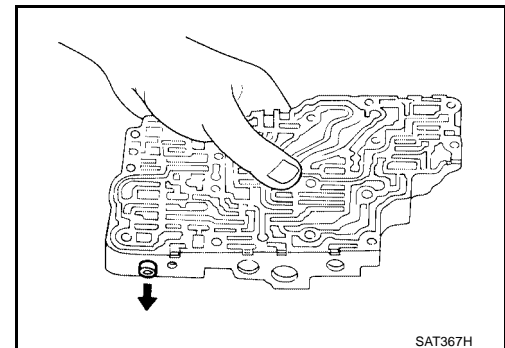
- OK >> GO TO 3.  
 NG >> GO TO 6.

### 3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-431, "CONTROL VALVE ASSEMBLY"](#).
2. Check to ensure that:
  - Valve, sleeve and plug slide along valve bore under their own weight.
  - Valve, sleeve and plug are free from burrs, dents and scratches.
  - Control valve springs are free from damage, deformation and fatigue.
  - Hydraulic line is free from obstacles.

OK or NG

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



### 4. CHECK SHIFT UP (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?

Yes or No

- Yes >> GO TO 5.  
 No >> Check control valve again. Repair or replace control valve assembly.

### 5. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-299, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).

OK or NG

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

**6. CHECK LINE PRESSURE SOLENOID VALVE**

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#) .
2. Check line pressure solenoid valve operation. Refer to [AT-304, "SOLENOID VALVES"](#) .

OK or NG

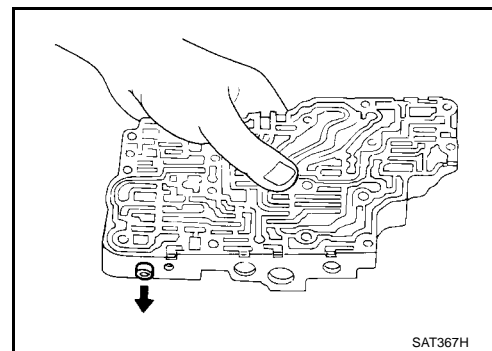
- OK >> GO TO 7.  
 NG >> Replace solenoid valve assembly.

**7. CHECK CONTROL VALVE**

1. Disassemble control valve assembly. Refer to [AT-431, "CONTROL VALVE ASSEMBLY"](#) .
2. Check line pressure circuit valves for sticking.
  - Pressure regulator valve
  - Pilot valve
  - Pressure modifier valve

OK or NG

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

**8. CHECK SHIFT UP (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?

Yes or No

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

**9. CHECK DTC**Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-299, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

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

**10. CHECK LOCK-UP CONDITION**During [AT-223, "Cruise Test — Part 1"](#) ,  
Does A/T perform lock-up at the specified speed?

Yes or No

- Yes >> Perform "Cruise Test – Part 1" again and return to the start point of this flow chart.  
 No >> GO TO 11.

**11. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE**

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#) .
2. Check torque converter clutch solenoid valve operation.  
 Refer to [AT-297, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#) .

OK or NG

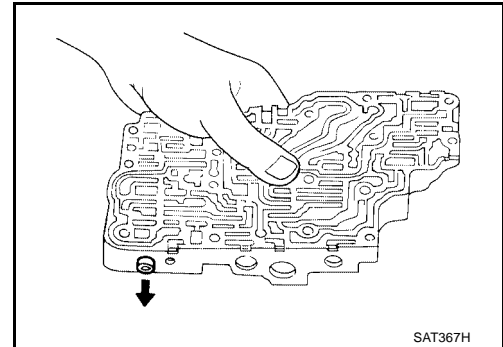
- OK >> GO TO 12.  
 NG >> Replace solenoid valve assembly.

## 12. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-431, "CONTROL VALVE ASSEMBLY"](#) .
2. Check control valves for sticking.
  - Torque converter clutch control valve
  - Torque converter clutch relief valve

OK or NG

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



## 13. CHECK LOCK-UP CONDITION

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

Yes or No

- Yes >> GO TO 14.
- No >> Check control valve again. Repair or replace control valve assembly.

## 14. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-299, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

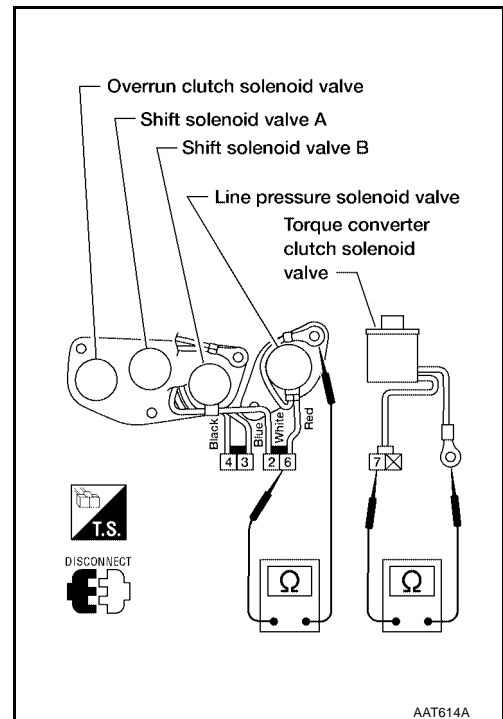
OK or NG

- OK >> **INSPECTION END.**
- NG >> Perform "Cruise Test — Part 1" again and return to the start point of this flow chart.

### Component Inspection SOLENOID VALVES

ECS007N6

- For removal, refer to [AT-402, "REMOVAL"](#) .





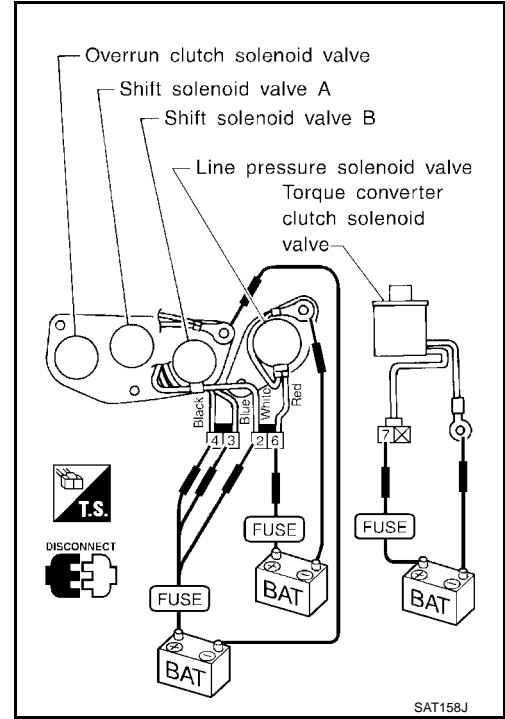
## Resistance Check

- Check resistance between terminals (6, 7) and ground.

Solenoid valve	Terminal No.	Resistance (Approx.)	
Line pressure solenoid valve	6	2.5 - 5 Ω	
Torque converter clutch solenoid valve	7		
		Ground	10 - 20 Ω

## Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminals (3, 2, 4, 6 or 7) and ground.



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

# DTC P0745 LINE PRESSURE SOLENOID VALVE

[RE4R01A]

PF3:31940

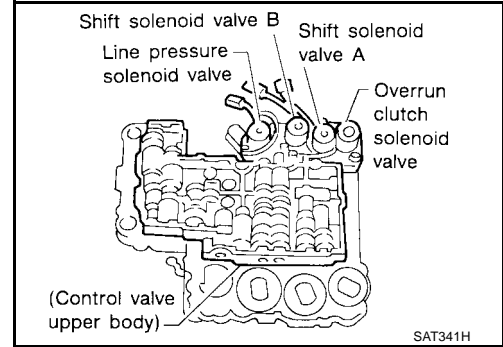
ECS007N7

## DTC P0745 LINE PRESSURE SOLENOID VALVE

### Description

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

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



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

Remarks: Specification data are reference values.

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

#### NOTE:

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

### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
1	GY/R	Line pressure solenoid valve	When releasing accelerator pedal after warming up engine.	1.5 - 2.5V
			When depressing accelerator pedal fully after warming up engine.	0V
2	BR/Y	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

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

### DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

#### NOTE:

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

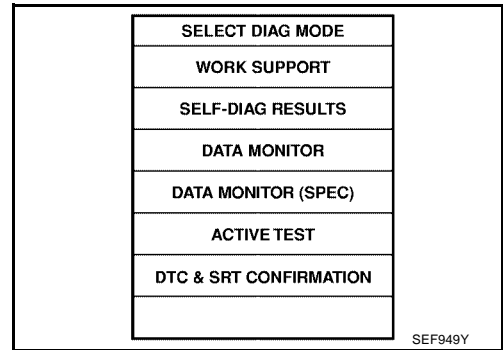
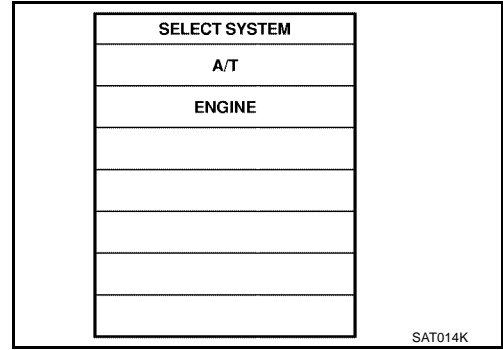
After the repair, perform the following procedure to confirm the malfunction is eliminated.

#### With CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “ENGINE” with CONSULT-II.
2. Depress accelerator pedal completely and wait at least 1 second.

#### With GST

- Follow the procedure “With CONSULT-II”.



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

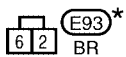
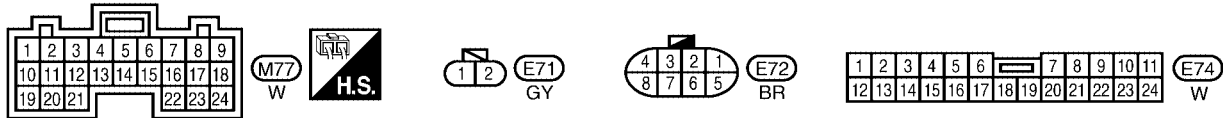
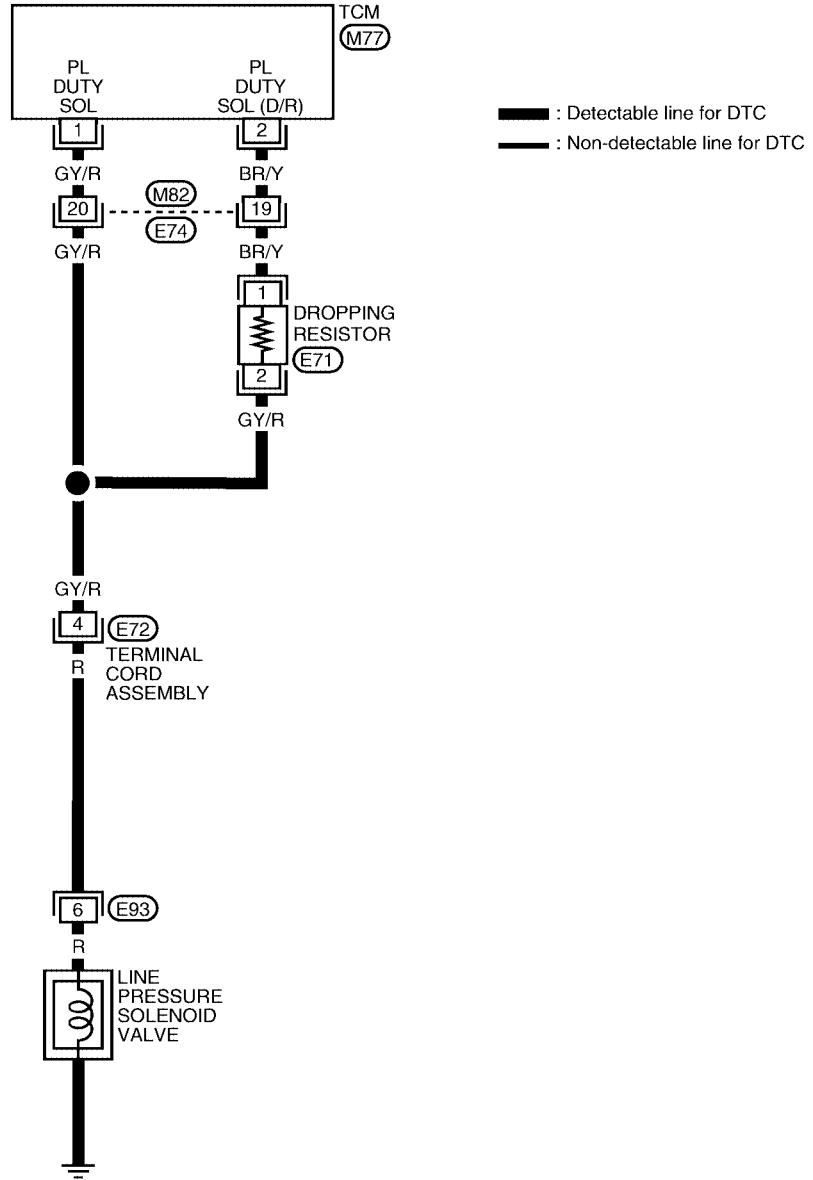
# DTC P0745 LINE PRESSURE SOLENOID VALVE

[RE4R01A]

## Wiring Diagram — AT — LPSV

ECS007N8

AT-LPSV-01



\* : This connector is not shown in "HARNES LAYOUT" of PG section.

WCWA0101E

## Diagnostic Procedure

### 1. CHECK GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal cord assembly connector E72 terminal 4 and ground. Refer to the wiring diagram.

Is resistance approx. 2.5 - 5Ω?

Yes >> GO TO 2.

No >> 1. Remove control valve assembly.  
Refer to [AT-402, "REMOVAL"](#).

2. Check the following items:

- Line pressure solenoid valve  
Refer to [AT-310, "LINE PRESSURE SOLENOID VALVE"](#).
- Harness of terminal cord assembly for short or open

### 2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check resistance between terminal cord assembly connector E72 terminal 4 and TCM harness connector M77 terminal 2. Refer to the wiring diagram.

Is resistance approx. 12Ω?

Yes >> GO TO 3.

No >> Check the following items:

- Dropping resistor  
Refer to [AT-310, "DROPPING RESISTOR"](#).
- Harness for short or open between TCM terminal 2 and terminal cord assembly connector

### 3. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Check resistance between terminal cord assembly connector E72 terminal 4 and TCM harness connector M77 terminal 1. Refer to the wiring diagram.

Is resistance approx. 0Ω?

Yes >> GO TO 4.

No >> Repair or replace harness between TCM terminal 1 and terminal cord assembly.

### 4. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-307, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).

OK or NG

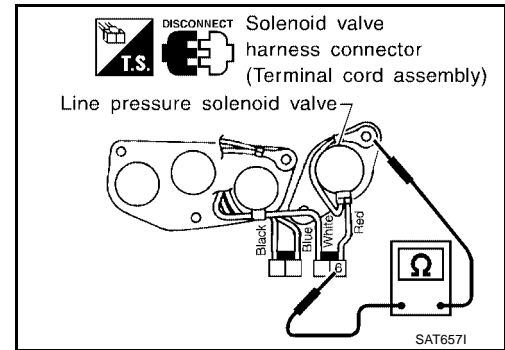
OK >> **INSPECTION END.**

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

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

## Component Inspection LINE PRESSURE SOLENOID VALVE

- For removal, refer to [AT-402, "REMOVAL"](#) .



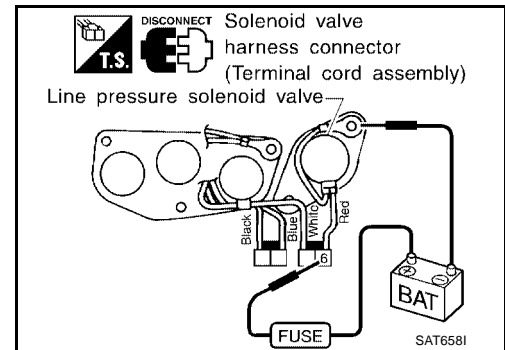
### Resistance Check

- Check resistance between terminal 6 and ground.

Solenoid valve	Terminal No.		Resistance (Approx.)
Line pressure solenoid valve	6	Ground	2.5 - 5 Ω

### Operation Check

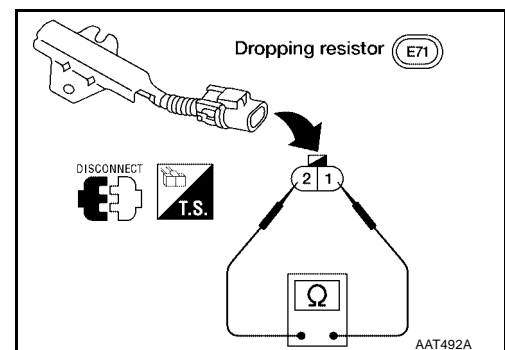
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal 6 and ground.



### DROPPING RESISTOR

- Check resistance between terminals 1 and 2.

**Resistance : Approx. 12Ω**



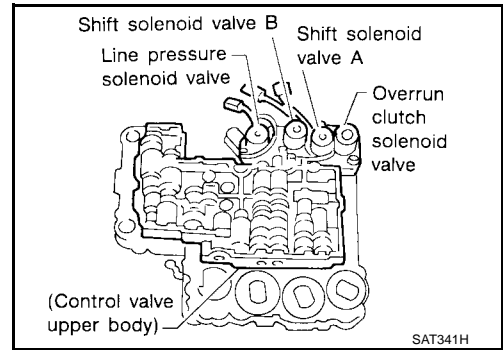
**DTC P0750 SHIFT SOLENOID VALVE A**

PF3:31940

ECS007NB

**Description**

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



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**

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
11	L/W	Shift solenoid valve A	When shift solenoid valve A operates. (When driving in D1 or D4)	Battery voltage
			When shift solenoid valve A does not operate. (When driving in D2 or D3)	0V

**ON BOARD DIAGNOSIS LOGIC**

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
ⓘ : SFT SOL A/CIRC ⓘ : P0750	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> <li>● Harness or connectors (The solenoid circuit is open or shorted)</li> <li>● Shift solenoid valve A</li> </ul>

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

**CAUTION:**

Always drive vehicle at a safe speed.

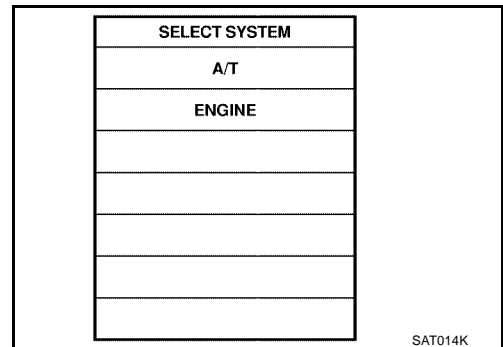
**NOTE:**

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

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

ⓘ With CONSULT-II

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



SAT014K

# DTC P0750 SHIFT SOLENOID VALVE A

[RE4R01A]

2. Start engine.
3. Drive vehicle in D position and allow the transmission to shift 1 → 2 (“GEAR”).



With GST

- Follow the procedure “With CONSULT-II”.

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

SEF949Y



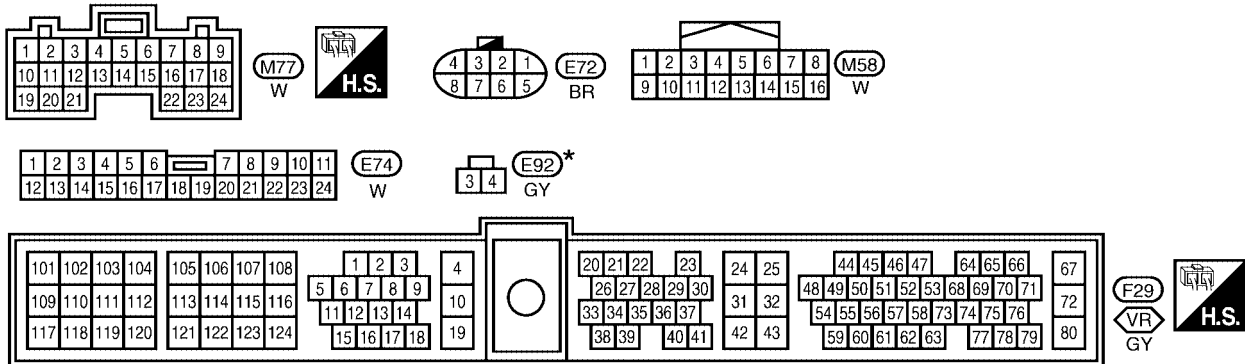
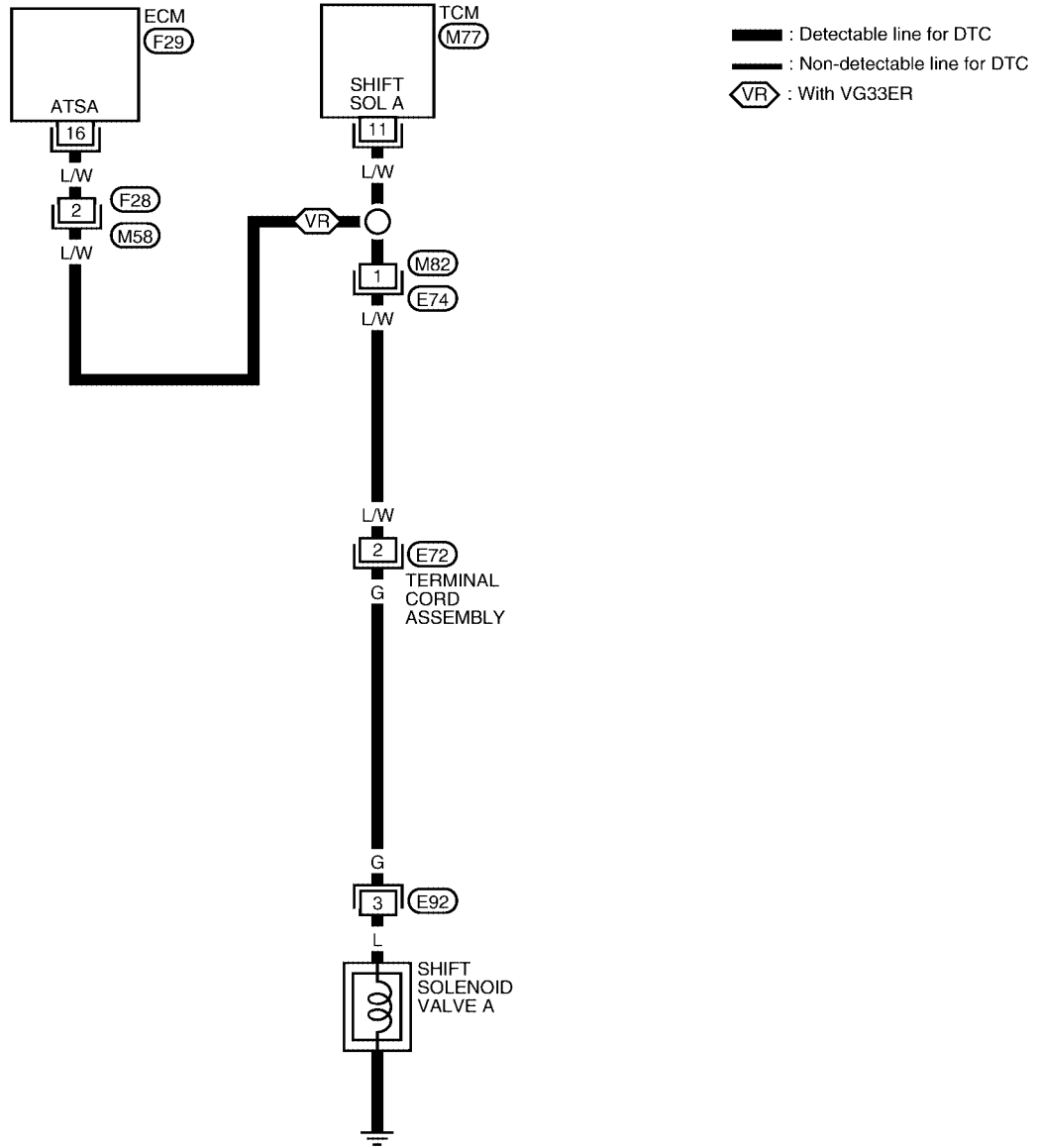
# DTC P0750 SHIFT SOLENOID VALVE A

[RE4R01A]

## Wiring Diagram — AT — SSV/A

ECS007NC

### AT-SSV/A-01



\*: This connector is not shown in "HARNESS LAYOUT" of PG section.

WCWA0153E

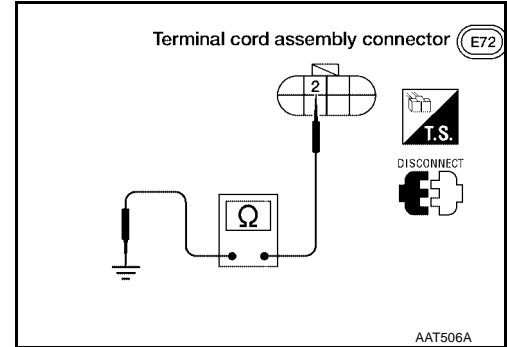
## Diagnostic Procedure

### 1. CHECK GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal cord assembly connector E72 terminal 2 and ground.

Is resistance approx. 20 - 40Ω?

- Yes >> GO TO 2.  
 No >> 1. Remove control valve assembly.  
 Refer to [AT-402, "REMOVAL"](#) .  
 2. Check the following items:
- Shift solenoid valve A  
 Refer to [AT-315, "SHIFT SOLENOID VALVE A"](#) .
  - Harness of terminal cord assembly for short or open



### 2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check resistance between terminal cord assembly connector E72 terminal 2 and TCM harness connector M77 terminal 11. Refer to wiring diagram.

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

Is resistance approx. 0Ω?

- Yes >> GO TO 3.  
 No >> Repair open circuit or short to ground or short to power in harness or connectors.

### 3. CHECK DTC

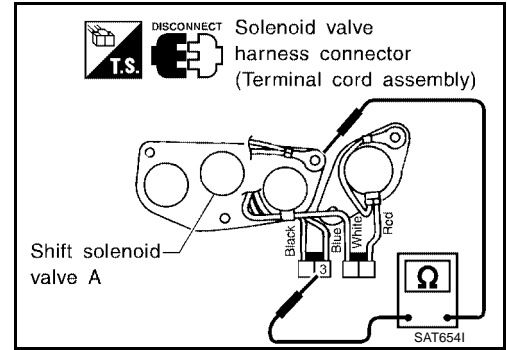
Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-311, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

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

**Component Inspection**  
**SHIFT SOLENOID VALVE A**

- For removal, refer to [AT-402, "REMOVAL"](#) .



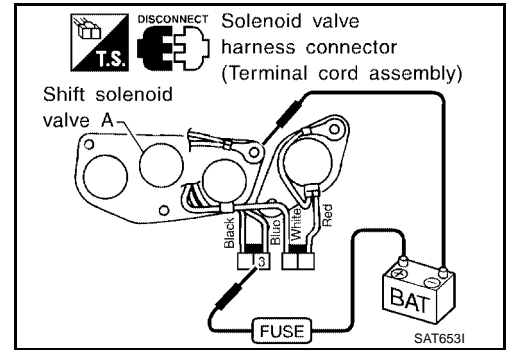
**Resistance Check**

- Check resistance between terminal 3 and ground.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	3	Ground	20 - 40 Ω

**Operation Check**

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal 3 and ground.



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

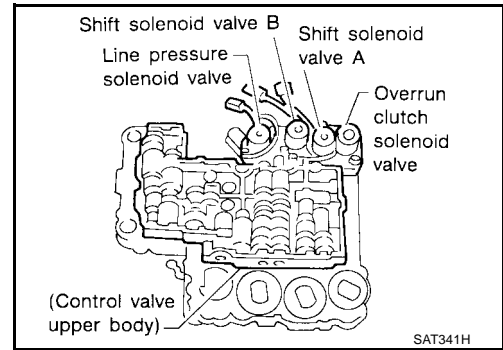
**DTC P0755 SHIFT SOLENOID VALVE B**

PF3:31940

**Description**

ECS007NF


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



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

**TCM TERMINALS AND REFERENCE VALUE**

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)	
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in D1 or D2)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in D3 or D4)	0V

**ON BOARD DIAGNOSIS LOGIC**

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
ⓘ : SFT SOL B/CIRC ⓘ : P0755	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> <li>● Harness or connectors (The solenoid circuit is open or shorted)</li> <li>● Shift solenoid valve B</li> </ul>

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

**CAUTION:**

Always drive vehicle at a safe speed.

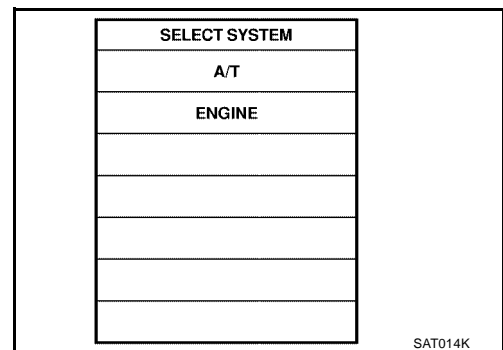
**NOTE:**

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

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

ⓘ With CONSULT-II

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



SAT014K

# DTC P0755 SHIFT SOLENOID VALVE B

[RE4R01A]

2. Drive vehicle in D position and allow the transmission to shift 1 → 2 → 3 (“GEAR”).



With GST

- Follow the procedure “With CONSULT-II”.

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

SEF949Y

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

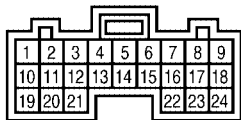
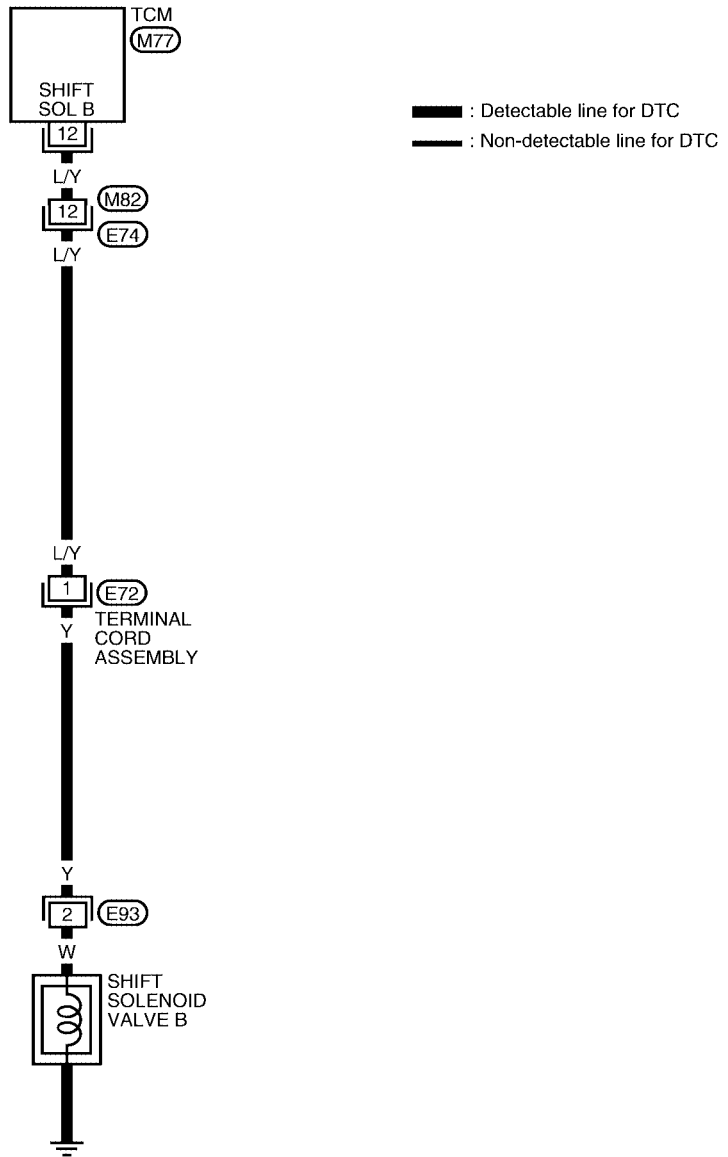
# DTC P0755 SHIFT SOLENOID VALVE B

[RE4R01A]

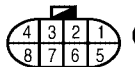
## Wiring Diagram — AT — SSV/B

ECS007NG

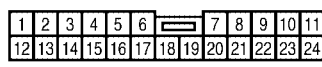
AT-SSV/B-01



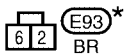
(M77)  
W



(E72)  
BR



(E74)  
W



(E93)\*  
BR

\* : This connector is not shown in "HARNESS LAYOUT" of PG section.

WCWA0103E

## Diagnostic Procedure

### 1. CHECK GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal cord assembly connector E72 terminal 1 and ground.

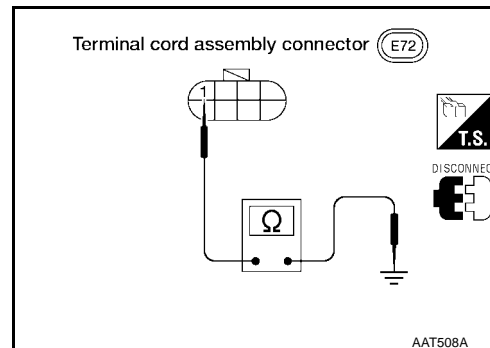
Is resistance approx. 20 - 40Ω?

Yes >> GO TO 2.

No >> 1. Remove control valve assembly.  
Refer to [AT-402, "REMOVAL"](#).

2. Check the following items:

- Shift solenoid valve B  
Refer to [AT-320, "SHIFT SOLENOID VALVE B"](#).
- Harness of terminal cord assembly for short or open



### 2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check resistance between terminal cord assembly connector E72 terminal 1 and TCM harness connector M77 terminal 12. Refer to wiring diagram.

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

Is resistance approx. 0Ω?

Yes >> GO TO 3.

No >> Repair open circuit or short to ground or short to power in harness or connectors.

### 3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-316, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).

OK or NG

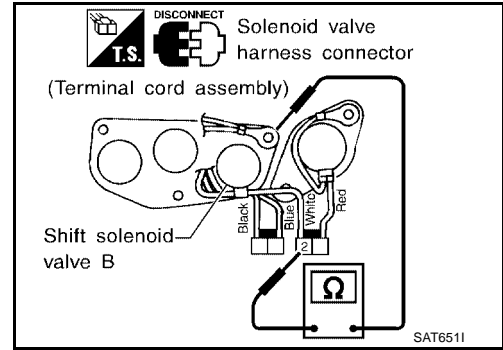
OK >> **INSPECTION END.**

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

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

**Component Inspection**  
**SHIFT SOLENOID VALVE B**

- For removal, refer to [AT-402, "REMOVAL"](#) .



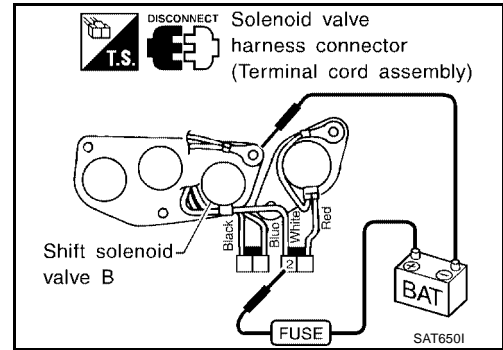
**Resistance Check**

- Check resistance between terminal 2 and ground.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve B	2	Ground	20 - 40Ω

**Operation Check**

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

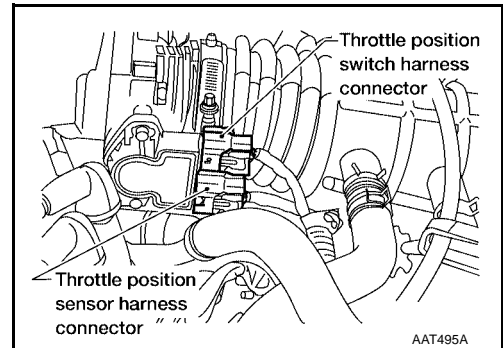




## DTC P1705 THROTTLE POSITION SENSOR

### Description

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



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

Remarks: Specification data are reference values.

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

### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
16	BR/W	Closed throttle position switch (in throttle position switch)	When releasing accelerator pedal after warming up engine. [Refer to <a href="#">AT-198, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)"</a> ]	Battery voltage
			When depressing accelerator pedal after warming up engine.	0V
17	OR/B	Wide open throttle position switch (in throttle position switch)	When depressing accelerator pedal more than half-way after warming up engine. [Refer to <a href="#">AT-198, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)"</a> ]	Battery voltage
			When releasing accelerator pedal after warming up engine.	0V
32	B/W	Throttle position sensor (Power source)	Ignition switch ON	4.5 - 5.5V
			Ignition switch OFF	0V
41	OR/L	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	BR	Throttle position sensor (Ground)	—	0V

### ON BOARD DIAGNOSIS LOGIC

# DTC P1705 THROTTLE POSITION SENSOR

[RE4R01A]

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
Ⓜ : TP SEN/CIRC A/T	TCM receives an excessively low or high voltage from the sensor.	<ul style="list-style-type: none"><li>● Harness or connectors (The solenoid circuit is open or shorted.)</li><li>● Throttle position sensor</li><li>● Throttle position switch</li></ul>
Ⓜ : P1705		

## DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

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

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

 With CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Apply vacuum to the throttle opener, then check the following. Refer to step 1 and step 2 of [AT-198, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#).

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

If the check result is NG, go to [AT-325, "Diagnostic Procedure"](#).  
If the check result is OK, go to following step.

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

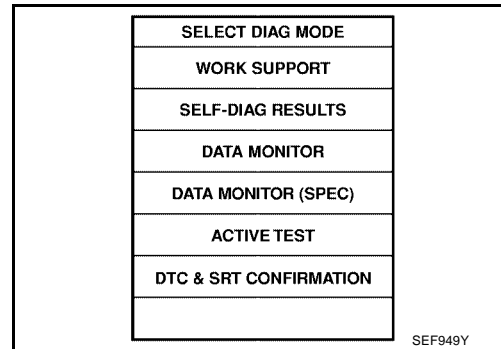
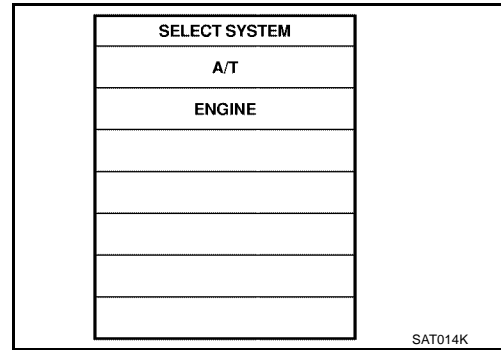
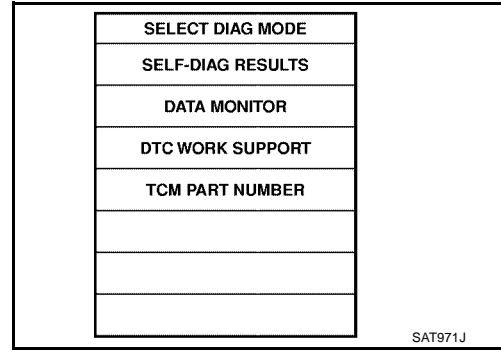
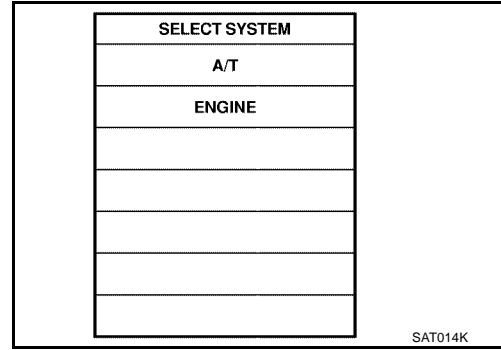
**VHCL SPEED SE: 10 km/h (6 MPH) or more**  
**THRTL POS SEN: Approximately 3V or less**  
**Selector lever: D position (O/D ON)**

If the check result is NG, go to [AT-325, "Diagnostic Procedure"](#).  
If the check result is OK, go to following step.

5. Maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.  
**VHCL SPEED SE: 10 km/h (6 MPH) or more**  
**Accelerator pedal: Wide open throttle**  
**Selector lever: D position (O/D ON)**

 With GST

- Follow the procedure "With CONSULT-II".



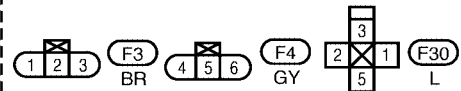
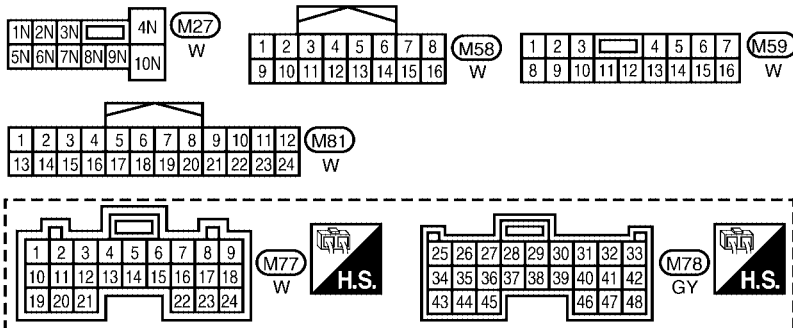
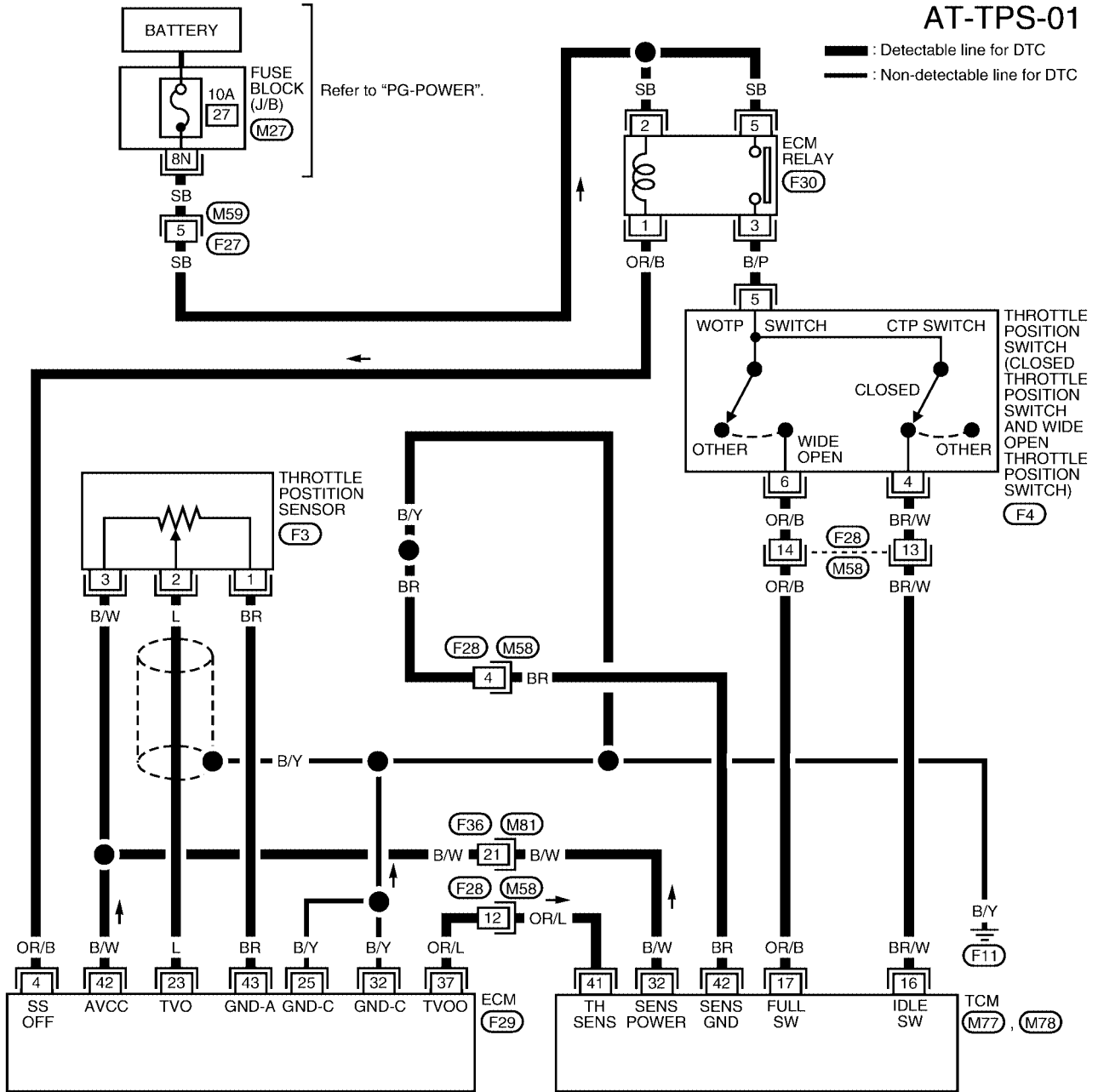
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# DTC P1705 THROTTLE POSITION SENSOR

[RE4R01A]

## Wiring Diagram — AT — TPS

ECS007NK



WCWA0154E

## Diagnostic Procedure

### 1. CHECK DTC WITH ECM

Perform diagnostic test mode II (self-diagnostic results) for engine control. Refer to [EC-640](#) (VG33E only) or [EC-1243](#) (VG33ER only), "Malfunction Indicator Lamp (MIL)".

OK or NG

- OK >> GO TO 2.
- NG >> Check throttle position sensor circuit for engine control. Refer to [EC-753](#), "[DTC P0121 TP SENSOR](#)" (VG33E only) or [EC-1362](#), "[DTC P0121 TP SENSOR](#)" (VG33ER only).

### 2. CHECK INPUT SIGNAL

#### With CONSULT-II

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

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

SAT614J

#### Voltage

**Fully-closed throttle : Approximately 0.5V**

**Fully-open throttle : Approximately 4V**

#### Without CONSULT-II

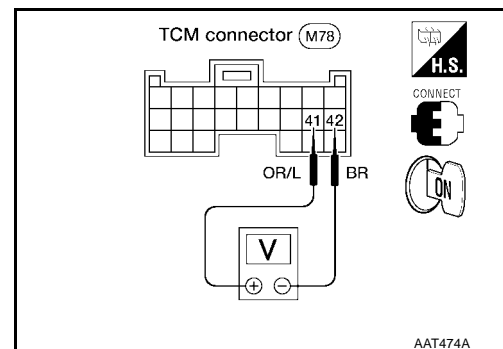
1. Turn ignition switch to ON position.  
(Do not start engine.)
2. Check voltage between TCM terminals 41 and 42 while accelerator pedal is depressed slowly.

#### Voltage

**Fully-closed throttle valve : Approximately 0.5V**

**Fully-open throttle valve : Approximately 4V**

**(Voltage rises gradually in response to throttle position.)**



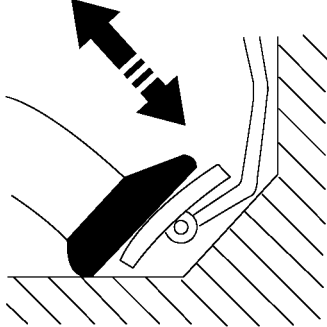
OK or NG

- OK (With CONSULT-II)>>GO TO 3.
- OK (Without CONSULT-II)>>GO TO 4.
- NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor circuit.  
(Main harness)

## 3. CHECK THROTTLE POSITION SWITCH CIRCUIT (WITH CONSULT-II)

 **With CONSULT-II**

1. Turn ignition switch to ON position.  
(Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "CLOSED THL/SW" and "W/O THRL/P-SW" depressing and releasing accelerator pedal.  
Check the signal of throttle position switch is indicated properly.



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

SAT646J

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

MTBL0011

OK or NG

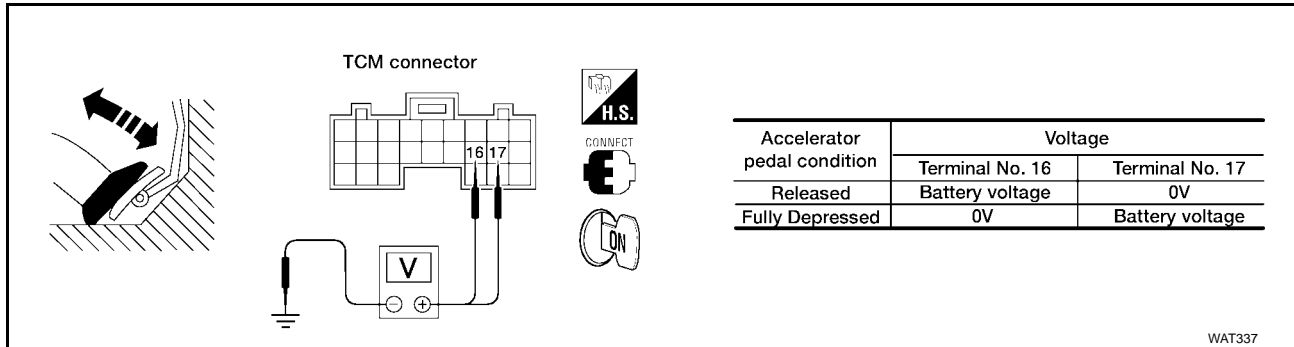
OK >> GO TO 5.

NG >> Check the following items:

- Throttle position switch  
Refer to [AT-328, "THROTTLE POSITION SWITCH"](#) .
- Harness for short or open between ignition switch and throttle position switch (Main harness)
- Harness for short or open between throttle position switch and TCM (Main harness)

**4. CHECK THROTTLE POSITION SWITCH CIRCUIT (WITHOUT CONSULT-II)****⊗ Without CONSULT-II**

- Turn ignition switch to ON position.  
(Do not start engine.)
- Check voltage between TCM connector M77 terminals 16 (BR/W), 17 (OR/B) and ground while depressing, and releasing accelerator pedal slowly. (after warming up engine)

**OK or NG**

OK &gt;&gt; GO TO 5.

NG &gt;&gt; Check the following items:

- Throttle position switch  
Refer to [AT-328, "THROTTLE POSITION SWITCH"](#) .
- Harness for short or open between ignition switch and throttle position switch (Main harness)
- Harness for short or open between throttle position switch and TCM (Main harness)

**5. CHECK DTC**

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-323, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

**OK or NG**OK >> **INSPECTION END**

NG &gt;&gt; 1. Perform TCM input/output signal inspection.

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

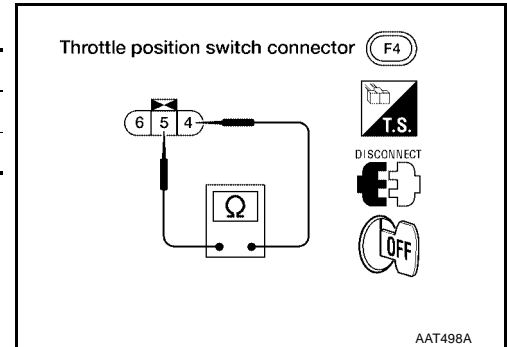
**Component Inspection**  
**THROTTLE POSITION SWITCH**

**Closed Throttle Position Switch (Idle position)**

- Check continuity between terminals 4 and 5.

Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

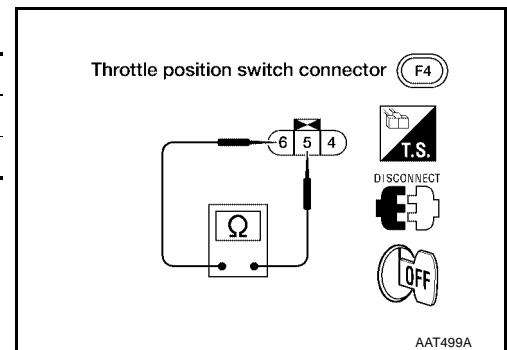
- To adjust closed throttle position switch, refer to [EC-652, "Basic Inspection"](#) (VG33E only) or [EC-1255, "Basic Inspection"](#) (VG33ER only).



**Wide Open Throttle Position Switch**

- Check continuity between terminals 5 and 6.

Accelerator pedal condition	Continuity
Released	No
Depressed	Yes





# DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

[RE4R01A]

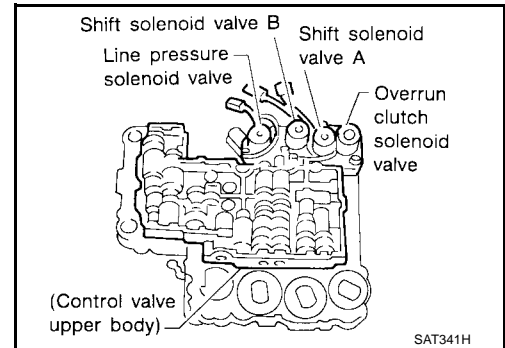
## DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

PF3:31940

### Description


ECS007NN

The overrun clutch solenoid valve is activated by the TCM in response to signals sent from the PNP switch, overdrive control switch, vehicle speed and 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	L/B	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	Malfunction is detected when ...	Check item (Possible cause)
Ⓜ : O/R CLTCH SOL/CIRC Ⓜ : P1760	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> <li>● Harness or connectors (The solenoid circuit is open or shorted.)</li> <li>● Overrun clutch solenoid valve</li> </ul>

## DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

**CAUTION:**

Always drive vehicle at a safe speed.

**NOTE:**

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

**TESTING CONDITION:**

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

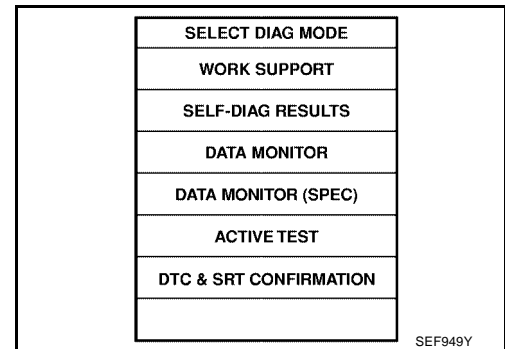
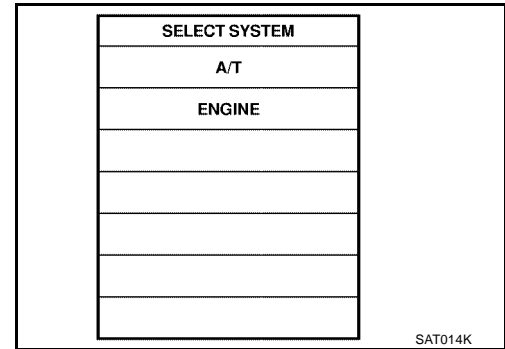
After the repair, perform the following procedure to confirm the malfunction is eliminated.

 With CONSULT-II

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

 With GST

1. Follow the procedure “With CONSULT-II”.



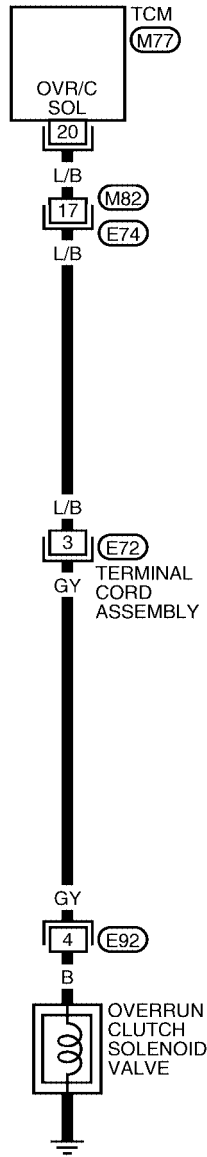
# DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

[RE4R01A]

## Wiring Diagram — AT — OVRCSV

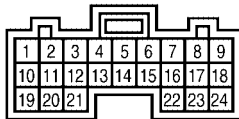
ECS007NO

### AT-OVRCSV-01



: Detectable line for DTC  
 : Non-detectable line for DTC

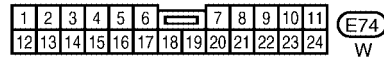
A  
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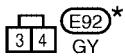
M77  
W



E72  
BR



E74  
W



\* : This connector is not shown in "HARNESS LAYOUT" of PG section.

WCWA0105E

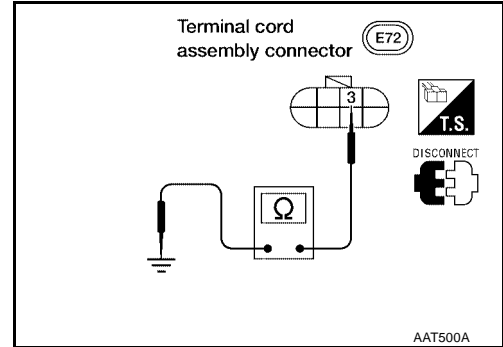
## Diagnostic Procedure

### 1. CHECK GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal cord assembly connector E72 terminal 3 and ground.

Is resistance approx. 20 - 40Ω?

- Yes >> GO TO 2.  
 No >> 1. Remove control valve assembly.  
 Refer to [AT-402, "REMOVAL"](#) .
2. Check the following items:
- Overrun clutch solenoid valve  
 Refer to [AT-333, "OVERRUN CLUTCH SOLENOID VALVE"](#) .
  - Harness of terminal cord assembly for short or open



### 2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check resistance between terminal cord assembly connector E72 terminal 3 and TCM harness connector M77 terminal 20.

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

Is resistance approx 0Ω?

- Yes >> GO TO 3.  
 No >> Repair open circuit or short to ground or short to power in harness or connectors.

### 3. CHECK DTC

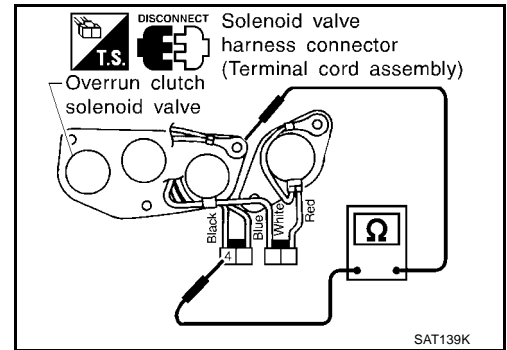
Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-330, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

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

## Component Inspection OVERRUN CLUTCH SOLENOID VALVE

- For removal, refer to [AT-402, "REMOVAL"](#).



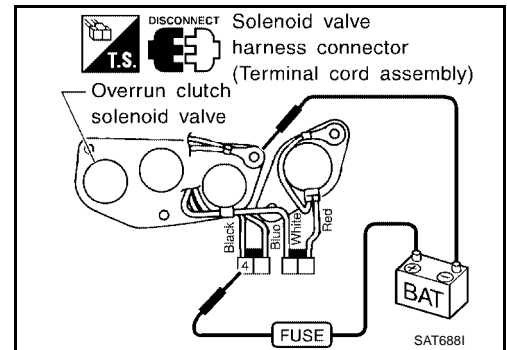
## Resistance Check

- Check resistance between terminal 4 and ground.

Solenoid valve	Terminal No.		Resistance (Approx.)
Overrun clutch solenoid valve	4	Ground	20 - 40Ω

## Operation Check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal 4 and ground.



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

[RE4R01A]

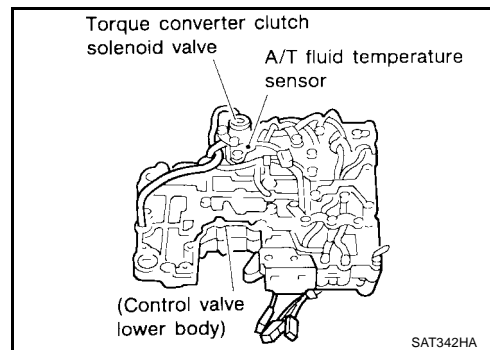
## DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

PF3:31940

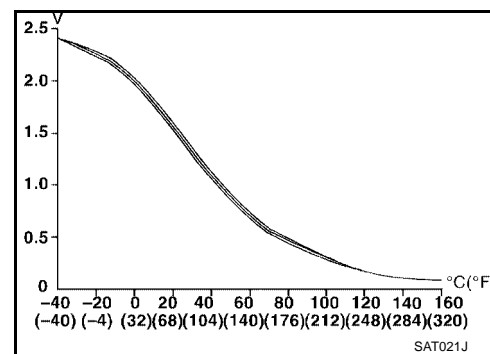
### Description

ECS007NR

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



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



Remarks: Specification data are reference values.

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

### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

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

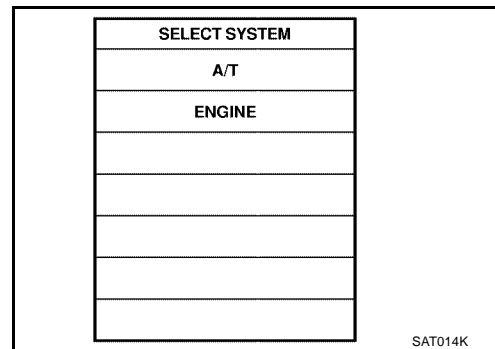
# DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

[RE4R01A]

## ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
⊕ : BATT/FLUID TEMP SEN ⊗ : 8th judgement flicker	TCM receives an excessively low or high voltage from the sensor.	<ul style="list-style-type: none"> <li>● Harness or connections (The sensor circuit is open or shorted)</li> <li>● A/T fluid temperature sensor</li> </ul>

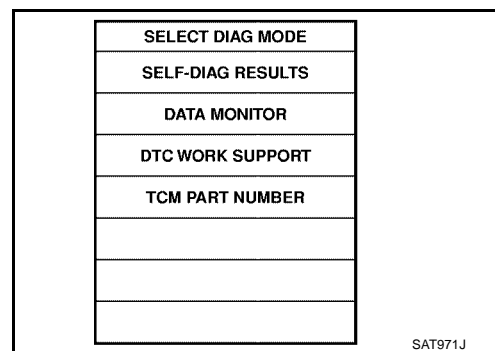
## DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE



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

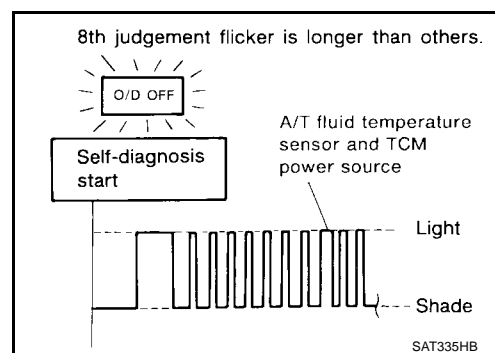
⊕ With CONSULT-II

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 position, vehicle speed higher than 20 km/h (12 MPH).



⊗ Without CONSULT-II

- Follow the procedure "With CONSULT-II".



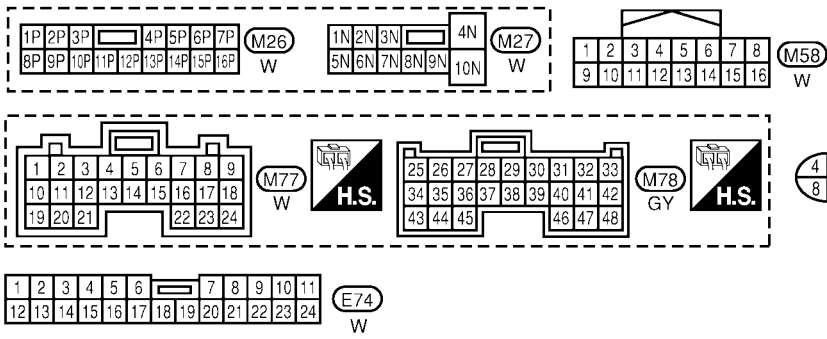
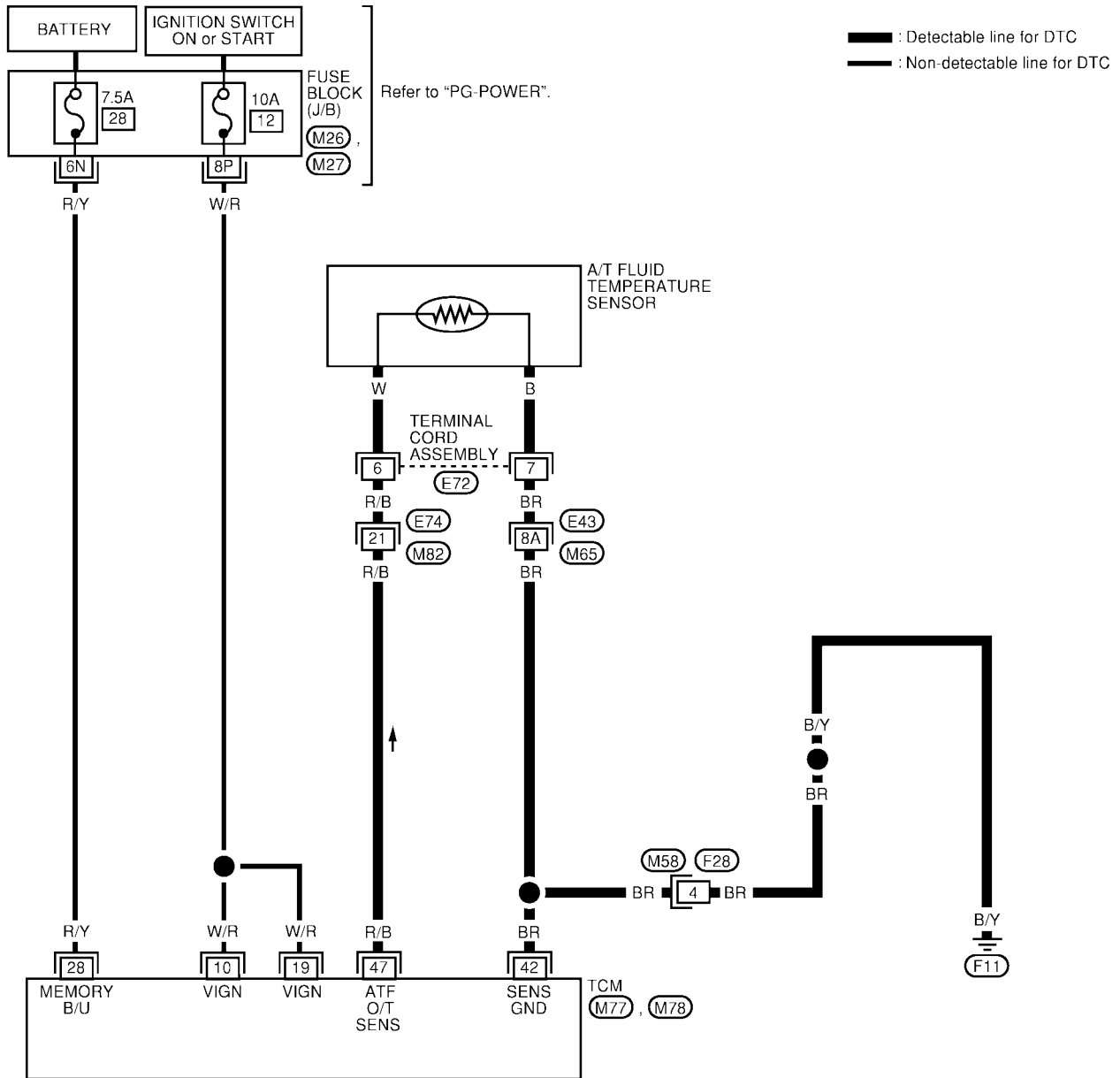
# DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

[RE4R01A]

## Wiring Diagram — AT — BA/FTS

ECS007NS

### AT-BA/FTS-01



Refer to the following.  
 (E43) - SUPER  
 MULTIPLE JUNCTION (SMJ)



## Diagnostic Procedure

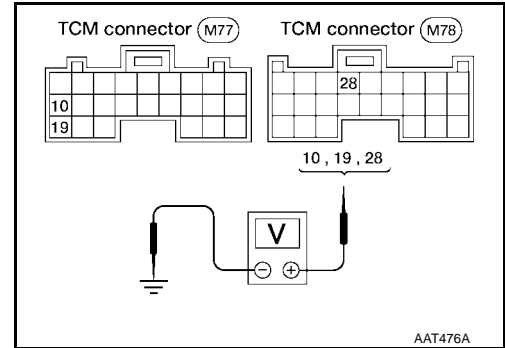
### 1. CHECK TCM POWER SOURCE

1. Turn ignition switch to ON position.  
(Do not start engine.)
2. Check voltage between TCM harness connectors M77, M78 terminals (10, 19, 28) and ground.

**Voltage** : **Battery voltage**

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

**Voltage** : **Battery voltage**



**OK or NG**

OK >> GO TO 2.

NG >> Check the following items:

- Harness for short or open between fuse block J/B harness and TCM terminals (10, 19 and 28) (Main harness)
- Ignition switch and fuse  
Refer to [PG-9, "POWER SUPPLY ROUTING"](#).

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

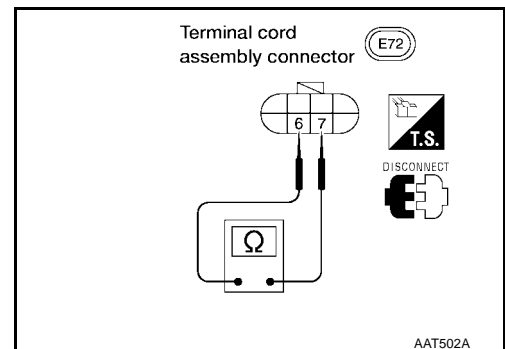
1. Turn ignition switch to OFF position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminals 6 and 7 when A/T is cold [20°C (68°F)].

**Is resistance approx. 2.5kΩ?**

Yes >> GO TO 3.

No >> 1. Remove oil pan.

2. Check the following items:
  - A/T fluid temperature sensor  
Refer to [AT-339, "A/T FLUID TEMPERATURE SENSOR"](#).
  - Harness of terminal cord assembly for short or open



## 3. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR

### With CONSULT-II

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

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

SAT614J

### Voltage

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

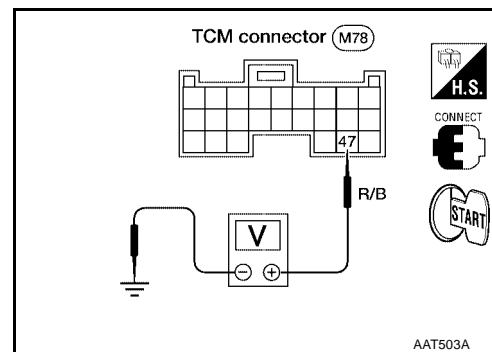
### Without CONSULT-II

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

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

### OK or NG

- OK >> GO TO 4.  
 NG >> Check the following item:
- Harness for short or open between TCM and terminal cord assembly (Main harness)



## 4. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-335, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).

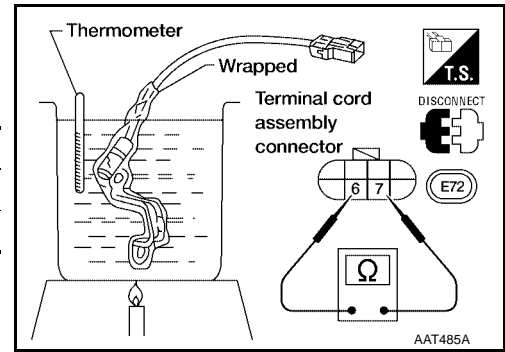
### OK or NG

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

**Component Inspection**  
**A/T FLUID TEMPERATURE SENSOR**

- For removal, refer to [AT-402, "REMOVAL"](#) .
- Check resistance between terminals 6 and 7 while changing temperature as shown at left.

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



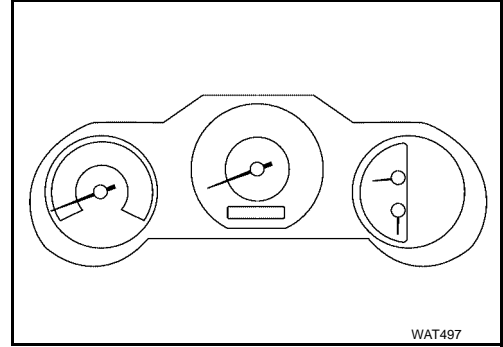
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 M

## DTC VEHICLE SPEED SENSOR-MTR

### Description


ECS007NV

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





### TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

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

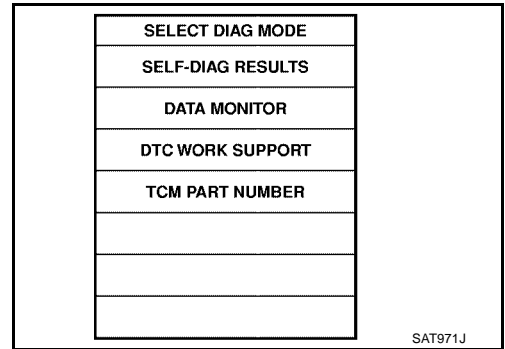
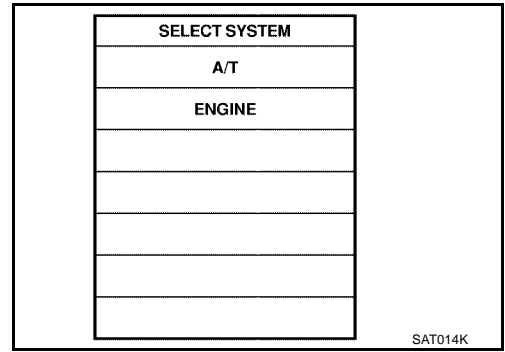
### ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
 : VHCL SPEED SEN-MTR	TCM does not receive the proper voltage signal from the sensor.	<ul style="list-style-type: none"> <li>● Harness or connectors (The sensor circuit is open or shorted.)</li> <li>● Vehicle speed sensor</li> </ul>
 : 2nd judgement flicker		

## DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

**CAUTION:**

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



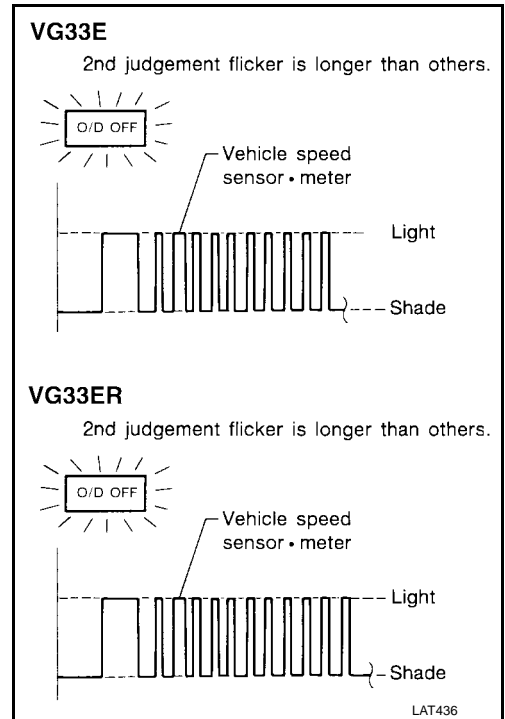
After the repair, perform the following procedure to confirm the malfunction is eliminated.

☑ With CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Start engine and accelerate vehicle from 0 to 25 km/h (0 to 6 MPH).

☒ Without CONSULT-II

- Follow the procedure “With CONSULT-II”.



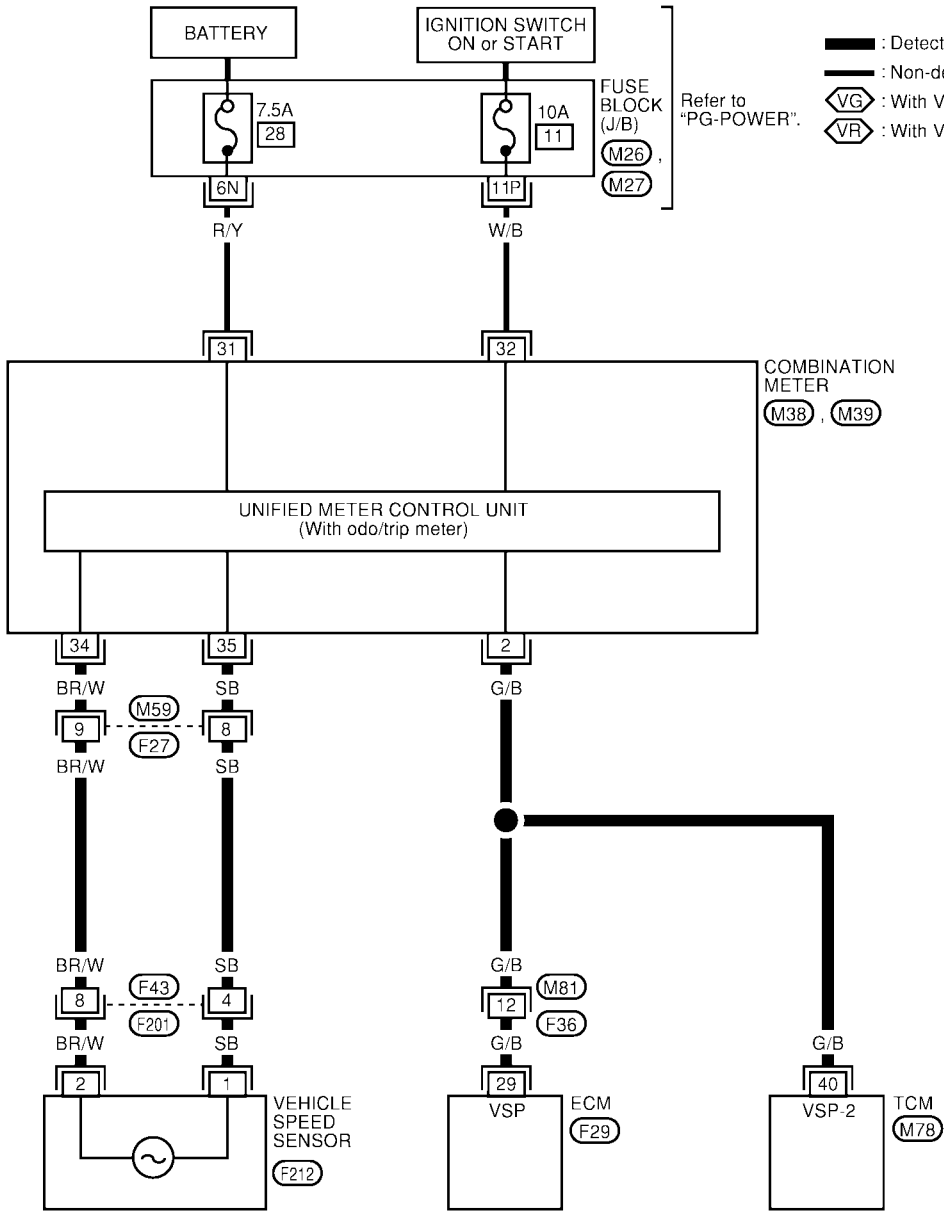
# DTC VEHICLE SPEED SENSOR-MTR

[RE4R01A]

## Wiring Diagram — AT — VSSMTR

ECS007NW

### AT-VSSMTR-01



: Detectable line for DTC  
 : Non-detectable line for DTC  
VG : With VG33E  
VR : With VG33ER

Refer to "PG-POWER".

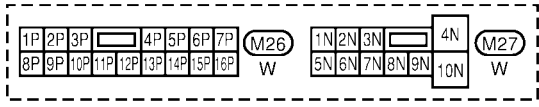
COMBINATION METER  
(M38, M39)

UNIFIED METER CONTROL UNIT  
(With odo/trip meter)

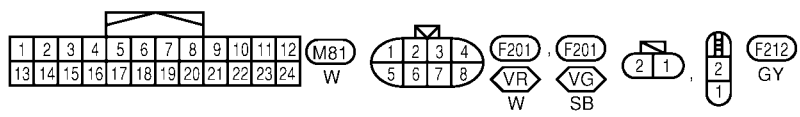
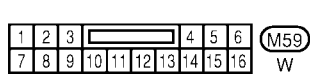
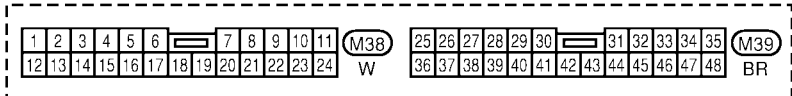
VEHICLE SPEED SENSOR  
(F212)

VSP  
ECM  
(F29)

VSP-2  
TCM  
(M78)



Refer to the following.  
(M78, F29) - ELECTRICAL UNITS



**Diagnostic Procedure**

**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**

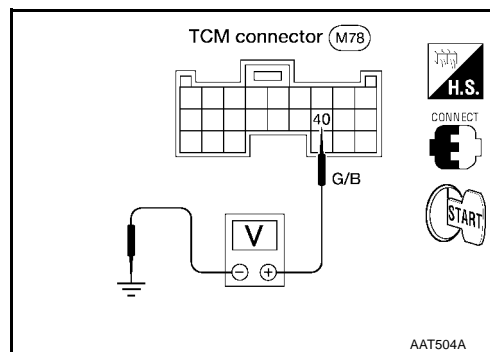
1. Start engine.
2. Check voltage between TCM harness connector M78 terminal 40 and ground while driving at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.

Does battery voltage vary between less than 1V and more than 4.5V?

Yes >> GO TO 2.

No >> Check the following items:

- Vehicle speed sensor and ground circuit for vehicle speed sensor. Refer to [DI-3, "METERS AND GAUGES"](#).
- Harness for short or open between TCM and vehicle speed sensor (Main harness)



**2. CHECK DTC**

Perform [AT-341, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).

OK or NG

OK >> **INSPECTION END.**

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

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

# DTC TURBINE REVOLUTION SENSOR (VG33ER ONLY)

[RE4R01A]

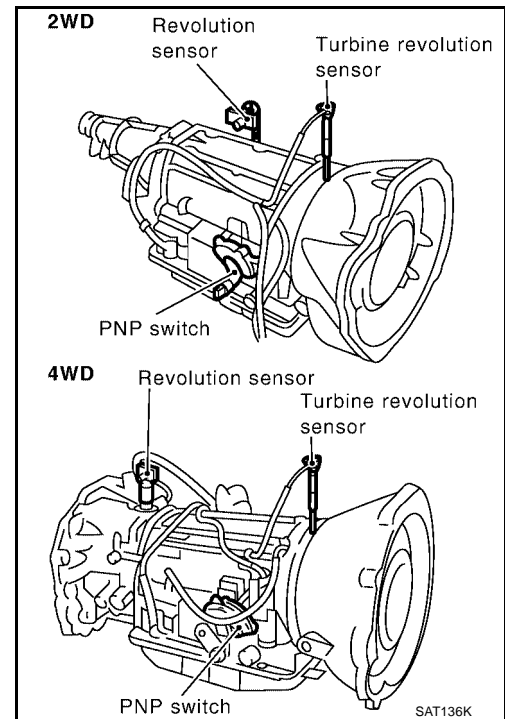
## DTC TURBINE REVOLUTION SENSOR (VG33ER ONLY)

PF3:31935

### Description

ECS007NY

The turbine revolution sensor detects input shaft 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

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
38	Y	Turbine revolution sensor (Measure in AC range)	When engine is running at 1,000 rpm	1.2V Voltage rises gradually in response to engine speed.
42	BR	Throttle position sensor (Ground)	—	0V

### ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
(P) : TURBINE REV (NO TOOLS) : 10th judgement flicker	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>● Turbine revolution sensor</li> </ul>



## DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE


**CAUTION:**

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

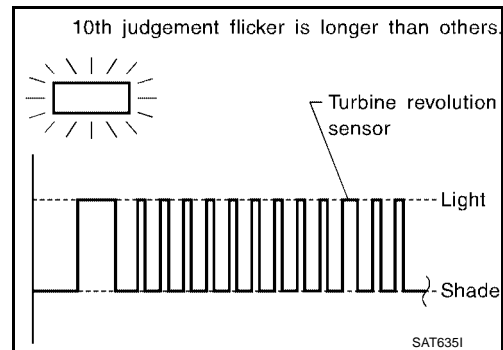
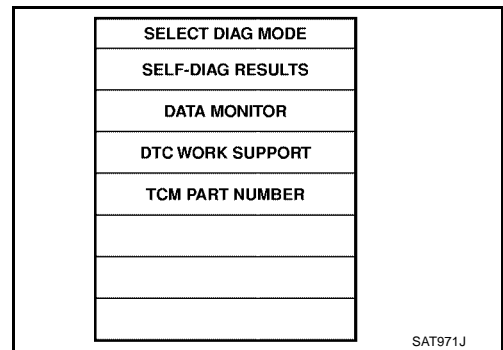
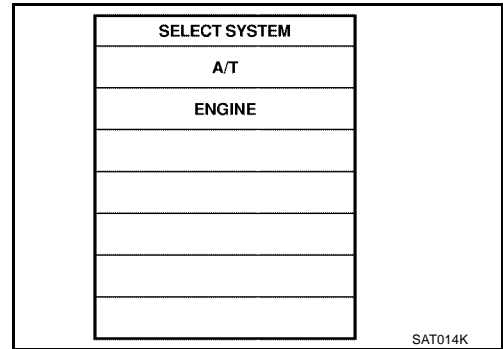
After the repair, perform the following procedure to confirm the malfunction is eliminated.

 With CONSULT-II

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

 No Tools

1. Start engine.
2. 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 1/8 of the full throttle position and driving for more than 5 seconds.
3. Perform self-diagnosis.  
Refer to [AT-198, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) .



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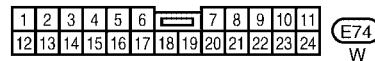
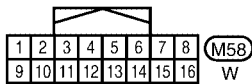
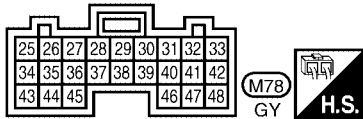
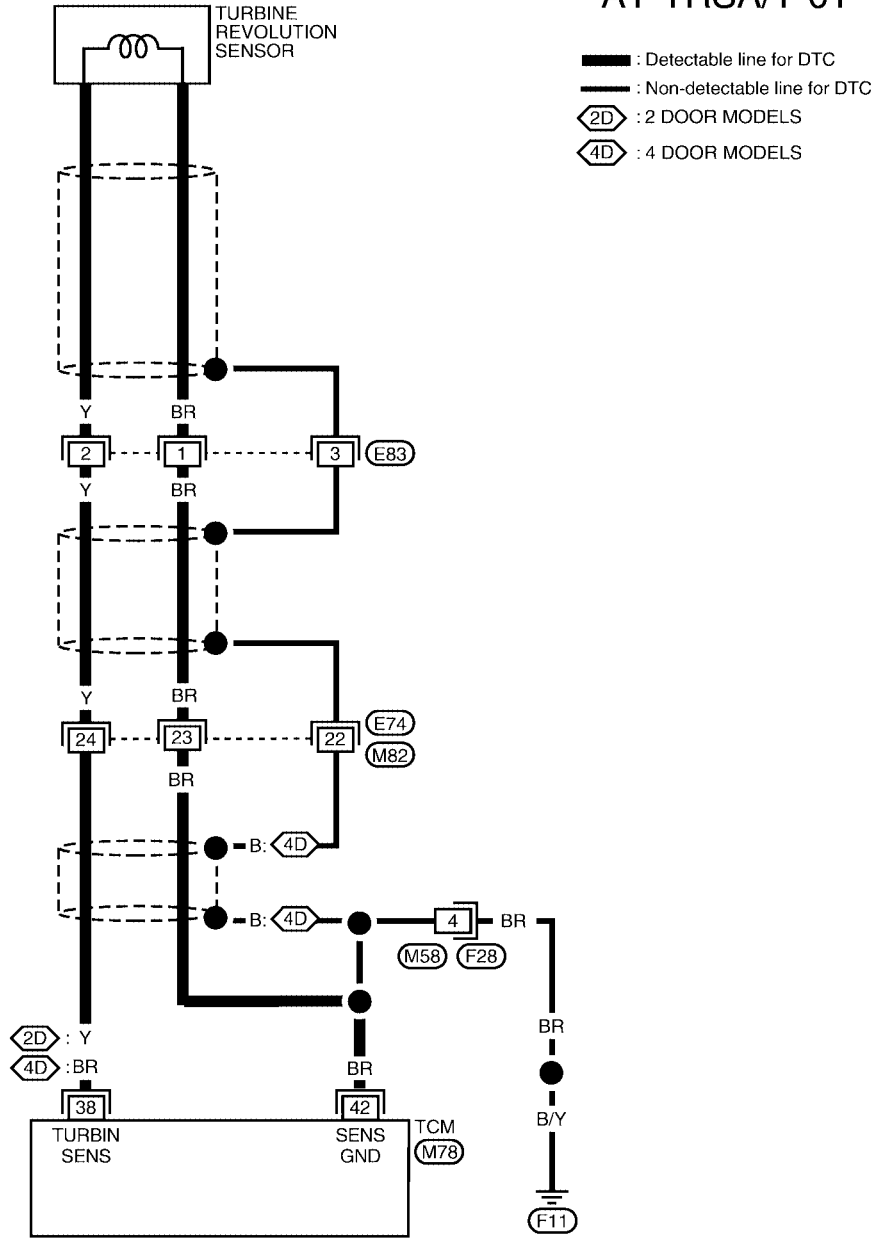
# DTC TURBINE REVOLUTION SENSOR (VG33ER ONLY)

[RE4R01A]

## Wiring Diagram — AT — TRSA/T

ECS007NZ

### AT-TRSA/T-01



WCWA0157E

## Diagnostic Procedure

### 1. CHECK INPUT SIGNAL

**With CONSULT-II**

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

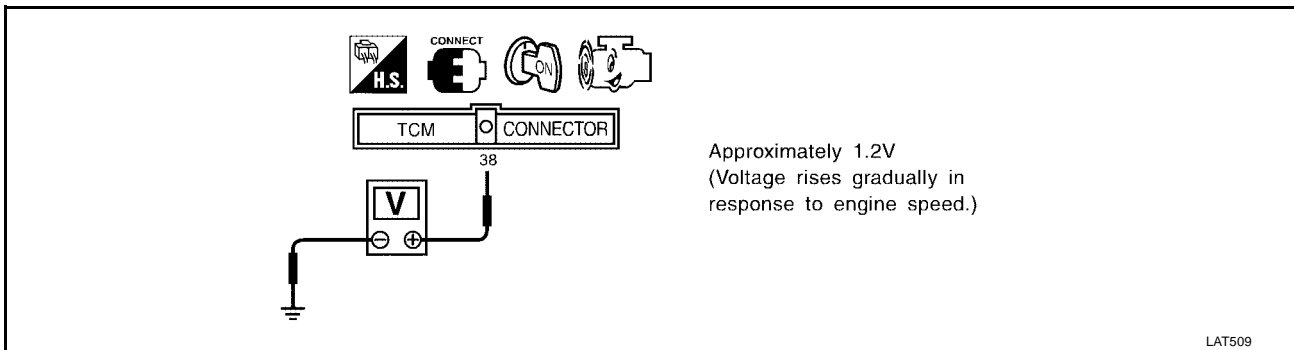
**Without CONSULT-II**

1. Start engine.

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

SAT740J

2. Check voltage between TCM harness connector M78 terminal 38 (Y) and ground. (Measure in AC range.)



**OK or NG**

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

### 2. DETECT MALFUNCTIONING ITEM

Check harness for short or open between TCM and turbine revolution sensor.

**OK or NG**

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

### 3. CHECK DTC

Perform [AT-345, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).

**OK or NG**

- OK >> **INSPECTION END.**
- NG >> GO TO 4.

### 4. CHECK TCM INSPECTION

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

**OK or NG**

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

# DTC TURBINE REVOLUTION SENSOR (VG33ER ONLY)

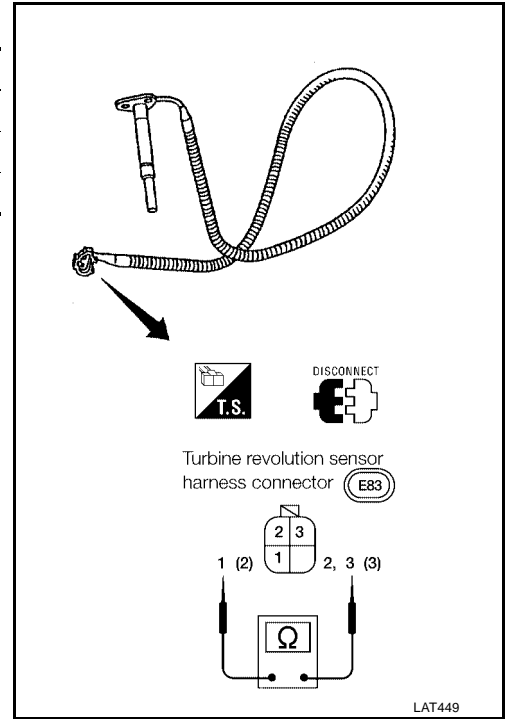
[RE4R01A]

ECS00701

## Component Inspection TURBINE REVOLUTION SENSOR

- Check resistance between terminals 1, 2 and 3.

Terminal No.		Resistance (Approx.)
1	2	2.4 - 2.8 k $\Omega$
1	3	No continuity
2	3	No continuity



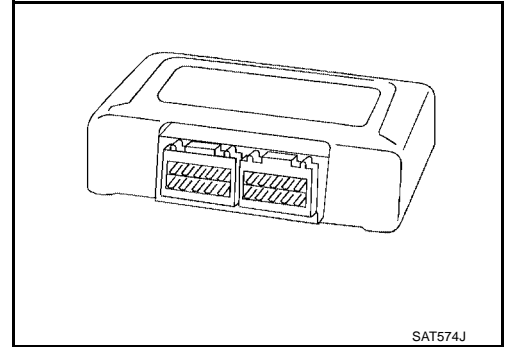
## DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)

PFP:31036

### Description

ECS00702

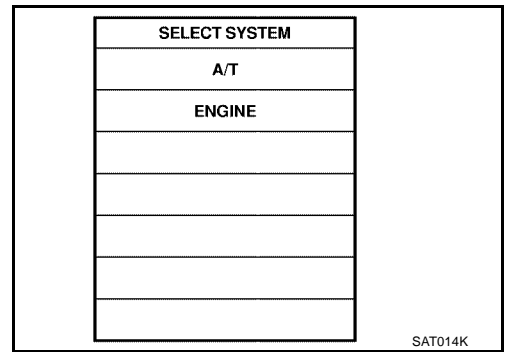
The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T.



### ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when ...	Check Items (Possible Cause)
Ⓜ : CONTROL UNIT (RAM) : CONTROL UNIT (ROM)	<ul style="list-style-type: none"> <li>● TCM memory (RAM) or (ROM) is malfunctioning.</li> </ul>	<ul style="list-style-type: none"> <li>● TCM</li> </ul>

### DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

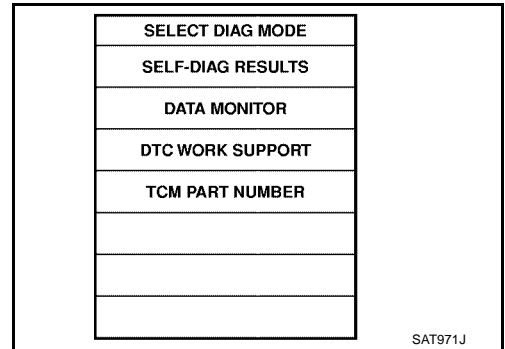


#### NOTE:

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

#### Ⓜ With CONSULT-II

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



## Diagnostic Procedure

ECS00703

### 1. INSPECTION START

---

#### ④ With CONSULT-II

1. Turn ignition switch ON and select "SELF DIAG RESULTS" mode for A/T with CONSULT-II.
2. Touch "ERASE".
3. Turn ignition switch OFF for 10 seconds.
4. Perform [AT-349, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

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

Yes or No

Yes >> Replace TCM.

No >> **INSPECTION END.**

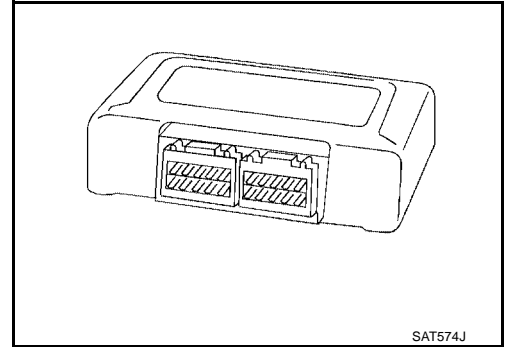
## DTC CONTROL UNIT (EEP ROM)

PFP:31036

### Description

ECS00704

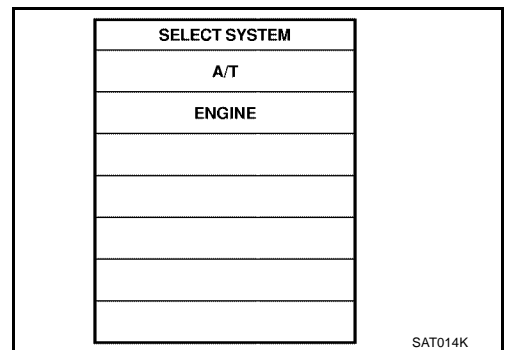
The TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls the A/T.



### ON BOARD DIAGNOSIS LOGIC

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

### DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

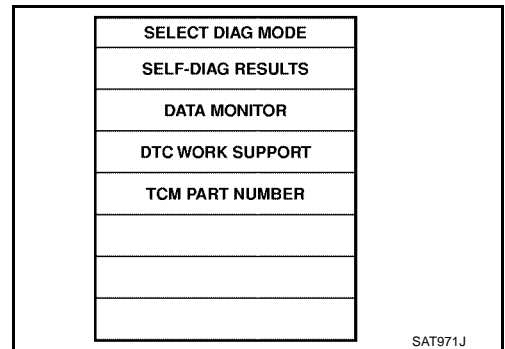


**NOTE:**

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

**With CONSULT-II**

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



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## Diagnostic Procedure

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### 1. INSPECTION START

---

#### ④ With CONSULT-II

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

Perform [AT-351, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).

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

Yes or No

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



# TROUBLE DIAGNOSES FOR SYMPTOMS

[RE4R01A]

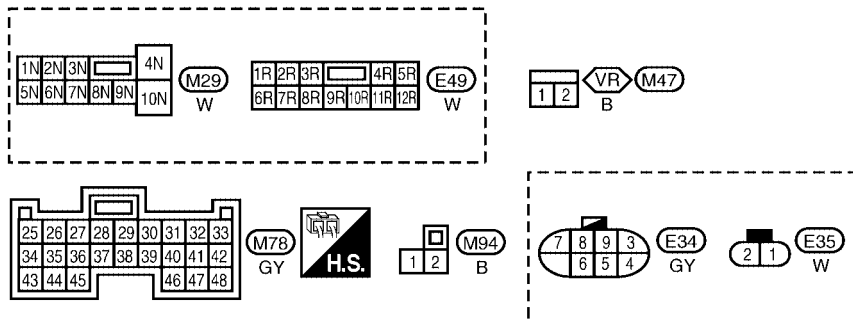
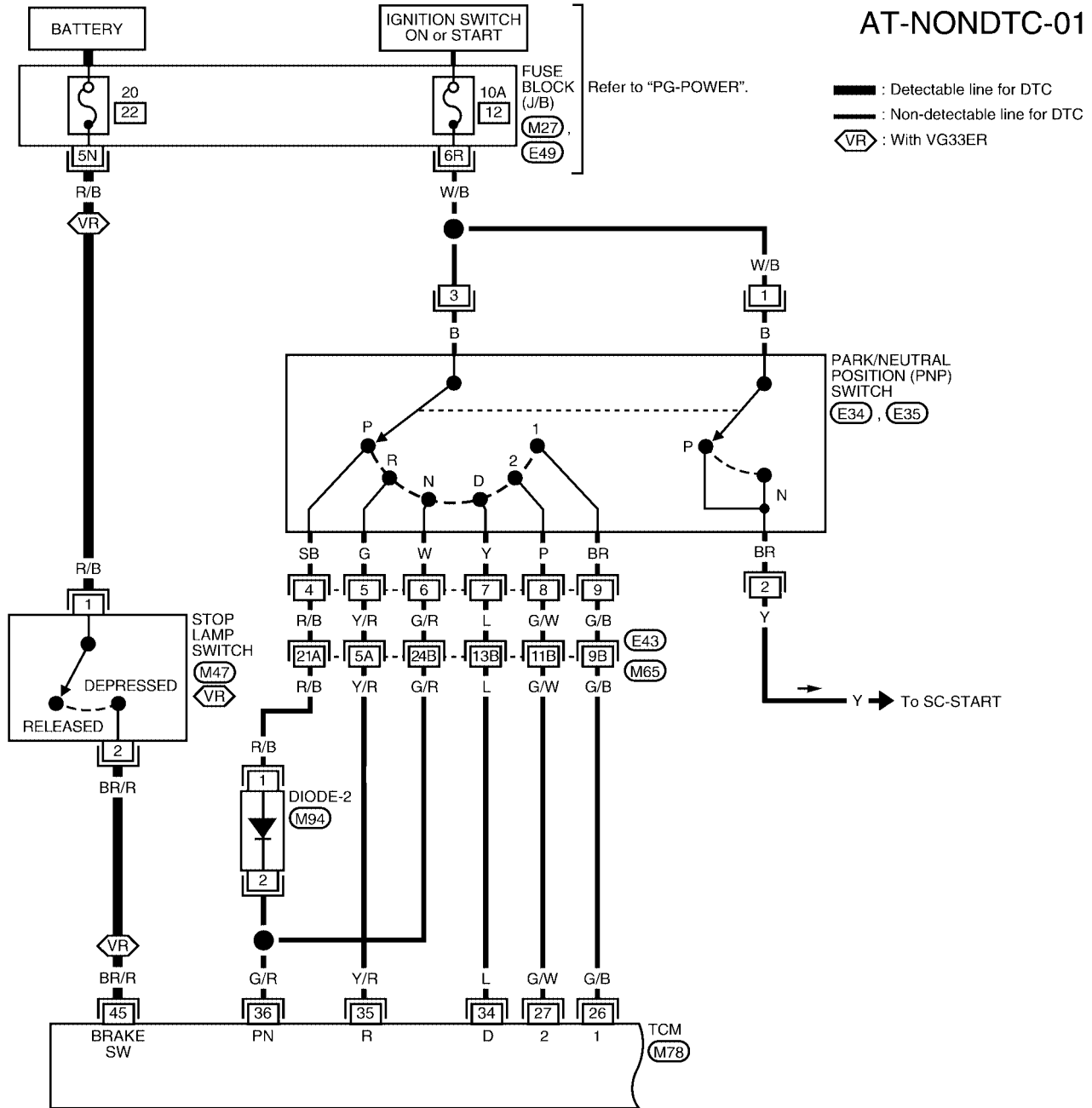
PFP:00007

ECS00706

## TROUBLE DIAGNOSES FOR SYMPTOMS

### Wiring Diagram — AT — NONDTC

#### AT-NONDTC-01

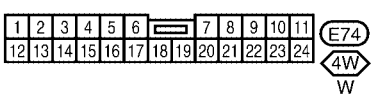
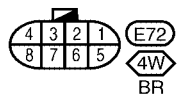
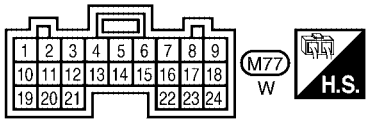
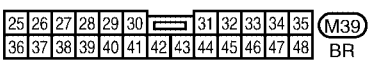
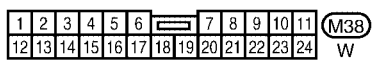
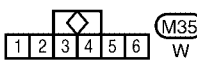
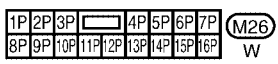
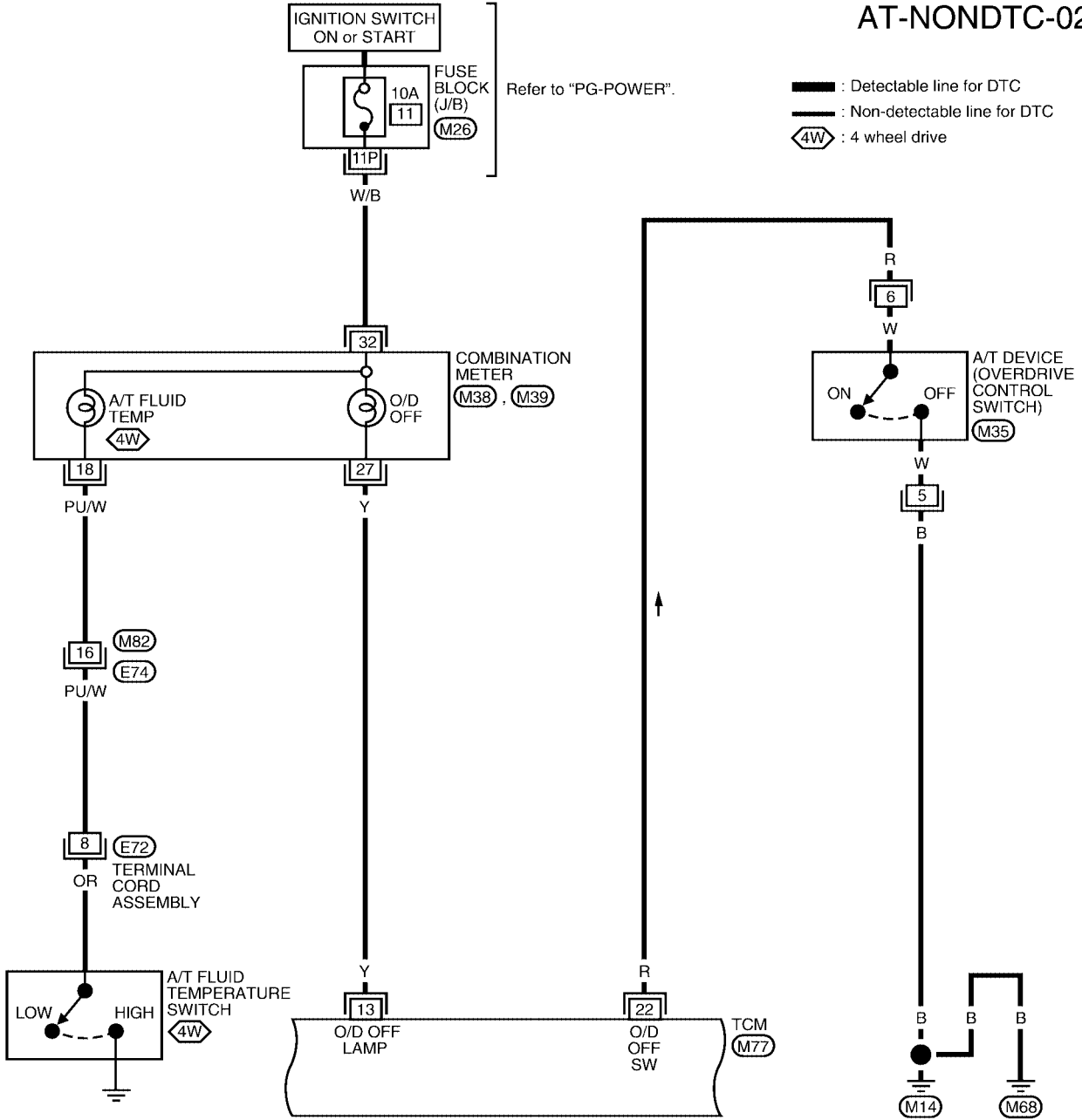


Refer to the following.  
E43 - SUPER  
 MULTIPLE JUNCTION (SMJ)

# TROUBLE DIAGNOSES FOR SYMPTOMS

[RE4R01A]

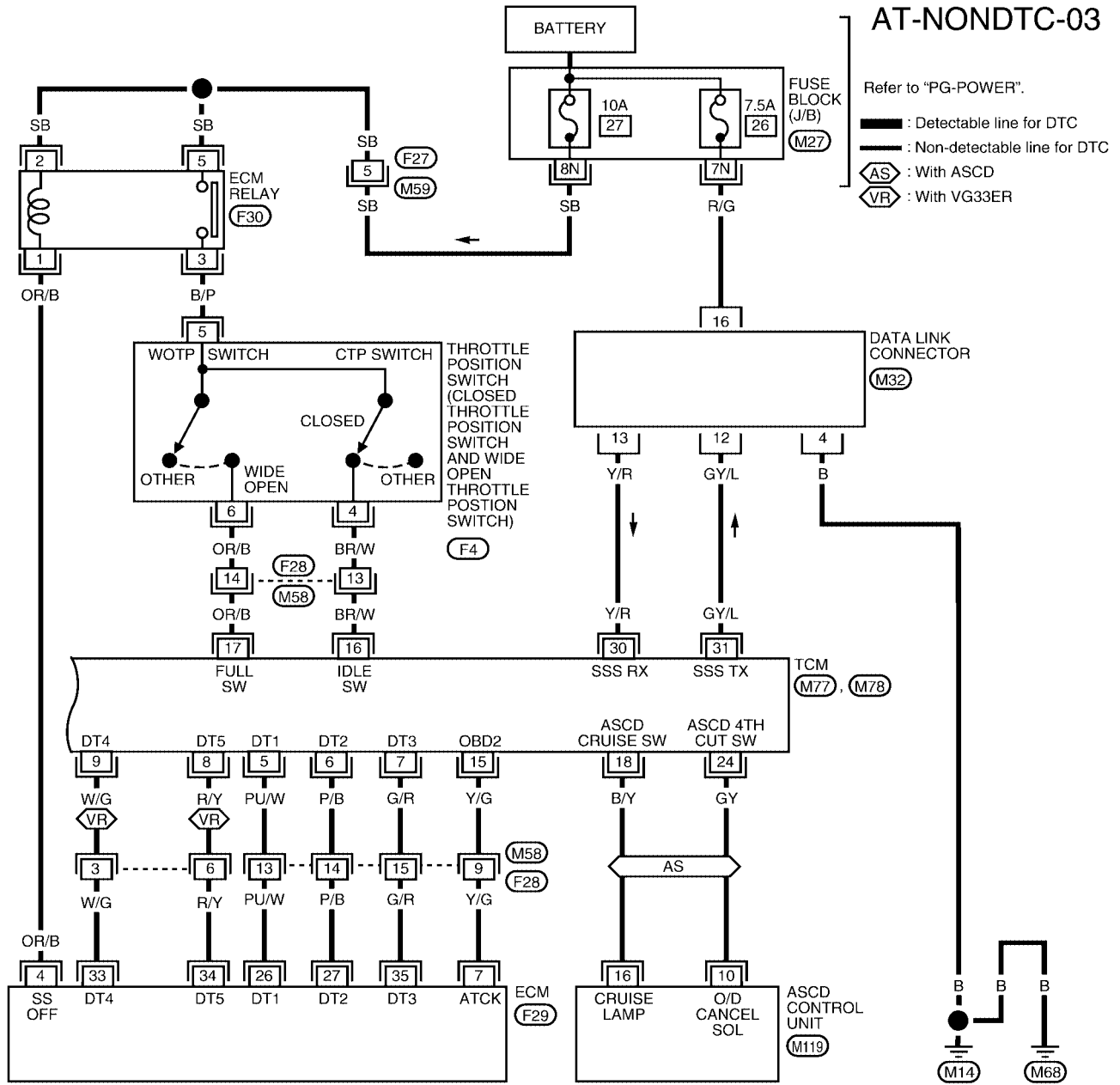
## AT-NONDTC-02



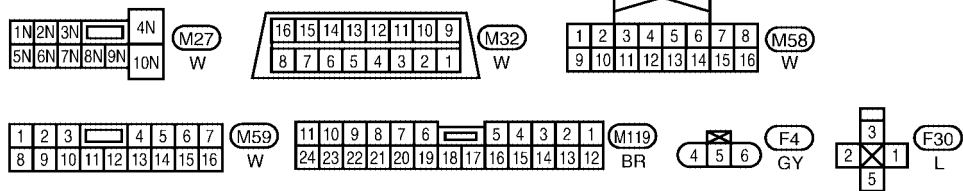
# TROUBLE DIAGNOSES FOR SYMPTOMS

[RE4R01A]

## AT-NONDTC-03



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Refer to the following.  
 (M77), (M78), (F29) - ELECTRICAL UNITS

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

SYMPTOM:

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

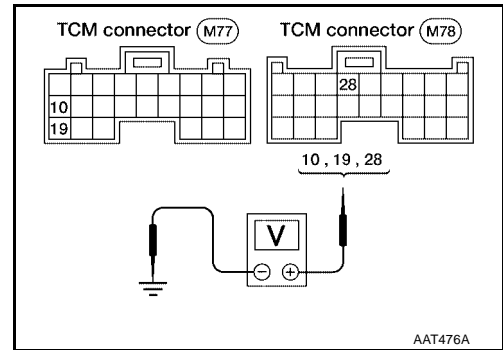
### 1. CHECK TCM POWER SOURCE

1. Turn ignition switch to ON position.  
(Do not start engine.)
2. Check voltage between TCM harness connectors (M77, M78) terminals (10, 19, 28) and ground.

**Voltage** : **Battery voltage**

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

**Voltage** : **Battery voltage**



OK or NG

OK >> GO TO 2.

NG >> Check the following items:

- Harness for short or open between ignition switch and TCM (Main harness)
- Refer to [AT-246, "Wiring Diagram — AT — MAIN"](#) .
- Ignition switch and fuse  
Refer to [PG-9, "POWER SUPPLY ROUTING"](#) .

### 2. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check resistance between TCM harness connector M78 terminals (25, 48) and ground. Refer to wiring diagram.

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

Is resistance approx. 0Ω?

Yes >> GO TO 3.

No >> ● Repair open circuit or short to ground or short to power in harness or connectors.

- Refer to [AT-246, "Wiring Diagram — AT — MAIN"](#) .

### 3. CHECK LAMP CIRCUIT

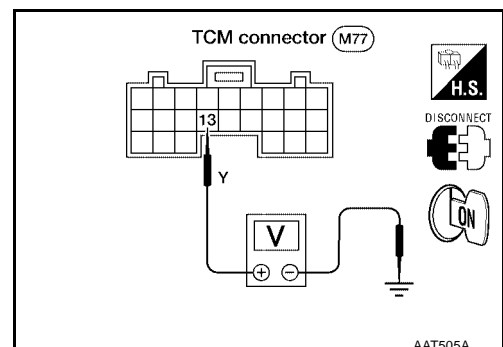
1. Turn ignition switch to ON position.
2. Set overdrive control switch to ON position.
3. Check voltage between TCM harness connector M78 terminal 13 and ground.

Does battery voltage exist?

Yes >> GO TO 4.

No >> Check the following items.

- Fuse
- O/D OFF indicator lamp  
Refer to [DI-25, "WARNING LAMPS"](#) .
- Harness for short or open between ignition switch and O/D OFF indicator lamp (Main harness)
- Refer to [PG-9, "POWER SUPPLY ROUTING"](#) .
- Harness for short or open between O/D OFF indicator lamp and TCM



**4. CHECK SYMPTOM**

---

Check again.

OK or NG

OK >> **INSPECTION END.**

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

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

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

SYMPTOM:

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

### 1. CHECK PNP SWITCH CIRCUIT

 **With CONSULT-II**

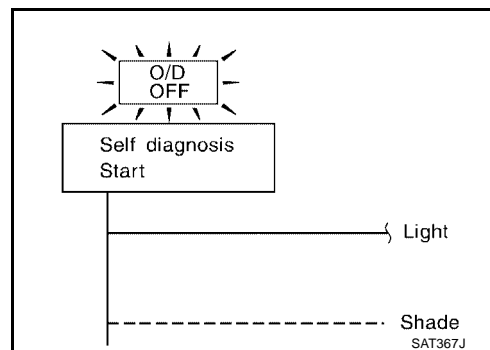
Does "TCM INPUT SIGNALS" in Data Monitor show damage to PNP switch circuit?

 **Without CONSULT-II**

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to [AT-249, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) .
- No >> GO TO 2.

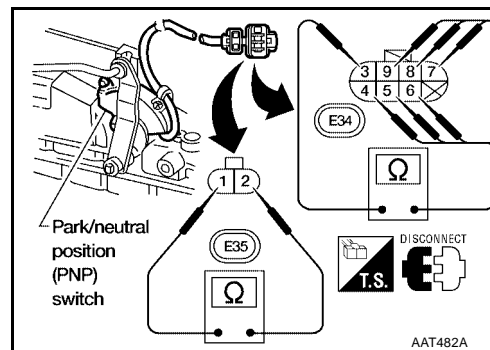


### 2. CHECK PNP SWITCH INSPECTION

Check for short or open of PNP switch 2-pin connector. Refer to [AT-393, "PNP Switch"](#) .

OK or NG

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



### 3. CHECK STARTING SYSTEM

Check starting system. Refer to [SC-9, "STARTING SYSTEM"](#) .

OK or NG

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

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

SYMPTOM:

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

**1. CHECK PARKING COMPONENTS**

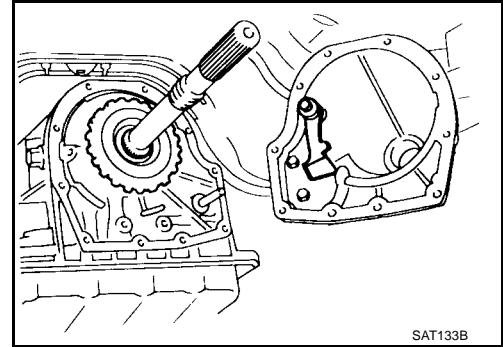
Check parking components.

Refer to [AT-475. "PARKING PAWL COMPONENTS"](#) .

OK or NG

OK >> **INSPECTION END.**

NG &gt;&gt; Repair or replace damaged parts.



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**4. In N Position, Vehicle Moves**

SYMPTOM:

- Vehicle moves forward or backward when selecting N position.

**1. CHECK PNP SWITCH CIRCUIT**

Ⓟ **With CONSULT**

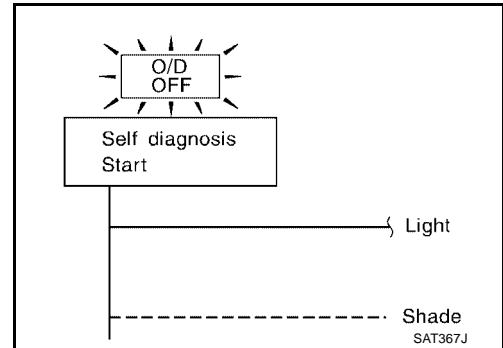
Does "TCM INPUT SIGNALS" in Data Monitor show damage to PNP switch circuit?

ⓧ **Without CONSULT**

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to [AT-249, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) .
- No >> GO TO 2.

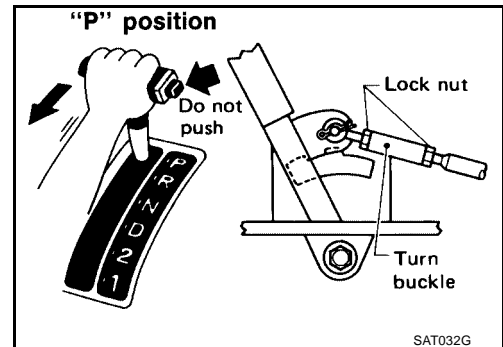


**2. CHECK CONTROL LINKAGE**

Check control linkage. Refer to [AT-406, "Manual Control Linkage Adjustment"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Adjust control linkage. Refer to [AT-406, "Manual Control Linkage Adjustment"](#) .

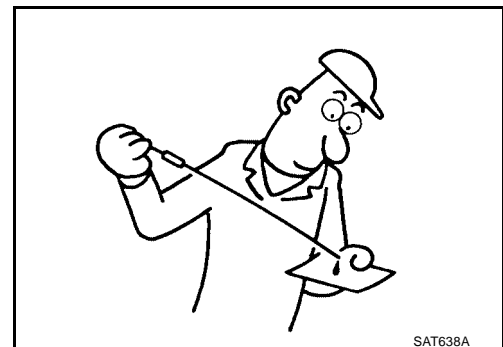


**3. CHECK A/T FLUID LEVEL**

Check A/T fluid level again.

OK or NG

- OK >> GO TO 4.
- NG >> Refill ATF.



SAT638A



#### 4. CHECK A/T FLUID CONDITION

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

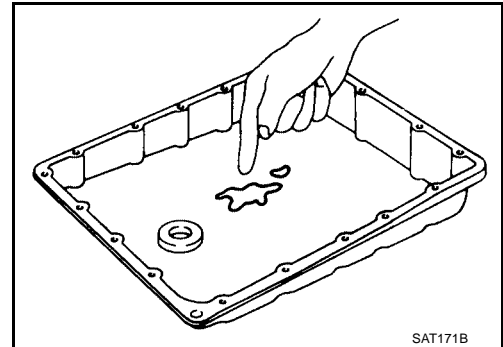
##### OK or NG

OK >> GO TO 5.

NG >> 1. Disassemble A/T.

2. Check the following items:

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



#### 5. CHECK SYMPTOM

Check again.

##### OK or NG

OK >> **INSPECTION END.**

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

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

A

B

AT

D

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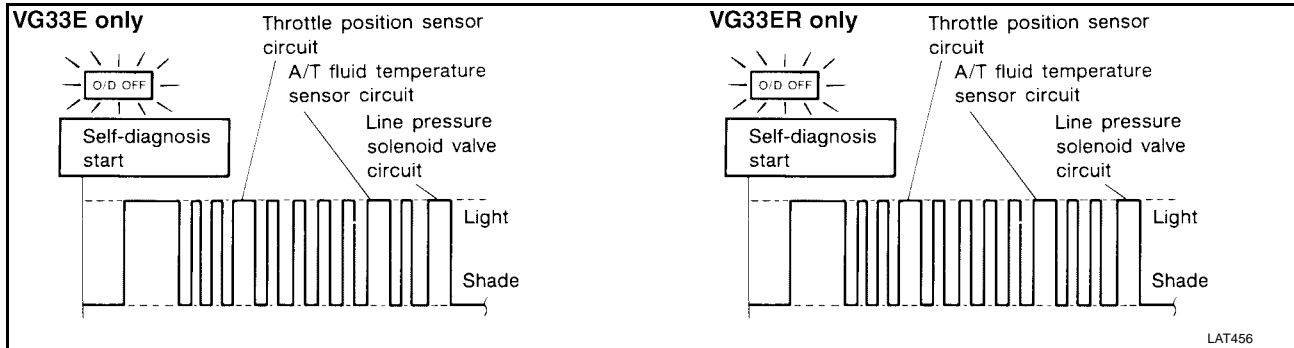
**5. Large Shock. N → R Position**

SYMPTOM:

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

**1. CHECK SELF-DIAGNOSTIC RESULTS**

Does self-diagnosis show damage to A/T fluid temperature sensor, line pressure solenoid valve or throttle position sensor circuit?



Yes or No

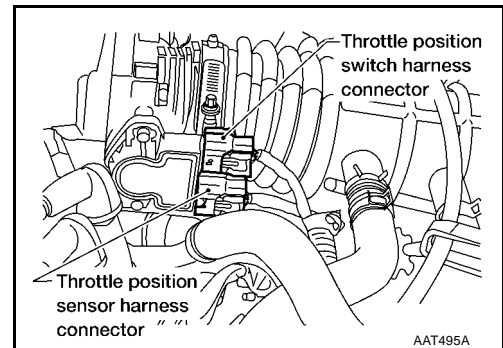
- Yes >> Check damaged circuit. Refer to [AT-255, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"](#) , [AT-306, "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#) , [AT-321, "DTC P1705 THROTTLE POSITION SENSOR"](#) .
- No >> GO TO 2.

**2. CHECK THROTTLE POSITION SENSOR**

Check throttle position sensor. Refer to [EC-753, "DTC P0121 TP SENSOR"](#) (VG33E only) or [EC-1362, "DTC P0121 TP SENSOR"](#) (VG33ER only).

OK or NG

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

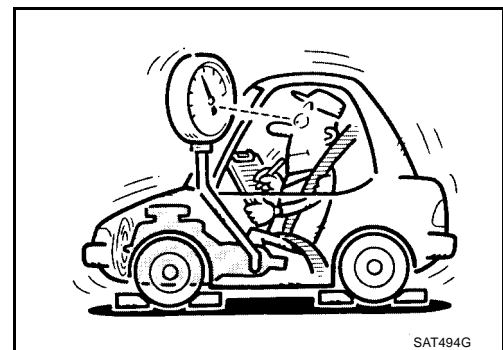


**3. CHECK LINE PRESSURE**

Check line pressure at idle with selector lever in D position. Refer to [AT-214, "Line Pressure Test"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> 1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#) .
2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
  - Line pressure solenoid valve



**4. CHECK SYMPTOM**

---

Check again.

OK or NG

OK >> **INSPECTION END.**

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

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

A

B

AT

D

E

F

G

H

I

J

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

SYMPTOM:

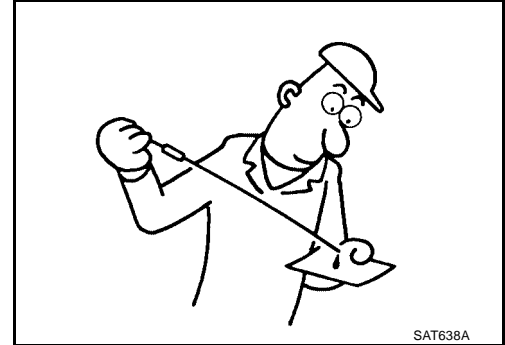
- Vehicle does not creep backward when selecting R position.

### 1. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

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



SAT638A

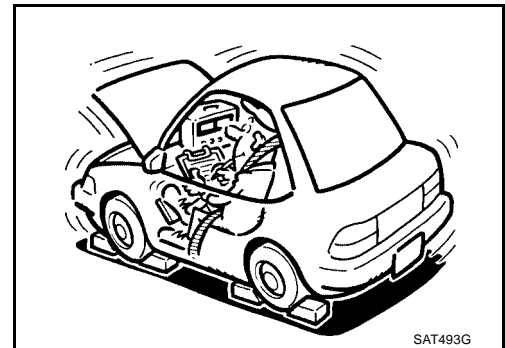
### 2. CHECK STALL TEST

Check stall revolution with selector lever in 1 and R positions.  
Refer to [AT-496, "Stall Revolution"](#) .

OK or NG

- OK >> GO TO 3.
- OK in 1 position, NG in R position>>1.Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#) .
- 2. Check the following items:
  - Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
  - Line pressure solenoid valve
- 3. Disassemble A/T.
- 4. Check the following items:
  - Oil pump assembly
  - Torque converter
  - Reverse clutch assembly
  - High clutch assembly

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



SAT493G

## 3. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in R position. Refer to [AT-214, "Line Pressure Test"](#) .

OK or NG

OK >> GO TO 4.

NG >> 1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#) .

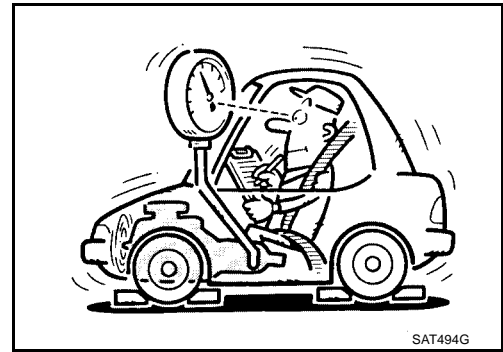
2. Check the following items:

- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve

3. Disassemble A/T.

4. Check the following items:

- Oil pump assembly



## 4. CHECK A/T FLUID CONDITION

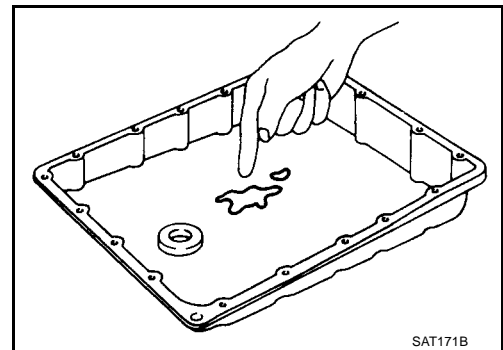
1. Remove oil pan.

2. Check A/T fluid condition.

OK or NG

OK >> GO TO 5.

NG >> GO TO 6.



## 5. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END.**

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

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

A  
B  
AT  
D  
E  
F  
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I  
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L  
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---

## 6. DETECT MALFUNCTIONING ITEM

---

1. Remove control valve assembly. Refer to [AT-402. "REMOVAL"](#) .
2. Check the following items:
  - Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
  - Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following items:
  - Oil pump assembly
  - Torque converter
  - Reverse clutch assembly
  - High clutch assembly
  - Low & reverse brake assembly
  - Low one-way clutch

>> Repair or replace damaged parts.

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

SYMPTOM:

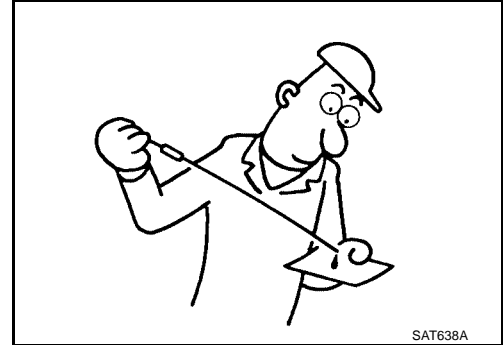
- Vehicle does not creep forward when selecting D, 2 or 1 position.

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

Check A/T fluid level again.

OK or NG

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



SAT638A

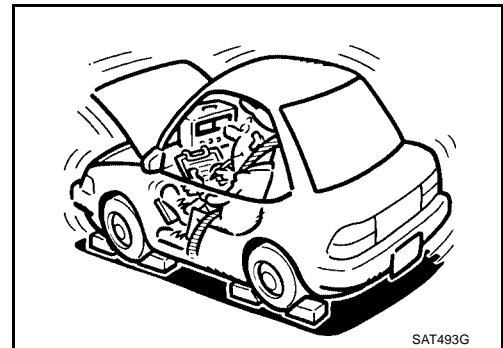
**2. CHECK STALL TEST**

Check stall revolution with selector lever in D position.

Refer to [AT-211, "Stall Test"](#) .

OK or NG

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



SAT493G

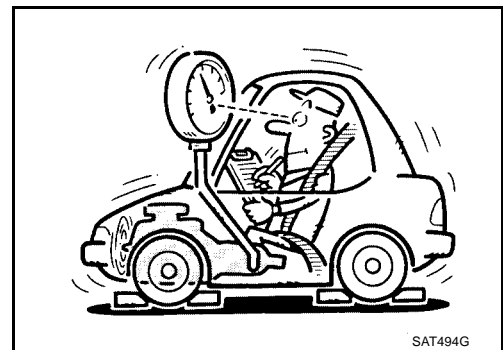
**3. CHECK LINE PRESSURE**

Check line pressure at idle with selector lever in R position.

Refer to [AT-214, "Line Pressure Test"](#) .

OK or NG

- OK >> GO TO 4.  
 NG >> 1. Remove control valve assembly.  
     Refer to [AT-402, "REMOVAL"](#) .  
 2. Check the following items:
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
  - Line pressure solenoid valve
3. Disassemble A/T.  
 4. Check the following items:
- Oil pump assembly



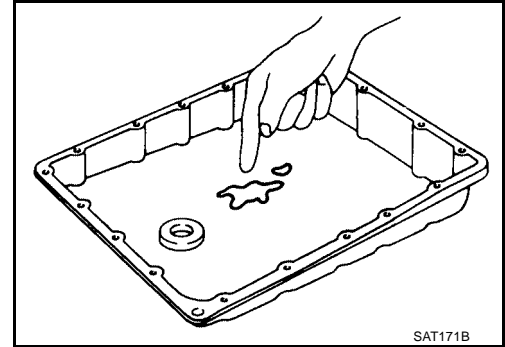
SAT494G

#### 4. CHECK A/T FLUID CONDITION

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

OK or NG

- OK >> GO TO 5.  
 NG >> GO TO 6.



SAT171B

#### 5. CHECK SYMPTOM

Check again.

OK or NG

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

#### 6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#).
2. Check the following items:
  - Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
  - Line pressure solenoid valve
3. Disassemble A/T.
4. Check the following items:
  - Oil pump assembly
  - Forward clutch assembly
  - Forward one-way clutch
  - Low one-way clutch
  - Low & reverse brake assembly
  - Torque converter

>> Repair or replace damaged parts.



**8. Vehicle Cannot Be Started From D1**

SYMPTOM:

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

**1. CHECK SYMPTOM**

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

Yes or No

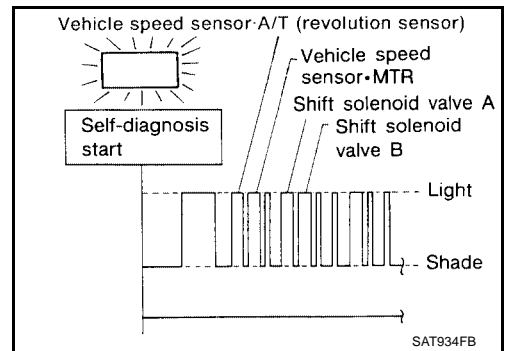
- Yes >> GO TO 2.
- No >> Go to [AT-364, "6. Vehicle Does Not Creep Backward In R Position"](#).

**2. CHECK SELF-DIAGNOSTIC RESULTS**

Does self-diagnosis show damage to vehicle speed sensor-A/T (revolution sensor), shift solenoid valve A, B or vehicle speed sensor-MTR after cruise test?

Yes or No

- Yes >> Check damaged circuit. Refer to [AT-261, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#), [AT-311, "DTC P0750 SHIFT SOLENOID VALVE A"](#), [AT-316, "DTC P0755 SHIFT SOLENOID VALVE B"](#), or [AT-340, "DTC VEHICLE SPEED SENSOR-MTR"](#).
- No >> GO TO 3.

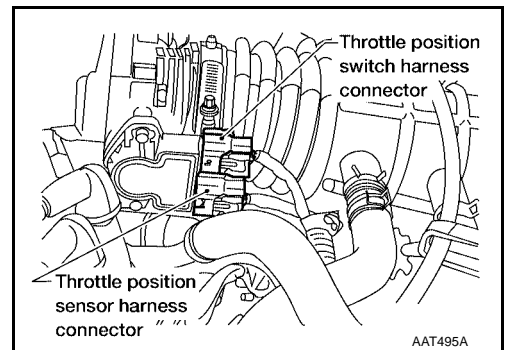


**3. CHECK THROTTLE POSITION SENSOR**

Check throttle position sensor. Refer to [EC-753, "DTC P0121 TP SENSOR"](#) (VG33E only) or [EC-1362, "DTC P0121 TP SENSOR"](#) (VG33ER only).

OK or NG

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

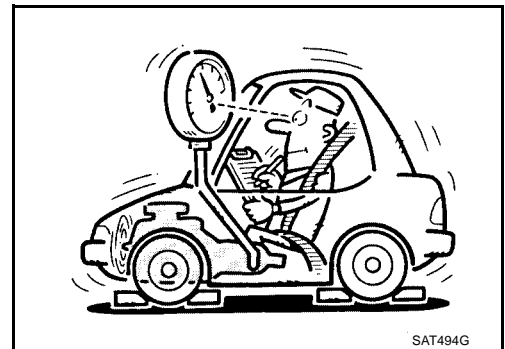


**4. CHECK LINE PRESSURE**

Check line pressure at stall point with selector lever in D position. Refer to [AT-214, "Line Pressure Test"](#).

OK or NG

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

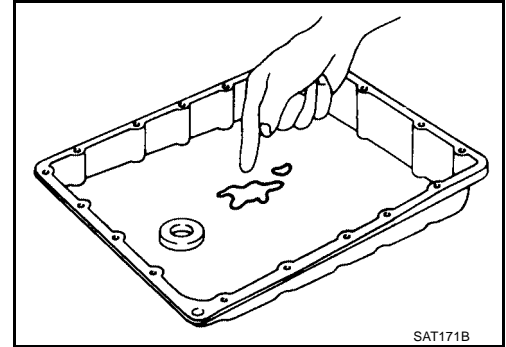


**5. CHECK A/T FLUID CONDITION**

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

OK or NG

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



SAT171B

**6. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly.  
 Refer to [AT-402, "REMOVAL"](#).
2. Check the following items:
  - Shift valve A
  - Shift valve B
  - Shift solenoid valve A
  - Shift solenoid valve B
  - Pilot valve
  - Pilot filter

OK or NG

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

**7. CHECK SYMPTOM**

Check again.

OK or NG

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

**8. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly.  
Refer to [AT-402, "REMOVAL"](#) .
  2. Check the following items:
    - Shift valve A
    - Shift valve B
    - Shift solenoid valve A
    - Shift solenoid valve B
    - Pilot valve
    - Pilot filter
  3. Disassemble A/T.
  4. Check the following items:
    - Forward clutch assembly
    - Forward one-way clutch
    - Low one-way clutch
    - High clutch assembly
    - Torque converter
    - Oil pump assembly
- OK or NG
- OK >> GO TO 7.
- NG >> Repair or replace damaged parts.

A

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

SYMPTOM:

- A/T does not shift from D1 to D2 at the specified speed.  
A/T does not shift from D4 to D2 when depressing accelerator pedal fully at the specified speed.

### 1. CHECK SYMPTOM

Are "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position" and "8. Vehicle Cannot Be Started From D1 " OK?

Yes or No

Yes >> GO TO 2.

No >> Go to [AT-367, "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position"](#) and [AT-369, "8. Vehicle Cannot Be Started From D1"](#) .

### 2. CHECK PNP SWITCH CIRCUIT

**With CONSULT**

Does "TCM INPUT SIGNALS" in Data Monitor show damage to PNP switch circuit?

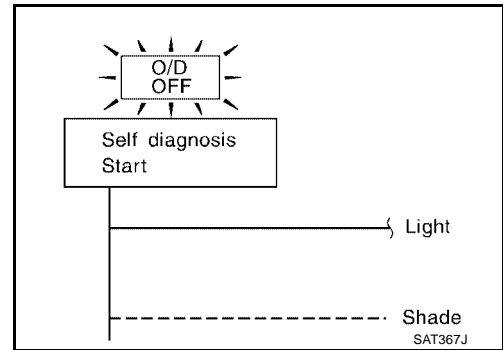
**Without CONSULT**

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to [AT-249, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) .

No >> GO TO 3.



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

Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-261, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and [AT-340, "DTC VEHICLE SPEED SENSOR-MTR"](#) .

OK or NG

OK >> GO TO 4.

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

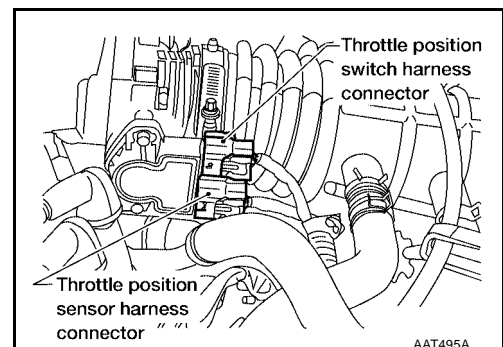
### 4. CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to [EC-753, "DTC P0121 TP SENSOR"](#) (VG33E only) or [EC-1362, "DTC P0121 TP SENSOR"](#) (VG33ER only).

OK or NG

OK >> GO TO 5.

NG >> Repair or replace throttle position sensor.

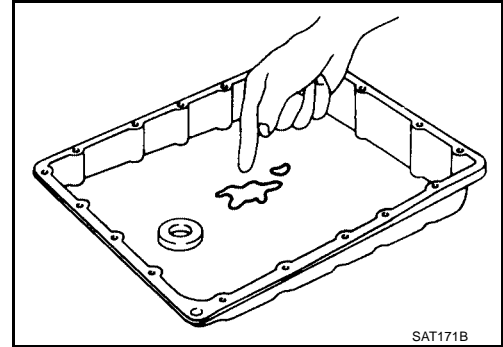


**5. CHECK A/T FLUID CONDITION**

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

OK or NG

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



**6. DETECT MALFUNCTIONING ITEM**

1. Remove control valve. Refer to [AT-402, "REMOVAL"](#).
2. Check the following items:
  - Shift valve A
  - Shift solenoid valve A
  - Pilot valve
  - Pilot filter

OK or NG

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

**7. CHECK SYMPTOM**

Check again.

OK or NG

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

**8. DETECT MALFUNCTIONING ITEM**

1. Remove control valve. Refer to [AT-402, "REMOVAL"](#).
2. Check the following items:
  - Shift valve A
  - Shift solenoid valve A
  - Pilot valve
  - Pilot filter
3. Disassemble A/T.
4. Check the following items:
  - Servo piston assembly
  - Brake band
  - Oil pump assembly

OK or NG

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

**10. A/T Does Not Shift: D2 → D3**

SYMPTOM:

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

**1. CHECK SYMPTOM**

Are "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position" and "8. Vehicle Cannot Be Started From D1 " OK?

Yes or No

Yes >> GO TO 2.

No >> Go to [AT-367, "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position"](#) and [AT-369, "8. Vehicle Cannot Be Started From D1"](#).

**2. CHECK PNP SWITCH CIRCUIT**

**With CONSULT**

Does "TCM INPUT SIGNALS" in Data Monitor show damage to PNP switch circuit?

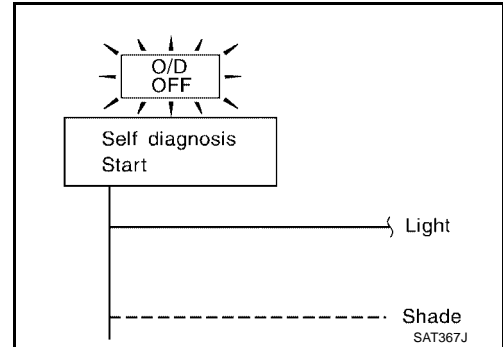
**Without CONSULT**

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to [AT-249, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#).

No >> GO TO 3.



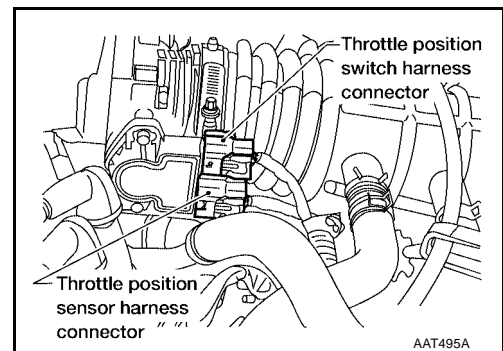
**3. CHECK THROTTLE POSITION SENSOR**

Check throttle position sensor. Refer to [EC-753, "DTC P0121 TP SENSOR"](#) (VG33E only) or [EC-1362, "DTC P0121 TP SENSOR"](#) (VG33ER only).

OK or NG

OK >> GO TO 4.

NG >> Repair or replace throttle position sensor.

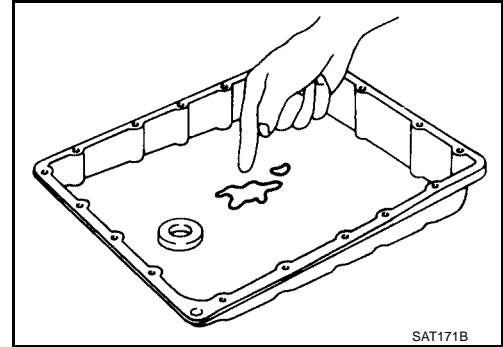


**4. CHECK A/T FLUID CONDITION**

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

OK or NG

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

**5. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#).
2. Check the following items:
  - Shift valve B
  - Shift solenoid valve B
  - Pilot valve
  - Pilot filter

OK or NG

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

**6. CHECK SYMPTOM**

Check again.

OK or NG

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

**7. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#).
2. Check the following items:
  - Shift valve B
  - Shift solenoid valve B
  - Pilot valve
  - Pilot filter
3. Disassemble A/T.
4. Check the following items:
  - Servo piston assembly
  - High clutch assembly
  - Oil pump assembly

OK or NG

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

**11. A/T Does Not Shift: D3 → D4**

SYMPTOM:

- A/T does not shift from D3 to D4 at the specified speed.
- A/T must be warm before D3 to D4 shift will occur.

**1. CHECK SYMPTOM**

Are "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position" and "8. Vehicle Cannot Be Started From D1" OK?

Yes or No

Yes >> GO TO 2.

No >> Go to [AT-367, "7. Vehicle Does Not Creep Forward In D, 2 Or 1 Position"](#) and [AT-369, "8. Vehicle Cannot Be Started From D1"](#).

**2. CHECK SELF-DIAGNOSTIC RESULTS**

 **With CONSULT**

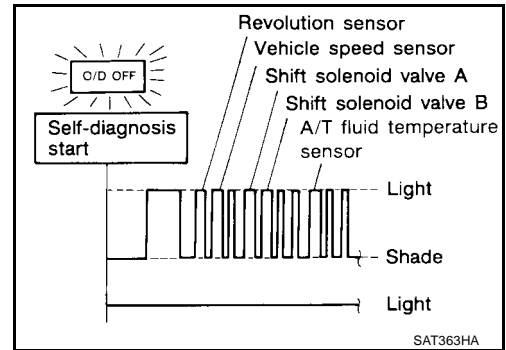
Does self-diagnosis, after Cruise Test, show damage to any of the following circuits?

- PNP switch
- Overdrive control switch
- A/T fluid temperature sensor
- Revolution sensor
- Shift solenoid valve A or B
- Vehicle speed sensor

Yes or No

Yes >> Check damaged circuit. Refer to [AT-321, "DTC P1705 THROTTLE POSITION SENSOR"](#), [AT-255, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"](#), [AT-261, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#), [AT-311, "DTC P0750 SHIFT SOLENOID VALVE A"](#), [AT-316, "DTC P0755 SHIFT SOLENOID VALVE B"](#), or [AT-340, "DTC VEHICLE SPEED SENSOR-MTR"](#).

No >> GO TO 3.



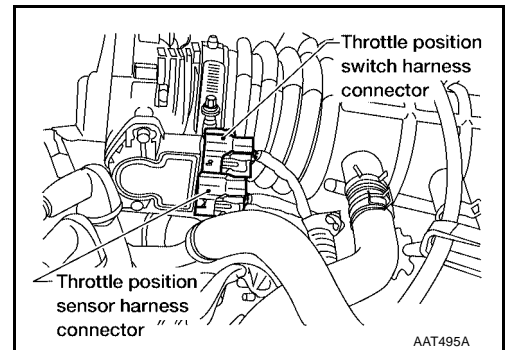
**3. CHECK THROTTLE POSITION SENSOR**

Check throttle position sensor. Refer to [EC-753, "DTC P0121 TP SENSOR"](#) (VG33E only) or [EC-1362, "DTC P0121 TP SENSOR"](#) (VG33ER only).

OK or NG

OK >> GO TO 4.

NG >> Repair or replace throttle position sensor.



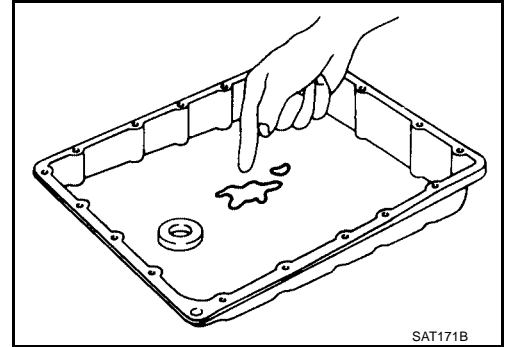


**4. CHECK A/T FLUID CONDITION**

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

OK or NG

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



**5. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#).
2. Check the following items:
  - Shift valve B
  - Overrun clutch control valve
  - Shift solenoid valve B
  - Pilot valve
  - Pilot filter

OK or NG

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

**6. CHECK SYMPTOM**

Check again.

OK or NG

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

**7. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#).
2. Check the following items:
  - Shift valve B
  - Overrun clutch control valve
  - Shift solenoid valve B
  - Pilot valve
  - Pilot filter
3. Disassemble A/T.
4. Check the following items:
  - Servo piston assembly
  - Brake band
  - Torque converter
  - Oil pump assembly

OK or NG

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

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

SYMPTOM:

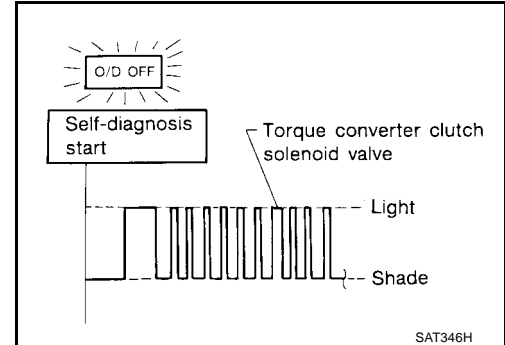
- A/T does not perform lock-up at the specified speed.

### 1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to torque converter clutch solenoid valve circuit after Cruise Test?

Yes or No

- Yes >> Check torque converter clutch solenoid valve circuit. Refer to [AT-293, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#).
- No >> GO TO 2.

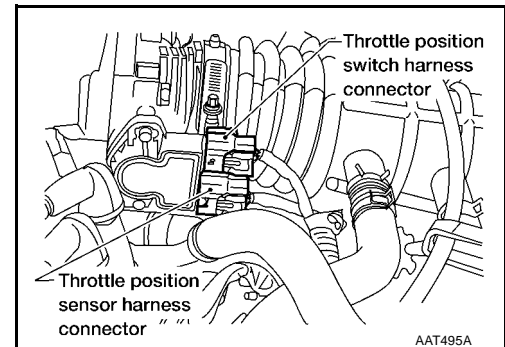


### 2. CHECK THROTTLE POSITION SENSOR

Check throttle position sensor. Refer to [EC-753, "DTC P0121 TP SENSOR"](#) (VG33E only) or [EC-1362, "DTC P0121 TP SENSOR"](#) (VG33ER only).

OK or NG

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



### 3. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to [AT-402, "REMOVAL"](#).
2. Check following items:
  - Torque converter clutch control valve
  - Torque converter relief valve
  - Torque converter clutch solenoid valve
  - Pilot valve
  - Pilot filter

OK or NG

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

### 4. CHECK SYMPTOM

Check again.

OK or NG

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

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

SYMPTOM:

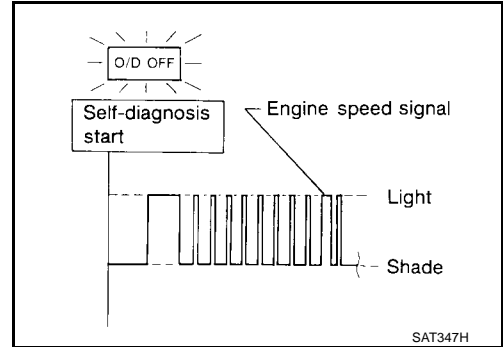
- A/T does not hold lock-up condition for more than 30 seconds.

**1. CHECK DIAGNOSTIC RESULTS**

Does self-diagnosis show damage to engine speed signal circuit after Cruise Test?

Yes or No

- Yes >> Check engine speed signal circuit. Refer to [AT-266, "DTC P0725 ENGINE SPEED SIGNAL"](#).
- No >> GO TO 2.

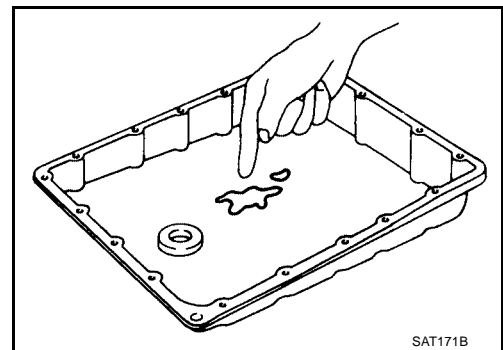


**2. CHECK A/T FLUID CONDITION**

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

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 5.



**3. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#).
2. Check the following items:
  - Torque converter clutch control valve
  - Pilot valve
  - Pilot filter

OK or NG

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

**4. CHECK SYMPTOM**

Check again.

OK or NG

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

---

## 5. DETECT MALFUNCTIONING ITEM

---

1. Remove control valve assembly. Refer to [AT-402. "REMOVAL"](#) .
2. Check the following items:
  - Torque converter clutch control valve
  - Pilot valve
  - Pilot filter
3. Disassemble A/T.
4. Check torque converter and oil pump assembly.

### OK or NG

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

**14. Lock-up Is Not Released**

SYMPTOM:

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

**1. CHECK THROTTLE POSITION SWITCH CIRCUIT**

**With CONSULT**

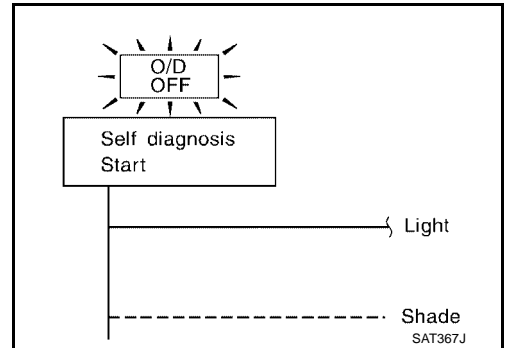
Does "TCM INPUT SIGNALS" in Data Monitor show damage to closed throttle position switch circuit?

**Without CONSULT**

Does self-diagnosis show damage to closed throttle position switch circuit?

Yes or No

- Yes >> Check closed throttle position switch circuit. Refer to [AT-321, "DTC P1705 THROTTLE POSITION SENSOR"](#).
- No >> GO TO 2.



**2. CHECK SYMPTOM**

Check again.

OK or NG

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

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

SYMPTOM:

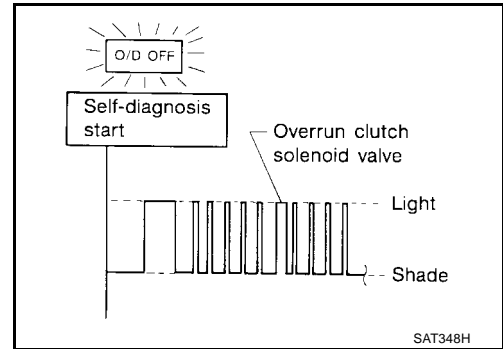
- Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 .
- Vehicle does not decelerate by engine brake when turning overdrive control switch OFF.
- Vehicle does not decelerate by engine brake when shifting A/T from D to 2 position.

**1. CHECK SELF-DIAGNOSTIC RESULTS**

Does self-diagnosis show damage to overrun clutch solenoid valve circuit after Cruise Test?

Yes or No

- Yes >> Check overrun clutch solenoid valve circuit. Refer to [AT-329, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"](#) .
- No >> GO TO 2.

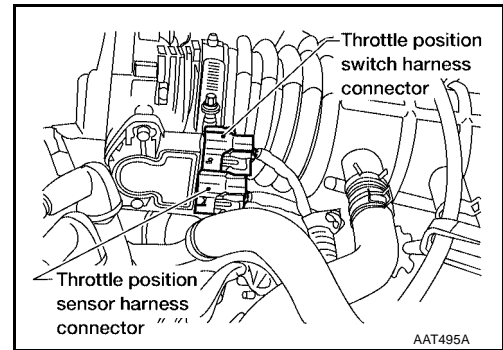


**2. CHECK THROTTLE POSITION SENSOR**

Check throttle position sensor. Refer to [EC-753, "DTC P0121 TP SENSOR"](#) (VG33E only) or [EC-1362, "DTC P0121 TP SENSOR"](#) (VG33ER only).

OK or NG

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

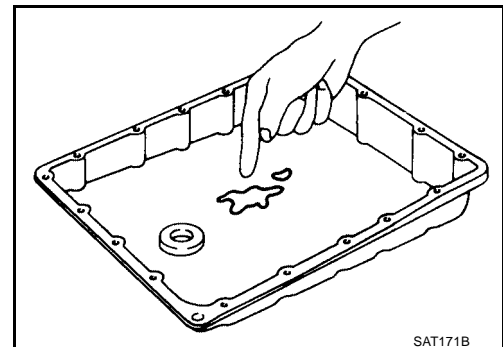


**3. CHECK A/T FLUID CONDITION**

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

OK or NG

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



**4. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#) .
2. Check the following items:
  - Overrun clutch control valve
  - Overrun clutch reducing valve
  - Overrun clutch solenoid valve

OK or NG

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

**5. CHECK SYMPTOM**

Check again.

OK or NG

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

**6. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-402, "REMOVAL"](#) .
2. Check the following items:
  - Overrun clutch control valve
  - Overrun clutch reducing valve
  - Overrun clutch solenoid valve
3. Disassemble A/T.
4. Check the following items:
  - Overrun clutch assembly
  - Oil pump assembly

OK or NG

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

**16. Vehicle Does Not Start From D1**

ECS0070M

SYMPTOM:

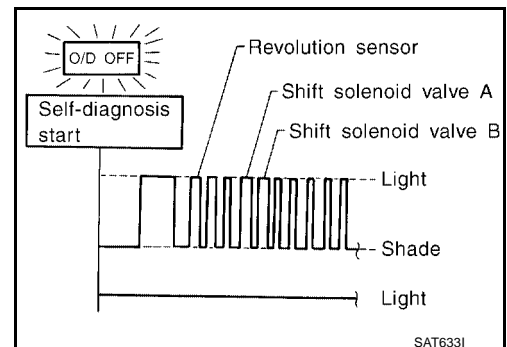
- **Vehicle does not start from D1 on Cruise Test — Part 2.**

**1. CHECK SELF-DIAGNOSTIC RESULTS**

Does self-diagnosis show damage to vehicle speed sensor-A/T (revolution sensor), shift solenoid valve A, B or vehicle speed sensor-MTR after Cruise Test?

Yes or No

- Yes >> Check damaged circuit. Refer to [AT-261, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) , [AT-311, "DTC P0750 SHIFT SOLENOID VALVE A"](#) , [AT-316, "DTC P0755 SHIFT SOLENOID VALVE B"](#) , or [AT-340, "DTC VEHICLE SPEED SENSOR-MTR"](#) .
- No >> GO TO 2.



---

## 2. CHECK SYMPTOM

---

Check again.

OK or NG

- OK >> Go to [AT-369, "8. Vehicle Cannot Be Started From D1"](#) .
- NG >> 1. Perform TCM input/output signal inspection.  
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.



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

SYMPTOM:

- A/T does not shift from D4 to D3 when changing overdrive control switch to OFF position.

**1. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT**

**With CONSULT**

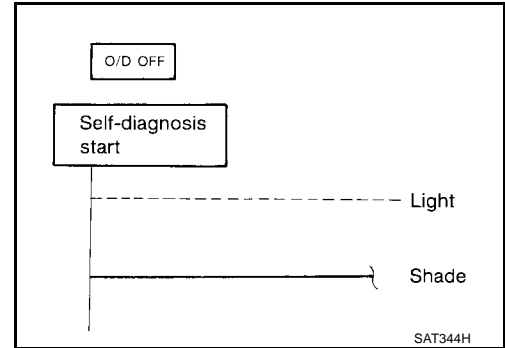
Does "TCM INPUT SIGNALS" in Data Monitor show damage to overdrive control switch circuit?

**Without CONSULT**

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

Yes or No

- Yes >> Check overdrive control switch circuit. Refer to [AT-389](#), "DIAGNOSTIC PROCEDURE".
- No >> Go to [AT-374](#), "10. A/T Does Not Shift: D2 → D3".



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

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

SYMPTOM:

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

**1. CHECK PNP SWITCH CIRCUIT**

**Ⓜ With CONSULT**

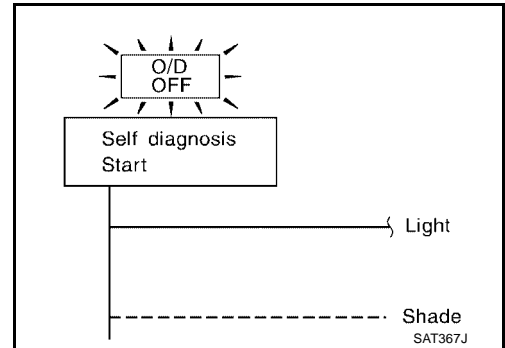
Does "TCM INPUT SIGNALS" in Data Monitor show damage to PNP switch circuit?

**ⓧ Without CONSULT**

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to [AT-249, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) .
- No >> Go to [AT-372, "9. A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2"](#) .



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

SYMPTOM:

- A/T does not shift from 22 to 11 when changing selector lever from 2 to 1 position.

**1. CHECK PNP SWITCH CIRCUIT**

 **With CONSULT**

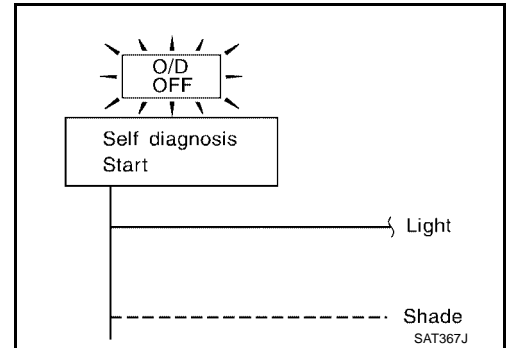
Does "TCM INPUT SIGNALS" in Data Monitor show damage to PNP switch circuit?

 **Without CONSULT**

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to [AT-249, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) .
- No >> GO TO 2.

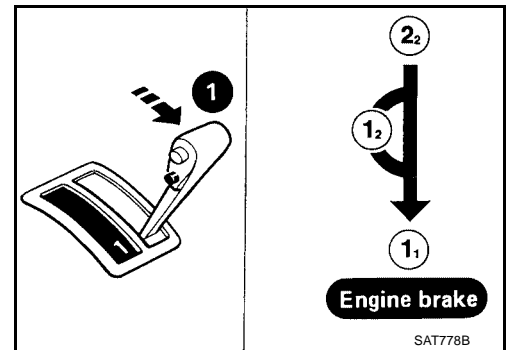


**2. CHECK SYMPTOM**

Check again.

OK or NG

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



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

SYMPTOM:

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

**1. CHECK SYMPTOM**

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

Yes or No

- Yes >> Go to [AT-382, "15. Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) .
- No >> Go to [AT-364, "6. Vehicle Does Not Creep Backward In R Position"](#) .

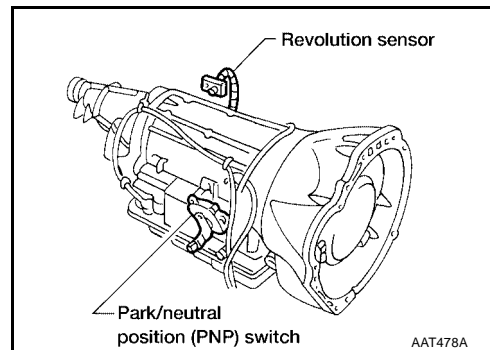
**21. TCM Self-diagnosis Does Not Activate (PNP, Overdrive Control and Throttle Position Switches Circuit Checks)**

SYMPTOM:

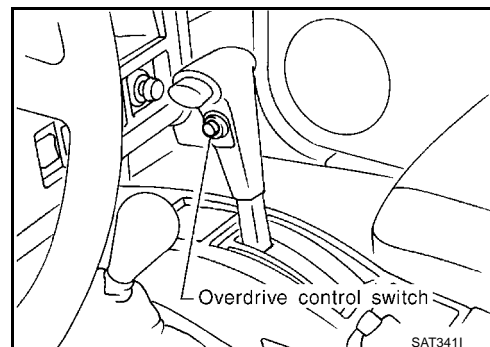
- O/D OFF indicator lamp does not come on in TCM self-diagnostic procedure even the lamp circuit is good.

## DESCRIPTION

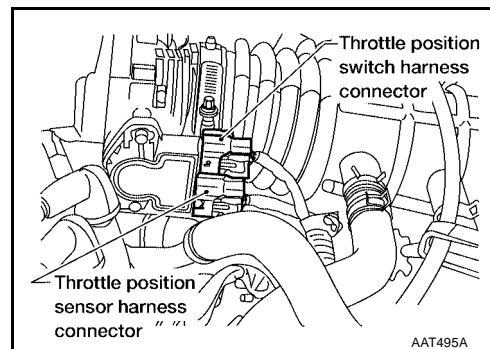
- PNP switch  
The PNP switch assembly includes a transmission range switch. The transmission range switch detects the selector position and sends a signal to the TCM.



- Overdrive control switch  
Detects the overdrive control switch position (ON or OFF) and sends a signal to the TCM.



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



## DIAGNOSTIC PROCEDURE

### NOTE:

The diagnostic procedure includes inspections for the overdrive control and throttle position switch circuits.

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

### With CONSULT-II

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

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

SAT701J

### OK or NG

OK >> GO TO 3.

NG >> Check the following items:

- PNP switch  
Refer to [AT-393, "PNP Switch"](#) .
- Harness for short or open between ignition switch and PNP switch (Main harness)
- Harness for short or open between PNP switch and TCM (Main harness)

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

### Without CONSULT-II

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

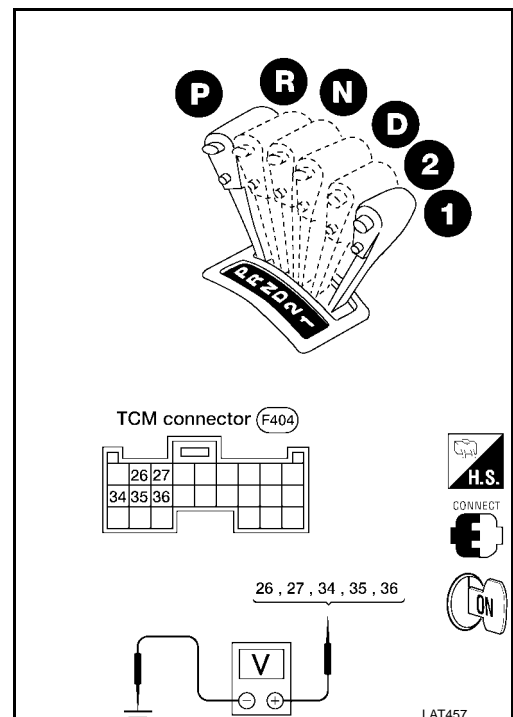
Lever Position	Terminals				
	36	35	34	27	26
P, N	B	0	0	0	0
R	0	B	0	0	0
D	0	0	B	0	0
2	0	0	0	B	0
1	0	0	0	0	B

Does battery voltage exist (B) or non-existent (0)?

Yes >> GO TO 3.

No >> Check the following items:

- PNP switch  
Refer to [AT-393, "PNP Switch"](#) .
- Harness for short or open between ignition switch and PNP switch (Main harness)
- Harness for short or open between PNP switch and TCM (Main harness)



## 3. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

 **With CONSULT-II**

1. Turn ignition switch to ON position.  
(Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "OVERDRIVE SW". Check the signal of the overdrive control switch is indicated properly.  
(Overdrive control switch ON displayed on CONSULT-II means overdrive OFF.)

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

SAT645J

 **Without CONSULT-II**

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

2. Check voltage between TCM harness connector M77 terminal 22 and ground when overdrive control switch is ON and OFF.

**Voltage**

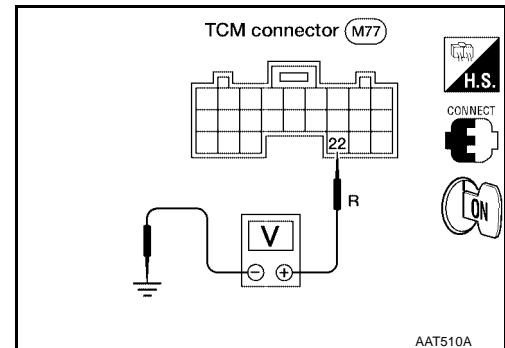
**Switch position ON : Battery voltage**

**Switch position OFF : 1V or less**

OK or NG

- OK (With CONSULT-II)>> GO TO 4.  
 OK (Without CONSULT-II)>> GO TO 5.  
 NG >> Check the following items:

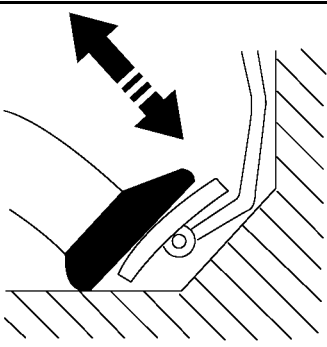
- Overdrive control switch  
Refer to [AT-392, "Overdrive Control Switch"](#) .
- Harness for short or open between TCM and overdrive control switch (Main harness)
- Harness for short or open of ground circuit for overdrive control switch (Main harness)



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

**With CONSULT-II**

1. Turn ignition switch to ON position.  
(Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "CLOSED THL/SW" and "W/O THRL/P-SW" depressing and releasing accelerator pedal.  
Check the signal of throttle position switch is indicated properly.



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

SAT646J

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

**OK or NG**

OK >> GO TO 6.

NG >> Check the following items:

- Throttle position switch  
Refer to [AT-394, "Throttle Position Switch"](#).
- Harness for short or open between ignition switch and throttle position switch (Main harness)
- Harness for short or open between throttle position switch and TCM (Main harness)

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

⊗ **Without CONSULT-II**

1. Turn ignition switch to ON position.  
(Do not start engine.)
2. Check voltage between TCM terminals (16, 17) and ground while depressing, and releasing accelerator pedal slowly. (after warming up engine).

Accelerator pedal condition	Voltage	
	Terminal No. 16	Terminal No. 17
Released	Battery voltage	0V
Fully Depressed	0V	Battery voltage

WAT337

OK or NG

OK >> GO TO 6.

NG >> Check the following items:

- Throttle position switch  
Refer to [AT-394, "Throttle Position Switch"](#) .
- Harness for short or open between ignition switch and throttle position switch (Main harness)
- Harness for short or open between throttle position switch and TCM (Main harness)

**6. CHECK DTC**

Perform diagnostic procedure. Refer to [AT-389, "DIAGNOSTIC PROCEDURE"](#) .

OK or NG

OK >> **INSPECTION END.**

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

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

**COMPONENT INSPECTION**

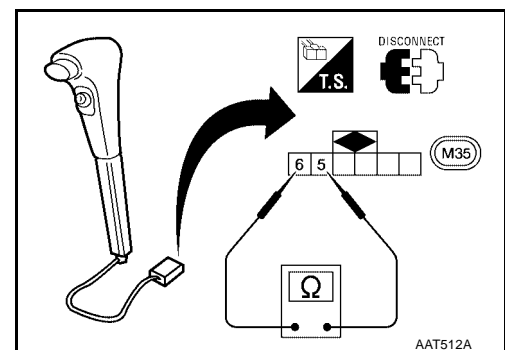
**Overdrive Control Switch**

- Check continuity between terminals 5 and 6.

**Continuity**

Switch position ON : No

Switch position OFF : Yes





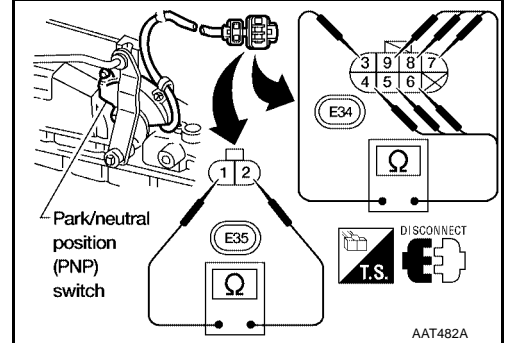
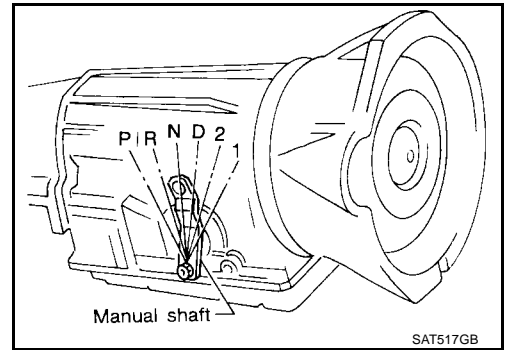
# TROUBLE DIAGNOSES FOR SYMPTOMS

[RE4R01A]

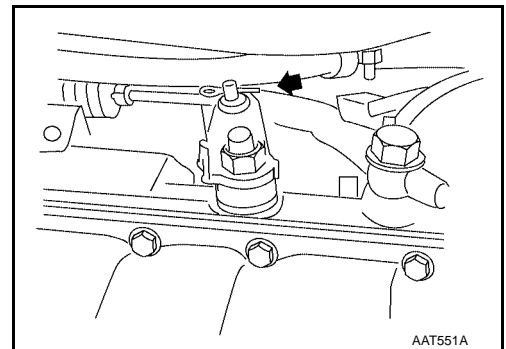
## PNP Switch

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

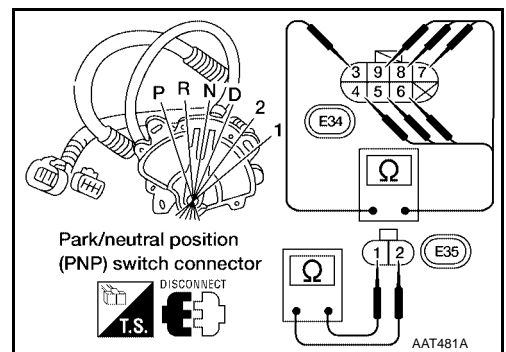
Lever position	P	R	N	D	2	1
Terminal No.	1 - 2 3 - 4	3 - 5	1 - 2 3 - 6	3 - 7	3 - 8	3 - 9



2. If NG, check again with manual control linkage disconnected from manual shaft of A/T assembly. Refer to step 1.
3. If OK on step 2, adjust manual control linkage. Refer to [AT-406. "Manual Control Linkage Adjustment"](#).



4. If NG on step 2, remove PNP switch from A/T and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to [AT-405. "Park/Neutral Position \(PNP\) Switch Adjustment"](#).
6. If NG on step 4, replace PNP switch.

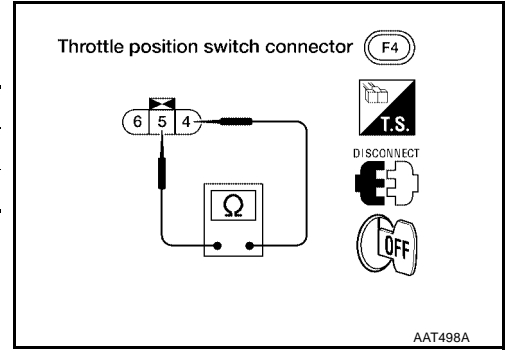


## Throttle Position Switch

### Closed Throttle Position Switch (Idle Position)

- Check continuity between terminals 4 and 5.

Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

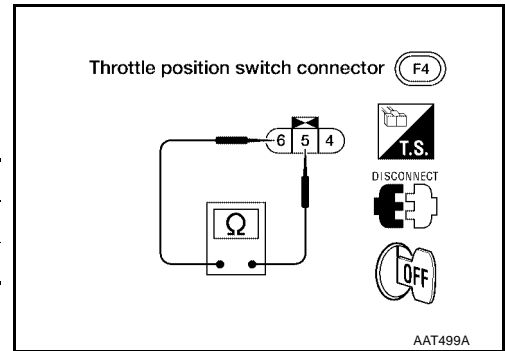


- To adjust closed throttle position switch, refer to [EC-652](#) (VG33E only) or [EC-1255](#) (VG33ER only), "Basic Inspection".

### Wide Open Throttle Position Switch

- Check continuity between terminals 5 and 6.

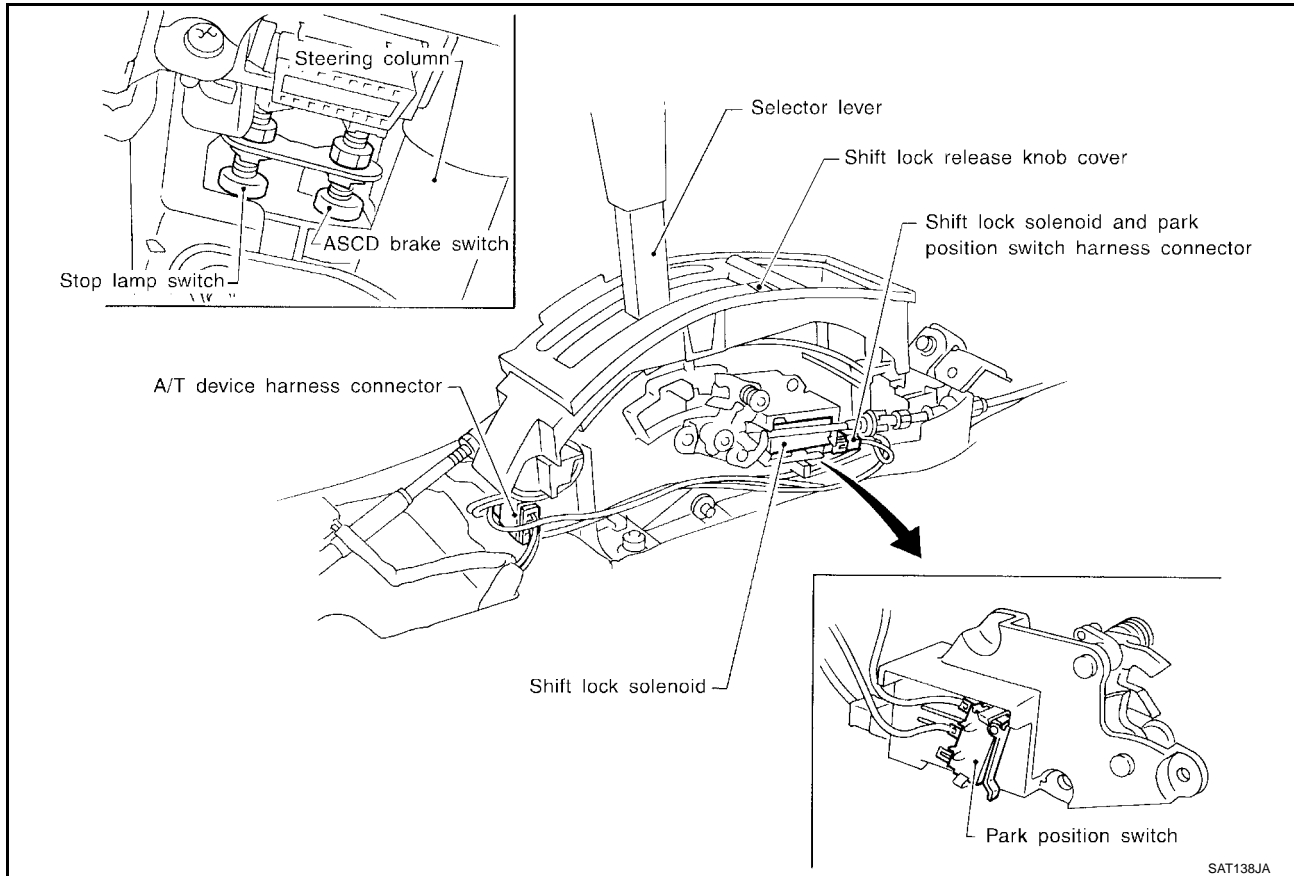
Accelerator pedal condition	Continuity
Released	No
Depressed	Yes



## A/T SHIFT LOCK SYSTEM

### Description

- The mechanical key interlock mechanism also operates as a shift lock:  
 With the key switch turned to ON, the selector lever cannot be shifted from P (park) 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.



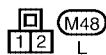
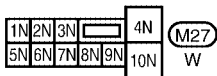
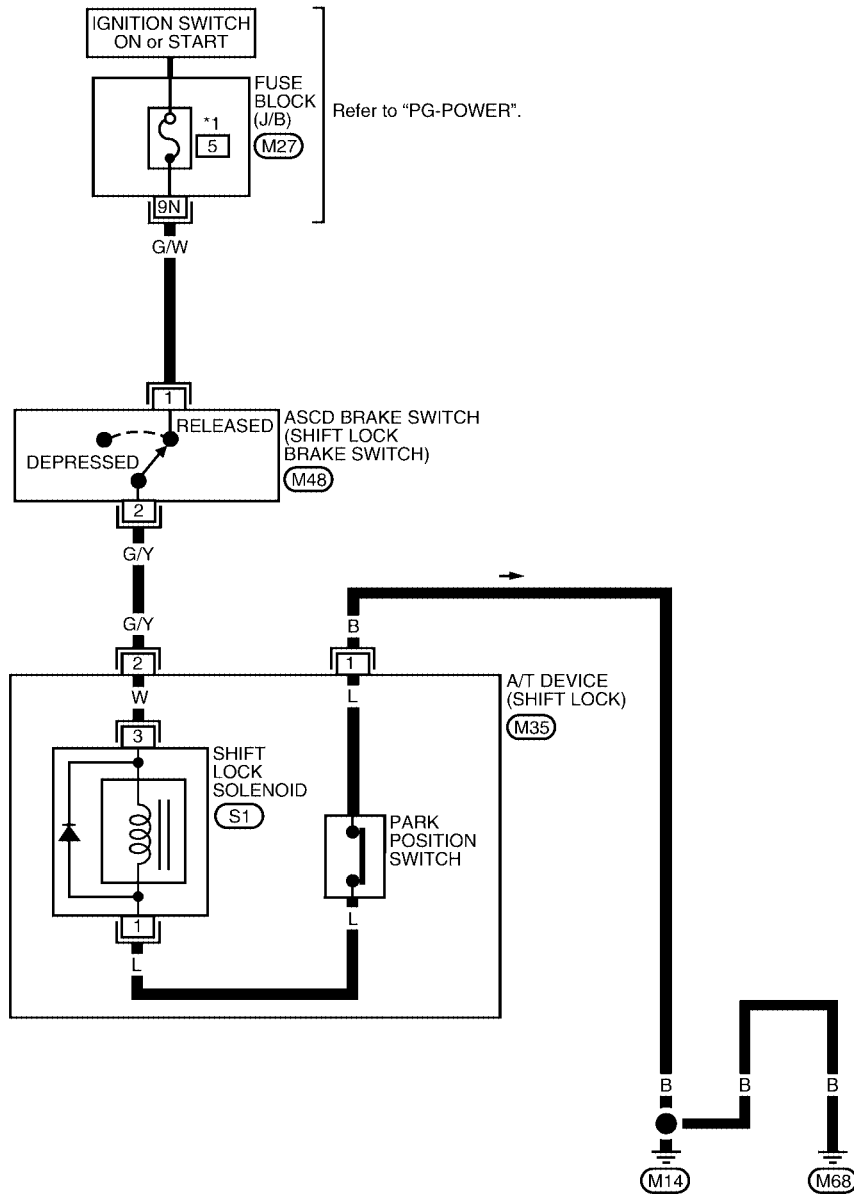
# A/T SHIFT LOCK SYSTEM

[RE4R01A]

## Wiring Diagram — SHIFT —

ECS0070T

AT-SHIFT-01



\* : This connector is not shown in "HARNESS LAYOUT" of PG section.

WCWA0112E

## Diagnostic Procedure

SYMPTOM 1:

- Selector lever cannot be moved from P position with key in ON position and brake pedal applied.
- Selector lever can be moved from P position with key in ON position and brake pedal released.
- Selector lever can be moved from P position when key is removed from key cylinder.

SYMPTOM 2:

- Ignition key cannot be removed when selector lever is set to P position. It can be removed when selector lever is set to any position except P.

### 1. CHECK KEY INTERLOCK CABLE

Check key interlock cable for damage.

OK or NG

OK >> GO TO 2.

NG >> Repair key interlock cable. Refer to [AT-400, "KEY INTERLOCK CABLE"](#) .

### 2. CHECK SELECTOR LEVER POSITION

Check selector lever position for damage.

OK or NG

OK >> GO TO 3.

NG >> Check selector lever. Refer to [AT-405, "Park/Neutral Position \(PNP\) Switch Adjustment"](#) and [AT-406, "Manual Control Linkage Adjustment"](#) .

### 3. CHECK POWER SOURCE

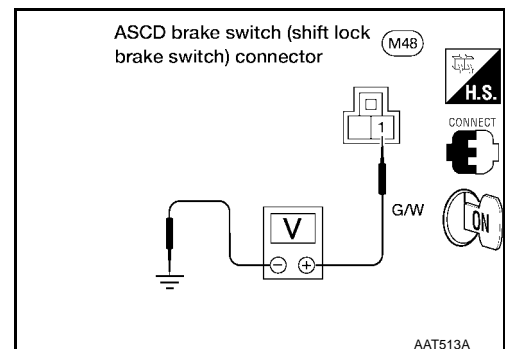
1. Turn ignition switch to ON position.  
(Do not start engine.)
2. Check voltage between ASCD brake switch (shift lock brake switch) harness terminal 1 and ground.

Does battery voltage exist?

Yes >> GO TO 4.

No >> Check the following items:

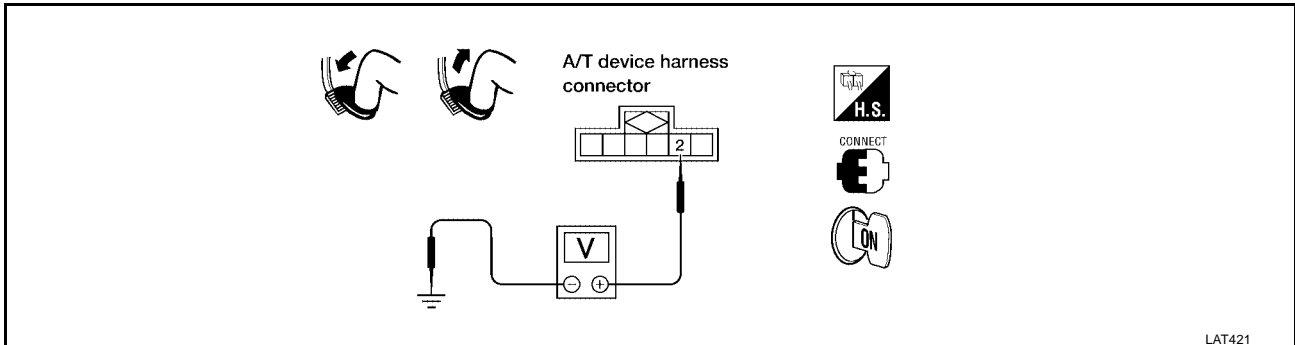
- Harness for short or open between battery and ASCD brake switch (shift lock brake switch) harness terminal 1
  - Fuse
  - Ignition switch
- Refer to [PG-9, "POWER SUPPLY ROUTING"](#) .



## 4. CHECK INPUT SIGNAL (BRAKE SWITCH)

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

- Check voltage between A/T device harness connector M35 terminal 2 (GY) and ground.



### Voltage

**Brake pedal depressed : 0V**

**Brake pedal released : Battery voltage**

### OK or NG

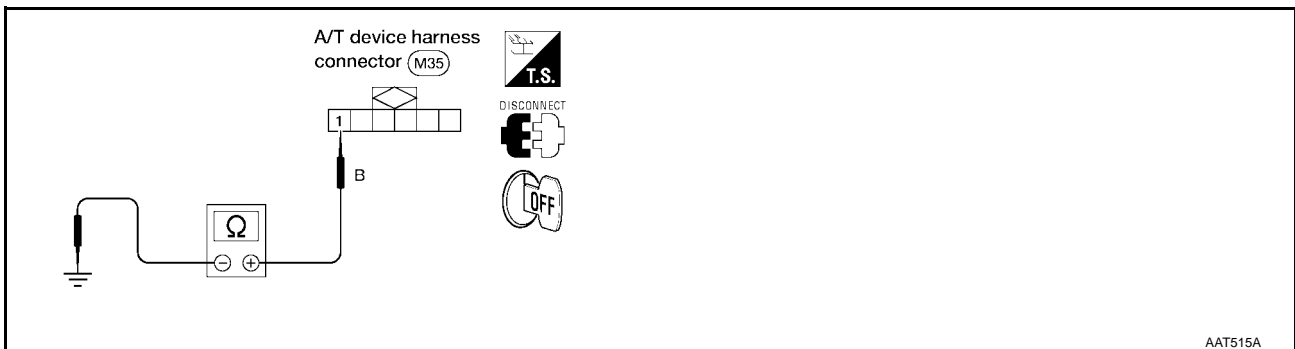
OK >> GO TO 5.

NG >> Check the following items:

- Harness for short or open between A/T device harness connector 2 and ASCD brake switch (shift lock brake switch) harness connector 2
- ASCD brake switch (shift lock brake switch)  
Refer to [AT-399, "ASCd BRAKE SWITCH \(SHIFT LOCK BRAKE SWITCH\)"](#).

## 5. CHECK GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect A/T device harness connector.
3. Check continuity between A/T device harness terminal 1 and ground.



### OK or NG

OK >> GO TO 6.

NG >> Repair harness or connector.

## 6. CHECK PARK POSITION SWITCH

Refer to [AT-399, "PARK POSITION SWITCH"](#).

### OK or NG

OK >> GO TO 7.

NG >> Replace park position switch.

## 7. CHECK SHIFT LOCK SOLENOID

Refer to [AT-399, "SHIFT LOCK SOLENOID"](#) .

OK or NG

- OK >> GO TO 8.
- NG >> Replace shift lock solenoid.

## 8. CHECK SHIFT LOCK OPERATION

1. Reconnect shift lock harness connector.
2. Turn ignition switch from OFF to ON" position. (Do not start engine.)
3. Recheck shift lock operation.

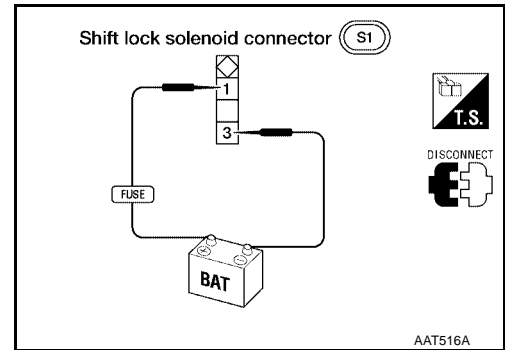
OK or NG

- OK >> **INSPECTION END.**
- NG >> 1. Perform A/T device input/output signal inspection test.  
2. If NG, recheck harness connector connection.

### Component Check SHIFT LOCK SOLENOID

ECS0070V

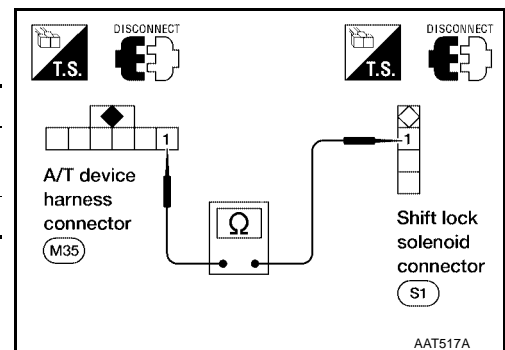
- Check operation by applying battery voltage between shift lock solenoid connector terminals 1 and 3.



### PARK POSITION SWITCH

- Check continuity between park position switch harness connector terminal 1 and A/T device harness connector terminal 1.

Condition	Continuity
When selector lever is set in "P" position and selector lever button is released	Yes
Except above	No

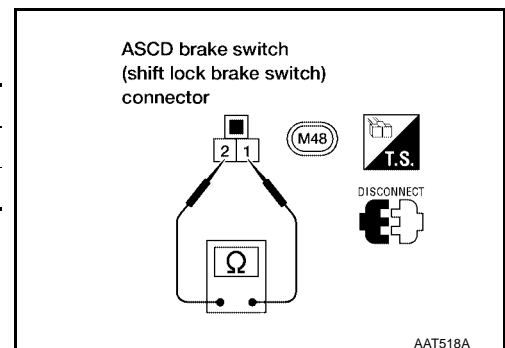


### ASCD BRAKE SWITCH (SHIFT LOCK BRAKE SWITCH)

- Check continuity between ASCD brake switch (shift lock brake switch) harness connector terminals 1 and 2.

Condition	Continuity
When brake pedal is depressed	No
When brake pedal is released	Yes

Check ASCD brake switch (shift lock brake switch) after adjusting brake pedal — refer to [BR-8, "Adjustment"](#) .

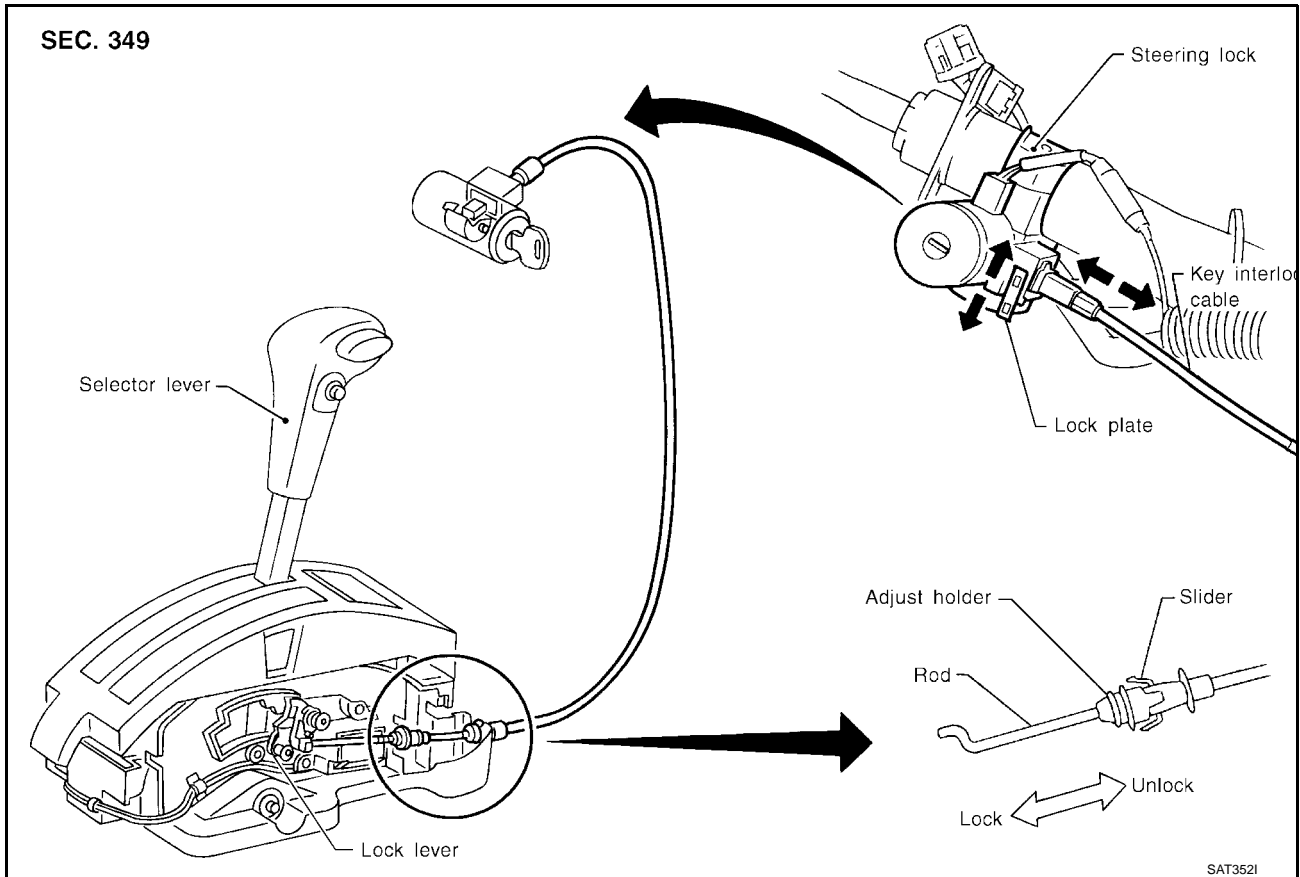


## KEY INTERLOCK CABLE

PFP:34908

### Components

ECS0070W



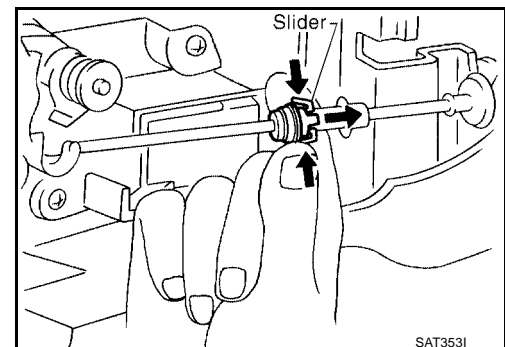
### CAUTION:

- Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.
- After installing key interlock cable to control device, make sure that casing cap and bracket are firmly secured in their positions. If casing cap can be removed with an external load of less than 39.2 N (4.0 kg, 8.8 lb), replace key interlock cable with new one.

### Removal

ECS0070X

Unlock slider from adjuster holder and remove rod from cable.





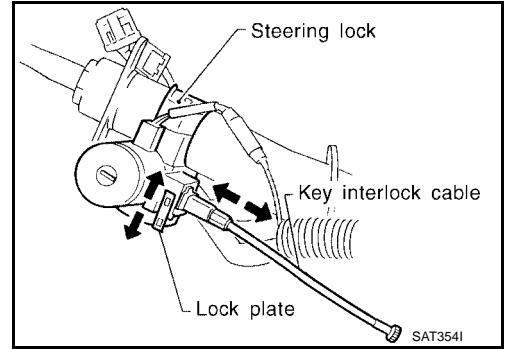
# KEY INTERLOCK CABLE

[RE4R01A]

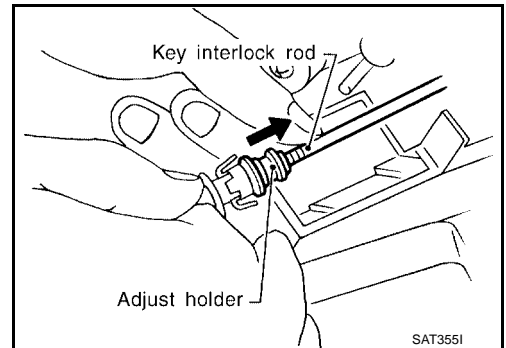
ECS0070Y

## Installation

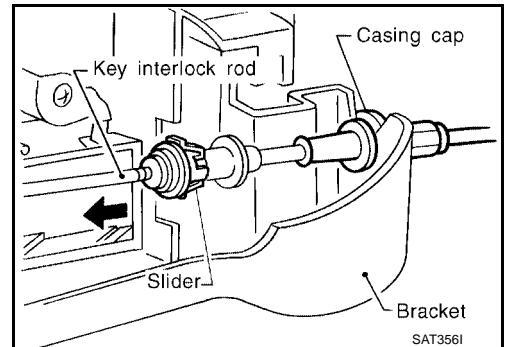
1. Set key interlock cable to steering lock assembly and install lock plate.
2. Clamp cable to steering column and fix to control cable with band.
3. Set selector lever to P position.



4. Insert interlock rod into adjuster holder.



5. Install casing cap to bracket.
6. Move slider in order to fix adjuster holder to interlock rod.

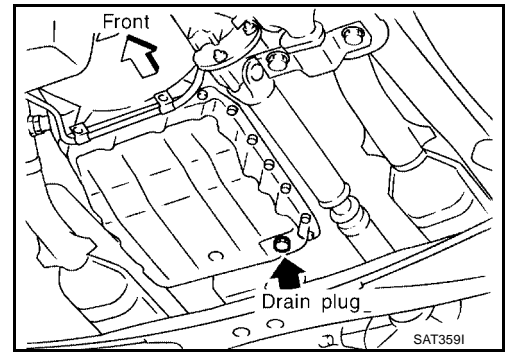


A  
B  
AT  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

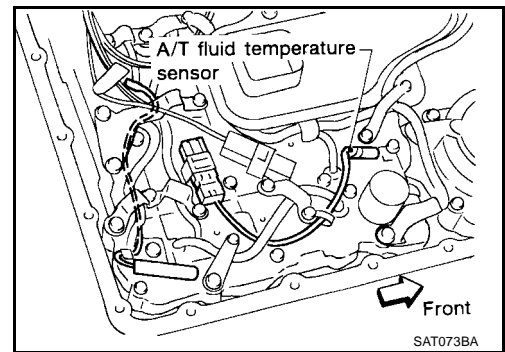
**ON-VEHICLE SERVICE**

**Control Valve Assembly and Accumulators  
REMOVAL**

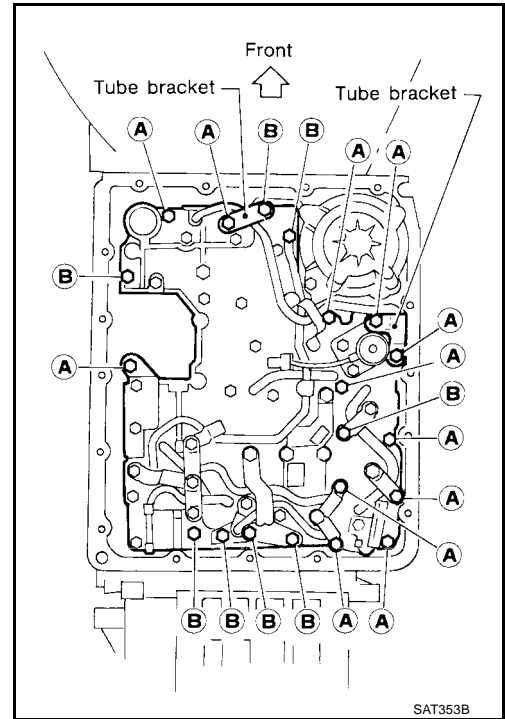
1. Drain ATF through drain plug.
2. Remove exhaust front tube.
3. Remove oil pan and gasket.
  - Always replace oil pan bolts as they are self-sealing bolts.




4. Remove A/T fluid temperature sensor if necessary.
5. Remove oil strainer.



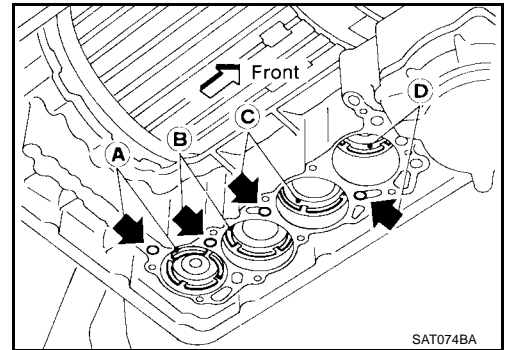
6. Remove control valve assembly by removing fixing bolts and disconnecting harness connector.



**Bolt length and location**

Bolt symbol	$\ell$ mm (in)
	
A	33 (1.30)
B	45 (1.77)

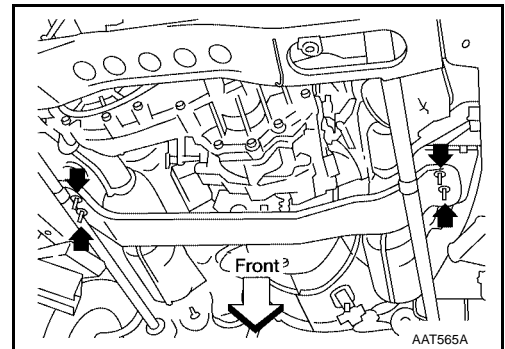
7. Remove solenoids and valves from valve body if necessary.
8. Remove terminal cord assembly if necessary.
9. Remove accumulator **A**, **B**, **C** and **D** by applying compressed air if necessary.
  - **Hold each piston with rag.**
10. Reinstall any part removed.
  - **Always use new sealing parts.**
  - **Always replace oil pan bolts as they are self-sealing bolts.**



**Revolution Sensor Replacement**

**—4WD MODEL—**

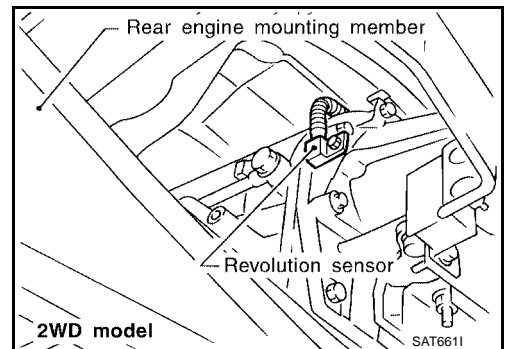
ECS007P0



1. Remove rear engine mounting member from side member while supporting A/T with transfer case with jack. Tighten rear engine mounting member to the specified torque. Refer to [EM-129, "REMOVAL"](#).
2. Lower A/T with transfer case as much as possible.
3. Remove revolution sensor from A/T.
4. Reinstall any part removed.
  - **Always use new sealing parts.**

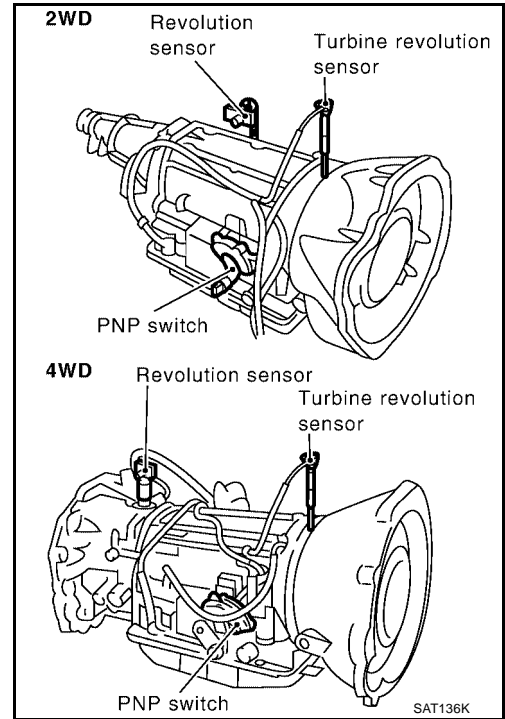
**—2WD MODEL—**

- Remove revolution sensor from A/T.
- **Always use new sealing parts.**



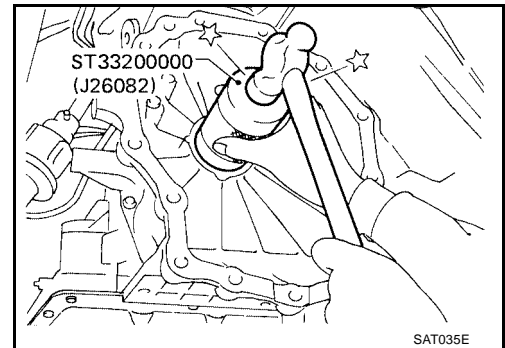
**Turbine Revolution Sensor Replacement (VG33ER only)**

1. Remove A/T assembly. Refer to [AT-407, "Removal"](#).
2. Remove turbine revolution sensor from A/T assembly upper side.
3. Reinstall any part removed.
- **Always use new sealing parts.**



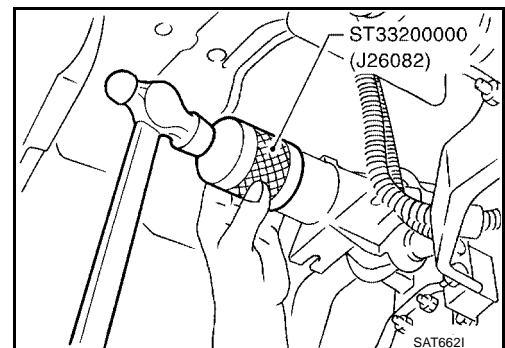
**Rear Oil Seal Replacement  
—4WD MODEL—**

1. Remove transfer case from vehicle. Refer to [TF-11, "Removal"](#).
2. Remove rear oil seal.
3. Install rear oil seal.
- **Apply ATF before installing.**
4. Reinstall any part removed.



**—2WD MODEL—**

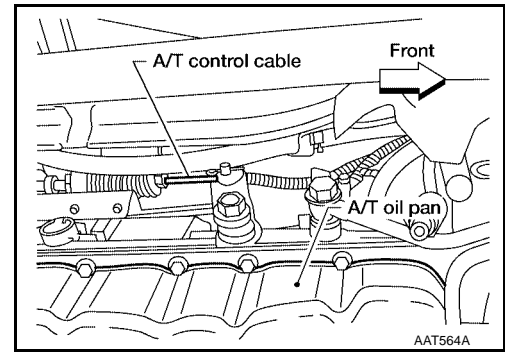
1. Remove propeller shaft from vehicle. Refer to [PR-8, "Removal and Installation"](#).
2. Remove rear oil seal.
3. Install rear oil seal.
- **Apply ATF before installing.**
4. Reinstall any part removed.



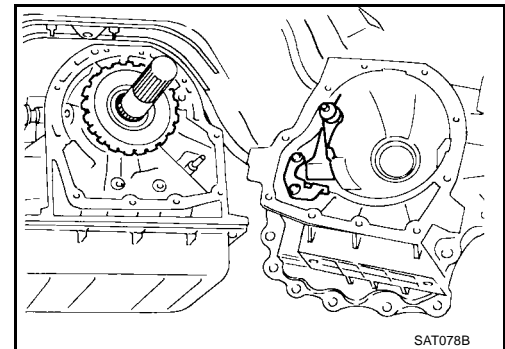
## Parking Components Inspection

### —4WD MODEL—

1. Remove propeller shaft. Refer to [PR-8, "Removal and Installation"](#) .
2. Remove transfer case from vehicle. Refer to [TF-11, "Removal"](#) .
3. Remove A/T control cable bracket from transmission case.



4. Support A/T assembly with a jack.
  5. Remove adapter case from transmission case.
  6. Replace parking components if necessary.
  7. Reinstall any part removed.
- **Always use new sealing parts.**

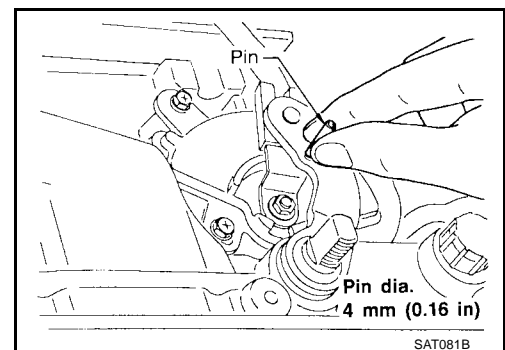


### —2WD MODEL—

1. Remove propeller shaft from vehicle. Refer to [PR-8, "Removal and Installation"](#) .
  2. Support A/T assembly with jack.
  3. Remove rear engine mounting member. Tighten rear engine mounting member to the specified torque. Refer [EM-129, "REMOVAL"](#) .
  4. Remove rear extension from transmission case.
  5. Replace parking components if necessary.
  6. Reinstall any part removed.
- **Always use new sealing parts.**

## Park/Neutral Position (PNP) Switch Adjustment

1. Remove manual control linkage from manual shaft of A/T assembly.
2. Set manual shaft of A/T assembly in N position.
3. Loosen PNP switch fixing bolts.
4. Insert pin into adjustment holes in both PNP switch and manual shaft of A/T assembly as near vertical as possible.
5. Reinstall any part removed.
6. Check continuity of PNP switch. Refer to [AT-393, "PNP Switch"](#) .

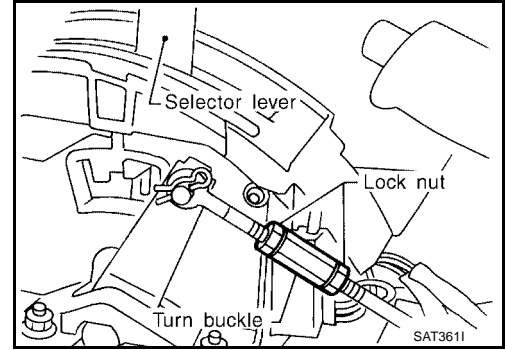


## Manual Control Linkage Adjustment

Move selector lever from P position to 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 linkage needs adjustment.

1. Place selector lever in P position.
2. Loosen lock nuts.



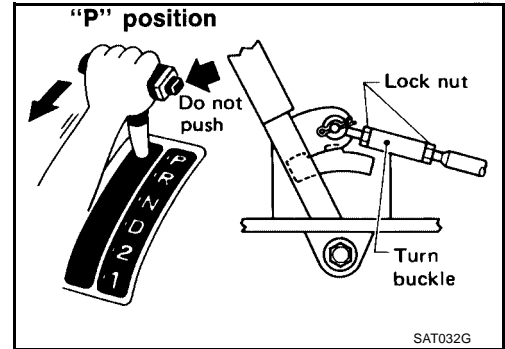
3. Tighten turn buckle until it aligns with inner cable, pulling selector lever toward R position side without pushing button.
4. Back off turn buckle 1 turn and tighten lock nuts to the specified torque.

### Lock nut



: 4.4 - 5.9 N·m (0.45 - 0.60 kg·m, 39.1 - 52.1 in-lb)

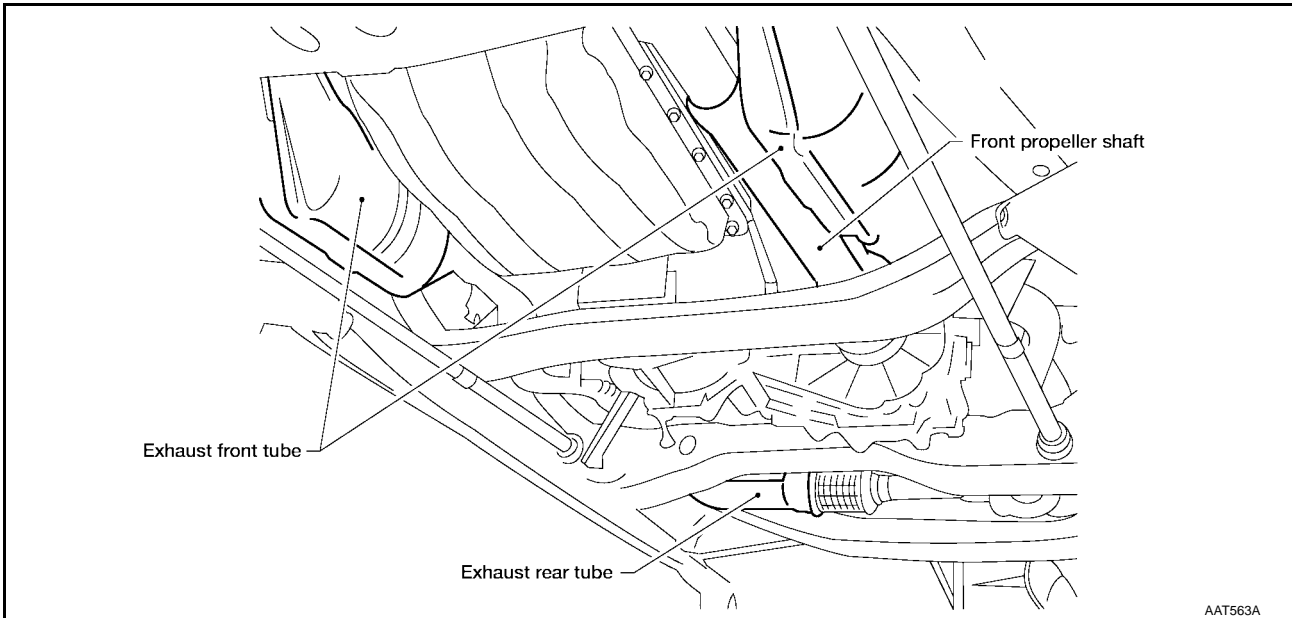
5. Move selector lever from P position to 1 position. Make sure that selector lever can move smoothly.



REMOVAL AND INSTALLATION

Removal

—4WD MODEL—



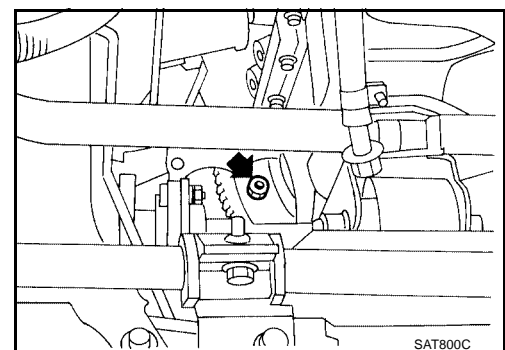
**CAUTION:**

When removing the A/T assembly from engine, first remove the crankshaft position sensor (OBD) from the A/T assembly upper side. Be careful not to damage sensor edge.

**NOTE:**

To prevent oil spills, drain the A/T fluid before removing the A/T assembly, Refer to [MA-38, "Changing A/T Fluid"](#) or insert a plug into the rear oil seal after removing the propeller shaft.

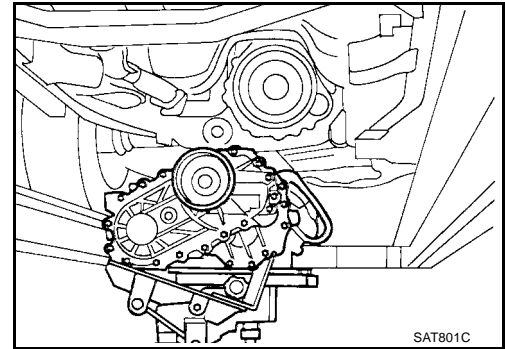
1. Remove battery negative terminal.
2. Remove exhaust front and rear tubes.
3. Remove fluid charging pipe from A/T assembly.
4. Remove oil cooler pipe from A/T assembly.
5. Plug up openings such as the fluid charging pipe hole, etc.
6. Remove propeller shaft. Refer to [PR-6, "FRONT PROPELLER SHAFT"](#) (front), [PR-7, "REAR PROPELLER SHAFT"](#) (rear).
7. Remove transfer control linkage from transfer. Refer to [TF-11, "Removal"](#) .
  - Insert plug into rear oil seal after removing rear propeller shaft.
  - Be careful not to damage spline, sleeve yoke and rear oil seal.
8. Remove A/T control cable from A/T assembly.
9. Disconnect A/T, turbine revolution sensor (VG33ER only) and vehicle speed sensor harness connectors.
10. Remove the starter motor. [SC-25, "Removal and Installation"](#) .
11. Remove the gusset and the rear plate securing engine to A/T assembly.
12. Remove bolts securing torque converter to drive plate.
  - Remove the bolts by turning crankshaft.



# REMOVAL AND INSTALLATION

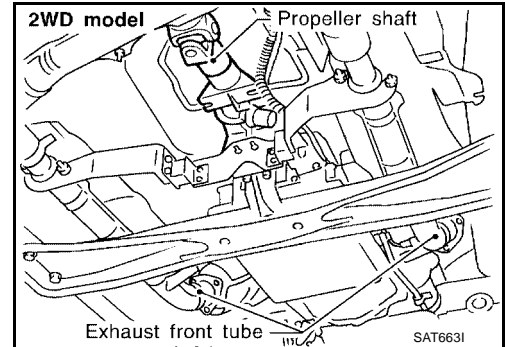
[RE4R01A]

13. Support A/T and transfer assembly with a jack.
14. Remove rear engine mounting member from body and A/T assembly. Refer to [EM-129, "REMOVAL"](#) .
15. Remove bolts securing A/T assembly to engine.
16. Lower A/T assembly with transfer.



## —2WD MODEL—

1. Remove battery negative terminal.
2. Remove exhaust front and rear tubes.
3. Remove fluid charging pipe from A/T assembly.
4. Remove oil cooler pipe from A/T assembly.
5. Plug up openings such as the fluid charging pipe hole, etc.
6. Remove propeller shaft. Refer to [PR-7, "REAR PROPELLER SHAFT"](#) .
  - **Insert plug into rear oil seal after removing rear propeller shaft.**
  - **Be careful not to damage spline, sleeve yoke and rear oil seal.**
7. Remove A/T control cable from A/T assembly.
8. Disconnect A/T, turbine revolution sensor (VG33ER only) and vehicle speed sensor harness connectors.
9. Remove starter motor. [SC-25, "Removal and Installation"](#) .
10. Remove the gusset and the rear plate securing engine to A/T assembly.
11. Remove bolts securing torque converter to drive plate.
  - **Remove the bolts by turning crankshaft.**
12. Support A/T assembly with a jack.
13. Remove rear engine mounting member from body and A/T assembly. Refer to [EM-129, "REMOVAL"](#) .
14. Remove bolts securing A/T assembly to engine.
15. Pull A/T assembly backwards.
  - **Secure torque converter to prevent it from dropping.**
  - **Secure A/T assembly to a jack.**
16. Lower A/T assembly.



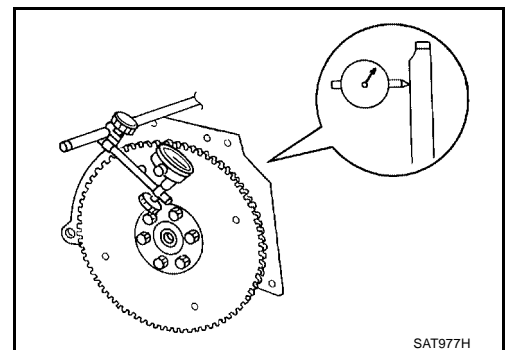
## Installation

- Drive plate runout

**Maximum allowable runout**

**: Refer to [EM-140, "FLY-WHEEL/DRIVE PLATE RUNOUT"](#) .**

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





# REMOVAL AND INSTALLATION

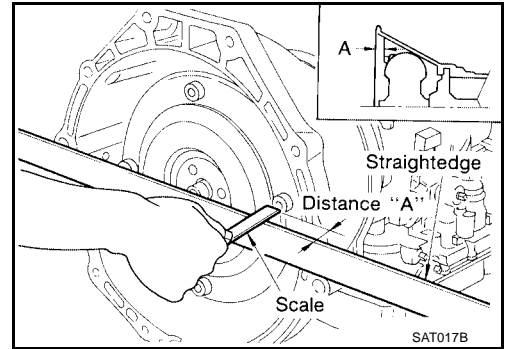
[RE4R01A]

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

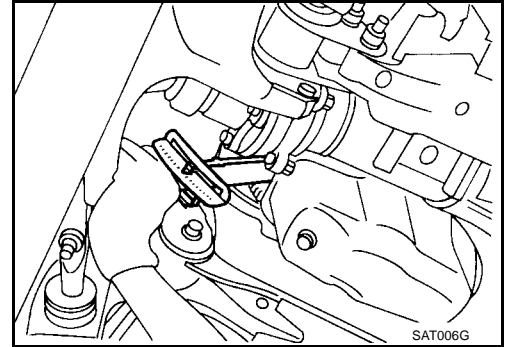
**Distance "A"**

**VG33E : 26.0 mm (1.024 in) or more**

**VG33ER : 25.0 mm (0.984 in) or more**

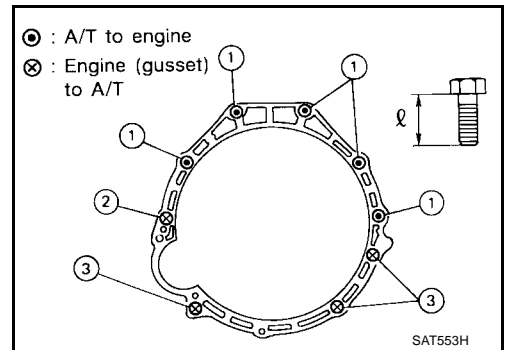


- Install converter to drive plate.
- After converter is installed to drive plate, rotate crankshaft several turns and check to be sure that transmission rotates freely without binding.

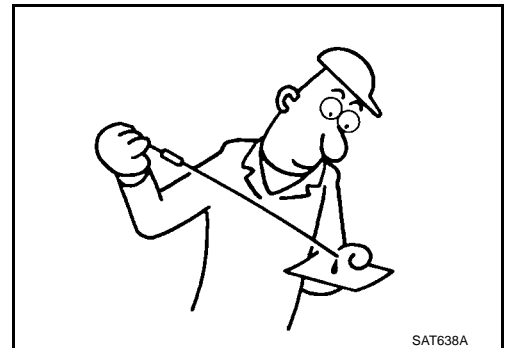


- Tighten bolts securing transmission.

Bolt No.	Tightening torque N-m (kg-m, ft-lb)	Bolt length "\$\$\$Use Symbol (litre)\$\$\$" mm (in)
1	39 - 49 (4.0 - 5.0, 29 - 36)	47.5 (1.870)
2	39 - 49 (4.0 - 5.0, 29 - 36)	58.0 (2.283)
3	29 - 39 (3.0 - 4.0, 22 - 29)	25.0 (0.984)
Gusset to engine	29 - 39 (3.0 - 4.0, 22 - 29)	20.0 (0.787)



- Reinstall any part removed.
- Check fluid level in transmission.
- Move selector lever through all positions to be sure that transmission operates correctly. With parking brake applied, rotate engine at idling. Move selector lever through N to D, to 2, to 1 and to R positions. A slight shock should be felt by hand gripping selector each time transmission is shifted.
- Perform road test. Refer to "[AT-216, "Road Test"](#)".



## OVERHAUL Components

### SEC. 311•313•315

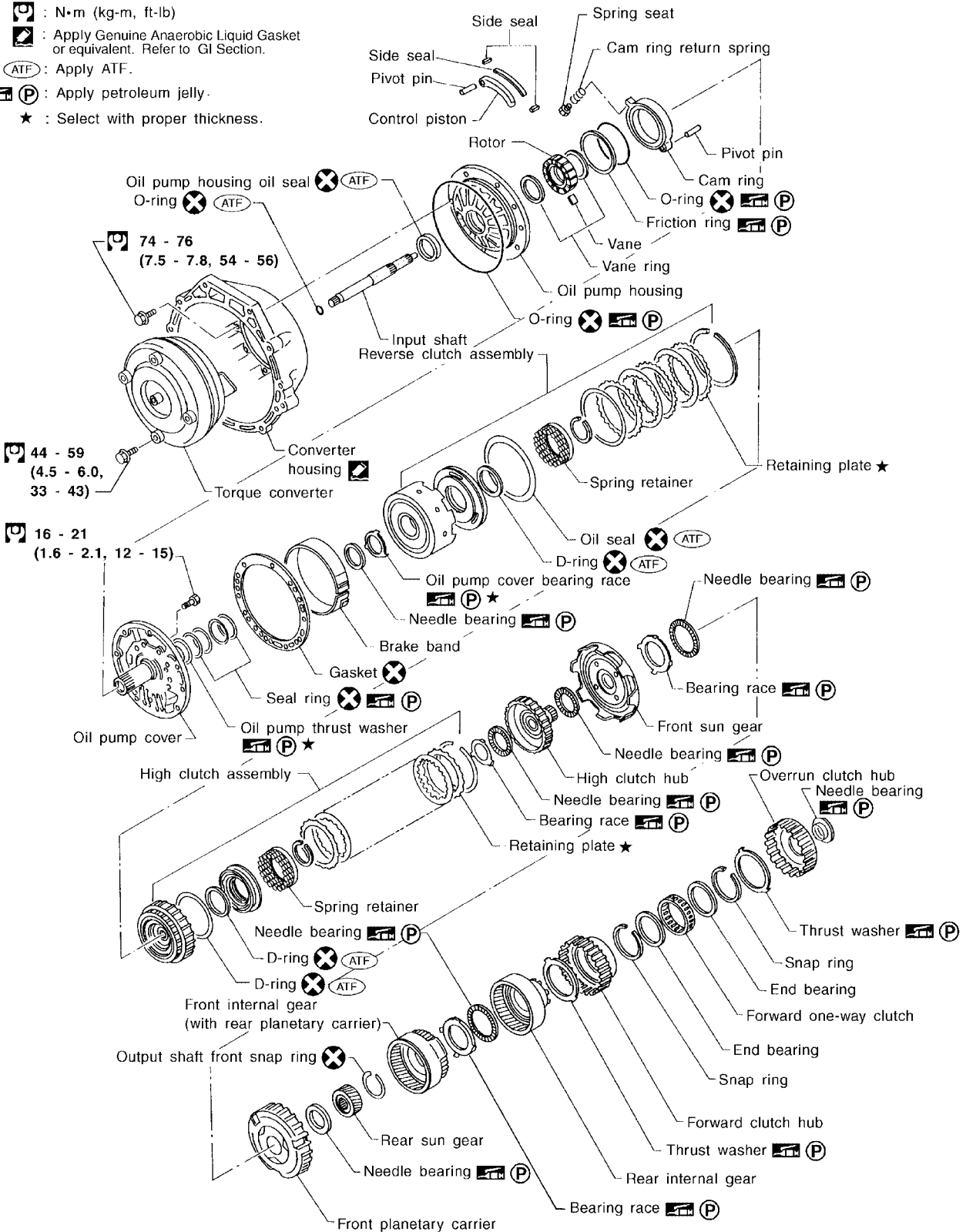
: N•m (kg-m, ft-lb)

: Apply Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI Section.

: Apply ATF.

: Apply petroleum jelly.

★ : Select with proper thickness.



# OVERHAUL

[RE4R01A]

## SEC. 311 • 315 • 317

: N·m (kg-m, in-lb)

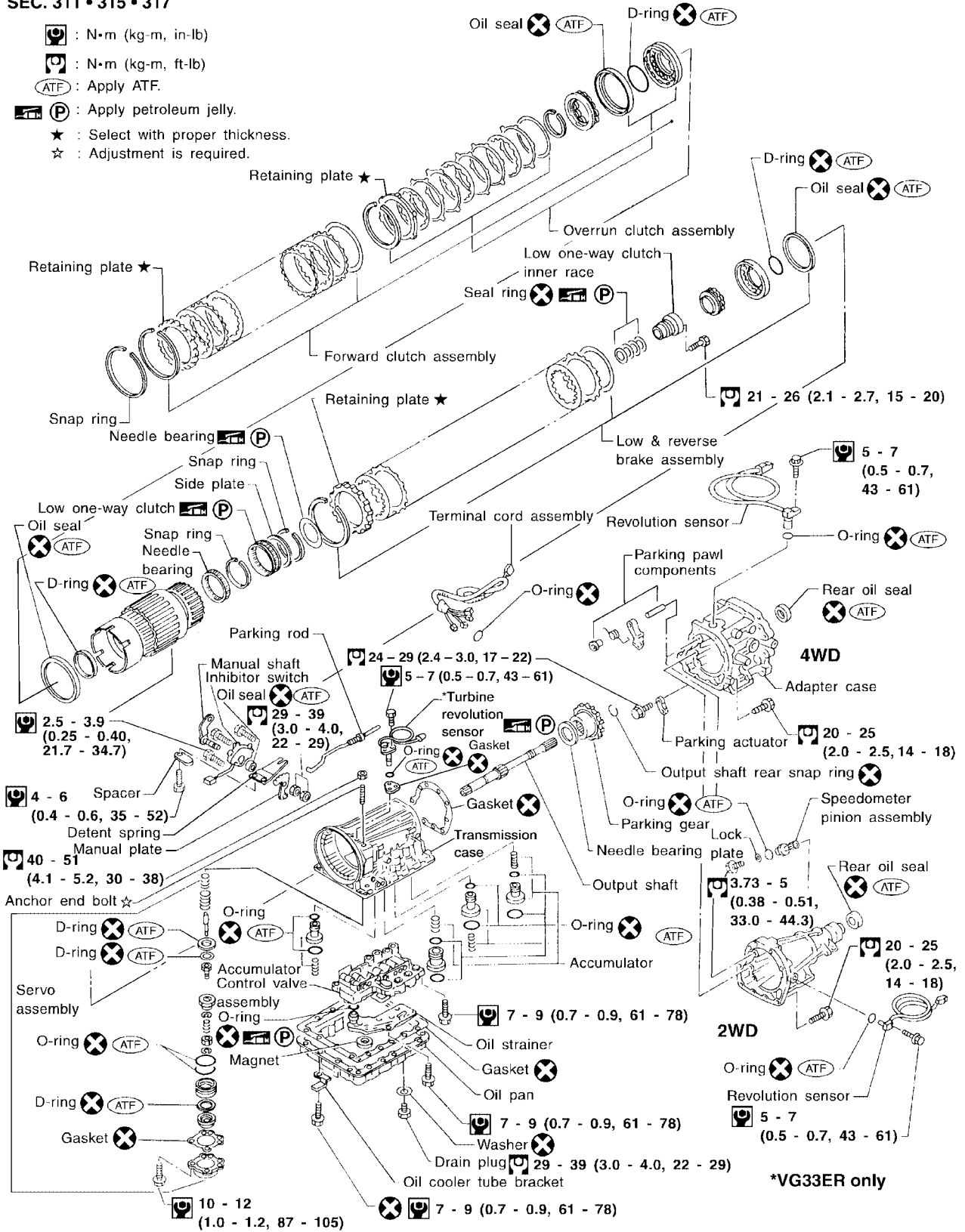
: N·m (kg-m, ft-lb)

: Apply ATF.

: Apply petroleum jelly.

★ : Select with proper thickness.

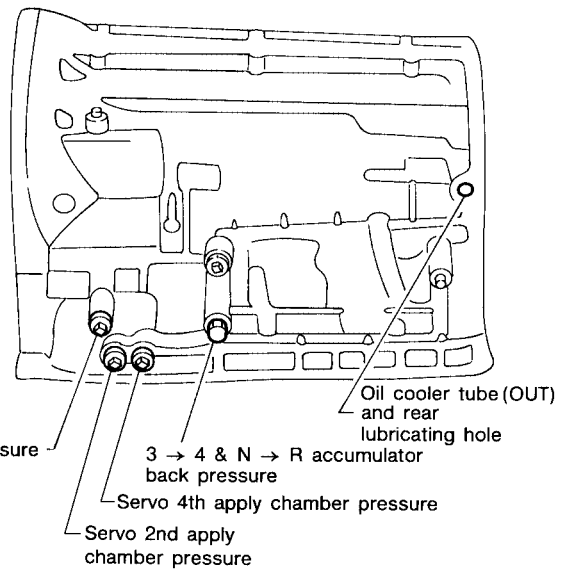
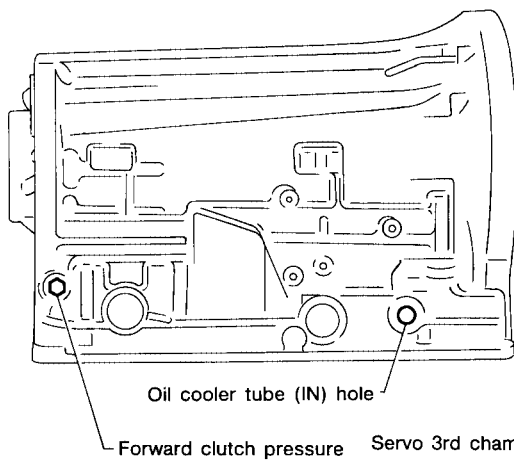
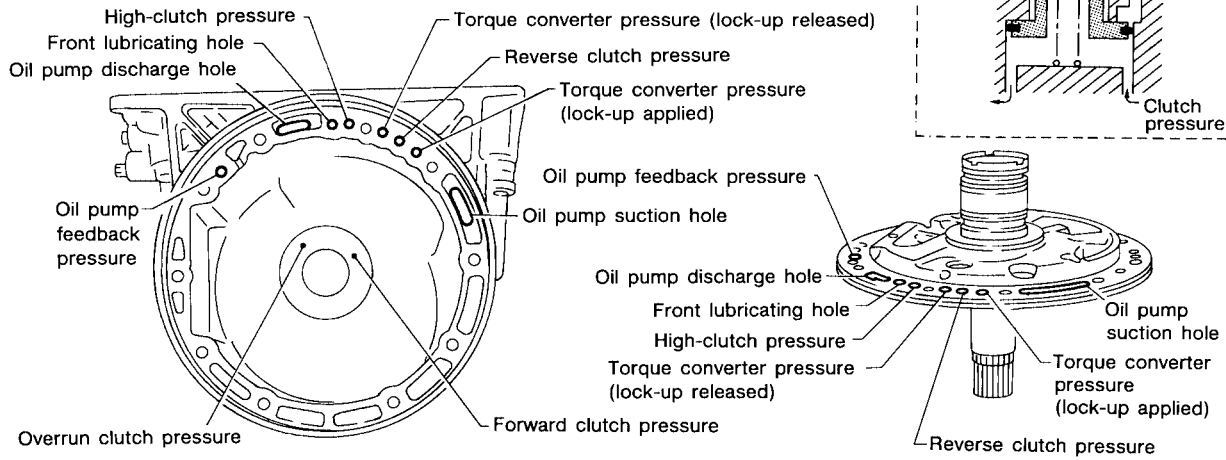
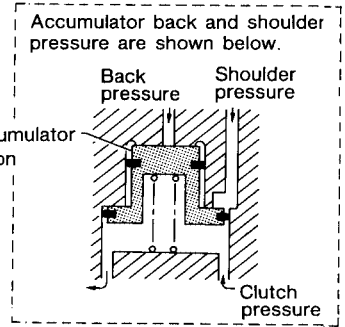
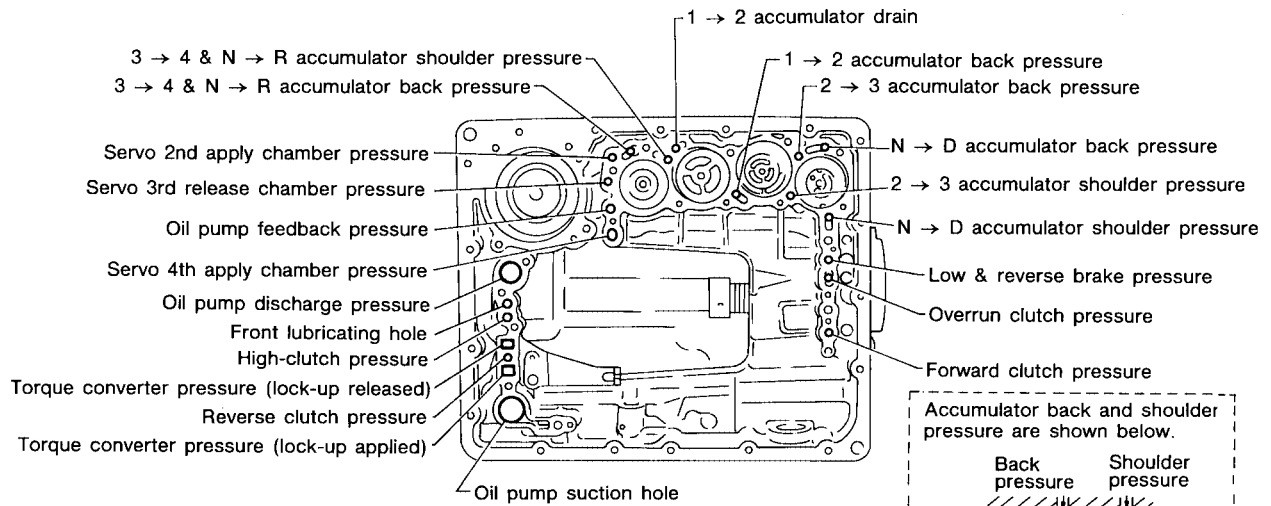
☆ : Adjustment is required.



\*VG33ER only

WAT499

## Oil Channel



Locations of Needle Bearings, Thrust Washers and Snap Rings

Outer diameter of snap rings

Item number	Outer diameter mm (in)
②	161.0 (6.34)
③	140.1 (5.52)
④	156.4 (6.16)
⑥	142.0 (5.59)
⑦	159.2 (6.27)

Thrust washers

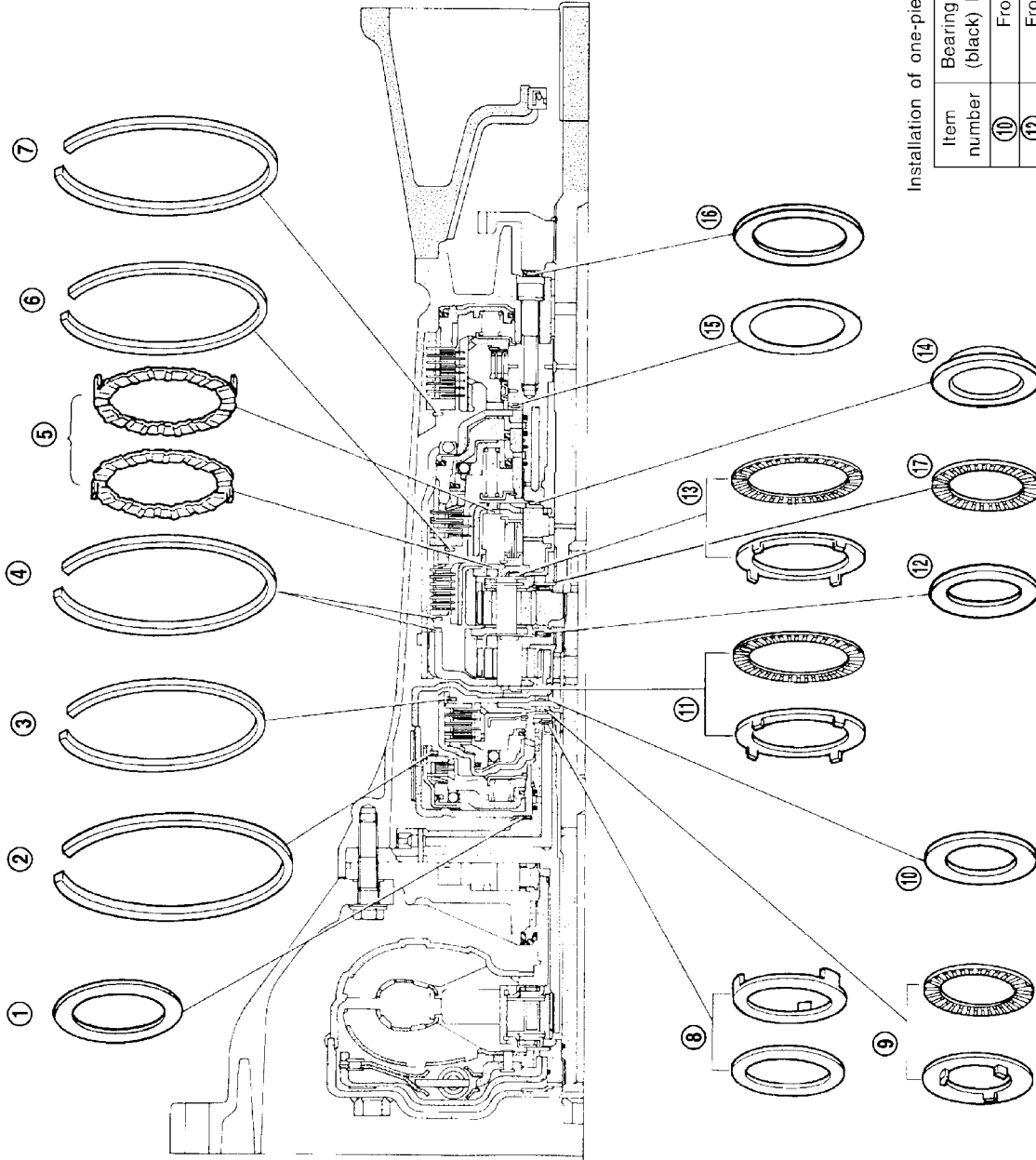
Item number	Color
①	Black
⑤	White

Outer diameter of needle bearings

Item number	Outer diameter mm (in)
⑧	47 (1.85)
⑨	53 (2.09)
⑪	78 (3.07)
⑫	53 (2.09)
⑬	78 (3.07)
⑭	57 (2.24)
⑮	78.1 (3.075)
⑯	64 (2.52)
⑰	53 (2.09)

Inner diameter of bearing races

Item number	Outer diameter mm (in)
⑪	58 (2.315)
⑬	58 (2.315)



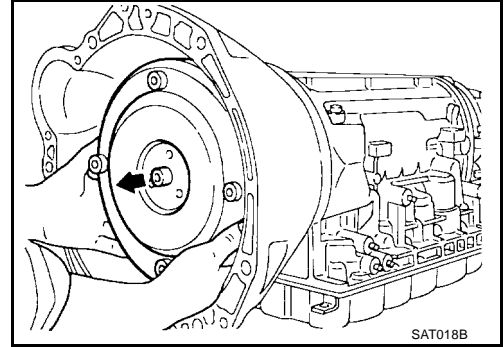
Installation of one-piece bearings

Item number	Bearing race (black) location
⑩	Front
⑫	Front
⑮	Rear side
⑯	Rear side

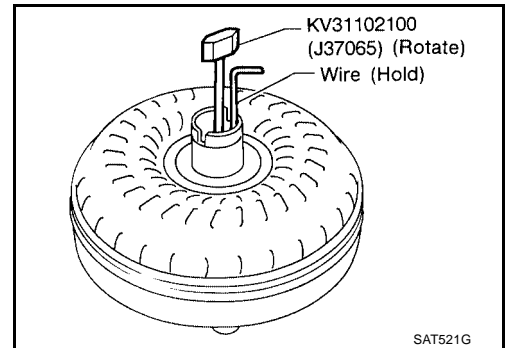
A  
B  
AT  
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### Disassembly

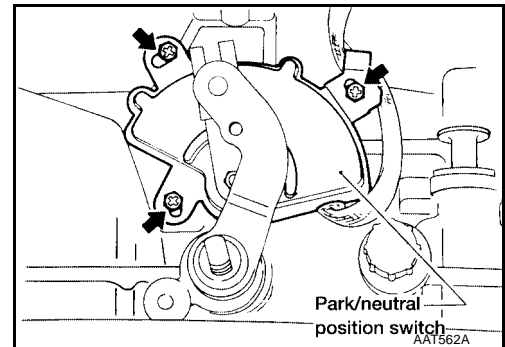
1. Drain ATF through drain plug.
2. Remove turbine revolution sensor (VG33ER only).
3. Remove torque converter by holding it firmly and turning while pulling straight out.



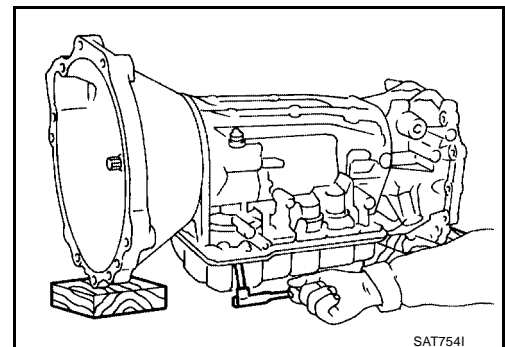
4. Check torque converter one-way clutch.
  - a. Insert Tool into spline of one-way clutch inner race.
  - b. Hook bearing support unitized with one-way clutch outer race with suitable wire.
  - c. Check that one-way clutch inner race rotates only clockwise with Tool while holding bearing support with wire.



5. Remove park/neutral position (PNP) switch from transmission case.



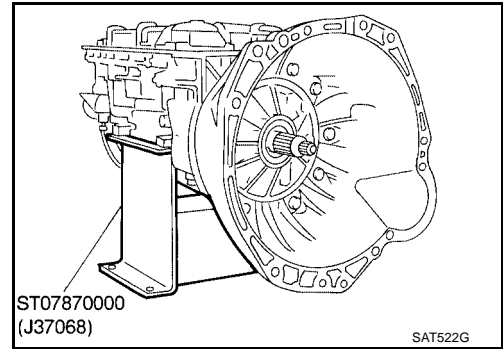
6. Remove oil pan.
  - **Always place oil pan straight down so that foreign particles inside will not move.**
  - **Always replace oil pan bolts as they are self-sealing bolts.**



# OVERHAUL

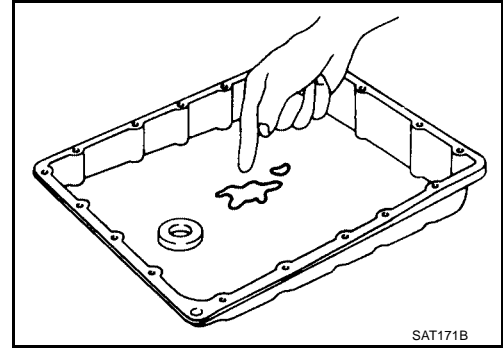
[RE4R01A]

7. Place transmission into Tool with the control valve facing up.



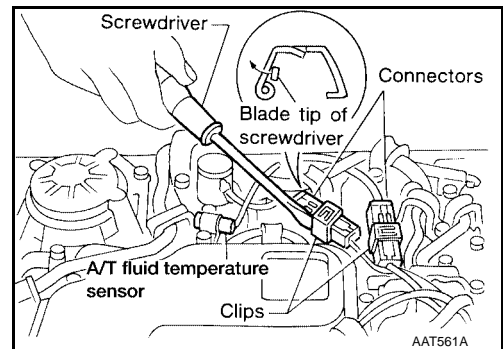
8. Check foreign materials in oil pan to help determine cause of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and may inhibit pump pressure.

- **If frictional material is detected, replace radiator after repair of A/T. Refer to [CO-30, "Removal and Installation"](#) .**



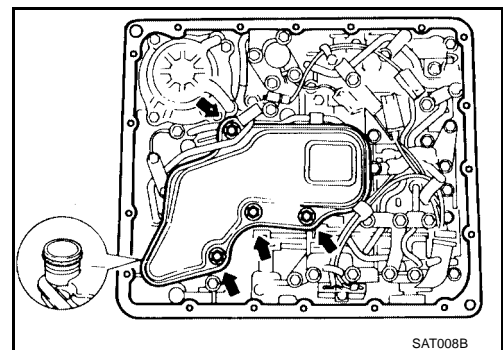
9. Remove torque converter clutch solenoid valve and A/T fluid temperature sensor connectors.

- **Be careful not to damage connector.**



10. Remove oil strainer.

- a. Remove oil strainer from control valve assembly. Then remove O-ring from oil strainer.

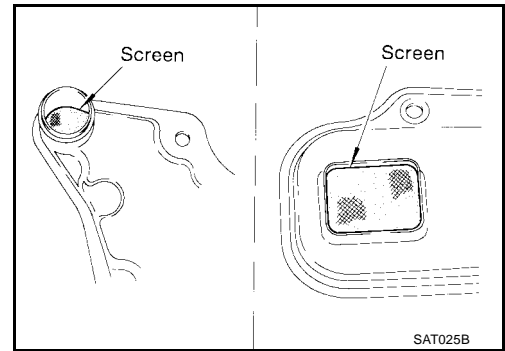


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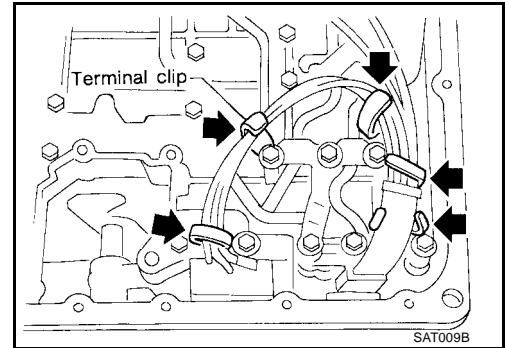
[RE4R01A]

b. Check oil strainer screen for damage.



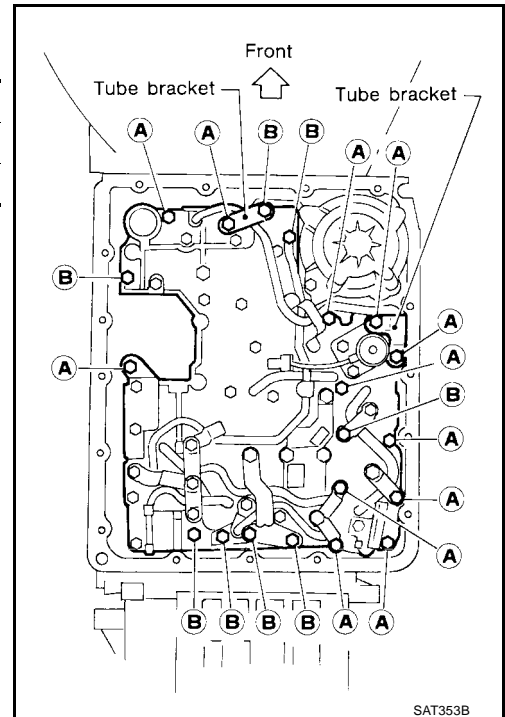
11. Remove control valve assembly.

a. Straighten terminal clips to free terminal cords then remove terminal clips.



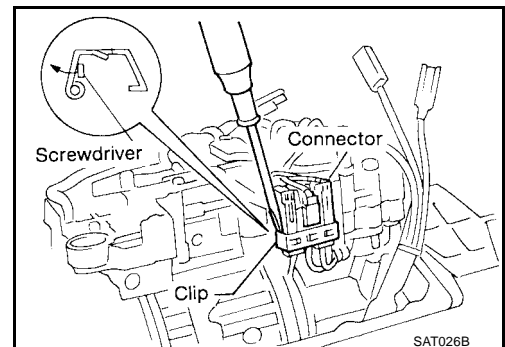
b. Remove bolts A and B, and remove control valve assembly from transmission.

Bolt symbol	Length mm (in)
A	33 (1.30)
B	45 (1.77)



Remove solenoid connector.

- Be careful not to damage connector.

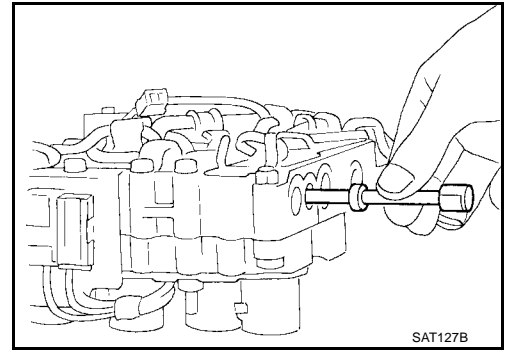




# OVERHAUL

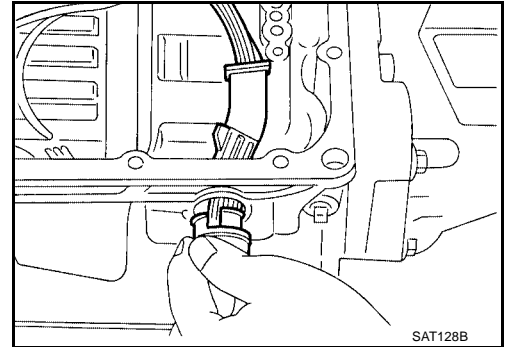
[RE4R01A]

d. Remove manual valve from control valve assembly.



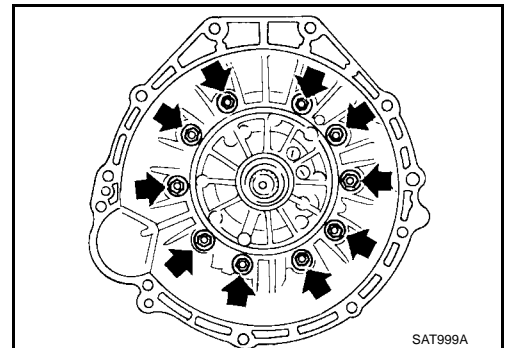
12. Remove terminal cord assembly from transmission case while pushing on stopper.

- Be careful not to damage cord.
- Do not remove terminal cord assembly unless it is damaged.

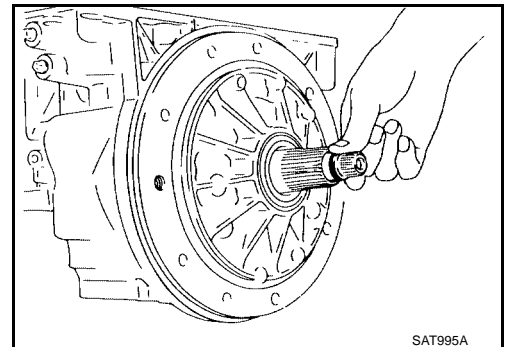


13. Remove converter housing from transmission case.

- Be careful not to scratch converter housing.



14. Remove O-ring from input shaft.



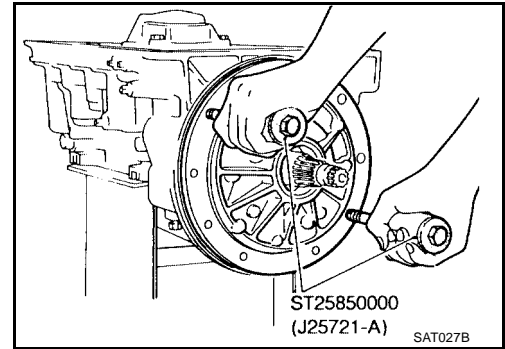
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# OVERHAUL

[RE4R01A]

15. Remove oil pump assembly.

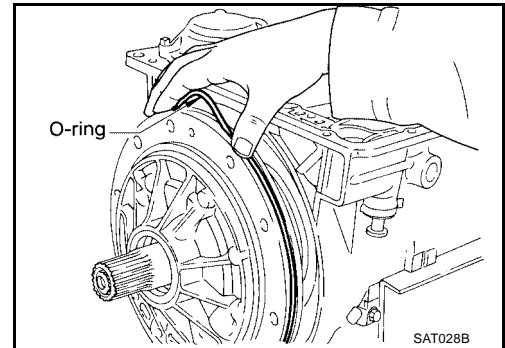
a. Attach Tool to oil pump assembly and extract it evenly from transmission case.



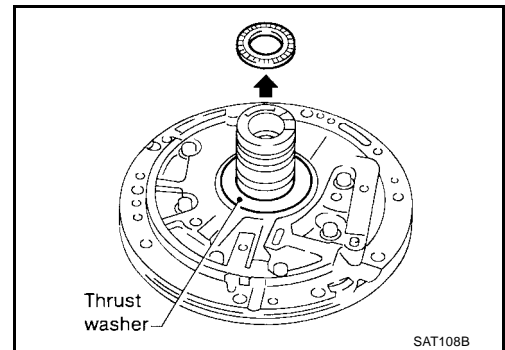
b. Remove O-ring from oil pump assembly.

c. Remove traces of sealant from oil pump housing.

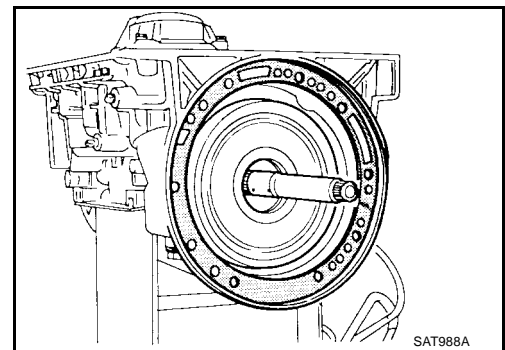
● **Be careful not to scratch pump housing.**



d. Remove needle bearing and thrust washer from oil pump assembly.



16. Remove input shaft and oil pump gasket.

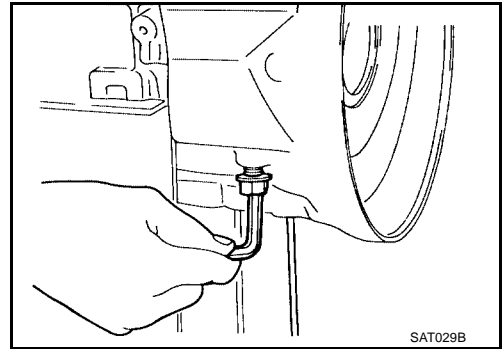


# OVERHAUL

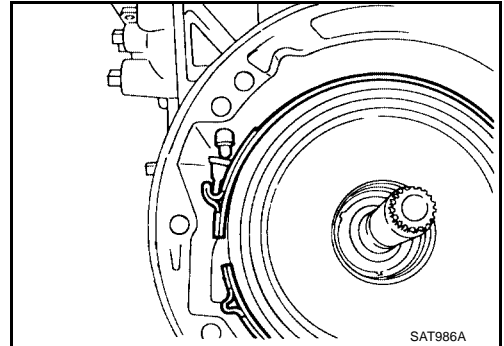
[RE4R01A]

17. Remove brake band and band strut.

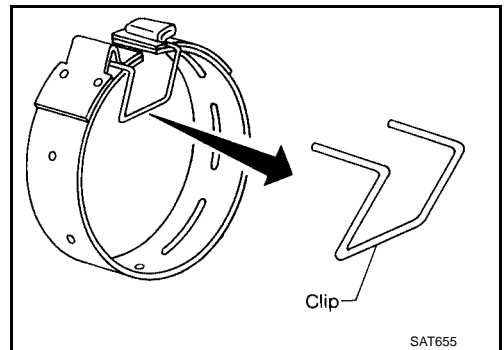
a. Loosen lock nut and remove band servo anchor end pin from transmission case.



b. Remove brake band and band strut from transmission case.

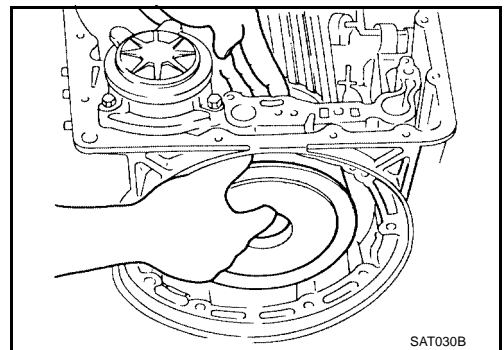


c. Hold brake band in a circular shape with clip.



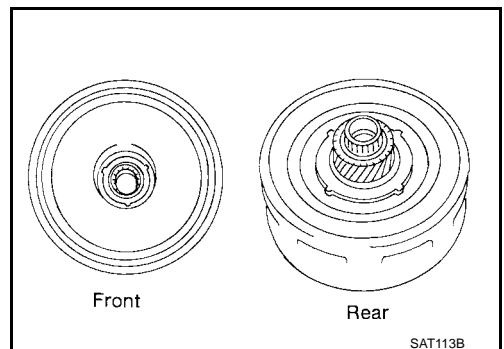
18. Remove front side clutch and gear components.

a. Remove clutch pack (reverse clutch, high clutch and front sun gear) from transmission case.



b. Remove front bearing race from clutch pack.

c. Remove rear bearing race from clutch pack.

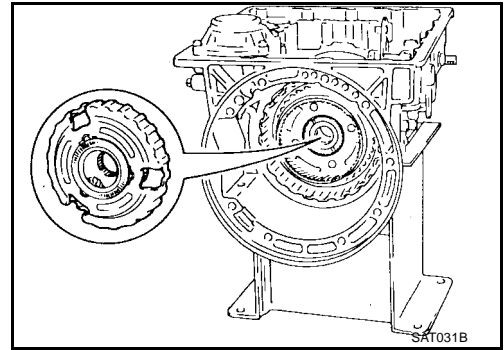


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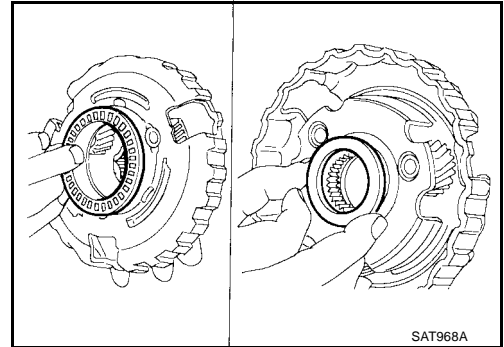
[RE4R01A]

d. Remove front planetary carrier from transmission case.

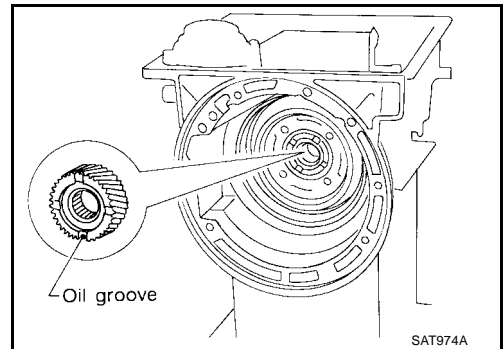


e. Remove front needle bearing from front planetary carrier.

f. Remove rear bearing from front planetary carrier.



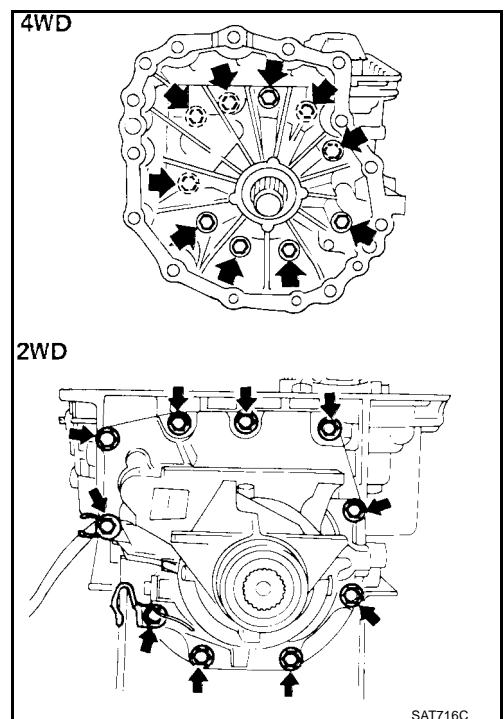
g. Remove rear sun gear from transmission case.



19. Remove rear extension or adapter case.

a. Remove rear extension or adapter case from transmission case.

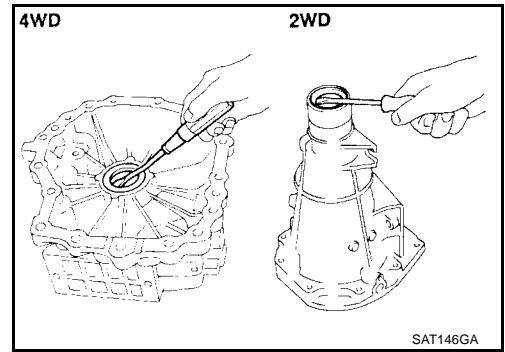
b. Remove rear extension or adapter case gasket from transmission case.



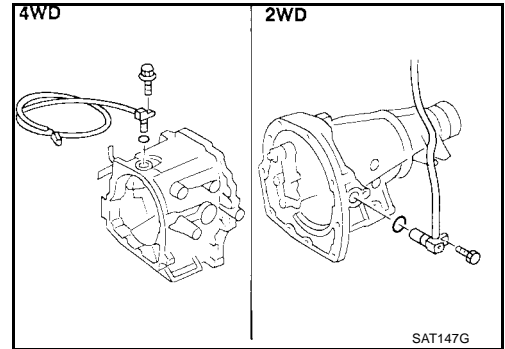
# OVERHAUL

[RE4R01A]

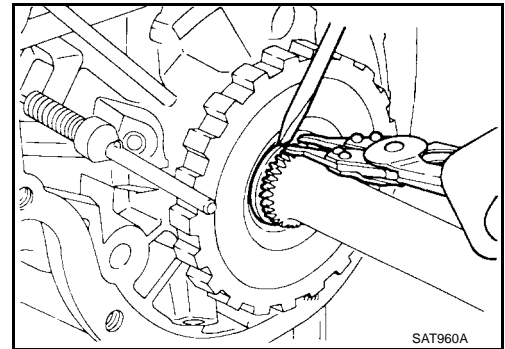
- c. Remove oil seal from adapter case or rear extension.
- Do not remove oil seal unless it is to be replaced.



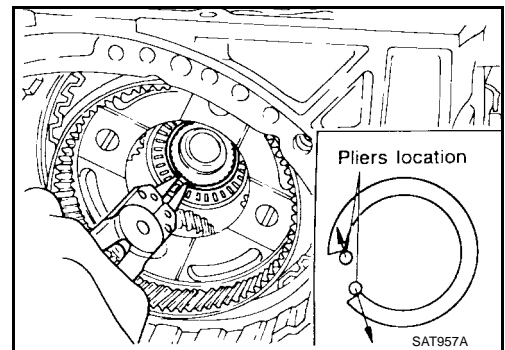
- d. Remove revolution sensor from adapter case or rear extension.  
e. Remove O-ring from revolution sensor.



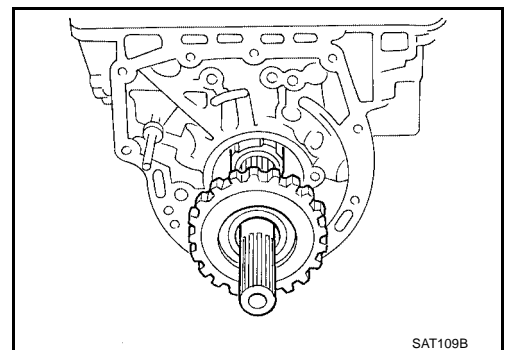
20. Remove output shaft and parking gear.  
a. Remove rear snap ring from output shaft.



- b. Slowly push output shaft all the way forward.  
● Do not use excessive force.  
c. Remove snap ring from output shaft.



- d. Remove output shaft and parking gear as a unit from transmission case.  
e. Remove parking gear from output shaft.

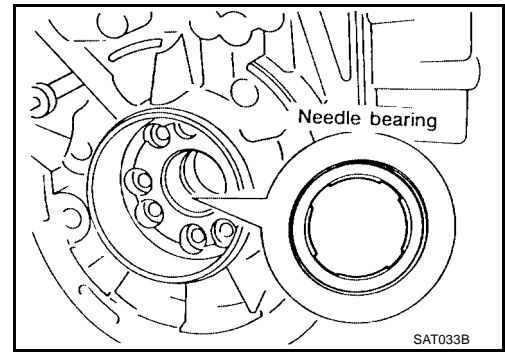


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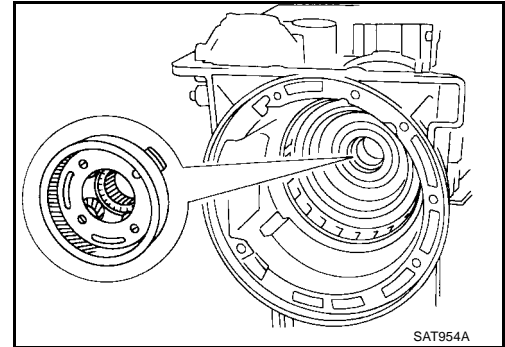
[RE4R01A]

- f. Remove needle bearing from transmission case.

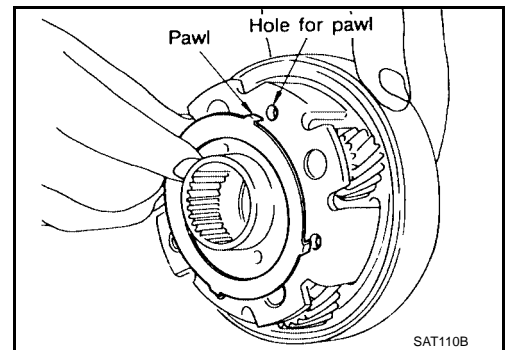


21. Remove rear side clutch and gear components.

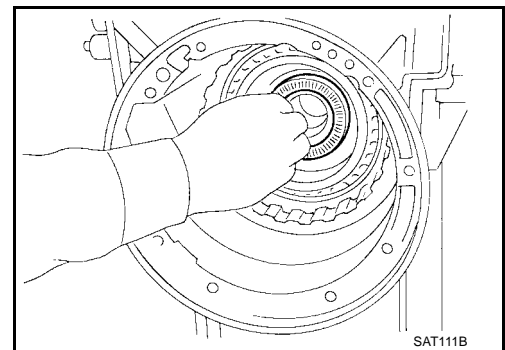
- a. Remove front internal gear.



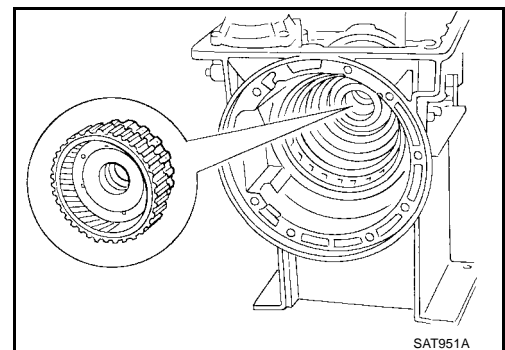
- b. Remove bearing race from front internal gear.



- c. Remove needle bearing from rear internal gear.



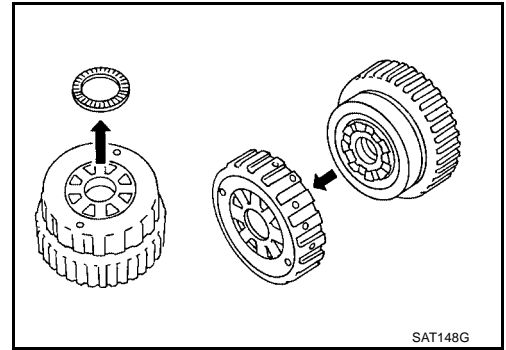
- d. Remove rear internal gear, forward clutch hub and overrun clutch hub as a set from transmission case.



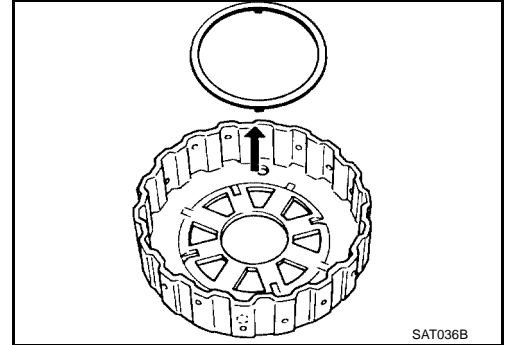
# OVERHAUL

[RE4R01A]

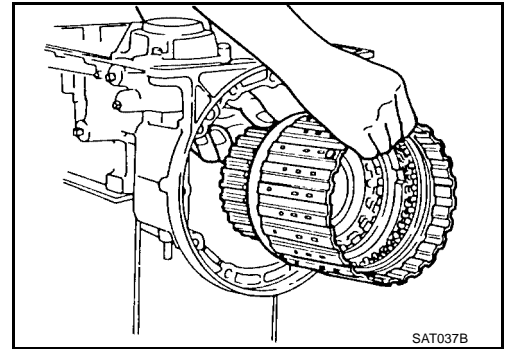
- e. Remove needle bearing from overrun clutch hub.
- f. Remove overrun clutch hub from rear internal gear and forward clutch hub.



- g. Remove thrust washer from overrun clutch hub.

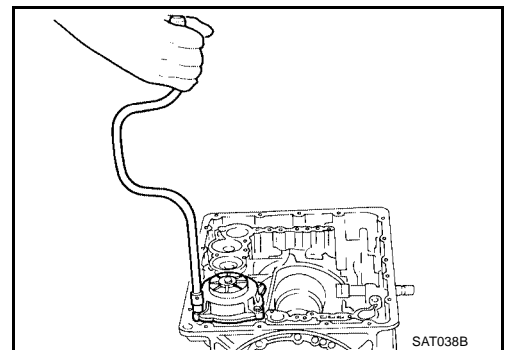


- h. Remove forward clutch assembly from transmission case.



- 22. Remove band servo and accumulator components.

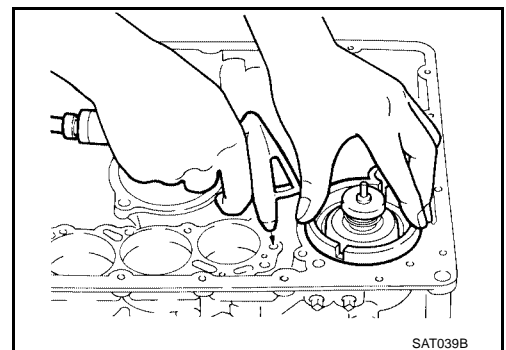
- a. Remove band servo retainer from transmission case.



- b. Apply compressed air to oil hole until band servo piston comes out of transmission case.

- **Hold piston with a rag and gradually direct air to oil hole.**

- c. Remove return springs.



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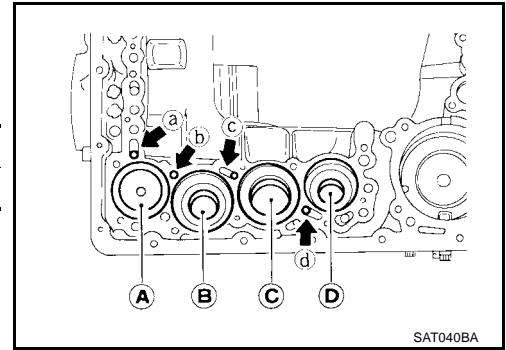
# OVERHAUL

[RE4R01A]

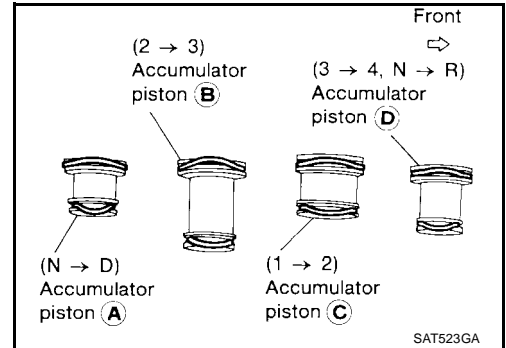
- d. Remove springs from accumulator pistons B, C and D.
- e. Apply compressed air to each oil hole until piston comes out.

● Hold piston with a rag and gradually direct air to oil hole.

Identification of accumulator pistons	A	B	C	D
Identification of oil holes	a	b	c	d

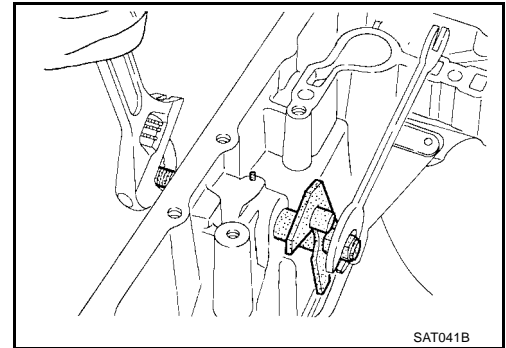


- f. Remove O-ring from each piston.

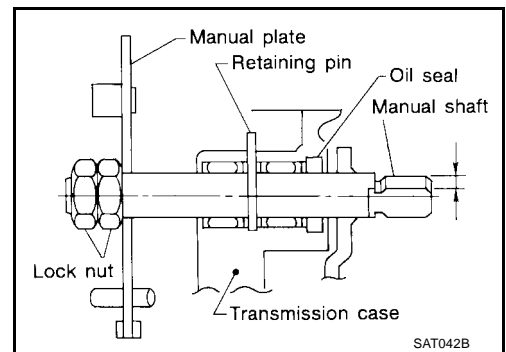


- 23. Remove manual shaft components, if necessary.

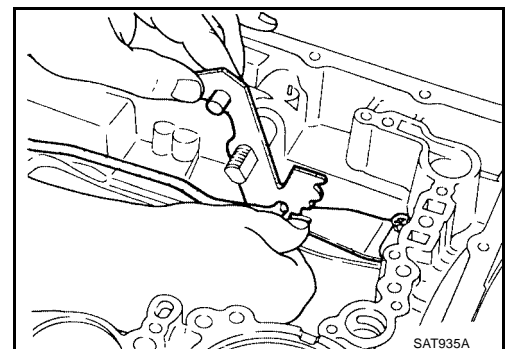
- a. Hold width across flats of manual shaft (outside the transmission case) and remove lock nut from shaft.



- b. Remove retaining pin from transmission case.



- c. While pushing detent spring down, remove manual plate and parking rod from transmission case.

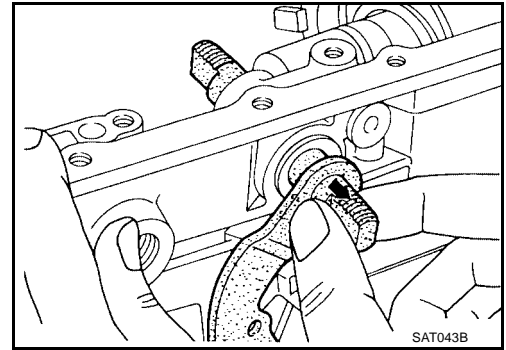




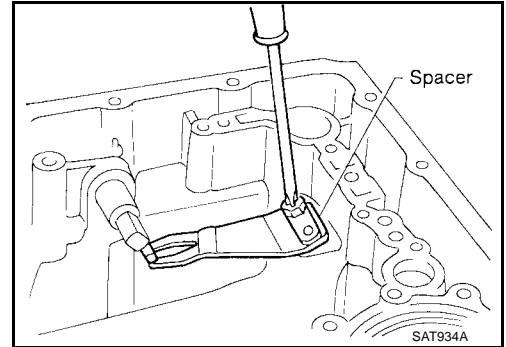
# OVERHAUL

[RE4R01A]

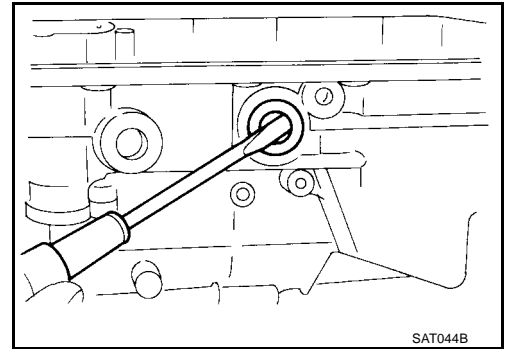
d. Remove manual shaft from transmission case.



e. Remove spacer and detent spring from transmission case.



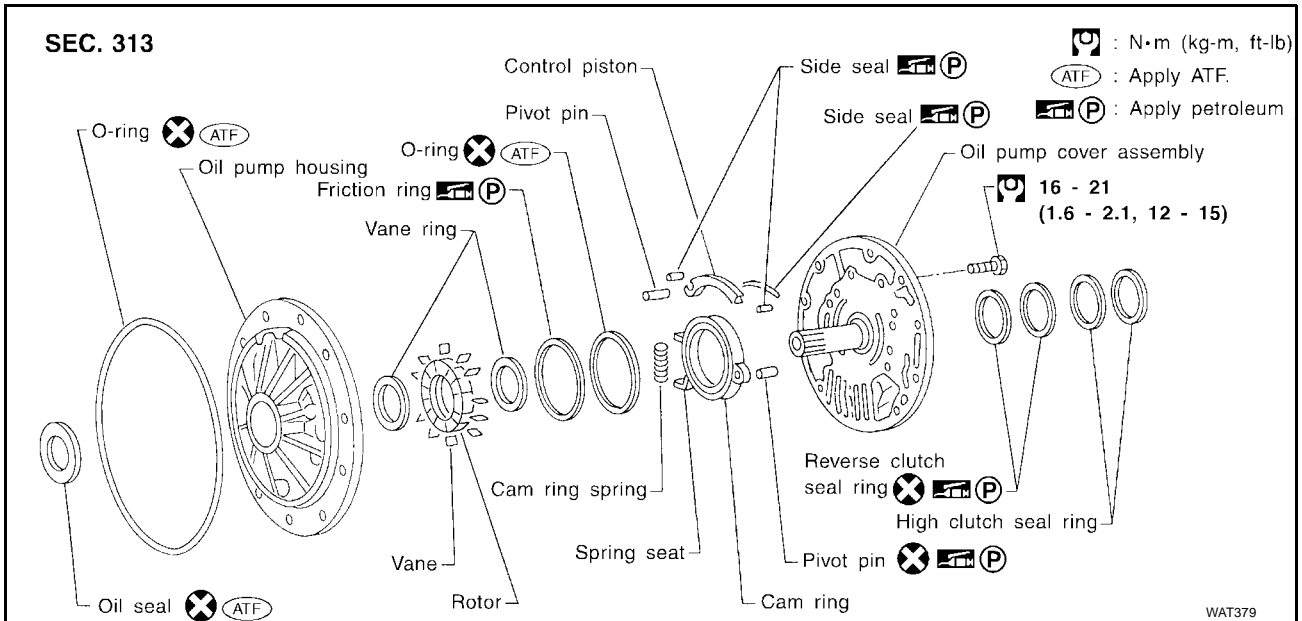
f. Remove oil seal from transmission case.



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## OIL PUMP Components

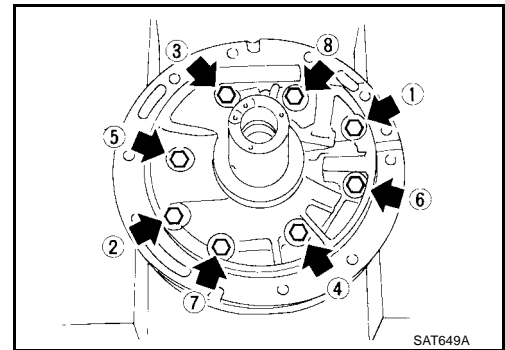
ECS007PC



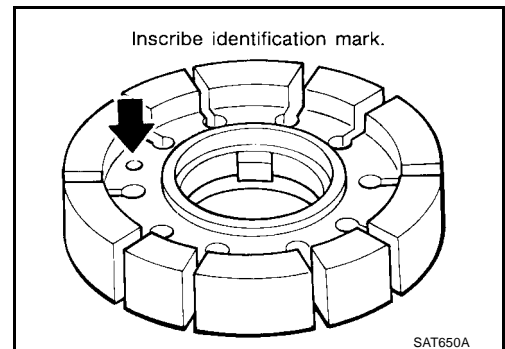
## Disassembly

ECS007PD

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



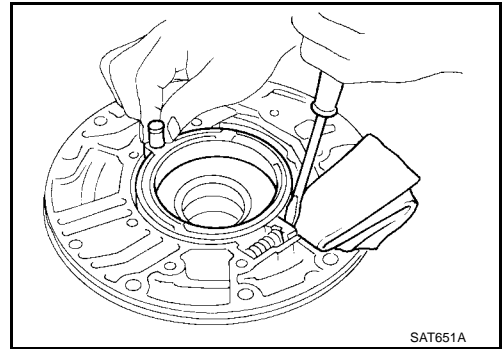
- Remove rotor, vane rings and vanes.
  - Inscribe a mark on back of rotor for identification of fore-aft direction when reassembling rotor. Then remove rotor.



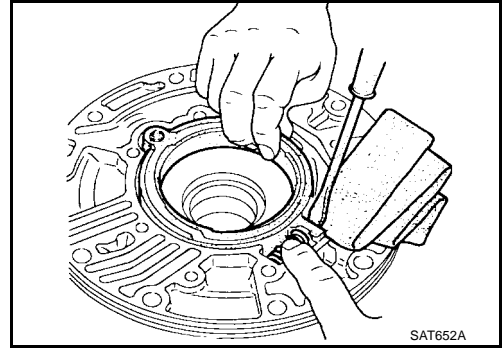
# OIL PUMP

[RE4R01A]

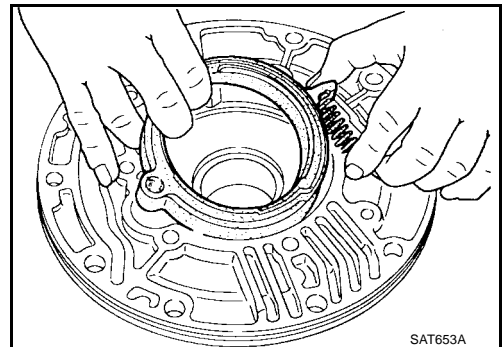
3. While pushing on cam ring remove pivot pin.
  - **Be careful not to scratch oil pump housing.**



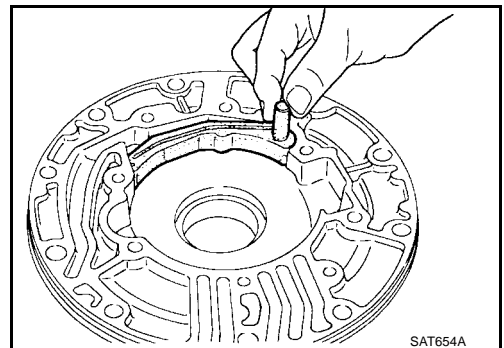
4. While holding cam ring and spring lift out cam ring spring.
  - **Be careful not to damage oil pump housing.**
  - **Hold cam ring spring to prevent it from jumping.**



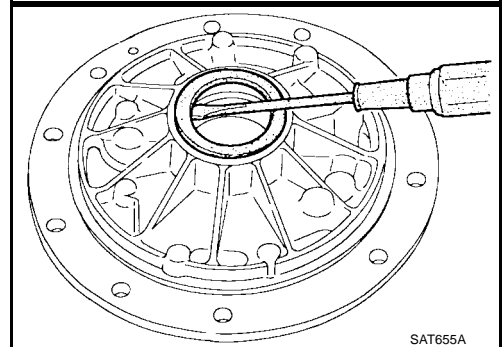
5. Remove cam ring and cam ring spring from oil pump housing.



6. Remove pivot pin from control piston and remove control piston assembly.



7. Remove oil seal from oil pump housing.
  - **Be careful not to scratch oil pump housing.**

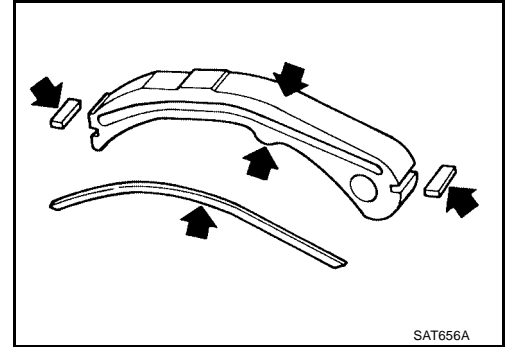


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## Inspection

### OIL PUMP COVER, ROTOR, VANES, CONTROL PISTON, SIDE SEALS, CAM RING AND FRICTION RING

- Check for wear or damage.

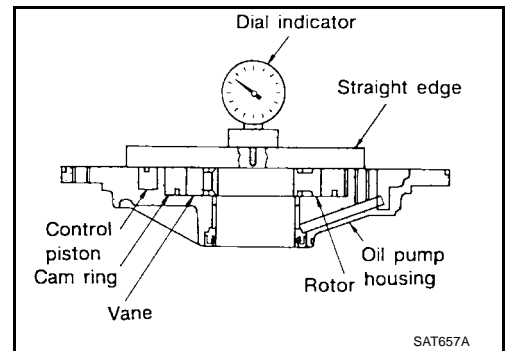


## SIDE CLEARANCES

- Measure side clearances between end of oil pump housing and cam ring, rotor, vanes and control piston. Measure in at least four places along their circumferences. Maximum measured values should be within specified positions.
- **Before measurement, check that friction rings, O-ring, control piston side seals and cam ring spring are removed.**

**Standard clearance (Cam ring, rotor, vanes and control piston)** : Refer to [AT-500, "Oil Pump and Low One-way Clutch"](#) .

- If not within standard clearance, replace oil pump assembly except oil pump cover assembly.



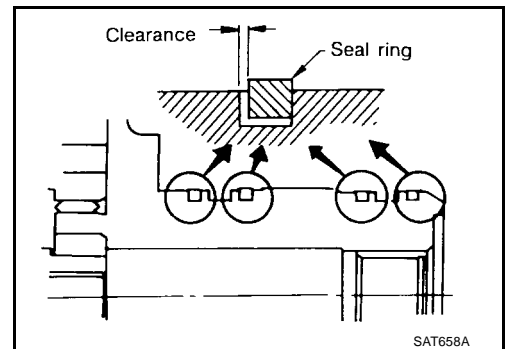
## SEAL RING CLEARANCE

- Measure clearance between seal ring and ring groove.

**Standard clearance** : 0.10 - 0.25 mm (0.0039 - 0.0098 in)

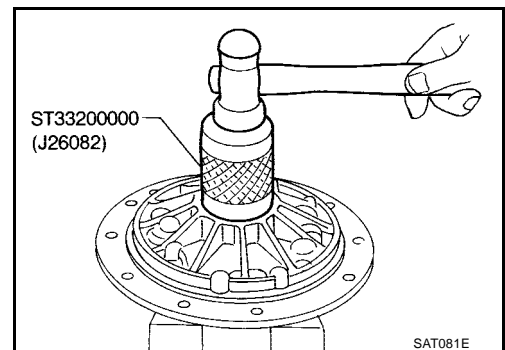
**Wear limit** : 0.25 mm (0.0098 in)

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



## Assembly

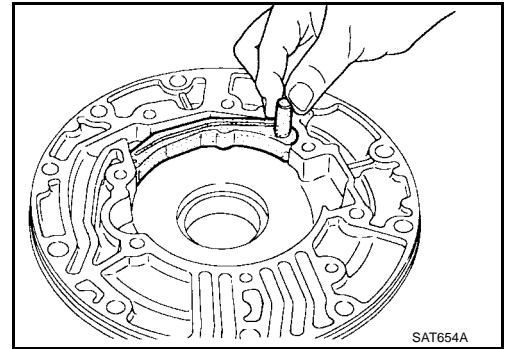
1. Drive oil seal into oil pump housing.
- **Apply ATF to outer periphery and lip surface.**



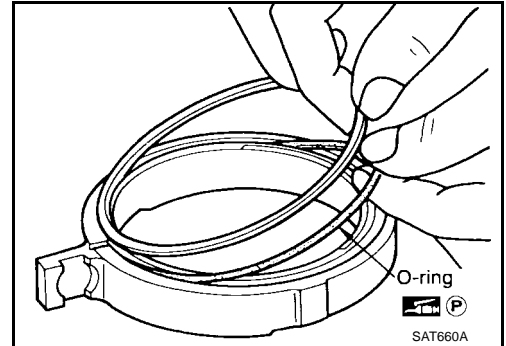
# OIL PUMP

[RE4R01A]

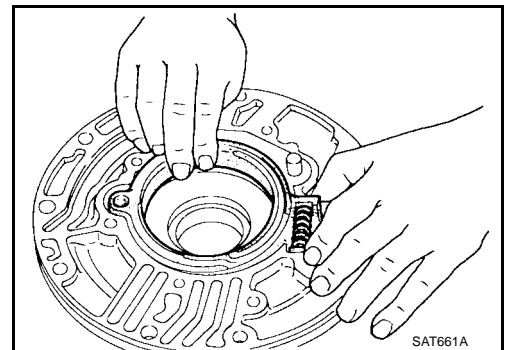
2. Install cam ring in oil pump housing as follows:
  - a. Install side seal on control piston.
    - Pay attention to its direction — Black surface goes toward control piston.
    - Apply petroleum jelly to side seal.
  - b. Install control piston on oil pump.



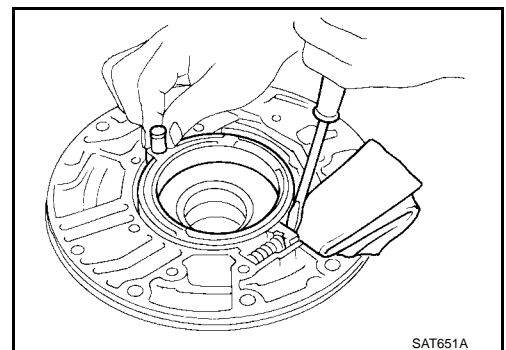
- c. Install O-ring and friction ring on cam ring.
      - Apply petroleum jelly to O-ring.



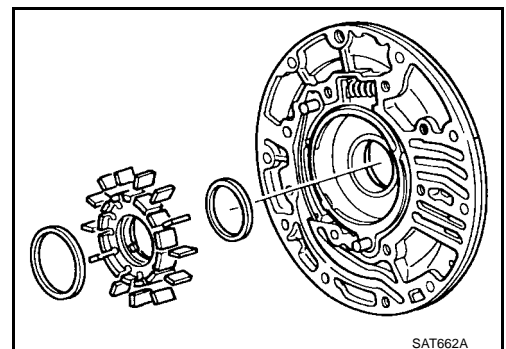
- d. Assemble cam ring, cam ring spring and spring seat. Install spring by pushing it against pump housing.



- e. While pushing on cam ring install pivot pin.



3. Install rotor, vanes and vane rings.
  - Pay attention to direction of rotor.

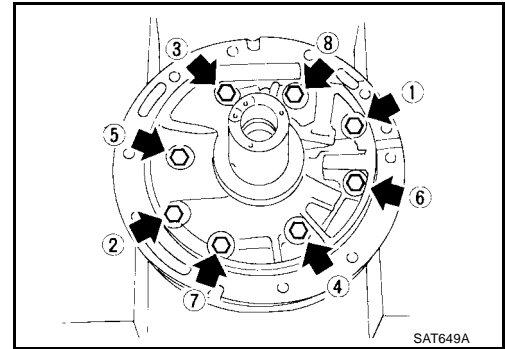


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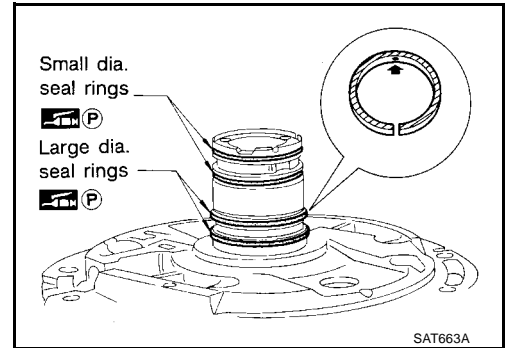
# OIL PUMP

[RE4R01A]

4. Install oil pump housing and oil pump cover.
  - a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly in oil pump housing assembly, then remove masking tape.
  - b. Tighten bolts in a crisscross pattern.



5. Install new seal rings carefully after packing ring grooves with petroleum jelly. Press rings down into jelly to a close fit.
  - Seal rings come in two different diameters. Check fit carefully in each groove.
    - Small dia. seal ring : No mark
    - Large dia. seal ring : Yellow mark in area shown by arrow
  - Do not spread gap of seal ring excessively while installing. It may deform ring.



# CONTROL VALVE ASSEMBLY

[RE4R01A]

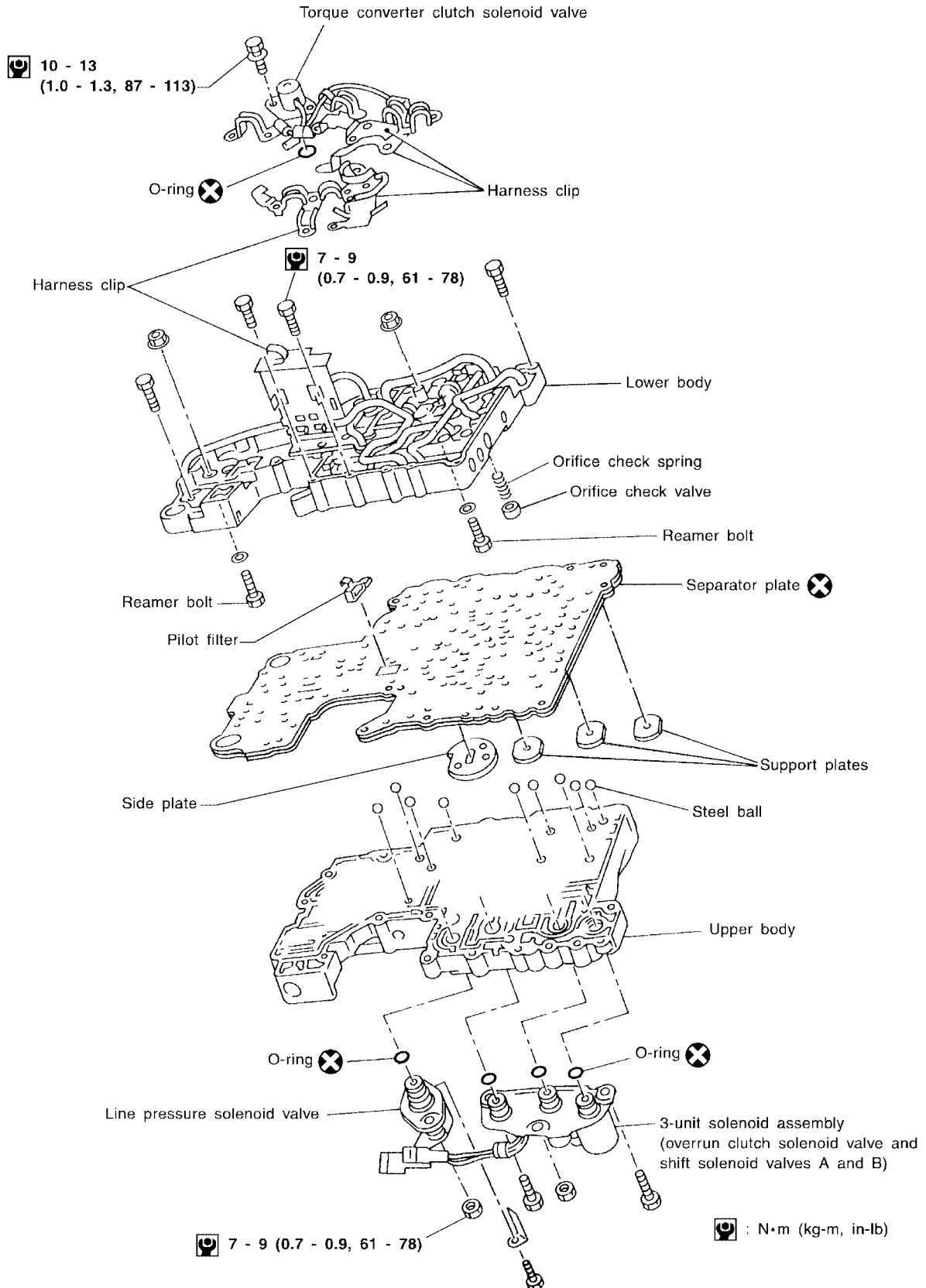
## CONTROL VALVE ASSEMBLY

PFP:31705

### Components

ECS007PG

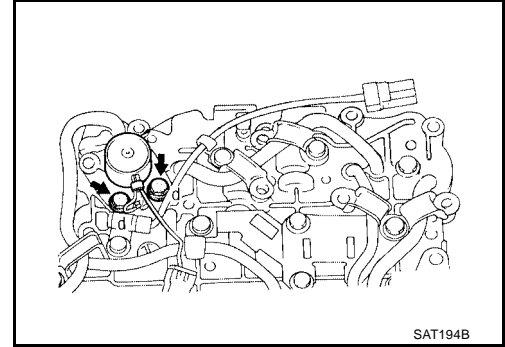
SEC. 317



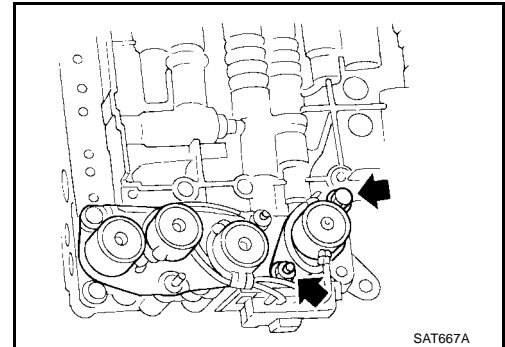
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## Disassembly

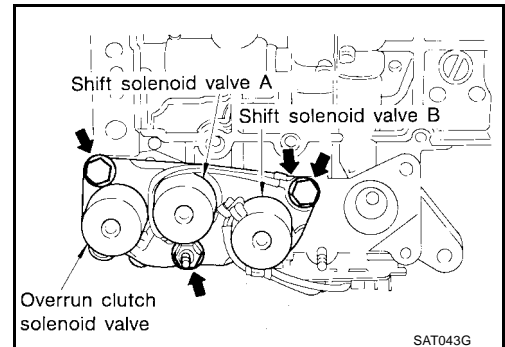
1. Remove solenoids.
  - a. Remove torque converter clutch solenoid valve and side plate from lower body.
  - b. Remove O-ring from solenoid.



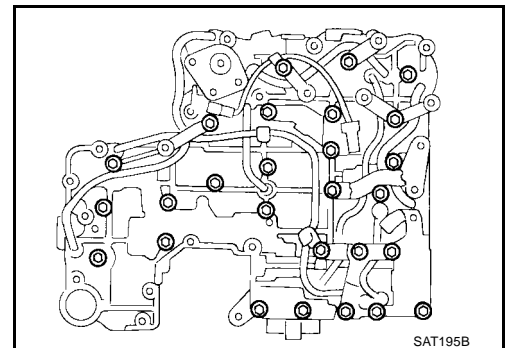
- c. Remove line pressure solenoid valve from upper body.
  - d. Remove O-ring from solenoid.



- e. Remove 3-unit solenoid assembly from upper body.
  - f. Remove O-rings from solenoids.



2. Disassemble upper and lower bodies.
  - a. Place upper body face down, and remove bolts, reamer bolts, side plate and support plates.
  - b. Remove lower body and separator plate as a unit from upper body.
    - **Be careful not to drop pilot filter, orifice check valve, spring and steel balls.**

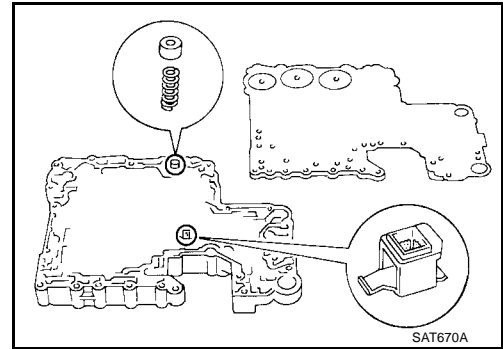




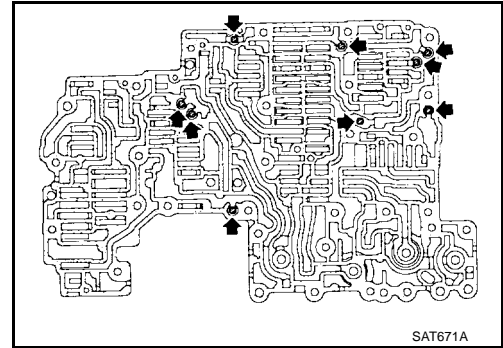
# CONTROL VALVE ASSEMBLY

[RE4R01A]

- c. Place lower body face down, and remove separator plate.
- d. Remove pilot filter, orifice check valve and orifice check spring.

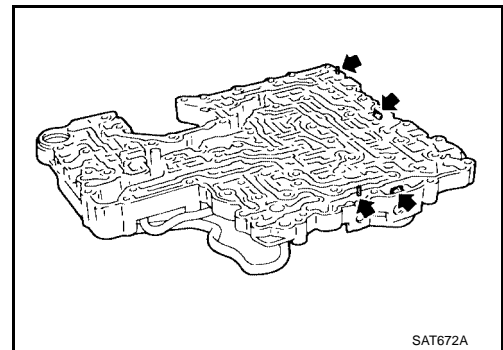


- e. Check to see that steel balls are properly positioned in upper body. Then remove them from upper body.

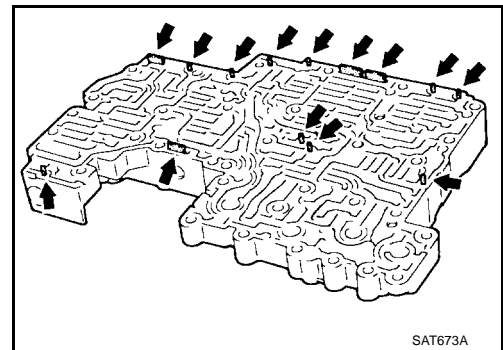


## Inspection LOWER AND UPPER BODIES

- Check to see that there are pins and retainer plates in lower body.



- Check to see that there are pins and retainer plates in upper body.
- **Be careful not to lose these parts.**

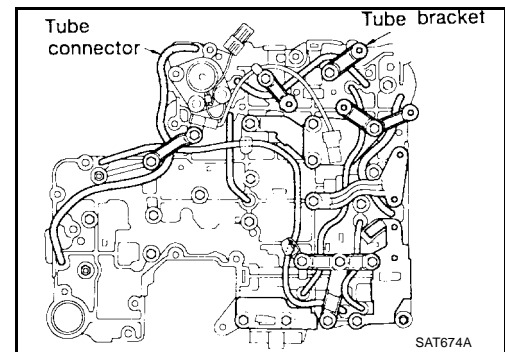


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# CONTROL VALVE ASSEMBLY

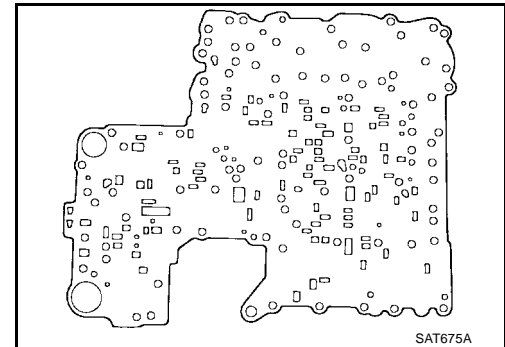
[RE4R01A]

- Check to make sure that oil circuits are clean and free from damage.
- Check tube brackets and tube connectors for damage.



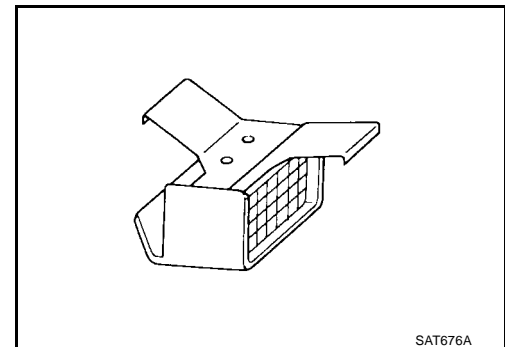
## SEPARATOR PLATE

- Make sure that separator plate is free of damage and not deformed and oil holes are clean.



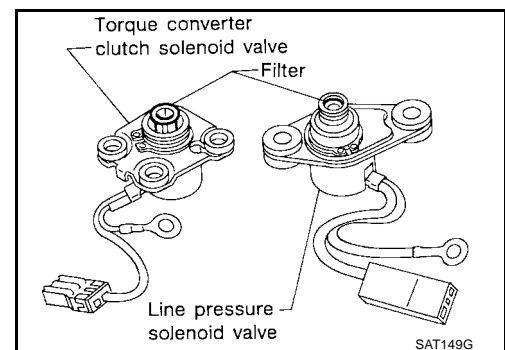
## PILOT FILTER

- Check to make sure that filter is not clogged or damaged.



## TORQUE CONVERTER CLUTCH SOLENOID VALVE

- Check that filter is not clogged or damaged.
- Measure resistance. Refer to [AT-297, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#).



## LINE PRESSURE SOLENOID VALVE

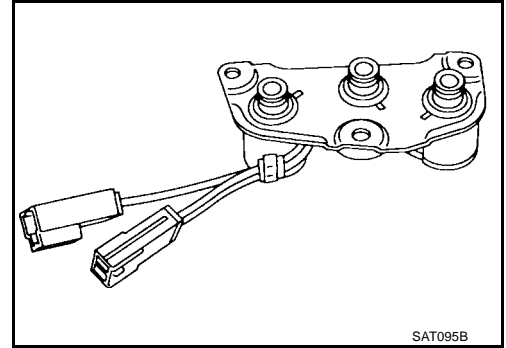
- Check that filter is not clogged or damaged.
- Measure resistance. Refer to [AT-310, "LINE PRESSURE SOLENOID VALVE"](#).

# CONTROL VALVE ASSEMBLY

[RE4R01A]

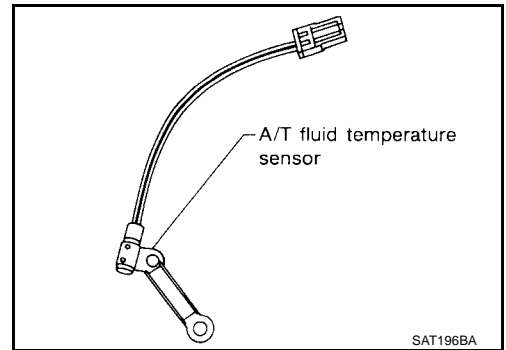
## 3-UNIT SOLENOID ASSEMBLY (OVERRUN CLUTCH SOLENOID VALVE AND SHIFT SOLENOID VALVES A AND B)

- Measure resistance of each solenoid. Refer to [AT-333, "OVERRUN CLUTCH SOLENOID VALVE"](#) , [AT-315, "SHIFT SOLENOID VALVE A"](#) , [AT-320, "SHIFT SOLENOID VALVE B"](#) .



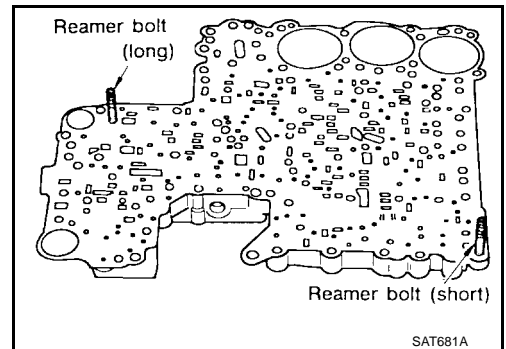
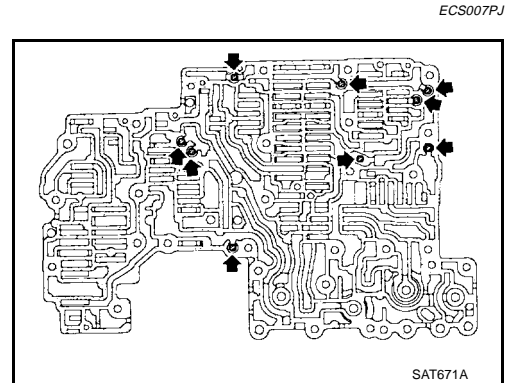
## A/T FLUID TEMPERATURE SENSOR

- Measure resistance. Refer to [AT-339, "A/T FLUID TEMPERATURE SENSOR"](#) .



## Assembly

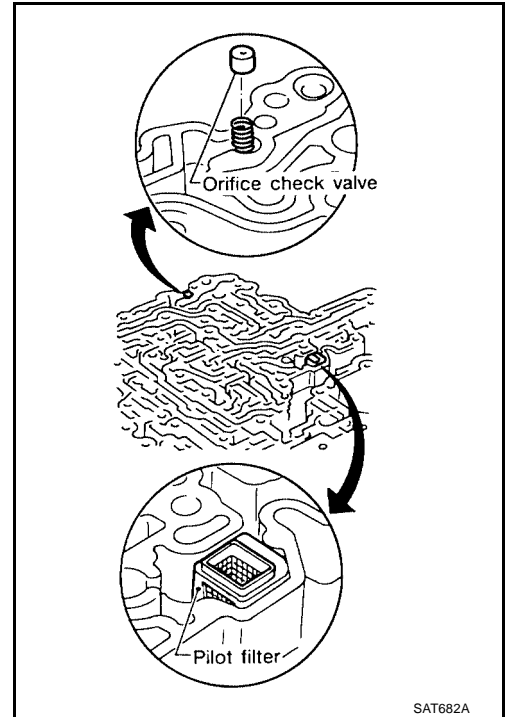
1. Install upper and lower bodies.
  - a. Place oil circuit of upper body face up. Install steel balls in their proper positions.
  - b. Install reamer bolts from bottom of upper body.



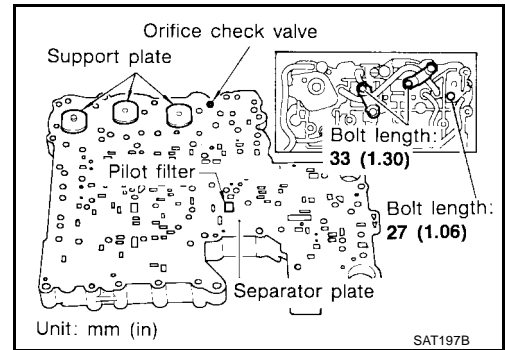
# CONTROL VALVE ASSEMBLY

[RE4R01A]

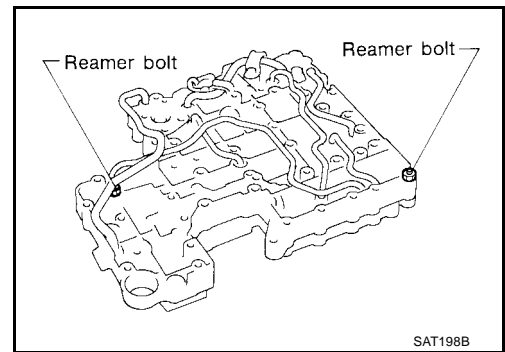
- c. Place oil circuit of lower body face up. Install orifice check spring, orifice check valve and pilot filter.



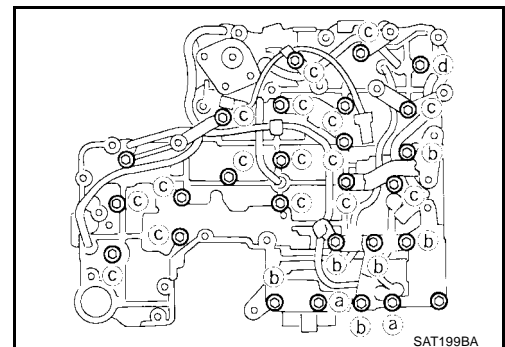
- d. Install separator plate on lower body.  
 e. Install and temporarily tighten support plates, fluid temperature sensor and tube brackets.



- f. Temporarily assemble lower and upper bodies, using reamer bolt as a guide.  
 ● Be careful not to dislocate or drop steel balls, orifice check spring, orifice check valve and pilot filter.



- g. Install and temporarily tighten bolts and tube brackets in their proper locations.



# CONTROL VALVE ASSEMBLY

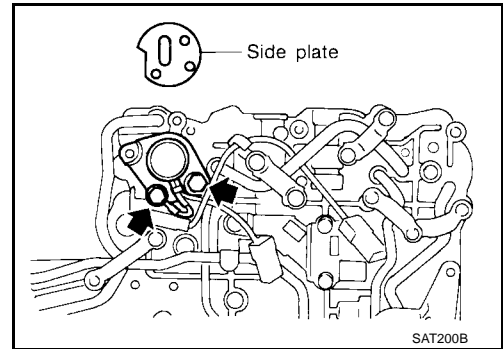
[RE4R01A]

## Bolt length and location:

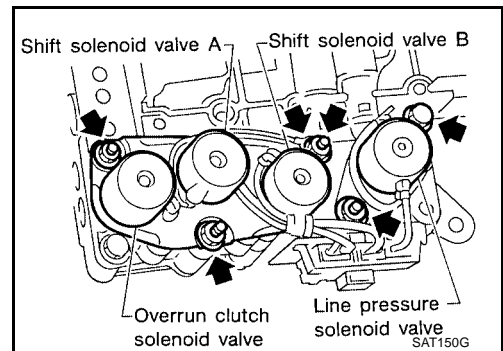
Bolt symbol	a	b	c	d
Bolt length mm (in)	70 (2.76)	50 (1.97)	33 (1.30)	27 (1.06)

### 2. Install solenoids.

- a. Attach O-ring and install torque converter clutch solenoid valve and side plates onto lower body.



- b. Attach O-rings and install 3-unit solenoids assembly onto upper body.
  - c. Attach O-ring and install line pressure solenoid valve onto upper body.
- ### 3. Tighten all bolts.



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# CONTROL VALVE UPPER BODY

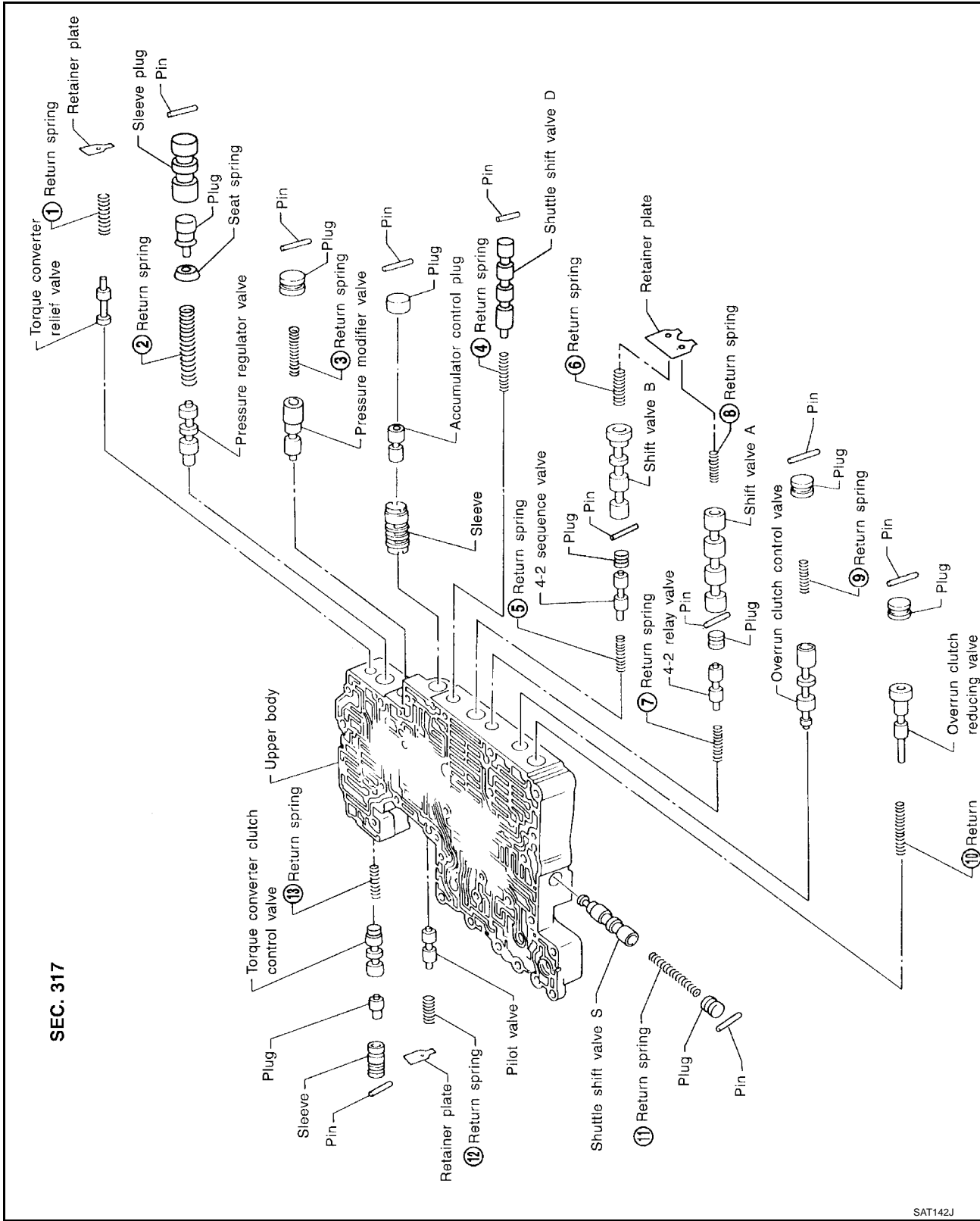
[RE4R01A]

## CONTROL VALVE UPPER BODY

PF3:31711

### Components

ECS007PK



Apply ATF to all components before their installation.

Numbers preceding valve springs correspond with those shown in [AT-497, "Return Springs"](#).

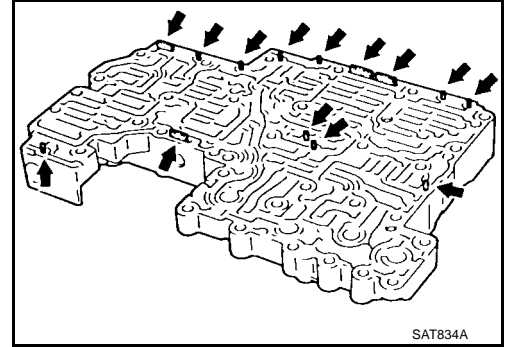
# CONTROL VALVE UPPER BODY

[RE4R01A]

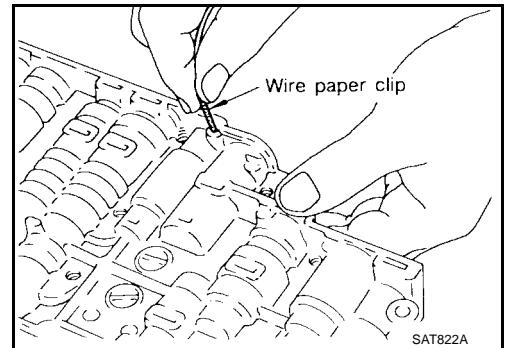
ECS007PL

## Disassembly

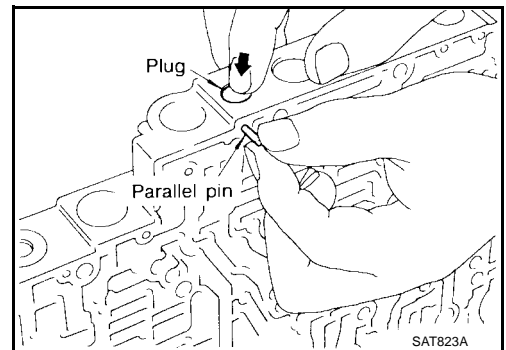
1. Remove valves at parallel pins.
  - Do not use a magnetic hand.



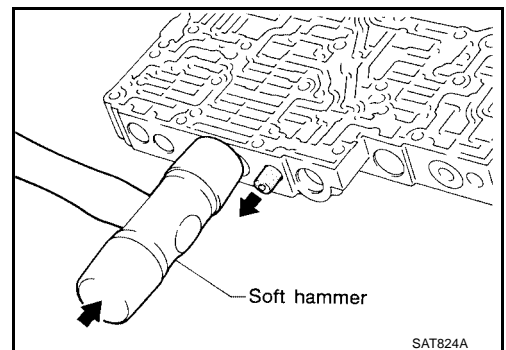
- a. Use a wire paper clip to push out parallel pins.



- b. Remove parallel pins while pressing their corresponding plugs and sleeves.
  - Remove plug slowly to prevent internal parts from jumping out.



- c. Place mating surface of valve face down, and remove internal parts.
  - If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.
  - Be careful not to drop or damage valves and sleeves.

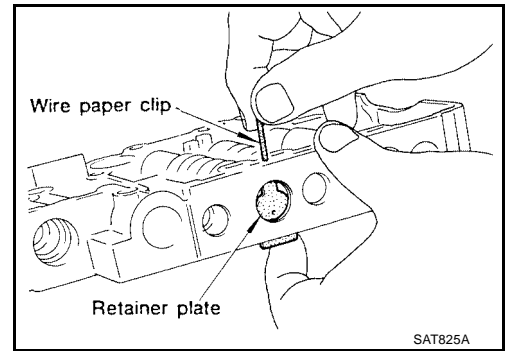


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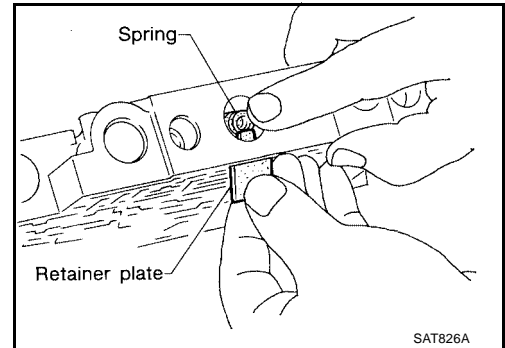
# CONTROL VALVE UPPER BODY

[RE4R01A]

2. Remove valves at retainer plates.
  - a. Pry out retainer plate with wire paper clip.

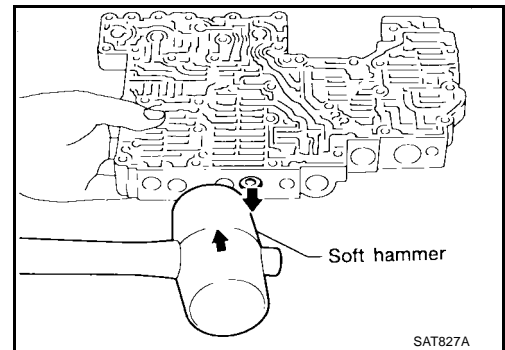


- b. Remove retainer plates while holding spring.

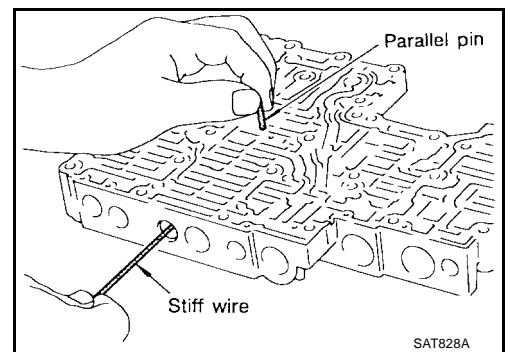


- c. Place mating surface of valve face down, and remove internal parts.

- If a valve is hard to remove, lightly tap valve body with a soft hammer.
- Be careful not to drop or damage valves, sleeves, etc.

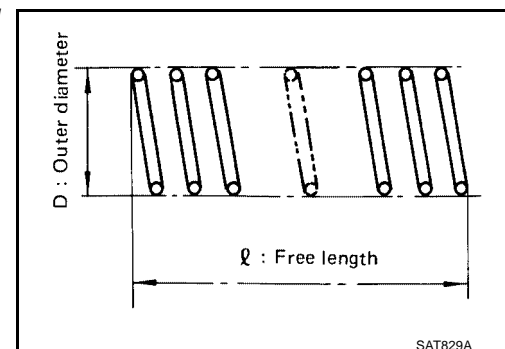


- 4-2 sequence valve and relay valve are located far back in upper body. If they are hard to remove, carefully push them out using stiff wire.
- Be careful not to scratch sliding surface of valve with wire.



## Inspection

ECS007PM





## VALVE SPRINGS

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

**Inspection standard** : Refer to [AT-497, "Return Springs"](#).

- Replace valve springs if deformed or fatigued.

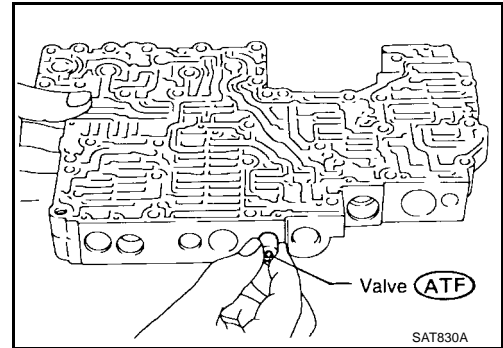
## CONTROL VALVES

- Check sliding surfaces of valves, sleeves and plugs.

## Assembly

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

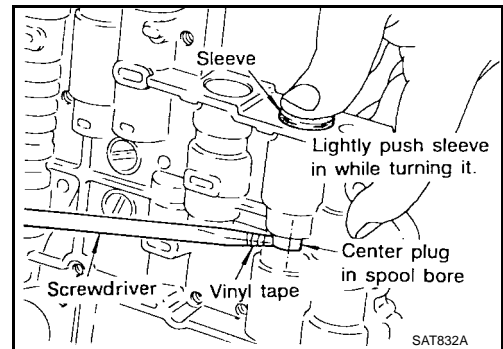
- **Be careful not to scratch or damage valve body.**



- Wrap a small screwdriver with vinyl tape and use it to insert the valves into proper position.

### Pressure regulator valve

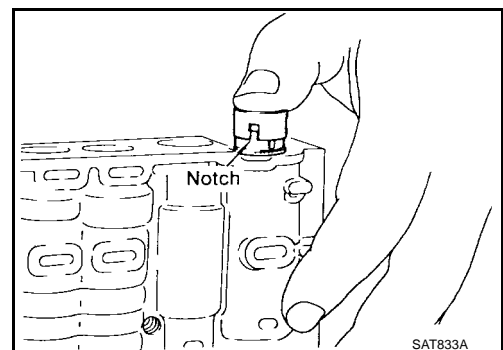
- If pressure regulator plug is not centered properly, sleeve cannot be inserted into bore in upper body. If this happens, use vinyl tape wrapped screwdriver to center sleeve until it can be inserted.



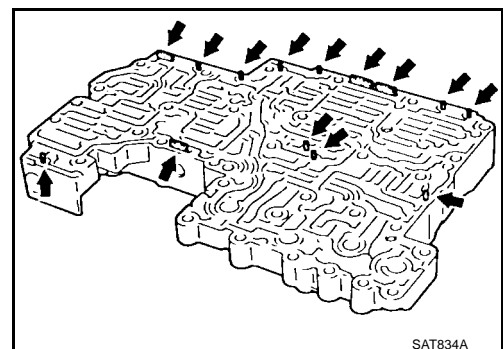
- Turn sleeve slightly while installing.

### Accumulator control plug

- Align protrusion of accumulator control sleeve with notch in plug.
- Align parallel pin groove in plug with parallel pin, and install accumulator control valve.



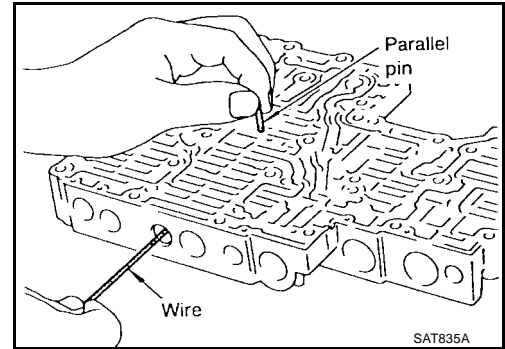
2. Install parallel pins and retainer plates.



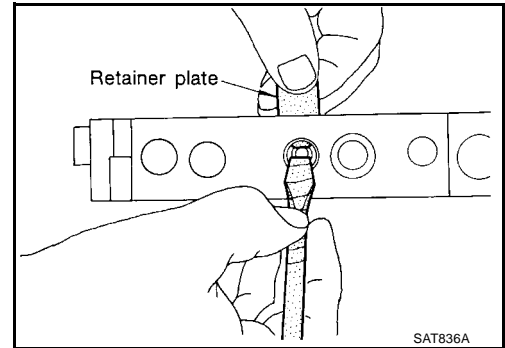
# CONTROL VALVE UPPER BODY

[RE4R01A]

- While pushing plug, install parallel pin.
- 4-2 sequence valve and relay valve**
- Push 4-2 sequence valve and relay valve with wire wrapped in vinyl tape to prevent scratching valve body. Install parallel pins.



- Insert retainer plate while pushing spring.



# CONTROL VALVE LOWER BODY

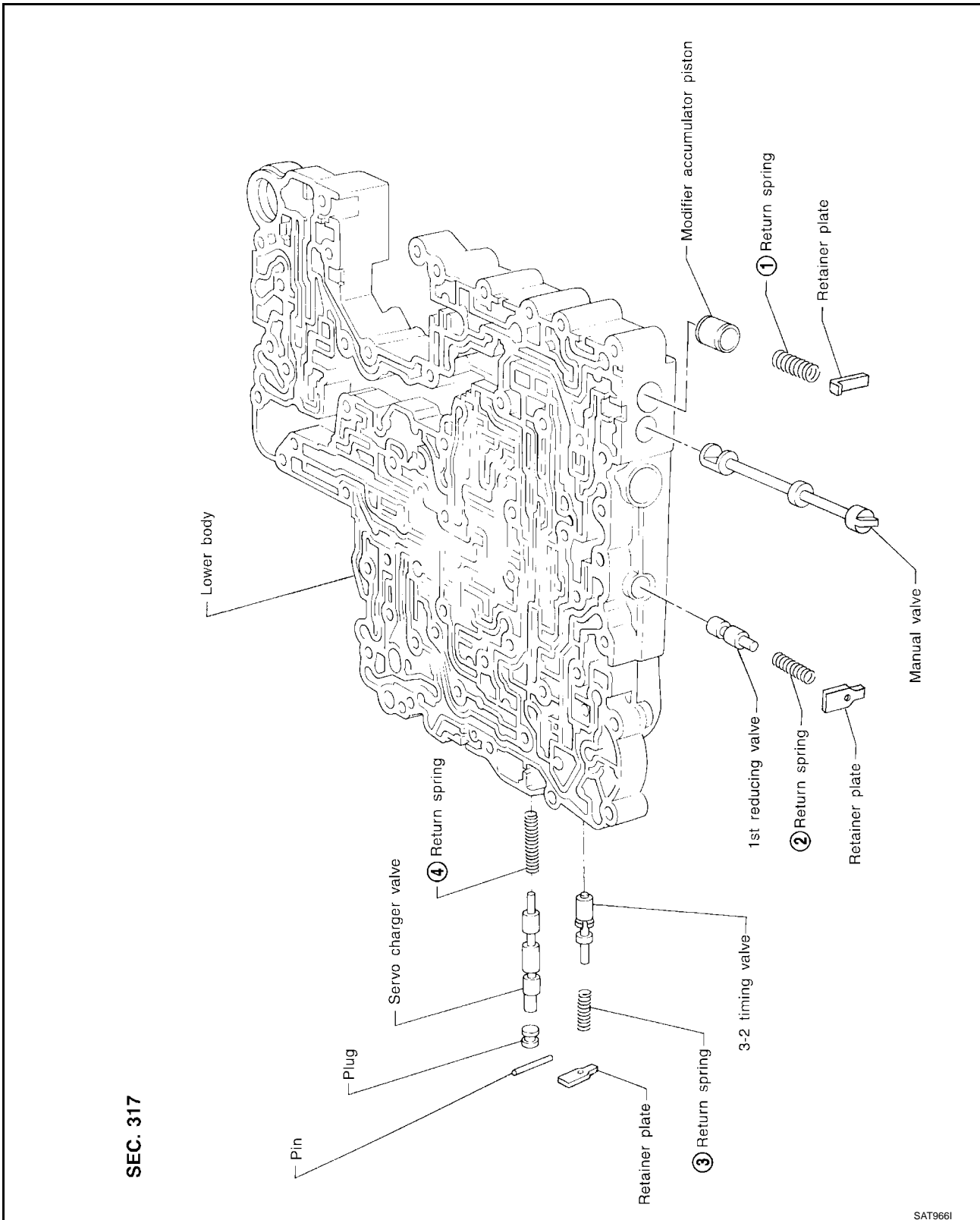
[RE4R01A]

## CONTROL VALVE LOWER BODY

PF3:31713

### Components

ECS007PO



Apply ATF to all components before their installation.

Numbers preceding valve springs correspond with those shown in [AT-497, "Return Springs" 9.](#)

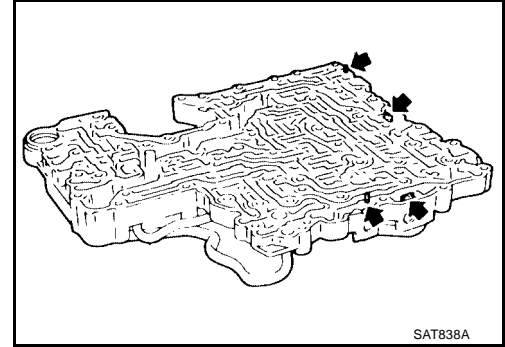
# CONTROL VALVE LOWER BODY

[RE4R01A]

## Disassembly

ECS007PP

1. Remove valves at parallel pins.
2. Remove valves at retainer plates.  
For removal procedures, refer to "DISASSEMBLY" of control valve upper body.



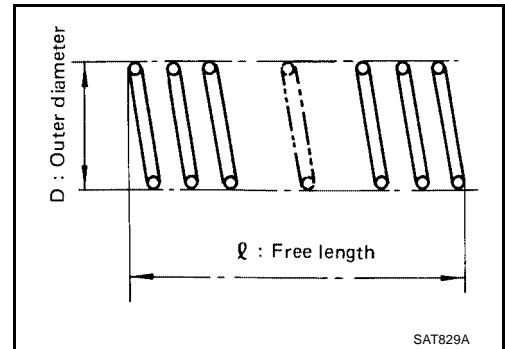
## Inspection VALVE SPRINGS

ECS007PQ

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

**Inspection standard** : Refer to [AT-497, "Return Springs"](#) .

- Replace valve springs if deformed or fatigued.



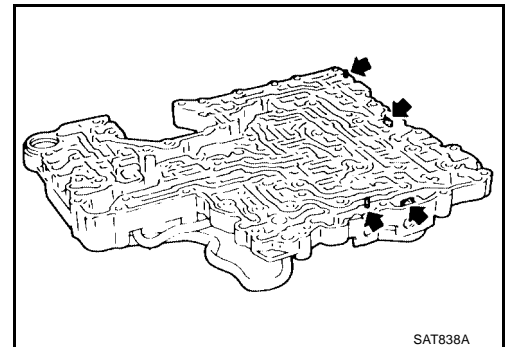
## CONTROL VALVES

- Check sliding surfaces of control valves, sleeves and plugs for damage.

## Assembly

ECS007PR

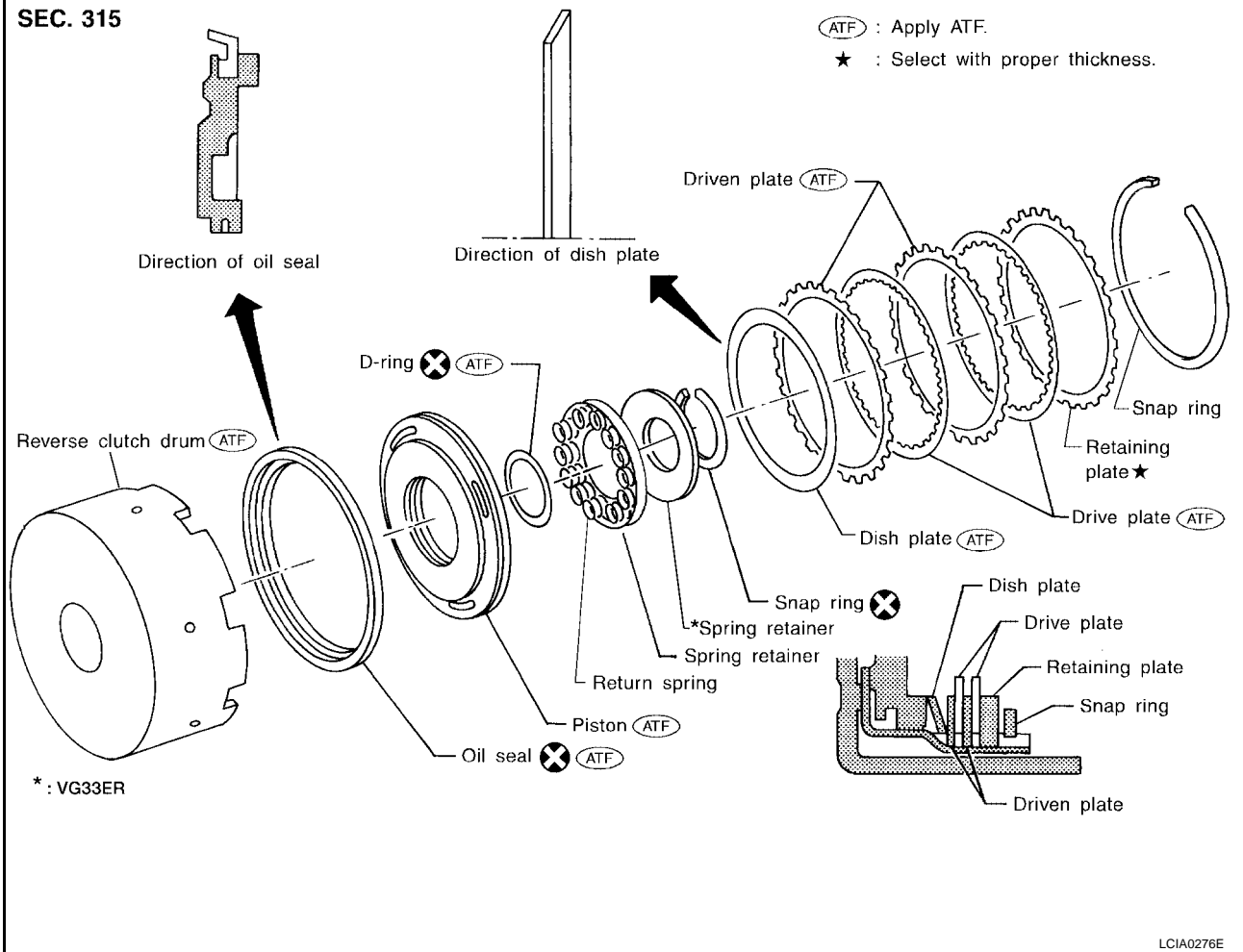
- Install control valves.  
For installation procedures, refer to [AT-478, "ASSEMBLY"](#) .



## REVERSE CLUTCH

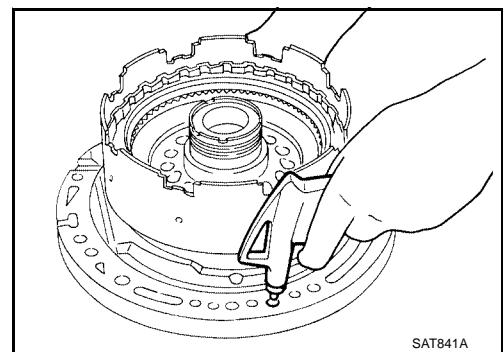
### Components

SEC. 315



### Disassembly

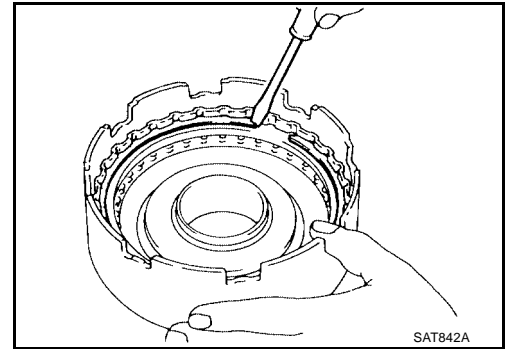
1. Check operation of reverse clutch.
  - a. Install seal ring onto oil pump cover and install reverse clutch. Apply compressed air to oil hole.
  - b. Check to see that retaining plate moves to snap ring.
  - c. If retaining plate does not contact snap ring:
    - D-ring might be damaged.
    - Oil seal might be damaged.
    - Fluid might be leaking past piston check ball.



# REVERSE CLUTCH

[RE4R01A]

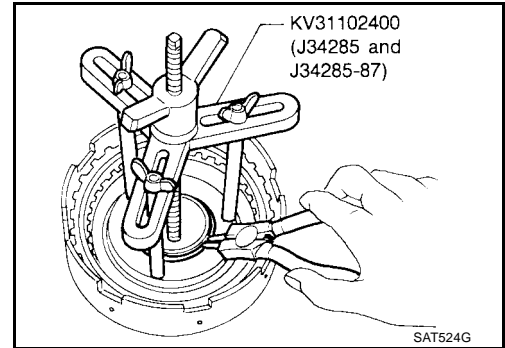
2. Remove drive plates, driven plates, retaining plate, dish plate and snap ring.



3. Remove snap ring from clutch drum while compressing clutch spring(s).

- **Do not expand snap ring excessively.**

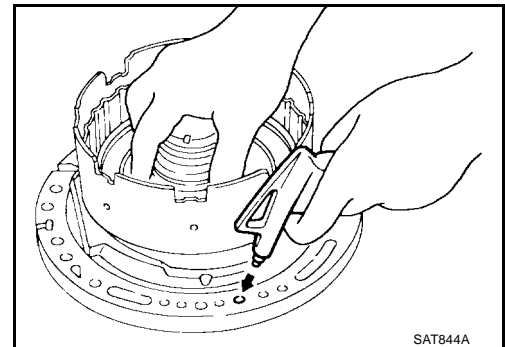
4. Remove spring retainer and return spring.



5. Install seal ring onto oil pump cover and install reverse clutch drum. While holding piston, gradually apply compressed air to oil hole until piston is removed.

- **Do not apply compressed air abruptly.**

6. Remove D-ring and oil seal from piston.



## Inspection

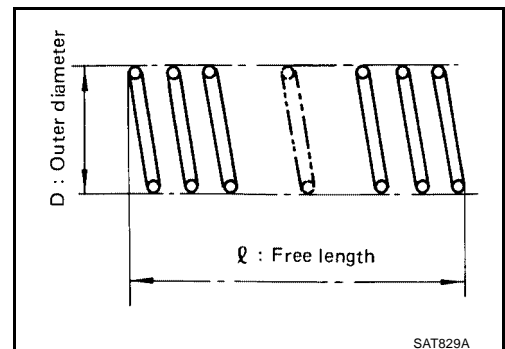
### REVERSE CLUTCH SNAP RING AND SPRING RETAINER

- Check for deformation, fatigue or damage.

### REVERSE CLUTCH RETURN SPRINGS (VG33E ONLY)

- Check for deformation or damage. Also measure free length and outside diameter.

Inspection standard : Refer to [AT-497, "Return Springs"](#) .



# REVERSE CLUTCH

[RE4R01A]

## REVERSE CLUTCH DRIVE PLATES

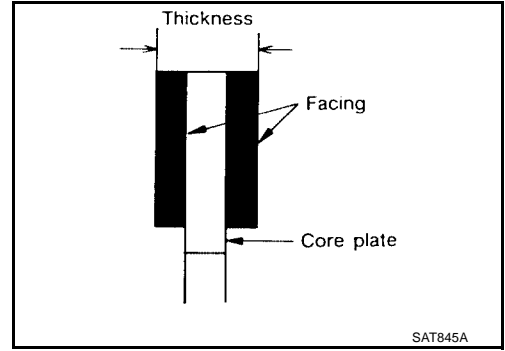
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

### Thickness of drive plate

Standard value : 1.90 - 2.05 mm (0.0748 - 0.0807 in)

Wear limit : 1.80 mm (0.0709 in)

- If not within wear limit, replace.

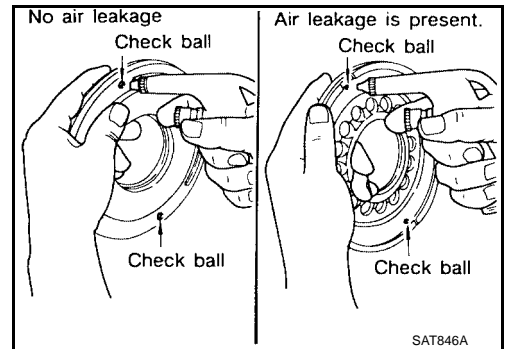


## REVERSE CLUTCH DISH PLATE

- Check for deformation or damage.

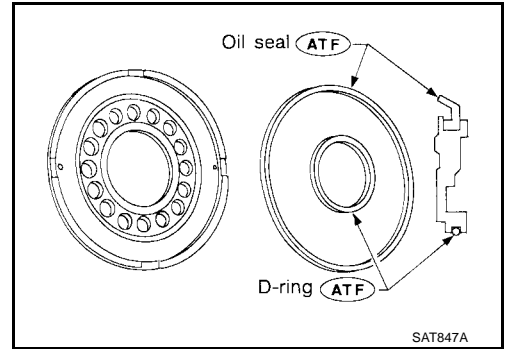
## REVERSE CLUTCH PISTON

- Shake piston to assure that balls are not seized.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Also apply compressed air to oil hole on return spring side to assure that air leaks past ball.

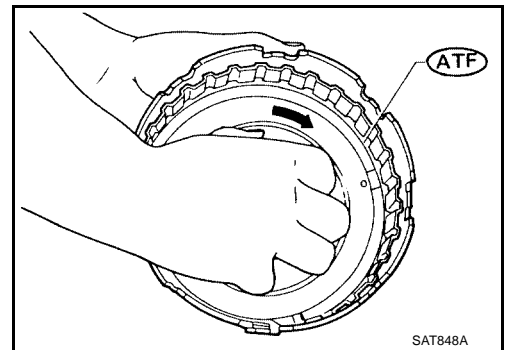


## Assembly

1. Install D-ring and oil seal on piston.
  - Apply ATF to both parts.



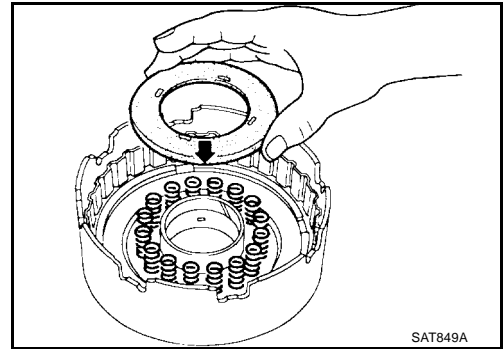
2. Install piston assembly by turning it slowly and evenly.
  - Apply ATF to inner surface of drum.



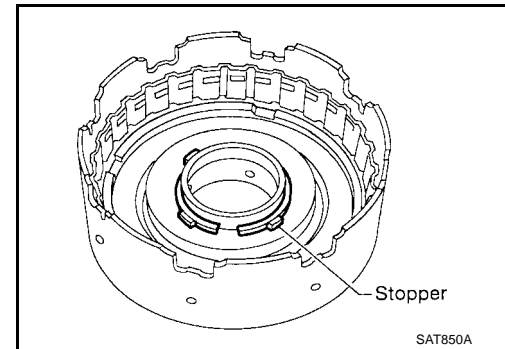
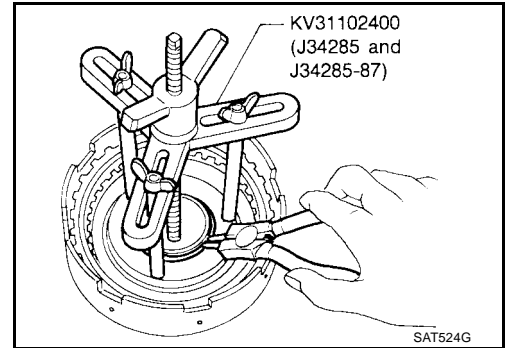
# REVERSE CLUTCH

[RE4R01A]

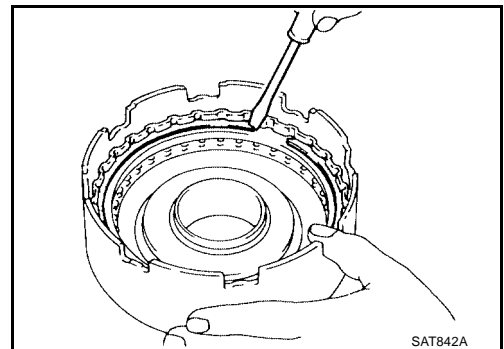
3. Install return springs and spring retainer (VG33E only) or spring retainer (VG33ER only).



4. Install snap ring while compressing clutch springs.



- **Do not align snap ring gap with spring retainer stopper.**
5. Install drive plates, driven plates, retaining plate and dish plate.
  6. Install snap ring.





# REVERSE CLUTCH

[RE4R01A]

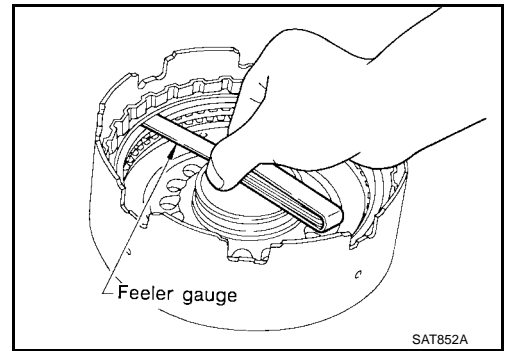
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

**Specified clearance**

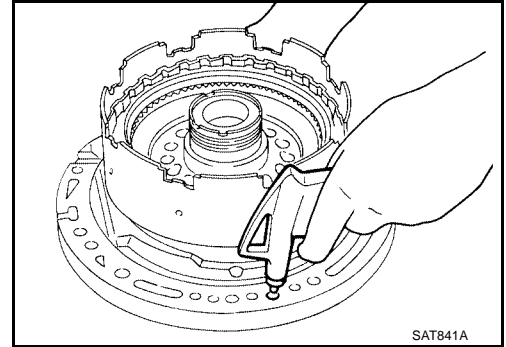
**Standard** : 0.5 - 0.8 mm (0.020 - 0.031 in)

**Allowable limit** : 1.2 mm (0.047 in)

**Retaining plate** : Refer to [AT-498](#), "[REVERSE CLUTCH](#)".



8. Check operation of reverse clutch.  
Refer to [AT-445](#), "[Disassembly](#)".



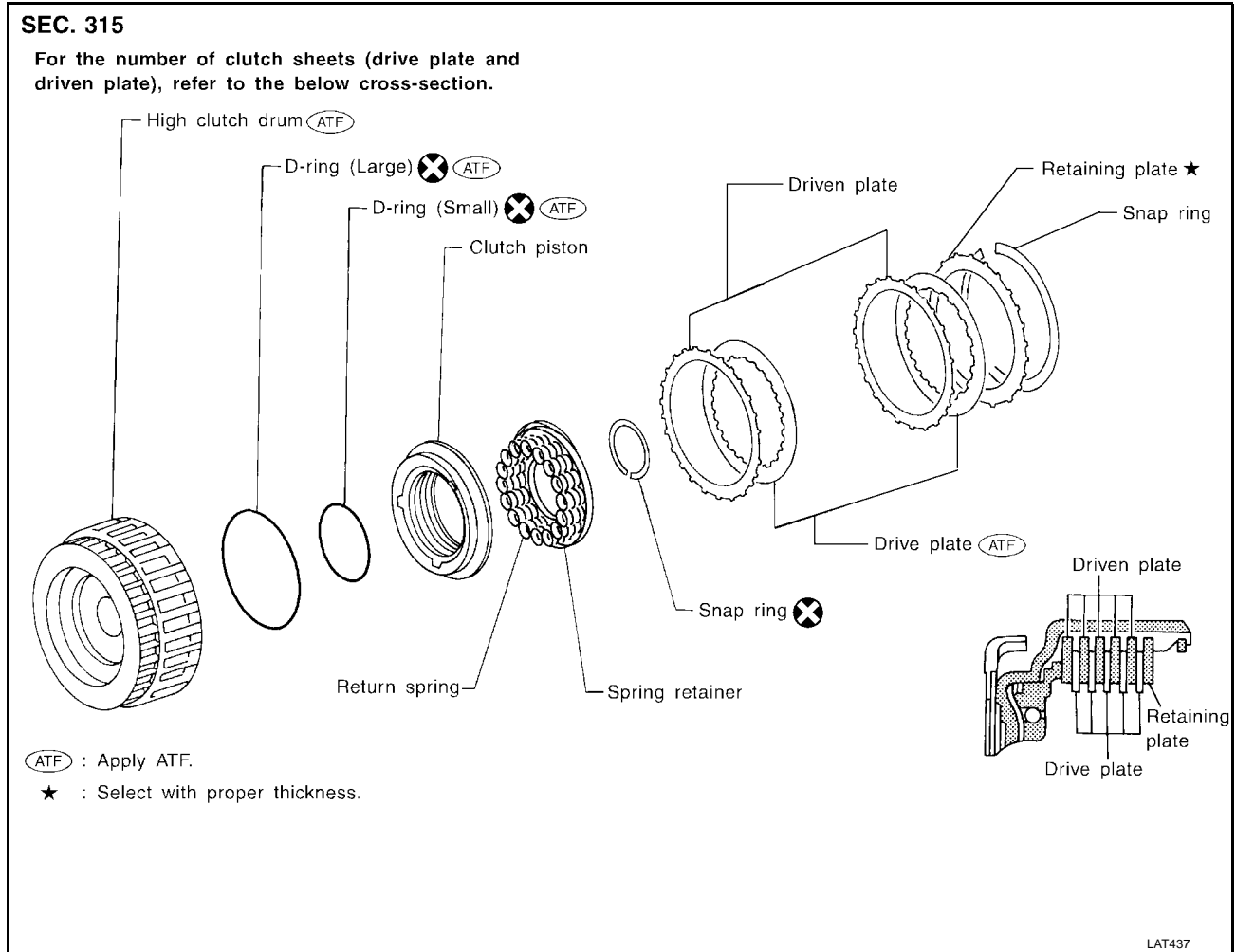
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## HIGH CLUTCH

PFP:31410

### Components

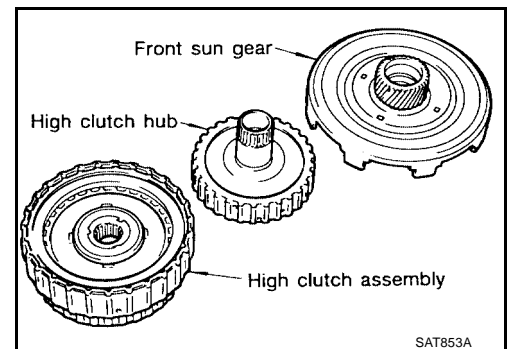
ECS007PW



### Disassembly and Assembly

ECS007PX

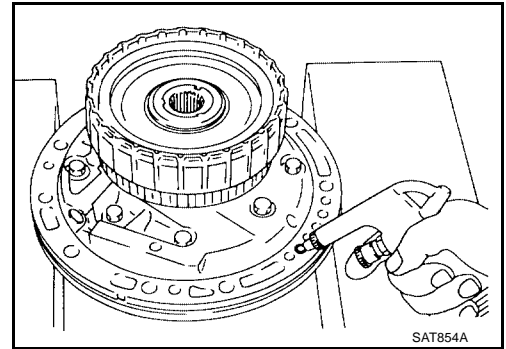
Service procedures for high clutch are essentially the same as those for reverse clutch, with the following exception:



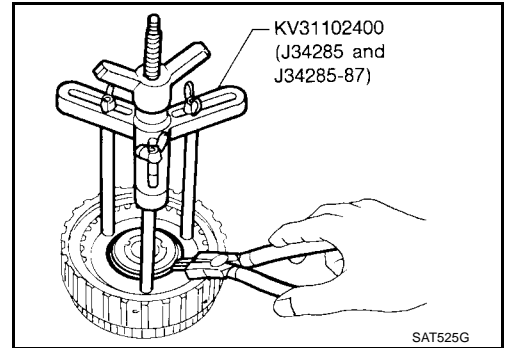
# HIGH CLUTCH

[RE4R01A]

- Check of high clutch operation

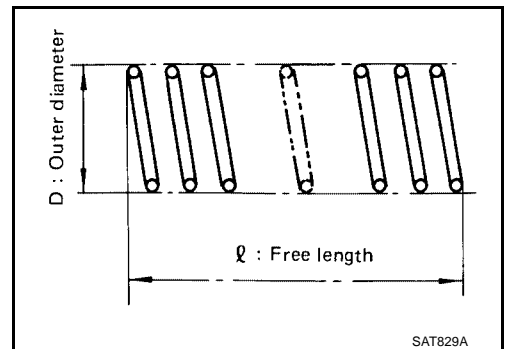


- Removal and installation of return spring



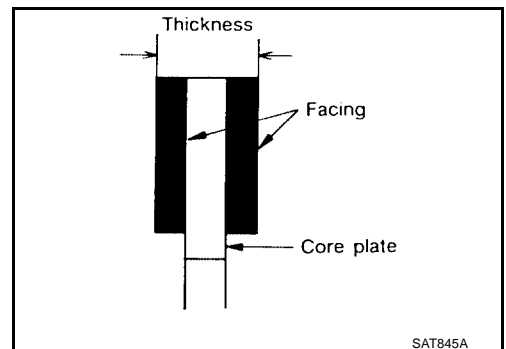
- Inspection of high clutch return springs

**Inspection standard** : Refer to [AT-497, "Return Springs"](#) .



- Inspection of high clutch drive plate

**Thickness of drive plate**  
**Standard** : 1.52 - 1.67 mm (0.0598 - 0.0657 in)  
**Wear limit** : 1.40 mm (0.0551 in)



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# HIGH CLUTCH

[RE4R01A]

- Measurement of clearance between retaining plate and snap ring

**Specified clearance**

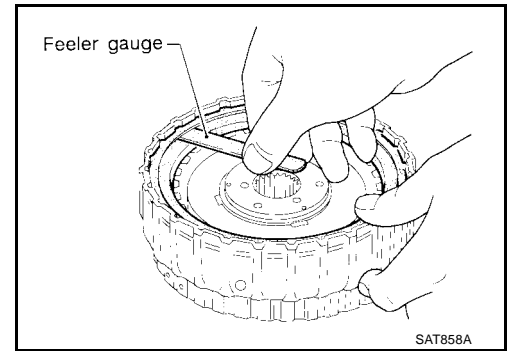
**Standard** : 1.8 - 2.2 mm (0.071 - 0.087 in)

**Allowable limit**

**VG33E only** : 2.8 mm (0.110 in)

**VG33ER only** : 2.2 mm (0.087 in)

**Retaining plate** : Refer to [AT-498, "HIGH CLUTCH"](#) .



FORWARD AND OVERRUN CLUTCHES

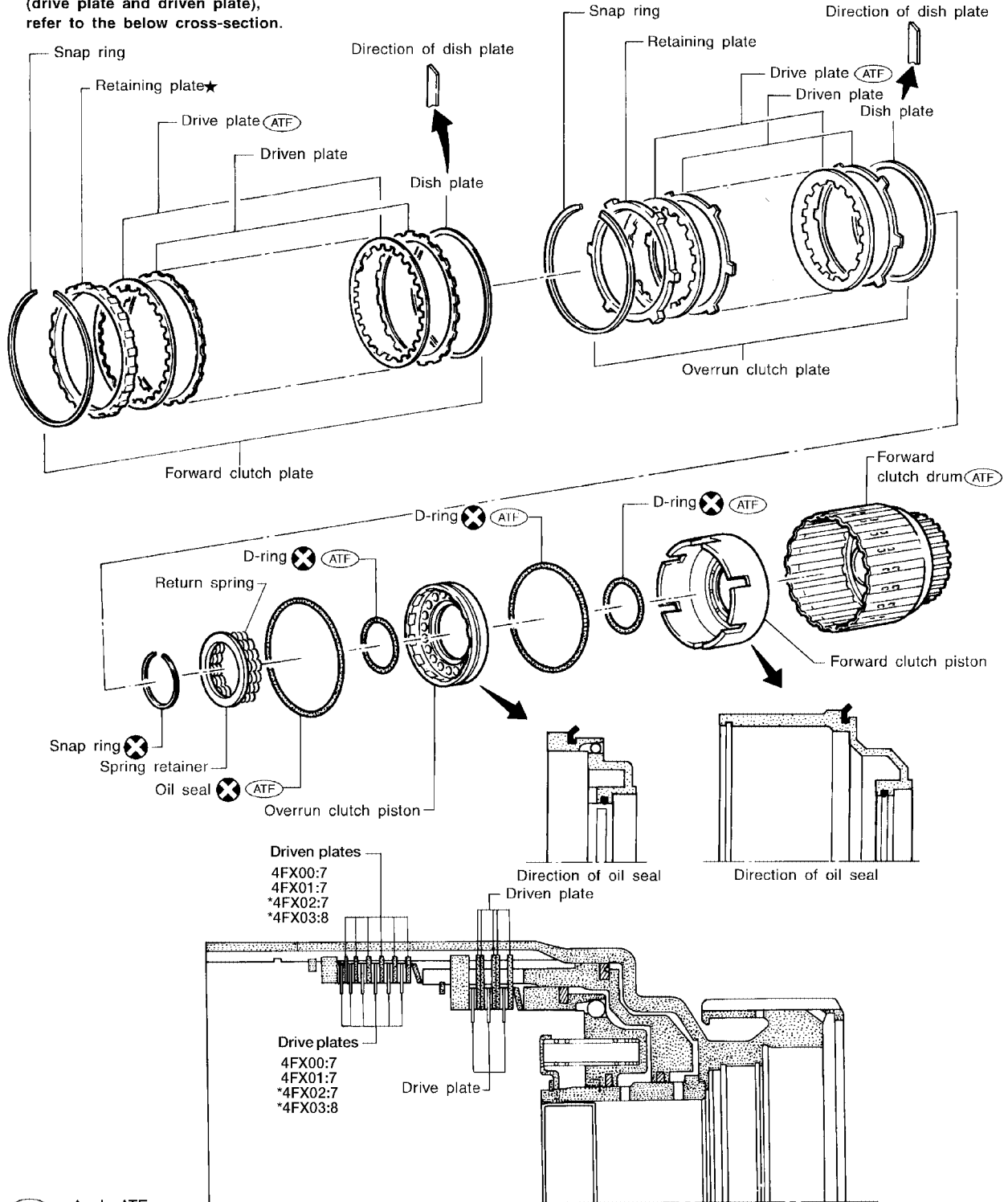
PF3:31570

Components

ECS007PY

SEC. 315

For the number of clutch sheets (drive plate and driven plate), refer to the below cross-section.



(ATF) : Apply ATF.

★ : Select with proper thickness.

\* VG33ER only

# FORWARD AND OVERRUN CLUTCHES

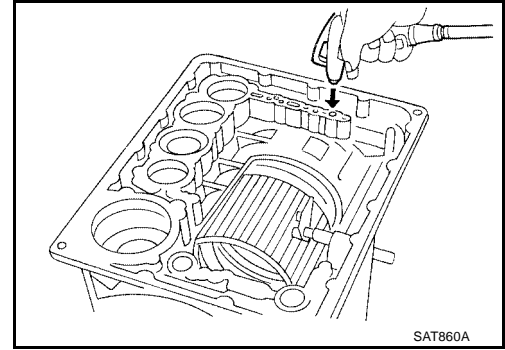
[RE4R01A]

ECS007PZ

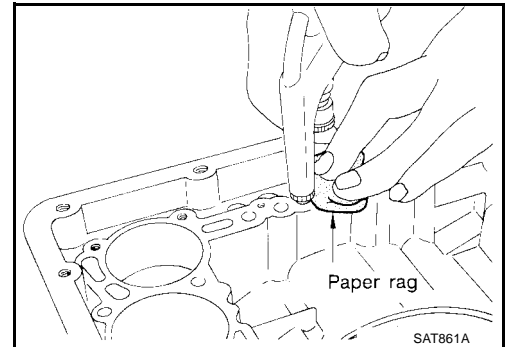
## Disassembly and Assembly

Forward and overrun clutches are serviced essentially the same way as reverse clutch is serviced. However, note the following exceptions.

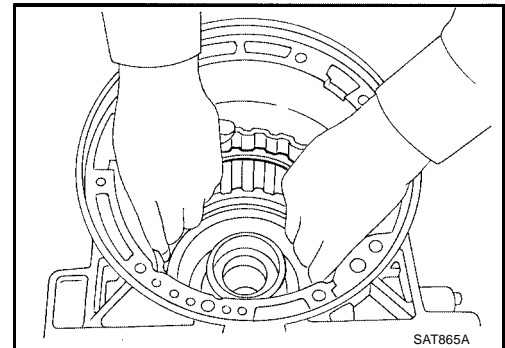
- Check of forward clutch operation



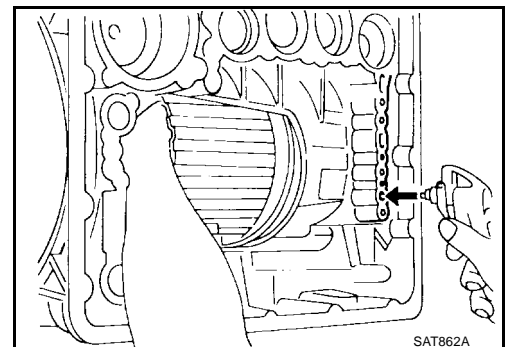
- Check of overrun clutch operation



- Removal of forward clutch drum  
Remove forward clutch drum from transmission case by holding snap ring.



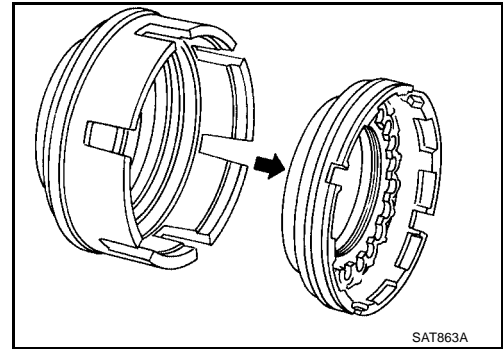
- Removal of forward clutch and overrun clutch pistons
  - While holding overrun clutch piston, gradually apply compressed air to oil hole.



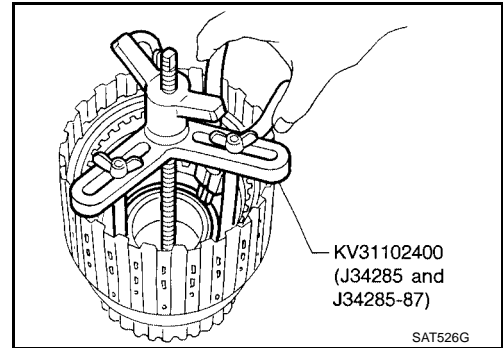
# FORWARD AND OVERRUN CLUTCHES

[RE4R01A]

- Remove overrun clutch from forward clutch.

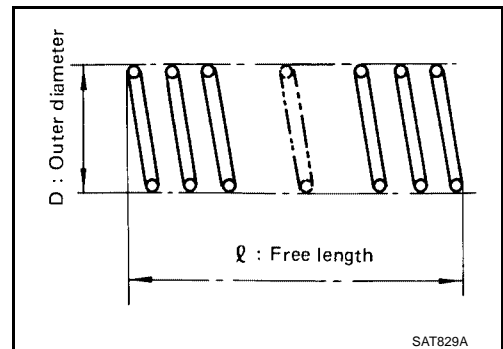


- Removal and installation of return springs



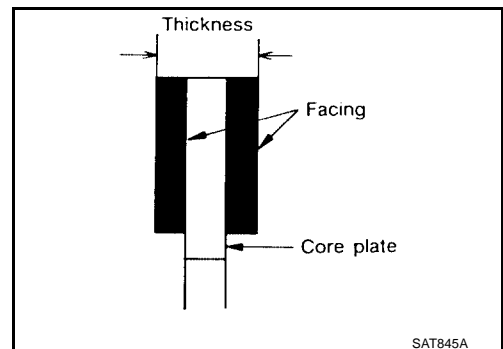
- Inspection of forward clutch and overrun clutch return springs

**Inspection standard** : Refer to [AT-497, "Return Springs"](#) .



- Inspection of forward clutch drive plates

**Thickness of drive plate**  
**Standard** : 1.52 - 1.67 mm (0.0598 - 0.0657 in)  
**Wear limit** : 1.40 mm (0.0551 in)



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# FORWARD AND OVERRUN CLUTCHES

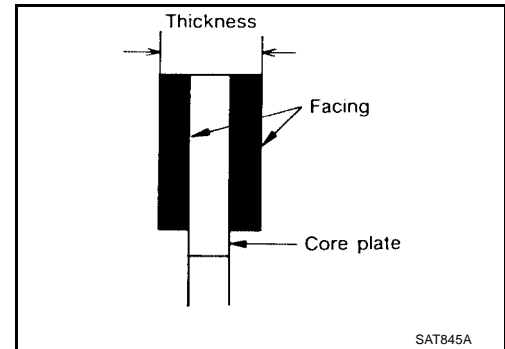
[RE4R01A]

- Inspection of overrun clutch drive plates

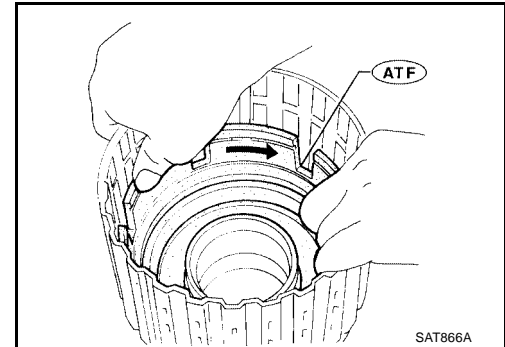
## Thickness of drive plate

**Standard : 1.90 - 2.05 mm (0.0748 - 0.0807 in)**

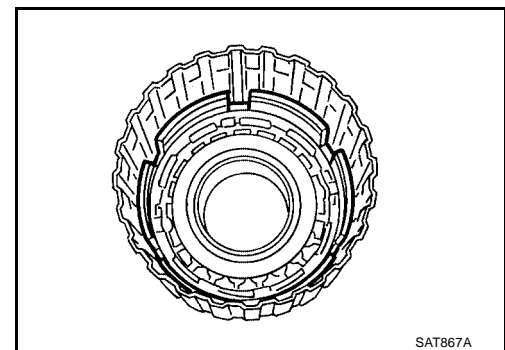
**Wear limit : 1.80 mm (0.0709 in)**



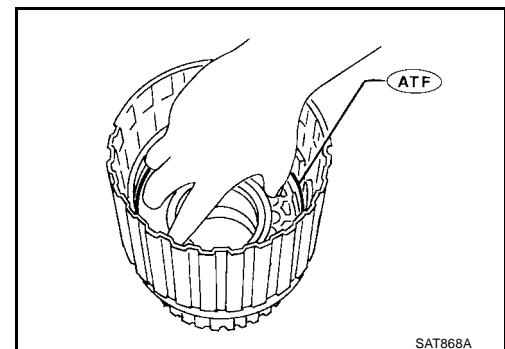
- Installation of forward clutch piston and overrun clutch piston
  - Install forward clutch piston by turning it slowly and evenly.
  - **Apply ATF to inner surface of clutch drum.**



- **Align notch in forward clutch piston with groove in forward clutch drum.**



- Install overrun clutch by turning it slowly and evenly.
- **Apply ATF to inner surface of forward clutch piston.**





# FORWARD AND OVERRUN CLUTCHES

[RE4R01A]

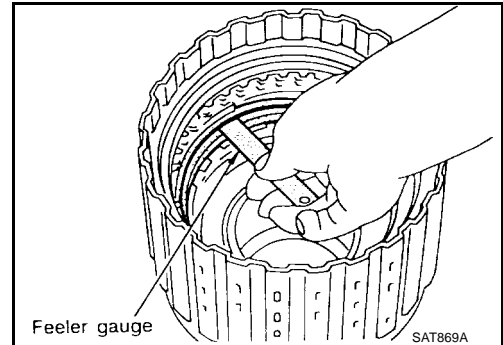
- Measurement of clearance between retaining plate and snap ring of overrun clutch

**Specified clearance**

**Standard : 1.0 - 1.4 mm (0.039 - 0.055 in)**

**Allowable limit : 2.4 mm (0.094 in)**

**Retaining plate : Refer to [AT-499, "FORWARD CLUTCH"](#) .**



- Measurement of clearance between retaining plate and snap ring of forward clutch

**Specified clearance**

**Standard : 0.35 - 0.75 mm (0.0138 - 0.0295 in)**

**Allowable limit**

**VG33E only**

**Model 4FX17 (2WD) : 2.15 mm (0.085 in)**

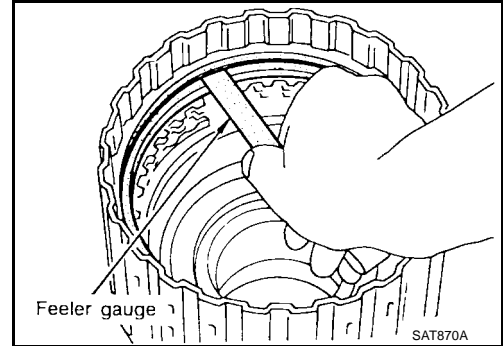
**Model 4FX18 (4WD) : 2.15 mm (0.085 in)**

**VG33ER only**

**Model 4FX19 (2WD) : 2.15 mm (0.085 in)**

**Model 4FX20 (4WD) : 2.35 mm (0.093 in)**

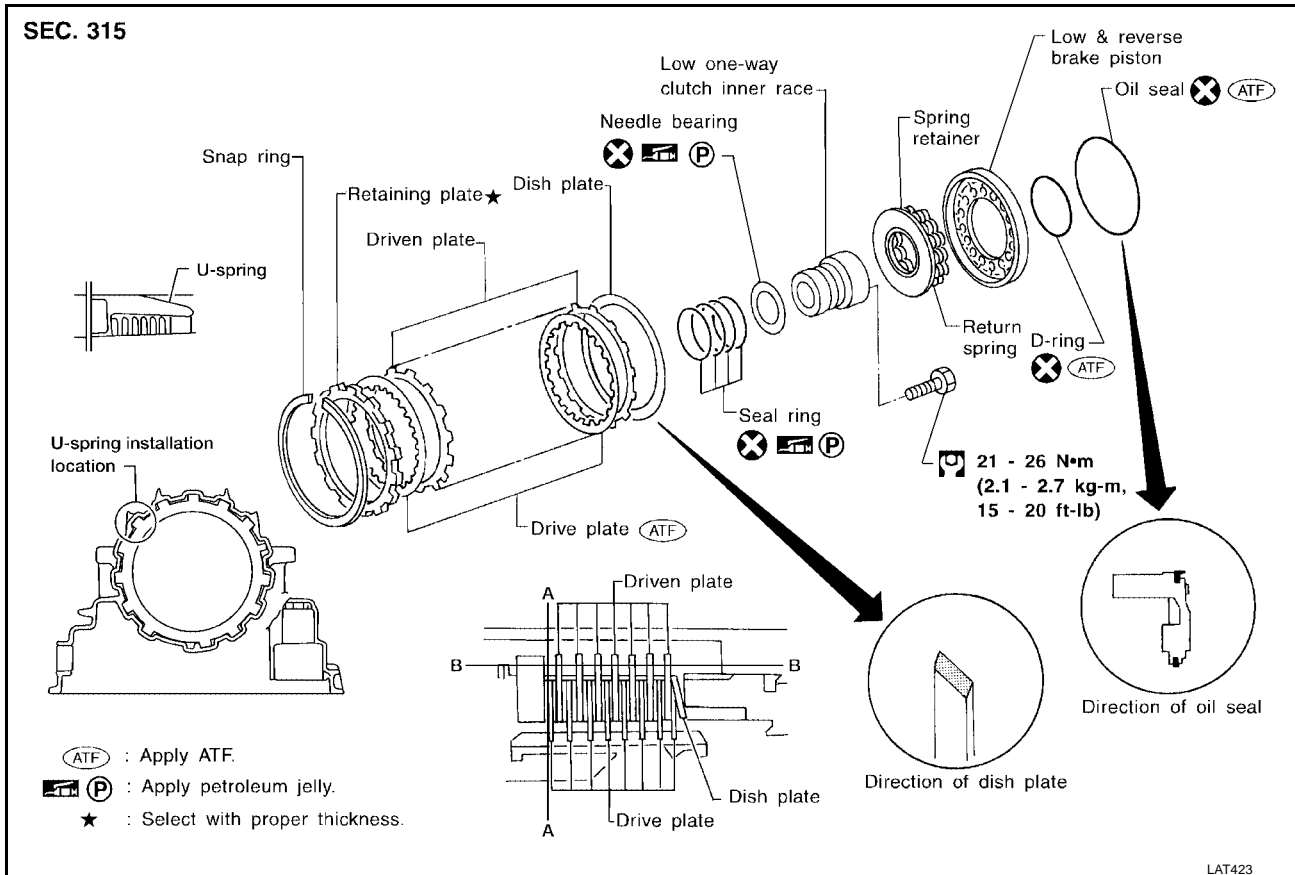
**Retaining plate : Refer to [AT-499, "FORWARD CLUTCH"](#) .**



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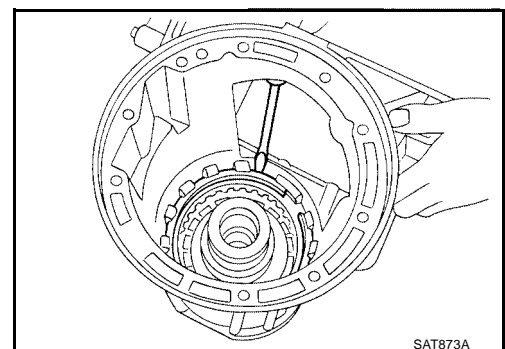
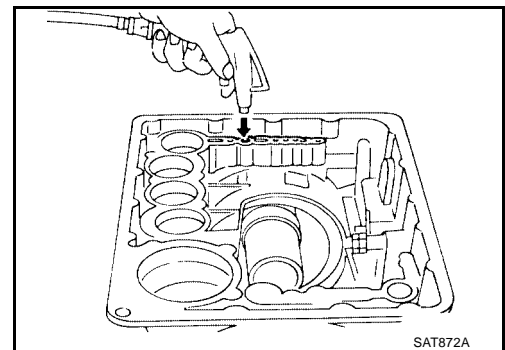
## LOW & REVERSE BRAKE

### Components



### Disassembly

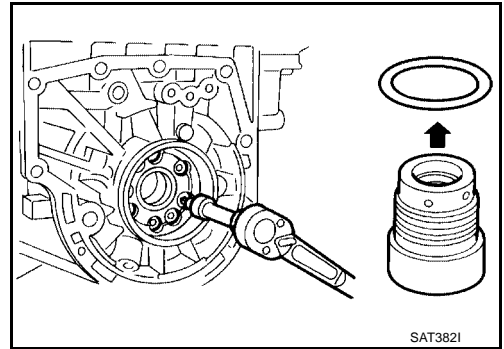
1. Check operation of low and reverse brake.
  - a. Install seal ring onto oil pump cover and install reverse clutch. Apply compressed air to oil hole.
  - b. Check to see that retaining plate moves to snap ring.
  - c. If retaining plate does not contact snap ring:
    - D-ring might be damaged.
    - Oil seal might be damaged.
    - Fluid might be leaking past piston check ball.
  
2. Remove snap ring, low and reverse brake drive plates, driven plates and dish plate.



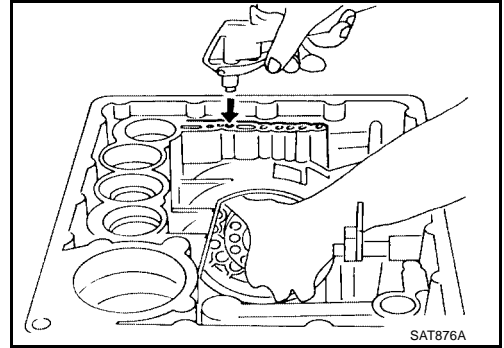
# LOW & REVERSE BRAKE

[RE4R01A]

3. Remove low one-way clutch inner race, spring retainer and return spring from transmission case.
4. Remove seal rings from low one-way clutch inner race.
5. Remove needle bearing from low one-way clutch inner race.



6. Remove low and reverse brake piston using compressed air.
7. Remove oil seal and D-ring from piston.



## Inspection

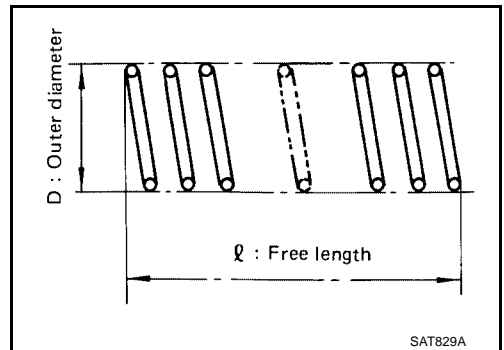
### LOW AND REVERSE BRAKE SNAP RING AND SPRING RETAINER

- Check for deformation, or damage.

### LOW AND REVERSE BRAKE RETURN SPRINGS

- Check for deformation or damage. Also measure free length and outside diameter.

**Inspection standard** : Refer to [AT-497, "Return Springs"](#) .



### LOW AND REVERSE BRAKE DRIVE PLATES

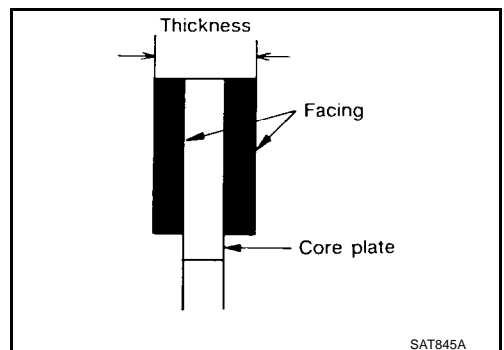
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

**Thickness of drive plate**

**Standard value** : 1.52 - 1.67 mm (0.0598 - 0.0657 in)

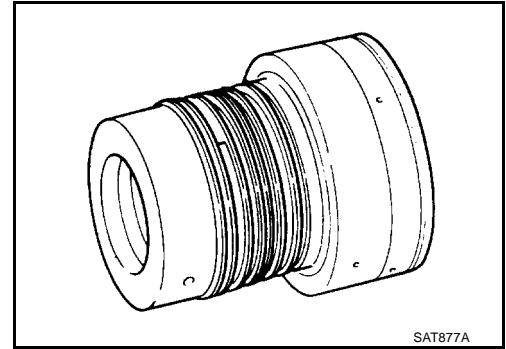
**Wear limit** : 1.40 mm (0.0551 in)

- If not within wear limit, replace.



## LOW ONE-WAY CLUTCH INNER RACE

- Check frictional surface of inner race for wear or damage.



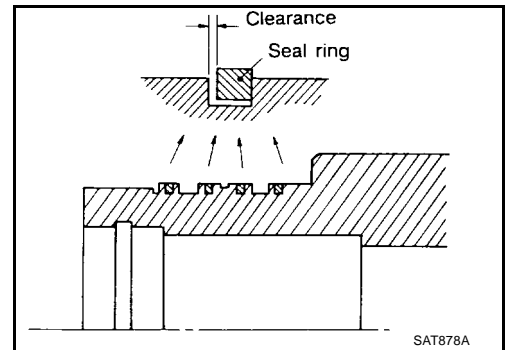
- Install a new seal rings onto low one-way clutch inner race.
- **Be careful not to expand seal ring gap excessively.**
- Measure seal ring-to-groove clearance.

**Inspection standard**

**Standard value** : 0.10 - 0.25 mm (0.0039 - 0.0098 in)

**Allowable limit** : 0.25 mm (0.0098 in)

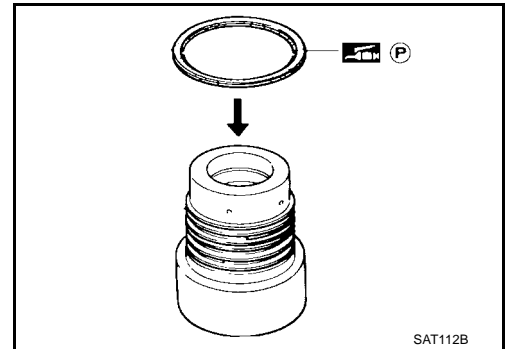
- If not within allowable limit, replace low one-way clutch inner race.



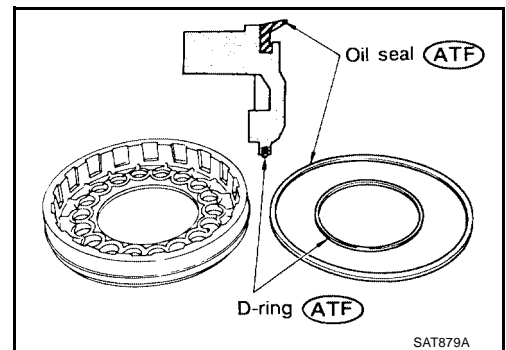
ECS007Q3

## Assembly

1. Install needle bearing onto one-way clutch inner race.
  - **Pay attention to its direction — Black surface goes to rear side.**
  - **Apply petroleum jelly to needle bearing.**



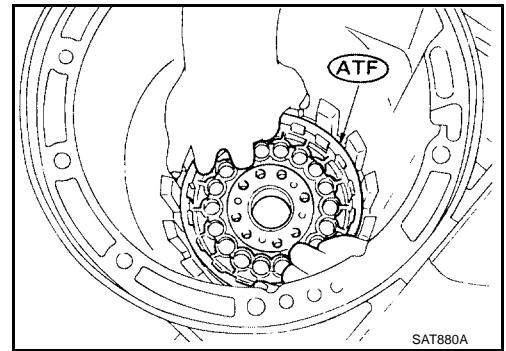
2. Install oil seal and D-ring onto piston.
  - **Apply ATF to oil seal and D-ring.**



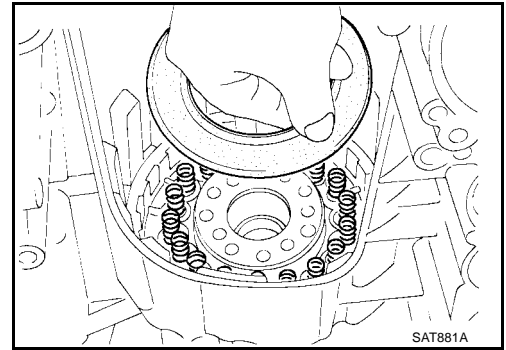
# LOW & REVERSE BRAKE

[RE4R01A]

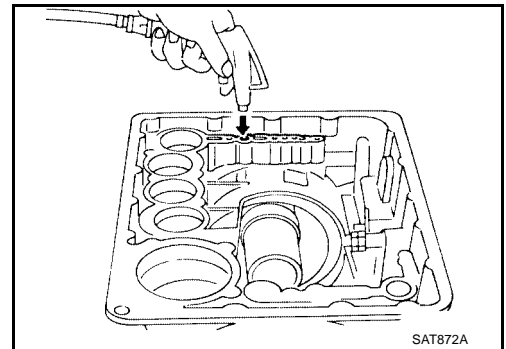
3. Install piston by rotating it slowly and evenly.
  - Apply ATF to inner surface of transmission case.



4. Install return springs, spring retainer and low one-way clutch inner race onto transmission case.
5. Install dish plate, low and reverse brake drive plates, driven plates and retaining plate.
6. Install snap ring on transmission case.



7. Check operation of low and reverse brake clutch piston. Refer to [AT-414, "Disassembly"](#).



8. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

## Specified clearance

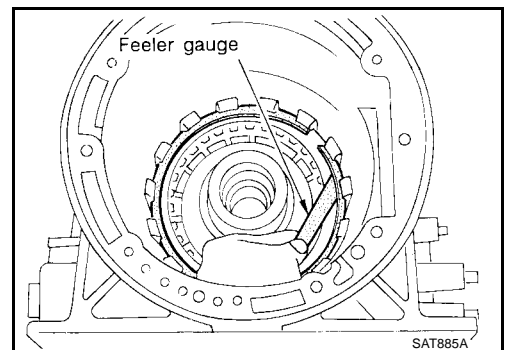
Standard : 0.8 - 1.1 mm (0.031 - 0.043 in)

## Allowable limit

VG33E only : 2.5 mm (0.098 in)

VG33ER only : 2.7 mm (0.106 in)

Retaining plate : Refer to [AT-500, "LOW & REVERSE BRAKE"](#).

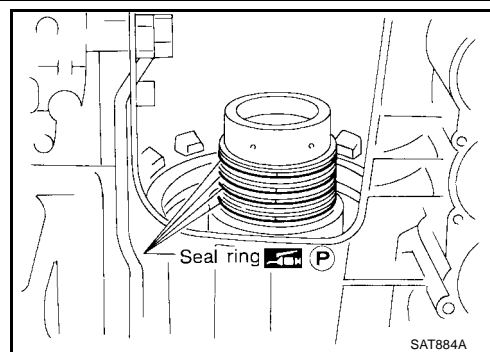


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## LOW & REVERSE BRAKE

[RE4R01A]

9. Install low one-way clutch inner race seal ring.
  - **Apply petroleum jelly to seal ring.**
  - **Make sure seal rings are pressed firmly into place and held by petroleum jelly.**



# FORWARD CLUTCH DRUM ASSEMBLY

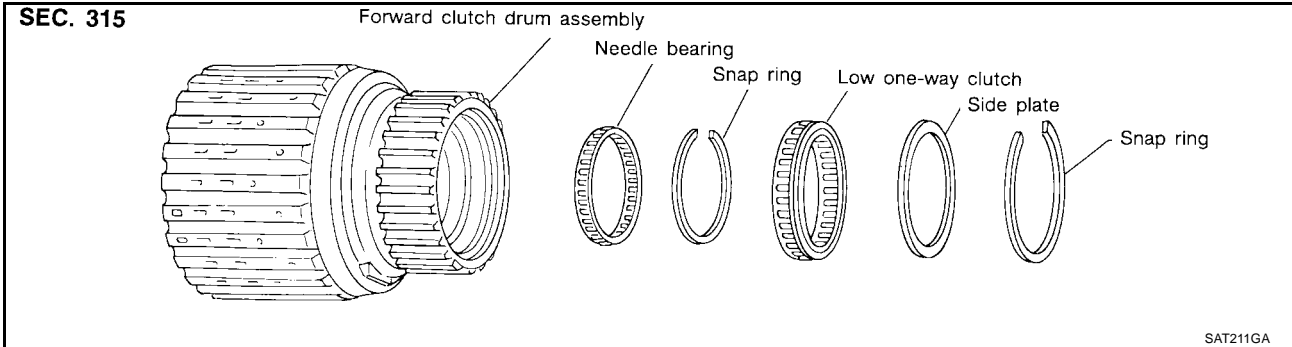
[RE4R01A]

## FORWARD CLUTCH DRUM ASSEMBLY

PF3:31571

### Components

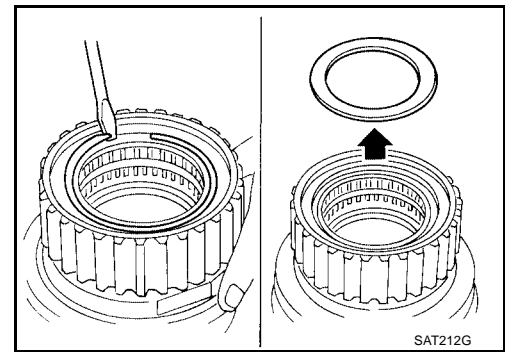
ECS007Q4



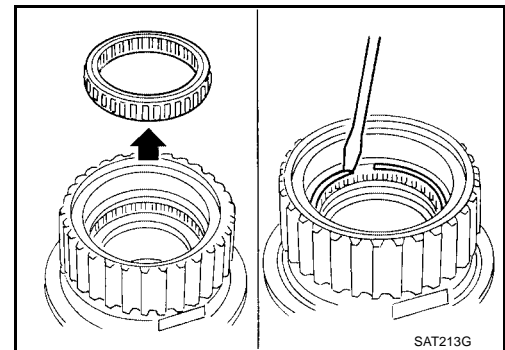
### Disassembly

ECS007Q5

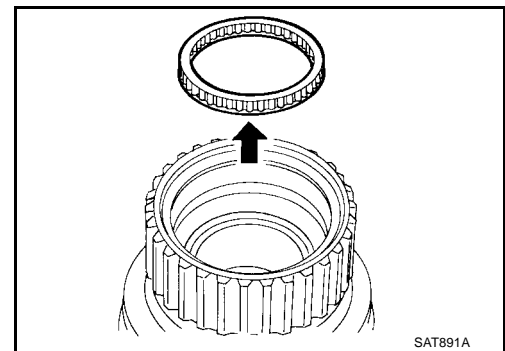
1. Remove snap ring from forward clutch drum.
2. Remove side plate from forward clutch drum.



3. Remove low one-way clutch from forward clutch drum.
4. Remove snap ring from forward clutch drum.



5. Remove needle bearing from forward clutch drum.



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# FORWARD CLUTCH DRUM ASSEMBLY

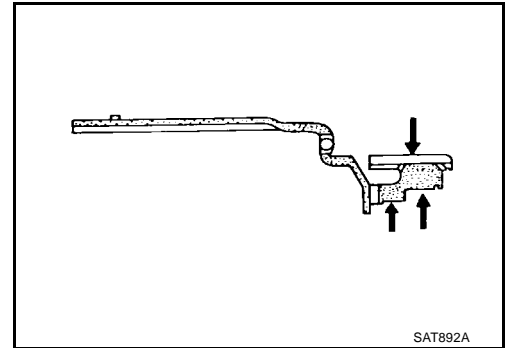
[RE4R01A]

ECS007Q6

## Inspection

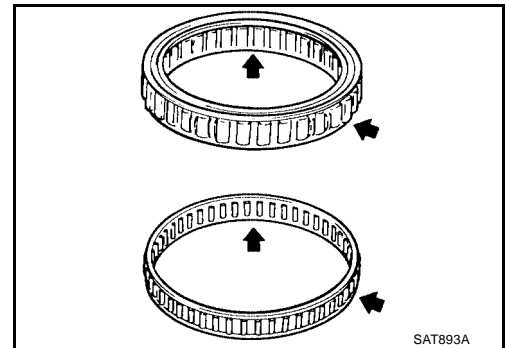
### FORWARD CLUTCH DRUM

- Check spline portion for wear or damage.
- Check frictional surfaces of low one-way clutch and needle bearing for wear or damage.



### NEEDLE BEARING AND LOW ONE-WAY CLUTCH

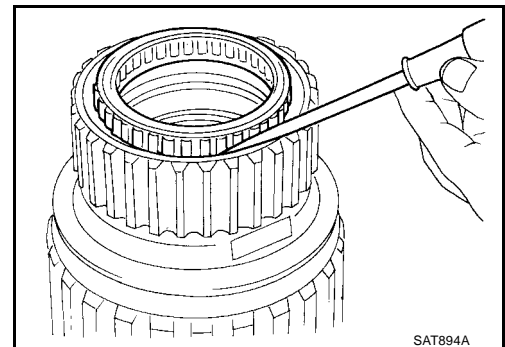
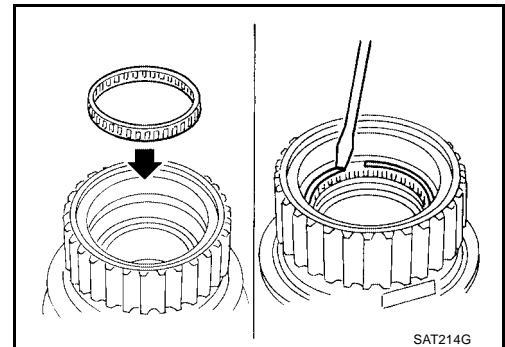
- Check frictional surface for wear or damage.



ECS007Q7

## Assembly

1. Install needle bearing in forward clutch drum.
2. Install snap ring onto forward clutch drum.
3. Install low one-way clutch onto forward clutch drum by pushing the roller in evenly.

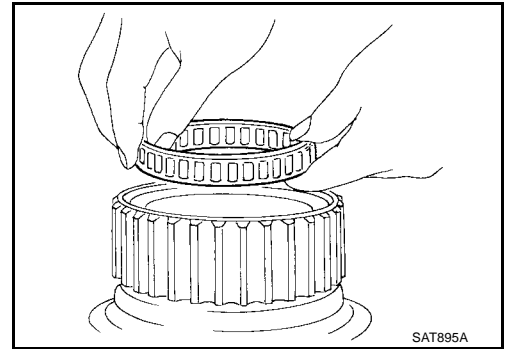




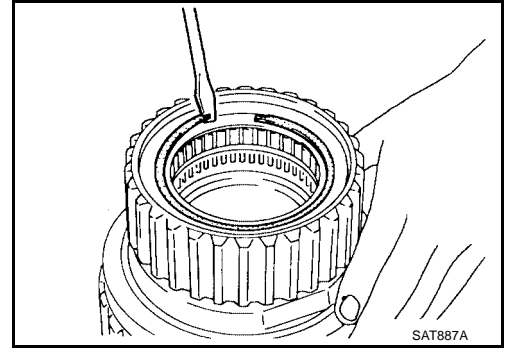
# FORWARD CLUTCH DRUM ASSEMBLY

[RE4R01A]

- Install low one-way clutch with flange facing rearward.



4. Install side plate onto forward clutch drum.
5. Install snap ring onto forward clutch drum.



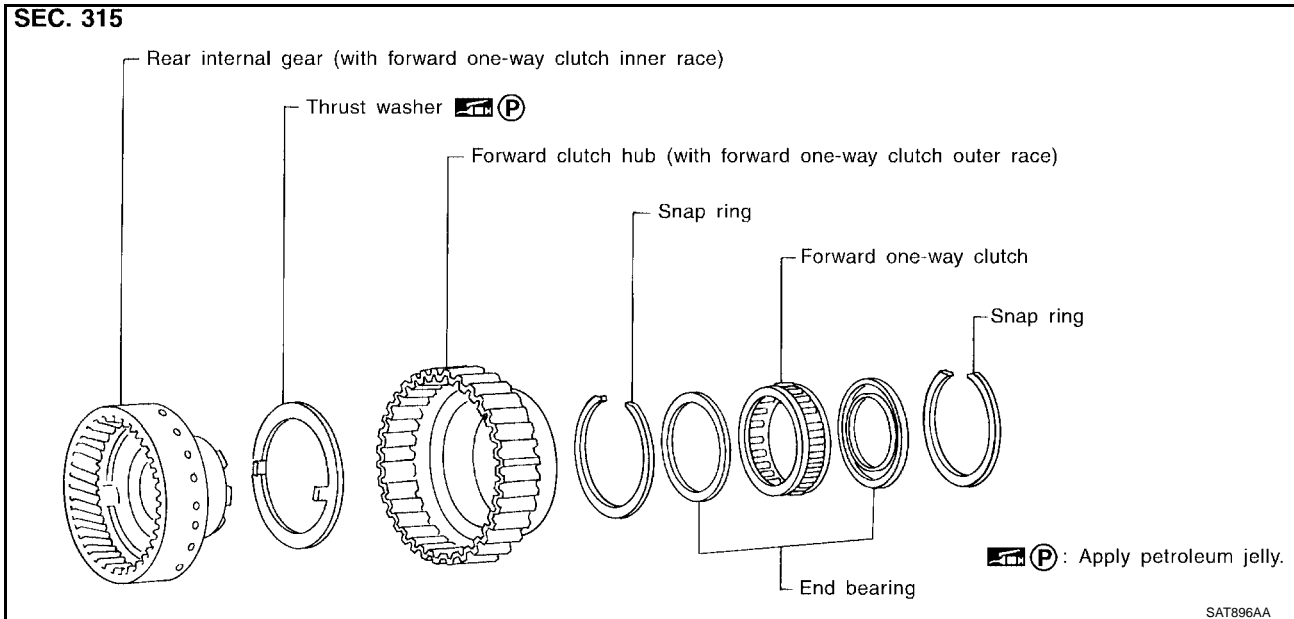
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## REAR INTERNAL GEAR AND FORWARD CLUTCH HUB

PF3:31450

### Components

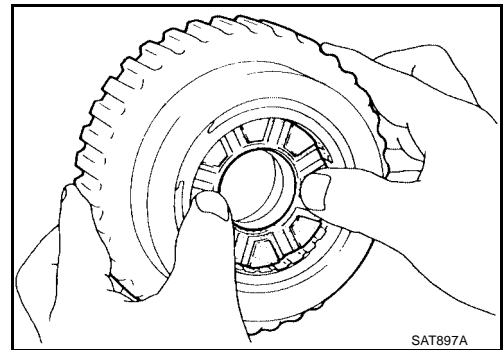
ECS007Q8



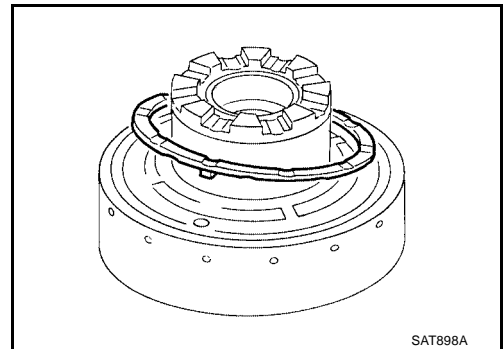
### Disassembly

ECS007Q9

1. Remove rear internal gear by pushing forward clutch hub forward.



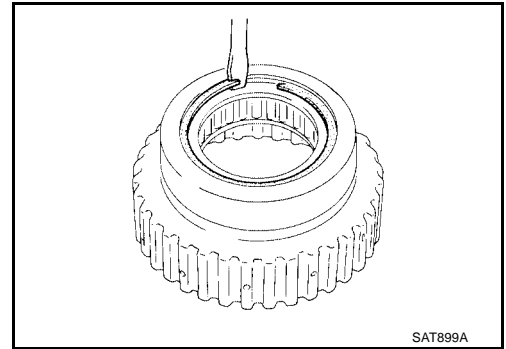
2. Remove thrust washer from rear internal gear.



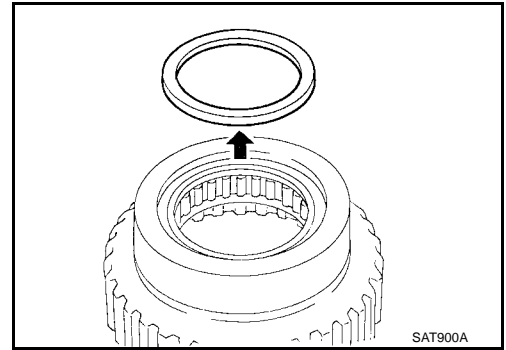
# REAR INTERNAL GEAR AND FORWARD CLUTCH HUB

[RE4R01A]

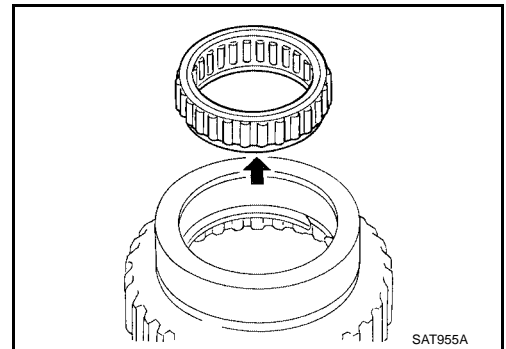
3. Remove snap ring from forward clutch hub.



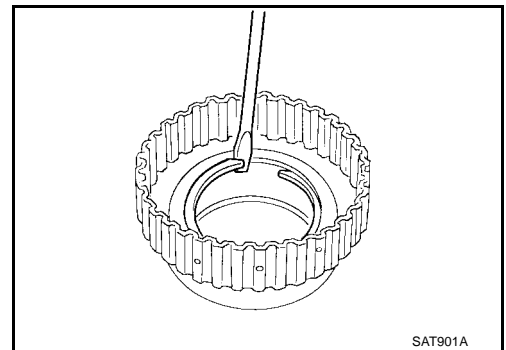
4. Remove end bearing.



5. Remove forward one-way clutch and end bearing as a unit from forward clutch hub.



6. Remove snap ring from forward clutch hub.



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# REAR INTERNAL GEAR AND FORWARD CLUTCH HUB

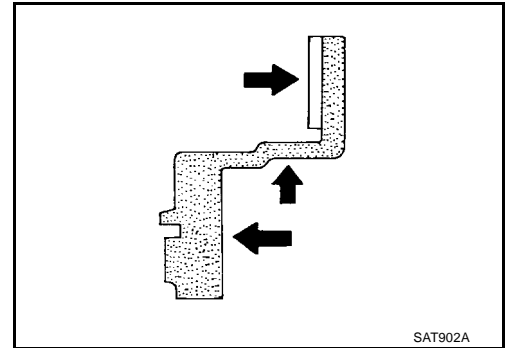
[RE4R01A]

ECS0070A

## Inspection

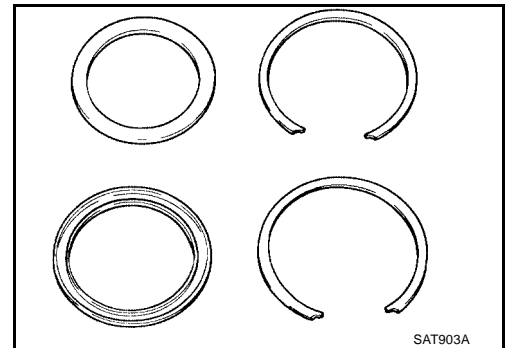
### REAR INTERNAL GEAR AND FORWARD CLUTCH HUB

- Check gear for excessive wear, chips or cracks.
- Check frictional surfaces of forward one-way clutch and thrust washer for wear or damage.
- Check spline for wear or damage.



### SNAP RING AND END BEARING

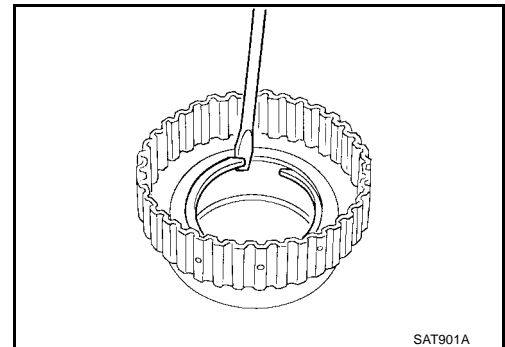
- Check for deformation or damage.



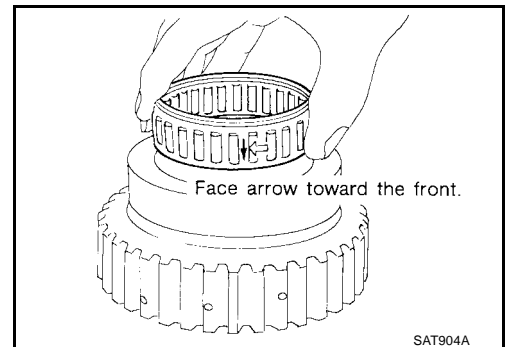
ECS0070B

## Assembly

1. Install snap ring onto forward clutch hub.
2. Install end bearing.



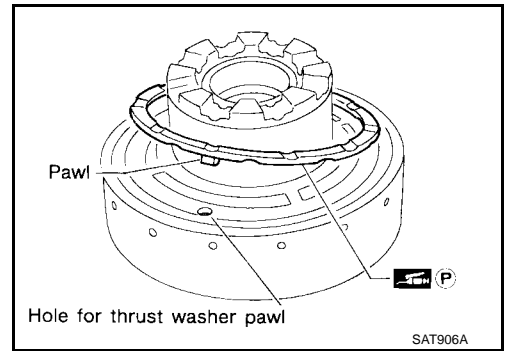
3. Install forward one-way clutch onto clutch hub.
  - **Install forward one-way clutch with flange facing rearward.**
4. Install end bearing.
5. Install snap ring onto forward clutch hub.



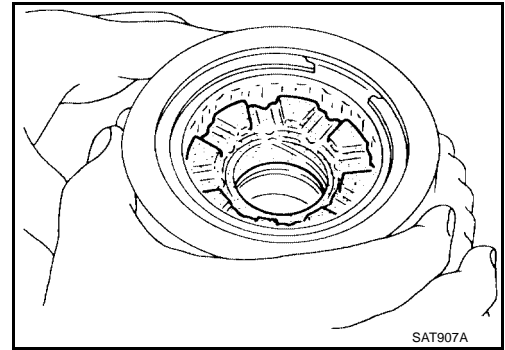
# REAR INTERNAL GEAR AND FORWARD CLUTCH HUB

[RE4R01A]

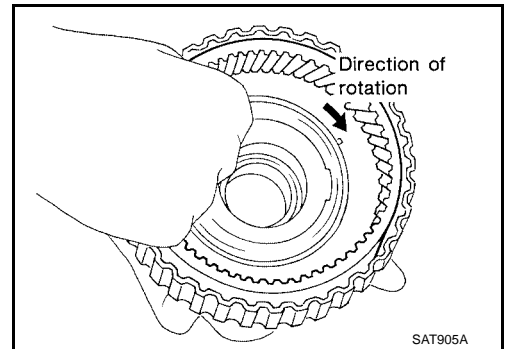
6. Install thrust washer onto rear internal gear.
  - Apply petroleum jelly to thrust washer.
  - Securely insert pawls of thrust washer into holes in rear internal gear.



7. Position forward clutch hub in rear internal gear.



8. After installing, check to assure that forward clutch hub rotates clockwise.



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# BAND SERVO PISTON ASSEMBLY

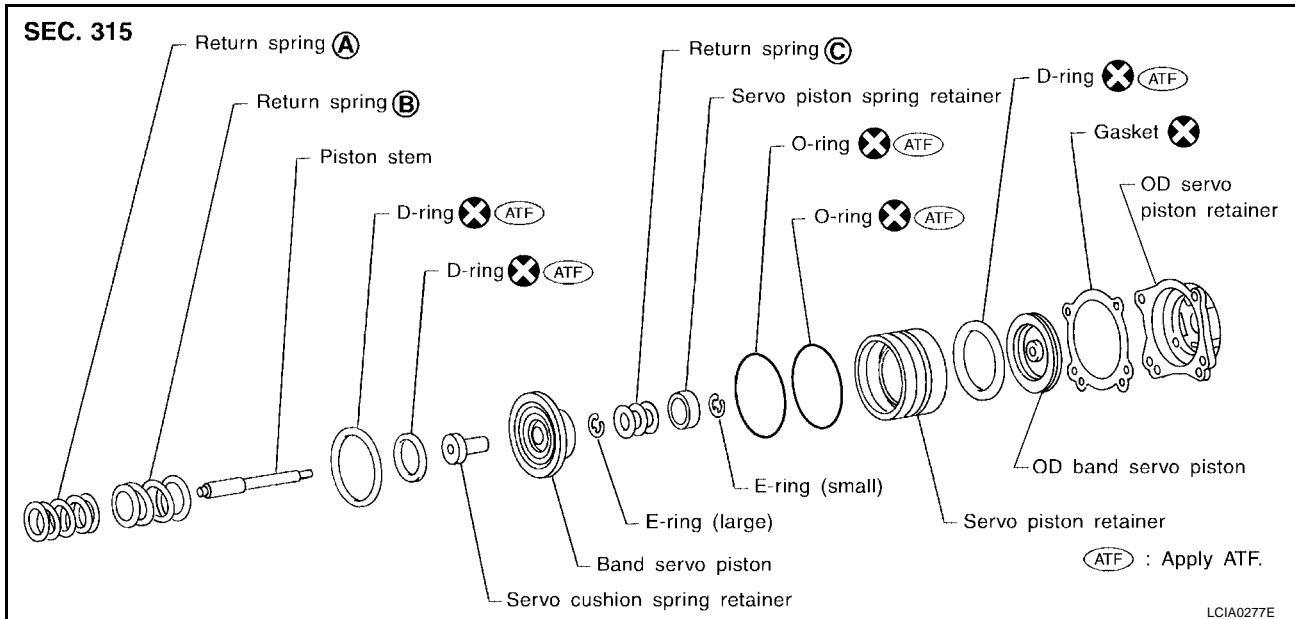
[RE4R01A]

## BAND SERVO PISTON ASSEMBLY

PFP:31615

### Components

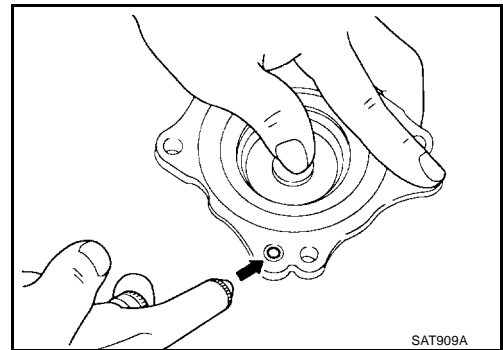
ECS007QC



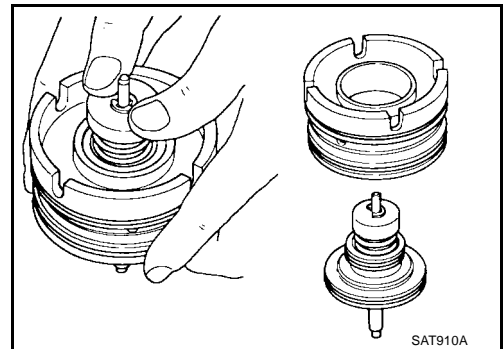
### Disassembly

ECS007QD

1. Block one oil hole in O/D servo piston retainer and the center hole in O/D band servo piston.
2. Apply compressed air to the other oil hole in piston retainer to remove O/D band servo piston from retainer.
3. Remove D-ring from O/D band servo piston.



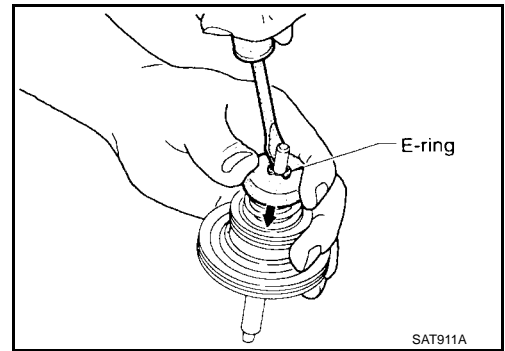
4. Remove band servo piston assembly from servo piston retainer by pushing it forward.



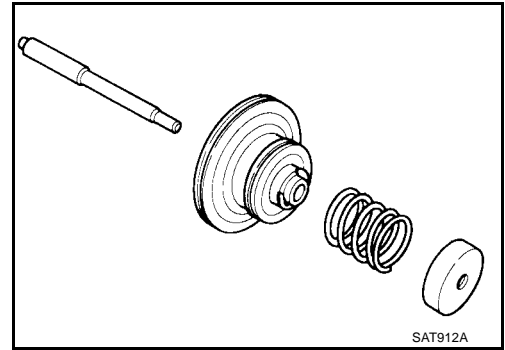
# BAND SERVO PISTON ASSEMBLY

[RE4R01A]

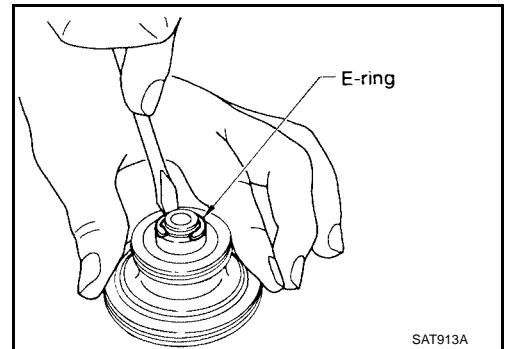
5. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.



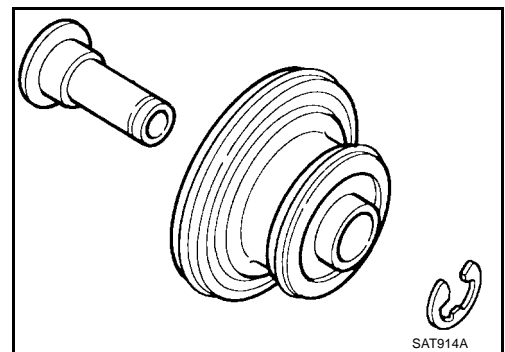
6. Remove servo piston spring retainer, return spring C and piston stem from band servo piston.



7. Remove E-ring from band servo piston.



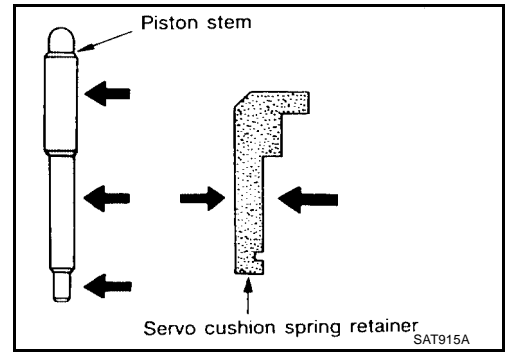
8. Remove servo cushion spring retainer from band servo piston.  
9. Remove D-rings from band servo piston.  
10. Remove O-rings from servo piston retainer.



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## Inspection PISTONS, RETAINERS AND PISTON STEM

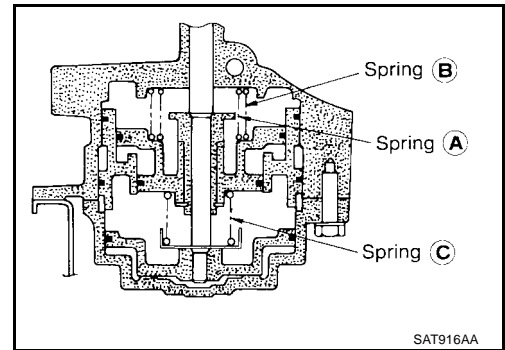
- Check frictional surfaces for abnormal wear or damage.



## RETURN SPRINGS

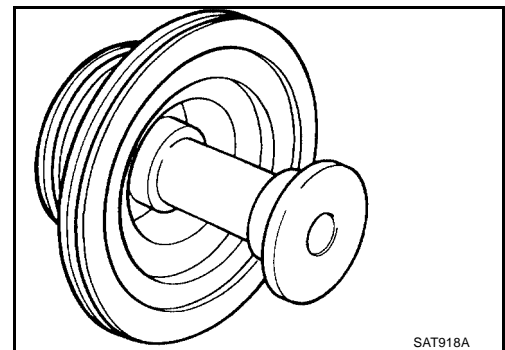
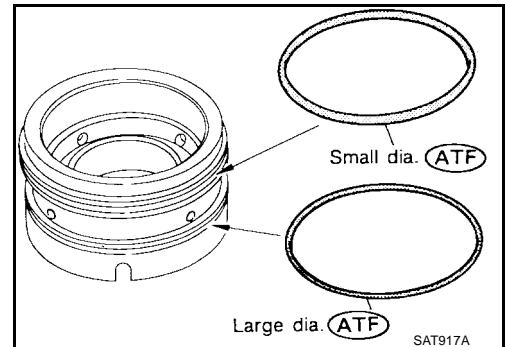
- Check for deformation or damage. Measure free length and outer diameter.

**Inspection standard** : Refer to [AT-497, "Return Springs"](#) .



## Assembly

1. Install O-rings onto servo piston retainer.
  - **Apply ATF to O-rings.**
  - **Pay attention to position of each O-ring.**
2. Install servo cushion spring retainer onto band servo piston.

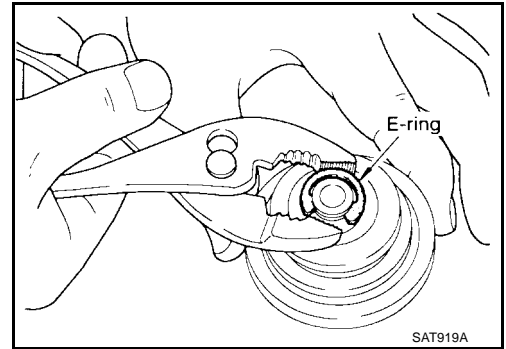




# BAND SERVO PISTON ASSEMBLY

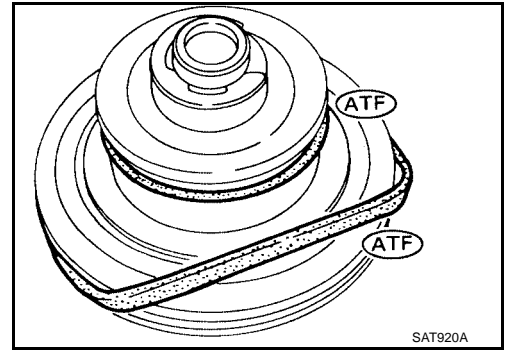
[RE4R01A]

3. Install E-ring onto servo cushion spring retainer.

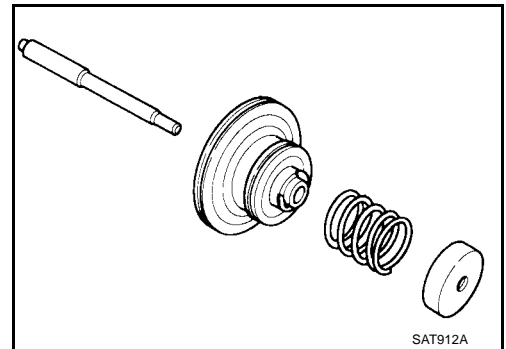


4. Install D-rings onto band servo piston.

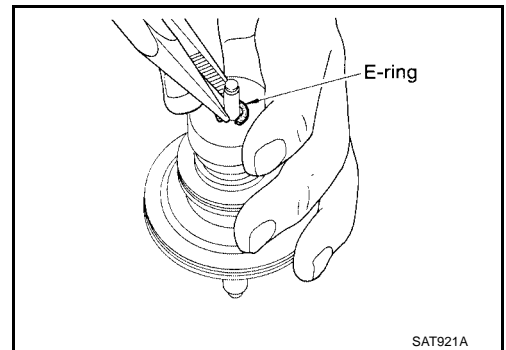
- **Apply ATF to D-rings.**



5. Install servo piston spring retainer, return spring C and piston stem onto band servo piston.



6. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.

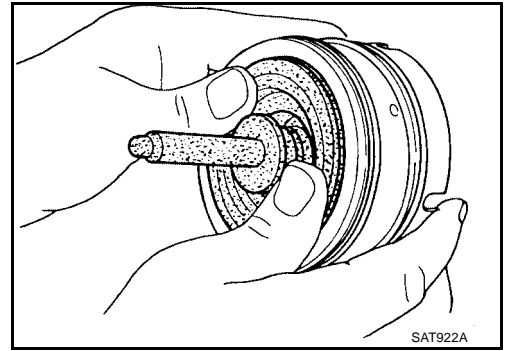


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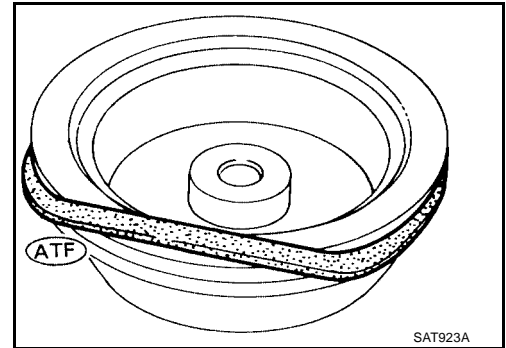
# BAND SERVO PISTON ASSEMBLY

[RE4R01A]

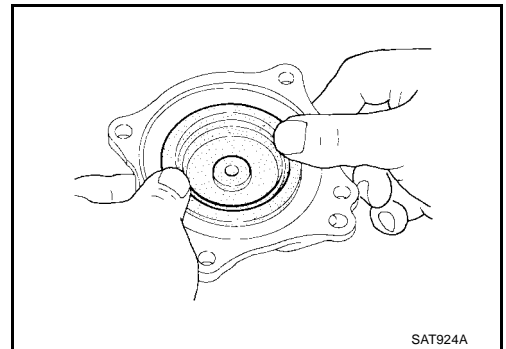
7. Install band servo piston assembly onto servo piston retainer by pushing it inward.



8. Install D-ring on O/D band servo piston.
- **Apply ATF to D-ring.**



9. Install O/D band servo piston onto servo piston retainer by pushing it inward.

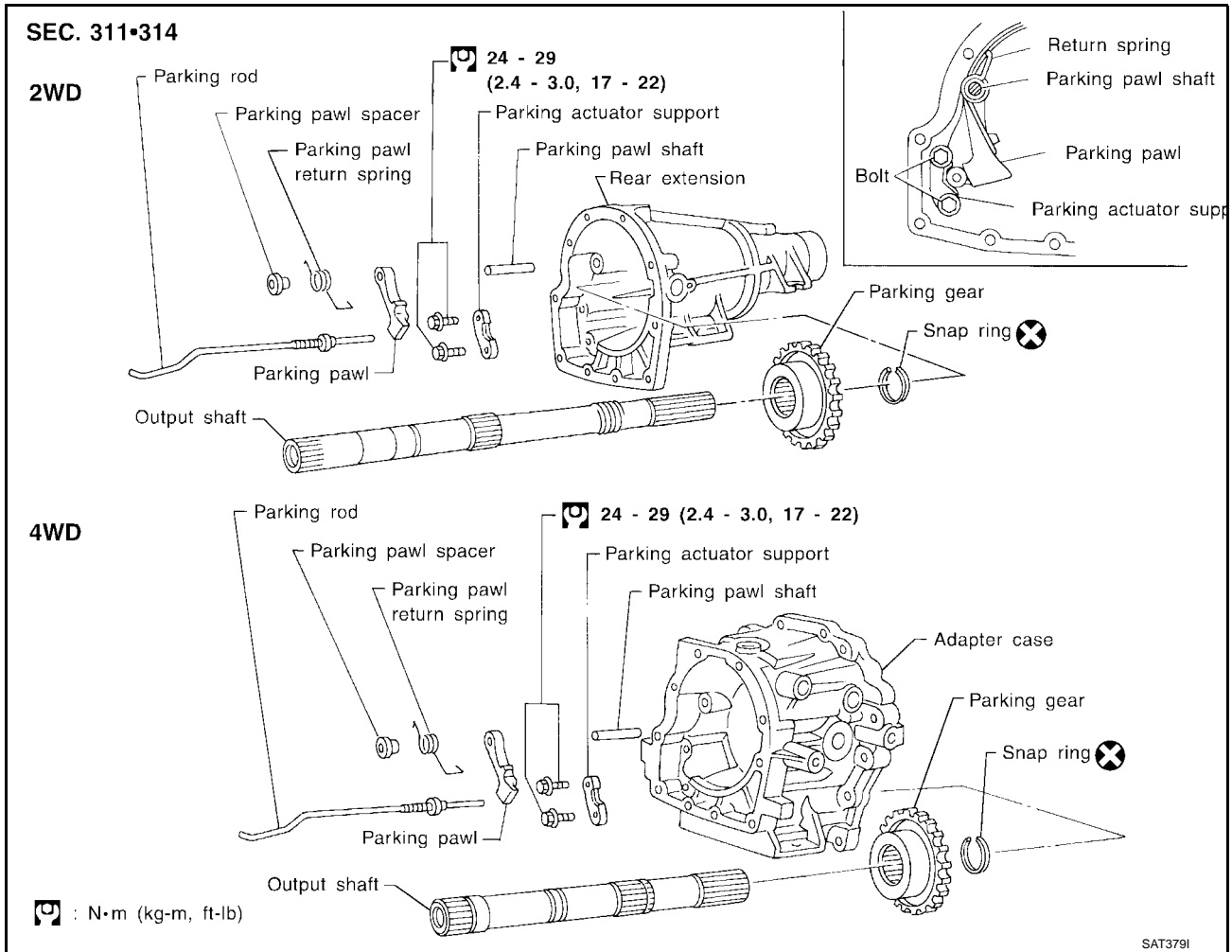


## PARKING PAWL COMPONENTS

PFP:31991

### Components

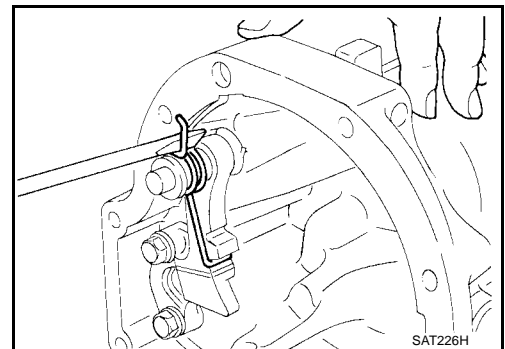
ECS007QG



### Disassembly

ECS007QH

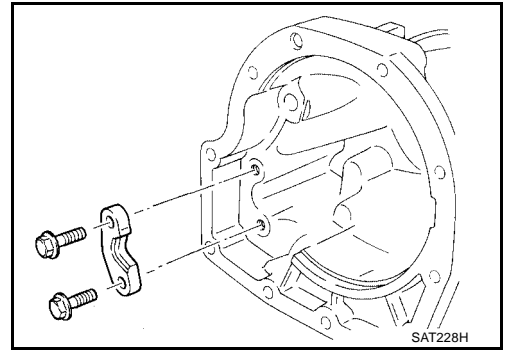
1. Slide return spring to the front of adapter case flange.
2. Remove return spring, pawl spacer and parking pawl from adapter case.
3. Remove parking pawl shaft from adapter case.



## PARKING PAWL COMPONENTS

[RE4R01A]

4. Remove parking actuator support from adapter case.



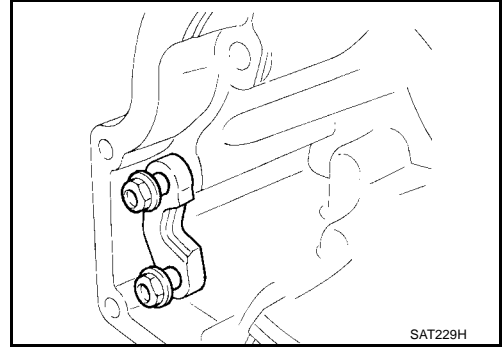
# PARKING PAWL COMPONENTS

[RE4R01A]

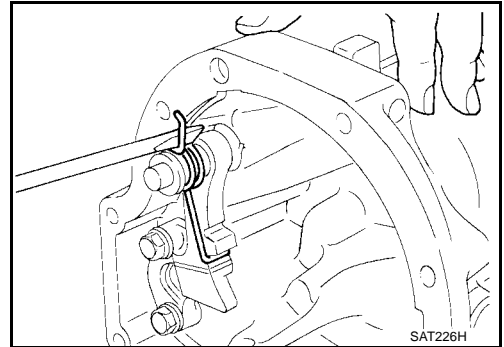
ECS007QI

## Assembly

1. Install parking actuator support onto adapter case.
2. Insert parking pawl shaft into adapter case.
3. Install return spring, pawl spacer and parking pawl onto parking pawl shaft.



4. Bend return spring upward and install it onto adapter case.

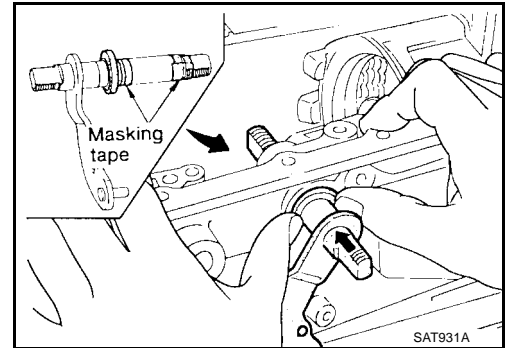


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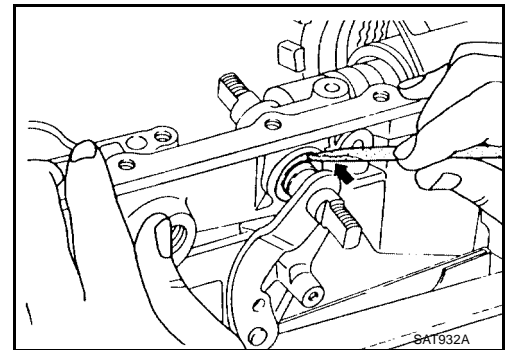
### ASSEMBLY

#### Assembly (1)

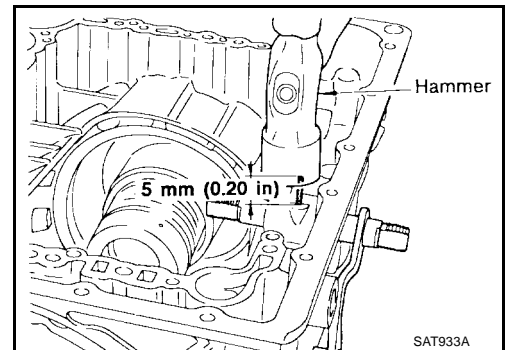
1. Install manual shaft components.
  - a. Install oil seal onto manual shaft.
    - **Apply ATF to oil seal.**
    - **Wrap threads of manual shaft with masking tape.**
  - b. Insert manual shaft and oil seal as a unit into transmission case.
  - c. Remove masking tape.



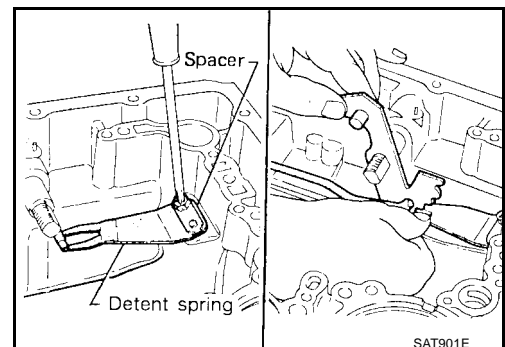
- d. Push oil seal evenly and install it onto transmission case.



- e. Align groove in shaft with drive pin hole, then drive pin into position as shown.



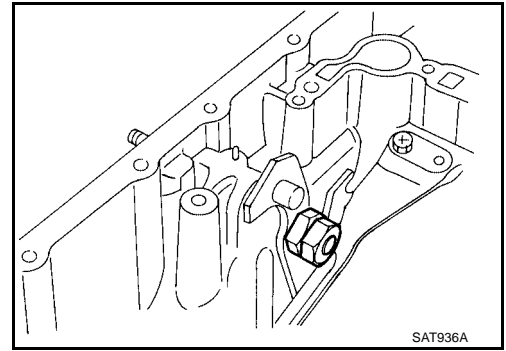
- f. Install detent spring and spacer.
  - g. While pushing detent spring down, install manual plate onto manual shaft.



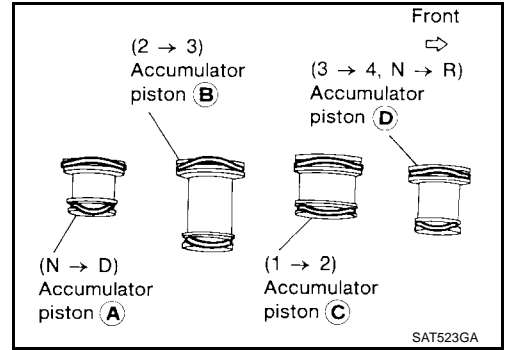
# ASSEMBLY

[RE4R01A]

h. Install lock nuts onto manual shaft.



2. Install accumulator piston.
  - a. Install O-rings onto accumulator piston.
    - **Apply ATF to O-rings.**



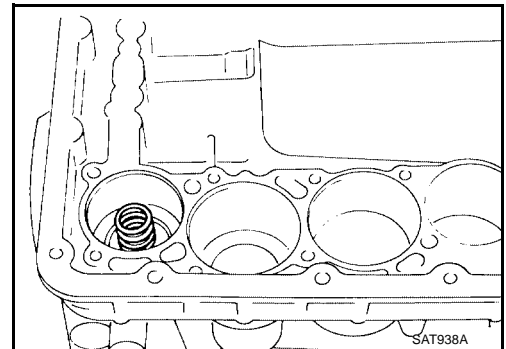
## Accumulator piston O-rings

Accumulator	A	B	C	D
Small diameter end	29 (1.14)	32 (1.26)	45 (1.77)	29 (1.14)
Large diameter end	45 (1.77)	50 (1.97)	50 (1.97)	45 (1.77)

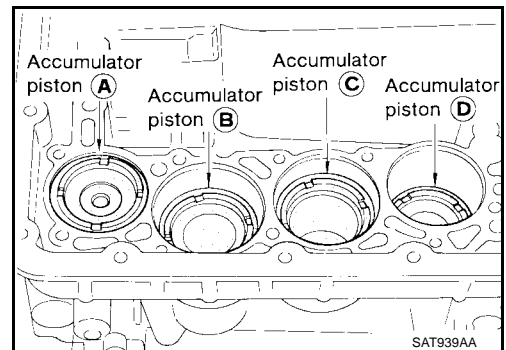
Unit: mm (in)

b. Install return spring for accumulator A onto transmission case.

**Free length of return spring** : Refer to [AT-497, "Return Springs"](#) .



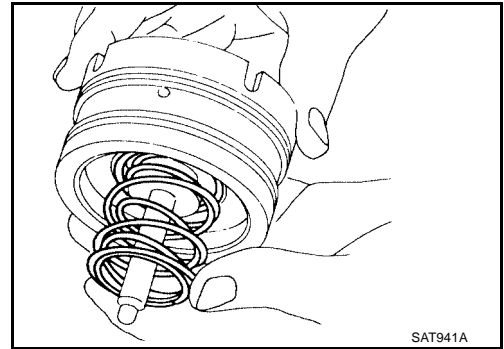
- c. Install accumulator pistons A, B, C and D.
  - **Apply ATF to transmission case.**



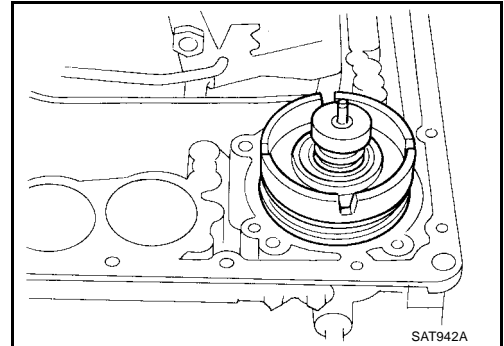
# ASSEMBLY

[RE4R01A]

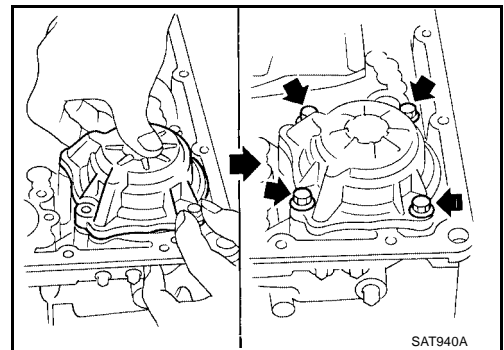
3. Install band servo piston.
  - a. Install return springs onto servo piston.



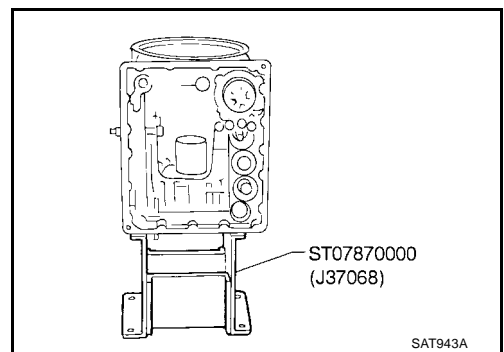
- b. Install band servo piston onto transmission case.
    - **Apply ATF to O-ring of band servo piston and transmission case.**
  - c. Install gasket for band servo onto transmission case.



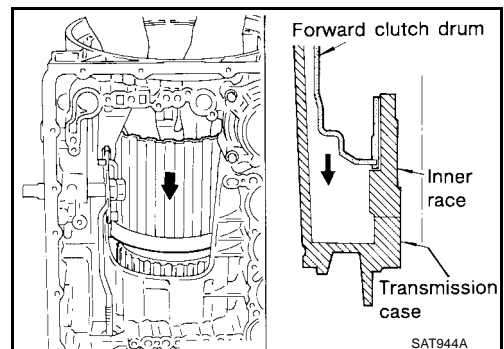
- d. Install band servo retainer onto transmission case.



4. Install rear side clutch and gear components.
  - a. Place transmission case in vertical position.



- b. Slightly lift forward clutch drum assembly. Then slowly rotate it clockwise until its hub passes fully over clutch inner race inside transmission case.

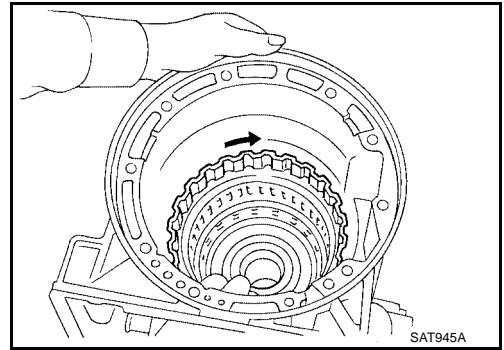




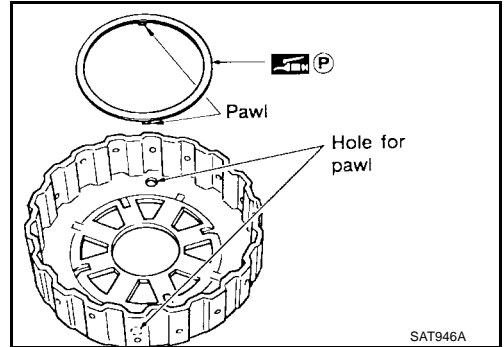
# ASSEMBLY

[RE4R01A]

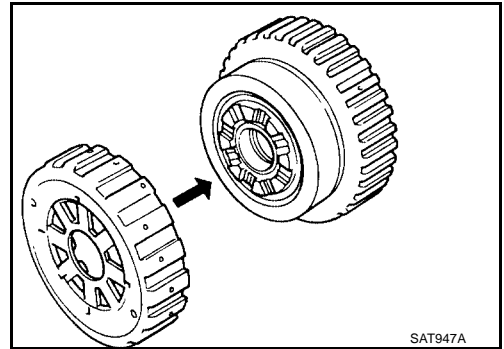
- c. Check to be sure that rotation direction of forward clutch assembly is correct.



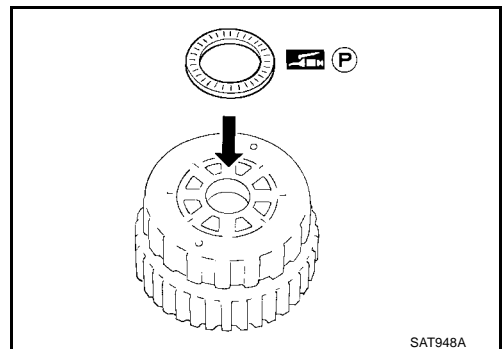
- d. Install thrust washer onto front of overrun clutch hub.
- Apply petroleum jelly to the thrust washer.
  - Insert pawls of thrust washer securely into holes in overrun clutch hub.



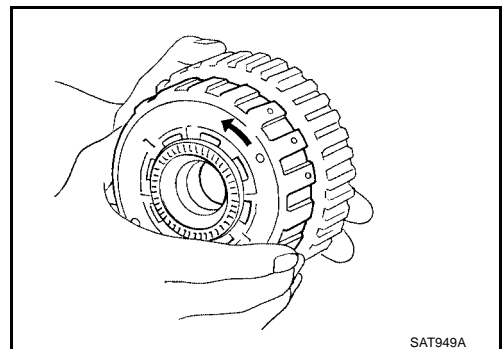
- e. Install overrun clutch hub onto rear internal gear assembly.



- f. Install needle bearing onto rear of overrun clutch hub.
- Apply petroleum jelly to needle bearing.



- g. Check that overrun clutch hub rotates as shown while holding forward clutch hub.

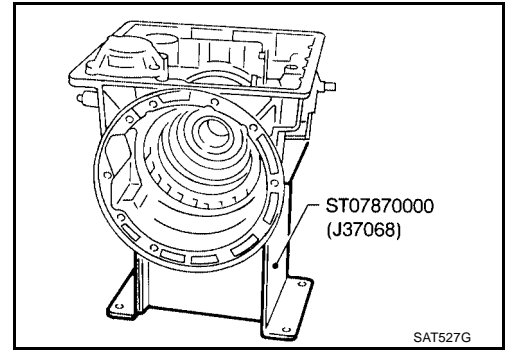


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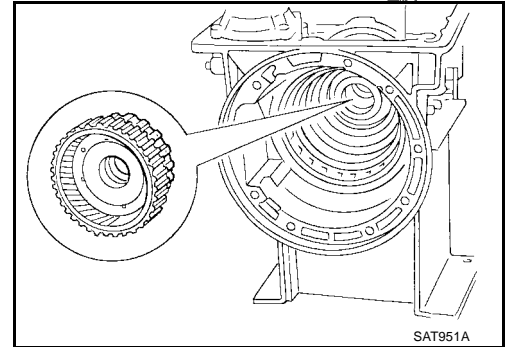
# ASSEMBLY

[RE4R01A]

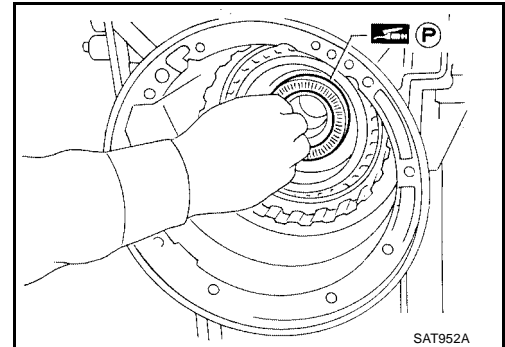
h. Place transmission case into horizontal position.



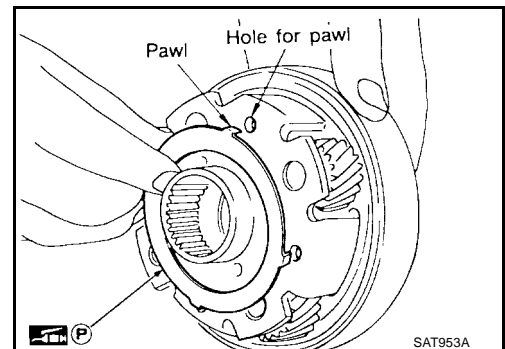
i. Install rear internal gear, forward clutch hub and overrun clutch hub as a unit onto transmission case.



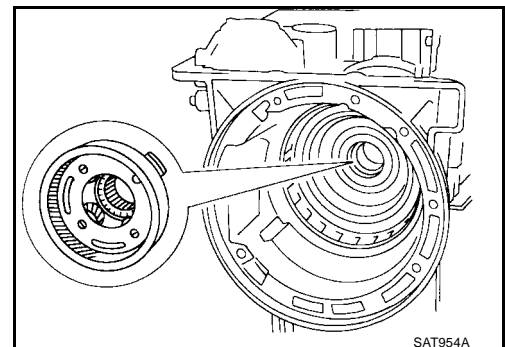
j. Install needle bearing onto rear internal gear.  
● **Apply petroleum jelly to needle bearing.**



k. Install bearing race onto rear of front internal gear.  
● **Apply petroleum jelly to bearing race.**  
● **Securely engage pawls of bearing race with holes in front internal gear.**



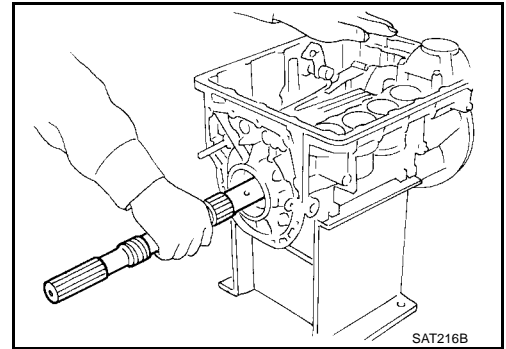
l. Install front internal gear on transmission case.



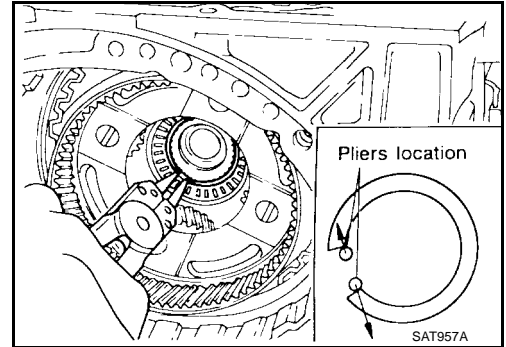
# ASSEMBLY

[RE4R01A]

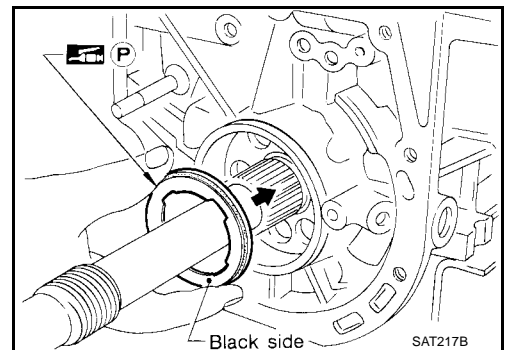
5. Install output shaft and parking gear.
- a. Insert output shaft from rear of transmission case while slightly lifting front internal gear.
- **Do not force output shaft against front of transmission case.**



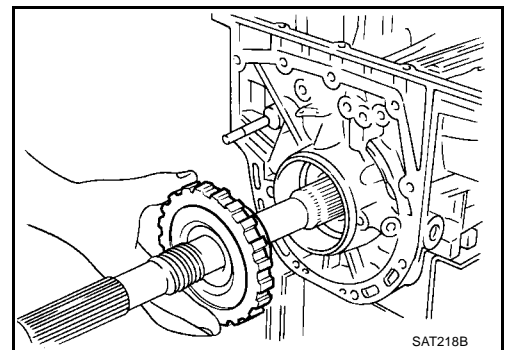
- b. Carefully push output shaft against front of transmission case. Install snap ring on front of output shaft.
- **Check to be sure output shaft cannot be removed in rear direction.**



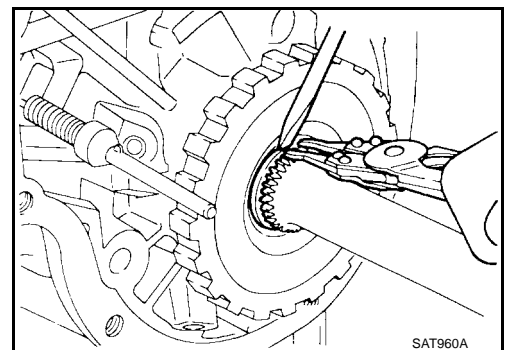
- c. Install needle bearing on transmission case.
- **Pay attention to its direction — black side goes to rear.**
  - **Apply petroleum jelly to needle bearing.**



- d. Install parking gear on transmission case.



- e. Install snap ring on rear of output shaft.
- **Check to be sure output shaft cannot be removed in forward direction.**



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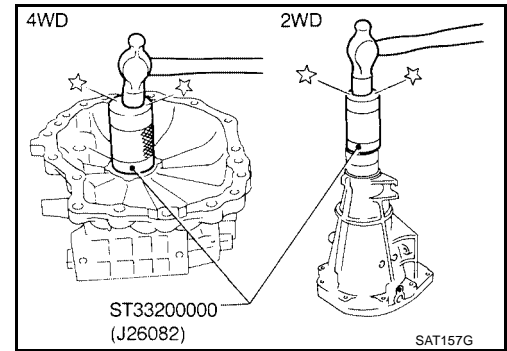
# ASSEMBLY

[RE4R01A]

6. Install adapter case or rear extension.

a. Install oil seal on adapter case or rear extension.

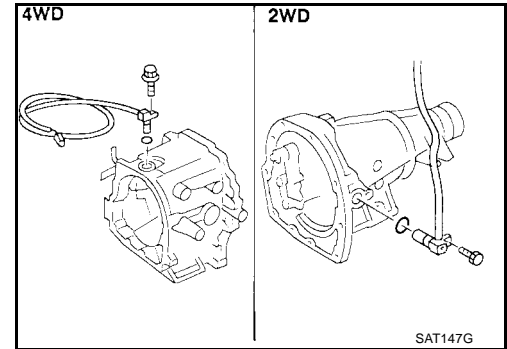
● **Apply ATF to oil seal.**



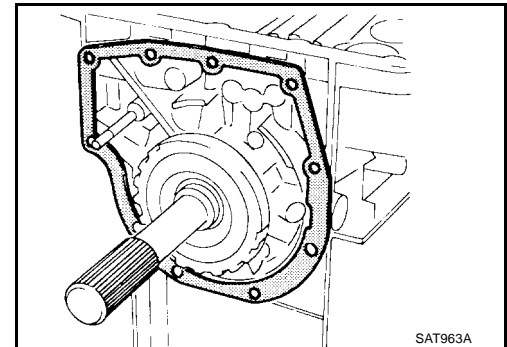
b. Install O-ring on revolution sensor.

● **Apply ATF to O-ring.**

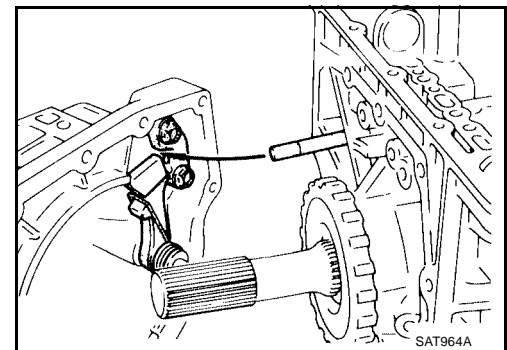
c. Install revolution sensor on adapter case or rear extension.



d. Install rear extension gasket on transmission case.



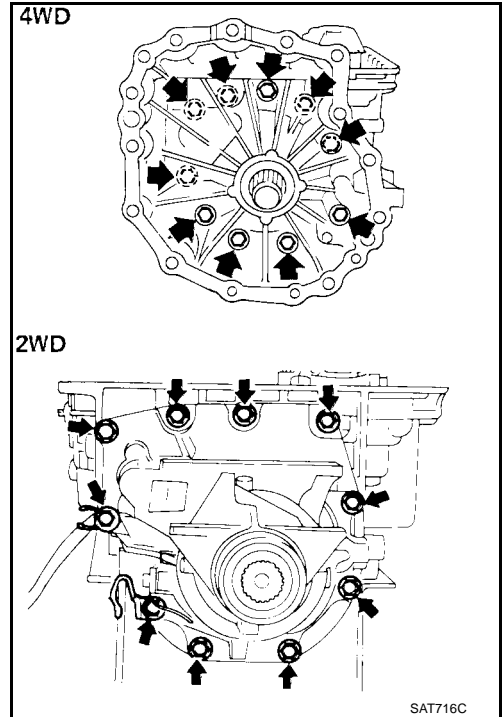
e. Install parking rod on transmission case.



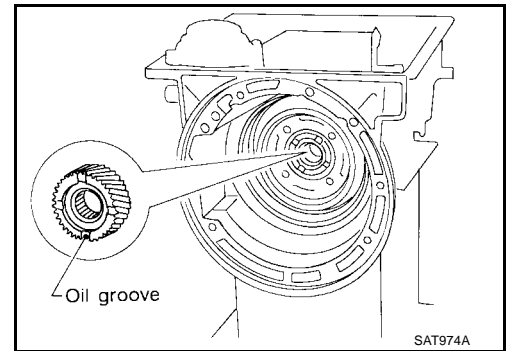
# ASSEMBLY

[RE4R01A]

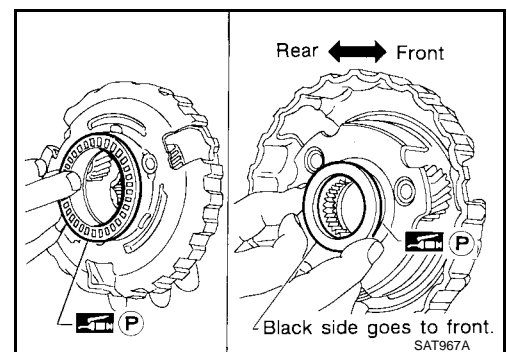
f. Install rear extension or adapter case on transmission case.



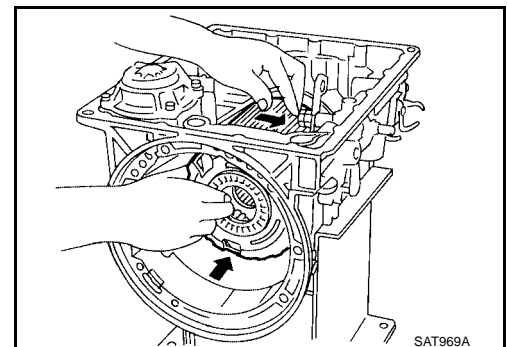
7. Install front side clutch and gear components.
- a. Install rear sun gear on transmission case.
- Pay attention to its direction.



- b. Make sure needle bearing is on front of front planetary carrier.
- Apply petroleum jelly to needle bearing.
- c. Make sure needle bearing is on rear of front planetary carrier.
- Apply petroleum jelly to bearing.
  - Pay attention to its direction — Black side goes to front.

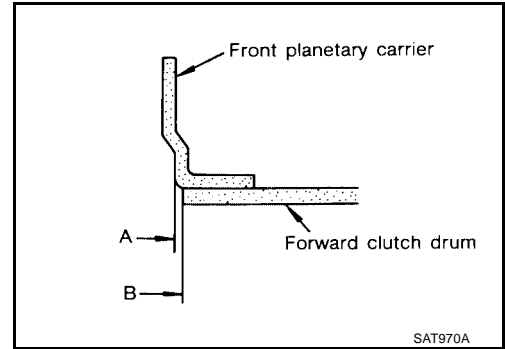


- d. While rotating forward clutch drum clockwise, install front planetary carrier on forward clutch drum.

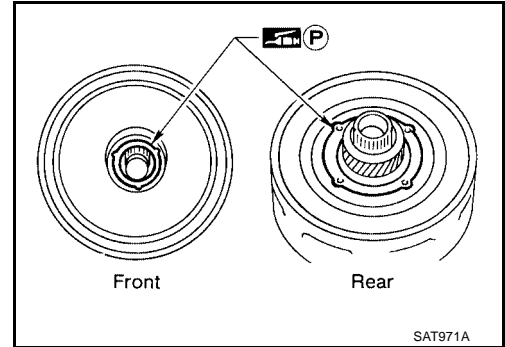


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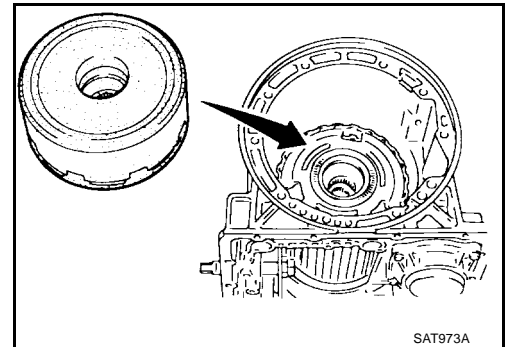
- Check that portion A of front planetary carrier protrudes approximately 2 mm (0.08 in) beyond portion B of forward clutch assembly.



- e. Make sure bearing races are on front and rear of clutch pack.
- Apply petroleum jelly to bearing races.
  - Securely engage pawls of bearing races with holes in clutch pack.



- f. Install clutch pack into transmission case.



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## Adjustment

When any parts listed in the following table are replaced, total end play or reverse clutch end play must be adjusted.

Part name	Total end play	Reverse clutch end play
Transmission case	●	●
Low one-way clutch inner race	●	●
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	—	●

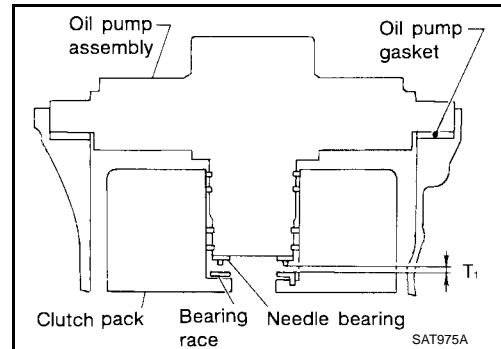
# ASSEMBLY

[RE4R01A]

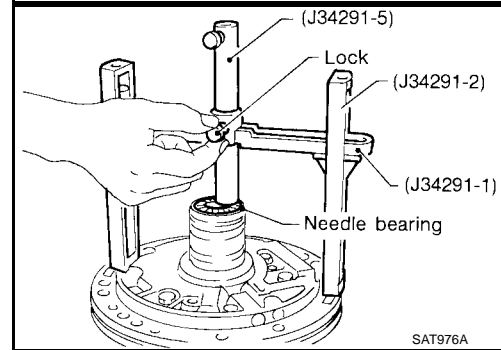
1. Adjust total end play.

**Total end play "T<sub>1</sub>" : 0.25 - 0.55 mm (0.0098 - 0.0217 in)**

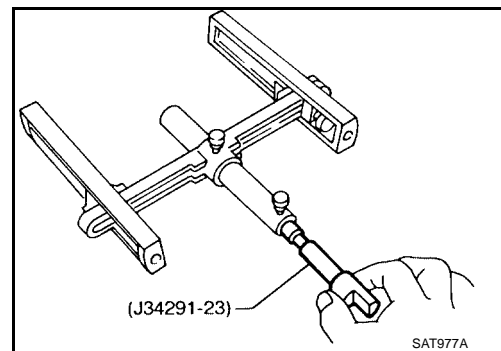
- a. With needle bearing installed, place J34291-1 (bridge), J34291-2 (legs) and the J34291-5 (gauging cylinder) onto oil pump. The long ends of legs should be placed firmly on machined surface of oil pump assembly. The gauging cylinder should rest on top of the needle bearing. Lock gauging cylinder in place with set screw.



- b. Install J34291-23 (gauging plunger) into gauging cylinder.



- c. Install original bearing race inside reverse clutch drum. Place shim selecting gauge with its legs on machined surface of transmission case (no gasket). Allow gauging plunger to rest on bearing race. Lock gauging plunger in place with set screw.

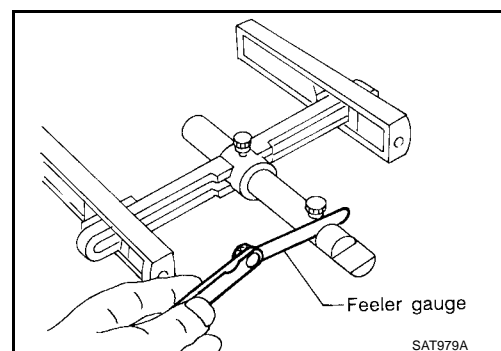
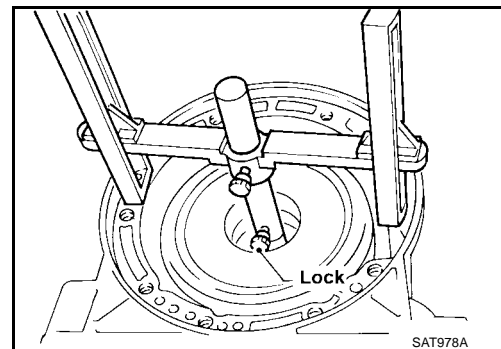


- d. Remove Tool and use feeler gauge to measure gap between gauging cylinder and gauging plunger. This measurement should give exact total end play.

**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 oil pump cover bearing race as necessary.

**Available oil pump cover bearing race : Refer to [AT-501, "Total End Play"](#) .**



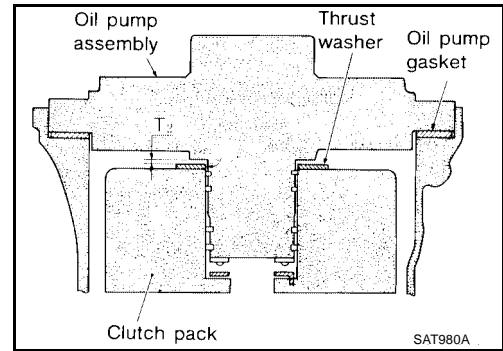
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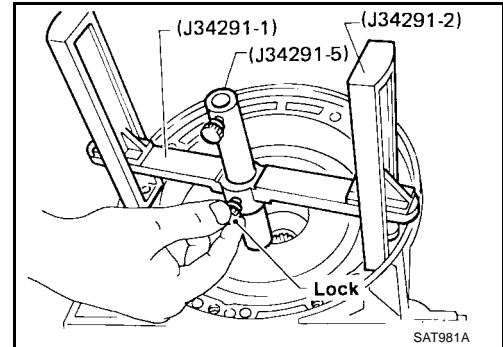
[RE4R01A]

2. Adjust reverse clutch drum end play.

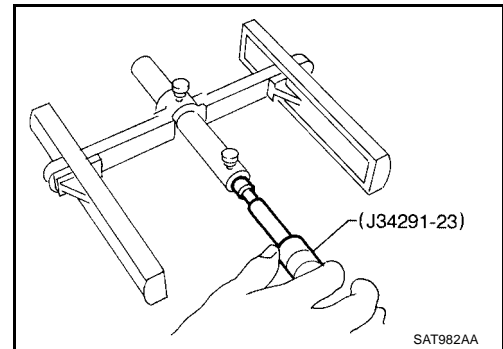
**Reverse clutch drum end play "T<sub>2</sub>" : 0.55 - 0.90 mm (0.0217 - 0.0354 in)**



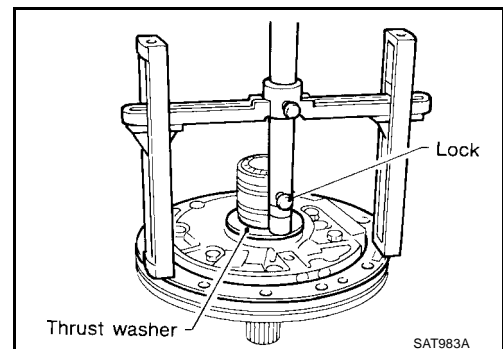
- a. Place J34291-1 (bridge), J34291-2 (legs) and J34291-5 (gauging cylinder) on machined surface of transmission case (no gasket). Allow gauging cylinder to rest on front thrust surface of reverse clutch drum. Lock cylinder in place with set screw.



- b. Install J34291-23 (gauging plunger) into gauging cylinder.



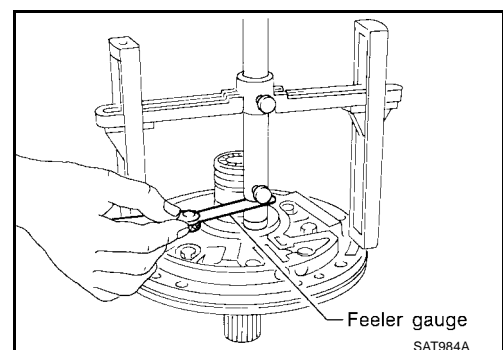
- c. Install original thrust washer on oil pump. Place shim setting gauge legs onto machined surface of oil pump assembly. Allow gauging plunger to rest on thrust washer. Lock plunger in place with set screw.



- d. Use feeler gauge to measure gap between gauging plunger and gauging cylinder. This measurement should give you 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 oil pump thrust washer as necessary.





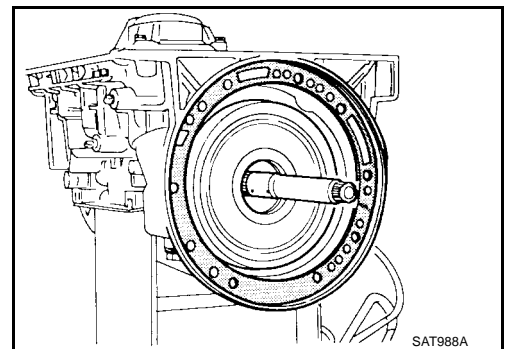
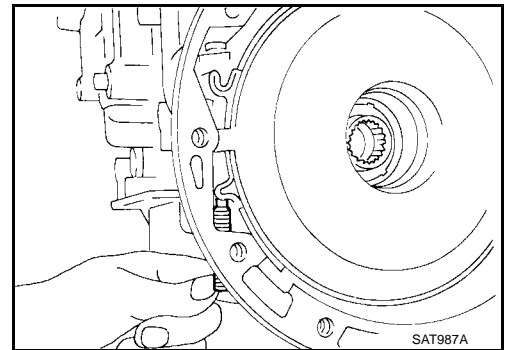
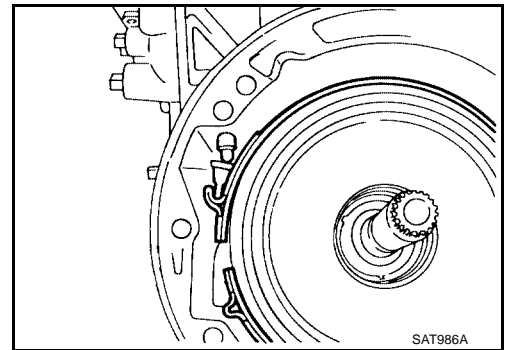
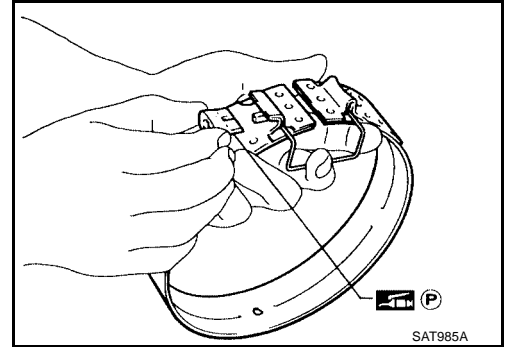
Available oil pump thrust washer

: Refer to [AT-501](#), "[Reverse Clutch Drum End Play](#)".

### Assembly (2)

1. Install brake band and band strut.
  - a. Install band strut on brake band.
    - Apply petroleum jelly to band strut.
  - b. Place brake band on periphery of reverse clutch drum, and insert band strut into end of band servo piston stem.
  - c. Install anchor end pin on transmission case. Then, tighten anchor end pin just enough so that reverse clutch drum (clutch pack) will not tilt forward.
2. Install input shaft on transmission case.
  - Pay attention to its direction — O-ring groove side is front.
3. Install gasket on transmission case.

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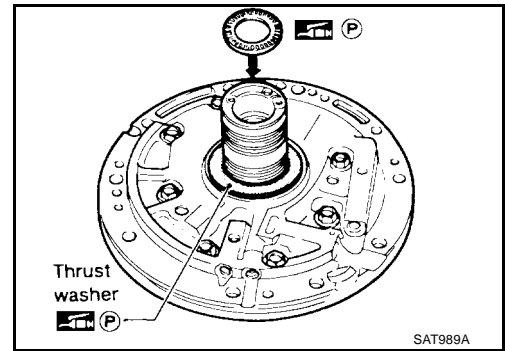


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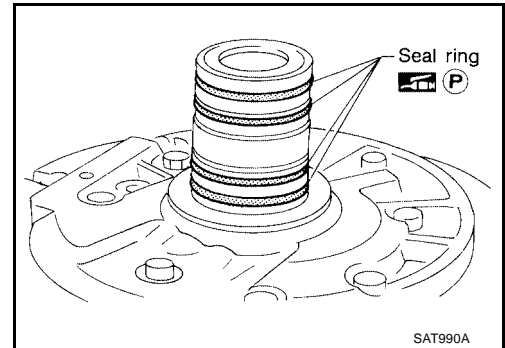
# ASSEMBLY

[RE4R01A]

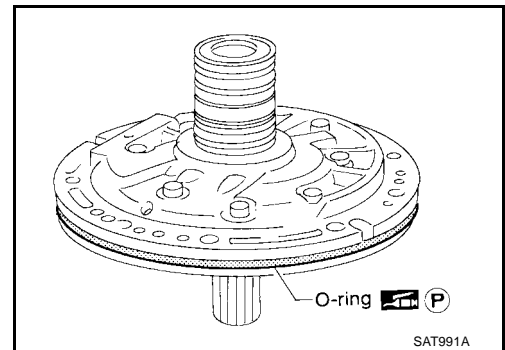
4. Install oil pump assembly.
  - a. Install needle bearing on oil pump assembly.
    - **Apply petroleum jelly to the needle bearing.**
  - b. Install selected thrust washer on oil pump assembly.
    - **Apply petroleum jelly to thrust washer.**



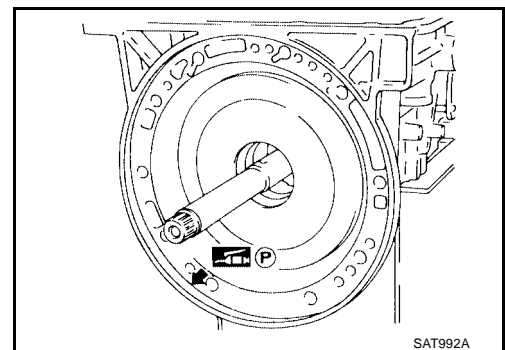
- c. Carefully install seal rings into grooves and press them into the petroleum jelly so that they are a tight fit.



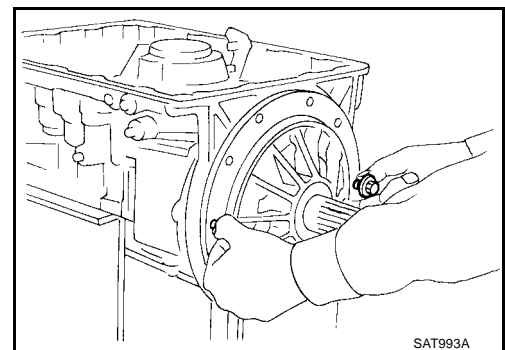
- d. Install O-ring on oil pump assembly.
      - **Apply petroleum jelly to O-ring.**



- e. Apply petroleum jelly to mating surface of transmission case and oil pump assembly.



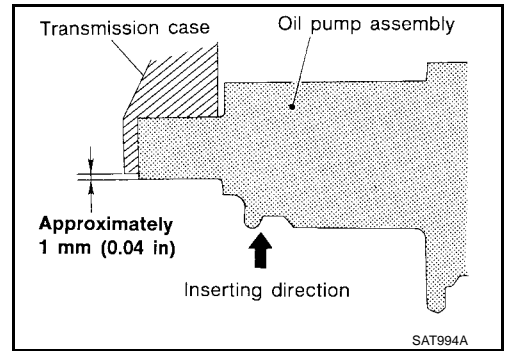
- f. Install oil pump assembly.
      - **Install two converter housing securing bolts in bolt holes in oil pump assembly as guides.**



# ASSEMBLY

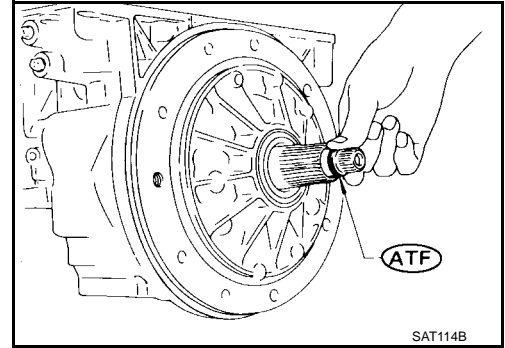
[RE4R01A]

- Insert oil pump assembly to the specified position in transmission, as shown at left.



5. Install O-ring on input shaft.

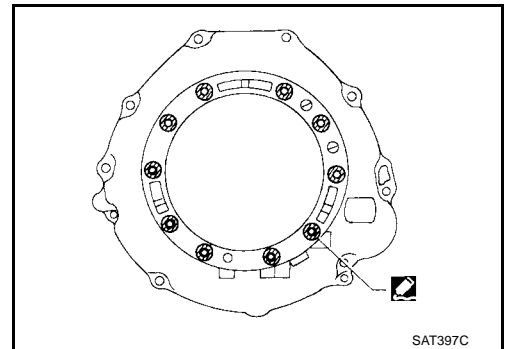
- Apply ATF to O-rings.



6. Install converter housing.

- a. Apply Genuine Anaerobic Liquid Gasket or equivalent to outer periphery of bolt holes in converter housing. Refer to [GI-42](#), "[RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS](#)".

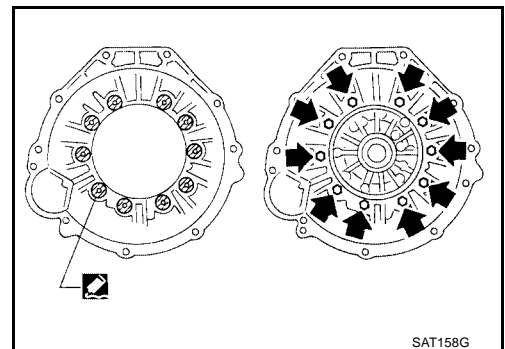
- Do not apply too much sealant.



- b. Apply Genuine Anaerobic Liquid Gasket or equivalent to seating surfaces of bolts that secure front of converter housing. Refer to [GI-42](#), "[RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS](#)".

- c. Install converter housing on transmission case.

7. Install turbine revolution sensor (VG33ER only).




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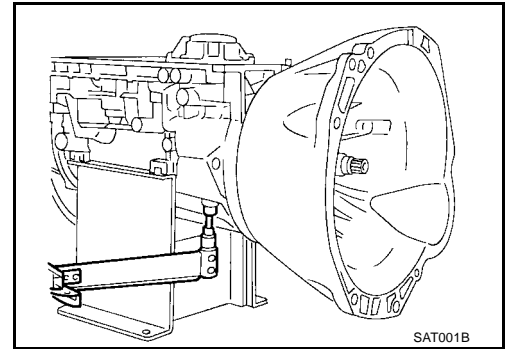
# ASSEMBLY

[RE4R01A]

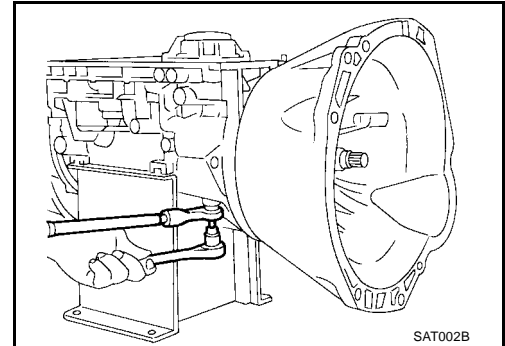
8. Adjust brake band.
  - a. Tighten anchor end bolt to specified torque.

**Anchor end bolt** :  
 : 4 - 6 N·m (0.4 - 0.6 kg·m, 35 - 52 in·lb)

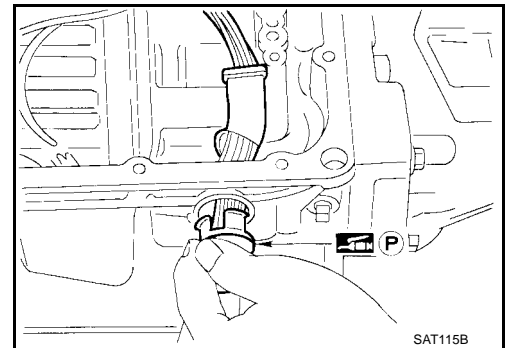
- b. Back off anchor end bolt two and a half turns.



- c. While holding anchor end pin, tighten lock nut.

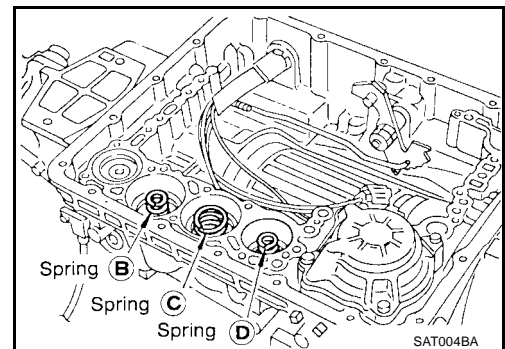


9. Install terminal cord assembly.
  - a. Install O-ring on terminal cord assembly.
    - **Apply petroleum jelly to O-ring.**
  - b. Compress terminal cord assembly stopper and install terminal cord assembly on transmission case.

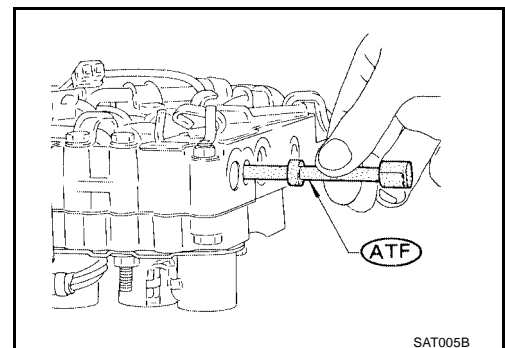


10. Install control valve assembly.
  - a. Install accumulator piston return springs B, C and D.

**Free length of return springs** : Refer to [AT-497, "Return Springs"](#).



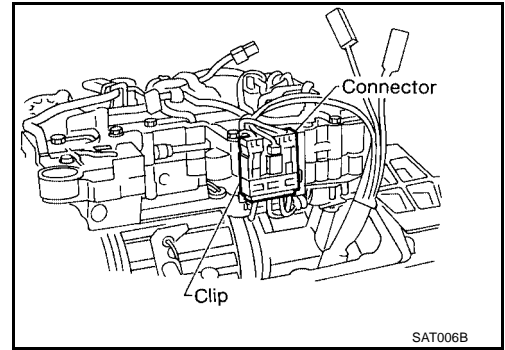
- b. Install manual valve on control valve.
        - **Apply ATF to manual valve.**




# ASSEMBLY

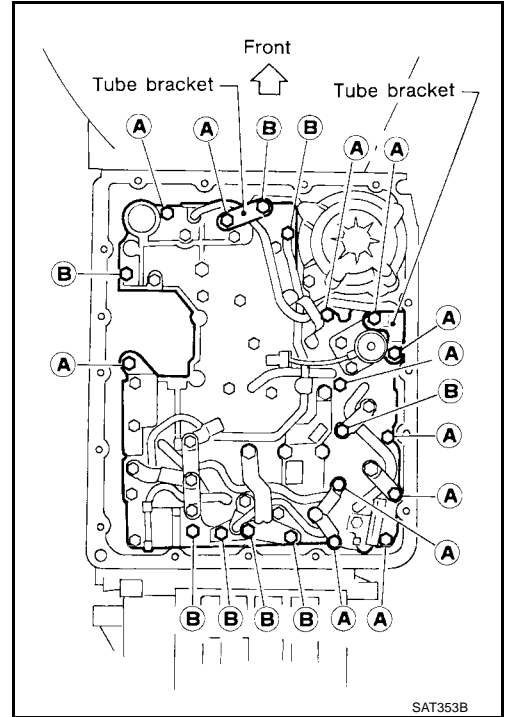
[RE4R01A]

- c. Place control valve assembly on transmission case. Connect solenoid connector for upper body.
- d. Install connector clip.

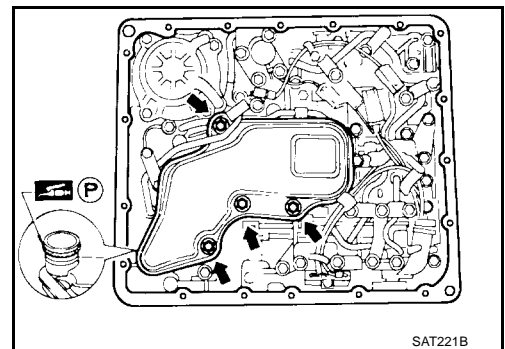


- e. Install control valve assembly on transmission case.
- f. Install connector tube brackets and tighten bolts A and B.
  - Check that terminal assembly does not catch.

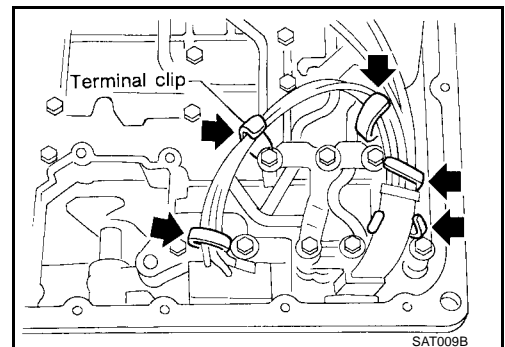
Bolt symbol	ℓ mm (in) 
A	33 (1.30)
B	45 (1.77)



- g. Install O-ring on oil strainer.
  - Apply petroleum jelly to O-ring.
- h. Install oil strainer on control valve.



- i. Securely fasten terminal harness with clips.

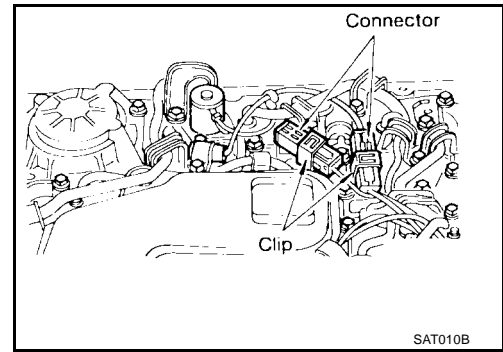


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# ASSEMBLY

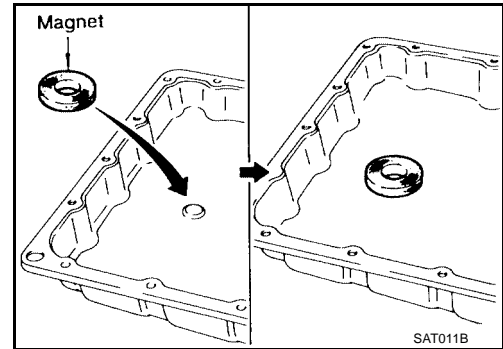
[RE4R01A]

- j. Install torque converter clutch solenoid valve and fluid temperature sensor connectors.



## 11. Install oil pan.

- a. Attach a magnet to oil pan.

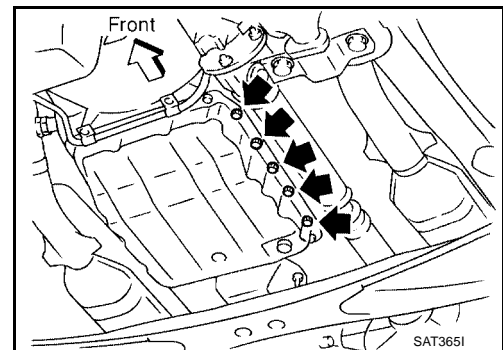


- b. Install new oil pan gasket on transmission case.

- c. Install oil pan and bracket on transmission case.

- Always replace oil pan bolts as they are self-sealing bolts.
- Before installing bolts, remove traces of sealant and oil from mating surface and thread holes.
- Tighten four bolts in a crisscross pattern to prevent dislocation of gasket.

- d. Tighten drain plug.

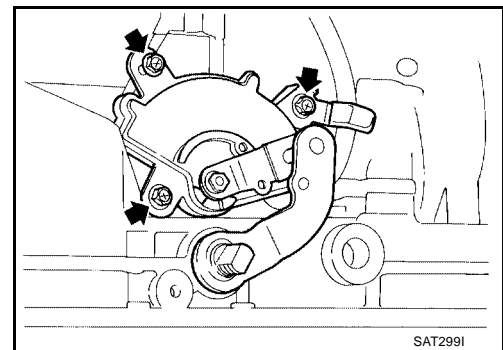


## 12. Install park/neutral position (PNP) switch.

- a. Check that manual shaft is in 1 position.

- b. Temporarily install park/neutral position (PNP) switch on manual shaft.

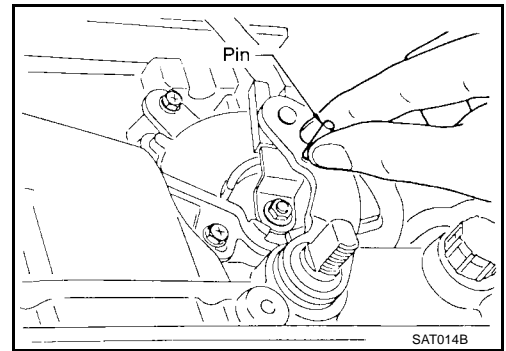
- c. Move manual shaft to N.



# ASSEMBLY

[RE4R01A]

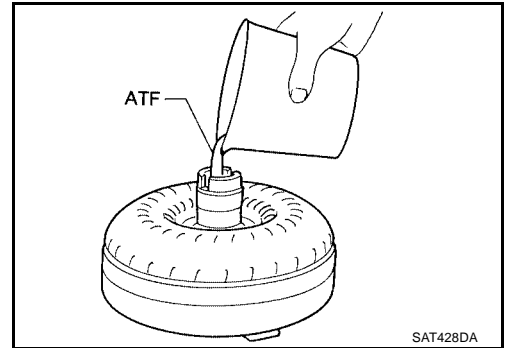
- d. Tighten bolts while inserting 4.0 mm (0.157 in) dia. pin vertically into locating holes in park/neutral position (PNP) switch and manual shaft.



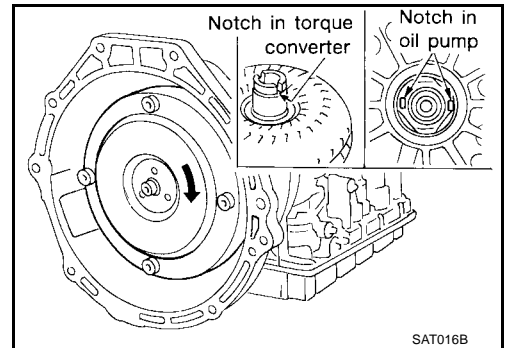
13. Install torque converter.

- a. Pour ATF into torque converter.

- Approximately 2 liters (2-1/8 US qt, 1-3/4 Imp qt) of fluid are 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 and oil pump.



- c. Measure distance A to check that torque converter is in proper position.

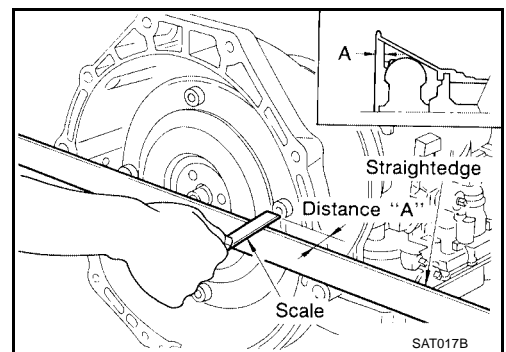
**Distance "A"**

**VG33E only**

**: 26.0 mm (1.024 in) or more**

**VG33ER only**

**: 25.0 mm (0.984 in) or more**



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# SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4R01A]

## SERVICE DATA AND SPECIFICATIONS (SDS)

PF0:00030

### General Specifications

ECS007QM

Applied model		VG33E engine		VG33ER engine	
		2WD	4WD	2WD	4WD
Automatic transmission model		RE4R01A			
Transmission model code number		4FX17	4FX18	4FX19	4FX20
Stall torque ratio		2.0 : 1			
Transmission gear ratio	1st	2.785			
	2nd	1.545			
	Top	1.000			
	O/D	0.694			
	Reverse	2.272			
Recommended fluid		Nissan Matic "D" (Continental U.S. and Alaska) or Genuine Nissan Automatic Transmission Fluid (Canada)*1			
Fluid capacity		8.3 ℓ (8-3/4 US qt, 7-1/4 Imp qt)	8.5 ℓ (9 US qt, 7-1/2 Imp qt)	8.3 ℓ (8-3/4 US qt, 7-1/4 Imp qt)	8.5 ℓ (9 US qt, 7-1/2 Imp qt)

\*1: Refer to [MA-12. "RECOMMENDED FLUIDS AND LUBRICANTS"](#) .

### Shift Schedule

ECS007QN

#### VEHICLE SPEED WHEN SHIFTING GEARS THROTTLE POSITION

Throttle position		Vehicle speed km/h (MPH)						
		D1 → D2	D2 → D3	D3 → D4	D4 → D3	D3 → D2	D2 → D1	12 → 11
Full throttle	VG33E only	47 - 51 (29 - 32)	92 - 100 (57 - 62)	146 - 156 (91 - 97)	141 - 151 (88 - 94)	87 - 95 (54 - 59)	42 - 46 (26 - 29)	43 - 47 (27 - 29)
	VG33ER only	49 - 53 (30 - 33)	94 - 102 (58 - 63)	151 - 161 (94 - 100)	147 - 157 (91 - 98)	87 - 95 (54 - 59)	43 - 47 (27 - 29)	54 - 58 (34 - 36)
Half throttle	VG33E only	34 - 38 (21 - 24)	68 - 74 (42 - 46)	132 - 140 (82 - 87)	59 - 67 (37 - 42)	31 - 37 (19 - 23)	10 - 14 (6 - 9)	43 - 47 (27 - 29)
	VG33ER only	41 - 45 (25 - 28)	68 - 74 (42 - 46)	121 - 129 (75 - 80)	76 - 84 (47 - 52)	41 - 47 (25 - 29)	11 - 15 (7 - 9)	54 - 58 (34 - 36)

#### VEHICLE SPEED WHEN PERFORMING AND RELEASING LOCK-UP

Throttle position		Overdrive control switch [Shift position]	Vehicle speed km/h (MPH)	
			Lock-up "ON"	Lock-up "OFF"
Full throttle	VG33E only	ON [D4]	147 - 155 (91 - 96)	142 - 150 (88 - 93)
		OFF [D3]	74 - 82 (46 - 51)	71 - 79 (44 - 49)
	VG33ER only	ON [D4]	152 - 160 (94 - 99)	148 - 156 (92 - 97)
		OFF [D3]	86 - 94 (53 - 58)	83 - 91 (52 - 57)
Half throttle	VG33E only	ON [D4]	139 - 147 (86 - 91)	84 - 92 (52 - 57)
		OFF [D3]	74 - 82 (46 - 51)	71 - 79 (44 - 49)
	VG33ER only	ON [D4]	134 - 142 (83 - 88)	103 - 111 (64 - 69)
		OFF [D3]	86 - 94 (53 - 58)	83 - 91 (52 - 57)

### Stall Revolution

ECS007QO

Engine	Stall revolution rpm
VG33E only	2,450 - 2,650
VG33ER only	2,420 - 2,620



# SERVICE DATA AND SPECIFICATIONS (SDS)

**[RE4R01A]**

## Line Pressure

ECS007QP

Engine speed rpm	Line pressure kPa (kg/cm <sup>2</sup> , psi)	
	D, 2 and 1 positions	R position
Idle	422 - 461 (4.3 - 4.7, 61 - 67)	667 - 706 (6.8 - 7.2, 97 - 102)
Stall	1,020 - 1,098 (10.4 - 11.2, 148 - 159)	1,422 - 1,500 (14.5 - 15.3, 206 - 218)

## Return Springs

ECS007QQ

Unit: mm (in)

		Parts		Item		
				Part No.*	Free length	Outer diameter
Control valve	Upper body	1	Torque converter relief valve spring	31742-41X23	38.0 (1.496)	9.0 (0.354)
		2	Pressure regulator valve spring	31742-41X24	44.02 (1.7331)	14.0 (0.551)
		3	Pressure modifier valve spring	31742-41X19	31.95 (1.2579)	6.8 (0.268)
		—	Accumulator control valve spring	—	—	—
		4	Shuttle shift valve D spring	31762-41X01	25.0 (0.984)	7.0 (0.276)
		5	4-2 sequence valve spring	31756-41X00	29.1 (1.146)	6.95 (0.2736)
		6	Shift valve B spring	31762-41X01	25.0 (0.984)	7.0 (0.276)
		7	4-2 relay valve spring	31756-41X00	29.1 (1.146)	6.95 (0.2736)
		8	Shift valve A spring	31762-41X01	25.0 (0.984)	7.0 (0.276)
		9	Overrun clutch control valve spring	31762-41X03	23.6 (0.929)	7.0 (0.276)
		10	Overrun clutch reducing valve spring	31762-41X14 (VG33ER only) 31742-41X20 (VG33E only)	38.9 (1.531) (VG33ER only) 32.5 (1.280) (VG33E only)	7.0 (0.276)
		11	Shuttle shift valve S spring	31762-41X04	51.0 (2.008)	5.65 (0.2224)
		12	Pilot valve spring	31742-41X13	25.7 (1.012)	9.0 (0.354)
13	Lock-up control valve spring	31742-41X22	18.5 (0.728)	13.0 (0.512)		
	Lower body	1	Modifier accumulator piston spring	31742-27X70	31.4 (1.236)	9.8 (0.386)
		2	1st reducing valve spring	31756-41X05 (VG33E only) 31756-60X00 (VG33ER only)	25.4 (1.000) (VG33E only) 29.5 (1.161) (VG33ER only)	6.75 (0.2657) (VG33E only) 7.00 (0.2756) (VG33ER only)
		3	3-2 timing valve spring	31742-41X06	23.0 (0.906)	6.7 (0.264)
		4	Servo charger valve spring	31742-41X06	23.0 (0.906)	6.7 (0.264)
Reverse clutch		16 pcs (VG33E only) 1 pc (VG33ER only)	31521-41X02 (Assembly) (VG33E only) 31505-41X07 (Assembly) (VG33ER only)	19.7 (0.7756) (VG33E only) — (VG33ER only)	11.6 (0.457) (VG33E only) — (VG33ER only)	
High clutch		10 pcs	31521-41X03 (Assembly)	24.2 (0.9528)	11.6 (0.457)	
Forward clutch (Over-run clutch)		20 pcs	31521-41X04 (Assembly)	35.77 (1.4083)	9.7 (0.382)	
Low & reverse brake		18 pcs	31655-41X00 (Assembly)	22.3 (0.878)	11.2 (0.441)	

# SERVICE DATA AND SPECIFICATIONS (SDS)

**[RE4R01A]**

Parts		Item		
		Part No.*	Free length	Outer diameter
Band servo	Spring A	31605-41X05 (VG33E only) 31605-41X14 (VG33ER only)	45.6 (1.795) (VG33E only) 47.6 (1.874) (VG33ER only)	34.3 (1.350) (VG33E only) 26.5 (1.043) (VG33ER only)
	Spring B	31605-41X00 (VG33E only)	53.8 (2.118) (VG33E only)	40.3 (1.587) (VG33E only)
	Spring C	31605-41X01	29.7 (1.169)	27.6 (1.087)
Accumulator	Accumulator A	31605-41X02	43.0 (1.693)	18.0 (0.709)
	Accumulator B	31605-41X10 (VG33E only) 31605-4AX03 (VG33ER only)	66.0 (2.598)	20.0 (0.787)
	Accumulator C	31605-41X09	45.0 (1.772)	29.3 (1.154)
	Accumulator D	31605-41X06	58.4 (2.299)	17.3 (0.681)

\*: Always check with the Parts Department for the latest parts information.

## Accumulator O-ring

*ECS007QR*

Accumulator	Diameter mm (in)			
	A	B	C	D
Small diameter end	29 (1.14)	32 (1.26)	45 (1.77)	29 (1.14)
Large diameter end	45 (1.77)	50 (1.97)	50 (1.97)	45 (1.77)

## Clutches and Brakes REVERSE CLUTCH

*ECS007QS*

Code number	4FX17	4FX18	4FX19	4FX20
Number of drive plates	2			
Number of driven plates	2			
Thickness of drive plate mm (in)	Standard	1.90 - 2.05 (0.0748 - 0.0807)		
	Wear limit	1.80 (0.0709)		
Clearance mm (in)	Standard	0.5 - 0.8 (0.020 - 0.031)		
	Allowable limit	1.2 (0.047)		
Thickness of retaining plate	Thickness mm (in)	Part No.*	Thickness mm (in)	Part No.*
	4.8 (0.189)	31537-42X02	4.6 (0.181)	31537-42X20
	5.0 (0.197)	31537-42X03	4.8 (0.189)	31537-42X21
	5.2 (0.205)	31537-42X04	5.0 (0.197)	31537-42X22
	5.4 (0.213)	31537-42X05	5.2 (0.205)	31537-42X23
5.6 (0.220)	31537-42X06	5.4 (0.213)	31537-42X24	

\*: Always check with the Parts Department for the latest parts information.

## HIGH CLUTCH

Code number	4FX17	4FX18	4FX19	4FX20
Number of drive plates	5			
Number of driven plates	5		6	
Thickness of drive plate mm (in)	Standard	1.52 - 1.67 (0.0598 - 0.0657)		
	Wear limit	1.40 (0.0551)		
Clearance mm (in)	Standard	1.8 - 2.2 (0.071 - 0.087)		
	Allowable limit	3.2 (0.126)		2.2 (0.087)

# SERVICE DATA AND SPECIFICATIONS (SDS)

**[RE4R01A]**

	Thickness mm (in)	Part No.*	Thickness mm (in)	Part No.*
	Thickness of retaining plate	3.4 (0.134)	31537-41X71	4.0 (0.157)
3.6 (0.142)		31537-41X61	4.2 (0.165)	31537-41X64
3.8 (0.150)		31537-41X62	4.4 (0.173)	31537-41X65
4.0 (0.157)		31537-41X63	4.6 (0.181)	31537-41X66
4.2 (0.165)		31537-41X64	4.8 (0.189)	31537-41X67
4.4 (0.173)		31537-41X65	5.0 (0.197)	31537-41X68
4.6 (0.181)		31537-41X66		
4.8 (0.189)		31537-41X67		

\*: Always check with the Parts Department for the latest parts information.

## FORWARD CLUTCH

Code number		4FX17	4FX18	4FX19	4FX20			
Number of drive plates		7	7	7	8			
Number of driven plates		7	7	7	8			
Thickness of drive plate mm (in)	Standard	1.52 - 1.67 (0.0598 - 0.0657)						
	Wear limit	1.40 (0.0551)						
Clearance mm (in)	Standard	0.35 - 0.75 (0.0138 - 0.0295)						
	Allowable limit	2.15 (0.0846)	2.15 (0.0846)	2.15 (0.0846)	2.35 (0.0925)			
Thickness of retaining plate	Thick- ness mm (in)	Part No.*	Thick- ness mm (in)	Part No.*	Thick- ness mm (in)	Part No.*	Thick- ness mm (in)	Part No.*
	4.6 (0.181)	31537- 42X13	4.6 (0.181)	31537- 42X13	4.6 (0.181)	31537- 42X13	4.0 (0.157)	31537- 42X10
	4.8 (0.189)	31537- 42X14	4.8 (0.189)	31537- 42X14	4.8 (0.189)	31537- 42X14	4.2 (0.165)	31537- 42X11
	5.0 (0.197)	31537- 42X15	5.0 (0.197)	31537- 42X15	5.0 (0.197)	31537- 42X15	4.4 (0.173)	31537- 42X12
	5.2 (0.205)	31537- 4AX00	5.2 (0.205)	31537- 4AX00	5.2 (0.205)	31537- 4AX00	4.6 (0.181)	31537- 42X13
	5.4 (0.213)	31537- 4AX01	5.4 (0.213)	31537- 4AX01	5.4 (0.213)	31537- 4AX01	4.8 (0.189)	31537- 42X14
	5.6 (0.220)	31537- 4AX02	5.6 (0.220)	31537- 4AX02	5.6 (0.220)	31537- 4AX02	5.0 (0.197)	31537- 42X15
	5.8 (0.228)	31537- 4AX03	5.8 (0.228)	31537- 4AX03	5.8 (0.228)	31537- 4AX03	5.2 (0.205)	31537- 4AX00
							5.4 (0.213)	31537- 4AX01

\*: Always check with the Parts Department for the latest parts information.

# SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4R01A]

## OVERRUN CLUTCH

Code number		4FX17	4FX18	4FX19	4FX20
Number of drive plates					3
Number of driven plates					5
Thickness of drive plate mm (in)	Standard				1.90 - 2.05 (0.0748 - 0.0807)
	Wear limit				1.80 (0.0709)
Clearance mm (in)	Standard				1.0 - 1.4 (0.039 - 0.055)
	Allowable limit				2.4 (0.094)
Thickness of retaining plate		Thickness mm (in)		Part No.*	
		4.2 (0.165)		31537-41X80	
		4.4 (0.173)		31537-41X81	
		4.6 (0.181)		31537-41X82	
		4.8 (0.189)		31537-41X83	
		5.0 (0.197)		31537-41X84	

\*: Always check with the Parts Department for the latest parts information.

## LOW & REVERSE BRAKE

Code number		4FX17	4FX18	4FX19	4FX20
Number of drive plates		7		8	
Number of driven plates		7		8	
Thickness of drive plate mm (in)	Standard				1.52 - 1.67 (0.0598 - 0.0657)
	Wear limit				1.40 (0.0551)
Clearance mm (in)	Standard				0.8 - 1.1 (0.031 - 0.043)
	Allowable limit	2.5 (0.098)		2.7 (0.106)	
Thickness of retaining plate		Thickness mm (in)	Part No.*	Thickness mm (in)	Part No.*
		6.6 (0.260)	31667-41X17	7.6 (0.299)	31667-41X07
		6.8 (0.268)	31667-41X11	7.8 (0.307)	31667-41X08
		7.0 (0.276)	31667-41X12	8.0 (0.315)	31667-41X00
		7.2 (0.283)	31667-41X13	8.2 (0.323)	31667-41X01
		7.4 (0.291)	31667-41X14	8.4 (0.331)	31667-41X02
		7.6 (0.299)	31667-41X07	8.6 (0.339)	31667-41X03
		7.8 (0.307)	31667-41X08	8.8 (0.346)	31667-41X04
		8.0 (0.315)	31667-41X00	9.0 (0.354)	31667-41X05
		8.2 (0.323)	31667-41X01	9.2 (0.362)	31667-41X06
		8.4 (0.331)	31667-41X02	9.4 (0.370)	31667-41X09
		8.6 (0.339)	31667-41X03	9.6 (0.378)	31667-41X10
		8.8 (0.346)	31667-41X04		
		9.0 (0.354)	31667-41X05		

\*: Always check with the Parts Department for the latest parts information.

## BRAKE BAND

Anchor end bolt tightening torque	4 - 6 N·m (0.4 - 0.6 kg·m, 35 - 52 in·lb)
Number of returning revolution for anchor end bolt	2.5

## Oil Pump and Low One-way Clutch

ECS007QT

Unit: mm (in)

Oil pump clearance	Cam ring — oil pump housing	Standard	0.01 - 0.024 (0.0004 - 0.0009)
	Rotor, vanes and control piston — oil pump housing	Standard	0.03 - 0.044 (0.0012 - 0.0017)
Seal ring clearance		Standard	0.10 - 0.25 (0.0039 - 0.0098)
		Allowable limit	0.25 (0.0098)

# SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4R01A]

## Total End Play

ECS007QU

Total end play "T1 "	0.25 - 0.55 mm (0.0098 - 0.0217 in)	
Thickness of oil pump cover bearing race	Thickness mm (in)	Part No.*
	0.8 (0.031)	31435-41X01
	1.0 (0.039)	31435-41X02
	1.2 (0.047)	31435-41X03
	1.4 (0.055)	31435-41X04
	1.6 (0.063)	31435-41X05
	1.8 (0.071)	31435-41X06
2.0 (0.079)	31435-41X07	

\*: Always check with the Parts Department for the latest parts information.

## Reverse Clutch Drum End Play

ECS007QV

Reverse clutch drum end play "T2 "	0.55 - 0.90 mm (0.0217 - 0.0354 in)	
Thickness of oil pump thrust washer	Thickness mm (in)	Part No.*
	0.9 (0.035)	31528-21X01
	1.1 (0.043)	31528-21X02
	1.3 (0.051)	31528-21X03
	1.5 (0.059)	31528-21X04
	1.7 (0.067)	31528-21X05
	1.9 (0.075)	31528-21X06

\*: Always check with the Parts Department for the latest parts information.

## Removal and Installation

ECS007QW

Manual control linkage	Number of returning revolutions for lock nut	2
	Lock nut tightening torque	4.4 - 5.9 N·m (0.45 - 0.60 kg·m, 39.1 - 52.1 in·lb)
Distance between end of clutch housing and torque converter		26.0 mm (1.024 in) or more (VG33E only) 25.0 mm (0.984 in) or more (VG33ER only)

## Shift Solenoid Valves

ECS007QX

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

ECS007QY

Solenoid valves	Resistance (Approx.) Ω	Terminal No.
Shift solenoid valve A	20 - 40	3
Shift solenoid valve B	20 - 40	2
Overrun clutch solenoid valve	20 - 40	4
Line pressure solenoid valve	2.5 - 5	6
Torque converter clutch solenoid valve	10 - 20	7

## A/T Fluid Temperature Sensor

ECS007QZ

Remarks: Specification data are reference values.

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

# SERVICE DATA AND SPECIFICATIONS (SDS)

[RE4R01A]

## Turbine Revolution Sensor

ECS007R0

Terminal No.		Resistance (Approx.)
1	2	2.4 - 2.8 K $\Omega$
1	3	No continuity
2	3	No continuity

## Revolution Sensor

ECS007R1

Terminal No.		Resistance (Approx.)
1	2	500 - 650 $\Omega$
2	3	No continuity
1	3	No continuity

## Dropping Resistor

ECS007R2

Resistance	Approx. 12 $\Omega$
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