SECTION AT
AUTOMATIC TRANSAXLE

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TROUBLE DIAGNOSIS — INDEX

PFP:00000

Alphabetical & P No. Index for DTC

ECS003VK

ALPHABETICAL INDEX FOR DTC

NOTE:

- **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-44, "IDENTIFICATION PLATE".**
- **If DTC “U1000” is displayed with other DTC, first perform the trouble diagnosis for “DTC U1000 CAN COMMUNICATION LINE”. Refer to AT-97, "DTC U1000 CAN COMMUNICATION LINE" .**

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-125
A/T 2ND GR FNCTN	P0732	AT-130
A/T 3RD GR FNCTN	P0733	AT-135
A/T 4TH GR FNCTN	P0734	AT-140
ATF TEMP SEN/CIRC	P0710	AT-106
BATT/FLUID TEMP SEN	—	AT-184
CAN COMM CIRCUIT	U1000	AT-97
CONTROL UNIT (RAM)	—	AT-198
CONTROL UNIT (ROM)	—	AT-198
CONT UNIT (EEP ROM)	—	AT-200
ENGINE SPEED SIG	P0725	AT-119
INITIAL START	—	—
LINE PRESSURE S/V	P0745	AT-154
OVERRUN CLUTCH S/V	P1760	AT-178
PNP SW/CIRC	P0705	AT-100
SHIFT SOLENOID/V A	P0750	AT-161
SHIFT SOLENOID/V B	P0755	AT-167
T/C CLUTCH SOL/V	P0740	AT-148
THROTTLE POSI SEN	P1705	AT-173
VHCL SPEED SEN·A/T	P0720	AT-112
VHCL SPEED SEN·MTR	—	AT-192

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

P NO. INDEX FOR DTC

NOTE:

- **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-44, "IDENTIFICATION PLATE" .**
- **If DTC “U1000” is displayed with other DTC, first perform the trouble diagnosis for “DTC U1000 CAN COMMUNICATION LINE”. Refer to AT-97, "DTC U1000 CAN COMMUNICATION LINE" .**

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

DTC CONSULT-II GST*1	Items (CONSULT-II screen terms)	Reference page
P0705	PNP SW/CIRC	AT-100
P0710	ATF TEMP SEN/CIRC	AT-106
P0720	VHCL SPEED SEN·A/T	AT-112
P0725	ENGINE SPEED SIG	AT-119
P0731	A/T 1ST GR FNCTN	AT-125
P0732	A/T 2ND GR FNCTN	AT-130
P0733	A/T 3RD GR FNCTN	AT-135
P0734	A/T 4TH GR FNCTN	AT-140
P0740	T/C CLUTCH SOL/V	AT-148
P0745	LINE PRESSURE S/V	AT-154
P0750	SHIFT SOLENOID/V A	AT-161
P0755	SHIFT SOLENOID/V B	AT-167
P1705	THROTTLE POSI SEN	AT-173
P1760	OVERRUN CLUTCH S/V	AT-178
U1000	CAN COMM CIRCUIT	AT-97
—	BATT/FLUID TEMP SEN	AT-184
—	CONTROL UNIT (RAM)	AT-198
—	CONTROL UNIT (ROM)	AT-198
—	CONT UNIT (EEP ROM)	AT-200
—	INITIAL START	—
—	VHCL SPEED SEN·MTR	AT-192

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

PRECAUTIONS

PFP:00001

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

ECS004Q0

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 harnesses or harness connectors.**

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

ECS004Q1

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

ECS004VN

CAN SYSTEM

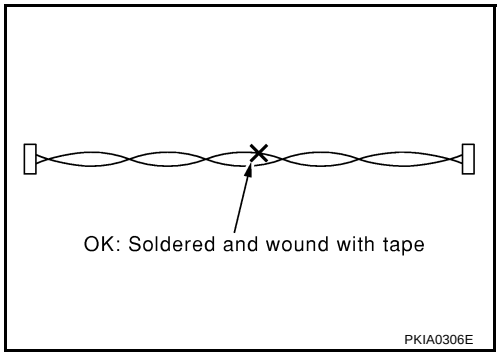
- Do not apply voltage of 7.0V or higher to the measurement terminals.
- Use the tester with its open terminal voltage being 7.0V or less.

Precautions for Harness Repair

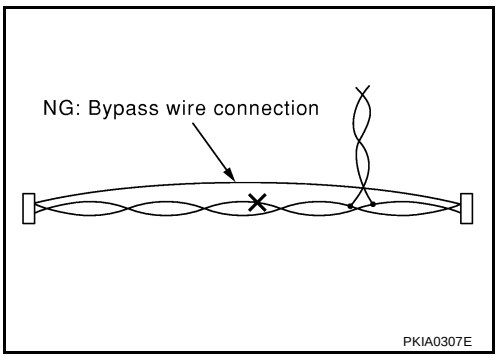
ECS004VO

CAN SYSTEM

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



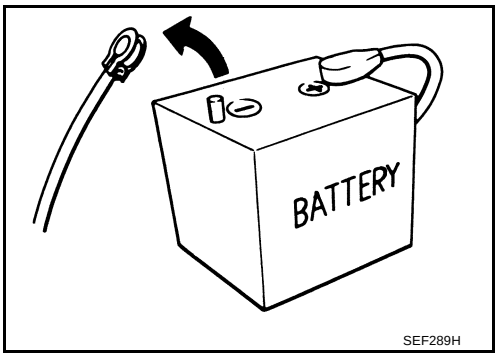
- Do not perform bypass wire connections for the repair parts.(The spliced wire will become separated and the characteristics of twisted line will be lost.)



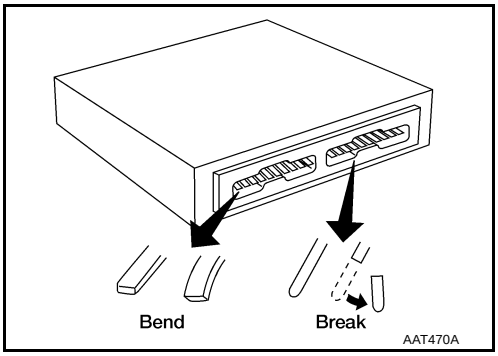
Precautions

ECS004Q2

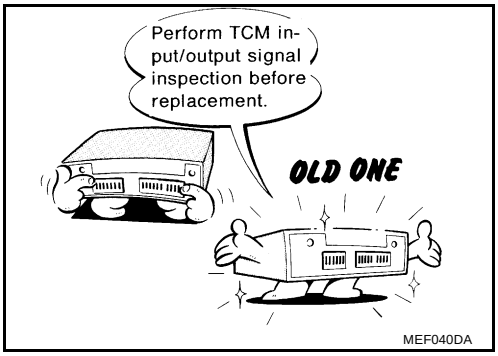
- **Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect battery negative cable from battery negative terminal. Failure to do so may damage the TCM. Because battery voltage is applied to TCM even if ignition switch is turned off.**



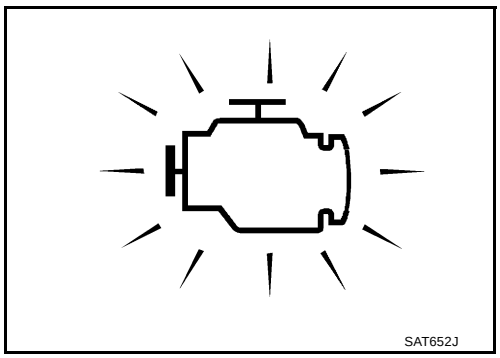
- **When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on TCM pin terminal, when connecting pin connectors.



- **Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. (See page AT-94, "TCM Terminals and Reference Value".)**



- **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.


SAT652J

- 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-16, "A/T FLUID" .

Service Notice or Precautions

ECS004Q3

FAIL-SAFE

The TCM has an electronic Fail-Safe (limp home mode). This allows the vehicle to be driven even if a major electrical input/output device circuit is damaged.
Under Fail-Safe, the vehicle always runs in third gear, even with a shift lever position of "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-246, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" (EXCEPT FOR EURO-OBD) or AT-52, "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-255, "Work Flow" (EXCEPT FOR Euro-OBD) or AT-61, "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.)

- 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-45, "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-42, "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-51, "ON BOARD DIAGNOSTIC (OBD) SYSTEM" .

- **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-70, "HARNESS CONNECTOR" .

Wiring Diagrams and Trouble Diagnosis

ECS004Q4

When you read wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams"
- PG-2, "POWER SUPPLY ROUTING"

When you perform trouble diagnosis, refer to the following:

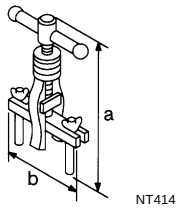
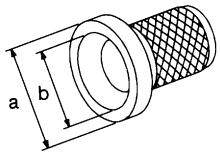
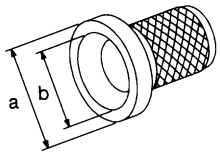
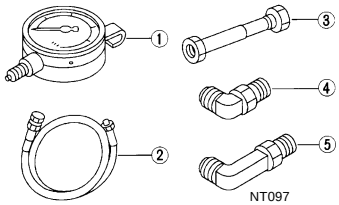
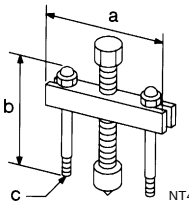
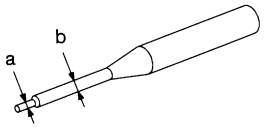
- GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-23, "How to Perform Efficient Diagnosis for an Electrical Incident"

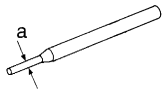
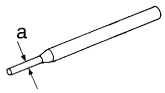
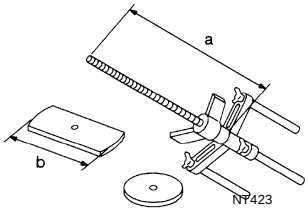
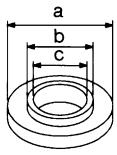
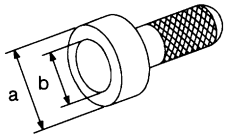
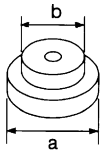
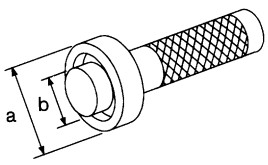
PREPARATION

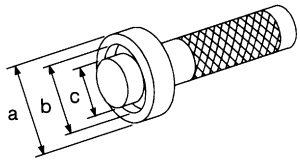
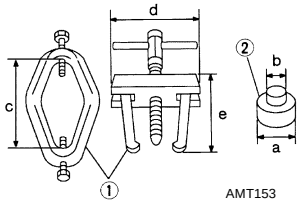
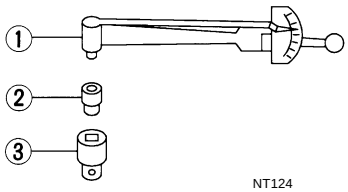
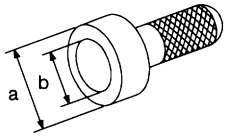
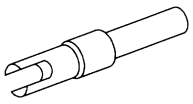
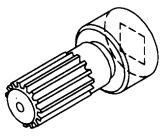
PFP:00100

Special Service Tools

ECS004Q5

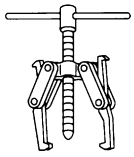
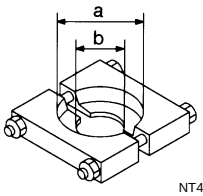
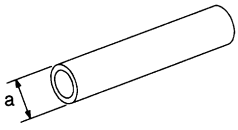
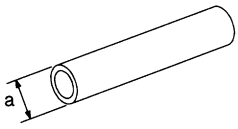
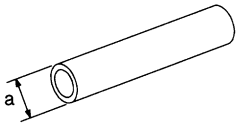
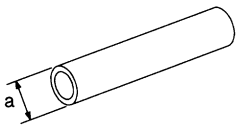
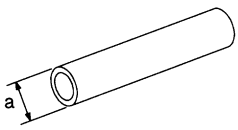
Tool number Tool name	Description
KV381054S0 Puller  NT414	● Removing differential side oil seals ● Removing differential side bearing outer race ● Removing idler gear bearing outer race **a: 250 mm (9.84 in)** **b: 160 mm (6.30 in)**
ST33400001 Drift  NT086	● Installing LH differential side oil seal ● Installing oil seal on oil pump housing **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**
KV40100621 Drift  NT086	Installing RH differential side oil seal **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**
ST2505S001 Oil pressure gauge set 1. ST25051001 Oil pressure gauge 2. ST25052000 Hose 3. ST25053000 Joint pipe 4. ST25054000 Adapter 5. ST25055000 Adapter  NT097	● Measuring line pressure
ST27180001 Puller  NT424	● Removing idler gear **a: 100 mm (3.94 in)** **b: 110 mm (4.33 in)** **c: M8 x 1.25P**
ST23540000 Pin punch  NT442	● Removing and installing parking rod plate and manual plate pins **a: 2.3 mm (0.091 in) dia.** **b: 4 mm (0.16 in) dia.**

Tool number Tool name	Description
ST25710000 Pin punch  NT410	● Aligning groove of manual shaft and hole of transmission case **a: 2 mm (0.08 in) dia.**
KV32101000 Pin punch  NT410	● Removing and installing manual shaft retaining pin ● Removing and installing pinion mate shaft lock pin **a: 4 mm (0.16 in) dia.**
KV31102400 Clutch spring compressor  NT423	● Removing and installing clutch return springs ● Installing low and reverse brake piston **a: 320 mm (12.60 in)** **b: 174 mm (6.85 in)**
KV40100630 Drift  NT107	● Installing reduction gear bearing inner race ● Installing idler gear bearing inner race **a: 67.5 mm (2.657 in) dia.** **b: 44 mm (1.73 in) dia.** **c: 38.5 mm (1.516 in) dia.**
ST30720000 Bearing installer  NT115	● Installing idler gear bearing outer race **a: 77 mm (3.03 in) dia.** **b: 55.5 mm (2.185 in) dia.**
ST35321000 Drift  NT073	● Installing output shaft bearing **a: 49 mm (1.93 in) dia.** **b: 41 mm (1.61 in) dia.**
ST33230000 Drift  NT084	● Installing differential side bearing inner race **a: 51 mm (2.01 in) dia.** **b: 28.5 mm (1.122 in) dia.**

Tool number Tool name	Description
ST33220000 Drift  NT085	● Selecting differential side bearing adjusting shim **a: 37 mm (1.46 in) dia.** **b: 31 mm (1.22 in) dia.** **c: 22 mm (0.87 in) dia.**
ST3306S001 Differential side bearing puller set 1. ST33051001 Puller 2. ST33061000 Adapter  AMT153	● Removing differential side bearing inner race **a: 38 mm (1.50 in) dia.** **b: 28.5 mm (1.122 in) dia.** **c: 130 mm (5.12 in)** **d: 135 mm (5.31 in)** **e: 100 mm (3.94 in)**
ST3127S000 Preload gauge 1. GG9103000 Torque wrench 2. HT62900000 Socket adapter  NT124	● Checking differential side bearing preload
ST35271000 Drift  NT115	● Installing idler gear ● Installing differential side bearing inner race **a: 72 mm (2.83 in) dia.** **b: 63 mm (2.48 in) dia.**
KV38107700 Preload adapter  NT087	● Selecting differential side bearing adjusting shim ● Checking differential side bearing preload
KV38105210 Preload adapter  NT075	● Selecting differential side bearing adjusting shim ● Checking differential side bearing preload

Commercial Service Tools

ECS004Q6

Tool name	Description
Puller  NT077	● Removing idler gear bearing inner race ● Removing and installing band servo piston snap ring
Puller  NT411	● Removing reduction gear bearing inner race **a: 60 mm (2.36 in) dia.** **b: 35 mm (1.38 in) dia.**
Drift  NT083	● Installing differential side oil seal **a: 90 mm (3.54 in) dia.**
Drift  NT083	● Installing needle bearing on bearing retainer **a: 36 mm (1.42 in) dia.**
Drift  NT083	● Removing needle bearing from bearing retainer **a: 33.5 mm (1.319 in) dia.**
Drift  NT083	● Installing differential side bearing outer race (RH side) **a: 75 mm (2.95 in) dia.**
Drift  NT083	● Installing differential side bearing outer race (LH side) **a: 100 mm (3.94 in) dia.**

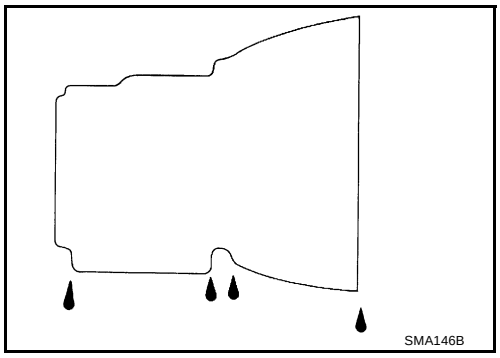
A/T FLUID

PFP:KLE40

Checking A/T Fluid

ECS004Q7

1. Warm up engine.
2. Check for A/T fluid leakage.

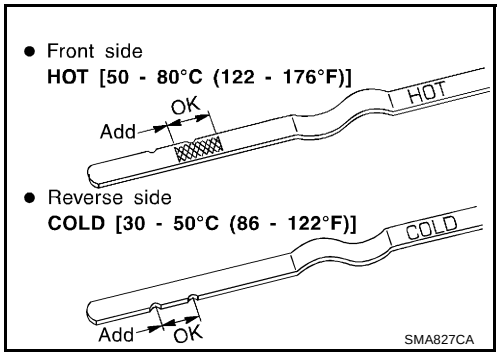


3. Before driving, A/T fluid level can be checked at A/T fluid temperatures of 30 to 50°C (86 to 122°F) using “COLD” range on A/T fluid level gauge.

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 A/T fluid level with engine idling.



d. Remove A/T fluid level gauge and note reading. If level is at low side of either range, and A/T fluid to the A/T fluid charging pipe.

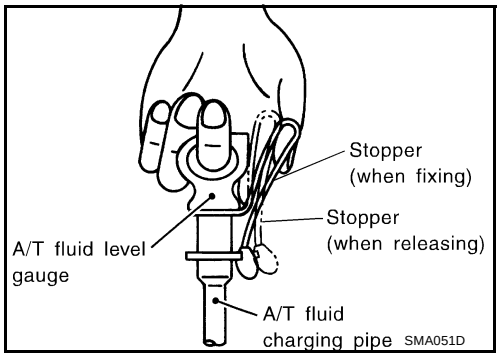
CAUTION:
When wiping away the A/T fluid level gauge, always use lint-free paper, not a cloth one.

e. Re-insert A/T fluid level gauge into A/T fluid charging pipe as far as it will go.

CAUTION:
Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using a stopper attached.

f. Remove A/T fluid level gauge and note reading. If reading is at low side of range, add A/T fluid to the A/T fluid charging pipe.

CAUTION:
Do not overfill.

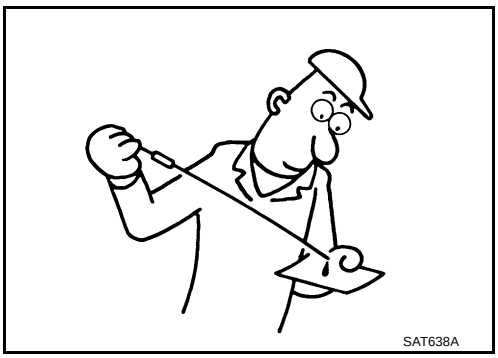


4. Drive vehicle for approximately 5 minutes in urban areas.
5. Recheck A/T fluid level at A/T fluid temperatures of 50 to 80°C (122 to 176°F) using “HOT” range on A/T fluid level gauge.

CAUTION:
- **When wiping away the A/T fluid level gauge, always use lint-free paper, not a cloth one.**
- **Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using a stopper attached.**

6. Check A/T fluid condition.
   - If A/T fluid is very dark or smells burned, 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-12, "RADIATOR" , CO-14, "RADIATOR (ALUMINUM TYPE)" .
7. Install the removed A/T fluid level gauge in the A/T fluid charging pipe.

   CAUTION:
   Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using a stopper attached.


SAT638A

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. Refer to MA-17, "RECOMMENDED FLUIDS AND LUBRICANTS" .

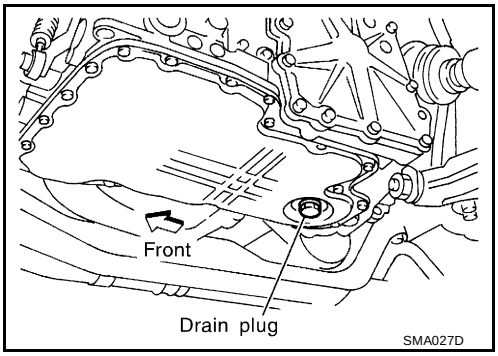
   CAUTION:
   Do not reuse drain plug gasket.

   Fluid capacity (With torque converter):

   Approx. 8.5 ℓ (7-1/2 lmp qt)

   Drain plug:

   : 34 N·m (3.5 kg-m, 25 ft-lb)
4. Run engine at idle speed for five minutes.
5. Check A/T fluid level and condition. Refer to AT-16, "Checking A/T Fluid" . If A/T fluid is still dirty, repeat steps 2 through 5.



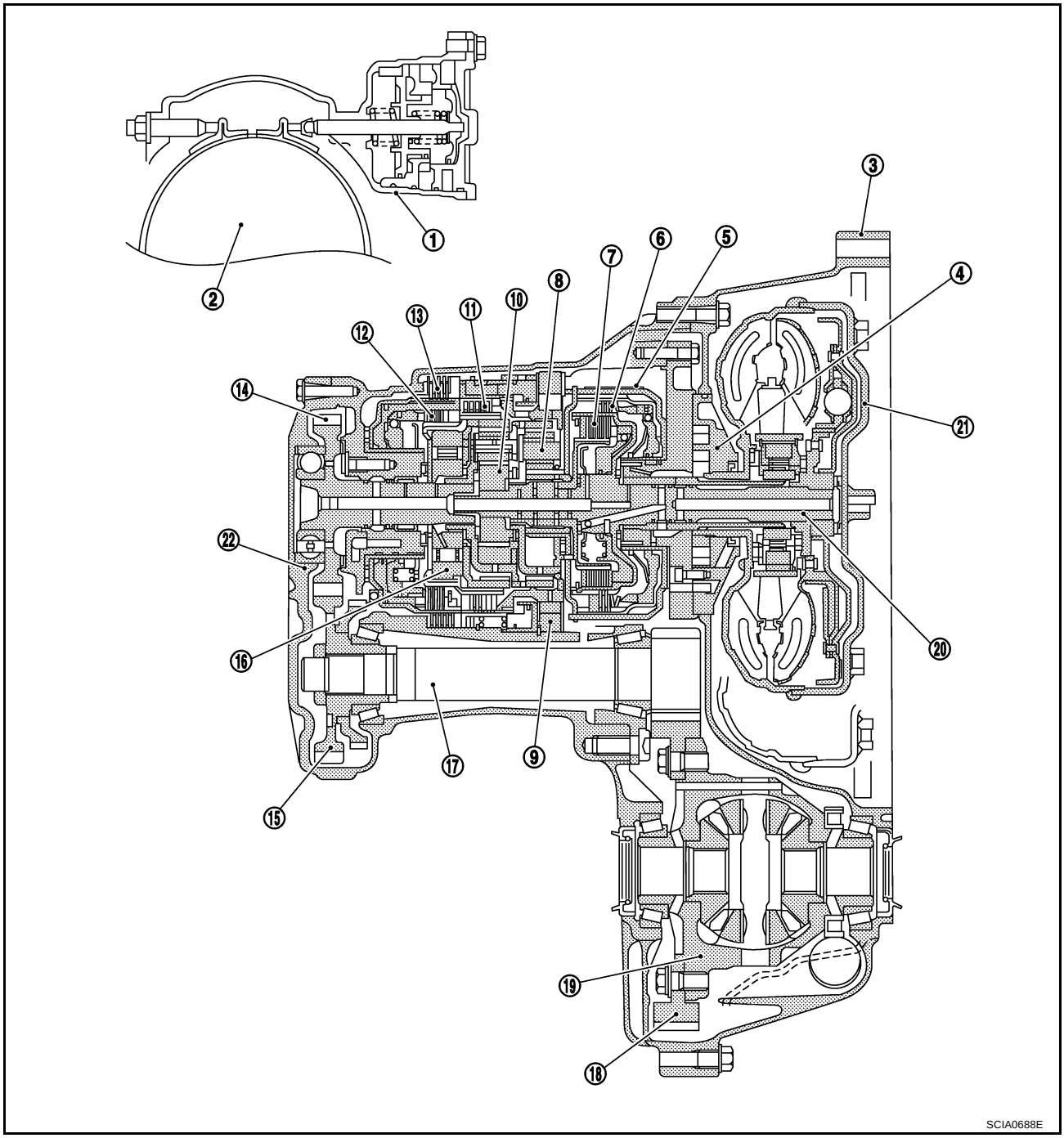
SMA027D

OVERALL SYSTEM

PFP:00000

Cross-Sectional View

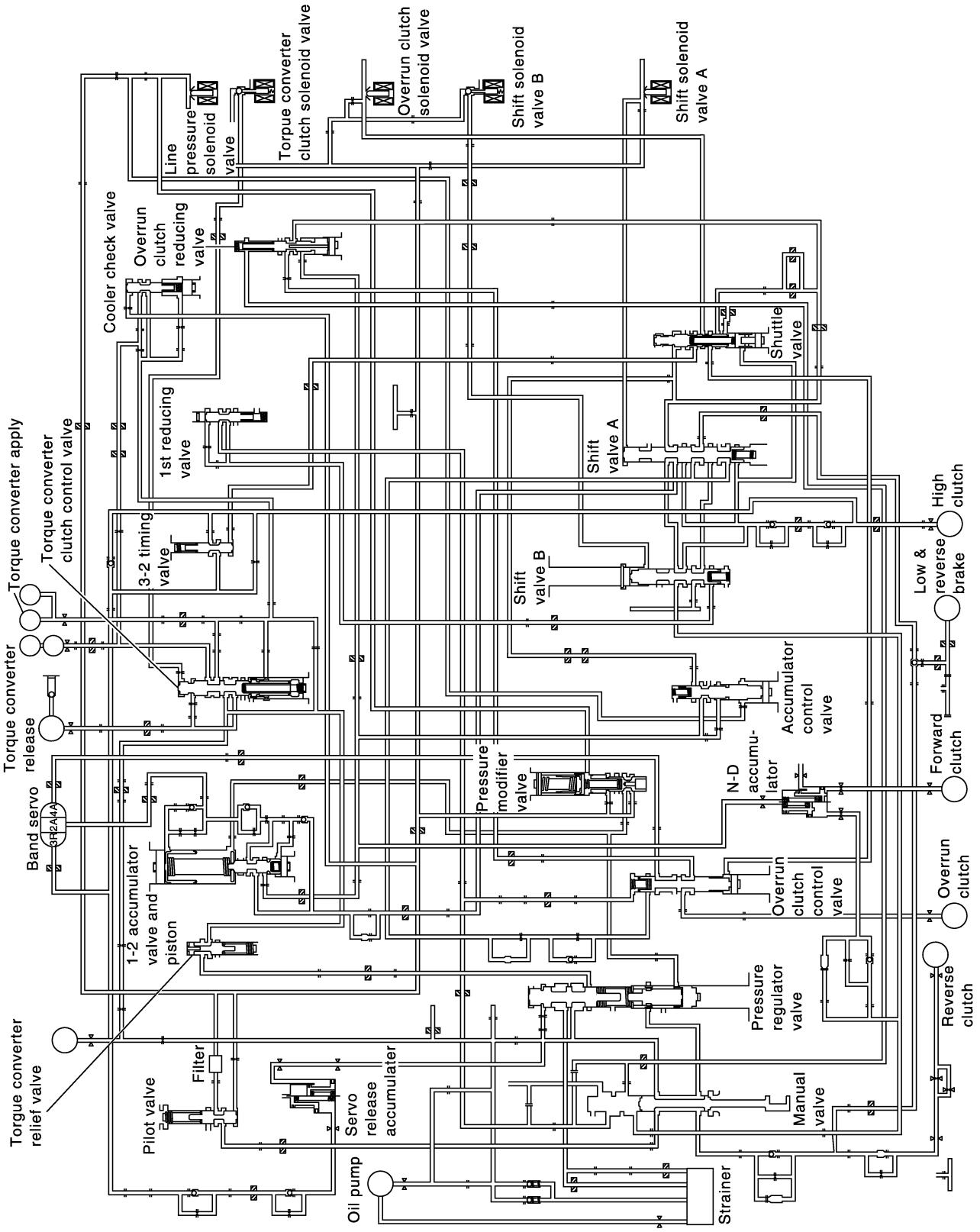
ECS00CTA



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

Hydraulic Control Circuit

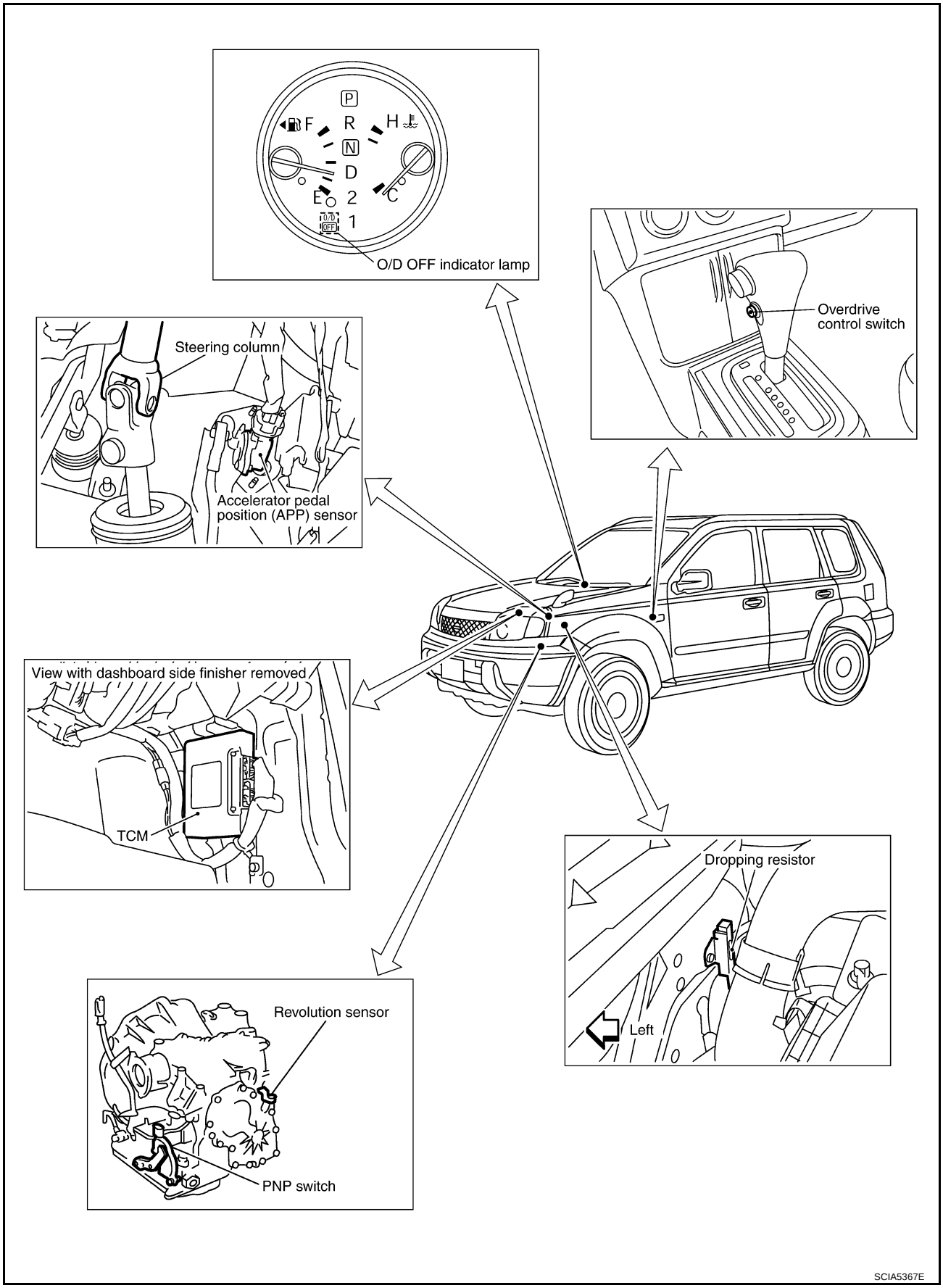
ECS004QC



SCIA0689E

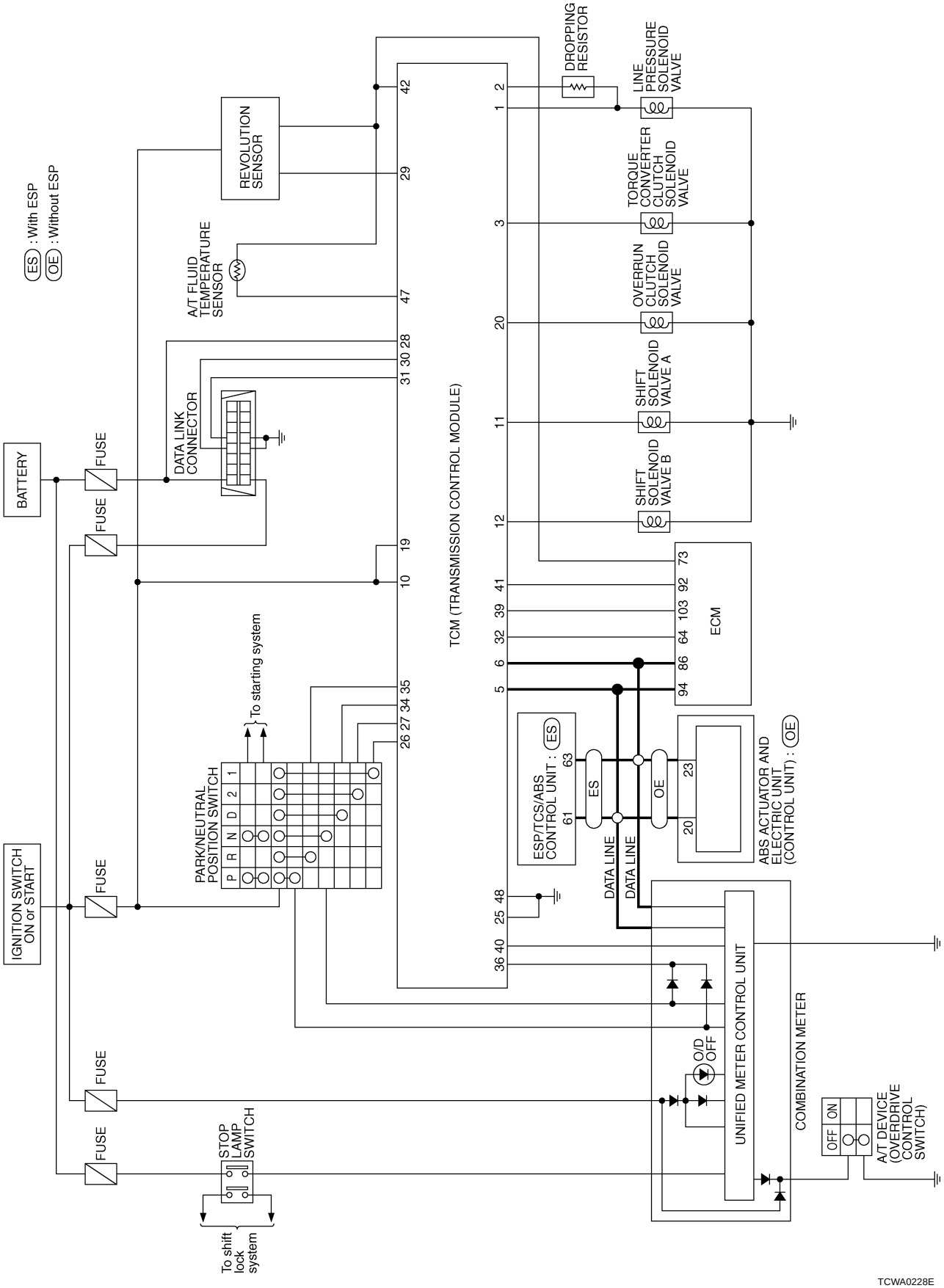
A/T Electrical Parts Location

ECS004Q9



Circuit Diagram

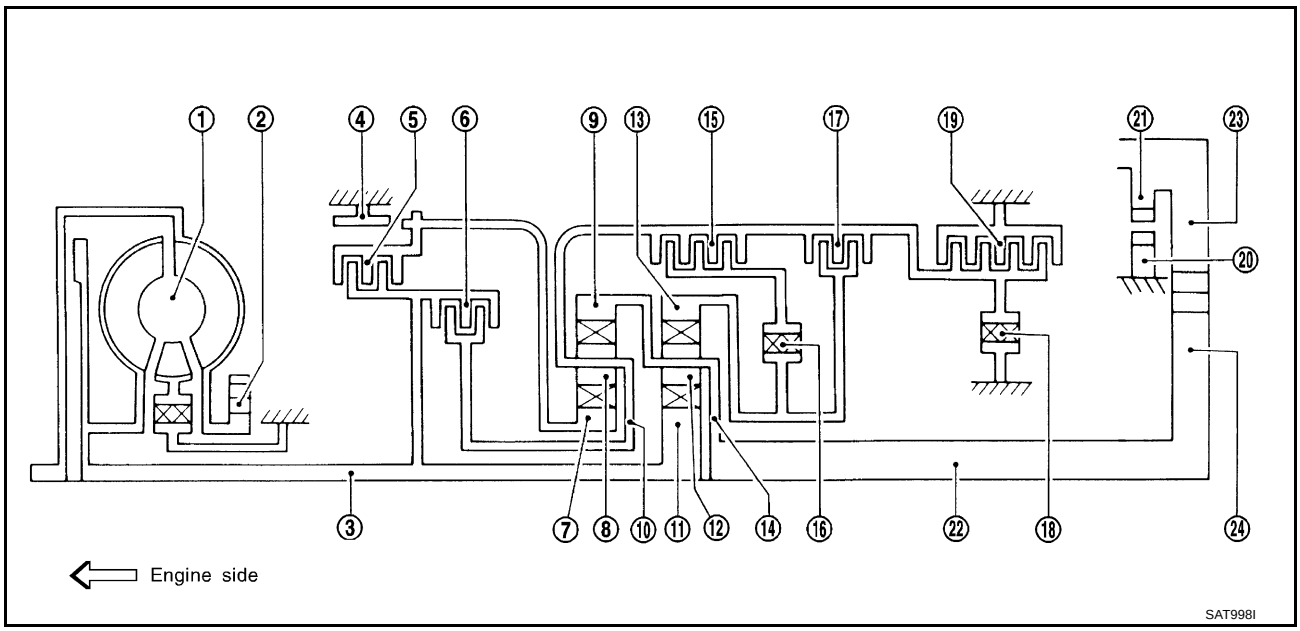
ECS004QA



Shift Mechanism

ECS004QD

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** .

CLUTCH AND BAND CHART

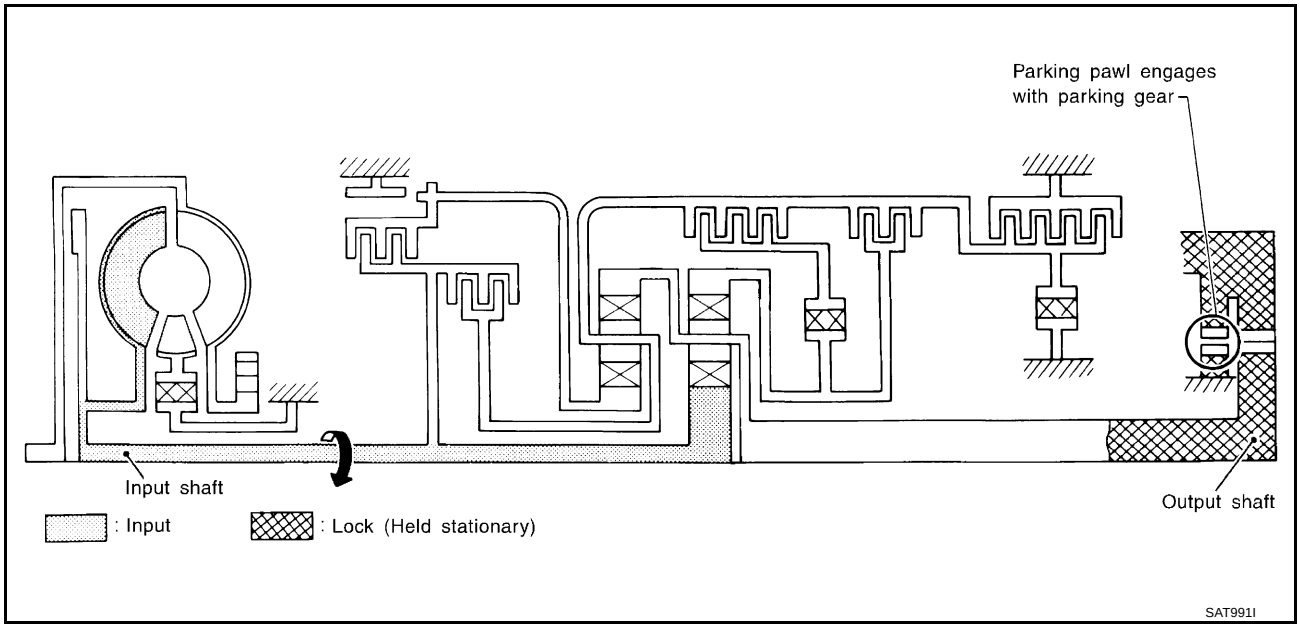
Shift position		Reverse clutch **5**	High clutch **6**	Forward clutch **15**	Overrun clutch **17**	Band servo			Forward one-way clutch **16**	Low one-way clutch **18**	Low & reverse brake **19**	Lock-up	Remarks
						2nd apply	3rd release	4th apply					
P													PARK POSITION
R		○									○		REVERSE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

- *1: Operates when 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.

POWER TRANSMISSION

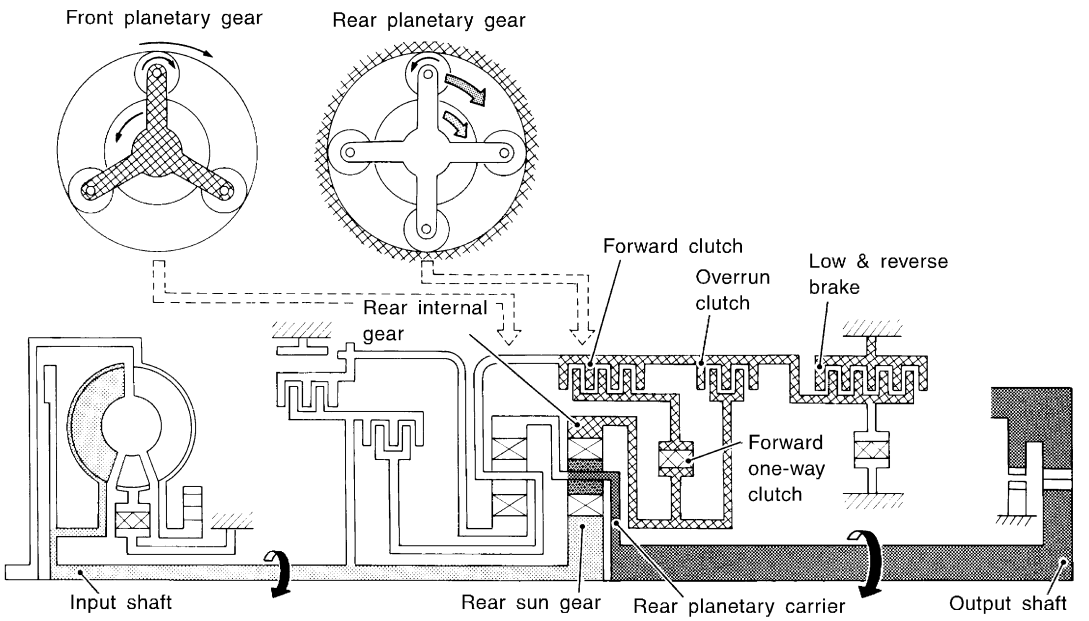
“N” and “P” Positions

- “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.



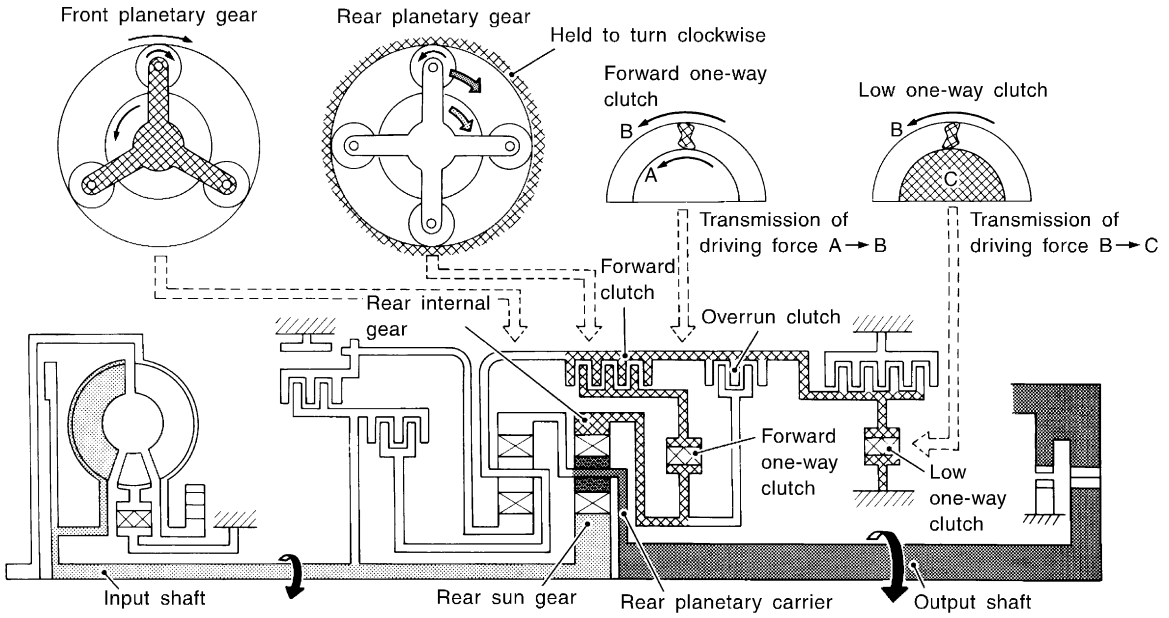
“1₁ ” Position

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



“D1 ” and “21 ” Positions

● **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.



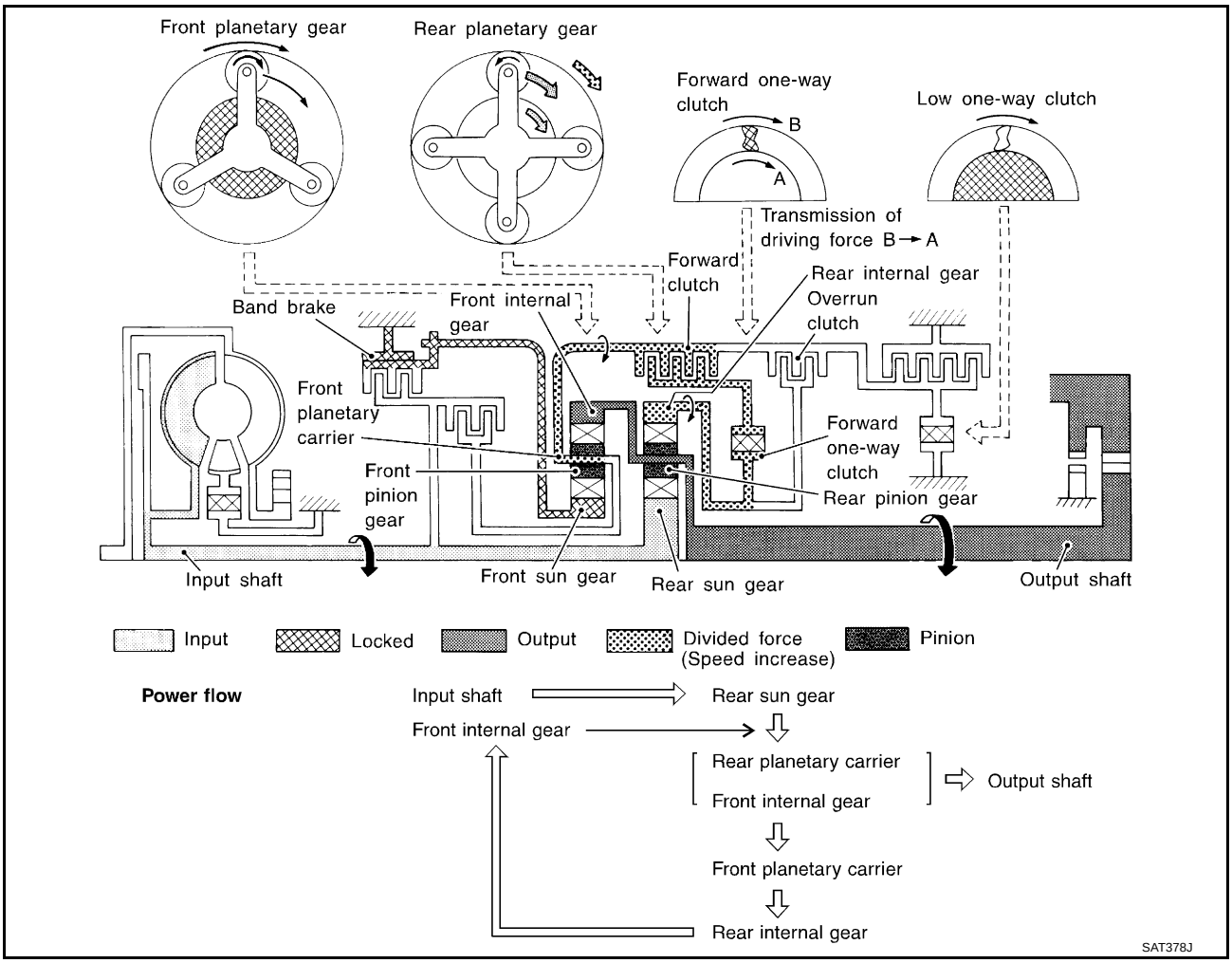
Power flow

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

SAT377J

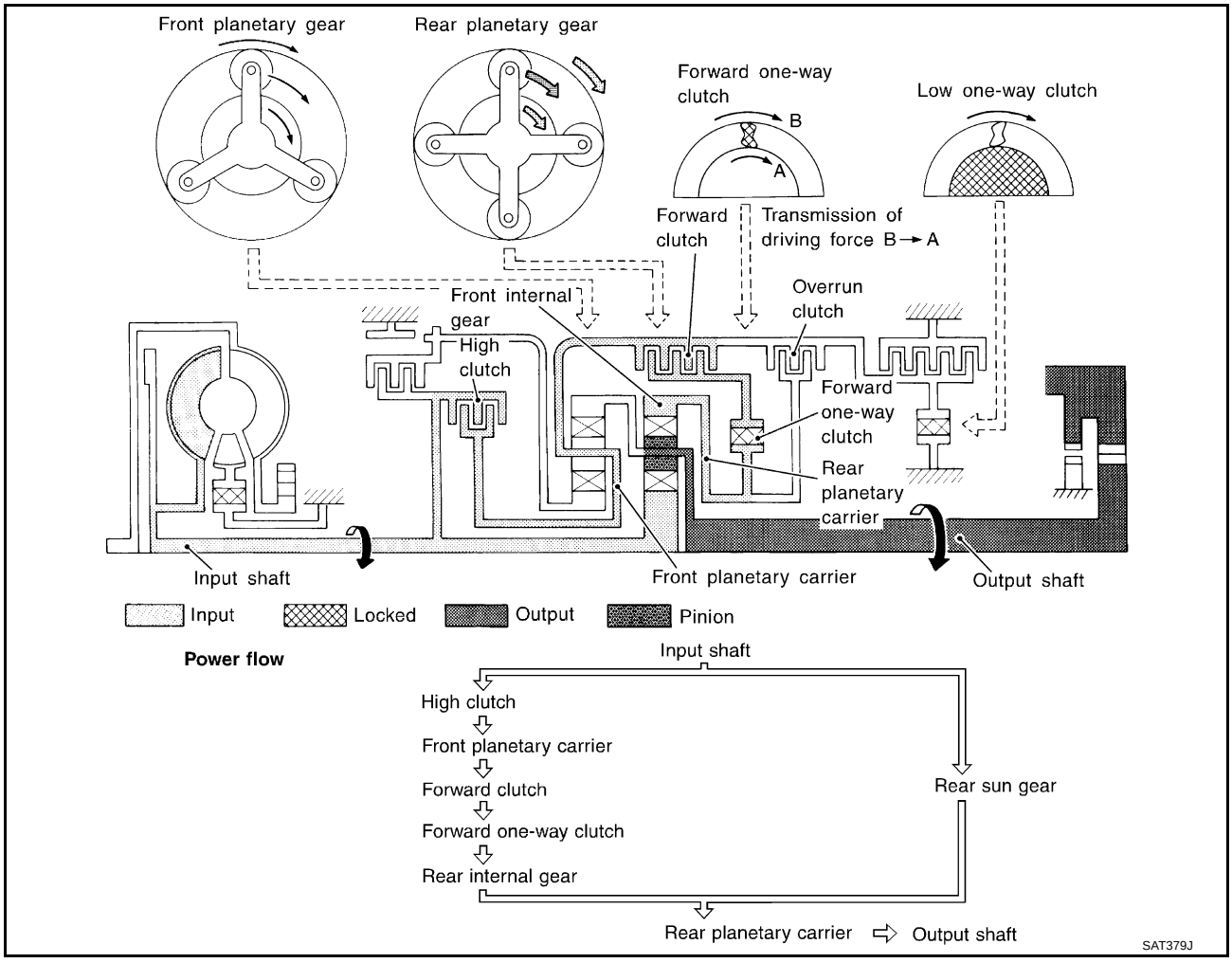
“D2 ”, “22 ” and “12 ” Positions

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



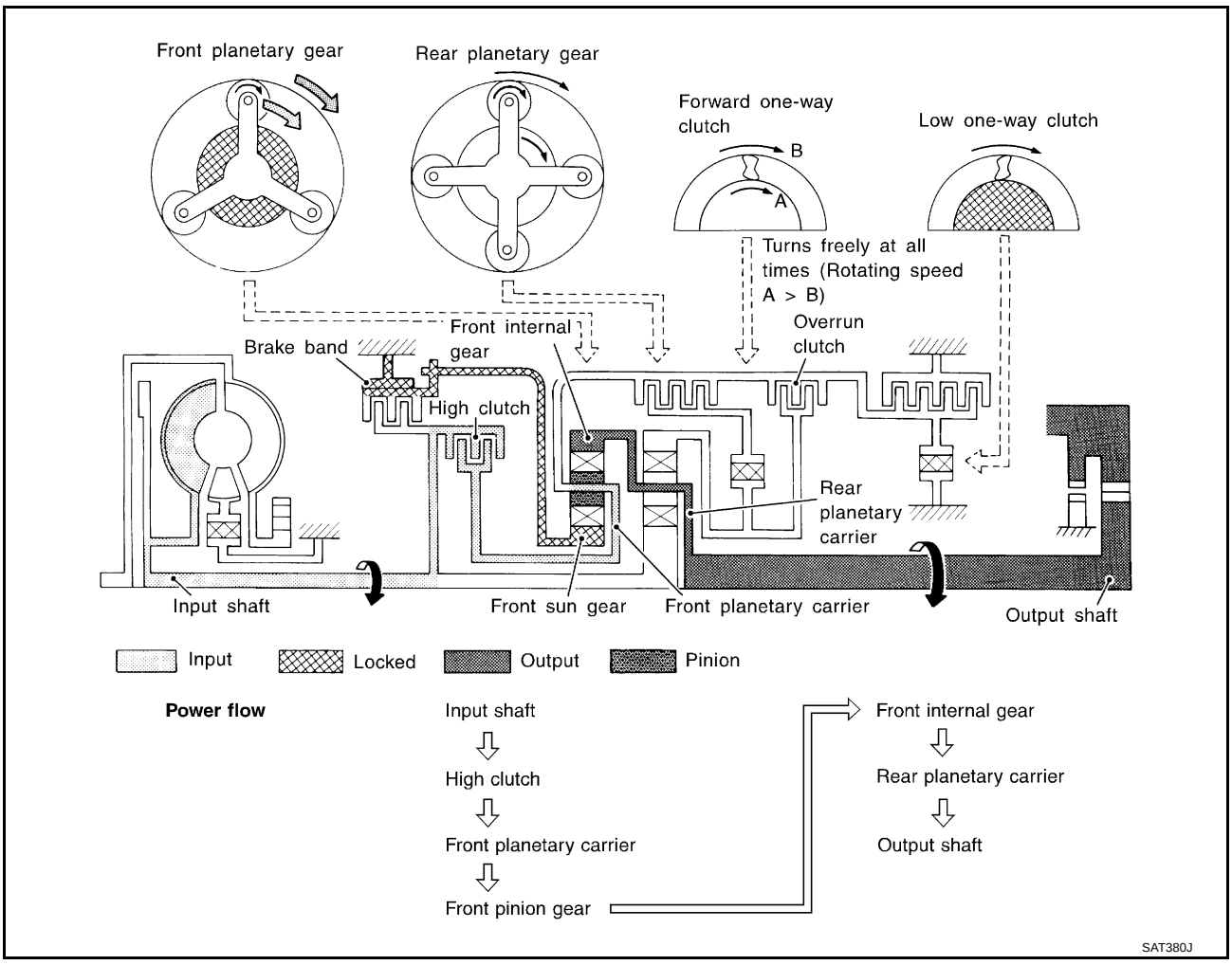
“D3 ”, “23 ” and “13 ” Positions

● **High clutch** ● **Forward clutch** ● **Forward one-way clutch**	Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch. This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.
Overrun clutch engagement conditions	D3 : Overdrive control switch “OFF” and throttle opening is less than 3/16 23 and 13 : Always engaged



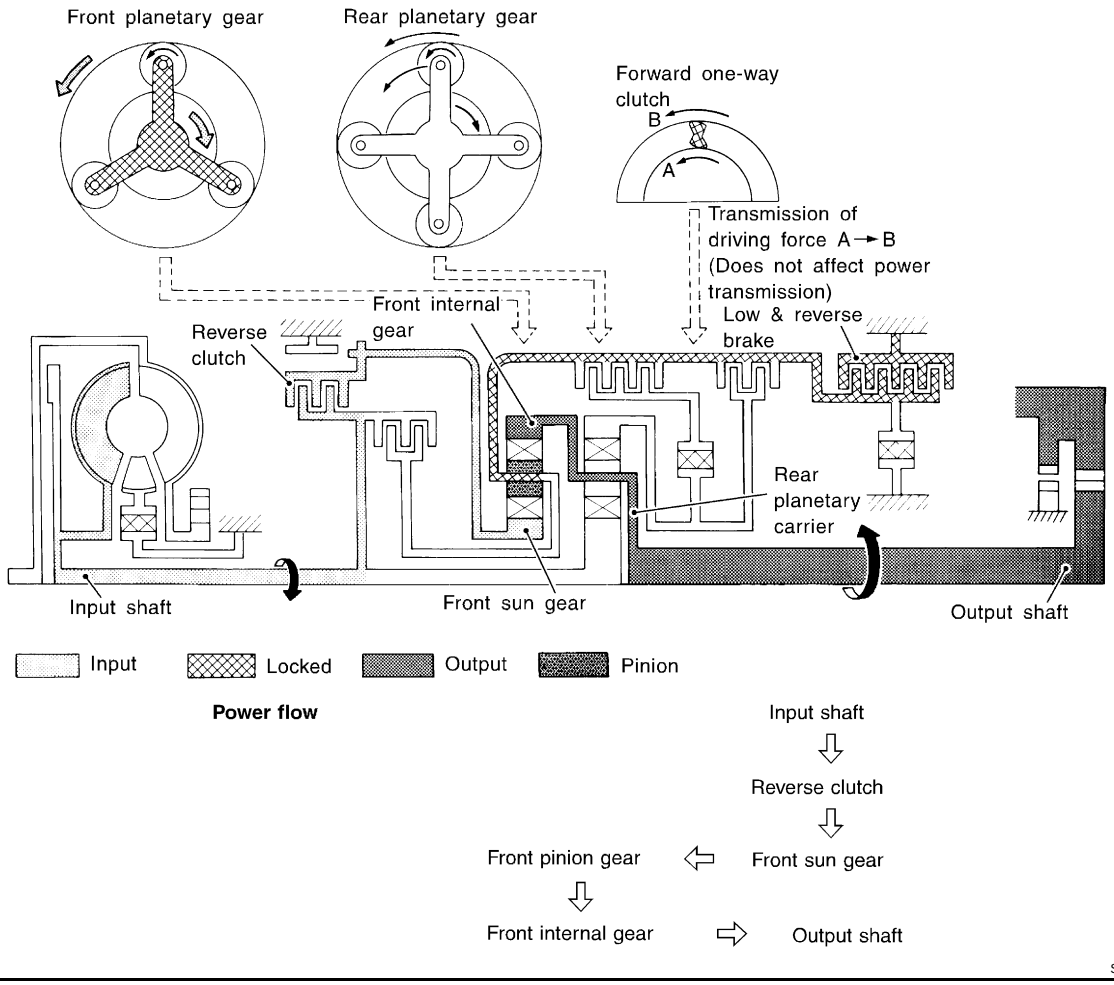
"D4 " (OD) Position

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



“R” Position

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



TCM Function

ECS004QE

The function of the TCM is to:

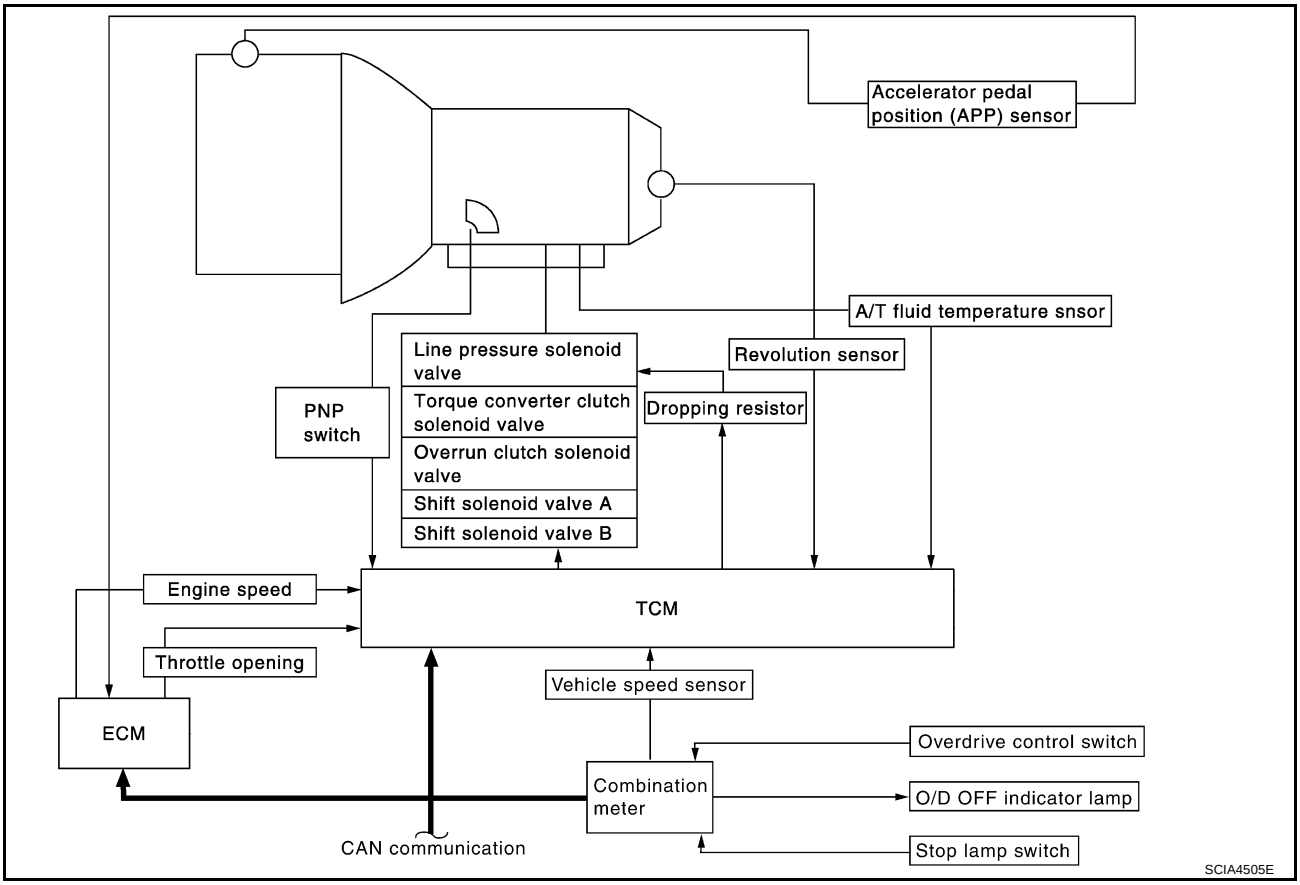
- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, lock-up operation, and engine brake operation.
- Send required output signals to the respective solenoids.

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 signal Stop lamp switch signal	⇒	Shift control Line pressure control Lock-up control Overrun clutch control Timing control Fail-safe control Self-diagnosis CONSULT-II communication line control CAN system	⇒	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



CAN Communication

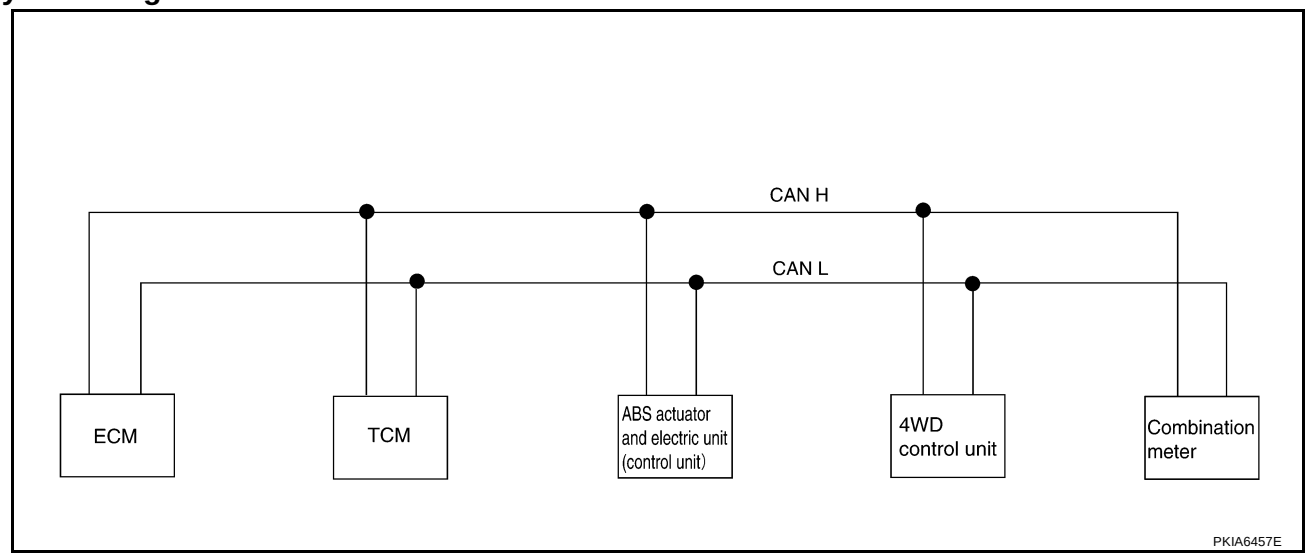
ECS00CTB

SYSTEM DESCRIPTION

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

ABS MODELS

System diagram



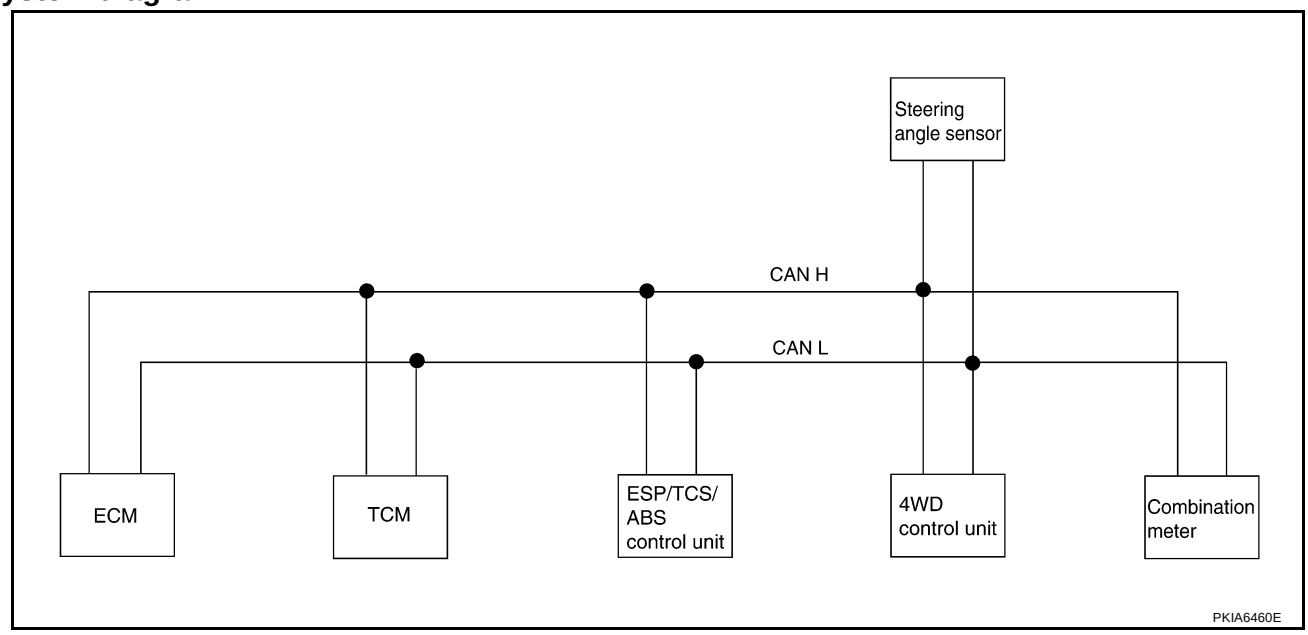
Input/output signal chart

T: Transmit R: Receive

Signals	TCM	ECM	Combination meter
Stop lamp switch signal	R		T
P·N range signal	R		T
A/T position indicator lamp signal	T		R
Overdrive control switch signal	R		T
O/D OFF indicator signal	T		R
Closed throttle position signal	R	T	
Wide open throttle position signal	R	T	
Output shaft revolution signal	T	R	
Engine A/T integrated control signal	R	T	
	T	R	
A/T self-diagnosis signal	T	R	

ESP MODELS

System diagram



Input/output signal chart

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A/T position indicator lamp signal	T		R
O/D OFF indicator signal	T		R
Overdrive control switch signal	R		T
Closed throttle position signal	R	T	
Wide open throttle position signal	R	T	
Output shaft revolution signal	T	R	
Engine and A/T integrated	R	T	
	T	R	
A/T self-diagnosis signal	R	T	

Input/Output Signal of TCM

ECS00CTC

Control item		Line pressure control	Vehicle speed control	Shift control	Lock-up control	Engine brake control	Fail-safe function (*3)	Self-diagnostics function
Input	Accelerator pedal position signal	X	X	X	X	X	X	X
	Vehicle speed sensor A/T (Revolution sensor)	X	X	X	X		X	X
	Vehicle speed sensor MTR(*1)	X	X	X	X			X
	Closed throttle position signal(*5)	(*2) X	(*2) X		X			(*4) X
	Wide open throttle position signal(*5)	(*2) X	(*2) X					(*4) X
	Engine speed signal				X			X
	PNP switch	X	X	X	X	X	X	(*4) X
	Stop lamp switch signal(*5)		X		X	X		(*4) X
	A/T fluid temperature sensors	X	X		X	X		X
	TCM power supply voltage signal	X						X
Out-put	Shift solenoid valve A/B		X				X	X
	Line pressure solenoid	X					X	X
	Torque converter clutch solenoid valve				X		X	X
	Overrun clutch solenoid valve		X			X	X	X
	O/D OFF indicator lamp(*6)							X

*1: Spare for vehicle speed sensor·A/T (revolution sensor)
*2: Spare for accelerator pedal position signal
*3: If these input and output signals are different, the TCM triggers the fail-safe function.
*4: Used as a condition for starting self-diagnostics; if self-diagnostics are not started, it is judged that there is some kind of error.
*5: Input by CAN communications.
*6: Output by CAN communications.

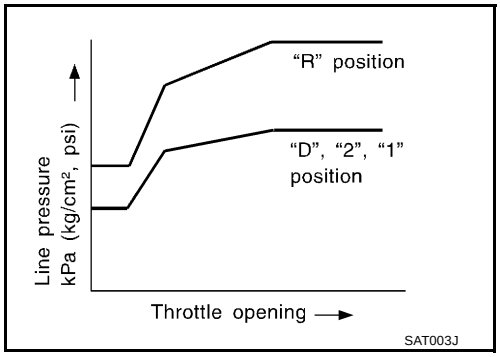
Line Pressure Control

ECS004QF

- 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.

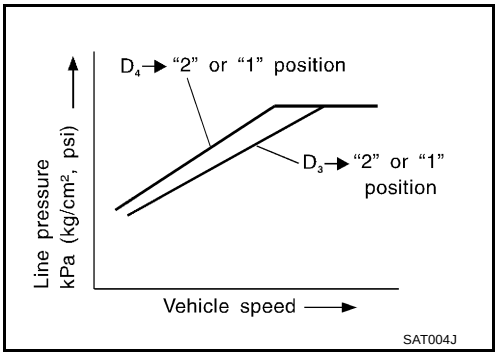
NORMAL CONTROL

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



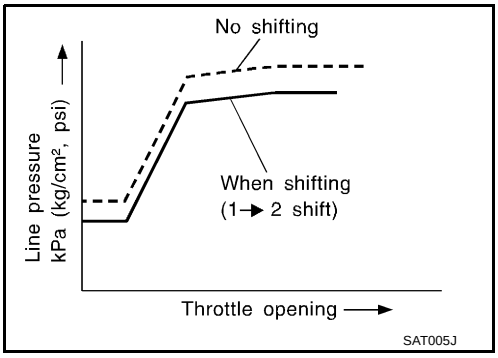
BACK-UP CONTROL (ENGINE BRAKE)

If the selector lever is shifted to “2” position while driving in D_4 (OD) or D_3 , great driving force is applied to the clutch inside the transmission. Clutch operating pressure (line pressure) must be increased to deal with this driving force.



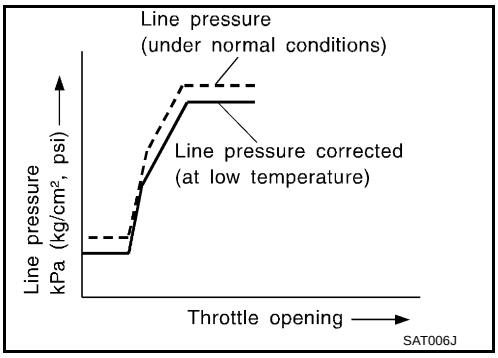
DURING SHIFT CHANGE

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.

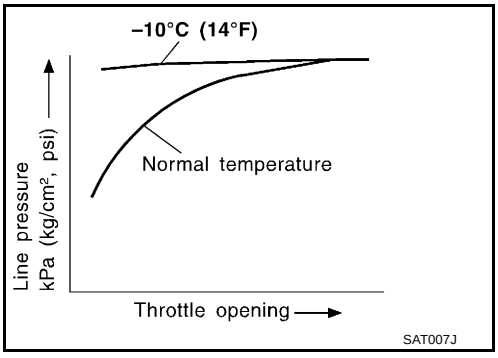


AT LOW FLUID TEMPERATURE

- 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.



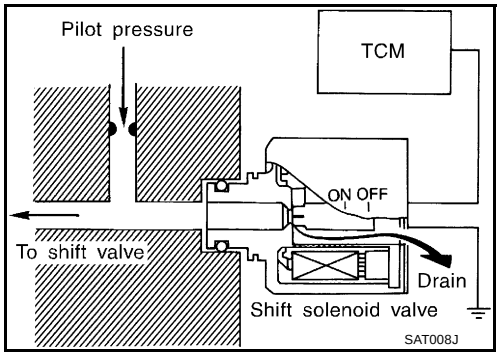
Shift Control

ECS00CTD

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 the ECM (accelerator pedal position sensor). This results in improved acceleration performance and fuel economy.

CONTROL OF SHIFT SOLENOID VALVES A AND B

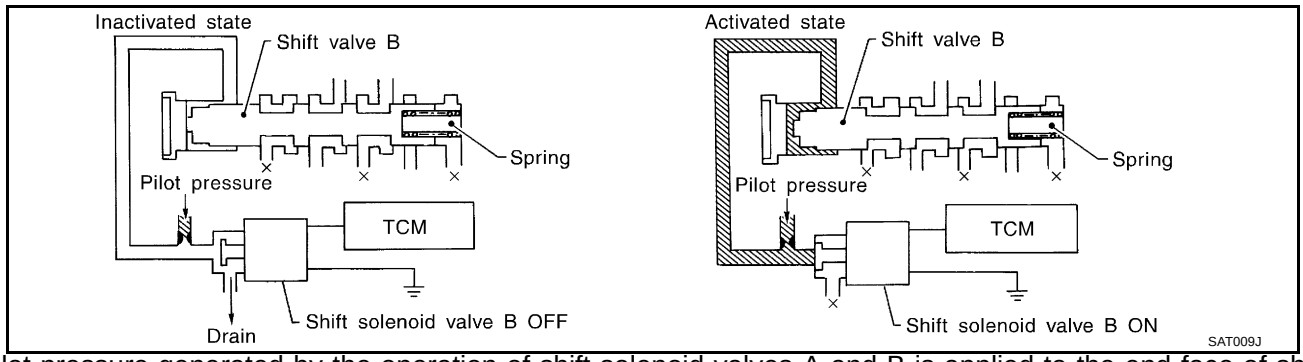
The TCM activates shift solenoid valves A and B according to signals from the throttle position sensor and revolution sensor to select the optimum gear position on the basis of the shift schedule memorized in the TCM.
The shift solenoid valve performs simple ON-OFF operation. When set to “ON”, the drain circuit closes and pilot pressure is applied to the shift valve.



RELATION BETWEEN SHIFT SOLENOID VALVES A AND B GEAR POSITIONS

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

CONTROL OF SHIFT VALVES A AND B



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

ECS00CTE

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.

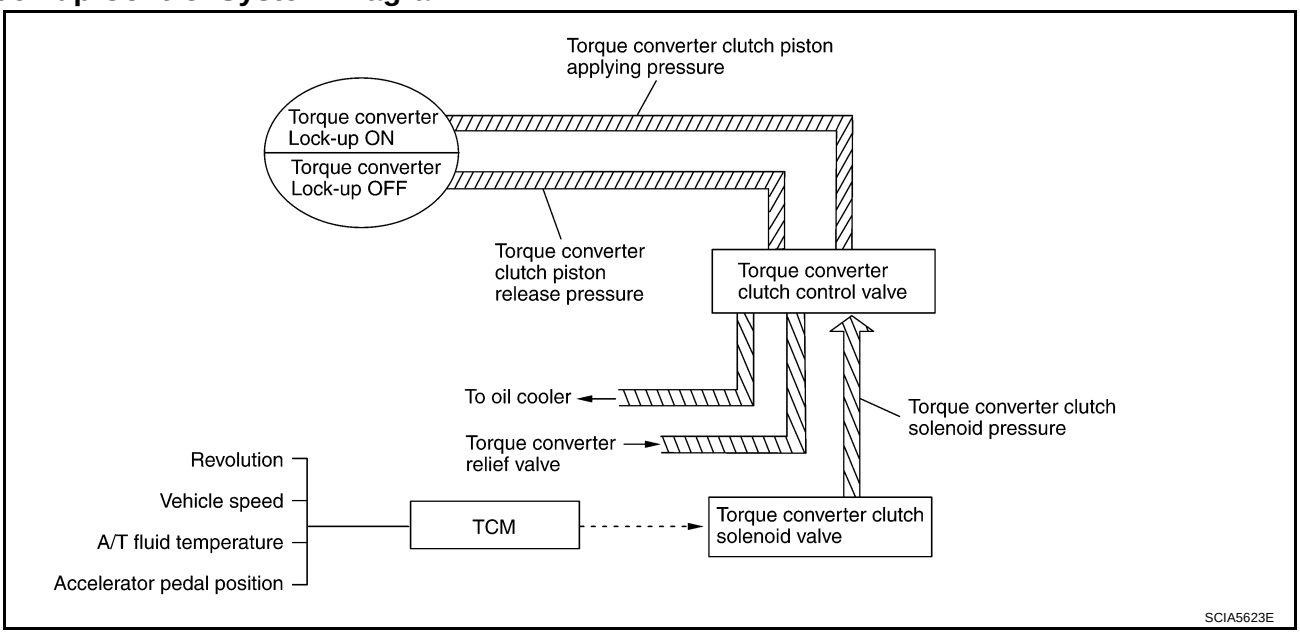
CONDITIONS FOR LOCK-UP OPERATION

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

TORQUE CONVERTER CLUTCH SOLENOID VALVE CONTROL

Lock-up Control System Diagram



Lock-up Released

- In the lock-up released state, the torque converter clutch control valve is set into the unlocked state by the torque converter clutch solenoid applying pressure is drained and the torque converter clutch piston release pressure is generated.
  In this way, the torque converter clutch piston is not coupled.

Lock-up Applied

- In the lock-up applied state, the torque converter clutch control valve is set into the locked state by the torque converter clutch solenoid applying pressure is generated and the torque converter clutch piston release pressure is drained.
  In this way, the torque converter clutch piston is pressed and coupled.

SMOOTH LOCK-UP CONTROL

When shifting from the lock-up released state to the lock-up applied state, the current output to the torque converter clutch solenoid is controlled with the TCM. In this way, when shifting to the lock-up applied state, the torque converter clutch is temporarily set to the half-clutched state to reduce the shock.

Half-Clutched State

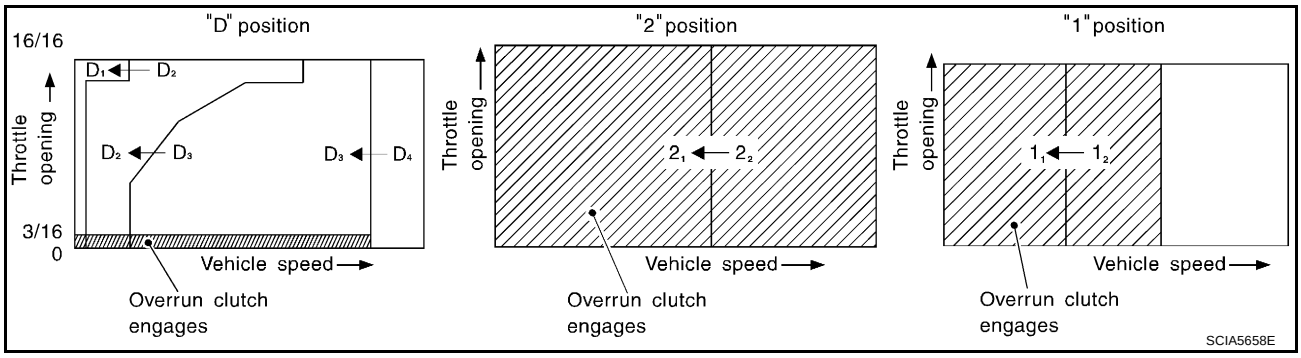
- The current output from the TCM to the torque converter clutch solenoid is varied to steadily increase the torque converter clutch solenoid pressure.
  In this way, the lock-up applying pressure gradually rises and while the torque converter clutch piston is put into half-clutched status, the torque converter clutch piston operating pressure is increased and the coupling is completed smoothly.

Engine Brake Control (Overrun Clutch Control)

ECS00CTF

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

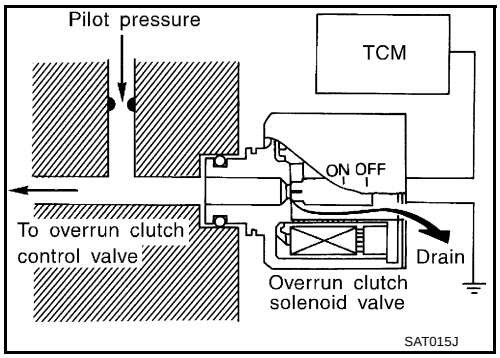
OVERRUN CLUTCH OPERATING CONDITIONS



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

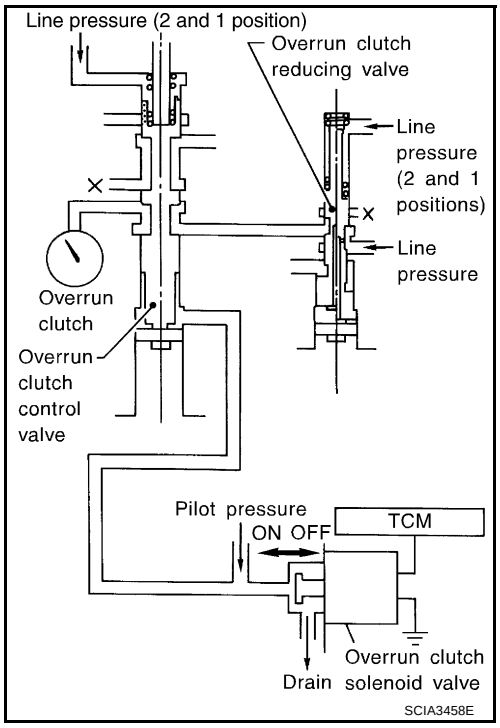
OVERRUN CLUTCH SOLENOID VALVE CONTROL

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



Control Valve

ECS004QG

FUNCTION OF CONTROL VALVES

Valve name	Function
Pressure regulator valve, plug and sleeve plug	Regulates oil discharged from the oil pump to provide optimum line pressure for all driving conditions.
Pressure modifier valve and sleeve	Used as a signal supplementary valve to the pressure regulator valve. Regulates pressure-modifier pressure (signal pressure) which controls optimum line pressure for all driving conditions.
Pilot valve	Regulates line pressure to maintain a constant pilot pressure level which controls lock-up mechanism, overrun clutch, shift timing.
Accumulator control valve	Regulates accumulator back-pressure to pressure suited to driving conditions.
Manual valve	Directs line pressure to oil circuits corresponding to select positions. Hydraulic pressure drains when the shift lever is in Neutral.
Shift valve A	Simultaneously switches three oil circuits using output pressure of shift solenoid valve A to meet driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and upshifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve B.
Shift valve B	Simultaneously switches two oil circuits using output pressure of shift solenoid valve B in relation to driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and upshifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve A.
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with application of the brake band in D_4 . (Interlocking occurs if the overrun clutch engages during D_4 .)
1st reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when downshifting from the 1st position 1_2 to 1_1 .
Overrun clutch reducing valve	Reduces oil pressure directed to the overrun clutch and prevents engine-brake shock. In the 1st and 2nd 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	Lessens the shock find when the 2nd gear band servo contracts, and provides smooth shifting.
3-2 timing valve	Switches the pace that oil pressure is released depending on vehicle speed; maximizes the high clutch release timing, and allows for soft downshifting.
Shuttle valve	Determines if the overrun clutch solenoid valve should control the 3-2 timing valve or the overrun clutch control valve and switches between the two.
Cooler check valve	At low speeds and with a small load when a little heat is generated, saves the volume of cooler flow, and stores the oil pressure for lock-up.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

PFP: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-45, "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

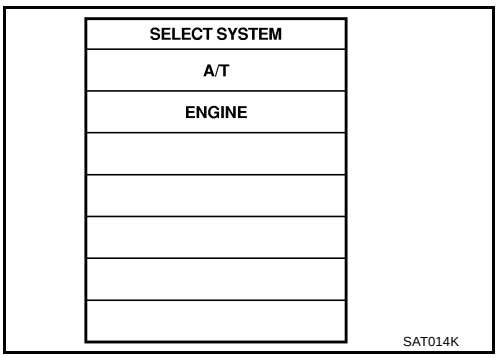
HOW TO READ DTC AND 1ST TRIP DTC

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

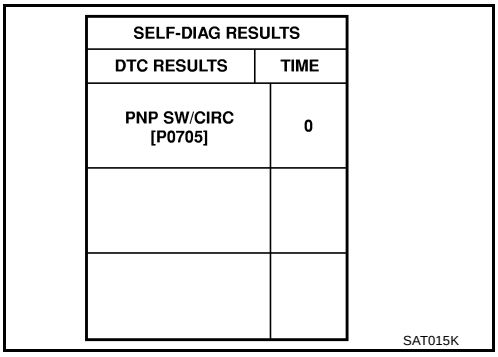
(With CONSULT-II or GST GST) CONSULT-II or GST (Generic Scan Tool) Examples: P0705, P0710, P0720, P0725, etc.
These DTCs are prescribed by SAE J2012.
(CONSULT-II also displays the malfunctioning component or system.)

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

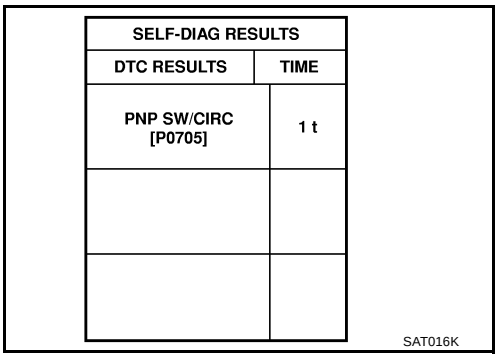
A sample of CONSULT-II display for DTC is shown in the following page. DTC or 1st trip DTC of a malfunction is displayed in SELF DIAGNOSIS mode for “ENGINE” with CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.



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



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



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-102, "CONSULT-II Function" .
Only one set of freeze frame data (either 1st trip freeze frame data of freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM.
The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0306 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 toEC-52, "Emission-related Diagnostic Information" (WITH EURO-OBD) or EC-513, "Emission-related Diagnostic Information" (WITHOUT EURO-OBD).

- **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)

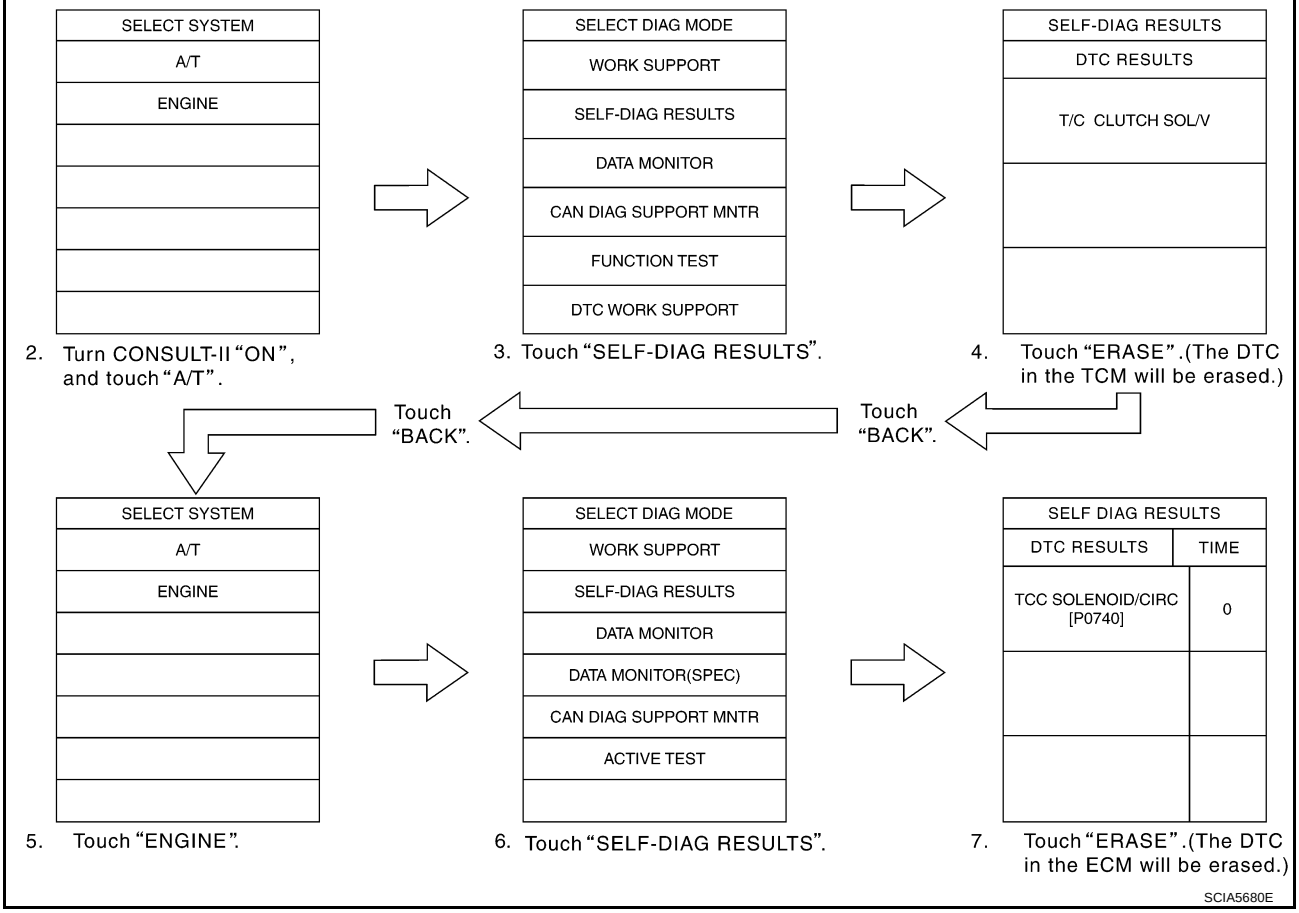
- **If a DTC is displayed for both ECM and TCM, it needs to be erased for both ECM and TCM.**

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.



HOW TO ERASE DTC (WITH GST)

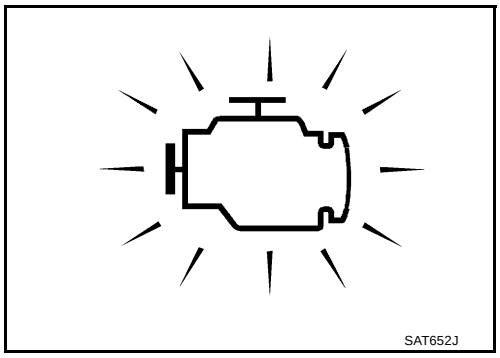
1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 5 seconds and then turn it “ON” (engine stopped) again.
2. Perform “TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)”. Refer to AT-52 . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with Generic Scan Tool (GST). For details, refer to EC-112, "Generic Scan Tool (GST) Function" .

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-52 . (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-52 .

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-33, "Schematic" .
     (Or see MIL & CONSULT-II in EC section. Refer to EC-64, "Malfunction Indicator (MI)" (WITH EURO-OBD) or EC-516, "Malfunction Indicator (MI)" (WITHOUT EURO-OBD) or EC-102, "CONSULT-II Function" (WITH EURO-OBD) or EC-551, "CONSULT-II Function" (WITHOUT EURO-OBD).
2. When the engine is started, the malfunction indicator should go off.
   If the lamp remains on, the on board diagnostic system has detected an emission-related (EURO-OBD) malfunction. For detail, refer to EC-51, "ON BOARD DIAGNOSTIC (OBD) SYSTEM" .

CONSULT-II

ECS004QM

After performing “SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)” AT-45 , place check marks for results on the “DIAGNOSTIC WORKSHEET”, AT-58 . 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.

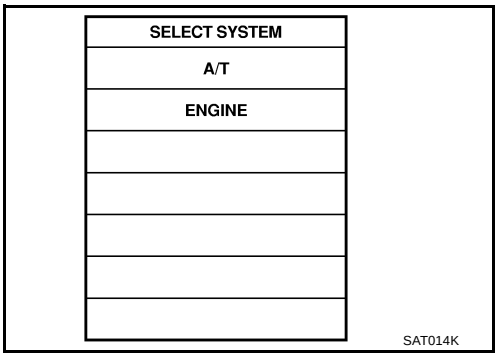
3. Shift solenoid valve “A” or “B” is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).
4. Additional CONSULT-II information can be found in the Operation Manual supplied with the CONSULT-II unit.

FUNCTION

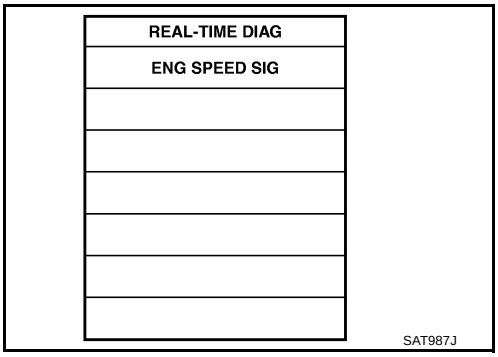
Diagnostic test mode	Function	Reference page
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-II.	—
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	AT-45
Data monitor	Input/Output data in the ECM can be read.	AT-46
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.	—
Function test	Conducted by CONSULT-II instead of a technician to determine whether each system is “OK” or “NG”.	—
DTC work support	Select the operating condition to confirm Diagnosis Trouble Codes.	AT-47
TCM part number	TCM part number can be read.	—

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-94, "TCM Terminals and Reference Value" . If result is NG, refer to PG-2, "POWER SUPPLY ROUTING" .



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



SELF-DIAGNOSTIC RESULT TEST MODE

Items (CONSULT-II screen terms)	Malfunction is detected when...	EURO-OBD (DTC)
CAN COMM CIRCUIT	● Malfunction is detected in CAN communication line.	U1000
VHCL SPEED SEN·A/T	● TCM does not receive the proper voltage signal from the sensor.	P0720
VHCL SPEED SEN·MTR		—
THROTTLE POSI SEN	● TCM receives an excessively low or high voltage from this sensor	P1705
SHIFT SOLENOID/V A	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0750
SHIFT SOLENOID/V B	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0755
OVERRUN CLUTCH S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P1760
T/C CLUTCH SOL/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0740
ATF TEMP SEN/CIRC	● TCM receives an excessively low or high voltage from the sensor.	P0710
BATT/FLUID TEMP SEN		—
ENGINE SPEED SIG	● TCM does not receive the proper voltage signal from the ECM.	P0725
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 GR FNCTN	● A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	P0732*1
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 GR FNCTN	● A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	P0734*1
LINE PRESSURE S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	P0745
CONTROL UNIT (RAM)	● TCM memory (RAM) is malfunctioning	—
CONTROL UNIT (ROM)	● TCM memory (ROM) is malfunctioning	—

Items (CONSULT-II screen terms)	Malfunction is detected when...	EURO-OBD (DTC)
CONT UNIT(EEP ROM)	● TCM memory (EEP ROM) is malfunctioning.	—
PNP SW/CIRC	● TCM does not receive the correct voltage signal (based on the gear position) from the switch.	P0705
INITIAL START	● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen).	—
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED)	● No failure has been detected.	—

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

DATA MONITOR MODE (A/T)

X: Standard, —: Not applicable, ▼: Option

Monitor item (Unit)	SELECT MONITOR ITEM			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
VHCL/S SE·A/T (km/h)	X	—	▼	Revolution sensor
VHCL/S SE·MTR (km/h)	X	—	▼	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.
THRTL POS SEN (V)	X	—	▼	
FLUID TEMP SE (V)	X	—	▼	
BATTERY VOLT (V)	X	—	▼	
ENGINE SPEED (rpm)	X	X	▼	
TURBINE REV (rpm)	X	—	▼	
OVERDRIVE SW (ON/OFF)	X	—	▼	
PN POSI SW (ON/OFF)	X	—	▼	
R POSITION SW (ON/OFF)	X	—	▼	
D POSITION SW (ON/OFF)	X	—	▼	
2 POSITION SW (ON/OFF)	X	—	▼	
1 POSITION SW (ON/OFF)	X	—	▼	
ASCD·CRUISE (ON/OFF)	X	—	▼	Signal input with CAN communication.
ACC OD CUT (ON/OFF)	X	—	▼	
KICKDOWN SW (ON/OFF)	X	—	▼	Not mounted but displayed.
POWERSHIFT SW (ON/OFF)	X	—	▼	
CLOSED THL/SW (ON/OFF)	X	—	▼	Signal input with CAN communication.
W/O THRL/P-SW (ON/OFF)	X	—	▼	
*SHIFT S/V A (ON/OFF)	—	—	▼	Displays status of check signal (reinput signal) for TCM control signal output. Remains unchanged when solenoid valves are open or shorted.
*SHIFT S/V B (ON/OFF)	—	—	▼	
*OVERRUN/C S/V (ON/OFF)	—	—	▼	
HOLD SW (ON/OFF)	X	—	▼	Not mounted but displayed.
BRAKE SW (ON/OFF)	X	—	▼	Stop lamp switch

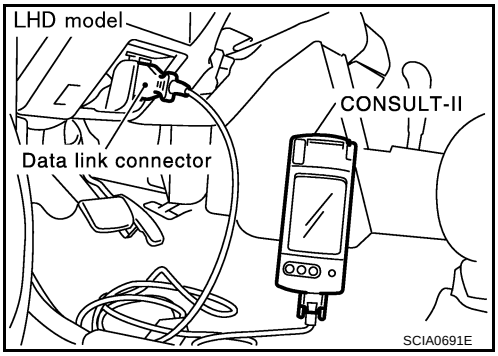
Monitor item (Unit)	SELECT MONITOR ITEM			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
GEAR	—	X	▼	Gear position recognized by the TCM updated after gear-shifting
SLCT LVR POSI	—	X	▼	Selector lever position is recognized by the TCM. For fail-safe operation, the specific value used for control is displayed.
VEHICLE SPEED (km/h)	—	X	▼	Vehicle speed recognized by the TCM.
THROTTLE POSI (0.0/8)	—	X	▼	Degree of opening for accelerator recognized by the TCM For fail-safe operation, the specific value used for control is displayed.
LINE PRES DTY (%)	—	X	▼	
TCC S/V DUTY (%)	—	X	▼	
SHIFT S/V A (ON/OFF)	—	X	▼	
SHIFT S/V B (ON/OFF)	—	X	▼	
OVERRUN/C S/V (ON/OFF)	—	X	▼	
SELF-D DP LMP (ON/OFF)	—	X	▼	
TC SLIP RATIO (0.000)	—	—	▼	
TC SLIP SPEED (rpm)	—	—	▼	Difference between engine speed and torque converter input shaft speed
Voltage (V)	—	—	▼	Displays the value measured by the voltage probe.
Frequency (Hz)	—	—	▼	The value measured by the pulse probe is displayed.
DUTY·HI (high) (%)	—	—	▼	
DUTY·LOW (low) (%)	—	—	▼	
PLS WIDTH·HI (ms)	—	—	▼	
PLS WIDTH·LOW (ms)	—	—	▼	

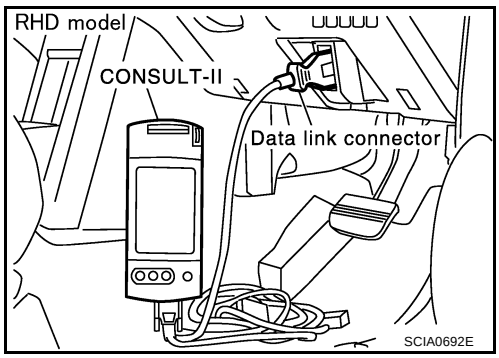
DTC WORK SUPPORT MODE WITH CONSULT-II

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

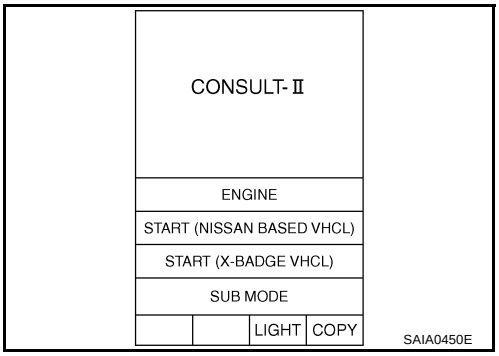
CONSULT-II Setting Procedure

1. Turn ignition switch “OFF”.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector, which is located in instrument lower panel on driver side.

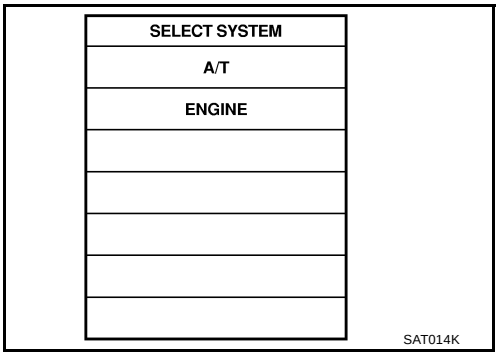




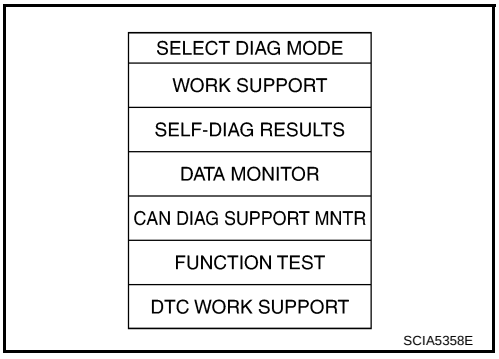
3. Turn ignition switch “ON”. (Do not start engine.)
4. Touch “START (NISSAN BASED VHCL)”.



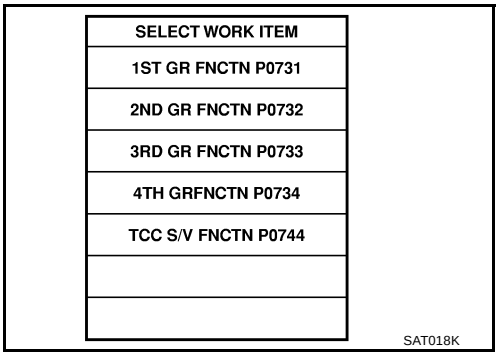
5. Touch “A/T”.
   If “A/T” is not indicated, go to GI-35, "CONSULT-II Data Link Connector (DLC) Circuit" .



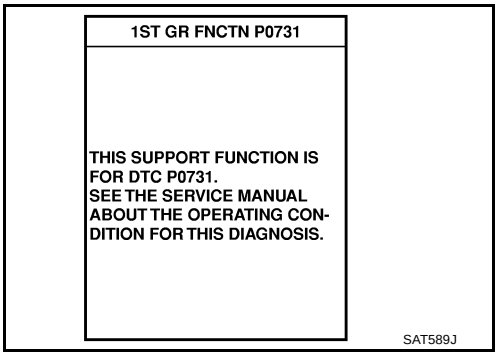
6. Touch “DTC WORK SUPPORT”.



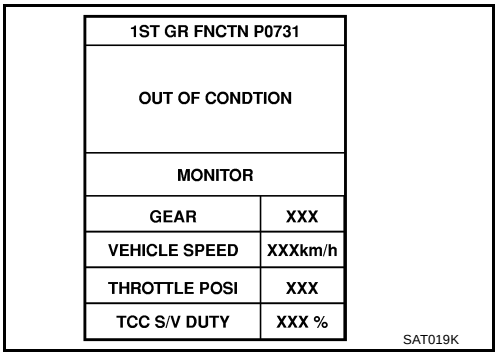
7. Touch select item menu (1ST, 2ND, etc.).



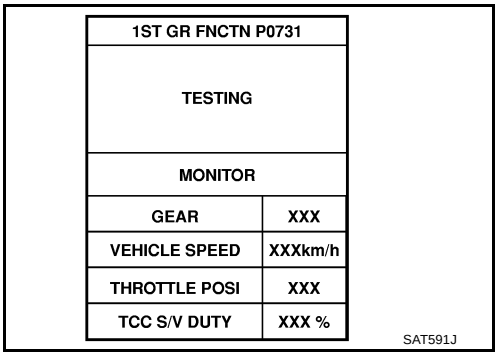
8. Touch “START”.



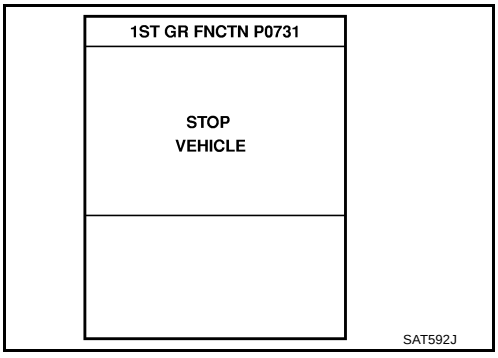
9. Perform driving test according to “DTC Confirmation Procedure” in “TROUBLE DIAGNOSIS FOR DTC”.



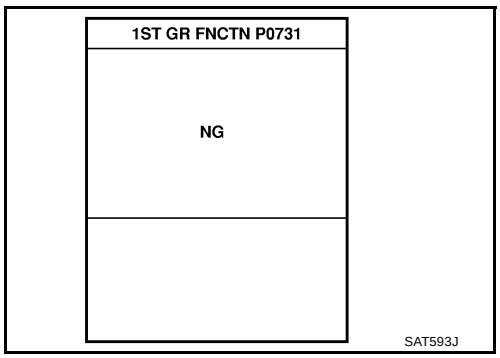
- **When testing conditions are satisfied, CONSULT-II screen changes from “OUT OF CONDITION” to “TESTING”.**



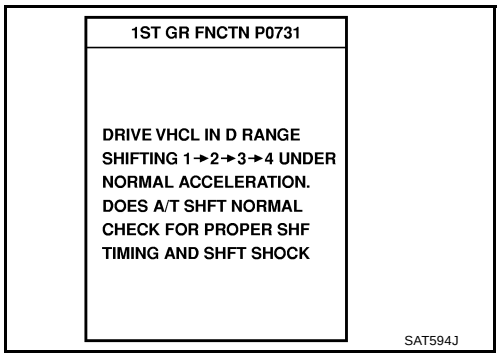
10. Stop vehicle.



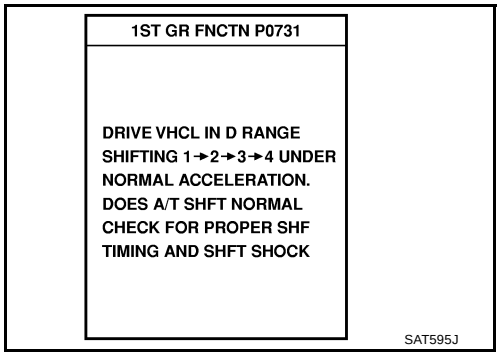
- **If “NG” appears on the screen, malfunction may exist. Go to “Diagnostic Procedure”.**



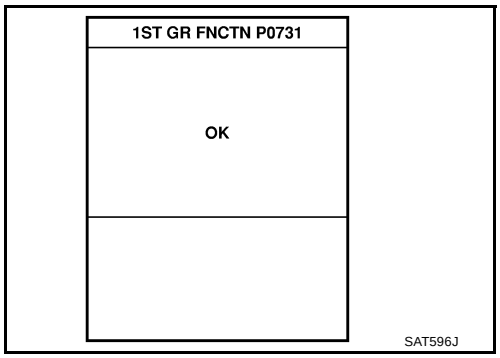
11. Perform test drive to check gear shift feeling in accordance with instructions displayed.



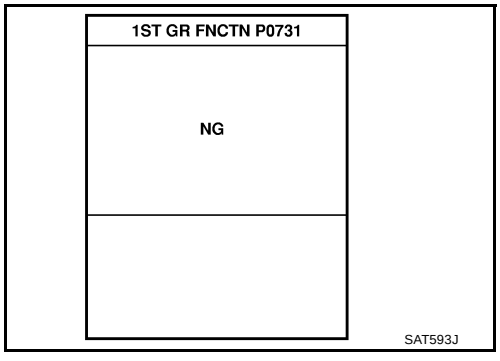
12. Touch “YES” or “NO”.



13. CONSULT-II procedure ended.
    If “NG” appears on the screen, a malfunction may exist. Go to “Diagnostic Procedure”.



- **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

ECS004QN

EURO-OBD SELF-DIAGNOSTIC PROCEDURE (WITH GST)

Refer to EC-112, "Generic Scan Tool (GST) Function" (WITH EURO-OBD).

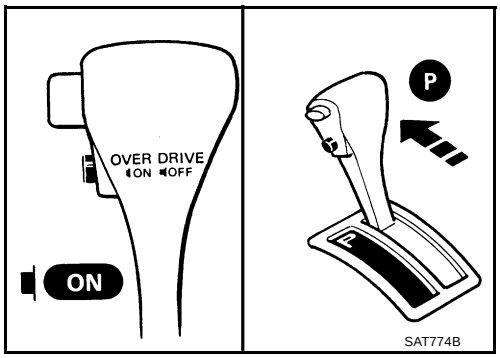
EURO-OBD SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

Refer toEC-64, "Malfunction Indicator (MI)" (WITH EURO-OBD) or EC-516, "Malfunction Indicator (MI)" (WITHOUT EURO-OBD).

TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

1. CHECK O/D OFF INDICATOR LAMP

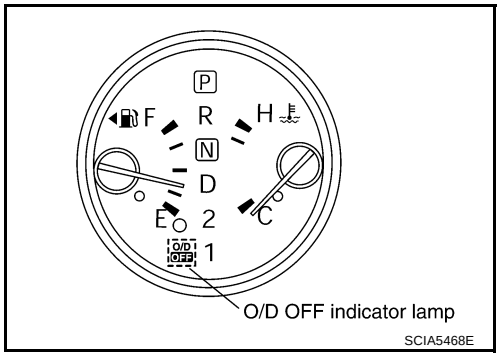
1. Selector lever in P position.
2. Turn ignition switch to OFF position.
3. Wait 5 seconds.
4. Set overdrive control switch to ON position.



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

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

YES >> GO TO 2.
NO >> Go to AT-204, "O/D OFF Indicator Lamp Does Not Come On" .

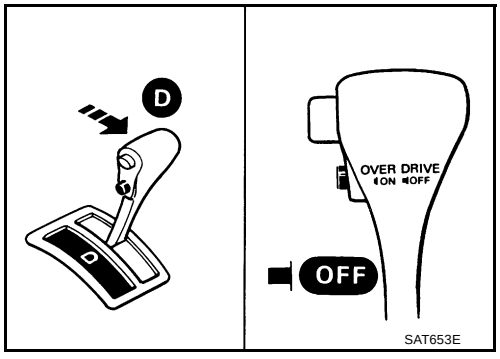


2. JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch to OFF position.
2. Move selector lever to D position.
3. Set overdrive control switch to OFF position.
4. Turn ignition switch to ON position. (Do not start engine.)

– Wait more than 2 seconds after turning ignition switch ON.

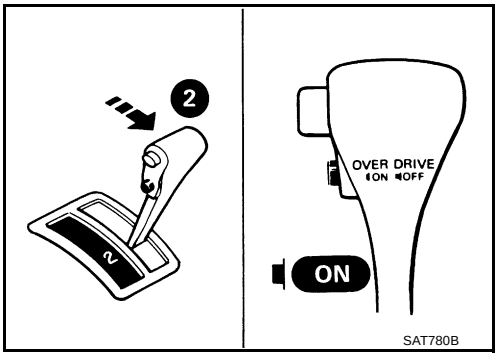
>> GO TO 3.



3. JUDGEMENT PROCEDURE STEP 2

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

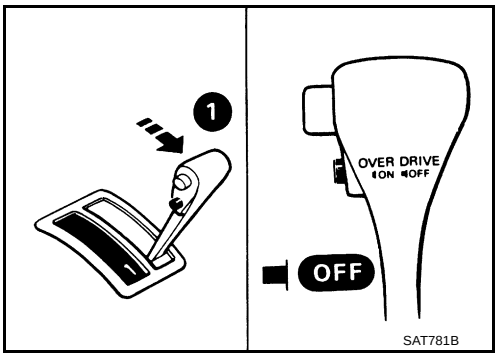
>> GO TO 4.



4. JUDGEMENT PROCEDURE STEP 3

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

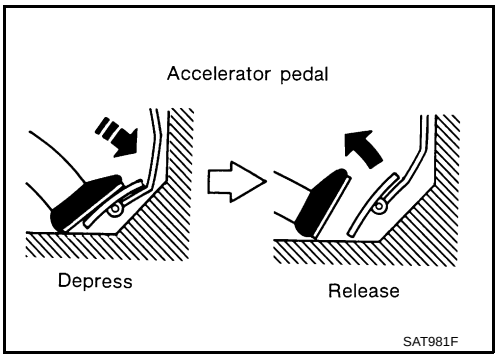
>> GO TO 5.



5. JUDGEMENT PROCEDURE STEP 4

Depress accelerator pedal fully and release it.

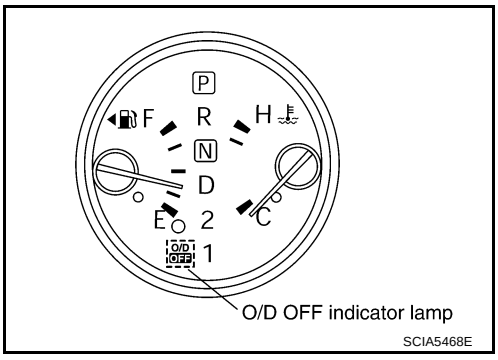
>> GO TO 6.



6. CHECK SELF-DIAGNOSIS CODE

Check O/D OFF indicator lamp. Refer to AT-54, "JUDGEMENT OF SELF-DIAGNOSIS CODE" .

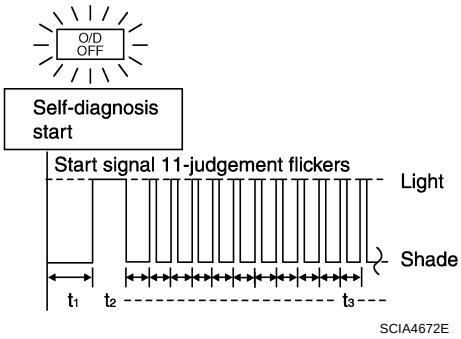
>> **DIAGNOSIS END**



JUDGEMENT OF SELF-DIAGNOSIS CODE

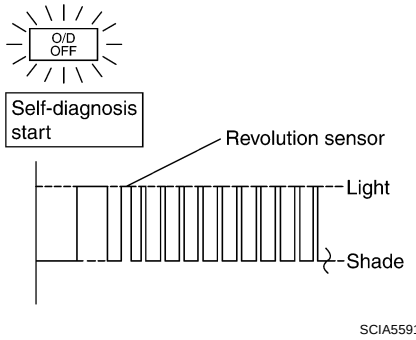
O/D OFF indicator lamp

All judgement flickers are the same.



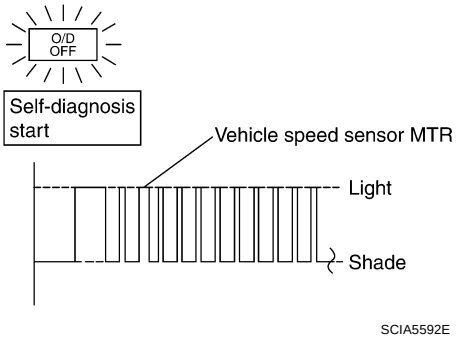
All circuits that can be confirmed by self-diagnosis are OK.

1st judgement flicker is longer than others.



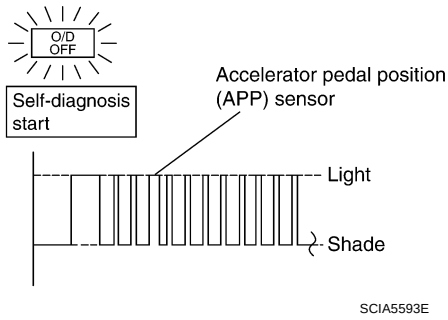
Revolution sensor circuit is short-circuited or disconnected.
⇒ **Go to DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR).**
Refer to AT-112

2nd judgement flicker is longer than others.



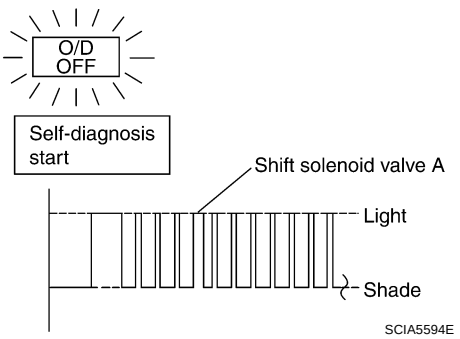
Vehicle speed sensor circuit is short-circuited or disconnected.
⇒ **Go to DTC VEHICLE SPEED SENSOR·MTR.**
Refer to AT-192

3rd judgement flicker is longer than others.



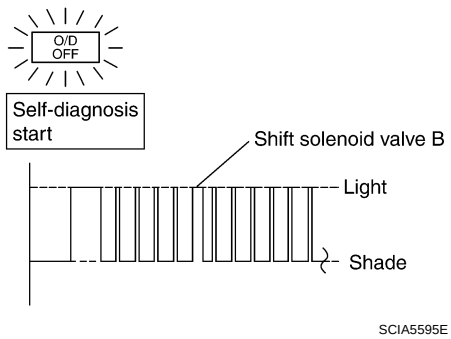
Accelerator pedal position (APP) sensor circuit is short-circuited or disconnected.
⇒ **Go to DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR.**
Refer to AT-173

4th judgement flicker is longer than others.

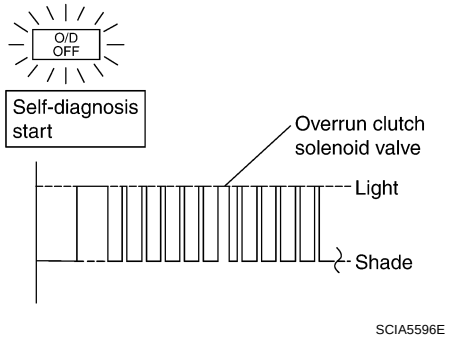
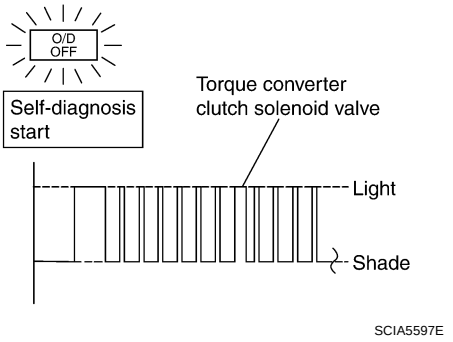
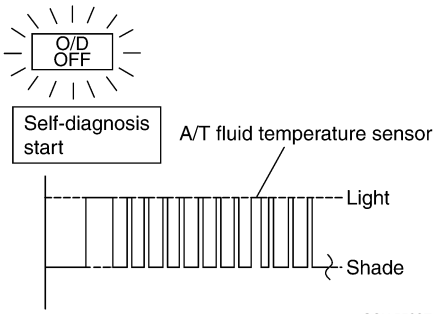
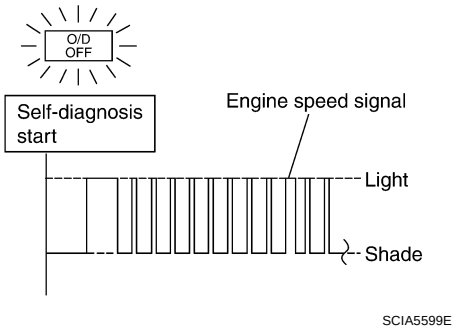


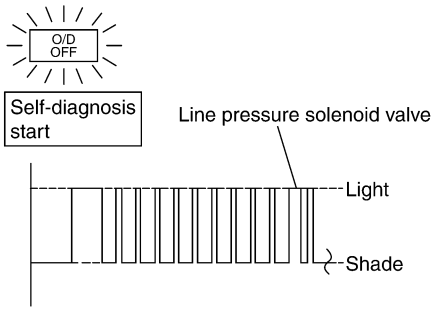
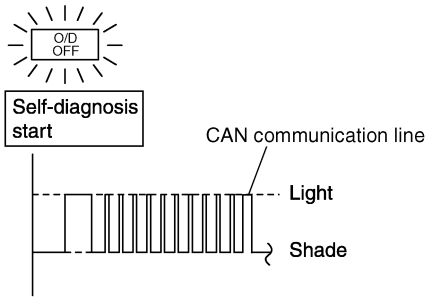
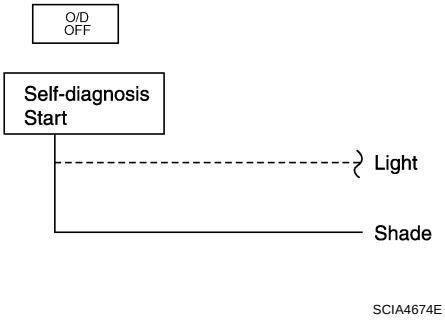
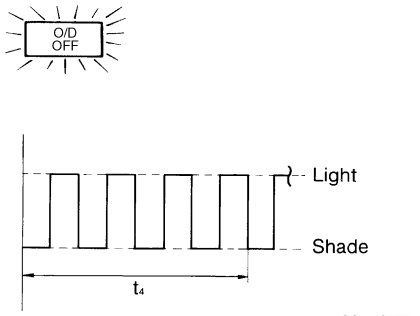
Shift solenoid valve A circuit is short-circuited or disconnected.
⇒ **Go to DTC P0750 SHIFT SOLENOID VALVE A.**
Refer to AT-161

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-167

O/D OFF indicator lamp	
6th judgement flicker is longer than others.  SCIA5596E Overrun clutch solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to DTC P1760 OVERRUN CLUTCH SOLENOID VALVE.** Refer to AT-178	7th judgement flicker is longer than others.  SCIA5597E Torque converter clutch solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE.** Refer to AT-148
8th judgement flicker is longer than others.  SCIA5598E A/T fluid temperature sensor is disconnected or TCM power supply circuit is damaged. ⇒ **Go to DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE).** Refer to AT-184	9th judgement flicker is longer than others.  SCIA5599E Engine speed signal circuit is short-circuited or disconnected. ⇒ **Go to DTC P0725 ENGINE SPEED SIGNAL.** Refer to AT-119

O/D OFF indicator lamp	
10th judgement flicker is longer than others.  SCIA5600E	11th judgement flicker is longer than others.  SCIA4673E
Line pressure solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to DTC P0745 LINE PRESSURE SOLENOID VALVE.** Refer to AT-154	CAN communication line is damaged. ⇒**Go to DTC U1000 CAN COMMUNICATION LINE.** Refer to AT-97
Lamp comes off.  SCIA4674E	Flickers as shown below.  SCIA4675E
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-237	Battery power is low. Battery has been disconnected for a long time. Battery is connected conversely. (When reconnecting TCM connectors.—This is not a malfunction).

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

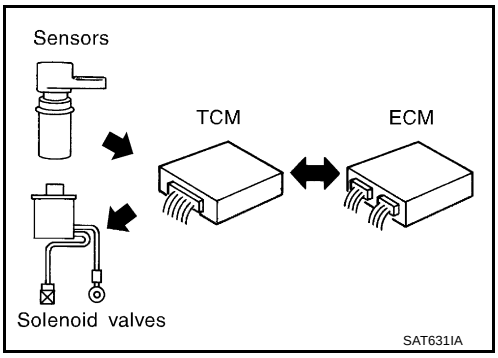
TROUBLE DIAGNOSIS — INTRODUCTION

PFP:00000

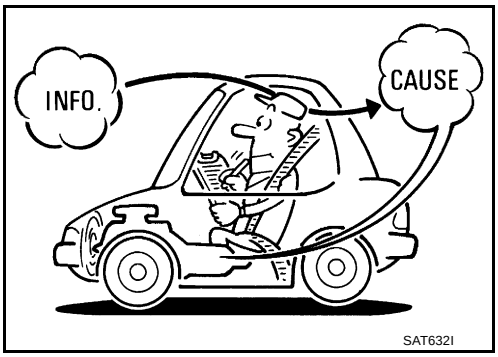
Introduction

ECS004QO

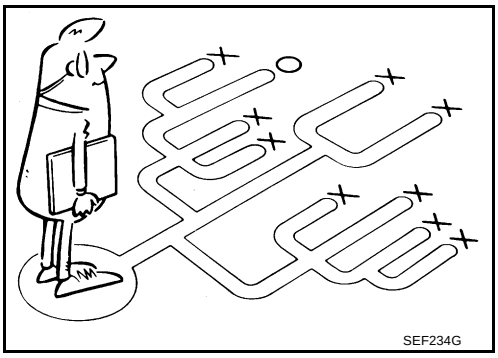
The TCM receives a signal from the vehicle speed sensor, throttle position sensor or PNP switch and provides shift control or lock-up control via A/T solenoid valves.
The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the EURO-OBD related parts of the A/T 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-61, "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-58, "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

Information from Customer

KEY POINTS

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

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

Diagnostic Worksheet

1.	❑ Read the Fail-safe and listen to customer complaints.		AT-58
2.	❑ Check A/T fluid		AT-64
	❑ Leakage (Follow specified procedure) ❑ Fluid condition ❑ Fluid level		
3.	❑ Perform Stall Test and Line Pressure Test.		AT-65, AT-68
	❑ Stall test — Mark possible damaged components/others.		
	❑ Torque converter one-way clutch ❑ Reverse clutch ❑ Forward clutch ❑ Overrun clutch ❑ Forward one-way clutch	❑ Low & reverse brake ❑ Low one-way clutch ❑ Engine ❑ Line pressure is low ❑ Clutches and brakes except high clutch and brake band are OK	
	❑ Line Pressure test — Suspected parts:		
4.	❑ Perform all Road Test and mark required procedures.		AT-70
	4-1. Check before engine is started.		AT-71
	❑ O/D OFF Indicator Lamp Does Not Come On, AT-204 . ❑ SELF-DIAGNOSTIC PROCEDURE/DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE. — Mark detected items.		
	❑ PNP switch, AT-100 . ❑ A/T fluid temperature sensor, AT-106 . ❑ Vehicle speed sensor·A/T (Revolution sensor), AT-112 . ❑ Engine speed signal, AT-119 . ❑ Torque converter clutch solenoid valve, AT-148 . ❑ Line pressure solenoid valve, AT-154 . ❑ Shift solenoid valve A, AT-161 . ❑ Shift solenoid valve B, AT-167 . ❑ Accelerator pedal position (App) sensor, AT-173 . ❑ Overrun clutch solenoid valve, AT-178 . ❑ PNP & overdrive control switches, and throttle position sensor, AT-237 . ❑ Batt/fluid temp sen (A/T fluid temperature sensor and TCM power source), AT-184 . ❑ Vehicle speed sensor·MTR, AT-192 . ❑ CAN communication line, AT-97 . ❑ Control unit (RAM), control unit (ROM), AT-198 . ❑ Control unit (EEP ROM), AT-200 . ❑ Battery ❑ Others		
	4-2. Check at idle		AT-72
	❑ Engine Cannot Be Started In “P” And “N” Position, AT-206 . ❑ In “P” Position, Vehicle Moves Forward Or Backward When Pushed, AT-207 . ❑ In “N” Position, Vehicle Moves, AT-208 . ❑ Large Shock. “N” → “R” Position, AT-209 . ❑ Vehicle Does Not Creep Backward In “R” Position, AT-210 . ❑ Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position, AT-212 .		

4.	4-3.	Cruise test	AT-74 AT-78
		Part-1	
		❏ Vehicle Cannot Be Started From D_1 , AT-214 . ❏ A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$, AT-217 . ❏ A/T Does Not Shift: $D_2 \rightarrow D_3$, AT-220 . ❏ A/T Does Not Shift: $D_3 \rightarrow D_4$, AT-222 . ❏ A/T Does Not Perform Lock-up, AT-224 . ❏ A/T Does Not Hold Lock-up Condition, AT-225 . ❏ Lock-up Is Not Released, AT-227 . ❏ Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$), AT-228 .	
		Part-2	AT-81
		❏ Vehicle Does Not Start From D_1 , AT-230 . ❏ A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$, AT-217 . ❏ A/T Does Not Shift: $D_2 \rightarrow D_3$, AT-220 . ❏ A/T Does Not Shift: $D_3 \rightarrow D_4$, AT-222 .	
		Part-3	AT-82
		❏ A/T Does Not Shift: $D_4 \rightarrow D_3$ When Overdrive Control Switch “ON” → “OFF”, AT-231 . ❏ Engine Speed Does Not Return To Idle (Engine Brake In D_3), AT-228 . ❏ A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever “D” → “2” Position, AT-232 . ❏ Engine Speed Does Not Return To Idle (Engine Brake In 2_2), AT-228 . ❏ A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever “2” → “1” Position, AT-233 . ❏ Vehicle Does Not Decelerate By Engine Brake, AT-235 . ❏ TCM Self-diagnosis Does Not Activate (PNP & Overdrive control switches, and throttle position sensor circuit checks), AT-237 . ❏ SELF-DIAGNOSTIC PROCEDURE/DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE — Mark detected items.	
		❏ PNP switch, AT-100 . ❏ A/T fluid temperature sensor, AT-106 . ❏ Vehicle speed sensor·A/T (Revolution sensor), AT-112 . ❏ Engine speed signal, AT-119 . ❏ Torque converter clutch solenoid valve, AT-148 . ❏ Line pressure solenoid valve, AT-154 . ❏ Shift solenoid valve A, AT-161 . ❏ Shift solenoid valve B, AT-167 . ❏ Accelerator pedal position (App) sensor, AT-173 . ❏ Overrun clutch solenoid valve, AT-178 . ❏ PNP & overdrive control switches, and throttle position sensor, AT-237 . ❏ A/T fluid temperature sensor and TCM power source, AT-184 . ❏ Vehicle speed sensor·MTR, AT-192 . ❏ CAN communication line, AT-97 . ❏ Control unit (RAM), control unit (ROM), AT-198 . ❏ Control unit (EEP ROM), AT-200 . ❏ Battery ❏ Others	
5.	❏ For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.		AT-52
6.	❏ Perform all Road Test and re-mark required procedures.		AT-70
7.	❏ Perform DTC Confirmation Procedure for following MILL indicating items and check out NG items.		EC-52
	❏ DTC (P0731) A/T 1st gear function, AT-125 . ❏ DTC (P0732) A/T 2nd gear function, AT-130 . ❏ DTC (P0733) A/T 3rd gear function, AT-135 . ❏ DTC (P0734) A/T 4th gear function, AT-140 .		
8.	❏ Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.)		AT-85
9.	❏ Erase DTC from TCM and ECM memories.		AT-42

Work Flow

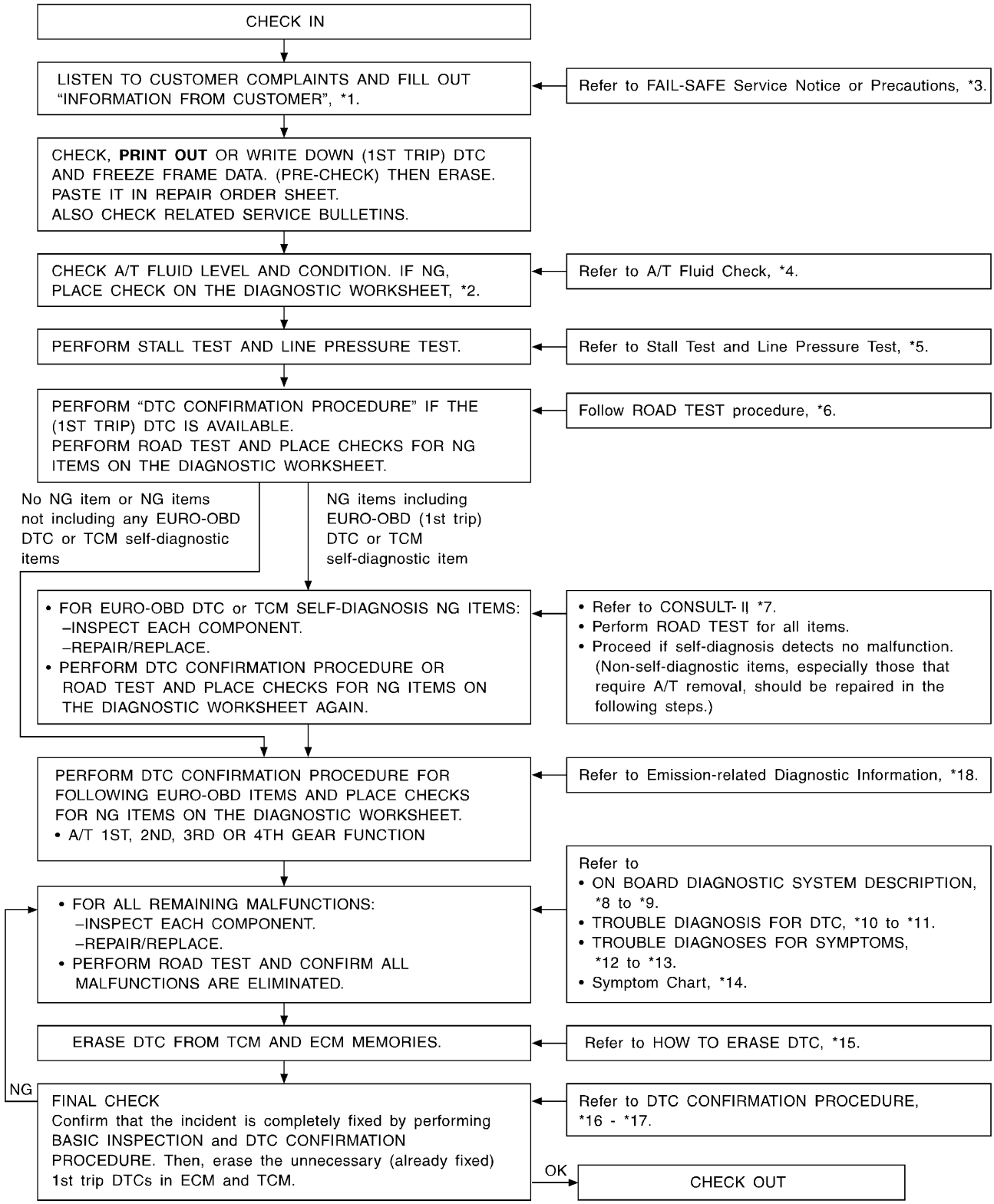
ECS004QP

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-58, "Information from Customer") and “DIAGNOSTIC WORKSHEET” (AT-59, "Diagnostic Worksheet"), to perform the best trouble-shooting possible.

WORK FLOW CHART



SAT183K

*1: AT-58 *2: AT-59 *3: AT-10
*4: AT-64 *5: AT-65 and AT-68 *6: AT-70

*7: AT-44	*8: AT-40	*9: AT-52
*10: AT-100	*11: AT-192 and AT-198 to AT-200	*12: AT-204
*13: AT-235	*14: AT-85	*15: AT-42
*16: AT-100	*17: AT-192 and AT-198 to AT-200	*18: EC-52

TROUBLE DIAGNOSIS — BASIC INSPECTION

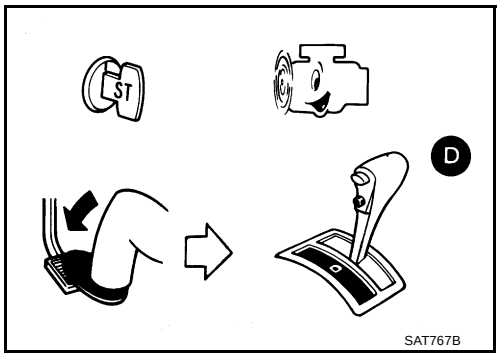
PFP:00000

A/T Fluid Check

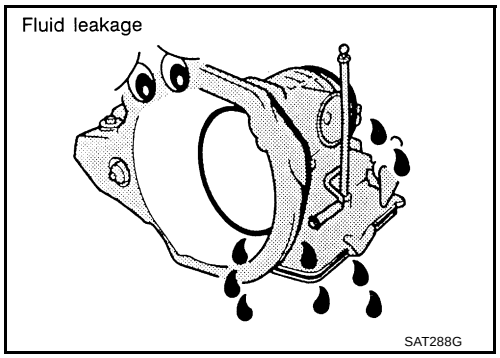
ECS004QQ

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.

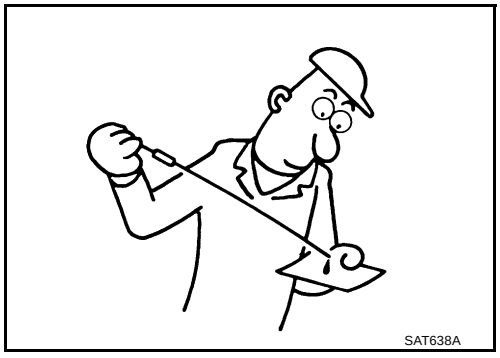


FLUID CONDITION CHECK

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-16, "Checking A/T Fluid" .

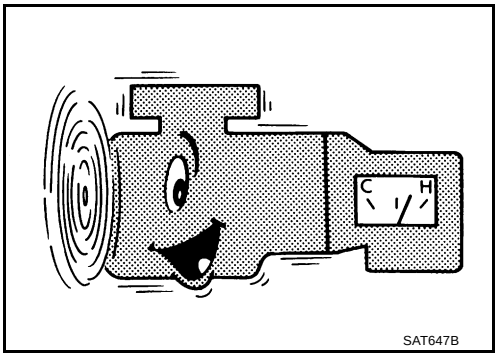


Stall Test

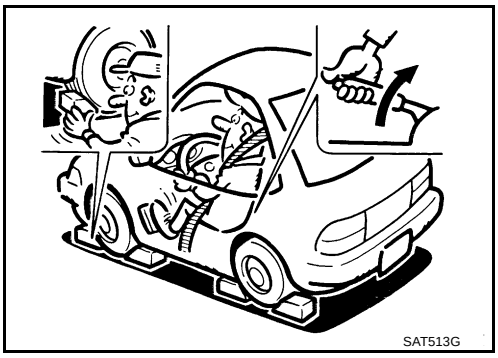
ECS004QR

STALL TEST PROCEDURE

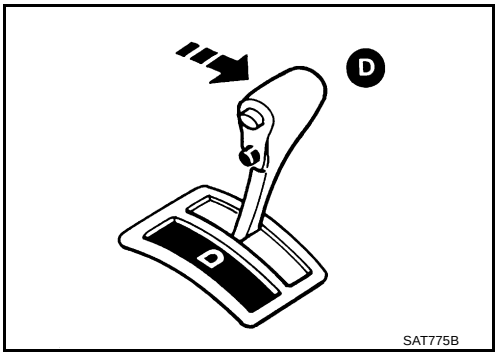
1. Check A/T fluid and engine oil levels. If necessary, add.
2. Drive vehicle for approx. 10 minutes or until fluid and oil reach operating temperature. Refer to AT-16, "Checking A/T Fluid" .



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



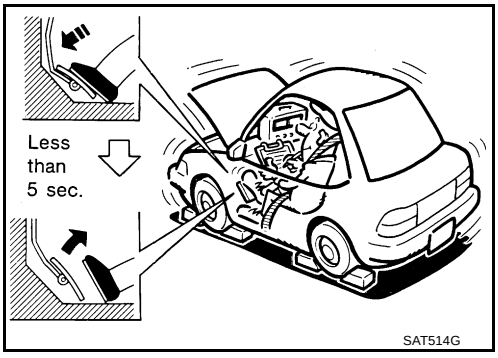
5. Start engine, apply foot brake, and place selector lever in D position.



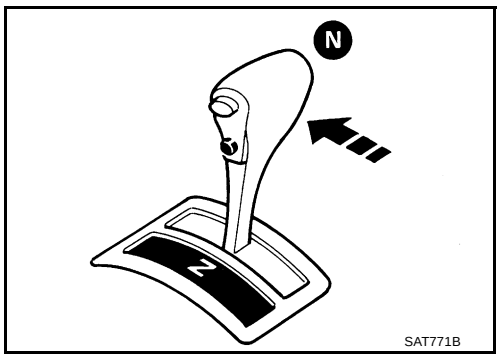
6. Accelerate to wide open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.
   - **During test, never hold throttle wide open for more than 5 seconds.**

Stall revolution:

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-61, "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.

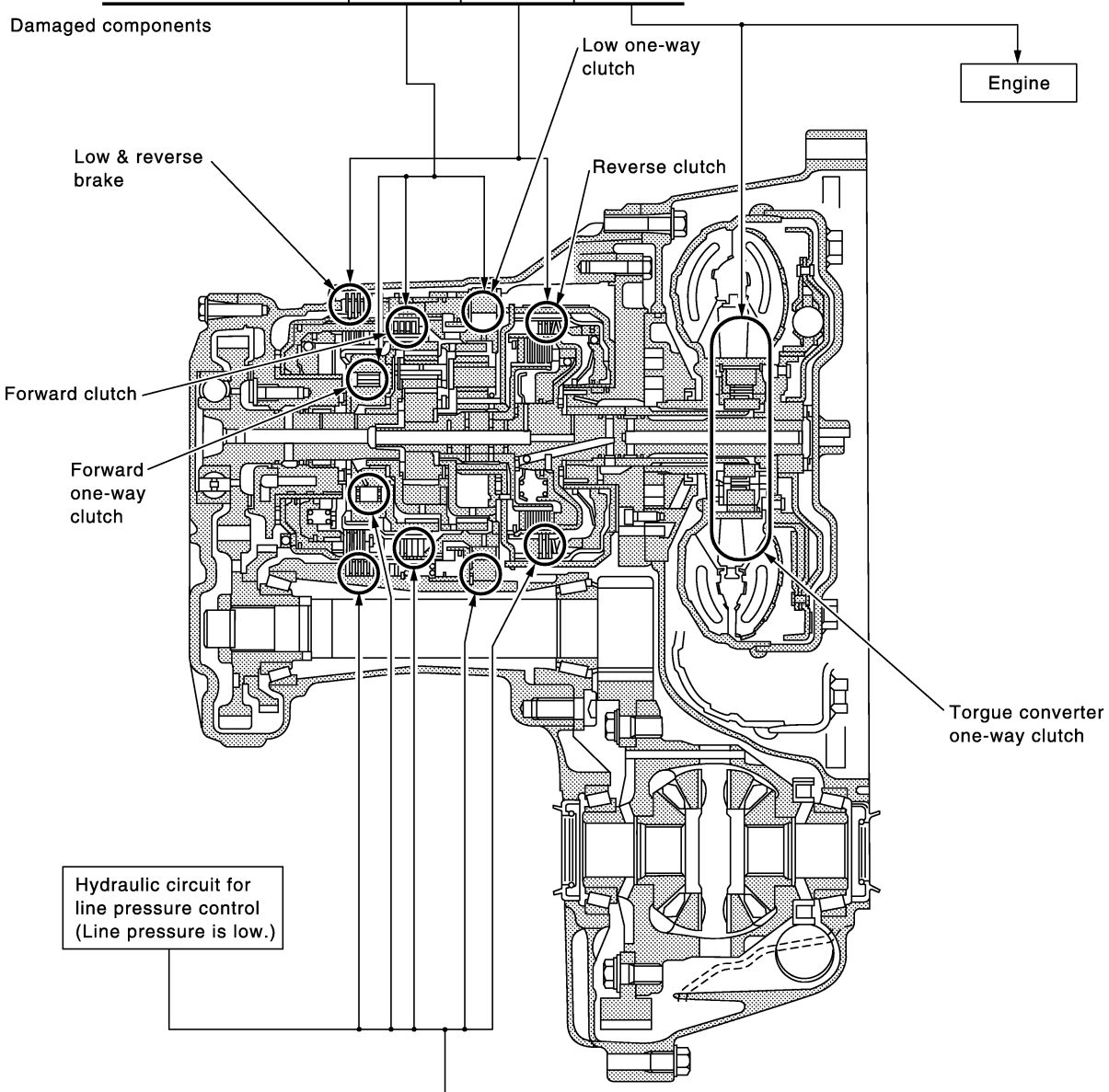
- Slippage occurs in 3rd and 4th gears in D position..... High clutch slippage
- Slippage occurs in 2nd and 4th gear in D position..... Brake band slippage
- Engine brake does not function in 2nd and 3rd gears in D position, 2nd gear in 2 position, and 1st gear in 1 position with overdrive control switch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

Stall revolution less than specifications:

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

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.



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

SCIA0707E

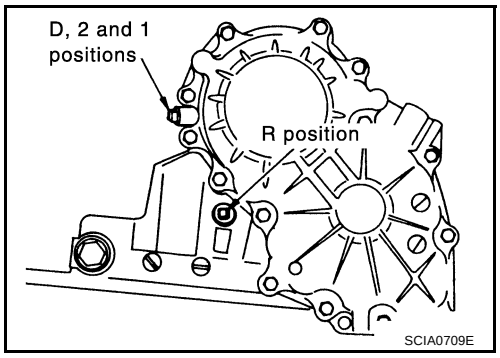
Line Pressure Test

ECS004QS

LINE PRESSURE TEST PORTS

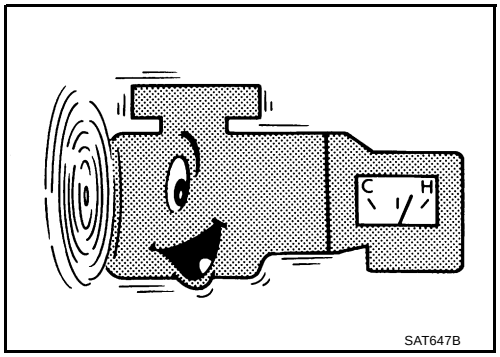
Location of line pressure test ports are shown in the illustration.

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

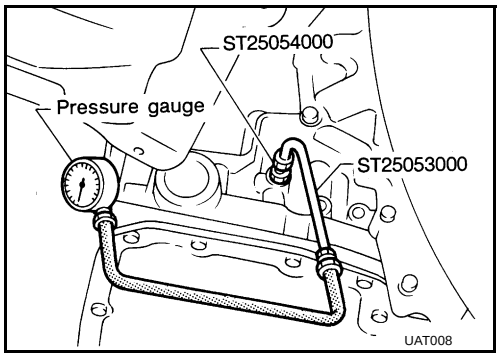


LINE PRESSURE TEST PROCEDURE

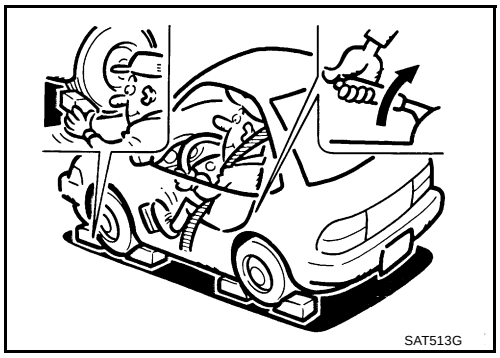
1. Check A/T fluid and engine oil levels. If necessary, add fluid or oil.
2. Drive vehicle for approx. 10 minutes or until engine oil and ATF reach operating temperature. Refer to AT-16, "Checking A/T Fluid" .



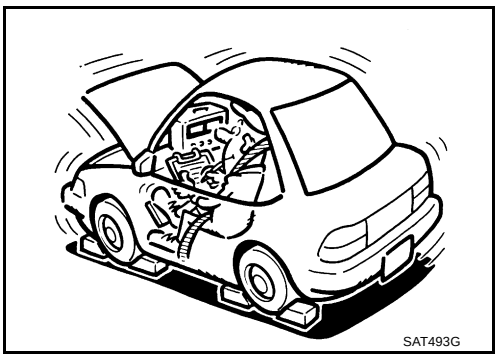
3. Install pressure gauge to corresponding line pressure port.



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

Check lock-up hold.	Line pressure kPa (bar, kg/cm^2 , psi)	
	"D", "2" and "1" positions	"R" position
Idle	500 (5.00, 5.1, 73)	778 (7.78, 7.9, 113)
Stall	1,233 (12.33, 12.6, 179)	1,918 (19.18, 19.6, 278)

JUDGEMENT OF LINE PRESSURE TEST

Judgement		Suspected parts
At idle	Line pressure is low in all positions.	● Oil pump wear ● Control piston damage ● Pressure regulator valve or plug sticking ● Spring for pressure regulator valve damaged ● Fluid pressure leakage between oil strainer and pressure regulator valve ● Clogged strainer
	Line pressure is low in particular position.	● Fluid pressure leakage between manual valve and particular clutch ● For example, line pressure is: – Low in "R" and "1" positions, but – Normal in "D" and "2" positions. Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to AT-23 .
	Line pressure is high.	● Maladjustment of throttle position sensor ● A/T fluid temperature sensor damaged ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure modifier valve sticking ● Pressure regulator valve or plug sticking ● Open in dropping resistor circuit
At stall speed	Line pressure is low.	● Maladjustment of throttle position sensor ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure regulator valve or plug sticking ● Pressure modifier valve sticking ● Pilot valve sticking

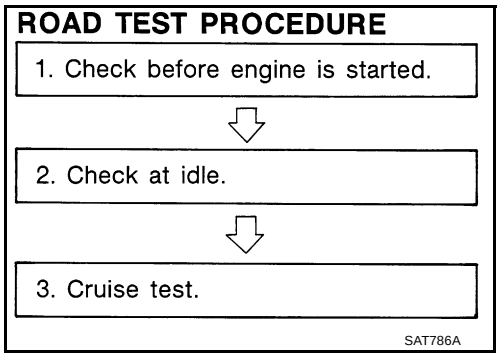
Road Test

ECS004QT

DESCRIPTION

- The purpose of the test is to determine overall performance of A/T and analyze causes of problems.
- The road test consists of the following three parts:

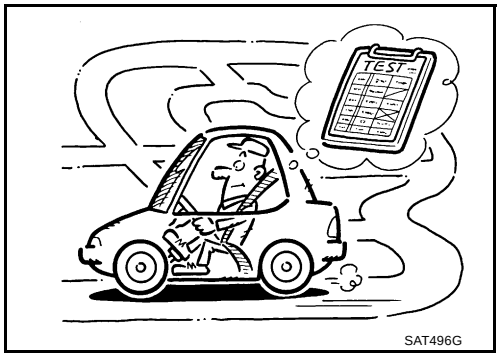
1. Check before engine is started
2. Check at idle



3. Cruise test

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

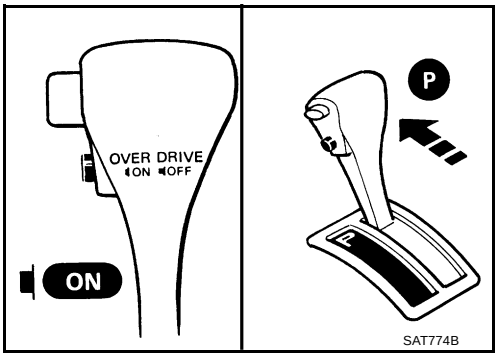
	ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION	TROUBLE DIAGNOSES FOR SYMPTOMS
EURO-OBD	AT-40 to AT-52	AT-204 to AT-237



1. CHECK BEFORE ENGINE IS STARTED

1. CHECK O/D OFF INDICATOR LAMP

1. Park vehicle on flat surface.
2. Move selector lever to “P” position.
3. Turn ignition switch OFF. Wait at least 5 seconds.

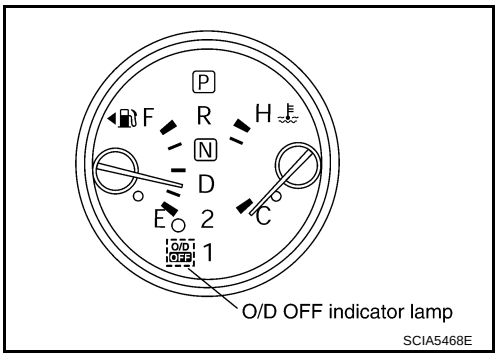


4. Turn ignition switch ON. (Do not start engine.)

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

YES >> 1. Turn ignition switch OFF.
2. Perform self-diagnosis and note NG items.
Refer to AT-45, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" , AT-52, "Diagnostic Procedure Without CONSULT-II" .
3. Go to AT-72, "2. CHECK AT IDLE" .

NO >> Stop “Road Test”. Go to AT-204, "O/D OFF Indicator Lamp Does Not Come On" .



2. CHECK AT IDLE

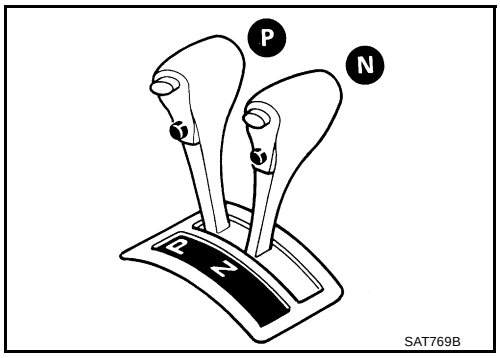
1. CHECK ENGINE START

1. Park vehicle on flat surface.
2. Turn ignition switch ON. (Do not start engine.)
3. Move selector lever to “P” or “N” position.
4. Turn ignition switch START position.

Is engine started?

YES >> GO TO 2.

NO >>
- Stop “Road Test”. Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-206, "Engine Cannot Be Started In “P” and “N” Position" .



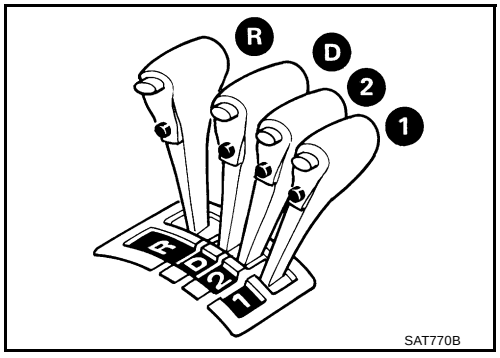
2. CHECK ENGINE START

1. Turn ignition switch ON. (Do not start engine.)
2. Move selector lever to “R”, “D”, “2” or “1” position.
3. Turn ignition switch START position.

Is engine started?

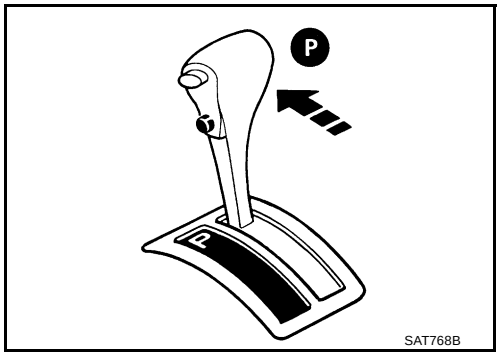
YES >>
- Stop “Road Test”. Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-206, "Engine Cannot Be Started In “P” and “N” Position" .
- Continue “Road Test”.

NO >> GO TO 3.



3. CHECK VEHICLE MOVE

1. Move selector lever to “P” position.
2. Turn ignition switch OFF.
3. Release parking brake.

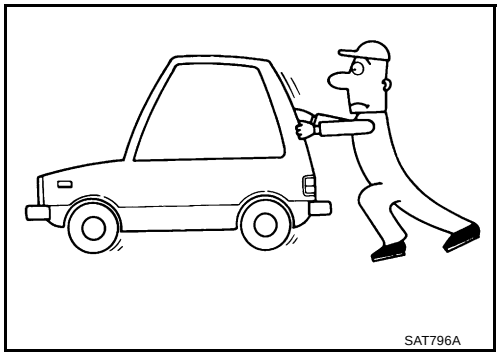


4. Push vehicle forward or backward.

Does vehicle move when it is pushed forward or backyard?

YES >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-207, "In “P” Position, Vehicle Moves Forward Or Backward When Pushed" .
- Continue “Road Test”.

NO >> GO TO 4.



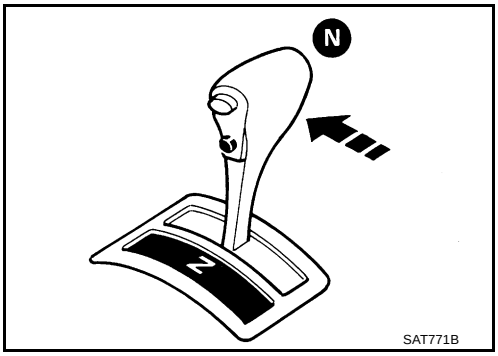
4. CHECK VEHICLE MOVE

1. Apply parking brake.
2. Start engine.
3. Move selector lever to “N” position.
4. Release parking brake.

Does vehicle move forward or backward?

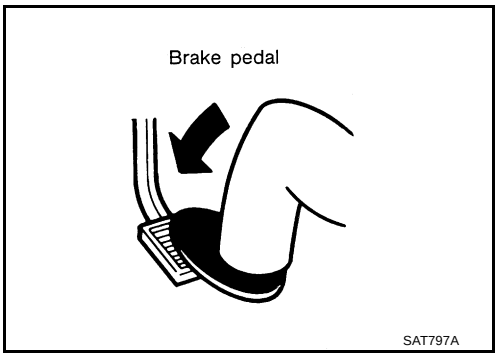
YES >> ● Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
● GO TO AT-208, "In “N” Position, Vehicle Moves" .
● Continue “Road Test”.

NO >> GO TO 5.



5. CHECK SHIFT SHOCK

1. Apply foot brake.

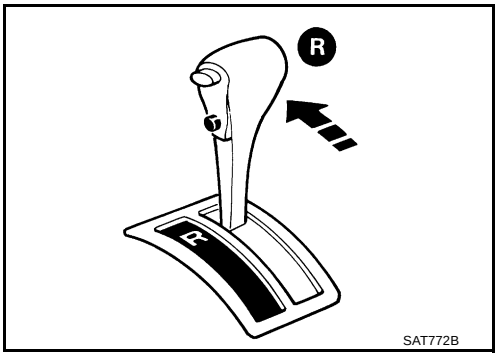


2. Move selector lever to “R” position.

Is there large shock when changing from “N” to “R” position?

YES >> ● Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
● GO TO AT-209, "Large Shock. “N” → “R” Position" .
● Continue “Road Test”.

NO >> GO TO 6.



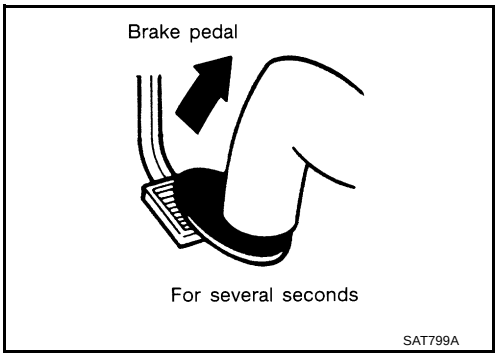
6. CHECK VEHICLE MOVE

Release foot brake for several seconds.

Does vehicle creep backward when foot brake is released?

YES >> GO TO 7.

NO >> ● Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
● GO TO AT-210, "Vehicle Does Not Creep Backward In “R” Position" .
● Continue “Road Test”.



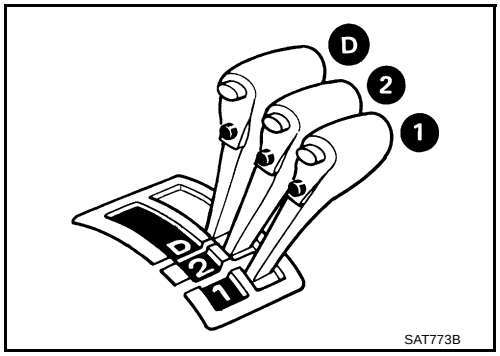
7. CHECK VEHICLE MOVE

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

Does vehicle creep forward in all three positions?

YES >> Go to AT-74, "3. CRUISE TEST" .

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-212, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" .
- Continue “Road Test”.

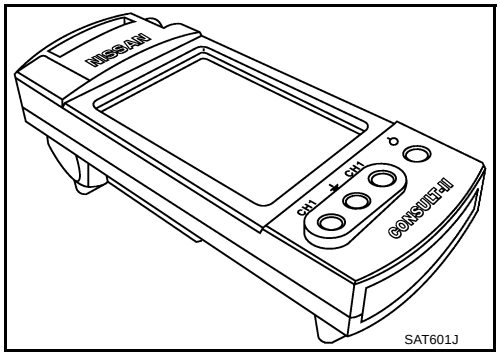


3. CRUISE TEST

- Check all items listed in Parts 1 through 3.

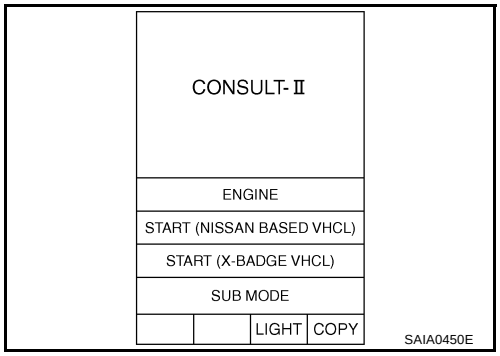
With CONSULT-II

- 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.

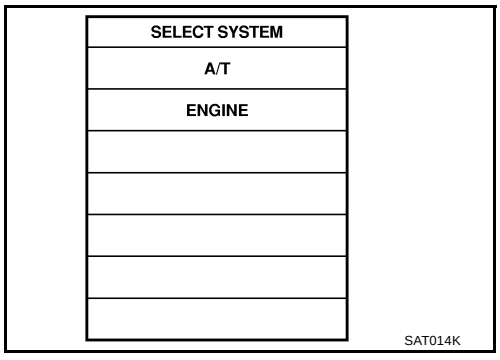


CONSULT-II Setting Procedure

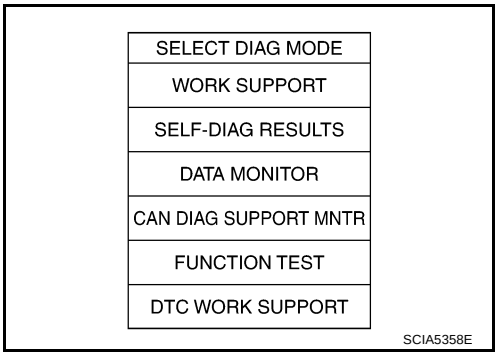
1. Turn ignition switch ON. (Do not start engine.)
2. Touch “START (NISSAN BASED VHCL)”.



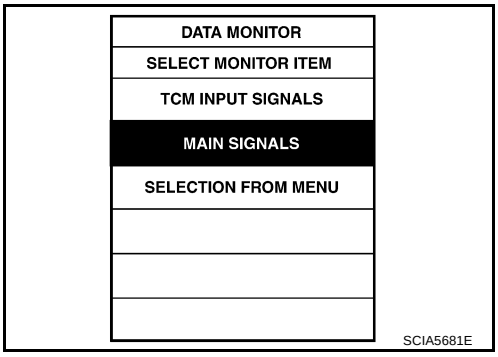
3. Touch “A/T”.
   If “A/T” is not indicated, go to GI-35, "CONSULT-II Data Link Connector (DLC) Circuit" .



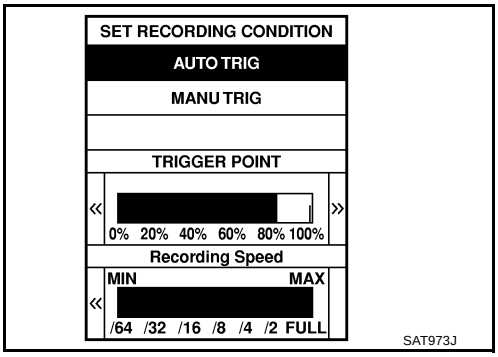
4. Touch “DATA MONITOR”.



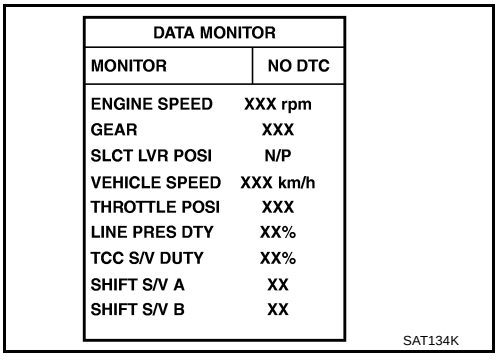
5. Touch “MAIN SIGNALS” or “TCM INPUT SIGNALS”.
6. Select “Numerical Display”, “Barchart Display” or “Line Graph Display”.



7. Touch “SETTING” to recording condition (“AUTO TRIG” or “MANU TRIG”) and touch “BACK”.
8. Touch “Start”.



9. When performing cruise test, touch “RECORD”.



10. 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

11. Touch “STORE” and touch “BACK”.

REAL-TIME DIAG
ENG SPEED SIG

SAT987J

STORE	
SYSTEM	SAVE REC DATA

SAT974J

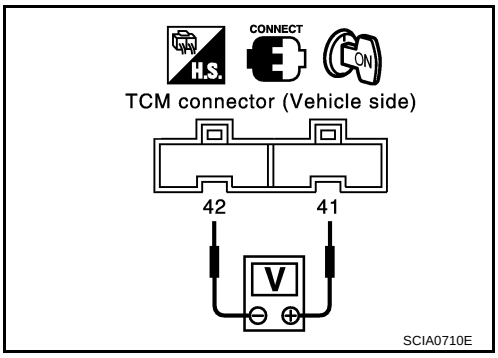
12. Touch “DISPLAY”.
13. Touch “PRINT”.
14. Check the monitor data printed out.
15. Continue cruise test part 2 and 3.

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

SAT975J

Without CONSULT-II

- Accelerator pedal position (APP) sensor can be checked by voltage across terminals 41 and 42 of TCM.



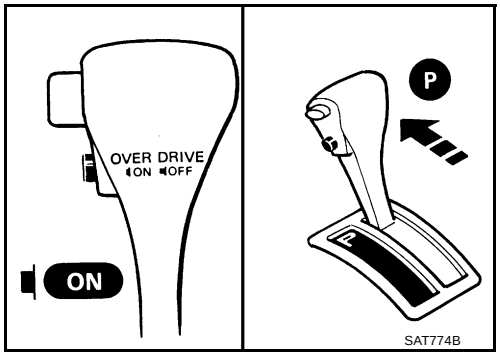
Cruise Test — Part 1

1. CHECK STARTING GEAR (D_1) POSITION

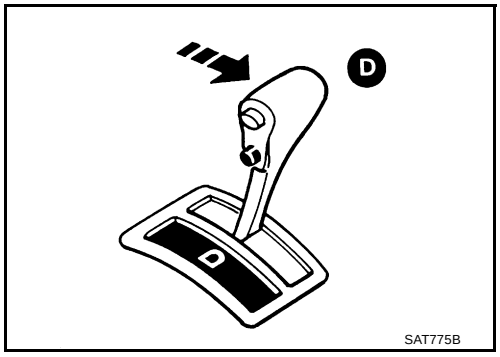
1. Drive vehicle for approximately 10 minutes to warm engine oil and ATF up to operating temperature.

   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.



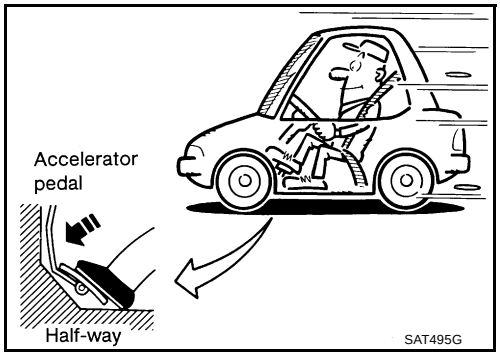
7. Accelerate vehicle by constantly depressing accelerator pedal half-way.

   Read gear position. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

Does vehicle start from D_1 ?

YES >> GO TO 2.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-214, "Vehicle Cannot Be Started From D_1" .
- Continue “Road Test”.



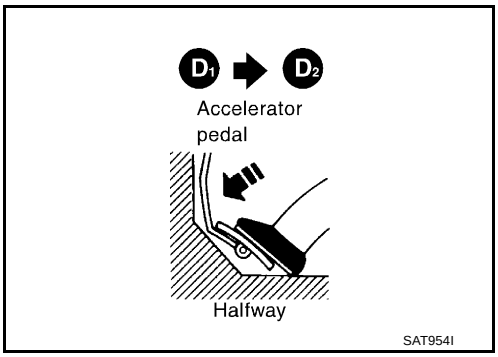
2. CHECK SHIFT-UP (D_1 TO D_2)

Check shift-up (D_1 to D_2).
Specified speed when shifting from D_1 to D_2. Refer to AT-530, "VEHICLE SPEED WHEN SHIFTING GEARS AND THROTTLE POSITION" .

Read gear position, throttle opening and vehicle speed. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

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

YES >> GO TO 3.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-217, "A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$" .
- Continue “Road Test”.



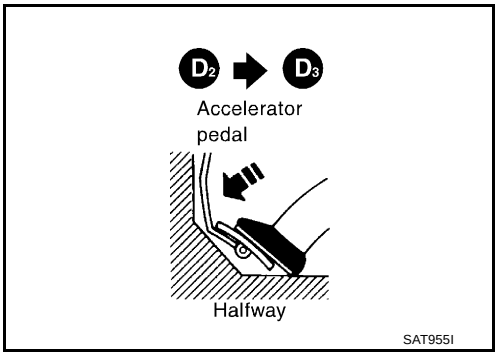
3. CHECK SHIFT-UP (D_2 TO D_3)

Check shift-up (D_2 to D_3).
Specified speed when shifting from D_2 to D_3. Refer to AT-530, "VEHICLE SPEED WHEN SHIFTING GEARS AND THROTTLE POSITION" .

Read gear position, throttle opening and vehicle speed. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

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

YES >> GO TO 4.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-220, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .
- Continue “Road Test”.



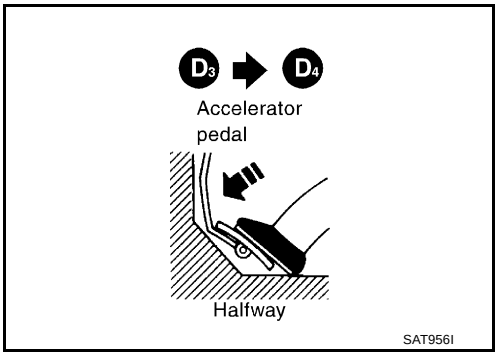
4. CHECK SHIFT-UP (D_3 TO D_4)

Check shift-up (D_3 to D_4).
Specified speed when shifting from D_3 to D_4. Refer to AT-530, "VEHICLE SPEED WHEN SHIFTING GEARS AND THROTTLE POSITION" .

Read gear position, throttle opening and vehicle speed. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

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

YES >> GO TO 5.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-222, "A/T Does Not Shift: $D_3 \rightarrow D_4$" .
- Continue “Road Test”.



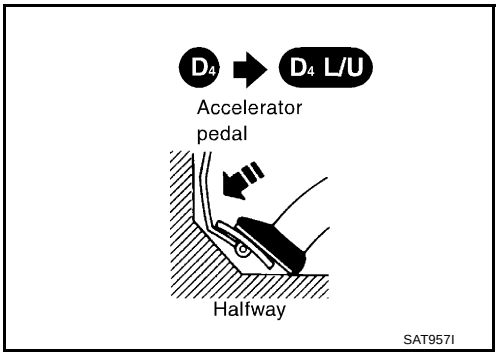
5. CHECK LOCK-UP (D4 TO D4 L/U)

Check lock-up (D4 to D4 L/U).
Specified speed when lock-up occurs. Refer to AT-530, "VEHICLE SPEED WHEN PERFORMING LOCK-UP" .

Read vehicle speed, throttle opening when lock-up duty becomes 94%. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

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

YES >> GO TO 6.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-224, "A/T Does Not Perform Lock-up" .
- Continue “Road Test”.



6. CHECK LOCK-UP HOLD

Check lock-up hold.

When lock-up duty becomes 94%. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

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

YES >> GO TO 7.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-225, "A/T Does Not Hold Lock-up Condition" .
- Continue “Road Test”.

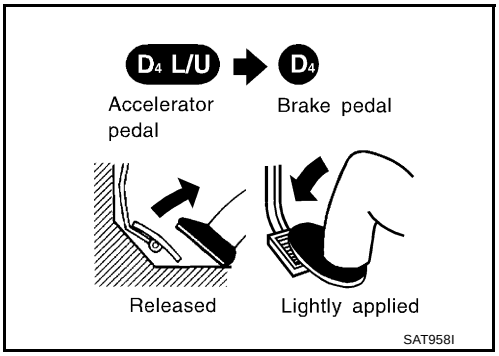
7. CHECK SHIFT-DOWN (D4 L/U TO D4)

Release accelerator pedal.

When lock-up duty becomes 4%. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

Is lock-up released when accelerator pedal is released?

YES >> GO TO 8.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-227, "Lock-up Is Not Released" .
- Continue “Road Test”.



8. CHECK SHIFT-DOWN (D4 TO D3)

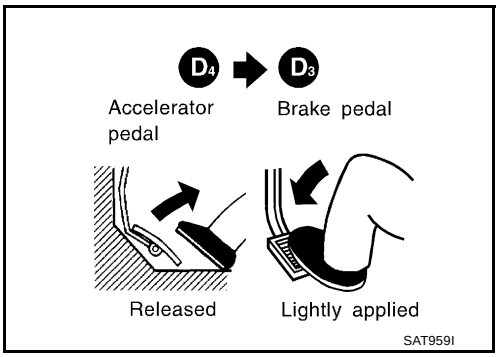
Decelerate vehicle by applying foot brake lightly.

Read gear position and engine speed. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

Does engine speed return to idle smoothly when A/T is shifted from D4 to D3 ?

YES >>
1. Stop vehicle.
2. Go to AT-81, "Cruise Test — Part 2" .

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-228, "Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" .
- Continue “Road Test”.



Cruise Test — Part 2

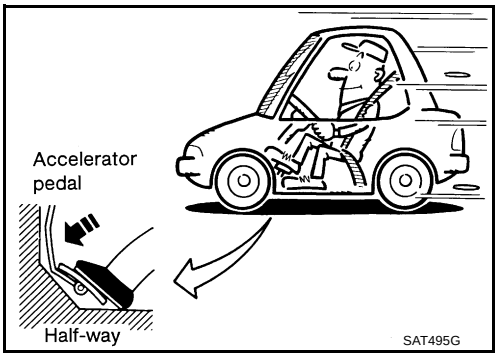
1. CHECK STARTING GEAR (D_1) POSITION

1. Confirm gear selector lever is in “D” position.
2. Accelerate vehicle by half throttle again.

Read gear position. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

Does vehicle start from D_1 ?

YES >> GO TO 2.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-230, "Vehicle Does Not Start From D_1" .
- Continue “Road Test”.



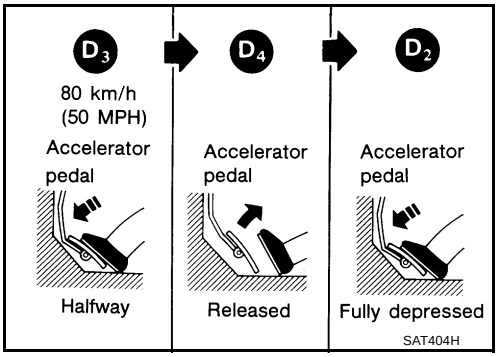
2. CHECK SHIFT-UP AND SHIFT-DOWN (D_3 TO D_4 TO D_2)

1. Accelerate vehicle to 80 km/h (50 MPH) as shown in the figure.
2. Release accelerator pedal and then quickly depress it fully.

Read gear position and throttle opening. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

Does A/T shift from D_4 to D_2 as soon as accelerator pedal is depressed fully?

YES >> GO TO 3.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-217, "A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$" .
- Continue “Road Test”.



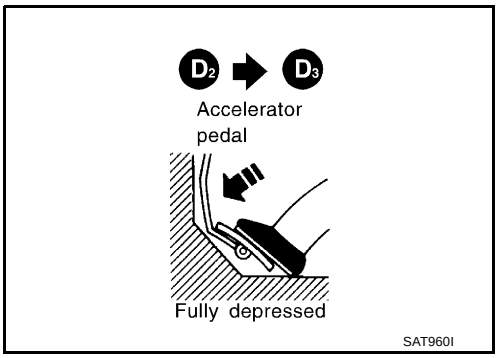
3. CHECK SHIFT-UP (D_2 TO D_3)

Check shift-up (D_2 to D_3)
Specified speed when shifting from D_2 to D_3 . Refer to AT-530, "VEHICLE SPEED WHEN SHIFTING GEARS AND THROTTLE POSITION" .

Read gear position, throttle opening and vehicle speed. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

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

YES >> GO TO 4.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-220, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .
- Continue “Road Test”.



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

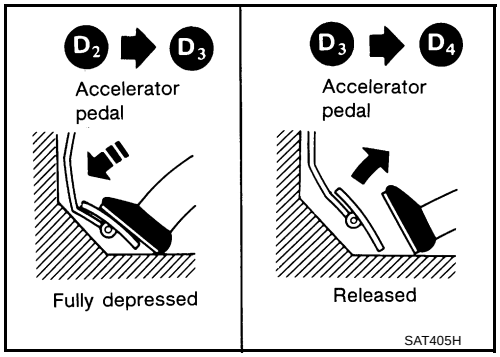
Release accelerator pedal after shifting from D_2 to D_3.

Read gear position, throttle opening and vehicle speed. Refer to AT-46, "DATA MONITOR MODE (A/T)".

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

YES >> 1. Stop vehicle.
2. Go to AT-82, "Cruise Test — Part 3".

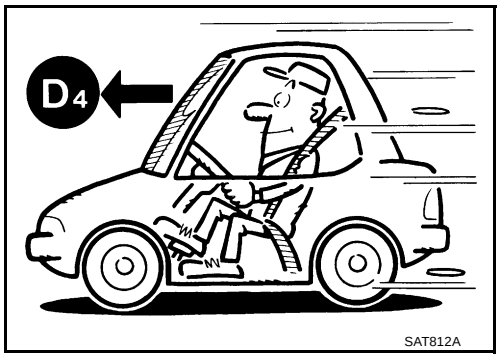
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58.
- GO TO AT-222, "A/T Does Not Shift: $D_3 \rightarrow D_4$".
- Continue “Road Test”.



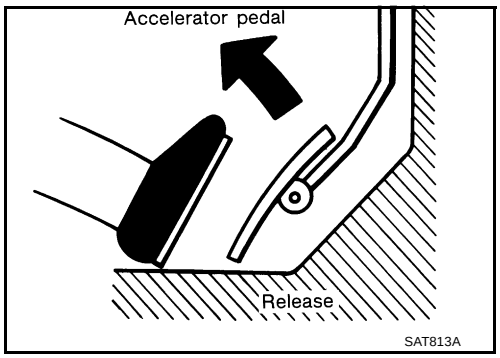
Cruise Test — Part 3

1. CHECK SHIFT-DOWN (D_4 TO 3_3)

1. Confirm overdrive control switch is ON position.
2. Confirm gear selector lever is in “D” position.
3. Accelerate vehicle using half-throttle to D_4.



4. Release accelerator pedal.



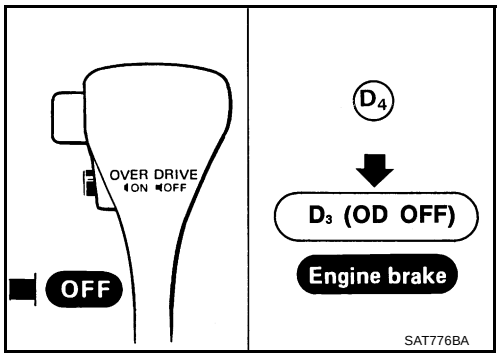
5. Set overdrive control switch to OFF position while driving in D_4.

Read gear position and vehicle speed. Refer to AT-46, "DATA MONITOR MODE (A/T)".

Does A/T shift from D_4 to D_3 (O/D OFF)?

YES >> GO TO 2.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58.
- GO TO AT-231, "A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch “ON” → “OFF”"".
- Continue “Road Test”.



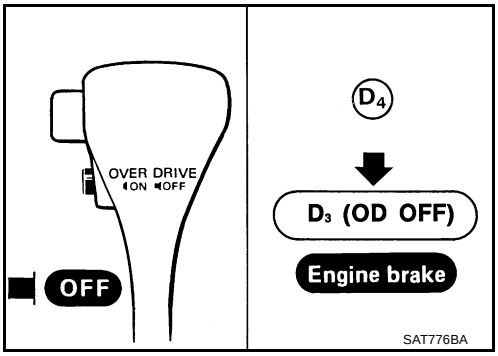
2. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 3.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-235, "Vehicle Does Not Decelerate By Engine Brake" .
- Continue “Road Test”.



3. CHECK SHIFT-DOWN (D_3 TO 2_2)

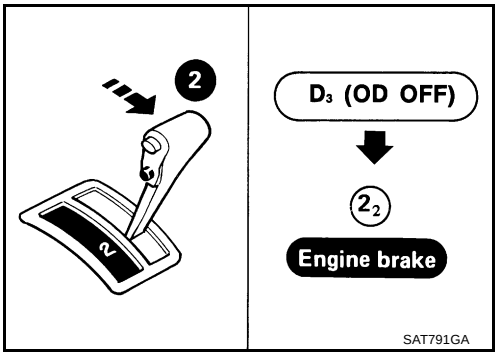
Move selector lever from “D” to “2” position while driving in D_3 (O/D OFF).

Read gear position. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

Does A/T shift from D_3 (O/D OFF) to 2_2 ?

YES >> GO TO 4.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-232, "A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever “D” → “2” Position" .
- Continue “Road Test”.



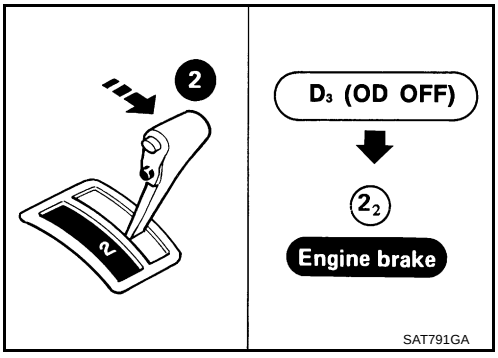
4. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 5.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-235, "Vehicle Does Not Decelerate By Engine Brake" .
- Continue “Road Test”.



5. CHECK SHIFT-DOWN (2_2 TO 1_1)

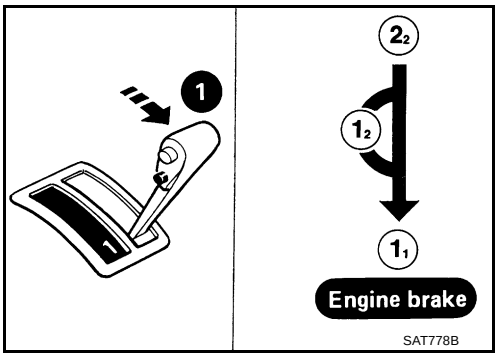
Move selector lever from “2” to “1” position while driving in 2_2 .

Read gear position. Refer to AT-46, "DATA MONITOR MODE (A/T)" .

Does A/T shift from 2_2 to 1_1 position?

YES >> GO TO 6.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-233, "A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever “2” → “1” Position" .
- Continue “Road Test”.



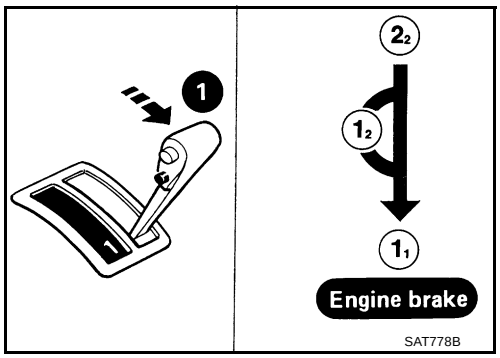
6. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> 1. Stop vehicle.
2. Perform self-diagnosis. Refer to AT-45, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" , AT-52, "Diagnostic Procedure Without CONSULT-II" .

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-58 .
- GO TO AT-235, "Vehicle Does Not Decelerate By Engine Brake" .
- Stop “Road Test”.



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
Engine cannot start in “P” and “N” positions. AT-206	ON vehicle	1. Ignition switch and starter	PG-2, SC-21
		2. Control cable adjustment	AT-409
		3. PNP switch	AT-100
Engine starts in position other than “N” and “P” positions. AT-206	ON vehicle	1. Control cable adjustment	AT-409
		2. PNP switch	AT-100
Transaxle noise in “P” and “N” positions.	ON vehicle	1. Fluid level	AT-64
		2. Line pressure test	AT-68
		3. Accelerator pedal position (APP) sensor	AT-173
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-112, AT-192
	OFF vehicle	5. Oil pump	AT-443
		6. Torque converter	AT-423
Vehicle moves when changing into “P” position, or parking gear does not disengage when shifted out of “P” position. AT-207	ON vehicle	1. Control cable adjustment	AT-409
	OFF vehicle	2. Parking components	AT-416, AT-440
Vehicle runs in “N” position. AT-208	ON vehicle	1. Control cable adjustment	AT-409
	OFF vehicle	2. Forward clutch	AT-475
		3. Reverse clutch	AT-464
		4. Overrun clutch	AT-475
Vehicle will not run in “R” position (but runs in “D”, “2” and “1” positions). Clutch slips. Very poor acceleration. AT-210	ON vehicle	1. Control cable adjustment	AT-409
		2. Stall test	AT-65
		3. Line pressure test	AT-68
		4. Line pressure solenoid valve	AT-154
		5. Control valve assembly	AT-404
Vehicle will not run in “R” position (but runs in “D”, “2” and “1” positions). Clutch slips. Very poor acceleration. AT-210	OFF vehicle	6. Reverse clutch	AT-464
		7. High clutch	AT-469
		8. Forward clutch	AT-475
		9. Overrun clutch	AT-475
		10. Low & reverse brake	AT-483
Vehicle braked when shifting into “R” position.	ON vehicle	1. Fluid level	AT-64
		2. Line pressure test	AT-68
		3. Line pressure solenoid valve	AT-154
		4. Control valve assembly	AT-404
	OFF vehicle	5. High clutch	AT-469
		6. Brake band	AT-497
		7. Forward clutch	AT-475
		8. Overrun clutch	AT-475

Symptom	Condition	Diagnostic Item	Reference Page
Sharp shock in shifting from “N” to “D” position.	ON vehicle	1. Engine idling rpm	EC-44
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Line pressure test	AT-68
		4. A/T fluid temperature sensor	AT-184
		5. Engine speed signal	AT-119
		6. Line pressure solenoid valve	AT-154
		7. Control valve assembly	AT-404
		8. Accumulator N-D	AT-404
	OFF vehicle	9. Forward clutch	AT-475
Vehicle will not run in “D” and “2” positions (but runs in “1” and “R” positions).	ON vehicle	1. Control cable adjustment	AT-409
	OFF vehicle	2. Low one-way clutch	AT-416, AT-423
Vehicle will not run in “D”, “1”, “2” positions (but runs in “R” position). Clutch slips. Very poor acceleration. AT-212	ON vehicle	1. Fluid level	AT-64
		2. Stall test	AT-65
		3. Line pressure test	AT-68
		4. Line pressure solenoid valve	AT-154
		5. Control valve assembly	AT-404
		6. Accumulator N-D	AT-404
Vehicle will not run in “D”, “1”, “2” positions (but runs in “R” position). Clutch slips. Very poor acceleration. AT-212	OFF vehicle	7. Reverse clutch	AT-464
		8. High clutch	AT-469
		9. Forward clutch	AT-475
		10. Forward one-way clutch	AT-416
		11. Low one-way clutch	AT-416, AT-423
Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-64
		2. Control cable adjustment	AT-409
		3. Accelerator pedal position (APP) sensor	AT-173
		4. Line pressure test	AT-68
		5. Line pressure solenoid valve	AT-154
		6. Control valve assembly	AT-404
		7. Accumulator N-D	AT-404
		8. Shift solenoid valve A	AT-161
		9. Shift solenoid valve B	AT-167
		10. Overrun clutch solenoid valve	AT-178
		11. Torque converter clutch solenoid valve	AT-148
	OFF vehicle	12. Forward clutch	AT-475
		13. Reverse clutch	AT-464
		14. Low & reverse brake	AT-483
		15. Oil pump	AT-443
		16. Torque converter	AT-423
Excessive creep.	ON vehicle	1. Engine idling rpm	EC-44

Symptom	Condition	Diagnostic Item	Reference Page
No creep at all. AT-210 and AT-212	ON vehicle	1. Fluid level	AT-64
		2. Line pressure test	AT-387
		3. Control valve assembly	AT-404
	OFF vehicle	4. Forward clutch	AT-475
		5. Oil pump	AT-443
		6. Torque converter	AT-423
Failure to change gear from “D_1 ” to “D_2 ”.	ON vehicle	1. Control cable adjustment	AT-409
		2. Shift solenoid valve A	AT-161
		3. Control valve assembly	AT-404
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-112, AT-192
		5. Accelerator pedal position (APP) sensor	AT-173
	OFF vehicle	6. Brake band	AT-497
Failure to change gear from “D_2 ” to “D_3 ”.	ON vehicle	1. Control cable adjustment	AT-409
		2. Shift solenoid valve B	AT-167
		3. Control valve assembly	AT-404
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-112, AT-192
		5. Accelerator pedal position (APP) sensor	AT-173
	OFF vehicle	6. High clutch	AT-469
		7. Brake band	AT-497
Failure to change gear from “D_3 ” to “D_4 ”.	ON vehicle	1. PNP switch	AT-100
		2. Overdrive control switch	AT-237
		3. Shift solenoid valve A	AT-161
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-112, AT-192
		5. A/T fluid temperature sensor	AT-184
	OFF vehicle	6. Brake band	AT-497
Too high a gear change point from “D_1 ” to “D_2 ”, from “D_2 ” to “D_3 ”, from “D_3 ” to “D_4 ”. AT-217, AT-220 and AT-222	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-173
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-112, AT-192
		3. Shift solenoid valve A	AT-161
		4. Shift solenoid valve B	AT-167
Gear change directly from “D_1 ” to “D_3 ” occurs.	ON vehicle	1. Fluid level	AT-64
		2. Accumulator servo release	AT-404
	OFF vehicle	3. Brake band	AT-497
Engine stops when shifting lever into “R”, “D”, “2” and “1”.	ON vehicle	1. Engine idling rpm	EC-44
		2. Fluid level	AT-64
		3. Torque converter clutch solenoid valve	AT-148
		4. Control valve assembly	AT-404
	OFF vehicle	5. Torque converter	AT-423

Symptom	Condition	Diagnostic Item	Reference Page
Too sharp a shock in change from “D_1 ” to “D_2 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-173
		2. Line pressure test	AT-68
		3. Accumulator servo release	AT-404
		4. Control valve assembly	AT-404
		5. A/T fluid temperature sensor	AT-184
	OFF vehicle	6. Brake band	AT-497
Too sharp a shock in change from “D_2 ” to “D_3 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-173
		2. Line pressure test	AT-68
		3. Control valve assembly	AT-404
		4. A/T fluid temperature sensor	AT-184
	OFF vehicle	5. High clutch	AT-469
		6. Brake band	AT-497
Too sharp a shock in change from “D_3 ” to “D_4 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-173
		2. Line pressure test	AT-68
		3. Control valve assembly	AT-404
		4. A/T fluid temperature sensor	AT-184
	OFF vehicle	5. Brake band	AT-497
		6. Overrun clutch	AT-475
		7. Forward one-way clutch	AT-416
Almost no shock or clutches slipping in change from “D_1 ” to “D_2 ”.	ON vehicle	1. Fluid level	AT-64
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Line pressure test	AT-68
		4. Accumulator servo release	AT-404
		5. Control valve assembly	AT-404
	OFF vehicle	6. Brake band	AT-497
Almost no shock or slipping in change from “D_2 ” to “D_3 ”.	ON vehicle	1. Fluid level	AT-64
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Line pressure test	AT-68
		4. Control valve assembly	AT-404
	OFF vehicle	5. High clutch	AT-469
		6. Brake band	AT-497
Almost no shock or slipping in change from “D_3 ” to “D_4 ”.	ON vehicle	1. Fluid level	AT-64
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Line pressure test	AT-68
		4. Control valve assembly	AT-404
	OFF vehicle	5. Brake band	AT-497
Vehicle braked by gear change from “D_1 ” to “D_2 ”.	ON vehicle	1. Fluid level	AT-64
	OFF vehicle	2. Reverse clutch	AT-464
		3. Low & reverse brake	AT-483
		4. High clutch	AT-469
		5. Low one-way clutch	AT-416, AT-423
Vehicle braked by gear change from “D_2 ” to “D_3 ”.	ON vehicle	1. Fluid level	AT-64
	OFF vehicle	2. Brake band	AT-497

Symptom	Condition	Diagnostic Item	Reference Page
Vehicle braked by gear change from “D_3 ” to “D_4 ”.	ON vehicle	1. Fluid level	AT-64
	OFF vehicle	2. Overrun clutch	AT-362
		3. Forward one-way clutch	AT-416
		4. Reverse clutch	AT-464
Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-64
		2. PNP switch	AT-100
		3. Overdrive control switch	AT-237
		4. Accelerator pedal position (APP) sensor	AT-173
		5. Shift solenoid valve A	AT-161
		6. Shift solenoid valve B	AT-167
		7. Control valve assembly	AT-404
	OFF vehicle	8. Reverse clutch	AT-464
		9. High clutch	AT-469
		10. Brake band	AT-497
		11. Low & reverse brake	AT-483
		12. Oil pump	AT-443
		13. Torque converter	AT-423
Failure to change gear from “D_4 ” to “D_3 ”.	ON vehicle	1. Fluid level	AT-64
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Overrun clutch solenoid valve	AT-178
		4. Shift solenoid valve A	AT-161
		5. Line pressure solenoid valve	AT-154
		6. Control valve assembly	AT-404
	OFF vehicle	7. Brake band	AT-497
		8. Overrun clutch	AT-475
Failure to change gear from “D_3 ” to “D_2 ” or from “D_4 ” to “D_2 ”.	ON vehicle	1. Fluid level	AT-64
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Shift solenoid valve A	AT-161
		4. Shift solenoid valve B	AT-167
		5. Control valve assembly	AT-404
	OFF vehicle	6. High clutch	AT-469
		7. Brake band	AT-497
Failure to change gear from “D_2 ” to “D_1 ” or from “D_3 ” to “D_1 ”.	ON vehicle	1. Fluid level	AT-64
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Shift solenoid valve A	AT-161
		4. Shift solenoid valve B	AT-167
		5. Control valve assembly	AT-404
	OFF vehicle	6. Low one-way clutch	AT-416, AT-423
		7. High clutch	AT-469
		8. Brake band	AT-497
Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-173
		2. Line pressure test	AT-68
		3. Overrun clutch solenoid valve	AT-178
		4. Control valve assembly	AT-404

Symptom	Condition	Diagnostic Item	Reference Page
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-173
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-112, AT-192
Kickdown does not operate when depressing pedal in “D4 ” within kick down vehicle speed.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-173
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-112, AT-192
		3. Shift solenoid valve A	AT-161
		4. Shift solenoid valve B	AT-167
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-112, AT-192
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Shift solenoid valve A	AT-161
		4. Shift solenoid valve B	AT-167
Races extremely fast or slips in changing from “D4 ” to “D3 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-64
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Line pressure test	AT-68
		4. Line pressure solenoid valve	AT-154
		5. Shift solenoid valve A	AT-161
		6. Control valve assembly	AT-404
	OFF vehicle	7. Brake band	AT-497
		8. Forward clutch	AT-475
Races extremely fast or slips in changing from “D4 ” to “D2 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-64
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Line pressure test	AT-68
		4. Line pressure solenoid valve	AT-154
		5. Shift solenoid valve A	AT-161
		6. Shift solenoid valve B	AT-167
		7. Control valve assembly	AT-404
	OFF vehicle	8. Brake band	AT-497
		9. High clutch	AT-469
		10. Forward clutch	AT-475
Races extremely fast or slips in changing from “D3 ” to “D2 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-64
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Line pressure test	AT-68
		4. Line pressure solenoid valve	AT-154
		5. Control valve assembly	AT-404
		6. Shift solenoid valve B	AT-167
	OFF vehicle	7. Brake band	AT-497
		8. High clutch	AT-469

Symptom	Condition	Diagnostic Item	Reference Page
Races extremely fast or slips in changing from “D_4 ” or “D_3 ” to “D_1 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-64
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Line pressure test	AT-68
		4. Line pressure solenoid valve	AT-154
		5. Shift solenoid valve A	AT-161
		6. Shift solenoid valve B	AT-167
		7. Control valve assembly	AT-404
	OFF vehicle	8. Forward clutch	AT-475
		9. Forward one-way clutch	AT-416
		10. Low one-way clutch	AT-416, AT-423
Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-64
		2. Control cable adjustment	AT-409
		3. Line pressure test	AT-68
		4. Line pressure solenoid valve	AT-154
	OFF vehicle	5. Oil pump	AT-443
		6. Torque converter	AT-423
		7. Parking components	AT-416
Transmission noise in “D”, “2”, “1” and “R” positions.	ON vehicle	1. Fluid level	AT-64
	OFF vehicle	2. Torque converter	AT-423
Failure to change from “D_3 ” to “2_2 ” when changing lever into “2” position. AT-232	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-173
		2. Shift solenoid valve B	AT-167
		3. Control valve assembly	AT-404
		4. Control cable adjustment	AT-409
Failure to change from “D_3 ” to “2_2 ” when changing lever into “2” position. AT-232	OFF vehicle	5. Brake band	AT-497
Gear change from “2_2 ” to “2_3 ” in “2” position.	ON vehicle	1. PNP switch	AT-100
		2. Control cable adjustment	AT-409
Engine brake does not operate in “1” position. AT-230	ON vehicle	1. PNP switch	AT-100
		2. Control cable adjustment	AT-409
		3. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-112, AT-192
		4. Control valve assembly	AT-404
		5. Overrun clutch solenoid valve	AT-178
	OFF vehicle	6. Overrun clutch	AT-475
		7. Low & reverse brake	AT-483
Gear change from “1_1 ” to “1_2 ” in “1” position.	ON vehicle	1. PNP switch	AT-100
		2. Control cable adjustment	AT-409

Symptom	Condition	Diagnostic Item	Reference Page
Does not change from “1$_2$ ” to “1$_1$ ” in “1” position.	ON vehicle	1. PNP switch	AT-100
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-112, AT-192
		3. Shift solenoid valve A	AT-161
		4. Control valve assembly	AT-404
	OFF vehicle	5. Low one-way clutch	AT-416, AT-423
		6. Brake band	AT-497
		7. Low & reverse brake	AT-483
Large shock changing from “1$_2$ ” to “1$_1$ ” in “1” position.	ON vehicle	1. Control valve assembly	AT-404
	OFF vehicle	2. Low & reverse brake	AT-483
Transmission overheats.	ON vehicle	1. Fluid level	AT-64
		2. Engine idling rpm	EC-44
		3. Accelerator pedal position (APP) sensor	AT-173
		4. Line pressure test	AT-68
		5. Line pressure solenoid valve	AT-154
		6. Control valve assembly	AT-404
Transmission overheats.	OFF vehicle	7. Oil pump	AT-443
		8. Reverse clutch	AT-464
		9. High clutch	AT-469
		10. Brake band	AT-497
		11. Forward clutch	AT-475
		12. Overrun clutch	AT-475
		13. Low & reverse brake	AT-483
		14. Torque converter	AT-423
ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-64
	OFF vehicle	2. Reverse clutch	AT-464
		3. High clutch	AT-469
		4. Brake band	AT-497
		5. Forward clutch	AT-475
		6. Overrun clutch	AT-475
		7. Low & reverse brake	AT-483
Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-64
	OFF vehicle	2. Torque converter	AT-423
		3. Oil pump	AT-443
		4. Reverse clutch	AT-464
		5. High clutch	AT-469
		6. Brake band	AT-497
		7. Forward clutch	AT-475
		8. Overrun clutch	AT-475
		9. Low & reverse brake	AT-483

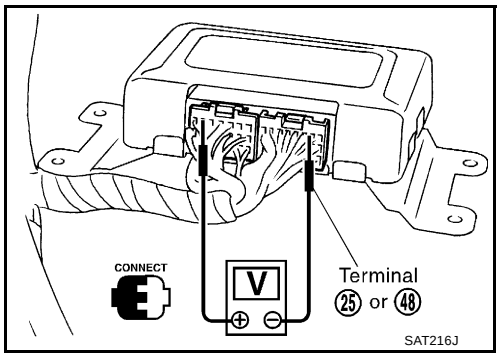
Symptom	Condition	Diagnostic Item	Reference Page
Torque converter is not locked up.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-173
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-112, AT-192
		3. Engine speed signal	AT-119
		4. A/T fluid temperature sensor	AT-184
		5. Line pressure test	AT-68
		6. Torque converter clutch solenoid valve	AT-148
		7. Control valve assembly	AT-404
Torque converter is not locked up.	OFF vehicle	8. Torque converter	AT-423
Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-64
		2. Accelerator pedal position (APP) sensor	AT-173
		3. Line pressure test	AT-68
		4. Torque converter clutch solenoid valve	AT-148
		5. Line pressure solenoid valve	AT-154
		6. Control valve assembly	AT-404
	OFF vehicle	7. Torque converter	AT-423
Lock-up point is extremely high or low. AT-224	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-173
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-112, AT-192
		3. Torque converter clutch solenoid valve	AT-148
		4. Control valve assembly	AT-404
A/T does not shift to “D_4 ” when driving with overdrive control switch “ON”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-173
		2. PNP switch	AT-100
		3. Overdrive control switch	AT-237
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-112, AT-192
		5. Shift solenoid valve A	AT-161
		6. Overrun clutch solenoid valve	AT-178
		7. Control valve assembly	AT-404
		8. A/T fluid temperature sensor	AT-184
		9. Line pressure test	AT-68
A/T does not shift to “D_4 ” when driving with overdrive control switch “ON”.	OFF vehicle	10. Brake band	AT-497
		11. Overrun clutch	AT-475
Engine is stopped at “R”, “D”, “2” and “1” positions.	ON vehicle	1. Fluid level	AT-64
		2. Torque converter clutch solenoid valve	AT-148
		3. Shift solenoid valve A	AT-161
		4. Shift solenoid valve B	AT-167
		5. Control valve assembly	AT-404

TCM Terminals and Reference Value

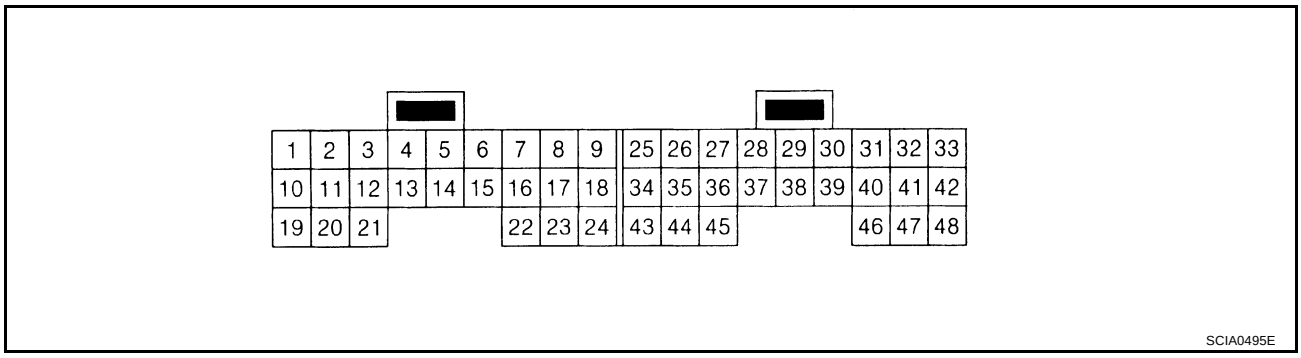
ECS004QV

PREPARATION

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

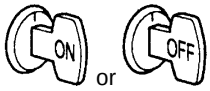


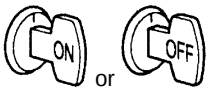
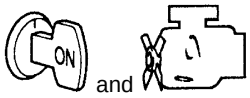
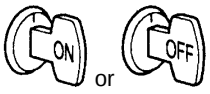
TCM CONNECTOR TERMINAL LAYOUT

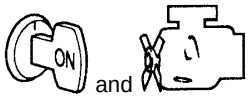
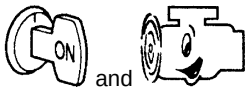


TCM INSPECTION TABLE

(Data are reference values.)

Terminal No.	Wire color	Item	Condition		Judgementstandard(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	G/R	CAN-H	—		—
6	GY/R	CAN-L	—		—
10	BR/W	Power source	 or	When turning ignition switch to “ON”.	Battery voltage
				When turning ignition switch to “OFF”.	0V

Terminal No.	Wire color	Item	Condition		Judgementstandard(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
19	BR/W	Power source	 or	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
25	B	Ground	Always		0V
26	BR/Y	PNP switch “1” position	 and	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	L	Power source (Memory back-up)	Always		Battery voltage
29	W/R	Revolution sensor		When moving at 20 km/h (12 MPH)	450 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
30 *2	G/B	CONSULT- II (RX)		—	—
31 *2	W	CONSULT- II (TX)		—	—
32 *1	R	Accelerator pedal position (APP) sensor (Power source)	 or	When turning ignition switch to “ON”.	4.5 - 5.5V
				When turning ignition switch to “OFF”.	0V

Terminal No.	Wire color	Item	Condition		Judgementstandard(Approx.)
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	Y/G	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 “P”, “N” position		When setting selector lever to “P”, “N” position.	Battery voltage
				When setting selector lever to other positions.	0V
39 *1	L/OR	Engine speed signal		Refer to EC-95 .	—
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	G/Y	Accelerator pedal position (APP) sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Sensor ground	Always		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	Ground	Always		0V

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

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.

On Board Diagnosis Logic

ECS008D0

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

Possible Cause

ECS00CUO

Harness or connectors
(CAN communication line is open or shorted.)

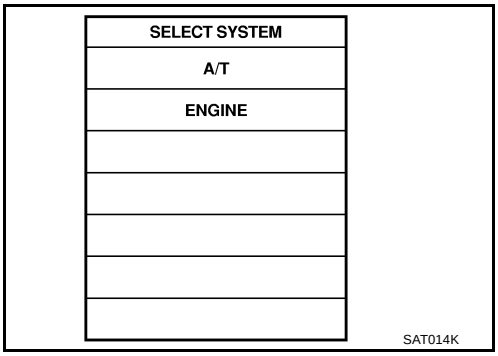
DTC Confirmation Procedure

ECS008D1

NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Wait at least 6 seconds or start engine and wait for at least 6 seconds.
4. If DTC is detected, go to AT-99, "Diagnostic Procedure" .

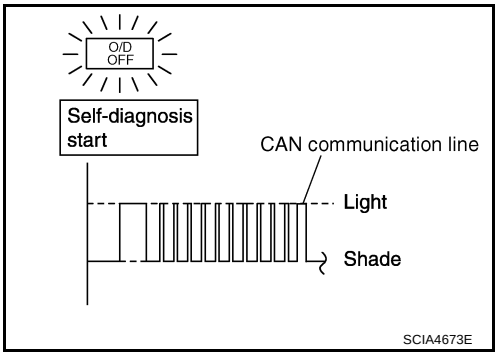


WITH GST

Follow the procedure "WITH CONSULT-II"

WITHOUT CONSULT-II

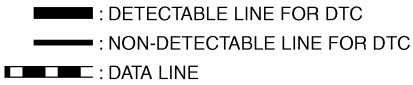
1. Turn ignition switch ON. (Do not start engine.)
2. Wait at least 6 seconds or start engine and wait at least 6 seconds.
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If DTC is detected, go to AT-99, "Diagnostic Procedure" .

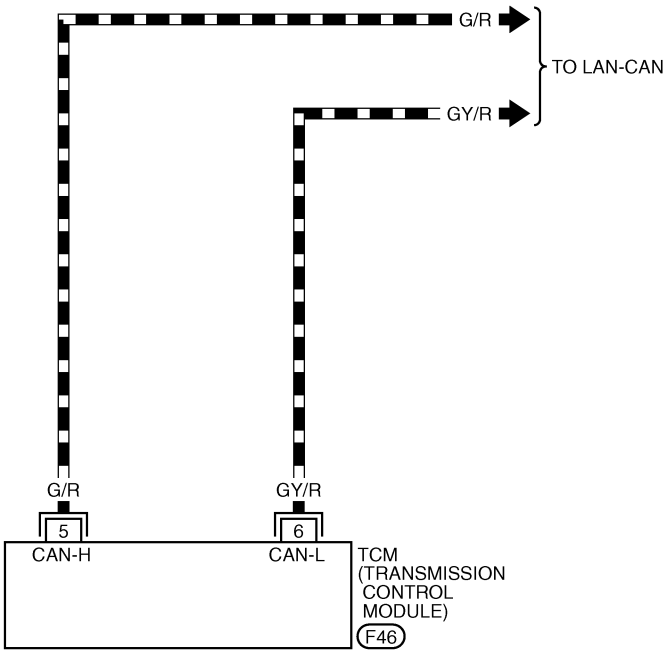


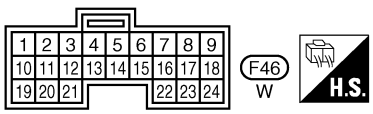
Wiring Diagram — AT — CAN

ECS008D2

AT-CAN-01







TCWA0234E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
5	G/R	CAN-H	—	—
6	GY/R	CAN-L	—	—

Diagnostic Procedure

ECS008D3

1. CHECK CAN COMMUNICATION CIRCUIT

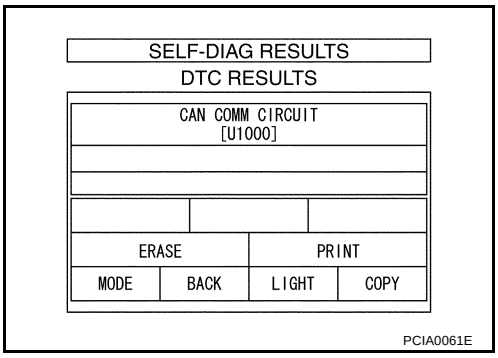
With CONSULT-II

1. Turn ignition switch “ON” and start engine.
2. Select “SELF-DIAG RESULTS” mode for “A/T” with CONSULT-II.

Is any malfunction of the “CAN COMM CIRCUIT” indicated?

YES >> Print out CONSULT-II screen, GO TO LAN section. Refer to LAN-4, "CAN Communication Unit" .

NO >> **INSPECTION END**



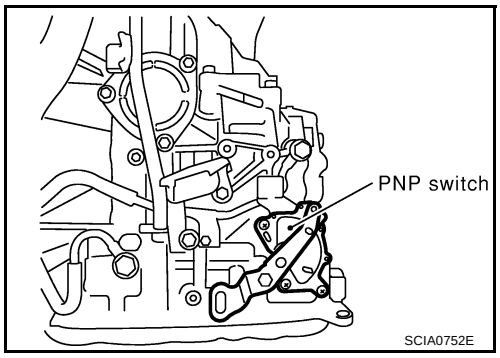
DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

PFP: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.



On Board Diagnosis Logic

ECS00CTG

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

Possible Cause

ECS00CTH

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

DTC Confirmation Procedure

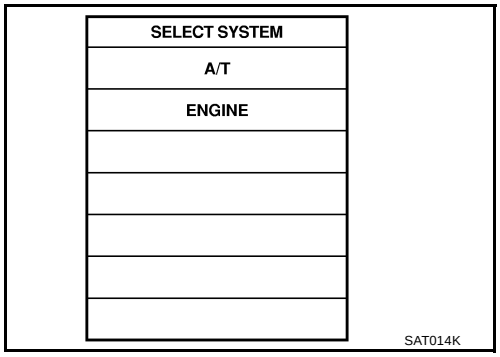
ECS00CTI

CAUTION:
Always drive vehicle at a safe speed.

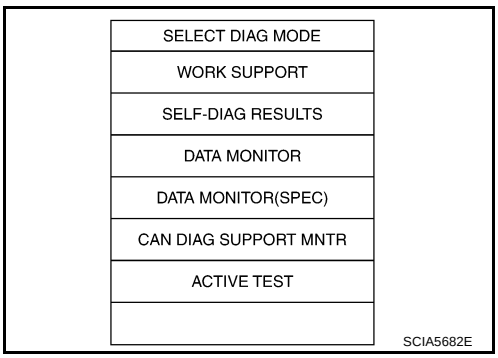
NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

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



2. Select “DATA MONITOR” mode for “ENGINE” with CONSULT-II.
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)
4. If the check result is NG, go to AT-103, "Diagnostic Procedure" .

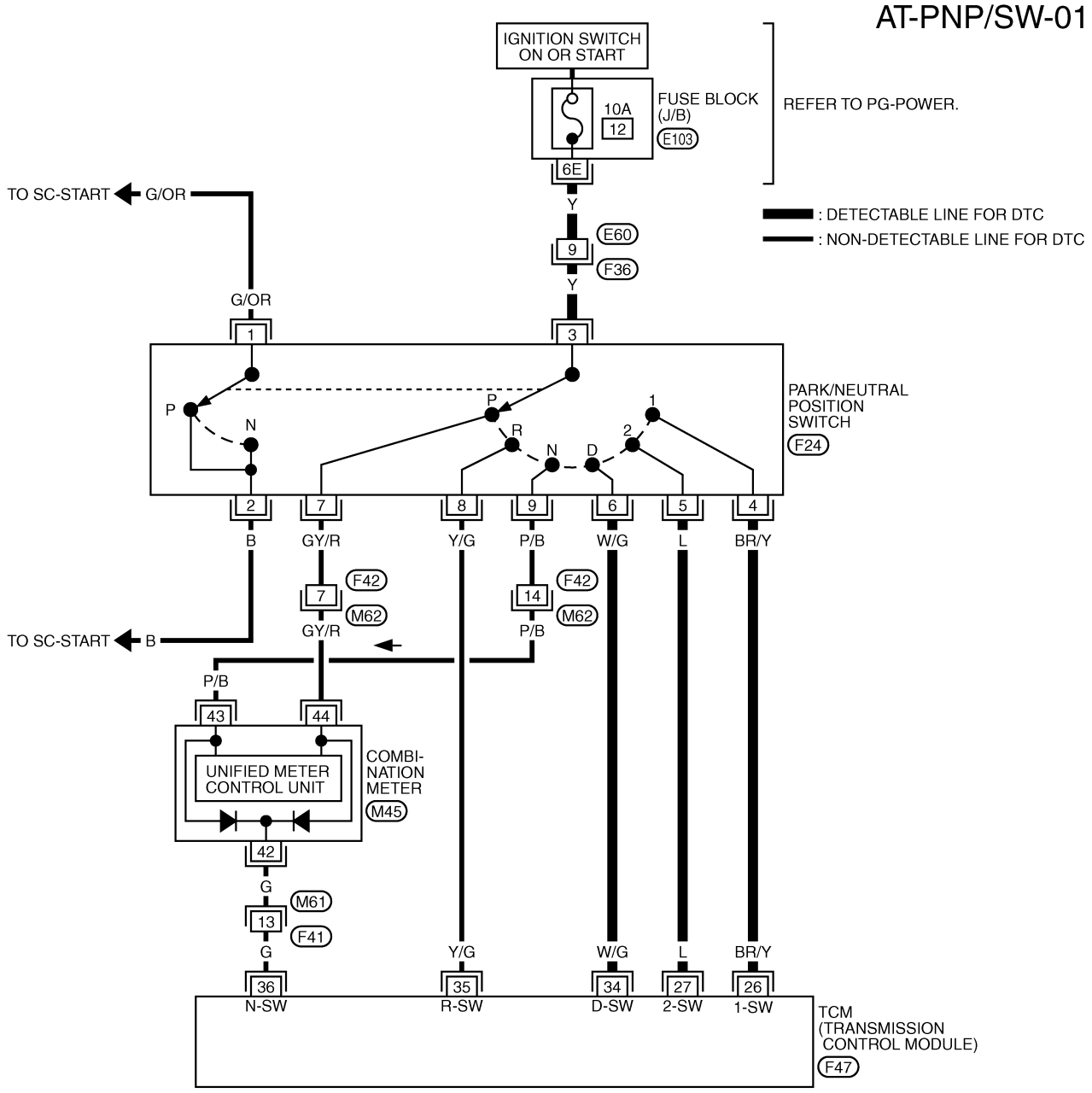


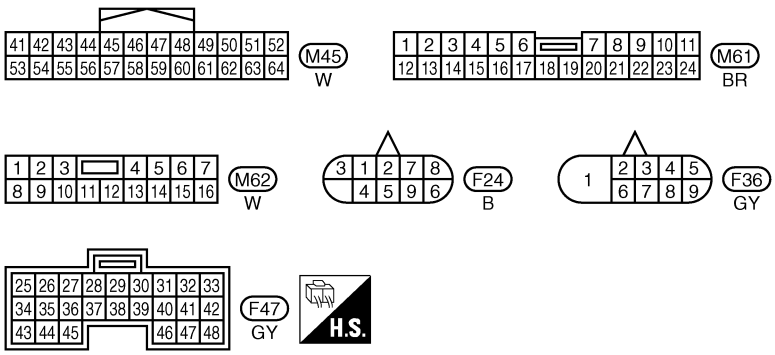
WITH GST

Follow the procedure “WITH CONSULT-II”.

Wiring Diagram — AT — PNP/SW

ECS004QX

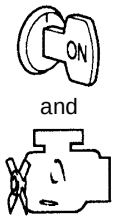




REFER TO THE FOLLOWING.
E103 -FUSE BLOCK-JUNCTION BOX (J/B)

TCWA0229E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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	Y/G	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

Diagnostic Procedure

ECS004QY

1. INSPECTION START

Do you have CONSULT-II?

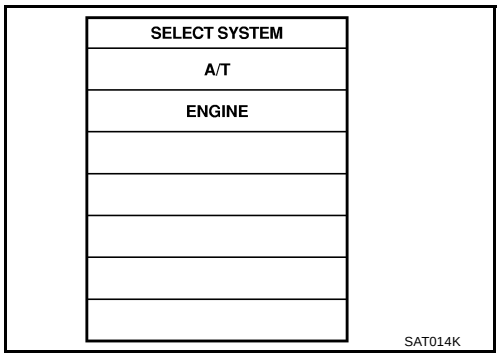
YES or NO

YES >> GO TO 2.
NO >> GO TO 6.

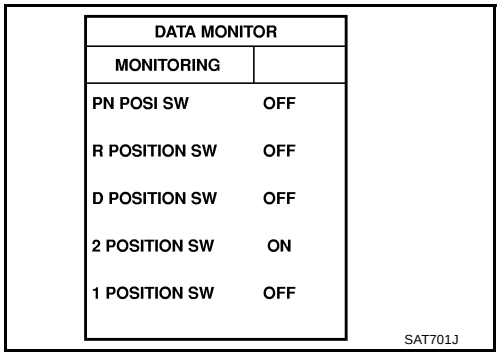
2. CHECK PNP SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch to ON. (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.



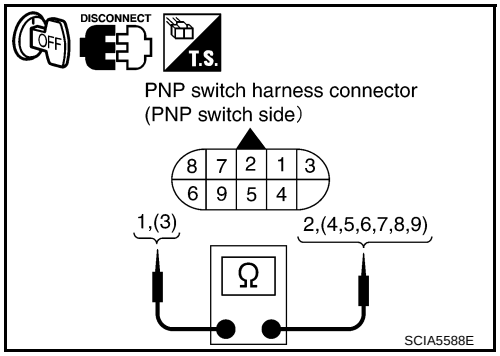
OK or NG

OK >> GO TO 7.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

Check continuity between PNP switch harness connector terminals.

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	



OK or NG

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

4. CHECK MANUAL CONTROL CABLE ADJUSTMENT

Check PNP switch again with manual control cable disconnected from manual shaft of A/T assembly. Refer to test group 1.

OK or NG

OK >> Adjust manual control cable. Refer to AT-409, "Control Cable Adjustment" .
NG >> Repair or replace PNP switch.

5. DETECT MALFUNCTIONING ITEM

Check the following items.

- Harness for short open between ignition switch and park/neutral position (PNP) switch.
- Harness for short or open between park/neutral position (PNP) switch and TCM.
- Fuse
- Ignition switch
  Refer to PG-2, "POWER SUPPLY ROUTING" .

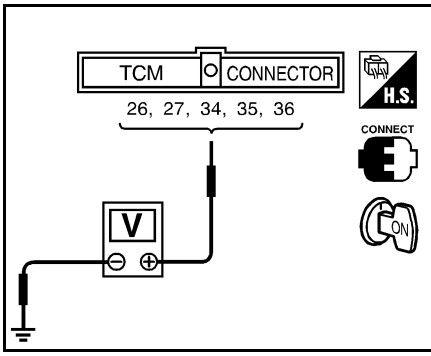
OK or NG

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

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

Without CONSULT-II

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



Voltage:
B: Battery voltage
0: 0V

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

SAT840J

OK or NG

OK >> GO TO 7.
NG >> GO TO 3.

7. CHECK DTC

Perform AT-100, "DTC Confirmation Procedure" .

OK or NG

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

8. CHECK TCM INSPECTION

1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

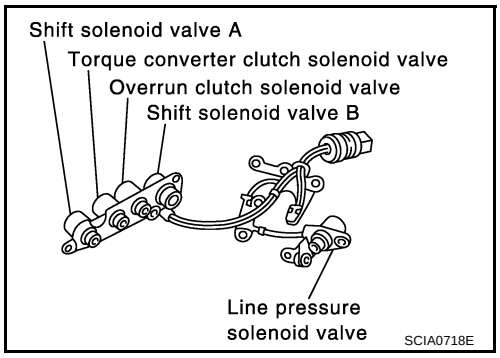
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

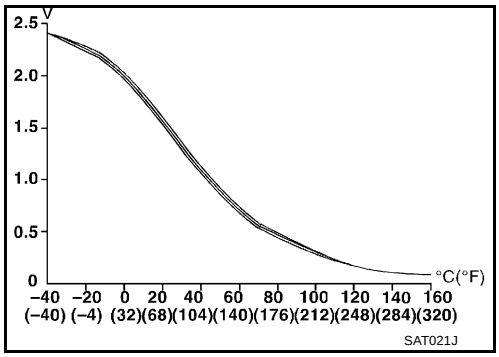
PFP:31940

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)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ

On Board Diagnosis Logic

ECS00CTJ

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.	● Harness or connectors (The sensor circuit is open or shorted.) ● A/T fluid temperature sensor
GST : P0710		

Possible Cause

ECS00CTK

Check the following items.

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

DTC Confirmation Procedure

ECS00CTL

CAUTION:

Always drive vehicle at a safe speed.

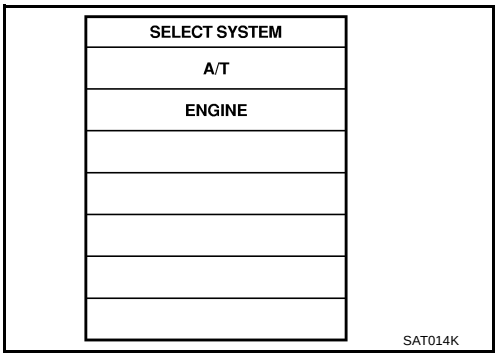
NOTE:

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

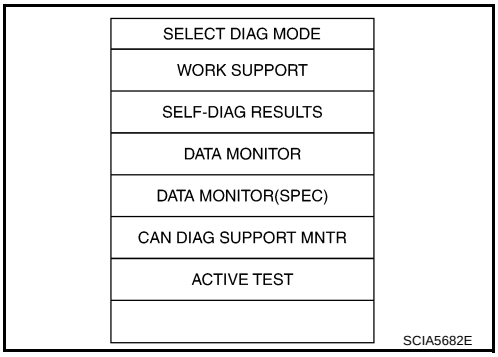
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “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)
3. If the check result is NG, go toAT-109, "Diagnostic Procedure" .

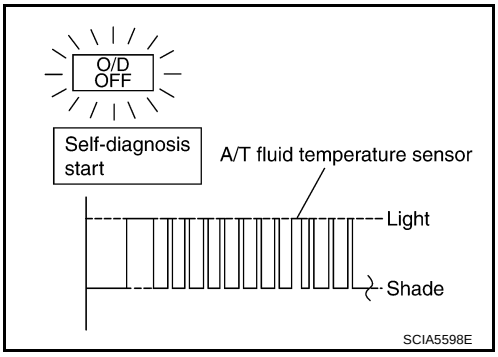


WITH GST

Follow the procedure “With CONSULT-II”.

WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions.
   Selector lever position: D position
   Vehicle speed: higher than 20km/h (12MPH)
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-109, "Diagnostic Procedure" .

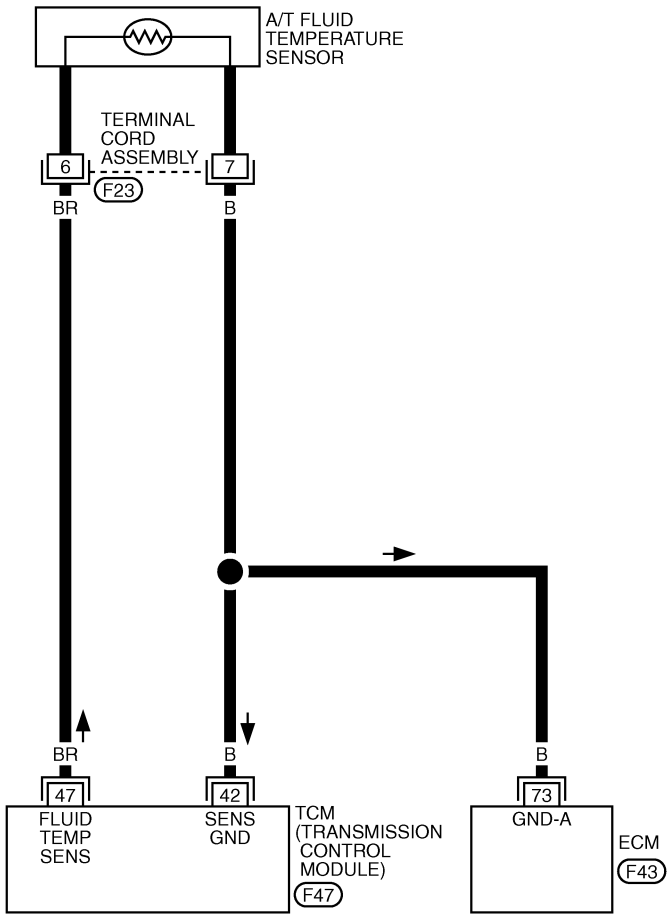


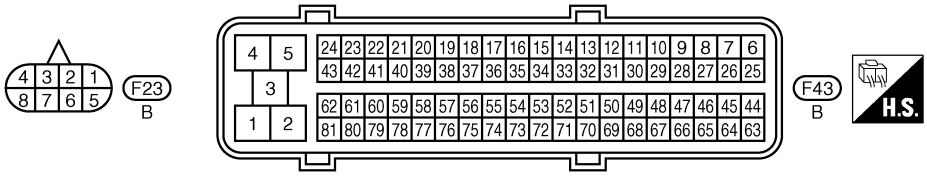
Wiring Diagram — AT — FTS

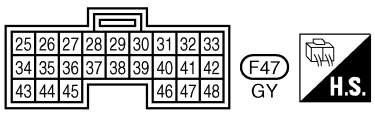
ECS004R1

AT-FTS-01

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







TCWA0230E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

Diagnostic Procedure

ECS004R2

1. INSPECTION START

Do you have CONSULT-II?

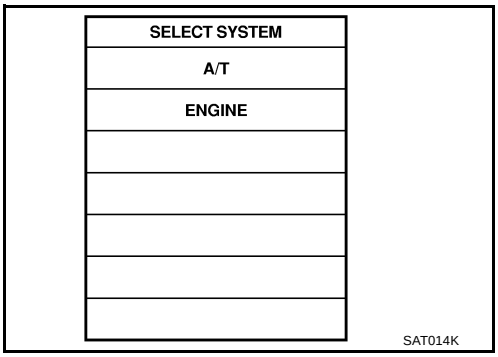
YES or NO

YES >> GO TO 2.
NO >> GO TO 3.

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

With CONSULT-II

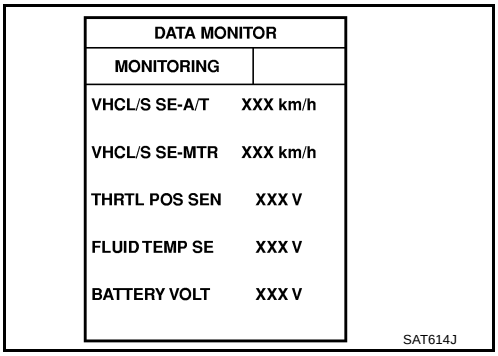
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “FLUID TEMP SE”.



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.

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

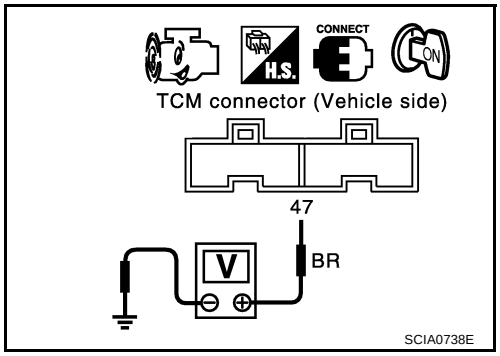
Without CONSULT-II

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

Voltage:

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

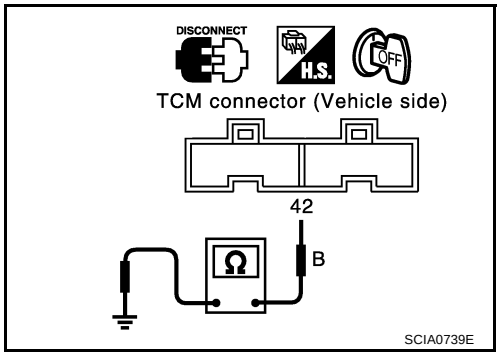
Approximately 1.5V → 0.5V



3. Turn ignition switch to “OFF” position.
4. Disconnect TCM connector.
5. Check continuity between TCM connector 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 AT-106, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

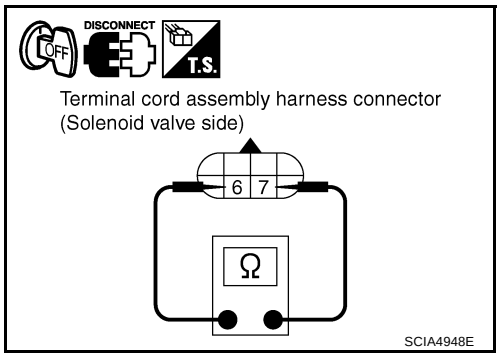
5. CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

1. Turn ignition switch to OFF.
2. Disconnect terminal cord assembly harness connector in engine compartment.
3. Check resistance between terminals 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. Refer to AT-404, "COMPONENTS" .
2. Check the following items:
- A/T fluid temperature sensor
  Refer to AT-111, "Component Inspection" .
- Harness of terminal cord assembly for short or open

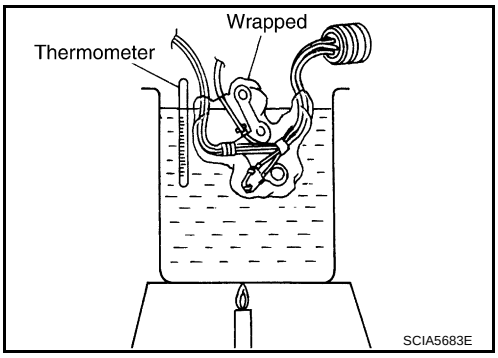
Component Inspection

ECS004R3

A/T FLUID TEMPERATURE SENSOR

- For removal, refer to AT-404, "Control Valve Assembly and Accumulators" .
- Check resistance between two terminals while changing temperature as shown.

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



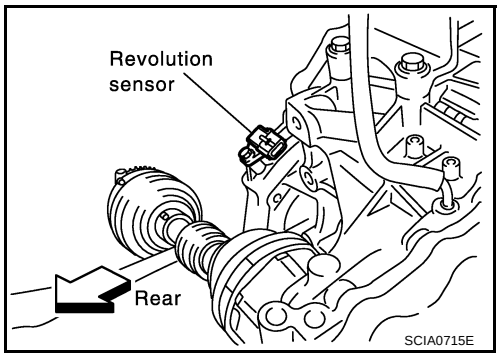
DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)

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.



On Board Diagnosis Logic

ECS00CTM

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

Possible Cause

ECS00CTN

Check the following items.

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

DTC Confirmation Procedure

ECS00CTO

CAUTION:

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

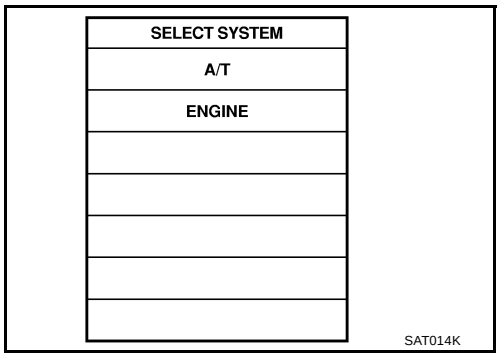
NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.

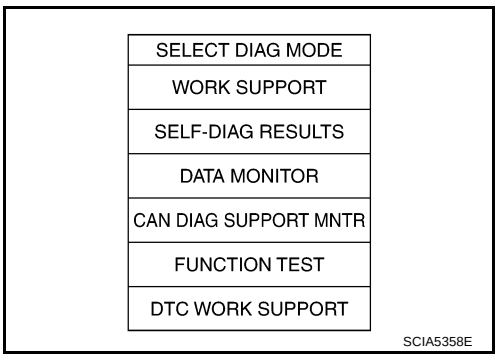
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

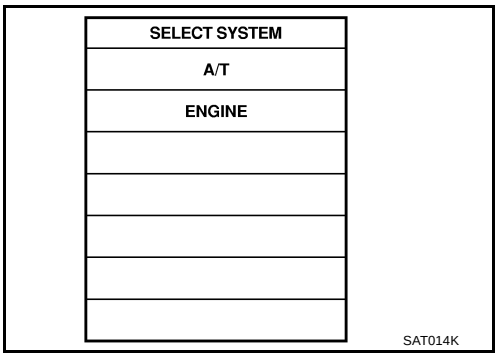
1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.



2. Drive vehicle and check for an increase of “VHCL/S SE·MTR” value increase.
If the check result is NG, go to AT-115, "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-115, "Diagnostic Procedure" .
If the check result is OK, go to following step.



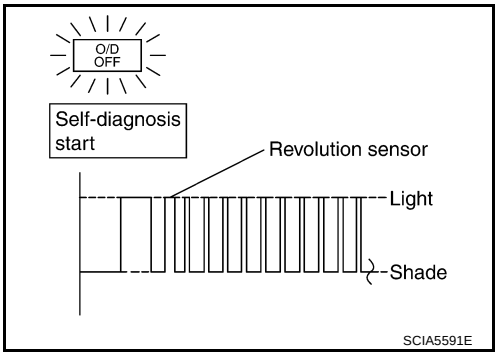
5. Maintain the following conditions for at least 5 consecutive seconds.
CMPS·RPM (REF): 3,500 rpm or more
THRTL POS SEN: More than 1.2V
Selector lever: D position (OD ON)
Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

WITH GST

Follow the procedure “WITH CONSULT-II”.

WITHOUT CONSULT-II

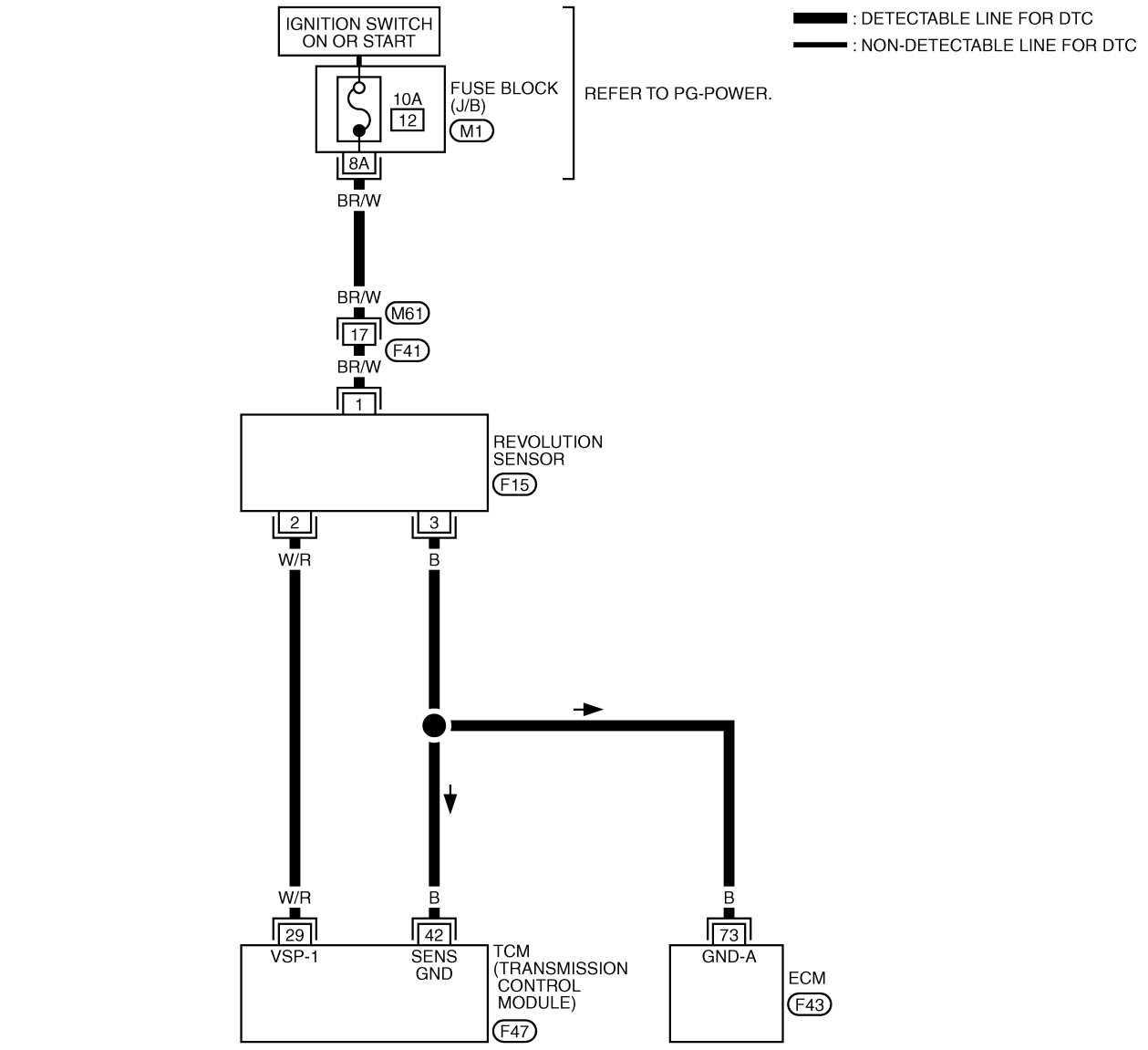
1. Start engine.
2. Drive vehicle under the following conditions for more than 5 seconds.
Selector lever position: D position
Vehicle speed: 30 km/h (19 MPH) or more
Throttle position: greater than 1.0/8 of the full throttle position
3. Perform self-diagnosis.
Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-115, "Diagnostic Procedure" .



Wiring Diagram — AT — VSSA/T

ECS004R5

AT-VSSA/T-01



TCWA0231E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
29	W/R	Revolution sensor		When moving at 20 km/h (12 MPH).	450 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
42	B	Sensor ground	Always		0V

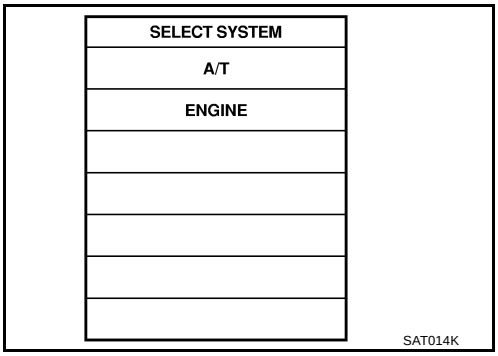
Diagnostic Procedure

ECS004R6

1. CHECK INPUT SIGNAL

With CONSULT-II

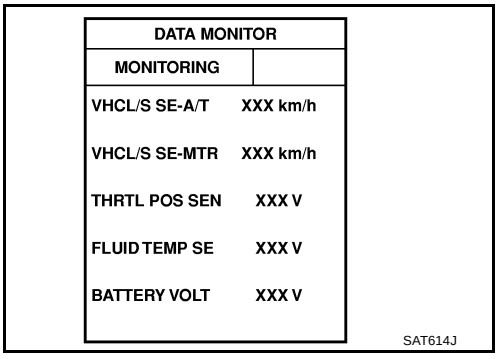
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·A/T” while driving.



Check the value changes according to driving speed.

OK or NG

OK >> GO TO 8.
NG >> GO TO 2.



2. CHECK REVOLUTION SENSOR

With CONSULT-II

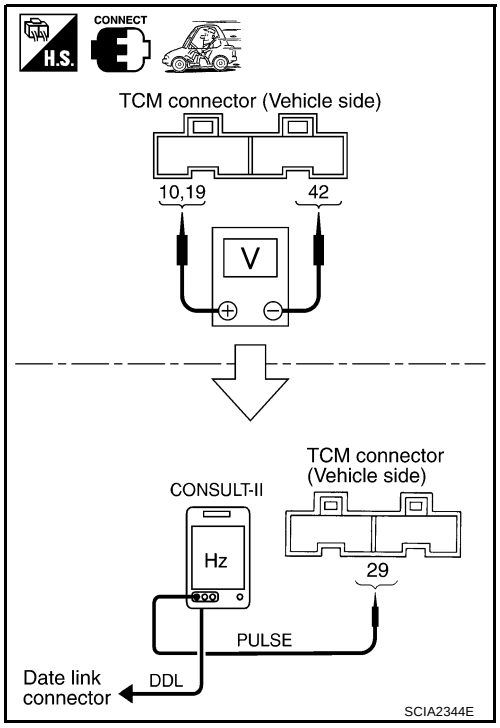
1. Start engine.
2. Check power supply to revolution sensor by voltage between TCM connector terminals. Refer to AT-395, "Wiring Diagram — AT — MAIN" and AT-114, "Wiring Diagram — AT — VSSA/T" .

Item	Connector No.	Terminal No. (Wire color)	Data (Approx.)
TCM	F46, F47	10 (BR/W) - 42 (B)	Battery voltage
		19 (BR/W) - 42 (B)	

3. If OK check the pulse when vehicle cruises.

Name	Condition
Revolution sensor	When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. **CAUTION:** **Connect the diagnosis data link cable to the data link connector.**

Item	Connector No.	Terminal No. (Wire color)	Name	Data (Approx.)
TCM	F47	29 (W/R)	Revolution sensor	450 Hz



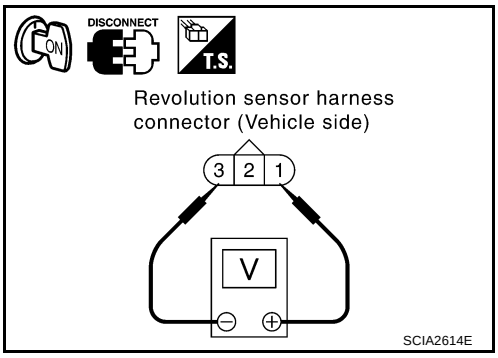
OK or NG

OK >> GO TO 8.
NG >> GO TO 3.

3. CHECK POWER AND SENSOR GROUND

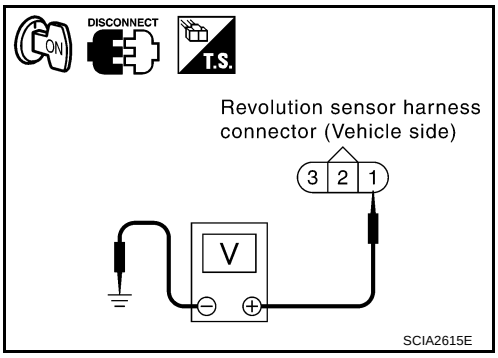
1. Turn ignition switch OFF.
2. Disconnect the revolution sensor harness connector.
3. Turn ignition switch ON. (Do not start engine.)
4. Check voltage between revolution sensor harness connector terminals.

Item	Connector No.	Terminal No. (Wire color)	Data (Approx.)
Revolution sensor	F15	1 (BR/W) - 3 (B)	Battery voltage



5. Check voltage between revolution sensor harness connector terminal and ground.

Item	Connector No.	Terminal No. (Wire color)	Data (Approx.)
Revolution sensor	F15	1 (BR/W) - ground	Battery voltage



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

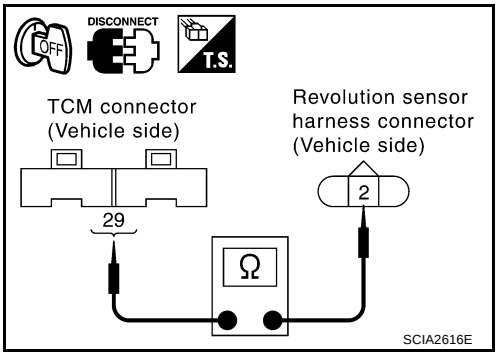
OK or NG

OK >> GO TO 4.
NG - 1 >> Battery voltage is not supplied between terminals 1 and 3, terminals 1 and ground.:GO TO 6.
NG - 2 >> Battery voltage is not supplied between terminals 1 and 3 only.: GO TO 7.

4. CHECK HARNESS BETWEEN TCM AND REVOLUTION SENSOR

1. Turn ignition switch OFF.
2. Disconnect the TCM connector and revolution sensor harness connector.
3. Check continuity between TCM connector terminal and revolution sensor harness connector terminal.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F47	29 (W/R)	Yes
Revolution sensor	F15	2 (W/R)	



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

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK TCM

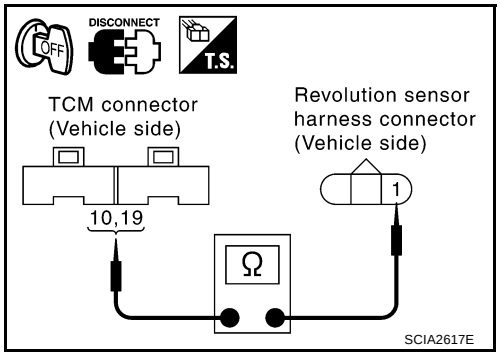
1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK HARNESS BETWEEN TCM AND REVOLUTION SENSOR (POWER)

1. Turn ignition switch OFF.
2. Disconnect the TCM connector and revolution sensor harness connector.
3. Check continuity between TCM connector terminals and revolution sensor harness connector terminals. Refer to AT-21, "Circuit Diagram" and AT-395, "Wiring Diagram — AT — MAIN" .



Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	10 (BR/W)	Yes
Revolution sensor	F15	1 (Y)	

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	19 (BR/W)	Yes
Revolution sensor	F15	1 (Y)	

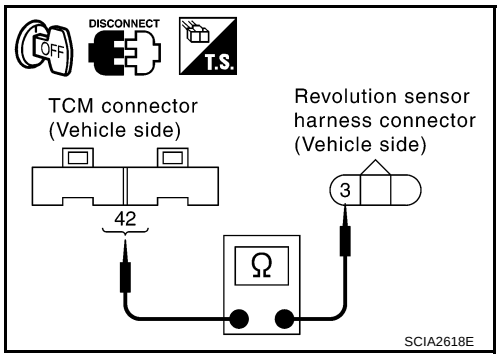
4. If OK, check harness for short to ground and short power.
5. Reinstall any part removed.

OK or NG

OK >> Fuse or ignition switch are malfunctioning.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK HARNESS BETWEEN TCM AND REVOLUTION SENSOR (SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect the TCM connector and revolution sensor harness connector.
3. Check continuity between TCM connector terminal and revolution sensor harness connector terminal.



Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F47	42 (B)	Yes
Revolution sensor	F15	3 (B)	

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

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK DTC

Perform AT-112, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

DTC P0725 ENGINE SPEED SIGNAL

PFP:24825

Description

ECS004R7

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

On Board Diagnosis Logic

ECS00CTP

Diagnostic trouble code	Malfunction is detected when...	Check item (Possible cause)
: ENGINE SPEED SIG : P0725	TCM does not receive the proper voltage signal from ECM.	● Harness or connectors (The sensor circuit is open or shorted.)

Possible Cause

ECS00CTQ

Check the following items.

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

DTC Confirmation Procedure

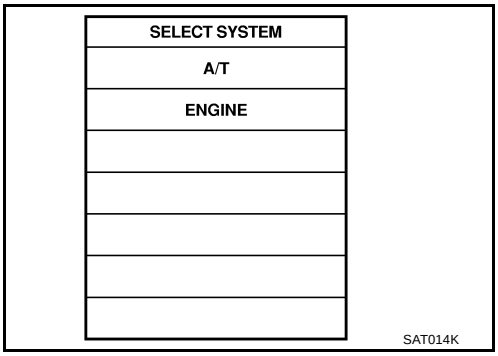
ECS00CTR

CAUTION:
Always drive vehicle at a safe speed.

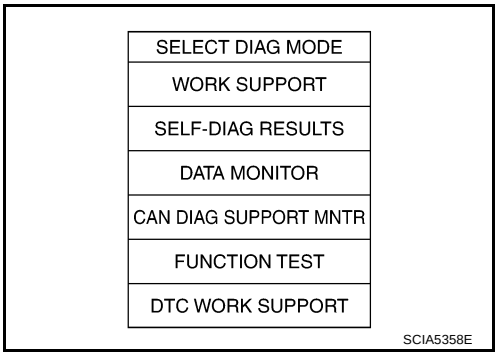
NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

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



2. 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)
3. If the check result is NG, go to AT-122, "Diagnostic Procedure" .

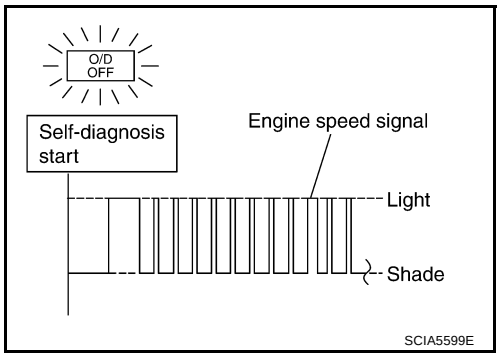


WITH GST

Follow the procedure "WITH CONSULT-II".

WITHOUT CONSULT-II

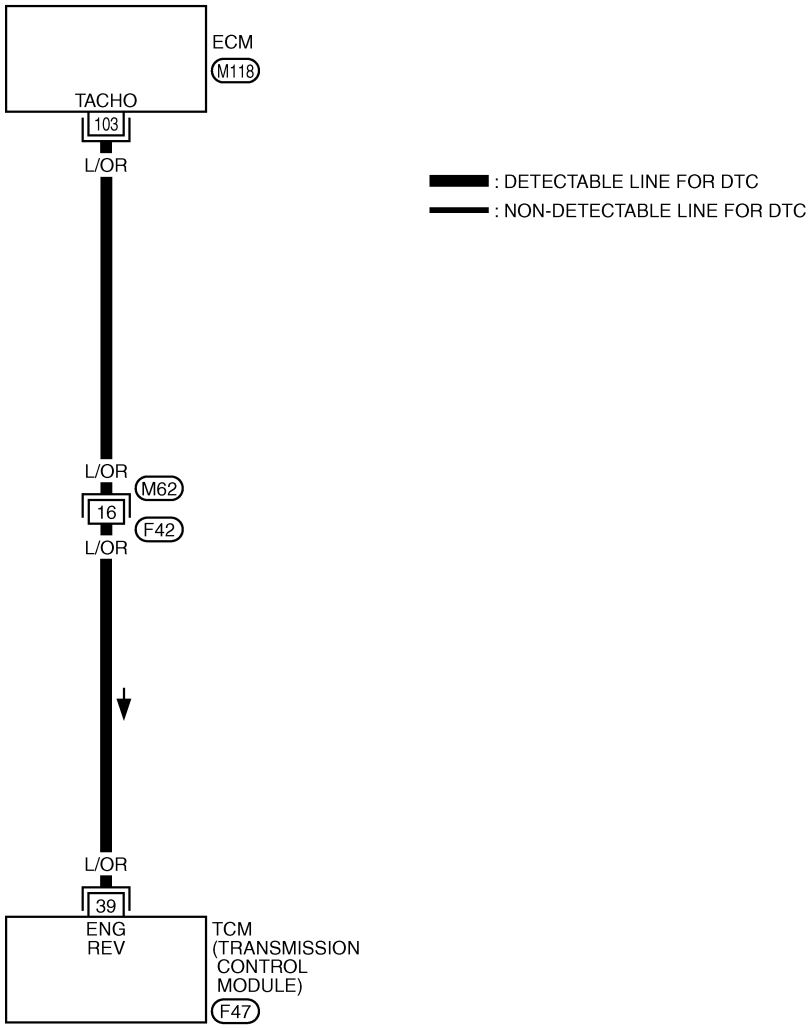
1. Start engine.
2. Drive vehicle under the following conditions for more than 5 seconds.
   Selector lever: D position (OD ON)
   Vehicle speed: 10 km/h (6 MPH) or more
   Throttle position: greater than 1.0/8 of the full throttle position
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-122, "Diagnostic Procedure" .

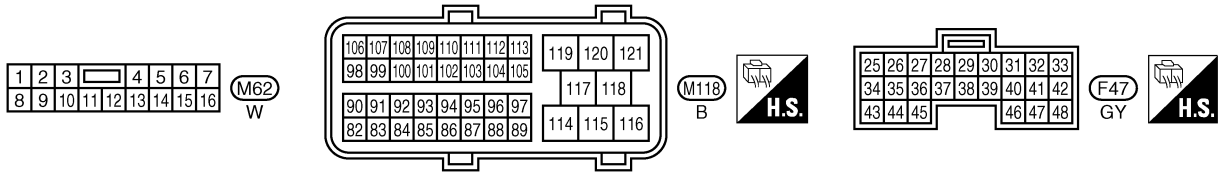


Wiring Diagram — AT — ENGSS

ECS004R8

AT-ENGSS-01





TCWA0232E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
39	L/OR	Engine speed signal	 and 	Refer to EC-95, "ECM INSPECTION TABLE" .	—

Diagnostic Procedure

ECS004R9

1. CHECK DTC WITH ECM

Perform diagnostic test mode II (self-diagnostic results) for engine control. Check ignition signal circuit condition.

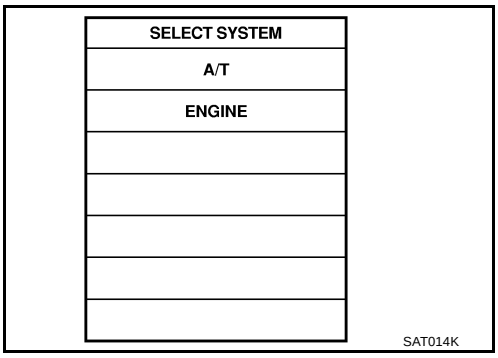
OK or NG

OK >> GO TO 2.
NG >> Check ignition signal circuit for engine control. Refer to EC-417, "IGNITION SIGNAL" .

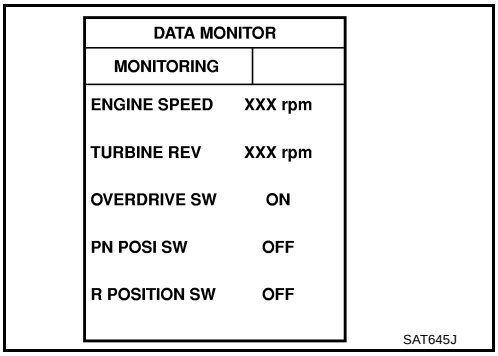
2. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.



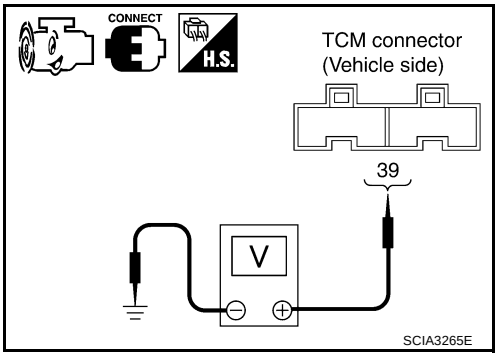
3. Read out the value of “ENGINE SPEED”.
   Check engine speed changes according to throttle position.



Without CONSULT-II

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

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgement standard (Approx.)
Engine speed signal	F47	39 (L/OR) - Ground	—	Refer to EC-95, "ECM INSPECTION TABLE" .



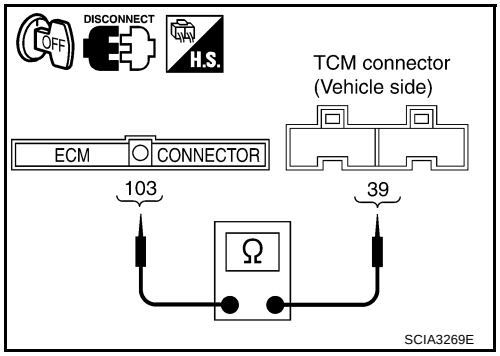
OK or NG

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

3. CHECK HARNESS BETWEEN TCM AND ECM

1. Turn ignition switch OFF.
2. Disconnect ECM connector and TCM connector.
3. Check continuity between ECM connector terminal and TCM connector terminal.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F47	39 (L/OR)	Yes
ECM	M118	103 (L/OR)	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between body ground and transaxle assembly.
6. 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 AT-119, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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 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)

On Board Diagnostic Logic

ECS00CTS

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is higher than the position (1st) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
This malfunction will be caused when either shift solenoid valve A is stuck open or shift solenoid valve B is stuck open.

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

*: P0731 is detected.

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

Possible Cause

ECS00CTT

Check the following items.

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

DTC Confirmation Procedure

ECS00CTU

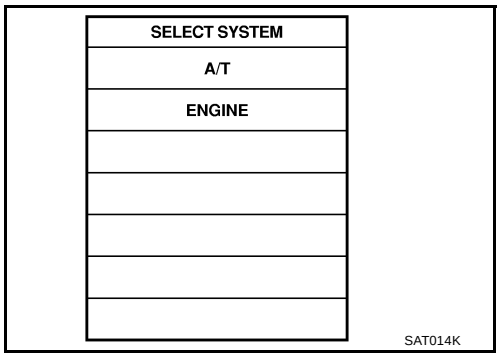
CAUTION:

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

NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.
TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

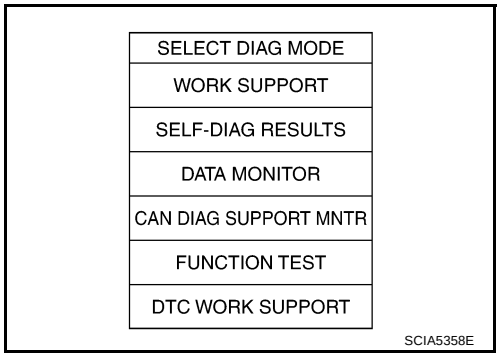
1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select “1ST GR FNCTN P0731” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.



4. Accelerate vehicle to 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”)

– **Make sure 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-128, "Diagnostic Procedure" .
   If “STOP VEHICLE” appears on CONSULT-II screen, go to the following step.

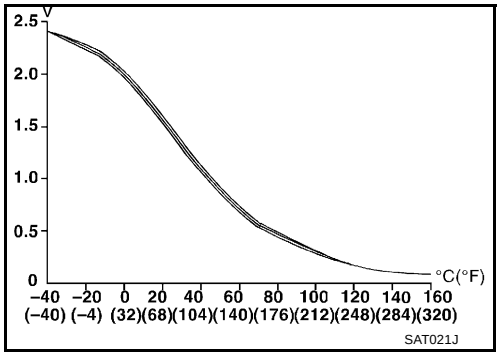


– **Make sure that “GEAR” shows “1” when depressing accelerator pedal to WOT.**

– **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAGNOSIS” for “ENGINE”. In case a 1st trip DTC other than P0731 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.**

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

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



8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “Diagnostic Procedure”.)
   Refer to AT-128, "Diagnostic Procedure" .
   Refer to AT-530, "Shift Schedule" .

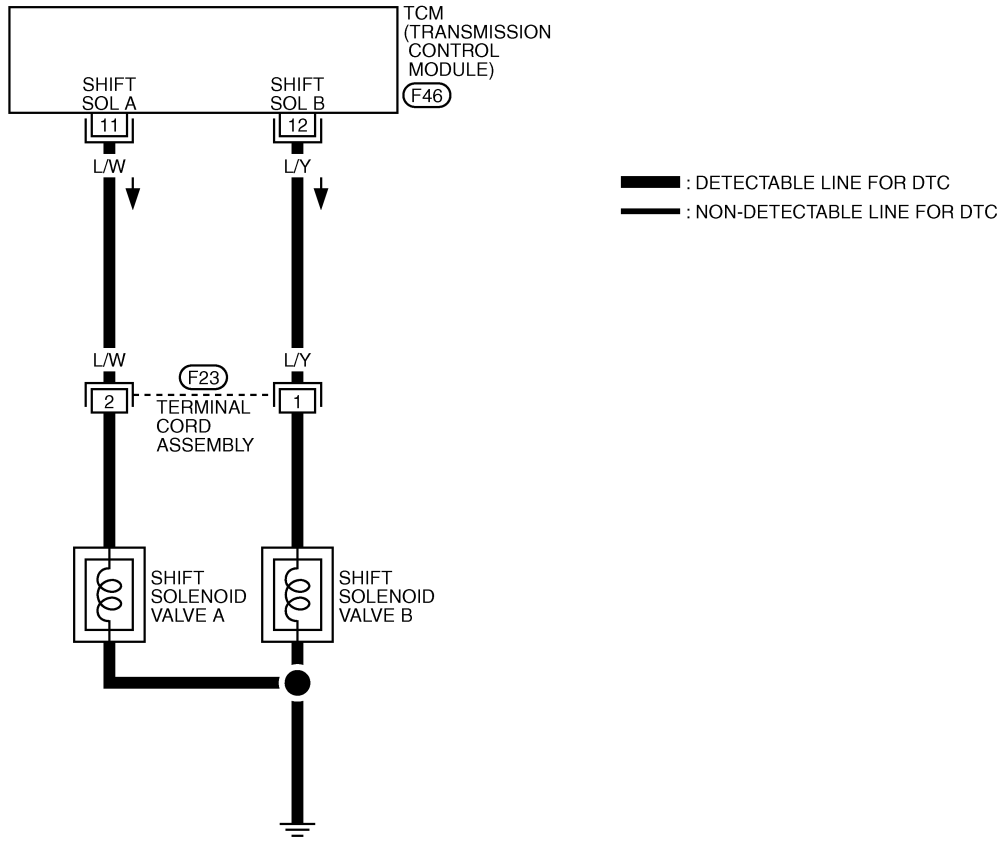
WITH GST

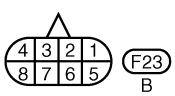
Follow the procedure “WITH CONSULT-II”.

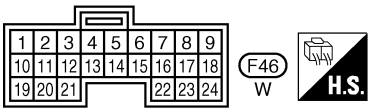
Wiring Diagram — AT — 1STSIG

ECS004RB

AT-1STSIG-01







TCWA0049E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

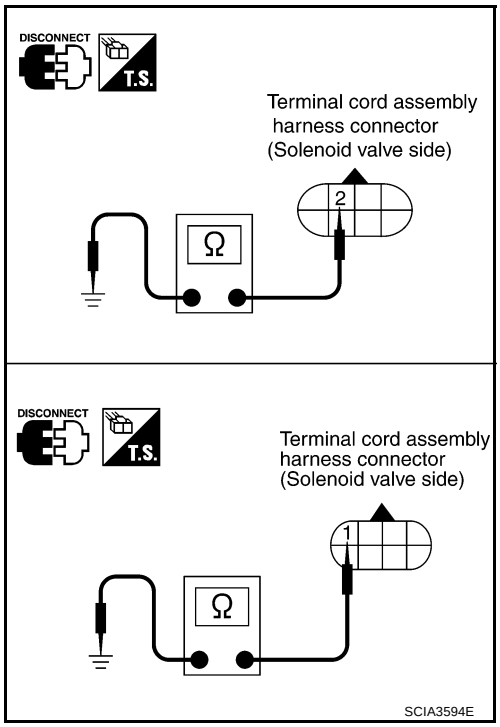
Diagnostic Procedure

ECS004RC

1. CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
- Shift solenoid valve A
- Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminals and ground.

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



OK or NG

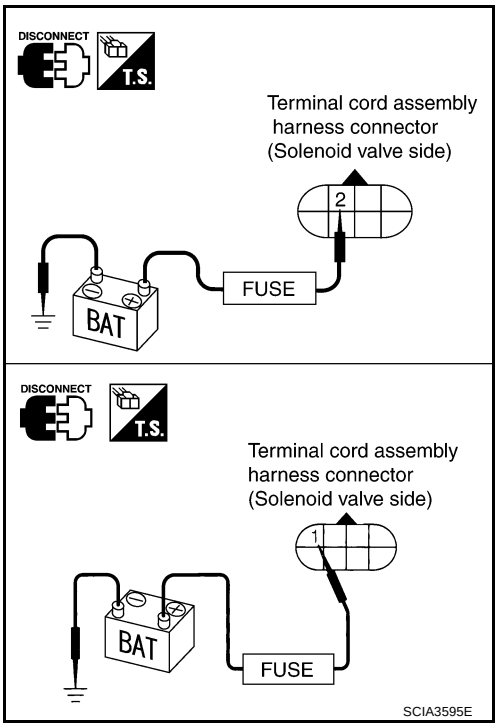
OK >> GO TO 2.
NG >> Repair or replace shift solenoid valve assembly.

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
- Shift solenoid valve A
- Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

OK or NG

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



3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to 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 4.
NG >> Repair control valve assembly.

4. CHECK DTC

Perform AT-125, "DTC Confirmation Procedure" .

OK or NG

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

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)

On Board Diagnostic Logic

ECS00CTV

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

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

*: P0732 is detected.

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

Possible Cause

ECS00CTW

Check the following items.

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

DTC Confirmation Procedure

ECS00CTX

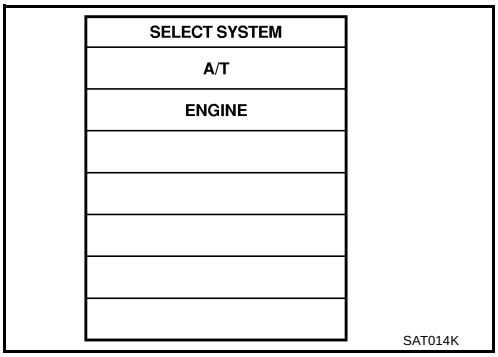
CAUTION:

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

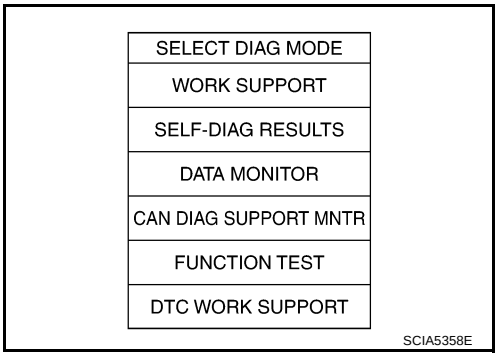
NOTE:
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.
TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure 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”.

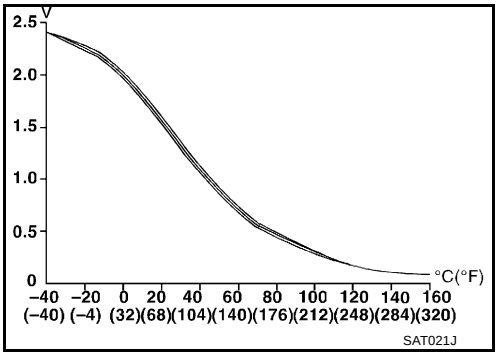


4. Accelerate vehicle to 35 to 40 km/h (22 to 25 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   Selector lever: D position (OD “ON”)
   - **Make sure that “GEAR” shows “3” or “4” after releasing pedal.**
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-133, "Diagnostic Procedure" .
   If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.
   - **Make sure that “GEAR” shows “2” when depressing accelerator pedal to WOT.**
   - **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAGNOSIS” for “ENGINE”. In case a 1st trip DTC other than P0732 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.**
6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)



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

8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “Diagnostic Procedure”.)
   Refer to AT-133, "Diagnostic Procedure" .
   Refer to AT-530, "Shift Schedule" .



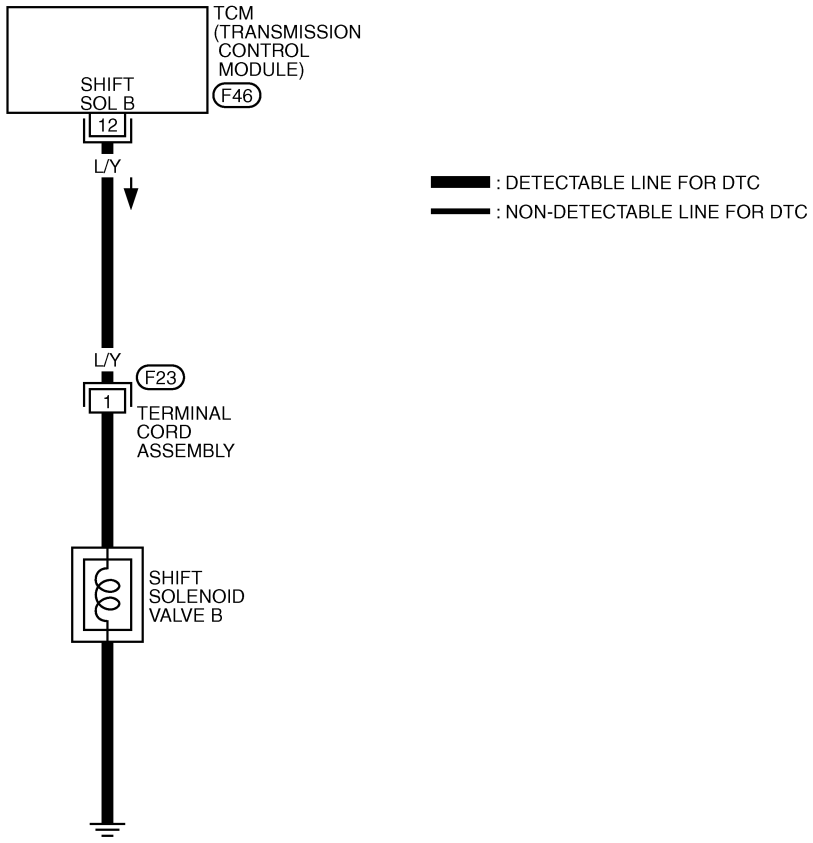
WITH GST

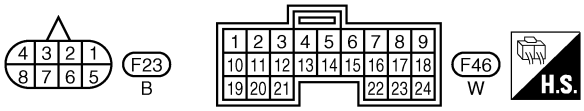
Follow the procedure “WITH CONSULT-II”.

Wiring Diagram — AT — 2NDSIG

ECS004RF

AT-2NDSIG-01





TCWA0050E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

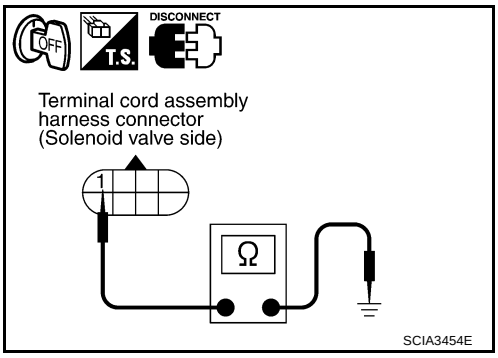
Diagnostic Procedure

ECS004RG

1. CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
- Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminal and ground.

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



OK or NG

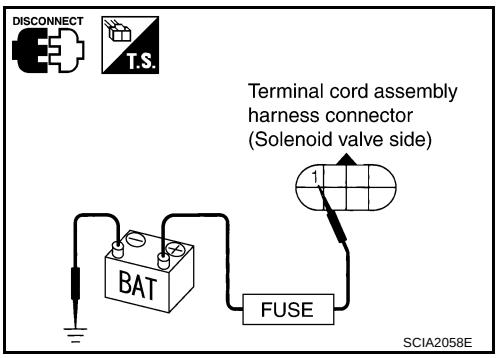
OK >> GO TO 2.
NG >> Repair or replace shift solenoid valve assembly.

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
- Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

OK or NG

OK >> GO TO 3.
NG >> Repair to replace shift solenoid valve assembly.



3. 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 4.
NG >> Repair control valve assembly.

4. CHECK DTC

Perform AT-130, "DTC Confirmation Procedure" .

OK or NG

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

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)

On Board Diagnostic Logic

ECS00CTY

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

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

*: P0733 is detected.

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

Possible Cause

ECS00CTZ

Check the following items.

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

DTC Confirmation Procedure

ECS00CU0

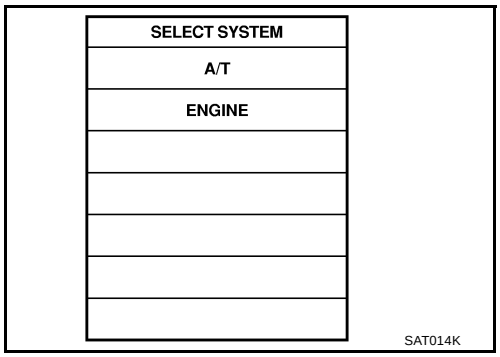
CAUTION:

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

NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 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

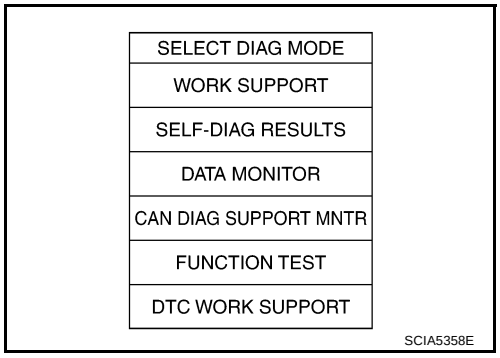
1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase 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”)

– **Make sure 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-138, "Diagnostic Procedure" .
   If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.



– **Make sure that “GEAR” shows “3” when depressing accelerator pedal with 3.5/8 - 4.5/8 of “THROTTLE POSI”.**

– **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAGNOSIS” for “ENGINE”. In case a 1st trip DTC other than P0733 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.**

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

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

8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to Diagnostic Procedure.)
   Refer to AT-138, "Diagnostic Procedure" .
   Refer to AT-530, "Shift Schedule" .

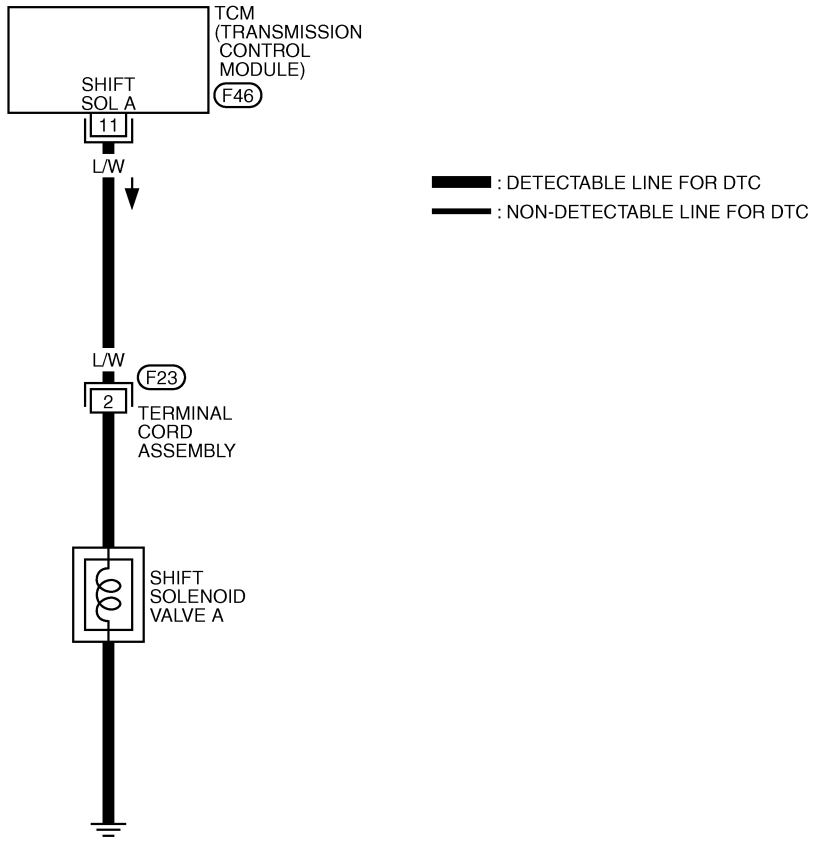
WITH GST

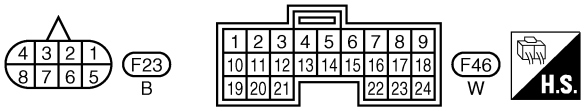
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — 3RDSIG

ECS004RJ

AT-3RDSIG-01





TCWA0051E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

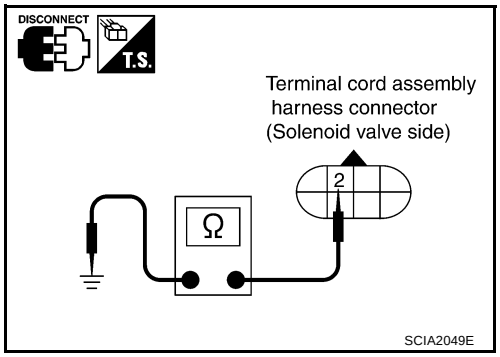
Diagnostic Procedure

ECS004RK

1. CHECK SHIFT SOLENOID VALVE

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
– Shift solenoid valve A
2. Check resistance between terminal cord assembly harness connector terminal and ground.

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

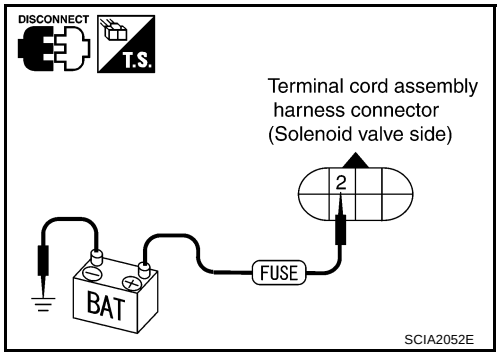


OK or NG

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

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer toAT-404, "Control Valve Assembly and Accumulators" .
– Shift solenoid valve A
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



OK or NG

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

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to 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 4.
NG >> Repair control valve assembly.

4. CHECK DTC

Perform AT-135, "DTC Confirmation Procedure" .

OK or NG

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

DTC P0734 A/T 4TH GEAR FUNCTION

PFP: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) ↓ Large throttle opening (High line pressure)	Approximately 24% ↓ Approximately 95%

On Board Diagnosis Logic

ECS00CU1

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction. This malfunction will be caused when shift solenoid valve 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 : P0734	A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	● Shift solenoid valve A ● Shift solenoid valve B ● Line pressure solenoid valve ● Each clutch ● Hydraulic control circuit

Possible Cause

ECS00CU2

Check the following items.

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

DTC Confirmation Procedure

ECS00CU3

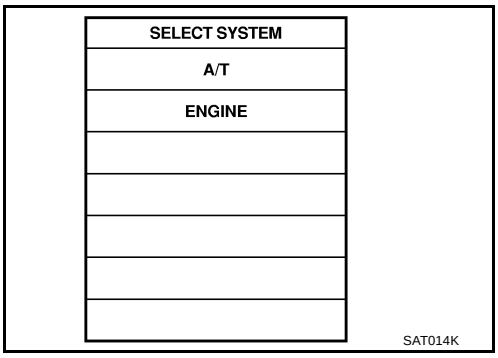
CAUTION:

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

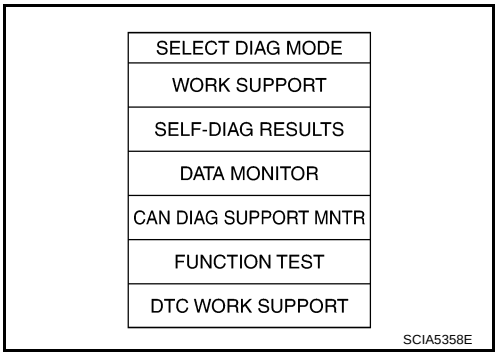
NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.
TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select "4TH GR FNCTN P0734" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".

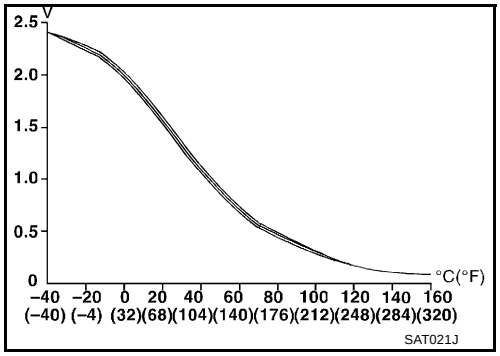


4. Accelerate vehicle to 55 to 65 km/h (34 to 40 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 5.5/8 (at all times during step 4)
   Selector lever: D position (OD "ON")
   - **Check that "GEAR" shows "3" after releasing pedal.**
5. Depress 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-144, "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 Diagnostic Procedure.)
   Refer to AT-144, "Diagnostic Procedure" .
   Refer to AT-530, "Shift Schedule" .

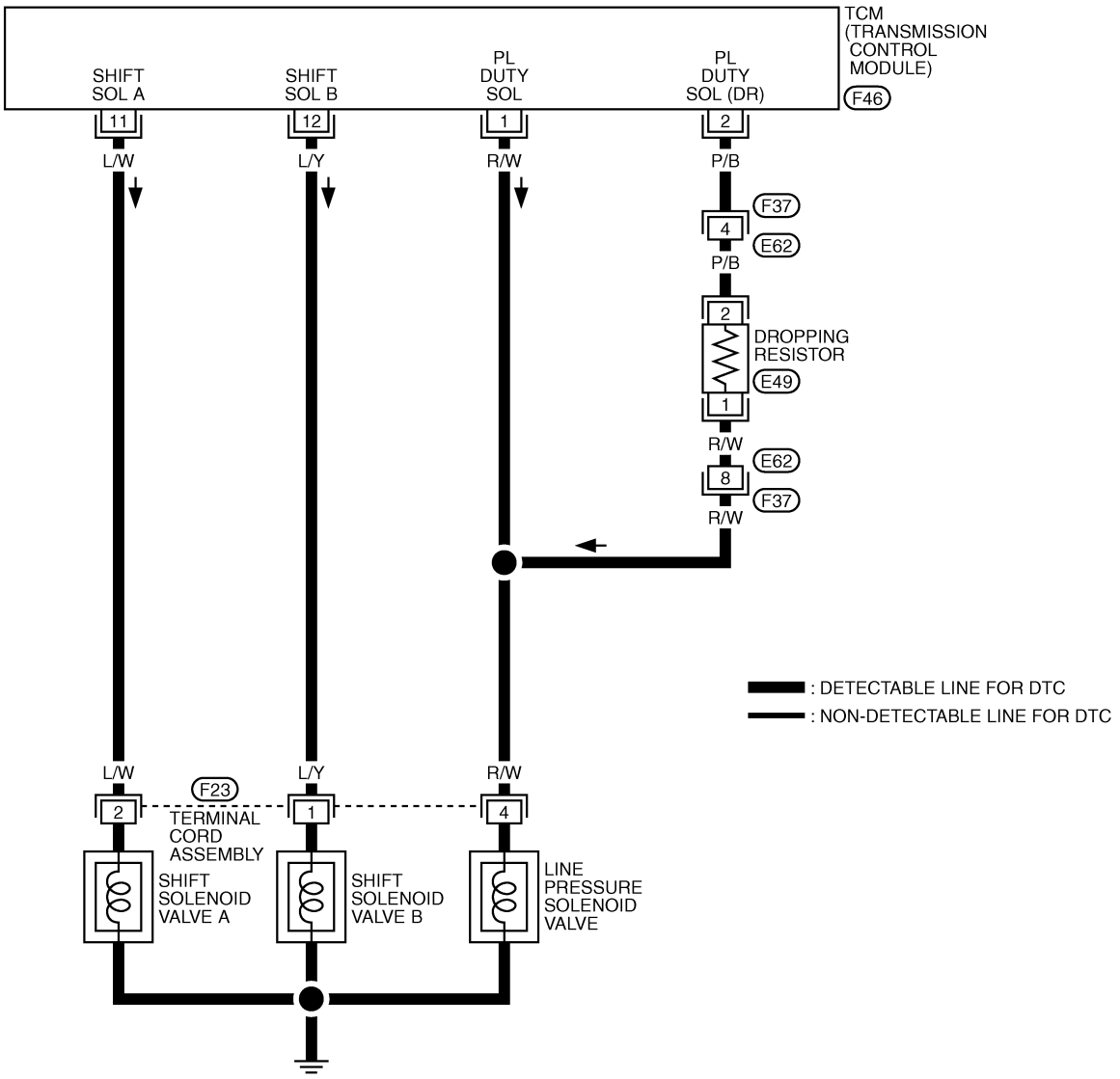
WITH GST

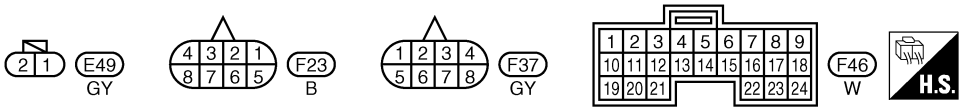
Follow the procedure “WITH CONSULT-II”.

Wiring Diagram — AT — 4THSIG

ECS004RN

AT-4THSIG-01





TCWA0052E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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 “D_1 ” or “D_4 ”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D_2 ” or “D_3 ”.)	0V
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in “D_1 ” or “D_2 ”.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in “D_3 ” or “D_4 ”.)	0V

Diagnostic Procedure

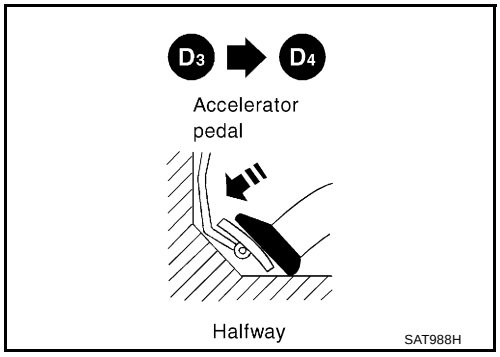
ECS004RO

1. CHECK SHIFT UP (D_3 TO D_4)

During AT-78, "Cruise Test — Part 1" .

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

YES >> GO TO 11.
NO >> GO TO 2.



2. CHECK LINE PRESSURE

Perform line pressure test.
Refer to AT-68, "Line Pressure Test" .

OK or NG

OK >> GO TO 3.
NG >> GO TO 7.

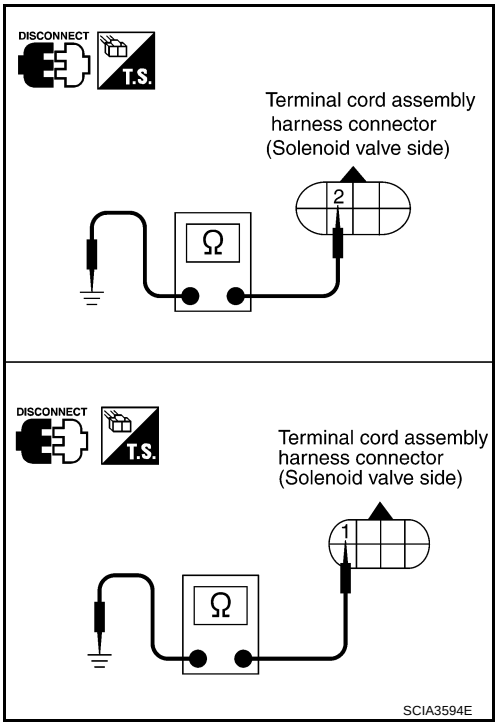
3. CHECK SOLENOID VALVES

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
- Shift solenoid valve A
- Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminals and ground.

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

OK or NG

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

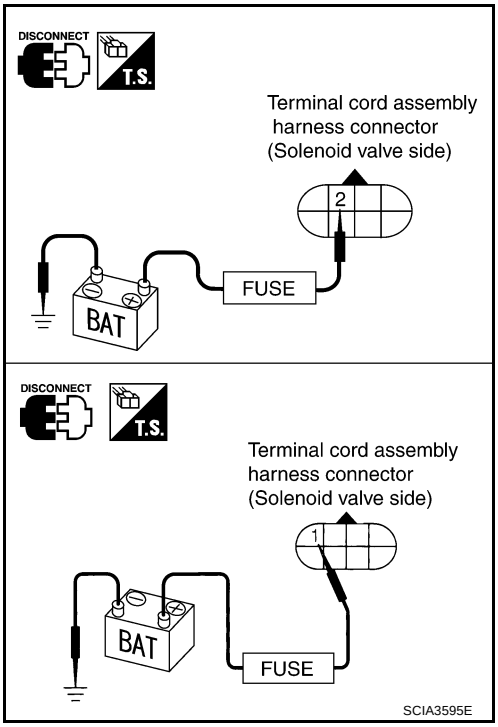


4. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
- Shift solenoid valve A
- Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

OK or NG

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



5. 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

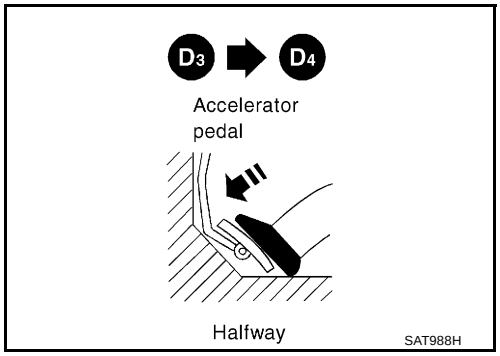
OK >> GO TO 6.
NG >> Repair control valve.

6. CHECK SHIFT UP (D_3 TO D_4)

During AT-78, "Cruise Test — Part 1" .

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

YES >> GO TO 11.
NO >> Check control valve again.Repair or replace control valve assembly.



7. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .

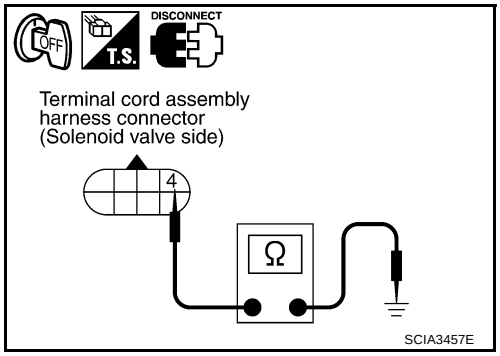
– Line pressure solenoid valves

2. Check resistance between terminal cord assembly harness connector terminal and ground.

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

OK or NG

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



8. CHECK VALVE OPERATION

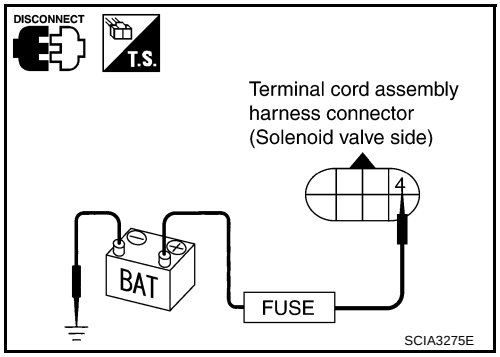
1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .

– Line pressure solenoid valves

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

OK or NG

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



9. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-448, "Control Valve Assembly" .
2. Check line pressure circuit valves for sticking.

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

OK or NG

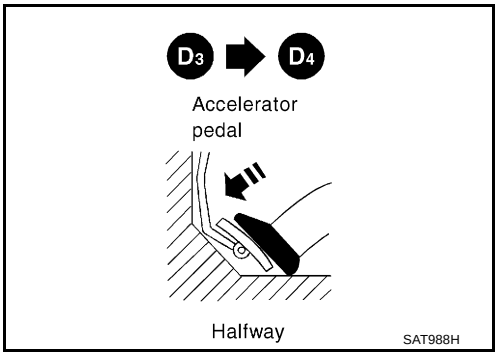
OK >> GO TO 10.
NG >> Repair control valve.

10. CHECK SHIFT UP (D_3 TO D_4)

During AT-78, "Cruise Test — Part 1" .

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

YES >> GO TO 11.
NO >> Check control valve again. Repair or replace control valve assembly.



11. CHECK DTC

Perform AT-141, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Perform AT-78, "Cruise Test — Part 1" again and return to the start point of this test group.

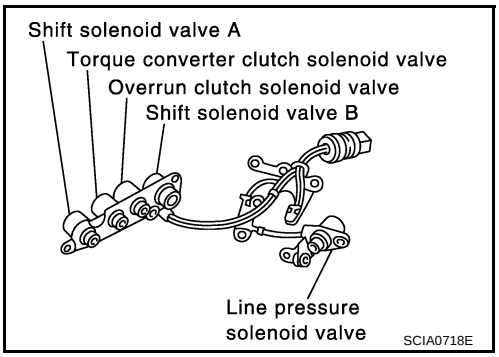
DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

PFP:31940

Description

ECS004RQ

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 ↓ Lock-up ON	Approximately 4% ↓ Approximately 94%

On Board Diagnosis Logic

ECS00CU4

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.	● Harness or connectors (The solenoid circuit is open or shorted.) ● T/C clutch solenoid valve
: P0740		

Possible Cause

ECS00CU5

Check the following items.

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

DTC Confirmation Procedure

ECS00CU6

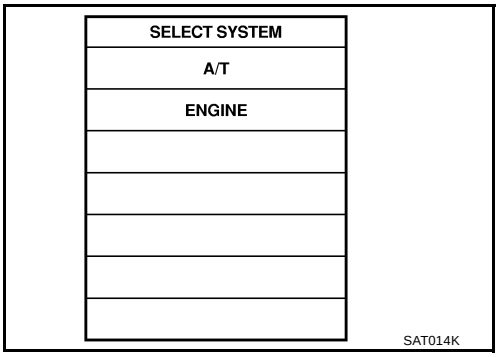
CAUTION:

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

NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.
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 "A/T" 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.
4. If the check result is NG go to AT-151, "Diagnostic Procedure" .

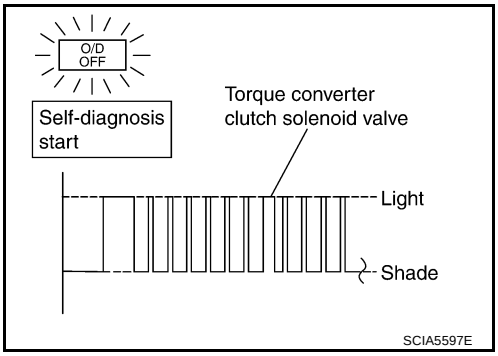


WITH GST

Follow the procedure “WITH CONSULT-II”.

WITHOUT CONSULT-II

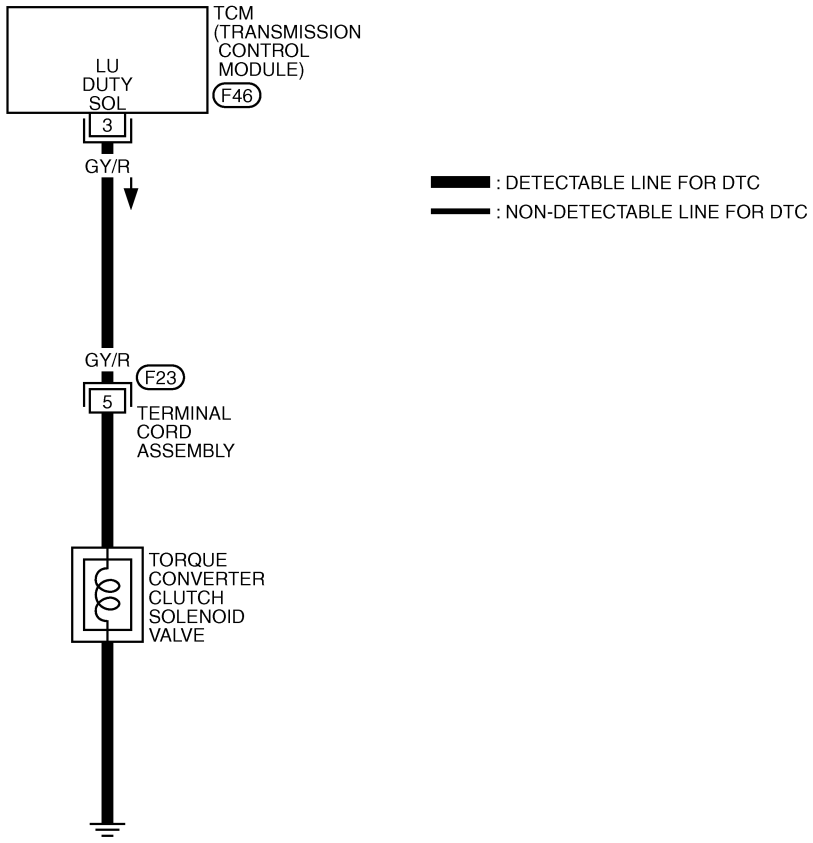
1. Start engine.
2. Drive vehicle in $D_1 \rightarrow D_2 \rightarrow D_3 \rightarrow D_4 \rightarrow D_4$ lock-up position.
3. Perform self-diagnosis.
   Refer toAT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-151, "Diagnostic Procedure" .

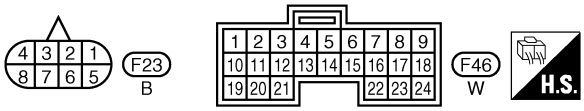


Wiring Diagram — AT — TCV

ECS004RR

AT-TCV-01





TCWA0043E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

Diagnostic Procedure

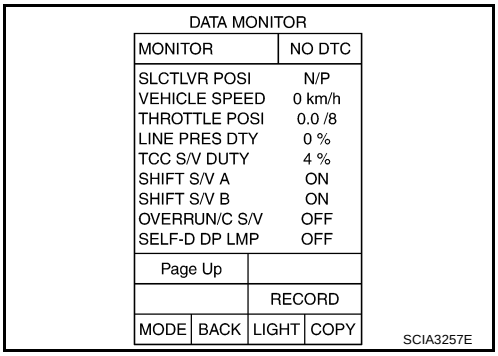
ECS004RS

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “TCC S/V DUTY” while driving.
   Check the value changes according to driving speed.

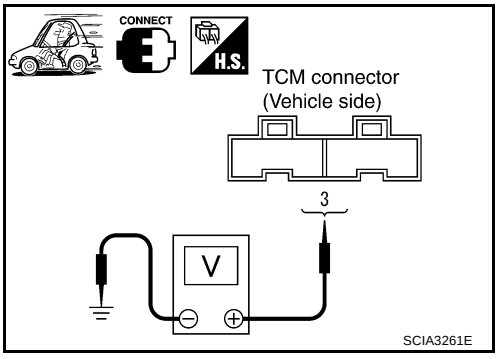
Monitor item	Condition	Display value
TCC S/V DUTY (%)	Lock-up OFF ↓ Lock-up ON	Approx. 4% ↓ Approx. 94%



Without CONSULT-II

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

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgement standard (Approx.)
Torque converter clutch solenoid valve	F46	3 (GY/R) - Ground	When A/T performs lock-up.	8 - 15V
			When A/T does not perform lock-up.	0V



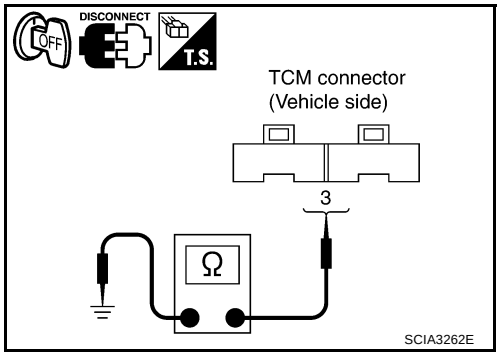
OK or NG

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

2. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector No.	Terminal No. (Wire color)	Resistance (Approx.)
Torque converter clutch solenoid valve	F46	3 (GY/R) - Ground	5 - 20 Ω



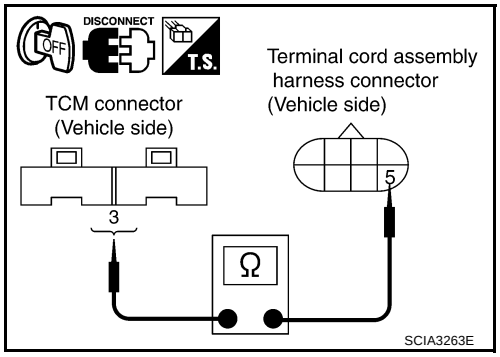
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	3 (GY/R)	Yes
Terminal cord assembly harness connector	F23	5 (GY/R)	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

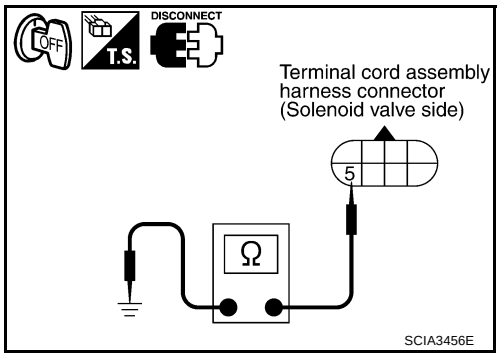
OK or NG

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

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Resistance : 5 - 20Ω



OK or NG

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

5. CHECK DTC

Perform AT-148, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

Component Inspection

ECS004RT

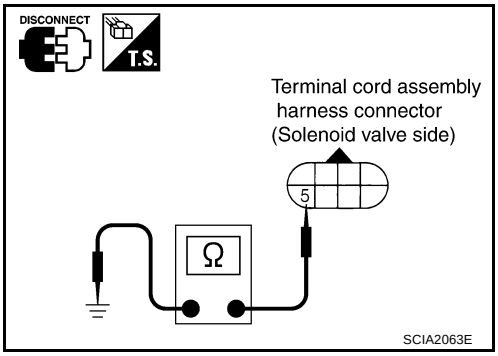
TORQUE CONVERTER CLUTCH SOLENOID VALVE

- For removal, refer to AT-404, "Control Valve Assembly and Accumulators" .

Resistance Check

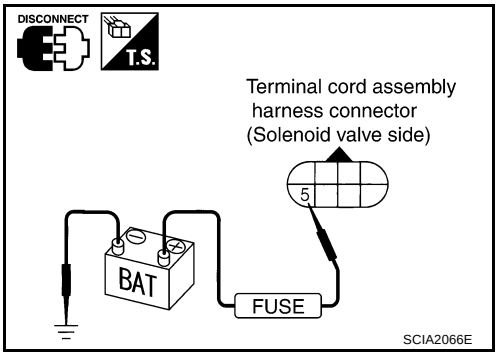
- Check resistance between terminal and ground.

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

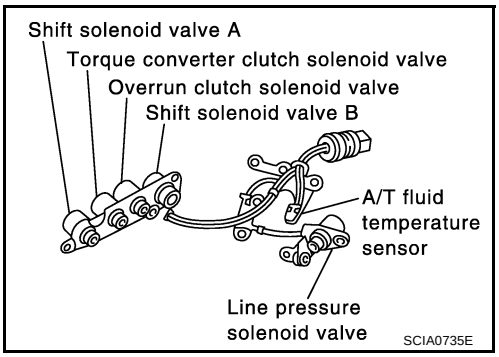
PFP:31940

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) ↓ Large throttle opening (High line pressure)	Approximately 0% ↓ Approximately 95%

NOTE:

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

On Board Diagnosis Logic

ECS00CU7

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: LINE PRESSURE S/V	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Line pressure solenoid valve
GST : P0745		

Possible Cause

ECS00CU8

Check the following items.

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

DTC Confirmation Procedure

ECS00CU9

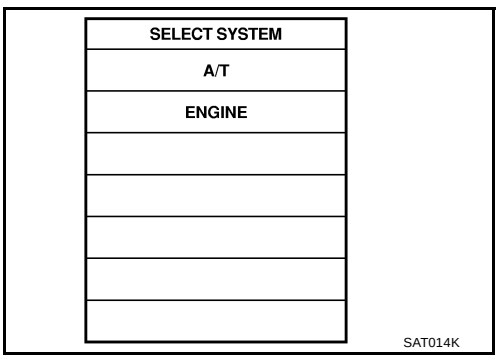
NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.

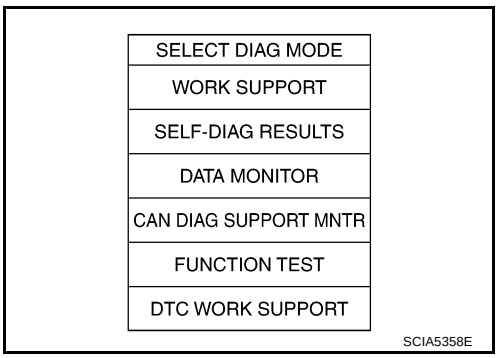
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

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



2. Depress accelerator pedal completely and wait at least 5 seconds.
3. If check result is NG, go to AT-157, "Diagnostic Procedure" .

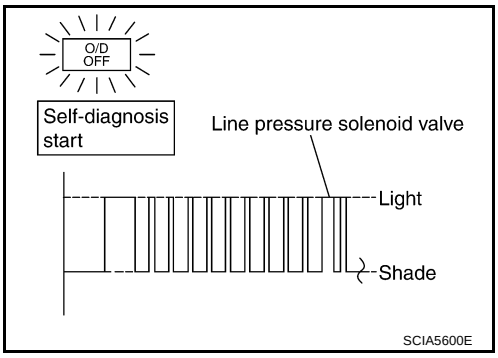


WITH GST

Follow the procedure “WITH CONSULT-II”.

WITHOUT CONSULT-II

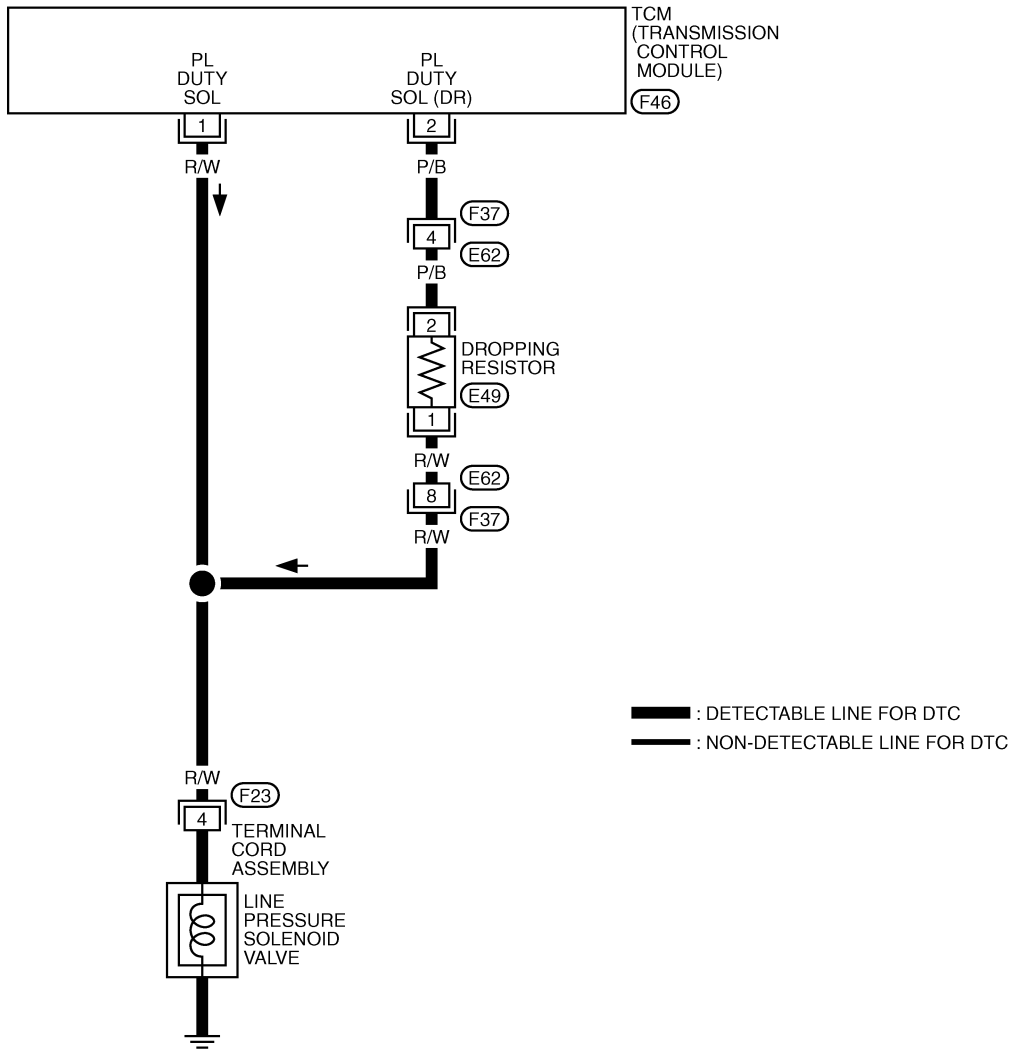
1. Start engine.
2. With brake pedal depressed, shift the lever from P → N → D → N → P positions.
3. Perform safe-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-157, "Diagnostic Procedure" .

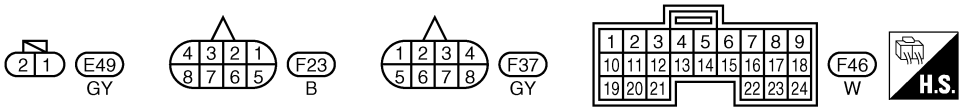


Wiring Diagram — AT — LPSV

ECS004RV

AT-LPSV-01





TCWA0046E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

Diagnostic Procedure

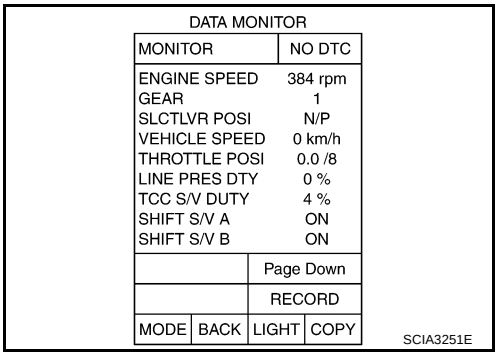
ECS004RW

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “LINE PRES DTY” while driving.
   Check the value changes according to driving speed.

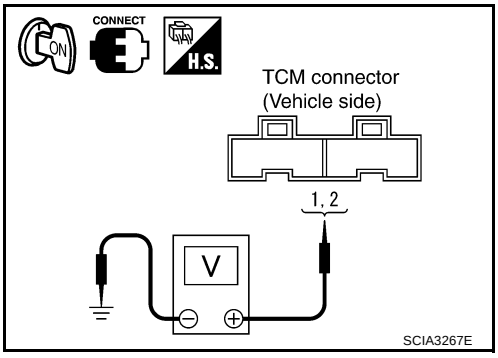
Monitor item	Condition	Display value
LINE PRES DTY (%)	Line pressure low – Line pressure high	0% – 95%



Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminal and ground.

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgement standard (Approx.)
Line pressure solenoid valve	F46	1 (R/W) - Ground	When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
			When depressing accelerator pedal fully after warming up engine.	0V
Line pressure solenoid valve (with dropping resistor)	F46	2 (P/B) - Ground	When releasing accelerator pedal after warming up engine.	5 - 14V
			When depressing accelerator pedal fully after warming up engine.	0V



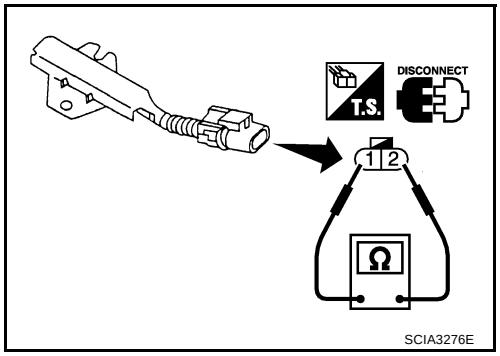
OK or NG

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

2. CHECK DROPPING RESISTOR

1. Turn ignition switch OFF.
2. Disconnect dropping resistor harness connector in engine room.
3. Check resistance between terminal 1 and 2.

Resistance: Approx.12Ω



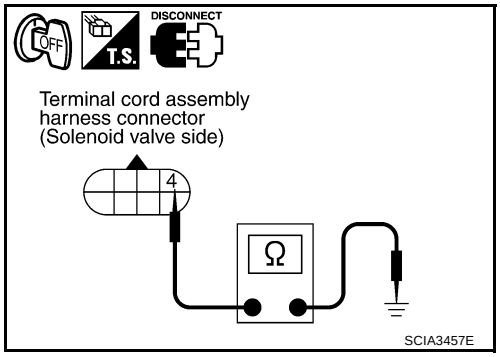
OK or NG

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

3. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Resistance: 2.5 - 5Ω



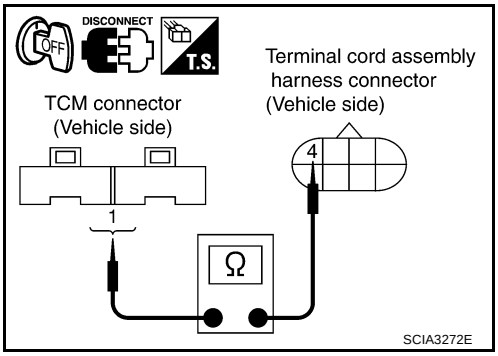
OK or NG

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

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

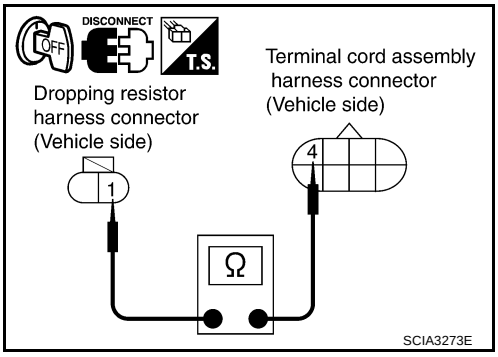
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	1 (R/W)	Yes
Terminal cord assembly harness connector	F23	4 (R/W)	



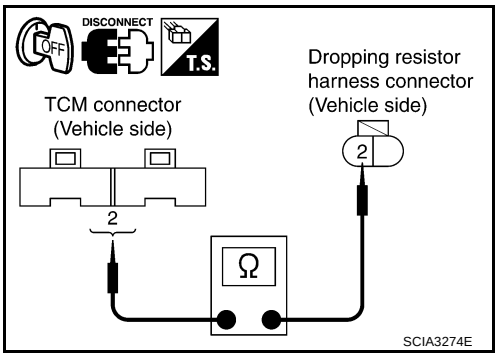
4. Check continuity between terminal cord assembly harness connector terminal and dropping resistor harness connector terminal.

Item	Connector No.	Terminal No. (Wire color)	Continuity
Dropping resistor harness connector	E49	1 (R/W)	Yes
Terminal cord assembly harness connector	F23	4 (R/W)	



5. Check continuity between dropping resistor harness connector terminal and TCM connector terminal.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	2 (P/B)	Yes
Dropping resistor harness connector	E49	2 (P/B)	



6. If OK, check harness for short to ground and short to power.
7. If OK, check continuity between ground and transaxle assembly.
8. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK DTC

Perform AT-154, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

Component Inspection

ECS004RX

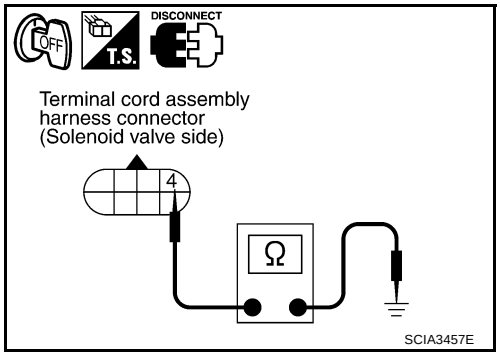
LINE PRESSURE SOLENOID VALVE

- For removal, refer to AT-404, "Control Valve Assembly and Accumulators" .

Resistance Check

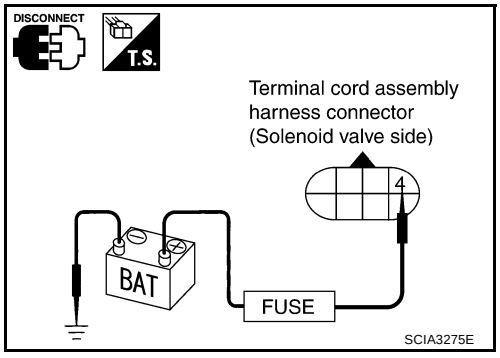
- Check resistance between terminal and ground.

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



Operation Check

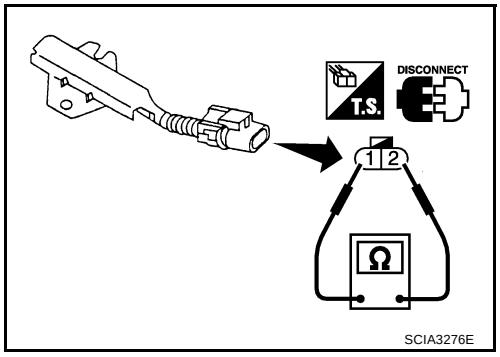
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DROPPING RESISTOR

- Check resistance between terminal 1 and 2.

Resistance: Approx.12Ω



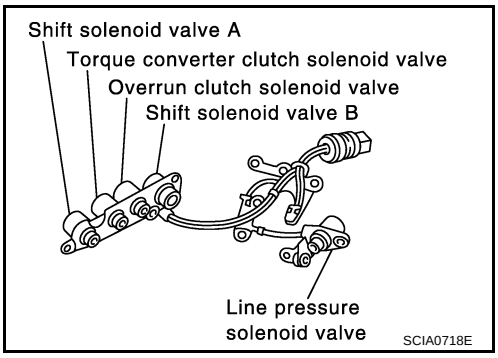
DTC P0750 SHIFT SOLENOID VALVE A

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)

CONSULT-II REFERENCE VALUE IN DATE MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Display value
SHIFT S/V A (ON/OFF)	When shift solenoid valve A operates. (When driving in D_1 or D_4 .)	ON
	When shift solenoid valve A does not operate. (When driving in D_2 or D_3 .)	OFF

On Board Diagnosis Logic

ECS00CUA

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: SHIFT SOLENOID/V A	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Shift solenoid valve A
: P0750		

Possible Cause

ECS00CUB

Check the following items.

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

DTC Confirmation Procedure

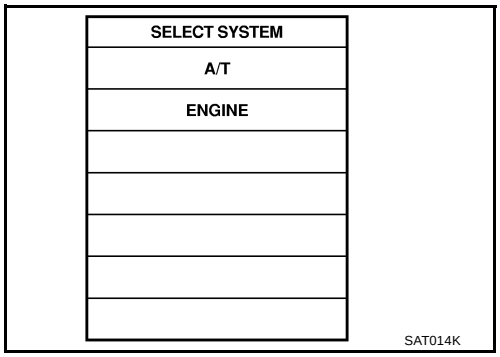
ECS00CUC

CAUTION:
Always drive vehicle at a safe speed.

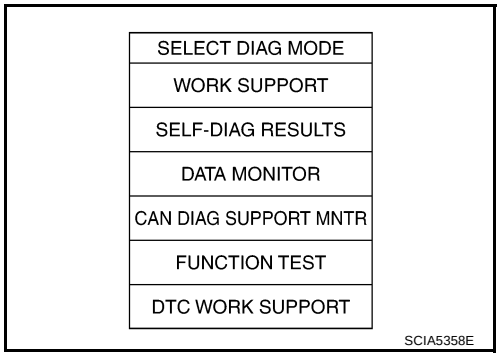
NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Start engine.



3. Drive vehicle in D position and allow the transmission to shift “1” → “2” (“GEAR”).
4. If the check result is NG, go to AT-164, "Diagnostic Procedure" .

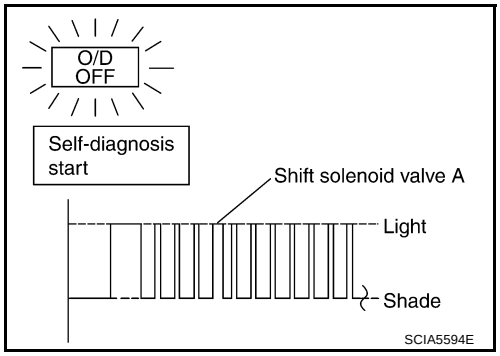


WITH GST

Follow the procedure “WITH CONSULT-II”.

WITHOUT CONSULT-II

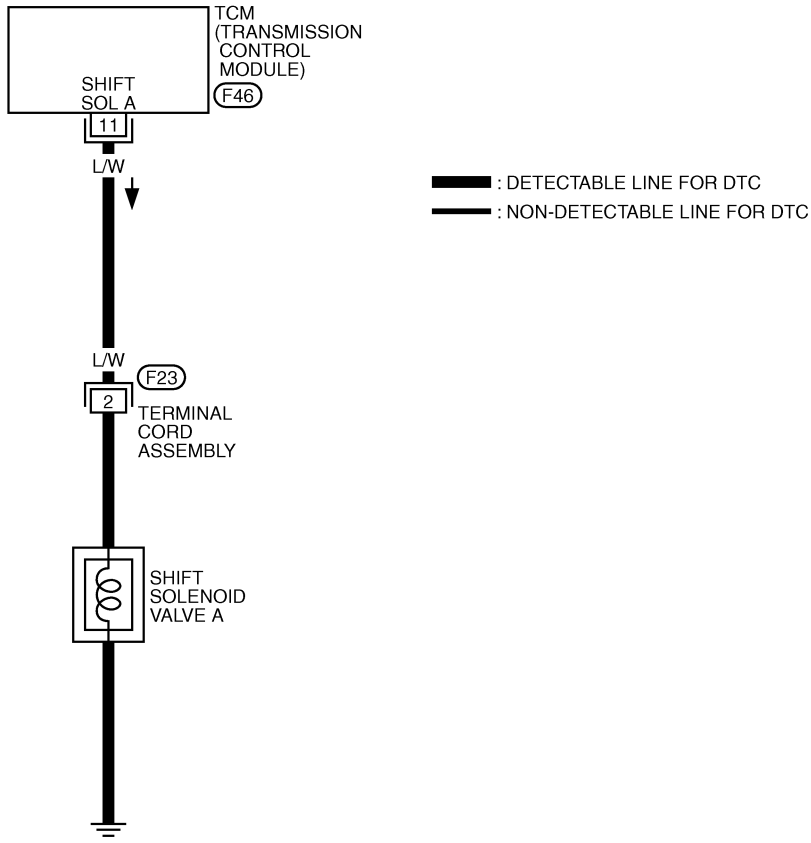
1. Start engine.
2. Drive vehicle in D_1 → D_2 position.
3. Perform safe-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-164, "Diagnostic Procedure" .

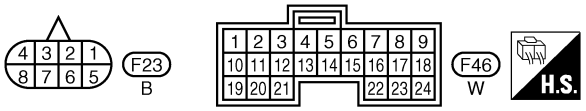


Wiring Diagram — AT — SSV/A

ECS004RZ

AT-SSV/A-01





TCWA0040E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

Diagnostic Procedure

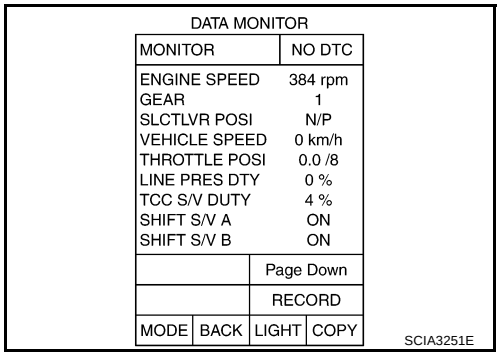
ECS004S0

1. CHECK INPUT SIGNAL

With CONSULT-II

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

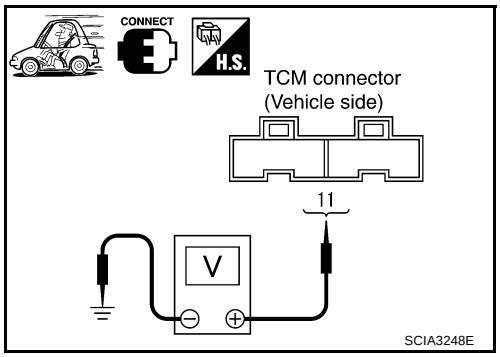
Monitor item	Condition	Display value
SHIFT S/V A	When shift solenoid valve A operates. (When driving in D1 or D4 .)	ON
	When shift solenoid valve A does not operate. (When driving in D2 or D3 .)	OFF



Without CONSULT-II

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

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgementstandard(Approx.)
Shift solenoid valve A	F46	11 (L/W) - Ground	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



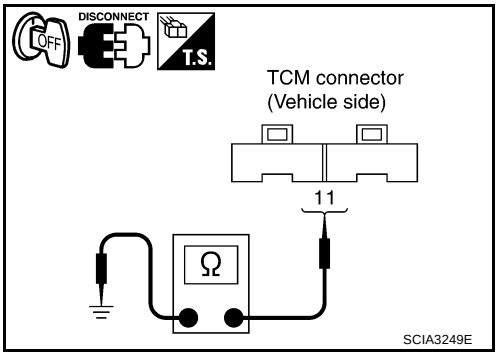
OK or NG

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

2. CHECK SHIFT SOLENOID VALVE A CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector No.	Terminal No. (Wire color)	Resistance (Approx.)
Shift solenoid valve A	F46	11 (L/W) - Ground	20 - 30 Ω



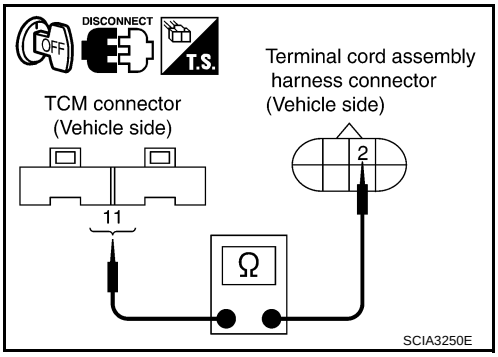
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	11 (L/W)	Yes
Terminal cord assembly harness connector	F23	2 (L/W)	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

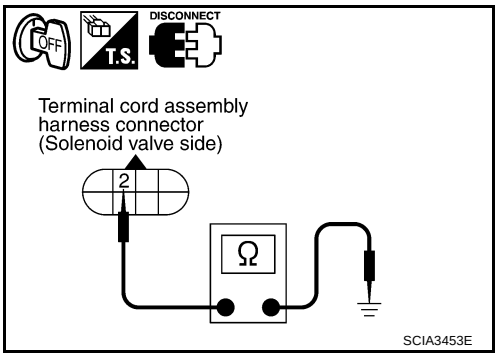
OK or NG

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

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Resistance : 20 - 30Ω



OK or NG

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

5. CHECK DTC

Perform AT-161, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

Component Inspection

ECS004S1

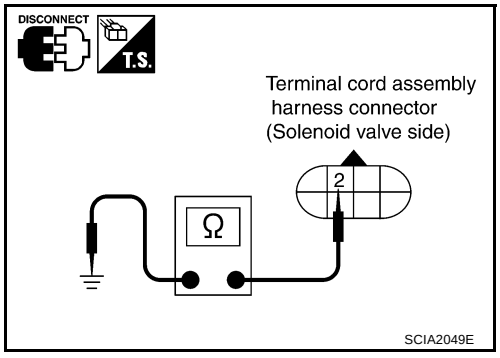
SHIFT SOLENOID VALVE A

- For removal, refer to AT-404, "Control Valve Assembly and Accumulators" .

Resistance Check

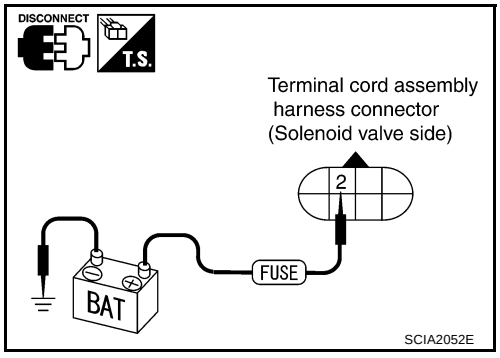
- Check resistance between terminal and ground.

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.



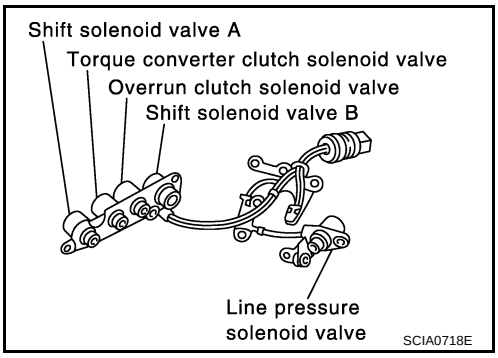
DTC P0755 SHIFT SOLENOID VALVE B

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)

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Display value
SHIFT S/V B (ON/OFF)	When shift solenoid valve B operates. (When driving in D_1 or D_2 .)	ON
	When shift solenoid valve B does not operate. (When driving in D_3 or D_4 .)	OFF

On Board Diagnosis Logic

ECS00CUD

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

Possible Cause

ECS00CUE

Check the following items.

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

DTC Confirmation Procedure

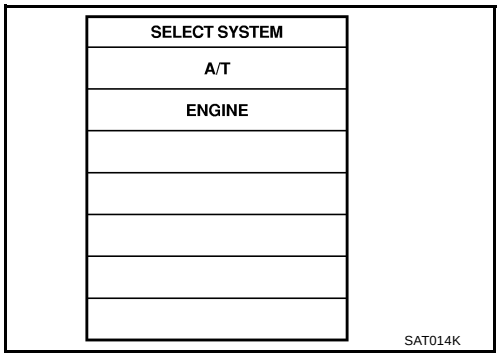
ECS00CUF

CAUTION:
Always drive vehicle at a safe speed.

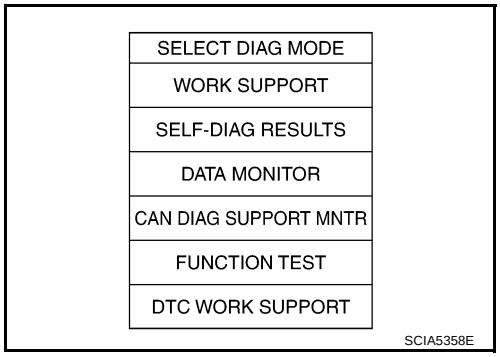
NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Start engine.



3. Drive vehicle in D position and allow the transmission to shift 1 → 2 → 3 (“GEAR”).
4. If the check result is NG, go to AT-170, "Diagnostic Procedure" .

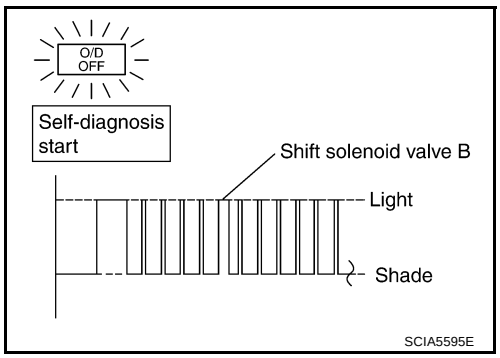


WITH GST

Follow the procedure “WITH CONSULT-II”.

WITHOUT CONSULT-II

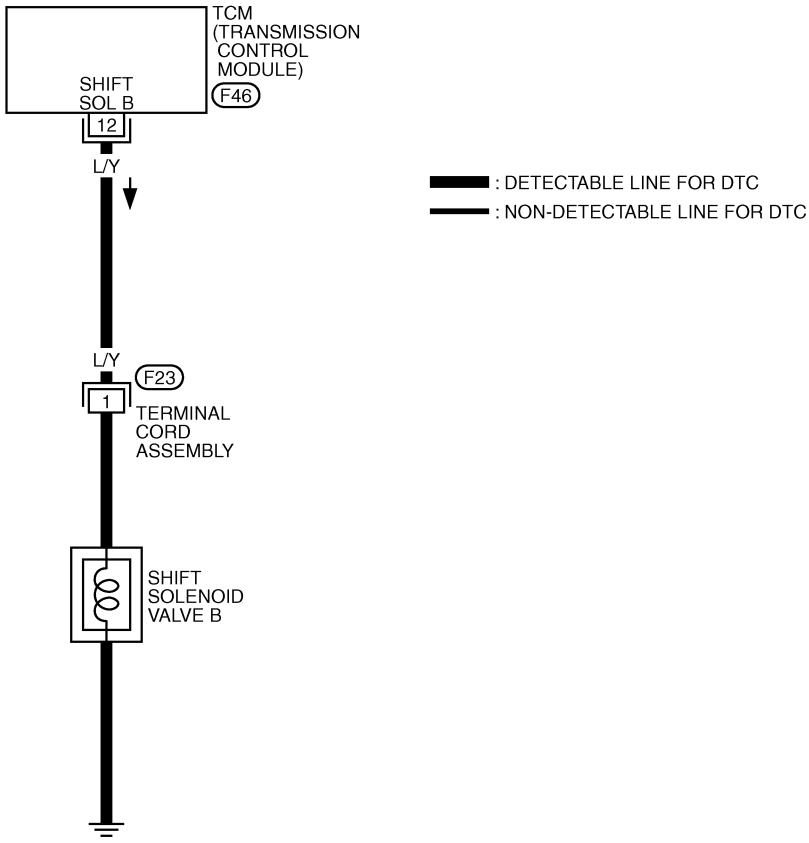
1. Start engine.
2. Drive vehicle in D → D2 → D3 position.
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-170, "Diagnostic Procedure" .

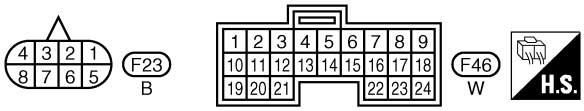


Wiring Diagram — AT — SSV/B

ECS004S3

AT-SSV/B-01





TCWA0041E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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 D_1 or D_2 .)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in D_3 or D_4 .)	0V

Diagnostic Procedure

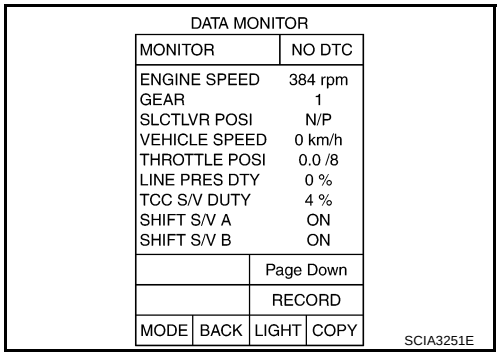
ECS004S4

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “SHIFT S/V B” while driving.
   Check the value changes according to driving speed.

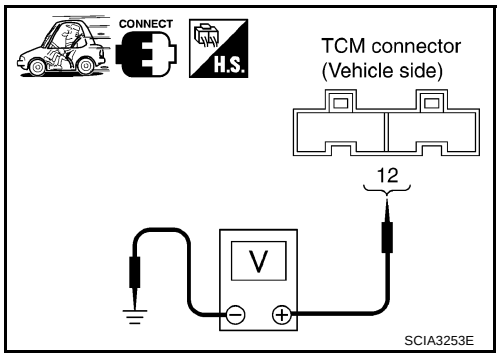
Monitor item	Condition	Display value
SHIFT S/V B	When shift solenoid valve B operates. (When driving in D_1 or D_2 .)	ON
	When shift solenoid valve B does not operate. (When driving in D_3 or D_4 .)	OFF



Without CONSULT-II

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

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgementstandard(Approx.)
Shift solenoid valve B	F46	12 (L/Y) - Ground	When shift solenoid valve B operates. (When driving in D_1 or D_2 .)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in D_3 or D_4 .)	0V



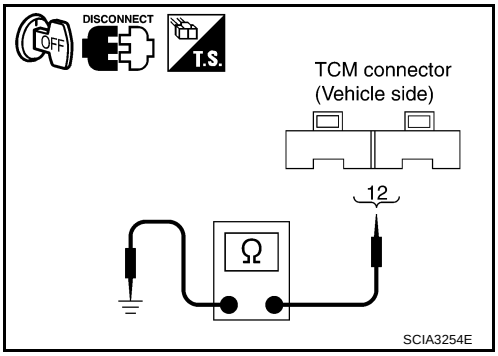
OK or NG

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

2. CHECK SHIFT SOLENOID VALVE B CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector No.	Terminal No. (Wire color)	Resistance (Approx.)
Shift solenoid valve B	F46	12 (L/Y) - Ground	5 - 20 Ω



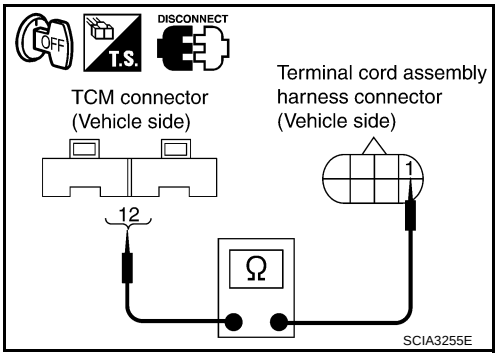
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	12 (L/Y)	Yes
Terminal cord assembly harness connector	F23	1 (L/Y)	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

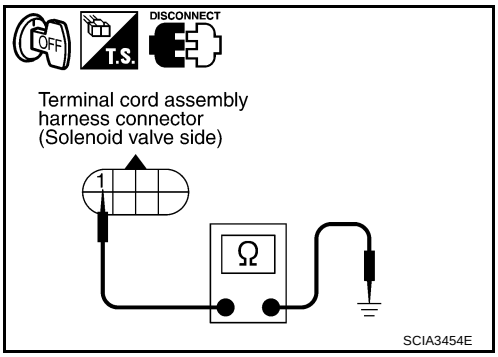
OK or NG

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

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Resistance : 5 - 20Ω



OK or NG

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

5. CHECK DTC

Perform AT-167, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

Component Inspection

ECS004S5

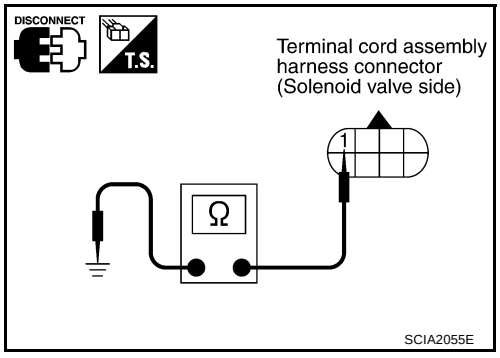
SHIFT SOLENOID VALVE B

- For removal, refer to AT-404, "Control Valve Assembly and Accumulators" .

Resistance Check

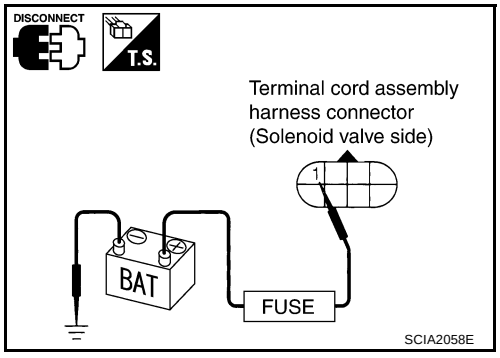
- Check resistance between terminal and ground.

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.



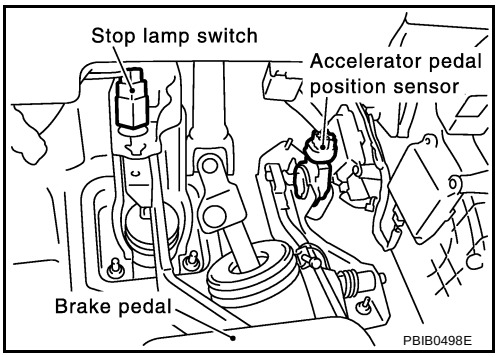
DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR

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

On Board Diagnosis Logic

ECS00CUG

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.	● Harness or connectors (The sensor circuit is open or shorted.) ● Accelerator pedal position (APP) sensor
: P1705		

Possible Cause

ECS00CUH

Harness or connector
(The sensor circuit is open shorted.)

DTC Confirmation Procedure

ECS00CUI

CAUTION:
Always drive vehicle at a safe speed.

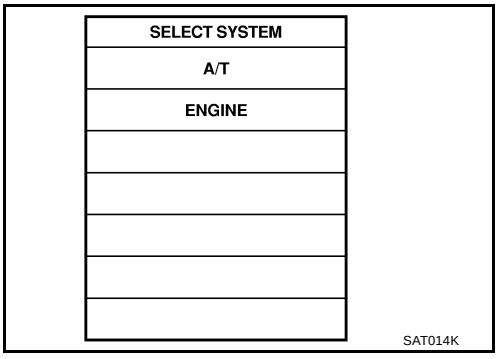
NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

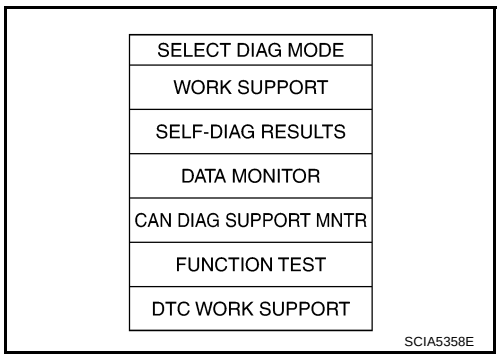
1. Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Check the following.

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-176, "Diagnostic Procedure" .
If the check result is OK, go to following step.



3. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
4. Start engine and maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   THRTL POS SEN: Approximately 3V or less
   Selector lever: D position (OD ON)
   If the check result is NG, go to AT-176, "Diagnostic Procedure" .
   If the check result is OK, go to following step.
5. Maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   Accelerator pedal: Wide open throttle
   Selector lever: D position (OD ON)

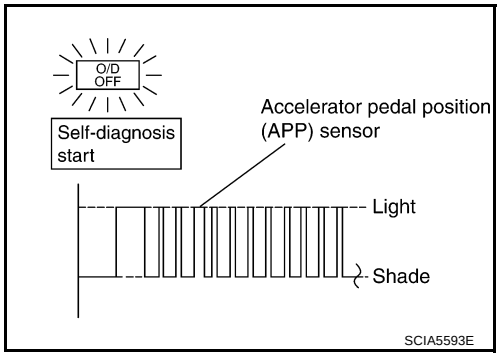


WITH GST

Follow the procedure “WITH CONSULT-II”.

WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions for more than 3 seconds.
   Selector lever position: D position
   Vehicle speed: 10km/h (6MPH) or more
   Throttle position: greater than 4.0/8 of the full throttle position
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-176, "Diagnostic Procedure" .

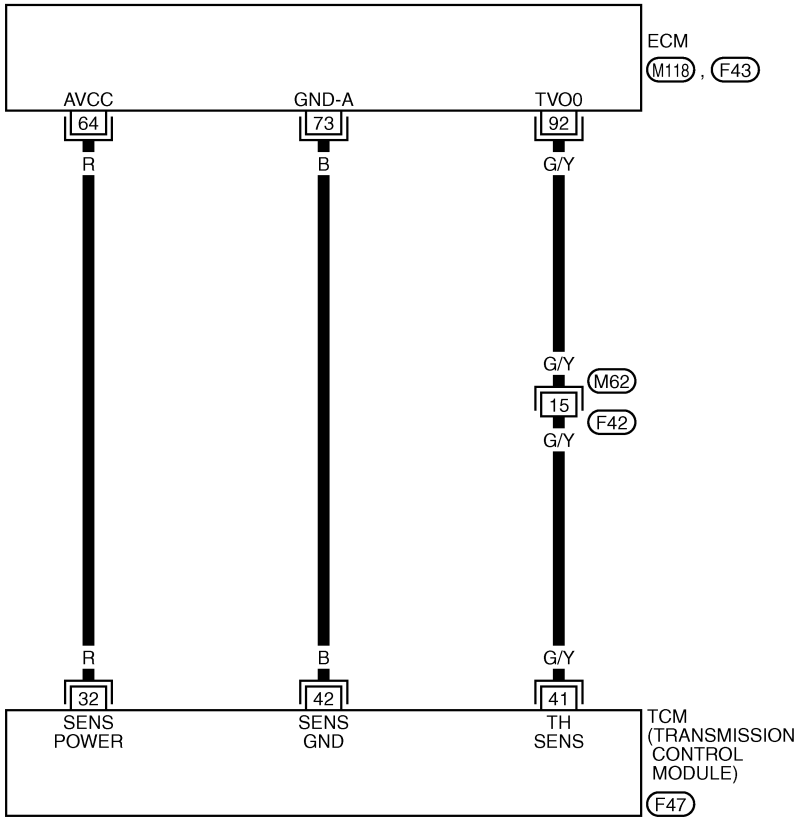


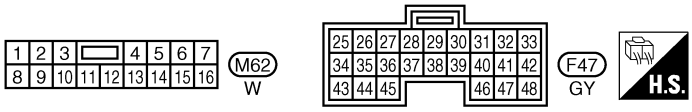
Wiring Diagram — AT — TPS

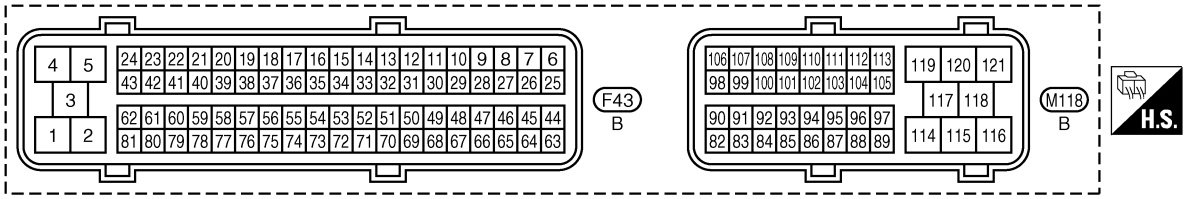
ECS004S7

AT-TPS-01

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

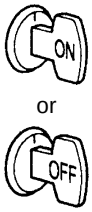






TCWA0233E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
32	R	Accelerator pedal position (APP) sensor (Power source)		When turning ignition switch ON	4.5 - 5.5V
				When turning ignition switch OFF	0V
41	G/Y	Accelerator pedal position (APP) sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Sensor ground	Always		0V

Diagnostic Procedure

ECS004S8

1. CHECK DTC WITH ECM

Perform diagnostic test mode II (self-diagnostic results) for engine control.
Refer to EC-64, "Malfunction Indicator (MI)" .

OK or NG

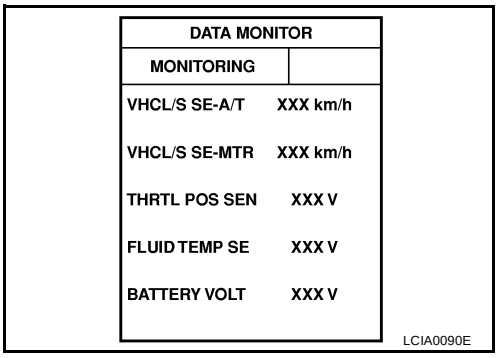
OK (With CONSULT-II)>>GO TO 2.
OK (Without CONSULT-II)>>GO TO 3.
NG >> Check throttle position sensor circuit for engine control.

2. CHECK INPUT SIGNAL

With CONSULT-II

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

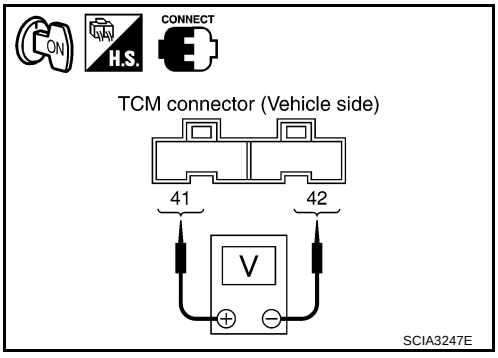
Monitor item	Condition	Display value
THRTL POS SEN (V)	When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.8V Fully-open throttle: 4.4V



Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals.

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgementstandard(Approx.)
Accelerator pedal position (APP) sensor	F47	41 (G/Y) - 42 (B)	When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.8V Fully-open throttle: 4.4V



OK or NG

OK >> GO TO 3.
NG >> Check harness for short or open between ECM and TCM regarding accelerator pedal position sensor circuit.

3. CHECK DTC

Perform AT-173, "DTC Confirmation Procedure" .

OK or NG

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

4. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

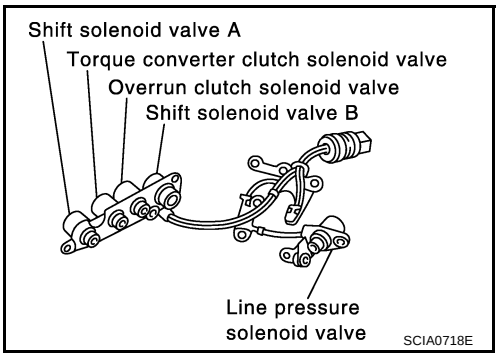
DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

PFP:31940

Description

ECS004S9

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



On Board Diagnosis Logic

ECS00CUJ

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: OVERRUN CLUTCH S/V	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Overrun clutch solenoid valve
GST : P1760		

Possible Cause

ECS00CUK

Check the following items.

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

DTC Confirmation Procedure

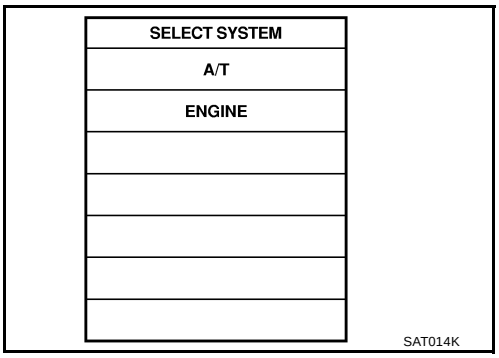
ECS00CUL

CAUTION:
Always drive vehicle at a safe speed.

NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.
TESTING CONDITION:
Always drive vehicle on a level road to improve accuracy of test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

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

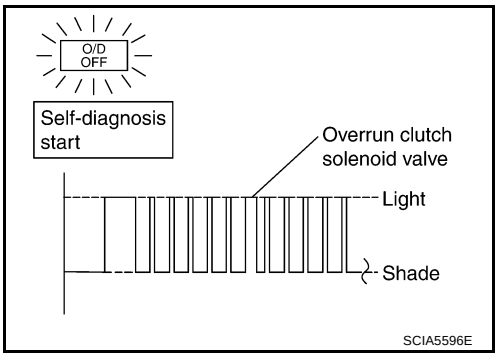


WITH GST

Follow the procedure "WITH CONSULT-II".

WITHOUT CONSULT-II

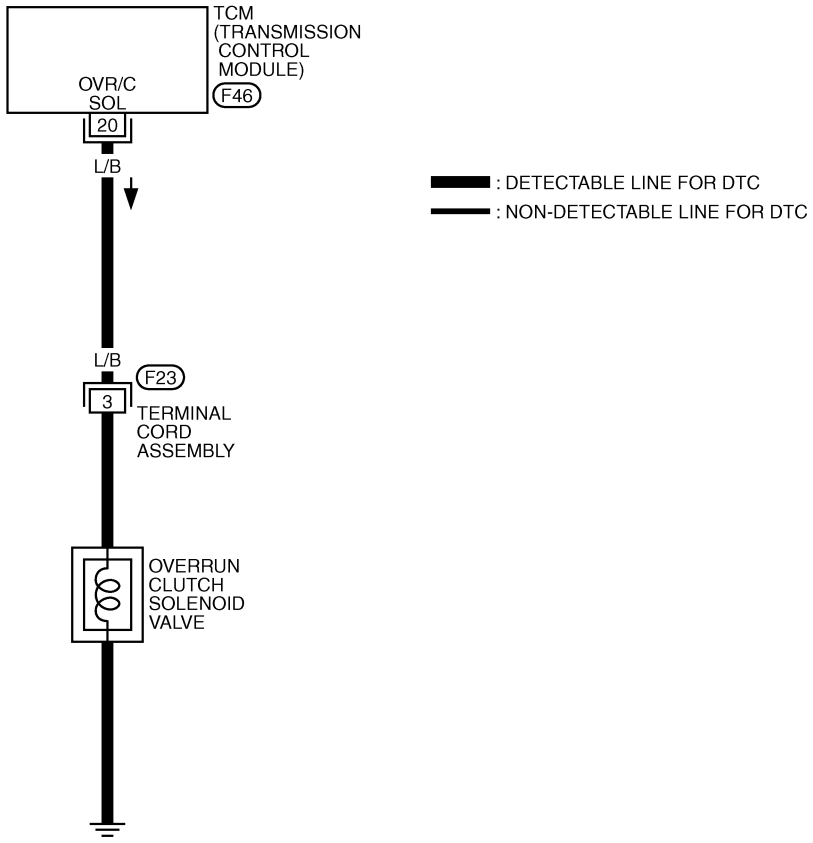
1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in 3rd position, vehicle speed higher than 10 km/h (6 MPH).
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-181, "Diagnostic Procedure" .

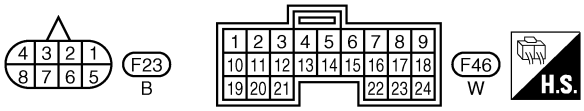


Wiring Diagram — AT — OVRCSV

ECS004SA

AT-OVRCSV-01





TCWA0042E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

Diagnostic Procedure

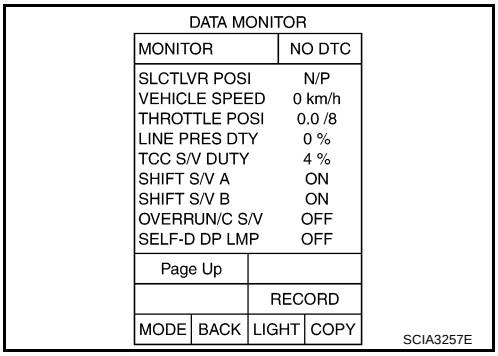
ECS004SB

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “OVERRUN/C S/V” while driving.
   Check the value changes according to driving speed.

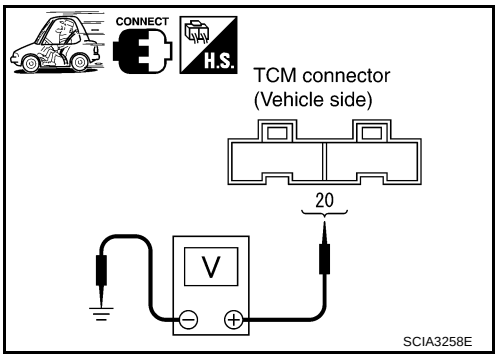
Monitor item	Condition	Display value
OVERRUN/C S/V	When overrun clutch solenoid valve operates.	ON
	When overrun clutch solenoid valve does not operate.	OFF



Without CONSULT-II

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

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgementstandard(Approx.)
Overrun clutch solenoid valve	F46	20 (L/B) - Ground	When overrun clutch solenoid valve operates.	Battery voltage
			When overrun clutch solenoid valve does not operate.	0V



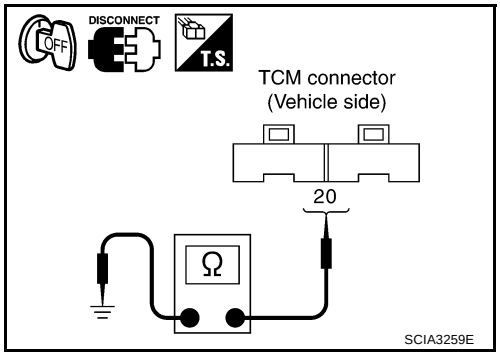
OK or NG

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

2. CHECK OVERRUN CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector No.	Terminal No. (Wire color)	Resistance (Approx.)
Overrun clutch solenoid valve	F46	20 (L/B) - Ground	20 - 30 Ω



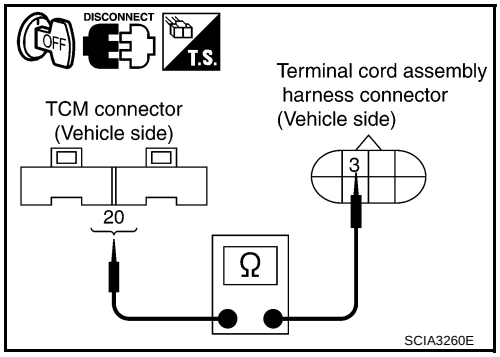
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	20 (L/B)	Yes
Terminal cord assembly harness connector	F23	3 (L/B)	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

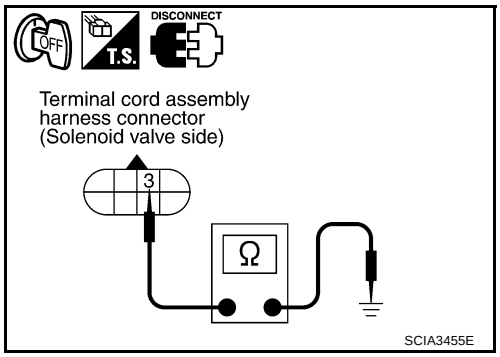
OK or NG

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

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Resistance: 20 - 30Ω



OK or NG

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

5. CHECK DTC

Perform AT-178, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

Component Inspection

ECS004SC

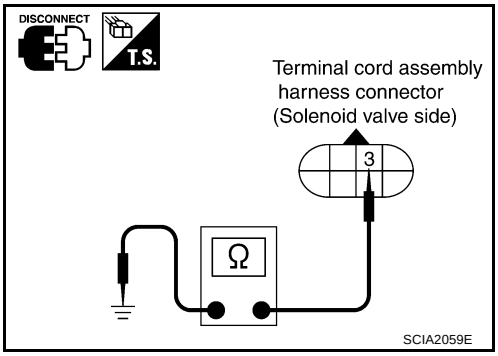
OVERRUN CLUTCH SOLENOID VALVE

- For removal, refer to AT-404, "Control Valve Assembly and Accumulators" .

Resistance Check

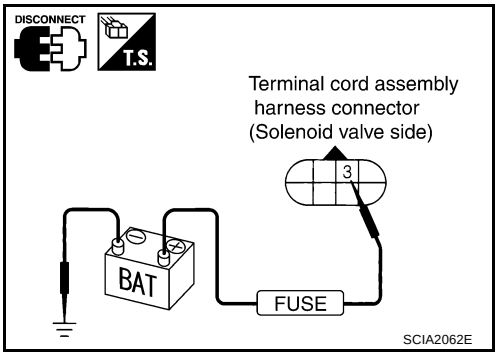
- Check resistance between terminal and ground.

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.



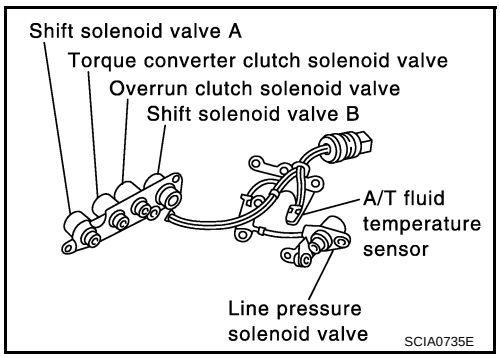
DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

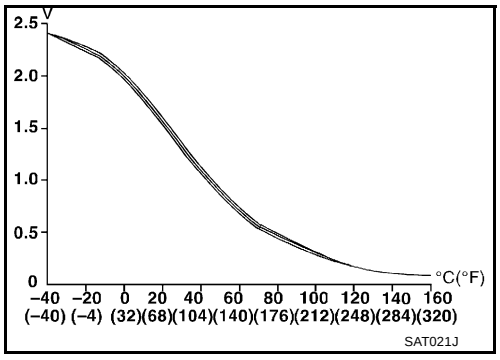
PFP:31940

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)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ

On Board Diagnosis Logic

ECS00CUP

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

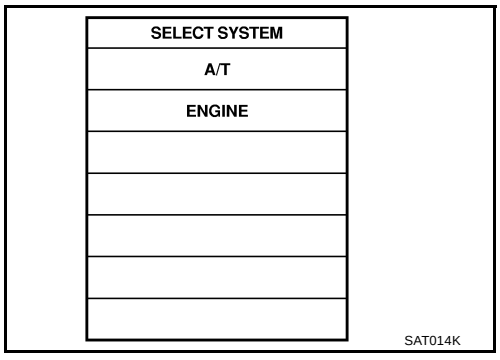
DTC Confirmation Procedure

ECS00CUQ

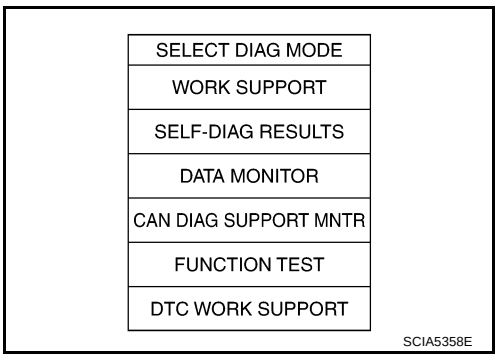
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

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



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

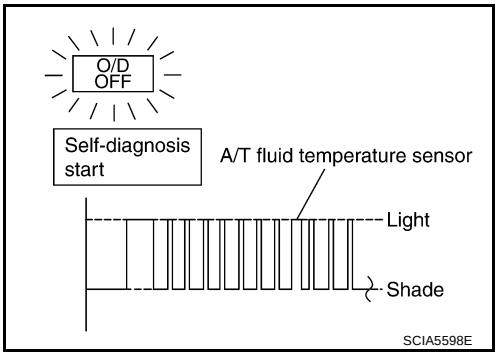


WITH GST

Follow the procedure “WITH CONSULT-II”.

WITHOUT CONSULT-II

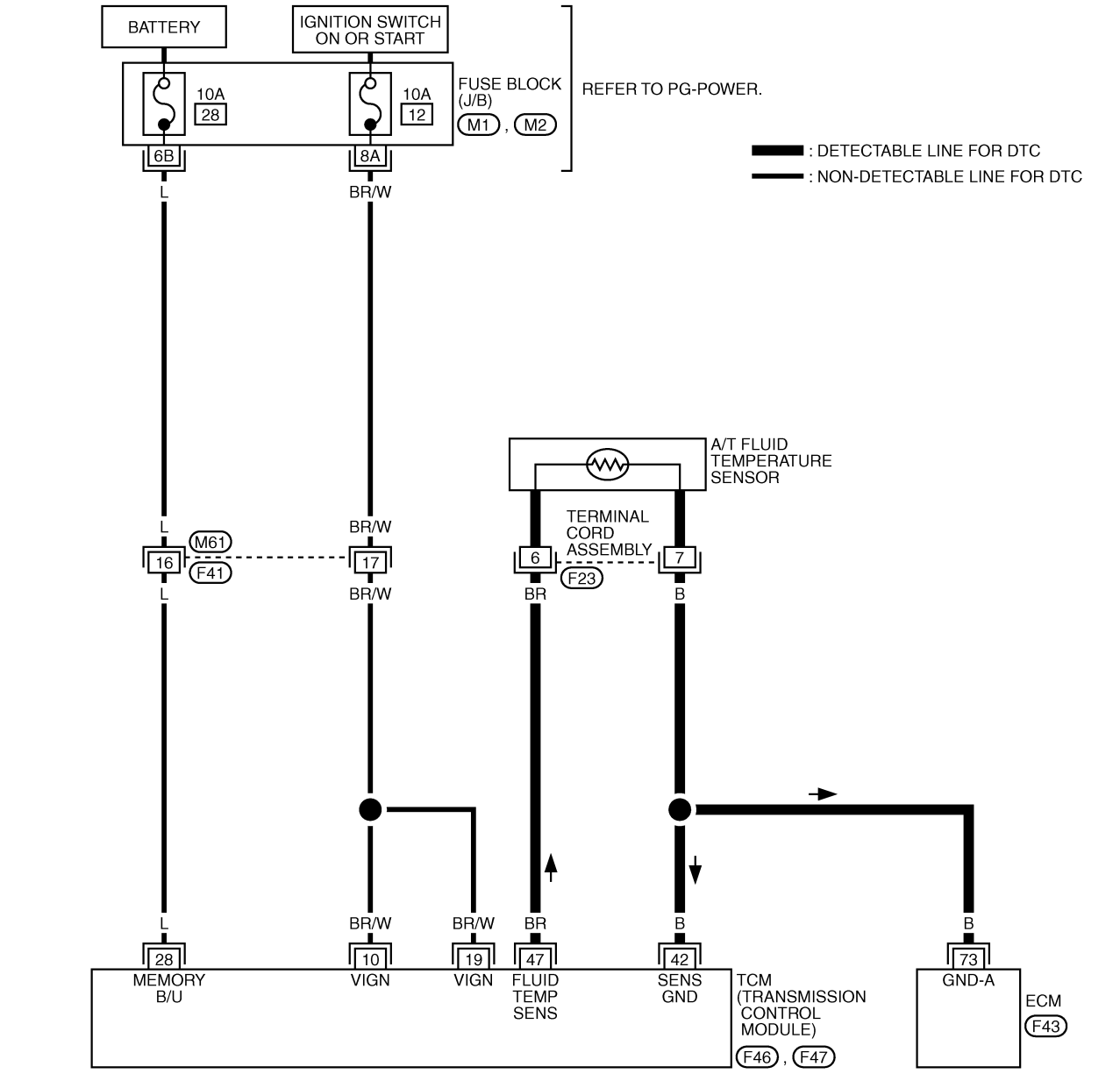
1. Start engine.
2. Drive vehicle under the following conditions.
   Selector lever position: D position
   Vehicle speed: higher than 20 km/h (12 MPH)
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-187, "Diagnostic Procedure" .

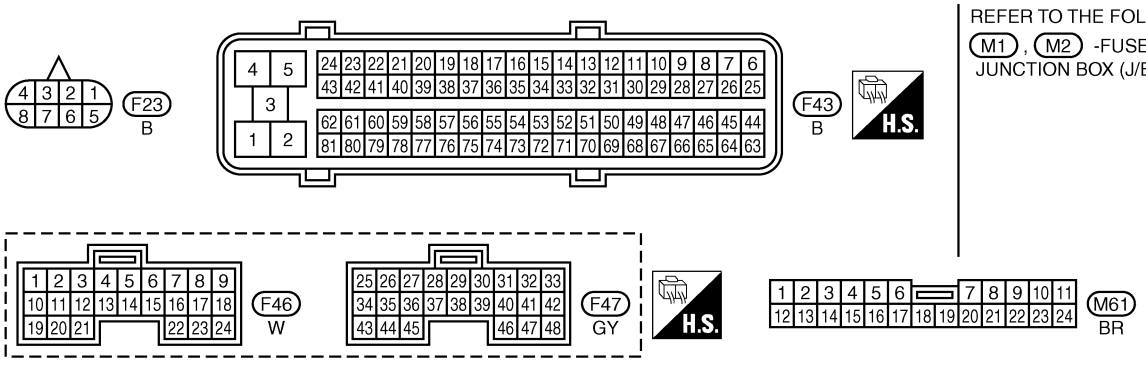


Wiring Diagram — AT — BA/FTS

ECS004SJ

AT-BA/FTS-01

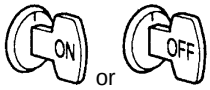




REFER TO THE FOLLOWING.
M1, M2 -FUSE BLOCK-JUNCTION BOX (J/B)

TCWA0235E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
10	BR/W	Power source	 or	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	L	Power source (Memory back-up)	Always		Battery voltage
42	B	Sensor ground	Always		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

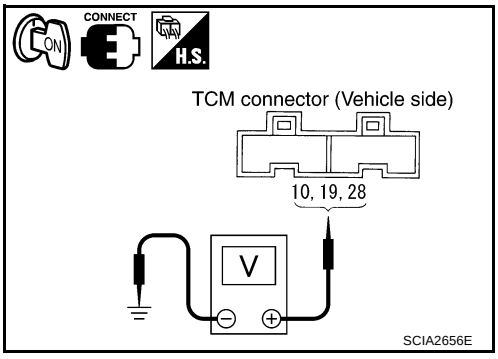
Diagnostic Procedure

ECS004SK

1. CHECK TCM POWER SOURCE

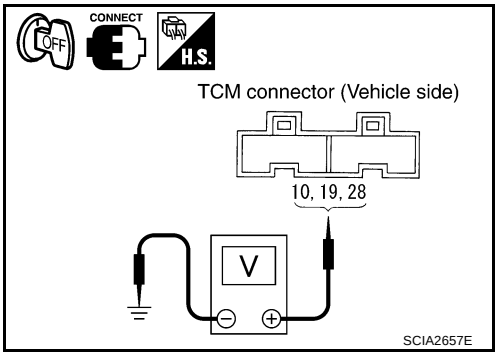
1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminal and ground.

Name	Connector No.	Terminal No. (wire color)	Judgement standard (Approx.)
Power source	F46	10 (BR/W)	Battery voltage
	F46	19 (BR/W)	Battery voltage
Power source (Memory back-up)	F47	28 (L)	Battery voltage



3. Turn ignition switch OFF.
4. Check voltage between TCM connector terminal and ground.

Name	Connector No.	Terminal No. (Wire color)	Judgement standard (Approx.)
Power source	F46	10 (BR/W)	0V
	F46	19 (BR/W)	0V
Power source (Memory back-up)	F47	28 (L)	Battery voltage



OK or NG

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

2. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and TCM connector terminal 10, 19.
- Harness for short or open between battery and TCM connector terminal 28.
- Fuse.
- Ignition switch. Refer to PG-2, "POWER SUPPLY ROUTING" .

OK or NG

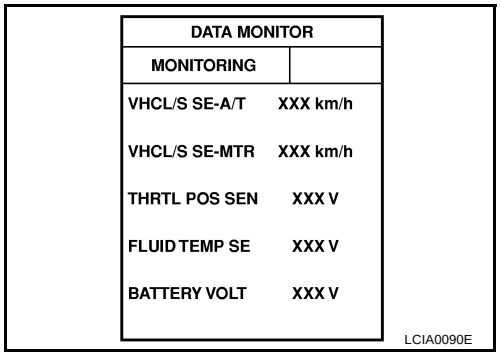
OK >> GO TO 9.
NG >> Repair or replace damaged parts.

3. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR

With CONSULT-II

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

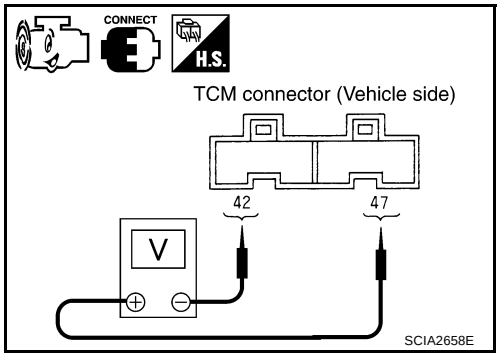
Monitor item	Condition	Display value
FLUID TEMP SE	When ATF temperature is 20°C (68°F).	1.5V
	When ATF temperature is 80°C (176°F).	0.5V



Without CONSULT-II

1. Start engine.
2. Check voltage TCM connector terminals while warming up A/T.

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgement standard (Approx.)
A/T fluid temperature sensor	F47	47 (BR) - 42 (B)	When ATF temperature is 20°C (68°F).	1.5V
			When ATF temperature is 80°C (176°F).	0.5V



OK or NG

OK >> GO TO 9.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM, ECM and terminal cord assembly harness connector
- Ground circuit for ECM
  Refer to PG-2, "POWER SUPPLY ROUTING" .

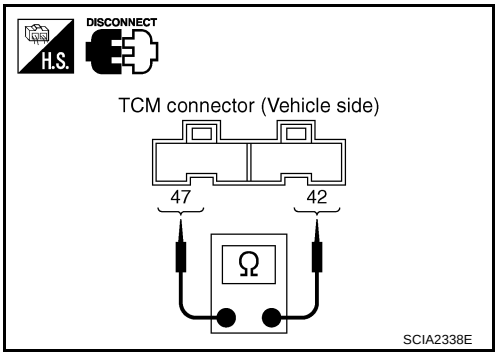
OK or NG

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

5. CHECK FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the TCM connector.
3. Check resistance between terminals.

Name	Connector No.	Terminal No. (Wire color)	Temperature °C (°F)	Resistance (KΩ) (Approx.)
A/T fluid temperature sensor	F47	47 (BR) - 42 (B)	20 (68)	2.5
			80 (176)	0.3

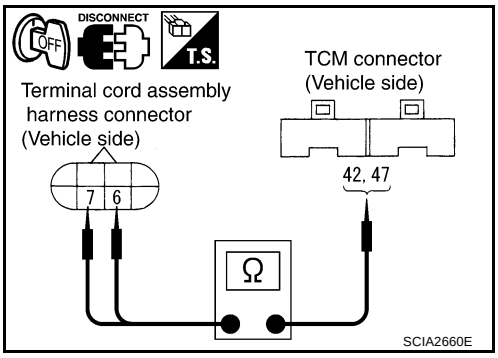


OK or NG

OK >> GO TO 9.
NG >> GO TO 6.

6. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminals and TCM connector terminals.



Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F47	42 (B)	Yes
Terminal cord assembly harness connector	F23	7 (B)	

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F47	47 (BR)	Yes
Terminal cord assembly harness connector	F23	6 (BR)	

4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

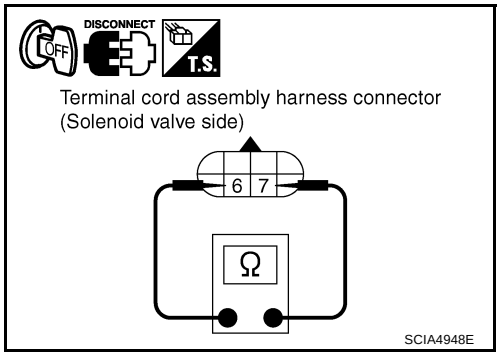
OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminals when A/T is cold.

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



4. Reinstall any part removed.

OK or NG

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

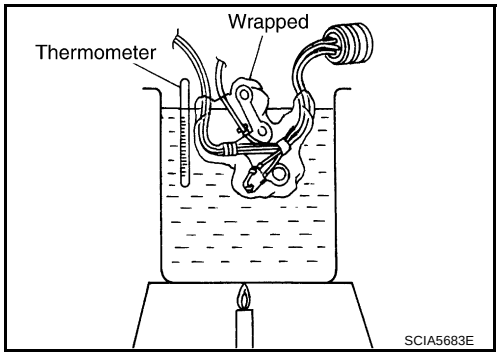
8. DETECT MALFUNCTIONING ITEM

1. Remove oil pan. Refer toAT-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

– A/T fluid temperature sensor

• Check resistance between two terminals while changing temperature as shown.

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



– Harness of terminal cord assembly for short or open

OK or NG

OK >> GO TO 9.
NG >> Repair or replace damaged parts.

9. CHECK DTC

Perform AT-184, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 10.

10. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

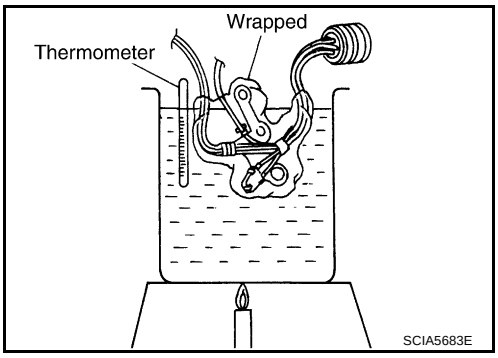
Component Inspection

ECS004SL

A/T FLUID TEMPERATURE SENSOR

- For removal, refer to AT-404, "Control Valve Assembly and Accumulators" .
- Check resistance between two terminals while changing temperature as shown.

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



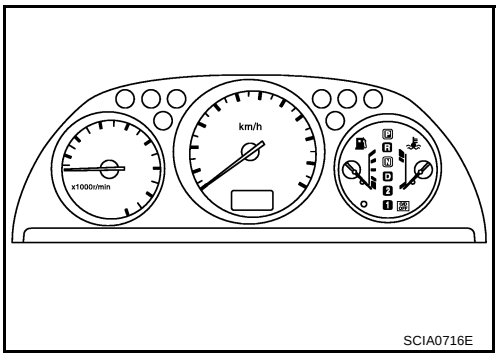
DTC VEHICLE SPEED SENSOR MTR

PFP: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.



On Board Diagnosis Logic

ECS00CUR

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: VHCL SPEED SEN·MTR : 2nd judgement flicker	TCM does not receive the proper voltage signal from the sensor.	● Harness or connectors (The sensor circuit is open or shorted.) ● Combination meter ● 4WD/ABS control unit

Possible Cause

ECS00CUS

Check the following items.

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

DTC Confirmation Procedure

ECS00CUT

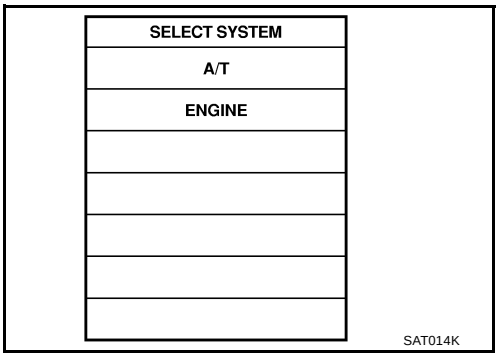
CAUTION:

- **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.**

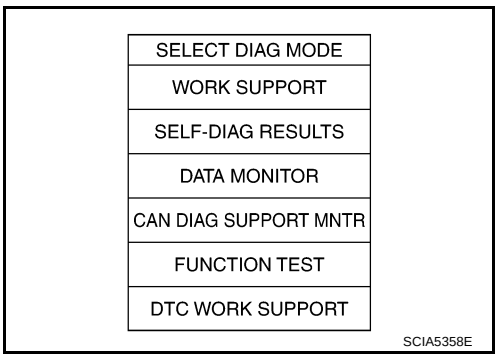
After the repair, perform the following procedure to confirm the malfunction is eliminated.

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).
3. If the check result is NG, go to AT-196, "Diagnostic Procedure" .

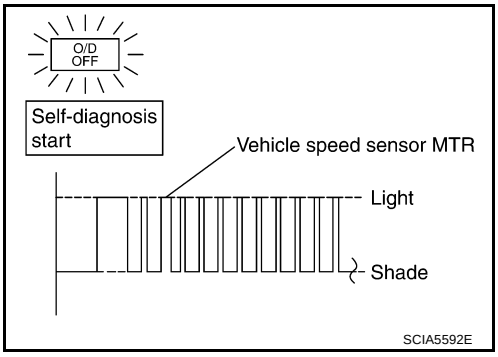


WITH GST

Follow the procedure “WITH CONSULT-II”

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 AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-196, "Diagnostic Procedure" .

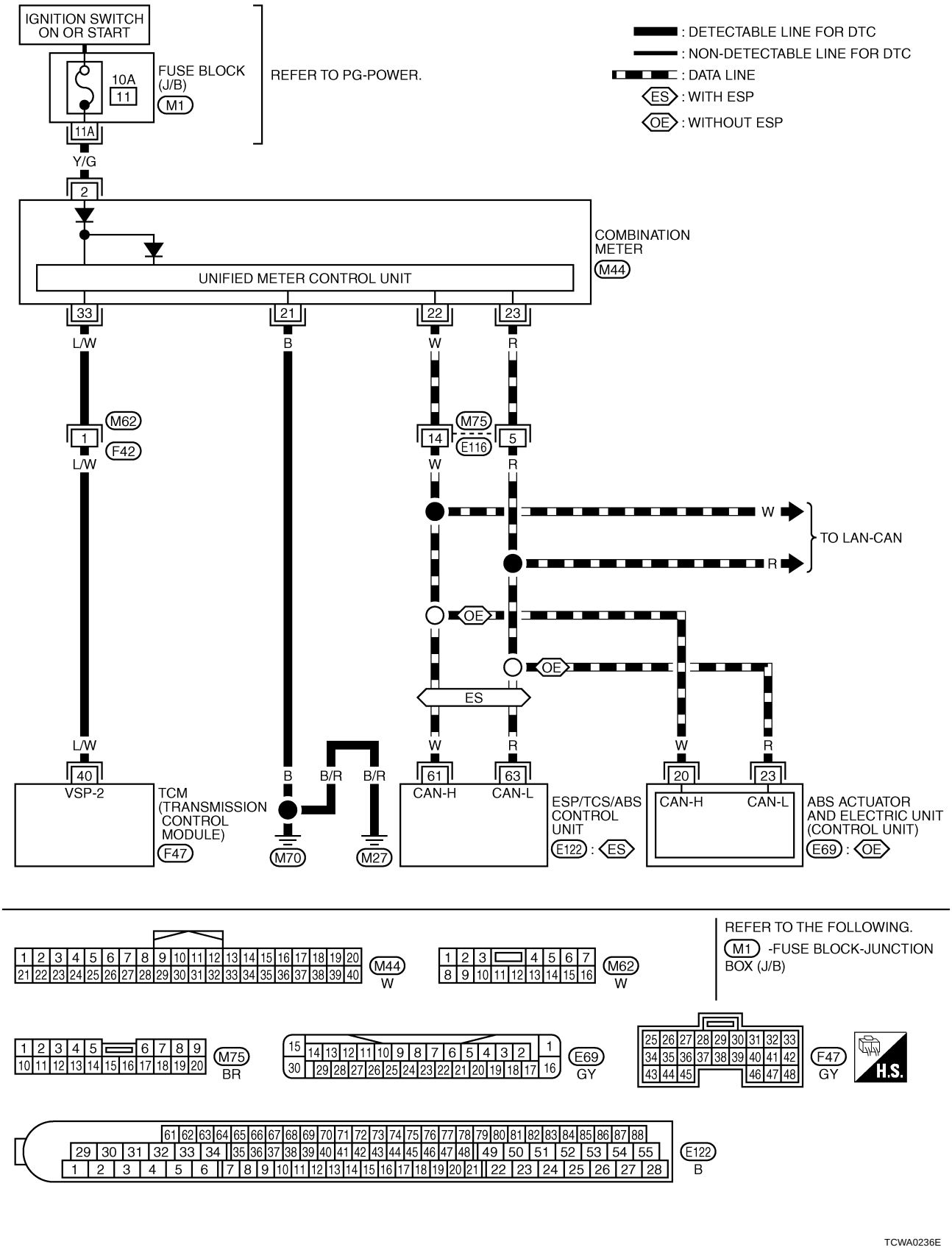


Wiring Diagram — AT — VSSMTR

ECS004SN

LHD MODELS

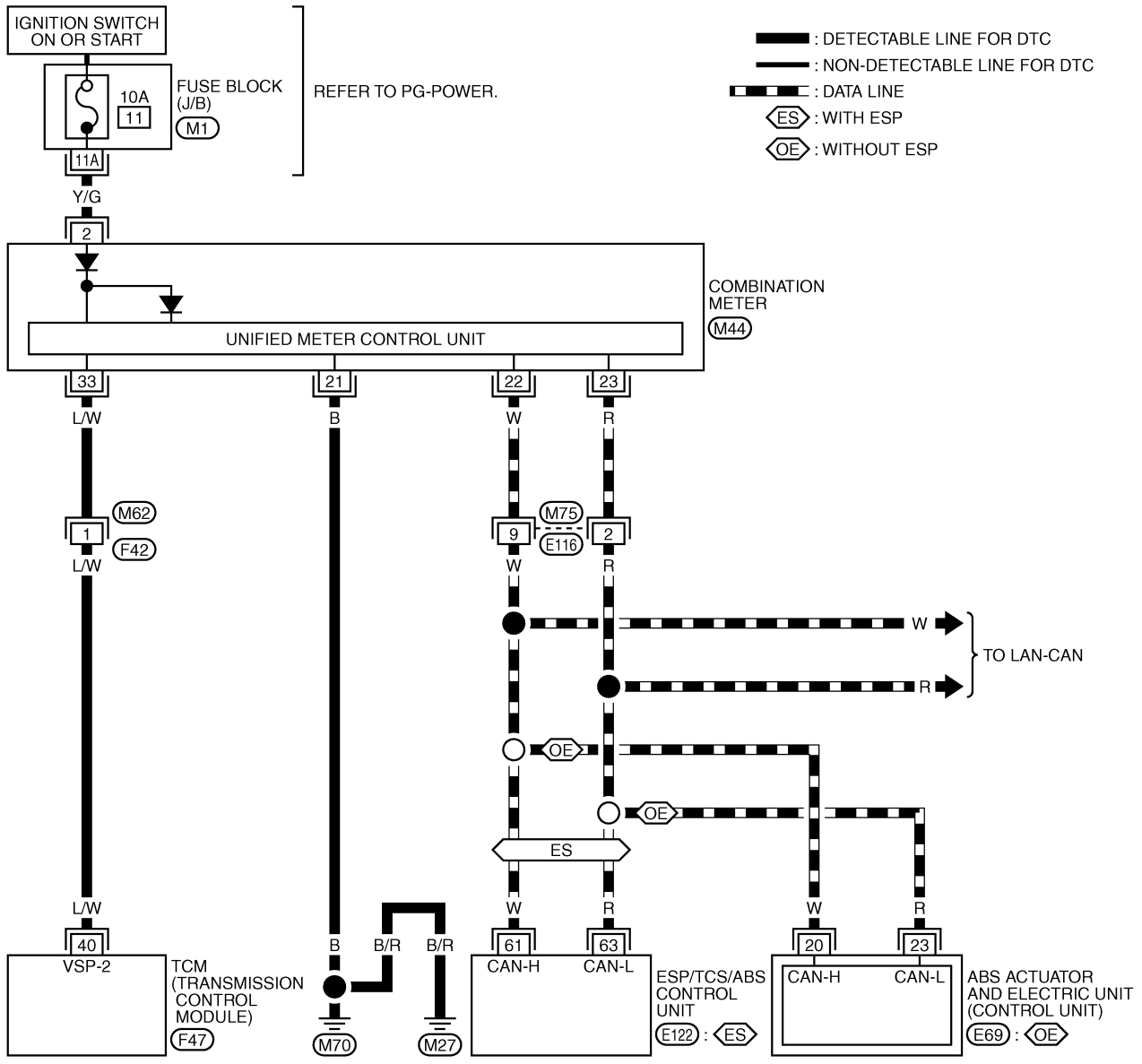
AT-VSSMTR-01

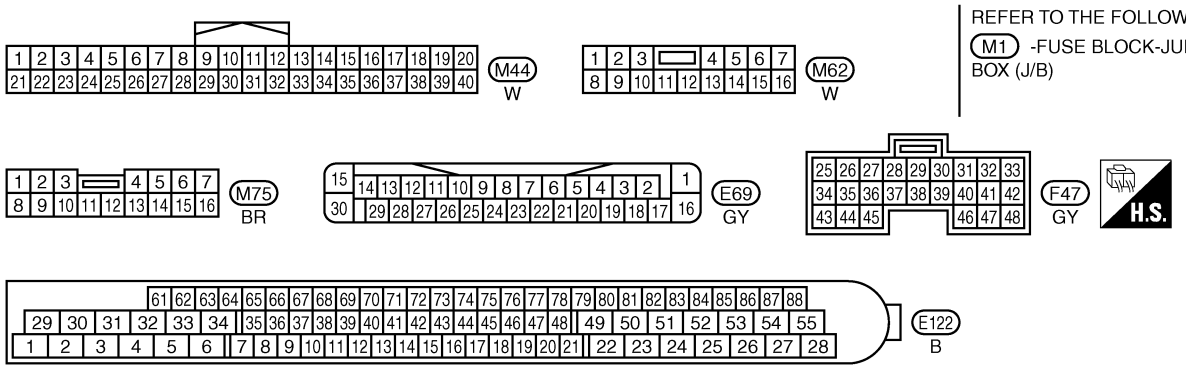


TCWA0236E

RHD MODELS

AT-VSSMTR-02





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

TCWA0237E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
40	L/W	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

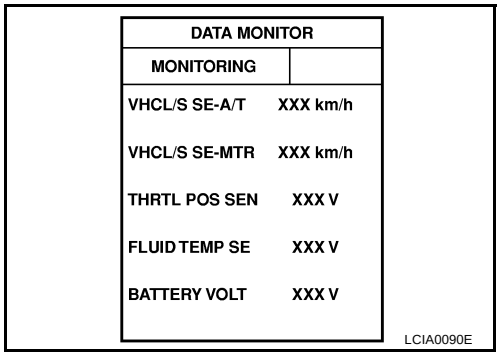
Diagnostic Procedure

ECS004SO

1. CHECK INPUT SIGNAL

With CONSULT-II

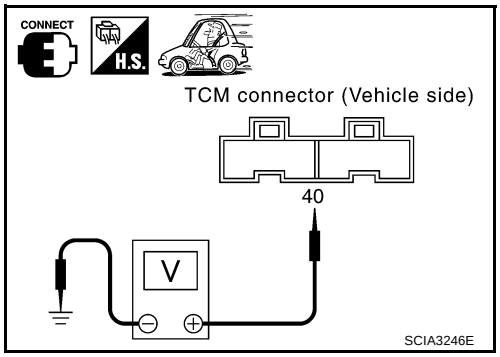
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·MTR” while driving. Check the value changes according to driving speed.



Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector and ground.

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgementstandard(Approx.)
Vehicle speed sensor	F47	40 (L/W) - Ground	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



OK or NG

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

2. DETECT MALFUNCTIONING ITEM

Check the following items:

- Combination meters. Refer to DI-4, "COMBINATION METERS" .
- Harness for short or open between TCM and combination meters.

OK or NG

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

3. CHECK DTC

Perform AT-192, "DTC Confirmation Procedure" .

OK or NG

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

4. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

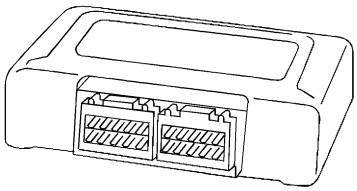
DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)

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.


SAT574J

On Board Diagnosis Logic

ECS00CUU

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

Possible Cause

ECS00CUV

TCM.

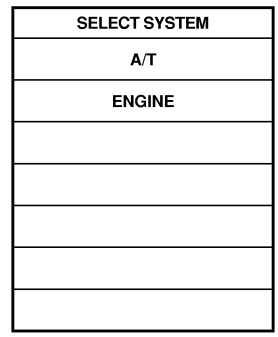
DTC Confirmation Procedure

ECS00CUW

NOTE:
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.

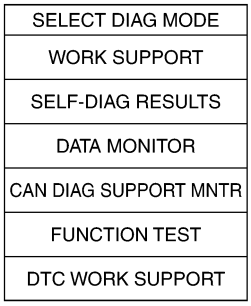
WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for A/T with CONSULT-II.
2. Start engine.



SAT014K

3. Run engine for at least 2 seconds at idle speed.
4. If the check result is NG, go to AT-199, "Diagnostic Procedure" .



SCIA5358E

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”.
3. Perform AT-198, "DTC Confirmation Procedure" .

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

YES >> Replace TCM.
NO >> **INSPECTION END**

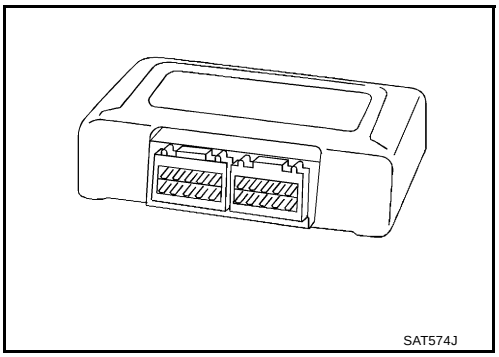
DTC CONTROL UNIT(EEPROM)

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.



SAT574J

On Board Diagnosis Logic

ECS00CUX

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

Possible Cause

ECS00CUY

TCM.

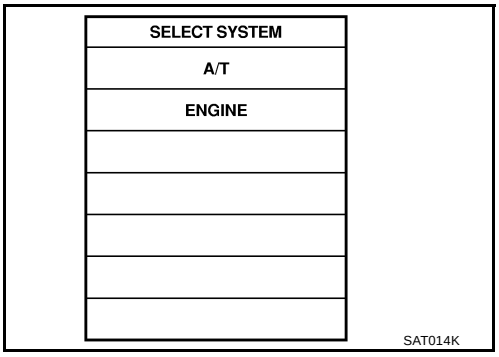
DTC Confirmation Procedure

ECS00CUZ

NOTE:
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 5 seconds before conducting the next test.

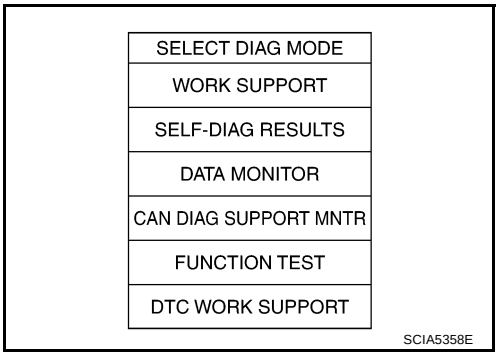
WITH CONSULT-II

1. Turn ignition switch “ON” and select “DATA MONITOR” mode for A/T with CONSULT-II.
2. Start engine.



SAT014K

3. Run engine for at least 2 seconds at idle speed.
4. If the check result is NG, go to AT-201, "Diagnostic Procedure" .



SCIA5358E

Diagnostic Procedure

ECS004SS

1. CHECK DTC

With CONSULT-II

1. Turn ignition switch ON and select “SELF DIAGNOSIS” mode for A/T with CONSULT-II.
2. Move selector lever to R position.
3. Depress accelerator pedal (Full throttle position).
4. Touch “ERASE”.
5. Turn ignition switch OFF for 10 seconds.
6. Perform AT-200, "DTC Confirmation Procedure" .

Is the “CONT UNIT (EEP ROM)” displayed again?

YES >> Replace TCM.
NO >> **INSPECTION END**

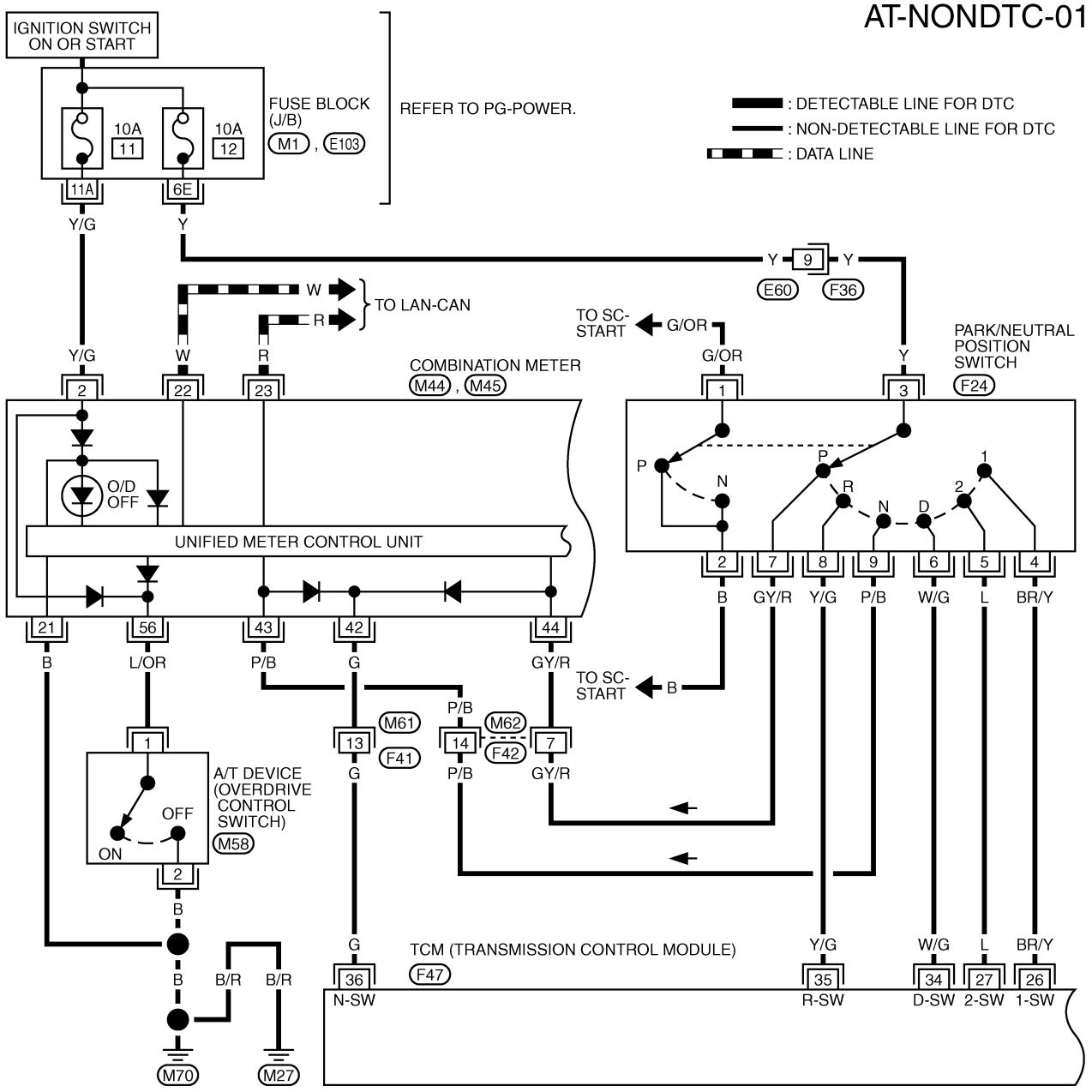
TROUBLE DIAGNOSES FOR SYMPTOMS

PFP:00100

Wiring Diagram — AT — NONDTC

ECS004ST

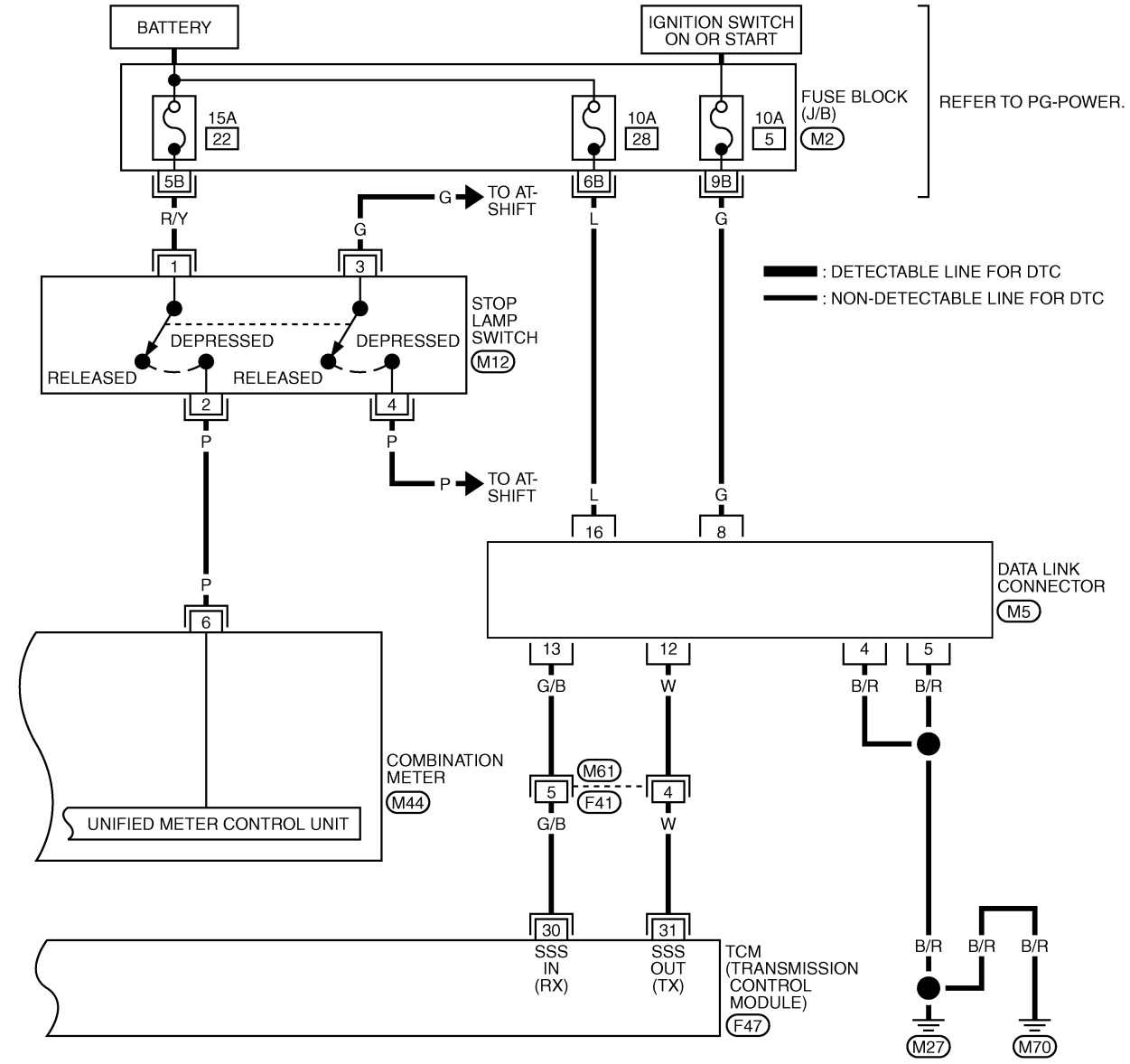
AT-NONDTC-01

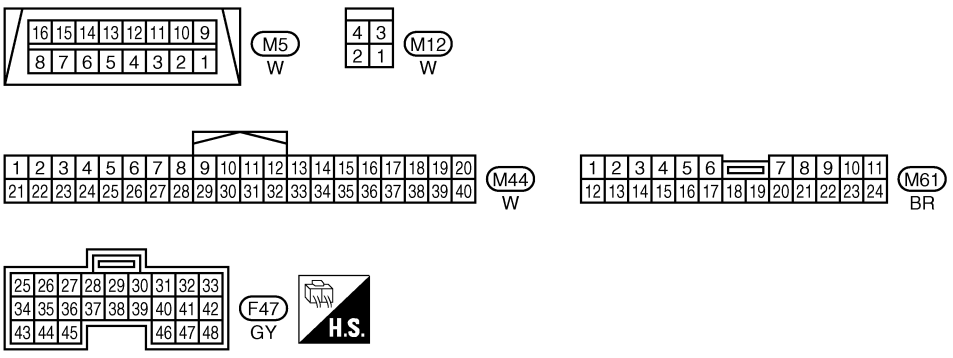


REFER TO THE FOLLOWING.
M1, E103 -FUSE BLOCK-JUNCTION BOX (J/B)

TCWA0238E

AT-NONDTC-02





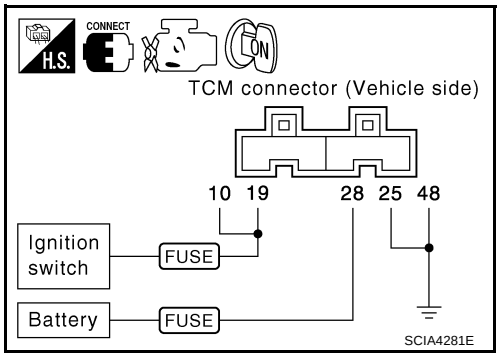
REFER TO THE FOLLOWING.
M2 -FUSE BLOCK-JUNCTION BOX (J/B)

TCWA0239E

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”.



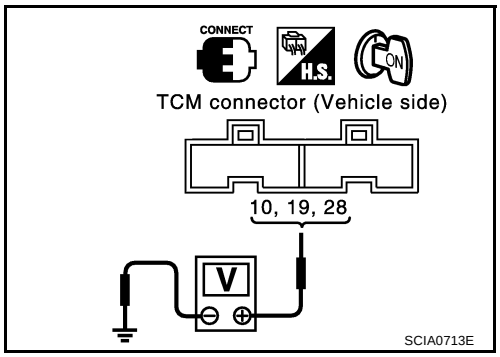
1. CHECK TCM POWER SOURCE

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

Voltage: Battery voltage

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

Voltage: Battery voltage



OK or NG

OK >> GO TO 2.
NG >> Check the following items:

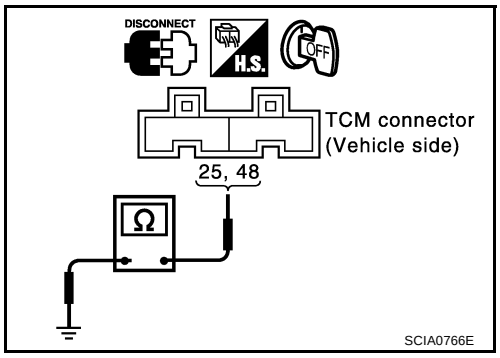
- Harness for short or open between ignition switch and TCM connector terminals 10, 19 and 28
- Refer to AT-395, "Wiring Diagram — AT — MAIN" .
- Ignition switch and fuse Refer to PG-2, "POWER SUPPLY ROUTING" .

2. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector 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-395, "Wiring Diagram — AT — MAIN" .

3. CHECK COMBINATION METERS SYSTEM

Check combination meters system. Refer to DI-12, "Combination Meter" .

OK or NG

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

4. CHECK SYMPTOM

Check again. Refer to AT-71, "1. CHECK BEFORE ENGINE IS STARTED" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .

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

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

ECS004SV

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 SELF-DIAGNOSIS RESULTS

Perform self-diagnosis. Refer to AT-45, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" .

Do the self-diagnosis results indicate PNP switch circuit?

YES >> Check park/neutral position (PNP) switch circuit. Refer to AT-100, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

NO >> GO TO 2.

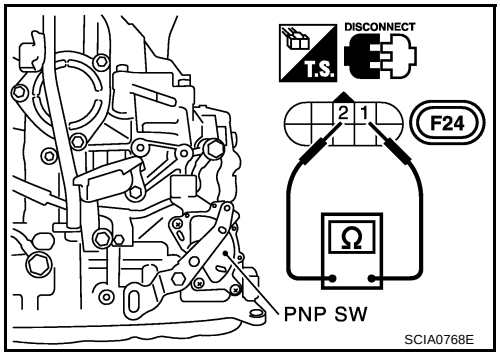
2. CHECK PNP SWITCH INSPECTION

Check for short or open of PNP switch harness connector terminals 1 and 2.
Refer to AT-237, "TCM Self-diagnosis Does Not Activate" .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace PNP switch.



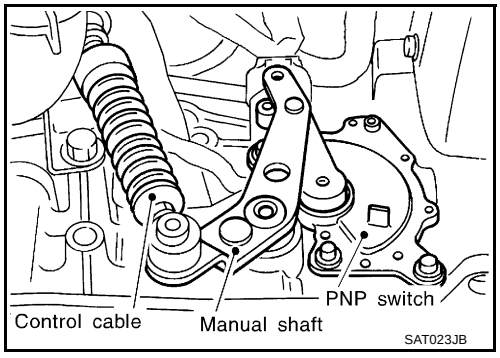
3. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 4.

NG >> Adjust control cable. Refer to AT-409, "Control Cable Adjustment" .



4. CHECK STARTING SYSTEM

Check starting system. Refer to SC-21, "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

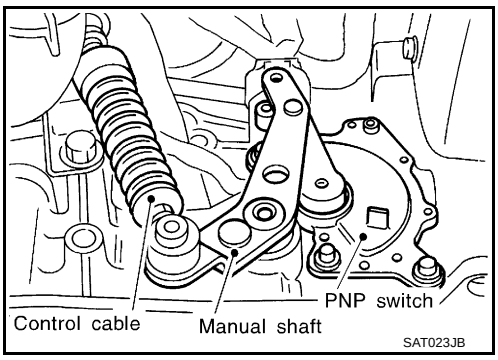
SYMPTOM:
Vehicle moves when it is pushed forward or backward with selector lever in “P” position.

1. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 2.
NG >> Adjust control cable. Refer to AT-409, "Control Cable Adjustment" .

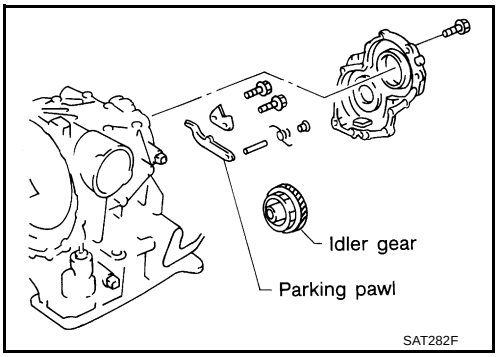


2. CHECK PARKING COMPONENTS

Check parking components. Refer to AT-416, "OVERHAUL" .

OK or NG

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



In “N” Position, Vehicle Moves

ECS004SX

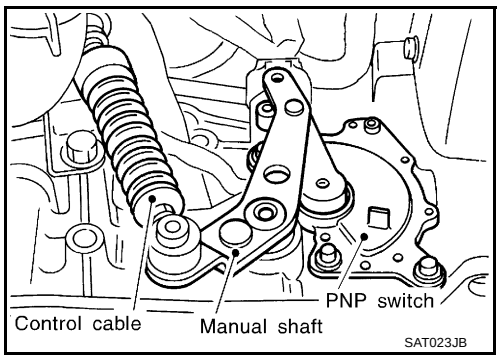
SYMPTOM:
Vehicle moves forward or backward when selecting “N” position.

1. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 2.
NG >> Adjust control cable. Refer to AT-409, "Control Cable Adjustment" .

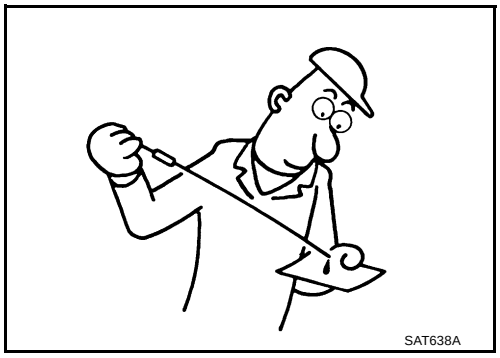


2. CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to AT-16, "Checking A/T Fluid" .

OK or NG

OK >> GO TO 3.
NG >> Refill ATF.

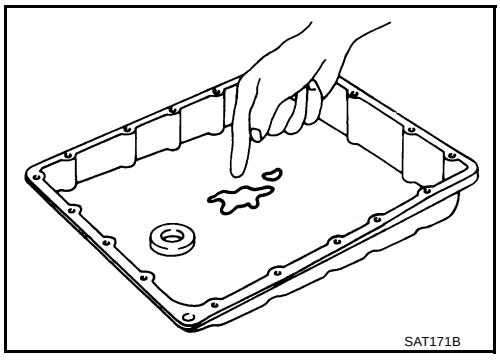


3. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-64, "FLUID CONDITION CHECK" .

OK or NG

OK >> GO TO 4.
NG >> 1. Disassemble A/T. Refer to AT-424, "Disassembly" .
2. Check the following items:
- Forward clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .
- Overrun clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .
- Reverse clutch assembly. Refer to AT-464, "Reverse Clutch" .



4. CHECK SYMPTOM

Check again. Refer to AT-72, "2. CHECK AT IDLE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Large Shock. “N” → “R” Position

ECS004SY

SYMPTOM:
There is large shock when changing from “N” to “R” position.

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-45, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-52, "Diagnostic Procedure Without CONSULT-II" .

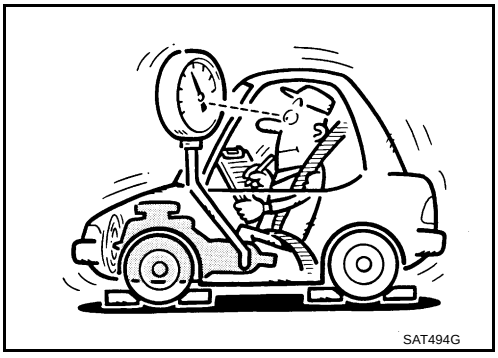
Do the self-diagnosis results indicate A/T fluid temperature sensor, line pressure solenoid valve, accelerator pedal position (APP) sensor circuit?

YES >> ● Check damaged circuit. Refer to the following items.
- AT-154, "DTC P0745 LINE PRESSURE SOLENOID VALVE"
- AT-173, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"
- AT-184, "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-68, "Line Pressure Test" .


SAT494G

OK or NG

OK >> GO TO 3.

NG >> 1. Remove control valve assembly. Refer to AT-404, "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
- Oil pump assembly. Refer to AT-443, "Oil Pump" .

3. CHECK SYMPTOM

Check again. Refer to AT-72, "2. CHECK AT IDLE" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Vehicle Does Not Creep Backward In “R” Position

ECS004SZ

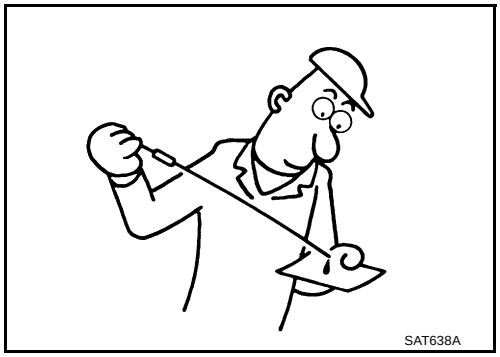
SYMPTOM:
Vehicle does not creep backward when selecting “R” position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to AT-16, "Checking A/T Fluid" .

OK or NG

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


SAT638A

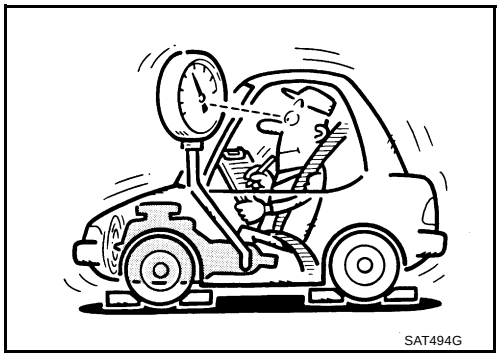
2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in R position. Refer to AT-68, "Line Pressure Test" .

OK or NG

OK >> GO TO 3.
NG >> 1. Remove control valve assembly. Refer to AT-404, "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

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following item:
- Oil pump assembly. Refer to AT-443, "Oil Pump" .


SAT494G

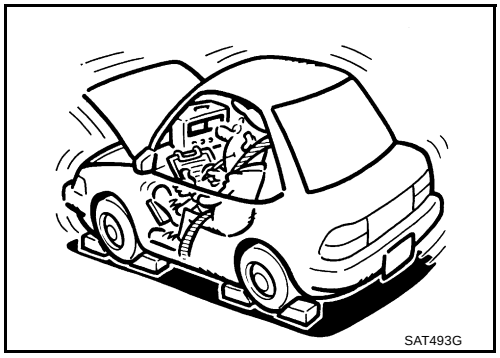
3. CHECK STALL TEST

Check stall revolution with selector lever in 1 and R positions.
Refer to AT-65, "Stall Test" .

OK or NG

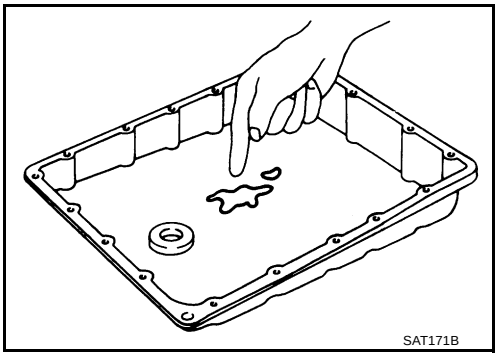
OK >> GO TO 4.
OK in “1” position, NG in R position>>1.Disassemble A/T. Refer to AT-424, "Disassembly" .
2. Check the following items:
- Reverse clutch assembly. Refer to AT-464, "Reverse Clutch" .
- Low & reverse brake assembly. Refer to AT-483, "Low & Reverse Brake" .

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


SAT493G

4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-64, "FLUID CONDITION CHECK" .



OK or NG

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

5. CHECK SYMPTOM

Check again. Refer to AT-72, "2. CHECK AT IDLE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

6. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to AT-424, "Disassembly" .
2. Check the following items:

- Reverse clutch assembly. Refer to AT-464, "Reverse Clutch" .
- High clutch assembly. Refer to AT-469, "High Clutch" .
- Low & reverse brake assembly. Refer to AT-483, "Low & Reverse Brake" .
- Forward clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .
- Overrun clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .

OK or NG

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

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

ECS004T0

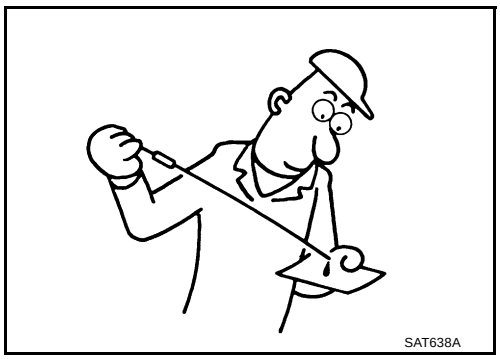
SYMPTOM:
Vehicle does not creep forward when selecting “D”, “2” or “1” position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to AT-16, "Checking A/T Fluid" .

OK or NG

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

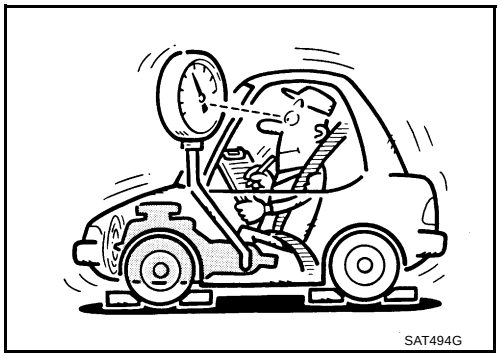

SAT638A

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in D position. Refer to AT-68, "Line Pressure Test" .

OK or NG

OK >> GO TO 3.
NG >> 1. Remove control valve assembly. Refer to AT-404, "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
3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following item:
- Oil pump assembly. Refer to AT-443, "Oil Pump" .

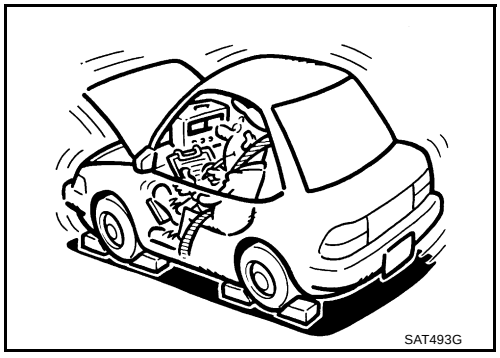

SAT494G

3. CHECK STALL TEST

Check stall revolution with selector lever in D position. Refer to AT-65, "Stall Test" .

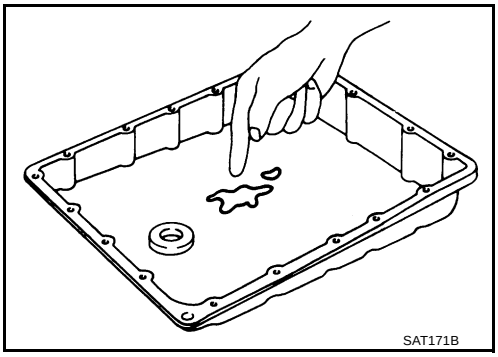
OK or NG

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


SAT493G

4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-64, "FLUID CONDITION CHECK" .



OK or NG

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

5. CHECK SYMPTOM

Check again. Refer to AT-72, "2. CHECK AT IDLE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

6. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to AT-424, "Disassembly" .
2. Check the following items:

- Oil pump assembly. Refer to AT-443, "Oil Pump" .
- Forward clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .
- Forward one-way clutch. Refer to AT-475, "Forward and Overrun Clutches" .
- Low one-way clutch. Refer to AT-424, "Disassembly" .
- Torque converter. Refer to AT-424, "Disassembly" .

OK or NG

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

Vehicle Cannot Be Started From D1

ECS004T1

SYMPTOM:
Vehicle cannot be started from D1 on Cruise Test — Part 1.

1. SYMPTOM CHECK

Check symptom. Refer to AT-78, "Cruise Test — Part 1" .

Is Vehicle does not creep backward in R position OK?

YES >> GO TO 2.
NO >> Go to AT-210, "Vehicle Does Not Creep Backward In “R” Position" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-45, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-52, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate vehicle speed sensor·A/T (revolution sensor), overrun clutch solenoid valve, torque converter clutch solenoid valve, shift solenoid valve A,B or vehicle speed sensor·MTR circuit?

YES >>
- Check damaged circuit. Refer to the following items.
  - AT-112, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
  - AT-148, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE"
  - AT-161, "DTC P0750 SHIFT SOLENOID VALVE A"
  - AT-167, "DTC P0755 SHIFT SOLENOID VALVE B"
  - AT-178, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE"
  - AT-339, "DTC VEHICLE SPEED SENSOR MTR"

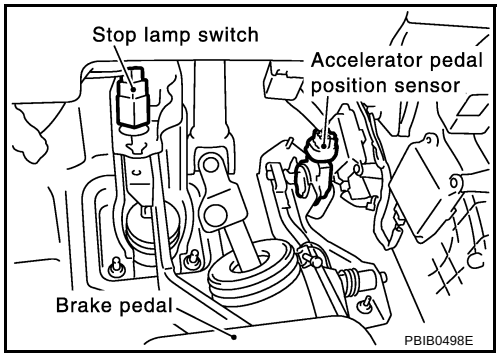
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-173, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace accelerator pedal position (APP) sensor.

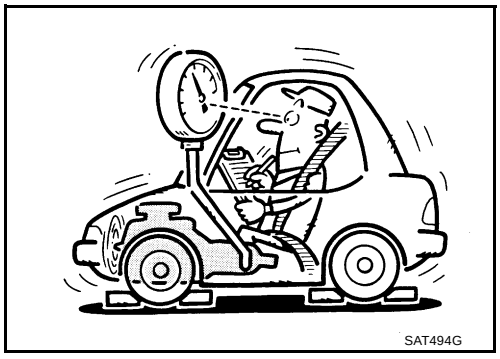


4. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in D position. Refer to AT-68, "Line Pressure Test" .

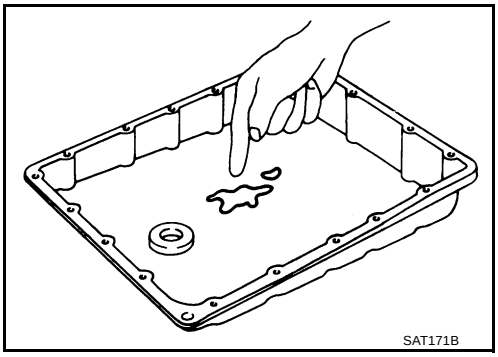
OK or NG

OK >> GO TO 5.
NG >> GO TO 8.



5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-64, "FLUID CONDITION CHECK" .



OK or NG

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

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "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. Refer to AT-78, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
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-404, "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

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following items:

- Forward clutch. Refer to AT-475, "Forward and Overrun Clutches" .
- Forward one-way clutch assembly. Refer to AT-424, "Disassembly" .
- High clutch assembly. Refer to AT-469, "High Clutch" .
- Torque converter. Refer to AT-424, "Disassembly" .
- Oil pump assembly. Refer to AT-443, "Oil Pump" .
- Reverse clutch assembly. Refer to AT-464, "Reverse Clutch" .
- Low & reverse clutch assembly

OK or NG

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

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

ECS004T2

SYMPTOM:
A/T does not shift from D_1 to D_2 at the specified speed.
A/T does not shift from D_4 to D_2 when depressing accelerator pedal fully at the specified speed.

1. CHECK SYMPTOM

Check symptom. Refer to AT-78, "Cruise Test — Part 1" and AT-81, "Cruise Test — Part 2" .

Are “Vehicle Does Not Creep Ford In “D”, “2” Or “1” Position” and “Vehicle Cannot Be Started From D_1 ” OK?

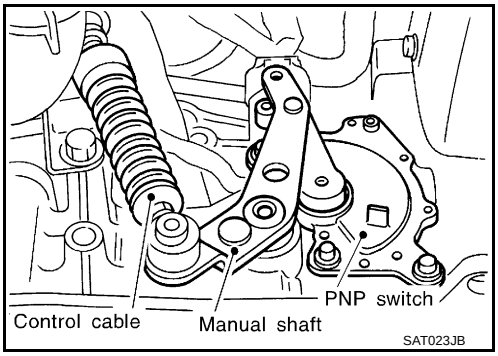
YES >> GO TO 2.
NO >> GO TO AT-212, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" , AT-214, "Vehicle Cannot Be Started From D_1" .

2. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-409, "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-112, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-192, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

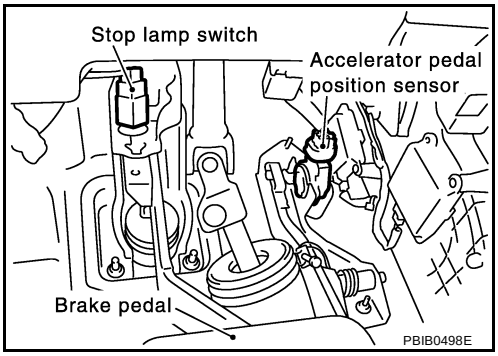
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer AT-173, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

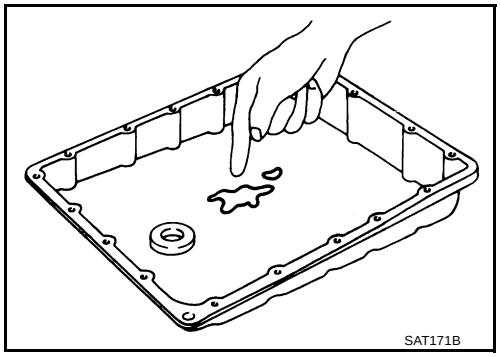
OK or NG

OK >> GO TO 5
NG >> Repair or replace accelerator pedal position (APP) sensor.



5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-64, "FLUID CONDITION CHECK" .



OK or NG

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

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-404, "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. Refer to AT-78, "Cruise Test — Part 1" and AT-81, "Cruise Test — Part 2" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
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-404, "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
3. Disassemble A/T. Refer to AT-424, "Disassembly" .
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: $D_2 \rightarrow D_3$

ECS004T3

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

1. CHECK SYMPTOM

Check symptom. Refer to AT-78, "Cruise Test — Part 1" and AT-81, "Cruise Test — Part 2" .

Are “Vehicle Does Not Creep Ford In “D”, “2” Or “1” Position” and “Vehicle Cannot Be Started From D_1 ” OK?

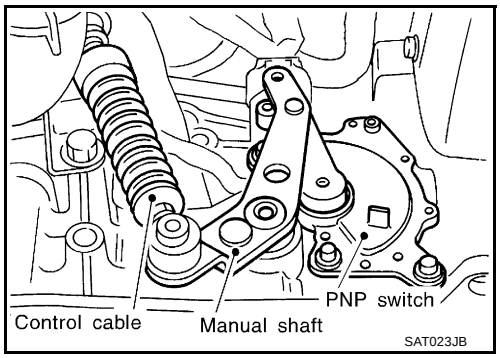
YES >> GO TO 2.
NO >> GO TO AT-212, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" , AT-214, "Vehicle Cannot Be Started From D_1" .

2. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-409, "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-112, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-192, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

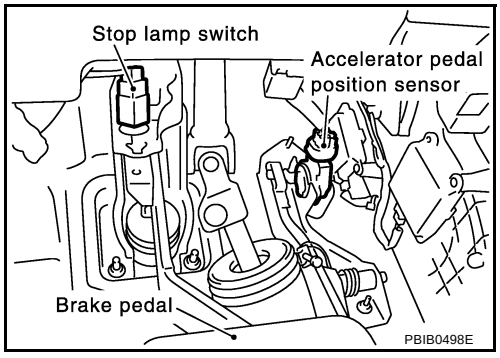
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-173, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

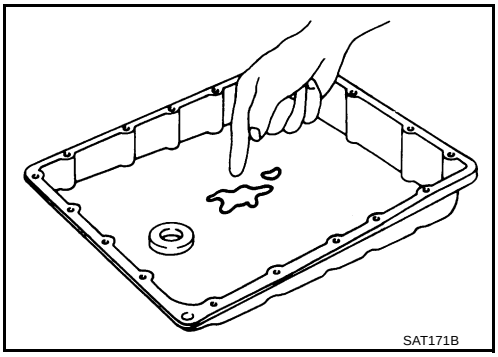
OK or NG

OK >> GO TO 5.
NG >> Repair or replace accelerator pedal position (APP) sensor.



5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-64, "FLUID CONDITION CHECK" .



OK or NG

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

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

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

OK or NG

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

7. CHECK SYMPTOM

Check again. Refer to AT-78, "Cruise Test — Part 1" and AT-81, "Cruise Test — Part 2" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
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-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

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

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following items:

- Servo piston assembly
- High clutch assembly. Refer to AT-469, "High Clutch" .
- Oil pump assembly. Refer to AT-443, "Oil Pump" .

OK or NG

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

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

ECS004T4

SYMPTOM:

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

1. CHECK SYMPTOM

Check symptom. Refer to AT-78, "Cruise Test — Part 1" and AT-81, "Cruise Test — Part 2" .

Are “Vehicle Does Not Creep Ford In “D”, “2” Or “1” Position” and “Vehicle Cannot Be Started From D_1 ” OK?

YES >> GO TO 2.
NO >> GO TO AT-212, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" , AT-214, "Vehicle Cannot Be Started From D_1" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-45, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-52, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate PNP switch, overdrive control switch, A/T fluid temperature sensor, vehicle speed sensor·A/T (revolution sensor), shift solenoid valve A,B or vehicle speed sensor·MTR circuit?

YES >>
- Check damaged circuit. Refer to the following items.
  - AT-112, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
  - AT-161, "DTC P0750 SHIFT SOLENOID VALVE A"
  - AT-167, "DTC P0755 SHIFT SOLENOID VALVE B"
  - AT-184, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
  - AT-192, "DTC VEHICLE SPEED SENSOR MTR"
  - AT-237, "TCM Self-diagnosis Does Not Activate"

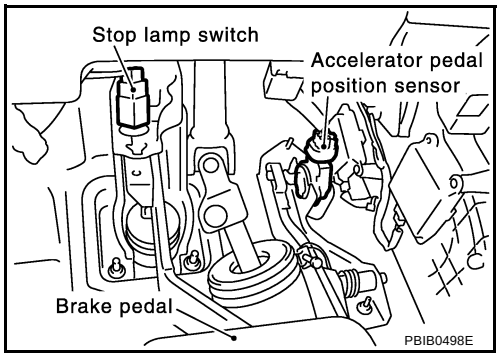
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-173, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"

OK or NG

OK >> GO TO 4.
NG >> Repair or replace accelerator pedal position (APP) sensor.

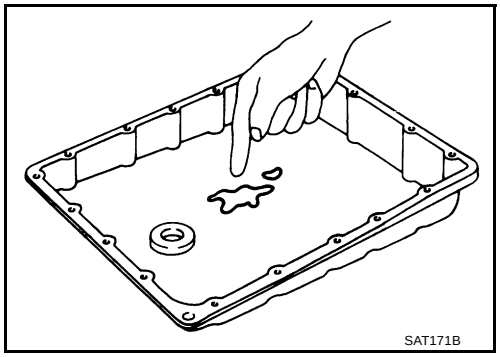


4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-64, "FLUID CONDITION CHECK" .

OK or NG

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



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
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. Refer to AT-81, "Cruise Test — Part 2" and AT-78, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
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-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve A
- Overrun clutch control valve
- Shift solenoid valve A
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following items:

- Servo piston assembly
- Torque converter. Refer to AT-424, "Disassembly" .
- Oil pump assembly. Refer to AT-443, "Oil Pump" .
- Brake band

OK or NG

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

A/T Does Not Perform Lock-up

ECS004T5

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

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-45, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-52, "Diagnostic Procedure Without CONSULT-II" .

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

YES >> Check damaged circuit. Refer to AT-148, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" , AT-106, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" , AT-112, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-119, "DTC P0725 ENGINE SPEED SIGNAL" , AT-192, "DTC VEHICLE SPEED SENSOR MTR" .

NO >> GO TO 2.

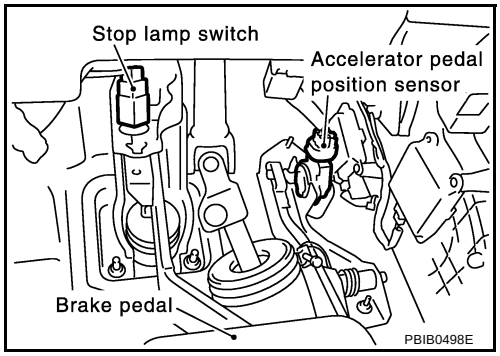
2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-173, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"

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-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:
- Torque converter clutch control valve
- Torque converter clutch solenoid valve
- Torque converter relief valve
- Pilot valve
- Pilot filter
3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check torque converter. Refer to AT-424, "Disassembly" .

OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again. Refer to AT-78, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

A/T Does Not Hold Lock-up Condition

ECS004T6

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

1. CHECK DIAGNOSTIC RESULTS

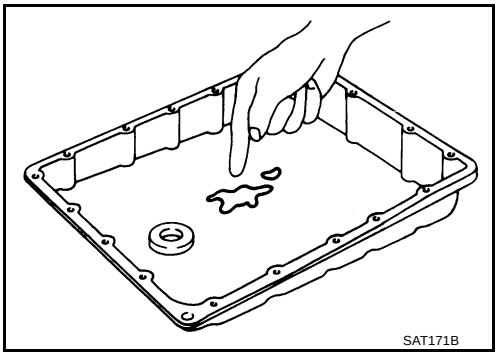
Perform self-diagnosis. Refer to AT-45, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-52, "Diagnostic Procedure Without CONSULT-II" .

Does self-diagnosis show damage to engine speed signal circuit after cruise test?

YES >> Check engine speed signal circuit. Refer to AT-119, "DTC P0725 ENGINE SPEED SIGNAL" .
NO >> GO TO 2.

2. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-64, "FLUID CONDITION CHECK" .


SAT171B

OK or NG

OK >> GO TO 3.
NG >> GO TO 5.

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Torque converter clutch control valve
- Torque converter clutch solenoid valve
- Pilot valve
- Pilot filter

OK or NG

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

4. CHECK SYMPTOM

Check again. Refer to AT-78, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
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-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Torque converter clutch control valve
- Torque converter clutch solenoid valve
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check torque converter and oil pump assembly.

OK or NG

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

Lock-up Is Not Released

ECS004T7

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

1. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR CIRCUIT

Perform self-diagnosis. Refer to AT-45, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-52, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate accelerator pedal position (APP) sensor circuit?

YES >> Check accelerator pedal position (APP) sensor circuit. Refer to AT-173, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

NO >> GO TO 2.

2. CHECK SYMPTOM

Check again. Refer to AT-78, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
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)

ECS004T8

SYMPTOM:
Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 .

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-45, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-52, "Diagnostic Procedure Without CONSULT-II" .

Does self-diagnosis show damage to overrun clutch solenoid valve circuit after cruise test?

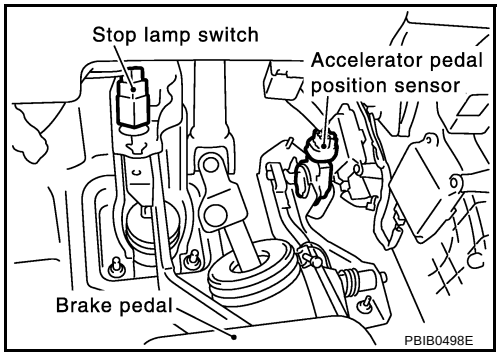
YES >> Check overrun clutch solenoid valve circuit. Refer to AT-178, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" .
NO >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-173, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR"

OK or NG

OK >> GO TO 3.
NG >> Repair or replace accelerator pedal position (APP) sensor.

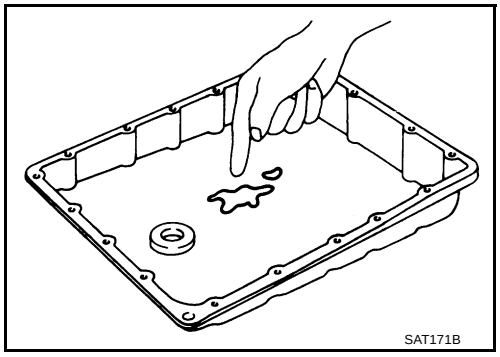


3. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-64, "FLUID CONDITION CHECK" .

OK or NG

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



4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
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. Refer to AT-78, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .

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-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following item:

- Overrun clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .

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

Perform self-diagnosis. Refer to AT-45, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-52, "Diagnostic Procedure Without CONSULT-II" .

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 >> ● Check damaged circuit. Refer to the following items.
- AT-112, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
- AT-161, "DTC P0750 SHIFT SOLENOID VALVE A"
- AT-167, "DTC P0755 SHIFT SOLENOID VALVE B"
- AT-192, "DTC VEHICLE SPEED SENSOR MTR"

NO >> GO TO 2.

2. CHECK SYMPTOM

Check again. Refer to AT-81, "Cruise Test — Part 2" .

OK or NG

OK >> GO TO AT-214, "Vehicle Cannot Be Started From D1" .
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch “ON” → “OFF”

ECS004TA

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

1. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

Check overdrive control switch circuit. Refer to AT-237, "TCM Self-diagnosis Does Not Activate" .

OK or NG

OK >> GO TO AT-220, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .
NG >> Check overdrive control switch circuit. Refer to AT-237, "TCM Self-diagnosis Does Not Activate" .

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

ECS004TB

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

1. CHECK PNP SWITCH CIRCUIT

Check PNP switch circuit. Refer to AT-100, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

OK or NG

OK >> GO TO AT-217, "A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$" .
NG >> Check PNP switch circuit. Refer to AT-100, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

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

ECS004TC

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

1. CHECK PNP SWITCH CIRCUIT

Check PNP switch circuit. Refer to AT-100, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

OK or NG

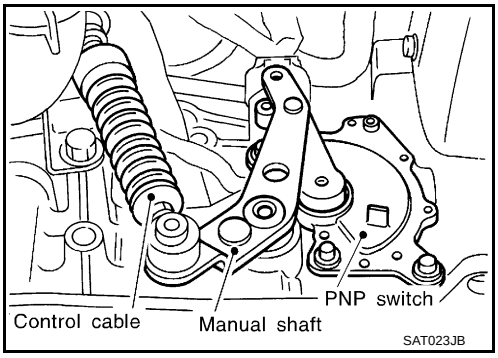
OK >> GO TO 2.
NG >> Check PNP switch circuit. Refer to AT-100, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

2. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-409, "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-112, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-192, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

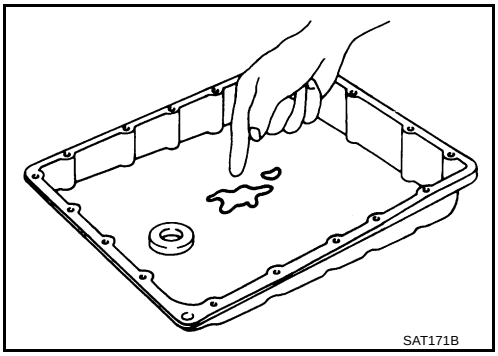
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-64, "FLUID CONDITION CHECK" .

OK or NG

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



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Overrun clutch control valve
- Overrun clutch solenoid valve
- Shift valve A
- Shift solenoid valve A

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following items:

- Servo piston assembly
- Brake band

OK or NG

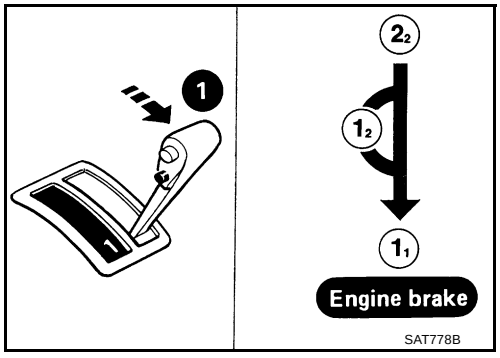
OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again. Refer to AT-82, "Cruise Test — Part 3" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.



Vehicle Does Not Decelerate By Engine Brake

ECS004TD

SYMPTOM:

- **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.**
- **Vehicle does not decelerate by engine brake when shifting from 2$_2$ (1$_2$) to 1$_1$.**

1. CHECK PNP SWITCH CIRCUIT

Check PNP switch circuit. Refer to AT-100, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

OK or NG

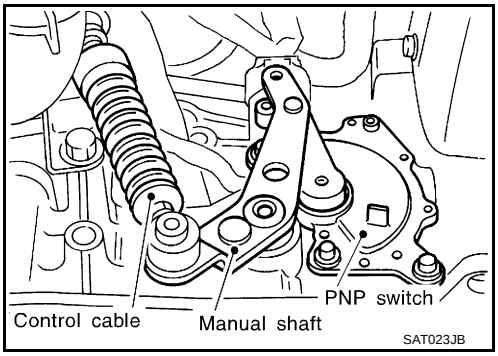
OK >> GO TO 2.
NG >> Check PNP switch circuit. Refer to AT-100, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

2. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-409, "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-112, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-192, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

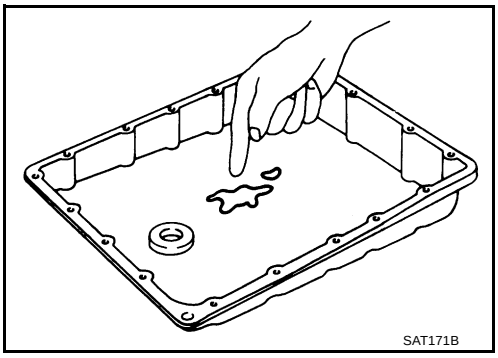
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-64, "FLUID CONDITION CHECK" .

OK or NG

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



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:
- Overrun clutch solenoid valve
- Shift valve A
3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following items:
- Overrun clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .
- Low & reverse bake assembly

OK or NG

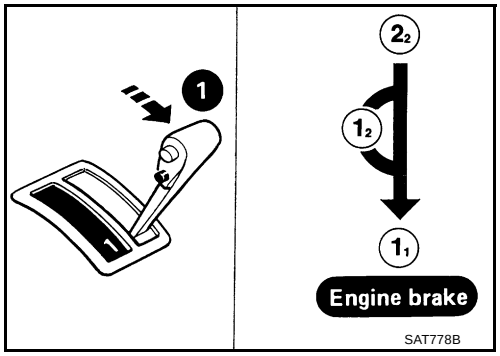
OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again. Refer to AT-82, "Cruise Test — Part 3" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.



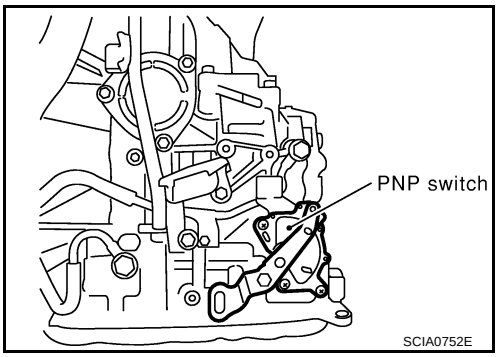
TCM Self-diagnosis Does Not Activate

ECS004TE

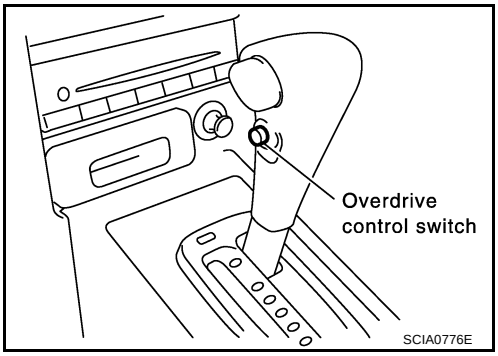
SYMPTOM:
O/D OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

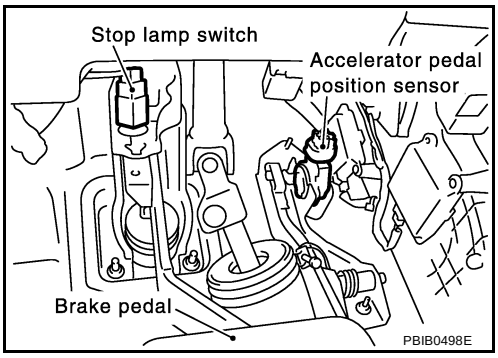
- PNP switch
  The PNP switch assembly includes a transmission position switch. The transmission position switch detects the selector lever position and sends a signal to the TCM.



- 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.

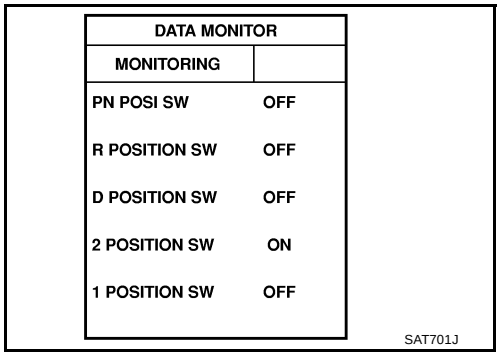


DIAGNOSTIC PROCEDURE

1. CHECK PNP SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch to ON. (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-240, "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)

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

Without CONSULT-II

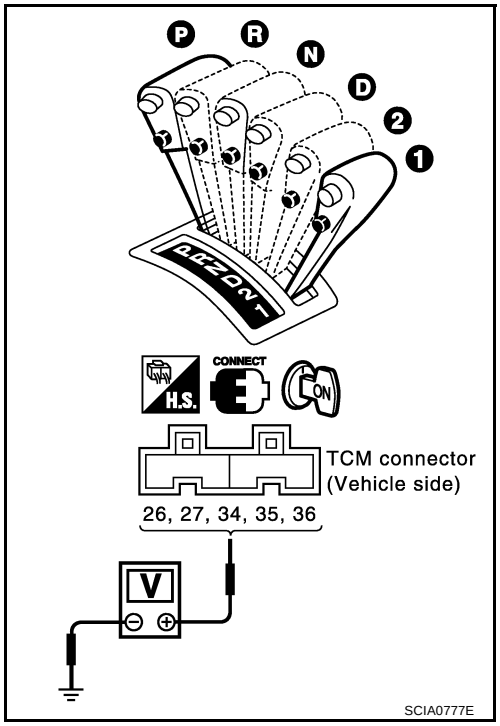
1. Turn ignition switch to ON. (Do not start engine.)
2. Check voltage between TCM terminals 26, 27, 34, 35, 36 and ground while moving selector lever through each position.

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 3.
NG >> Check the following items:

- PNP switch (Refer to AT-240, "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

1. Turn ignition switch to ON. (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.)

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

SAT645J

OK or NG

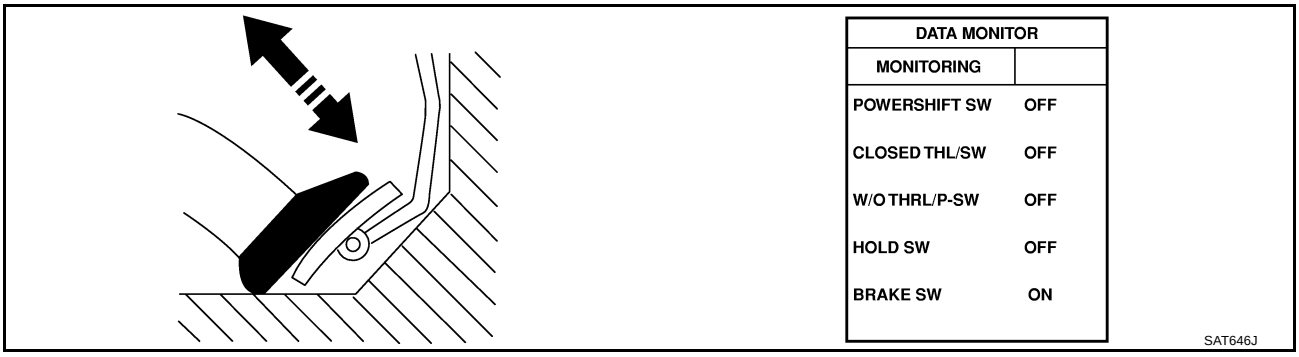
OK >> GO TO 4.
NG >> Check the following items:

- Overdrive control switch (Refer to AT-240, "COMPONENT INSPECTION" .)
- Harness for short or open between Combination meter and overdrive control switch
- Harness of ground circuit for overdrive control switch for short or open
- Combination Meter (Refer to DI-4, "COMBINATION METERS" .)

4. CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch to ON. (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 5.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Accelerator pedal position sensor — Refer to AT-173, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .
- Harness for short or open between accelerator pedal position sensor and ECM

5. 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-173, "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 6.
NG >> Repair or replace damaged parts.

6. CHECK DTC

Perform AT-52, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .

OK or NG

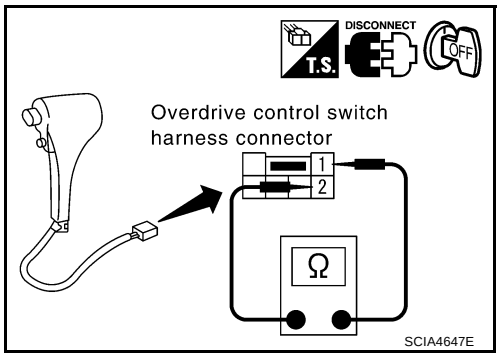
OK >> **INSPECTION END**
NG >> ● Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
● If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

COMPONENT INSPECTION

Overdrive Control Switch

- Check continuity between two terminals 1 and 2.

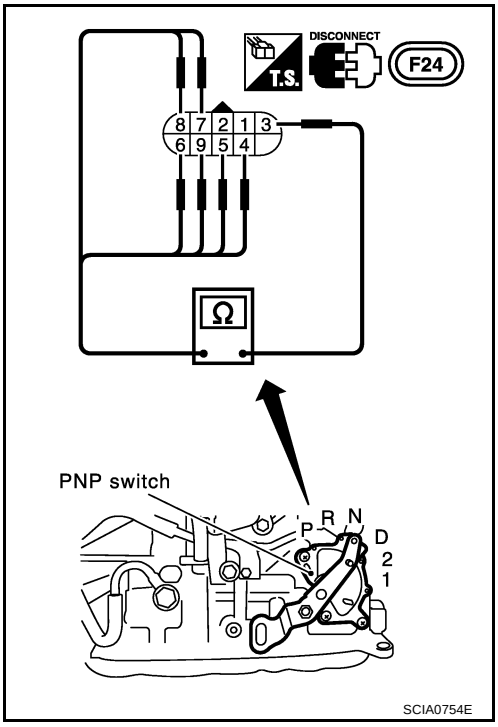
Switch position	Continuity
ON	No
OFF	Yes



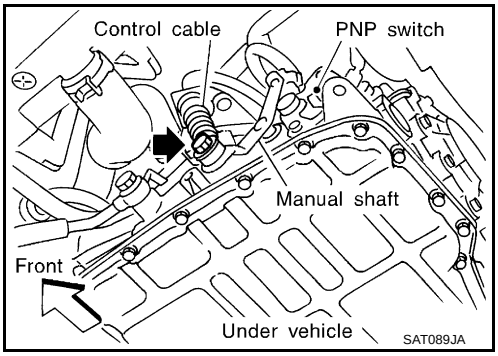
PNP Switch

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-409, "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-409, "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-242, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" , place check marks for results on the AT-252, "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.

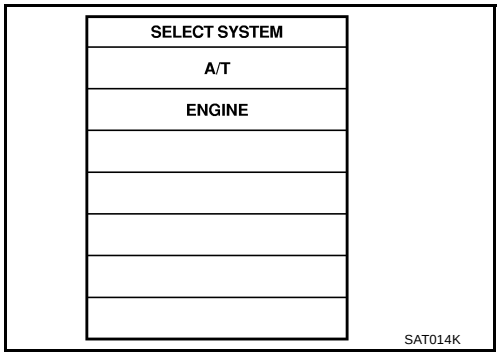
3. Shift solenoid valve “A” or “B” is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).
4. Additional CONSULT-II information can be found in the Operation Manual supplied with the CONSULT-II unit.

FUNCTION

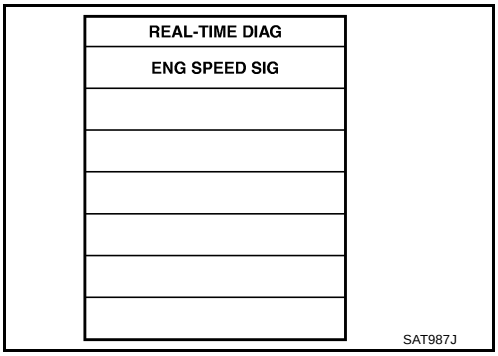
Diagnostic test mode	Function	Reference page
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-II.	—
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	AT-242
Data monitor	Input/Output data in the ECM can be read.	AT-244
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.	—
Function test	Conducted by CONSULT-II instead of a technician to determine whether each system is “OK” or “NG”.	—
DTC work support	Select the operating condition to confirm Diagnosis Trouble Codes.	AT-47
TCM part number	TCM part number can be read.	—

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-286, "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

Items (CONSULT-II screen terms)	Malfunction is detected when...	Remarks
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED)	● No failure has been detected.	
INITIAL START	● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)	
VHCL SPEED SEN·A/T	● TCM does not receive the proper voltage signal from the sensor.	
VHCL SPEED SEN·MTR	● TCM does not receive the proper voltage signal from the sensor.	
THROTTLE POSI SEN	● TCM receives an excessively low or high voltage from the sensor.	
SHIFT SOLENOID/V A	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
SHIFT SOLENOID/V B	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
OVERRUN CLUTCH S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
T/C CLUTCH SOL/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
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 SIG	● TCM does not receive the proper voltage signal from the ECM.	
LINE PRESSURE S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	
CAN COMM CIRCUIT	● When malfunction is detected in CAN communication line.	
CONTROL UNIT (RAM)	● TCM memory (RAM) is malfunctioning	Refer to AT-286
CONTROL UNIT (ROM)	● TCM memory (ROM) is malfunctioning	Refer to AT-286
CONT UNIT (EEP ROM)	● TCM memory (EEP ROM) is malfunctioning.	Refer to AT-286

CAUTION:
If malfunction is detected in multiple systems including CAN communication line, CAN communication line trouble diagnosis shall be performed first.

DATA MONITOR MODE (A/T)

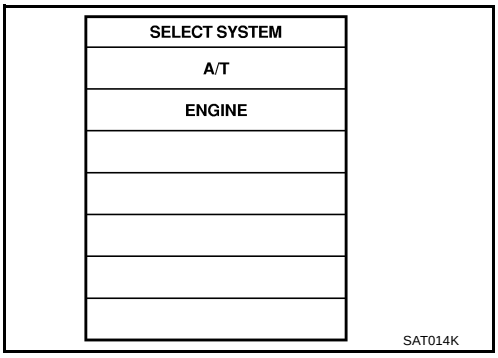
X: Standard, —: Not applicable, ▼: Option

Monitor item (Unit)	SELECT MONITOR ITEM			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
VHCL/S SE·A/T [km/h] or [mph]	X	—	▼	When racing engine in N or P with vehicle stationary, CONSULT-II data may not indicate 0 km/h (0 mph).
VHCL/S SE·MTR [km/h] or [mph]	X	—	▼	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.
THRTL POS SEN [V]	X	—	▼	
FLUID TEMP SE [V]	X	—	▼	
BATTERY VOLT [V]	X	—	▼	
ENGINE SPEED [rpm]	X	X	▼	Engine speed display may not be accurate under approx. 800 rpm. It may not indicate 0 rpm even when engine is not running.
OVERDRIVE SW [ON/OFF]	X	—	▼	
PN POSI SW [ON/OFF]	X	—	▼	
R POSITION SW [ON/OFF]	X	—	▼	
D POSITION SW [ON/OFF]	X	—	▼	
2 POSITION SW [ON/OFF]	X	—	▼	
1 POSITION SW [ON/OFF]	X	—	▼	
ASCD·CRUISE [ON/OFF]	X	—	▼	● This is displayed even when no ASCD is mounted.
ASCD·OD CUT [ON/OFF]	X	—	▼	● This is displayed even when no ASCD is mounted.
KICKDOWN SW [ON/OFF]	X	—	▼	● This is displayed even when no kick down switch is equipped.
CLOSED THL/SW [ON/OFF]	X	—	▼	● This means closed throttle position signal input via CAN communication line.
W/O THRL/P-SW [ON/OFF]	X	—	▼	● This means wide open throttle position signal input via CAN communication line.
GEAR	—	X	▼	
SLCT LVR POSI	—	X	▼	● A specific value used for control is displayed if fail-safe is activated due to error.
VEHICLE SPEED [km/h] or [mph]	—	X	▼	
TC SLIP RATIO [0.000]	—	—	▼	
TC SLIP SPEED [rpm]	—	—	▼	Display doesn't indicate o rpm even if engine is stopped. But this isn't malfunction.

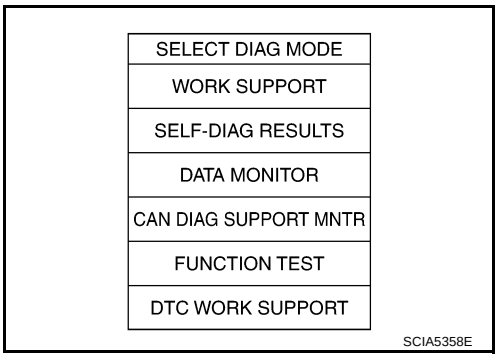
Monitor item (Unit)	SELECT MONITOR ITEM			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
THROTTLE POSI [/8]	—	X	▼	● A specific value used for control is displayed if fail-safe is activated due to error.
BRAKE SW [ON/OFF]	X	—	▼	
LINE PRES DTY [%]	—	X	▼	
TCC S/V DUTY [%]	—	X	▼	
SHIFT S/V A [ON/OFF]	—	X	▼	Control value of solenoid is displayed even if solenoid circuit is disconnected. The OFF signal is displayed if solenoid circuit is shorted.
SHIFT S/V B [ON/OFF]	—	X	▼	
OVERRUN/C S/V [ON/OFF]	—	X	▼	
SELF-D DP LMP [ON/OFF]	—	X	▼	
Voltage [V]	—	—	▼	
Frequency [Hz]	—	—	▼	
DUTY-HI [%]	—	—	▼	
DUTY-LOW [%]	—	—	▼	
PLS WIDTH-HI [msec]	—	—	▼	
PLS WIDTH-LOW [msec]	—	—	▼	

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

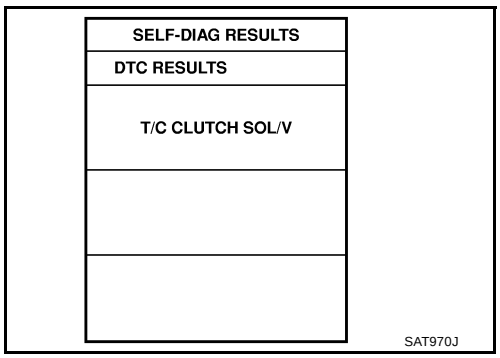
1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait for at least 3 seconds and then turn it “ON” again.
2. Turn CONSULT-II “ON”, and touch “A/T”.



3. Touch “SELF-DIAG RESULTS”.



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



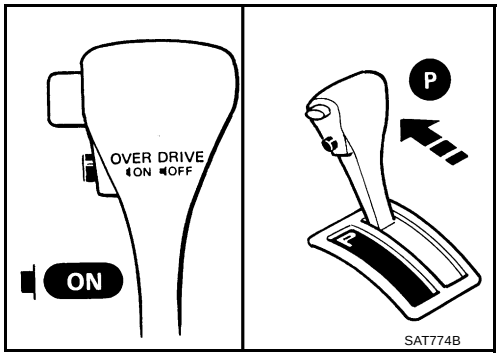
Diagnostic Procedure Without CONSULT-II

ECS004NX

SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)

1. CHECK O/D OFF INDICATOR LAMP

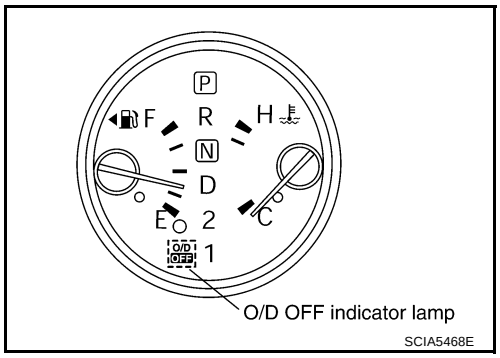
1. Selector lever in P position.
2. Turn ignition switch to OFF.
3. Wait 5 seconds.
4. Set overdrive control switch to ON.



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

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

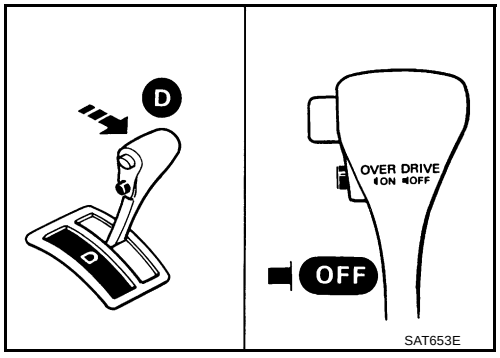
YES >> GO TO 2.
NO >> GO TO AT-291, "O/D OFF Indicator Lamp Does Not Come On" .



2. JUDGEMENT PROCEDURE STEP 1

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

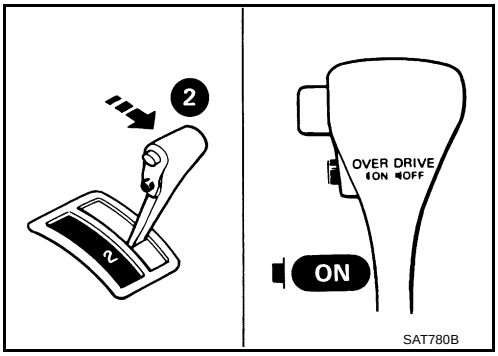
>> GO TO 3.



3. JUDGEMENT PROCEDURE STEP 2

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

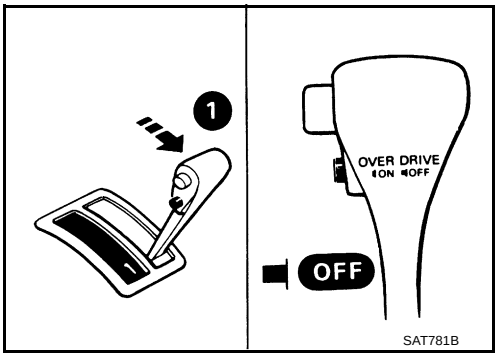
>> GO TO 4.



4. JUDGEMENT PROCEDURE STEP 3

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

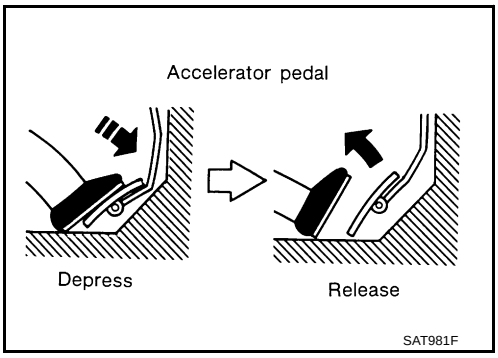
>> GO TO 5.



5. JUDGEMENT PROCEDURE STEP 4

1. Depress accelerator pedal fully and release it.

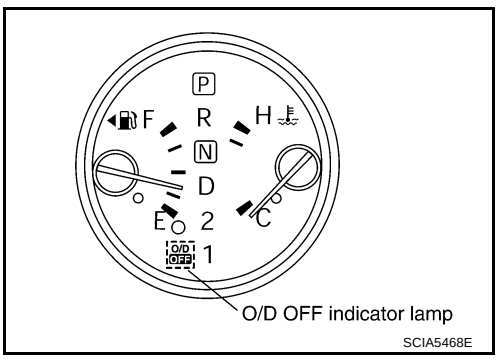
>> GO TO 6.



6. CHECK SELF-DIAGNOSIS CODE

Check O/D OFF indicator lamp. Refer to AT-248, "JUDGEMENT OF SELF-DIAGNOSIS CODE" .

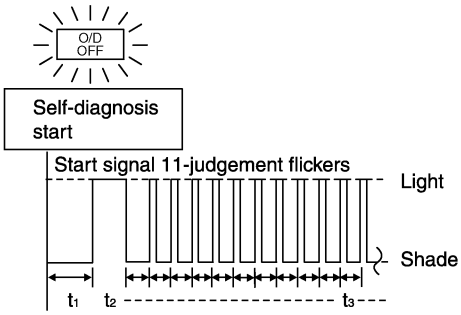
>> **DIAGNOSIS END**



JUDGEMENT OF SELF-DIAGNOSIS CODE

O/D OFF indicator lamp:

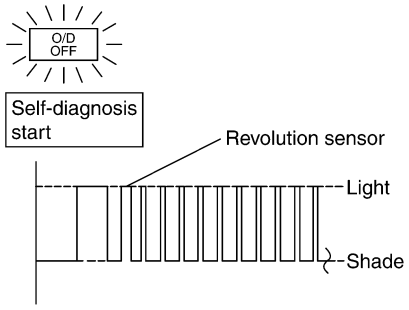
All judgement flickers are the same.



SCIA4672E

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

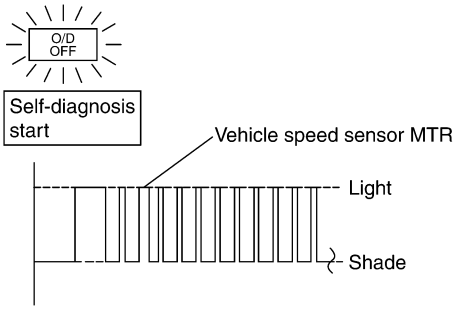
1st judgement flicker is longer than others.



SCIA5591E

Revolution sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR).**
Refer to AT-332

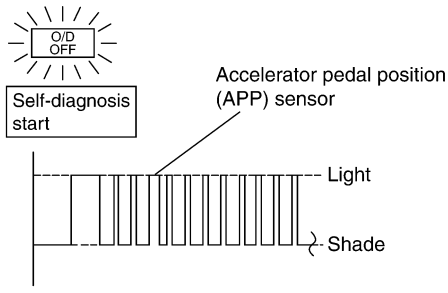
2nd judgement flicker is longer than others.



SCIA5592E

Vehicle speed sensor circuit is short-circuited or disconnected.
⇒ **Go to VEHICLE SPEED SENSOR·MTR.**
Refer to AT-339

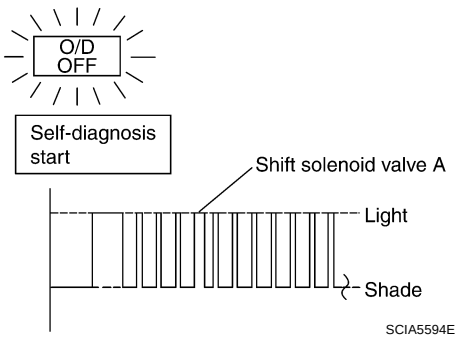
3rd judgement flicker is longer than others.



SCIA5593E

Accelerator pedal position (APP) sensor circuit is short-circuited or disconnected.
⇒ **Go to ACCELERATOR PEDAL POSITION (APP) SENSOR.**
Refer to AT-345

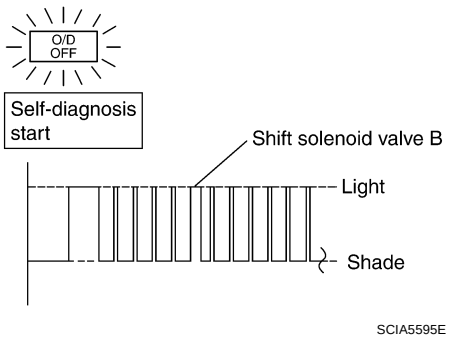
4th judgement flicker is longer than others.



SCIA5594E

Shift solenoid valve A circuit is short-circuited or disconnected.
⇒ **Go to SHIFT SOLENOID VALVE A.**
Refer to AT-350

5th judgement flicker is longer than others.

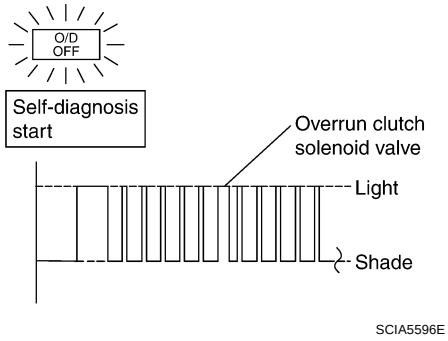


SCIA5595E

Shift solenoid valve B circuit is short-circuited or disconnected.
⇒ **Go to SHIFT SOLENOID VALVE B.**
Refer to AT-356

O/D OFF indicator lamp:

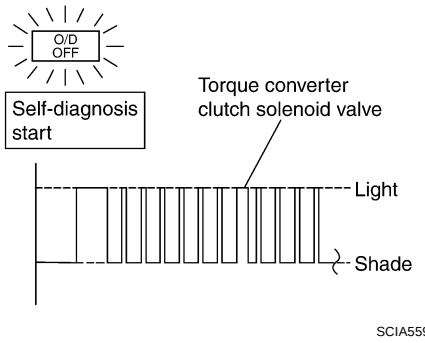
6th judgement flicker is longer than others.



SCIA5596E

Overrun clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to OVERRUN CLUTCH SOLENOID VALVE.**
Refer to AT-362

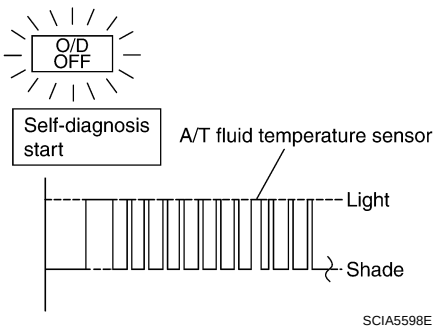
7th judgement flicker is longer than others.



SCIA5597E

Torque converter clutch solenoid valve circuit is short-circuited or disconnected.
⇒ **Go to TORQUE CONVERTER CLUTCH SOLENOID VALVE.**
Refer to AT-368

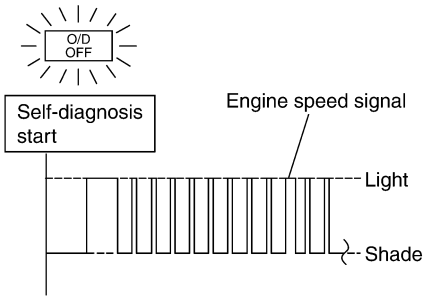
8th judgement flicker is longer than others.



SCIA5598E

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-374

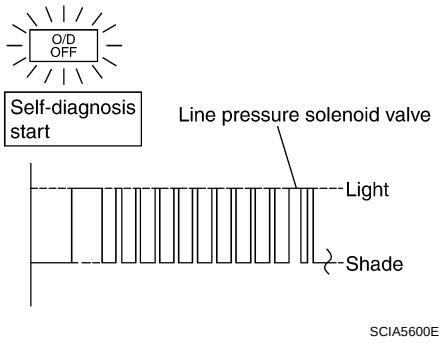
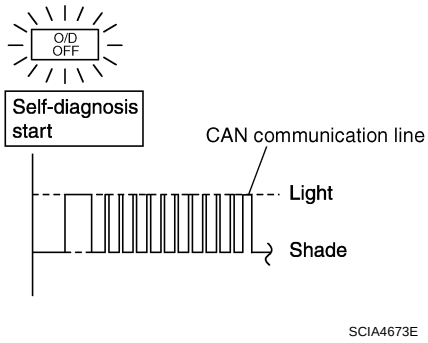
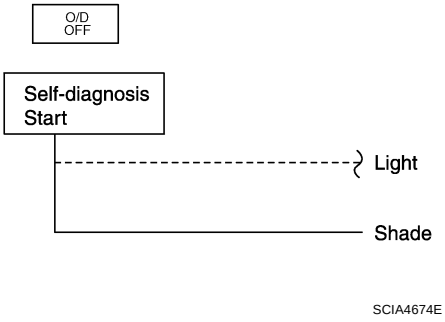
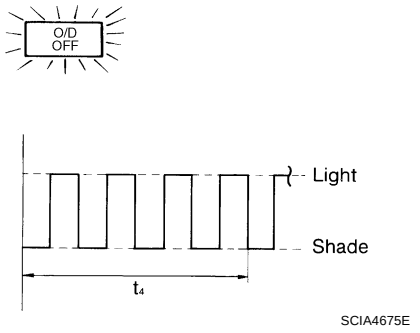
9th judgement flicker is longer than others.



SCIA5599E

Engine speed signal circuit is short-circuited or disconnected.
⇒ **Go to ENGINE SPEED SIGNAL.**
Refer to AT-382

O/D OFF indicator lamp:

10th judgement flicker is longer than others.  SCIA5600E	11th judgement flicker is longer than others.  SCIA4673E
Line pressure solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to LINE PRESSURE SOLENOID VALVE.** Refer to AT-387	CAN communication line is damaged. ⇒**Go to CAN COMMUNICATION LINE.** Refer to AT-329
Lamp comes OFF.  SCIA4674E	Flickers as shown below.  SCIA4675E
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-324	Battery power is low. Battery has been disconnected for a long time. Battery is connected conversely. (When reconnecting TCM connectors.—This is a problem.)

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

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

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-246, "Diagnostic Procedure Without CONSULT-II" .
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.

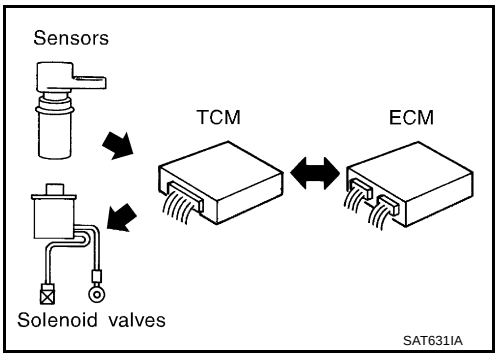
It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

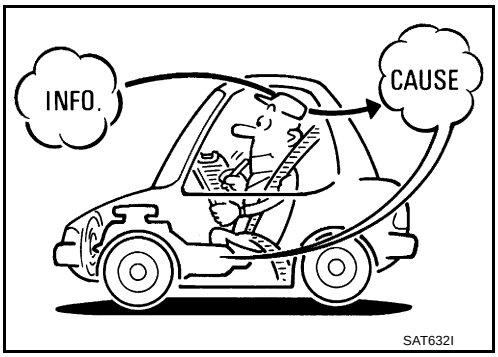
A visual check only, may not find the cause of the problems. A road test with CONSULT-II or a circuit tester connected should be performed. Follow the “Work Flow”. Refer to AT-61 .

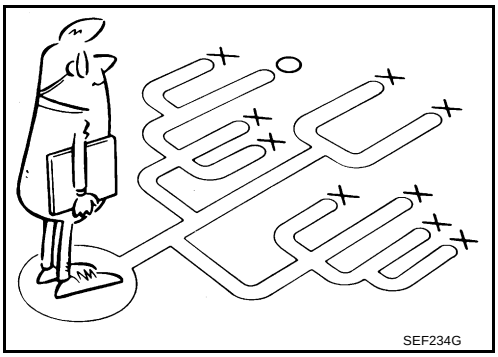
Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drive ability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “Diagnostic Worksheet” like the example (AT-58) 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

Information from Customer

KEY POINTS

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

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

Diagnostic Worksheet

1.	❑ Read the Fail-safe and listen to customer complaints.		AT-11, AT-252
2.	❑ Check A/T fluid		AT-256
	❑ Leakage (Follow specified procedure) ❑ Fluid condition ❑ Fluid level		
3.	❑ Perform Stall Test and Line Pressure Test.		AT-257, AT-260
	❑ Stall test — Mark possible damaged components/others.		
	❑ Torque converter one-way clutch ❑ Reverse clutch ❑ Forward clutch ❑ Overrun clutch ❑ Forward one-way clutch	❑ Low & reverse brake ❑ Low one-way clutch ❑ Engine ❑ Line pressure is low ❑ Clutches and brakes except high clutch and brake band are OK	
	❑ Line Pressure test — Suspected parts:		
4.	❑ Perform all Road Test and mark required procedures.		AT-262
4-1.	Check before engine is started.		AT-263
	❑ O/D OFF Indicator Lamp Does Not Come On, AT-291 . ❑ SELF-DIAGNOSTIC CONFIRMATION PROCEDURE — Mark detected items.		
	❑ Vehicle speed sensor·A/T (Revolution sensor), AT-332 . ❑ Vehicle speed sensor·MTR, AT-339 . ❑ Accelerator pedal position (APP) sensor, AT-345 . ❑ Shift solenoid valve A, AT-350 . ❑ Shift solenoid valve B, AT-356 . ❑ Overrun clutch solenoid valve, AT-362 . ❑ Torque converter clutch solenoid valve, AT-368 . ❑ A/T fluid temperature sensor and TCM power source, AT-374 . ❑ Engine speed signal, AT-382 . ❑ Line pressure solenoid valve, AT-387 . ❑ CAN communication line, AT-329 . ❑ Control unit (RAM), control unit (ROM), AT-198 . ❑ Control unit (EEP ROM), AT-200 . ❑ PNP & overdrive control switches, and throttle position sensor, AT-324 . ❑ Battery ❑ Others		
4-2.	Check at idle		AT-264
	❑ Engine Cannot Be Started In “P” And “N” Position, AT-293 . ❑ In “P” Position, Vehicle Moves Forward Or Backward When Pushed, AT-294 . ❑ In “N” Position, Vehicle Moves, AT-295 . ❑ Large Shock. “N” → “R” Position, AT-296 . ❑ Vehicle Does Not Creep Backward In “R” Position, AT-297 . ❑ Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position, AT-299 .		

4.	4-3.	Cruise test	AT-266, AT-270
		Part-1	
		❏ Vehicle Cannot Be Started From D1 , AT-301 . ❏ A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , AT-304 . ❏ A/T Does Not Shift: D2 → D3 , AT-307 . ❏ A/T Does Not Shift: D3 → D4 , AT-309 . ❏ A/T Does Not Perform Lock-up,AT-311 . ❏ A/T Does Not Hold Lock-up Condition, AT-312 . ❏ Lock-up Is Not Released, AT-314 . ❏ Engine Speed Does Not Return To Idle (Light Braking D4 → D3), AT-315 .	
		Part-2	AT-273
		❏ Vehicle Does Not Start From D1 , AT-317 . ❏ A/T Does Not Shift: D1 → D2 Or Does Not Kickdown: D4 → D2 , AT-304 . ❏ A/T Does Not Shift: D2 → D3 , AT-307 . ❏ A/T Does Not Shift: D3 → D4 , AT-309 .	
		Part-3	AT-275
		❏ A/T Does Not Shift: D4 → D3 When Overdrive Control Switch “ON” → “OFF”, AT-318 . ❏ Engine Speed Does Not Return To Idle (Engine Brake In D3), AT-315 . ❏ A/T Does Not Shift: D3 → 22 , When Selector Lever “D” → “2” Position, AT-319 . ❏ Engine Speed Does Not Return To Idle (Engine Brake In 22),AT-315 . ❏ A/T Does Not Shift: 22 → 11 , When Selector Lever “2” → “1” Position, AT-320 . ❏ Vehicle Does Not Decelerate By Engine Brake, AT-322 . ❏ TCM Self-diagnosis Does Not Activate (PNP & Overdrive Control Switches, and throttle position sensor Circuit Checks), AT-324 . ❏ SELF-DIAGNOSTIC PROCEDURE — Mark detected items.	
		❏ Vehicle speed sensor·A/T (Revolution sensor), AT-332 . ❏ Vehicle speed sensor·MTR, AT-339 . ❏ Accelerator pedal position (APP) sensor, AT-345 . ❏ Shift solenoid valve A, AT-350 . ❏ Shift solenoid valve B, AT-356 . ❏ Overrun clutch solenoid valve, AT-362 . ❏ Torque converter clutch solenoid valve, AT-368 . ❏ Batt/fluid temp sen (A/T fluid temperature sensor and TCM power source), AT-374 . ❏ Engine speed signal, AT-382 . ❏ Line pressure solenoid valve, AT-387 . ❏ CAN communication line, AT-329 . ❏ Control unit (RAM), control unit (ROM), AT-198 . ❏ Control unit (EEP ROM), AT-200 . ❏ PNP & overdrive control switches, and throttle position sensor, AT-324 . ❏ Battery ❏ Others	
5.	❏ For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.		AT-246
6.	❏ Perform all Road Test and re-mark required procedures.		AT-262
7.	❏ Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.)		AT-277
8.	❏ Erase self-diagnosis code from TCM memories.		AT-245, AT-250

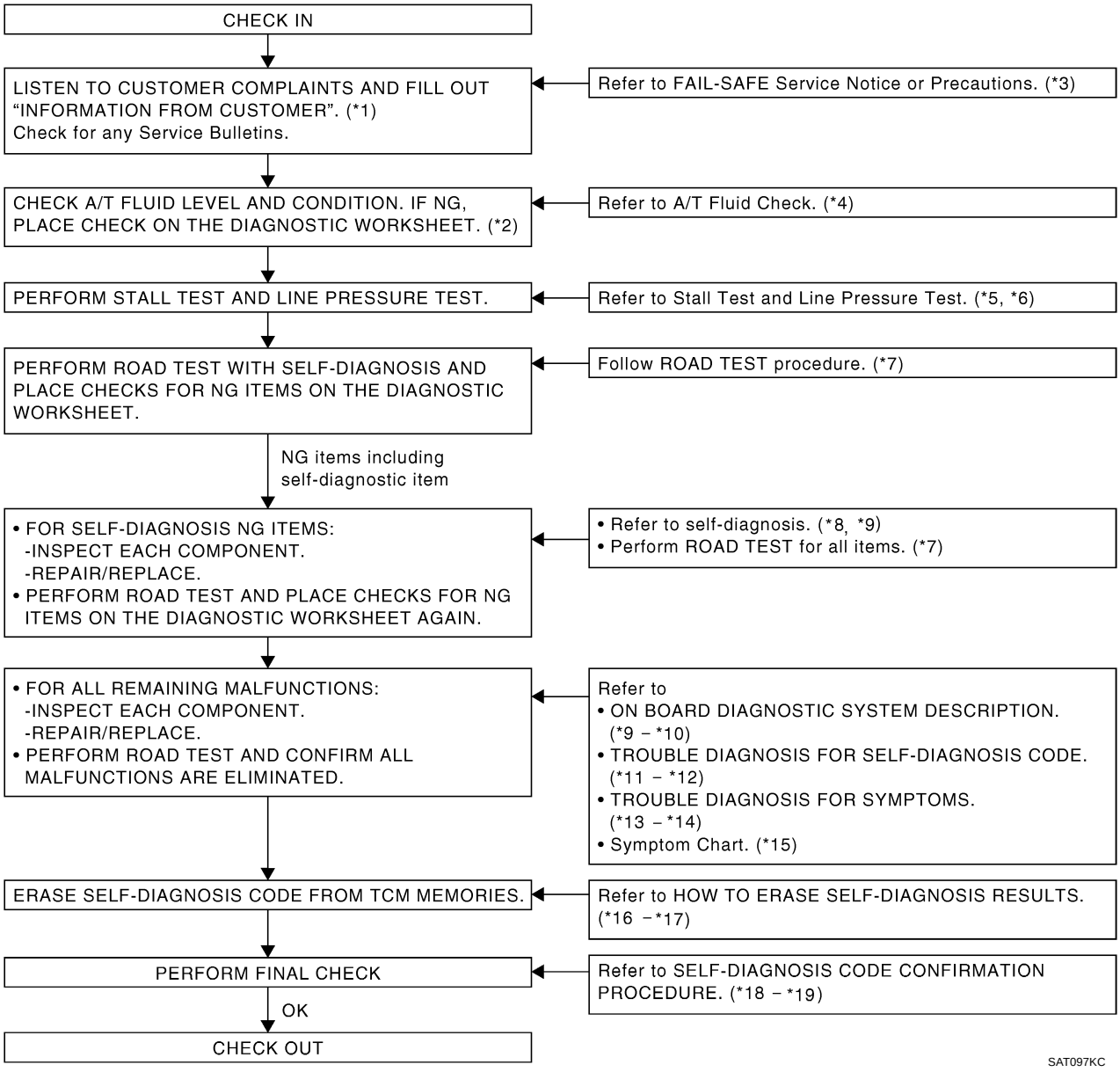
Work Flow

ECS004TG

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-252) and “DIAGNOSTIC WORKSHEET” (AT-253), to perform the best troubleshooting possible.

WORK FLOW CHART



SAT097KC

*1 AT-252	*2 AT-253	*3 AT-10
*4 AT-256	*5 AT-257	*6 AT-260
*7 AT-262	*8 AT-246	*9 AT-242
*10 AT-242	*11 AT-332	*12 AT-329
*13 AT-291	*14 AT-322	:15 AT-277
*16 AT-245	*17 AT-250	*18 AT-332
*19 AT-329		

TROUBLE DIAGNOSIS — BASIC INSPECTION

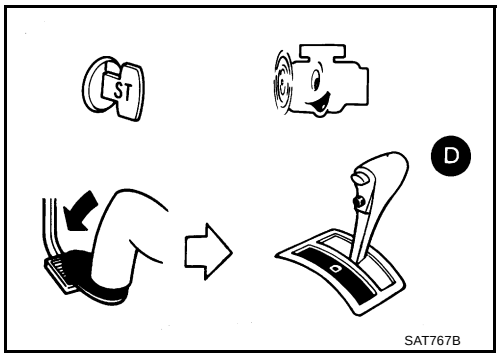
PFP:00000

A/T Fluid Check

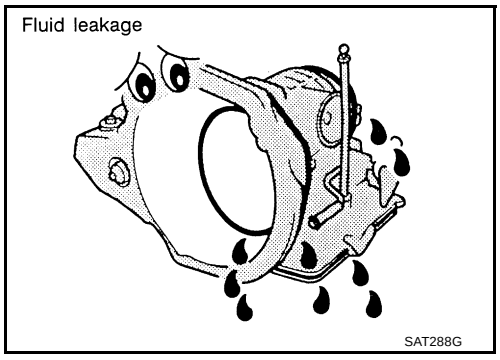
ECS004VR

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.

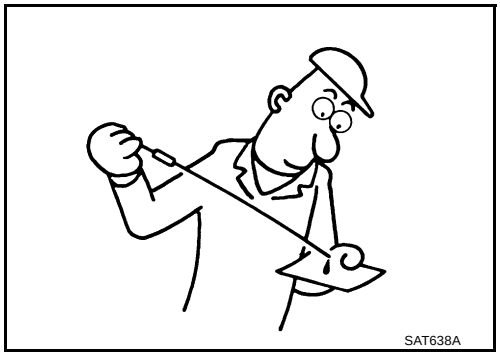


FLUID CONDITION CHECK

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-16, "Checking A/T Fluid" .

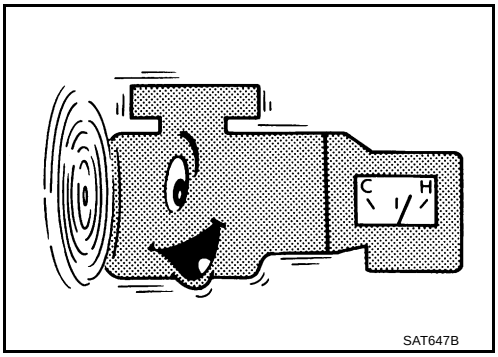


Stall Test

ECS004VS

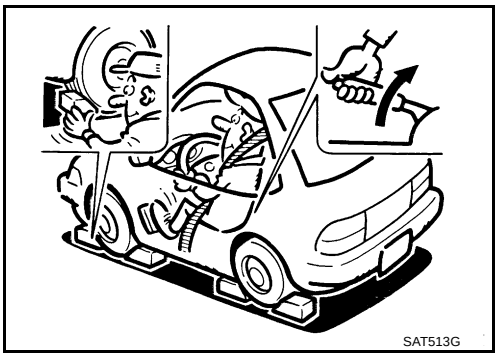
STALL TEST PROCEDURE

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. Refer to AT-17, "Changing A/T Fluid" .



SAT647B

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.**

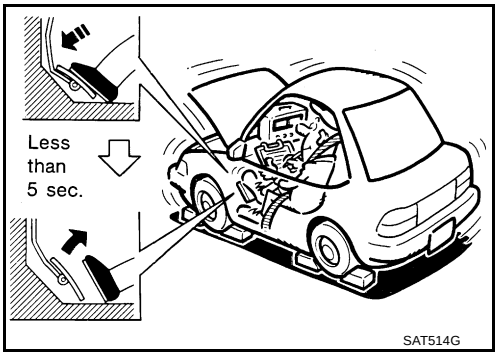

SAT513G

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

   Stall revolution:

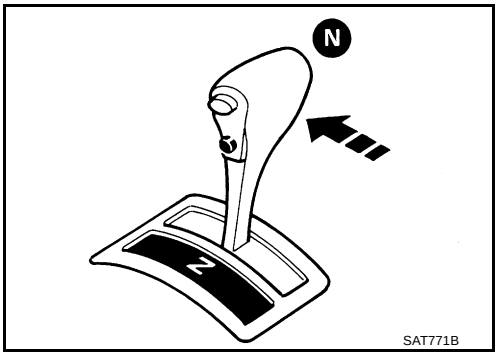
   QR20DE: 2,450 - 2,950 rpm

   QR25DE: 2,300 - 2,750 rpm



SAT514G

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



SAT771B

JUDGEMENT OF STALL TEST

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-255, "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.

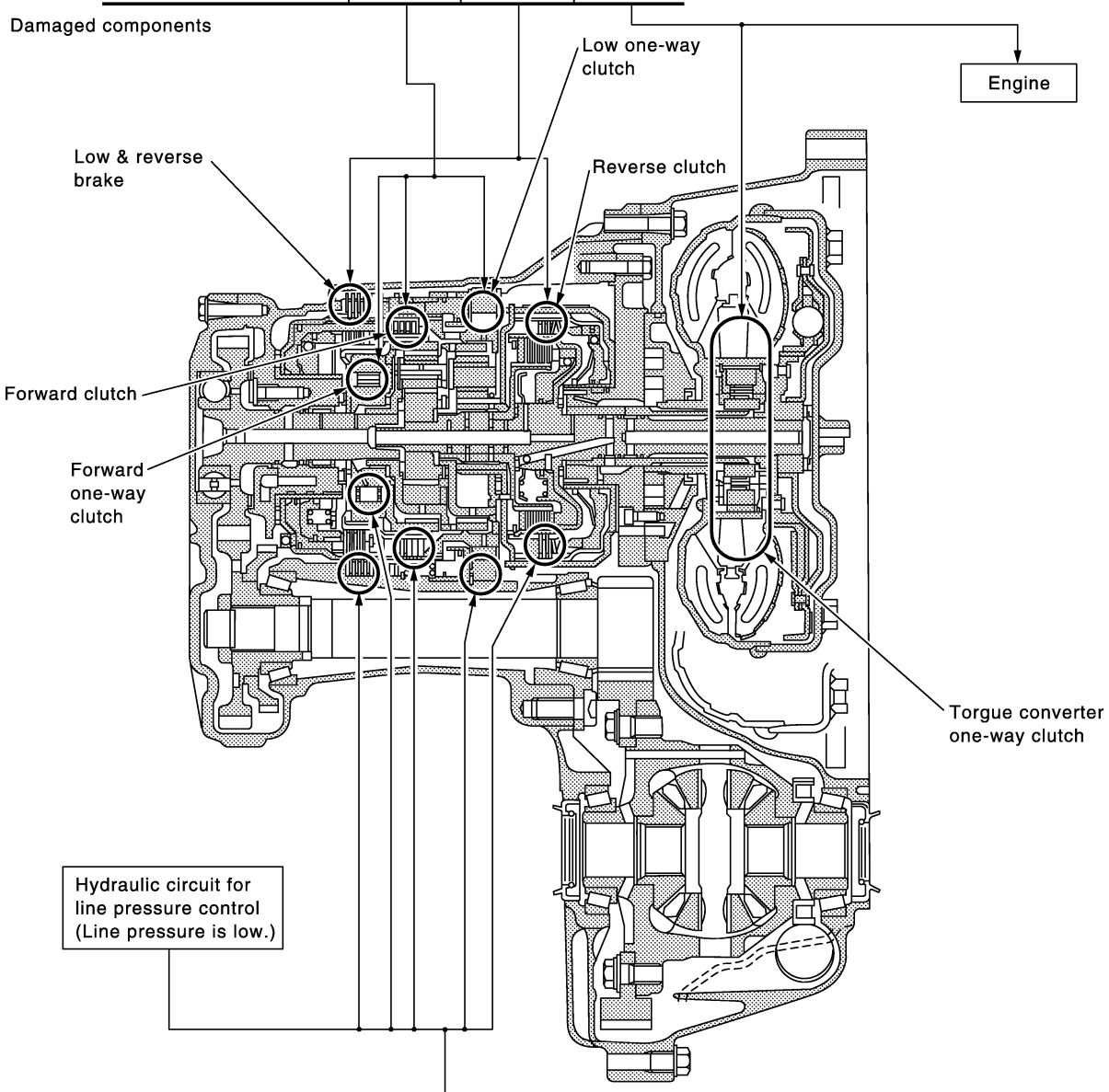
- Slippage occurs in 3rd and 4th gears in D position..... High clutch slippage
- Slippage occurs in 2nd and 4th gear in D position..... Brake band slippage
- Engine brake does not function in 2nd and 3rd gears in D position, 2nd gear in 2 position, and 1st gear in 1 position with overdrive control switch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

Stall revolution less than specifications:

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

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.



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

SCIA0707E

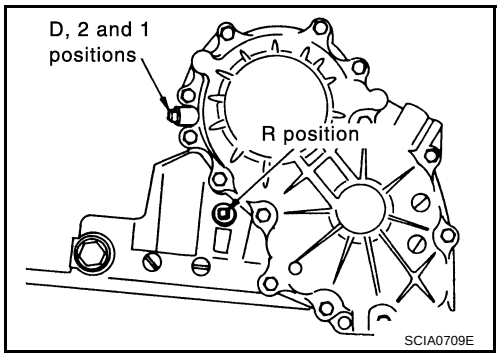
Line Pressure Test

ECS004VT

LINE PRESSURE TEST PORTS

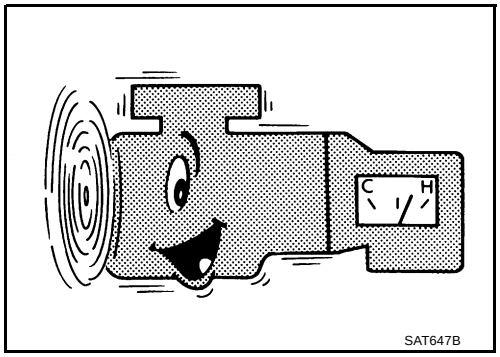
Location of line pressure test ports are shown in the illustration.

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

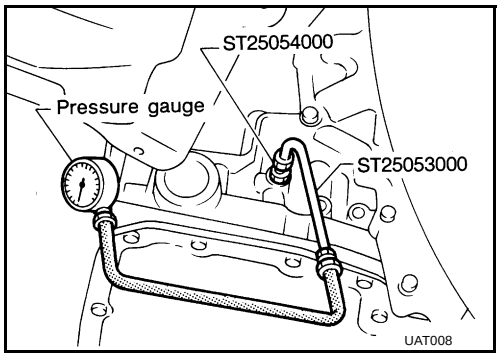


LINE PRESSURE TEST PROCEDURE

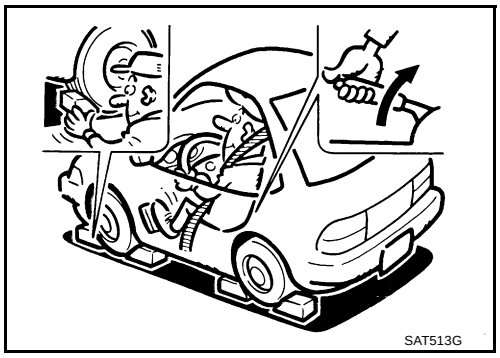
1. Check A/T fluid and engine oil levels. If necessary, add fluid or oil.
2. Drive vehicle for approx. 10 minutes or until engine oil and ATF reach operating temperature. Refer to AT-17, "Changing A/T Fluid" .



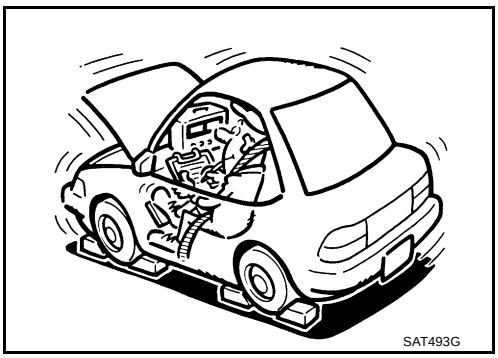
3. Install pressure gauge to corresponding line pressure port.



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

Check lock-up hold.	Line pressure kPa (bar, kg/cm^2 , psi)	
	"D", "2" and "1" positions	"R" position
Idle	500 (5.00, 5.1, 73)	778 (7.78, 7.9, 113)
Stall	1,233 (12.33, 12.6, 179)	1,918 (19.18, 19.6, 278)

JUDGEMENT OF LINE PRESSURE TEST

Judgement		Suspected parts
At idle	Line pressure is low in all positions.	● Oil pump wear ● Control piston damage ● Pressure regulator valve or plug sticking ● Spring for pressure regulator valve damaged ● Fluid pressure leakage between oil strainer and pressure regulator valve ● Clogged strainer
	Line pressure is low in particular position.	● Fluid pressure leakage between manual valve and particular clutch ● For example, line pressure is: – Low in R and 1 positions, but – Normal in D and 2 positions. Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to AT-23 .
	Line pressure is high.	● Maladjustment of throttle position sensor ● A/T fluid temperature sensor damaged ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure modifier valve sticking ● Pressure regulator valve or plug sticking ● Open in dropping resistor circuit
At stall speed	Line pressure is low.	● Maladjustment of throttle position sensor ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure regulator valve or plug sticking ● Pressure modifier valve sticking ● Pilot valve sticking

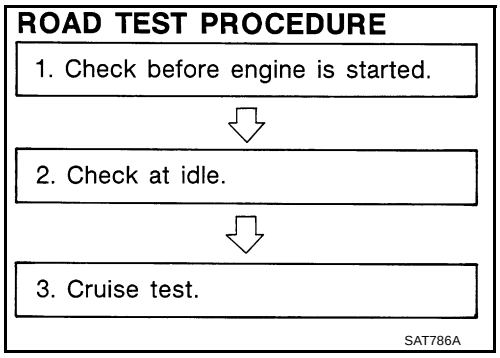
Road Test

ECS004VU

DESCRIPTION

- The purpose of the test is to determine overall performance of A/T and analyze causes of problems.
- The road test consists of the following three parts:

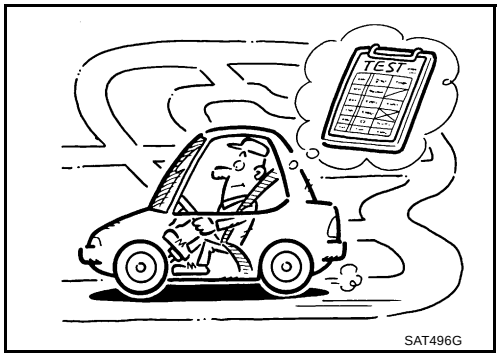
1. Check before engine is started
2. Check at idle



3. Cruise test

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

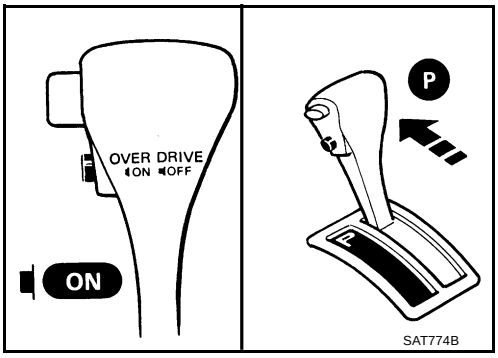
	ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION	TROUBLE DIAGNOSES FOR SYMPTOMS
Except for Euro-OBD	AT-242 to AT-246	AT-291 to AT-324



1. CHECK BEFORE ENGINE IS STARTED

1. CHECK O/D OFF INDICATOR LAMP

1. Park vehicle on flat surface.
2. Move selector lever to P position.
3. Turn ignition switch to OFF position.
4. Wait 5 seconds.
5. Set overdrive control switch to ON position.

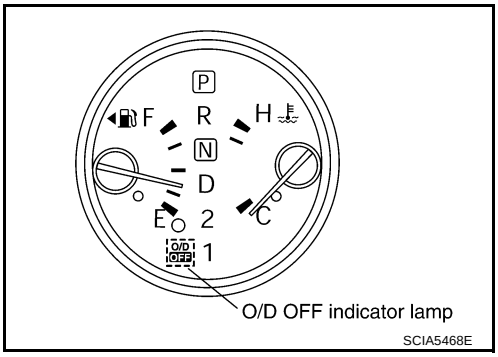


6. Turn ignition switch to ON. (Do not start engine.)

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

YES >> 1. Turn ignition switch to OFF position.
2. Perform self-diagnosis and note NG items.
Refer to AT-246, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)" .
3. GO TO “2. CHECK AT IDLE”, AT-264 .

NO >> Stop road test. GO TO “O/D OFF indicator Lamp Does Not Come On”. AT-291 .



2. CHECK AT IDLE

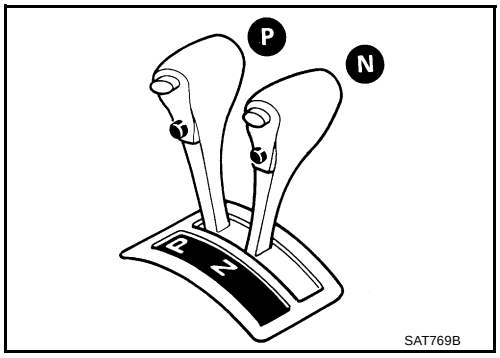
1. CHECK ENGINE START

1. Park vehicle on flat surface.
2. Move selector lever to P or N position.
3. Turn ignition switch to OFF position.
4. Turn ignition switch to START position.

Is engine started?

YES >> GO TO 2.

NO >>
- Stop Road Test. Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-252, "DIAGNOSTIC WORKSHEET" .
- GO TO AT-293, "Engine Cannot Be Started In “P” and “N” Position" .



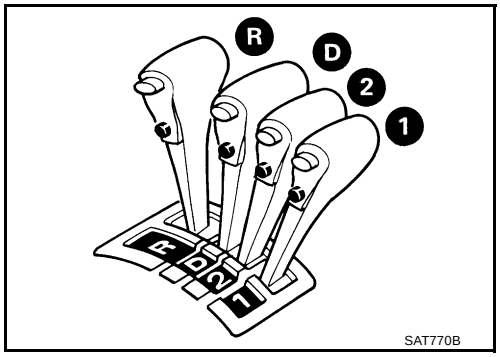
2. CHECK ENGINE START

1. Turn ignition switch to ON position. (Do not start engine.)
2. Move selector lever to D, 1, 2 or R position.
3. Turn ignition switch to START.

Is engine started?

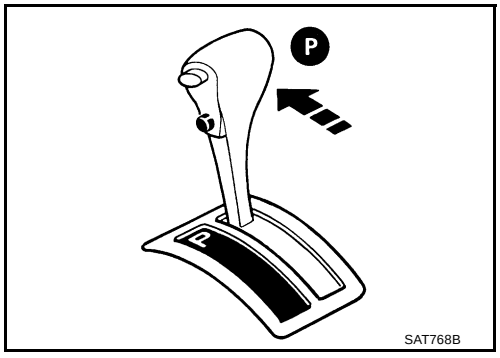
YES >>
- Stop Road Test. Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-252, "DIAGNOSTIC WORKSHEET" .
- GO TO AT-293, "Engine Cannot Be Started In “P” and “N” Position" .
- Continue Road Test. Refer to AT-262, "Road Test" .

NO >> GO TO 3.



3. CHECK VEHICLE MOVE

1. Move selector lever to P position.
2. Turn ignition switch to OFF position.
3. Release parking brake.

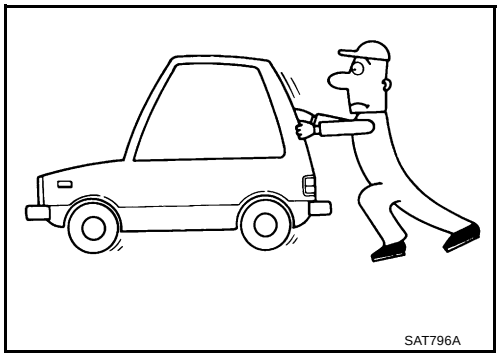


4. Push vehicle forward or backward.

Does vehicle move when it is pushed forward or backward?

YES >>
- Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-252, "DIAGNOSTIC WORKSHEET" .
- GO TO AT-294, "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. Start engine.
3. Move selector lever to N position.
4. Release parking brake.

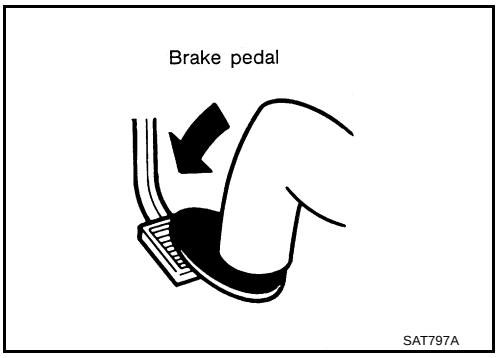
Does vehicle move forward or backward?

YES >> ● Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-252, "DIAGNOSTIC WORKSHEET" .
● GO TO AT-295, "In “N” Position, Vehicle Moves" .
● Continue “Road Test”.

NO >> GO TO 5.

5. CHECK SHIFT SHOCK

1. Apply foot brake.

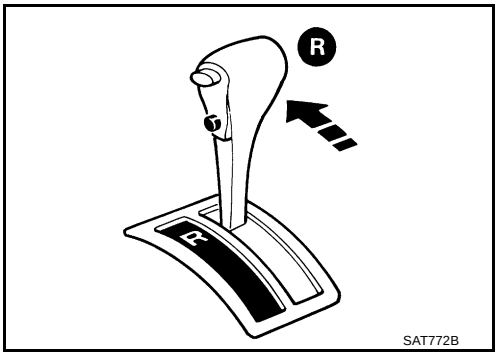


2. Move selector lever to R position.

Is there large shock when changing from N to R position?

YES >> ● Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-252, "DIAGNOSTIC WORKSHEET" .
● GO TO AT-296, "Large Shock. “N” → “R” Position" .
● Continue “Road Test”.

NO >> GO TO 6.



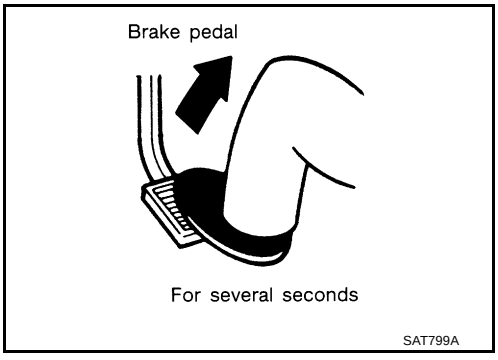
6. CHECK VEHICLE MOVE

Release foot brake for several seconds.

Does vehicle creep backward when foot brake is released?

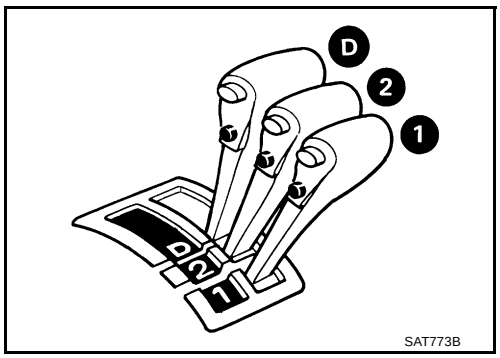
YES >> GO TO 7.

NO >> ● Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-252, "DIAGNOSTIC WORKSHEET" .
● GO TO AT-297, "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.



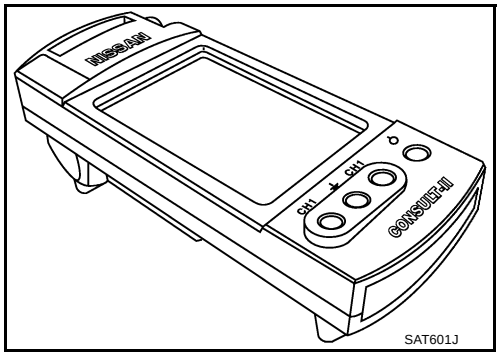
Does vehicle creep forward in all three position?

YES >> GO TO AT-266, "3. CRUISE TEST" .

NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET. Refer to AT-252, "DIAGNOSTIC WORKSHEET" .
- GO TO AT-299, "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.

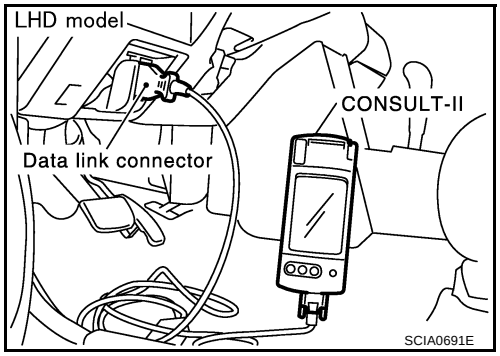


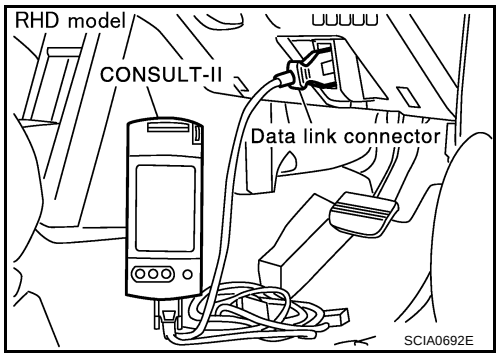
With CONSULT-II

- 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.

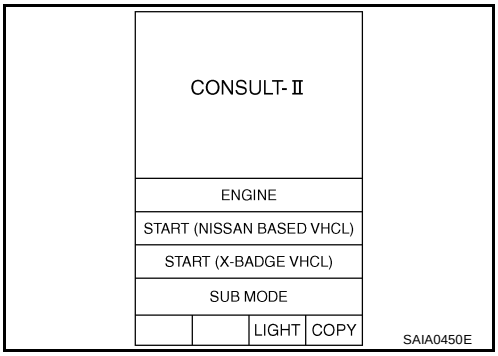
CONSULT-II Setting Procedure

1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector, which is located in instrument lower panel on driver side.

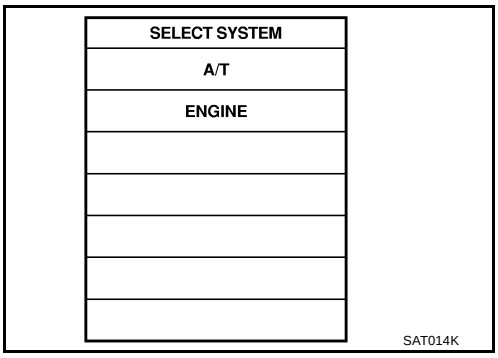




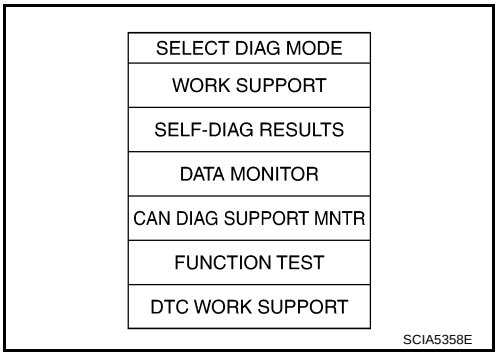
3. Turn ignition switch ON. (Do not start engine.)
4. Touch “START (NISSAN BASED VHCL)”.



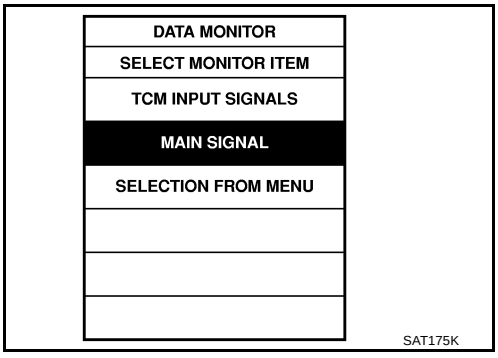
5. Touch “A/T”.
   If “A/T” is not indicated, go to GI-35, "CONSULT-II Data Link Connector (DLC) Circuit" .



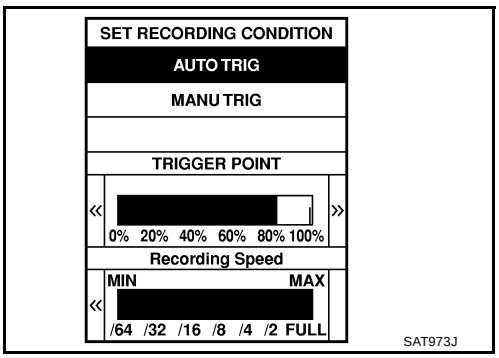
6. Touch “DATA MONITOR”.



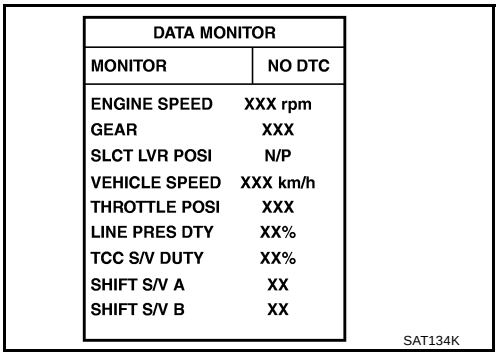
7. Touch “MAIN SIGNALS” or “TCM INPUT SIGNALS”.
8. Select “Numerical Display”, “Barchart Display” or “Line Graph Display”.



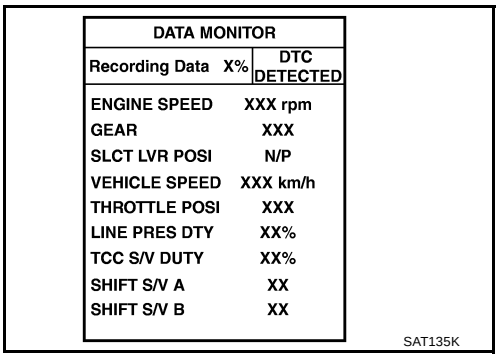
9. Touch “SETTING” to recording condition (“AUTO TRIG” or “MANU TRIG”) and touch “BACK”.
10. Touch “Start”.



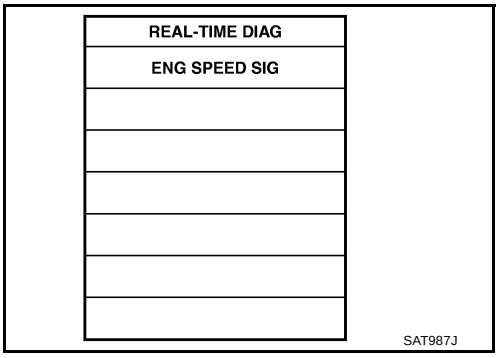
11. When performing cruise test, touch “RECORD”.

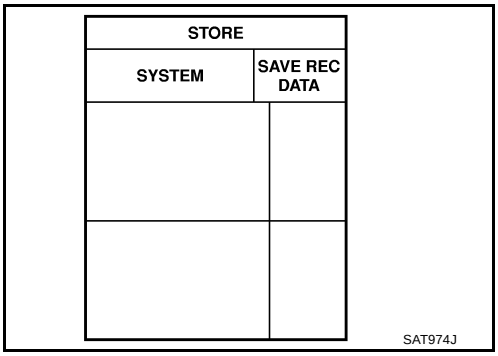


12. After finishing cruise test part 1, touch “STOP”.

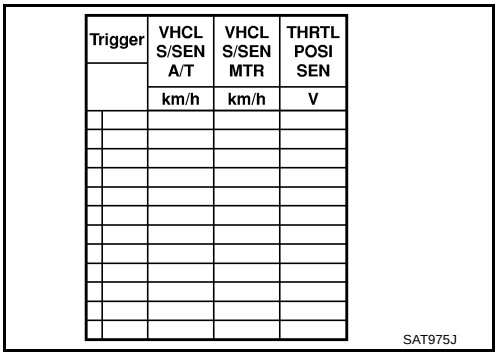


13. Touch “STORE” and touch “BACK”.



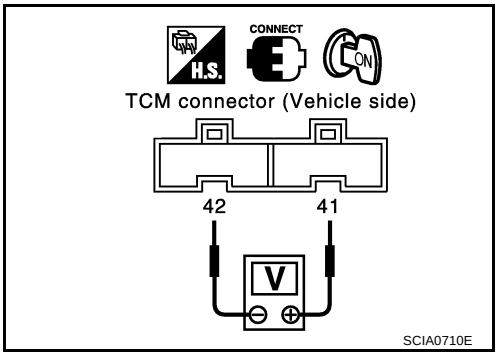


14. Touch “DISPLAY”.
15. Touch “PRINT”.
16. Check the monitor data printed out.
17. Continue cruise test part 2 and 3.



Without CONSULT-II

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



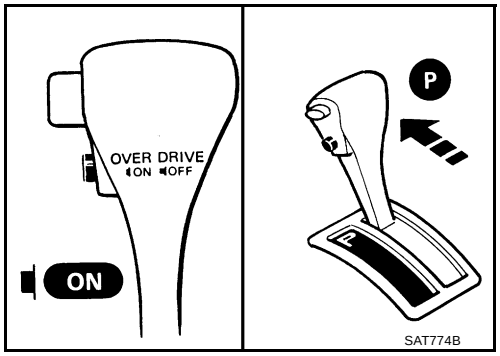
Cruise Test — Part 1

1. CHECK STARTING GEAR (D_1) POSITION

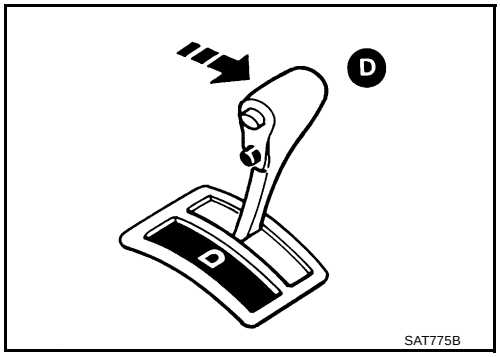
1. Drive vehicle for approximately 10 minutes to warm engine oil and ATF up to operating temperature.

   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.



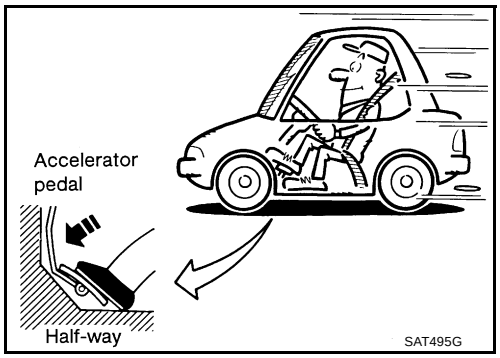
7. Accelerate vehicle by constantly depressing accelerator pedal halfway.

   Read gear position. Refer to AT-244, "DATA MONITOR MODE (A/T)" .

Does vehicle start from D_1 ?

YES >> GO TO 2.

NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-301, "Vehicle Cannot Be Started From D_1" .
- Continue “Road Test”.



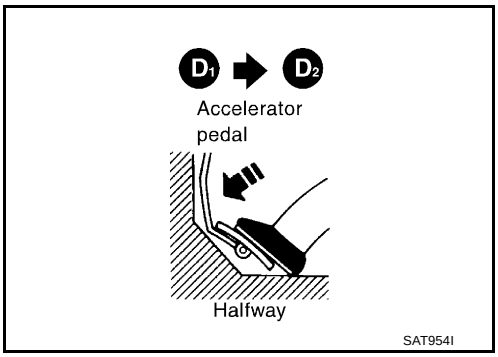
2. CHECK SHIFT UP (D_1 TO D_2)

Check shift-up (D_1 to D_2).
Specified speed when shifting from D_1 to D_2. Refer to AT-530, "VEHICLE SPEED WHEN SHIFTING GEARS AND THROTTLE POSITION" .

Read gear position, throttle opening and vehicle speed. Refer to AT-244, "DATA MONITOR MODE (A/T)" .

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

YES >> GO TO 3.
NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-304, "A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$" .
- Continue “Road Test”.



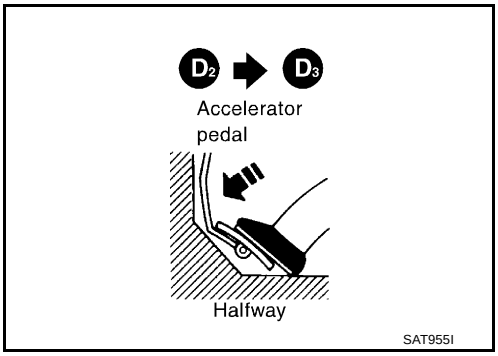
3. CHECK SHIFT UP (D_2 TO D_3)

Check shift-up (D_2 to D_3).
Specified speed when shifting from D_2 to D_3. Refer to AT-530, "VEHICLE SPEED WHEN SHIFTING GEARS AND THROTTLE POSITION" .

Read gear position, throttle opening and vehicle speed. Refer to AT-244, "DATA MONITOR MODE (A/T)" .

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

YES >> GO TO 4.
NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-307, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .
- Continue “Road Test”.



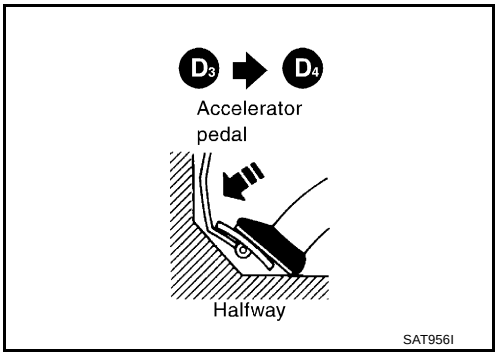
4. CHECK SHIFT UP (D_3 TO D_4)

Check shift-up (D_3 to D_4).
Specified speed when shifting from D_3 to D_4. Refer to AT-530, "VEHICLE SPEED WHEN SHIFTING GEARS AND THROTTLE POSITION" .

Read gear position, throttle opening and vehicle speed. Refer to AT-244, "DATA MONITOR MODE (A/T)" .

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

YES >> GO TO 5.
NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-309, "A/T Does Not Shift: $D_3 \rightarrow D_4$" .
- Continue “Road Test”.



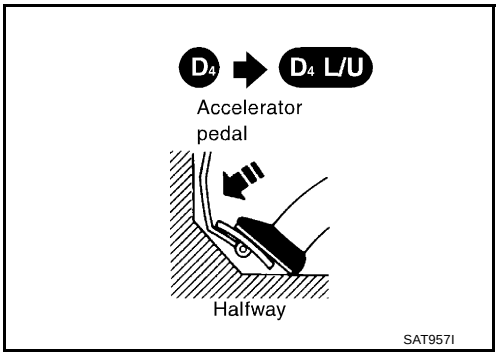
5. CHECK LOCK-UP (D4 TO D4 L/U)

Check lock-up (D4 to D4 L/U).
Specified speed when lock-up occurs. Refer to AT-530, "VEHICLE SPEED WHEN PERFORMING LOCK-UP" .

Read vehicle speed, throttle opening when lock-up duty becomes 94%. Refer to AT-244, "DATA MONITOR MODE (A/T)" .

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

YES >> GO TO 6.
NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-311, "A/T Does Not Perform Lock-up" .
- Continue “Road Test”.



6. CHECK HOLD LOCK-UP

Continue Road Test.

When lock-up duty becomes 94%. Refer to AT-244, "DATA MONITOR MODE (A/T)" .

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

YES >> GO TO 7.
NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-312, "A/T Does Not Hold Lock-up Condition" .
- Continue “Road Test”.

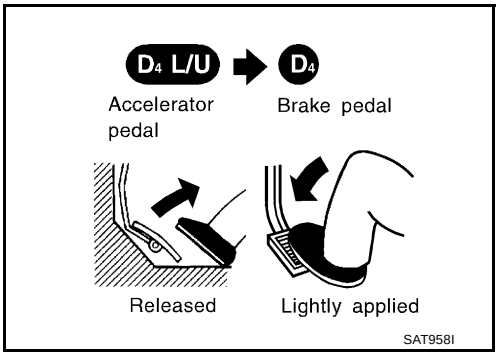
7. CHECK SHIFT DOWN (D4 L/U TO D4)

Release accelerator pedal.

When lock-up duty becomes 4%. Refer to AT-244, "DATA MONITOR MODE (A/T)" .

Is lock-up released when accelerator pedal is released?

YES >> GO TO 8.
NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-314, "Lock-up Is Not Released" .
- Continue “Road Test”.



8. CHECK SHIFT DOWN (D4 TO D3)

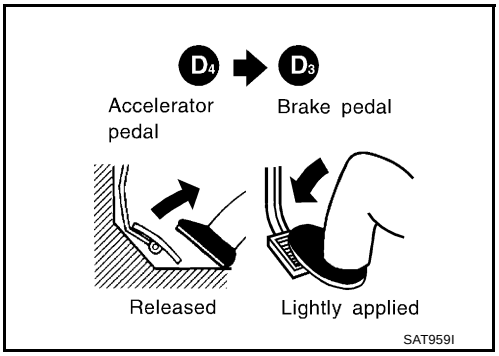
Decelerate vehicle by applying foot brake lightly.

Read gear position and engine speed. Refer to AT-244, "DATA MONITOR MODE (A/T)" .

Does engine speed return to idle smoothly when A/T is shifted from D4 to D3 ?

YES >>
1. Stop vehicle.
2. GO TO AT-273, "Cruise Test — Part 2" .

NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-315, "Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" .
- Continue “Road Test”.



Cruise Test — Part 2

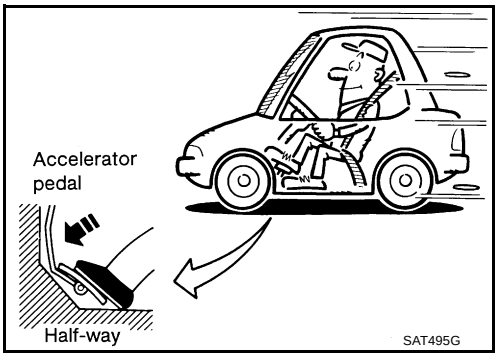
1. CHECK STARTING GEAR (D_1) POSITION

1. Confirm selector lever is in D.
2. Accelerate vehicle by half throttle again.

Read gear position. Refer to AT-244, "DATA MONITOR MODE (A/T)".

Does vehicle start from D_1 ?

YES >> GO TO 2.
NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-317, "Vehicle Does Not Start From D_1".
- Continue “Road Test”.



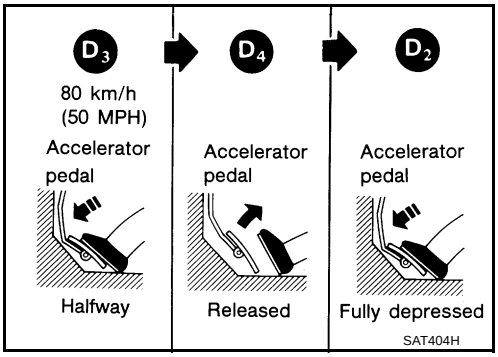
2. CHECK SHIFT UP AND SHIFT DOWN (D_3 TO D_4 TO D_2)

1. Accelerate vehicle to 80 km/h (50 MPH) as shown in illustration.
2. Release accelerator pedal and then quickly depress it fully.

Read gear position and throttle position. Refer to AT-244, "DATA MONITOR MODE (A/T)".

Does A/T shift from D_4 to D_2 as soon as accelerator pedal is depressed fully?

YES >> GO TO 3.
NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-304, "A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$".
- Continue “Road Test”.



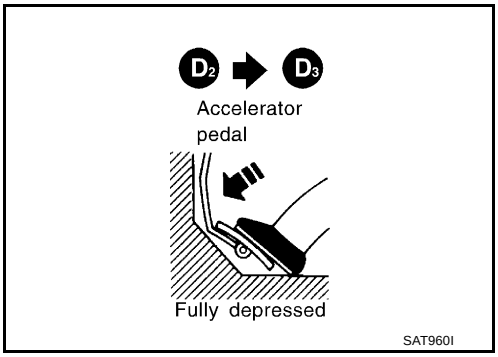
3. CHECK SHIFT UP (D_2 TO D_3)

Check shift-up (D_2 to D_3)
Specified speed when shifting from D_2 to D_3. Refer to AT-530, "VEHICLE SPEED WHEN SHIFTING GEARS AND THROTTLE POSITION".

Read gear position, throttle opening and vehicle speed. Refer to AT-244, "DATA MONITOR MODE (A/T)".

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

YES >> GO TO 4.
NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-307, "A/T Does Not Shift: $D_2 \rightarrow D_3$".
- Continue “Road Test”.



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

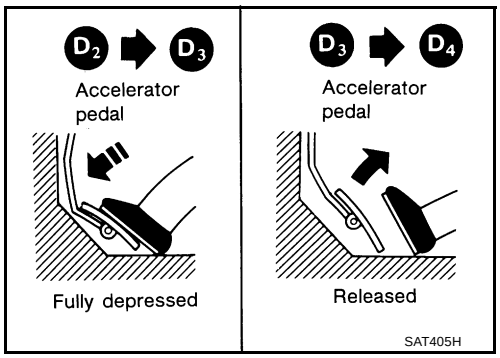
Release accelerator pedal after shifting from D_2 to D_3.

Read gear position, throttle position and vehicle speed. Refer to AT-244, "DATA MONITOR MODE (A/T)".

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

YES >> 1. Stop vehicle.
2. GO TO AT-275, "Cruise Test — Part 3".

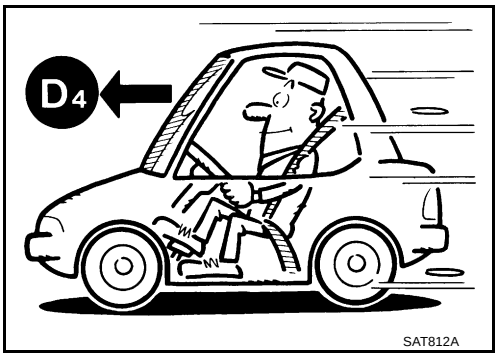
NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-309, "A/T Does Not Shift: $D_3 \rightarrow D_4$".
- Continue “Road Test”.



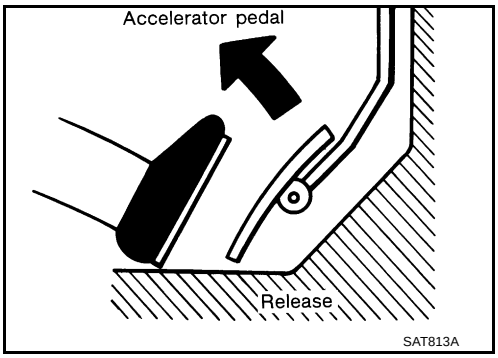
Cruise Test — Part 3

1. CHECK SHIFT DOWN (D_4 TO D_3)

1. Confirm overdrive control switch is in ON.
2. Confirm selector lever is in D position.
3. Accelerate vehicle using half-throttle to D_4.



4. Release accelerator pedal.

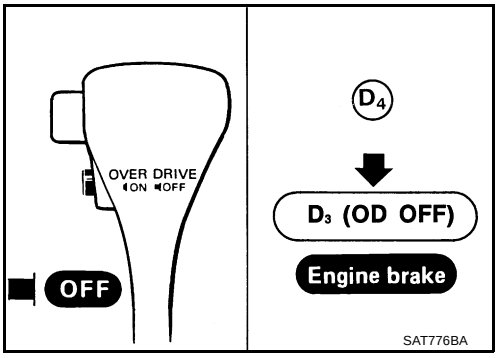


5. Set overdrive control switch to OFF while driving in D_4.

Read gear position and vehicle speed. Refer to AT-244, "DATA MONITOR MODE (A/T)".

Does A/T shift from D_4 to D_3 (O/D OFF)?

YES >> GO TO 2.
NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-318, "A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch "ON" → "OFF"".
- Continue "Road Test".

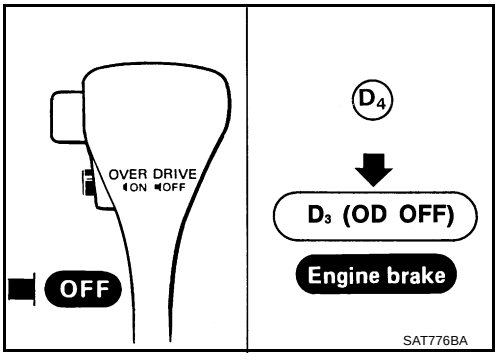


2. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 3.
NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-322, "Vehicle Does Not Decelerate By Engine Brake".
- Continue "Road Test".



3. CHECK SHIFT DOWN (D_3 TO 2_2)

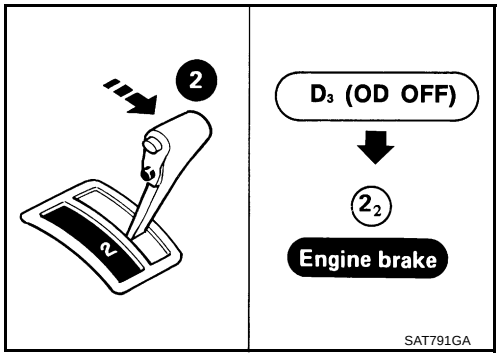
Move selector lever from D to 2 position while driving in D_3 (O/D OFF).

Read gear position. Refer to AT-244, "DATA MONITOR MODE (A/T)".

Does A/T shift from D_3 (O/D OFF) to 2_2 ?

YES >> GO TO 4.

NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-319, "A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" → "2" Position".
- Continue "Road Test".



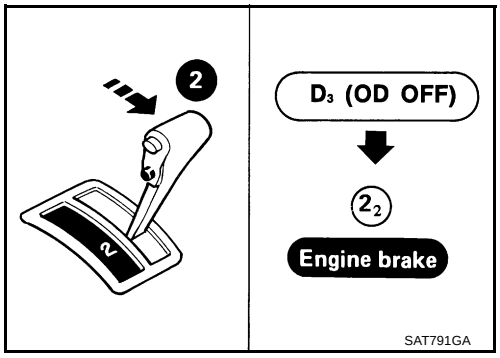
4. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 5.

NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-322, "Vehicle Does Not Decelerate By Engine Brake".
- Continue "Road Test".



5. CHECK SHIFT DOWN

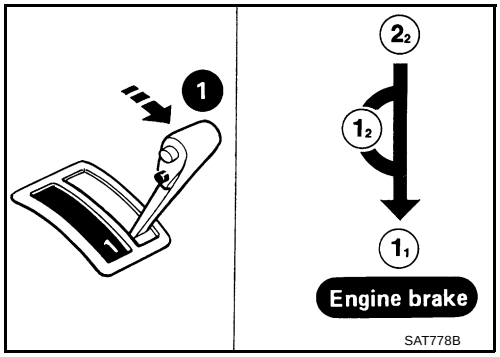
Move selector lever from 2 to 1 position while driving in 2_2 .

Read gear position. Refer to AT-244, "DATA MONITOR MODE (A/T)".

Does A/T shift from 2_2 to 1_1 position?

YES >> GO TO 6.

NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-320, "A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever "2" → "1" Position".
- Continue "Road Test".



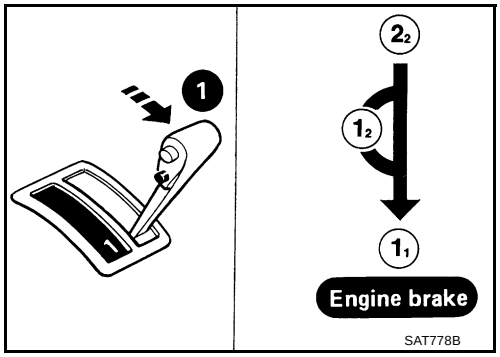
6. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >>
1. Stop vehicle.
2. Perform self-diagnosis.
   Except for Euro-OBD: Refer to AT-246, "SELF-DIAGNOSTIC PROCEDURE (WITHOUT CONSULT-II)".

NO >>
- Mark the box on the DIAGNOSTIC WORKSHEET.
- GO TO AT-322, "Vehicle Does Not Decelerate By Engine Brake".
- Stop Road Test.



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-293	ON vehicle	1. Ignition switch and starter	PG-2, SC-21
		2. Control cable adjustment	AT-409
		3. PNP switch	AT-324
Engine starts in position other than “N” and “P” positions. AT-293	ON vehicle	1. Control cable adjustment	AT-409
		2. PNP switch	AT-324
Transaxle noise in “P” and “N” positions.	ON vehicle	1. Fluid level	AT-256
		2. Line pressure test	AT-260
		3. Accelerator pedal position (APP) sensor	AT-345
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-332, AT-339
	OFF vehicle	5. Oil pump	AT-443
		6. Torque converter	AT-423
Vehicle moves when changing into “P” position, or parking gear does not disengage when shifted out of “P” position. AT-294	ON vehicle	1. Control cable adjustment	AT-409
	OFF vehicle	2. Parking components	AT-416, AT-440
Vehicle runs in “N” position. AT-295	ON vehicle	1. Control cable adjustment	AT-409
	OFF vehicle	2. Forward clutch	AT-475
		3. Reverse clutch	AT-464
		4. Overrun clutch	AT-475
Vehicle will not run in “R” position (but runs in “D”, “2” and “1” positions). Clutch slips. Very poor acceleration. AT-297	ON vehicle	1. Control cable adjustment	AT-409
		2. Stall test	AT-257
		3. Line pressure test	AT-260
		4. Line pressure solenoid valve	AT-387
		5. Control valve assembly	AT-404
Vehicle will not run in “R” position (but runs in “D”, “2” and “1” positions). Clutch slips. Very poor acceleration. AT-297	OFF vehicle	6. Reverse clutch	AT-464
		7. High clutch	AT-469
		8. Forward clutch	AT-475
		9. Overrun clutch	AT-475
		10. Low & reverse brake	AT-483
Vehicle braked when shifting into “R” position.	ON vehicle	1. Fluid level	AT-256
		2. Line pressure test	AT-260
		3. Line pressure solenoid valve	AT-387
		4. Control valve assembly	AT-404
	OFF vehicle	5. High clutch	AT-469
		6. Brake band	AT-497
		7. Forward clutch	AT-475
		8. Overrun clutch	AT-475

Symptom	Condition	Diagnostic Item	Reference Page
Sharp shock in shifting from “N” to “D” position.	ON vehicle	1. Engine idling rpm	EC-506
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Line pressure test	AT-260
		4. A/T fluid temp sen circ and TCM pow sour	AT-374
		5. Engine speed signal	AT-382
		6. Line pressure solenoid valve	AT-387
		7. Control valve assembly	AT-404
		8. Accumulator N-D	AT-404
	OFF vehicle	9. Forward clutch	AT-475
Vehicle will not run in “D” and “2” positions (but runs in “1” and “R” positions).	ON vehicle	1. Control cable adjustment	AT-409
	OFF vehicle	2. Low one-way clutch	AT-416, AT-423
Vehicle will not run in “D”, “1”, “2” positions (but runs in “R” position). Clutch slips. Very poor acceleration. AT-299	ON vehicle	1. Fluid level	AT-256
		2. Stall test	AT-257
		3. Line pressure test	AT-260
		4. Line pressure solenoid valve	AT-387
		5. Control valve assembly	AT-404
		6. Accumulator N-D	AT-404
Vehicle will not run in “D”, “1”, “2” positions (but runs in “R” position). Clutch slips. Very poor acceleration. AT-299	OFF vehicle	7. Reverse clutch	AT-464
		8. High clutch	AT-469
		9. Forward clutch	AT-475
		10. Forward one-way clutch	AT-416
		11. Low one-way clutch	AT-416, AT-423
Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-256
		2. Control cable adjustment	AT-409
		3. Accelerator pedal position (APP) sensor	AT-345
		4. Line pressure test	AT-260
		5. Line pressure solenoid valve	AT-387
		6. Control valve assembly	AT-404
		7. Accumulator N-D	AT-404
		8. Shift solenoid valve A	AT-350
		9. Shift solenoid valve B	AT-356
		10. Overrun clutch solenoid valve	AT-362
		11. Torque converter clutch solenoid valve	AT-368
	OFF vehicle	12. Forward clutch	AT-475
		13. Reverse clutch	AT-464
		14. Low & reverse brake	AT-483
		15. Oil pump	AT-443
		16. Torque converter	AT-423
Excessive creep.	ON vehicle	1. Engine idling rpm	EC-506

Symptom	Condition	Diagnostic Item	Reference Page
No creep at all. AT-297 and AT-299	ON vehicle	1. Fluid level	AT-256
		2. Line pressure test	AT-387
		3. Control valve assembly	AT-404
	OFF vehicle	4. Forward clutch	AT-475
		5. Oil pump	AT-443
		6. Torque converter	AT-423
Failure to change gear from “D_1 ” to “D_2 ”.	ON vehicle	1. Control cable adjustment	AT-409
		2. Shift solenoid valve A	AT-350
		3. Control valve assembly	AT-404
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-332, AT-339
		5. Accelerator pedal position (APP) sensor	AT-345
	OFF vehicle	6. Brake band	AT-497
Failure to change gear from “D_2 ” to “D_3 ”.	ON vehicle	1. Control cable adjustment	AT-409
		2. Shift solenoid valve B	AT-356
		3. Control valve assembly	AT-404
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-332, AT-339
		5. Accelerator pedal position (APP) sensor	AT-345
	OFF vehicle	6. High clutch	AT-469
		7. Brake band	AT-497
Failure to change gear from “D_3 ” to “D_4 ”.	ON vehicle	1. PNP switch	AT-324
		2. Overrun clutch solenoid valve	AT-362
		3. Shift solenoid valve A	AT-350
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-332, AT-339
		5. A/T fluid temp sen circ and TCM pow sour	AT-374
	OFF vehicle	6. Brake band	AT-497
Too high a gear change point from “D_1 ” to “D_2 ”, from “D_2 ” to “D_3 ”, from “D_3 ” to “D_4 ”. AT-304 and AT-309	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-345
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-332, AT-339
		3. Shift solenoid valve A	AT-350
		4. Shift solenoid valve B	AT-356
Gear change directly from “D_1 ” to “D_3 ” occurs.	ON vehicle	1. Fluid level	AT-256
		2. Accumulator servo release	AT-404
	OFF vehicle	3. Brake band	AT-497
Engine stops when shifting lever into “R”, “D”, “2” and “1”.	ON vehicle	1. Engine idling rpm	EC-506
		2. Fluid level	AT-256
		3. Torque converter clutch solenoid valve	AT-368
		4. Control valve assembly	AT-404
	OFF vehicle	5. Torque converter	AT-423

Symptom	Condition	Diagnostic Item	Reference Page
Too sharp a shock in change from “D_1 ” to “D_2 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-345
		2. Line pressure test	AT-260
		3. Accumulator servo release	AT-404
		4. Control valve assembly	AT-404
		5. A/T fluid temp sen circ and TCM pow sour	AT-374
	OFF vehicle	6. Brake band	AT-497
Too sharp a shock in change from “D_2 ” to “D_3 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-345
		2. Line pressure test	AT-260
		3. Control valve assembly	AT-404
		4. A/T fluid temp sen circ and TCM pow sour	AT-374
	OFF vehicle	5. High clutch	AT-469
		6. Brake band	AT-497
Too sharp a shock in change from “D_3 ” to “D_4 ”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-345
		2. Line pressure test	AT-260
		3. Control valve assembly	AT-404
		4. A/T fluid temp sen circ and TCM pow sour	AT-374
	OFF vehicle	5. Brake band	AT-497
		6. Overrun clutch	AT-475
		7. Forward one-way clutch	AT-416
Almost no shock or clutches slipping in change from “D_1 ” to “D_2 ”.	ON vehicle	1. Fluid level	AT-256
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Line pressure test	AT-260
		4. Accumulator servo release	AT-404
		5. Control valve assembly	AT-404
	OFF vehicle	6. Brake band	AT-497
Almost no shock or slipping in change from “D_2 ” to “D_3 ”.	ON vehicle	1. Fluid level	AT-256
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Line pressure test	AT-260
		4. Control valve assembly	AT-404
	OFF vehicle	5. High clutch	AT-469
		6. Brake band	AT-497
Almost no shock or slipping in change from “D_3 ” to “D_4 ”.	ON vehicle	1. Fluid level	AT-256
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Line pressure test	AT-260
		4. Control valve assembly	AT-404
	OFF vehicle	5. Brake band	AT-497
Vehicle braked by gear change from “D_1 ” to “D_2 ”.	ON vehicle	1. Fluid level	AT-256
	OFF vehicle	2. Reverse clutch	AT-464
		3. Low & reverse brake	AT-483
		4. High clutch	AT-469
		5. Low one-way clutch	AT-416, AT-423

Symptom	Condition	Diagnostic Item	Reference Page
Vehicle braked by gear change from “D2 ” to “D3 ”.	ON vehicle	1. Fluid level	AT-256
	OFF vehicle	2. Brake band	AT-497
Vehicle braked by gear change from “D3 ” to “D4 ”.	ON vehicle	1. Fluid level	AT-256
	OFF vehicle	2. Overrun clutch	AT-362
		3. Forward one-way clutch	AT-416
		4. Reverse clutch	AT-464
Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-256
		2. PNP switch	AT-324
		3. Overdrive control switch	AT-324
		4. Accelerator pedal position (APP) sensor	AT-345
		5. Shift solenoid valve A	AT-350
		6. Shift solenoid valve B	AT-356
		7. Control valve assembly	AT-404
	OFF vehicle	8. Reverse clutch	AT-464
		9. High clutch	AT-469
		10. Brake band	AT-497
		11. Low & reverse brake	AT-483
		12. Oil pump	AT-443
		13. Torque converter	AT-423
Failure to change gear from “D4 ” to “D3 ”.	ON vehicle	1. Fluid level	AT-256
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Overrun clutch solenoid valve	AT-362
		4. Shift solenoid valve A	AT-350
		5. Line pressure solenoid valve	AT-387
		6. Control valve assembly	AT-404
	OFF vehicle	7. Brake band	AT-497
		8. Overrun clutch	AT-475
Failure to change gear from “D3 ” to “D2 ” or from “D4 ” to “D2 ”.	ON vehicle	1. Fluid level	AT-256
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Shift solenoid valve A	AT-350
		4. Shift solenoid valve B	AT-356
		5. Control valve assembly	AT-404
	OFF vehicle	6. High clutch	AT-469
		7. Brake band	AT-497
Failure to change gear from “D2 ” to “D1 ” or from “D3 ” to “D1 ”.	ON vehicle	1. Fluid level	AT-256
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Shift solenoid valve A	AT-350
		4. Shift solenoid valve B	AT-356
		5. Control valve assembly	AT-404
	OFF vehicle	6. Low one-way clutch	AT-416, AT-423
		7. High clutch	AT-469
		8. Brake band	AT-497

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-345
		2. Line pressure test	AT-260
		3. Overrun clutch solenoid valve	AT-362
		4. Control valve assembly	AT-404
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-345
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-332, AT-339
Kickdown does not operate when depressing pedal in “D4 ” within kick down vehicle speed.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-345
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-332, AT-339
		3. Shift solenoid valve A	AT-350
		4. Shift solenoid valve B	AT-356
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-332, AT-339
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Shift solenoid valve A	AT-350
		4. Shift solenoid valve B	AT-356
Races extremely fast or slips in changing from “D4 ” to “D3 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-256
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Line pressure test	AT-260
		4. Line pressure solenoid valve	AT-387
		5. Shift solenoid valve A	AT-350
		6. Control valve assembly	AT-404
	OFF vehicle	7. Brake band	AT-497
		8. Forward clutch	AT-475
Races extremely fast or slips in changing from “D4 ” to “D2 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-256
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Line pressure test	AT-260
		4. Line pressure solenoid valve	AT-387
		5. Shift solenoid valve A	AT-350
		6. Shift solenoid valve B	AT-356
		7. Control valve assembly	AT-404
	OFF vehicle	8. Brake band	AT-497
		9. High clutch	AT-469
		10. Forward clutch	AT-475
Races extremely fast or slips in changing from “D3 ” to “D2 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-256
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Line pressure test	AT-260
		4. Line pressure solenoid valve	AT-387
		5. Control valve assembly	AT-404
		6. Shift solenoid valve B	AT-356
	OFF vehicle	7. Brake band	AT-497
		8. High clutch	AT-469

Symptom	Condition	Diagnostic Item	Reference Page
Races extremely fast or slips in changing from “D_4 ” or “D_3 ” to “D_1 ” when depressing pedal.	ON vehicle	1. Fluid level	AT-256
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Line pressure test	AT-260
		4. Line pressure solenoid valve	AT-387
		5. Shift solenoid valve A	AT-350
		6. Shift solenoid valve B	AT-356
		7. Control valve assembly	AT-404
	OFF vehicle	8. Forward clutch	AT-475
		9. Forward one-way clutch	AT-416
		10. Low one-way clutch	AT-416, AT-423
Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-256
		2. Control cable adjustment	AT-409
		3. Line pressure test	AT-260
		4. Line pressure solenoid valve	AT-387
	OFF vehicle	5. Oil pump	AT-443
		6. Torque converter	AT-423
		7. Parking components	AT-416
Transmission noise in “D”, “2”, “1” and “R” positions.	ON vehicle	1. Fluid level	AT-256
	OFF vehicle	2. Torque converter	AT-423
Failure to change from “D_3 ” to “2_2 ” when changing lever into “2” position. AT-319	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-345
		2. Shift solenoid valve B	AT-356
		3. Control valve assembly	AT-404
		4. Control cable adjustment	AT-409
	OFF vehicle	5. Brake band	AT-497
Gear change from “2_2 ” to “2_3 ” in “2” position.	ON vehicle	1. PNP switch	AT-324
		2. Control cable adjustment	AT-409
Engine brake does not operate in “1” position. AT-317	ON vehicle	1. PNP switch	AT-324
		2. Control cable adjustment	AT-409
		3. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-332, AT-339
		4. Control valve assembly	AT-404
		5. Overrun clutch solenoid valve	AT-362
	OFF vehicle	6. Overrun clutch	AT-475
		7. Low & reverse brake	AT-483
Gear change from “1_1 ” to “1_2 ” in “1” position.	ON vehicle	1. PNP switch	AT-324
		2. Control cable adjustment	AT-409
Does not change from “1_2 ” to “1_1 ” in “1” position.	ON vehicle	1. PNP switch	AT-324
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-332, AT-339
		3. Shift solenoid valve A	AT-350
		4. Control valve assembly	AT-404
	OFF vehicle	5. Low one-way clutch	AT-416, AT-423
		6. Brake band	AT-497
		7. Low & reverse brake	AT-483

Symptom	Condition	Diagnostic Item	Reference Page
Large shock changing from “1$_2$ ” to “1$_1$ ” in “1” position.	ON vehicle	1. Control valve assembly	AT-404
	OFF vehicle	2. Low & reverse brake	AT-483
Transmission overheats.	ON vehicle	1. Fluid level	AT-256
		2. Engine idling rpm	EC-506
		3. Accelerator pedal position (APP) sensor	AT-345
		4. Line pressure test	AT-260
		5. Line pressure solenoid valve	AT-387
		6. Control valve assembly	AT-404
Transmission overheats.	OFF vehicle	7. Oil pump	AT-443
		8. Reverse clutch	AT-464
		9. High clutch	AT-469
		10. Brake band	AT-497
		11. Forward clutch	AT-475
		12. Overrun clutch	AT-475
		13. Low & reverse brake	AT-483
		14. Torque converter	AT-423
ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-256
	OFF vehicle	2. Reverse clutch	AT-464
		3. High clutch	AT-469
		4. Brake band	AT-497
		5. Forward clutch	AT-475
		6. Overrun clutch	AT-475
		7. Low & reverse brake	AT-483
Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-256
	OFF vehicle	2. Torque converter	AT-423
		3. Oil pump	AT-443
		4. Reverse clutch	AT-464
		5. High clutch	AT-469
		6. Brake band	AT-497
		7. Forward clutch	AT-475
		8. Overrun clutch	AT-475
		9. Low & reverse brake	AT-483
Torque converter is not locked up.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-345
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-332, AT-339
		3. Engine speed signal	AT-382
		4. A/T fluid temp sen circ and TCM pow sour	AT-374
		5. Line pressure test	AT-260
		6. Torque converter clutch solenoid valve	AT-368
		7. Control valve assembly	AT-404
Torque converter is not locked up.	OFF vehicle	8. Torque converter	AT-423

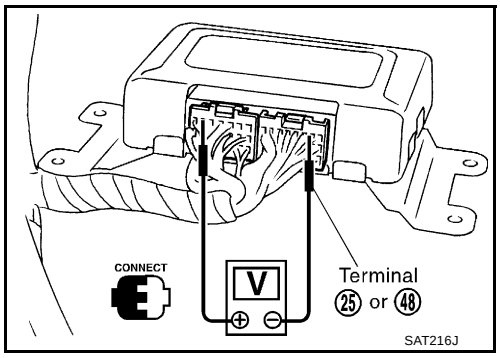
Symptom	Condition	Diagnostic Item	Reference Page
Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-256
		2. Accelerator pedal position (APP) sensor	AT-345
		3. Line pressure test	AT-260
		4. Torque converter clutch solenoid valve	AT-368
		5. Line pressure solenoid valve	AT-387
		6. Control valve assembly	AT-404
	OFF vehicle	7. Torque converter	AT-423
Lock-up point is extremely high or low. AT-311	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-345
		2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-332, AT-339
		3. Torque converter clutch solenoid valve	AT-368
		4. Control valve assembly	AT-404
A/T does not shift to “D4 ” when driving with overdrive control switch “ON”.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-345
		2. PNP switch	AT-324
		3. Overdrive control switch	AT-324
		4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-332, AT-339
		5. Shift solenoid valve A	AT-350
		6. Overrun clutch solenoid valve	AT-362
		7. Control valve assembly	AT-404
		8. A/T fluid temp sen circ and TCM pow sour	AT-374
		9. Line pressure test	AT-260
A/T does not shift to “D4 ” when driving with overdrive control switch “ON”.	OFF vehicle	10. Brake band	AT-497
		11. Overrun clutch	AT-475
Engine is stopped at “R”, “D”, “2” and “1” positions.	ON vehicle	1. Fluid level	AT-256
		2. Torque converter clutch solenoid valve	AT-368
		3. Shift solenoid valve A	AT-350
		4. Shift solenoid valve B	AT-356
		5. Control valve assembly	AT-404

TCM Terminals and Reference Value

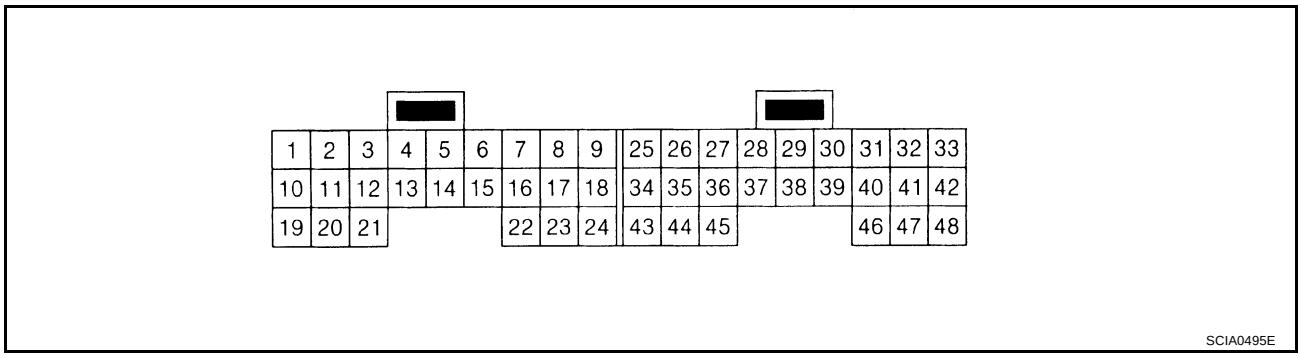
ECS004VW

PREPARATION

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

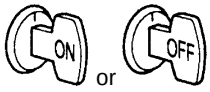


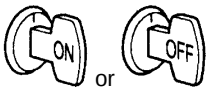
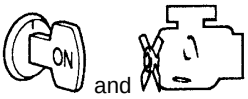
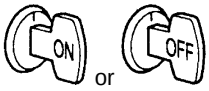
TCM HARNESS CONNECTOR TERMINAL LAYOUT

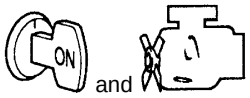
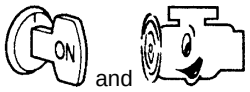


TCM INSPECTION TABLE

(Data are reference values.)

Terminal No.	Wire color	Item	Condition		Judgementstandard(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	G/R	CAN-H	—		—
6	GY/R	CAN-L	—		—
10	BR/W	Power source	 or	When turning ignition switch to “ON”.	Battery voltage
				When turning ignition switch to “OFF”.	0V

Terminal No.	Wire color	Item	Condition		Judgementstandard(Approx.)
11	L/W	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in “D_1 ” or “D_4 ”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D_2 ” or “D_3 ”.)	0V
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in “D_1 ” or “D_2 ”.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in “D_3 ” or “D_4 ”.)	0V
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
25	B	Ground	Always		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	L	Power source (Memory back-up)	Always		Battery voltage
29	W/R	Revolution sensor		When moving at 20 km/h (12 MPH)	450 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
30 *2	G/B	CONSULT- II (RX)		—	—
31 *2	W	CONSULT- II (TX)		—	—
32 *1	R	Throttle position sensor (Power source)		When turning ignition switch to “ON”.	4.5 - 5.5V
				When turning ignition switch to “OFF”.	0V

Terminal No.	Wire color	Item	Condition		Judgementstandard(Approx.)
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	Y/G	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 *1	L/OR	Engine speed signal		Refer to EC-95, "ECM INSPECTION TABLE" .	—
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	G/Y	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Sensor ground	Always		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	Ground	Always		0V

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

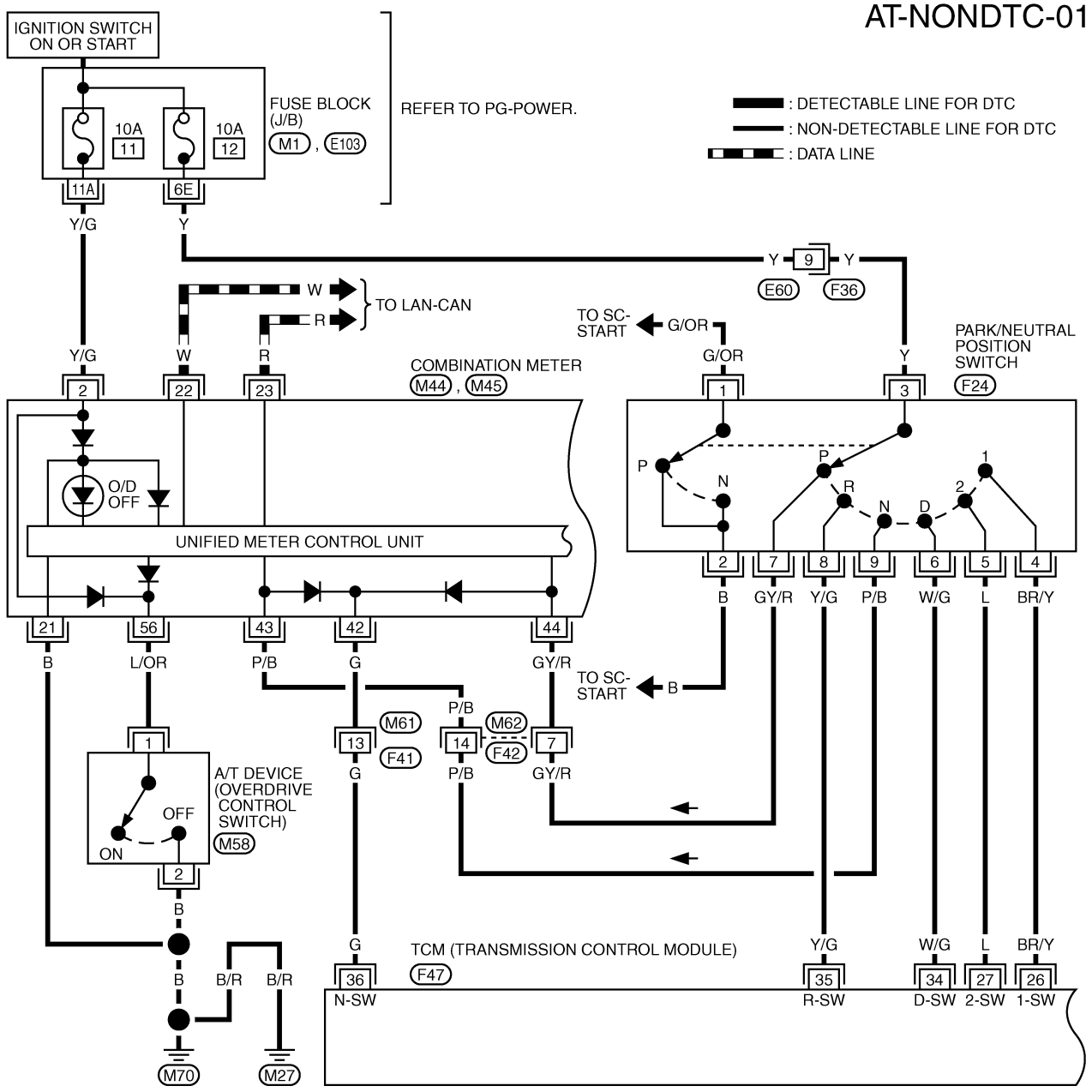
TROUBLE DIAGNOSES FOR SYMPTOMS

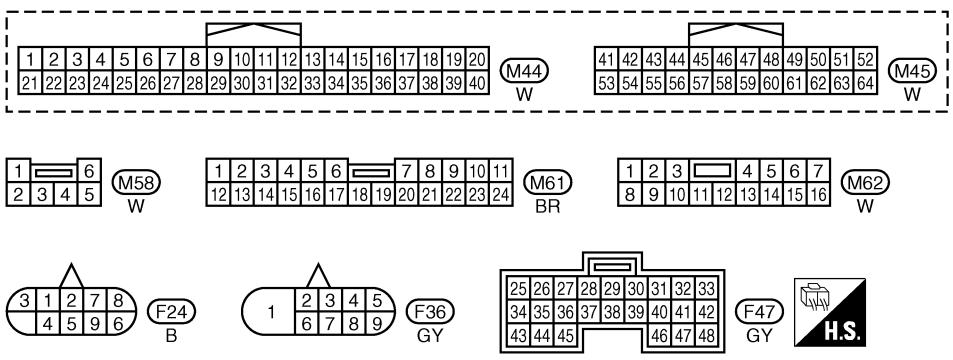
PFP:00100

Wiring Diagram — AT — NONDTC

ECS004V1

AT-NONDTC-01

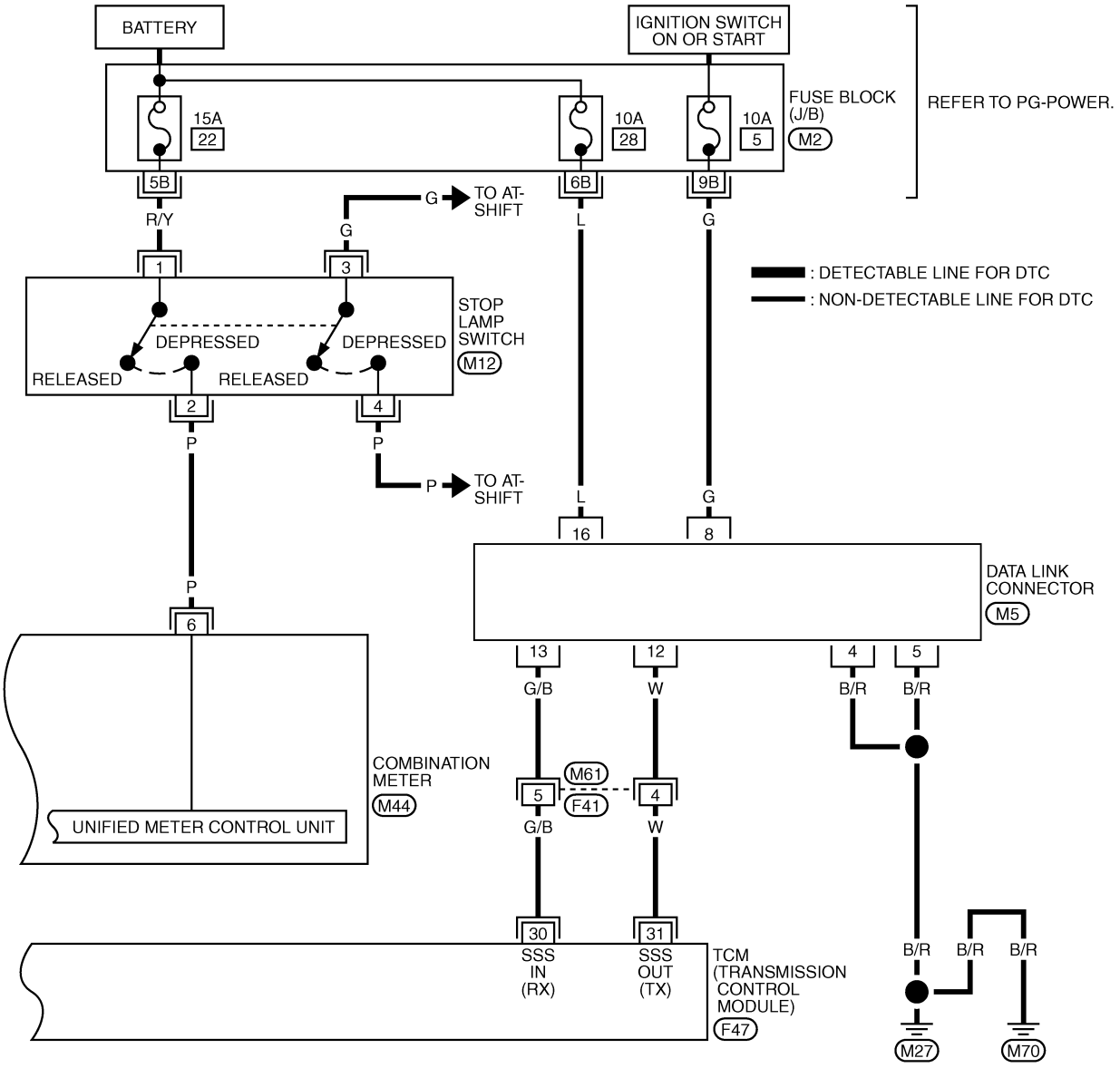


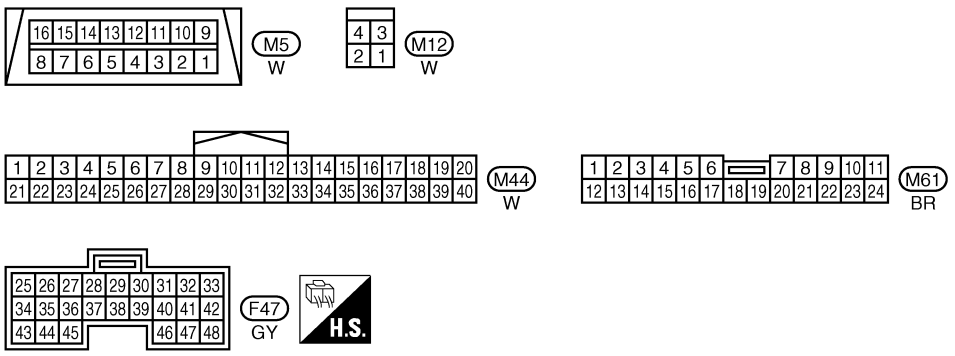


REFER TO THE FOLLOWING.
M1, E103 -FUSE BLOCK-JUNCTION BOX (J/B)

TCWA0238E

AT-NONDTC-02





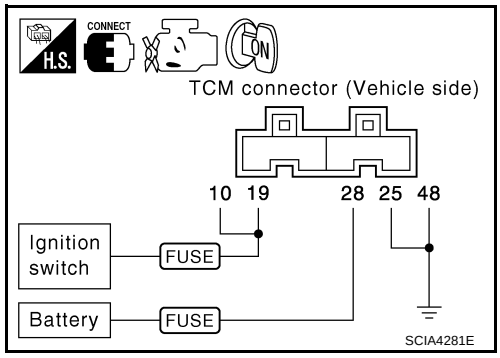
REFER TO THE FOLLOWING.
M2 -FUSE BLOCK-JUNCTION BOX (J/B)

TCWA0239E

O/D OFF Indicator Lamp Does Not Come On

ECS00EBE

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



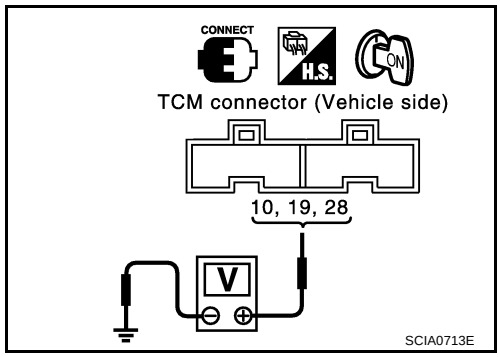
1. CHECK TCM POWER SOURCE

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

Voltage: Battery voltage

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

Voltage: Battery voltage



OK or NG

OK >> GO TO 2.
NG >> Check the following items:

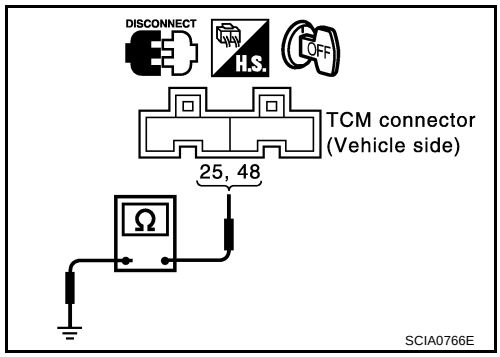
- Harness for short or open between ignition switch and TCM connector terminals 10, 19 and 28
- Refer to AT-395, "Wiring Diagram — AT — MAIN" .
- Ignition switch and fuse Refer to PG-2, "POWER SUPPLY ROUTING" .

2. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector 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-395, "Wiring Diagram — AT — MAIN" .

3. CHECK COMBINATION METERS SYSTEM

Check combination meters system. Refer to DI-12, "Combination Meter" .

OK or NG

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

4. CHECK SYMPTOM

Check again. Refer to AT-263, "1. CHECK BEFORE ENGINE IS STARTED" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .

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

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

ECS00EBF

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 SELF-DIAGNOSIS RESULTS

Perform self-diagnosis. Refer to AT-242, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" .

Do the self-diagnosis results indicate PNP switch circuit?

YES >> Check park/neutral position (PNP) switch circuit. Refer to AT-324, "TCM Self-diagnosis Does Not Activate" .

NO >> GO TO 2.

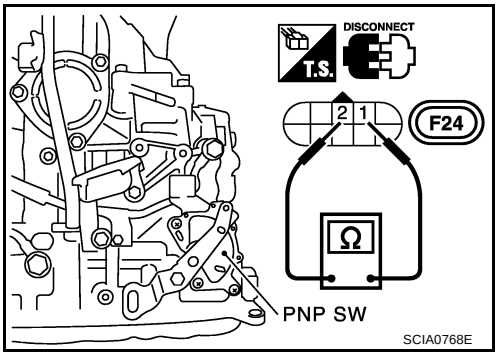
2. CHECK PNP SWITCH INSPECTION

Check for short or open of PNP switch harness connector terminals 1 and 2.
Refer to AT-324, "TCM Self-diagnosis Does Not Activate" .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace PNP switch.



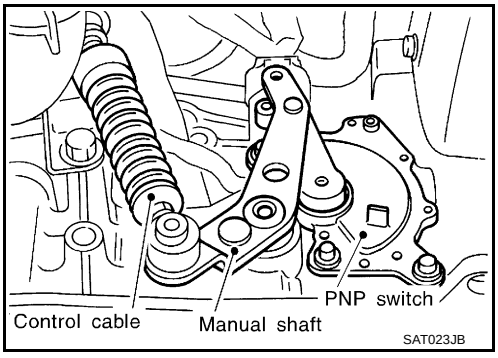
3. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 4.

NG >> Adjust control cable. Refer to AT-409, "Control Cable Adjustment" .



4. CHECK STARTING SYSTEM

Check starting system. Refer to SC-21, "STARTING SYSTEM" .

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

In “P” Position, Vehicle Moves Forward Or Backward When Pushed

ECS00EBG

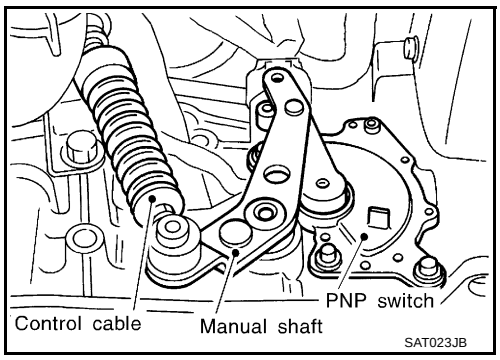
SYMPTOM:
Vehicle moves when it is pushed forward or backward with selector lever in “P” position.

1. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 2.
NG >> Adjust control cable. Refer to AT-409, "Control Cable Adjustment" .

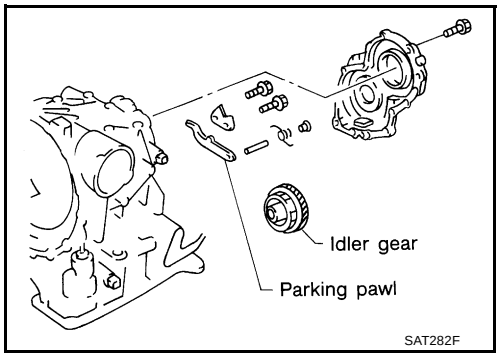


2. CHECK PARKING COMPONENTS

Check parking components. Refer to AT-416, "OVERHAUL" .

OK or NG

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



In “N” Position, Vehicle Moves

ECS00EBH

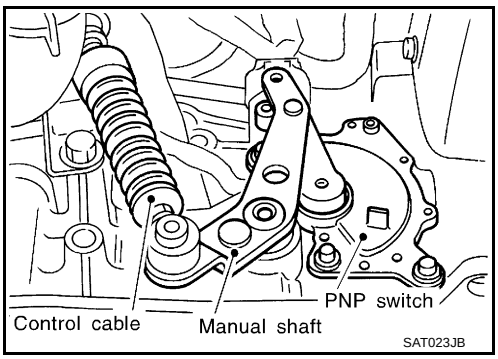
SYMPTOM:
Vehicle moves forward or backward when selecting “N” position.

1. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 2.
NG >> Adjust control cable. Refer to AT-409, "Control Cable Adjustment" .

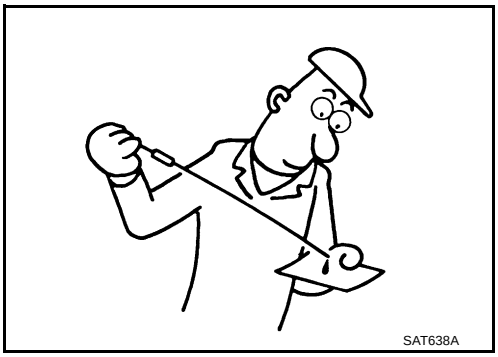


2. CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to AT-16, "Checking A/T Fluid" .

OK or NG

OK >> GO TO 3.
NG >> Refill ATF.

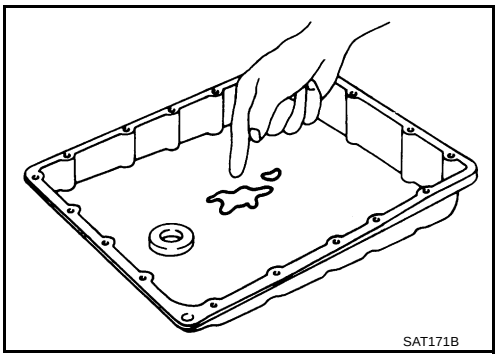


3. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-256, "FLUID CONDITION CHECK" .

OK or NG

OK >> GO TO 4.
NG >> 1. Disassemble A/T. Refer to AT-424, "Disassembly" .
2. Check the following items:
- Forward clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .
- Overrun clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .
- Reverse clutch assembly. Refer to AT-464, "Reverse Clutch" .



4. CHECK SYMPTOM

Check again. Refer to AT-264, "2. CHECK AT IDLE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Large Shock. “N” → “R” Position

ECS00EBI

SYMPTOM:
There is large shock when changing from “N” to “R” position.

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-242, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-246, "Diagnostic Procedure Without CONSULT-II" .

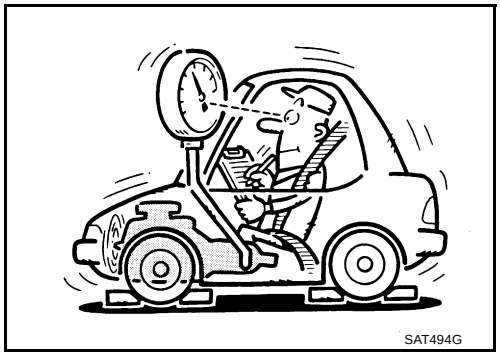
Do the self-diagnosis results indicate A/T fluid temperature sensor, line pressure solenoid valve, accelerator pedal position (APP) sensor circuit?

YES >> ● Check damaged circuit. Refer to the following items.
- AT-387, "LINE PRESSURE SOLENOID VALVE"
- AT-345, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"
- AT-374, "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-260, "Line Pressure Test" .


SAT494G

OK or NG

OK >> GO TO 3.

NG >> 1. Remove control valve assembly. Refer to AT-404, "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
- Oil pump assembly. Refer to AT-443, "Oil Pump" .

3. CHECK SYMPTOM

Check again. Refer to AT-264, "2. CHECK AT IDLE" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

Vehicle Does Not Creep Backward In “R” Position

ECS00EBJ

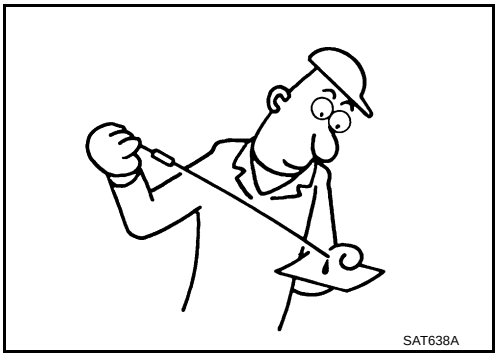
SYMPTOM:
Vehicle does not creep backward when selecting “R” position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to AT-16, "Checking A/T Fluid" .

OK or NG

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


SAT638A

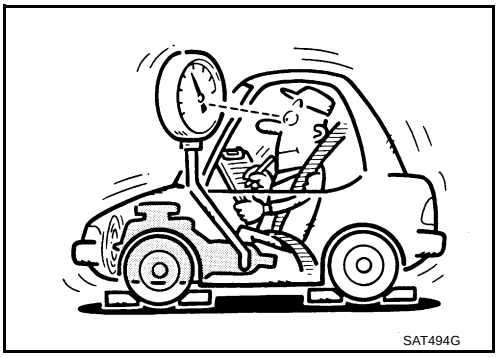
2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in R position. Refer to AT-260, "Line Pressure Test" .

OK or NG

OK >> GO TO 3.
NG >> 1. Remove control valve assembly. Refer to AT-404, "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

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following item:
- Oil pump assembly. Refer to AT-443, "Oil Pump" .


SAT494G

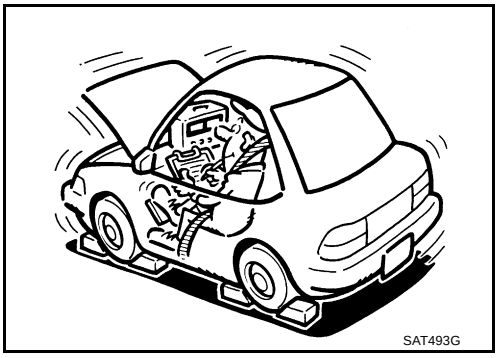
3. CHECK STALL TEST

Check stall revolution with selector lever in 1 and R positions.
Refer to AT-257, "Stall Test" .

OK or NG

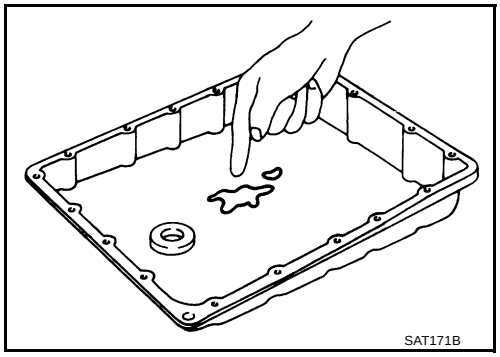
OK >> GO TO 4.
OK in “1” position, NG in R position>>1.Disassemble A/T. Refer to AT-424, "Disassembly" .
2. Check the following items:
- Reverse clutch assembly. Refer to AT-464, "Reverse Clutch" .
- Low & reverse brake assembly. Refer to AT-483, "Low & Reverse Brake" .

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


SAT493G

4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-256, "FLUID CONDITION CHECK" .



OK or NG

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

5. CHECK SYMPTOM

Check again. Refer to AT-264, "2. CHECK AT IDLE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

6. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to AT-424, "Disassembly" .
2. Check the following items:

- Reverse clutch assembly. Refer to AT-464, "Reverse Clutch" .
- High clutch assembly. Refer to AT-469, "High Clutch" .
- Low & reverse brake assembly. Refer to AT-483, "Low & Reverse Brake" .
- Forward clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .
- Overrun clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .

OK or NG

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

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

ECS00EBK

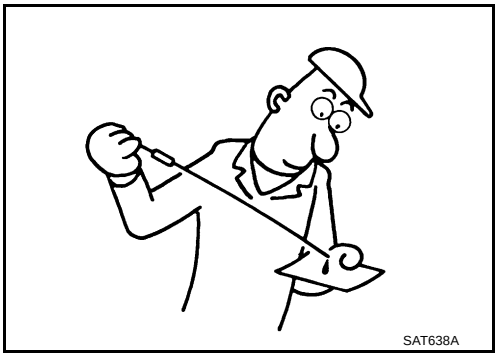
SYMPTOM:
Vehicle does not creep forward when selecting “D”, “2” or “1” position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to AT-16, "Checking A/T Fluid" .

OK or NG

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

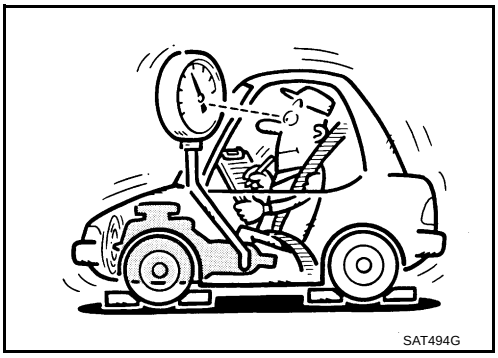

SAT638A

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in D position. Refer to AT-260, "Line Pressure Test" .

OK or NG

OK >> GO TO 3.
NG >> 1. Remove control valve assembly. Refer to AT-404, "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
3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following item:
- Oil pump assembly. Refer to AT-443, "Oil Pump" .

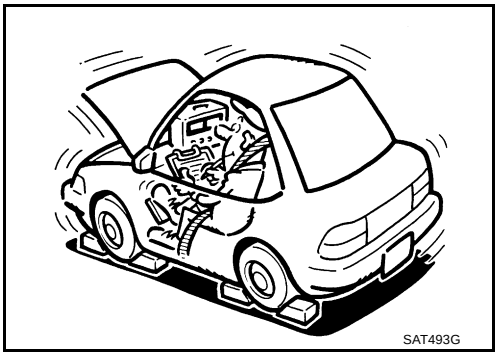

SAT494G

3. CHECK STALL TEST

Check stall revolution with selector lever in D position. Refer to AT-257, "Stall Test" .

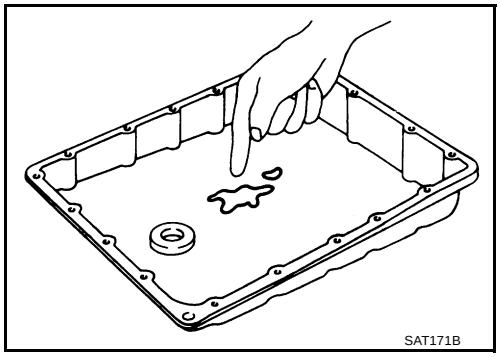
OK or NG

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


SAT493G

4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-256, "FLUID CONDITION CHECK" .



OK or NG

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

5. CHECK SYMPTOM

Check again. Refer to AT-264, "2. CHECK AT IDLE" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

6. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to AT-424, "Disassembly" .
2. Check the following items:

- Oil pump assembly. Refer to AT-443, "Oil Pump" .
- Forward clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .
- Forward one-way clutch. Refer to AT-475, "Forward and Overrun Clutches" .
- Low one-way clutch. Refer to AT-424, "Disassembly" .
- Torque converter. Refer to AT-424, "Disassembly" .

OK or NG

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

Vehicle Cannot Be Started From D1

ECS00EBL

SYMPTOM:
Vehicle cannot be started from D1 on Cruise Test — Part 1.

1. SYMPTOM CHECK

Check symptom. Refer to AT-270, "Cruise Test — Part 1" .

Is Vehicle does not creep backward in R position OK?

YES >> GO TO 2.
NO >> Go to AT-297, "Vehicle Does Not Creep Backward In “R” Position" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-242, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-246, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate vehicle speed sensor·A/T (revolution sensor), overrun clutch solenoid valve, torque converter clutch solenoid valve, shift solenoid valve A,B or vehicle speed sensor·MTR circuit?

YES >> ● Check damaged circuit. Refer to the following items.
- AT-332, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
- AT-368, "TORQUE CONVERTER CLUTCH SOLENOID VALVE"
- AT-350, "SHIFT SOLENOID VALVE A"
- AT-356, "SHIFT SOLENOID VALVE B"
- AT-362, "OVERRUN CLUTCH SOLENOID VALVE"
- AT-339, "DTC VEHICLE SPEED SENSOR MTR"

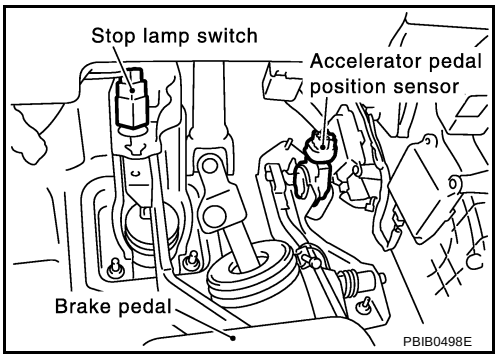
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-345, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace accelerator pedal position (APP) sensor.

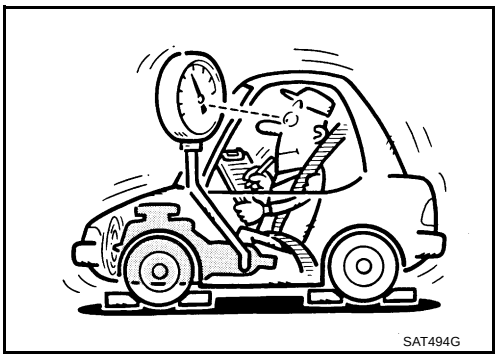


4. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in D position. Refer to AT-260, "Line Pressure Test" .

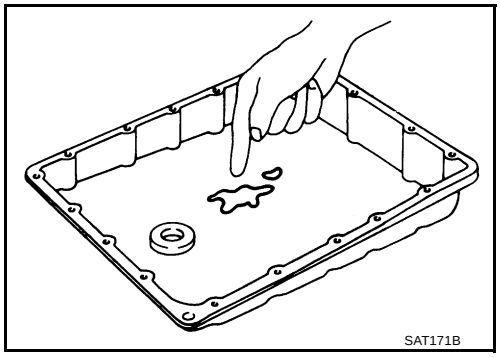
OK or NG

OK >> GO TO 5.
NG >> GO TO 8.



5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-256, "FLUID CONDITION CHECK" .



OK or NG

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

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "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. Refer to AT-270, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
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-404, "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

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following items:

- Forward clutch. Refer to AT-475, "Forward and Overrun Clutches" .
- Forward one-way clutch assembly. Refer to AT-424, "Disassembly" .
- High clutch assembly. Refer to AT-469, "High Clutch" .
- Torque converter. Refer to AT-424, "Disassembly" .
- Oil pump assembly. Refer to AT-443, "Oil Pump" .
- Reverse clutch assembly. Refer to AT-464, "Reverse Clutch" .
- Low & reverse clutch assembly

OK or NG

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

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

ECS00EBM

SYMPTOM:
A/T does not shift from D_1 to D_2 at the specified speed.
A/T does not shift from D_4 to D_2 when depressing accelerator pedal fully at the specified speed.

1. CHECK SYMPTOM

Check symptom. Refer to AT-270, "Cruise Test — Part 1" and AT-273, "Cruise Test — Part 2" .

Are “Vehicle Does Not Creep Ford In “D”, “2” Or “1” Position” and “Vehicle Cannot Be Started From D_1 ” OK?

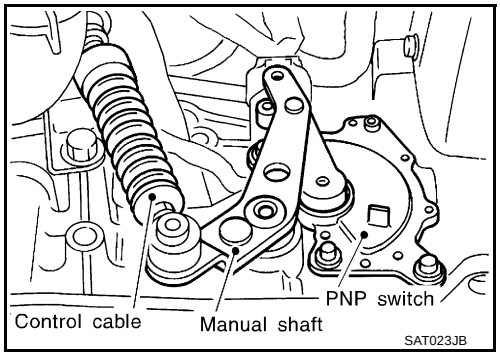
YES >> GO TO 2.
NO >> GO TO AT-299, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" , AT-301, "Vehicle Cannot Be Started From D_1" .

2. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-409, "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-332, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-339, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

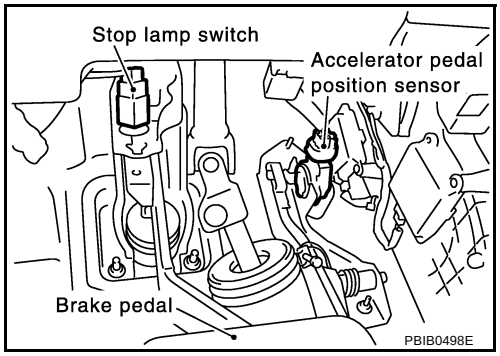
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer AT-345, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .

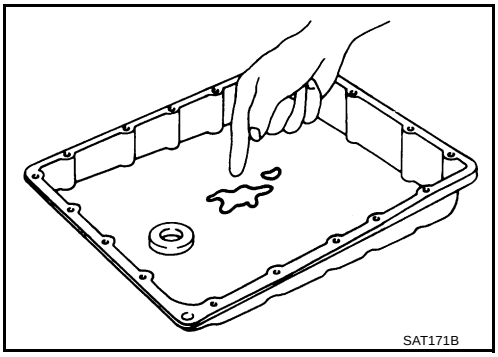
OK or NG

OK >> GO TO 5
NG >> Repair or replace accelerator pedal position (APP) sensor.



5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-256, "FLUID CONDITION CHECK" .



OK or NG

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

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-404, "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. Refer to AT-270, "Cruise Test — Part 1" and AT-273, "Cruise Test — Part 2" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
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-404, "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

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
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: $D_2 \rightarrow D_3$

ECS00EBN

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

1. CHECK SYMPTOM

Check symptom. Refer to AT-270, "Cruise Test — Part 1" and AT-273, "Cruise Test — Part 2" .

Are “Vehicle Does Not Creep Ford In “D”, “2” Or “1” Position” and “Vehicle Cannot Be Started From D_1 ” OK?

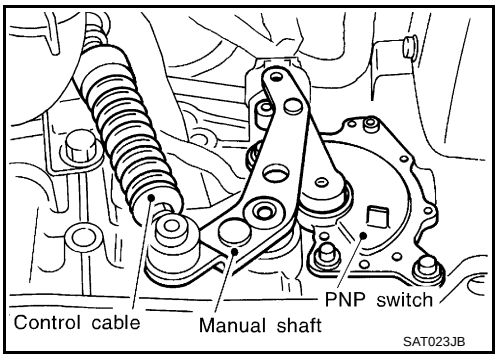
YES >> GO TO 2.
NO >> GO TO AT-299, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" , AT-301, "Vehicle Cannot Be Started From D_1" .

2. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-409, "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-332, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-339, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

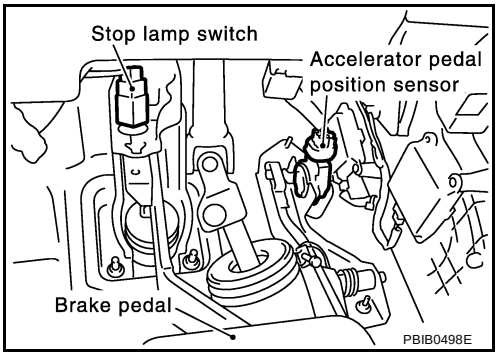
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-345, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .

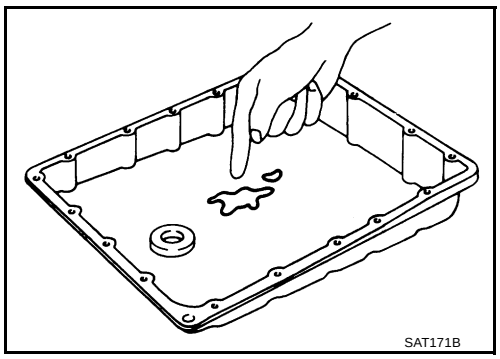
OK or NG

OK >> GO TO 5.
NG >> Repair or replace accelerator pedal position (APP) sensor.



5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-256, "FLUID CONDITION CHECK" .



OK or NG

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

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

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

OK or NG

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

7. CHECK SYMPTOM

Check again. Refer to AT-270, "Cruise Test — Part 1" and AT-273, "Cruise Test — Part 2" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
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-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

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

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following items:

- Servo piston assembly
- High clutch assembly. Refer to AT-469, "High Clutch" .
- Oil pump assembly. Refer to AT-443, "Oil Pump" .

OK or NG

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

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

ECS00EBO

SYMPTOM:

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

1. CHECK SYMPTOM

Check symptom. Refer to AT-270, "Cruise Test — Part 1" and AT-273, "Cruise Test — Part 2" .

Are “Vehicle Does Not Creep Ford In “D”, “2” Or “1” Position” and “Vehicle Cannot Be Started From D_1 ” OK?

YES >> GO TO 2.
NO >> GO TO AT-299, "Vehicle Does Not Creep Forward In “D”, “2” Or “1” Position" , AT-301, "Vehicle Cannot Be Started From D_1" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-242, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-246, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate PNP switch, overdrive control switch, A/T fluid temperature sensor, vehicle speed sensor·A/T (revolution sensor), shift solenoid valve A,B or vehicle speed sensor·MTR circuit?

YES >>
- Check damaged circuit. Refer to the following items.
  - AT-332, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
  - AT-350, "SHIFT SOLENOID VALVE A"
  - AT-356, "SHIFT SOLENOID VALVE B"
  - AT-374, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)"
  - AT-339, "DTC VEHICLE SPEED SENSOR MTR"
  - AT-324, "TCM Self-diagnosis Does Not Activate"

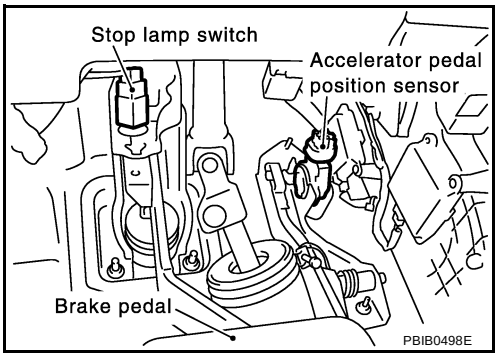
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-345, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"

OK or NG

OK >> GO TO 4.
NG >> Repair or replace accelerator pedal position (APP) sensor.

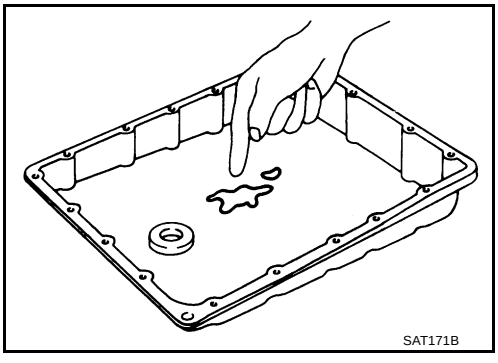


4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-64, "FLUID CONDITION CHECK" .

OK or NG

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



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
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. Refer to AT-270, "Cruise Test — Part 1" and AT-273, "Cruise Test — Part 2" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
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-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve A
- Overrun clutch control valve
- Shift solenoid valve A
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following items:

- Servo piston assembly
- Torque converter. Refer to AT-424, "Disassembly" .
- Oil pump assembly. Refer to AT-443, "Oil Pump" .
- Brake band

OK or NG

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

A/T Does Not Perform Lock-up

ECS00EBP

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

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-242, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-246, "Diagnostic Procedure Without CONSULT-II" .

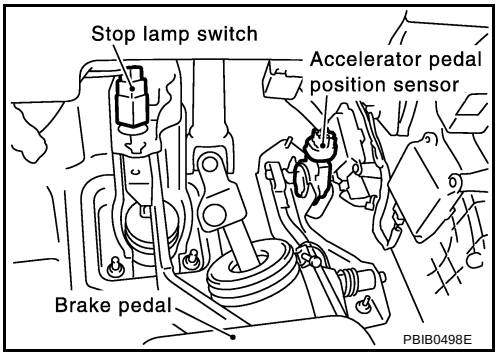
Does self-diagnosis show damage to A/T fluid temperature sensor, vehicle speed sensor·A/T (revolution sensor), engine speed signal, vehicle speed sensor·MTR or torque converter clutch solenoid valve circuit after cruise test?

YES >> Check damaged circuit. Refer to AT-368, "TORQUE CONVERTER CLUTCH SOLENOID VALVE" , AT-374, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" , AT-332, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-382, "ENGINE SPEED SIGNAL" , AT-339, "DTC VEHICLE SPEED SENSOR MTR" .

NO >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-345, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"



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-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:
- Torque converter clutch control valve
- Torque converter clutch solenoid valve
- Torque converter relief valve
- Pilot valve
- Pilot filter
3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check torque converter. Refer to AT-424, "Disassembly" .

OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again. Refer to AT-270, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

A/T Does Not Hold Lock-up Condition

ECS00EBQ

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

1. CHECK DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-242, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-246, "Diagnostic Procedure Without CONSULT-II" .

Does self-diagnosis show damage to engine speed signal circuit after cruise test?

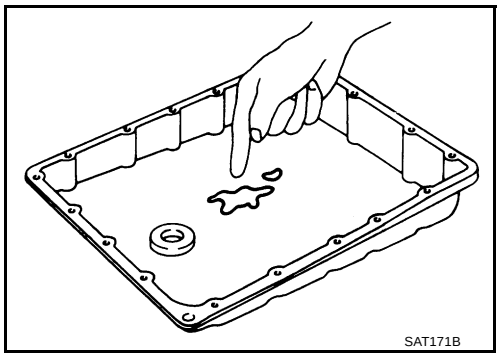
YES >> Check engine speed signal circuit. Refer to AT-382, "ENGINE SPEED SIGNAL" .
NO >> GO TO 2.

2. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-256, "FLUID CONDITION CHECK" .

OK or NG

OK >> GO TO 3.
NG >> GO TO 5.


SAT171B

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Torque converter clutch control valve
- Torque converter clutch solenoid valve
- Pilot valve
- Pilot filter

OK or NG

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

4. CHECK SYMPTOM

Check again. Refer to AT-270, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
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-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Torque converter clutch control valve
- Torque converter clutch solenoid valve
- Pilot valve
- Pilot filter

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check torque converter and oil pump assembly.

OK or NG

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

Lock-up Is Not Released

ECS00EBR

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

1. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR CIRCUIT

Perform self-diagnosis. Refer to AT-242, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-246, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate accelerator pedal position (APP) sensor circuit?

YES >> Check accelerator pedal position (APP) sensor circuit. Refer to AT-345, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .
NO >> GO TO 2.

2. CHECK SYMPTOM

Check again. Refer to AT-270, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
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)

ECS00EBS

SYMPTOM:
Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 .

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-242, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-246, "Diagnostic Procedure Without CONSULT-II" .

Does self-diagnosis show damage to overrun clutch solenoid valve circuit after cruise test?

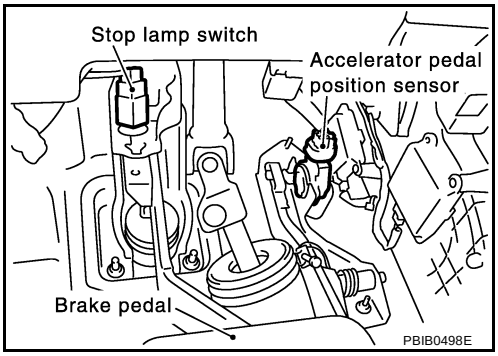
YES >> Check overrun clutch solenoid valve circuit. Refer to AT-362, "OVERRUN CLUTCH SOLENOID VALVE" .
NO >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-345, "ACCELE RATOR PEDAL POSITION (APP) SENSOR"

OK or NG

OK >> GO TO 3.
NG >> Repair or replace accelerator pedal position (APP) sensor.

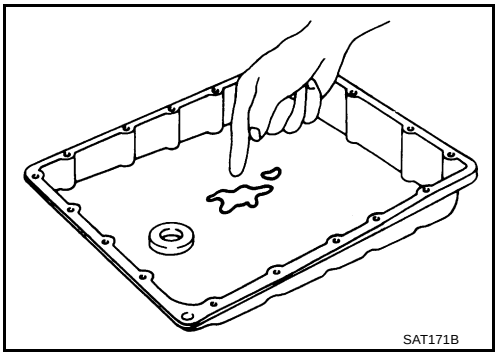


3. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-256, "FLUID CONDITION CHECK" .

OK or NG

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



4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
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. Refer to AT-270, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**

NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .

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-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following item:

- Overrun clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

Vehicle Does Not Start From D1

ECS00EBT

SYMPTOM:
Vehicle does not start from D1 on Cruise test — Part 2.

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-242, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)" or AT-246, "Diagnostic Procedure Without CONSULT-II" .

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 >> ● Check damaged circuit. Refer to the following items.
- AT-332, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)"
- AT-350, "SHIFT SOLENOID VALVE A"
- AT-356, "SHIFT SOLENOID VALVE B"
- AT-339, "DTC VEHICLE SPEED SENSOR MTR"

NO >> GO TO 2.

2. CHECK SYMPTOM

Check again. Refer to AT-273, "Cruise Test — Part 2" .

OK or NG

OK >> GO TO AT-301, "Vehicle Cannot Be Started From D1" .
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch “ON” $\rightarrow$ “OFF”

ECS00EBU

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

1. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

Check overdrive control switch circuit. Refer to AT-324, "TCM Self-diagnosis Does Not Activate" .

OK or NG

OK >> GO TO AT-307, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .
NG >> Check overdrive control switch circuit. Refer to AT-324, "TCM Self-diagnosis Does Not Activate" .

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

ECS00EBV

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

1. CHECK PNP SWITCH CIRCUIT

Check PNP switch circuit. Refer to AT-324, "TCM Self-diagnosis Does Not Activate" .

OK or NG

OK >> GO TO AT-304, "A/T Does Not Shift: $D_1 \rightarrow D_2$ Or Does Not Kickdown: $D_4 \rightarrow D_2$" .
NG >> Check PNP switch circuit. Refer to AT-324, "TCM Self-diagnosis Does Not Activate" .

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

ECS00EBW

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

1. CHECK PNP SWITCH CIRCUIT

Check PNP switch circuit. Refer to AT-324, "TCM Self-diagnosis Does Not Activate" .

OK or NG

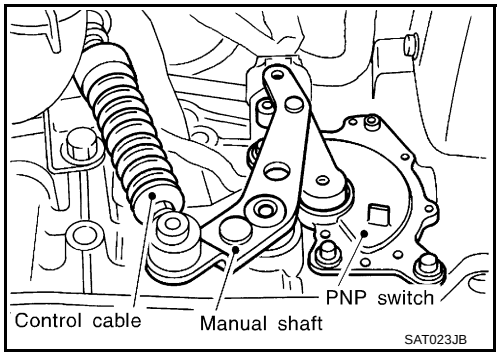
OK >> GO TO 2.
NG >> Check PNP switch circuit. Refer to AT-324, "TCM Self-diagnosis Does Not Activate" .

2. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-409, "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-332, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-339, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

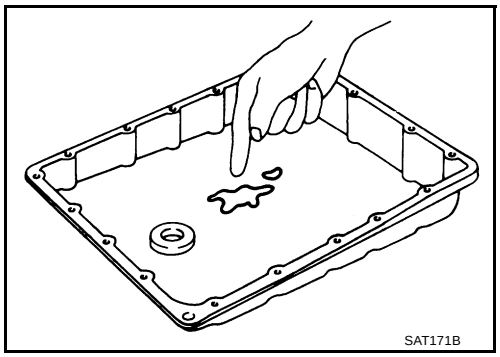
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-256, "FLUID CONDITION CHECK" .

OK or NG

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



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Overrun clutch control valve
- Overrun clutch solenoid valve
- Shift valve A
- Shift solenoid valve A

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following items:

- Servo piston assembly
- Brake band

OK or NG

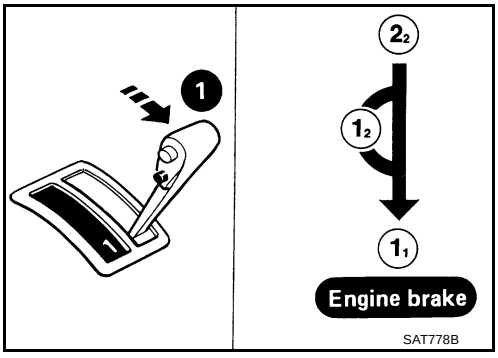
OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again. Refer to AT-275, "Cruise Test — Part 3" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.



Vehicle Does Not Decelerate By Engine Brake

ECS00EBX

SYMPTOM:

- **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.**
- **Vehicle does not decelerate by engine brake when shifting from 2$_2$ (1$_2$) to 1$_1$.**

1. CHECK PNP SWITCH CIRCUIT

Check PNP switch circuit. Refer to AT-324, "TCM Self-diagnosis Does Not Activate" .

OK or NG

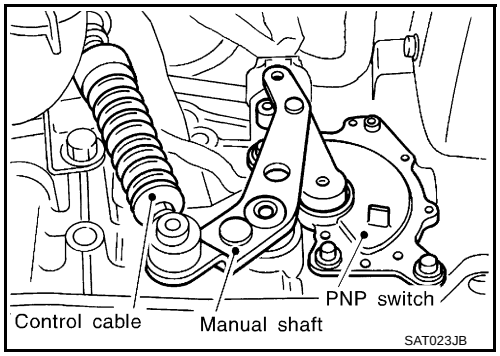
OK >> GO TO 2.
NG >> Check PNP switch circuit. Refer to AT-324, "TCM Self-diagnosis Does Not Activate" .

2. ADJUST CONTROL CABLE

Check control cable. Refer to AT-409, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-409, "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-332, "VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-339, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

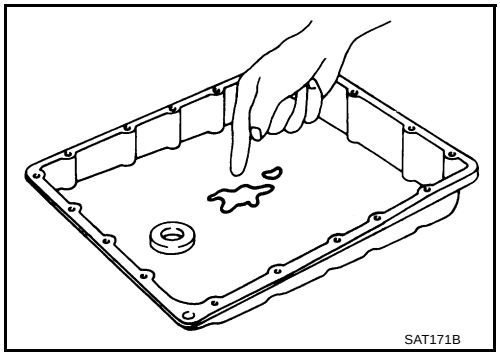
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-404, "COMPONENTS" .
2. Check A/T fluid condition. Refer to AT-256, "FLUID CONDITION CHECK" .

OK or NG

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



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Overrun clutch solenoid valve
- Shift valve A

3. Disassemble A/T. Refer to AT-424, "Disassembly" .
4. Check the following items:

- Overrun clutch assembly. Refer to AT-475, "Forward and Overrun Clutches" .
- Low & reverse bake assembly

OK or NG

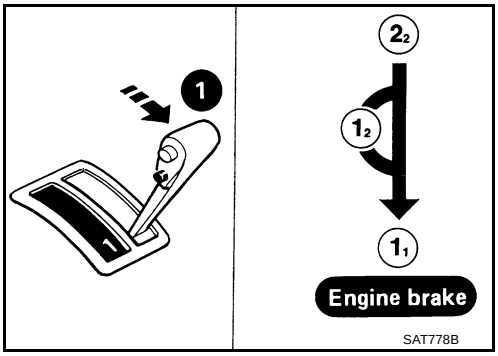
OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again. Refer to AT-275, "Cruise Test — Part 3" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.



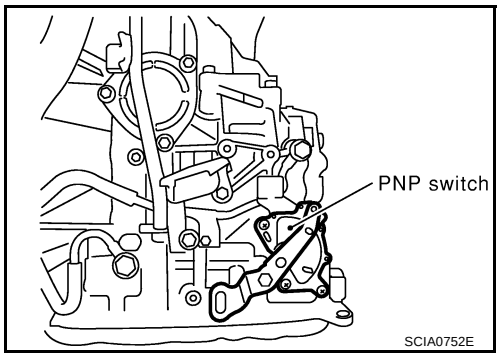
TCM Self-diagnosis Does Not Activate

ECS00EBY

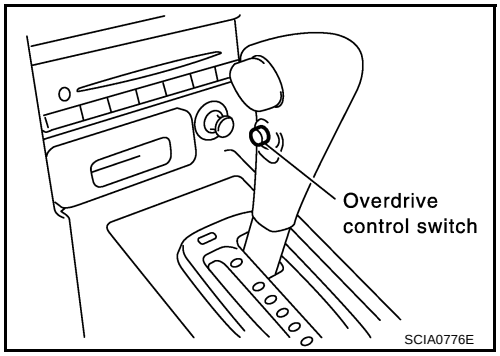
SYMPTOM:
O/D OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

DESCRIPTION

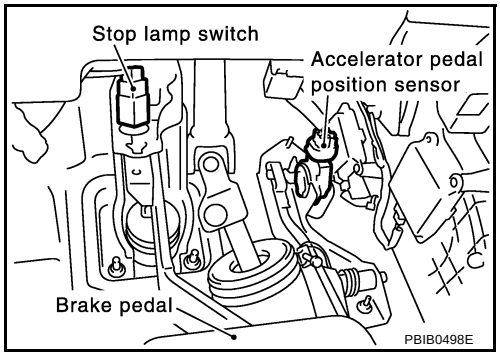
- PNP switch
  The PNP switch assembly includes a transmission position switch. The transmission position switch detects the selector lever position and sends a signal to the TCM.



- 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.

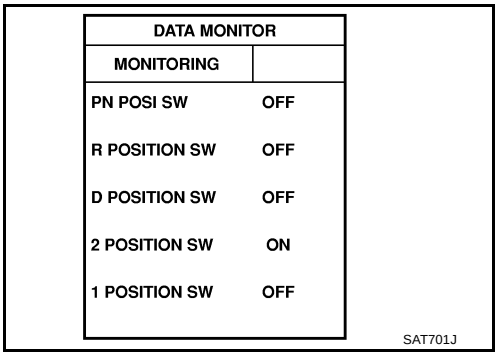


DIAGNOSTIC PROCEDURE

1. CHECK PNP SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch to ON. (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-327, "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)

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

Without CONSULT-II

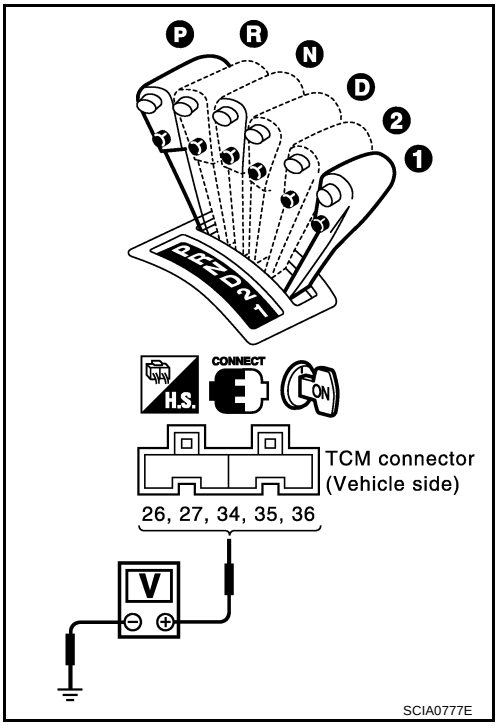
1. Turn ignition switch to ON. (Do not start engine.)
2. Check voltage between TCM terminals 26, 27, 34, 35, 36 and ground while moving selector lever through each position.

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 3.
NG >> Check the following items:

- PNP switch (Refer to AT-327, "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

1. Turn ignition switch to ON. (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.)

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

SAT645J

OK or NG

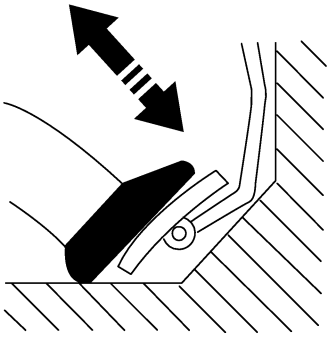
OK >> GO TO 4.
NG >> Check the following items:

- Overdrive control switch (Refer to AT-327, "COMPONENT INSPECTION" .)
- Harness for short or open between Combination meter and overdrive control switch
- Harness of ground circuit for overdrive control switch for short or open
- Combination Meter (Refer to DI-4, "COMBINATION METERS" .)

4. CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch to ON. (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 5.
NG >> Check the following items. If any items are damaged, repair or replace damaged parts.

- Accelerator pedal position sensor — Refer to AT-345, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .
- Harness for short or open between accelerator pedal position sensor and ECM

5. 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-345, "ACCELE RATOR PEDAL POSITION (APP) SENSOR" .
- Harness for short or open between accelerator pedal position sensor and ECM

OK or NG

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

6. CHECK DTC

Perform self-diagnosis. Refer to AT-246, "Diagnostic Procedure Without CONSULT-II" .

OK or NG

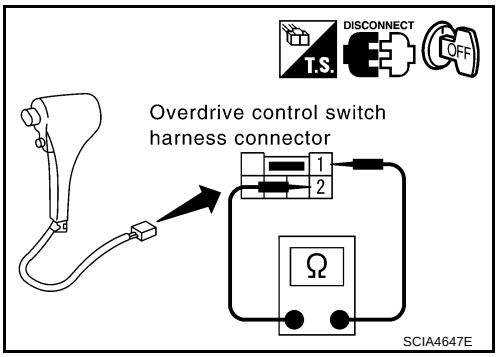
OK >> **INSPECTION END**
NG >>
- Perform TCM input/output signal inspection. Refer to AT-286, "TCM Terminals and Reference Value" .
- If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

COMPONENT INSPECTION

Overdrive Control Switch

- Check continuity between two terminals 1 and 2.

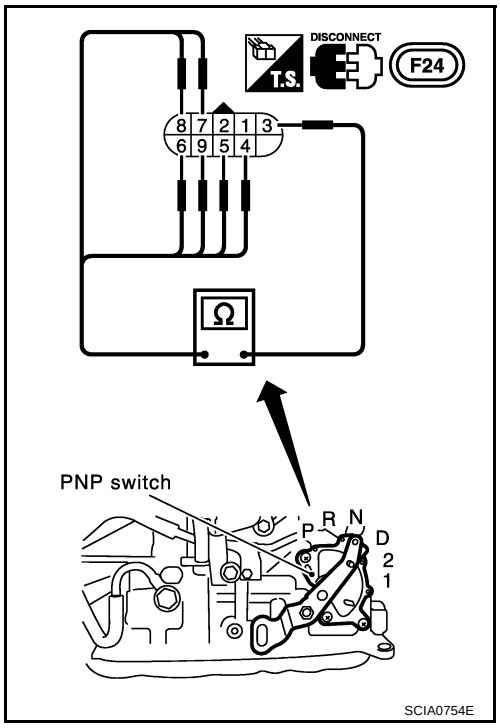
Switch position	Continuity
ON	No
OFF	Yes



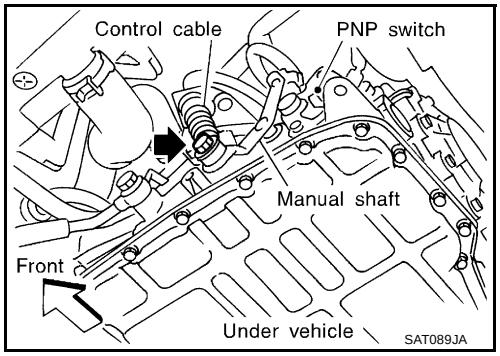
PNP Switch

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-409, "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-409, "Control Cable Adjustment" .
6. If NG on step 4, replace PNP switch.



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.

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.)

Possible Cause

ECS00CT9

Harness or connector
(CAN communication line is open or shorted.)

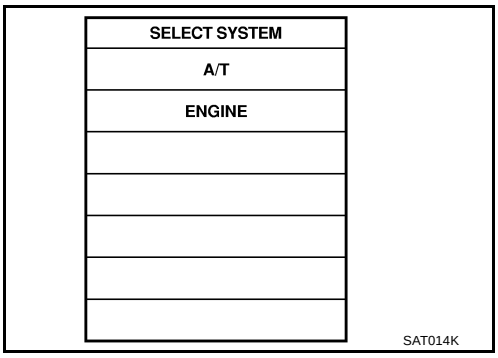
DTC Confirmation Procedure

ECS004UL

NOTE:
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

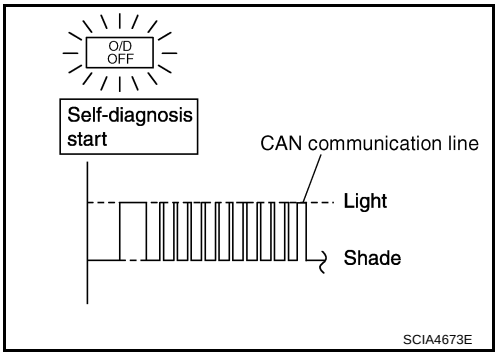
WITH CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Wait at least 6 seconds or start engine and wait for at least 6 seconds.
4. If DTC is detected, go to AT-331, "Diagnostic Procedure" .



WITHOUT CONSULT-II

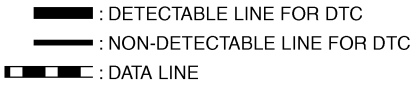
1. Turn ignition switch ON. (Do not start engine.)
2. Wait at least 6 seconds or start engine and wait at least 6 seconds.
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If DTC is detected, go to AT-331, "Diagnostic Procedure" .

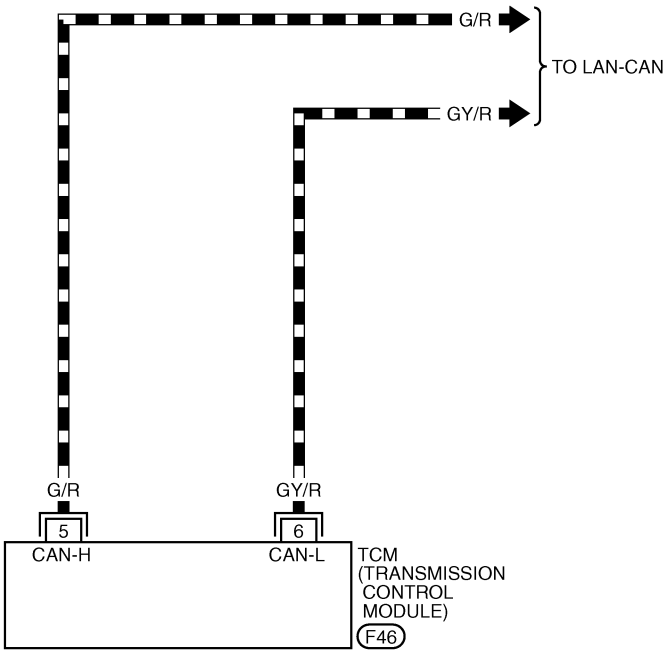


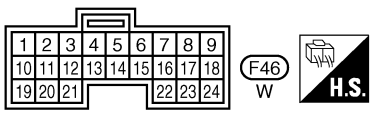
Wiring Diagram — AT — CAN

ECS004UM

AT-CAN-01







TCWA0234E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

Terminal No.	Wire color	Item	Condition	Judgement standard (Approx.)
5	G/R	CAN-H	—	—
6	GY/R	CAN-L	—	—

Diagnostic Procedure

ECS004UN

1. CHECK CAN COMMUNICATION CIRCUIT

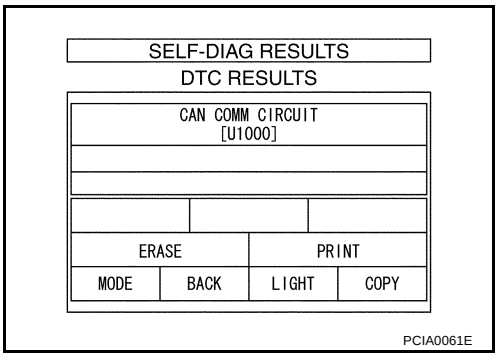
With CONSULT-II

1. Turn ignition switch “ON” and start engine.
2. Select “SELF-DIAG RESULTS” mode for “A/T” with CONSULT-II.

Is any malfunction of the “CAN COMM CIRCUIT” indicated?

YES >> Print out CONSULT-II screen, GO TO LAN section. Refer to LAN-4, "CAN Communication Unit" .

NO >> **INSPECTION END**



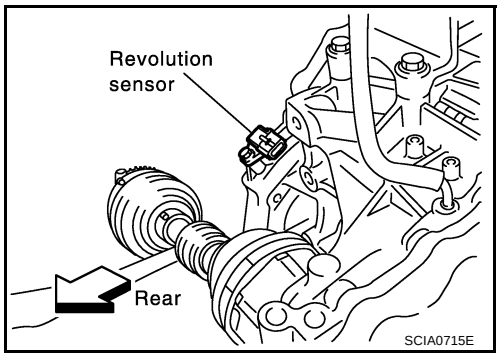
VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)

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.



CONSULT-II Reference Value

ECS00CS5

Remarks: Specification data are reference values.

Monitor item	Condition	Display value
VHCL/S SE·A/T (km/h)	During driving	Approximately matches the speedometer reading.

On Board Diagnosis Logic

ECS00CS6

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

Possible Cause

ECS00CS7

Check the following items.

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

DTC Confirmation Procedure

ECS00CS8

CAUTION:

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

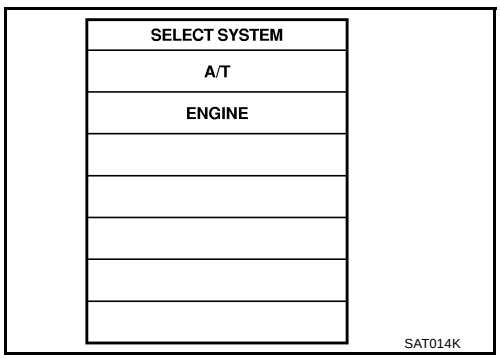
NOTE:

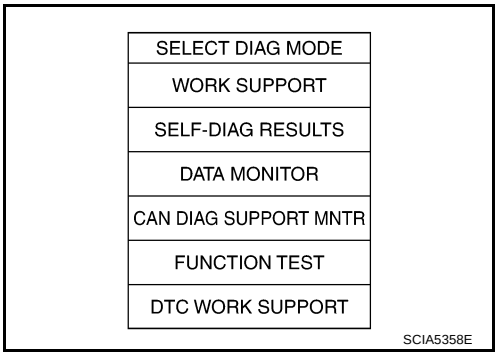
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.

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

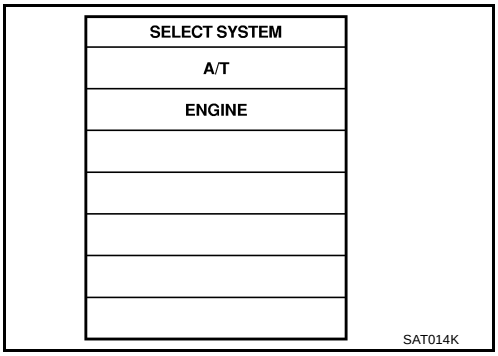
WITH CONSULT-II

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





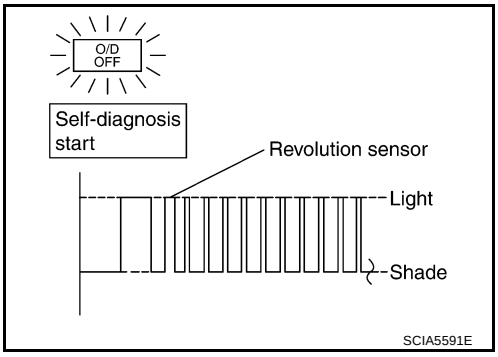
2. Drive vehicle and check for an increase of “VHCL/S SE·MTR” value.
   If the check result is NG, go to AT-335, "Diagnostic Procedure" .
   If the check result is OK, go to following step.
3. Select “DATA MONITOR” mode for “A/T” with CONSULT-II.
4. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL SPEED SE: 30 km/h (19 MPH) or more
   THRTL POS SEN: More than 1.2V
   SLCT LVR POSI: D position
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
   If the check result is NG, go to AT-335, "Diagnostic Procedure" .
   If the check result is OK, go to following step.



5. Maintain the following conditions for at least 5 consecutive seconds.
   ENGINE SPEED: 3,500 rpm or more
   THRTL POS SEN: More than 1.2V
   SLCT LVR POSI: D position
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

⊗ WITHOUT CONSULT-II

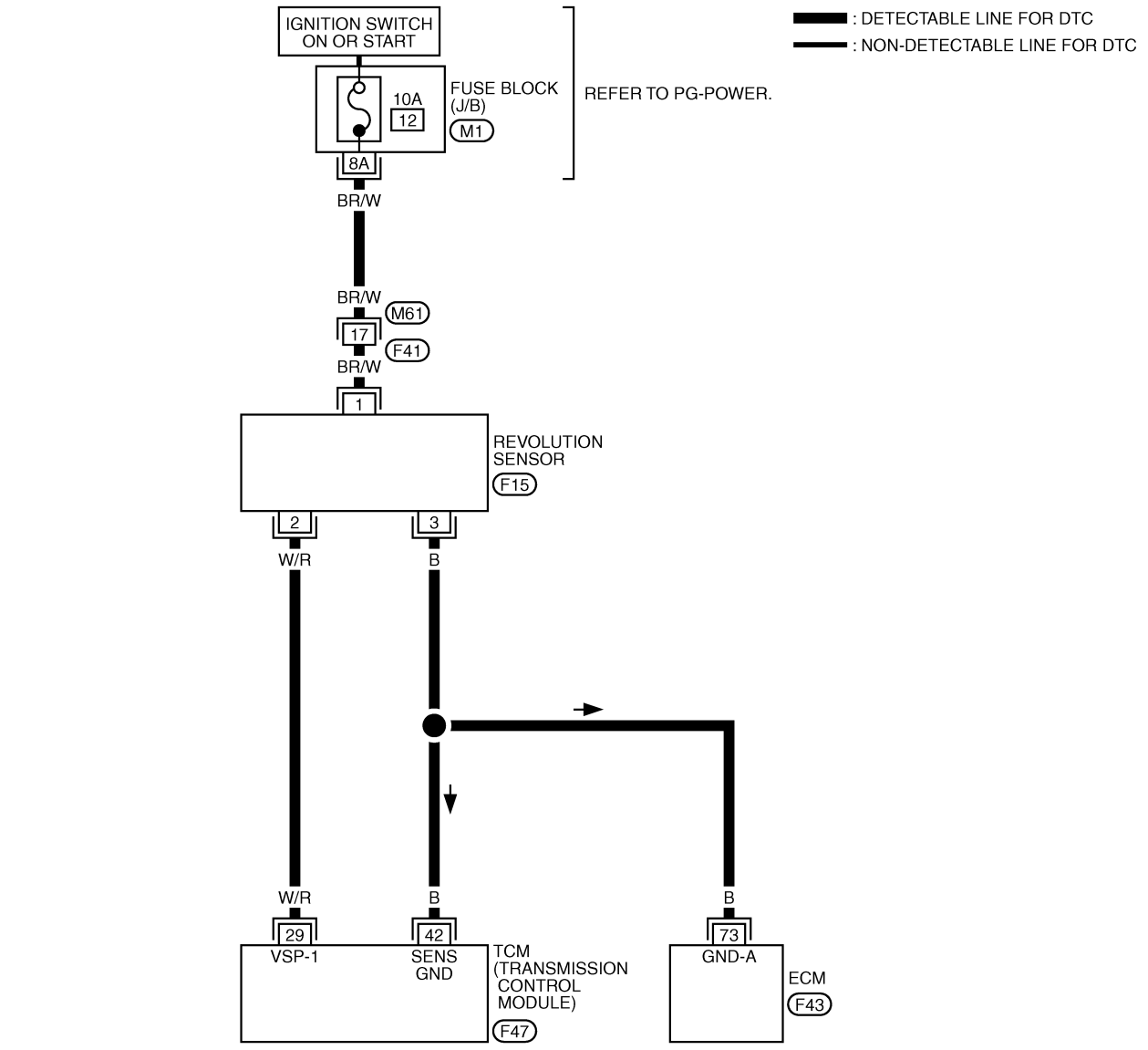
1. Start engine.
2. Drive vehicle under the following conditions for more than 5 seconds.
   Selector lever position: D position
   Vehicle speed: 30 km/h (19 MPH) or more
   Throttle position: greater than 1.0/8 of the full throttle position
3. Perform self-diagnosis.
   Refer to AT-246, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-335, "Diagnostic Procedure" .

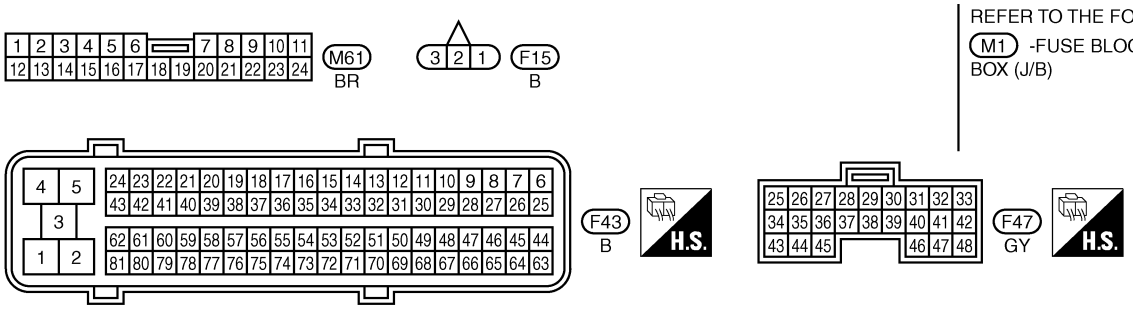


Wiring Diagram — AT — VSSA/T

ECS004TK

AT-VSSA/T-01





TCWA0231E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
29	W/R	Revolution sensor		When moving at 20 km/h (12 MPH)	450 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
42	B	Sensor ground	Always		0V

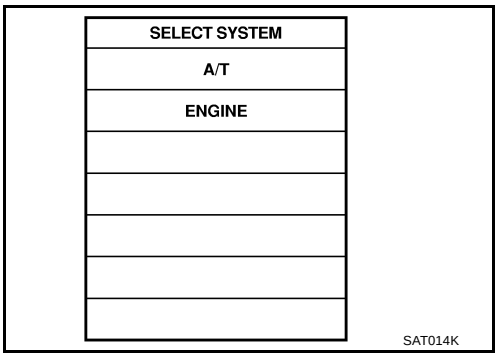
Diagnostic Procedure

ECS004TL

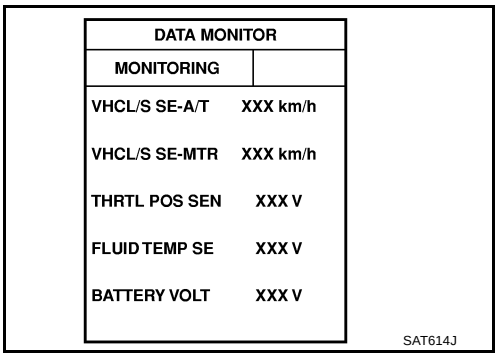
1. CHECK INPUT SIGNAL (WITH CONSULT-II)

With CONSULT-II

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



Check the value changes according to driving speed.



OK or NG

OK >> GO TO 8.
NG >> GO TO 2.

2. CHECK REVOLUTION SENSOR

With CONSULT-II

1. Start engine.
2. Check power supply to revolution sensor by voltage between TCM connector terminals. Refer to AT-395, "Wiring Diagram — AT — MAIN" and AT-334, "Wiring Diagram — AT — VSSA/T" .

Item	Connector No.	Terminal No. (Wire color)	Data (Approx.)
TCM	F46, F47	10 (BR/W) - 42 (B)	Battery voltage
		19 (BR/W) - 42 (B)	

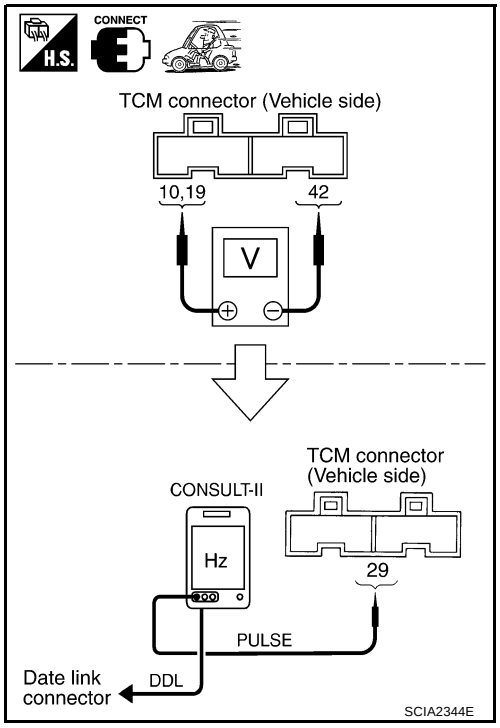
3. If OK check the pulse when vehicle cruises.

Name	Condition
Revolution sensor	When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. **CAUTION:** **Connect the diagnosis data link cable to the data link connector.**

Item	Connector No.	Terminal No. (Wire color)	Name	Data (Approx.)
TCM	F47	29 (W/R)	Revolution sensor	450 Hz

OK or NG

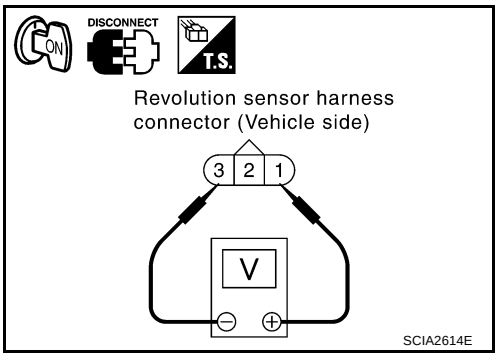
OK >> GO TO 8.
NG >> GO TO 3.



3. CHECK POWER AND SENSOR GROUND

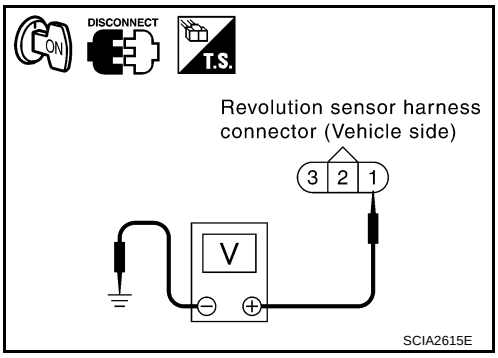
1. Turn ignition switch OFF.
2. Disconnect the revolution sensor harness connector.
3. Turn ignition switch ON. (Do not start engine.)
4. Check voltage between revolution sensor harness connector terminals.

Item	Connector No.	Terminal No. (Wire color)	Data (Approx.)
Revolution sensor	F15	1 (BR/W) - 3 (B)	Battery voltage



5. Check voltage between revolution sensor harness connector terminal and ground.

Item	Connector No.	Terminal No. (Wire color)	Data (Approx.)
Revolution sensor	F15	1 (BR/W) - ground	Battery voltage



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

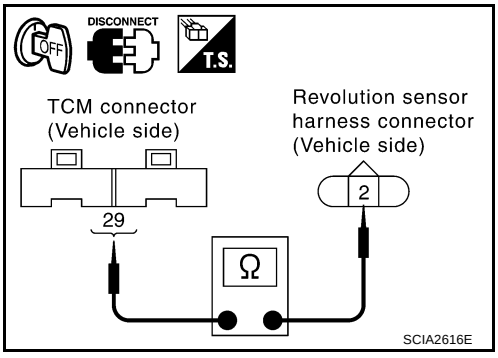
OK or NG

OK >> GO TO 4.
NG - 1 >> Battery voltage is not supplied between terminals 1 and 3, terminals 1 and ground.:GO TO 6.
NG - 2 >> Battery voltage is not supplied between terminals 1 and 3 only.: GO TO 7.

4. CHECK HARNESS BETWEEN TCM AND REVOLUTION SENSOR

1. Turn ignition switch OFF.
2. Disconnect the TCM connector and revolution sensor harness connector.
3. Check continuity between TCM connector and revolution sensor harness connector.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F47	29 (W/R)	Yes
Revolution sensor	F15	2 (W/R)	



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

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK TCM

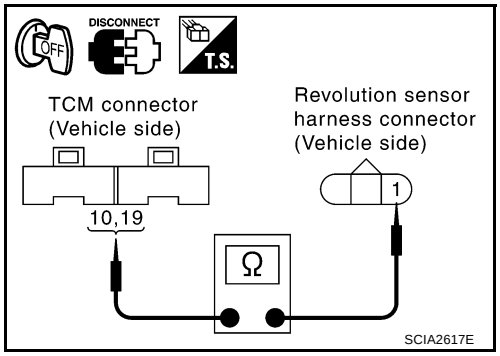
1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
2. If NG, re-check TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK HARNESS BETWEEN TCM AND REVOLUTION SENSOR (POWER)

1. Turn ignition switch OFF.
2. Disconnect the TCM connector and revolution sensor harness connector.
3. Check continuity between TCM connector and revolution sensor harness connector. Refer to AT-21, "Circuit Diagram" and AT-395, "Wiring Diagram — AT — MAIN" .



Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	10 (BR/W)	Yes
Revolution sensor	F15	1 (Y)	

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	19 (BR/W)	Yes
Revolution sensor	F15	1 (Y)	

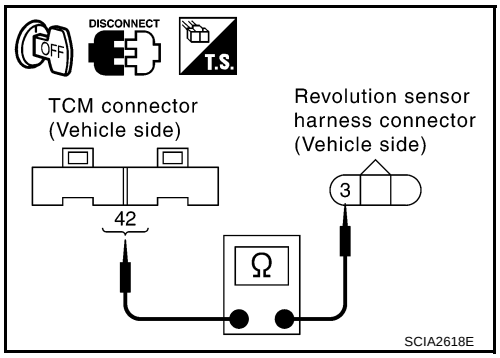
4. If OK, check harness for short to ground and short power.
5. Reinstall any part removed.

OK or NG

OK >> Fuse or ignition switch are malfunctioning.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK HARNESS BETWEEN TCM AND REVOLUTION SENSOR (SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect the TCM connector and revolution sensor harness connector.
3. Check continuity between TCM connector and revolution sensor harness connector.



Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F47	42 (B)	Yes
Revolution sensor	F15	3 (B)	

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

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK DTC

Perform AT-332, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

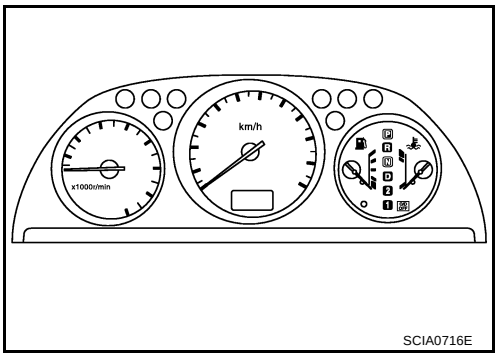
DTC VEHICLE SPEED SENSOR MTR

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.



SCIA0716E

CONSULT-II Reference Value

ECS00CSH

Remarks: Specification data are reference values.

Monitor item	Condition	Display value
VHCL/S SE·MTR (km/h)	During driving	Approximately matches the speedometer reading.

On Board Diagnosis Logic

ECS00CSA

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: VHCL SPEED SEN·MTR : 2nd judgement flicker	TCM does not receive the proper voltage signal from the sensor.	● Harness or connectors (The sensor circuit is open or shorted.) ● Combination meter ● 4WD/ABS control unit

Possible Cause

ECS00CSB

Check the following items.

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

DTC Confirmation Procedure

ECS00CSC

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

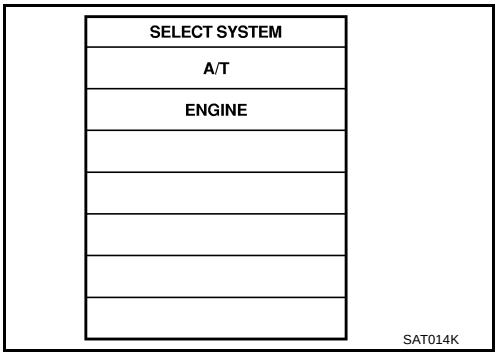
CAUTION:

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

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

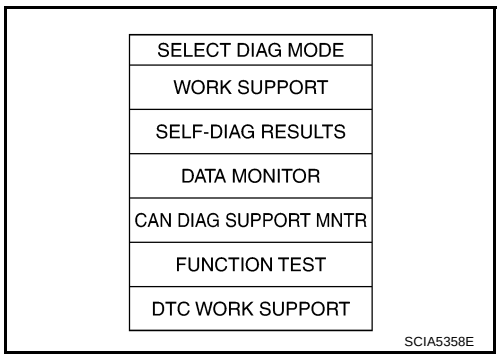
WITH CONSULT-II

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



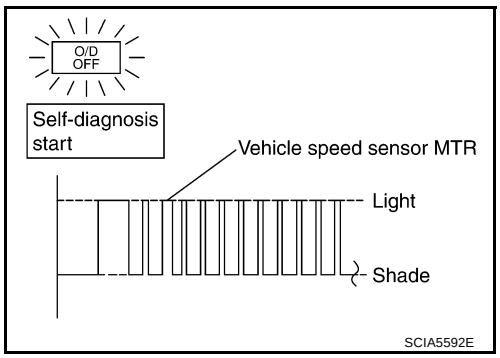
SAT014K

2. Start engine and accelerate vehicle from 0 to 25 km/h (0 to 16 MPH).
3. If the check result is NG, go to AT-343, "Diagnostic Procedure" .



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 AT-246, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-343, "Diagnostic Procedure" .

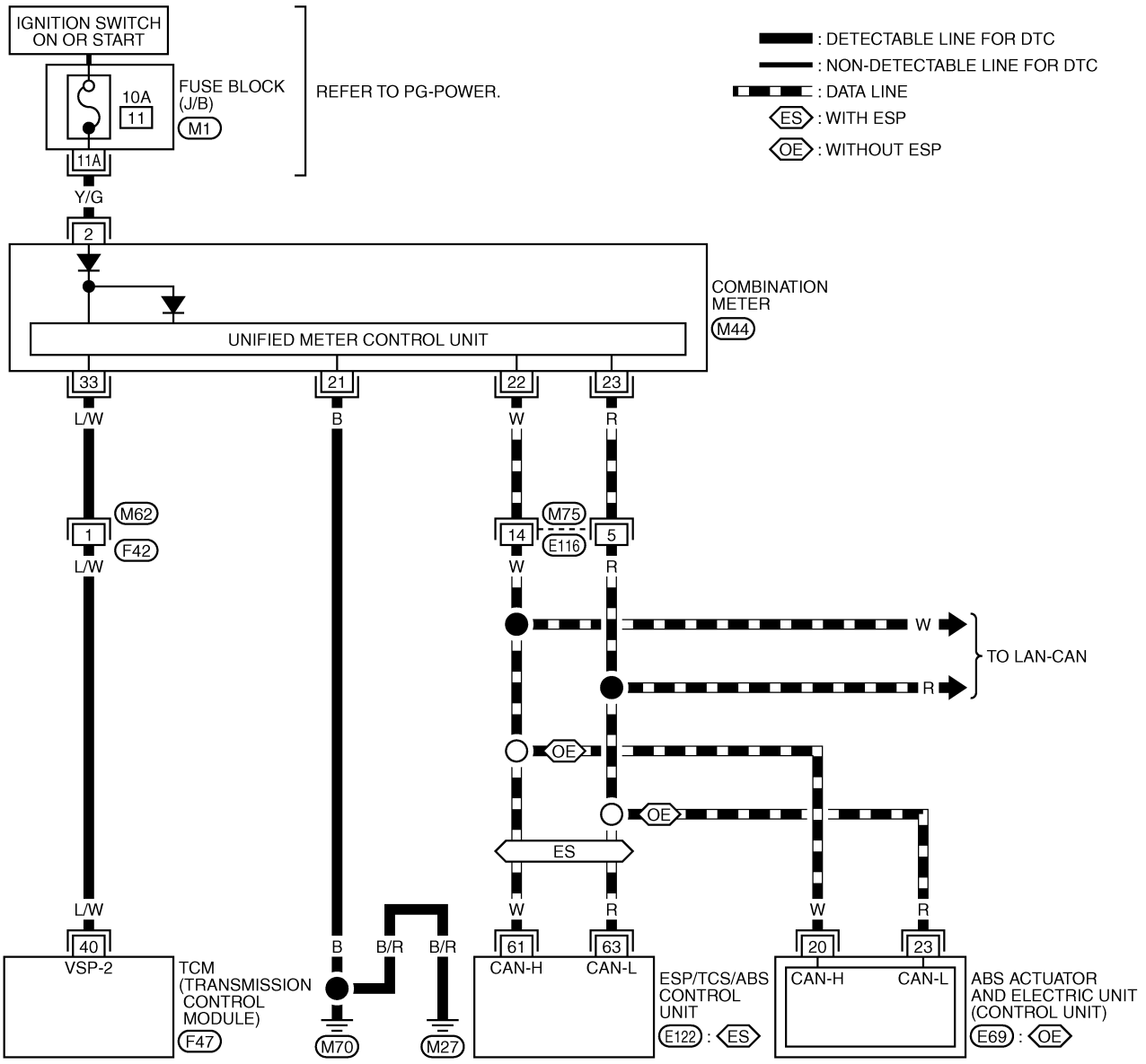


Wiring Diagram — AT — VSSMTR

ECS004TN

LHD models

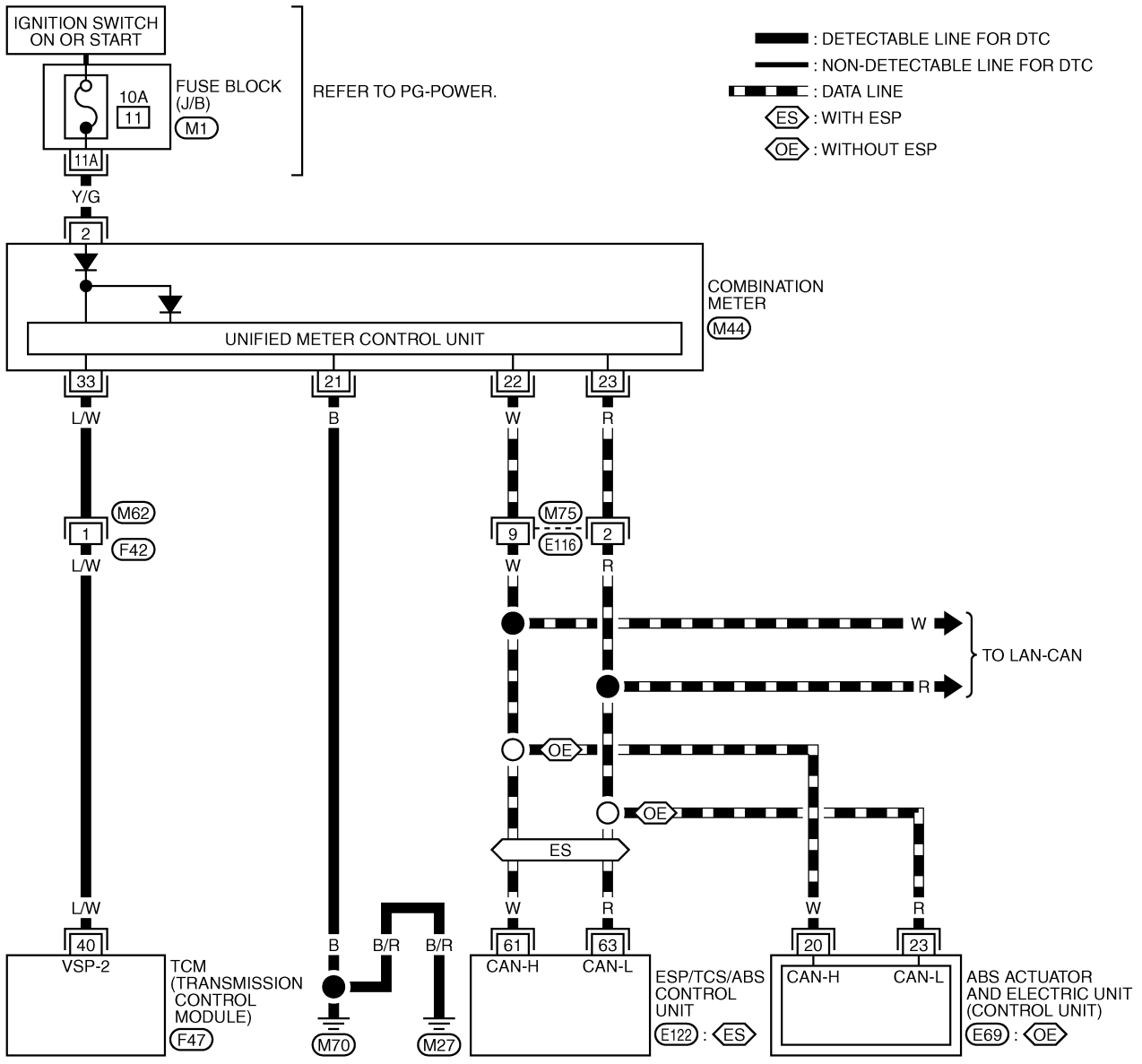
AT-VSSMTR-01

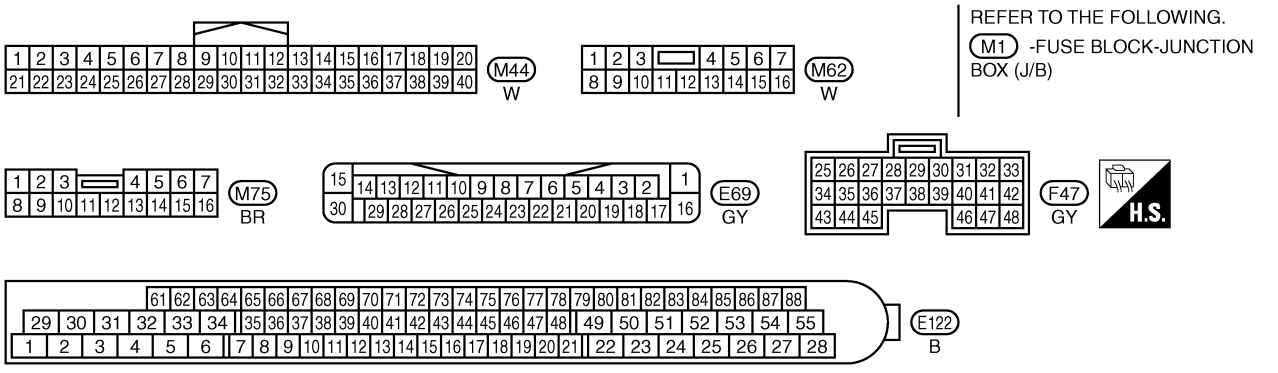


TCWA0236E

RHD models

AT-VSSMTR-02





TCWA0237E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
40	L/W	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

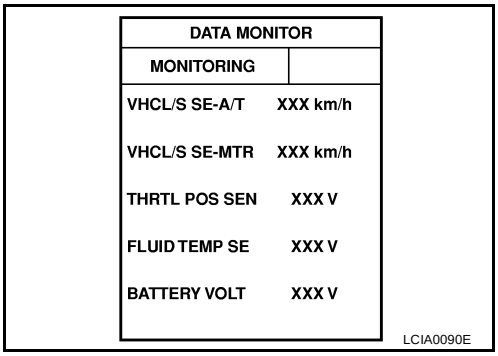
Diagnostic Procedure

ECS004TO

1. CHECK INPUT SIGNAL

With CONSULT-II

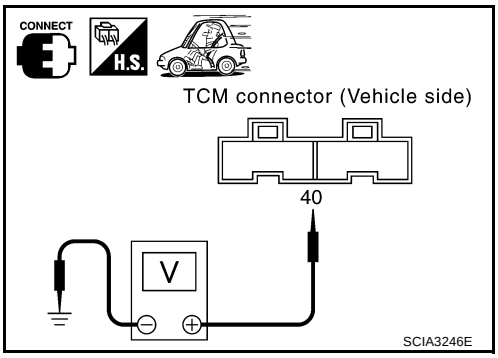
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·MTR” while driving. Check the value changes according to driving speed.



Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector and ground.

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgementstandard(Approx.)
Vehicle speed sensor	F47	40(L/W) - Ground	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



OK or NG

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

2. DETECT MALFUNCTIONING ITEM

Check the following items:

- Combination meters. Refer to DI-4, "COMBINATION METERS" .
- Harness for short or open between TCM and unified combination meter.

OK or NG

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

3. CHECK DTC

Perform AT-339, "DTC Confirmation Procedure" .

OK or NG

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

4. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

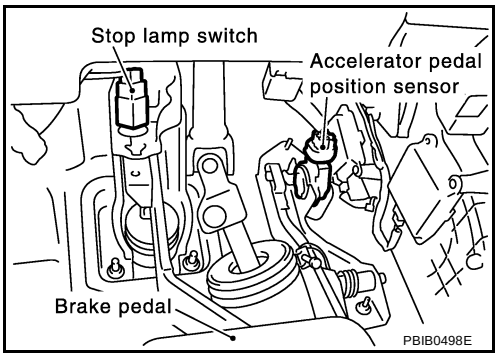
ACCELE RATOR PEDAL POSITION (APP) SENSOR

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 ECM.



CONSULT-II REFERENCE VALUE

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

On Board Diagnosis Logic

ECS00CSD

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.	● 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.

Possible Cause

ECS00CSE

Harness or connector
(The sensor circuit is open or shorted.)

DTC Confirmation Procedure

ECS00CSF

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

CAUTION:

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

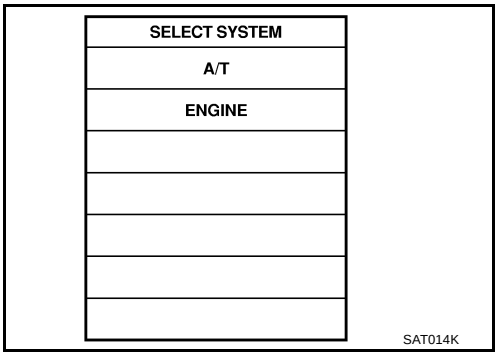
NOTE:

If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

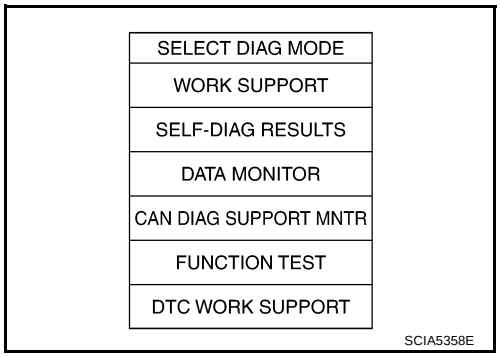
1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Touch “TCM INPUT SIGNALS”.
3. Touch “START”

Accelerator pedal condition	THRTL POS SEN
Fully released	Approx. 0.5V
Partially depressed	0.5 - 4V
Fully depressed	Approx. 4V

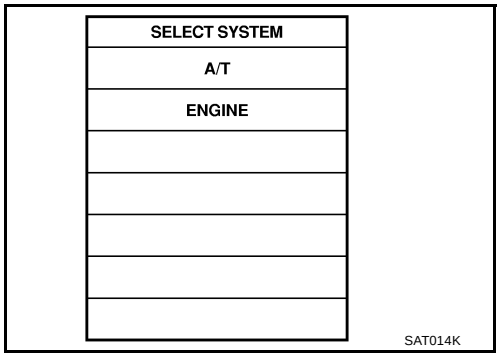


If the check result is NG, go to AT-348, "Diagnostic Procedure" .
If the check result is OK, go to following step.

4. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
5. Touch “SELECTION FROM MENU”
6. Touch “VHCL SPEED SE” and “THRTL POS SEN”.
   Touch “START”.
7. 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
   SLCT LVR POSI: D position
   If the check result is NG, go to AT-348, "Diagnostic Procedure" .
   If the check result is OK, go to following step.

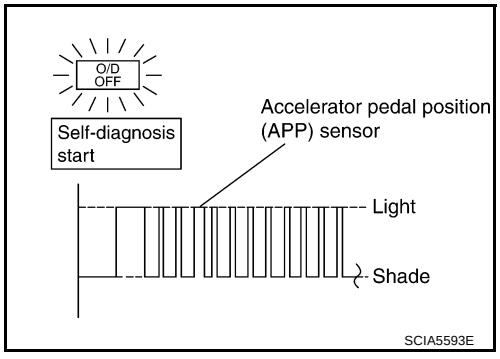


8. Maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   THROTTLE POSI: 8.0/8
   SLCT LVR POSI: D position



WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions for more than 3 seconds.
   Selector lever position: D position
   Vehicle speed: 10 km/h (6 MPH) or more
   Throttle position: greater than 4.0/8 of the full throttle position
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-348, "Diagnostic Procedure" .

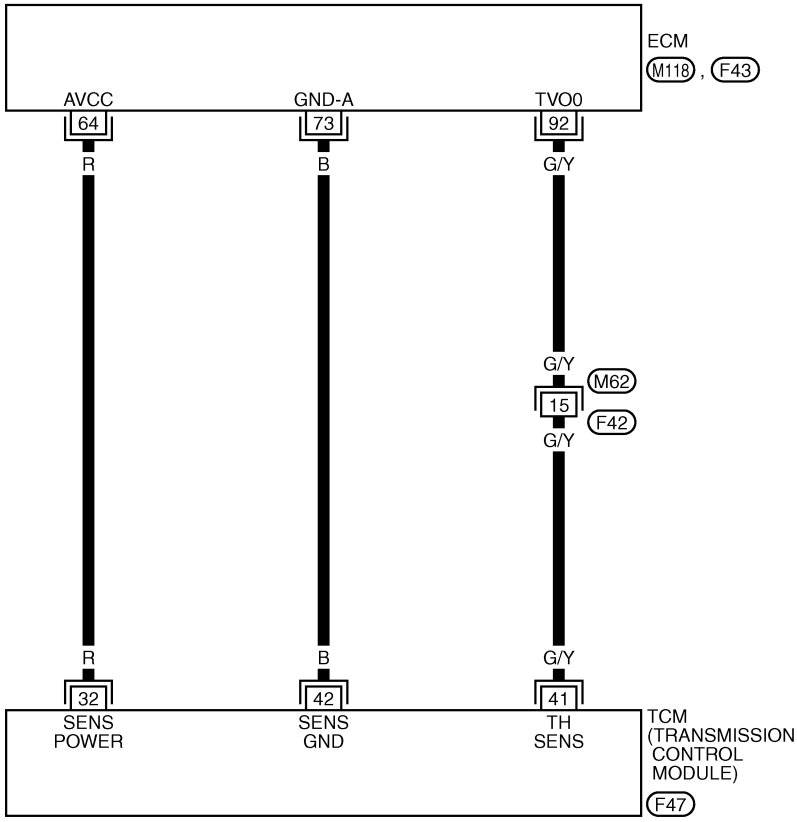


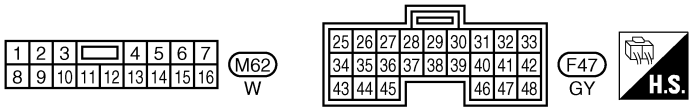
Wiring Diagram — AT — TPS

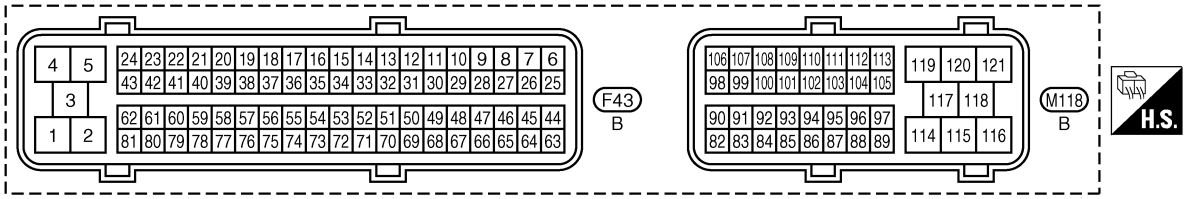
ECS004TQ

AT-TPS-01

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

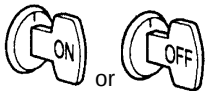






TCWA0233E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
32	R	Throttle position sensor (Power source)		When turning ignition switch “ON”.	4.5 - 5.5V
				When turning ignition switch “OFF”.	0V
41	G/Y	Throttle position sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V
42	B	Sensor ground	Always		0V

Diagnostic Procedure

ECS00CSG

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-64, "Malfunction Indicator (MI)" (WITH EURO-OBD) or EC-516, "Malfunction Indicator (MI)" (WITHOUT EURO-OBD).

OK or NG

OK >> GO TO 2.

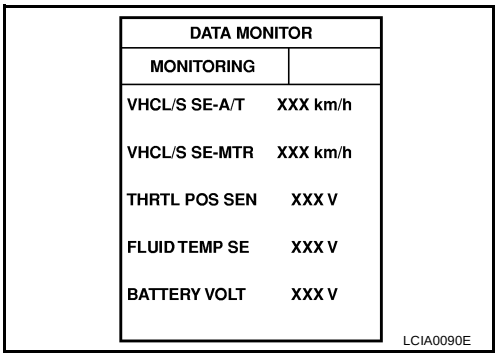
NG >> Check accelerator pedal position (APP) sensor circuit for engine control. Refer to EC-386, "DTC P2122, P2123 APP SENSOR" , EC-393, "DTC P2127, P2128 APP SENSOR" , EC-409, "DTC P2138 APP SENSOR" . If CAN communication line is detected, GO TO LAN-4, "CAN COMMUNICATION" .

2. CHECK INPUT SIGNAL

With CONSULT-II

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

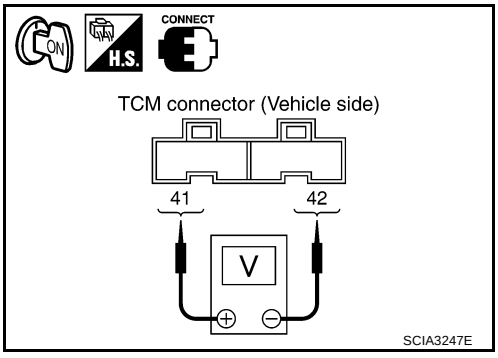
Monitor item	Condition	Display value
THRTL POS SEN (V)	When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.5V Fully-open throttle: 4V



Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals.

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgementstandard(Approx.)
Accelerator pedal position (APP) sensor	F47	41(G/Y) - 42(B)	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



OK or NG

OK >> GO TO 3.
NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor circuit.

3. CHECK DTC

Perform AT-345, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

4. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

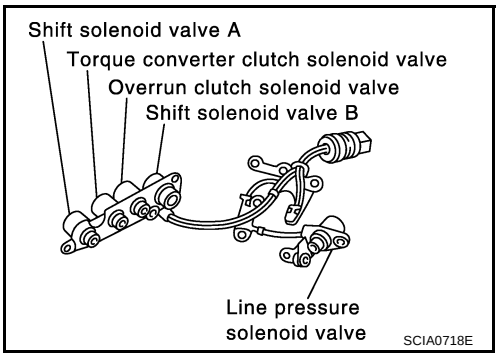
SHIFT SOLENOID VALVE A

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)

CONSULT-II Reference Value

ECS00CSI

Remarks: Specification data are reference values.

Monitor item	Condition	Display value
SHIFT S/V A (ON/OFF)	When shift solenoid valve A operates. (When driving in “D_1 ” or “D_4 ”.)	ON
	When shift solenoid valve A does not operate. (When driving in “D_2 ” or “D_3 ”.)	OFF

On Board Diagnosis Logic

ECS00CSJ

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

Possible Cause

ECS00CSK

Check the following items.

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

DTC Confirmation Procedure

ECS00CSL

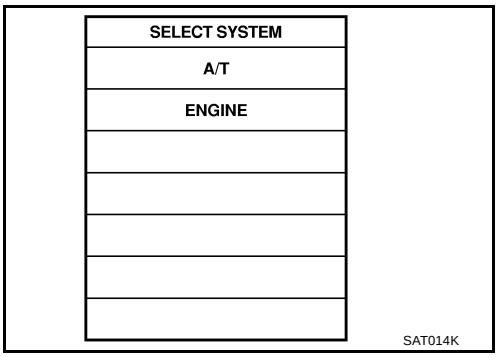
CAUTION:

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

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

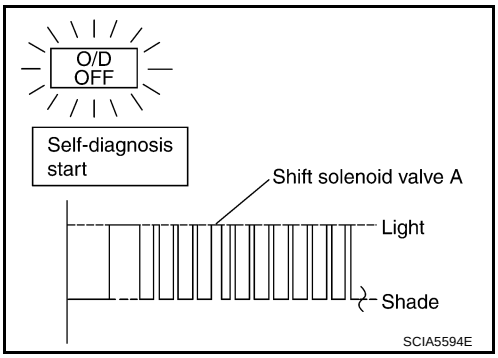
WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Start engine.
3. Drive vehicle in D position and allow the transmission to shift 1 → 2 (“GEAR”).
4. If the check result is NG, go to AT-353, "Diagnostic Procedure" .



WITHOUT CONSULT-II

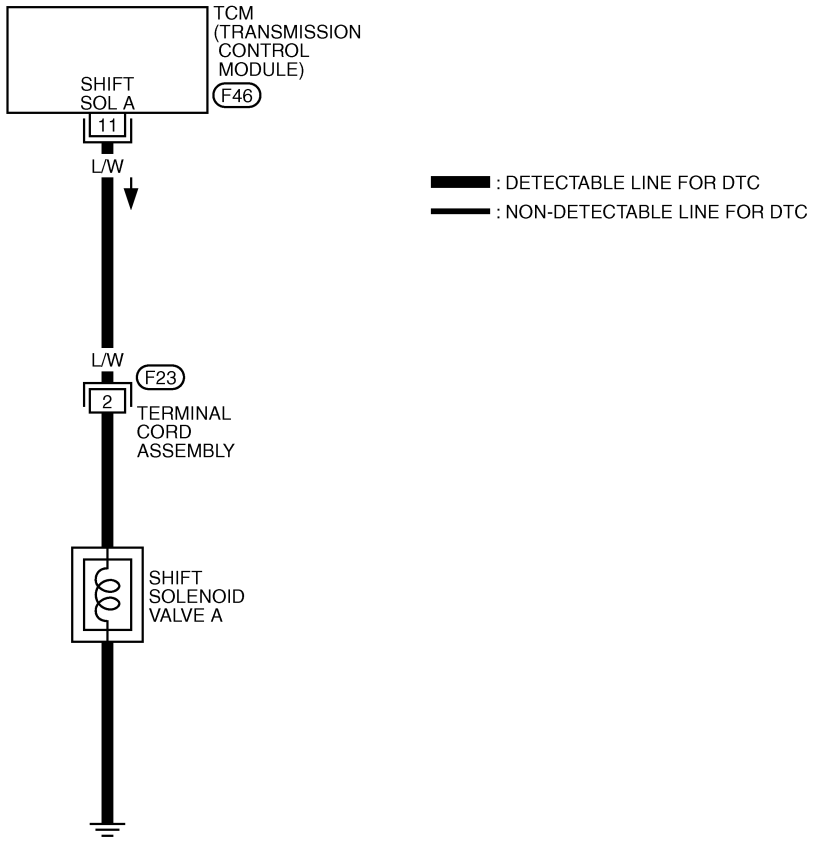
1. Start engine.
2. Drive vehicle in D_1 → D_2 position.
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-353, "Diagnostic Procedure" .

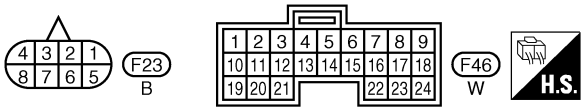


Wiring Diagram — AT — SSV/A

ECS004TT

AT-SSV/A-01





TCWA0040E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

Diagnostic Procedure

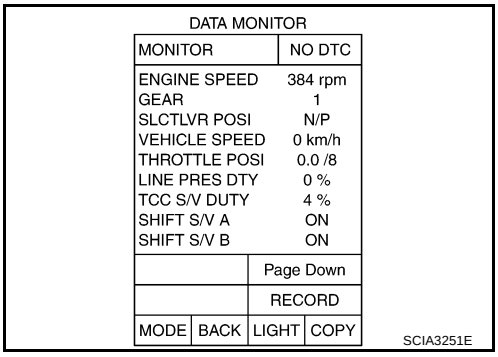
ECS004TU

1. CHECK INPUT SIGNAL

With CONSULT-II

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

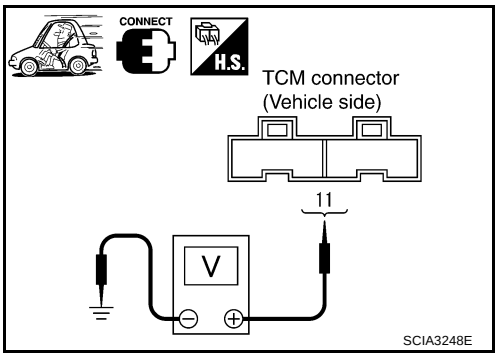
Monitor item	Condition	Display value
SHIFT S/V A	When shift solenoid valve A operates. (When driving in “D1 ” or “D4 ”.)	ON
	When shift solenoid valve A does not operate. (When driving in “D2 ” or “D3 ”.)	OFF



Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector and ground.

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgementstandard(Approx.)
Shift solenoid valve A	F46	11 (L/W) - Ground	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



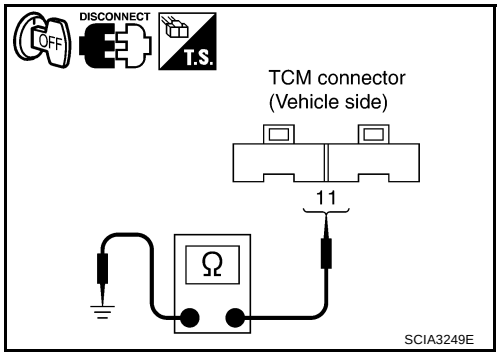
OK or NG

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

2. CHECK SHIFT SOLENOID VALVE A CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector No.	Terminal No. (Wire color)	Resistance (Approx.)
Shift solenoid valve A	F46	11 (L/W) - Ground	20 - 30 Ω



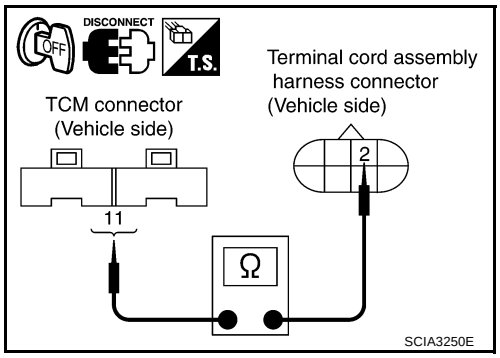
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector and TCM connector.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	11 (L/W)	Yes
Terminal cord assembly harness connector	F23	2 (L/W)	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

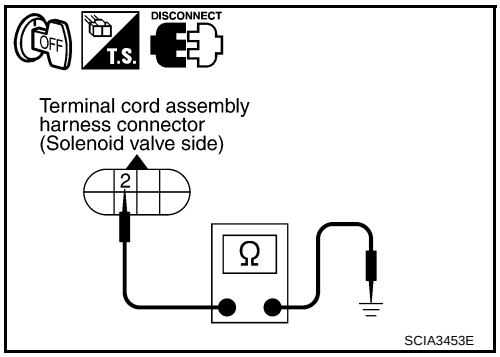
OK or NG

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

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector F23 terminal 2 (L/W) and ground.

Resistance: 20 - 30Ω



OK or NG

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

5. CHECK DTC

Perform AT-350, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

Component Inspection

ECS004TV

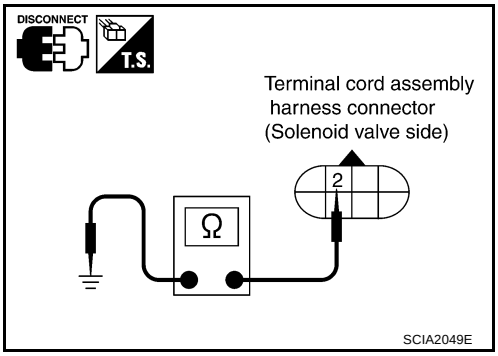
SHIFT SOLENOID VALVE A

- For removal, refer to AT-404, "Control Valve Assembly and Accumulators" .

Resistance Check

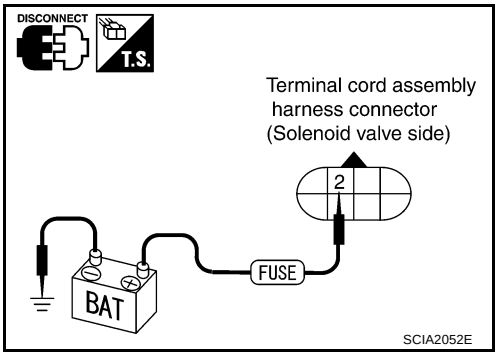
- Check resistance between two terminal 2 and ground.

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.



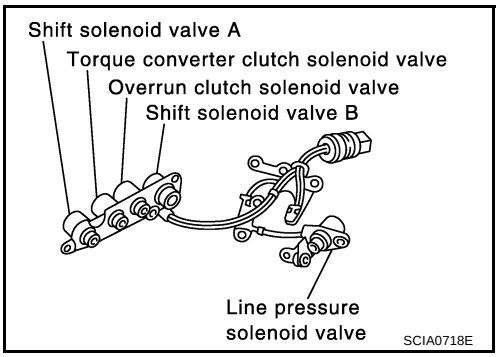
SHIFT SOLENOID VALVE B

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)

CONSULT-II Reference Value

ECS00CSN

Remarks: Specification data are reference values.

Monitor item	Condition	Display value
SHIFT S/V B (ON/OFF)	When shift solenoid valve B operates. (When driving in “D_1 ” or “D_2 ”.)	ON
	When shift solenoid valve B does not operate. (When driving in “D_3 ” or “D_4 ”.)	OFF

On Board Diagnosis Logic

ECS00CSM

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

DTC Confirmation Procedure

ECS00CSO

CAUTION:

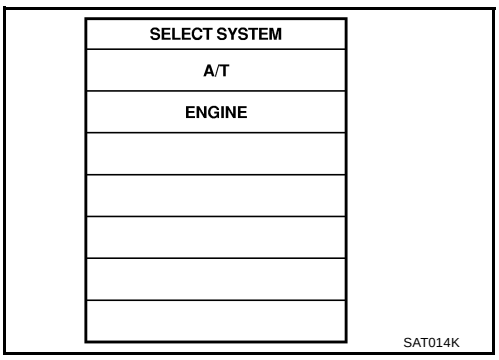
- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

NOTE:

If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

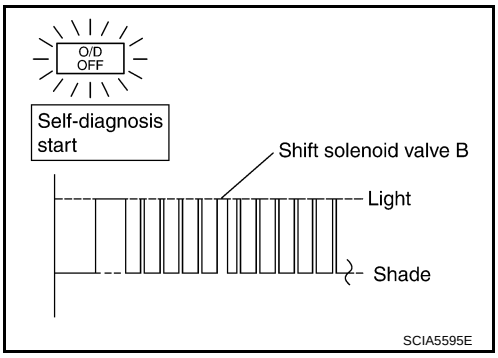
WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Start engine.
3. Drive vehicle in D position and allow the transmission to shift 1 → 2 → 3 (“GEAR”).
4. If the check result is NG, go to AT-359, "Diagnostic Procedure" .



WITHOUT CONSULT-II

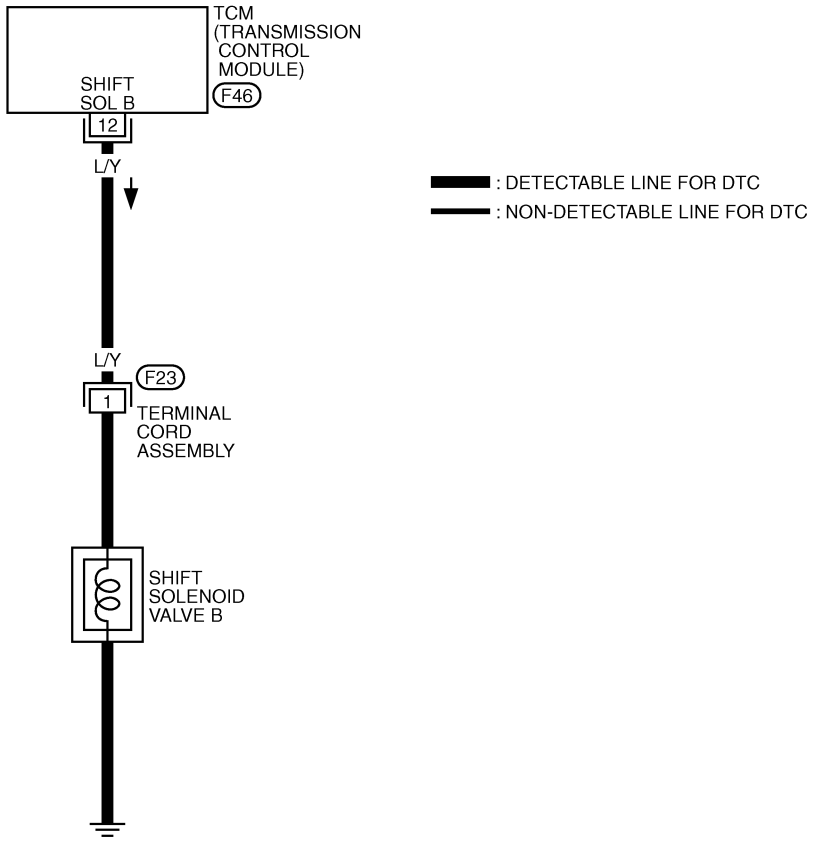
1. Start engine.
2. Drive vehicle in $D_1 \rightarrow D_2 \rightarrow D_3$ position.
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-359, "Diagnostic Procedure" .

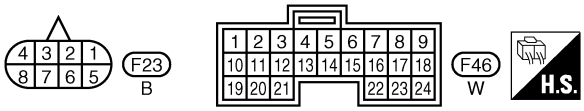


Wiring Diagram — AT — SSV/B

ECS004TX

AT-SSV/B-01





TCWA0041E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

Diagnostic Procedure

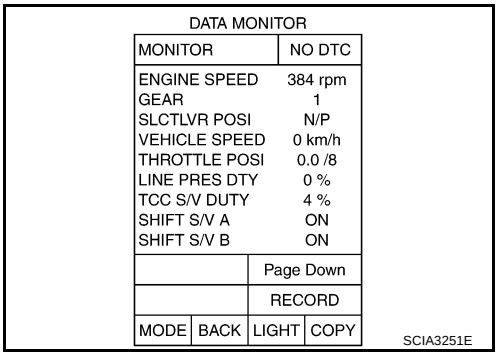
ECS004TY

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “SHIFT S/V B” while driving.
   Check the value changes according to driving speed.

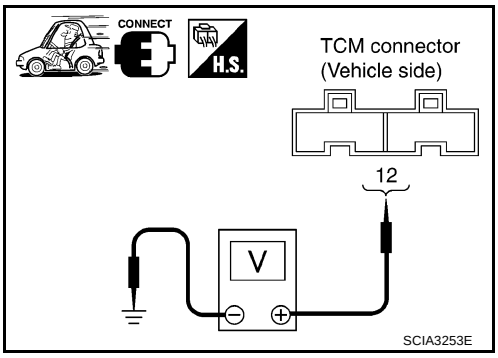
Monitor item	Condition	Display value
SHIFT S/V B	When shift solenoid valve B operates. (When driving in “D1 ” or “D2 ”.)	ON
	When shift solenoid valve B does not operate. (When driving in “D3 ” or “D4 ”.)	OFF



Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector and ground.

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgementstandard(Approx.)
Shift solenoid valve B	F46	12 (L/Y) - Ground	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



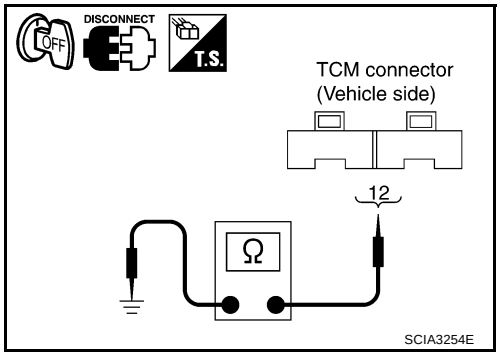
OK or NG

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

2. CHECK SHIFT SOLENOID VALVE B CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector No.	Terminal No. (Wire color)	Resistance (Approx.)
Shift solenoid valve B	F46	12 (L/Y) - Ground	5 - 20 Ω



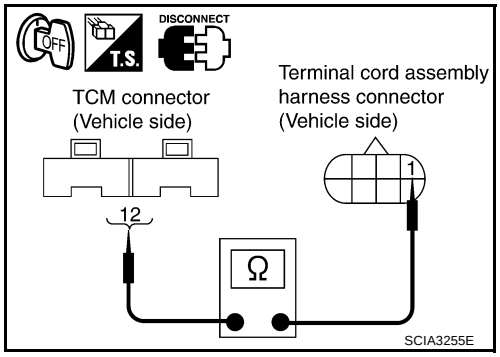
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector and TCM connector.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	12 (L/Y)	Yes
Terminal cord assembly harness connector	F23	1 (L/Y)	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

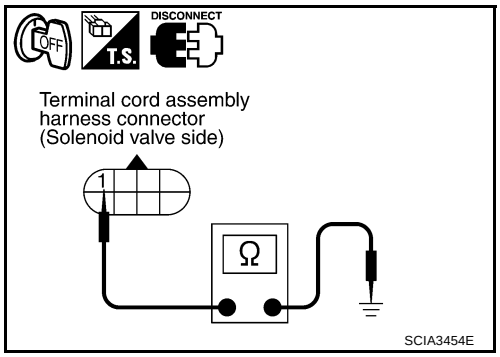
OK or NG

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

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector F23 terminal 1(L/Y) and ground.

Resistance: 5 - 20Ω



OK or NG

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

5. CHECK DTC

Perform AT-356, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

Component Inspection

SHIFT SOLENOID VALVE B

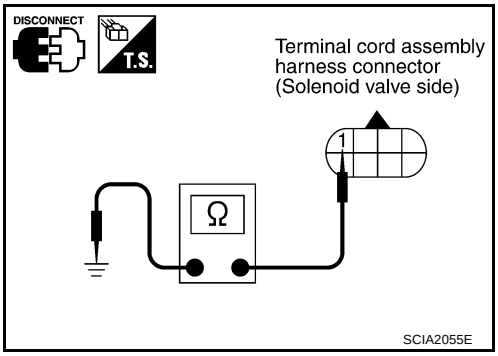
ECS004TZ

- For removal, refer to AT-404, "Control Valve Assembly and Accumulators" .

Resistance Check

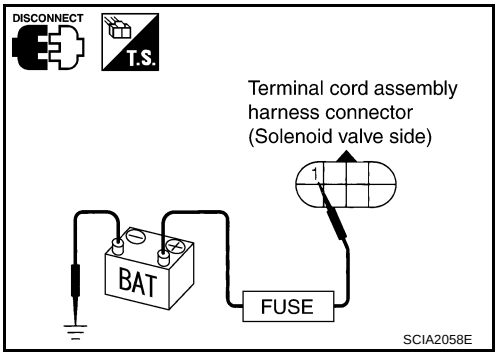
- Check resistance between two terminal 1 and ground.

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.



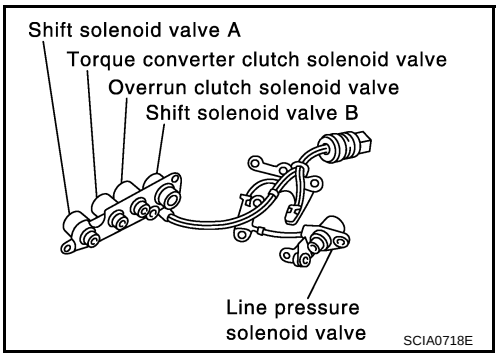
OVERRUN CLUTCH SOLENOID VALVE

PFP: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.



CONSULT-II Reference Value

ECS00CSR

Remarks: Specification data are reference values.

Monitor item	Condition	Display value
OVERRUN/C S/V (ON/OFF)	When overrun clutch solenoid valve operates.	ON
	When overrun clutch solenoid valve does not operate.	OFF

On Board Diagnosis Logic

ECS00CSS

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: OVERRUN CLUTCH S/V	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Overrun clutch solenoid valve
: 6th judgement flicker		

Possible Cause

ECS00CST

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

DTC Confirmation Procedure

ECS00CSU

CAUTION:

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

NOTE:

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

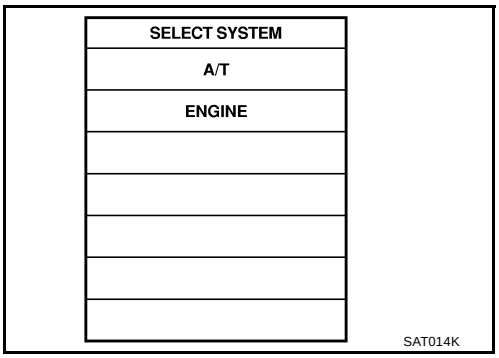
TESTING CONDITION:

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

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

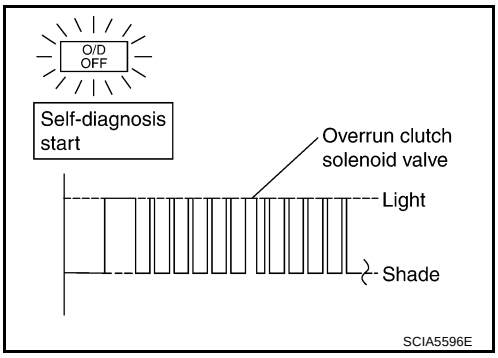
WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Start engine.
3. Accelerate vehicle to a speed of more than 10 km/h (6 MPH) with selector lever in D position.
4. Release accelerator pedal completely with selector lever in 3rd position.
5. If the check result is NG, go to AT-365, "Diagnostic Procedure" .



WITHOUT CONSULT-II

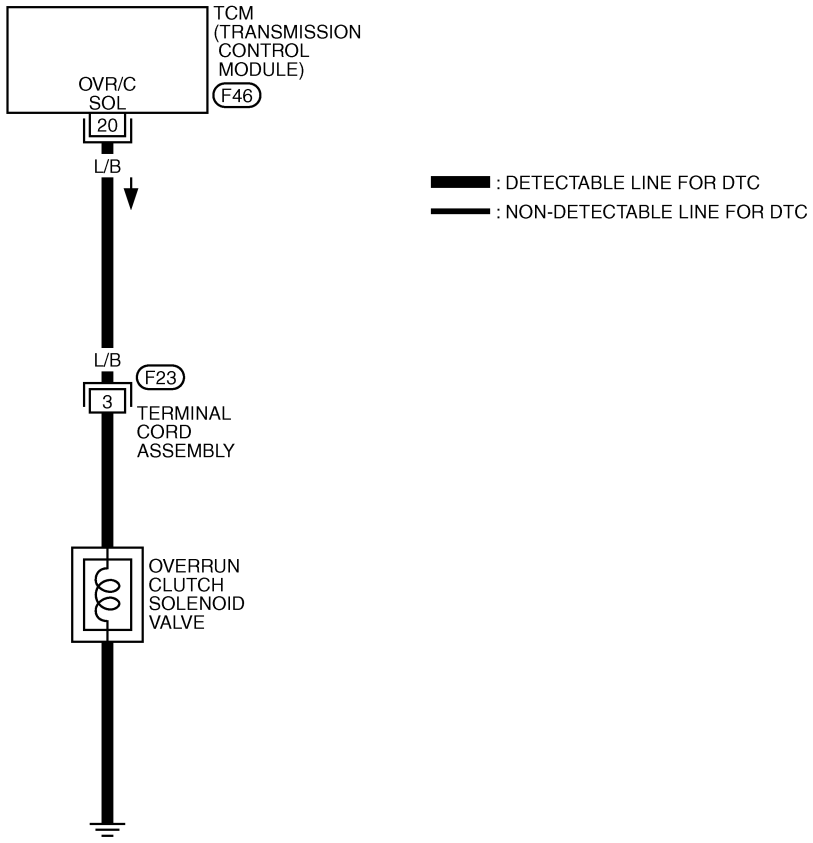
1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in 3rd position, vehicle speed higher than 10 km/h (6 MPH).
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-365, "Diagnostic Procedure" .

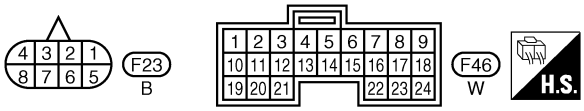


Wiring Diagram — AT — OVRCSV

ECS004U1

AT-OVRCSV-01





TCWA0042E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

Diagnostic Procedure

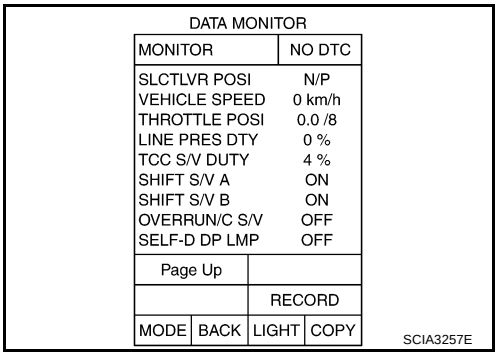
ECS004U2

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “OVERRUN/C S/V” while driving.
   Check the value changes according to driving speed.

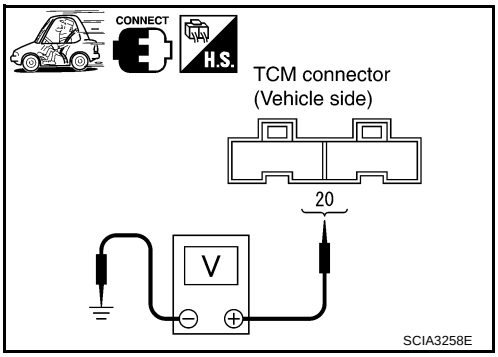
Monitor item	Condition	Display value
OVERRUN/C S/V	When overrun clutch solenoid valve operates.	ON
	When overrun clutch solenoid valve does not operate.	OFF



Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector and ground.

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgementstandard(Approx.)
Overrun clutch solenoid valve	F46	20 (L/B) - Ground	When overrun clutch solenoid valve operates.	Battery voltage
			When overrun clutch solenoid valve does not operate.	0V



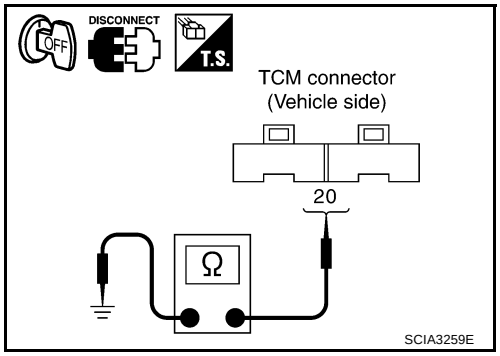
OK or NG

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

2. CHECK OVERRUN CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector No.	Terminal No. (Wire color)	Resistance (Approx.)
Overrun clutch solenoid valve	F46	20 (L/B) - Ground	20 - 30 Ω



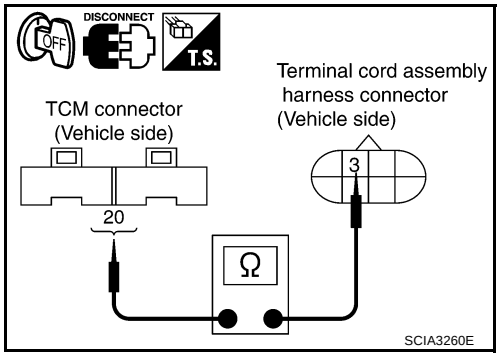
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector and TCM connector.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	20 (L/B)	Yes
Terminal cord assembly harness connector	F23	3 (L/B)	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

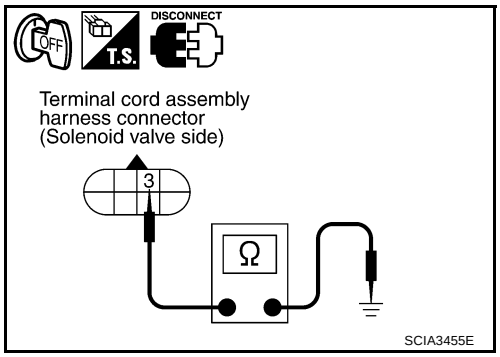
OK or NG

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

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector F23 terminal 3 (L/B) and ground.

Resistance: 20 - 30Ω



OK or NG

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

5. CHECK DTC

Perform AT-362, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

Component Inspection

ECS004U3

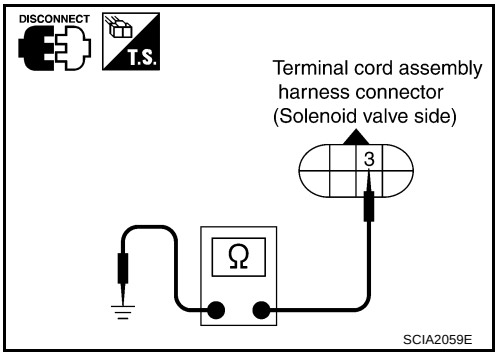
OVERRUN CLUTCH SOLENOID VALVE

- For removal, refer toAT-404, "Control Valve Assembly and Accumulators" .

Resistance Check

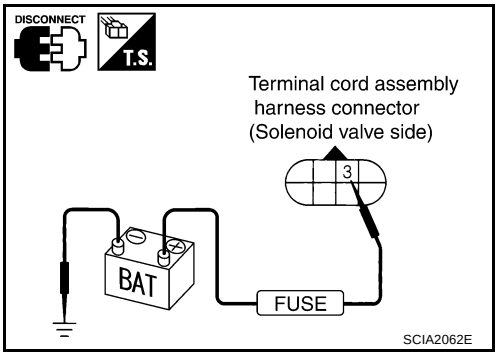
- Check resistance between two terminal 3 and ground.

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.



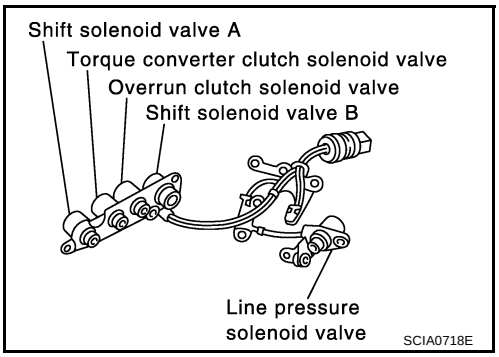
TORQUE CONVERTER CLUTCH SOLENOID VALVE

PFP:31940

Description

ECS004U4

The torque converter clutch solenoid valve is activated, with the gear in "D_4 ", by the TCM in response to signals sent from the vehicle speed and throttle position sensors. Lock-up piston operation will then be controlled.
Lock-up operation, however, is prohibited when A/T fluid temperature is too low.
When the accelerator pedal is depressed (less than 2/8) in lock-up condition, the engine speed should not change abruptly. If there is a big jump in engine speed, there is no lock-up.



CONSULT-II Reference Value

ECS00CSV

Remarks: Specification data are reference values.

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

On Board Diagnosis Logic

ECS00CSW

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.	● Harness or connectors (The solenoid circuit is open or shorted.) ● T/C clutch solenoid valve
: 7th judgement flicker		

Possible Cause

ECS00CW8

Check the following items.

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

DTC Confirmation Procedure

ECS00CSX

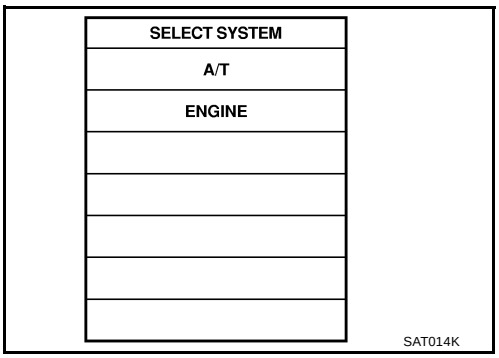
CAUTION:

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

NOTE:
If "DTC Confirmation Procedure" has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

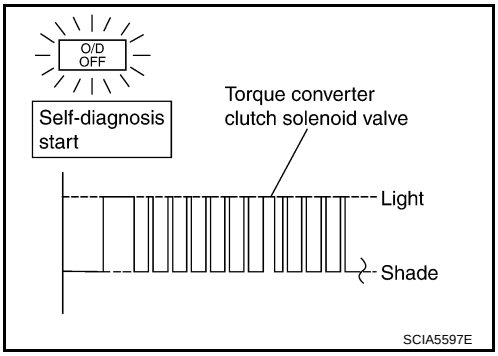
WITH CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II and wait at least 1 second.
3. Start engine and maintain the following condition for at least 5 consecutive seconds.
   VHCL SPEED SE: 80 km/h (50 MPH) or more
   THROTTLE POSI: 0.5/8 - 1.0/8
   SLCT LVR POSI: D position
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
4. If the check result is NG, go to AT-371, "Diagnostic Procedure" .



WITHOUT CONSULT-II

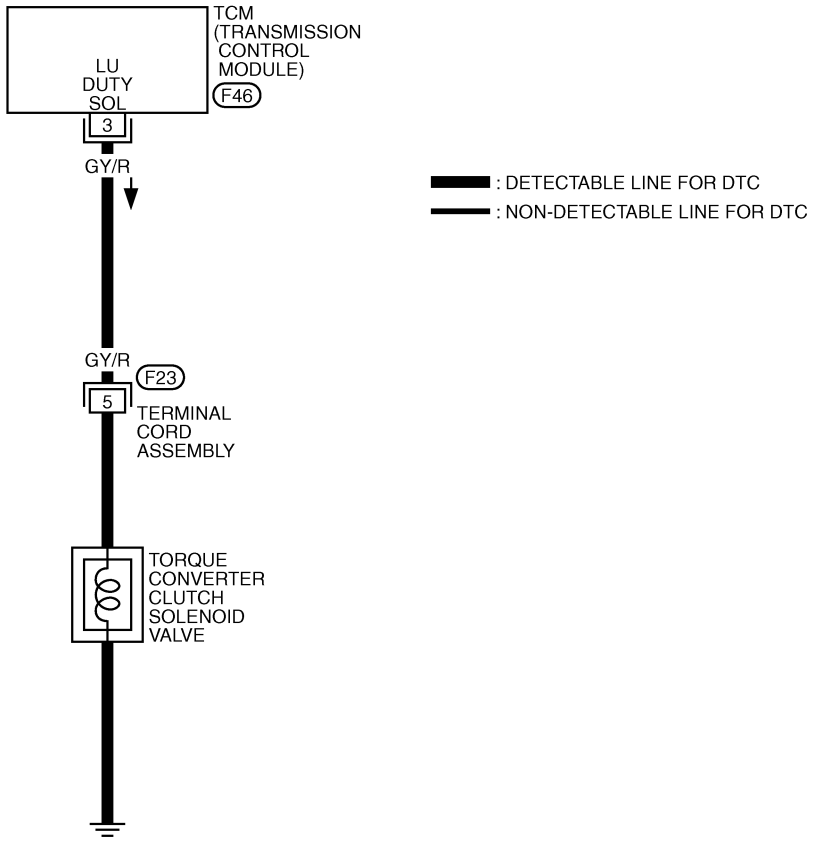
1. Start engine.
2. Drive vehicle in $D_1 \rightarrow D_2 \rightarrow D_3 \rightarrow D_4 \rightarrow D_4$ lock-up position.
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-371, "Diagnostic Procedure" .

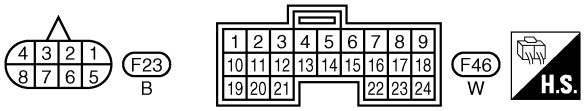


Wiring Diagram — AT — TCV

ECS004U5

AT-TCV-01





TCWA0043E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

Diagnostic Procedure

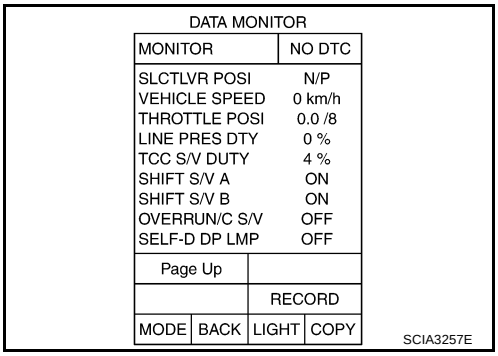
ECS004U6

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “TCC S/V DUTY” while driving.
   Check the value changes according to driving speed.

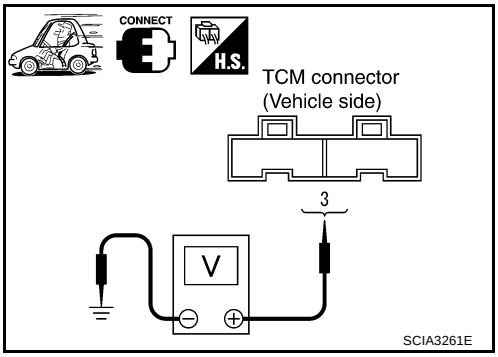
Monitor item	Condition	Display value
TCC S/V DUTY (%)	Lock-up OFF ↓ Lock-up ON	Approx. 4% ↓ Approx. 94%



Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector and ground.

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgement standard (Approx.)
Torque converter clutch solenoid valve	F46	3 (GY/R) - Ground	When A/T performs lock-up.	8 - 15V
			When A/T does not perform lock-up.	0V



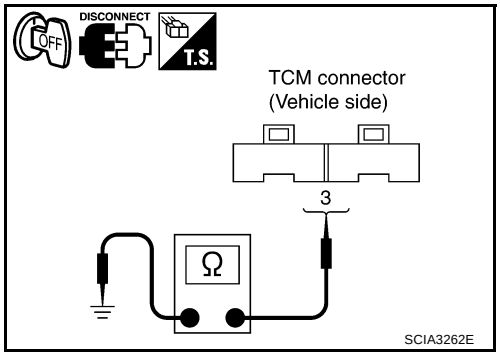
OK or NG

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

2. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector No.	Terminal No. (Wire color)	Resistance (Approx.)
Torque converter clutch solenoid valve	F46	3 (GY/R) - Ground	5 - 20 Ω



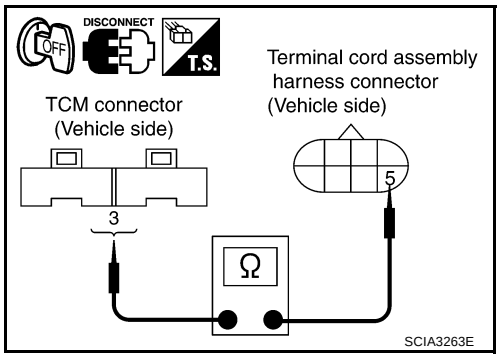
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector and TCM connector.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	3 (GY/R)	Yes
Terminal cord assembly harness connector	F23	5 (GR/Y)	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

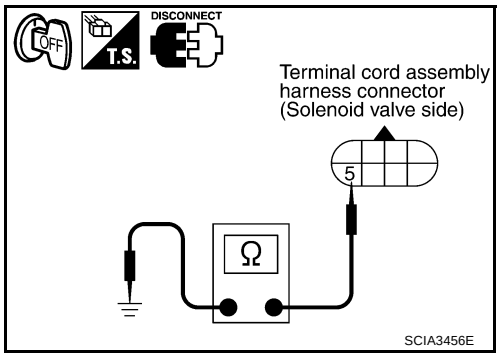
OK or NG

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

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector F23 terminal 5 (GY/R) and ground.

Resistance: 5 - 20Ω



OK or NG

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

5. CHECK DTC

Perform AT-368, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

Component Inspection

ECS004U7

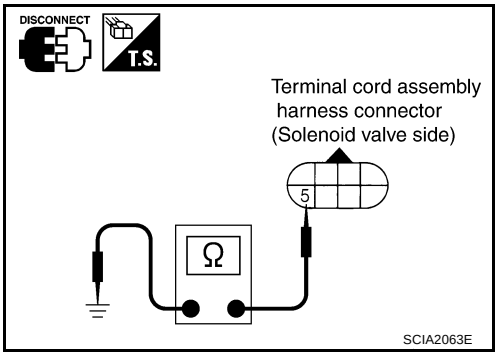
TORQUE CONVERTER CLUTCH SOLENOID VALVE

- For removal, refer to AT-404, "Control Valve Assembly and Accumulators" .

Resistance Check

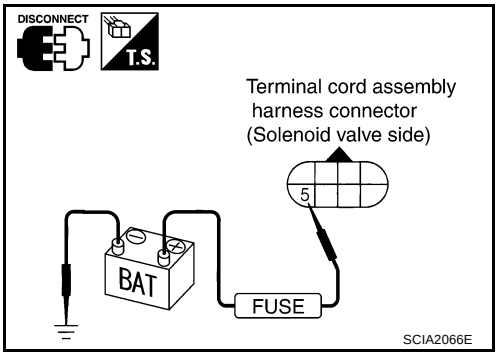
- Check resistance between two terminal 5 and ground.

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.



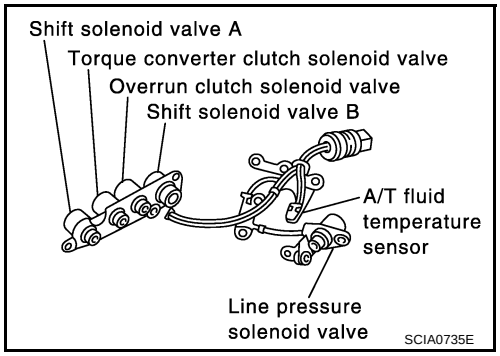
BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

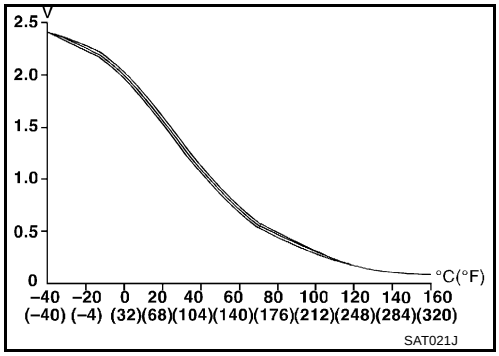
PFP:31940

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

ECS00CSY

Remarks: Specification data are reference values.

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

On Board Diagnosis Logic

ECS00CSZ

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

Possible Cause

ECS00CT0

Check the following items.

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

DTC Confirmation Procedure

ECS00CT1

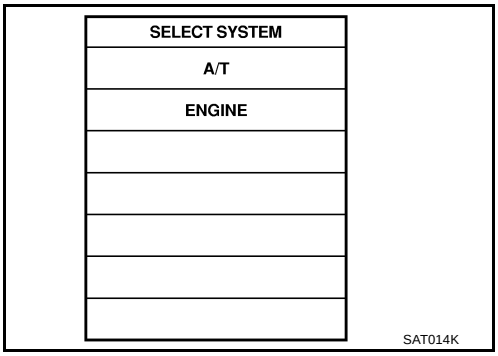
CAUTION:

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

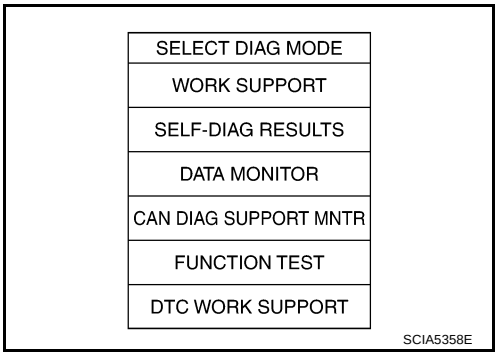
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

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

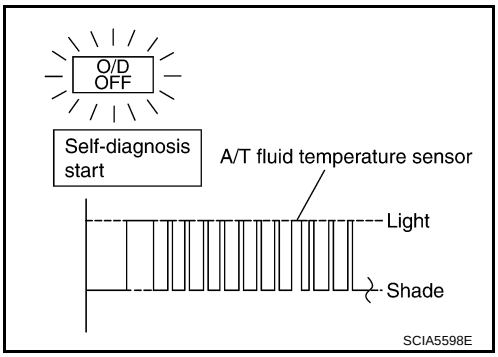


3. Drive vehicle under the following conditions.
   SLCT LVR POSI: D position
   VHCL SPEED SE: higher than 20 km/h (12 MPH)
4. If the check result is NG, go to AT-377, "Diagnostic Procedure" .



WITHOUT CONSULT-II

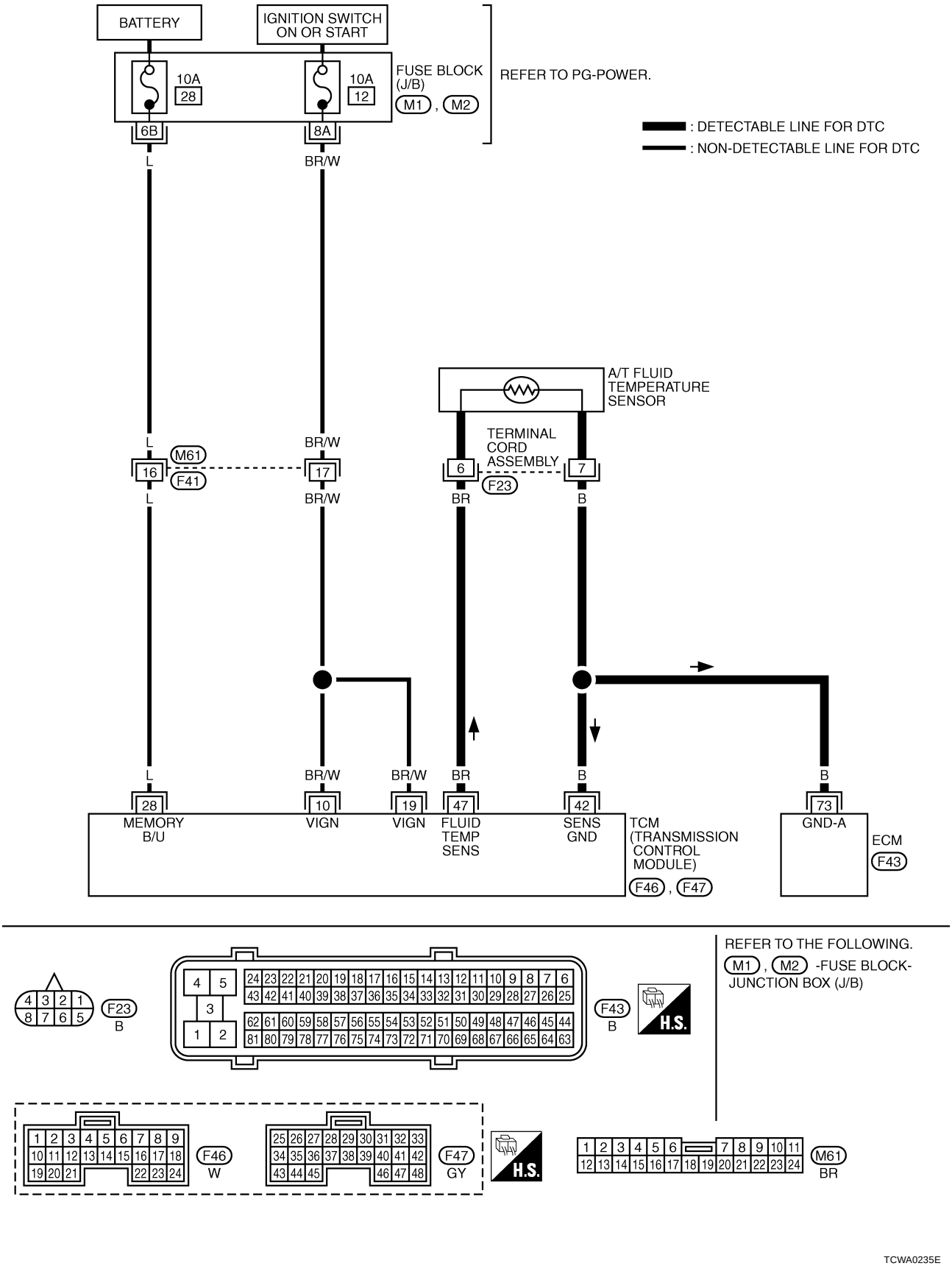
1. Start engine.
2. Drive vehicle under the following conditions.
   Selector lever position: D position
   Vehicle speed: higher than 20 km/h (12 MPH)
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-377, "Diagnostic Procedure" .



Wiring Diagram — AT — BA/FTS

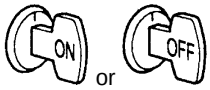
ECS004U9

AT-BA/FTS-01



TCWA0235E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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	L	Power source (Memory back-up)	Always		Battery voltage
42	B	Sensor ground	Always		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

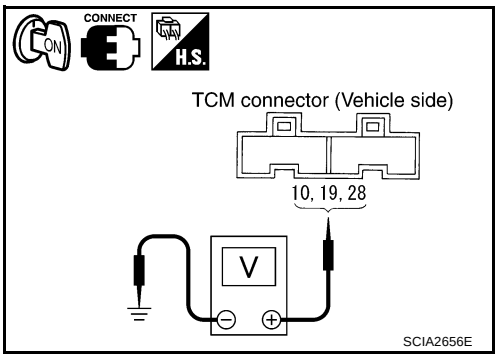
Diagnostic Procedure

ECS004UA

1. CHECK TCM POWER SOURCE

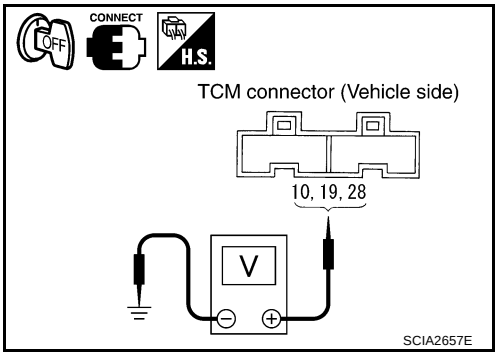
1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector and ground.

Name	Connector No.	Terminal No. (Wire color)	Judgement standard (Approx.)
Power source	F46	10 (BR/W)	Battery voltage
		19 (BR/W)	Battery voltage
Power source (Memory back-up)	F47	28 (L)	Battery voltage



3. Turn ignition switch OFF.
4. Check voltage between TCM connector and ground.

Name	Connector No.	Terminal No. (Wire color)	Judgement standard (Approx.)
Power source	F46	10 (BR/W)	0V
		19 (BR/W)	0V
Power source (Memory back-up)	F47	28 (L)	Battery voltage



OK or NG

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

2. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and TCM terminal 10, 19
- Harness for short or open between battery and TCM terminal 28
- Fuse
- Ignition switch. Refer to PG-2, "POWER SUPPLY ROUTING" .

OK or NG

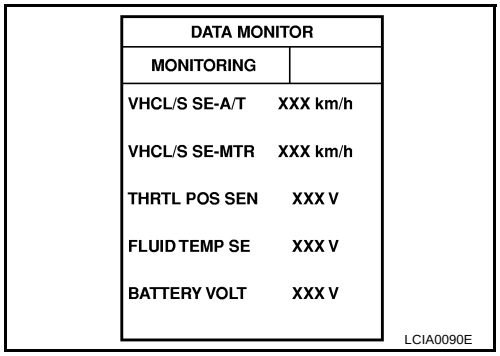
OK >> GO TO 9.
NG >> Repair or replace damaged parts.

3. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR

With CONSULT-II

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

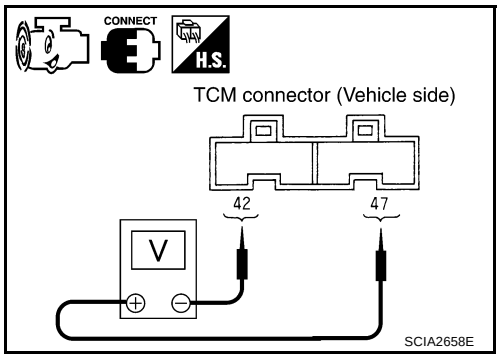
Monitor item	Condition	Display value
FLUID TEMP SE	When ATF temperature is 20°C (68°F).	1.5V
	When ATF temperature is 80°C (176°F).	0.5V



Without CONSULT-II

1. Start engine.
2. Check voltage TCM connector while warming up A/T.

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgement standard (Approx.)
A/T fluid temperature sensor	F47	47 (BR) - 42 (B)	When ATF temperature is 20°C (68°F).	1.5V
			When ATF temperature is 80°C (176°F).	0.5V



OK or NG

OK >> GO TO 9.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM
  Refer to PG-2, "POWER SUPPLY ROUTING" .

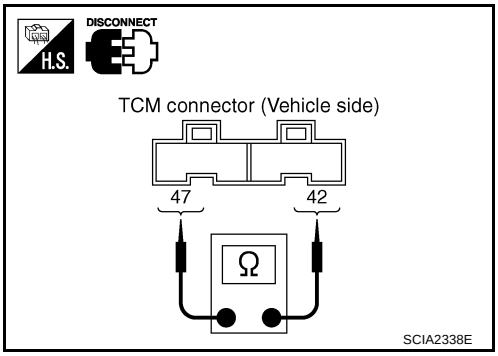
OK or NG

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

5. CHECK FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the TCM connector.
3. Check resistance between terminals.

Name	Connector No.	Terminal No. (Wire color)	Temperature °C (°F)	Resistance (KΩ) (Approx.)
A/T fluid temperature sensor	F47	47 (BR) - 42 (B)	20 (68)	2.5
			80 (176)	0.3

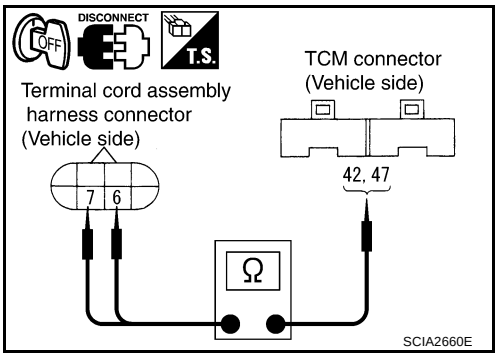


OK or NG

OK >> GO TO 9.
NG >> GO TO 6.

6. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector and TCM connector.



Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F47	42 (B)	Yes
Terminal cord assembly harness connector	F23	7 (B)	

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F47	47 (BR)	Yes
Terminal cord assembly harness connector	F23	6 (BR)	

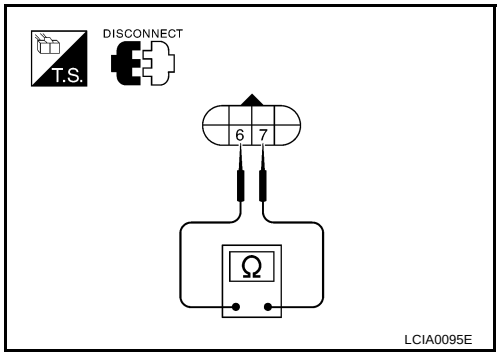
4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly F23 terminals 6 (BR) and 7 (B) when A/T is cold.



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

4. Reinstall any part removed.

OK or NG

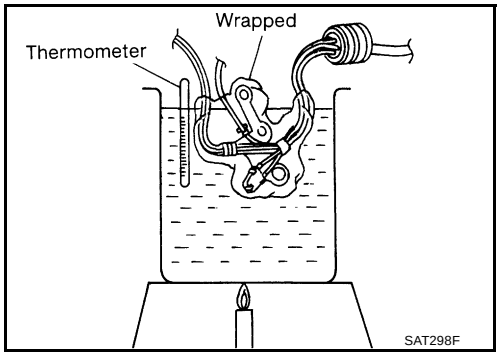
OK >> GO TO 8.
NG >> Repair or replace damaged parts.

8. DETECT MALFUNCTIONING ITEM

1. Remove oil pan. Refer to AT-404, "Control Valve Assembly and Accumulators" .
2. Check the following items:

– A/T fluid temperature sensor

• Check resistance between two terminals while changing temperature as shown.



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

– Harness of terminal cord assembly for short or open

OK or NG

OK >> GO TO 9.
NG >> Repair or replace damaged parts.

9. CHECK DTC

Perform AT-375, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 10.

10. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

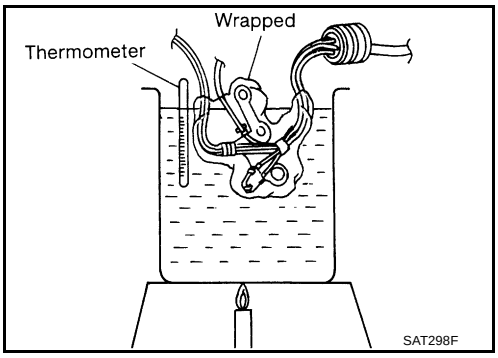
Component Inspection

ECS004UB

A/T FLUID TEMPERATURE SENSOR

- For removal, refer toAT-404, "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

PFP:24825

Description

ECS004UC

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

CONSULT-II Reference Value

ECS00CT2

Remarks: Specification data are reference values.

Monitor item	Condition	Display value
ENGINE SPEED (rpm)	Engine running	Approximately matches the tachometer reading.

On Board Diagnosis Logic

ECS00CT3

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

DTC Confirmation Procedure

ECS00CT4

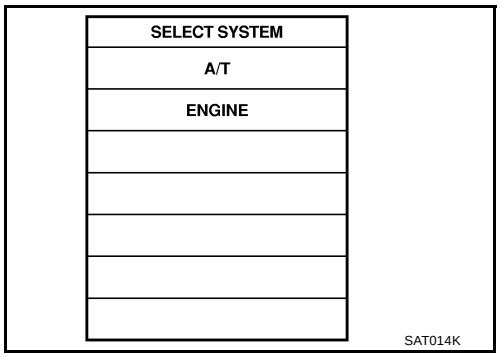
CAUTION:

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

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

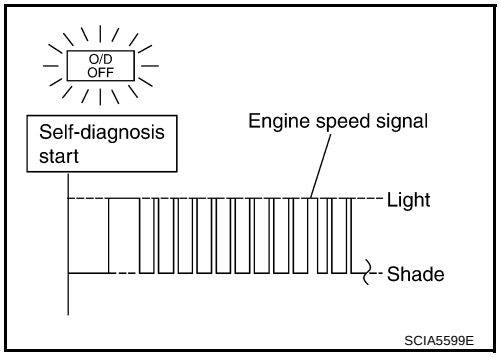
WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” 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
   SLCT LVR POSI: D position
3. If the check result is NG, go to AT-384, "Diagnostic Procedure" .



WITHOUT CONSULT-II

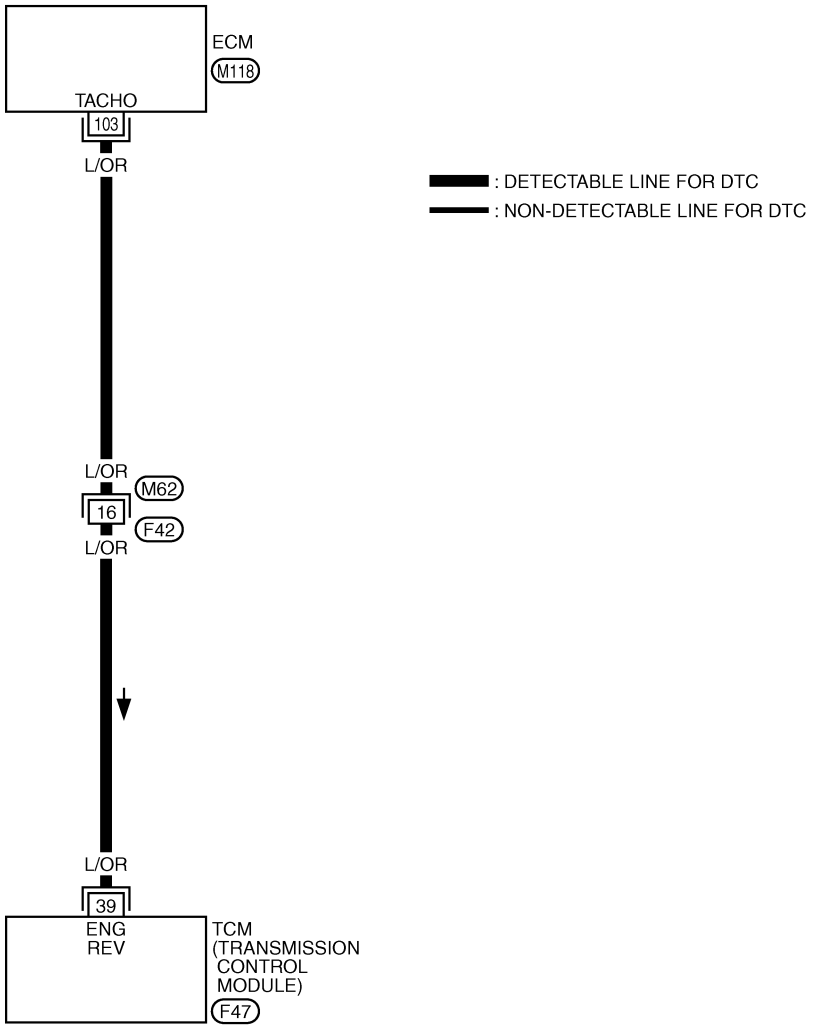
1. Start engine.
2. Drive vehicle under the following conditions for more than 10 seconds.
   Selector lever position: D position
   Vehicle speed: higher than 10 km/h (6 MPH)
   Throttle position: greater than 1.0/8 of the full throttle position
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-384, "Diagnostic Procedure" .

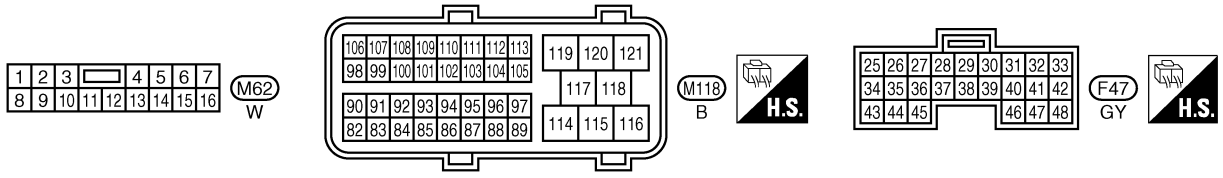


Wiring Diagram — AT — ENGSS

ECS004UD

AT-ENGSS-01





TCWA0232E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
39	L/OR	Engine speed signal	 and 	Refer to EC-95, "ECM INSPECTION TABLE" (WITH EURO-OBD) or EC-543, "ECM INSPECTION TABLE" (WITHOUT EURO-OBD).	—

Diagnostic Procedure

ECS004UE

1. CHECK DTC WITH ECM

Perform diagnostic test mode II (self-diagnostic results) for engine control. Check ignition signal circuit condition.

OK or NG

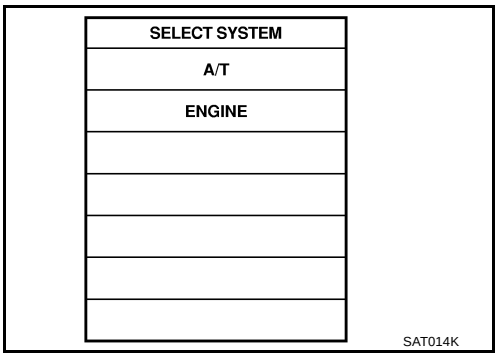
OK >> GO TO 2.

NG >> Check ignition signal circuit for engine control. Refer to EC-417, "IGNITION SIGNAL" (WITH EURO-OBD) or EC-798, "IGNITION SIGNAL" (WITHOUT EURO-OBD).

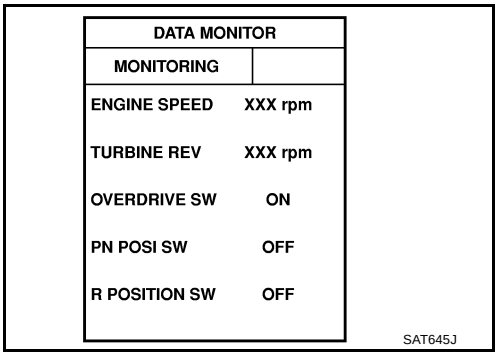
2. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.



3. Read out the value of “ENGINE SPEED”.
   Check engine speed changes according to throttle position.



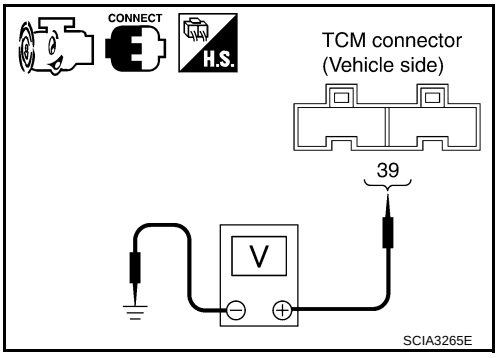
Without CONSULT-II

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

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgement standard (Approx.)
Engine speed signal	F47	39(L/OR) - Ground	—	Refer to EC-543, "ECM INSPECTION TABLE" (WITHOUT EURO-OBD).

OK or NG

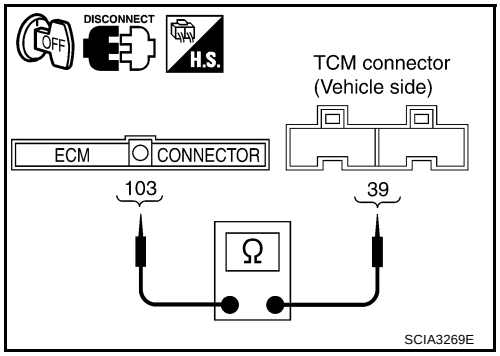
OK >> GO TO 4.
NG >> GO TO 3.



3. CHECK HARNESS BETWEEN TCM AND ECM

1. Turn ignition switch OFF.
2. Disconnect ECM connector and TCM connector.
3. Check continuity between ECM connector and TCM connector.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F47	39 (L/OR)	Yes
ECM	M118	103 (L/OR)	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between body ground and transaxle assembly.
6. 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 Refer to AT-382, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> 1. Perform TCM input/output signal inspection. Refer to AT-94, "TCM Terminals and Reference Value" .
2. GO TO 5.

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

LINE PRESSURE SOLENOID VALVE

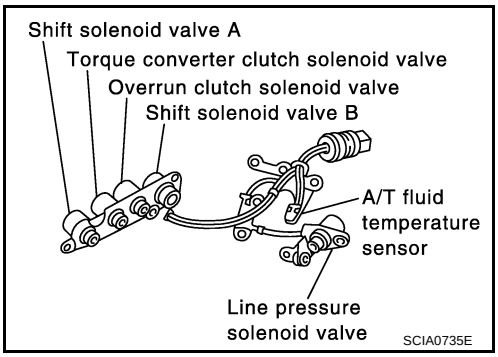
PFP:31940

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

ECS00CT5

Remarks: Specification data are reference values.

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

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

On Board Diagnosis Logic

ECS00CT6

Diagnostic trouble code	Malfunction is detected when...	Check items (Possible cause)
: LINE PRESSURE S/V	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	● Harness or connectors (The solenoid circuit is open or shorted.) ● Line pressure solenoid valve
: 10th judgement flicker		

Possible Cause

ECS00CT7

Check the following items.

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

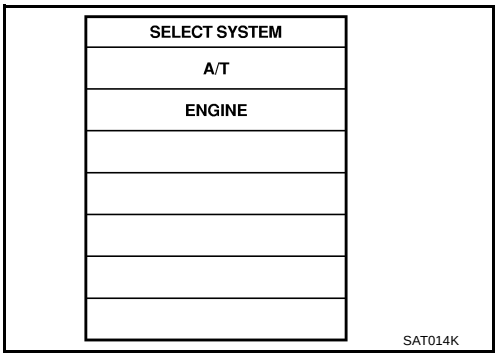
DTC Confirmation Procedure

ECS00CT8

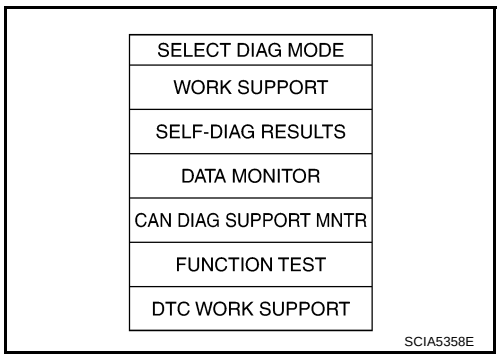
NOTE:
If “DTC Confirmation Procedure” has been previously performed, always turn ignition switch OFF and wait at least 10 seconds before performing the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

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

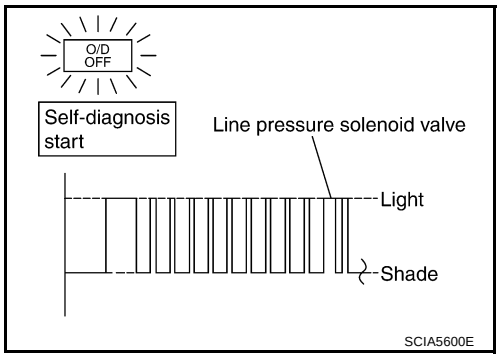


2. Depress accelerator pedal completely and wait at least 5 seconds.
3. If check result is NG, go to AT-390, "Diagnostic Procedure" .



WITHOUT CONSULT-II

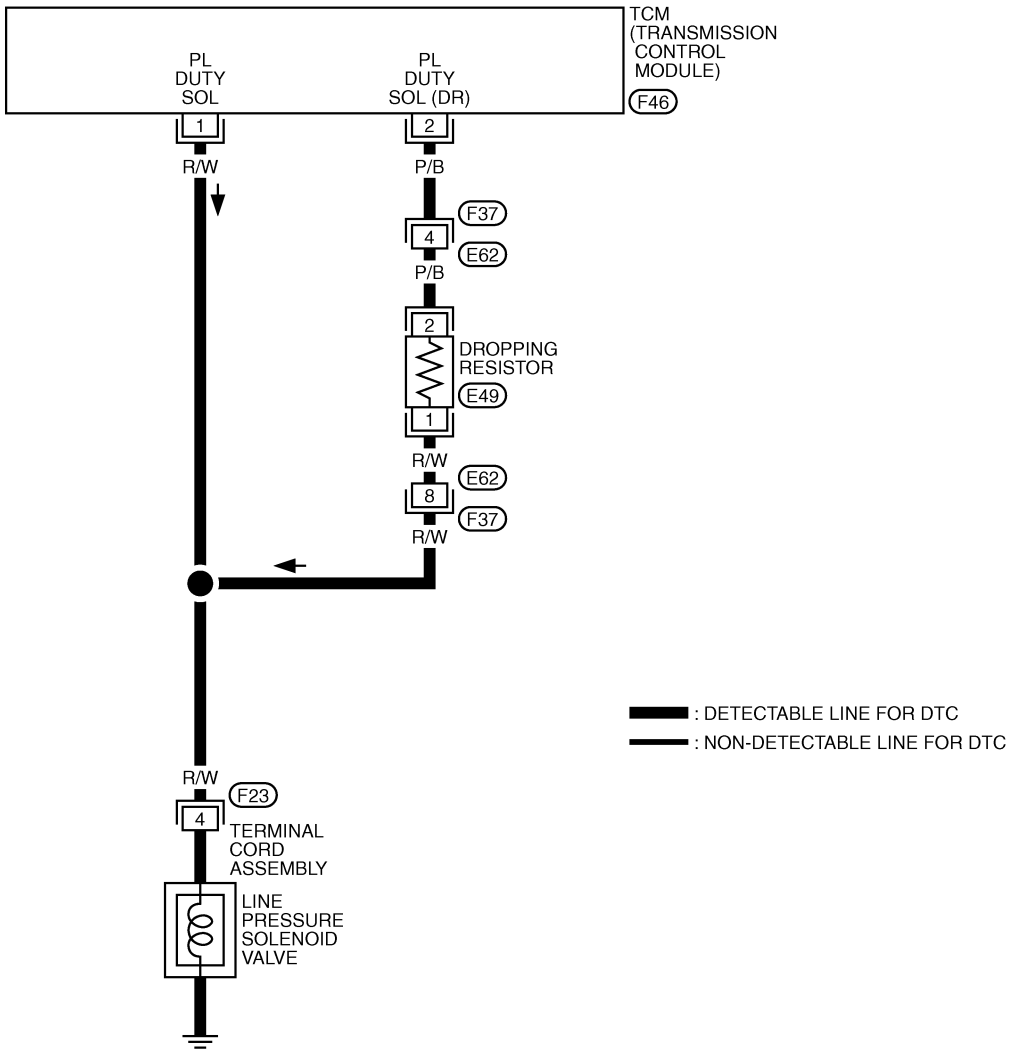
1. Start engine.
2. With brake pedal depressed, shift the lever from P → N → D → N → P positions.
3. Perform self-diagnosis.
   Refer to AT-52, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-390, "Diagnostic Procedure" .

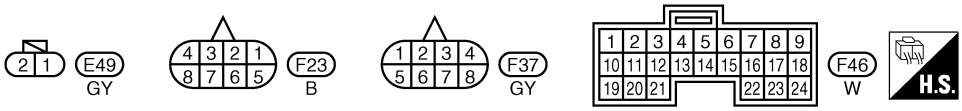


Wiring Diagram — AT — LPSV

ECS004UG

AT-LPSV-01





TCWA0046E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

Diagnostic Procedure

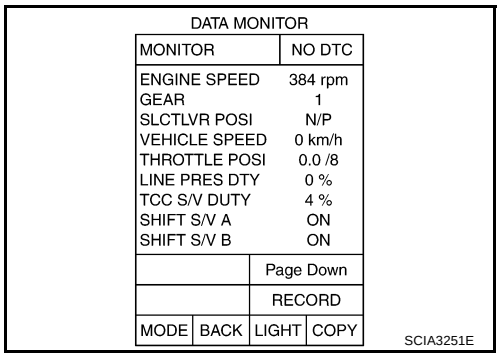
ECS004UH

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “LINE PRES DTY” while driving.
   Check the value changes according to driving speed.

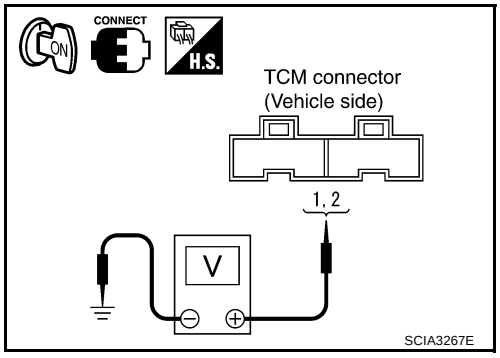
Monitor item	Condition	Display value
LINE PRES DTY (%)	Line pressure low – Line pressure high	24% – 95%



Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector and ground.

Name	Connector No.	Terminal No. (Wire color)	Condition	Judgement standard (Approx.)
Line pressure solenoid valve	F46	1 (R/W) - Ground	When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
			When depressing accelerator pedal fully after warming up engine.	0V
Line pressure solenoid valve (with dropping resistor)	F46	2 (P/B) - Ground	When releasing accelerator pedal after warming up engine.	5 - 14V
			When depressing accelerator pedal fully after warming up engine.	0V



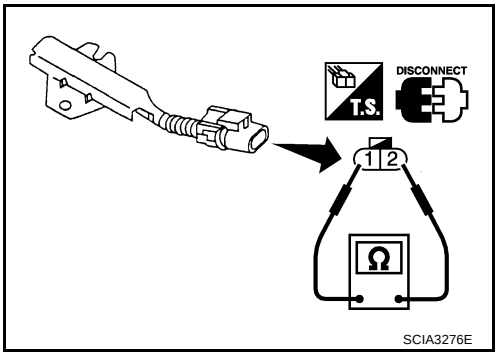
OK or NG

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

2. CHECK DROPPING RESISTOR

1. Turn ignition switch OFF.
2. Disconnect dropping resistor harness connector in engine room.
3. Check resistance between terminal 1 and 2.

Resistance: Approx.12Ω



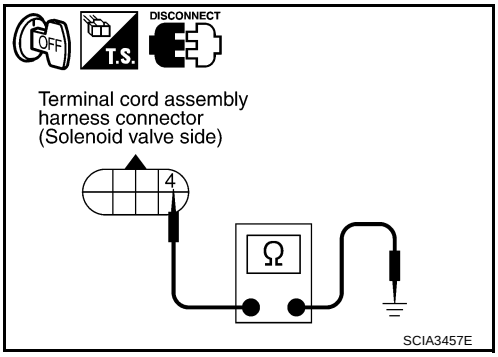
OK or NG

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

3. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector F23 terminal 4 (R/W) and ground.

Resistance: 2.5 - 5Ω



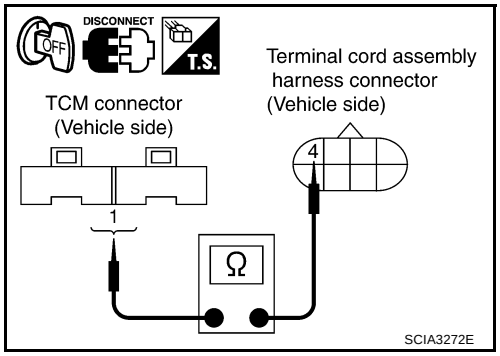
OK or NG

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

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

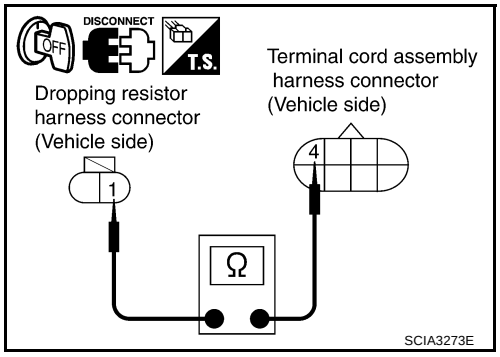
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector and TCM connector.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	1 (R/W)	Yes
Terminal cord assembly harness connector	F23	4 (R/W)	



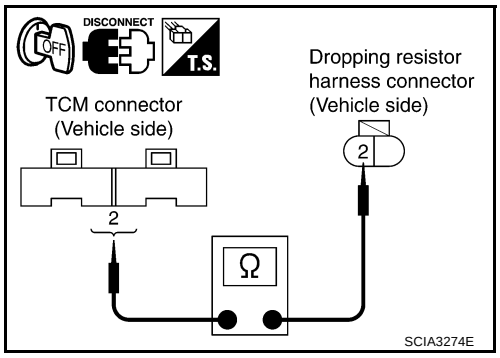
4. Check continuity between terminal cord assembly harness connector and dropping resistor harness connector.

Item	Connector No.	Terminal No. (Wire color)	Continuity
Dropping resistor harness connector	E49	1 (R/W)	Yes
Terminal cord assembly harness connector	F23	4 (R/W)	



5. Check continuity between dropping resistor harness connector and TCM connector.

Item	Connector No.	Terminal No. (Wire color)	Continuity
TCM	F46	2 (P/B)	Yes
Dropping resistor harness connector	E49	2 (P/B)	



6. If OK, check harness for short to ground and short to power.
7. If OK, check continuity between ground and transaxle assembly.
8. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK DTC

Perform AT-387, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

Component Inspection

ECS004UI

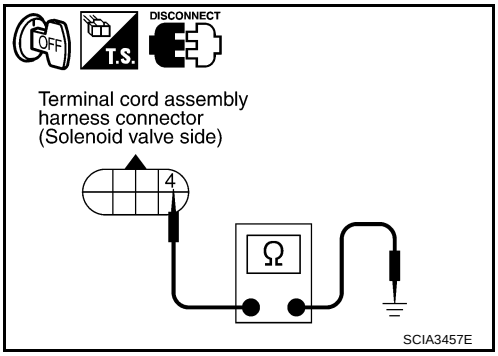
LINE PRESSURE SOLENOID VALVE

- For removal, refer to AT-404, "Control Valve Assembly and Accumulators" .

Resistance Check

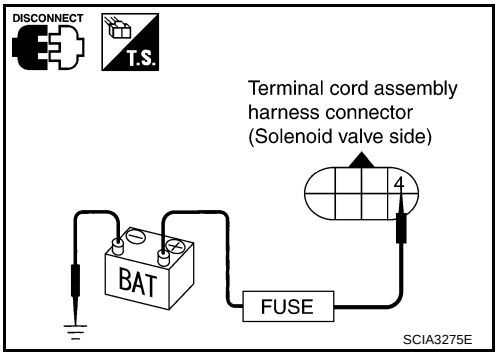
- Check resistance between terminal 4 and ground.

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



Operation Check

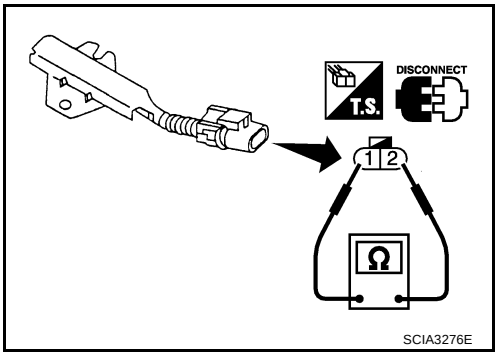
- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DROPPING RESISTOR

- Check resistance between terminal 1 and 2.

Resistance: Approx.12Ω



MAIN POWER SUPPLY AND GROUND CIRCUIT

PFP:00100

Description

ECS00CS1

When the power supply to the TCM is cut OFF, for example because the battery is removed, and the self-diagnostics memory function stops, malfunction is detected.

On Board Diagnosis Logic

ECS00CS2

- Diagnostic trouble code “INITIAL START” with CONSULT-II is detected when TCM dose not receive the voltage signal from the battery power supply.
- This is not a malfunction message. (Whenever shutting “OFF” a power supply to the TCM, this message appears on the screen.)

Possible Cause

ECS00CS3

Harness or connector
(Battery or ignition switch and TCM circuit is open or shorted.)

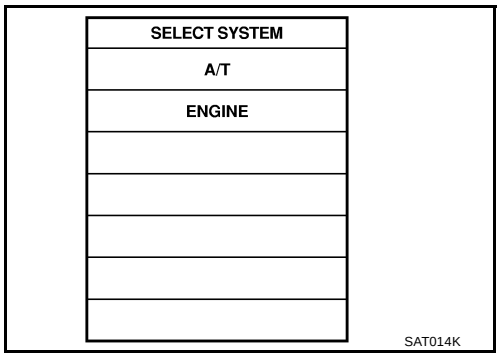
DTC Confirmation Procedure

ECS00CS4

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

WITH CONSULT-II

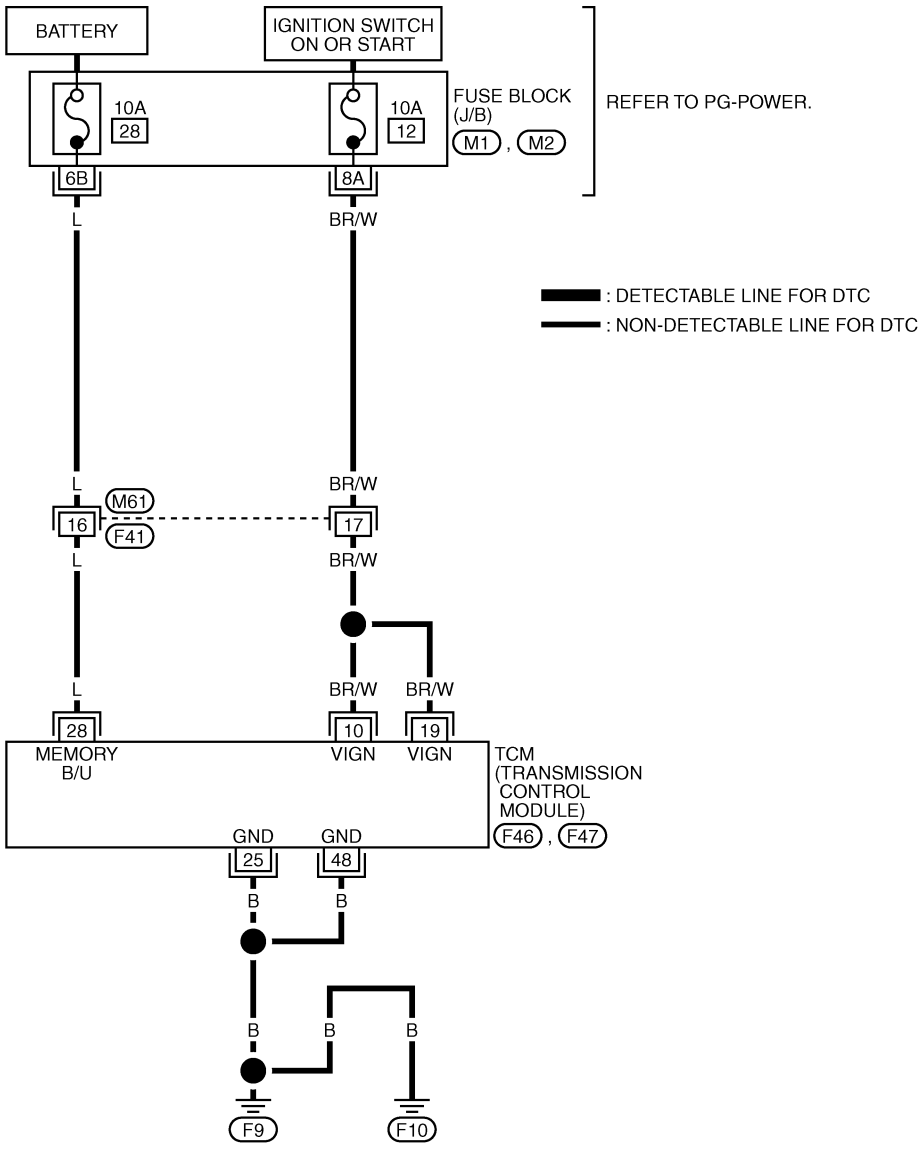
1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Wait for at least 2 consecutive seconds.
4. If DTC is detected, go to AT-396, "Diagnostic Procedure" .

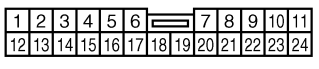


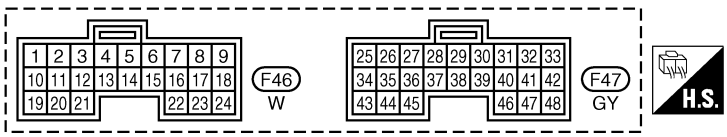
Wiring Diagram — AT — MAIN

ECS004TH

AT-MAIN-01



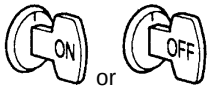




REFER TO THE FOLLOWING.
M1, M2 -FUSE BLOCK-JUNCTION BOX (J/B)

TCWA0240E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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	Always		0V
28	L	Power source (Memory back-up)	Always		Battery voltage
48	B/W	Ground	Always		0V

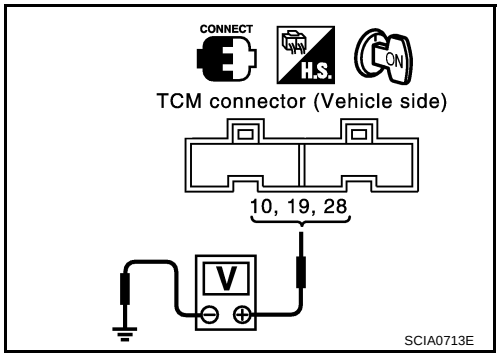
Diagnostic Procedure

ECS004TI

1. CHECK TCM POWER SOURCE

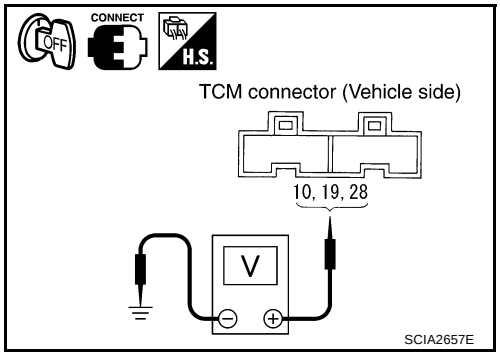
1. Turn ignition switch to ON. (Do not start engine.)
2. Check voltage between TCM terminals 10, 19, 28 and ground.

Name	Connector No.	Terminal No. (Wire color)	Judgement standard (Approx.)
Power source	F46	10 (BR/W)	Battery voltage
		19 (BR/W)	Battery voltage
Power source (Memory back-up)	F47	28 (L)	Battery voltage



3. Turn ignition switch to OFF.
4. Check voltage between TCM terminal 10, 19, 28 and ground.

Name	Connector No.	Terminal No. (Wire color)	Judgement standard (Approx.)
Power source	F46	10 (BR/W)	0V
		19 (BR/W)	0V
Power source (Memory back-up)	F47	28 (L)	Battery voltage



OK or NG

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

2. 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”.

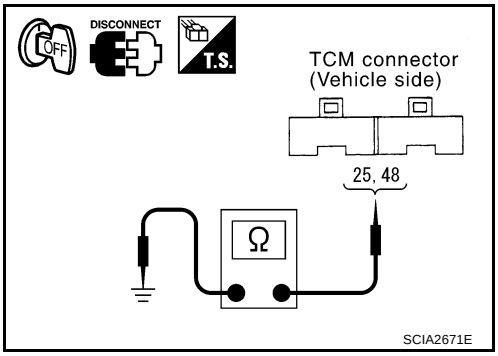
OK or NG

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

3. CHECK TCM GROUND CIRCUIT

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

Name	Connector No.	Terminal No. (Wire color)	Continuity
Ground	F47	25 (B), 48 (B) -Ground	Yes



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 AT-394, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-94, "TCM Terminals and Reference Value" .
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.

A/T SHIFT LOCK SYSTEM

PFP:34950

Description

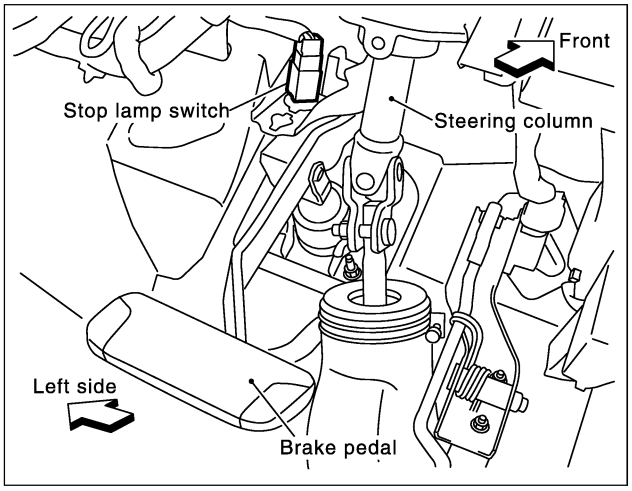
ECS00405

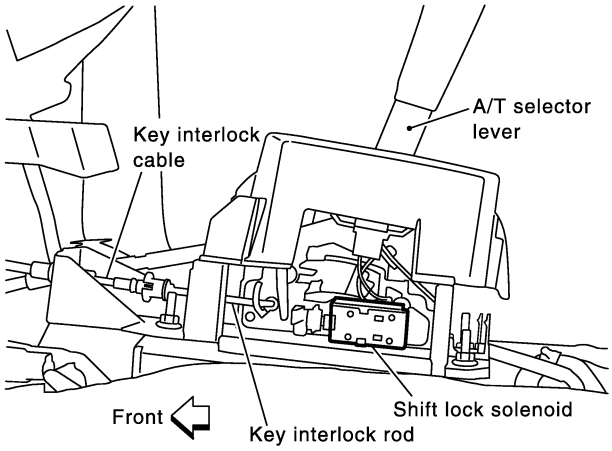
- The mechanical key interlock mechanism also operates as a shift lock:
  With the ignition switch turned to ON, the selector lever cannot be shifted from “P” (parking) to any other position unless the brake pedal is depressed.
  With the key removed, the selector lever cannot be shifted from “P” to 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.

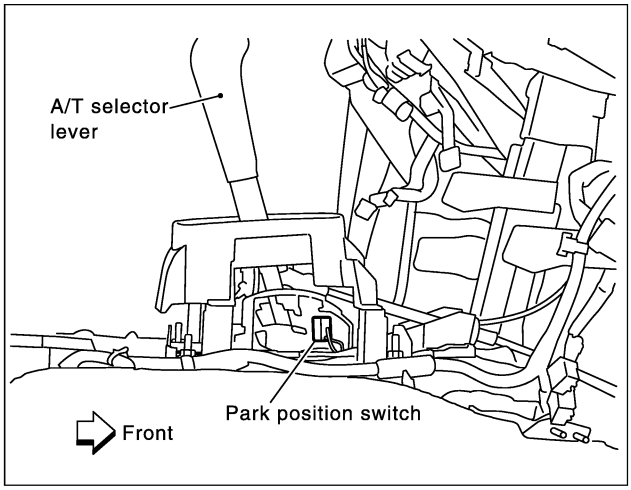
Shift Lock System Electrical Parts Location

ECS00406

View with center console removed





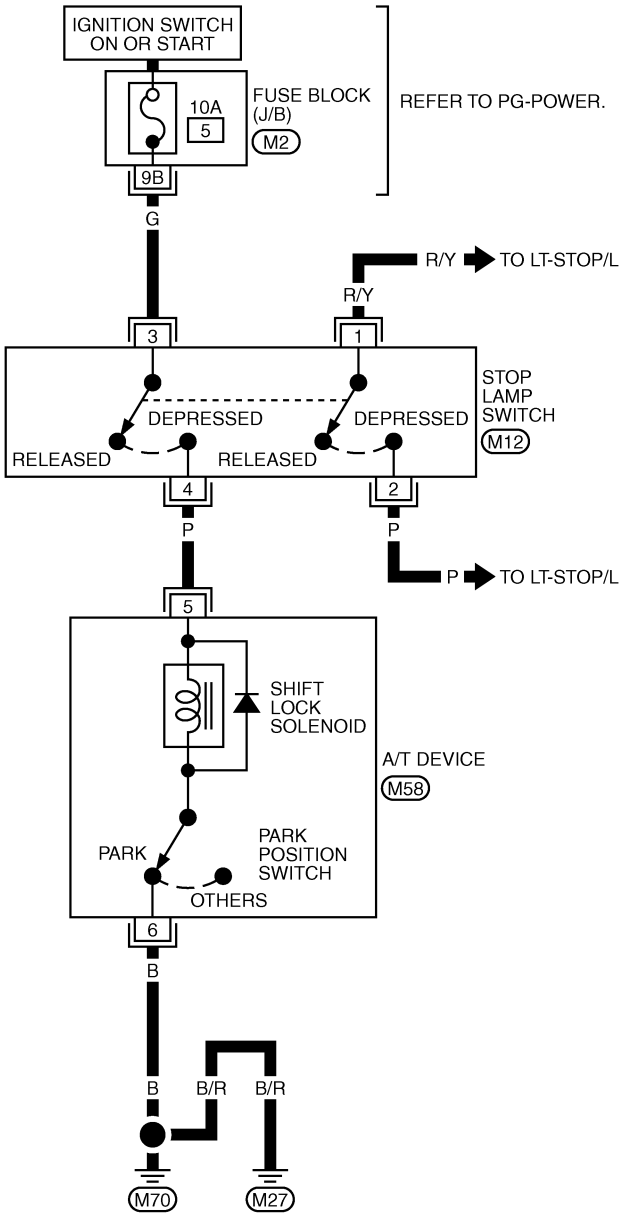


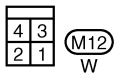
SCIA4597E

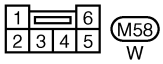
Wiring Diagram — SHIFT

ECS00407

AT-SHIFT-01







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

TCWA0241E

Diagnostic Procedure

ECS00408

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-402, "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-409, "Park/Neutral Position (PNP) Switch Adjustment" .

3. CHECK SHIFT LOCK SOLENOID AND PARK POSITION SWITCH

1. Turn ignition switch to ON. (Do not start engine.)
2. Selector lever is set in P 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 >> **INSPECTION END**
NG >> GO TO 4.

4. CHECK POWER SOURCE

1. Turn ignition switch to ON. (Do not start engine.)
2. Check voltage between A/T device harness connector M58 terminal 5 (P) and ground.

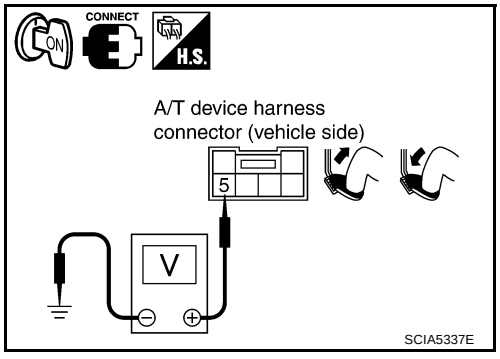
Voltage:

Brake pedal depressed:

Battery voltage

Brake pedal released:

0V

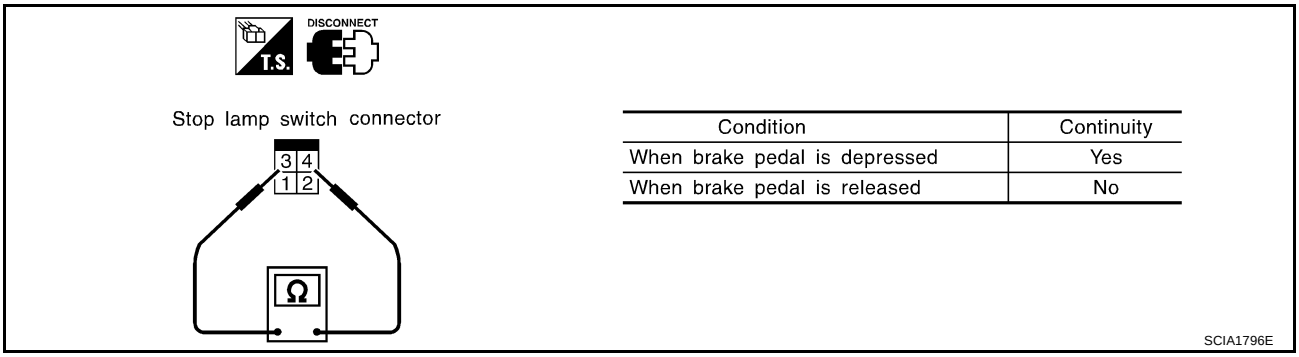


OK or NG

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

5. CHECK STOP LAMP SWITCH

1. Turn ignition switch to OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch harness connector M12 terminals 3 (G) and 4 (P).



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

Check stop lamp switch after adjusting brake pedal — refer to BR-6, "BRAKE PEDAL" .

OK or NG

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

6. DETECT MALFUNCTIONING ITEM

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

1. Harness for short or open between battery and stop lamp switch harness connector 3 (G)
2. Harness for short or open between stop lamp switch harness connector 4 (P) and A/T device harness connector 5 (P)
3. 15A fuse [No.22, located in the fuse block (J/B)]
4. Ignition switch (Refer to PG-2, "POWER SUPPLY ROUTING" .)

OK or NG

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

7. CHECK GROUND CIRCUIT

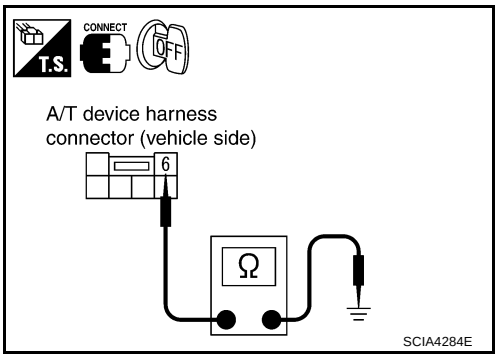
1. Turn ignition switch to OFF.
2. Disconnect A/T device harness connector.
3. Check continuity between A/T device harness connector M58 terminal 6 (B) and ground.

Continuity should exist.

4. Connect A/T device harness connector.

OK or NG

OK >> Replace shift lock solenoid or park position switch.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

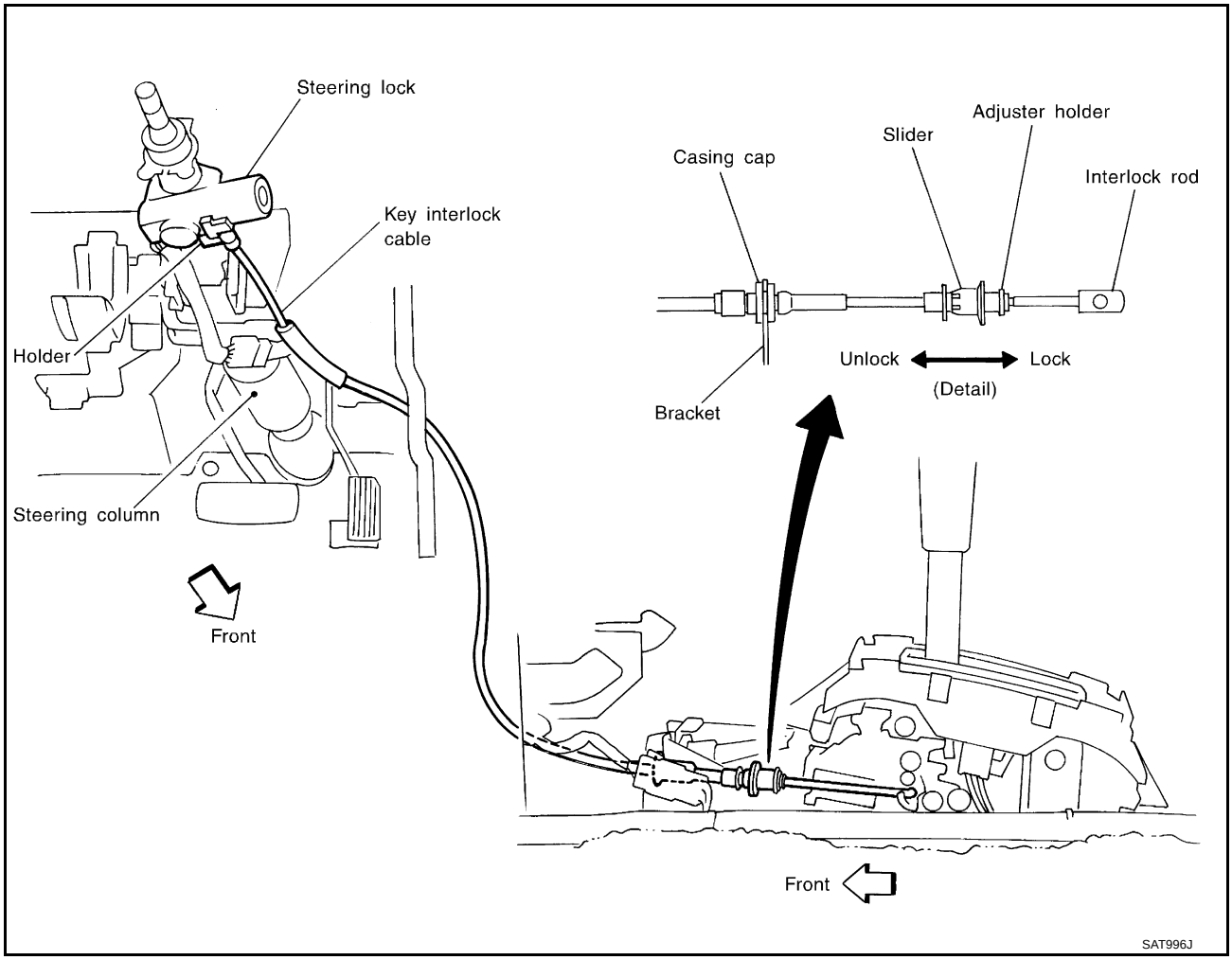


KEY INTERLOCK CABLE

PFP:34908

Components

ECS00409



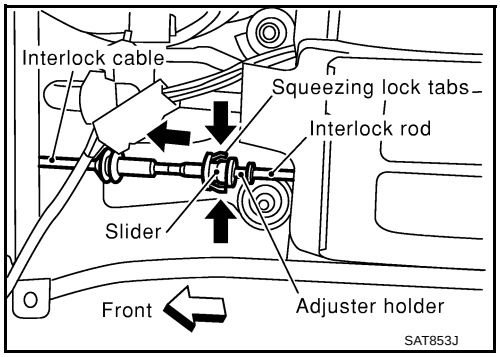
CAUTION:

- **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.**

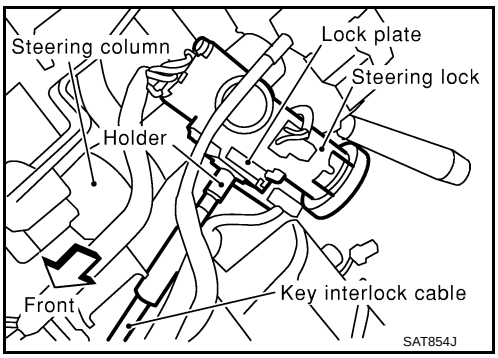
Removal

ECS0040A

1. Unlock slider by squeezing lock tabs on slider from adjuster holder and remove interlock rod from cable.



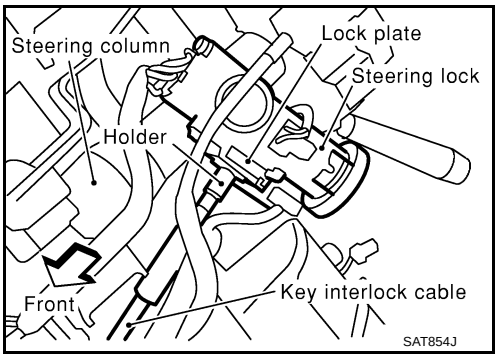
2. Remove lock plate from steering lock assembly and remove key interlock cable.



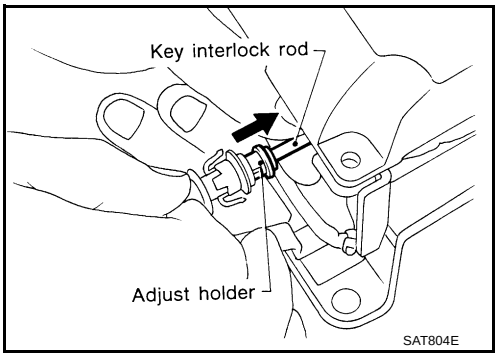
Installation

ECS0040B

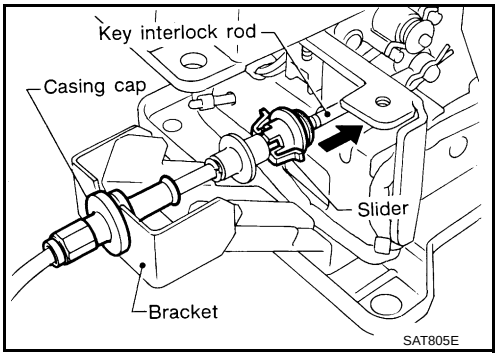
1. Turn ignition key to lock position.
2. Set A/T selector lever to P position.
3. Set key interlock cable to steering lock assembly and install lock plate.
4. Clamp cable to steering column and fix to control cable with band.



5. Insert interlock rod into adjuster holder.



6. Install casing cap to bracket.
7. Move slider in order to fix adjuster holder to interlock rod.



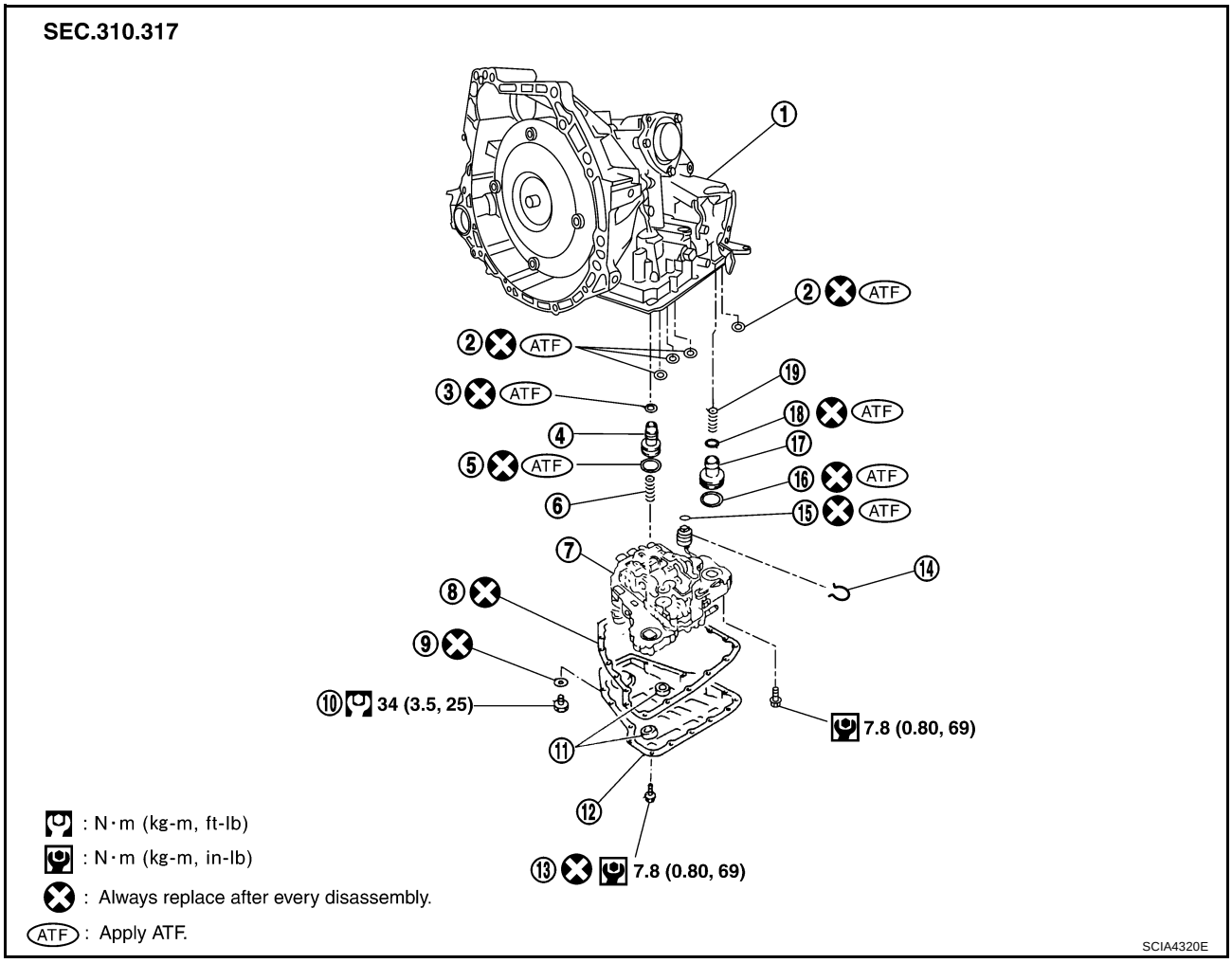
ON-VEHICLE SERVICE

PFP:00000

Control Valve Assembly and Accumulators

ECS0040C

COMPONENTS

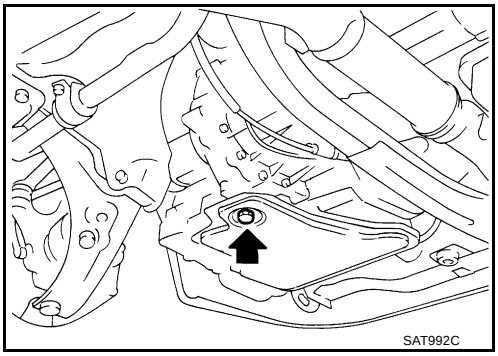


1. Transaxle
2. Lip seal
3. O-ring
4. Servo release accumulator piston
5. O-ring
6. Return spring
7. Control valve assembly
8. Oil pan gasket
9. Drain plug gasket
10. Drain plug
11. Magnet
12. Oil pan
13. Oil pan fitting bolt
14. Snap ring
15. O-ring
16. O-ring
17. N-D accumulator piston
18. O-ring
19. Return spring

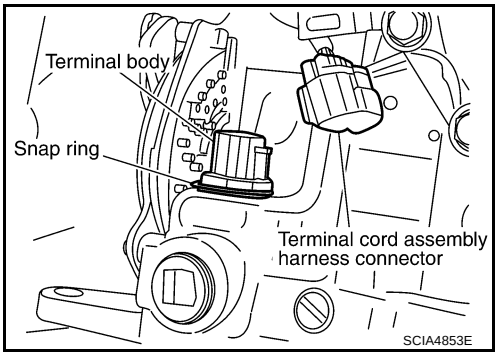
REMOVAL AND INSTALLATION

Removal

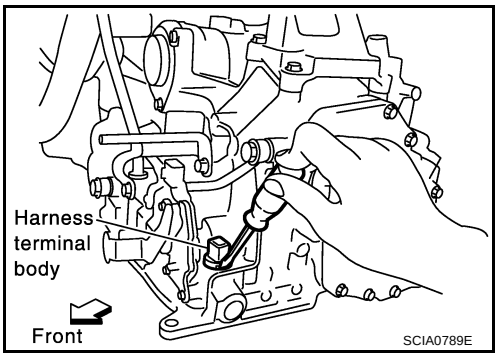
1. Disconnect negative battery terminal.
2. Drain ATF from transaxle. Refer to MA-39, "Changing A/T Fluid".
3. Remove oil pan and gasket.



4. Disconnect terminal cord assembly harness connector.

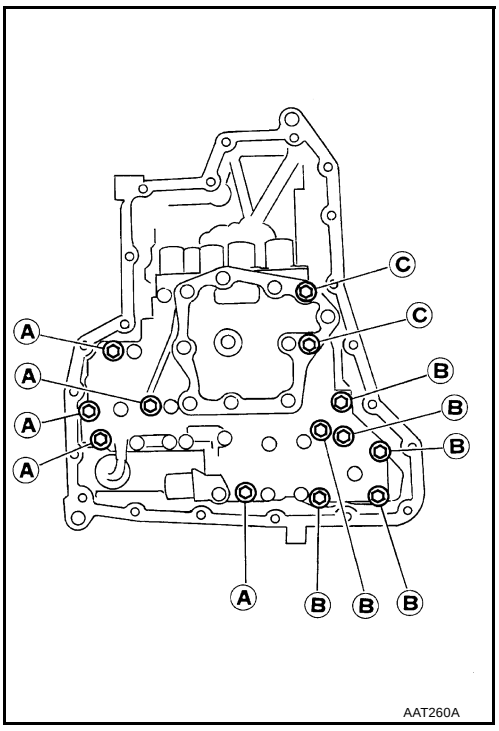


5. Remove snap ring from terminal body.
6. Remove terminal cord assembly by pushing terminal body into transaxle case.



7. Remove control valve assembly by removing fixing bolts **A, B** and **C** .

CAUTION:
Be careful not to drop manual valve and servo release accumulator return springs.

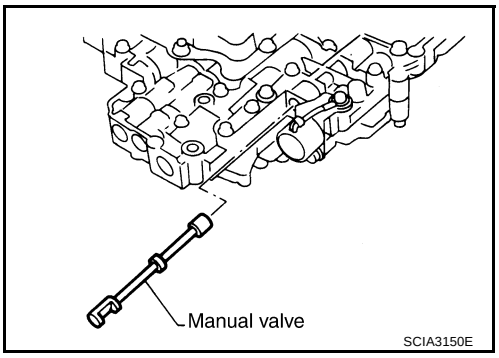


Bolt length, number and location:

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

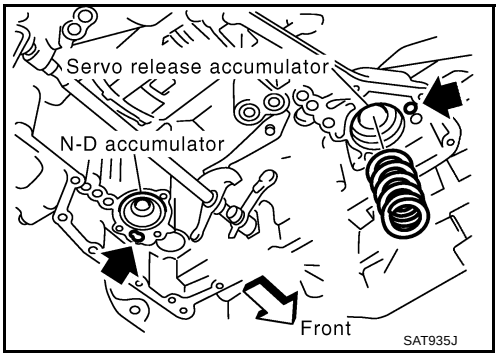
8. Remove manual valve from control valve assembly.

CAUTION:
Be careful not to drop manual valve.

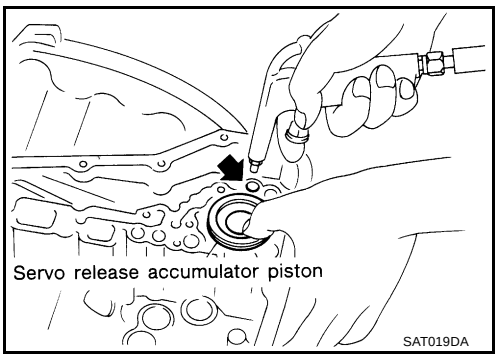


9. Disassemble and inspect control valve assembly if necessary. Refer to AT-448, "Control Valve Assembly" AT-457, "Control Valve Upper Body" and AT-461, "Control Valve Lower Body" .

10. Remove servo release accumulator and N-D accumulator by applying compressed air if necessary.
    - **Hold each piston with a paper towel.**



11. Blow air into the oil hole as shown in the figure and remove servo release accumulator piston from transaxle case.

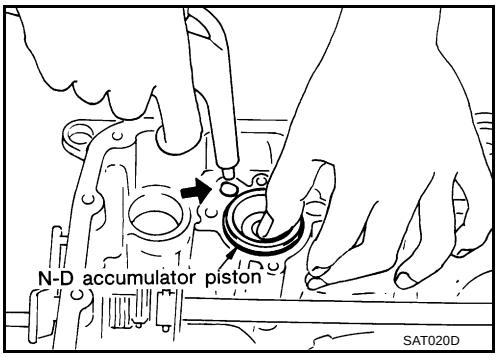


CAUTION:

- **Strong flow of air will push the accumulator piston out along with a splash of oil. Cover the area with paper towels and blow air little by little to avoid this.**
- **Wrap the removed accumulator piston in a paper towel.**

12. Remove O-ring from servo release accumulator piston.

13. Blow air into the oil hole shown in the figure and remove N-D accumulator piston and return spring from transaxle case.



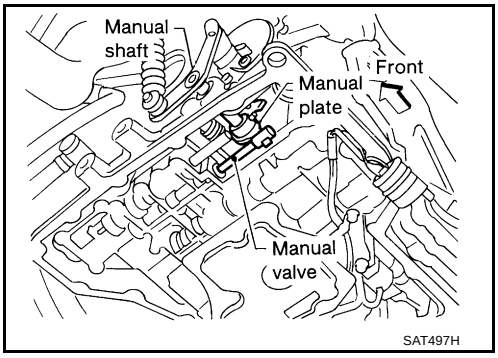
CAUTION:

- **Strong flow of air will push the accumulator piston out along with a splash of oil. Cover the area with paper towels and blow air little by little to avoid this.**
- **Wrap the removed accumulator piston in a paper towel.**

14. Remove O-ring from N-D accumulator piston.
15. Remove lip seals from oil groove for band servo.

INSTALLATION

- **Note the following, and install in the reverse order of removal.**
- **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.**
- **After completing installation, check for leakage, and fluid level. Refer to AT-16, "Checking A/T Fluid".**



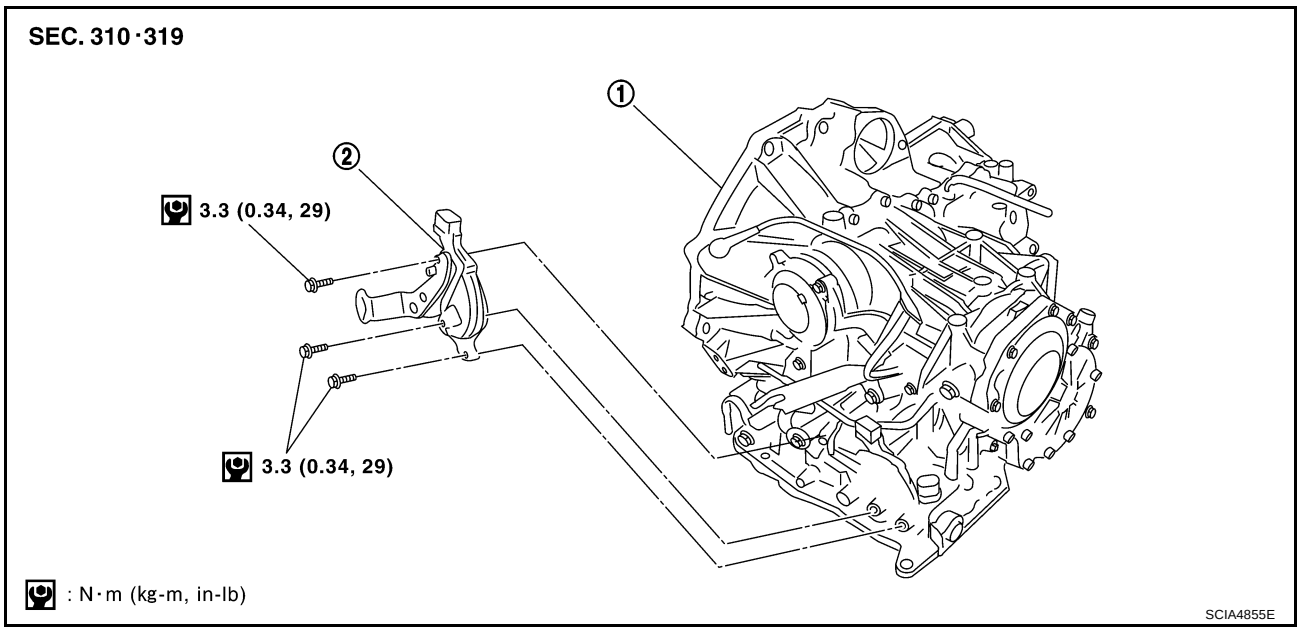
CAUTION:

- **Do not reuse O-ring and lip seal.**
- **Do not reuse oil pan gasket and oil pan fixing bolt.**

Park/Neutral Position (PNP) Switch

ECS00CRB

COMPONENTS

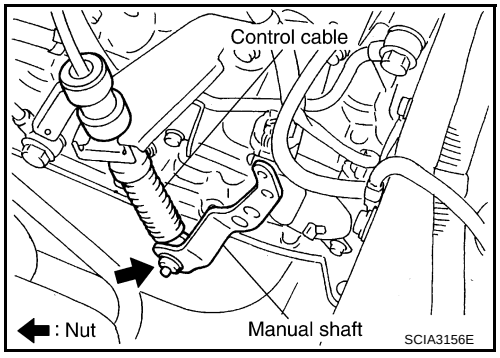


1. Transaxle assembly
2. PNP switch

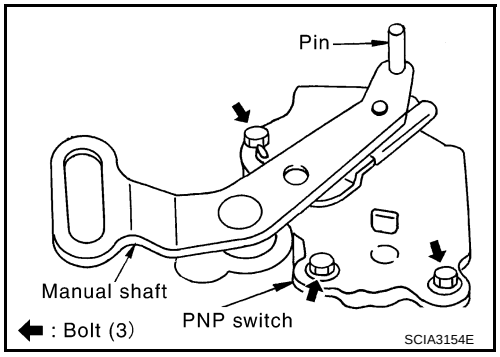
REMOVAL AND INSTALLATION

Removal

1. Set select lever in N position.
2. Remove front tire LH from vehicle.
3. Remove LH splash guard. (Front fender side) Refer to EI-21, "Removal and Installation" .
4. Remove engine under cover.
5. Remove control cable end from manual shaft.



6. Remove PNP switch fixing bolts.
7. Remove PNP switch from transaxle assembly.



Installation

Note the following, and install in the reverse order of removal.

- Align PNP switch position when installing.

- After installation is completed, adjust and check A/T position. Refer to AT-409, "Control Cable Adjustment" , AT-409, "Park/Neutral Position (PNP) Switch Adjustment" .
- After installation is completed, check continuity of PNP switch. Refer to AT-100, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

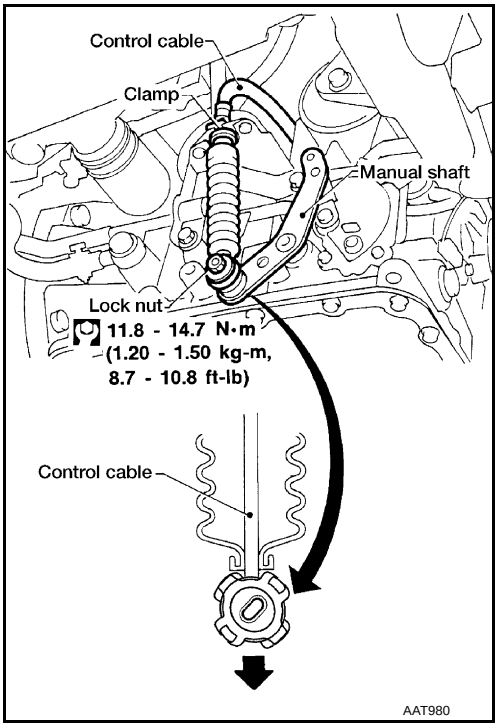
CONTROL CABLE ADJUSTMENT

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.

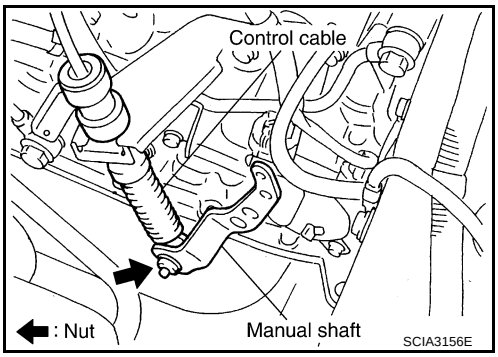
Specified force: 6.9N (0.7 kg, 1.5 lb)

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. Set select lever and manual shaft in N position.
2. Remove control cable end from manual shaft.

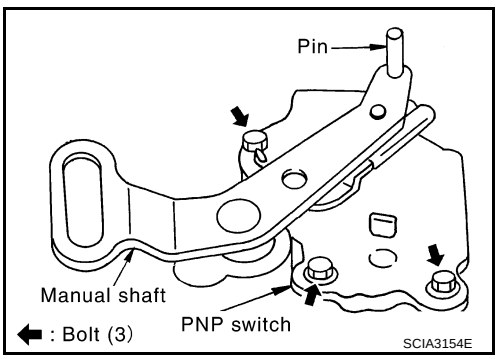


3. Loosen PNP switch fixing bolts.
4. Use a 3 mm (0.12 in) pin for this adjustment.

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.

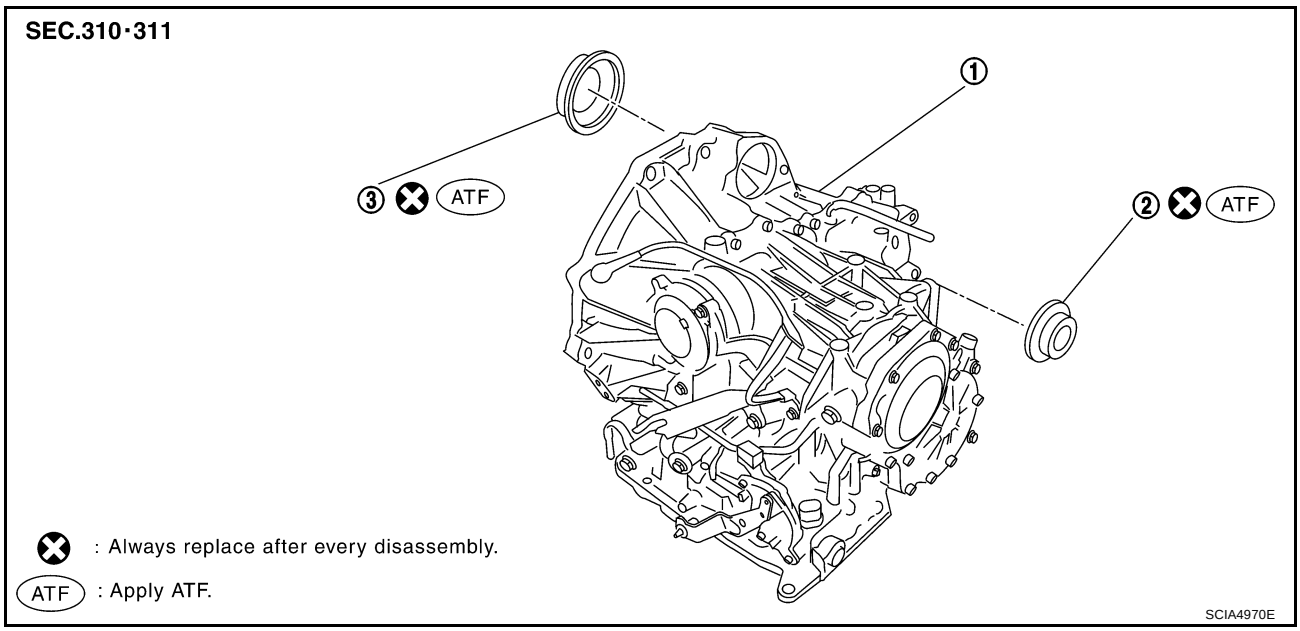
5. Tighten PNP switch fixing bolts.
6. Remove pin from adjustment hole after adjusting PNP switch.
7. Reinstall any part removed.
8. Adjust control cable. Refer to AT-409, "Control Cable Adjustment" .
9. Check continuity of PNP switch. Refer to AT-237 (EUR-OBD) or AT-324 (Except EUR-OBD).



Differential Side Oil Seal Replacement

ECS0040F

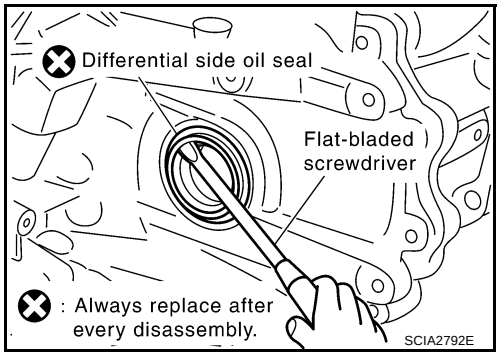
COMPONENTS



1. transaxle assembly
2. LH differential side oil seal
3. RH differential side oil seal

1. Remove exhaust front tube. Refer to EX-2, "Removal and Installation"
2. Remove left side drive shaft assemblies. Refer to FAX-11, "FRONT DRIVE SHAFT" .
3. Remove transfer from right side of transaxle.
   Refer to TF-55, "Removal and Installation" .
4. Remove differential side oil seal using a flat-bladed screwdriver.

   CAUTION:
   Be careful not to scratch transaxle case.

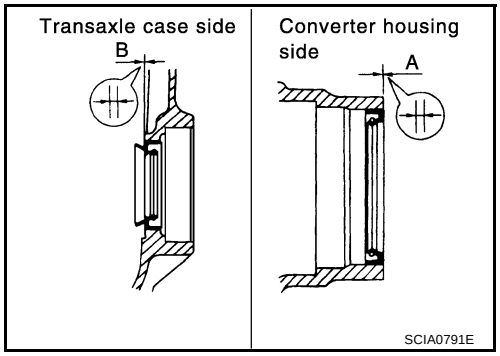


Installation

1. As shown below, use a drift to drive the differential side oil seals into the case until it is flush. Refer to dimensions A.

Unit: mm (in)

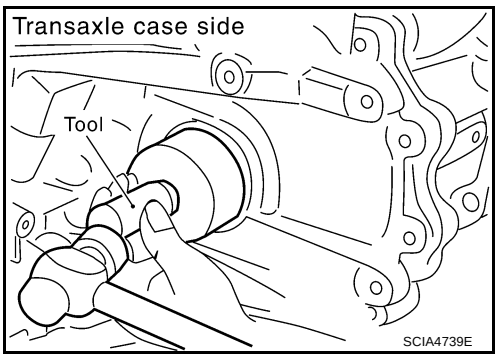
A	B
-0.5 to 0.5 (-0.020 to 0.020)	–0.5 to 0.5 (–0.020 to 0.020)



NOTE:
The differential side oil seal pulling direction is used as the reference.

Drift to be used:

Transaxle case side:	**ST33400001**
Converter housing side:	**KV40100621**



CAUTION:

- **Apply ATF to differential side oil seal.**
- **Do not reuse differential side oil seal.**

2. Reinstall any part removed.

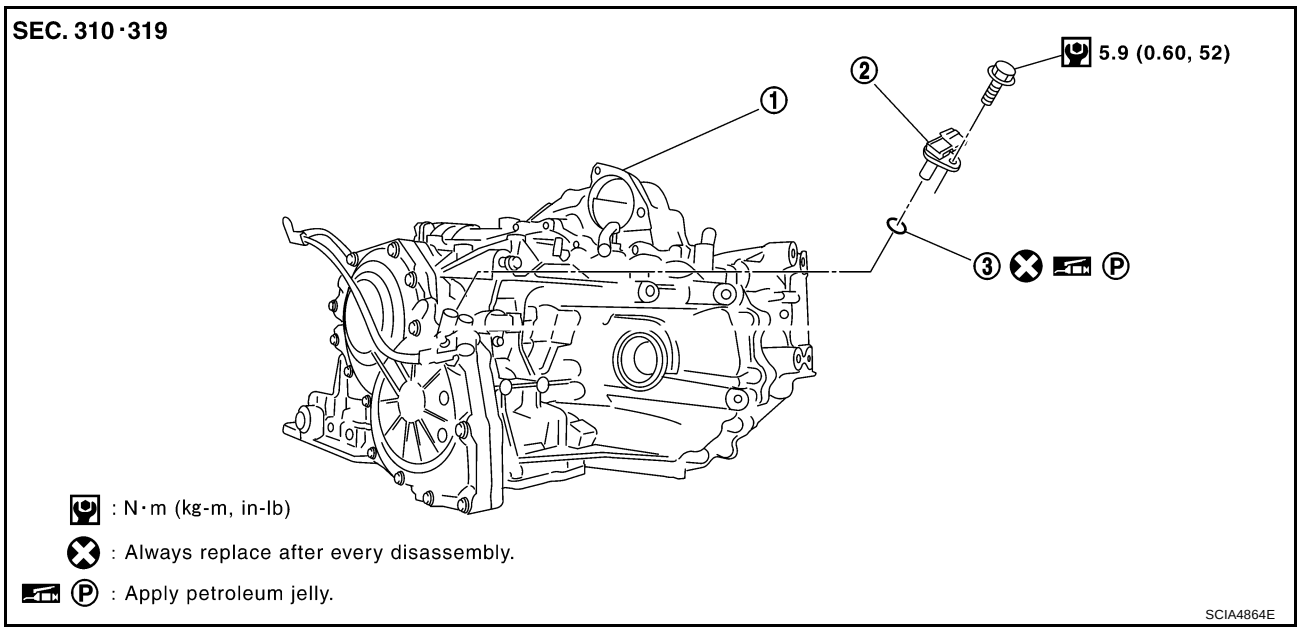
CAUTION:

If lubricant leak has occurred, after finishing work, check A/T fluid level.

Revolution Sensor Replacement

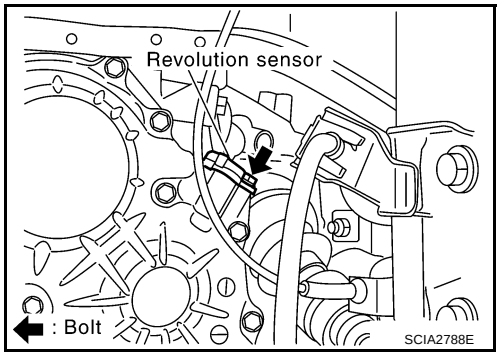
ECS0040G

COMPONENTS



1. transaxle assembly
2. Revolution sensor
3. O-ring

1. Remove front tire LH from vehicle.
2. Remove LH splash guard.(Front fender side) Refer toEI-21, "Removal and Installation" .
3. Disconnect revolution sensor harness connector.
4. Remove harness bracket from transaxle assembly.
5. Remove revolution sensor from transaxle assembly.



Installation

Note the following, and install in the reverse order of removal.

CAUTION:

- **Do not reuse O-ring.**
- **Apply petroleum jelly to O-ring.**

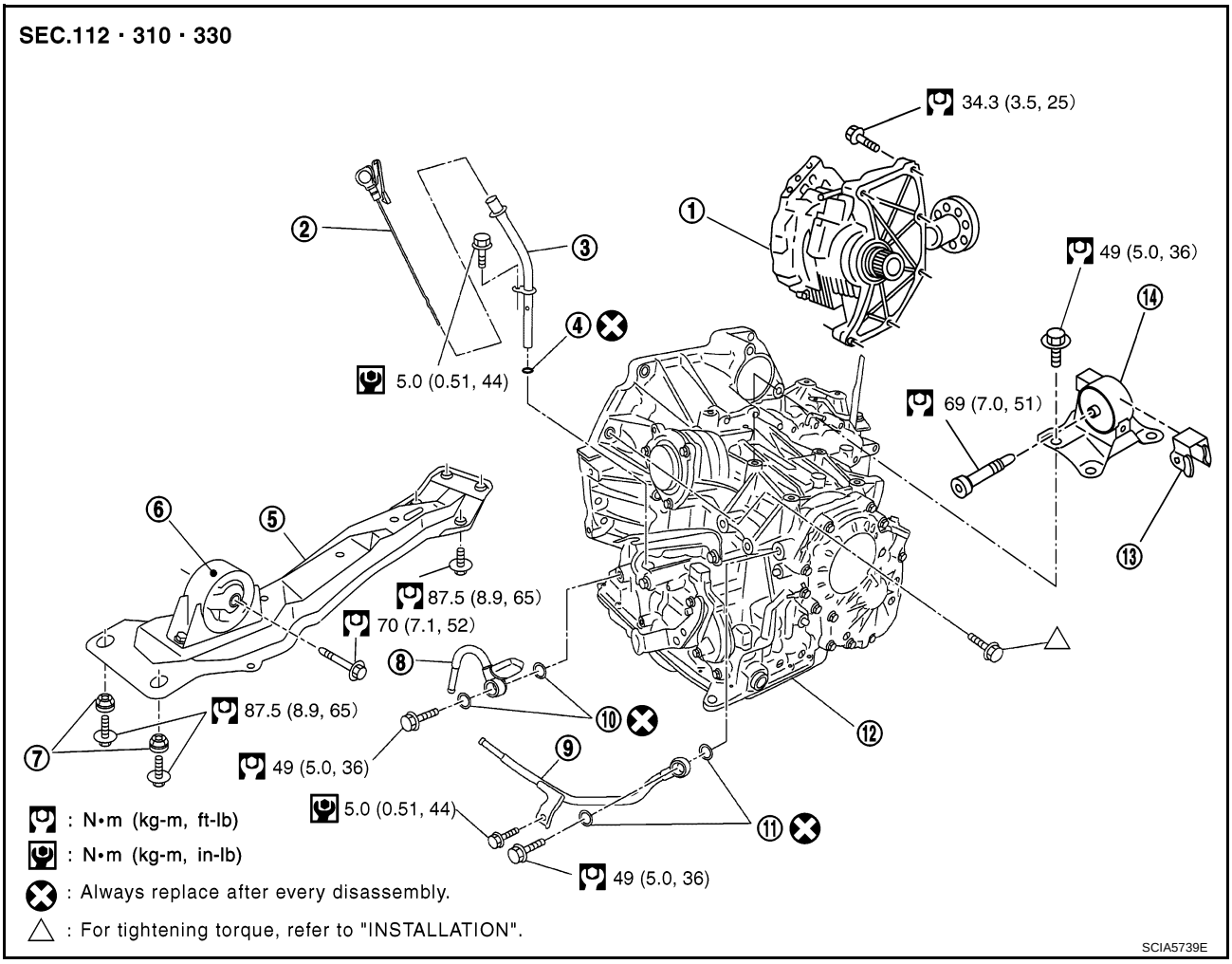
REMOVAL AND INSTALLATION

PFP:00000

Removal

ECS004NC

COMPONENTS



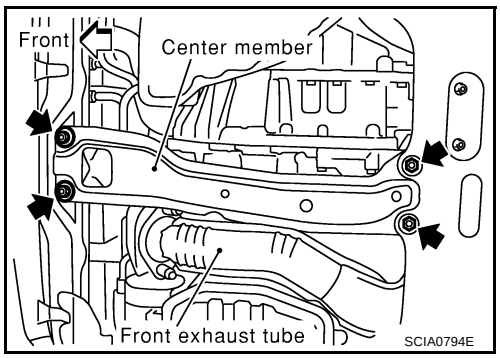
1. Transfer assembly
2. A/T fluid level gauge
3. A/T fluid charging pipe
4. O-ring
5. Center member
6. Front engine mounting insulator
7. Grommet
8. Fluid cooler tube
9. Fluid cooler tube
10. Copper washer
11. Copper washer
12. Transaxle assembly
13. Stopper
14. LH engine mounting insulator

CAUTION:

Before separating transaxle from engine, remove the crankshaft position sensor (Euro-OBD) from transaxle. Be careful not to damage sensor.

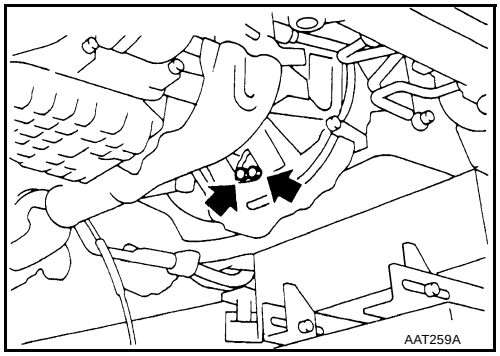
1. Remove battery and bracket, air cleaner and air duct.
2. Remove air breather hose.
3. Disconnect terminal cord assembly harness connector, PNP switch harness connector and revolution sensor harness connector.
4. Remove crankshaft position sensor (Euro-OBD) from transaxle.
5. Disconnect control cable from transaxle.
6. Remove front exhaust tube. Refer to EX-2, "Removal and Installation"
7. Disconnect A/T fluid cooler hoses.
8. Remove drive shafts. Refer to FAX-11, "FRONT DRIVE SHAFT" , RAX-10, "REAR DRIVE SHAFT" .
9. Remove transfer assembly. Refer to TF-55, "Removal and Installation" .
10. Remove starter motor from transaxle. Refer to SC-25, "Removal and Installation" .
11. Support transaxle with a transmission jack.

12. Remove center member, engine insulator and engine mounting bracket.
    - Center member fixing bolts to specified torque, Refer to AT-413, "Components" .
13. Remove suspension member. Refer to FSU-12, "FRONT SUSPENSION MEMBER" .

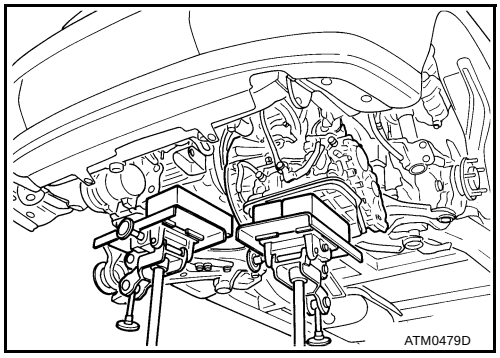


14. Remove dust cover from converter housing part.
15. Turn crankshaft, and remove the four tightening bolts for drive plate and torque converter.

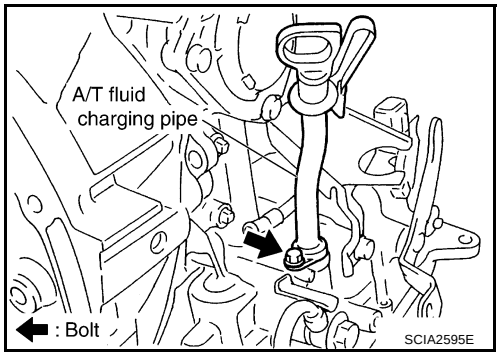
    CAUTION:
    The crankshaft should be rotated clockwise, viewed from the front of engine.



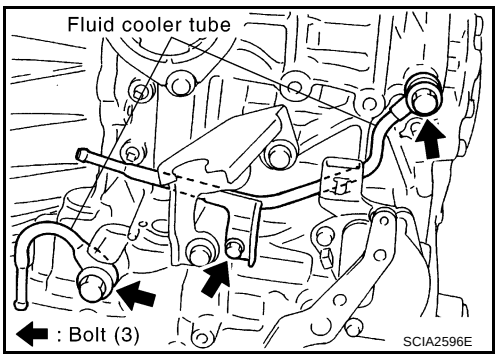
16. Support engine with a transmission jack.
17. Remove bolts fixing transaxle to engine.
18. Lower transaxle while supporting it with a transmission jack.



19. Disconnect harness connector and wire harness.
20. Remove A/T fluid charging pipe.



21. Remove fluid cooler tube.



INSPECTION

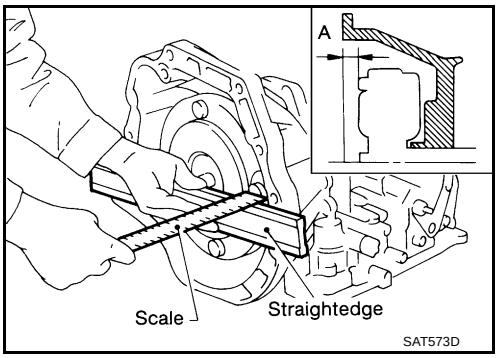
Installation and inspection of torque converter

- After inserting a torque converter to a transaxle, be sure to check distance “A” to ensure it is within the reference value limit.

Distance “A”

QR20DE models: 19.0 mm (0.75 in) or more

QR25DE models: 14.0 mm (0.55 in) or more



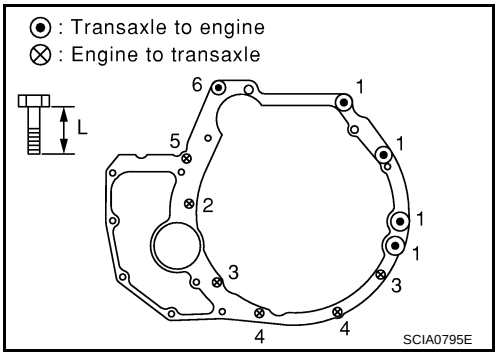
Installation

ECS004ND

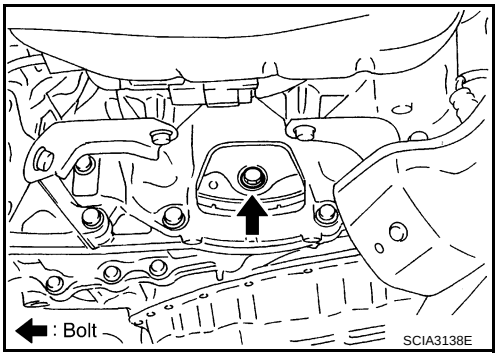
Install the removed parts in the reverse order of the removal, while paying attention to the following work.

- When installing transaxle to the engine, attach the fixing bolts in accordance with the following standard.

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	Bolt length “ L ” mm (in)
1	75 (7.7, 55)	49 (1.93)
2		45 (1.77)
3	43 (4.4, 32)	40 (1.57)
4		30 (1.18)
5	36 (3.7, 27)	40 (1.57)
6		45 (1.97)



- Align the positions of tightening bolts for drive plate with those of the torque converter, and temporarily tighten the bolts. Then, tighten the bolts to the specified torque. Refer to AT-416, "Components" .



CAUTION:

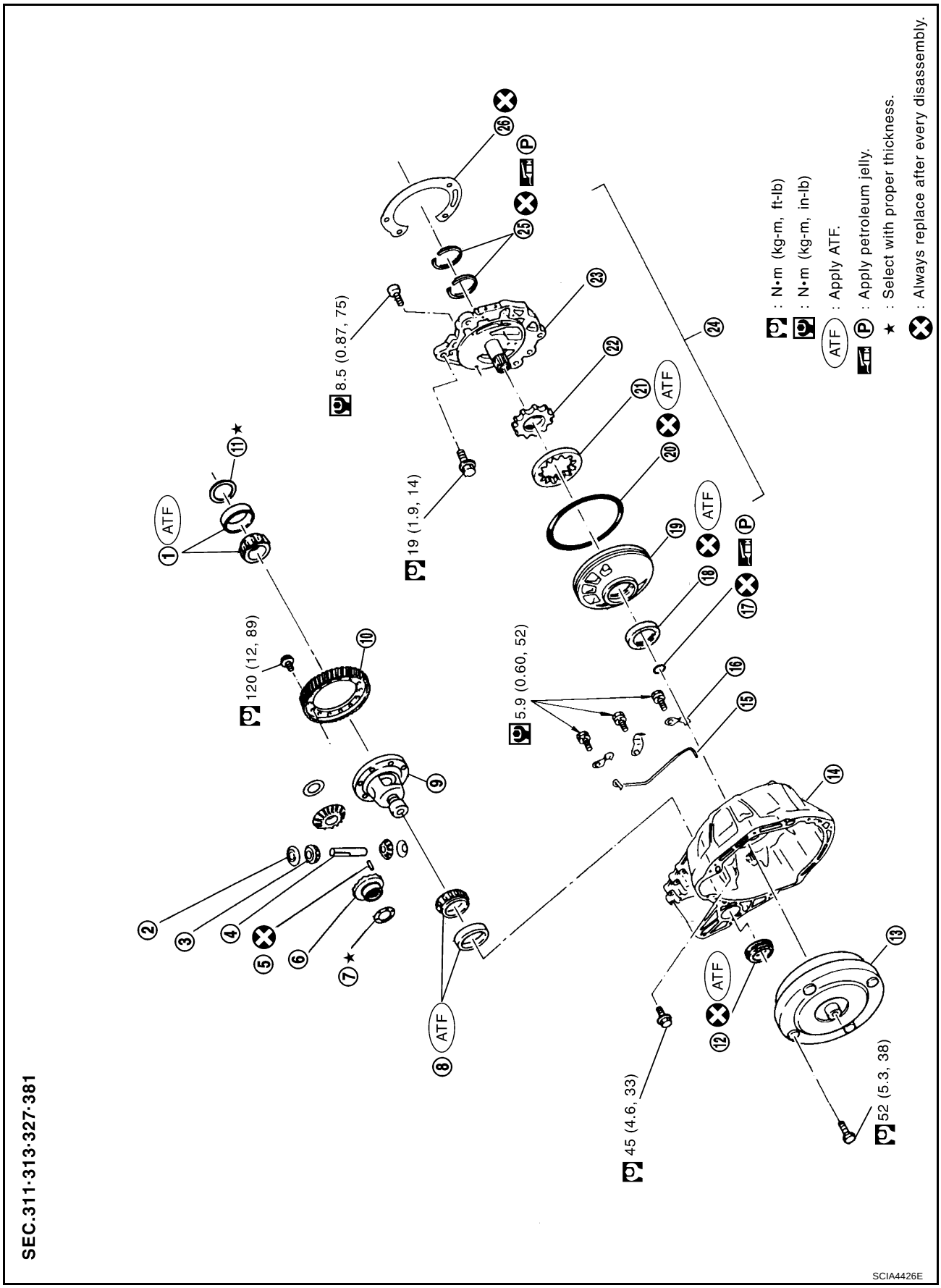
- **When turning crankshaft, turn it clockwise as viewed from the front of the engine.**
- **When tightening the tightening bolts for the torque converter after fixing the crankshaft pulley bolts, be sure to confirm the tightening torque of the crankshaft pulley mounting bolts.**
- **After converter is installed to drive plate, rotate crankshaft several turns and check to be sure that transaxle rotates freely without binding.**
- After completing installation, check for fluid leakage, fluid level, and the positions of A/T. Refer to AT-16, "Checking A/T Fluid" , AT-409, "Control Cable Adjustment" .

OVERHAUL

PFP:00000

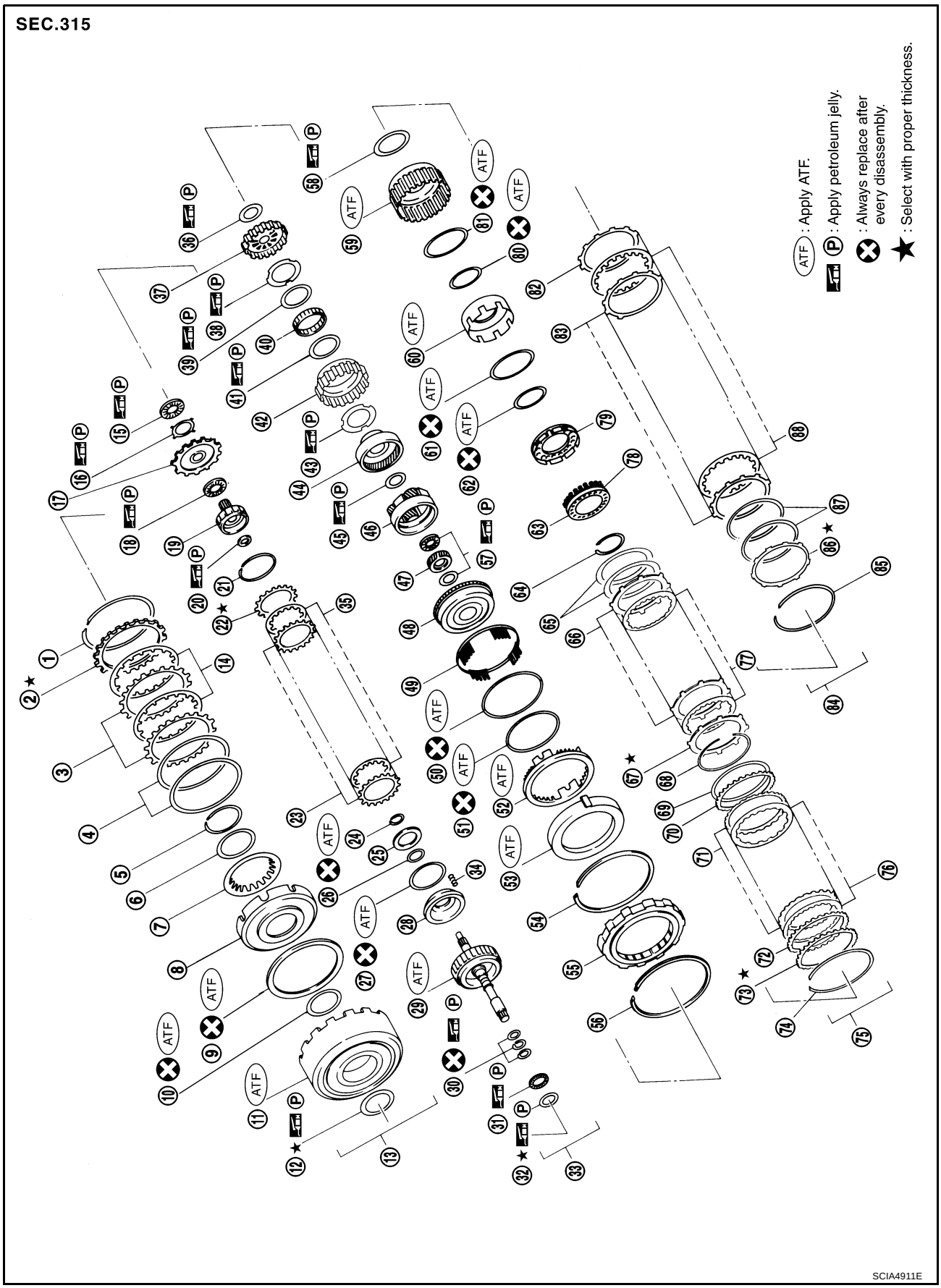
Components

ECS004LW



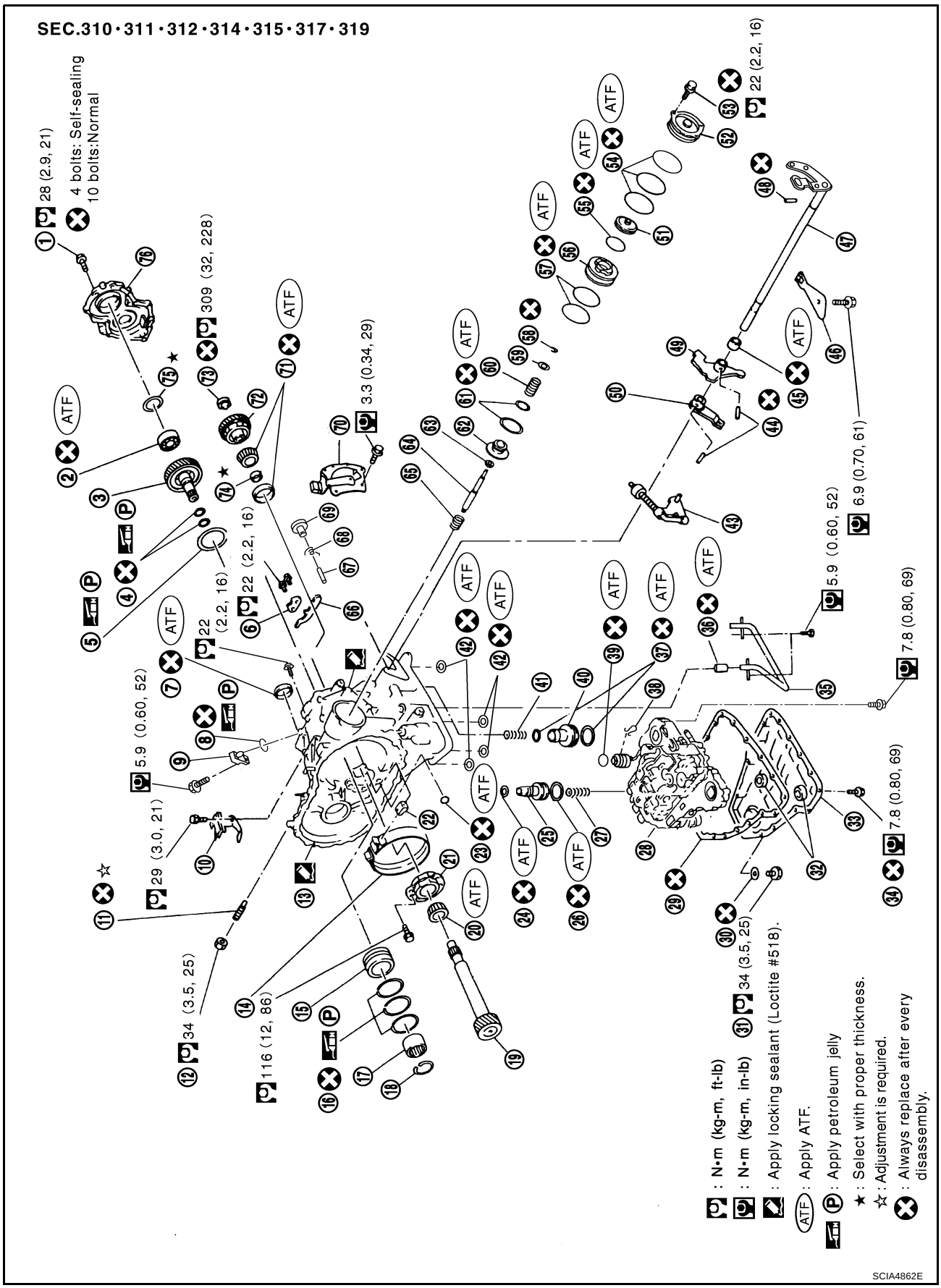
1. Differential side bearing
2. Pinion mate gear thrust washer
3. Pinion mate gear
4. Pinion mate shaft
5. Lock pin
6. Side gear
7. Side gear thrust washer
8. Differential side bearing
9. Differential case
10. Final gear
11. Differential side bearing adjusting shim
12. RH differential side oil seal
13. Torque converter
14. Converter housing
15. Differential lubricant tube
16. Clip
17. O-ring
18. Oil pump housing oil seal
19. Oil pump housing
20. O-ring
21. Outer gear
22. Inner gear
23. Oil pump cover
24. Oil pump assembly
25. Seal ring
26. Gasket

SEC.315



1. Snap ring
2. Retaining plate
3. Driven plate
4. Dish plate
5. Snap ring
6. Spring retainer
7. Return spring
8. Reverse clutch piston
9. Seal ring

10. D-ring
11. Reverse clutch drum
12. Thrust washer
13. Reverse clutch assembly
14. Drive plate
15. Needle bearing
16. Bearing race
17. Front sun gear
18. Needle bearing
19. High clutch hub
20. Needle bearing
21. Snap ring
22. Retaining plate
23. Driven plate
24. Snap ring
25. Spring retainer
26. D-ring
27. D-ring
28. High clutch piston
29. High clutch drum
30. Seal ring
31. Needle bearing
32. Bearing race
33. High clutch assembly
34. Return spring
35. Drive plate
36. Needle bearing
37. Overrun clutch hub
38. Thrust washer
39. Bearing race
40. Forward one-way clutch
41. Bearing race
42. Forward clutch hub
43. Thrust washer
44. Rear internal gear
45. Needle bearing
46. Rear planetary carrier
47. Rear sun gear
48. Front planetary carrier
49. Spring retainer
50. D-ring
51. D-ring
52. Low & reverse brake piston
53. Retainer
54. Snap ring
55. Low one-way clutch
56. Snap ring
57. Needle bearing
58. Needle bearing
59. Forward clutch drum
60. Forward clutch piston
61. Seal ring
62. D-ring
63. Spring retainer
64. Snap ring
65. Dish plate
66. Driven plate
67. Retaining plate
68. Snap ring
69. Dish plate
70. Driven plate
71. Retaining plate
72. Retaining plate
73. Snap ring
74. Forward clutch assembly and overrun clutch assembly
75. Drive plate
76. Drive plate
77. Return spring
78. overrun clutch piston
79. D-ring
80. seal ring
81. Retaining plate
82. Driven plate
83. Low & reverse brake assembly
84. snap ring
85. Retaining plate
86. Dish plate
87. Drive plate

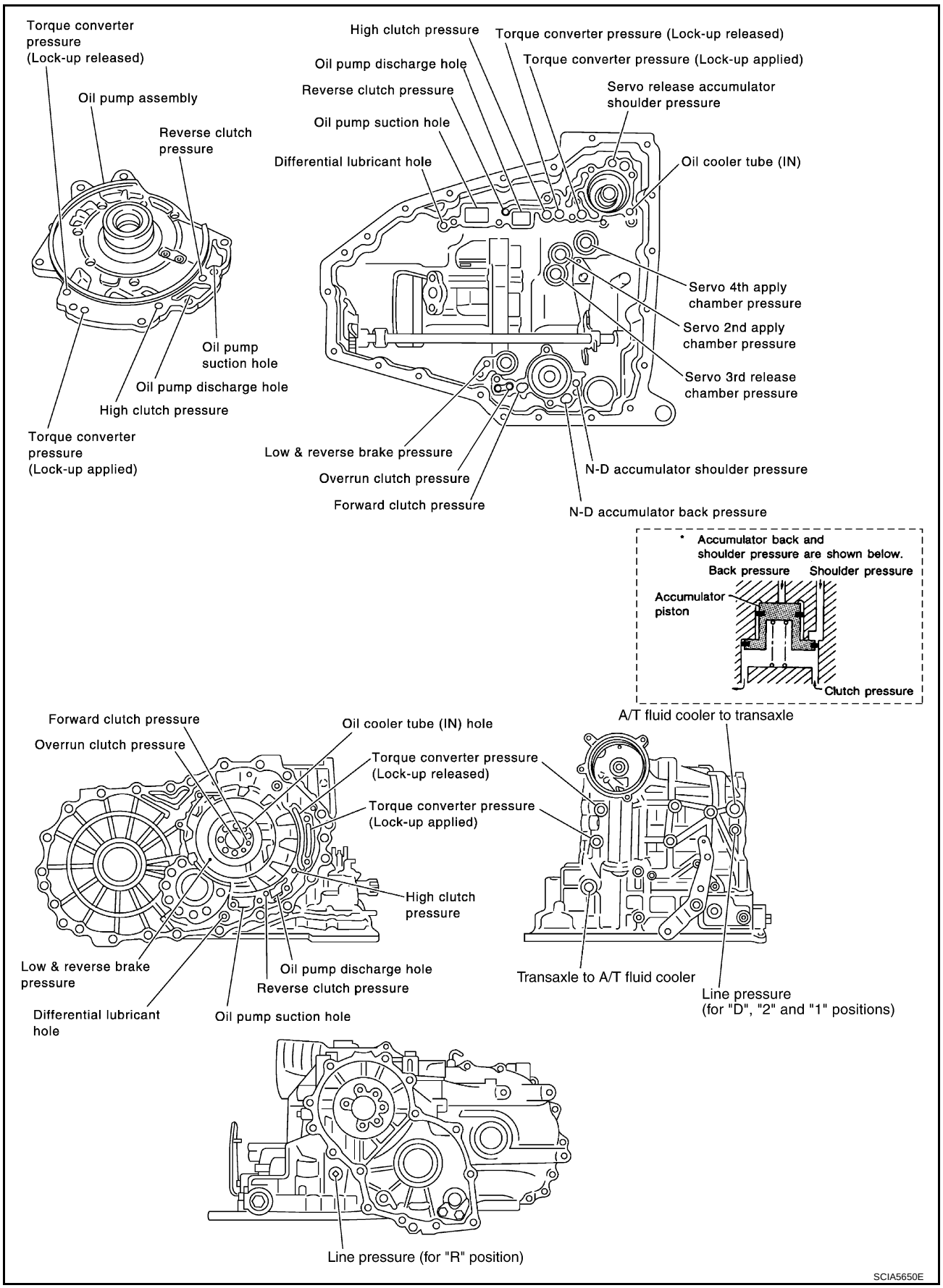


1. Side cover fitting bolt
2. Output shaft bearing
3. Output shaft
4. Seal ring
5. Needle bearing
6. Parking actuator support
7. LH differential side oil seal
8. O-ring
9. Revolution sensor

10. Bracket
11. Anchor end pin
12. Lock nut
13. Transaxle case
14. Brake band
15. Bearing retainer
16. Seal ring
17. Radial needle bearing
18. Snap ring
19. Reduction pinion gear
20. Reduction pinion gear bearing inner race
21. Reduction pinion gear bearing outer race
22. Strut
23. O-ring
24. O-ring
25. Servo release accumulator piston
26. O-ring
27. Return spring
28. Control valve assembly
29. Oil pan gasket
30. Drain plug gasket
31. Drain plug
32. Magnet
33. Oil pan
34. Oil pan fitting bolt
35. Low & reverse brake tube
36. Oil sleeve
37. O-ring
38. Snap ring
39. O-ring
40. N-D accumulator piston
41. Return spring
42. Lip seal
43. Parking rod
44. Retaining pin
45. Manual shaft oil seal
46. Detent spring
47. Manual shaft
48. Retaining pin
49. Manual plate
50. Parking rod plate
51. O/D servo piston
52. O/D servo piston retainer
53. O/D servo piston retainer fitting bolt
54. O-ring
55. D-ring
56. Servo piston retainer
57. O-ring
58. E-ring
59. Spring retainer
60. O/D servo return spring
61. D-ring
62. Band servo piston
63. Band servo thrust washer
64. Band servo piston stem
65. 2nd servo return spring
66. Parking pawl
67. Parking shaft
68. Return spring
69. Paring pawl spacer
70. PNP switch
71. Idler gear bearing
72. Idler gear
73. Idler gear lock nut
74. Reduction pinion gear adjusting shim
75. Output shaft adjusting shim
76. Side cover

Oil Channel

ECS004LX



Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings

ECS004LY

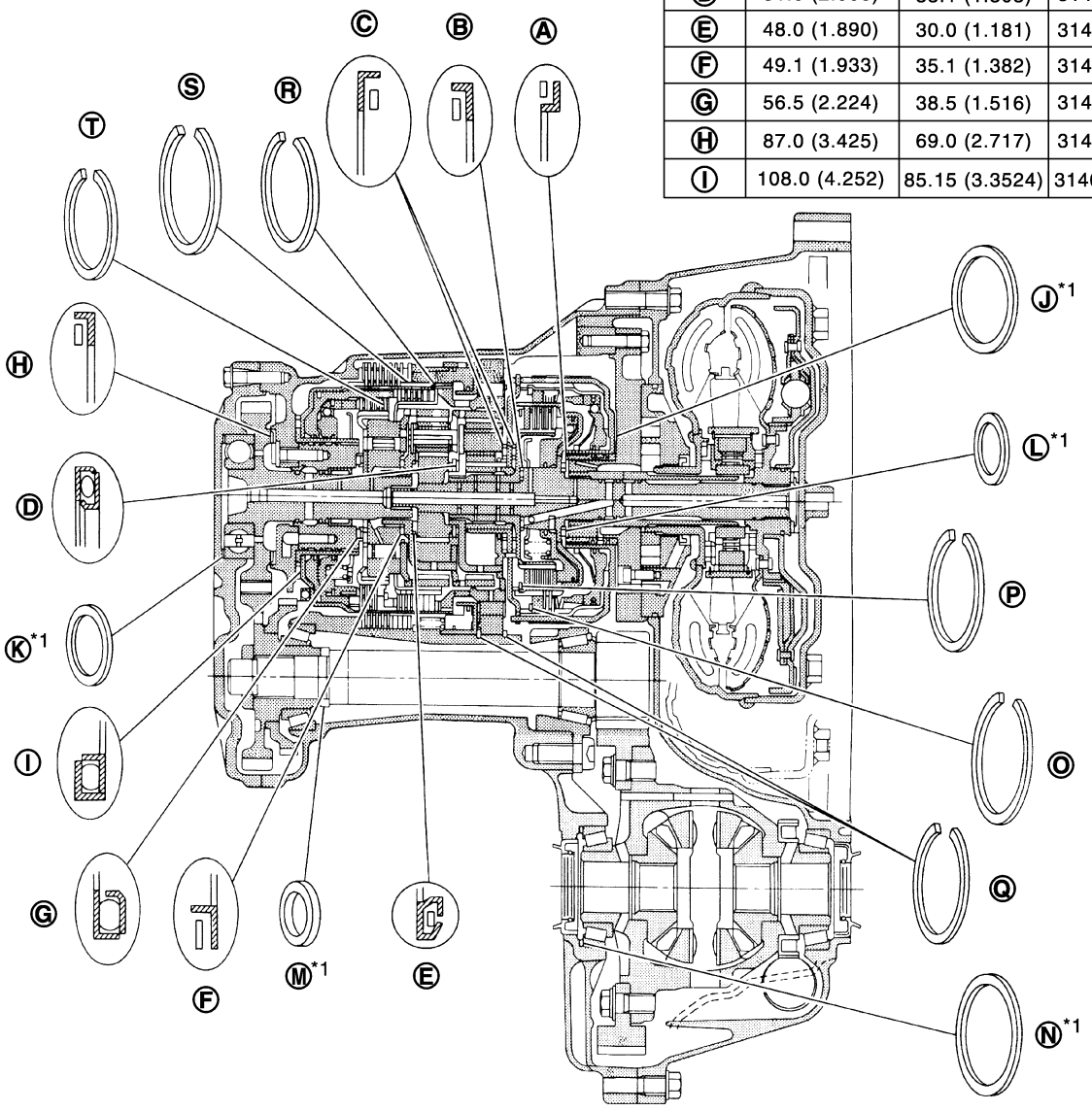
Outer diameter of thrust washers

Item number	Outer diameter mm (in)	Part number*2
Ⓙ*1	76.0 (2.992)	31508 80X13 - 31508 80X20
Ⓚ*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
Ⓐ	49.1 (1.933)	35.2 (1.386)	31407 80X10
Ⓑ	42.0 (1.654)	23.7 (0.933)	31407 80X01
Ⓒ	70.0 (2.756)	50.0 (1.969)	31407 80X09
Ⓓ	51.0 (2.008)	33.1 (1.303)	31407 80X02
Ⓔ	48.0 (1.890)	30.0 (1.181)	31407 80X03
Ⓕ	49.1 (1.933)	35.1 (1.382)	31407 80X10
Ⓖ	56.5 (2.224)	38.5 (1.516)	31407 80X08
Ⓗ	87.0 (3.425)	69.0 (2.717)	31407 80X07
Ⓘ	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
Ⓛ*1	51.0 (2.008)	36.0 (1.417)	31435 80X00 - 31435 80X14
Ⓜ*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
Ⓝ*1	75.0 (2.953)	67.0 (2.638)	31438 80X00 - 31438 80X11

Outer diameter of snap rings

Item number	Outer diameter mm (in)	Part number*2
Ⓞ	150 (5.91)	31506 80X13
Ⓟ	119.1 (4.689)	31506 80X06
Ⓠ	182.8 (7,197)	31506 80X08
Ⓡ	144.8 (5.701)	31506 80X03
Ⓢ	173.8 (6.843)	31506 80X09
Ⓣ	133.9 (5.272)	31506 80X01

*1: Select proper thickness.
*2: Always check with the Parts Department for the latest parts information.

SCIA0799E

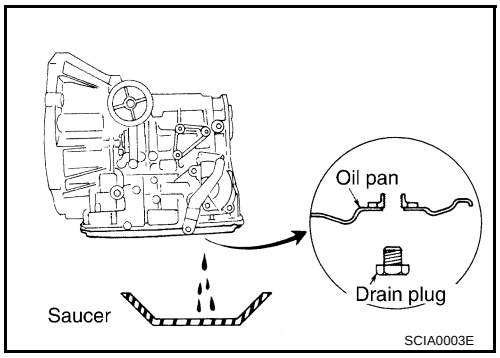
DISASSEMBLY

PFP:31020

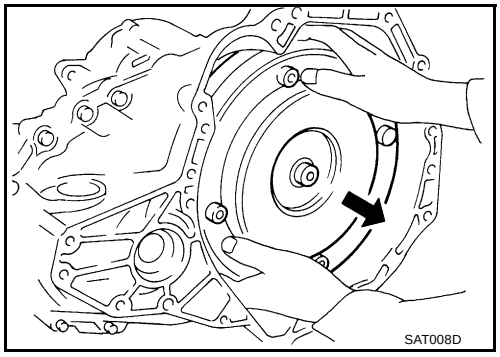
Disassembly

ECS004LZ

1. Drain ATF through drain plug.



2. Remove torque converter.

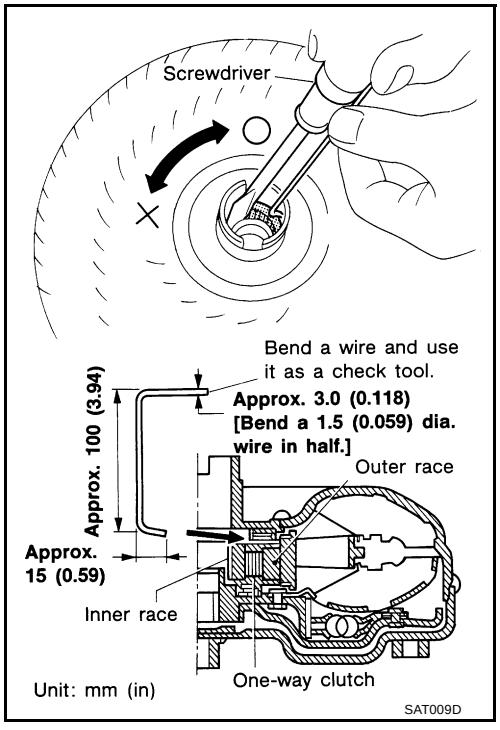


3. Check torque converter one-way clutch using check tool as shown in the right figure.

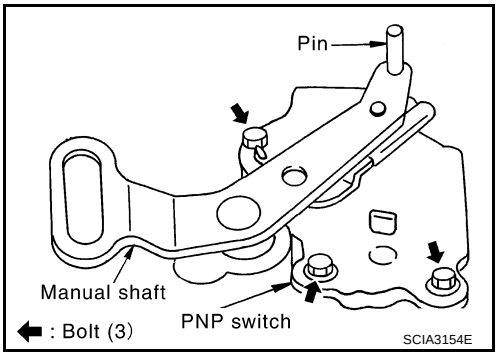
a. Insert check tool into the groove of bearing support built into one-way clutch outer race.

b. When fixing bearing support with check tool, rotate one- way clutch spline using screwdriver.

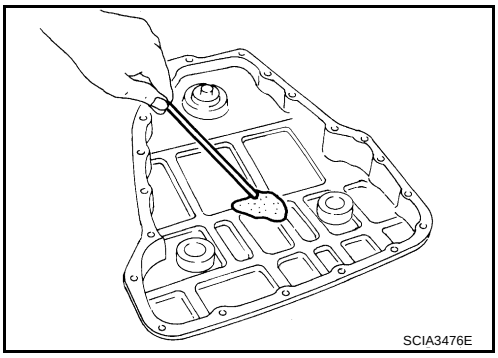
c. Check that inner race rotates clockwise only. If not, replace torque converter assembly.



4. Set manual shaft to position P.
5. Remove park/neutral position (PNP) switch.
6. Remove bracket from transaxle case.
7. Remove revolution sensor from transaxle case.
8. Remove O-ring from revolution sensor.

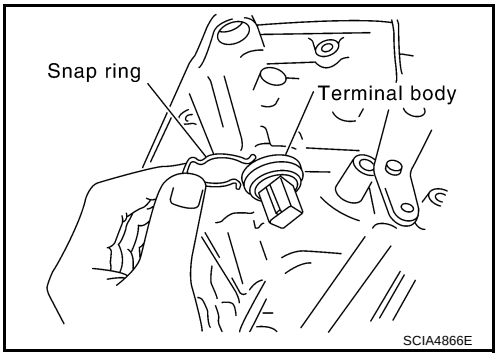


9. Remove oil pan and oil pan gasket.
   - **Do not reuse oil pan bolts.**
10. Check foreign materials in oil pan to help determine causes of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film 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-12, "RADIATOR" .**
11. Remove magnets from oil pan.

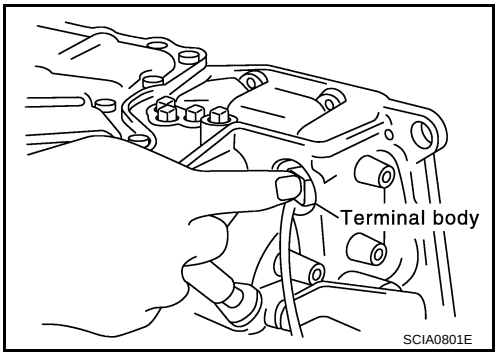


12. Remove control valve assembly according to the following procedures.

a. Remove snap ring from terminal body.



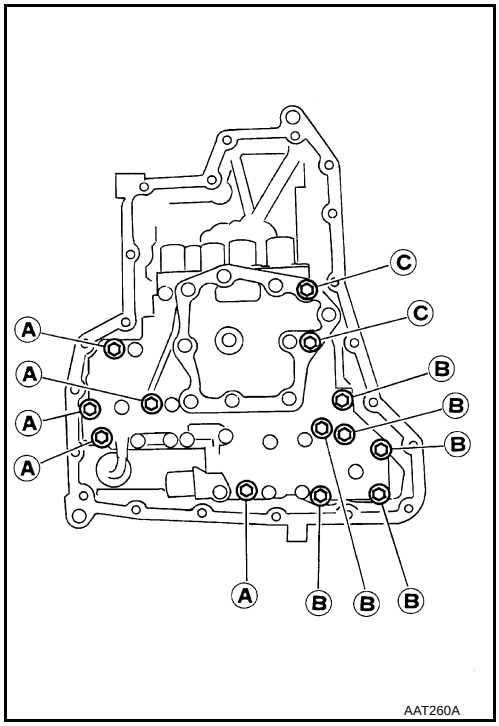
b. Push terminal body into transaxle case and draw out terminal cord assembly.



c. Remove control valve assembly mounting bolts **A, B** and **C** .

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



AAT260A

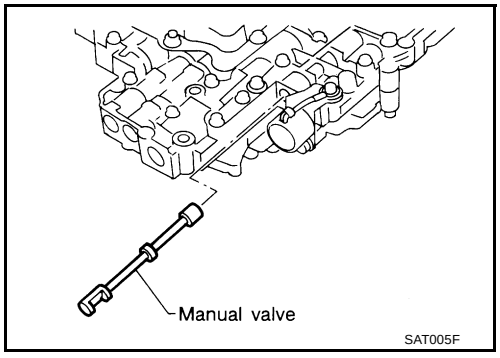
d. Remove control valve assembly from transaxle case.

13. Remove manual valve from control valve assembly.

CAUTION:

Be careful not to drop manual valve and servo release accumulator return springs.

14. Remove O-ring from terminal body.



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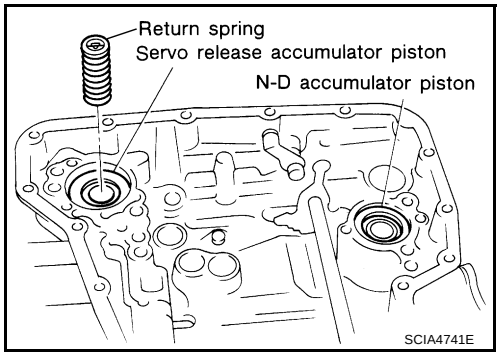
15. Remove return spring from servo release accumulator piston.



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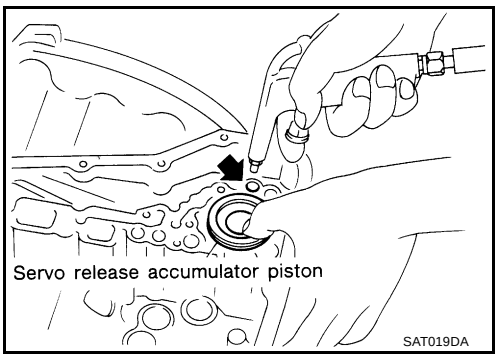
16. Remove servo release accumulator piston with compressed air.

CAUTION:

- **Strong flow of air will push the accumulator piston out along with a splash of oil.Cover the area with paper towels and blow air little by little to avoid this.**
- **Wrap the removed accumulator piston in a paper towel.**

17. Remove O-rings from servo release accumulator piston.

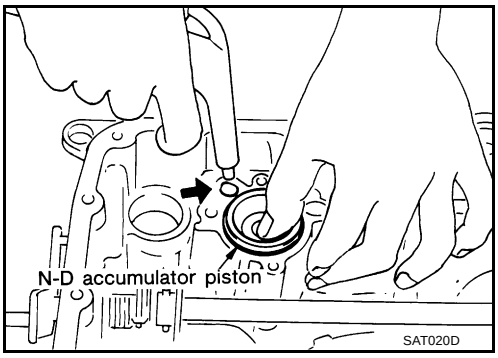


18. Remove N-D accumulator piston and return spring with compressed air.

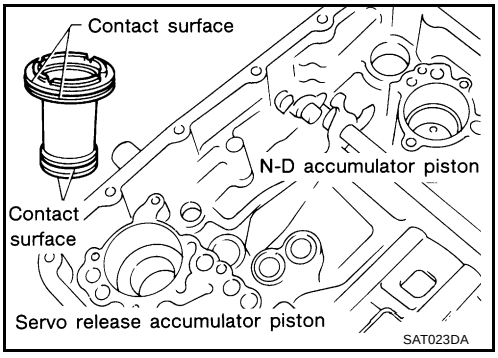
CAUTION:

- **Strong flow of air will push the accumulator piston out along with a splash of oil.Cover the area with paper towels and blow air little by little to avoid this.**
- **Wrap the removed accumulator piston in a paper towel.**

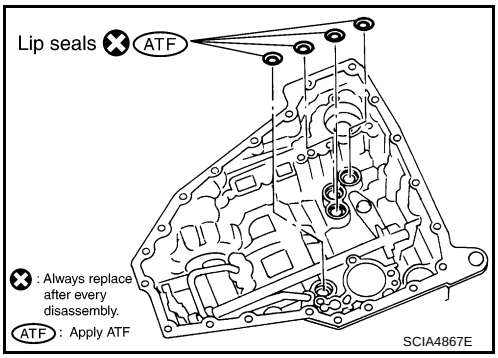
19. Remove O-rings from N-D accumulator piston.



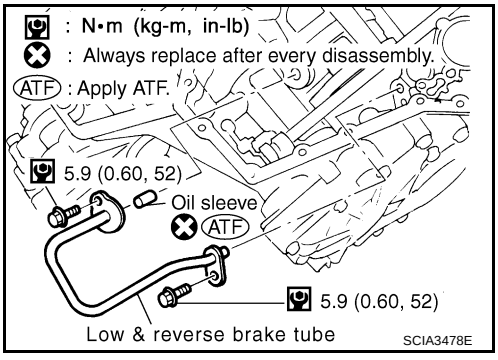
20. Check accumulator pistons and contact surface of transaxle case for damage.
21. Check accumulator return springs for damage and free length.



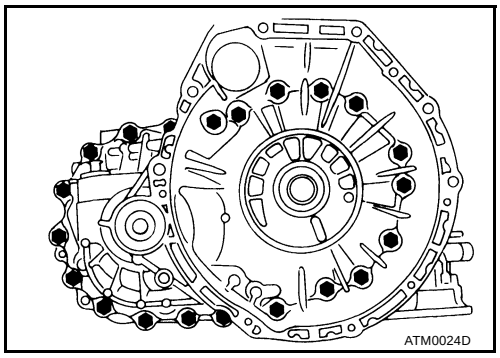
22. Remove lip seals.



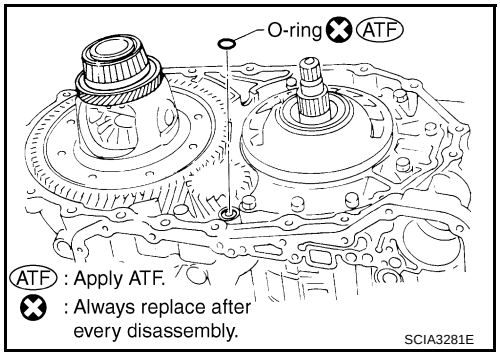
23. Remove low & reverse brake tube and oil sleeve.



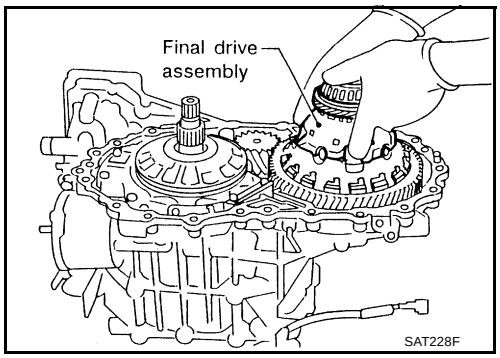
24. Remove converter housing according to the following procedures.
a. Remove converter housing mounting bolts.
b. Remove converter housing by tapping it lightly.



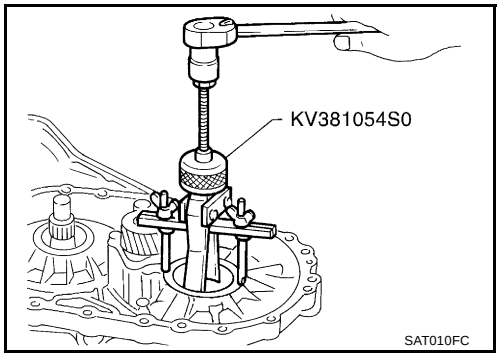
c. Remove O-ring from differential oil port.



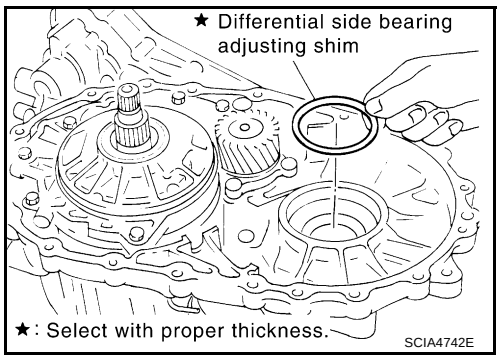
25. Remove final drive assembly from transaxle case.



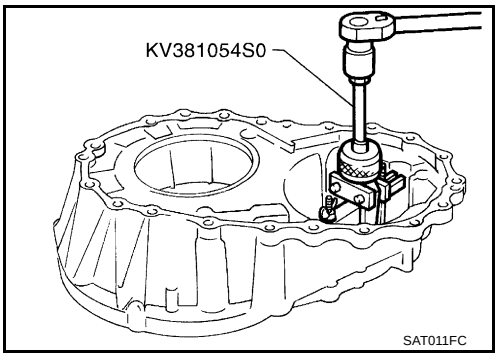
26. Remove differential side bearing outer race.



27. Remove differential side bearing adjusting shim from transaxle case.



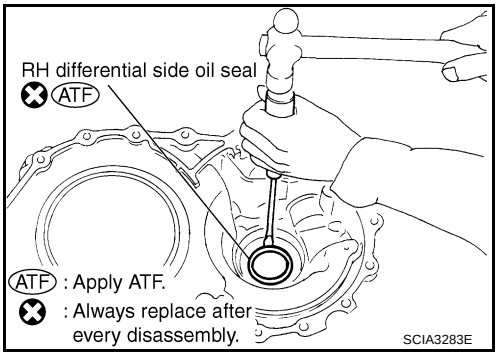
28. Remove differential side bearing outer race from converter housing.



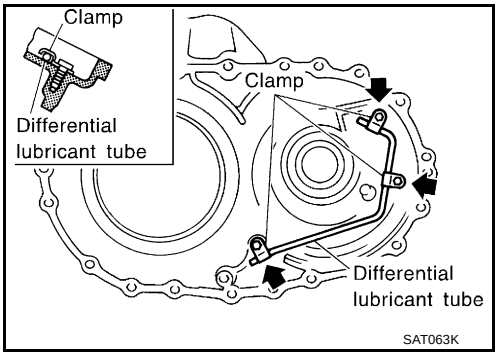
29. Remove RH differential side oil seal with flat-bladed screwdriver from converter housing.

CAUTION:

Be careful not to damage converter housing.

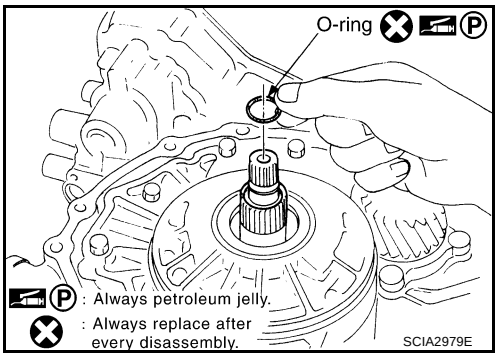


30. Remove differential lubricant tube from converter housing.

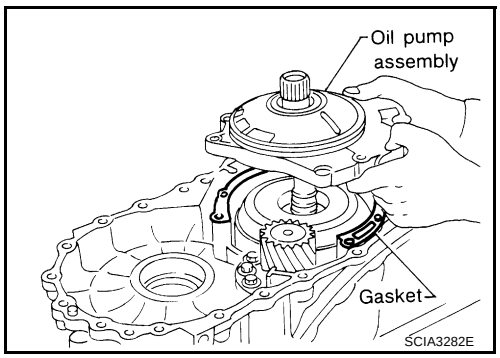


31. Remove oil pump assembly according to the following procedures.

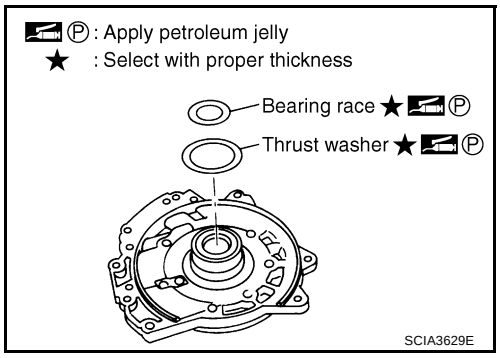
a. Remove O-ring from input shaft assembly (high clutch drum).



b. Remove oil pump assembly and gasket from transaxle case.



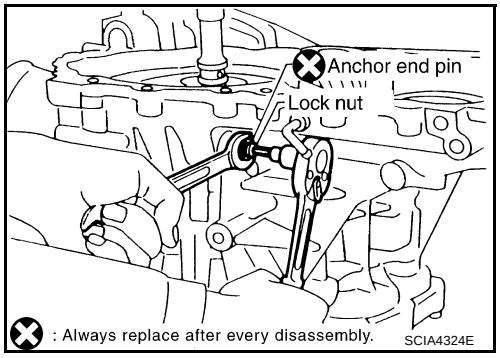
c. Remove thrust washer and bearing race from oil pump assembly.



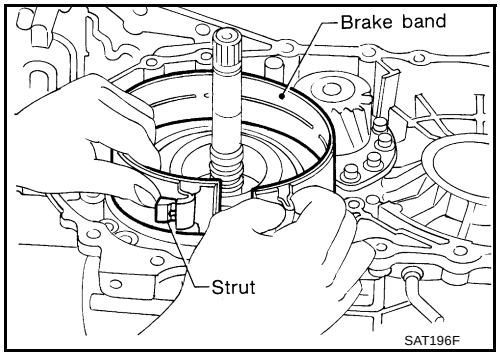
32. Remove brake band according to the following procedures.

a. Loosen lock nut, then back off anchor end pin.

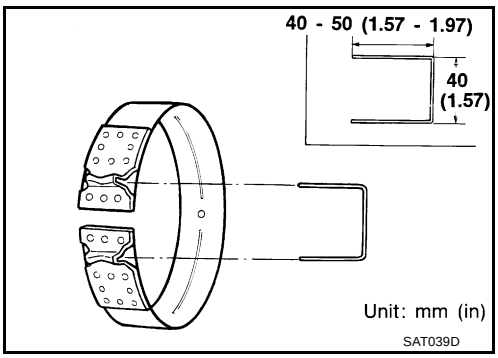
CAUTION:
Do not reuse anchor end pin.



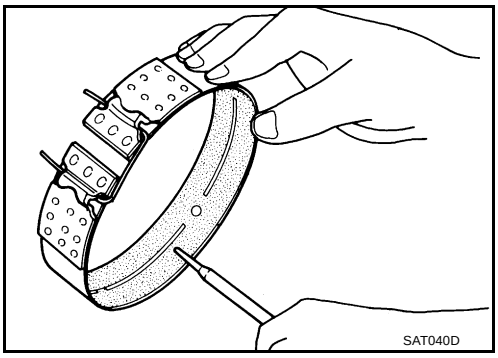
b. Remove brake band and strut from transaxle case.



- **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 right figure.**
  Leave the clip in position after removing the brake band.

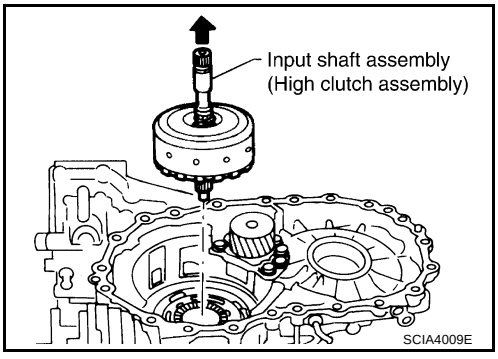


c. Check brake band facing for damage, cracks, wear or burns.

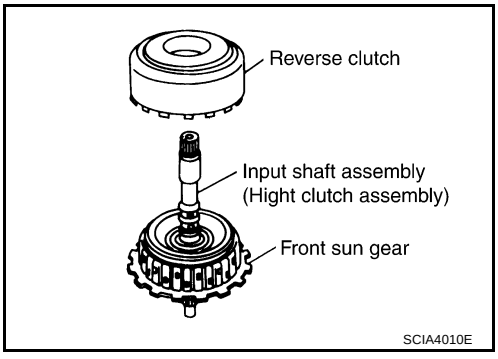


33. Remove input shaft assembly (high clutch assembly) and reverse clutch assembly according to the following procedures.

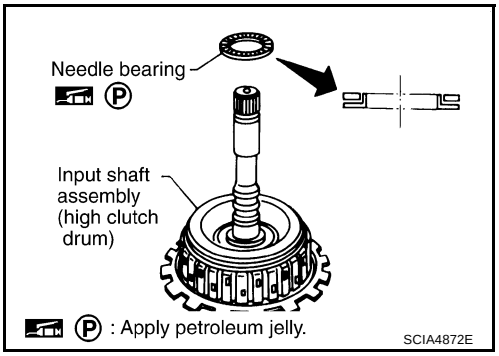
a. Remove input shaft assembly (high clutch assembly) with reverse clutch assembly.



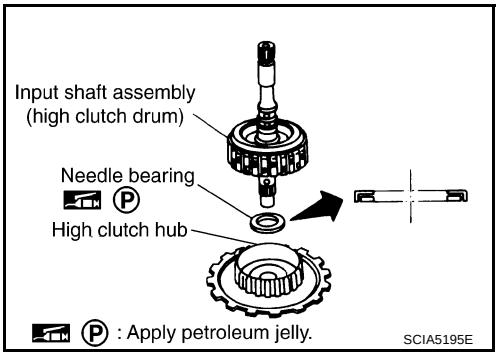
b. Remove input shaft assembly (high clutch assembly) from reverse clutch.



c. Remove needle bearing from input shaft assembly (high clutch drum) and check for damage or wear.

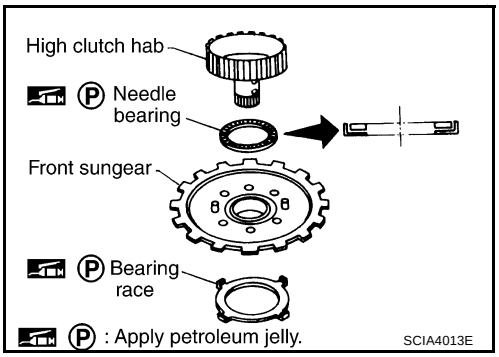


d. Remove high clutch hub (with front sun gear) and needle bearing from input shaft assembly (high clutch drum) and check for damage or wear.

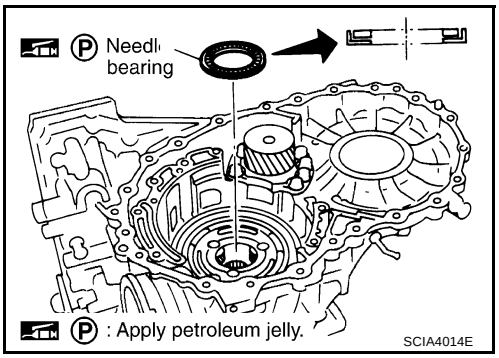


e. Remove front sun gear and needle bearing from high clutch hab and check for damage or wear.

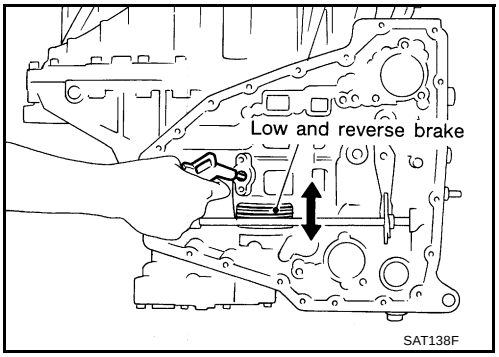
f. Remove bearing race from front sun gear and check for damage or wear.



34. Remove needle bearing from transaxle case and check for damage or wear.

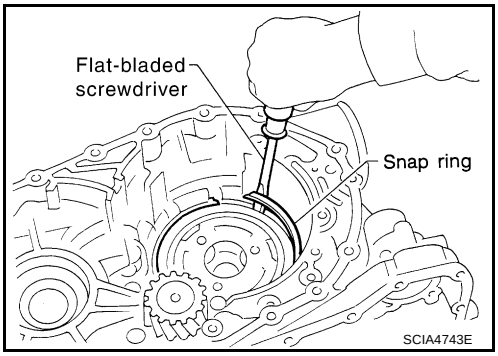


35. Apply compressed air and check to see that low and reverse brake operates.



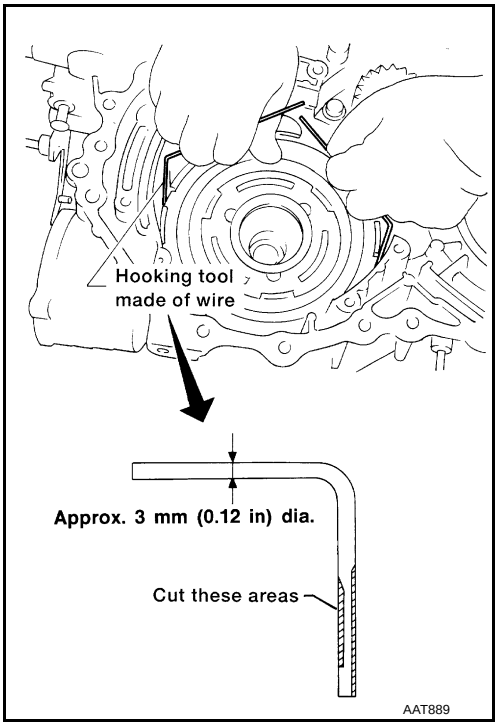
36. Remove low one-way clutch and front planetary carrier assembly according to the following procedures.

a. Remove snap ring with flat-bladed screwdriver.

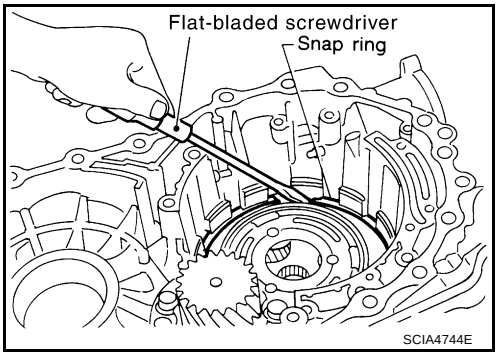


b. Remove low one-way clutch with a hook made of wire.

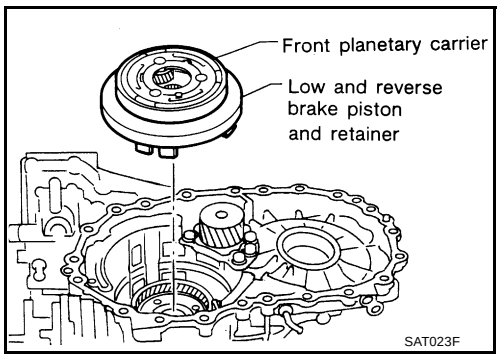
c. Check low one-way clutch for damage or wear.



d. Remove snap ring with flat-bladed screwdriver.



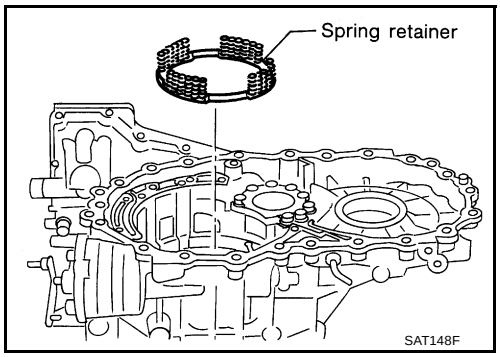
e. Remove front planetary carrier with low & reverse brake piston and retainer.



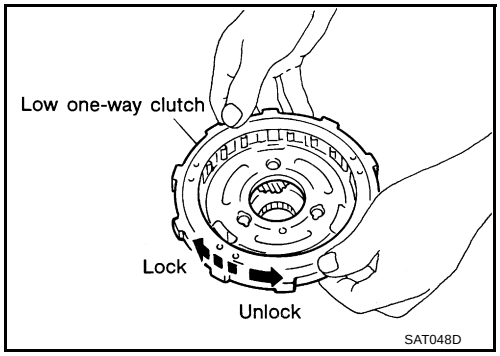
f. Remove low and reverse brake spring retainer.

CAUTION:

Do not remove return springs from spring retainer.

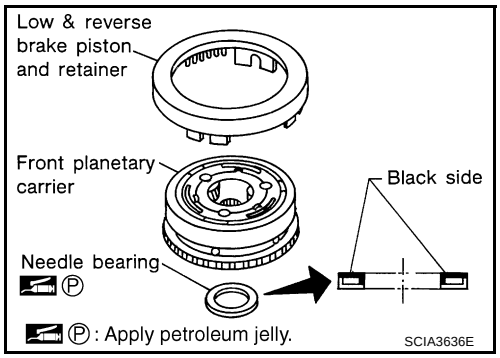


g. Check that low one-way clutch rotates in the direction of the clockwise arrow and locks in the opposite direction.



h. Remove needle bearing, low and reverse brake piston and retainer from front planetary carrier.

i. Check front planetary carrier, low & reverse brake piston, retainer and needle bearing for damage or wear.



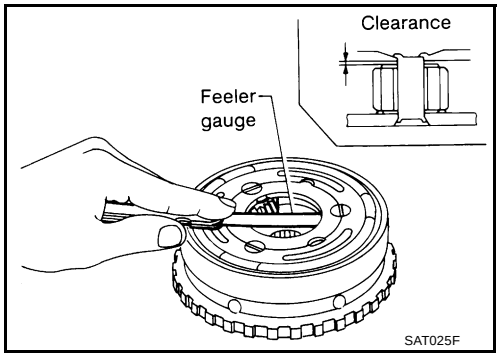
j. Check front planetary carrier, low one-way clutch and needle bearing for damage or wear.

k. Check clearance between planetary gears and planetary carrier with feeler gauge.

Standard clearance: 0.20 - 0.70 mm (0.0079 - 0.0276 in)

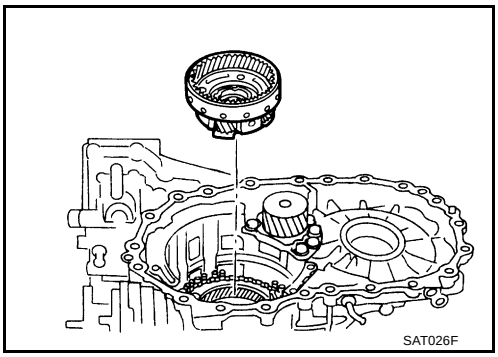
Allowable limit: 0.80 mm (0.0315 in)

Replace front planetary carrier if the clearance exceeds allowable limit.

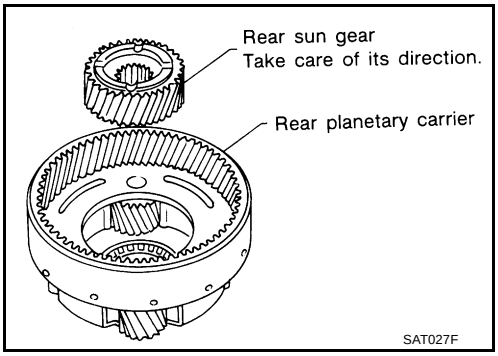


37. Remove rear planetary carrier and rear sun gear according to the following procedures.

a. Remove rear planetary carrier (with rear sun gear) from transaxle case.

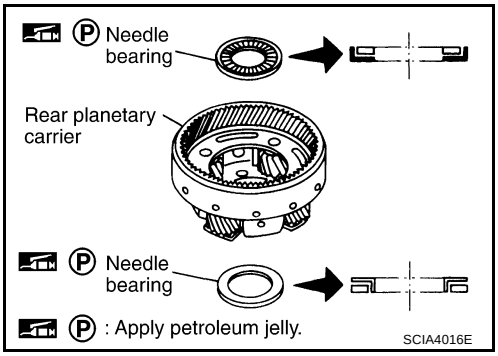


b. Remove rear sun gear from rear planetary carrier.



c. Remove needle bearings from rear planetary carrier.

d. Check rear planetary carrier, rear sun gear and needle bearings for damage or wear.

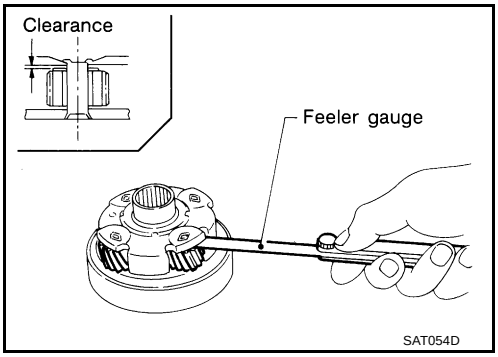


e. Check clearance between pinion washer and rear planetary carrier with feeler gauge.

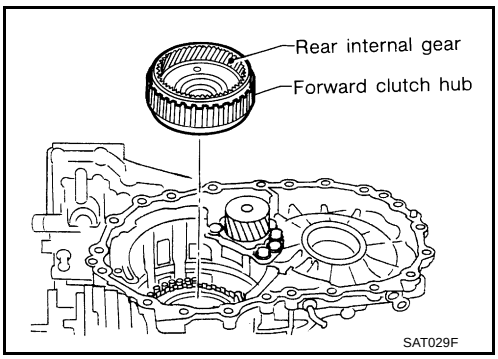
Standard clearance: 0.20 - 0.70 mm (0.0079 - 0.0276 in)

Allowable limit: 0.80 mm (0.0315 in)

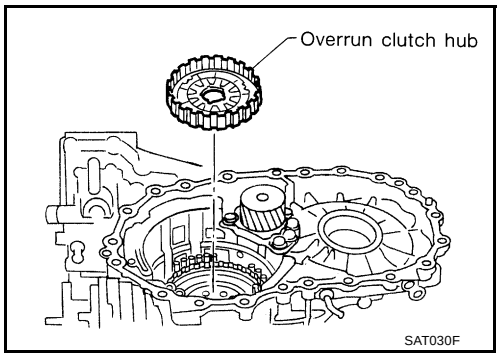
Replace rear planetary carrier if the clearance exceeds allowable limit.



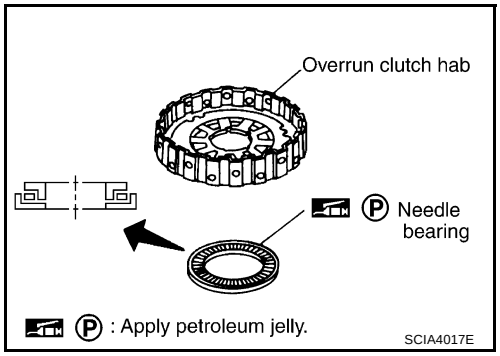
38. Remove rear internal gear and forward clutch hub from transaxle case.



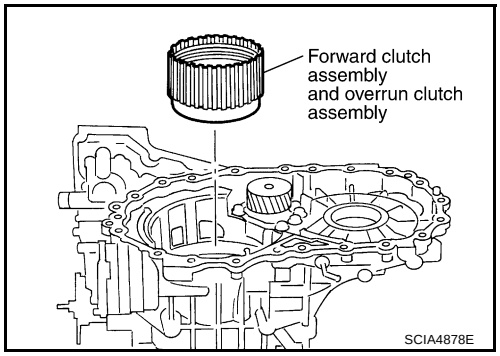
39. Remove overrun clutch hub from transaxle case.



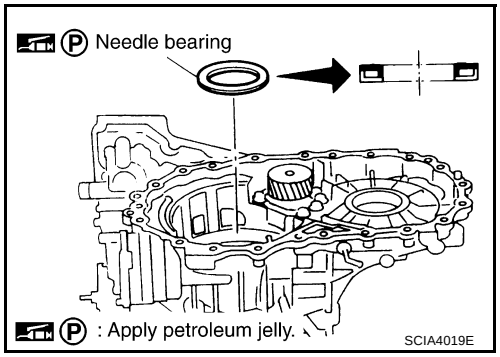
40. Remove needle bearing from overrun clutch hub and check for damage or wear.



41. Remove forward clutch assembly and overrun clutch assembly from transaxle case.



42. Remove needle bearing from transaxle case and check for damage or wear.

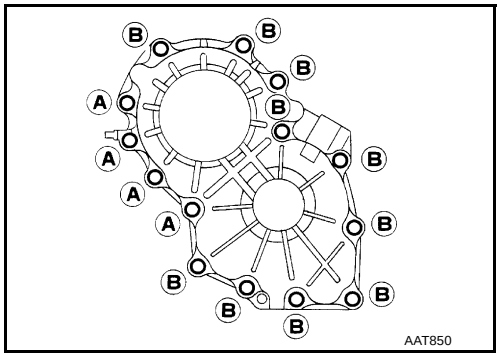


43. Remove output shaft assembly according to the following procedures.

a. Remove side cover bolts.

CAUTION:

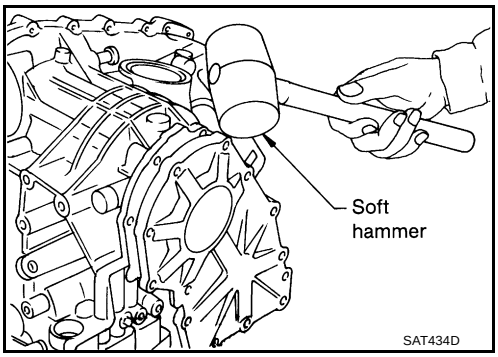
- **Do not mix bolts A and B.**
- **Always replace bolts A as they are self-sealing bolts.**



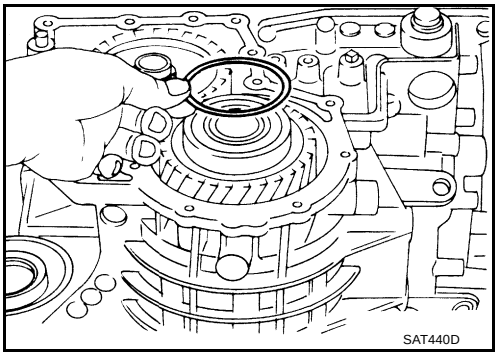
b. Remove side cover by lightly tapping it with a soft hammer.

CAUTION:

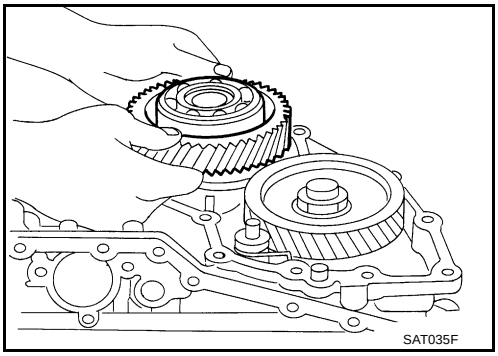
- **Be careful not to drop output shaft assembly. It might come out when removing side cover.**
- **Be careful not to damage side cover.**



c. Remove adjusting shim.



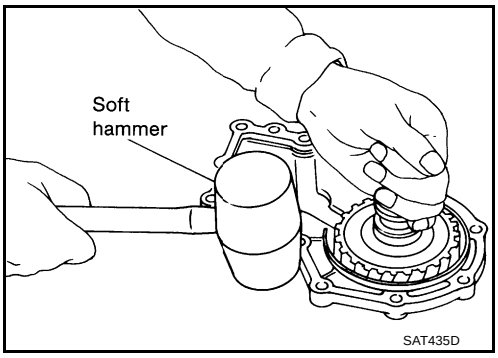
d. Remove output shaft assembly.



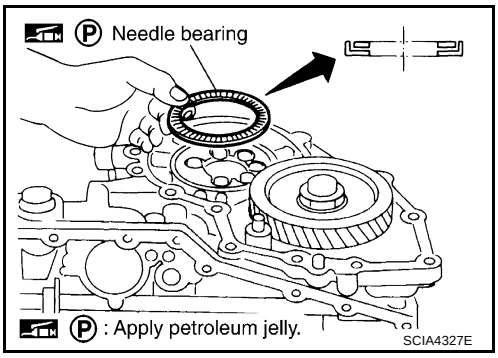
- If output shaft assembly came off with side cover, tap cover with a soft hammer to separate.

CAUTION:

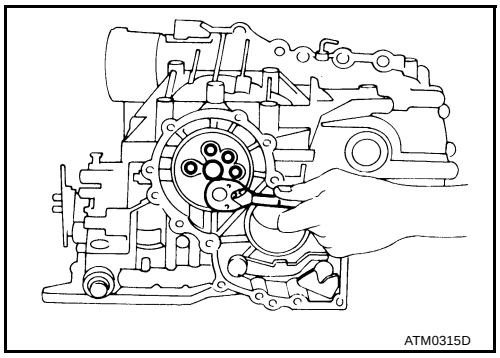
Be careful not to damage side cover.



e. Remove needle bearing.



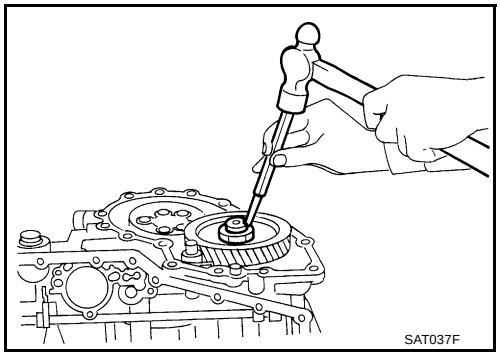
f. Remove bearing retainer from transaxle case.



44. Disassemble reduction pinion gear according to the following procedures.

a. Set manual shaft to position P to fix idler gear.

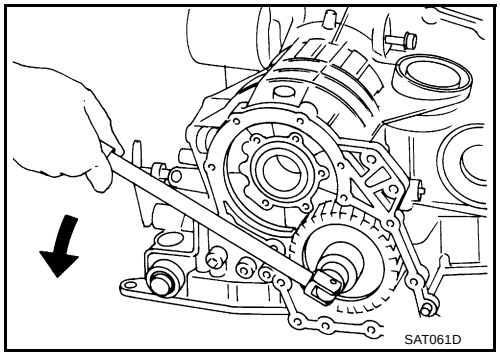
b. Unlock idler gear lock nut using a pin punch.



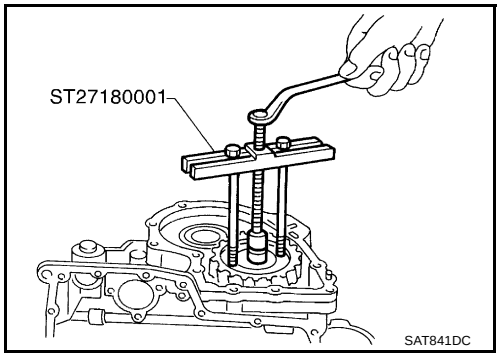
c. Remove idler gear lock nut.

CAUTION:

Do not reuse idler gear lock nut.

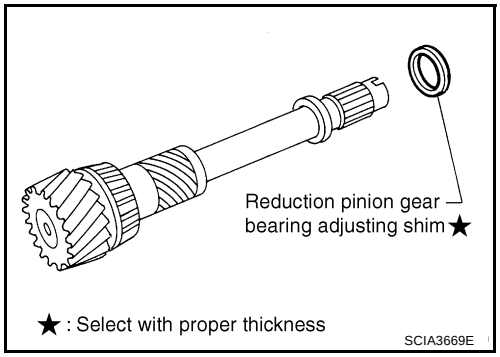


d. Remove idler gear with puller.

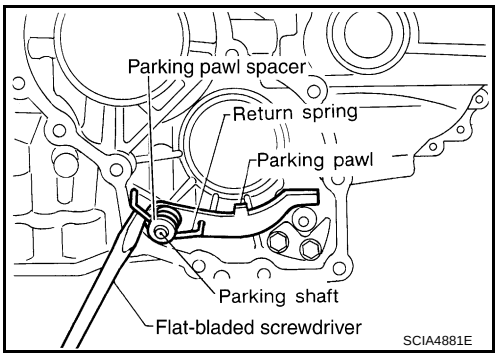


e. Remove reduction pinion gear.

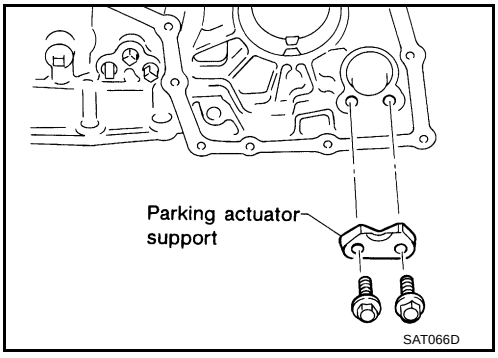
f. Remove reduction pinion gear adjusting shim from reduction pinion gear.



45. Remove return spring and parking pawl spacer with flat-bladed screwdriver from parking shaft.
46. Draw out parking shaft and remove parking pawl from transaxle case.
47. Check parking pawl and shaft for damage or wear.

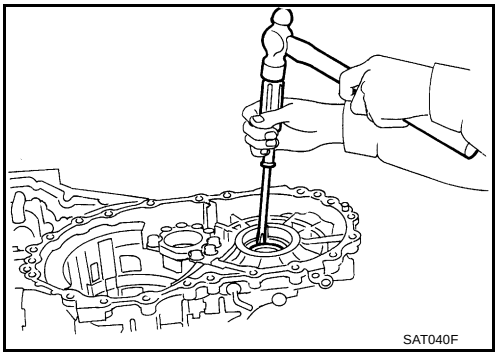


48. Remove parking actuator support from transaxle case.
49. Check parking actuator support for damage or wear.



50. Remove LH differential side oil seal with flat-bladed screwdriver from transaxle case.

CAUTION:
Be careful not to scratch transaxle case.



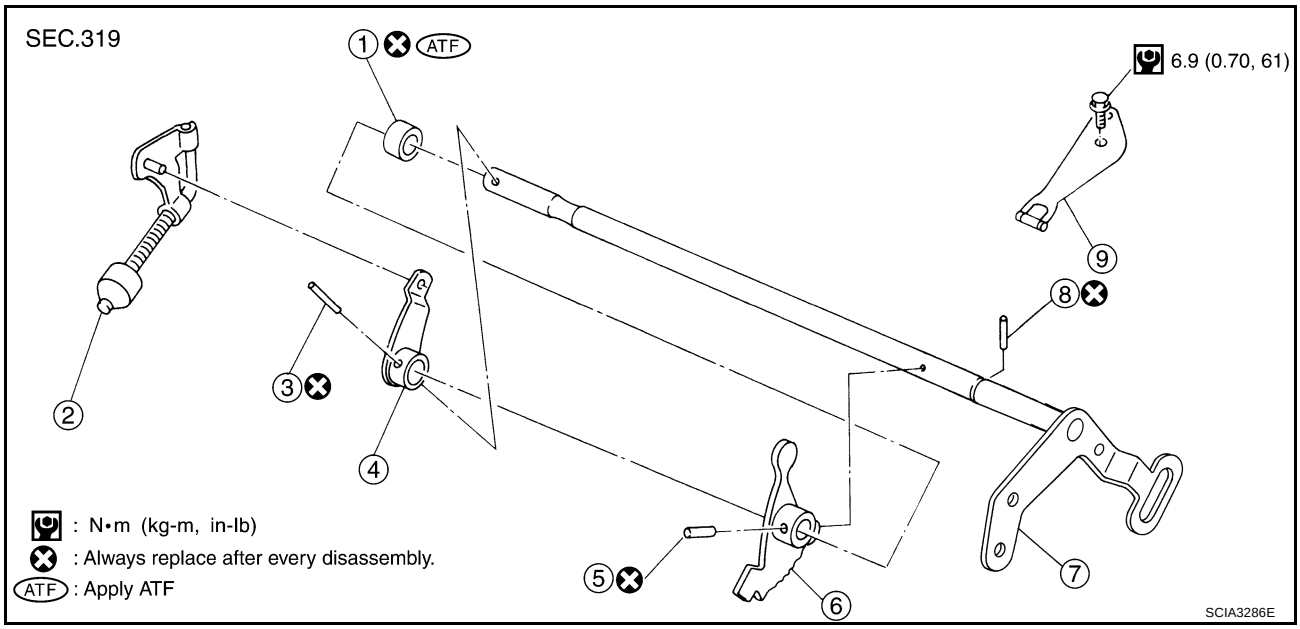
REPAIR FOR COMPONENT PARTS

PFP:00000

Manual Shaft

ECS00EBZ

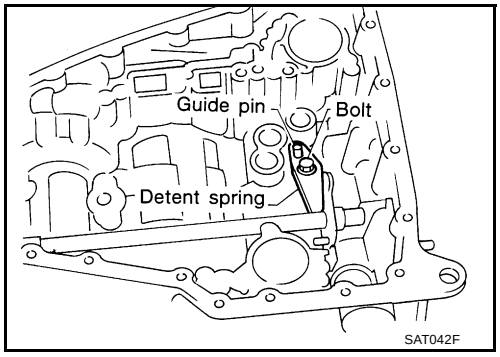
COMPONENTS



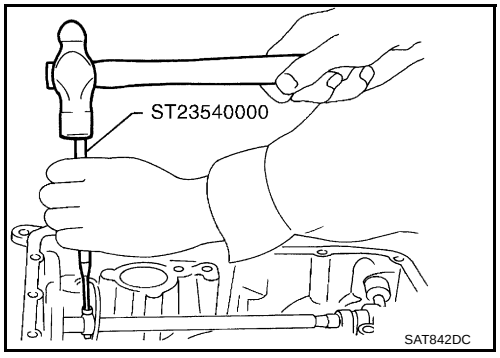
1. Manual shaft oil seal
2. Parking rod
3. Retaining pin
4. Parking rod plate
5. Retaining pin
6. Manual plate
7. Manual shaft
8. Retaining pin
9. Detent spring

REMOVAL

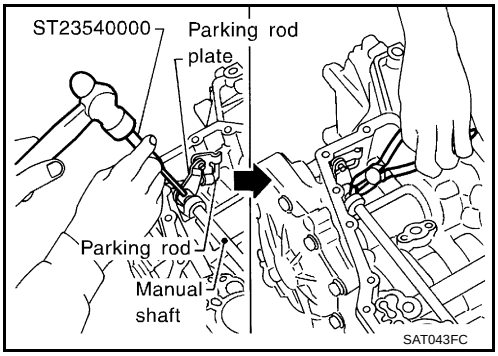
1. Remove detent spring from transaxle case.



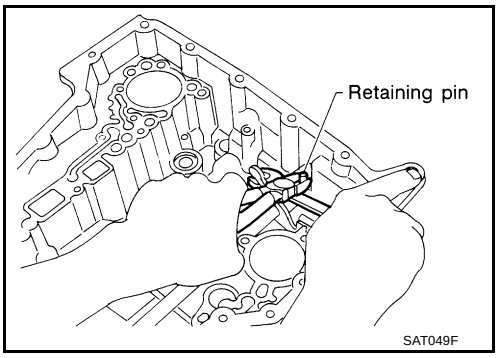
2. Drive out manual plate retaining pin.



3. Drive and pull out parking rod plate retaining pin.
4. Remove parking rod plate (with parking rod) from manual shaft.
5. Draw out parking rod (with parking rod plate) from transaxle case.
6. Remove parking rod from parking rod plate.

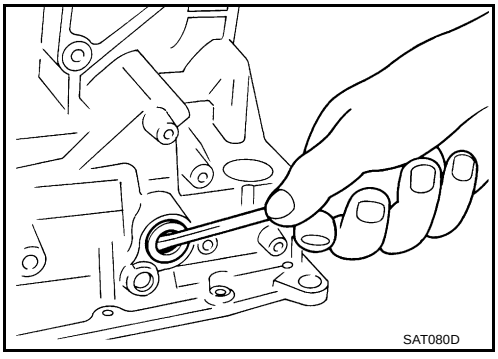


7. Pull out manual shaft retaining pin.
8. Remove manual shaft and manual plate from transaxle case.



9. Remove manual shaft oil seal.

CAUTION:
Be careful not to scratch transaxle case.



INSPECTION

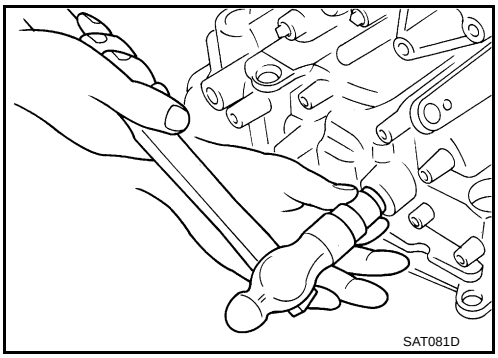
- Check component parts for wear or damage. Replace if necessary.

INSTALLATION

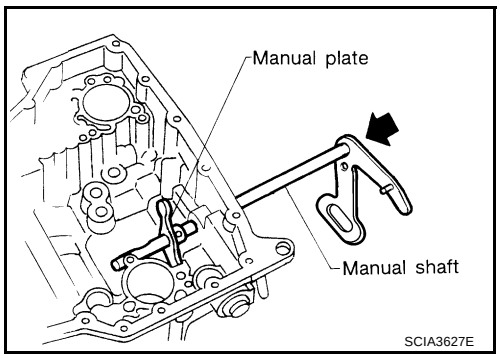
1. Use a drift [commercial service tool ϕ 22 mm (0.87 in)] to drive manual shaft oil seal into the transaxle case.

CAUTION:
- **Do not reuse manual shaft oil seal.**
- **Apply ATF to outer surface of manual shaft oil seal.**

2. Install parking rod to parking rod plate.

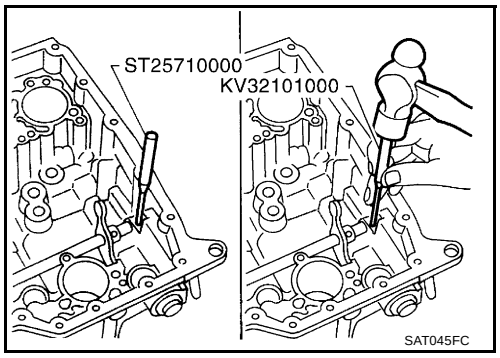


3. Install manual shaft and manual plate.
4. Install parking rod plate (with parking rod) on manual shaft.



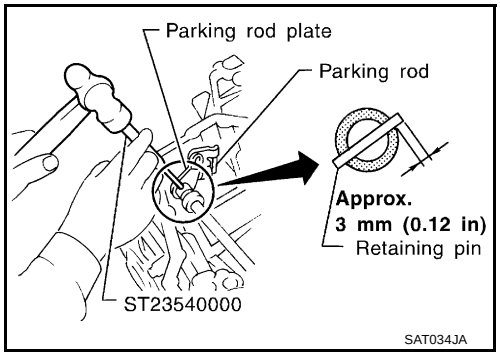
5. Align groove of manual shaft and hole of transaxle case.
6. Install manual shaft retaining pin up to bottom of hole.

CAUTION:
Do not reuse retaining pin.



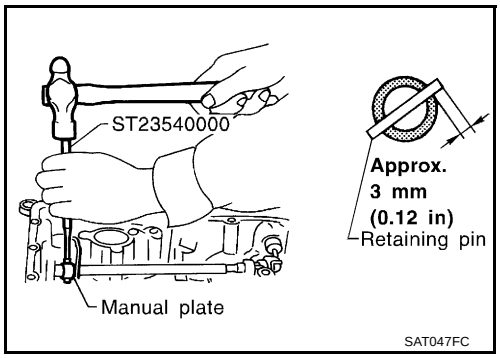
7. Set parking rod plate onto manual shaft and drive retaining pin.

CAUTION:
- **Both ends of pin should protrude.**
- **Do not reuse retaining pin.**

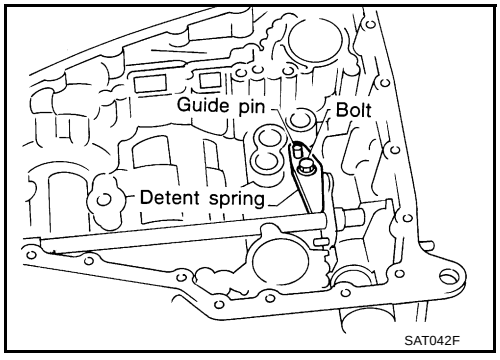


8. Install manual plate retaining pin.

CAUTION:
- **Both ends of pin should protrude.**
- **Do not reuse retaining pin.**



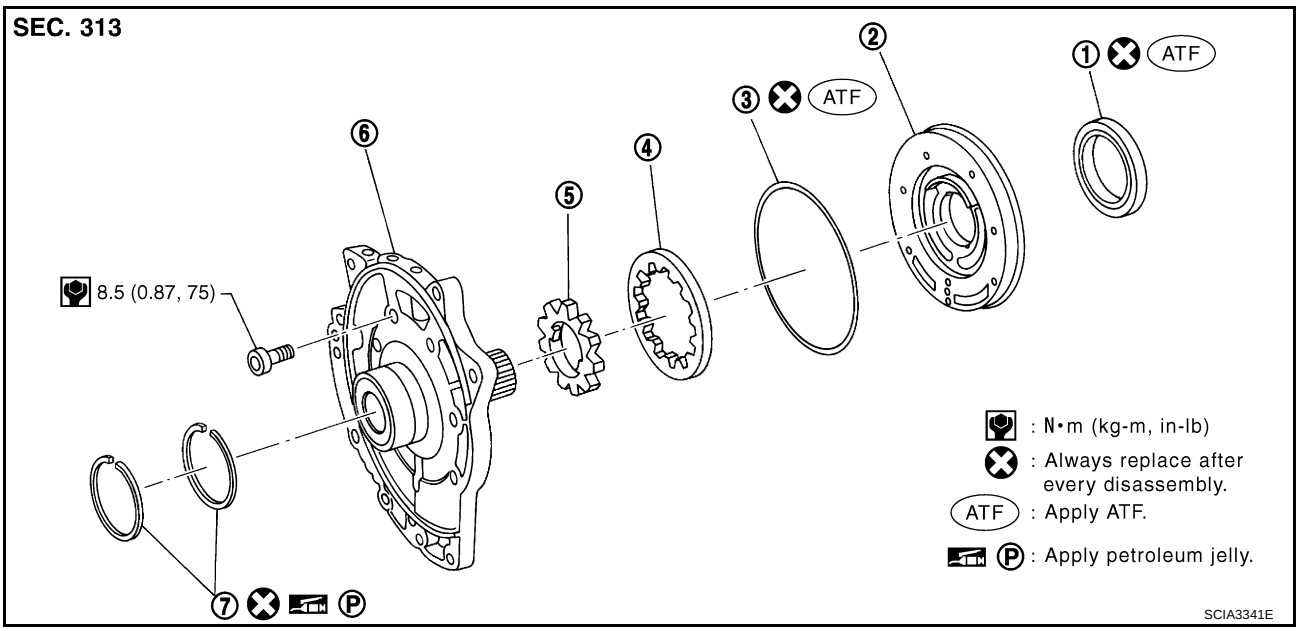
9. Install detente spring on transaxle case. Tighten detente spring fitting bolt to the specified torque. Refer to AT-440, "COMPONENTS" .



Oil Pump

ECS00EC0

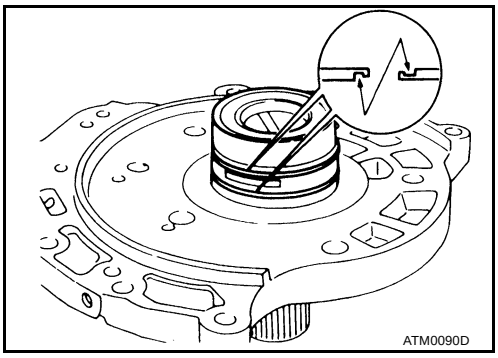
COMPONENTS



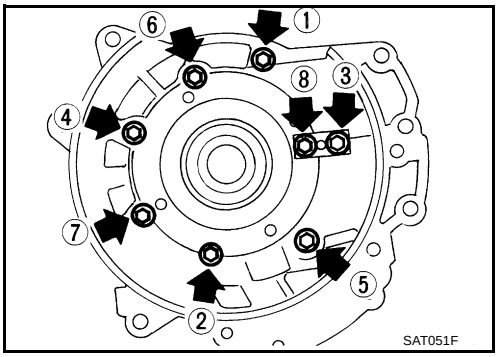
1. Oil pump housing oil seal
2. Oil pump housing
3. O-ring
4. Outer gear
5. Inner gear
6. Oil pump cover
7. Seal ring

DISASSEMBLY

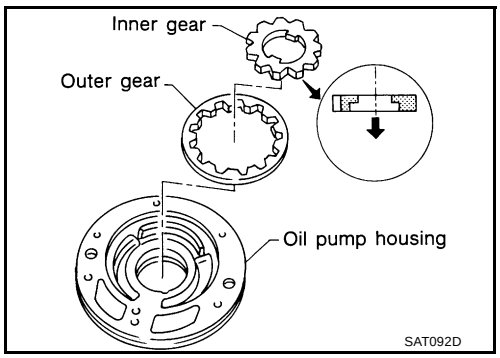
1. Remove seal rings.



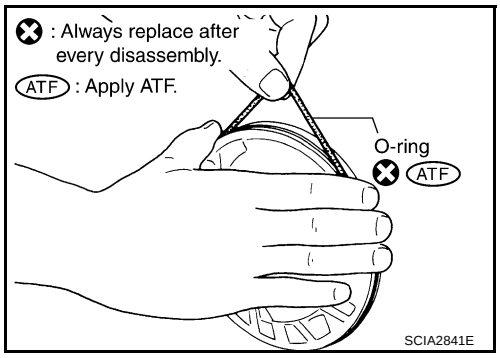
2. Loosen bolts in a crisscross pattern and remove oil pump cover.



3. Remove inner and outer gear from oil pump housing.



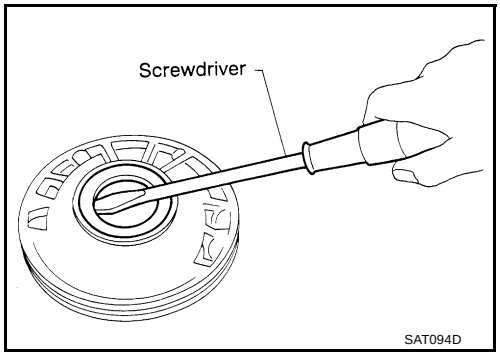
4. Remove O-ring from oil pump housing.



5. Remove oil pump housing oil seal.

CAUTION:

Be careful not to scratch oil pump housing.



INSPECTION

Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear

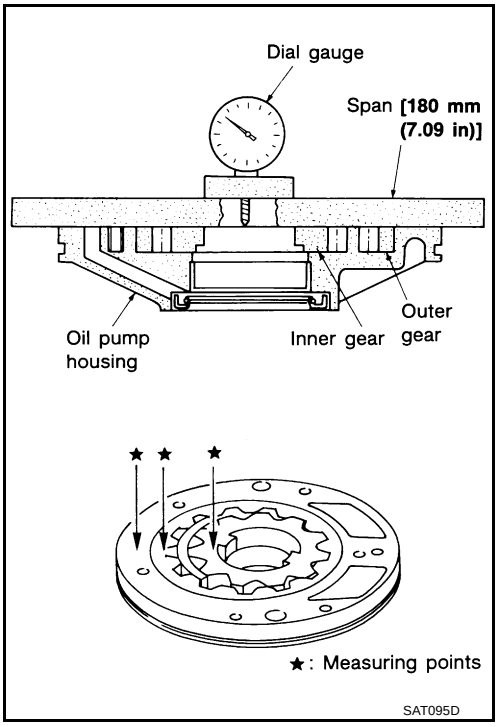
- Check for wear or damage.

Side Clearances

- Measure the 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 the clearance is less than standard, select inner and outer gear as a set so that clearance is within specifications. Refer to AT-530, "SERVICE DATA AND SPECIFICATIONS (SDS)" .
- If the clearance is more than standard, replace whole oil pump assembly except oil pump cover.

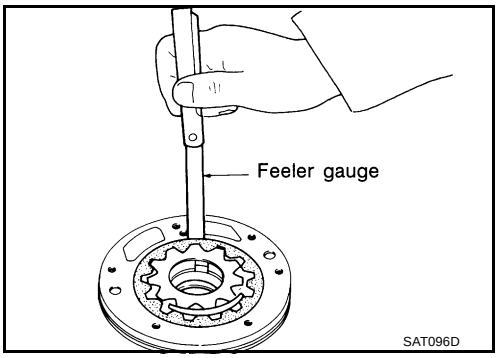


- Measure the clearance between outer gear and oil pump housing.

  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.



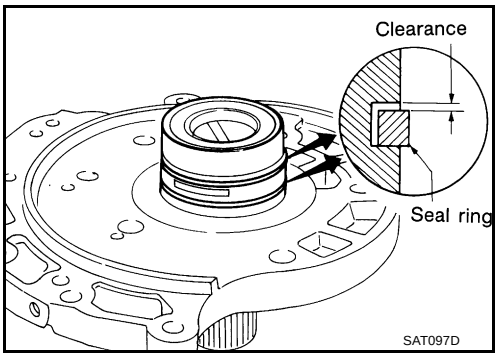
Seal Ring Clearance

- Measure the 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.

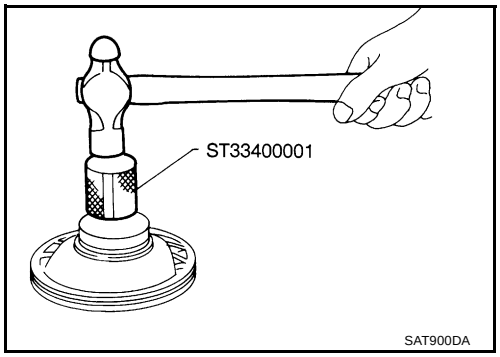


ASSEMBLY

1. Install oil pump housing oil seal on oil pump housing.

CAUTION:

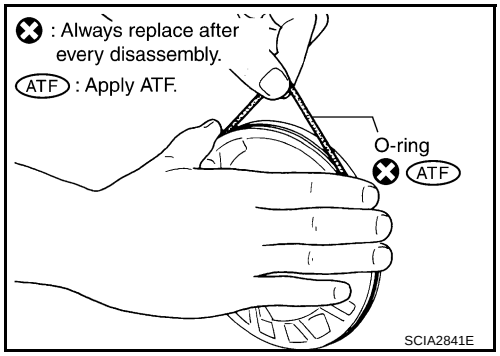
- **Do not reuse oil pump housing oil seal.**
- **Apply ATF to outer surface of oil pump housing oil seal.**



2. Install O-ring on oil pump housing.

CAUTION:

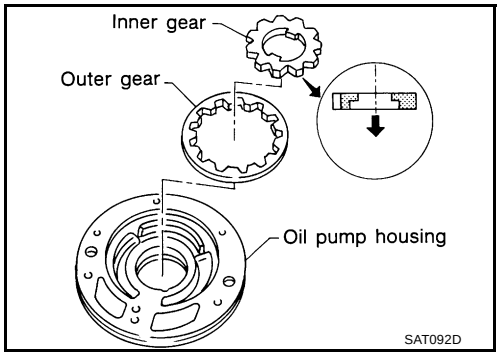
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**



3. Install inner and outer gears on oil pump housing.

CAUTION:

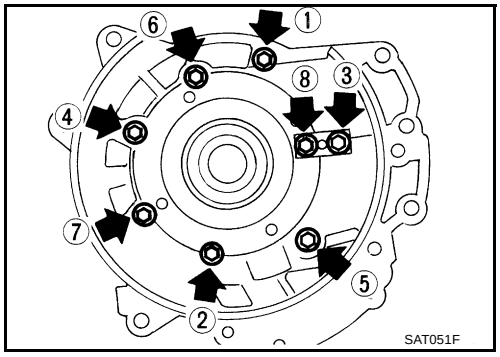
Be careful of the direction of inner gear.



4. Install oil pump cover on oil pump housing.

a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.

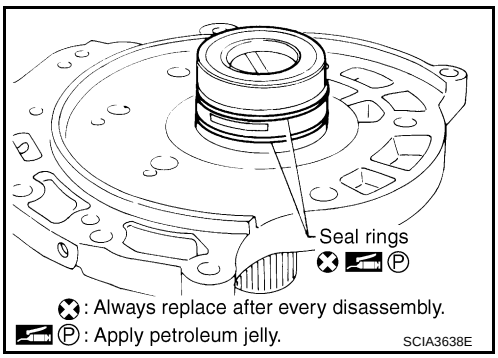
b. Tighten bolts in a crisscross pattern. Tighten oil pump cover bolts to the specified torque. Refer to AT-443, "COMPONENTS" .



5. Install new seal rings carefully after packing ring groove with petroleum jelly.

CAUTION:

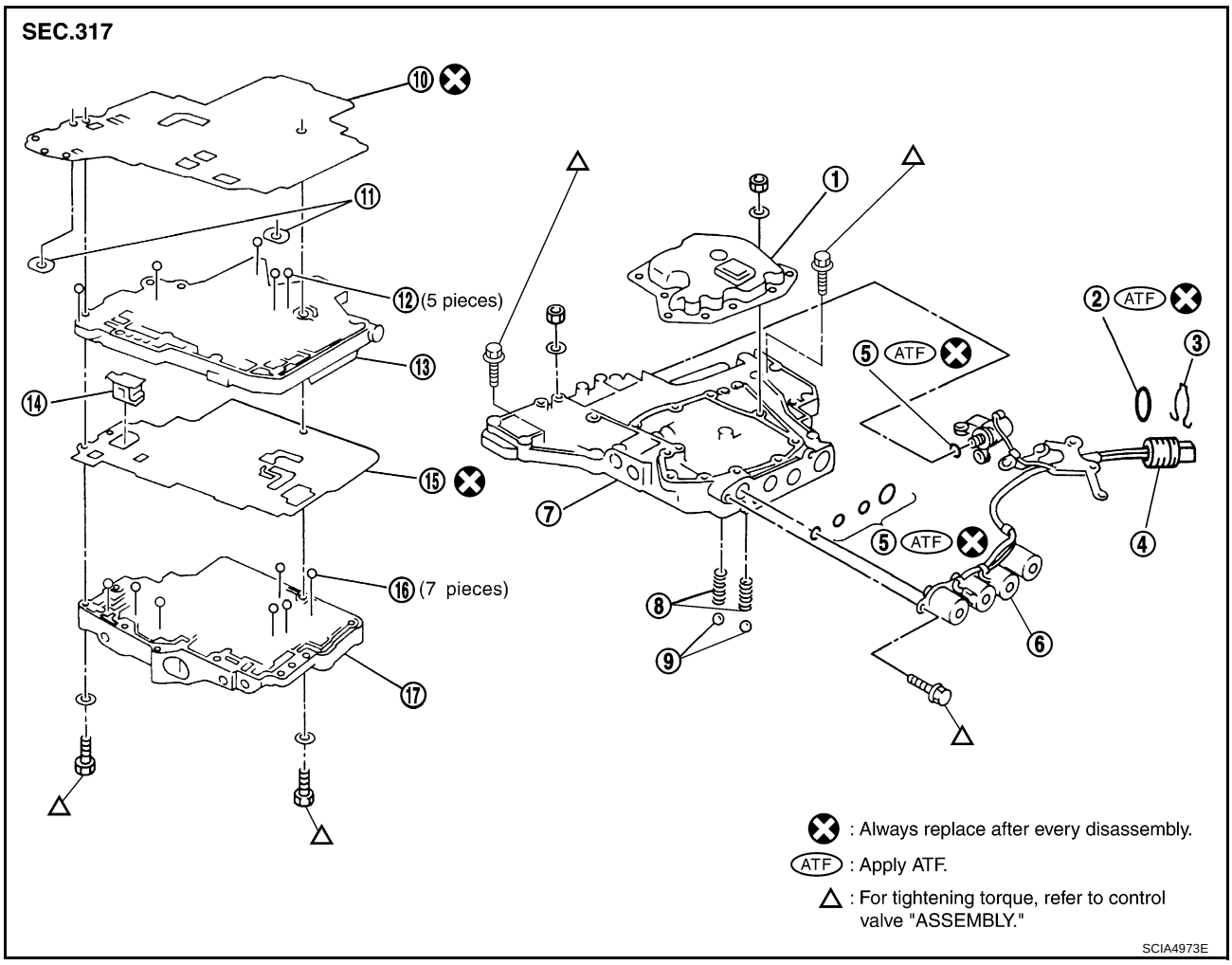
- **Do not spread the gap of seal ring excessively while installing. The ring may be deformed.**
- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**



Control Valve Assembly

ECS00EC1

COMPONENTS



1. Oil strainer
2. O-ring
3. Snap ring
4. Terminal body
5. O-ring
6. Solenoid valve assembly
7. Control valve lower body
8. Oil cooler relief valve spring
9. Check ball
10. Separating plate
11. Support plate
12. Steel ball
13. Control valve inter body
14. Pilot filter
15. Separating plate
16. Steel ball
17. Control valve upper body

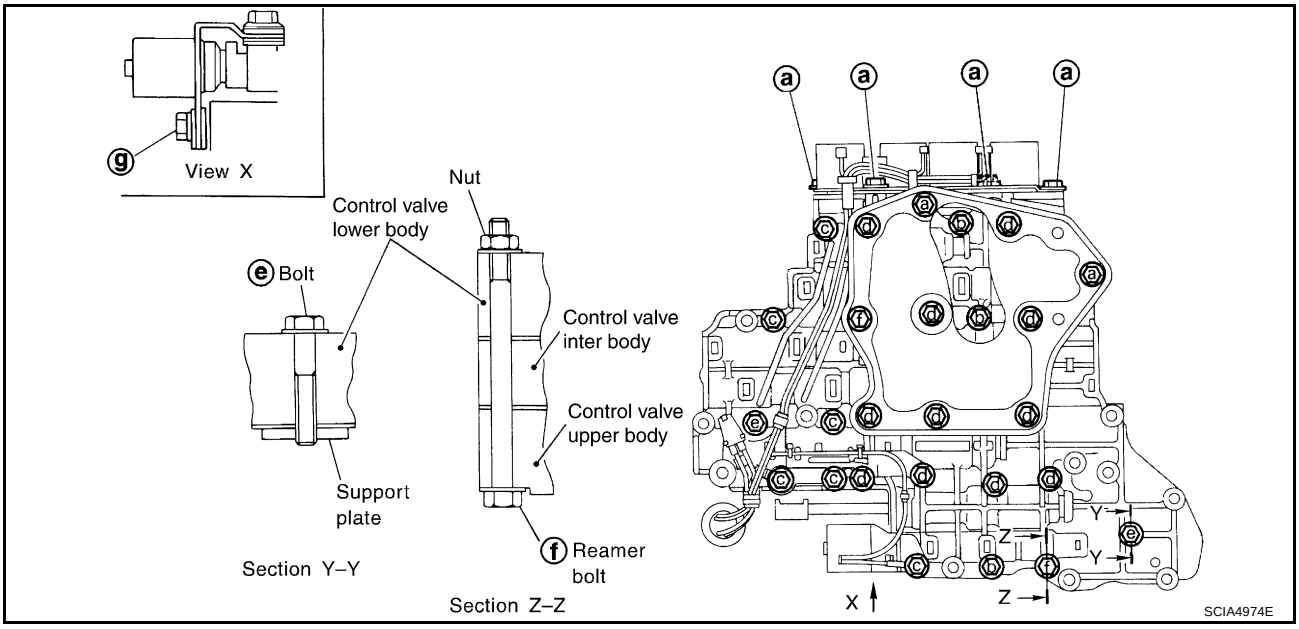
DISASSEMBLY

Disassemble upper, inter and lower bodies.

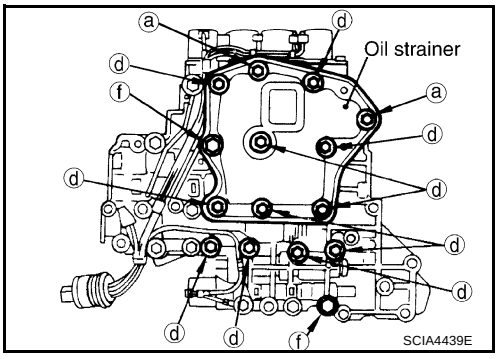
Bolt length, number and location:

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

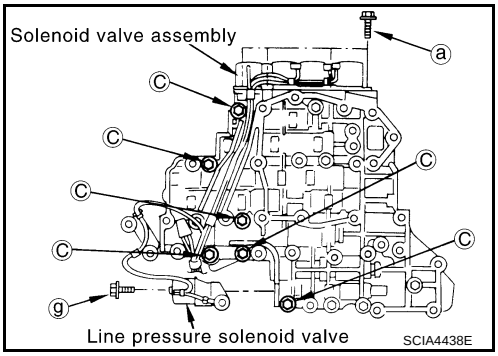
f: Reamer bolt and nut.



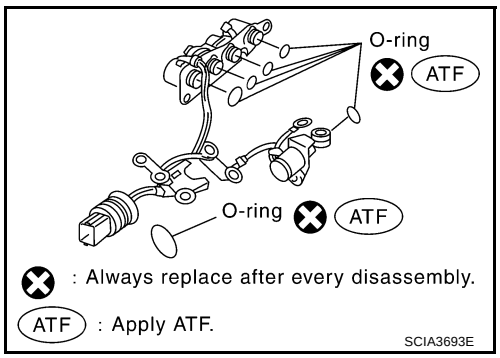
1. Remove bolts **a, d** , reamer bolt **f** and nut and remove oil strainer from control valve assembly.



2. Remove bolts **a, c, g** , solenoid valve assembly and line pressure solenoid valve from control valve assembly.



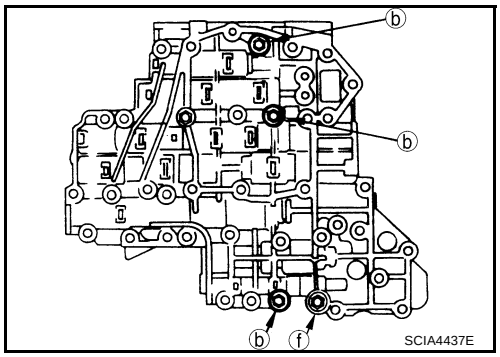
3. Remove O-rings from solenoid valves and terminal body.



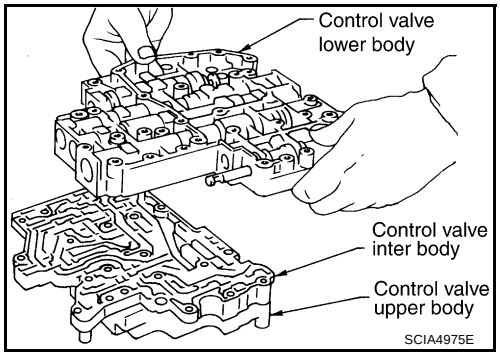
4. Place control valve upper body facedown, and remove bolts **b** , and nut **f** .

CAUTION:

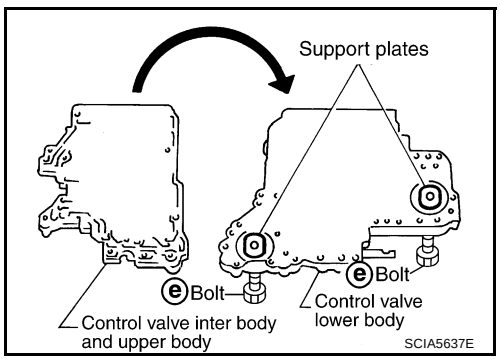
Remove bolts with control valve upper body facing down, because control valve upper body and control valve inter body may come off and steel ball may fall and be lost.



5. Remove control valve lower body from control valve inter body.



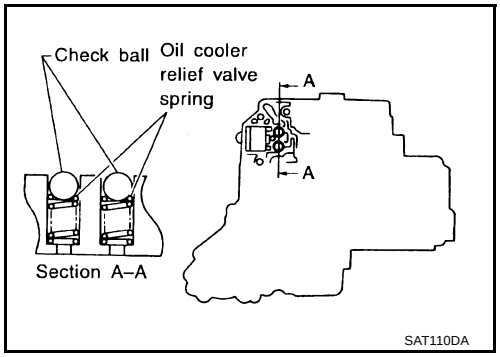
6. Turn over control valve lower body.
7. Remove bolts **e** , separating plate and support plates from control valve lower body.



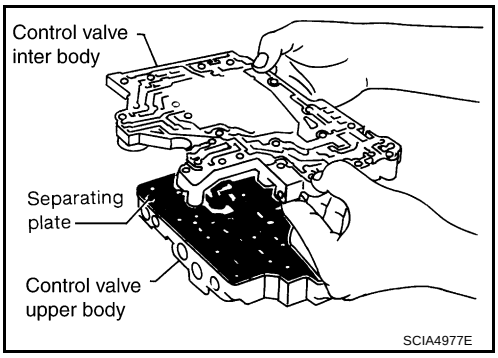
8. Remove check balls and oil cooler relief valve springs from control valve lower body.

CAUTION:

Be careful not to lose check balls and oil cooler relief valve springs.



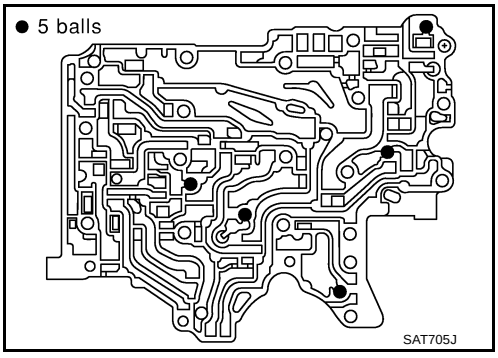
9. Remove control valve inter body from control valve upper body.



10. Check to see that steel balls are properly positioned in control valve inter body and then remove them.

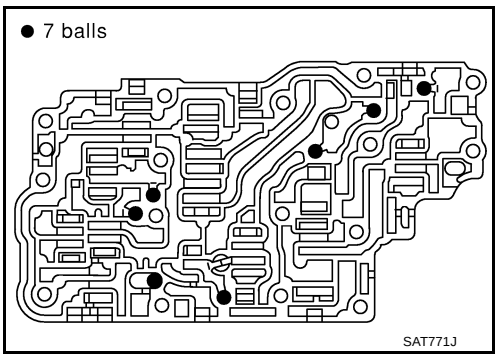
CAUTION:
Be careful not to lose steel balls.

11. Remove pilot filter from control valve upper body.
12. Remove separating plate from control valve upper body.



13. Check to see that steel balls are properly positioned in control valve upper body and then remove them.

CAUTION:
Be careful not to lose steel balls.

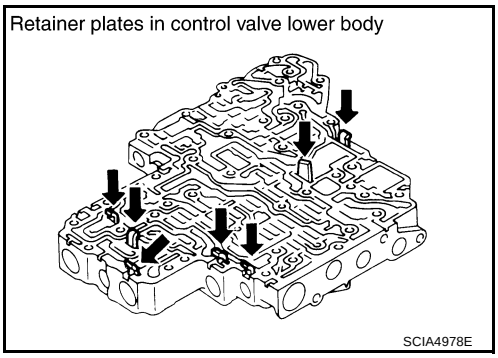


INSPECTION

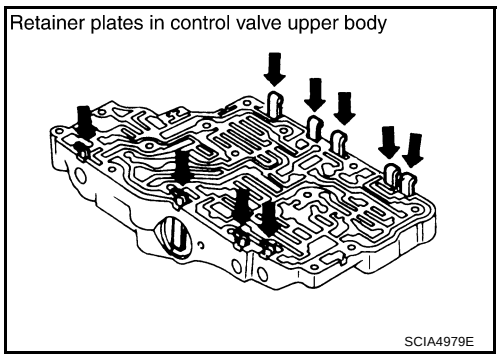
Control Valve Lower Body and Upper Body

CAUTION:
Be careful not to lose these parts.

- Check to see that retainer plates are properly positioned in control valve lower body.

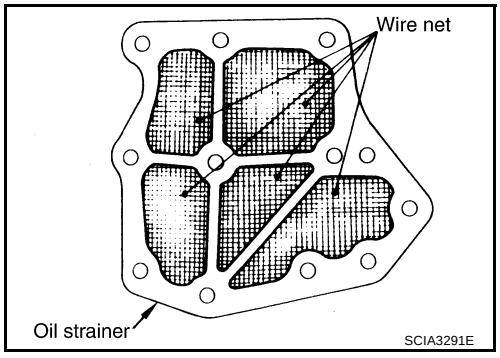


- Check to see that retainer plates are properly positioned in control valve upper body.



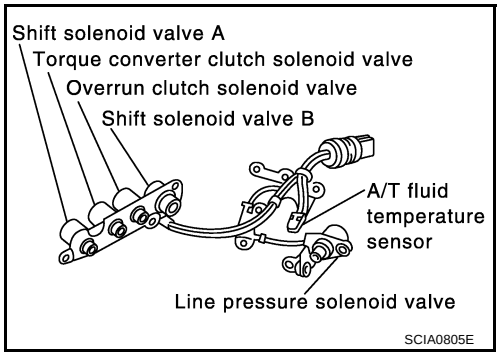
Oil Strainer

- 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

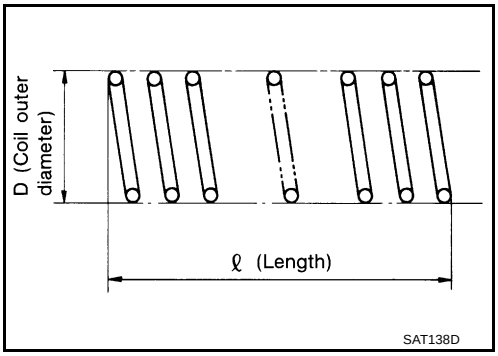
- Measure resistance.
- Except for EURO-OBD:
- For shift solenoid valve A, refer to AT-350, "SHIFT SOLENOID VALVE A" .
- For shift solenoid valve B, refer to AT-356, "SHIFT SOLENOID VALVE B" .
- For line pressure solenoid valve, refer to AT-387, "LINE PRESSURE SOLENOID VALVE" .
- For torque converter clutch solenoid valve, refer to AT-368, "TORQUE CONVERTER CLUTCH SOLENOID VALVE" .
- For overrun clutch solenoid valve, refer to AT-362, "OVERRUN CLUTCH SOLENOID VALVE" .



- For A/T fluid temperature sensor, refer toAT-374, "BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" .
- EURO-OBD:
- For shift solenoid valve A, refer to AT-161, "DTC P0750 SHIFT SOLENOID VALVE A" .
- For shift solenoid valve B, refer to AT-167, "DTC P0755 SHIFT SOLENOID VALVE B" .
- For line pressure solenoid valve, refer to AT-154, "DTC P0745 LINE PRESSURE SOLENOID VALVE" .
- For torque converter clutch solenoid valve, refer to AT-148, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" .
- For overrun clutch solenoid valve, refer to AT-178, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" .
- For A/T fluid temperature sensor, refer to AT-184, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" .

Oil Cooler Relief Valve Spring

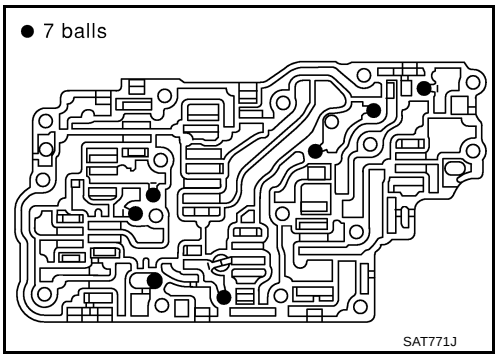
- Check springs for damage or deformation.
- Measure free length and outer diameter. Refer to AT-530, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



ASSEMBLY

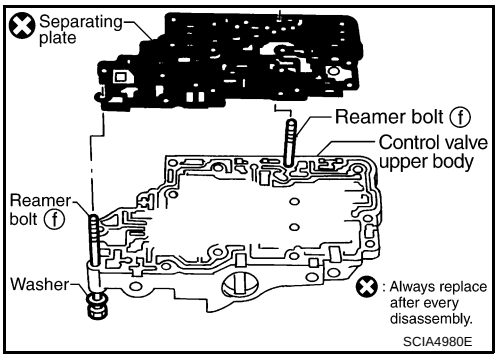
1. Install control valve upper, inter and lower body.

a. Place oil circuit of control valve upper body face up. Install steel balls in their proper positions.

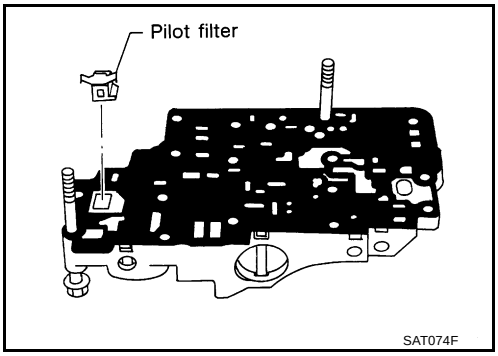


b. Install reamer bolts **f** from bottom of control valve upper body. Using reamer bolts as guides, install separating plate as a set.

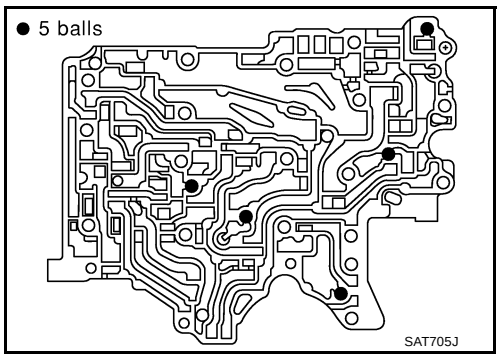
CAUTION:
Do not reuse separating plate.



c. Install pilot filter.

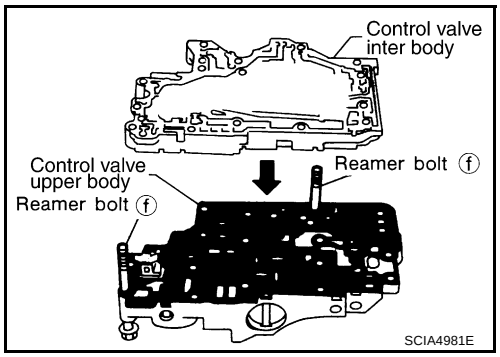


d. Place control valve inter body as shown in the figure (side of control valve lower body face up). Install steel balls in their proper positions.

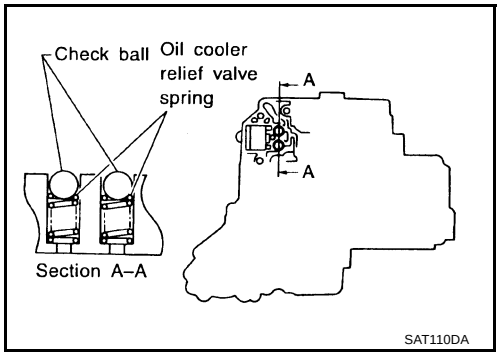


e. Install control valve inter body on control valve upper body using reamer bolts **f** as guides.

CAUTION:
Be careful not to dislocate or drop steel balls.



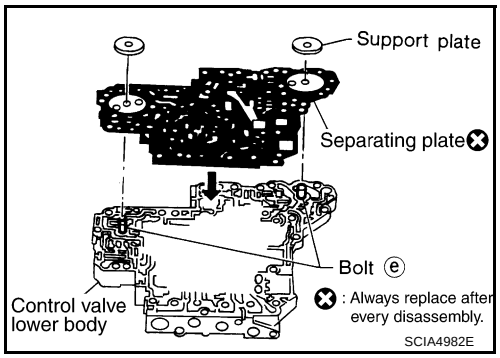
f. Install check balls and oil cooler relief valve springs in their proper positions in control valve lower body.



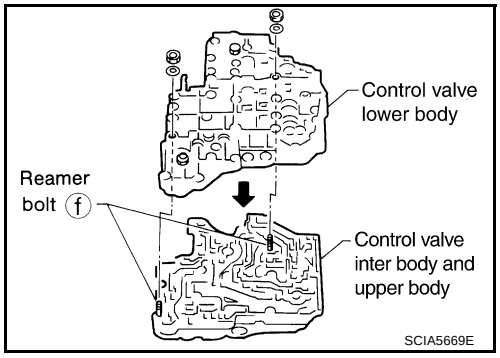
g. Install bolts **e** from bottom of control valve lower body. Using bolts **e** as guides, install separating plate as a set.

CAUTION:
Do not reuse separating plate.

h. Install support plates on control valve lower body.



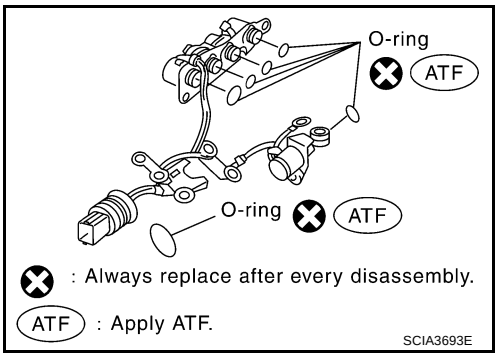
i. Install control valve lower body on control valve inter body using reamer bolts **f** as guides and tighten reamer bolts **f** slightly.



2. Install O-rings to solenoid valves and terminal body.

CAUTION:

- **Do not reuse O-rings.**
- **Apply ATF to O-rings.**

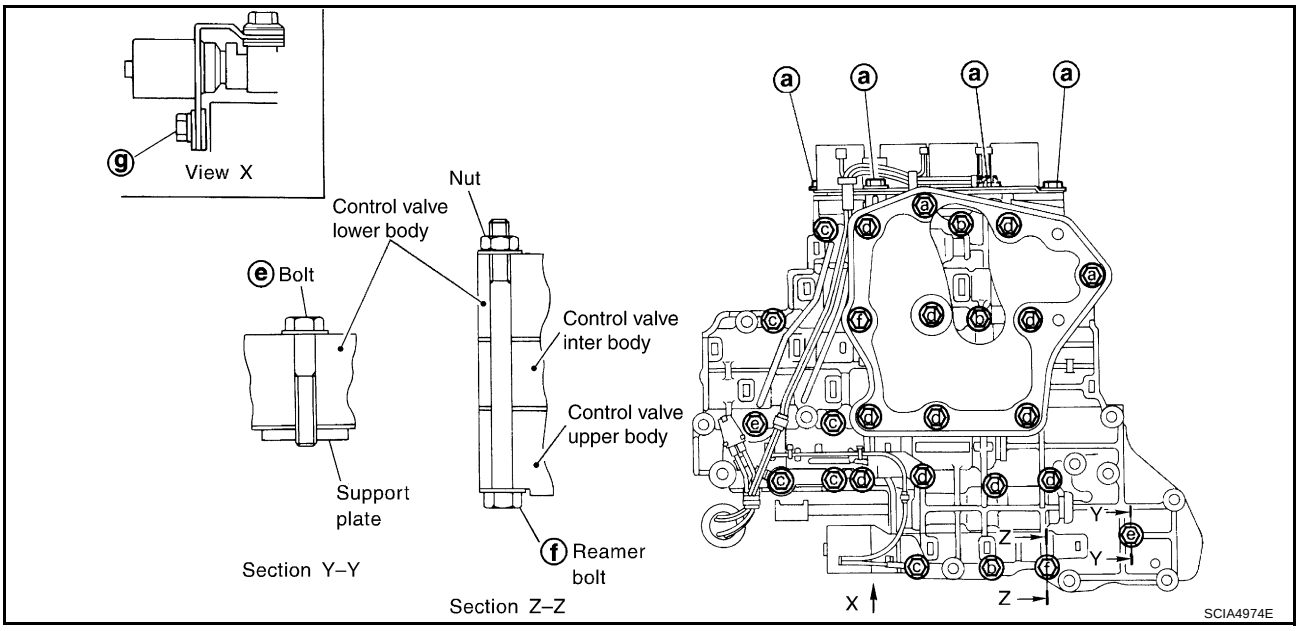


3. Install and tighten bolts.

Bolt length, number and location:

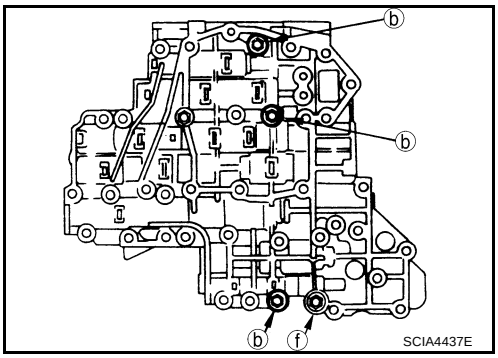
Bolt symbol	a	b	c	d	e	f	g
Bolt length "ℓ" mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1
Tightening torque N·m (kg-m, in-lb)	7.8 (0.80, 69)				4.0 (0.41, 35)	7.8 (0.80, 69)	

f: Reamer bolt and nut.



a. Install and tighten bolts **b** and nut **f** to specified torque.

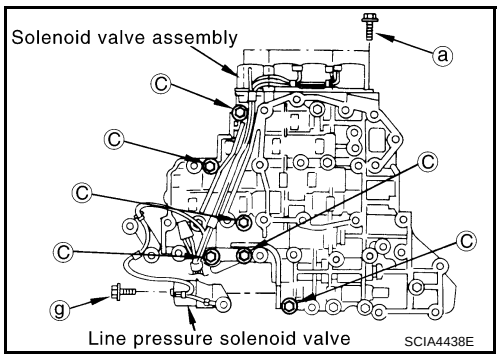
: 7.8 N·m (0.80 kg-m, 69 in-lb)



b. Install solenoid valve assembly and line pressure solenoid valve on control valve assembly.

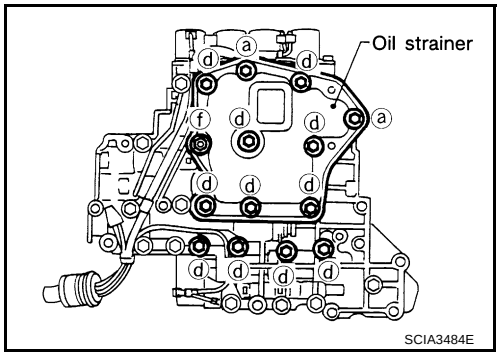
c. Tighten bolts **a** , **c** and **g** to specified torque.

: 7.8 N·m (0.80 kg-m, 69 in-lb)



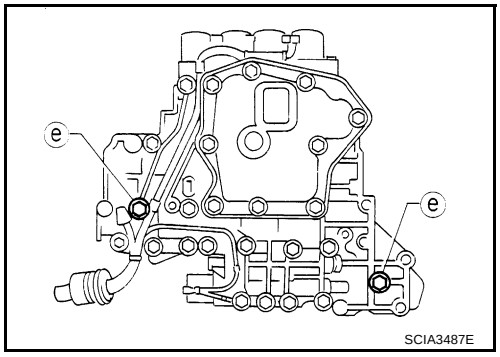
d. Set oil strainer, then tighten bolts **a** , **d** and nut **f** to specified torque.

: 7.8 N·m (0.80 kg-m, 69 in-lb)



e. Tighten bolts **e** to specified torque.

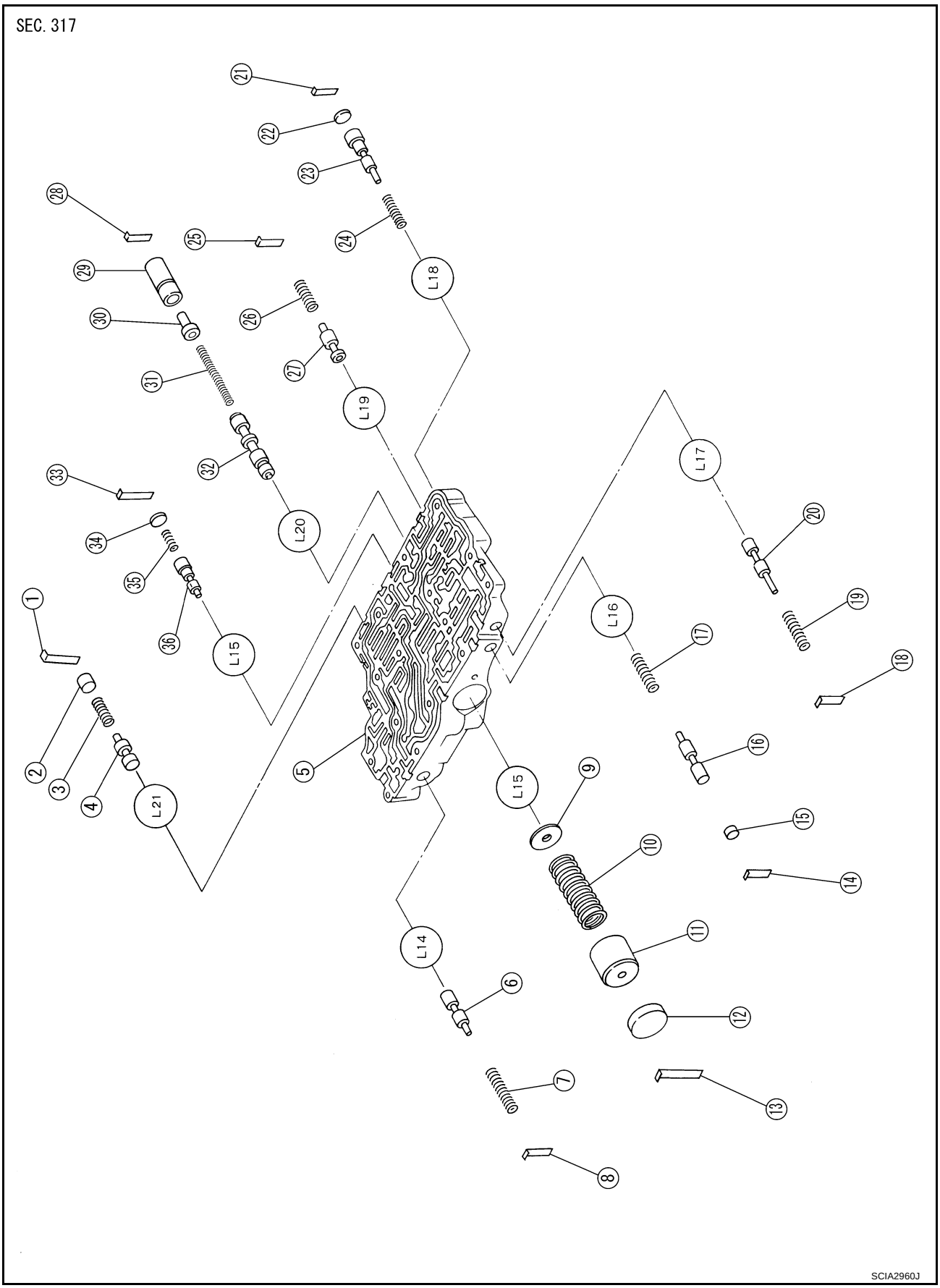
: 4.0 N·m (0.41 kg-m, 35 in-lb)



Control Valve Upper Body

ECS00EC2

COMPONENTS



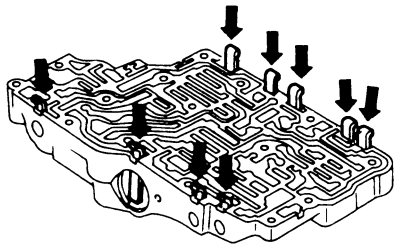
1. Retainer plate	2. Plug	3. Cooler check valve spring
4. Cooler check valve	5. Control valve upper body	6. Pilot valve
7. Pilot valve spring	8. Retainer plate	9. 1-2 accumulator retainer plate
10. 1-2 accumulator piston spring	11. 1-2 accumulator piston	12. Plug
13. Retainer plate	14. Retainer plate	15. Plug
16. 1st reducing valve	17. 1st reducing valve spring	18. Retainer plate
19. 3-2 timing valve spring	20. 3-2 timing valve	21. Retainer plate
22. Plug	23. Overrun clutch reducing valve	24. Overrun clutch reducing valve spring
25. Retainer plate	26. Torque converter relief valve spring	27. Torque converter relief valve
28. Retainer plate	29. Sleeve	30. Plug
31. Torque converter clutch control valve spring	32. Torque converter clutch control valve	33. Retainer plate
34. Plug	35. 1-2 accumulator valve spring	36. 1-2 accumulator valve

DISASSEMBLY

1. Remove valves at retainer plates.

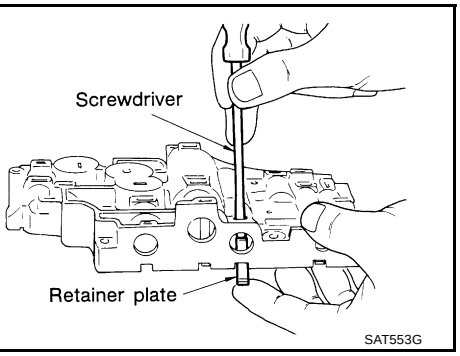
CAUTION:
Do not use a magnetic pick-up tool.

Retainer plates in control valve upper body



SCIA4979E

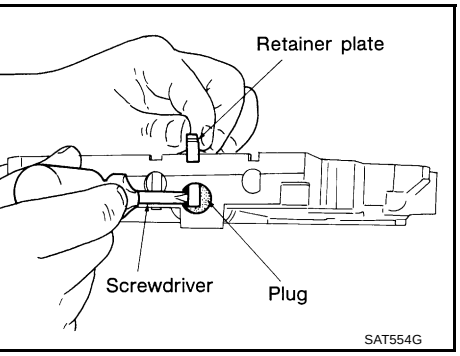
a. Use a screwdriver to remove retainer plates.



SAT553G

b. Remove retainer plates while holding spring, plugs or sleeves.

CAUTION:
Remove plugs slowly to prevent internal parts from jumping out.

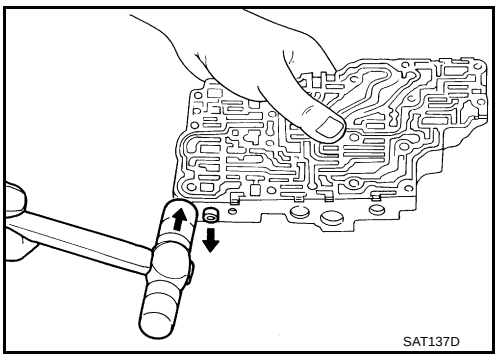


SAT554G

c. Place mating surface of valve body face down, and remove internal parts.

CAUTION:

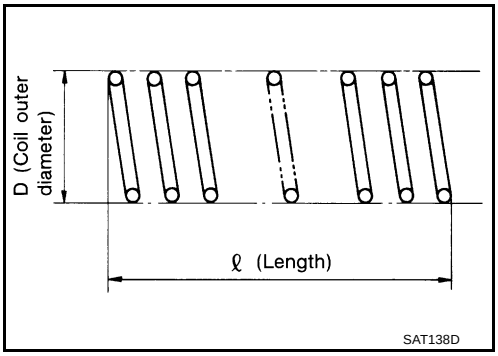
- **If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.**
- **Be careful not to drop or damage valves and sleeves.**



INSPECTION

Valve Spring

- Measure free length and outer diameter of each valve spring. Also check for damage or deformation. Refer to AT-530, "SERVICE DATA AND SPECIFICATIONS (SDS)" .
- Replace valve springs if deformed or fatigued.



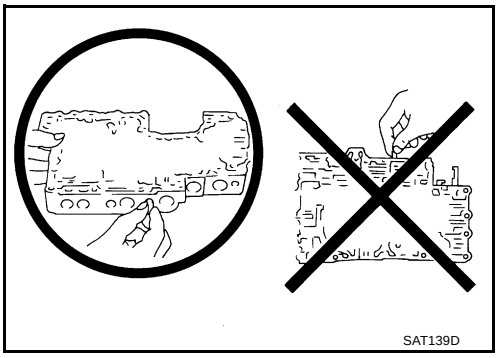
Control Valves

- Check sliding surfaces of valves, sleeves and plugs.

ASSEMBLY

CAUTION:

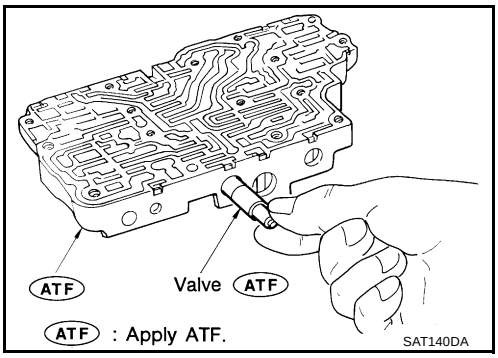
- **Apply ATF to all components before installation.**
- **Lay control valve body down when installing valves. Do not stand control valve body upright.**



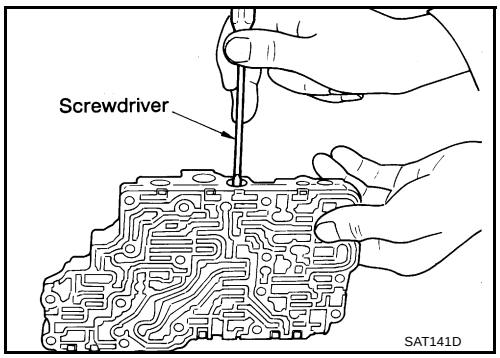
- Lubricate control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.

CAUTION:

- **Install each control valve one by one.**
- **Install control valves after checking, because some of them are similar.**
- **Be careful not to scratch or damage valve body.**

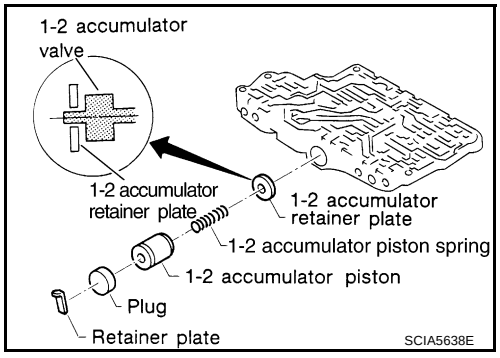


– Wrap a small screwdriver with vinyl tape and use it to insert valves into their proper positions.



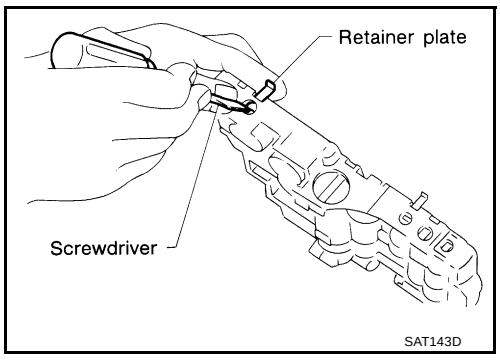
1-2 Accumulator Valve

- Install 1-2 accumulator valve. Align 1-2 accumulator retainer plate from opposite side of control valve body.
- Install 1-2 accumulator piston spring, 1-2 accumulator valve spring, 1-2 accumulator piston and plugs.



- Install retainer plates.

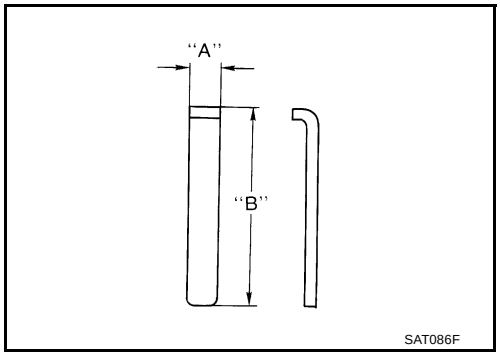
– While pushing plugs (with 1-2 accumulator piston spring and 1-2 accumulator valve spring), install retainer plate.



Retainer Plate (Control Valve Upper Body)

Unit: mm (in)

Location	Name of control valve	Width A	Length B
L14	Pilot valve	6.0 (0.236)	21.5 (0.846)
L16	1st reducing valve		
L17	3-2 timing valve		
L19	Torque converter relief valve		
L15	1-2 accumulator valve		40.5 (1.594)
	1-2 accumulator piston		
L18	Overrun clutch reducing valve		24.0 (0.945)
L21	Cooler check valve		
L20	Torque converter clutch control valve		28.0 (1.102)

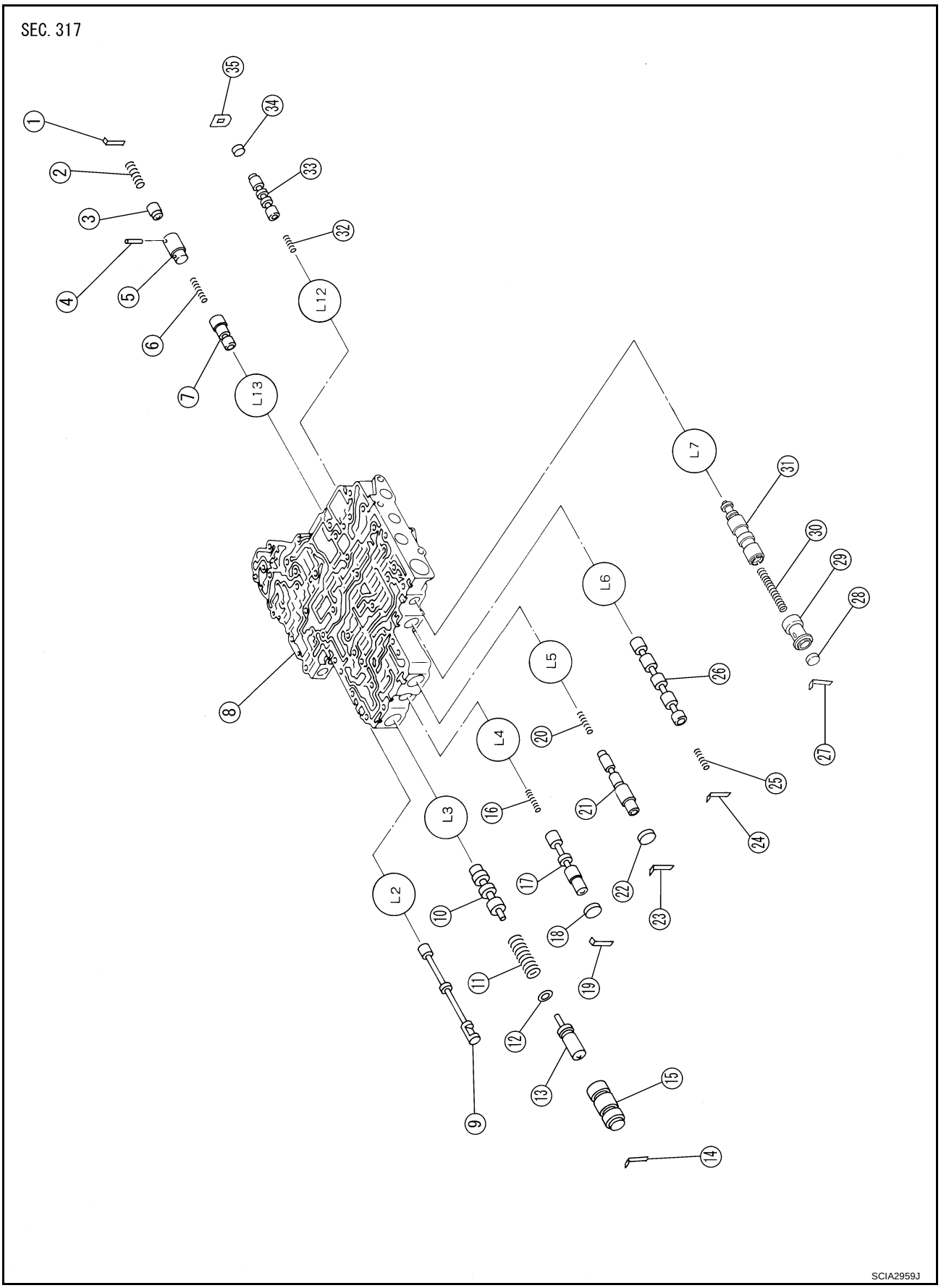


- Install proper retainer plates.
  Refer to AT-457, "Control Valve Upper Body" .

Control Valve Lower Body

ECS00EC3

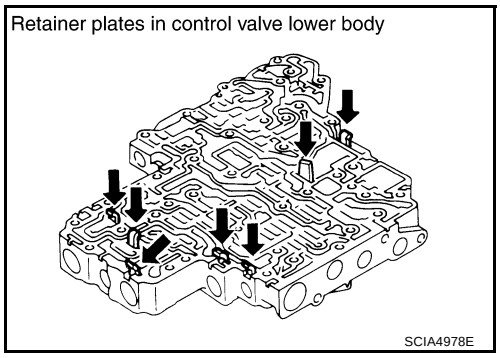
COMPONENTS



1. Retainer plate
2. Pressure modifier piston spring
3. Pressure modifier piston
4. Parallel pin
5. Sleeve
6. Pressure modifier valve spring
7. Pressure modifier valve
8. Control valve lower body
9. Manual valve
10. Pressure regulator valve
11. Pressure regulator valve spring
12. Spring seat
13. Plug
14. Retainer plate
15. Sleeve
16. Overrun clutch control valve spring
17. Overrun clutch control valve
18. Plug
19. Retainer plate
20. Accumulator control valve spring
21. Accumulator control valve
22. Plug
23. Retainer plate
24. Retainer plate
25. Shift valve A spring
26. Shift valve A
27. Retainer plate
28. Plug
29. Shuttle plug
30. Shuttle valve spring
31. Shuttle valve
32. Shift valve B spring
33. Shift valve B
34. Plug
35. Retainer plate

DISASSEMBLY

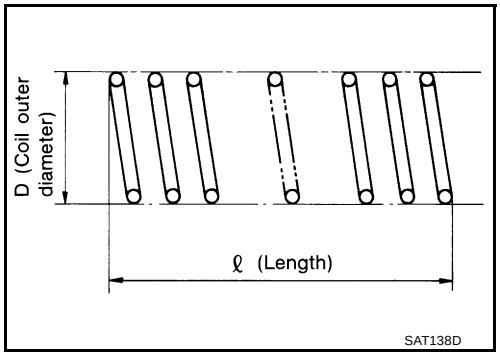
- Remove valves at retainer plates.
  For removal procedures, refer to AT-458, "DISASSEMBLY" .



INSPECTION

Valve Springs

- Check each valve spring for damage or deformation. Also measure free length and outer diameter. Refer to AT-530, "SERVICE DATA AND SPECIFICATIONS (SDS)" .
- Replace valve springs if deformed or fatigued.



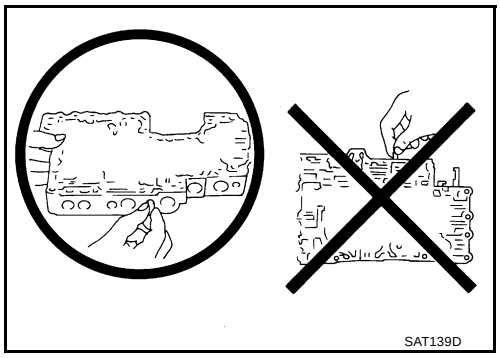
Control Valves

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

ASSEMBLY

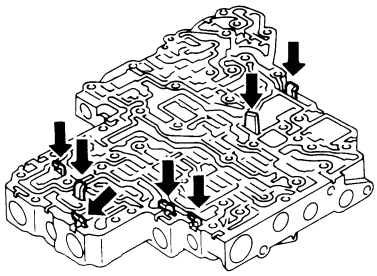
CAUTION:

- **Apply ATF to all components before installation.**
- **Lay control valve body down when installing valves. Do not stand control valve body upright.**



- Install control valves.
  For installation procedures, refer to AT-459, "ASSEMBLY" .

Retainer plates in control valve lower body



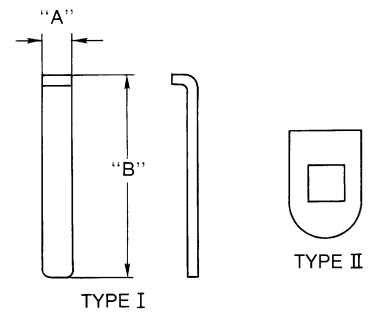
SCIA4978E

Retainer Plate (Control Valve Lower Body)

- Install proper retainer plates. Refer to AT-461, "COMPONENTS" .

Unit: mm (in)

Location	Name of control valve and plug	Width A	Length B	Type
L3	Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
L5	Accumulator control valve			
L6	Shift valve A			
L4	Overrun clutch control valve			
L13	Pressure modifier valve			
L7	Shuttle valve			
L12	Shift valve B	17.0 (0.669)	24.0 (0.945)	II

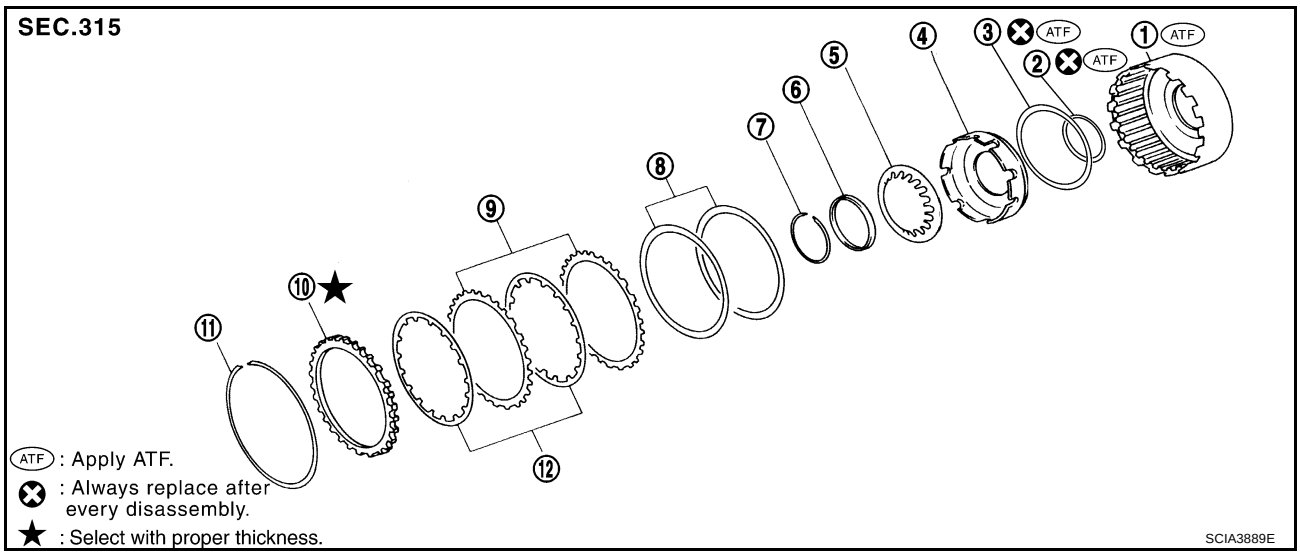


SAT089F

Reverse Clutch

ECS00EC4

COMPONENTS



1. Reverse clutch drum
2. D-ring
3. Seal ring
4. Reverse clutch piston
5. Return spring
6. Spring retainer
7. Snap ring
8. Dish plate
9. Driven plate
10. Retaining plate
11. Snap ring
12. Drive plate

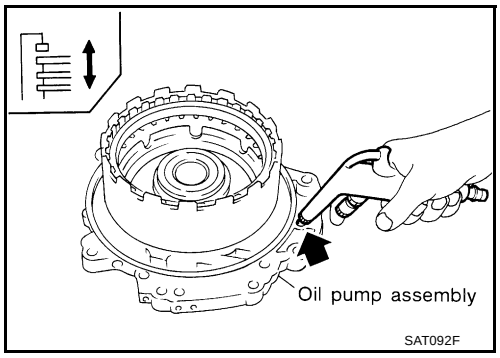
DISASSEMBLY

1. Check operation of reverse clutch

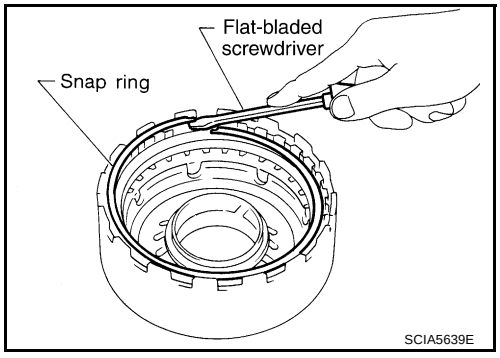
a. Install seal ring onto drum support of oil pump cover and install reverse clutch assembly. Apply compressed air to oil hole.

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.
   - Seal ring 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.

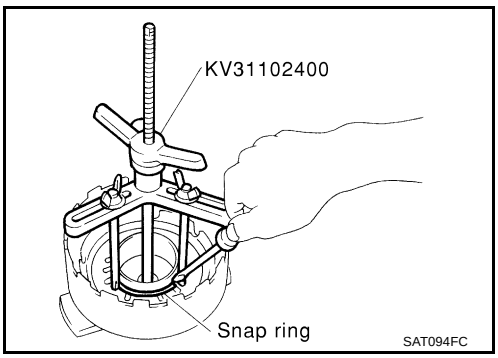


4. Set SST on spring retainer and remove snap ring from reverse clutch drum while compressing return spring.

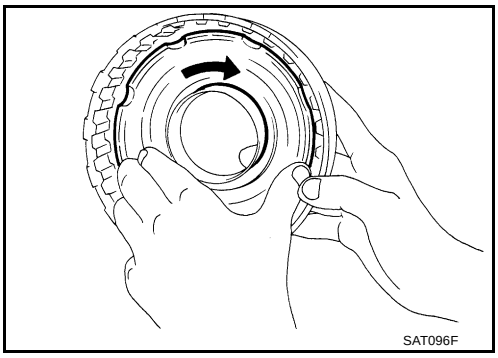
CAUTION:

- **Set SST directly over return spring.**
- **Do not expand snap ring excessively.**

5. Remove spring retainer and return springs.



6. Remove reverse clutch piston from reverse clutch drum by turning it.
7. Remove D-ring and seal ring from reverse clutch piston.



INSPECTION

Reverse Clutch Snap Rings, Spring Retainer and Return Spring

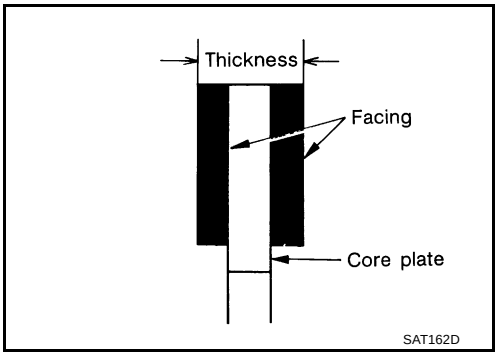
- Check for deformation, fatigue or damage.
  If necessary, replace.

Reverse Clutch Drive Plates

- Check facing for burns, cracks or damage.
- Measure the 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.

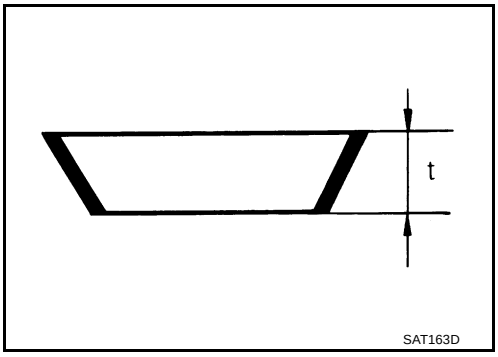


Reverse Clutch Dish Plates

- Check for deformation or damage.
- Measure the thickness of dish plate.

Thickness of dish plate: 3.08 mm (0.1213 in)

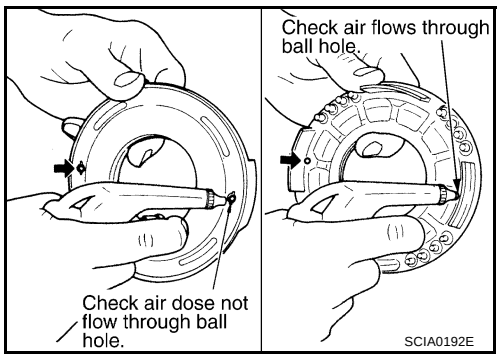
- If deformed or fatigued, replace.



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.

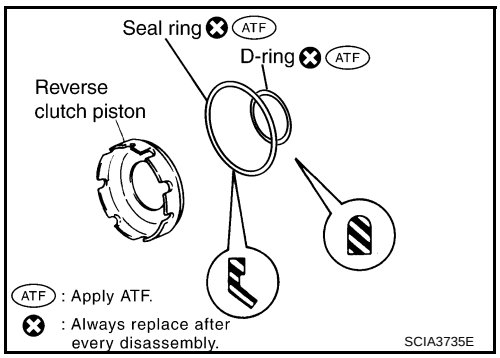
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.



ASSEMBLY

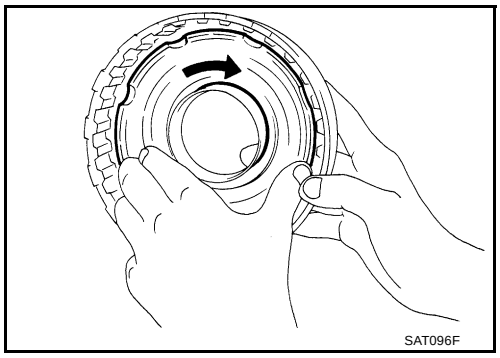
1. Install D-ring and Seal ring on piston.

   CAUTION:
   - **Take care with the direction of Seal ring.**
   - **Apply ATF to D-ring and seal ring.**
   - **Do not reuse D-ring and seal ring.**



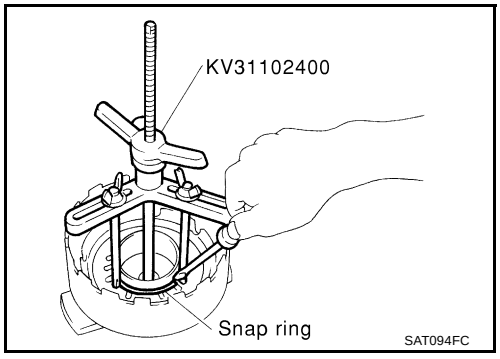
2. Install reverse clutch piston by turning it slowly.

   CAUTION:
   Apply ATF to inner surface of drum.



3. Install return springs and spring retainer on reverse clutch piston.
4. Set SST on spring retainer and install snap ring while compressing return spring.

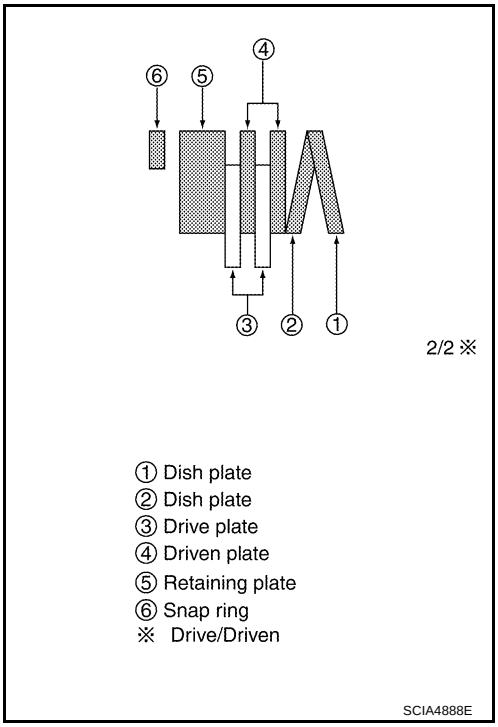
   CAUTION:
   - **Set SST directly over return spring.**
   - **Do not expand snap ring excessively.**



5. Install drive plates, driven plates, retaining plate and dish plates. Refer to AT-533, "REVERSE CLUTCH" .

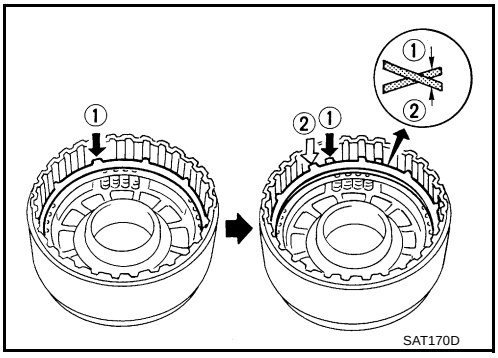
CAUTION:

Be careful with the order and the direction of plates.

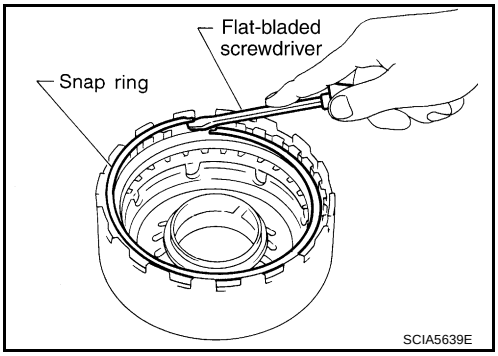


NOTE:

Install two dish plates fitting each installation direction with reverse clutch drum groove displaced slightly.



6. Install snap ring.

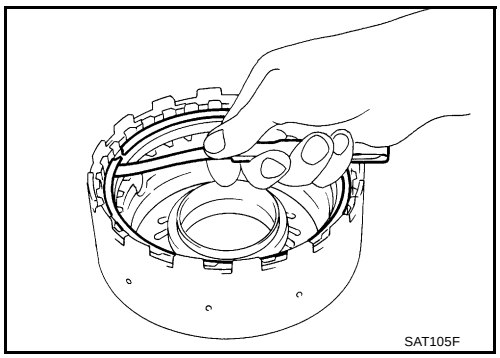


7. Measure the clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate. Refer to AT-533, "REVERSE CLUTCH" .

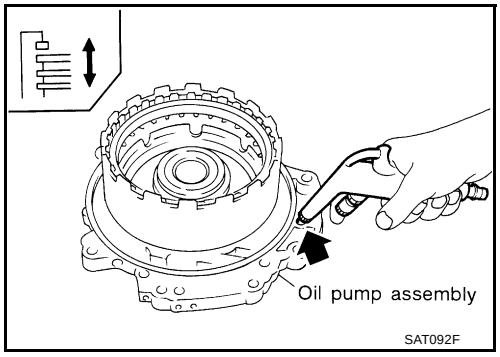
   Specified clearance:

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

   Allowable limit: 1.2 mm (0.047 in)



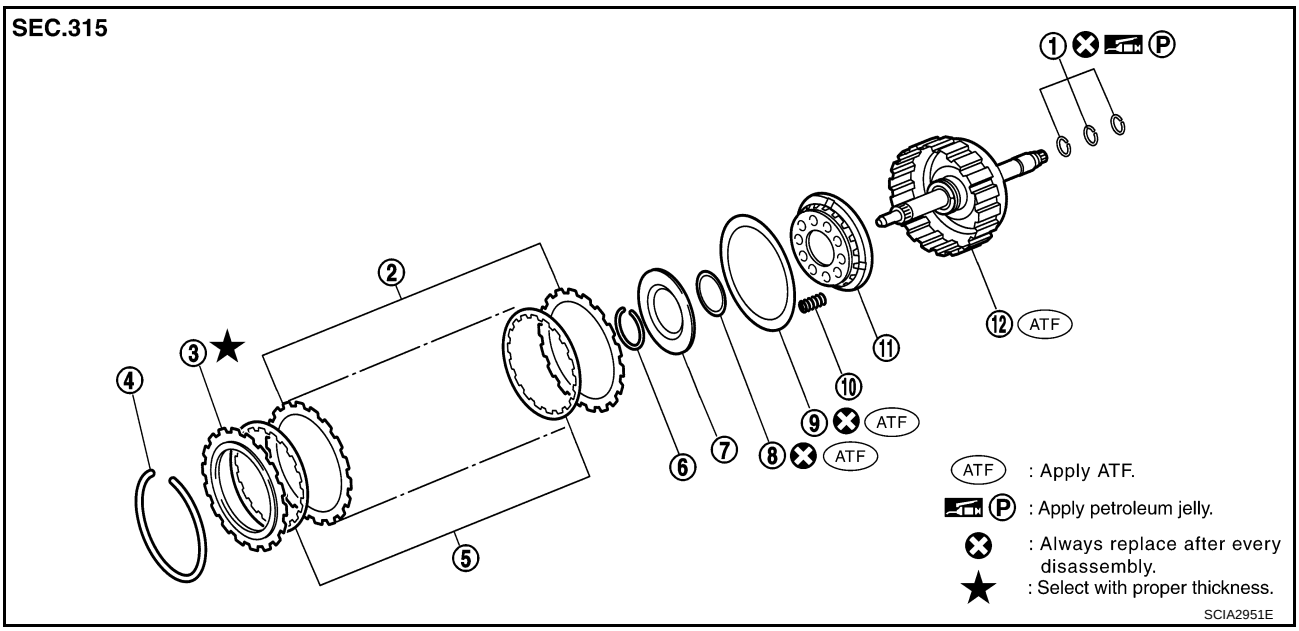
8. Check operation of reverse clutch. Refer to AT-464, "DISASSEMBLY" .



High Clutch

ECS00EC5

COMPONENTS



1. Seal ring
2. Driven plate
3. Retaining plate
4. Snap ring
5. Drive plate
6. Snap ring
7. Cancel cover
8. D-ring
9. D-ring
10. Return spring
11. High clutch piston
12. Input shaft assembly (High clutch drum)

DISASSEMBLY

1. Check operation of high clutch.

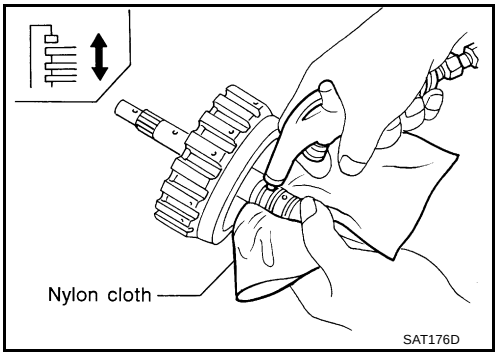
a. Apply compressed air to oil hole of input shaft assembly (high clutch drum) with nylon cloth.

CAUTION:
Stop up hole on opposite side of input shaft assembly (high clutch drum) with nylon cloth.

b. Check to see that retaining plate moves to snap ring.

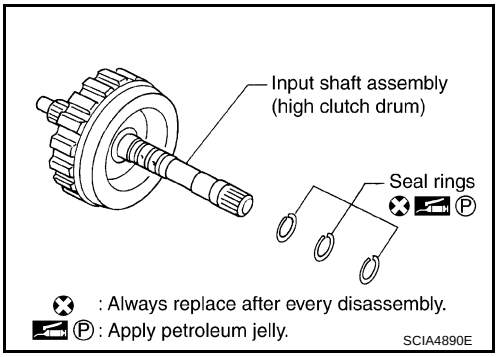
c. If retaining plate does not contact snap ring:

- Fluid might be leaking past piston check ball.

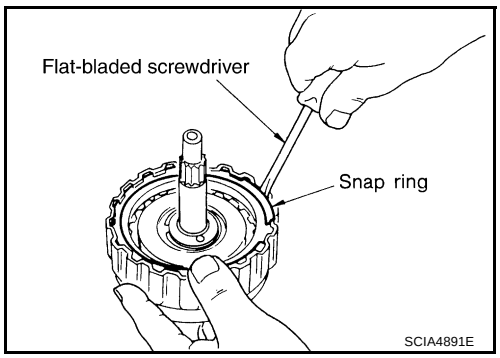


2. Remove seal rings from input shaft assembly (high clutch drum).

CAUTION:
Always replace seal rings when removed.



3. Remove snap ring with flat-bladed screwdriver.
4. Remove drive plates, driven plates and retaining plate.

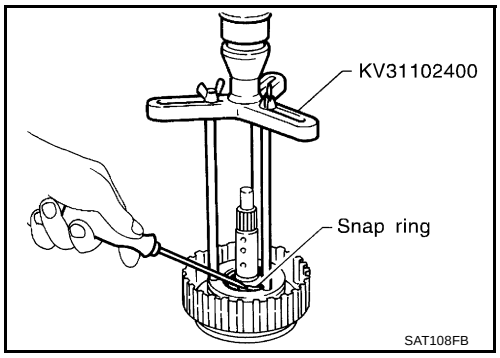


5. Set SST on spring retainer and remove snap ring from input shaft assembly (high clutch drum) while compressing return springs.

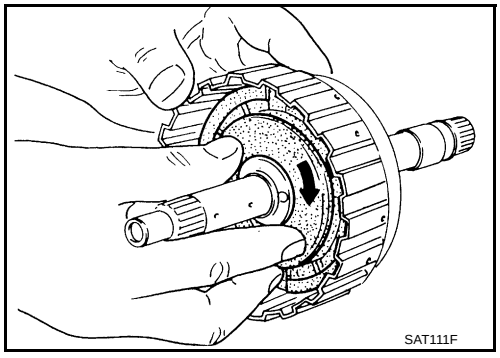
CAUTION:

- **Set SST directly over springs.**
- **Do not expand snap ring excessively.**

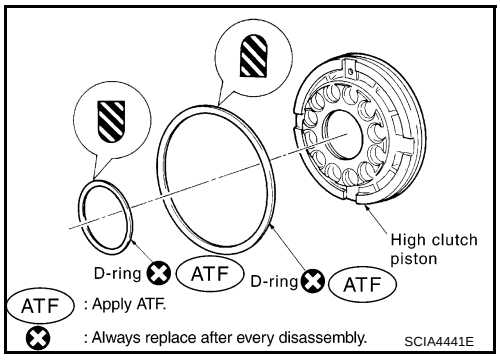
6. Remove spring retainer and return springs.



7. Remove high clutch piston from input shaft assembly (high clutch drum) by turning it.



8. Remove D-rings from high clutch piston.



INSPECTION

High Clutch Snap Ring, Spring Retainer and Return Springs

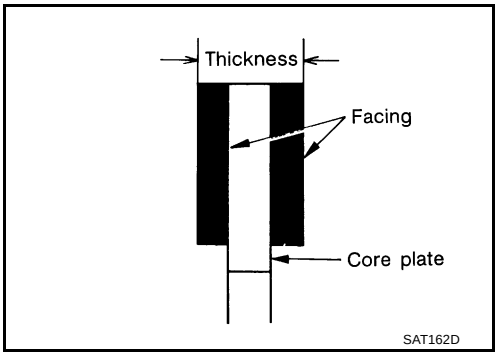
- Check for deformation, fatigue or damage.
  If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**

High Clutch Drive Plates

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

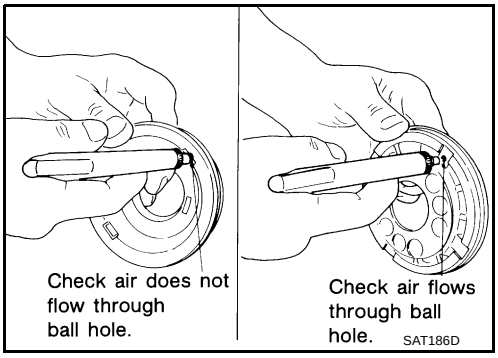
Thickness of drive plate:
Standard value 1.6 mm (0.063 in)
Wear limit 1.4 mm (0.055 in)

- 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 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.

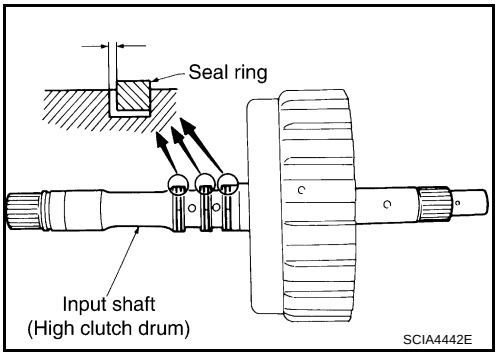


Seal Ring Clearance

- Install new seal rings onto input shaft assembly (high clutch drum).
- Measure the 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)

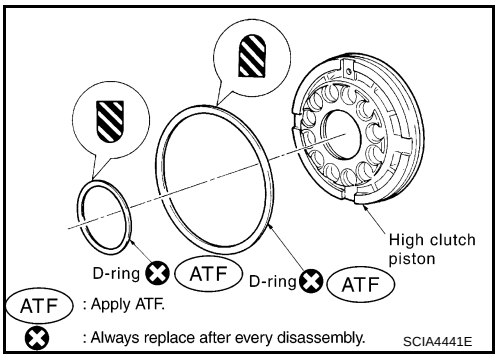
- If not within allowable limit, replace input shaft assembly.



ASSEMBLY

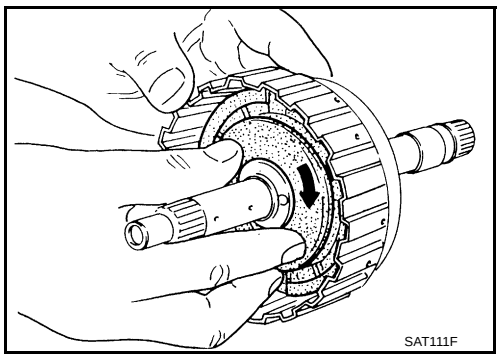
1. Install D-rings on high clutch piston.

CAUTION:
- **Apply ATF to D-rings.**
- **Do not reuse D-rings.**

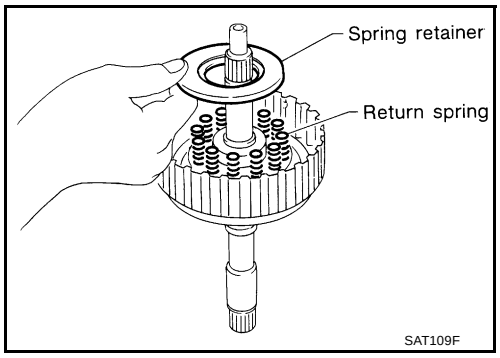


2. Install high clutch piston by turning it slowly.

CAUTION:
Apply ATF to inner surface of input shaft assembly (high clutch drum).

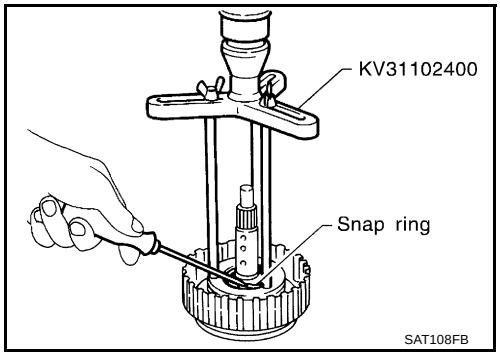


3. Install return springs and spring retainer on high clutch piston.

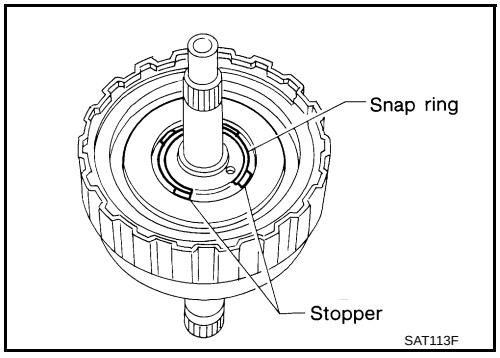


4. Set SST on spring retainer and install snap ring while slowly compressing return springs.

CAUTION:
- **Set SST directly over return springs.**
- **Do not expand snap ring excessively.**

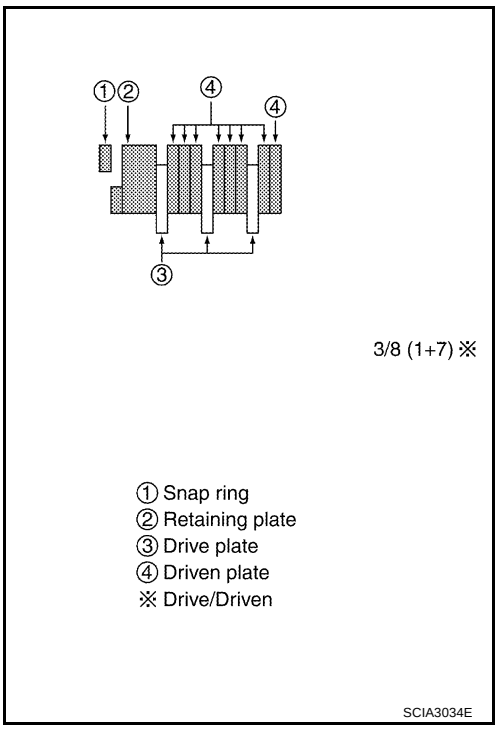


CAUTION:
Do not align snap ring gap with spring retainer stopper.

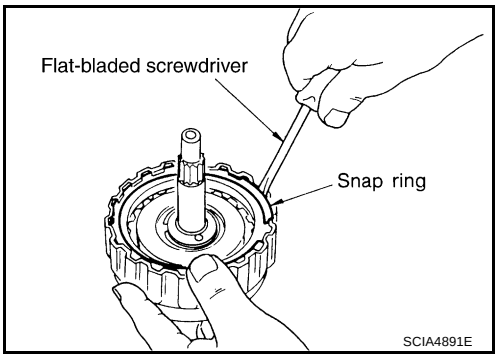


5. Install drive plates, driven plates and retaining plate. Refer to AT-533, "HIGH CLUTCH" .

CAUTION:
Be careful with the order and the direction of plates.



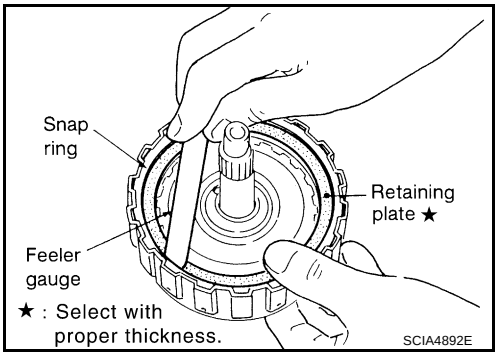
6. Install snap ring with flat-bladed screwdriver.



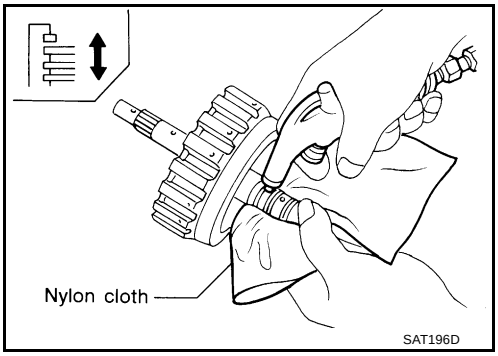
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate. Refer to AT-533, "HIGH CLUTCH" .

Specified clearance

Standard:	**1.8 - 2.2 mm (0.071 - 0.087 in)**
Allowable limit:	**2.8 mm (0.110 in)**



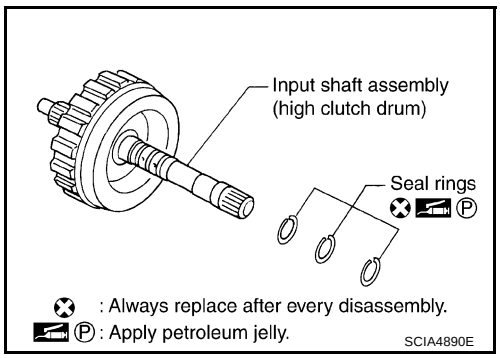
8. Check operation of high clutch. Refer to AT-469, "DISASSEMBLY" .



9. Install seal rings to input shaft assembly (high clutch drum).

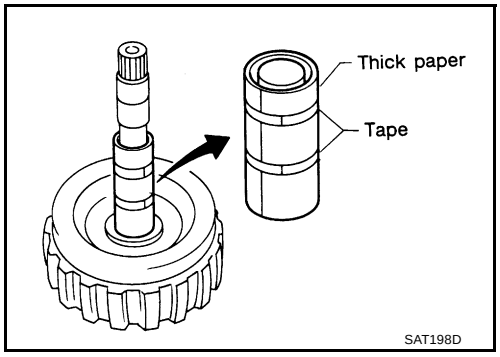
CAUTION:

- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**



CAUTION:

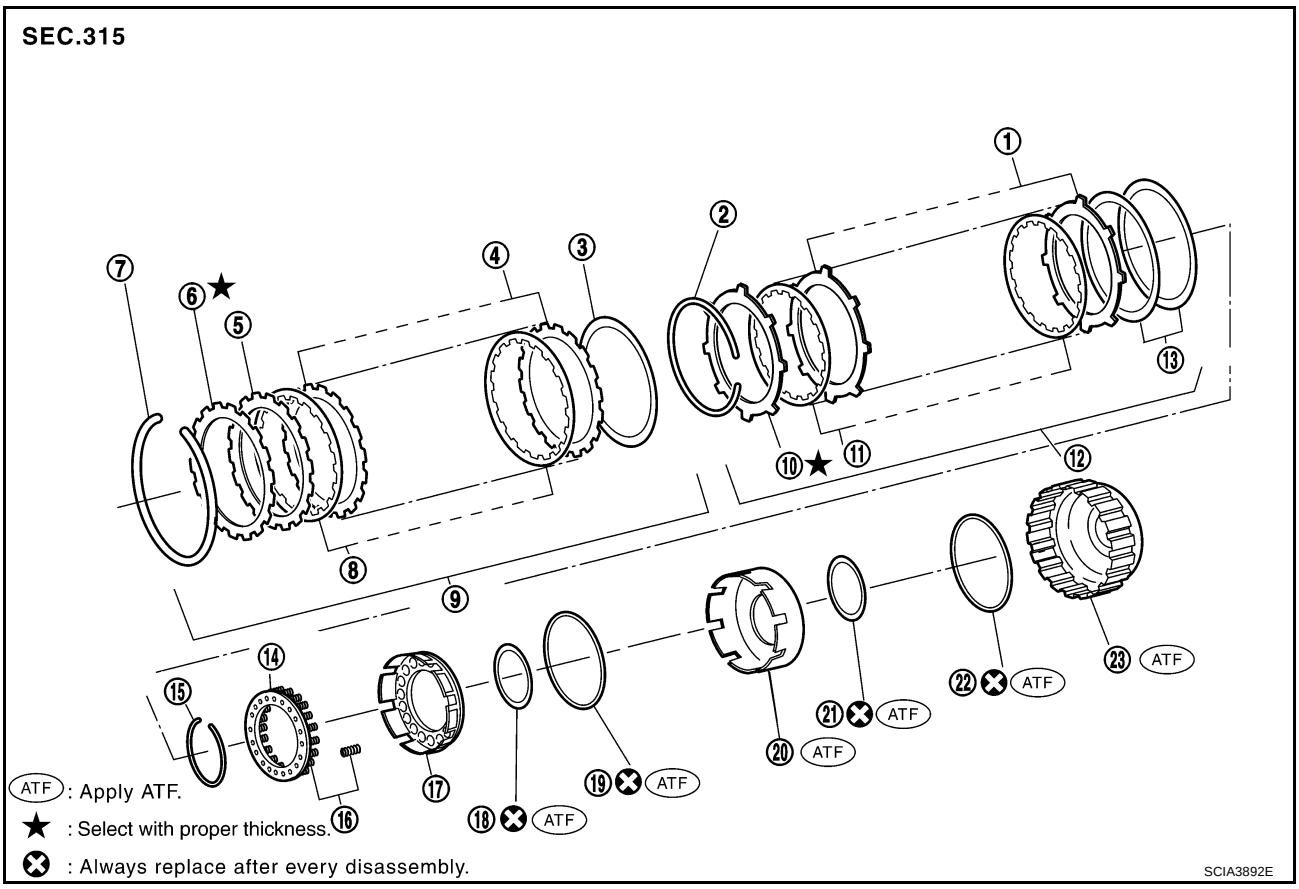
Roll paper around seal rings to prevent seal rings from spreading.



Forward and Overrun Clutches

ECS00EC6

COMPONENTS

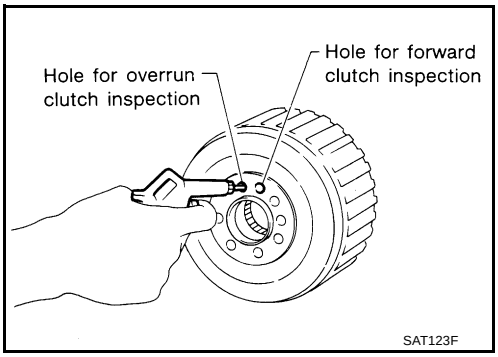


1. Driven plate
2. Snap ring
3. Dish plate
4. Driven plate
5. Retaining plate
6. Retaining plate
7. Snap ring
8. Drive plate
9. Forward clutch
10. Retaining plate
11. Drive plate
12. Overrun clutch
13. Dish plate
14. Spring retainer
15. Snap ring
16. Return spring
17. Overrun clutch piston
18. D-ring
19. Seal ring
20. Forward clutch piston
21. D-ring
22. Seal ring
23. Forward clutch drum

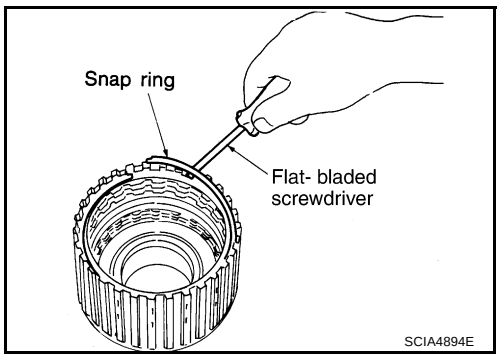
DISASSEMBLY

1. Check operation of forward clutch and overrun clutch.

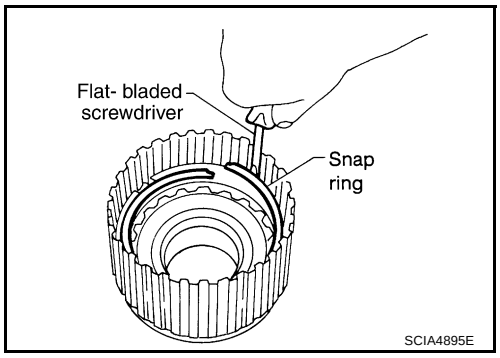
a. Install bearing retainer on forward clutch drum.
b. Apply compressed air to oil hole of forward clutch drum.
c. Check to see that retaining plate moves to snap ring.
d. If retaining plate does not contact snap ring:
   - D-ring might be damaged.
   - Seal ring might be damaged.
   - Fluid might be leaking past piston check ball.



2. Remove snap ring for forward clutch.
3. Remove drive plates, driven plates, retaining plate and dish plate for forward clutch.



4. Remove snap ring for overrun clutch with flat-bladed screwdriver.
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.

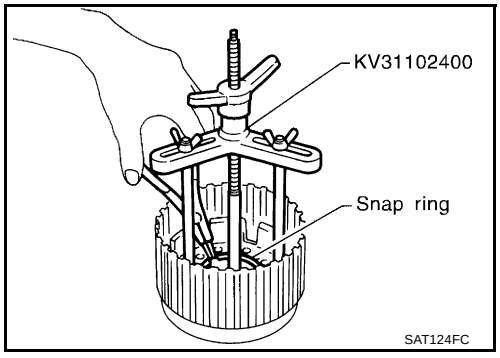
CAUTION:

- **Set SST directly over return springs.**
- **Do not expand snap ring excessively.**

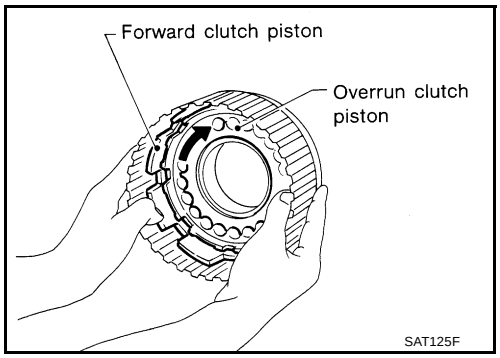
7. Remove spring retainer and return springs.

CAUTION:

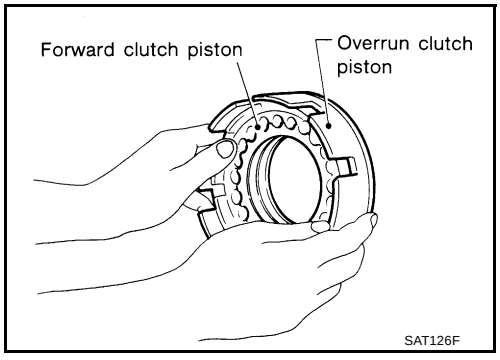
Do not remove return springs from spring retainer.



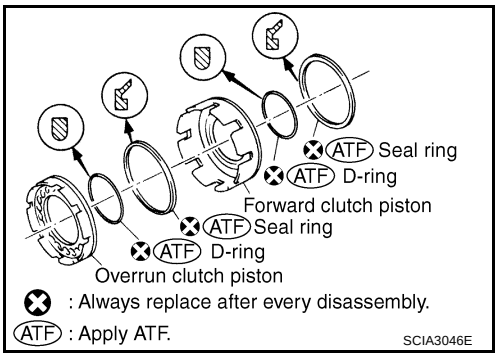
8. Remove forward clutch piston with overrun clutch piston from forward clutch drum by turning it.



9. Remove overrun clutch piston from forward clutch piston by turning it.



10. Remove D-rings and seal rings from forward clutch piston and overrun clutch piston.



INSPECTION

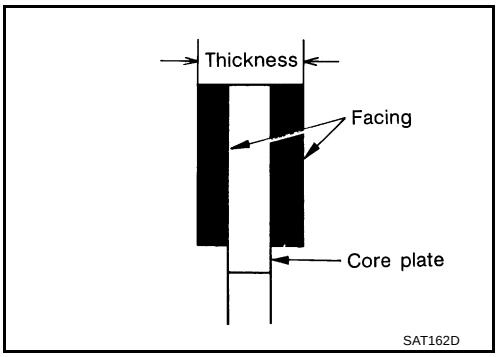
Snap Rings, Spring Retainer and Return Springs

- 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 the thickness of facing.

Thickness of drive plate:
Forward clutch
Standard value: 1.6 mm (0.063 in)
Wear limit: 1.4 mm (0.055 in)
Overrun clutch
Standard value: 1.6 mm (0.063 in)
Wear limit: 1.4 mm (0.055 in)

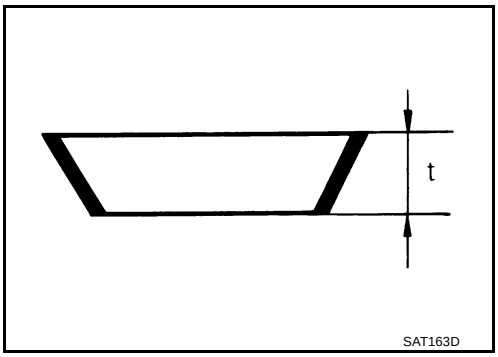


- If not within wear limit, replace.

Forward Clutch and Overrun Clutch Dish Plates

- Check for deformation or damage.
- Measure the thickness of dish plate.

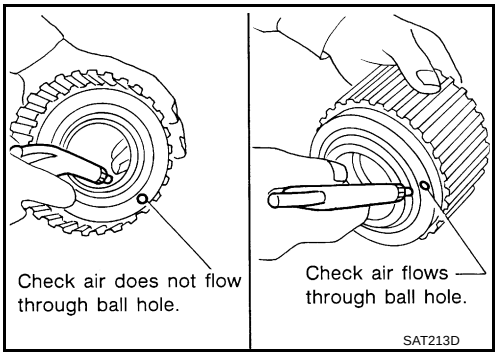
Thickness of dish plate:
Forward clutch 2.7 mm (0.106 in)
Overrun clutch 2.7 mm (0.106 in)



- If deformed or fatigued, replace.

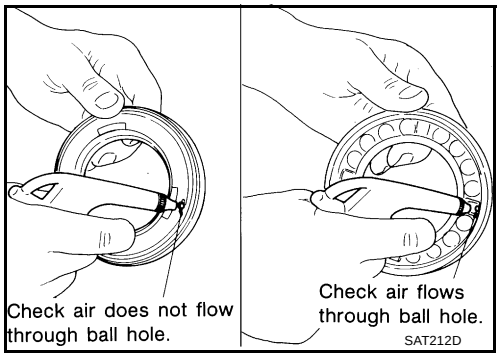
Forward Clutch Drum

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole from the outside of forward clutch drum. Make sure air leaks past ball.
- Apply compressed air to oil hole from the inside of forward clutch drum. Make sure there is no air leakage.



Overrun Clutch Piston

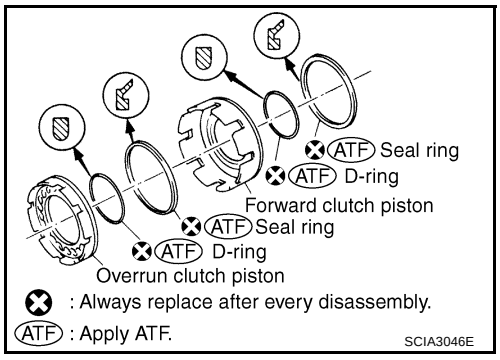
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite the return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side. Make sure that air leaks past ball.



ASSEMBLY

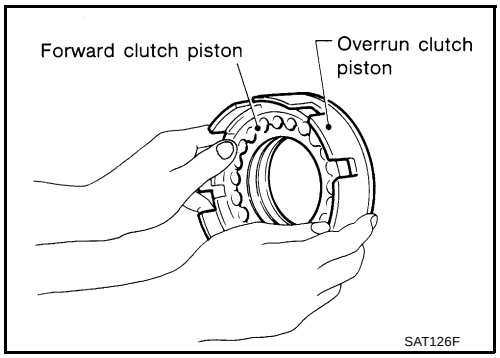
1. Install D-rings and Seal rings on forward clutch piston and overrun clutch piston.

   CAUTION:
   - **Do not reuse D-rings and seal rings.**
   - **Take care with the direction of seal rings.**
   - **Apply ATF to both parts.**



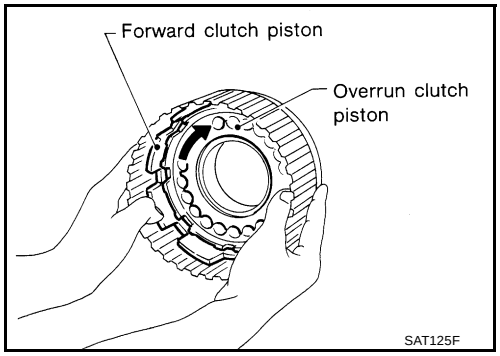
2. Install overrun clutch piston on forward clutch piston by turning it slowly.

   CAUTION:
   Apply ATF to inner surface of forward clutch piston.

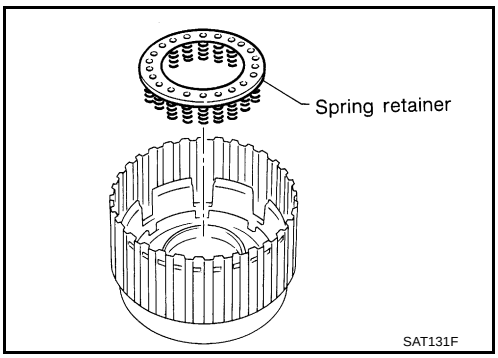


3. Install forward clutch piston assembly on forward clutch drum by turning it slowly.

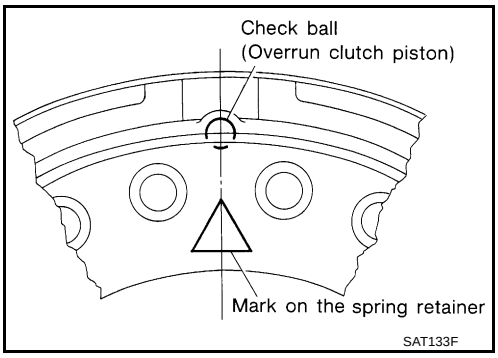
   CAUTION:
   Apply ATF to inner surface of forward clutch drum.



4. Install spring retainer and return spring on overrun clutch piston.



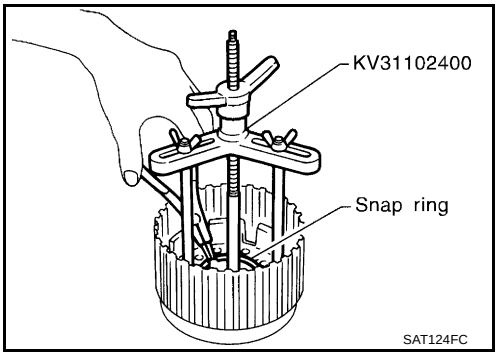
- Align the mark on spring retainer with check ball in overrun clutch piston.



5. Set SST on spring retainer and install snap ring while compressing return springs.

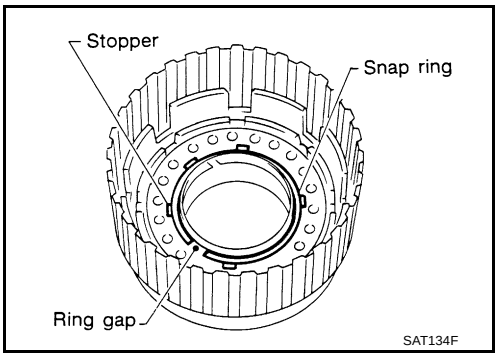
CAUTION:

- **Set SST directly over return springs.**
- **Do not expand snap ring excessively.**



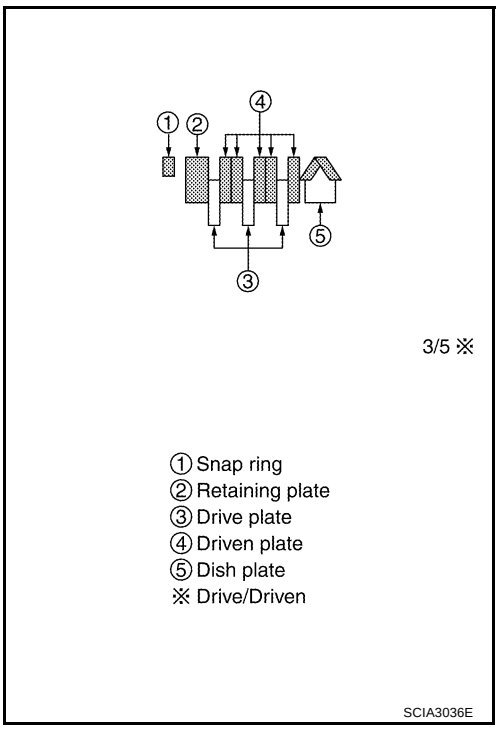
CAUTION:

Do not align snap ring gap with spring retainer stopper.

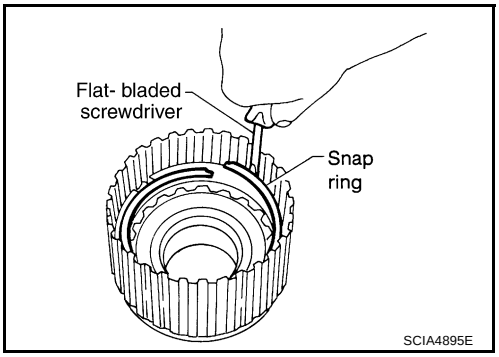


6. Install drive plates, driven plates, retaining plate and dish plate for overrun clutch. Refer to AT-534, "OVERRUN CLUTCH" .

CAUTION:
Take care with the order of plates.

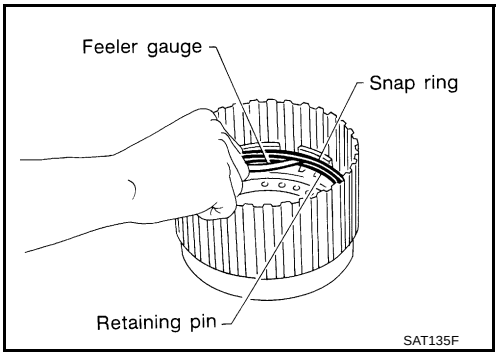


7. Install snap ring for overrun clutch.



8. Measure the clearance between overrun clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate. Refer to AT-534, "OVERRUN CLUTCH" .

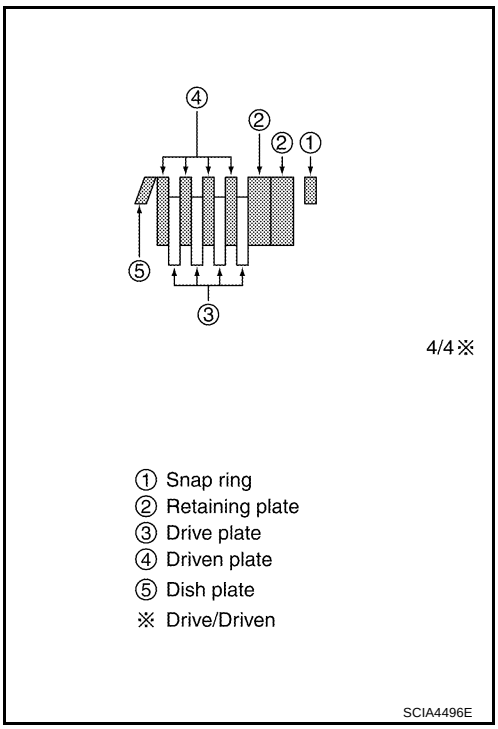
Specified clearance:
Standard 0.7 - 1.1 mm (0.028 - 0.043 in)
Allowable limit 1.7 mm (0.067 in)



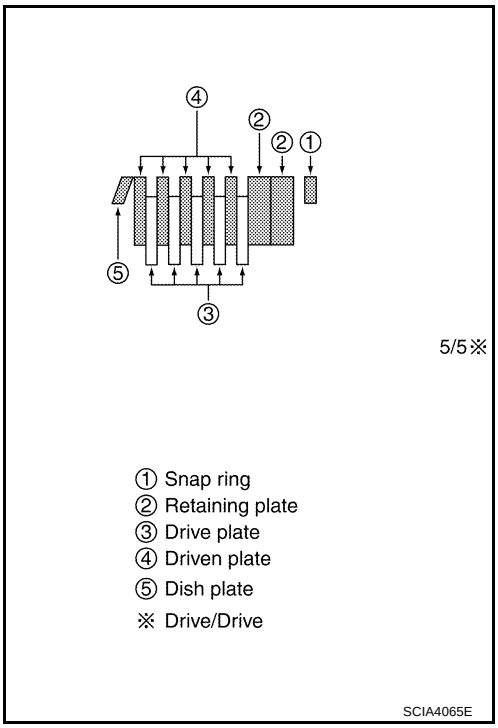
9. Install drive plates, driven plates, retaining plate and dish plate for forward clutch.

CAUTION:
Take care with the order of plates.

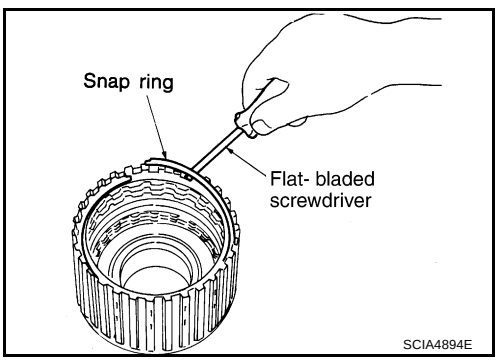
- For 85X23 model



- For 85X64 model



10. Install snap ring for forward clutch.

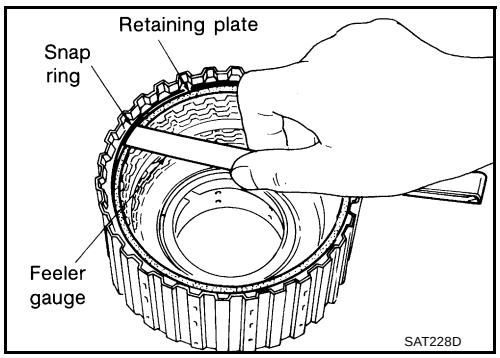


11. Measure clearance between forward clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate. Refer to AT-533, "FORWARD CLUTCH" .

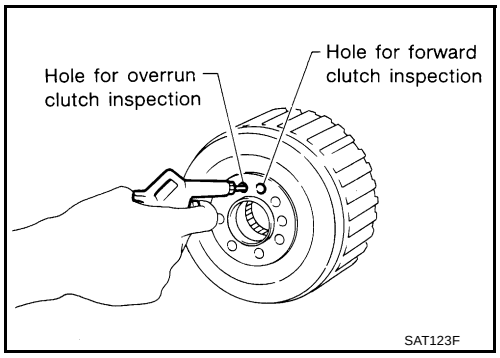
Specified clearance:

Standard 0.45 - 0.85 mm (0.0177 - 0.0335 in)

Allowable limit 1.85 mm (0.0728 in)



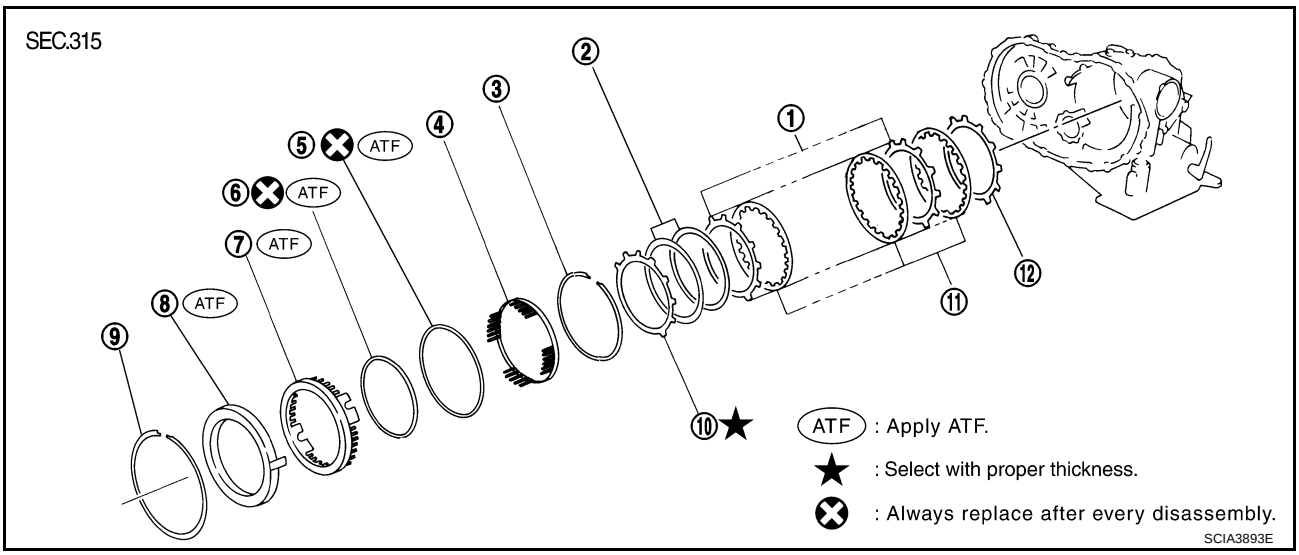
12. Check operation of forward clutch and overrun clutch. Refer to AT-475, "DISASSEMBLY" .



Low & Reverse Brake

ECS00EC7

COMPONENTS



1. Driven plate	2. Dish plate	3. Snap ring
4. Spring retainer	5. D-ring	6. D-ring
7. Low & reverse brake piston	8. Retainer	9. Snap ring
10. Retaining plate	11. Drive plate	12. Retaining plate

DISASSEMBLY

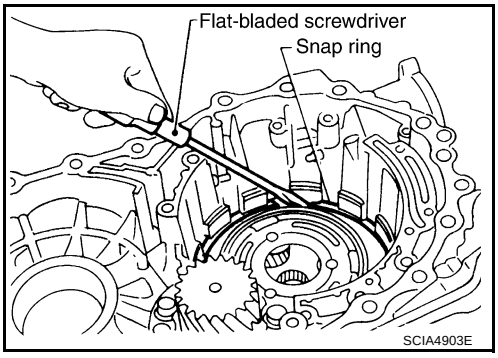
1. Check operation of low & reverse brake.

a. Apply compressed air to oil hole of transaxle case.

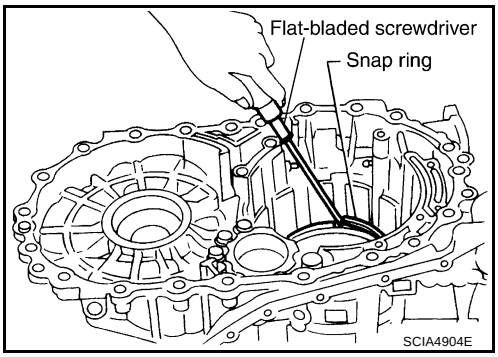
b. Check to see that retaining plate moves to snap ring.

c. If retaining plate does not contact snap ring:
   - D-ring might be damaged.
   - Fluid might be leaking past piston check ball.

2. Remove snap ring with flat-bladed screwdriver.
3. Remove retainer, low & reverse brake piston and spring retainer from transaxle case.

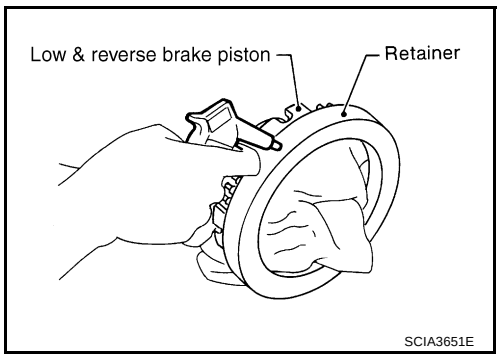


4. Remove snap ring with flat-bladed screwdriver.
5. Remove driven plates, drive plate, retaining plate and dish plates on transaxle case.

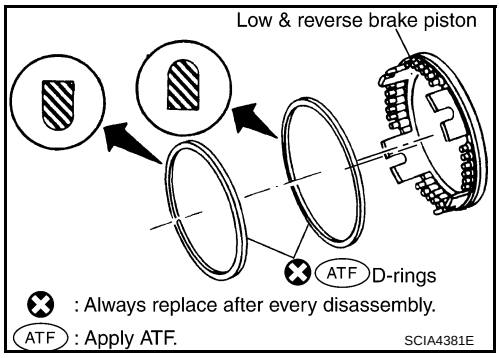


6. In order to remove low & reverse brake piston, apply compressed air to oil hole of retainer while holding low & reverse brake piston.

CAUTION:
Apply air gradually and allow low & reverse brake piston to come out evenly.



7. Remove D-rings from low & reverse brake piston.



INSPECTION

Low and Reverse Brake Snap Ring, Spring Retainer and Return Springs

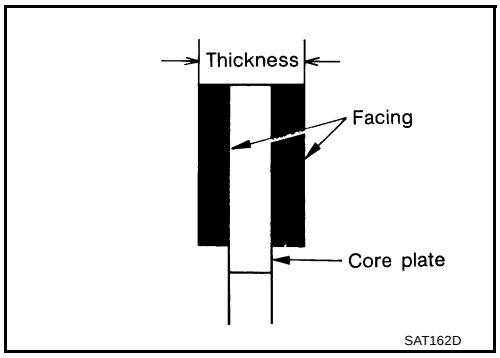
- Check for deformation, fatigue or damage.
  If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**

Low and Reverse Brake Drive Plate

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

Thickness of drive plate:
Standard value 1.8 mm (0.071 in)
Wear limit 1.6 mm (0.063 in)

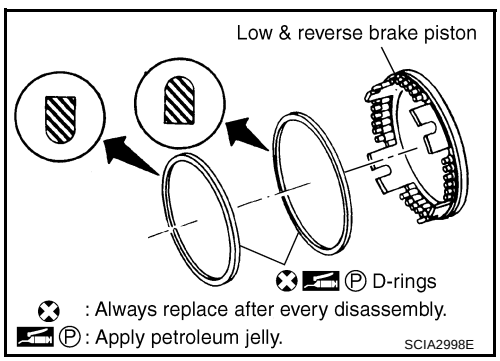
- If not within wear limit, replace.



ASSEMBLY

1. Install D-rings on piston.

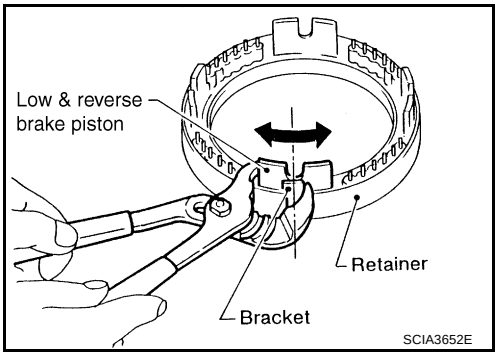
CAUTION:
- **Apply ATF to both parts.**
- **Do not reuse D-ring.**



2. Set and align low & reverse brake piston with retainer.

CAUTION:

- **This operation is required in order to engage the protrusions of piston to return springs correctly. Further procedures are given in AT-507, "ASSEMBLY" .**
- **Apply ATF to surface of low & reverse brake piston and retainer.**

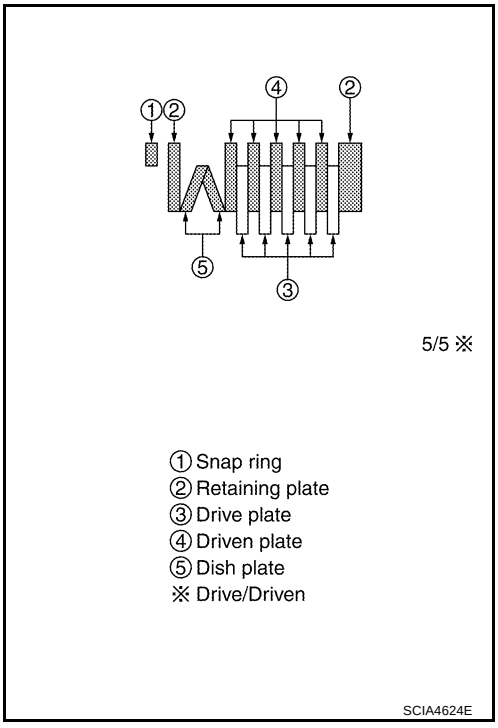


3. Install driven plates, drive plates, retaining plate and dish plate on transaxle case. Refer to AT-533, "Clutch and Brakes" .

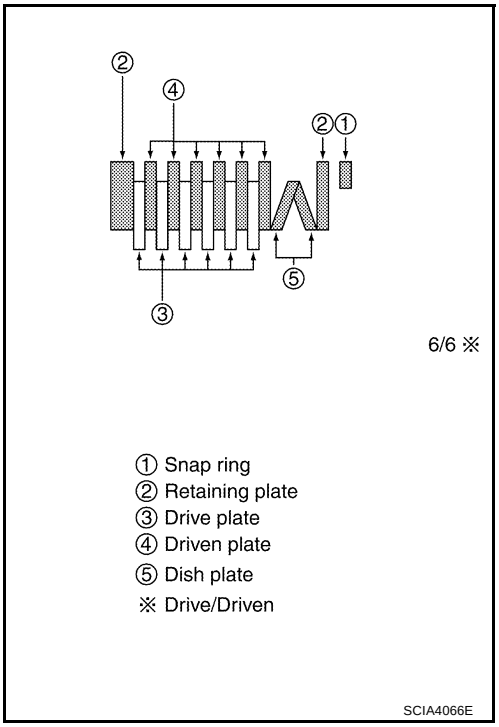
CAUTION:

Take care with the order of plates and direction of dish plate.

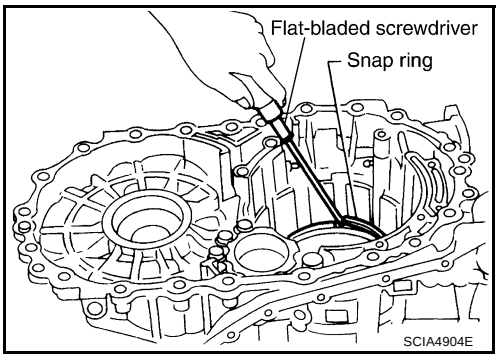
- For 85X23 model



- For 85X64 model



4. Install snap ring with flat-bladed screwdriver.

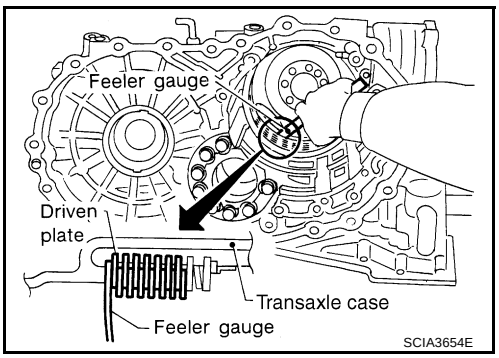


5. Measure clearance between retaining plate and transaxle case. If not within allowable limit, select proper retaining plate. (front side) Refer to AT-534, "LOW & REVERSE BRAKE" .

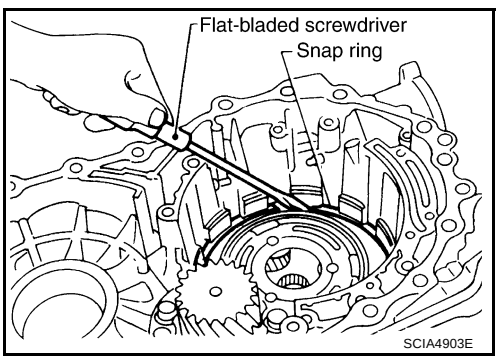
Specified clearance:

Standard 1.7 - 2.1 mm (0.067 - 0.083 in)

Allowable limit 3.3 mm (0.130 in)



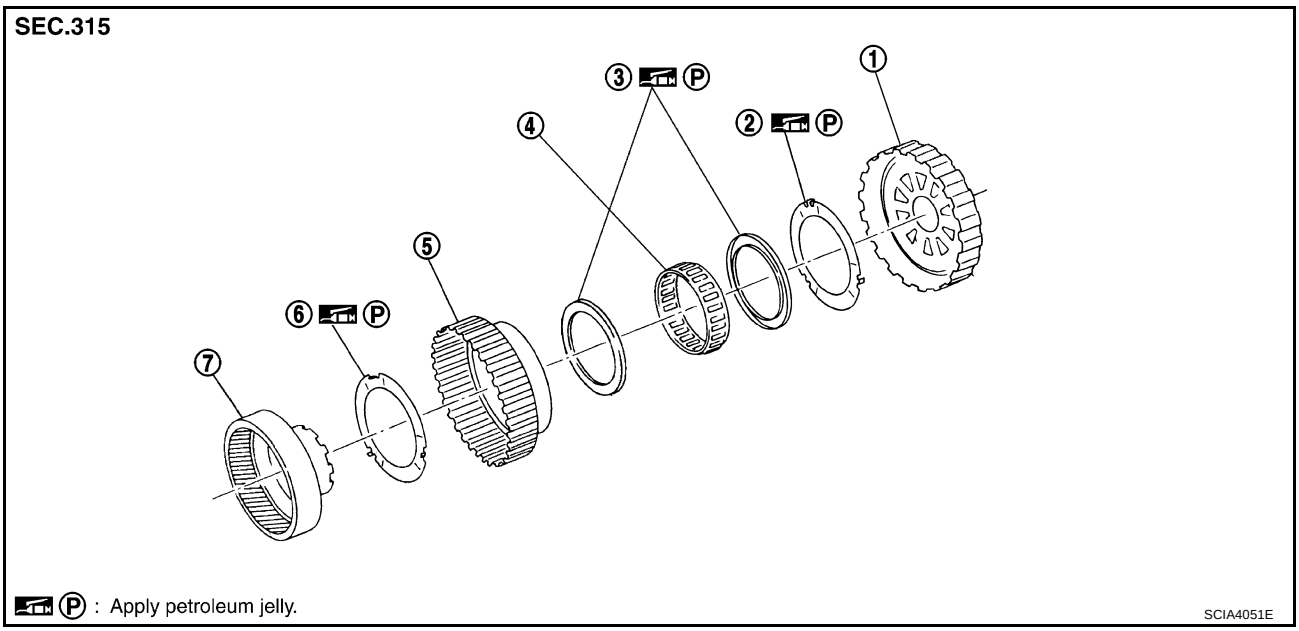
6. Install low & reverse brake piston (with retainer) and spring retainer on transaxle case.
7. Install snap ring with flat-bladed screwdriver.
8. Check operation of low & reverse brake. Refer to AT-483, "DISASSEMBLY" .



Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

ECS00EC8

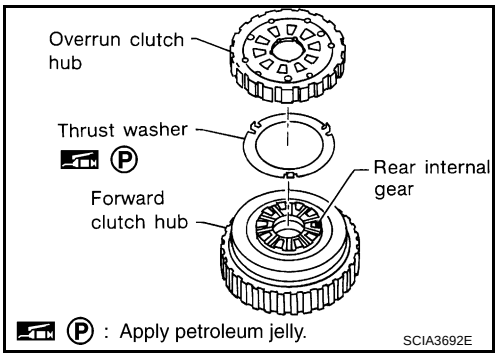
COMPONENTS



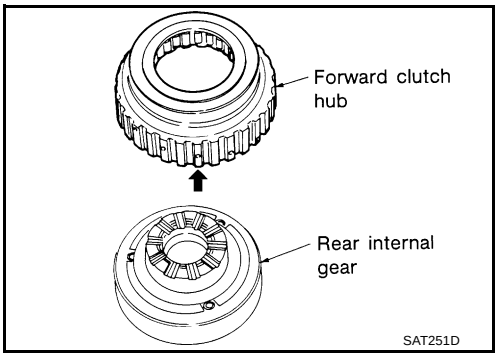
1. Overrun clutch hub
2. Thrust washer
3. Bearing race
4. Forward one-way clutch
5. Forward clutch hub
6. Thrust washer
7. Rear internal gear

DISASSEMBLY

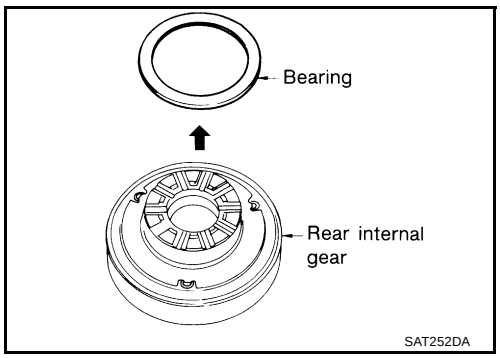
1. Remove overrun clutch hub and thrust washer from forward clutch hub.



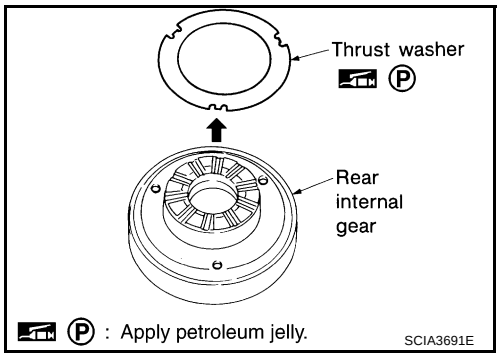
2. Remove forward clutch hub from rear internal gear.



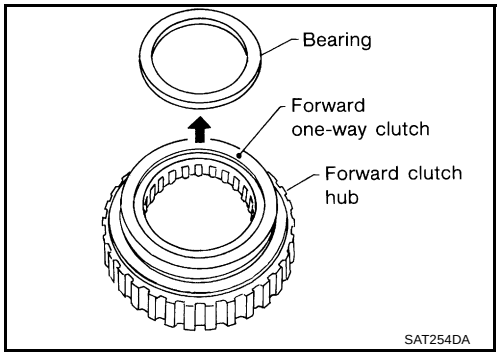
3. Remove bearing from rear internal gear.



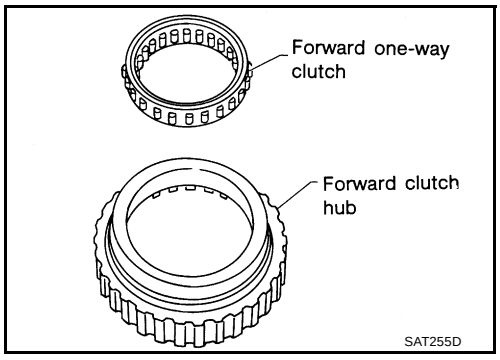
4. Remove thrust washer from rear internal gear.



5. Remove bearing from forward one-way clutch.



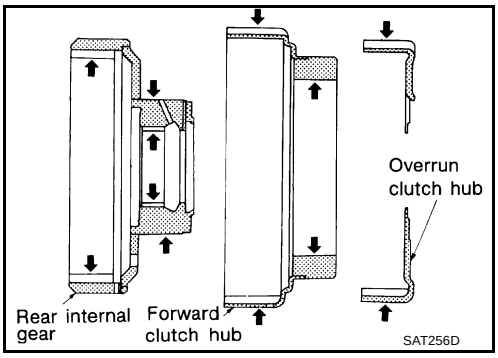
6. Remove forward one-way clutch from forward clutch hub.



INSPECTION

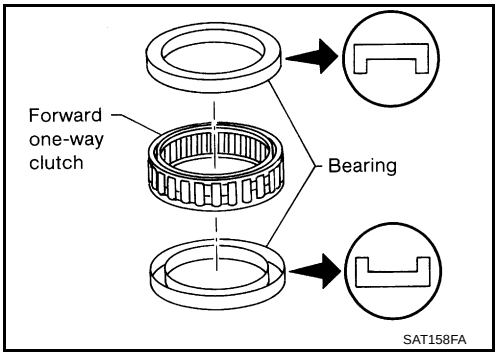
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

- Check rubbing surfaces for wear or damage.



Bearings and Forward One-way Clutch

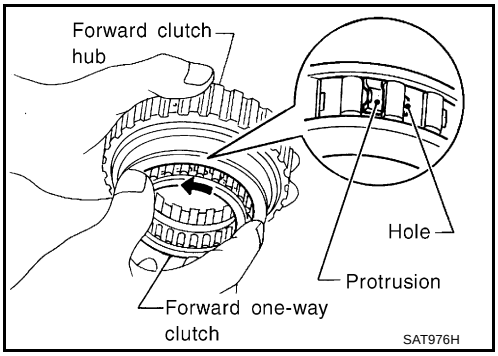
- Check bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.



ASSEMBLY

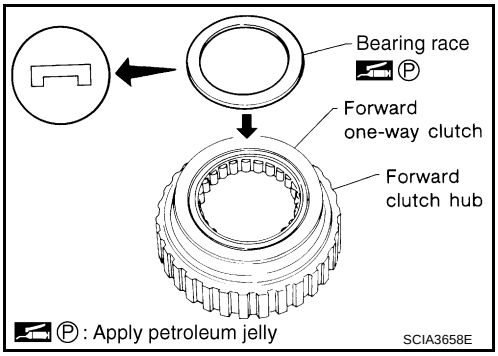
1. Install forward one-way clutch on forward clutch.

   CAUTION:
   Take care with the direction of forward one-way clutch.



2. Install bearing on forward one-way clutch.

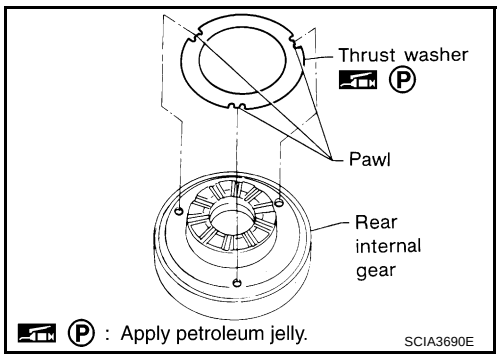
   CAUTION:
   Apply petroleum jelly to bearing.



3. Install thrust washer on rear internal gear.

CAUTION:

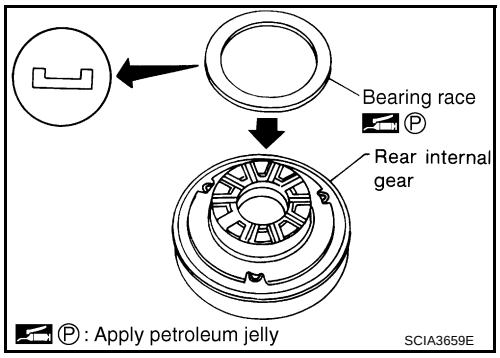
- **Apply petroleum jelly to thrust washer.**
- **Align hooks of thrust washer with holes of rear internal gear.**



4. Install bearing on rear internal gear.

CAUTION:

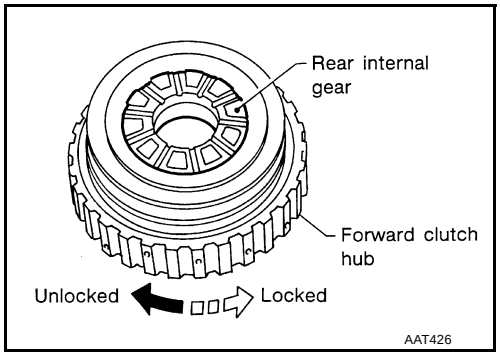
Apply petroleum jelly to the bearing.



5. Install forward clutch hub on rear internal gear.

CAUTION:

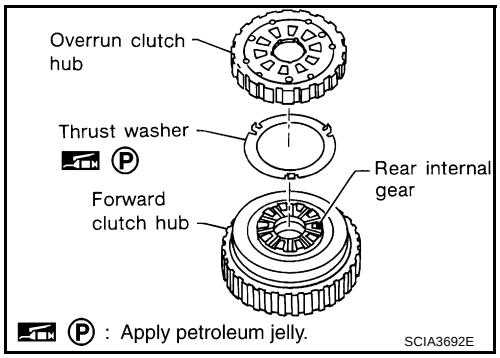
- **Check operation of forward one-way clutch.**
- **Hold rear internal gear and turn forward clutch hub. Check forward clutch hub for correct locking and unlocking directions.**
- **If not as shown in figure, check installation direction of forward one-way clutch.**



6. Install thrust washer and overrun clutch hub.

CAUTION:

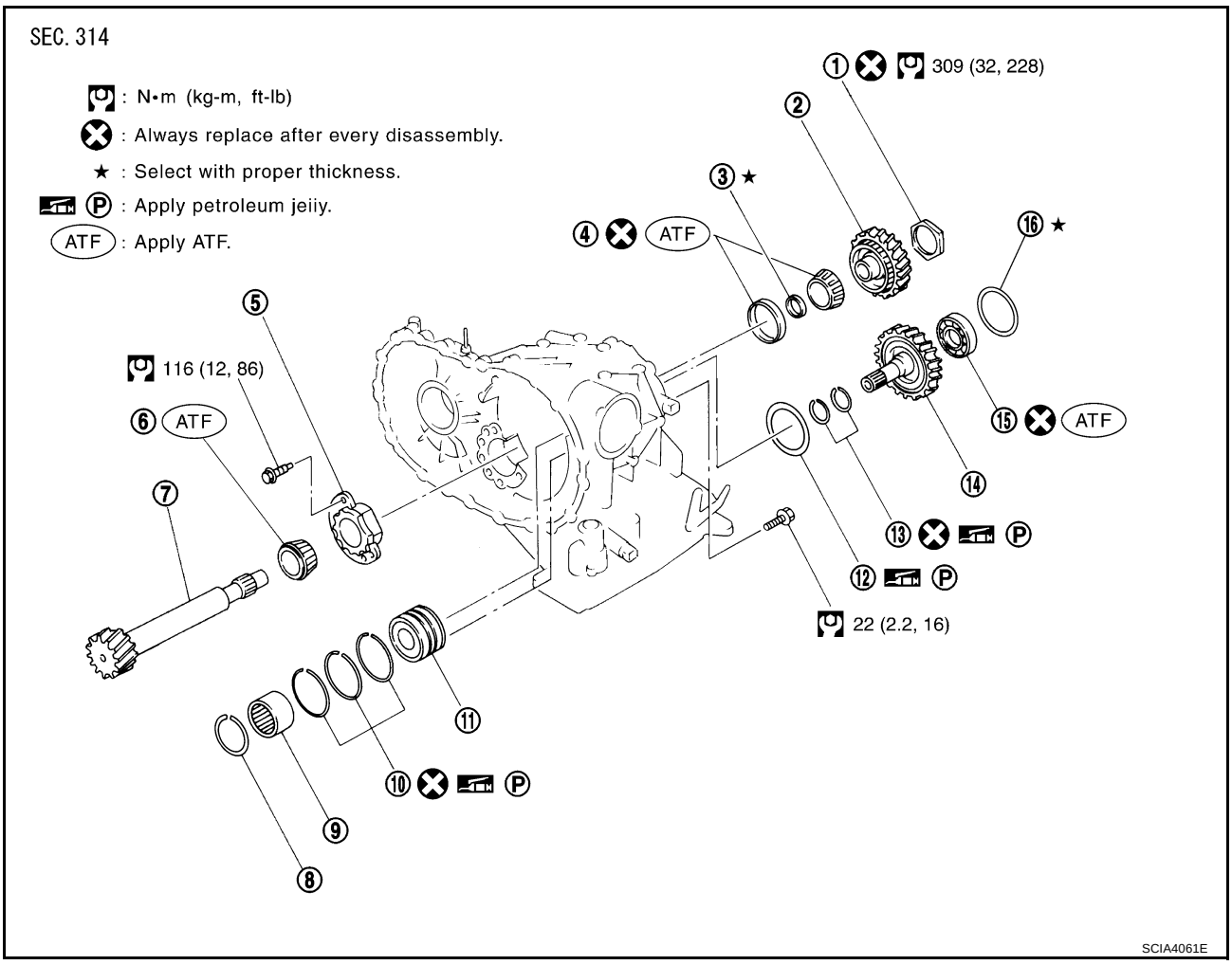
- **Apply petroleum jelly to thrust washer.**
- **Align hooks of thrust washer with holes of overrun clutch hub.**
- **Align projections of rear internal gear with holes of overrun clutch hub.**



Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer

ECS00EC9

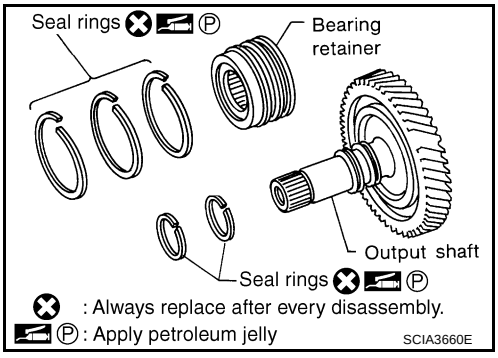
COMPONENTS



1. Idler gear lock nut
2. Idler gear
3. Reduction pinion gear bearing adjusting shim
4. Idler gear bearing
5. Reduction pinion gear bearing outer race
6. Reduction pinion gear bearing inner race
7. Reduction pinion gear
8. Snap ring
9. Radial needle bearing
10. Seal ring
11. Bearing retainer
12. Needle bearing
13. Seal ring
14. Out put shaft
15. Out put shaft bearing
16. Output shaft adjusting shim

DISASSEMBLY

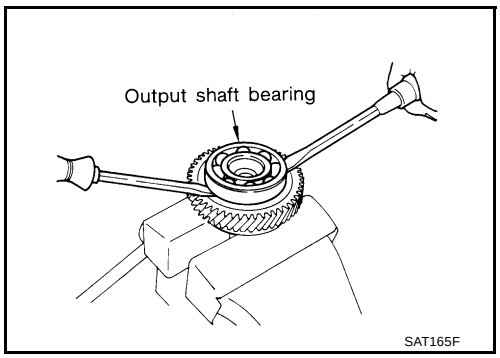
1. Remove seal rings from output shaft and bearing retainer.



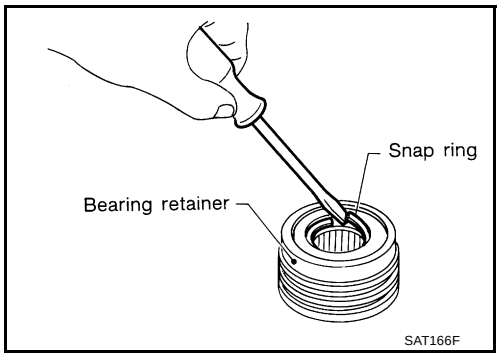
2. Remove output shaft bearing with flat-bladed screwdrivers.

CAUTION:

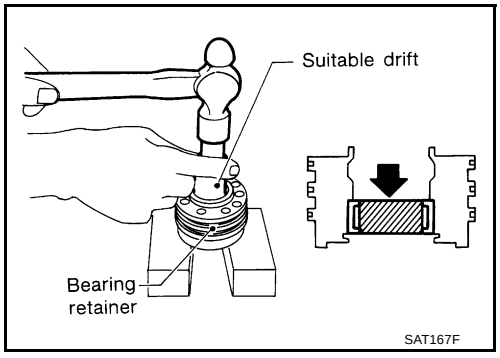
- **Always replace bearing with a new one when removed.**
- **Do not damage output shaft.**



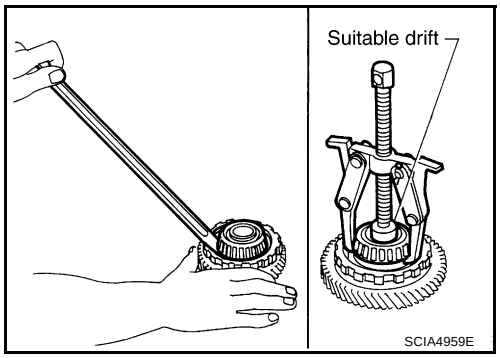
3. Remove snap ring from bearing retainer.



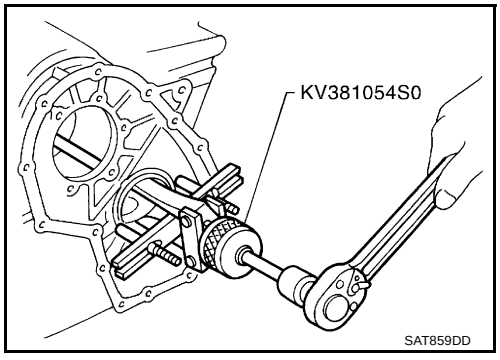
4. Remove needle bearing from bearing retainer.



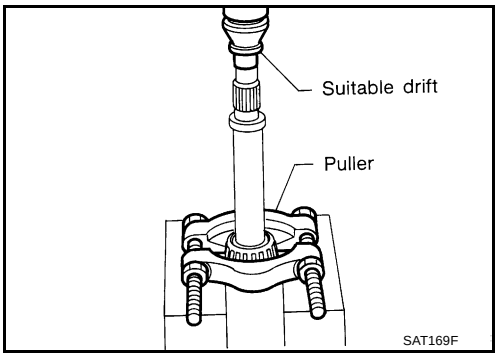
5. Remove idler gear bearing inner race from idler gear.



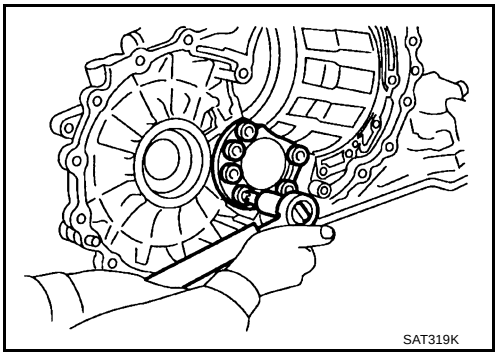
6. Remove idler gear bearing outer race from transaxle case.



7. Press out reduction pinion gear bearing inner race from reduction pinion gear.



8. Remove reduction pinion gear bearing outer race from transaxle case.



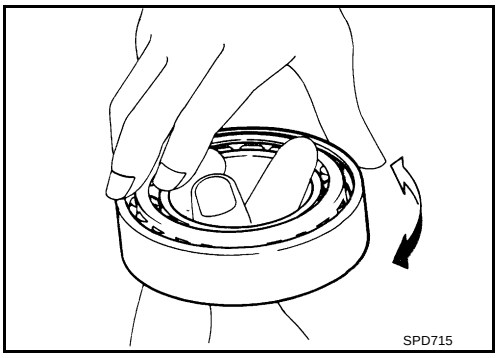
INSPECTION

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

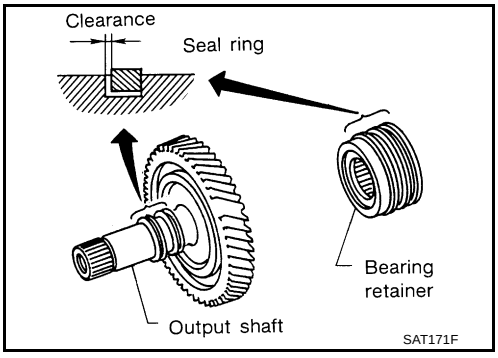
- Install new seal rings to output shaft.
- Measure the clearance between seal ring and ring groove of output shaft.

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 the 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)

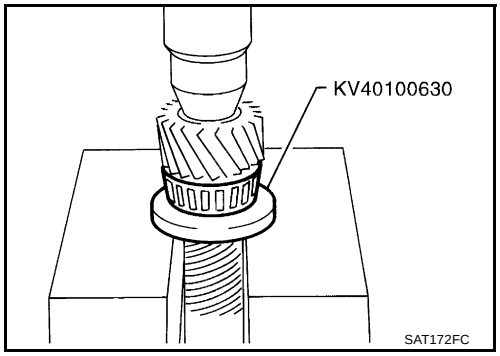
- If not within allowable limit, replace bearing retainer.

ASSEMBLY

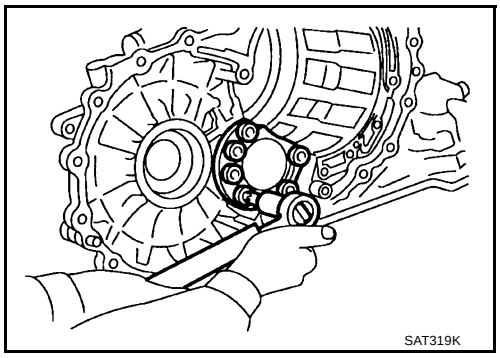
1. Press reduction pinion gear bearing inner race on reduction pinion gear.

   CAUTION:

   Apply ATF to reduction pinion gear bearing inner race.



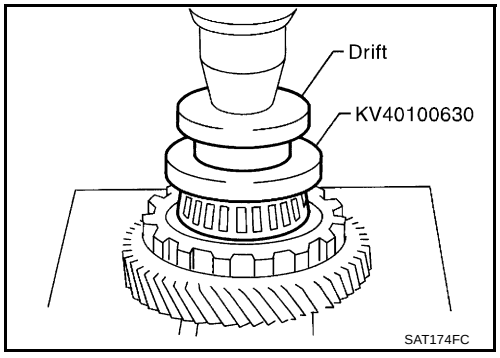
2. Install reduction pinion gear bearing outer race on transaxle case. Refer to AT-491, "COMPONENTS" .
3. Checking reduction pinion gear bearing preload. Refer to AT-509, "REDUCTION PINION GEAR BEARING PRELOAD" .



4. Press idler gear bearing inner race on idler gear.

   CAUTION:

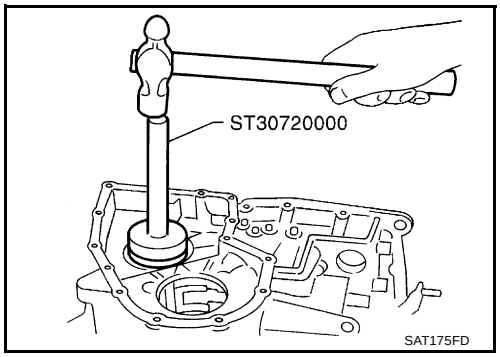
   - **Do not reuse idler gear bearing.**
   - **Apply ATF to idler gear bearing.**



5. Install idler gear bearing outer race on transaxle case.

   CAUTION:

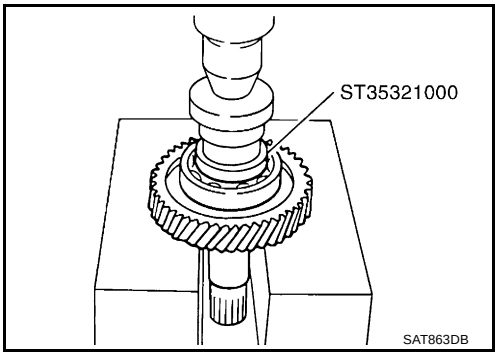
   - **Do not reuse idler gear bearing.**
   - **Apply ATF to idler gear bearing.**



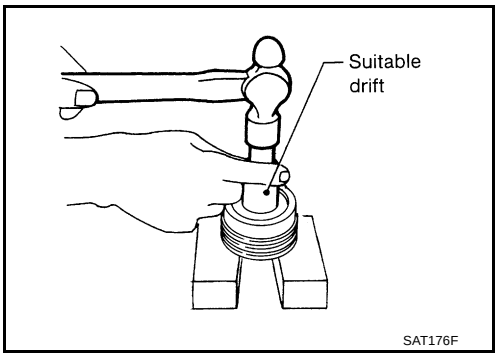
6. Press output shaft bearing on output shaft.

CAUTION:

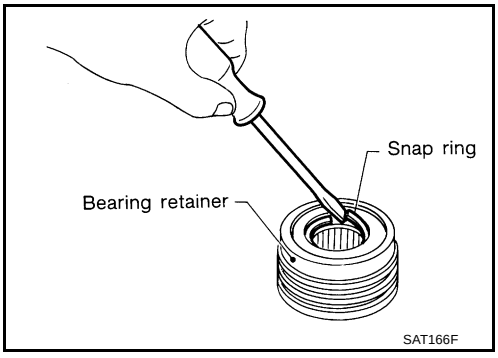
- **Do not reuse output shaft bearing.**
- **Apply ATF to output shaft bearing.**



7. Press needle bearing on bearing retainer.



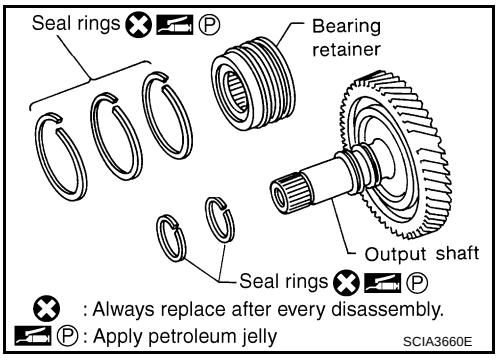
8. Install snap ring to bearing retainer.



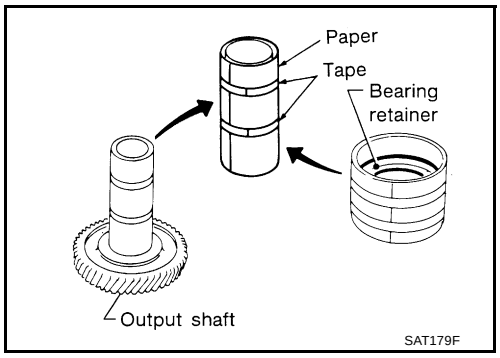
9. After packing ring grooves with petroleum jelly, carefully install new seal rings on output shaft and bearing retainer.

CAUTION:

- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**



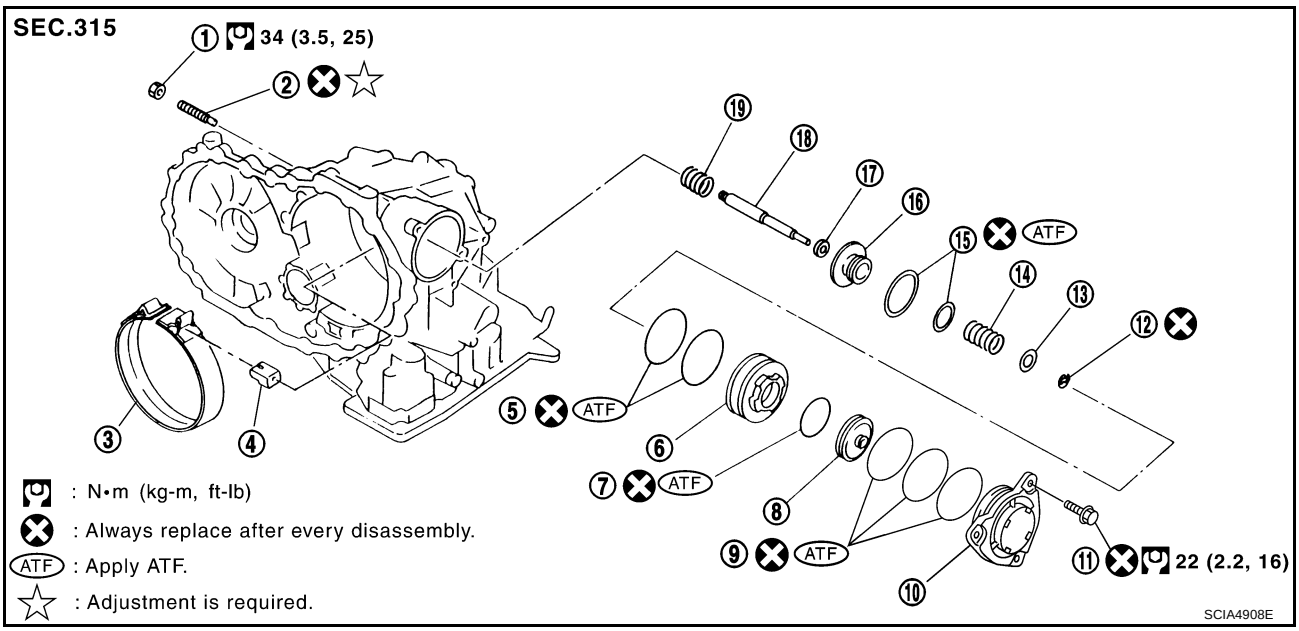
CAUTION:
Roll paper around seal rings to prevent seal rings from spreading.



Band Servo Piston Assembly

ECS00ECA

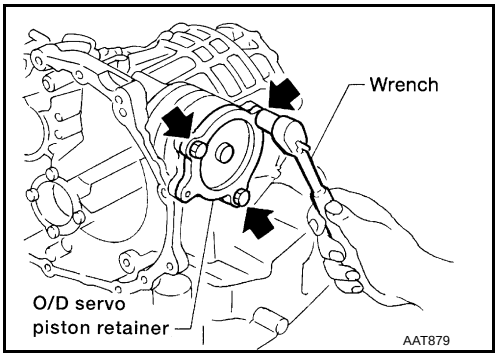
COMPONENTS



1. Lock nut
2. Anchor end pin
3. Brake band
4. Strut
5. O-ring
6. Servo piston retainer
7. D-ring
8. O/D servo piston
9. O-rings
10. O/D servo piston retainer
11. E-ring
12. Spring retainer
13. O/D servo return spring
14. D-ring
15. Band servo piston
16. Band servo thrust washer
17. Band servo piston stem
18. 2nd servo return spring

DISASSEMBLY

1. Remove O/D servo piston retainer fitting bolts.

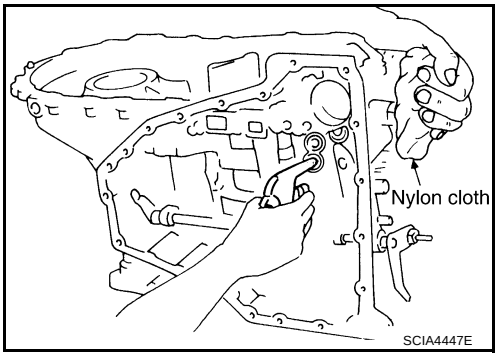


2. Apply compressed air to oil hole in transaxle case to remove O/D servo piston retainer and band servo piston assembly.

CAUTION:

Hold band servo piston assembly with a rag or nylon waste.

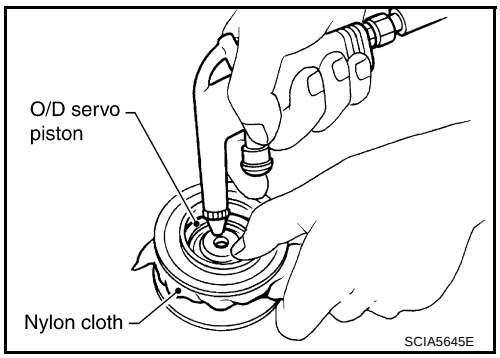
3. Remove 2nd servo return spring from transaxle case.



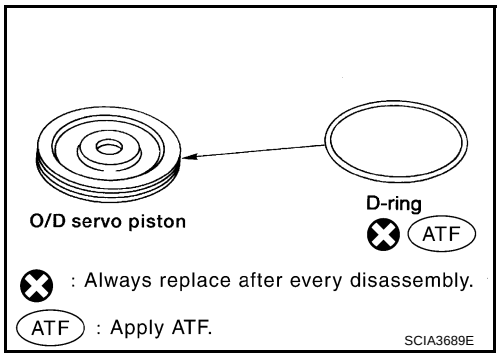
4. Apply compressed air to oil hole in O/D servo piston retainer to remove O/D servo piston from O/D servo piston retainer.

CAUTION:

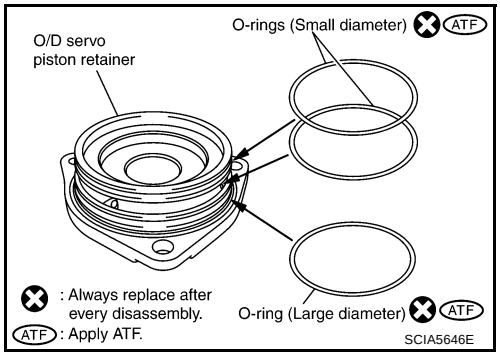
Hold O/D servo piston while applying compressed air.



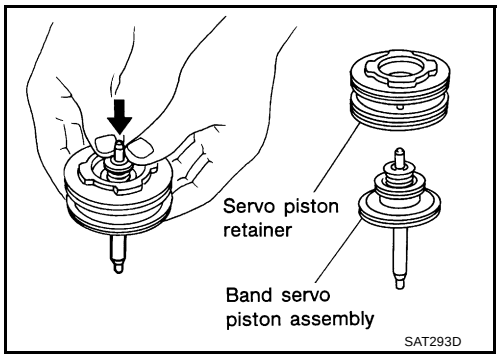
5. Remove D-ring from O/D servo piston.



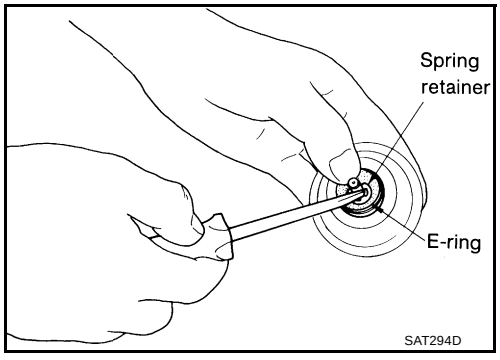
6. Remove O-rings from O/D servo piston retainer.



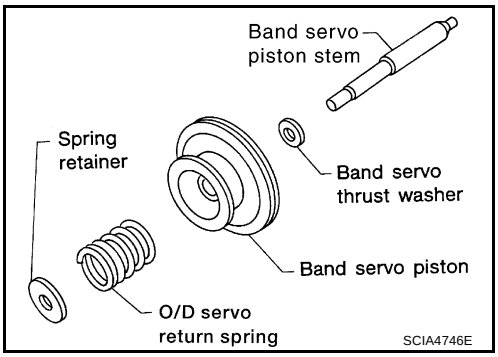
7. Remove band servo piston assembly from servo piston retainer by pushing it forward.



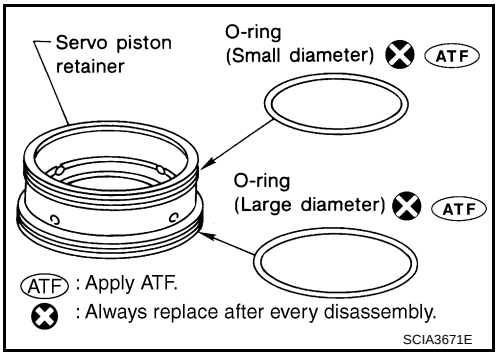
8. Place band servo piston stem end on a wooden block. While pushing spring retainer down, remove E-ring.



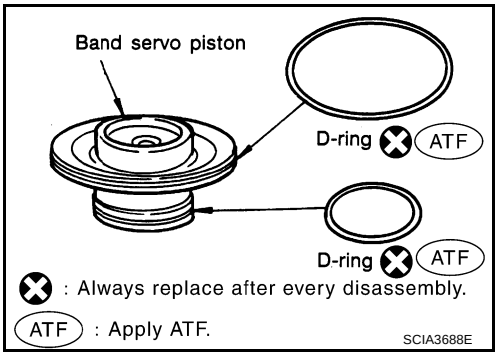
9. Remove spring retainer, O/D servo return spring, band servo thrust washer and band servo piston stem from band servo piston.



10. Remove O-rings from servo piston retainer.



11. Remove D-rings from band servo piston.



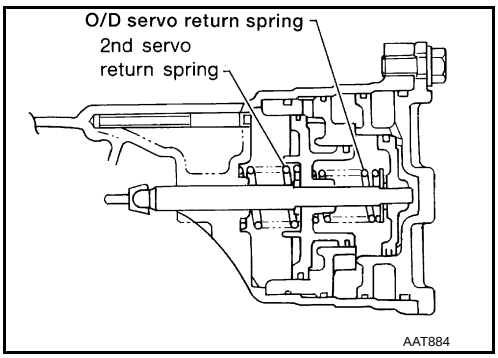
INSPECTION

Pistons, Retainers and Piston Stem

- Check frictional surfaces for abnormal wear or damage.

Return Springs

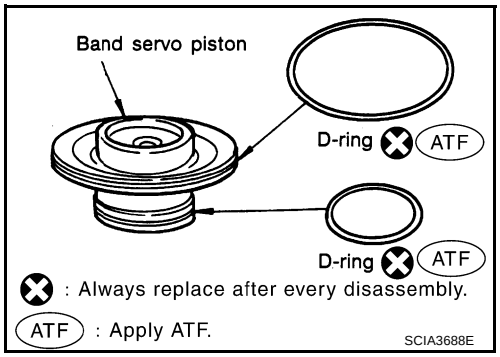
- Check for deformation or damage.
- Measure the free length and outer diameter. Refer to AT-538, "Band Servo" .



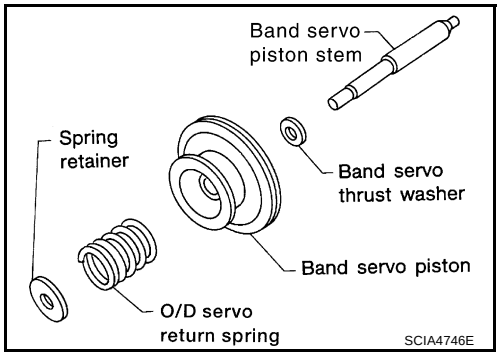
ASSEMBLY

1. Install D-rings to band servo piston.

   CAUTION:
   - **Do not reuse D-rings.**
   - **Apply ATF to D-rings.**
   - **Pay attention to position of each D-rings.**

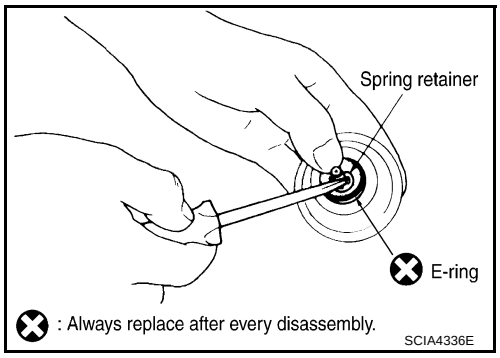


2. Install band servo piston stem, band servo thrust washer, O/D servo return spring and spring retainer to band servo piston.



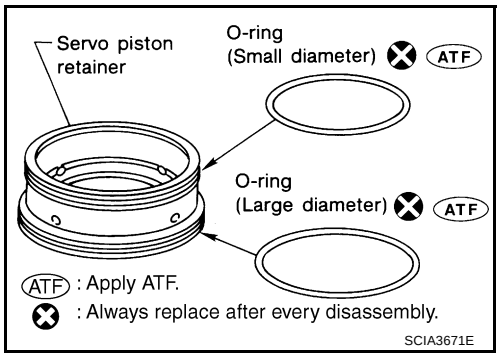
3. Place band servo piston stem end on a wooden block. While pushing spring retainer down, install E-ring.

   CAUTION:
   Do not reuse E-ring.

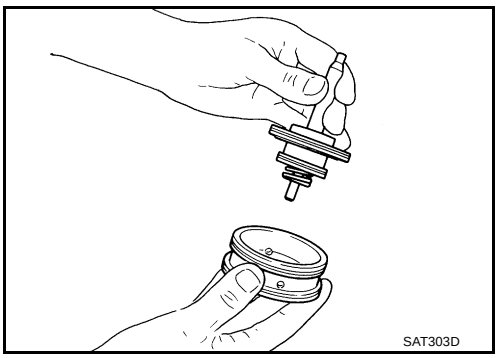


4. Install O-rings to servo piston retainer.

   CAUTION:
   - **Do not reuse O-rings.**
   - **Apply ATF to O-rings.**
   - **Pay attention to position of each O-rings.**



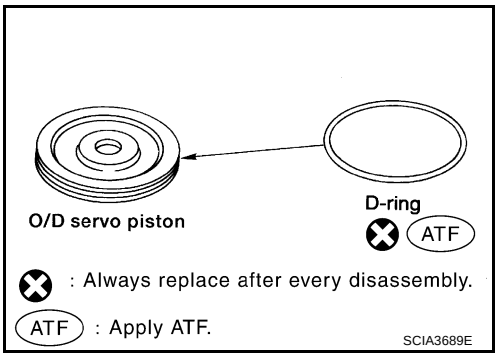
5. Install band servo piston assembly to servo piston retainer by pushing it inward.



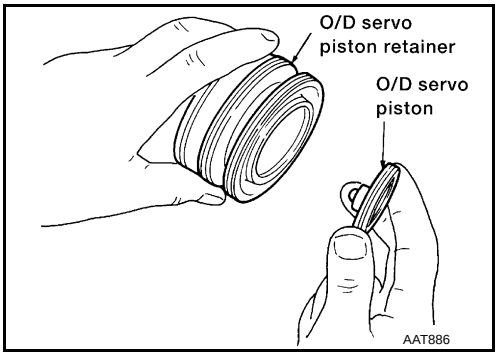
6. Install D-ring to O/D servo piston.

CAUTION:

- **Do not reuse D-ring.**
- **Apply ATF to D-ring.**



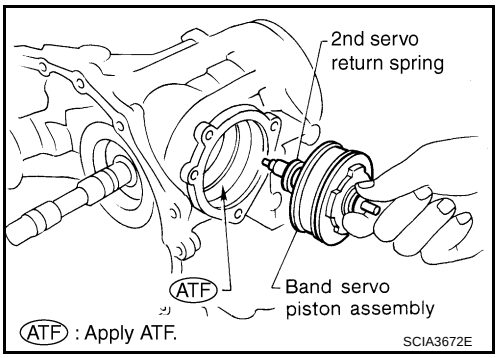
7. Install O/D servo piston to O/D servo piston retainer fitting the installation direction on it.



8. Install band servo piston assembly and 2nd servo return spring to transaxle case.

CAUTION:

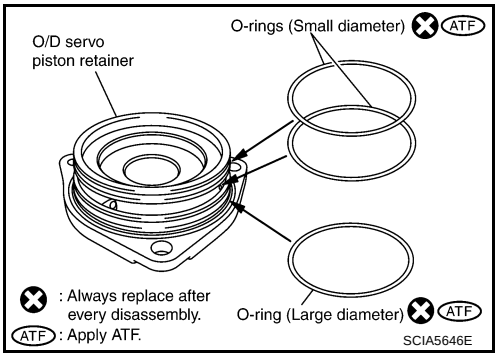
Apply ATF to O-rings of band servo piston assembly and transaxle case.



9. Install O-rings to O/D servo piston retainer.

CAUTION:

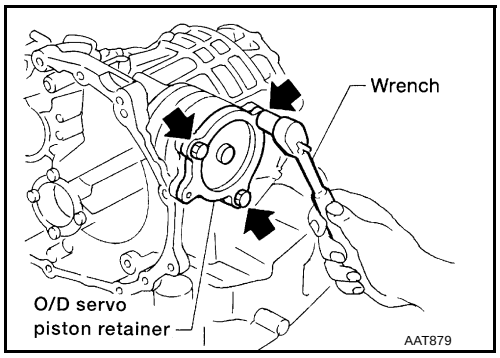
- **Do not reuse O-rings.**
- **Apply ATF to O-rings.**
- **Pay attention to position of each O-rings.**



10. Install O/D servo piston retainer to transaxle case. Refer to AT-497, "COMPONENTS" .

CAUTION:

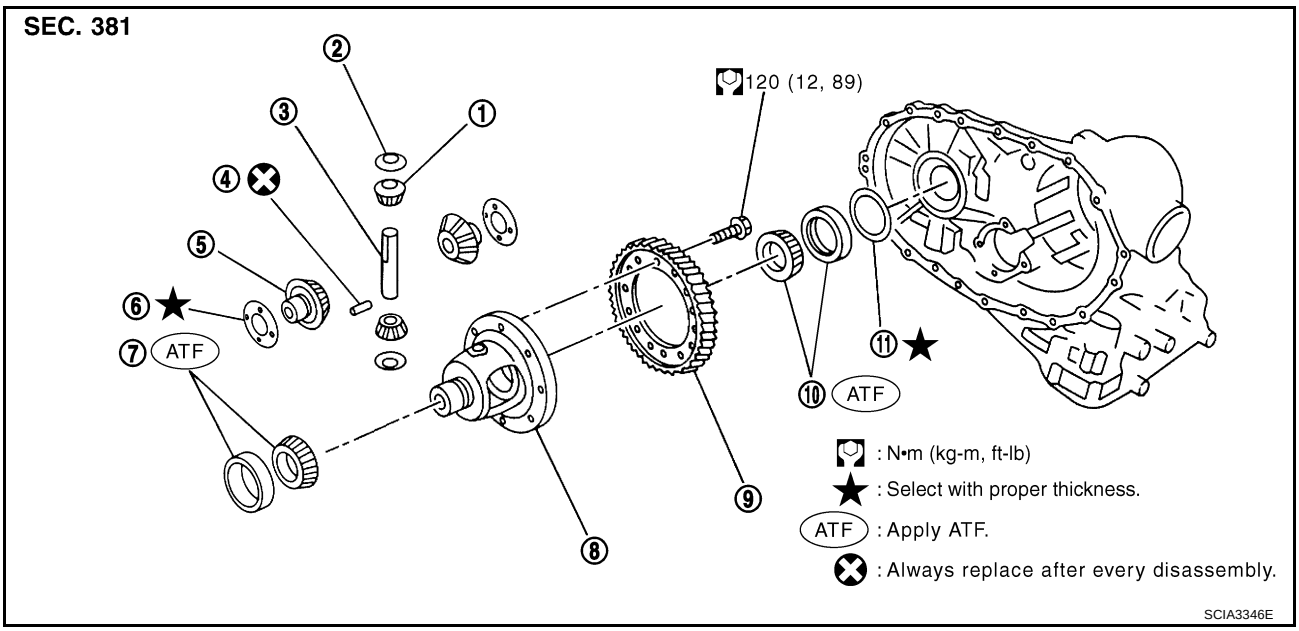
- **Do not reuse O/D servo piston retainer fitting bolts.**
- **Apply ATF to O-rings of O/D servo piston retainer and transaxle case.**



Final Drive

ECS00ECB

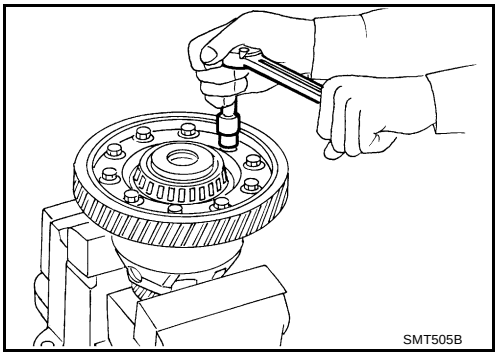
COMPONENTS



1. Pinion mate gear
2. Pinion mate gear thrust washer
3. Pinion mate shaft
4. Lock pin
5. Side gear
6. Side gear thrust washer
7. Differential side bearing
8. Differential case
9. Final gear
10. Differential side bearing
11. Differential side bearing adjusting shim

DISASSEMBLY

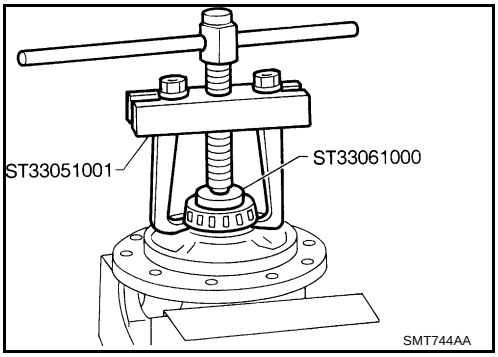
1. Remove final gear.



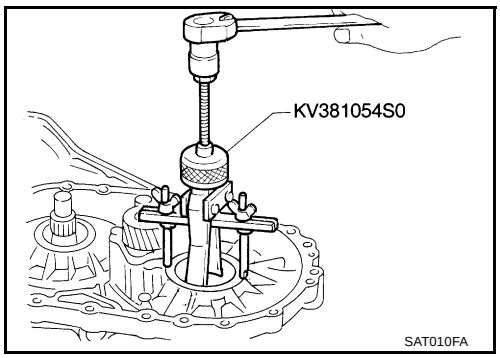
2. Press out differential side bearings.

CAUTION:

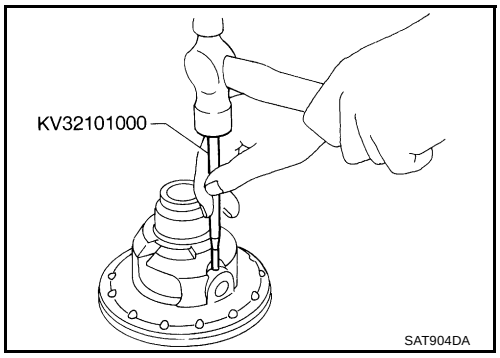
Be careful not to mix up the right and left bearings.



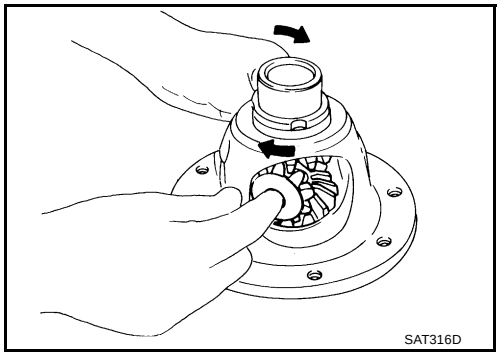
3. Remove differential side bearing outer race, and side bearing adjusting shim from transaxle case.



4. Drive out lock pin.



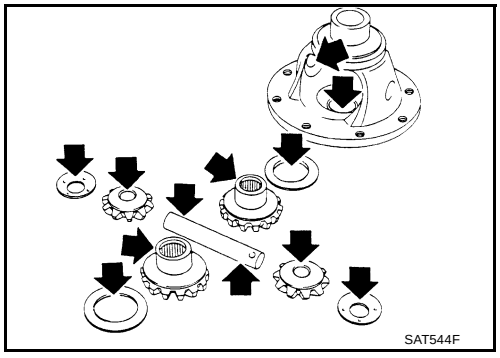
5. Draw out pinion mate shaft.
6. Remove pinion mate gears, pinion mate gear thrust washers, side gears and side gear thrust washers.



INSPECTION

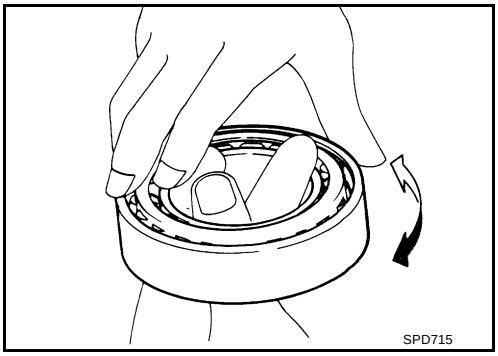
Gear, Washer, Shaft and Case

- Check mating surfaces of differential case, side gears, pinion mate gears and pinion mate shaft.
- Check washers for wear.



Bearings

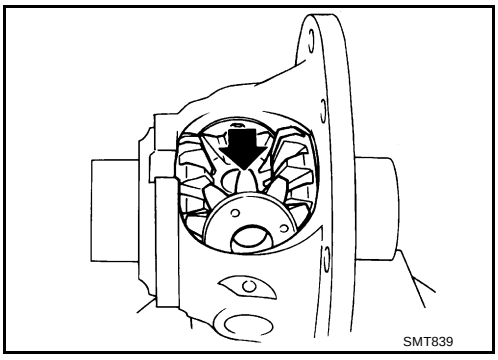
- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing taper roller bearing, replace outer and inner race as a set.**



ASSEMBLY

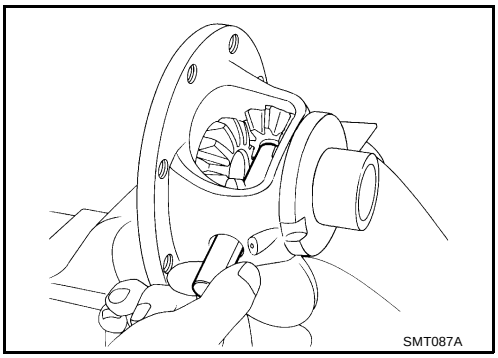
1. Attach side gear thrust washers to side gears, then install pinion mate thrust washers and pinion mate gears in place.

   CAUTION:
   Apply ATF to any parts.



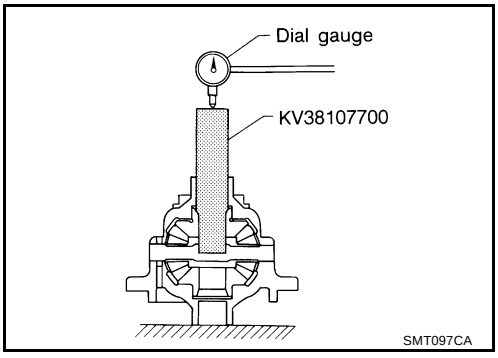
2. Insert pinion mate shaft.

   CAUTION:
   When inserting, be careful not to damage pinion mate thrust washers.



3. Measure the clearance between side gear and differential case with washers following the procedure below:

a. Set the special tool and dial indicator on side gear.

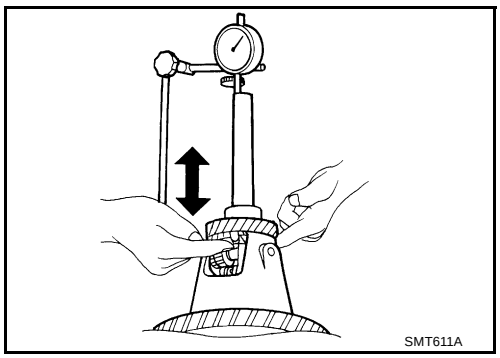


b. Move side gear up and down to measure dial indicator deflection. Always measure indicator deflection on both side gears.

Clearance between side gear and differential case with washer:

0.1 - 0.2 mm (0.004 - 0.008 in)

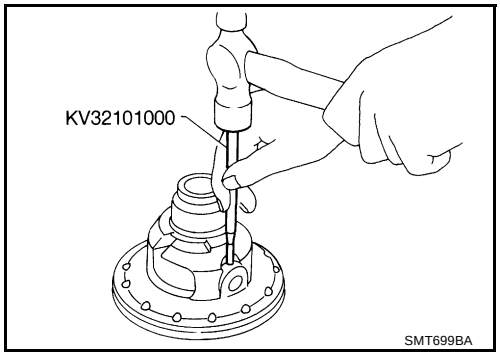
c. If not within specification, adjust the clearance by changing the thickness of differential side gear thrust washers. Refer to AT-535, "Final Drive" .



4. Install lock pin.

CAUTION:

- **Do not reuse lock pin.**
- **Make sure that lock pin is flush with case.**

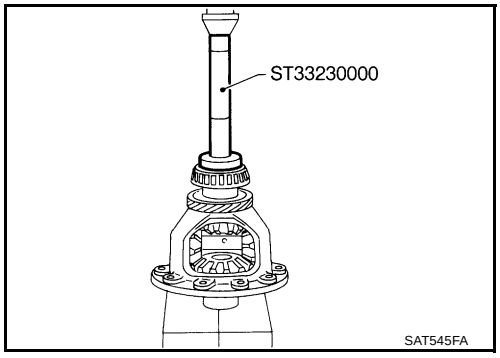


5. Press on differential side bearings.

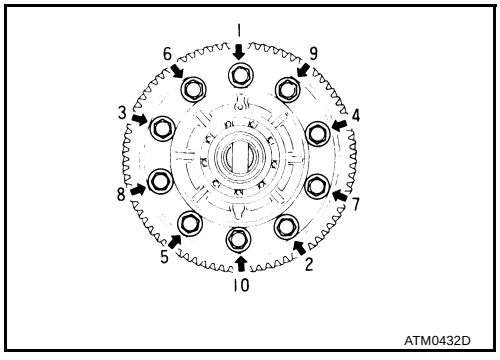
CAUTION:

Apply ATF to differential side bearings.

6. Install differential side bearing outer race and differential side bearing adjusting shim on transaxle case. Refer to AT-508, "Adjustment (1)" .



7. Tighten final gear and tighten fixing bolts to the specified torque in numerical order shown in the figure after temporarily tightening them. Refer to AT-503, "COMPONENTS" .



ASSEMBLY

PFP:00000

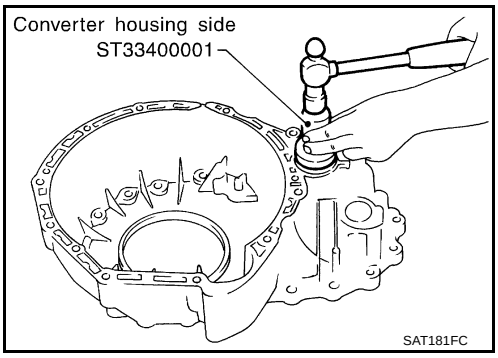
Assembly (1)

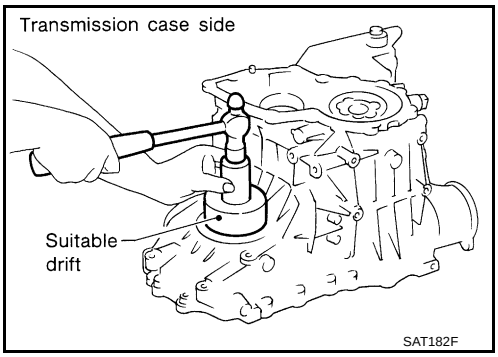
ECS004MD

1. Install differential side oil seals on transaxle case and converter housing.

CAUTION:

- **Do not reuse differential side oil seals.**
- **Apply ATF to differential side oil seals.**

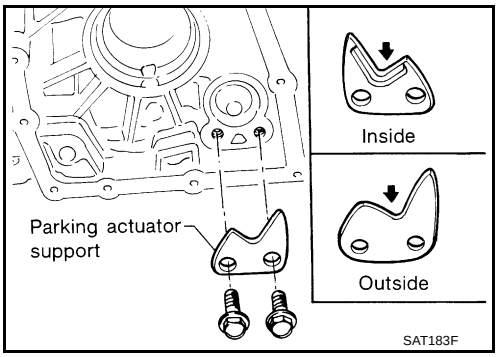




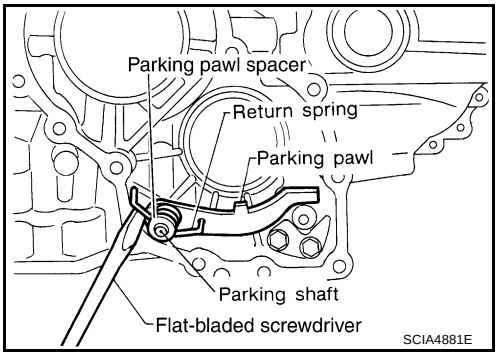
2. Install parking actuator support to transaxle case. Tighten parking actuator support bolts to the specified torque. Refer to AT-416, "Components" .

CAUTION:

Pay attention to the direction of parking actuator support.



3. Install parking pawl on transaxle case and fix it with parking shaft.
4. Install return spring and parking pawl spacer.



Adjustment (1)

ECS004ME

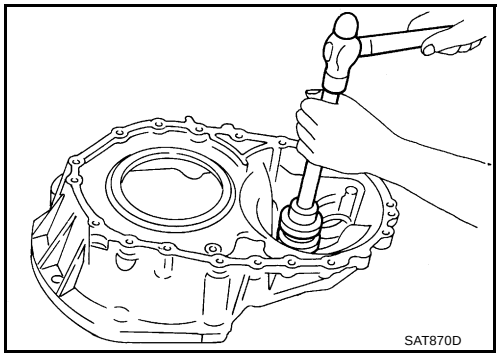
DIFFERENTIAL SIDE BEARING PRELOAD

1. Install differential side bearing outer race without differential side bearing adjusting shim on transaxle case.

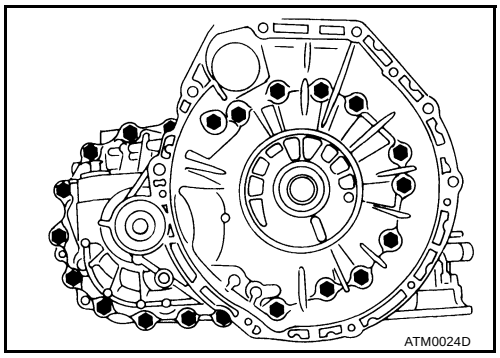
   CAUTION:
   Apply ATF to differential side bearing outer race.

2. Install differential side bearing outer race on converter housing.

   CAUTION:
   Apply ATF to differential side bearing outer race.



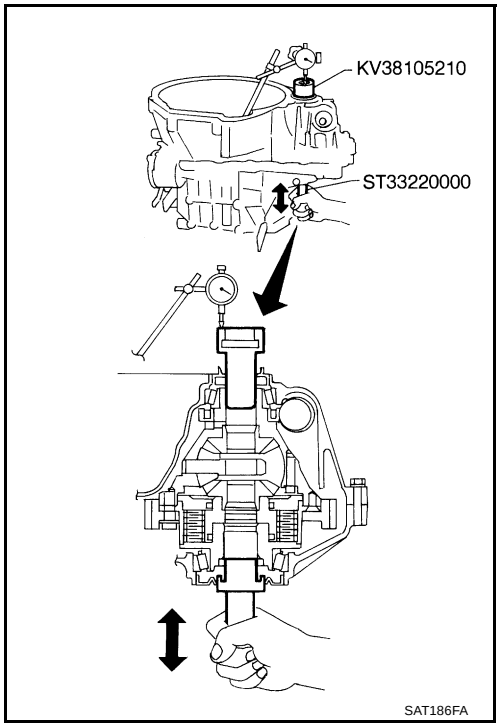
3. Place final drive assembly on transaxle case.
4. Install transaxle case on converter housing. Tighten transaxle case fixing bolts to the specified torque. Refer to AT-416, "Components" .



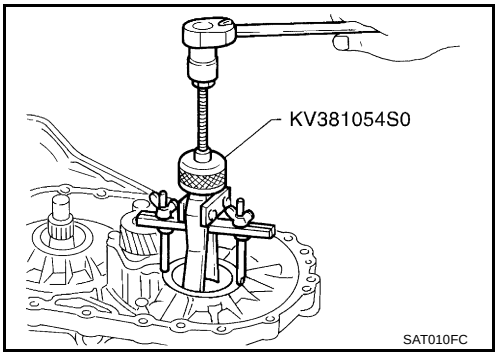
5. Attach dial indicator on differential case at converter housing side.
6. Insert Tool into differential side gear from transaxle case side.
7. Move SST up and down and measure dial indicator deflection.
8. Select proper thickness of differential side bearing adjusting shim(s). Refer to AT-536, "DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS" .
   Suitable shim thickness = Dial indicator deflection + Specified bearing preload

   Bearing preload:

   0.05 - 0.09 mm (0.0020 - 0.0035 in)



9. Remove converter housing from transaxle case.
10. Remove final drive assembly from transaxle case.
11. Remove differential side bearing outer race from transaxle case.
12. Reinstall differential side bearing outer race and differential side bearing adjusting shim selected from SDS table on transaxle case. Refer to AT-536, "DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS" .
13. Reinstall converter housing on transaxle case and tighten converter housing mounting bolts to the specified torque. Refer to AT-416, "Components" .



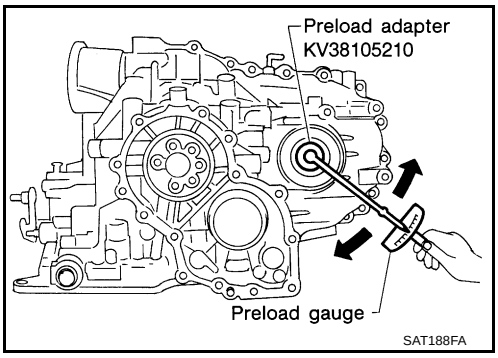
14. Insert SST and measure turning torque of final drive assembly.
    - **Turn final drive assembly in both directions several times to seat bearing rollers correctly.**

    Turning torque of final drive assembly (New bearing):

    0.78 - 1.37 N-m (0.8 - 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.**

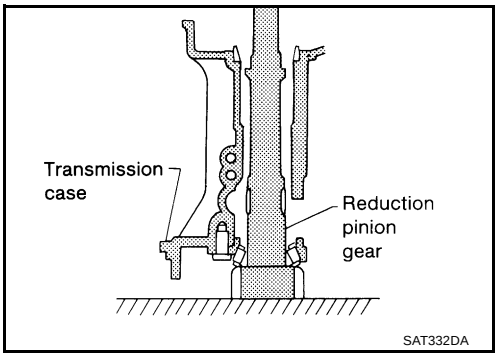
    Preload adapter: KV38105210



REDUCTION PINION GEAR BEARING PRELOAD

1. Remove converter housing and final drive assembly from transaxle case.
2. Select proper thickness of reduction pinion gear adjusting shim using the following procedures.

a. Place reduction pinion gear on transaxle case as shown.

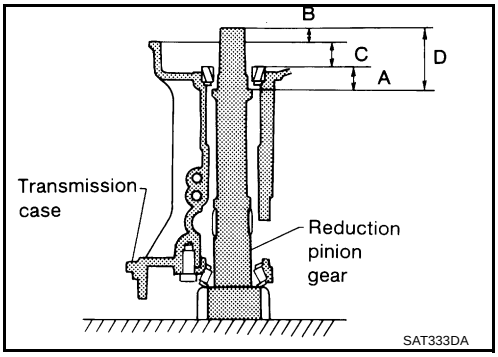


b. Place idler gear bearing on transaxle case.

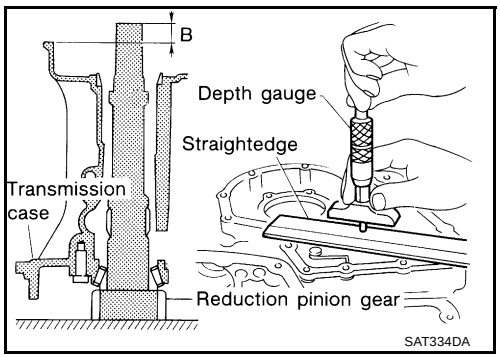
c. Measure the dimensions “B” “C” and “D” and calculate dimension “A”.

A = D – (B + C)

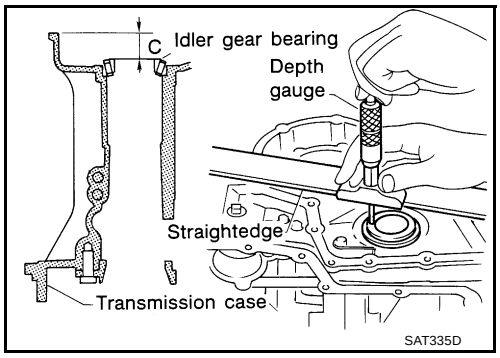
“A”: Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.



- Measure the dimension “B” between the end of reduction pinion gear and the surface of transaxle case.
- **Measure the dimension “B” in at least two places.**

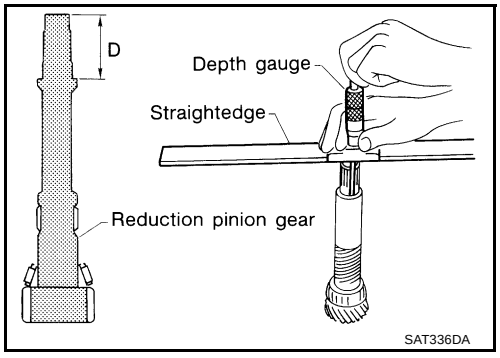


- Measure the dimension “C” between the surface of idler gear bearing inner race and the surface of transaxle case.
- **Measure the dimension “C” in at least two places.**



- Measure the dimension “D” between the end of reduction pinion gear and the adjusting shim mating surface of reduction pinion gear.
- **Measure the dimension “D” in at least two places.**
- Calculate dimension “A”.

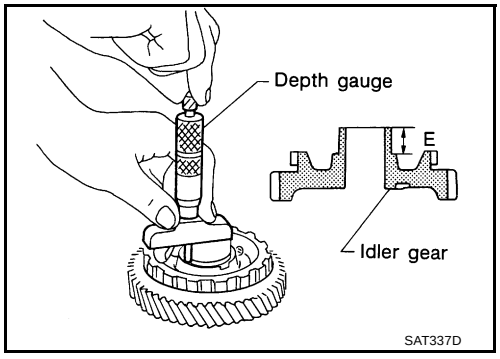
A = D – (B + C)



d. Measure the dimension “E” between the end of idler gear and the idler gear bearing inner race mating surface of idler gear.
   - **Measure the dimension “E” in at least two places.**

e. Select proper thickness of reduction pinion gear bearing adjusting shim. Refer to AT-537, "REDUCTION PINION GEAR BEARING ADJUSTING SHIMS" .

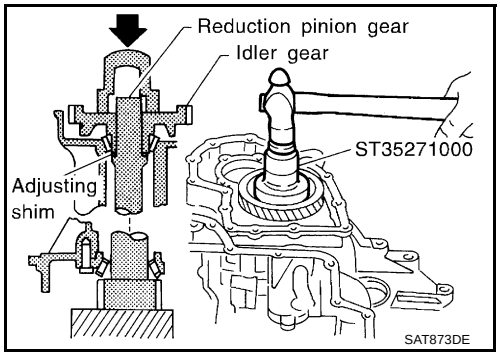
Proper shim thickness = A – E – 0.05 mm (0.0020 in)*
(*... Bearing preload)



3. Install reduction gear and reduction gear bearing adjusting shim selected in step 2-e on transaxle case.
4. Press idler gear bearing inner race on idler gear.

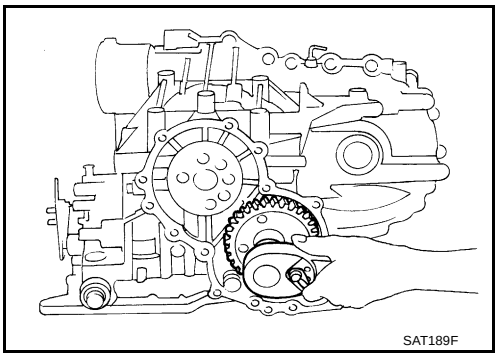
   CAUTION:
   - **Do not reuse idler gear bearing.**
   - **Apply ATF to idler gear bearing.**
5. Press idler gear on reduction gear.

   CAUTION:
   Press idler gear until idler gear fully contacts adjusting shim.



6. Set manual shaft to “P” position to fix idler gear.
7. Tighten idler gear lock nut to the specified torque. Refer to AT-416, "Components" .

CAUTION:
Lock idler gear with parking pawl when tightening lock nut.

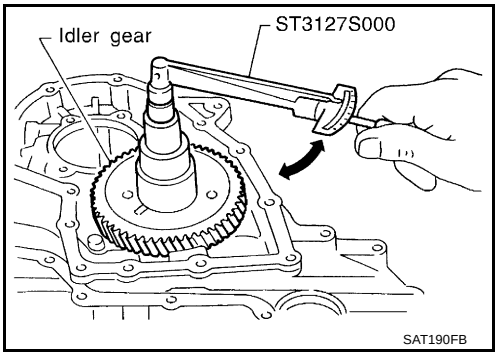


8. Measure turning torque of reduction pinion gear.
   - **When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.**

     Turning torque of reduction pinion gear:

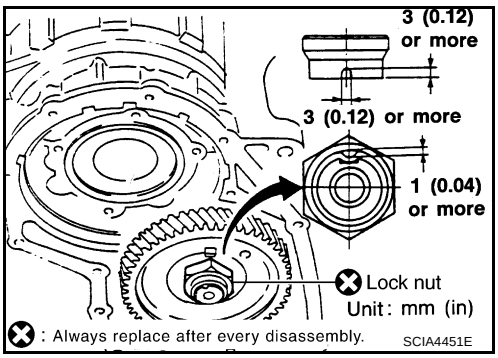
     0.05 - 0.39 N-m (0.5 - 4.0 kg-cm, 0.43 - 3.47 in-lb)

   - **If turning torque is out of specification, decrease or increase the thickness of reduction pinion gear bearing adjusting shim.**



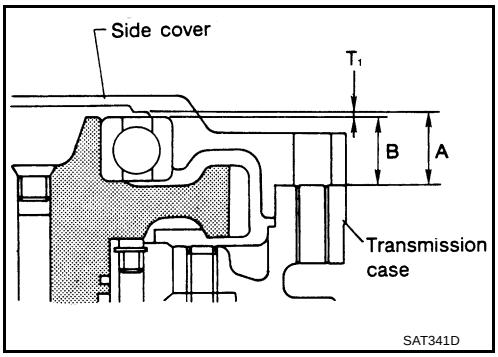
9. After properly adjusting turning torque, clinch idler gear lock nut as shown.

CAUTION:
Do not reuse idler gear lock nut.

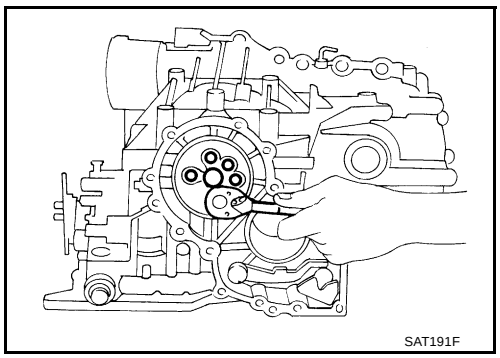


OUTPUT SHAFT END PLAY

- Measure the clearance between side cover and the end of the output shaft bearing.
- Select proper thickness of output shaft adjusting shim so that clearance is within specifications.



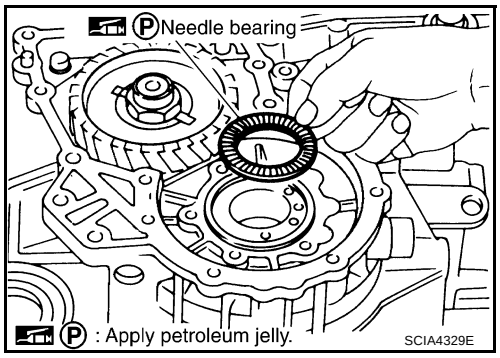
1. Install bearing retainer for output shaft. Refer to AT-416, "Components" .



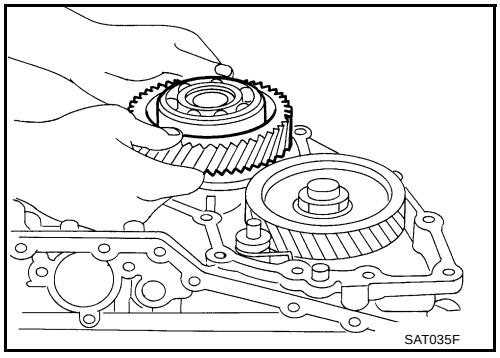
2. Install needle bearing on bearing retainer.

CAUTION:

- **Apply petroleum jelly to needle bearing.**
- **Be careful with the direction of needle bearing.**



3. Install output shaft on transaxle case.

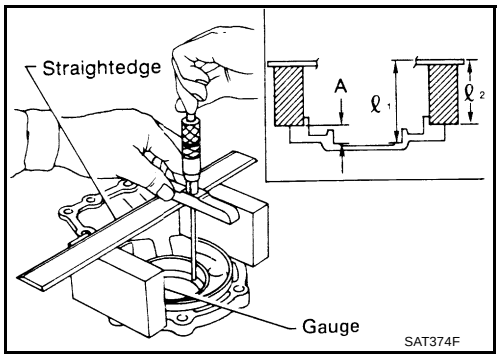


4. Measure the dimensions "ℓ_1" and "ℓ_2" at side cover and then calculate dimension "A".
   - Measure dimension "**ℓ_1**" **and "ℓ_2" in at least two places.**

   "A": Distance between transaxle case fitting surface and adjusting shim mating surface.

   $A = \ell_1 - \ell_2$

   ℓ_2: Height of gauge

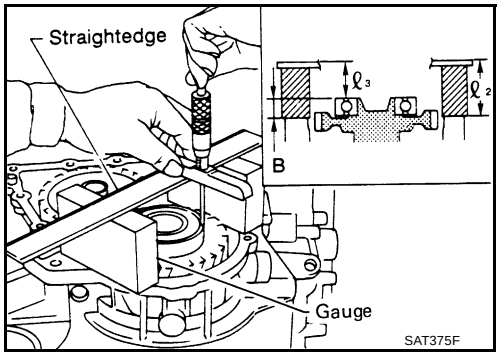


5. Measure the dimensions "ℓ_2" and "ℓ_3" and then calculate dimension "B".
   - Measure "**ℓ_2**" **and "ℓ_3" in at least two places.**

   "B": Distance between the end of output shaft bearing outer race and the side cover fitting surface of transaxle case.

   $B = \ell_2 - \ell_3$

   ℓ_2: Height of gauge

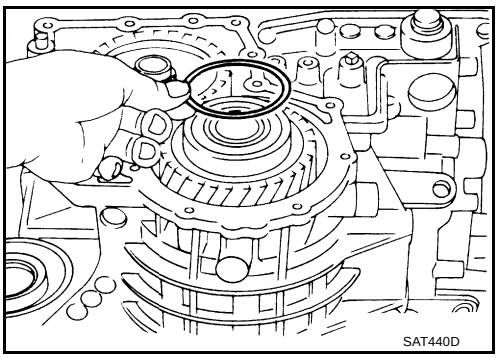


6. Select proper thickness of output shaft adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications. Refer to AT-538, "OUTPUT SHAFT ADJUSTING SHIMS" .

Output shaft end play (A – B):

0 - 0.15 mm (0 - 0.0059 in)

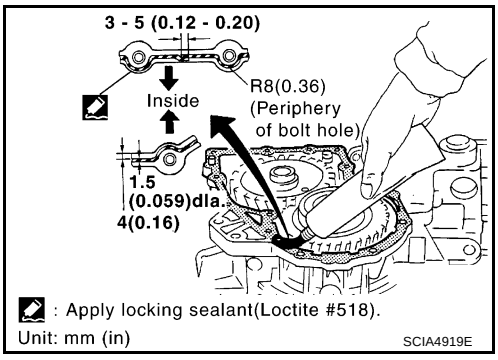
7. Install output shaft adjusting shim on output shaft bearing.



Assembly (2)

ECS004MF

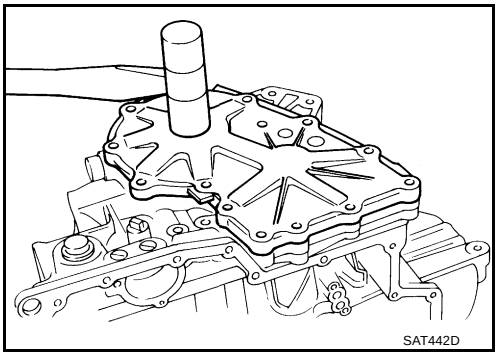
1. Apply locking sealant (Locktite #518) to transaxle case as shown in illustration.



2. Fit the mounting part of output shaft bearing on side cover to output shaft bearing, and after adjusting knock pin position, install it with light taps using a soft hammer and things like that.

CAUTION:

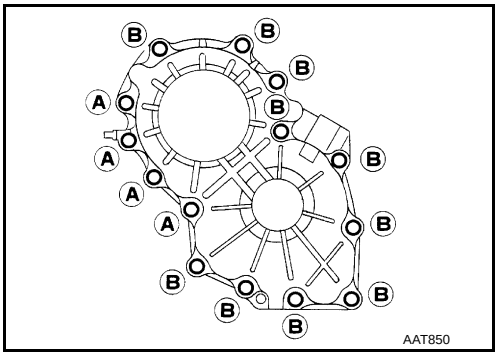
When installing, to avoid getting damaged and deformed, set the mounting part straight to parallel with the mounting surface.



3. Tighten side cover fixing bolts to specified torque. Refer to AT-416, "Components" .

CAUTION:

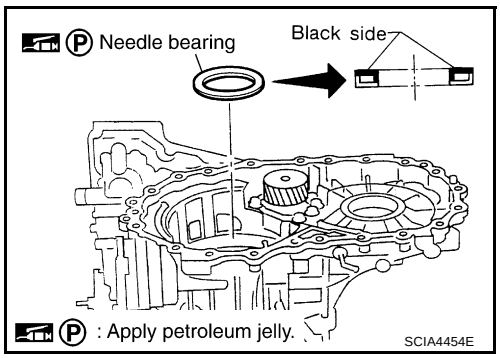
- **Do not mix bolts A and B.**
- **Always replace bolts A as they are self-sealing bolts.**



4. Install thrust washer on bearing retainer.

CAUTION:

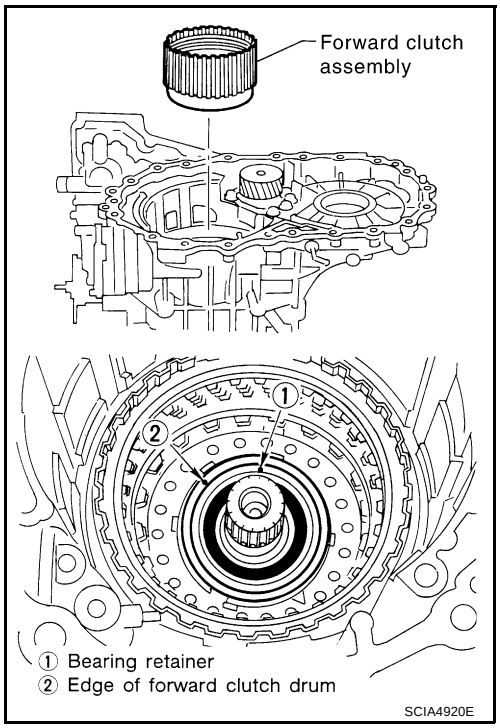
Apply petroleum jelly to thrust washer.



5. Install forward clutch assembly.

CAUTION:

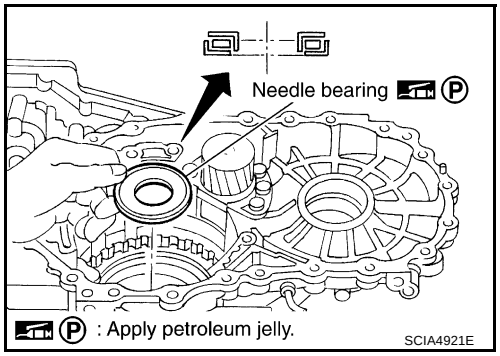
- **Align teeth of low & reverse brake before installing.**
- **Make sure that bearing retainer seal rings are not spread.**
- **If forward clutch assembly is correctly seated, points 1 and 2 are at almost same level.**



6. Install needle bearing.

CAUTION:

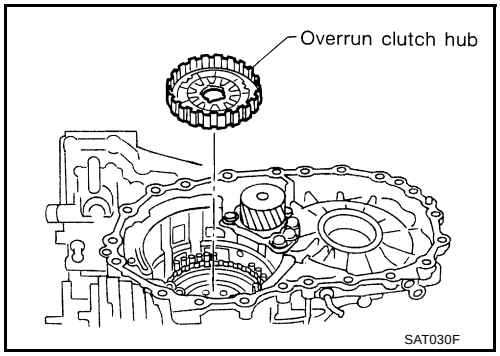
- **Apply petroleum jelly to needle bearing.**
- **Be careful with the direction of needle bearing.**



7. Install overrun clutch hub.

CAUTION:

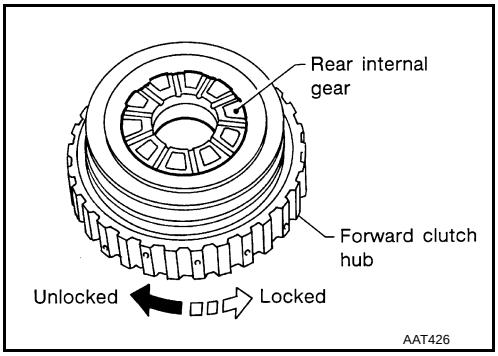
Align teeth of overrun clutch before installing.



8. Check operation of forward one-way clutch.

CAUTION:

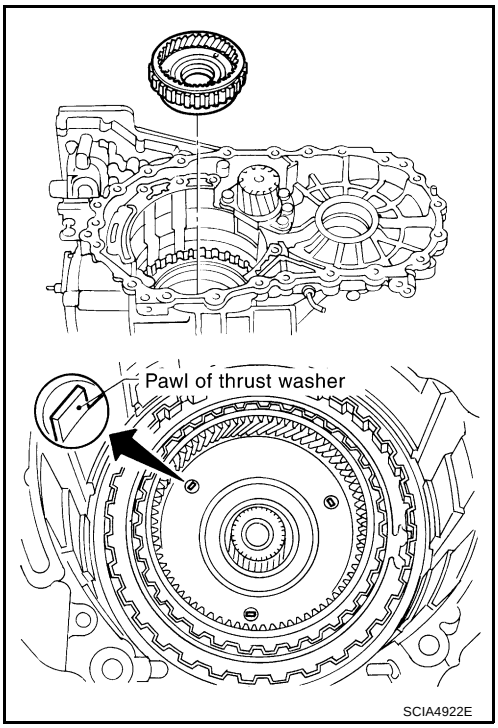
- **Hold rear internal gear and turn forward clutch hub. Check forward clutch hub for correct locking and unlocking directions.**
- **If not as shown in figure, check installation direction of forward one-way clutch.**



9. Install forward clutch hub and rear internal gear on transaxle case.

CAUTION:

- **Align teeth of forward clutch before installing.**
- **Make sure that three pawls of thrust washer are correctly aligned after installing.**

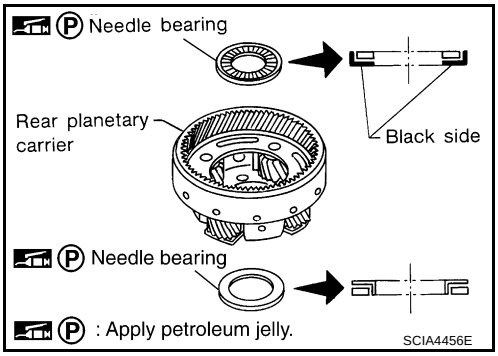


10. Install rear planetary carrier assembly and rear sun gear according to the following procedures.

a. Install needle bearings on rear planetary carrier.

CAUTION:

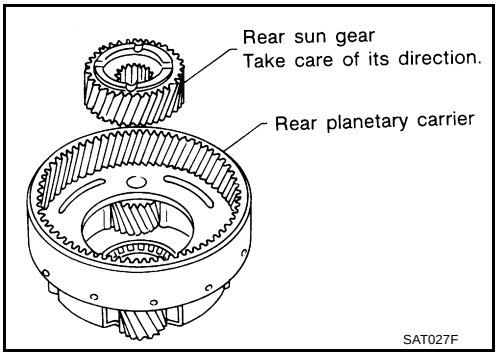
- **Apply petroleum jelly to needle bearings.**
- **Pay attention to the direction of needle bearings.**



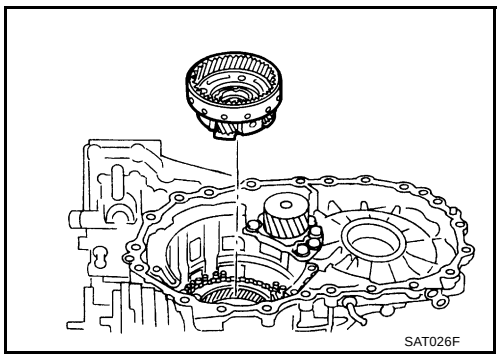
b. Install rear sun gear on rear planetary carrier.

CAUTION:

Pay attention to the direction of rear sun gear.



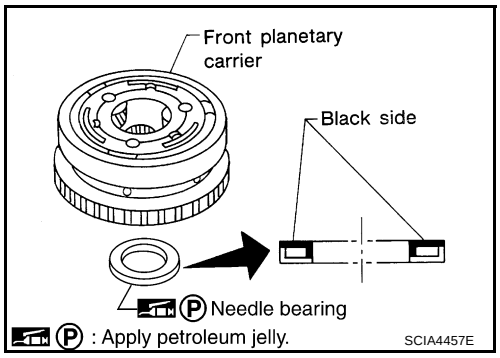
c. Install rear planetary carrier (with rear sun gear) on transaxle case.



11. Install needle bearing on front planetary carrier, then install them together on transaxle case.

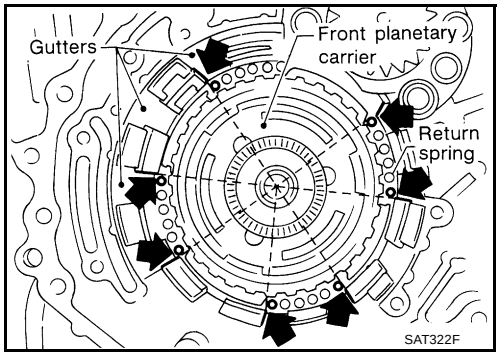
CAUTION:

- **Apply petroleum jelly to thrust needle bearing.**
- **Pay attention to the direction of thrust needle bearing.**



12. Install low and reverse brake piston according to the following procedures.

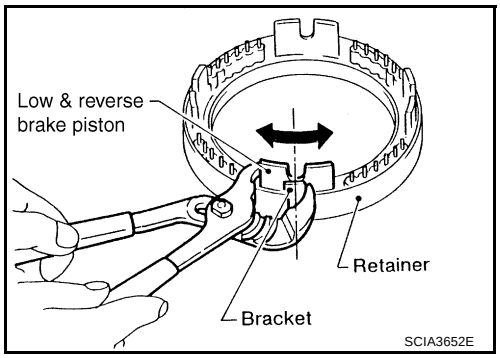
a. Set and align return springs to transaxle case gutters as shown in illustration.



b. Set and align low & reverse brake piston with retainer.

CAUTION:

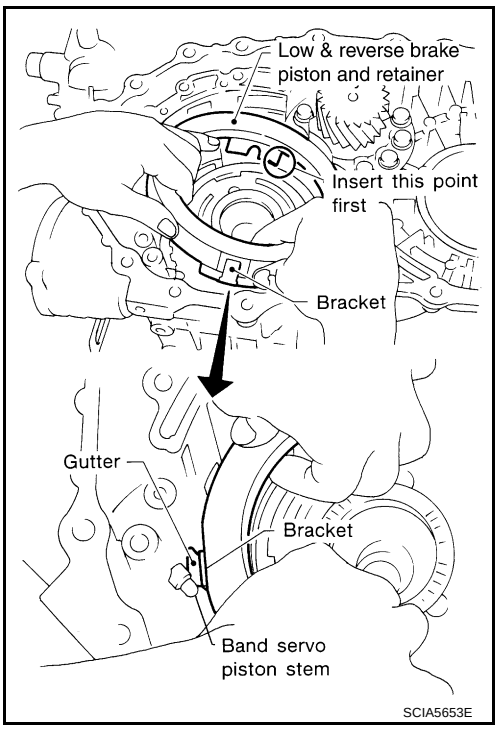
Apply ATF to the surface of low & reverse brake piston and retainer.



c. Install low & reverse brake piston and retainer on transaxle case.

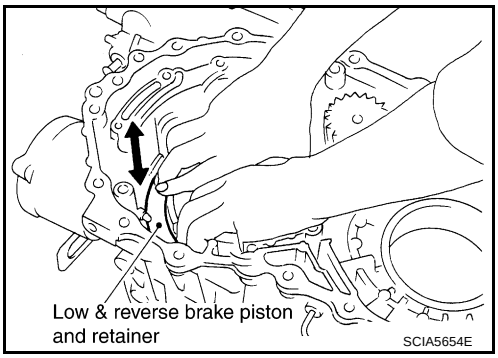
CAUTION:

Align bracket to specified gutter as indicated in the figure.

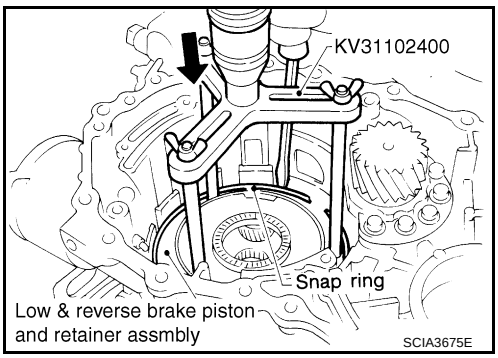


d. Make sure that each protrusion of low & reverse brake piston is correctly set to corresponding return spring as follows.

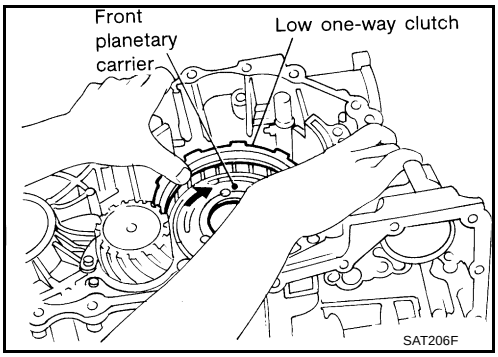
- **Push low & reverse brake piston and retainer evenly and confirm they move smoothly.**
- **If they cannot move smoothly, remove low & reverse brake piston and retainer and align return spring correctly as instructed in step “a”.**



e. Push down low & reverse brake piston and retainer and install snap ring.



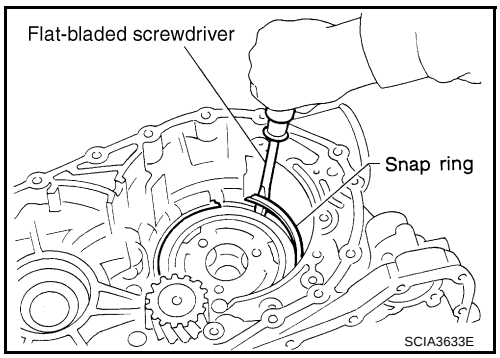
13. Install low one-way clutch to front planetary carrier by turning carrier in the direction of the arrow shown.



14. Install snap ring with flat-bladed screwdriver.

CAUTION:

Forward clutch and bearing must be correctly installed for snap ring to fit into groove of transaxle case.



15. Install front sun gear according to the following procedures.

a. Install bearing race on front sun gear.

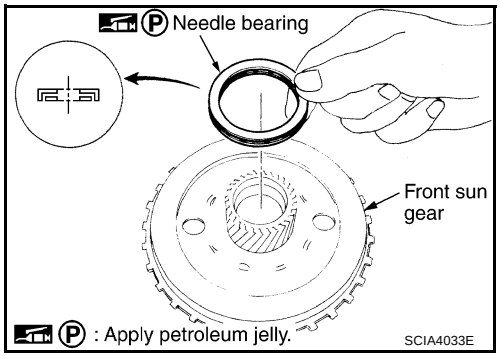
CAUTION:

Apply petroleum jelly to bearing race.

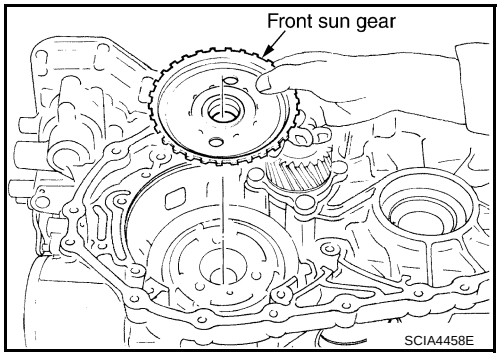
b. Install needle bearing on front sun gear.

CAUTION:

- **Apply petroleum jelly to needle bearing.**
- **Pay attention to the direction of needle bearing.**



c. Install front sun gear on front planetary carrier.

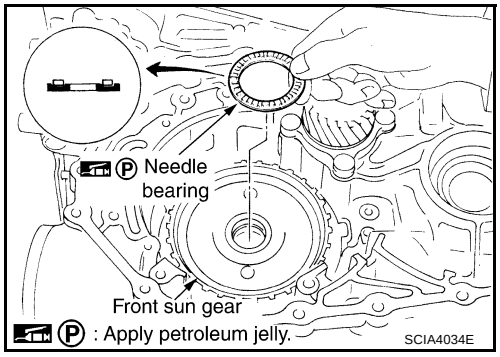


16. Install high clutch hub according to the following procedures.

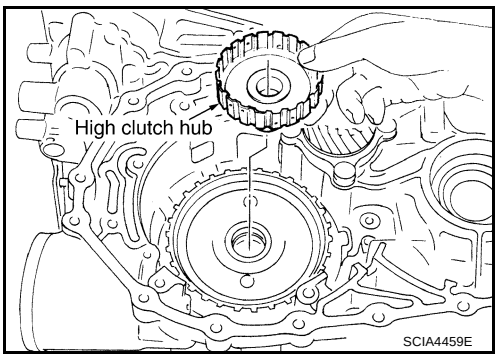
a. Install needle bearing on front sun gear.

CAUTION:

- **Apply petroleum jelly to needle bearing.**
- **Pay attention to the direction of needle bearing.**



b. Install high clutch hub on front sun gear.

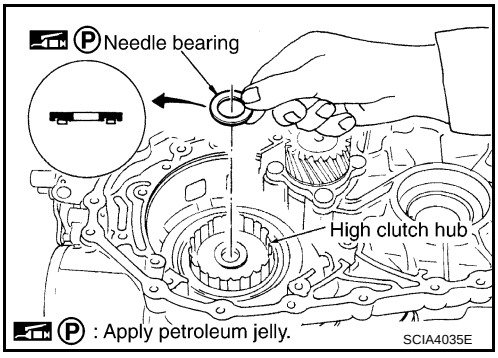


17. Install input shaft assembly (high clutch assembly) according to the following procedures.

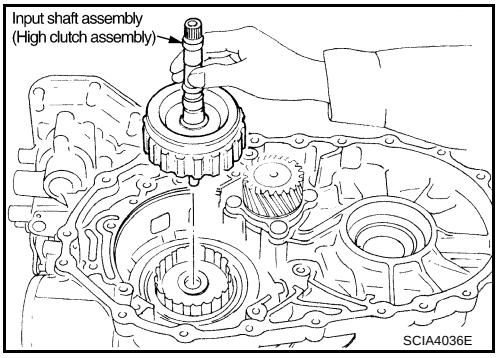
a. Install needle bearing on high clutch hub.

CAUTION:

- **Apply petroleum jelly.**
- **Pay attention to the direction of needle bearing.**



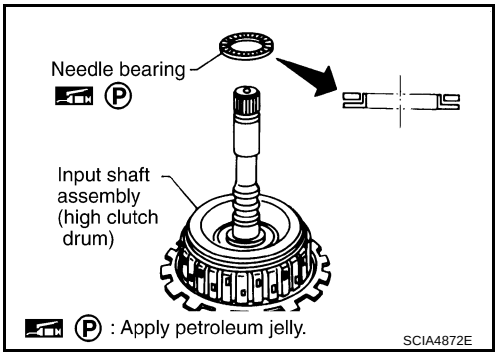
b. Install input shaft assembly (high clutch assembly) on high clutch hub.



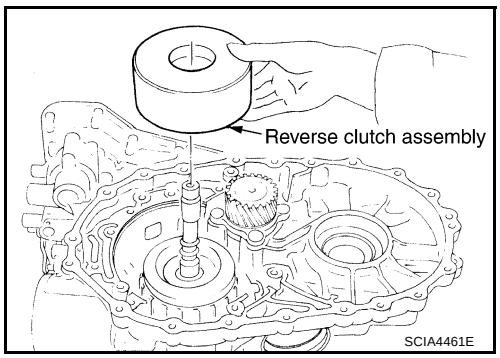
c. Install needle bearing on input shaft assembly (high clutch drum).

CAUTION:

- **Apply petroleum jelly to needle bearing.**
- **Be careful with the direction of needle bearing.**



18. Install reverse clutch assembly on input shaft assembly (high clutch drum).



Adjustment (2)

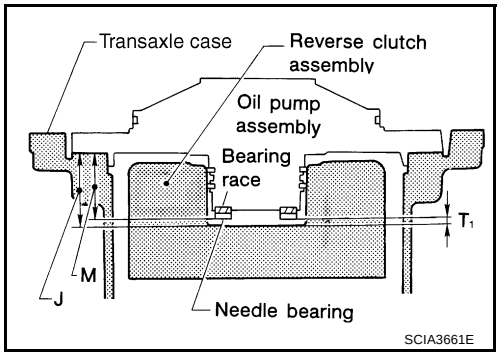
ECS004MG

When any parts listed below are replaced, adjust total end play and reverse clutch end play.

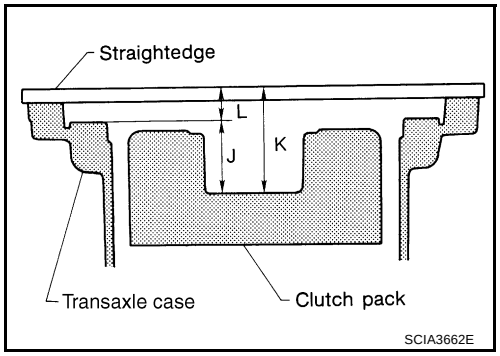
Part name	Total end play	Reverse clutch end play
transaxle case	●	●
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
High clutch drum	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●

TOTAL END PLAY

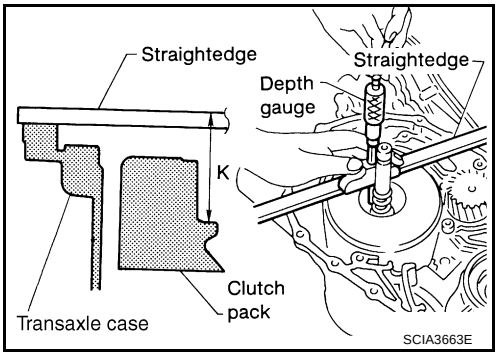
- Measure the clearance between reverse clutch drum and needle bearing for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



1. Measure dimensions “K” and “L” and then calculate dimension “J”.



a. Measure dimension “K”.

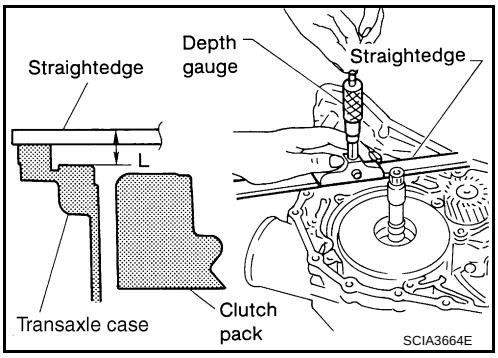


b. Measure dimension “L”.

c. Calculate dimension “J”.

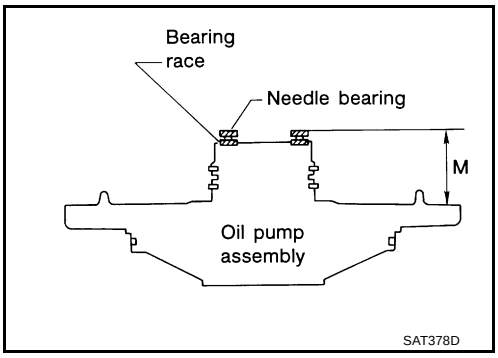
“J”: Distance between oil pump fitting surface of transaxle case and needle bearing mating surface of high clutch drum.

J = K – L



2. Measure dimension “M”.

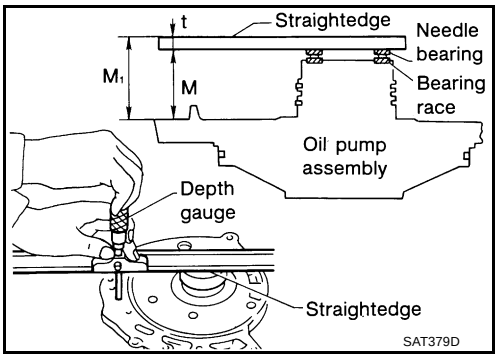
a. Place bearing race and needle bearing on oil pump assembly.



b. Measure dimension “M”.

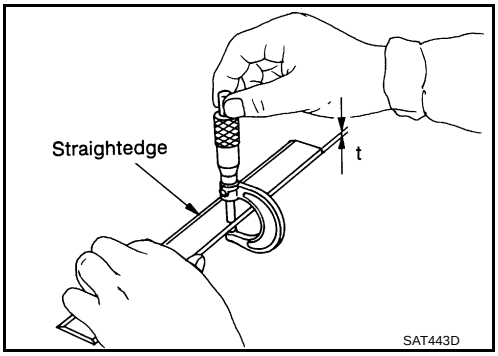
“M”: Distance between transaxle case fitting surface of oil pump cover and needle bearing on oil pump cover.

“M_1 ”: Indication of gauge.



c. Measure thickness of straightedge “t”.

M = M_1 – t



3. Adjust total end play “T_1 ”.

T_1 = J – M

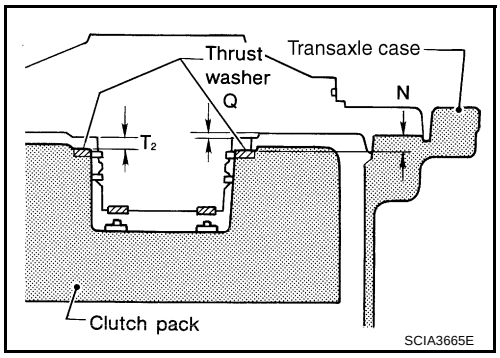
Total end play “T_1 ”:

0.25 - 0.55 mm (0.0098 - 0.0217 in)

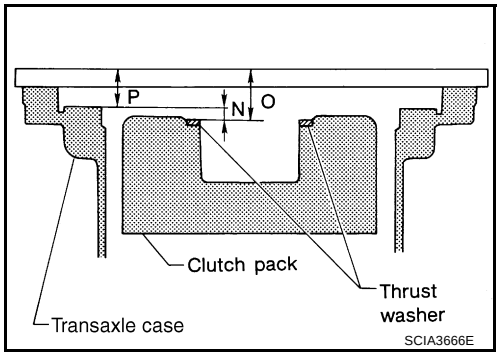
- Select proper thickness of bearing race so that total end play is within specifications. Refer to AT-538, "Total End Play" .

REVERSE CLUTCH END PLAY

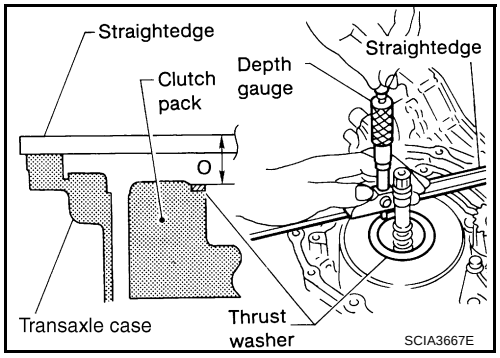
- Measure the clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specification.



1. Measure dimensions “O” and “P” and then calculate dimension “N”.



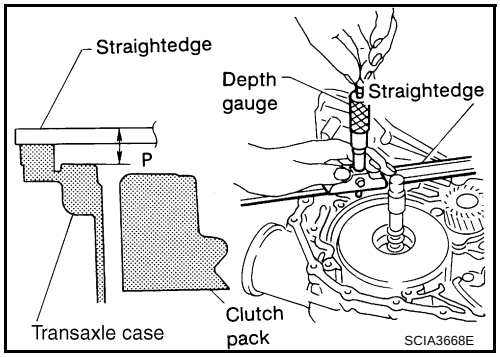
a. Place thrust washer on reverse clutch drum.
b. Measure dimension “O”.



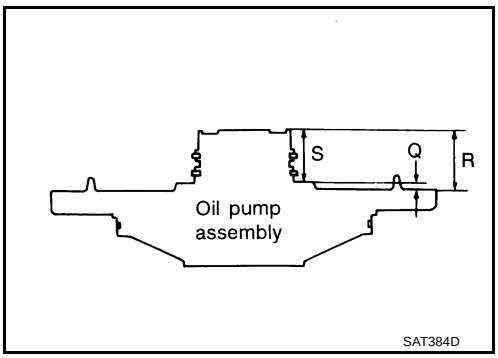
c. Measure dimension “P”.
d. Calculate dimension “N”.

“N”: Distance between oil pump fitting surface of transaxle case and thrust washer on reverse clutch drum.

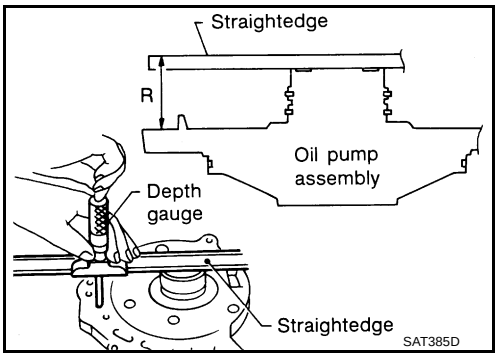
N = O – P



2. Measure dimensions “R” and “S” and then calculate dimension “Q”.



a. Measure dimension “R”.

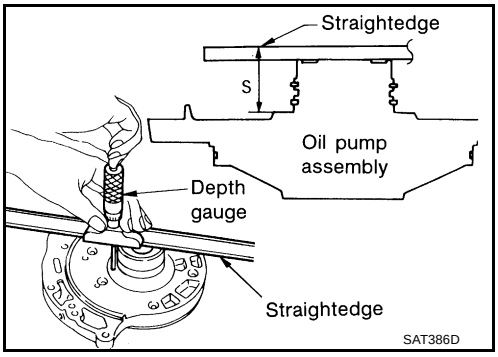


b. Measure dimension “S”.

c. Calculate dimension “Q”.

“Q”: Distance between transaxle case fitting surface and thrust washer mating surface.

Q = R – S



3. Adjust reverse clutch end play “T_2 ”.

T_2 = N – Q

Reverse clutch end play:

0.61 - 1.0 mm (0.0240 - 0.039 in)

- Select proper thickness of thrust washer so that reverse clutch end play is within specifications. Refer to AT-539, "Reverse Clutch End Play" .

Assembly (3)

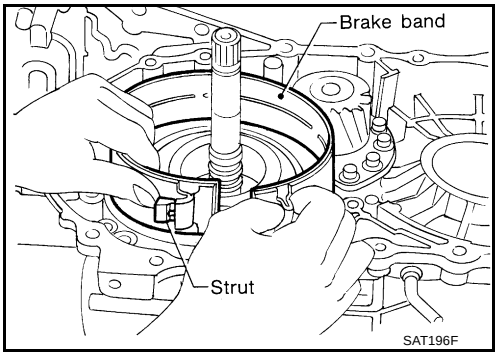
ECS004MH

1. Install anchor end pin and lock nut on transaxle case.

CAUTION:

Do not reuse anchor end pin.

2. Place brake band and strut on outside of reverse clutch drum. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.

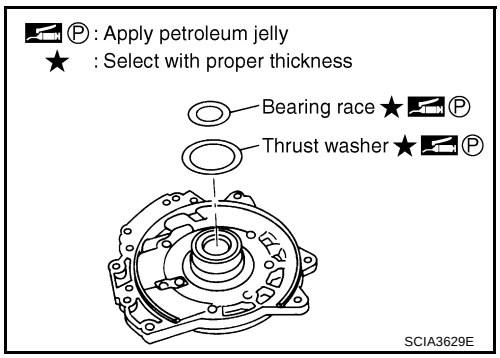


3. Place bearing race selected in total end play adjustment step on oil pump cover.

CAUTION:
Apply petroleum jelly to bearing race.

4. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.

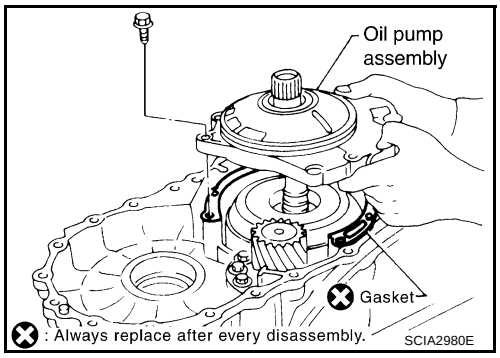
CAUTION:
Apply petroleum jelly to thrust washer.



5. Install oil pump assembly and gasket on transaxle case.

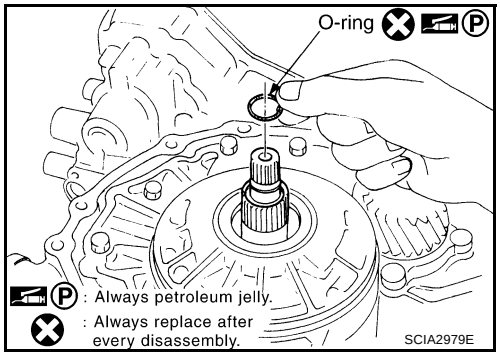
CAUTION:
Do not reuse gasket.

6. Tighten oil pump fixing bolts to the specified torque. Refer to AT-416, "Components"



7. Install O-ring to input shaft assembly (high clutch drum).

CAUTION:
- **Apply petroleum jelly to O-ring.**
- **Do not reuse O-ring.**



8. Adjust brake band.

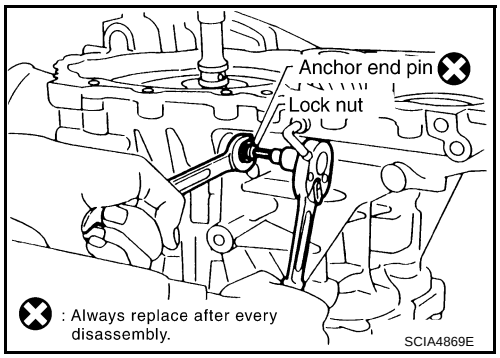
CAUTION:
Do not reuse anchor end pin.

a. Tighten anchor end pin to the specified torque.

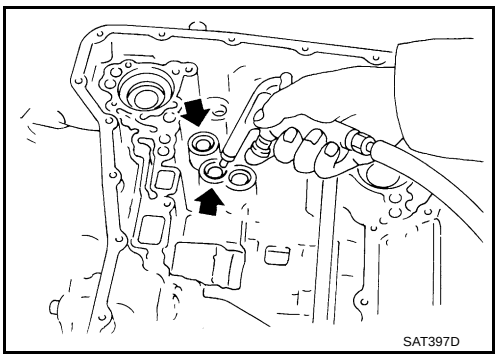
: 4.9 N·m (0.50 kg-m, 43 in-lb)

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

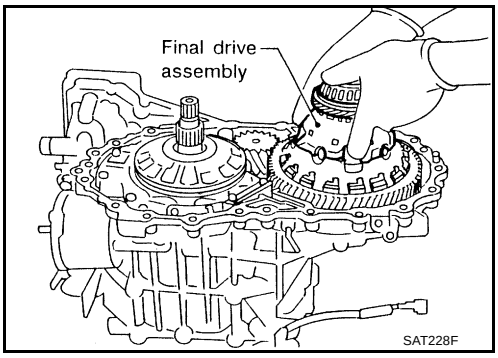
c. While holding anchor end pin, tighten lock nut. Refer to AT-535, "BRAKE BAND" .



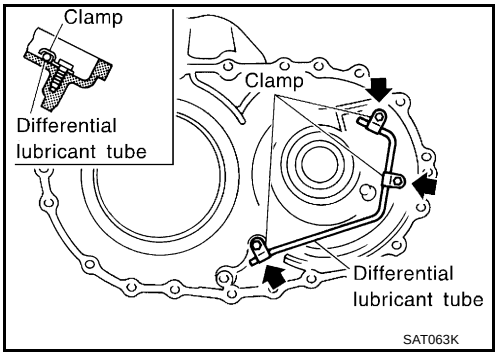
9. Apply compressed air to oil holes of transaxle case and check operation of brake band.



10. Install final drive assembly on transaxle case.



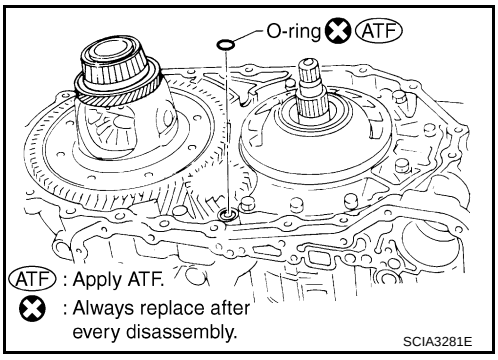
11. Install differential lubricant tube on converter housing. Tighten differential lubricant tube bolts to the specified torque. Refer to AT-416, "Components" .



12. Install O-ring on differential oil port of transaxle case.

CAUTION:

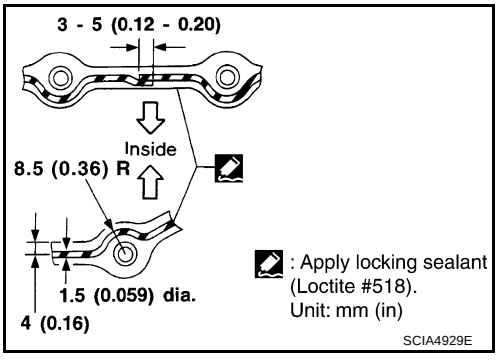
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**



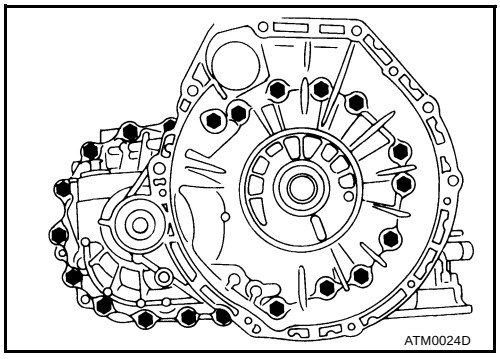
13. Install converter housing on transaxle case.

CAUTION:

Apply locking sealant (Locktite #518) to mating surface of converter housing.

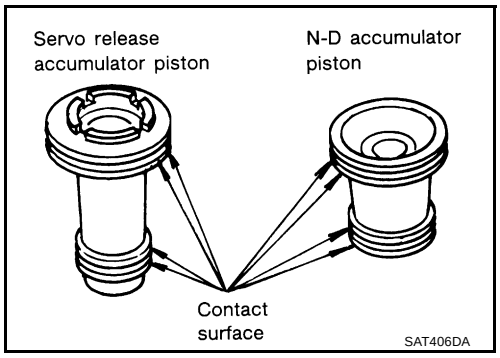


- Tighten converter housing bolts to the specified torque. Refer to AT-416, "Components" .



14. Install accumulator piston.

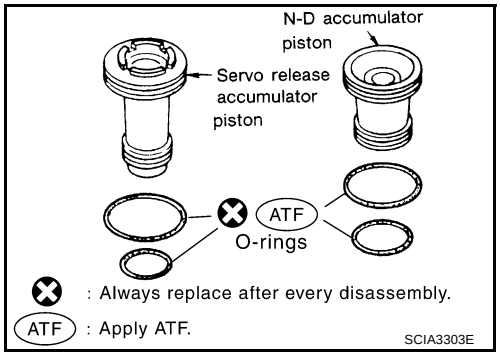
a. Check contact surface of accumulator piston for damage.



b. Install O-rings on accumulator piston. Refer to AT-530, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

CAUTION:

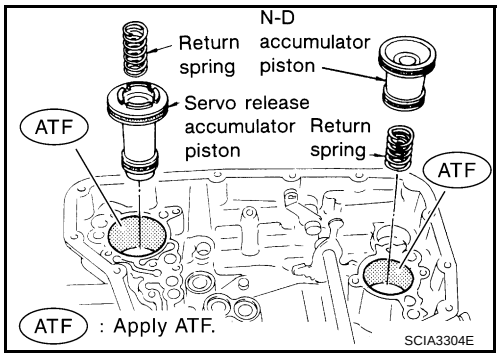
- **Do not reuse O-rings.**
- **Apply ATF to O-rings.**



c. Install accumulator pistons and return springs on transaxle case. Refer to AT-530, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

CAUTION:

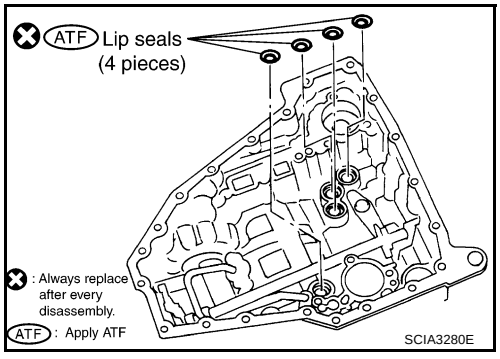
Apply ATF to inner surface of transaxle case.



15. Install lip seals for band servo oil holes on transaxle case.

CAUTION:

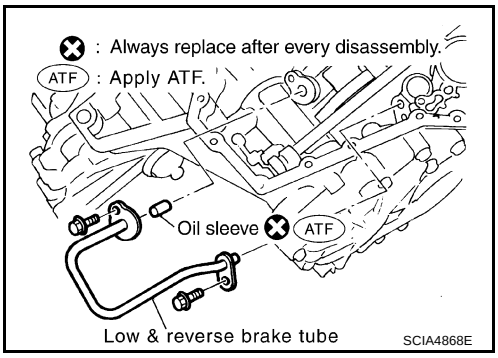
- **Do not reuse lip seals.**
- **Apply ATF to lip seals.**



16. Install low & reverse brake tube and oil sleeve. Tighten Low & reverse brake tube bolts to the specified torque. Refer to AT-416, "Components" .

CAUTION:

- **Do not reuse oil sleeve.**
- **Apply ATF to oil sleeve.**



17. Install control valve assembly.

a. Install O-ring to terminal body.

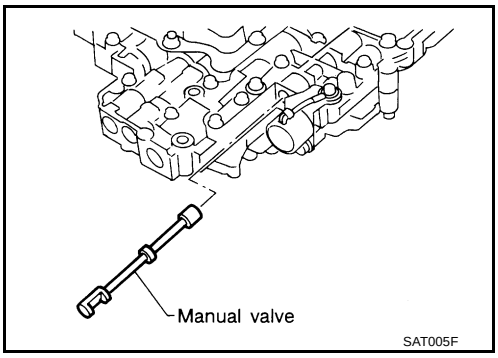
CAUTION:

- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**

b. Insert manual valve into control valve assembly.

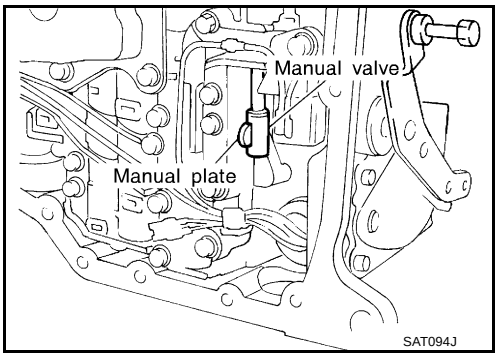
CAUTION:

Apply ATF to manual valve.



c. Set manual shaft in Neutral position.

d. Install control valve assembly on transaxle case while aligning manual valve with manual plate.

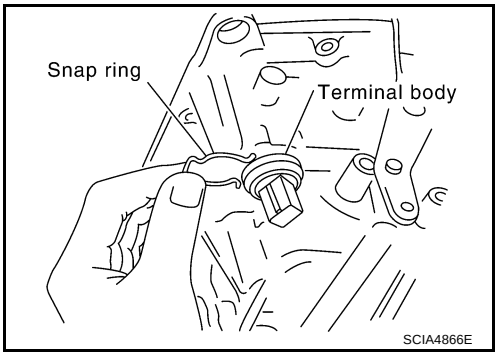


e. Pass terminal cord assembly through transaxle case and install terminal body on transaxle case by pushing it.

f. Install snap ring to terminal body.

CAUTION:

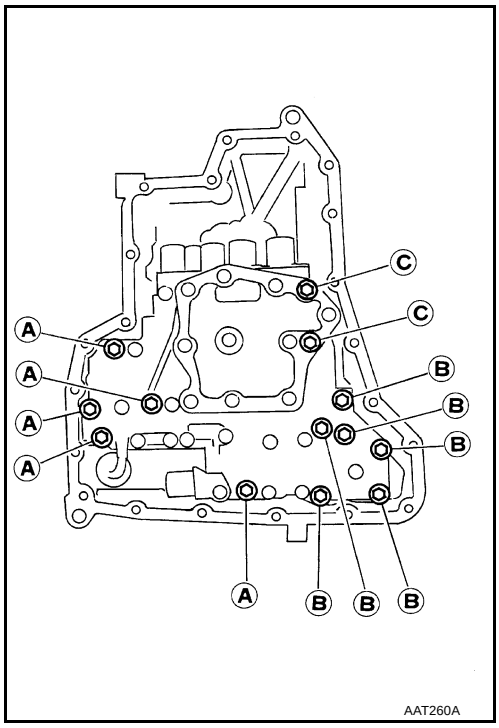
Do not expand snap ring excessively.



g. Tighten control valve assembly fixing bolts **A** , **B** and **C** to the specified torque. Refer to AT-416, "Components" .

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



AAT260A

CAUTION:

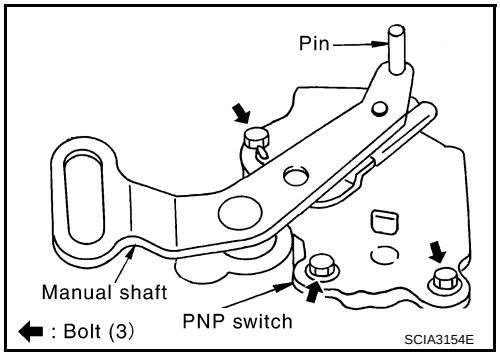
- **Do not reuse idler gear bearing.**
- **Apply ATF to idler gear bearing.**

18. Install PNP switch.

a. Set manual shaft in "P" position.

b. Temporarily install PNP switch on manual shaft.

c. Move manual shaft to "N" position.



SCIA3154E

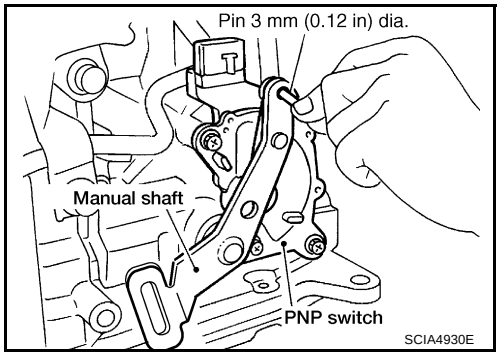
d. Use a 3 mm (0.12 in) pin for this adjustment.

i. Insert the pin straight into the manual shaft adjustment hole.

ii. Rotate PNP switch until the pin can also be inserted straight into hole in PNP switch.

e. Tighten PNP switch fitting bolts. Refer to AT-416, "Components" .

f. Remove pin from adjustment hole after adjusting PNP switch.



SCIA4930E

19. Install bracket on transaxle case.

20. Install O-ring on revolution sensor.

CAUTION:

- **Do not reuse O-ring.**
- **Apply petroleum jelly to O-ring.**

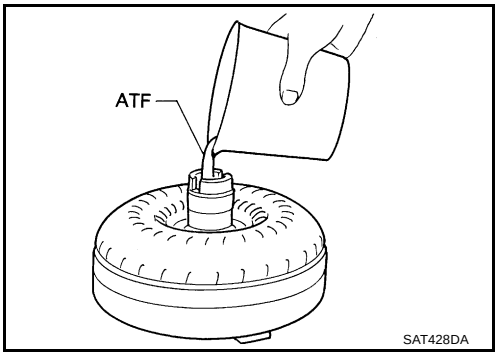
21. Install revolution sensor on transaxle case.

22. Install torque converter.

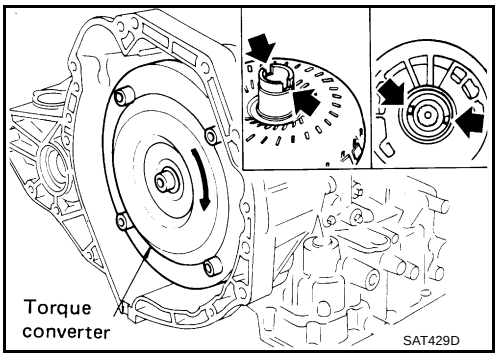
a. Pour ATF into torque converter.

CAUTION:

- **Approximately 1 liter (7/8 Imp qt) of fluid is required for a new torque converter.**
- **When reusing old torque converter, add the same amount of fluid as was drained.**



b. Install torque converter while aligning notches of torque converter with notches of oil pump.

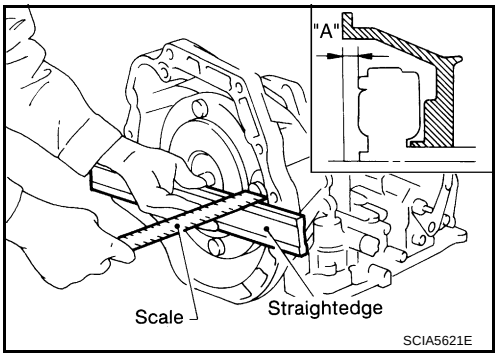


c. Measure distance “A” to Make sure that torque converter is in proper position.

Distance “A”

QR20DE models: 19.0 mm (0.75 in) or more

QR25DE models: 14.0 mm (0.55 in) or more



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ECS00CXK

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 equiualent*1	
Fluid capacity ℓ (Imp qt)		8.5 (7-1/2)	

*1: Refer to MA-17, "Fluids and Lubricants" .

Shift Schedule

ECS00CXL

VEHICLE SPEED WHEN SHIFTING GEARS AND THROTTLE POSITION

For 85X23 model

Throttle position	Shift pattern	Vehicle speed km/h (MPH)					
		$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$
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)					
		$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$
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 D_4 position.
- Perform lock-up inspection after warming up engine.
- Lock-up vehicle speed may vary depending on the driving conditions and circumstances.

Stall Revolution

ECS00CXM

Engine	Stall revolution rpm
QR20DE	2,450 - 2,950
QR25DE	2,300 - 2,750

Line Pressure

ECS00F1T

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

ECS00F1U

CONTROL VALVE AND PLUG RETURN SPRINGS

For 85X23 model

Unit: mm (in)

Parts			Item		
			Part No.*	Free length	Outer diameter
Upper body	7	Pilot valve spring	31742-3AX03	38.98 (1.535)	8.9 (0.350)
	35	1-2 accumulator valve spring	31742-3AX00	20.5 (0.807)	6.95 (0.274)
	10	1-2 accumulator piston spring	31742-85X02	55.60 (2.189)	19.6 (0.772)
	17	1st reducing valve spring	31742-80X05	27.0 (1.063)	7.0 (0.276)
	19	3-2 timing valve spring	31736-01X00	23.0 (0.906)	6.65 (0.262)
	24	Overrun clutch reducing valve spring	31742-80X15	37.5 (1.476)	6.9 (0.272)
	26	Torque converter relief valve spring	31742-80X07	31.0 (1.220)	9.0 (0.354)
	31	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	11	Pressure regulator valve spring	31742-80X13	45.0 (1.772)	15.0 (0.591)
	16	Overrun clutch control valve spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	20	Accumulator control valve spring	31742-80X02	22.0 (0.866)	6.5 (0.256)
	25	Shift valve A spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	30	Shuttle valve spring	31762-41X04	51.0 (2.008)	5.65 (0.222)
	32	Shift valve B spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	2	Pressure modifier piston spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
	6	Pressure modifier valve spring	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.

For 85X64 model

Unit: mm (in)

Parts			Item		
			Part No.*	Free length	Outer diameter
Upper body	7	Pilot valve spring	31742-3AX03	38.98 (1.535)	8.9 (0.350)
	35	1-2 accumulator valve spring	31742-3AX00	20.5 (0.807)	6.95 (0.274)
	10	1-2 accumulator piston spring	31742-3AX08	55.26 (2.176)	19.6 (0.772)
	17	1st reducing valve spring	31742-80X05	27.0 (1.063)	7.0 (0.276)
	19	3-2 timing valve spring	31736-01X00	23.29 (0.917)	6.65 (0.262)
	24	Overrun clutch reducing valve spring	31742-80X15	37.5 (1.476)	6.9 (0.272)
	26	Torque converter relief valve spring	31742-80X07	31.0 (1.220)	9.0 (0.354)
	31	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	11	Pressure regulator valve spring	31742-80X13	45.0 (1.772)	15.0 (0.591)
	16	Overrun clutch control valve spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	20	Accumulator control valve spring	31742-80X02	22.0 (0.866)	6.5 (0.256)
	25	Shift valve A spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	30	Shuttle valve spring	31762-41X04	51.0 (2.008)	5.65 (0.222)
	32	Shift valve B spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	2	Pressure modifier piston spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
	6	Pressure modifier valve spring	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

ECS00F1V

O-RING

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.

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

ECS00F1W

REVERSE CLUTCH

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)	
	Wear 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)	
	Wear 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)	
	Wear 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)	
	Wear 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)
	Wear 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)	
	Wear 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)	
	Wear 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)	
	Wear 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)	
	Wear 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)	
	Wear 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

Drive plate thickness mm (in)	Standard	1.8 (0.071)	
	Wear 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)	
	Wear limit	3.3 (0.130)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		2.0 (0.079) 2.2 (0.087) 2.4 (0.094) 2.6 (0.102) 2.8 (0.110) 3.0 (0.118) 3.2 (0.126) 3.4 (0.134)	31667-80X00 31667-80X01 31667-80X02 31667-80X03 31667-80X04 31667-80X05 31667-80X06 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)	
	Wear 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)	
	Wear limit	3.3 (0.130)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		2.0 (0.079) 2.2 (0.087) 2.4 (0.094) 2.6 (0.102) 2.8 (0.110) 3.0 (0.118) 3.2 (0.126) 3.4 (0.134)	31667-80X00 31667-80X01 31667-80X02 31667-80X03 31667-80X04 31667-80X05 31667-80X06 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)	4.9 (0.50, 43)
Number of returning revolutions for anchor end pin	2.5
Lock nut tightening torque N·m (kg-m, ft-lb)	34 (3.5, 25)

Final Drive

ECS00F1X

DIFFERENTIAL SIDE GEAR CLEARANCE

Clearance between side gear and differential case with washer mm (in)	0.1 - 0.2 (0.004 - 0.008)

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)

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)

Planetary Carrier and Oil Pump

ECS00F1Y

PLANETARY CARRIER

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) 11.98 - 11.99 (0.4717 - 0.4720) 11.97 - 11.98 (0.4713 - 0.4717)	31346-80X00 31346-80X01 31346-80X02
		Outer gear	
		Thickness mm (in)	Part number*
		11.99 - 12.0 (0.4720 - 0.4724) 11.98 - 11.99 (0.4717 - 0.4720) 11.97 - 11.98 (0.4713 - 0.4717)	31347-80X00 31347-80X01 31347-80X02
Clearance between oil pump housing and outer gear mm (in)	Standard	0.111 - 0.181 (0.0044 - 0.0071)	
	Allowable limit	0.181 (0.0071)	
Oil pump cover seal ring clearance mm (in)	Standard	0.1 - 0.25 (0.0039 - 0.0098)	
	Allowable limit	0.25 (0.0098)	

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

Input Shaft

ECS00F1Z

SEAL RING CLEARANCE

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)	1nner 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

ECS00F20

TURNING TORQUE

Turning torque of reduction pinion gear N·m (kg-cm, in-lb)	0.05 - 0.39 (0.5 - 4.0, 0.43 - 3.47)

REDUCTION PINION GEAR BEARING ADJUSTING SHIMS

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

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

Band Servo

ECS00F21

RETURN SPRING

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

ECS00F22

SEAL RING CLEARANCE

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)	1nner 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

ECS00F23

SEAL RING CLEARANCE

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

ECS00F24

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

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

ECS00F25

Reverse clutch end play mm (in)	0.61 - 1.0 (0.0240 - 0.039)

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

ECS00F26

Unit: mm (in)

Engine	Distance between end of converter housing and torque converter
QR20DE	19 (0.75)
QR25DE	14 (0.55)

Shift Solenoid Valves

ECS00F27

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

ECS00F28

Solenoid valves	Resistance (Approx.) Ω	Terminal No.
Shift solenoid valve A	20 - 30	2
Shift solenoid valve B	5 - 20	1
Overrun clutch solenoid valve	20 - 30	3
Line pressure solenoid valve	2.5 - 5	4
Torque converter clutch solenoid valve	5 - 20	5

A/T Fluid Temperature Sensor

ECS00F29

Remarks: Specification data are reference values.

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

Revolution Sensor

ECS00F2A

Condition	Judgement standard
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.	450 Hz (Approx.)
When vehicle parks.	Under 1.3V or over 4.5V

Dropping Resistor

ECS00F2B

Resistance	12Ω (Approx)