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SECTION **AT**

AUTOMATIC TRANSAXLE

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PRECAUTIONS

PRECAUTIONS

PPF:00001

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

ECS00400

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harness connectors.

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

ECS00401

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 for Trouble Diagnosis CAN SYSTEM

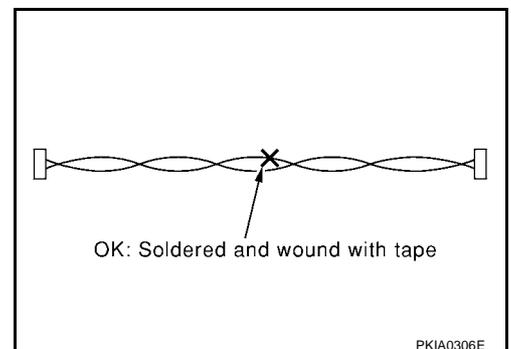
ECS004VN

- Do not apply voltage of 7.0V or higher to the measurement terminals.
- Use the tester with its open terminal voltage being 7.0V or less.

Precautions for Harness Repair CAN SYSTEM

ECS004VO

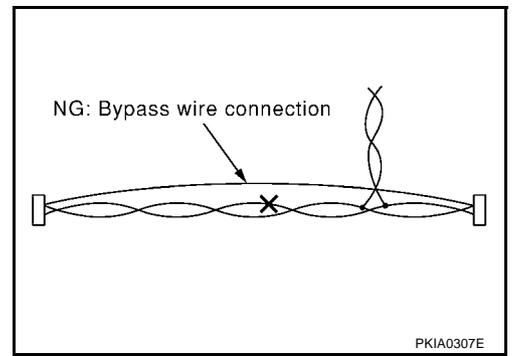
- Solder the repaired parts, and wrap with tape. [Frays of twisted line must be within 110 mm (4.33 in)]



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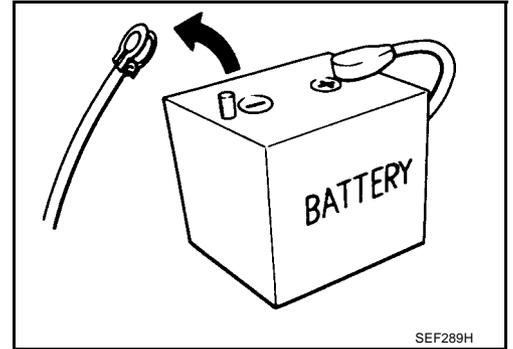
PRECAUTIONS

- Do not perform bypass wire connections for the repair parts. (The spliced wire will become separated and the characteristics of twisted line will be lost.)

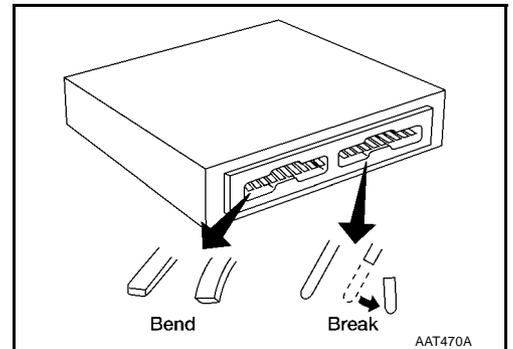


Precautions

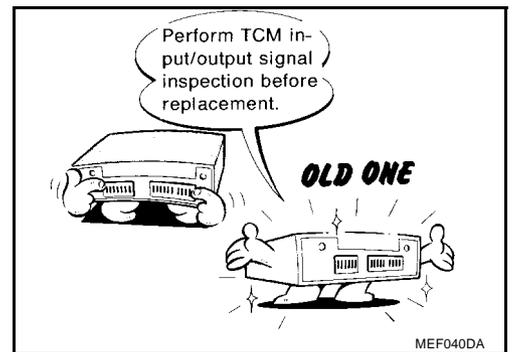
- Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the TCM. Because battery voltage is applied to TCM even if ignition switch is turned off.



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



- Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. (See page [AT-106, "TCM Terminals and Reference Value"](#).)

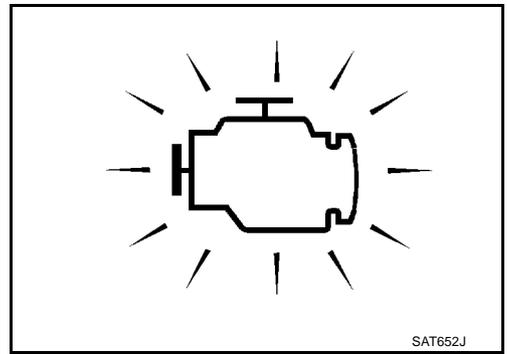


PRECAUTIONS

- After performing each TROUBLE DIAGNOSIS, perform “DTC (Diagnostic Trouble Code) CONFIRMATION PROCEDURE”.

The DTC should not be displayed in the “DTC CONFIRMATION PROCEDURE” if the repair is completed.

- Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transaxle.
- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should be replaced any time the transaxle is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- After overhaul, refill the transaxle with new ATF.
- When the A/T drain plug is removed, only some of the fluid is drained. Old A/T fluid will remain in torque converter and ATF cooling system.
Always follow the procedures under “Changing A/T Fluid” in the AT section when changing A/T fluid. Refer to “Changing A/T Fluid”, [AT-13, "AT FLUID"](#) .



Service Notice or Precautions FAIL-SAFE

EC5004Q3

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-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#) (EXCEPT FOR EURO-OBD) or [AT-51, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#) (EURO-OBD).

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-262, "Work Flow"](#) (EXCEPT FOR Euro-OBD) or [AT-60, "Work Flow"](#) (Euro-OBD).

The SELF-DIAGNOSIS results will be as follows:

- The first SELF-DIAGNOSIS will indicate damage to the vehicle speed sensor or the revolution sensor.
- During the next SELF-DIAGNOSIS, performed after checking the sensor, no damages will be indicated.

TORQUE CONVERTER SERVICE

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.)

PRECAUTIONS

- Converter is contaminated with engine coolant containing antifreeze.
- Internal failure of stator roller clutch.
- Heavy clutch debris due to overheating (blue converter).
- Steel particles or clutch lining material found in fluid filter or on magnet when no internal parts in unit are worn or damaged — indicates that lining material came from converter.

The torque converter should not be replaced if:

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

EURO-OBD SELF-DIAGNOSIS — EURO-OBD —

- 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 lamp or the malfunction indicator lamp (MIL). Refer to the table on [AT-42, "SELF-DIAGNOSTIC RESULT TEST MODE"](#) for the indicator used to display each self-diagnostic result.
- The self-diagnostic results indicated by the MIL are automatically stored in both the ECM and TCM memories.
Always perform the procedure "HOW TO ERASE DTC" on [AT-39, "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.
 - PNP switch
 - A/T 1st, 2nd, 3rd, or 4th gear function

*: For details of EURO-OBD, refer to [EC-44, "ON BOARD DIAGNOSTIC \(OBD\) SYSTEM"](#) (QR25DE) or [EC-777, "ON BOARD DIAGNOSTIC \(OBD\) SYSTEM"](#) (QR20DE).

- **Certain systems and components, especially those related to EURO-OBD, may use a new style slide-locking type harness connector.**
For description and how to disconnect, refer to [PG-68, "HARNES CONNECTOR"](#) .

Wiring Diagrams and Trouble Diagnosis

ECS004Q4

When you read wiring diagrams, refer to the following:

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

When you perform trouble diagnosis, refer to the following:

- [GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#)
- [GI-23, "How to Perform Efficient Diagnosis for an Electrical Incident"](#)

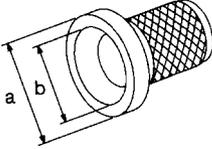
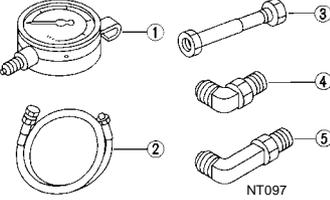
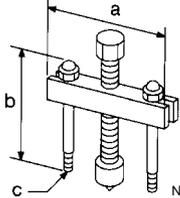
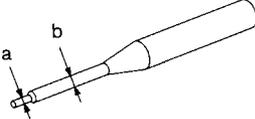
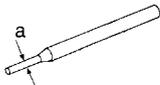
PREPARATION

PREPARATION

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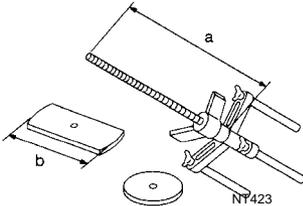
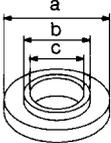
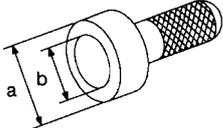
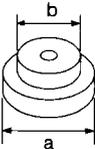
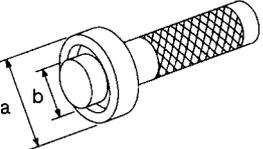
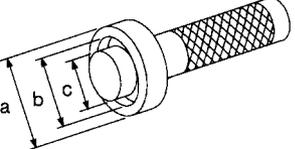
Special Service Tools

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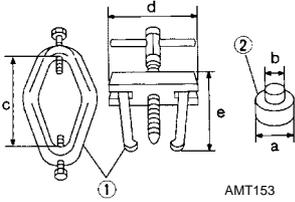
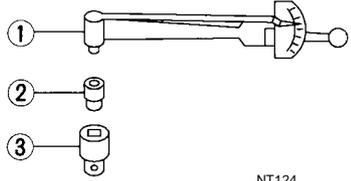
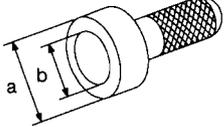
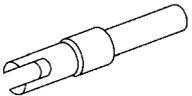
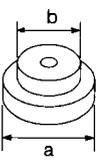
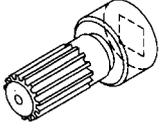
Tool number Tool name	Description
KV381054S0 Puller	 <p>NT414</p> <ul style="list-style-type: none"> ● Removing differential side oil seals ● Removing differential side bearing outer race ● Removing idler gear bearing outer race <p>a: 250 mm (9.84 in) b: 160 mm (6.30 in)</p>
ST33400001 Drift	 <p>NT086</p> <ul style="list-style-type: none"> ● Installing differential side oil seal F04B ● Installing oil seal on oil pump housing <p>a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.</p>
ST2505S001 Oil pressure gauge set 1. ST25051001 Oil pressure gauge 2. ST25052000 Hose 3. ST25053000 Joint pipe 4. ST25054000 Adapter 5. ST25055000 Adapter	 <p>NT097</p> <ul style="list-style-type: none"> ● Measuring line pressure
ST27180001 Puller	 <p>NT424</p> <ul style="list-style-type: none"> ● Removing idler gear <p>a: 100 mm (3.94 in) b: 110 mm (4.33 in) c: M8 x 1.25P</p>
ST23540000 Pin punch	 <p>NT442</p> <ul style="list-style-type: none"> ● Removing and installing parking rod plate and manual plate pins <p>a: 2.3 mm (0.091 in) dia. b: 4 mm (0.16 in) dia.</p>
ST25710000 Pin punch	 <p>NT410</p> <ul style="list-style-type: none"> ● Aligning groove of manual shaft and hole of transmission case <p>a: 2 mm (0.08 in) dia.</p>

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PREPARATION

Tool number Tool name	Description
KV32101000 Pin punch	<ul style="list-style-type: none"> ● Removing and installing manual shaft retaining pin ● Removing and installing pinion mate shaft lock pin <p>a: 4 mm (0.16 in) dia.</p>  <p style="text-align: center;">NT410</p>
KV31102400 Clutch spring compressor	<ul style="list-style-type: none"> ● Removing and installing clutch return springs ● Installing low and reverse brake piston <p>a: 320 mm (12.60 in) b: 174 mm (6.85 in)</p>  <p style="text-align: center;">NT423</p>
KV40100630 Drift	<ul style="list-style-type: none"> ● Installing reduction gear bearing inner race ● Installing idler gear bearing inner race <p>a: 67.5 mm (2.657 in) dia. b: 44 mm (1.73 in) dia. c: 38.5 mm (1.516 in) dia.</p>  <p style="text-align: center;">NT107</p>
ST30720000 Bearing installer	<ul style="list-style-type: none"> ● Installing idler gear bearing outer race <p>a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.</p>  <p style="text-align: center;">NT115</p>
ST35321000 Drift	<ul style="list-style-type: none"> ● Installing output shaft bearing <p>a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia.</p>  <p style="text-align: center;">NT073</p>
ST33230000 Drift	<ul style="list-style-type: none"> ● Installing differential side bearing inner race <p>a: 51 mm (2.01 in) dia. b: 28.5 mm (1.122 in) dia.</p>  <p style="text-align: center;">NT084</p>
ST33220000 Drift	<ul style="list-style-type: none"> ● Selecting differential side bearing adjusting shim <p>a: 37 mm (1.46 in) dia. b: 31 mm (1.22 in) dia. c: 22 mm (0.87 in) dia.</p>  <p style="text-align: center;">NT085</p>

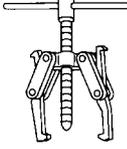
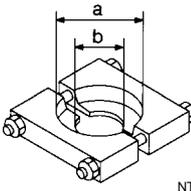
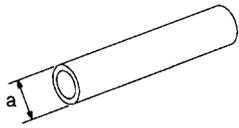
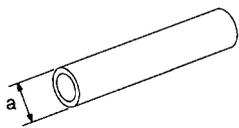
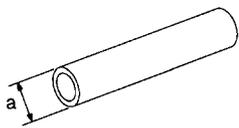
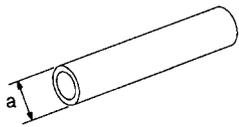
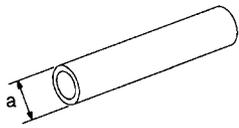
PREPARATION

Tool number Tool name	Description	A B AT
ST3306S001 Differential side bearing puller set 1. ST33051001 Puller 2. ST33061000 Adapter	 <ul style="list-style-type: none"> ● Removing differential side bearing inner race a: 38 mm (1.50 in) dia. b: 28.5 mm (1.122 in) dia. c: 130 mm (5.12 in) d: 135 mm (5.31 in) e: 100 mm (3.94 in) 	
ST3127S000 Preload gauge 1. GG9103000 Torque wrench 2. HT62900000 Socket adapter	 <ul style="list-style-type: none"> ● Checking differential side bearing preload 	D E F
ST35271000 Drift	 <ul style="list-style-type: none"> ● Installing idler gear ● Installing differential side bearing inner race a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia. 	G H
KV38107700 Preload adapter	 <ul style="list-style-type: none"> ● Selecting differential side bearing adjusting shim ● Checking differential side bearing preload 	I J
ST30613000 Drift	 <ul style="list-style-type: none"> ● Installing differential side bearing inner race a: 72 mm (2.83 in) dia. b: 48 mm (1.89 in) dia. 	K L M
KV38105210 Preload adapter	 <ul style="list-style-type: none"> ● Selecting differential side bearing adjusting shim ● Checking differential side bearing preload 	

PREPARATION

Commercial Service Tools

ECS004Q6

Tool name	Description	
Puller	 <p style="text-align: center;">NT077</p>	<ul style="list-style-type: none"> ● Removing idler gear bearing inner race ● Removing and installing band servo piston snap ring
Puller	 <p style="text-align: center;">NT411</p>	<ul style="list-style-type: none"> ● Removing reduction gear bearing inner race <p>a: 60 mm (2.36 in) dia. b: 35 mm (1.38 in) dia.</p>
Drift	 <p style="text-align: center;">NT083</p>	<ul style="list-style-type: none"> ● Installing differential side oil seal <p>a: 90 mm (3.54 in) dia.</p>
Drift	 <p style="text-align: center;">NT083</p>	<ul style="list-style-type: none"> ● Installing needle bearing on bearing retainer <p>a: 36 mm (1.42 in) dia.</p>
Drift	 <p style="text-align: center;">NT083</p>	<ul style="list-style-type: none"> ● Removing needle bearing from bearing retainer <p>a: 33.5 mm (1.319 in) dia.</p>
Drift	 <p style="text-align: center;">NT083</p>	<ul style="list-style-type: none"> ● Installing differential side bearing outer race <p>a: 75 mm (2.95 in) dia.</p>
Drift	 <p style="text-align: center;">NT083</p>	<ul style="list-style-type: none"> ● Installing differential side bearing outer race <p>a: 100 mm (3.94 in) dia.</p>

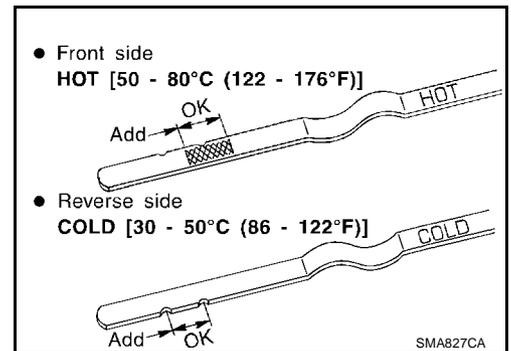
A/T FLUID

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Checking A/T Fluid

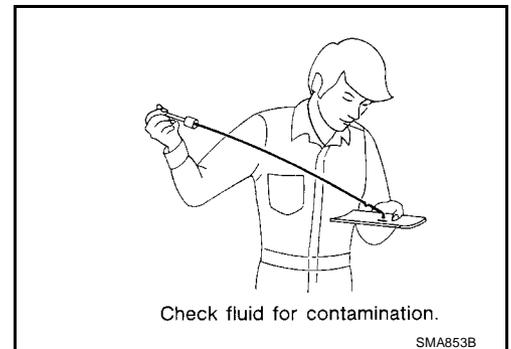
ECS004Q7

1. Warm up engine.
2. Check for fluid leakage.
3. Before driving, fluid level can be checked at fluid temperatures of 30 to 50°C (86 to 122°F) using "COLD" range on dipstick.
 - a. Park vehicle on level surface and set parking brake.
 - b. Start engine and move selector lever through each gear position. Leave selector lever in "P" position.
 - c. Check fluid level with engine idling.
 - d. Remove dipstick and note reading. If level is at low side of either range, and fluid to the charging pipe.
 - e. Re-insert dipstick into charging pipe as far as it will go.
 - f. Remove dipstick and note reading. If reading is at low side of range, add fluid to the charging pipe.



Do not overfill.

4. Drive vehicle for approximately 5 minutes in urban areas.
5. Re-check fluid level at fluid temperatures of 50 to 80°C (122 to 176°F) using "HOT" range on dipstick.
6. Check fluid condition.
 - If fluid is very dark or smells burned, refer to AT section for checking operation of A/T. Flush cooling system after repair of A/T.
 - If A/T fluid contains frictional material (clutches, bands, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of A/T. Refer to [CO-11, "RADIATOR"](#), [CO-14, "RADIATOR \(ALUMINUM TYPE\)"](#).



Changing A/T Fluid

ECS004Q8

1. Warm up A/T fluid.
2. Stop engine.
3. Drain A/T fluid from drain plug and refill with new A/T fluid. Always refill same volume with drained fluid.

Fluid grade:

Genuine Nissan ATF or equivalent. Refer to [MA-16, "RECOMMENDED FLUIDS AND LUBRICANTS"](#).

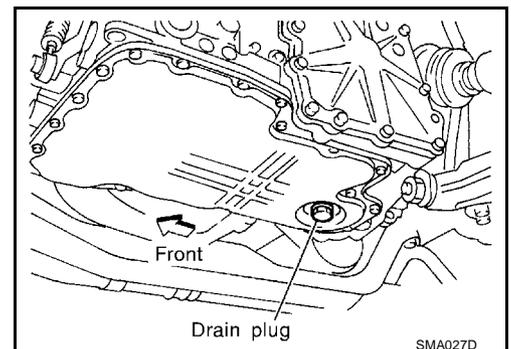
Fluid capacity (With torque converter):

Approx. 8.5 l (7-1/2 Imp qt)

Drain plug:

 : **29 - 39 N·m (3.0 - 4.0 kg·m, 22 - 29 ft·lb)**

4. Run engine at idle speed for five minutes.
5. Check fluid level and condition. Refer to "Checking A/T Fluid". If fluid is still dirty, repeat steps 2 through 5.



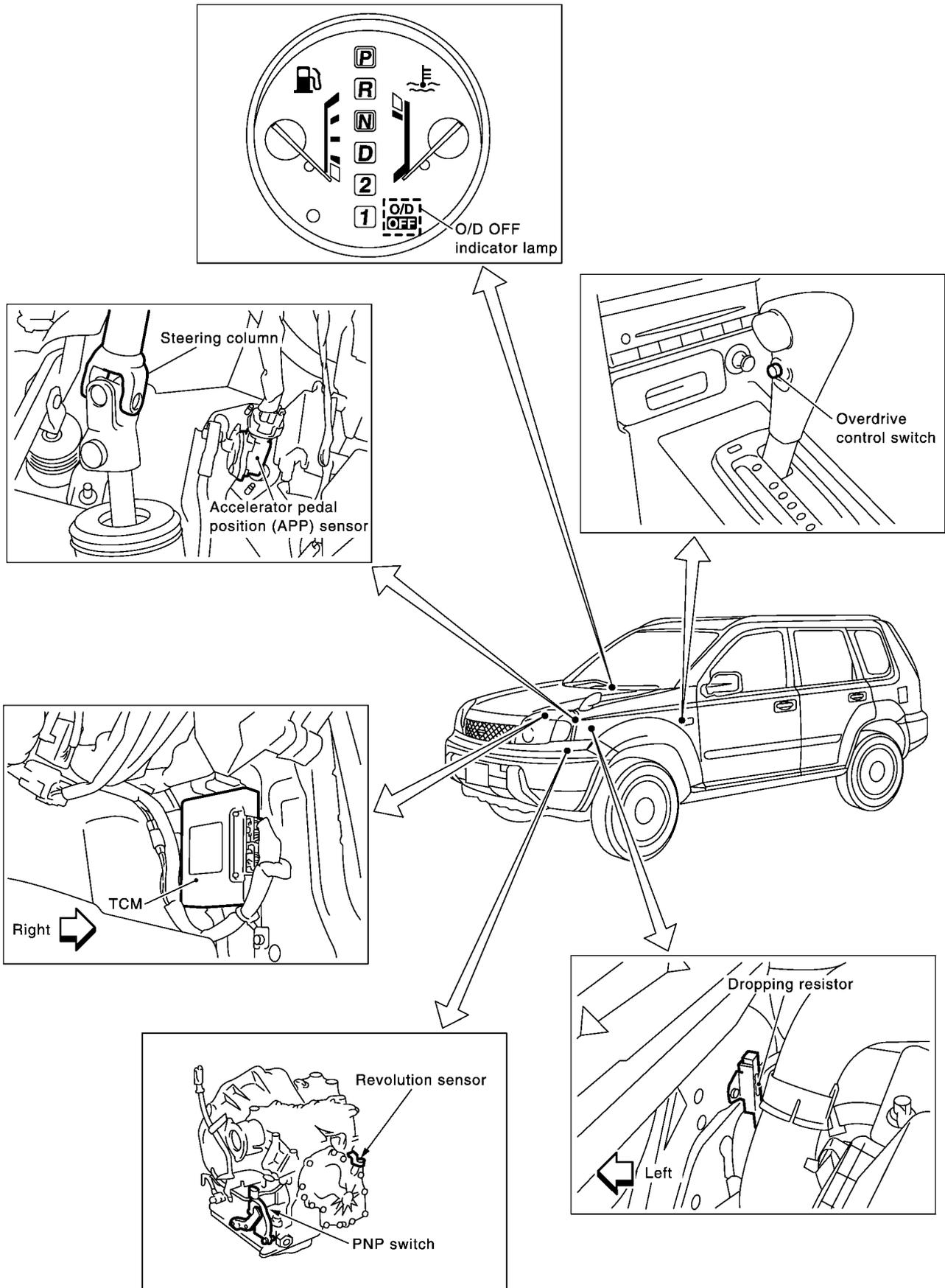
OVERALL SYSTEM

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A/T Electrical Parts Location

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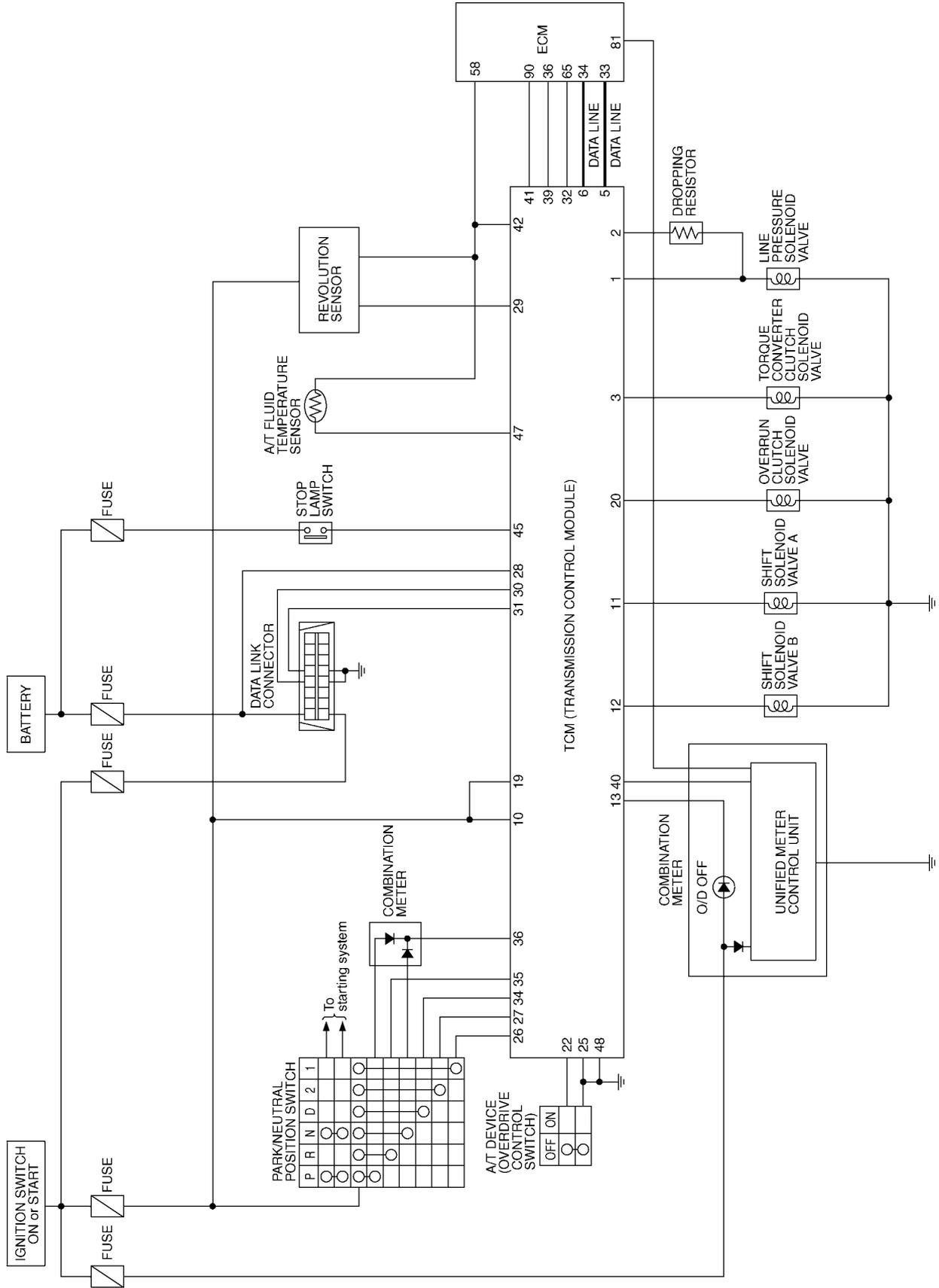


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OVERALL SYSTEM

Circuit Diagram

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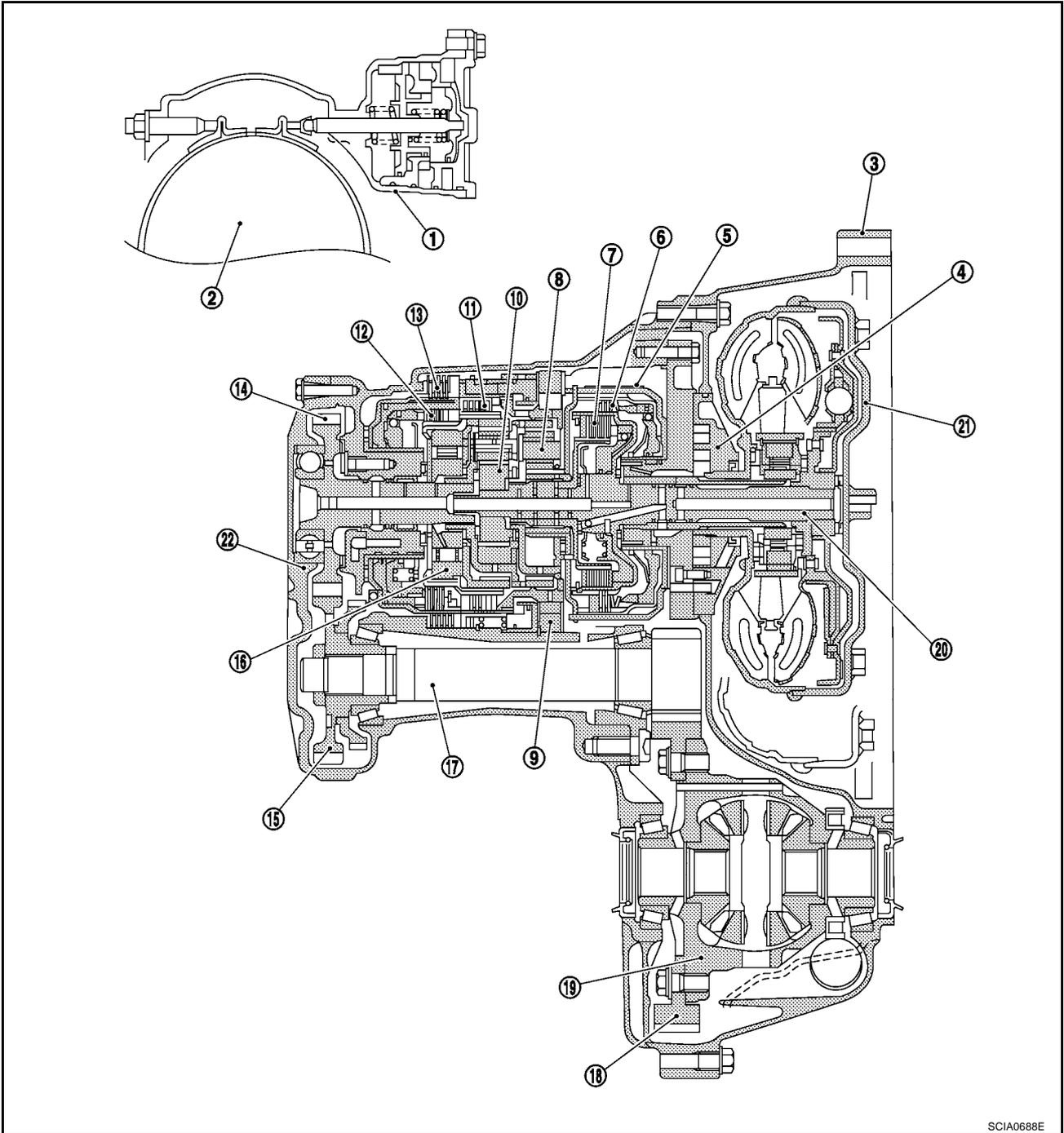


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OVERALL SYSTEM

Cross-Sectional View

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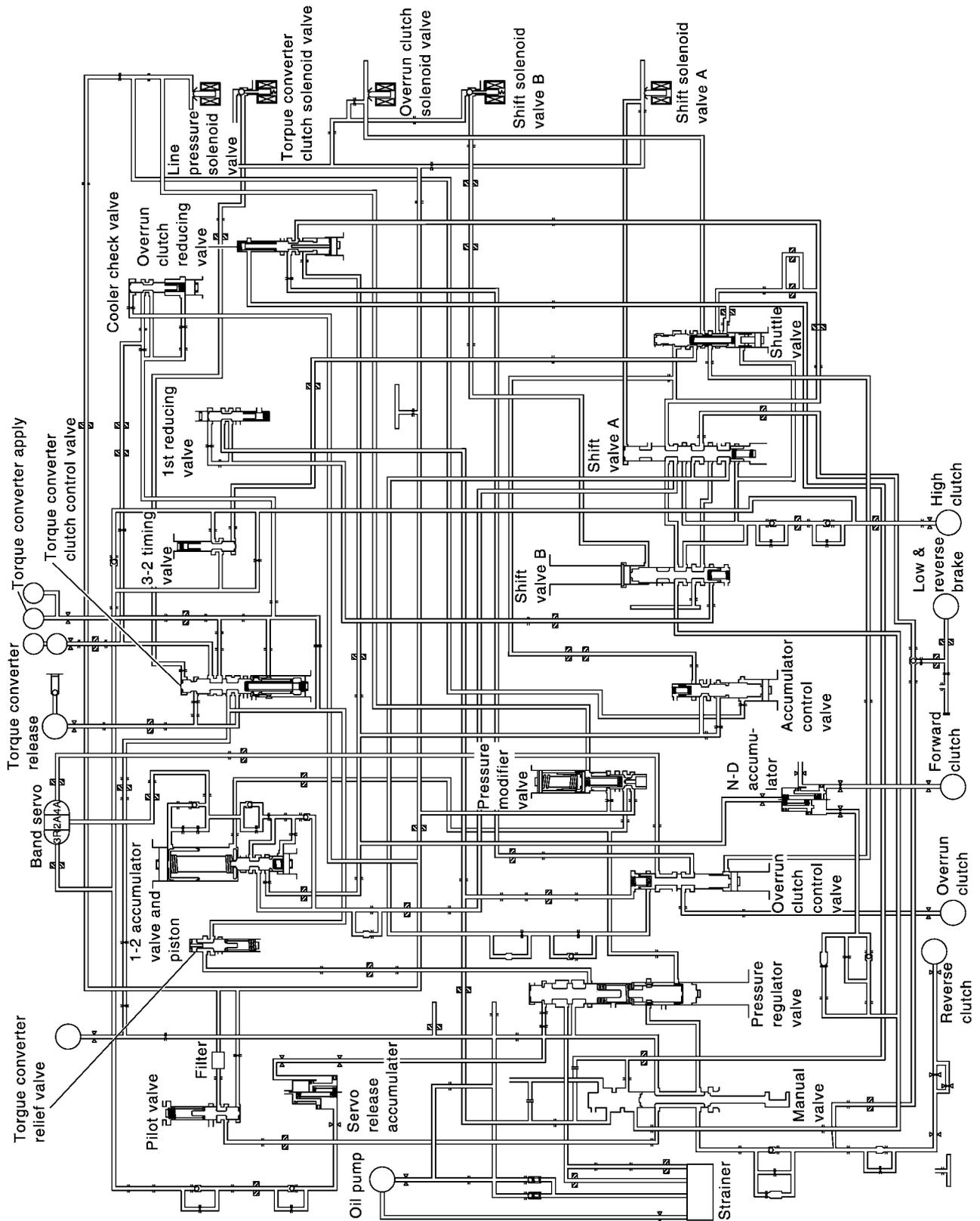
- | | | |
|-------------------------|----------------------------|---------------------------|
| 1. Band servo piston | 9. Low one-way clutch | 17. Pinion reduction gear |
| 2. Reverse clutch drum | 10. Rear planetary gear | 18. Final gear |
| 3. Converter housing | 11. Forward clutch | 19. Differential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

OVERALL SYSTEM

Hydraulic Control Circuit

ECS0040C

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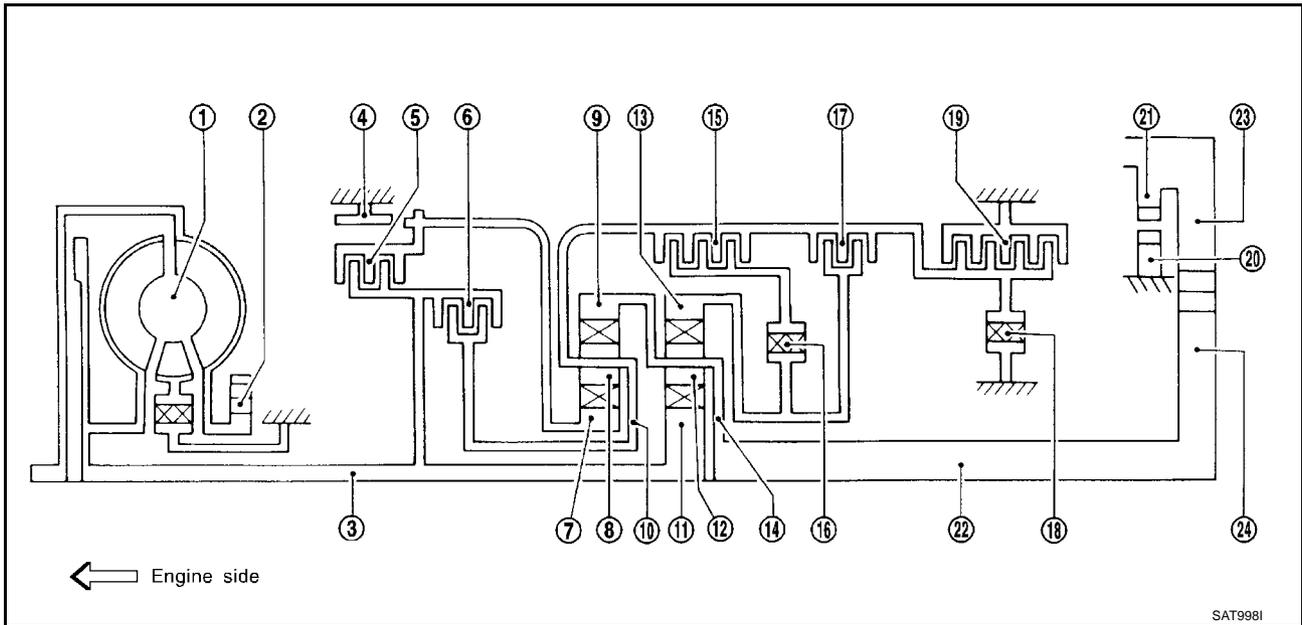


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OVERALL SYSTEM

ECS004QD

Shift Mechanism CONSTRUCTION



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

FUNCTION OF CLUTCH AND BRAKE

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

OVERALL SYSTEM

CLUTCH AND BAND CHART

Shift position	Reverse clutch 5	High clutch 6	Forward clutch 15	Over-run clutch 17	Band servo			Forward one-way clutch 16	Low one-way clutch 18	Low & reverse brake 19	Lock-up	Remarks
					2nd apply	3rd release	4th apply					
P												PARK POSITION
R	○									○		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			*1○	
	4th		○	C		*3C	C	○			○	
2	1st		○	○				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 in "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.

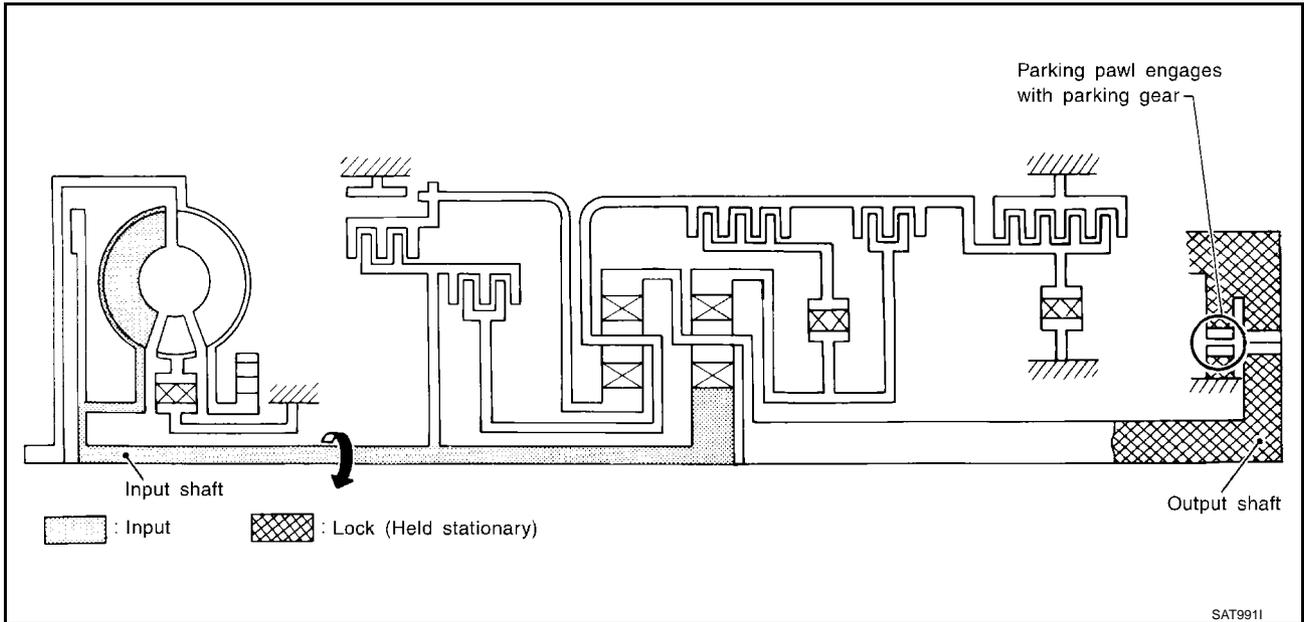
OVERALL SYSTEM

OVERALL SYSTEM

POWER TRANSMISSION

“N” and “P” Positions

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

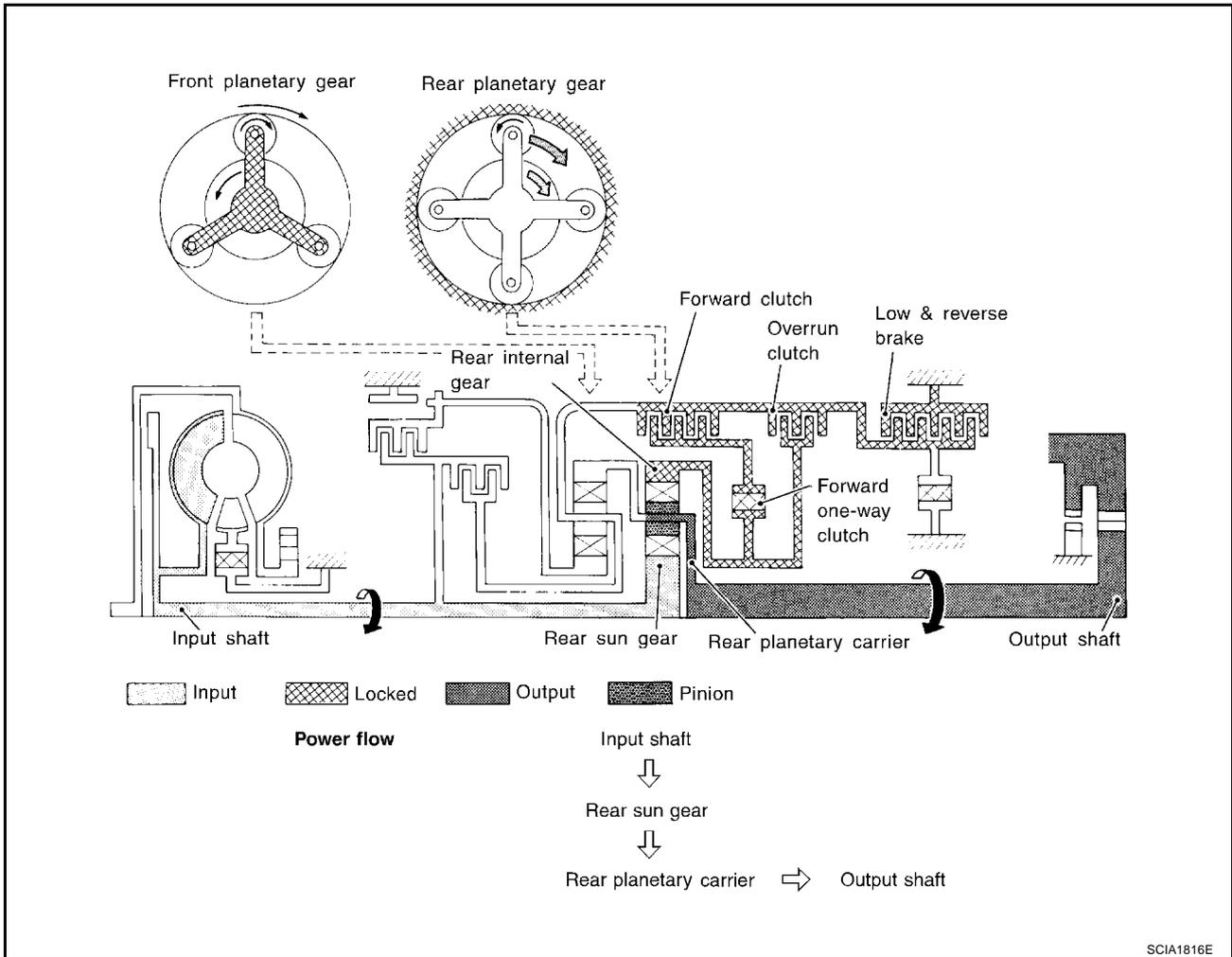


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OVERALL SYSTEM

"11" Position

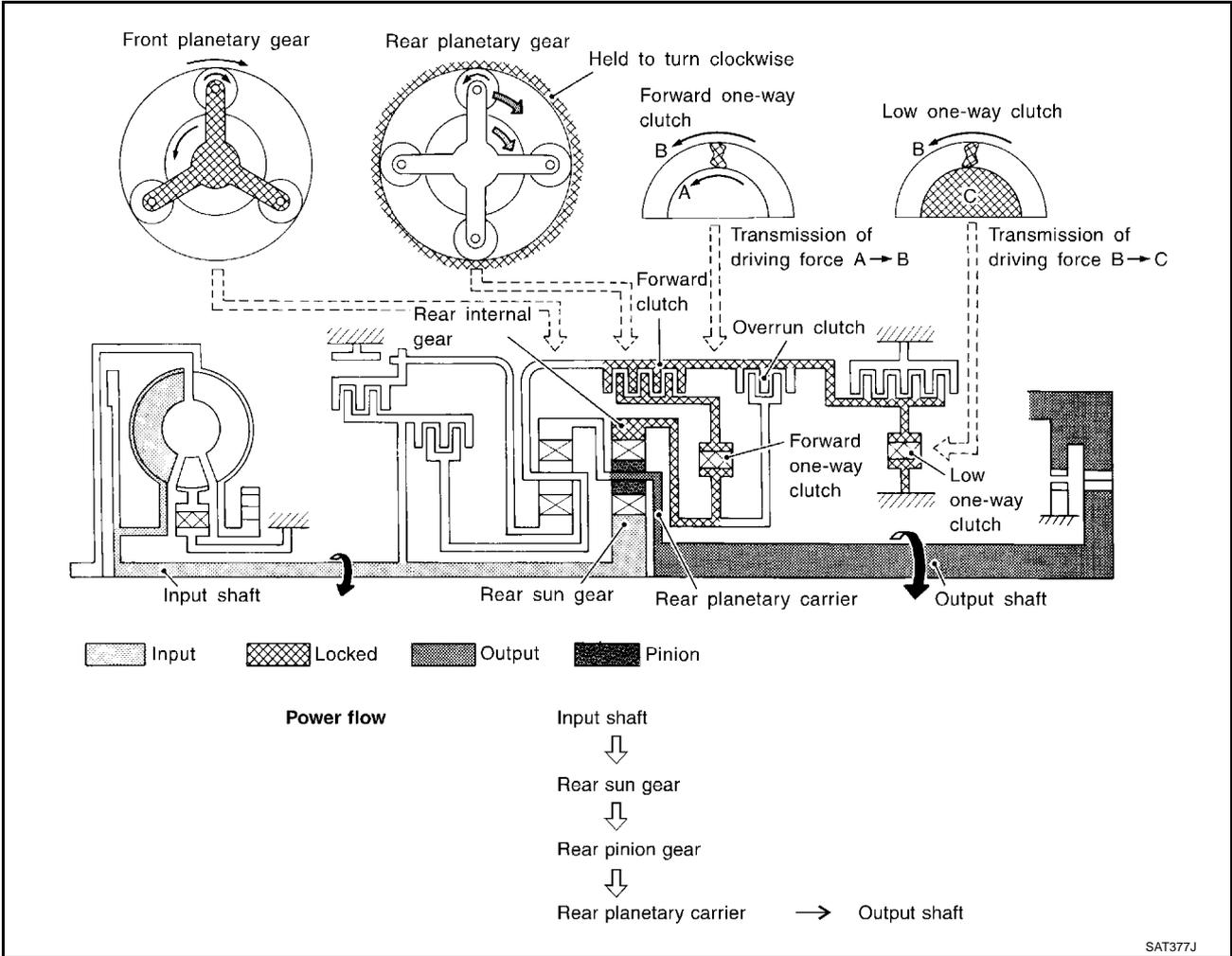
<ul style="list-style-type: none"> ● Forward clutch ● Forward one-way clutch ● Overrun clutch ● Low and reverse brake 	<p>As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake. This is different from that of D1 and 21 .</p>
<p>Engine brake</p>	<p>Overrun clutch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



OVERALL SYSTEM

“D1 ” and “21 ” Positions

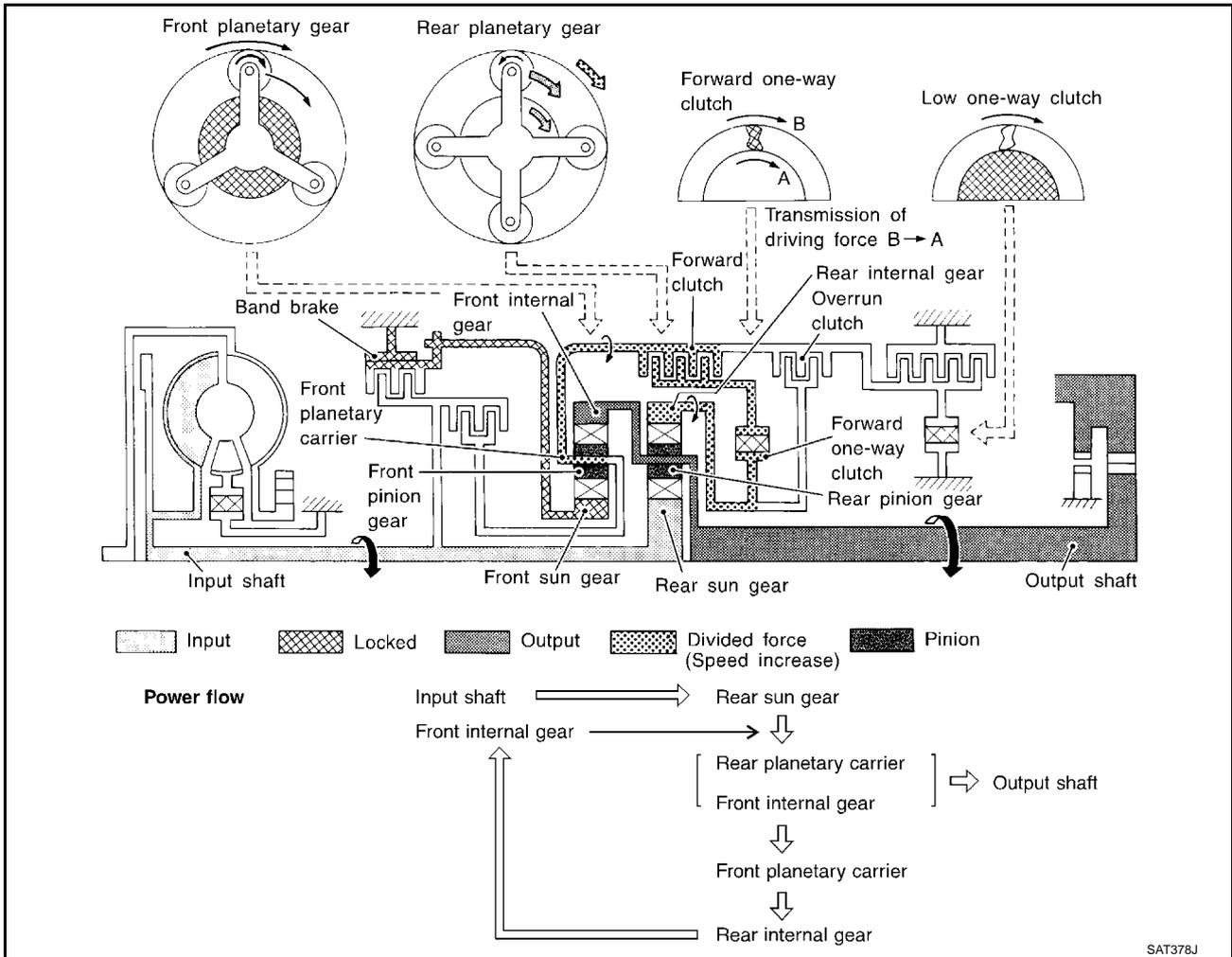
<ul style="list-style-type: none"> ● Forward one-way clutch ● Forward clutch ● Low one-way clutch 	Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches.
Overrun clutch engagement conditions (Engine brake)	D1 : Overdrive control switch “OFF” and throttle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



OVERALL SYSTEM

“D2”, “22” and “12” Positions

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

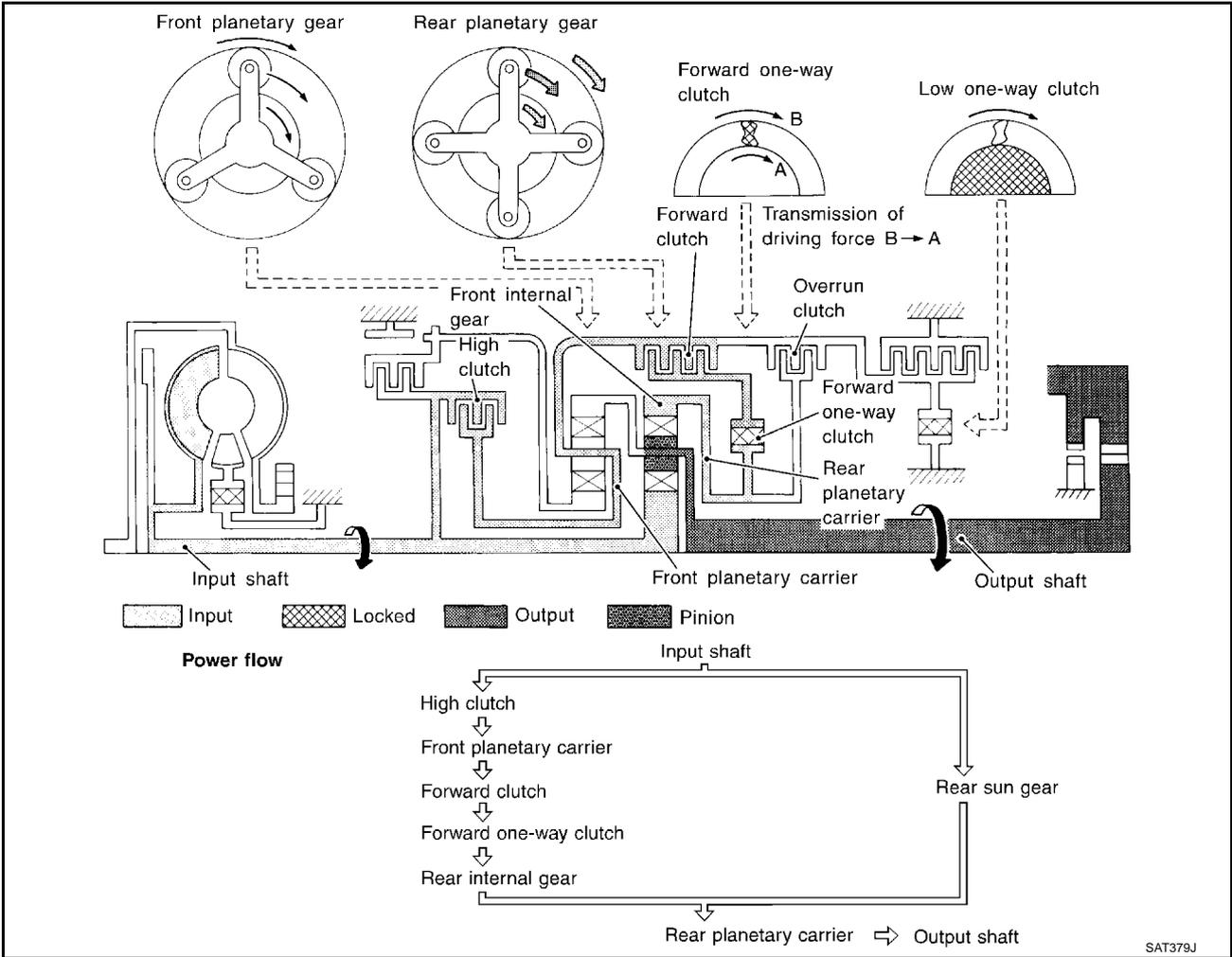


SAT378J

OVERALL SYSTEM

"D3" Position

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

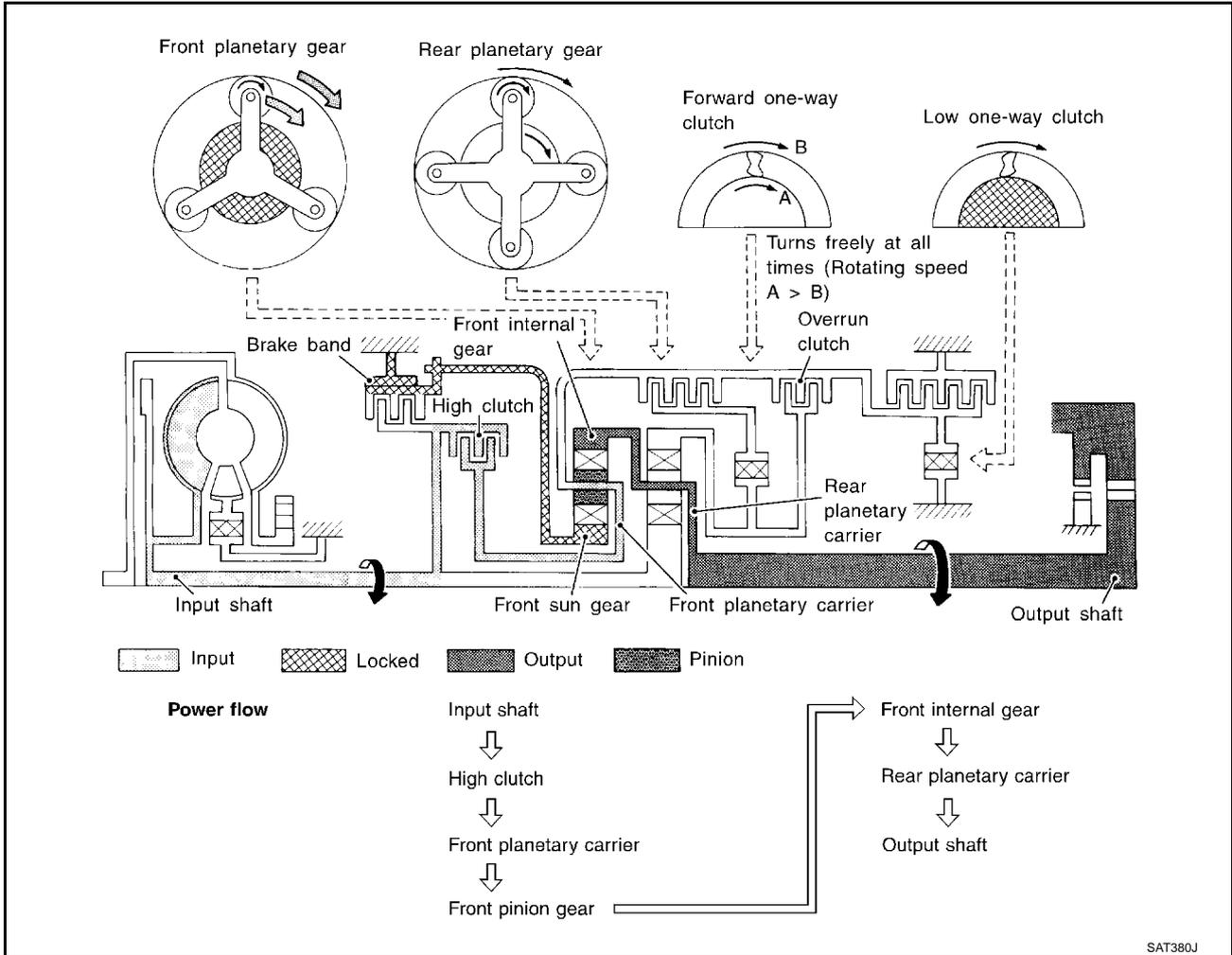


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OVERALL SYSTEM

“D4 ” (OD) Position

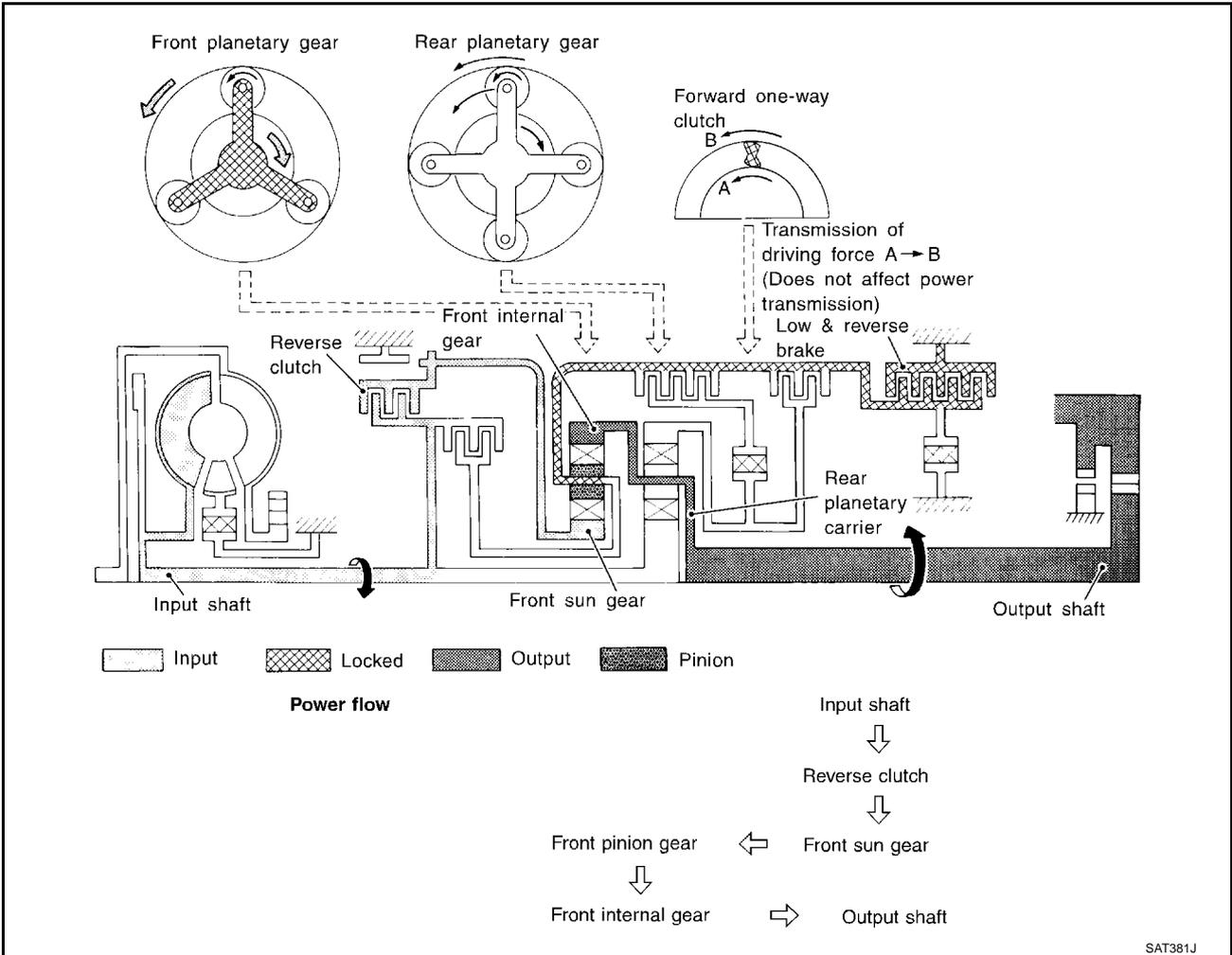
<ul style="list-style-type: none"> ● High clutch ● Brake band ● Forward clutch (Does not affect power transmission) 	<p>Input power is transmitted to front carrier through high clutch. This front carrier turns around the sun gear which is fixed by brake band and makes front internal gear (output) turn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



OVERALL SYSTEM

"R" Position

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



SAT381J

OVERALL SYSTEM

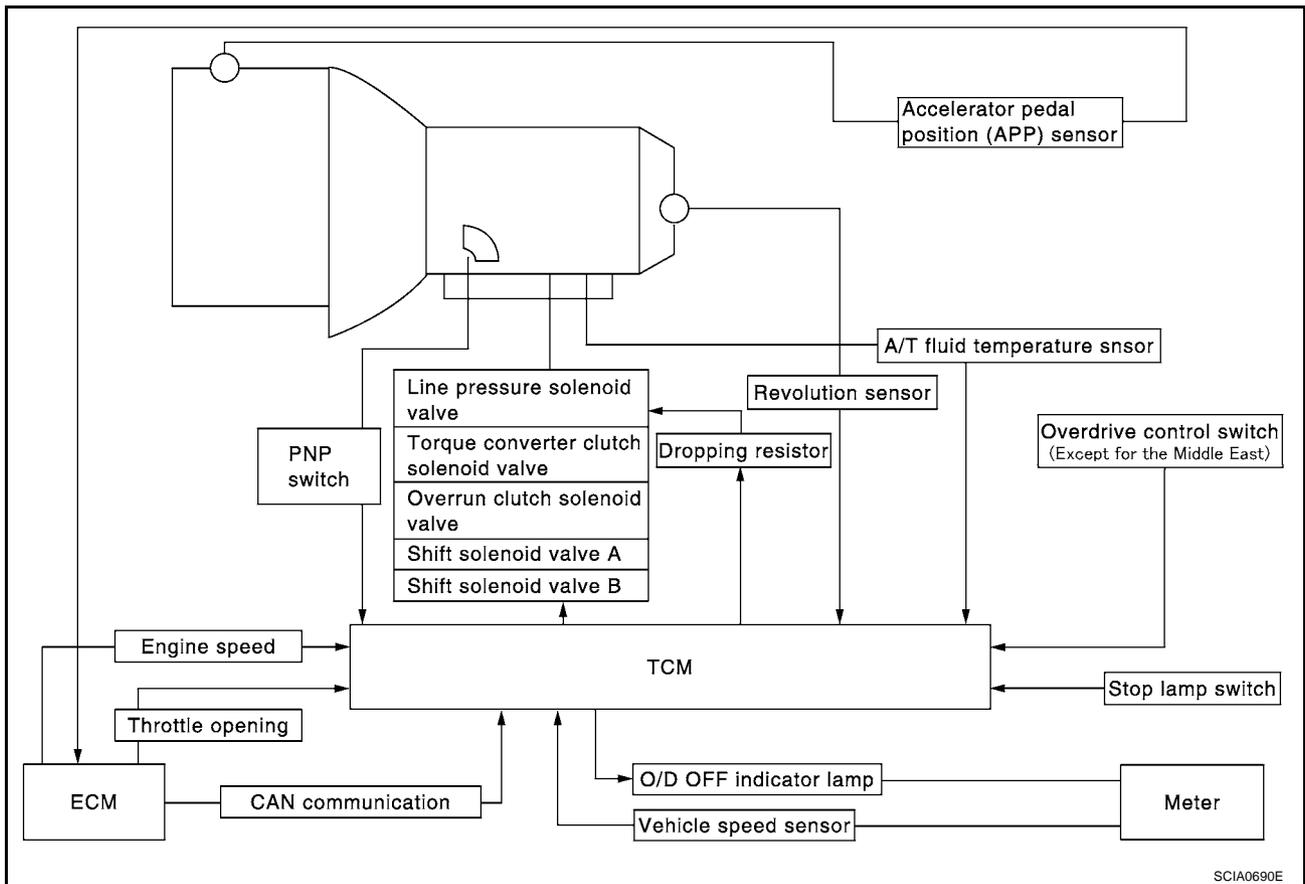
ECS004QE

Control System OUTLINE

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

SWITCHES & SENSORS	TCM	ACTUATORS
PNP switch Accelerator pedal position (APP) sensor Closed throttle position signal Wide open throttle position signal Engine speed signal A/T fluid temperature sensor Revolution sensor Vehicle speed sensor Overdrive control switch Stop lamp switch	Shift control Line pressure control Lock-up control Overrun clutch control Timing control Fail-safe control Self-diagnosis CONSULT-II communication line control	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



SCIA0690E

OVERALL SYSTEM

TCM FUNCTION

The function of the TCM is to:

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

INPUT/OUTPUT SIGNAL OF TCM

	Sensors, switches and solenoid valves	Function
Input	PNP switch	Detects select lever position and sends a signal to TCM.
	Accelerator pedal position (APP) sensor	Detects accelerator pedal position sensor as throttle position signal and sends a signal from ECM to TCM.
	Closed throttle position signal	Detects throttle valve's fully-closed position and sends a signal from ECM to TCM.
	Wide open throttle position signal	Detects a throttle valve position of greater than 1/2 of full throttle and sends a signal from ECM to TCM.
	Engine speed signal	From ECM.
	A/T fluid temperature sensor	Detects transmission fluid temperature and sends a signal to TCM.
	Revolution sensor	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.
Output	Stop lamp switch	Releases lock-up system when depressing pedal in lock-up condition.
	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

ECS0040F

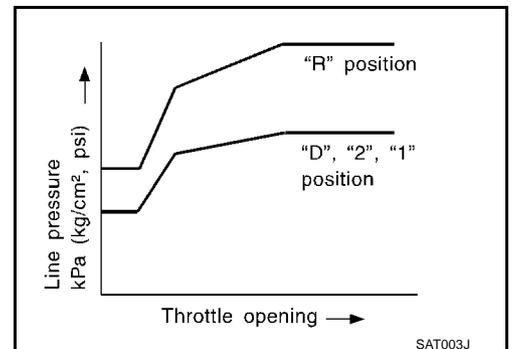
TCM has various line pressure control characteristics to match the driving conditions.

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

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

Normal Control

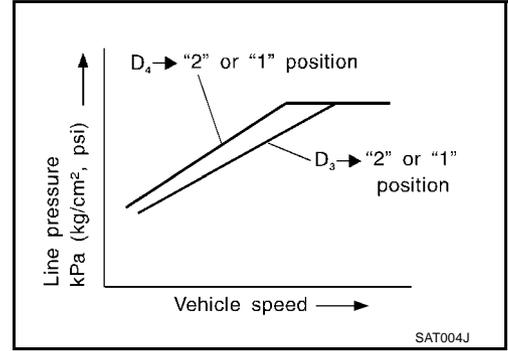
The line pressure to throttle opening characteristics is set for suitable clutch operation.



OVERALL SYSTEM

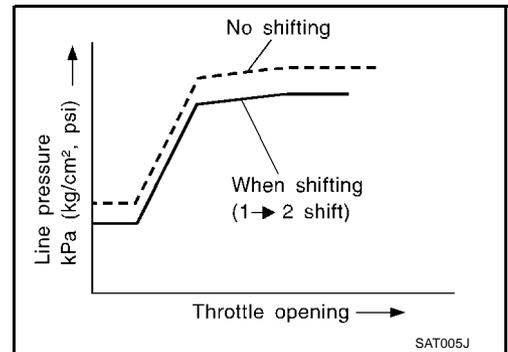
Back-up Control (Engine Brake)

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



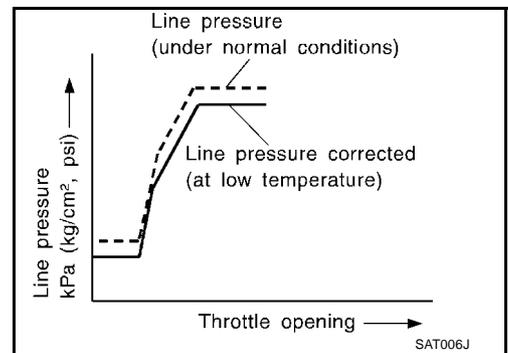
During Shift Change

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

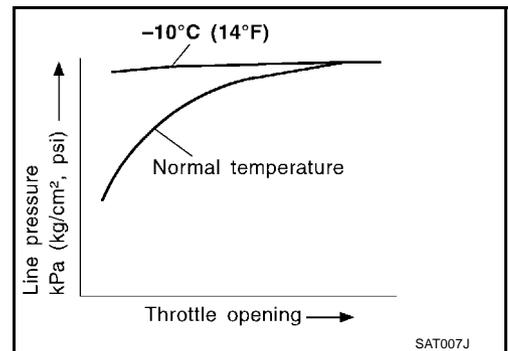


At Low Fluid Temperature

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



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



SHIFT CONTROL

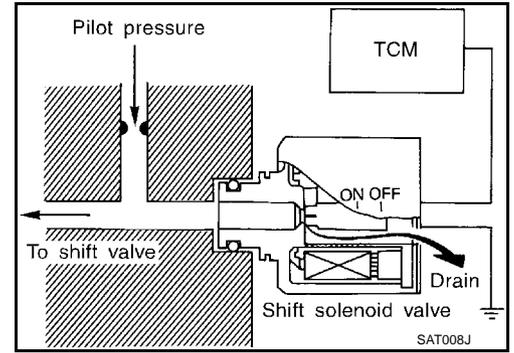
The shift is regulated entirely by electronic control to accommodate vehicle speed and varying engine operations. This is accomplished by electrical signals transmitted by the revolution sensor and throttle position sensor. This results in improved acceleration performance and fuel economy.

OVERALL SYSTEM

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.

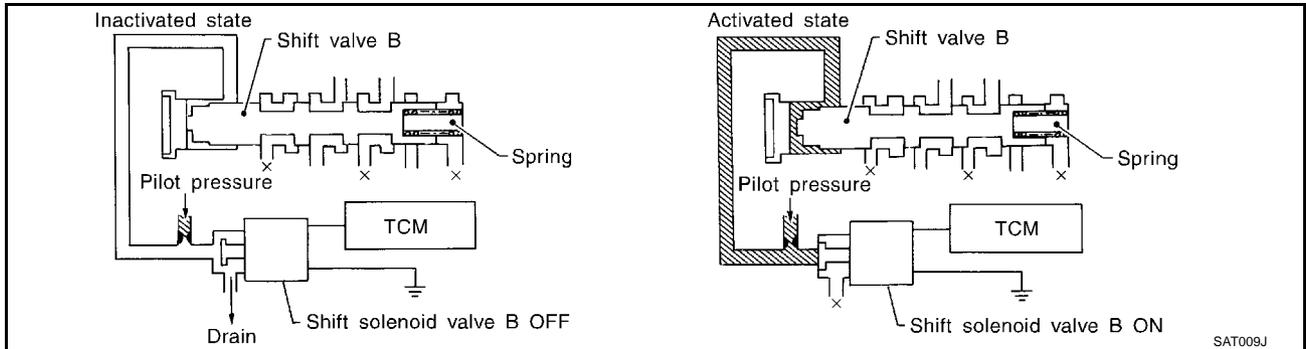
The shift solenoid valve performs simple ON-OFF operation. When set to "ON", the drain circuit closes and pilot pressure is applied to the shift valve.



Relation Between Shift Solenoid Valves A and B and Gear Positions

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

Control of Shift Valves A and B



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

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

LOCK-UP CONTROL

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

Conditions for Lock-Up Operation

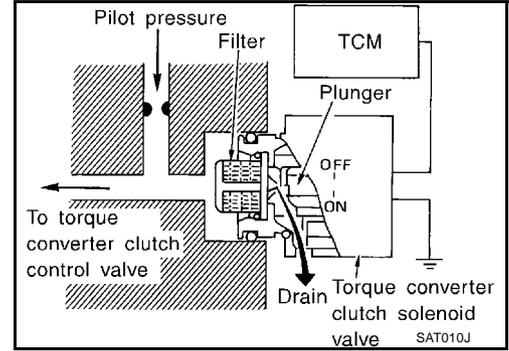
When vehicle is driven in 3rd and 4th gear position, vehicle speed and throttle opening are detected. If the detected values fall within the lock-up zone memorized in the TCM, lock-up is performed.

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

OVERALL SYSTEM

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



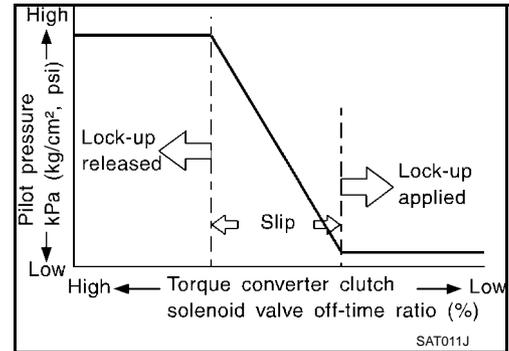
Amount of drain DECREASING



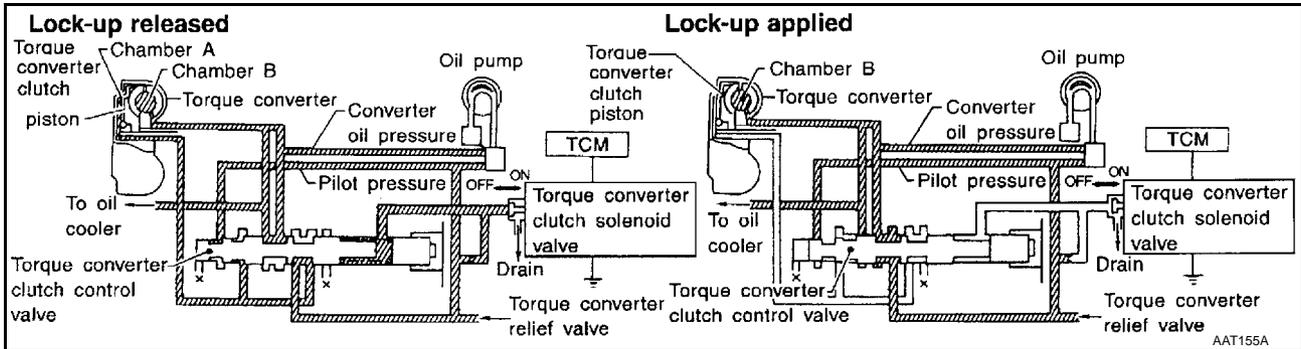
Pilot pressure HIGH



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)

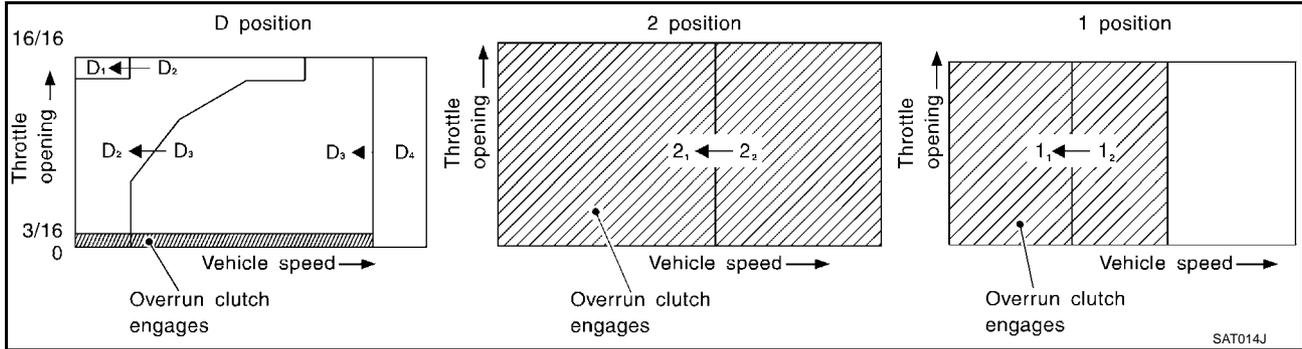
Forward one-way clutch is used to reduce shifting shocks in downshifting operations. This clutch transmits engine torque to the wheels. However, drive force from the wheels is not transmitted to the engine because the one-way clutch rotates idle. This means the engine brake is not effective.

The overrun clutch operates when the engine brake is needed.

OVERALL SYSTEM

Overrun Clutch Operating Conditions

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

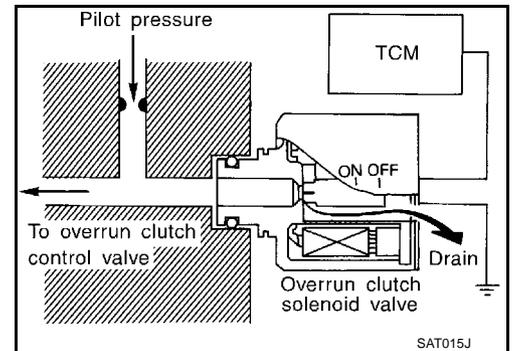


Overrun Clutch Solenoid Valve Control

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

When this solenoid valve is "ON", the pilot pressure drain port closes. When it is "OFF", the drain port opens.

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

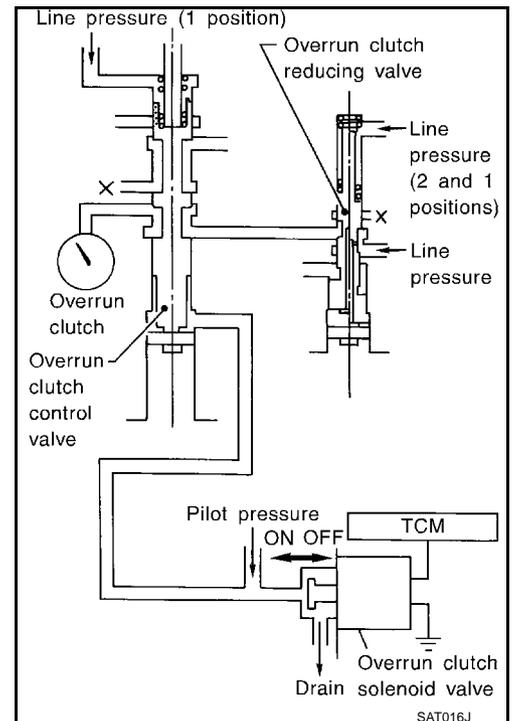


Overrun Clutch Control Valve Operation

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

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

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



OVERALL SYSTEM

Control Valve FUNCTION OF CONTROL VALVES

ECS004QG

Valve name	Function
Pressure regulator valve, plug and sleeve	Regulates oil discharged from the oil pump to provide optimum line pressure for all driving conditions.
Pressure modifier valve and sleeve	Used as a signal supplementary valve to the pressure regulator valve. Regulates pressure-modifier pressure (signal pressure) which controls optimum line pressure for all driving conditions.
Pilot valve	Regulates line pressure to maintain a constant pilot pressure level which controls lock-up mechanism, overrun clutch, shift timing.
Accumulator control valve	Regulates accumulator back-pressure to pressure suited to driving conditions.
Manual valve	Directs line pressure to oil circuits corresponding to select positions. Hydraulic pressure drains when the shift lever is in Neutral.
Shift valve A	Simultaneously switches four oil circuits using output pressure of shift solenoid valve A to meet driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve B.
Shift valve B	Simultaneously switches three oil circuits using output pressure of shift solenoid valve B in relation to driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve A.
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with application of the brake band in D4 . (Interlocking occurs if the overrun clutch engages during D4 .)
1st reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when down-shifting from the "1" position 12 to 11 .
Overrun clutch reducing valve	Reduces oil pressure directed to the overrun clutch and prevents engine-brake shock. In "1" and "2" positions, line pressure acts on the overrun clutch reducing valve to increase the pressure-regulating point, with resultant engine brake capability.
Torque converter relief valve	Prevents an excessive rise in torque converter pressure.
Torque converter clutch control valve, plug and sleeve	Activates or inactivates the lock-up function. Also provides smooth lock-up through transient application and release of the lock-up system.
1-2 accumulator valve and piston	Dampens the shock encountered when 2nd gear band servo contracts, and provides smooth shifting.
3-2 timing valve	Switches oil pressure with 3-2 timing valve according to throttle opening.
Shuttle control valve	Reduces shock when down-shifting from 3rd to 2nd and regulates overrun clutch.
Cooler check valve	Regulates oil pressure which causes lock-up when driving at low speeds.

TROUBLE DIAGNOSIS — INDEX

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

Check if the vehicle is a model with Euro-OBD system or not by the "Type approval number" on the identification plate. Refer to [GI-43, "IDENTIFICATION PLATE"](#) .

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

Items (CONSULT-II screen terms)	DTC	Reference page
	CONSULT-II GST*1	
A/T 1ST GR FNCTN	P0731	AT-131, "DTC P0731 A/T 1ST GEAR FUNCTION"
A/T 2ND GR FNCTN	P0732	AT-137, "DTC P0732 A/T 2ND GEAR FUNCTION"
A/T 3RD GR FNCTN	P0733	AT-143, "DTC P0733 A/T 3RD GEAR FUNCTION"
A/T 4TH GR FNCTN	P0734	AT-149, "DTC P0734 A/T 4TH GEAR FUNCTION"
ATF TEMP SEN/CIRC	P0710	AT-116, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"
CAN COMM CIRCUIT	U1000	AT-190, "DTC U1000 CAN COMMUNICATION LINE"
ENGINE SPEED SIG	P0725	AT-127, "DTC P0725 ENGINE SPEED SIGNAL"
L/PRESS SOL/CIRC	P0745	AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
O/R CLTCH SOL/CIRC	P1760	AT-185, "DTC P1760 OVER-RUN CLUTCH SOLENOID VALVE"
PNP SW/CIRC	P0705	AT-110, "DTC P0705 PARK/ NEUTRAL POSITION (PNP) SWITCH"
SFT SOL A/CIRC*2	P0750	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
SFT SOL B/CIRC*2	P0755	AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"
TCC SOLENOID/CIRC	P0740	AT-158, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
TP SEN/CIRC A/T*2	P1705	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
VEH SPD SEN/CIR AT*3	P0720	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)"

● *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

[EURO-OBD]

P NO. INDEX FOR DTC

Check if the vehicle is a model with Euro-OBD system or not by the “Type approval number” on the identification plate. Refer to [GI-43, "IDENTIFICATION PLATE"](#) .

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

DTC	Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*1		
P0705	PNP SW/CIRC	AT-110, "DTC P0705 PARK/ NEUTRAL POSITION (PNP) SWITCH"
P0710	ATF TEMP SEN/CIRC	AT-116, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"
P0720	VEH SPD SEN/CIR AT*3	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVO- LUTION SENSOR)"
P0725	ENGINE SPEED SIG	AT-127, "DTC P0725 ENGINE SPEED SIGNAL"
P0731	A/T 1ST GR FNCTN	AT-131, "DTC P0731 A/T 1ST GEAR FUNCTION"
P0732	A/T 2ND GR FNCTN	AT-137, "DTC P0732 A/T 2ND GEAR FUNCTION"
P0733	A/T 3RD GR FNCTN	AT-143, "DTC P0733 A/T 3RD GEAR FUNCTION"
P0734	A/T 4TH GR FNCTN	AT-149, "DTC P0734 A/T 4TH GEAR FUNCTION"
P0740	TCC SOLENOID/CIRC	AT-158, "DTC P0740 TORQUE CONVERTER CLUTCH SOLE- NOID VALVE"
P0745	L/PRESS SOL/CIRC	AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
P0750	SFT SOL A/CIRC*2	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
P0755	SFT SOL B/CIRC*2	AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"
P1705	TP SEN/CIRC A/T*2	AT-180, "DTC P1705 ACCEL- ERATOR PEDAL POSITION (APP) SENSOR"
P1760	O/R CLTCH SOL/CIRC	AT-185, "DTC P1760 OVER- RUN CLUTCH SOLENOID VALVE"
U1000	CAN COMM CIRCUIT	AT-190, "DTC U1000 CAN COMMUNICATION LINE"

- *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.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

PPF:00000

Introduction

ECS004QH

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

The first is the emission-related on board diagnostic system (EURO-OBD) performed by the TCM 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 EURO-OBD self-diagnostic items. For detail, refer to [AT-42. "SELF-DIAGNOSTIC RESULT TEST MODE"](#).

EURO-OBD Function for A/T System

ECS004QI

The ECM provides emission-related on board diagnostic (EURO-OBD) functions for the A/T system. One function is to receive a signal from the TCM used with EURO-OBD-related parts of the A/T system. The signal is sent to the ECM when a malfunction occurs in the corresponding EURO-OBD-related part. The other function is to indicate a diagnostic result by means of the 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 EURO-OBD

ECS004QJ

ONE TRIP DETECTION LOGIC

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

TWO TRIP DETECTION LOGIC

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

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

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

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

EURO-OBD Diagnostic Trouble Code (DTC)

ECS004QK

HOW TO READ DTC AND 1ST TRIP DTC

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

(With CONSULT-II or GST) CONSULT-II or GST (Generic Scan Tool) Examples: P0705, P0710, P0720, P0725, etc.

These DTCs are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

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

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EURO-OBD]

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

SELECT SYSTEM	
A/T	
ENGINE	

SAT014K

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

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

SAT015K

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

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-94, "CONSULT-II Function"](#) (QR25DE) or [EC-826, "CONSULT-II Function"](#) (QR20DE).

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

The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0306 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

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 EURO-OBD. For details, refer to [EC-45, "Emission-related Diagnostic Information"](#) (QR25DE) or [EC-778, "Emission-related Diagnostic Information"](#) (QR20DE).

- **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)**

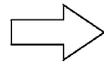
- **If a DTC is displayed for both ECM and TCM, it needs to be erased for both ECM and TCM.**
1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 5 seconds and then turn it "ON" (engine stopped) again.
 2. Turn CONSULT-II "ON" and touch "A/T".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

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

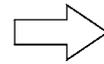
How to erase DTC (With CONSULT-II)

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 5 seconds and then turn it "ON" (engine stopped) again.

SELECT SYSTEM
A/T
ENGINE



SELECT DIAG MODE
SELF-DIAG RESULTS
DATA MONITOR
DTC WORK SUPPORT
TCM PART NUMBER

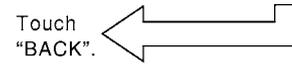
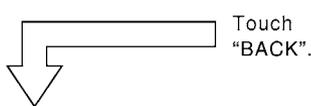


SELF-DIAG RESULTS
DTC RESULTS
T/C CLUTCH SOLV

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

3. Turn "SELF-DIAG RESULTS".

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



SELECT SYSTEM
A/T
ENGINE

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
ACTIVE TEST
DTC & SRT CONFIRMATION
ECM PART NUMBER

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

5. Touch "ENGINE".

6. Touch "SELF-DIAG RESULTS".

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

SAT017K

HOW TO ERASE DTC (WITH GST)

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 5 seconds and then turn it "ON" (engine stopped) again.
2. Perform "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)". Refer to [AT-51](#) . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with Generic Scan Tool (GST). For details, refer to [EC-104, "Generic Scan Tool \(GST\) Function"](#) (QR25DE) or [EC-836, "Generic Scan Tool \(GST\) Function"](#) (QR20DE).

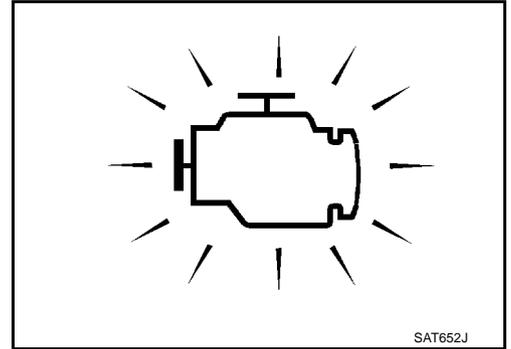
HOW TO ERASE DTC (NO TOOLS)

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-51](#) . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Perform "EURO-OBD SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)". Refer to [AT-50](#) .

Malfunction Indicator lamp (MIL)

ECS004QL

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 does not light up, refer to [DI-43, "Schematic"](#).
(Or see MIL & CONSULT-II in EC section. Refer to [EC-58, "Malfunction Indicator \(MI\)"](#) (QR25DE) or [EC-790, "Malfunction Indicator \(MI\)"](#) (QR20DE), [EC-94, "CONSULT-II Function"](#) (QR25DE) or [EC-826, "CONSULT-II Function"](#) (QR20DE).
2. When the engine is started, the malfunction indicator should go off.



SAT652J

If the lamp remains on, the on board diagnostic system has detected an emission-related (EURO-OBD) malfunction. For detail, refer to [EC-44, "ON BOARD DIAGNOSTIC \(OBD\) SYSTEM"](#) (QR25DE) or [EC-777, "ON BOARD DIAGNOSTIC \(OBD\) SYSTEM"](#) (QR20DE).

CONSULT-II

ECS004QM

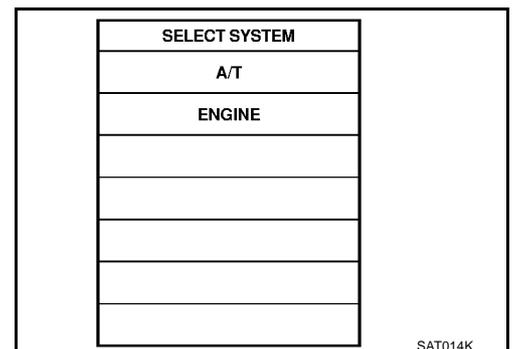
After performing "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" [AT-41](#), place check marks for results on the "DIAGNOSTIC WORKSHEET", [AT-57](#). Reference pages are provided following the items.

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 EURO-OBD detected items or touch "A/T" for TCM self-diagnosis.
If A/T is not displayed, check TCM power supply and ground circuit. Refer to [AT-106, "TCM Terminals and Reference Value"](#). If result is NG, refer to [PG-2, "POWER SUPPLY ROUTING"](#).

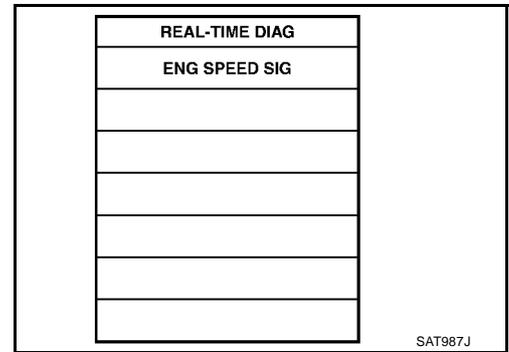


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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EURO-OBD]

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



SELF-DIAGNOSTIC RESULT TEST MODE

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when...	TCM self-diagnosis	EURO-OBD (DTC)
"A/T"	"ENGINE"		Available by O/D OFF indicator lamp	Available by malfunction indicator*2, "ENGINE" on CONSULT-II or GST
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED**)		● No failure has been detected.	X	X
Initial start INITIAL START		● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)	X	—
Park/neutral position (PNP) switch circuit — PNP SW/CIRC		● TCM does not receive the correct voltage signal (based on the gear position) from the switch.	—	P0705
Revolution sensor VHCL SPEED SEN-A/T VEH SPD SEN/CIR AT		● TCM does not receive the proper voltage signal from the sensor.	X	P0720
Vehicle speed sensor (Meter) VHCL SPEED SEN-MTR		● TCM does not receive the proper voltage signal from the sensor.	X	—
A/T 1st gear function A/T 1ST GR FNCTN A/T 1ST GR FNCTN		● A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	—	P0731*1
A/T 2nd gear function A/T 2ND GR FNCTN A/T 2ND GR FNCTN		● A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	—	P0732*1
A/T 3rd gear function A/T 3RD GR FNCTN A/T 3RD GR FNCTN		● A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	—	P0733*1
A/T 4th gear function A/T 4TH GR FNCTN A/T 4TH GR FNCTN		● A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	—	P0734*1
Shift solenoid valve A SHIFT SOLENOID/V A SFT SOL A/CIRC		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0750
Shift solenoid valve B SHIFT SOLENOID/V B SFT SOL B/CIRC		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0755

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EURO-OBD]

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when...	TCM self-diagnosis	EURO-OBD (DTC)
"A/T"	"ENGINE"		Available by O/D OFF indicator lamp	Available by malfunction indicator*2, "ENGINE" on CONSULT-II or GST
Overrun clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P1760
OVERRUN CLUTCH S/V	O/R CLUCH SOL/ CIRC			
T/C clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0740
T/C CLUTCH SOL/V	TCC SOLENOID/ CIRC			
Line pressure solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0745
LINE PRESSURE S/ V	L/PRESS SOL/CIRC			
Accelerator pedal position (APP) sensor		● TCM receives an excessively low or high voltage from the sensor.	X	P1705
THROTTLE POSI SEN	TP SEN/CIRC A/T			
Engine speed signal		● TCM does not receive the proper voltage signal from the ECM.	X	P0725
ENGINE SPEED SIG				
A/T fluid temperature sensor		● TCM receives an excessively low or high voltage from the sensor.	X	P0710
BATT/FLUID TEMP SEN	ATF TEMP SEN/ CIRC			
CAN communication		● When a malfunction is detected in CAN communication line	X	U1000
CAN COMM CIRCUIT	—			
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)	—			

X: Applicable

—: Not applicable

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

*2: Refer to [EC-58, "Malfunction Indicator \(MI\)"](#) (QR25DE) or [EC-790, "Malfunction Indicator \(MI\)"](#) (QR20DE).

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EURO-OBD]

DATA MONITOR MODE (A/T)

Item	Display	Mover to center Monitor items				Description	Remarks
		TCM Input signals	CAN comm signals	Main signals	Selection from menu		
Vehicle speed sensor 1 (A/T) (Revolution sensor)	VHCL/S SE-A/T [km/h] or [mph]	X	—	—	▼	<ul style="list-style-type: none"> Vehicle speed computed from signal of revolution sensor is displayed. 	When racing engine in N or P with vehicle stationary, CONSULT-II data may not indicate 0 km/h (0 mph).
Vehicle speed sensor 2 (Meter)	VHCL/S SE-MTR [km/h] or [mph]	X	—	—	▼	<ul style="list-style-type: none"> Vehicle speed computed from signal of vehicle speed sensor is displayed. 	Vehicle speed display may not be accurate under approx. 10 km/h (6 mph). It may not indicate 0 km/h (0 mph) when vehicle is stationary.
Accelerator pedal position sensor	THR TL POS SEN [V]	X	—	—	▼	<ul style="list-style-type: none"> Accelerator pedal position sensor signal voltage is displayed. 	
A/T fluid temperature sensor	FLUID TEMP SE [V]	X	—	—	▼	<ul style="list-style-type: none"> A/T fluid temperature sensor signal voltage is displayed. Signal voltage lowers as fluid temperature rises. 	
Battery voltage	BATTERY VOLT [V]	X	—	—	▼	<ul style="list-style-type: none"> Source voltage of TCM is displayed. 	
Engine speed	ENGINE SPEED [rpm]	X	—	X	▼	<ul style="list-style-type: none"> Engine speed, computed from engine speed signal, is displayed. 	Engine speed display may not be accurate under approx. 800 rpm. It may not indicate 0 rpm even when engine is not running.
Overdrive control switch	OVERDRIVE SW [ON/OFF]	X	—	—	▼	<ul style="list-style-type: none"> ON/OFF state computed from signal of overdrive control SW is displayed. 	
PN position (PNP) switch	PN POSI SW [ON/OFF]	X	—	—	▼	<ul style="list-style-type: none"> ON/OFF state computed from signal of PN position SW is displayed. 	
R position switch	R POSITION SW [ON/OFF]	X	—	—	▼	<ul style="list-style-type: none"> ON/OFF state computed from signal of R position SW is displayed. 	
D position switch	D POSITION SW [ON/OFF]	X	—	—	▼	<ul style="list-style-type: none"> ON/OFF state computed from signal of D position SW is displayed. 	
2 position switch	2 POSITION SW [ON/OFF]	X	—	—	▼	<ul style="list-style-type: none"> ON/OFF status, computed from signal of 2 position SW, is displayed. 	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EURO-OBD]

Item	Display	Mover to center Monitor items				Description	Remarks
		TCM Input signals	CAN comm signals	Main signals	Selection from menu		
1 position switch	1 POSITION SW [ON/OFF]	X	—	—	▼	● ON/OFF status, computed from signal of 1 position SW, is displayed.	
ASCD cruise signal	ASCD-CRUISE [ON/OFF]	X	—	—	▼	● Status of ASCD cruise signal is displayed. ON... Cruising state OFF... Normal running state	● This is displayed even when no ASCD is mounted.
ASCD OD cut signal	ASCD-OD CUT [ON/OFF]	X	—	—	▼	● Status of ASCD OD release signal is displayed. ON... OD released OFF... OD not released	● This is displayed even when no ASCD is mounted.
Kickdown switch	KICKDOWN SW [ON/OFF]	X	—	—	▼	● ON/OFF status, computed from signal of kick down SW, is displayed.	● This is displayed even when no kick down switch is equipped.
Closed throttle position signal	CLOSED THL/SW [ON/OFF]	X	—	—	▼	● ON/OFF status, computed from signal of closed throttle position signal, is displayed.	● This means closed throttle position signal input via CAN communication line.
Wide open throttle position signal	W/O THRL/P-SW [ON/OFF]	X	—	—	▼	● ON/OFF status, computed from signal of wide open throttle position signal, is displayed.	● This means wide open throttle position signal input via CAN communication line.
Gear position	GEAR	—	—	X	▼	● Gear position data used for computation by TCM, is displayed.	
Selector lever position	SLCT LVR POSI	—	—	X	▼	● Selector lever position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	—	—	X	▼	● Vehicle speed data, used for computation by TCM, is displayed.	
Torque converter slip ratio	TC SLIP RATIO [0.000]	—	—	—	▼	● Ratio of engine revolution to input shaft revolution of torque converter	
Torque converter slip speed	TC SLIP SPEED [rpm]	—	—	—	▼	Difference in revolution between input shaft revolution and input shaft revolution of torque converter	Display doesn't indicate 0 rpm even if engine is stopped. But this isn't malfunction.
CAN communication	CAN COMM [OK/NG]	—	X	—	▼		
CAN circuit 1	CAN CIRC 1 [OK/UNKWN]	—	X	—	▼		
CAN circuit 2	CAN CIRC 2 [OK/UNKWN]	—	X	—	▼		

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EURO-OBD]

Item	Display	Mover to center Monitor items				Description	Remarks
		TCM Input signals	CAN comm signals	Main signals	Selection from menu		
CAN circuit 3	CAN CIRC 3 [OK/UNKWN]	—	X	—	▼		
CAN circuit 4	CAN CIRC 4 [OK/UNKWN]	—	X	—	▼		
CAN circuit 5	CAN CIRC 5 [OK/UNKWN]	—	X	—	▼		
Throttle position	THROTTLE POSI [8]	—	—	X	▼	● Throttle position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Stop lamp switch	BRAKE SW [ON/OFF]	X	—	—	▼	● ON/OFF status is displayed. ON... Brake pedal is depressed. OFF... Brake pedal is released.	
Line pressure duty	LINE PRES DTY [%]	—	—	X	▼	● Control value of line pressure solenoid valve, computed by TCM from each input signal, is displayed.	
Torque converter clutch solenoid valve duty	TCC S/V DUTY [%]	—	—	X	▼	● Control value of torque converter clutch solenoid valve, computed by TCM from each input signal, is displayed.	
Shift solenoid valve A	SHIFT S/V A [ON/OFF]	—	—	X	▼	● Control value of shift solenoid valve A, computed by TCM from each input signal, is displayed.	Control value of solenoid is displayed even if solenoid circuit is disconnected. The OFF signal is displayed if solenoid circuit is shorted.
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	—	—	X	▼	● Control value of shift solenoid valve B, computed by TCM from each input signal, is displayed.	
Overrun clutch solenoid valve	OVERRUN/C S/V [ON/OFF]	—	—	X	▼	● Control value of overrun clutch solenoid valve computed by TCM from each input signal is displayed.	
Self-diagnosis display lamp (O/D OFF indicator lamp)	SELF-D DP LMP [ON/OFF]	—	—	X	▼	● Control status of O/D OFF indicator lamp is displayed.	
Voltage [V]		—	—	—	▼	Value measured by voltage probe is displayed.	
Frequency [Hz]		—	—	—	▼	Value measured by pulse probe is displayed. If measurement is impossible, “#” sign is displayed. “#” sign is also displayed at the final data value until the measurement result is obtained.	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EURO-OBD]

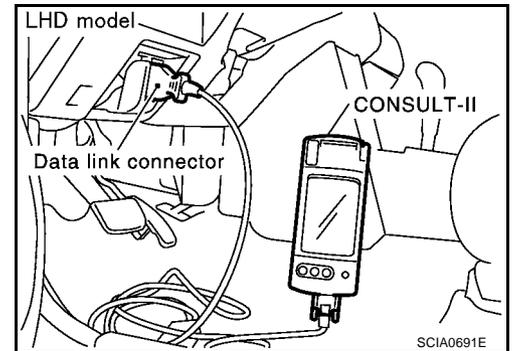
Item	Display	Mover to center Monitor items				Description	Remarks
		TCM Input signals	CAN comm signals	Main signals	Selection from menu		
DUTY-HI		—	—	—	▼	Duty cycle value for measurement probe is displayed.	
DUTY-LOW		—	—	—	▼		
PLS WIDTH-HI		—	—	—	▼	Measured pulse width of measurement probe is displayed.	
PLS WIDTH-LOW		—	—	—	▼		

X: Applicable —: Not applicable ▼: Option

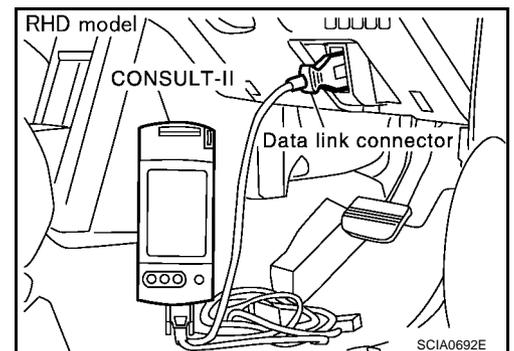
DTC WORK SUPPORT MODE WITH CONSULT-II

CONSULT-II Setting Procedure

1. Turn ignition switch "OFF".

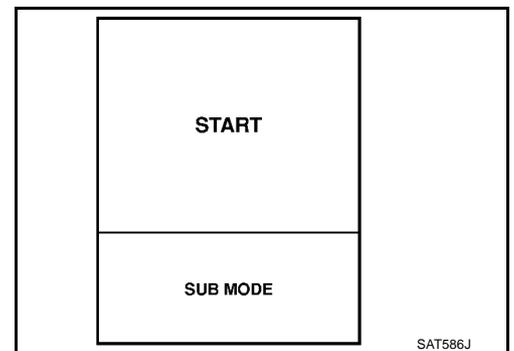


2. Connect CONSULT-II to data link connector which is located in left or right side lower dash panel.



3. Turn ignition switch "ON".

4. Touch "START".



ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EURO-OBD]

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

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

SAT591J

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

1ST GR FNCTN P0731	
STOP VEHICLE	

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1ST GR FNCTN P0731	
NG	

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- 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	

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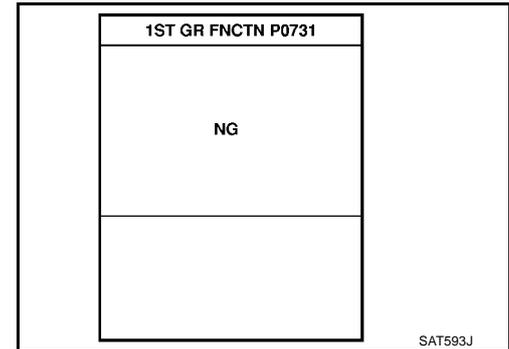
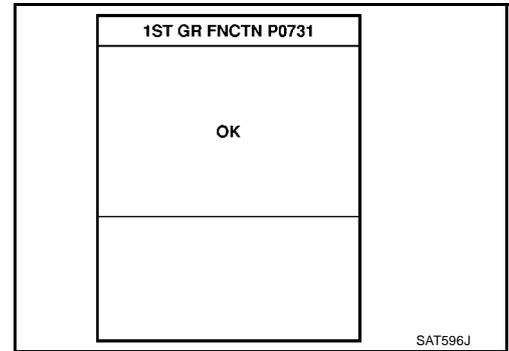
M

- Touch “YES” or “NO”.

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

SAT595J

13. CONSULT-II procedure ended.



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

DTC WORK SUPPORT MODE

DTC work support item	Description	Check items (Possible cause)
1ST GR FNCTN P0731	Following items for “A/T 1st gear function (P0731)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve A ● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
2ND GR FNCTN P0732	Following items for “A/T 2nd gear function (P0732)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
3RD GR FNCTN P0733	Following items for “A/T 3rd gear function (P0733)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve A ● Each clutch ● Hydraulic control circuit
4TH GR FNCTN P0734	Following items for “A/T 4th gear function (P0734)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve A ● Shift solenoid valve B ● Overrun clutch solenoid valve ● Line pressure solenoid valve ● Each clutch ● Hydraulic control circuit

Diagnostic Procedure Without CONSULT-II

EURO-OBD SELF-DIAGNOSTIC PROCEDURE (WITH GST)

ECS004QN

Refer to [EC-104, "Generic Scan Tool \(GST\) Function"](#) (QR25DE) or [EC-836, "Generic Scan Tool \(GST\) Function"](#) (QR20DE).

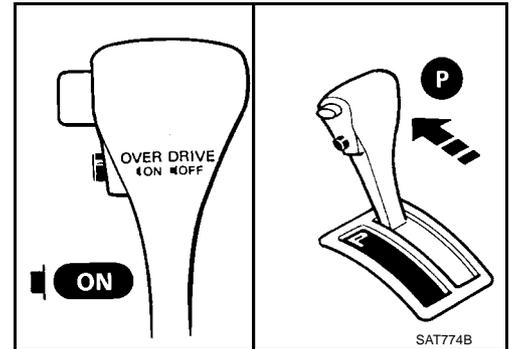
EURO-OBD SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

Refer to [EC-58, "Malfunction Indicator \(MI\)"](#) (QR25DE) or [EC-790, "Malfunction Indicator \(MI\)"](#) (QR20DE).

⊗ TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

1. CHECK O/D OFF INDICATOR LAMP

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

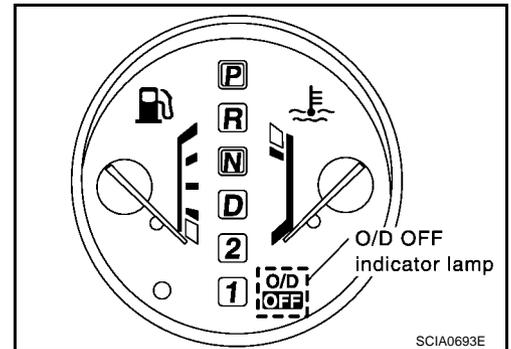


7. Does O/D OFF indicator lamp come on for about 2 seconds?

Yes or No

Yes >> GO TO 2.

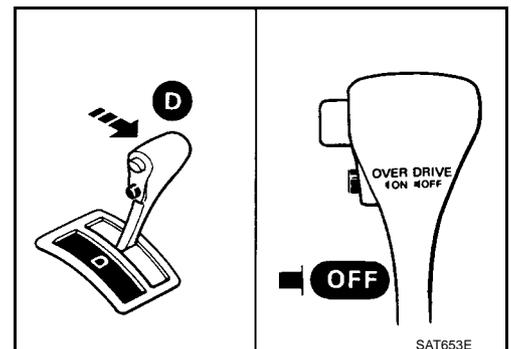
No >> Go to [AT-209, "O/D OFF Indicator Lamp Does Not Come On"](#).



2. JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch to "OFF" position.
 2. Turn ignition switch to "ACC" position.
 3. Move selector lever to "D" position.
 4. Set overdrive control switch to "OFF" position.
 5. Turn ignition switch to "ON" position. (Do not start engine.)
- Wait more than 2 seconds after turning ignition switch "ON".

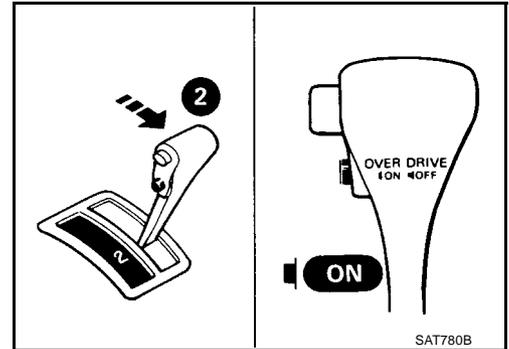
>> GO TO 3.



3. JUDGEMENT PROCEDURE STEP 2

1. Move selector lever to "2" position.
2. Set overdrive control switch to "ON" position.

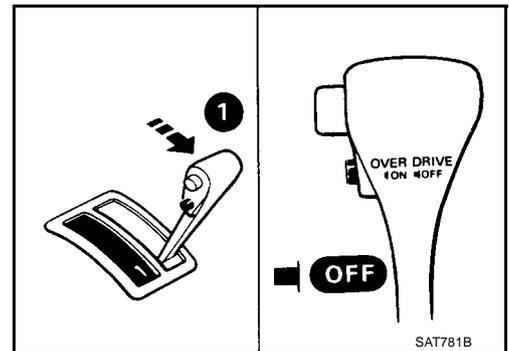
>> GO TO 4.



4. JUDGEMENT PROCEDURE STEP 3

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

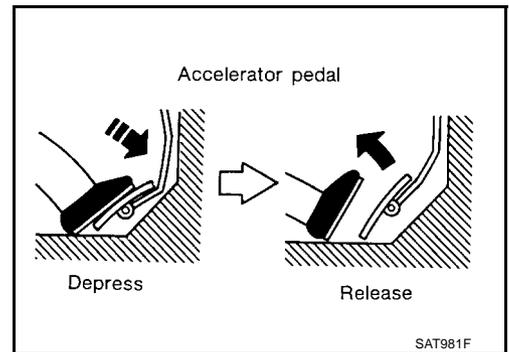
>> GO TO 5.



5. JUDGEMENT PROCEDURE STEP 4

1. Depress accelerator pedal fully and release it.

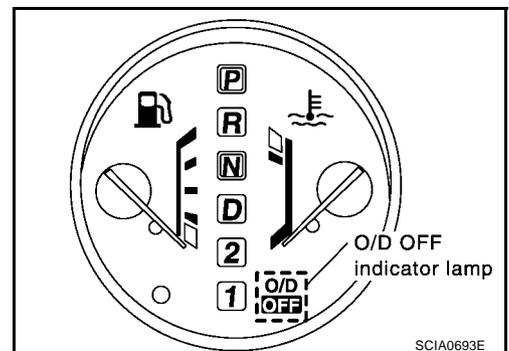
>> GO TO 6.



6. CHECK SELF-DIAGNOSIS CODE

Check O/D OFF indicator lamp. Refer to [AT-53. "JUDGEMENT OF SELF-DIAGNOSIS CODE"](#) .

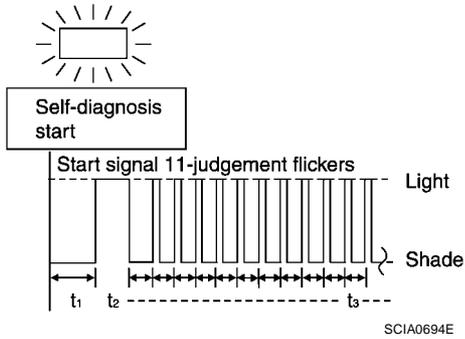
>> DIAGNOSIS END



JUDGEMENT OF SELF-DIAGNOSIS CODE

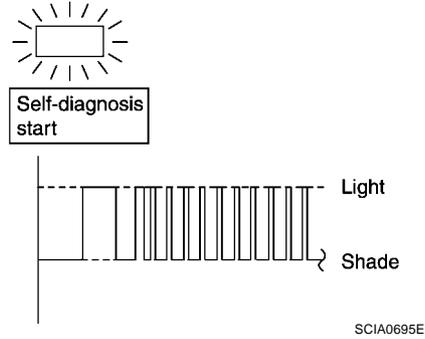
O/D OFF indicator lamp:

All judgement flickers are the same.



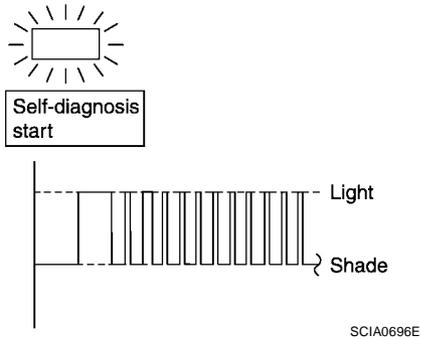
All circuits that can be confirmed by self-diagnosis are OK.

1st judgement flicker is longer than others.



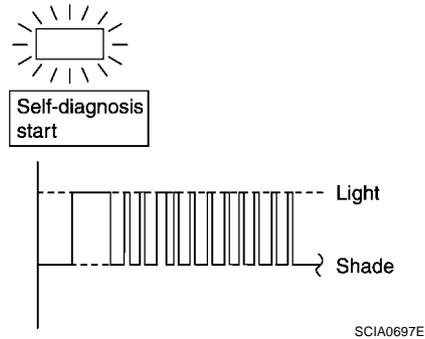
Revolution sensor circuit is short-circuited or disconnected.
 ⇒ **Go to DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR).**
 Refer to [AT-122](#)

2nd judgement flicker is longer than others.



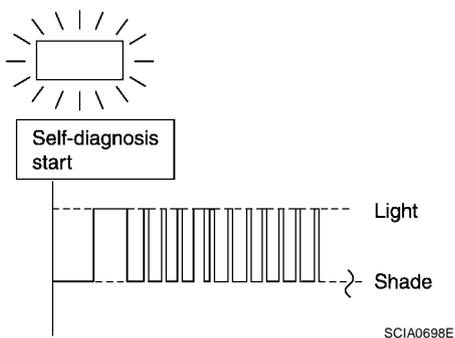
Vehicle speed sensor circuit is short-circuited or disconnected.
 ⇒ **Go to VEHICLE SPEED SENSOR-MTR.**
 Refer to [AT-199](#)

3rd judgement flicker is longer than others.



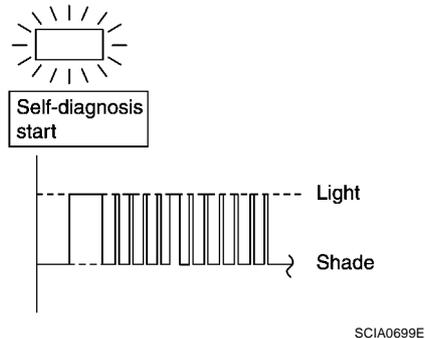
Accelerator pedal position (APP) sensor circuit is short-circuited or disconnected.
 ⇒ **Go to DTC P1705 ACCELEPATOR PEDAL POSITION (APP) SENSOR.**
 Refer to [AT-180](#)

4th judgement flicker is longer than others.



Shift solenoid valve A circuit is short-circuited or disconnected.
 ⇒ **Go to DTC P0750 SHIFT SOLENOID VALVE A.**
 Refer to [AT-170](#)

5th judgement flicker is longer than others.

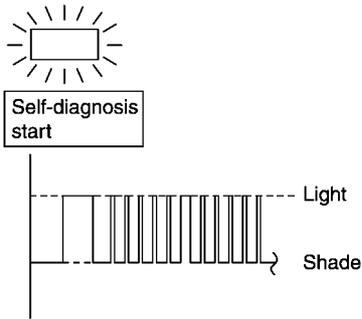


Shift solenoid valve B circuit is short-circuited or disconnected.
 ⇒ **Go to DTC P0755 SHIFT SOLENOID VALVE B.**
 Refer to [AT-175](#)

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O/D OFF indicator lamp:

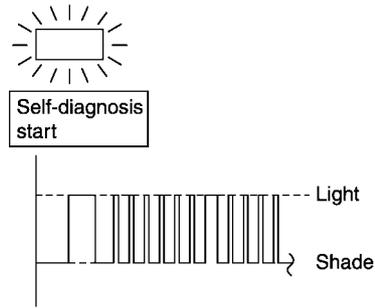
6th judgement flicker is longer than others.



SCIA0700E

Overrun clutch solenoid valve circuit is short-circuited or disconnected.
 ⇒ **Go to DTC P1760 OVERRUN CLUTCH SOLENOID VALVE.**
 Refer to [AT-185](#)

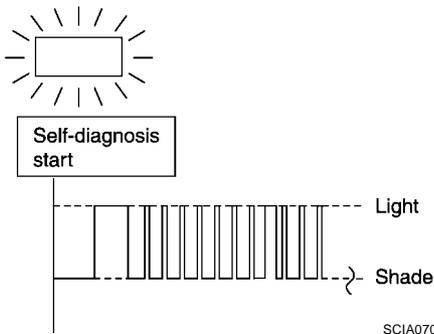
7th judgement flicker is longer than others.



SCIA0701E

Torque converter clutch solenoid valve circuit is short-circuited or disconnected.
 ⇒ **Go to DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE.**
 Refer to [AT-158](#)

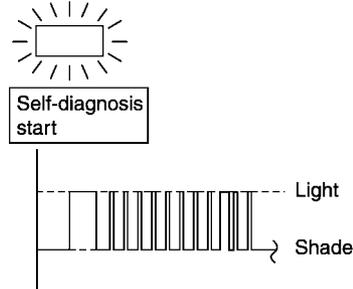
8th judgement flicker is longer than others.



SCIA0702E

A/T fluid temperature sensor is disconnected or TCM power source circuit is damaged.
 ⇒ **Go to DTC BATT/FLUID TEMP SEN A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE.**
 Refer to [AT-193](#)

9th judgement flicker is longer than others.



SCIA0703E

Engine speed signal circuit is short-circuited or disconnected.
 ⇒ **Go to DTC P0725 ENGINE SPEED SIGNAL.**
 Refer to [AT-127](#)

O/D OFF indicator lamp:

<p>10th judgement flicker is longer than others.</p> <div style="text-align: center;"> </div> <p style="text-align: right; font-size: small;">SCIA0704E</p> <p>Line pressure solenoid valve circuit is short-circuited or disconnected. ⇒ Go to DTC P0745 LINE PRESSURE SOLENOID VALVE. Refer to AT-163</p>	<p>11th judgement flicker is longer than others.</p> <div style="text-align: center;"> </div> <p style="text-align: right; font-size: small;">SCIA0705E</p> <p>CAN communication line is damaged. ⇒ Go to DTC U1000 CAN COMMUNICATION LINE. Refer to AT-190</p>
<p>Lamp comes off.</p> <div style="text-align: center;"> </div> <p style="text-align: right; font-size: small;">SCIA0706E</p> <p>PNP switch, overdrive control switch, closed throttle position signal or wide-open throttle position signal circuit is disconnected or TCM is damaged. (Because closed throttle position signal and wide-open throttle position signal are input via CAN communication line malfunction may continue after self-diagnosis.) ⇒ Go to TCM Self-diagnosis Does Not Activate Refer to AT-241</p>	<p>Flickers as shown below.</p> <div style="text-align: center;"> </div> <p style="text-align: right; font-size: small;">SAT804H</p> <p>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).</p>

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

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TROUBLE DIAGNOSIS — INTRODUCTION

PFP:00000

Introduction

ECS00400

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 EURO-OBD related parts of the A/T system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.

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

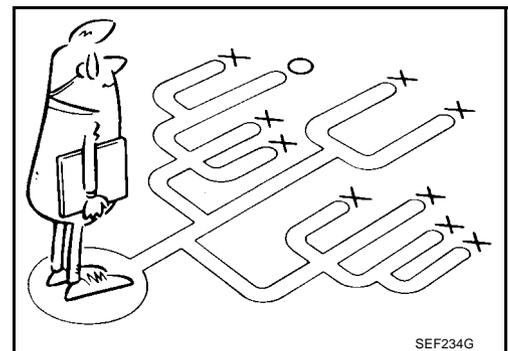
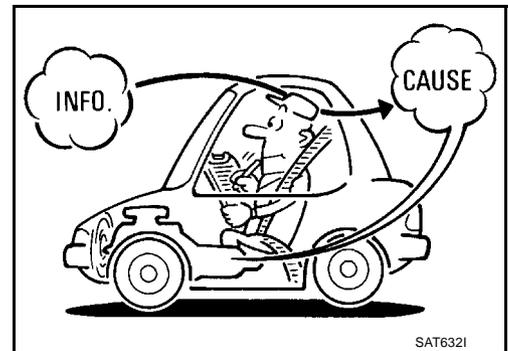
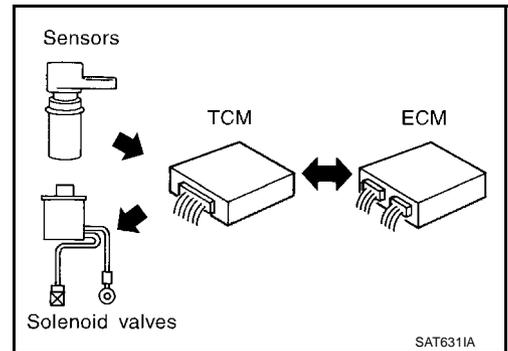
It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

A visual check only, may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow". Refer to [AT-60, "Work Flow"](#).

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drive ability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" like the example ([AT-57, "DIAGNOSTIC WORKSHEET"](#)) should be used.

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

Also check related Service bulletins for information.



Diagnostic Worksheet

1.	<input type="checkbox"/> Read the Fail-safe and listen to customer complaints.	AT-57. "Information from Customer"
2.	<input type="checkbox"/> CHECK A/T FLUID <div style="margin-left: 20px;"> <input type="checkbox"/> Leakage (Follow specified procedure) <input type="checkbox"/> Fluid condition <input type="checkbox"/> Fluid level </div>	AT-63. "A/T Fluid Check"
3.	<input type="checkbox"/> Perform STALL TEST and LINE PRESSURE TEST. <div style="margin-left: 20px;"> <input type="checkbox"/> Stall test — Mark possible damaged components/others. <div style="display: flex; justify-content: space-between; margin-left: 40px;"> <div style="width: 45%;"> <input type="checkbox"/> Torque converter one-way clutch <input type="checkbox"/> Reverse clutch <input type="checkbox"/> Forward clutch <input type="checkbox"/> Overrun clutch <input type="checkbox"/> Forward one-way clutch </div> <div style="width: 45%;"> <input type="checkbox"/> Low & reverse brake <input type="checkbox"/> Low one-way clutch <input type="checkbox"/> Engine <input type="checkbox"/> Line pressure is low <input type="checkbox"/> Clutches and brakes except high clutch and brake band are OK </div> </div> </div> <div style="margin-left: 20px; margin-top: 10px;"> <input type="checkbox"/> Line Pressure test — Suspected parts: </div>	AT-64. "Stall Test", AT-67. "Line Pressure Test"
4.	<input type="checkbox"/> Perform all ROAD TEST and mark required procedures.	AT-68. "Road Test"
4-1.	Check before engine is started. <input type="checkbox"/> O/D OFF Indicator Lamp Does Not Come On, AT-209. "O/D OFF Indicator Lamp Does Not Come On" . <input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE/DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE. — Mark detected items. <div style="margin-left: 20px;"> <input type="checkbox"/> PNP switch, AT-110. "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . <input type="checkbox"/> A/T fluid temperature sensor, AT-116. "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" . <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-122. "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)" . <input type="checkbox"/> Engine speed signal, AT-127. "DTC P0725 ENGINE SPEED SIGNAL" . <input type="checkbox"/> Torque converter clutch solenoid valve, AT-158. "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" . <input type="checkbox"/> Line pressure solenoid valve, AT-163. "DTC P0745 LINE PRESSURE SOLENOID VALVE" . <input type="checkbox"/> Shift solenoid valve A, AT-170. "DTC P0750 SHIFT SOLENOID VALVE A" . <input type="checkbox"/> Shift solenoid valve B, AT-175. "DTC P0755 SHIFT SOLENOID VALVE B" . <input type="checkbox"/> Accelerator pedal position (App) sensor, AT-180. "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" . <input type="checkbox"/> Overrun clutch solenoid valve, AT-185. "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" . <input type="checkbox"/> PNP & overdrive control switches, and throttle position sensor, AT-241. "TCM Self-diagnosis Does Not Activate" . <input type="checkbox"/> Batt/fluid temp sen (A/T fluid temperature sensor and TCM power source), AT-193. "DTC BATT/ FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" . <input type="checkbox"/> Vehicle speed sensor-MTR, AT-199. "DTC VEHICLE SPEED SENSOR MTR" . <input type="checkbox"/> CAN communication line, AT-190. "DTC U1000 CAN COMMUNICATION LINE" . <input type="checkbox"/> Control unit (RAM), control unit (ROM), AT-203. "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . <input type="checkbox"/> Control unit (EEP ROM), AT-205. "DTC CONTROL UNIT(EEPROM)" . <input type="checkbox"/> Battery <input type="checkbox"/> Others </div>	AT-70. "1. CHECK BEFORE ENGINE IS STARTED"
4-2.	Check at idle <input type="checkbox"/> Engine Cannot Be Started In "P" And "N" Position, AT-211. "Engine Cannot Be Started In "P" and "N" Position" . <input type="checkbox"/> In "P" Position, Vehicle Moves Forward Or Backward When Pushed, AT-212. "In "P" Position, Vehicle Moves Forward Or Backward When Pushed" . <input type="checkbox"/> In "N" Position, Vehicle Moves, AT-213. "In "N" Position, Vehicle Moves" . <input type="checkbox"/> Large Shock. "N" → "R" Position, AT-214. "Large Shock. "N" → "R" Position" . <input type="checkbox"/> Vehicle Does Not Creep Backward In "R" Position, AT-215. "Vehicle Does Not Creep Backward In "R" Position" . <input type="checkbox"/> Vehicle Does Not Creep Forward In "D", "2" Or "1" Position, AT-218. "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position" .	AT-71. "2. CHECK AT IDLE"

4.	4-3.	<p>Cruise test</p> <p>Part-1</p> <ul style="list-style-type: none"> <input type="checkbox"/> Vehicle Cannot Be Started From D1 , AT-220, "Vehicle Cannot Be Started From D1" . <input type="checkbox"/> A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , AT-223, "A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2" . <input type="checkbox"/> A/T Does Not Shift: D2 → D3 , AT-225, "A/T Does Not Shift: D2 → D3" . <input type="checkbox"/> A/T Does Not Shift: D3 → D4 , AT-227, "A/T Does Not Shift: D3 → D4" . <input type="checkbox"/> A/T Does Not Perform Lock-up, AT-229, "A/T Does Not Perform Lock-up" . <input type="checkbox"/> A/T Does Not Hold Lock-up Condition, AT-230, "A/T Does Not Hold Lock-up Condition" . <input type="checkbox"/> Lock-up Is Not Released, AT-232, "Lock-up Is Not Released" . <input type="checkbox"/> Engine Speed Does Not Return To Idle (Light Braking D4 → D3) , AT-233, "Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" . <p>Part-2</p> <ul style="list-style-type: none"> <input type="checkbox"/> Vehicle Does Not Start From D1 , AT-234, "Vehicle Does Not Start From D1" . <input type="checkbox"/> A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , AT-223, "A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2" . <input type="checkbox"/> A/T Does Not Shift: D2 → D3 , AT-225, "A/T Does Not Shift: D2 → D3" . <input type="checkbox"/> A/T Does Not Shift: D3 → D4 , AT-227, "A/T Does Not Shift: D3 → D4" . <p>Part-3</p> <ul style="list-style-type: none"> <input type="checkbox"/> A/T Does Not Shift: D4 → D3 When Overdrive Control Switch "ON" → "OFF" , AT-236, "A/T Does Not Shift: D4 → D3 , When Overdrive Control Switch "ON" → "OFF" . <input type="checkbox"/> Engine Speed Does Not Return To Idle (Engine Brake In D3) , AT-233, "Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" . <input type="checkbox"/> A/T Does Not Shift: D3 → 22 , When Selector Lever "D" → "2" Position, AT-237, "A/T Does Not Shift: D3 → 22 , When Selector Lever "D" → "2" Position" . <input type="checkbox"/> Engine Speed Does Not Return To Idle (Engine Brake In 22) , AT-233, "Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" . <input type="checkbox"/> A/T Does Not Shift: 22 → 11 , When Selector Lever "2" → "1" Position, AT-238, "A/T Does Not Shift: 22 → 11 , When Selector Lever "2" → "1" Position" . <input type="checkbox"/> Vehicle Does Not Decelerate By Engine Brake, AT-240, "Vehicle Does Not Decelerate By Engine Brake" . <input type="checkbox"/> TCM Self-diagnosis Does Not Activate (PNP & Overdrive control switches, and throttle position sensor circuit checks), AT-241, "TCM Self-diagnosis Does Not Activate" . <input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE/DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE — Mark detected items. 	<p>AT-74, "3. CRUISE TEST" AT-78, "Cruise Test — Part 1"</p> <p>AT-81, "Cruise Test — Part 2"</p> <p>AT-83, "Cruise Test — Part 3"</p>
		<ul style="list-style-type: none"> <input type="checkbox"/> PNP switch, AT-110, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . <input type="checkbox"/> A/T fluid temperature sensor, AT-116, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" . <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)" . <input type="checkbox"/> Engine speed signal, AT-127, "DTC P0725 ENGINE SPEED SIGNAL" . <input type="checkbox"/> Torque converter clutch solenoid valve, AT-158, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" . <input type="checkbox"/> Line pressure solenoid valve, AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE" . <input type="checkbox"/> Shift solenoid valve A, AT-170, "DTC P0750 SHIFT SOLENOID VALVE A" . <input type="checkbox"/> Shift solenoid valve B, AT-175, "DTC P0755 SHIFT SOLENOID VALVE B" . <input type="checkbox"/> Accelerator pedal position (App) sensor, AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" . <input type="checkbox"/> Overrun clutch solenoid valve, AT-185, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" . <input type="checkbox"/> PNP & overdrive control switches, and throttle position sensor, AT-241, "TCM Self-diagnosis Does Not Activate" . <input type="checkbox"/> A/T fluid temperature sensor and TCM power source, AT-193, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" . <input type="checkbox"/> Vehicle speed sensor-MTR, AT-199, "DTC VEHICLE SPEED SENSOR MTR" . <input type="checkbox"/> CAN communication line, AT-190, "DTC U1000 CAN COMMUNICATION LINE" . <input type="checkbox"/> Control unit (RAM), control unit (ROM), AT-203, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . <input type="checkbox"/> Control unit (EEP ROM), AT-205, "DTC CONTROL UNIT(EEPROM)" . <input type="checkbox"/> Battery <input type="checkbox"/> Others 	

TROUBLE DIAGNOSIS — INTRODUCTION

[EURO-OBD]

5.	<input type="checkbox"/> For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.	AT-50. "Diagnostic Procedure Without CONSULT-II"
6.	<input type="checkbox"/> Perform all ROAD TEST and re-mark required procedures.	AT-68. "Road Test"
7.	<input type="checkbox"/> Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items. Refer to "EC-XX", "Emission-related Diagnostic Information".	EC section
	<input type="checkbox"/> DTC (P0731) A/T 1st gear function, AT-131. "DTC P0731 A/T 1ST GEAR FUNCTION" . <input type="checkbox"/> DTC (P0732) A/T 2nd gear function, AT-137. "DTC P0732 A/T 2ND GEAR FUNCTION" . <input type="checkbox"/> DTC (P0733) A/T 3rd gear function, AT-143. "DTC P0733 A/T 3RD GEAR FUNCTION" . <input type="checkbox"/> DTC (P0734) A/T 4th gear function, AT-149. "DTC P0734 A/T 4TH GEAR FUNCTION" .	
8.	<input type="checkbox"/> Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.)	AT-86. "Symptom Chart"
9.	<input type="checkbox"/> Erase DTC from TCM and ECM memories.	AT-39. "HOW TO ERASE DTC"

Work Flow

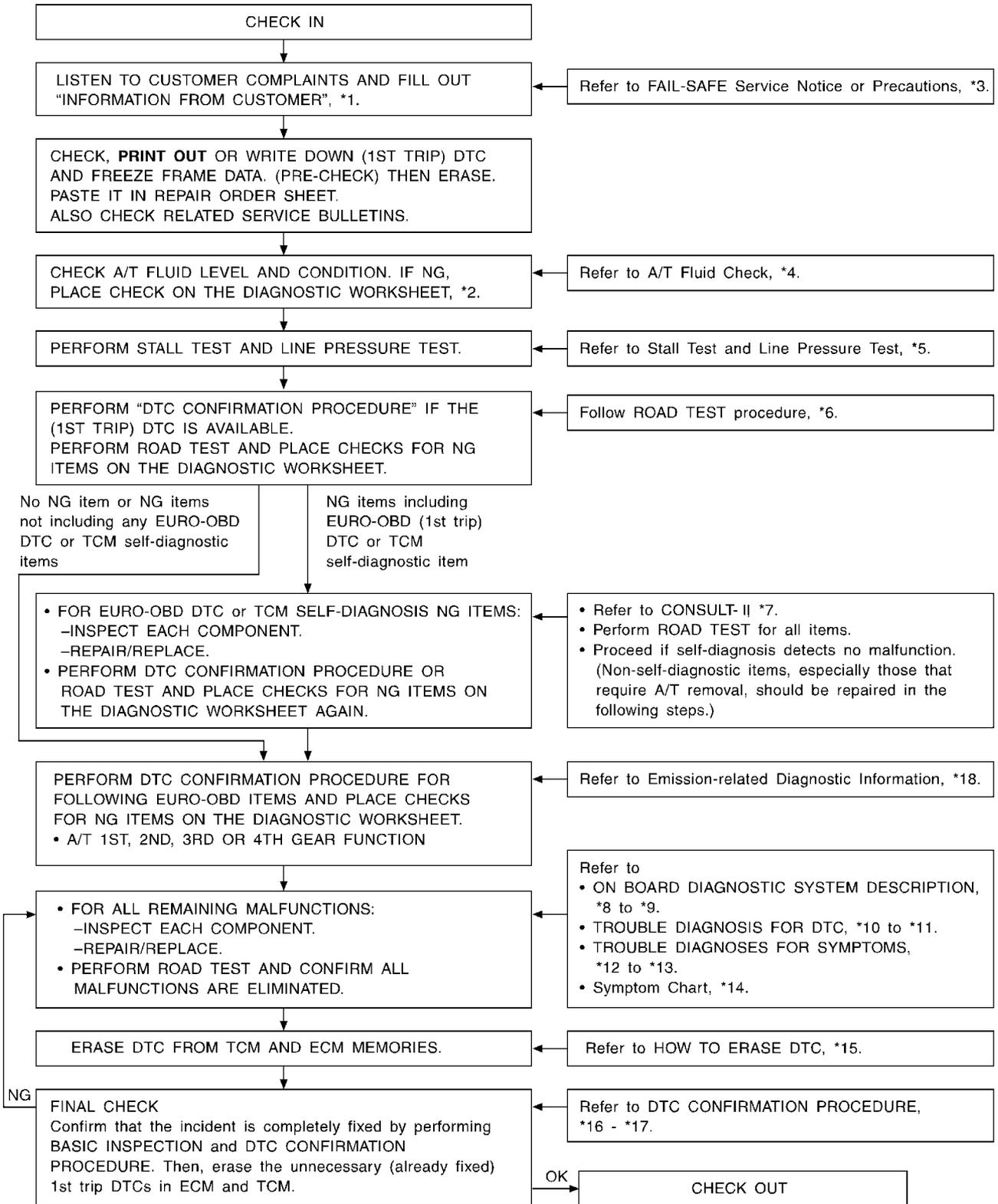
ECS004QP

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-57. "Information from Customer"](#)) and "DIAGNOSTIC WORKSHEET" ([AT-58. "Diagnostic Worksheet"](#)), to perform the best troubleshooting possible.

WORK FLOW CHART



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TROUBLE DIAGNOSIS — INTRODUCTION

[EURO-OBD]

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|---|--|--|
| *1: AT-57, "Information from Customer" | *2: AT-58, "Diagnostic Worksheet" | *3: AT-7, "Service Notice or Precautions" |
| *4: AT-63, "A/T Fluid Check" | *5: AT-64, "Stall Test" and AT-67, "Line Pressure Test" | *6: AT-68, "Road Test" |
| *7: AT-41, "CONSULT-II" | *8: AT-37, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" | *9: AT-50, "Diagnostic Procedure Without CONSULT-II" |
| *10: AT-110, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" | *11: AT-199, "DTC VEHICLE SPEED SENSOR MTR" and AT-203, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" to AT-205, "DTC CONTROL UNIT(EEPROM)" | *12: AT-209, "O/D OFF Indicator Lamp Does Not Come On" |
| *13: AT-240, "Vehicle Does Not Decelerate By Engine Brake" | *14: AT-86, "Symptom Chart" | *15: AT-39, "HOW TO ERASE DTC" |
| *16: AT-111, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" | *17: AT-199, "DTC VEHICLE SPEED SENSOR MTR" and AT-203, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" to AT-205, "DTC CONTROL UNIT(EEPROM)" | *18: EC section |

TROUBLE DIAGNOSIS — BASIC INSPECTION

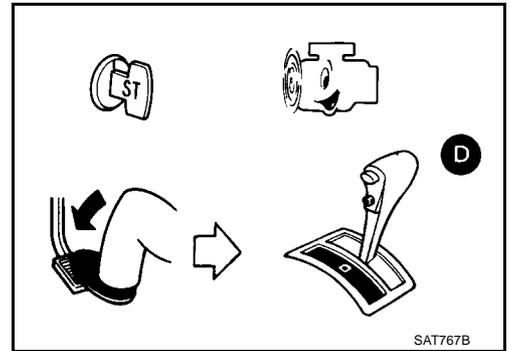
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A/T Fluid Check

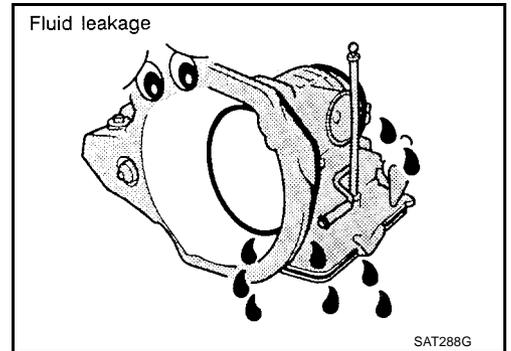
ECS00400

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 [AT-13, "Checking A/T Fluid"](#) .



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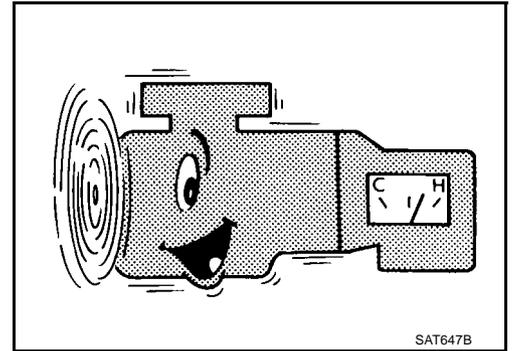
Stall Test

STALL TEST PROCEDURE

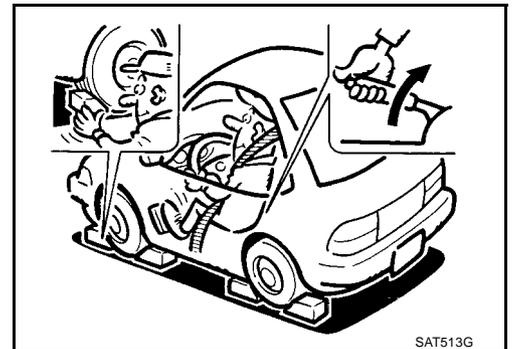
1. Check A/T fluid and engine oil levels. If necessary, add.
2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature.

ATF operating temperature:

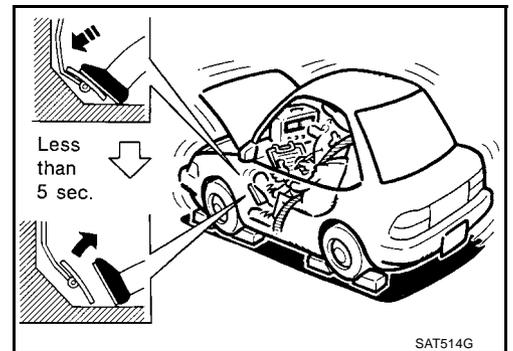
50 - 80°C (122 - 176°F)



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



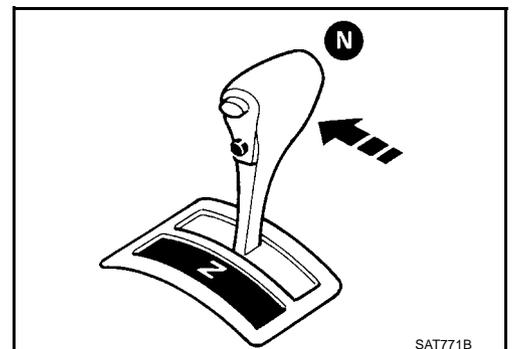
5. Start engine, apply foot brake, and place selector lever in D position.
6. Accelerate to wide open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.
 - **During test, never hold throttle wide open for less than 5 seconds.**



Stall revolution:

QR20DE	2,450 - 2,950 rpm
QR25DE	2,300 - 2,750 rpm

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



JUDGEMENT OF STALL TEST

The test result and possible damaged components relating to each result are shown in the illustrations on next page.

In order to pinpoint the possible damaged components, follow the WORK FLOW shown in [AT-60, "Work Flow"](#) (EURO-OBD).

NOTE:

Stall revolution is too high in "D", "2" or "1" position:

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

Stall revolution is too high in R position:

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

Stall revolution within specifications:

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

CAUTION:

Be careful since automatic fluid temperature increases abnormally.

- Slippage occurs in 3rd and 4th gears in "D" position..... High clutch slippage
- Slippage occurs in 2nd and 4th gear in "D" position..... Brake band slippage
- Engine brake does not function in 2nd and 3rd gears in "D" position, 2nd gear in "2" position, and 1st gear in "1" position with overdrive control switch set to "OFF"..... Overrun clutch slippage

Stall revolution less than specifications:

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

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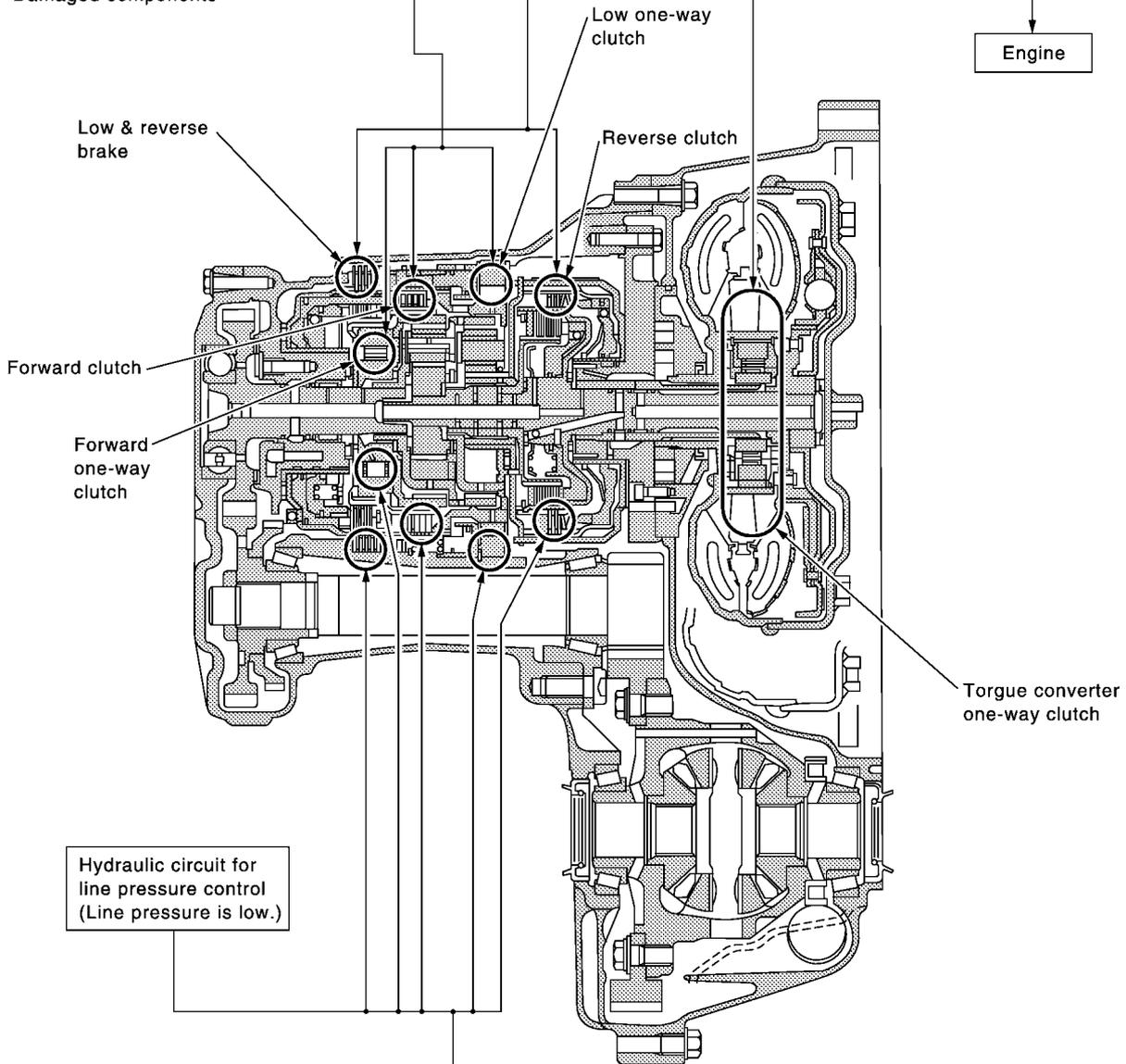
TROUBLE DIAGNOSIS — BASIC INSPECTION

[EURO-OBD]

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

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

Damaged components



Hydraulic circuit for line pressure control
(Line pressure is low.)

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

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

SCIA0707E

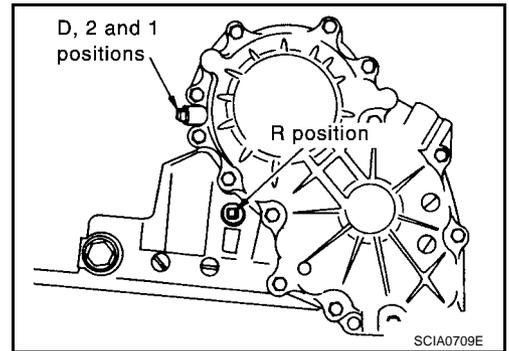
Line Pressure Test

LINE PRESSURE TEST PORTS

ECS004QS

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

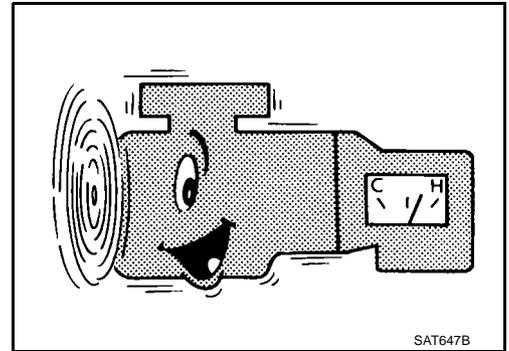
- Always replace pressure plugs as they are self-sealing bolts.



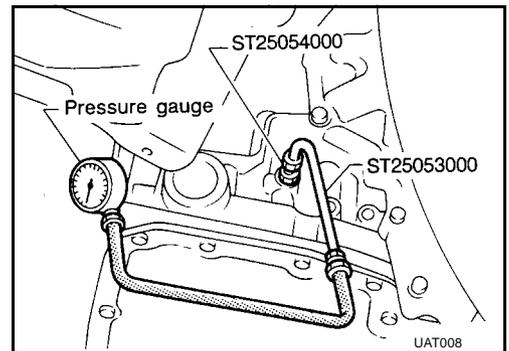
LINE PRESSURE TEST PROCEDURE

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

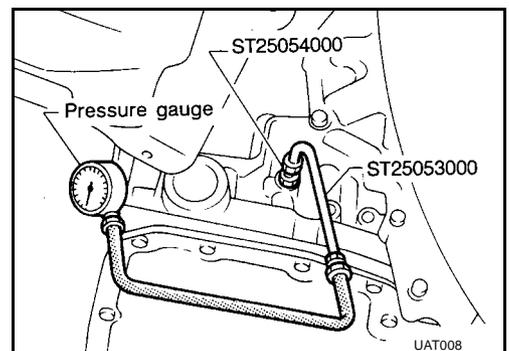
ATF operating temperature: 50 - 80°C (122 -176°F)



3. Install pressure gauge to corresponding line pressure port.

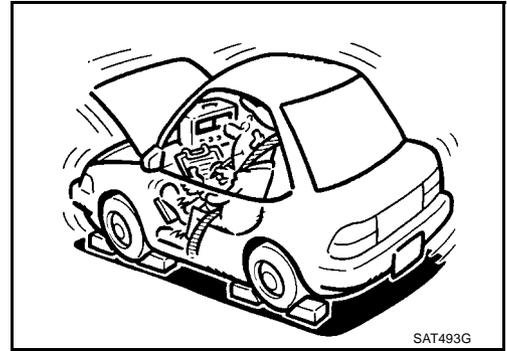


4. Set parking brake and block wheels.
 - Continue to depress brake pedal fully while line pressure test is being performed at stall speed.



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

Line pressure: Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#).



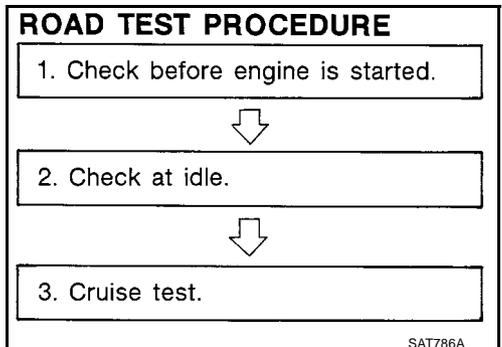
JUDGEMENT OF LINE PRESSURE TEST

	Judgement	Suspected parts
At idle	Line pressure is low in all positions.	<ul style="list-style-type: none"> ● Oil pump wear ● Control piston damage ● Pressure regulator valve or plug sticking ● Spring for pressure regulator valve damaged ● Fluid pressure leakage between oil strainer and pressure regulator valve ● Clogged strainer
	Line pressure is low in particular position.	<ul style="list-style-type: none"> ● Fluid pressure leakage between manual valve and particular clutch ● For example, line pressure is: <ul style="list-style-type: none"> – Low in "R" and "1" positions, but – Normal in "D" and "2" positions. Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to AT-19, "CLUTCH AND BAND CHART" .
	Line pressure is high.	<ul style="list-style-type: none"> ● Maladjustment of throttle position sensor ● A/T fluid temperature sensor damaged ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure modifier valve sticking ● Pressure regulator valve or plug sticking ● Open in dropping resistor circuit
At stall speed	Line pressure is low.	<ul style="list-style-type: none"> ● Maladjustment of throttle position sensor ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure regulator valve or plug sticking ● Pressure modifier valve sticking ● Pilot valve sticking

Road Test DESCRIPTION

ECS0040T

- The purpose of the test is to determine overall performance of A/T and analyze causes of problems.
- The road test consists of the following three parts:
 1. Check before engine is started
 2. Check at idle



TROUBLE DIAGNOSIS — BASIC INSPECTION

[EURO-OBD]

3. Cruise test

- Before road test, familiarize yourself with all test procedures and items to check.
- Conduct tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test. Refer to the following items.



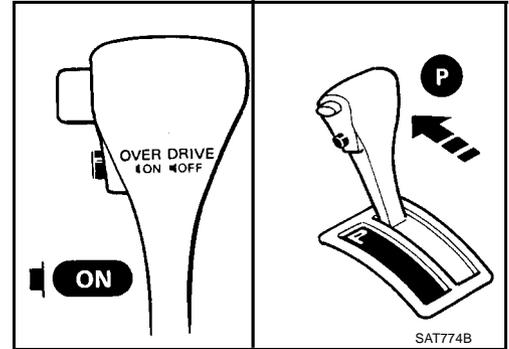
	ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION	TROUBLE DIAGNOSES FOR SYMPTOMS
EURO-OBD	AT-37, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" to AT-50, "Diagnostic Procedure Without CONSULT-II"	AT-209, "O/D OFF Indicator Lamp Does Not Come On" to AT-241, "TCM Self-diagnosis Does Not Activate"

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1. CHECK BEFORE ENGINE IS STARTED

1. CHECK O/D OFF INDICATOR LAMP

1. Park vehicle on flat surface.
2. Turn ignition switch to "OFF" position.
3. Move selector lever to "P" position.
4. Set overdrive control switch to "ON" position.
5. Turn ignition switch to "ON" position. (Do not start engine.)

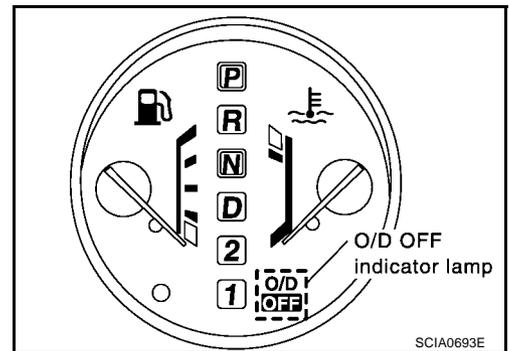


6. Does O/D OFF indicator lamp come on for about 2 seconds?

Yes or No

Yes >> GO TO 2

No >> Stop Road Test. Go to "O/D OFF Indicator Lamp Does Not Come On", [AT-209](#).



2. CHECK O/D OFF INDICATOR LAMP

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

Yes or No

Yes (Except for Euro-OBD)>>TCM is under fail-safe mode. Perform self-diagnosis and check NG items on the DIAGNOSTIC WORKSHEET, [AT-259, "DIAGNOSTIC WORKSHEET"](#). Refer to [AT-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#).

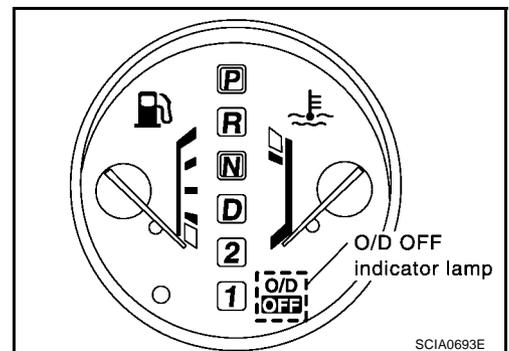
No (Except for Euro-OBD)>>1. Turn ignition switch to "OFF" position.

2. Perform self-diagnosis and note NG items. Refer to [AT-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#).
3. Go to "2. CHECK AT IDLE", [AT-71](#).

Yes (EURO-OBD)>>TCM is under fail-safe mode. Perform self-diagnosis and check NG items on the DIAGNOSTIC WORKSHEET, [AT-57, "DIAGNOSTIC WORKSHEET"](#). Refer to [AT-51, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#).

No (EURO-OBD)>>1. Turn ignition switch to "OFF" position.

2. Perform self-diagnosis and note NG items. Refer to [AT-51, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#).
3. Go to "2. CHECK AT IDLE", [AT-71](#).



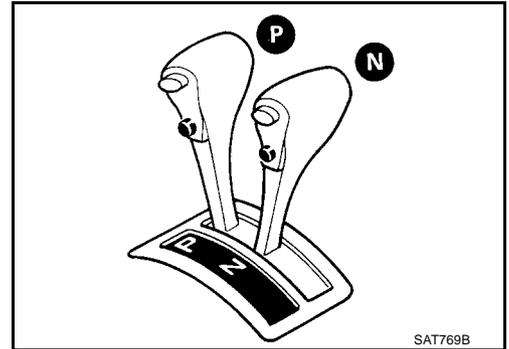
2. CHECK AT IDLE

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 >> Stop Road Test. Mark the box on the DIAGNOSTIC WORKSHEET. Go to "Engine Cannot Be Started In "P" and "N" Position" [AT-211](#) .

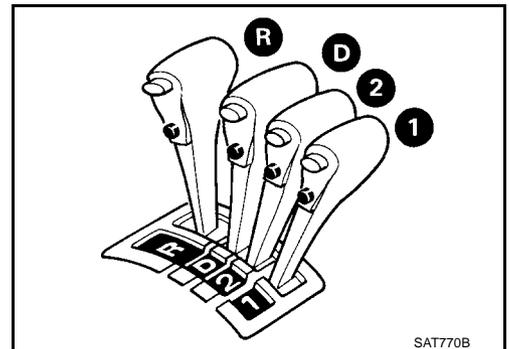


2. CHECK ENGINE START

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

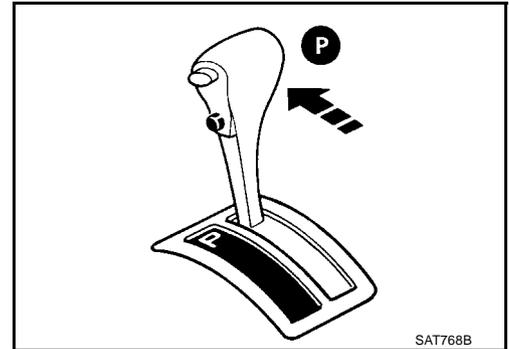
- Yes >> Stop Road Test. Mark the box on the DIAGNOSTIC WORKSHEET. Go To "Engine Cannot Be Started In "P" and "N" Position", [AT-211](#) . Continue Road Test.
 No >> GO TO 3



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3. CHECK VEHICLE MOVE

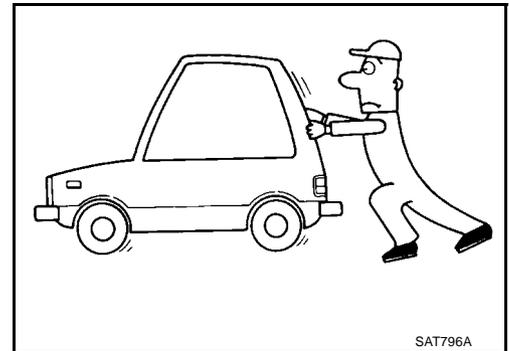
1. Turn ignition switch to "OFF" position.
2. Move selector lever to "P" position.
3. Release parking brake.
4. Push vehicle forward or backward.



5. Does vehicle move when it is pushed forward or backward?

Yes or No

- Yes >> Mark the box of "In "P" Position, Vehicle Moves Forward Or Backward When Pushed" on the DIAGNOSTIC WORKSHEET. Continue Road Test.
- No >> GO TO 4

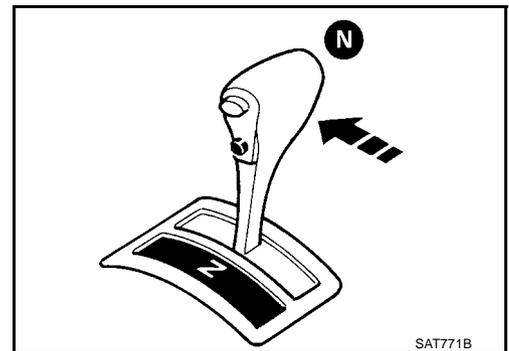


4. CHECK VEHICLE MOVE

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?

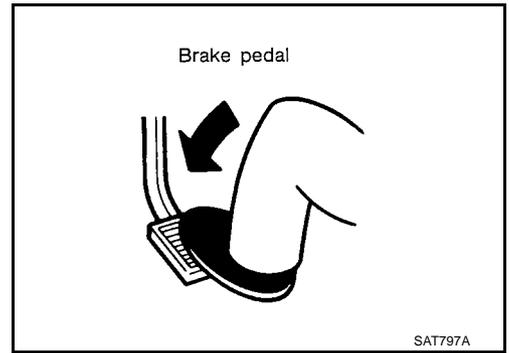
Yes or No

- Yes >> Mark the box of "In "N" Position, Vehicle Moves" on the DIAGNOSTIC WORKSHEET. Continue Road Test.
- No >> GO TO 5



5. CHECK SHIFT SHOCK

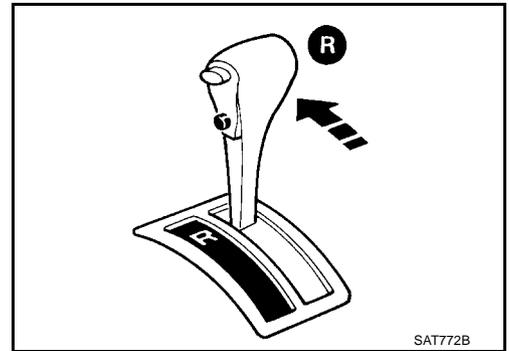
1. Apply foot brake.



2. Move selector lever to "R" position.
3. Is there large shock when changing from "N" to "R" position?

Yes or No

- Yes >> Mark the box of "Large Shock "N" → "R" Position" on the DIAGNOSTIC WORKSHEET. Continue Road Test.
- No >> GO TO 6

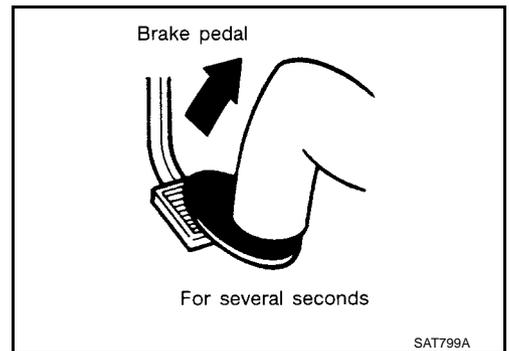


6. CHECK VEHICLE MOVE

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

Yes or No

- Yes >> GO TO 7
- No >> Mark the box of "Vehicle Does Not Creep Backward In "R" Position" on the DIAGNOSTIC WORKSHEET. Continue Road Test.

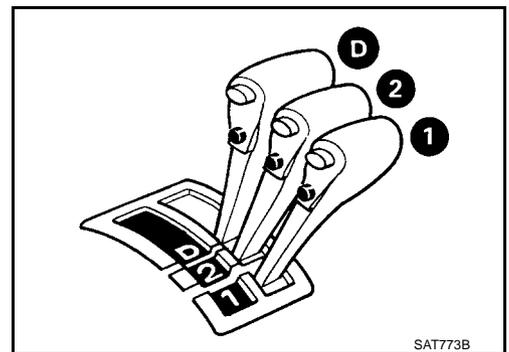


7. CHECK VEHICLE MOVE

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

Yes or No

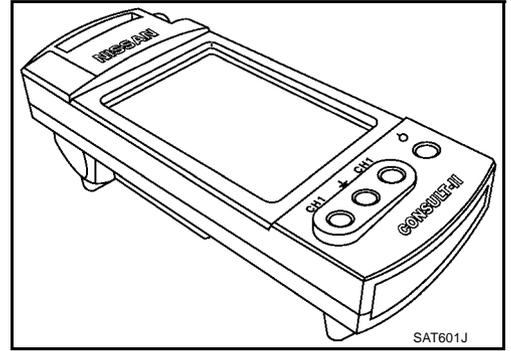
- Yes >> Go To "3. CRUISE TEST", [AT-74](#).
- No >> Mark the box of "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position" on the DIAGNOSTIC WORKSHEET. Continue Road Test.



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3. CRUISE TEST

- Check all items listed in Parts 1 through 3.

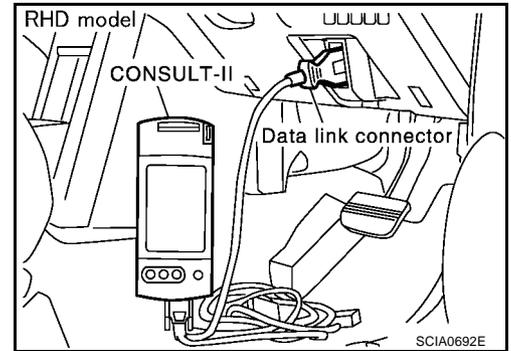
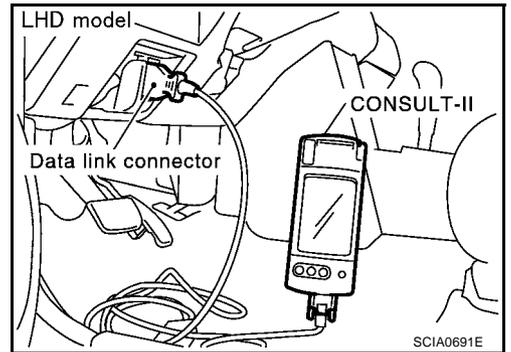


Ⓜ With CONSULT-II

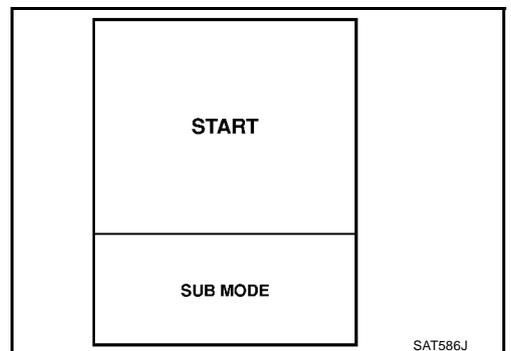
- Using CONSULT-II, conduct a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per Shift Schedule.

CONSULT-II Setting Procedure

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



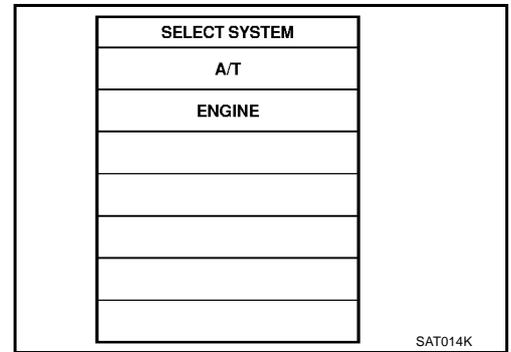
3. Turn ignition switch "ON".
4. Touch "START".



TROUBLE DIAGNOSIS — BASIC INSPECTION

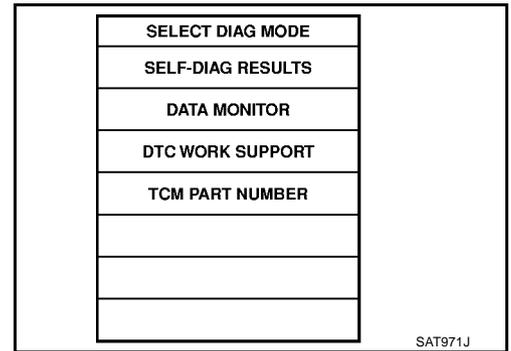
[EURO-OBD]

- Touch "A/T".
If "A/T" is not indicated, go to [GI-34, "CONSULT-II Data Link Connector \(DLC\) Circuit"](#).



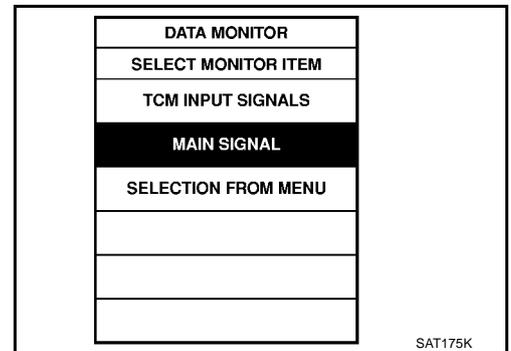
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- Touch "DATA MONITOR".



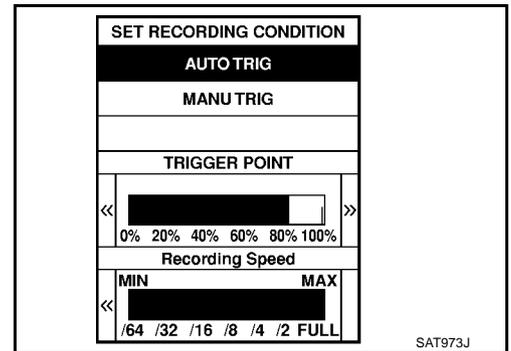
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- Touch "MAIN SIGNALS" or "TCM INPUT SIGNALS".
- Select "Numerical Display", "Barchart Display" or "Line Graph Display".



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- Touch "SETTING" to recording condition ("AUTO TRIG" or "MANU TRIG") and touch "BACK".
- Touch "Start".



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TROUBLE DIAGNOSIS — BASIC INSPECTION

[EURO-OBD]

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

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

SAT134K

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

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

SAT135K

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

REAL-TIME DIAG
ENG SPEED SIG

SAT987J

STORE	
SYSTEM	SAVE REC DATA

SAT974J

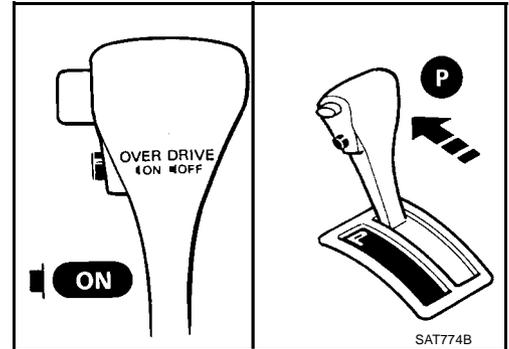
Cruise Test — Part 1

1. CHECK STARTING GEAR (D1) POSITION

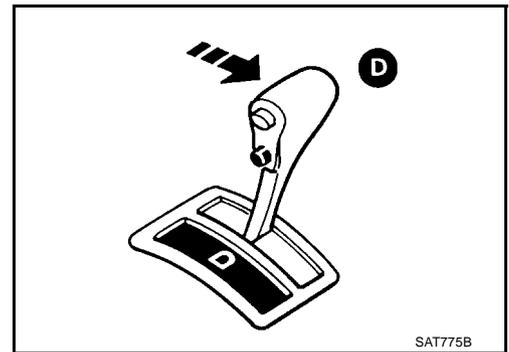
1. Drive vehicle for approx. 10 minutes to warm engine oil and ATF up to operating temperature.

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.



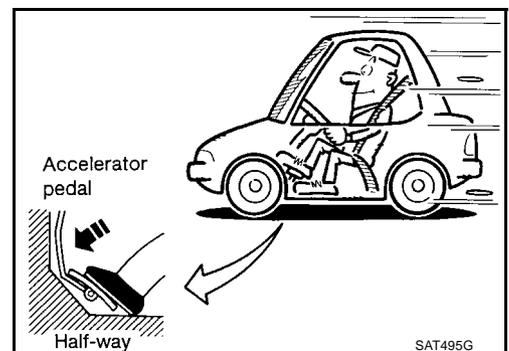
6. Move selector lever to “D” position.



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 >> Mark the box of “Vehicle Cannot Be Started From D1 ” on the DIAGNOSTIC WORKSHEET. Continue Road Test.



2. CHECK SHIFT UP (D1 TO D2)

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

① Read gear position, throttle opening and vehicle speed.

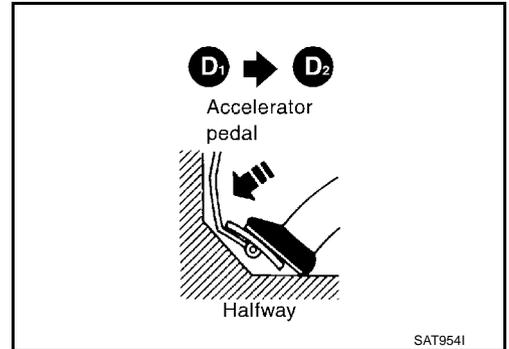
Specified speed when shifting from D1 to D2 :

Refer to [AT-521, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 3

No >> Mark the box of "A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2" on the DIAGNOSTIC WORKSHEET. Continue Road Test.



3. CHECK SHIFT UP (D2 TO D3)

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

① Read gear position, throttle position and vehicle speed.

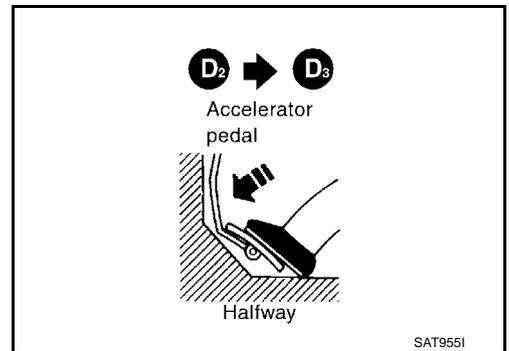
Specified speed when shifting from D2 to D3 :

Refer to [AT-521, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 4

No >> Mark the box of "A/T Does Not Shift: D2 → D3" on the DIAGNOSTIC WORKSHEET. Continue Road Test.



4. CHECK SHIFT UP (D3 TO D4)

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

① Read gear position, throttle position and vehicle speed.

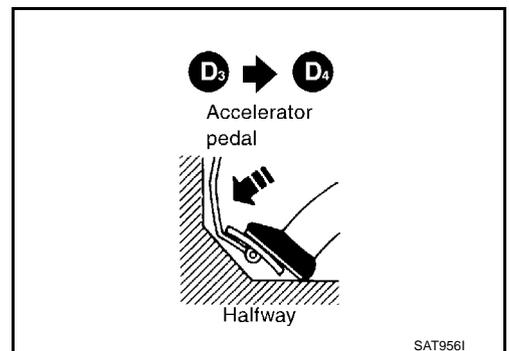
Specified speed when shifting from D3 to D4 :

Refer to [AT-521, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 5

No >> Mark the box of "A/T Does Not Shift: D3 → D4" on the DIAGNOSTIC WORKSHEET. Continue Road Test.



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

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

① **Read vehicle speed, throttle position when lock-up duty becomes 94%.**

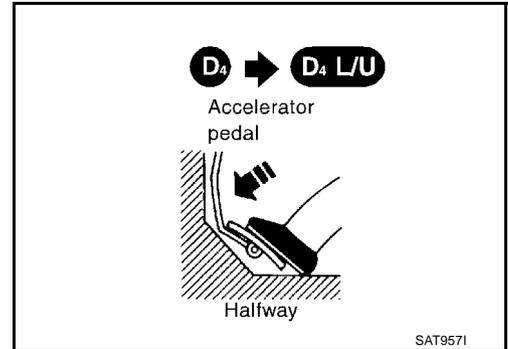
Specified speed when lock-up occurs:

Refer to [AT-521, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 6

No >> Mark the box of "A/T Does Not Perform Lock-up" on the DIAGNOSTIC WORKSHEET. Continue Road Test.



6. CHECK HOLD LOCK-UP

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

Yes or No

Yes >> GO TO 7

No >> Mark the box of "A/T Does Not Hold Lock-up Condition" on the DIAGNOSTIC WORKSHEET. Continue Road Test.

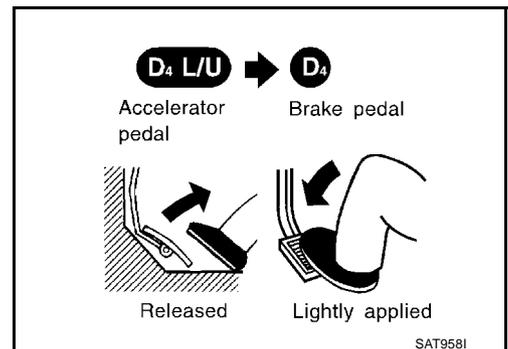
7. CHECK SHIFT DOWN (D4 L/U TO D4)

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

Yes or No

Yes >> GO TO 8

No >> Mark the box of "Lock-up Is Not Released" on the DIAGNOSTIC WORKSHEET. Continue Road Test.



8. CHECK SHIFT DOWN (D4 TO D3)

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

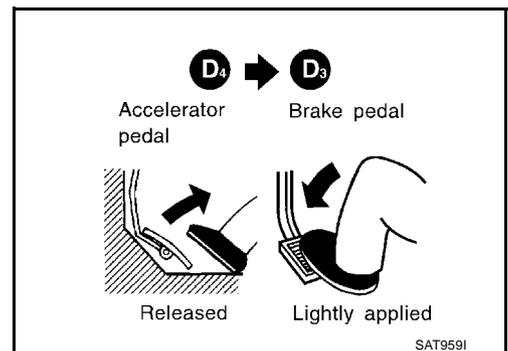
① **Read gear position and engine speed.**

Yes or No

Yes >> 1. Stop vehicle.

2. Go To "Cruise test — Part 2", [AT-81](#) .

No >> Mark the box of "Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" on the DIAGNOSTIC WORKSHEET. Continue Road Test.



Cruise Test — Part 2

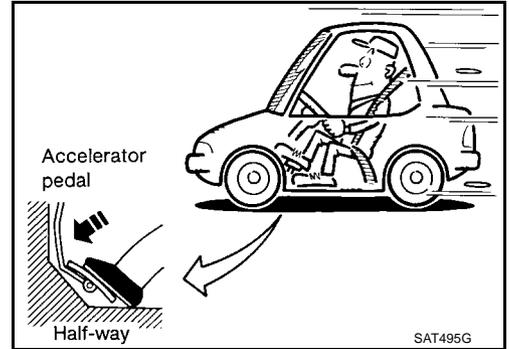
1. CHECK STARTING GEAR (D1) POSITION

1. Confirm overdrive control switch is in "ON" position.
2. Confirm selector lever is in "D" position.
3. Accelerate vehicle by half throttle again.
4. Does vehicle start from D1 ?

Ⓜ Read gear position.

Yes or No

- Yes >> GO TO 2
- No >> Mark the box of "Vehicle Does Not Start From D1 " on the DIAGNOSTIC WORKSHEET. Continue Road Test.



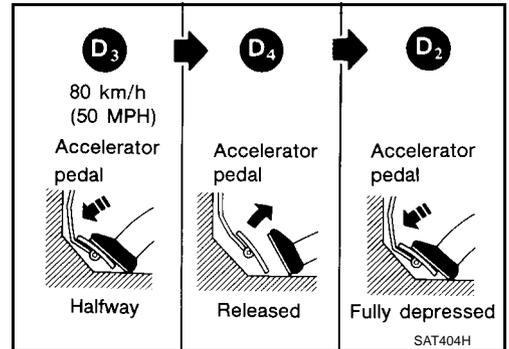
2. CHECK SHIFT UP AND SHIFT DOWN (D3 TO D4 TO D2)

1. Accelerate vehicle to 80 km/h (50 MPH) as shown in illustration.
2. Release accelerator pedal and then quickly depress it fully.
3. Does A/T shift from D4 to D2 as soon as accelerator pedal is depressed fully?

Ⓜ Read gear position and throttle position.

Yes or No

- Yes >> GO TO 3
- No >> Mark the box of "A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 " on the DIAGNOSTIC WORKSHEET. Continue Road Test.



3. CHECK SHIFT UP (D2 TO D3)

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

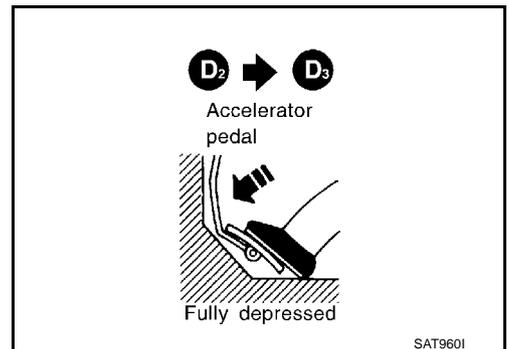
Ⓜ Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D2 to D3 :

Refer to [AT-521, "Shift Schedule"](#) .

Yes or No

- Yes >> GO TO 4
- No >> Mark the box of "A/T Does Not Shift: D2 → D3 " on the DIAGNOSTIC WORKSHEET. Continue Road Test.



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

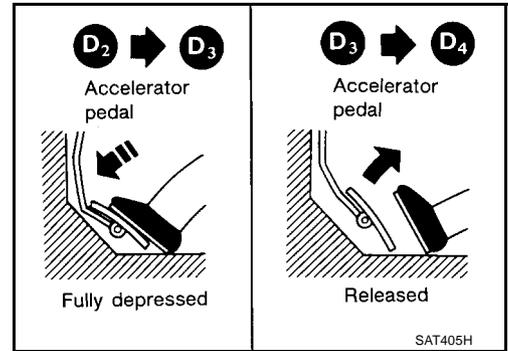
Release accelerator pedal after shifting from D₂ to D₃.

Does A/T shift from D₃ to D₄ and does vehicle decelerate by engine brake?

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

Yes or No

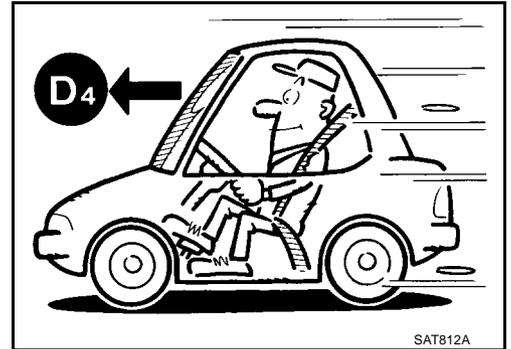
- Yes >> 1. Stop vehicle.
2. Go To "Cruise test — Part 3", [AT-83](#).
- No >> Mark the box of "11. A/T Does Not Shift: D₃ → D₄" on the DIAGNOSTIC WORKSHEET. Continue Road Test.



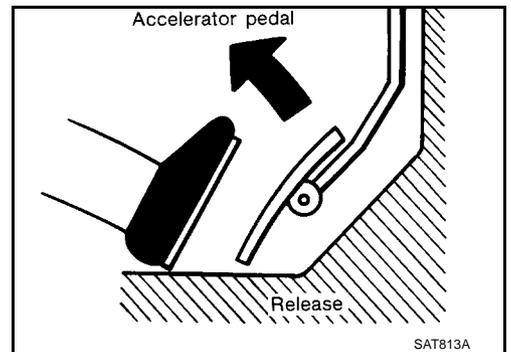
Cruise Test — Part 3

1. CHECK SHIFT DOWN (D4 TO D3)

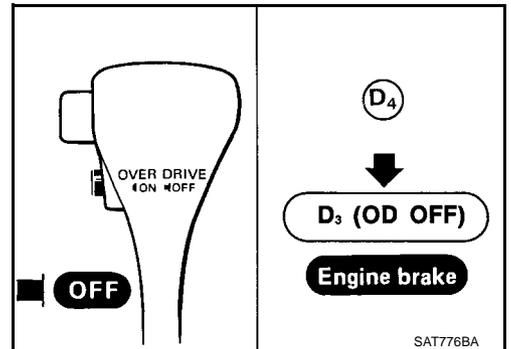
1. Confirm overdrive control switch is in "ON" position.
2. Confirm selector lever is in "D" position.
3. Accelerate vehicle using half-throttle to D4 .



4. Release accelerator pedal.



5. Set overdrive control switch to "OFF" position while driving in D4 .



6. Does A/T shift from D4 to D3 (O/D OFF)?

④ Read gear position and vehicle speed.

Yes or No

Yes >> GO TO 2

No >> Mark the box of "A/T Does Not Shift: D4 → D3 , When Overdrive Control Switch "ON" → "OFF" on the DIAGNOSTIC WORKSHEET. Continue Road Test.

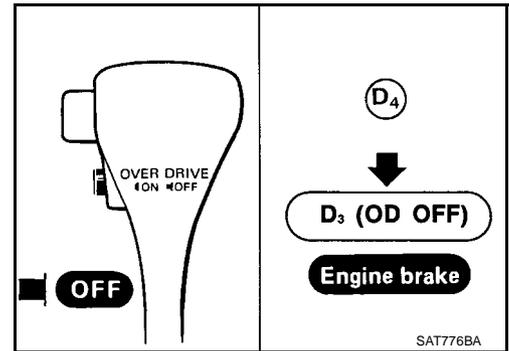
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2. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> GO TO 3
- No >> Mark the box of "Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" on the DIAGNOSTIC WORKSHEET. Continue Road Test.



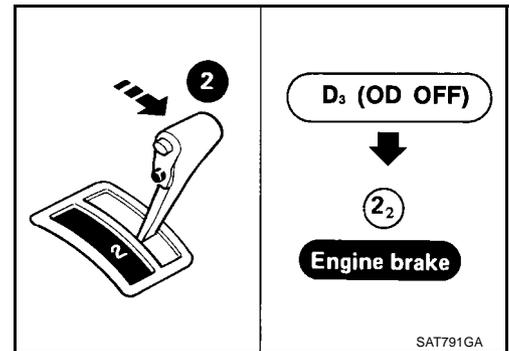
3. CHECK SHIFT DOWN (D3 TO 22)

1. Move selector lever from "D" to "2" position while driving in D3 (O/D OFF).
2. Does A/T shift from D3 (O/D OFF) to 22 ?

Read gear position.

Yes or No

- Yes >> GO TO 4
- No >> Mark the box of "A/T Does Not Shift: D3 → 22 , When Selector Lever "D" → "2" Position" on the DIAGNOSTIC WORKSHEET. Continue Road Test.

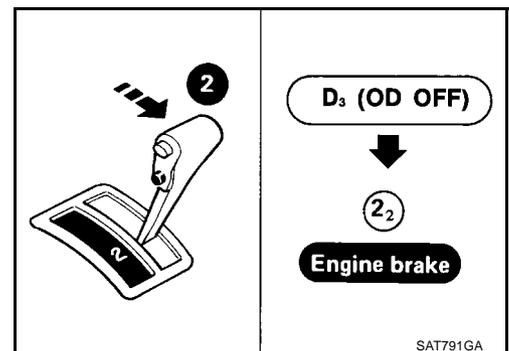


4. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> GO TO 5
- No >> Mark the box of "Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" on the DIAGNOSTIC WORKSHEET. Continue Road Test.



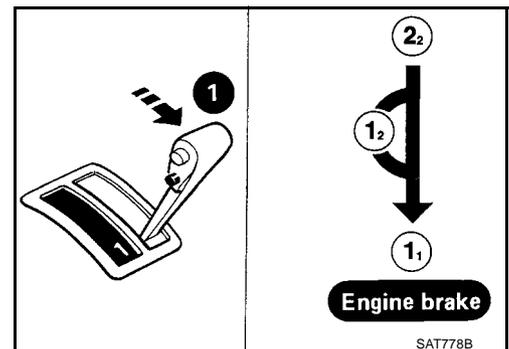
5. CHECK SHIFT DOWN

1. Move selector lever from "2" to "1" position while driving in 22 .
2. Does A/T shift from 22 to 11 position?

Read gear position.

Yes or No

- Yes >> GO TO 6
- No >> Mark the box of "A/T Does Not Shift: 22 → 11 , When Selector lever "2" → "1" Position" on the DIAGNOSTIC WORKSHEET. Continue Road Test.

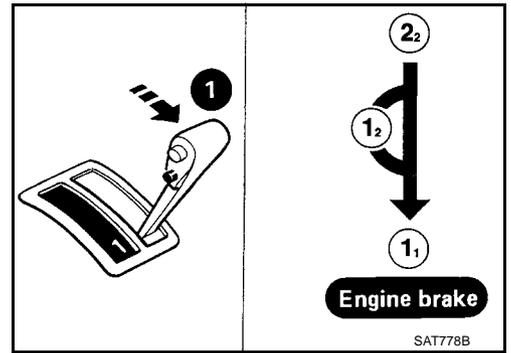


6. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> 1. Stop vehicle.
 2. Perform self-diagnosis.
 EURO-OBD: Refer to [AT-51, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#).
- No >> Mark the box of "Vehicle Does Not Decelerate By Engine Brake" on the DIAGNOSTIC WORKSHEET. Stop Road Test.



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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

PFP:00000

Symptom Chart

ECS004QU

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

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Engine cannot start in "P" and "N" positions. AT-211, "Engine Cannot Be Started In "P" and "N" Position"	ON vehicle	1. Ignition switch and starter	PG-2, "POWER SUPPLY ROUTING", SC-20, "STARTING SYSTEM"
		2. Control cable adjustment	AT-416, "Control Cable Adjustment"
		3. PNP switch	AT-110, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
Engine starts in position other than "N" and "P" positions. AT-211, "Engine Cannot Be Started In "P" and "N" Position"	ON vehicle	1. Control cable adjustment	AT-416, "Control Cable Adjustment"
		2. PNP switch	AT-110, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
Transaxle noise in "P" and "N" positions.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Line pressure test	AT-67, "Line Pressure Test"
		3. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-199, "DTC VEHICLE SPEED SENSOR MTR"
	OFF vehicle	5. Oil pump	AT-444, "Oil Pump"
		6. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Vehicle moves when changing into "P" position, or parking gear does not disengage when shifted out of "P" position. AT-212, "In "P" Position, Vehicle Moves Forward Or Backward When Pushed"	ON vehicle	1. Control cable adjustment	AT-416, "Control Cable Adjustment"
	OFF vehicle	2. Parking components	AT-421, "Components", AT-441, "REPAIR FOR COMPONENT PARTS"
Vehicle runs in "N" position. AT-213, "In "N" Position, Vehicle Moves"	ON vehicle	1. Control cable adjustment	AT-416, "Control Cable Adjustment"
	OFF vehicle	2. Forward clutch	AT-471, "Forward and Overrun Clutches"
		3. Reverse clutch	AT-463, "Reverse Clutch"
		4. Overrun clutch	AT-471, "Forward and Overrun Clutches"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Vehicle will not run in "R" position (but runs in "D", "2" and "1" positions). Clutch slips. Very poor acceleration. AT-215, "Vehicle Does Not Creep Backward In "R" Position"	ON vehicle	1. Control cable adjustment	AT-416, "Control Cable Adjustment"
		2. Stall test	AT-64, "Stall Test"
		3. Line pressure test	AT-67, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		5. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
Vehicle will not run in "R" position (but runs in "D", "2" and "1" positions). Clutch slips. Very poor acceleration. AT-215, "Vehicle Does Not Creep Backward In "R" Position"	OFF vehicle	6. Reverse clutch	AT-463, "Reverse Clutch"
		7. High clutch	AT-466, "High Clutch"
		8. Forward clutch	AT-471, "Forward and Overrun Clutches"
		9. Overrun clutch	AT-471, "Forward and Overrun Clutches"
		10. Low & reverse brake	AT-476, "Low & Reverse Brake"
Vehicle braked when shifting into "R" position.	ON vehicle	1. Fluid level	AT-63, "A/T Fluid Check"
		2. Line pressure test	AT-67, "Line Pressure Test"
		3. Line pressure solenoid valve	AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. High clutch	AT-466, "High Clutch"
		6. Brake band	AT-488, "Band Servo Piston Assembly"
		7. Forward clutch	AT-471, "Forward and Overrun Clutches"
		8. Overrun clutch	AT-471, "Forward and Overrun Clutches"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Sharp shock in shifting from "N" to "D" position.	ON vehicle	1. Engine idling rpm	EC-38 [QR25 (WITH EURO-OBD)], EC-448 [QR25 (WITHOUT EURO-OBD)], EC-771 [QR20 (WITH EURO-OBD)], EC-1135 [QR20 (WITHOUT EURO-OBD)]
		2. Accelerator pedal position (APP) sensor	AT-180 , " DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR "
		3. Line pressure test	AT-67 , " Line Pressure Test "
		4. A/T fluid temperature sensor	AT-193 , " DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE) "
		5. Engine speed signal	AT-127 , " DTC P0725 ENGINE SPEED SIGNAL "
		6. Line pressure solenoid valve	AT-163 , " DTC P0745 LINE PRESSURE SOLENOID VALVE "
		7. Control valve assembly	AT-414 , " Control Valve Assembly and Accumulators "
		8. Accumulator N-D	AT-414 , " Control Valve Assembly and Accumulators "
	OFF vehicle	9. Forward clutch	AT-471 , " Forward and Overrun Clutches "
Vehicle will not run in "D" and "2" positions (but runs in "1" and "R" positions).	ON vehicle	1. Control cable adjustment	AT-416 , " Control Cable Adjustment "
	OFF vehicle	2. Low one-way clutch	AT-421 , " OVERHAUL ", AT-425 , " Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings "
Vehicle will not run in "D", "1", "2" positions (but runs in "R" position). Clutch slips. Very poor acceleration. AT-218 , " Vehicle Does Not Creep Forward In "D", "2" Or "1" Position "	ON vehicle	1. Fluid level	AT-63 , " FLUID LEVEL CHECK "
		2. Stall test	AT-64 , " Stall Test "
		3. Line pressure test	AT-67 , " Line Pressure Test "
		4. Line pressure solenoid valve	AT-163 , " DTC P0745 LINE PRESSURE SOLENOID VALVE "
		5. Control valve assembly	AT-414 , " Control Valve Assembly and Accumulators "
		6. Accumulator N-D	AT-414 , " Control Valve Assembly and Accumulators "

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Vehicle will not run in "D", "1", "2" positions (but runs in "R" position). Clutch slips. Very poor acceleration. AT-218. "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"	OFF vehicle	7. Reverse clutch	AT-463. "Reverse Clutch"
		8. High clutch	AT-466. "High Clutch"
		9. Forward clutch	AT-471. "Forward and Overrun Clutches"
		10. Forward one-way clutch	AT-421. "OVERHAUL"
		11. Low one-way clutch	AT-421. "OVERHAUL", AT-425. "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-63. "FLUID LEVEL CHECK"
		2. Control cable adjustment	AT-416. "Control Cable Adjustment"
		3. Accelerator pedal position (APP) sensor	AT-180. "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		4. Line pressure test	AT-67. "Line Pressure Test"
		5. Line pressure solenoid valve	AT-163. "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-414. "Control Valve Assembly and Accumulators"
		7. Accumulator N-D	AT-414. "Control Valve Assembly and Accumulators"
		8. Shift solenoid valve A	AT-170. "DTC P0750 SHIFT SOLENOID VALVE A"
		9. Shift solenoid valve B	AT-175. "DTC P0755 SHIFT SOLENOID VALVE B"
		10. Overrun clutch solenoid valve	AT-185. "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
		11. Torque converter clutch solenoid valve	AT-158. "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
	OFF vehicle	12. Forward clutch	AT-471. "Forward and Overrun Clutches"
		13. Reverse clutch	AT-463. "Reverse Clutch"
		14. Low & reverse brake	AT-476. "Low & Reverse Brake"
		15. Oil pump	AT-444. "Oil Pump"
		16. Torque converter	AT-425. "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Excessive creep.	ON vehicle	1. Engine idling rpm	EC-38 [QR25 (WITH EURO-OBD)], EC-448 [QR25 (WITHOUT EURO-OBD)], EC-771 [QR20 (WITH EURO-OBD)], EC-1135 [QR20 (WITHOUT EURO-OBD)]
No creep at all. AT-215, "Vehicle Does Not Creep Backward In "R" Position" and AT-218, "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Line pressure test	AT-396, "LINE PRESSURE SOLENOID VALVE"
		3. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	4. Forward clutch	AT-471, "Forward and Overrun Clutches"
		5. Oil pump	AT-444, "Oil Pump"
		6. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Failure to change gear from "D1 " to "D2 ".	ON vehicle	1. Control cable adjustment	AT-416, "Control Cable Adjustment"
		2. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		3. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-199, "DTC VEHICLE SPEED SENSOR MTR"
		5. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
	OFF vehicle	6. Brake band	AT-488, "Band Servo Piston Assembly"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Failure to change gear from "D2" to "D3".	ON vehicle	1. Control cable adjustment	AT-416, "Control Cable Adjustment"
		2. Shift solenoid valve B	AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"
		3. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-199, "DTC VEHICLE SPEED SENSOR MTR"
		5. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
	OFF vehicle	6. High clutch	AT-466, "High Clutch"
		7. Brake band	AT-488, "Band Servo Piston Assembly"
Failure to change gear from "D3" to "D4".	ON vehicle	1. PNP switch	AT-110, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		2. Overdrive control switch	AT-241, "TCM Self-diagnosis Does Not Activate"
		3. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-199, "DTC VEHICLE SPEED SENSOR MTR"
		5. A/T fluid temperature sensor	AT-193, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	6. Brake band	AT-488, "Band Servo Piston Assembly"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
<p>Too high a gear change point from "D1 " to "D2 ", from "D2 " to "D3 ", from "D3 " to "D4 ".</p> <p>AT-223, "A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2", AT-225, "A/T Does Not Shift: D2 → D3" and AT-227, "A/T Does Not Shift: D3 → D4"</p>	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)" , AT-199, "DTC VEHICLE SPEED SENSOR MTR"
		3. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"
<p>Gear change directly from "D1 " to "D3 " occurs.</p>	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
	OFF vehicle	2. Accumulator servo release	AT-414, "Control Valve Assembly and Accumulators"
		3. Brake band	AT-488, "Band Servo Piston Assembly"
<p>Engine stops when shifting lever into "R", "D", "2" and "1".</p>	ON vehicle	1. Engine idling rpm	EC-38 [QR25 (WITH EURO-OBD)] , EC-448 [QR25 (WITHOUT EURO-OBD)] , EC-771 [QR20 (WITH EURO-OBD)] , EC-1135 [QR20 (WITHOUT EURO-OBD)]
		2. Fluid level	AT-63, "FLUID LEVEL CHECK"
		3. Torque converter clutch solenoid valve	AT-158, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Too sharp a shock in change from "D1 " to "D2 ".	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-67, "Line Pressure Test"
		3. Accumulator servo release	AT-414, "Control Valve Assembly and Accumulators"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		5. A/T fluid temperature sensor	AT-193, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	6. Brake band	AT-488, "Band Servo Piston Assembly"
Too sharp a shock in change from "D2 " to "D3 ".	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-67, "Line Pressure Test"
		3. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		4. A/T fluid temperature sensor	AT-193, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	5. High clutch	AT-466, "High Clutch"
		6. Brake band	AT-488, "Band Servo Piston Assembly"
Too sharp a shock in change from "D3 " to "D4 ".	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-67, "Line Pressure Test"
		3. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		4. A/T fluid temperature sensor	AT-193, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	5. Brake band	AT-488, "Band Servo Piston Assembly"
		6. Overrun clutch	AT-471, "Forward and Overrun Clutches"
		7. Forward one-way clutch	AT-421, "OVERHAUL"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Almost no shock or clutches slipping in change from "D1 " to "D2 ".	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-67, "Line Pressure Test"
		4. Accumulator servo release	AT-414, "Control Valve Assembly and Accumulators"
		5. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. Brake band	AT-488, "Band Servo Piston Assembly"
Almost no shock or slipping in change from "D2 " to "D3 ".	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-67, "Line Pressure Test"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. High clutch	AT-466, "High Clutch"
		6. Brake band	AT-488, "Band Servo Piston Assembly"
Almost no shock or slipping in change from "D3 " to "D4 ".	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-67, "Line Pressure Test"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. Brake band	AT-488, "Band Servo Piston Assembly"
Vehicle braked by gear change from "D1 " to "D2 ".	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
	OFF vehicle	2. Reverse clutch	AT-463, "Reverse Clutch"
		3. Low & reverse brake	AT-476, "Low & Reverse Brake"
		4. High clutch	AT-466, "High Clutch"
		5. Low one-way clutch	AT-421, "OVERHAUL", AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Vehicle braked by gear change from "D2 " to "D3 ".	ON vehicle	1. Fluid level	AT-63. "FLUID LEVEL CHECK"
	OFF vehicle	2. Brake band	AT-488. "Band Servo Piston Assembly"
Vehicle braked by gear change from "D3 " to "D4 ".	ON vehicle	1. Fluid level	AT-63. "FLUID LEVEL CHECK"
	OFF vehicle	2. Overrun clutch	AT-377. "OVERRUN CLUTCH SOLENOID VALVE"
		3. Forward one-way clutch	AT-421. "OVERHAUL"
		4. Reverse clutch	AT-463. "Reverse Clutch"
Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-63. "FLUID LEVEL CHECK"
		2. PNP switch	AT-110. "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		3. Overdrive control switch	AT-241. "TCM Self-diagnosis Does Not Activate"
		4. Accelerator pedal position (APP) sensor	AT-180. "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		5. Shift solenoid valve A	AT-170. "DTC P0750 SHIFT SOLENOID VALVE A"
		6. Shift solenoid valve B	AT-175. "DTC P0755 SHIFT SOLENOID VALVE B"
		7. Control valve assembly	AT-414. "Control Valve Assembly and Accumulators"
	OFF vehicle	8. Reverse clutch	AT-463. "Reverse Clutch"
		9. High clutch	AT-466. "High Clutch"
		10. Brake band	AT-488. "Band Servo Piston Assembly"
		11. Low & reverse brake	AT-476. "Low & Reverse Brake"
		12. Oil pump	AT-444. "Oil Pump"
		13. Torque converter	AT-425. "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Failure to change gear from "D4" to "D3".	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Overrun clutch solenoid valve	AT-185, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
		4. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		5. Line pressure solenoid valve	AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Brake band	AT-488, "Band Servo Piston Assembly"
		8. Overrun clutch	AT-471, "Forward and Overrun Clutches"
Failure to change gear from "D3" to "D2" or from "D4" to "D2".	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"
		5. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. High clutch	AT-466, "High Clutch"
		7. Brake band	AT-488, "Band Servo Piston Assembly"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Failure to change gear from "D2" to "D1" or from "D3" to "D1".	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"
		5. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. Low one-way clutch	AT-421, "OVERHAUL", AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		7. High clutch	AT-466, "High Clutch"
		8. Brake band	AT-488, "Band Servo Piston Assembly"
Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-67, "Line Pressure Test"
		3. Overrun clutch solenoid valve	AT-185, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
Too high a change point from "D4" to "D3", from "D3" to "D2", from "D2" to "D1".	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-199, "DTC VEHICLE SPEED SENSOR MTR"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Kickdown does not operate when depressing pedal in "D4" within kick down vehicle speed.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-199, "DTC VEHICLE SPEED SENSOR MTR"
		3. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"
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	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-199, "DTC VEHICLE SPEED SENSOR MTR"
		2. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"
Races extremely fast or slips in changing from "D4" to "D3" when depressing pedal.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-67, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		5. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		6. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Brake band	AT-488, "Band Servo Piston Assembly"
		8. Forward clutch	AT-471, "Forward and Overrun Clutches"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Races extremely fast or slips in changing from "D4" to "D2" when depressing pedal.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-67, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		5. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		6. Shift solenoid valve B	AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"
		7. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	8. Brake band	AT-488, "Band Servo Piston Assembly"
		9. High clutch	AT-466, "High Clutch"
		10. Forward clutch	AT-471, "Forward and Overrun Clutches"
Races extremely fast or slips in changing from "D3" to "D2" when depressing pedal.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-67, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		5. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		6. Shift solenoid valve B	AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"
	OFF vehicle	7. Brake band	AT-488, "Band Servo Piston Assembly"
		8. High clutch	AT-466, "High Clutch"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Races extremely fast or slips in changing from "D4" or "D3" to "D1" when depressing pedal.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-67, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		5. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		6. Shift solenoid valve B	AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"
		7. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	8. Forward clutch	AT-471, "Forward and Overrun Clutches"
		9. Forward one-way clutch	AT-421, "OVERHAUL"
		10. Low one-way clutch	AT-421, "OVERHAUL", AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Control cable adjustment	AT-416, "Control Cable Adjustment"
		3. Line pressure test	AT-67, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
	OFF vehicle	5. Oil pump	AT-444, "Oil Pump"
		6. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		7. Parking components	AT-421, "Components"
Transmission noise in "D", "2", "1" and "R" positions.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
	OFF vehicle	2. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Failure to change from "D3" to "22" when changing lever into "2" position. AT-237, "A/T Does Not Shift: D3 → 22, When Selector Lever "D" → "2" Position"	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Shift solenoid valve B	AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"
		3. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		4. Control cable adjustment	AT-416, "Control Cable Adjustment"
Failure to change from "D3" to "22" when changing lever into "2" position. AT-237, "A/T Does Not Shift: D3 → 22, When Selector Lever "D" → "2" Position"	OFF vehicle	5. Brake band	AT-488, "Band Servo Piston Assembly"
Gear change from "22" to "23" in "2" position.	ON vehicle	1. PNP switch	AT-110, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		2. Control cable adjustment	AT-416, "Control Cable Adjustment"
Engine brake does not operate in "1" position. AT-234, "Vehicle Does Not Start From D1"	ON vehicle	1. PNP switch	AT-110, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		2. Control cable adjustment	AT-416, "Control Cable Adjustment"
		3. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-199, "DTC VEHICLE SPEED SENSOR MTR"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		5. Overrun clutch solenoid valve	AT-185, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
	OFF vehicle	6. Overrun clutch	AT-471, "Forward and Overrun Clutches"
		7. Low & reverse brake	AT-476, "Low & Reverse Brake"
Gear change from "11" to "12" in "1" position.	ON vehicle	1. PNP switch	AT-110, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		2. Control cable adjustment	AT-416, "Control Cable Adjustment"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Does not change from "12" to "11" in "1" position.	ON vehicle	1. PNP switch	AT-110, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-199, "DTC VEHICLE SPEED SENSOR MTR"
		3. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. Low one-way clutch	AT-421, "OVERHAUL", AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		6. Brake band	AT-488, "Band Servo Piston Assembly"
		7. Low & reverse brake	AT-476, "Low & Reverse Brake"
Large shock changing from "12" to "11" in "1" position.	ON vehicle	1. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	2. Low & reverse brake	AT-476, "Low & Reverse Brake"
Transmission overheats.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Engine idling rpm	EC-38 [QR25 (WITH EURO-OBD)], EC-448 [QR25 (WITHOUT EURO-OBD)], EC-771 [QR20 (WITH EURO-OBD)], EC-1135 [QR20 (WITHOUT EURO-OBD)]
		3. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		4. Line pressure test	AT-67, "Line Pressure Test"
		5. Line pressure solenoid valve	AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Transmission overheats.	OFF vehicle	7. Oil pump	AT-444, "Oil Pump"
		8. Reverse clutch	AT-463, "Reverse Clutch"
		9. High clutch	AT-466, "High Clutch"
		10. Brake band	AT-488, "Band Servo Piston Assembly"
		11. Forward clutch	AT-471, "Forward and Overrun Clutches"
		12. Overrun clutch	AT-471, "Forward and Overrun Clutches"
		13. Low & reverse brake	AT-476, "Low & Reverse Brake"
		14. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
	OFF vehicle	2. Reverse clutch	AT-463, "Reverse Clutch"
		3. High clutch	AT-466, "High Clutch"
		4. Brake band	AT-488, "Band Servo Piston Assembly"
		5. Forward clutch	AT-471, "Forward and Overrun Clutches"
		6. Overrun clutch	AT-471, "Forward and Overrun Clutches"
		7. Low & reverse brake	AT-476, "Low & Reverse Brake"
Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
	OFF vehicle	2. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		3. Oil pump	AT-444, "Oil Pump"
		4. Reverse clutch	AT-463, "Reverse Clutch"
		5. High clutch	AT-466, "High Clutch"
		6. Brake band	AT-488, "Band Servo Piston Assembly"
		7. Forward clutch	AT-471, "Forward and Overrun Clutches"
		8. Overrun clutch	AT-471, "Forward and Overrun Clutches"
		9. Low & reverse brake	AT-476, "Low & Reverse Brake"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Torque converter is not locked up.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-199, "DTC VEHICLE SPEED SENSOR MTR"
		3. Engine speed signal	AT-127, "DTC P0725 ENGINE SPEED SIGNAL"
		4. A/T fluid temperature sensor	AT-193, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
		5. Line pressure test	AT-67, "Line Pressure Test"
		6. Torque converter clutch solenoid valve	AT-158, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		7. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
Torque converter is not locked up.	OFF vehicle	8. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-63, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-67, "Line Pressure Test"
		4. Torque converter clutch solenoid valve	AT-158, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		5. Line pressure solenoid valve	AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Lock-up point is extremely high or low. AT-229, "A/T Does Not Perform Lock-up"	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-199, "DTC VEHICLE SPEED SENSOR MTR"
		3. Torque converter clutch solenoid valve	AT-158, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
A/T does not shift to "D4" when driving with overdrive control switch "ON".	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. PNP switch	AT-110, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH"
		3. Overdrive control switch	AT-241, "TCM Self-diagnosis Does Not Activate"
		4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-199, "DTC VEHICLE SPEED SENSOR MTR"
		5. Shift solenoid valve A	AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"
		6. Overrun clutch solenoid valve	AT-185, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
		7. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		8. A/T fluid temperature sensor	AT-193, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
		9. Line pressure test	AT-67, "Line Pressure Test"
A/T does not shift to "D4" when driving with overdrive control switch "ON".	OFF vehicle	10. Brake band	AT-488, "Band Servo Piston Assembly"
		11. Overrun clutch	AT-471, "Forward and Overrun Clutches"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

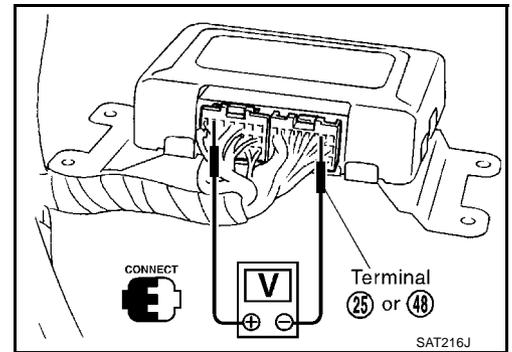
[EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
			EURO-OBD
Engine is stopped at "R", "D", "2" and "1" positions.	ON vehicle	1. Fluid level	AT-63. "FLUID LEVEL CHECK"
		2. Torque converter clutch solenoid valve	AT-158. "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		3. Shift solenoid valve A	AT-170. "DTC P0750 SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-175. "DTC P0755 SHIFT SOLENOID VALVE B"
		5. Control valve assembly	AT-414. "Control Valve Assembly and Accumulators"

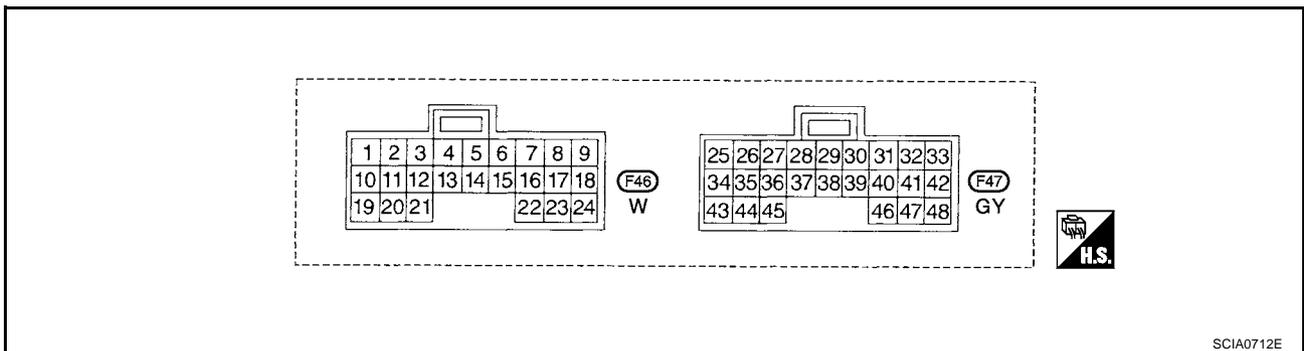
TCM Terminals and Reference Value PREPARATION

ECS004QV

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



TCM HARNESS CONNECTOR TERMINAL LAYOUT

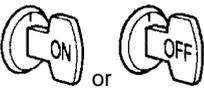
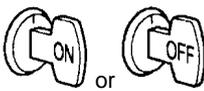
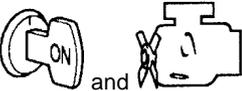
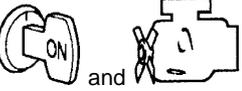
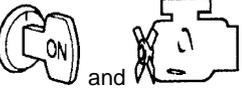
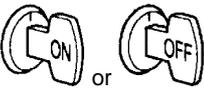


TCM INSPECTION TABLE (Data are reference values.)

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
1	R/W	Line pressure solenoid valve	When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
			When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve (with dropping resistor)	When releasing accelerator pedal after warming up engine.	5 - 14V
			When depressing accelerator pedal fully after warming up engine.	0V

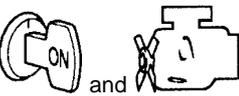
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
3	GY/R	Torque converter clutch solenoid valve		When A/T performs lock-up. 8 - 15V
				When A/T does not perform lock-up. 0V
5	QR20DE: B/W QR25DE: W/B	CAN-H (high)	—	—
6	L/R	CAN-L (low)	—	—
10	BR/W	Power source		When turning ignition switch to "ON". Battery voltage
				When turning ignition switch to "OFF". 0V
11	L/W	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in "D1" or "D4".) Battery voltage
				When shift solenoid valve A does not operate. (When driving in "D2" or "D3".) 0V
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in "D1" or "D2".) Battery voltage
				When shift solenoid valve B does not operate. (When driving in "D3" or "D4".) 0V
13	R/L	O/D OFF indicator lamp		When setting overdrive control or A/T check switch in "OFF" position. 0V
				When setting overdrive control or A/T check switch in "ON" position. Battery voltage
19	BR/W	Power source		Same as No. 10
20	L/B	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates. Battery voltage
				When overrun clutch solenoid valve does not operate. 0V
22	L/OR	Overdrive control switch		When setting overdrive control switch in "ON" position Battery voltage
				When setting overdrive control switch in "OFF" position 0V
25	B/W	Ground	—	0V
26	BR/Y	PNP switch "1" position		When setting selector lever to "1" position. Battery voltage
				When setting selector lever to other positions. 0V
27	L	PNP switch "2" position		When setting selector lever to "2" position. Battery voltage
				When setting selector lever to other positions. 0V
28	R/B	Power source (Memory back-up)		When turning ignition switch to "OFF". Battery voltage
				When turning ignition switch to "ON". Battery voltage

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EURO-OBD]

Terminal No.	Wire color	Item	Condition		Judgementstandard(Approx.)
29	W	Revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 CAUTION: Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	450 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
30 *3	G/B	CONSULT- II (RX)		—	—
31 *3	GY/L	CONSULT- II (TX)		—	—
32 *2	R	Throttle position sensor (Power source)		When turning ignition switch to "ON".	4.5 - 5.5V
				When turning ignition switch to "OFF".	0V
34	W/G	PNP switch "D" position		When setting selector lever to "D" position.	Battery voltage
				When setting selector lever to other positions.	0V
35	L/W	PNP switch "R" position		When setting selector lever to "R" position.	Battery voltage
				When setting selector lever to other positions.	0V
36	G	PNP switch "N" or "P" position		When setting selector lever to "N" or "P" position.	Battery voltage
				When setting selector lever to other positions.	0V
39 *2	L/OR	Engine speed signal		Refer to EC-87, "ECM INSPECTION TABLE" (QR25DE) or EC-819, "ECM INSPECTION TABLE" (QR20DE).	—
40	L/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 0V and more than 4.5V
41	W/R	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Throttle position sensor (Ground)	—	—	—
45	P	Stop lamp switch		When depressing brake pedal.	Battery voltage
				When releasing brake pedal.	0V
47	BR	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V
48	B/W	Ground	—	—	—

*2: These terminals are connected to the ECM.

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

CAN COMMUNICATION

PFP:23710

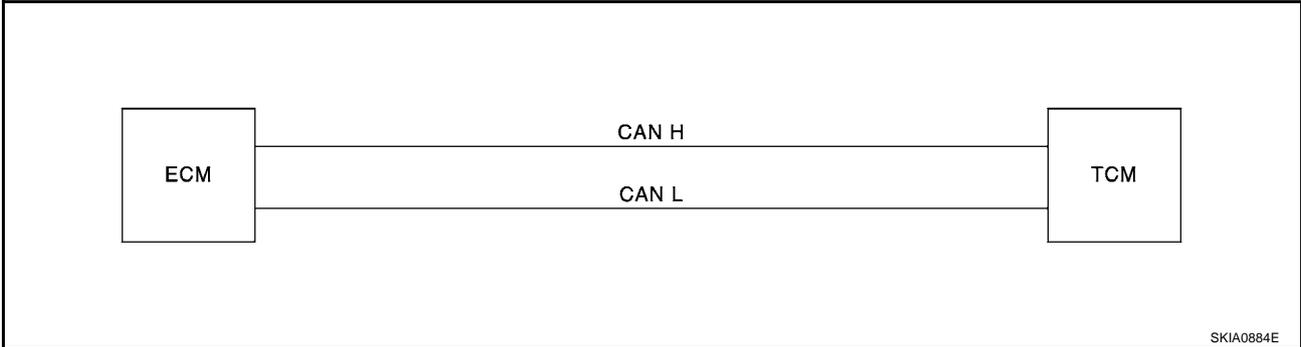
System Description

ECS004VP

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

FOR A/T MODELS

System diagram



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	TCM
Engine coolant temperature signal	T	R
Accelerator pedal position signal	T	R
A/T self-diagnosis signal	R	T

DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

[EURO-OBD]

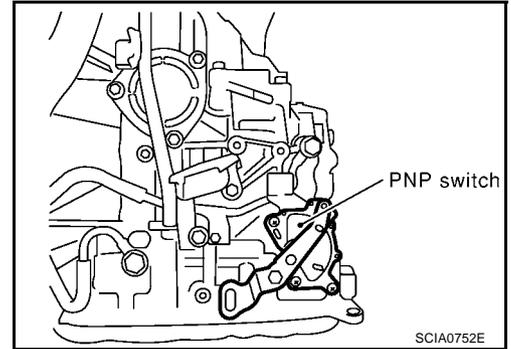
DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

PF0:32006

Description

ECS004QW

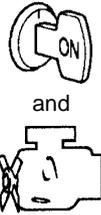
- The PNP switch assembly includes a transmission range switch.
- The transmission range switch detects the selector lever position and sends a signal to the TCM.



TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

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



ON BOARD DIAGNOSIS LOGIC

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

DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

[EURO-OBD]

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.

SELECT SYSTEM
A/T
ENGINE

SAT014K

Ⓜ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.

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

THRTL POS SEN: More than 1.3V

Selector lever: D position (OD "ON" or "OFF")

Ⓜ With GST

Follow the procedure "With CONSULT-II".

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
ACTIVE TEST
DTC & SRT CONFIRMATION
ECM PART NUMBER

SAT020K

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

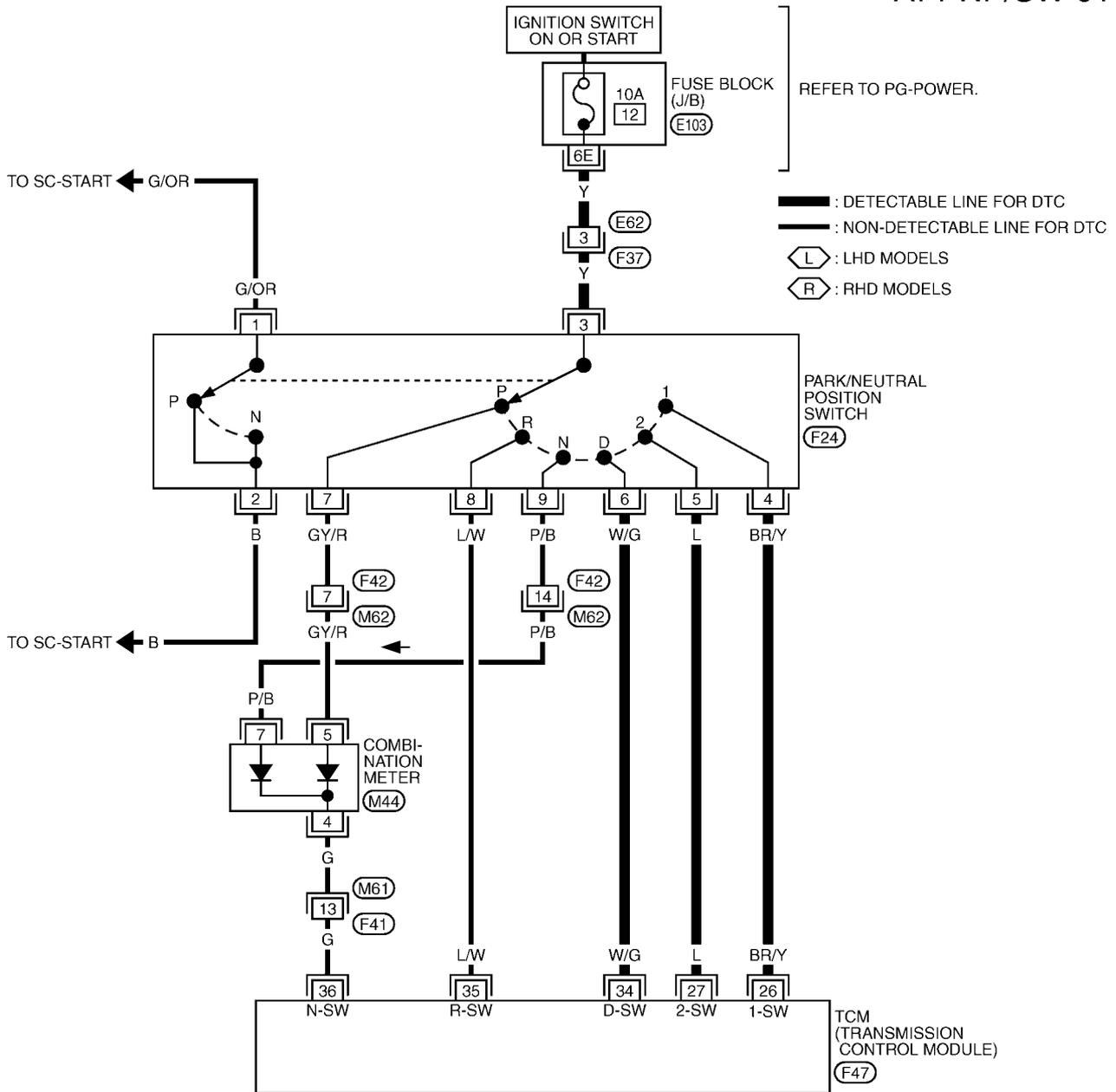
DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

[EURO-OBD]

Wiring Diagram — AT — PNP/SW

ECS004QX

AT-PNP/SW-01

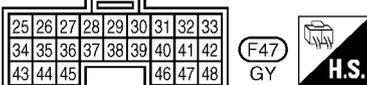
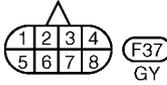
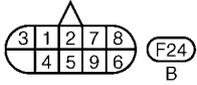


1	2	3	4	5	6	7	8	9	10	11		
12	13	14	15	16	17	18	19	20	21	22	23	24

(M44) BR: L, W: R
(M61) BR

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

(M62) W



REFER TO THE FOLLOWING.
(E103) - FUSE BLOCK-JUNCTION BOX (J/B)

Diagnostic Procedure

ECS004QY

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.

No >> GO TO 3.

2. 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/N", "R", "D", "2" and "1" position switches moving selector lever to each position.

SELECT SYSTEM	
A/T	
ENGINE	

SAT014K

Check the signal of the selector lever position is indicated properly.

OK or NG

OK >> GO TO 4.

NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- PNP switch
Refer to [AT-115, "Component Inspection"](#) .
- Harness for short or open between ignition switch and PNP switch
- Harness for short or open between PNP switch and TCM
- Ignition switch and fuse
Refer to [PG-2, "POWER SUPPLY ROUTING"](#) .
- Diode (P, N positions)

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

SAT701J

3. CHECK PNP SWITCH CIRCUIT (WITHOUT CONSULT-II)

⊗ Without CONSULT-II

1. Turn ignition switch to "ON" position.
(Do not start engine.)
2. Check voltage between TCM terminals 26, 27, 34, 35, 36 and ground while moving selector lever through each position.

Voltage:
B: Battery voltage
0: 0V

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

SAT840J

OK or NG

OK >> GO TO 4.

NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- PNP switch
Refer to [AT-115, "Component Inspection"](#) .
- Harness for short or open between ignition switch and PNP switch
- Harness for short or open between PNP switch and TCM
- Ignition switch and fuse
Refer to [PG-2, "POWER SUPPLY ROUTING"](#) .
- Diode (P, N positions)

4. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-111, "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

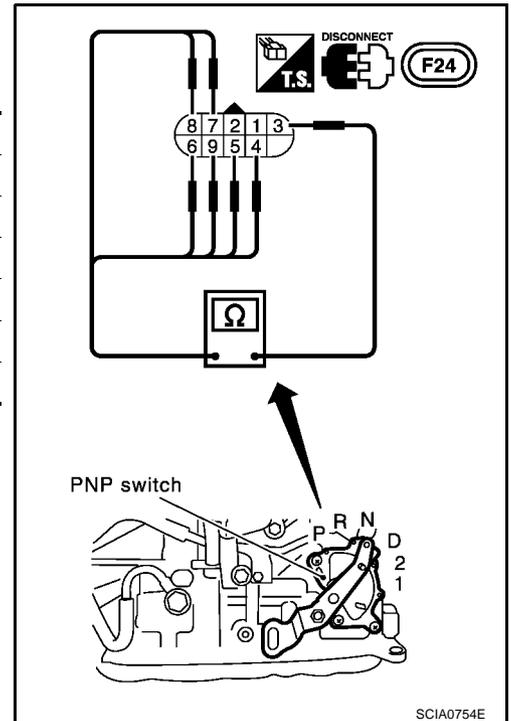
[EURO-OBD]

ECS004QZ

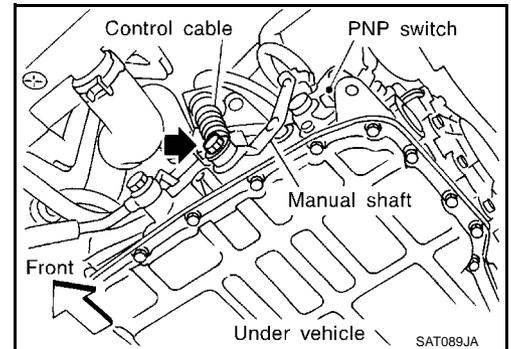
Component Inspection PARK/NEUTRAL POSITION SWITCH

1. Check continuity between terminals 1 and 3 and between terminals 2 and 4, 5, 6, 7, 8, 9 while moving manual shaft through each position.

Lever position	Terminal No.	
P	3 - 7	1 - 2
R	3 - 8	
N	3 - 9	1 - 2
D	3 - 6	
2	3 - 5	
1	3 - 4	



2. If NG, check again with control cable disconnected from manual shaft of A/T assembly. Refer to step 1.
3. If OK on step 2, adjust control cable. Refer to [AT-51, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#).
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-414, "Control Valve Assembly and Accumulators"](#).
6. If NG on step 4, replace PNP switch.



DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[EURO-OBD]

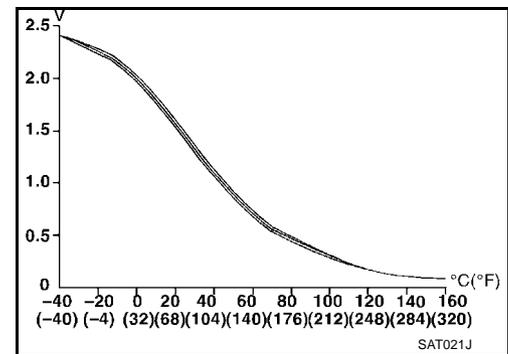
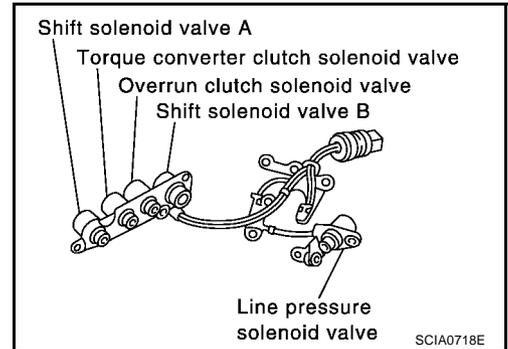
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

PFP:31940

Description

ECS004R0

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



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

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

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

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

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: ATF TEMP SEN/CIRC	TCM receives an excessively low or high voltage from the sensor.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● A/T fluid temperature sensor
: P0710		

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[EURO-OBD]

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.

SELECT SYSTEM
A/T
ENGINE

SAT014K

Ⓜ With CONSULT-II

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

2. Start engine and maintain the following conditions for at least 10 minutes (Total). (It is not necessary to maintain continuously.)

CMPS-RPM (REF): 450 rpm or more

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

THRTL POS SEN: More than 1.2V

Selector lever: D position (OD "ON")

Ⓜ With GST

Follow the procedure "With CONSULT-II".

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
ACTIVE TEST
DTC & SRT CONFIRMATION
ECM PART NUMBER

SAT020K

A

B

AT

D

E

F

G

H

I

J

K

L

M

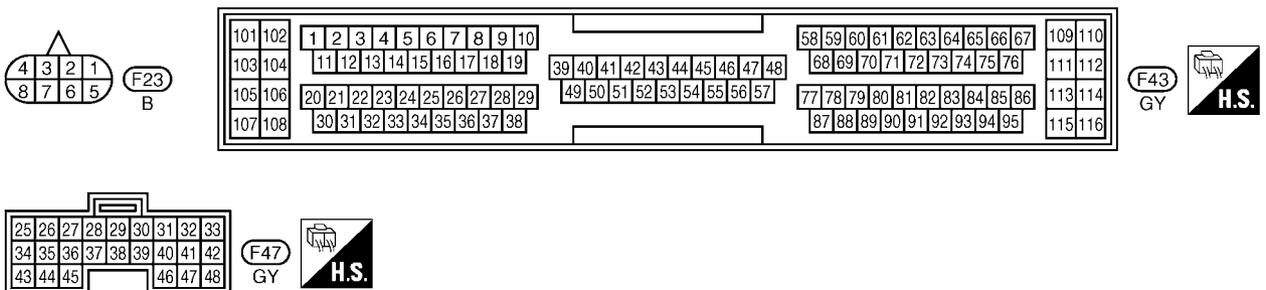
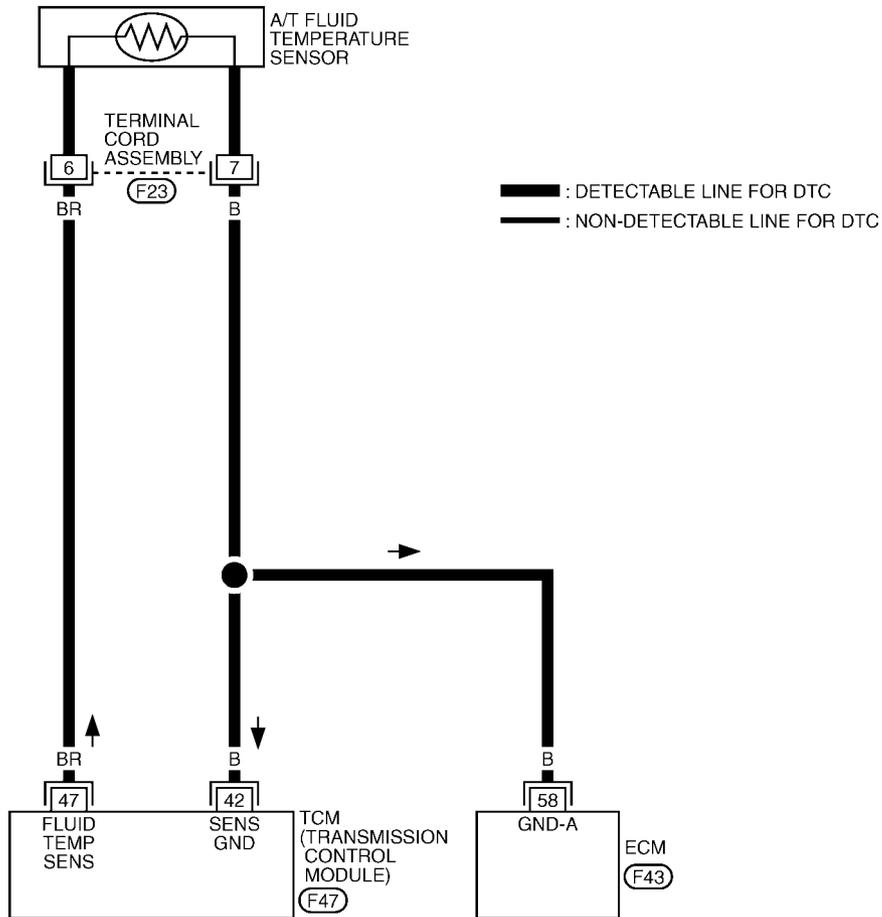
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

[EURO-OBD]

Wiring Diagram — AT — FTS

ECS004R1

AT-FTS-01



Diagnostic Procedure

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

- Yes >> GO TO 2.
- No >> GO TO 3.

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

With CONSULT-II

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

SELECT SYSTEM	
A/T	
ENGINE	

SAT014K

Voltage:

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

Approximately 1.5V → 0.5V

OK or NG

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

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

SAT614J

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

⊗ Without CONSULT-II

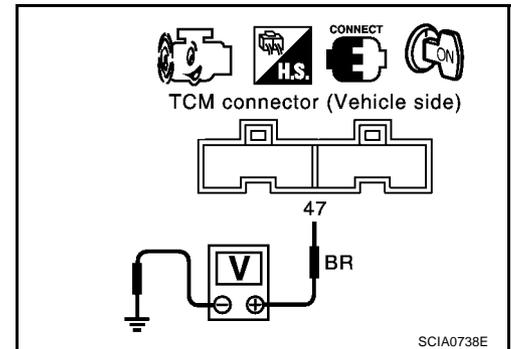
1. Start engine.
2. Check voltage between TCM terminal 47 and ground while warming up A/T.

Voltage:

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

Approximately 1.5V → 0.5V

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

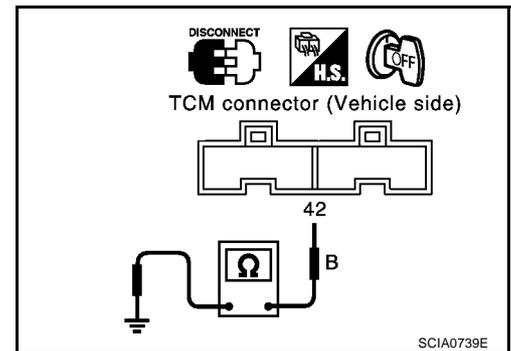


Continuity should exist.

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

OK or NG

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



4. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-117, "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.

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

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

Resistance:

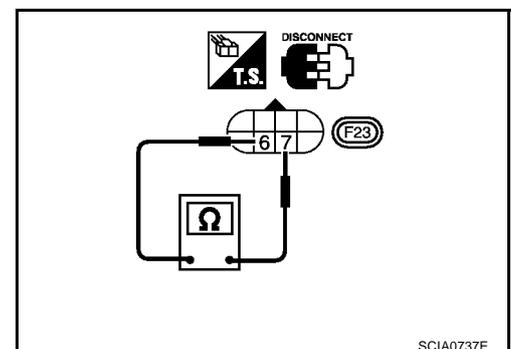
Cold [20°C (68°F)]

Approximately 2.5 kΩ

4. Reinstall any part removed.

OK or NG

- OK (With CONSULT-II)>>GO TO 2.
 OK (Without CONSULT-II)>>GO TO 3.
 NG >> 1. Remove oil pan.
 2. Check the following items:
 - A/T fluid temperature sensor
 Refer to [AT-121, "Component Inspection"](#).
 - Harness of terminal cord assembly for short or open



DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

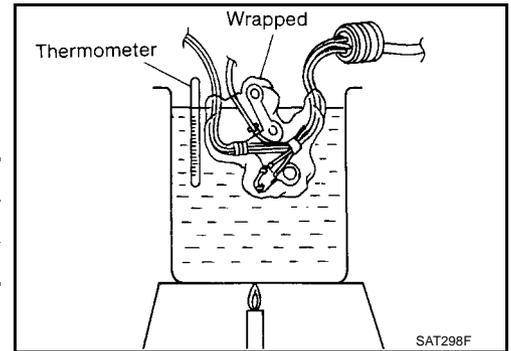
[EURO-OBD]

ECS004R3

Component Inspection A/T FLUID TEMPERATURE SENSOR

- For removal, refer to [AT-414, "Control Valve Assembly and Accumulators"](#).
- Check resistance between two terminals while changing temperature as shown at left.

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



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

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

[EURO-OBD]

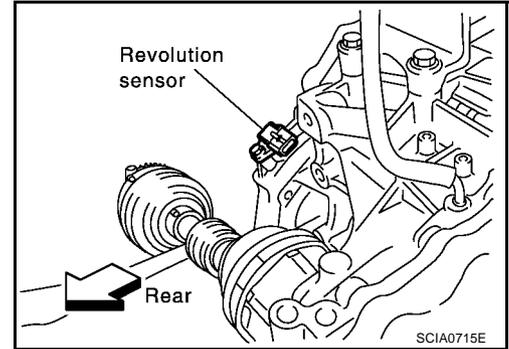
DTC P0720 VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

PFP:32702

Description

ECS004R4

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



TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

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

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
 : VEH SPD SEN/CIR AT  : P0720	TCM does not receive the proper voltage signal from the sensor.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Revolution sensor

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

[EURO-OBID]

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.

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Drive vehicle and check for an increase of "VHCL/S SE·MTR" value increase.
If the check result is NG, go to [AT-125, "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 (OD "ON")

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

If the check result is NG, go to [AT-125, "Diagnostic Procedure"](#).

If the check result is OK, go to following step.

SELECT DIAG MODE
SELF-DIAG RESULTS
DATA MONITOR
DTC WORK SUPPORT
TCM PART NUMBER

SAT971J

SELECT SYSTEM
A/T
ENGINE

SAT014K

5. Maintain the following conditions for at least 5 consecutive seconds.

CMPS·RPM (REF): 3,500 rpm or more

THRTL POS SEN: More than 1.2V

Selector lever: D position (OD "ON")

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

With GST

Follow the procedure "With CONSULT-II".

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
ACTIVE TEST
DTC & SRT CONFIRMATION
ECM PART NUMBER

SAT020K

Diagnostic Procedure

ECS004R6

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

1. CHECK INPUT SIGNAL (WITH CONSULT-II)

With CONSULT-II

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

SELECT SYSTEM	
A/T	
ENGINE	

SAT014K

Check the value changes according to driving speed.

OK or NG

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

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

SAT614J

2. CHECK REVOLUTION SENSOR (WITH CONSULT-II)

With CONSULT-II

1. Start engine.

Condition	Judgement standard (Approx.)
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. *1 CAUTION: Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	Approximately 150 Hz
When vehicle parks.	Under 1.3V or 4.5V

MTBL0581

- Harness for short or open between TCM, ECM and revolution sensor
- Harness for short or open between ignition switch and revolution sensor

OK or NG

- OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-123, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

4. CHECK TCM INSPECTION

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

OK or NG

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

DTC P0725 ENGINE SPEED SIGNAL

PFP:24825

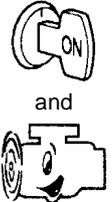
Description

ECS004R7

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	L/OR	Engine speed signal	 <p style="text-align: center;">and</p>	—
<p>Refer to EC-87. "ECM INSPECTION TABLE" (QR25DE) or EC-819. "ECM INSPECTION TABLE" (QR20DE).</p>				

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check item (Possible cause)
<p> : ENGINE SPEED SIG</p> <p> : P0725</p>	TCM does not receive the proper voltage signal from ECM.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.)

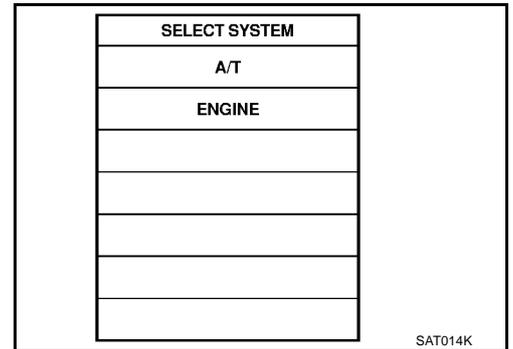
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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



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

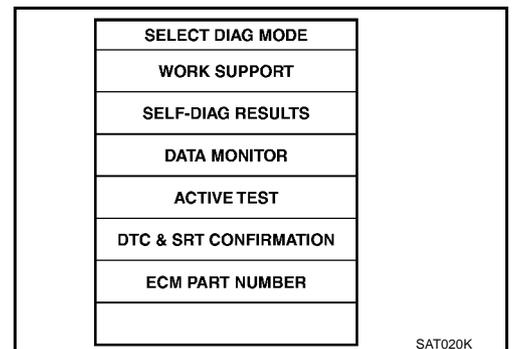
 With CONSULT-II

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for "ENGINE" with CONSULT-II.
2. Start engine and maintain the following conditions for at least 10 consecutive seconds.

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

THRTL POS SEN: More than 1.2V

Selector lever: D position (OD "ON")



 With GST

Follow the procedure "With CONSULT-II".

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

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

NG >> Check ignition signal circuit for engine control. Refer to [EC-379, "IGNITION SIGNAL"](#) (QR25DE) or [EC-1074, "IGNITION SIGNAL"](#) (QR20DE).

2. CHECK INPUT SIGNAL (WITH CONSULT-II)

 **With CONSULT-II**

1. Start engine.
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "ENGINE SPEED".

SELECT SYSTEM	
A/T	
ENGINE	

SAT014K

Check engine speed changes according to throttle position.

OK or NG

OK >> GOTO4

NG >> Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil. Refer to [EC-379, "IGNITION SIGNAL"](#) (QR25DE) or [EC-1074, "IGNITION SIGNAL"](#) (QR20DE).

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

SAT645J

3. CHECK INPUT SIGNAL (WITHOUT CONSULT-II)

⊗ Without CONSULT-II

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

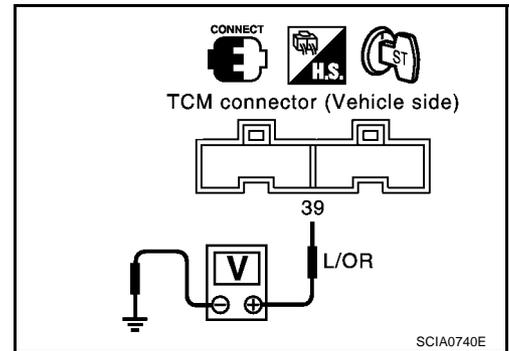
Voltage (Idle speed): Refer to [EC-87, "ECM INSPECTION TABLE" \(QR25DE\)](#) or [EC-819, "ECM INSPECTION TABLE" \(QR20DE\)](#).

OK or NG

OK >> GOTO4

NG >> Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil. Refer to [EC-379, "IGNITION SIGNAL" \(QR25DE\)](#) or [EC-1074, "IGNITION SIGNAL" \(QR20DE\)](#).



4. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-127, "DTC P0725 ENGINE SPEED SIGNAL"](#).

OK or NG

OK >> **INSPECTION END**

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

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

DTC P0731 A/T 1ST GEAR FUNCTION

[EURO-OBD]

DTC P0731 A/T 1ST GEAR FUNCTION

PFP:31940

Description

ECS004RA

- 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 DIAGNOSTIC 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

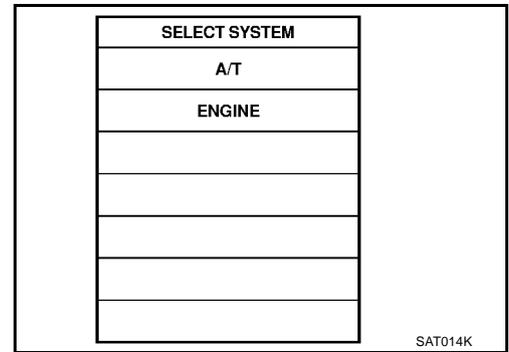
*: P0731 is detected.

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
(P) : A/T 1ST GR FNCTN (P) : P0731	A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	<ul style="list-style-type: none"> • Shift solenoid valve A • Shift solenoid valve B • Each clutch • Hydraulic control circuit

DTC P0731 A/T 1ST GEAR FUNCTION

[EURO-OBD]

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

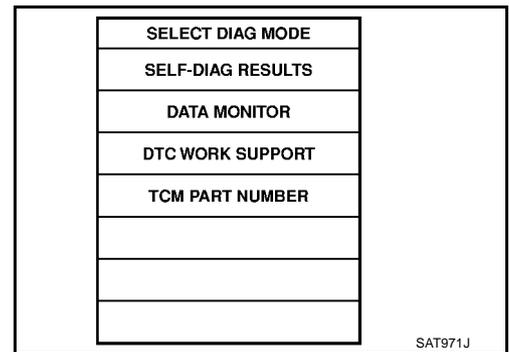


CAUTION:

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

NOTE:

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



TESTING CONDITION:

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

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

④ With CONSULT-II

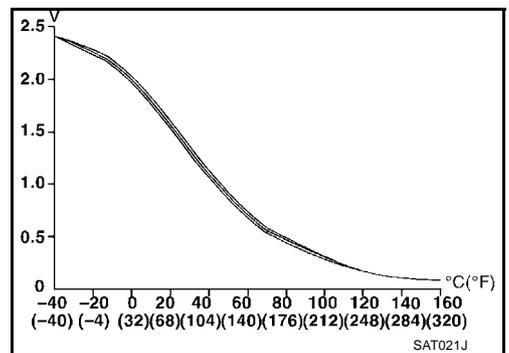
1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
FLUID TEMP SEN: 0.4 - 1.5V
If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the 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 15 to 20 km/h (9 to 12 MPH) under the following condition and release the accelerator pedal completely.
THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
Selector lever: D position (OD "ON")

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

5. Depress accelerator pedal to WOT (more than 7.0/8 of "THROTTLE POSI") quickly from a speed of 15 to 20 km/h (9 to 12 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-135. "Diagnostic Procedure"](#).

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

- Check that "GEAR" shows "1" when depressing accelerator pedal to WOT.
- If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAGNOSIS" for "ENGINE". In case a 1st trip DTC other than P0731 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".

DTC P0731 A/T 1ST GEAR FUNCTION

[EURO-OBD]

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-135, "Diagnostic Procedure"](#) .
Refer to [AT-521, "Shift Schedule"](#) .

 **With GST**

Follow the procedure "With CONSULT-II".

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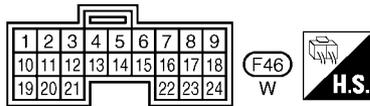
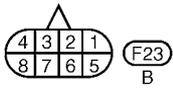
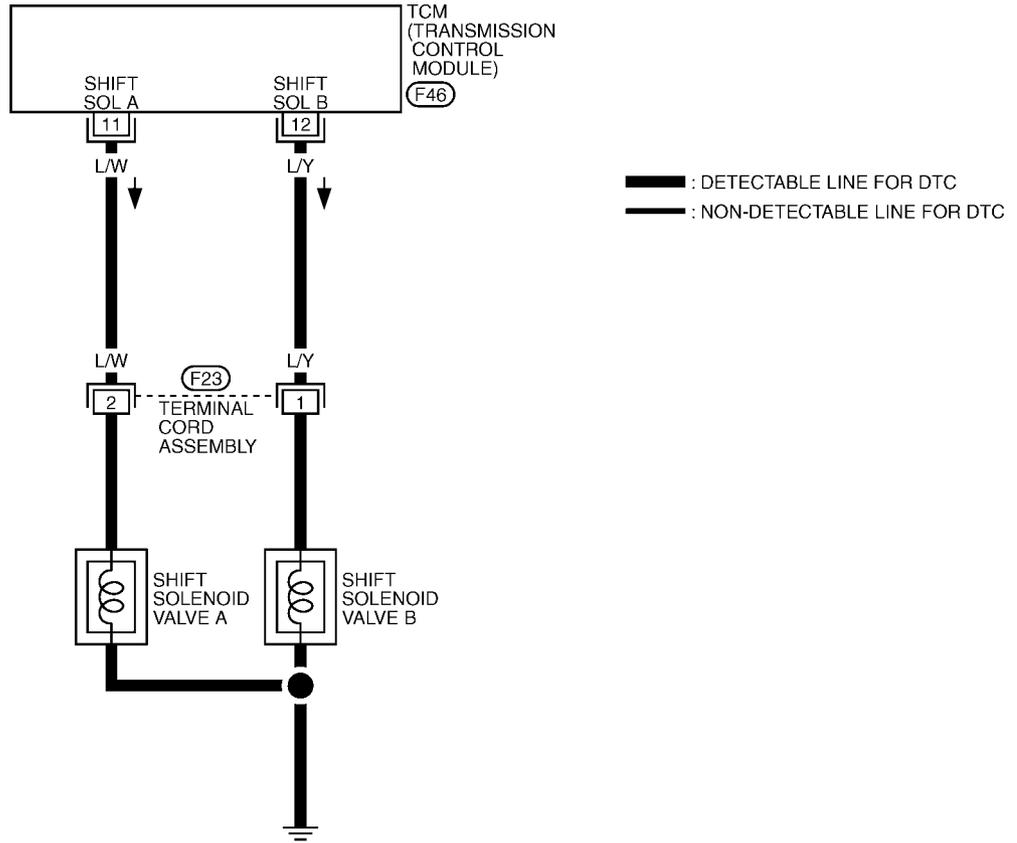
DTC P0731 A/T 1ST GEAR FUNCTION

[EURO-OBD]

Wiring Diagram — AT — 1ST

ECS004RB

AT-1STSIG-01



TCWA0049E

Diagnostic Procedure

1. CHECK SHIFT SOLENOID VALVE

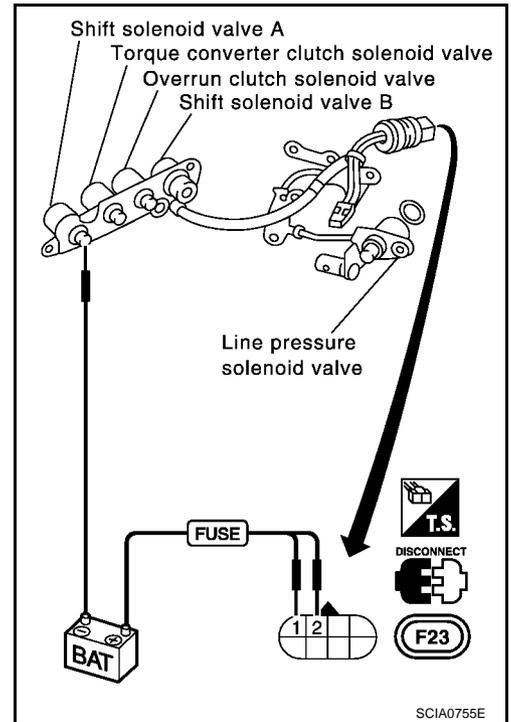
1. Remove control valve assembly. Refer to [AT-414, "Control Valve Assembly and Accumulators"](#)
2. Check shift solenoid valve operation.

- Shift solenoid valve A
- Shift solenoid valve B

Refer to [AT-136, "Component Inspection"](#) .

OK or NG

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

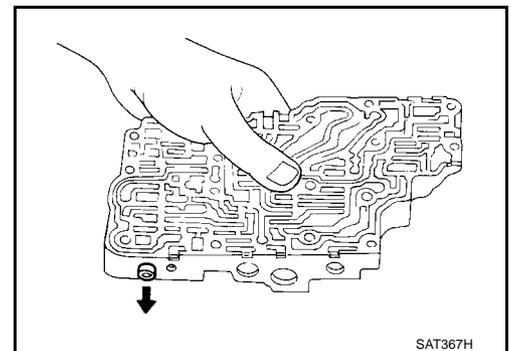


2. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-448, "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

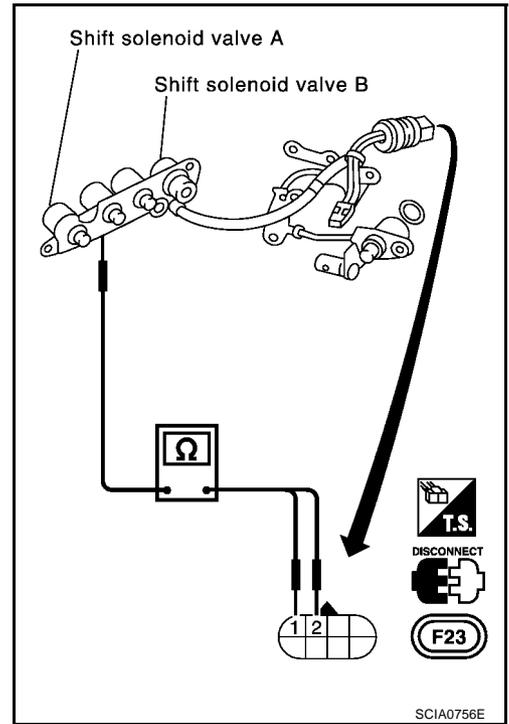
Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-132, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

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

Component Inspection SHIFT SOLENOID VALVE A AND B

- For removal, refer to [AT-414, "REMOVAL"](#) .



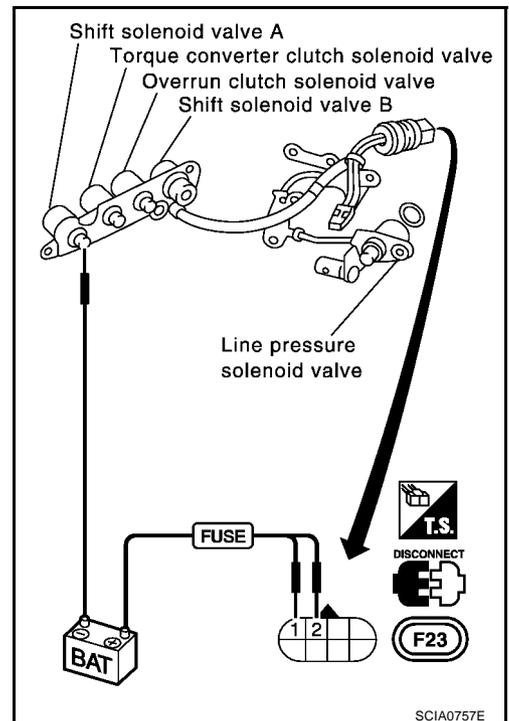
Resistance Check

- Check resistance between two terminals.

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

Operation Check

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



DTC P0732 A/T 2ND GEAR FUNCTION

PFP:31940

Description

ECS004RE

- 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	 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".)

ON BOARD DIAGNOSTIC LOGIC

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

Torque converter slip ratio = A x C/B

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is higher than the position (2nd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.

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

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

*: P0732 is detected.

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
 : A/T 2ND GR FNCTN  : P0732	A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	<ul style="list-style-type: none"> ● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit

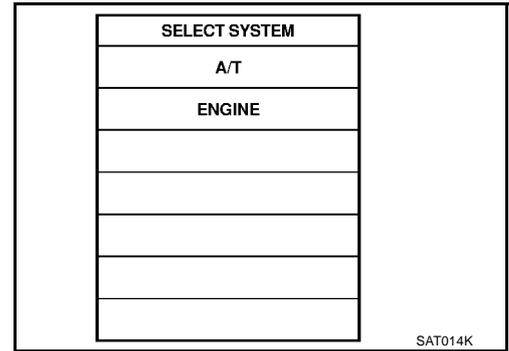
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

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

NOTE:

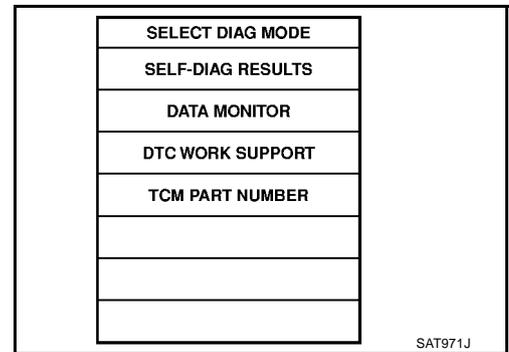
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.



TESTING CONDITION:

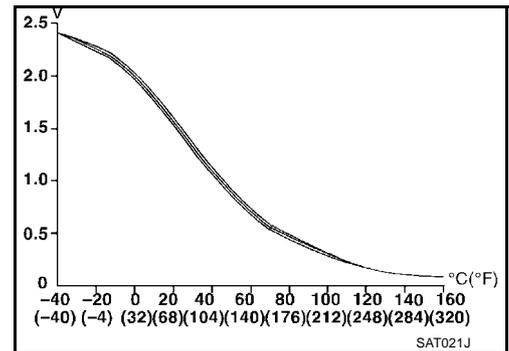
Always drive vehicle on a level road to improve the accuracy of test.

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



With CONSULT-II

1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
FLUID TEMP SEN: 0.4 - 1.5V
 If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select "2ND GR FNCTN P0732" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".
4. Accelerate vehicle to 35 to 40 km/h (22 to 25 MPH) under the following condition and release the accelerator pedal completely.
THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
Selector lever: D position (OD "ON")
 - Check that "GEAR" shows "3" or "4" after releasing pedal.
5. Depress accelerator pedal to WOT (more than 7.0/8 of "THROTTLE POSI") quickly from a speed of 35 to 40 km/h (22 to 25 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-141, "Diagnostic Procedure"](#).
 If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.
 - Check that "GEAR" shows "2" when depressing accelerator pedal to WOT.
 - If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAGNOSIS" for "ENGINE". In case a 1st trip DTC other than P0732 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".
6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)



Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
-------------------	---

DTC P0732 A/T 2ND GEAR FUNCTION

[EURO-OBD]

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-141, "Diagnostic Procedure"](#) .
Refer to [AT-521, "Shift Schedule"](#) .

With GST

Follow the procedure "With CONSULT-II".

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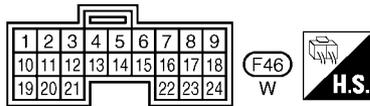
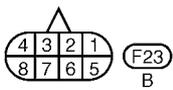
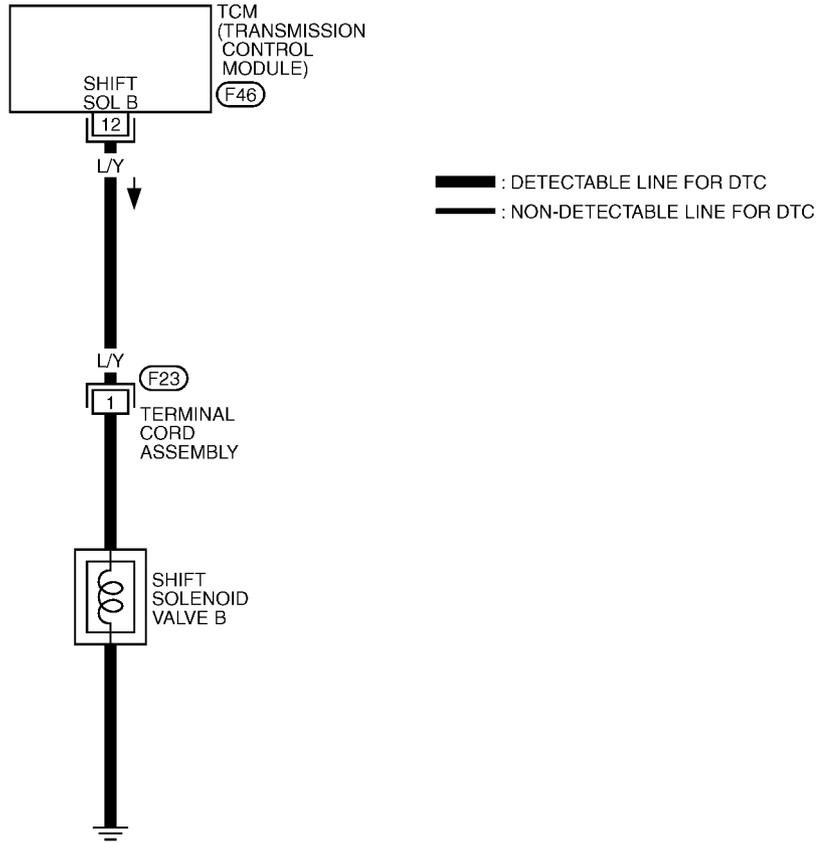
DTC P0732 A/T 2ND GEAR FUNCTION

[EURO-OBD]

Wiring Diagram — AT — 2ND

ECS004RF

AT-2NDSIG-01



TCWA0050E

Diagnostic Procedure

1. CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to [AT-414, "REMOVAL"](#) .
2. Check shift solenoid valve operation.

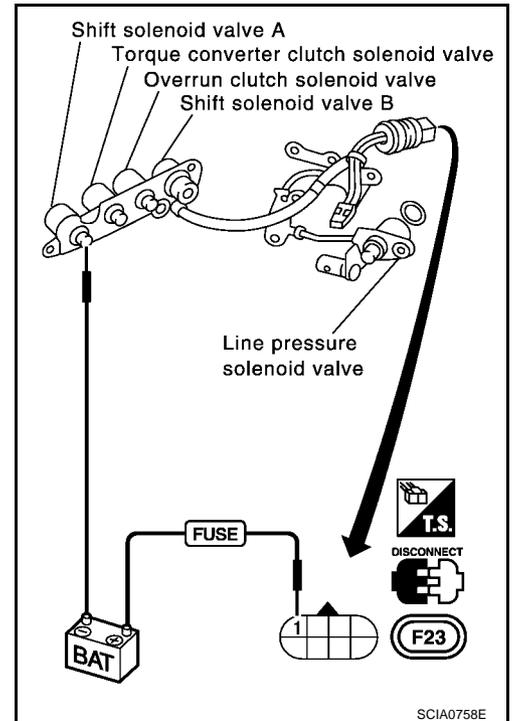
- Shift solenoid valve B

Refer to [AT-142, "Component Inspection"](#) .

OK or NG

OK >> GO TO 2.

NG >> Repair or replace shift solenoid valve assembly.



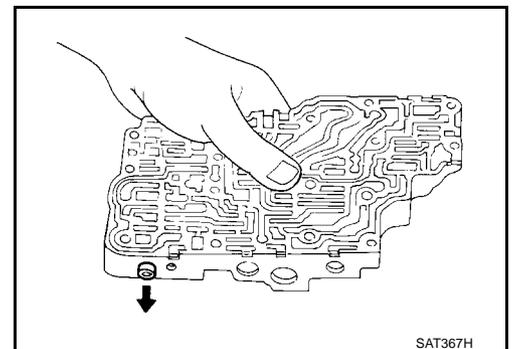
2. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-448, "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-138, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

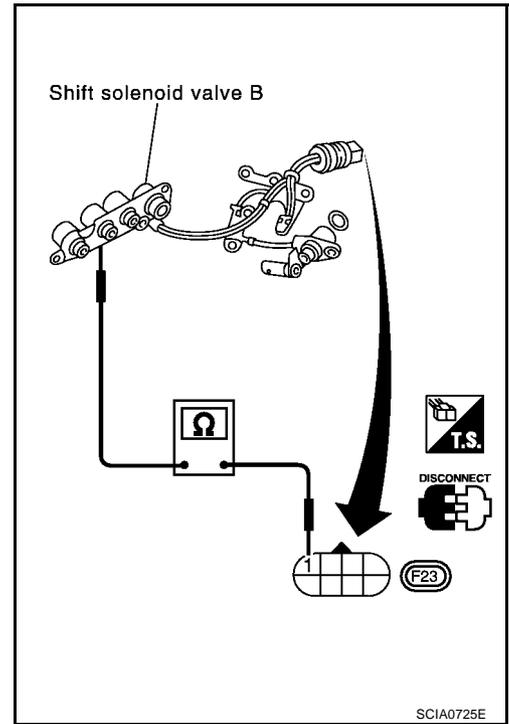
OK or NG

OK >> **INSPECTION END**

NG >> Check transaxle inner parts (clutch, brake, etc.).

Component Inspection SHIFT SOLENOID VALVE B

- For removal, refer to [AT-414, "REMOVAL"](#) .



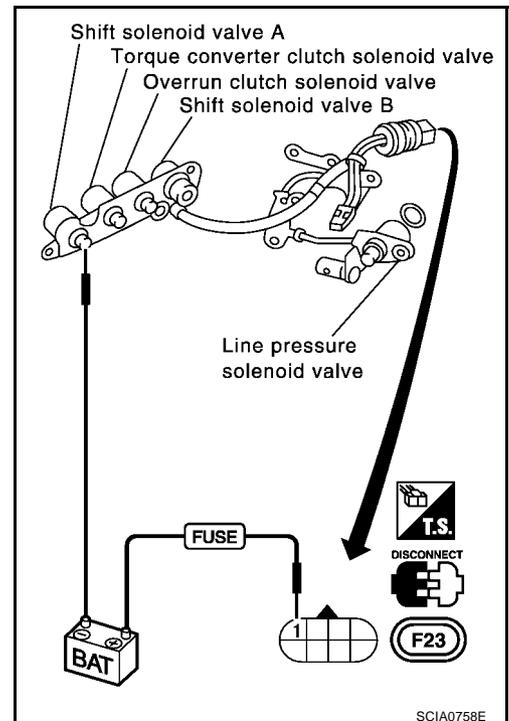
Resistance Check

- Check resistance between two terminals.

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

Operation Check

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



DTC P0733 A/T 3RD GEAR FUNCTION

PFP:31940

Description

ECS004RI

- 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 DIAGNOSTIC 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 (3rd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.

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

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

*: P0733 is detected.

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

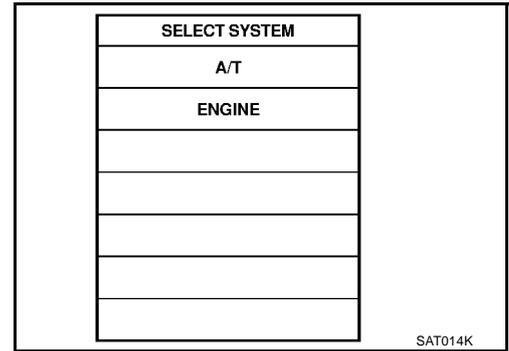
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

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

NOTE:

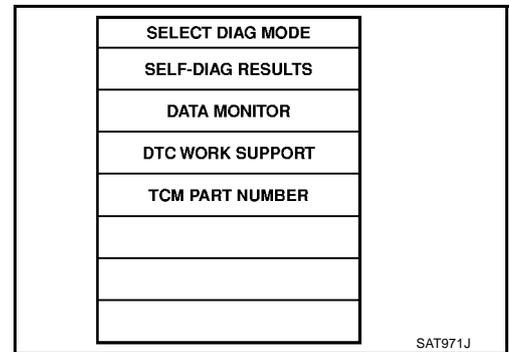
If “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch “OFF” and wait at least 5 seconds before conducting the next test.



TESTING CONDITION:

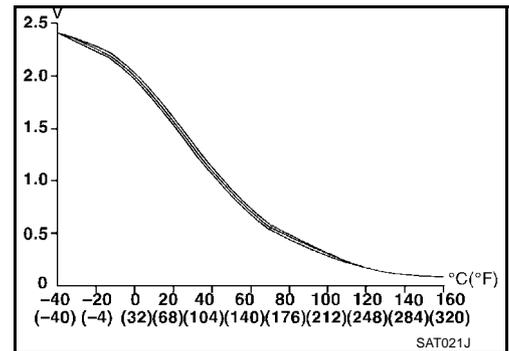
Always drive vehicle on a level road to improve the accuracy of test.

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



With CONSULT-II

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
FLUID TEMP SEN: 0.4 - 1.5V
 If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select “3RD GR FNCTN P0733” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.
4. Accelerate vehicle to 55 to 70 km/h (34 to 44 MPH) under the following condition and release the accelerator pedal completely.
THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
Selector lever: D position (OD “ON”)
 - Check that “GEAR” shows “4” after releasing pedal.
5. Depress accelerator pedal steadily with 3.5/8 - 4.5/8 of “THROTTLE POSI” from a speed of 55 to 70 km/h (34 to 44 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-147, "Diagnostic Procedure"](#) .
 If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.
 - Check that “GEAR” shows “3” when depressing accelerator pedal with 3.5/8 - 4.5/8 of “THROTTLE POSI”.
 - If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAGNOSIS” for “ENGINE”. In case a 1st trip DTC other than P0733 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.
6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)



DTC P0733 A/T 3RD GEAR FUNCTION

[EURO-OBD]

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-147, "Diagnostic Procedure"](#) .)
Refer to [AT-147, "Diagnostic Procedure"](#) .
Refer to [AT-521, "Shift Schedule"](#) .

 **With GST**

Follow the procedure "With CONSULT-II".

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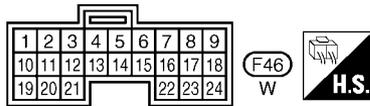
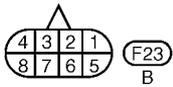
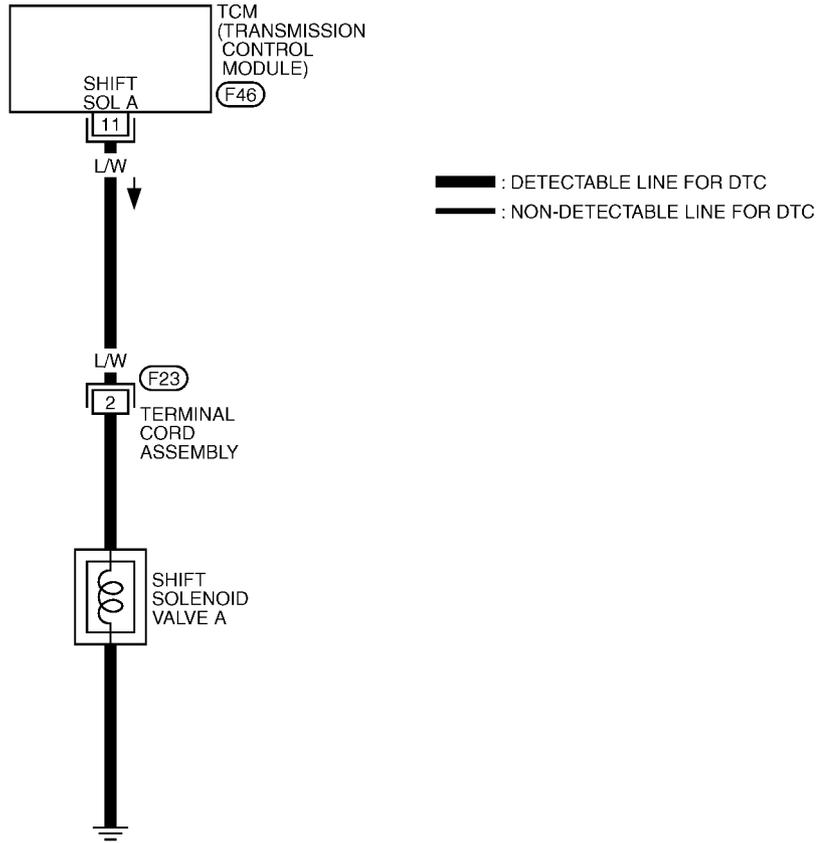
DTC P0733 A/T 3RD GEAR FUNCTION

[EURO-OBD]

Wiring Diagram — AT — 3RD

ECS004RJ

AT-3RDSIG-01



TCWA0051E

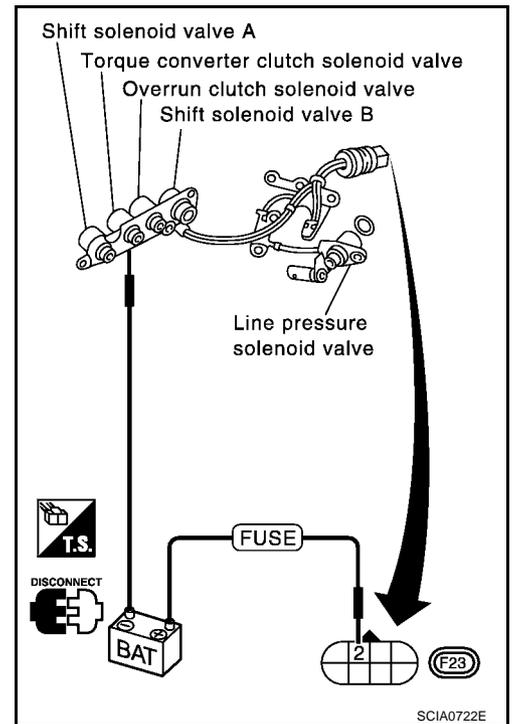
Diagnostic Procedure

1. CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to [AT-414, "REMOVAL"](#) .
2. Check shift solenoid valve operation.
 - Shift solenoid valve A
Refer to "Component Inspection" below.

OK or NG

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

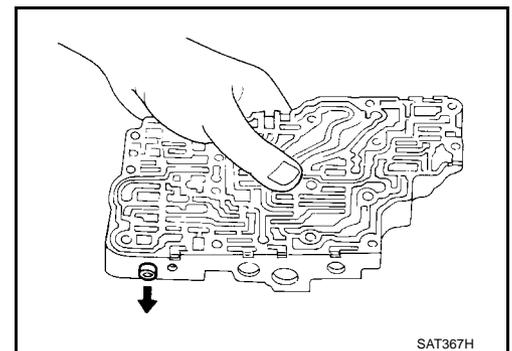


2. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to [AT-448, "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

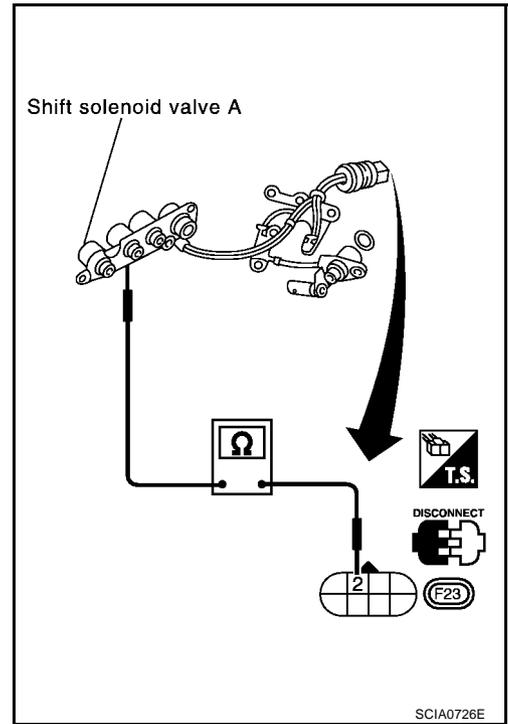
Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-143, "DTC P0733 A/T 3RD GEAR FUNCTION"](#) .

OK or NG

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

Component Inspection SHIFT SOLENOID VALVE A

- For removal, refer to [AT-414, "Control Valve Assembly and Accumulators"](#).



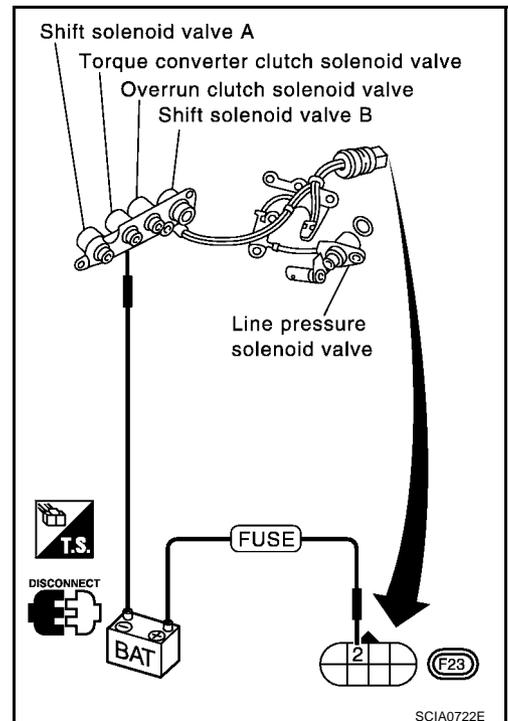
Resistance Check

- Check resistance between two terminals.

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

Operation Check

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



DTC P0734 A/T 4TH GEAR FUNCTION

[EURO-OBD]

DTC P0734 A/T 4TH GEAR FUNCTION

PF3:31940

Description

ECS004RM

- 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 line pressure is low as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

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

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

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

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
1	R/W	Line pressure solenoid valve	When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
			When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve (with dropping resistor)	When releasing accelerator pedal after warming up engine.	5 - 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

DTC P0734 A/T 4TH GEAR FUNCTION

[EURO-OBD]

ON BOARD DIAGNOSTIC LOGIC

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

Torque converter slip ratio = $A \times C/B$

A: Output shaft revolution signal from revolution sensor

B: Engine speed signal from ECM

C: Gear ratio determined as gear position which TCM supposes

If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction. This malfunction will be caused when shift solenoid valve A is stuck open or shift solenoid valve B is stuck closed.

Gear 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 closed	1	2	2	1*

*: P0734 is detected.

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

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
 : A/T 4TH GR FNCTN	A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	<ul style="list-style-type: none"> ● Shift solenoid valve A ● Shift solenoid valve B ● Line pressure solenoid valve ● Each clutch ● Hydraulic control circuit
 : P0734		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

- Always drive vehicle at a safe speed.
- If conducting this “DTC CONFIRMATION PROCEDURE” again, always turn ignition switch “OFF” and wait at least 5 seconds before continuing.
- Be careful not to rev engine into the red zone on the tachometer.

SELECT SYSTEM
A/T
ENGINE

SAT014K

NOTE:

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

TESTING CONDITION:

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

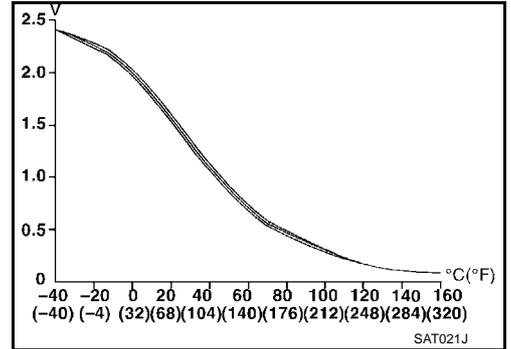
After the repair, perform the following procedure to confirm the malfunction is eliminated.

SELECT DIAG MODE
SELF-DIAG RESULTS
DATA MONITOR
DTC WORK SUPPORT
TCM PART NUMBER

SAT971J

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 55 to 65 km/h (34 to 40 MPH) under the following condition and release the accelerator pedal completely.
THROTTLE POSI: Less than 5.5/8 (at all times during step 4)
Selector lever: D position (OD "ON")
 - Check that "GEAR" shows "3" after releasing pedal.
5. Depress accelerator pedal steadily with 1.0/8 - 2.0/8 of "THROTTLE POSI" from a speed of 55 to 65 km/h (34 to 40 MPH) until "TESTING" has turned to "STOP VEHICLE" or "COMPLETED".
 (It will take approximately 3 seconds.)
 If the check result NG appears on CONSULT-II screen, go to [AT-153, "Diagnostic Procedure"](#).
 If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.
 - Check that "GEAR" shows "4" when depressing accelerator pedal with 1.0/8 - 2.0/8 of "THROTTLE POSI".
 - If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAGNOSIS" for "ENGINE". In case a 1st trip DTC other than P0734 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".
6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)



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

8. Make sure that "OK" is displayed. (If "NG" is displayed, refer to [AT-153, "Diagnostic Procedure"](#).)
 Refer to [AT-153, "Diagnostic Procedure"](#).
 Refer to [AT-521, "Shift Schedule"](#).

With GST

Follow the procedure "With CONSULT-II".

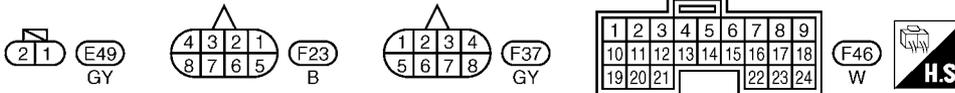
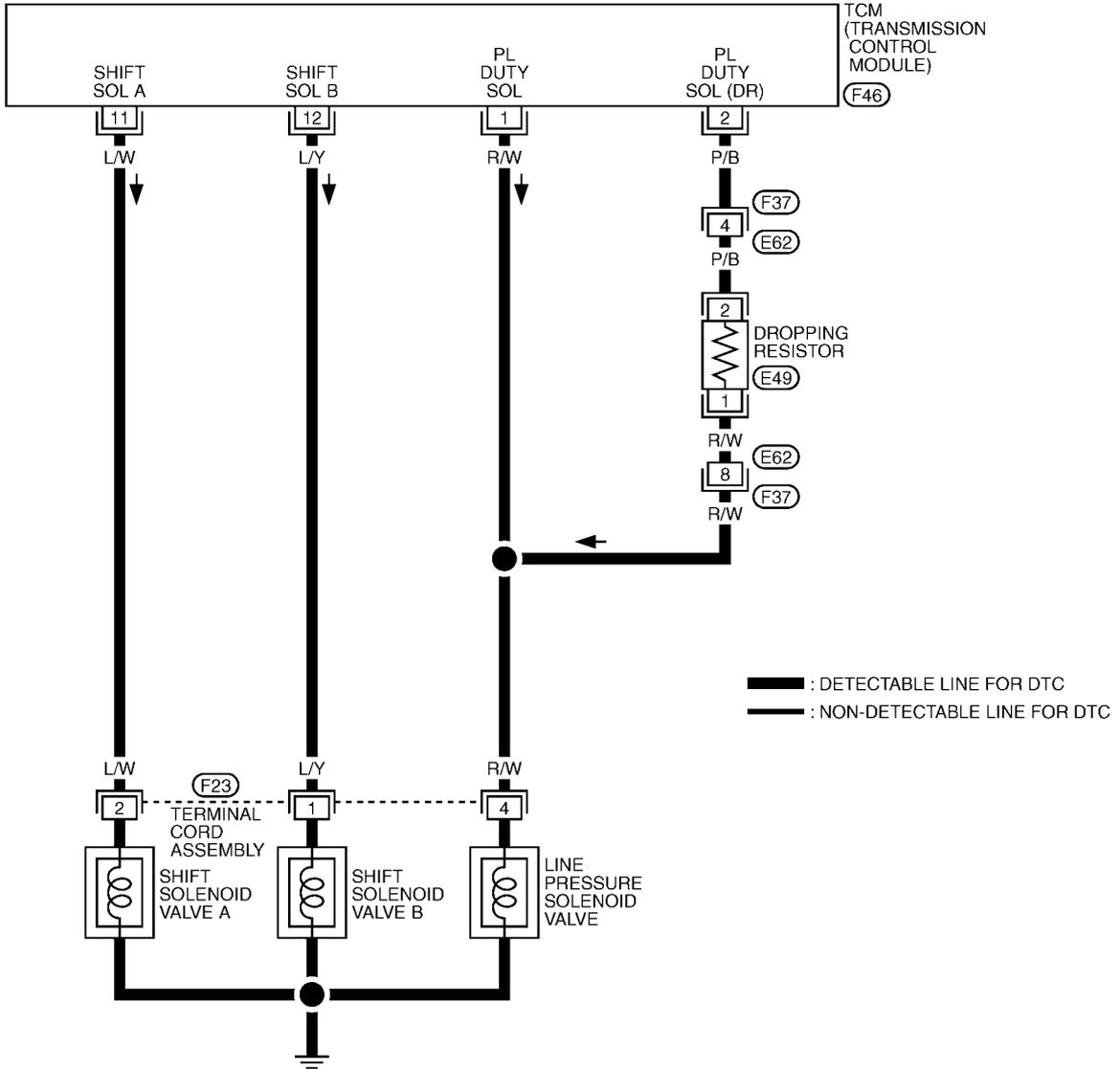
DTC P0734 A/T 4TH GEAR FUNCTION

[EURO-OBD]

Wiring Diagram — AT — 4TH

ECS004RN

AT-4THSIG-01



TCWA0052E

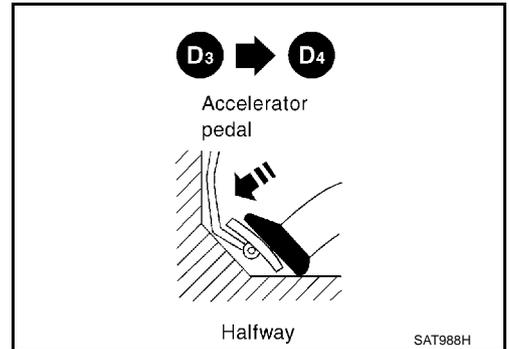
Diagnostic Procedure

1. CHECK SHIFT UP (D3 TO D4)

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

Yes or No

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



2. CHECK LINE PRESSURE

Perform line pressure test.
Refer to [AT-67, "Line Pressure Test"](#).

OK or NG

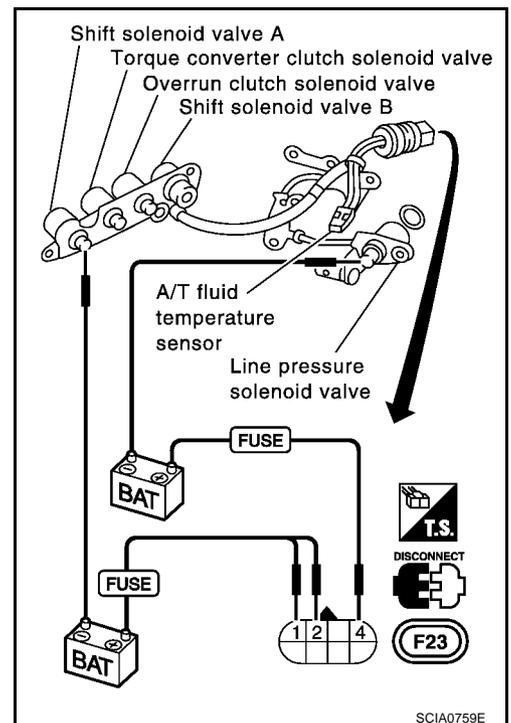
- OK >> GO TO 3.
- NG >> GO TO 6.

3. CHECK SOLENOID VALVES

1. Remove control valve assembly.
Refer to [AT-414, "REMOVAL"](#).
2. Refer to [AT-156, "Component Inspection"](#).

OK or NG

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



4. CHECK CONTROL VALVE

1. Disassemble control valve assembly.
Refer to [AT-448, "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 5.
NG >> Repair control valve.

5. CHECK SHIFT UP (D₃ TO D₄)

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

OK or NG

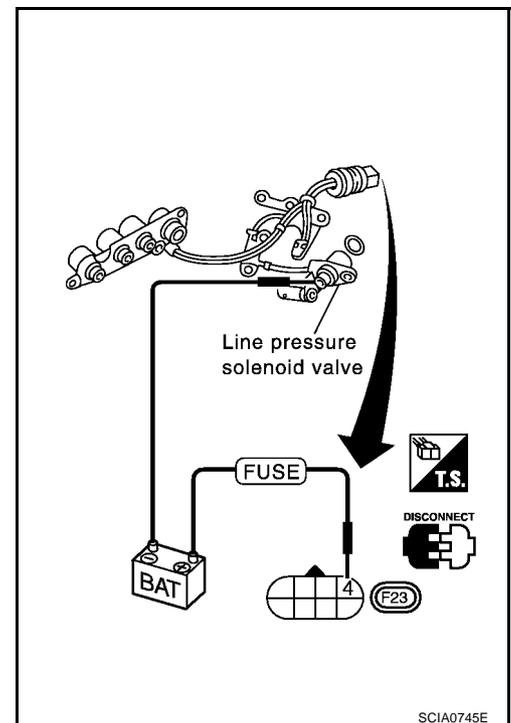
- OK >> GO TO 9.
NG >> Check transaxle inner parts (clutch, brake, etc.).

6. CHECK LINE PRESSURE SOLENOID VALVE

1. Remove control valve assembly.
Refer to [AT-414, "REMOVAL"](#) .
2. Refer to [AT-156, "Component Inspection"](#) .

OK or NG

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

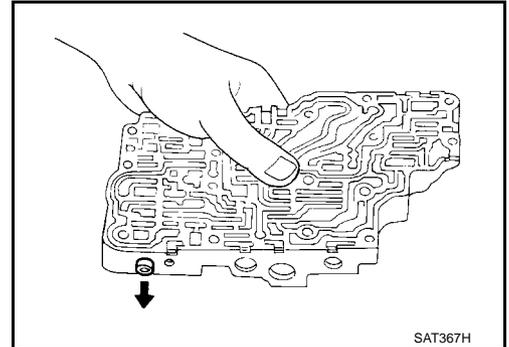


7. CHECK CONTROL VALVE

1. Disassemble control valve assembly.
Refer to [AT-448, "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?

Yes or No

- Yes >> GO TO 9.
- No >> Check transaxle inner parts (clutch, brake, etc.).

9. CHECK DTC

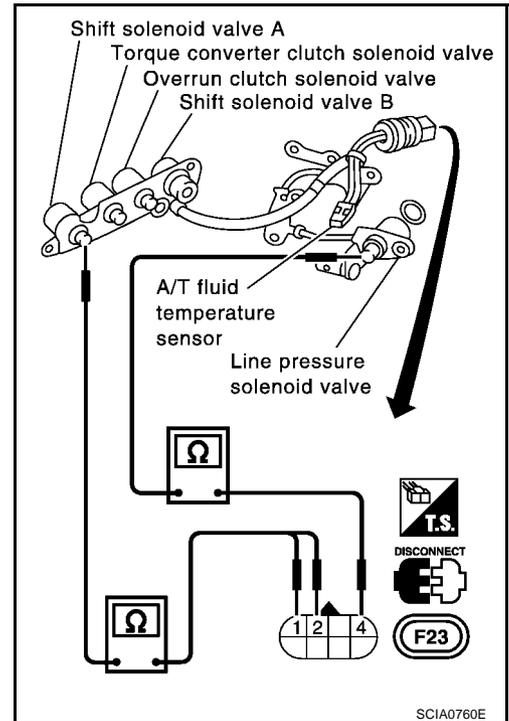
Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-150, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

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

Component Inspection SOLENOID VALVES

- For removal, refer to [AT-414, "REMOVAL"](#) .



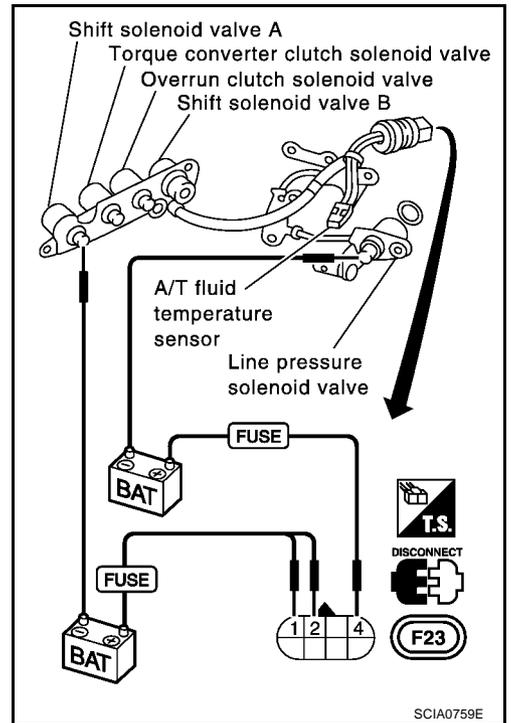
Resistance Check

- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω
Shift solenoid valve B	1		5 - 20Ω
Line pressure solenoid valve	4		2.5 - 5Ω

Operation Check

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



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DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

[EURO-OBD]

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

PFP:31940

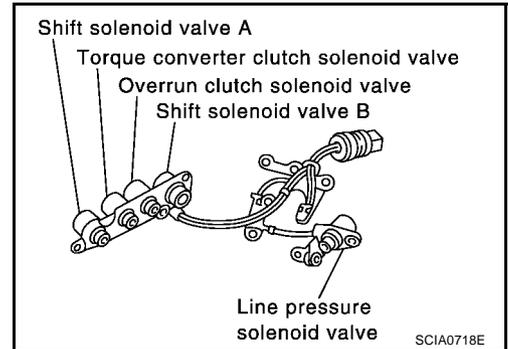
Description

ECS004R0

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

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

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

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (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"> ● Harness or connectors (The solenoid circuit is open or shorted.) ● T/C clutch solenoid valve
Ⓟ : P0740		

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

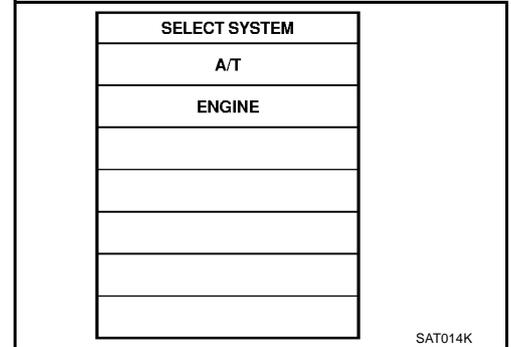
[EURO-OBD]

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

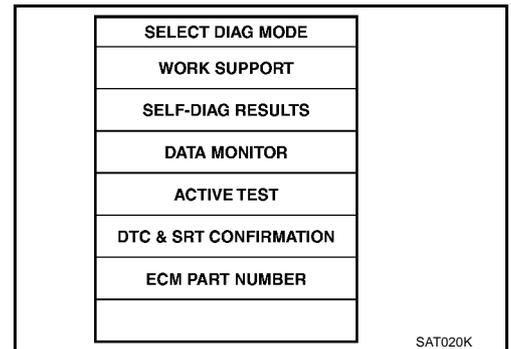
1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “ENGINE” with CONSULT-II and wait at least 1 second.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.

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

THROTTLE POSI : 0.5/8 - 1.0/8

Selector lever: D position (OD “ON”)

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



With GST

Follow the procedure “With CONSULT-II”.

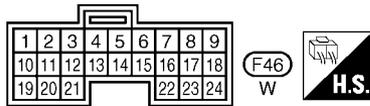
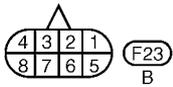
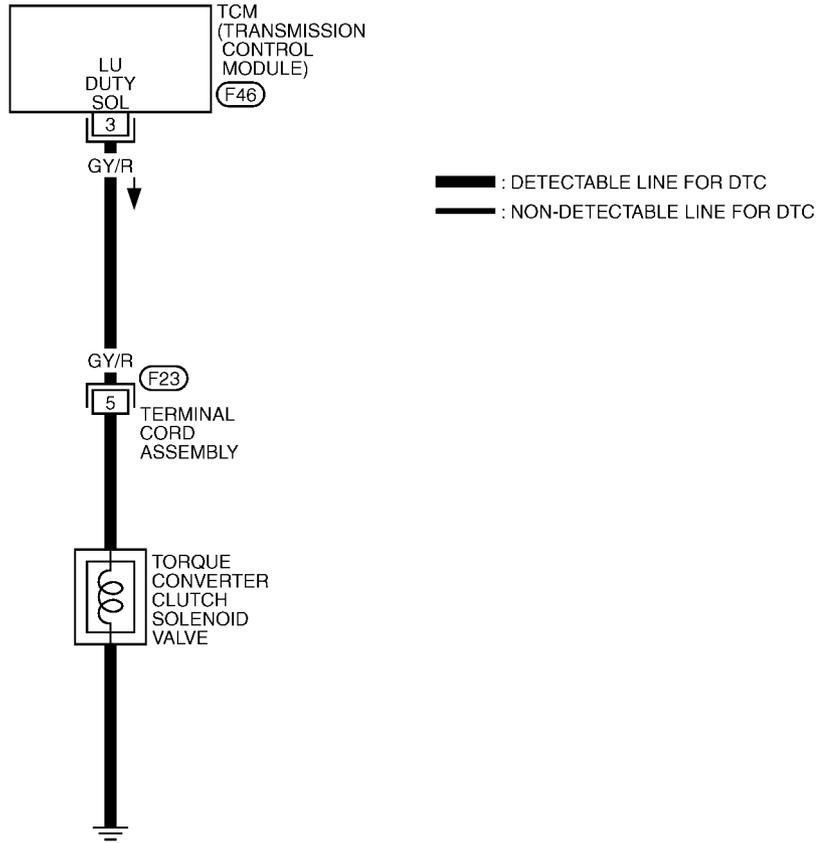
DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

[EURO-OBD]

Wiring Diagram — AT — TCV

ECS004RR

AT-TCV-01



TCWA0043E

Diagnostic Procedure

ECS004RS

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 5 and ground.

Resistance: 5 - 20Ω

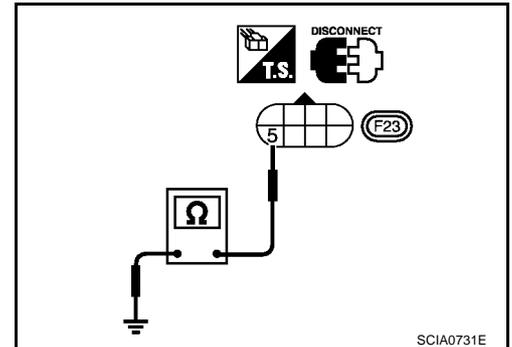
OK or NG

OK >> GO TO 2.

NG >> 1. Remove oil pan. Refer to [AT-414, "ON-VEHICLE SERVICE"](#).

2. Check the following items:

- Torque converter clutch solenoid valve
Refer to [AT-162, "Component Inspection"](#).
- Harness of terminal cord assembly for short or open



2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 5 and TCM harness connector terminal 3.

Continuity should exist.

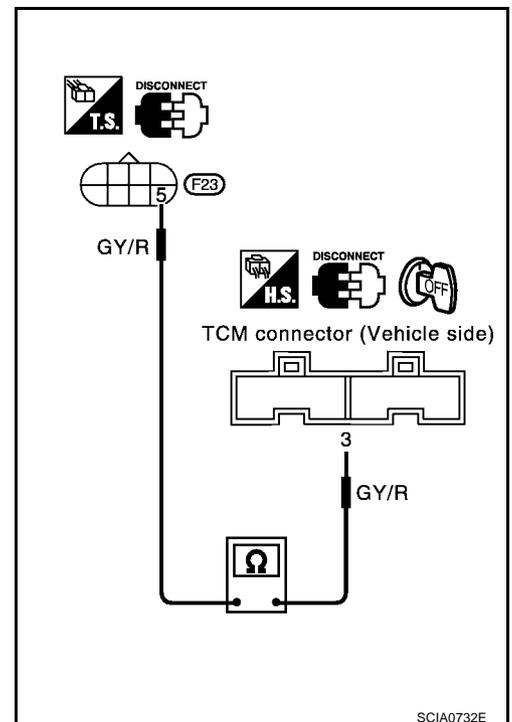
If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-159, "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

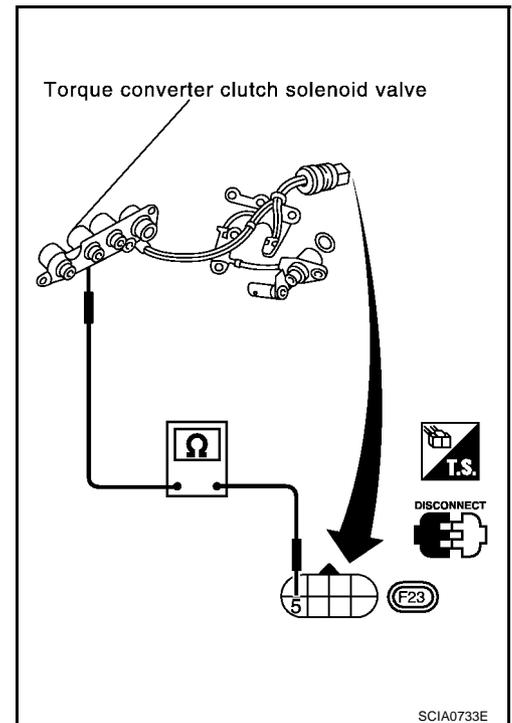
[EURO-OBD]

Component Inspection

TORQUE CONVERTER CLUTCH SOLENOID VALVE

EC5004RT

- For removal, refer to [AT-414, "REMOVAL"](#).



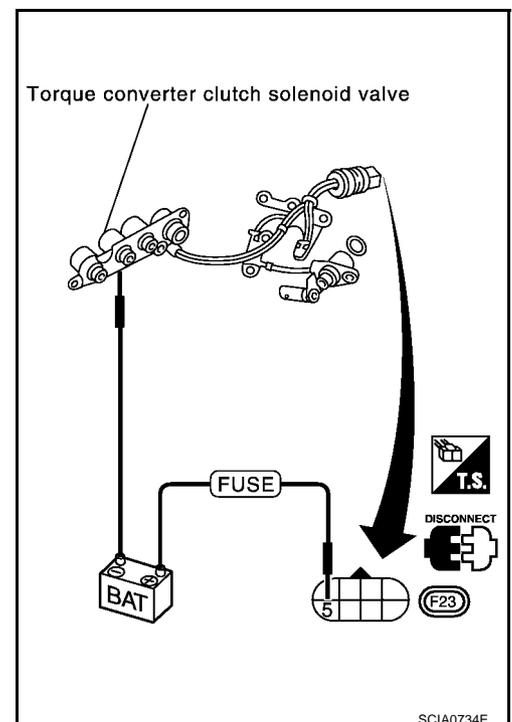
Resistance Check

- Check resistance between two terminals.

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

Operation Check

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



DTC P0745 LINE PRESSURE SOLENOID VALVE

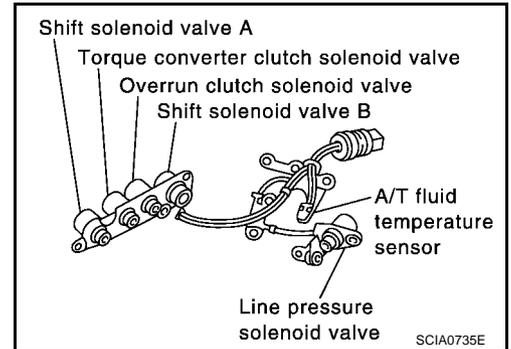
PFP:31940

Description

ECS004RU

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

NOTE:

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

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
1	R/W	Line pressure solenoid valve	When releasing accelerator pedal after warming up engine.	1.5 - 2.5V
			When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve (with dropping resistor)	When releasing accelerator pedal after warming up engine.	5 - 14V
			When depressing accelerator pedal fully after warming up engine.	0V

ON BOARD DIAGNOSIS LOGIC

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

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NOTE:

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

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

SELECT SYSTEM
A/T
ENGINE

SAT014K

Ⓜ With CONSULT-II

1. Turn ignition switch “ON” and select “DATA MONITOR” mode for “ENGINE” with CONSULT-II.
2. Depress accelerator pedal completely and wait at least 5 seconds.

Ⓜ With GST

Follow the procedure “With CONSULT-II”.

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
ACTIVE TEST
DTC & SRT CONFIRMATION
ECM PART NUMBER

SAT020K

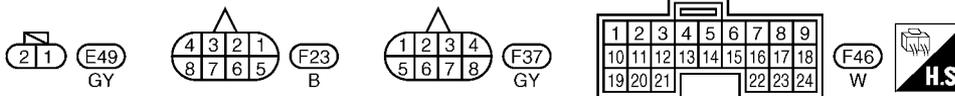
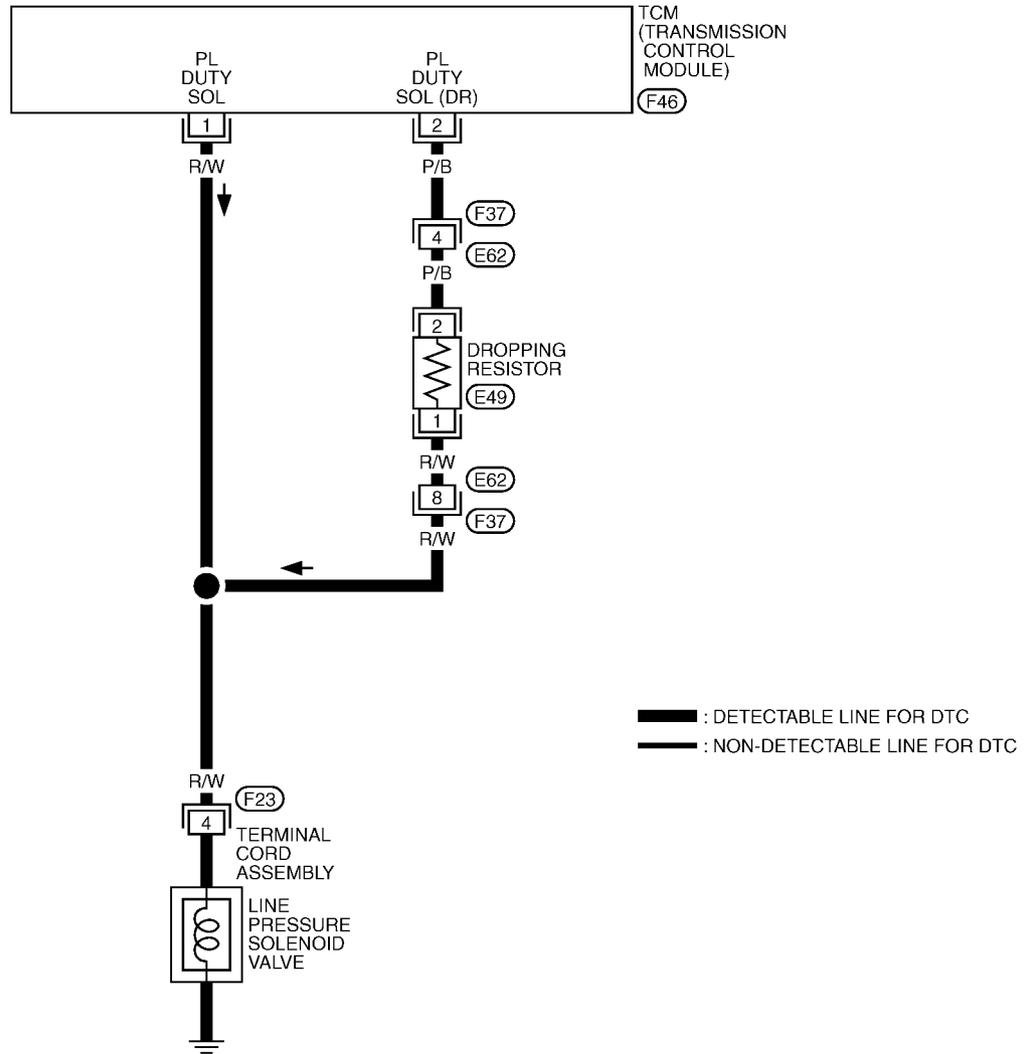
DTC P0745 LINE PRESSURE SOLENOID VALVE

[EURO-OBD]

Wiring Diagram — AT — LPSV

ECS004RV

AT-LPSV-01



Diagnostic Procedure

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 4 and ground.

Resistance: 2.5 - 5Ω

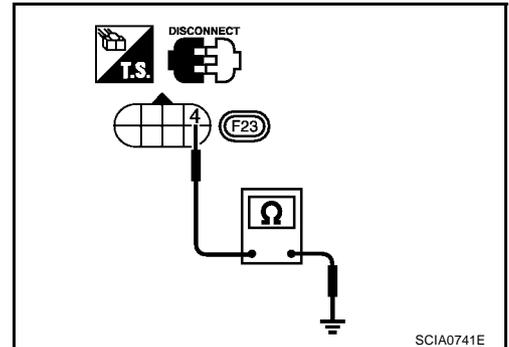
OK or NG

OK >> GO TO 2.

NG >> 1. Remove control valve assembly. Refer to [AT-414](#), "REMOVAL" .

2. Check the following items:

- Line pressure solenoid valve
Refer to [AT-168](#), "Component Inspection" .
- Harness of terminal cord assembly for short or open



2. CHECK POWER SOURCE CIRCUIT

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

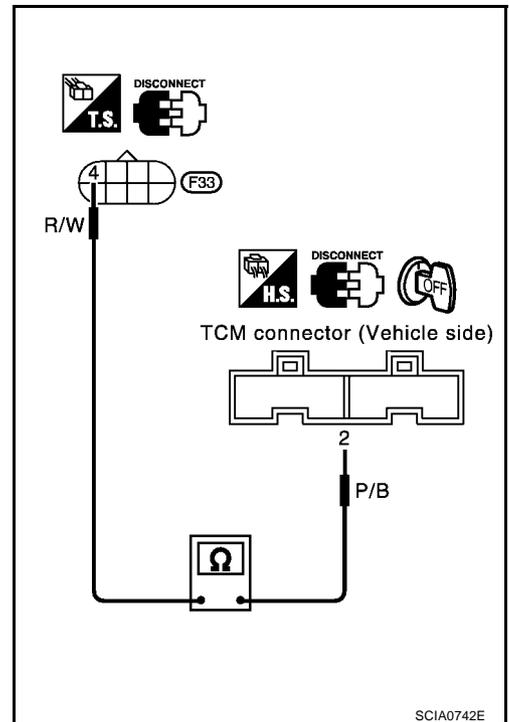
Resistance: 10 - 15Ω

OK or NG

OK >> GO TO 3.

NG >> Check the following items:

- Dropping resistor
Refer to [AT-168](#), "Component Inspection" .
- Harness for short or open between TCM terminal 2 and terminal cord assembly



3. CHECK POWER SOURCE CIRCUIT

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

Resistance: Approx. 0Ω

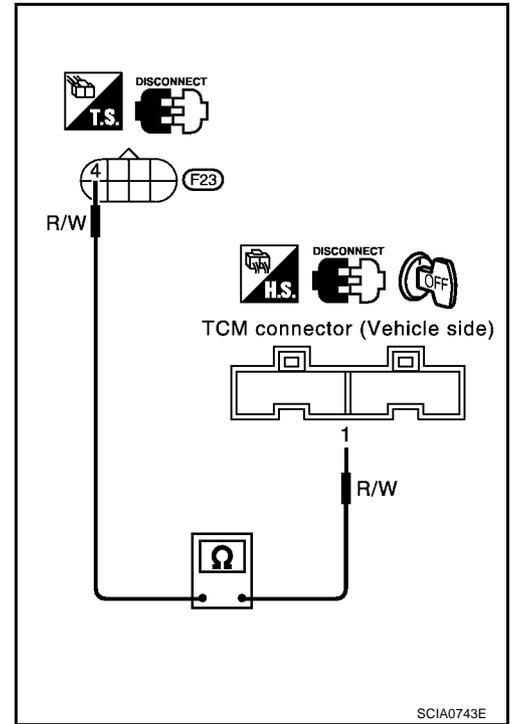
If OK, check harness for short to ground and short to power.

3. Reinstall any part removed.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-164, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).

OK or NG

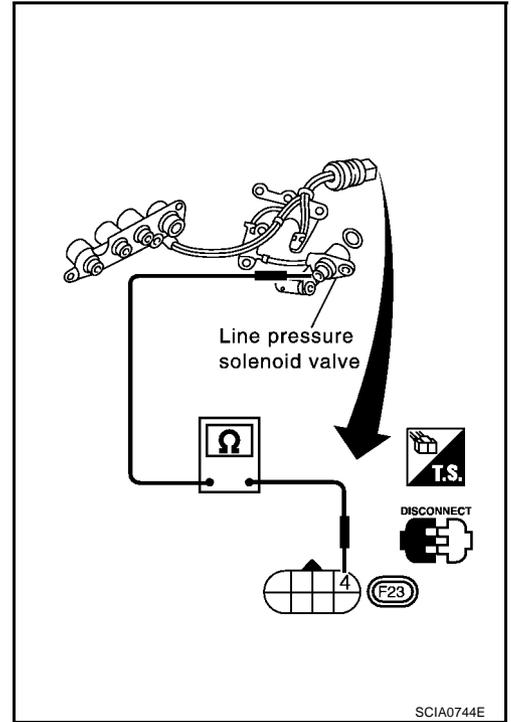
OK >> **INSPECTION END**

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-414, "REMOVAL"](#) .



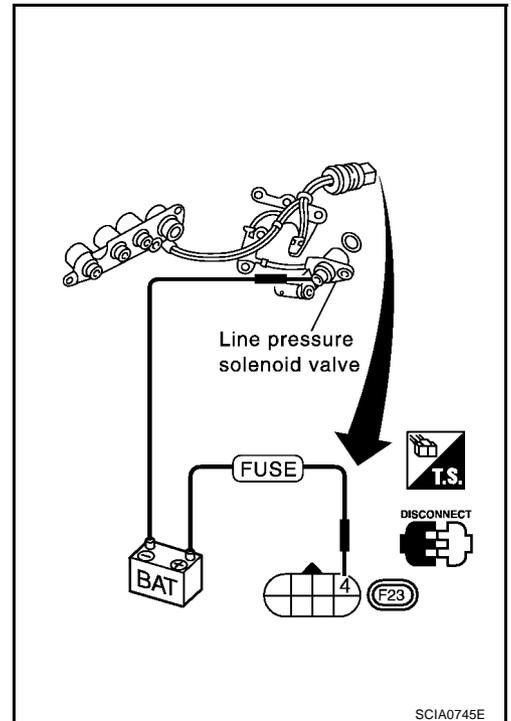
Resistance Check

- Check resistance between two terminals.

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

Operation Check

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



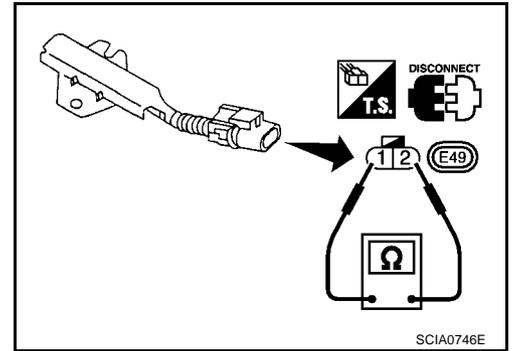
DTC P0745 LINE PRESSURE SOLENOID VALVE

[EURO-OBD]

DROPPING RESISTOR

- Check resistance between two terminals.

Resistance: 10 - 15Ω



A

B

AT

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L

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DTC P0750 SHIFT SOLENOID VALVE A

[EURO-OBD]

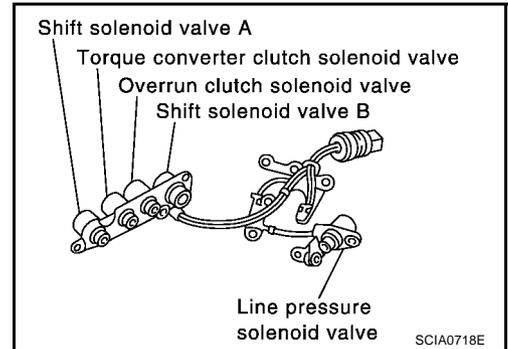
DTC P0750 SHIFT SOLENOID VALVE A

PFP:31940

Description

ECS004RY

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 items (Possible cause)
 : SFT SOL A/CIRC  : P0750	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> ● Harness or connectors (The solenoid circuit is open or shorted.) ● Shift solenoid valve A

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

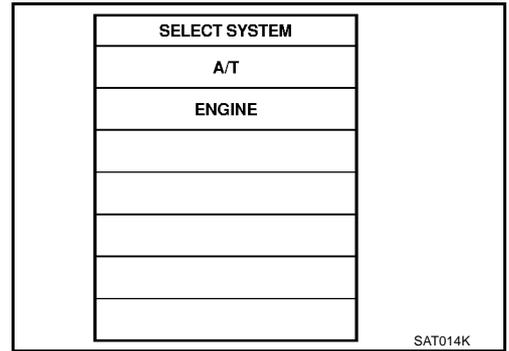
CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

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

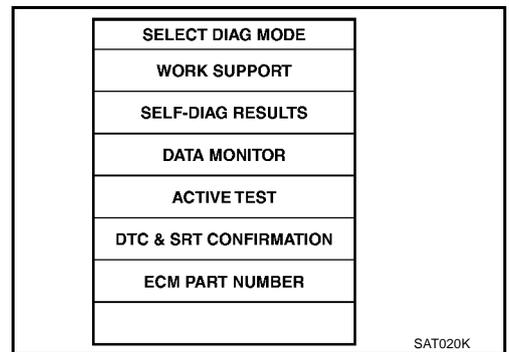


Ⓜ With CONSULT-II

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

Ⓜ With GST

Follow the procedure "With CONSULT-II".



A
B
AT
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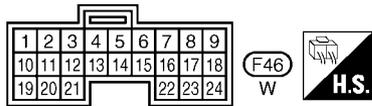
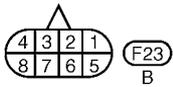
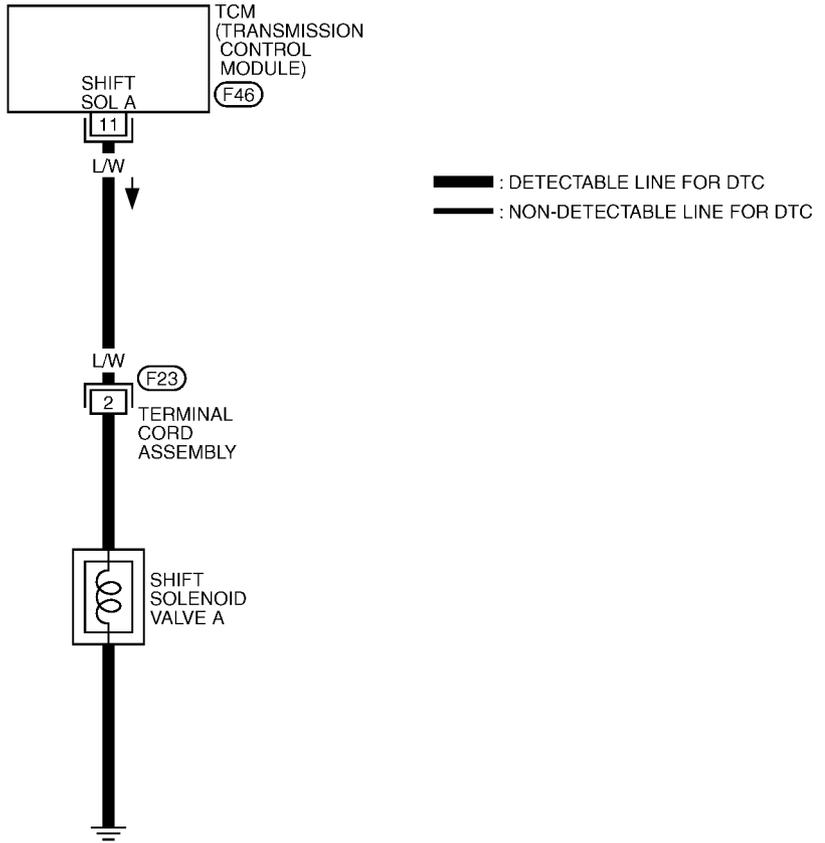
DTC P0750 SHIFT SOLENOID VALVE A

[EURO-OBD]

Wiring Diagram — AT — SSV/A

ECS004RZ

AT-SSV/A-01



TCWA0040E

Diagnostic Procedure

ECS004S0

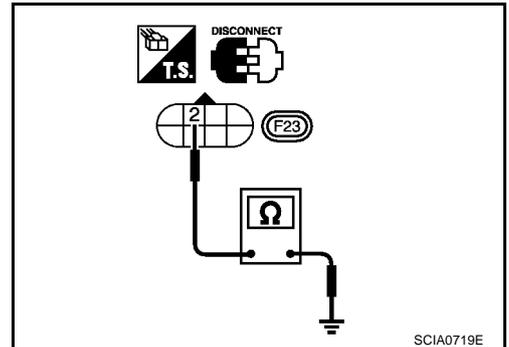
1. CHECK VALVE RESISTANCE

1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 2 and ground.

Resistance: 20 - 30Ω

OK or NG

- OK >> GO TO 2.
 NG >> 1. Remove control valve assembly. Refer to [AT-414](#), "[REMOVAL](#)".
 2. Check the following items:
 - Shift solenoid valve A
 Refer to [AT-174](#), "[Component Inspection](#)".
 - Harness of terminal cord assembly for short or open



2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 2 and TCM harness connector terminal 11.

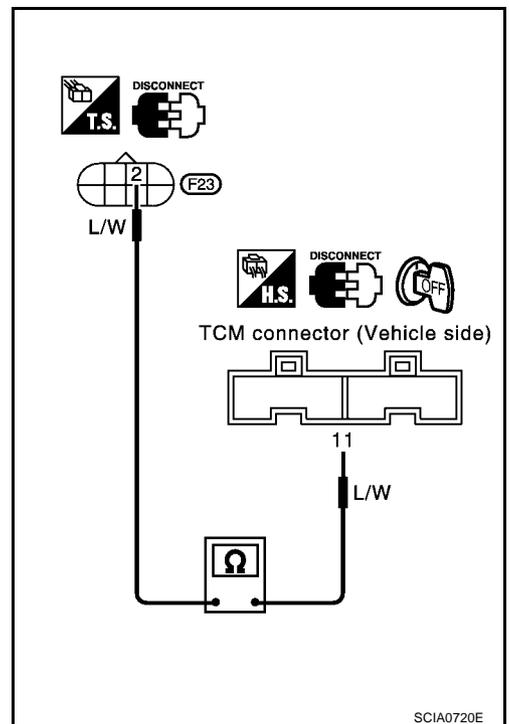
Continuity should exist.

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

4. Reinstall any part removed.

OK or NG

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



3. CHECK DTC

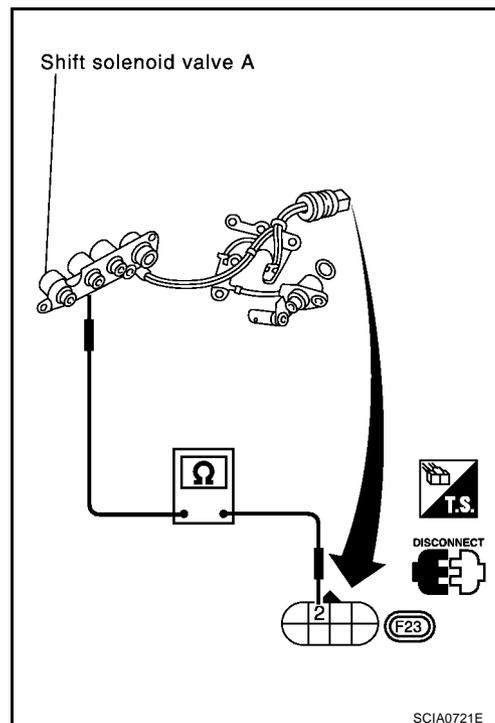
Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-171](#), "[DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE](#)".

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-414, "REMOVAL"](#) .



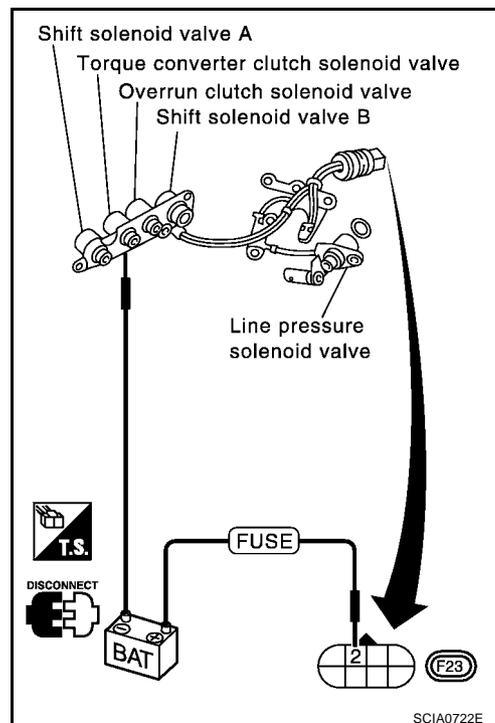
Resistance Check

- Check resistance between two terminals.

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

Operation Check

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



DTC P0755 SHIFT SOLENOID VALVE B

[EURO-OBD]

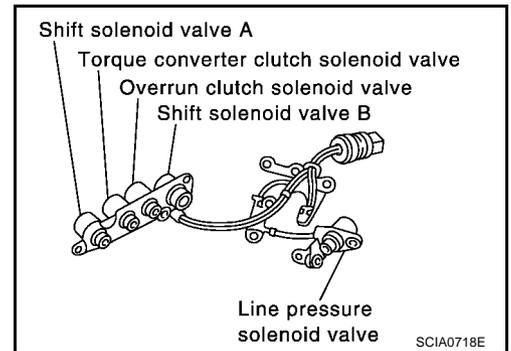
DTC P0755 SHIFT SOLENOID VALVE B

PFP:31940

Description

ECS004S2

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 items (Possible cause)
 : SFT SOL B/CIRC  : P0755	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> ● Harness or connectors (The solenoid circuit is open or shorted.) ● Shift solenoid valve B

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

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

SELECT SYSTEM
A/T
ENGINE

SAT014K

 **With CONSULT-II**

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

 **With GST**

Follow the procedure "With CONSULT-II".

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
ACTIVE TEST
DTC & SRT CONFIRMATION
ECM PART NUMBER

SAT020K

DTC P0755 SHIFT SOLENOID VALVE B

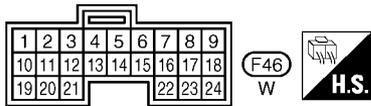
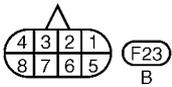
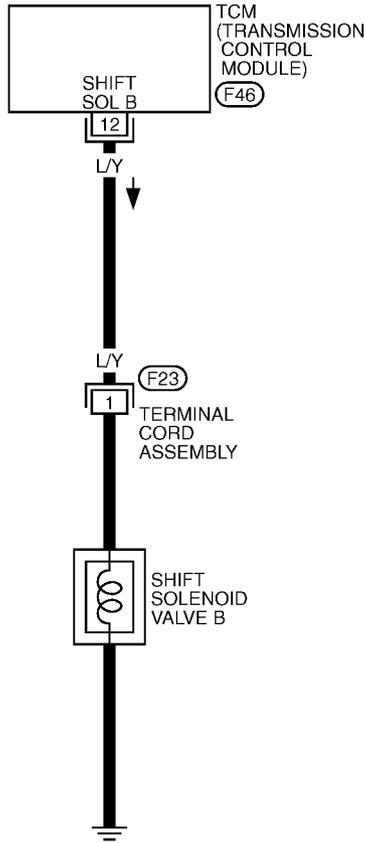
[EURO-OBD]

Wiring Diagram — AT — SSV/B

ECS004S3

AT-SSV/B-01

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



TCWA0041E

Diagnostic Procedure

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 1 and ground.

Resistance: 5 - 20 Ω

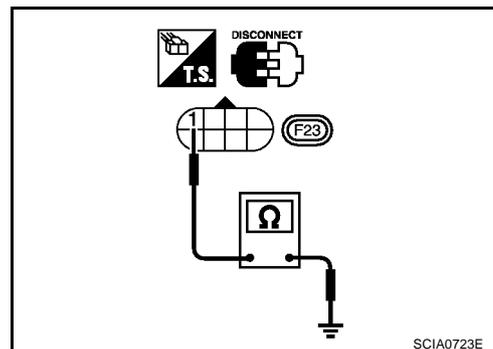
OK or NG

OK >> GO TO 2.

NG >> 1. Remove control valve assembly. Refer to [AT-414](#), "REMOVAL" .

2. Check the following items:

- Shift solenoid valve B
Refer to [AT-179](#), "Component Inspection" .
- Harness of terminal cord assembly for short or open



2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 12 and TCM harness connector terminal 1.

Continuity should exist.

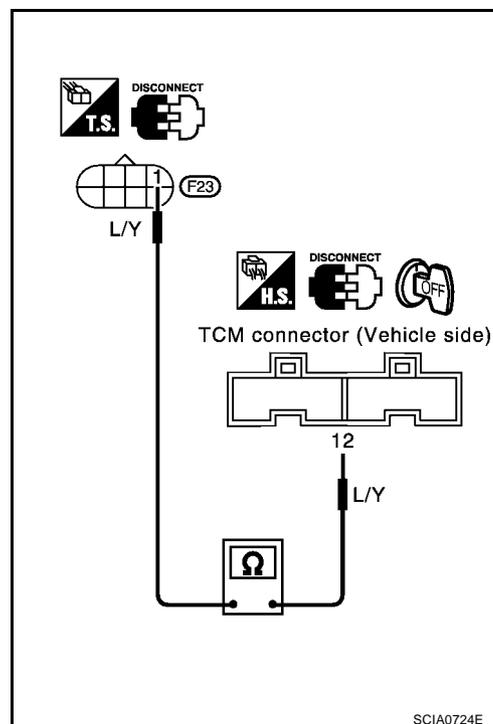
If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-176](#), "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

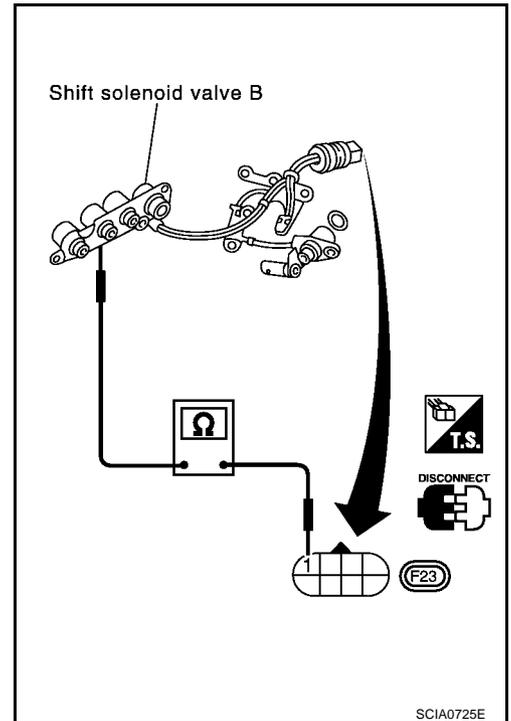
OK >> **INSPECTION END**

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-414, "REMOVAL"](#) .



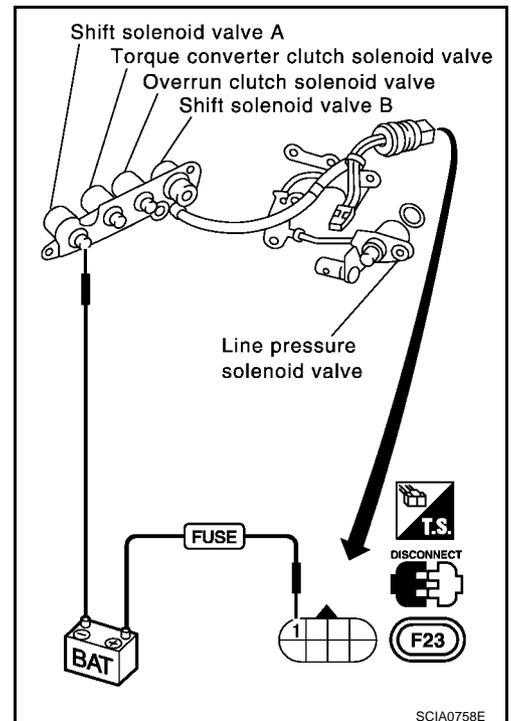
Resistance Check

- Check resistance between two terminals.

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

Operation Check

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



A
B
AT
D
E
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DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR

[EURO-OBD]

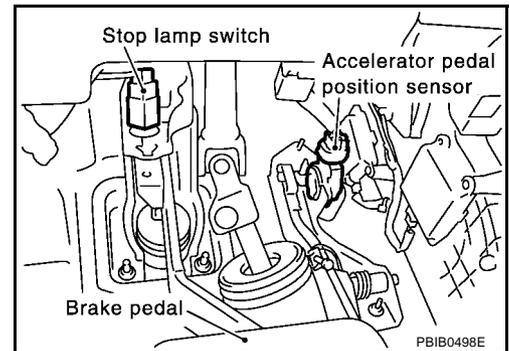
DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR

PFP:22620

Description

ECS004S6

- Accelerator pedal position (APP) sensor
Electric throttle control actuator consists of throttle control motor, acceleration pedal position sensor, throttle position sensor, etc. The actuator sends a signal to the TCM.



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Accelerator pedal position (APP) sensor (THRTL POS SEN)	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.)	
32	R	Throttle position sensor (Power source)	 ON	When turning ignition switch "ON"	4.5 - 5.5V
			 OFF	When turning ignition switch "OFF"	0V
41	W/R	Throttle position sensor	 ON	When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Ground (Throttle position sensor)	—	—	—

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
 : TP SEN/CIRC A/T*	TCM receives an excessively low or high voltage from the sensor.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Accelerator pedal position (APP) sensor
 : P1705		

*:This code means Accelerator pedal position (APP) sensor in reality.

DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR

[EURO-OBD]

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

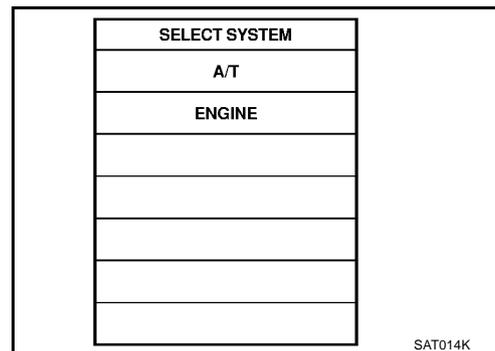
CAUTION:

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.



A
B
AT
D

Ⓜ With CONSULT-II

- Turn ignition switch "ON" and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
- Check the following.

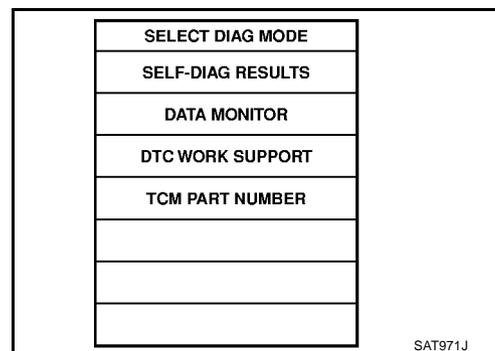
Accelerator pedal condition	THRTL POS SEN
Fully released	Less than 4.7V
Partially depressed	0.1 - 4.6V
Fully depressed	1.9 - 4.6V

If the check result is NG, go to [AT-183, "Diagnostic Procedure"](#).
If the check result is OK, go to following step.

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

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

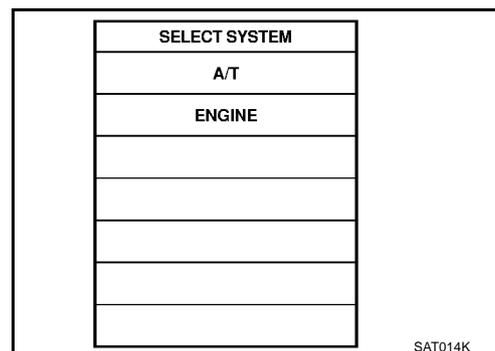
If the check result is NG, go to [AT-183, "Diagnostic Procedure"](#).
If the check result is OK, go to following step.



E
F
G
H

- Maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.

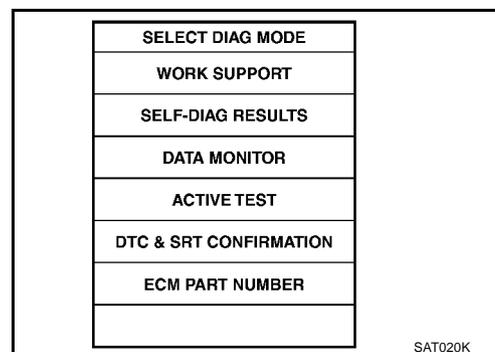
VHCL SPEED SE: 10 km/h (6 MPH) or more
Accelerator pedal: Wide open throttle
Selector lever: D position (OD "ON")



I
J
K
L

Ⓜ With GST

Follow the procedure "With CONSULT-II".



M

Diagnostic Procedure

1. CHECK DTC WITH ECM

Perform diagnostic test mode II (self-diagnostic results) for engine control.

Refer to [EC-58, "Malfunction Indicator \(MI\)"](#) (QR25DE) or [EC-790, "Malfunction Indicator \(MI\)"](#) (QR20DE).

OK or NG

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

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

NG >> Check throttle position sensor circuit for engine control.

2. CHECK INPUT SIGNAL (WITH CONSULT-II)

 **With CONSULT-II**

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

SELECT SYSTEM	
A/T	
ENGINE	

SAT014K

- Read out the value of "THRTL POS SEN".

Voltage:

Fully-closed throttle: Approximately 0.5V

Fully-open throttle: Approximately 4V

OK or NG

OK >> GO TO 4.

NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor circuit.

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

DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR

[EURO-OBD]

3. CHECK INPUT SIGNAL (WITHOUT CONSULT-II)

⊗ Without CONSULT-II

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

Voltage:

Fully-closed throttle valve: Approximately 0.5V

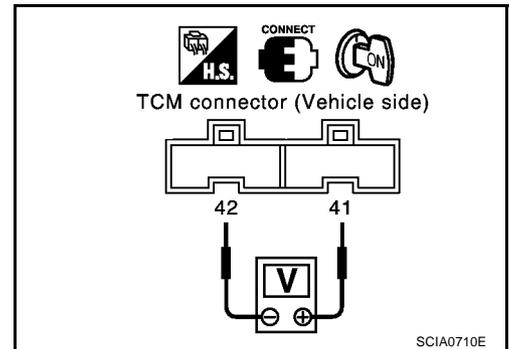
Fully-open throttle valve: Approximately 4V

(Voltage rises gradually in response to throttle position)

OK or NG

OK >> GO TO 4.

NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor circuit.



4. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-181, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#).

OK or NG

OK >> **INSPECTION END**

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

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

DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

[EURO-OBD]

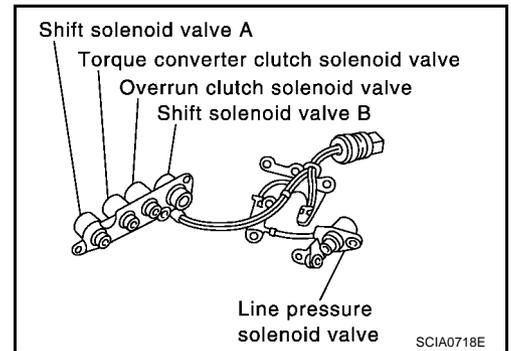
DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

PFP:31940

Description

ECS004S9

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



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 items (Possible cause)
 : O/R CLTCH SOL/CIRC  : P1760	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> ● Harness or connectors (The solenoid circuit is open or shorted.) ● Overrun clutch solenoid valve

DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

[EURO-OBD]

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:

SELECT SYSTEM
A/T
ENGINE

SAT014K

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

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

With CONSULT-II

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

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
ACTIVE TEST
DTC & SRT CONFIRMATION
ECM PART NUMBER

SAT020K

With GST

Follow the procedure "With CONSULT-II".

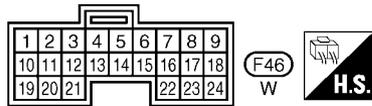
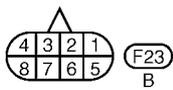
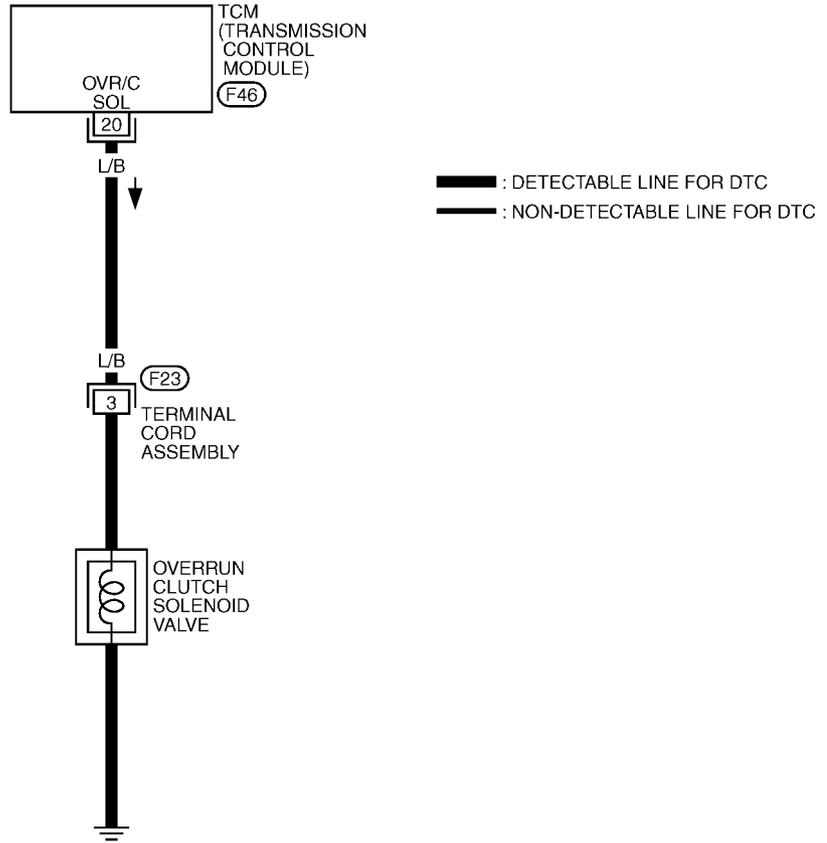
DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

[EURO-OBD]

Wiring Diagram — AT — OVRCSV

ECS004SA

AT-OVRCSV-01



Diagnostic Procedure

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 3 and ground.

Resistance: 20 - 30Ω

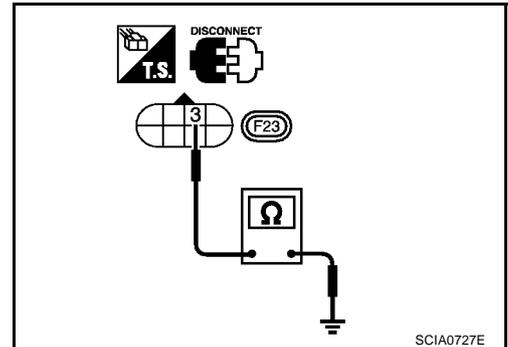
OK or NG

OK >> GO TO 2.

NG >> 1. Remove control valve assembly. Refer to [AT-414](#), "REMOVAL" .

2. Check the following items:

- Overrun clutch solenoid valve
Refer to [AT-189](#), "Component Inspection" .
- Harness of terminal cord assembly for short or open



2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 3 and TCM harness connector terminal 20.

Continuity should exist.

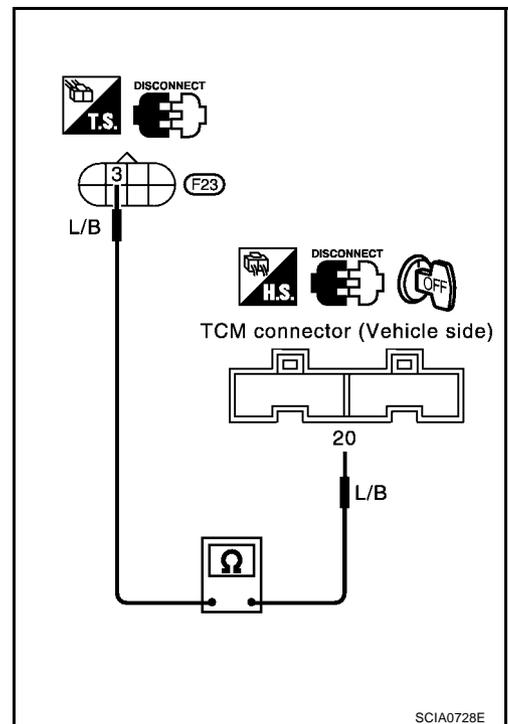
If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-186](#), "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

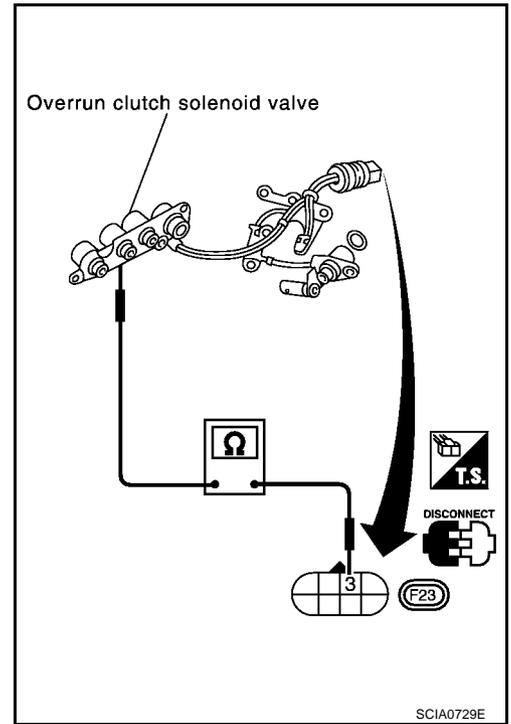
OK >> **INSPECTION END**

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-414, "REMOVAL"](#) .



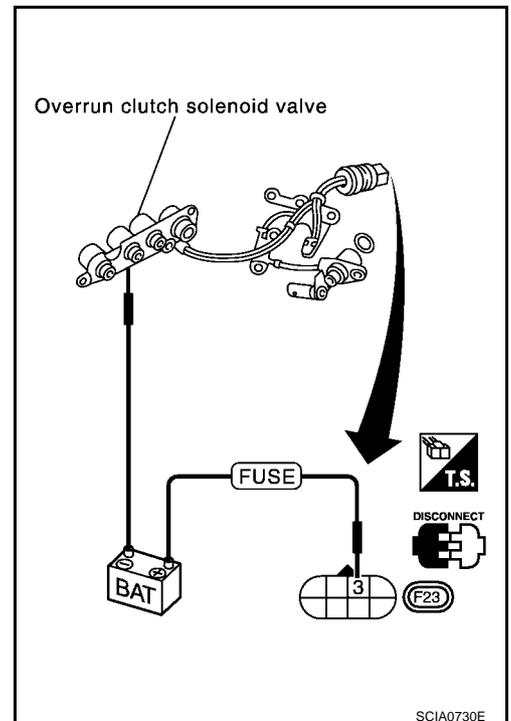
Resistance Check

- Check resistance between two terminals.

Solenoid valve	Terminal No.		Resistance (Approx.)
	1	2	
Overrun clutch solenoid valve	3	Ground	20 - 30Ω

Operation Check

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



DTC U1000 CAN COMMUNICATION LINE

PFP:31940

Description

ECS008CZ

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

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
5	QR20DE: B/W QR25DE: W/B	CAN-H (high)	—	—
6	L/R	CAN-L (low)	—	—

On Board Diagnosis Logic

ECS008D0

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
(P):CAN COMM CIRCUIT (X):11th judgement flicker	When a malfunction is detected in CAN communication line.	● Harness or connectors (CAN communication line is open or shorted.)

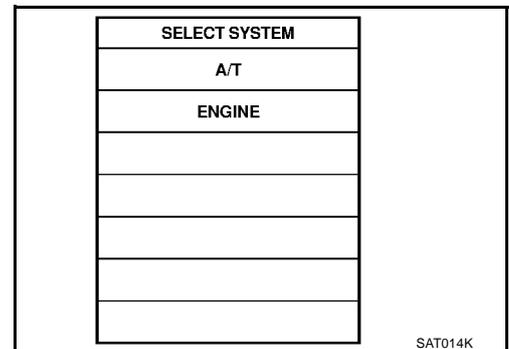
DTC Confirmation Procedure

ECS008D1

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

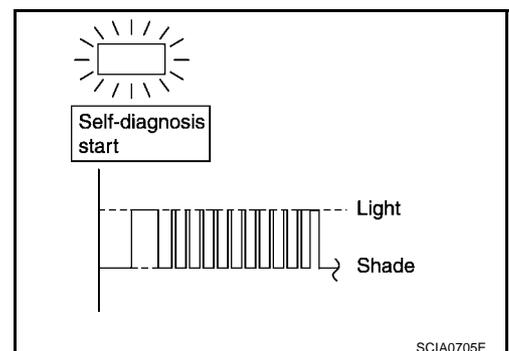
WITH CONSULT-II

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



WITHOUT CONSULT-II

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



Diagnostic Procedure

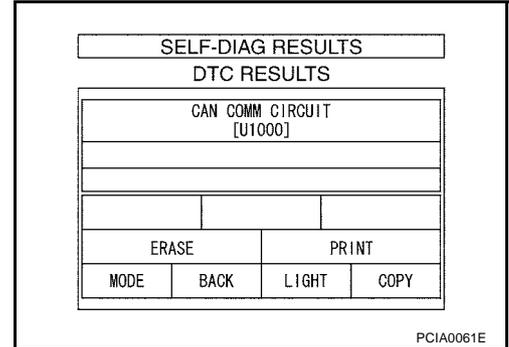
1. CHECK CAN COMMUNICATION CIRCUIT

④ With CONSULT-II

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. The "CAN COMM CIRCUIT" is detected.

Yes or No?

- Yes >> Print out CONSULT-II screen, GO TO 2.
 No >> **INSPECTION END**



2. CHECK CAN COMMUNICATION SIGNALS

④ With CONSULT-II

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

>> Print out CONSULT-II screen, go to [LAN-5, "CAN SYSTEM \(FOR A/T MODELS\)"](#) .

CAN Communication Signals

Normal conditions	Abnormal conditions (examples)
CAN COMM: OK	CAN COMM: OK
CAN CIRC 1: OK	CAN CIRC 1: UNKWN
CAN CIRC 2: OK	CAN CIRC 2: UNKWN
CAN CIRC 3: OK	CAN CIRC 3: UNKWN
CAN CIRC 4: OK	CAN CIRC 4: UNKWN
CAN CIRC 5: UNKWN	CAN CIRC 5: UNKWN

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

[EURO-OBD]

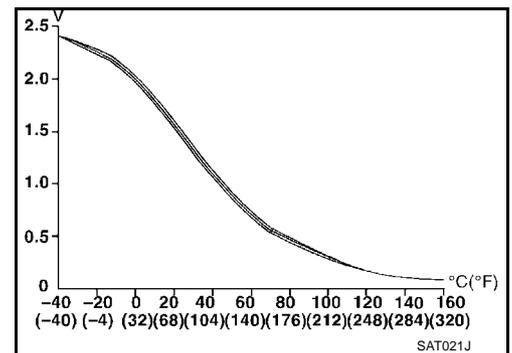
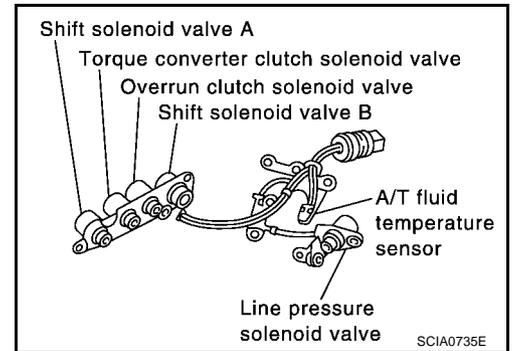
DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

PF1:31940

Description

ECS004SI

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



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

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

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

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

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

[EURO-OBD]

ON BOARD DIAGNOSIS LOGIC

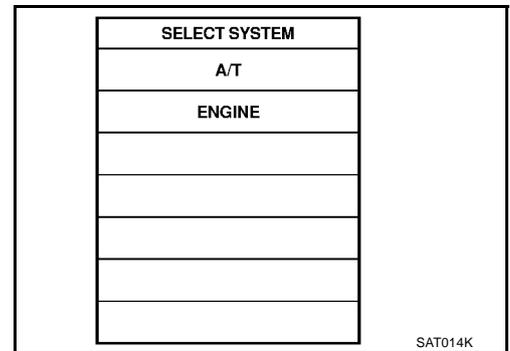
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
① : BATT/FLUID TEMP SEN ② : 8th judgement flicker	TCM receives an excessively low or high voltage from the sensor.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● A/T fluid temperature sensor

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

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

① With CONSULT-II

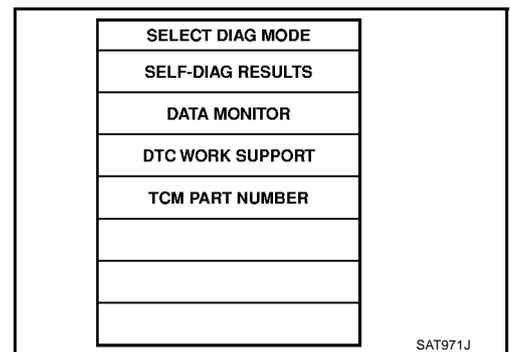
1. Start engine.
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.



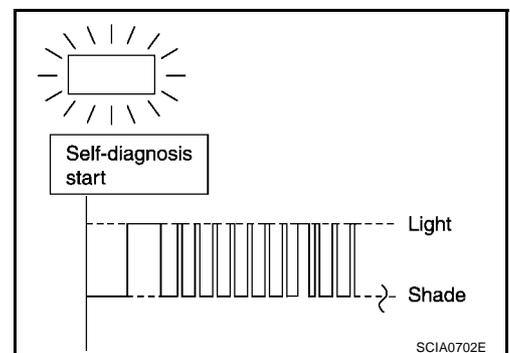
3. Drive vehicle under the following conditions:
Selector lever in "D", vehicle speed higher than 20 km/h (12 MPH).

② Without CONSULT-II

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



3. Perform self-diagnosis.
Refer to [AT-51, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#).



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

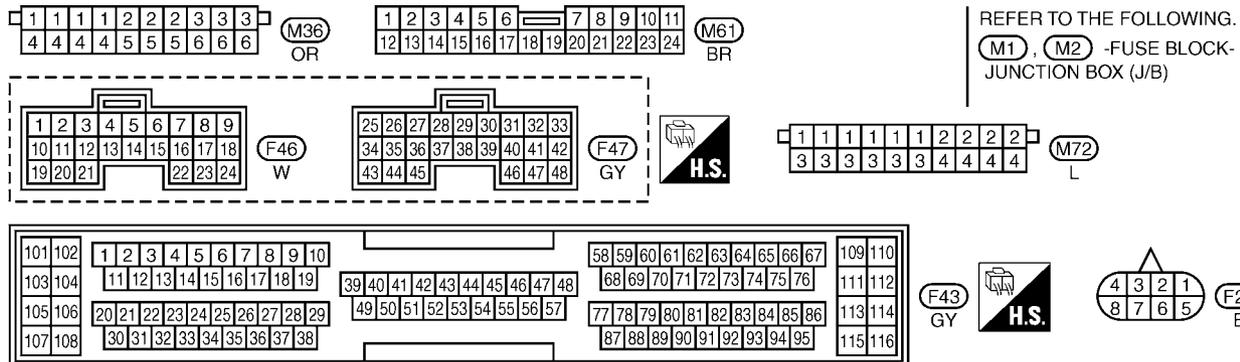
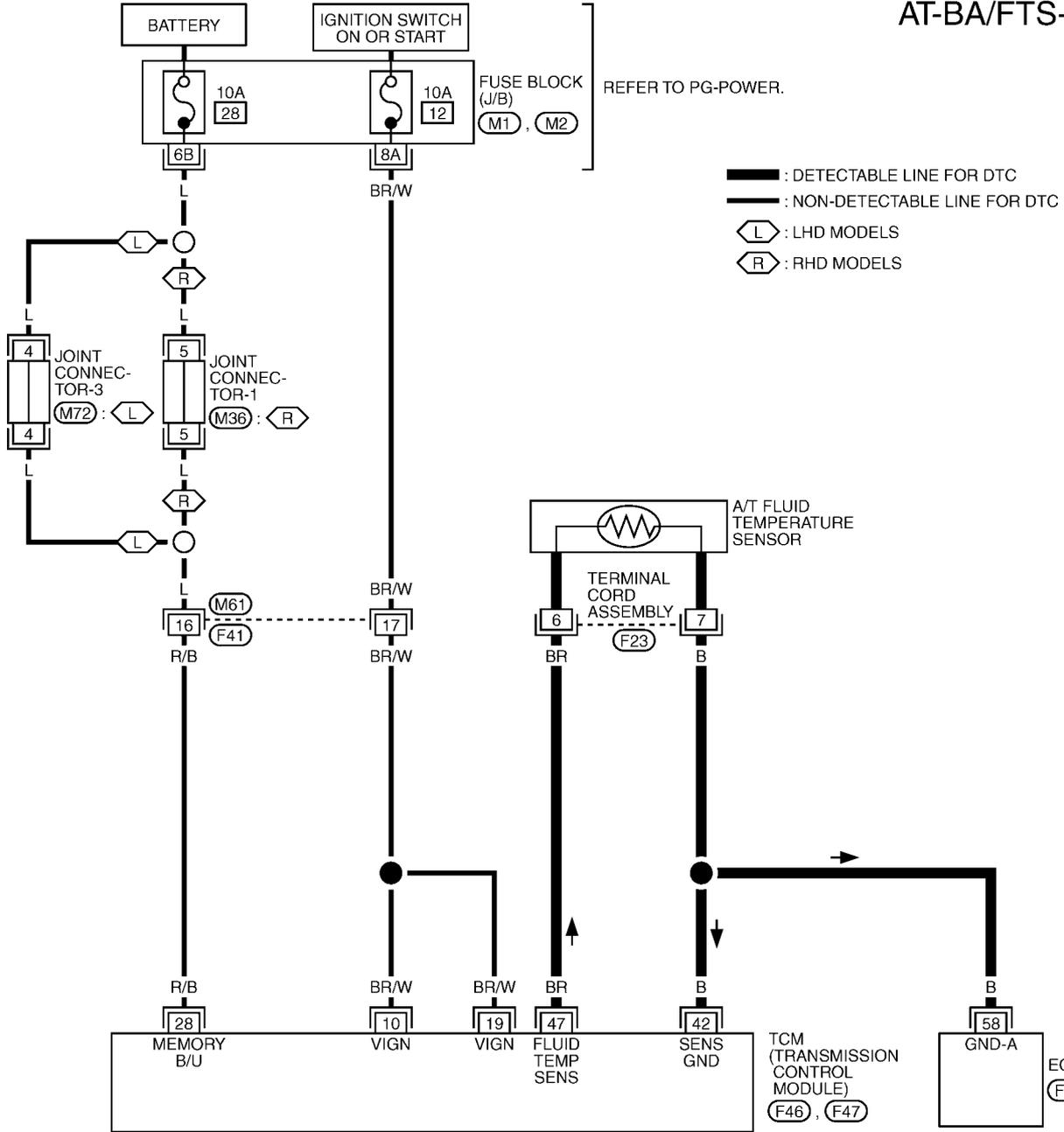
[EURO-OBD]

Wiring Diagram — AT — BA/FTS

ECS004SJ

AT-BA/FTS-01

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



TCWA0044E

Diagnostic Procedure

1. CHECK TCM POWER SOURCE

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

Voltage: Battery voltage

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

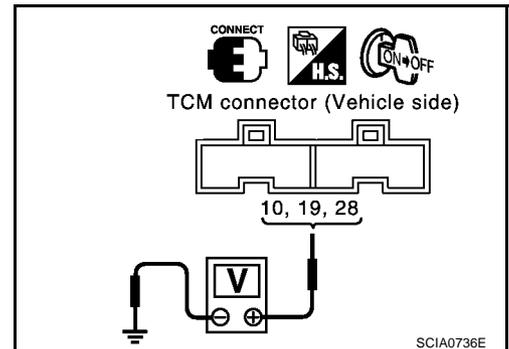
Voltage: Battery voltage

OK or NG

OK >> GO TO 2.

NG >> Check the following items:

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



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

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

Resistance: Cold [20°C (68°F)]

Approximately 2.5 kΩ

4. Reinstall any part removed.

OK or NG

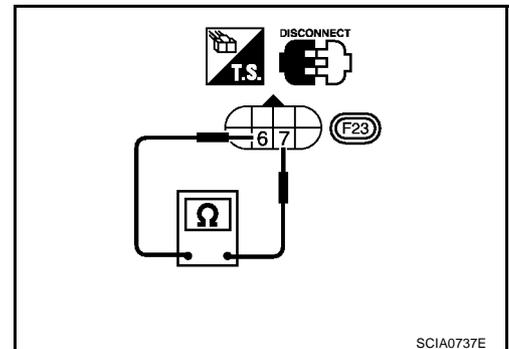
OK (With CONSULT-II)>>GO TO 3.

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

NG >> 1. Remove oil pan.

2. Check the following items:

- A/T fluid temperature sensor
Refer to [AT-198, "Component Inspection"](#) .
- Harness of terminal cord assembly for short or open



3. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (WITH CONSULT-II)

With CONSULT-II

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

Voltage:

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

Approximately 1.5V → 0.5V

OK or NG

OK >> GO TO 5.

NG >> Check the following item:

- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM

Refer to [EC-267, "DTC P1065 ECM POWER SUPPLY"](#) (QR25DE) or [EC-995, "DTC P1065 ECM POWER SUPPLY"](#) (QR20DE).

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

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

Without CONSULT-II

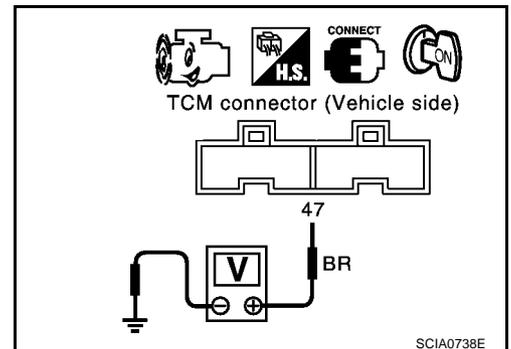
1. Start engine.
2. Check voltage between TCM terminal 47 and ground while warming up A/T.

Voltage:

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

Approximately 1.5V → 0.5V

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



Continuity should exist.

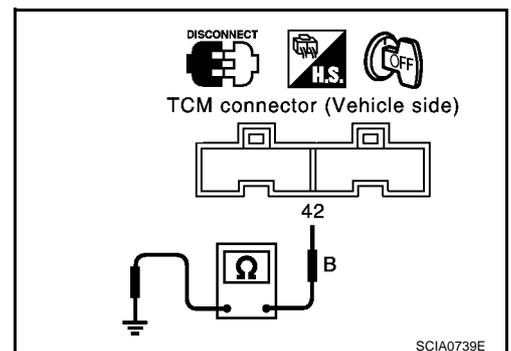
OK or NG

OK >> GO TO 5.

NG >> Check the following item:

- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM

Refer to [EC-267, "DTC P1065 ECM POWER SUPPLY"](#) (QR25DE) or [EC-995, "DTC P1065 ECM POWER SUPPLY"](#) (QR20DE).



5. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure, [AT-194, "DIAGNOSTIC TROUBLE CODE \(DTC\) CONFIRMATION PROCEDURE"](#) .

OK or NG

OK >> **INSPECTION END**

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

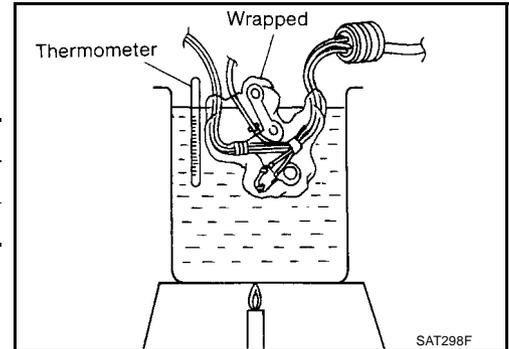
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection A/T FLUID TEMPERATURE SENSOR

ECS004SL

- For removal, refer to [AT-414, "REMOVAL"](#) .
- Check resistance between two terminals while changing temperature as shown at left.

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



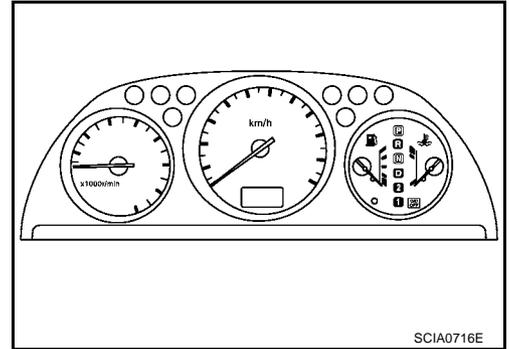
DTC VEHICLE SPEED SENSOR MTR

PF2:24814

Description

ECS004SM

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	L/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

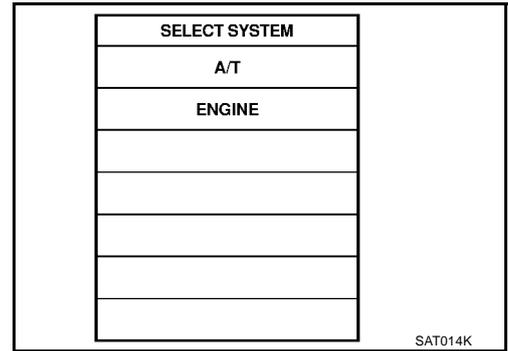
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
(H) : VHCL SPEED SEN·MTR (X) : 2nd judgement flicker	TCM does not receive the proper voltage signal from the sensor.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Combination meter ● 4WD/ABS control unit

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

CAUTION:

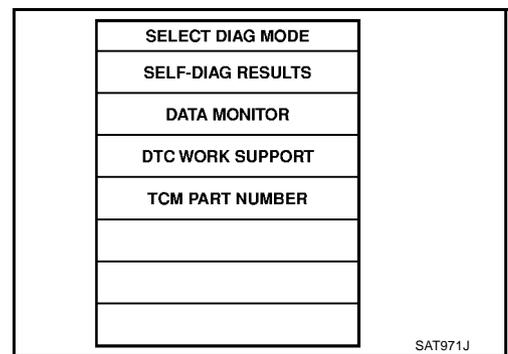
- Always drive vehicle at a safe speed.
- If conducting this “DTC CONFIRMATION PROCEDURE” again, always turn ignition switch “OFF” and wait at least 5 seconds before continuing.

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



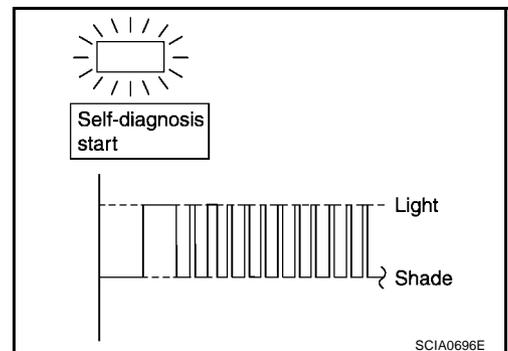
With CONSULT-II

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



Without CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions:
Selector lever in “D” and vehicle speed higher than 25 km/h (16 MPH).
3. Perform self-diagnosis.
Refer to TCM SELF-DIAGNOSTIC PROCEDURE (No Tools), [AT-51, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#)



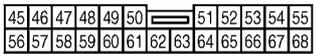
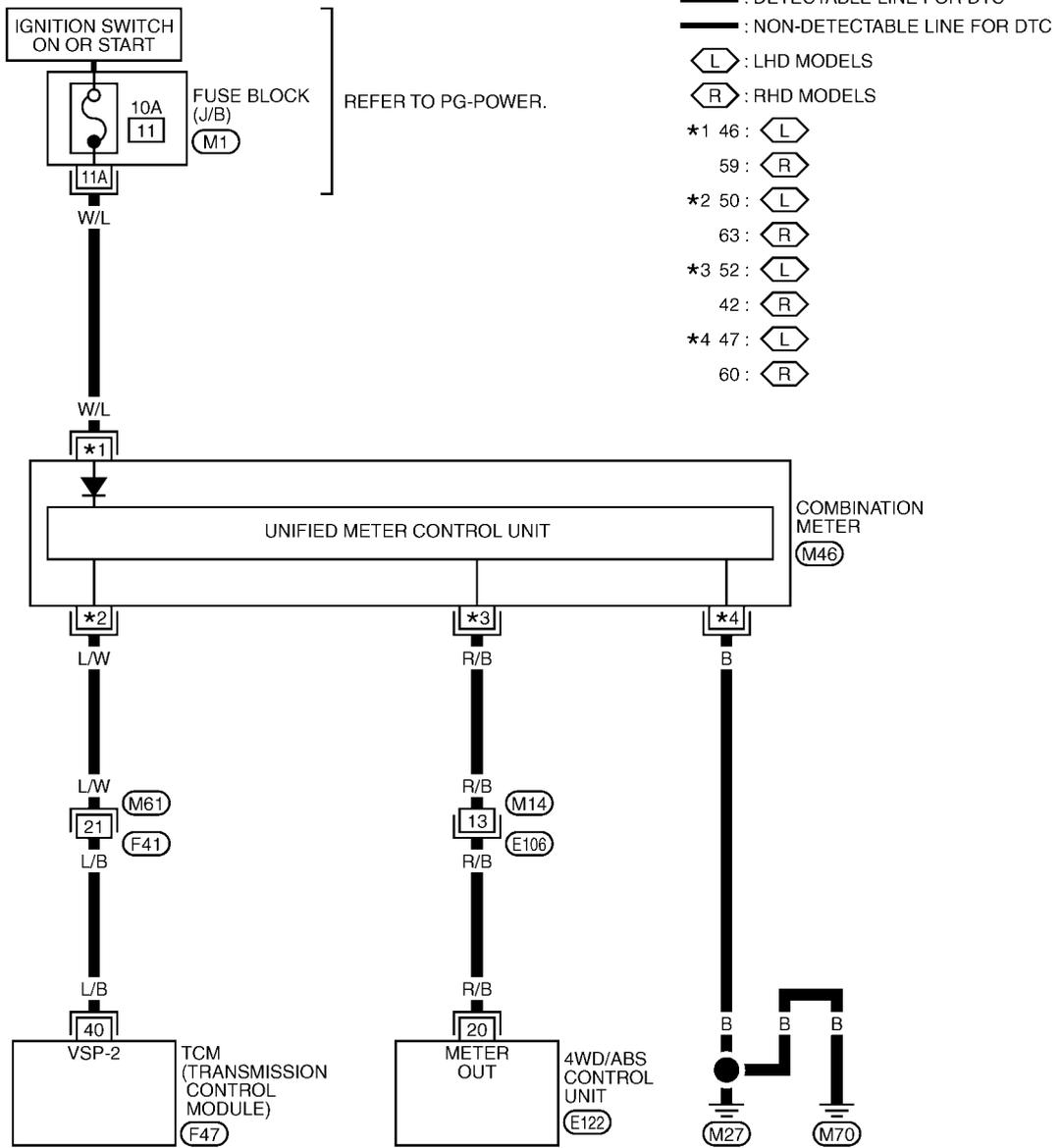
DTC VEHICLE SPEED SENSOR MTR

[EURO-OBD]

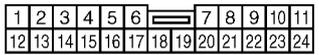
Wiring Diagram — AT — VSSMTR

ECS004SN

AT-VSSMTR-01

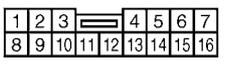


(M46)
W : (L)
BR : (R)

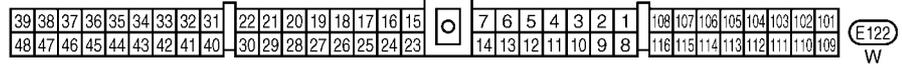


(M61)
BR

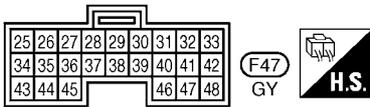
REFER TO THE FOLLOWING.
(M1) - FUSE BLOCK-JUNCTION BOX (J/B)



(E106)
BR



(E122)
W



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

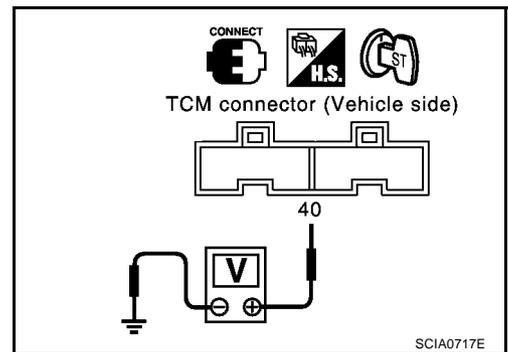
1. Start engine.
2. Check voltage between TCM terminal 40 and ground while driving at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.

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

OK or NG

- OK >> GO TO 2.
 NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Combination meter
Refer to [DI-4, "COMBINATION METERS \(LHD MODELS\)"](#) or [DI-24, "COMBINATION METERS \(RHD MODELS\)"](#).
- Harness for short or open between TCM and combination meter
- 4WD/ABS control unit
Refer to [BRC-24, "SELF-DIAGNOSIS"](#).
- Harness for short or open between 4WD/ABS control unit and combination meter



2. CHECK DTC

Perform Diagnostic Trouble Code (DTC) confirmation procedure. Refer to [AT-200, "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.

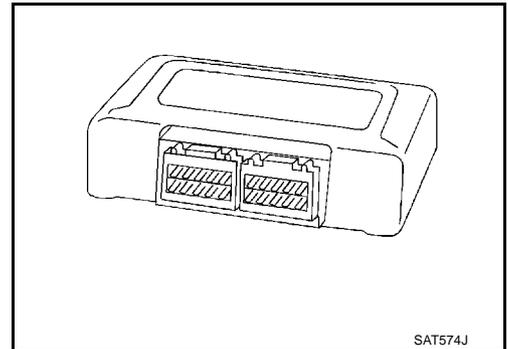
DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)

PFP:31036

Description

ECS004SP

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



ON BOARD DIAGNOSIS LOGIC

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

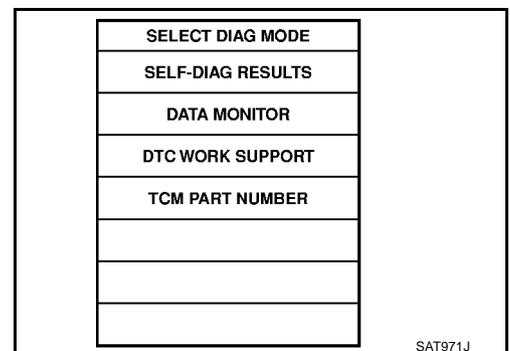
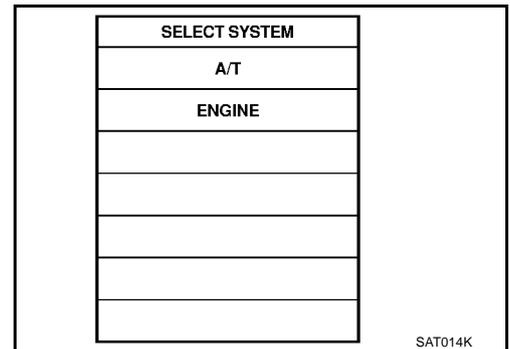
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NOTE:

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

Ⓜ 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

ECS004SQ

1. INSPECTION START (WITH CONSULT-II)

Ⓜ With CONSULT-II

1. Turn ignition switch “ON” and select “SELF DIAGNOSIS” mode for A/T with CONSULT-II.
2. Touch “ERASE”.

>> GO TO 2.

2. CHECK DTC

PERFORM DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE.
See above.

>> GO TO 3.

3. CHECK DTC AGAIN

Is the "CONTROL UNIT (RAM) or CONTROL UNIT (ROM)" displayed again?

Yes or No

Yes >> Replace TCM.

No >> **INSPECTION END**

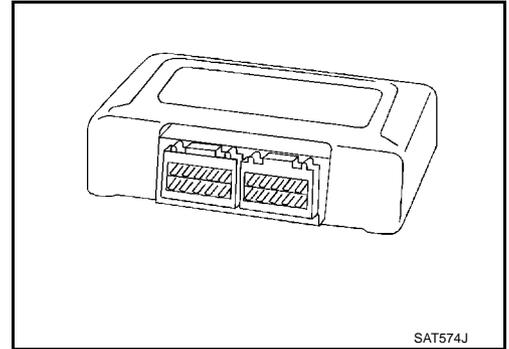
DTC CONTROL UNIT(EEPROM)

PFP:31036

Description

ECS004SR

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



ON BOARD DIAGNOSIS LOGIC

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

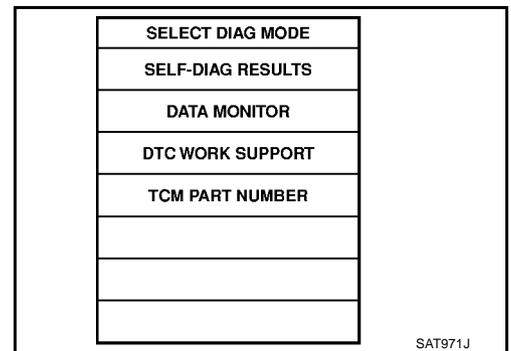
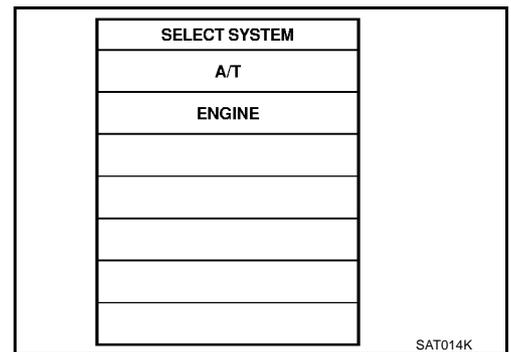
DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

NOTE:

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

Ⓜ **With CONSULT-II**

1. Turn ignition switch "ON" and select "DATA MONITOR" mode for A/T with CONSULT-II.
2. Start engine.
3. Run engine for at least 2 seconds at idle speed.



Diagnostic Procedure

ECS004SS

1. CHECK DTC

① With CONSULT-II

1. Turn ignition switch "ON" and select "SELF DIAGNOSIS" mode for A/T with CONSULT-II.
2. Move selector lever to "R" position.
3. Depress accelerator pedal (Full throttle position).
4. Touch "ERASE".
5. Turn ignition switch "OFF" position for 10 seconds.

PERFORM DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE.

See previous page.

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

Yes >> Replace TCM.

No >> **INSPECTION END**

TROUBLE DIAGNOSES FOR SYMPTOMS

[EURO-OBD]

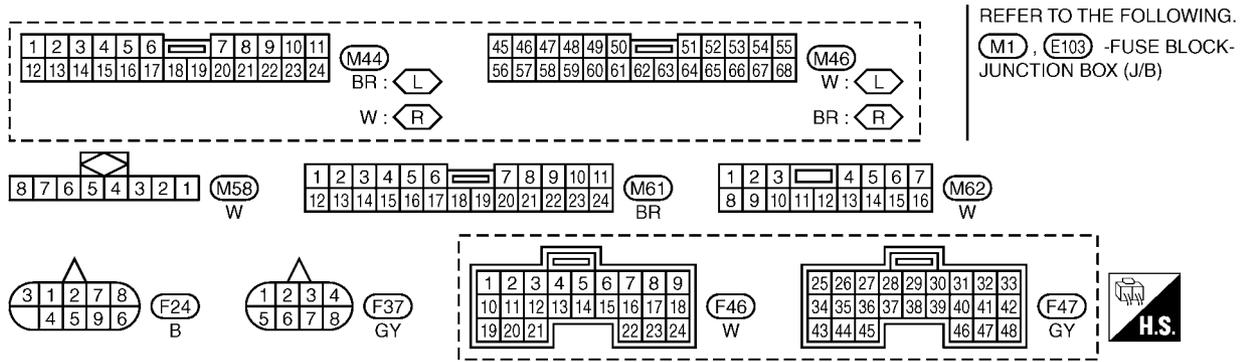
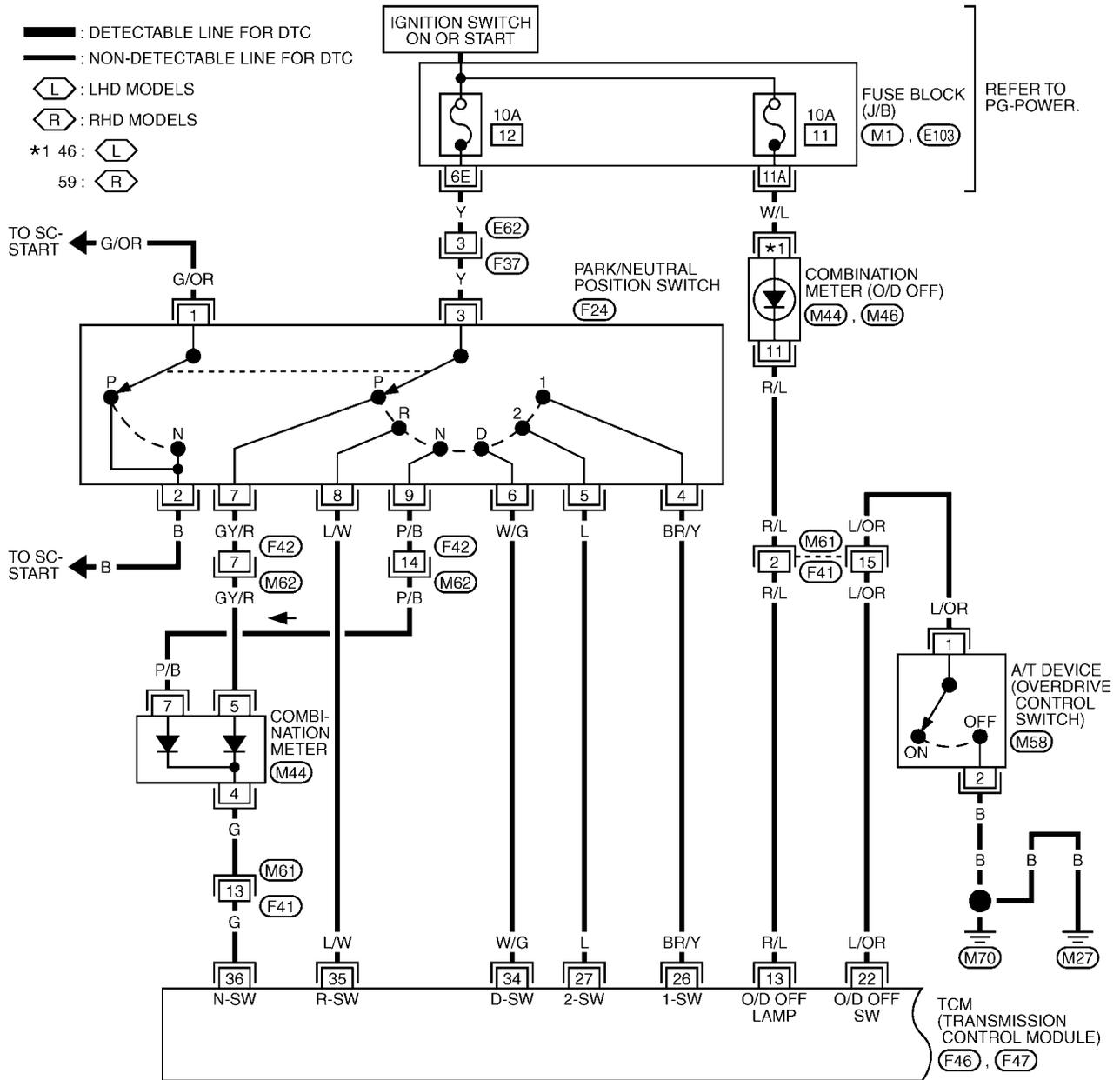
TROUBLE DIAGNOSES FOR SYMPTOMS

PF01:00100

Wiring Diagram — AT — NONDTC

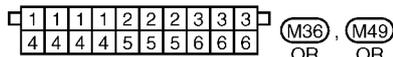
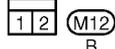
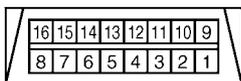
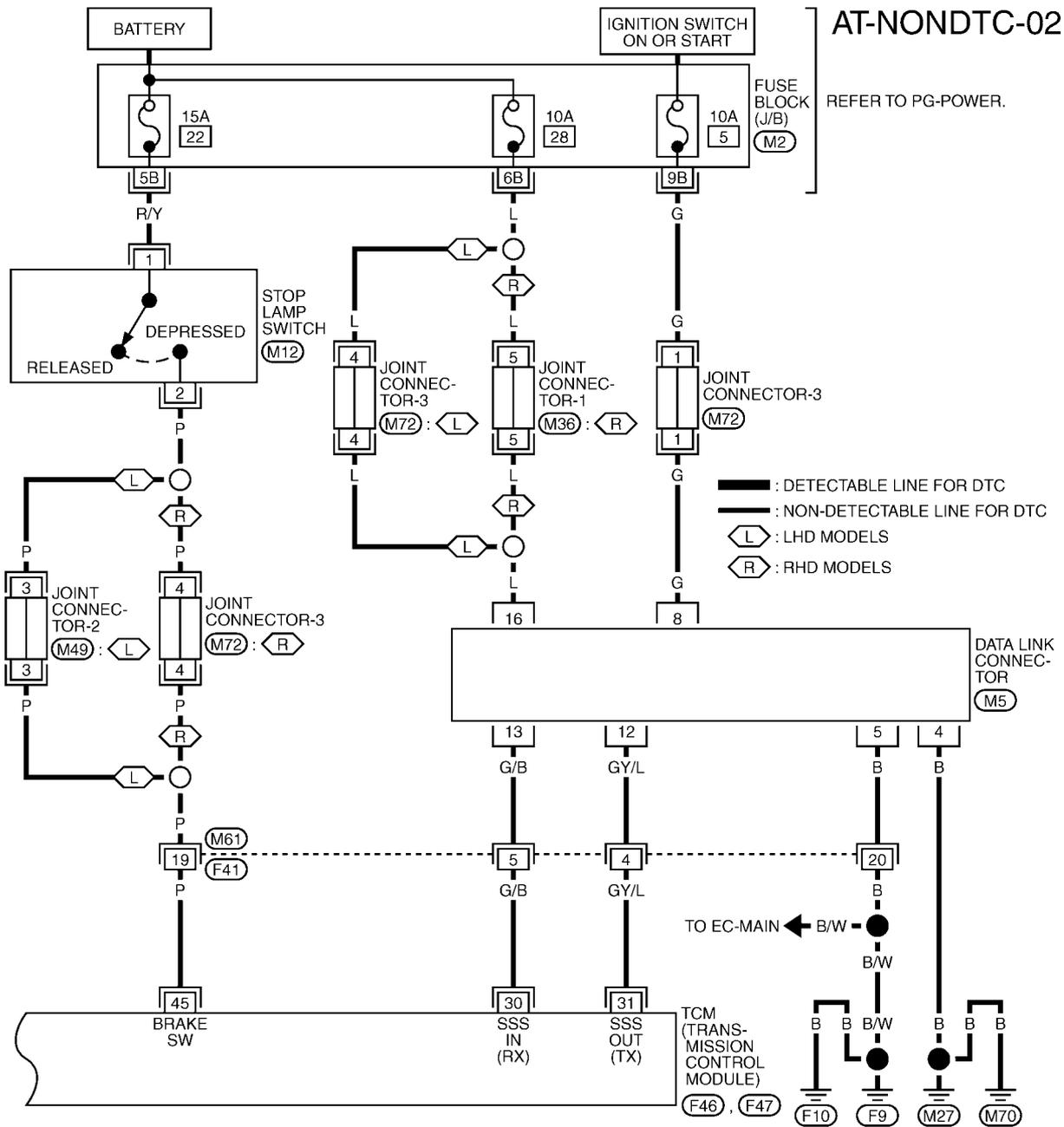
ECS0045T

AT-NONDTC-01

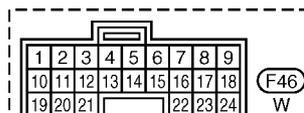
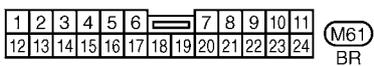
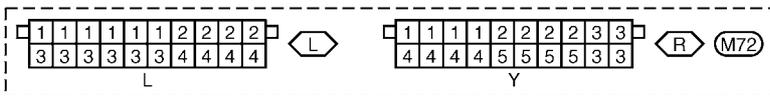


TROUBLE DIAGNOSES FOR SYMPTOMS

[EURO-OBD]



REFER TO THE FOLLOWING.
 (M2) - FUSE BLOCK-JUNCTION BOX (J/B)

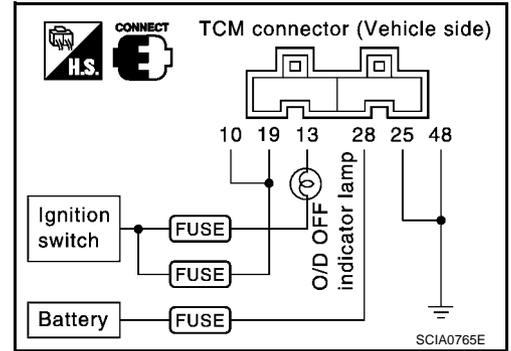


O/D OFF Indicator Lamp Does Not Come On

ECS004SU

SYMPTOM:

O/D OFF indicator lamp does not come on for about 2 seconds when turning ignition switch to "ON".



1. CHECK TCM POWER SOURCE

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

Voltage: Battery voltage

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

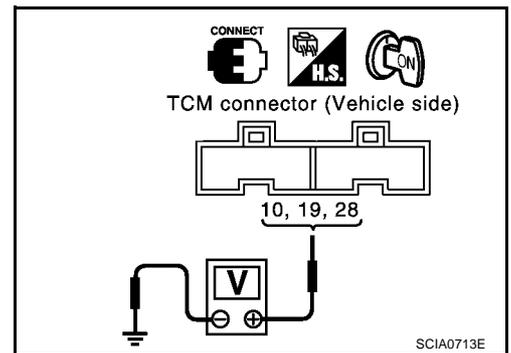
Voltage: Battery voltage

OK or NG

OK >> GO TO 2.

NG >> Check the following items:

- Harness for short or open between ignition switch and TCM terminals 10, 19 and 28
- Refer to [AT-350, "Wiring Diagram — AT — MAIN"](#) .
- Ignition switch and fuse Refer to [PG-2, "POWER SUPPLY ROUTING"](#) .



2. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Disconnect TCM harness connector.
3. Check continuity between TCM terminals 25, 48 and ground.

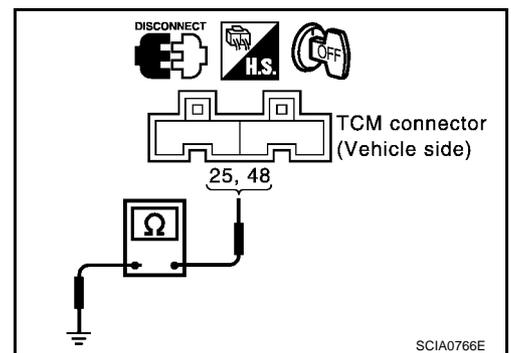
Continuity should exist.

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

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors. Refer to [AT-350, "Wiring Diagram — AT — MAIN"](#) .



3. CHECK LAMP CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Check resistance between TCM terminals 13 and 10, 19.

Resistance: 50 - 100Ω

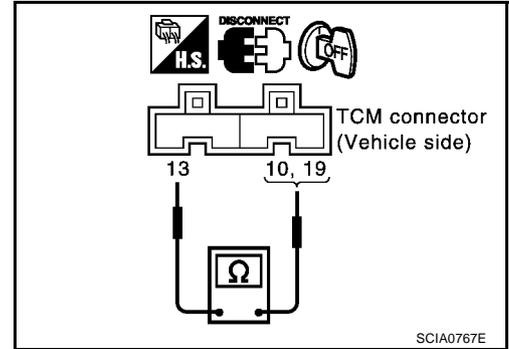
3. Reinstall any part removed.

OK or NG

OK >> GO TO 4.

NG >> Check the following items:

- O/D OFF indicator lamp.
Refer to [DI-10, "Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode"](#) .
- Harness and fuse for short or open between ignition switch and O/D OFF indicator lamp
Refer to [PG-2, "POWER SUPPLY ROUTING"](#) .
- Harness for short or open between O/D OFF indicator lamp and TCM.



SCIA0767E

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.

Engine Cannot Be Started In "P" and "N" Position

SYMPTOM:

- Engine cannot be started with selector lever in "P" or "N" position.
- Engine can be started with selector lever in "D", "2", "1" or "R" position.

1. CHECK PNP SWITCH CIRCUIT

④ With CONSULT-II

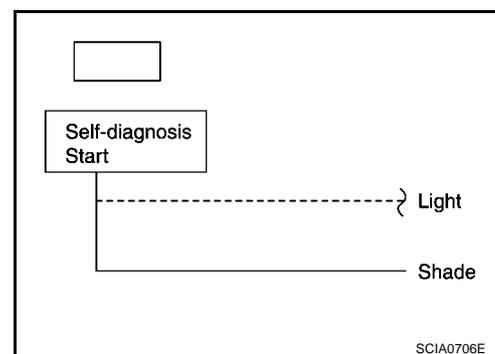
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit?

⊗ Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to [AT-241, "TCM Self-diagnosis Does Not Activate"](#).
- No >> GO TO 2.



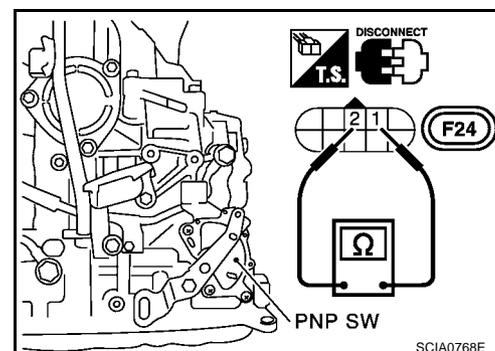
2. CHECK PNP SWITCH INSPECTION

Check for short or open of PNP switch harness connector terminals 1 and 2.

Refer to [AT-241, "TCM Self-diagnosis Does Not Activate"](#).

OK or NG

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

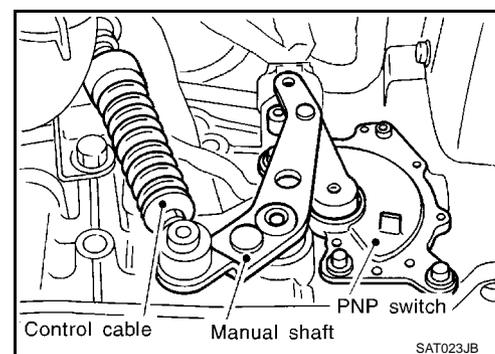


3. CHECK CONTROL CABLE

Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#).

OK or NG

- OK >> GO TO 4.
- NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#).



4. CHECK STARTING SYSTEM

Check starting system. Refer to [SC-20, "STARTING SYSTEM"](#).

OK or NG

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

In "P" Position, Vehicle Moves Forward Or Backward When Pushed

ECS004SW

SYMPTOM:

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

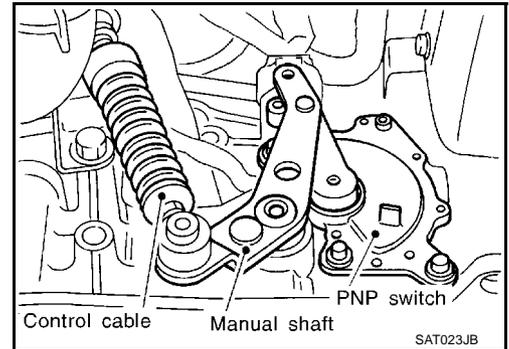
1. CHECK CONTROL CABLE

Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#).

OK or NG

OK >> GO TO 2.

NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#).



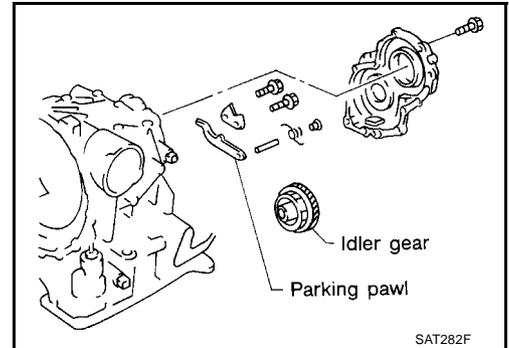
2. CHECK PARKING COMPONENTS

Check parking components. Refer to [AT-421, "OVERHAUL"](#).

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.



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

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

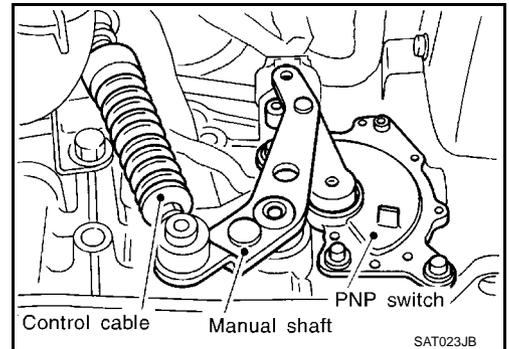
1. CHECK CONTROL CABLE

Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

OK or NG

OK >> GO TO 2.

NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

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

Check A/T fluid level again.

OK or NG

OK >> GO TO 3.

NG >> Refill ATF.

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

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

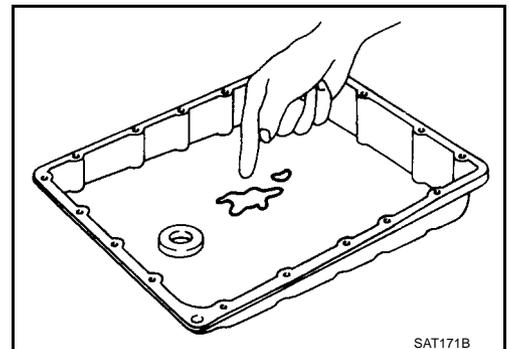
OK or NG

OK >> GO TO 4.

NG >> 1. Disassemble A/T.

2. Check the following items:

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

**4. CHECK SYMPTOM**

Check again.

OK or NG

OK >> **INSPECTION END**

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

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

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 the following items.

Euro-OBD

- [AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#)
- [AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#)
- [AT-193, "DTC BATT/FLUID TEMP SEN \(A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE\)"](#)

No >> GO TO 2

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in "D" position. Refer to [AT-67, "Line Pressure Test"](#).

OK or NG

OK >> GO TO 3.

NG >> 1. Remove control valve assembly. Refer to [AT-413, "Installation"](#).

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. CHECK SYMPTOM

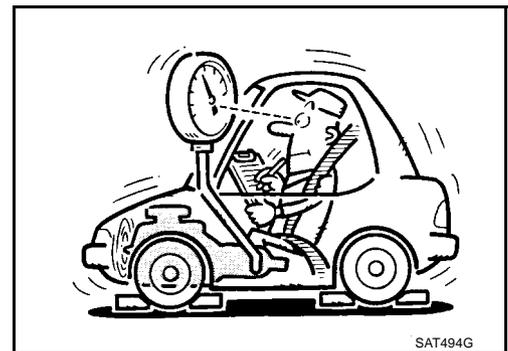
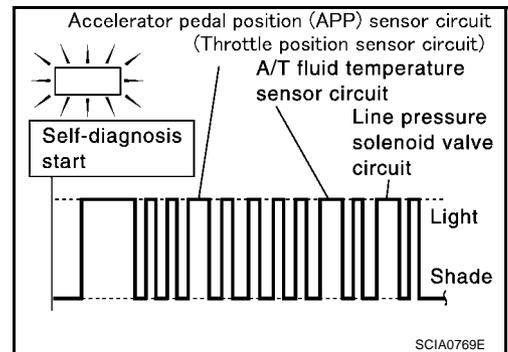
Check again.

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.



Vehicle Does Not Creep Backward In "R" Position

ECS004SZ

SYMPTOM:

Vehicle does not creep backward when selecting "R" position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

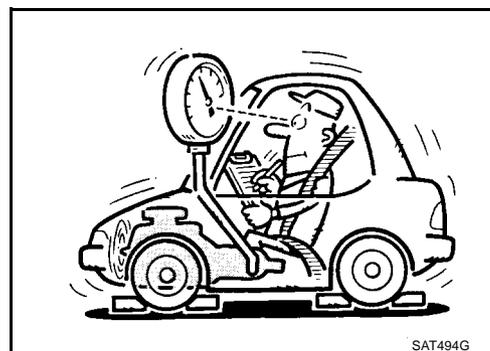
- OK >> GO TO 2.
 NG >> Refill ATF.



SAT638A

2. CHECK LINE PRESSURECheck line pressure at idle with selector lever in "R" position. Refer to [AT-67, "Line Pressure Test"](#).OK or NG

- OK >> GO TO 3.
 NG >> 1. Remove control valve assembly. Refer to [AT-413, "Installation"](#).
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 ([AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#) : Euro-OBD)
3. Disassemble A/T.
 4. Check the following item:
- Oil pump assembly



SAT494G

3. CHECK STALL TEST

Check stall revolution with selector lever in "1" and "R" positions.
Refer to [AT-64, "Stall Test"](#) .

OK or NG

OK >> GO TO 4.

OK in "1" position, NG in "R" position>>1.Remove control valve assembly. Refer to [AT-413, "Installation"](#) .

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 ([AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#) : Euro-OBD)

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

NG in both "1" and "R" positions>>GO TO 6.



4. CHECK A/T FLUID CONDITION

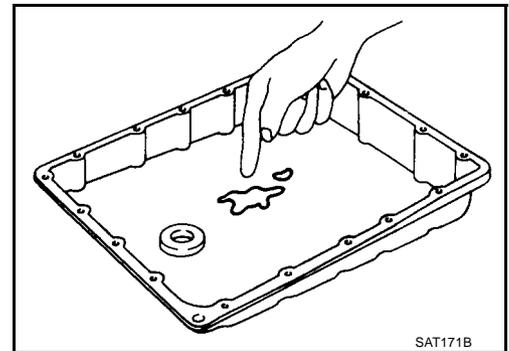
1. Remove oil pan.

2. Check A/T fluid condition.

OK or NG

OK >> GO TO 5.

NG >> GO TO 6.



5. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**

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

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

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .
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 ([AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#) : Euro-OBD)
3. Disassemble A/T.
4. Check the following items:
 - Oil pump assembly
 - Torque converter
 - Reverse clutch assembly
 - High clutch assembly
 - Low & reverse brake assembly
 - Forward clutch assembly
 - Overrun clutch assembly

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

A

B

AT

D

E

F

G

H

I

J

K

L

M

Vehicle Does Not Creep Forward In "D", "2" Or "1" Position

ECS00470

SYMPTOM:

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

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

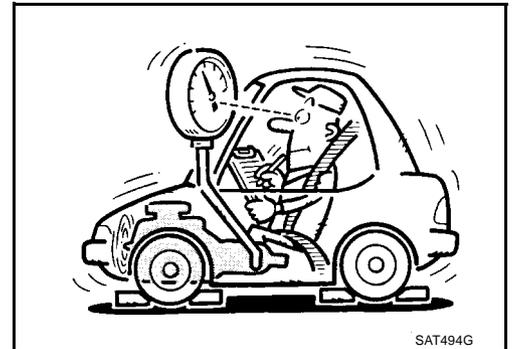
- OK >> GO TO 2.
 NG >> Refill ATF.



SAT638A

2. CHECK LINE PRESSURECheck line pressure at idle with selector lever in "D" position. Refer to [AT-67, "Line Pressure Test"](#).**OK or NG**

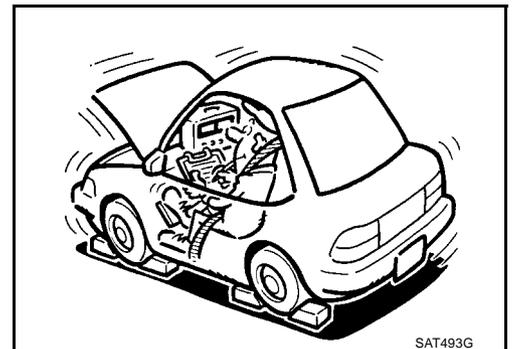
- OK >> GO TO 3.
 NG >> 1. Remove control valve assembly. Refer to [AT-413, "Installation"](#).
 2. Check the following items:
 - Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
 - Line pressure solenoid valve ([AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#) : Euro-OBD)
 3. Disassemble A/T.
 4. Check the following item:
 - Oil pump assembly



SAT494G

3. CHECK STALL TESTCheck stall revolution with selector lever in "D" position. Refer to [AT-64, "Stall Test"](#).**OK or NG**

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



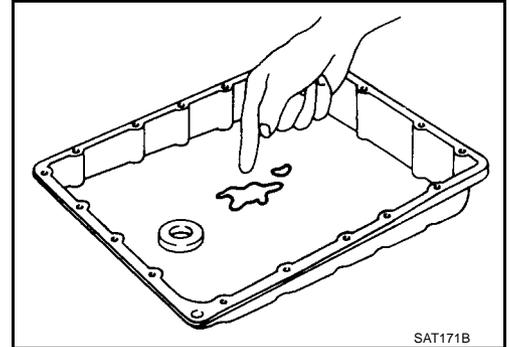
SAT493G

4. CHECK A/T FLUID CONDITION

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

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 6.

**5. CHECK SYMPTOM**

Check again.

OK or NG

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

6. DETECT MALFUNCTIONING ITEM

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

OK or NG

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

Vehicle Cannot Be Started From D1

SYMPTOM:

Vehicle cannot be started from D1 on Cruise test — Part 1.

1. CHECK SYMPTOM

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

Yes or No

Yes >> GO TO 2.

No >> Go to [AT-215, "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, overrun clutch solenoid valve, torque converter clutch solenoid valve or vehicle speed sensor-MTR after cruise test?

Yes or No

Yes >> ● Check damaged circuit. Refer to the following items.

Euro-OBD

- [AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#)
- [AT-158, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#)
- [AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"](#)
- [AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"](#)
- [AT-185, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"](#)
- [AT-358, "DTC VEHICLE SPEED SENSOR MTR"](#)

No >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

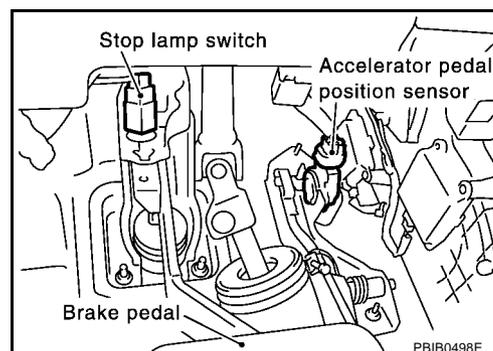
Check accelerator pedal position (APP) sensor. Refer to [AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#)

— Euro-OBD

OK or NG

OK >> GO TO 4.

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



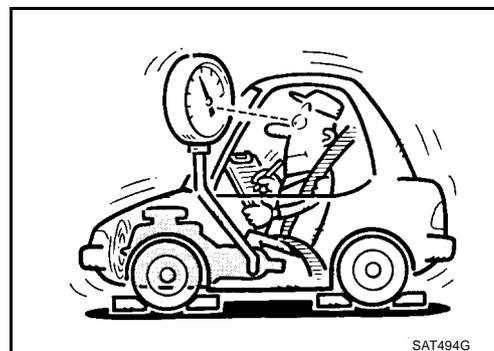
4. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in "D" position. Refer to [AT-67, "Line Pressure Test"](#).

OK or NG

OK >> GO TO 5.

NG >> GO TO 8.

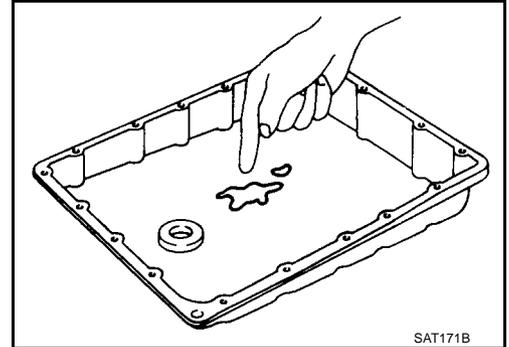


5. CHECK A/T FLUID CONDITION

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

OK or NG

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

**6. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-448, "Control Valve Assembly"](#).
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-413, "Installation"](#) .
2. Check the following items:
 - Shift valve A
 - Shift valve B
 - Shift solenoid valve A
 - Shift solenoid valve B
 - Pilot valve
 - Pilot filter
3. Disassemble A/T.
4. Check the following items:
 - High clutch assembly
 - Torque converter
 - Oil pump assembly
 - Reverse clutch assembly
 - Low & reverse clutch assembly

OK or NG

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

A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2

ECS004T2

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 Vehicle Does Not Creep Forward In "D", "2" Or "1" Position and Vehicle Cannot Be Started From D1 OK?

Yes or No

Yes >> GO TO 2.

No >> Go to [AT-218, "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"](#) , [AT-220, "Vehicle Cannot Be Started From D1"](#) .

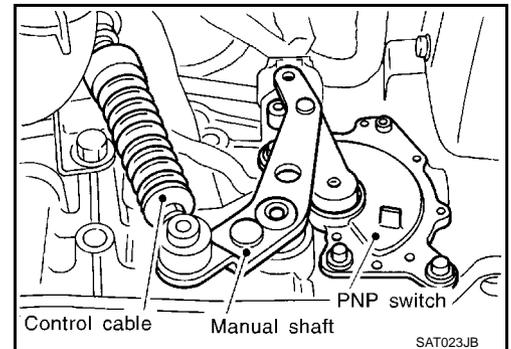
2. CHECK CONTROL CABLE

Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

OK or NG

OK >> GO TO 3.

NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .



3. CHECK VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR-MTR CIRCUIT

Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-353, "VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and [AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) (Except for Euro-OBD)./ Refer to [AT-358, "DTC VEHICLE SPEED SENSOR MTR"](#) and [AT-199, "DTC VEHICLE SPEED SENSOR MTR"](#) (EURO-OBD).

OK or NG

OK >> GO TO 4.

NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

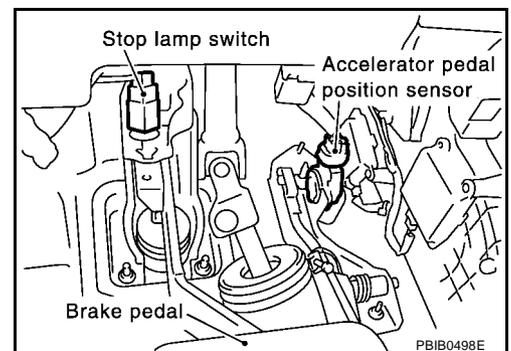
4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer [AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#) — Euro-OBD

OK or NG

OK >> GO TO 5

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

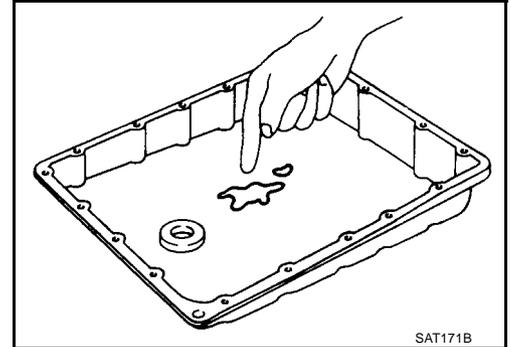


5. CHECK A/T FLUID CONDITION

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

OK or NG

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



6. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to [AT-413, "Installation"](#) .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

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

7. CHECK SYMPTOM

Check again.

OK or NG

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

8. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to [AT-413, "Installation"](#) .
2. Check the following items:

- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T.

4. Check the following items:

- Servo piston assembly
- Brake band

OK or NG

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

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 Vehicle Does Not Creep Forward In "D", "2" Or "1" Position and Vehicle Cannot Be Started From D1 OK?
Yes or No

Yes >> GO TO 2.

No >> Go to [AT-218, "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"](#) , [AT-220, "Vehicle Cannot Be Started From D1"](#) .

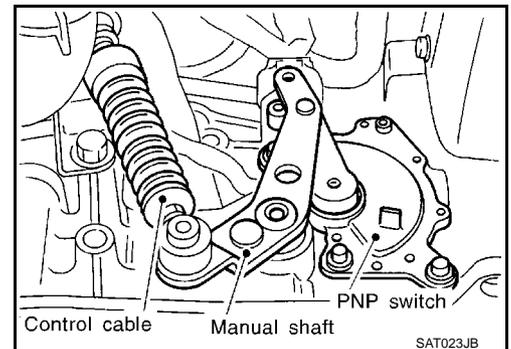
2. CHECK CONTROL CABLE

Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

OK or NG

OK >> GO TO 3.

NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

**3. CHECK VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR-MTR CIRCUIT**

Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-353, "VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and [AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) (Except for Euro-OBD)./ Refer to [AT-358, "DTC VEHICLE SPEED SENSOR MTR"](#) and [AT-199, "DTC VEHICLE SPEED SENSOR MTR"](#) (EURO-OBD).

OK or NG

OK >> GO TO 4.

NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

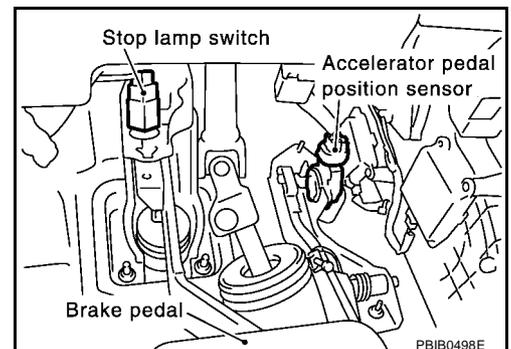
4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to [AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#)
— Euro-OBD

OK or NG

OK >> GO TO 5.

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

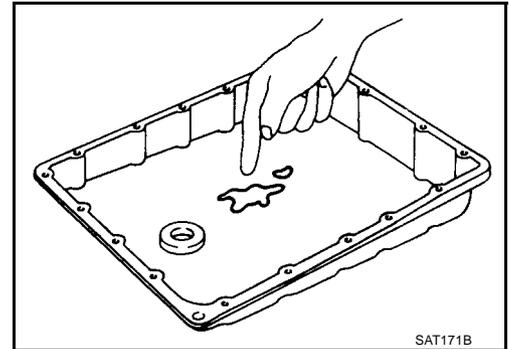


5. CHECK A/T FLUID CONDITION

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

OK or NG

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



6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .
2. Check the following items:
 - Shift valve B
 - Shift solenoid valve B ([AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"](#) : Euro-OBD)
 - 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-413, "Installation"](#) .
2. Check the following items:
 - Shift valve B
 - Shift solenoid valve B
 - Pilot valve
 - Pilot filter
3. Disassemble A/T.
4. Check the following items:
 - Servo piston assembly
 - High clutch assembly
 - Brake band

OK or NG

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

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 Vehicle Does Not Creep Forward In "D", "2" Or "1" Position and Vehicle Cannot Be Started From D1 OK? AT

Yes or No

Yes >> GO TO 2.

No >> Go to [AT-218, "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"](#) , [AT-220, "Vehicle Cannot Be Started From D1"](#) .

2. CHECK SELF-DIAGNOSTIC RESULTS

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

- PNP switch
- Overdrive control switch
- A/T fluid temperature sensor
- Vehicle speed sensor-A/T (revolution sensor)
- Shift solenoid valve A or B
- Vehicle speed sensor-MTR

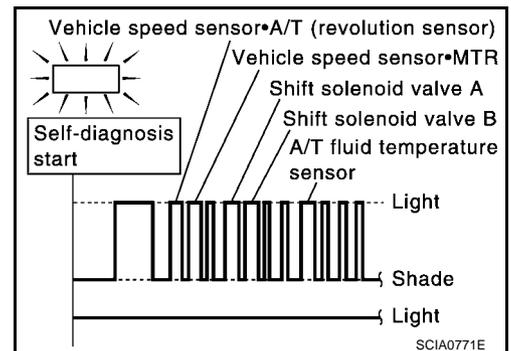
Yes or No

Yes >> ● Check damaged circuit. Refer to the following items.

Euro-OBD

- VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR): [AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#)
- SHIFT SOLENOID VALVE A: [AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"](#)
- SHIFT SOLENOID VALVE B: [AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"](#)
- BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE): [AT-193, "DTC BATT/FLUID TEMP SEN \(A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE\)"](#)
- VHCL SPEED SEN-MTR VEHICLE SPEED SENSOR-MTR: [AT-199, "DTC VEHICLE SPEED SENSOR MTR"](#)
- TCM Self-diagnosis Does Not Activate): [AT-241, "TCM Self-diagnosis Does Not Activate"](#)

No >> GO TO 3.



3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

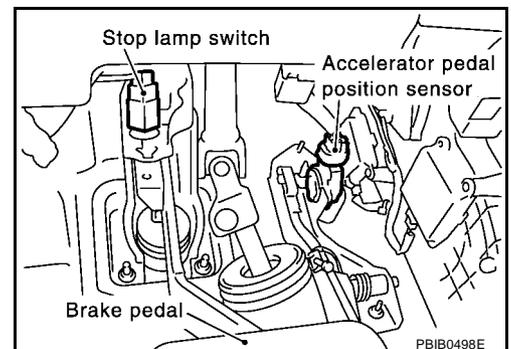
Check accelerator pedal position (APP) sensor. Refer to [AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#)

— Euro-OBD

OK or NG

OK >> GO TO 4.

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

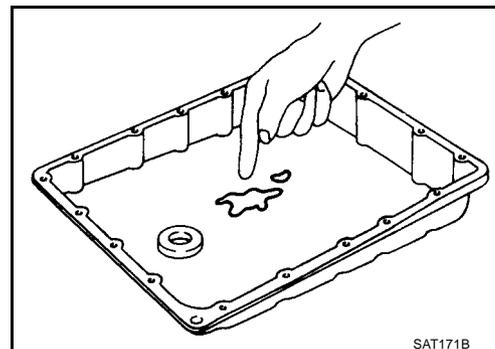


4. CHECK A/T FLUID CONDITION

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

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 7.



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .

2. Check the following items:
 - Shift valve A
 - Overrun clutch control valve
 - Shift solenoid valve A
 - Pilot valve
 - Pilot filter

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .

2. Check the following items:
 - Shift valve A
 - Overrun clutch control valve
 - Shift solenoid valve A
 - Pilot valve
 - Pilot filter

3. Disassemble A/T.

4. Check the following items:
 - Servo piston assembly
 - Brake band

OK or NG

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

A/T Does Not Perform Lock-up**SYMPTOM:**

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

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to A/T fluid temperature sensor, vehicle speed sensor-A/T (revolution sensor), engine speed signal or torque converter clutch solenoid valve circuit after cruise test?

Yes or No

Yes >> Check damaged circuit. Refer to [AT-158, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#), [AT-116, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT"](#), [AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#), [AT-127, "DTC P0725 ENGINE SPEED SIGNAL"](#). — Euro-OBD

No >> GO TO 2.

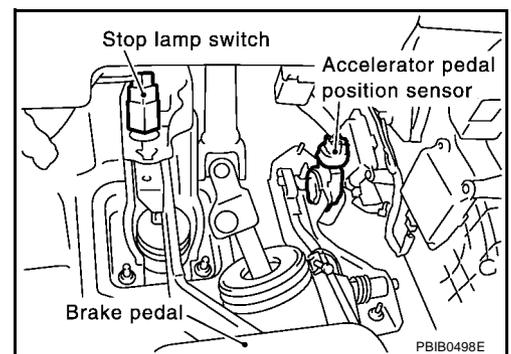
2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to [AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#). — Euro-OBD

OK or NG

OK >> GO TO 3.

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

**3. DETECT MALFUNCTIONING ITEM**

1. Remove control valve. Refer to [AT-413, "Installation"](#).

2. Check the following items:

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

3. Disassemble A/T.

4. Check torque converter.

OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**

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

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

A/T Does Not Hold Lock-up Condition

SYMPTOM:

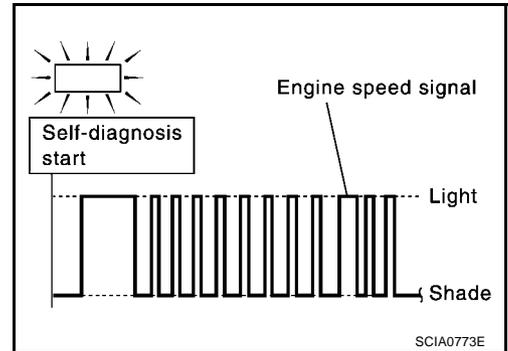
A/T does not hold lock-up condition for more than 30 seconds.

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-127](#), "[DTC P0725 ENGINE SPEED SIGNAL](#)" (Euro-OBD).
 No >> GO TO 2.

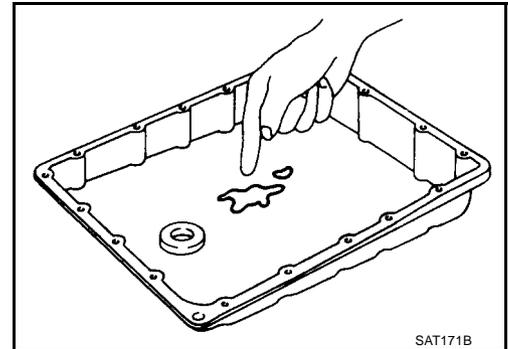


2. CHECK A/T FLUID CONDITION

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-413](#), "[Installation](#)".
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-413, "Installation"](#) .
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.

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Lock-up Is Not Released**SYMPTOM:**

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

1. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR CIRCUIT**④ With CONSULT-II**

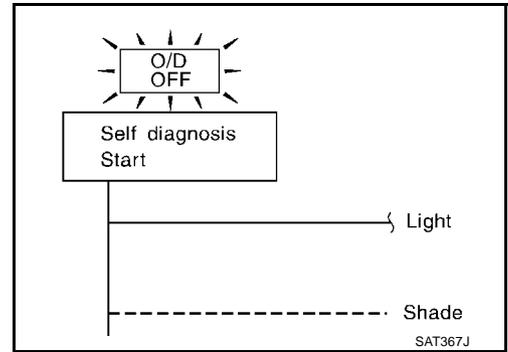
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage accelerator pedal position (APP) sensor circuit?

⊗ Without CONSULT-II

Does self-diagnosis show damage to accelerator pedal position (APP) sensor circuit?

Yes or No

- Yes >> Check accelerator pedal position (APP) sensor circuit.
Refer to [AT-241, "TCM Self-diagnosis Does Not Activate"](#).
- 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.

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

EC500478

SYMPTOM:

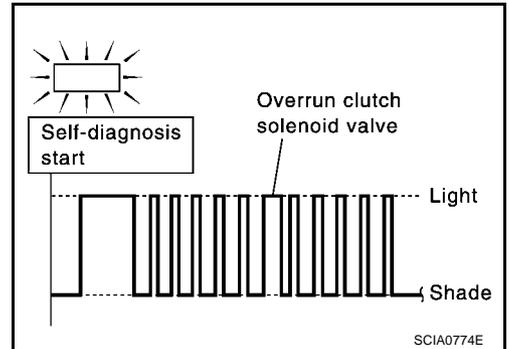
- Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 .
- Vehicle does not decelerate by engine brake when turning overdrive control switch OFF.
- Vehicle does not decelerate by engine brake when shifting A/T from “D” to “2” position.

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-185, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"](#) (Euro-OBD).
- No >> GO TO 2.

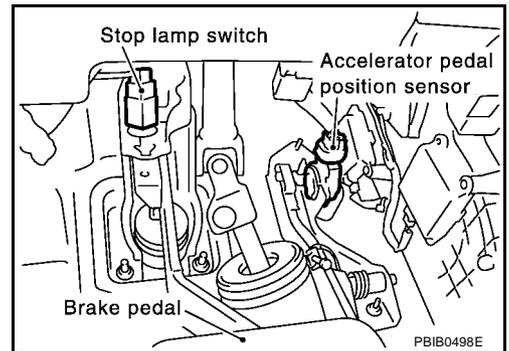


2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to [AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#) — Euro-OBD

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace accelerator pedal position (APP) sensor. ([AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#) : Euro-OBD)

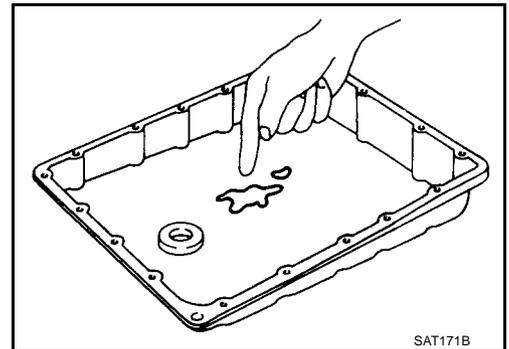


3. CHECK A/T FLUID CONDITION

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-413, "Installation"](#) .
2. Check the following items:
 - Overrun clutch control valve
 - Overrun clutch reducing valve
 - Overrun clutch solenoid valve ([AT-185, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"](#) : Euro-OBD)

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-413, "Installation"](#) .
2. Check the following items:
 - Overrun clutch control valve
 - Overrun clutch reducing valve
 - Overrun clutch solenoid valve ([AT-185, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"](#) : Euro-OBD)
3. Disassemble A/T.
4. Check the following item:
 - Overrun clutch assembly

OK or NG

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

Vehicle Does Not Start From D1

ECS004T9

SYMPTOM:

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

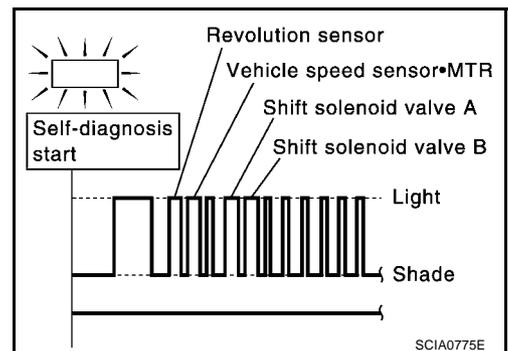
1. CHECK SELF-DIAGNOSTIC RESULTS

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 the following items.
 Euro-OBD
- [AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#)
 - [AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"](#)
 - [AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"](#)
 - [AT-199, "DTC VEHICLE SPEED SENSOR MTR"](#)

No >> GO TO 2.



2. CHECK SYMPTOM

Check again.

OK or NG

OK >> Go to [AT-220. "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.

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

ECS004TA

SYMPTOM:

A/T does not shift from D4 to D3 when changing overdrive control switch to “OFF” position.

1. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

① With CONSULT-II

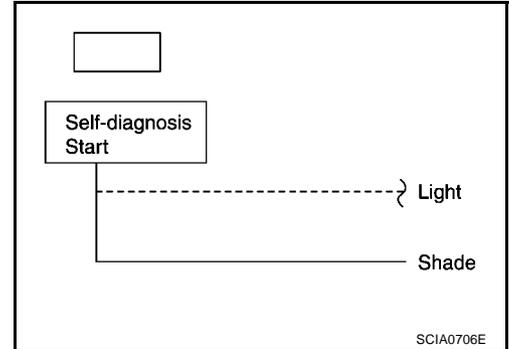
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to overdrive control switch circuit?

⊗ Without CONSULT-II

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

Yes or No

- Yes >> Check overdrive control switch circuit. Refer to [AT-242](#), "[DIAGNOSTIC PROCEDURE](#)".
- No >> Go to [AT-225](#), "A/T Does Not Shift: D2 → D3".



A/T Does Not Shift: D3 → 22 , When Selector Lever “D” → “2” Position

ECS004TB

SYMPTOM:

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

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

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

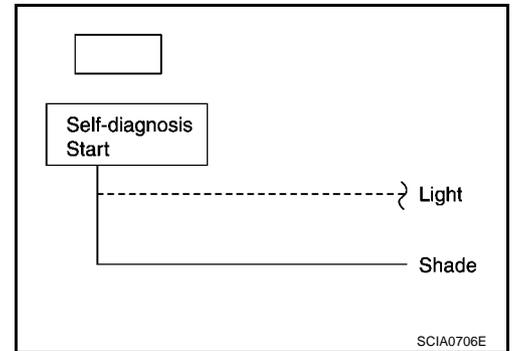
② Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to [AT-241, "TCM Self-diagnosis Does Not Activate"](#) .

No >> Go to [AT-223, "A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2"](#) .



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

ECS004TC

SYMPTOM:

A/T does not shift from 22 to 11 when changing selector lever from “2” to “1” position.

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

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

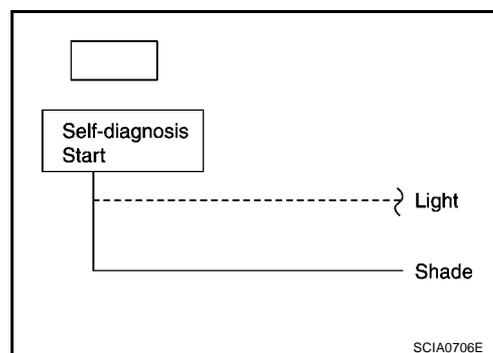
② Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

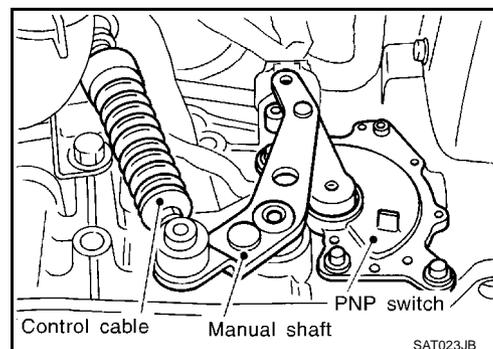
Yes >> Check PNP switch circuit. Refer to [AT-241, "TCM Self-diagnosis Does Not Activate"](#) .

No >> GO TO 2.

**2. CHECK CONTROL CABLE**Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

OK or NG

OK >> GO TO 3.

NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .**3. CHECK VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR-MTR CIRCUIT**Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-353, "VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and [AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) (Except for Euro-OBD)./ Refer to [AT-358, "DTC VEHICLE SPEED SENSOR MTR"](#) and [AT-199, "DTC VEHICLE SPEED SENSOR MTR"](#) (EURO-OBD).

OK or NG

OK >> GO TO 4.

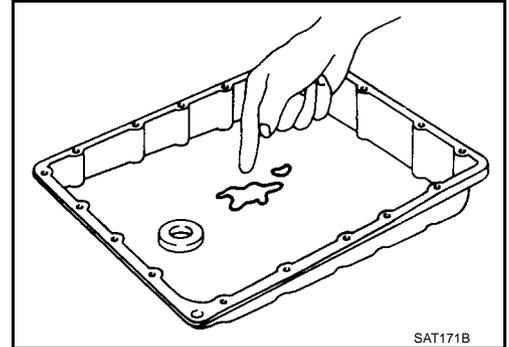
NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

4. CHECK A/T FLUID CONDITION

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

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .
2. Check the following items:
 - Overrun clutch control valve
 - Shift solenoid valve A
3. Disassemble A/T.
4. Check the following items:
 - Servo piston assembly
 - Brake band

OK or NG

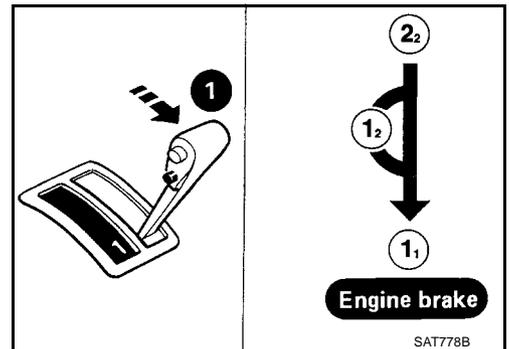
- OK >> GO TO 6.
- NG >> Repair or replace damaged parts.

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.



Vehicle Does Not Decelerate By Engine Brake

SYMPTOM:

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

1. CHECK PNP SWITCH CIRCUIT

④ With CONSULT-II

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

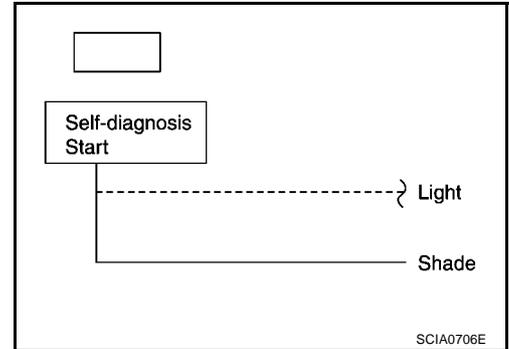
⊗ Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to [AT-241, "TCM Self-diagnosis Does Not Activate"](#).

No >> GO TO 2.



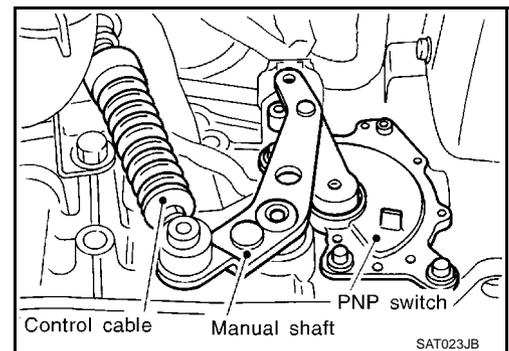
2. CHECK CONTROL CABLE

Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#).

OK or NG

OK >> GO TO 3.

NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#).



3. CHECK VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR-MTR CIRCUIT

Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-353, "VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and [AT-122, "DTC P0720 VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) (Except for Euro-OBD)./ Refer to [AT-358, "DTC VEHICLE SPEED SENSOR MTR"](#) and [AT-199, "DTC VEHICLE SPEED SENSOR MTR"](#) (EURO-OBD).

OK or NG

OK >> GO TO 4.

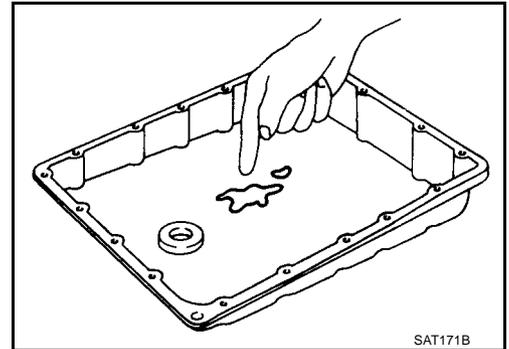
NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

4. CHECK A/T FLUID CONDITION

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

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .
2. Check the following items:
 - Overrun clutch control valve
 - Shift solenoid valve A
3. Disassemble A/T.
4. Check the following items:
 - Overrun clutch assembly
 - Low & reverse bake assembly

OK or NG

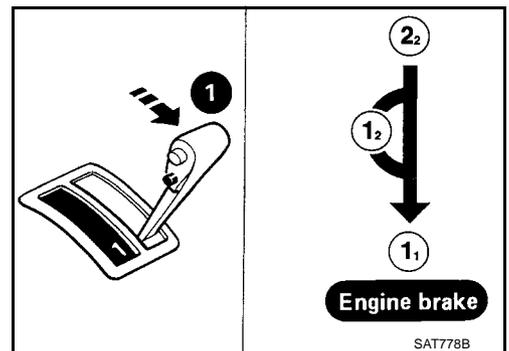
- OK >> GO TO 6.
- NG >> Repair or replace damaged parts.

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.



TCM Self-diagnosis Does Not Activate

ECS004TE

SYMPTOM:

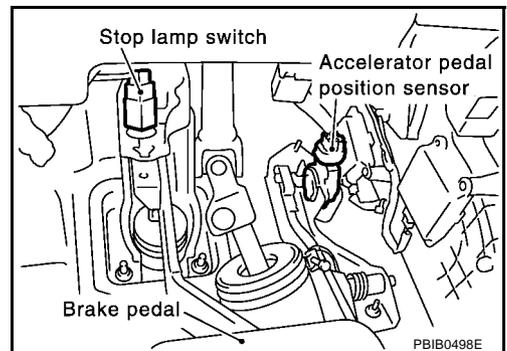
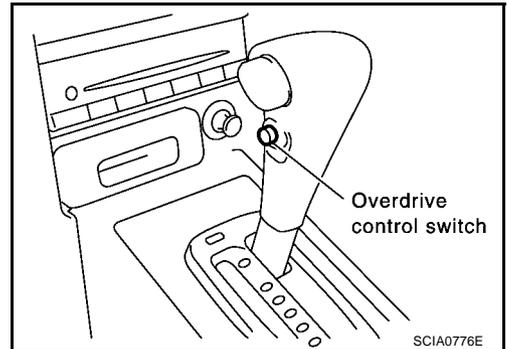
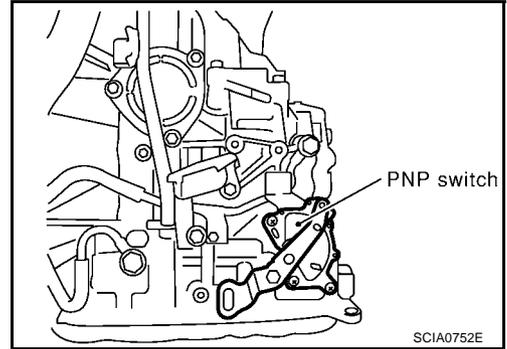
O/D OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

- PNP switch
The PNP switch assembly includes a transmission position switch. The transmission position switch detects the selector lever position and sends a signal to the TCM.

- Overdrive control switch
Detects the overdrive control switch position (ON or OFF) and sends a signal to the TCM.

- Closed throttle position signal and wide-open throttle position signal
ECM judges throttle opening based on a signal from accelerator pedal position sensor, and sends the signal via CAN communication to TCM.



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/N", "R", "D", "2" and "1" position switches moving selector lever to each position.
Check that the signal of the selector lever position is indicated properly.

OK or NG

OK >> GO TO 3.

NG >> Check the following items:

- PNP switch (Refer to [AT-246, "COMPONENT INSPECTION"](#) .)
- Harness for short or open between ignition switch and PNP switch
- Harness for short or open between PNP switch and TCM
- Diode (P, N positions)

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

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2. CHECK PNP SWITCH CIRCUIT (WITHOUT CONSULT-II)

⊗ Without CONSULT-II

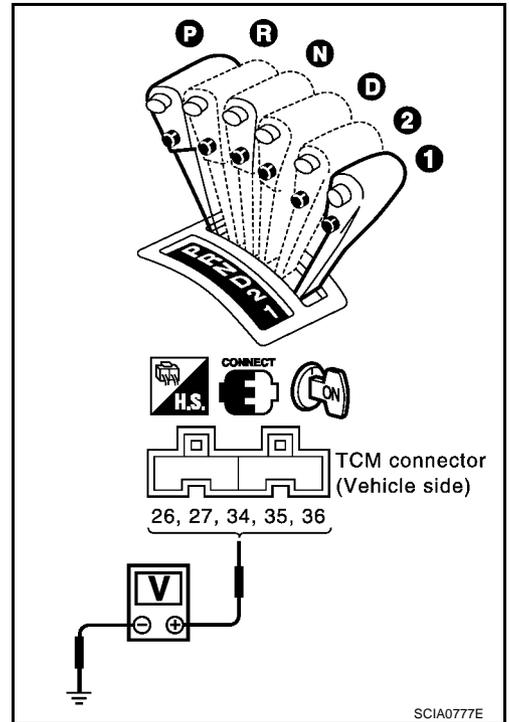
1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Check voltage between TCM terminals 26, 27, 34, 35, 36 and ground while moving selector lever through each position.

Voltage:

B: Battery voltage

0: 0V

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



OK or NG

OK >> GO TO 4.

NG >> Check the following items:

- PNP switch (Refer to [AT-246, "COMPONENT INSPECTION"](#) .)
- Harness for short or open between ignition switch and PNP switch
- Harness for short or open between PNP switch and TCM
- Diode (P, N positions)

3. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT (WITH CONSULT-II)

Ⓜ With CONSULT-II

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "OVERDRIVE SWITCH".
Check the signal of the overdrive control switch is indicated properly. (Overdrive control switch "ON" displayed on CONSULT-II means overdrive "OFF".)

OK or NG

OK >> GO TO 5.

NG >> Check the following items:

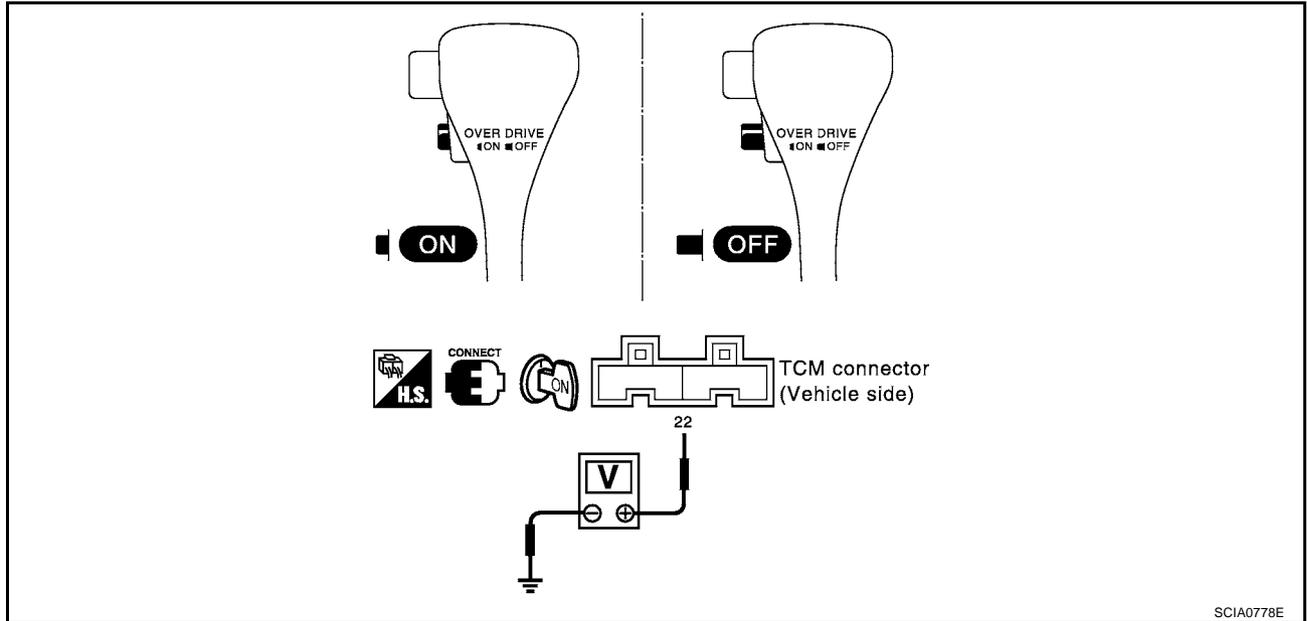
- Overdrive control switch (Refer to [AT-246, "COMPONENT INSPECTION"](#) .)
- Harness for short or open between TCM and overdrive control switch
- Harness of ground circuit for overdrive control switch for short or open

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

4. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT (WITHOUT CONSULT-II)

⊗ Without CONSULT-II

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



Voltage:

Switch position "ON":

Battery voltage

Switch position "OFF":

1V or less

OK or NG

OK >> GO TO 6.

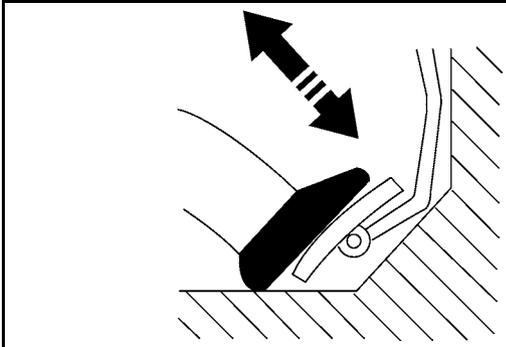
NG >> Check the following items:

- Overdrive control switch (Refer to [AT-246, "COMPONENT INSPECTION"](#) .)
- Harness for short or open between TCM and overdrive control switch
- Harness of ground circuit for overdrive control switch for short or open

5. CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL 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-SW" depressing and releasing accelerator pedal. Check the signal of throttle position signal 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

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

OK or NG

- OK >> GO TO 7.
 NG >> Check the following items. If any items are damaged, repair or replace damaged parts.
- Accelerator pedal position sensor — Refer to [AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#).
 - Harness for short or open between accelerator pedal position sensor and ECM

6. CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

Check the following items:

- Accelerator pedal position sensor — Refer to [AT-180, "DTC P1705 ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#).
- Harness for short or open between accelerator pedal position sensor and ECM

OK or NG

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

7. CHECK DTC

Perform "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)". Refer to [AT-51, "TCM SELF-DIAGNOSTIC PROCEDURE \(NO TOOLS\)"](#).

OK or NG

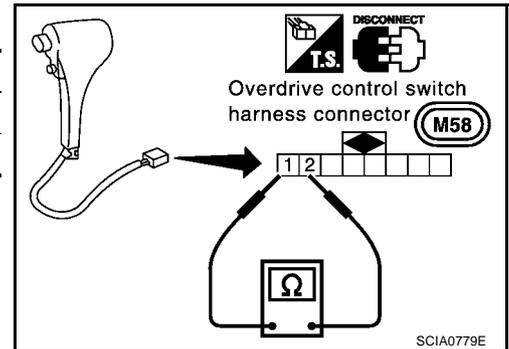
- OK >> **INSPECTION END**
 NG >> ● Perform TCM input/output signal inspection.
 ● If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

COMPONENT INSPECTION

Overdrive Control Switch

- Check continuity between two terminals 7 and 8.

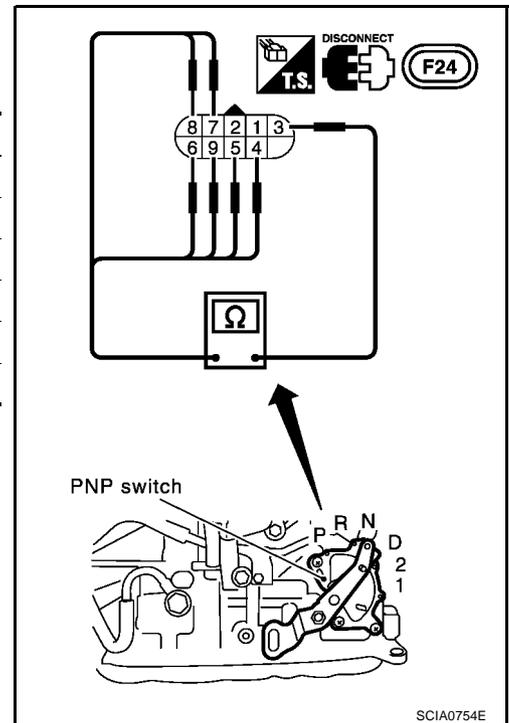
Switch position	Continuity
ON	No
OFF	Yes



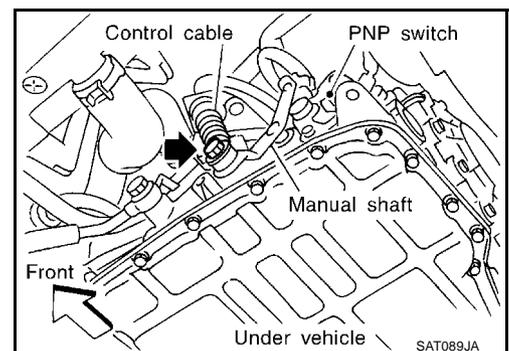
PNP Switch

1. Check continuity between terminals 1 and 2, and between terminals 3 and 4, 5, 6, 7, 8, 9 while moving manual shaft through each position.

Lever position	Terminal No.	
P	3 — 7	1 — 2
R	3 — 8	
N	3 — 9	1 — 2
D	3 — 6	
2	3 — 5	
1	3 — 4	



2. If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step 1.
3. If OK on step 2, adjust manual control cable. Refer to [AT-416. "Control Cable Adjustment"](#).
4. If NG on step 2, remove PNP switch from A/T and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to [AT-416. "Control Cable Adjustment"](#).
6. If NG on step 4, replace PNP switch.



ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

PFP:00000

CONSULT-II

ECS004NW

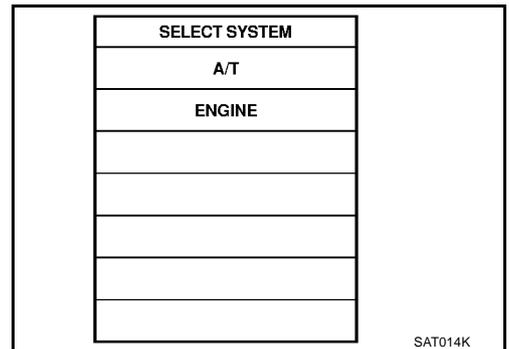
After performing [AT-247, "SELF-DIAGNOSTIC PROCEDURE \(WITH CONSULT-II\)"](#) , place check marks for results on the [AT-259, "DIAGNOSTIC WORKSHEET"](#) . Reference pages are provided following the items.

NOTICE:

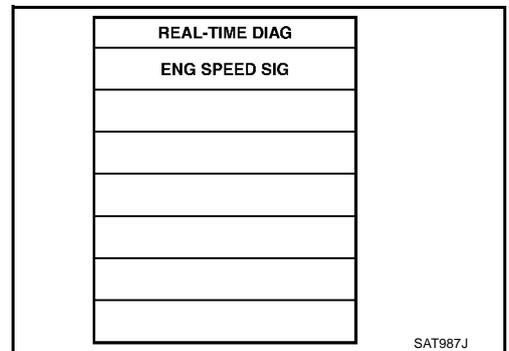
1. The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. 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 "A/T" for TCM self-diagnosis. If A/T is not displayed, check TCM power supply and ground circuit. Refer to [AT-306, "TCM Terminals and Reference Value"](#) . If result is NG, refer to [PG-2, "POWER SUPPLY ROUTING"](#) .



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



SELF-DIAGNOSTIC RESULT TEST MODE

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when...	Remarks
Item	Display		
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED)		● No failure has been detected.	
Initial start	INITIAL START	● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EXC.F/EURO-OBD]

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when...	Remarks
Item	Display		
Revolution sensor	VHCL SPEED SEN-A/T	● TCM does not receive the proper voltage signal from the sensor.	
Vehicle speed sensor (Meter)	VHCL SPEED SEN-MTR	● TCM does not receive the proper voltage signal from the sensor.	
Accelerator pedal position (APP) sensor	THROTTLE POSI SEN	● TCM receives an excessively low or high voltage from the sensor.	
Shift solenoid valve A	SHIFT SOLENOID/V A	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
Shift solenoid valve B	SHIFT SOLENOID/V B	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
Overrun clutch solenoid valve	OVERRUN CLUTCH S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
T/C clutch solenoid valve	T/C CLUTCH SOL/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
A/T fluid temperature sensor	BATT/FLUID TEMP SEN	● TCM receives an excessively low or high voltage from the sensor.	To be displayed in case of abnormality and when no recording is made.
Engine speed signal	ENGINE SPEED SIG	● TCM does not receive the proper voltage signal from the ECM.	
Line pressure solenoid valve	LINE PRESSURE S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
CAN communication	CAN COMM CIRCUIT	● When malfunction is detected in CAN communication line.	
TCM (RAM)	CONTROL UNIT (RAM)	● TCM memory (RAM) is malfunctioning	Refer to AT-351, "TCM TERMINALS AND REFERENCE VALUE"
TCM (ROM)	CONTROL UNIT (ROM)	● TCM memory (ROM) is malfunctioning	Refer to AT-351, "TCM TERMINALS AND REFERENCE VALUE"
TCM (EEP ROM)	CONT UNIT (EEP ROM)	● TCM memory (EEP ROM) is malfunctioning.	Refer to AT-351, "TCM TERMINALS AND REFERENCE VALUE"

CAUTION:

If malfunction is detected in multiple systems including CAN communication line, CAN communication line trouble diagnosis shall be performed first.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EXC.F/EURO-OBD]

DATA MONITOR MODE (A/T)

Item	Display	move to center Monitor items				Description	Remarks
		TCM Input signals	CAN comm signals	Main signals	Selection from menu		
Vehicle speed sensor 1 (A/T) (Revolution sensor)	VHCL/S SE-A/T [km/h] or [mph]	X	—	—	▼	<ul style="list-style-type: none"> Vehicle speed computed from signal of revolution sensor is displayed. 	When racing engine in N or P with vehicle stationary, CONSULT-II data may not indicate 0 km/h (0 mph).
Vehicle speed sensor 2 (Meter)	VHCL/S SE-MTR [km/h] or [mph]	X	—	—	▼	<ul style="list-style-type: none"> Vehicle speed computed from signal of vehicle speed sensor is displayed. 	Vehicle speed display may not be accurate under approx. 10 km/h (6 mph). It may not indicate 0 km/h (0 mph) when vehicle is stationary.
Accelerator pedal position sensor	THRTL POS SEN [V]	X	—	—	▼	<ul style="list-style-type: none"> Accelerator pedal position sensor signal voltage is displayed. 	
A/T fluid temperature sensor	FLUID TEMP SE [V]	X	—	—	▼	<ul style="list-style-type: none"> A/T fluid temperature sensor signal voltage is displayed. Signal voltage lowers as fluid temperature rises. 	
Battery voltage	BATTERY VOLT [V]	X	—	—	▼	<ul style="list-style-type: none"> Source voltage of TCM is displayed. 	
Engine speed	ENGINE SPEED [rpm]	X	—	X	▼	<ul style="list-style-type: none"> Engine speed, computed from engine speed signal, is displayed. 	Engine speed display may not be accurate under approx. 800 rpm. It may not indicate 0 rpm even when engine is not running.
Overdrive control switch	OVERDRIVE SW [ON/OFF]	X	—	—	▼	<ul style="list-style-type: none"> ON/OFF state computed from signal of overdrive control SW is displayed. 	
PN position (PNP) switch	PN POSI SW [ON/OFF]	X	—	—	▼	<ul style="list-style-type: none"> ON/OFF state computed from signal of PN position SW is displayed. 	
R position switch	R POSITION SW [ON/OFF]	X	—	—	▼	<ul style="list-style-type: none"> ON/OFF state computed from signal of R position SW is displayed. 	
D position switch	D POSITION SW [ON/OFF]	X	—	—	▼	<ul style="list-style-type: none"> ON/OFF state computed from signal of D position SW is displayed. 	
2 position switch	2 POSITION SW [ON/OFF]	X	—	—	▼	<ul style="list-style-type: none"> ON/OFF status, computed from signal of 2 position SW, is displayed. 	

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EXC.F/EURO-OBD]

Item	Display	move to center Monitor items				Description	Remarks
		TCM Input signals	CAN comm signals	Main signals	Selection from menu		
1 position switch	1 POSITION SW [ON/OFF]	X	—	—	▼	● ON/OFF status, computed from signal of 1 position SW, is displayed.	
ASCD cruise signal	ASCD-CRUISE [ON/OFF]	X	—	—	▼	● Status of ASCD cruise signal is displayed. ON... Cruising state OFF... Normal running state	● This is displayed even when no ASCD is mounted.
ASCD OD cut signal	ASCD-OD CUT [ON/OFF]	X	—	—	▼	● Status of ASCD OD release signal is displayed. ON... OD released OFF... OD not released	● This is displayed even when no ASCD is mounted.
Kickdown switch	KICKDOWN SW [ON/OFF]	X	—	—	▼	● ON/OFF status, computed from signal of kick down SW, is displayed.	● This is displayed even when no kick down switch is equipped.
Closed throttle position signal	CLOSED THL/SW [ON/OFF]	X	—	—	▼	● ON/OFF status, computed from signal of closed throttle position signal, is displayed.	● This means closed throttle position signal input via CAN communication line.
Wide open throttle position signal	W/O THRL/P-SW [ON/OFF]	X	—	—	▼	● ON/OFF status, computed from signal of wide open throttle position signal, is displayed.	● This means wide open throttle position signal input via CAN communication line.
Gear position	GEAR	—	—	X	▼	● Gear position data used for computation by TCM, is displayed.	
Selector lever position	SLCT LVR POSI	—	—	X	▼	● Selector lever position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	—	—	X	▼	● Vehicle speed data, used for computation by TCM, is displayed.	
Torque converter slip ratio	TC SLIP RATIO [0.000]	—	—	—	▼	● Ratio of engine revolution to input shaft revolution of torque converter	
Torque converter slip speed	TC SLIP SPEED [rpm]	—	—	—	▼	Difference in revolution between input shaft revolution and input shaft revolution of torque converter	Display doesn't indicate 0 rpm even if engine is stopped. But this isn't malfunction.
CAN communication	CAN COMM [OK/NG]	—	X	—	▼		
CAN circuit 1	CAN CIRC 1 [OK/UNKWN]	—	X	—	▼		
CAN circuit 2	CAN CIRC 2 [OK/UNKWN]	—	X	—	▼		

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EXC.F/EURO-OBD]

Item	Display	move to center Monitor items				Description	Remarks
		TCM Input signals	CAN comm signals	Main signals	Selection from menu		
CAN circuit 3	CAN CIRC 3 [OK/UNKWN]	—	X	—	▼		
CAN circuit 4	CAN CIRC 4 [OK/UNKWN]	—	X	—	▼		
CAN circuit 5	CAN CIRC 5 [OK/UNKWN]	—	X	—	▼		
Throttle position	THROTTLE POSI [8]	—	—	X	▼	● Throttle position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Stop lamp switch	BRAKE SW [ON/OFF]	X	—	—	▼	● ON/OFF status is displayed. ON... Brake pedal is depressed. OFF... Brake pedal is released.	
Line pressure duty	LINE PRES DTY [%]	—	—	X	▼	● Control value of line pressure solenoid valve, computed by TCM from each input signal, is displayed.	
Torque converter clutch solenoid valve duty	TCC S/V DUTY [%]	—	—	X	▼	● Control value of torque converter clutch solenoid valve, computed by TCM from each input signal, is displayed.	
Shift solenoid valve A	SHIFT S/V A [ON/OFF]	—	—	X	▼	● Control value of shift solenoid valve A, computed by TCM from each input signal, is displayed.	Control value of solenoid is displayed even if solenoid circuit is disconnected. The OFF signal is displayed if solenoid circuit is shorted.
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	—	—	X	▼	● Control value of shift solenoid valve B, computed by TCM from each input signal, is displayed.	
Overrun clutch solenoid valve	OVERRUN/C S/V [ON/OFF]	—	—	X	▼	● Control value of overrun clutch solenoid valve computed by TCM from each input signal is displayed.	
Self-diagnosis display lamp (O/D OFF indicator lamp)	SELF-D DP LMP [ON/OFF]	—	—	X	▼	● Control status of O/D OFF indicator lamp is displayed.	
Voltage [V]		—	—	—	▼	Value measured by voltage probe is displayed.	
Frequency [Hz]		—	—	—	▼	Value measured by pulse probe is displayed. If measurement is impossible, “#” sign is displayed. “#” sign is also displayed at the final data value until the measurement result is obtained.	

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

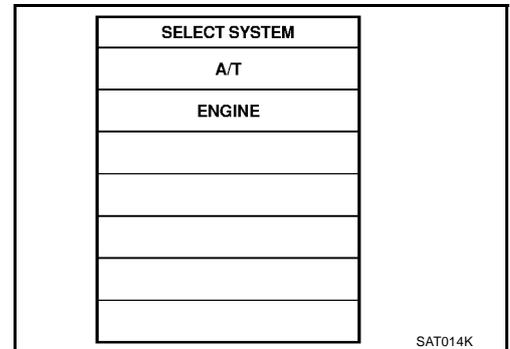
[EXC.F/EURO-OBD]

Item	Display	move to center Monitor items				Description	Remarks
		TCM Input signals	CAN comm signals	Main signals	Selection from menu		
DUTY-HI		—	—	—	▼	Duty cycle value for measurement probe is displayed.	
DUTY-LOW		—	—	—	▼		
PLS WIDTH-HI		—	—	—	▼	Measured pulse width of measurement probe is displayed.	
PLS WIDTH-LOW		—	—	—	▼		

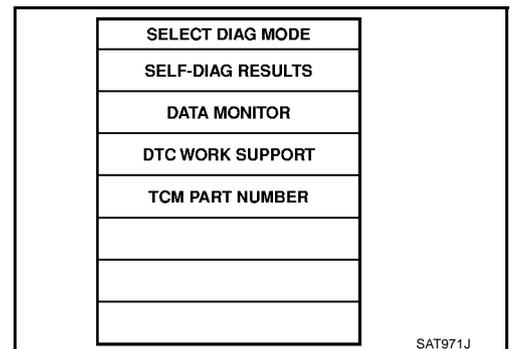
X: Applicable —: Not applicable ▼: Option

④ HOW TO ERASE SELF-DIAGNOSTIC RESULTS (WITH CONSULT-II)

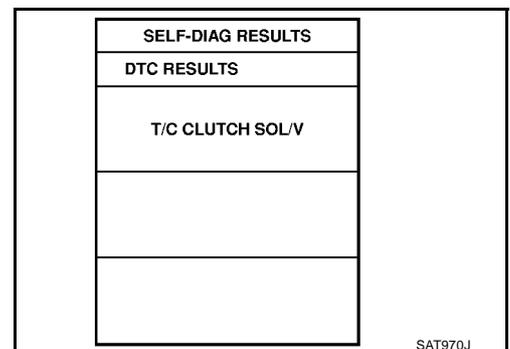
1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait for at least 3 seconds and then turn it “ON” again.
2. Turn CONSULT-II “ON”, and touch “A/T”.



3. Touch “SELF-DIAG RESULTS”.



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



Diagnostic Procedure Without CONSULT-II

ECS004NX

⊗ SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)

1. CHECK O/D OFF INDICATOR LAMP

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

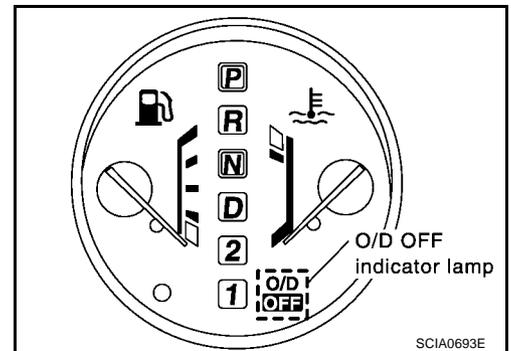


7. Does O/D OFF indicator lamp come on for about 2 seconds?

Yes or No

Yes >> GO TO 2.

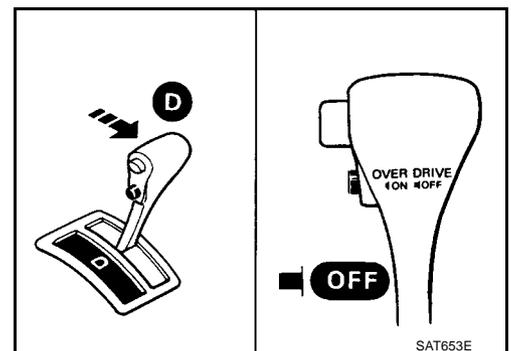
No >> GO TO [AT-312, "O/D OFF Indicator Lamp Does Not Come On"](#) .



2. JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch to "OFF" position.
2. Turn ignition switch to "ACC" position.
3. Move selector lever to "D" position.
4. Set overdrive control switch to "OFF" position.
5. Turn ignition switch to "ON" position. (Do not start engine.)
Wait more than 2 seconds after turning ignition switch "ON".

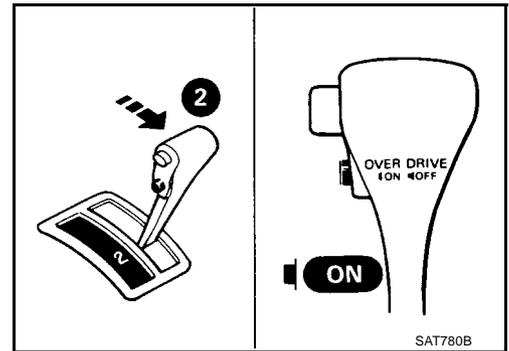
>> GO TO 3.



3. JUDGEMENT PROCEDURE STEP 2

1. Move selector lever to "2" position.
2. Set overdrive control switch to "ON" position.

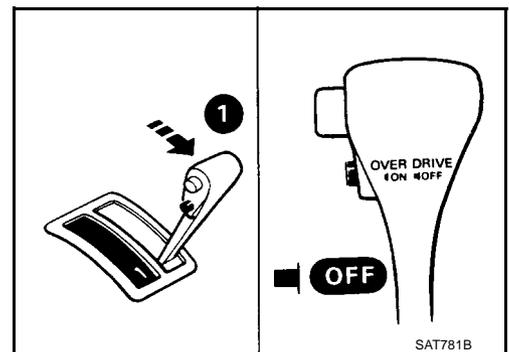
>> GO TO 4.



4. JUDGEMENT PROCEDURE STEP 3

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

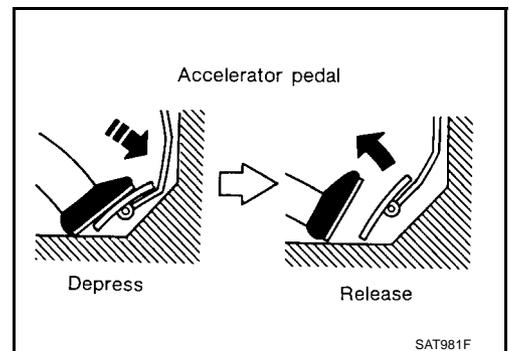
>> GO TO 5.



5. JUDGEMENT PROCEDURE STEP 4

1. Depress accelerator pedal fully and release it.

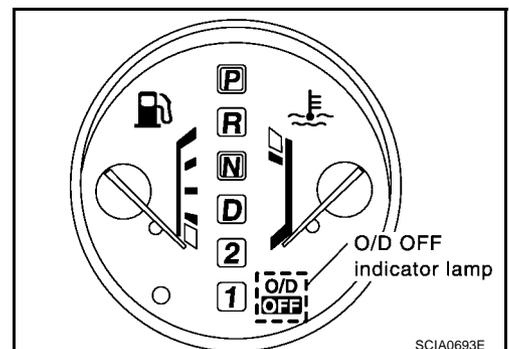
>> GO TO 6.



6. CHECK SELF-DIAGNOSIS CODE

Check O/D OFF indicator lamp. Refer to [AT-255, "JUDGEMENT OF SELF-DIAGNOSIS CODE"](#) .

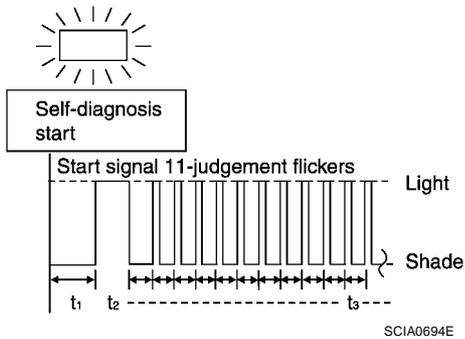
>> DIAGNOSIS END



JUDGEMENT OF SELF-DIAGNOSIS CODE

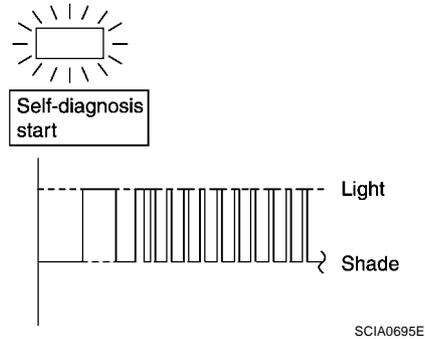
O/D OFF indicator lamp:

All judgement flickers are the same.



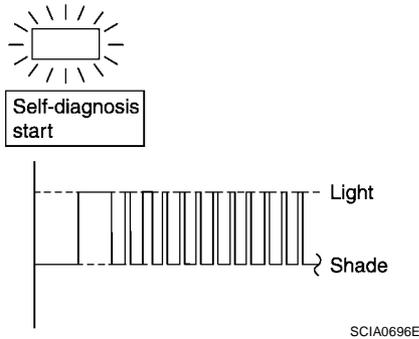
All circuits that can be confirmed by self-diagnosis are OK.

1st judgement flicker is longer than others.



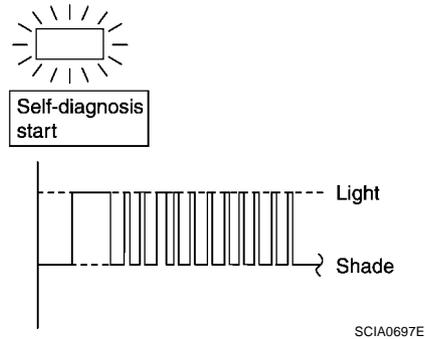
Revolution sensor circuit is short-circuited or disconnected.
 ⇒ **Go to VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR).**
 Refer to [AT-353](#)

2nd judgement flicker is longer than others.



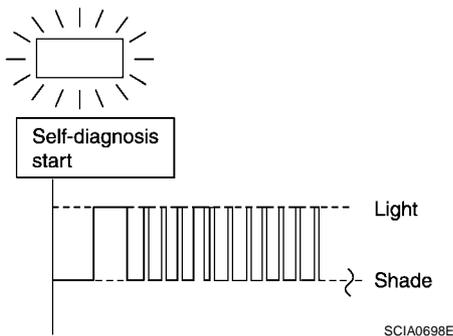
Vehicle speed sensor circuit is short-circuited or disconnected.
 ⇒ **Go to VEHICLE SPEED SENSOR-MTR.**
 Refer to [AT-358](#)

3rd judgement flicker is longer than others.



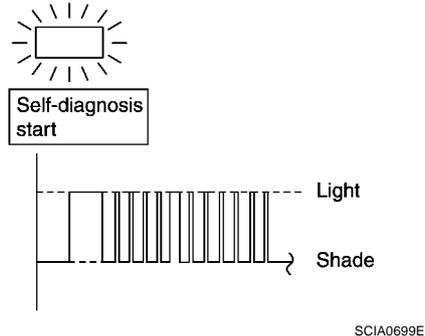
Accelerator pedal position (APP) sensor circuit is short-circuited or disconnected.
 ⇒ **Go to ACCELERATOR PEDAL POSITION (APP) SENSOR.**
 Refer to [AT-362](#)

4th judgement flicker is longer than others.



Shift solenoid valve A circuit is short-circuited or disconnected.
 ⇒ **Go to SHIFT SOLENOID VALVE A.**
 Refer to [AT-367](#)

5th judgement flicker is longer than others.



Shift solenoid valve B circuit is short-circuited or disconnected.
 ⇒ **Go to SHIFT SOLENOID VALVE B.**
 Refer to [AT-372](#)

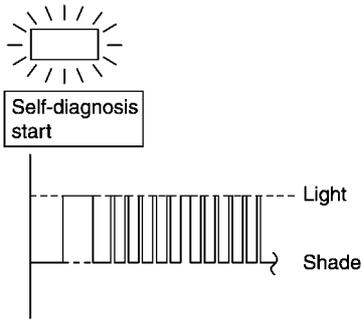
A
B
AT
D
E
F
G
H
I
J
K
L
M

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EXC.F/EURO-OBD]

O/D OFF indicator lamp:

6th judgement flicker is longer than others.



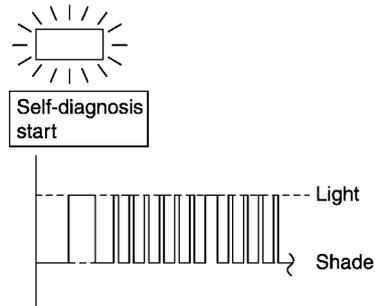
SCIA0700E

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

⇒ **Go to OVERRUN CLUTCH SOLENOID VALVE.**

Refer to [AT-377](#)

7th judgement flicker is longer than others.



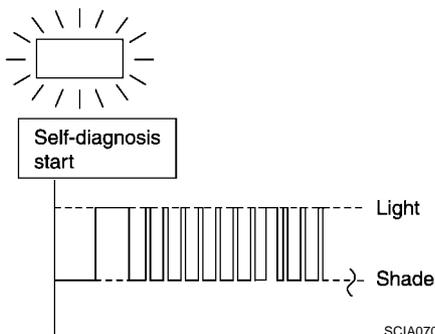
SCIA0701E

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

⇒ **Go to TORQUE CONVERTER CLUTCH SOLENOID VALVE.**

Refer to [AT-381](#)

8th judgement flicker is longer than others.



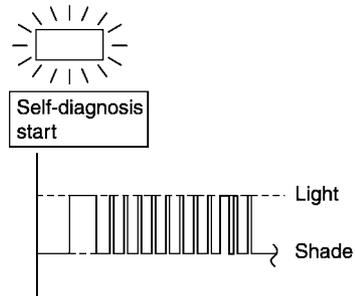
SCIA0702E

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

⇒ **Go to BATT/FLUID TEMP SEN(A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE).**

Refer to [AT-386](#)

9th judgement flicker is longer than others.



SCIA0703E

Engine speed signal circuit is short-circuited or disconnected.

⇒ **Go to ENGINE SPEED SIGNAL.**

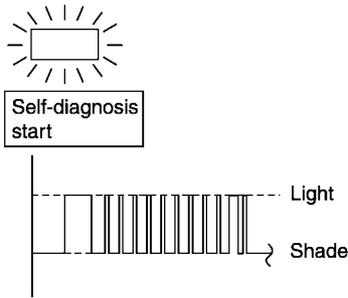
Refer to [AT-392](#)

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

[EXC.F/EURO-OBD]

O/D OFF indicator lamp:

10th judgement flicker is longer than others.



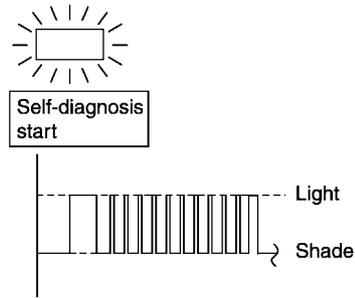
SCIA0704E

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

⇒ **Go to LINE PRESSURE SOLENOID VALVE.**

Refer to [AT-396](#)

11th judgement flicker is longer than others.



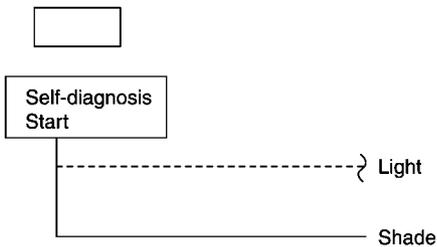
SCIA0705E

CAN communication line is damaged.

⇒ **Go to CAN COMMUNICATION LINE.**

Refer to [AT-403](#)

Lamp comes OFF.



SCIA0706E

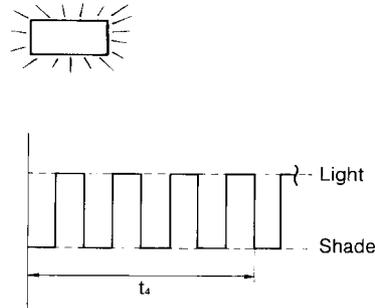
PNP switch, overdrive control switch, closed throttle position signal or wide-open throttle position signal circuit is disconnected or TCM is damaged.

(Because closed throttle position signal and wide-open throttle position signal are input via CAN communication line malfunction may continue after self-diagnosis.)

⇒ **Go to TCM Self-diagnosis Does Not Activate.**

Refer to [AT-344](#)

Flickers as shown below.



SAT804H

Battery power is low.

Battery has been disconnected for a long time.

Battery is connected conversely.

(When reconnecting TCM connectors.—This is a problem.)

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

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

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait for at least 3 seconds and then turn it "ON" again.
2. Perform "SELF-DIAGNOSTIC PROCEDURE (Without CONSULT-II)". Refer to [AT-253. "Diagnostic Procedure Without CONSULT-II"](#) (EXC. for EURO-OBD).
3. Turn ignition switch "OFF". (The self-diagnostic results will be erased.)

TROUBLE DIAGNOSIS — INTRODUCTION

PFP:00000

Introduction

ECS004TF

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.

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

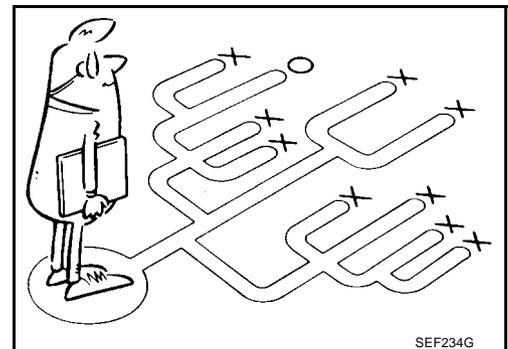
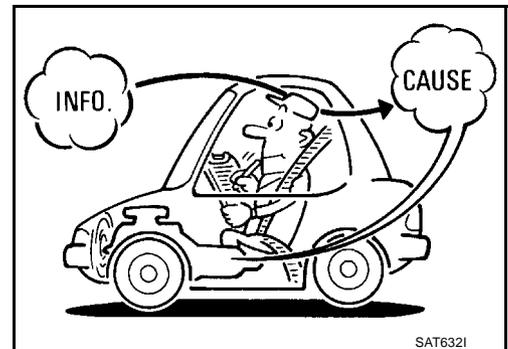
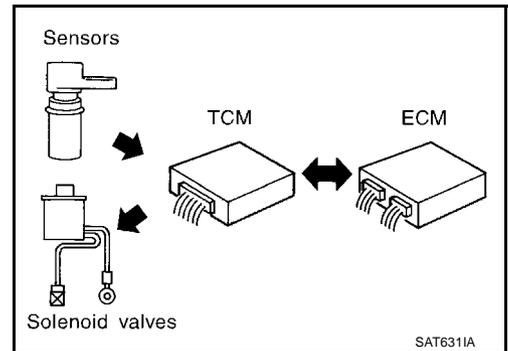
It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

A visual check only, may not find the cause of the problems. A road test with CONSULT-II or a circuit tester connected should be performed. Follow the "Work Flow". Refer to [AT-60](#).

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drive ability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" like the example ([AT-57](#)) should be used.

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

Also check related Service bulletins for information.



TROUBLE DIAGNOSIS — INTRODUCTION

[EXC.F/EURO-OBD]

Diagnostic Worksheet

1.	<input type="checkbox"/> Read the Fail-safe and listen to customer complaints.	AT-8, "Wiring Diagrams and Trouble Diagnosis", AT-259, "DIAGNOSTIC WORK-SHEET"																											
2.	<input type="checkbox"/> CHECK A/T FLUID	AT-264, "A/T Fluid Check"																											
3.	<input type="checkbox"/> Perform STALL TEST and LINE PRESSURE TEST.	AT-265, "Stall Test", AT-268, "Line Pressure Test"																											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 5px;"> <input type="checkbox"/> Stall test — Mark possible damaged components/others. </td> <td style="padding: 5px;"> <table style="width: 100%;"> <tr> <td style="width: 50%; padding: 5px;"> <input type="checkbox"/> Torque converter one-way clutch <input type="checkbox"/> Reverse clutch <input type="checkbox"/> Forward clutch <input type="checkbox"/> Overrun clutch <input type="checkbox"/> Forward one-way clutch </td> <td style="width: 50%; padding: 5px;"> <input type="checkbox"/> Low & reverse brake <input type="checkbox"/> Low one-way clutch <input type="checkbox"/> Engine <input type="checkbox"/> Line pressure is low <input type="checkbox"/> Clutches and brakes except high clutch and brake band are OK </td> </tr> </table> </td> </tr> <tr> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> Line Pressure test — Suspected parts: </td> </tr> </table>			<input type="checkbox"/> Stall test — Mark possible damaged components/others.	<table style="width: 100%;"> <tr> <td style="width: 50%; padding: 5px;"> <input type="checkbox"/> Torque converter one-way clutch <input type="checkbox"/> Reverse clutch <input type="checkbox"/> Forward clutch <input type="checkbox"/> Overrun clutch <input type="checkbox"/> Forward one-way clutch </td> <td style="width: 50%; padding: 5px;"> <input type="checkbox"/> Low & reverse brake <input type="checkbox"/> Low one-way clutch <input type="checkbox"/> Engine <input type="checkbox"/> Line pressure is low <input type="checkbox"/> Clutches and brakes except high clutch and brake band are OK </td> </tr> </table>	<input type="checkbox"/> Torque converter one-way clutch <input type="checkbox"/> Reverse clutch <input type="checkbox"/> Forward clutch <input type="checkbox"/> Overrun clutch <input type="checkbox"/> Forward one-way clutch	<input type="checkbox"/> Low & reverse brake <input type="checkbox"/> Low one-way clutch <input type="checkbox"/> Engine <input type="checkbox"/> Line pressure is low <input type="checkbox"/> Clutches and brakes except high clutch and brake band are OK	<input type="checkbox"/> Line Pressure test — Suspected parts:																						
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<input type="checkbox"/> Line Pressure test — Suspected parts:																													
4.	<input type="checkbox"/> Perform all ROAD TEST and mark required procedures.	AT-269, "Road Test"																											
4-1.	Check before engine is started.	AT-271, "1. CHECK BEFORE ENGINE IS STARTED"																											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 5px;"> <input type="checkbox"/> O/D OFF Indicator Lamp Does Not Come On, AT-312 . </td> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> SELF-DIAGNOSTIC CONFIRMATION PROCEDURE — Mark detected items. </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-353 . </td> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> Vehicle speed sensor-MTR, AT-358 . </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> Accelerator pedal position (APP) sensor, AT-362 . </td> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> Shift solenoid valve A, AT-367 . </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> Shift solenoid valve B, AT-372 . </td> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> Overrun clutch solenoid valve, AT-377 . </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> Torque converter clutch solenoid valve, AT-381 . </td> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> A/T fluid temperature sensor and TCM power source, AT-386 . </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> Engine speed signal, AT-392 . </td> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> Line pressure solenoid valve, AT-396 . </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> CAN communication line, AT-403 . </td> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> Control unit (RAM), control unit (ROM), AT-203, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> Control unit (EEP ROM), AT-205, "DTC CONTROL UNIT(EEPROM)" . </td> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> PNP & overdrive control switches, and throttle position sensor, AT-344 . </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> Battery </td> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> Others </td> </tr> </table>			<input type="checkbox"/> O/D OFF Indicator Lamp Does Not Come On, AT-312 .	<input type="checkbox"/> SELF-DIAGNOSTIC CONFIRMATION PROCEDURE — Mark detected items.		<input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-353 .	<input type="checkbox"/> Vehicle speed sensor-MTR, AT-358 .		<input type="checkbox"/> Accelerator pedal position (APP) sensor, AT-362 .	<input type="checkbox"/> Shift solenoid valve A, AT-367 .		<input type="checkbox"/> Shift solenoid valve B, AT-372 .	<input type="checkbox"/> Overrun clutch solenoid valve, AT-377 .		<input type="checkbox"/> Torque converter clutch solenoid valve, AT-381 .	<input type="checkbox"/> A/T fluid temperature sensor and TCM power source, AT-386 .		<input type="checkbox"/> Engine speed signal, AT-392 .	<input type="checkbox"/> Line pressure solenoid valve, AT-396 .		<input type="checkbox"/> CAN communication line, AT-403 .	<input type="checkbox"/> Control unit (RAM), control unit (ROM), AT-203, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" .		<input type="checkbox"/> Control unit (EEP ROM), AT-205, "DTC CONTROL UNIT(EEPROM)" .	<input type="checkbox"/> PNP & overdrive control switches, and throttle position sensor, AT-344 .		<input type="checkbox"/> Battery	<input type="checkbox"/> Others	
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<input type="checkbox"/> Torque converter clutch solenoid valve, AT-381 .	<input type="checkbox"/> A/T fluid temperature sensor and TCM power source, AT-386 .																												
<input type="checkbox"/> Engine speed signal, AT-392 .	<input type="checkbox"/> Line pressure solenoid valve, AT-396 .																												
<input type="checkbox"/> CAN communication line, AT-403 .	<input type="checkbox"/> Control unit (RAM), control unit (ROM), AT-203, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" .																												
<input type="checkbox"/> Control unit (EEP ROM), AT-205, "DTC CONTROL UNIT(EEPROM)" .	<input type="checkbox"/> PNP & overdrive control switches, and throttle position sensor, AT-344 .																												
<input type="checkbox"/> Battery	<input type="checkbox"/> Others																												
4-2.	Check at idle	AT-272, "2. CHECK AT IDLE"																											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 5px;"> <input type="checkbox"/> Engine Cannot Be Started In "P" And "N" Position, AT-314 . </td> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> In "P" Position, Vehicle Moves Forward Or Backward When Pushed, AT-315 . </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> In "N" Position, Vehicle Moves, AT-315 . </td> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> Large Shock. "N" → "R" Position, AT-317 . </td> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> Vehicle Does Not Creep Backward In "R" Position, AT-317 . </td> <td colspan="2" style="padding: 5px;"> <input type="checkbox"/> Vehicle Does Not Creep Forward In "D", "2" Or "1" Position, AT-321 . </td> </tr> </table>			<input type="checkbox"/> Engine Cannot Be Started In "P" And "N" Position, AT-314 .	<input type="checkbox"/> In "P" Position, Vehicle Moves Forward Or Backward When Pushed, AT-315 .		<input type="checkbox"/> In "N" Position, Vehicle Moves, AT-315 .	<input type="checkbox"/> Large Shock. "N" → "R" Position, AT-317 .		<input type="checkbox"/> Vehicle Does Not Creep Backward In "R" Position, AT-317 .	<input type="checkbox"/> Vehicle Does Not Creep Forward In "D", "2" Or "1" Position, AT-321 .																			
<input type="checkbox"/> Engine Cannot Be Started In "P" And "N" Position, AT-314 .	<input type="checkbox"/> In "P" Position, Vehicle Moves Forward Or Backward When Pushed, AT-315 .																												
<input type="checkbox"/> In "N" Position, Vehicle Moves, AT-315 .	<input type="checkbox"/> Large Shock. "N" → "R" Position, AT-317 .																												
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TROUBLE DIAGNOSIS — INTRODUCTION

[EXC.F/EURO-OBD]

4.	4-3.	<p>Cruise test</p> <p>Part-1</p> <ul style="list-style-type: none"> <input type="checkbox"/> Vehicle Cannot Be Started From D1 , AT-323 . <input type="checkbox"/> A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , AT-326 . <input type="checkbox"/> A/T Does Not Shift: D2 → D3 , AT-328 . <input type="checkbox"/> A/T Does Not Shift: D3 → D4 , AT-330 . <input type="checkbox"/> A/T Does Not Perform Lock-up, AT-332 . <input type="checkbox"/> A/T Does Not Hold Lock-up Condition, AT-333 . <input type="checkbox"/> Lock-up Is Not Released, AT-335 . <input type="checkbox"/> Engine Speed Does Not Return To Idle (Light Braking D4 → D3) , AT-336 . <p>Part-2</p> <ul style="list-style-type: none"> <input type="checkbox"/> Vehicle Does Not Start From D1 , AT-338 . <input type="checkbox"/> A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , AT-326 . <input type="checkbox"/> A/T Does Not Shift: D2 → D3 , AT-328 . <input type="checkbox"/> A/T Does Not Shift: D3 → D4 , AT-330 . <p>Part-3</p> <ul style="list-style-type: none"> <input type="checkbox"/> A/T Does Not Shift: D4 → D3 When Overdrive Control Switch "ON" → "OFF", AT-339 . <input type="checkbox"/> Engine Speed Does Not Return To Idle (Engine Brake In D3) , AT-336 . <input type="checkbox"/> A/T Does Not Shift: D3 → 22 , When Selector Lever "D" → "2" Position, AT-340 . <input type="checkbox"/> Engine Speed Does Not Return To Idle (Engine Brake In 22) , AT-336 . <input type="checkbox"/> A/T Does Not Shift: 22 → 11 , When Selector Lever "2" → "1" Position, AT-341 . <input type="checkbox"/> Vehicle Does Not Decelerate By Engine Brake, AT-343 . <input type="checkbox"/> TCM Self-diagnosis Does Not Activate (PNP & Overdrive Control Switches, and throttle position sensor Circuit Checks), AT-344 . <input type="checkbox"/> SELF-DIAGNOSTIC PROCEDURE — Mark detected items. <ul style="list-style-type: none"> <input type="checkbox"/> Vehicle speed sensor-A/T (Revolution sensor), AT-353 . <input type="checkbox"/> Vehicle speed sensor-MTR, AT-358 . <input type="checkbox"/> Accelerator pedal position (APP) sensor, AT-362 . <input type="checkbox"/> Shift solenoid valve A, AT-367 . <input type="checkbox"/> Shift solenoid valve B, AT-372 . <input type="checkbox"/> Overrun clutch solenoid valve, AT-377 . <input type="checkbox"/> Torque converter clutch solenoid valve, AT-381 . <input type="checkbox"/> Batt/fluid temp sen (A/T fluid temperature sensor and TCM power source), AT-386 . <input type="checkbox"/> Engine speed signal, AT-392 . <input type="checkbox"/> Line pressure solenoid valve, AT-396 . <input type="checkbox"/> CAN communication line, AT-403 . <input type="checkbox"/> Control unit (RAM), control unit (ROM), AT-203. "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . <input type="checkbox"/> Control unit (EEP ROM), AT-205. "DTC CONTROL UNIT(EEPROM)" . <input type="checkbox"/> PNP & overdrive control switches, and throttle position sensor, AT-344 . <input type="checkbox"/> Battery <input type="checkbox"/> Others 	<p>AT-275. "3. CRUISE TEST", AT-279. "Cruise Test — Part 1"</p> <p>AT-282. "Cruise Test — Part 2"</p> <p>AT-284. "Cruise Test — Part 3"</p>
5.		<p><input type="checkbox"/> For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.</p>	<p>AT-253. "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)"</p>
6.		<p><input type="checkbox"/> Perform all ROAD TEST and re-mark required procedures.</p>	<p>AT-269. "Road Test"</p>

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TROUBLE DIAGNOSIS — INTRODUCTION

[EXC.F/EURO-OBD]

7.	<input type="checkbox"/> Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.)	AT-287. "TROUBLE DIAGNOSIS — GENERAL DESCRIPTION"
8.	<input type="checkbox"/> Erase self-diagnosis code from TCM memories.	AT-252. "HOW TO ERASE SELF-DIAGNOSTIC RESULTS (WITH CONSULT-II)" , AT-257. "HOW TO ERASE SELF-DIAGNOSTIC RESULTS (WITHOUT CONSULT-II)"

Work Flow

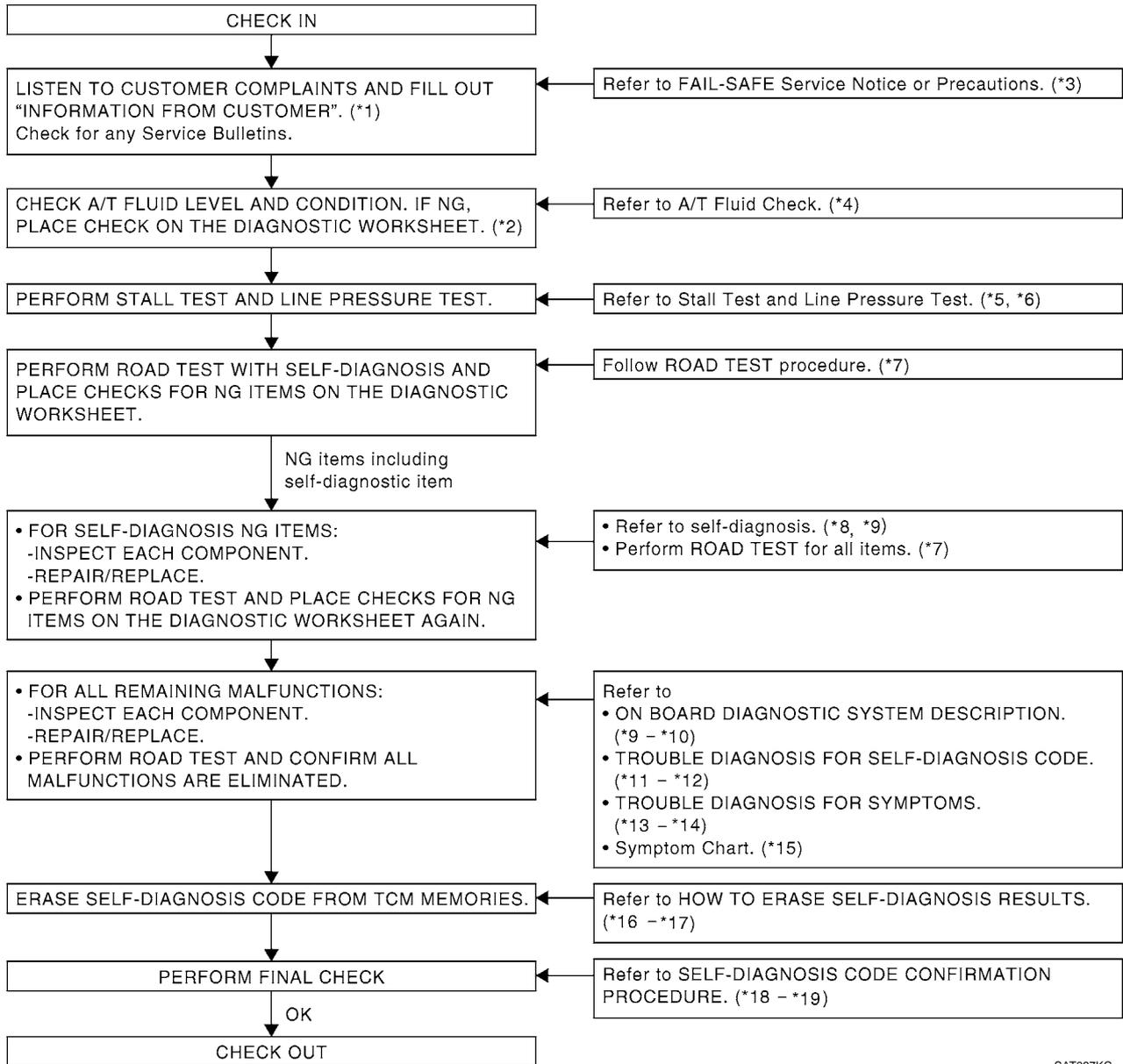
HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

ECS004TG

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-259](#)) and "DIAGNOSTIC WORKSHEET" ([AT-260](#)), to perform the best troubleshooting possible.

WORK FLOW CHART



- *1 [AT-259](#)
- *4 [AT-264](#)
- *7 [AT-269](#)
- *10 [AT-247](#)
- *13 [AT-312](#)
- *16 [AT-252](#)
- *19 [AT-403](#)

- *2 [AT-260](#)
- *5 [AT-265](#)
- *8 [AT-253](#)
- *11 [AT-353](#)
- *14 [AT-343](#)
- *17 [AT-257](#)

- *3 [AT-7](#)
- *6 [AT-268](#)
- *9 [AT-247](#)
- *12 [AT-403](#)
- :15 [AT-287](#)
- *18 [AT-353](#)

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TRUBLE DIAGNOSIS — BASIC INSPECTION

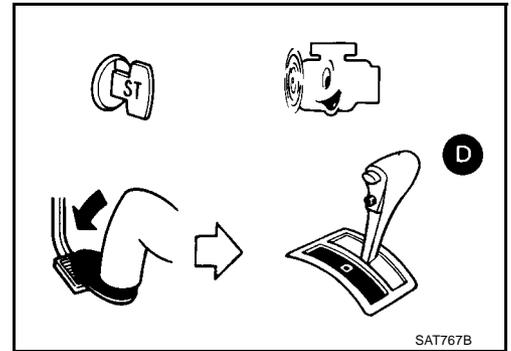
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A/T Fluid Check

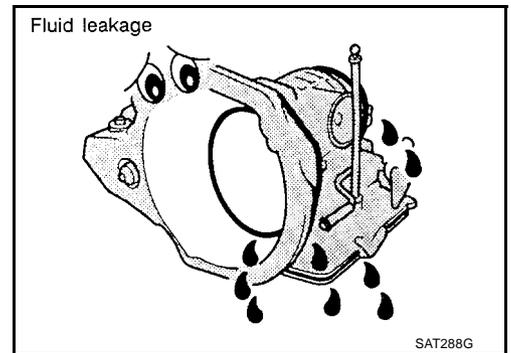
ECS004VR

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 [AT-13, "Checking A/T Fluid"](#) .



Stall Test

STALL TEST PROCEDURE

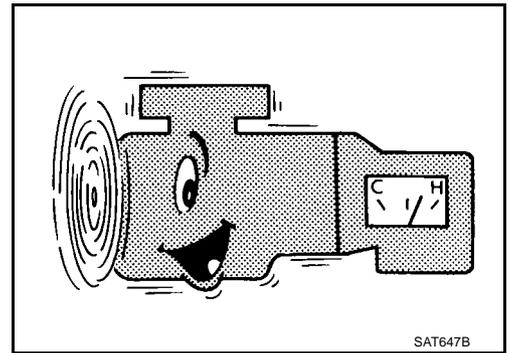
EC5004VS

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

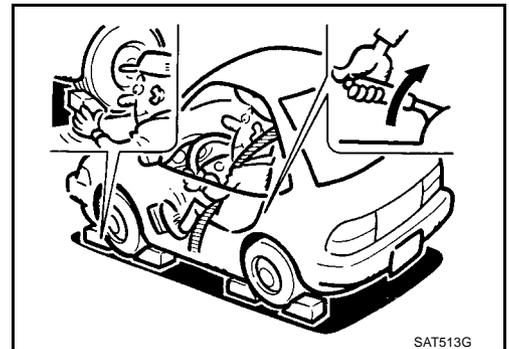
ATF operating temperature:

50 - 80°C (122 - 176°F)

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



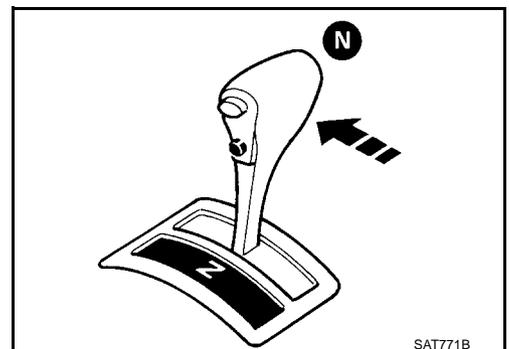
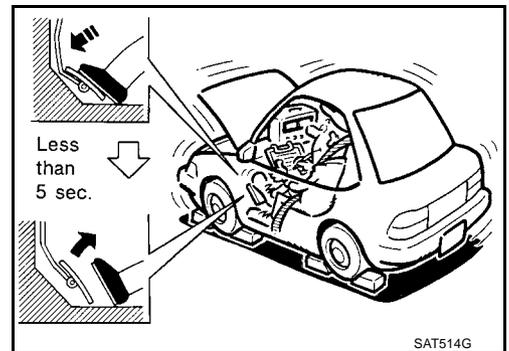
5. Start engine, apply foot brake, and place selector lever in D position.
6. Accelerate to wide open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.
 - **During test, never hold throttle wide open for less than 5 seconds.**



Stall revolution:

QR20DE	2,450 - 2,950 rpm
QR25DE	2,300 - 2,750 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.



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JUDGEMENT OF STALL TEST

The test result and possible damaged components relating to each result are shown in the illustrations on next page.

In order to pinpoint the possible damaged components, follow the WORK FLOW shown in [AT-262, "Work Flow"](#) (EXCEPT FOR EURO-OBD).

NOTE:

Stall revolution is too high in "D", "2" or "1" position:

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

Stall revolution is too high in R position:

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

Stall revolution within specifications:

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

CAUTION:

Be careful since automatic fluid temperature increases abnormally.

- Slippage occurs in 3rd and 4th gears in "D" position..... High clutch slippage
- Slippage occurs in 2nd and 4th gear in "D" position..... Brake band slippage
- Engine brake does not function in 2nd and 3rd gears in "D" position, 2nd gear in "2" position, and 1st gear in "1" position with overdrive control switch set to "OFF"..... Overrun clutch slippage

Stall revolution less than specifications:

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

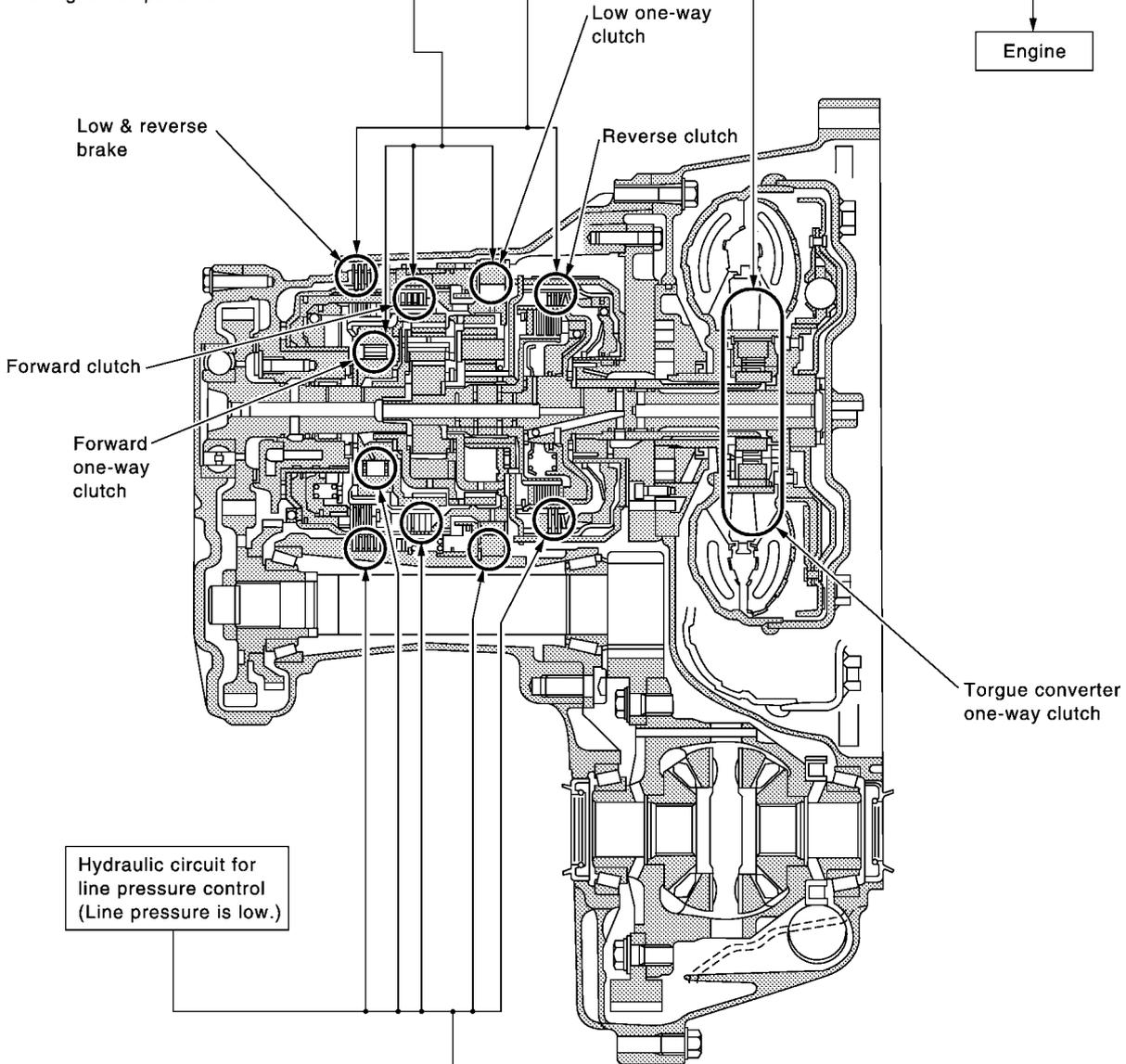
TROUBLE DIAGNOSIS — BASIC INSPECTION

[EXC.F/EURO-OBDD]

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

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

Damaged components



Hydraulic circuit for line pressure control
 (Line pressure is low.)

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

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

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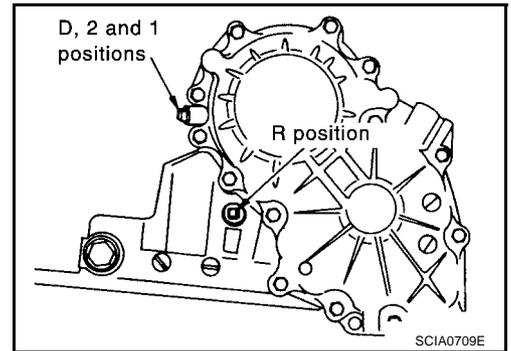
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Line Pressure Test

LINE PRESSURE TEST PORTS

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

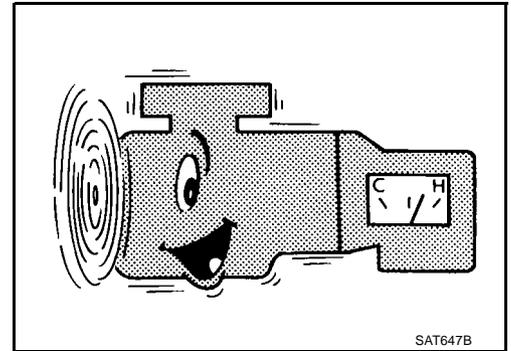
- Always replace pressure plugs as they are self-sealing bolts.



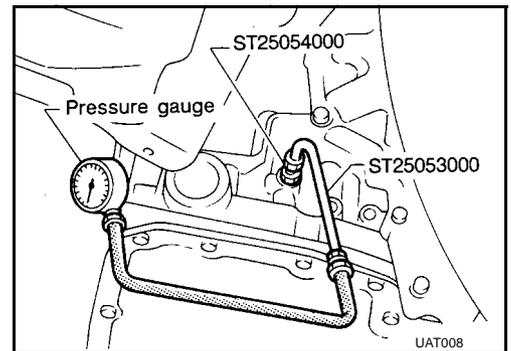
LINE PRESSURE TEST PROCEDURE

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

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

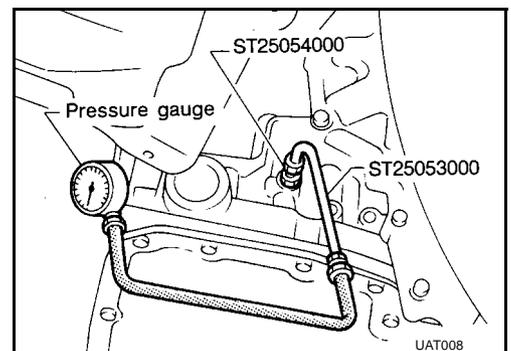


3. Install pressure gauge to corresponding line pressure port.



4. Set parking brake and block wheels.

- Continue to depress brake pedal fully while line pressure test is being performed at stall speed.



TROUBLE DIAGNOSIS — BASIC INSPECTION

[EXC.F/EURO-OBD]

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-522, "Line Pressure"](#).



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JUDGEMENT OF LINE PRESSURE TEST

Judgement		Suspected parts
At idle	Line pressure is low in all positions.	<ul style="list-style-type: none"> ● Oil pump wear ● Control piston damage ● Pressure regulator valve or plug sticking ● Spring for pressure regulator valve damaged ● Fluid pressure leakage between oil strainer and pressure regulator valve ● Clogged strainer
	Line pressure is low in particular position.	<ul style="list-style-type: none"> ● Fluid pressure leakage between manual valve and particular clutch ● For example, line pressure is: <ul style="list-style-type: none"> – Low in "R" and "1" positions, but – Normal in "D" and "2" positions. Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to AT-19, "CLUTCH AND BAND CHART" .
	Line pressure is high.	<ul style="list-style-type: none"> ● Maladjustment of throttle position sensor ● A/T fluid temperature sensor damaged ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure modifier valve sticking ● Pressure regulator valve or plug sticking ● Open in dropping resistor circuit
At stall speed	Line pressure is low.	<ul style="list-style-type: none"> ● Maladjustment of throttle position sensor ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure regulator valve or plug sticking ● Pressure modifier valve sticking ● Pilot valve sticking

Road Test DESCRIPTION

ECS004VU

- The purpose of the test is to determine overall performance of A/T and analyze causes of problems.
- The road test consists of the following three parts:
 1. Check before engine is started
 2. Check at idle

ROAD TEST PROCEDURE

1. Check before engine is started.



2. Check at idle.



3. Cruise test.

SAT786A

TROUBLE DIAGNOSIS — BASIC INSPECTION

[EXC.F/EURO-OBD]

3. Cruise test

- Before road test, familiarize yourself with all test procedures and items to check.
- Conduct tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test. Refer to the following items.

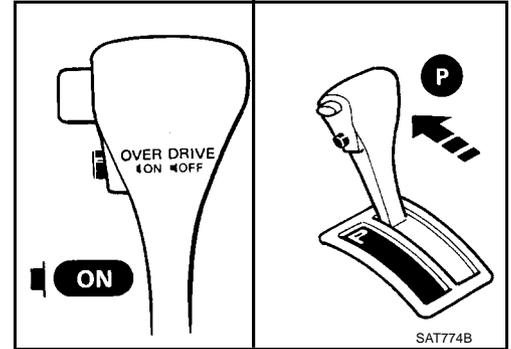


	ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION	TROUBLE DIAGNOSES FOR SYMPTOMS
Except for Euro-OBD	AT-247, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" to AT-253, "Diagnostic Procedure Without CONSULT-II"	AT-312, "O/D OFF Indicator Lamp Does Not Come On" to AT-344, "TCM Self-diagnosis Does Not Activate"

1. CHECK BEFORE ENGINE IS STARTED

1. CHECK O/D OFF INDICATOR LAMP

1. Park vehicle on flat surface.
2. Turn ignition switch to "OFF" position.
3. Move selector lever to "P" position.
4. Set overdrive control switch to "ON" position.
5. Turn ignition switch to "ON" position. (Do not start engine.)

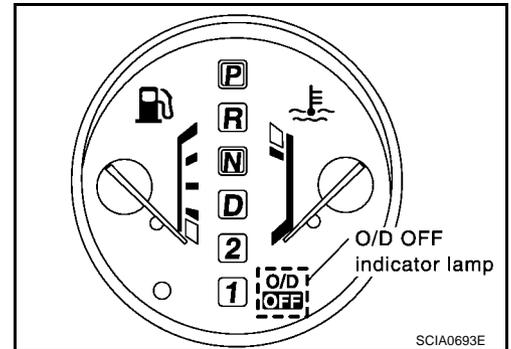


6. Does O/D OFF indicator lamp come on for about 2 seconds?

Yes or No

Yes >> GO TO 2.

No >> Stop ROAD TEST. GO TO [AT-312, "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

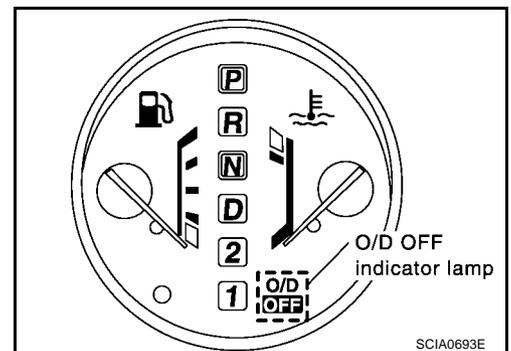
Yes (Except for Euro-OBD)>>TCM is under fail-safe mode. Perform self-diagnosis and check NG items on the DIAGNOSTIC WORKSHEET. Refer to [AT-259, "DIAGNOSTIC WORKSHEET"](#) and [AT-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#).

No (Except for Euro-OBD)>>1. Turn ignition switch to "OFF" position.

2. Perform self-diagnosis and note NG items.

Refer to [AT-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#).

3. GO TO [AT-272, "2. CHECK AT IDLE"](#).



2. CHECK AT IDLE

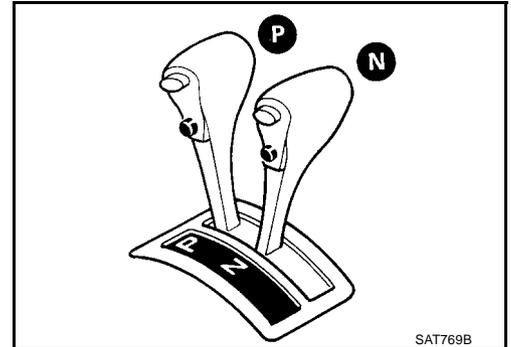
1. CHECK ENGINE START

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 >> ● Stop Road Test. Mark the box on the DIAGNOSTIC WORKSHEET. Refer to [AT-259, "DIAGNOSTIC WORKSHEET"](#) .
- GO TO [AT-314, "Engine Cannot Be Started In "P" and "N" Position"](#) .



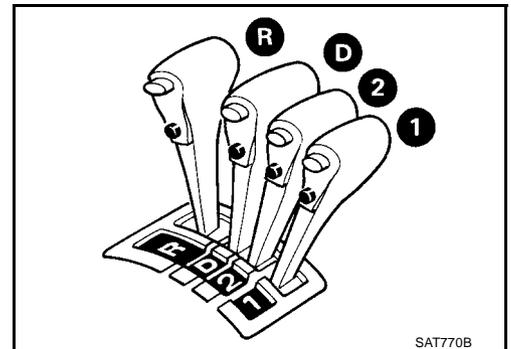
2. CHECK ENGINE START

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

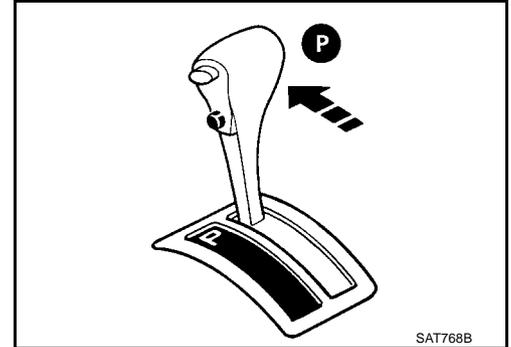
- Yes >> ● Stop Road Test. Mark the box on the DIAGNOSTIC WORKSHEET. Refer to [AT-259, "DIAGNOSTIC WORKSHEET"](#) .
- GO TO [AT-314, "Engine Cannot Be Started In "P" and "N" Position"](#) .
 - Continue ROAD TEST. Refer to [AT-269, "Road Test"](#) .

No >> GO TO 3.



3. CHECK VEHICLE MOVE

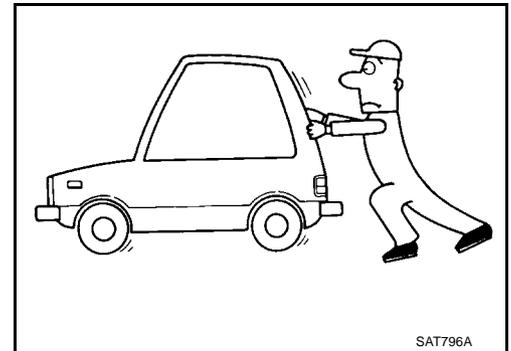
1. Turn ignition switch to "OFF" position.
2. Move selector lever to "P" position.
3. Release parking brake.
4. Push vehicle forward or backward.



5. Does vehicle move when it is pushed forward or backward?

Yes or No

- Yes >> ● Mark the box on the DIAGNOSTIC WORKSHEET. Refer to [AT-259, "DIAGNOSTIC WORKSHEET"](#) .
- GO TO [AT-315, "In "P" Position, Vehicle Moves Forward Or Backward When Pushed"](#) .
 - Continue ROAD TEST.
- No >> GO TO 4.

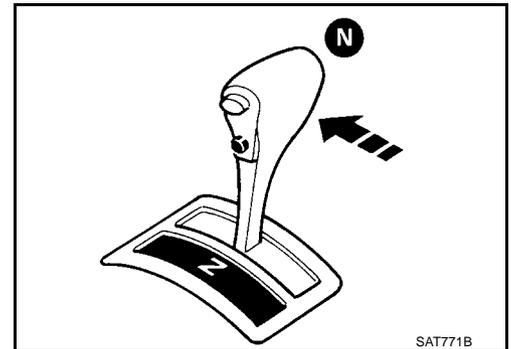


4. CHECK VEHICLE MOVE

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

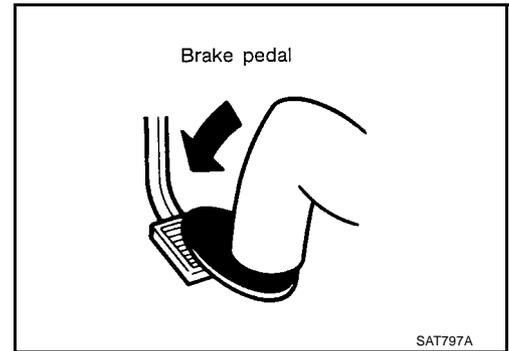
- Yes >> ● Mark the box on the DIAGNOSTIC WORKSHEET. Refer to [AT-259, "DIAGNOSTIC WORKSHEET"](#) .
- GO TO [AT-315, "In "N" Position, Vehicle Moves"](#) .
 - Continue ROAD TEST.
- No >> GO TO 5.



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5. CHECK SHIFT SHOCK

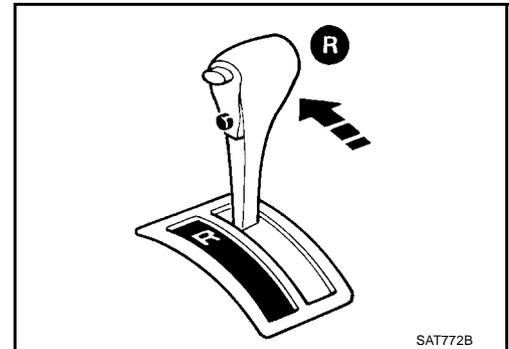
1. Apply foot brake.



2. Move selector lever to "R" position.
3. Is there large shock when changing from "N" to "R" position?

Yes or No

- Yes >> ● Mark the box on the DIAGNOSTIC WORKSHEET. Refer to [AT-259, "DIAGNOSTIC WORKSHEET"](#) .
- GO TO [AT-317, "Large Shock. "N" → "R" Position"](#) .
 - Continue ROAD TEST.
- No >> GO TO 6.

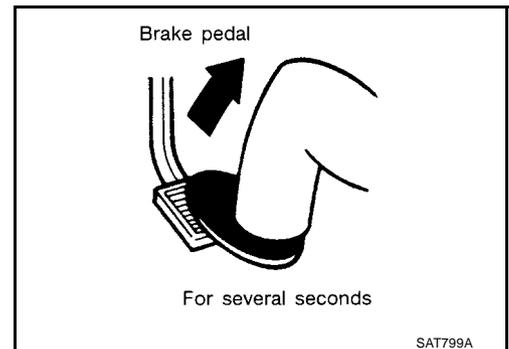


6. CHECK VEHICLE MOVE

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

Yes or No

- Yes >> GO TO 7.
- No >> ● Mark the box on the DIAGNOSTIC WORKSHEET. Refer to [AT-259, "DIAGNOSTIC WORKSHEET"](#) .
- GO TO [AT-318, "Vehicle Does Not Creep Backward In "R" Position"](#) .
 - Continue ROAD TEST.

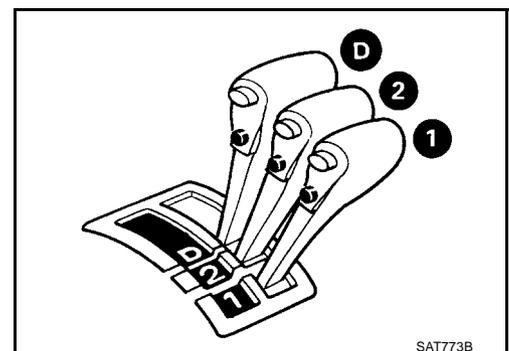


7. CHECK VEHICLE MOVE

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

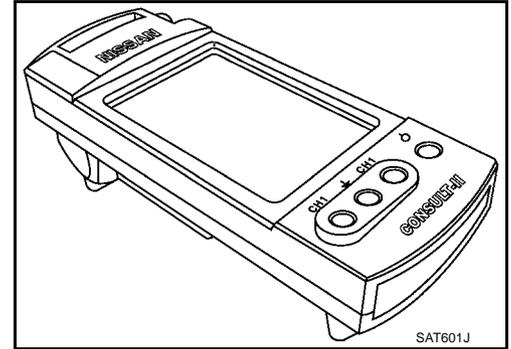
Yes or No

- Yes >> GO TO [AT-275, "3. CRUISE TEST"](#) .
- No >> ● Mark the box on the DIAGNOSTIC WORKSHEET. Refer to [AT-259, "DIAGNOSTIC WORKSHEET"](#) .
- GO TO [AT-321, "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"](#) .
 - Continue ROAD TEST.



3. CRUISE TEST

- Check all items listed in Parts 1 through 3.

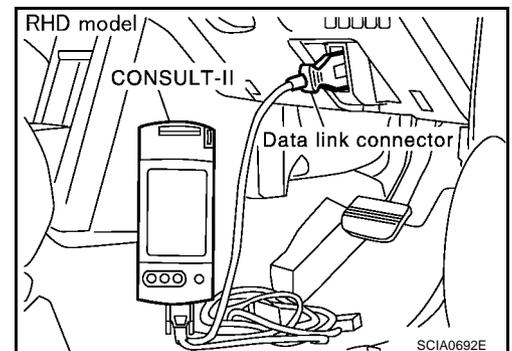
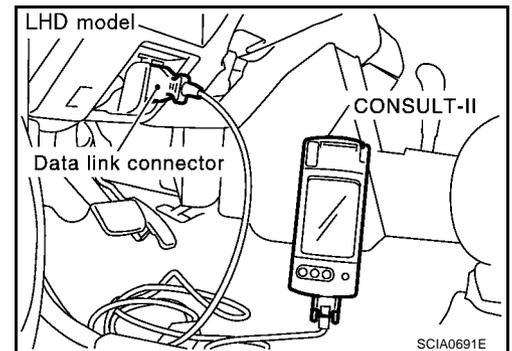


Ⓜ With CONSULT-II

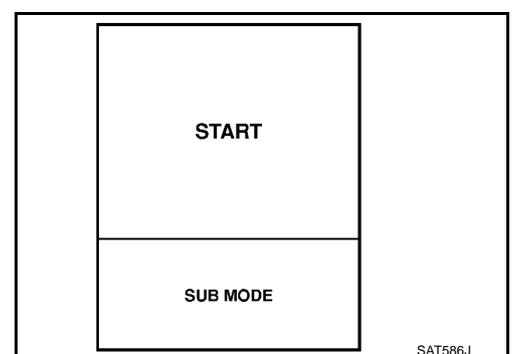
- Using CONSULT-II, conduct a cruise test and record the result.
- Print the result and ensure that shifts and lock-ups take place as per Shift Schedule.

CONSULT-II Setting Procedure

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



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

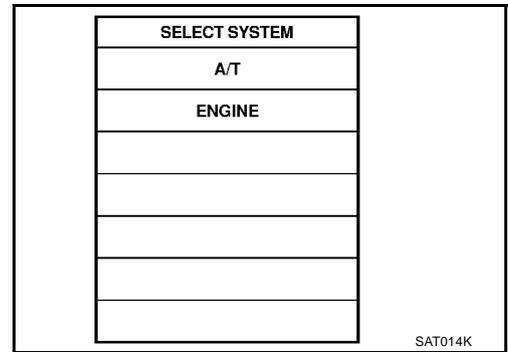


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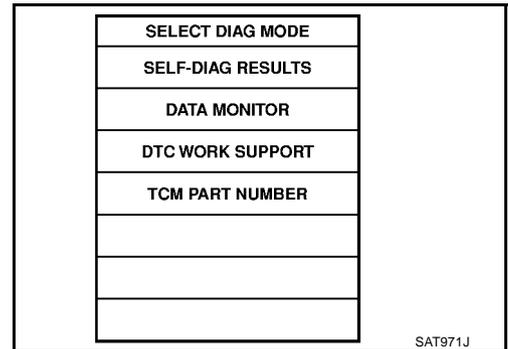
TROUBLE DIAGNOSIS — BASIC INSPECTION

[EXC.F/EURO-OBD]

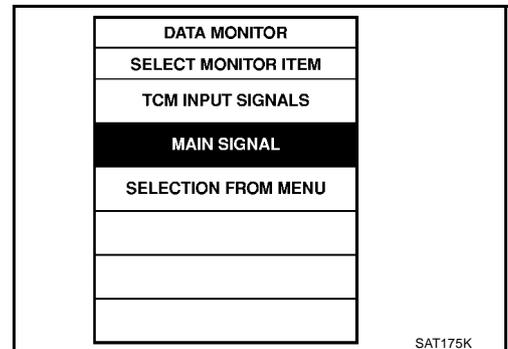
5. Touch "A/T".
If "A/T" is not indicated, go to [GI-34, "CONSULT-II Data Link Connector \(DLC\) Circuit"](#).



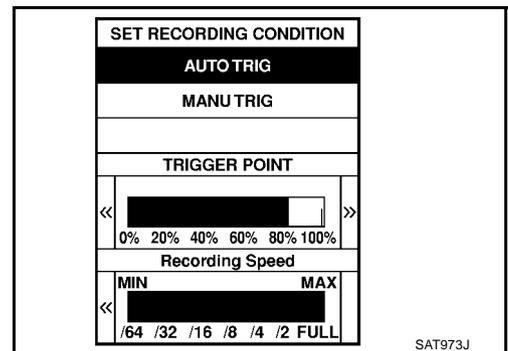
6. Touch "DATA MONITOR".



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



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



TROUBLE DIAGNOSIS — BASIC INSPECTION

[EXC.F/EURO-OBD]

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

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

SAT134K

A
B
AT

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

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

SAT135K

D
E
F
G

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

REAL-TIME DIAG
ENG SPEED SIG

SAT987J

H
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STORE	
SYSTEM	SAVE REC DATA

SAT974J

L
M

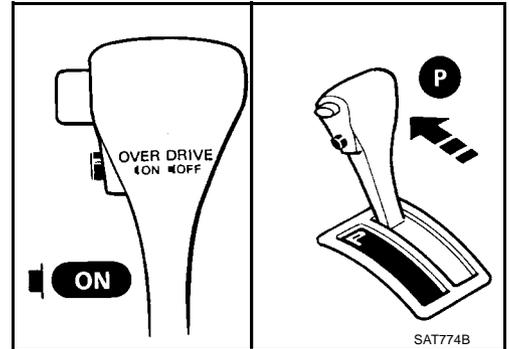
Cruise Test — Part 1

1. CHECK STARTING GEAR (D1) POSITION

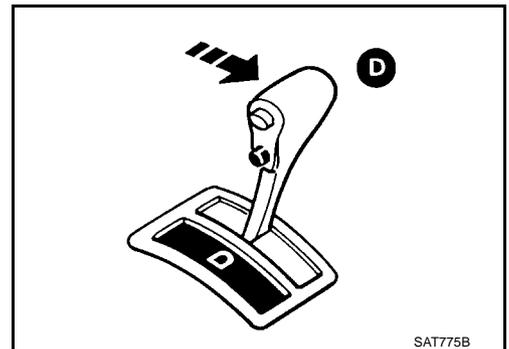
1. Drive vehicle for approx. 10 minutes to warm engine oil and ATF up to operating temperature.

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.

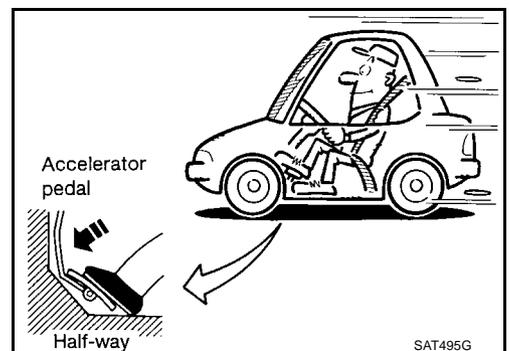


7. Accelerate vehicle by constantly depressing accelerator pedal halfway.
8. Does vehicle start from D1 ?

Ⓜ Read gear position.

Yes or No

- Yes >> GO TO 2.
 No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.
 ● GO TO [AT-323, "Vehicle Cannot Be Started From D1"](#)
 ● Continue ROAD TEST.



2. CHECK SHIFT UP (D1 TO D2)

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

① Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D1 to D2 :

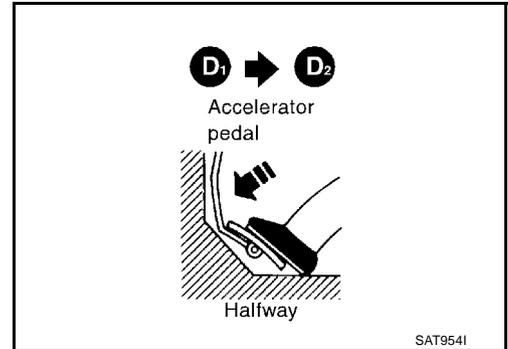
Refer to [AT-521, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 3.

No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.

- GO TO [AT-326, "A/T Does Not Shift: D1 → D2 Or Does Not Kick down: D4 → D2"](#) .
- Continue ROAD TEST.



3. CHECK SHIFT UP (D2 TO D3)

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

① Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D2 to D3 :

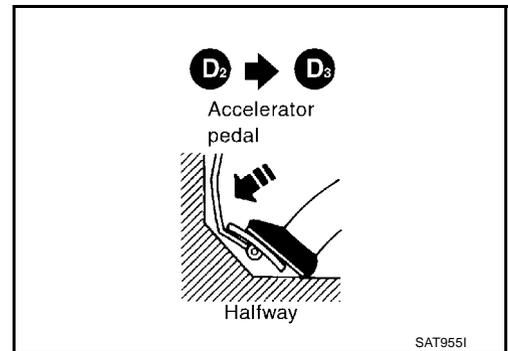
Refer to [AT-521, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 4.

No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.

- GO TO [AT-328, "A/T Does Not Shift: D2 → D3"](#) .
- Continue ROAD TEST.



4. CHECK SHIFT UP (D3 TO D4)

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

① Read gear position, throttle position and vehicle speed.

Specified speed when shifting from D3 to D4 :

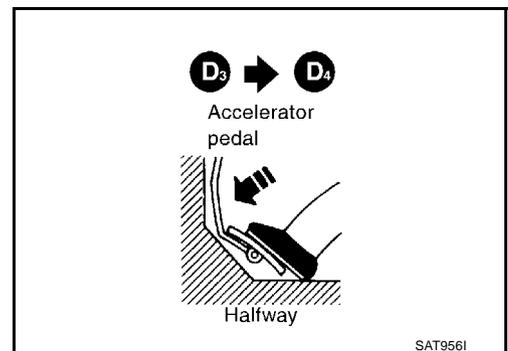
Refer to [AT-521, "Shift Schedule"](#) .

Yes or No

Yes >> GO TO 5.

No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.

- GO TO [AT-330, "A/T Does Not Shift: D3 → D4"](#) .
- Continue ROAD TEST.



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

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

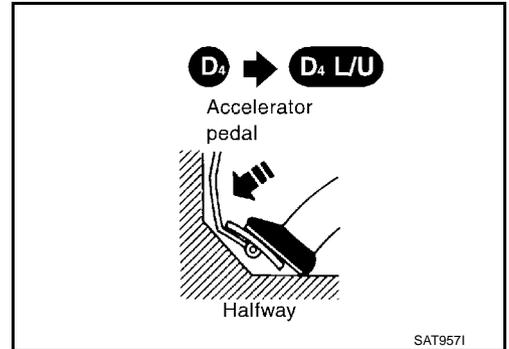
Ⓜ **Read vehicle speed, throttle position when lock-up duty becomes 94%.**

Specified speed when lock-up occurs:

Refer to [AT-521, "Shift Schedule"](#) .

Yes or No

- Yes >> GO TO 6.
- No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.
 - GO TO [AT-332, "A/T Does Not Perform Lock-up"](#) .
 - Continue ROAD TEST.



6. CHECK HOLD LOCK-UP

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

Yes or No

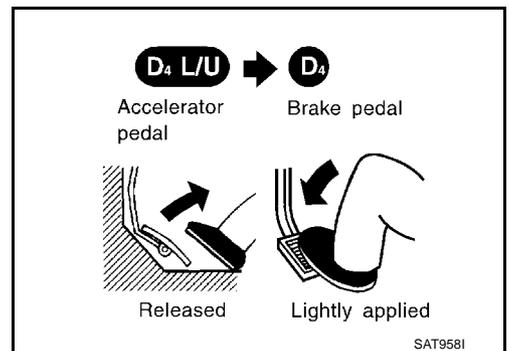
- Yes >> GO TO 7.
- No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.
 - GO TO [AT-333, "A/T Does Not Hold Lock-up Condition"](#) .
 - Continue ROAD TEST.

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

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

Yes or No

- Yes >> GO TO 8.
- No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.
 - GO TO [AT-335, "Lock-up Is Not Released"](#) .
 - Continue ROAD TEST.



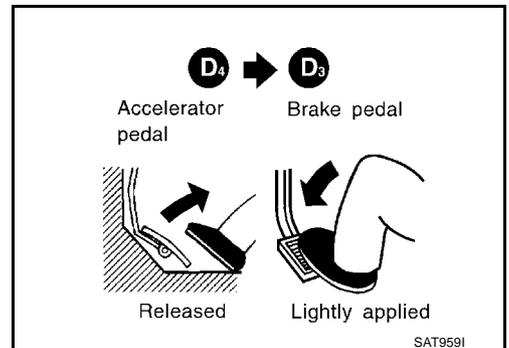
8. CHECK SHIFT DOWN (D4 TO D3)

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

Ⓜ **Read gear position and engine speed.**

Yes or No

- Yes >> 1. Stop vehicle.
 2. GO TO [AT-282, "Cruise Test — Part 2"](#) .
- No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.
 - GO TO [AT-336, "Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) .
 - Continue ROAD TEST.



Cruise Test — Part 2

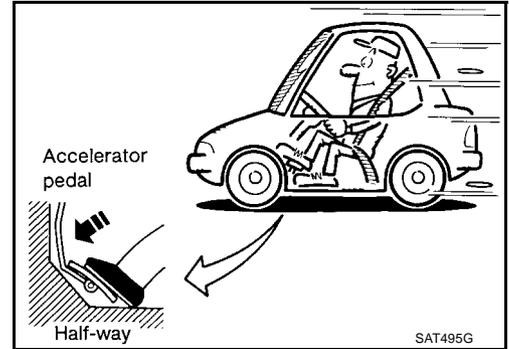
1. CHECK STARTING GEAR (D₁) POSITION

1. Confirm overdrive control switch is in "ON" position.
2. Confirm selector lever is in "D" position.
3. Accelerate vehicle by half throttle again.
4. Does vehicle start from D₁ ?

Ⓜ **Read gear position.**

Yes or No

- Yes >> GO TO 2.
 No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.
 ● GO TO [AT-338, "Vehicle Does Not Start From D₁"](#) .
 ● Continue ROAD TEST.



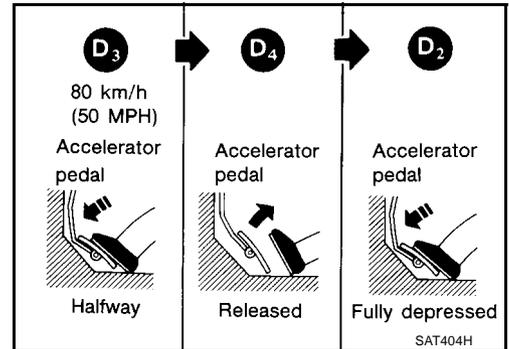
2. CHECK SHIFT UP AND SHIFT DOWN (D₃ TO D₄ TO D₂)

1. Accelerate vehicle to 80 km/h (50 MPH) as shown in illustration.
2. Release accelerator pedal and then quickly depress it fully.
3. Does A/T shift from D₄ to D₂ as soon as accelerator pedal is depressed fully?

Ⓜ **Read gear position and throttle position.**

Yes or No

- Yes >> GO TO 3.
 No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.
 ● GO TO [AT-326, "A/T Does Not Shift: D₁ → D₂ Or Does Not Kick down: D₄ → D₂"](#) .
 ● Continue ROAD TEST.



3. CHECK SHIFT UP (D₂ TO D₃)

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

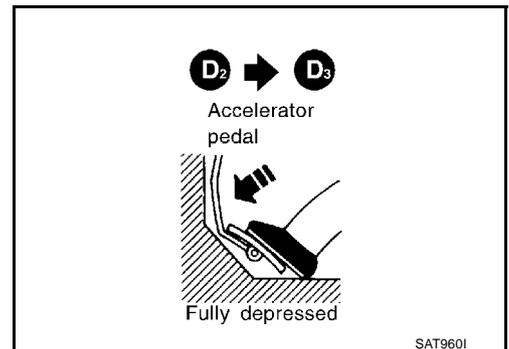
Ⓜ **Read gear position, throttle position and vehicle speed.**

Specified speed when shifting from D₂ to D₃ :

Refer to [AT-521, "Shift Schedule"](#) .

Yes or No

- Yes >> GO TO 4.
 No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.
 ● GO TO [AT-328, "A/T Does Not Shift: D₂ → D₃"](#) .
 ● Continue ROAD TEST.



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

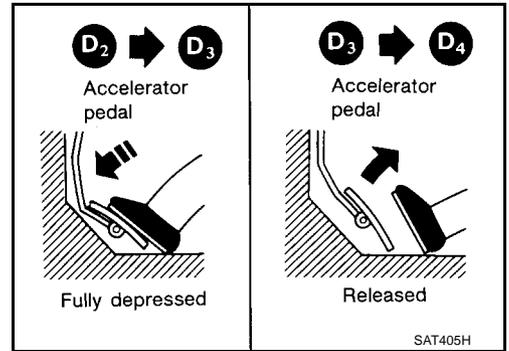
Release accelerator pedal after shifting from D₂ to D₃.

Does A/T shift from D₃ to D₄ and does vehicle decelerate by engine brake?

① **Read gear position, throttle position and vehicle speed.**

Yes or No

- Yes >> 1. Stop vehicle.
 2. GO TO [AT-284, "Cruise Test — Part 3"](#).
- No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.
 ● GO TO [AT-330, "A/T Does Not Shift: D₃ → D₄"](#).
 ● Continue ROAD TEST.

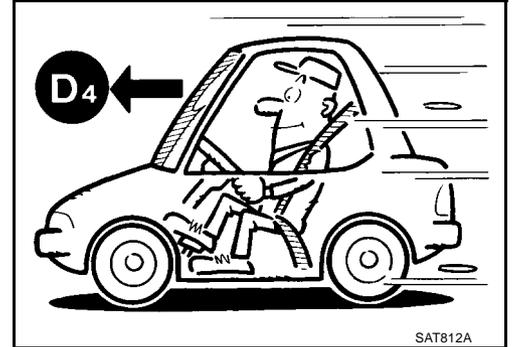


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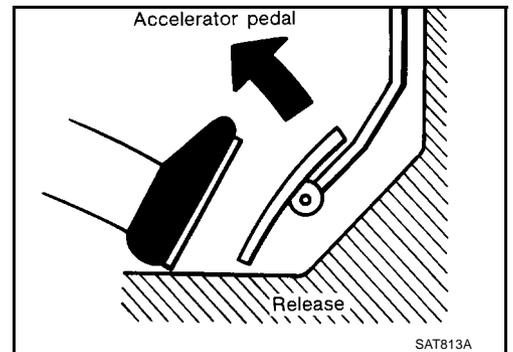
Cruise Test — Part 3

1. CHECK SHIFT DOWN (D4 TO D3)

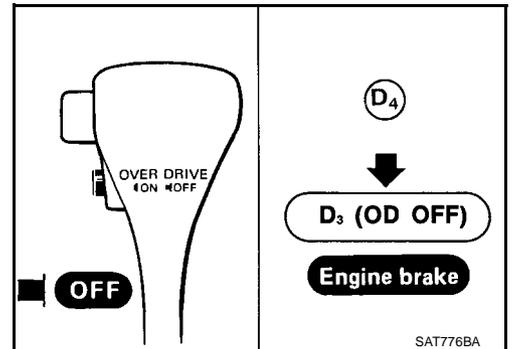
1. Confirm overdrive control switch is in "ON" position.
2. Confirm selector lever is in "D" position.
3. Accelerate vehicle using half-throttle to D4 .



4. Release accelerator pedal.



5. Set overdrive control switch to "OFF" position while driving in D4 .



6. Does A/T shift from D4 to D3 (O/D OFF)?

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

Yes or No

Yes >> GO TO 2.

No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.

- GO TO [AT-339, "A/T Does Not Shift: D4 → D3 , When Overdrive Control Switch "ON" → "OFF" "](#)

- Continue ROAD TEST.

2. CHECK ENGINE BRAKE

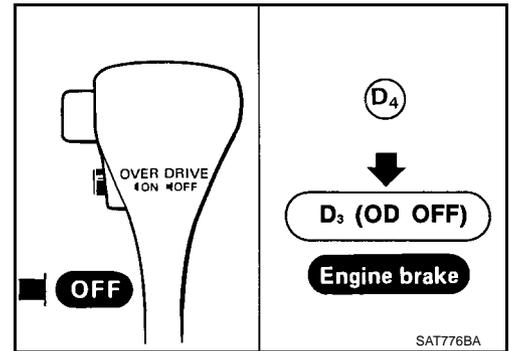
Does vehicle decelerate by engine brake?

Yes or No

Yes >> GO TO 3.

No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.

- GO TO [AT-336, "Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) .
- Continue ROAD TEST.



3. CHECK SHIFT DOWN (D3 TO 22)

1. Move selector lever from "D" to "2" position while driving in D3 (O/D OFF).

2. Does A/T shift from D3 (O/D OFF) to 22 ?

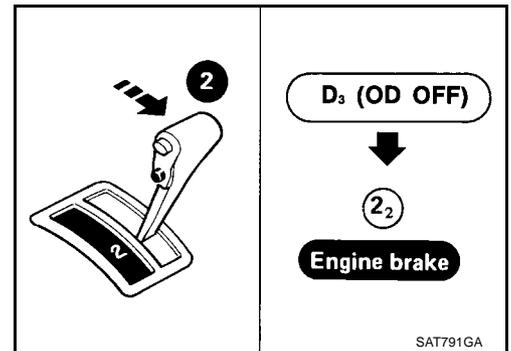
Read gear position.

Yes or No

Yes >> GO TO 4.

No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.

- GO TO [AT-340, "A/T Does Not Shift: D3 → 22 , When Selector Lever "D" → "2" Position"](#) .
- Continue ROAD TEST.



4. CHECK ENGINE BRAKE

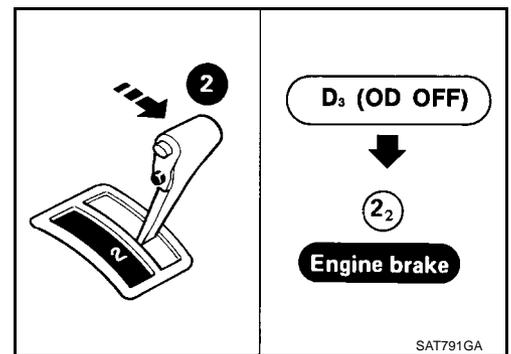
Does vehicle decelerate by engine brake?

Yes or No

Yes >> GO TO 5.

No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.

- GO TO [AT-336, "Engine Speed Does Not Return To Idle \(Light Braking D4 → D3\)"](#) .
- Continue ROAD TEST.



5. CHECK SHIFT DOWN

1. Move selector lever from "2" to "1" position while driving in 22 .

2. Does A/T shift from 22 to 11 position?

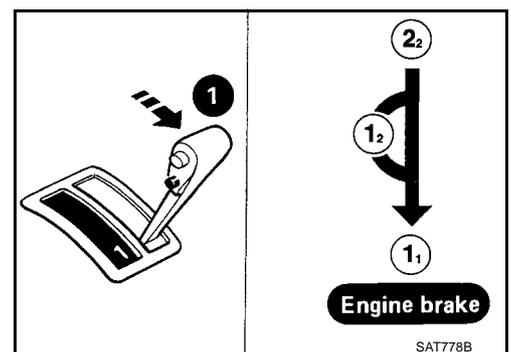
Read gear position.

Yes or No

Yes >> GO TO 6.

No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.

- GO TO [AT-341, "A/T Does Not Shift: 22 → 11 , When Selector Lever "2" → "1" Position"](#) .
- Continue ROAD TEST.

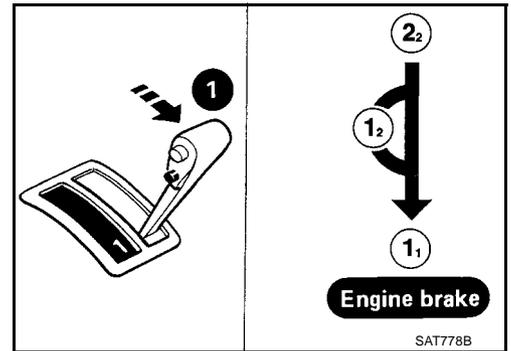


6. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

- Yes >> 1. Stop vehicle.
 2. Perform self-diagnosis.
 Except for Euro-OBD: Refer to [AT-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#) ,
- No >> ● Mark the box on the DIAGNOSTIC WORKSHEET.
 ● GO TO [AT-343, "Vehicle Does Not Decelerate By Engine Brake"](#) .
 ● Stop ROAD TEST.



TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

PFP:00000

Symptom Chart

ECS004VV

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

Symptom	Condition	Diagnostic Item	Reference Page
Engine cannot start in "P" and "N" positions. AT-314. "Engine Cannot Be Started In "P" and "N" Position"	ON vehicle	1. Ignition switch and starter	PG-2. "POWER SUPPLY ROUTING", SC-20. "STARTING SYSTEM"
		2. Control cable adjustment	AT-416. "Control Cable Adjustment"
		3. PNP switch	AT-344. "TCM Self-diagnosis Does Not Activate"
Engine starts in position other than "N" and "P" positions. AT-314. "Engine Cannot Be Started In "P" and "N" Position"	ON vehicle	1. Control cable adjustment	AT-416. "Control Cable Adjustment"
		2. PNP switch	AT-344. "TCM Self-diagnosis Does Not Activate"
Transaxle noise in "P" and "N" positions.	ON vehicle	1. Fluid level	AT-264. "FLUID LEVEL CHECK"
		2. Line pressure test	AT-268. "Line Pressure Test"
		3. Accelerator pedal position (APP) sensor	AT-362. "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-353. "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358. "DTC VEHICLE SPEED SENSOR MTR"
	OFF vehicle	5. Oil pump	AT-444. "Oil Pump"
		6. Torque converter	AT-425. "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Vehicle moves when changing into "P" position, or parking gear does not disengage when shifted out of "P" position. AT-315. "In "P" Position, Vehicle Moves Forward Or Backward When Pushed"	ON vehicle	1. Control cable adjustment	AT-416. "Control Cable Adjustment"
	OFF vehicle	2. Parking components	AT-421. "Components", AT-441. "REPAIR FOR COMPONENT PARTS"
Vehicle runs in "N" position. AT-315. "In "N" Position, Vehicle Moves"	ON vehicle	1. Control cable adjustment	AT-416. "Control Cable Adjustment"
	OFF vehicle	2. Forward clutch	AT-471. "Forward and Overrun Clutches"
		3. Reverse clutch	AT-463. "Reverse Clutch"
		4. Overrun clutch	AT-471. "Forward and Overrun Clutches"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Vehicle will not run in "R" position (but runs in "D", "2" and "1" positions). Clutch slips. Very poor acceleration. AT-318, "Vehicle Does Not Creep Backward In "R" Position"	ON vehicle	1. Control cable adjustment	AT-416, "Control Cable Adjustment"
		2. Stall test	AT-265, "Stall Test"
		3. Line pressure test	AT-268, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-396, "LINE PRES-SURE SOLENOID VALVE"
		5. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
Vehicle will not run in "R" position (but runs in "D", "2" and "1" positions). Clutch slips. Very poor acceleration. AT-318, "Vehicle Does Not Creep Backward In "R" Position"	OFF vehicle	6. Reverse clutch	AT-463, "Reverse Clutch"
		7. High clutch	AT-466, "High Clutch"
		8. Forward clutch	AT-471, "Forward and Overrun Clutches"
		9. Overrun clutch	AT-471, "Forward and Overrun Clutches"
		10. Low & reverse brake	AT-476, "Low & Reverse Brake"
Vehicle braked when shifting into "R" position.	ON vehicle	1. Fluid level	AT-264, "A/T Fluid Check"
		2. Line pressure test	AT-268, "Line Pressure Test"
		3. Line pressure solenoid valve	AT-396, "LINE PRES-SURE SOLENOID VALVE"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. High clutch	AT-466, "High Clutch"
		6. Brake band	AT-488, "Band Servo Piston Assembly"
		7. Forward clutch	AT-471, "Forward and Overrun Clutches"
		8. Overrun clutch	AT-471, "Forward and Overrun Clutches"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Sharp shock in shifting from "N" to "D" position.	ON vehicle	1. Engine idling rpm	EC-1391, "Idle Speed and Ignition Timing"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-268, "Line Pressure Test"
		4. A/T fluid temp sen circ and TCM power source	AT-386, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
		5. Engine speed signal	AT-392, "ENGINE SPEED SIGNAL"
		6. Line pressure solenoid valve	AT-396, "LINE PRESSURE SOLENOID VALVE"
		7. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		8. Accumulator N-D	AT-414, "Control Valve Assembly and Accumulators"
		OFF vehicle	9. Forward clutch
Vehicle will not run in "D" and "2" positions (but runs in "1" and "R" positions).	ON vehicle	1. Control cable adjustment	AT-416, "Control Cable Adjustment"
	OFF vehicle	2. Low one-way clutch	AT-421, "OVERHAUL", AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Vehicle will not run in "D", "1", "2" positions (but runs in "R" position). Clutch slips. Very poor acceleration. AT-321, "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Stall test	AT-265, "Stall Test"
		3. Line pressure test	AT-268, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-396, "LINE PRESSURE SOLENOID VALVE"
		5. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		6. Accumulator N-D	AT-414, "Control Valve Assembly and Accumulators"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Vehicle will not run in "D", "1", "2" positions (but runs in "R" position). Clutch slips. Very poor acceleration. AT-321, "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"	OFF vehicle	7. Reverse clutch	AT-463, "Reverse Clutch"
		8. High clutch	AT-466, "High Clutch"
		9. Forward clutch	AT-471, "Forward and Overrun Clutches"
		10. Forward one-way clutch	AT-421, "OVERHAUL"
		11. Low one-way clutch	AT-421, "OVERHAUL", AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Control cable adjustment	AT-416, "Control Cable Adjustment"
		3. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		4. Line pressure test	AT-268, "Line Pressure Test"
		5. Line pressure solenoid valve	AT-396, "LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		7. Accumulator N-D	AT-414, "Control Valve Assembly and Accumulators"
		8. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		9. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"
		10. Overrun clutch solenoid valve	AT-377, "OVERRUN CLUTCH SOLENOID VALVE"
		11. Torque converter clutch solenoid valve	AT-381, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"
	OFF vehicle	12. Forward clutch	AT-471, "Forward and Overrun Clutches"
		13. Reverse clutch	AT-463, "Reverse Clutch"
		14. Low & reverse brake	AT-476, "Low & Reverse Brake"
		15. Oil pump	AT-444, "Oil Pump"
		16. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Excessive creep.	ON vehicle	1. Engine idling rpm	EC-1391, "Idle Speed and Ignition Timing"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
No creep at all. AT-318, "Vehicle Does Not Creep Backward In "R" Position" and AT-321, "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Line pressure test	AT-396, "LINE PRES-SURE SOLENOID VALVE"
		3. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	4. Forward clutch	AT-471, "Forward and Overrun Clutches"
		5. Oil pump	AT-444, "Oil Pump"
		6. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Failure to change gear from "D1 " to "D2 ".	ON vehicle	1. Control cable adjustment	AT-416, "Control Cable Adjustment"
		2. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		3. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-353, "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358, "DTC VEHICLE SPEED SENSOR MTR"
		5. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
	OFF vehicle	6. Brake band	AT-488, "Band Servo Piston Assembly"
Failure to change gear from "D2 " to "D3 ".	ON vehicle	1. Control cable adjustment	AT-416, "Control Cable Adjustment"
		2. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"
		3. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-353, "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358, "DTC VEHICLE SPEED SENSOR MTR"
		5. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
	OFF vehicle	6. High clutch	AT-466, "High Clutch"
		7. Brake band	AT-488, "Band Servo Piston Assembly"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Failure to change gear from "D3" to "D4".	ON vehicle	1. PNP switch	AT-344, "TCM Self-diagnosis Does Not Activate"
		2. Overrun clutch solenoid valve	AT-377, "OVERRUN CLUTCH SOLENOID VALVE"
		3. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-353, "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358, "DTC VEHICLE SPEED SENSOR MTR"
		5. A/T fluid temp sen circ and TCM power source	AT-386, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	6. Brake band	AT-488, "Band Servo Piston Assembly"
Too high a gear change point from "D1" to "D2", from "D2" to "D3", from "D3" to "D4". AT-326, "A/T Does Not Shift: D1 → D2 Or Does Not Kick down: D4 → D2" and AT-330, "A/T Does Not Shift: D3 → D4"	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-353, "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358, "DTC VEHICLE SPEED SENSOR MTR"
		3. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"
Gear change directly from "D1" to "D3" occurs.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Accumulator servo release	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	3. Brake band	AT-488, "Band Servo Piston Assembly"
Engine stops when shifting lever into "R", "D", "2" and "1".	ON vehicle	1. Engine idling rpm	EC-1391, "Idle Speed and Ignition Timing"
		2. Fluid level	AT-264, "FLUID LEVEL CHECK"
		3. Torque converter clutch solenoid valve	AT-381, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Too sharp a shock in change from "D1" to "D2".	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-268, "Line Pressure Test"
		3. Accumulator servo release	AT-414, "Control Valve Assembly and Accumulators"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		5. A/T fluid temp sen circ and TCM power source	AT-386, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	6. Brake band	AT-488, "Band Servo Piston Assembly"
Too sharp a shock in change from "D2" to "D3".	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-268, "Line Pressure Test"
		3. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		4. A/T fluid temp sen circ and TCM power source	AT-386, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	5. High clutch	AT-466, "High Clutch"
		6. Brake band	AT-488, "Band Servo Piston Assembly"
Too sharp a shock in change from "D3" to "D4".	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-268, "Line Pressure Test"
		3. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		4. A/T fluid temp sen circ and TCM power source	AT-386, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
	OFF vehicle	5. Brake band	AT-488, "Band Servo Piston Assembly"
		6. Overrun clutch	AT-471, "Forward and Overrun Clutches"
		7. Forward one-way clutch	AT-421, "OVERHAUL"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Almost no shock or clutches slipping in change from "D1 " to "D2 ".	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-268, "Line Pressure Test"
		4. Accumulator servo release	AT-414, "Control Valve Assembly and Accumulators"
		5. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. Brake band	AT-488, "Band Servo Piston Assembly"
Almost no shock or slipping in change from "D2 " to "D3 ".	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-268, "Line Pressure Test"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. High clutch	AT-466, "High Clutch"
		6. Brake band	AT-488, "Band Servo Piston Assembly"
Almost no shock or slipping in change from "D3 " to "D4 ".	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-268, "Line Pressure Test"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. Brake band	AT-488, "Band Servo Piston Assembly"
Vehicle braked by gear change from "D1 " to "D2 ".	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
	OFF vehicle	2. Reverse clutch	AT-463, "Reverse Clutch"
		3. Low & reverse brake	AT-476, "Low & Reverse Brake"
		4. High clutch	AT-466, "High Clutch"
		5. Low one-way clutch	AT-421, "OVERHAUL", AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBDD]

Symptom	Condition	Diagnostic Item	Reference Page
Vehicle braked by gear change from "D2" to "D3".	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
	OFF vehicle	2. Brake band	AT-488, "Band Servo Piston Assembly"
Vehicle braked by gear change from "D3" to "D4".	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
	OFF vehicle	2. Overrun clutch	AT-377, "OVERRUN CLUTCH SOLENOID VALVE"
		3. Forward one-way clutch	AT-421, "OVERHAUL"
		4. Reverse clutch	AT-463, "Reverse Clutch"
Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. PNP switch	AT-344, "TCM Self-diagnosis Does Not Activate"
		3. Overdrive control switch	AT-344, "TCM Self-diagnosis Does Not Activate"
		4. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		5. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		6. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"
		7. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	8. Reverse clutch	AT-463, "Reverse Clutch"
		9. High clutch	AT-466, "High Clutch"
		10. Brake band	AT-488, "Band Servo Piston Assembly"
		11. Low & reverse brake	AT-476, "Low & Reverse Brake"
		12. Oil pump	AT-444, "Oil Pump"
		13. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Failure to change gear from "D4 " to "D3 ".	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Overrun clutch solenoid valve	AT-377, "OVERRUN CLUTCH SOLENOID VALVE"
		4. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		5. Line pressure solenoid valve	AT-396, "LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Brake band	AT-488, "Band Servo Piston Assembly"
		8. Overrun clutch	AT-471, "Forward and Overrun Clutches"
Failure to change gear from "D3 " to "D2 " or from "D4 " to "D2 ".	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"
		5. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. High clutch	AT-466, "High Clutch"
		7. Brake band	AT-488, "Band Servo Piston Assembly"
Failure to change gear from "D2 " to "D1 " or from "D3 " to "D1 ".	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"
		5. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	6. Low one-way clutch	AT-421, "OVERHAUL", AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		7. High clutch	AT-466, "High Clutch"
		8. Brake band	AT-488, "Band Servo Piston Assembly"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Line pressure test	AT-268, "Line Pressure Test"
		3. Overrun clutch solenoid valve	AT-377, "OVERRUN CLUTCH SOLENOID VALVE"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
Too high a change point from "D4" to "D3", from "D3" to "D2", from "D2" to "D1".	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-353, "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358, "DTC VEHICLE SPEED SENSOR MTR"
Kickdown does not operate when depressing pedal in "D4" within kick down vehicle speed.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-353, "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358, "DTC VEHICLE SPEED SENSOR MTR"
		3. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"
Kickdown operates or engine overruns 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	AT-353, "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358, "DTC VEHICLE SPEED SENSOR MTR"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Races extremely fast or slips in changing from "D4" to "D3" when depressing pedal.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-268, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-396, "LINE PRESSURE SOLENOID VALVE"
		5. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		6. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Brake band	AT-488, "Band Servo Piston Assembly"
		8. Forward clutch	AT-471, "Forward and Overrun Clutches"
Races extremely fast or slips in changing from "D4" to "D2" when depressing pedal.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-268, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-396, "LINE PRESSURE SOLENOID VALVE"
		5. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		6. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"
		7. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	8. Brake band	AT-488, "Band Servo Piston Assembly"
		9. High clutch	AT-466, "High Clutch"
		10. Forward clutch	AT-471, "Forward and Overrun Clutches"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBDD]

Symptom	Condition	Diagnostic Item	Reference Page
Races extremely fast or slips in changing from "D3" to "D2" when depressing pedal.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-268, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-396, "LINE PRESSURE SOLENOID VALVE"
		5. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		6. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"
	OFF vehicle	7. Brake band	AT-488, "Band Servo Piston Assembly"
		8. High clutch	AT-466, "High Clutch"
Races extremely fast or slips in changing from "D4" or "D3" to "D1" when depressing pedal.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-268, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-396, "LINE PRESSURE SOLENOID VALVE"
		5. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		6. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"
		7. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	8. Forward clutch	AT-471, "Forward and Overrun Clutches"
		9. Forward one-way clutch	AT-421, "OVERHAUL"
		10. Low one-way clutch	AT-421, "OVERHAUL", AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Control cable adjustment	AT-416, "Control Cable Adjustment"
		3. Line pressure test	AT-268, "Line Pressure Test"
		4. Line pressure solenoid valve	AT-396, "LINE PRES-SURE SOLENOID VALVE"
	OFF vehicle	5. Oil pump	AT-444, "Oil Pump"
		6. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		7. Parking components	AT-421, "Components"
Transmission noise in "D", "2", "1" and "R" positions.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
	OFF vehicle	2. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Failure to change from "D3" to "22" when changing lever into "2" position. AT-340, "A/T Does Not Shift: D3 → 22, When Selector Lever "D" → "2" Position"	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"
		3. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		4. Control cable adjustment	AT-416, "Control Cable Adjustment"
	OFF vehicle	5. Brake band	AT-488, "Band Servo Piston Assembly"
Gear change from "22" to "23" in "2" position.	ON vehicle	1. PNP switch	AT-344, "TCM Self-diagnosis Does Not Activate"
		2. Control cable adjustment	AT-416, "Control Cable Adjustment"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Engine brake does not operate in "1" position. AT-338, "Vehicle Does Not Start From D1"	ON vehicle	1. PNP switch	AT-344, "TCM Self-diagnosis Does Not Activate"
		2. Control cable adjustment	AT-416, "Control Cable Adjustment"
		3. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-353, "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358, "DTC VEHICLE SPEED SENSOR MTR"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		5. Overrun clutch solenoid valve	AT-377, "OVERRUN CLUTCH SOLENOID VALVE"
	OFF vehicle	6. Overrun clutch	AT-471, "Forward and Overrun Clutches"
		7. Low & reverse brake	AT-476, "Low & Reverse Brake"
Gear change from "11" to "12" in "1" position.	ON vehicle	1. PNP switch	AT-344, "TCM Self-diagnosis Does Not Activate"
		2. Control cable adjustment	AT-416, "Control Cable Adjustment"
Does not change from "12" to "11" in "1" position.	ON vehicle	1. PNP switch	AT-344, "TCM Self-diagnosis Does Not Activate"
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-353, "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358, "DTC VEHICLE SPEED SENSOR MTR"
		3. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	5. Low one-way clutch	AT-421, "OVERHAUL", AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		6. Brake band	AT-488, "Band Servo Piston Assembly"
		7. Low & reverse brake	AT-476, "Low & Reverse Brake"
Large shock changing from "12" to "11" in "1" position.	ON vehicle	1. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	2. Low & reverse brake	AT-476, "Low & Reverse Brake"

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBID]

Symptom	Condition	Diagnostic Item	Reference Page
Transmission overheats.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Engine idling rpm	EC-1391, "Idle Speed and Ignition Timing"
		3. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		4. Line pressure test	AT-268, "Line Pressure Test"
		5. Line pressure solenoid valve	AT-396, "LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
Transmission overheats.	OFF vehicle	7. Oil pump	AT-444, "Oil Pump"
		8. Reverse clutch	AT-463, "Reverse Clutch"
		9. High clutch	AT-466, "High Clutch"
		10. Brake band	AT-488, "Band Servo Piston Assembly"
		11. Forward clutch	AT-471, "Forward and Overrun Clutches"
		12. Overrun clutch	AT-471, "Forward and Overrun Clutches"
		13. Low & reverse brake	AT-476, "Low & Reverse Brake"
		14. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
	OFF vehicle	2. Reverse clutch	AT-463, "Reverse Clutch"
		3. High clutch	AT-466, "High Clutch"
		4. Brake band	AT-488, "Band Servo Piston Assembly"
		5. Forward clutch	AT-471, "Forward and Overrun Clutches"
		6. Overrun clutch	AT-471, "Forward and Overrun Clutches"
		7. Low & reverse brake	AT-476, "Low & Reverse Brake"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
	OFF vehicle	2. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
		3. Oil pump	AT-444, "Oil Pump"
		4. Reverse clutch	AT-463, "Reverse Clutch"
		5. High clutch	AT-466, "High Clutch"
		6. Brake band	AT-488, "Band Servo Piston Assembly"
		7. Forward clutch	AT-471, "Forward and Overrun Clutches"
		8. Overrun clutch	AT-471, "Forward and Overrun Clutches"
		9. Low & reverse brake	AT-476, "Low & Reverse Brake"
Torque converter is not locked up.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-353, "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358, "DTC VEHICLE SPEED SENSOR MTR"
		3. Engine speed signal	AT-392, "ENGINE SPEED SIGNAL"
		4. A/T fluid temp sen circ and TCM power source	AT-386, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
		5. Line pressure test	AT-268, "Line Pressure Test"
		6. Torque converter clutch solenoid valve	AT-381, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		7. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
Torque converter is not locked up.	OFF vehicle	8. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Symptom	Condition	Diagnostic Item	Reference Page
Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		3. Line pressure test	AT-268, "Line Pressure Test"
		4. Torque converter clutch solenoid valve	AT-381, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		5. Line pressure solenoid valve	AT-396, "LINE PRESSURE SOLENOID VALVE"
		6. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
	OFF vehicle	7. Torque converter	AT-425, "Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings"
Lock-up point is extremely high or low. AT-332, "A/T Does Not Perform Lock-up"	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-353, "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358, "DTC VEHICLE SPEED SENSOR MTR"
		3. Torque converter clutch solenoid valve	AT-381, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		4. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBID]

Symptom	Condition	Diagnostic Item	Reference Page
A/T does not shift to "D4" when driving with overdrive control switch "ON".	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-362, "ACCELERATOR PEDAL POSITION (APP) SENSOR"
		2. PNP switch	AT-344, "TCM Self-diagnosis Does Not Activate"
		3. Overdrive control switch	AT-344, "TCM Self-diagnosis Does Not Activate"
		4. Vehicle speed sensor-A/T (Revolution sensor) and vehicle speed sensor-MTR	AT-353, "VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)", AT-358, "DTC VEHICLE SPEED SENSOR MTR"
		5. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		6. Overrun clutch solenoid valve	AT-377, "OVERRUN CLUTCH SOLENOID VALVE"
		7. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"
		8. A/T fluid temp sen circ and TCM power source	AT-386, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
		9. Line pressure test	AT-268, "Line Pressure Test"
A/T does not shift to "D4" when driving with overdrive control switch "ON".	OFF vehicle	10. Brake band	AT-488, "Band Servo Piston Assembly"
		11. Overrun clutch	AT-471, "Forward and Overrun Clutches"
Engine is stopped at "R", "D", "2" and "1" positions.	ON vehicle	1. Fluid level	AT-264, "FLUID LEVEL CHECK"
		2. Torque converter clutch solenoid valve	AT-381, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"
		3. Shift solenoid valve A	AT-367, "SHIFT SOLENOID VALVE A"
		4. Shift solenoid valve B	AT-372, "SHIFT SOLENOID VALVE B"
		5. Control valve assembly	AT-414, "Control Valve Assembly and Accumulators"

A
B
AT
D
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G
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M

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

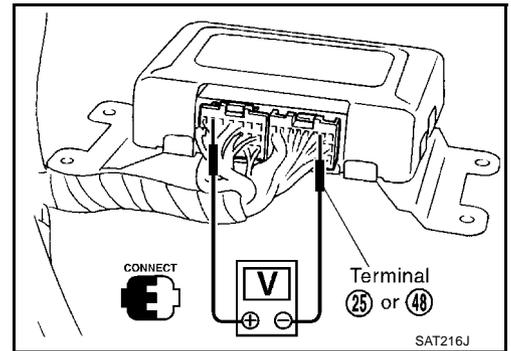
[EXC.F/EURO-OBD]

ECS004VW

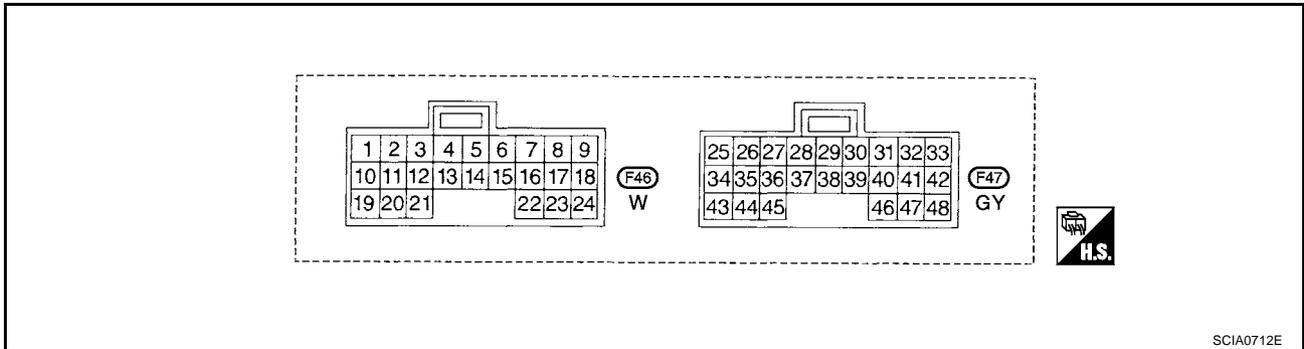
TCM Terminals and Reference Value

PREPARATION

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



TCM HARNESS CONNECTOR TERMINAL LAYOUT



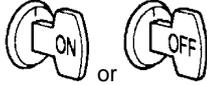
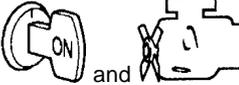
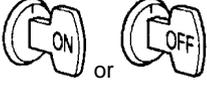
TCM INSPECTION TABLE

(Data are reference values.)

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
1	R/W	Line pressure solenoid valve	When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
			When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve (with dropping resistor)	When releasing accelerator pedal after warming up engine.	5 - 14V
			When depressing accelerator pedal fully after warming up engine.	0V
3	GY/R	Torque converter clutch solenoid valve	When A/T performs lock-up.	8 - 15V
			When A/T does not perform lock-up.	0V
5	QR20DE: B/W QR25DE: W/B	CAN-H (high)	—	—
6	L/R	CAN-L (low)	—	—
10	BR/W	Power source	When turning ignition switch to "ON".	Battery voltage
			When turning ignition switch to "OFF".	0V

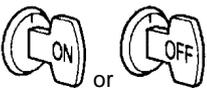
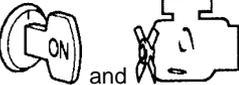
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

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	
13	R/L	O/D OFF indicator lamp		When setting overdrive control or A/T check switch in "OFF" position.	0V	
				When setting overdrive control or A/T check switch in "ON" position.	Battery voltage	
19	BR/W	Power source			Same as No. 10	
20	L/B	Overrun clutch solenoid valve			When overrun clutch solenoid valve operates.	Battery voltage
			When overrun clutch solenoid valve does not operate.		0V	
22	L/OR	Overdrive control switch			When setting overdrive control switch in "ON" position	Battery voltage
					When setting overdrive control switch in "OFF" position	0V
25	B/W	Ground		—	—	0V
26	BR/Y	PNP switch "1" position			When setting selector lever to "1" position.	Battery voltage
			When setting selector lever to other positions.		0V	
27	L	PNP switch "2" position	When setting selector lever to "2" position.		Battery voltage	
			When setting selector lever to other positions.		0V	
28	R/B	Power source (Memory back-up)		When turning ignition switch to "OFF".	Battery voltage	
				When turning ignition switch to "ON".	Battery voltage	
29	W	Revolution sensor			When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 CAUTION: Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	450 Hz
					When vehicle parks.	Under 1.3V or over 4.5V
30 *3	G/B	CONSULT- II (RX)			—	—
31 *3	GY/L	CONSULT- II (TX)			—	—

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

[EXC.F/EURO-OBD]

Terminal No.	Wire color	Item	Condition		Judgement standard(Approx.)
32 *2	R	Throttle position sensor (Power source)		When turning ignition switch to "ON".	4.5 - 5.5V
				When turning ignition switch to "OFF".	0V
34	W/G	PNP switch "D" position		When setting selector lever to "D" position.	Battery voltage
				When setting selector lever to other positions.	0V
35	L/W	PNP switch "R" position		When setting selector lever to "R" position.	Battery voltage
				When setting selector lever to other positions.	0V
36	G	PNP switch "N" or "P" position		When setting selector lever to "N" or "P" position.	Battery voltage
				When setting selector lever to other positions.	0V
39 *2	L/OR	Engine speed signal		Refer to EC-479. "ECM INSPECTION TABLE" (QR25DE) or EC-1166. "ECM INSPECTION TABLE" (QR20DE).	—
40	L/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 0V and more than 4.5V
41	W/R	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Throttle position sensor (Ground)	—	—	—
45	P	Stop lamp switch		When depressing brake pedal.	Battery voltage
				When releasing brake pedal.	0V
47	BR	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V
48	B/W	Ground	—	—	—

*2: These terminals are connected to the ECM.

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

CAN COMMUNICATION

PFP:23710

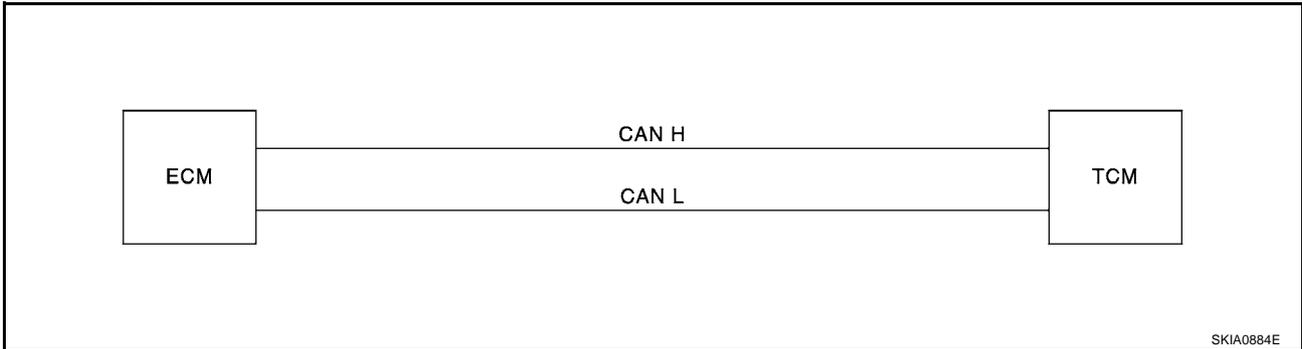
System Description

ECS004VQ

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

FOR A/T MODELS

System diagram



Input/output signal chart

T: Transmit R: Receive

Signals	ECM	TCM
Engine coolant temperature signal	T	R
Accelerator pedal position signal	T	R
A/T self-diagnosis signal	R	T

TROUBLE DIAGNOSES FOR SYMPTOMS

[EXC.F/EURO-OBD]

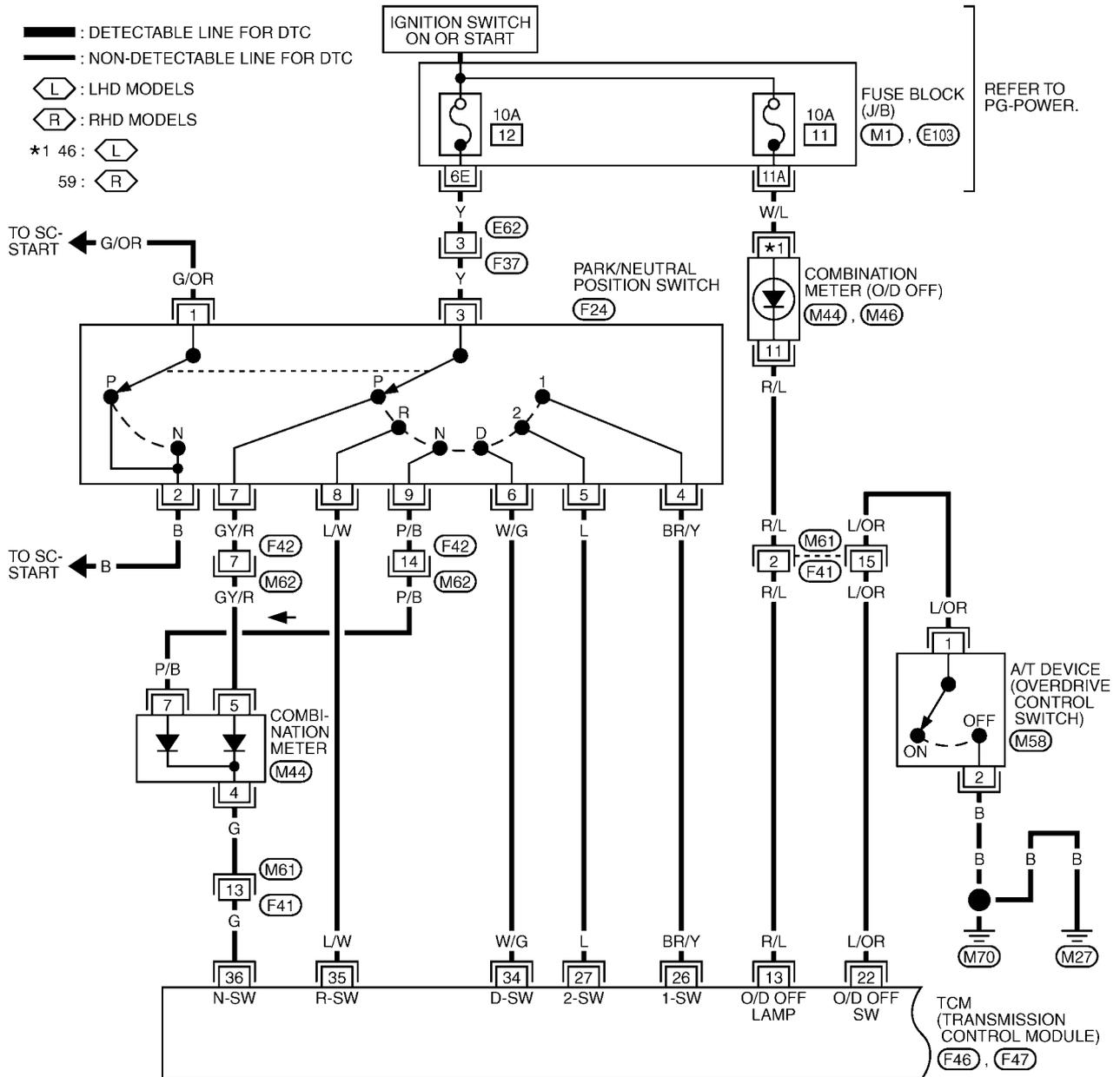
TROUBLE DIAGNOSES FOR SYMPTOMS

PF0:00100

Wiring Diagram — AT — NONDTC

ECS004V1

AT-NONDTC-01



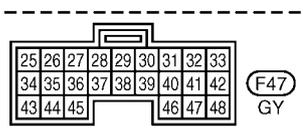
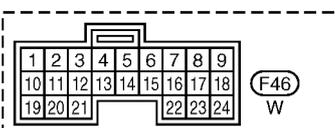
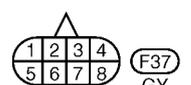
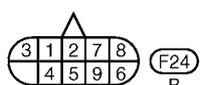
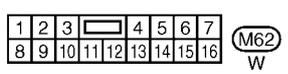
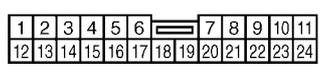
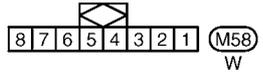
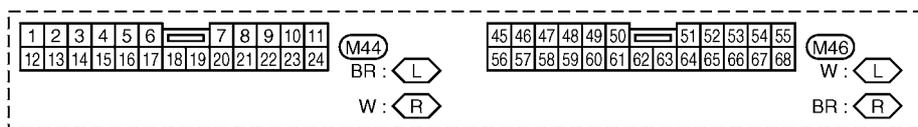
REFER TO PG-POWER.

TO SC-START ← G/OR

TO SC-START ← B

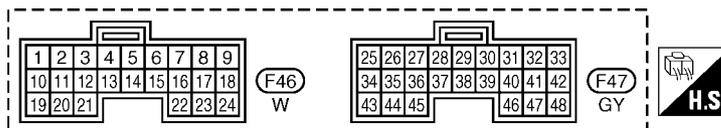
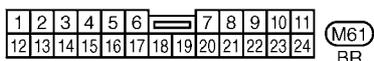
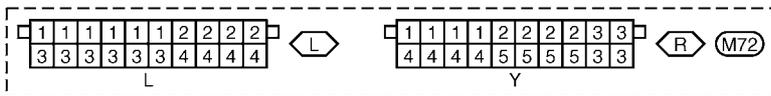
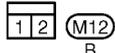
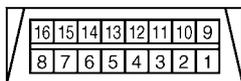
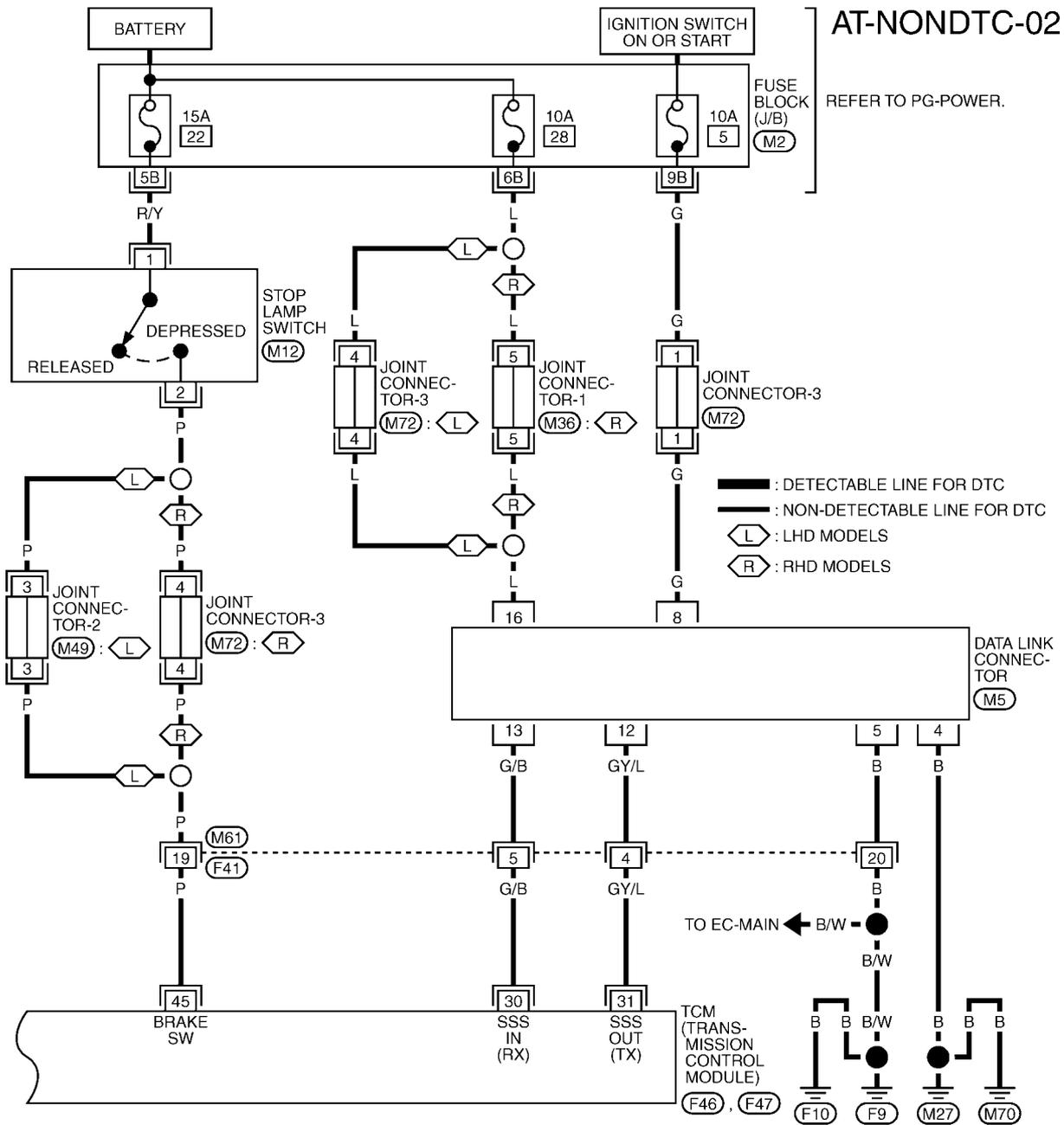
REFER TO THE FOLLOWING.

(M1), (E103) - FUSE BLOCK-JUNCTION BOX (J/B)



TROUBLE DIAGNOSES FOR SYMPTOMS

[EXC.F/EURO-OBID]



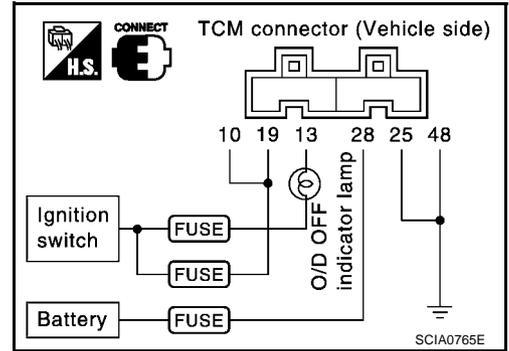
REFER TO THE FOLLOWING.

(M2) - FUSE BLOCK-JUNCTION BOX (J/B)

O/D OFF Indicator Lamp Does Not Come On

SYMPTOM:

O/D OFF indicator lamp does not come on for about 2 seconds when turning ignition switch to "ON".



1. CHECK TCM POWER SOURCE

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

Voltage: Battery voltage

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

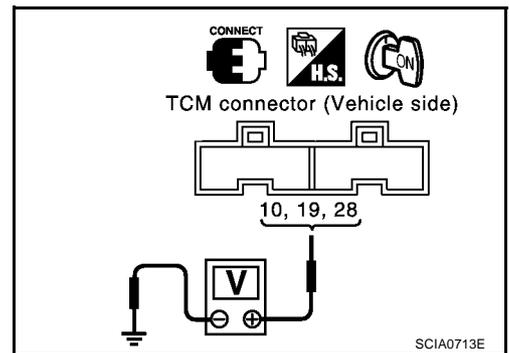
Voltage: Battery voltage

OK or NG

OK >> GO TO 2.

NG >> Check the following items:

- Harness for short or open between ignition switch and TCM terminals 10, 19 and 28
- Refer to [AT-350, "Wiring Diagram — AT — MAIN"](#) .
- Ignition switch and fuse. Refer to [PG-2, "POWER SUPPLY ROUTING"](#) .



2. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Disconnect TCM harness connector.
3. Check continuity between TCM terminals 25, 48 and ground.

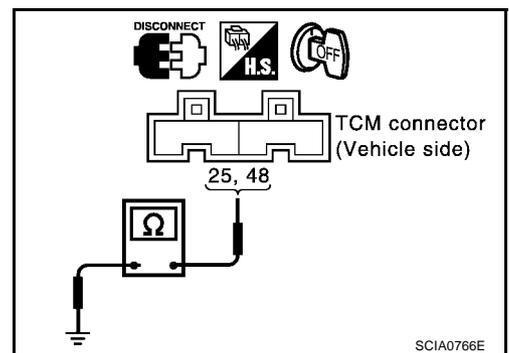
Continuity should exist.

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

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors. Refer to [AT-350, "Wiring Diagram — AT — MAIN"](#) .



3. CHECK LAMP CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Check resistance between TCM terminals 13 and 10, 19.

Resistance: 50 - 100Ω

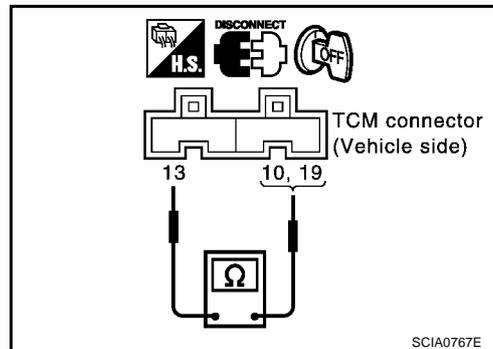
3. Reinstall any part removed.

OK or NG

OK >> GO TO 4.

NG >> Check the following items:

- O/D OFF indicator lamp.
Refer to [DI-10, "Meter/Gauge Operation and Odo/Trip Meter Segment Check in Diagnosis Mode"](#) .
- Harness and fuse for short or open between ignition switch and O/D OFF indicator lamp
Refer to [PG-2, "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.

Engine Cannot Be Started In "P" and "N" Position

SYMPTOM:

- Engine cannot be started with selector lever in "P" or "N" position.
- Engine can be started with selector lever in "D", "2", "1" or "R" position.

1. CHECK PNP SWITCH CIRCUIT

① With CONSULT-II

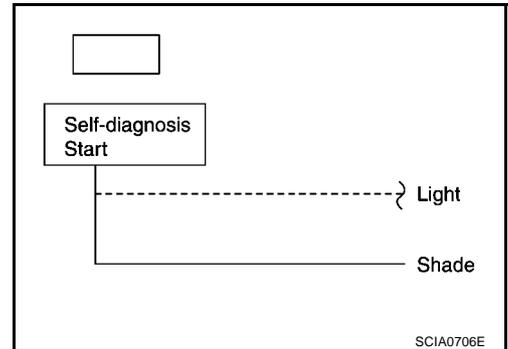
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage to PNP switch circuit?

② Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to [AT-344, "TCM Self-diagnosis Does Not Activate"](#) .
- No >> GO TO 2.



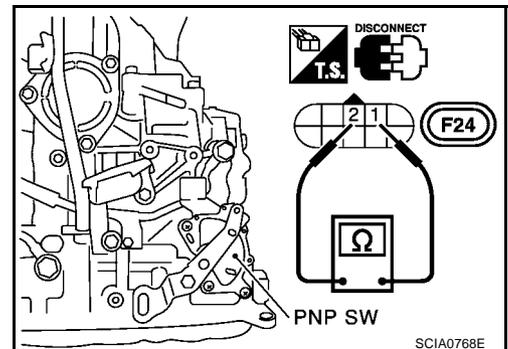
2. CHECK PNP SWITCH INSPECTION

Check for short or open of PNP switch harness connector terminals 1 and 2.

Refer to [AT-344, "TCM Self-diagnosis Does Not Activate"](#) .

OK or NG

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

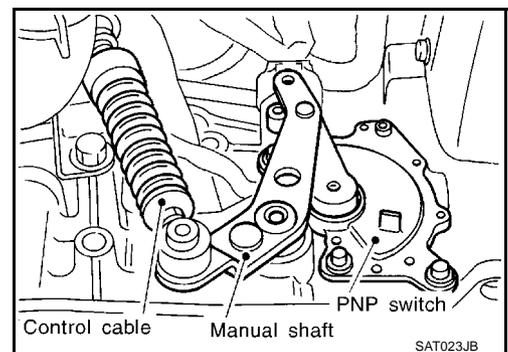


3. CHECK CONTROL CABLE

Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

OK or NG

- OK >> GO TO 4.
- NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .



4. CHECK STARTING SYSTEM

Check starting system. Refer to [SC-20, "STARTING SYSTEM"](#) .

OK or NG

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

In "P" Position, Vehicle Moves Forward Or Backward When Pushed

ECS004V4

SYMPTOM:

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

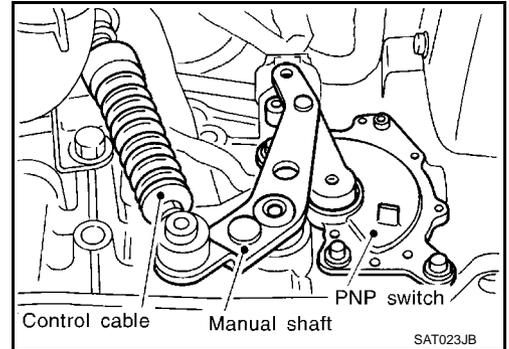
1. CHECK CONTROL CABLE

Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

OK or NG

OK >> GO TO 2.

NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .



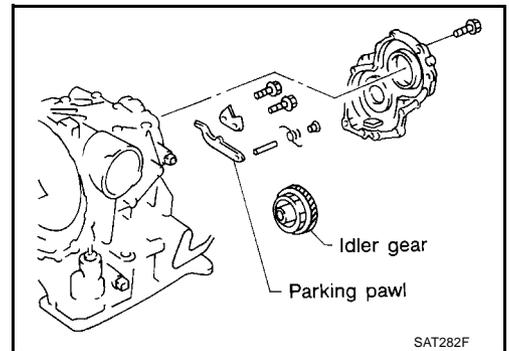
2. CHECK PARKING COMPONENTS

Check parking components. Refer to [AT-421, "OVERHAUL"](#) .

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.



In "N" Position, Vehicle Moves

ECS004V5

SYMPTOM:

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

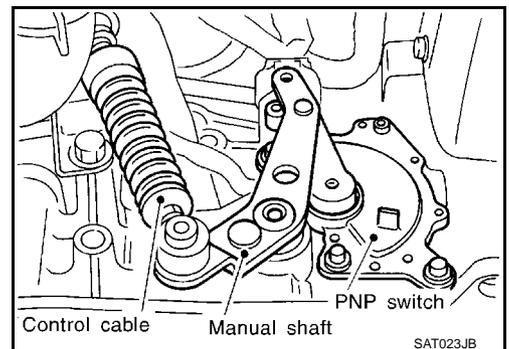
1. CHECK CONTROL CABLE

Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

OK or NG

OK >> GO TO 2.

NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

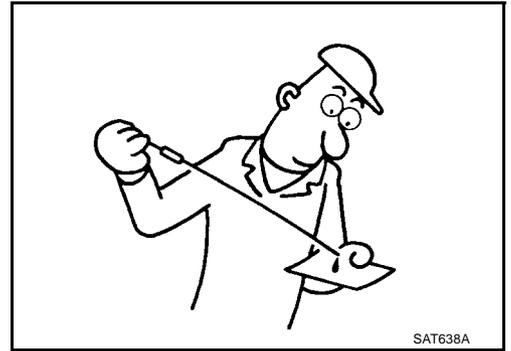


2. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

- OK >> GO TO 3.
- NG >> Refill ATF.

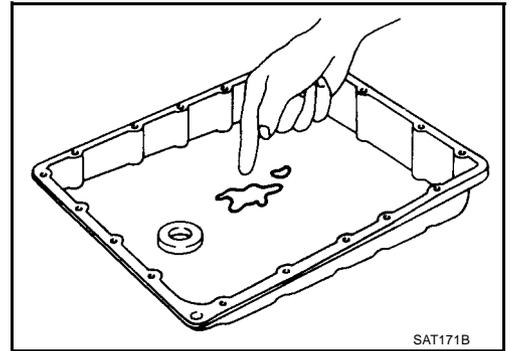


3. CHECK A/T FLUID CONDITION

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

OK or NG

- OK >> GO TO 4.
- NG >> 1. Disassemble A/T.
 2. Check the following items:
 - Forward clutch assembly
 - Overrun clutch assembly
 - Reverse clutch assembly



4. CHECK SYMPTOM

Check again.

OK or NG

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

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?

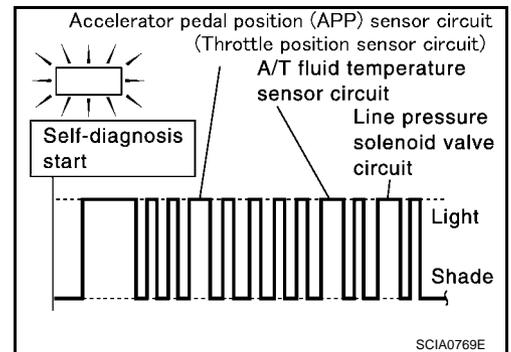
Yes or No

Yes >> ● Check damaged circuit. Refer to the following items.

Except for Euro-OBDD

- [AT-396. "LINE PRESSURE SOLENOID VALVE"](#)
- [AT-362. "ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#)
- [AT-386. "BATT/FLUID TEMP SEN \(A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE\)"](#)

No >> GO TO 2.

**2. CHECK LINE PRESSURE**

Check line pressure at idle with selector lever in "D" position. Refer to [AT-268. "Line Pressure Test"](#).

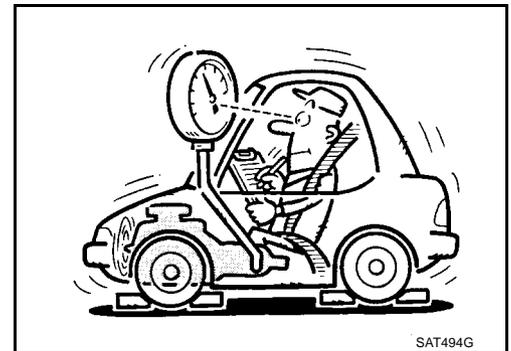
OK or NG

OK >> GO TO 3.

NG >> 1. Remove control valve assembly. Refer to [AT-413. "Installation"](#).

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. 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.

Vehicle Does Not Creep Backward In "R" Position

SYMPTOM:

Vehicle does not creep backward when selecting "R" position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

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



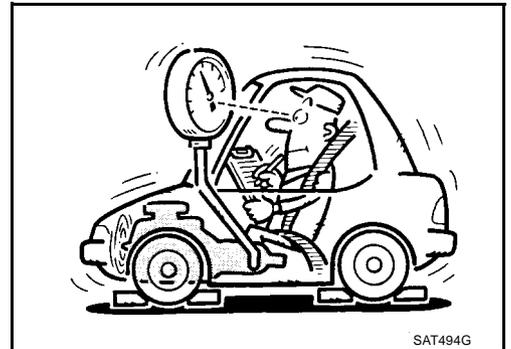
SAT638A

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in "R" position. Refer to [AT-268, "Line Pressure Test"](#).

OK or NG

- OK >> GO TO 3.
NG >> 1. Remove control valve assembly. Refer to [AT-414, "Control Valve Assembly and Accumulators"](#).
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 ([AT-396, "LINE PRESSURE SOLENOID VALVE"](#) : Except for Euro-OBD)
3. Disassemble A/T.
4. Check the following item:
- Oil pump assembly



SAT494G

3. CHECK STALL TEST

Check stall revolution with selector lever in "1" and "R" positions.
Refer to [AT-265, "Stall Test"](#) .

OK or NG

OK >> GO TO 4.

OK in "1" position, NG in "R" position>>1.Remove control valve assembly. Refer to [AT-414, "ON-VEHICLE SERVICE"](#)

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 ([AT-396, "LINE PRES-SURE SOLENOID VALVE"](#) : Except for Euro-OBD)

3. Disassemble A/T.

4. Check the following items:

- Reverse clutch assembly
- High clutch assembly
- Low & reverse brake assembly

NG in both "1" and "R" positions>>GO TO 6.



4. CHECK A/T FLUID CONDITION

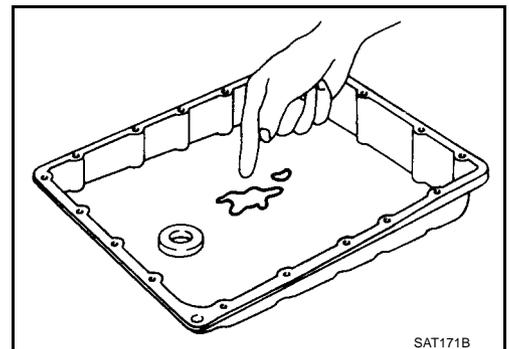
1. Remove oil pan.

2. Check A/T fluid condition.

OK or NG

OK >> GO TO 5.

NG >> GO TO 6.



5. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**

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

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

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-414, "Control Valve Assembly and Accumulators"](#) .
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 ([AT-268, "Line Pressure Test"](#) : Except for Euro-OBD)
3. Disassemble A/T.
4. Check the following items:
 - Reverse clutch assembly
 - High clutch assembly
 - Low & reverse brake assembly
 - Forward clutch assembly
 - Overrun clutch assembly

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

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

ECS004V8

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

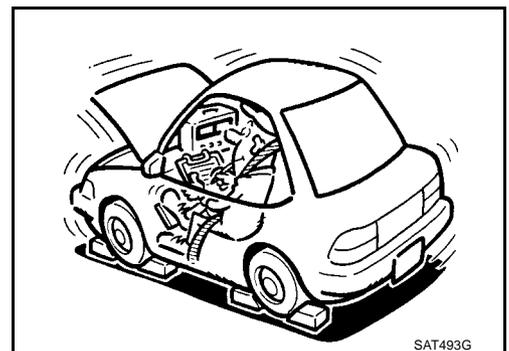
- OK >> GO TO 2.
 NG >> Refill ATF.

**2. CHECK LINE PRESSURE**Check line pressure at idle with selector lever in “D” position. Refer to [AT-268, "Line Pressure Test"](#) .**OK or NG**

- OK >> GO TO 3.
 NG >> 1. Remove control valve assembly. Refer to [AT-414, "Control Valve Assembly and Accumulators"](#) .
 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 ([AT-396, "LINE PRESSURE SOLENOID VALVE"](#))
 3. Disassemble A/T.
 4. Check the following item:
 - Oil pump assembly

**3. CHECK STALL TEST**Check stall revolution with selector lever in “D” position. Refer to [AT-265, "Stall Test"](#) .**OK or NG**

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

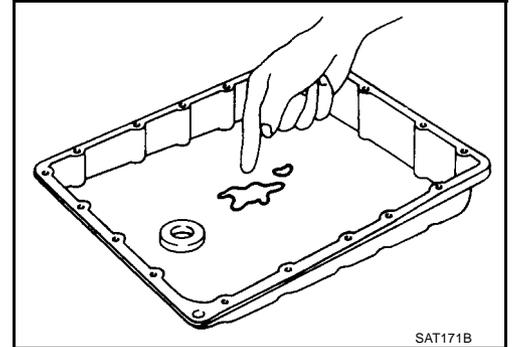


4. CHECK A/T FLUID CONDITION

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

OK or NG

- OK >> GO TO 5.
 NG >> GO TO 6.



5. CHECK SYMPTOM

Check again.

OK or NG

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

6. DETECT MALFUNCTIONING ITEM

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

OK or NG

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

Vehicle Cannot Be Started From D1**SYMPTOM:**

Vehicle cannot be started from D1 on Cruise test — Part 1.

1. CHECK SYMPTOM

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

Yes or No

Yes >> GO TO 2

No >> Go to Vehicle Does Not Creep Backward In "R" Position, [AT-318, "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, overrun clutch solenoid valve, torque converter clutch solenoid valve or vehicle speed sensor-MTR after cruise test?

Yes or No

Yes >> ● Check damaged circuit. Refer to the following items.

Except for Euro-OBD

- [AT-353, "VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#)
- [AT-358, "DTC VEHICLE SPEED SENSOR MTR"](#)
- [AT-367, "SHIFT SOLENOID VALVE A"](#)
- [AT-372, "SHIFT SOLENOID VALVE B"](#)
- [AT-377, "OVERRUN CLUTCH SOLENOID VALVE"](#)
- [AT-381, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#)

No >> GO TO 3.

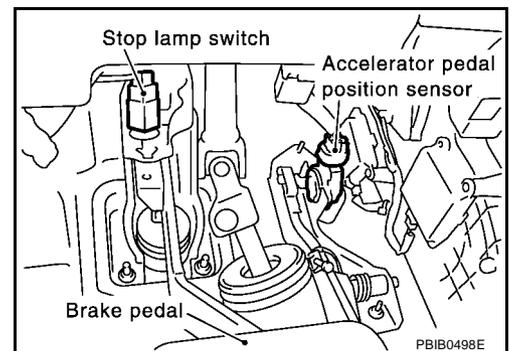
3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to [AT-362, "ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#) —Except for Euro-OBD

OK or NG

OK >> GO TO 4.

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

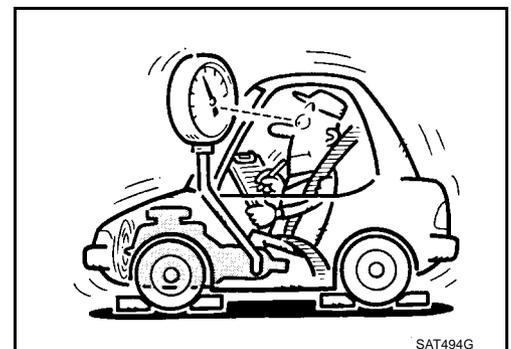
**4. CHECK LINE PRESSURE**

Check line pressure at stall point with selector lever in "D" position. Refer to [AT-268, "Line Pressure Test"](#) .

OK or NG

OK >> GO TO 5.

NG >> GO TO 8.

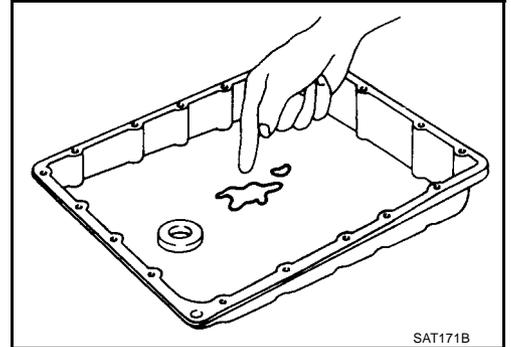


5. CHECK A/T FLUID CONDITION

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

OK or NG

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

**6. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-414, "Control Valve Assembly and Accumulators"](#).
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-413, "Installation"](#) .
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
 - Torque converter
 - Oil pump assembly
 - Reverse clutch assembly
 - Low & reverse clutch assembly

OK or NG

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

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

A/T Does Not Shift: D1 → D2 Or Does Not Kick down: D4 → D2

EC5004VA

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 Vehicle Does Not Creep Forward In "D", "2" Or "1" Position and Vehicle Cannot Be Started From D1 OK?

Yes or No

Yes >> GO TO 2

No >> Go to [AT-321, "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"](#) , [AT-323, "Vehicle Cannot Be Started From D1"](#) .

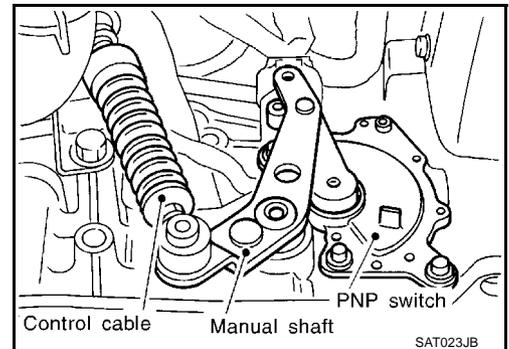
2. CHECK CONTROL CABLE

Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

OK or NG

OK >> GO TO 3.

NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .



3. CHECK VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR-MTR CIRCUIT

Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-353, "VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and [AT-358, "DTC VEHICLE SPEED SENSOR MTR"](#) (Except for Euro-OBD).

OK or NG

OK >> GO TO 4.

NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

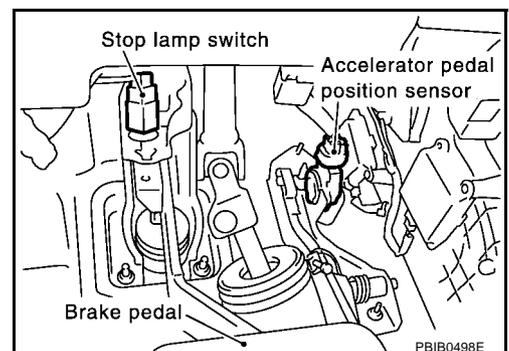
4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to [AT-362, "ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#) —Except for Euro-OBD.

OK or NG

OK >> GO TO 5

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

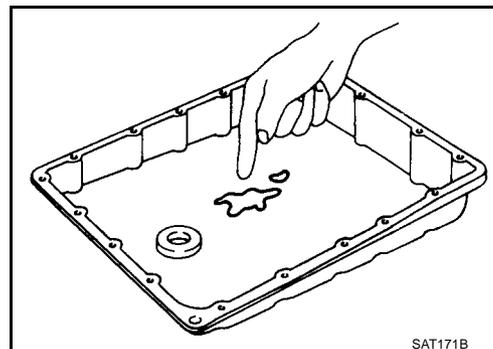


5. CHECK A/T FLUID CONDITION

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

OK or NG

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

**6. DETECT MALFUNCTIONING ITEM**

1. Remove control valve. Refer to [AT-413, "Installation"](#).
2. Check the following items:
 - Shift valve A
 - Shift valve B
 - Shift solenoid valve A
 - Shift solenoid valve B
 - Pilot valve
 - Pilot filter

OK or NG

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

7. CHECK SYMPTOM

Check again.

OK or NG

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

8. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to [AT-413, "Installation"](#).
2. Check the following items:
 - Shift valve A
 - Shift valve B
 - Shift solenoid valve A
 - Shift solenoid valve B
 - Pilot valve
 - Pilot filter
3. Disassemble A/T.
4. Check the following items:
 - Servo piston assembly
 - Brake band

OK or NG

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

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 Vehicle Does Not Creep Forward In "D", "2" Or "1" Position and Vehicle Cannot Be Started From D1 OK?

Yes or No

Yes >> GO TO 2.

No >> Go to [AT-321, "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"](#) , [AT-323, "Vehicle Cannot Be Started From D1"](#) .

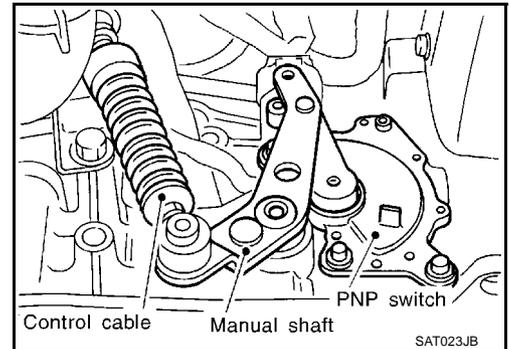
2. CHECK CONTROL CABLE

Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

OK or NG

OK >> GO TO 3.

NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .



3. CHECK VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR-MTR CIRCUIT

Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-353, "VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and [AT-358, "DTC VEHICLE SPEED SENSOR MTR"](#) (Except for Euro-OBD).

OK or NG

OK >> GO TO 4.

NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

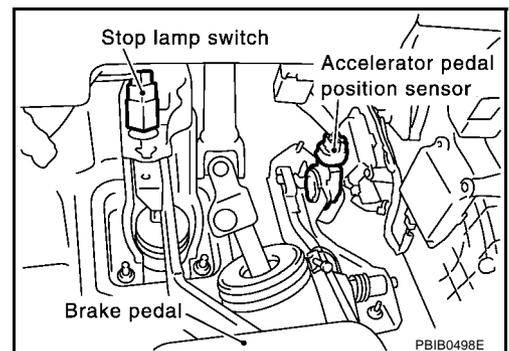
4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to [AT-362, "ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#) —Except for Euro-OBD.

OK or NG

OK >> GO TO 5.

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

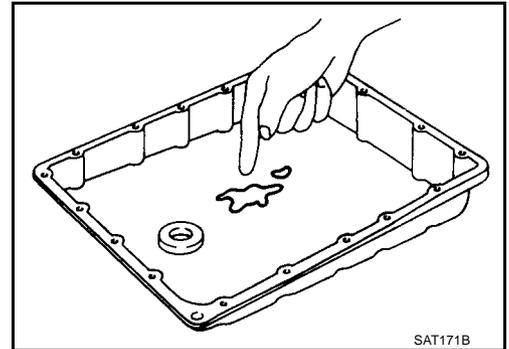


5. CHECK A/T FLUID CONDITION

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

OK or NG

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

**6. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .
2. Check the following items:
 - Shift valve B
 - Shift solenoid valve B ([AT-372, "SHIFT SOLENOID VALVE B"](#) : Except for Euro-OBD)
 - Pilot valve
 - Pilot filter

OK or NG

- OK >> GO TO 6
 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-413, "Installation"](#) .
2. Check the following items:
 - Shift valve B
 - Shift solenoid valve B ([AT-372, "SHIFT SOLENOID VALVE B"](#) : Except for Euro-OBD)
 - Pilot valve
 - Pilot filter
3. Disassemble A/T.
4. Check the following items:
 - Servo piston assembly
 - High clutch assembly
 - Brake band

OK or NG

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

A/T Does Not Shift: D3 → D4

ECS004VC

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 Vehicle Does Not Creep Forward In "D", "2" Or "1" Position and Vehicle Cannot Be Started From D1 OK?

Yes or No

Yes >> GO TO 2.

No >> Go to [AT-321, "Vehicle Does Not Creep Forward In "D", "2" Or "1" Position"](#) .

2. CHECK SELF-DIAGNOSTIC RESULTS

Ⓜ With CONSULT-II

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

- PNP switch
- Overdrive control switch
- A/T fluid temperature sensor
- Vehicle speed sensor-A/T (revolution sensor)
- Shift solenoid valve A or B
- Vehicle speed sensor-MTR

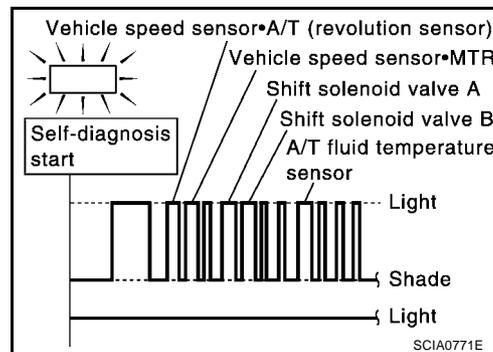
Yes or No

Yes >> ● Check damaged circuit. Refer to the following items.

Except for Euro-OBD

- [AT-353, "VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#)
- [AT-367, "SHIFT SOLENOID VALVE A"](#)
- [AT-372, "SHIFT SOLENOID VALVE B"](#)
- [AT-386, "BATT/FLUID TEMP SEN \(A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE\)"](#)
- [AT-358, "DTC VEHICLE SPEED SENSOR MTR"](#)
- [AT-344, "TCM Self-diagnosis Does Not Activate"](#)

No >> GO TO 3.



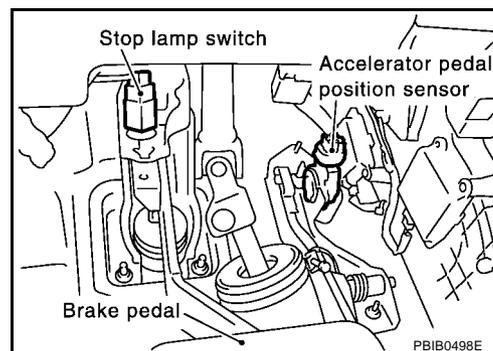
3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to [AT-362, "ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#) —Except for Euro-OBD

OK or NG

OK >> GO TO 4

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

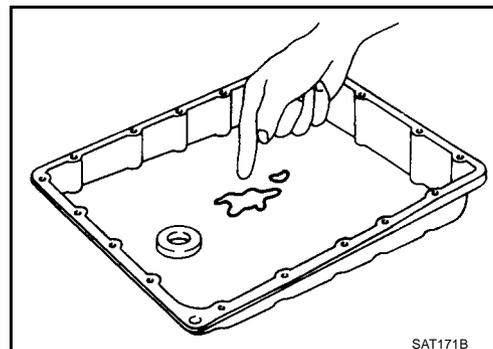


4. CHECK A/T FLUID CONDITION

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

OK or NG

- OK >> GO TO 5
 NG >> GO TO 7

**5. DETECT MALFUNCTIONING ITEM**

1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .
2. Check the following items:
 - Shift valve A
 - Overrun clutch control valve
 - Shift solenoid valve A
 - Pilot valve
 - Pilot filter

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .
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

OK or NG

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

A/T Does Not Perform Lock-up**SYMPTOM:**

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

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to A/T fluid temperature sensor, vehicle speed sensor-A/T (revolution sensor), engine speed signal or torque converter clutch solenoid valve circuit after cruise test?

Yes or No

Yes >> Check damaged circuit. Refer to [AT-381, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#) , [AT-386, "BATT/FLUID TEMP SEN \(A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE\)"](#) , [AT-353, "VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) , [AT-392, "ENGINE SPEED SIGNAL"](#) .— Except for Euro-OBD

No >> GO TO 2.

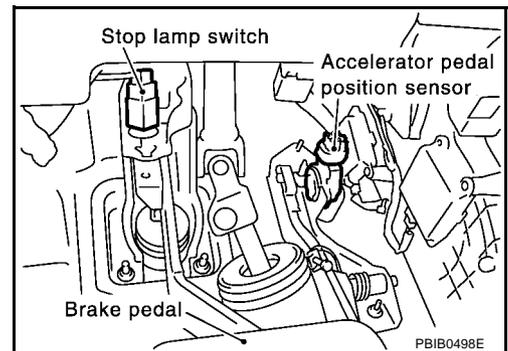
2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to [AT-362, "ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#) (Except for Euro-OBD).

OK or NG

OK >> GO TO 3.

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

**3. DETECT MALFUNCTIONING ITEM**

1. Remove control valve. Refer to [AT-413, "Installation"](#) .

2. Check the following items:

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

3. Disassemble A/T.

4. Check torque converter.

OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**

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

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

A/T Does Not Hold Lock-up Condition

SYMPTOM:

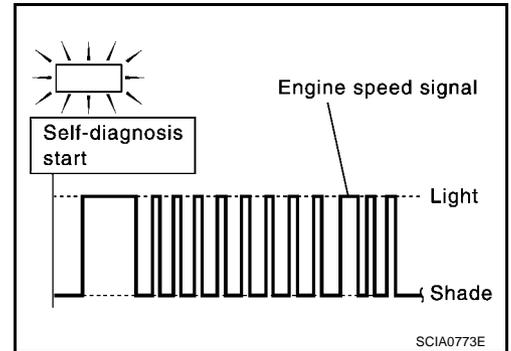
A/T does not hold lock-up condition for more than 30 seconds.

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-392](#).
"ENGINE SPEED SIGNAL" (Except for Euro-OBD).
 No >> GO TO 2.

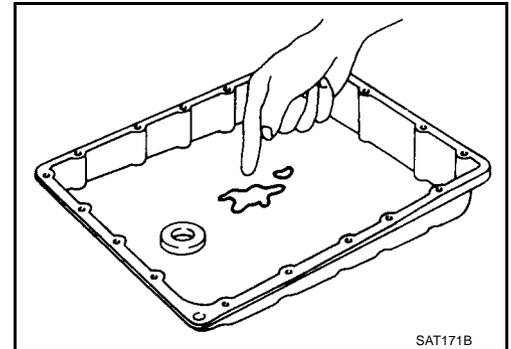


2. CHECK A/T FLUID CONDITION

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-413](#), "Installation" .
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-413, "Installation"](#) .
2. Check the following items:
 - Torque converter clutch control valve
 - Pilot valve
 - Pilot filter
3. Disassemble A/T.
4. Check torque converter.

OK or NG

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

Lock-up Is Not Released**SYMPTOM:**

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

1. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR CIRCUIT**① With CONSULT-II**

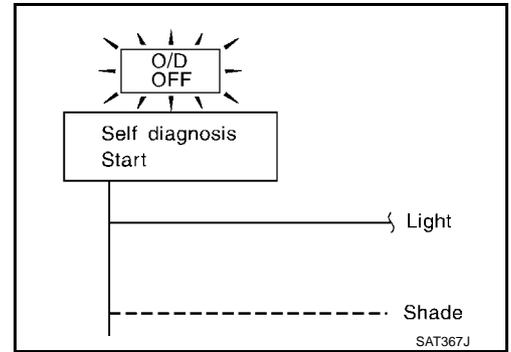
Does "TCM INPUT SIGNALS" in "DATA MONITOR" show damage accelerator pedal position (APP) sensor circuit?

⊗ Without CONSULT-II

Does self-diagnosis show damage to accelerator pedal position (APP) sensor circuit?

Yes or No

- Yes >> Check accelerator pedal position (APP) sensor circuit.
Refer to [AT-344, "TCM Self-diagnosis Does Not Activate"](#).
- 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.

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

ECS004VG

SYMPTOM:

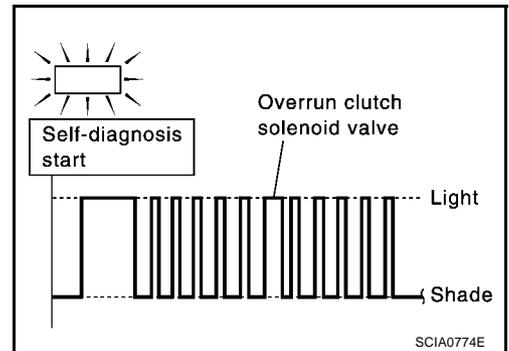
- Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 .
- Vehicle does not decelerate by engine brake when turning overdrive control switch OFF.
- Vehicle does not decelerate by engine brake when shifting A/T from “D” to “2” position.

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-377, "OVERRUN CLUTCH SOLENOID VALVE"](#) (Except for Euro-OBD).
- No >> GO TO 2.

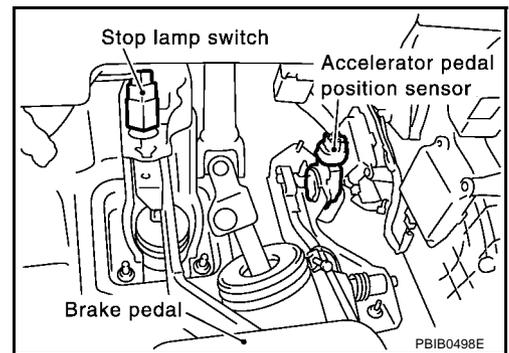


2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to [AT-362, "ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#) —Except for Euro-OBD.

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace accelerator pedal position (APP) sensor.

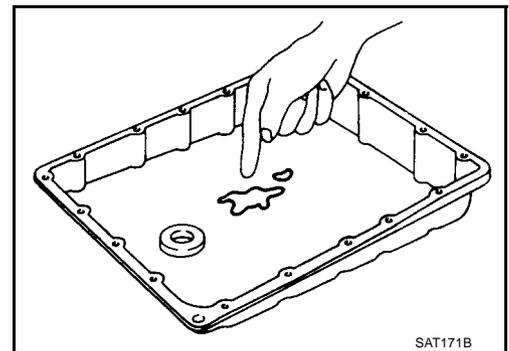


3. CHECK A/T FLUID CONDITION

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

OK or NG

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



4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .
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-413, "Installation"](#) .
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 item:
 - Overrun clutch assembly

OK or NG

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

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

Vehicle Does Not Start From D1**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?

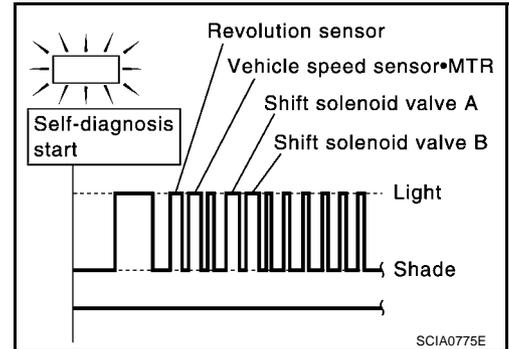
Yes or No

Yes >> ● Check damaged circuit. Refer to the following items.

Except for Euro-OBD

- [AT-353, "VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#)
- [AT-367, "SHIFT SOLENOID VALVE A"](#)
- [AT-372, "SHIFT SOLENOID VALVE B"](#)
- [AT-358, "DTC VEHICLE SPEED SENSOR MTR"](#)

No >> GO TO 2.

**2. CHECK SYMPTOM**

Check again.

OK or NG

OK >> Go to [AT-323, "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.

TROUBLE DIAGNOSES FOR SYMPTOMS

[EXC.F/EURO-OBDD]

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

ECS004VI

A

SYMPTOM:

A/T does not shift from D4 to D3 when changing overdrive control switch to “OFF” position.

1. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

B

① With CONSULT-II

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

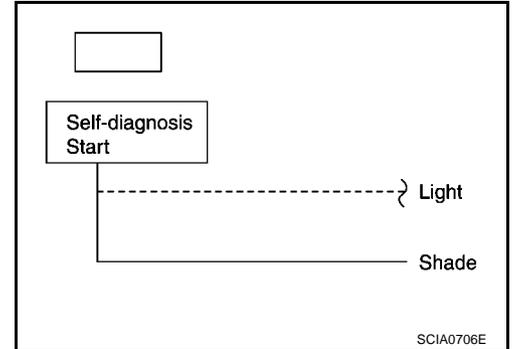
⊗ Without CONSULT-II

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

Yes or No

- Yes >> Check overdrive control switch circuit. Refer to [AT-345](#),
"DIAGNOSTIC PROCEDURE".
- No >> Go to [AT-328](#), "A/T Does Not Shift: D2 → D3".

AT



D

E

F

G

H

I

J

K

L

M

TROUBLE DIAGNOSES FOR SYMPTOMS

[EXC.F/EURO-OBD]

A/T Does Not Shift: D3 → 22 , When Selector Lever “D” → “2” Position

ECS004VJ

SYMPTOM:

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

1. CHECK PNP SWITCH CIRCUIT

④ With CONSULT-II

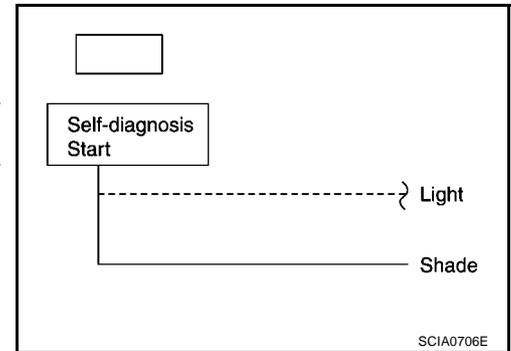
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

⊗ Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

- Yes >> Check PNP switch circuit. Refer to [AT-344, "TCM Self-diagnosis Does Not Activate"](#) .
- No >> Go to [AT-326, "A/T Does Not Shift: D1 → D2 Or Does Not Kick down: D4 → D2"](#) .



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

ECS004VK

SYMPTOM:

A/T does not shift from 22 to 11 when changing selector lever from “2” to “1” position.

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

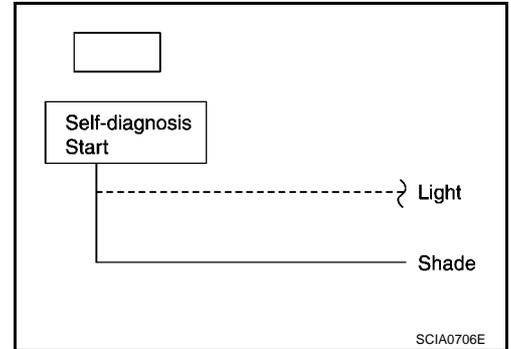
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to PNP switch circuit?

② Without CONSULT-II

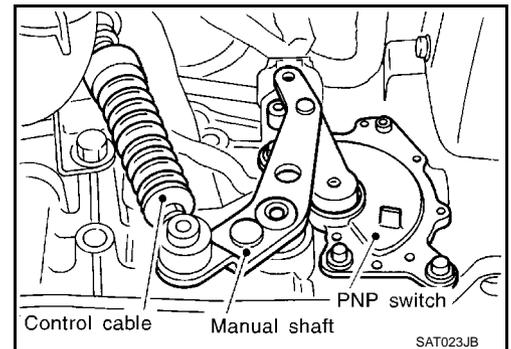
Does self-diagnosis show damage to PNP switch circuit?

Yes or NoYes >> Check PNP switch circuit. Refer to [AT-344, "TCM Self-diagnosis Does Not Activate"](#) .

No >> GO TO 2

**2. CHECK CONTROL CABLE**Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .**OK or NG**

OK >> GO TO 3.

NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .**3. CHECK VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR-MTR CIRCUIT**Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-353, "VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and [AT-358, "DTC VEHICLE SPEED SENSOR MTR"](#) (Except for Euro-OBD).**OK or NG**

OK >> GO TO 4.

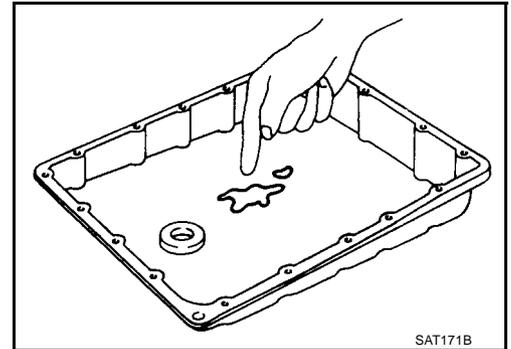
NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

4. CHECK A/T FLUID CONDITION

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

OK or NG

- OK >> GO TO 6.
 NG >> GO TO 5.



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .
2. Check the following items:
 - Shift valve A
 - Overrun clutch control valve
 - Shift solenoid valve A
3. Disassemble A/T.
4. Check the following items:
 - Servo piston assembly
 - Brake band

OK or NG

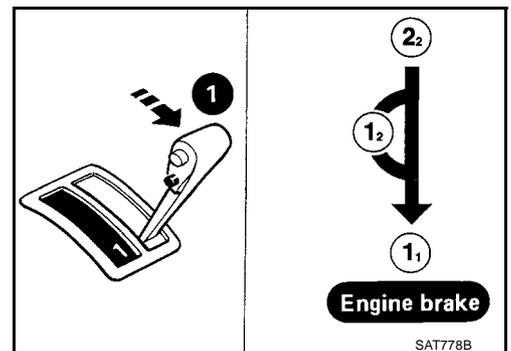
- OK >> GO TO 6.
 NG >> Repair or replace damaged parts.

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.



Vehicle Does Not Decelerate By Engine Brake**SYMPTOM:**

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

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

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

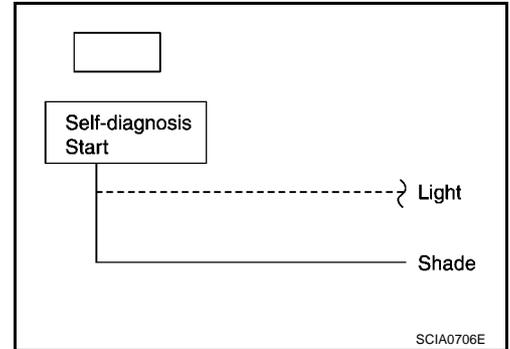
⊗ Without CONSULT-II

Does self-diagnosis show damage to PNP switch circuit?

Yes or No

Yes >> Check PNP switch circuit. Refer to [AT-344, "TCM Self-diagnosis Does Not Activate"](#) .

No >> GO TO 2

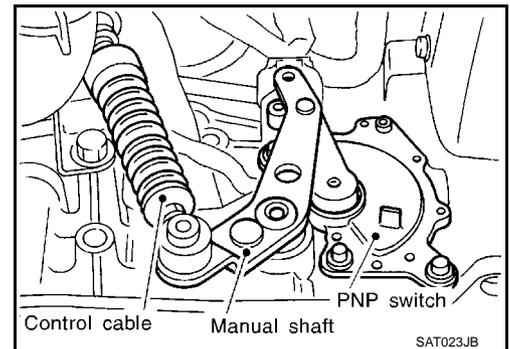
**2. CHECK CONTROL CABLE**

Check control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

OK or NG

OK >> GO TO 3.

NG >> Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .

**3. CHECK VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR) AND CHECK VEHICLE SPEED SENSOR-MTR CIRCUIT**

Check vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuit. Refer to [AT-353, "VEHICLE SPEED SENSOR-A/T \(REVOLUTION SENSOR\)"](#) and [AT-358, "DTC VEHICLE SPEED SENSOR MTR"](#) (Except for Euro-OBD).

OK or NG

OK >> GO TO 4.

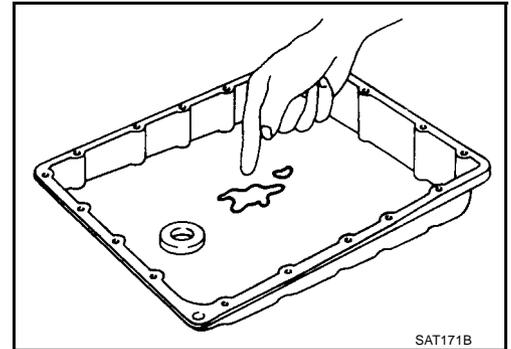
NG >> Repair or replace vehicle speed sensor-A/T (revolution sensor) and vehicle speed sensor-MTR circuits.

4. CHECK A/T FLUID CONDITION

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

OK or NG

- OK >> GO TO 6.
- NG >> GO TO 5.



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .
2. Check the following items:
 - Shift valve A
 - Overrun clutch control valve
 - Shift solenoid valve A
3. Disassemble A/T.
4. Check the following items:
 - Overrun clutch assembly
 - Low & reverse brake assembly

OK or NG

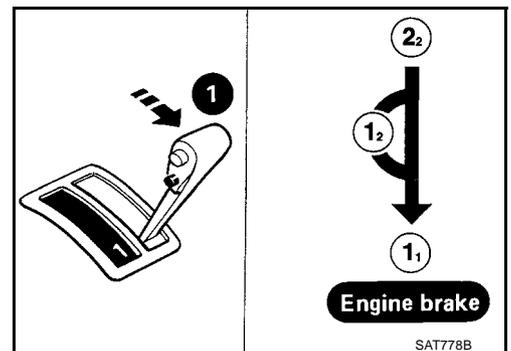
- OK >> GO TO 6.
- NG >> Repair or replace damaged parts.

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.



TCM Self-diagnosis Does Not Activate

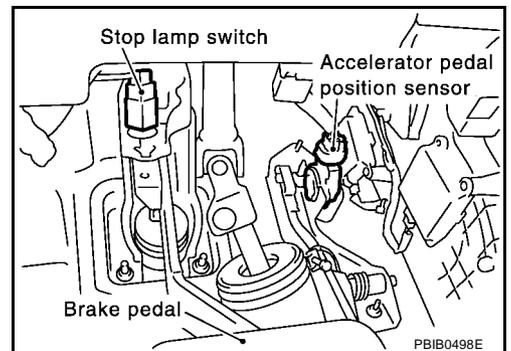
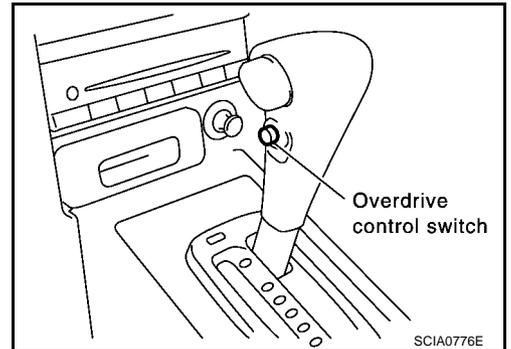
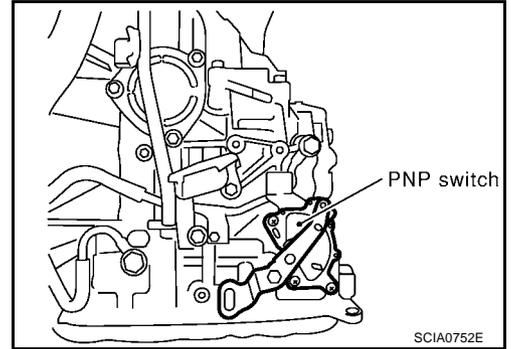
SYMPTOM:

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

ECS004VM

DESCRIPTION

- **PNP switch**
The PNP switch assembly includes a transmission position switch. The transmission position switch detects the selector lever position and sends a signal to the TCM.
- **Overdrive control switch**
Detects the overdrive control switch position (ON or OFF) and sends a signal to the TCM.
- **Closed throttle position signal and wide-open throttle position signal**
ECM judges throttle opening based on a signal from accelerator pedal position sensor, and sends the signal via CAN communication to TCM.



DIAGNOSTIC PROCEDURE

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

① With CONSULT-II

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

OK or NG

OK >> GO TO 3.

NG >> Check the following items:

- PNP switch (Refer to [AT-349, "COMPONENT INSPECTION"](#).)
- Harness for short or open between ignition switch and PNP switch
- Harness for short or open between PNP switch and TCM
- Diode (P, N positions)

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

SAT701J

2. CHECK PNP SWITCH CIRCUIT (WITHOUT CONSULT-II)

⊗ Without CONSULT-II

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Check voltage between TCM terminals 26, 27, 34, 35, 36 and ground while moving selector lever through each position.

Voltage:

B: Battery voltage

0: 0V

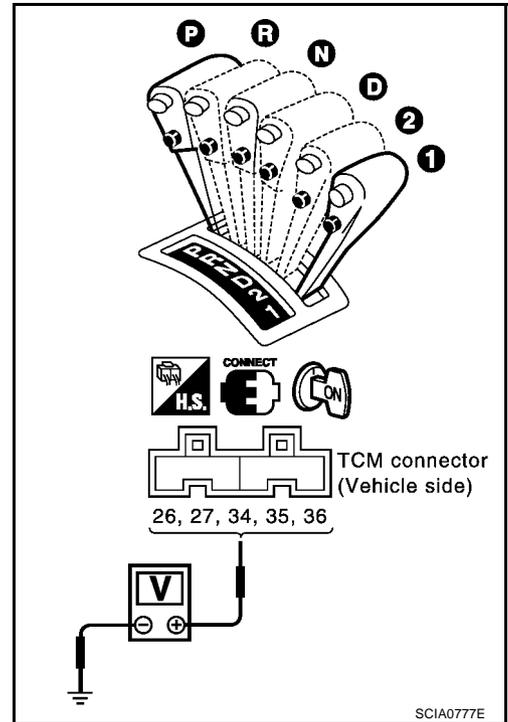
Lever position	Terminal No.				
	36	35	34	27	26
P, N	B	0	0	0	0
R	0	B	0	0	0
D	0	0	B	0	0
2	0	0	0	B	0
1	0	0	0	0	B

OK or NG

OK >> GO TO 4.

NG >> Check the following items:

- PNP switch (Refer to [AT-349, "COMPONENT INSPECTION"](#) .)
- Harness for short or open between ignition switch and PNP switch
- Harness for short or open between PNP switch and TCM
- Diode (P, N positions)



3. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT (WITH CONSULT-II)

⊕ With CONSULT-II

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "OVERDRIVE SWITCH".
Check the signal of the overdrive control switch is indicated properly. (Overdrive control switch "ON" displayed on CONSULT-II means overdrive "OFF".)

OK or NG

OK >> GO TO 5.

NG >> Check the following items:

- Overdrive control switch (Refer to [AT-349, "COMPONENT INSPECTION"](#) .)
- Harness for short or open between TCM and overdrive control switch
- Harness of ground circuit for overdrive control switch for short or open

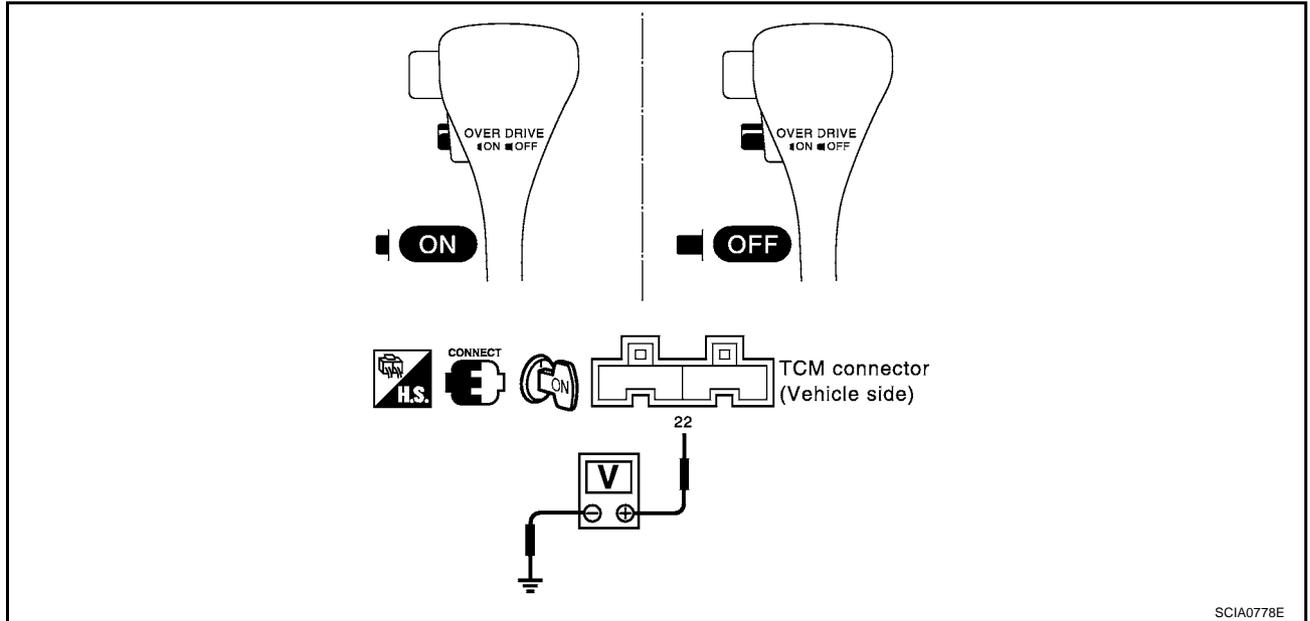
DATA MONITOR	
MONITORING	
ENGINE SPEED	XXX rpm
TURBINE REV	XXX rpm
OVERDRIVE SW	ON
PN POSI SW	OFF
R POSITION SW	OFF

SAT645J

4. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT (WITHOUT CONSULT-II)

⊗ Without CONSULT-II

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



Voltage:

Switch position "ON": Battery voltage

Switch position "OFF": 1V or less

OK or NG

OK >> GO TO 6.

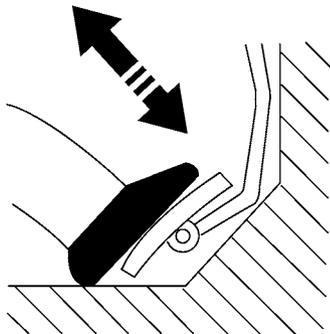
NG >> Check the following items:

- Overdrive control switch (Refer to "Component Inspection", [AT-349, "COMPONENT INSPECTION"](#) .)
- Harness for short or open between TCM and overdrive control switch
- Harness of ground circuit for overdrive control switch for short or open

5. CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL 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-SW" depressing and releasing accelerator pedal.
Check the signal of throttle position signal 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-SW
Released	ON	OFF
Fully depressed	OFF	ON

OK or NG

OK >> GO TO 7.

NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Accelerator pedal position sensor — Refer to [AT-362, "ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#).
- Harness for short or open between accelerator pedal position sensor and ECM

6. CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

Check the following items:

- Accelerator pedal position sensor — Refer to [AT-362, "ACCELERATOR PEDAL POSITION \(APP\) SENSOR"](#).
- Harness for short or open between accelerator pedal position sensor and ECM

OK or NG

OK >> GO TO 7.

NG >> Repair or replace damaged parts.

7. CHECK DTC

Perform "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)". Refer to [AT-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#).

OK or NG

OK >> **INSPECTION END**

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

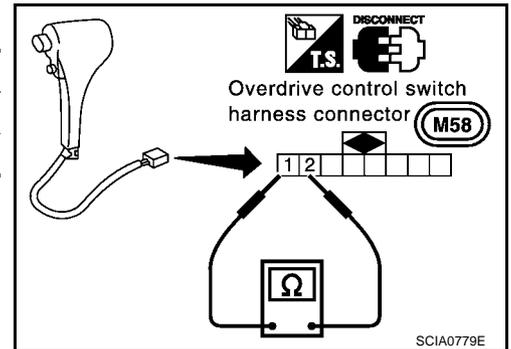
- If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

COMPONENT INSPECTION

Overdrive Control Switch

- Check continuity between two terminals 7 and 8.

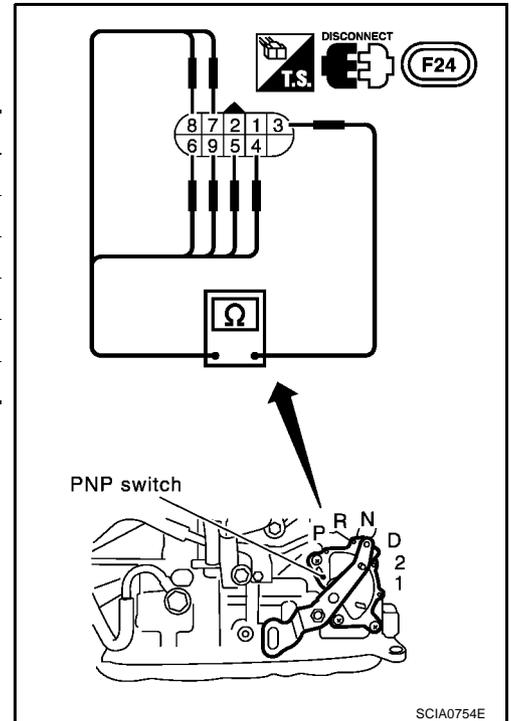
Switch position	Continuity
ON	No
OFF	Yes



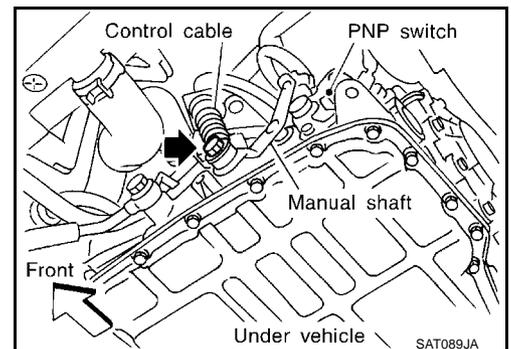
PNP Switch

1. Check continuity between terminals 1 and 2, and between terminals 3 and 4, 5, 6, 7, 8, 9 while moving manual shaft through each position.

Lever position	Terminal No.	
	P	3 — 7
R	3 — 8	
N	3 — 9	1 — 2
D	3 — 6	
2	3 — 5	
1	3 — 4	



2. If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step 1.
3. If OK on step 2, adjust manual control cable. Refer to [AT-416. "Control Cable Adjustment"](#) .
4. If NG on step 2, remove PNP switch from A/T and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to [AT-416. "Control Cable Adjustment"](#) .
6. If NG on step 4, replace PNP switch.



MAIN POWER SUPPLY AND GROUND CIRCUIT

[ALL]

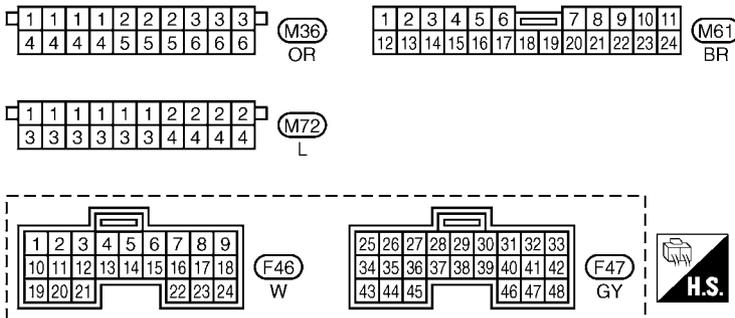
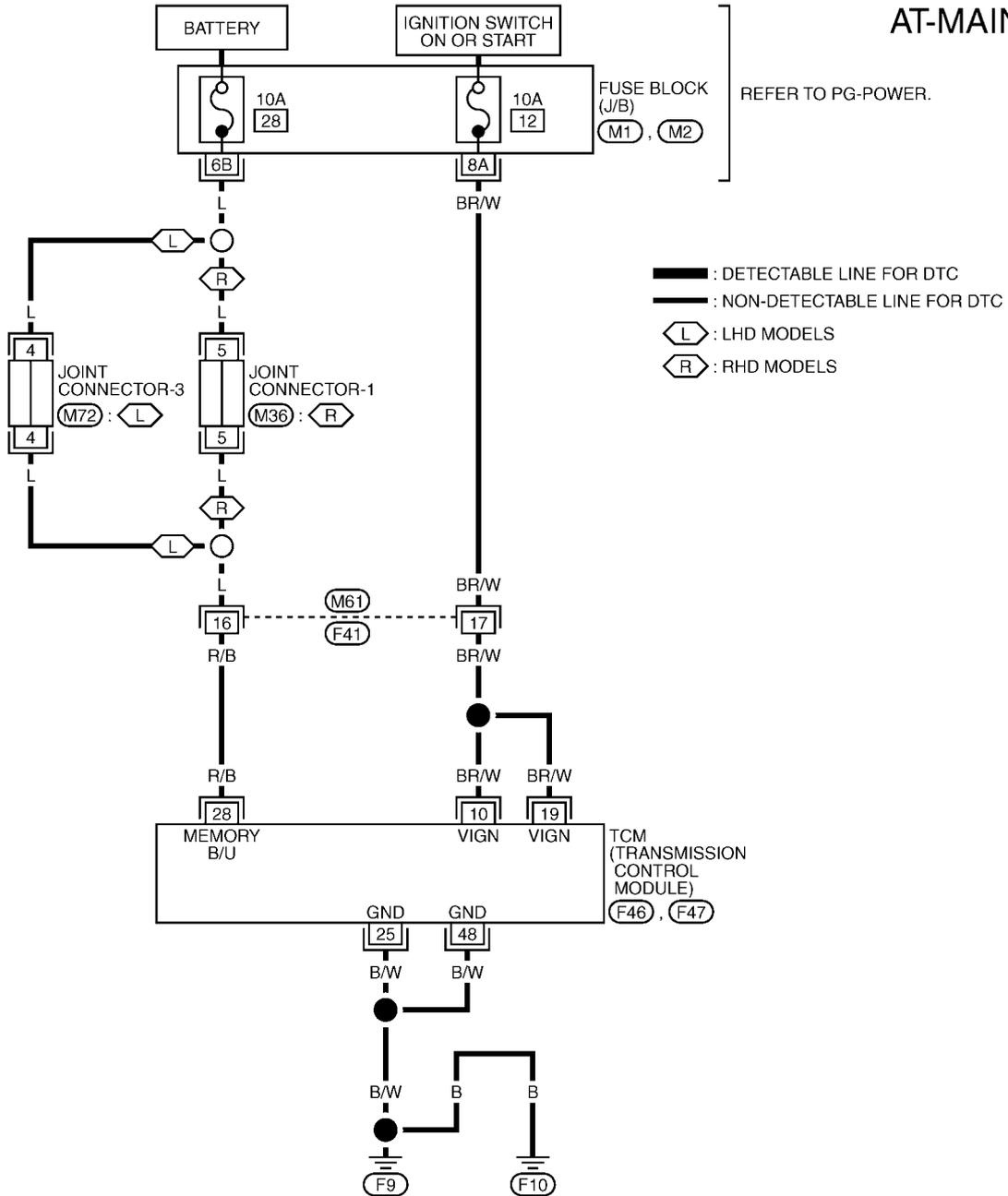
MAIN POWER SUPPLY AND GROUND CIRCUIT

PFP:00100

Wiring Diagram — AT — MAIN

ECS004TH

AT-MAIN-01



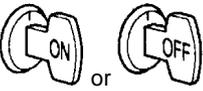
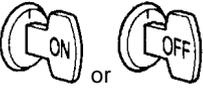
REFER TO THE FOLLOWING.
 (M1), (M2) - FUSE BLOCK-
 JUNCTION BOX (J/B)

MAIN POWER SUPPLY AND GROUND CIRCUIT

[ALL]

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

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

Diagnostic Procedure

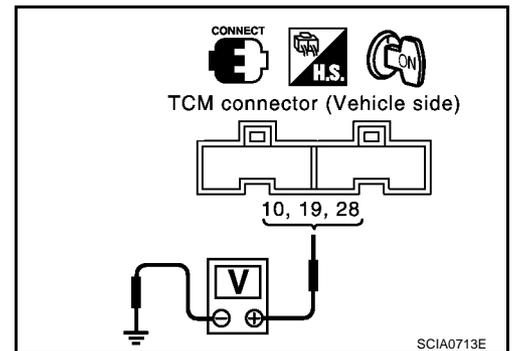
ECS0047I

1. CHECK TCM POWER SOURCE STEP 1

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

OK or NG

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

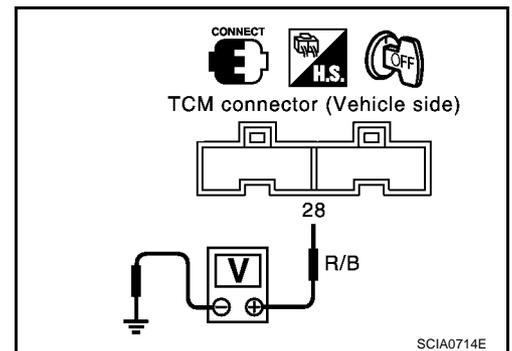


2. CHECK TCM POWER SOURCE STEP 2

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

OK or NG

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



3. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and TCM terminals 10, 19 and 28
- Fuse
- Ignition switch
Refer to "[PG-2, "POWER SUPPLY ROUTING"](#) , "POWER SUPPLY ROUTING".

OK or NG

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

4. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between TCM terminals 25, 48 and ground. Refer to wiring diagram — AT — MAIN.

Continuity should exist.

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

OK or NG

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

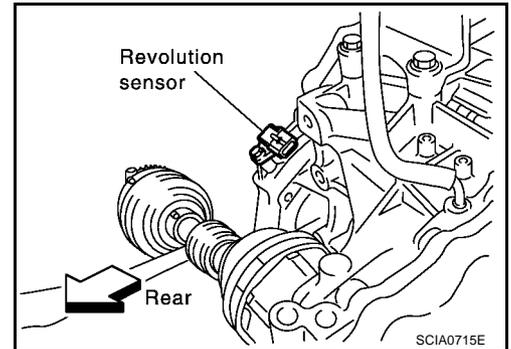
VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

PFP:32702

Description

ECS004TJ

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



TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

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

ON BOARD DIAGNOSIS LOGIC

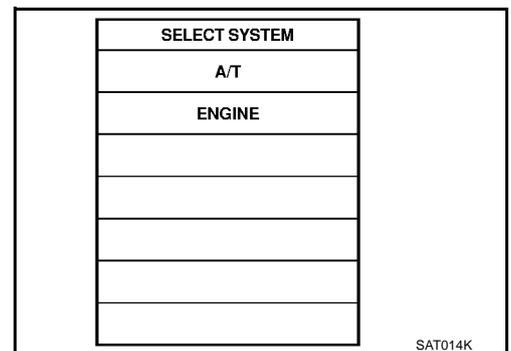
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
(P) : VHCL SPEED SEN-AT (X) : 1st judgement flicker	TCM does not receive the proper voltage signal from the sensor.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Revolution sensor

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

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

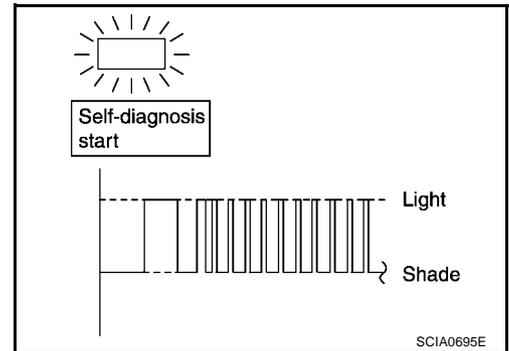
(P) With CONSULT-II

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



⊗ **Without CONSULT-II**

1. Start engine.
2. Drive vehicle under the following conditions:
Selector lever in "D" position, vehicle speed higher than 30 km/h (19 MPH), throttle opening greater than 1/8 of the full throttle position and driving for more than 5 seconds.
3. Perform self-diagnosis.
Refer to [AT-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#).



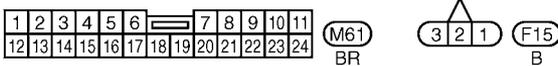
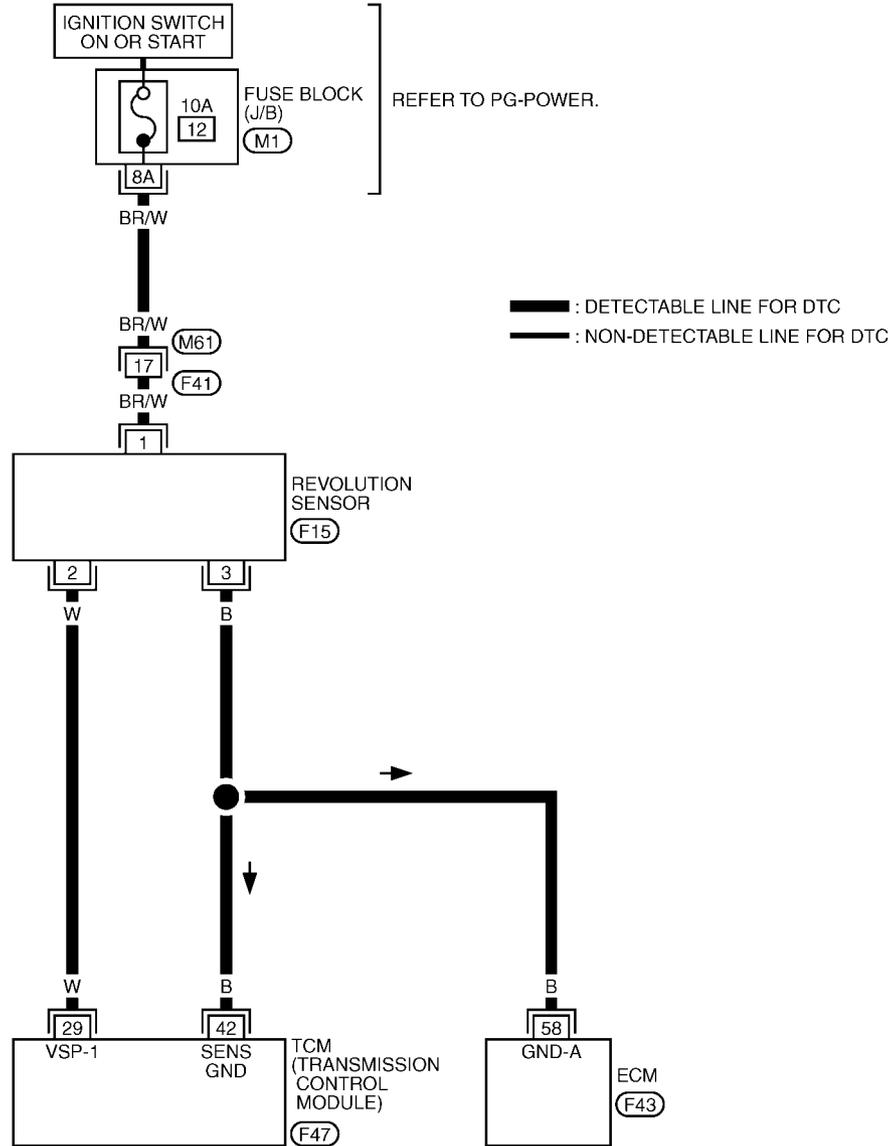
VEHICLE SPEED SENSOR-A/T (REVOLUTION SENSOR)

[ALL]

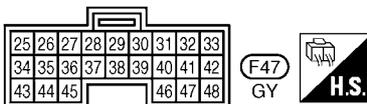
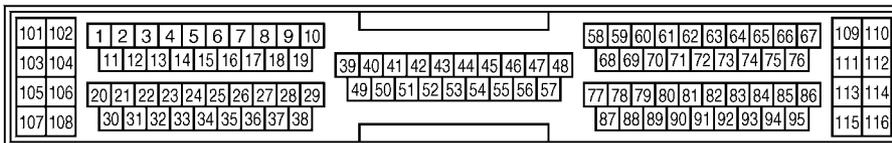
Wiring Diagram — AT — VSSA/T

ECS004TK

AT-VSSAT-01



REFER TO THE FOLLOWING.
 (M1) - FUSE BLOCK-JUNCTION BOX (J/B)



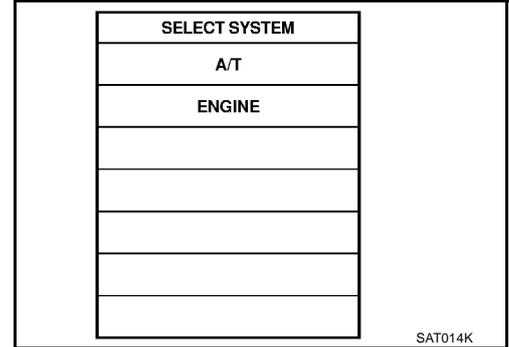
Diagnostic Procedure

ECS004TL

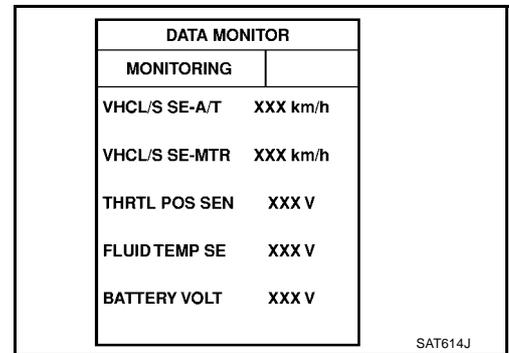
1. CHECK INPUT SIGNAL (WITH CONSULT-II)

④ **With CONSULT-II**

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



Check the value changes according to driving speed.



OK or NG

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

2. CHECK REVOLUTION SENSOR (WITH CONSULT-II)

④ **With CONSULT-II**

1. Start engine.

Condition	Judgement standard (Approx.)
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. *1 CAUTION: Connect the diagnosis data link cable to the vehicle diagnosis connector. *1: A circuit tester cannot be used to test this item.	150 Hz
When vehicle parks.	Under 1.3V or over 4.5V

MTBL0575

- Harness for short or open between TCM, ECM and revolution sensor
- Harness for short or open between ignition switch and revolution sensor

OK or NG

- OK >> GO TO 3.
- NG >> Repair or replace damaged parts.

3. CHECK DTC

Perform Self-diagnosis Code confirmation procedure, [AT-353, "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE"](#) .

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 4.

4. CHECK TCM INSPECTION

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

OK or NG

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

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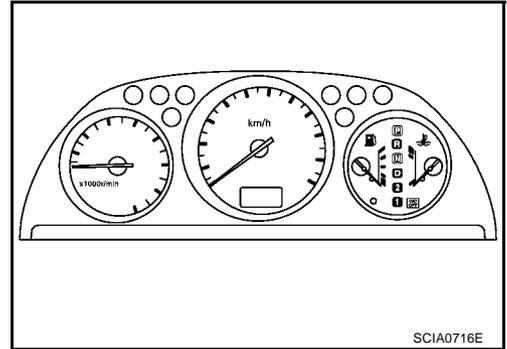
DTC VEHICLE SPEED SENSOR MTR

PFP:24814

Description

ECS004TM

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	L/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 0V and more than 4.5V

ON BOARD DIAGNOSIS LOGIC

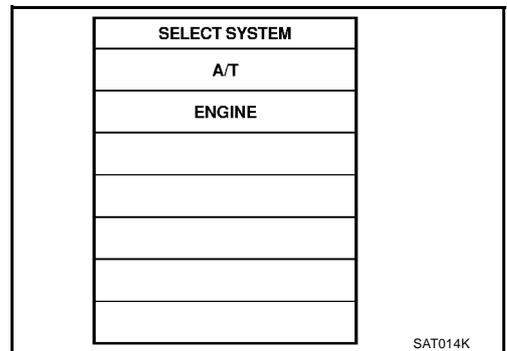
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
(P) : VHCL SPEED SEN-MTR (X) : 2nd judgement flicker	TCM does not receive the proper voltage signal from the sensor.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Combination meter ● 4WD/ABS control unit

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

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

(P) With CONSULT-II

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

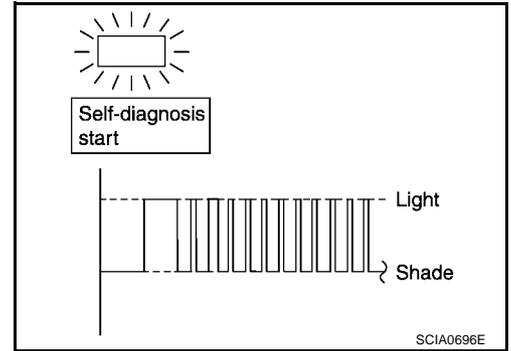


DTC VEHICLE SPEED SENSOR MTR

[ALL]

⊗ Without CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions:
Selector lever in "D" position and vehicle speed higher than 20 km/h (12 MPH).
3. Perform self-diagnosis.
Refer to [AT-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#).



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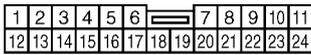
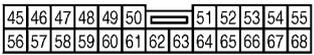
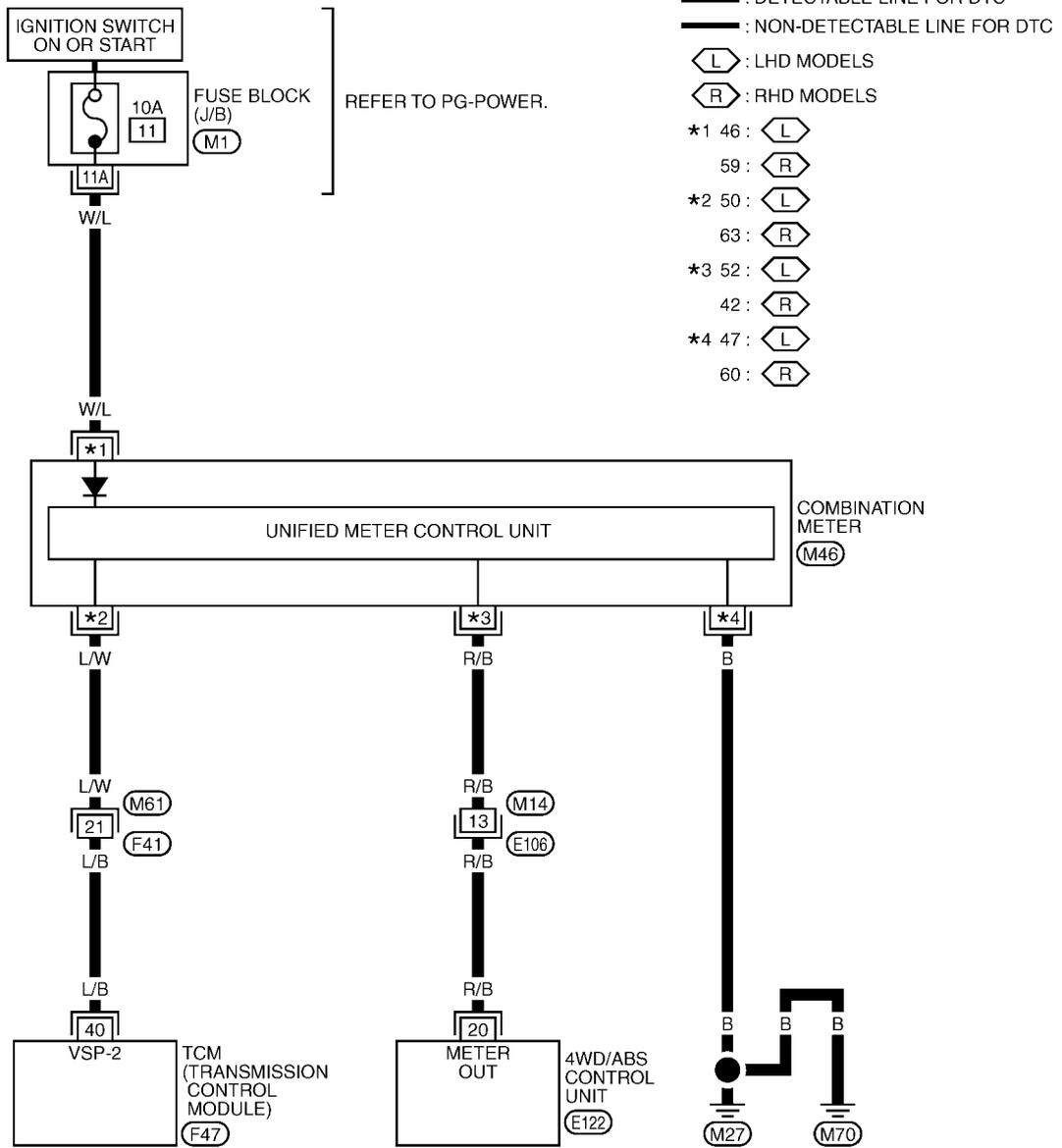
DTC VEHICLE SPEED SENSOR MTR

[ALL]

Wiring Diagram — AT — VSSMTR

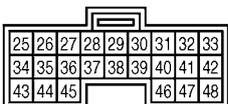
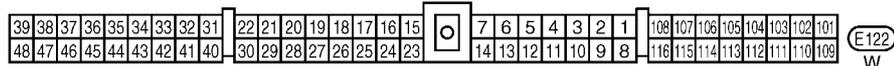
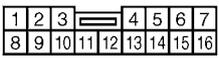
ECS004TN

AT-VSSMTR-01



REFER TO THE FOLLOWING.

M1 - FUSE BLOCK-JUNCTION BOX (J/B)



Diagnostic Procedure

EC500470

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.

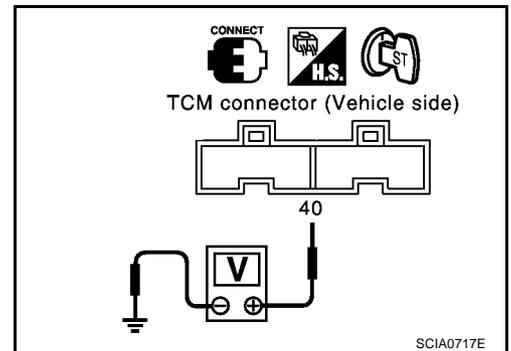
Without CONSULT-II

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

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

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



OK or NG

- OK >> GO TO 2
- NG >> Check the following items. If any items are damaged, repair or replace damaged parts.
- Combination meter
Refer to [DI-4, "COMBINATION METERS \(LHD MODELS\)"](#) or [DI-24, "COMBINATION METERS \(RHD MODELS\)"](#) .
 - Harness for short or open between TCM and combination meter
 - 4WD/ABS control unit
Refer to [BRC-24, "SELF-DIAGNOSIS"](#) .
 - Harness for short or open between 4WD/ABS control unit and combination meter

2. CHECK DTC

Perform Self-diagnosis Code confirmation procedure, [AT-358, "SELF-DIAGNOSIS CODE 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.

ACCELERATOR PEDAL POSITION (APP) SENSOR

[ALL]

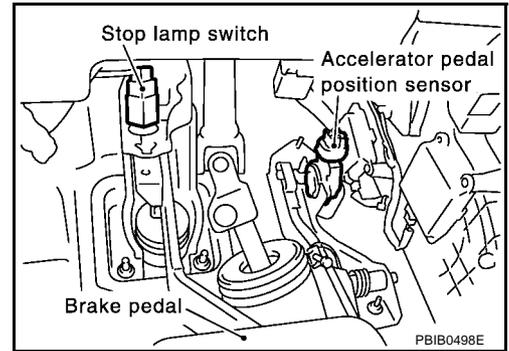
ACCELERATOR PEDAL POSITION (APP) SENSOR

PFP:22620

Description

ECS004TP

- Accelerator pedal position (APP) sensor
Electric throttle control actuator consists of throttle control motor, acceleration pedal position sensor, throttle position sensor, etc. The actuator sends a signal to the TCM.



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Accelerator pedal position (APP) sensor (THRTL POS SEN)	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.)	
32	R	Throttle position sensor (Power source)	 or 	When turning ignition switch "ON".	4.5 - 5.5V
				When turning ignition switch "OFF".	0V
41	W/R	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Ground (Throttle position sensor)	—	—	—

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
 : THROTTLE POSI SEN*	TCM receives an excessively low or high voltage from the sensor.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Accelerator pedal position (APP) sensor
 : 3rd judgement flicker		

*:This code means Accelerator pedal position (APP) sensor in reality.

ACCELERATOR PEDAL POSITION (APP) SENSOR

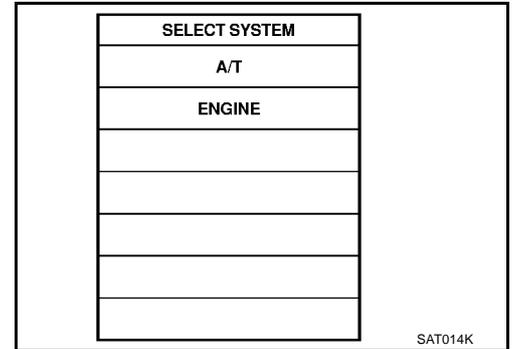
[ALL]

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

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

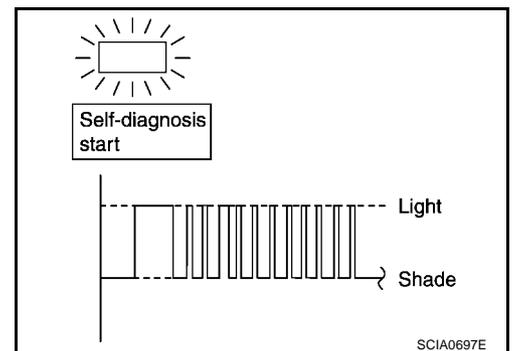
④ With CONSULT-II

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



⊗ Without CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions:
Selector lever in "D" position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/2 of the full throttle position and driving for more than 3 seconds.
3. Perform self-diagnosis.
Refer to [AT-253. "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#).



ACCELERATOR PEDAL POSITION (APP) SENSOR

[ALL]

Diagnostic Procedure

EC5004TR

1. CHECK DTC WITH ECM

- Check P code with CONSULT-II "ENGINE".

Turn ignition switch ON and select "SELF DIAGNOSTIC RESULTS" mode for "ENGINE" with CONSULT-II. Refer to [EC-457, "Malfunction Indicator \(MI\)"](#) (QR25DE) or [EC-1144, "Malfunction Indicator \(MI\)"](#) (QR20DE).

OK or NG

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

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

NG >> Check throttle position sensor circuit for engine control.

2. CHECK INPUT SIGNAL (WITH CONSULT-II)

Ⓜ With CONSULT-II

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

SELECT SYSTEM	
A/T	
ENGINE	

SAT014K

3. Read out the value of "THRTL POS SEN".

Voltage:

Fully-closed throttle :Approximately 0.5V

Fully-open throttle :Approximately 4V

OK or NG

OK >> GO TO 4.

NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor circuit.

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

SAT614J

3. CHECK INPUT SIGNAL (WITHOUT CONSULT-II)

⊗ **Without CONSULT-II**

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

Voltage:

Fully-closed throttle valve :Approximately 0.5V

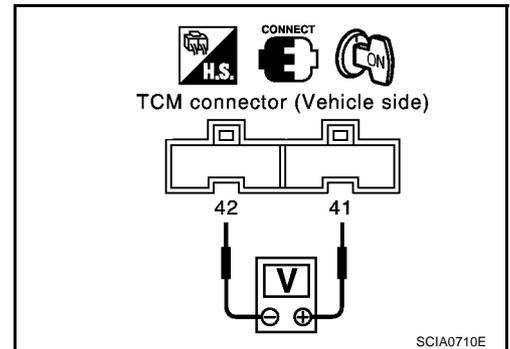
Fully-open throttle valve :Approximately 4V

(Voltage rises gradually in response to throttle position.)

OK or NG

OK >> GO TO 4.

NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor circuit.



4. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to [AT-363, "SELF-DIAGNOSIS CODE 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.

SHIFT SOLENOID VALVE A

[ALL]

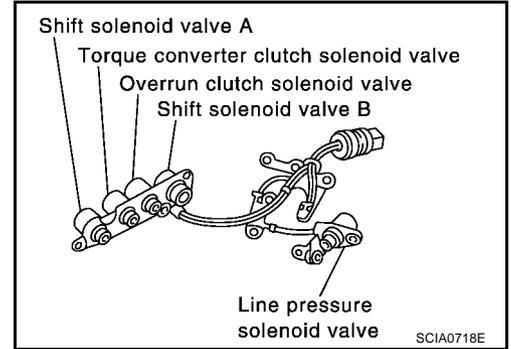
SHIFT SOLENOID VALVE A

PFP:31940

Description

ECS004TS

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

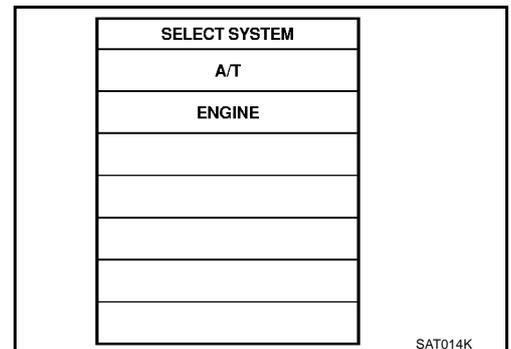
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
P1600 : SHIFT SOLENOID/VA P1601 : 4th judgement flicker	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> Harness or connectors (The solenoid circuit is open or shorted.) Shift solenoid valve A

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

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

With CONSULT-II

- Start engine.
- Select "SELF-DIAG RESULTS" mode for A/T with CONSULT-II.
- Drive vehicle in D1 → D2 position.

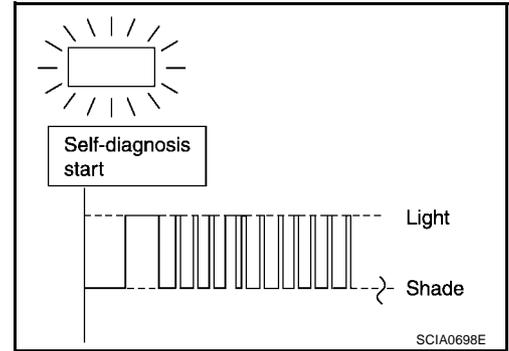


SHIFT SOLENOID VALVE A

[ALL]

⊗ Without CONSULT-II

1. Start engine.
2. Drive vehicle in D1 → D2 position.
3. Perform self-diagnosis.
Refer to [AT-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#) .



SHIFT SOLENOID VALVE A

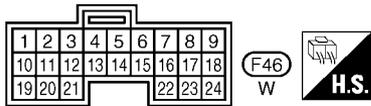
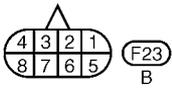
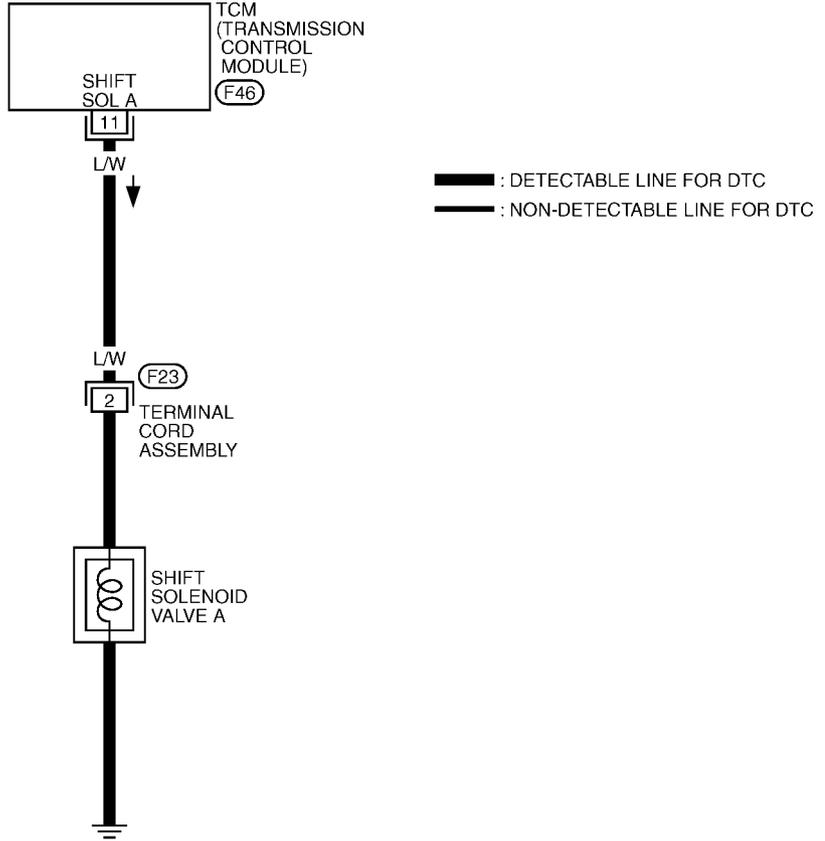
[ALL]

Wiring Diagram — AT — SSV/A

ECS004TT

AT-SSV/A-01

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Diagnostic Procedure

ECS004TU

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 2 and ground.

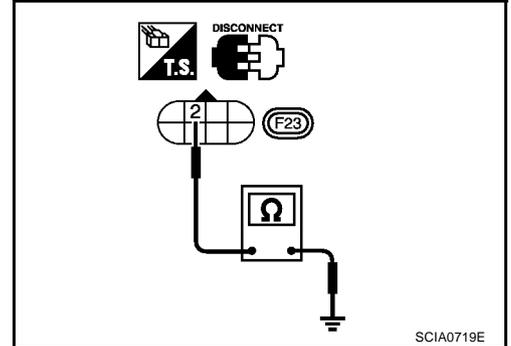
Resistance : 20 - 30Ω

OK or NG

OK >> GO TO 2.

NG >> 1. Remove control valve assembly. Refer to [AT-413, "Installation"](#) .

2. Check the following items:
 Shift solenoid valve A
 Refer to [AT-371, "Component Inspection"](#) .
 Harness of terminal cord assembly for short or open



2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 2 and TCM harness connector terminal 11.

Continuity should exist.

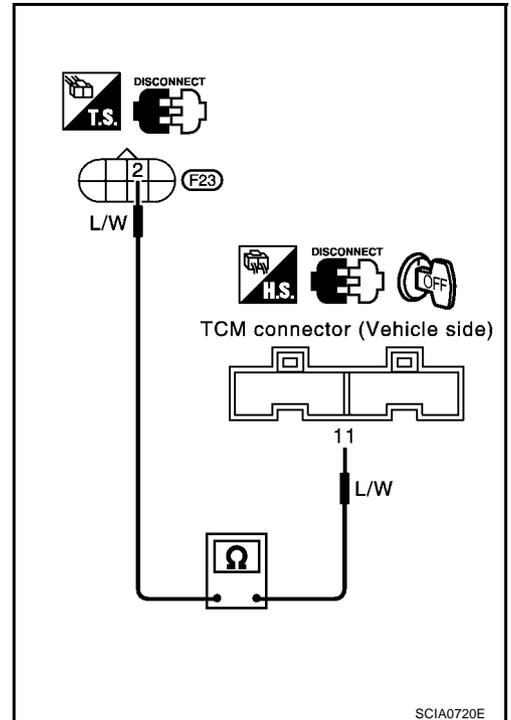
If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to [AT-367, "SELF-DIAGNOSIS CODE 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.

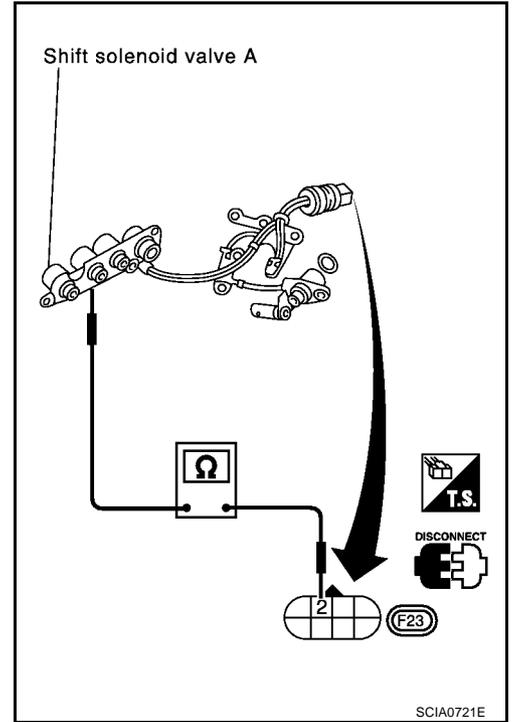
SHIFT SOLENOID VALVE A

[ALL]

ECS004TV

Component Inspection SHIFT SOLENOID VALVE A

- For removal, refer to [AT-414, "Control Valve Assembly and Accumulators"](#).



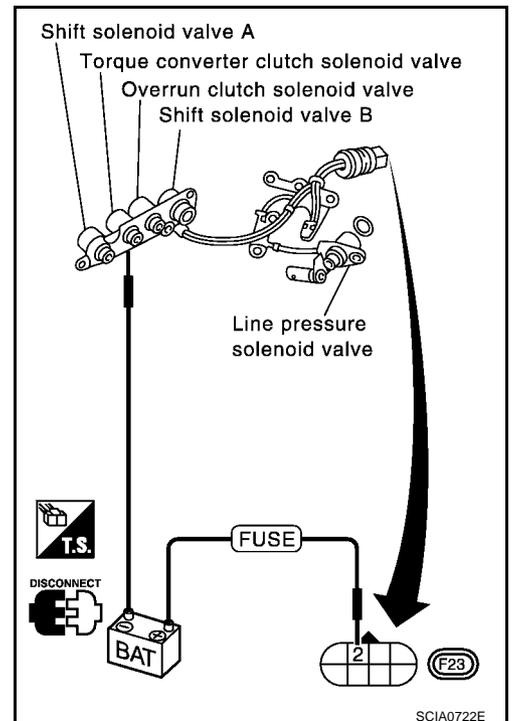
Resistance Check

- Check resistance between two terminals.

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

Operation Check

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



SHIFT SOLENOID VALVE B

[ALL]

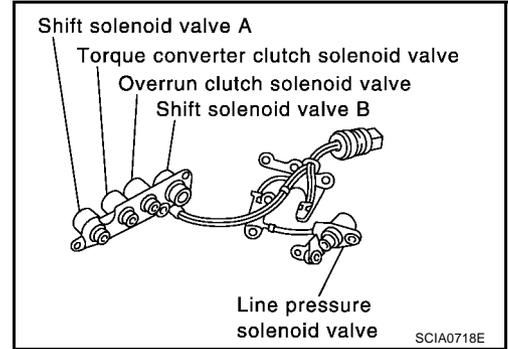
SHIFT SOLENOID VALVE B

PFP:31940

Description

ECS004TW

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".)

ON BOARD DIAGNOSIS LOGIC

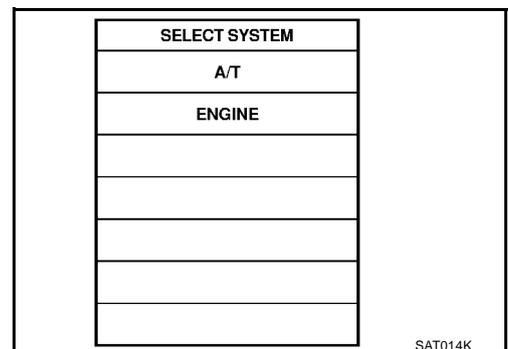
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
P1600 : SHIFT SOLENOID/VB P1601 : 5th judgement flicker	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> Harness or connectors (The solenoid circuit is open or shorted.) Shift solenoid valve B

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

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

With CONSULT-II

- Start engine.
- Select "SELF-DIAG RESULTS" mode for A/T with CONSULT-II.
- Drive vehicle in D1 → D2 → D3 position.



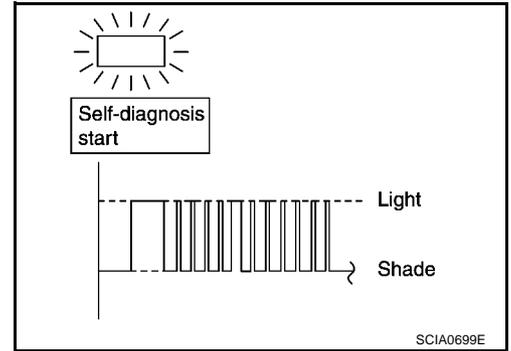
SAT014K

SHIFT SOLENOID VALVE B

[ALL]

⊗ Without CONSULT-II

1. Start engine.
2. Drive vehicle in D1 → D2 → D3 position.
3. Perform self-diagnosis.
Refer to [AT-253](#), "[SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)](#)".



A
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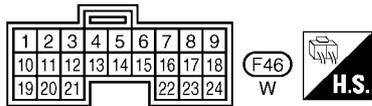
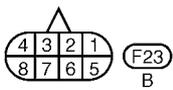
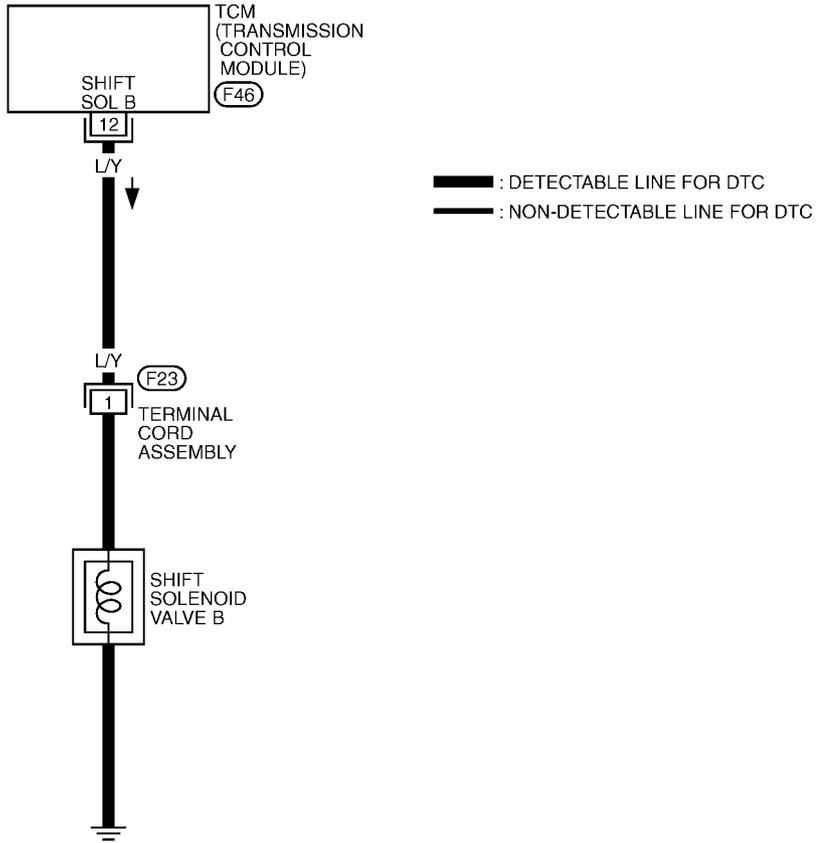
SHIFT SOLENOID VALVE B

[ALL]

Wiring Diagram — AT — SSV/B

EC5004TX

AT-SSV/B-01



TCWA0041E

Diagnostic Procedure

ECS004TY

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 1 and ground.

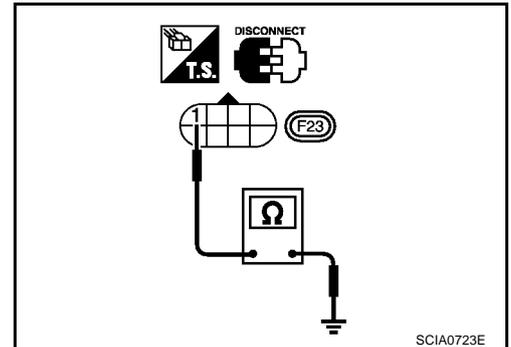
Resistance : 5 - 20Ω

OK or NG

OK >> GO TO 2.

NG >> 1. Remove control valve assembly. Refer to [AT-413, "Installation"](#).

2. Check the following items:
Shift solenoid valve B
Refer to [AT-376, "Component Inspection"](#).
Harness of terminal cord assembly for short or open



2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 12 and TCM harness connector terminal 1.

Continuity should exist.

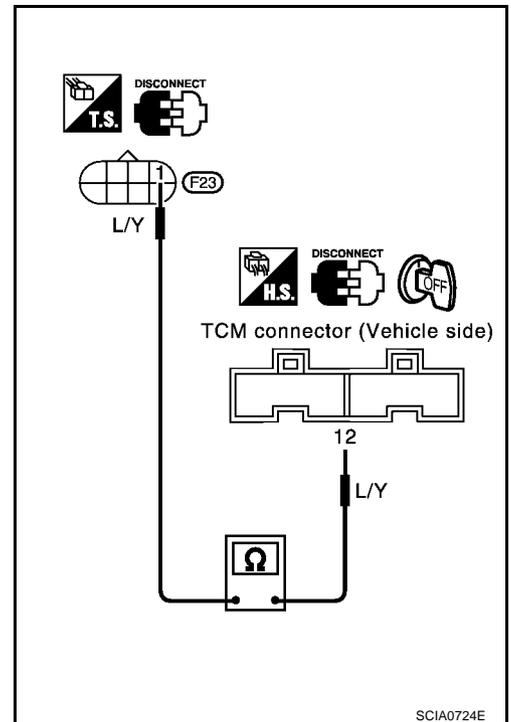
If OK, check harness for short to ground and short to power.

4. Reinstall any part removed.

OK or NG

OK >> GO TO 3.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



3. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to [AT-372, "SELF-DIAGNOSIS CODE 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.

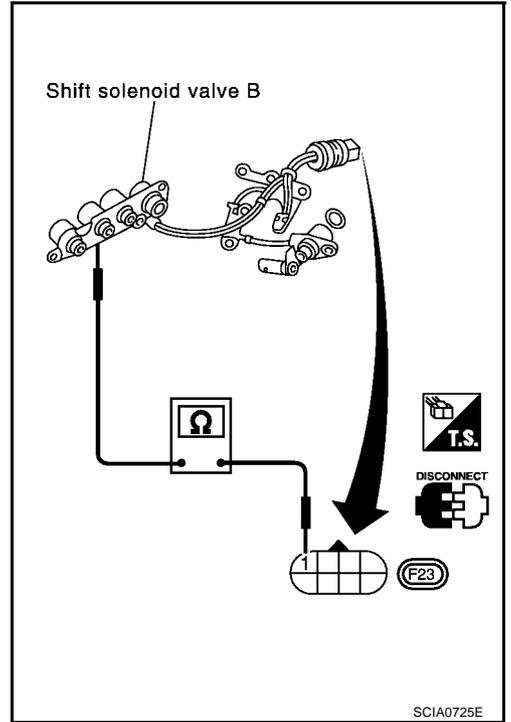
SHIFT SOLENOID VALVE B

[ALL]

ECS004TZ

Component Inspection SHIFT SOLENOID VALVE B

- For removal, refer to [AT-414, "Control Valve Assembly and Accumulators"](#).



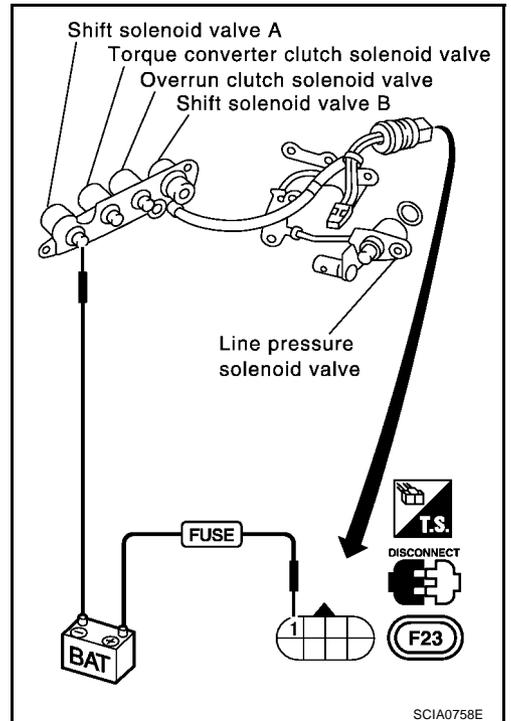
Resistance Check

- Check resistance between two terminals.

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

Operation Check

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



OVERRUN CLUTCH SOLENOID VALVE

[ALL]

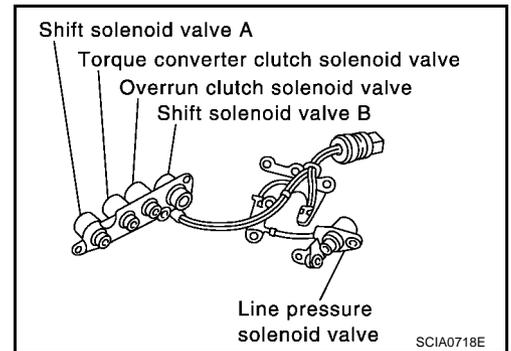
OVERRUN CLUTCH SOLENOID VALVE

PF3:31940

Description

ECS004U0

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



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

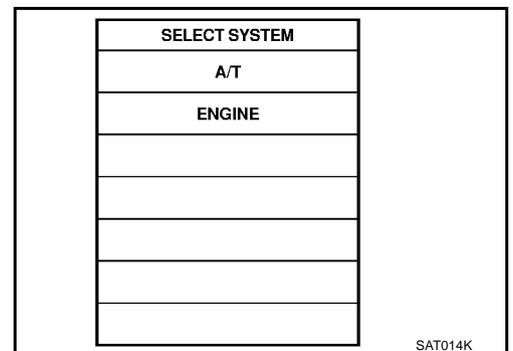
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
(P) : OVERRUN CLUTCH S/V (X) : 6th judgement flicker	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> ● Harness or connectors (The solenoid circuit is open or shorted.) ● Overrun clutch solenoid valve

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

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

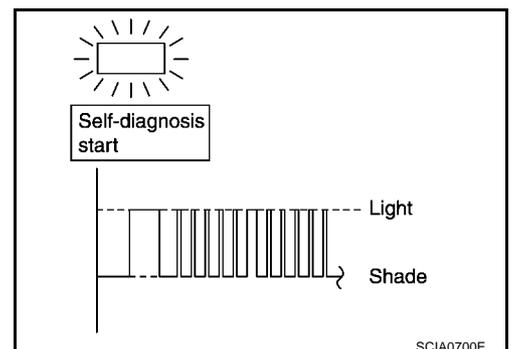
(P) With CONSULT-II

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



(X) Without CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions:
Selector lever in "D" position, overdrive control switch in "OFF" position and vehicle speed higher than 10 km/h (6 MPH).
3. Perform self-diagnosis.
Refer to [AT-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#).



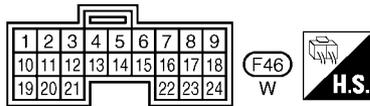
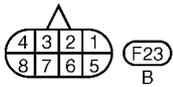
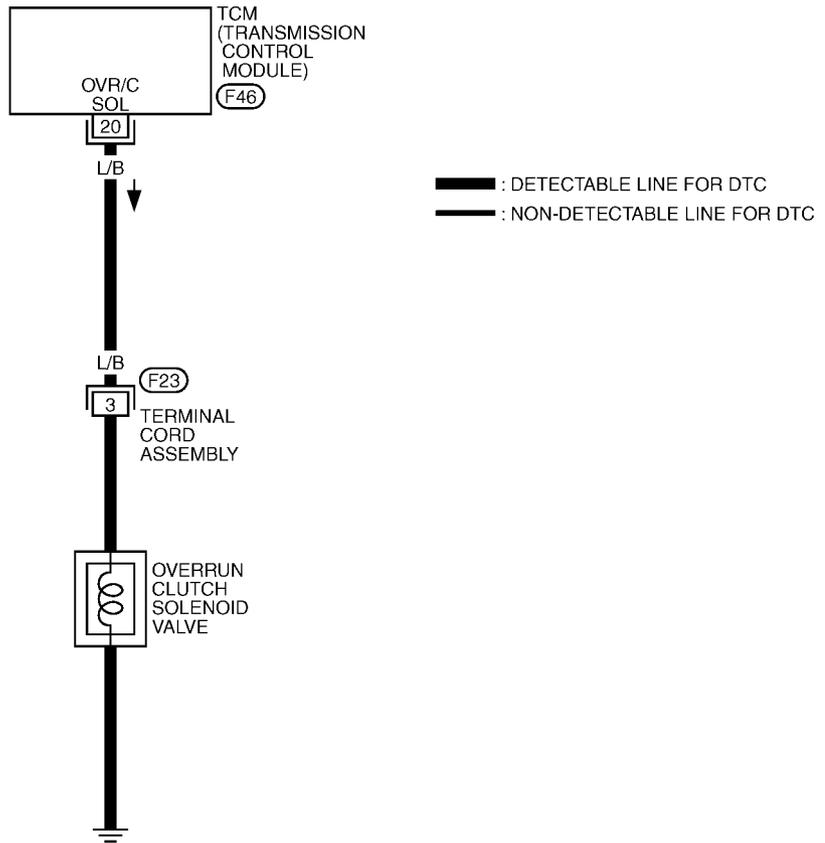
OVERRUN CLUTCH SOLENOID VALVE

[ALL]

Wiring Diagram — AT — OVRCSV

ECS004U1

AT-OVRCSV-01



TCWA0042E

Diagnostic Procedure

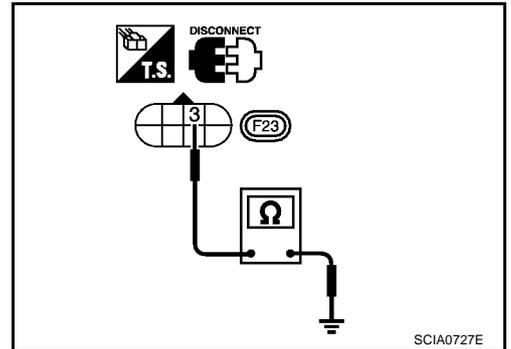
1. CHECK VALVE RESISTANCE

1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 3 and ground.

Resistance : 20 - 30Ω

OK or NG

- OK >> GO TO 2.
 NG >> 1. Remove control valve assembly. Refer to [AT-448](#), "[Control Valve Assembly](#)".
 2. Check the following items:
 Overrun clutch solenoid valve
 Refer to [AT-380](#), "[Component Inspection](#)".
 Harness of terminal cord assembly for short or open



2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 3 and TCM harness connector terminal 20.

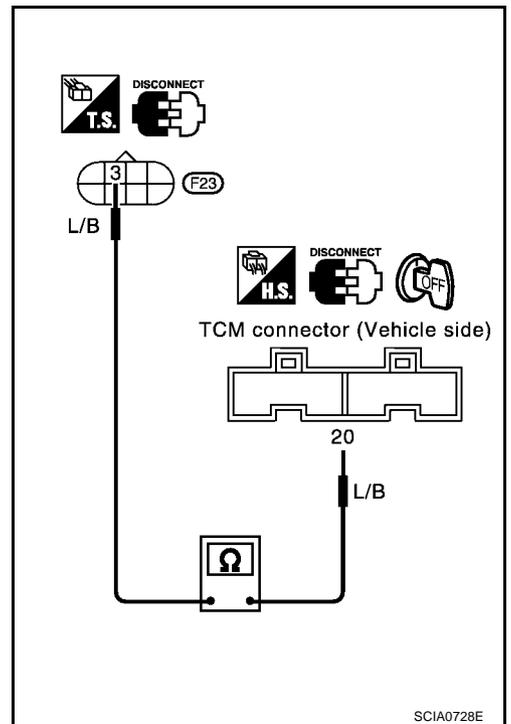
Continuity should exist.

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

4. Reinstall any part removed.

OK or NG

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



3. CHECK DTC

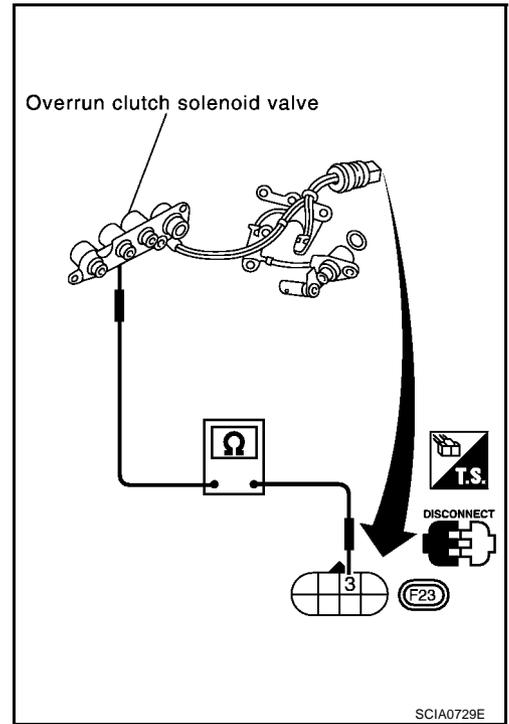
Perform Self-diagnosis Code confirmation procedure. Refer to [AT-377](#), "[SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE](#)".

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-414, "Control Valve Assembly and Accumulators"](#).



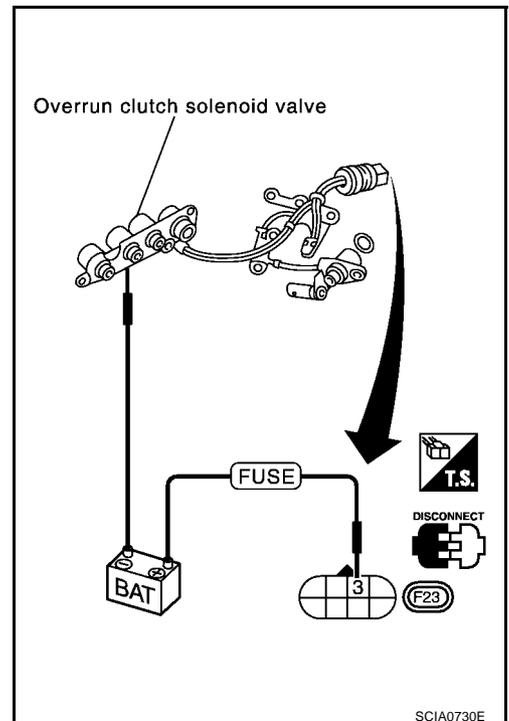
Resistance Check

- Check resistance between two terminals.

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

Operation Check

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



TORQUE CONVERTER CLUTCH SOLENOID VALVE

[ALL]

TORQUE CONVERTER CLUTCH SOLENOID VALVE

PF3:31940

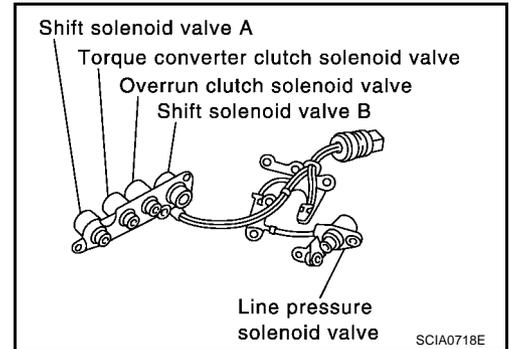
Description

ECS004U4

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

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

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

ON BOARD DIAGNOSIS LOGIC

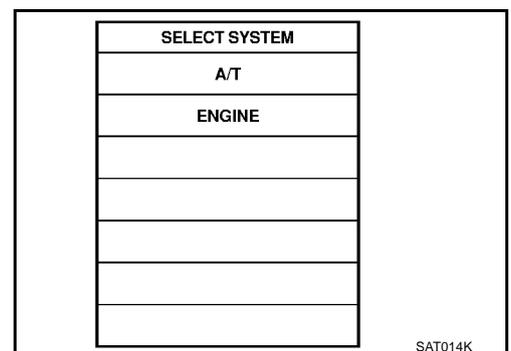
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
Ⓟ : T/C CLUTCH SOL/V	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> ● Harness or connectors (The solenoid circuit is open or shorted.) ● T/C clutch solenoid valve
ⓧ : 7th judgement flicker		

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

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

Ⓟ With CONSULT-II

1. Start engine.
2. Select "SELF-DIAG RESULTS" mode for A/T with CONSULT-II.
3. Drive vehicle in D1 → D2 → D3 → D4 → D4 lock-up position.

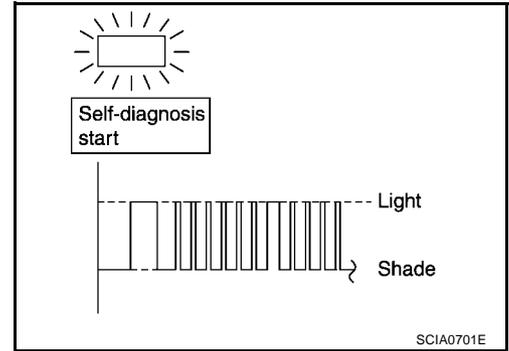


TORQUE CONVERTER CLUTCH SOLENOID VALVE

[ALL]

⊗ Without CONSULT-II

1. Start engine.
2. Drive vehicle in D1 → D2 → D3 → D4 → D4 lock-up position.
3. Perform self-diagnosis.
Refer to [AT-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#) .



TORQUE CONVERTER CLUTCH SOLENOID VALVE

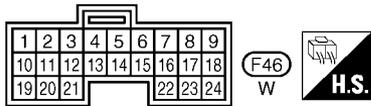
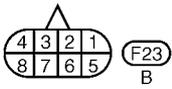
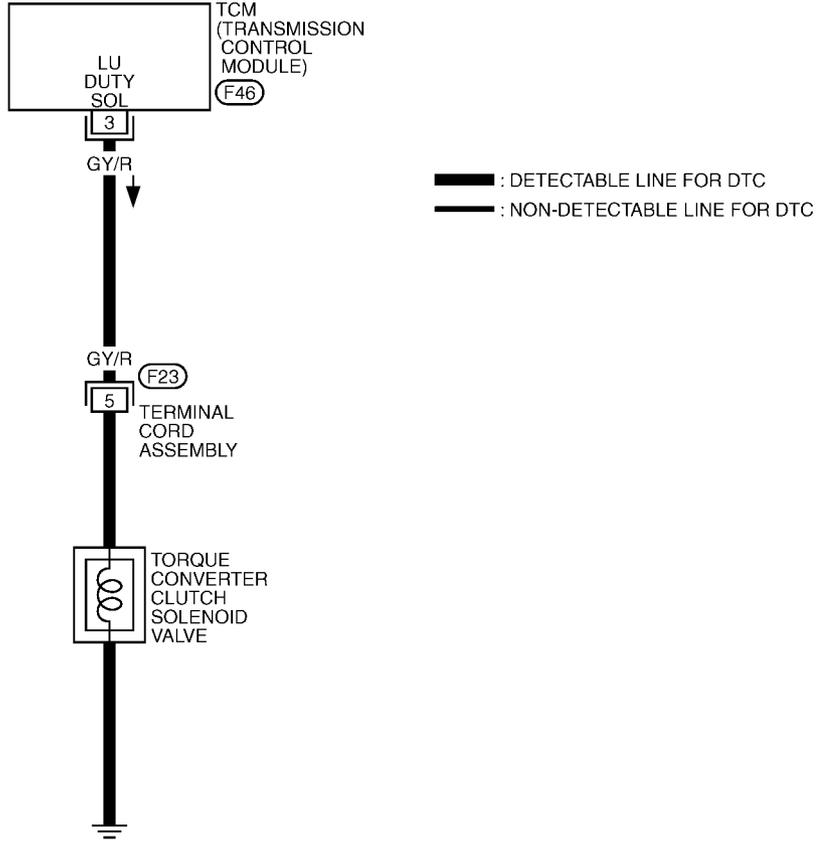
[ALL]

Wiring Diagram — AT — TCV

ECS004U5

AT-TCV-01

A
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TCWA0043E

Diagnostic Procedure

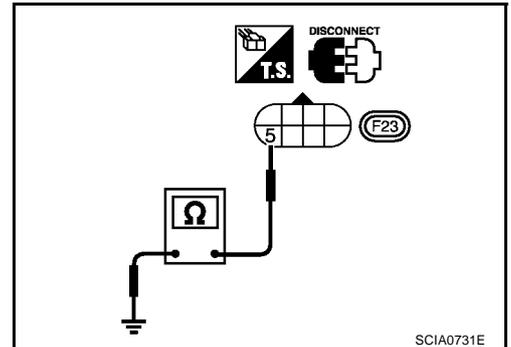
1. CHECK VALVE RESISTANCE

1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 5 and ground.

Resistance: 5 - 20Ω

OK or NG

- OK >> GO TO 2.
 NG >> 1. Remove oil pan. Refer to [AT-413, "Installation"](#) .
 2. Check the following items:
 Torque converter clutch solenoid valve
 Refer to [AT-385, "Component Inspection"](#) .
 Harness of terminal cord assembly for short or open



2. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal 5 and TCM harness connector terminal 3.

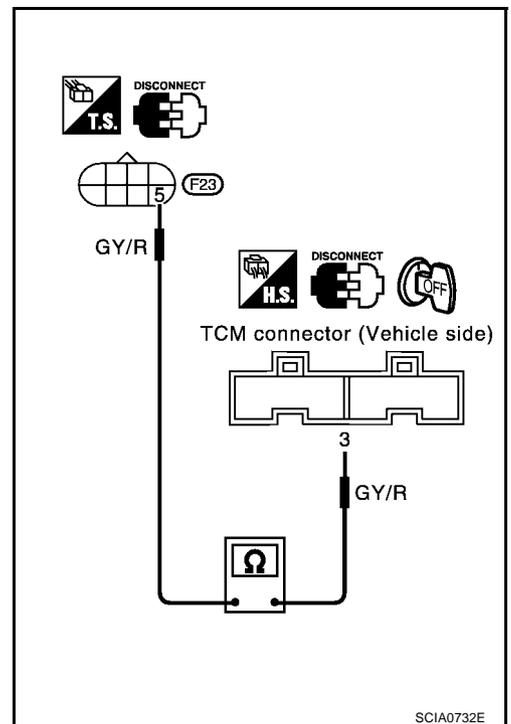
Continuity should exist.

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

4. Reinstall any part removed.

OK or NG

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



3. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to [AT-381, "SELF-DIAGNOSIS CODE 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.

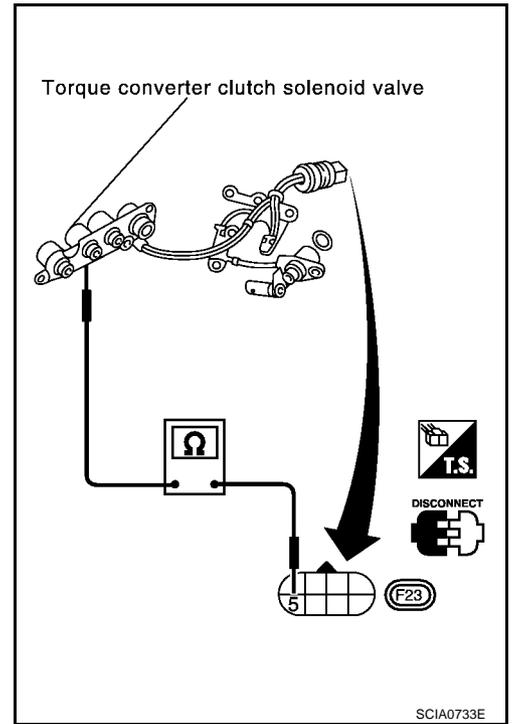
TORQUE CONVERTER CLUTCH SOLENOID VALVE

[ALL]

ECS004U7

Component Inspection TORQUE CONVERTER CLUTCH SOLENOID VALVE

- For removal, refer to [AT-414, "Control Valve Assembly and Accumulators"](#).



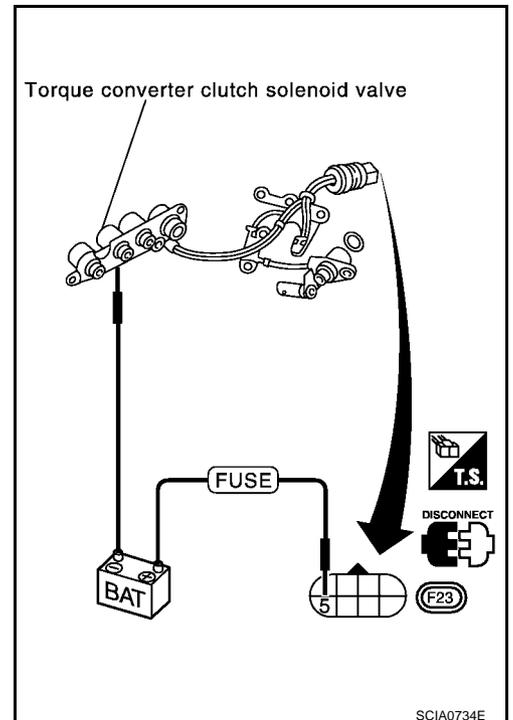
Resistance Check

- Check resistance between two terminals.

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

Operation Check

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



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

[ALL]

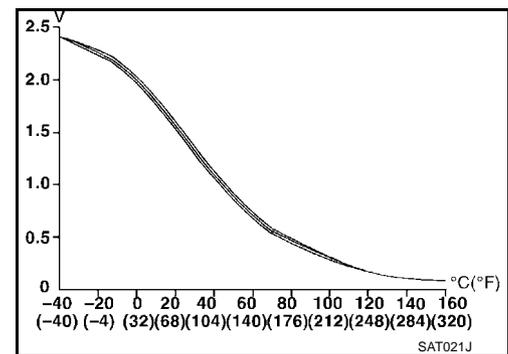
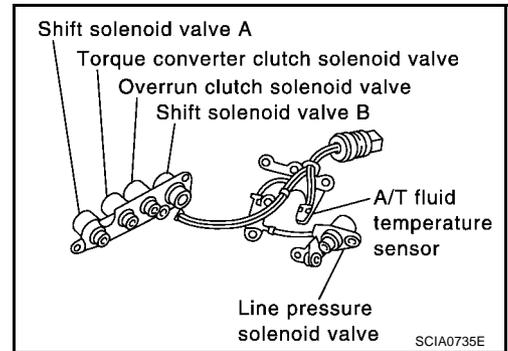
BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

PF3:31940

Description

ECS004U8

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



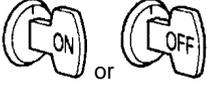
CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

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

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

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

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

[ALL]

ON BOARD DIAGNOSIS LOGIC

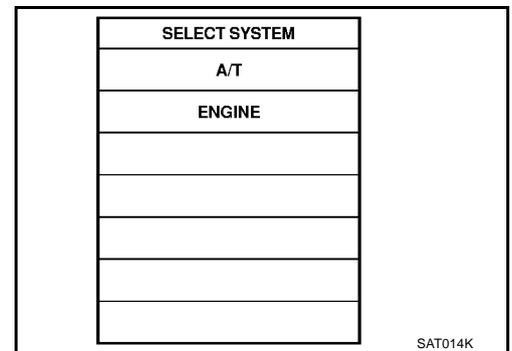
Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
① : BATT/FLUID TEMP SEN ② : 8th judgement flicker	TCM receives an excessively low or high voltage from the sensor.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● A/T fluid temperature sensor

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

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

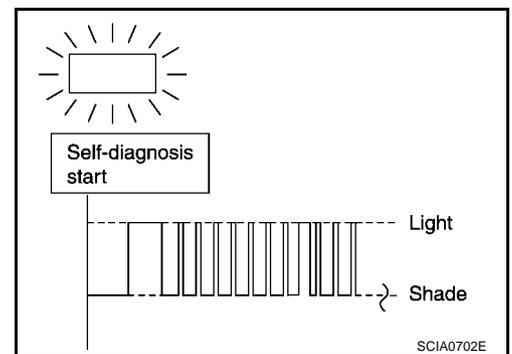
① With CONSULT-II

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



② Without CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions:
Selector lever in "D" position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/8 of the full open position, engine speed higher than 450 rpm and driving for more than 10 minutes.
3. Perform self-diagnosis.
Refer to [AT-253. "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#).



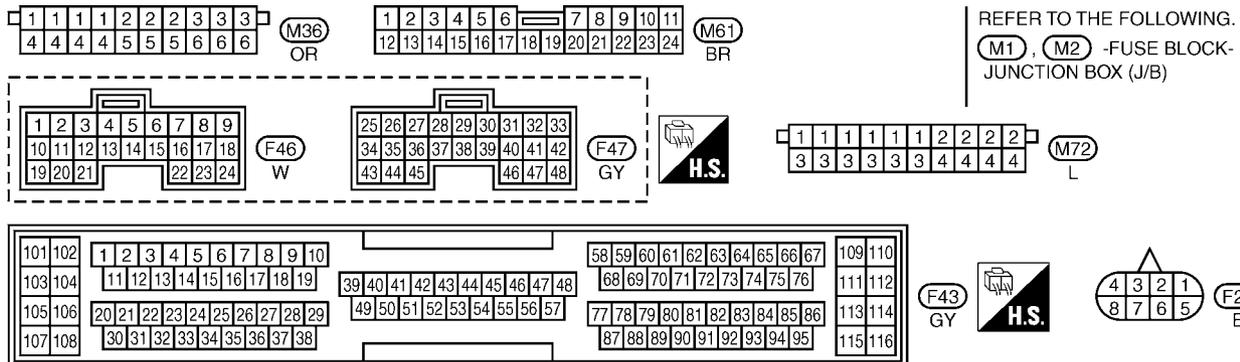
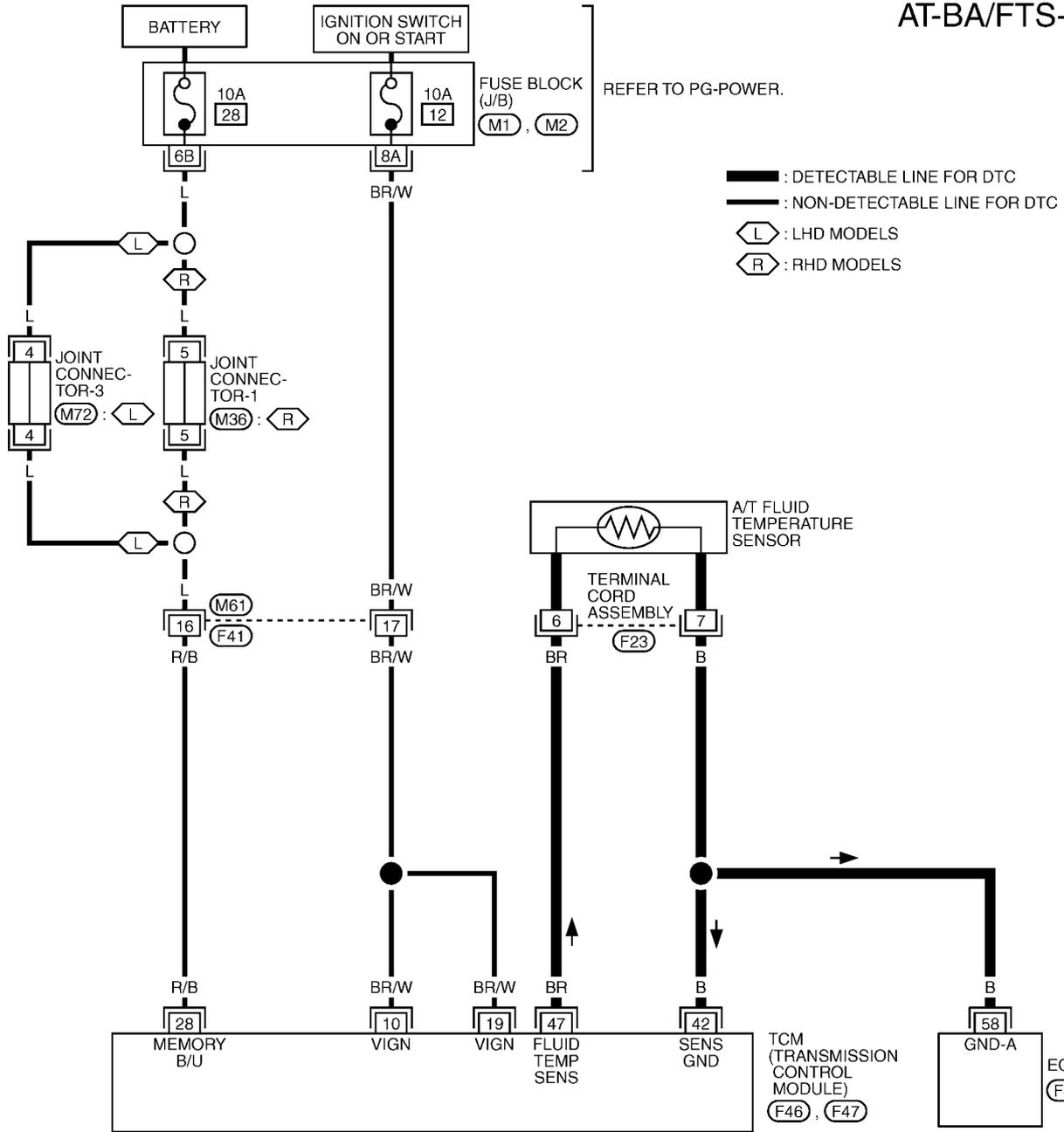
BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

[ALL]

Wiring Diagram — AT — BA/FTS

ECS004U9

AT-BA/FTS-01



Diagnostic Procedure

ECS004UA

1. CHECK TCM POWER SOURCE

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

Voltage: Battery voltage

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

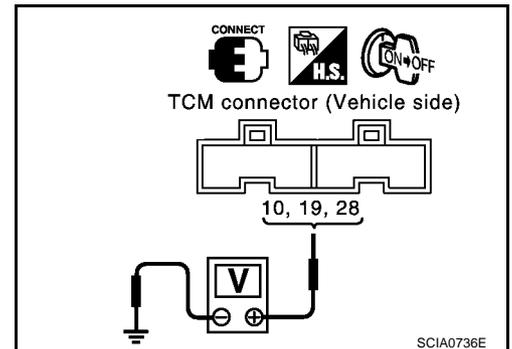
Voltage: Battery voltage

OK or NG

OK >> GO TO 2.

NG >> Check the following items:

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



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

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

Resistance Cold[20°C(68°F)]

: Approximately 2.5 kΩ

4. Reinstall any part removed.

OK or NG

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

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

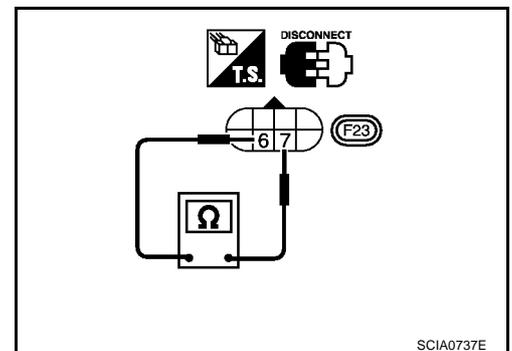
NG >> 1. Remove oil pan.

2. Check the following items:

A/T fluid temperature sensor

Refer to [AT-391, "Component Inspection"](#).

Harness of terminal cord assembly for short or open



3. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR (WITH CONSULT-II)

With CONSULT-II

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

Voltage

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

Approximately 1.5V→0.5V

OK or NG

OK >> GO TO 5.

NG >> Check the following item:

- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM

Refer to [EC-580, "DTC P1065 ECM POWER SUPPLY"](#) (QR25DE) or [EC-1269, "DTC P1065 ECM POWER SUPPLY"](#) (QR20DE).

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

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

Without CONSULT-II

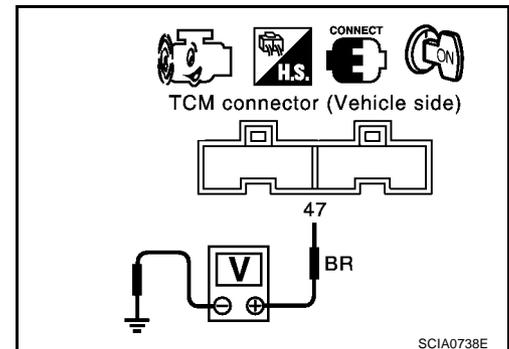
1. Start engine.
2. Check voltage between TCM terminal 47 and ground while warming up A/T.

Voltage

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

Approximately 1.5V→0.5V

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



5. Check resistance between terminal 42 and ground.

Continuity should exist.

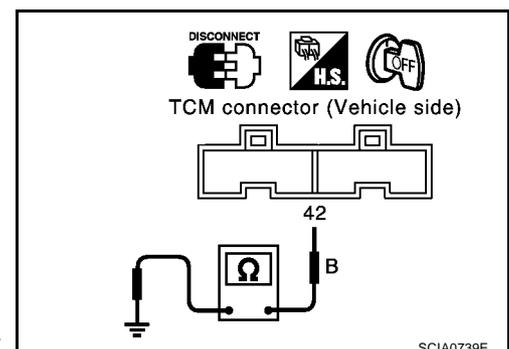
OK or NG

OK >> GO TO 5.

NG >> Check the following item:

- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM

Refer to [EC-580, "DTC P1065 ECM POWER SUPPLY"](#) (QR25DE) or [EC-1269, "DTC P1065 ECM POWER SUPPLY"](#) (QR20DE).



5. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to [AT-387, "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE"](#).

OK or NG

OK >> **INSPECTION END**

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

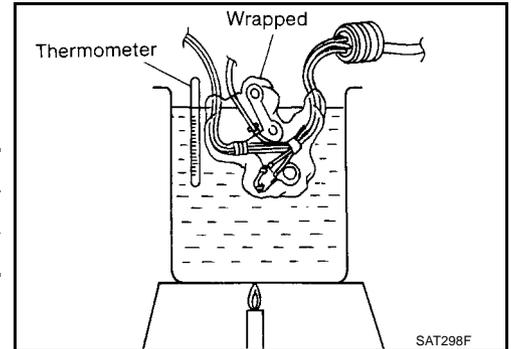
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Component Inspection A/T FLUID TEMPERATURE SENSOR

ECS004UB

- For removal, refer to [AT-414, "Control Valve Assembly and Accumulators"](#).
- Check resistance between two terminals while changing temperature as shown at left.

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



ENGINE SPEED SIGNAL

[ALL]

ENGINE SPEED SIGNAL

PFP:24825

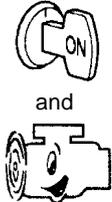
Description

ECS004UC

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	L/OR	Engine speed signal	 <p>Refer to EC-479. "ECM INSPECTION TABLE" (QR25DE) or EC-1166. "ECM INSPECTION TABLE" (QR20DE).</p>	—

ON BOARD DIAGNOSIS LOGIC

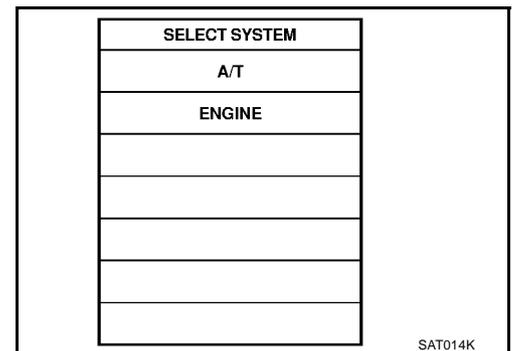
Diagnostic trouble code	Malfunction is detected when...	Check item (Possible cause)
<p>Ⓜ : ENGINE SPEED SIG</p> <p>ⓧ : 9th judgement flicker</p>	TCM does not receive the proper voltage signal from ECM.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.)

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

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

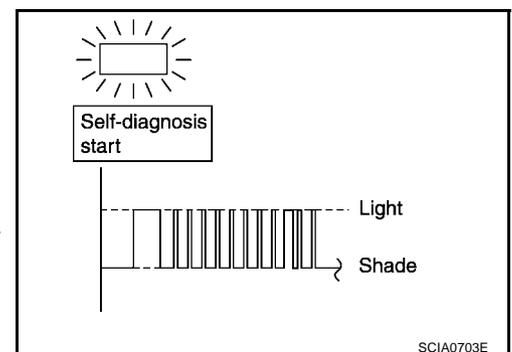
Ⓜ With CONSULT-II

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



ⓧ Without CONSULT-II

- Start engine.
- Drive vehicle under the following conditions:
Selector lever in "D" position, vehicle speed higher than 10 km/h (6 MPH), throttle opening greater than 1/8 of the full throttle position and driving for more than 10 seconds.
- Perform self-diagnosis.
Refer to [AT-253. "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#).



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

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

NG >> Check ignition signal circuit for engine control. Refer to [EC-683, "IGNITION SIGNAL"](#) (QR25DE) or [EC-1331, "IGNITION SIGNAL"](#) (QR20DE).

2. CHECK INPUT SIGNAL (WITH CONSULT-II)

 **With CONSULT-II**

1. Start engine.
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.

SELECT SYSTEM
A/T
ENGINE

SAT014K

3. Read out the value of "ENGINE SPEED".
Check engine speed changes according to throttle position.

OK or NG

OK >> GO TO 4.

NG >> Check the following items:

- Harness for short or open between TCM and ECM
 - Resistor and ignition coil
- Refer to [EC-683, "IGNITION SIGNAL"](#) (QR25DE) or [EC-1331, "IGNITION SIGNAL"](#) (QR20DE).

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

SAT645J

3. CHECK INPUT SIGNAL (WITHOUT CONSULT-II)

⊗ Without CONSULT-II

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

Voltage (Idle speed):

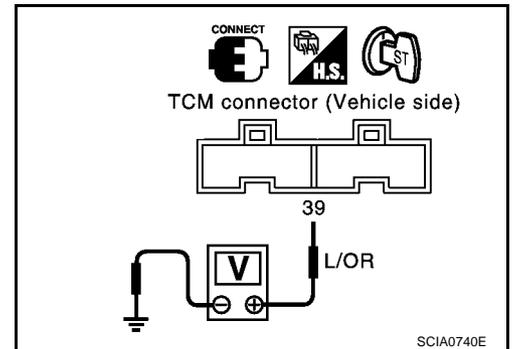
Refer to [EC-479, "ECM INSPECTION TABLE" \(QR25DE\)](#) or [EC-1166, "ECM INSPECTION TABLE" \(QR20DE\)](#).

OK or NG

OK >> GO TO 4.

NG >> Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
Refer to [EC-683, "IGNITION SIGNAL" \(QR25DE\)](#) or [EC-1331, "IGNITION SIGNAL" \(QR20DE\)](#).



4. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to [AT-392, "SELF-DIAGNOSIS CODE 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.

LINE PRESSURE SOLENOID VALVE

[ALL]

LINE PRESSURE SOLENOID VALVE

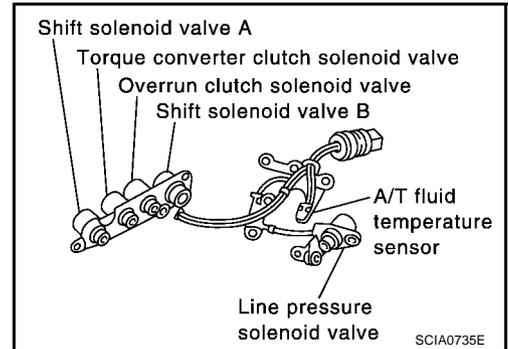
PFP:31940

Description

ECS004UF

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

NOTE:

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

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
1	R/W	Line pressure solenoid valve	When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
			When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve (with dropping resistor)	When releasing accelerator pedal after warming up engine.	5 - 14V
			When depressing accelerator pedal fully after warming up engine.	0V

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
P1600 : LINE PRESSURE S/V P1601 : 10th judgement flicker	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	<ul style="list-style-type: none"> Harness or connectors (The solenoid circuit is open or shorted.) Line pressure solenoid valve

SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE

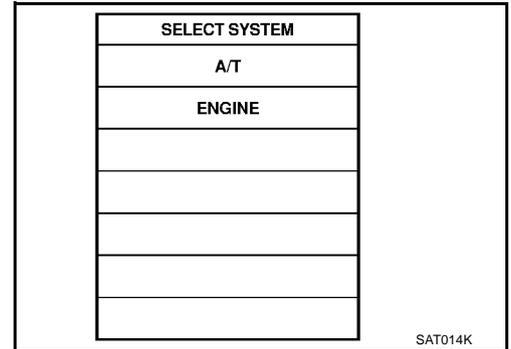
After the repair, perform the following procedure to confirm the malfunction is eliminated.

LINE PRESSURE SOLENOID VALVE

[ALL]

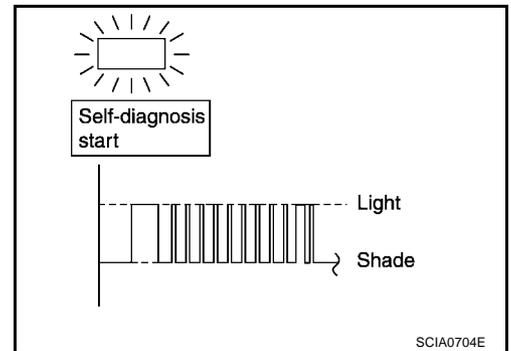
Ⓟ With CONSULT-II

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



ⓧ Without CONSULT-II

1. Start engine.
2. With brake pedal depressed, shift the lever from "P" → "N" → "D" → "N" → "P" positions.
3. Perform self-diagnosis.
Refer to [AT-253, "SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)"](#).



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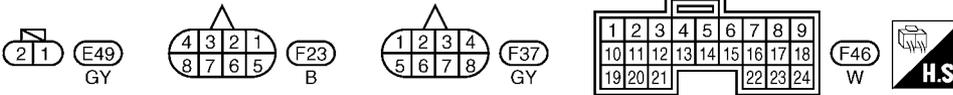
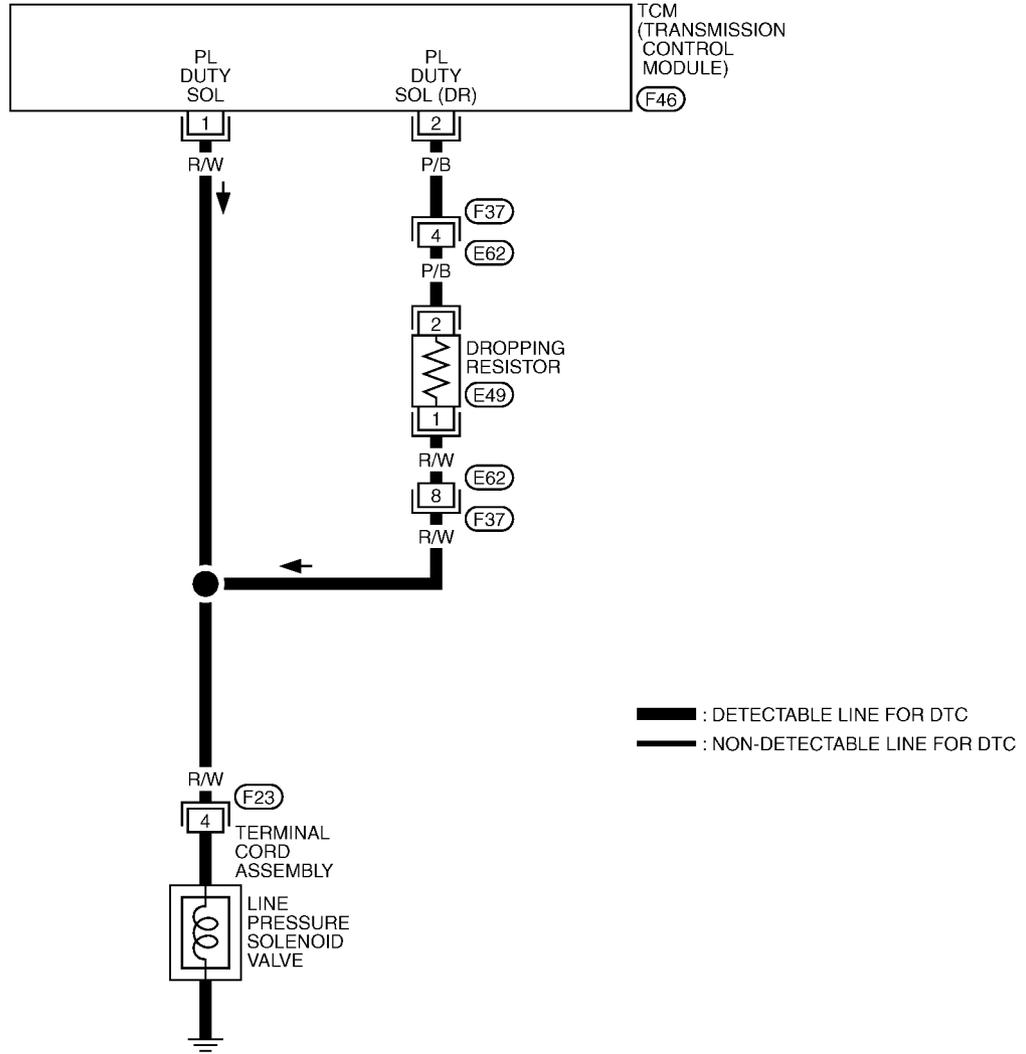
LINE PRESSURE SOLENOID VALVE

[ALL]

Wiring Diagram — AT — LPSV

ECS004UG

AT-LPSV-01



TCWA0046E

Diagnostic Procedure

ECS004UH

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to "OFF" position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal 4 and ground.

Resistance: 2.5 - 5Ω

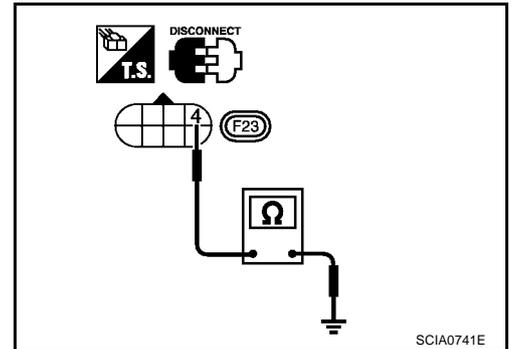
OK or NG

OK >> GO TO 2.

NG >> 1. Remove control valve assembly. Refer to [AT-413](#), "[Installation](#)".

2. Check the following items:

- Line pressure solenoid valve
Refer to [AT-401](#), "[Component Inspection](#)".
- Harness of terminal cord assembly for short or open



2. CHECK POWER SOURCE CIRCUIT

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

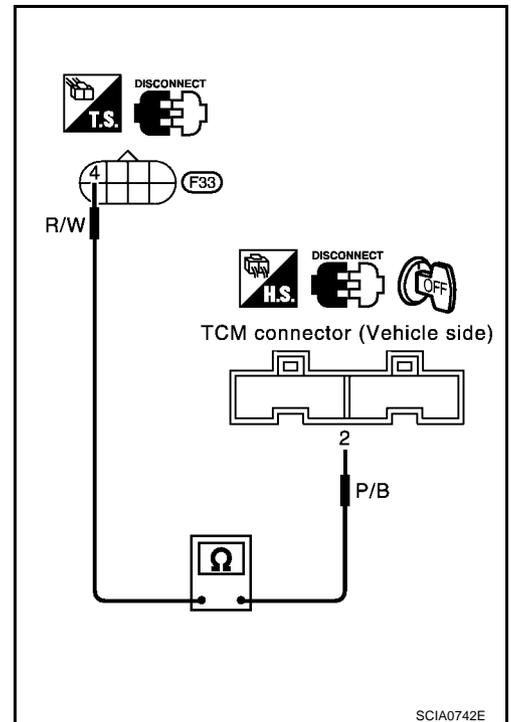
Resistance: 10 - 15Ω

OK or NG

OK >> GO TO 3.

NG >> Check the following items:

- Dropping resistor
Refer to [AT-401](#), "[Component Inspection](#)".
- Harness for short or open between TCM terminal 2 and terminal cord assembly



3. CHECK POWER SOURCE CIRCUIT

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

Resistance: Approx. 0Ω

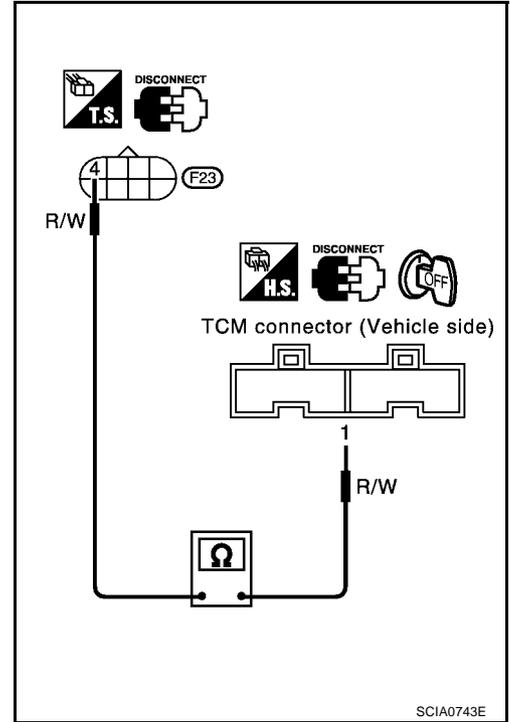
If OK, check harness for short to ground and short to power.

3. Reinstall any part removed.

OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



4. CHECK DTC

Perform Self-diagnosis Code confirmation procedure. Refer to [AT-396. "SELF-DIAGNOSIS CODE CONFIRMATION PROCEDURE"](#) .

OK or NG

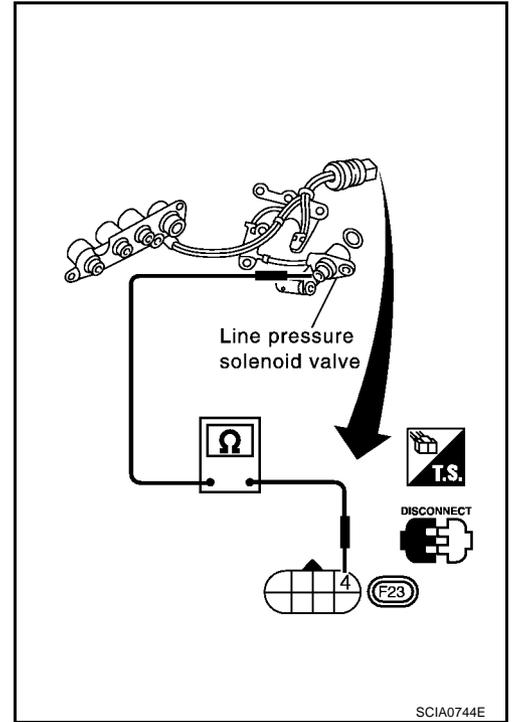
OK >> **INSPECTION END**

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-414, "Control Valve Assembly and Accumulators"](#).



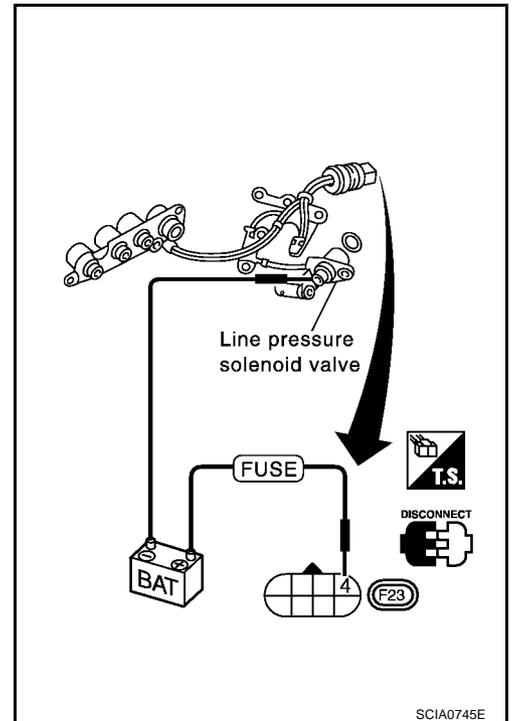
Resistance Check

- Check resistance between two terminals.

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

Operation Check

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



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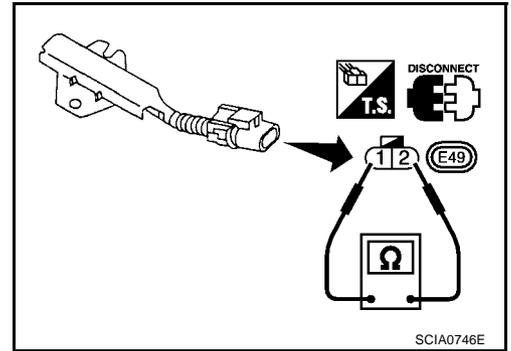
LINE PRESSURE SOLENOID VALVE

[ALL]

DROPPING RESISTOR

- Check resistance between two terminals.

Resistance: 10 - 15Ω



CAN COMMUNICATION LINE

PFP:31940

Description

ECS004UJ

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

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
5	QR20DE: B/W QR25DE: W/B	CAN-H (high)	—	—
6	L/R	CAN-L (low)	—	—

On Board Diagnosis Logic

ECS004UK

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
Ⓜ : CAN COMM CIRCUIT ⓧ : 11th judgement flicker	When a malfunction is detected in CAN communication line.	● Harness or connectors (CAN communication line is open or shorted.)

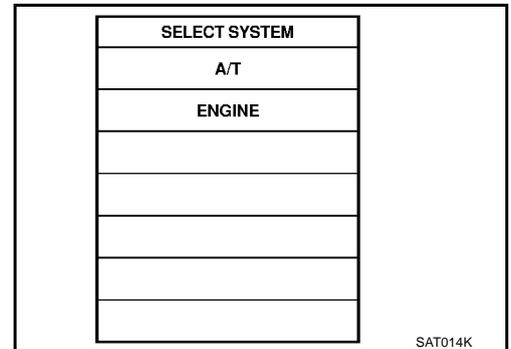
Self-Diagnosis Code Confirmation Procedure

ECS004UL

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

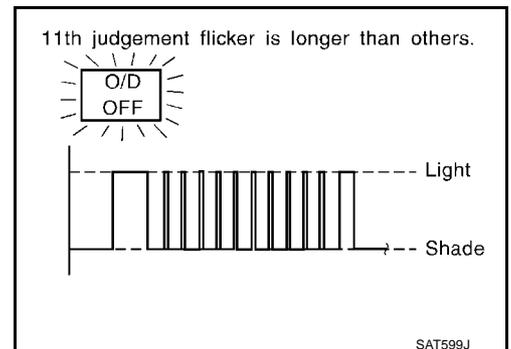
WITH CONSULT-II

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



WITHOUT CONSULT-II

- Turn ignition switch "ON".
- Wait at least 6 seconds or start engine and wait at least 6 seconds.
- Perform self-diagnosis.
Refer to [AT-253](#), "[SELF-DIAGNOSTIC PROCEDURE \(WITHOUT CONSULT-II\)](#)".



Diagnostic Procedure

ECS004UN

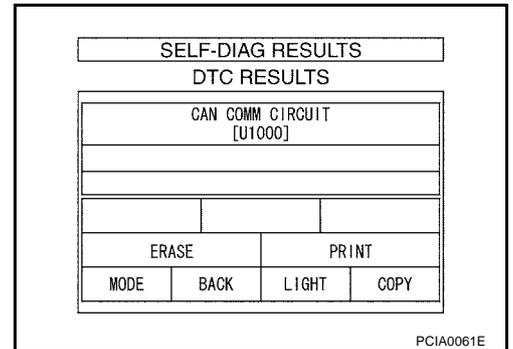
1. CHECK CAN COMMUNICATION CIRCUIT

④ With CONSULT-II

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. The "CON COMM CIRCUIT" is detected.

Yes or No?

- Yes >> Print out CONSULT-II screen, GO TO 2.
 NG >> **INSPECTION END**



2. CHECK CAN COMMUNICATION SIGNALS

④ With CONSULT-II

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

>> Print out CONSULT-II screen, go to [LAN-5, "CAN SYSTEM \(FOR A/T MODELS\)"](#)

CAN Communication Signals

Normal conditions	Abnormal conditions (examples)
CAN COMM: OK	CAN COMM: OK
CAN CIRC 1: OK	CAN CIRC 1: UNKWN
CAN CIRC 2: OK	CAN CIRC 2: UNKWN
CAN CIRC 3: OK	CAN CIRC 3: UNKWN
CAN CIRC 4: OK	CAN CIRC 4: UNKWN
CAN CIRC 5: UNKWN	CAN CIRC 5: UNKWN

A/T SHIFT LOCK SYSTEM

PFP:34950

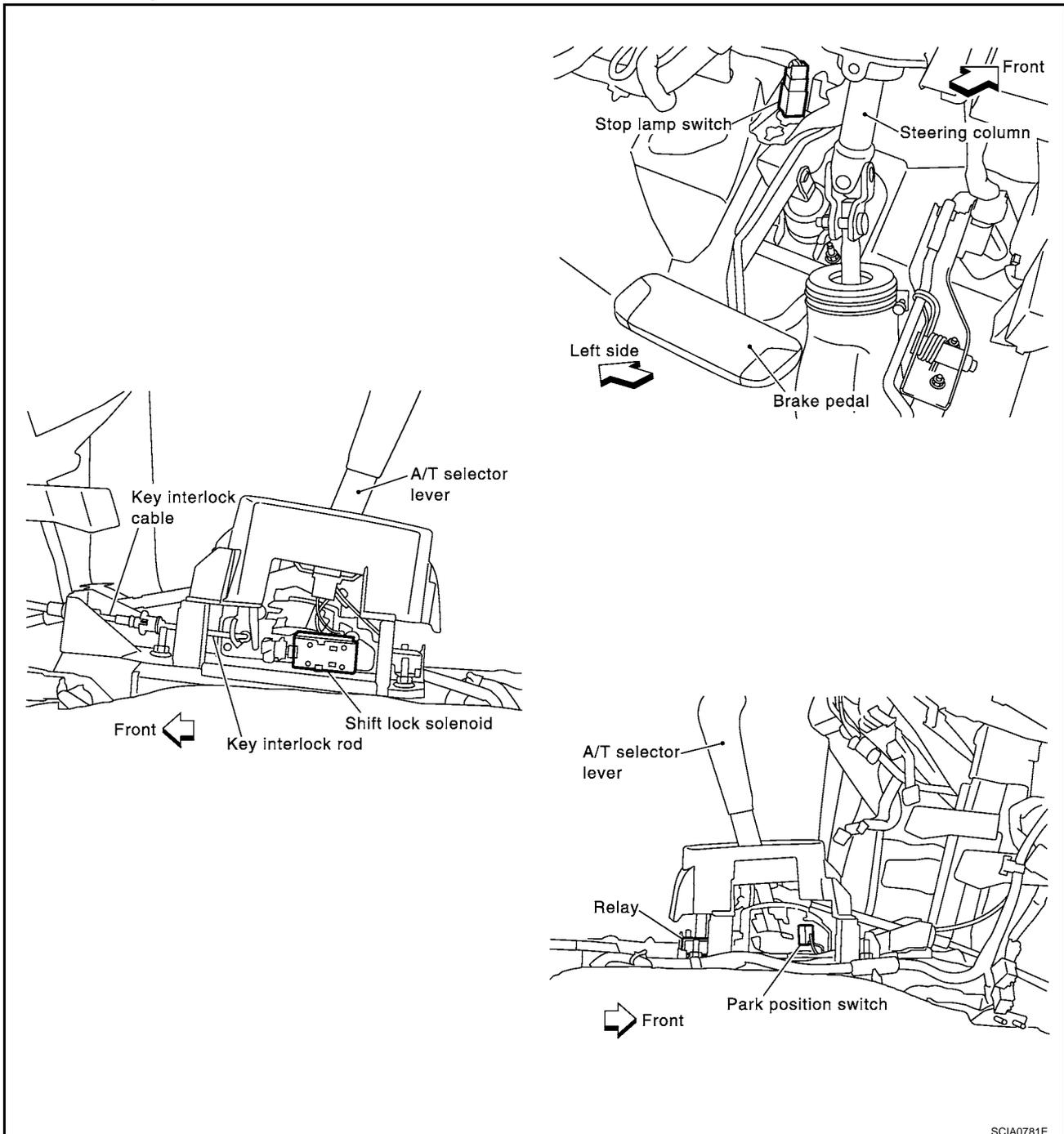
Description

ECS00405

- The mechanical key interlock mechanism also operates as a shift lock:
 With the key switch turned to ON, the selector lever cannot be shifted from "P" (parking) to any other position unless the brake pedal is depressed.
 With the key removed, the selector lever cannot be shifted from "P" to any other position.
 The key cannot be removed unless the selector lever is placed in "P".
- The shift lock and key interlock mechanisms are controlled by the ON-OFF operation of the shift lock solenoid and by the operation of the rotator and slider located inside the key cylinder.

Shift Lock System Electrical Parts Location

ECS00406



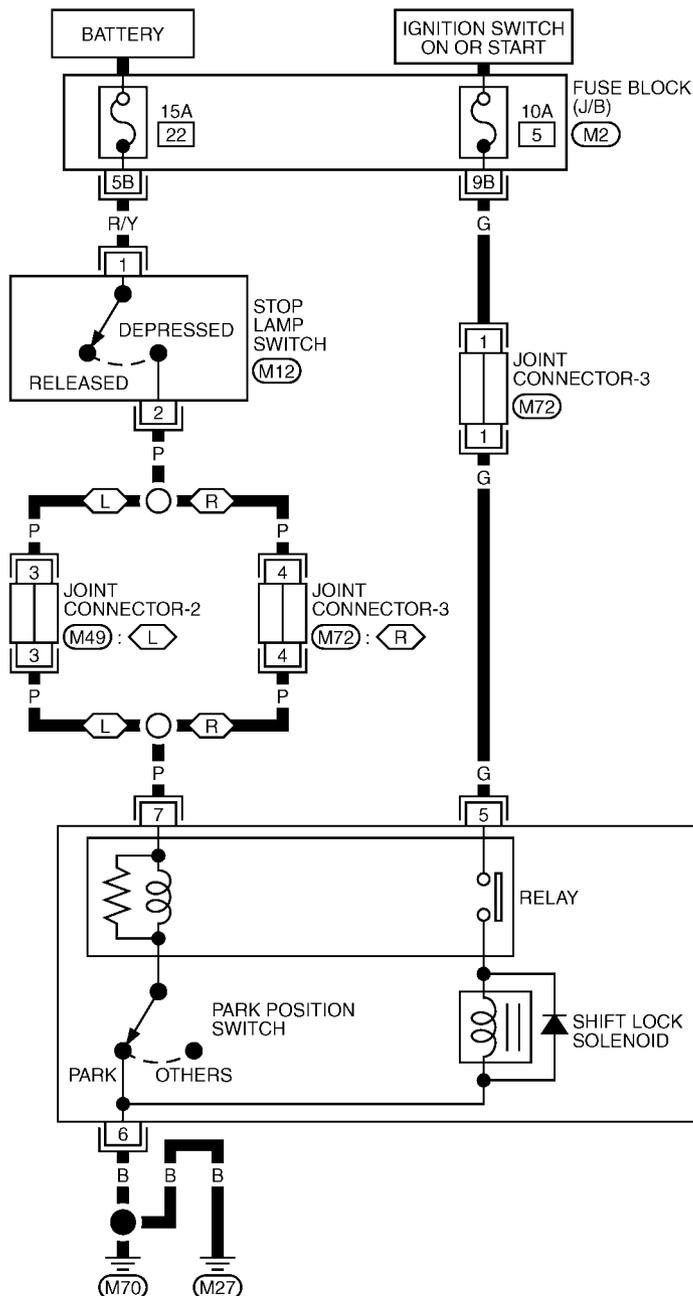
SCIA0781E

A/T SHIFT LOCK SYSTEM

[ALL]

Wiring Diagram — SHIFT —

ECS00407

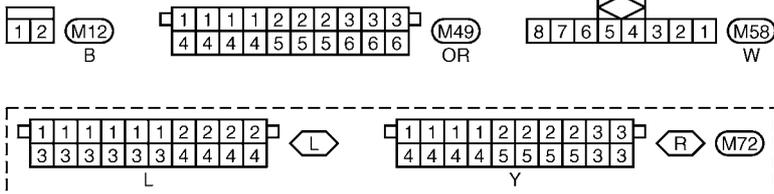


AT-SHIFT-01

REFER TO PG-POWER.

⬡ : LHD MODELS
⬢ : RHD MODELS

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

TCWA0055E

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 KEY INTERLOCK CABLE

Check key interlock cable for damage.

OK or NG

OK >> GO TO 2.

NG >> Repair key interlock cable. Refer to [AT-412, "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-416, "Park/Neutral Position \(PNP\) Switch Adjustment"](#) .

3. CHECK POWER SOURCE

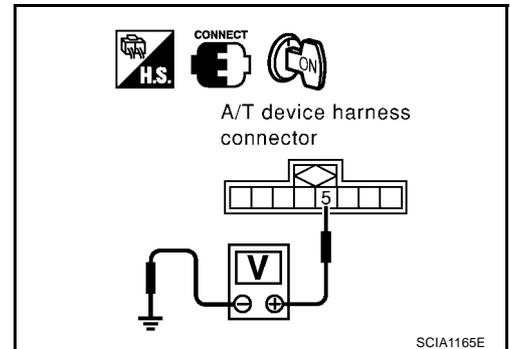
1. Turn ignition switch to “ON” position.
(Do not start engine.)
2. Check voltage between A/T device harness connector M58 terminal 5 (G) and ground.

Voltage: Battery voltage

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.



4. DETECT MALFUNCTIONING ITEM

Check the following items:

1. Harness for short or open between ignition switch and A/T device harness terminal 5
2. Fuse
3. Ignition switch (Refer to [PG-2, "POWER SUPPLY ROUTING"](#) .)

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

5. CHECK INPUT SIGNAL A/T DEVICE

Turn ignition switch to "OFF" position.

- Check voltage between A/T device harness connector M58 terminal 7 and ground.

Voltage:

Brake pedal depressed:

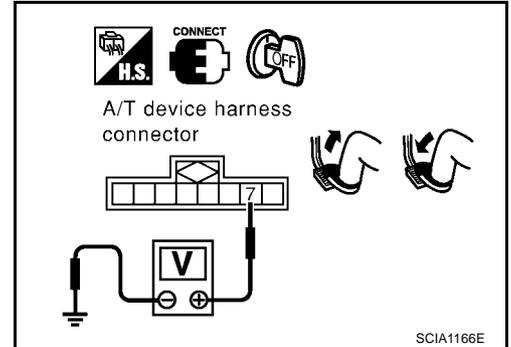
Battery voltage

Brake pedal released:

0V

OK or NG

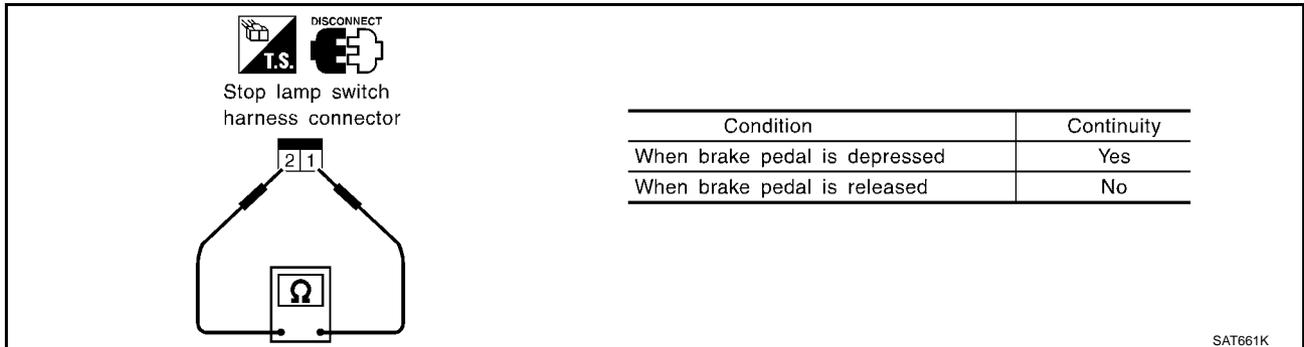
- OK >> GO TO 7.
- NG >> GO TO 6.



6. DETECT MALFUNCTIONING ITEM

Check the following items:

1. Harness for short or open between battery and stop lamp switch harness connector 1
 2. Harness for short or open between stop lamp switch harness connector 2 and A/T device harness connector 7
 3. Fuse
 4. Stop lamp switch
- Check continuity between stop lamp switch harness connector M12 terminals 1 (R/Y) and 2 (P).



Check stop lamp switch after adjusting brake pedal — refer to [BR-6, "BRAKE PEDAL"](#) .

OK or NG

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

7. CHECK GROUND CIRCUIT

1. Turn ignition switch to "OFF" position.
2. Disconnect A/T device harness connector.
3. Check continuity between A/T device harness connector M58 terminal 6 (B) and ground.

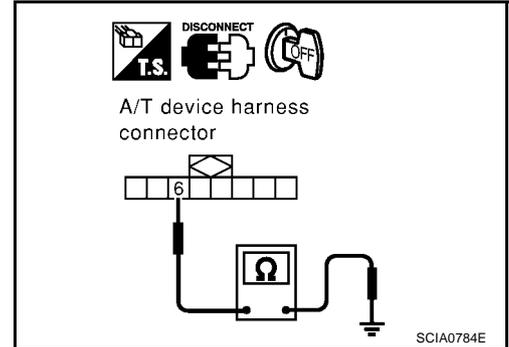
Continuity should exist.

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

OK or NG

OK >> GO TO 8.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.



8. CHECK PARK POSITION SWITCH AND RELAY CIRCUIT (COIL SIDE)

Check continuity between A/T device harness connector M58 terminals 6 (B) and 7 (P).

Condition	Continuity
When selector lever is set in "P" position and selector lever button is released	Yes
Except above	No

OK or NG

OK >> GO TO 9.

NG >> Replace park position switch or relay.

9. CHECK SHIFT LOCK SOLENOID AND RELAY CIRCUIT (POINT SIDE)

1. Connect A/T device harness connector.
2. Turn ignition switch to "ON" position.
3. Check operation sound.

Condition	Brake pedal	Operation sound
When ignition switch is turned to "ON" position and selector lever is set in "P" position.	Depressed	Yes
	Released	No

OK or NG

OK >> GO TO 10.

NG >> Replace shift lock solenoid or relay.

10. CHECK SHIFT LOCK OPERATION

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

OK or NG

- OK >> **INSPECTION END**
- NG >> GO TO 11.

11. CHECK A/T DEVICE INSPECTION

1. Perform A/T device input/output signal inspection test.
2. If NG, recheck harness connector connection.

OK or NG

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

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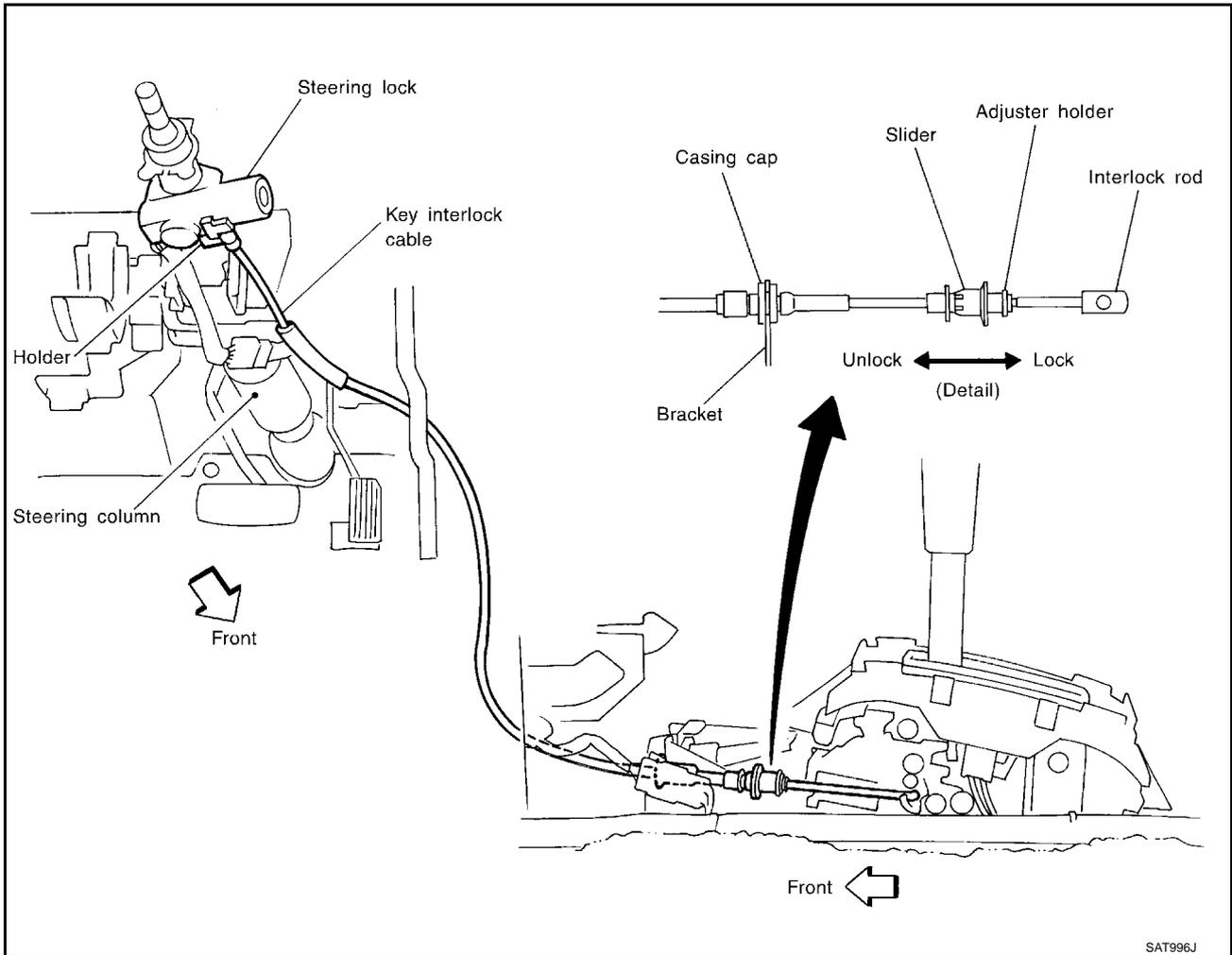
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KEY INTERLOCK CABLE

PFP:34908

Components

ECS00409



SAT996J

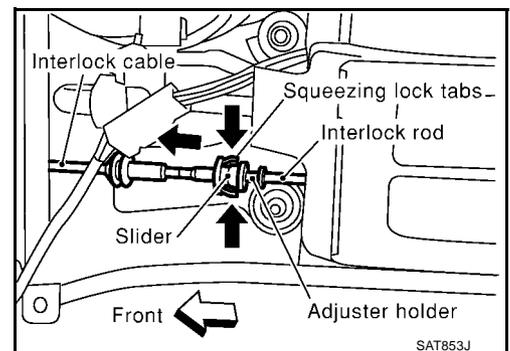
CAUTION:

- Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.
- After installing key interlock cable to control device, make sure that casing cap and bracket are firmly secured in their positions.

Removal

ECS0040A

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

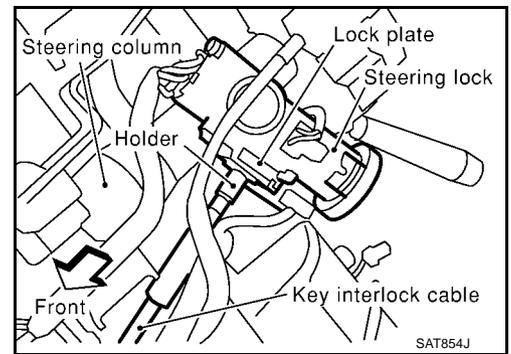


SAT853J

KEY INTERLOCK CABLE

[ALL]

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

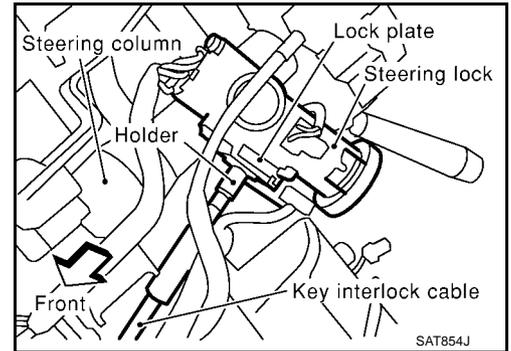


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Installation

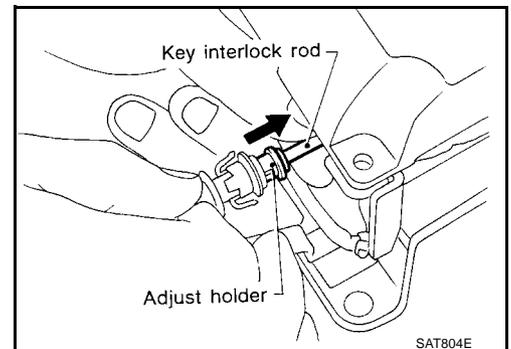
1. Turn ignition key to lock position.
2. Set A/T selector lever to P position.
3. Set key interlock cable to steering lock assembly and install lock plate.
4. Clamp cable to steering column and fix to control cable with band.

ECS0040B



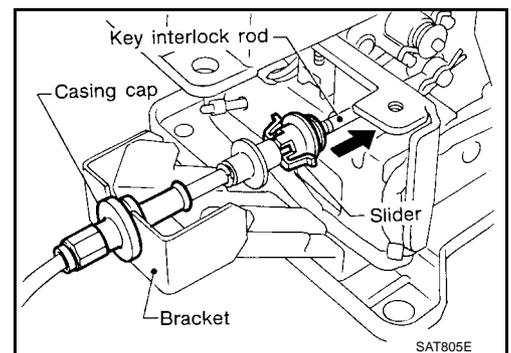
D
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F
G

5. Insert interlock rod into adjuster holder.



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



L
M

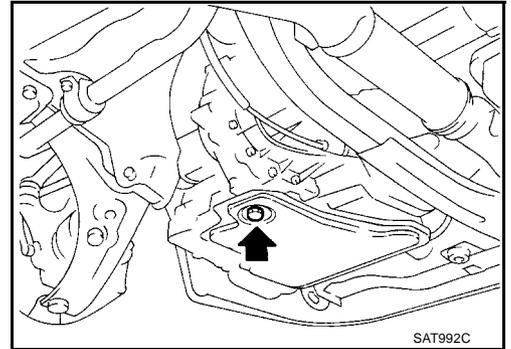
ON-VEHICLE SERVICE

PFP:00000

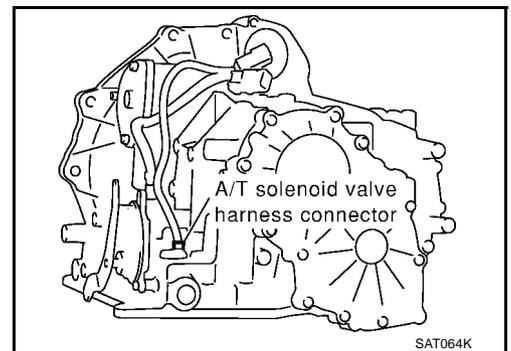
Control Valve Assembly and Accumulators REMOVAL

ECS0040C

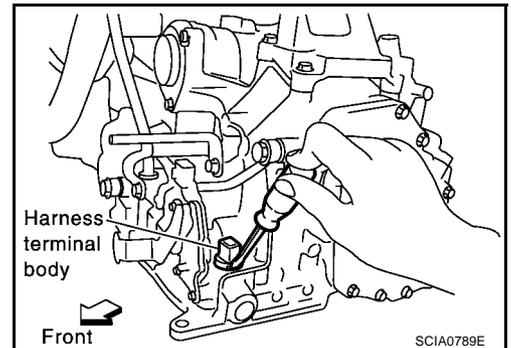
1. Drain ATF from transaxle.
2. Remove oil pan and gasket.



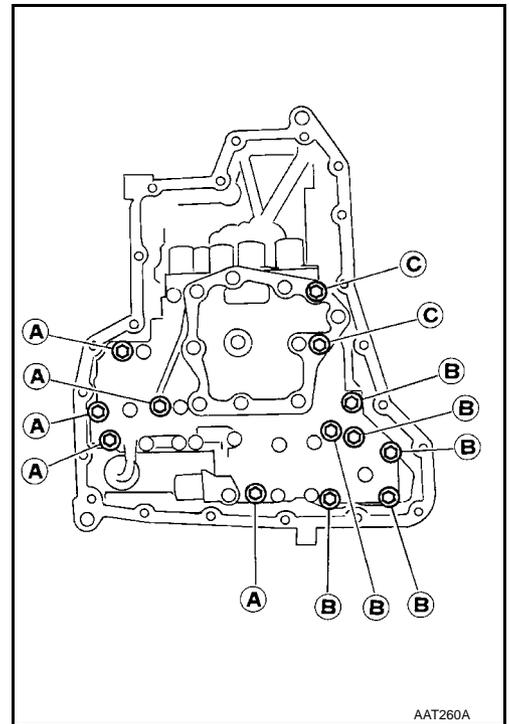
3. Disconnect A/T solenoid valve harness connector.



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



6. Remove control valve assembly by removing fixing bolts.



Bolt length, number and location:

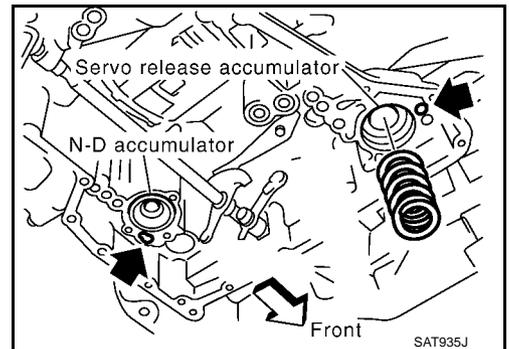
Bolt symbol	A	B	C
Bolt length "ℓ" mm(in) 	40.0 mm (1.575 in)	33.0 mm (1.299 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2

- **Be careful not to drop manual valve and servo release accumulator return springs.**

7. Disassemble and inspect control valve assembly if necessary. Refer to [AT-414, "Control Valve Assembly and Accumulators"](#) .

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

- **Hold each piston with a rag.**

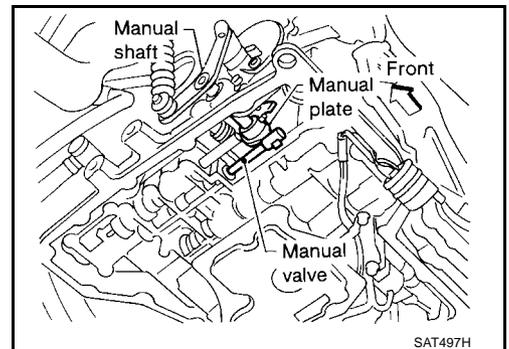


INSTALLATION

- **Tighten fixing bolts to specification.**

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

- **Set manual shaft in Neutral position, then align manual plate with groove in manual valve.**
- **After installing control valve assembly to transmission case, make sure that selector lever can be moved to all positions.**



ECS0040D

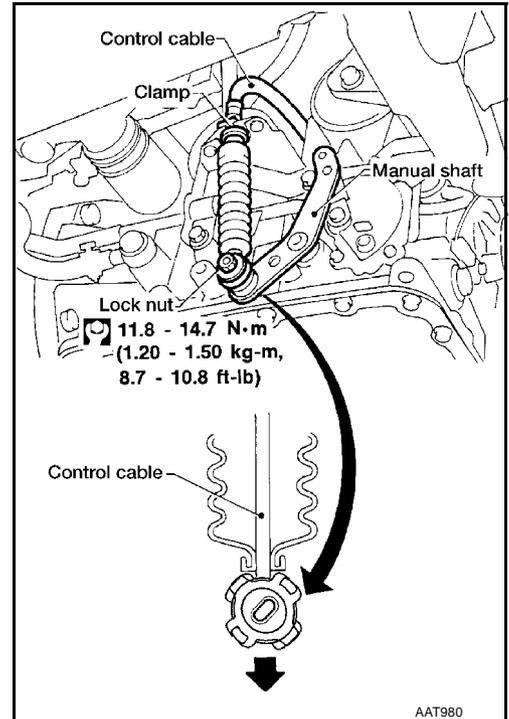
Control Cable Adjustment

Move selector lever from the “P” position to the “1” position. You should be able to feel the detents in each position. If the detents cannot be felt or if the pointer indicating the position is improperly aligned, the control cable needs adjustment.

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

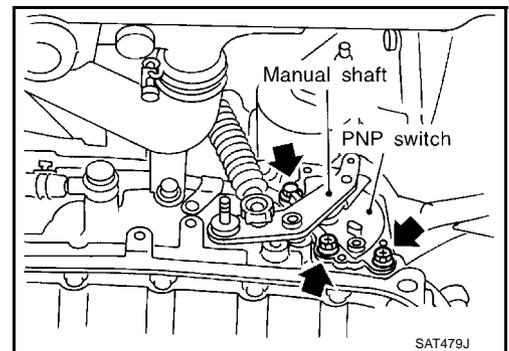
Specified force: 6.9N (0.7 kg, 1.5 lb)

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.

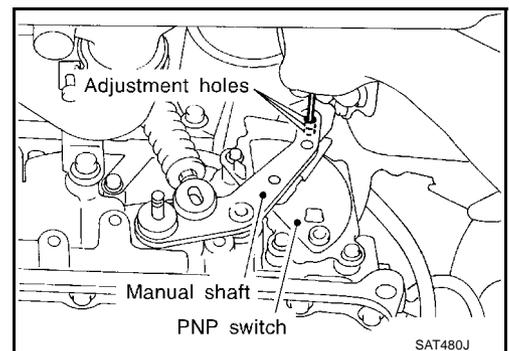


Park/Neutral Position (PNP) Switch Adjustment

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



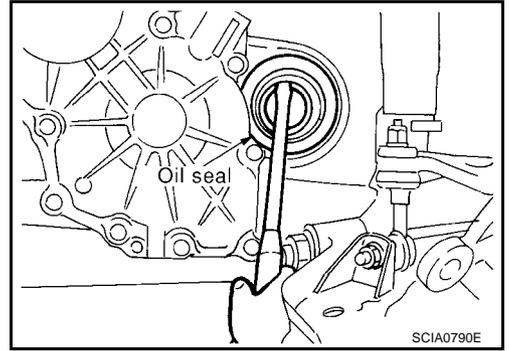
4. Use a 4 mm (0.157 in) pin for this adjustment.
 - a. Insert the pin straight into the manual shaft adjustment hole.
 - b. Rotate PNP switch until the pin can also be inserted straight into hole in PNP switch.
5. Tighten PNP switch fixing bolts.
6. Remove pin from adjustment hole after adjusting PNP switch.
7. Reinstall any part removed.
8. Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .
9. Check continuity of PNP switch. Refer to [AT-110, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) .



Differential Side Oil Seal Replacement

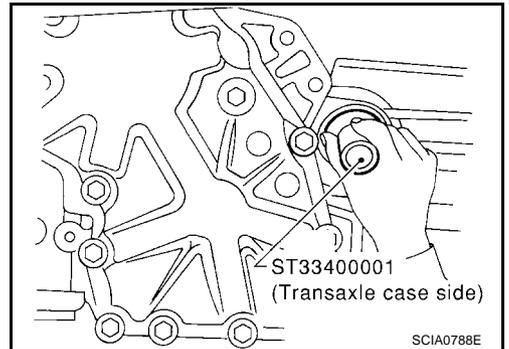
ECS0040F

1. Remove left side drive shaft assemblies. Refer to [FAX-11, "FRONT DRIVE SHAFT"](#) .
2. Remove transfer from right side of transaxle. Refer to [TF-11, "TRANSFER ASSEMBLY"](#) , then remove oil seals with tool.



3. Install oil seals.
 - Apply ATF to oil seal surface before installing.
 - Drift for installing

Transaxle case side :ST3340 0001
 converter housing side :KV4010 0621

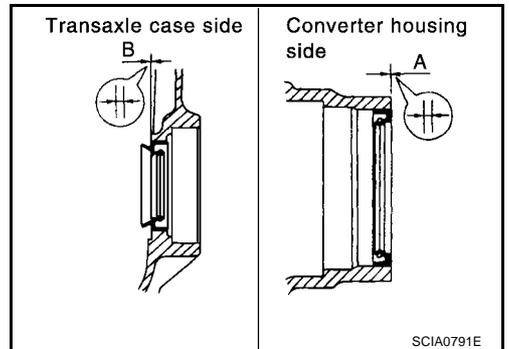


- Install oil seals so that dimensions "A" and "B" are within specifications.

Unit: mm (in)

A	B
-0.5 to 0.5 (-0.020 to 0.020)	-0.5 to 0.5 (-0.020 to 0.020)

4. Reinstall any part removed.

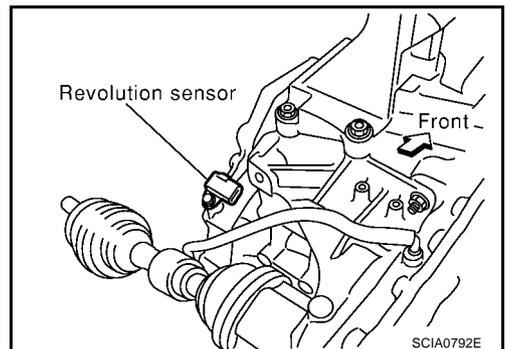


Revolution Sensor Replacement

ECS0040G

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

Always use new sealing parts.

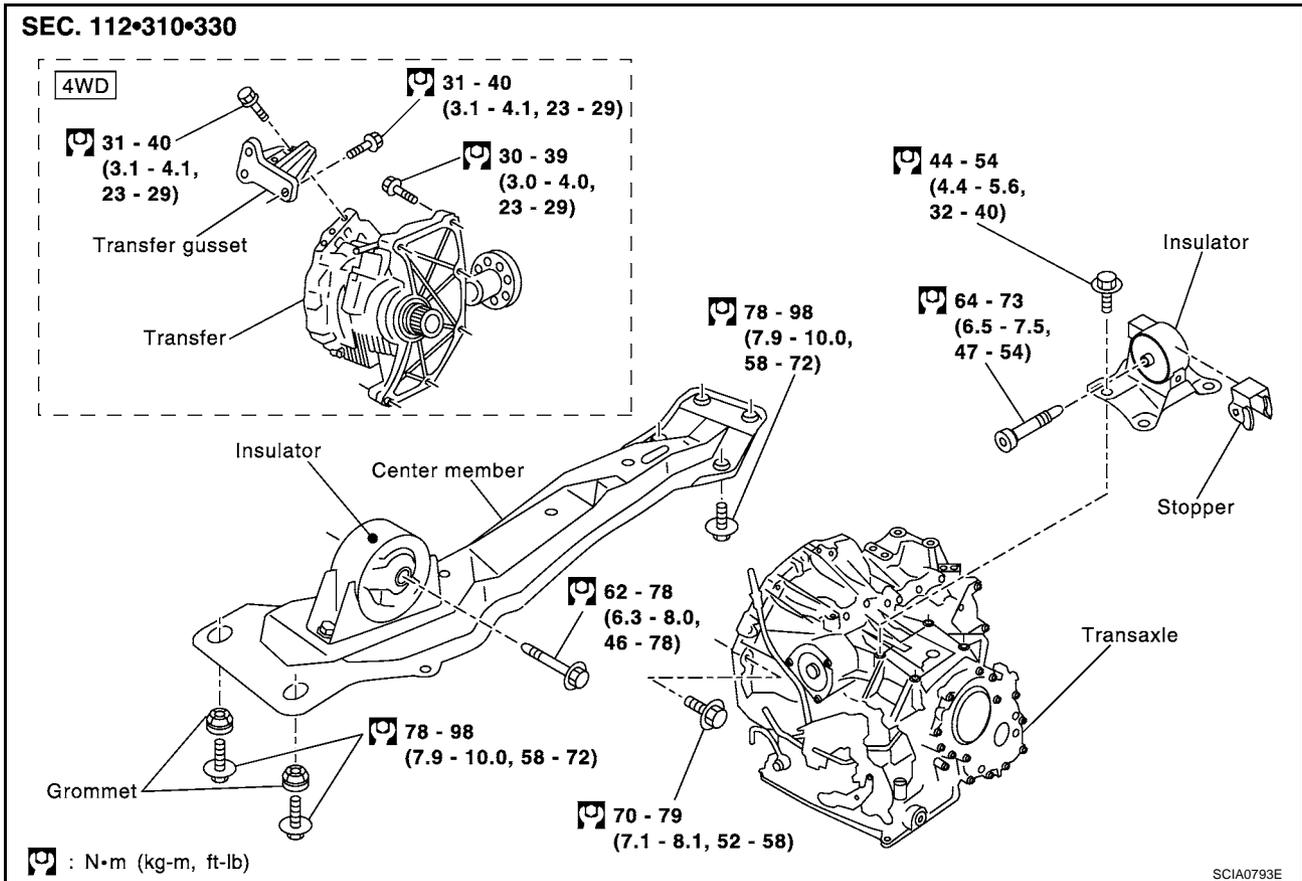


REMOVAL AND INSTALLATION

PFP:00000

Removal

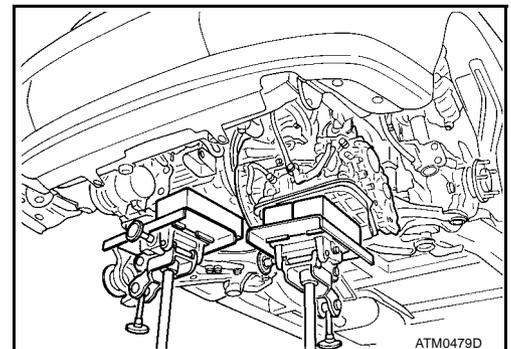
ECS004NC



CAUTION:

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

1. Remove battery and bracket, air cleaner and air duct.
2. Remove air breather hose.
3. Disconnect A/T solenoid valve harness connector, PNP switch harness connector and revolution sensor harness connector.
4. Remove crankshaft position sensor (Euro-OBD) from transaxle.
5. Disconnect control cable from transaxle.
6. Remove front exhaust tube.
7. Disconnect oil cooler hoses.
8. Remove drive shafts. Refer to [FAX-11, "FRONT DRIVE SHAFT"](#) , [RAX-9, "REAR DRIVE SHAFT"](#) .
9. Remove transfer. Refer to [TF-11, "TRANSFER ASSEMBLY"](#) .
10. Remove starter motor from transaxle.
11. Support transaxle with a jack.

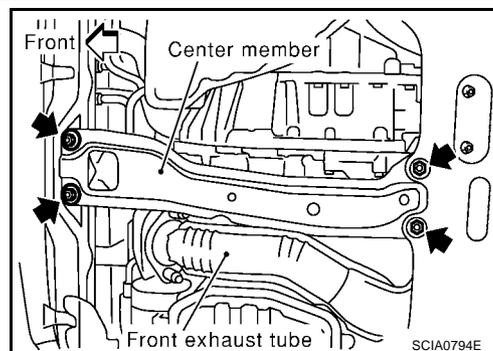


REMOVAL AND INSTALLATION

[ALL]

12. Remove center member, engine insulator and engine mounting bracket.

- Tighten center member fixing bolts to specified torque, Refer to [EM-69, "ENGINE ASSEMBLY"](#).



13. Remove suspension member. Refer to [FSU-12, "FRONT SUSPENSION MEMBER"](#).

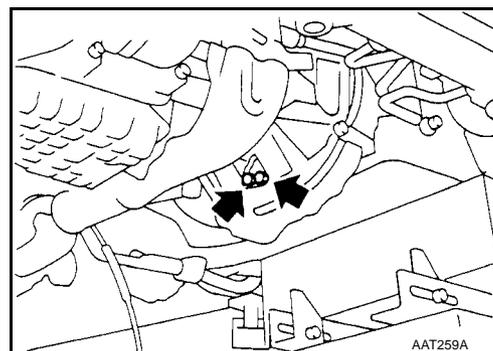
14. Remove dust cover from converter housing. Rotate crankshaft to gain access to securing bolts.

15. Remove securing bolts between drive plate and torque converter. When crank shaft rotates, turn to right at the front side of engine.

16. Support engine with a jack.

17. Remove bolts fixing transaxle to engine.

18. Lower transaxle while supporting it with a jack.



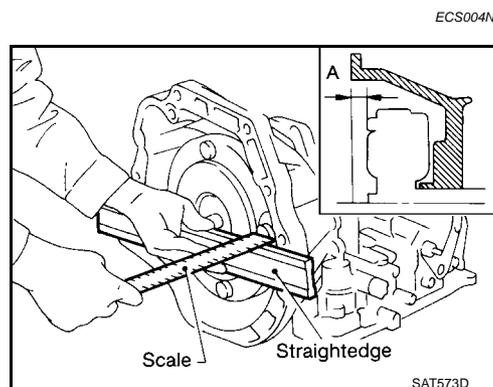
Installation

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

Distance "A"

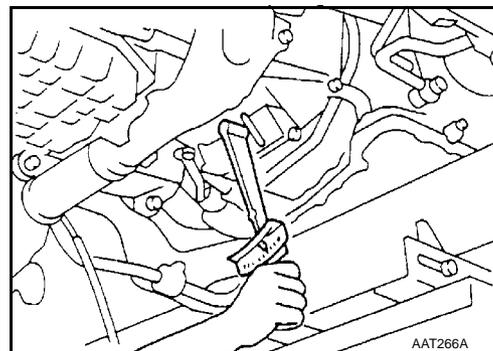
QR20DE : 19 mm (0.75 in) or more

QR25DE : 14 mm (0.55 in) or more



2. Install torque converter to drive plate.

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

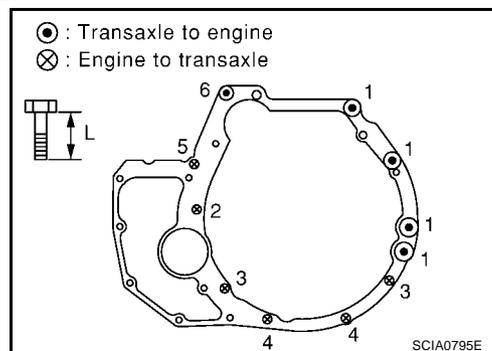


REMOVAL AND INSTALLATION

[ALL]

3. Tighten belts fixing transaxle.

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	Bolt length "L" mm (in)
1	69.6 - 79.4 (7.1 - 8.1, 51.4 - 58.6)	49 (1.93)
2		45 (1.77)
3	39.2 - 46.1 (4.0 - 4.7, 29.0 - 34.0)	40 (1.57)
4		30 (1.18)
5	30.4 - 40.2 (3.1 - 4.1, 22.4 - 29.7)	40 (1.57)
6		45 (1.97)



4. Reinstall any part removed.
5. Adjust control cable. Refer to [AT-416, "Control Cable Adjustment"](#) .
6. Check continuity of PNP switch. Refer to [AT-110, "DTC P0705 PARK/NEUTRAL POSITION \(PNP\) SWITCH"](#) .
7. Refill transaxle with ATF and check fluid level.
8. Move selector lever through all positions to be sure that transaxle operates correctly. With parking brake applied, idle engine. Move selector lever through "N" to "D", to "2", to "1" and "R" positions. A slight shock should be felt through the hand gripping the selector each time the transaxle is shifted.
9. Perform road test. Refer to [AT-68, "Road Test"](#) .



OVERHAUL

[ALL]

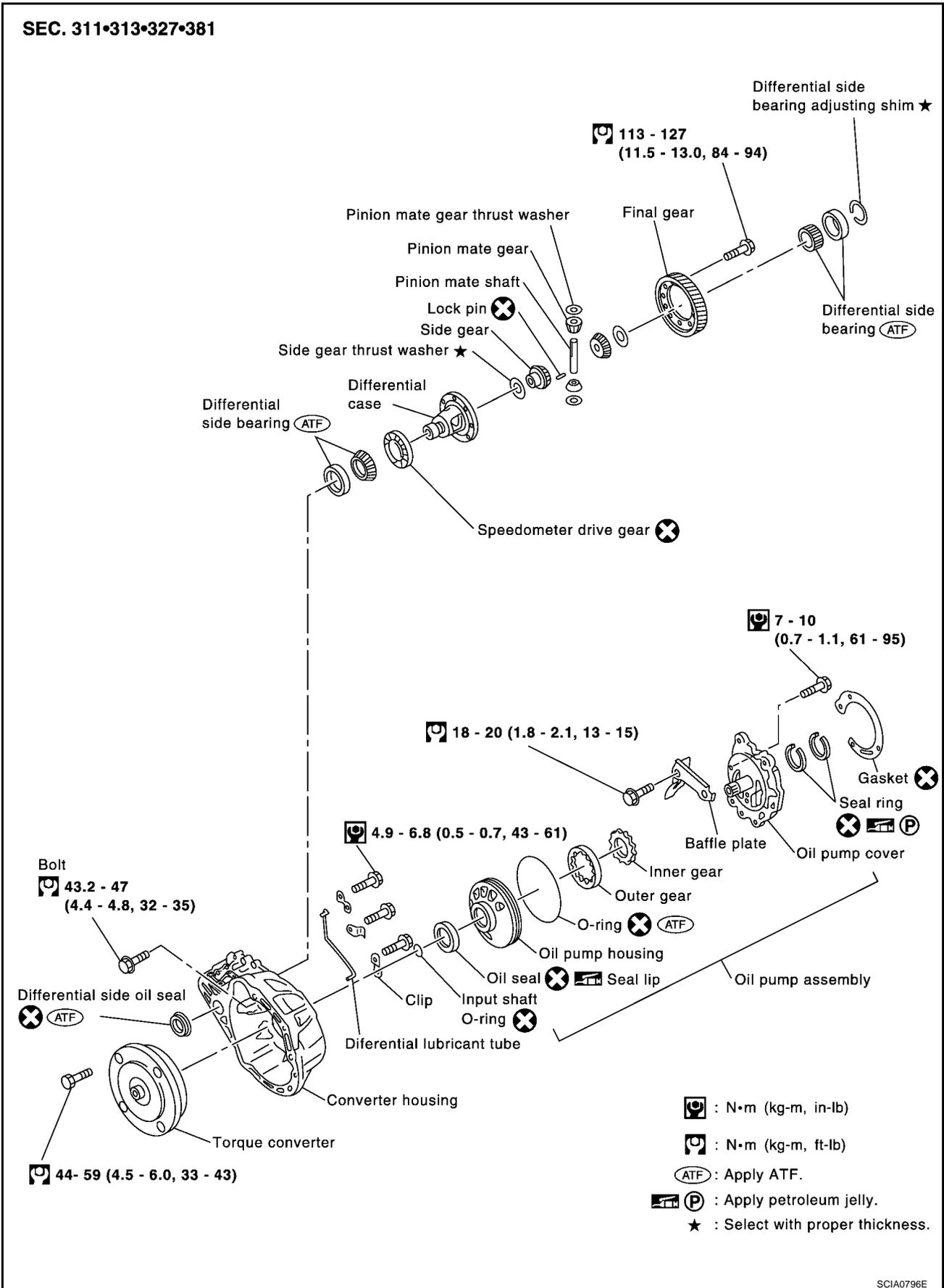
OVERHAUL Components

PF0:0000

ECS004LW

SEC. 311•313•327•381

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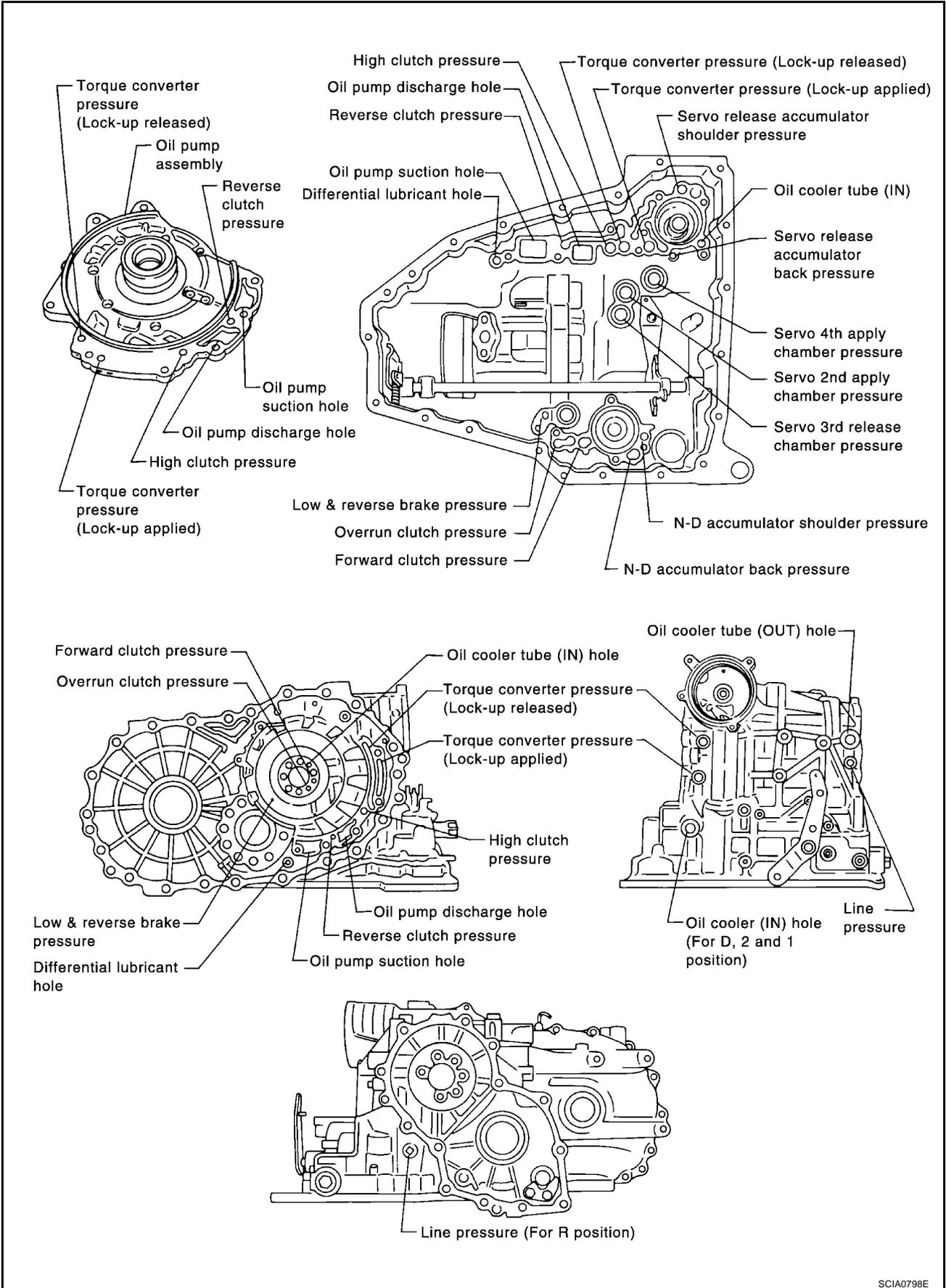
SCIA0796E

OVERHAUL

[ALL]

Oil Channel

ECS004LX



SCIA0798E

OVERHAUL

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

ECS004LY

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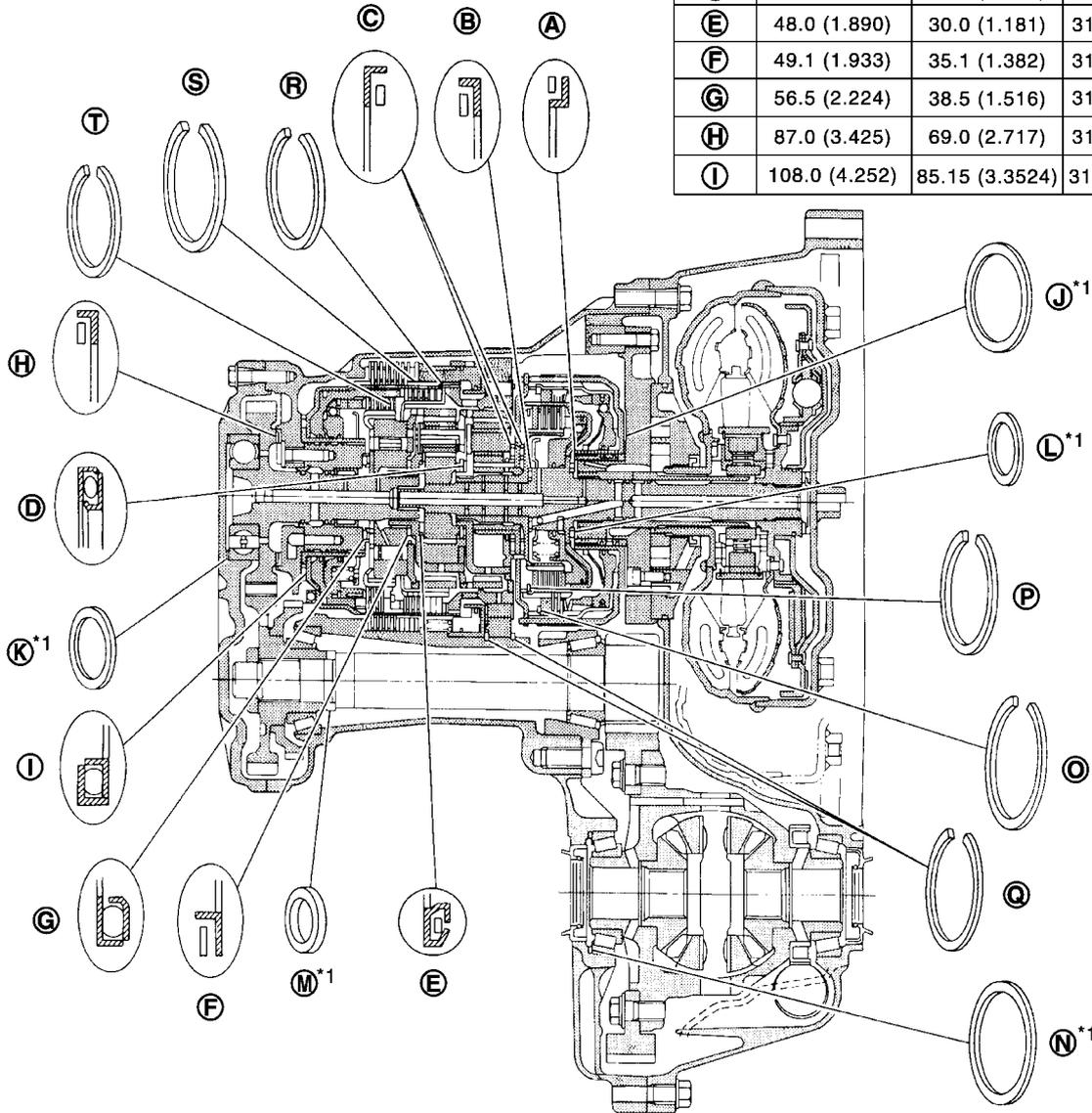
Outer diameter of thrust washers

Item number	Outer diameter mm (in)	Part number*2
J *1	76.0 (2.992)	31508 80X13 - 31508 80X20
K *1	80.0 (3.150)	31438 80X60 - 31438 80X70

*1: Select proper thickness.

Outer and inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Part number*2
A	49.1 (1.933)	35.2 (1.386)	31407 80X10
B	42.0 (1.654)	23.7 (0.933)	31407 80X01
C	70.0 (2.756)	50.0 (1.969)	31407 80X09
D	51.0 (2.008)	33.1 (1.303)	31407 80X02
E	48.0 (1.890)	30.0 (1.181)	31407 80X03
F	49.1 (1.933)	35.1 (1.382)	31407 80X10
G	56.5 (2.224)	38.5 (1.516)	31407 80X08
H	87.0 (3.425)	69.0 (2.717)	31407 80X07
I	108.0 (4.252)	85.15 (3.3524)	31407 80X06



Outer & inner diameter of bearing races, adjusting shims and adjusting spacer

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Part number*2
L *1	51.0 (2.008)	36.0 (1.417)	31435 80X00 - 31435 80X14
M *1	38.0 (1.496)	28.1 (1.106)	31439 85X01 - 31439 85X06 31439 83X11 - 31439 83X24 31439 81X00 - 31439 81X24 31439 81X46 - 31439 81X49 31439 81X60 - 31439 81X74
N *1	75.0 (2.953)	67.0 (2.638)	31438 80X00 - 31438 80X11

*1: Select proper thickness.

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

Outer diameter of snap rings

Item number	Outer diameter mm (in)	Part number*2
O	150 (5.91)	31506 80X13
P	119.1 (4.689)	31506 80X06
Q	182.8 (7.197)	31506 80X08
R	144.8 (5.701)	31506 80X03
S	173.8 (6.843)	31506 80X09
T	133.9 (5.272)	31506 80X01

SCIA0799E

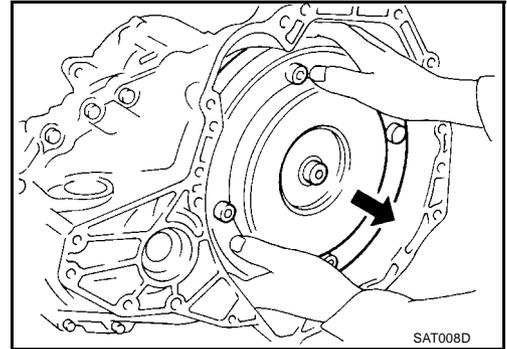
DISASSEMBLY

PFP:31020

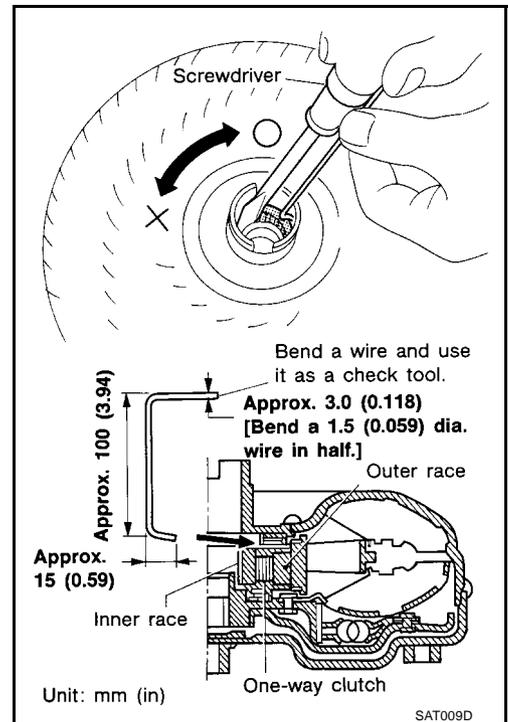
Disassembly

ECS004LZ

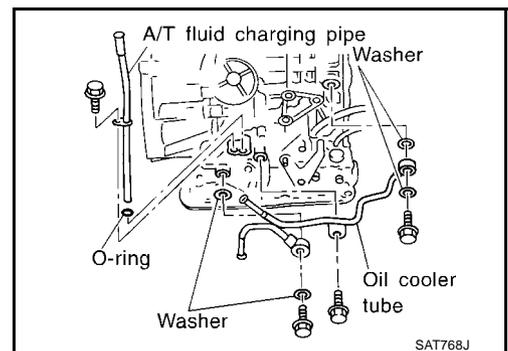
1. Drain ATF through drain plug.
2. Remove torque converter.



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



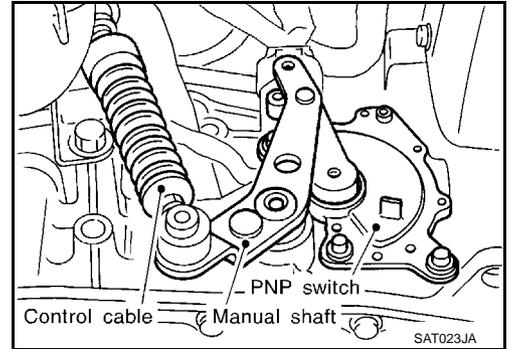
4. Remove A/T fluid charging pipe and fluid cooler tube.



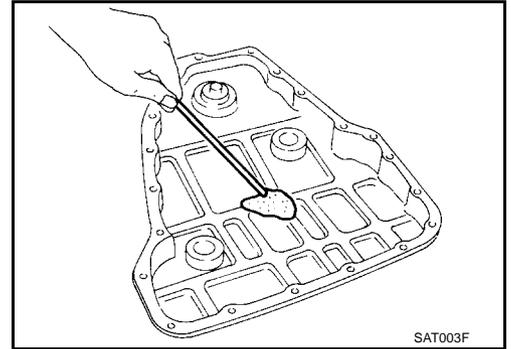
DISASSEMBLY

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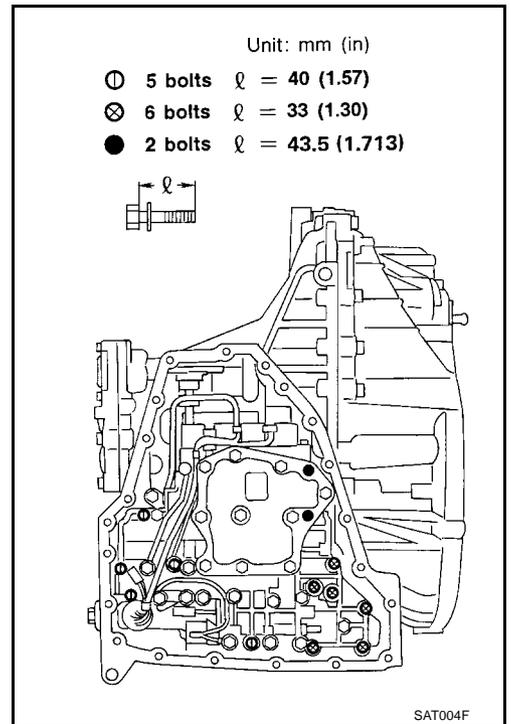
5. Set manual shaft to position P.
6. Remove park/neutral position (PNP) switch.



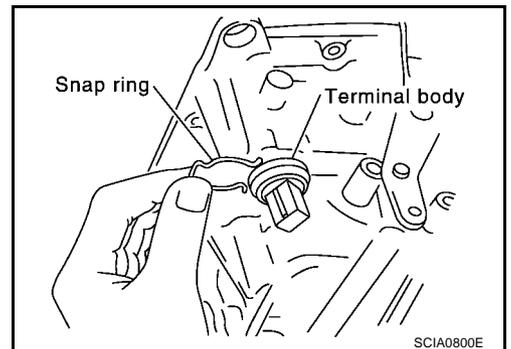
7. Remove oil pan and oil pan gasket.
 - Do not reuse oil pan bolts.
8. Check foreign materials in oil pan to help determine causes of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.
 - If frictional material is detected, replace radiator after repair of A/T. Refer to [CO-11, "RADIATOR"](#) .



9. Remove control valve assembly according to the following procedures.
 - a. Remove control valve assembly mounting bolts I , X and ●.



- b. Remove snap ring from terminal body.

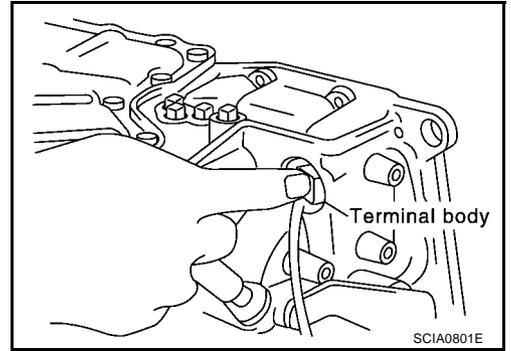


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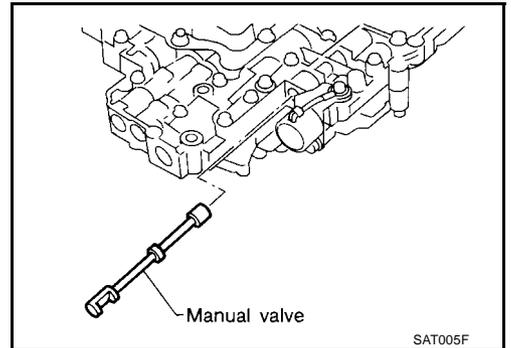
DISASSEMBLY

[ALL]

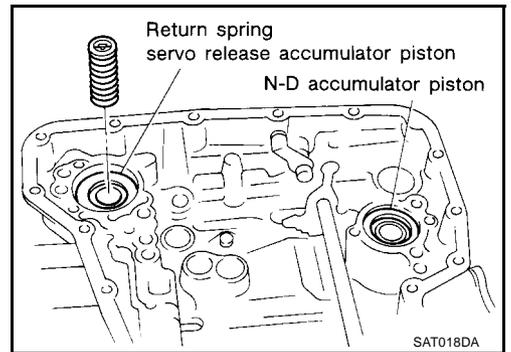
c. Push terminal body into transmission case.



10. Remove manual valve from control valve assembly.

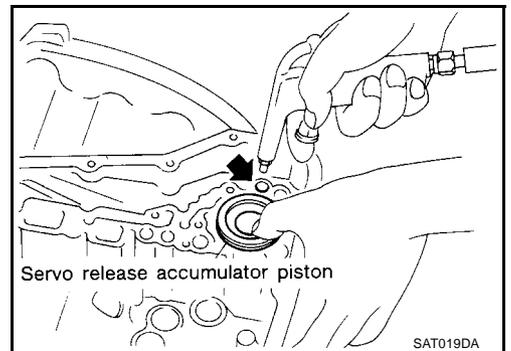


11. Remove return spring from servo release accumulator piston.



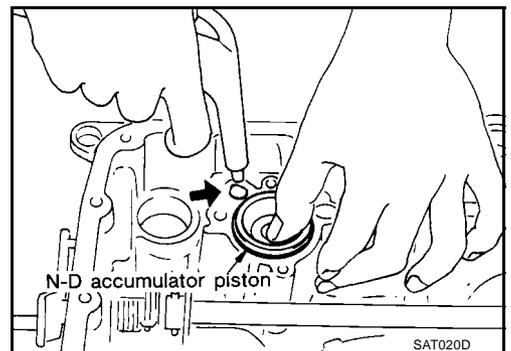
12. Remove servo release accumulator piston with compressed air.

13. Remove O-rings from servo release accumulator piston.



14. Remove N-D accumulator piston and return spring with compressed air.

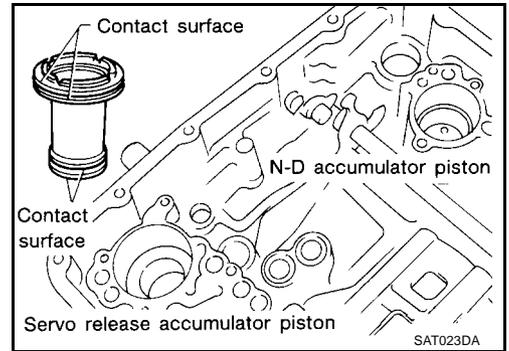
15. Remove O-rings from N-D accumulator piston.



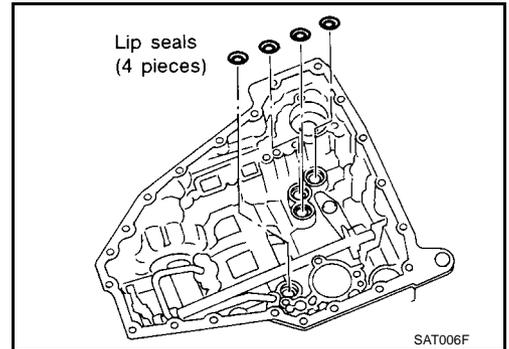
DISASSEMBLY

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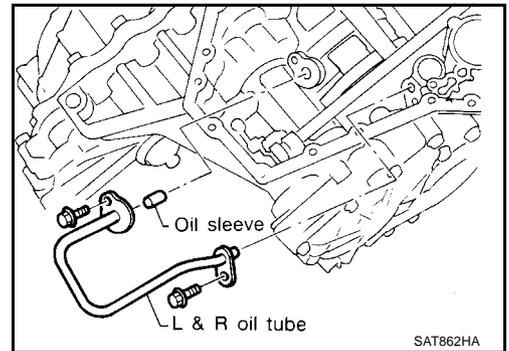
16. Check accumulator pistons and contact surface of transmission case for damage.
17. Check accumulator return springs for damage and free length.



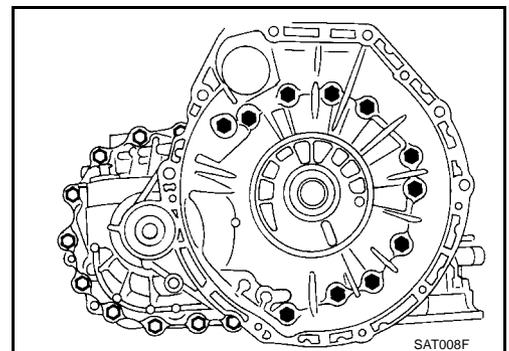
18. Remove lip seals.



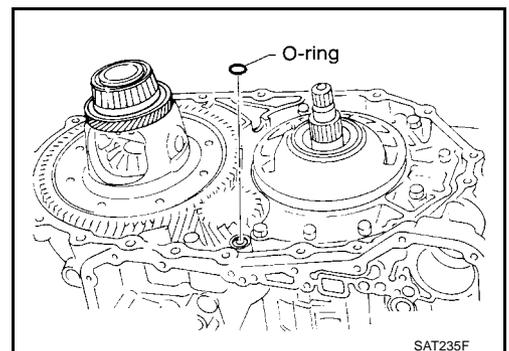
19. Remove L & R oil tube and oil sleeve.



20. Remove converter housing according to the following procedures.
 - a. Remove converter housing mounting bolts.
 - b. Remove converter housing by tapping it lightly.



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

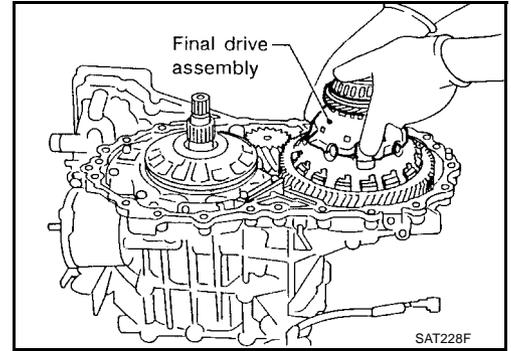


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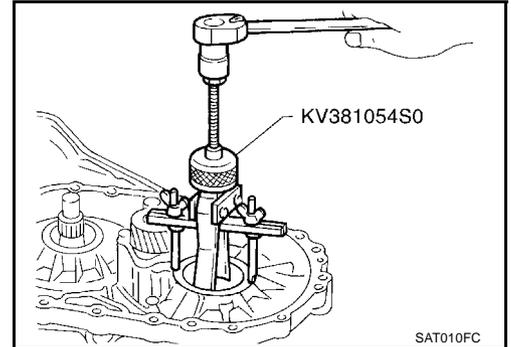
DISASSEMBLY

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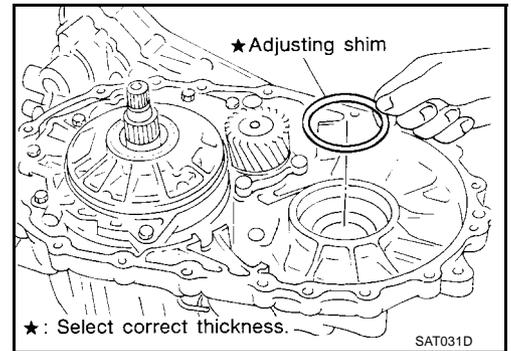
21. Remove final drive assembly from transmission case.



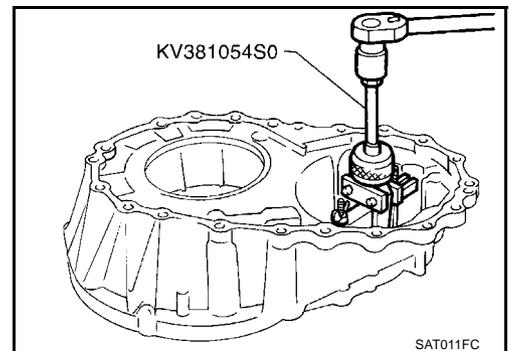
22. Remove differential side bearing outer race and side bearing adjusting shim from transmission case.



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

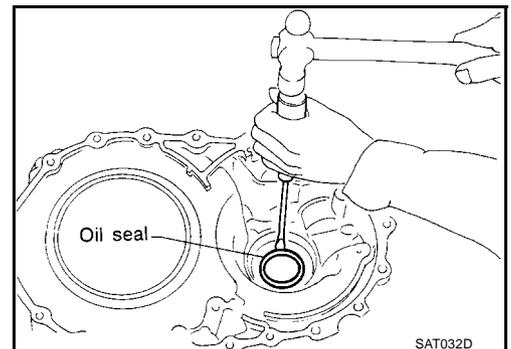


24. Remove differential side bearing outer race from converter housing.



25. Remove oil seal with screwdriver from converter housing.

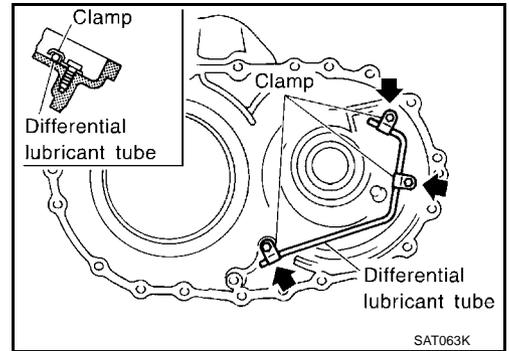
- Be careful not to damage case.



DISASSEMBLY

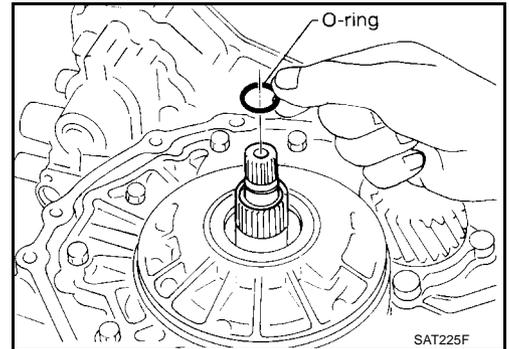
[ALL]

26. Remove differential lubricant tube from converter housing.

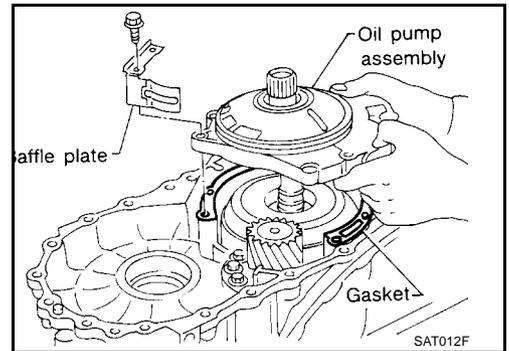


27. Remove oil pump according to the following procedures.

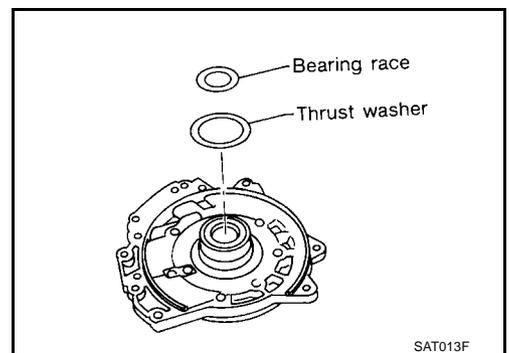
a. Remove O-ring from input shaft.



b. Remove oil pump assembly, baffle plate and gasket from transmission case.



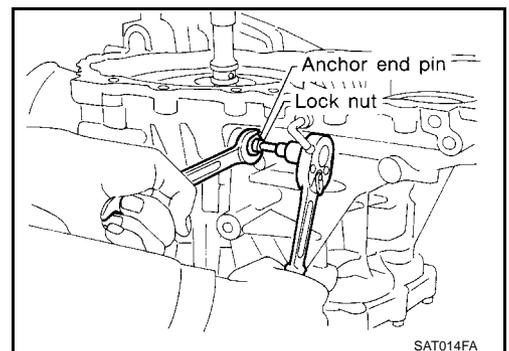
c. Remove thrust washer and bearing race from oil pump assembly.



28. Remove brake band according to the following procedures.

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

- **Do not reuse anchor end pin.**

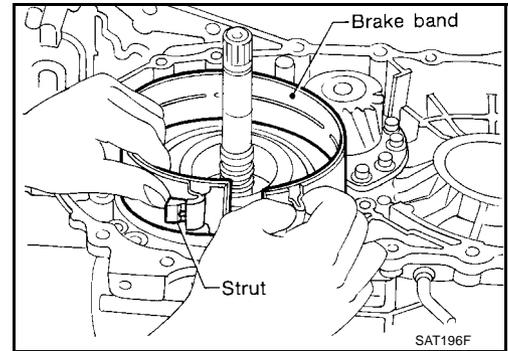


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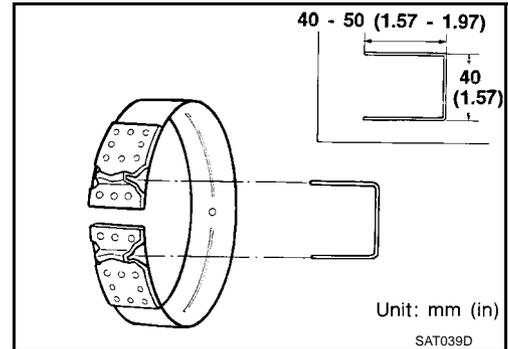
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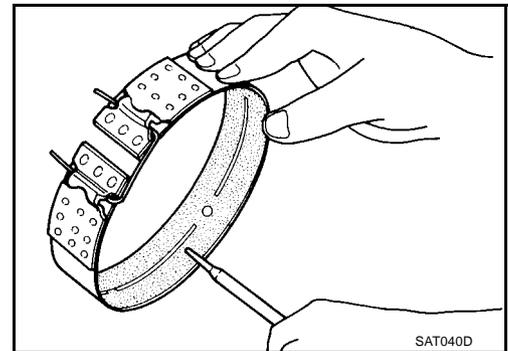
b. Remove brake band and strut from transmission case.



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

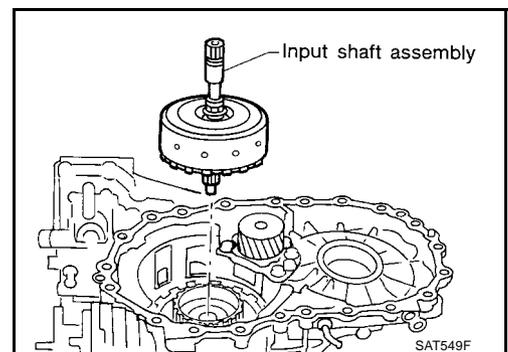


c. Check brake band facing for damage, cracks, wear or burns.

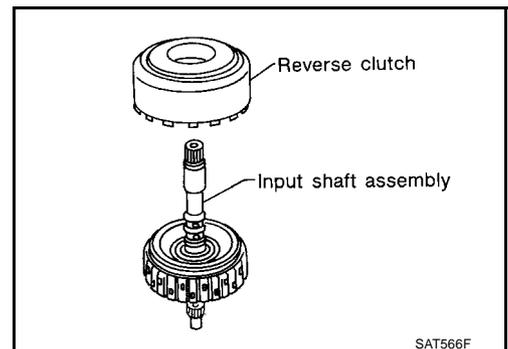


29. Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures.

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



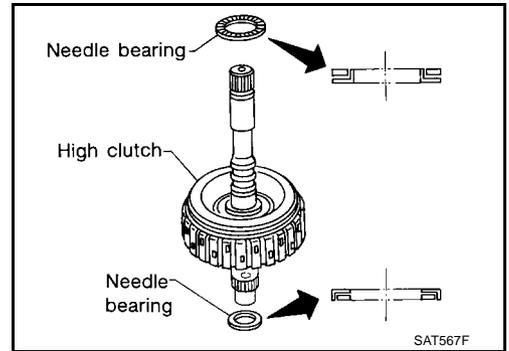
b. Remove input shaft assembly (high clutch) from reverse clutch.



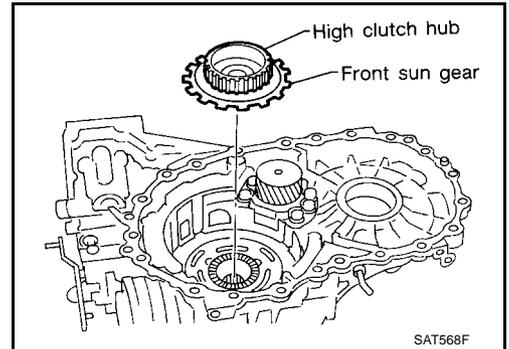
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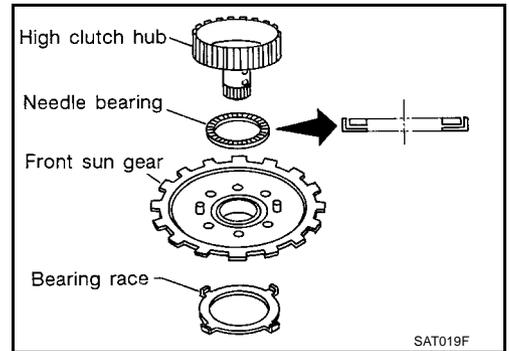
- c. Remove needle bearings from high clutch drum and check for damage or wear.



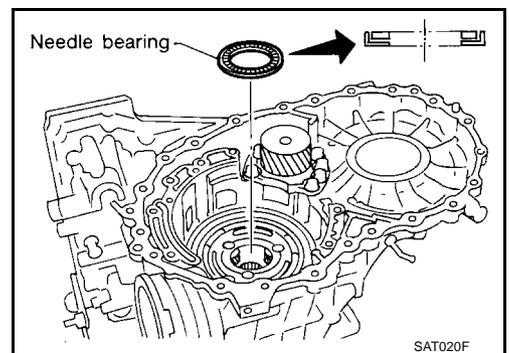
- d. Remove high clutch hub and front sun gear from transmission case.



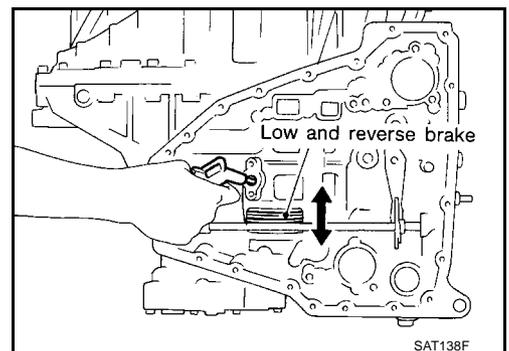
- e. Remove front sun gear and needle bearing from high clutch hub and check for damage or wear.
f. Remove bearing race from front sun gear and check for damage or wear.



30. Remove needle bearing from transmission case and check for damage or wear.



31. Apply compressed air and check to see that low and reverse brake operates.



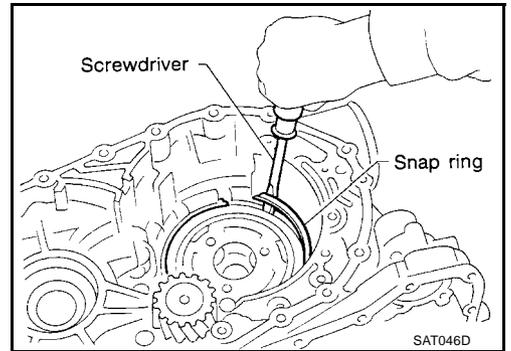
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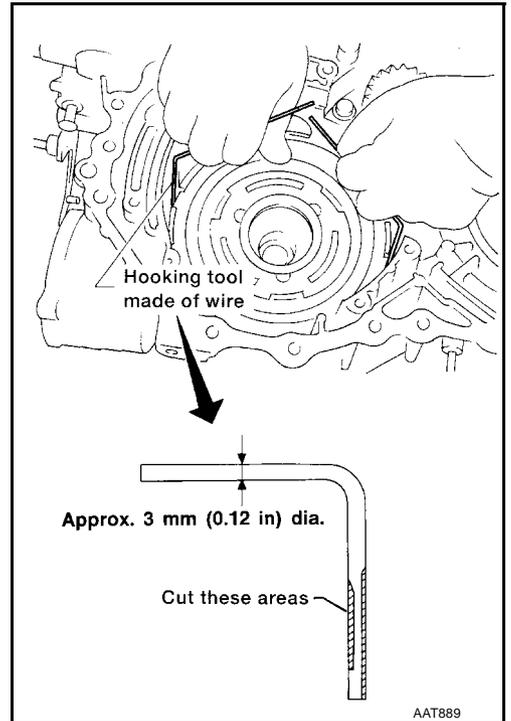
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32. Remove low one-way clutch and front planetary carrier assembly according to the following procedures.

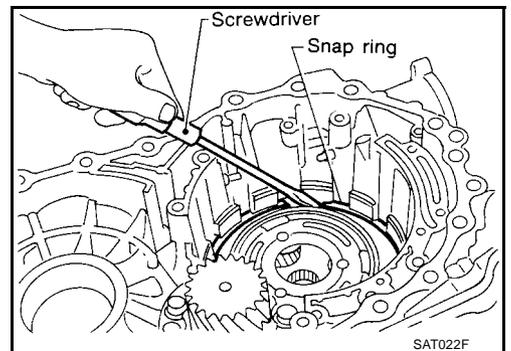
a. Remove snap ring with flat-bladed screwdriver.



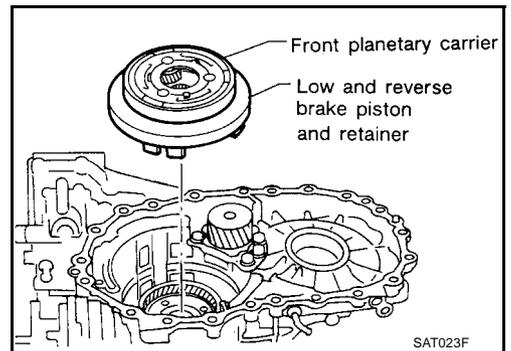
b. Remove low one-way clutch with a hook made of wire.



c. Remove snap ring with flat-bladed screwdriver.



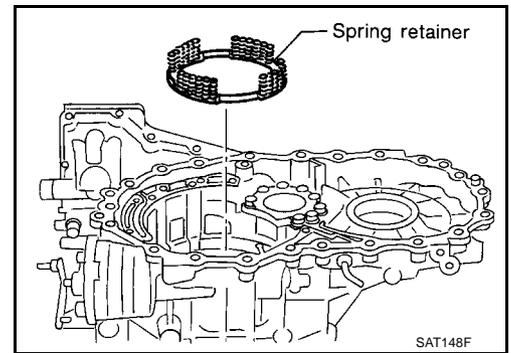
d. Remove front planetary carrier with low and reverse brake piston and retainer.



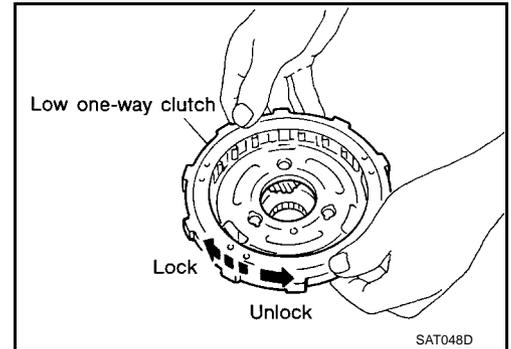
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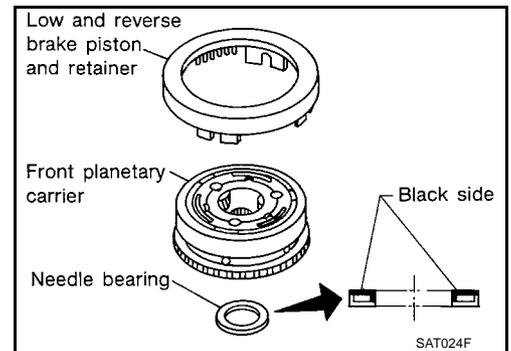
- e. Remove low and reverse brake spring retainer.
● Do not remove return springs from spring retainer.



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



- g. Remove needle bearing, low and reverse brake piston and retainer from front planetary carrier.

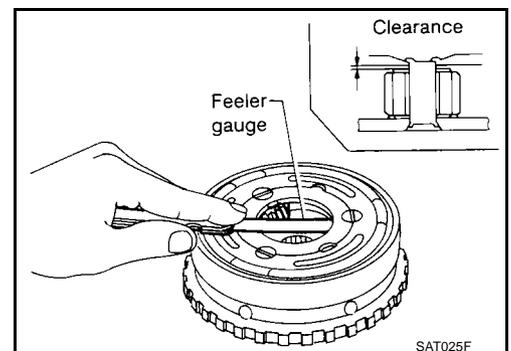


- h. Check front planetary carrier, low one-way clutch and needle bearing for damage or wear.
i. Check clearance between planetary gears and planetary carrier with feeler gauge.

Standard clearance: 0.20 - 0.70 mm (0.0079 - 0.0276 in)

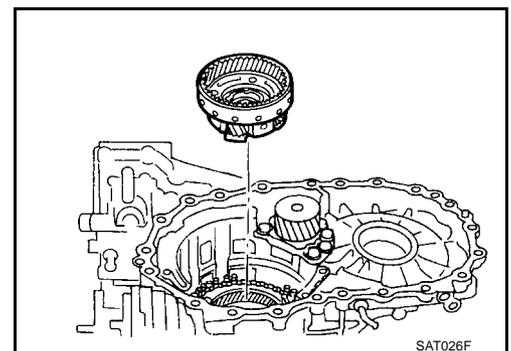
Allowable limit: 0.80 mm (0.0315 in)

Replace front planetary carrier if the clearance exceeds allowable limit.



33. Remove rear planetary carrier assembly and rear sun gear according to the following procedures.

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

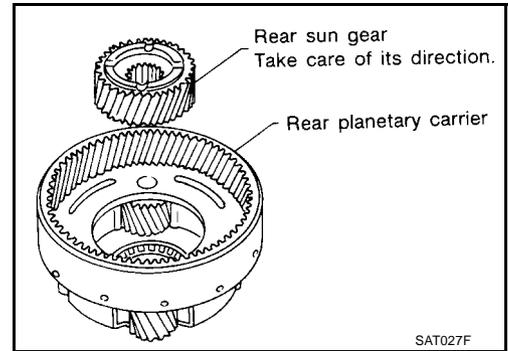


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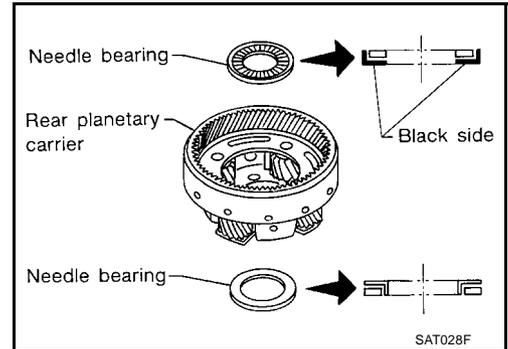
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- b. Remove rear sun gear from rear planetary carrier.



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

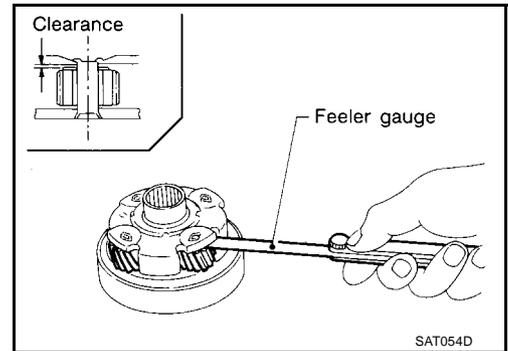


- d. Check rear planetary carrier, rear sun gear and needle bearings for damage or wear.
- e. Check clearance between pinion washer and rear planetary carrier with feeler gauge.

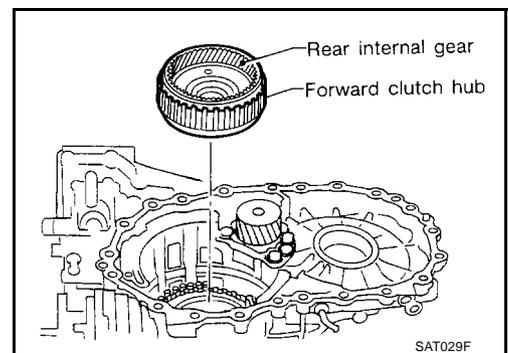
Standard clearance: 0.20 - 0.70 mm (0.0079 - 0.0276 in)

Allowable limit: 0.80 mm (0.0315 in)

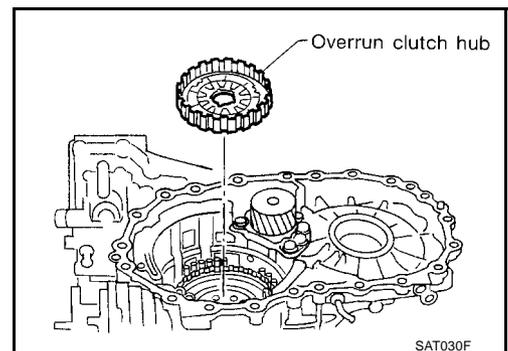
Replace rear planetary carrier if the clearance exceeds allowable limit.



34. Remove rear internal gear and forward clutch hub from transmission case.



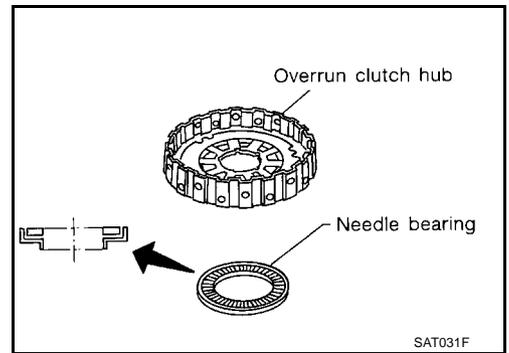
35. Remove overrun clutch hub from transmission case.



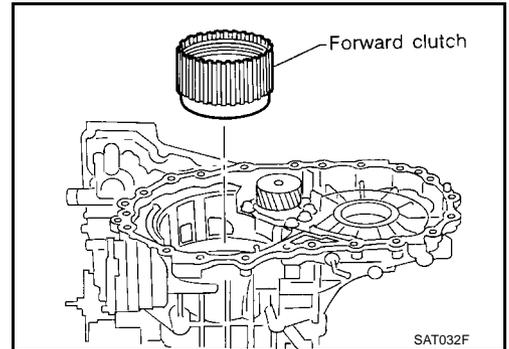
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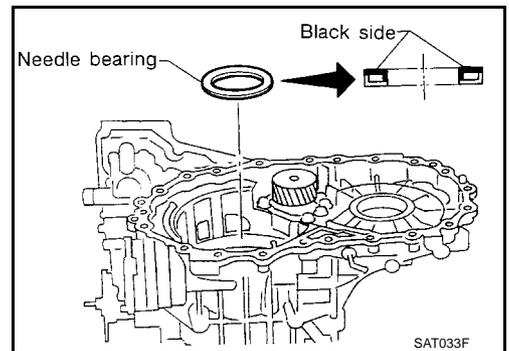
36. Remove needle bearing from overrun clutch hub and check for damage or wear.



37. Remove forward clutch assembly from transmission case.



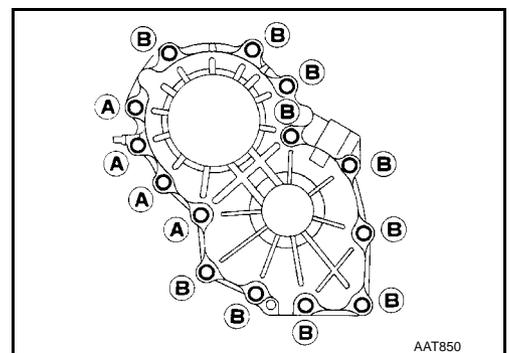
38. Remove needle bearing from transmission case.



39. Remove output shaft assembly according to the following procedures.

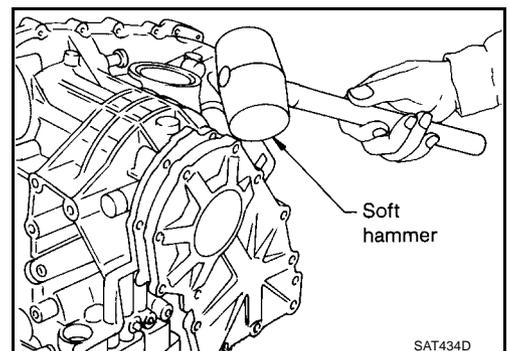
- a. Remove side cover bolts.

- Do not mix bolts A and B.
- Always replace bolts A as they are self-sealing bolts.



- b. Remove side cover by lightly tapping it with a soft hammer.

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

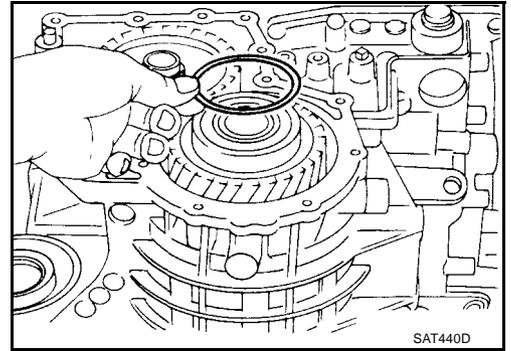


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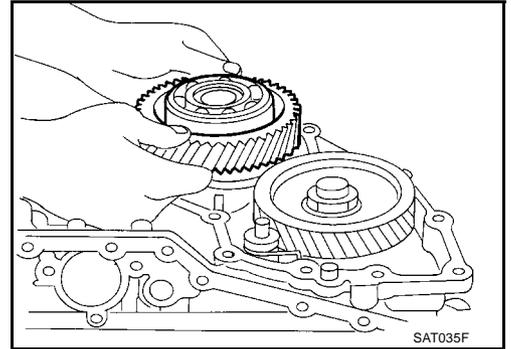
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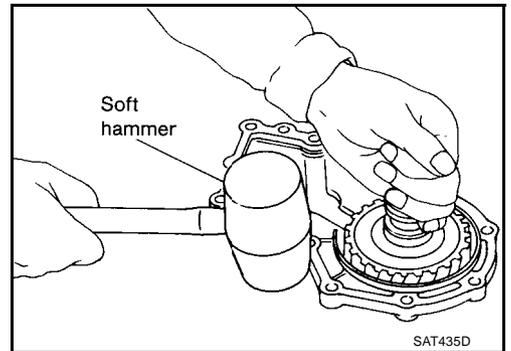
c. Remove adjusting shim.



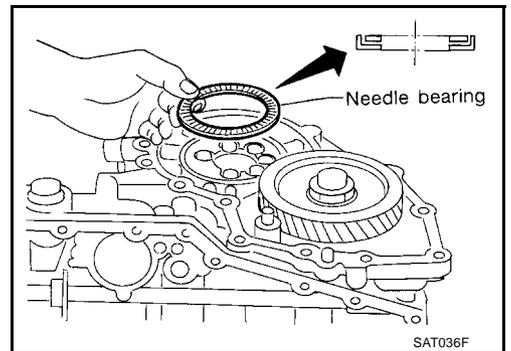
d. Remove output shaft assembly.



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

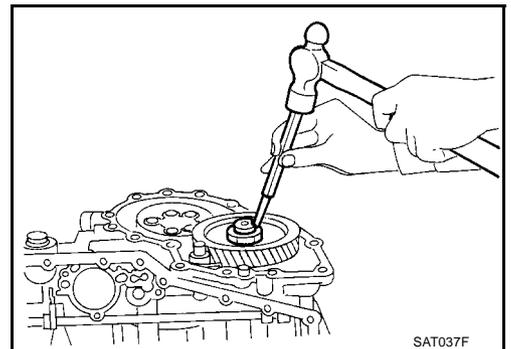


e. Remove needle bearing.



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

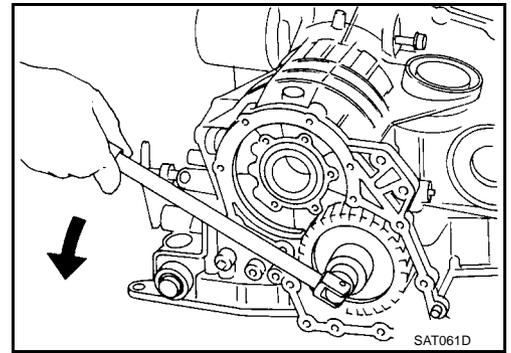
- a. Set manual shaft to position P to fix idler gear.
- b. Unlock idler gear lock nut using a pin punch.



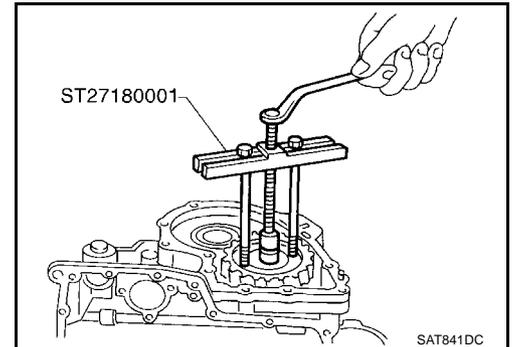
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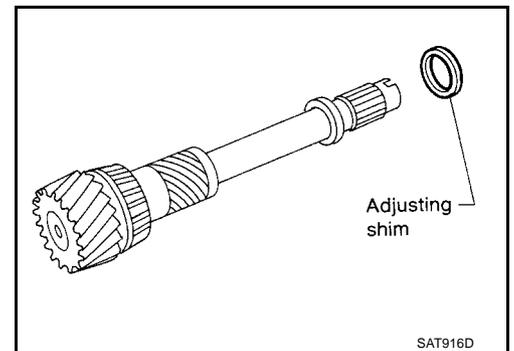
- c. Remove idler gear lock nut.
 - Do not reuse idler gear lock nut.



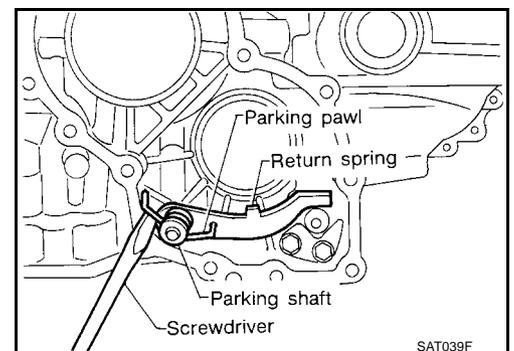
- d. Remove idler gear with puller.



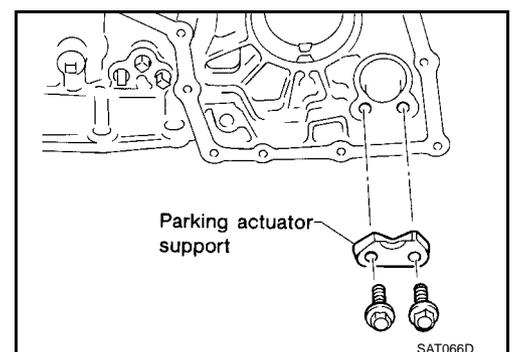
- e. Remove reduction pinion gear.
- f. Remove adjusting shim from reduction pinion gear.



- 41. Remove return spring from parking shaft with screwdriver.
- 42. Draw out parking shaft and remove parking pawl from transmission case.
- 43. Check parking pawl and shaft for damage or wear.



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

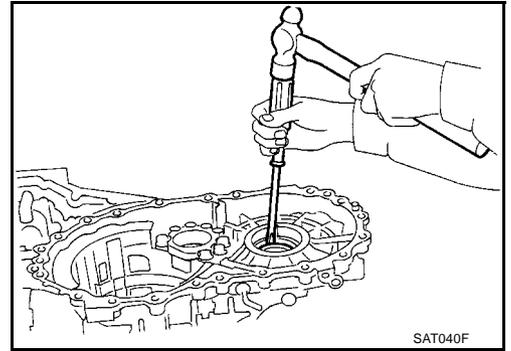


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46. Remove side oil seal with screwdriver from transmission case.



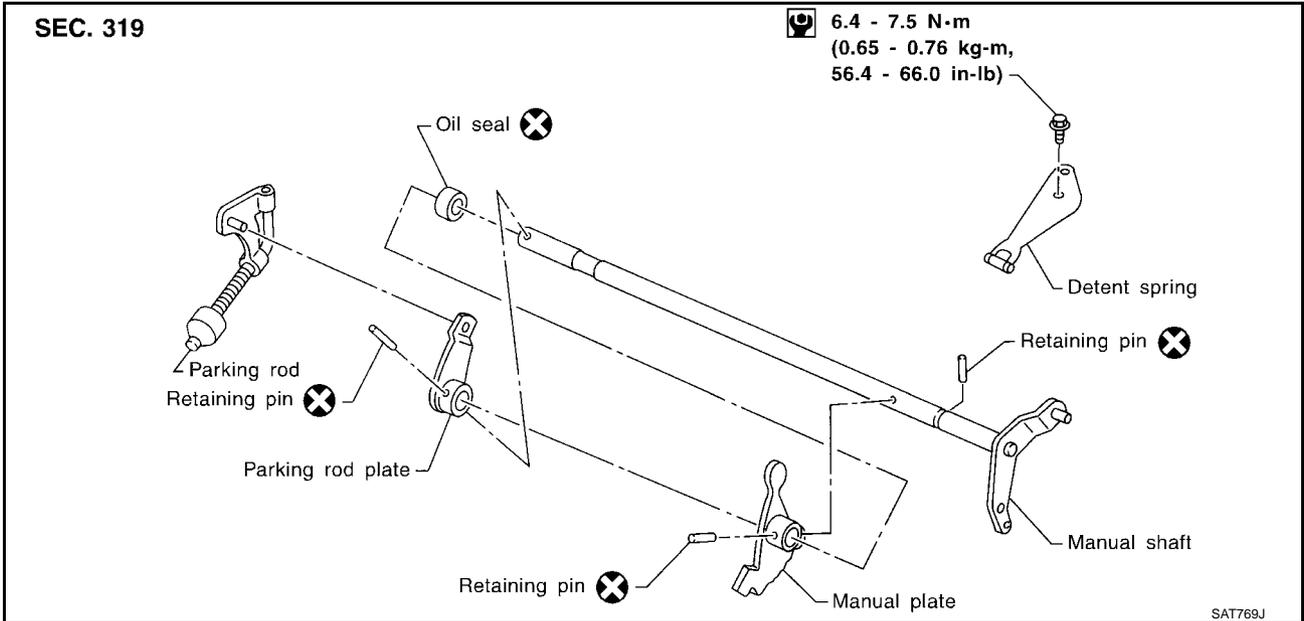
REPAIR FOR COMPONENT PARTS

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Manual Shaft COMPONENTS

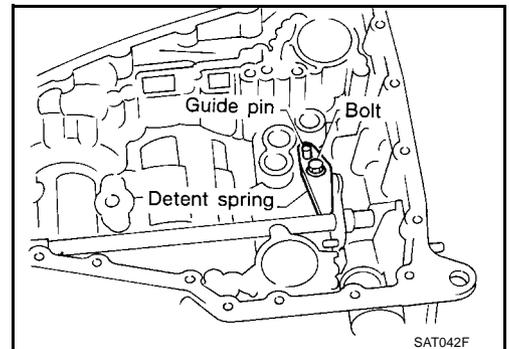
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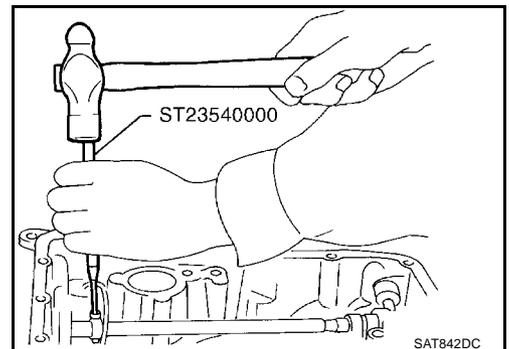


REMOVAL

1. Remove detent spring from transmission case.



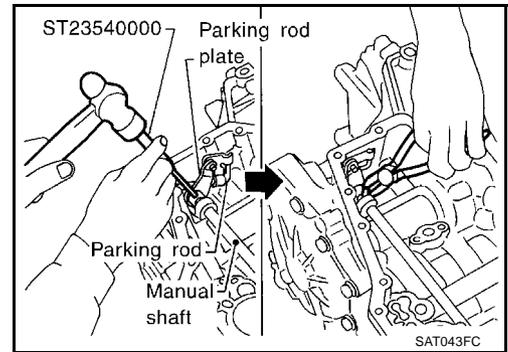
2. Drive out manual plate retaining pin.



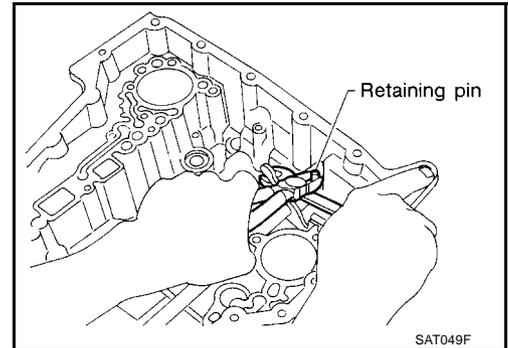
REPAIR FOR COMPONENT PARTS

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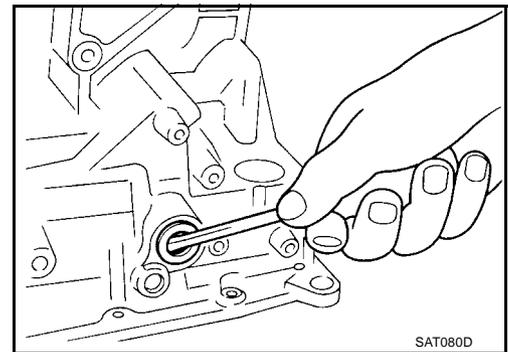
3. Drive and pull out parking rod plate retaining pin.
4. Remove parking rod plate from manual shaft.
5. Draw out parking rod from transmission case.



6. Pull out manual shaft retaining pin.
7. Remove manual shaft and manual plate from transmission case.



8. Remove manual shaft oil seal.

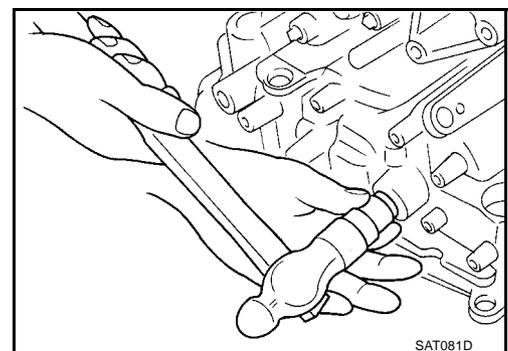


INSPECTION

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

INSTALLATION

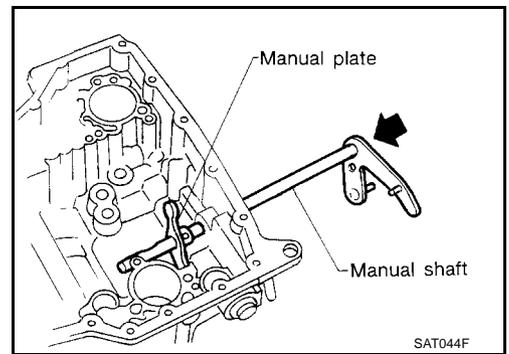
1. Install manual shaft oil seal.
 - Apply ATF to outer surface of oil seal.



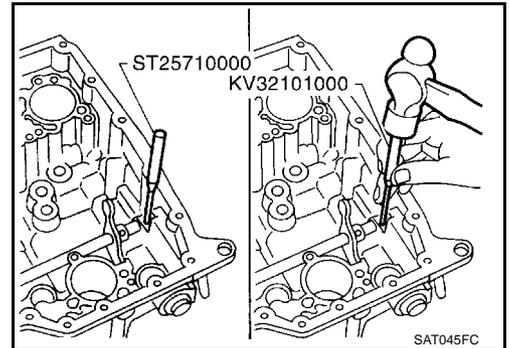
REPAIR FOR COMPONENT PARTS

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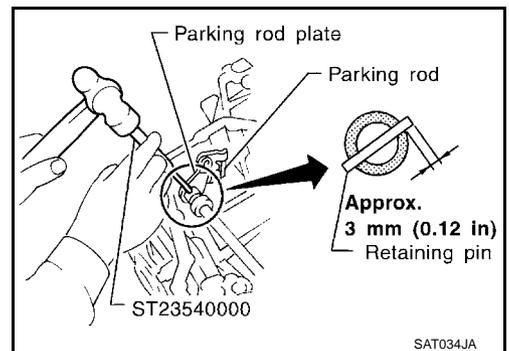
2. Install manual shaft and manual plate.



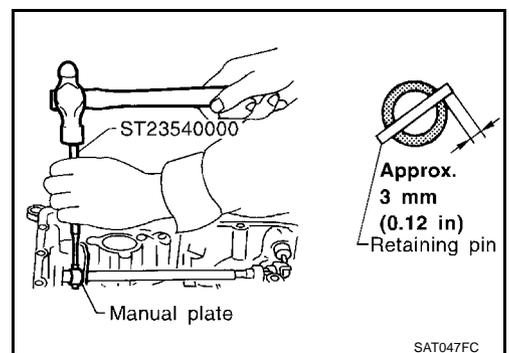
3. Align groove of manual shaft and hole of transmission case.
4. Install manual shaft retaining pin up to bottom of hole.



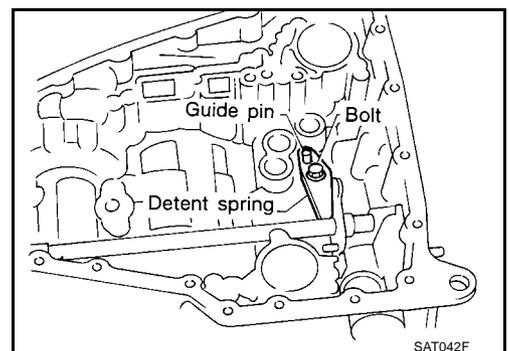
5. Install parking rod to parking rod plate.
6. Set parking rod assembly onto manual shaft and drive retaining pin.
● Both ends of pin should protrude.



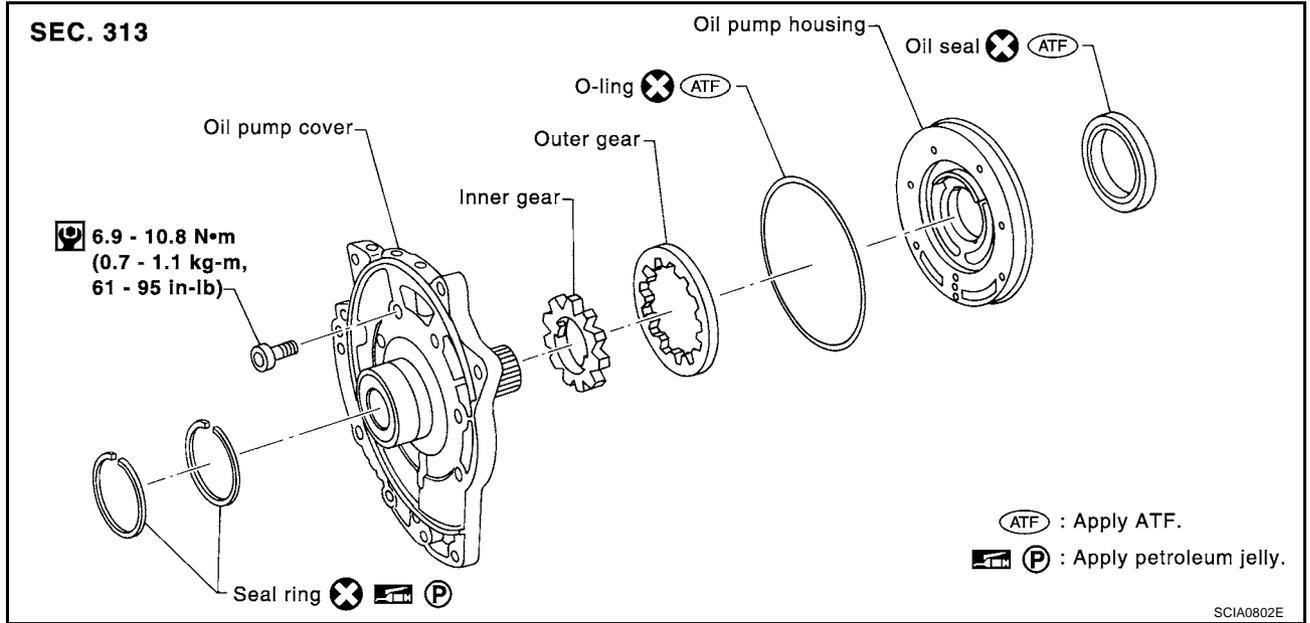
7. Drive manual plate retaining pin.
● Both ends of pin should protrude.



8. Install detent spring. Tighten detent spring bolts to the specified torque. Refer to [AT-441, "COMPONENTS"](#).

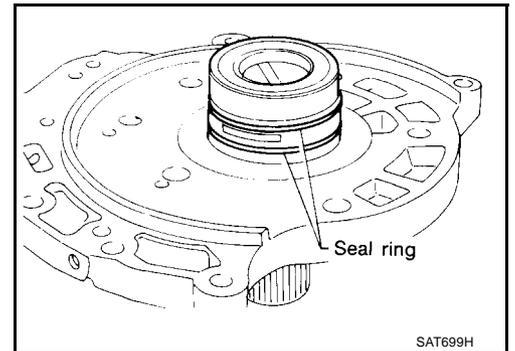


Oil Pump COMPONENTS

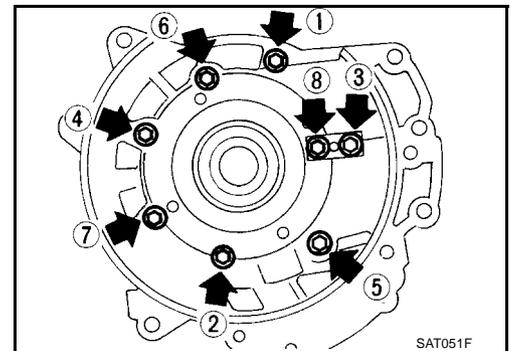


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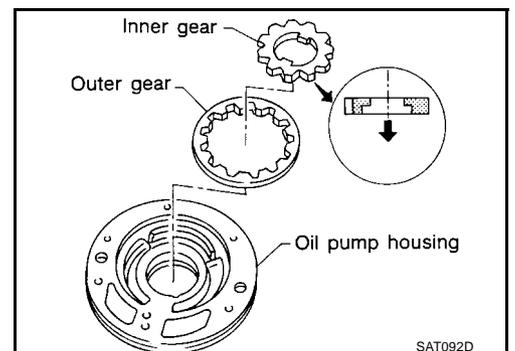
1. Remove seal rings.



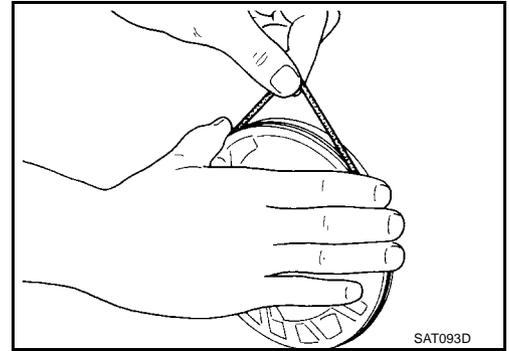
2. Loosen bolts in a crisscross pattern and remove oil pump cover.



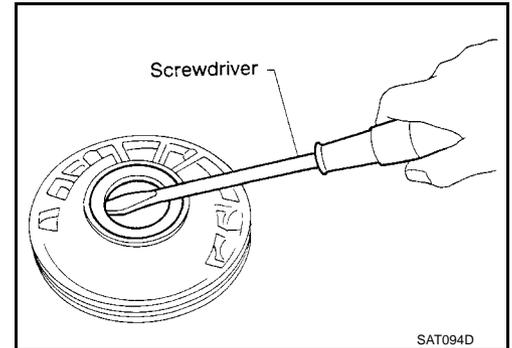
3. Remove inner and outer gear from oil pump housing.



- Remove O-ring from oil pump housing.



- Remove oil pump housing oil seal.



INSPECTION

Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear

- Check for wear or damage.

Side Clearances

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

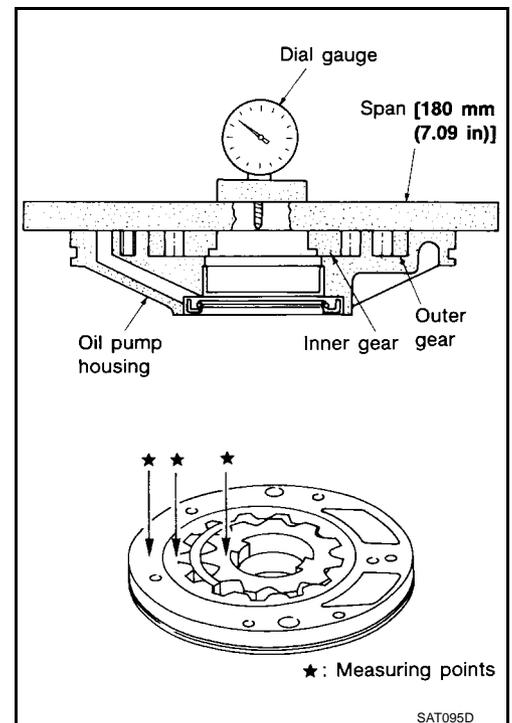
Standard clearance: 0.030 - 0.050 mm (0.0012 - 0.0020 in)

- If clearance is less than standard, select inner and outer gear as a set so that clearance is within specifications.

Inner and outer gear:

Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#)

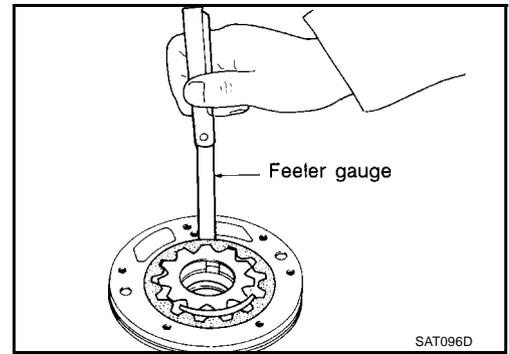
- If clearance is more than standard, replace whole oil pump assembly except oil pump cover.



REPAIR FOR COMPONENT PARTS

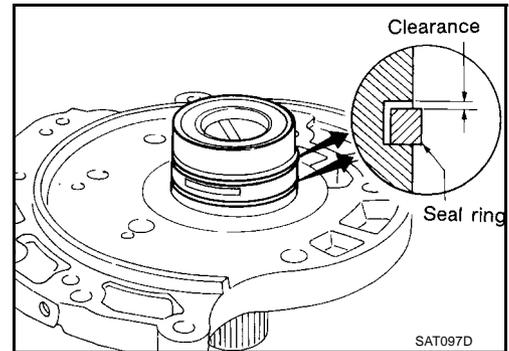
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- Measure clearance between outer gear and oil pump housing.
Standard clearance: 0.111 - 0.181 mm (0.0044 - 0.0071 in)
Allowable limit: 0.181 mm (0.0071 in)
- If not within allowable limit, replace whole oil pump assembly except oil pump cover.



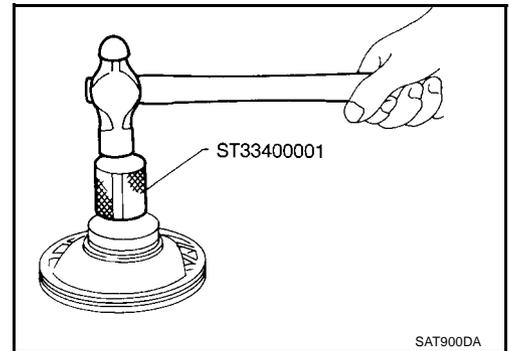
Seal Ring Clearance

- Measure clearance between seal ring and ring groove.
Standard clearance: 0.1 - 0.25 mm (0.0039 - 0.0098 in)
Allowable limit: 0.25 mm (0.0098 in)
- If not within allowable limit, replace oil pump cover assembly.

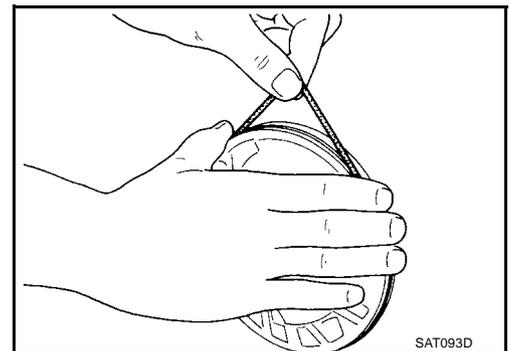


ASSEMBLY

1. Install oil seal on oil pump housing.



2. Install O-ring on oil pump housing.
 - **Apply ATF to O-ring.**

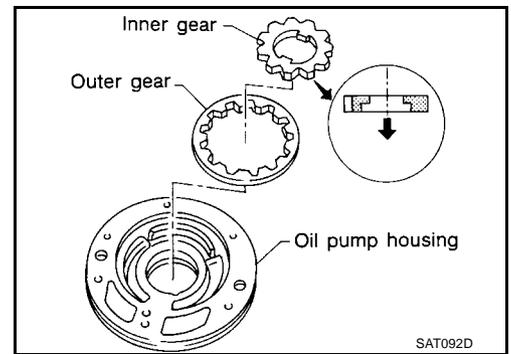


REPAIR FOR COMPONENT PARTS

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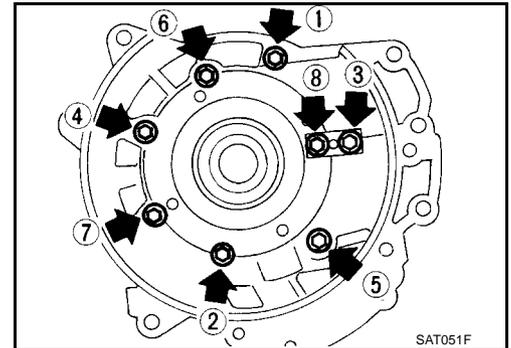
3. Install inner and outer gears on oil pump housing.

- Be careful of direction of inner gear.



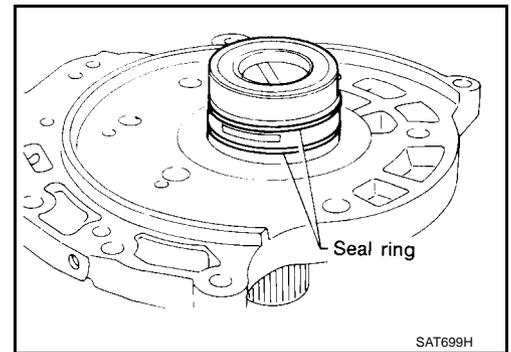
4. Install oil pump cover on oil pump housing.

- Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.
- Tighten bolts in a crisscross pattern. Tighten oil pump cover bolts to the specified torque. Refer to [AT-444, "COMPONENTS"](#)



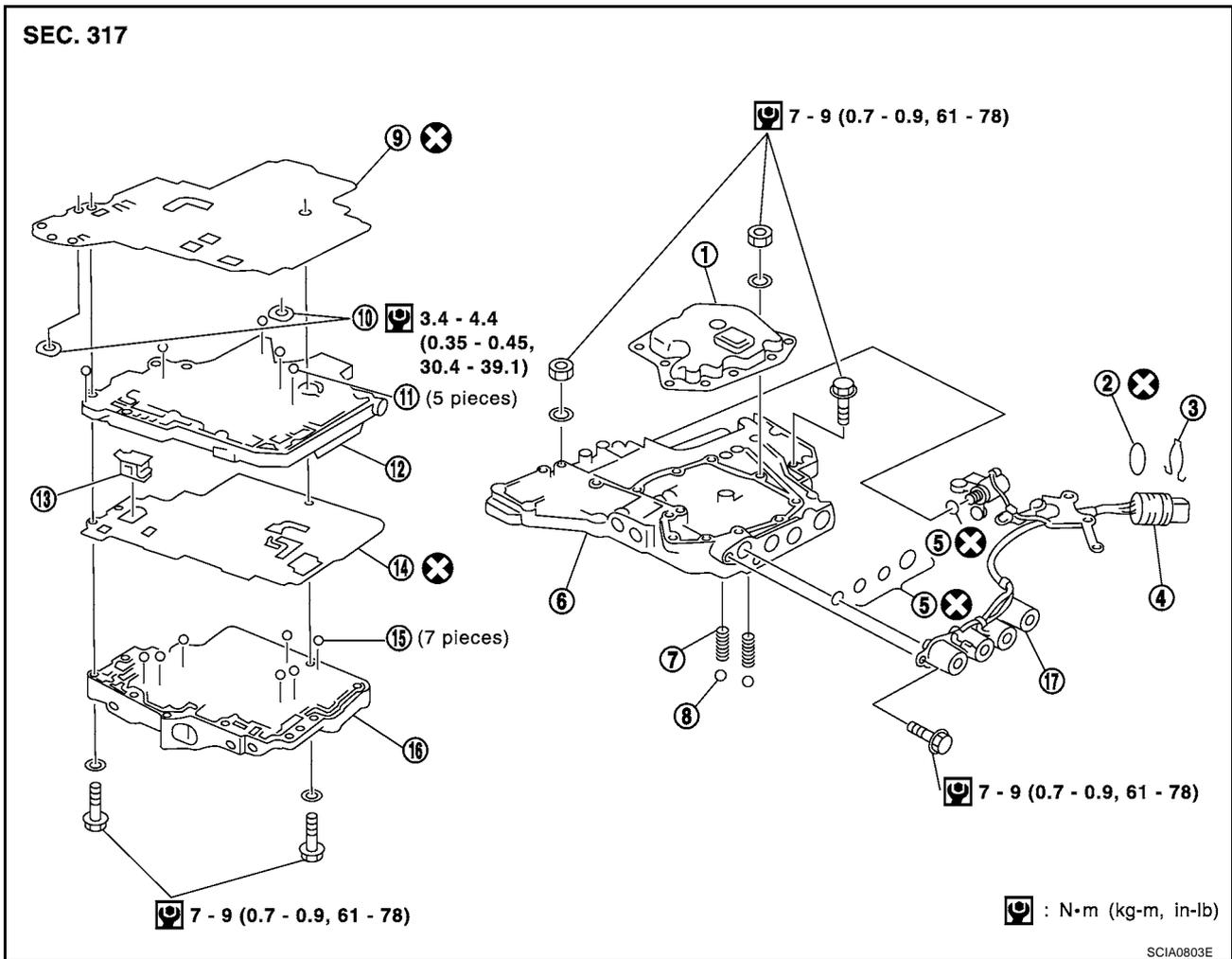
5. Install new seal rings carefully after packing ring groove with petroleum jelly.

- Do not spread gap of seal ring excessively while installing. The ring may be deformed.



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Control Valve Assembly COMPONENTS



- | | | |
|-----------------------------------|-----------------------------|------------------------------|
| 1. Oil strainer | 2. O-ring | 3. Snap ring |
| 4. Terminal body | 5. O-rings | 6. Control valve lower body |
| 7. Oil cooler relief valve spring | 8. Check ball | 9. Separating plate |
| 10. Support plate | 11. Steel ball | 12. Control valve inter body |
| 13. Pilot filter | 14. Separating plate | 15. Steel ball |
| 16. Control valve upper body | 17. Solenoid valve assembly | |

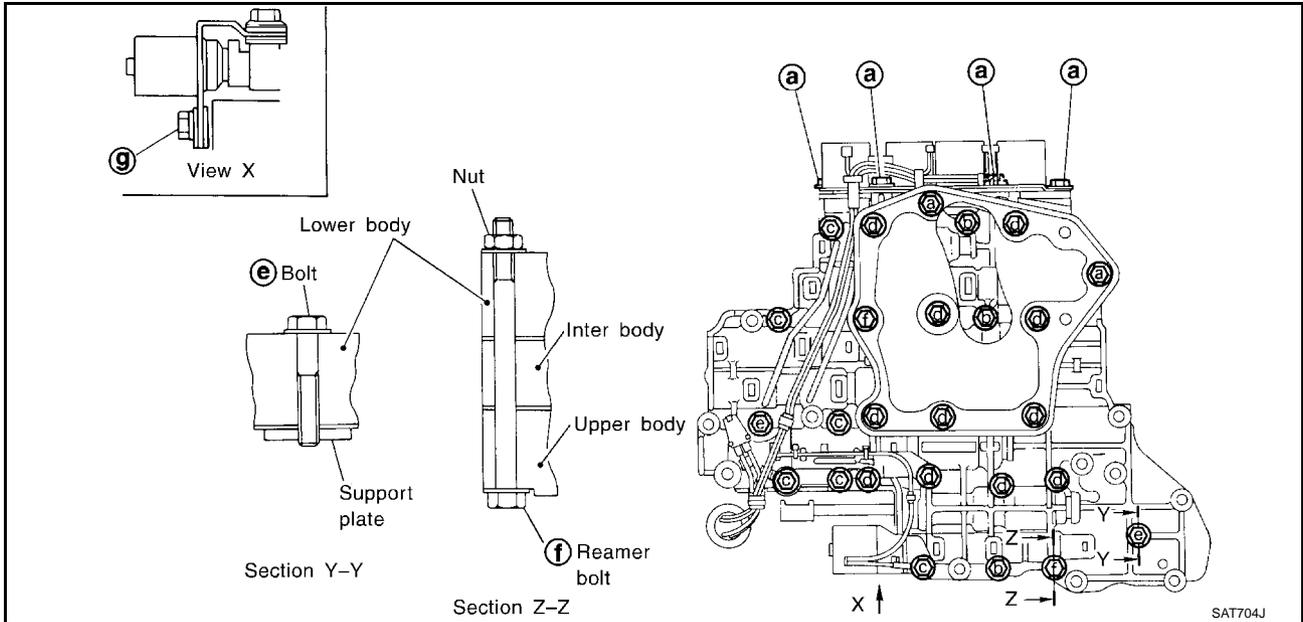
DISASSEMBLY

Disassemble upper, inter and lower bodies.

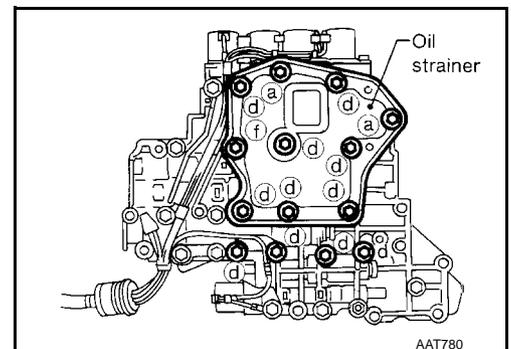
Bolt length, number and location:

Bolt symbol	a	b	c	d	e	f	g
Bolt length "ℓ" mm (in) 	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

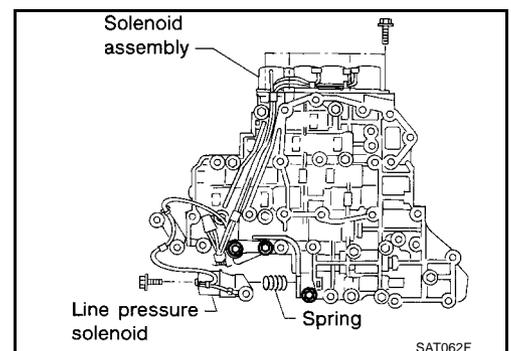
f: Reamer bolt and nut.



1. Remove bolts **a** , **d** and nut **f** and remove oil strainer from control valve assembly.



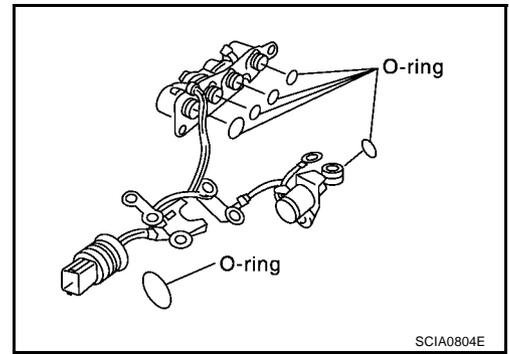
2. Remove solenoid valve assembly and line pressure solenoid valve from control valve assembly.



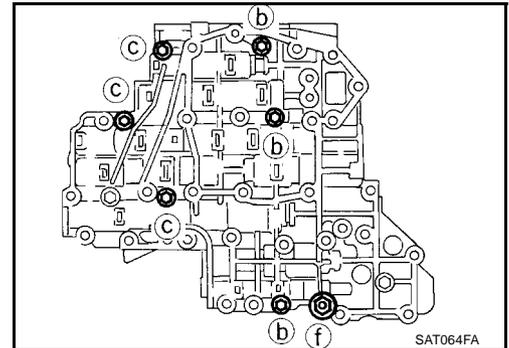
REPAIR FOR COMPONENT PARTS

[ALL]

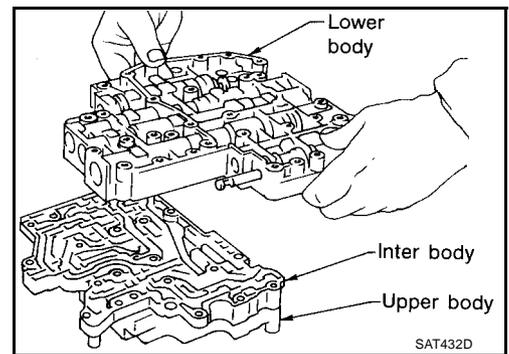
3. Remove O-rings from solenoid valves and terminal body.



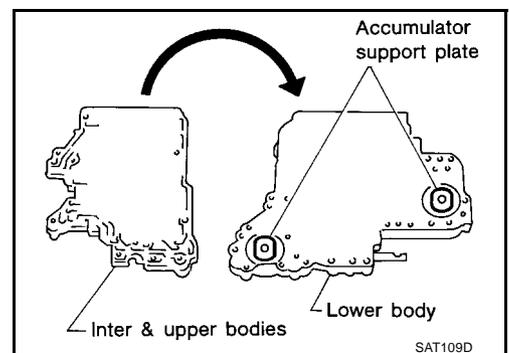
4. Place upper body facedown, and remove bolts **b** , **c** and nut **f** .



5. Remove inter body from lower body.



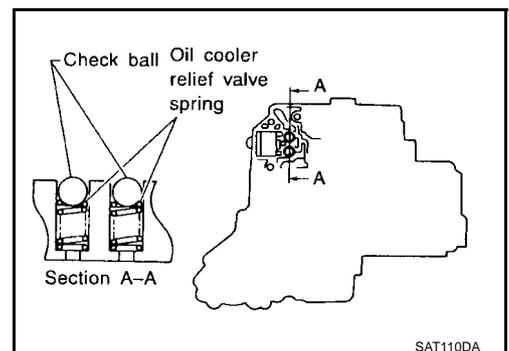
6. Turn over lower body, and remove accumulator support plate.



7. Remove bolts **e** , separating plate and separating gasket from lower body.

8. Remove check balls and oil cooler relief valve springs from lower body.

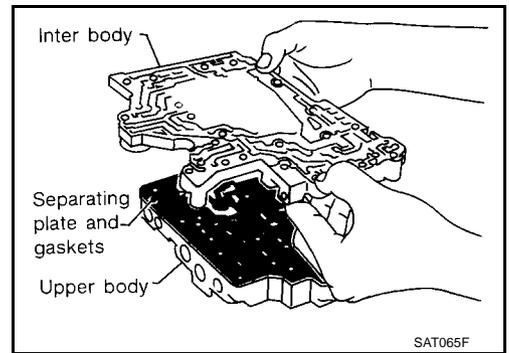
- Be careful not to lose check balls and oil cooler relief valve springs.



REPAIR FOR COMPONENT PARTS

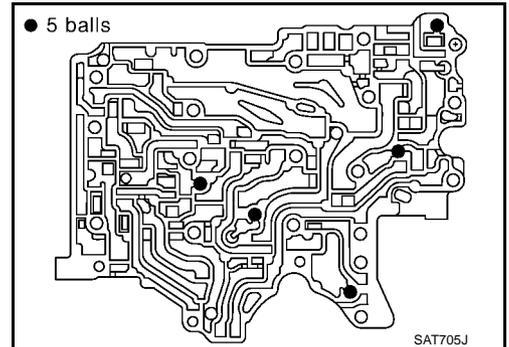
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9. Remove inter body from upper body.



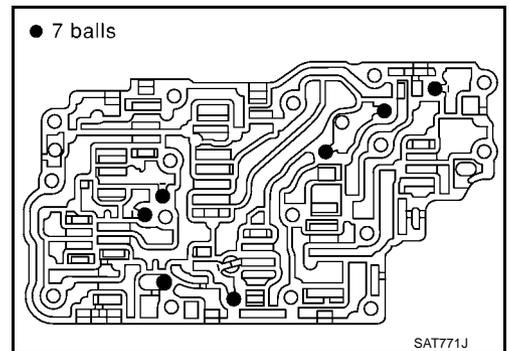
10. Check to see that steel balls are properly positioned in inter body and then remove them.

- Be careful not to lose steel balls.



11. Check to see that steel balls are properly positioned in upper body and then remove them.

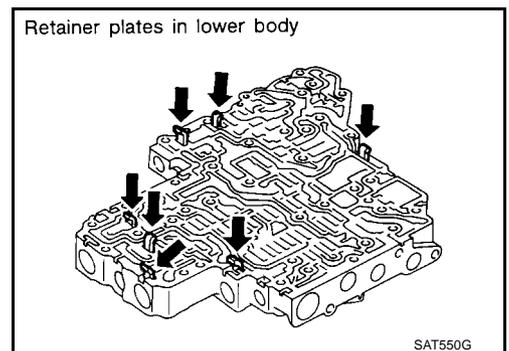
- Be careful not to lose steel balls.



INSPECTION

Lower and Upper Bodies

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



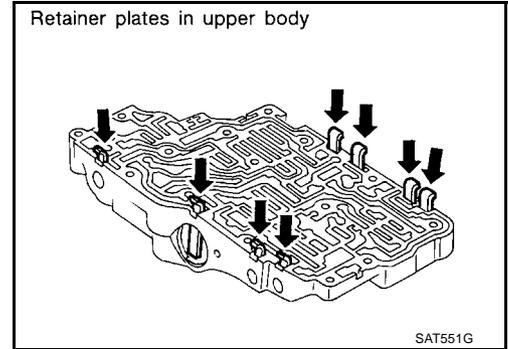
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REPAIR FOR COMPONENT PARTS

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- Check to see that retainer plates are properly positioned in upper body.
- **Be careful not to lose these parts.**

Retainer plates in upper body



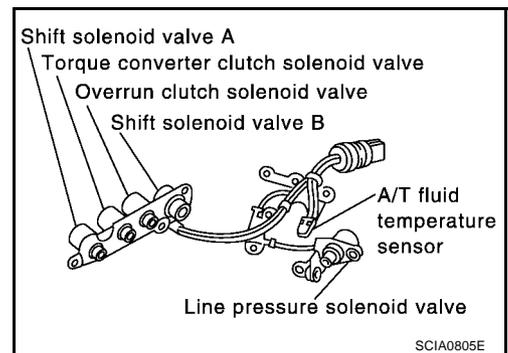
SAT551G

Oil Strainer

- Check wire netting of oil strainer for damage.

Shift Solenoid Valves “A” and “B”, Line Pressure Solenoid Valve, Torque Converter Clutch Solenoid Valve and Overrun Clutch Solenoid Valve

- Measure resistance.
- Except for EURO-OBD:
- For shift solenoid valve A, refer to [AT-367, "SHIFT SOLENOID VALVE A"](#) .
- For shift solenoid valve B, refer to [AT-372, "SHIFT SOLENOID VALVE B"](#) .
- For line pressure solenoid valve, refer to [AT-396, "LINE PRESSURE SOLENOID VALVE"](#) .
- For torque converter clutch solenoid valve, refer to [AT-381, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#) .
- For overrun clutch solenoid valve, refer to [AT-377, "OVERRUN CLUTCH SOLENOID VALVE"](#) .
- EURO-OBD:
- For shift solenoid valve A, refer to [AT-170, "DTC P0750 SHIFT SOLENOID VALVE A"](#) .
- For shift solenoid valve B, refer to [AT-175, "DTC P0755 SHIFT SOLENOID VALVE B"](#) .
- For line pressure solenoid valve, refer to [AT-163, "DTC P0745 LINE PRESSURE SOLENOID VALVE"](#) .
- For torque converter clutch solenoid valve, refer to [AT-158, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"](#) .
- For overrun clutch solenoid valve, refer to [AT-185, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"](#) .

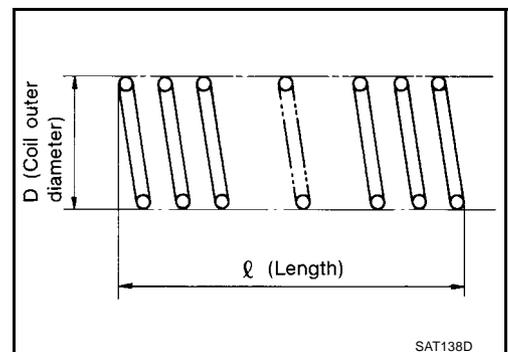


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Oil Cooler Relief Valve Spring

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

Inspection standard: Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#) .



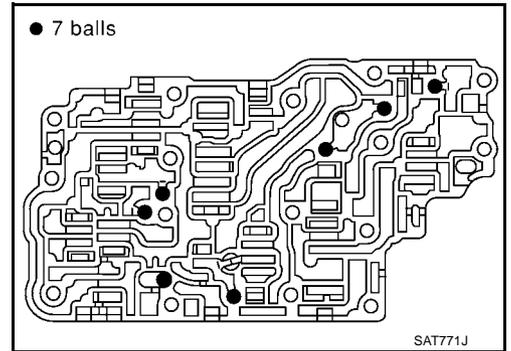
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REPAIR FOR COMPONENT PARTS

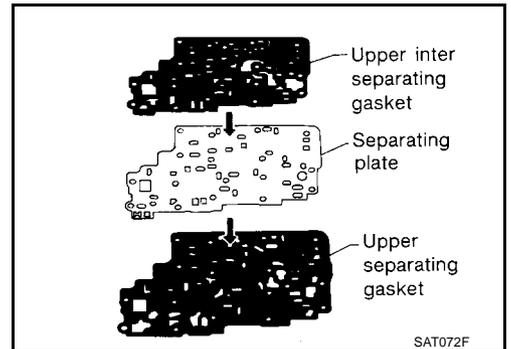
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ASSEMBLY

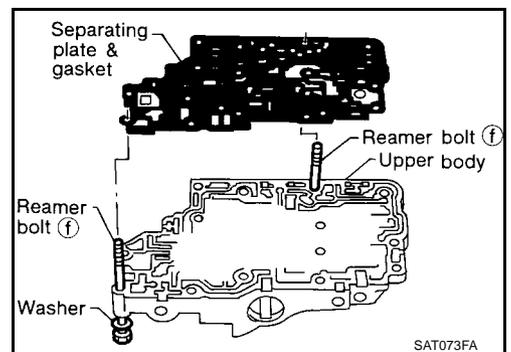
1. Install upper, inter and lower body.
 - a. Place oil circuit of upper body face up. Install steel balls in their proper positions.



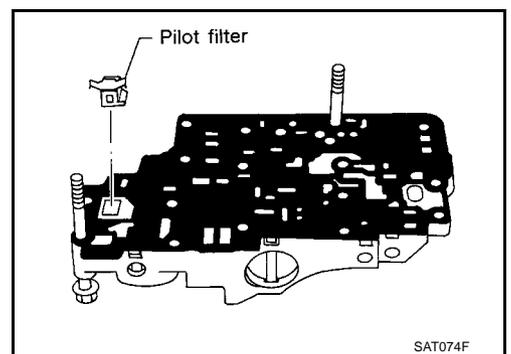
- b. Install upper separating gasket, upper inter separating gasket and upper separating plate in order shown in illustration.



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



- d. Install pilot filter.

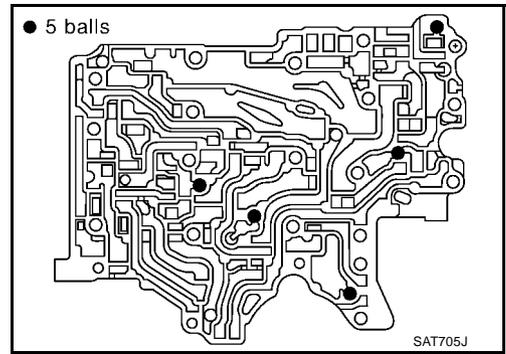


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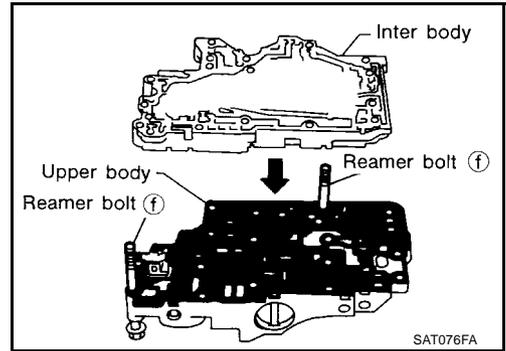
REPAIR FOR COMPONENT PARTS

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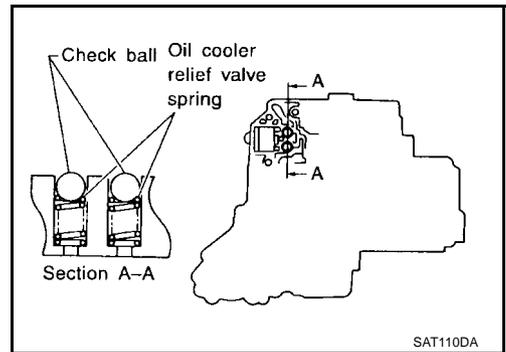
- e. Place lower body as shown in illustration (side of inter body face up). Install steel balls in their proper positions.



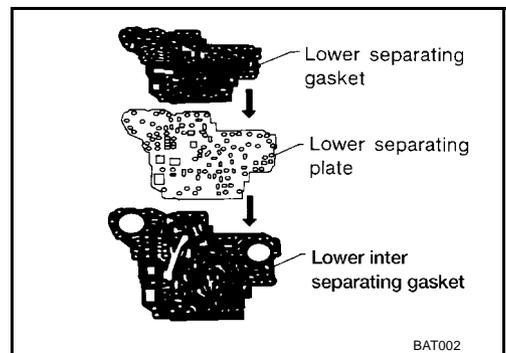
- f. Install inter body on upper body using reamer bolts **f** as guides.
 ● Be careful not to dislocate or drop steel balls.



- g. Install check balls and oil cooler relief valve springs in their proper positions in lower body.

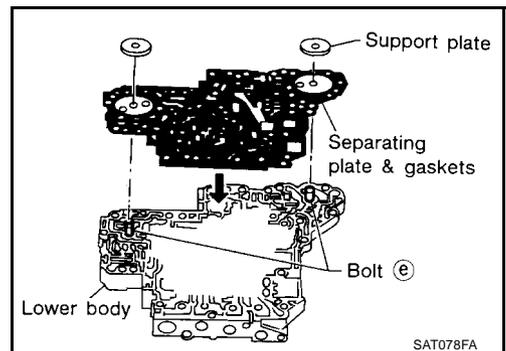


- h. Install lower separating gasket, lower inter separating gasket and lower separating plate in order shown in illustration.



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

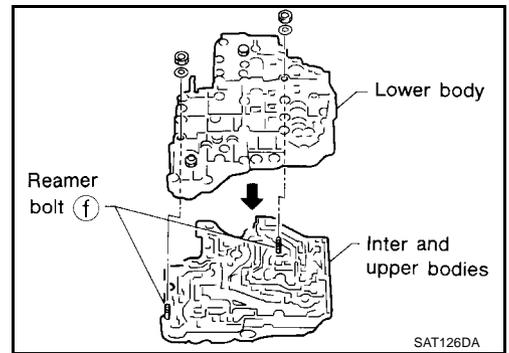
- j. Temporarily install support plates on lower body.



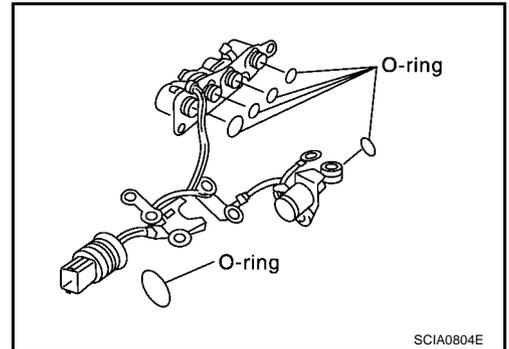
REPAIR FOR COMPONENT PARTS

[ALL]

- k. Install lower body on inter body using reamer bolts **f** as guides and tighten reamer bolts **f** slightly.



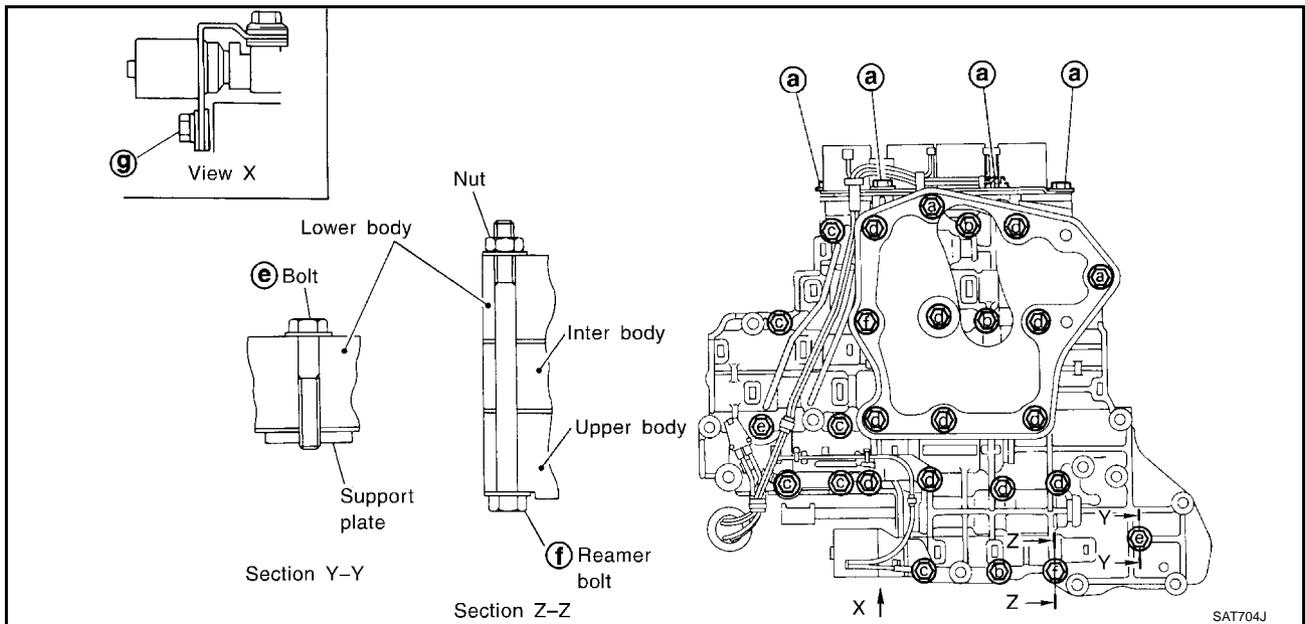
2. Install O-rings to solenoid valves and terminal body.
 ● Apply ATF to O-rings.



3. Install and tighten bolts.

Bolt length, number and location:

Bolt symbol	a	b	c	d	e	f	g
Bolt length "ℓ" mm (in) 	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

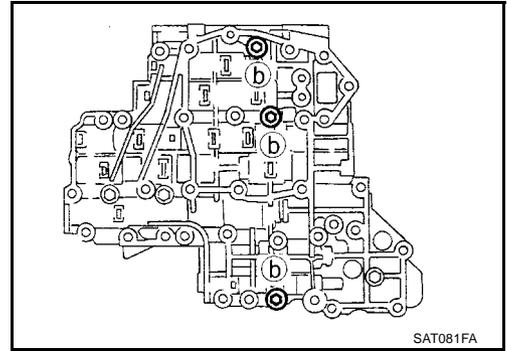


REPAIR FOR COMPONENT PARTS

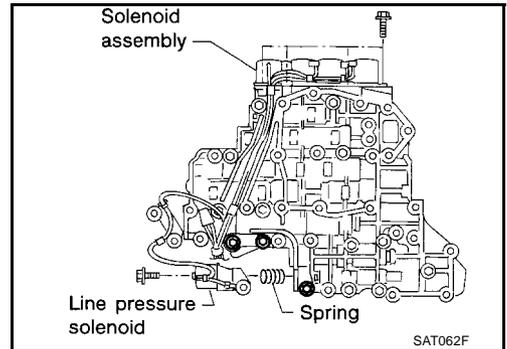
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- a. Install and tighten bolts **b** to specified torque.

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

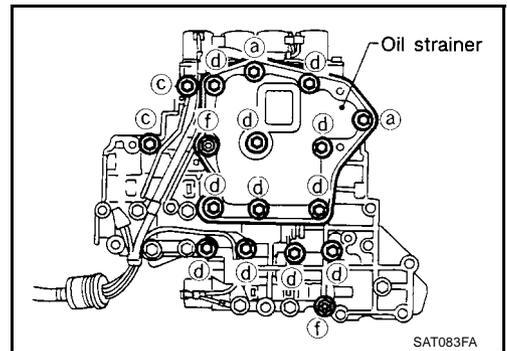


- b. Install solenoid valve assembly and line pressure solenoid valve to lower body.



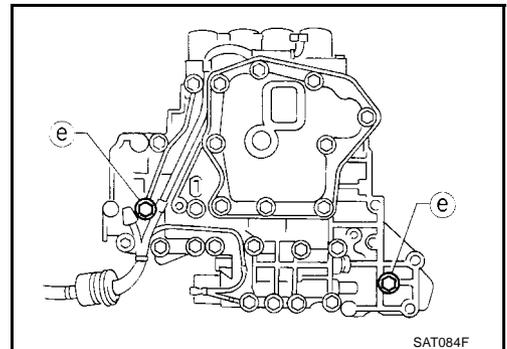
- c. Set oil strainer, then tighten bolts **a**, **c**, **d** and nuts **f** to specified torque.

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



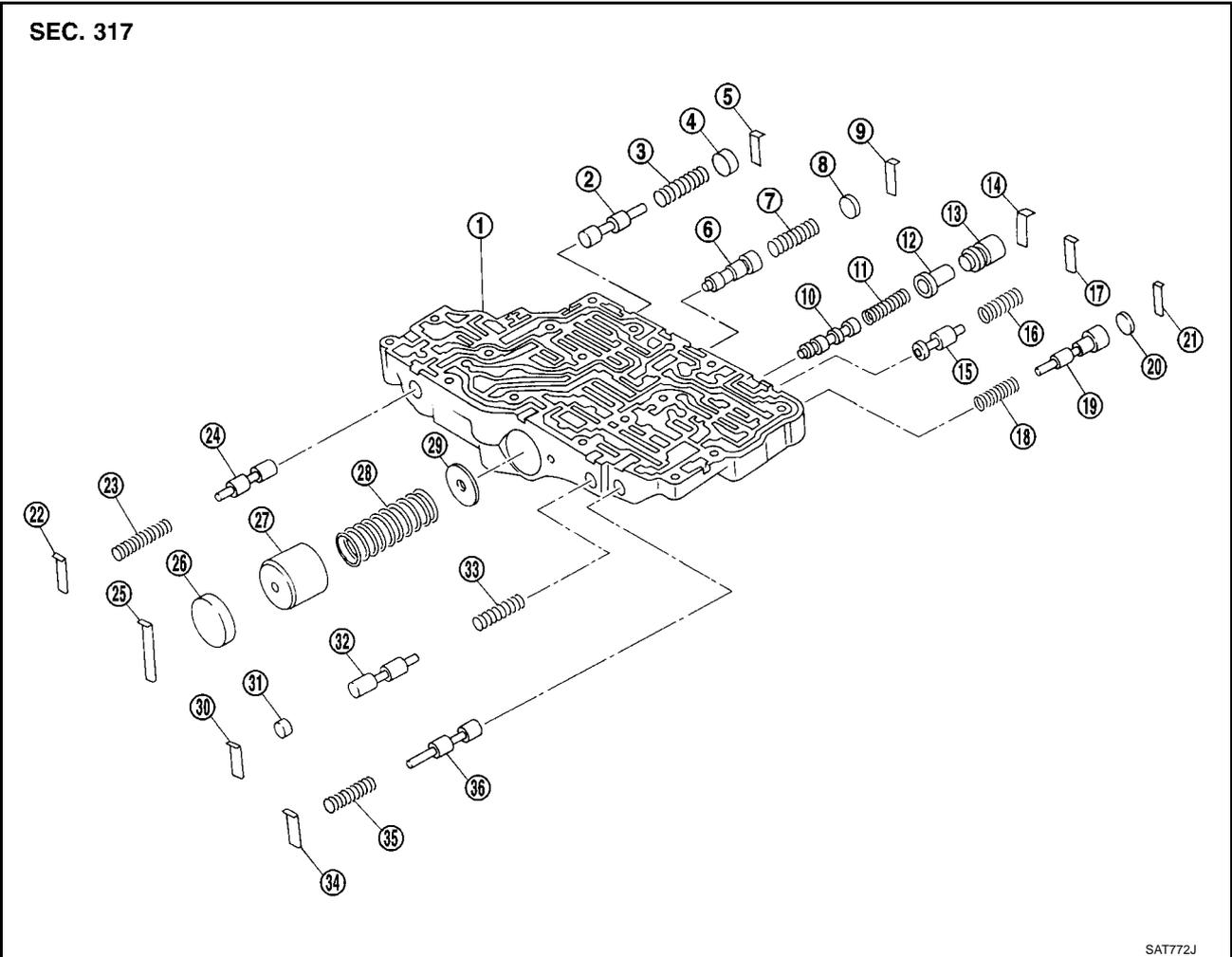
- d. Tighten bolts **e** to specified torque.

 : 3.4 - 4.4 N-m (0.35 - 0.45 kg-m, 30.4 - 39.1 in-lb)



Control Valve Upper Body COMPONENTS

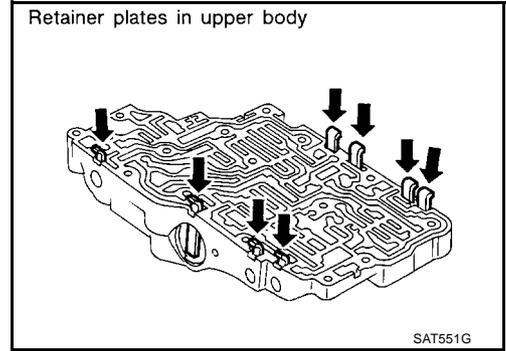
Apply ATF to all components before installation.



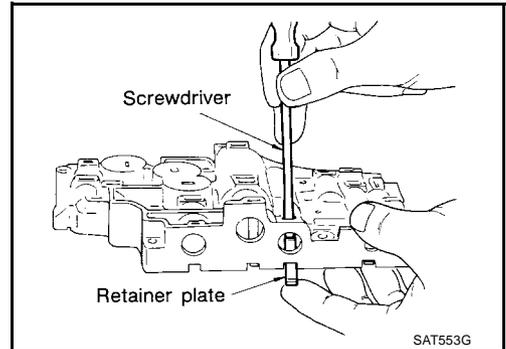
- | | | |
|--|------------------------------------|--|
| 1. Upper body | 2. Cooler check valve | 3. Return spring |
| 4. Plug | 5. Retainer plate | 6. 1-2 accumulator valve |
| 7. Return spring | 8. Plug | 9. Retainer plate |
| 10. Torque converter clutch control valve | 11. Return spring | 12. Torque converter clutch control plug |
| 13. Torque converter clutch control sleeve | 14. Retainer plate | 15. Torque converter relief valve |
| 16. Return spring | 17. Retainer plate | 18. Return spring |
| 19. Overrun clutch reducing valve | 20. Plug | 21. Retainer plate |
| 22. Retainer plate | 23. Return spring | 24. Pilot valve |
| 25. Retainer plate | 26. Plug | 27. 1-2 accumulator piston |
| 28. Return spring | 29. 1-2 accumulator retainer plate | 30. Retainer plate |
| 31. Plug | 32. 1st reducing valve | 33. Return spring |
| 34. Retainer plate | 35. Return spring | 36. 3-2 timing valve |

DISASSEMBLY

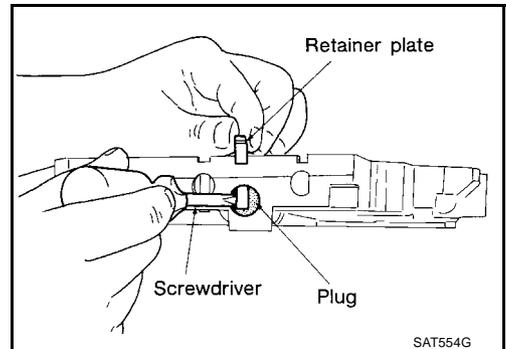
1. Remove valves at retainer plates.
 - Do not use a magnetic pick-up tool.



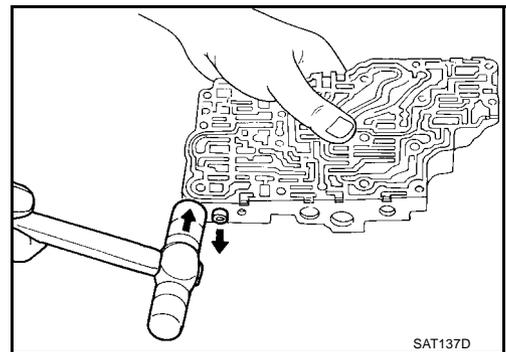
- a. Use a screwdriver to remove retainer plates.



- b. Remove retainer plates while holding spring, plugs or sleeves.
 - Remove plugs slowly to prevent internal parts from jumping out.



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



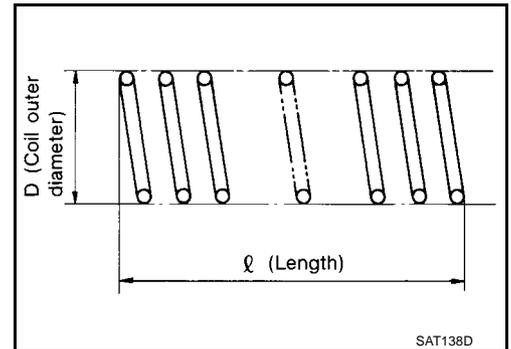
INSPECTION

Valve Spring

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

Inspection standard :Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#) .

- Replace valve springs if deformed or fatigued.

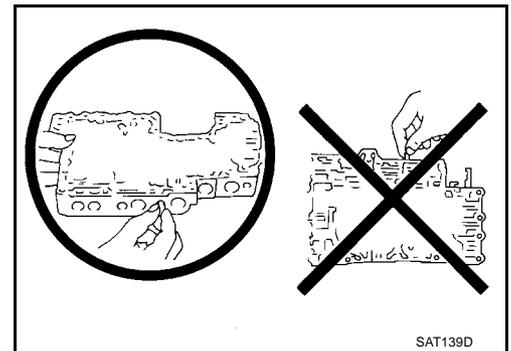


Control Valves

- Check sliding surfaces of valves, sleeves and plugs.

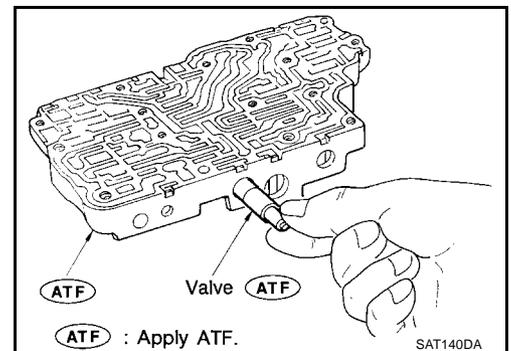
ASSEMBLY

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

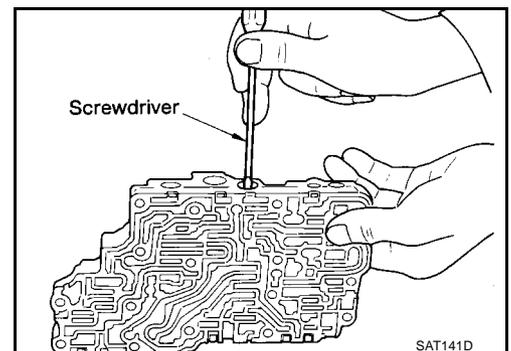


1. Lubricate the control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.

- Be careful not to scratch or damage valve body.

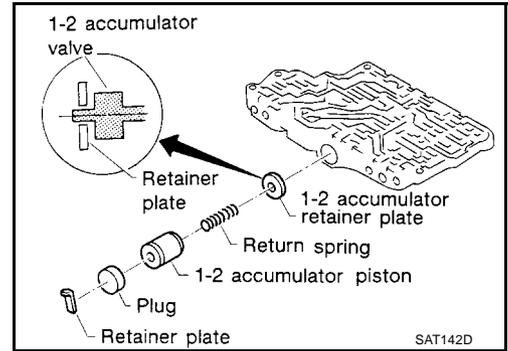


- Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.

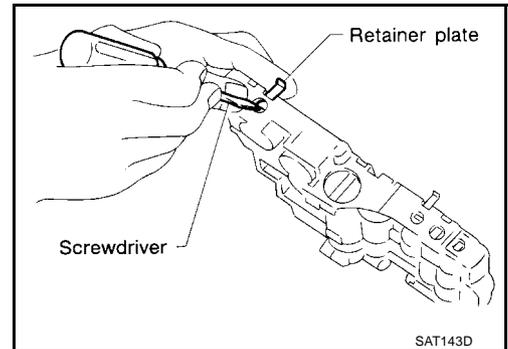


1-2 Accumulator Valve

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



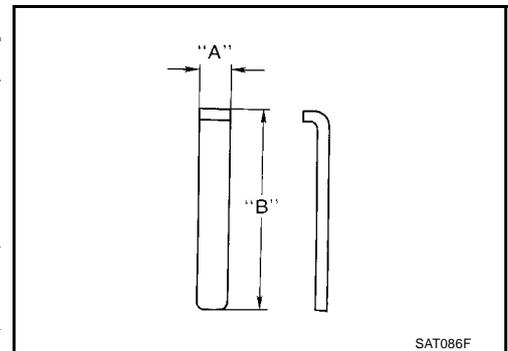
1. Install retainer plates.
 - While pushing plug or return spring, install retainer plate.



Retainer Plate (Upper Body)

Unit: mm (in)

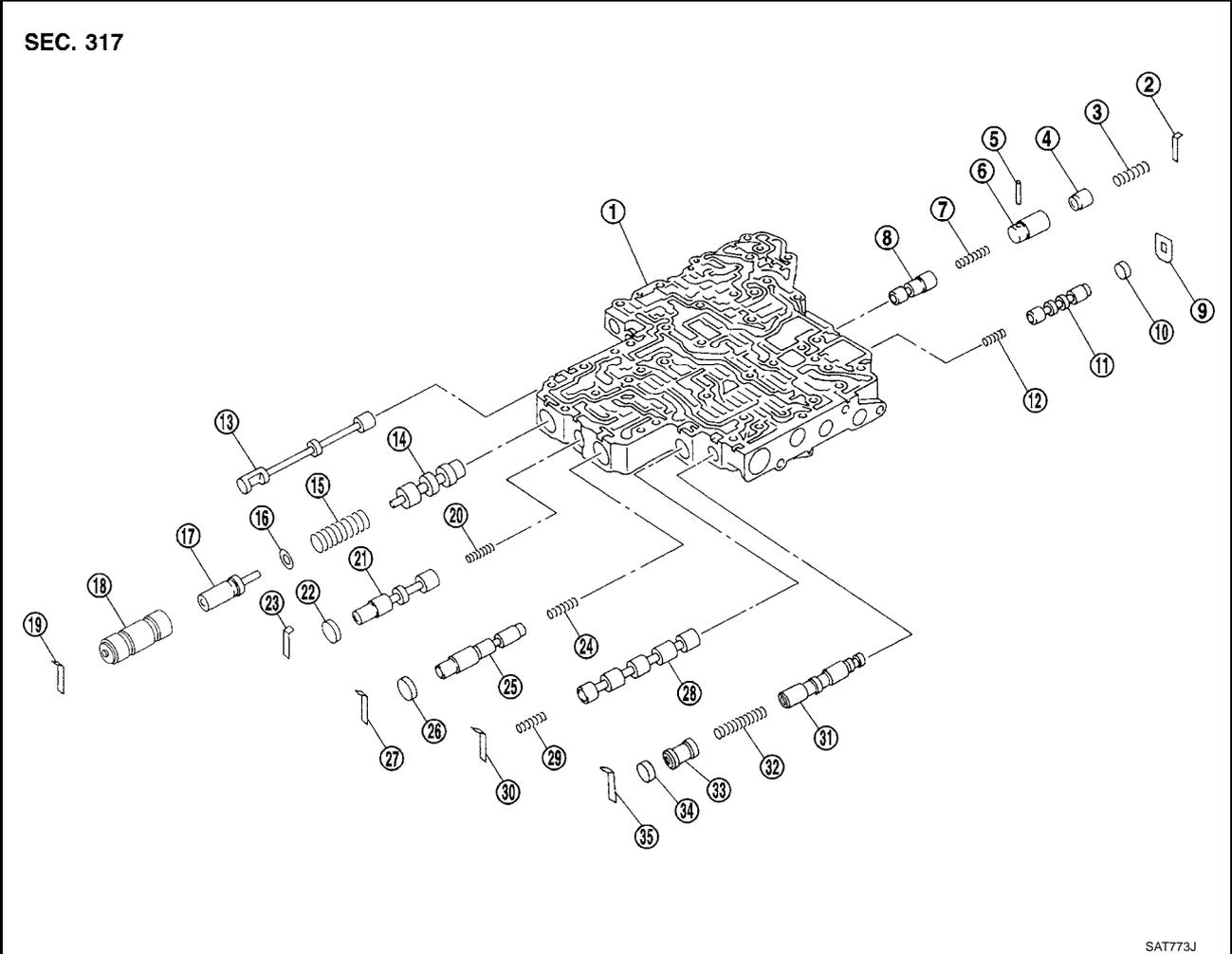
No.	Name of control valve	Width A	Length B
22	Pilot valve	6.0 (0.236)	21.5 (0.846)
30	1st reducing valve		
34	3-2 timing valve		
17	Torque converter relief valve		40.5 (1.59)
9	1-2 accumulator valve		
25	1-2 accumulator piston valve		24.0 (0.945)
21	Overrun clutch reducing valve		
5	Cooler check valve		28.0 (1.102)
14	Torque converter clutch control valve		



- Install proper retainer plates.
Refer to [AT-457, "Control Valve Upper Body"](#) .

Control Valve Lower Body COMPONENTS

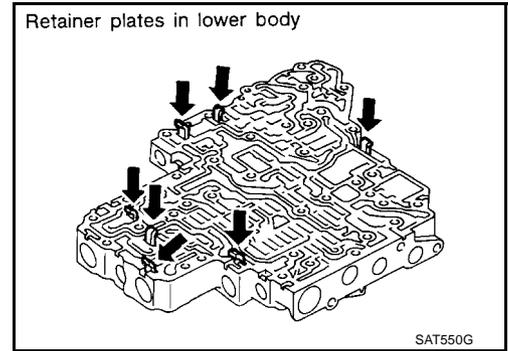
Apply ATF to all components before installation.



- | | | |
|-------------------------------|------------------------------|----------------------------------|
| 1. Lower body | 2. Retainer plate | 3. Return spring |
| 4. Piston | 5. Parallel pin | 6. Sleeve |
| 7. Return spring | 8. Pressure modifier valve | 9. Retainer plate |
| 10. Plug | 11. Shift valve B | 12. Return spring |
| 13. Manual valve | 14. Pressure regulator valve | 15. Return spring |
| 16. Spring seat | 17. Plug | 18. Sleeve |
| 19. Retainer plate | 20. Return spring | 21. Overrun clutch control valve |
| 22. Plug | 23. Retainer plate | 24. Return spring |
| 25. Accumulator control valve | 26. Plug | 27. Retainer plate |
| 28. Shift valve A | 29. Return spring | 30. Retainer plate |
| 31. Shuttle valve | 32. Return spring | 33. Plug |
| 34. Plug | 35. Retainer plate | |

DISASSEMBLY

- Remove valves at retainer plate.
For removal procedures, refer to "DISASSEMBLY", [AT-457](#), "[Control Valve Upper Body](#)".



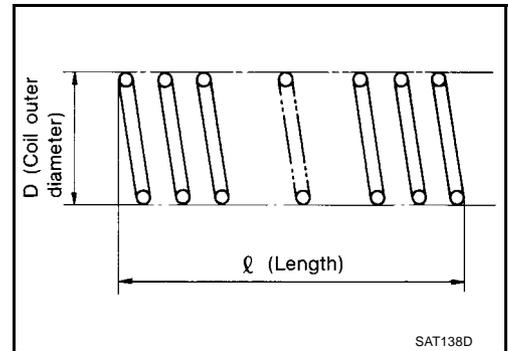
INSPECTION

Valve Springs

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

Inspection standard : Refer to [AT-521](#), "[SERVICE DATA AND SPECIFICATIONS \(SDS\)](#)".

- Replace valve springs if deformed or fatigued.

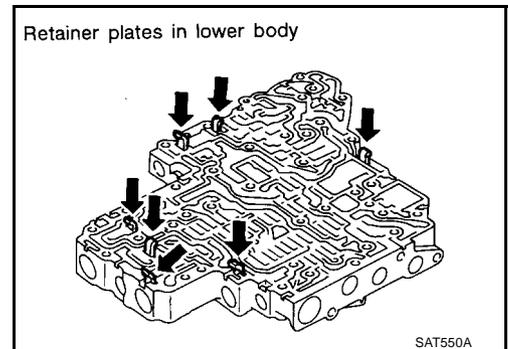


Control Valves

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

ASSEMBLY

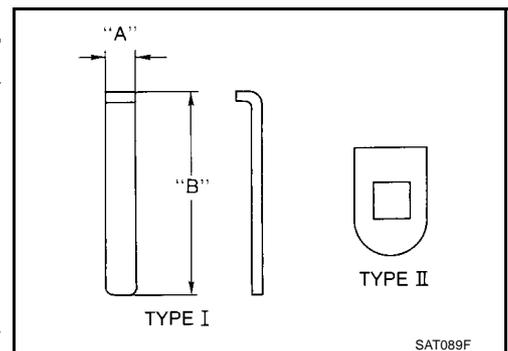
- Install control valves.
For installation procedures, refer to "ASSEMBLY", [AT-457](#), "[Control Valve Upper Body](#)".



Retainer Plate (Lower Body)

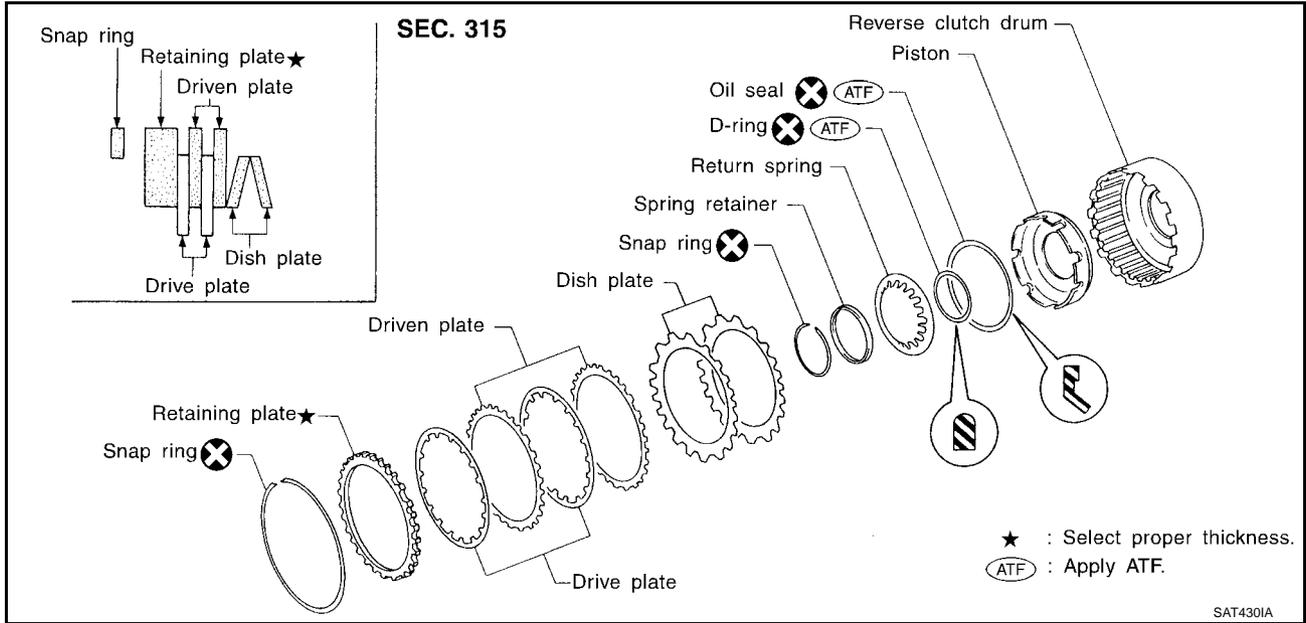
Unit: mm (in)

No.	Name of control valve and plug	Width A	Length B	Type
19	Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
27	Accumulator control valve			
30	Shift valve A			
23	Overrun clutch control valve			
2	Pressure modifier valve			
35	Shuttle valve			
9	Shift valve B	—	—	II



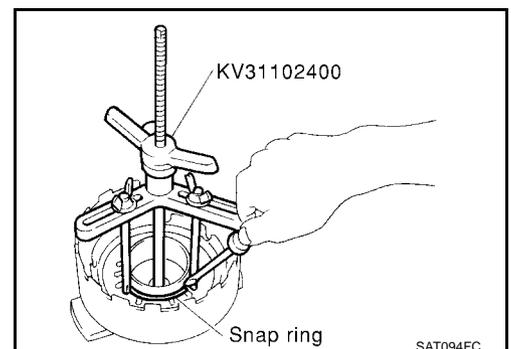
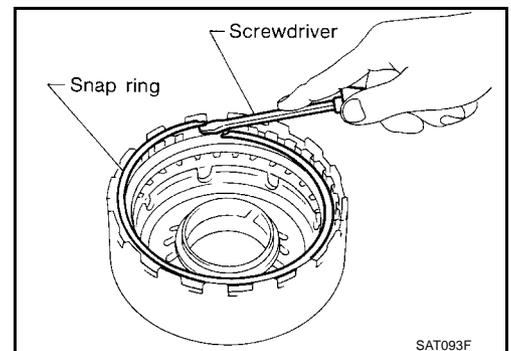
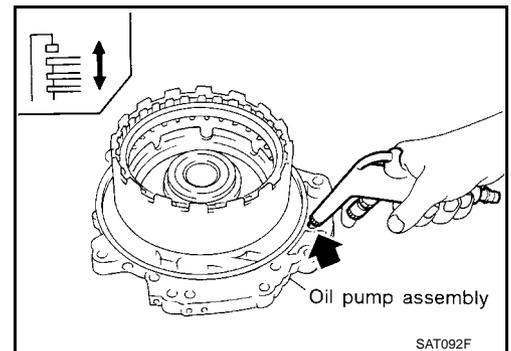
- Install proper retainer plates.
Refer to [AT-461](#), "[Control Valve Lower Body](#)".

Reverse Clutch COMPONENTS



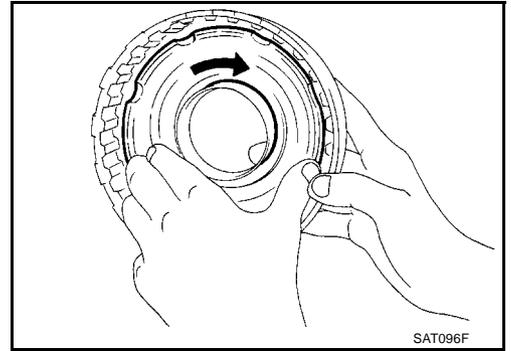
DISASSEMBLY

1. Check operation of reverse clutch
 - a. Install seal ring onto drum support of oil pump cover and install reverse clutch assembly. Apply compressed air to oil hole.
 - b. Check to see that retaining plate moves to snap ring.
 - c. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.
2. Remove snap ring.
3. Remove drive plates, driven plates, retaining plate, and dish plates.
4. Set Tool on spring retainer and remove snap ring from reverse clutch drum while compressing return springs.
 - **Set Tool directly over springs.**
 - **Do not expand snap ring excessively.**
5. Remove spring retainer and return springs.



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6. Remove piston from reverse clutch drum by turning it.
7. Remove D-ring and oil seal from piston.



INSPECTION

Reverse Clutch Snap Ring, Spring Retainer and Return Springs

- Check for deformation, fatigue or damage. If necessary, replace.

Reverse Clutch Drive Plates

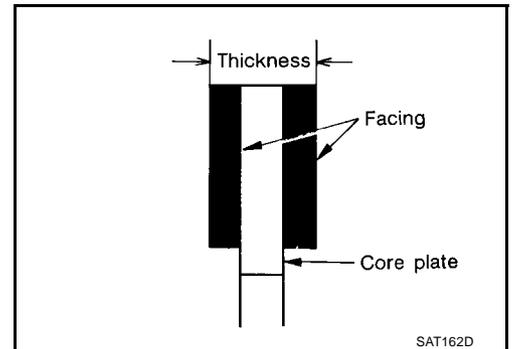
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate:

Standard value: 1.6 mm (0.063 in)

Wear limit: 1.4 mm (0.055 in)

- If not within wear limit, replace.

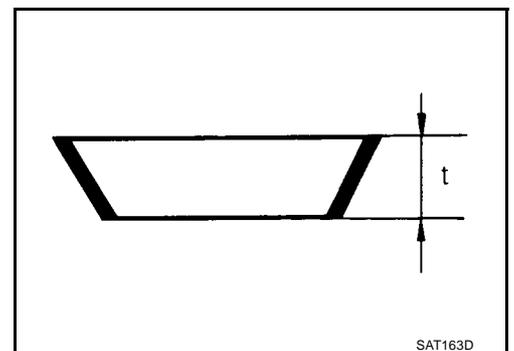


Reverse Clutch Dish Plates

- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate: 3.08 mm (0.1213 in)

- If deformed or fatigued, replace.

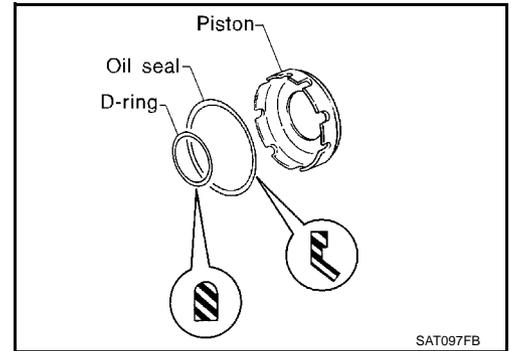


Reverse Clutch Piston

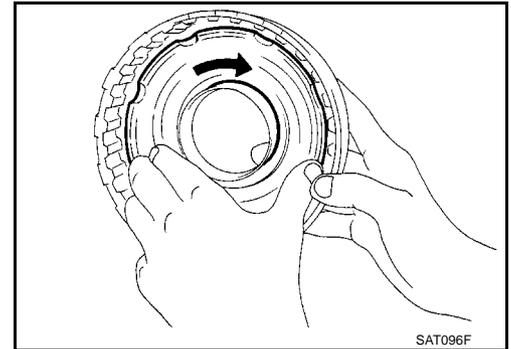
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.

ASSEMBLY

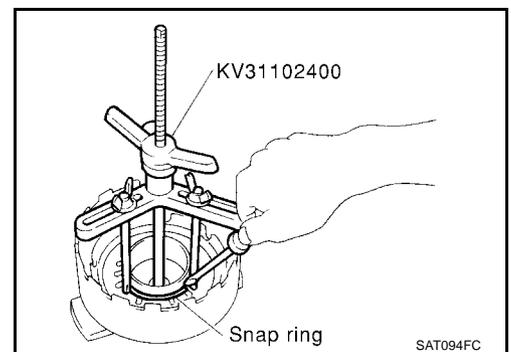
1. Install D-ring and oil seal on piston.
 - Take care with the direction of oil seal.
 - Apply ATF to both parts.



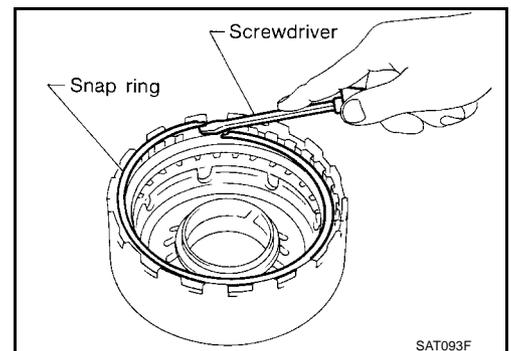
2. Install piston assembly by turning it slowly.
 - Apply ATF to inner surface of drum.



3. Install return springs and spring retainer on piston.
4. Set Tool on spring retainer and install snap ring while compressing return springs.
 - Set Tool directly over return springs.



5. Install drive plates, driven plates, retaining plate and dish plates.
 - Take care with order of plates.
6. Install snap ring.



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REPAIR FOR COMPONENT PARTS

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

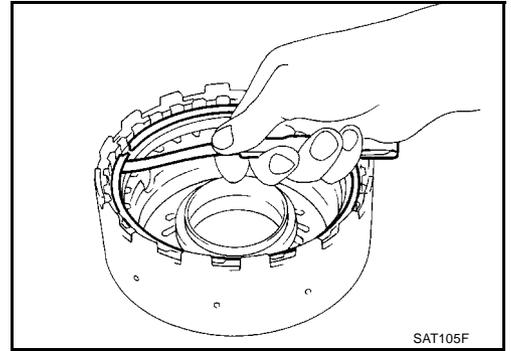
Specified clearance:

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

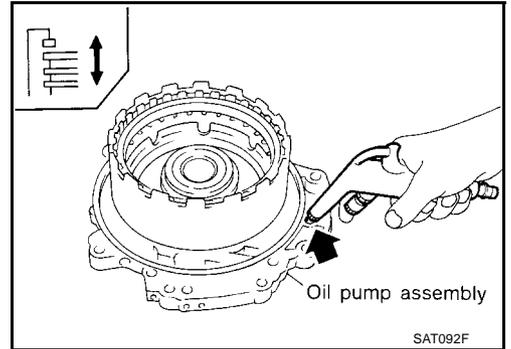
Allowable limit: 1.2 mm (0.047 in)

Retaining plate:

Refer to **AT-521, "SERVICE DATA AND SPECIFICATIONS (SDS)"**.

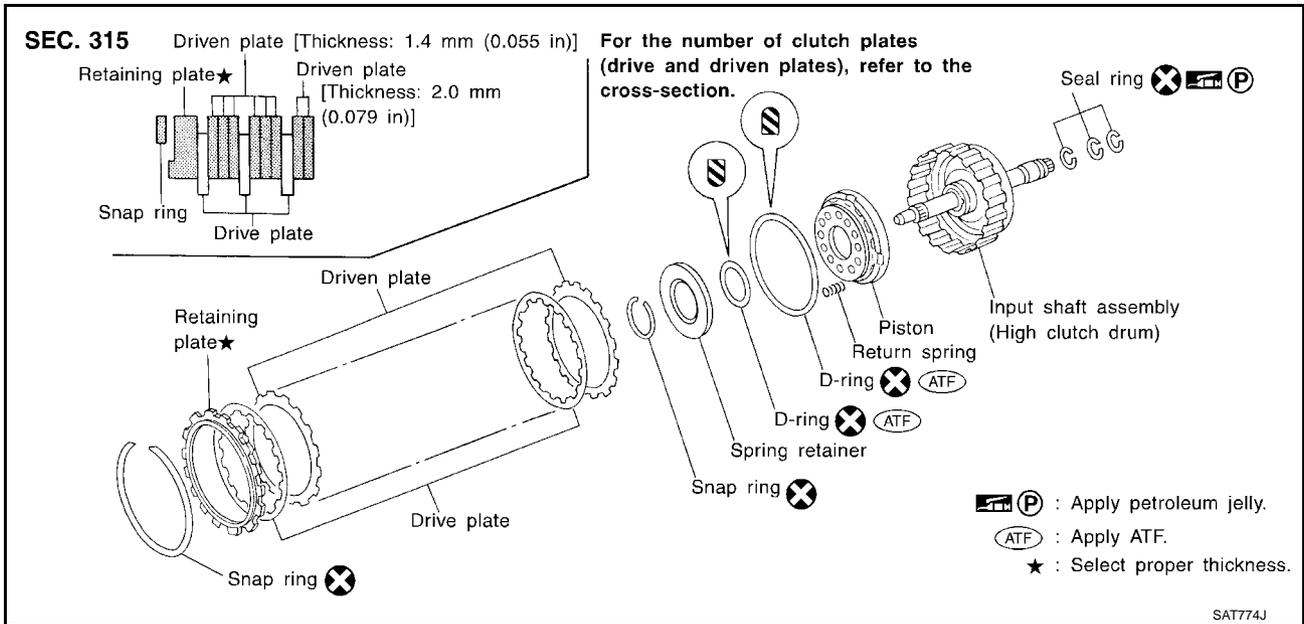


8. Check operation of reverse clutch.
Refer to "DISASSEMBLY", **AT-463, "Reverse Clutch"**.



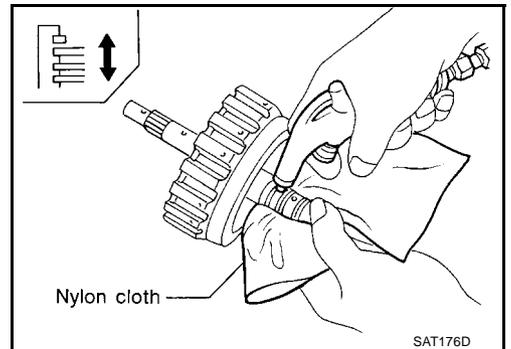
High Clutch COMPONENTS

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DISASSEMBLY

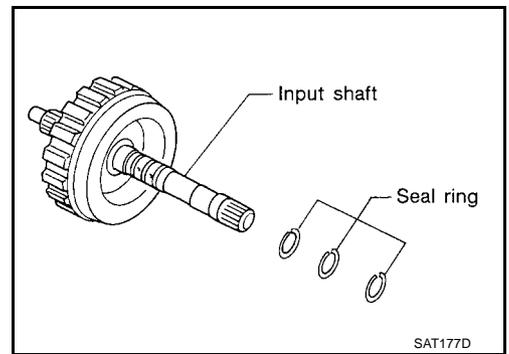
1. Check operation of high clutch.
 - a. Apply compressed air to oil hole of input shaft with nylon cloth.
 - Stop up hole on opposite side of input shaft with nylon cloth.
 - b. Check to see that retaining plate moves to snap ring.
 - c. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.



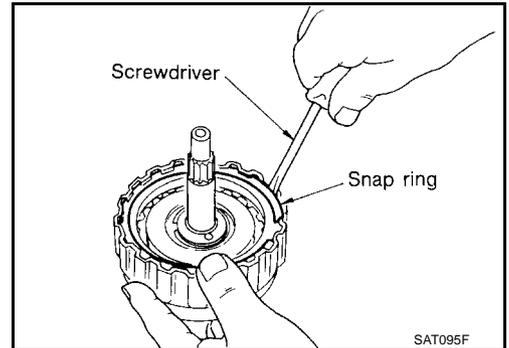
REPAIR FOR COMPONENT PARTS

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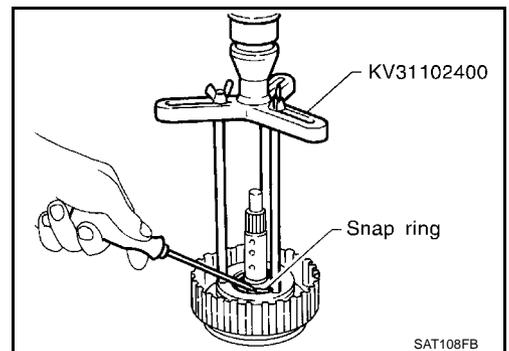
2. Remove seal rings from input shaft.
 - **Always replace when removed.**



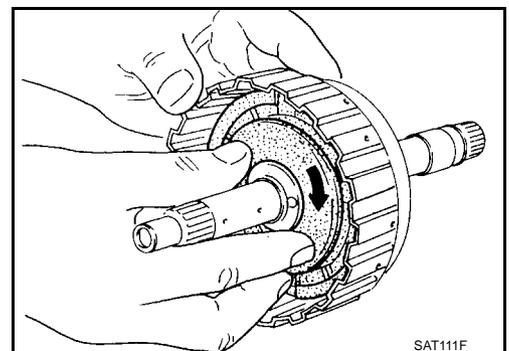
3. Remove snap ring.
4. Remove drive plates, driven plates and retaining plate.



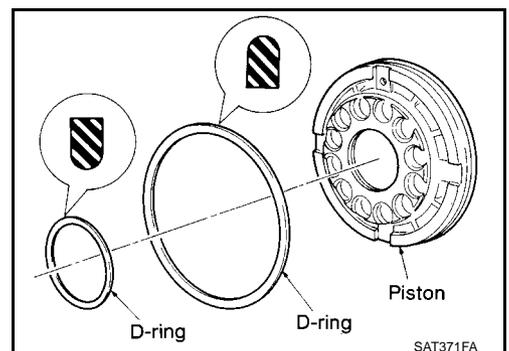
5. Set Tool on spring retainer and remove snap ring from high clutch drum while compressing return springs.
 - **Set Tool directly over springs.**
 - **Do not expand snap ring excessively.**
6. Remove spring retainer and return springs.



7. Remove piston from high clutch drum by turning it.



8. Remove D-rings from piston.



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INSPECTION

High Clutch Snap Ring, Spring Retainer and Return Springs

- Check for deformation, fatigue or damage. If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**

High Clutch Drive Plates

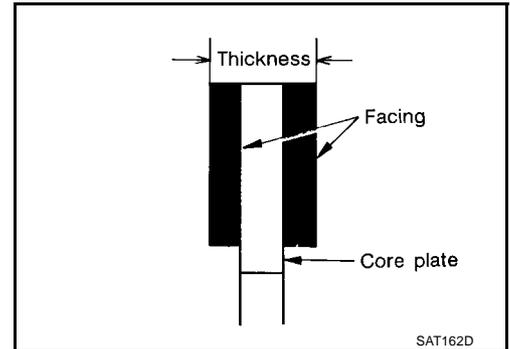
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate:

Standard value 1.6 mm (0.063 in)

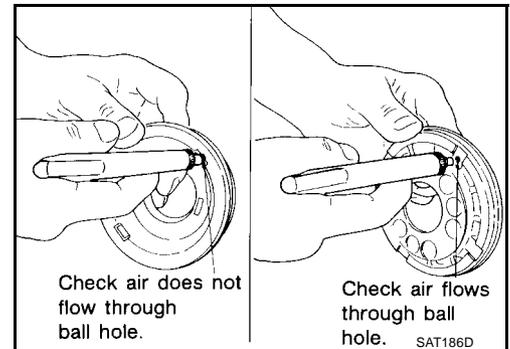
Wear limit 1.4 mm (0.055 in)

- If not within wear limit, replace.



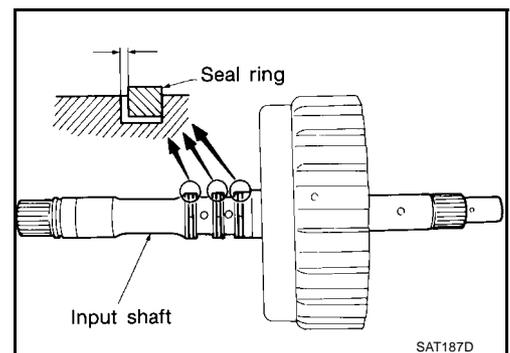
High Clutch Piston

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.



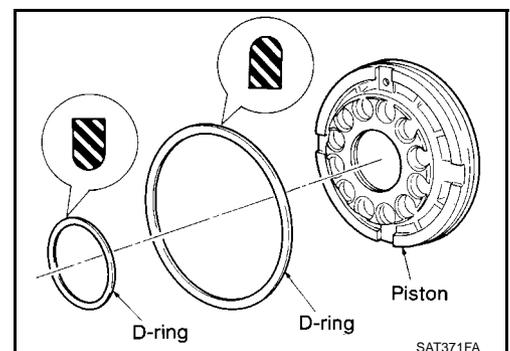
Seal Ring Clearance

- Install new seal rings onto input shaft.
 - Measure clearance between seal ring and ring groove.
- Standard clearance: 0.08 - 0.23 mm (0.0031 - 0.0091 in)**
Allowable limit: 0.23 mm (0.0091 in)
- If not within allowable limit, replace input shaft assembly.



ASSEMBLY

1. Install D-rings on piston.
 - **Apply ATF to both parts.**

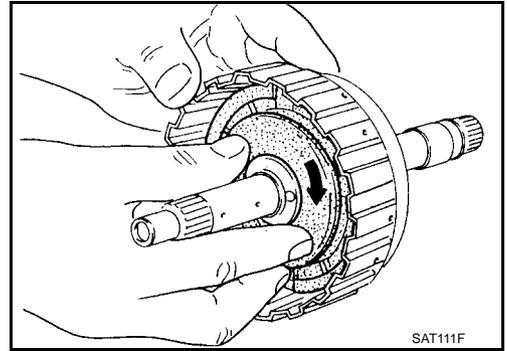


REPAIR FOR COMPONENT PARTS

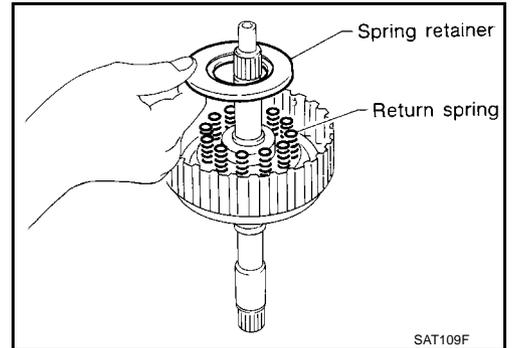
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2. Install piston assembly by turning it slowly.

- **Apply ATF to inner surface of drum.**

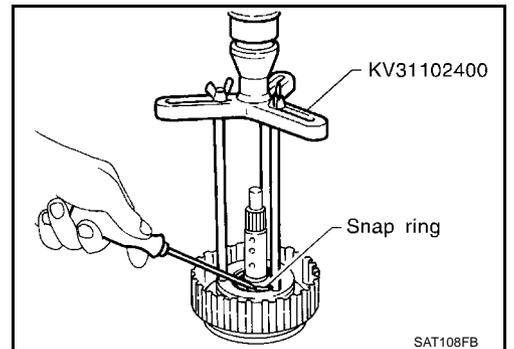


3. Install return springs and spring retainer on piston.

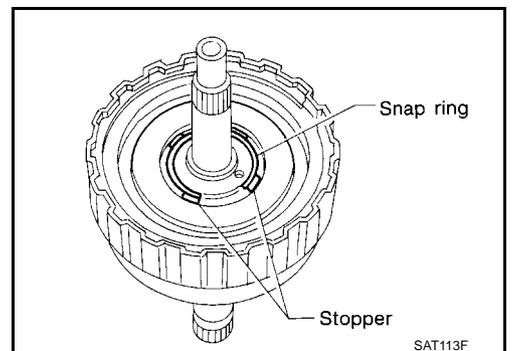


4. Set Tool on spring retainer and install snap ring while compressing return springs.

- **Set Tool directly over return springs.**



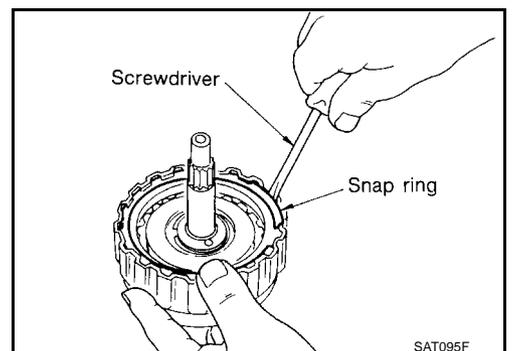
- **Do not align snap ring gap with spring retainer stopper.**



5. Install drive plates, driven plates and retaining plate.

- **Take care with the order and direction of plates.**

6. Install snap ring.



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REPAIR FOR COMPONENT PARTS

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

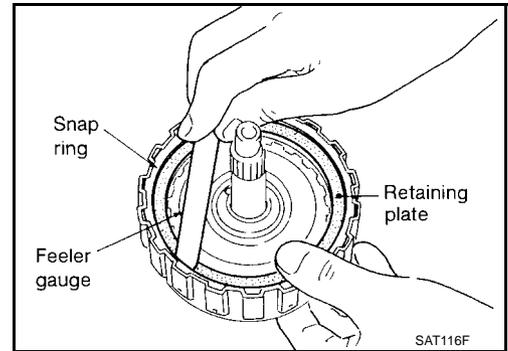
Specified clearance:

Standard 1.8 - 2.2 mm (0.071 - 0.087 in)

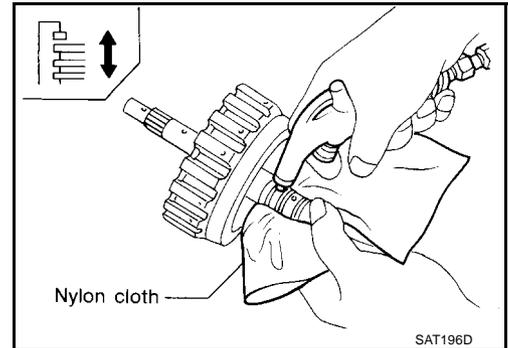
Allowable limit 2.8 mm (0.110 in)

Retaining plate:

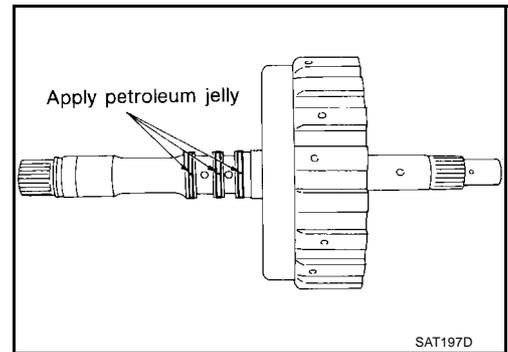
Refer to [AT-521](#), "[SERVICE DATA AND SPECIFICATIONS \(SDS\)](#)".



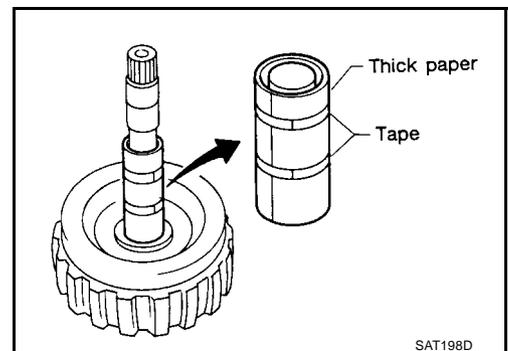
8. Check operation of high clutch.
Refer to "DISASSEMBLY", [AT-466](#), "[High Clutch](#)".



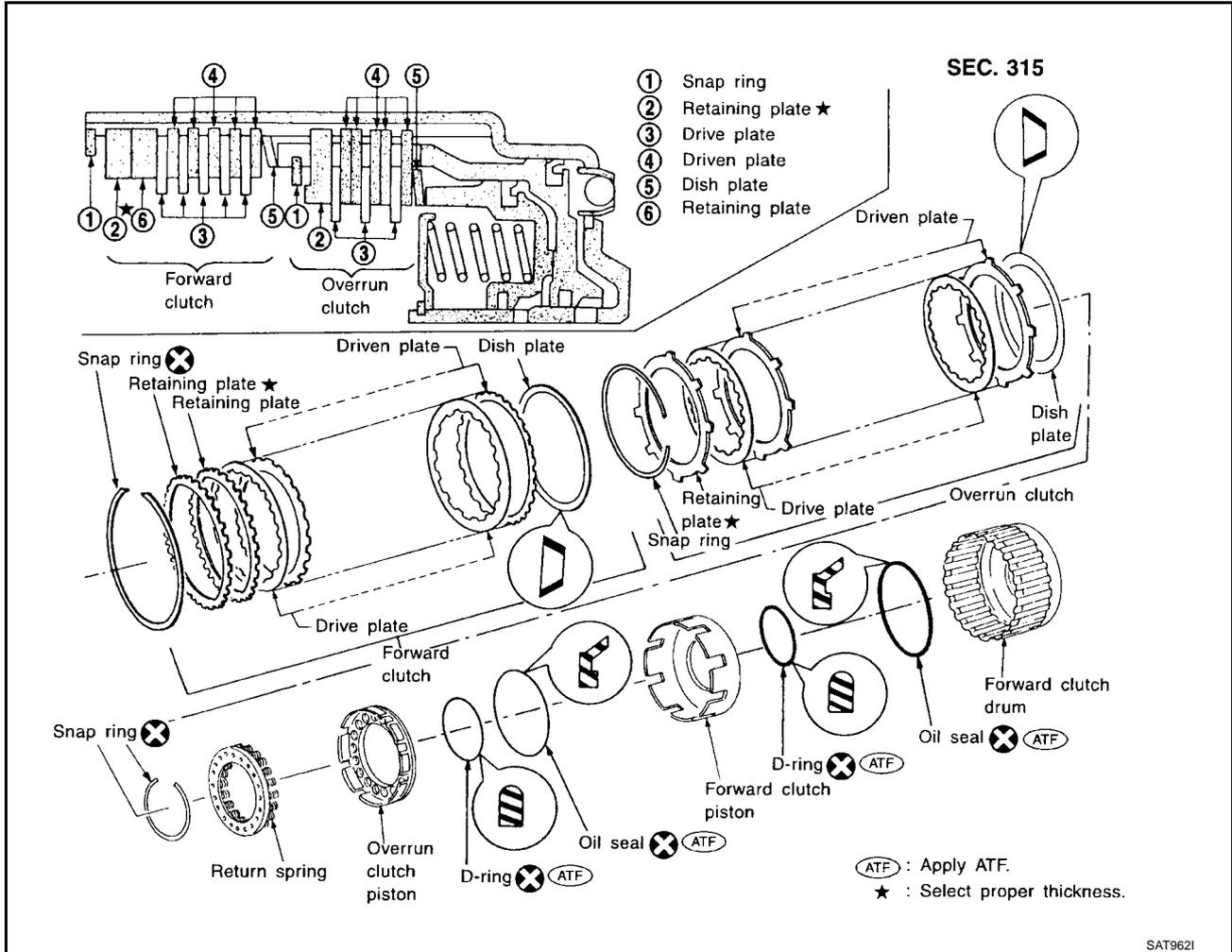
9. Install seal rings to input shaft.
- **Apply petroleum jelly to seal rings.**
 - **Always replace when removed.**



- **Roll paper around seal rings to prevent seal rings from spreading.**

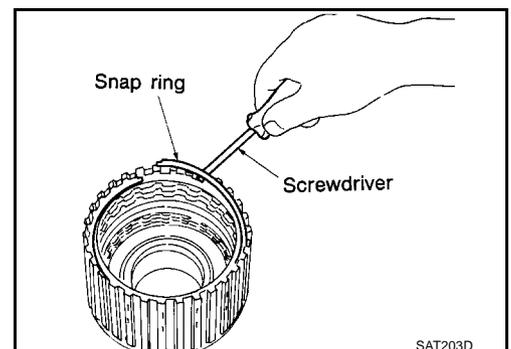
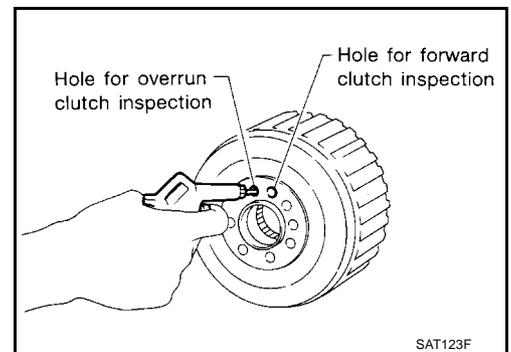


Forward and Overrun Clutches COMPONENTS



DISASSEMBLY

1. Check operation of forward clutch and overrun clutch.
 - a. Install bearing retainer on forward clutch drum.
 - b. Apply compressed air to oil hole of forward clutch drum.
 - c. Check to see that retaining plate moves to snap ring.
 - d. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Oil seal might be damaged.
 - Fluid might be leaking past piston check ball.
2. Remove snap ring for forward clutch.
3. Remove drive plates, driven plates, retaining plate and dish plate for forward clutch.

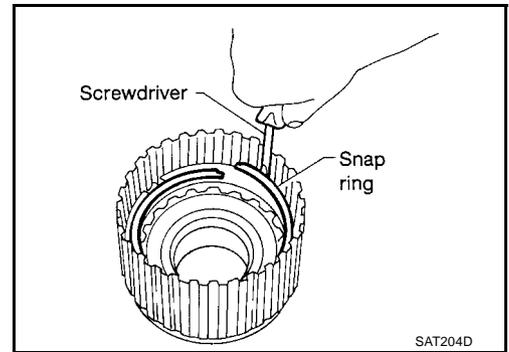


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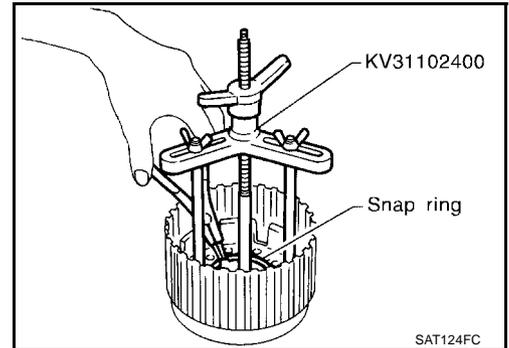
REPAIR FOR COMPONENT PARTS

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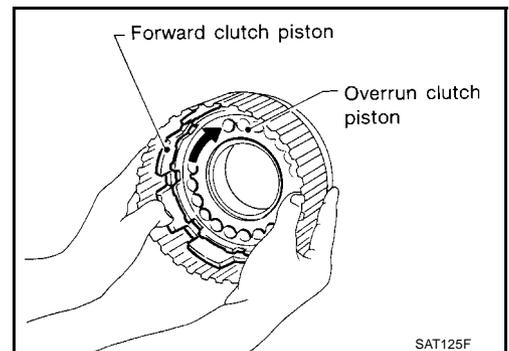
4. Remove snap ring for overrun clutch.
5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.



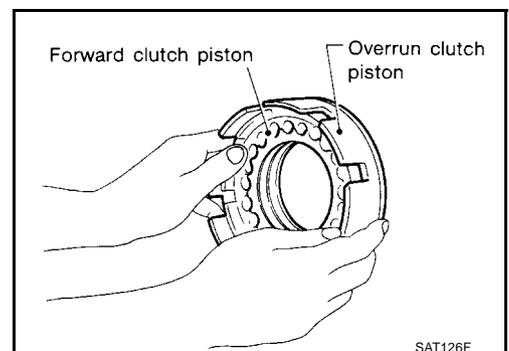
6. Set Tool on spring retainer and remove snap ring from forward clutch drum while compressing return springs.
 - **Set Tool directly over return springs.**
 - **Do not expand snap ring excessively.**
7. Remove spring retainer and return springs.
 - **Do not remove return springs from spring retainer.**



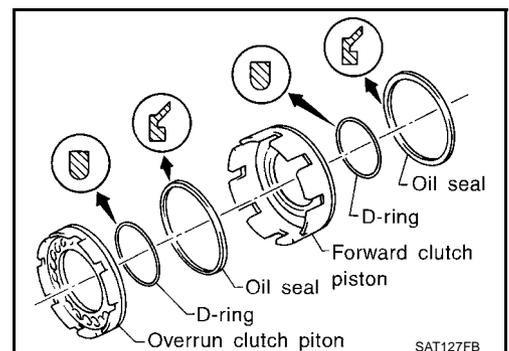
8. Remove forward clutch piston with overrun clutch piston from forward clutch drum by turning it.



9. Remove overrun clutch piston from forward clutch piston by turning it.



10. Remove D-rings and oil seals from forward clutch piston and overrun clutch piston.



INSPECTION

Snap Rings, Spring Retainer and Return Springs

- Check for deformation, fatigue or damage.
- Replace if necessary.
- **When replacing spring retainer and return springs, replace them as a set.**

Forward Clutch and Overrun Clutch Drive Plates

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

Thickness of drive plate:

Forward clutch

Standard value: 1.6 mm (0.063 in)

Wear limit: 1.4 mm (0.055 in)

Overrun clutch

Standard value: 1.6 mm (0.063 in)

Wear limit: 1.6 mm (0.063 in)

- If not within wear limit, replace.

Forward Clutch and Overrun Clutch Dish Plates

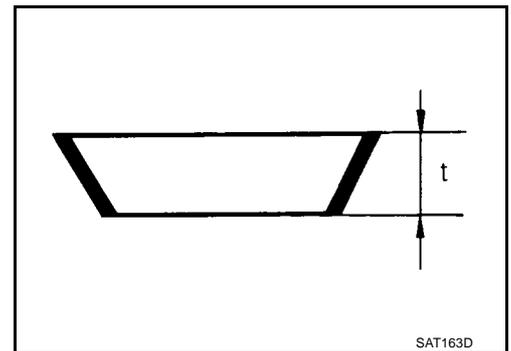
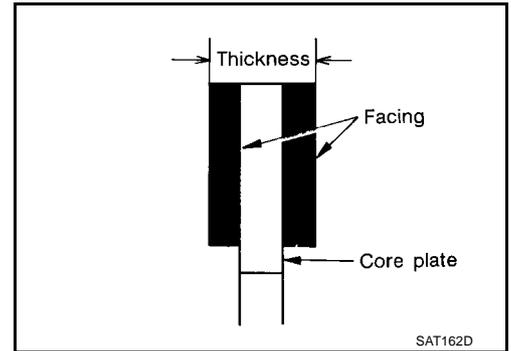
- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate:

Forward clutch 2.7 mm (0.106 in)

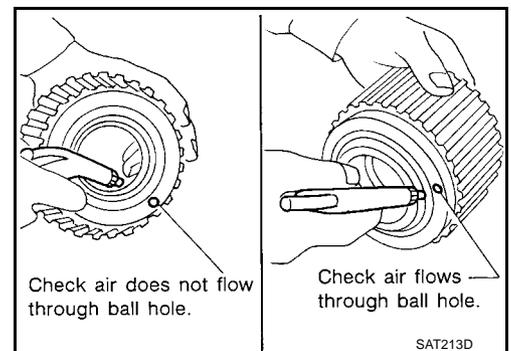
Overrun clutch 2.7 mm (0.106 in)

- If deformed or fatigued, replace.



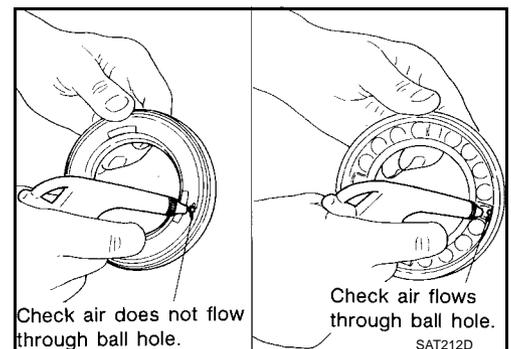
Forward Clutch Drum

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole from outside of forward clutch drum. Make sure air leaks past ball.
- Apply compressed air to oil hole from inside of forward clutch drum. Make sure there is no air leakage.



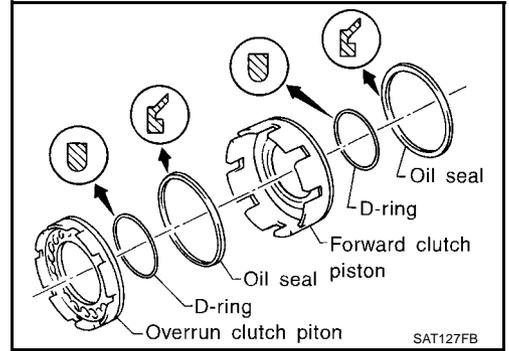
Overrun Clutch Piston

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side. Make sure that air leaks past ball.

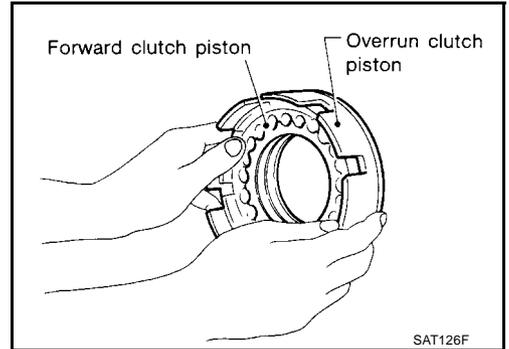


ASSEMBLY

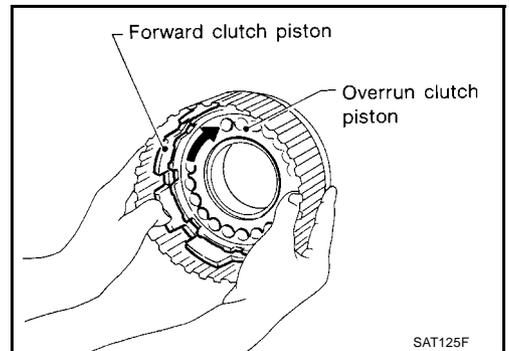
1. Install D-rings and oil seals on forward clutch piston and overrun clutch piston.
 - Take care with direction of oil seal.
 - Apply ATF to both parts.



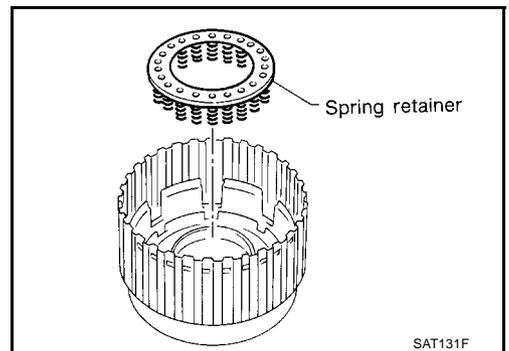
2. Install overrun clutch piston assembly on forward clutch piston by turning it slowly.
 - Apply ATF to inner surface of forward clutch piston.



3. Install forward clutch piston assembly on forward clutch drum by turning it slowly.
 - Apply ATF to inner surface of drum.



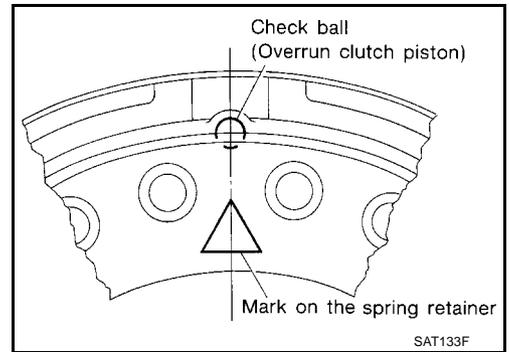
4. Install return spring on overrun clutch piston.



REPAIR FOR COMPONENT PARTS

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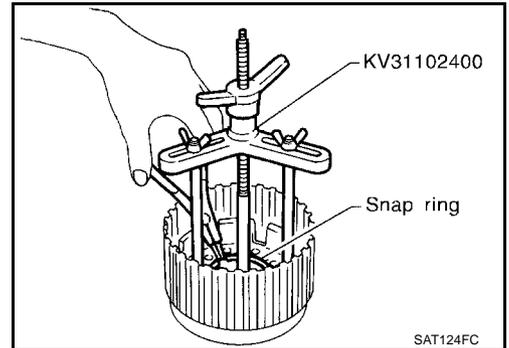
- Align the mark on spring retainer with check ball in overrun clutch piston.



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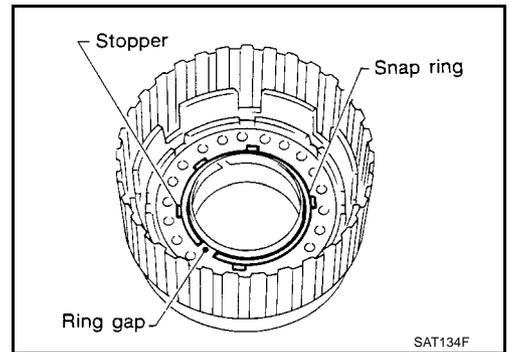
5. Set Tool on spring retainer and install snap ring while compressing return springs.

- Set Tool directly over return springs.



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

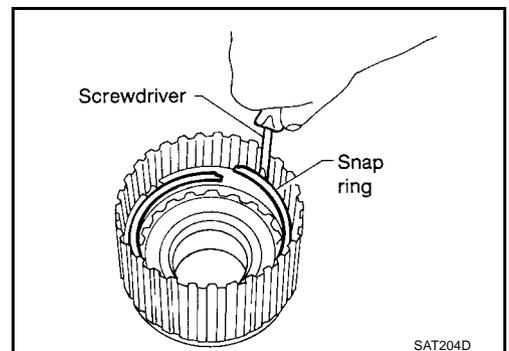


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6. Install drive plates, driven plates, retaining plate and dish plate for overrun clutch.

- Take care with order of plates.

7. Install snap ring for overrun clutch.



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8. Measure clearance between overrun clutch retaining plate and snap ring.

If not within allowable limit, select proper retaining plate.

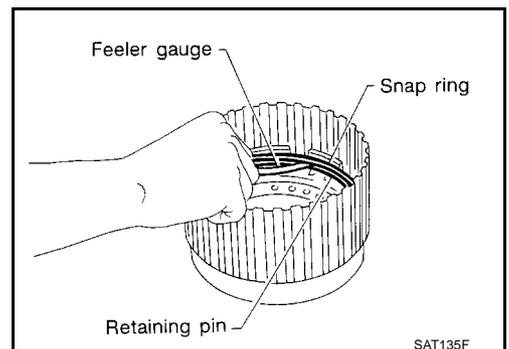
Specified clearance:

Standard 0.7 - 1.1 mm (0.028 - 0.043 in)

Allowable limit 1.7 mm (0.067 in)

Overrun clutch retaining plate:

Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#) .



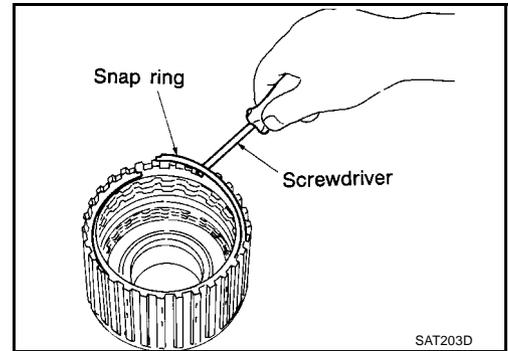
REPAIR FOR COMPONENT PARTS

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9. Install drive plates, driven plates, retaining plate and dish plate for forward clutch.

- **Take care with order of plates.**

10. Install snap ring for forward clutch.



11. Measure clearance between forward clutch retaining plate and snap ring.

If not within allowable limit, select proper retaining plate.

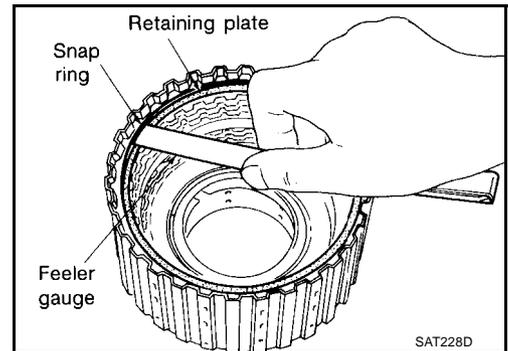
Specified clearance:

Standard 0.45 - 0.85 mm (0.0177 - 0.0335 in)

Allowable limit 1.85 mm (0.0728 in)

Forward clutch retaining plate:

Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#).

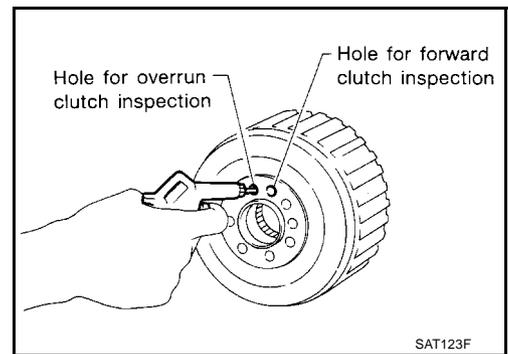


12. Check operation of forward clutch.

Refer to "DISASSEMBLY", [AT-471, "Forward and Overrun Clutches"](#).

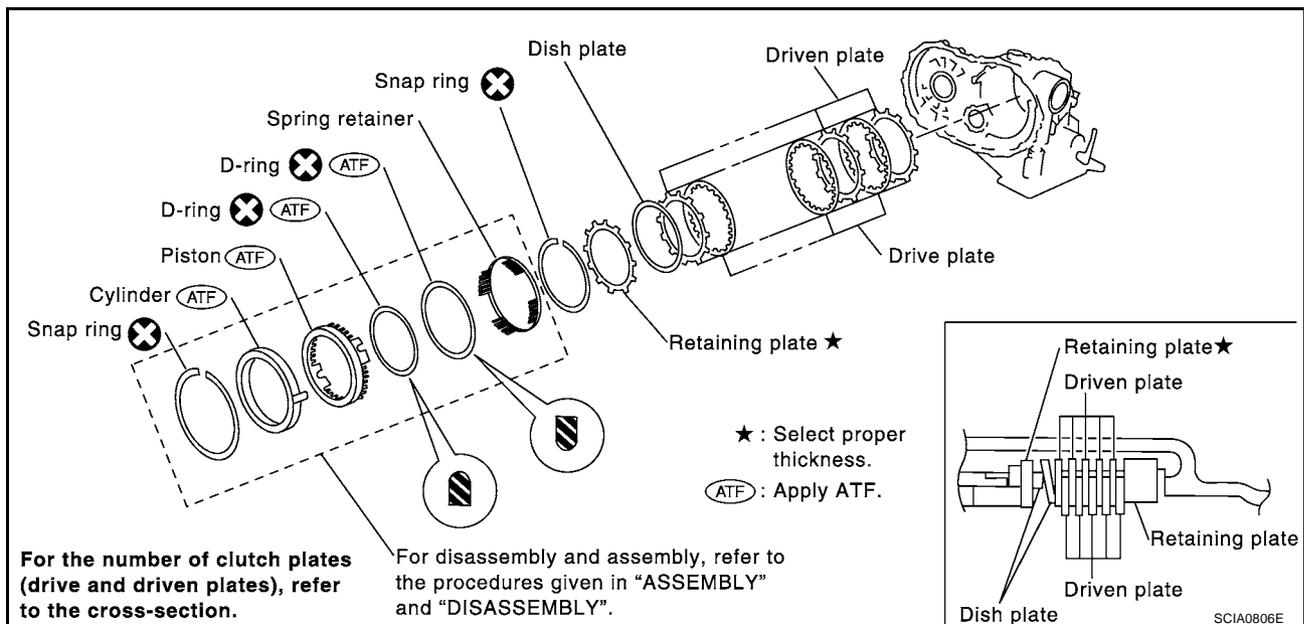
13. Check operation of overrun clutch.

Refer to "DISASSEMBLY", [AT-471, "Forward and Overrun Clutches"](#).



Low & Reverse Brake COMPONENTS

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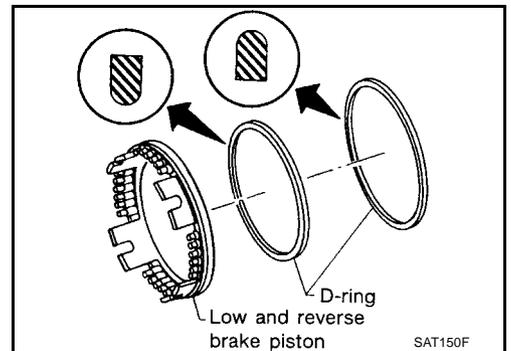
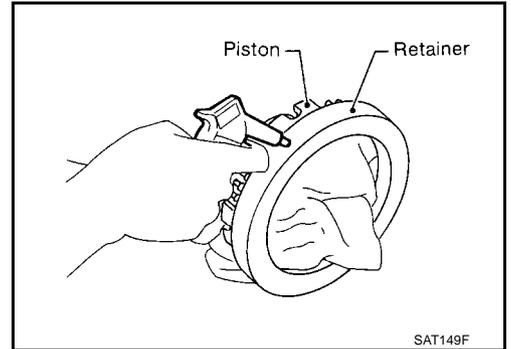
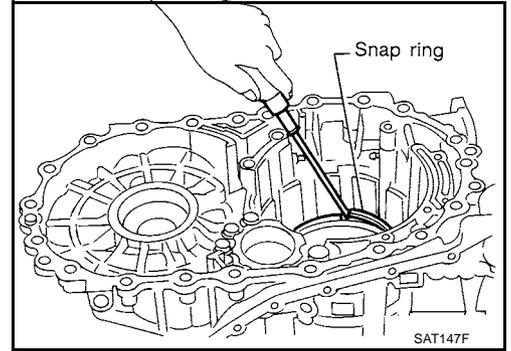


DISASSEMBLY

1. Check operation of low & reverse brake.
 - a. Apply compressed air to oil hole of transmission case.
 - b. Check to see that retaining plate moves to snap ring.
 - c. If retaining plate does not contact snap ring:
 - D-ring might be damaged.
 - Fluid might be leaking past piston check ball.

2. In order to remove piston, apply compressed air to oil hole of retainer while holding piston.
 - **Apply air gradually and allow piston to come out evenly.**

3. Remove D-rings from piston.



INSPECTION

Low and Reverse Brake Snap Ring, Spring Retainer and Return Springs

- Check for deformation, fatigue or damage. If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**

Low and Reverse Brake Drive Plate

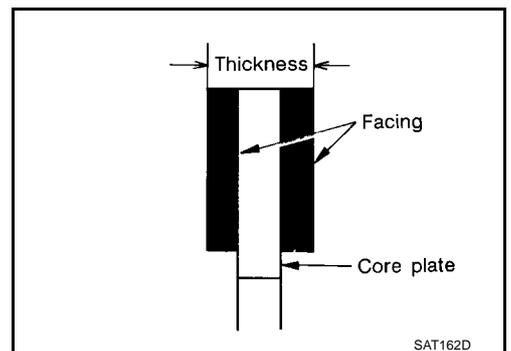
- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate:

Standard value 1.8 mm (0.071 in)

Wear limit 1.6 mm (0.063 in)

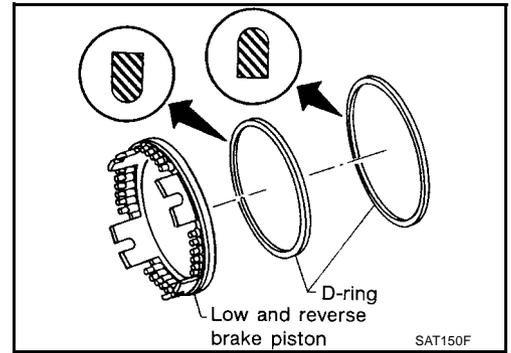
- If not within wear limit, replace.



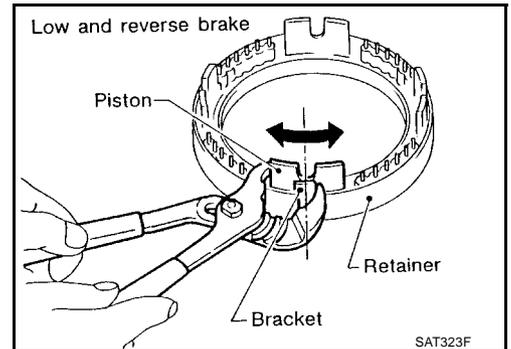
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ASSEMBLY

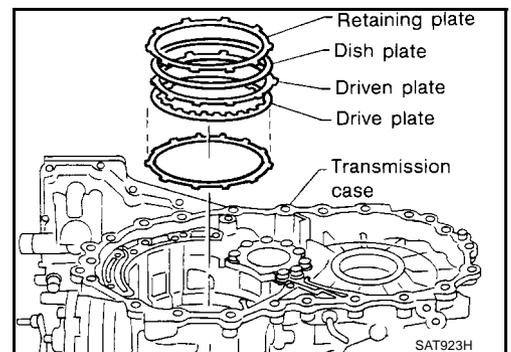
1. Install D-rings on piston.
 - Apply ATF to both parts.



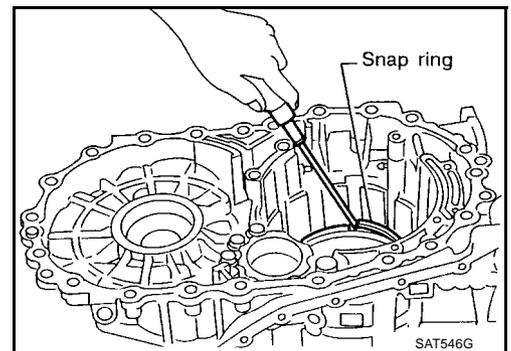
2. Set and align piston with retainer.
 - This operation is required in order to engage the protrusions of piston to return springs correctly. Further procedures are given in "ASSEMBLY".



3. Install driven plates, drive plates, retaining plate and dish plate on transmission case.
 - Take care with order of plates and direction of dish plate.



4. Install snap ring.



REPAIR FOR COMPONENT PARTS

[ALL]

5. Measure clearance between driven plate and transmission case. If not within allowable limit, select proper retaining plate. (front side)

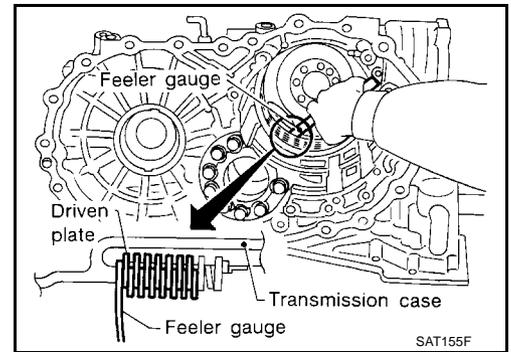
Specified clearance:

Standard 1.7 - 2.1 mm (0.067 - 0.083 in)

Allowable limit 3.3 mm (0.130 in)

Retaining plate:

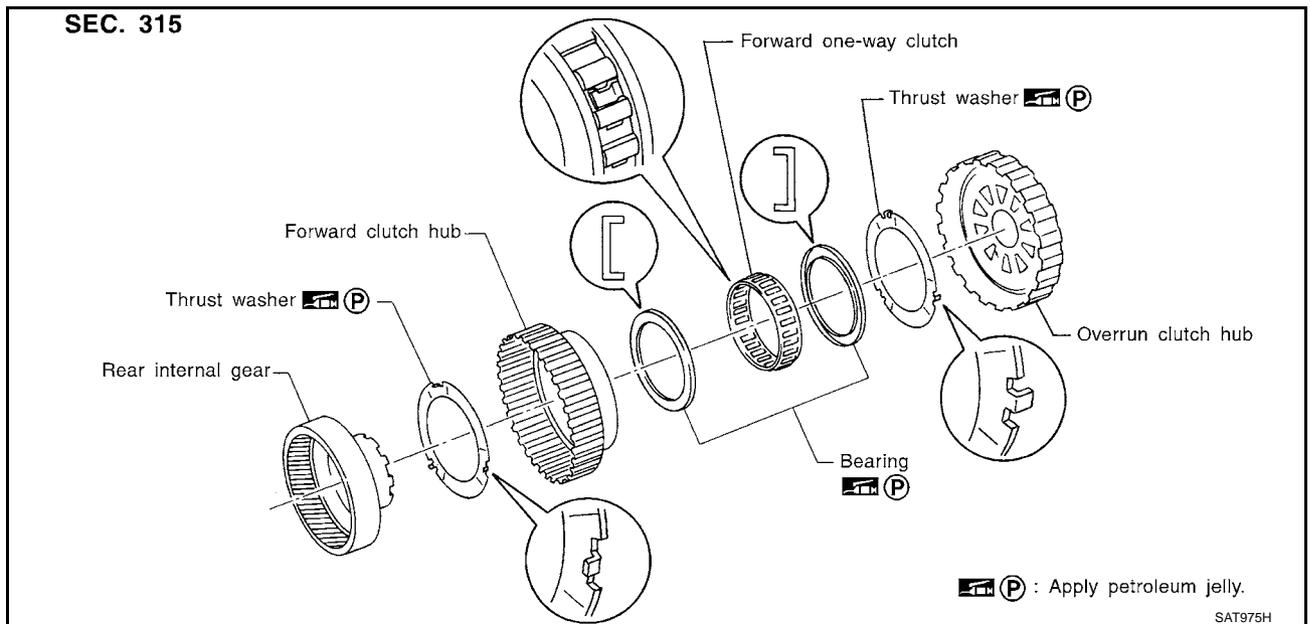
Refer to AT-521, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



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Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub COMPONENTS

ECS004M9

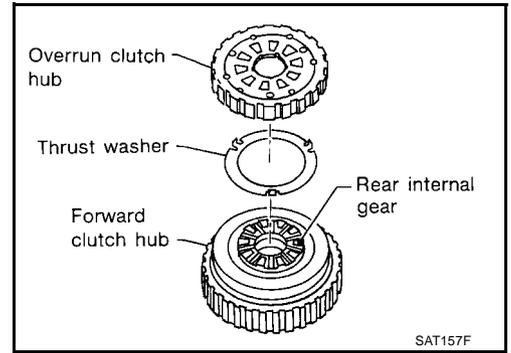


REPAIR FOR COMPONENT PARTS

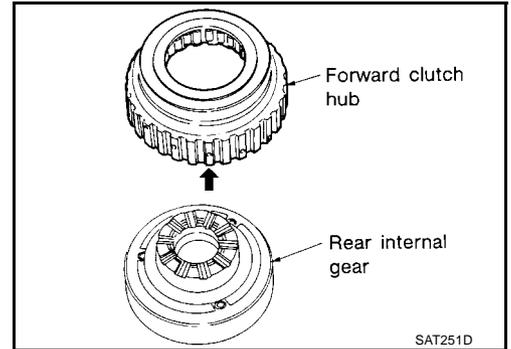
[ALL]

DISASSEMBLY

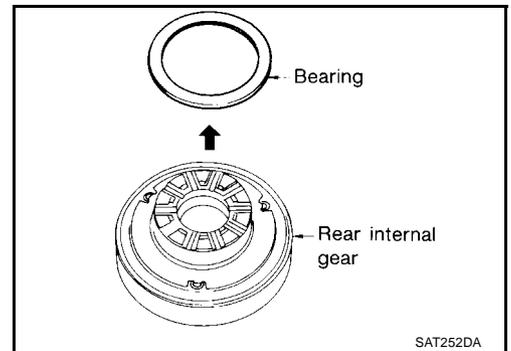
1. Remove overrun clutch hub and thrust washer from forward clutch hub.



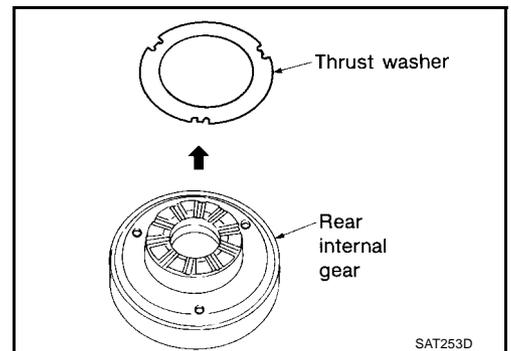
2. Remove forward clutch hub from rear internal gear.



3. Remove bearing from rear internal gear.



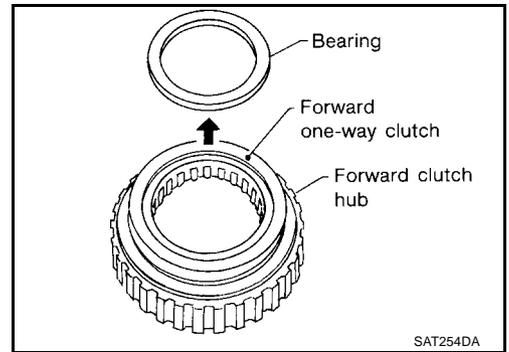
4. Remove thrust washer from rear internal gear.



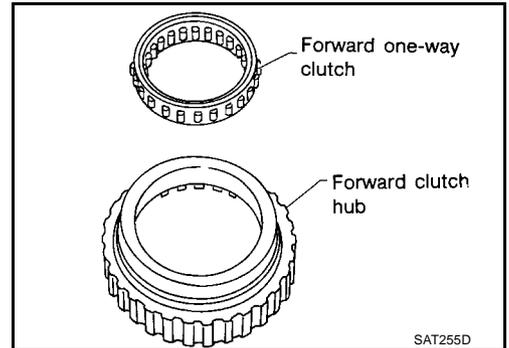
REPAIR FOR COMPONENT PARTS

[ALL]

5. Remove bearing from forward one-way clutch.



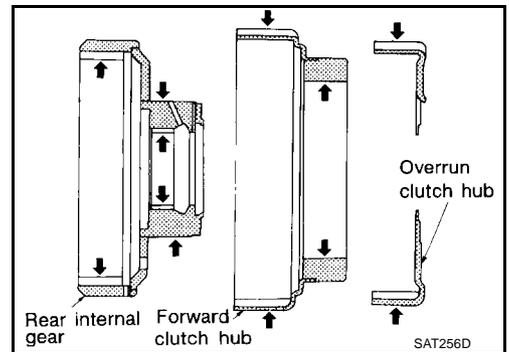
6. Remove forward one-way clutch from forward clutch hub.



INSPECTION

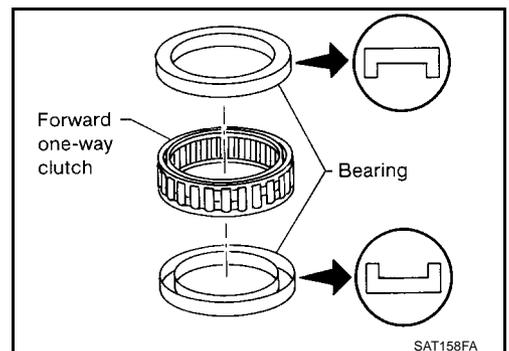
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

- Check rubbing surfaces for wear or damage.



Bearings and Forward One-way Clutch

- Check bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.



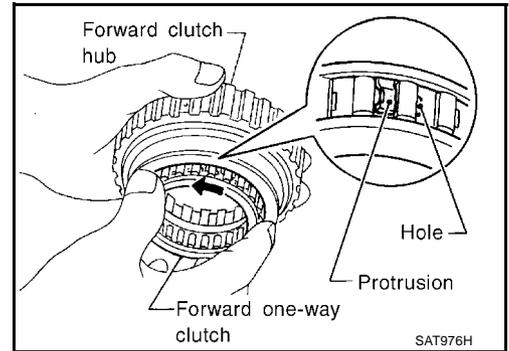
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REPAIR FOR COMPONENT PARTS

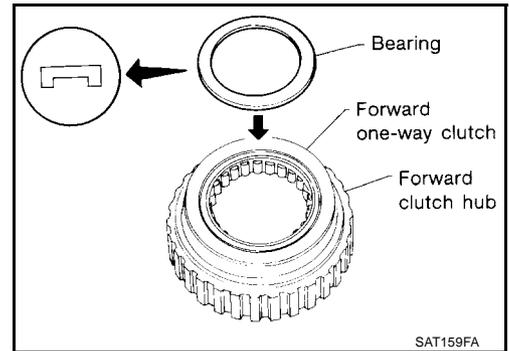
[ALL]

ASSEMBLY

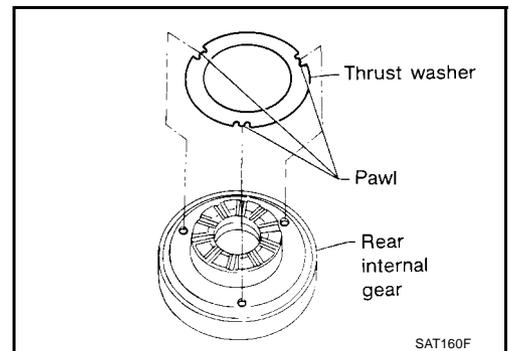
1. Install forward one-way clutch on forward clutch.
 - Take care with the direction of forward one-way clutch.



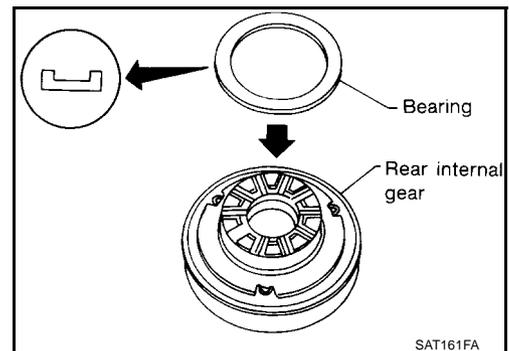
2. Install bearing on forward one-way clutch.
 - Apply petroleum jelly to bearing.



3. Install thrust washer on rear internal gear.
 - Apply petroleum jelly to thrust washer.
 - Align hooks of thrust washer with holes of rear internal gear.



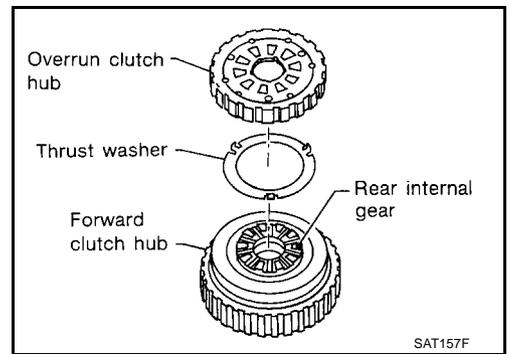
4. Install bearing on rear internal gear.
 - Apply petroleum jelly to bearing.



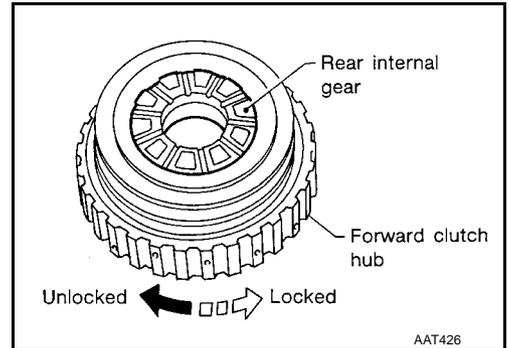
REPAIR FOR COMPONENT PARTS

[ALL]

5. Install thrust washer and overrun clutch hub.
 - Apply petroleum jelly to thrust washer.
 - Align hooks of thrust washer with holes of overrun clutch hub.
 - Align projections of rear internal gear with holes of overrun clutch hub.

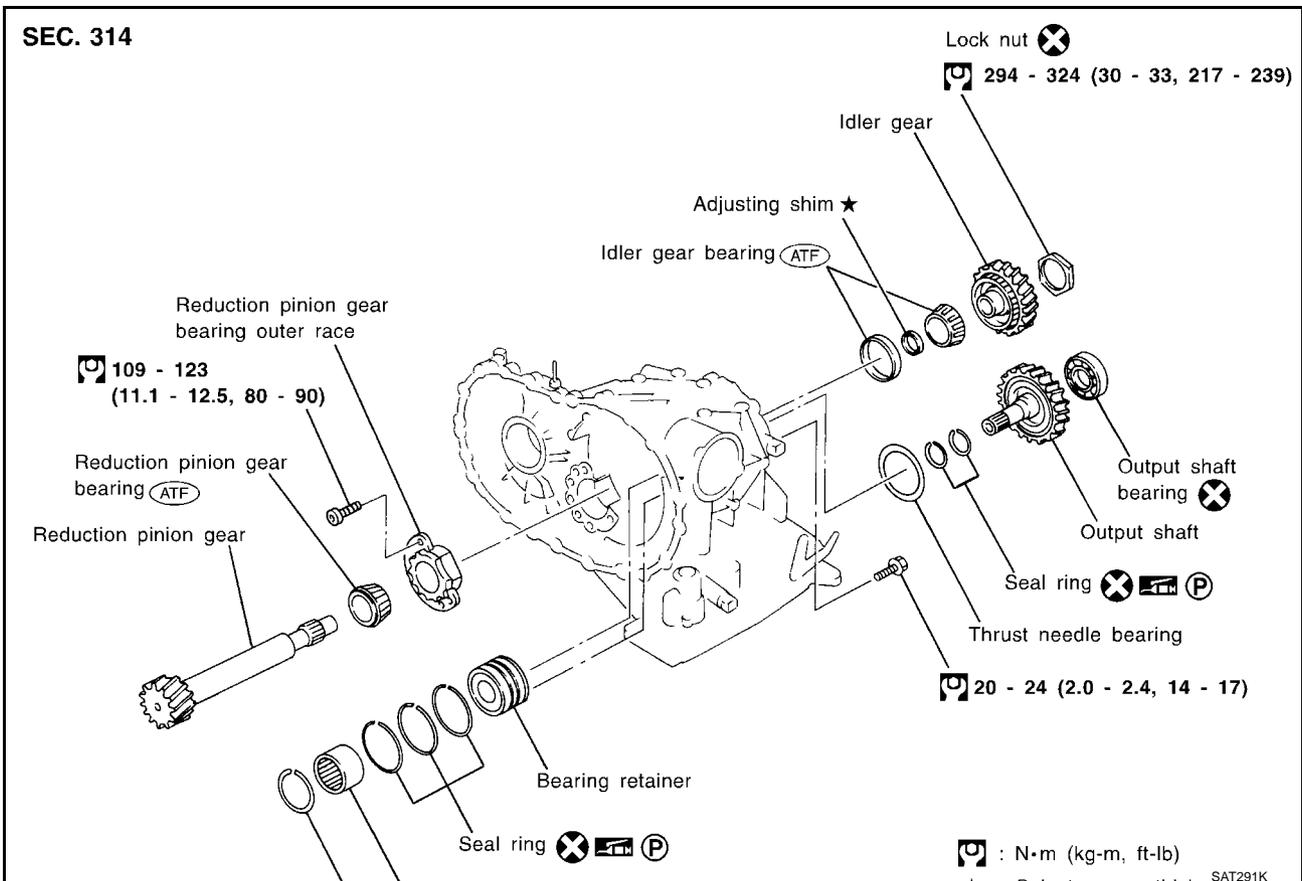


6. Install forward clutch hub on rear internal gear.
 - Check operation of forward one-way clutch. Hold rear internal gear and turn forward clutch hub. Check forward clutch hub for correct locking and unlocking directions.
 - If not as shown in illustration, check installation direction of forward one-way clutch.



Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer COMPONENTS

ECS004MA

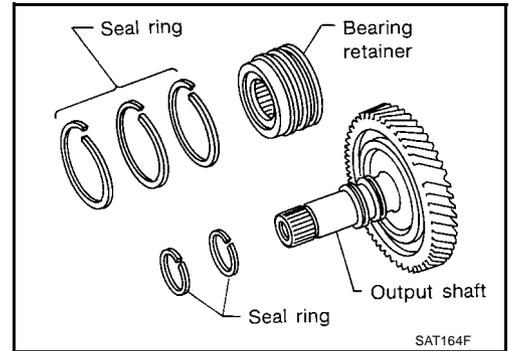


REPAIR FOR COMPONENT PARTS

[ALL]

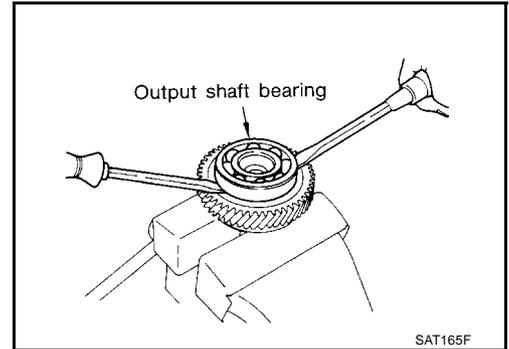
DISASSEMBLY

1. Remove seal rings from output shaft and bearing retainer.

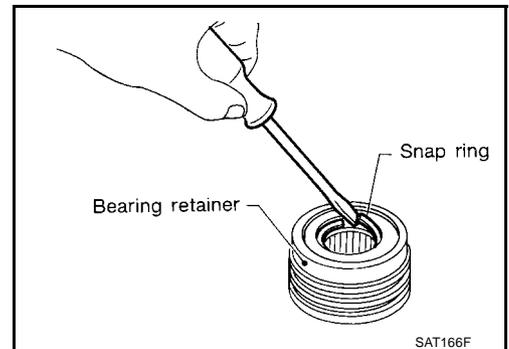


2. Remove output shaft bearing with screwdrivers.

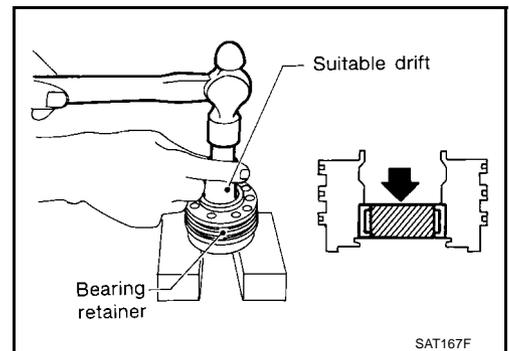
- Always replace bearing with a new one when removed.
- Do not damage output shaft.



3. Remove snap ring from bearing retainer.



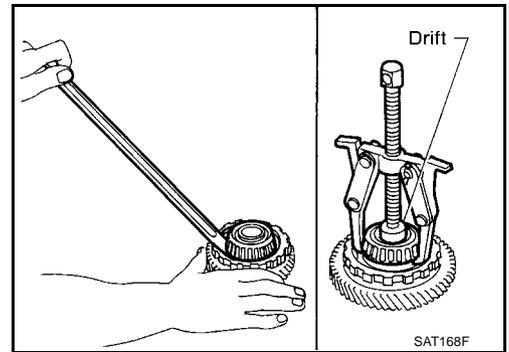
4. Remove needle bearing from bearing retainer.



REPAIR FOR COMPONENT PARTS

[ALL]

5. Remove idler gear bearing inner race from idler gear.

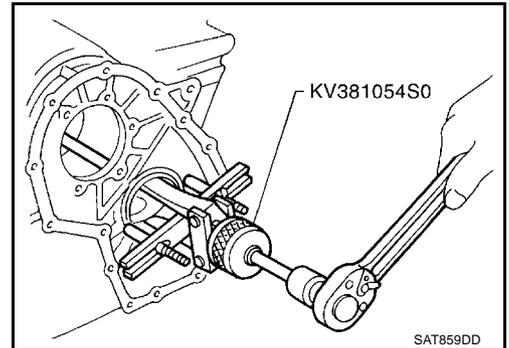


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6. Remove idler gear bearing outer race from transmission case.



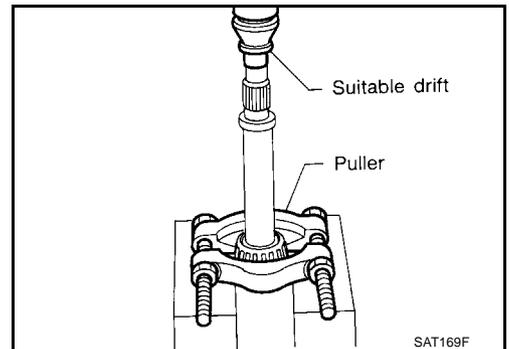
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7. Press out reduction pinion gear bearing inner race from reduction pinion gear.



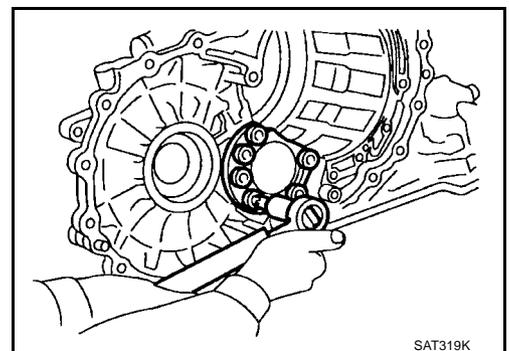
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8. Remove reduction pinion gear bearing outer race from transmission case.



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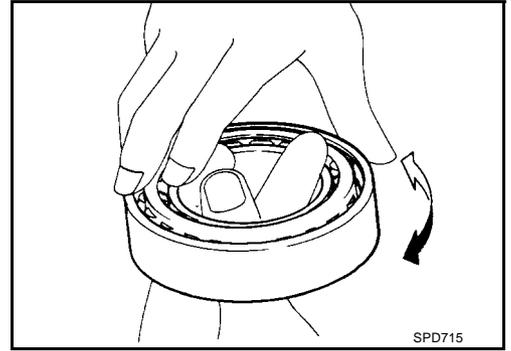
INSPECTION

Output Shaft, Idler Gear and Reduction Pinion Gear

- Check shafts for cracks, wear or bending.
- Check gears for wear, chips and cracks.

Bearing

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing taper roller bearing, replace outer and inner race as a set.**



Seal Ring Clearance

- Install new seal rings to output shaft.
- Measure clearance between seal ring and ring groove of output shaft.

Standard clearance:

0.10 - 0.25 mm (0.0039 - 0.0098 in)

Allowable limit:

0.25 mm (0.0098 in)

- If not within allowable limit, replace output shaft.
- Install new seal rings to bearing retainer.
- Measure clearance between seal ring and ring groove of bearing retainer.

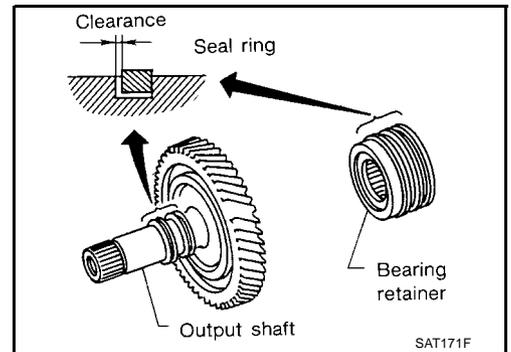
Standard clearance:

0.10 - 0.30 mm (0.0039 - 0.0118 in)

Allowable limit:

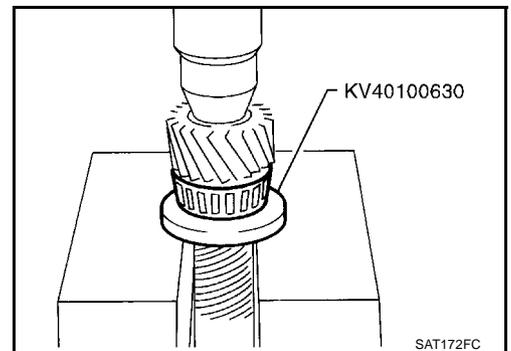
0.30 mm (0.0118 in)

- If not within allowable limit, replace bearing retainer.



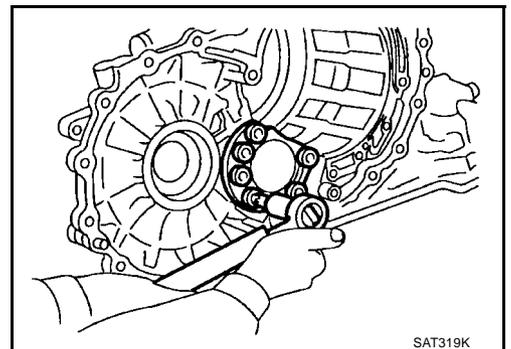
ASSEMBLY

1. Press reduction pinion gear bearing inner race on reduction pinion gear.



2. Install reduction pinion gear bearing outer race on transmission case.

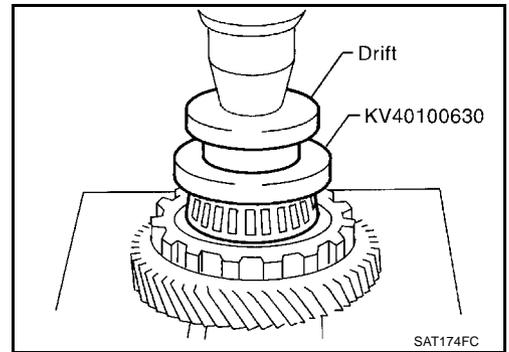
 : **109 - 123 N-m (11.1 - 12.5 kg-m, 80 - 90 ft-lb)**



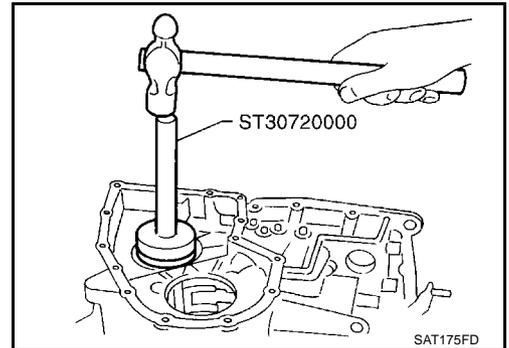
REPAIR FOR COMPONENT PARTS

[ALL]

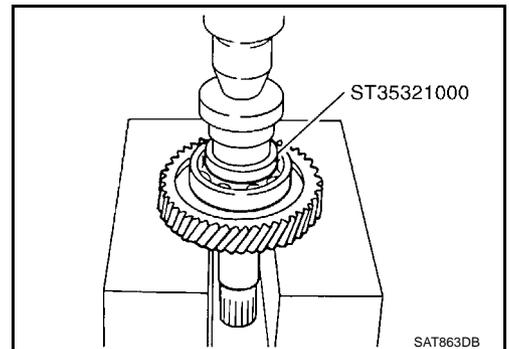
3. Press idler gear bearing inner race on idler gear.



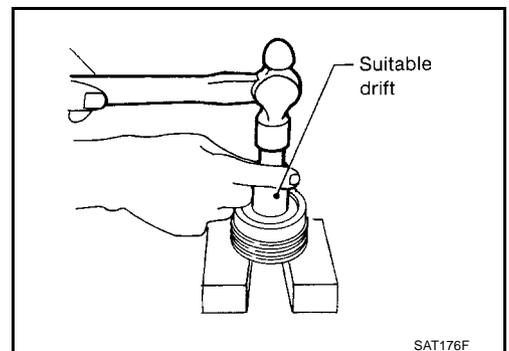
4. Install idler gear bearing outer race on transmission case.



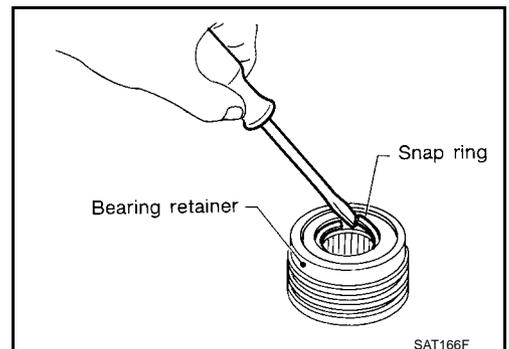
5. Press output shaft bearing on output shaft.



6. Press needle bearing on bearing retainer.



7. Install snap ring to bearing retainer.

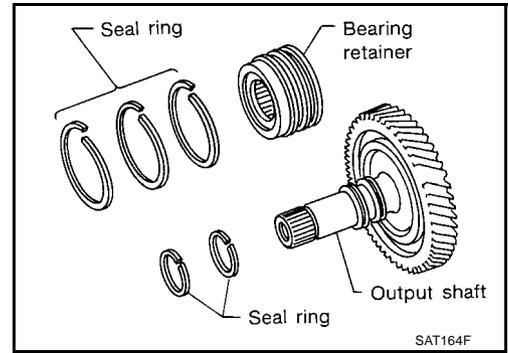


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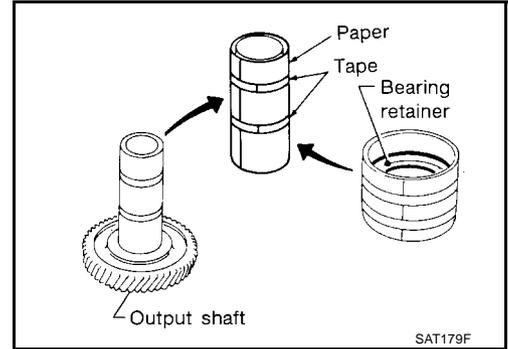
REPAIR FOR COMPONENT PARTS

[ALL]

- After packing ring grooves with petroleum jelly, carefully install new seal rings on output shaft and bearing retainer.

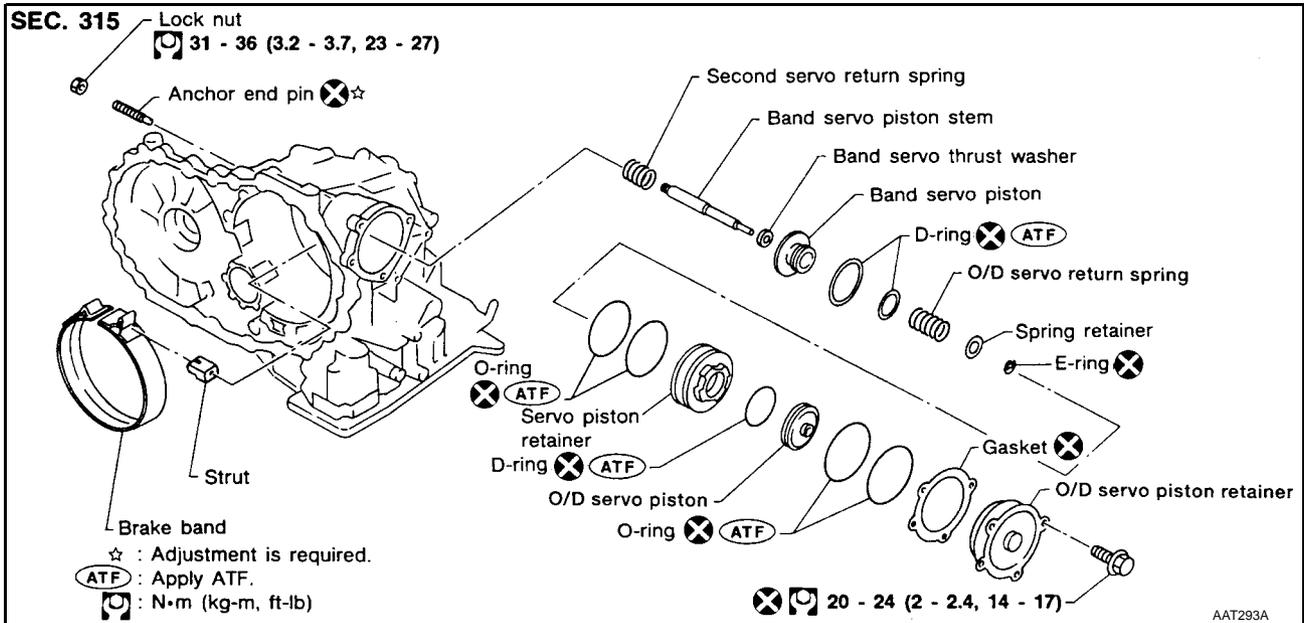


- Roll paper around seal rings to prevent seal rings from spreading.



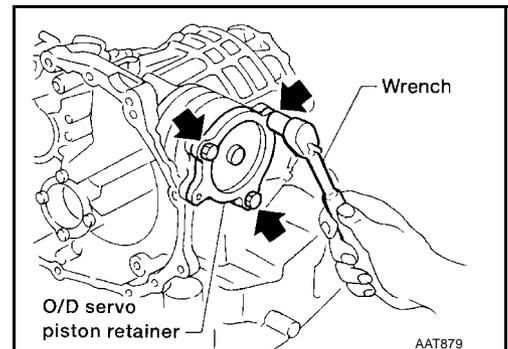
Band Servo Piston Assembly COMPONENTS

ECS004MB



DISASSEMBLY

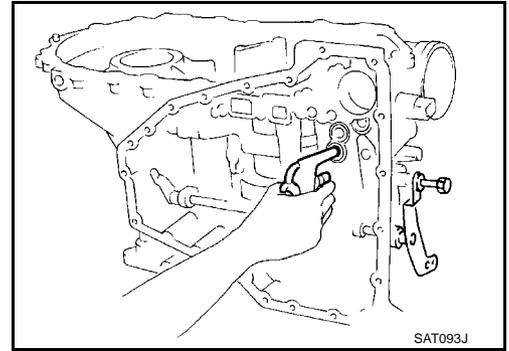
- Remove band servo piston fixing bolts.



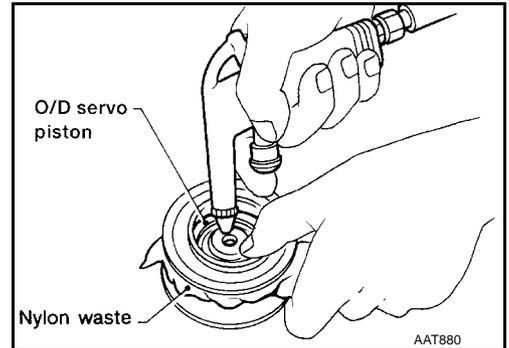
REPAIR FOR COMPONENT PARTS

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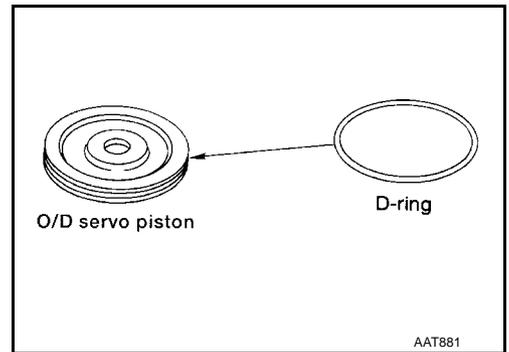
2. Apply compressed air to oil hole in transmission case to remove O/D servo piston retainer and band servo piston assembly.
 - Hold band servo piston assembly with a rag or nylon waste.



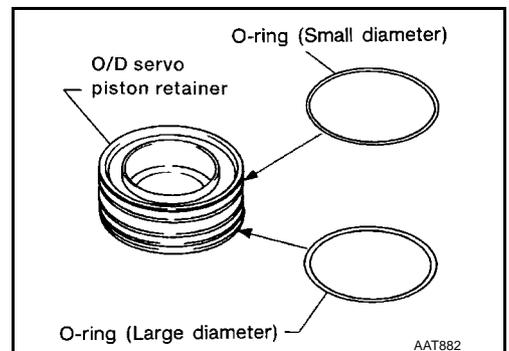
3. Apply compressed air to oil hole in O/D servo piston retainer to remove O/D servo piston from retainer.
 - Hold O/D band servo piston while applying compressed air.



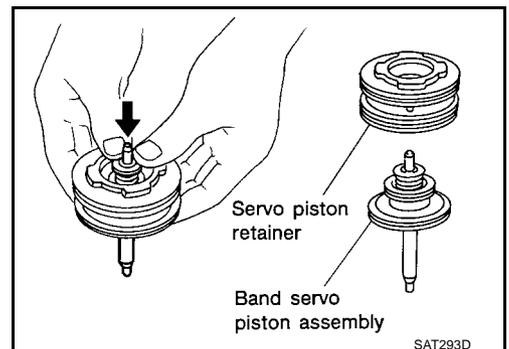
4. Remove D-ring from O/D servo piston.



5. Remove O-rings from O/D servo piston retainer.



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

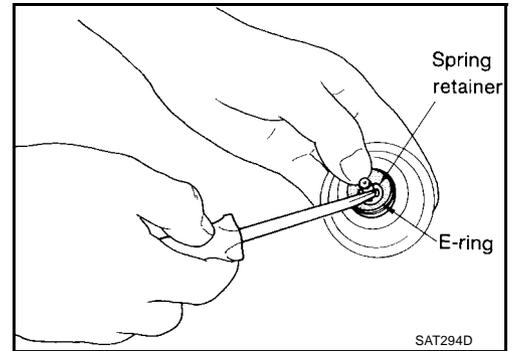


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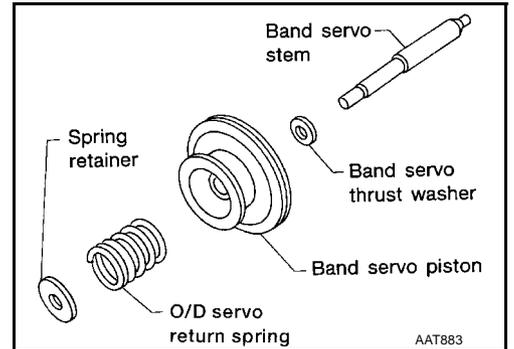
REPAIR FOR COMPONENT PARTS

[ALL]

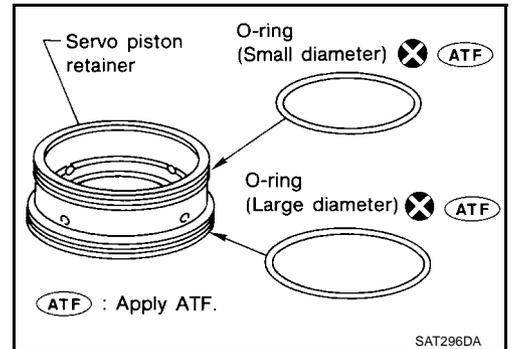
7. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, remove E-ring.



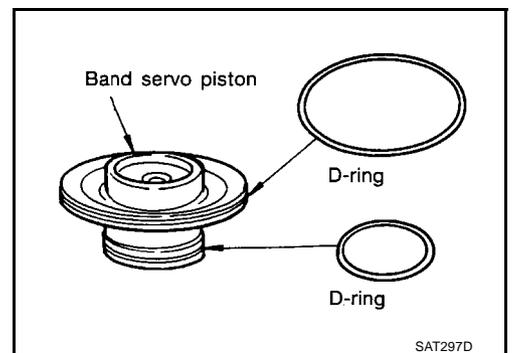
8. Remove O/D servo return spring, band servo thrust washer and band servo piston stem from band servo piston.



9. Remove O-rings from servo piston retainer.



10. Remove D-rings from band servo piston.



INSPECTION

Pistons, Retainers and Piston Stem

- Check frictional surfaces for abnormal wear or damage.

Return Springs

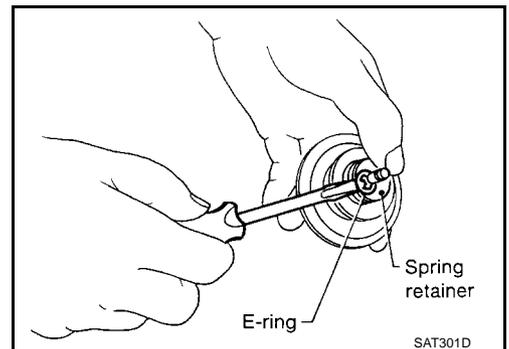
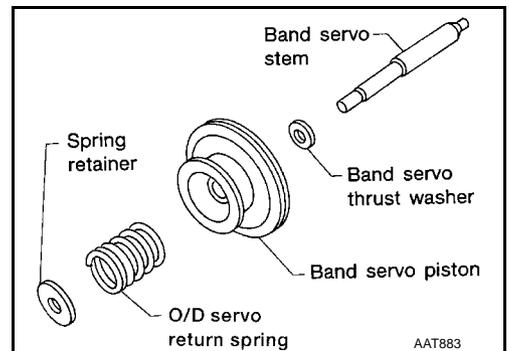
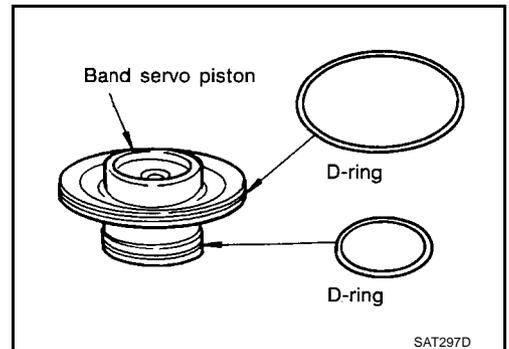
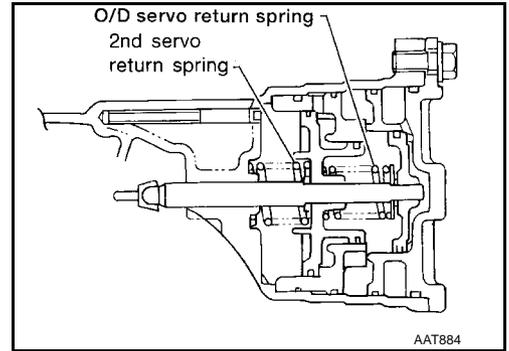
- Check for deformation or damage.
- Measure free length and outer diameter.

Inspection standard:

Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#).

ASSEMBLY

1. Install D-rings to servo piston retainer.
 - Apply ATF to D-rings.
 - Pay attention to position of each O-ring.
2. Install band servo piston stem, band servo thrust washer, O/D servo return spring and spring retainer to band servo piston.
3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring.

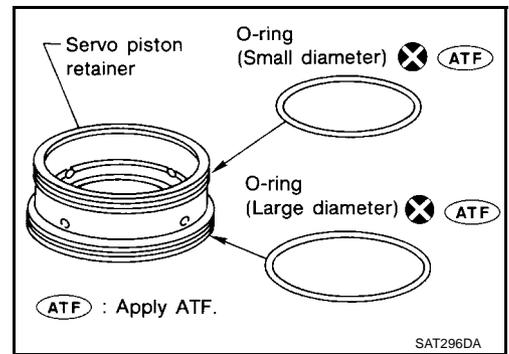


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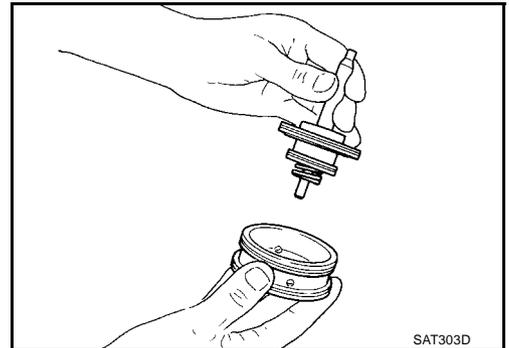
REPAIR FOR COMPONENT PARTS

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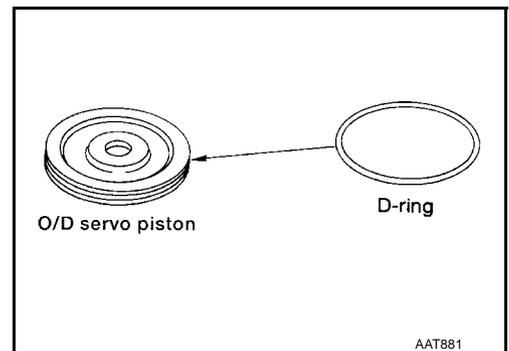
4. Install O-rings to servo piston retainer.
- **Apply ATF to O-rings.**
 - **Pay attention to position of each O-ring.**



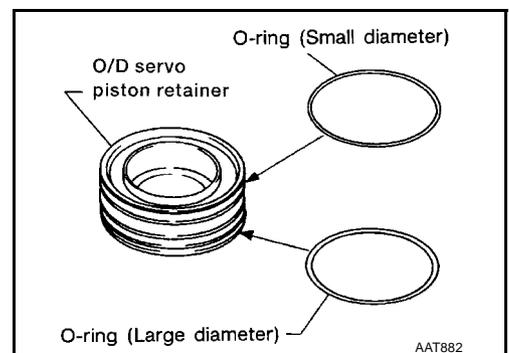
5. Install band servo piston assembly to servo piston retainer by pushing it inward.



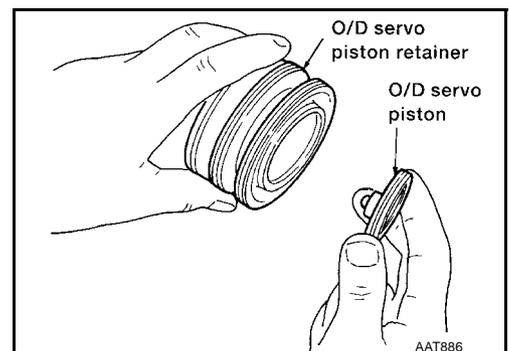
6. Install D-ring to O/D servo piston.
- **Apply ATF to D-ring.**



7. Install O-rings to O/D servo piston retainer.
- **Apply ATF to O-rings.**
 - **Pay attention to position of each O-ring.**



8. Install O/D servo piston to O/D servo piston retainer.

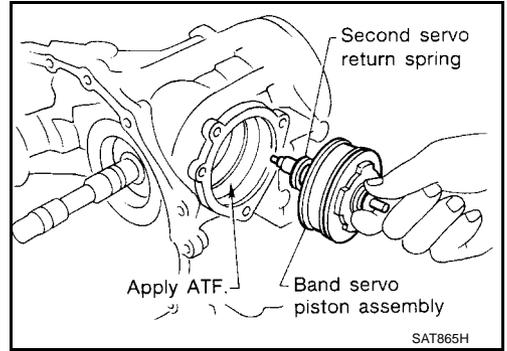


REPAIR FOR COMPONENT PARTS

[ALL]

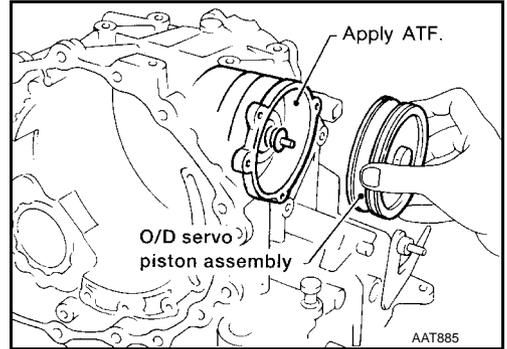
9. Install band servo piston assembly and 2nd servo return spring to transmission case.

- Apply ATF to O-ring of band servo piston and transmission case.

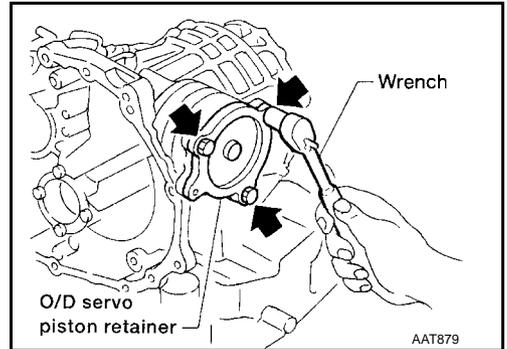


10. Install O/D servo piston assembly to transmission case.

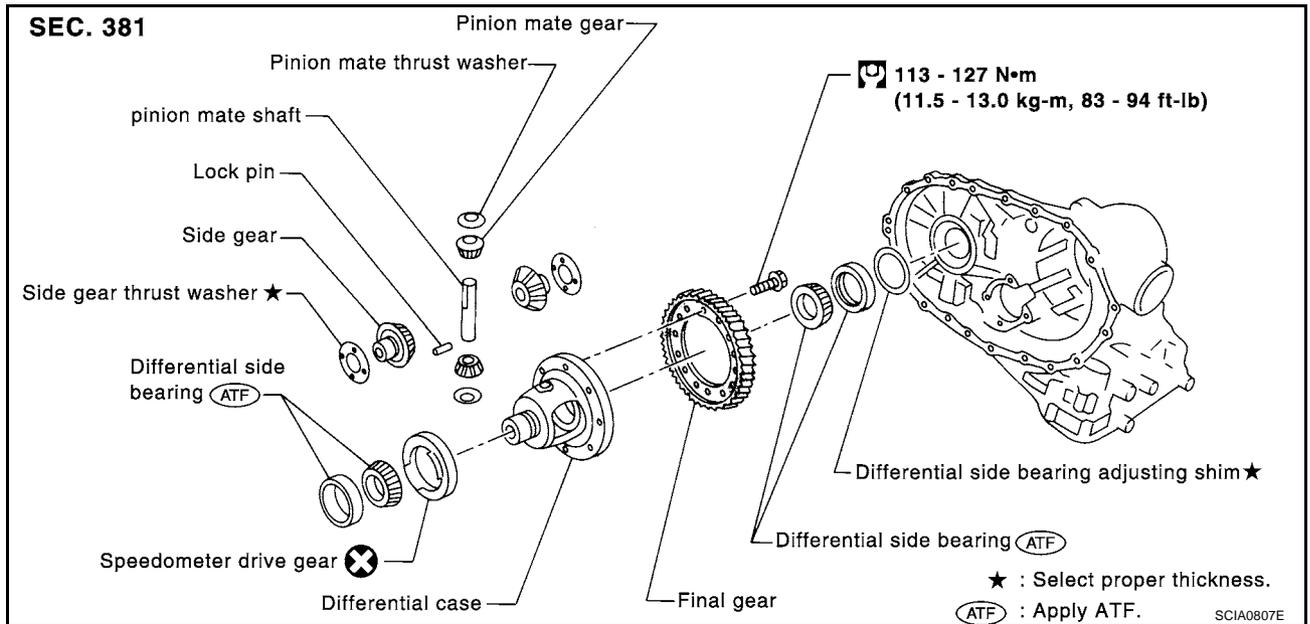
- Apply ATF to O-ring of band servo piston and transmission case.



11. Install O/D servo piston retainer to transmission case. Refer to [AT-424, "Oil Channel"](#).



Final Drive COMPONENTS

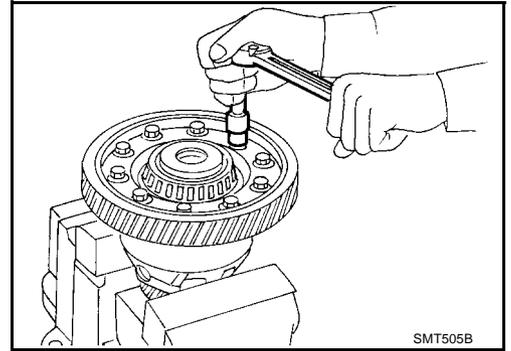


REPAIR FOR COMPONENT PARTS

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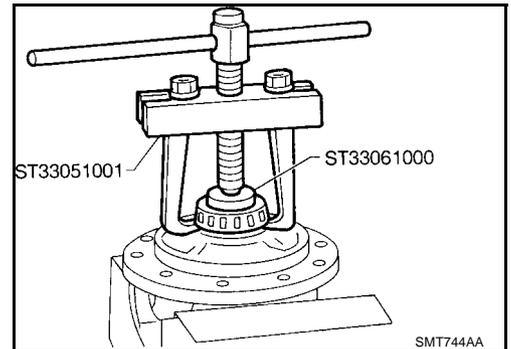
DISASSEMBLY

1. Remove final gear.

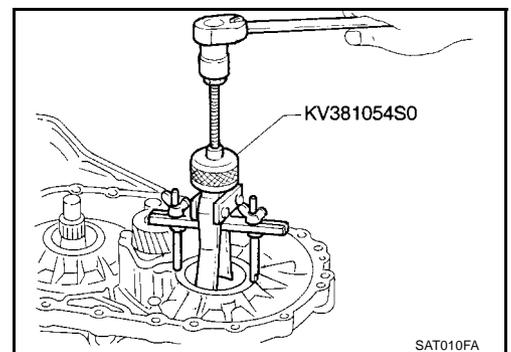


2. Press out differential side bearings.

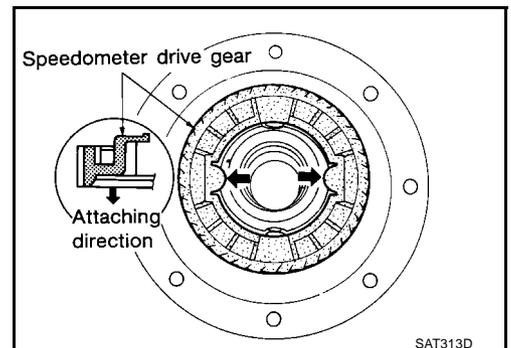
- Be careful not to mix up the right and left bearings.



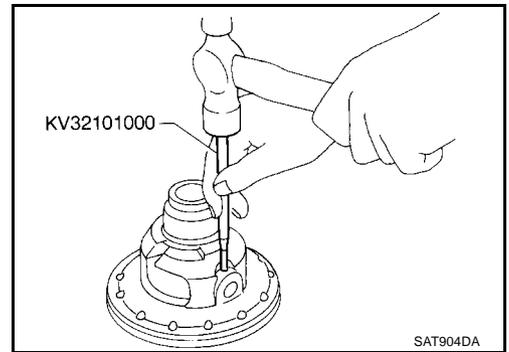
3. Remove differential side bearing outer race, and side bearing adjusting shim from transmission case.



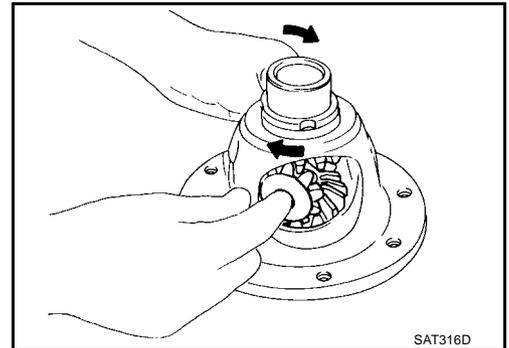
4. Remove speedometer drive gear.



5. Drive out pinion mate shaft lock pin.



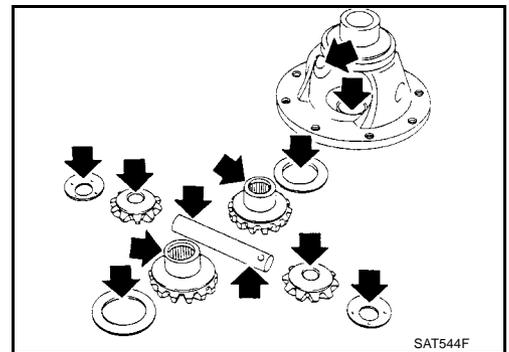
6. Draw out pinion mate shaft lock pin.
7. Remove pinion mate gears and side gears.



INSPECTION

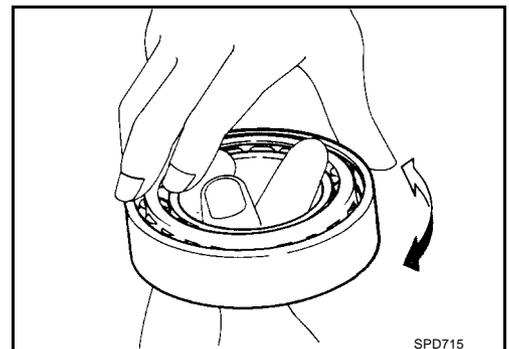
Gear, Washer, Shaft and Case

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.



Bearings

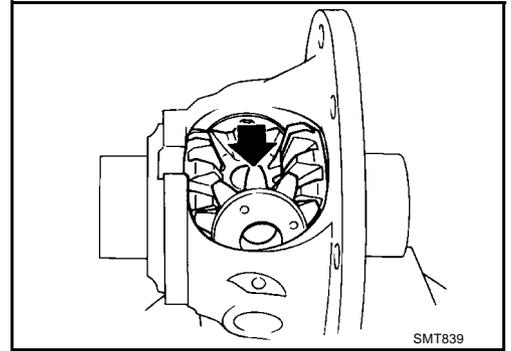
- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing taper roller bearing, replace outer and inner race as a set.**



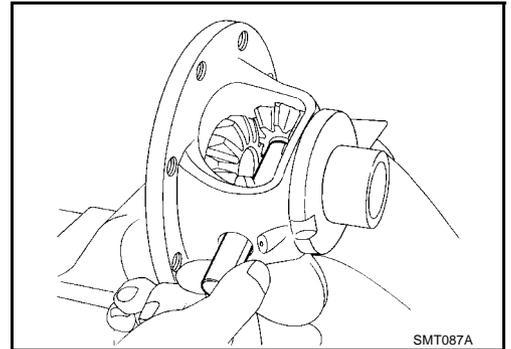
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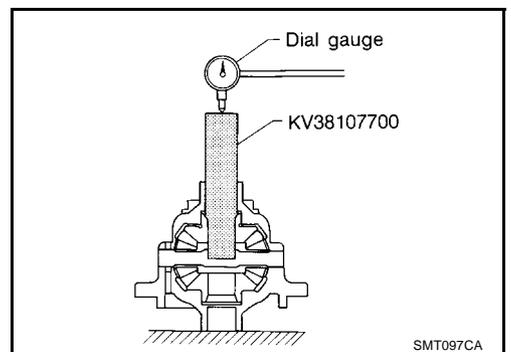
1. Attach side gear thrust washers to side gears, then install pinion mate thrust washers and pinion mate gears in place.



2. Insert pinion mate shaft.
 - When inserting, be careful not to damage pinion mate thrust washers.



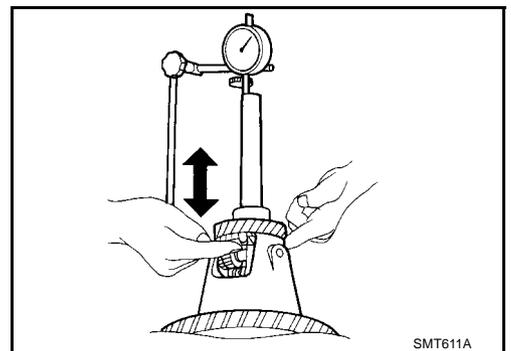
3. Measure clearance between side gear and differential case with washers following the procedure below:
 - a. Set Tool and dial indicator on side gear.



- b. Move side gear up and down to measure dial indicator deflection. Always measure indicator deflection on both side gears.

Clearance between side gear and differential case with washer:

0.1 - 0.2 mm (0.004 - 0.008 in)



- c. If not within specification, adjust clearance by changing thickness of differential side gear thrust washers.

Differential side gear thrust washers:

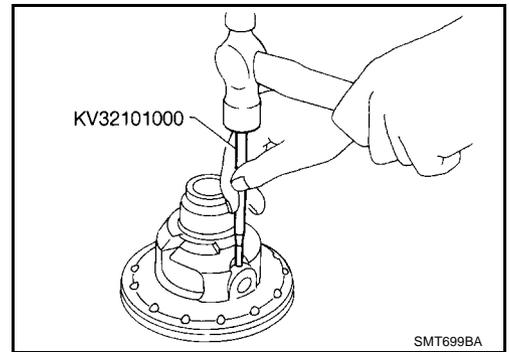
Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#) .

REPAIR FOR COMPONENT PARTS

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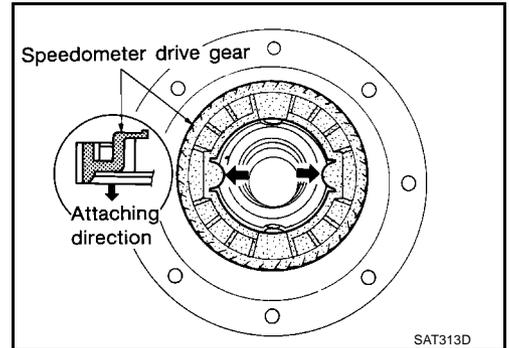
4. Install lock pin.

- Make sure that lock pin is flush with case.

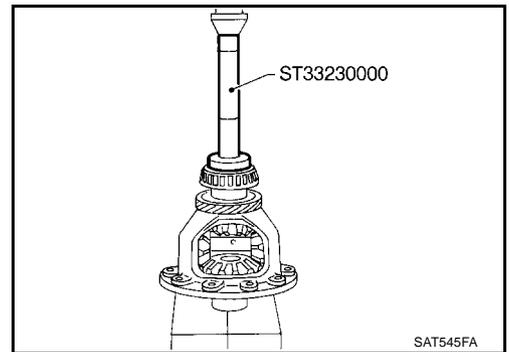


5. Install speedometer drive gear on differential case.

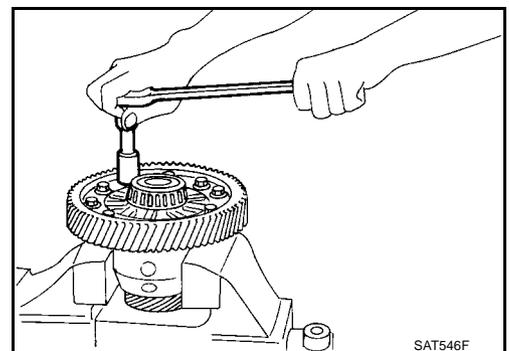
- Align the projection of speedometer drive gear with the groove of differential case.



6. Press on differential side bearings.



7. Install final gear and tighten fixing bolts in a crisscross pattern.



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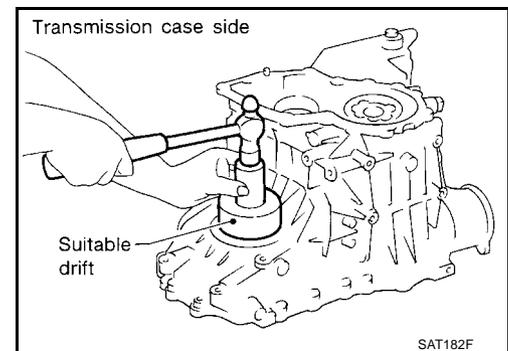
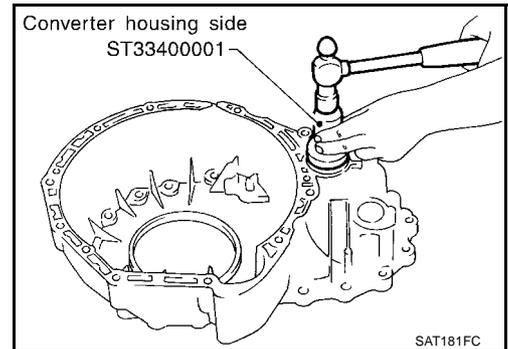
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Assembly (1)

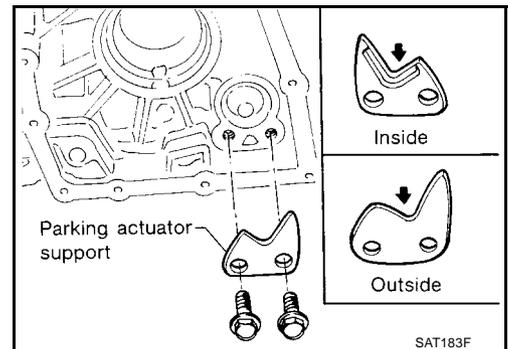
ECS004MD

1. Install differential side oil seals on transmission case and converter housing.

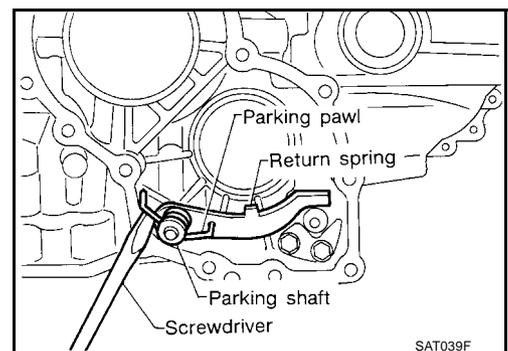


2. Install parking actuator support to transmission case. Tighten parking actuator support bolts to the specified torque. Refer to [AT-421, "OVERHAUL"](#).

- Pay attention to direction of parking actuator support.



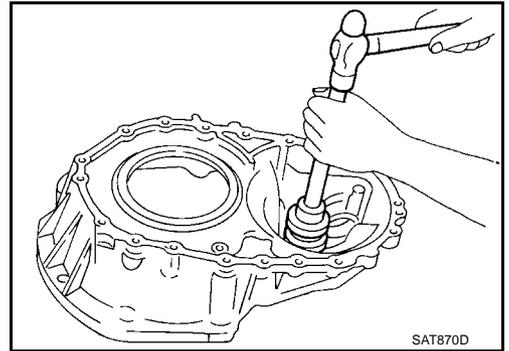
3. Install parking pawl on transmission case and fix it with parking shaft.
4. Install return spring.



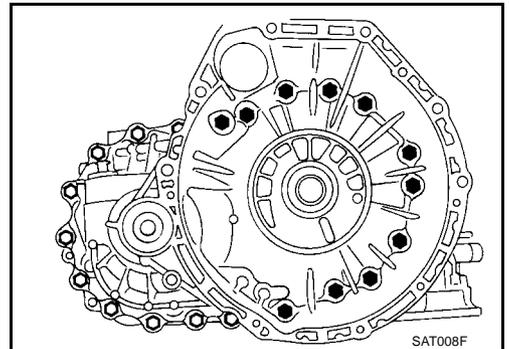
Adjustment (1)

DIFFERENTIAL SIDE BEARING PRELOAD

1. Install differential side bearing outer race without adjusting shim on transmission case.
2. Install differential side bearing outer race on converter housing.



3. Place final drive assembly on transmission case.
4. Install transmission case on converter housing. Tighten transmission case fixing bolts to the specified torque. Refer to [AT-421, "OVERHAUL"](#).



5. Attach dial indicator on differential case at converter housing side.
6. Insert Tool into differential side gear from transmission case side.
7. Move Tool up and down and measure dial indicator deflection.
8. Select proper thickness of differential side bearing adjusting shim(s).

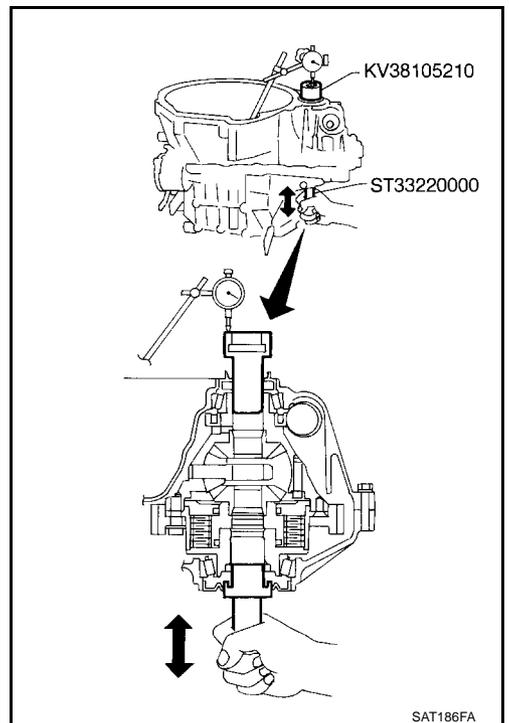
Suitable shim thickness = Dial indicator deflection + Specified bearing preload

Differential side bearing preload adjusting shim:

Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#).

Bearing preload:

0.05 - 0.09 mm (0.0020 - 0.0035 in)

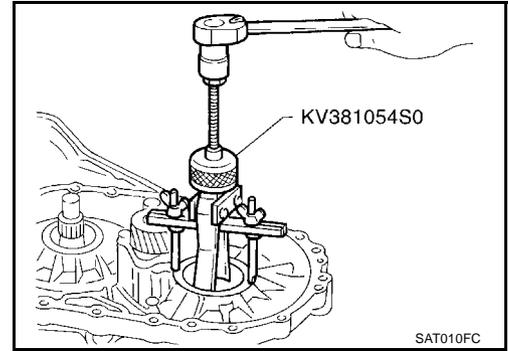


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9. Remove converter housing from transmission case.
10. Remove final drive assembly from transmission case.
11. Remove differential side bearing outer race from transmission case.
12. Reinstall differential side bearing outer race and shim(s) selected from SDS table on transmission case.
13. Reinstall converter housing on transmission case and tighten transmission case fixing bolts to the specified torque. Refer to [AT-421, "OVERHAUL"](#).

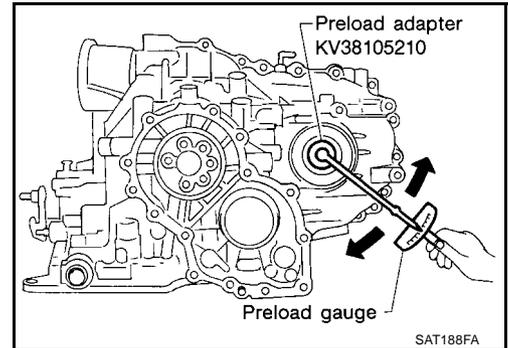


14. Insert Tool and measure turning torque of final drive assembly.
 - Turn final drive assembly in both directions several times to seat bearing rollers correctly.

Turning torque of final drive assembly (New bearing):
0.78 - 1.37 N-m (8.0 - 14.0 kg-cm, 6.9 - 12.2 in-lb)

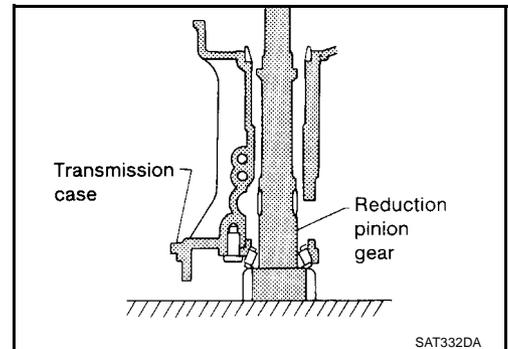
- When old bearing is used again, turning torque will be slightly less than the above.
- Make sure torque is close to the specified range.

Preload adapter: KV38105210



REDUCTION PINION GEAR BEARING PRELOAD

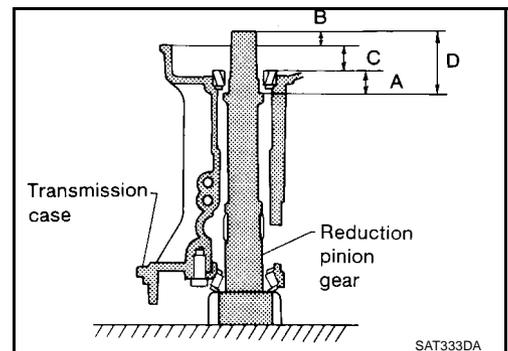
1. Remove transmission case and final drive assembly from converter housing.
2. Select proper thickness of reduction pinion gear bearing adjusting shim using the following procedures.
 - a. Place reduction pinion gear on transmission case as shown.



- b. Place idler gear bearing on transmission case.
 - c. Measure dimensions "B" "C" and "D" and calculate dimension "A".

$$A = D - (B + C)$$

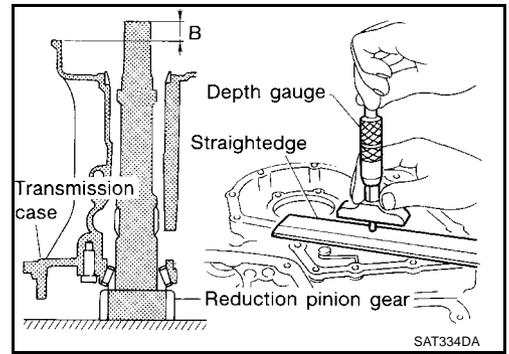
"A": Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.



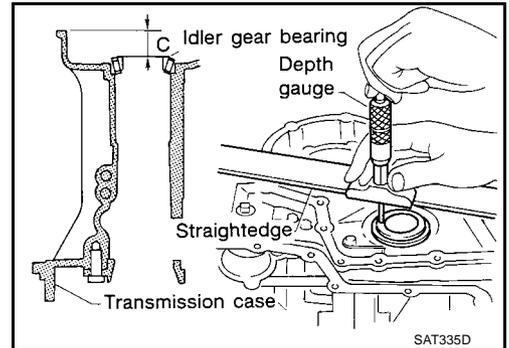
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- Measure dimension "B" between the end of reduction pinion gear and the surface of transmission case.
- **Measure dimension "B" in at least two places.**

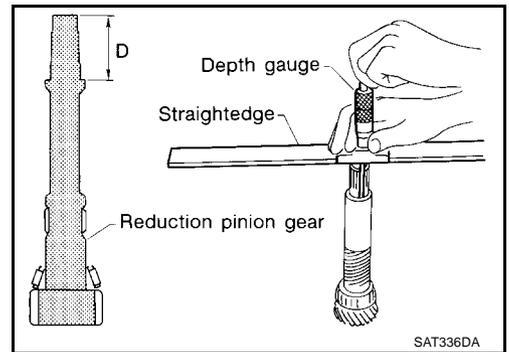


- Measure dimension "C" between the surface of idler gear bearing inner race and the surface of transmission case.
- **Measure dimension "C" in at least two places.**



- Measure dimension "D" between the end of reduction pinion gear and the adjusting shim mating surface of reduction pinion gear.
- **Measure dimension "D" in at least two places.**
- Calculate dimension "A".

$$A = D - (B + C)$$

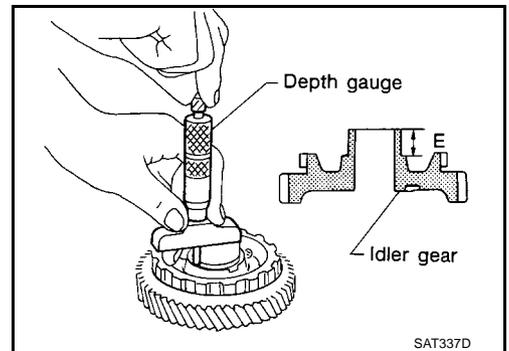


- d. Measure dimension "E" between the end of idler gear and the idler gear bearing inner race mating surface of idler gear.
- **Measure dimension "E" in at least two places.**
- e. Select proper thickness of reduction pinion gear bearing adjusting shim.

Proper shim thickness = $A - E - 0.05 \text{ mm (0.0020 in)*}$
(*... Bearing preload)

Reduction pinion gear bearing adjusting shim:

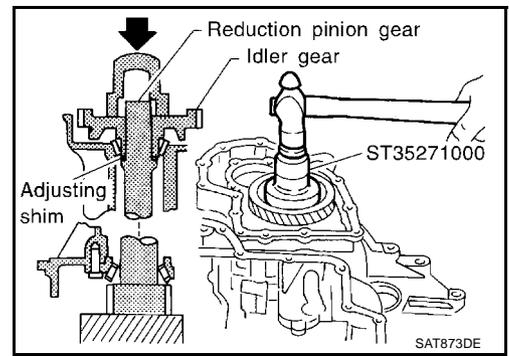
Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#) .



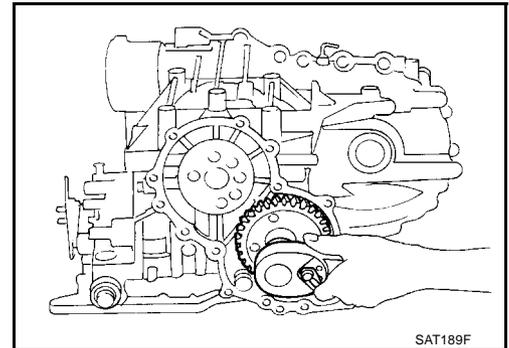
ASSEMBLY

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3. Install reduction gear and reduction gear bearing adjusting shim selected in step 2-e on transmission case.
4. Press idler gear bearing inner race on idler gear.
5. Press idler gear on reduction gear.
 - **Press idler gear until idler gear fully contacts adjusting shim.**



6. Tighten idler gear lock nut to the specified torque. Refer to [AT-421, "OVERHAUL"](#).
 - **Lock idler gear with parking pawl when tightening lock nut.**

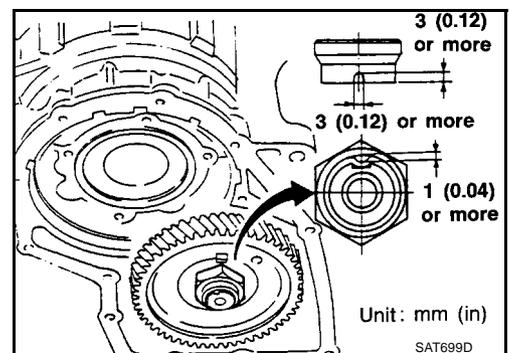
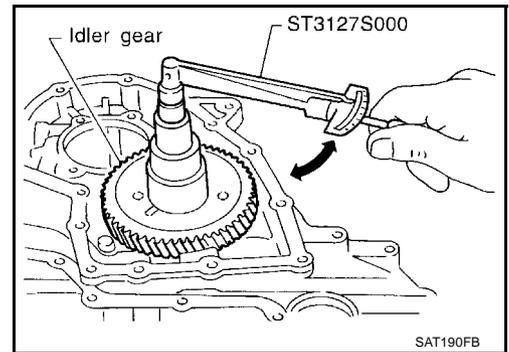


7. Measure turning torque of reduction pinion gear.
 - **When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.**

Turning torque of reduction pinion gear:

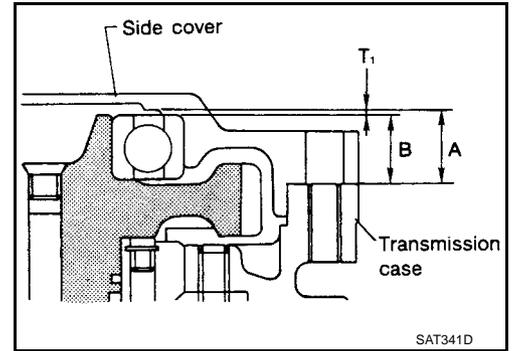
0.05 - 0.39 N-m (0.5 - 4.0 kg-cm, 0.43 - 3.47 in-lb)

- **If turning torque is out of specification, decrease or increase thickness of reduction pinion gear bearing adjusting shim.**
8. After properly adjusting turning torque, clinch idler gear lock nut as shown.



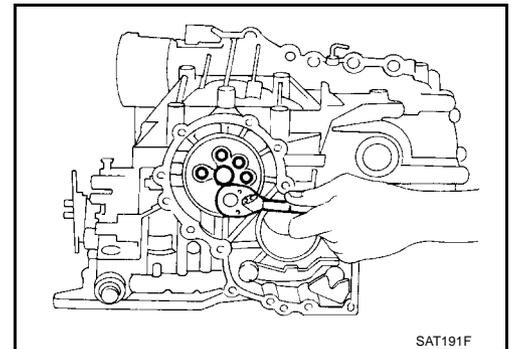
OUTPUT SHAFT END PLAY

- Measure clearance between side cover and the end of the output shaft bearing.
- Select proper thickness of adjusting shim so that clearance is within specifications.



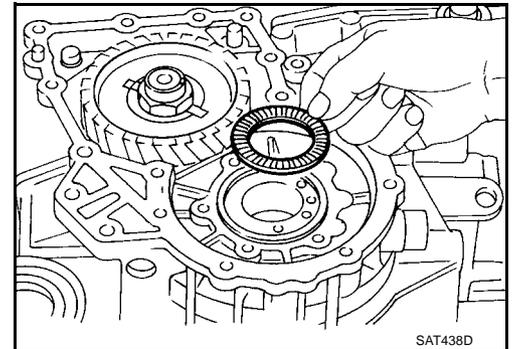
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1. Install bearing retainer for output shaft.



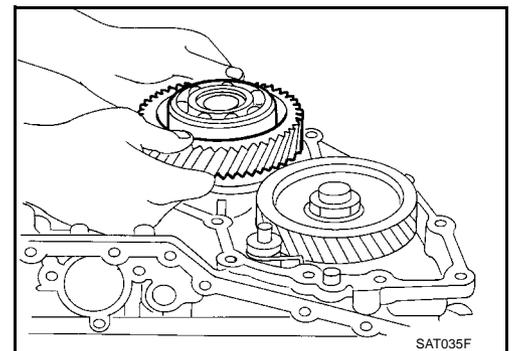
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2. Install output shaft thrust needle bearing on bearing retainer.



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3. Install output shaft on transmission case.



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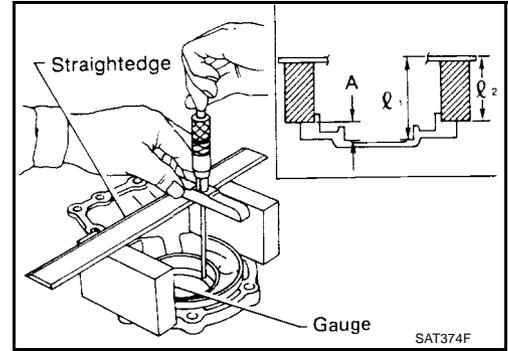
4. Measure dimensions “ ℓ_1 ” and “ ℓ_2 ” at side cover and then calculate dimension “A”.

- Measure dimension “ ℓ_1 ” and “ ℓ_2 ” in at least two places.

“A”: Distance between transmission case fitting surface and adjusting shim mating surface.

$$A = \ell_1 - \ell_2$$

ℓ_2 : Height of gauge



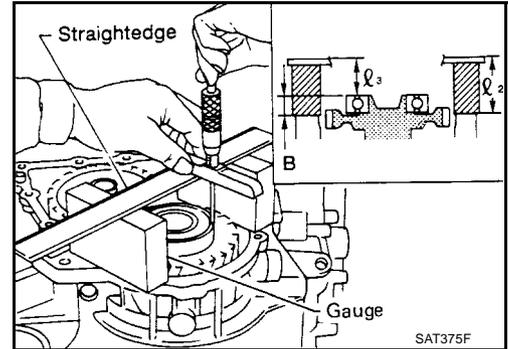
5. Measure dimensions “ ℓ_2 ” and “ ℓ_3 ” and then calculate dimension “B”.

- Measure “ ℓ_2 ” and “ ℓ_3 ” in at least two places.

“B”: Distance between the end of output shaft bearing outer race and the side cover fitting surface of transmission case.

$$B = \ell_2 - \ell_3$$

ℓ_2 : Height of gauge



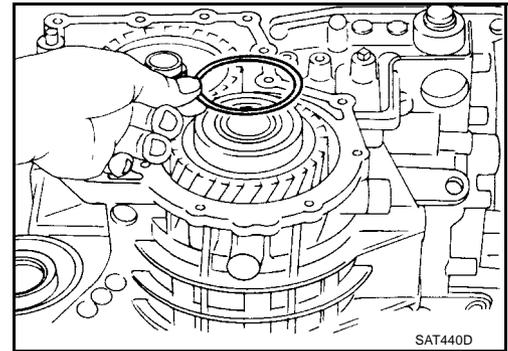
6. Select proper thickness of adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications.

Output shaft end play (A – B):

0 - 0.15 mm (0 - 0.0059 in)

Output shaft end play adjusting shims:

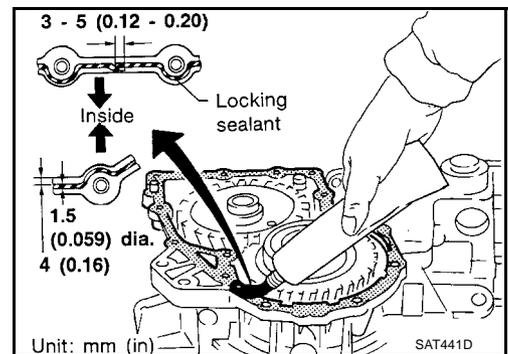
Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#).



7. Install adjusting shim on output shaft bearing.

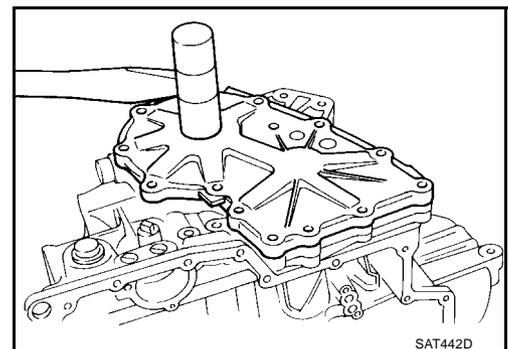
Assembly (2)

1. Apply locking sealant (Loctite #518) to transmission case as shown in illustration.



2. Set side cover on transmission case.

- Apply locking sealant to the mating surface of transmission case.

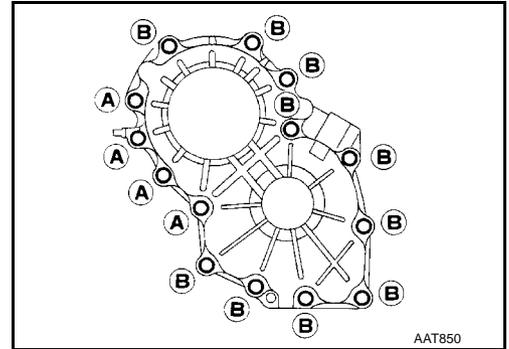


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3. Tighten side cover fixing bolts to specified torque. Refer to [AT-421, "OVERHAUL"](#) .

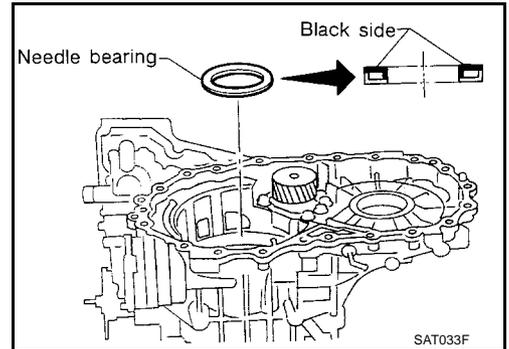
- Do not mix bolts A and B.
- Always replace bolts A as they are self-sealing bolts.



4. Remove paper rolled around bearing retainer.

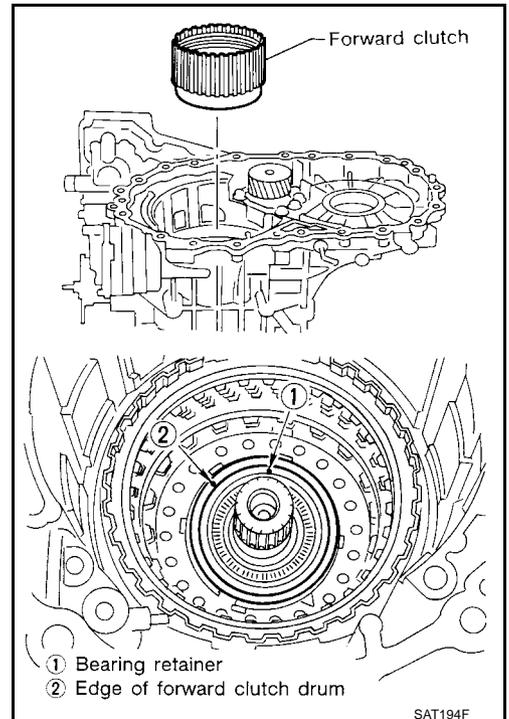
5. Install thrust washer on bearing retainer.

- Apply petroleum jelly to thrust washer.



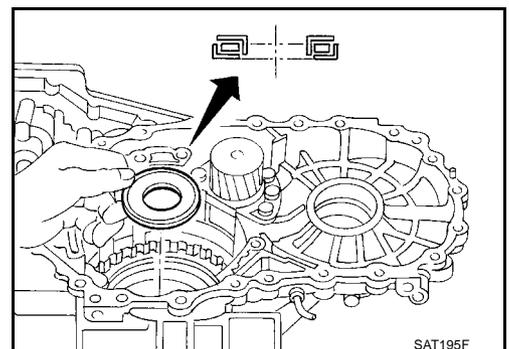
6. Install forward clutch assembly.

- Align teeth of low & reverse brake drive plates before installing.
- Make sure that bearing retainer seal rings are not spread.
- If forward clutch assembly is correctly seated, points 1 and 2 are at almost same level.



7. Install thrust needle bearing on bearing retainer.

- Apply petroleum jelly to thrust needle bearing.
- Pay attention to direction of thrust needle bearing.

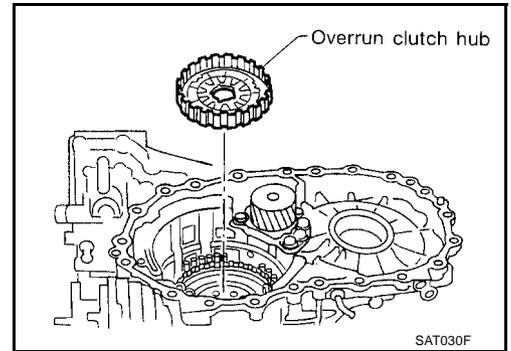


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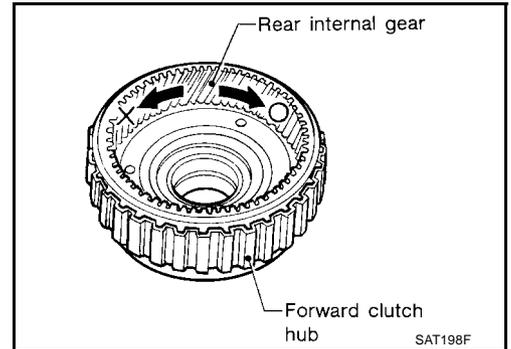
8. Install overrun clutch hub.

- Apply petroleum jelly to thrust washers.
- Align teeth of overrun clutch drive plates before installing.



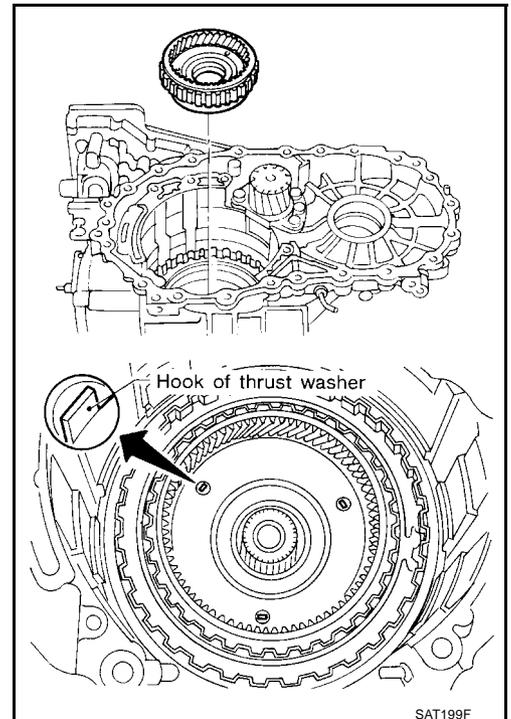
9. Hold forward clutch hub and turn rear internal gear. Check overrun clutch hub for correct directions of lock and unlock.

- If not shown as illustrated, check installed direction of forward one-way clutch.



10. Install forward clutch hub and rear internal gear assembly.

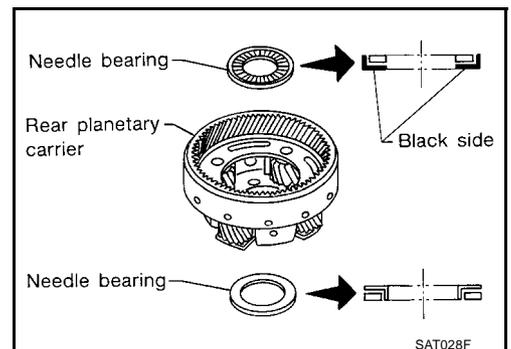
- Align teeth of forward clutch drive plates before installing.
- Check that three hooks of thrust washer are correctly aligned after installing.



11. Install rear planetary carrier assembly and rear sun gear according to the following procedures.

a. Install needle bearings on rear planetary carrier.

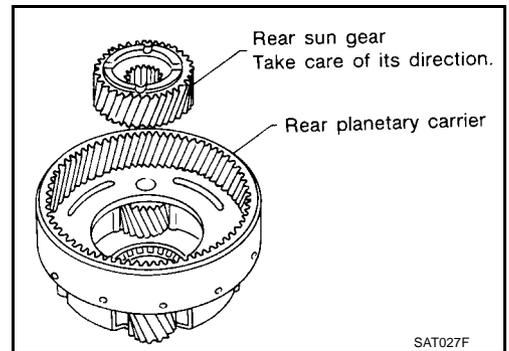
- Apply petroleum jelly to needle bearings.
- Pay attention to direction of needle bearings.



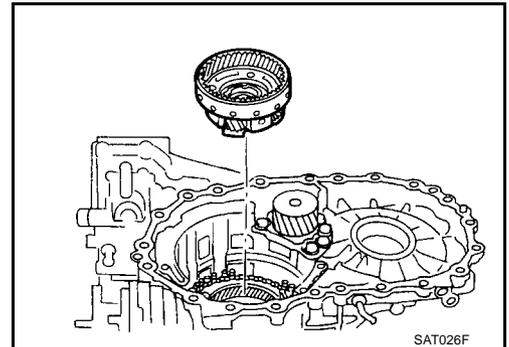
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- b. Install rear sun gear on rear planetary carrier.
- Pay attention to direction of rear sun gear.

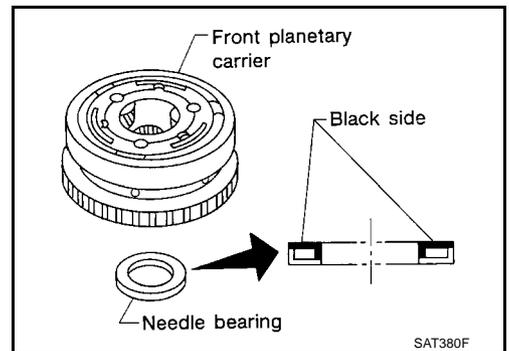


- c. Install rear planetary carrier on transmission case.



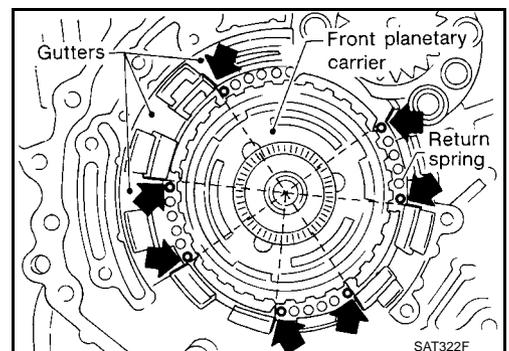
12. Install thrust needle bearing on front planetary carrier, then install them together on transmission case.

- Apply petroleum jelly to thrust needle bearing.
- Pay attention to direction of thrust needle bearing.

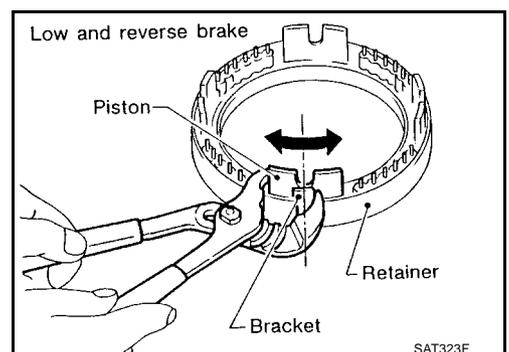


13. Install low and reverse brake piston according to the following procedures.

- a. Set and align return springs to transmission case gutters as shown in illustration.



- b. Set and align piston with retainer.



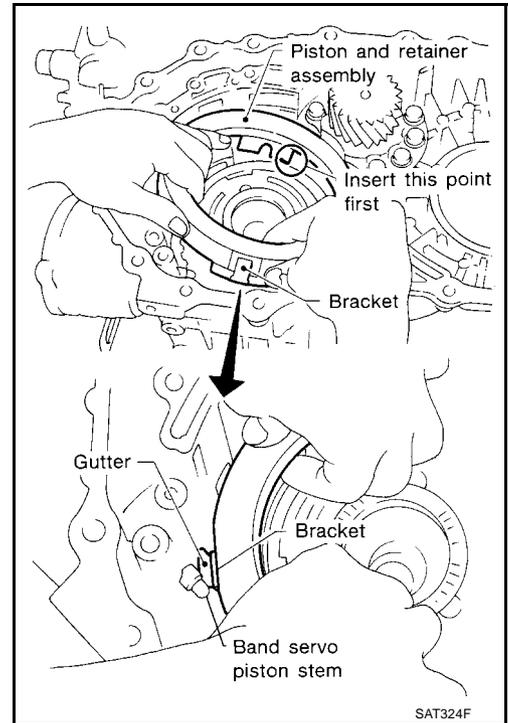
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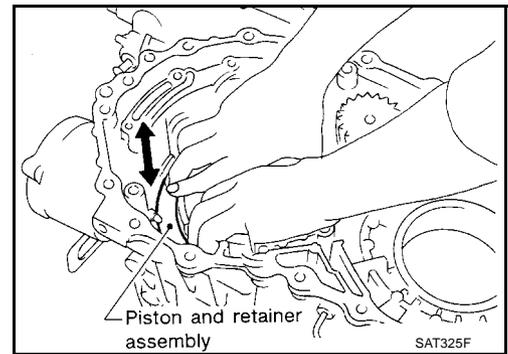
c. Install piston and retainer assembly on the transmission case.

- **Align bracket to specified gutter as indicated in illustration.**

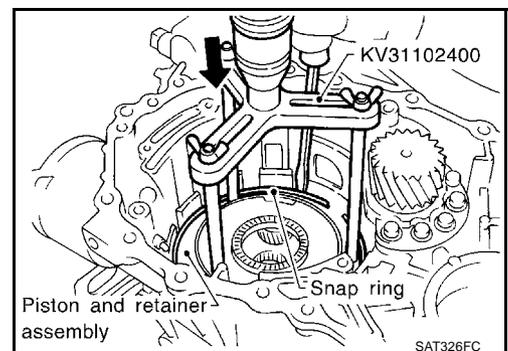


d. Check that each protrusion of piston is correctly set to corresponding return spring as follows.

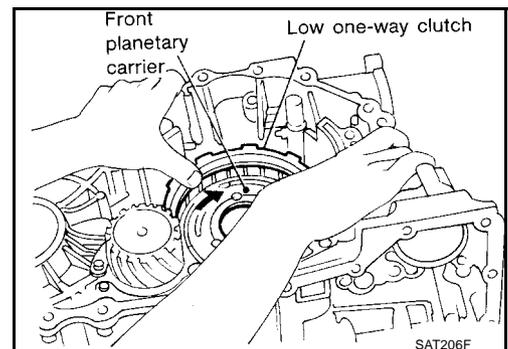
- **Push piston and retainer assembly evenly and confirm they move smoothly.**
- **If they can not move smoothly, remove piston and retainer assembly and align return spring correctly as instructed in step "a".**



e. Push down piston and retainer assembly and install snap ring.



14. Install low one-way clutch to front planetary carrier by turning carrier in the direction of the arrow shown.

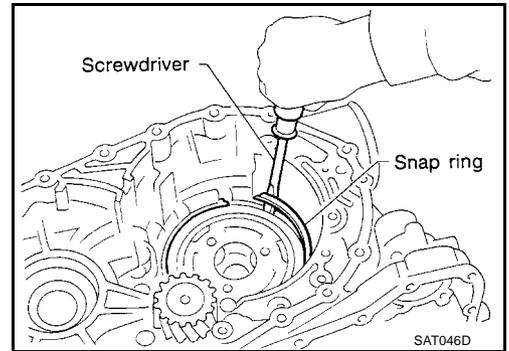


ASSEMBLY

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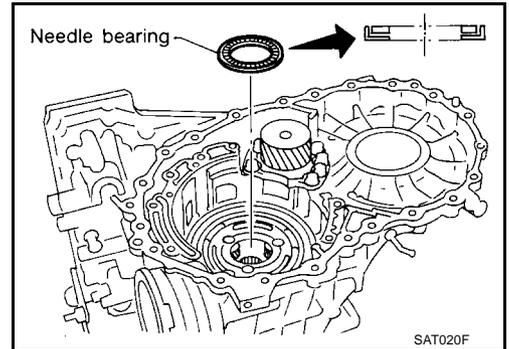
15. Install snap ring with screwdriver.

- **Forward clutch and bearing must be correctly installed for snap ring to fit into groove of transmission case.**



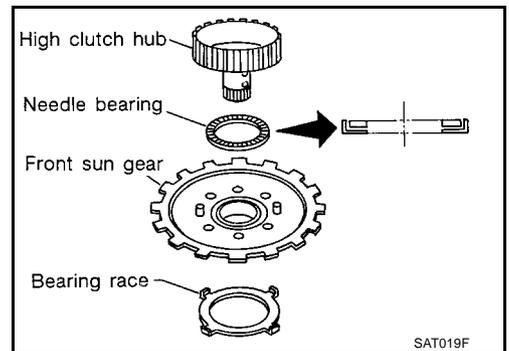
16. Install needle bearing on transmission case.

- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**

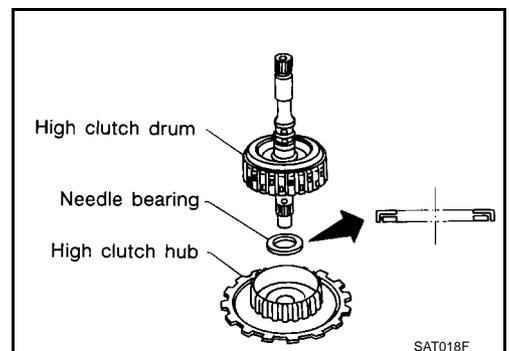


17. Install bearing race, needle bearing and high clutch hub on front sun gear.

- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**

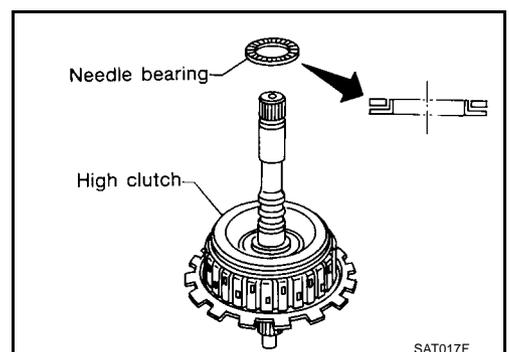


18. Install needle bearing and high clutch drum on high clutch hub.



19. Install needle bearing on high clutch drum.

- **Apply petroleum jelly to needle bearing.**
- **Pay attention to direction of needle bearing.**

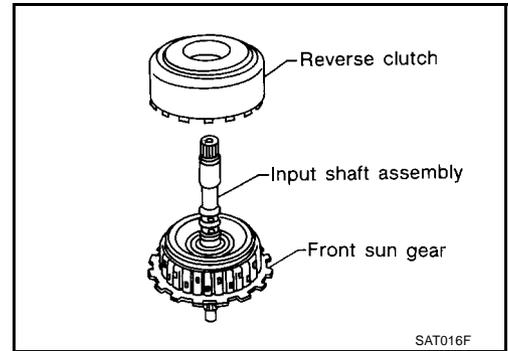


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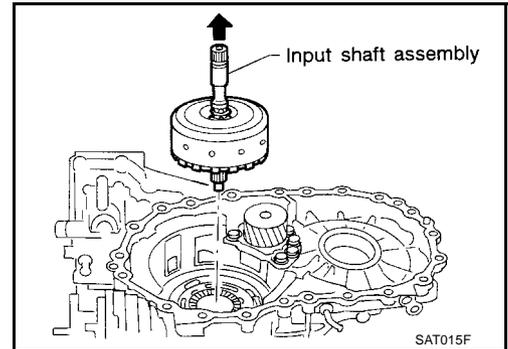
ASSEMBLY

[ALL]

20. Remove paper rolled around input shaft.
21. Install input shaft assembly in reverse clutch.
 - **Align teeth of reverse clutch drive plates before installing.**



22. Install reverse clutch assembly on transmission case.
 - **Align teeth of high clutch drive plates before installing.**



Adjustment (2)

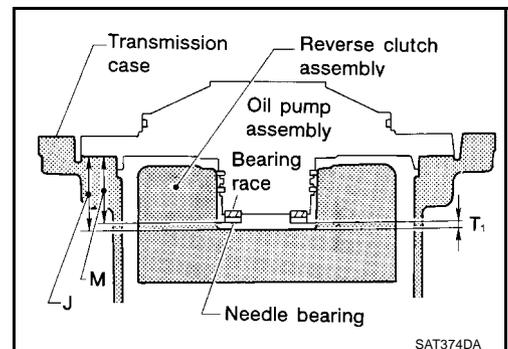
ECS004MG

When any parts listed below are replaced, adjust total end play and reverse clutch end play.

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

TOTAL END PLAY

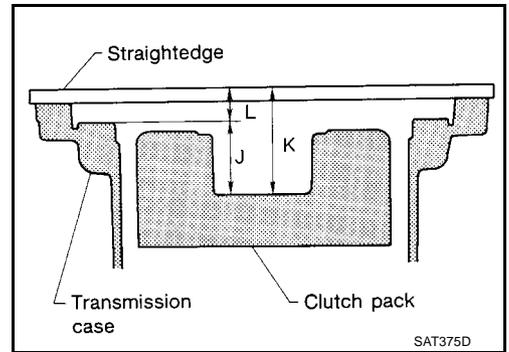
- Measure clearance between reverse clutch drum and needle bearing for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



ASSEMBLY

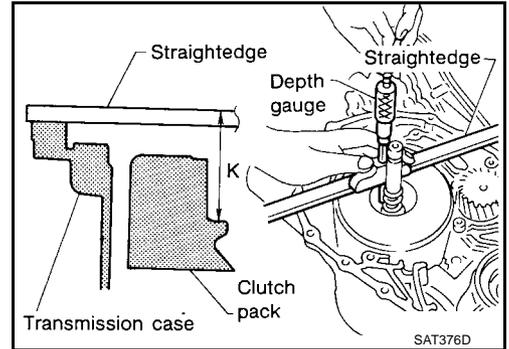
[ALL]

1. Measure dimensions "K" and "L" and then calculate dimension "J".



A
B
AT

- a. Measure dimension "K".

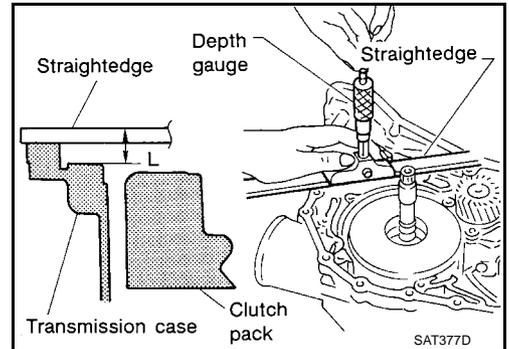


D
E
F
G

- b. Measure dimension "L".
- c. Calculate dimension "J".

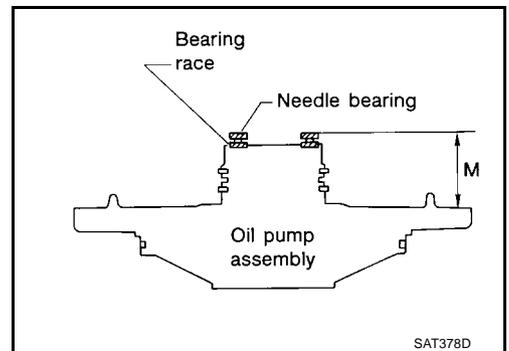
"J": Distance between oil pump fitting surface of transmission case and needle bearing mating surface of high clutch drum.

$$J = K - L$$



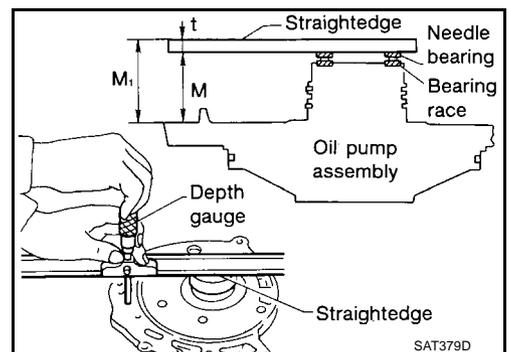
H
I
J
K

2. Measure dimension "M".
- a. Place bearing race and needle bearing on oil pump assembly.



L
M

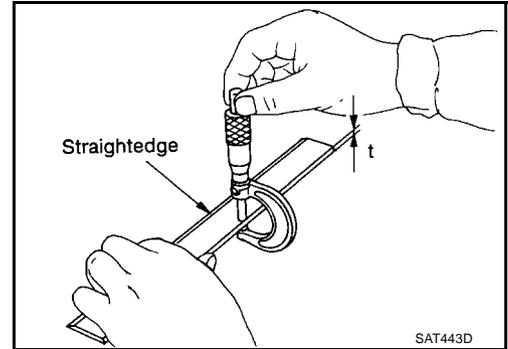
- b. Measure dimension "M".
- "M": Distance between transmission case fitting surface of oil pump cover and needle bearing on oil pump cover.**
"M1": Indication of gauge.



M

- c. Measure thickness of straightedge "t".

$$M = M_1 - t$$



3. Adjust total end play "T₁".

$$T_1 = J - M$$

Total end play "T₁":

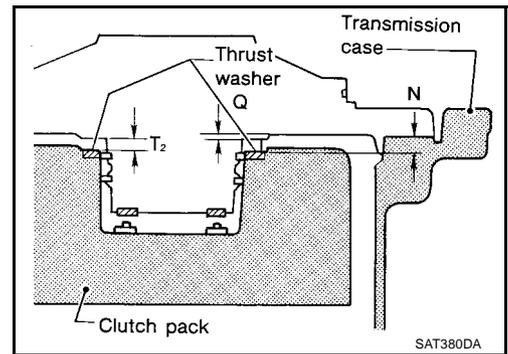
0.25 - 0.55 mm (0.0098 - 0.0217 in)

- Select proper thickness of bearing race so that total end play is within specifications.

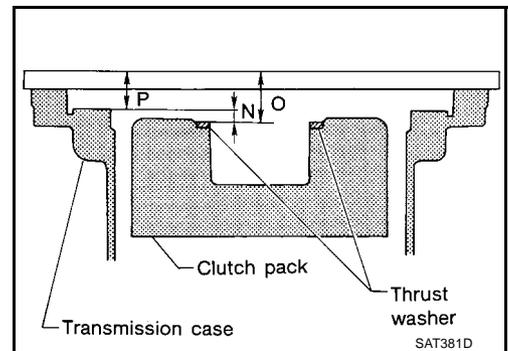
Bearing races: Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#)

REVERSE CLUTCH END PLAY

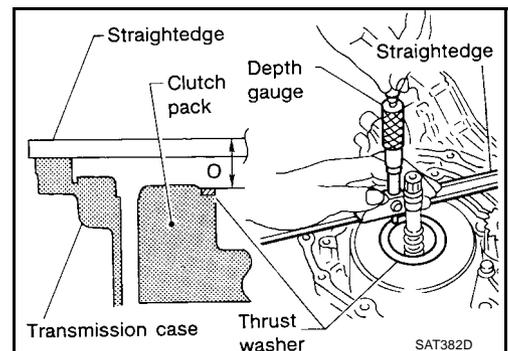
- Measure clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specification.



1. Measure dimensions "O" and "P" and then calculate dimension "N".



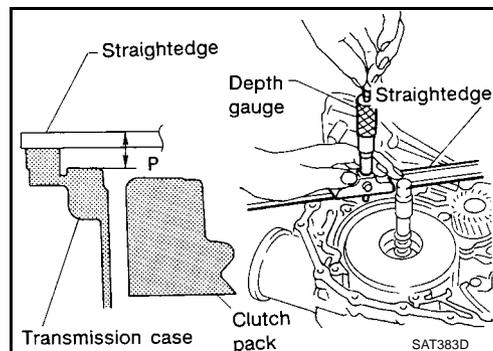
- Place thrust washer on reverse clutch drum.
- Measure dimension "O".



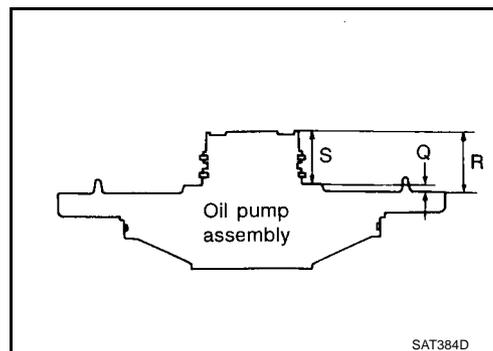
- c. Measure dimension "P".
- d. Calculate dimension "N".

"N": Distance between oil pump fitting surface of transmission case and thrust washer on reverse clutch drum.

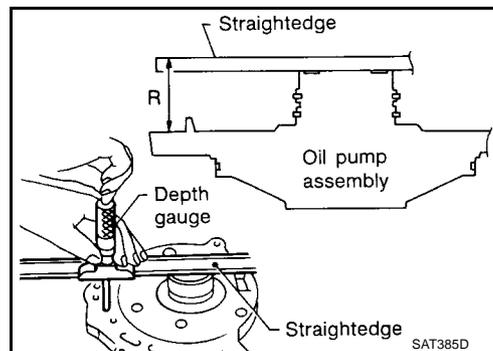
$$N = O - P$$



2. Measure dimensions "R" and "S" and then calculate dimension "Q".



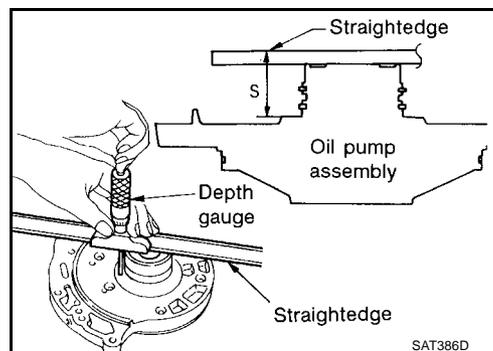
- a. Measure dimension "R".



- b. Measure dimension "S".
- c. Calculate dimension "Q".

"Q": Distance between transmission case fitting surface and thrust washer mating surface.

$$Q = R - S$$



3. Adjust reverse clutch end play "T2".

$$T_2 = N - Q$$

Reverse clutch end play:

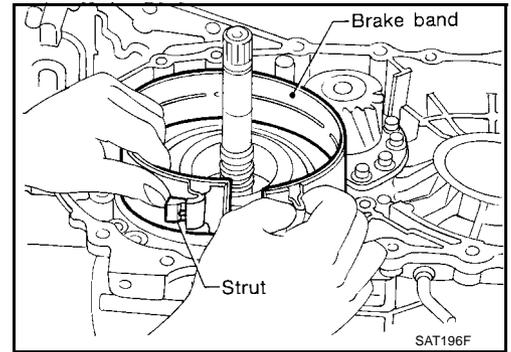
0.55 - 0.90 mm (0.0217 - 0.0354 in)

- Select proper thickness of thrust washer so that reverse clutch end play is within specifications.

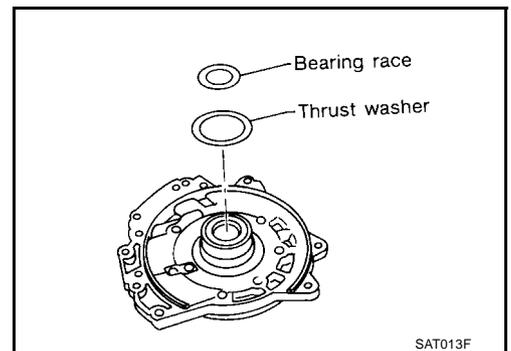
Thrust washer: Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#)

Assembly (3)

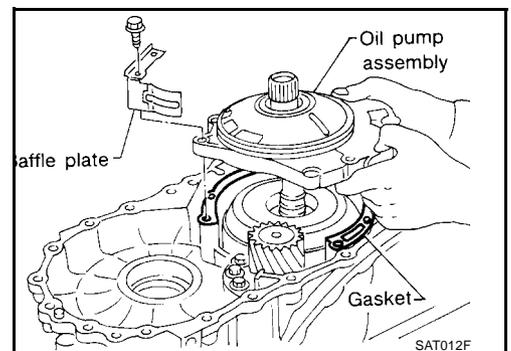
1. Install anchor end pin and lock nut on transmission case.
2. Place brake band on outside of reverse clutch drum. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.



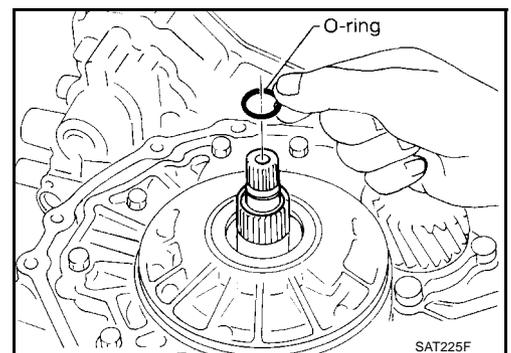
3. Place bearing race selected in total end play adjustment step on oil pump cover.
 - **Apply petroleum jelly to bearing race.**
4. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.
 - **Apply petroleum jelly to thrust washer.**



5. Install oil pump assembly, baffle plate and gasket on transmission case.
6. Tighten oil pump fixing bolts to the specified torque.



7. Install O-ring to input shaft.
 - **Apply ATF to O-ring.**



ASSEMBLY

[ALL]

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

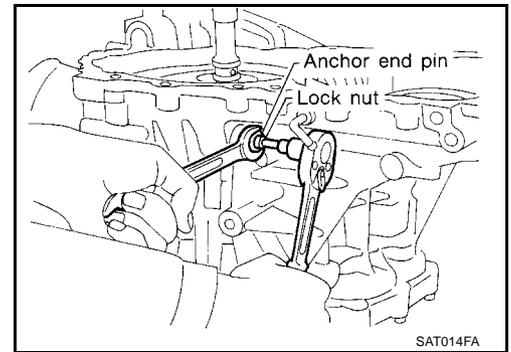
Anchor end pin:

Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#) .

- b. Back off anchor end pin two and a half turns.
 - c. While holding anchor end pin, tighten lock nut.

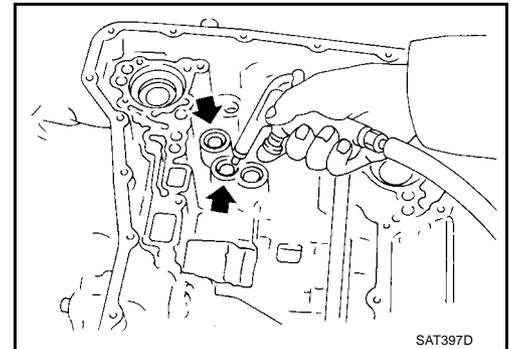
Lock nut:

Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#) .



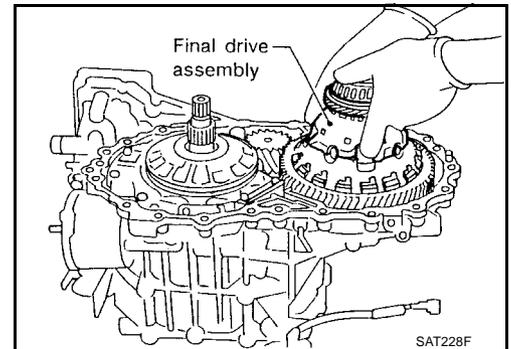
A
B
AT

9. Apply compressed air to oil holes of transmission case and check operation of brake band.



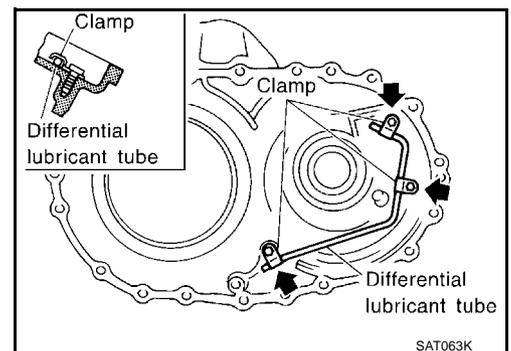
D
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10. Install final drive assembly on transmission case.



I
J
K

11. Install differential lubricant tube on converter housing. Tighten differential lubricant tube bolts to the specified torque. Refer to [AT-421, "OVERHAUL"](#) .

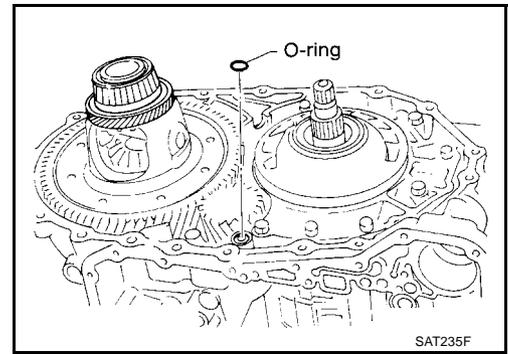


L
M

ASSEMBLY

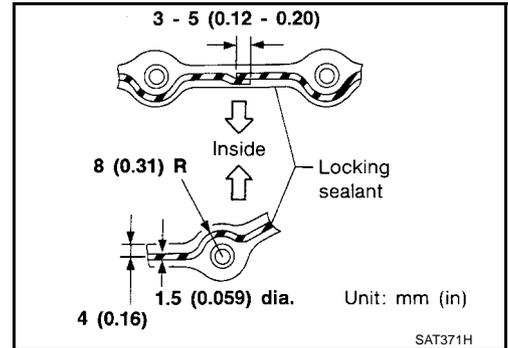
[ALL]

12. Install O-ring on differential oil port of transmission case.

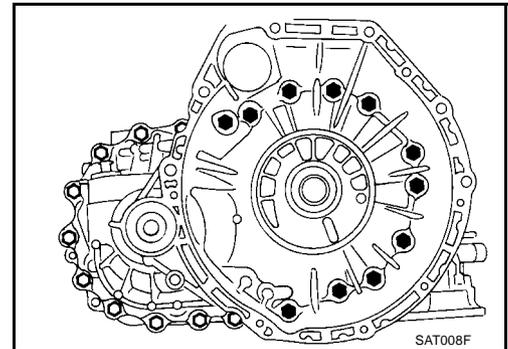


13. Install converter housing on transmission case.

- Apply locking sealant (Loctite #518) to mating surface of converter housing.

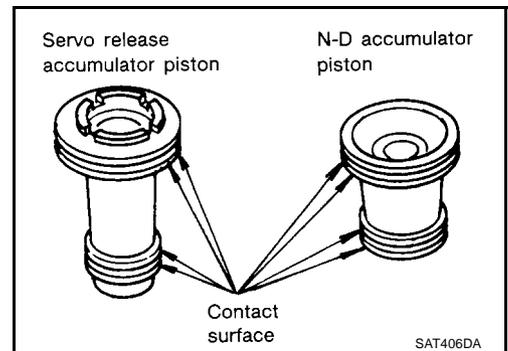


- Tighten converter housing bolts to the specified torque. Refer to [AT-421, "OVERHAUL"](#).



14. Install accumulator piston.

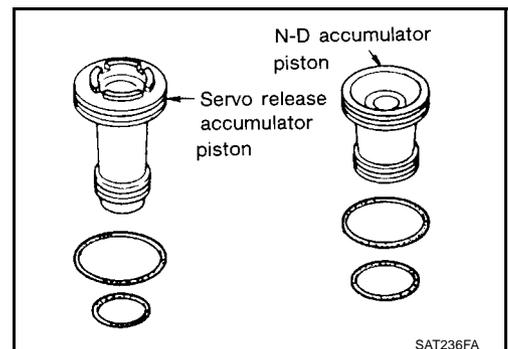
a. Check contact surface of accumulator piston for damage.



b. Install O-rings on accumulator piston.

- Apply ATF to O-rings.

Accumulator piston O-rings:
Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#).



ASSEMBLY

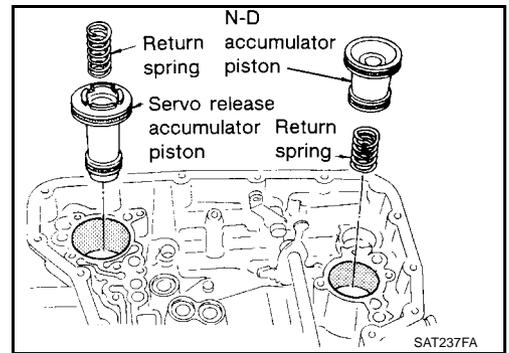
[ALL]

- c. Install accumulator pistons and return springs on transmission case.

- **Apply ATF to inner surface of transmission case.**

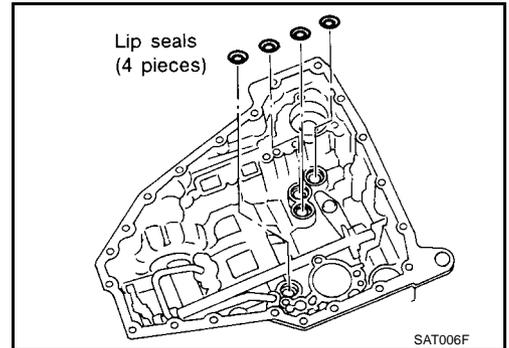
Return springs:

Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#) .

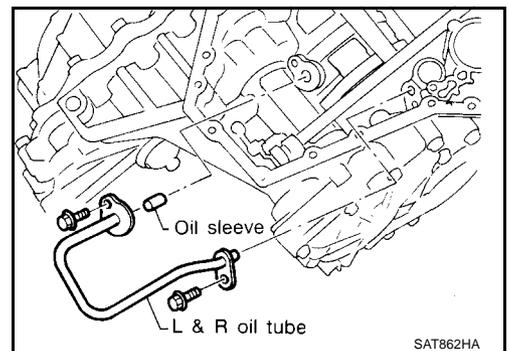


15. Install lip seals for band servo oil holes on transmission case.

- **Apply petroleum jelly to lip seals.**



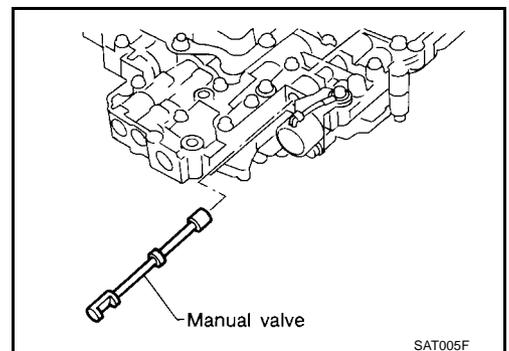
16. Install L & R oil tube and oil sleeve. Tighten L & R oil tube bolts to the specified torque. Refer to [AT-421, "OVERHAUL"](#) .



17. Install control valve assembly.

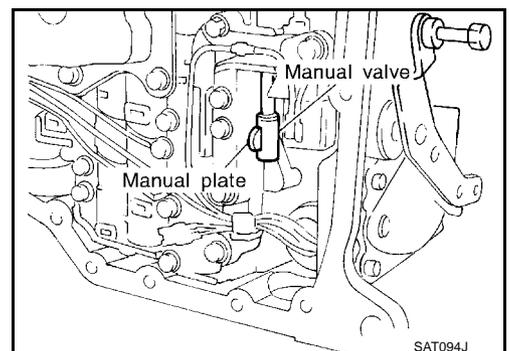
- a. Insert manual valve into control valve assembly.

- **Apply ATF to manual valve.**



- b. Set manual shaft in Neutral position.

- c. Install control valve assembly on transmission case while aligning manual valve with manual plate.

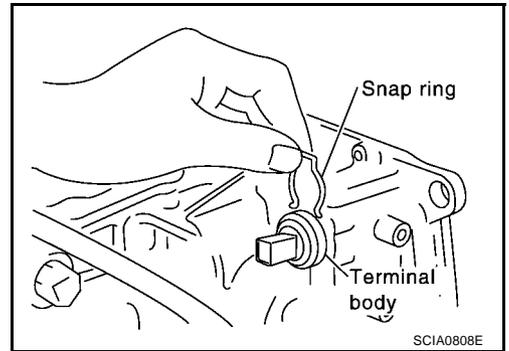


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ASSEMBLY

[ALL]

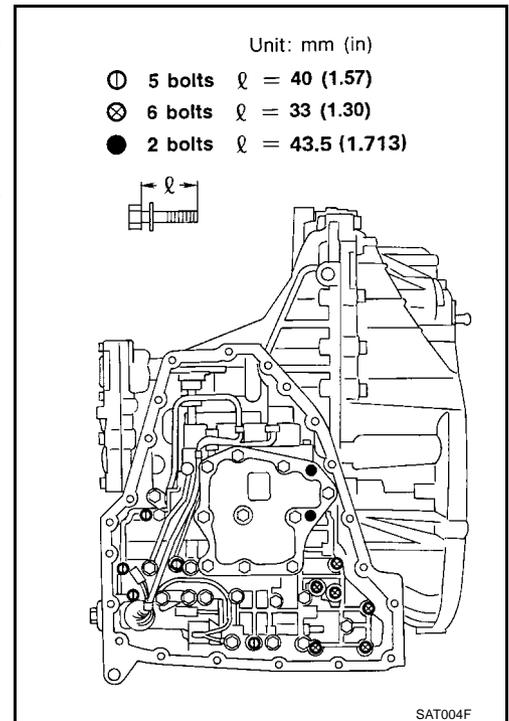
- d. Pass solenoid harness through transmission case and install terminal body on transmission case by pushing it.
- e. Install stopper ring to terminal body.



- f. Tighten bolts I, X and ●.

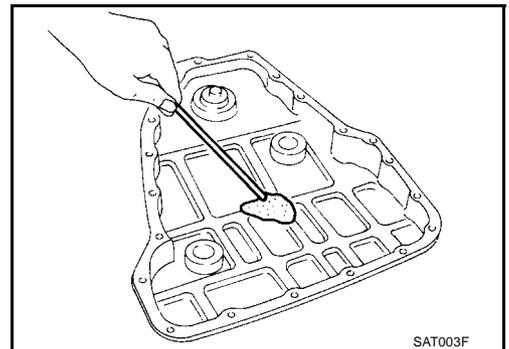
Bolt length, number and location:

Bolt	I	X	●
Bolt length "ℓ"  mm (in)	40 (1.57)	33 (1.30)	43.5 (1.713)
Number of bolts	5	6	2



18. Install oil pan.

- a. Attach a magnet to oil pan.
- b. Install new oil pan gasket on transmission case.
- c. Install oil pan on transmission case.
 - Always replace oil pan bolts as they are self-sealing bolts.
 - Tighten four bolts in a criss-cross pattern to prevent dislocation of gasket.
- d. Tighten oil pan bolts and drain plug to the specified torque. Refer to [AT-421, "OVERHAUL"](#).

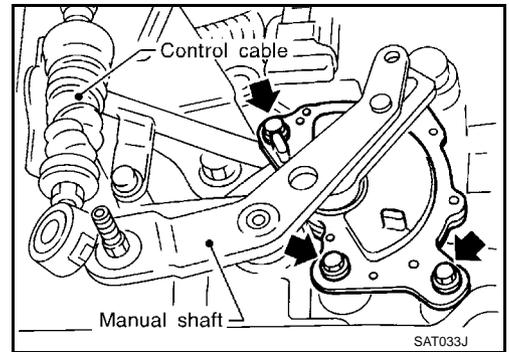


ASSEMBLY

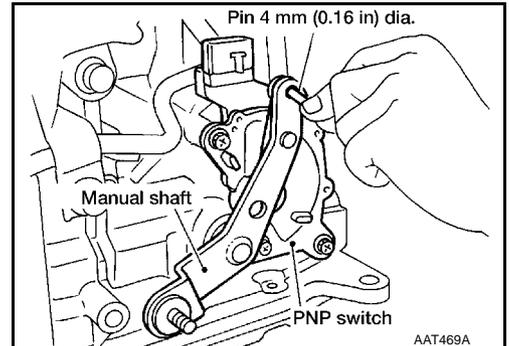
[ALL]

19. Install park/neutral position (PNP) switch.

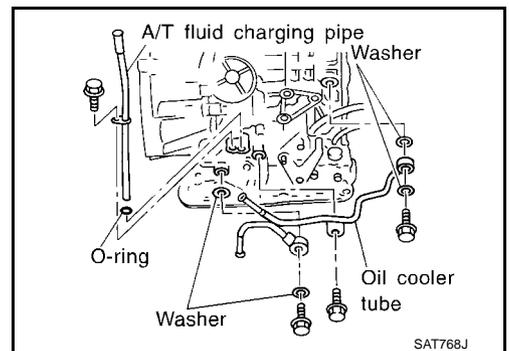
- a. Set manual shaft in P position.
- b. Temporarily install park/neutral position (PNP) switch on manual shaft.
- c. Move selector lever to N position.



- d. Use a 4 mm (0.16 in) pin for this adjustment.
 - i. Insert the pin straight into the manual shaft adjustment hole.
 - ii. Rotate park/neutral position (PNP) switch until the pin can also be inserted straight into hole in park/neutral position (PNP) switch.
- e. Tighten park/neutral position (PNP) switch fixing bolts. Refer to [AT-421, "OVERHAUL"](#).
- f. Remove pin from adjustment hole after adjusting park/neutral position (PNP) switch.

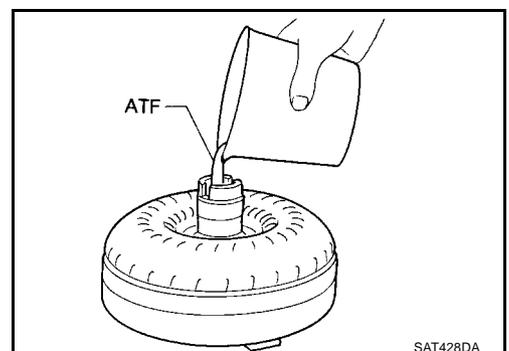


20. Install A/T fluid charging pipe and fluid cooler tube to transmission case. Tighten A/T fluid charging pipe and fluid cooler tube bolts to the specified torque. Refer to [AT-421, "OVERHAUL"](#).

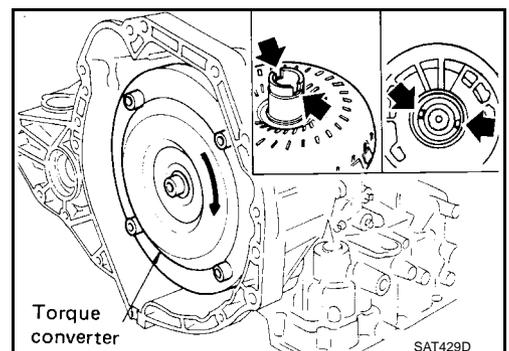


21. Install torque converter.

- a. Pour ATF into torque converter.
 - **Approximately 1 liter (1-1/8 US qt, 7/8 Imp qt) of fluid is required for a new torque converter.**
 - **When reusing old torque converter, add the same amount of fluid as was drained.**



b. Install torque converter while aligning notches of torque converter with notches of oil pump.



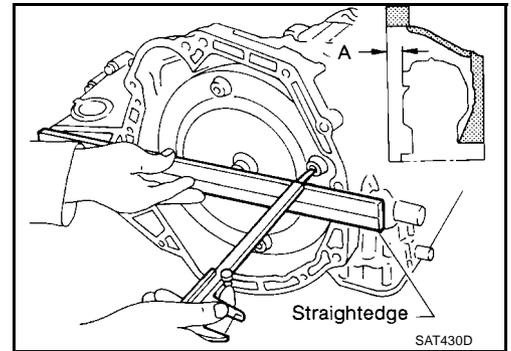
ASSEMBLY

[ALL]

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

Distance A:

Refer to [AT-521, "SERVICE DATA AND SPECIFICATIONS \(SDS\)"](#) .



SERVICE DATA AND SPECIFICATIONS (SDS)

[ALL]

SERVICE DATA AND SPECIFICATIONS (SDS)

PPF:00030

General Specifications

ECS004MI

Engine		QR20DE	QR25DE
Automatic transaxle model		RE4F04B (4WD)	
Automatic transaxle assembly	Model code number	85X23	85X64
Transaxle gear ratio	1st	2.785	
	2nd	1.545	
	3rd	1.000	
	4th	0.694	
	Reverse	2.272	
	Final drive	4.425	4.087
Recommended fluid		Genuine Nissan ATF or equivalent*1	
Fluid capacity ℓ (Imp qt)		8.5 (7-1/2)	

*1: Refer to [MA-16, "Fluids and Lubricants"](#).

Shift Schedule

ECS004MJ

VEHICLE SPEED WHEN SHIFTING GEARS THROTTLE POSITION

For 85X23 model

Throttle position	Shift pattern	Vehicle speed km/h (MPH)					
		D1 → D2	D2 → D3	D3 → D4	D4 → D3	D3 → D2	D2 → D1
Full throttle	Comfort	53 - 61 (33 - 38)	99 - 107 (62 - 67)	156 - 164 (97 - 102)	152 - 160 (94 - 99)	89 - 97 (53 - 60)	41 - 49 (25 - 30)
	Auto power	53 - 61 (33 - 38)	99 - 107 (62 - 67)	156 - 164 (97 - 102)	152 - 160 (94 - 99)	89 - 97 (55 - 60)	41 - 49 (25 - 30)
Half throttle	Comfort	34 - 42 (21 - 26)	64 - 72 (40 - 45)	124 - 138 (77 - 82)	82 - 90 (51 - 56)	41 - 49 (25 - 30)	5 - 13 (3 - 8)
	Auto power	38 - 46 (24 - 29)	70 - 78 (44 - 48)	124 - 132 (77 - 82)	81 - 89 (50 - 55)	44 - 53 (27 - 33)	5 - 13 (3 - 8)

For 85X64 model

Throttle position	Shift pattern	Vehicle speed km/h (MPH)					
		D1 → D2	D2 → D3	D3 → D4	D4 → D3	D3 → D2	D2 → D1
Full throttle	Comfort	57 - 65 (35 - 40)	107 - 115 (66 - 71)	167 - 175 (104 - 109)	163 - 171 (101 - 106)	97 - 105 (60 - 65)	41 - 49 (25 - 30)
	Auto power	57 - 65 (35 - 40)	107 - 115 (66 - 71)	167 - 175 (104 - 109)	163 - 171 (101 - 106)	97 - 105 (60 - 65)	41 - 49 (25 - 30)
Half throttle	Comfort	36 - 44 (22 - 27)	71 - 79 (44 - 49)	131 - 139 (81 - 86)	77 - 85 (48 - 53)	38 - 46 (23 - 28)	5 - 13 (3 - 8)
	Auto power	42 - 50 (26 - 31)	79 - 87 (49 - 54)	131 - 139 (81 - 86)	77 - 85 (48 - 53)	45 - 53 (28 - 33)	5 - 13 (3 - 8)

VEHICLE SPEED WHEN PERFORMING LOCK-UP

Unit: km/h (MPH)

Model code No.		85X23	85X64
Vehicle speed	Throttle position 1/8	58 - 66 (36 - 41)	61 - 69 (38 - 43)

NOTE:

- Lock-up vehicle speed indicates the speed in D4 position.
- Perform lock-up inspection after warming up engine.
- Lock-up vehicle speed may vary depending on the driving conditions and circumstances.

SERVICE DATA AND SPECIFICATIONS (SDS)

[ALL]

Stall Revolution

ECS004MK

Engine	Stall revolution rpm
QR20DE	2,450 - 2,950
QR25DE	2,300 - 2,750

Line Pressure

ECS004ML

Engine speed rpm	Line pressure kPa (kg/cm ² , psi)	
	D, 2 and 1 positions	R position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)

Control Valves

ECS004MM

CONTROL VALVE AND PLUG RETURN SPRINGS

For 85X23 model

Unit: mm (in)

	Parts		Item		
			Part No.*	Free length	Outer diameter
Upper body	23	Pilot valve spring	31742-3AX03	38.98 (1.535)	8.9 (0.350)
	7	1-2 accumulator valve spring	31742-3AX00	20.5 (0.807)	6.95 (0.274)
	28	1-2 accumulator piston spring	31742-85X02	55.60 (2.189)	19.6 (0.772)
	33	1st reducing valve spring	31742-80X05	27.0 (1.063)	7.0 (0.276)
	35	3-2 timing valve spring	31736-01X00	23.0 (0.906)	6.65 (0.262)
	18	Overrun clutch reducing valve spring	31742-80X15	37.5 (1.476)	6.9 (0.272)
	16	Torque converter relief valve spring	31742-80X07	31.0 (1.220)	9.0 (0.354)
	11	Torque converter clutch control valve	31742-85X00	56.98 (2.243)	6.5 (0.256)
	3	Cooler check valve spring	31742-85X01	29.4 (1.157)	6.0 (0.236)
Lower body	15	Pressure regulator valve spring	31742-80X13	45.0 (1.772)	15.0 (0.591)
	20	Overrun clutch control valve spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	24	Accumulator control valve spring	31742-80X02	22.0 (0.866)	6.5 (0.256)
	29	Shift valve A spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	32	Shuttle valve spring	31762-41X04	51.0 (2.008)	5.65 (0.222)
	12	Shift valve B spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	7	Pressure modifier valve spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
	3		31742-80X16	32.0 (1.260)	6.9 (0.272)
	—	Oil cooler relief valve spring	31872-31X00	17.02 (0.670)	8.0 (0.315)

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

SERVICE DATA AND SPECIFICATIONS (SDS)

[ALL]

For 85X64 model

Unit: mm (in)

	Parts		Item		
			Part No.*	Free length	Outer diameter
Upper body	23	Pilot valve spring	31742-3AX03	38.98 (1.535)	8.9 (0.350)
	7	1-2 accumulator valve spring	31742-3AX00	20.5 (0.807)	6.95 (0.274)
	28	1-2 accumulator piston spring	31742-3AX08	55.26 (2.176)	19.6 (0.772)
	33	1st reducing valve spring	31742-80X05	27.0 (1.063)	7.0 (0.276)
	35	3-2 timing valve spring	31736-01X00	23.29 (0.917)	6.65 (0.262)
	18	Overrun clutch reducing valve spring	31742-80X15	37.5 (1.476)	6.9 (0.272)
	16	Torque converter relief valve spring	31742-80X07	31.0 (1.220)	9.0 (0.354)
	11	Torque converter clutch control valve spring	31742-85X00	56.98 (2.243)	6.5 (0.256)
	3	Cooler check valve spring	31742-85X01	29.4 (1.157)	6.0 (0.236)
Lower body	15	Pressure regulator valve spring	31742-80X13	45.0 (1.772)	15.0 (0.591)
	20	Overrun clutch control valve spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	24	Accumulator control valve spring	31742-80X02	22.0 (0.866)	6.5 (0.256)
	29	Shift valve A spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	32	Shuttle valve spring	31762-41X04	51.0 (2.008)	5.65 (0.222)
	12	Shift valve B spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	7	Pressure modifier valve spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
	3		31742-80X16	32.0 (1.260)	6.9 (0.272)
	—	Oil cooler relief valve spring	31872-31X00	17.02 (0.670)	8.0 (0.315)

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

Accumulator O-RING

ECS004MN

Unit: mm (in)

Accumulator	Part No.*	Inner diameter (Small)	Part No.*	Inner diameter (Large)
Servo release accumulator	31526 41X03	26.9 (1.059)	31526 41X02	44.2 (1.740)
N-D accumulator	31526 31X08	34.6 (1.362)	31672 21X00	39.4 (1.551)

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

SERVICE DATA AND SPECIFICATIONS (SDS)

[ALL]

RETURN SPRING

Unit: mm (in)

Accumulator	Part number*	Free length	Outer diameter
Servo release accumulator	31605-80X00	52.5 (2.067)	20.1 (0.791)
N-D accumulator	31605-31X15	43.5 (1.713)	28.0 (1.102)

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

Clutch and Brakes REVERSE CLUTCH

ECS004M0

Model code number		85X23, 85X64	
Number of drive plates		2	
Number of driven plates		2	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Driven plate thickness mm (in)		Standard 1.8 (0.071)	
Clearance mm (in)	Standard	0.5 - 0.8 (0.020 - 0.031)	
	Allowable limit	1.2 (0.047)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		6.6 (0.260)	31537-80X05
		6.8 (0.268)	31537-80X06
		7.0 (0.276)	31537-80X07
		7.2 (0.283)	31537-80X08
		7.4 (0.291)	31537-80X09
		7.6 (0.299)	31537-80X20
		7.8 (0.307)	31537-80X21

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

HIGH CLUTCH

Model code number		85X23, 85X64	
Number of drive plates		3	
Number of driven plates		7*1 + 1*2	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Driven plate thickness mm (in)	*1 Standard	1.4 (0.055)	
	*2 Standard	2.0 (0.079)	
Clearance mm (in)	Standard	1.8 - 2.2 (0.071 - 0.087)	
	Allowable limit	2.8 (0.110)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		3.2 (0.126)	31537-81X11
		3.4 (0.134)	31537-81X12
		3.6 (0.142)	31537-81X13
		3.8 (0.150)	31537-81X14
		4.0 (0.157)	31537-81X15

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

FORWARD CLUTCH

Model code number		85X23	
Number of drive plates		4	
Number of driven plates		4	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	

SERVICE DATA AND SPECIFICATIONS (SDS)

[ALL]

Driven plate thickness mm (in)	Standard	1.8 (0.071)	
Clearance mm (in)	Standard	0.45 - 0.85 (0.0177 - 0.0335)	
	Allowable limit	1.85 (0.0728)	
Thickness of retaining plates	Thickness mm (in)	Part number*	
		3.2 (0.126)	31537-80X76
		3.4 (0.134)	31537-80X75
		3.6 (0.142)	31537-80X70
		3.8 (0.150)	31537-80X71
		4.0 (0.157)	31537-80X72
		4.2 (0.165)	31537-80X73
	4.4 (0.173)	31537-80X74	

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

Model code number	85X64		
Number of drive plates	5		
Number of driven plates	5		
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Driven plate thickness mm (in)	Standard	1.8 (0.071)	
Clearance mm (in)	Standard	0.45 - 0.85 (0.0177 - 0.0335)	
	Allowable limit	1.85 (0.0728)	
Thickness of retaining plates	Thickness mm (in)	Part number*	
		3.2 (0.126)	31537-80X76
		3.4 (0.134)	31537-80X75
		3.6 (0.142)	31537-80X70
		3.8 (0.150)	31537-80X71
		4.0 (0.157)	31537-80X72
		4.2 (0.165)	31537-80X73
	4.4 (0.173)	31537-80X74	

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

OVERRUN CLUTCH

Model code number	85X23, 85X64		
Number of drive plates	3		
Number of driven plates	5		
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Driven plate thickness mm (in)	Standard	1.6 (0.063)	
Clearance mm (in)	Standard	0.7 - 1.1 (0.028 - 0.043)	
	Allowable limit	1.7 (0.067)	
Thickness of retaining plates	Thickness mm (in)	Part number*	
		3.0 (0.118)	31537-80X65
		3.2 (0.126)	31537-80X66
		3.4 (0.134)	31537-80X67
		3.6 (0.142)	31537-80X68
		3.8 (0.150)	31537-80X69

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

LOW & REVERSE BRAKE

Model code number	85X23		
Number of drive plates	5		
Number of driven plates	5		

SERVICE DATA AND SPECIFICATIONS (SDS)

[ALL]

Drive plate thickness mm (in)	Standard	1.8 (0.071)
	Allowable limit	1.6 (0.063)
Driven plate thickness mm (in)	Standard	1.8 (0.071)
Clearance mm (in)	Standard	1.7 - 2.1 (0.067 - 0.083)
	Allowable limit	3.3 (0.130)
Thickness of retaining plates	Thickness mm (in)	Part number*
	2.0 (0.079)	31667-80X00
	2.2 (0.087)	31667-80X01
	2.4 (0.094)	31667-80X02
	2.6 (0.102)	31667-80X03
	2.8 (0.110)	31667-80X04
	3.0 (0.118)	31667-80X05
	3.2 (0.126)	31667-80X06
3.4 (0.134)	31667-80X07	

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

Model code number	85X64	
Number of drive plates	6	
Number of driven plates	6	
Drive plate thickness mm (in)	Standard	1.8 (0.071)
	Allowable limit	1.6 (0.063)
Driven plate thickness mm (in)	Standard	1.8 (0.071)
Clearance mm (in)	Standard	1.7 - 2.1 (0.067 - 0.083)
	Allowable limit	3.3 (0.130)
Thickness of retaining plates	Thickness mm (in)	Part number*
	2.0 (0.079)	31667-80X00
	2.2 (0.087)	31667-80X01
	2.4 (0.094)	31667-80X02
	2.6 (0.102)	31667-80X03
	2.8 (0.110)	31667-80X04
	3.0 (0.118)	31667-80X05
	3.2 (0.126)	31667-80X06
3.4 (0.134)	31667-80X07	

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

CLUTCH AND BRAKE RETURN SPRINGS

Unit: mm (in)

Parts	Part number*	Free length	Outer diameter
Forward clutch (Overrun clutch) (22 pcs)	31505-80X02	21.4 (0.843)	10.3 (0.406)
High clutch (12 pcs)	31505-80X05	22.5 (0.886)	10.8 (0.425)
Low & reverse brake (24 pcs)	31505-80X07	24.1 (0.949)	6.6 (0.260)

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

BRAKE BAND

Anchor end pin tightening torque N·m (kg·m, in·lb)	4.0 - 5.8 (0.4 - 0.6, 35 - 52)
Number of returning revolutions for anchor end pin	2.5
Lock nut tightening torque N·m (kg·m, ft·lb)	32 - 36 (3.3 - 3.7, 23 - 27)

Final Drive DIFFERENTIAL SIDE GEAR CLEARANCE

ECS004MP

Clearance between side gear and differential case with washer mm (in)	0.1 - 0.2 (0.004 - 0.008)
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SERVICE DATA AND SPECIFICATIONS (SDS)

[ALL]

DIFFERENTIAL SIDE GEAR THRUST WASHERS

Thickness mm (in)	Part number*
0.75 (0.0295)	38424-81X00
0.80 (0.0315)	38424-81X01
0.85 (0.0335)	38424-81X02
0.90 (0.0354)	38424-81X03
0.95 (0.0374)	38424-81X04

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

DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS

Thickness mm (in)	Part number*
0.48 (0.0189)	31438-80X00
0.52 (0.0205)	31438-80X01
0.56 (0.0220)	31438-80X02
0.60 (0.0236)	31438-80X03
0.64 (0.0252)	31438-80X04
0.68 (0.0268)	31438-80X05
0.72 (0.0283)	31438-80X06
0.76 (0.0299)	31438-80X07
0.80 (0.0315)	31438-80X08
0.84 (0.0331)	31438-80X09
0.88 (0.0346)	31438-80X10
0.92 (0.0362)	31438-80X11

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

BEARING PRELOAD

Differential side bearing preload mm (in)	0.05 - 0.09 (0.0020 - 0.0035)
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TURNING TORQUE

Turning torque of final drive assembly N·m (kg·cm, in·lb)	0.78 - 1.37 (8.0 - 14.0, 6.9 - 12.2)
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Planetary Carrier and Oil Pump PLANETARY CARRIER

ECS004MQ

Clearance between planetary carrier and pinion washer mm (in)	Standard	0.20 - 0.70 (0.0079 - 0.0276)
	Allowable limit	0.80 (0.0315)

OIL PUMP

Oil pump side clearance mm (in)	0.030 - 0.050 (0.0012 - 0.0020)	
Thickness of inner gears and outer gears	Inner gear	
	Thickness mm (in)	Part number*
	11.99 - 12.0 (0.4720 - 0.4724)	31346-80X00
	11.98 - 11.99 (0.4717 - 0.4720)	31346-80X01
	11.97 - 11.98 (0.4713 - 0.4717)	31346-80X02
	Outer gear	
	Thickness mm (in)	Part number*
11.99 - 12.0 (0.4720 - 0.4724)	31347-80X00	
11.98 - 11.99 (0.4717 - 0.4720)	31347-80X01	
11.97 - 11.98 (0.4713 - 0.4717)	31347-80X02	
Clearance between oil pump housing and outer gear mm (in)	Standard	0.111 - 0.181 (0.0044 - 0.0071)
	Allowable limit	0.181 (0.0071)
Oil pump cover seal ring clearance mm (in)	Standard	0.1 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

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

SERVICE DATA AND SPECIFICATIONS (SDS)

[ALL]

Input Shaft SEAL RING CLEARANCE

ECS004MR

Input shaft seal ring clearance mm (in)	Standard	0.08 - 0.23 (0.0031 - 0.0091)
	Allowable limit	0.23 (0.0091)

SEAL RING

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
26 (1.024)	22.4 (0.882)	1.97 (0.078)	31525 80X02

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

Reduction Pinion Gear TURNING TORQUE

ECS004MS

Turning torque of reduction pinion gear N-m (kg-cm, in-lb)	0.05 - 0.39 (0.5 - 4.0, 0.43 - 3.47)
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REDUCTION PINION GEAR BEARING ADJUSTING SHIMS

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
1	5.00 (0.1969)	31439-81X00	33	5.64 (0.2220)	31439-81X63
2	5.02 (0.1976)	31439-81X01	34	5.66 (0.2228)	31439-81X64
3	5.04 (0.1984)	31439-81X02	35	5.68 (0.2236)	31439-81X65
4	5.06 (0.1992)	31439-81X03	36	5.70 (0.2244)	31439-81X66
5	5.08 (0.2000)	31439-81X04	37	5.72 (0.2252)	31439-81X67
6	5.10 (0.2008)	31439-81X05	38	5.74 (0.2260)	31439-81X68
7	5.12 (0.2016)	31439-81X06	39	5.76 (0.2268)	31439-81X69
8	5.14 (0.2024)	31439-81X07	40	5.78 (0.2276)	31439-81X70
9	5.16 (0.2031)	31439-81X08	41	5.80 (0.2283)	31439-81X71
10	5.18 (0.2039)	31439-81X09	42	5.82 (0.2291)	31439-81X72
11	5.20 (0.2047)	31439-81X10	43	5.84 (0.2299)	31439-81X73
12	5.22 (0.2055)	31439-81X11	44	5.86 (0.2307)	31439-81X74
13	5.24 (0.2063)	31439-81X12	45	4.60 (0.1811)	31439-85X01
14	5.26 (0.2071)	31439-81X13	46	4.62 (0.1819)	31439-85X02
15	5.28 (0.2079)	31439-81X14	47	4.64 (0.1827)	31439-85X03
16	5.30 (0.2087)	31439-81X15	48	4.66 (0.1835)	31439-85X04
17	5.32 (0.2094)	31439-81X16	49	4.68 (0.1843)	31439 85X05
18	5.34 (0.2102)	31439-81X17	50	4.70 (0.1850)	31439 85X06
19	5.36 (0.2110)	31439-81X18	51	4.72 (0.1858)	31439 83X11
20	5.38 (0.2118)	31439-81X19	52	4.74 (0.1866)	31439 83X12
21	5.40 (0.2126)	31439-81X20	53	4.76 (0.1874)	31439 83X13
22	5.42 (0.2134)	31439-81X21	54	4.78 (0.1882)	31439 83X14
23	5.44 (0.2142)	31439-81X22	55	4.80 (0.1890)	31439 83X15
24	5.46 (0.2150)	31439-81X23	56	4.82 (0.1898)	31439 83X16
25	5.48 (0.2157)	31439-81X24	57	4.84 (0.1906)	31439 83X17
26	5.50 (0.2165)	31439-81X46	58	4.86 (0.1913)	31439 83X18
27	5.52 (0.2173)	31439-81X47	59	4.88 (0.1921)	31439 83X19
28	5.54 (0.2181)	31439-81X48	60	4.90 (0.1929)	31439 83X20
29	5.56 (0.2189)	31439-81X49	61	4.92 (0.1937)	31439 83X21
30	5.58 (0.2197)	31439-81X60	62	4.94 (0.1945)	31439 83X22
31	5.60 (0.2205)	31439-81X61	63	4.96 (0.1953)	31439 83X23
32	5.62 (0.2213)	31439-81X62	64	4.98 (0.1961)	31439 83X24

SERVICE DATA AND SPECIFICATIONS (SDS)

[ALL]

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

Band Servo RETURN SPRING

ECS004MT

Unit: mm (in)

Return spring	Part number*	Free length	Outer diameter
2nd servo return spring	31605-31X20	32.5 (1.280)	25.9 (1.020)
OD servo return spring	31605-80X07	31.0 (1.220)	62.6 (2.465)

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

Output Shaft SEAL RING CLEARANCE

ECS004MU

Output shaft seal ring clearance mm (in)	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

SEAL RING

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
33.71 (1.327)	30.25 (1.191)	1.95 (0.077)	31525 80X09

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

END PLAY

Output shaft end play mm (in)	0 - 0.15 (0 - 0.0059)

OUTPUT SHAFT ADJUSTING SHIMS

Thickness mm (in)	Part number*
0.80 (0.0315)	31438-80X60
0.84 (0.0331)	31438-80X61
0.88 (0.0346)	31438-80X62
0.92 (0.0362)	31438-80X63
0.96 (0.0378)	31438-80X64
1.00 (0.0394)	31438-80X65
1.04 (0.0409)	31438-80X66
1.08 (0.0425)	31438-80X67
1.12 (0.0441)	31438-80X68
1.16 (0.0457)	31438-80X69
1.20 (0.0472)	31438-80X70

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

Bearing Retainer SEAL RING CLEARANCE

ECS004MV

Bearing retainer seal ring clearance mm (in)	Standard	0.10 - 0.30 (0.0039 - 0.0118)
	Allowable limit	0.30 (0.0118)

Total End Play

ECS004MW

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

SERVICE DATA AND SPECIFICATIONS (SDS)

[ALL]

BEARING RACE FOR ADJUSTING TOTAL END PLAY

Thickness mm (in)	Part number*
0.8 (0.031)	31435-80X00
1.0 (0.039)	31435-80X01
1.2 (0.047)	31435-80X02
1.4 (0.055)	31435-80X03
1.6 (0.063)	31435-80X04
1.8 (0.071)	31435-80X05
2.0 (0.079)	31435-80X06
0.9 (0.035)	31435-80X09
1.1 (0.043)	31435-80X10
1.3 (0.051)	31435-80X11
1.5 (0.059)	31435-80X12
1.7 (0.067)	31435-80X13
1.9 (0.075)	31435-80X14

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

Reverse Clutch End Play

ECS004MX

Reverse clutch end play mm (in)	0.55 - 0.90 (0.0217 - 0.0354)
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THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH DRUM END PLAY

Thickness mm (in)	Part number*
0.80 (0.0315)	31508-80X13
0.95 (0.0374)	31508-80X14
1.10 (0.0433)	31508-80X15
1.25 (0.0492)	31508-80X16
1.40 (0.0551)	31508-80X17
1.55 (0.0610)	31508-80X18
1.70 (0.0669)	31508-80X19
1.85 (0.0728)	31508-80X20

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

Removal and Installation

ECS004MY

Unit: mm (in)

Engine	Distance between end of converter housing and torque converter
QR20DE	19 (0.75)
QR25DE	14 (0.55)

Shift Solenoid Valves

ECS004MZ

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

ECS004N0

Solenoid valves	Resistance (Approx.) Ω	Terminal No.
Shift solenoid valve A	20 - 30	2
Shift solenoid valve B	5 - 20	1
Overrun clutch solenoid valve	20 - 30	3
Line pressure solenoid valve	2.5 - 5	4
Torque converter clutch solenoid valve	5 - 20	5

SERVICE DATA AND SPECIFICATIONS (SDS)

[ALL]

A/T Fluid Temperature Sensor

ECS004N1

Remarks: Specification data are reference values.

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

Revolution Sensor

ECS004N2

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

Dropping Resistor

ECS004N3

Resistance	12Ω
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