SECTION AT
AUTOMATIC TRANSAXLE

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TROUBLE DIAGNOSIS - INDEX

PFP:00000

Alphabetical & P No. Index for DTC

ECS0095J

NOTE:
If DTC U1000 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000. Refer to AT-190, "DTC U1000 CAN COMMUNICATION LINE"

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*1: These numbers are prescribed by SAE J2012.
*2: When the fail-safe operation occurs, the MIL illuminates.
*3: The MIL illuminates when both the “Revolution sensor signal” and the “Vehicle speed sensor signal” meet the fail-safe condition at the same time.

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*1: These numbers are prescribed by SAE J2012.
*2: When the fail-safe operation occurs, the MIL illuminates.
*3: The MIL illuminates when both the “Revolution sensor signal” and the “Vehicle speed sensor signal” meet the fail-safe condition at the same time.

PRECAUTIONS

PFP:00001

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

ECS0095K

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

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 (OBD) System of A/T and Engine

ECS0095L

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

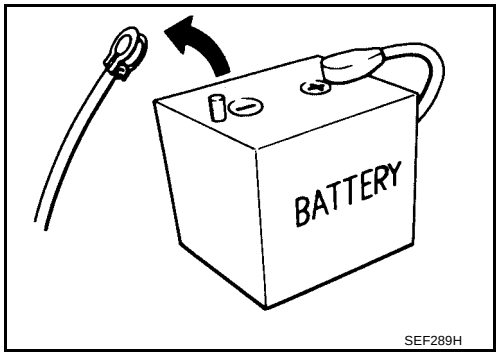
CAUTION:

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

Precautions

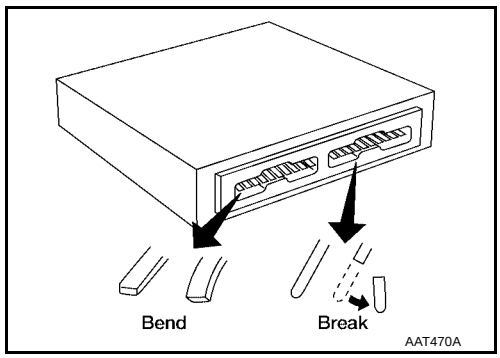
ECS0095M

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

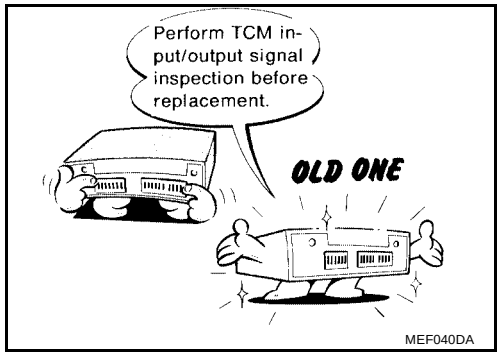


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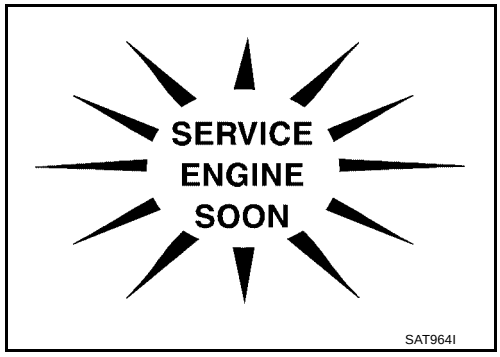
- **When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on TCM pin terminal, when connecting pin connectors.



- **Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. Refer to AT-37, "INPUT/OUTPUT SIGNAL OF TCM" .**



- **After performing each TROUBLE DIAGNOSIS, perform "DTC (Diagnostic Trouble Code) CONFIRMATION PROCEDURE".**
  The DTC should not be displayed in the "DTC CONFIRMATION PROCEDURE" if the repair is completed.
- Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transaxle.



- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should be replaced any time the transaxle is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- Replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to AT-12, "ATF COOLER SERVICE" .
- 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 when changing A/T fluid. Refer to AT-398, "Changing A/T Fluid" .

Service Notice or Precautions

ECS0095N

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, A/T check (position) indicator lamp blinks for about 8 seconds. [For “TCM Self-diagnostic Procedure (No Tools)”, refer to AT-60, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .]
The blinking of the A/T check (position) 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-68, "Work Flow").
The SELF-DIAGNOSIS results will be as follows:

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

TORQUE CONVERTER SERVICE

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

- External leaks in the hub weld area.
- Converter hub is scored or damaged.
- Converter pilot is broken, damaged or fits poorly into crankshaft.
- Steel particles are found after flushing the cooler and cooler lines.
- Pump is damaged or steel particles are found in the converter.
- Vehicle has TCC shudder and/or no TCC apply. Replace only after all hydraulic and electrical diagnoses have been made. (Converter clutch material may be glazed.)
- Converter is contaminated with engine coolant containing antifreeze.
- Internal failure of stator roller clutch.
- Heavy clutch debris due to overheating (blue converter).
- Steel particles or clutch lining material found in fluid filter or on magnet when no internal parts in unit are worn or damaged — indicates that lining material came from converter.
  The torque converter should not be replaced if:
- The fluid has an odor, is discolored, and there is no evidence of metal or clutch facing particles.
- The threads in one or more of the converter bolt holes are damaged.
- 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.

ATF COOLER SERVICE

If A/T fluid contains frictional material (clutches, bands, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of A/T. Refer to CO-13, "RADIATOR" .

OBD-II SELF-DIAGNOSIS

- A/T self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the A/T check (position) indicator or the malfunction indicator lamp (MIL). Refer to the table on AT-49 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-46 to complete the repair and avoid unnecessary blinking of the MIL.
- The following self-diagnostic items can be detected using ECM self-diagnostic results mode* only when the A/T check (position) indicator lamp does not indicate any malfunctions.

- park/neutral position (PNP) switch
- A/T 1st, 2nd, 3rd, or 4th gear function
- A/T TCC S/V function (lock-up).

*: For details of OBD-II, refer to EC-53, "ON BOARD DIAGNOSTIC (OBD) SYSTEM" .

- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector.**
  For description and how to disconnect, refer to GI-24, "How to Check Terminal" .

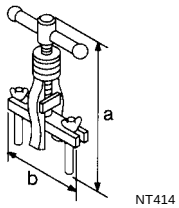
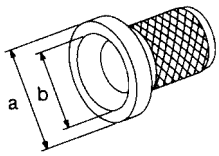
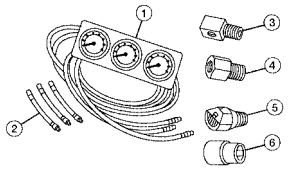
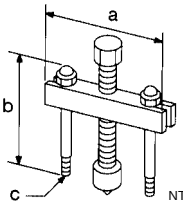
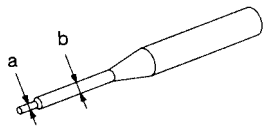
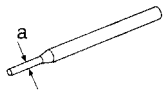
PREPARATION

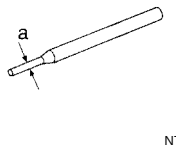
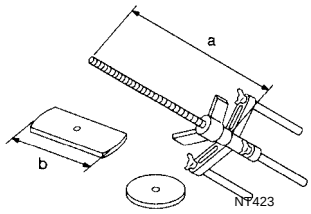
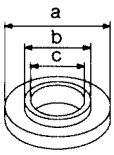
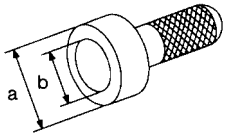
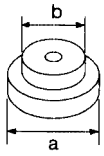
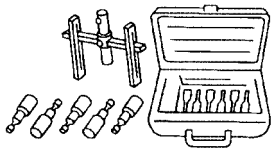
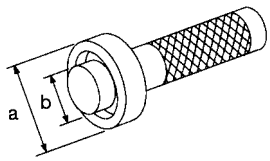
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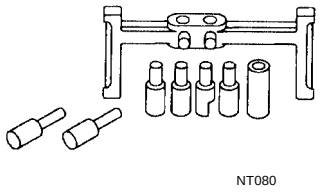
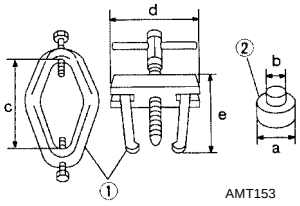
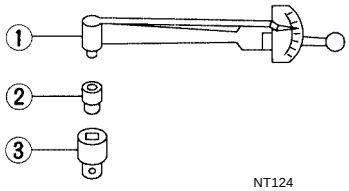
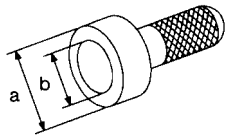
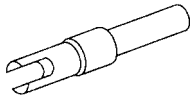
Special Service Tools

ECS0095P

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

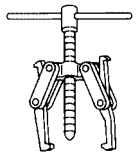
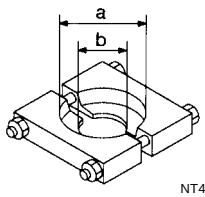
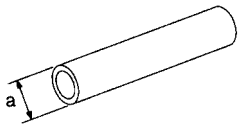
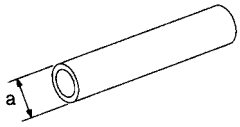
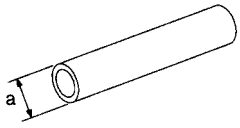
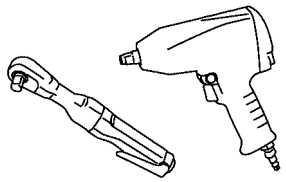
Tool number (Kent-Moore No.) Tool name	Description
KV381054S0 (J-34286) Puller  NT414	● Removing differential side oil seals ● Removing differential side bearing outer race ● Removing idler gear bearing outer race **a: 250 mm (9.84 in)** **b: 160 mm (6.30 in)**
ST33400001 (J-26082) Drift  NT086	● Installing differential side oil seal (RH side) ● Installing oil seal on oil pump housing **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**
(J-34301-C) Oil pressure gauge set 1 (J-34301-1) Oil pressure gauge 2 (J-34301-2) Hoses 3 (J-34298) Adapter 4 (J-34282-2) Adapter 5 (790-301-1230-A) 60° Adapter 6 (J-34301-15) Square socket  AAT896	Measuring line pressure
ST27180001 (J-25726-A) Puller  NT424	Removing idler gear **a: 100 mm (3.94 in)** **b: 110 mm (4.33 in)** **c: M8 x 1.25P**
ST23540000 (J-25689-A) Pin punch  NT442	Removing and installing parking rod plate and manual plate pins **a: 2.3 mm (0.091 in) dia.** **b: 4 mm (0.16 in) dia.**
ST25710000 (J-25689-A) Pin punch  NT410	Aligning groove of manual shaft and hole of transaxle case **a: 2 mm (0.08 in) dia.**

Tool number (Kent-Moore No.) Tool name	Description
KV32101000 (J-25689-A) 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 (J-34285 and J-34285-87) 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 (J-26092) 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 (J-25405 and J-34331) 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.**
(J-34291-A) Shim setting gauge set  NT101	● Selecting oil pump cover bearing race and oil pump thrust washer ● Selecting side gear thrust washer
ST33230000 (J-25805-01) Drift  NT084	Installing differential side bearing inner race (RH side) **a: 51 mm (2.01 in) dia.** **b: 28.5 mm (1.122 in) dia.**

Tool number (Kent-Moore No.) Tool name	Description
(J-34290) Shim selecting tool set  NT080	Selecting differential side bearing adjusting shim
ST3306S001 (J-22888-D) Differential side bearing puller set 1 ST33051001 (J-22888-D) Puller 2 ST33061000 (J-8107-2) 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 (J-25765-A) Preload gauge 1 GG91030000 (J-25765-A) Torque wrench 2 HT62940000 (—) Socket adapter 3 HT62900000 (—) Socket adapter  NT124	Checking differential side bearing preload
ST35271000 (J-26091) Drift  NT115	Installing idler gear **a: 72 mm (2.83 in) dia.** **b: 63 mm (2.48 in) dia.**
(J-39713) Preload adapter  NT087	● Selecting differential side bearing adjusting shim ● Checking differential side bearing preload

Commercial Service Tools

ECS0095Q

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 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.**
Power tool  PBIC0190E	● Removing transaxle assembly ● Removing transaxle oil pan ● Removing transaxle case and cover

A/T FLUID

PFP:KLE40

Changing A/T Fluid

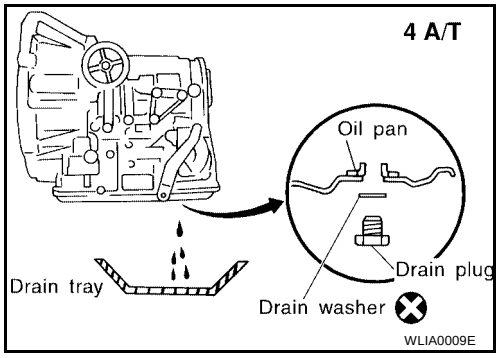
ECS00EMQ

1. Run the engine to warm up the transaxle until the fluid is at full operating temperature “HOT”.

   Temperature range
   COLD : 30° – 50° C (86° – 122° F)
   HOT : 50° – 80° C (122° – 176° F)

2. Stop the engine.
3. Remove the engine undercover.
4. Drain the A/T fluid by removing the drain plug. Reinstall the drain plug to the specified torque using a new drain washer.

   Drain plug : Refer to AT-275, "REMOVAL AND INSTALLATION" .



5. Refill the transaxle with new specified A/T fluid through the A/T fluid charging pipe. Always refill the transaxle with the same volume amount that was drained out.

   CAUTION:
   Do not overfill the transaxle.

   Fluid grade and capacity : Refer to MA-12, "Fluids and Lubricants" .

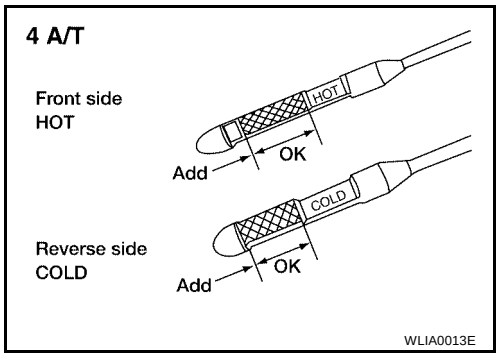
6. Run the engine at idle speed for five minutes.
7. Check fluid level and condition. Refer to AT-398, "Checking A/T Fluid" . If the fluid is still contaminated, repeat step 2 through 5.

Checking A/T Fluid

ECS00EMR

1. Warm up the engine.
2. Check for any transaxle fluid leaks.
3. Before driving, the fluid level can be checked at fluid temperature using the “COLD” range on the A/T fluid level gauge.

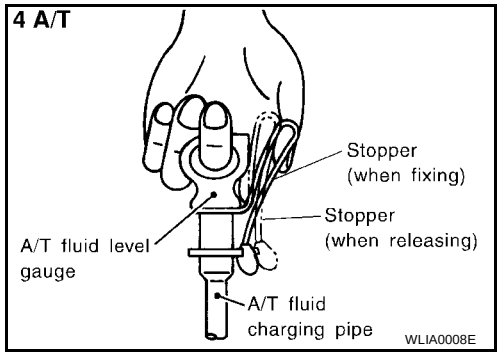
   Temperature range
   COLD : 30° – 50° C (86° – 122° F)
   HOT : 50° – 80° C (122° – 176° F)



a. Park the vehicle on a level surface and set parking brake.
b. Start the engine and move the transaxle selector lever through each gear position. Leave the selector lever in the “P” park position.

c. Check the fluid level with the engine idling.

CAUTION:
Firmly secure the A/T fluid level gauge into the A/T fluid charging pipe using the attached stopper, this will provide an accurate reading on the gauge.



d. Remove the A/T fluid level gauge and wipe it clean with a lint-free paper.

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

f. Remove the A/T fluid level gauge and note the reading. If the reading is at or below the low side of the range, add the necessary specified A/T fluid through the A/T fluid charging pipe and then re-insert the A/T fluid level gauge.

CAUTION:
- **Do not overfill the transaxle.**
- **Firmly secure the A/T fluid level gauge into the A/T fluid charging pipe using the attached stopper, this will provide an accurate reading on the gauge, and will keep the gauge in position while driving.**

4. Drive the vehicle for approximately 5 minutes at moderate speeds.

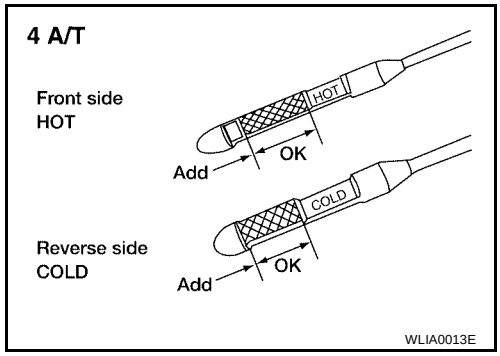
5. Re-check the fluid level at fluid temperatures using the “HOT” range on the A/T fluid level gauge.

CAUTION:
Firmly secure the A/T fluid level gauge into the A/T fluid charging pipe using the attached stopper, this will provide an accurate reading on the gauge, and will keep the gauge in position while driving.

Temperature range

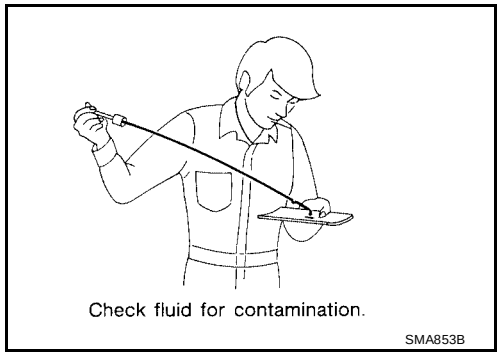
COLD : 30° – 50° C (86° – 122° F)

HOT : 50° – 80° C (122° – 176° F)



6. Check the fluid for the following conditions:

- If the fluid is very dark or smells burned, refer to the AT section for checking the operation of the transaxle. Flush the AT fluid cooling system after repairing the transaxle.
- If the fluid contains frictional material (from the clutches or bands), remove the radiator and flush the cooler lines using a cleaning solvent and compressed air after completing repairs to the transaxle. Refer to CO-13, "RADIATOR" .



A/T Fluid Cooler Cleaning

ECS00EMS

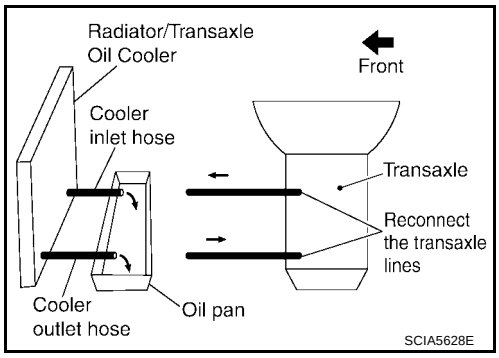
Whenever an automatic transaxle is repaired, overhauled, or replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned.
Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced A/T or, in severe cases, can block or restrict the flow of A/T fluid. In either case, malfunction of the newly serviced A/T may result.
Debris, if present, may build up as A/T fluid enters the cooler inlet. It will be necessary to back flush the cooler through the cooler outlet in order to flush out any built up debris.

A/T FLUID COOLER CLEANING PROCEDURE

1. Position an oil pan under the automatic transaxle's inlet and outlet cooler hoses.

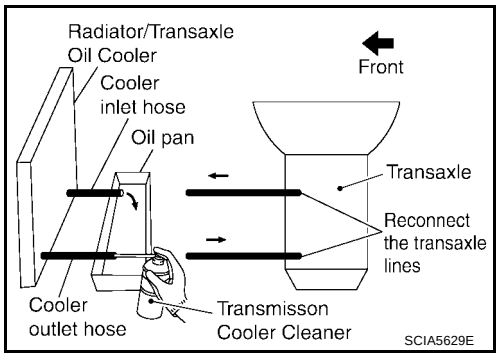
2. Identify the inlet and outlet fluid cooler hoses.
3. Disconnect the fluid cooler inlet and outlet rubber hoses from the steel cooler tubes or bypass valve.

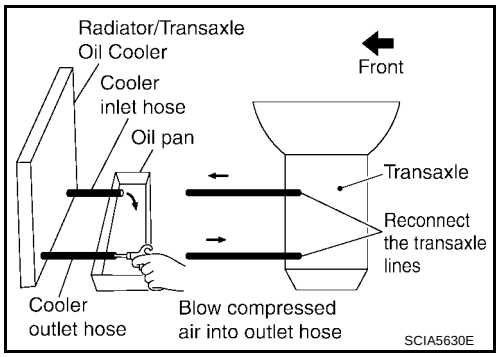
   NOTE:
   Replace the cooler hoses if rubber material from the hose remains on the tube fitting.
4. Allow any A/T fluid that remains in the cooler hoses to drain into the oil pan.



5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

   CAUTION:
   - **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
   - **Spray cooler cleaner only with adequate ventilation.**
   - **Avoid contact with eyes and skin.**
   - **Do not breath vapors or spray mist.**
6. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until fluid flows out of the cooler inlet hose for 5 seconds.
7. Insert the tip of an air gun into the end of the cooler outlet hose.
8. Wrap a shop rag around the air gun tip and of the cooler outlet hose.





9. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through the cooler outlet hose for 10 seconds to force out any remaining fluid.
10. Repeat steps 5 through 9 three additional times.
11. Position an oil pan under the banjo bolts that connect the fluid cooler steel lines to the transaxle.
12. Remove the banjo bolts.
13. Flush each steel line from the cooler side back toward the transaxle by spraying Transmission Cooler Cleaner in a continuous stream for 5 seconds.
14. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through each steel line from the cooler side back toward the transaxle for 10 seconds to force out any remaining fluid.
15. Ensure all debris is removed from the steel cooler lines.
16. Ensure all debris is removed from the banjo bolts and fittings.
17. Perform AT-400, "A/T FLUID COOLER DIAGNOSIS PROCEDURE" .

A/T FLUID COOLER DIAGNOSIS PROCEDURE

NOTE:
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

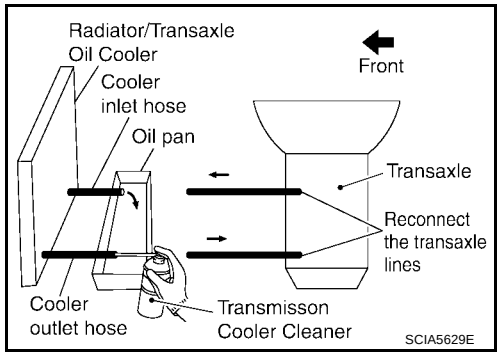
1. Position an oil pan under the automatic transaxle's inlet and outlet cooler hoses.
2. Clean the exterior and tip of the cooler inlet hose.

3. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

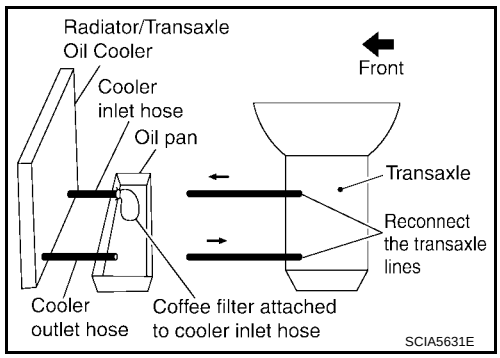
CAUTION:

- **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
- **Spray cooler cleaner only with adequate ventilation.**
- **Avoid contact with eyes and skin.**
- **Do not breath vapors or spray mist.**

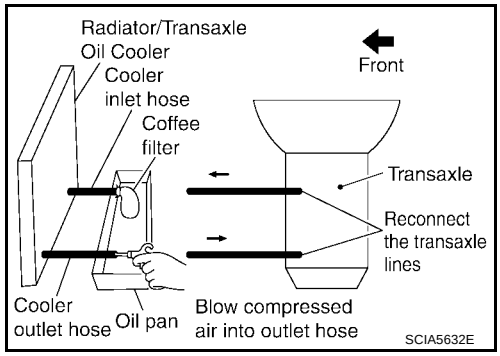
4. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until fluid flows out of the cooler inlet hose for 5 seconds.



5. Tie a common white, basket-type coffee filter to the end of the cooler inlet hose.



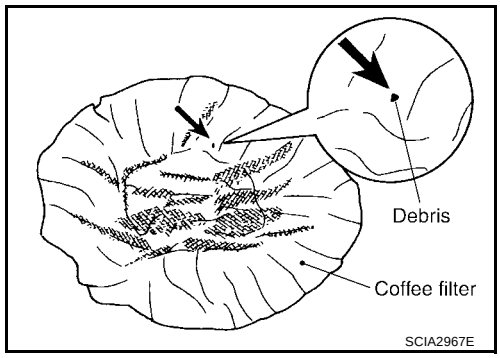
6. Insert the tip of an air gun into the end of the cooler outlet hose.
7. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
8. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through the cooler outlet hose to force any remaining A/T fluid into the coffee filter.
9. Remove the coffee filter from the end of the cooler inlet hose.
10. Perform AT-401, "A/T FLUID COOLER INSPECTION PROCEDURE" .



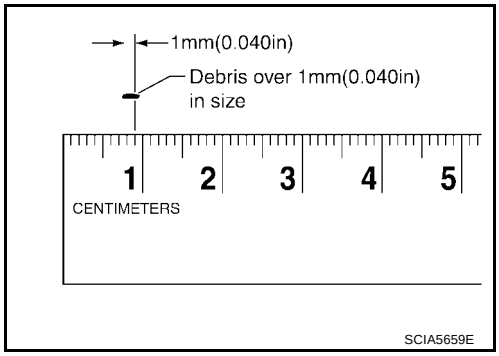
A/T FLUID COOLER INSPECTION PROCEDURE

1. Inspect the coffee filter for debris.

a. If small metal debris less than 1mm (0.040 in) in size or metal powder is found in the coffee filter, this is normal. If normal debris is found, the A/T fluid cooler/radiator can be re-used and the procedure is ended.



b. If one or more pieces of debris are found that are over 1mm (0.040 in) in size and/or peeled clutch facing material is found in the coffee filter, the fluid cooler is not serviceable. The A/T fluid cooler/radiator must be replaced and the inspection procedure is ended. Refer to CO-13, "RADIATOR" .



A/T FLUID COOLER FINAL INSPECTION

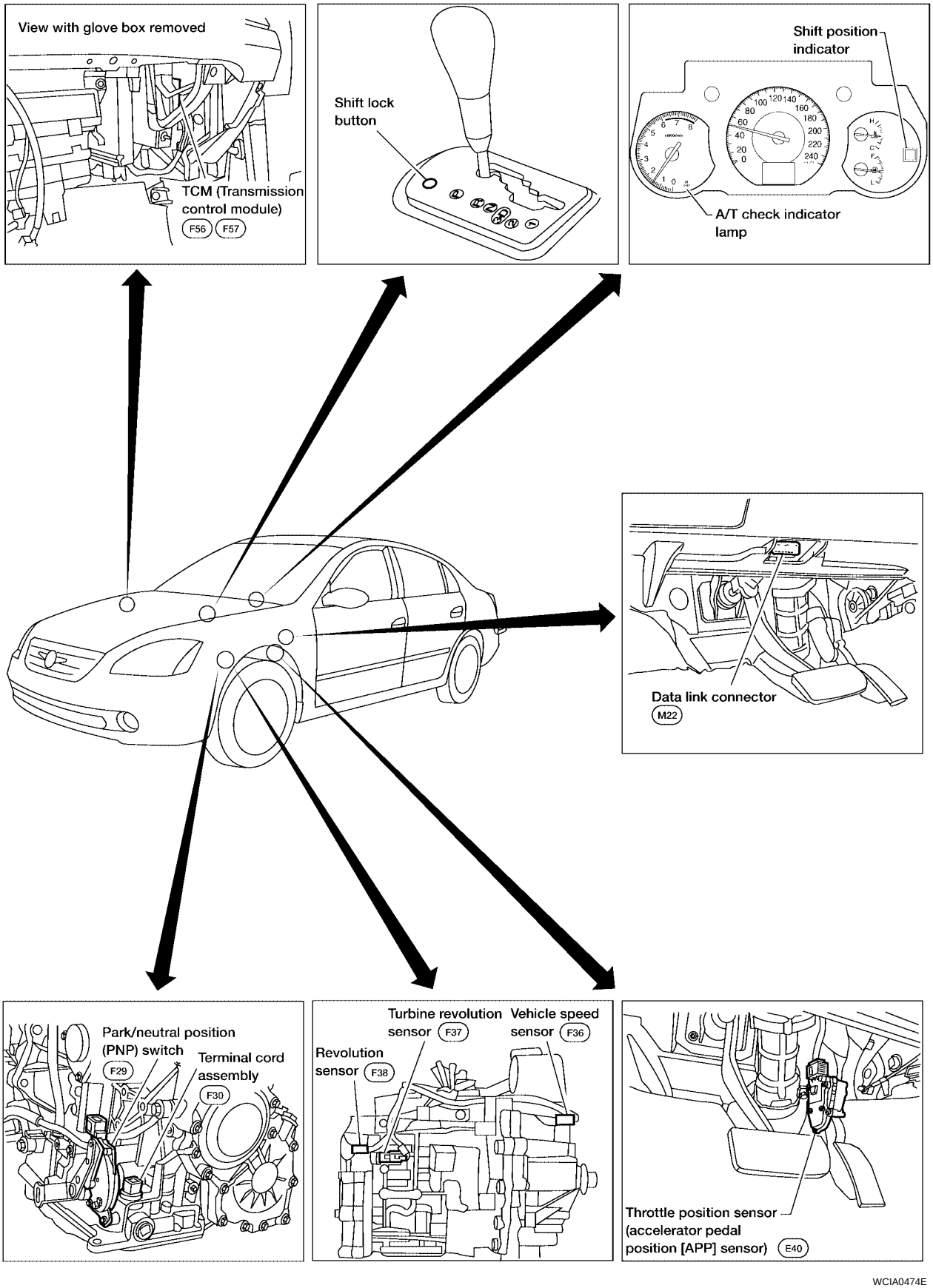
After performing all procedures, ensure that all remaining oil is cleaned from all components.

OVERALL SYSTEM

PFP:00000

A/T Electrical Parts Location

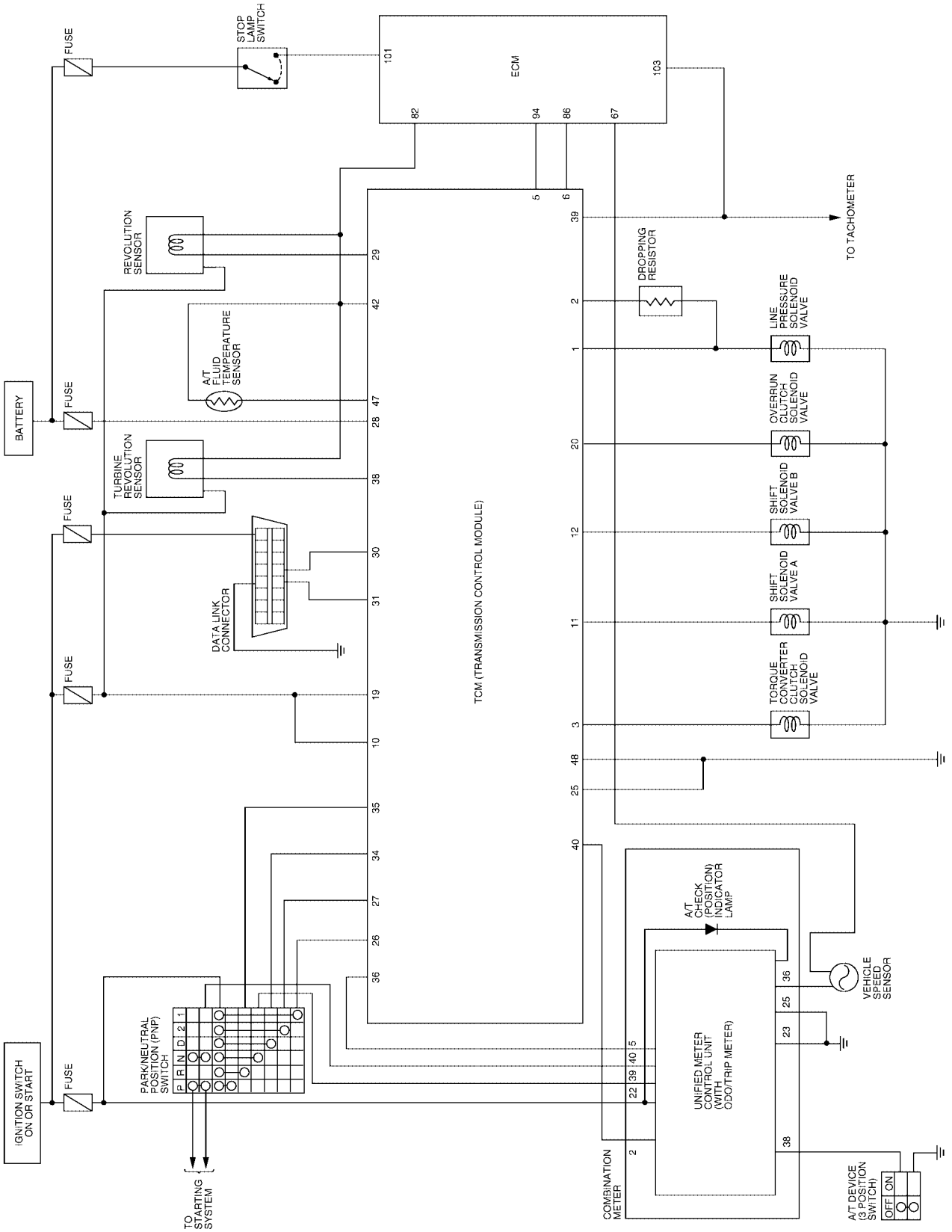
ECS0095R



WCIA0474E

Circuit Diagram

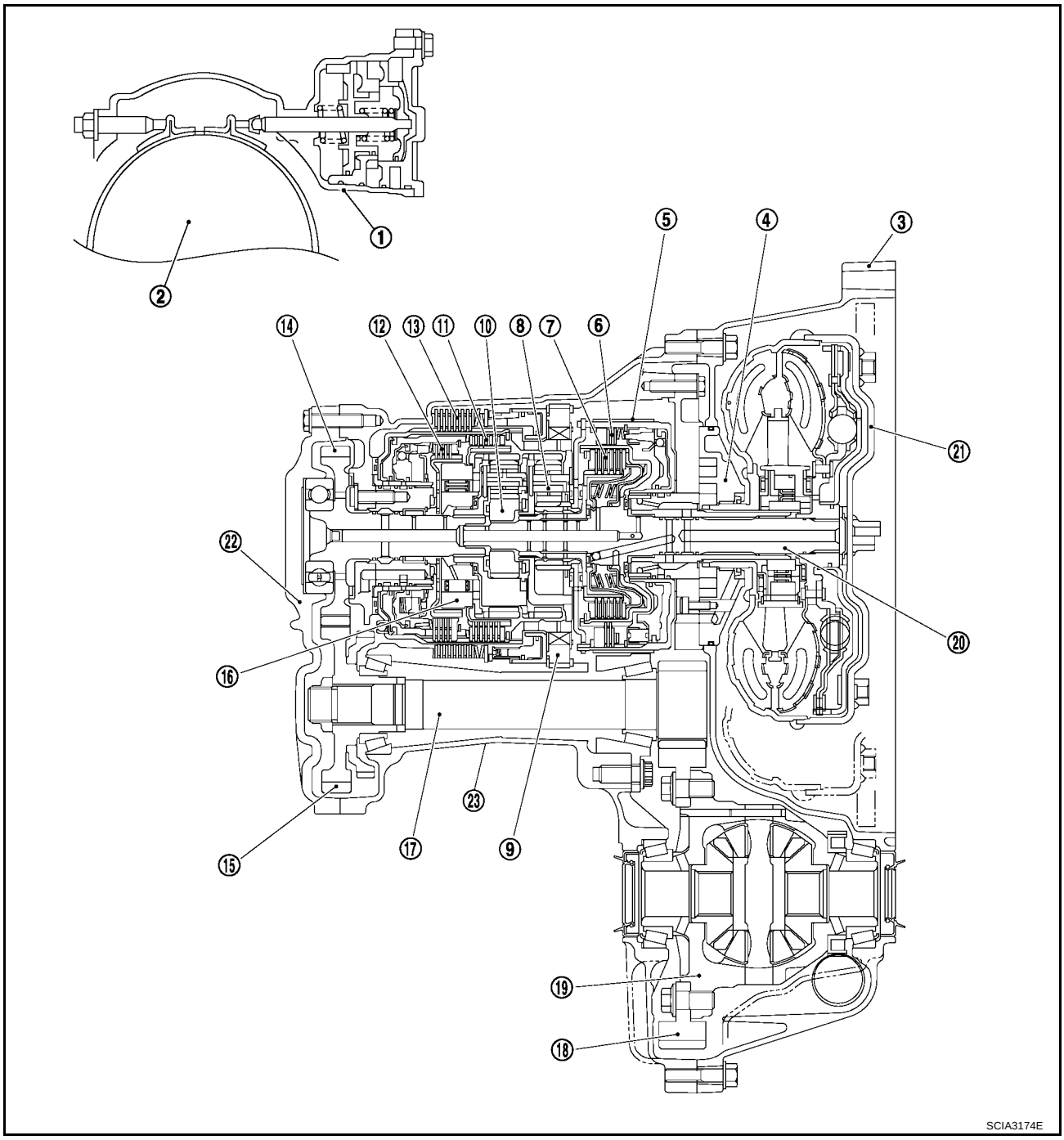
ECS0095S



BCWA0481E

Cross-sectional View

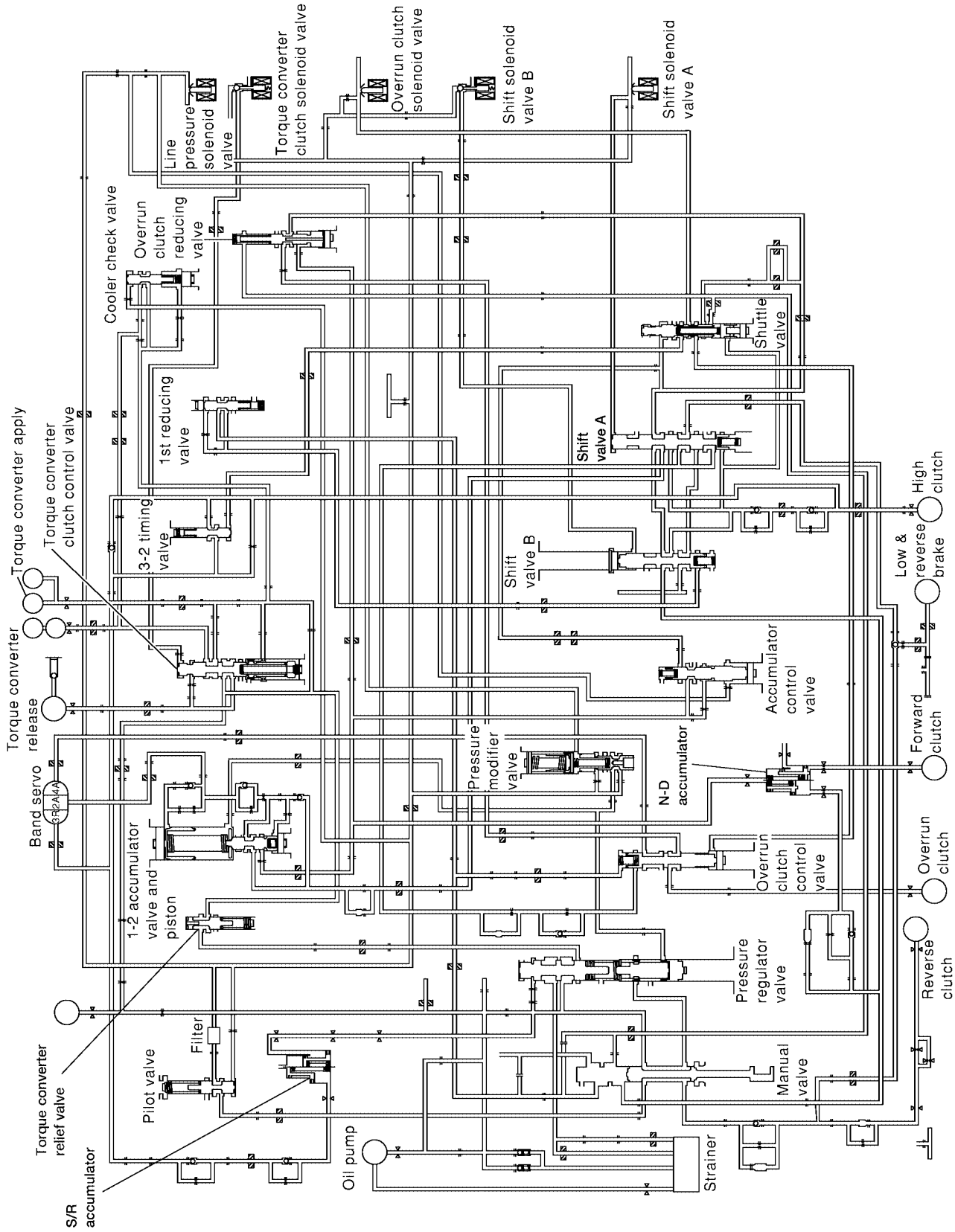
ECS0095T



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
23. Transaxle case

Hydraulic Control Circuit

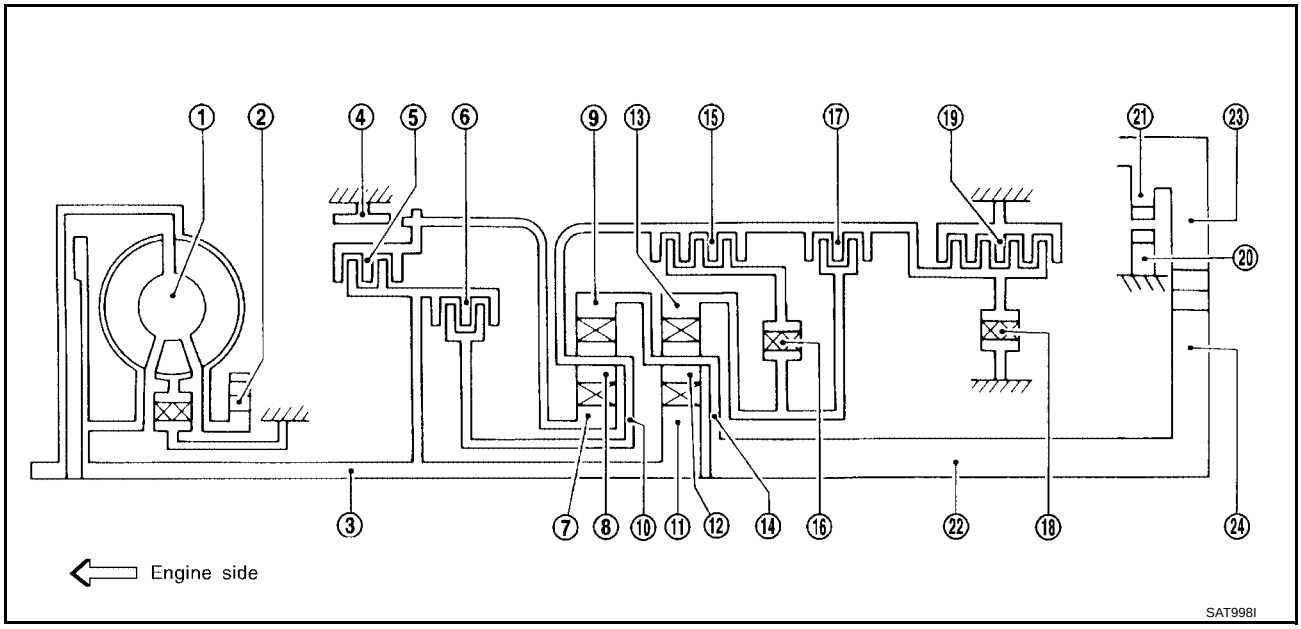
ECS0095U



Shift Mechanism

ECS0095V

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

CLUTCH AND BAND CHART

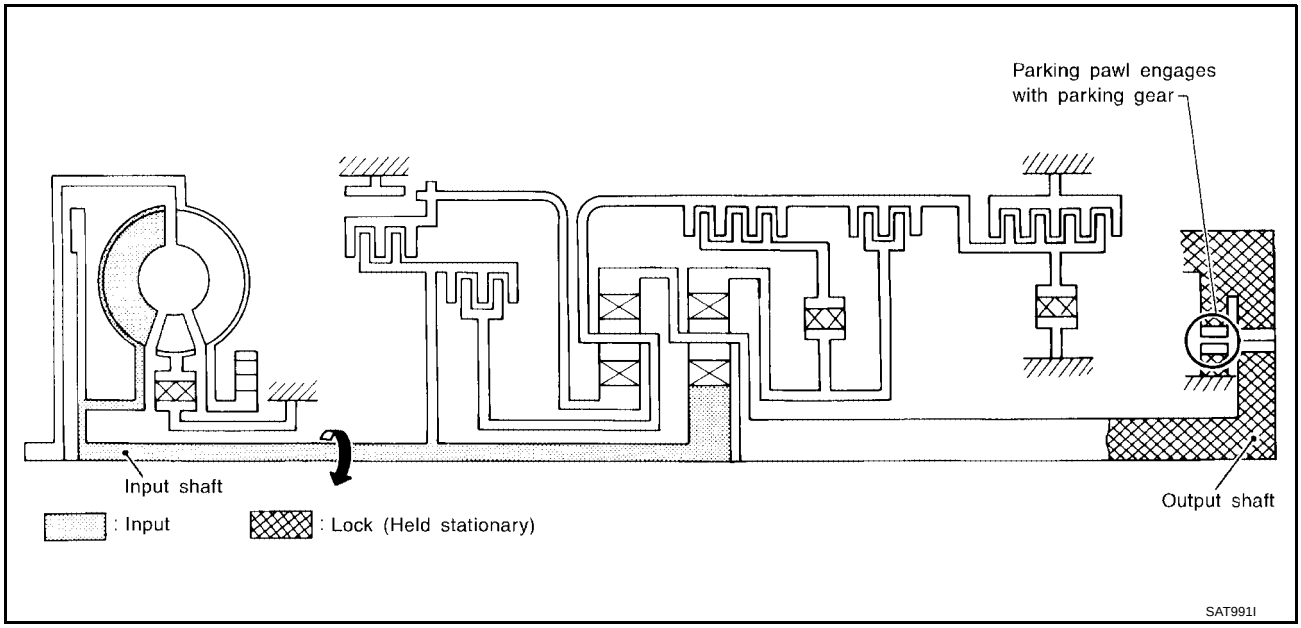
Shift position	Reverse clutch **5**	High clutch **6**	Forward clutch **15**	Overrun clutch **17**	Band servo			Forward one-way clutch **16**	Low one-way clutch **18**	Low & reverse brake **19**	Lock-up	Remarks
					2nd apply	3rd release	4th apply					
P												PARK POSITION
R	O									O		REVERSE POSITION

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					
N													NEUTRAL POSITION
D*4	1st			O	*1D				B	B			Automatic shift 1 ⇔ 2 ⇔ 3 ⇔ 4
	2nd			O	*1 A	O			B				
	3rd		O	O	*1 A	*2C	C		B			*5O	
	4th		O	C		*3C	C	O				O	
2	1st			O	D				B	B			Automatic shift 1 ⇔ 2 ⇐ 3
	2nd			O	A	O			B				
1	1st			O	O				B		O		Locks (held stationary) in 1st speed 1 ⇐ 2 ⇐ 3
	2nd			O	O	O			B				

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

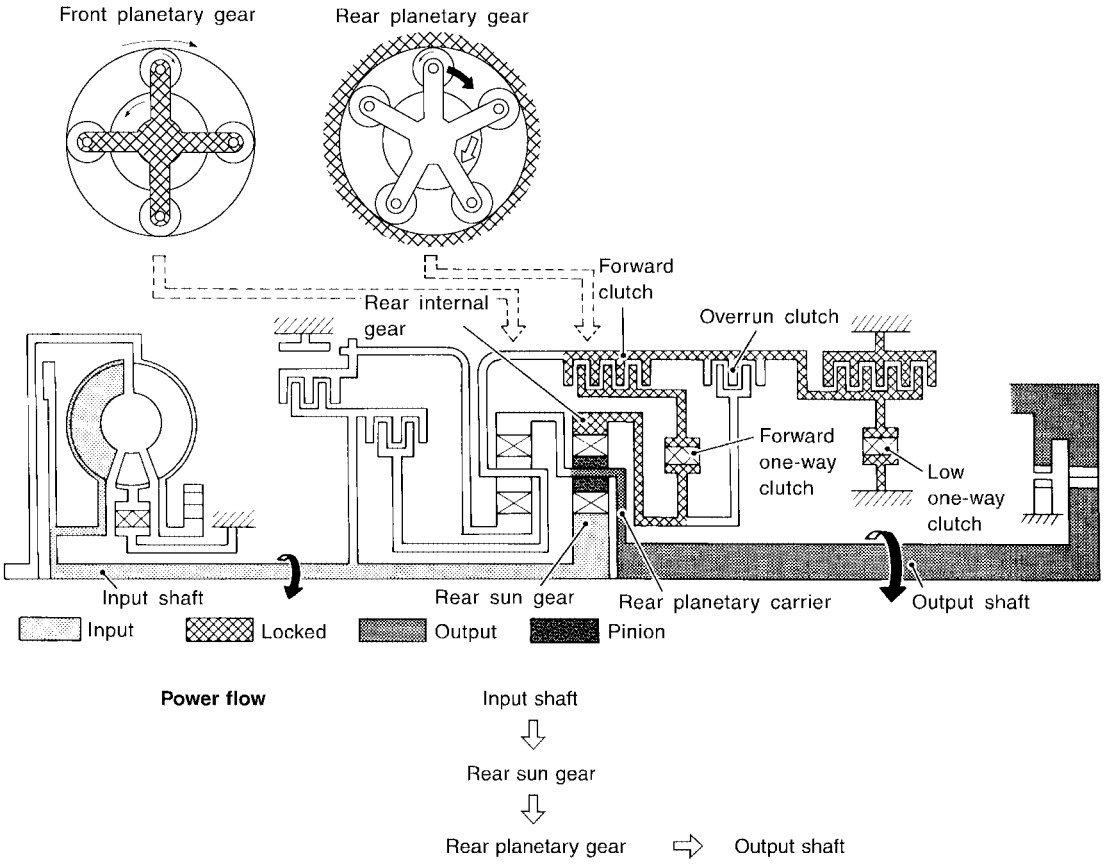
POWER TRANSMISSION

P and N Positions



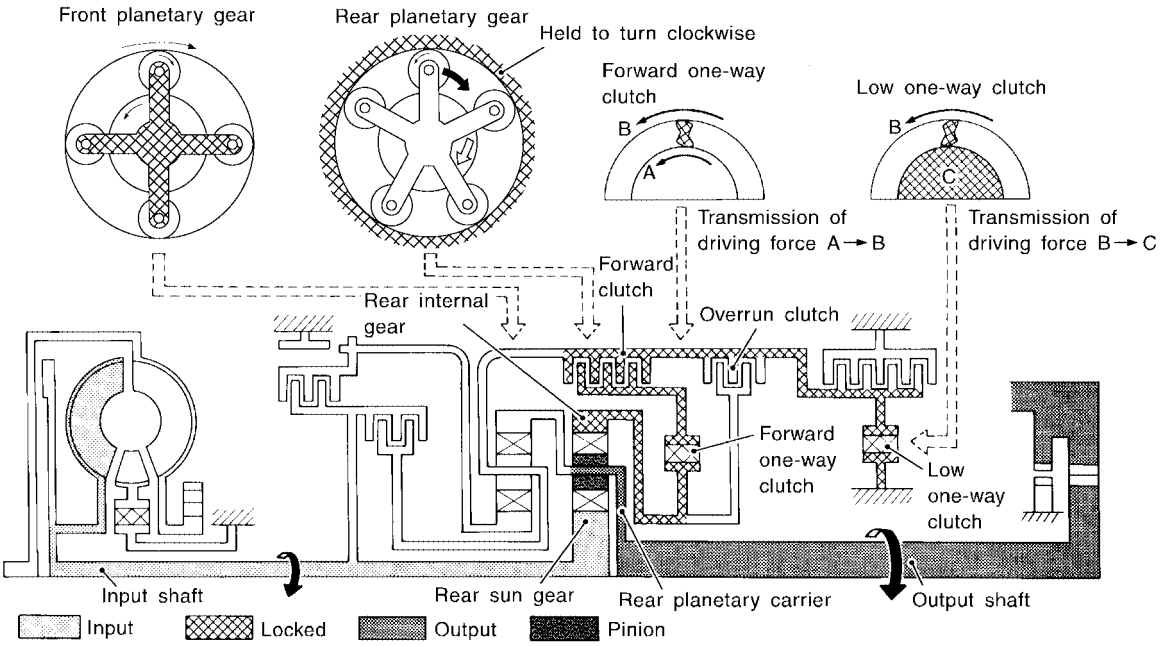
- P position
  Similar to the N position, the clutches do not operate. The parking pawl engages with the parking gear to mechanically hold the output shaft so that the power train is locked.
- N position
  Power from the input shaft is not transmitted to the output shaft because the clutches do not operate.

11 Position



● **Forward clutch** ● **Low one-way clutch** ● **Forward one-way clutch** ● **Overrun clutch** ● **Low and reverse brake**	As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake. This is different from that of D_1 , 2_1 , and 3_1 .
Engine brake	Overrun clutch always engages, therefore engine brake can be obtained when decelerating.

D1 and 21 Positions



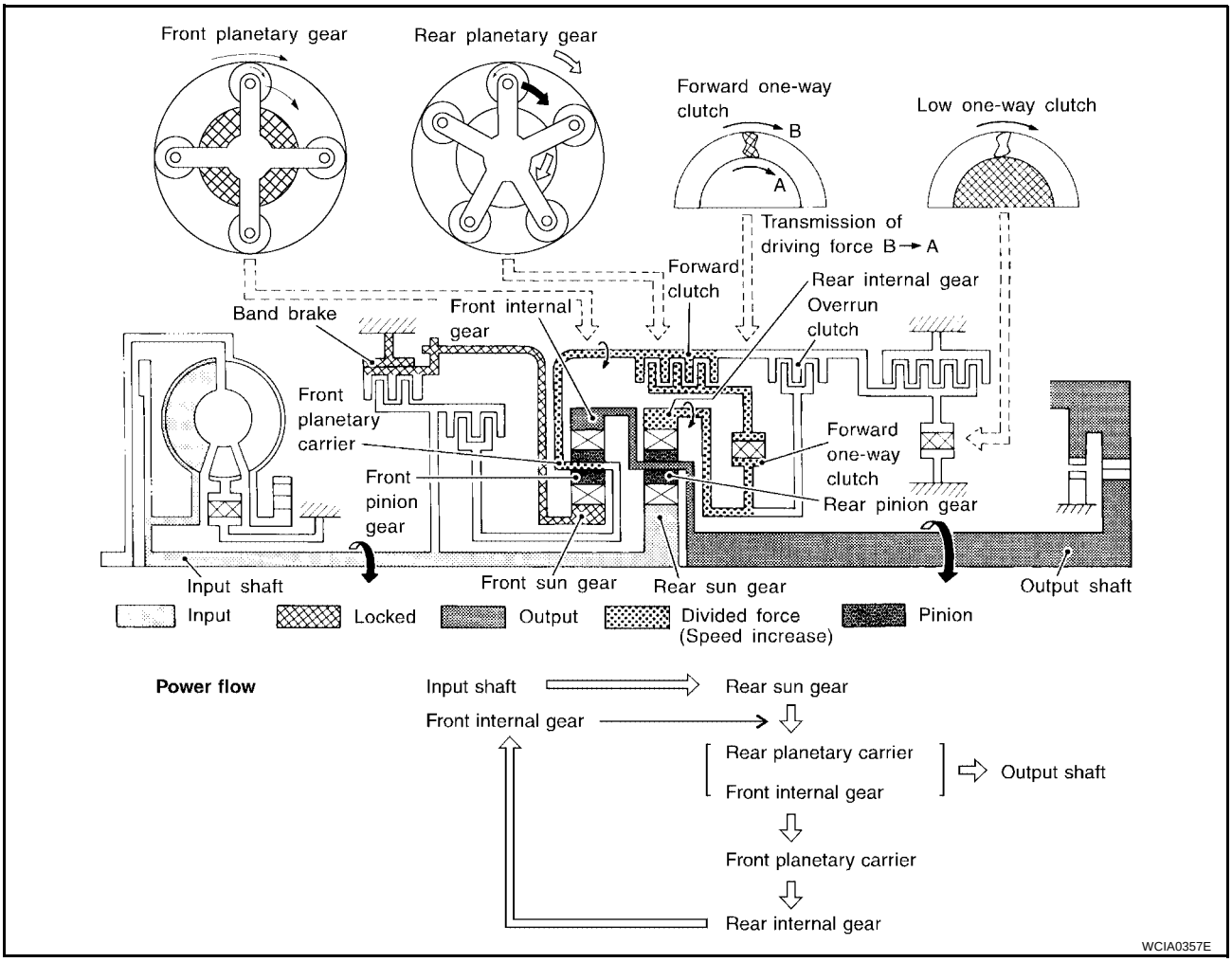
Power flow

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

WCIA0356E

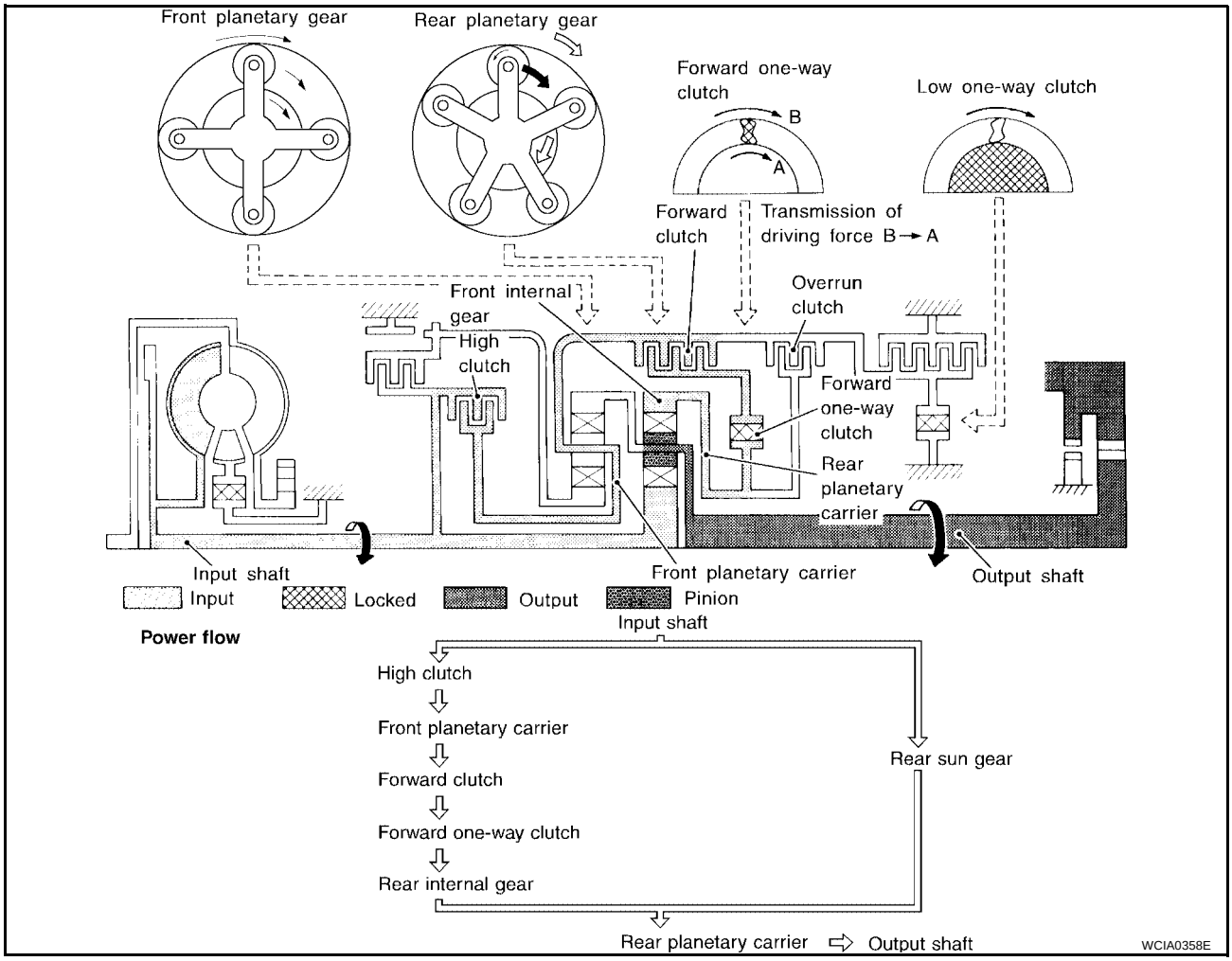
● **Forward one-way clutch** ● **Forward clutch** ● **Low one-way clutch**	Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches.
Overrun clutch engagement conditions (Engine brake)	D1 : Overdrive control switch OFF and throttle opening is less than 3/16 21 : Always engaged At D1 and 21 positions, engine brake is not activated due to free turning of low one-way clutch.

D2 , 32 , 22 and 12 Positions



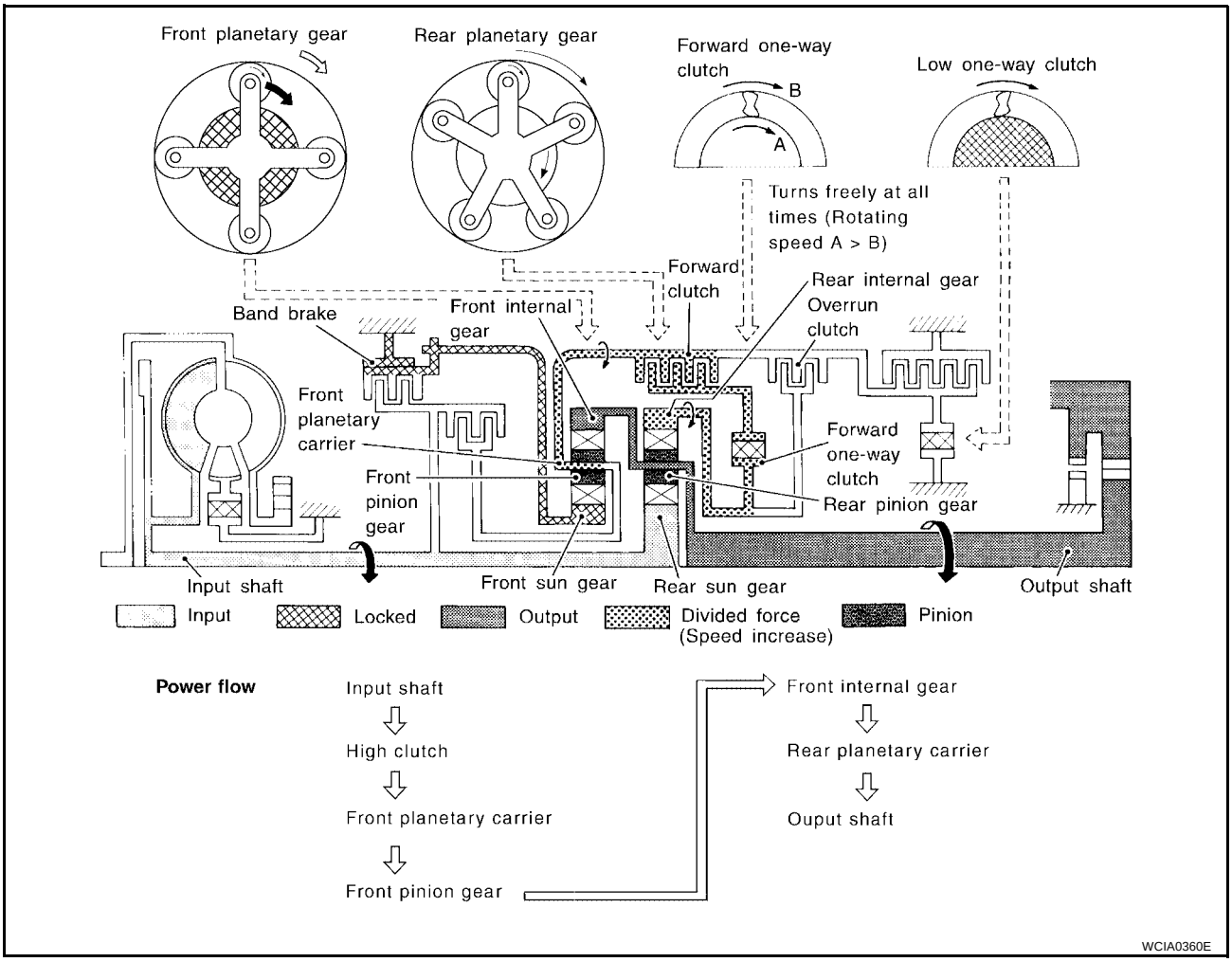
● **Forward clutch** ● **Forward one-way clutch** ● **Brake band**	Rear sun gear drives rear planetary carrier and combined front internal gear. Front internal gear now rotates around front sun gear accompanying front planetary carrier. As front planetary carrier transfers the power to rear internal 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	32 : Gear selector lever is set in 3 position and throttle opening is less than 3/16 32 , 22 and 12 : Always engaged

D3 and 33 Positions



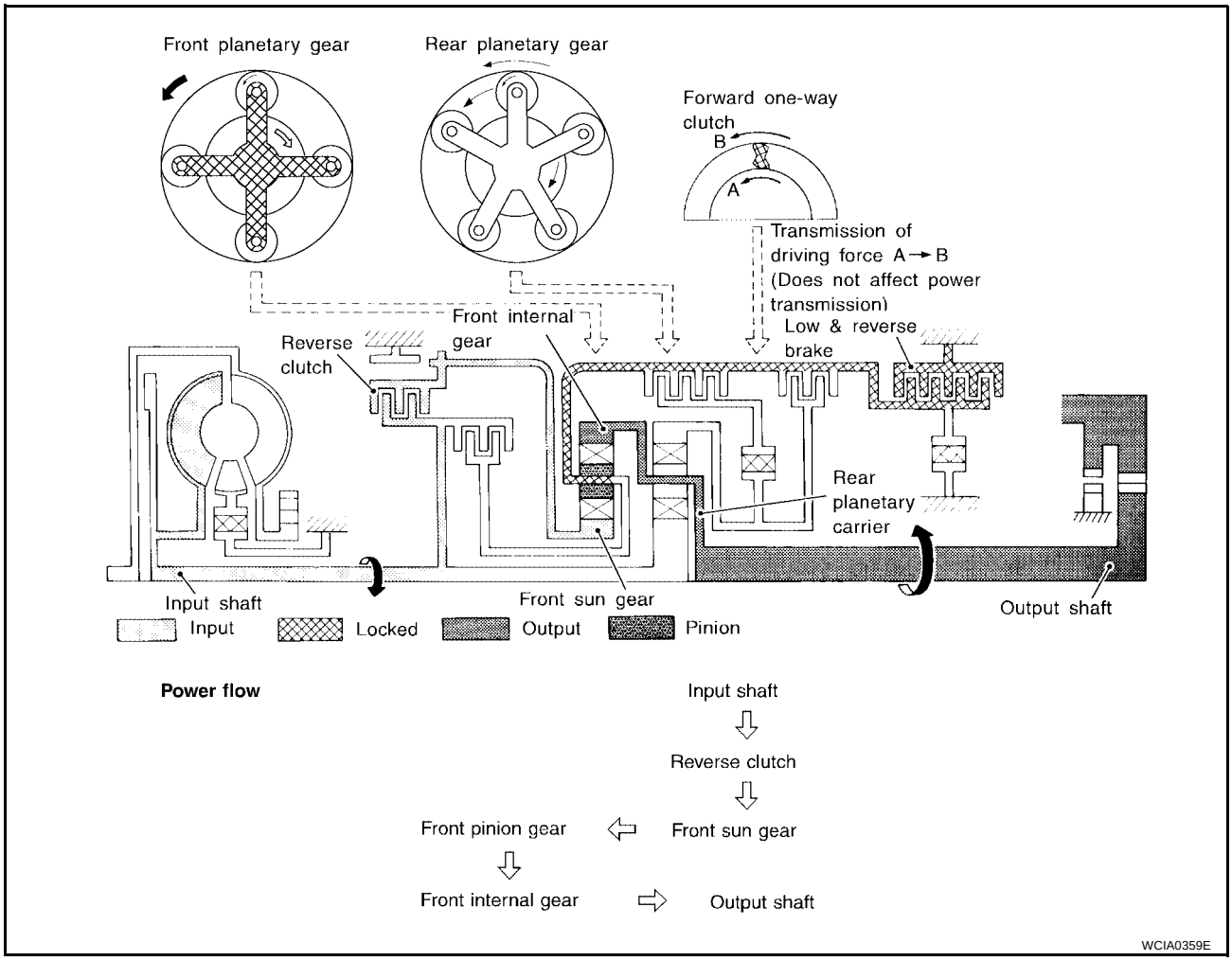
● **High clutch** ● **Forward clutch** ● **Forward one-way clutch**	Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch. This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.
Overrun clutch engagement conditions	D3 and 33 : Selector lever is set in 3 position and throttle opening is less than 3/16

D4 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 and reverse brake**	Front planetary carrier is stationary because of the operation of low and reverse brake. Input power is transmitted to front sun gear through reverse clutch, which drives front internal gear in the opposite direction.
Engine brake	As there is no one-way clutch in the power transmission line, engine brake can be obtained when decelerating.

Control System

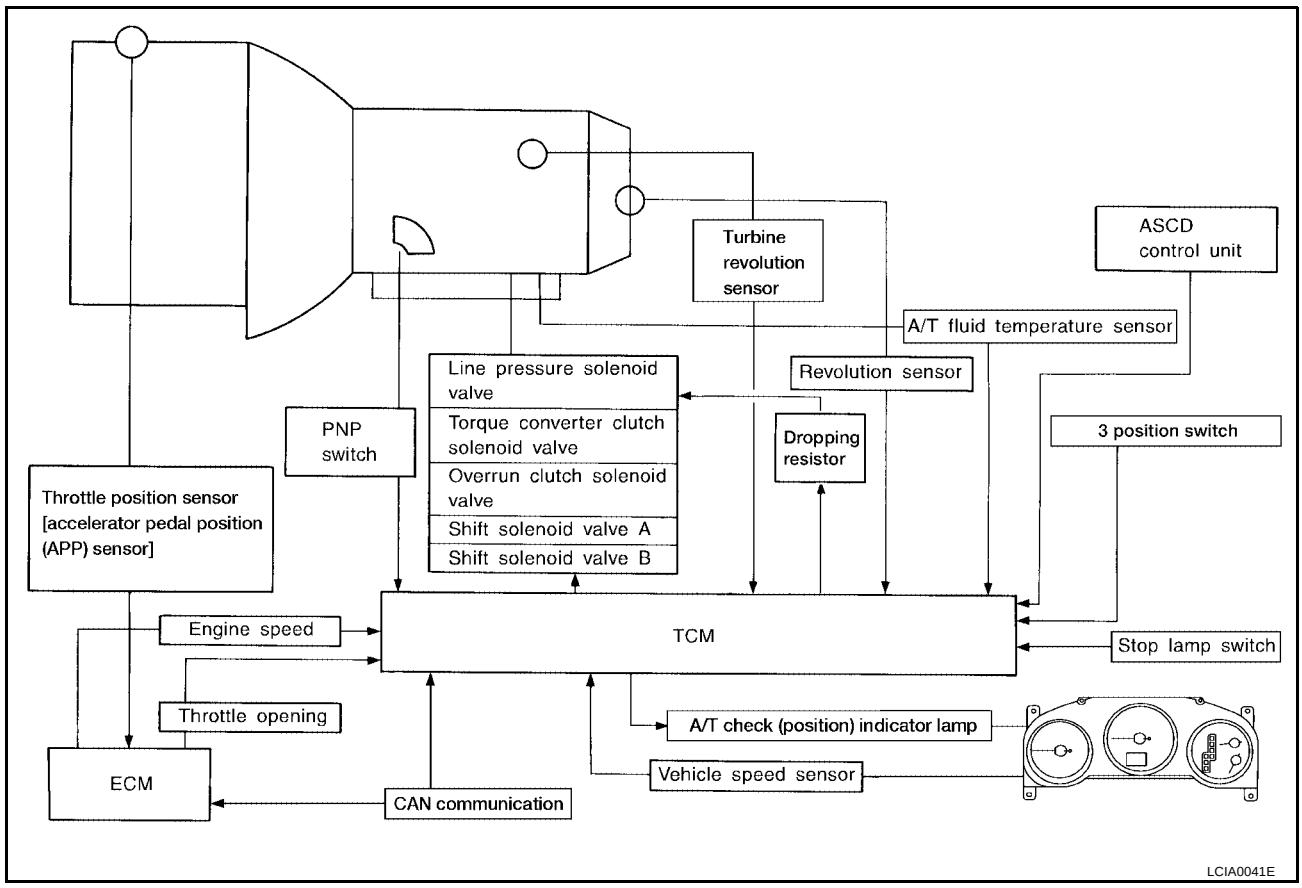
ECS0095W

OUTLINE

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

SENSORS		TCM		ACTUATORS
Park/neutral position (PNP) switch Accelerator pedal position (APP) signal Engine speed signal A/T fluid temperature sensor Revolution sensor Vehicle speed signal 3 position switch ASCD control signal Stop lamp switch Turbine revolution sensor (power train revolution sensor)	▶	Shift control Line pressure control Lock-up control Overrun clutch control Timing control Fail-safe control Self-diagnosis CAN communication line control	▶	Shift solenoid valve A Shift solenoid valve B Overrun clutch solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve A/T check (position) indicator lamp

CONTROL SYSTEM



TCM FUNCTION

The function of the TCM is to:

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

INPUT/OUTPUT SIGNAL OF TCM

	Sensors and solenoid valves	Function
Input	Park/neutral position (PNP) switch	Detects select lever position and sends a signal to TCM.
	Accelerator pedal position (APP) signal	Detects throttle valve position and sends a signal to TCM. (CAN communication)
	Engine speed signal	Receives signal from ECM and controls lock-up control solenoid valve.
	A/T fluid temperature sensor	Detects transaxle fluid temperature and sends a signal to TCM.
	Revolution sensor	Detects output shaft rpm and sends a signal to TCM.
	Vehicle speed sensor	Used as an auxiliary vehicle speed sensor. Sends a signal when revolution sensor (installed on transaxle) malfunctions.
	3 position switch	Sends a signal, which prohibits a shift to D_4 (overdrive) position, to the TCM.
	ASCD control signal	Sends the cruise signal and D_4 (overdrive) cancellation signal from ASCD control unit to TCM.
	Stop lamp switch	Send the lock-up release signal to the TCM at time of D_4 (lock-up).
	CAN communication	In CAN communication, control units are connected to 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transaxle with less wiring.
Output	Shift solenoid valve A/B	Selects shifting point suited to driving conditions in relation to a signal sent from TCM.
	Line pressure solenoid valve	Regulates (or decreases) line pressure suited to driving conditions in relation to a signal sent from TCM.
	Torque converter clutch solenoid valve	Regulates (or decreases) lock-up pressure suited to driving conditions in relation to a signal sent from TCM.
	Overrun clutch solenoid valve	Controls an “engine brake” effect suited to driving conditions in relation to a signal sent from TCM.
	A/T check (position) indicator lamp	Shows TCM faults, when A/T control components malfunction.
	CAN communication	In CAN communication, control units are connected to 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transaxle with less wiring.

Control Mechanism

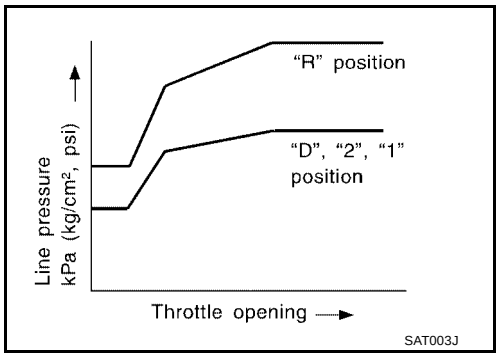
ECS0095X

LINE PRESSURE CONTROL

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

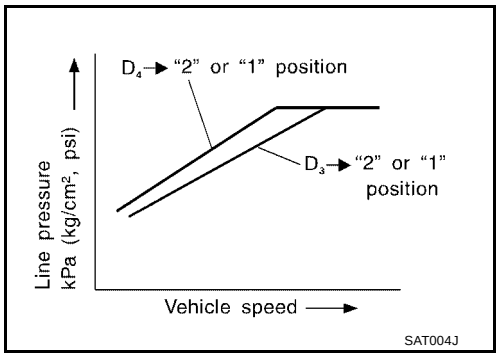
Normal Control

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



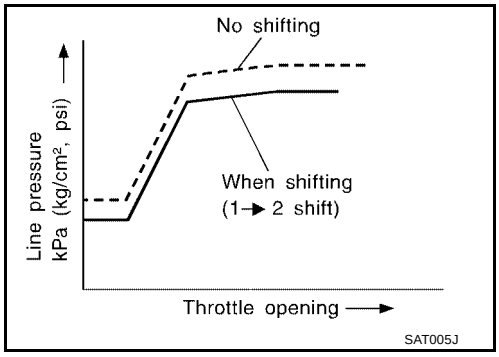
Back-up Control (Engine brake)

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



During Shift Change

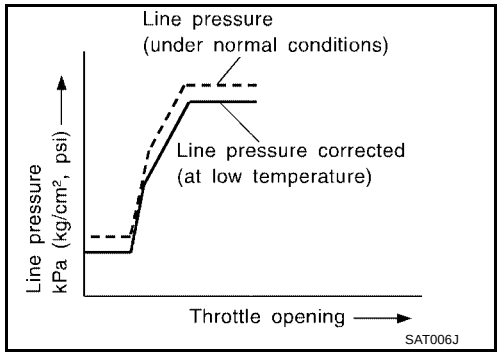
The line pressure is temporarily reduced corresponding to a change in engine torque when shifting gears (that is, when the shift solenoid valve is switched for clutch operation) to reduce shifting shock.



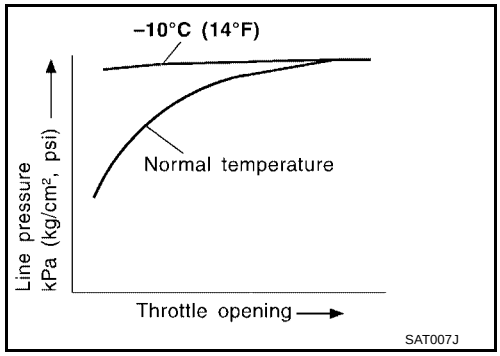
At Low Fluid Temperature

- 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 transaxle fluid when temperature is low.



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

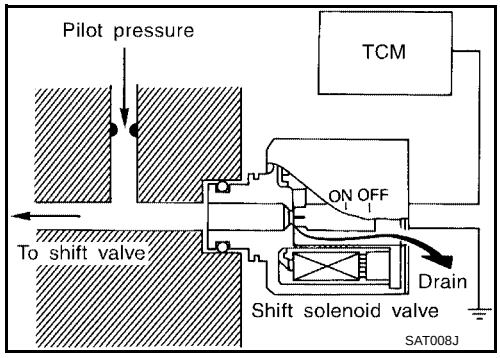


SHIFT CONTROL

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

Control of Shift Solenoid Valves A and B

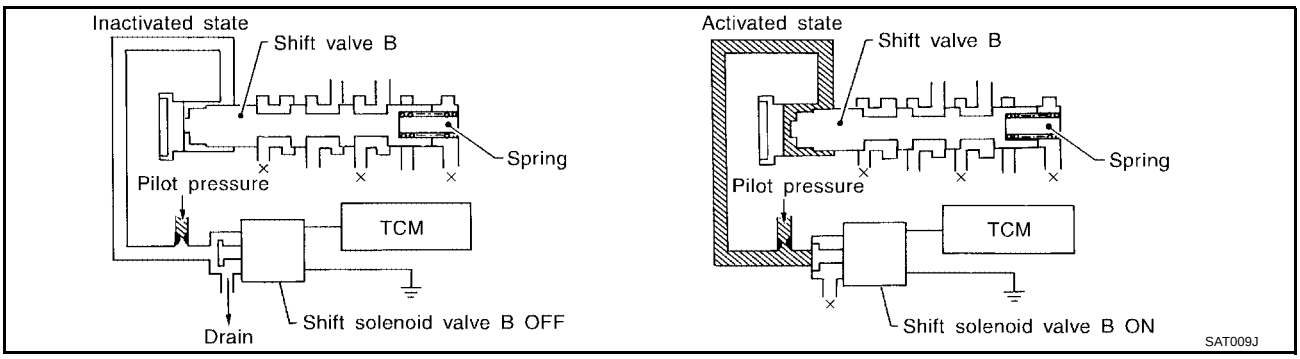
The shift solenoid valve performs simple ON-OFF operation. When set to ON, the drain circuit closes and pilot pressure is applied to the shift valve.
The TCM activates shift solenoid valves A and B according to signals from the ECM (throttle opening) and revolution sensor to select the optimum gear position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



Relation between shift solenoid valves A and B and gear positions

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

Control of Shift Valves A and B



Pilot pressure generated by the operation of shift solenoid valves A and B is applied to the end face of shift valves A and B.
The drawing above shows the operation of shift valve B. When the shift solenoid valve is ON, pilot pressure applied to the end face of the shift valve overcomes spring force, moving the valve upward.

LOCK-UP CONTROL

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

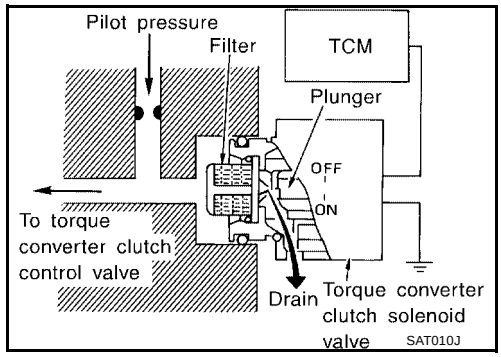
Conditions for Lock-up Operation

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

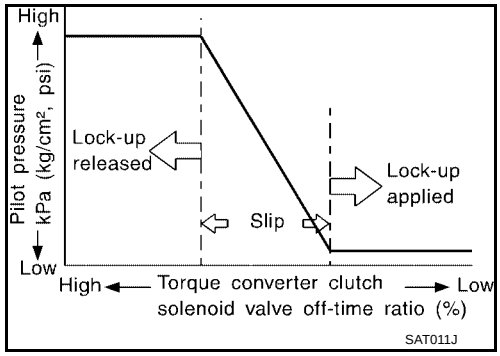
Selector lever	D position	3 position
Gear position	D_4	3
Vehicle speed sensor	More than set value	
ECM (throttle opening)	Less than set opening	
A/T fluid temperature sensor	More than 40°C (104°F)	

Torque Converter Clutch Solenoid Valve Control

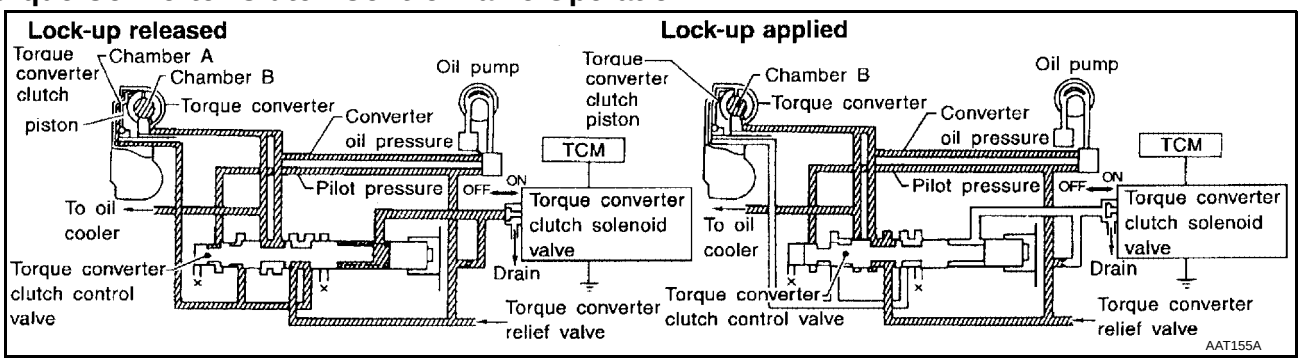
The torque converter clutch solenoid valve is controlled by the TCM. The plunger closes the drain circuit during the OFF period, and opens the circuit during the ON period. If the percentage of OFF-time increases in one cycle, the pilot pressure drain time is reduced and pilot pressure remains high.



The torque converter clutch piston is designed to slip to adjust the ratio of ON-OFF, thereby reducing lock-up shock.
OFF-time INCREASING
↓
Amount of drain DECREASING
↓
Pilot pressure HIGH
↓
Lock-up RELEASING



Torque Converter Clutch Control Valve Operation



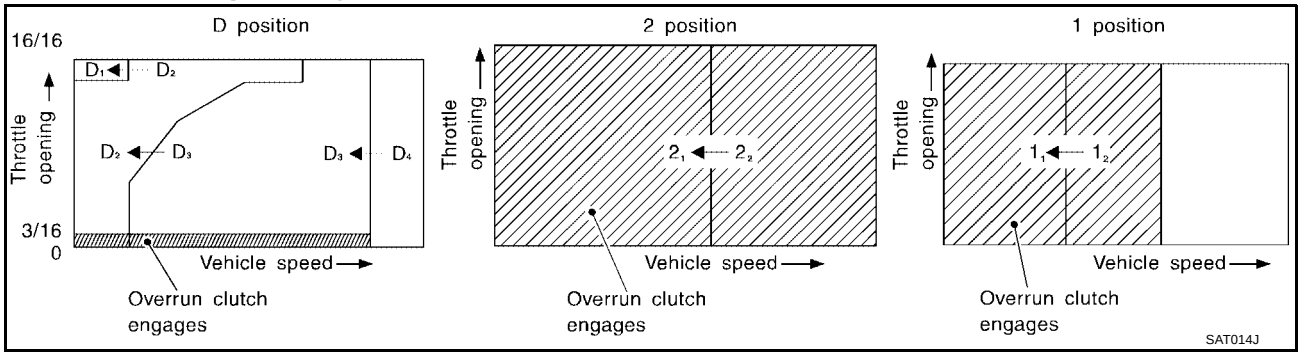
LOCK-UP RELEASED
The OFF-duration of the torque converter clutch solenoid valve is long, and pilot pressure is high. The pilot pressure pushes the end face of the torque converter clutch control valve in combination with spring force to move the valve to the left. As a result, converter pressure is applied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

LOCK-UP APPLIED
When the OFF-duration of the torque converter clutch solenoid valve is short, pilot pressure drains and becomes low. Accordingly, the control valve moves to the right by the pilot pressure of the other circuit and converter pressure. As a result, converter pressure is applied to chamber B, keeping the torque converter clutch piston applied.
Also smooth lock-up is provided by transient application and release of the lock-up.

OVERRUN CLUTCH CONTROL (ENGINE BRAKE CONTROL)

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

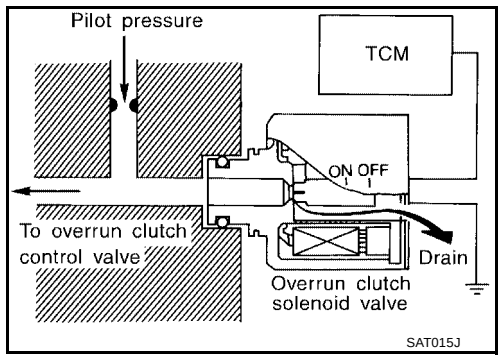
Overrun Clutch Operating Conditions



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

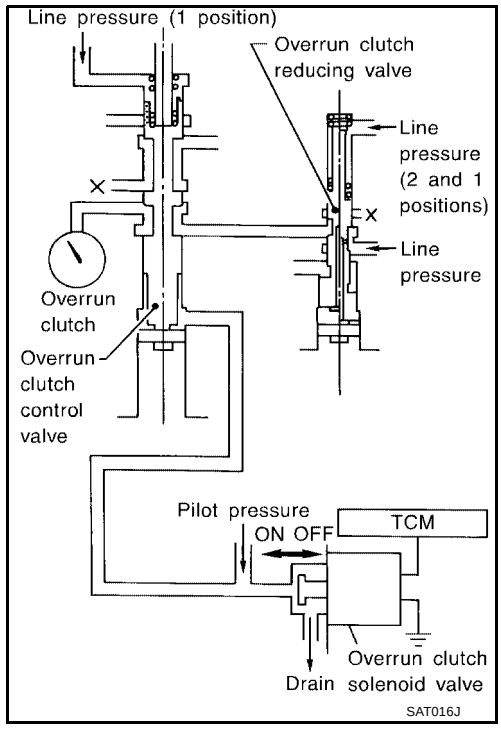
Overrun Clutch Solenoid Valve Control

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



Overrun Clutch Control Valve Operation

When the solenoid valve is ON, pilot pressure is applied to the overrun clutch control valve. This pushes up the overrun clutch control valve. The line pressure is then shut off so that the clutch does not engage.
When the solenoid valve is OFF, pilot pressure is not generated. At this point, the overrun clutch control valve moves downward by spring force. As a result, overrun clutch operation pressure is provided by the overrun clutch reducing valve. This causes the overrun clutch to engage.
In the 1 position, the overrun clutch control valve remains pushed down so that the overrun clutch is engaged at all times.



Control Valve

ECS0095Y

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 up-shifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve B.

Valve name	Function
Shift valve B	Simultaneously switches two oil circuits using output pressure of shift solenoid valve B in relation to driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and up-shifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve A.
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with application of the brake band in D_4 . (Interlocking occurs if the overrun clutch engages during D_4 .)
“1” reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when down-shifting from the 1 position 1_2 to 1_1 .
Overrun clutch reducing valve	Reduces oil pressure directed to the overrun clutch and prevents engine-brake shock. In 1 and 2 positions, line pressure acts on the overrun clutch reducing valve to increase the pressure-regulating point, with resultant engine brake capability.
Torque converter relief valve	Prevents an excessive rise in torque converter pressure.
Torque converter clutch control valve, plug and sleeve	Activates or inactivates the lock-up function. Also provides smooth lock-up through transient application and release of the lock-up system.
1-2 accumulator valve and piston	Dampens the shock encountered when 2nd gear band servo contracts, and provides smooth shifting.
3-2 timing valve	Switches the pace that oil pressure is released depending on vehicle speed; maximizes the high clutch release timing, and allows for soft down shifting.
Shuttle valve	Determines if the overrun clutch solenoid valve should control the 3-2 timing valve or the overrun clutch control valve and switches between the two.
Cooler check valve	At low speeds and with a small load when little heat is generated, saves the volume of cooler flow, and stores the oil pressure for lock up.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

PFP:00000

Introduction

ECS0095Z

The A/T system has two self-diagnostic systems.
The first is the emission-related on board diagnostic system (OBD-II) performed by the TCM (transaxle control module) in combination with the ECM. The malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory but not the TCM memory.
The second is the TCM original self-diagnosis indicated by the A/T check (position) indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For details, refer to AT-44, "OBD-II Function for A/T System" .

OBD-II Function for A/T System

ECS00960

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

One or Two Trip Detection Logic of OBD-II

ECS00961

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	
Accelerator pedal position (APP) 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.

OBD-II Diagnostic Trouble Code (DTC)

ECS00962

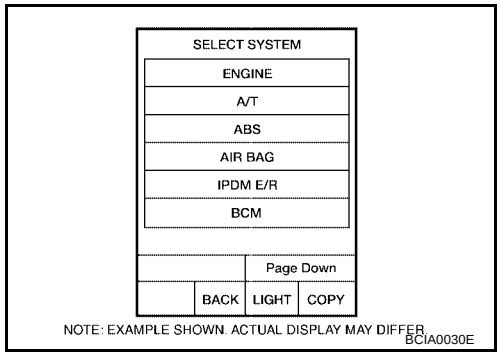
HOW TO READ DTC AND 1ST TRIP DTC

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

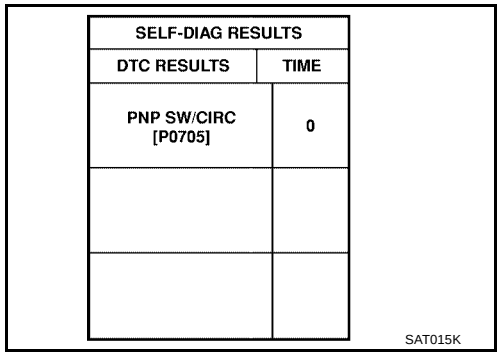
(With CONSULT-II or GST) GST) CONSULT-II or GST (Generic Scan Tool) Examples: P0705, P0710, P0720, P0725, etc.
These DTCs are prescribed by SAE J2012.
(CONSULT-II also displays the malfunctioning component or system.)

- **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.

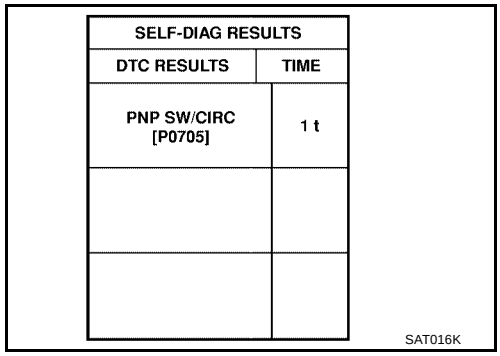
A sample of CONSULT-II display for DTC and 1st trip DTC is shown in the following page. DTC or 1st trip DTC of a malfunction is displayed in “SELF DIAGNOSIS” mode for “ENGINE” with CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.



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 details, refer to ! Hyper-link Error ! .
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 OBD-II. For details, refer to ! Hyper-link Error ! .

- **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)

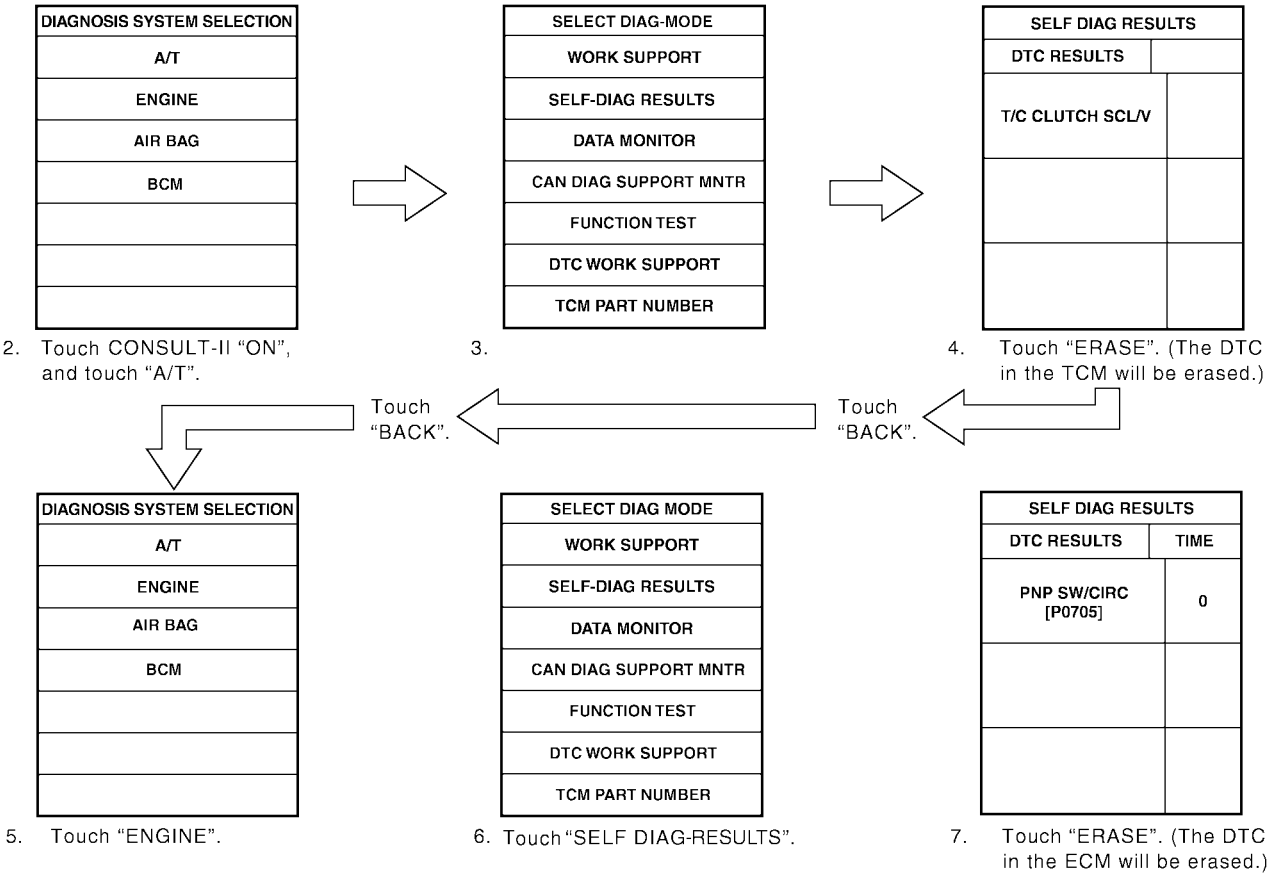
- **If a DTC is displayed for both ECM and TCM, it needs to be erased for both ECM and TCM.**

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

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

How to erase DTC (With CONSULT-II)

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



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 10 seconds and then turn it ON (engine stopped) again.
2. Perform “OBD-II SELF-DIAGNOSTIC PROCEDURE (No Tools)”. Refer to AT-59, "OBD-II SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with Generic Scan Tool (GST). For details, refer to EC-64, "How to Erase DTC" .

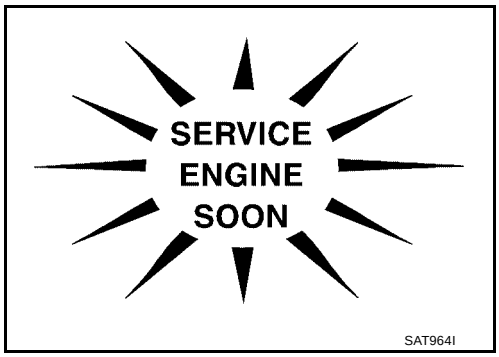
HOW TO ERASE DTC (NO TOOLS)

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform “TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)”. Refer to AT-60, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)

Malfunction Indicator Lamp (MIL)

ECS00963

1. The malfunction indicator lamp will light up when the ignition switch is turned ON without the engine running. This is for checking the lamp.
   - If the malfunction indicator lamp does not light up, refer to DI-31, "WARNING LAMPS" .
     (Or see EC-66, "Malfunction Indicator Lamp (MIL)" .)
2. When the engine is started, the malfunction indicator lamp should go off.
   If the lamp remains on, the on board diagnostic system has detected an emission-related (OBD-II) malfunction. For details, refer to ! Hyper-link Error ! .



CONSULT-II Function (TCM)

ECS00964

CONSULT-II can display each diagnostic item using the diagnostic test modes shown following.

TCM diagnostic mode	Description
WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the TCM for setting the status suitable for required operation, input/output signals are received from the TCM and received data is displayed.
SELF-DIAG RESULTS	Displays TCM self-diagnosis results.
DATA MONITOR	Displays TCM input/output data in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
FUNCTION TEST	Conducted by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".
ECU PART NUMBER	TCM part number can be read.

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

After performing “SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)” (AT-49, "SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)"), place check marks for results on the “Diagnostic Worksheet”, AT-65, "DIAGNOSTIC WORKSHEET" . Reference pages are provide following the items.

NOTICE:

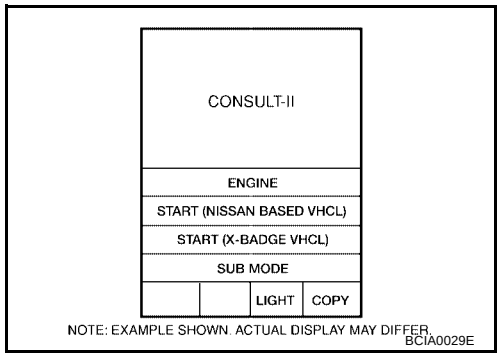
1. The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
   Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning.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

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

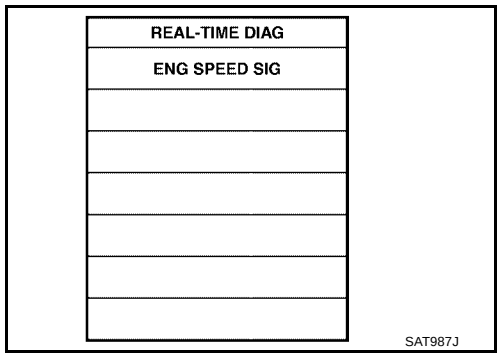
3. Shift solenoid valve “A” or “B” is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).
4. Additional CONSULT-II information can be found in the Operation Manual supplied with the CONSULT-II unit.

SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)

1. Touch on CONSULT-II, touch "START (NISSAN BASED VHCL)", and touch “ENGINE” for OBD-II detected items or touch “A/T” for TCM self-diagnosis.
   If A/T is not displayed, check TCM power supply and ground circuit. Refer to AT-107, "TROUBLE DIAGNOSIS FOR POWER SUPPLY" . If result is NG, refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .



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



SELF-DIAGNOSTIC RESULT TEST MODE

Detected items (Screen terms for CONSULT-II, “SELF DIAGNOSIS” test mode)		Malfunction is detected when...	TCM self-diagnosis	OBD-II (DTC)
“A/T”	“ENGINE”		Available by A/T check (position) indicator lamp or “A/T” on CONSULT-II	Available by malfunction indicator lamp*2, SERVICE ENGINE SOON “ENGINE” on CONSULT-II or GST
Park/neutral position (PNP) switch circuit		● TCM does not receive the correct voltage signal (based on the gear position) from the switch.	—	P0705
—	PNP SW/CIRC			
Revolution sensor		● TCM does not receive the proper voltage signal from the sensor.	X	P0720
VHCL SPEED SEN·A/T	VEH SPD SEN/ CIR AT			
Vehicle speed sensor (Meter)		● TCM does not receive the proper voltage signal from the sensor.	X	—
VHCL SPEED SEN·MTR	—			
A/T 1st gear function		● A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	—	P0731*1
—	A/T 1ST GR FNCTN			
A/T 2nd gear function		● A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	—	P0732*1
—	A/T 2ND GR FNCTN			
A/T 3rd gear function		● A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	—	P0733*1
—	A/T 3RD GR FNCTN			
A/T 4th gear function		● A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	—	P0734*1
—	A/T 4TH GR FNCTN			

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		Available by A/T check (position) indicator lamp or "A/T" on CONSULT-II	Available by malfunction indicator lamp*2, SERVICE ENGINE SOON "ENGINE" on CONSULT-II or GST
A/T TCC S/V function (lock-up)		● A/T cannot perform lock-up even if electrical circuit is good.	—	P0744*1
—	A/T TCC S/V FNCTN			
Shift solenoid valve A		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0750
SHIFT SOLENOID/V A	SFT SOL A/CIRC			
Shift solenoid valve B		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0755
SHIFT SOLENOID/V B	SFT SOL B/CIRC			
Overrun clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P1760
OVERRUN CLUTCH S/V	O/R CLUCH SOL/CIRC			
T/C clutch solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0740
T/C CLUTCH SOL/V	TCC SOLENOID/CIRC			
Line pressure solenoid valve		● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	X	P0745
LINE PRESSURE S/V	L/PRESS SOL/CIRC			
Throttle position sensor [accelerator pedal position (APP) sensor]		● TCM receives an excessively low or high voltage from this sensor	X	P1705
THROTTLE POSI SEN TP/SEN/CIRC A/T				
Engine speed signal		● TCM does not receive the proper voltage signal from the ECM.	X	P0725
ENGINE SPEED SIG				
A/T fluid temperature sensor		● TCM receives an excessively low or high voltage from the sensor.	X	P0710
BATT/FLUID TEMP SEN	ATF TEMP SEN/CIRC			
Engine control		● The ECM-A/T communication line is open or shorted.	X	U1000
A/T COMM LINE	—			
Turbine revolution sensor		● TCM does not receive proper voltage signal from sensor	X	—
TURBINE REV				
TCM (RAM)		● TCM memory (RAM) is malfunctioning	—	—
CONTROL UNIT (RAM)	—			
TCM (ROM)		● TCM memory (ROM) is malfunctioning	—	—
CONTROL UNIT (ROM)	—			
TCM (EEP ROM)		● TCM memory (EEP ROM) is malfunctioning.	—	—
CONT UNIT(EEP ROM)	—			

Detected items (Screen terms for CONSULT-II, "SELF DIAGNOSIS" test mode)		Malfunction is detected when...	TCM self-diagnosis	OBD-II (DTC)
"A/T"	"ENGINE"		Available by A/T check (position) indicator lamp or "A/T" on CONSULT-II	Available by malfunction indicator lamp*2, SERVICE ENGINE SOON "ENGINE" on CONSULT-II or GST
Initial start		● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen.)	X	—
INITIAL START	—			
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED**)		● No failure has been detected.	X	X

X: Applicable
–: Not applicable

*1: These malfunctions cannot be displayed by MIL SERVICE ENGINE SOON if another malfunction is assigned to MIL.
*2: Refer to EC-66, "Malfunction Indicator Lamp (MIL)" .

DATA MONITOR MODE (A/T)

Item	Display	Monitor item			Description	Remarks
		TCM Input signals	Main signals	Selection from menu		
Vehicle speed sensor 1 (A/T) (Revolution sensor)	VHCL/S SE·A/T [km/h] or [mph]	X	—	▼	● Vehicle speed computed from signal of revolution sensor is displayed.	● When racing engine in N or P with vehicle stationary, CONSULT-II data may not indicate 0 km/h (0 mph).
Vehicle speed sensor 2 (Meter)	VHCL/S SE·MTR [km/h] or [mph]	X	—	▼	● Vehicle speed computed from signal of vehicle speed sensor is displayed.	● Vehicle speed display may not be accurate under approx. 10 km/h (6 mph). It may not indicate 0 km/h (0 mph) when vehicle is stationary.
Throttle position sensor [accelerator pedal position (APP) sensor]	THRTL POS SEN [V]	X	—	▼	● Throttle position sensor signal voltage is displayed	
A/T fluid temperature sensor	FLUID TEMP SE [V]	X	—	▼	● A/T fluid temperature sensor signal voltage is displayed. ● Signal voltage lowers as fluid temperature rises.	
Battery voltage	BATTERY VOLT [V]	X	—	▼	● Source voltage of TCM is displayed.	
Engine speed	ENGINE SPEED [rpm]	X	X	▼	● Engine speed, computed from engine speed signal, is displayed.	● Engine speed display may not be accurate under approx. 800 rpm. It may not indicate 0 rpm even when engine is not running.
Turbine revolution sensor	TURBINE REV	X	—	▼	● Checks changing speed then performs oil pressure control and torque down control	
Overdrive control switch	OVERDRIVE SW [ON/OFF]	X	—	▼	● ON/OFF state computed from signal of 3 position switch is displayed.	

Item	Display	Monitor item			Description	Remarks
		TCM Input signals	Main signals	Selection from menu		
PN position (PNP) switch	PN POSI SW [ON/OFF]	X	—	▼	● ON/OFF state computed from signal of PN position SW is displayed.	
R position switch	R POSITION SW [ON/OFF]	X	—	▼	● ON/OFF state computed from signal of R position SW is displayed.	
D position switch	D POSITION SW [ON/OFF]	X	—	▼	● ON/OFF state computed from signal of D position SW is displayed.	
2 position switch	2 POSITION SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of 2 position SW, is displayed.	
1 position switch	1 POSITION SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of 1 position SW, is displayed.	
ASCD cruise signal	ASCD·CRUISE [ON/OFF]	X	—	▼	● Status of ASCD cruise signal is displayed. ON ... Cruising state OFF ... Normal running state	
ASCD OD cut signal	ASCD·OD CUT [ON/OFF]	X	—	▼	● Status of ASCD OD release signal is displayed. ON ... OD released OFF ... OD not released	
Kickdown switch	KICKDOWN SW [ON/OFF]	X	—	▼	● ON/OFF status, computed from signal of kickdown SW, is displayed.	● This is displayed even when no kickdown switch is equipped.
Stop lamp switch	BRAKE SW [ON/OFF]	X	—	—	● ON/OFF status is displayed. ON ... Brake pedal is depressed. OFF ... Brake pedal is released.	
Selector lever position	SLCT LVR POSI	—	X	▼	● Selector lever position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.
Vehicle speed	VEHICLE SPEED [km/h] or [mph]	—	X	▼	● Vehicle speed data, used for computation by TCM, is displayed.	
Throttle position [Accelerator pedal position (APP) sensor]	THROTTLE POSI [/8]	—	X	—	● Throttle position data, used for computation by TCM, is displayed.	● A specific value used for control is displayed if fail-safe is activated due to error.

Item	Display	Monitor item			Description	Remarks
		TCM Input signals	Main signals	Selection from menu		
Gear position	GEAR	—	X	▼	● Gear position data used for computation by TCM, is displayed.	
Line pressure duty	LINE PRES DTY [%]	—	X	—	● Control value of line pressure solenoid valve, computed by TCM from each input signal, is displayed.	
Torque converter clutch solenoid valve duty	TCC S/V DUTY [%]	—	X	—	● Control value of torque converter clutch solenoid valve, computed by TCM from each input signal, is displayed.	
Shift solenoid valve A	SHIFT S/V A [ON/OFF]	—	X	—	● Control value of shift solenoid valve A, computed by TCM from each input signal, is displayed.	● Control value of solenoid is displayed even if solenoid circuit is disconnected. The OFF signal is displayed if solenoid circuit is shorted.
Shift solenoid valve B	SHIFT S/V B [ON/OFF]	—	X	—	● Control value of shift solenoid valve B, computed by TCM from each input signal, is displayed.	
Overrun clutch solenoid valve	OVERRUN/C S/V [ON/OFF]	—	X	▼	● Control value of overrun clutch solenoid valve computed by TCM from each input signal is displayed.	
Self-diagnosis display lamp [A/T check (position) indicator lamp]	SELF-D DP LMP [ON/OFF]	—	X	▼	● Control status of A/T check (position) indicator lamp is displayed.	
Torque converter slip ratio	TC SLIP RATIO [0.000]	—	—	▼	● Ratio of engine revolution to input shaft revolution of torque converter.	
Torque converter slip speed	TC SLIP SPEED [rpm]	—	—	▼	● Difference in revolution between input shaft revolution and torque converter input shaft revolution.	● Display does not indicate engine is stopped even if 0 rpm — this is not a malfunction.
Voltage [V]		—	—	▼	● Value measured by voltage probe is displayed.	

Item	Display	Monitor item			Description	Remarks
		TCM Input signals	Main signals	Selection from menu		
Frequency [Hz]		—	—	▼	● Value measured by pulse probe is displayed. If measurement is impossible, "#" sign is displayed. "#" sign is also displayed at the final data value until the measurement result is obtained.	
DUTY-HI		—	—	▼	● Duty cycle value for measurement probe is displayed.	
DUTY-LOW		—	—	▼		
PLS WIDTH-HI		—	—	▼	● Measured pulse width of measurement probe is displayed.	
PLS WIDTH-LOW		—	—	▼		

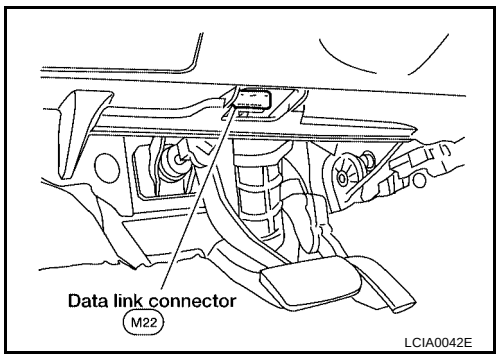
X: Applicable
—: Not applicable
▼: Option

DTC WORK SUPPORT MODE WITH CONSULT-II

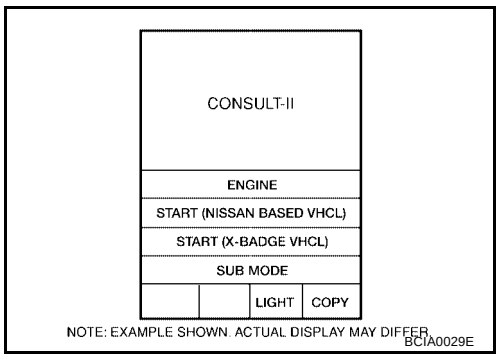
CONSULT-II Setting Procedure

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

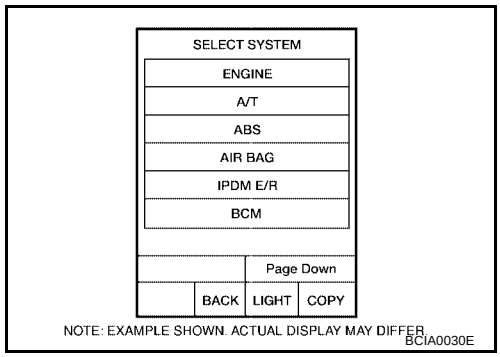
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector, which is located in left side dash panel.



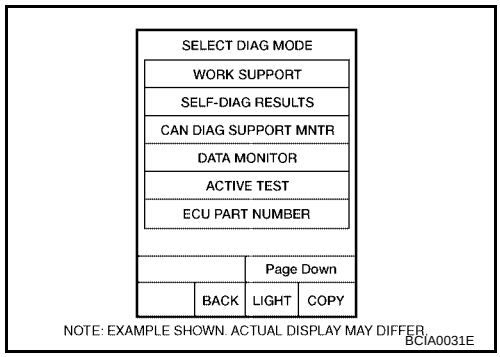
3. Turn ignition switch ON. (Do not start engine)
4. Touch “START (NISSAN BASED VHCL)”.



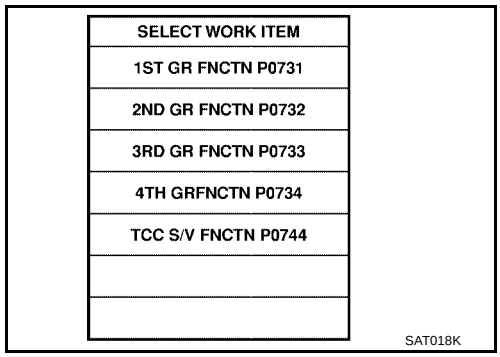
5. Touch “A/T”.
If "AT" is not indicated, go to GI-39, "Consult-II Data Link Connector (DLC) Circuit" .



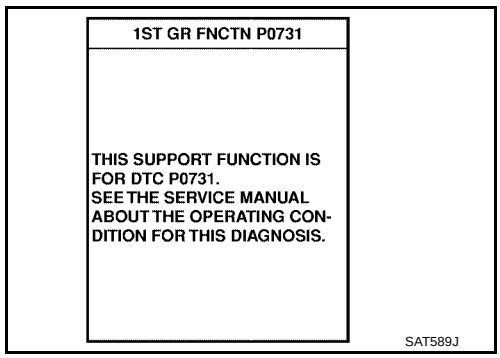
6. Touch “DTC WORK SUPPORT”.



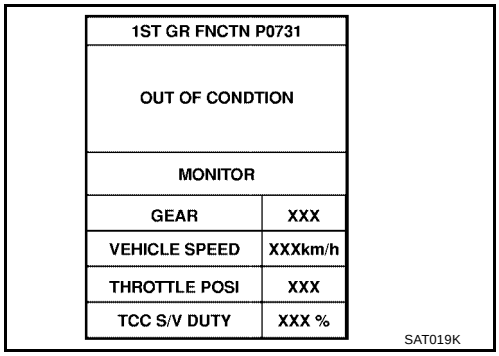
7. Touch select item menu (1ST, 2ND, etc.).



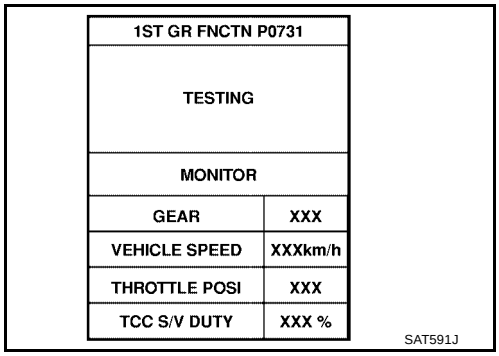
8. Touch “START”.



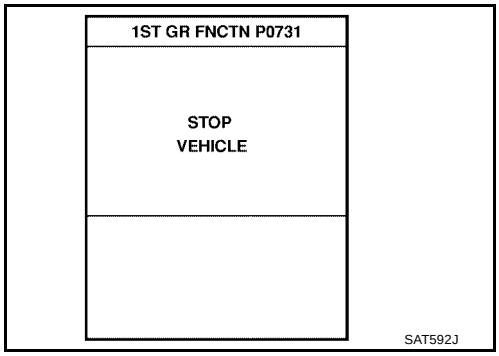
9. Perform driving test according to “DTC CONFIRMATION PROCEDURE” in “TROUBLE DIAGNOSIS FOR DTC”.

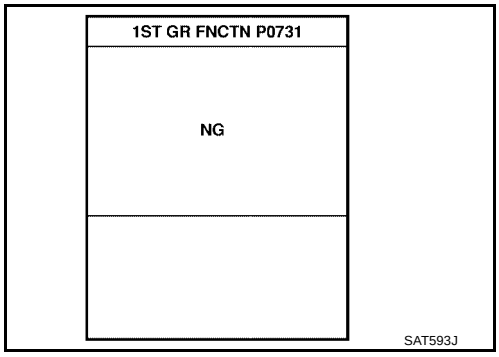


- **When testing conditions are satisfied, CONSULT-II screen changes from “OUT OF CONDITION” to “TESTING”.**

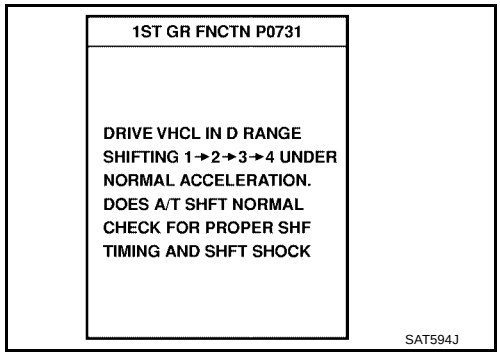


10. Stop vehicle. If “NG” appears on the screen, malfunction may exist. Go to “DIAGNOSTIC PROCEDURE”.

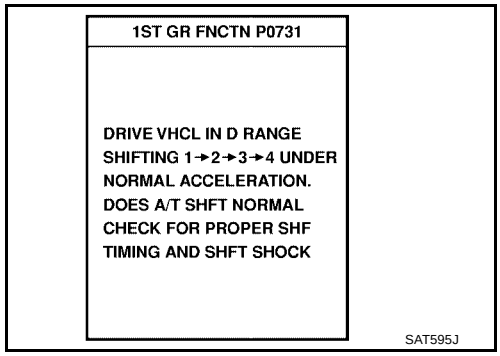




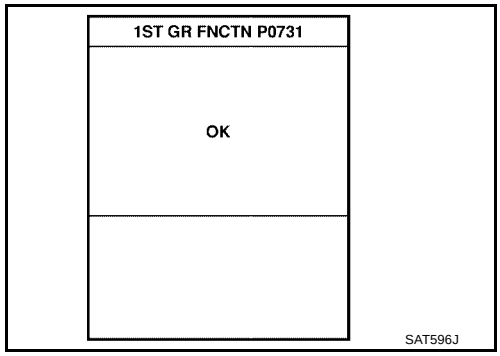
11. Perform test drive to check gear shift feeling in accordance with instructions displayed.

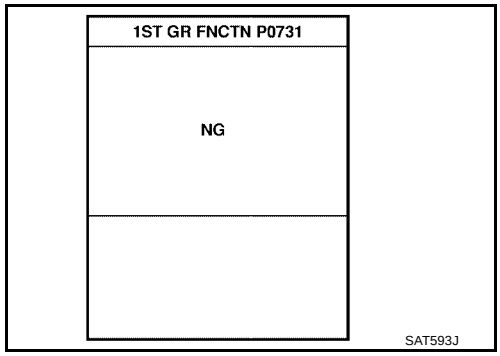


12. Touch “YES” or “NO”.



13. CONSULT-II procedure ended.





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

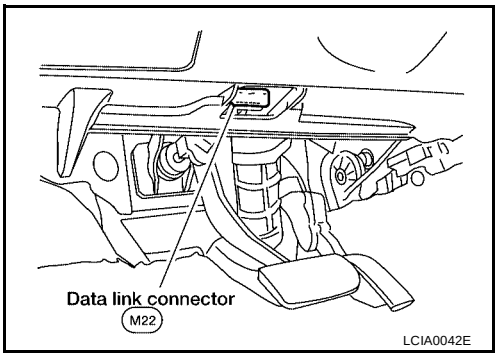
DTC WORK SUPPORT MODE

DTC work support item	Description	Check item
1ST GR FNCTN P0731	Following items for “A/T 1st gear function (P0731)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve A ● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
2ND GR FNCTN P0732	Following items for “A/T 2nd gear function (P0732)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
3RD GR FNCTN P0733	Following items for “A/T 3rd gear function (P0733)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Shift solenoid valve A ● Each clutch ● Hydraulic control circuit
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
TCC S/V FNCTN P0744	Following items for “A/T TCC S/V function (lock-up) (P0744)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being conducted or not) ● Self-diagnosis result (OK or NG)	● Torque converter clutch solenoid valve ● Each clutch ● Hydraulic control circuit

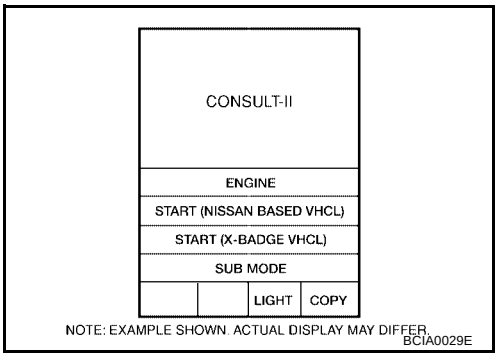
CAN DIAGNOSTIC SUPPORT MONITOR

CONSULT-II Setting Procedure

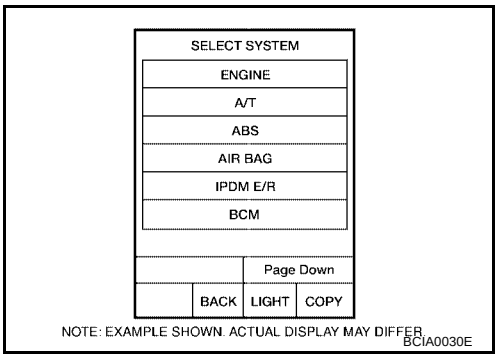
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT II CONVERTER to data link connector, which is located in left side dash panel.



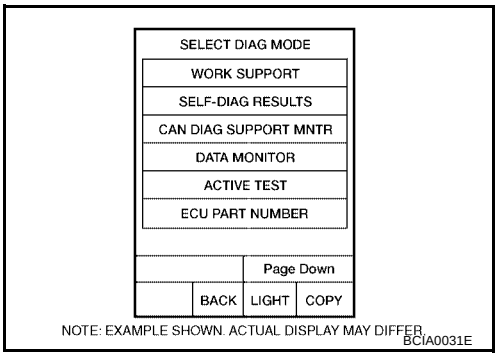
3. Turn ignition switch ON. (Do not start engine.)
4. Touch “START (NISSAN BASED VHCL)”.



5. Touch “A/T”.
   If "AT" is not indicated, go to GI-39, "Consult-II Data Link Connector (DLC) Circuit" .



6. Touch “CAN DIAGNOSTIC SUPPORT MONITOR”.
   Refer to LAN-15, "CAN Diagnostic Support Monitor" .



Diagnostic Procedure Without CONSULT-II

ECS00965

OBD-II SELF-DIAGNOSTIC PROCEDURE (WITH GST)

Refer to EC-129, "Generic Scan Tool (GST) Function" .

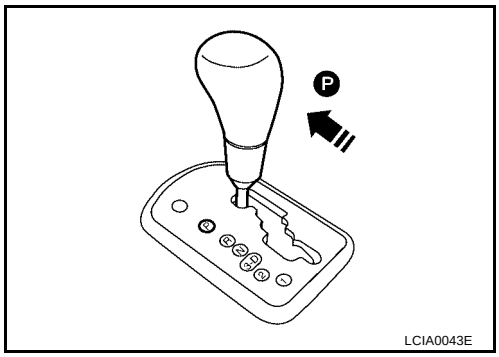
OBD-II SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

Refer to EC-66, "Malfunction Indicator Lamp (MIL)" .

TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

1. CHECK A/T CHECK (POSITION) INDICATOR LAMP

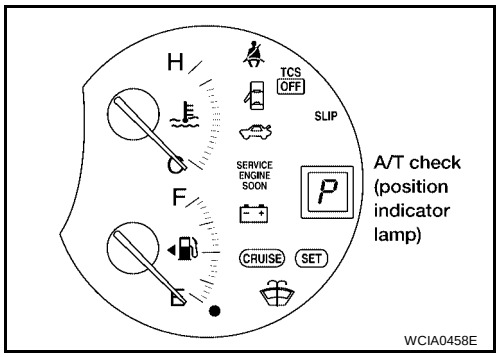
1. Move selector lever to P position.
   Start engine and warm it up to normal engine operating temperature.
2. Turn ignition switch to OFF position.
3. Wait 5 seconds.
4. Turn ignition switch to ON position.
   (Do not start engine.)



5. Does A/T check (position) indicator lamp come on for about 2 seconds?

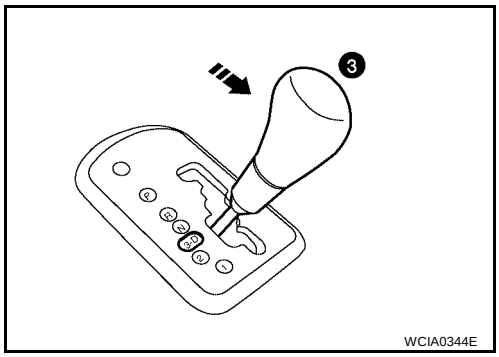
Yes or No

Yes >> GO TO 2.
No >> Stop procedure. Perform AT-217, "1. A/T Check (Position) Indicator Lamp Does Not Come On" before proceeding.



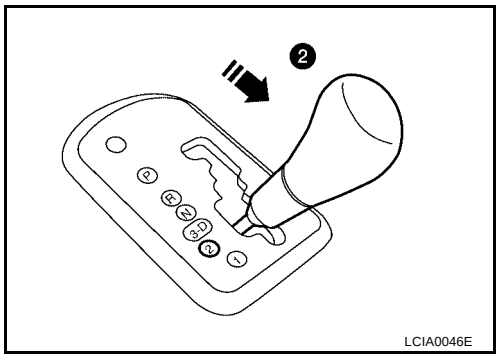
2. JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch to OFF position.
2. Push and hold shift lock button.
3. Depress the brake pedal, then move gear selector lever from P to 3 position.
4. Wait 3 seconds.



5. Move selector lever to 2 position.
6. Release brake pedal.

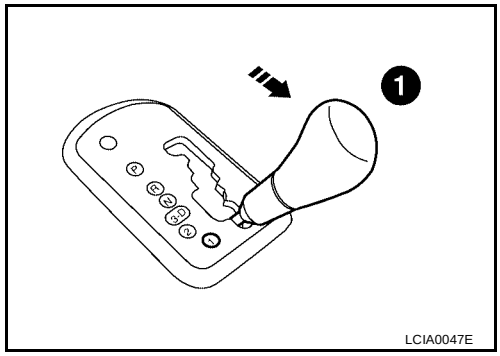
>> GO TO 3.



3. JUDGEMENT PROCEDURE STEP 2

1. Move selector lever to 1 position.
2. Depress brake pedal.
3. Depress accelerator pedal fully and release it.
4. The A/T check (position) indicator lamp will begin to flash.

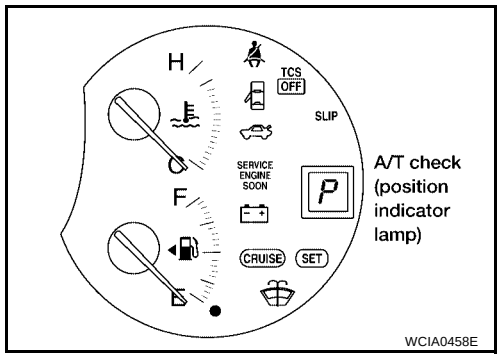
>> GO TO 4.



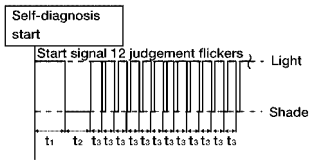
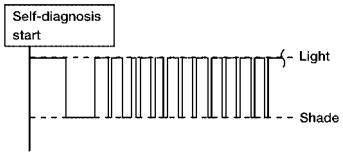
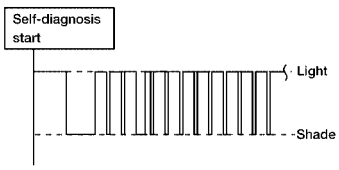
4. CHECK SELF-DIAGNOSTIC CODE

Check A/T check (position) indicator lamp.
Refer to AT-61, "JUDGEMENT OF SELF-DIAGNOSIS CODE" .

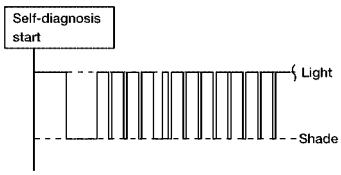
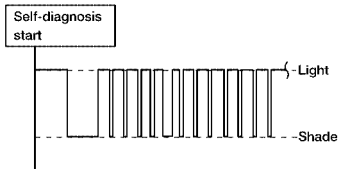
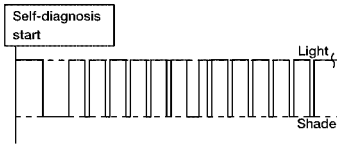
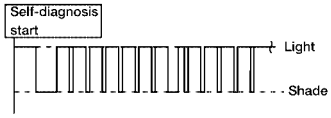
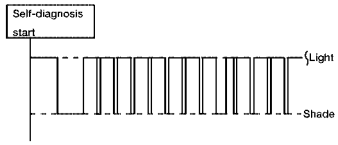
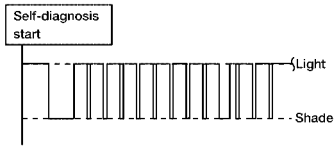
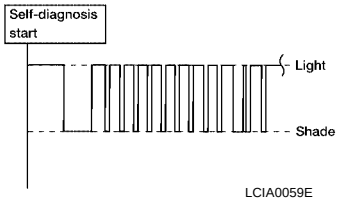
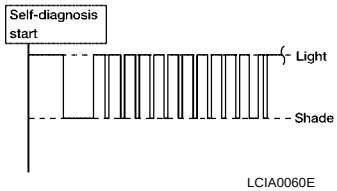
>> **DIAGNOSIS END**

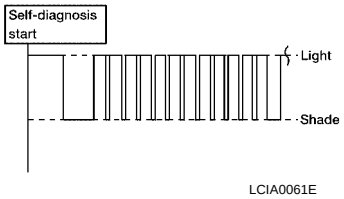
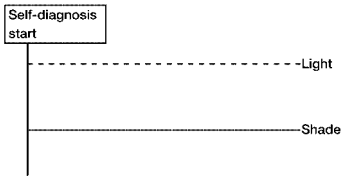
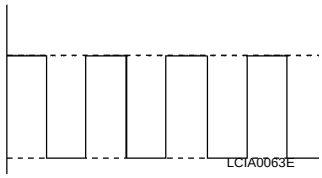


JUDGEMENT OF SELF-DIAGNOSIS CODE

A/T check (position) indicator lamp:	
All judgement flickers are the same.  LCIA0049E All circuits that can be confirmed by self-diagnosis are OK.	1st judgement flicker is longer than others.  LCIA0050E Revolution sensor circuit is short-circuited or disconnected. ⇒ **Go to** AT-122, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" **.**
2nd judgement flicker is longer than others.  LCIA0051E Vehicle speed sensor circuit is short-circuited or disconnected. ⇒ **Go to** AT-201, "DTC VEHICLE SPEED SENSOR MTR" **.**	3rd judgement flicker is longer than others.  LCIA0052E Throttle position sensor circuit is short-circuited or disconnected. ⇒ **Go to** AT-182, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]".

A/T check (position) indicator lamp:

4th judgement flicker is longer than others.  LCIA0053E Shift solenoid valve A circuit is short-circuited or disconnected. ⇒ **Go to** AT-172, "DTC P0750 SHIFT SOLENOID VALVE A" **.**	5th judgement flicker is longer than others.  LCIA0054E Shift solenoid valve B circuit is short-circuited or disconnected. ⇒ **Go to** AT-177, "DTC P0755 SHIFT SOLENOID VALVE B" **.**
6th judgement flicker is longer than others.  LCIA0055E Overrun clutch solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to** AT-185, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" **.**	7th judgement flicker is longer than others.  LCIA0056E Torque converter clutch solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to** AT-153, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" **.**
8th judgement flicker is longer than others.  LCIA0057E A/T fluid temperature sensor is disconnected or TCM power source circuit is damaged. ⇒ **Go to** AT-116, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" **.**	9th judgement flicker is longer than others.  LCIA0058E Engine speed signal circuit is short-circuited or disconnected. ⇒ **Go to** AT-127, "DTC P0725 ENGINE SPEED SIGNAL" **.**
10th judgement flicker is longer than others.  LCIA0059E Turbine revolution sensor circuit is short-circuited or disconnected. ⇒ **Go to** AT-205, "DTC TURBINE REVOLUTION SENSOR" **.**	11th judgement flicker is longer than others.  LCIA0060E Line pressure solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to** AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE" **.**

A/T check (position) indicator lamp:	
12th judgement flicker is longer than others.  LCIA0061E The ECM-A/T communication line is open or shorted. ⇒ **Go to** AT-190, "DTC U1000 CAN COMMUNICATION LINE" **.**	
Lamp turns off.  LCIA0062E Park/neutral position (PNP) switch, and 3 position switch circuit is disconnected or TCM is damaged. ⇒ **Go to** AT-254, "21. TCM Self-diagnosis Does Not Activate (PNP & 3 Position Switches Circuit Checks), and Throttle Position Sensor [Accelerator Pedal Position (APP) Sensor] Circuit Check" **.**	Flickers as shown below.  LCIA0063E Battery power is low. Battery has been disconnected for a long time. Battery is connected conversely. (When reconnecting TCM connectors. — This is not a problem.)

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

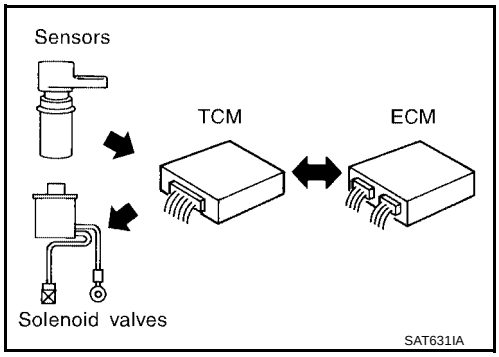
TROUBLE DIAGNOSIS - INTRODUCTION

PFP:00000

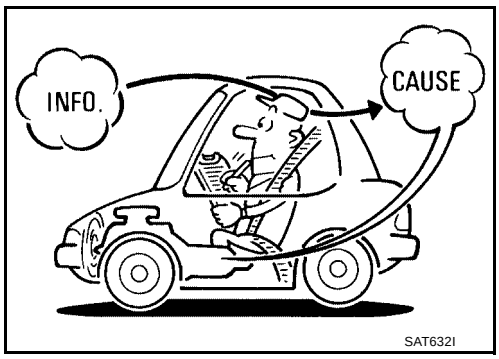
Introduction

ECS00966

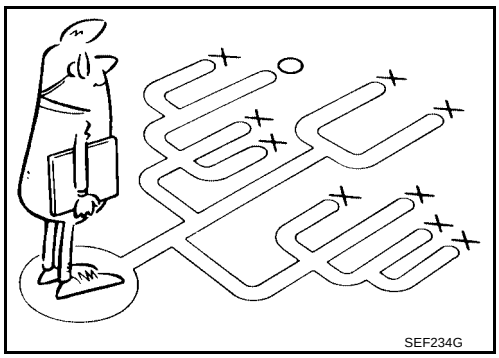
The TCM receives a signal from the vehicle speed sensor, ECM (throttle opening) or park/neutral position (PNP) switch and provides shift control or lock-up control via A/T solenoid valves.
The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the OBD-related parts of the A/T system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.
Input and output signals must always be correct and stable in the operation of the A/T system. The A/T system must be in good operating condition and be free of valve seizure, solenoid valve malfunction, etc.



It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.
A visual check only, may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the “Work Flow”. Refer to AT-68, "Work Flow" .



Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “DIAGNOSTIC WORKSHEET” like the example on page AT-66 should be used.
Start your diagnosis by looking for “conventional” problems first. This will help troubleshoot driveability problems on an electronically controlled engine vehicle.
Also check related Service bulletins for information.



DIAGNOSTIC WORKSHEET

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 → 4th)	
	❑ No down-shift (❑ 4th → 3rd ❑ 3rd → 2nd ❑ 2nd → 1st)	
	❑ Lockup malfunction	
	❑ Shift point too high or too low.	
	❑ Shift shock or slip (❑ N → D ❑ Lockup ❑ Any drive position)	
	❑ Noise or vibration	
	❑ No kickdown	
	❑ No pattern select	
	❑ Others ( )	
A/T check (position) 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-12
2.	❑ CHECK A/T FLUID			AT-71
		❑ Leakage (Follow specified procedure) ❑ Fluid condition ❑ Fluid level		
3.	❑ Perform STALL TEST and PRESSURE TEST.			AT-74, AT-77
		❑ Stall test — Mark possible damaged components/others.		
			❑ Torque converter one-way clutch ❑ Reverse clutch ❑ Forward clutch ❑ Overrun clutch ❑ Forward one-way clutch	❑ Low & reverse brake ❑ Low one-way clutch ❑ Engine ❑ Line pressure is low ❑ Clutches and brakes except high clutch and brake band are OK
		❑ Pressure test — Suspected parts:		
4.	❑ Perform all ROAD TEST and mark required procedures.			AT-78
	4-1.	Check before engine is started.		AT-80
		❑ SELF-DIAGNOSTIC PROCEDURE - Mark detected items.		
			❑ Park/neutral position (PNP) switch, AT-110 ❑ A/T fluid temperature sensor, AT-116 . ❑ Vehicle speed sensor·A/T (Revolution sensor), AT-122 . ❑ Engine speed signal, AT-127 . ❑ Turbine revolution sensor, AT-205 . ❑ Torque converter clutch solenoid valve, AT-153 . ❑ Line pressure solenoid valve, AT-166 . ❑ Shift solenoid valve A, AT-172 . ❑ Shift solenoid valve B, AT-177 . ❑ Throttle position sensor [accelerator pedal position (APP) sensor], AT-182 . ❑ Overrun clutch solenoid valve, AT-185 . ❑ Park/neutral position (PNP) & 3 position switches circuit checks, and throttle position sensor [accelerator pedal position (APP) sensor circuit check AT-254 . ❑ A/T fluid temperature sensor, AT-116 . ❑ Vehicle speed sensor·MTR, AT-201 . ❑ CAN communication line, AT-190 . ❑ Control unit (RAM), Control unit (ROM), AT-209 . ❑ Control unit (EEP ROM), AT-211 . ❑ Battery ❑ Others	

4.	4-2.	Check at idle	AT-80
		❏ 1. A/T Check (Position) Indicator Lamp Does Not Come On, AT-217 . ❏ 2. Engine Cannot Be Started In P and N Position, AT-219 . ❏ 3. In P Position, Vehicle Moves Forward or Backward When Pushed, AT-220 . ❏ 4. In N Position, Vehicle Moves, AT-221 . ❏ 5. Large Shock. N → R Position, AT-223 . ❏ 6. Vehicle Does Not Creep Backward In R Position, AT-225 . ❏ 7. Vehicle Does Not Creep Forward In D, 2 or 1 Position, AT-228 .	
	4-3.	Cruise test	AT-82 AT-86
		Part-1	
		❏ 8. Vehicle Cannot Be Started From D_1 , AT-231 . ❏ 9. A/T Does Not Shift: D_1 → D_2 or Does Not Kickdown: D_4 → D_2 , AT-234 . ❏ 10. A/T Does Not Shift: D_2 → D_3 , AT-237 . ❏ 11. A/T Does Not Shift: D_3 → D_4 , AT-240 . ❏ 12. A/T Does Not Perform Lock-up, AT-243 . ❏ 13. A/T Does Not Hold Lock-up Condition, AT-245 . ❏ 14. Lock-up Is Not Released, AT-247 . ❏ 15. Engine Speed Does Not Return To Idle (Light Braking D_4 → D_3), AT-248 .	
		Part-2	AT-89
		❏ 16. Vehicle Does Not Start From D_1 , AT-250 . ❏ 9. A/T Does Not Shift: D_1 → D_2 or Does Not Kickdown: D_4 → D_2 , AT-234 . ❏ 10. A/T Does Not Shift: D_2 → D_3 , AT-237 . ❏ 11. A/T Does Not Shift: D_3 → D_4 , AT-240 .	
		Part-3	AT-91
		❏ 17. A/T Does Not Shift: D_4 → D_3 When Gear Selector Lever D → 3, AT-251 . ❏ 15. Engine Speed Does Not Return To Idle (Engine Brake In D_3), AT-248 . ❏ 18. A/T Does Not Shift: D_3 → 2_2 , When Selector Lever D → 2 Position, AT-252 . ❏ 15. Engine Speed Does Not Return To Idle (Engine Brake In 2_2), AT-248 . ❏ 19. A/T Does Not Shift: 2_2 → 1_1 , When Selector Lever 2 → 1 Position, AT-253 . ❏ 20. Vehicle Does Not Decelerate By Engine Brake, AT-254 . ❏ SELF-DIAGNOSTIC PROCEDURE — Mark detected items.	
		❏ Park/neutral position (PNP) switch, AT-110 ❏ A/T fluid temperature sensor, AT-116 . ❏ Vehicle speed sensor·A/T (Revolution sensor), AT-122 . ❏ Engine speed signal, AT-127 . ❏ Turbine revolution sensor, AT-205 . ❏ Torque converter clutch solenoid valve, AT-153 . ❏ Line pressure solenoid valve, AT-166 . ❏ Shift solenoid valve A, AT-172 . ❏ Shift solenoid valve B, AT-177 . ❏ Throttle position sensor [accelerator pedal position (APP) sensor], AT-182 . ❏ Overrun clutch solenoid valve, AT-185 . ❏ Park/neutral position (PNP) & 3 position switches circuit checks, and throttle position sensor [accelerator pedal position (APP) sensor] circuit check, AT-254 . ❏ A/T fluid temperature sensor, AT-116 . ❏ Vehicle speed sensor·MTR, AT-201 . ❏ CAN communication line, AT-190 . ❏ Control unit (RAM), Control unit (ROM), AT-209 . ❏ Control unit (EEP ROM), AT-211 . ❏ Battery ❏ Others	
5.	❏ For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.		AT-267
6.	❏ Perform all ROAD TEST and re-mark required procedures.		AT-78
7.	❏ Perform DTC CONFIRMATION PROCEDURE for following MIL indicating items and check out NG items. Refer to ! Hyper-link Error ! .		! Hyper-link Error !, ! Hyper-link Error !
	❏ DTC (P0731) A/T 1st gear function, AT-131 . ❏ DTC (P0732) A/T 2nd gear function, AT-136 . ❏ DTC (P0733) A/T 3rd gear function, AT-141 . ❏ DTC (P0734) A/T 4th gear function, AT-146 . ❏ DTC (P0744) A/T TCC S/V function (lock-up), AT-158 .		

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-49 AT-59
9.	❑ Erase DTC from TCM and ECM memories.	AT-46

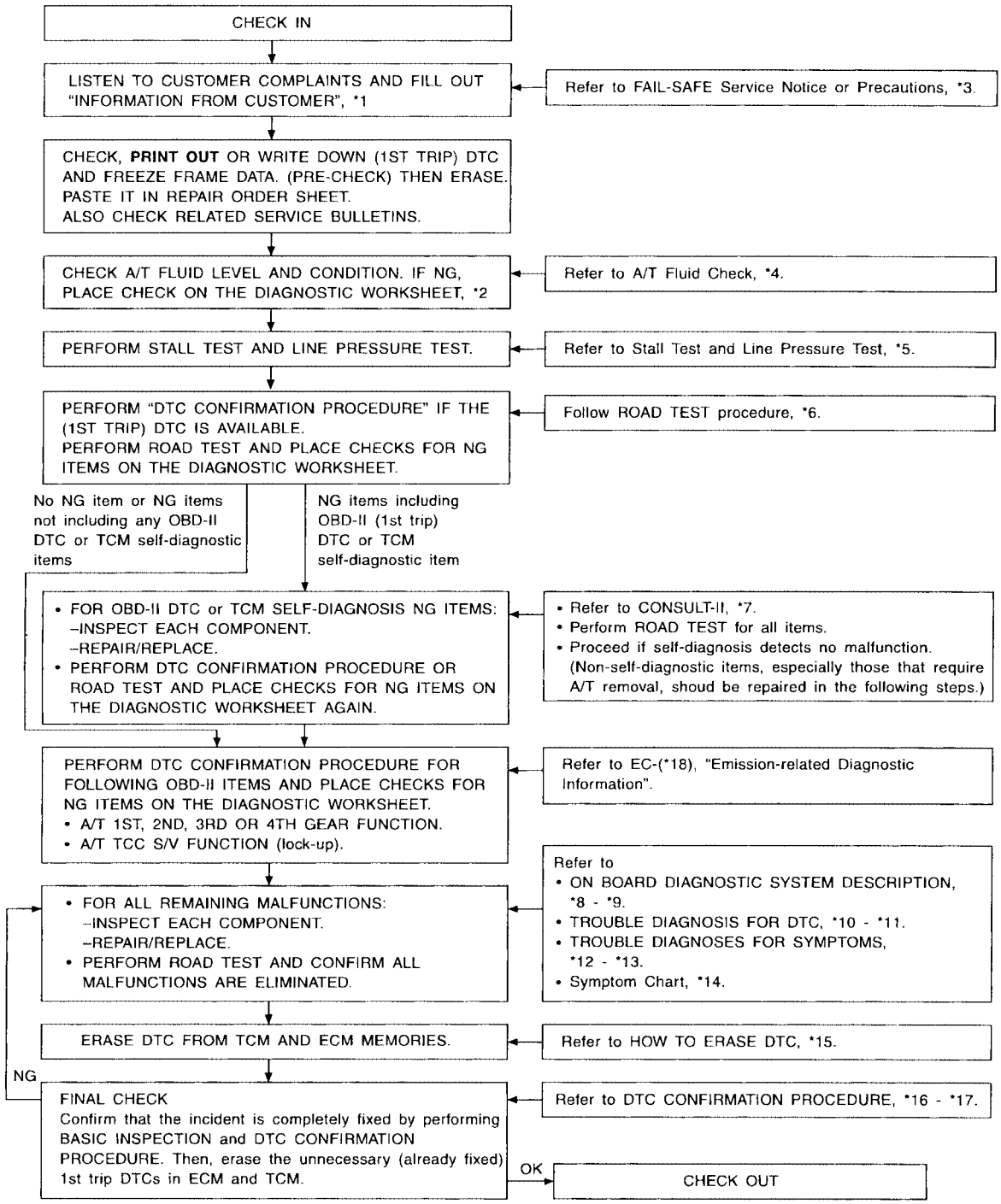
Work Flow

ECS00967

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, AT-65, "Information from Customer" and AT-66, "Diagnostic Work-sheet" , to perform the best troubleshooting possible.

WORK FLOW CHART



SAT086JI

*1: AT-65 *2: AT-66 *3: AT-12
*4: AT-71 *5: AT-74, AT-77 *6: AT-78
*7: AT-48 *8: AT-44 *9: AT-44
*10: AT-110 *11: AT-211 *12: AT-213

*13: AT-254
*14: AT-93
*15: AT-46
*16: AT-110
*17: AT-194
*18: ! Hyper-link Error ! , ! Hyper-link Error !

TROUBLE DIAGNOSIS - BASIC INSPECTION

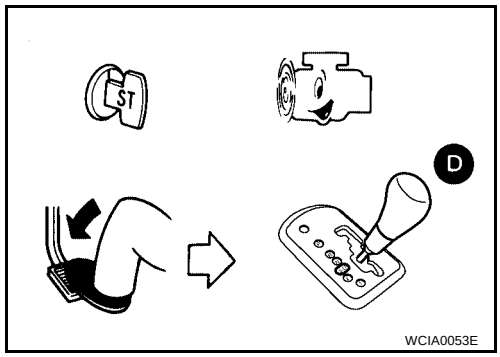
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A/T Fluid Check

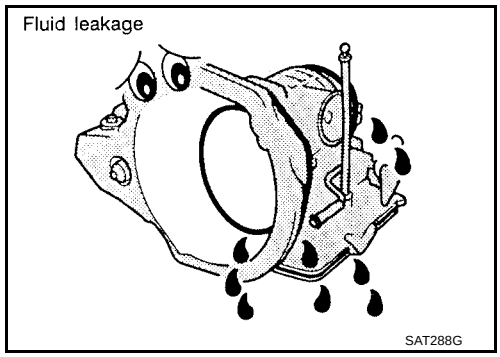
ECS00968

FLUID LEAKAGE CHECK

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

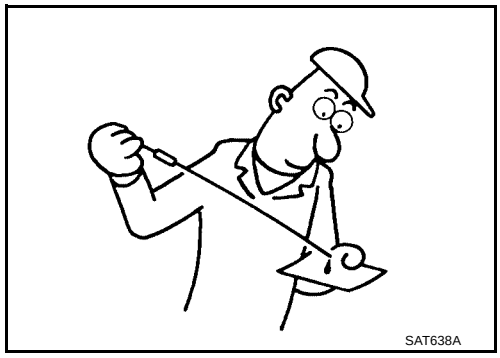


4. Check for fresh leakage.



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-398, "Checking A/T Fluid" .

A/T Fluid Cooler Cleaning

ECS00969

Whenever an automatic transaxle is repaired, overhauled, or replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned.
Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced A/T or, in severe cases, can block or restrict the flow of A/T fluid. In either case, malfunction of the newly serviced A/T may result.
Debris, if present, may build up as A/T fluid enters the cooler inlet. It will be necessary to back flush the cooler through the cooler outlet in order to flush out any built up debris.

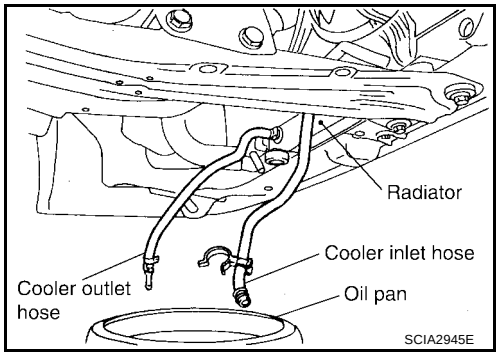
A/T FLUID COOLER CLEANING PROCEDURE

1. Position an oil pan under the automatic transaxle's inlet and outlet cooler hoses.
2. Identify the inlet and outlet fluid cooler hoses.

3. Disconnect the fluid cooler inlet and outlet rubber hoses from the steel cooler tubes or bypass valve.

   NOTE:
   Replace the cooler hoses if rubber material from the hose remains on the tube fitting.

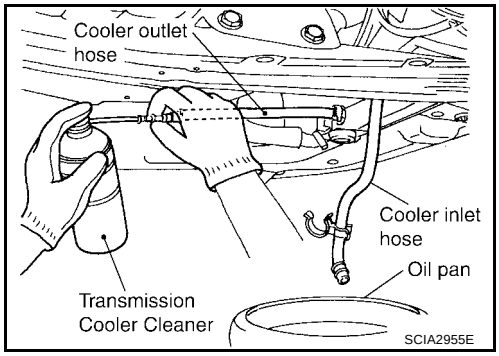
4. Allow any A/T fluid that remains in the cooler hoses to drain into the oil pan.



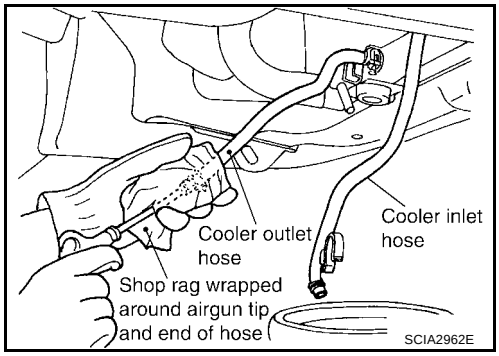
5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

   CAUTION:
   - **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
   - **Spray cooler cleaner only with adequate ventilation.**
   - **Avoid contact with eyes and skin.**
   - **Do not breath vapors or spray mist.**

6. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until fluid flows out of the cooler inlet hose for 5 seconds.



7. Insert the tip of an air gun into the end of the cooler outlet hose.
8. Wrap a shop rag around the air gun tip and of the cooler outlet hose.



9. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through the cooler outlet hose for 10 seconds to force out any remaining fluid.
10. Repeat steps 5 through 9 three additional times.
11. Position an oil pan under the banjo bolts that connect the fluid cooler steel lines to the transaxle.
12. Remove the banjo bolts.
13. Flush each steel line from the cooler side back toward the transaxle by spraying Transmission Cooler Cleaner in a continuous stream for 5 seconds.
14. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through each steel line from the cooler side back toward the transaxle for 10 seconds to force out any remaining fluid.
15. Ensure all debris is removed from the steel cooler lines.
16. Ensure all debris is removed from the banjo bolts and fittings.
17. Perform AT-72, "A/T FLUID COOLER DIAGNOSIS PROCEDURE" .

A/T FLUID COOLER DIAGNOSIS PROCEDURE

NOTE:
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

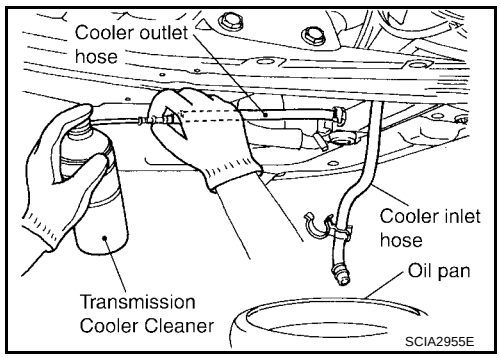
1. Position an oil pan under the automatic transaxle's inlet and outlet cooler hoses.
2. Clean the exterior and tip of the cooler inlet hose.

3. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

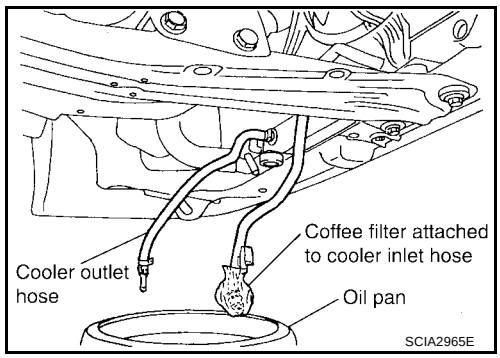
CAUTION:

- **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
- **Spray cooler cleaner only with adequate ventilation.**
- **Avoid contact with eyes and skin.**
- **Do not breath vapors or spray mist.**

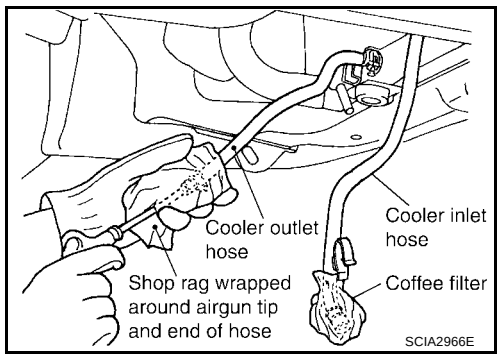
4. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until fluid flows out of the cooler inlet hose for 5 seconds.



5. Tie a common white, basket-type coffee filter to the end of the cooler inlet hose.



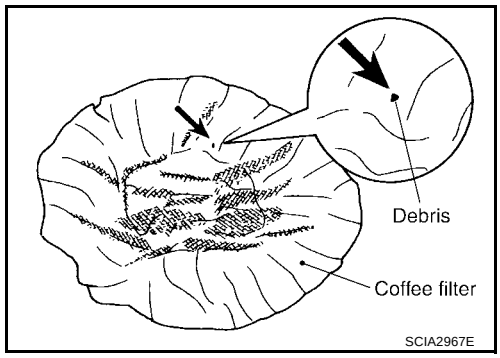
6. Insert the tip of an air gun into the end of the cooler outlet hose.
7. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
8. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through the cooler outlet hose to force any remaining A/T fluid into the coffee filter.
9. Remove the coffee filter from the end of the cooler inlet hose.
10. Perform AT-73, "A/T FLUID COOLER INSPECTION PROCEDURE" .



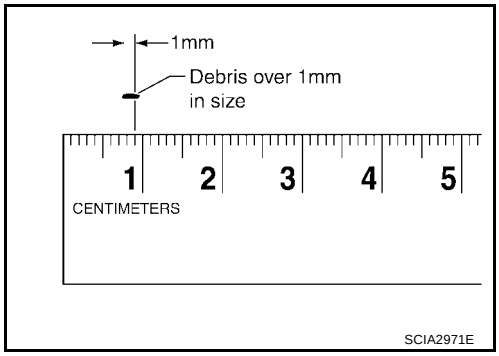
A/T FLUID COOLER INSPECTION PROCEDURE

1. Inspect the coffee filter for debris.

a. If small metal debris less than 1mm (0.040 in) in size or metal powder is found in the coffee filter, this is normal. If normal debris is found, the A/T fluid cooler/radiator can be re-used and the procedure is ended.



b. If one or more pieces of debris are found that are over 1mm in size and/or peeled clutch facing material is found in the coffee filter, the fluid cooler is not serviceable. The radiator/fluid cooler must be replaced and the inspection procedure is ended.



A/T FLUID COOLER FINAL INSPECTION

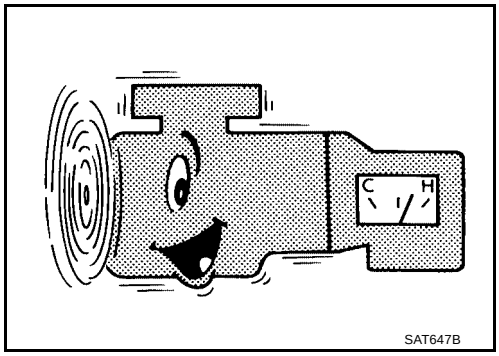
After performing all procedures, ensure that all remaining oil is cleaned from all components.

Stall Test

ECS0096A

STALL TEST PROCEDURE

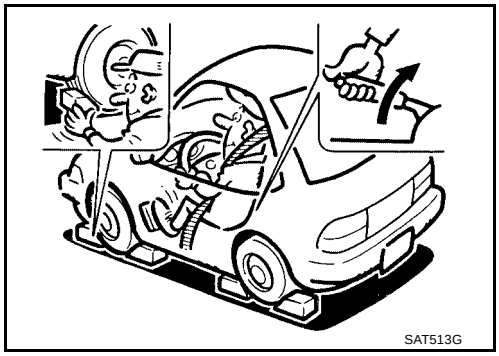
1. Check A/T fluid and engine oil levels. If necessary, add fluid and oil.



2. Drive vehicle for approximately 10 minutes or until fluid and oil reach operating temperature.

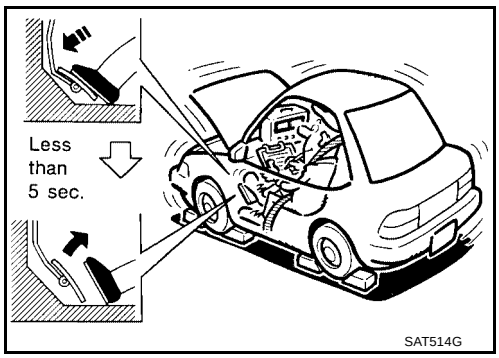
   ATF operating temperature :50 - 80°C (122 - 176°F)

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

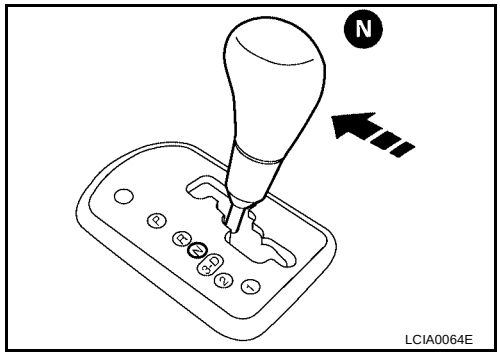


5. Start engine, apply foot brake, and place selector lever in D position.
6. Accelerate to wide open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.
   - **During test, never hold throttle wide open for more than 5 seconds.**

   Stall revolution : 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, refer to AT-69, "WORK FLOW CHART" .

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 3 position and engine brake functions.
  1st and 2nd gears in 2 position and engine brake functions with accelerator pedal released (fully closed throttle). ..... Forward clutch or forward one-way clutch slippage

Stall revolution is too high in R position:

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

Stall revolution within specifications:

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

CAUTION:
Be careful since automatic fluid temperature increases abnormally.

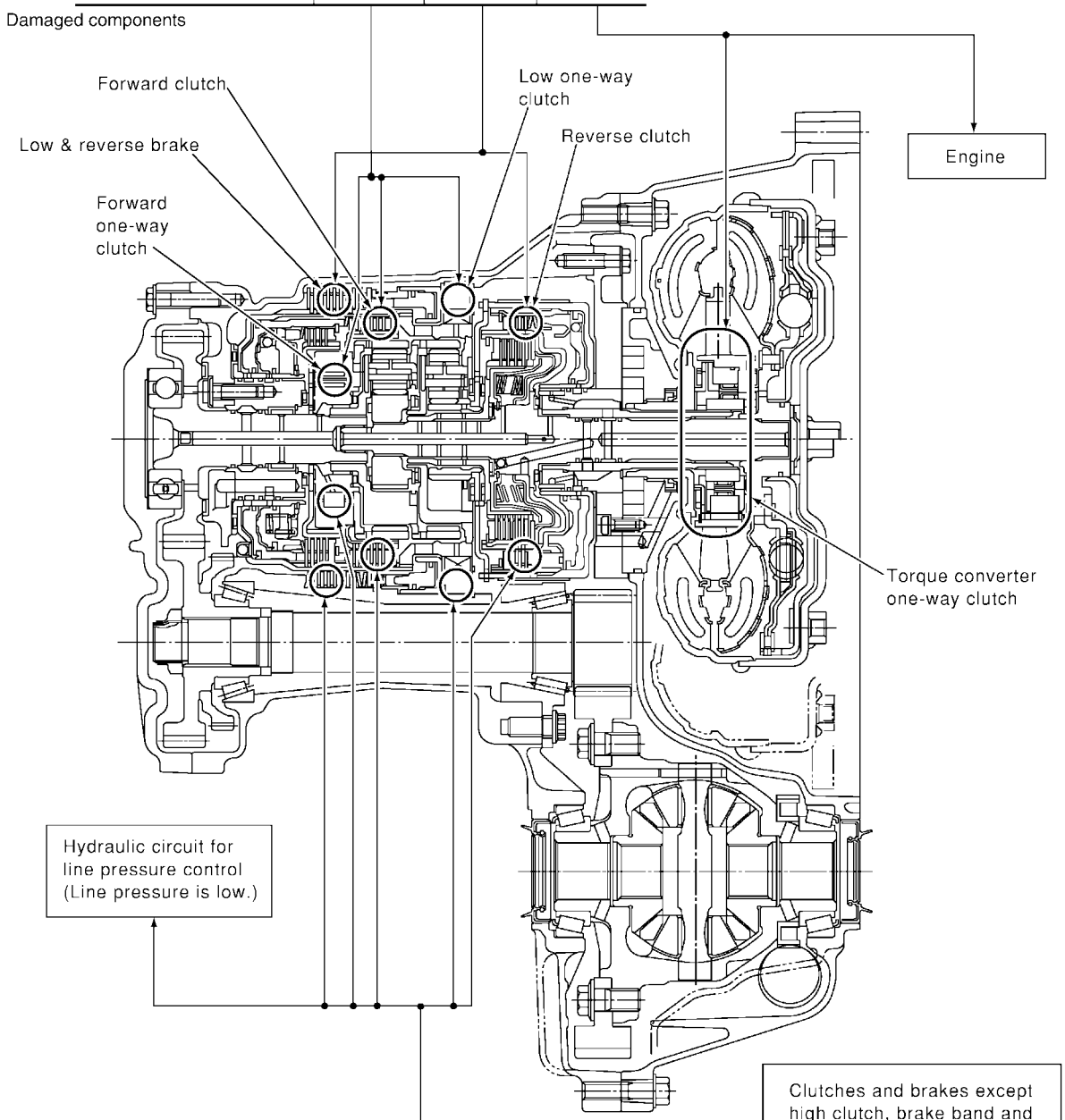
- Slippage occurs in 3rd and 4th gears in D position. ..... High clutch slippage
- Slippage occurs in 2nd and 4th gear in D position. ..... Brake band slippage
- Engine brake does not function in 2nd and 3rd gears in D position, 2nd gear in 2 position, and 1st gear in 1 position.

Stall revolution less than specifications:

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

Selector lever position	Judgement		
D	H	O	L
3	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.



D	H	O
3	H	O
2	H	O
1	H	O
R	H	O
Selector level position	Judgement	

SCIA3256E

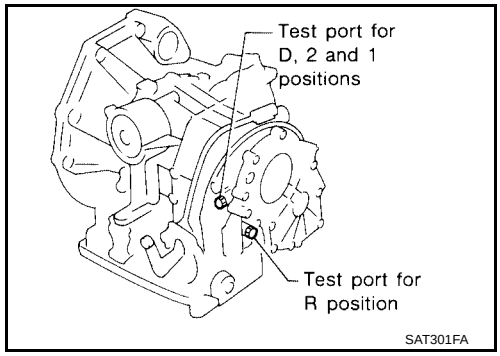
Line Pressure Test

ECS0096B

LINE PRESSURE TEST PORTS

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

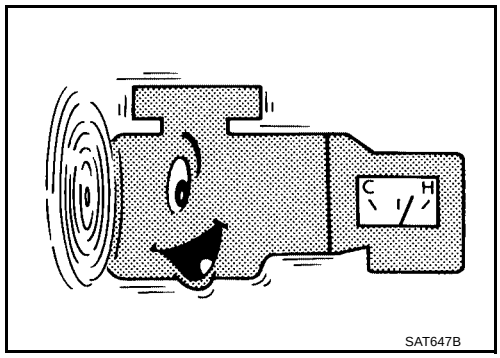
- **Always replace pressure plugs as they are self-sealing bolts.**



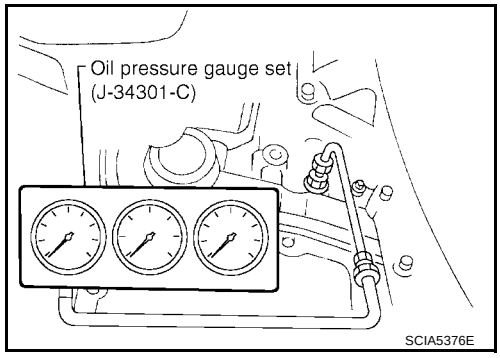
LINE PRESSURE TEST PROCEDURE

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

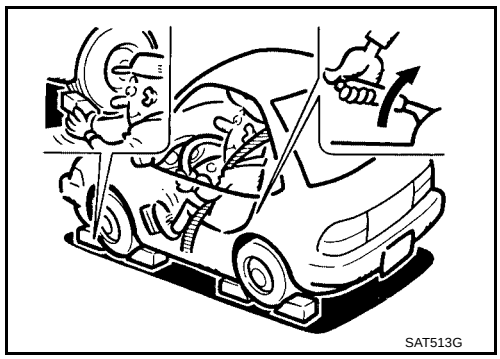
   ATF operating temperature :50 - 80°C (122 - 176°F)



3. Install pressure gauge to corresponding line pressure port.

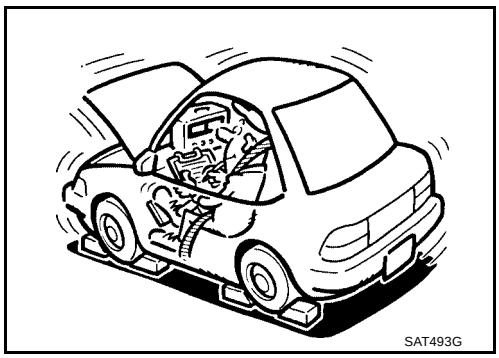


4. Set parking brake and block wheels.
   - **Continue to depress brake pedal fully while line pressure test is being performed at stall speed.**



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

AT-77, "Line Pressure Test" : Refer to SDS, AT-379, "Line Pressure"


SAT493G

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-27, "CLUTCH AND BAND CHART" .
	Line pressure is high.	● 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.	● 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

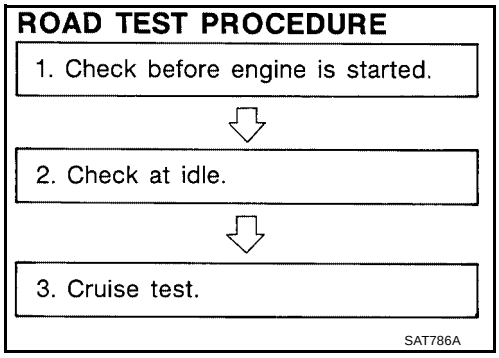
Road Test

ECS0096C

DESCRIPTION

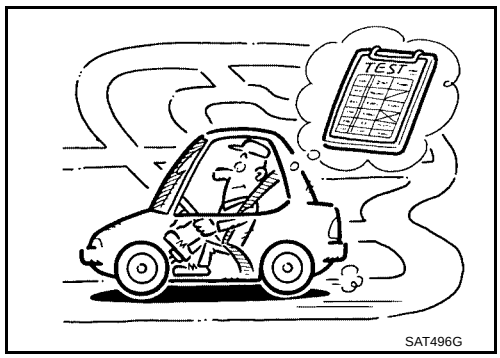
- The purpose of the test is to determine overall performance of A/T and analyze causes of problems.
- The road test consists of the following three parts:

1. Check before engine is started
2. Check at idle
3. Cruise test



SAT786A

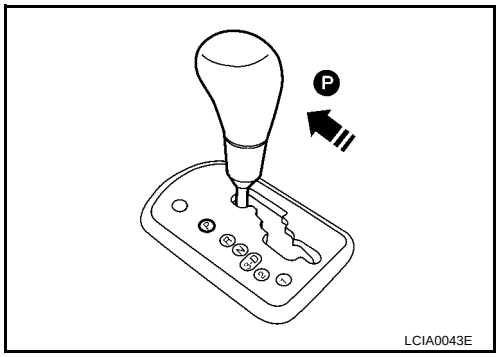
- Before road test, familiarize yourself with all test procedures and items to check.
- Conduct tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test. Refer to AT-44, "ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION" and AT-213, "TROUBLE DIAGNOSIS FOR SYMPTOMS" .



1. CHECK BEFORE ENGINE IS STARTED

1. CHECK A/T CHECK (POSITION) INDICATOR LAMP

1. Park vehicle on flat surface.
2. Move selector lever to P position.
3. Turn ignition switch to OFF position. Wait at least 5 seconds.
4. Turn ignition switch to ON position. (Do not start engine.)
5. Does A/T check (position) indicator lamp come on for about 2 seconds?

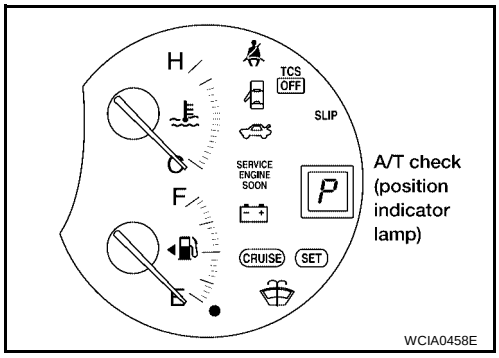


Yes or No

Yes >> GO TO 2.
No >> Stop ROAD TEST. Go to AT-217, "1. A/T Check (Position) Indicator Lamp Does Not Come On" .

2. CHECK A/T CHECK (POSITION) INDICATOR LAMP

Does A/T check (position) OFF indicator lamp flicker for about 8 seconds?



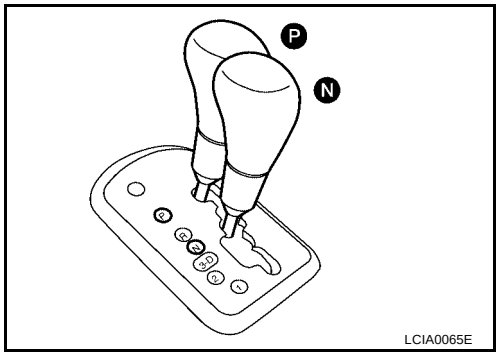
Yes or No

Yes >> Perform self-diagnosis and check NG items on the DIAGNOSTIC WORKSHEET, AT-66 . Refer to AT-60, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .
No >> 1. Turn ignition switch to OFF position.
2. Perform self-diagnosis and note NG items. Refer to AT-60, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .
3. Go to AT-80, "2. CHECK AT IDLE" .

2. CHECK AT IDLE

1. CHECK ENGINE START

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



Yes or No

Yes >> GO TO 2.
No >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-219, "2. Engine Cannot Be Started In P and N Position" . Continue ROAD TEST.

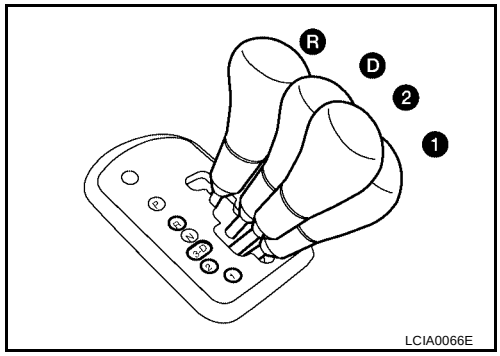
2. CHECK ENGINE START

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

Yes or No

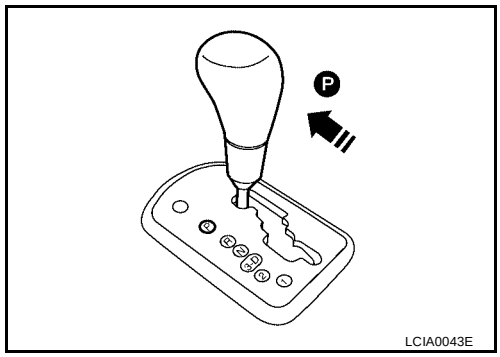
Yes >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-219, "2. Engine Cannot Be Started In P and N Position" . Continue ROAD TEST.

No >> GO TO 3.



3. CHECK VEHICLE MOVE

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

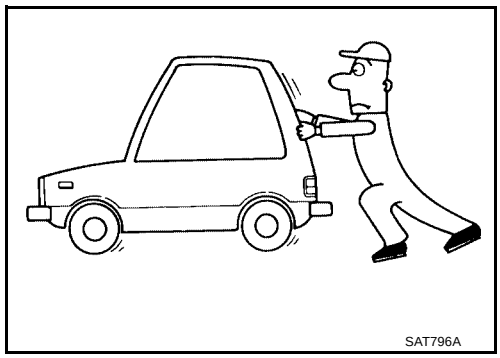


4. Push vehicle forward or backward.
5. Does vehicle move when it is pushed forward or backward?
6. Apply parking brake.

Yes or No

Yes >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-220, "3. In P Position, Vehicle Moves Forward or Backward When Pushed" . Continue ROAD TEST.

No >> GO TO 4.



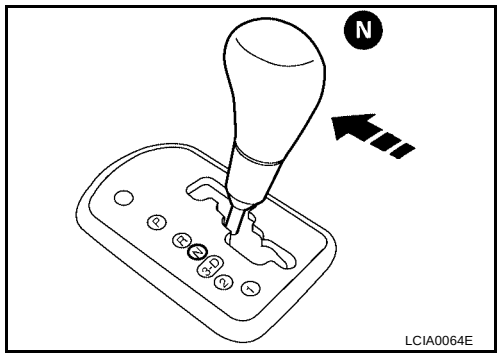
4. CHECK VEHICLE MOVE

1. Start engine.
2. Move selector lever to N position.
3. Release parking brake.
4. Does vehicle move forward or backward?

Yes or No

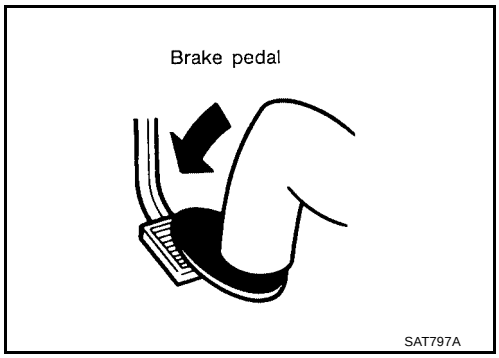
Yes >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-221, "4. In N Position, Vehicle Moves" . Continue ROAD TEST.

No >> GO TO 5.



5. CHECK SHIFT LOCK

1. Apply foot brake.

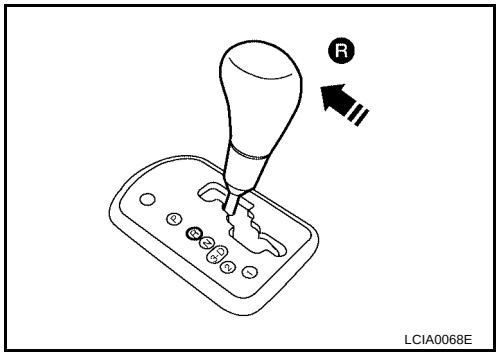


2. Move selector lever to R position.
3. Is there large shock when changing from N to R position?

Yes or No

Yes >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-223, "5. Large Shock. N → R Position" . Continue ROAD TEST.

No >> GO TO 6.



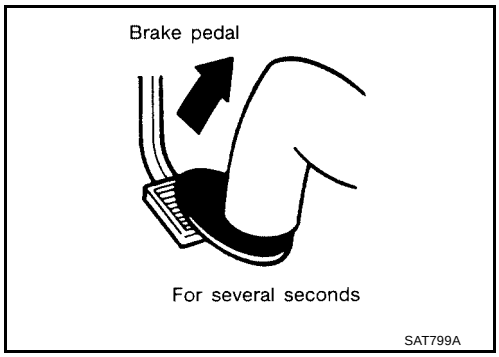
6. CHECK VEHICLE MOVE

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

Yes or No

Yes >> GO TO 7.

No >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-225, "6. Vehicle Does Not Creep Backward In R Position" . Continue ROAD TEST.



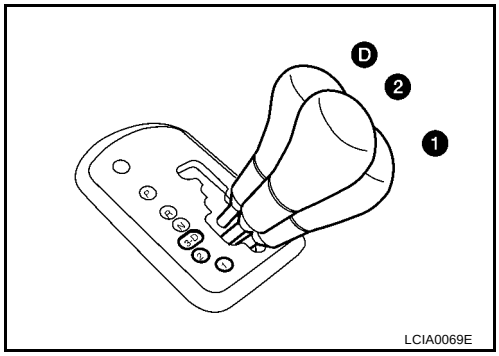
7. CHECK VEHICLE MOVE

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

Yes or No

Yes >> Go to AT-82, "3. CRUISE TEST" .

No >> Mark the box on the DIAGNOSTIC WORKSHEET. Go to AT-228, "7. Vehicle Does Not Creep Forward in D, 3, 2 or 1 Position" . Continue ROAD TEST.

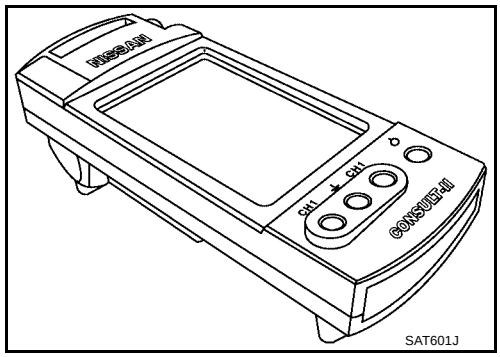


3. CRUISE TEST

- 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. Refer to AT-378, "Shift Schedule"

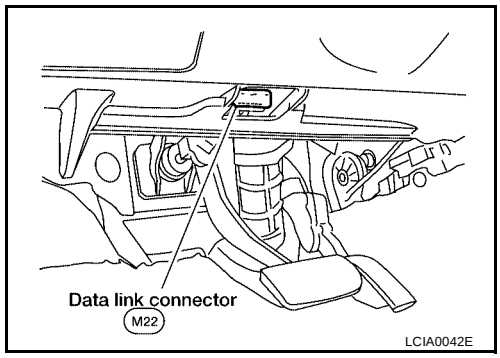


CONSULT-II Setting Procedure

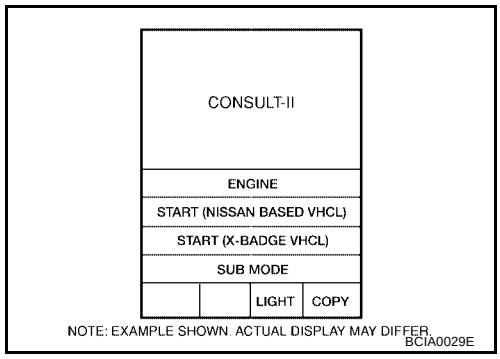
CAUTION:

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

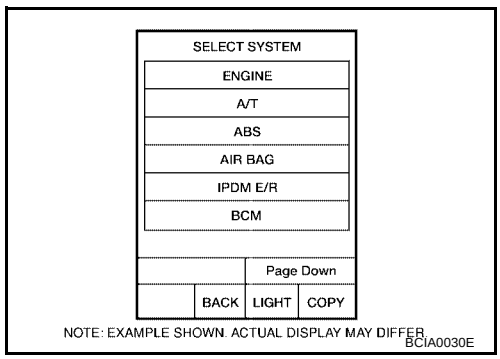
1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector, which is located in left side dash panel.



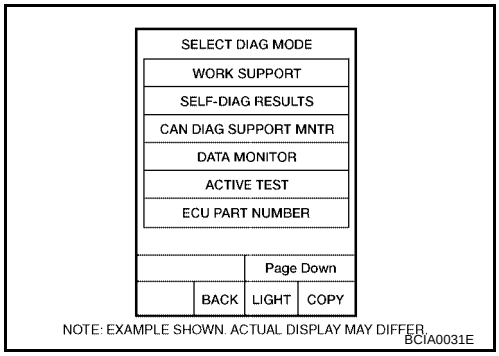
3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)”.



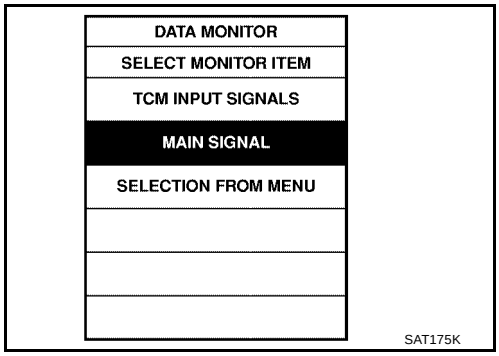
5. Touch “A/T”.



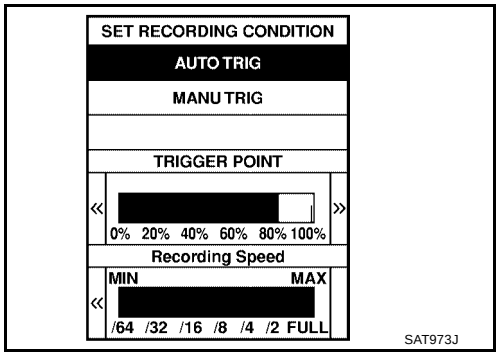
6. Touch “DATA MONITOR”.



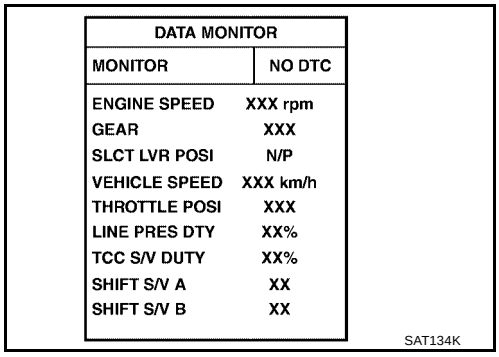
7. Touch “MAIN SIGNALS” or “TCM INPUT SIGNALS”.
8. See “Numerical Display”, “Barchart Display” or “Line Graph Display”.



9. Touch “SETTING” to set 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”.

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

SAT135K

13. Touch “STORE” and touch “BACK”.

REAL-TIME DIAG
ENG SPEED SIG

SAT987J

STORE	
SYSTEM	SAVE REC DATA

SAT974J

14. Touch “DISPLAY”.
15. Touch “PRINT”.
16. Check the monitor data printed out.
17. 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

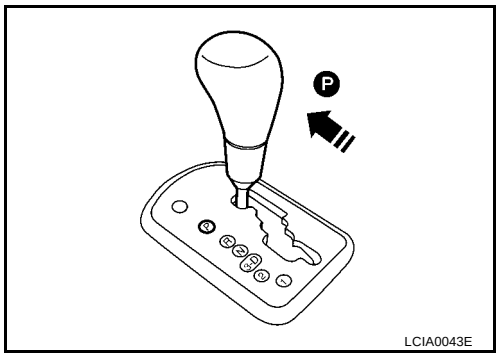
Cruise Test — Part 1

1. CHECK STARTING GEAR (D_1) POSITION

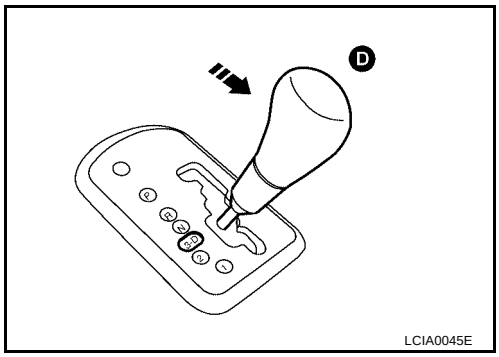
1. Drive vehicle for approximately 10 minutes to warm engine oil and ATF up to operating temperature.

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

2. Park vehicle on flat surface.
3. Set gear selector lever to D position.
4. Move selector lever to P position.
5. Start engine.



6. Move selector lever to D position.

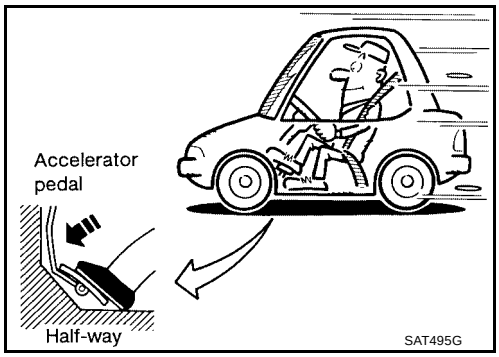


7. Accelerate vehicle by constantly depressing accelerator pedal half-way.
8. Does vehicle start from D_1 ?

Read gear position.

Yes or No

Yes >> GO TO 2.
No >> Go to AT-231, "8. Vehicle Cannot Be Started From D_1" . Continue ROAD TEST.

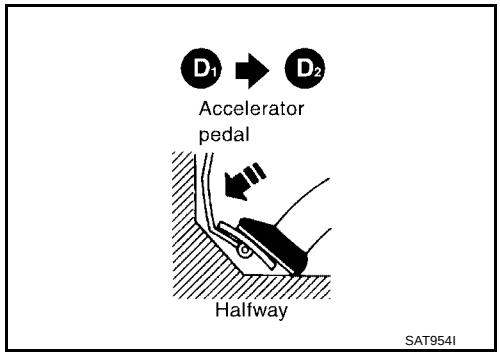


2. CHECK SHIFT UP (D_1 TO D_2)

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

Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D_1 to D_2 **:Refer to AT-378, "Shift Schedule" .**



Yes or No

Yes >> GO TO 3.

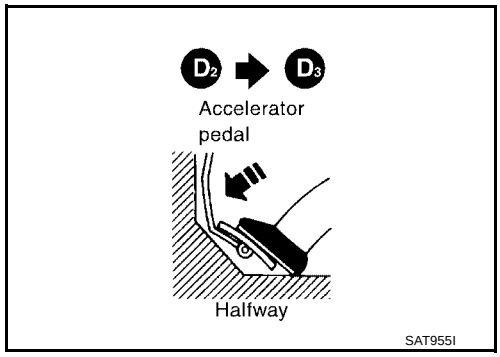
No >> Go to AT-234, "9. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$" . Continue ROAD TEST.

3. CHECK SHIFT UP (D_2 TO D_3)

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

Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D_2 to D_3 **:Refer to AT-378, "Shift Schedule"**



Yes or No

Yes >> GO TO 4.

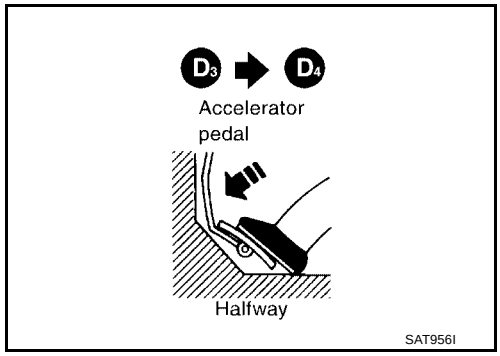
No >> Go to AT-237, "10. A/T Does Not Shift: $D_2 \rightarrow D_3$" . Continue ROAD TEST.

4. CHECK SHIFT UP (D_3 TO D_4)

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

Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D_3 to D_4 **:Refer to AT-378, "Shift Schedule" .**



Yes or No

Yes >> GO TO 5.

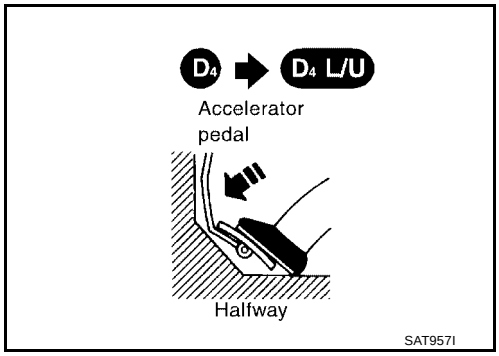
No >> Go to AT-240, "11. A/T Does Not Shift: $D_3 \rightarrow D_4$" . Continue ROAD TEST.

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

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

Read vehicle speed, throttle opening when lock-up duty becomes 94%.

Specified speed when lock-up occurs :Refer to AT-378, "Shift Schedule" .



Yes or No

Yes >> GO TO 6.
No >> Go to AT-243, "12. A/T Does Not Perform Lock-up" . Continue ROAD TEST.

6. CHECK HOLD LOCK-UP

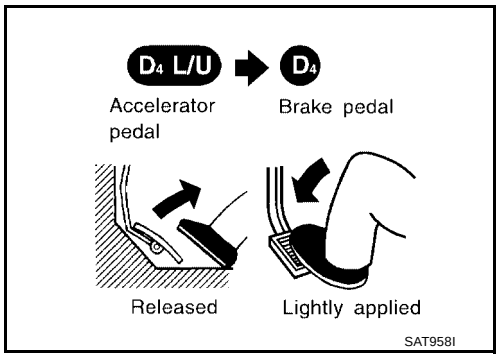
Does A/T hold lock-up condition for more than 30 seconds?

Yes or No

Yes >> GO TO 7.
No >> Go to AT-245, "13. A/T Does Not Hold Lock-up Condition" .

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

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



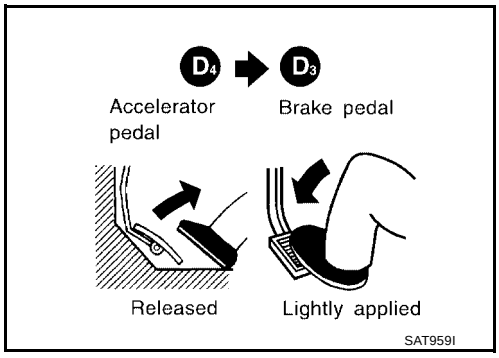
Yes or No

Yes >> GO TO 8.
No >> Go to AT-247, "14. Lock-up Is Not Released" . Continue ROAD TEST.

8. CHECK SHIFT DOWN (D4 TO D3)

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

Read gear position and engine speed.



Yes or No

Yes >> 1. Stop vehicle.
2. Go to AT-89, "Cruise Test — Part 2" .
No >> Go to AT-248, "15. Engine Speed Does Not Return To Idle (Light Braking D4 → D3)" . Continue ROAD TEST.

Cruise Test — Part 2

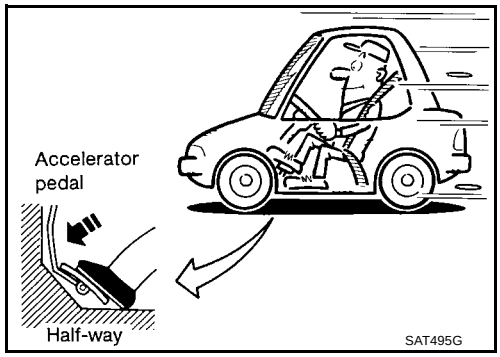
1. CHECK STARTING GEAR (D_1) POSITION

1. Confirm gear selector lever is in D position.
2. Accelerate vehicle by half throttle again.
3. Does vehicle start from D_1 ?

Read gear position.

Yes or No

Yes >> GO TO 2.
No >> Go to AT-250, "16. Vehicle Does Not Start From D_1" . Continue ROAD TEST.



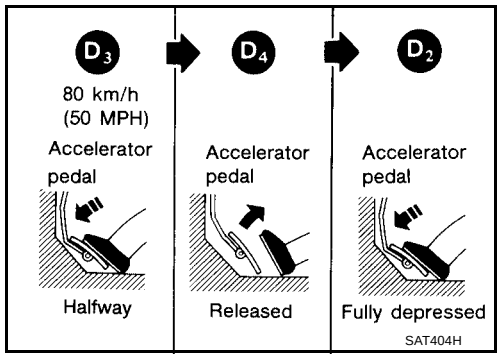
2. CHECK SHIFT UP AND SHIFT DOWN (D_3 TO D_4 TO D_2)

1. Accelerate vehicle to 80 km/h (50 MPH) as shown in illustration.
2. Release accelerator pedal and then quickly depress it fully.
3. Does A/T shift from D_4 to D_2 as soon as accelerator pedal is depressed fully?

Read gear position and throttle opening.

Yes or No

Yes >> GO TO 3.
No >> Go to AT-234, "9. 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)

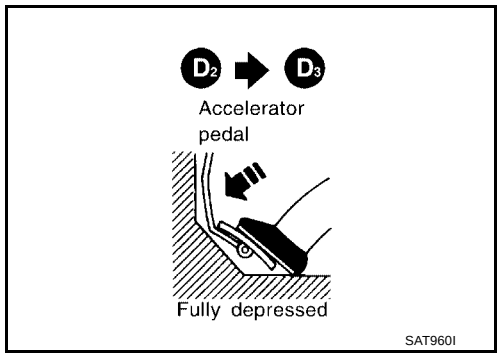
Does A/T shift from D_2 to D_3 at the specified speed?

Read gear position, throttle opening and vehicle speed.

Specified speed when shifting from D_2 to D_3 **:Refer to AT-378, "Shift Schedule" .**

Yes or No

Yes >> GO TO 4.
No >> Go to AT-237, "10. 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

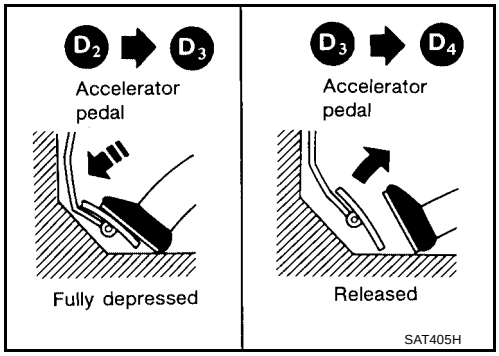
Release accelerator pedal after shifting from D_2 to D_3.
Does A/T shift from D_3 to D_4 and does vehicle decelerate by engine brake?

Read gear position, throttle opening and vehicle speed.

Yes or No

Yes >> 1. Stop vehicle.
2. Go to AT-91, "Cruise Test — Part 3".

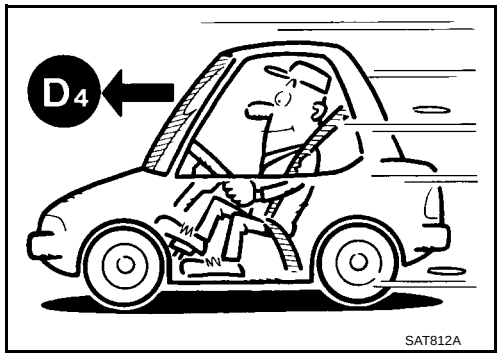
No >> Go to AT-240, "11. A/T Does Not Shift: $D_3 \rightarrow D_4$". Continue ROAD TEST.



Cruise Test — Part 3

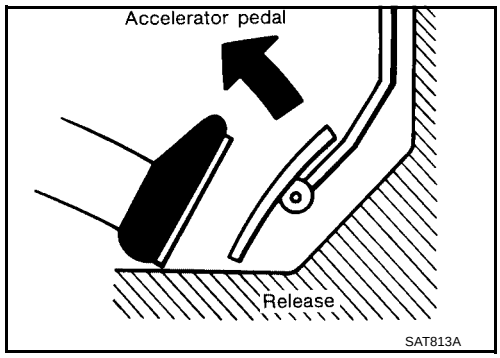
1. VEHICLE SPEED (D_4) POSITION

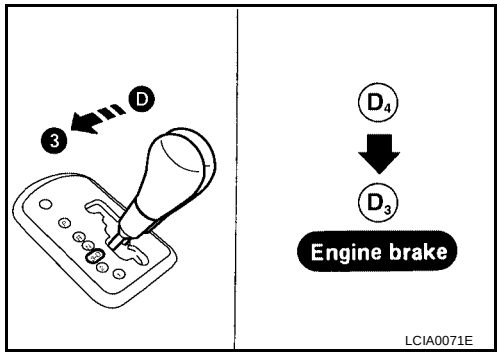
1. Confirm gear selector lever is in D position.
2. Using half-throttle, accelerate vehicle until it shifts into D_4 .



3. Release accelerator pedal.
4. Move gear selector lever from D position to 3 position while driving in D_4 .
5. Does A/T shift from D_4 to 3?

Read gear position and vehicle speed.





Yes or No

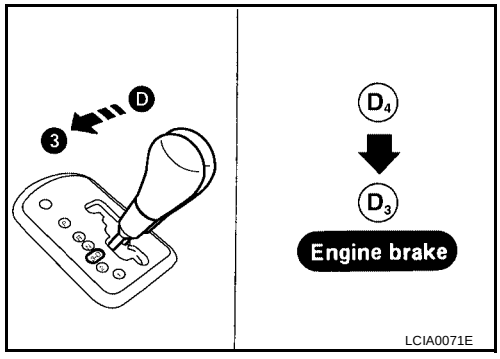
Yes >> GO TO 2.
No >> Go to AT-251, "17. A/T Does Not Shift: $D_4 \rightarrow 3_3$, When A/T Selector Lever D → 3" . Continue ROAD TEST.

2. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

Yes >> GO TO 3.
No >> Go to AT-248, "15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)" . Continue ROAD TEST.



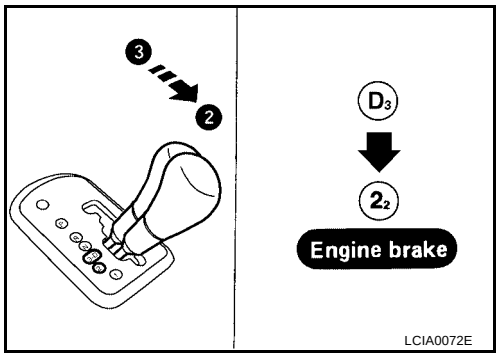
3. CHECK SHIFT DOWN (3_3 TO 2_2)

1. Move selector lever from 3 to 2 position while driving in 3_3.
2. Does A/T shift from 3_3 to 2_2?

Read gear position.

Yes or No

Yes >> GO TO 4.
No >> Go to AT-252, "18. A/T Does Not Shift: $3_3 \rightarrow 2_2$, When Selector Lever 3 → 2 Position". Continue ROAD TEST.

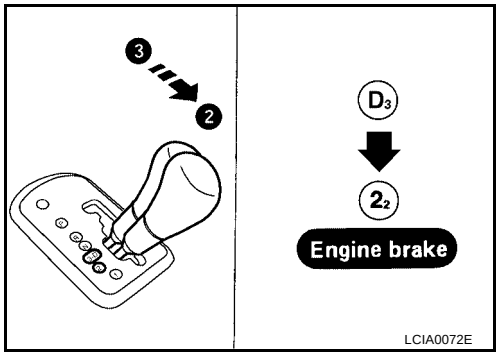


4. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

Yes >> GO TO 5.
No >> Go to AT-248, "15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)". Continue ROAD TEST.



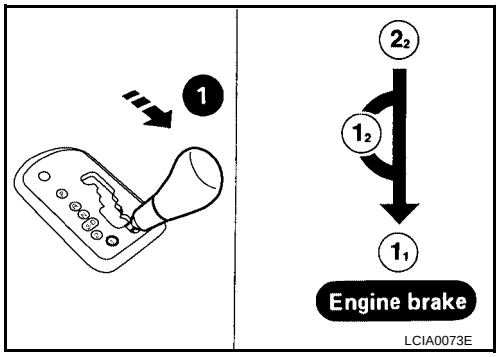
5. CHECK SHIFT DOWN (2_2 TO 1_1)

1. Move selector lever from 2 to 1 position while driving in 2_2.
2. Does A/T shift from 2_2 to 1_1 position?

Read gear position.

Yes or No

Yes >> GO TO 6.
No >> Go to AT-253, "19. A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever 2 → 1 Position". Continue ROAD TEST.



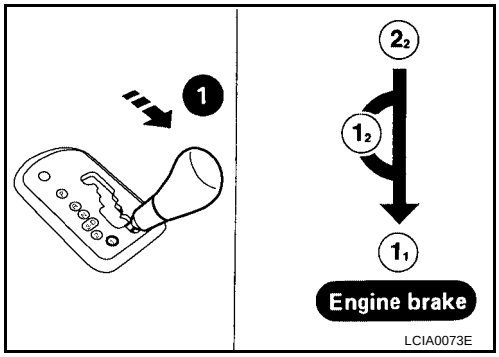
6. CHECK ENGINE BRAKE

Does vehicle decelerate by engine brake?

Yes or No

Yes >> 1. Stop vehicle.
2. Perform self-diagnosis. Refer to AT-60, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)".

No >> Go to AT-254, "20. Vehicle Does Not Decelerate By Engine Brake". Continue ROAD TEST.



TROUBLE DIAGNOSIS - GENERAL DESCRIPTION

PFP:00000

Symptom Chart

ECS0096D

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

Items	Symptom	Condition	Diagnostic Item	Reference Page
No Lock-up Engagement/ TCC Inoperative	Torque converter is not locked up.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
			3. Park/neutral position (PNP) switch adjustment	AT-269
			4. Engine speed signal	AT-127
			5. A/T fluid temperature sensor	AT-116
			6. Line pressure test	AT-77
			7. Torque converter clutch solenoid valve	AT-153
			8. Control valve assembly	AT-267
		OFF vehicle	9. Torque converter	AT-283
	Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-71
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Line pressure test	AT-77
			4. Torque converter clutch solenoid valve	AT-153
			5. Line pressure solenoid valve	AT-166
			6. Control valve assembly	AT-267
		OFF vehicle	7. Torque converter	AT-283
	Lock-up point is extremely high or low.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
			3. Torque converter clutch solenoid valve	AT-153
			4. Control valve assembly	AT-267
Shift Shock	Sharp shock in shifting from N to D position.	ON vehicle	1. Engine idling rpm	EC-80 , ! Hyper-link Error !
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Line pressure test	AT-77
			4. A/T fluid temperature sensor	AT-116
			5. Engine speed signal	AT-127
			6. Line pressure solenoid valve	AT-166
			7. Control valve assembly	AT-267
			8. Accumulator N-D	AT-283
		OFF vehicle	9. Forward clutch	AT-328

Items	Symptom	Condition	Diagnostic Item	Reference Page
Shift Shock	Too sharp a shock in change from D_1 to D_2.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			2. Line pressure test	AT-77
			3. Accumulator servo release	AT-283
			4. Control valve assembly	AT-267
			5. A/T fluid temperature sensor	AT-116
		OFF vehicle	6. Brake band	AT-283
	Too sharp a shock in change from D_2 to D_3.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			2. Line pressure test	AT-77
			3. Control valve assembly	AT-267
		OFF vehicle	4. High clutch	AT-324
			5. Brake band	AT-283
	Too sharp a shock in change from D_3 to D_4.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			2. Line pressure test	AT-77
			3. Control valve assembly	AT-267
		OFF vehicle	4. Brake band	AT-283
			5. Overrun clutch	AT-328
	Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			2. Line pressure test	AT-77
			3. Overrun clutch solenoid valve	AT-185
			4. Control valve assembly	AT-267
	Large shock changing from 1_2 to 1_1 in 1 position.	ON vehicle	1. Control valve assembly	AT-267
		ON vehicle	2. Low & reverse brake	AT-334
Improper Shift Timing	Too high a gear change point from D_1 to D_2, from D_2 to D_3, from D_3 to D_4.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
			3. Shift solenoid valve A	AT-172
			4. Shift solenoid valve B	AT-177
	Gear change directly from D_1 to D_3 occurs.	ON vehicle	1. Fluid level	AT-71
			2. Accumulator servo release	AT-278
		OFF vehicle	3. Brake band	AT-283
	Too high a change point from D_4 to D_3, from D_3 to D_2, from D_2 to D_1.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
	Kickdown does not operate when depressing pedal in D_4 within kickdown vehicle speed.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
			3. Shift solenoid valve A	AT-172
			4. Shift solenoid valve B	AT-177

Items	Symptom	Condition	Diagnostic Item	Reference Page
Improper Shift Timing	Kickdown operates or engine overruns when depressing pedal in D4 beyond kickdown vehicle speed limit.	ON vehicle	1. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Shift solenoid valve A	AT-172
			4. Shift solenoid valve B	AT-177
	Gear change from 22 to 23 in 2 position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-269
	Gear change from 11 to 12 in 1 position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-269
			2. Control cable adjustment	AT-270
No Down Shift	Failure to change gear from D4 to D3 .	ON vehicle	1. Fluid level	AT-71
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Overrun clutch solenoid valve	AT-185
			4. Shift solenoid valve A	AT-172
			5. Line pressure solenoid valve	AT-166
			6. Control valve assembly	AT-267
		OFF vehicle	7. Low & reverse brake	AT-334
			8. Overrun clutch	AT-328
	Failure to change gear from D3 to D2 or from D4 to D2 .	ON vehicle	1. Fluid level	AT-71
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Shift solenoid valve A	AT-172
			4. Shift solenoid valve B	AT-177
			5. Control valve assembly	AT-267
		OFF vehicle	6. High clutch	AT-324
			7. Brake band	AT-283
	Failure to change gear from D2 to D1 or from D3 to D1 .	ON vehicle	1. Fluid level	AT-71
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Shift solenoid valve A	AT-172
			4. Shift solenoid valve B	AT-177
			5. Control valve assembly	AT-267
		OFF vehicle	6. Low one-way clutch	AT-283
			7. High clutch	AT-324
			8. Brake band	AT-283

Items	Symptom	Condition	Diagnostic Item	Reference Page
No Down Shift	Failure to change from D_3 to 2_2 when changing lever into 2 position. AT-252	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-269
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Overrun clutch solenoid valve	AT-185
			4. Shift solenoid valve B	AT-177
			5. Shift solenoid valve A	AT-172
			6. Control valve assembly	AT-267
			7. Control cable adjustment	AT-270
		OFF vehicle	8. Brake band	AT-283
			9. Overrun clutch	AT-328
	Does not change from 1_2 to 1_1 in 1 position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-269
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
			3. Shift solenoid valve A	AT-172
			4. Control valve assembly	AT-267
			5. Overrun clutch solenoid valve	AT-185
		OFF vehicle	6. Overrun clutch	AT-328
			7. Low & reverse brake	AT-334
No Up Shift	Failure to change gear from D_1 to D_2.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-269
			2. Control cable adjustment	AT-270
			3. Shift solenoid valve A	AT-172
			4. Control valve assembly	AT-267
			5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
		OFF vehicle	6. Brake band	AT-283
	Failure to change gear from D_2 to D_3.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-269
			2. Control cable adjustment	AT-270
			3. Shift solenoid valve B	AT-177
			4. Control valve assembly	AT-267
			5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
		OFF vehicle	6. High clutch	AT-324
			7. Brake band	AT-283

Items	Symptom	Condition	Diagnostic Item	Reference Page
No Up Shift	Failure to change gear from D_3 to D_4.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-269
			2. Control cable adjustment	AT-270
			3. Shift solenoid valve A	AT-172
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
			5. A/T fluid temperature sensor	AT-116
		OFF vehicle	6. Brake band	AT-283
	A/T does not shift to D_4 when driving with overdrive control switch ON.	ON vehicle	1. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			2. Park/neutral position (PNP) switch adjustment	AT-269
			3. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
			4. Shift solenoid valve A	AT-172
			5. Overrun clutch solenoid valve	AT-185
			6. Control valve assembly	AT-267
			7. A/T fluid temperature sensor	AT-116
			8. Line pressure solenoid valve	AT-166
		OFF vehicle	9. Brake band	AT-283
			10. Overrun clutch	AT-328
Slips/Will Not Engage	Vehicle will not run in R position (but runs in D, 2 and 1 positions). Clutch slips. Very poor acceleration.	ON vehicle	1. Control cable adjustment	AT-270
			2. Line pressure test	AT-77
			3. Line pressure solenoid valve	AT-166
			4. Control valve assembly	AT-267
		OFF vehicle	5. Reverse clutch	AT-321
			6. High clutch	AT-324
			7. Forward clutch	AT-328
			8. Overrun clutch	AT-328
			9. Low & reverse brake	AT-334
	Vehicle will not run in D and 2 positions (but runs in 1 and R positions).	ON vehicle	1. Control cable adjustment	AT-270
		OFF vehicle	2. Low one-way clutch	AT-283

Items	Symptom	Condition	Diagnostic Item	Reference Page
Slips/Will Not Engage	Vehicle will not run in D, 1, 2 positions (but runs in R position). Clutch slips. Very poor acceleration.	ON vehicle	1. Fluid level	AT-71
			2. Line pressure test	AT-77
			3. Line pressure solenoid valve	AT-166
			4. Control valve assembly	AT-267
			5. Accumulator N-D	AT-283
		OFF vehicle	6. Reverse clutch	AT-321
			7. High clutch	AT-324
			8. Forward clutch	AT-328
			9. Forward one-way clutch	AT-283
			10. Low one-way clutch	AT-283
	Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-71
			2. Control cable adjustment	AT-270
			3. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			4. Line pressure test	AT-77
			5. Line pressure solenoid valve	AT-166
			6. Control valve assembly	AT-267
			7. Accumulator N-D	AT-283
		OFF vehicle	8. Forward clutch	AT-328
			9. Reverse clutch	AT-321
			10. Low & reverse brake	AT-334
			11. Oil pump	AT-302
			12. Torque converter	AT-283
	No creep at all. AT-225, AT-228	ON vehicle	1. Fluid level	AT-71
			2. Line pressure test	AT-77
			3. Control valve assembly	AT-267
		OFF vehicle	4. Forward clutch	AT-328
			5. Oil pump	AT-302
			6. Torque converter	AT-283
	Almost no shock or clutches slipping in change from D_1 to D_2 .	ON vehicle	1. Fluid level	AT-71
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Line pressure test	AT-77
			4. Accumulator servo release	AT-278
			5. Control valve assembly	AT-267
		OFF vehicle	6. Brake band	AT-283

Items	Symptom	Condition	Diagnostic Item	Reference Page
Slips/Will Not Engage	Almost no shock or slipping in change from D_2 to D_3 .	ON vehicle	1. Fluid level	AT-71
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Line pressure test	AT-77
			4. Control valve assembly	AT-267
		OFF vehicle	5. High clutch	AT-324
			6. Forward clutch	AT-328
	Almost no shock or slipping in change from D_3 to D_4 .	ON vehicle	1. Fluid level	AT-71
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Line pressure test	AT-77
			4. Control valve assembly	AT-267
		OFF vehicle	5. High clutch	AT-324
			6. Brake band	AT-283
	Races extremely fast or slips in changing from D_4 to D_3 when depressing pedal.	ON vehicle	1. Fluid level	AT-71
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Line pressure test	AT-77
			4. Line pressure solenoid valve	AT-166
			5. Control valve assembly	AT-267
		OFF vehicle	6. High clutch	AT-324
			7. Forward clutch	AT-328
	Races extremely fast or slips in changing from D_4 to D_2 when depressing pedal.	ON vehicle	1. Fluid level	AT-71
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Line pressure test	AT-77
			4. Line pressure solenoid valve	AT-166
			5. Shift solenoid valve A	AT-172
			6. Control valve assembly	AT-267
		OFF vehicle	7. Brake band	AT-283
			8. Forward clutch	AT-328
	Races extremely fast or slips in changing from D_3 to D_2 when depressing pedal.	ON vehicle	1. Fluid level	AT-71
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Line pressure test	AT-77
			4. Line pressure solenoid valve	AT-166
			5. Control valve assembly	AT-267
			6. A/T fluid temperature sensor	AT-116
		OFF vehicle	7. Brake band	AT-283
			8. Forward clutch	AT-328
			9. High clutch	AT-324

Items	Symptom	Condition	Diagnostic Item	Reference Page
Slips/Will Not Engage	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-71
			2. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			3. Line pressure test	AT-77
			4. Line pressure solenoid valve	AT-166
			5. Control valve assembly	AT-267
		OFF vehicle	6. Forward clutch	AT-328
			7. Forward one-way clutch	AT-283
			8. Low one-way clutch	AT-283
	Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-71
			2. Control cable adjustment	AT-270
			3. Line pressure test	AT-77
			4. Line pressure solenoid valve	AT-166
		OFF vehicle	5. Oil pump	AT-302
			6. High clutch	AT-324
			7. Brake band	AT-283
			8. Low & reverse brake	AT-334
			9. Torque converter	AT-283
			10. Parking components	AT-278
NOT USED	Engine cannot be started in P and N positions. AT-219	ON vehicle	1. Ignition switch and starter	SC-13
			2. Control cable adjustment	AT-270
			3. Park/neutral position (PNP) switch adjustment	AT-269
	Engine starts in positions other than P and N.	ON vehicle	1. Control cable adjustment	AT-270
			2. Park/neutral position (PNP) switch adjustment	AT-269
	Transaxle noise in P and N positions.	ON vehicle	1. Fluid level	AT-71
			2. Line pressure test	AT-77
			3. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
			5. Engine speed signal	AT-127
		OFF vehicle	6. Oil pump	AT-302
			7. Torque converter	AT-283
	Vehicle moves when changing into P position or parking gear does not disengage when shifted out of P position.	ON vehicle	1. Control cable adjustment	AT-270
		OFF vehicle	2. Parking components	AT-278

Items	Symptom	Condition	Diagnostic Item	Reference Page
NOT USED	Vehicle runs in N position. AT-221	ON vehicle	1. Control cable adjustment	AT-270
		OFF vehicle	2. Forward clutch	AT-328
			3. Reverse clutch	AT-321
			4. Overrun clutch	AT-328
	Vehicle braked when shifting into R position.	ON vehicle	1. Fluid level	AT-71
			2. Control cable adjustment	AT-270
			3. Line pressure test	AT-77
			4. Line pressure solenoid valve	AT-166
			5. Control valve assembly	AT-267
		OFF vehicle	6. High clutch	AT-324
			7. Brake band	AT-283
			8. Forward clutch	AT-328
			9. Overrun clutch	AT-328
	Excessive creep.	ON vehicle	1. Engine idling rpm	EC-80
	Engine stops when shifting lever into R, D, 2 and 1.	ON vehicle	1. Engine idling rpm	EC-80
			2. Torque converter clutch solenoid valve	AT-153
			3. Control valve assembly	AT-267
		OFF vehicle	4. Torque converter	AT-283
	Vehicle braked by gear change from D_1 to D_2.	ON vehicle	1. Fluid level	AT-71
		OFF vehicle	2. Reverse clutch	AT-321
			3. Low & reverse brake	AT-334
			4. High clutch	AT-324
			5. Low one-way clutch	AT-283
	Vehicle braked by gear change from D_2 to D_3.	ON vehicle	1. Fluid level	AT-71
		OFF vehicle	2. Brake band	AT-283
	Vehicle braked by gear change from D_3 to D_4.	ON vehicle	1. Fluid level	AT-71
		OFF vehicle	2. Overrun clutch	AT-328
			3. Forward one-way clutch	AT-283
			4. Reverse clutch	AT-321

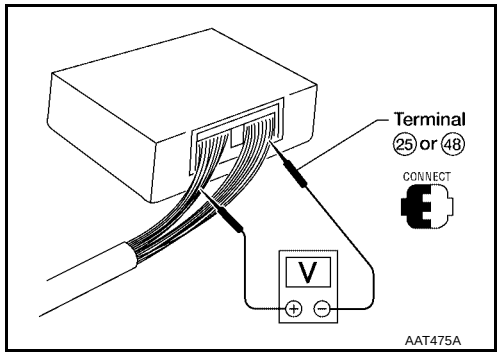
Items	Symptom	Condition	Diagnostic Item	Reference Page
NOT USED	Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-71
			2. Park/neutral position (PNP) switch adjustment	AT-269
			3. Shift solenoid valve A	AT-172
			4. Shift solenoid valve B	AT-177
			5. Control valve assembly	AT-267
		OFF vehicle	6. Reverse clutch	AT-321
			7. High clutch	AT-324
			8. Brake band	AT-283
			9. Low & reverse brake	AT-334
			10. Oil pump	AT-302
			11. Torque converter	AT-283
	Transaxle noise in D, 2, 1 and R positions.	ON vehicle	1. Fluid level	AT-71
		OFF vehicle	2. Torque converter	AT-283
	Engine brake does not operate in “1” position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-269
			2. Control cable adjustment	AT-270
			3. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-122, AT-201
			5. Shift solenoid valve A	AT-172
			6. Control valve assembly	AT-267
			7. Overrun clutch solenoid valve	AT-185
		OFF vehicle	8. Overrun clutch	AT-328
			9. Low & reverse brake	AT-334
	Transaxle overheats.	ON vehicle	1. Fluid level	AT-71
			2. Engine idling rpm	EC-80
			3. Throttle position sensor [accelerator pedal position (APP) sensor] adjustment	EC-81
			4. Line pressure test	AT-77
			5. Line pressure solenoid valve	AT-166
			6. Control valve assembly	AT-267
		OFF vehicle	7. Oil pump	AT-302
			8. Reverse clutch	AT-321
			9. High clutch	AT-324
			10. Brake band	AT-283
			11. Forward clutch	AT-328
			12. Overrun clutch	AT-328
			13. Low & reverse brake	AT-334
			14. Torque converter	AT-283

Items	Symptom	Condition	Diagnostic Item	Reference Page
NOT USED	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-71
		OFF vehicle	2. Reverse clutch	AT-321
			3. High clutch	AT-324
			4. Brake band	AT-283
			5. Forward clutch	AT-328
			6. Overrun clutch	AT-328
			7. Low & reverse brake	AT-334
	Offensive smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-71
		OFF vehicle	2. Torque converter	AT-283
			3. Oil pump	AT-302
			4. Reverse clutch	AT-321
			5. High clutch	AT-324
			6. Brake band	AT-283
			7. Forward clutch	AT-328
			8. Overrun clutch	AT-328
			9. Low & reverse brake	AT-334
	Engine is stopped at R, D, 2 and 1 positions.	ON vehicle	1. Fluid level	AT-71
			2. Torque converter clutch solenoid valve	AT-153
			3. Shift solenoid valve B	AT-177
			4. Shift solenoid valve A	AT-172
			5. Control valve assembly	AT-267

TCM Terminals and Reference Value

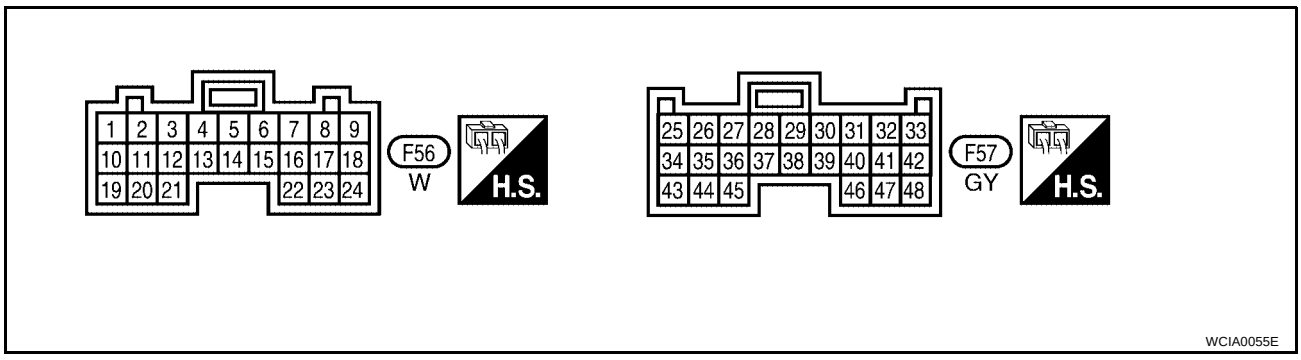
ECS0096E

PREPARATION



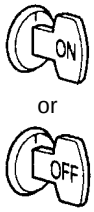
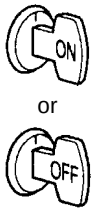
- Measure voltage between each terminal and terminal 25 or 48 by following “TCM INSPECTION TABLE”.

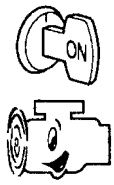
TCM HARNESS CONNECTOR TERMINAL LAYOUT



TCM INSPECTION TABLE

(Data are reference values.)

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
1	G/R	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	W/B	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	4 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V
3	G/B	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V
5*	L	CAN-H	—	—	—
6*	P	CAN-L	—	—	—
10	R/Y	Power source		With ignition switch ON.	Battery voltage
				With ignition switch OFF.	0V
11	R/Y	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in D_1 or D_4.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in D_2 or D_3.)	0V
12	LG/B	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in D_1 or D_2.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in D_3 or D_4.)	0V
19	R/Y	Power source	Same as No. 10		
20	BR/Y	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	0V
25	B	Ground	—	—	—
26	PU/W	PNP switch 1 position		When setting selector lever to 1 position.	Battery voltage
				When setting selector lever to other positions.	0V
27	P/B	PNP switch 2 position		When setting selector lever to 2 position.	Battery voltage
				When setting selector lever to other positions.	0V
28	Y/R	Power source (Memory back-up)		With ignition switch OFF.	Battery voltage
				With ignition switch ON.	Battery voltage

Terminal No.	Wire color	Item	Condition		Judgement standard (Approx.)
29	W	Revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	450 Hz
				When vehicle is parked.	Under 1.3V or over 4.5V
30**	BR/Y	Data link connector (RX)		—	—
31**	LG	Data link connector (TX)		—	—
34	G	PNP switch D position		When setting selector lever to D position.	Battery voltage
				When setting selector lever to other positions.	0V
35	G/W	PNP switch R position		When setting selector lever to R position.	Battery voltage
				When setting selector lever to other positions.	0V
36	R/B	PNP switch P or N position		When setting selector lever to P or N position.	Battery voltage
				When setting selector lever to other positions.	0V
38	G	Turbine revolution sensor		When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	240 Hz
				When vehicle is parked.	Under 1.3V or over 4.5V
39	W/G	Engine speed signal		Refer to EC-109, "ECM INSPECTION TABLE" .	
40	PU/R	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 1V and more than 4.5V
42	B	Sensor ground	—	—	—
47	G	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V
48	B	Ground	—	—	—

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

CAN Communication

ECS0096F

For details, refer to LAN-20, "CAN COMMUNICATION" .

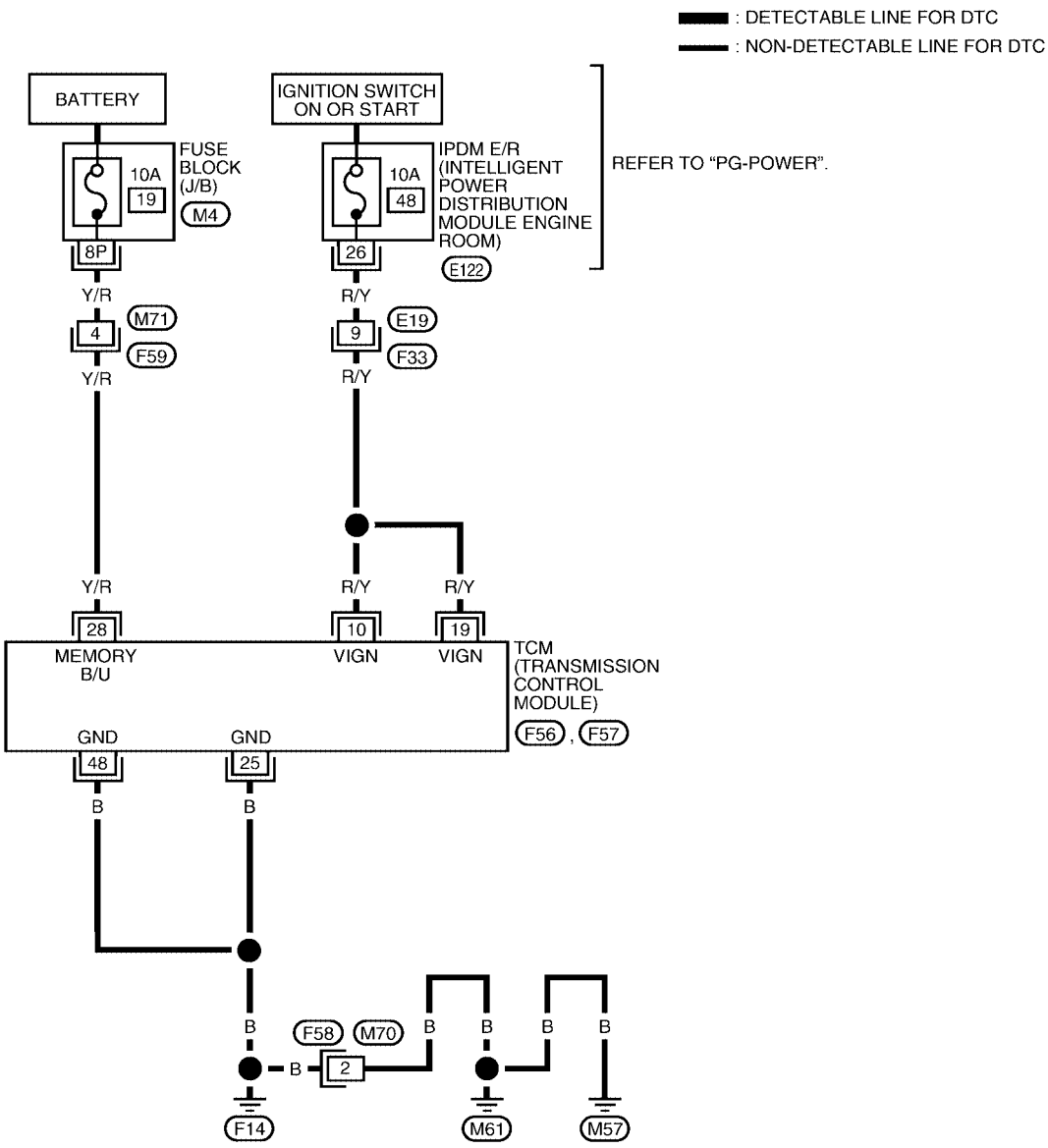
TROUBLE DIAGNOSIS FOR POWER SUPPLY

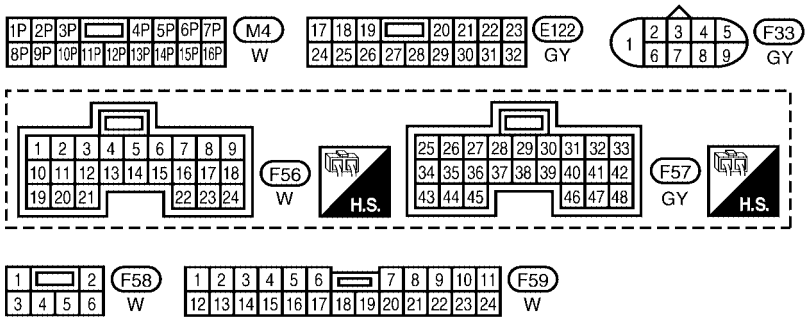
PFP:00000

Wiring Diagram — AT — MAIN

ECS0096G

AT-MAIN-01





BCWA0137E

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
10	R/Y	POWER SOURCE	IGNITION ON	BATTERY VOLTAGE
			IGNITION OFF	0V
19	R/Y	POWER SOURCE	IGNITION ON	BATTERY VOLTAGE
			IGNITION OFF	0V
25	B	GROUND	—	—
28	Y/R	POWER SOURCE (MEMORY BACKUP)	IGNITION ON	BATTERY VOLTAGE
			IGNITION OFF	BATTERY VOLTAGE
48	B	GROUND	—	—

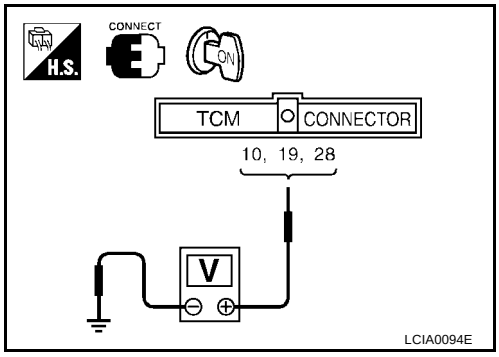
Diagnostic Procedure

ECS0096H

1. CHECK TCM POWER SOURCE STEP 1

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

Voltage : Battery voltage



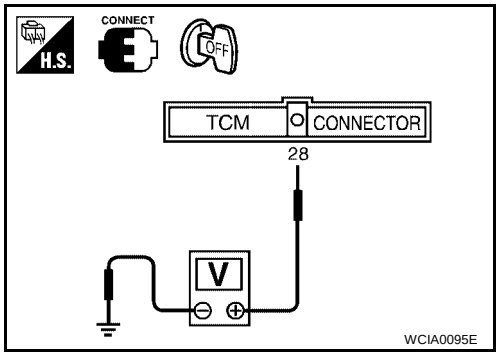
OK or NG

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

2. CHECK TCM POWER SOURCE STEP 2

1. Turn ignition switch to OFF position.
2. Check voltage between TCM terminal 28 and ground.

Voltage : Battery voltage



OK or NG

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

3. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and TCM terminals 10, 19 and 28
- Fuse
- Ignition switch
  Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .

OK or NG

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

4. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between TCM terminals 25, 48 and ground. Refer to AT-107, "Wiring Diagram — AT — MAIN" .

Continuity should exist.

OK or NG

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

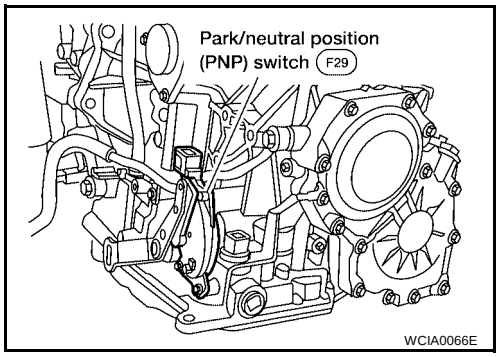
DTC P0705 PARK/NEUTRAL POSITION SWITCH

PFP:32006

Description

ECS0096I

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



On Board Diagnosis Logic

ECS0096J

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

Possible Cause

ECS0096K

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0096L

CAUTION:

Always drive vehicle at a safe speed.

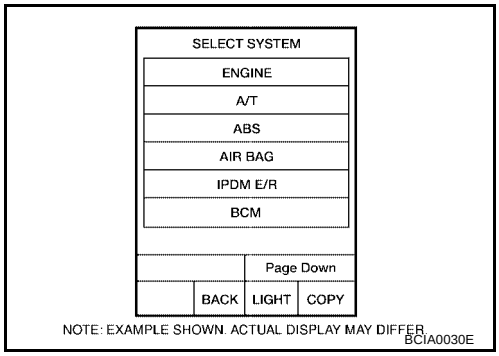
NOTE:

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

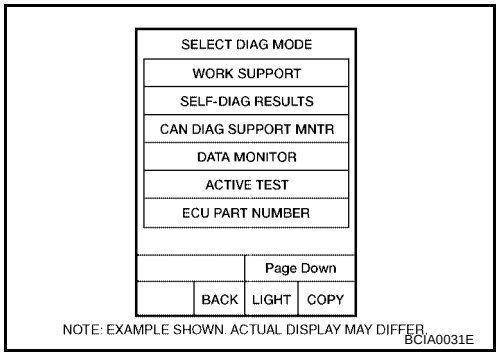
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON.



2. Select “DATA MONITOR” mode for “A/T” 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: 3 or D position

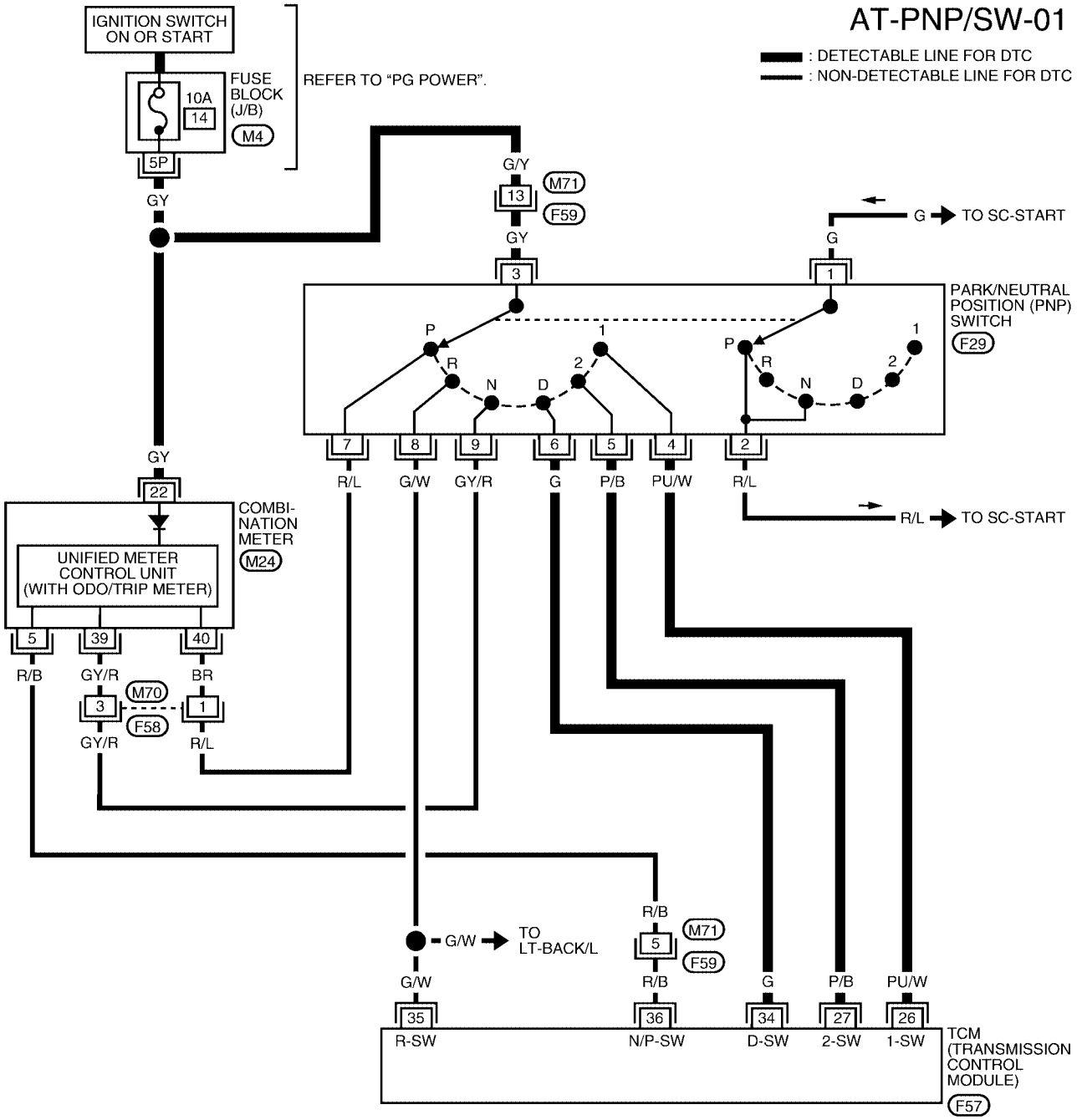


WITH GST

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — PNP/SW

ECS0096M



WCWA0221E

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

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

Diagnostic Procedure

ECS0096N

1. INSPECTION START

Do you have CONSULT-II?

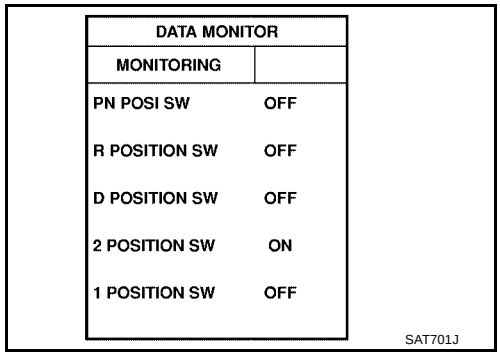
Yes or No

Yes >> GO TO 2.
No >> GO TO 6.

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

With CONSULT-II

1. Turn ignition switch to ON position. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out P, R, N, D, 2 and 1 position switches moving selector lever to each position. Check that the signal of the selector lever position is indicated properly.



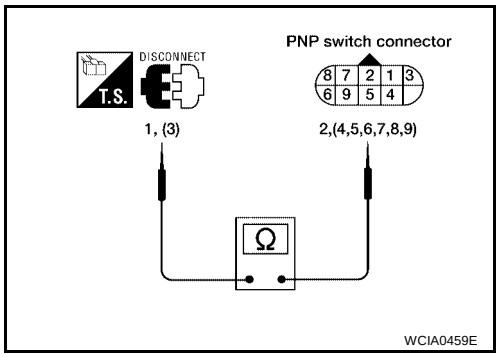
OK or NG

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

3. DETECT MALFUNCTIONING ITEM

Check the following item:

- Park/neutral position (PNP) switch
  Check continuity between park/neutral position (PNP) switch F29 terminals 1 and 2 and between terminals 3 and 4, 5, 6, 7, 8 and 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	

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-270, "Control Cable Adjustment" .
NG >> Repair or replace PNP switch.

5. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and park/neutral position (PNP) switch (Main harness)
- Harness for short or open between park/neutral position (PNP) switch and TCM (Main harness)
- Fuse
- Ignition switch
  Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .

OK or NG

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

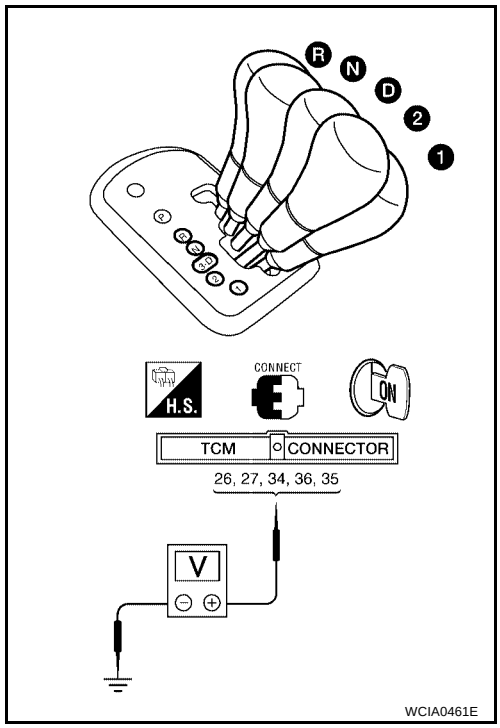
6. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

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

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

B = Battery voltage
0 = 0V



OK or NG

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

7. CHECK DTC

Perform AT-110, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

8. CHECK TCM INSPECTION

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

OK or NG

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

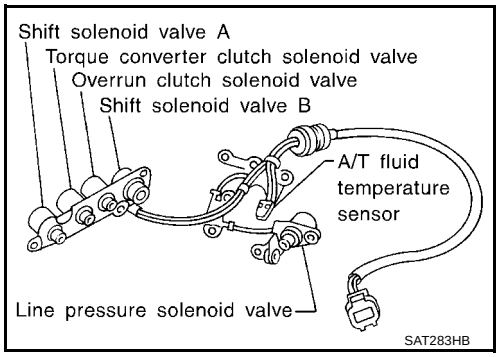
DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

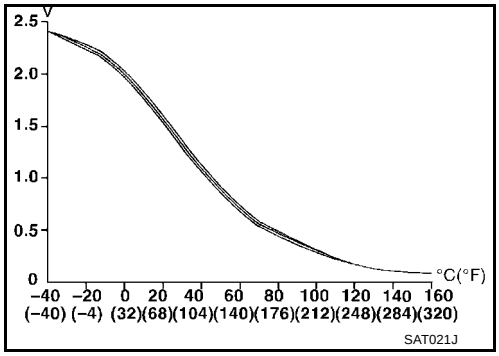
PFP:31940

Description

ECS0096O

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

ECS0096P

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

Possible Cause

ECS0096Q

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0096R

CAUTION:

Always drive vehicle at a safe speed.

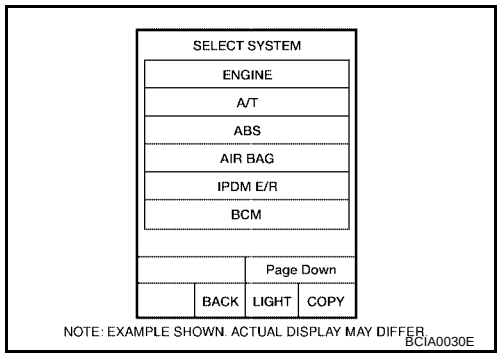
NOTE:

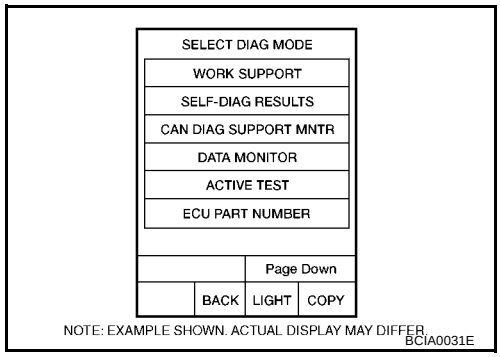
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

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

WITH CONSULT-II

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





2. Select "ECM INPUT SIGNALS" touch "START".
3. Start engine and maintain the following conditions for at least 10 minutes (Total). (It is not necessary to maintain continuously.)
   ENG SPEED: 450 rpm or more
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   THRTL POSI: More than 1.2V
   Selector lever: D position

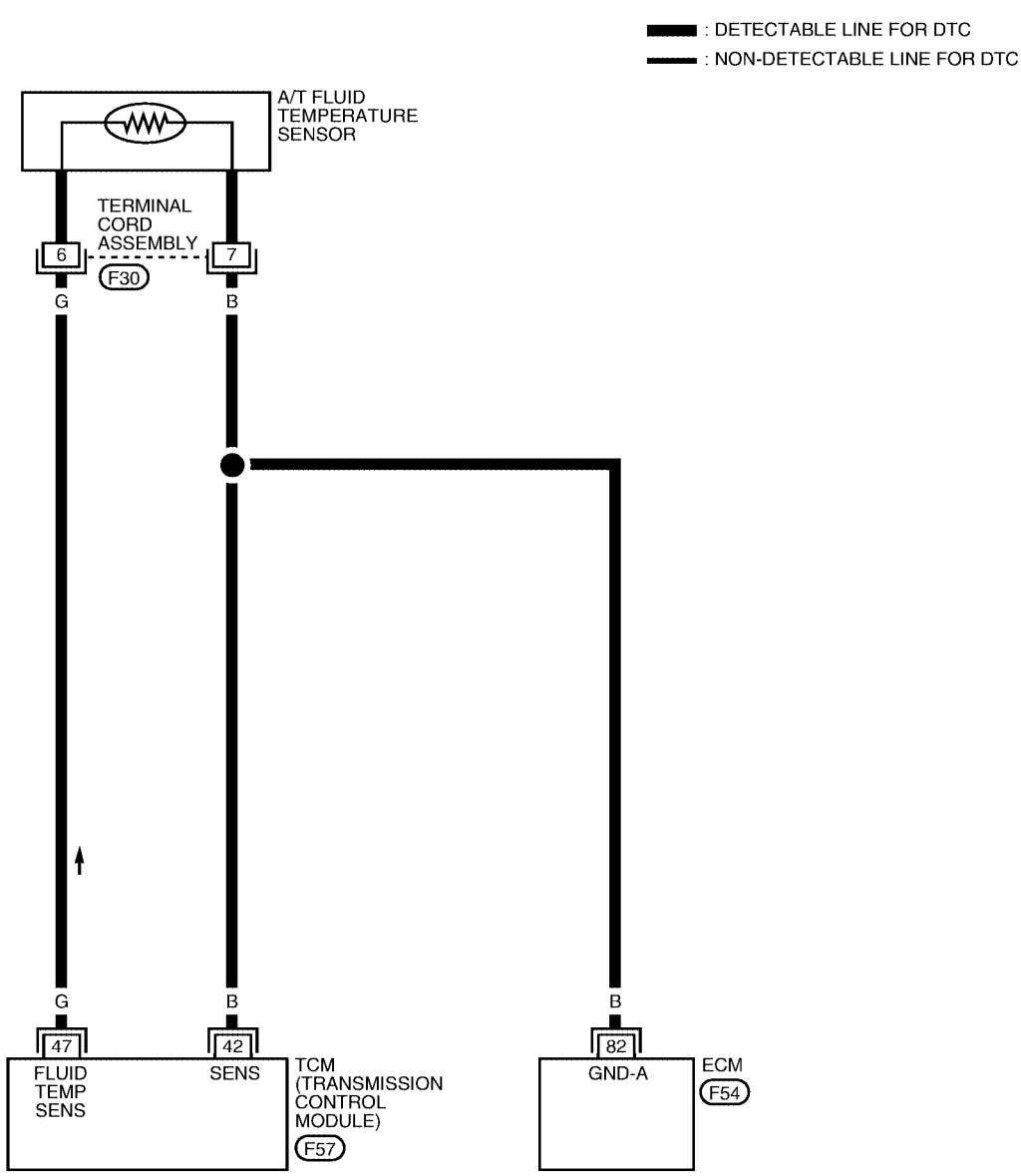
WITH GST

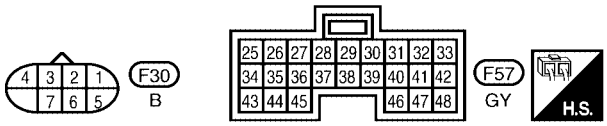
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — FTS

ECS0096S

AT-FTS-01





REFER TO THE FOLLOWING.
F54 - ELECTRICAL UNITS

BCWA0139E

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
42	B	SENSOR GROUND	—	—
47	G	A/T FLUID TEMPERATURE SENSOR	IGNITION ON AND ATF TEMPERATURE IS 20°C (68°F)	1.5V
			IGNITION ON AND ATF TEMPERATURE IS 80°C (176°F)	0.5V

Diagnostic Procedure

ECS0096T

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

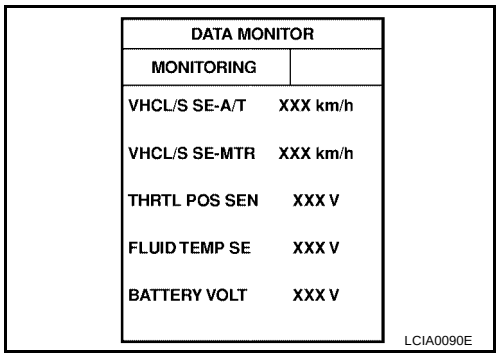
Yes >> GO TO 2.
No >> GO TO 6.

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

With CONSULT-II

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

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



OK or NG

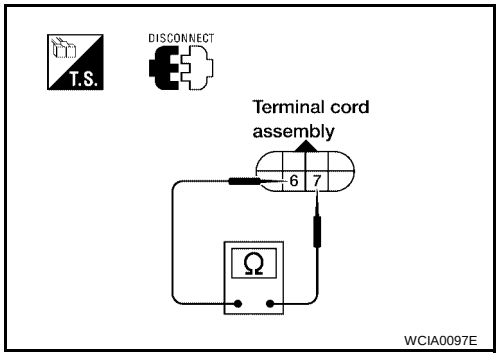
OK >> GO TO 7.
NG >> GO TO 3.

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

1. Turn ignition switch to OFF position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal cord F30 terminals 6 and 7 (component side) when A/T is cold.

Temperature	Resistance (Approx.)
Cold [20°C (68°F)]	2.5kΩ

4. Reinstall any part removed.



OK or NG

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

4. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short to ground or short to power or open between TCM, ECM and terminal cord assembly (Main harness)
- Ground circuit for ECM
  Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .

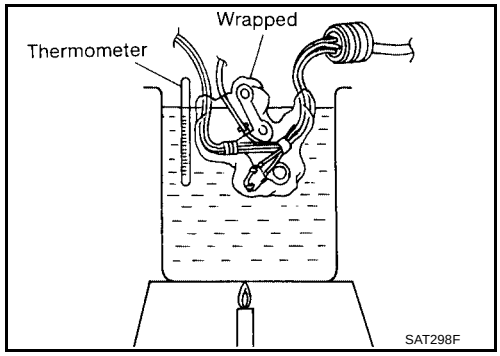
OK or NG

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

5. DETECT MALFUNCTIONING ITEM

1. Remove oil pan.
2. Check the following items:

– A/T fluid temperature sensor
Check resistance between two terminals while changing temperature as shown in figure.



Temperature	Resistance (Approx.)
20 (68)	25kΩ
80 (176)	0.3kΩ

– Harness of terminal cord assembly for short or open

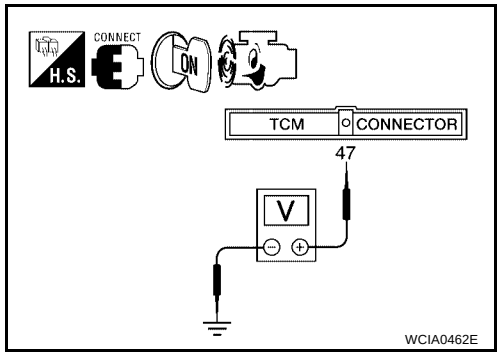
OK or NG

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

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

Without CONSULT-II

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



Temperature	Voltage (Approx.)
Cold [20°C (68°F)] → Hot [80°C (176°F)]	1.5V → 0.5V

OK or NG

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

7. CHECK DTC

Perform AT-116, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

8. CHECK TCM INSPECTION

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

OK or NG

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

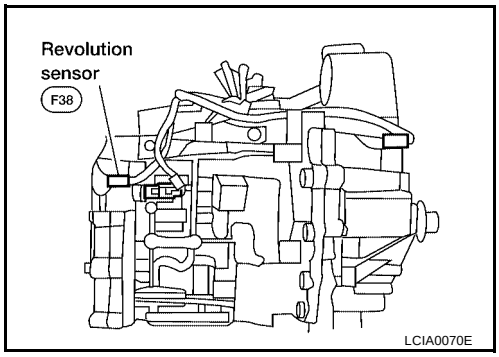
DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)

PFP:32702

Description

ECS0096U

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

ECS0096V

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

Possible Cause

ECS0096W

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0096X

CAUTION:

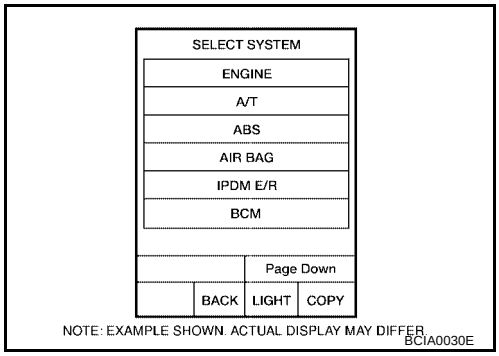
- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**

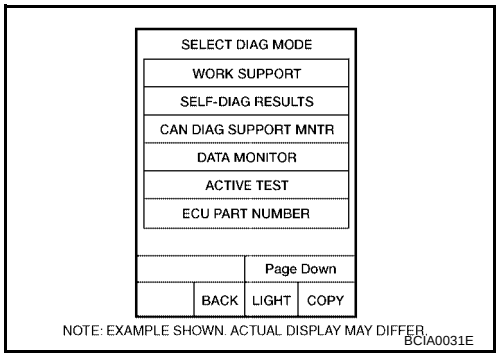
NOTE:

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

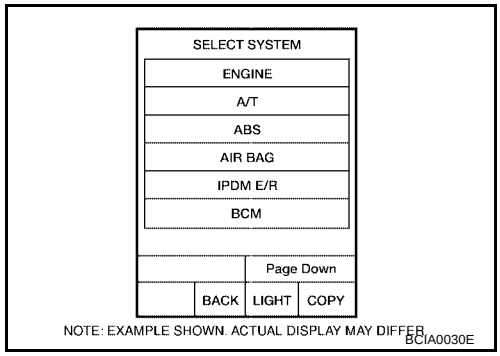
WITH CONSULT-II

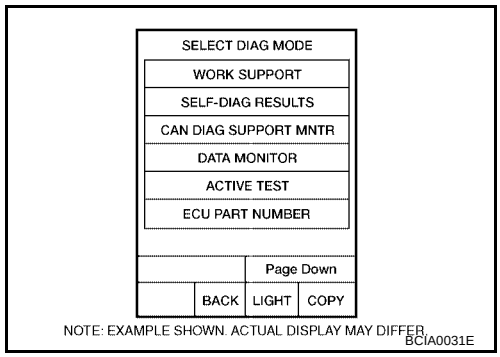
1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.





2. Drive vehicle and check for an increase of “VHCL/S SE·MTR” value.
   If the check result is NG, go to AT-125, "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
   Selector lever: D position
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
   If the check result is NG, go to AT-125, "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
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

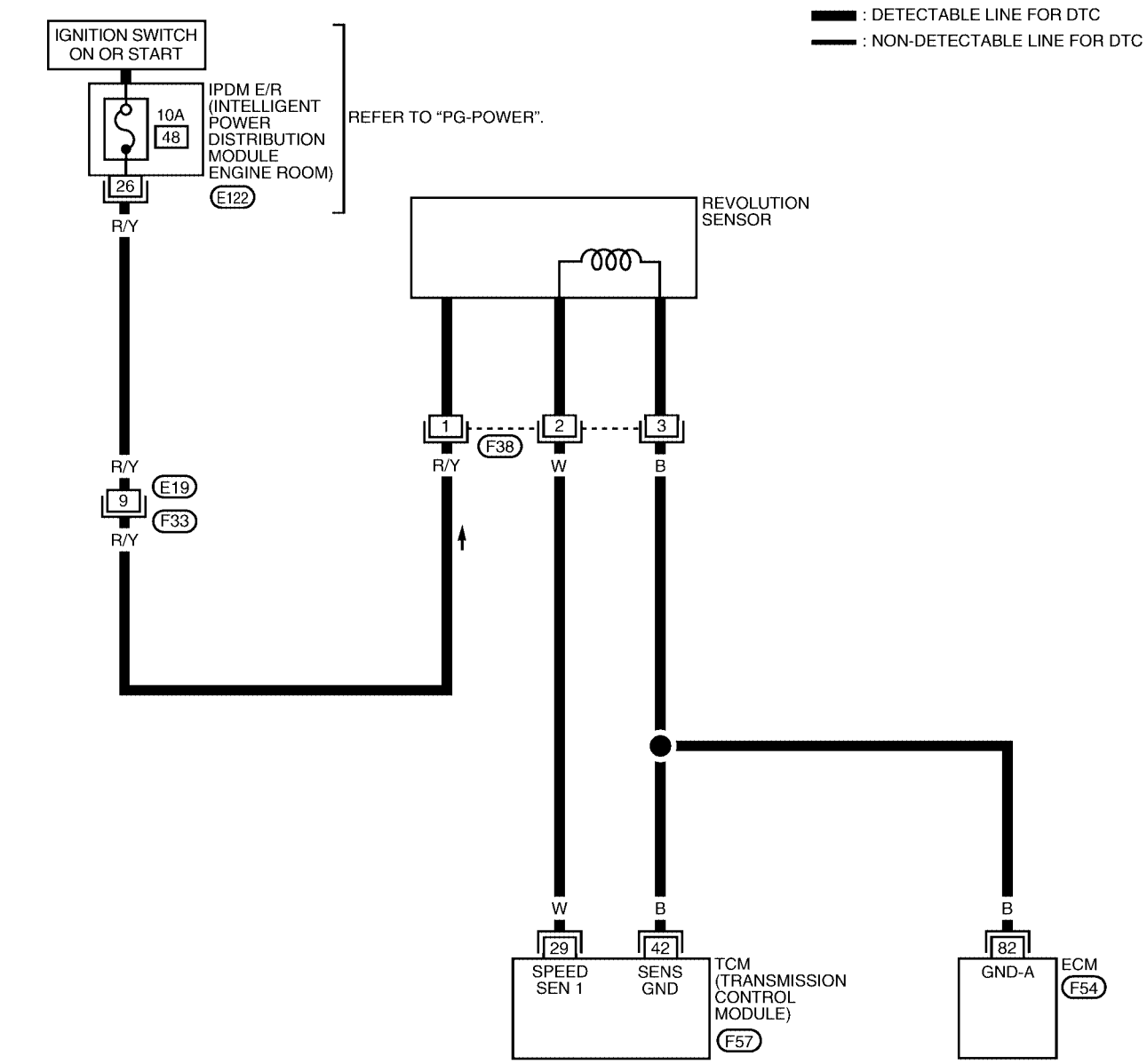
WITH GST

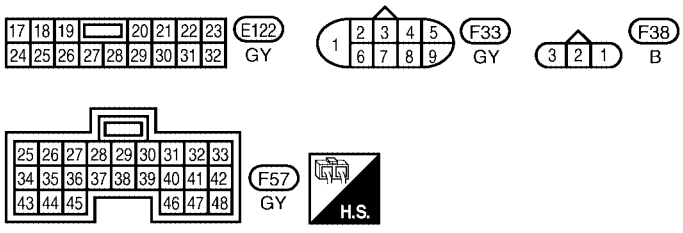
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — VSSA/T

ECS0096Y

AT-VSSA/T-01





REFER TO THE FOLLOWING.
F54 - ELECTRICAL UNITS

BCWA0140E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

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

Diagnostic Procedure

ECS0096Z

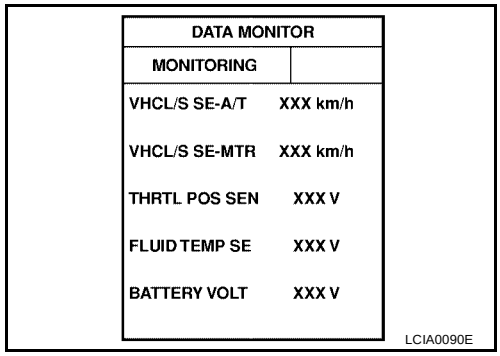
1. CHECK INPUT SIGNAL (WITH CONSULT-II)

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 3.
NG >> GO TO 2.



2. CHECK REVOLUTION SENSOR (WITH CONSULT-II)

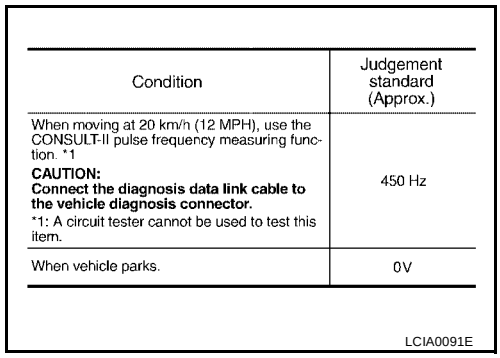
With CONSULT-II

1. Start engine.

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

OK or NG

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



3. CHECK DTC

Perform AT-122, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

4. CHECK TCM INSPECTION

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

OK or NG

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

DTC P0725 ENGINE SPEED SIGNAL

PFP:24825

Description

ECS00970

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

On Board Diagnosis Logic

ECS00971

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

Possible Cause

ECS00972

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

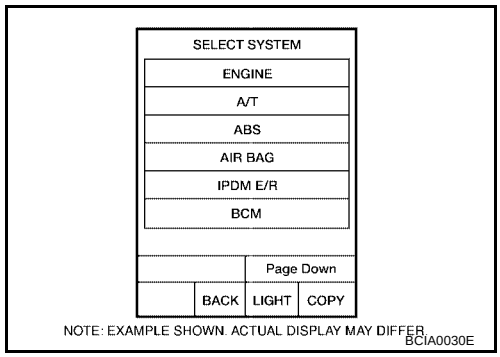
ECS00973

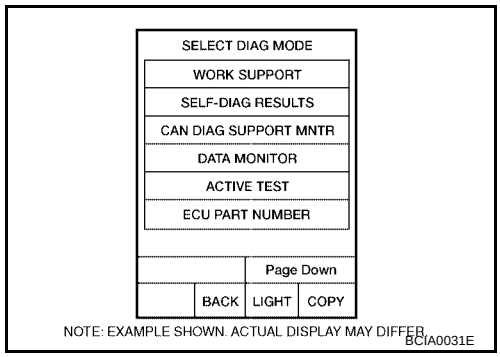
CAUTION:
Always drive vehicle at a safe speed.

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

WITH CONSULT-II

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





2. Start engine and maintain the following conditions for at least 10 consecutive seconds.
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   THRTL POS SEN: More than 1.2V
   Selector lever: D position

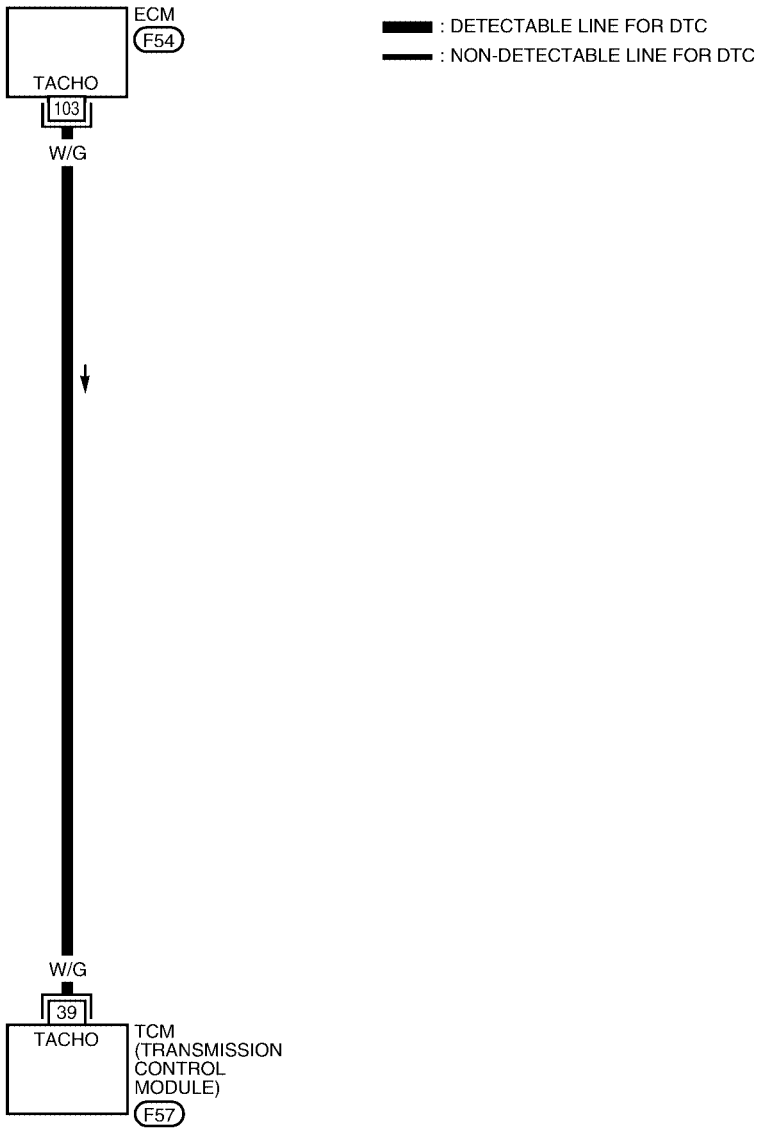
WITH GST

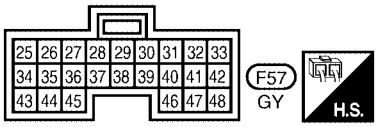
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — ENGSS

ECS00974

AT-ENGSS-01





REFER TO THE FOLLOWING.
F54 - ELECTRICAL UNITS

BCWA0141E

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA
39	W/G	ENGINE SPEED SIGNAL	EC-109, "ECM INSPECTION TABLE"	

Diagnostic Procedure

ECS00975

1. CHECK DTC WITH ECM

- Check P code.
  Turn ignition switch ON and select “SELF-DIAGNOSTIC RESULTS” mode for “ENGINE” with CONSULT-II.
  Refer to EC-66, "Malfunction Indicator Lamp (MIL)" .

OK or NG

OK (with CONSULT-II)>> GO TO 2.
OK (without CONSULT-II)>> GO TO 4.
NG >> Check ignition signal circuit for engine control. Refer to EC-585, "IGNITION SIGNAL" .

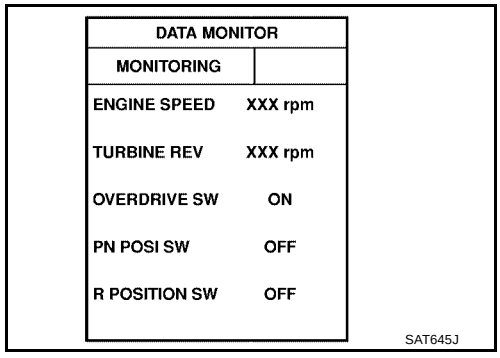
2. CHECK INPUT SIGNAL (WITH CONSULT-II)

With CONSULT-II

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

OK or NG

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



3. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
  Refer to EC-585, "IGNITION SIGNAL" .

OK or NG

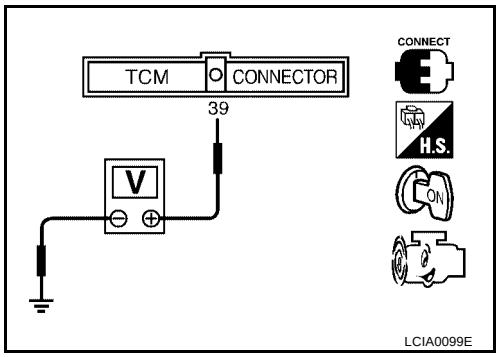
OK >> GO TO 6.
NG >> Repair or replace damaged parts.

4. CHECK INPUT SIGNAL (WITHOUT CONSULT-II)

Without CONSULT-II

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

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



OK or NG

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

5. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM and ECM
- Resistor and ignition coil
  Refer to EC-585, "IGNITION SIGNAL" .

OK or NG

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

6. CHECK DTC

Perform AT-127, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

7. CHECK TCM INSPECTION

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

OK or NG

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

DTC P0731 A/T 1ST GEAR FUNCTION

PFP:31940

Description

ECS00976

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the A/T check (position) 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 Diagnosis Logic

ECS00977

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

Possible Cause

ECS00978

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS00979

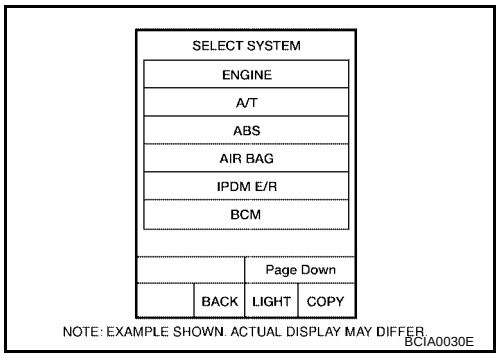
CAUTION:

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

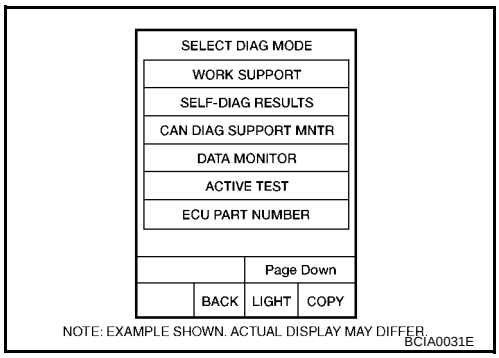
NOTE:
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

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

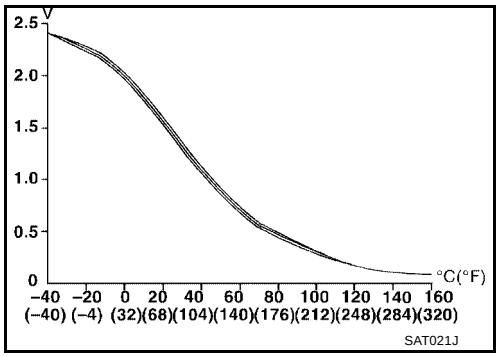


4. Accelerate vehicle to 20 to 25 km/h (12 to 16 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   Selector lever: D position
   - **Check that “GEAR” shows “2” after releasing pedal.**
5. Depress accelerator pedal to WOT (more than 7.0/8 of “THROTTLE POSI”) quickly from a speed of 20 to 25 km/h (12 to 16 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to AT-134, "Diagnostic Procedure" .
   If “STOP VEHICLE” appears on CONSULT-II screen, go to the following step.
   - **Check that “GEAR” shows “1” when depressing accelerator pedal to WOT.**
   - **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “ENGINE”. In case a 1st trip DTC other than P0731 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.**



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

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



8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.)
   Refer to AT-134, "Diagnostic Procedure" .
   Refer to AT-378, "Shift Schedule" .

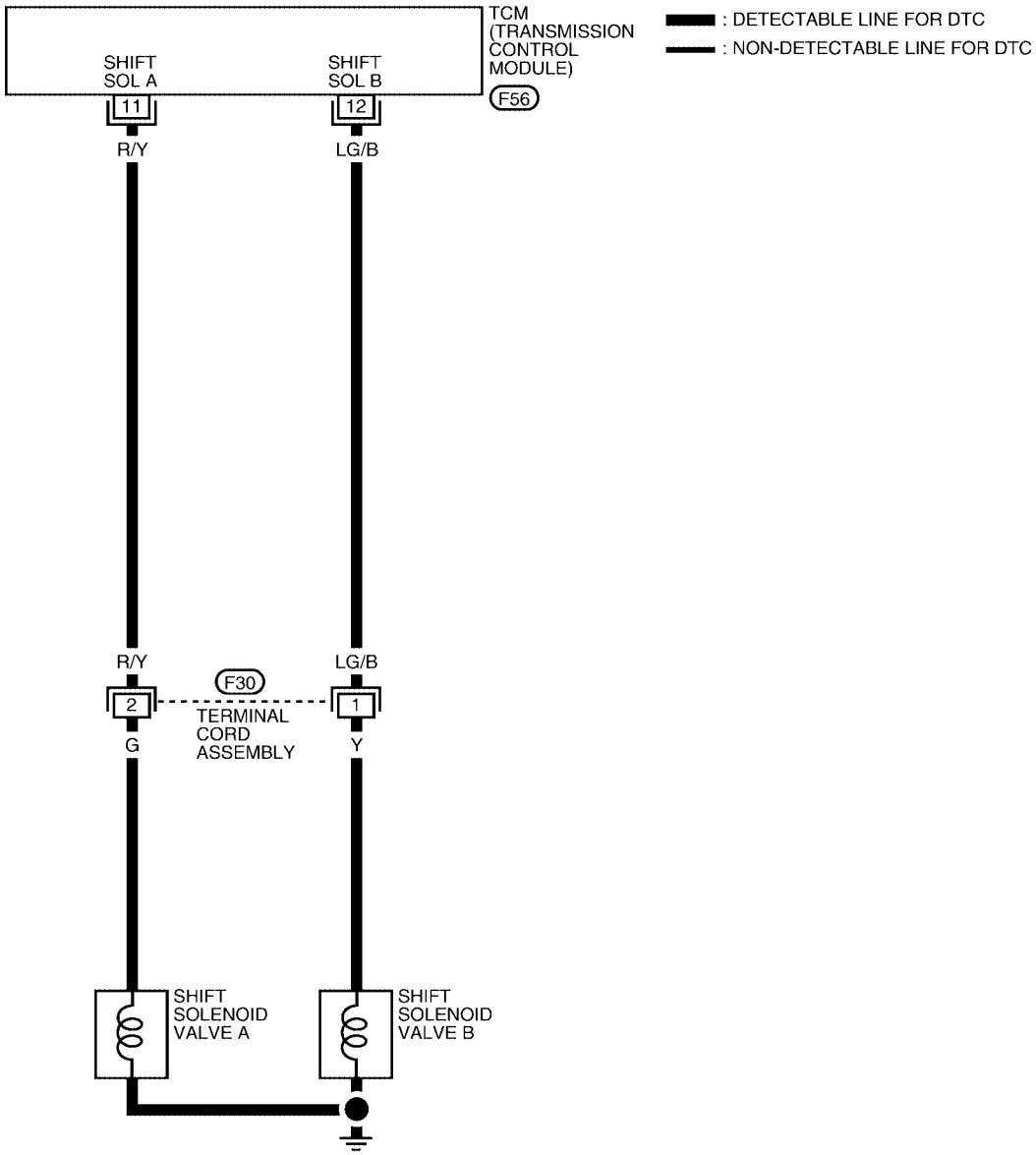
WITH GST

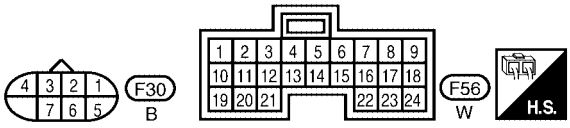
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — 1STSIG

ECS0097A

AT-1STSIG-01





LCWA0010E

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A IS OPERATING (DRIVING IN D_1 OR D_4)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A IS NOT OPERATING (DRIVING IN D_2 OR D_3)	0V
12	LG/B	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS OPERATING (DRIVING IN D_1 OR D_2)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B IS NOT OPERATING (DRIVING IN D_3 OR D_4)	0V

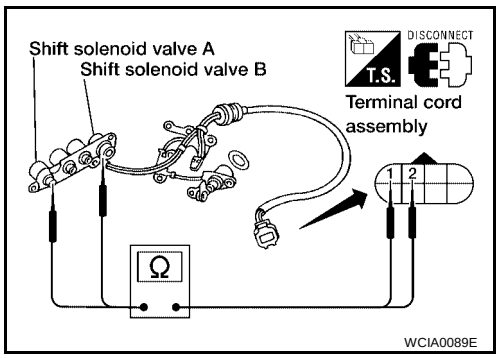
Diagnostic Procedure

ECS0097B

1. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
- Shift solenoid valve A
- Shift solenoid valve B
2. Check resistance between two terminals.

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

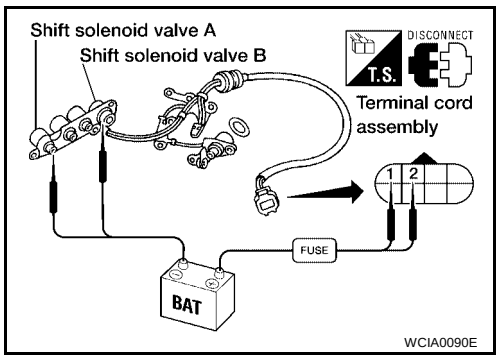


OK or NG

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

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-267, "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.



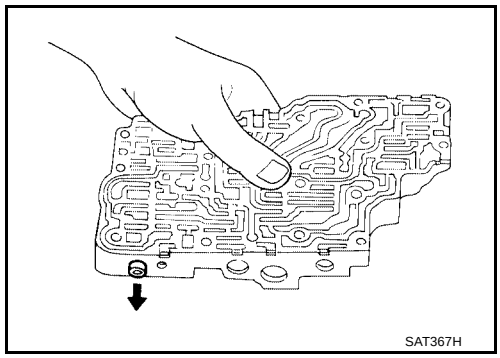
OK or NG

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

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-306, "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-131, "Diagnostic Trouble Code (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

ECS0097C

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the A/T check (position) 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 Diagnosis Logic

ECS0097D

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

Possible Cause

ECS0097E

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0097F

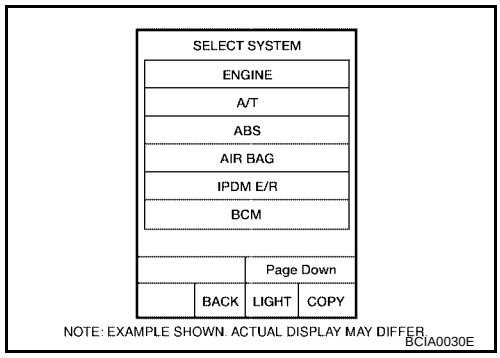
CAUTION:

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

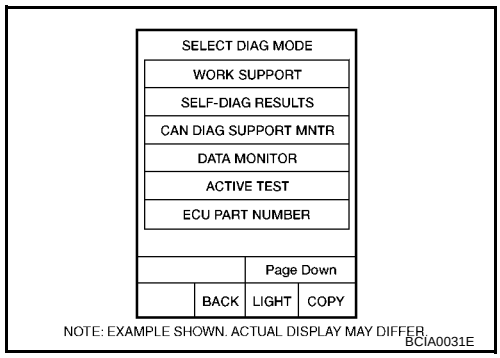
NOTE:
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

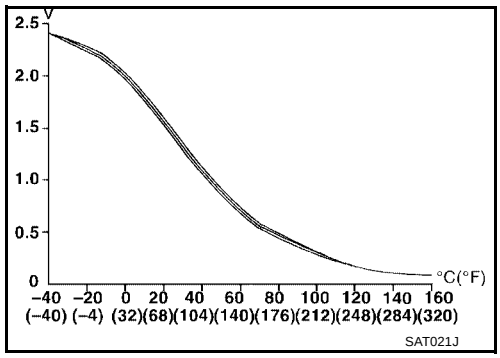
WITH CONSULT-II

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select “2ND GR FNCTN P0732” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.



4. Accelerate vehicle to 45 to 50 km/h (28 to 31 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8
   Selector lever: D position
   - **Check that “GEAR” shows “3” or “4” after releasing pedal.**
5. Depress accelerator pedal to WOT (more than 7.0/8 of “THROTTLE POSI”) quickly from a speed of 45 to 50 km/h (28 to 31 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETE”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to AT-139, "Diagnostic Procedure" .
   If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.
   - **Check that “GEAR” shows “2” when depressing accelerator pedal to WOT.**
   - **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “ENGINE”. In case a 1st trip DTC other than P0732 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.**
6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)





Vehicle condition	Gear on actual transaxle 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-139, "Diagnostic Procedure" .
   Refer to AT-378, "Shift Schedule" .

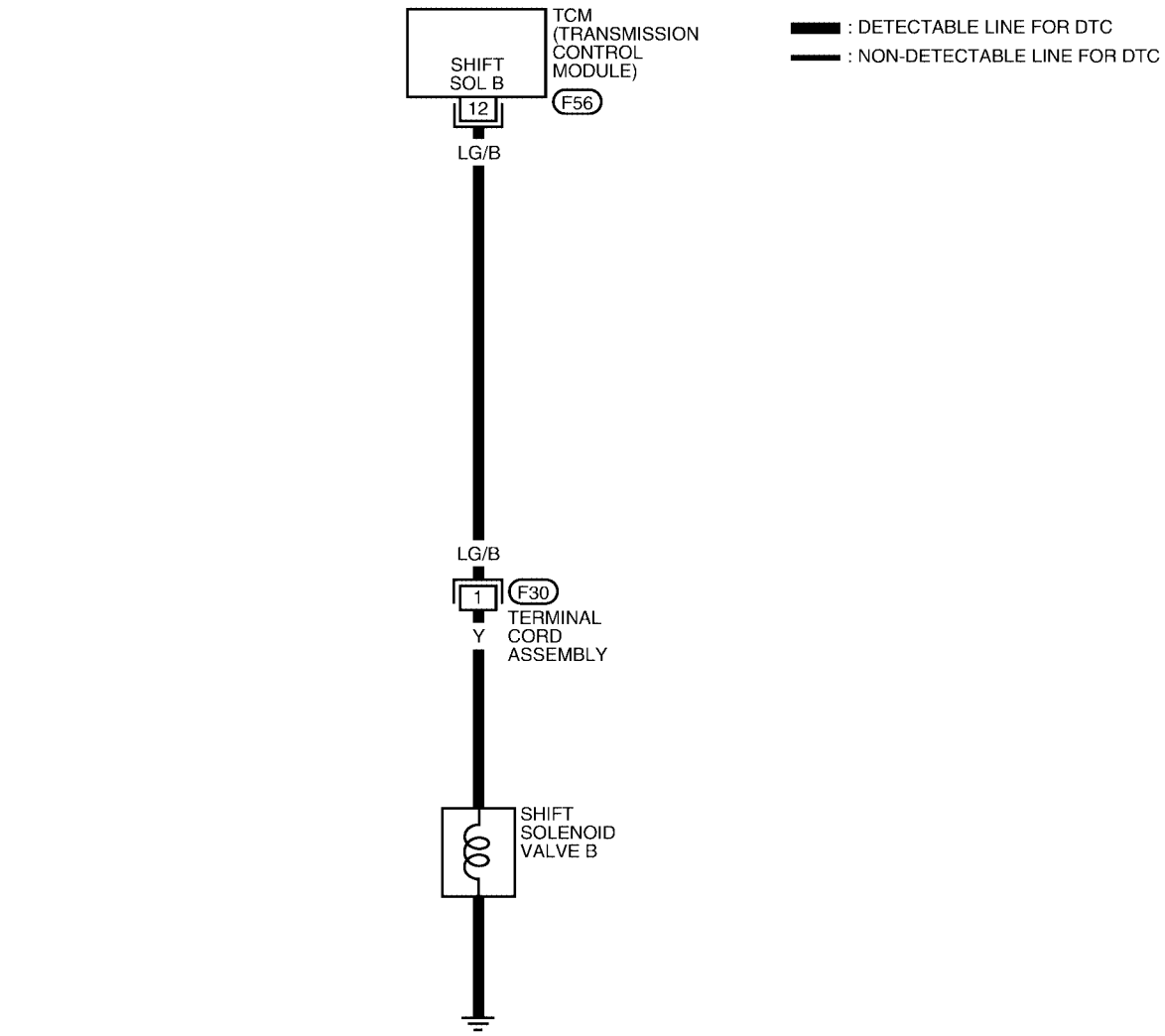
WITH GST

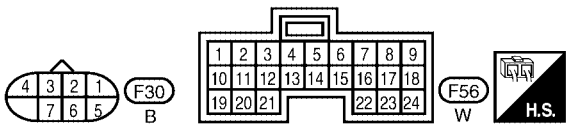
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — 2NDSIG

ECS0097G

AT-2NDSIG-01





LCWA0011E

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
12	LG/B	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS OPERATING (DRIVING IN D_1 OR D_2)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE B IS NOT OPERATING (DRIVING IN D_3 OR D_4)	0V

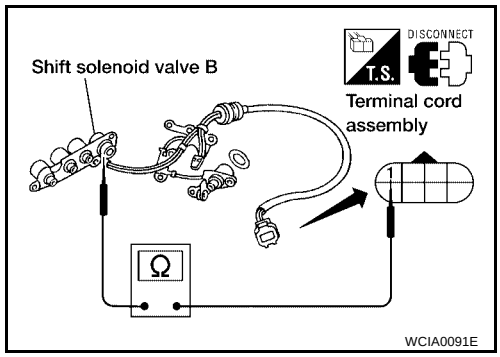
Diagnostic Procedure

ECS0097H

1. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
- Shift solenoid valve B
2. Check resistance to the terminal and ground.

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

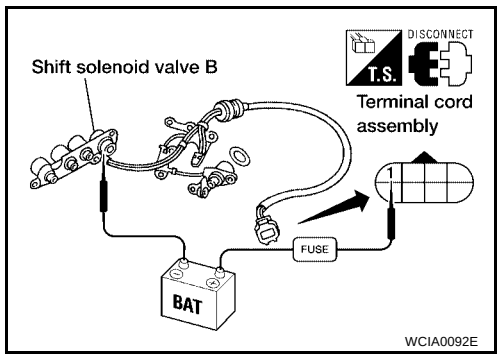


OK or NG

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

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-267, "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.

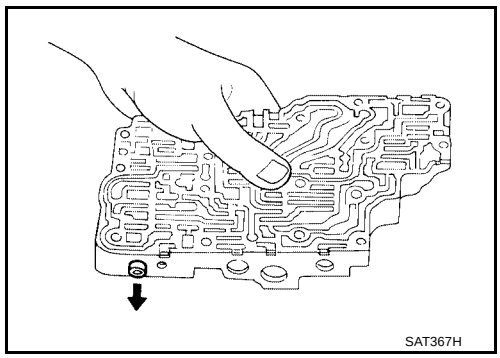


OK or NG

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

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-306, "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-136, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

DTC P0733 A/T 3RD GEAR FUNCTION

PFP:31940

Description

ECS0097I

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while the A/T check (position) 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 Diagnosis Logic

ECS0097J

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

Possible Cause

ECS0097K

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0097L

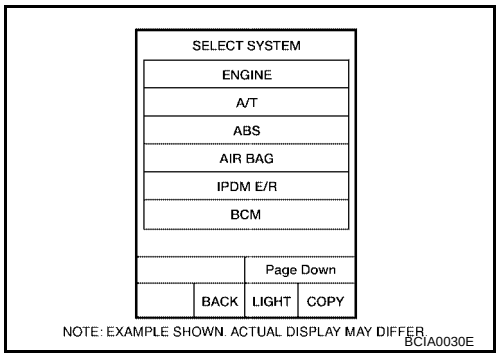
CAUTION:

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

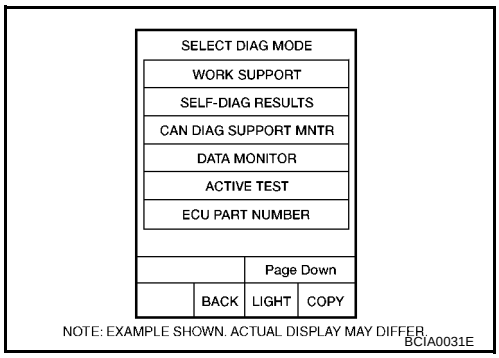
NOTE:
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

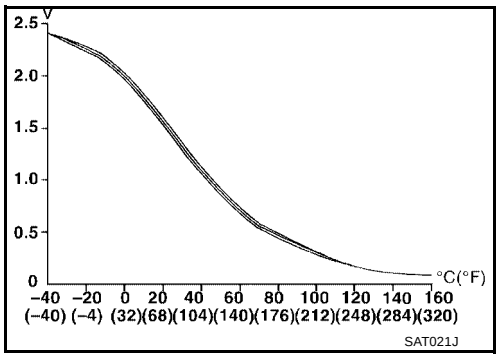
WITH CONSULT-II

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select “3RD GR FNCTN P0733” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.



4. Accelerate vehicle to 60 to 75 km/h (37 to 47 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   Selector lever: D position
   - **Check that “GEAR” shows “4” after releasing pedal.**
5. Depress accelerator pedal steadily with 3.5/8 - 4.5/8 of “THROTTLE POSI” from a speed of 60 to 75 km/h (37 to 47 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to AT-144, "Diagnostic Procedure" .
   If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.
   - **Check that “GEAR” shows “3” when depressing accelerator pedal with 3.5/8 - 4.5/8 of “THROTTLE POSI”.**
   - **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS” for “ENGINE”. In case a 1st trip DTC other than P0733 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.**
6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)





Vehicle condition	Gear on actual transaxle 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-144, "Diagnostic Procedure" .
   Refer to AT-378, "Shift Schedule" .

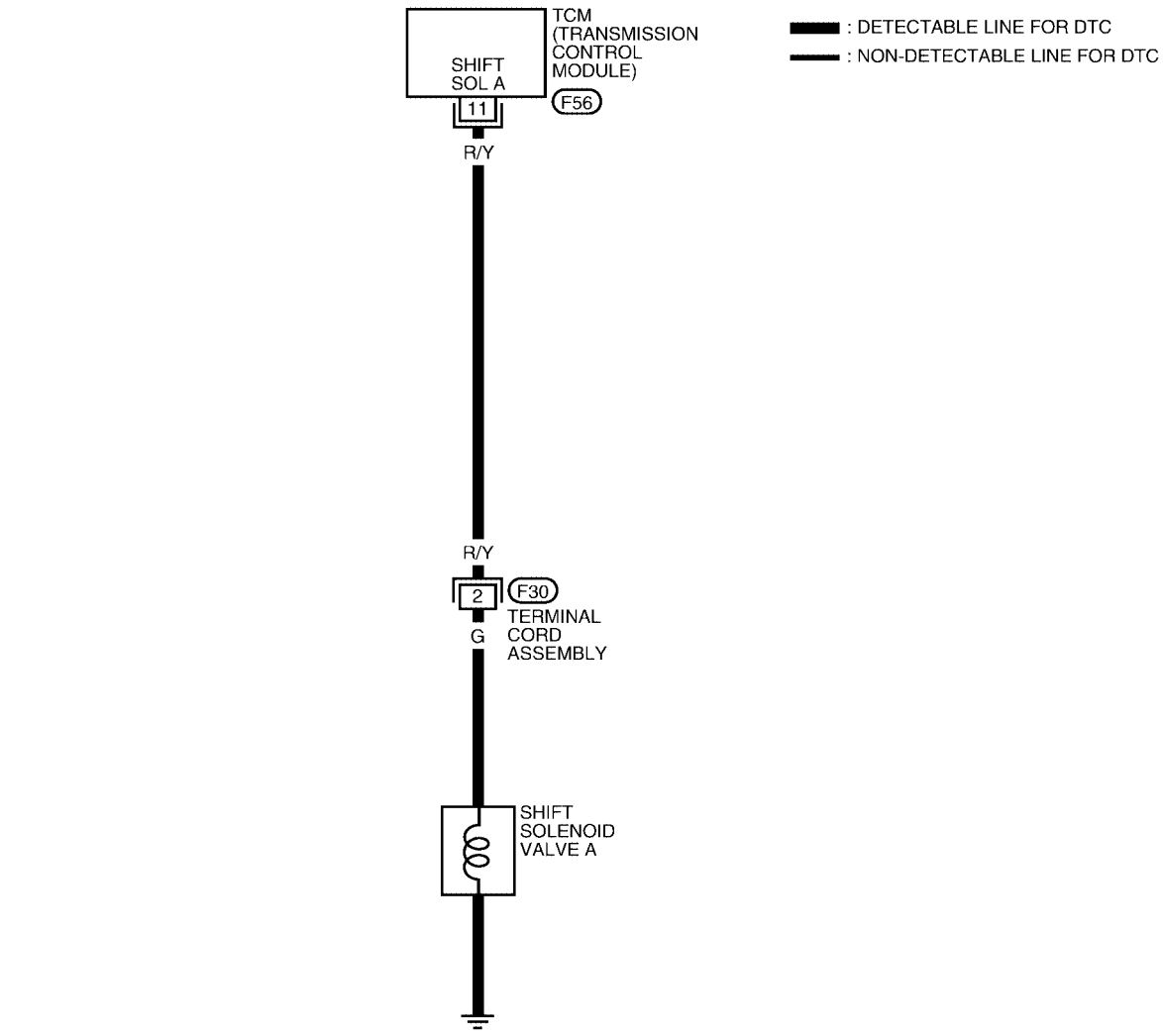
WITH GST

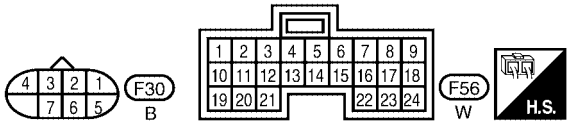
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — 3RDSIG

ECS0097M

AT-3RDSIG-01





LCWA0012E

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A IS OPERATING (DRIVING IN D_1 OR D_4)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A IS NOT OPERATING (DRIVING IN D_2 OR D_3)	0V

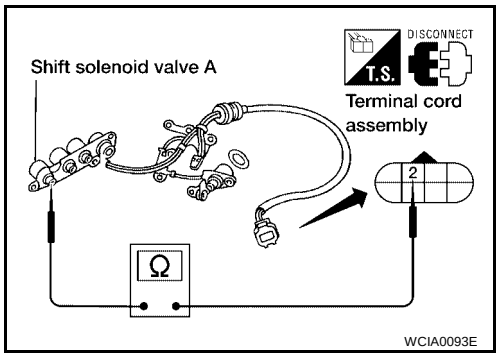
Diagnostic Procedure

ECS0097N

1. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
- Shift solenoid valve A
2. Check resistance to the terminal and ground.

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

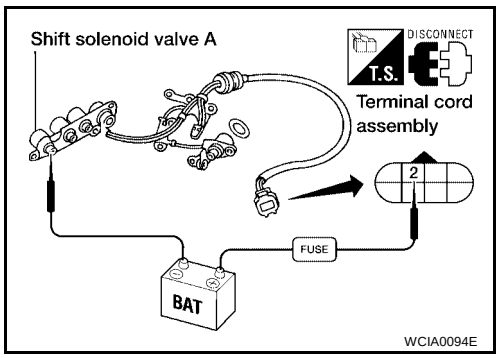


OK or NG

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

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-267, "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.

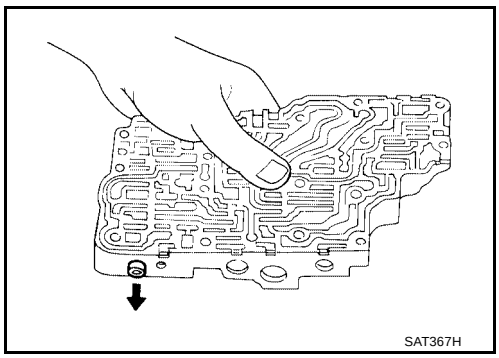


OK or NG

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

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-306, "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-141, "Diagnostic Trouble Code (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

ECS0097O

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

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

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

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%
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

ECS0097P

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

Possible Cause

ECS0097Q

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0097R

CAUTION:

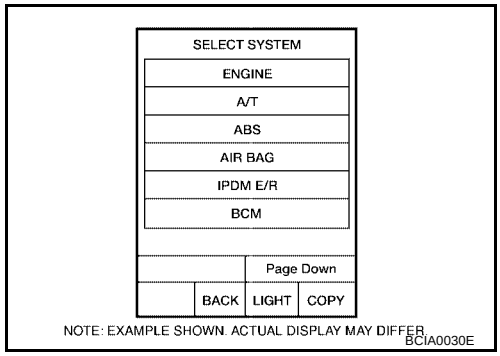
- **Always drive vehicle at a safe speed.**
- **If conducting this "DTC CONFIRMATION PROCEDURE" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**
- **Be careful not to rev engine into the red zone on the tachometer.**

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

TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

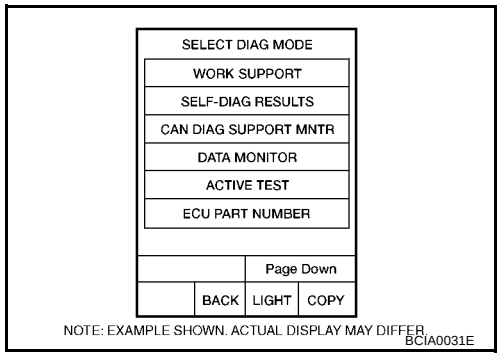
1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive the vehicle to decrease the voltage (warm up the fluid) or stop engine to increase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



4. Accelerate vehicle to 55 to 65 km/h (34 to 40 MPH) under the following condition and release the accelerator pedal completely.
   THROTTLE POSI: Less than 5.5/8 (at all times during step 4)
   Selector lever: D position

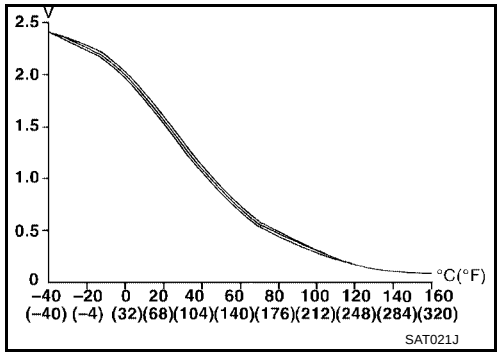
– **Check that “GEAR” shows “3” after releasing pedal.**

5. Depress accelerator pedal steadily with 1.0/8 - 2.0/8 of “THROTTLE POSI” from a speed of 55 to 65 km/h (34 to 40 MPH) until “TESTING” has turned to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to AT-149, "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-DIAG RESULTS” for “ENGINE”. In case a 1st trip DTC other than P0734 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.**

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



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

8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.)
   Refer to AT-149, "Diagnostic Procedure" .
   Refer to AT-378, "Shift Schedule" .

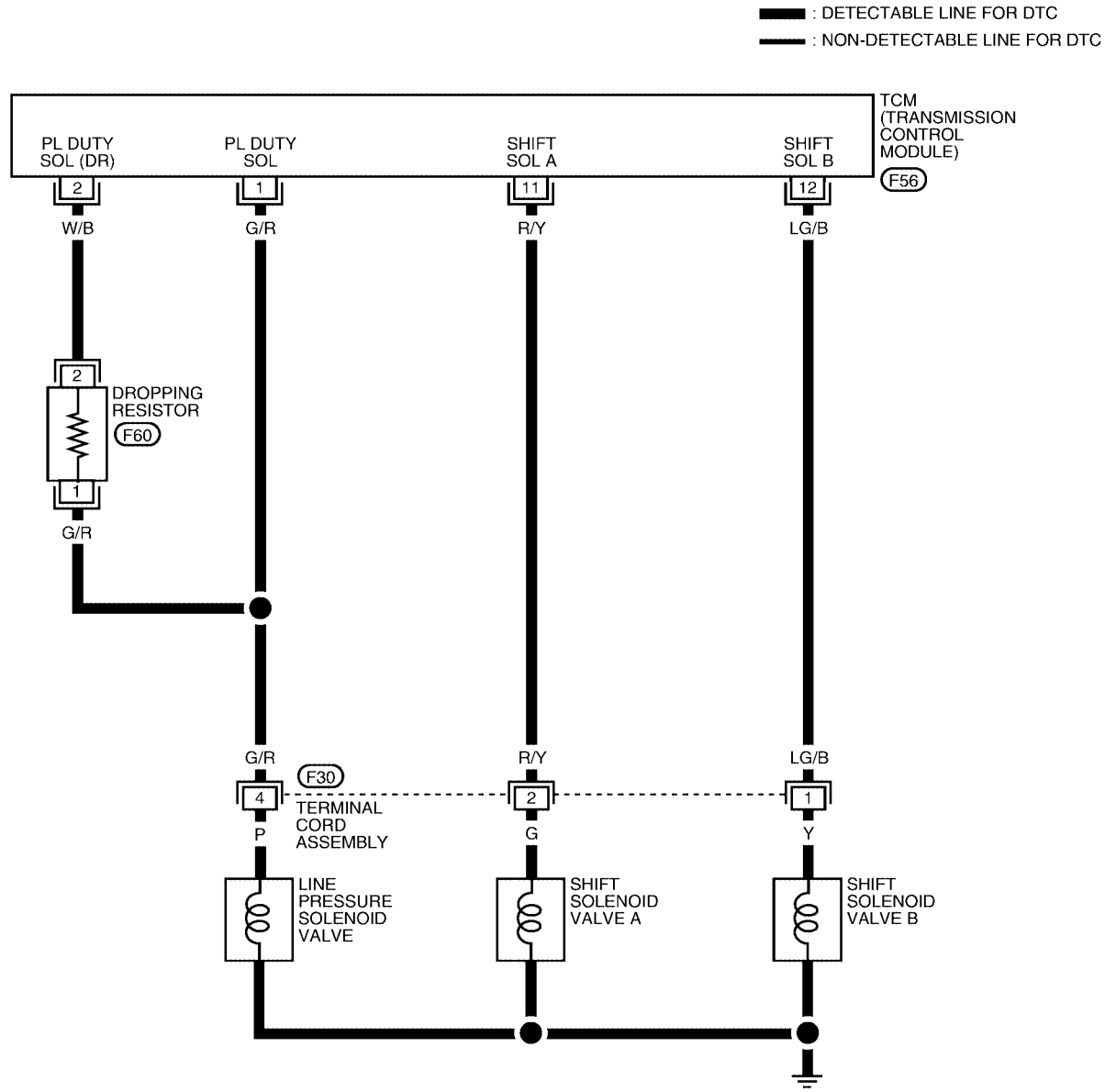
WITH GST

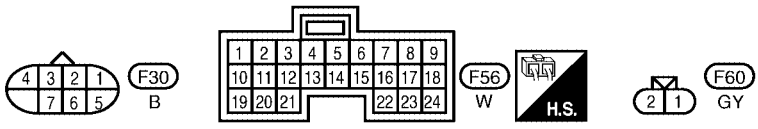
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — 4THSIG

ECS0097S

AT-4THSIG-01





BCWA0142E

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
1	G/R	LINE PRESSURE SOLENOID VALVE	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	1.5 - 3.0V
			WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	0V
2	W/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	4 - 14V
			WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	0V
11	R/Y	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A IS OPERATING (DRIVING IN D_1 OR D_4)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A IS NOT OPERATING (DRIVING IN D_2 OR D_3)	0V
12	LG/B	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS OPERATING (DRIVING IN D_1 OR D_2)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE BE IS NOT OPERATING (DRIVING IN D_3 OR D_4)	OV

Diagnostic Procedure

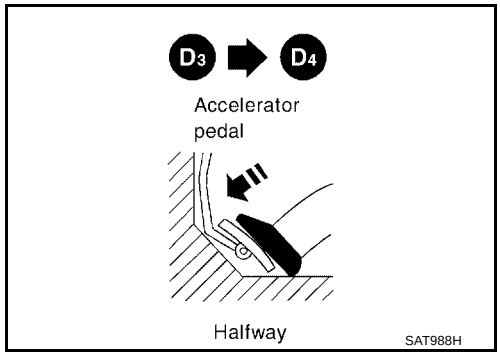
ECS0097T

1. CHECK SHIFT UP (D_3 TO D_4)

During AT-86, "Cruise Test — Part 1" , does A/T shift from D_3 to D_4 at the specified speed?

Yes or No

Yes >> GO TO 11.
No >> GO TO 2.



2. CHECK LINE PRESSURE

Perform line pressure test.

Engine Speed RPM	Line Pressure kPa (kg/cm^2 , psi)	
	D, 2 and 1 Position	R Position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)

Refer to AT-77, "Line Pressure Test" .

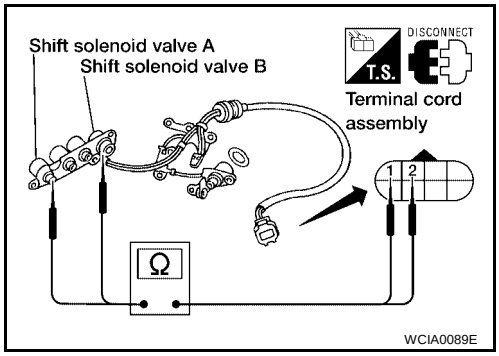
OK or NG

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

3. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
- Shift solenoid valve A
- Shift solenoid valve B
2. Check resistance between two terminals.

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



OK or NG

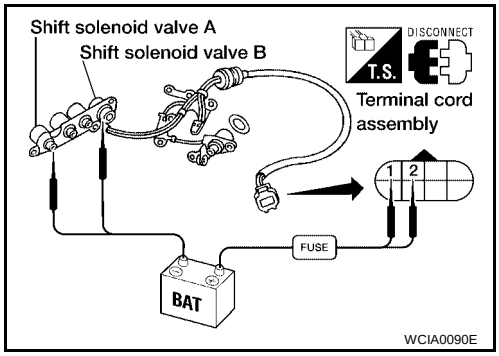
OK >> GO TO 5.
NG >> Replace solenoid valve assembly.

4. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-267, "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.

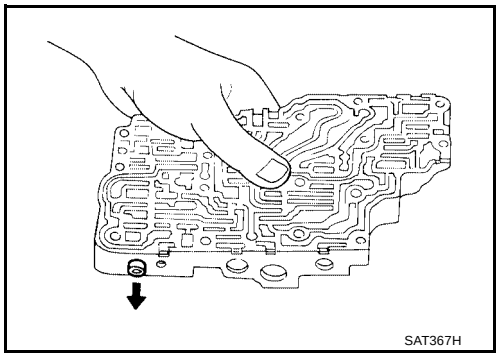
OK or NG

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



5. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-306, "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)

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

OK or NG

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

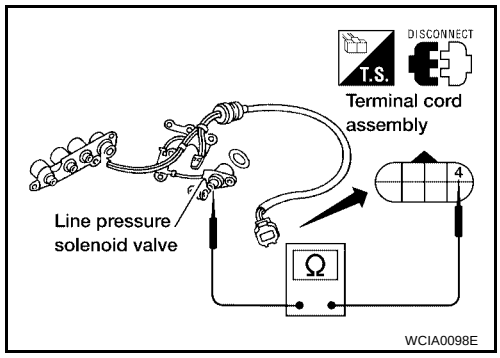
7. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
- Line pressure solenoid valves
2. Check resistance to the terminal and ground.

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

OK or NG

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

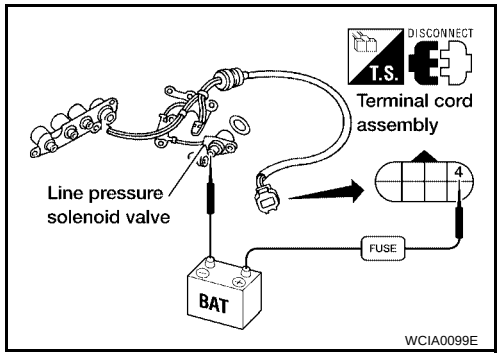


8. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-267, "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.

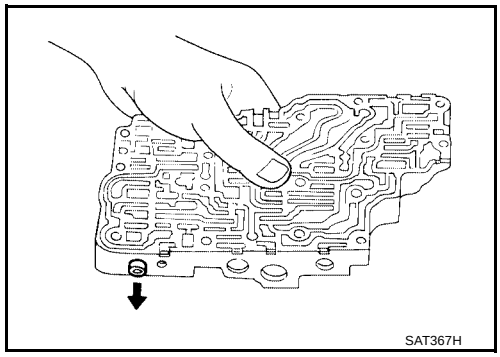


9. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-306, "Control Valve Assembly" .
2. Check line pressure circuit valves for sticking.
- Pressure regulator valve
- Pilot valve
- Pressure modifier valve

OK or NG

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



10. CHECK SHIFT UP (D_3 TO D_4)

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

OK or NG

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

11. CHECK DTC

Perform AT-146, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

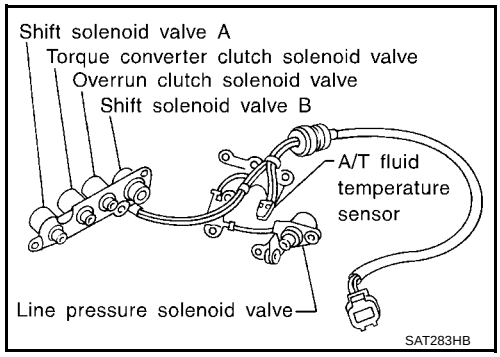
DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

PFP:31940

Description

ECS0097U

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 the ECM (throttle opening). 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

ECS0097V

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

Possible Cause

ECS0097W

Check the following items.

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

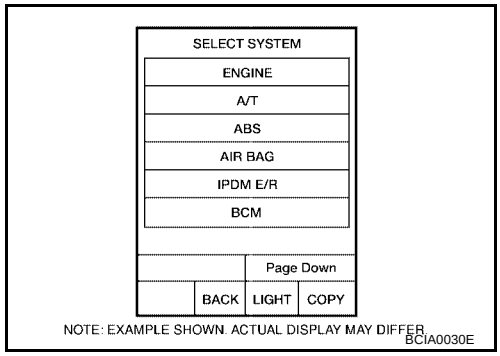
Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0097X

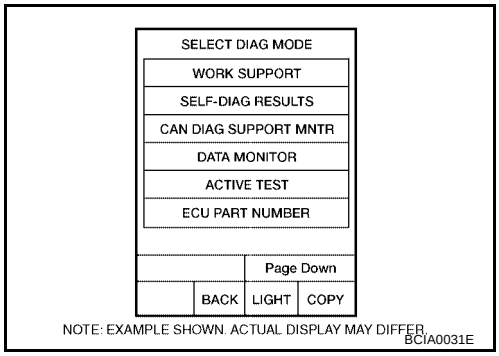
NOTE:
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON.



2. Select “DATA MONITOR” mode for “A/T” with CONSULT-II and wait at least 1 second.



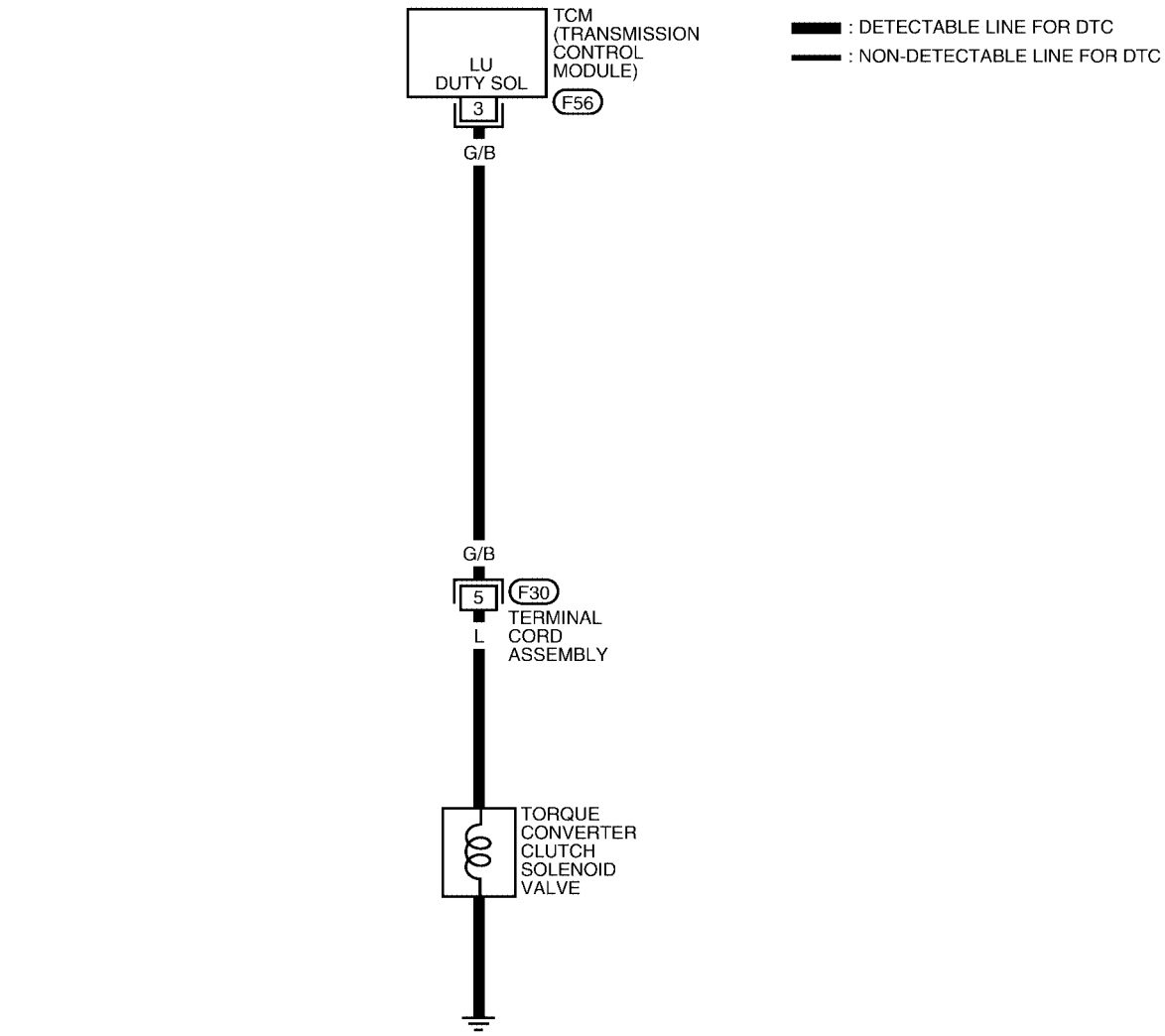
WITH GST

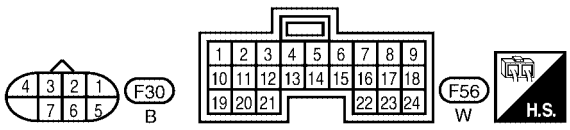
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — TCV

ECS0097Y

AT-TCV-01





LCWA0014E

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
3	G/B	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WITH TORQUE CONVERTER LOCK-UP	8 - 15V
			WITHOUT TORQUE CONVERTER LOCK-UP	0V

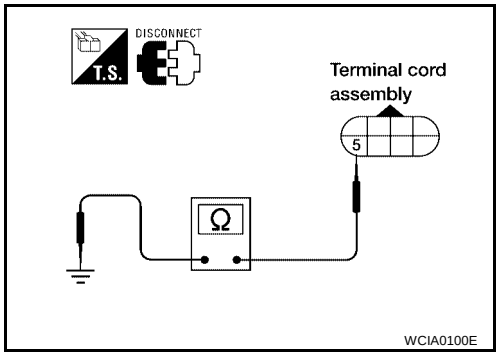
Diagnostic Procedure

ECS0097Z

1. CHECK VALVE RESISTANCE

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

Resistance : 5 - 20Ω



OK or NG

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

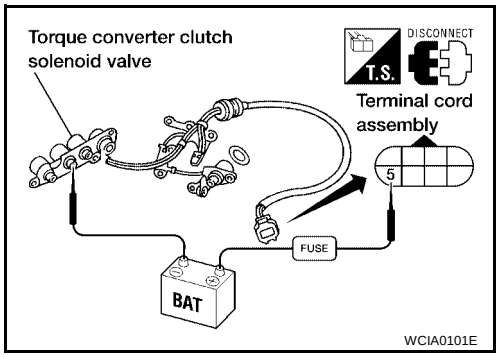
2. CHECK VALVE OPERATION

1. Remove oil pan.
2. Check the following items:

– Torque converter clutch solenoid valve

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

– Harness of terminal cord assembly for short or open



OK or NG

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

3. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal cord assembly harness connector terminal 5 and TCM harness connector terminal 3. Refer to AT-155, "Wiring Diagram — AT — TCV" .

Continuity should exist.

4. Reinstall any part removed.

OK or NG

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

4. CHECK DTC

Perform AT-153, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

5. CHECK TCM INSPECTION

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

OK or NG

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

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

PFP:31940

Description

ECS00980

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

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Torque converter clutch solenoid valve duty	Lock-up OFF ↓ Lock-up ON	Approximately 4% ↓ Approximately 94%

On Board Diagnosis Logic

ECS00981

This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
Torque converter slip ratio = A x C/B
A: Output shaft revolution signal from revolution sensor
B: Engine speed signal from ECM
C: Gear ratio determined as gear position which TCM supposes
If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction. This malfunction will be caused when shift solenoid valve B is stuck closed.
Gear positions supposed by TCM are as follows.
In case of gear position with no malfunctions: 1, 2, 3 and 4 positions
In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and 1* positions to each gear position above
*: P0744 is detected.
Diagnostic trouble code A/T TCC S/V FNCTN with CONSULT-II or P0744 without CONSULT-II is detected when A/T cannot perform lock-up even if electrical circuit is good.

Possible Cause

ECS00982

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

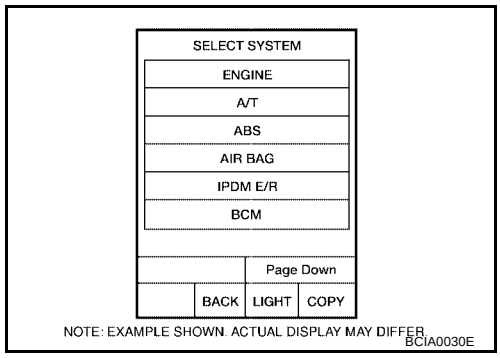
ECS00983

CAUTION:
Always drive vehicle at a safe speed.

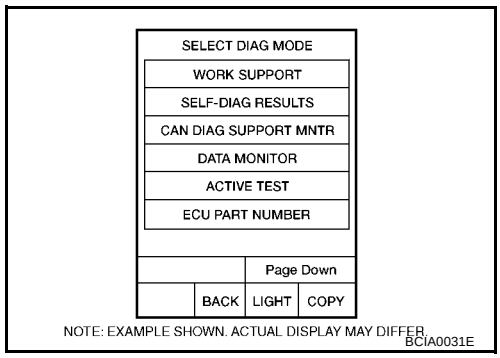
NOTE:
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

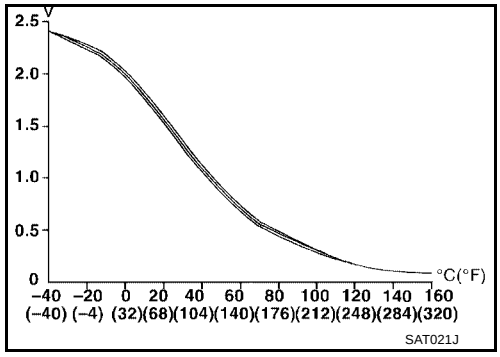
1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SEN: 0.4 - 1.5V
   If out of range, drive vehicle to decrease voltage (warm up the fluid) or stop engine to increase voltage (cool down the fluid).
3. Select “TCC S/V FNCTN P0744” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.



4. Accelerate vehicle to more than 80 km/h (50 MPH) and maintain the following condition continuously until “TESTING” has turned to “COMPLETE”. (It will take approximately 30 seconds after “TESTING” shows.)
   THROTTLE POSI: 1.0/8 - 2.0/8 (at all times during step 4)
   Selector lever: D position
   TCC S/V DUTY: More than 94%
   VHCL/S SE·A/T: Constant speed of more than 80 km/h (50 MPH)
   - **Check that “GEAR” shows “4”.**
   - **For shift schedule, refer to AT-378, "Shift Schedule" .**
   - **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAG RESULTS”. In case a 1st trip DTC other than P0744 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.**



5. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.)
   Refer to AT-161, "Diagnostic Procedure" .
   Refer to AT-378, "Shift Schedule" .



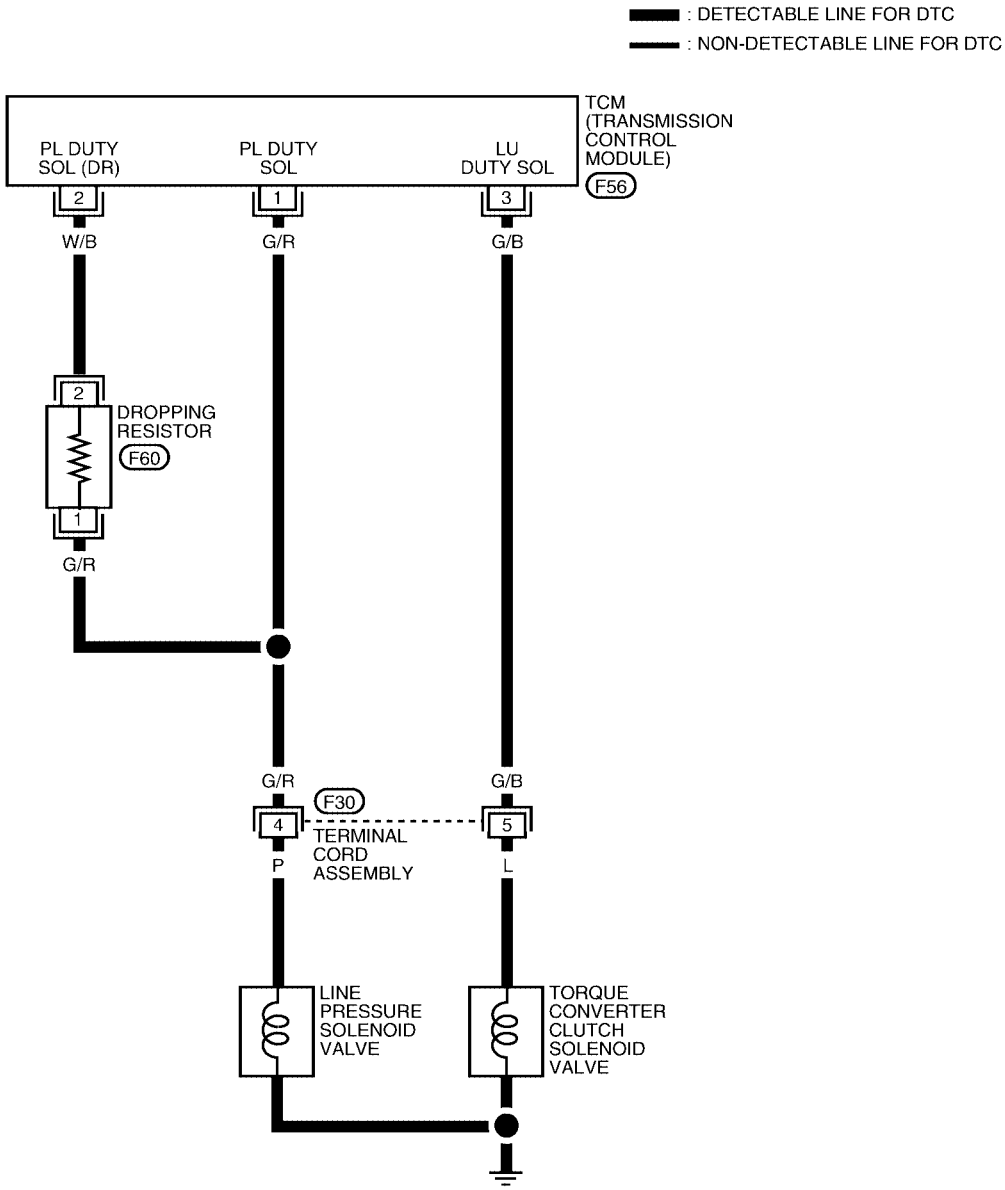
WITH GST

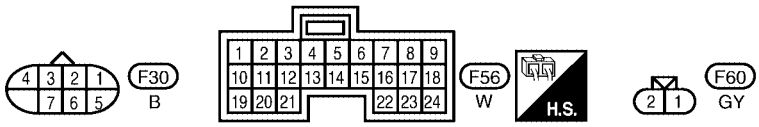
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — TCCSIG

ECS00984

AT-TCCSIG-01





BCWA0143E

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
1	G/R	LINE PRESSURE SOLENOID VALVE	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	1.5 - 3.0V
			WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	0V
2	W/B	LINE PRESSURE SOLENOID VALVE (DROPPING RESISTOR)	WHEN ACCELERATOR PEDAL IS RELEASED WHILE DRIVING	4 - 14V
			WHEN ACCELERATOR PEDAL IS DEPRESSED WHILE DRIVING	0V
3	G/B	TORQUE CONVERTER CLUTCH SOLENOID VALVE	WITH TORQUE CONVERTER LOCK-UP	8 - 15V
			WITHOUT TORQUE CONVERTER LOCK-UP	0V

Diagnostic Procedure

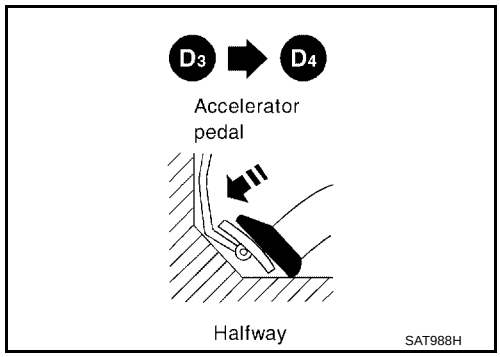
ECS00985

1. CHECK SHIFT UP (D_3 TO D_4)

During AT-86, "Cruise Test — Part 1" , does A/T shift from D_3 to D_4 at the specified speed?

Yes or No

Yes >> GO TO 11.
No >> GO TO 2.



2. CHECK LINE PRESSURE

Perform line pressure test.

Engine Speed RPM	Line Pressure kPa (kg/cm^2 , psi)	
	D, 2 and 1 Position	R Position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)

Refer to AT-77, "Line Pressure Test" .

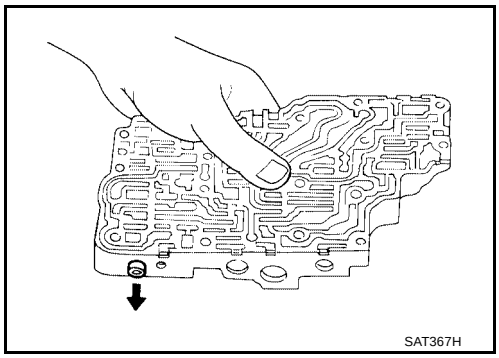
OK or NG

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

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-306, "Control Valve Assembly" .
2. Check to ensure that:

- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.



OK or NG

OK >> GO TO 4.
NG >> Repair control valve.

4. CHECK SHIFT UP (D_3 TO D_4)

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

OK or NG

OK >> GO TO 5.
NG >> Check control valve again. Repair or replace control valve assembly.

5. CHECK DTC

Perform AT-158, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 11. Check for proper lock-up.

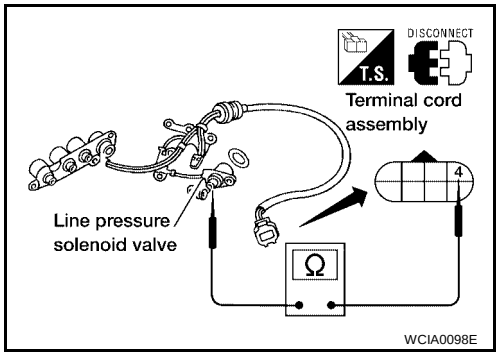
6. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .

- Line pressure solenoid valve

2. Check resistance to the terminal and ground.

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



OK or NG

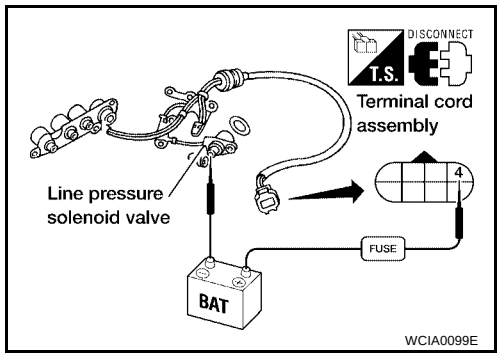
OK >> GO TO 8.
NG >> Replace solenoid valve assembly.

7. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
- Line pressure solenoid valve
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 8.
NG >> Replace solenoid valve assembly.

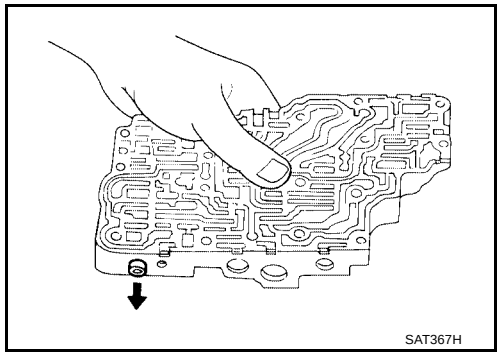


8. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-306, "Control Valve Assembly" .
2. Check line pressure circuit valves for sticking.
- Pressure regulator valve
- Pilot valve
- Pressure modifier valve

OK or NG

OK >> GO TO 9.
NG >> Repair control valve.



9. CHECK SHIFT UP (D_3 TO D_4)

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

OK or NG

OK >> GO TO 10.
NG >> Check control valve again. Repair or replace control valve assembly.

10. CHECK DTC

Perform AT-158, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

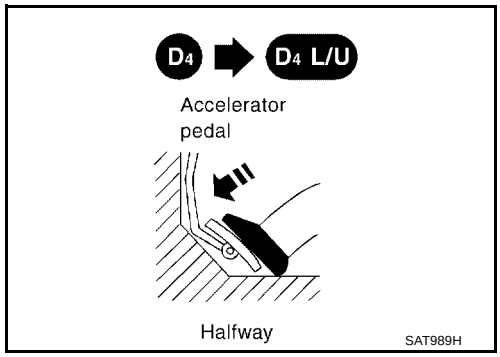
OK >> **INSPECTION END**
NG >> GO TO 11. Check for proper lock-up.

11. CHECK LOCK-UP

During AT-86, "Cruise Test — Part 1" , does A/T perform lock-up at the specified speed?

Yes or No

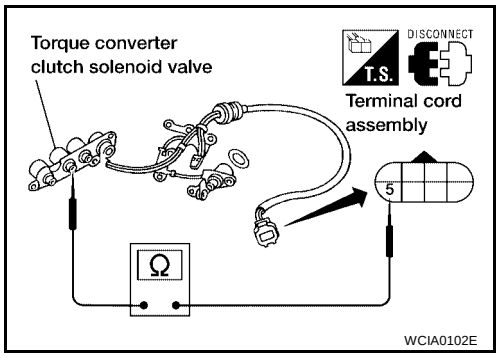
Yes >> Perform “Cruise test — Part 1” again and return to the start point of this test group.
No >> GO TO 12.



12. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
- Torque converter clutch solenoid valve
2. Check resistance to the terminal and ground.

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



OK or NG

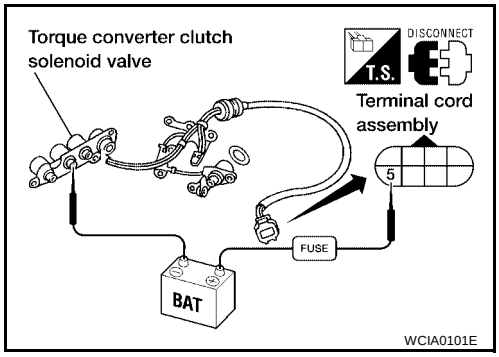
OK >> GO TO 14.
NG >> Replace solenoid valve assembly.

13. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
- Torque converter clutch solenoid valve
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 14.
NG >> Replace solenoid valve assembly.

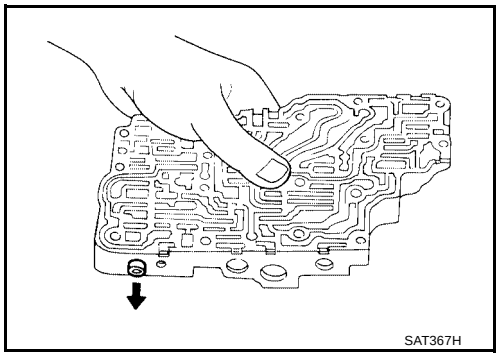


14. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-306, "Control Valve Assembly" .
2. Check control valves for sticking.
- Torque converter clutch control valve
- Torque converter clutch relief valve

OK or NG

OK >> GO TO 15.
NG >> Repair control valve.



15. CHECK LOCK-UP

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

Yes or No

Yes >> GO TO 16.
No >> Check control valve again. Repair or replace control valve assembly.

16. CHECK DTC

Perform AT-158, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

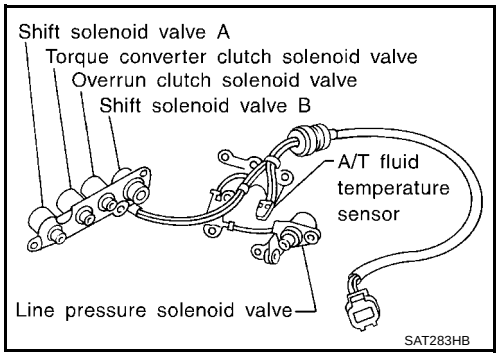
DTC P0745 LINE PRESSURE SOLENOID VALVE

PFP:31940

Description

ECS00986

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.



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

ECS00987

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

Possible Cause

ECS00988

Check the following items.

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

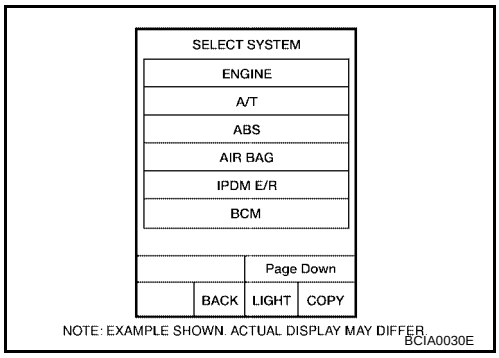
Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS00989

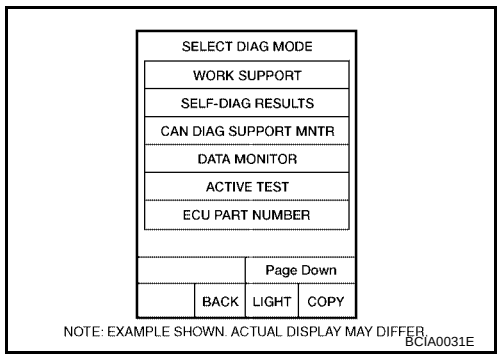
NOTE:
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

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



2. Depress accelerator pedal completely and wait at least 1 second.



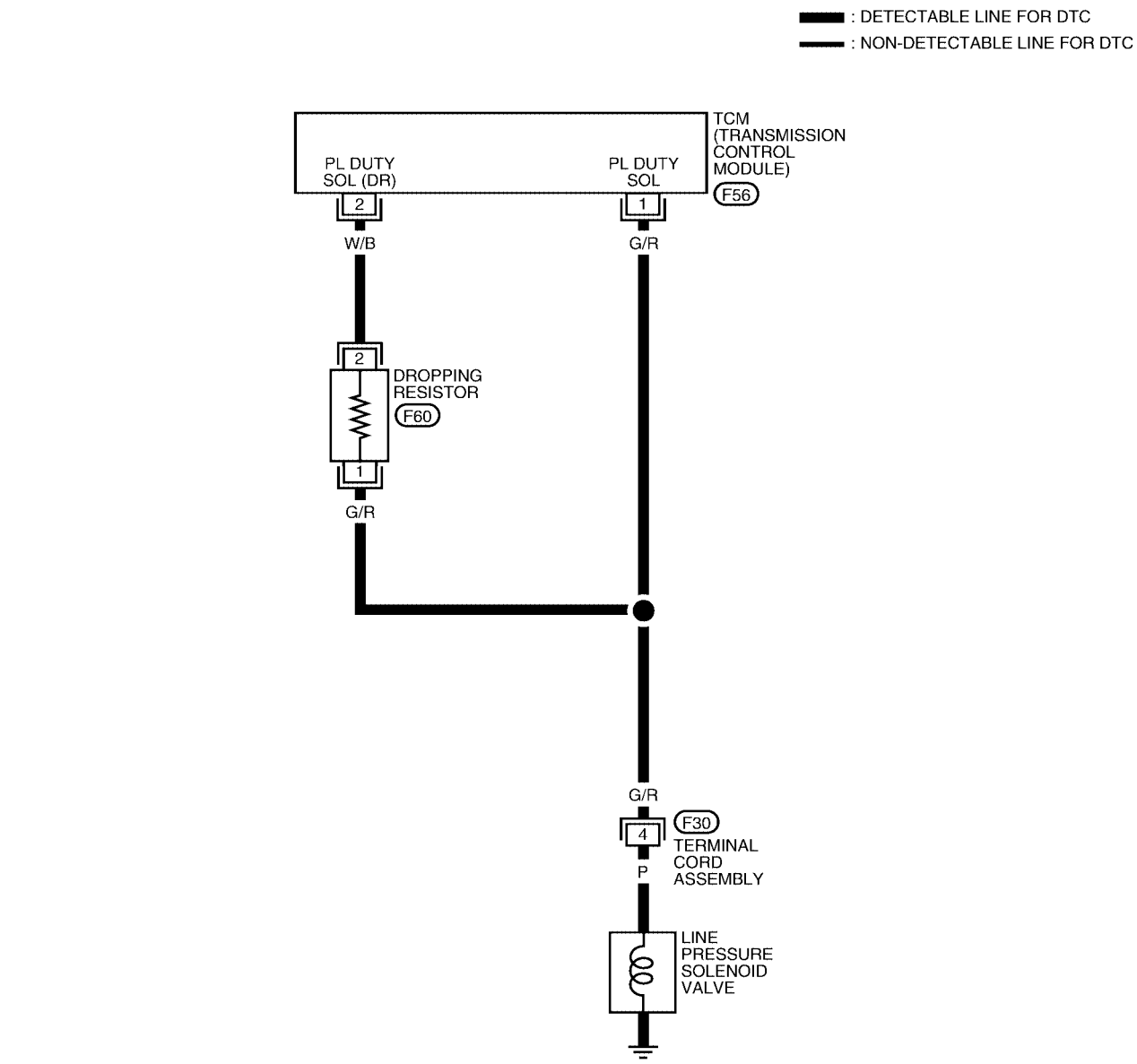
WITH GST

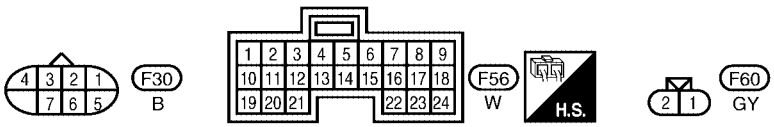
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — LPSV

ECS0098A

AT-LPSV-01





BCWA0468E

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

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

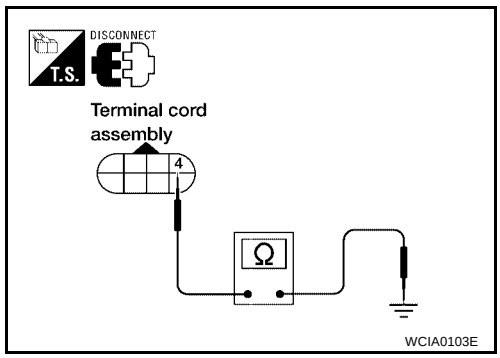
Diagnostic Procedure

ECS0098B

1. CHECK VALVE RESISTANCE

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

Resistance : 2.5 - 5Ω



OK or NG

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

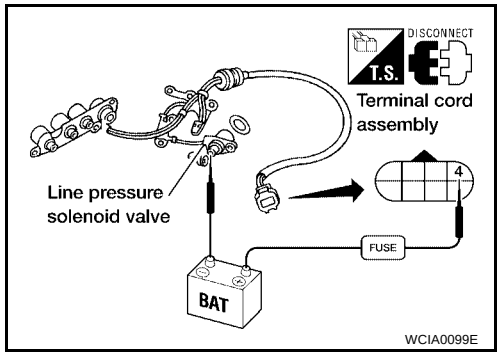
2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
2. Check the following items:

– Line pressure solenoid valve

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

– Harness of terminal cord assembly for short or open



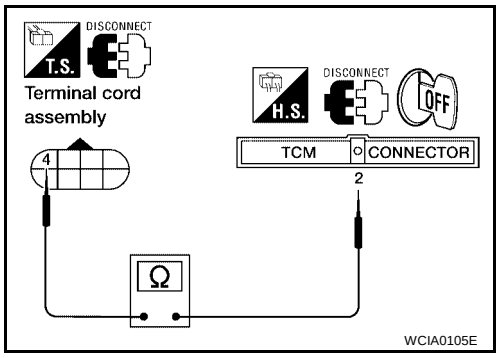
OK or NG

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

3. CHECK POWER SOURCE AND DROPPING RESISTOR CIRCUIT

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

Resistance : 10 - 15Ω



OK or NG

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

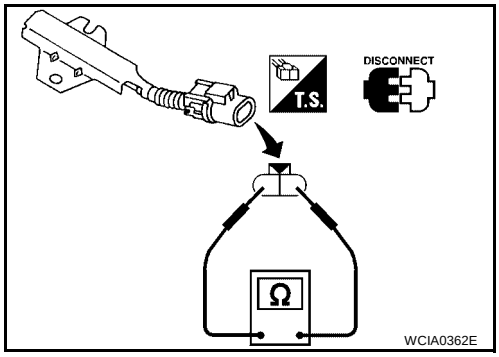
4. DETECT MALFUNCTIONING ITEM

Check the following items:

- Dropping resistor
- Check resistance between two terminals.

Resistance :10 - 15Ω

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



OK or NG

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

5. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Check continuity between terminal cord assembly harness connector terminal 4 and TCM harness connector terminal 1. Refer to AT-168, "Wiring Diagram — AT — LPSV" .

Continuity should exist.

3. Reinstall any part removed.

OK or NG

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

6. CHECK DTC

Perform AT-166, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

7. CHECK TCM INSPECTION

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

OK or NG

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

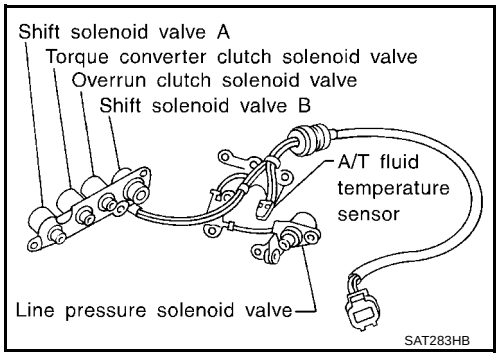
DTC P0750 SHIFT SOLENOID VALVE A

PFP:31940

Description

ECS0098C

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

On Board Diagnosis Logic

ECS0098D

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

Possible Cause

ECS0098E

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0098F

CAUTION:

Always drive vehicle at a safe speed.

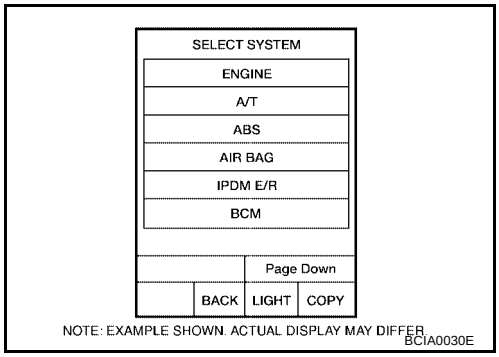
NOTE:

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

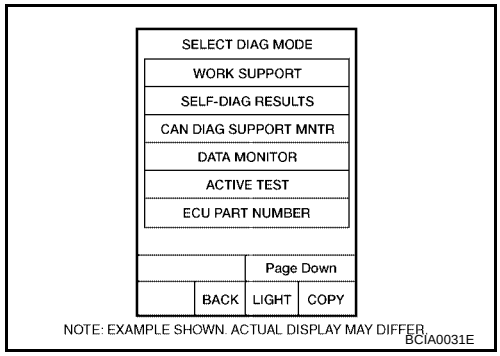
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. 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 transaxle to shift 1 → 2 (“GEAR”).



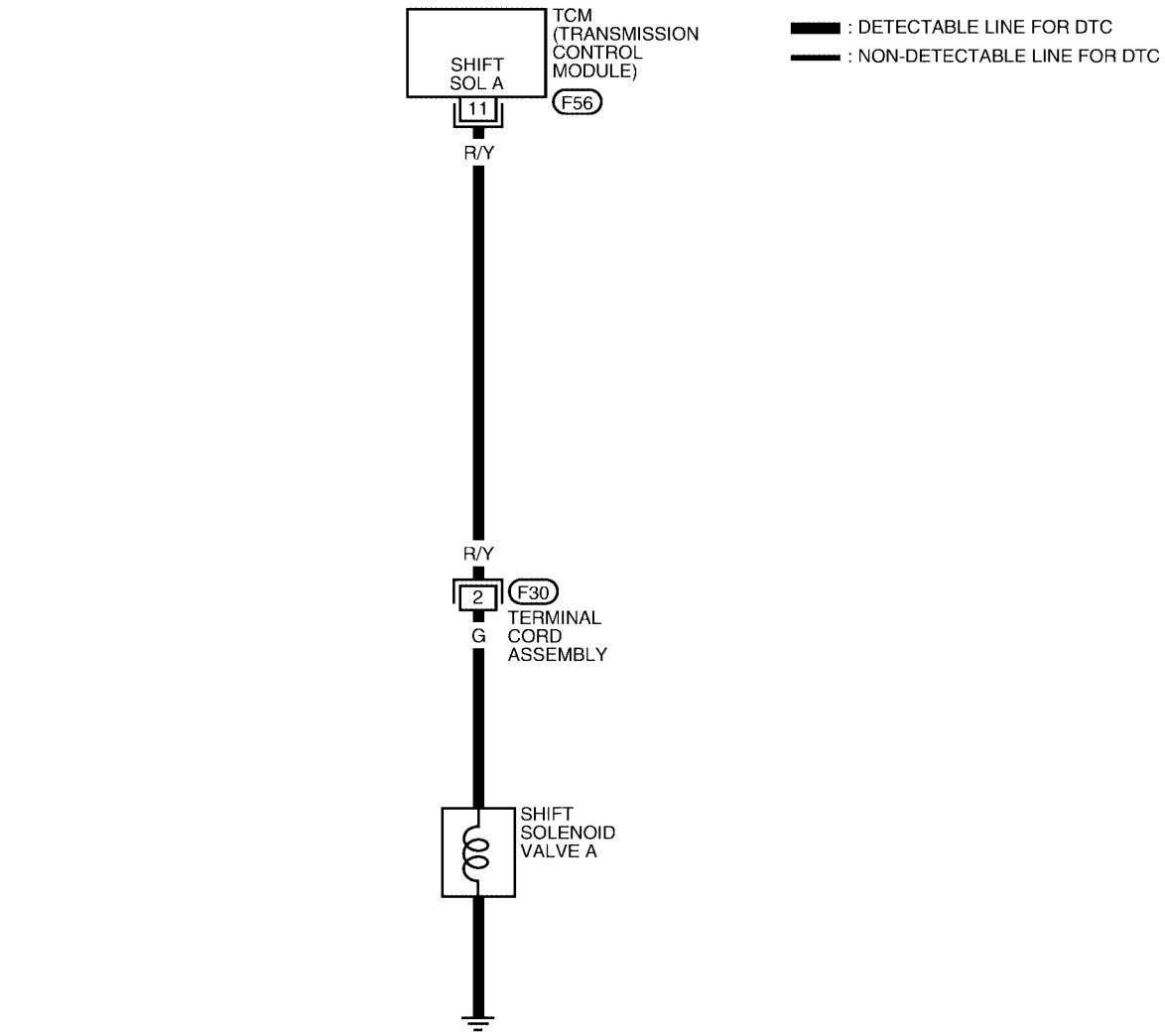
WITH GST

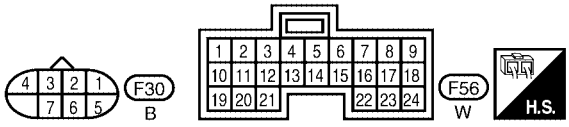
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/A

ECS0098G

AT-SSV/A-01





LCWA0017E

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
11	R/Y	SHIFT SOLENOID VALVE A	WHEN SHIFT SOLENOID VALVE A IS OPERATING (DRIVING IN D_1 OR D_4)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE A IS NOT OPERATING (DRIVING IN D_2 OR D_3)	0V

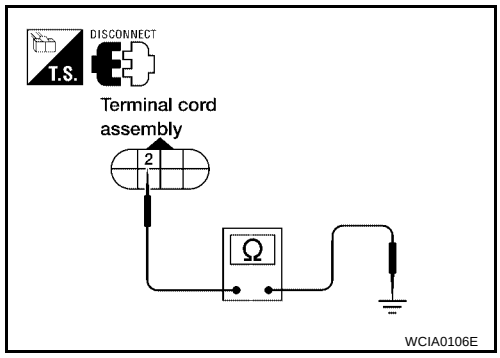
Diagnostic Procedure

ECS0098H

1. CHECK VALVE RESISTANCE

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

Resistance : 20 - 30Ω



OK or NG

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

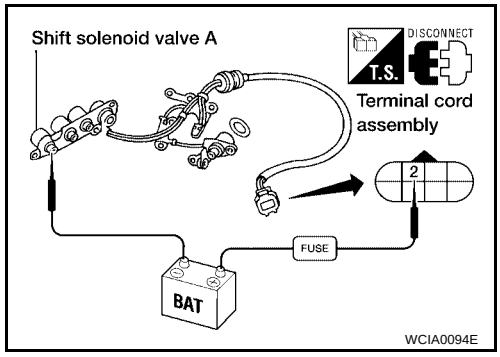
2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
2. Check the following items:

– Shift solenoid valve A
– Operation check

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

– Harness of terminal cord assembly for short or open



OK or NG

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

3. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal cord assembly harness connector terminal 2 and TCM harness connector terminal 11. Refer to AT-174, "Wiring Diagram — AT — SSV/A" .

Continuity should exist.

4. Reinstall any part removed.

OK or NG

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

4. CHECK DTC

Perform AT-172, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

5. CHECK TCM INSPECTION

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

OK or NG

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

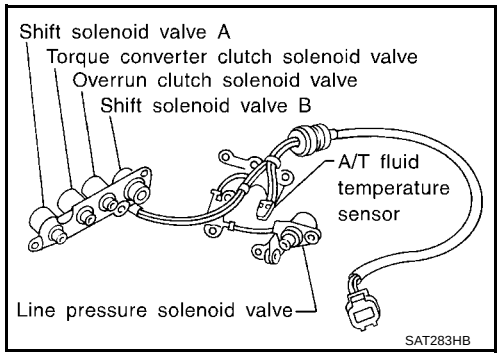
DTC P0755 SHIFT SOLENOID VALVE B

PFP:31940

Description

ECS0098I

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

On Board Diagnosis Logic

ECS0098J

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

Possible Cause

ECS0098K

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0098L

CAUTION:

Always drive vehicle at a safe speed.

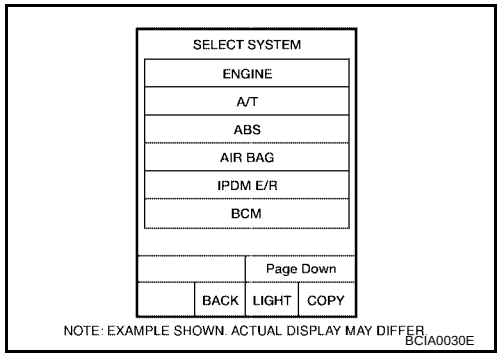
NOTE:

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

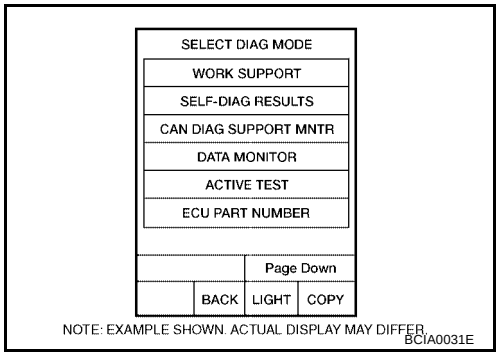
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. 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 transaxle to shift 1 → 2 → 3 (“GEAR”).



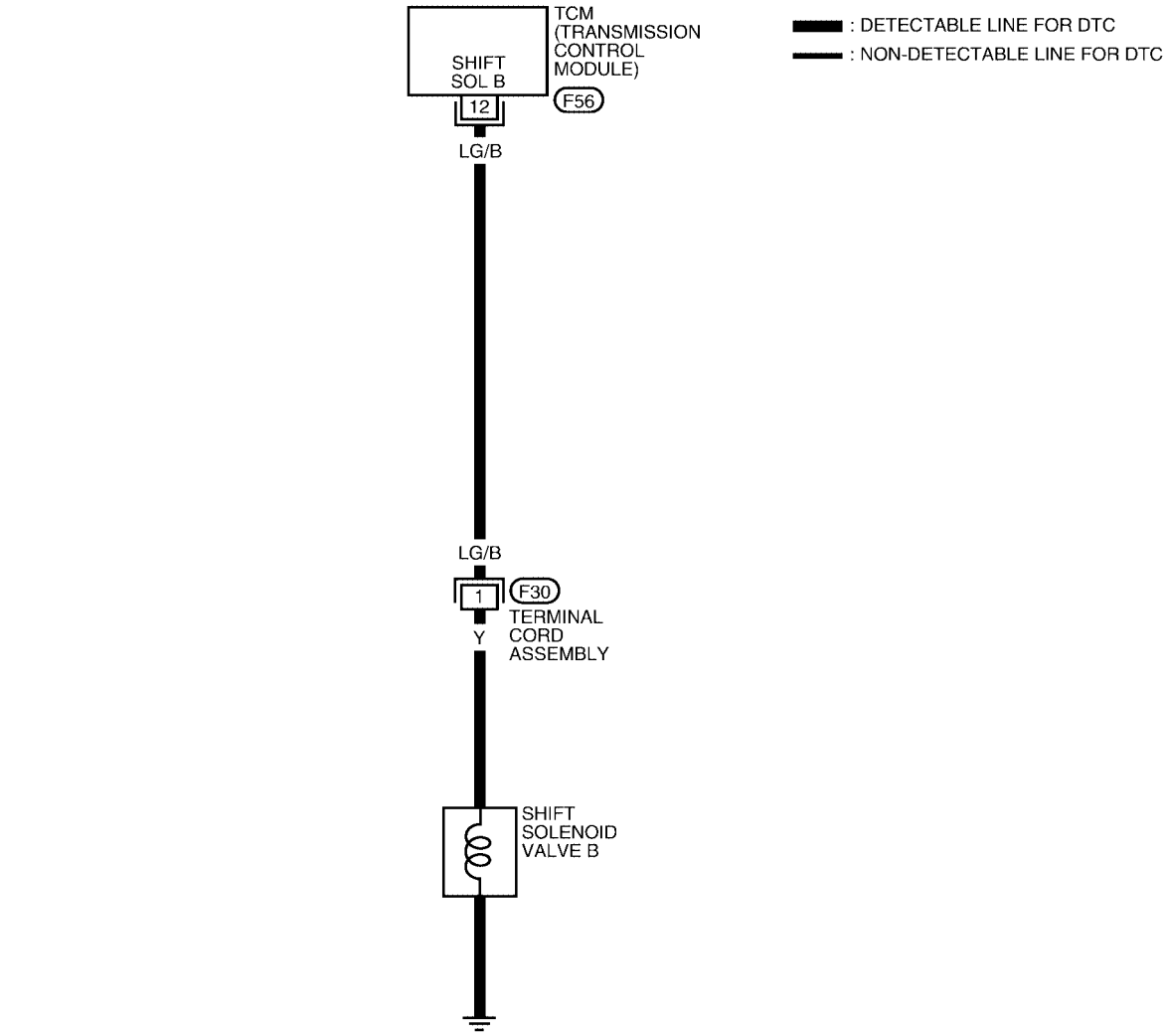
WITH GST

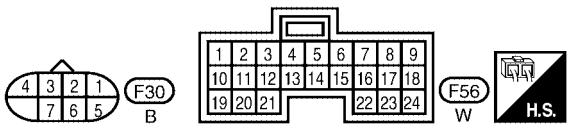
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/B

ECS0098M

AT-SSV/B-01





LCWA0018E

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
12	LG/B	SHIFT SOLENOID VALVE B	WHEN SHIFT SOLENOID VALVE B IS OPERATING (DRIVING IN D_1 OR D_2)	BATTERY VOLTAGE
			WHEN SHIFT SOLENOID VALVE BE IS NOT OPERATING (DRIVING IN D_3 OR D_4)	0V

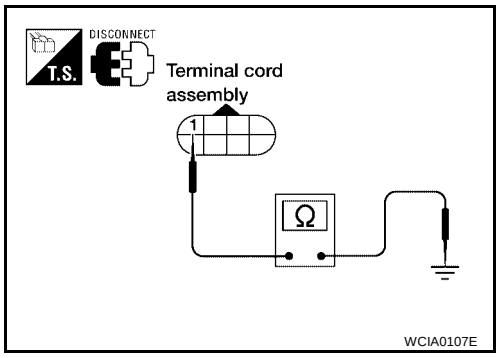
Diagnostic Procedure

ECS0098N

1. CHECK VALVE RESISTANCE

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

Resistance : 5 - 20Ω



OK or NG

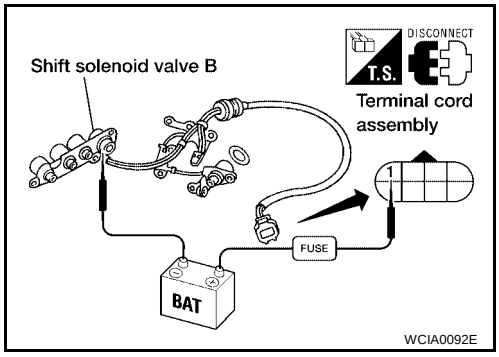
OK >> GO TO 3.
NG >> GO TO 2.

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift solenoid valve B
- Operation check

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.
- Harness of terminal cord assembly for short or open



OK or NG

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

3. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal cord harness connector terminal 1 and TCM harness connector terminal 12. Refer to AT-179, "Wiring Diagram — AT — SSV/B" .

Continuity should exist.

4. Reinstall any part removed.

OK or NG

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

4. CHECK DTC

Perform AT-177, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

5. CHECK TCM INSPECTION

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

OK or NG

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

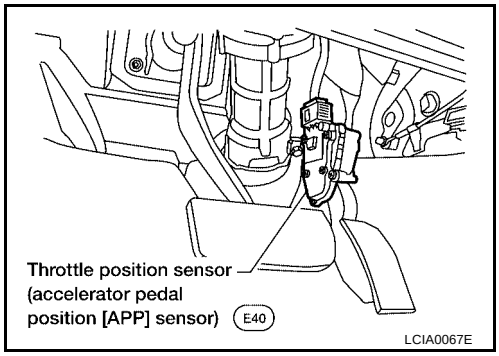
DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

PFP:22560

Description

ECS0098O

Electric throttle control actuator consists of throttle control motor, accelerator pedal position sensor, throttle position sensor, etc. The actuator sends signals to the ECM, and ECM sends signals to TCM via CAN communication.



CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
THROTTLE POSI	Released accelerator pedal	0.0/8
	Fully depressed accelerator pedal	8.0/8

On Board Diagnosis Logic

ECS0098P

This is an OBD self-diagnostic item.
Diagnostic trouble code "P1705 THROTTLE POSI SEN" with CONSULT-II or 3rd judgement flicker without CONSULT-II is detected when TCM does not receive the proper accelerator pedal position signals (input via CAN communication from ECM.

Possible Cause

ECS0098Q

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

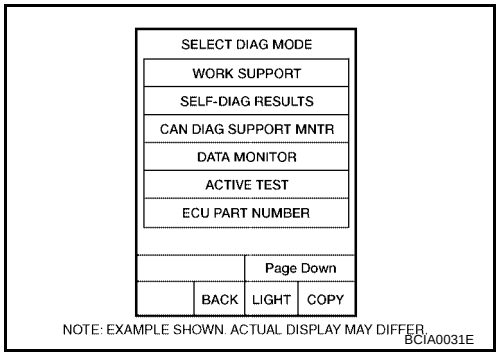
ECS0098R

CAUTION:
Always drive vehicle at a safe speed.

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

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Depress accelerator pedal fully and release it, then wait for 5 seconds.
3. If DTC is detected, go to AT-183, "Diagnostic Procedure" .



WITH GST

Follow the procedure “With CONSULT-II”.

Diagnostic Procedure

ECS0098T

1. CHECK CAN COMMUNICATIN LINE

Perform the self-diagnosis check. Refer to AT-49, "SELF-DIAGNOSTIC RESULT TEST MODE" , AT-59, "Diagnostic Procedure Without CONSULT-II" .

Is any malfunction of the "U1000 CAN COMM CIRCUIT" indicated?

YES >> Check the CAN communication line. Refer to AT-190, "DTC U1000 CAN COMMUNICATION LINE" .

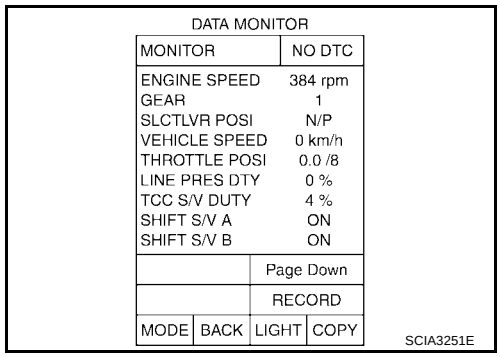
NO >> GO TO 2.

2. CHECK INPUT SIGNAL

With CONSULT-II

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

Item name	Condition	Display value (Approx.)
THROTTLE POSI	Release accelerator pedal	0.0/8
	Fully depressed accelerator pedal	8.0/8



OK or NG

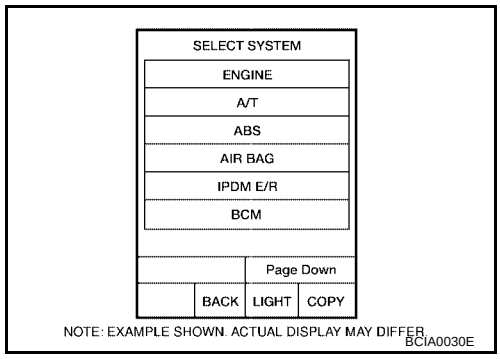
OK >> GO TO 4.

NG >> GO TO 3.

3. CHECK DTC WITH ECM

With CONSULT-II

1. Turn ignition switch to ON position. (Do not start engine.)
2. Select "SELF-DIAG RESULTS" mode for "Engine" with CONSULT-II. Refer to EC-121, "SELF-DIAG RESULTS MODE" .



OK or NG

OK >> GO TO 4.

NG >> Check the DTC detected item. GO TO EC-121, "SELF-DIAG RESULTS MODE" .

4. CHECK DTC

Perform "DTC Confirmation Procedure". Refer to AT-182, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 5.

5. CHECK TCM INSPECTION

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

OK or NG

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

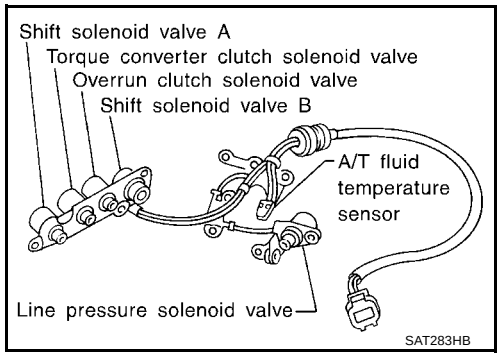
DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

PFP:31940

Description

ECS0098U

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 ECM (throttle opening). The overrun clutch operation will then be controlled.



On Board Diagnosis Logic

ECS0098V

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

Possible Cause

ECS0098W

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0098X

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

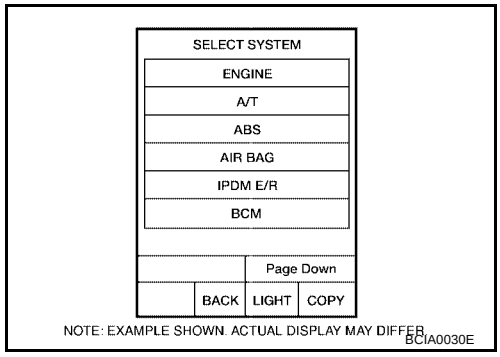
TESTING CONDITION:

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

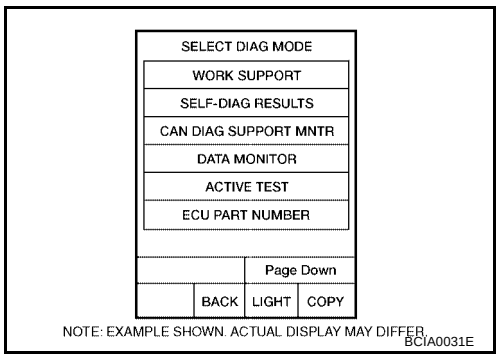
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Touch "MAIN SIGNALS".
   Touch "START".
3. Start engine.
4. Accelerate vehicle to a speed of more than 10 km/h (6 MPH) with selector lever in D position.



5. Release accelerator pedal completely with selector lever in 3 position. Verify operation of "OVERRUN/C S/V".



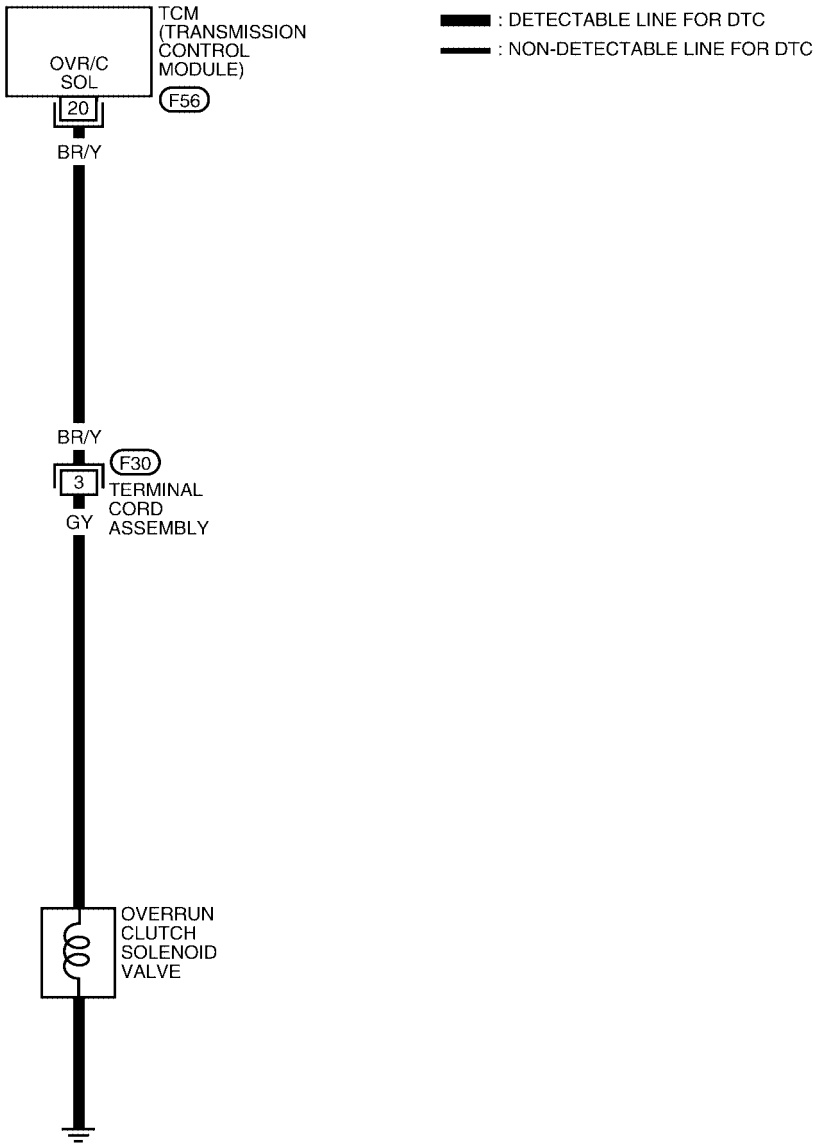
WITH GST

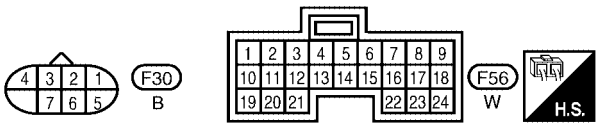
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — OVRCSV

ECS0098Y

AT-OVRCSV-01





WCWA0053E

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
20	BR/Y	OVERRUN CLUTCH SOLENOID VALVE	WHEN OVERRUN CLUTCH SOLENOID VALVE OPERATES	BATTERY VOLTAGE
			WHEN OVERRUN CLUTCH SOLENOID VALVE DOES NOT OPERATE	0V

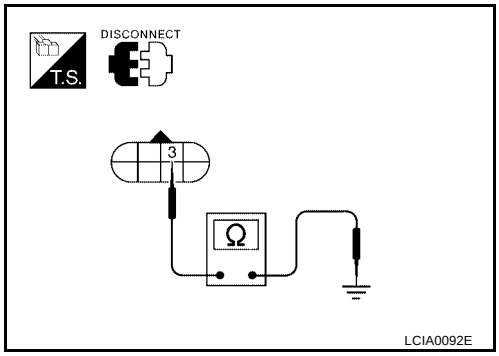
Diagnostic Procedure

ECS0098Z

1. CHECK VALVE RESISTANCE

1. Turn ignition switch to OFF position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal cord assembly F30 terminal 3 (component side) and ground.

Resistance : 20 - 30Ω



OK or NG

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

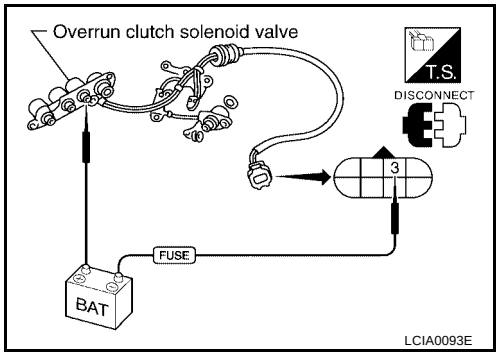
2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Overrun clutch solenoid valve
- Operation check

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

- Harness of terminal cord assembly for short or open



OK or NG

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

3. CHECK POWER SOURCE CIRCUIT

1. Turn ignition switch to OFF position.
2. Disconnect TCM harness connector.
3. Check continuity between terminal cord assembly harness connector terminal 3 and TCM harness connector terminal 20. Refer to AT-187, "Wiring Diagram — AT — OVRCSV" .

Continuity should exist.

4. Reinstall any part removed.

OK or NG

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

4. CHECK DTC

Perform AT-185, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

5. CHECK TCM INSPECTION

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

OK or NG

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

DTC U1000 CAN COMMUNICATION LINE

PFP:23710

Description

ECS00990

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

ECS00991

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code A/T COMM LINE or U1000 with CONSULT-II and 12th judgement flicker without CONSULT-II is detected when TCM cannot communicate to other control unit.

Possible Cause

ECS00992

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

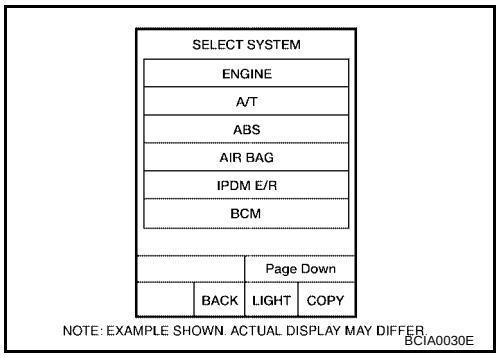
DTC Confirmation Procedure

ECS00993

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.

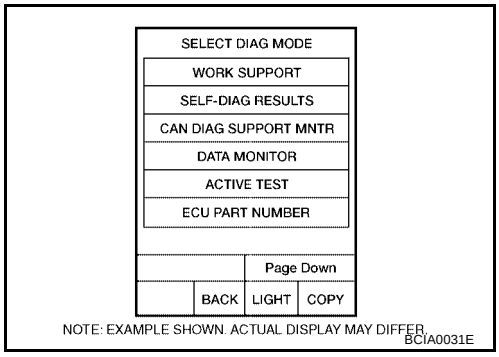
WITH CONSULT-II

1. Turn ignition switch to "ON" position. (Do not start engine.)
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Start engine and wait for at least 6 seconds.
4. If DTC is detected, go to AT-193, "Diagnostic Procedure" .



WITH GST

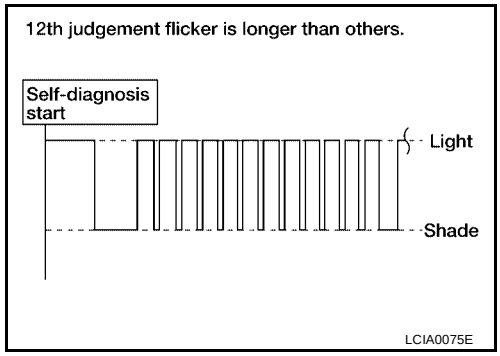
Follow the procedure "WITH CONSULT-II".



WITHOUT CONSULT-II

1. Turn ignition switch "ON".

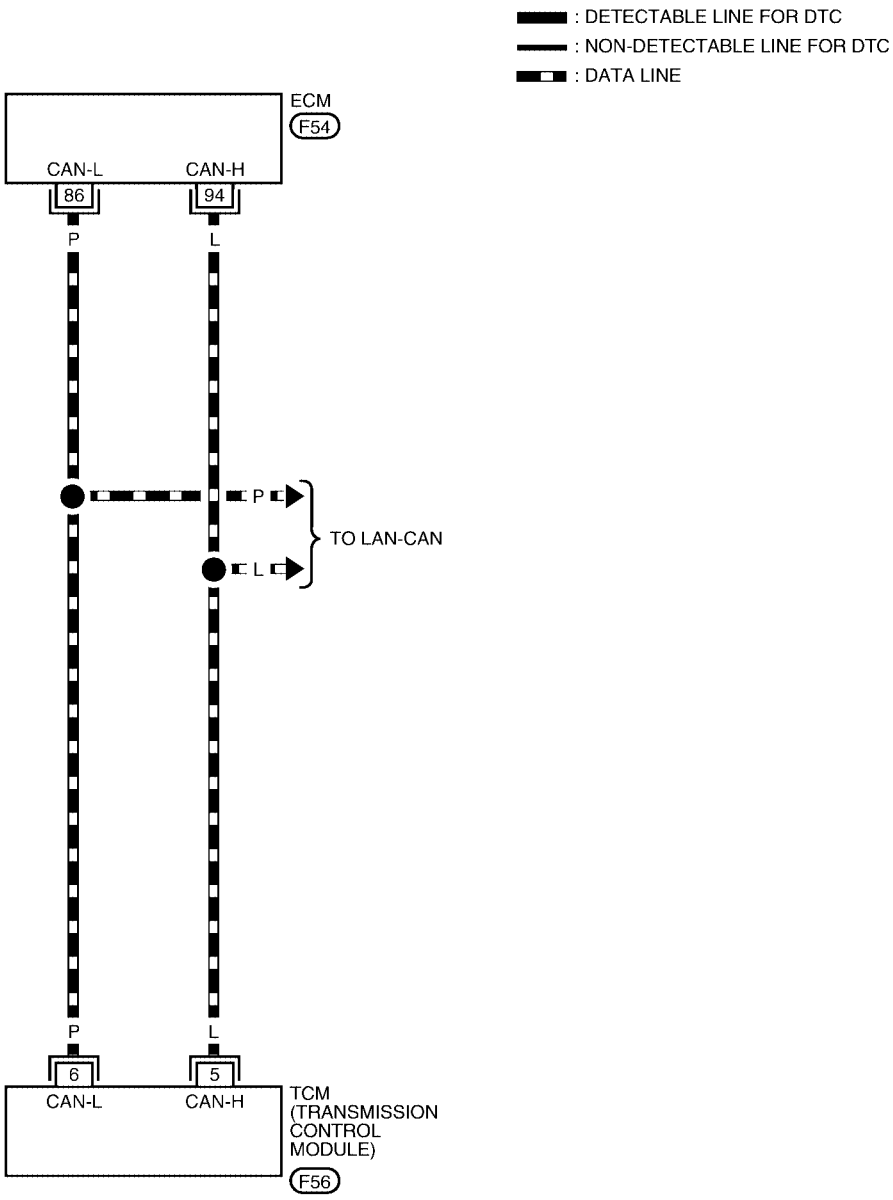
2. Wait at least 6 seconds or start engine and wait at least 6 seconds.
3. Perform self-diagnosis. Refer to AT-60, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .

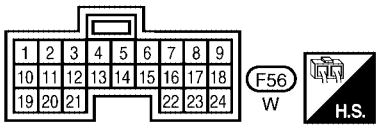


Wiring Diagram — AT — CAN

ECS00994

AT-CAN-01





REFER TO THE FOLLOWING.
F54 - ELECTRICAL UNITS

BCWA0469E

Diagnostic Procedure

ECS00995

1. CHECK CAN COMMUNICATION CIRCUIT

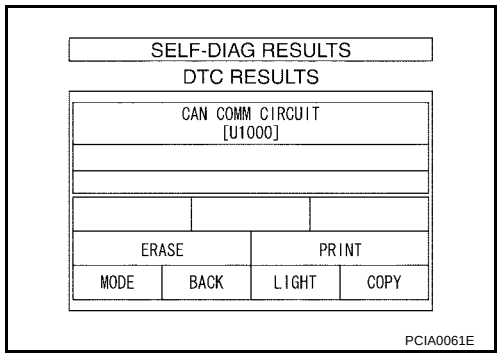
With CONSULT-II

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

Yes or No

Yes >> Print out CONSULT-II screen, GO TO LAN-3, "Precautions When Using CONSULT-II" .

No >> **INSPECTION END**



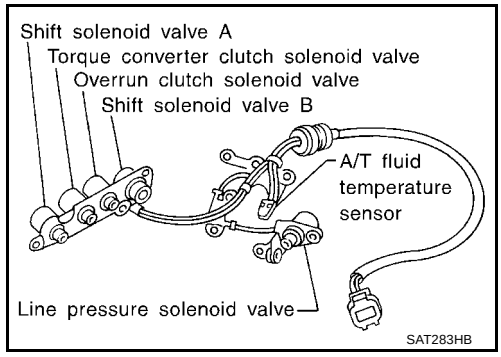
DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

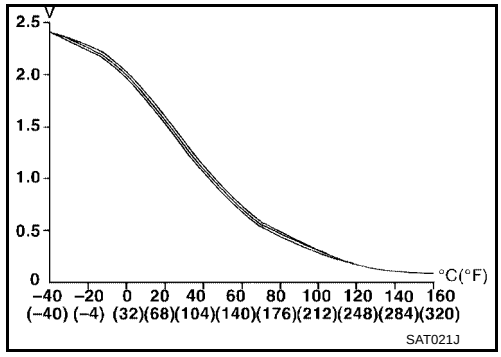
PFP:31940

Description

ECS00996

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

ECS00997

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

Possible Cause

ECS00998

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

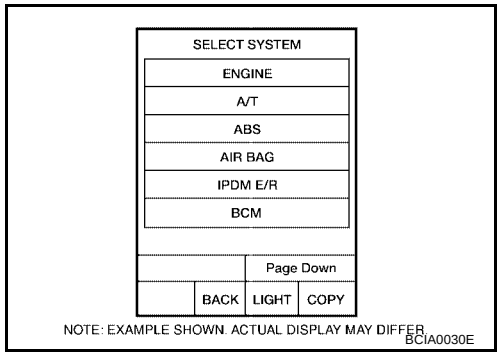
ECS00999

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

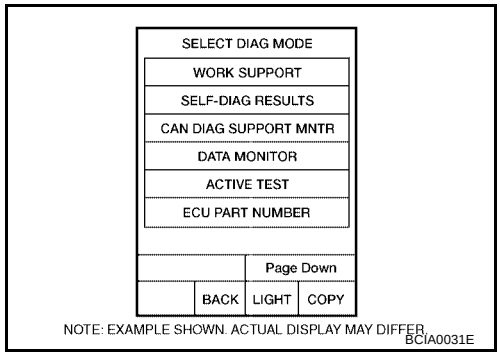
WITH CONSULT-II

1. Start engine.

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

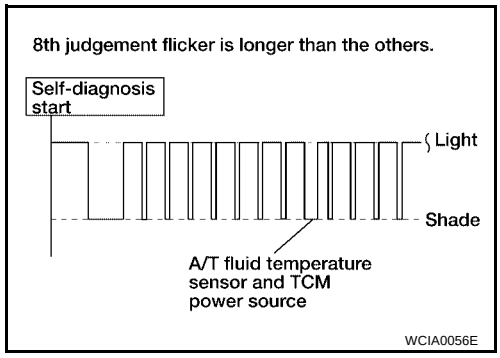


3. Drive vehicle under the following conditions:
   Selector lever in D, vehicle speed higher than 20 km/h (12 MPH).



WITHOUT CONSULT-II

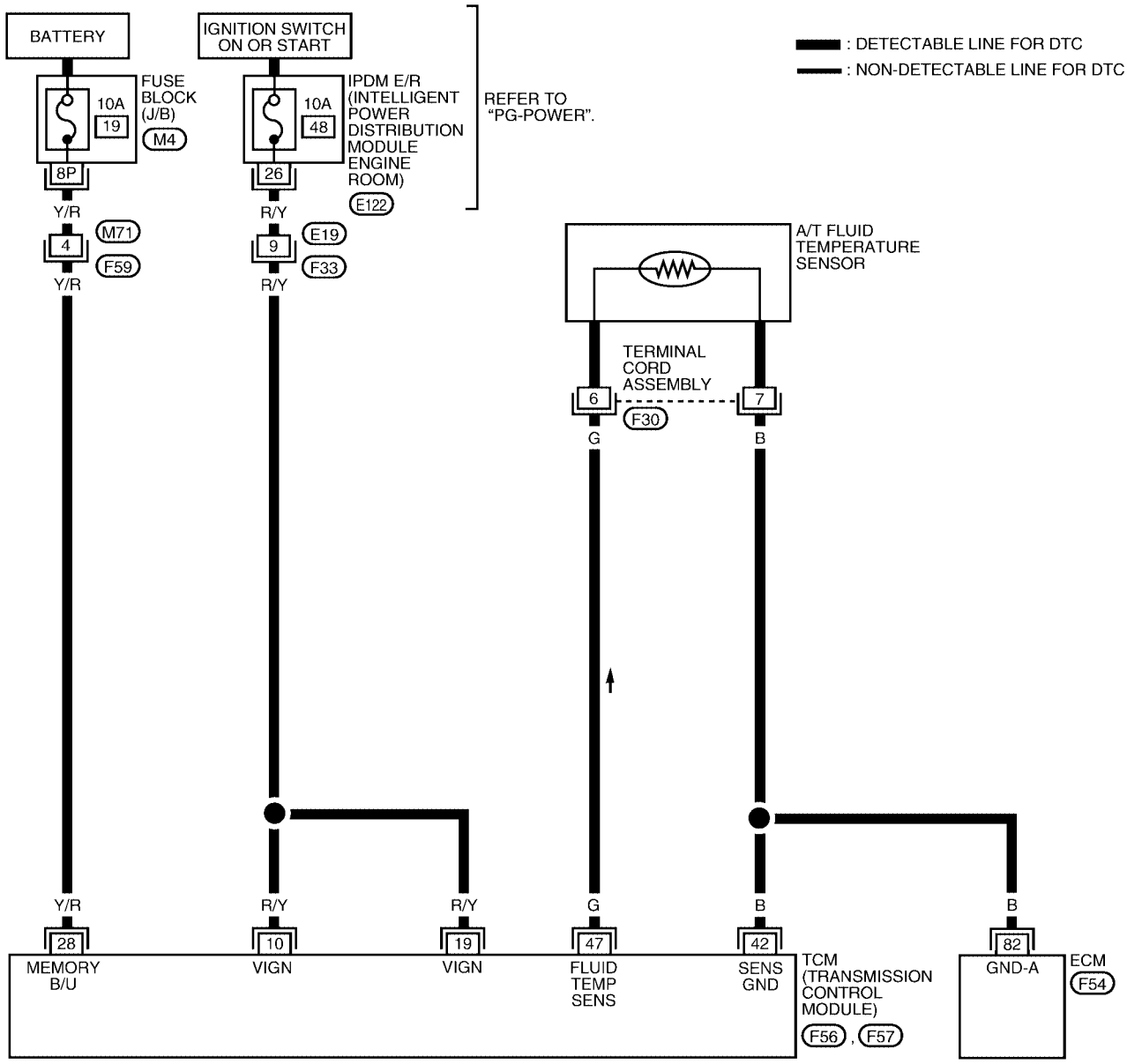
1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in D, vehicle speed higher than 20 km/h (12 MPH).
3. Perform self-diagnosis.
   Refer to AT-60, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .

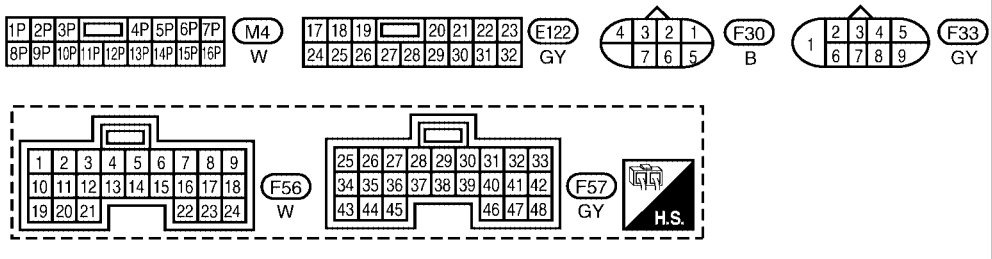


Wiring Diagram — AT — BA/FTS

ECS0099A

AT-BA/FTS-01





REFER TO THE FOLLOWING.
F54 - ELECTRICAL UNITS

BCWA0470E

TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
10	R/Y	POWER SOURCE	IGNITION ON	BATTERY VOLTAGE
			IGNITION OFF	0V
19	R/Y	POWER SOURCE	IGNITION ON	BATTERY VOLTAGE
			IGNITION OFF	0V
28	Y/R	POWER SOURCE (MEMORY BACKUP)	IGNITION ON	BATTERY VOLTAGE
			IGNITION OFF	BATTERY VOLTAGE
42	B	SENSOR GROUND	—	—
47	G	A/T FLUID TEMPERATURE SENSOR	IGNITION ON WITH ATF TEMPERATURE AT 20°C (68°F)	1.5V
			IGNITION ON WITH ATF TEMPERATURE AT 80°C (176°F)	0.5V

Diagnostic Procedure

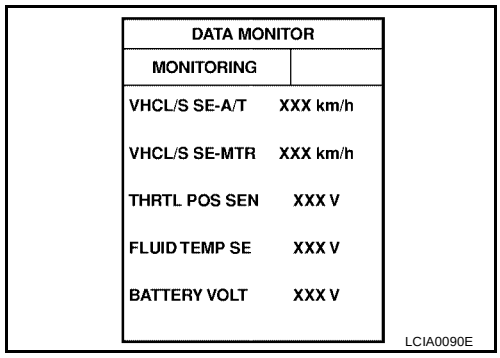
ECS0099B

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

With CONSULT-II

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

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



OK or NG

OK >> GO TO 9.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM, ECM and terminal cord assembly (Main harness)
- Ground circuit for ECM
  Refer to EC-148, "POWER SUPPLY AND GROUND CIRCUIT" .

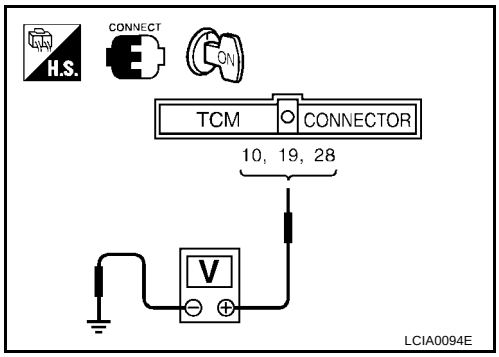
OK or NG

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

3. CHECK TCM POWER SOURCE STEP 1

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

Voltage : Battery voltage



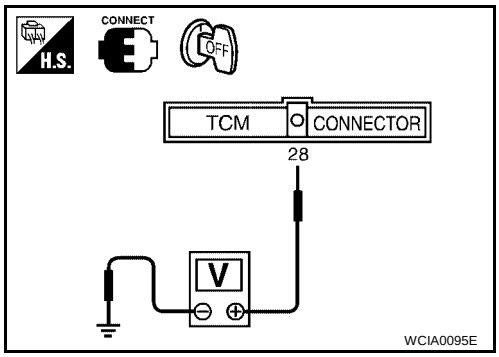
OK or NG

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

4. CHECK TCM POWER SOURCE STEP 2

1. Turn ignition switch to OFF position.
2. Check voltage between TCM harness connector terminal 28 and ground.

Voltage : Battery voltage



OK or NG

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

5. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and TCM (Main harness)
- Ignition switch and fuse
  Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .

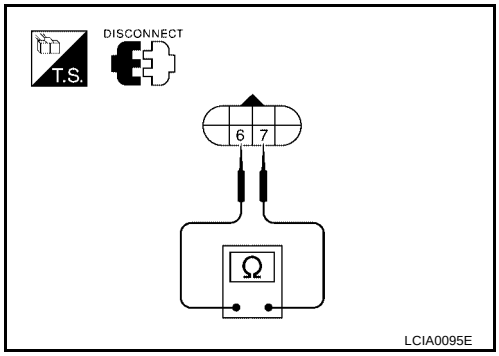
OK or NG

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

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

1. Turn ignition switch to OFF position.
2. Disconnect terminal cord assembly connector in engine compartment.
3. Check resistance between terminal cord assembly F30 terminals 6 and 7 (component side) when A/T is cold.

Temperature	Resistance (Approx.)
Cold 20°C (68°F)	2.5kΩ



4. Reinstall any part removed.

OK or NG

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

7. DETECT MALFUNCTIONING ITEM

1. Remove oil pan.
2. Check the following items:

– A/T fluid temperature sensor

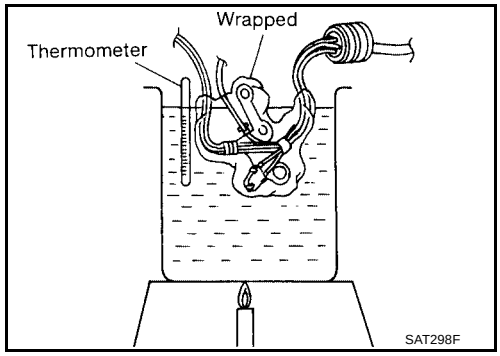
- Check resistance between two terminals while changing temperature as shown.

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

– Harness of terminal cord assembly for short or open

OK or NG

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



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

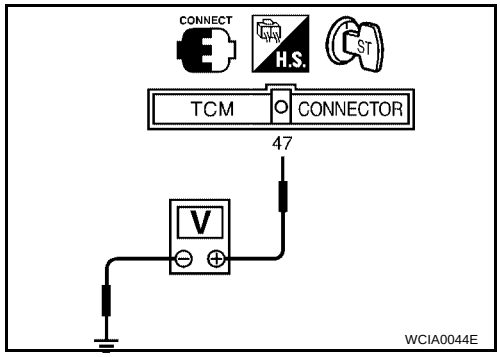
Without CONSULT-II

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

Temperature	Voltage (Approx.)
Cold [20°C (68°F)] → Hot [80°C (176°F)]	1.5V → 0.5V

3. Turn ignition switch to OFF position.
4. Disconnect TCM harness connector.
5. Check resistance between terminal 42 and ground. Refer to AT-196, "Wiring Diagram — AT — BA/FTS" .

Continuity should exist.



OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between TCM, ECM and terminal cord assembly (Main harness)
- Ground circuit for ECM
  Refer to EC-148, "POWER SUPPLY AND GROUND CIRCUIT" .

OK or NG

OK >> GO TO 10.
NG >> Repair or replace damaged parts.

10. CHECK DTC

Perform AT-194, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 11.

11. CHECK TCM INSPECTION

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

OK or NG

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

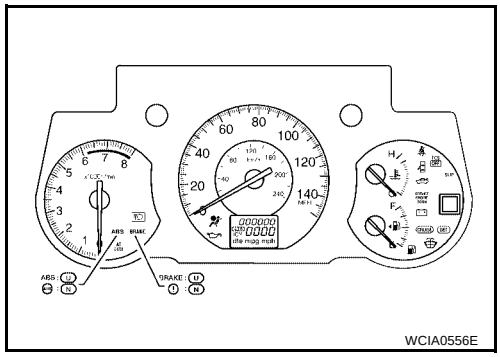
DTC VEHICLE SPEED SENSOR MTR

PFP:24814

Description

ECS0099C

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

ECS0099D

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

Possible Cause

ECS0099E

Check the following items.

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

Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0099F

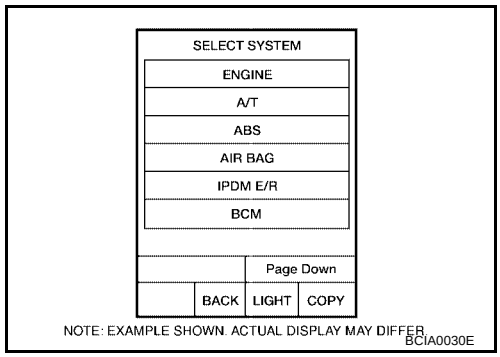
CAUTION:

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

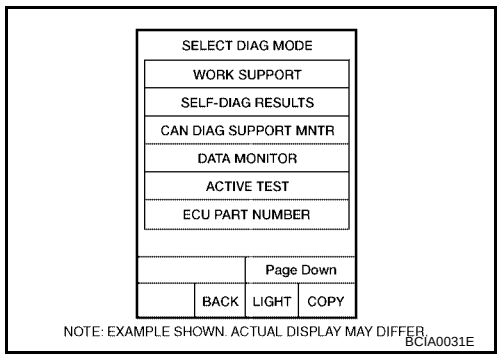
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

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



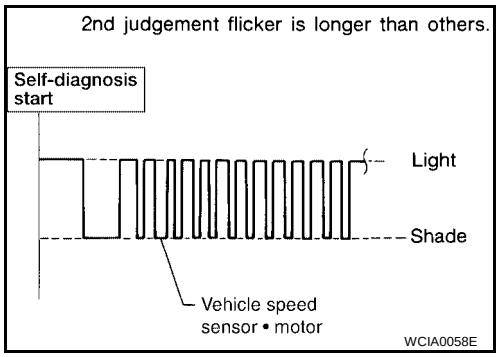
2. Start engine and accelerate vehicle from 0 to 25 km/h (0 to 16 MPH).



WITHOUT CONSULT-II

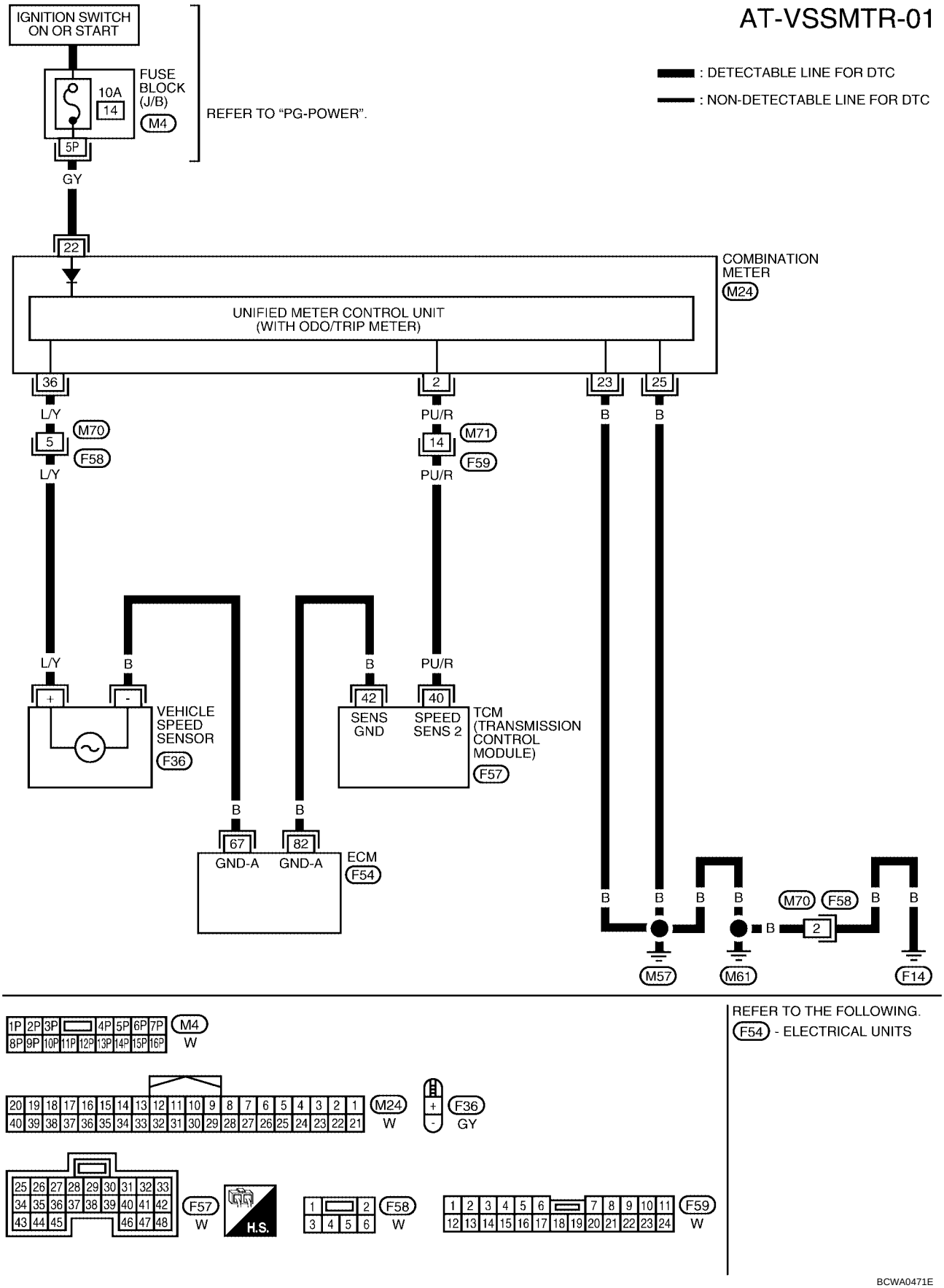
1. Start engine.

2. Drive vehicle under the following conditions:
   Selector lever in D and vehicle speed higher than 25 km/h (16 MPH).
3. Perform self-diagnosis.
   Refer to AT-60, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .



Wiring Diagram — AT — VSSMTR

ECS0099G



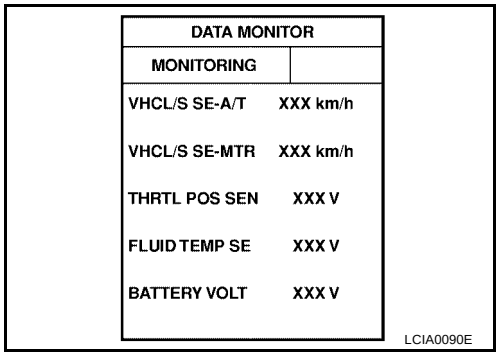
Diagnostic Procedure

ECS0099H

1. CHECK INPUT SIGNAL

With CONSULT-II

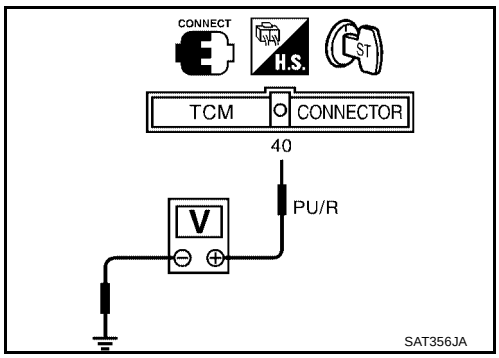
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·MTR” while driving. Check the value changes according to driving speed.



Without CONSULT-II

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

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



OK or NG

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

2. DETECT MALFUNCTIONING ITEM

Check the following items:

- Vehicle speed sensor and ground circuit for vehicle speed sensor
  Refer to DI-18, "Vehicle Speed System" .
- Harness for short or open between TCM and vehicle speed sensor (Main harness)

OK or NG

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

3. CHECK DTC

Perform AT-201, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .

OK or NG

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

4. CHECK TCM INSPECTION

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

OK or NG

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

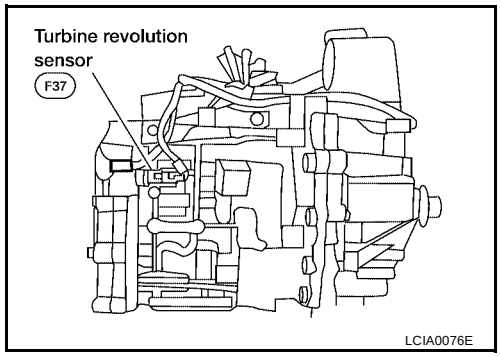
DTC TURBINE REVOLUTION SENSOR

PFP:31935

Description

ECS0099I

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



ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when ...	Check items (Possible cause)
: TURBINE REV	TCM does not receive the proper voltage signal from the sensor.	● Harness or connectors (The sensor circuit is open or shorted.) ● Turbine revolution sensor
: 10th judgement flicker		

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

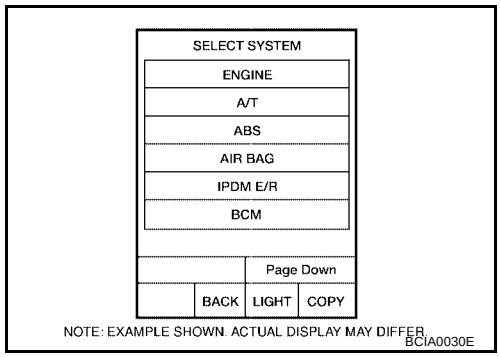
CAUTION:

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

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

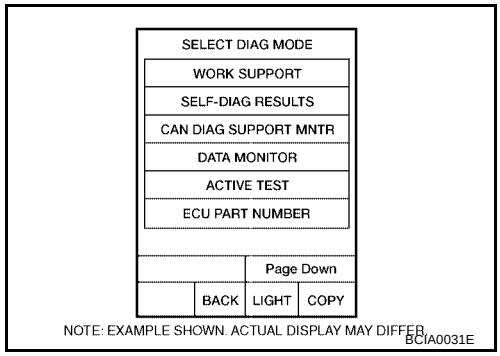
WITH CONSULT-II

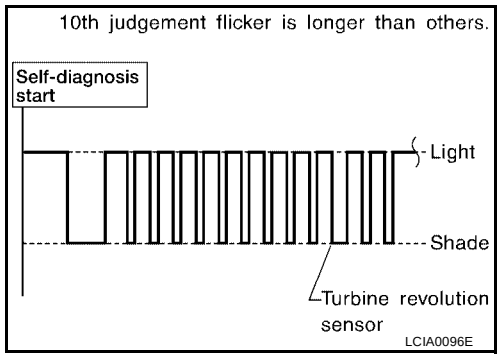
1. Start engine.
2. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Drive vehicle under the following conditions:
   Selector lever in D, vehicle speed higher than 40 km/h (25 MPH), engine speed higher than 1,500 rpm, throttle opening greater than 1.0/8 of the full throttle position and driving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



WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in "D" and vehicle speed higher than 40 km/h (25 MPH), engine speed higher than 1,500 rpm, throttle opening greater than 1/8 of the full throttle position and driving for more than 5 seconds.
3. Perform self-diagnosis.
   Refer to AT-60, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .

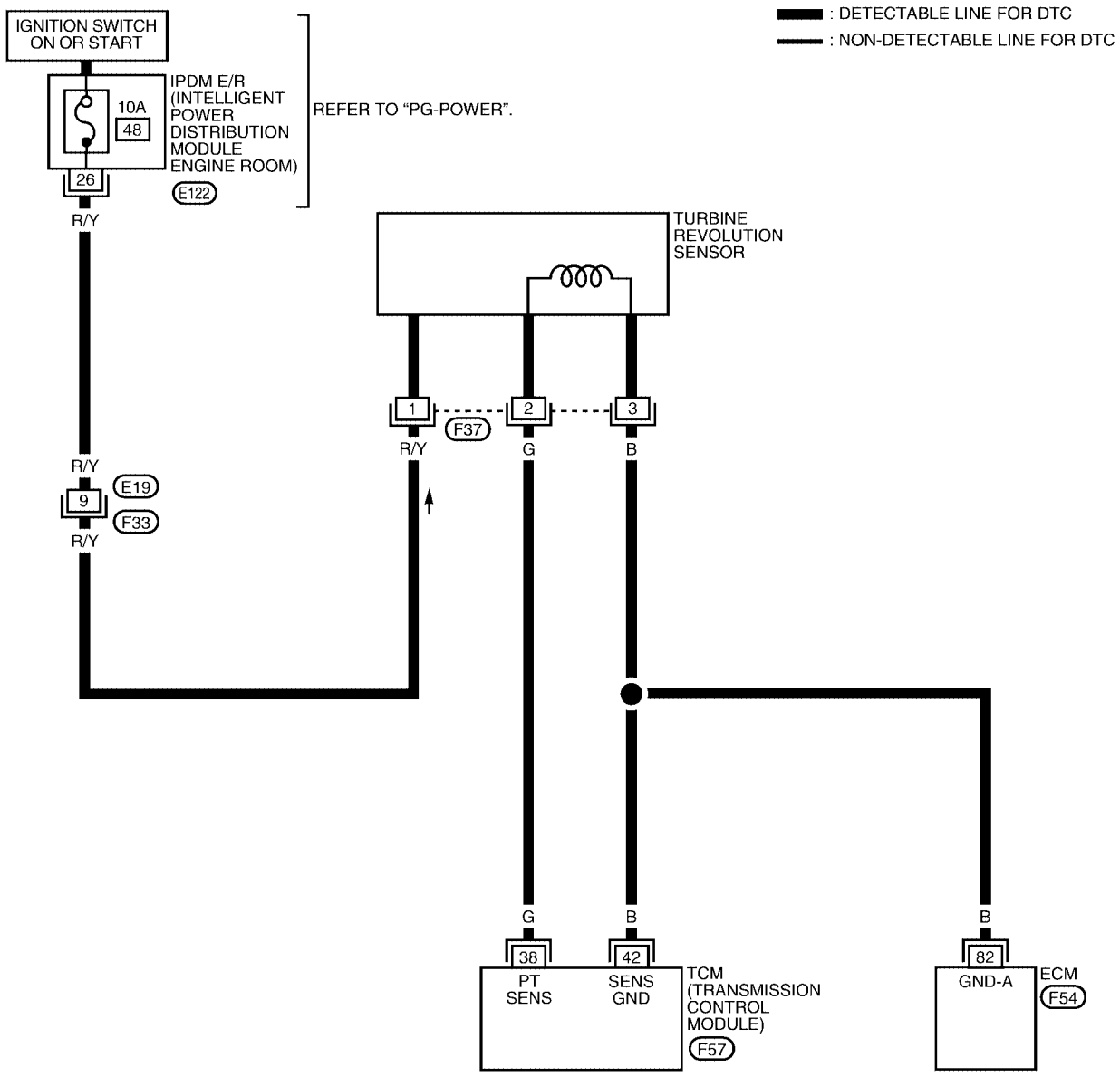


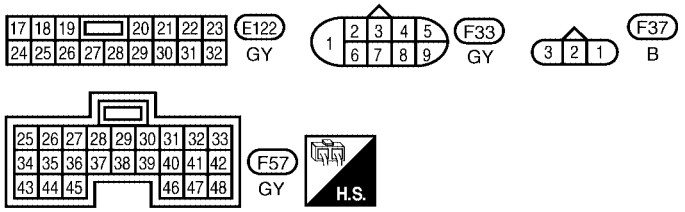


Wiring Diagram — AT — TRSA/T

ECS0099J

AT-TRSA/T-01





REFER TO THE FOLLOWING.
F54 - ELECTRICAL UNITS

BCWA0149E

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

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
38	G	TURBINE REVOLUTION SENSOR (SIGNAL)	WHEN MOVING AT 20 KM/H (12 MPH), USE THE CONSULT-II PULSE FREQUENCY MEASURING FUNCTION.*1 **CAUTION:** **CONNECT THE DIAGNOSIS DATA LINK CABLE TO THE VEHICLE DIAGNOSIS CONNECTOR.** *1: A CIRCUIT TESTER CANNOT BE USED TO TEST THIS ITEM.	240 Hz
			WHEN VEHICLE IS PARKED.	UNDER 1.3V OR OVER 4.5V
42	B	SENSOR GROUND	—	—

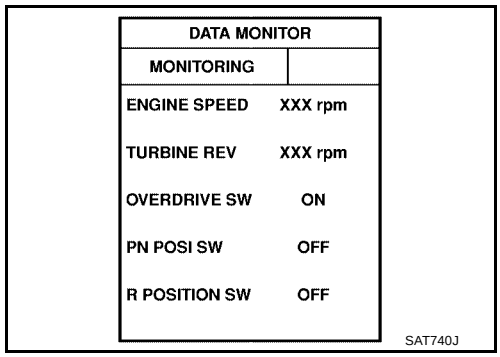
Diagnostic Procedure

ECS0099K

1. CHECK INPUT SIGNAL

With CONSULT-II

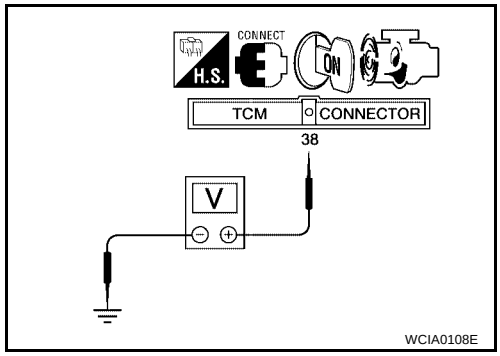
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “TURBINE REV” while driving.
   Check the value changes according to driving speed.



Without CONSULT-II

1. Start engine.
2. Check frequency between TCM terminal 38 and ground.

Frequency : Approximately 240 Hz when driving 20 km/h (12 MPH)



OK or NG

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

2. DETECT MALFUNCTIONING ITEM

Check harness for short or open between TCM and turbine revolution sensor.

OK or NG

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

3. CHECK DTC

Perform AT-205, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

OK or NG

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

4. CHECK TCM INSPECTION

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

OK or NG

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

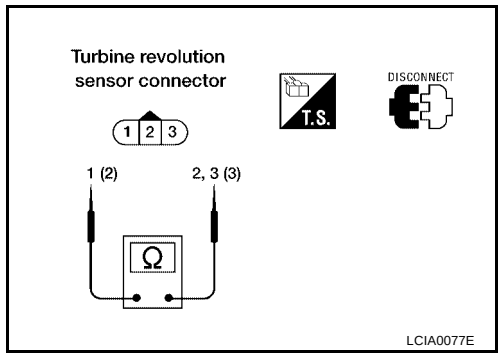
Component Inspection

ECS0099L

TURBINE REVOLUTION SENSOR

- Check resistance between terminals 1, 2 and 3.

Terminal No.		Resistance (Approx.)
1	2	No continuity
1	3	No continuity
2	3	2.4 - 2.8 kΩ



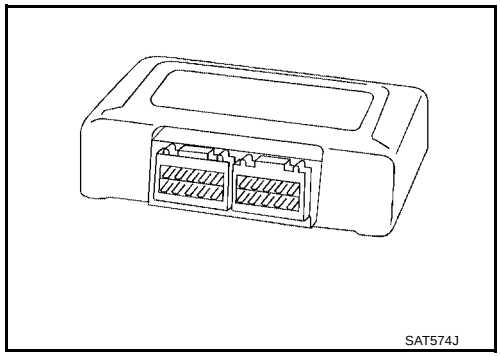
DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)

PFP:31036

Description

ECS0099M

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

ECS0099N

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

Possible Cause

ECS0099O

Check TCM.

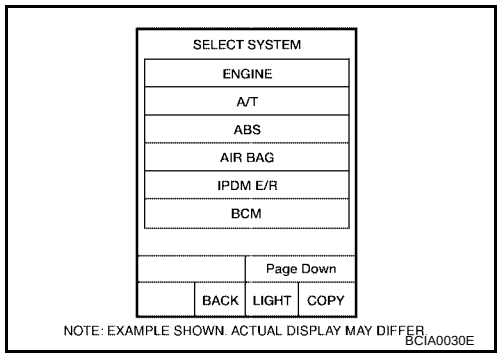
Diagnostic Trouble Code (DTC) Confirmation Procedure

ECS0099P

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

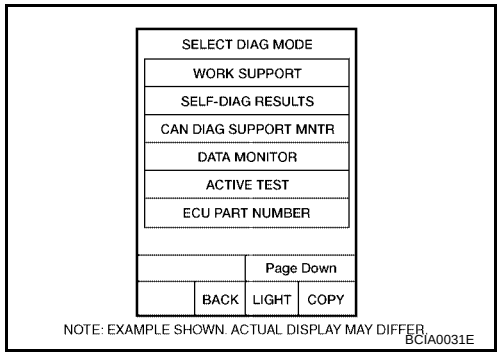
WITH CONSULT-II

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



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER.
BCIA0030E

3. Run engine for at least 2 seconds at idle speed.



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER.
BCIA0031E

Diagnostic Procedure

ECS0099Q

1. INSPECTION START

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-209, "Diagnostic Trouble Code (DTC) Confirmation Procedure" .
4. Is the “CONTROL UNIT (RAM)” or “CONTROL UNIT (ROM)” displayed again?

Yes or No

Yes >> Replace TCM.
No >> **INSPECTION END**

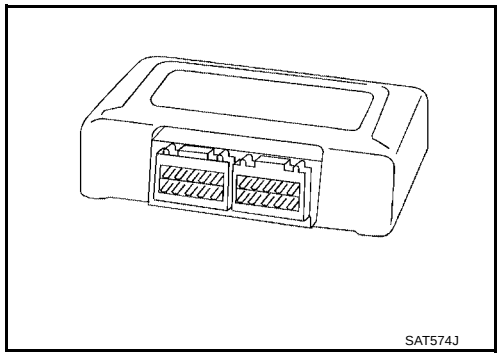
DTC CONTROL UNIT (EEP ROM)

PFP:31036

Description

ECS0099R

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

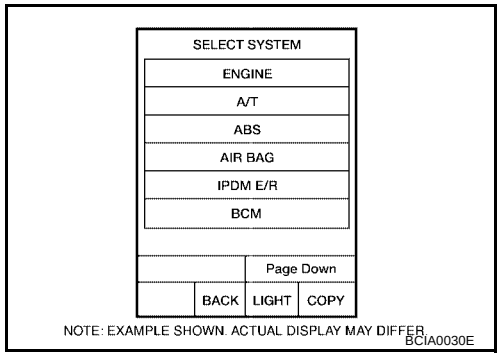
Diagnostic trouble code	Malfunction is detected when ...	Check item (Possible cause)
: CONT UNIT (EEP ROM)	TCM memory (EEP ROM) is malfunctioning.	● TCM

DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE

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

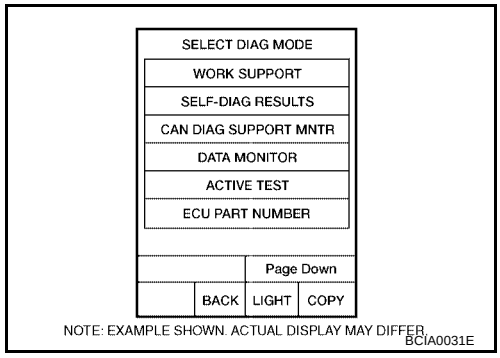
With CONSULT-II

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



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER
BCIA0030E

3. Run engine for at least 2 seconds at idle speed.



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER
BCIA0031E

Diagnostic Procedure

ECS0099S

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” position for 10 seconds.

Perform AT-211, "DIAGNOSTIC TROUBLE CODE (DTC) CONFIRMATION PROCEDURE" .

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

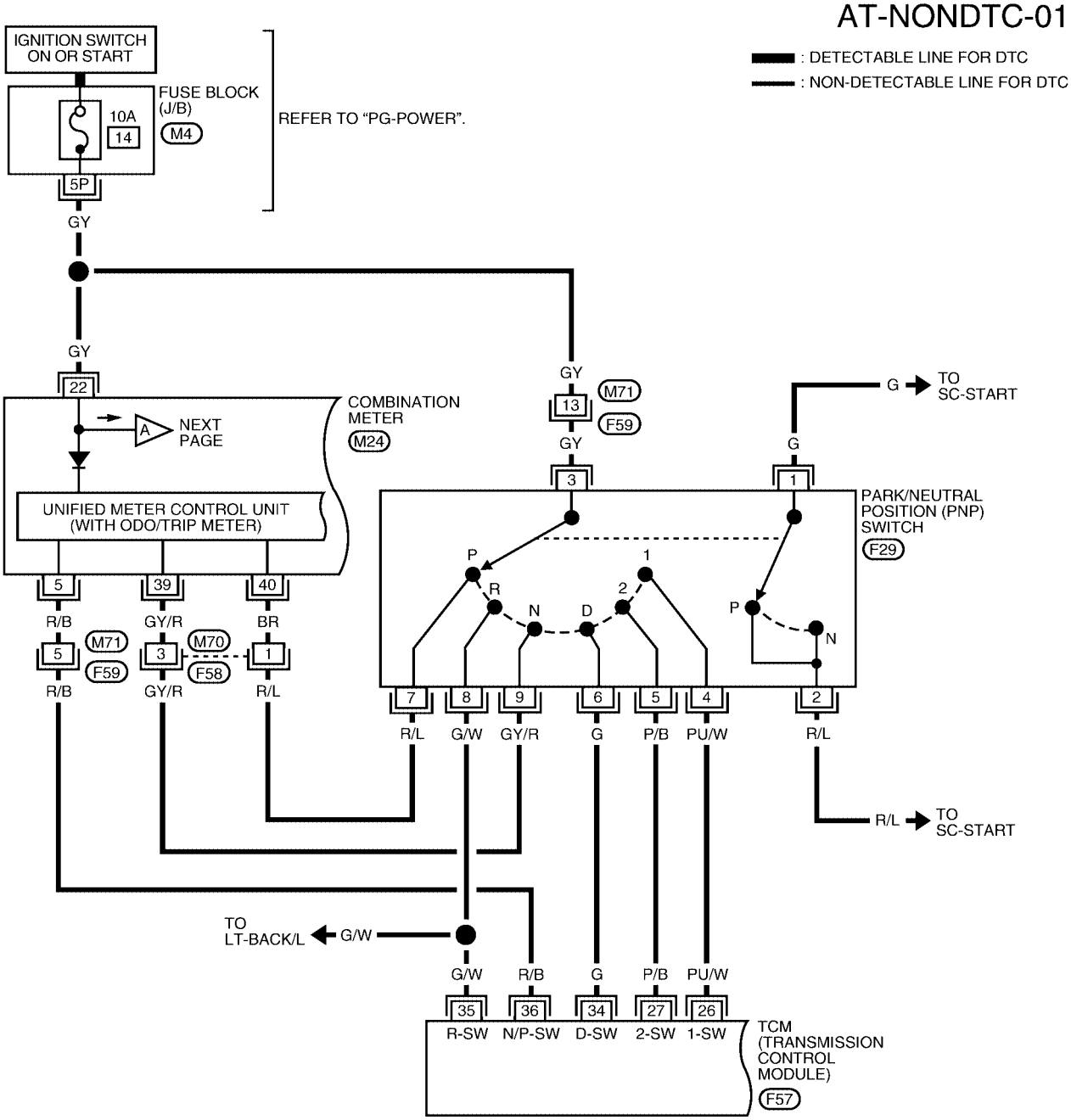
Yes >> Replace TCM.
No >> **INSPECTION END**

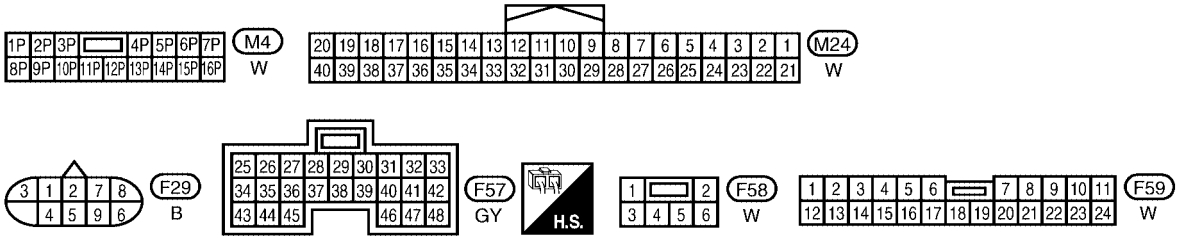
TROUBLE DIAGNOSIS FOR SYMPTOMS

PFP:00007

Wiring Diagram — AT — NONDTC

ECS0099T



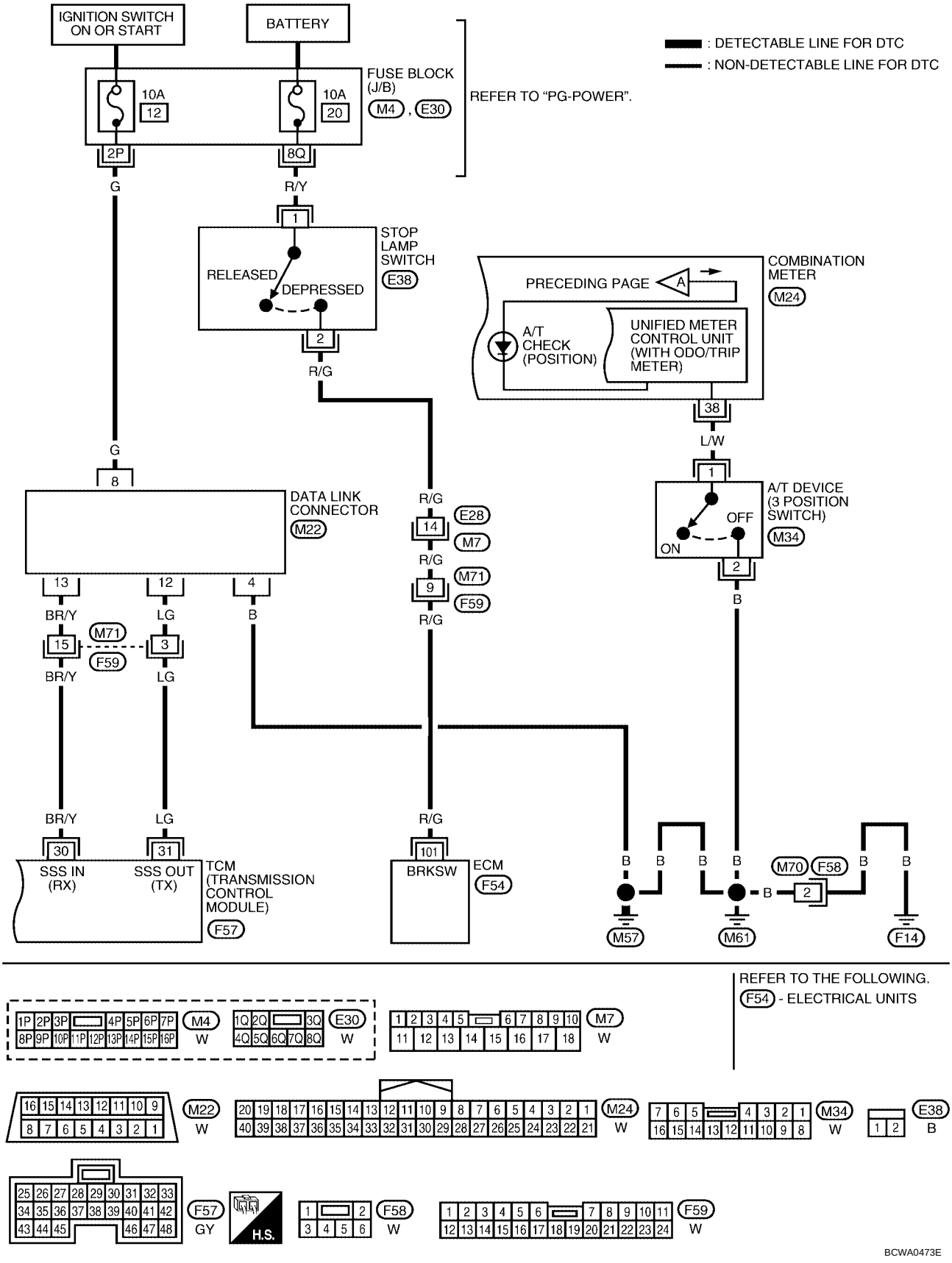


BCWA0472E

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

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

AT-NONDTC-02



BCWA0473E

TCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND 25 OR 48 (TCM GROUND)				
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (APPROX.)
30	BR/Y	DATA LINK CONNECTOR	—	—
31	LG	DATA LINK CONNECTOR	—	—

1. A/T Check (Position) Indicator Lamp Does Not Come On

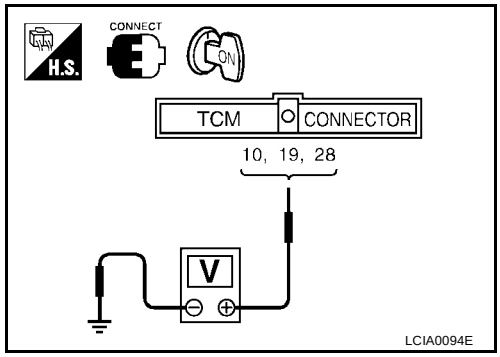
ECS0099U

SYMPTOM:
A/T check (position) indicator lamp does not come on for about 2 seconds when turning ignition switch to ON.

1. CHECK TCM POWER SOURCE

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

Voltage : Battery voltage



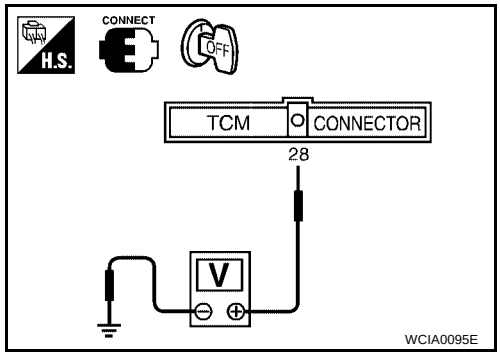
OK or NG

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

2. CHECK POWER SOURCE STEP 2

1. Turn ignition switch to OFF position.
2. Check voltage between TCM terminal 28 and ground.

Voltage : Battery voltage



OK or NG

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

3. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness for short or open between ignition switch and TCM (Main harness)
  Refer to AT-107, "Wiring Diagram — AT — MAIN" .
- Ignition switch and fuse
  Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .

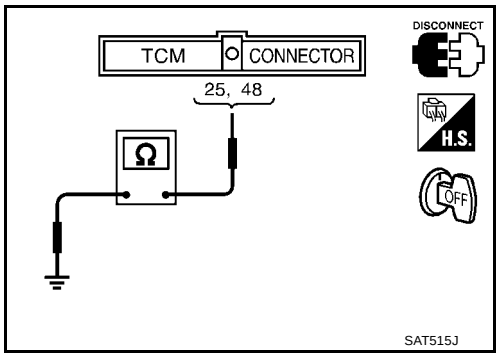
OK or NG

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

4. CHECK TCM GROUND CIRCUIT

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

Continuity should exist.



OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors. Refer to AT-107, "Wiring Diagram — AT — MAIN" .

5. DETECT MALFUNCTIONING ITEM

Check the following items:

- Harness and fuse for short or open between ignition switch and A/T check (position) indicator lamp (Main harness)
  Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .
- Harness for short or open between A/T check (position) indicator lamp and TCM

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

7. CHECK TCM INSPECTION

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

OK or NG

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

2. Engine Cannot Be Started In P and N Position

ECS0099V

SYMPTOM:

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

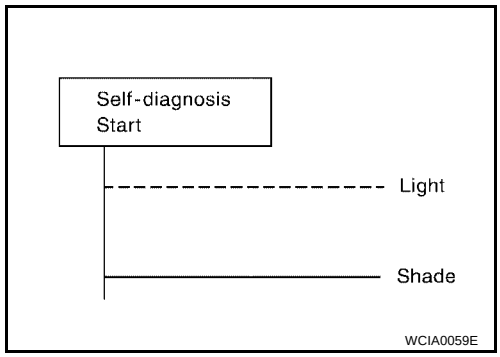
1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

With CONSULT-II

Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?

Without CONSULT-II

Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?



Yes or No

Yes >> Check park/neutral position (PNP) switch circuit. Refer to AT-110, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" .

No >> GO TO 2.

2. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

Check for short or open of park/neutral position (PNP) switch harness connector terminals 1 and 2. Refer to SC-16, "DIAGNOSTIC PROCEDURE 2" .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace park/neutral position (PNP) switch.

3. CHECK STARTING SYSTEM

Check starting system. Refer to SC-14, "WORK FLOW" .

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

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

ECS0099W

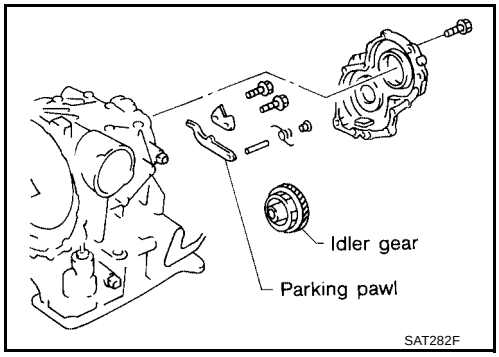
SYMPTOM:
Vehicle moves when it is pushed forward or backward with selector lever in P position.

1. CHECK PARKING COMPONENTS

Check parking components. Refer to AT-278, "OVERHAUL" and AT-283, "DISASSEMBLY" .

OK or NG

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



4. In N Position, Vehicle Moves

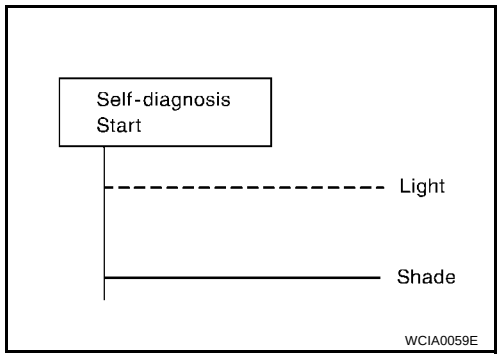
ECS0099X

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

1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?



Yes or No

Yes >> Check park/neutral position (PNP) switch circuit. Refer to AT-110, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" .
No >> GO TO 2.

2. CHECK CONTROL LINKAGE

Check control cable. Refer to AT-266, "Control Cable" .

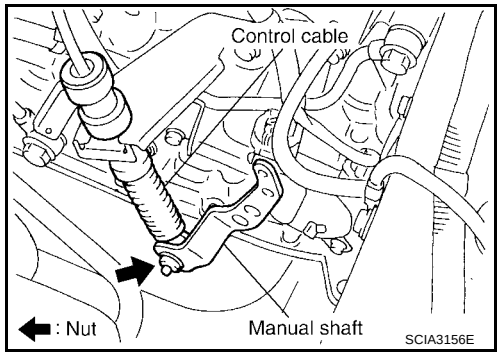
OK or NG

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

3. ADJUST CONTROL CABLE

Adjust control cable.

>> Refer to AT-270, "Control Cable Adjustment" .

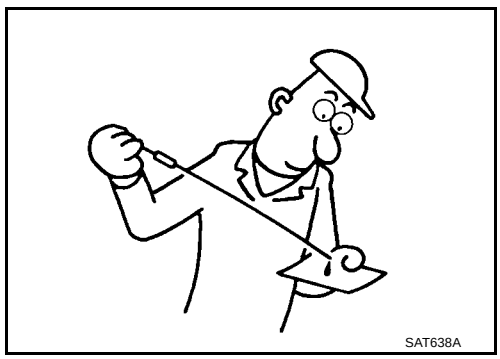


4. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

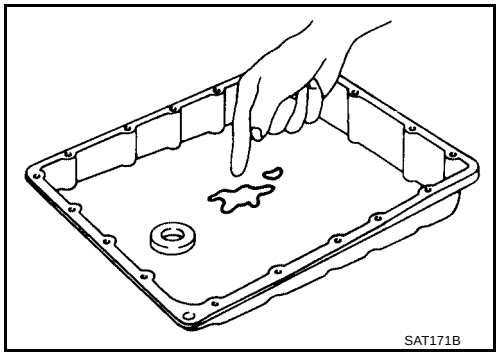
OK or NG

OK >> GO TO 5.
NG >> Refill ATF.



5. CHECK A/T FLUID CONDITION

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



OK or NG

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

6. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T.
2. Check the following items:

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

OK or NG

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

7. CHECK SYMPTOM

Check again.

OK or NG

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

8. CHECK TCM INSPECTION

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

OK or NG

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

5. Large Shock. N → R Position

ECS0099Y

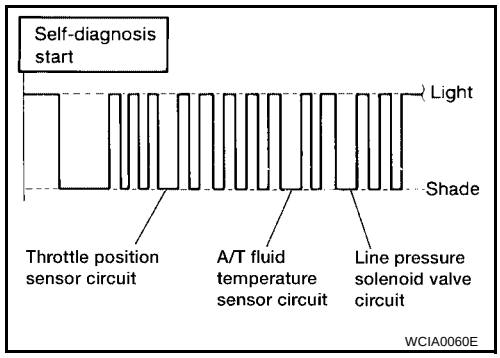
SYMPTOM:
There is large shock when changing from N to R position.

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to A/T fluid temperature sensor, line pressure solenoid valve or throttle position sensor [accelerator pedal position (APP) sensor] circuit?

Yes or No

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



2. CHECK DAMAGED CIRCUIT

Check damaged circuit.

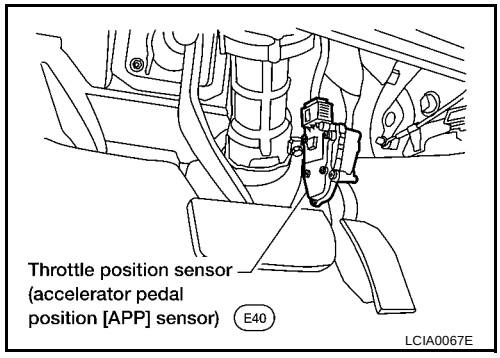
>> Refer to AT-116, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" , AT-166, "DTC P0745 LINE PRESSURE SOLENOID VALVE" or AT-182, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]" .

3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-206, "DTC P0122, P0123 TP SENSOR" and EC-521, "DTC P2122, P2123 APP SENSOR" .

OK or NG

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

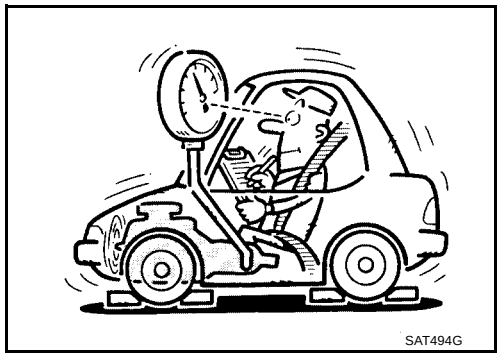


4. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in D position. Refer to AT-77, "Line Pressure Test" .

OK or NG

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



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

7. CHECK TCM INSPECTION

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

OK or NG

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

6. Vehicle Does Not Creep Backward In R Position

ECS0099Z

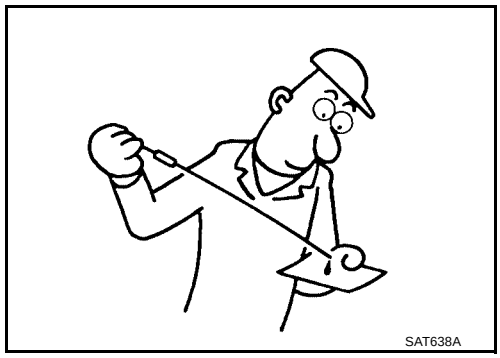
SYMPTOM:
Vehicle does not creep backward when selecting R position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

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

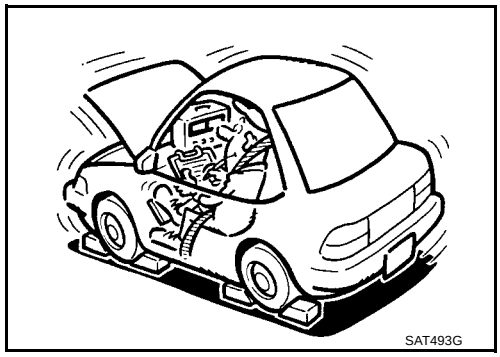

SAT638A

2. CHECK STALL REVOLUTION

Check stall revolution with selector lever in 1 and R positions.

OK or NG

OK >> GO TO 5.
OK in 1 position, NG in R position>> GO TO 3.
NG in both 1 and R positions>> GO TO 4.


SAT493G

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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.
4. Check the following items:
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly

OK or NG

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

4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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.
4. Check the following items:

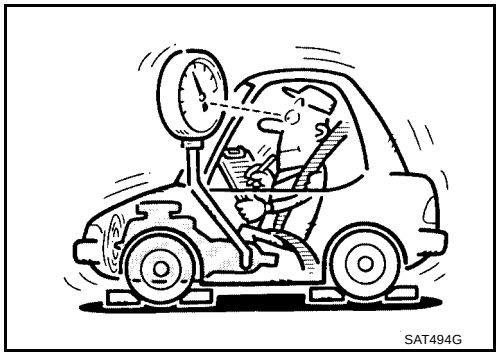
- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly
- Low & reverse brake assembly
- Low one-way clutch

OK or NG

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

5. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in R position. Refer to AT-77, "Line Pressure Test" .



OK or NG

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

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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.
4. Check the following item:

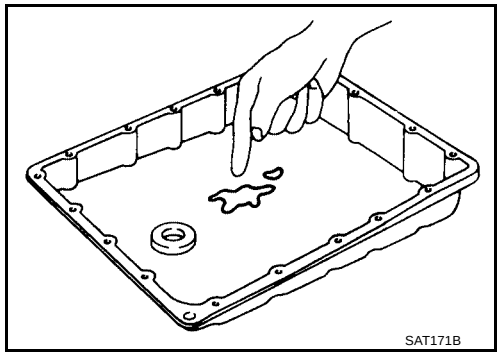
- Oil pump assembly

OK or NG

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

7. CHECK A/T FLUID CONDITION

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



OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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.
4. Check the following items:

- Oil pump assembly
- Torque converter
- Reverse clutch assembly
- High clutch assembly
- Low & reverse brake assembly
- Low one-way clutch

OK or NG

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

9. CHECK SYMPTOM

Check again.

OK or NG

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

10. CHECK TCM INSPECTION

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

OK or NG

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

7. Vehicle Does Not Creep Forward in D, 3, 2 or 1 Position

ECS009A0

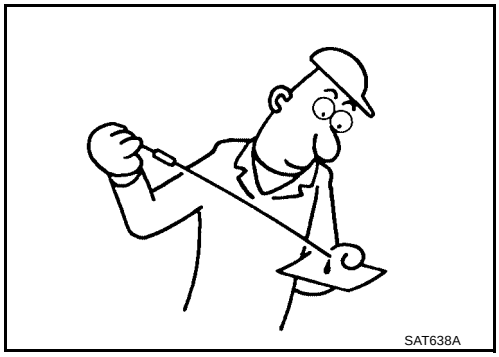
SYMPTOM:
Vehicle does not creep forward when selecting D, 3, 2 or 1 position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level again.

OK or NG

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

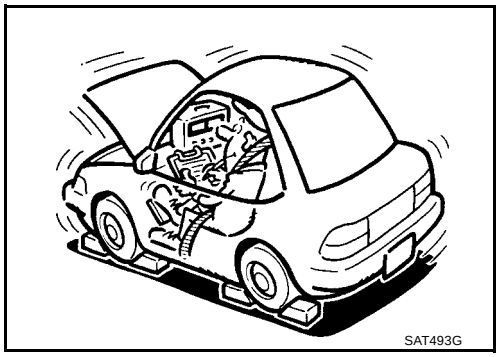

SAT638A

2. CHECK STALL REVOLUTION

Check stall revolution with selector lever in D position. Refer to AT-74, "Stall Test" .

OK or NG

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


SAT493G

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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.
4. Check the following items:

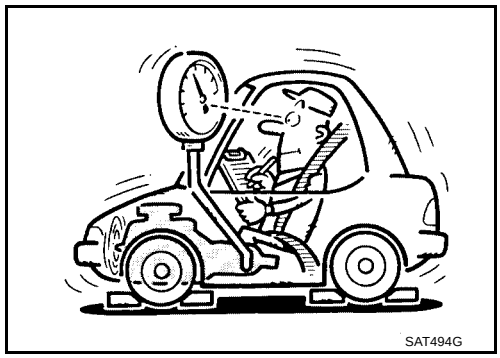
- Oil pump assembly
- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- Low & reverse brake assembly
- Torque converter

OK or NG

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

4. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in D position. Refer to AT-77, "Line Pressure Test" .



OK or NG

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

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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.
4. Check the following item:

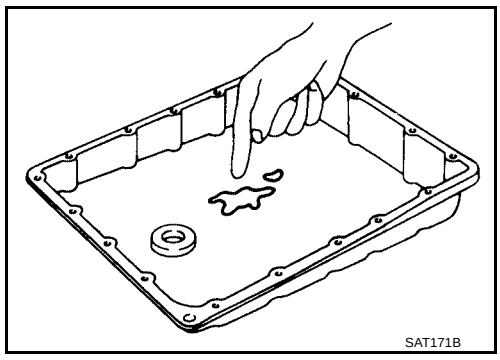
- Oil pump assembly

OK or NG

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

6. CHECK A/T FLUID CONDITION

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



OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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.
4. Check the following items:

- Oil pump assembly
- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- Low & reverse brake assembly
- Torque converter

OK or NG

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

8. CHECK SYMPTOM

Check again.

OK or NG

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

9. CHECK TCM INSPECTION

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

OK or NG

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

8. Vehicle Cannot Be Started From D1

ECS009A1

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

1. CHECK SYMPTOM

Is “6. Vehicle Does Not Creep Backward In R Position” OK?

Yes or No

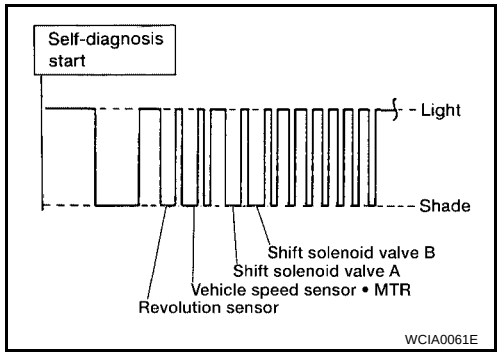
Yes >> GO TO 2.
No >> Go to AT-225, "6. Vehicle Does Not Creep Backward In R Position" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to vehicle speed sensor·A/T (revolution sensor), shift solenoid valve A, B or vehicle speed sensor·MTR after cruise test?

Yes or No

Yes >> Check damaged circuit. Refer to AT-122, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-172, "DTC P0750 SHIFT SOLENOID VALVE A" , AT-177, "DTC P0755 SHIFT SOLENOID VALVE B" or AT-201, "DTC VEHICLE SPEED SENSOR MTR" .
No >> GO TO 3.

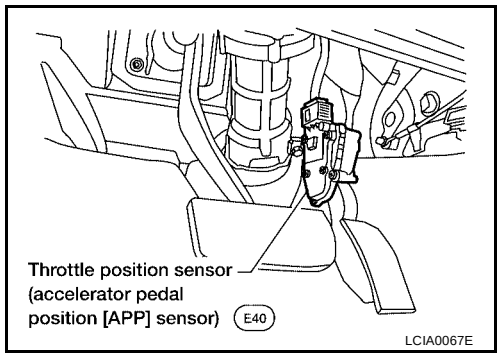


3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-206, "DTC P0122, P0123 TP SENSOR" and EC-521, "DTC P2122, P2123 APP SENSOR" .

OK or NG

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

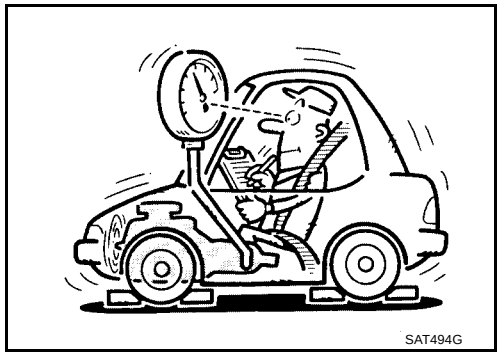


4. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in D position. Refer to AT-77, "Line Pressure Test" .

OK or NG

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



5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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.
4. Check the following items:

- Forward clutch assembly
- Forward one-way clutch
- Low one-way clutch
- High clutch assembly
- Torque converter
- Oil pump assembly

OK or NG

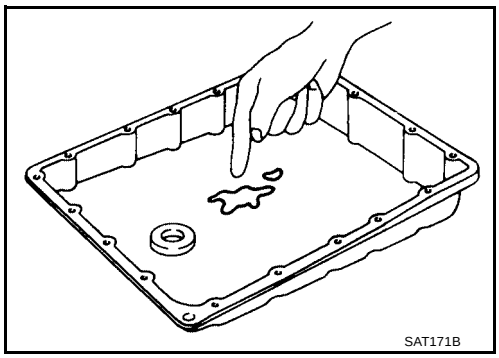
OK >> GO TO 8.
NG >> Repair or replace damaged parts.

6. CHECK A/T FLUID CONDITION

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

OK or NG

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



7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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 8.
NG >> Repair or replace damage parts.

8. CHECK SYMPTOM

Check again.

OK or NG

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

9. CHECK TCM INSPECTION

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

OK or NG

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

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

ECS009A2

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

1. CHECK SYMPTOM

Are “7. Vehicle Does Not Creep Forward In D, 3, 2 Or 1 Position” and “8. Vehicle Cannot Be Started From D_1 ” OK?

Yes or No

Yes >> GO TO 2.
No >> Go to AT-228, "7. Vehicle Does Not Creep Forward in D, 3, 2 or 1 Position" and AT-231, "8. Vehicle Cannot Be Started From D_1" .

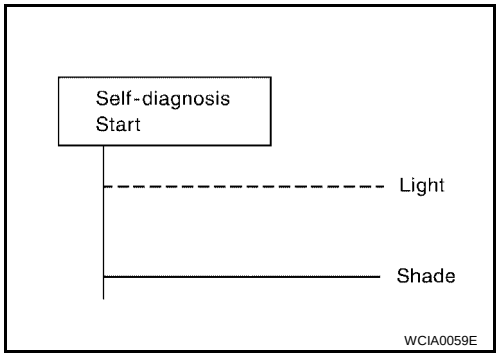
2. CHECK SELF-DIAGNOSTIC RESULTS

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?

Yes or No

Yes >> Check park/neutral position (PNP) switch circuit. Refer to AT-110, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" .
No >> GO TO 3.



3. CHECK VEHICLE SPEED SENSOR·A/T AND VEHICLE SPEED SENSOR·MTR CIRCUIT

Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-122, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-201, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

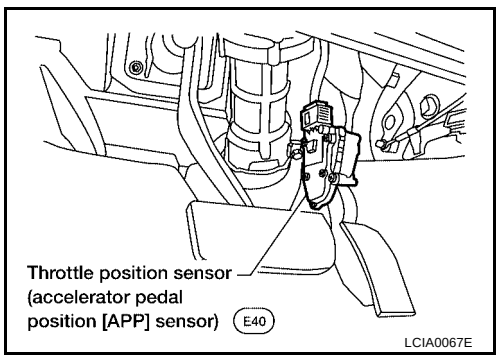
OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-206, "DTC P0122, P0123 TP SENSOR" and EC-521, "DTC P2122, P2123 APP SENSOR" .

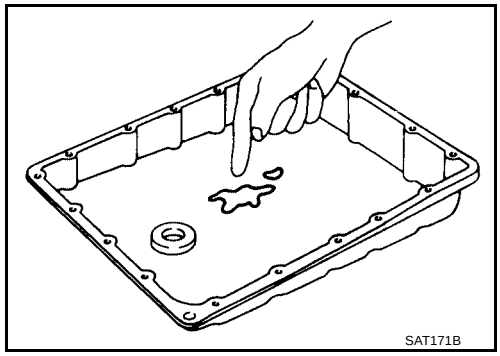
OK or NG

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



5. CHECK A/T FLUID CONDITION

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



OK or NG

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

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-267, "Control Valve Assembly and Accumulators" .
2. Check the following items:

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

3. Disassemble A/T.
4. Check the following items:

- Servo piston assembly
- Brake band
- Oil pump assembly

OK or NG

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

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-267, "Control Valve Assembly and Accumulators" .
2. Check the following items:

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

OK or NG

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

8. CHECK SYMPTOM

Check again.

OK or NG

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

9. CHECK TCM INSPECTION

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

OK or NG

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

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

ECS009A3

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

1. CHECK SYMPTOM

Are 7. Vehicle Does Not Creep Forward In D, 3, 2 or 1 Position and 8. Vehicle Cannot Be Started From D_1 OK?

Yes or No

Yes >> GO TO 2.
No >> Go to AT-228, "7. Vehicle Does Not Creep Forward in D, 3, 2 or 1 Position" and AT-231, "8. Vehicle Cannot Be Started From D_1" .

2. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

With CONSULT-II

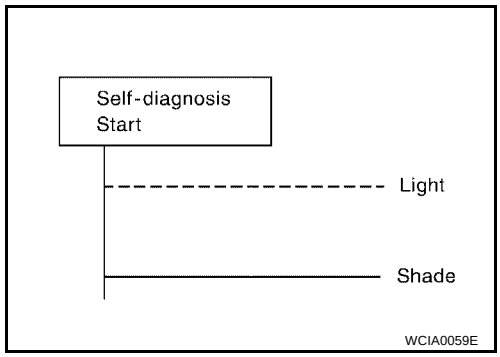
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?

Without CONSULT-II

Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?

Yes or No

Yes >> Check park/neutral position (PNP) switch circuit. Refer to AT-110, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" .
No >> GO TO 3.

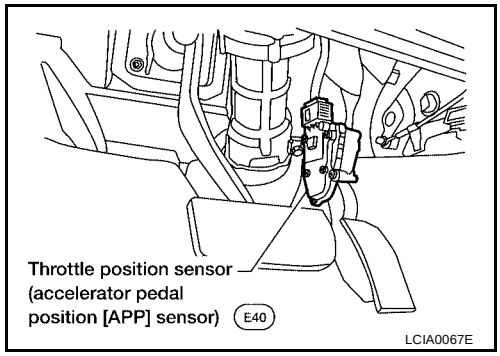


3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-206, "DTC P0122, P0123 TP SENSOR" and EC-521, "DTC P2122, P2123 APP SENSOR" .

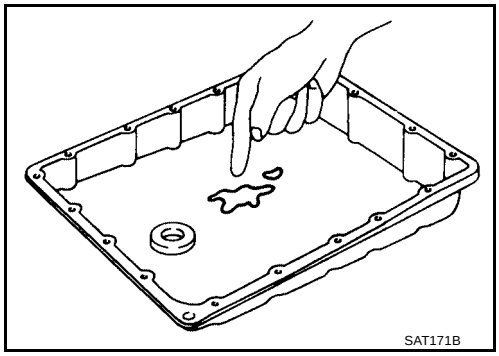
OK or NG

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



4. CHECK A/T FLUID CONDITION

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



OK or NG

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

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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.
4. Check the following items:

- Servo piston assembly
- High clutch assembly
- Oil pump assembly

OK or NG

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

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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.

OK or NG

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

8. CHECK TCM INSPECTION

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

OK or NG

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

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

ECS009A4

SYMPTOM:

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

1. CHECK SYMPTOM

Are “7. Vehicle Does Not Creep Forward In D, 3, 2 or 1 Position” and “8. Vehicle Cannot Be Started From D_1 ” OK?

Yes or No

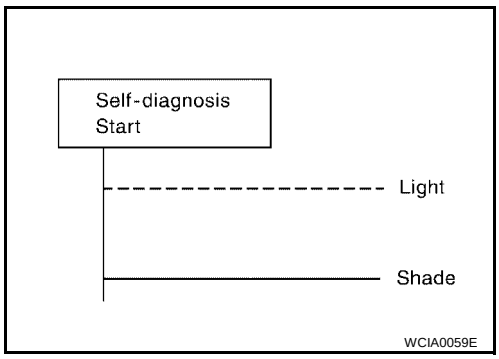
Yes >> GO TO 2.
No >> Go to AT-228, "7. Vehicle Does Not Creep Forward in D, 3, 2 or 1 Position" and AT-231, "8. Vehicle Cannot Be Started From D_1" .

2. CHECK SELF-DIAGNOSTIC RESULTS

With CONSULT-II

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

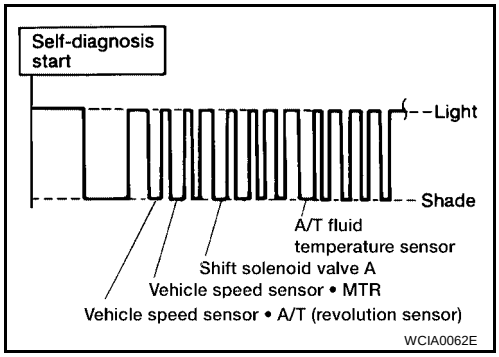
- Park/neutral position (PNP) switch
- Overdrive control switch
- A/T fluid temperature sensor
- Vehicle speed sensor·A/T (revolution sensor)
- Shift solenoid valve A or B



- Vehicle speed sensor·MTR

Yes or No

Yes >> Check damaged circuit. Refer to AT-110, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" , AT-116, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" , AT-122, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-172, "DTC P0750 SHIFT SOLENOID VALVE A" , AT-177, "DTC P0755 SHIFT SOLENOID VALVE B" or AT-201, "DTC VEHICLE SPEED SENSOR MTR" .
No >> GO TO 3.

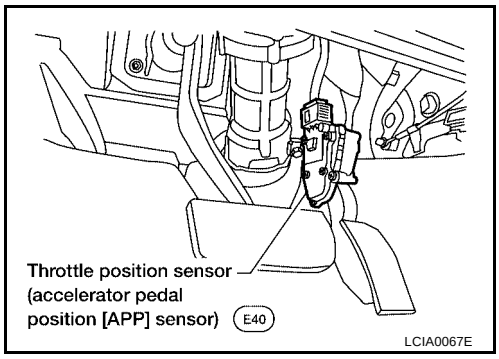


3. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-206, "DTC P0122, P0123 TP SENSOR" and EC-521, "DTC P2122, P2123 APP SENSOR" .

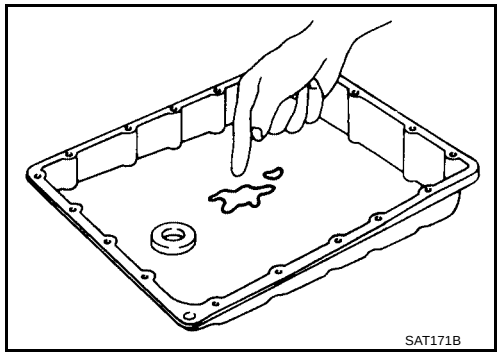
OK or NG

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



4. CHECK A/T FLUID CONDITION

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



OK or NG

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

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve B
- Overrun clutch control valve
- Shift solenoid valve B
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check the following items:

- Servo piston assembly
- Brake band
- Torque converter
- Oil pump assembly

OK or NG

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

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Shift valve B
- Overrun clutch control valve
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

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

7. CHECK SYMPTOM

Check again.

OK or NG

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

8. CHECK TCM INSPECTION

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

OK or NG

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

12. A/T Does Not Perform Lock-up

ECS009A5

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

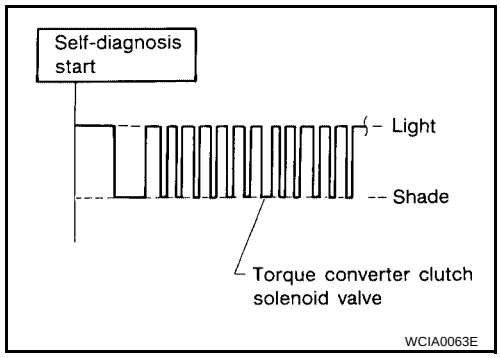
1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to torque converter clutch solenoid valve circuit after cruise test?

Yes or No

Yes >> Check torque converter clutch solenoid valve circuit. Refer to AT-153, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" .

No >> GO TO 2.



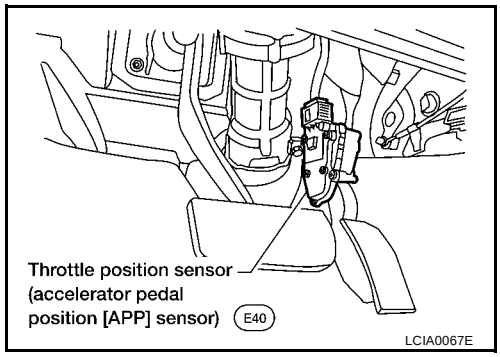
2. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-206, "DTC P0122, P0123 TP SENSOR" and EC-521, "DTC P2122, P2123 APP SENSOR" .

OK or NG

OK >> GO TO 3.

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



3. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-267, "Control Valve Assembly and Accumulators" .
2. Check following items:

- Torque converter clutch control valve
- Torque converter relief valve
- Torque converter clutch solenoid valve
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 5.

5. CHECK TCM INSPECTION

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

OK or NG

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

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

ECS009A6

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

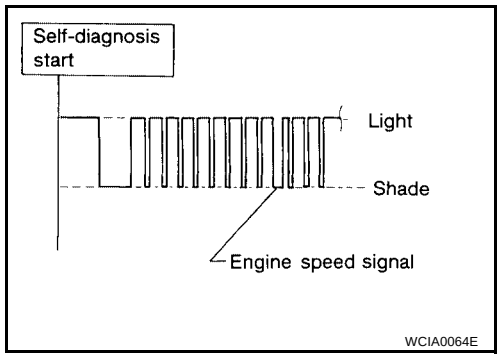
1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to engine speed signal circuit after cruise test?

Yes or No

Yes >> Check engine speed signal circuit. Refer to AT-127, "DTC P0725 ENGINE SPEED SIGNAL" .

No >> GO TO 2.



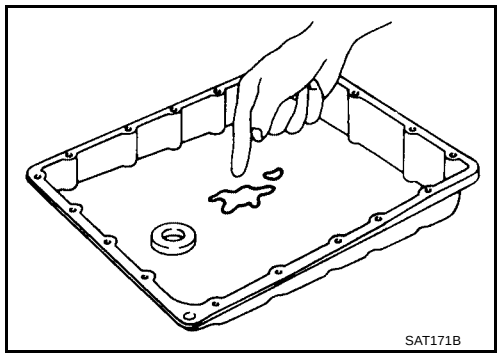
2. CHECK A/T FLUID CONDITION

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

OK or NG

OK >> GO TO 4.

NG >> GO TO 3.



3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Torque converter clutch control valve
- Pilot valve
- Pilot filter

3. Disassemble A/T.
4. Check torque converter and oil pump assembly.

OK or NG

OK >> GO TO 5.

NG >> Repair or replace damaged parts.

4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "Control Valve Assembly and Accumulators" .
2. Check the following items:

- Torque converter clutch control valve
- Pilot valve
- Pilot filter

OK or NG

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

5. CHECK SYMPTOM

Check again.

OK or NG

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

6. CHECK TCM INSPECTION

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

OK or NG

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

14. Lock-up Is Not Released

ECS009A7

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

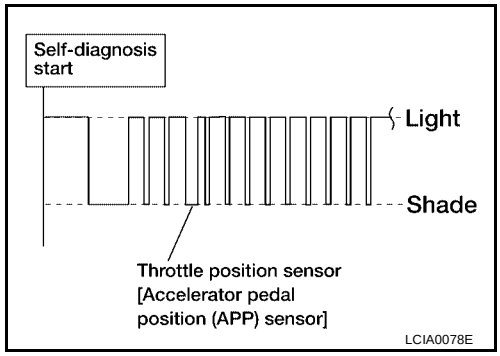
1. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR] CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to throttle position sensor [accelerator pedal position (APP) sensor] circuit?

Without CONSULT-II
Does self-diagnosis show damage to throttle position sensor [accelerator pedal position (APP) sensor] circuit?

Yes or No

Yes >> Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-206, "DTC P0122, P0123 TP SENSOR" and EC-521, "DTC P2122, P2123 APP SENSOR" .
No >> GO TO 2.



2. CHECK SYMPTOM

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3. CHECK TCM INSPECTION

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

OK or NG

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

15. Engine Speed Does Not Return To Idle (Light Braking D4 → D3)

ECS009A8

SYMPTOM:

- **Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 .**
- **Vehicle does not decelerate by engine brake when A/T selector lever is in 3 position.**
- **Vehicle does not decelerate by engine brake when shifting A/T from D to 2 position.**

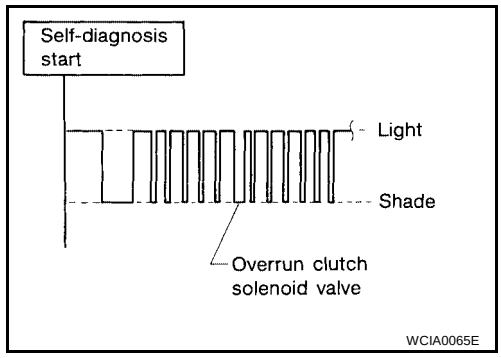
1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to overrun clutch solenoid valve circuit after cruise test?

Yes or No

Yes >> Check overrun clutch solenoid valve circuit. Refer to AT-185, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" .

No >> GO TO 2.



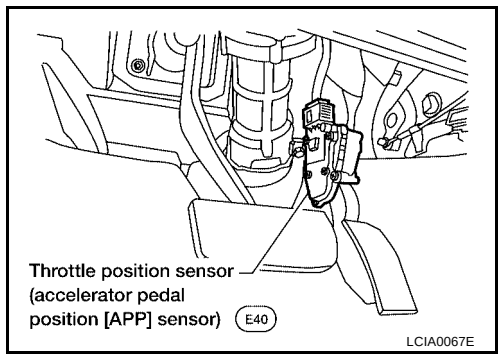
2. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

Check throttle position sensor [accelerator pedal position (APP) sensor]. Refer to EC-206, "DTC P0122, P0123 TP SENSOR" and EC-521, "DTC P2122, P2123 APP SENSOR" .

OK or NG

OK >> GO TO 3.

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



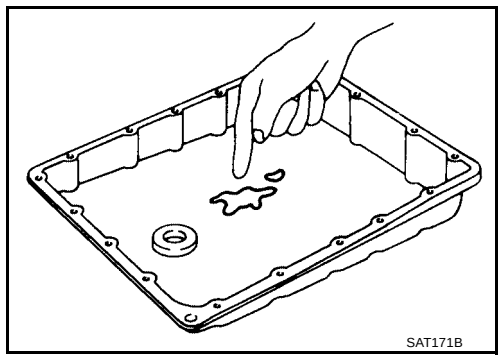
3. CHECK A/T FLUID CONDITION

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

OK or NG

OK >> GO TO 5.

NG >> GO TO 4.



4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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.
4. Check the following items:
- Overrun clutch assembly
- Oil pump assembly

OK or NG

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

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-267, "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 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again.

OK or NG

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

7. CHECK TCM INSPECTION

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

OK or NG

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

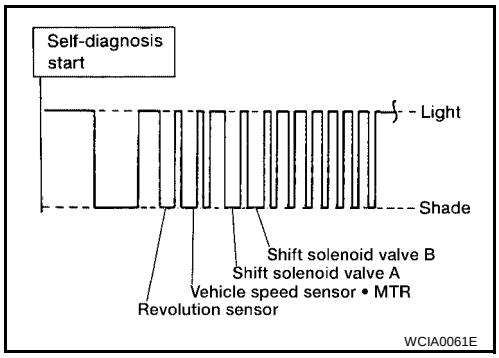
16. Vehicle Does Not Start From D1

ECS009A9

SYMPTOM:
Vehicle does not start from D1 on Cruise test — Part 2.

1. CHECK SELF-DIAGNOSTIC RESULTS

Does self-diagnosis show damage to vehicle speed sensor·A/T (revolution sensor), shift solenoid valve A, B or vehicle speed sensor·MTR after cruise test?



Yes or No

Yes >> Check damaged circuit. Refer to AT-122, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-172, "DTC P0750 SHIFT SOLENOID VALVE A" , AT-177, "DTC P0755 SHIFT SOLENOID VALVE B" or AT-201, "DTC VEHICLE SPEED SENSOR MTR" .

No >> GO TO 2.

2. CHECK SYMPTOM

Check again.

OK or NG

OK >> Go to AT-231, "8. Vehicle Cannot Be Started From D1" .

NG >> GO TO 3.

3. CHECK TCM INSPECTION

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

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

17. A/T Does Not Shift: $D_4 \rightarrow 3_3$, When A/T Selector Lever D $\rightarrow$ 3

ECS009AA

SYMPTOM:
A/T does not shift from D_4 to 3_3 when changing A/T selector lever from D $\rightarrow$ 3 position.

1. CHECK 3 POSITION SWITCH CIRCUIT

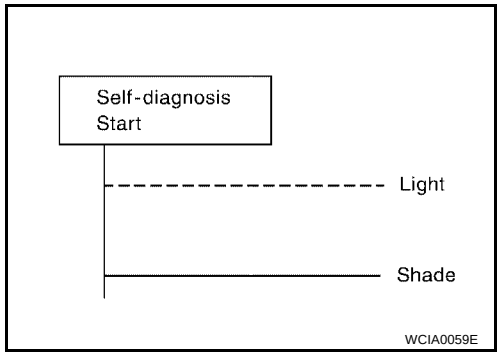
With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to 3 position switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to 3 position switch circuit?

Yes or No

Yes >> Check 3 position switch circuit. Refer to AT-110, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" .

No >> Go to AT-237, "10. A/T Does Not Shift: $D_2 \rightarrow D_3$" .



18. A/T Does Not Shift: $3_3 \rightarrow 2_2$, When Selector Lever 3 $\rightarrow$ 2 Position

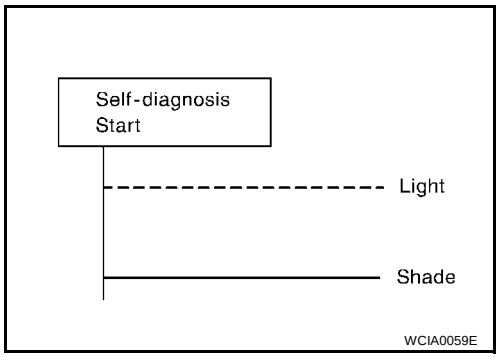
ECS009AB

SYMPTOM:
A/T does not shift from 3_3 to 2_2 when changing selector lever from 3 to 2 position.

1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?



Yes or No

Yes >> Check park/neutral position (PNP) switch circuit. Refer to AT-110, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" .

No >> Go to AT-234, "9. A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$" .

19. A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever 2 → 1 Position

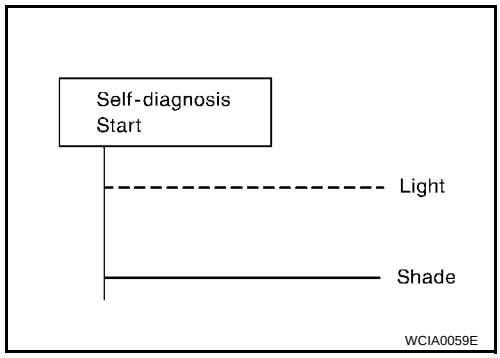
ECS009AC

SYMPTOM:
A/T does not shift from 2_2 to 1_1 when changing selector lever from 2 to 1 position.

1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT

With CONSULT-II
Does “TCM INPUT SIGNALS” in “DATA MONITOR” show damage to park/neutral position (PNP) switch circuit?

Without CONSULT-II
Does self-diagnosis show damage to park/neutral position (PNP) switch circuit?

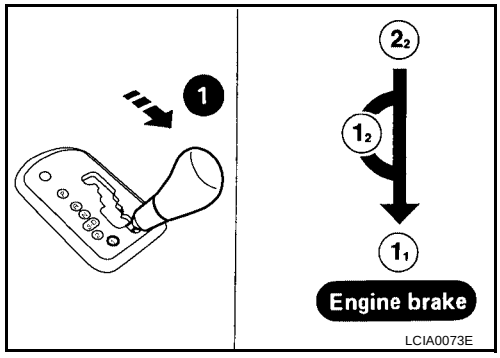


Yes or No

Yes >> Check park/neutral position (PNP) switch circuit. Refer to AT-110, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" .
No >> GO TO 2.

2. CHECK SYMPTOM

Check again.



OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3. CHECK TCM INSPECTION

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

OK or NG

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

20. Vehicle Does Not Decelerate By Engine Brake

ECS009AD

SYMPTOM:
Vehicle does not decelerate by engine brake when shifting from 2_2 (1_2) to 1_1.

1. CHECK SYMPTOM

Is “6. Vehicle Does Not Creep Backward In R Position” OK?

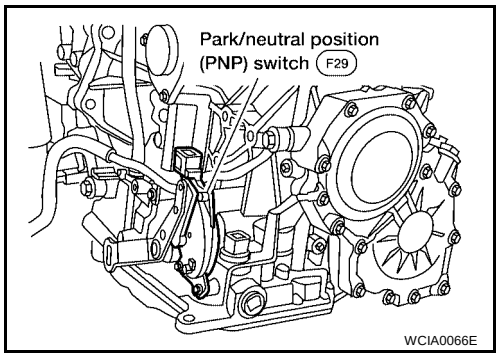
Yes or No

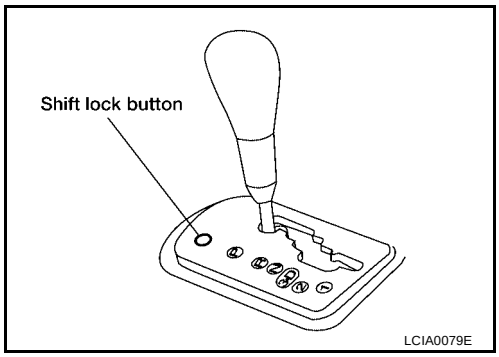
Yes >> Go to AT-248, "15. Engine Speed Does Not Return To Idle (Light Braking $D_4 \rightarrow D_3$)".
No >> Go to AT-225, "6. Vehicle Does Not Creep Backward In R Position".

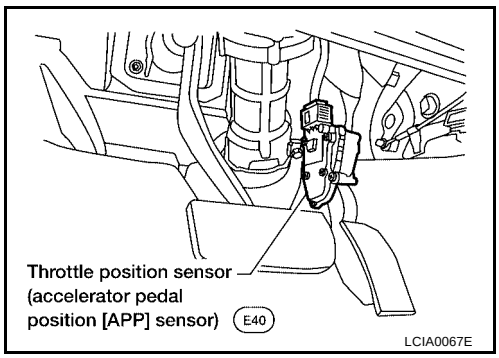
21. TCM Self-diagnosis Does Not Activate (PNP & 3 Position Switches Circuit Checks), and Throttle Position Sensor [Accelerator Pedal Position (APP) Sensor] Circuit Check

ECS009AE

SYMPTOM:
A/T check (position) indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.







DESCRIPTION

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

Detects the A/T selector lever in 3 position and sends a signal to the TCM.

- Throttle position sensor [accelerator pedal position (APP) sensor]
  The throttle position sensor [accelerator pedal position (APP) sensor] is part of the system that controls the throttle position. This system also uses an electric throttle control actuator, which consists of a throttle control motor and throttle position sensors. Accelerator pedal position signal is sent to the ECM.

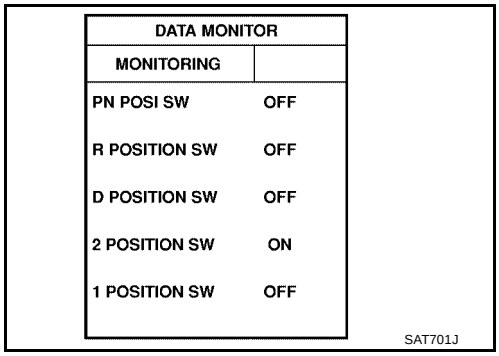
DIAGNOSTIC PROCEDURE

NOTE:
The diagnostic procedure includes inspection for the 3 position switch circuit.

1. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch to “ON” position.
   (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out P/N, R, D, 2 and 1 position switches moving selector lever to each position.
   Check that the signal of the selector lever position is indicated properly.



OK or NG

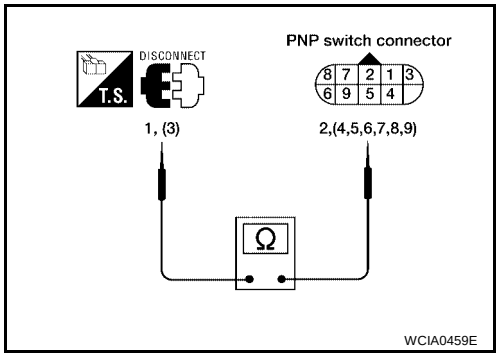
OK >> GO TO 5.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following items:

- Park/neutral position (PNP) switch

– Check continuity between park/neutral position (PNP) switch F29 terminals 1 and 2 and between terminals 3 and 4, 5, 6, 7, 8 and 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	

– If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step a.
– If OK on step b, adjust manual control cable. Refer to AT-270, "Control Cable Adjustment" .
– If NG on step b, remove park/neutral position (PNP) switch from A/T and check continuity of park/neutral position (PNP) switch terminals. Refer to step a.
– If OK on step d, adjust park/neutral position (PNP) switch. Refer to AT-269, "Park/Neutral Position (PNP) Switch Adjustment" .
– If NG on step d, replace park/neutral position (PNP) switch.

- Harness for short or open between ignition switch and park/neutral position (PNP) switch (Main harness)
- Harness for short or open between park/neutral position (PNP) switch and TCM (Main harness)

OK or NG

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

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

Without CONSULT-II

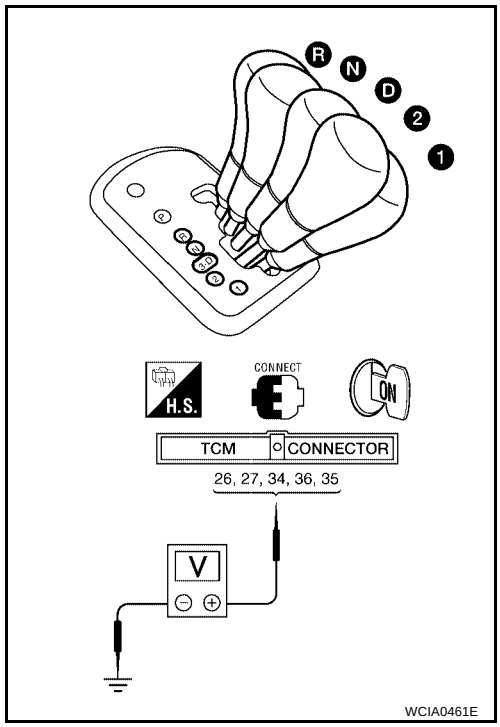
1. Turn ignition switch to ON position. (Do not start engine.)
2. Check voltage between TCM terminals 26, 27, 34, 35, 36 and ground while moving selector lever through each position.

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

Voltage:

B : Battery voltage

0 : 0V



OK or NG

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

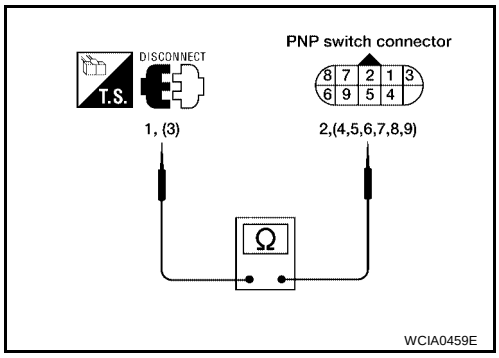
4. DETECT MALFUNCTIONING ITEM

Check the following items:

- Park/neutral position (PNP) switch

– Check continuity between park/neutral position (PNP) switch terminals 1 and 2, and between terminals 3 and 4, 5, 6, 7, 8 and 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	



– If NG, check again with manual control cable disconnected from manual shaft of A/T assembly. Refer to step a.

– If OK on step b, adjust manual control cable. Refer to AT-270, "Control Cable Adjustment" .

– If NG on step b, remove park/neutral position (PNP) switch from A/T and check continuity of park/neutral position (PNP) switch terminals. Refer to step a.

– If OK on step d, adjust park/neutral position (PNP) switch. Refer to AT-269, "Park/Neutral Position (PNP) Switch Adjustment" .

– If NG on step d, replace park/neutral position (PNP) switch.

- Harness for short or open between ignition switch and park/neutral position (PNP) switch (Main harness)
- Harness for short or open between park/neutral position (PNP) switch and TCM (Main harness)

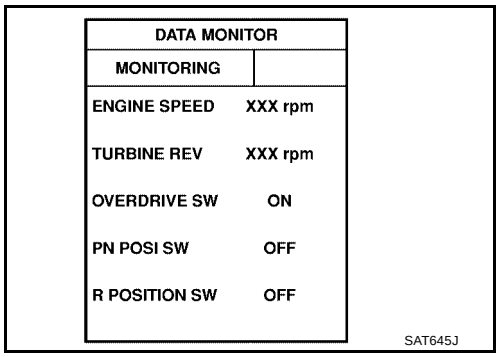
OK or NG

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

5. CHECK 3 POSITION SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch to “ON” position.
   (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “OVERDRIVE SW”.
   Check the signal of the 3 position switch is indicated properly.
   (Overdrive switch “ON” displayed on CONSULT-II means overdrive “OFF”.)



OK or NG

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

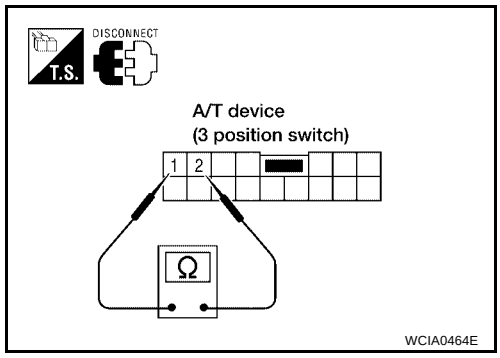
6. DETECT MALFUNCTIONING ITEM

Check the following items:

- 3 position switch M34.

– Check for continuity between terminals 1 and 2 with selector lever in 3 position.

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



OK or NG

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

7. CHECK THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]

- Perform throttle position sensor [accelerator pedal position (APP) sensor] inspection. Refer to AT-182, "DTC P1705 THROTTLE POSITION SENSOR [ACCELERATOR PEDAL POSITION (APP) SENSOR]" .

OK or NG

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

8. CHECK TCM INSPECTION

1. Perform TCM input/output inspection. Refer to AT-104, "TCM INSPECTION TABLE"

OK or NG

OK >> **INSPECTION END**
NG >> Inspect TCM terminals and related wiring harnesses for damage or loose connections. Repair or replace damaged parts.

A/T SHIFT LOCK SYSTEM

PFP:34950

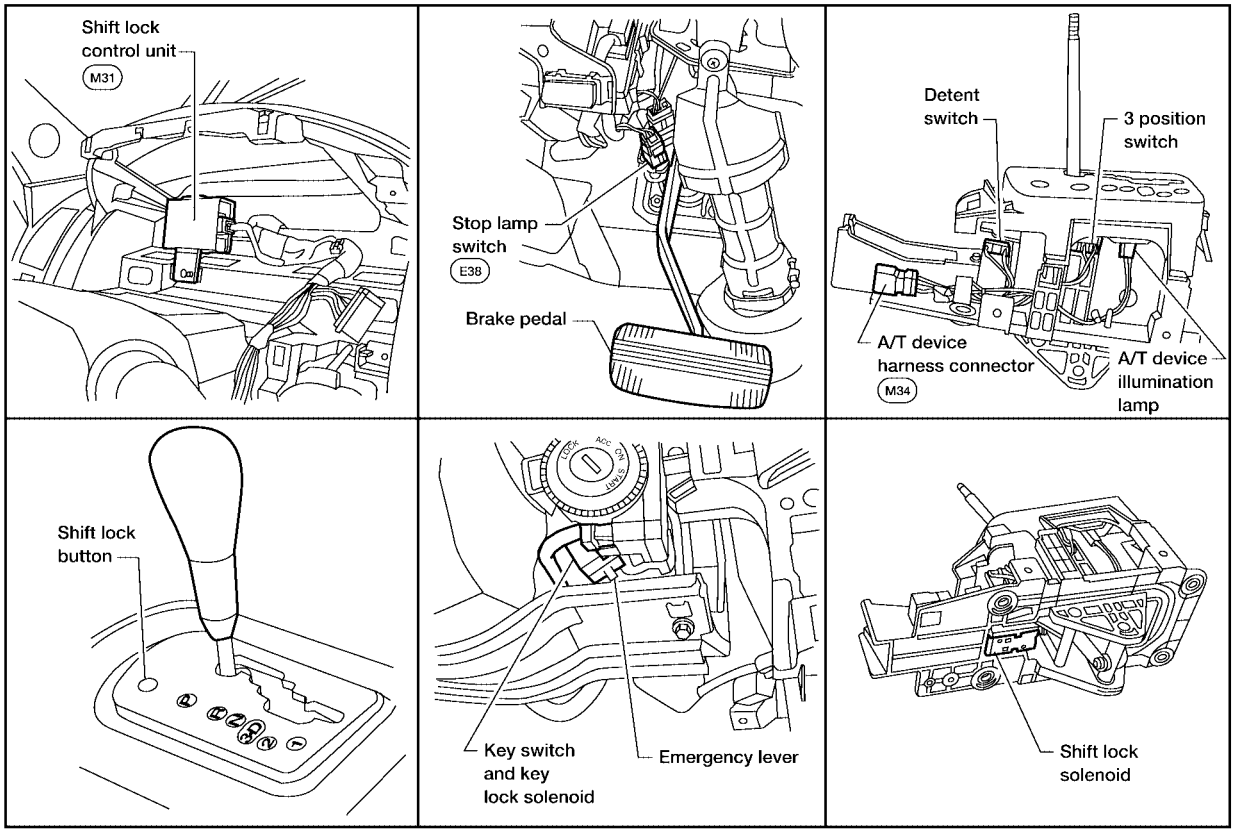
Description

ECS009AF

- The electrical key interlock mechanism also operates as a shift lock:
  With the key switch turned to ON, the selector lever cannot be shifted from “P” (parking) to any other position unless the brake pedal is depressed.
  With the key removed, the selector lever cannot be shifted from “P” to any other position.
  The key cannot be removed unless the selector lever is placed in “P”.
- The shift lock and key interlock mechanisms are controlled by the ON-OFF operation of the shift lock solenoid and by the operation of the rotator and slider located inside the key cylinder.

Shift Lock System Electrical Parts Location

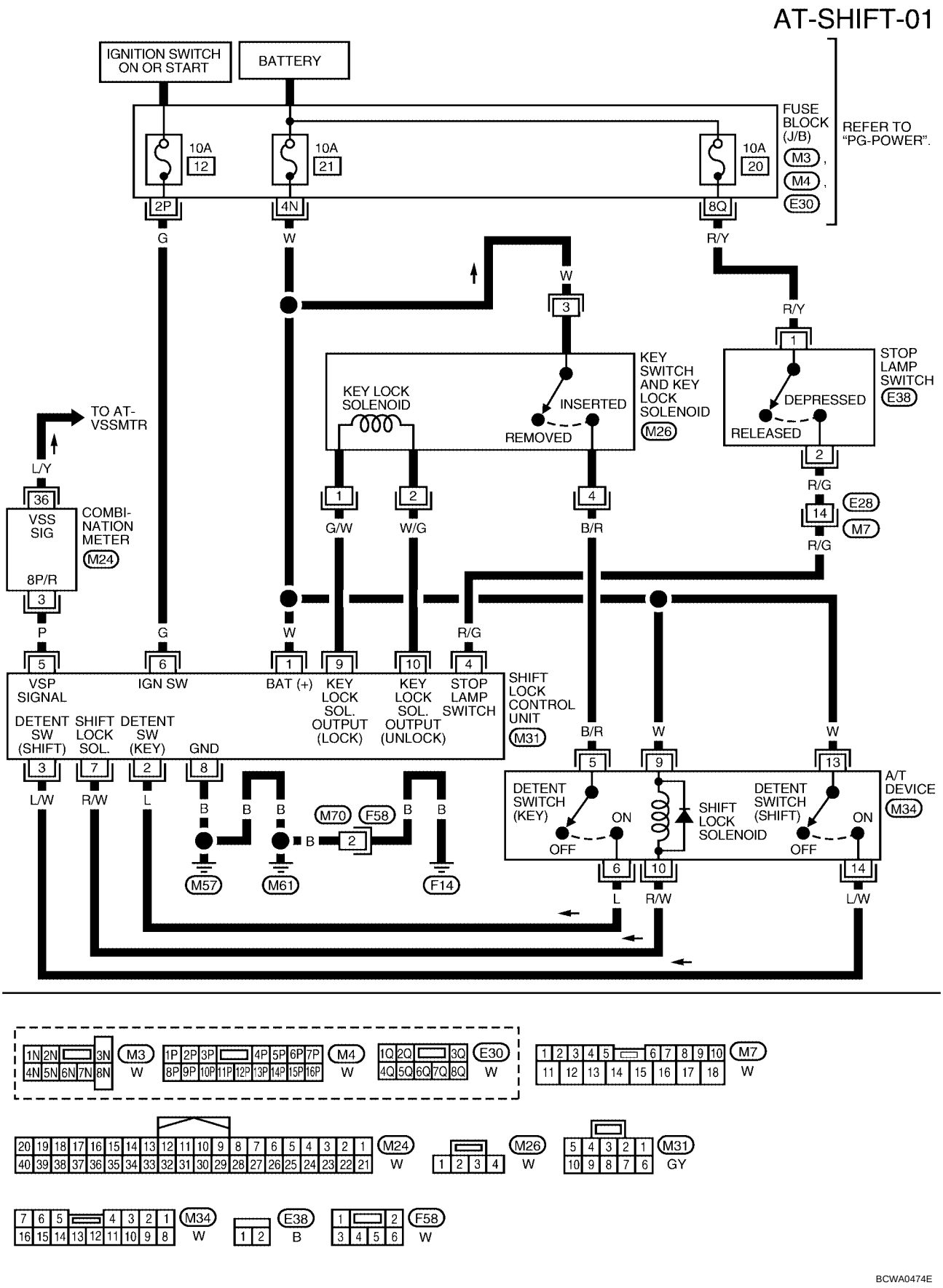
ECS009AG



LCIA0082E

Wiring Diagram — SHIFT —

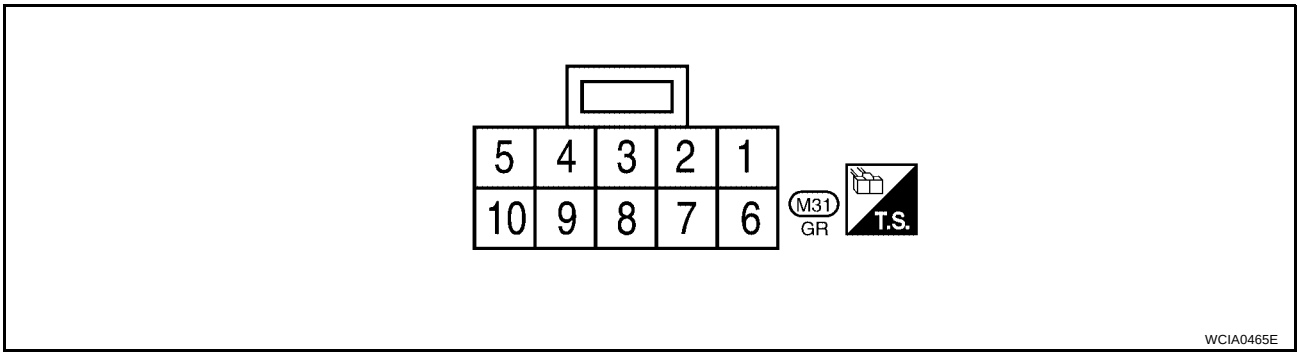
ECS009AH



Shift Lock Control Unit Reference Values

ECS009AI

SHIFT LOCK HARNESS CONNECTOR TERMINAL LAYOUT



SHIFT LOCK CONTROL UNIT INSPECTION TABLE

Data are reference values.

Terminal No. (Wire color)		Item	Condition	Judgement standard
(+)	(-)			
1 (W)	8 (B)	Power source	Always	Battery voltage
2 (L)	8 (B)	Detent switch (key)	When selector lever is not in "P" position with key inserted	Battery voltage
			Except the above	Approx. 0V
3 (L/W)	8 (B)	Detention switch (for shift)	When selector lever is not in "P" position	Battery voltage
			When selector lever is in "P" position	Approx. 0V
4 (R/G)	8 (B)	Stop lamp switch	When brake pedal is depressed	Battery voltage
			When brake pedal is released	Approx. 0V
5 (P)	8 (B)	Vehicle speed signal	—	—
6 (G)	8 (B)	Ignition signal	Ignition switch: “ON”	Battery voltage
			Ignition switch: “OFF”	Approx. 0V
7 (R/W)	8 (B)	Shift lock solenoid	When the brake pedal is depressed	Battery voltage
			Ignition switch: "ON" and vehicle speed is less than 8 km/h (5 MPH)	Approx. 0V
8 (B)	–	Ground	Always	Approx. 0V
9 (G/W)	8 (B)	Key lock signal	When the selector lever is set to a position other than the “P” position	Battery voltage for approx. 0.1 sec. (Note)
			Except the above	Approx. 0V
10 (W/G)	8 (B)	Key unlock signal	When the selector lever is set to the“ P” position	Battery voltage for approx. 0.1 sec. (Note)
			Except the above	Approx. 0V

NOTE:

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

Component Inspection

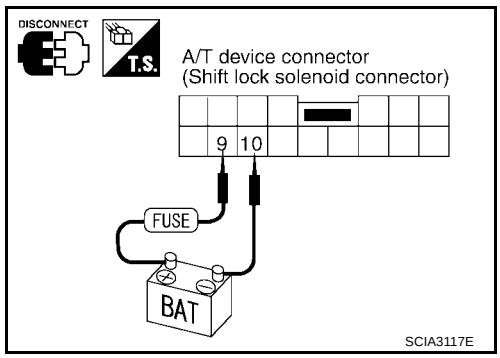
ECS009AJ

SHIFT LOCK SOLENOID

- Check operation by applying battery voltage to A/T device connector.

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

Terminal No.
9 (Battery voltage) - 10 (Ground)

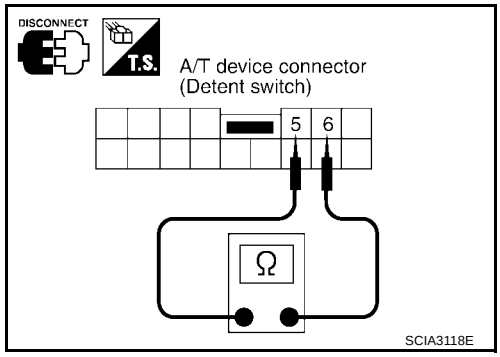


DETENT SWITCH

For Key:

- Check continuity between terminals of the A/T device connector.

Condition	Terminal No.	Continuity
When selector lever is not in "P" position with key inserted.	5 - 6	Yes
Except the above		No

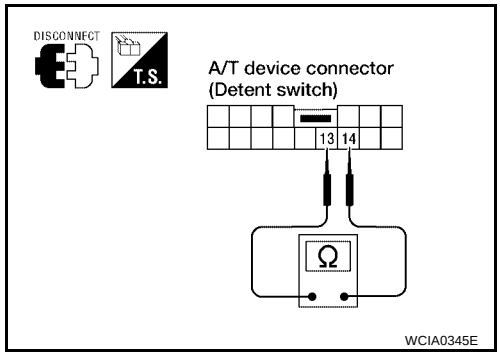


DETENT SWITCH

For Shift:

- Check continuity between terminals of the A/T device connector.

Condition	Terminal No.	Continuity
When selector lever is not in "P" position.	13 - 14	Yes
Except the above		No



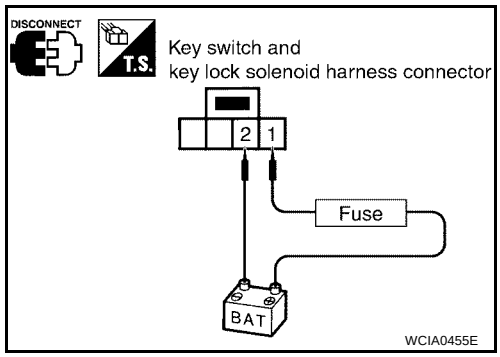
KEY LOCK SOLENOID

Key Lock

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

CAUTION:
Be careful not to cause burnout of the harness.

Terminal No.
1 (Battery voltage) - 2 (Ground)

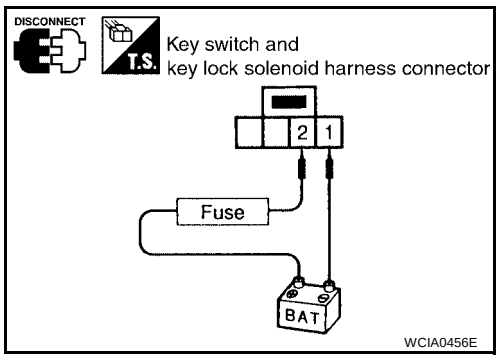


Key Unlock

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

CAUTION:
Be careful not to cause burnout of the harness.

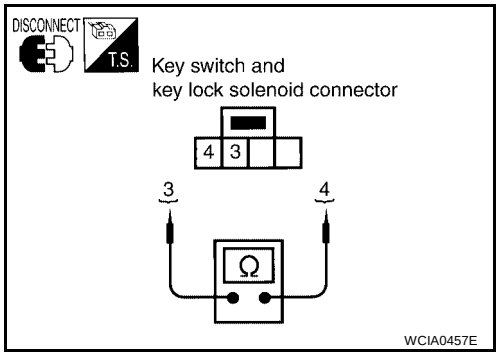
Terminal No.
2 (Battery voltage) - 1 (Ground)



KEY SWITCH

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

Condition	Terminal No.	Continuity
Key inserted	3 - 4	Yes
Key removed		No

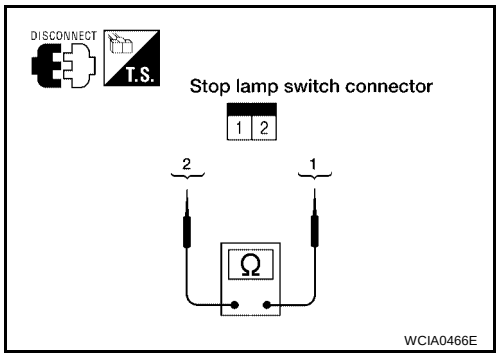


STOP LAMP SWITCH

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

Condition	Terminal No.	Continuity
When brake pedal is depressed	1 - 2	Yes
When brake pedal is released		No

Check stop lamp switch after adjusting brake pedal. Refer to BR-6, "Inspection and Adjustment" .

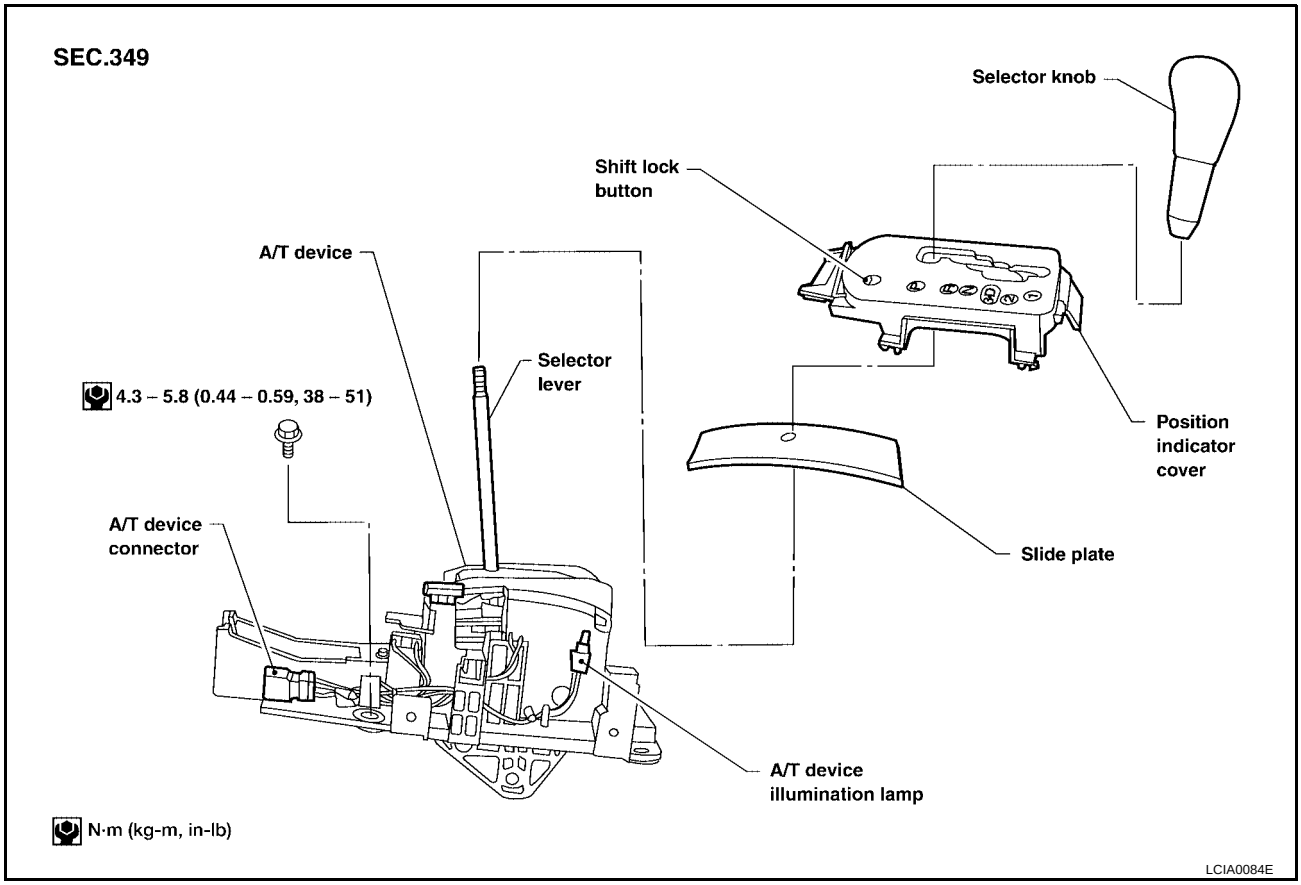


SHIFT CONTROL SYSTEM

PFP:34901

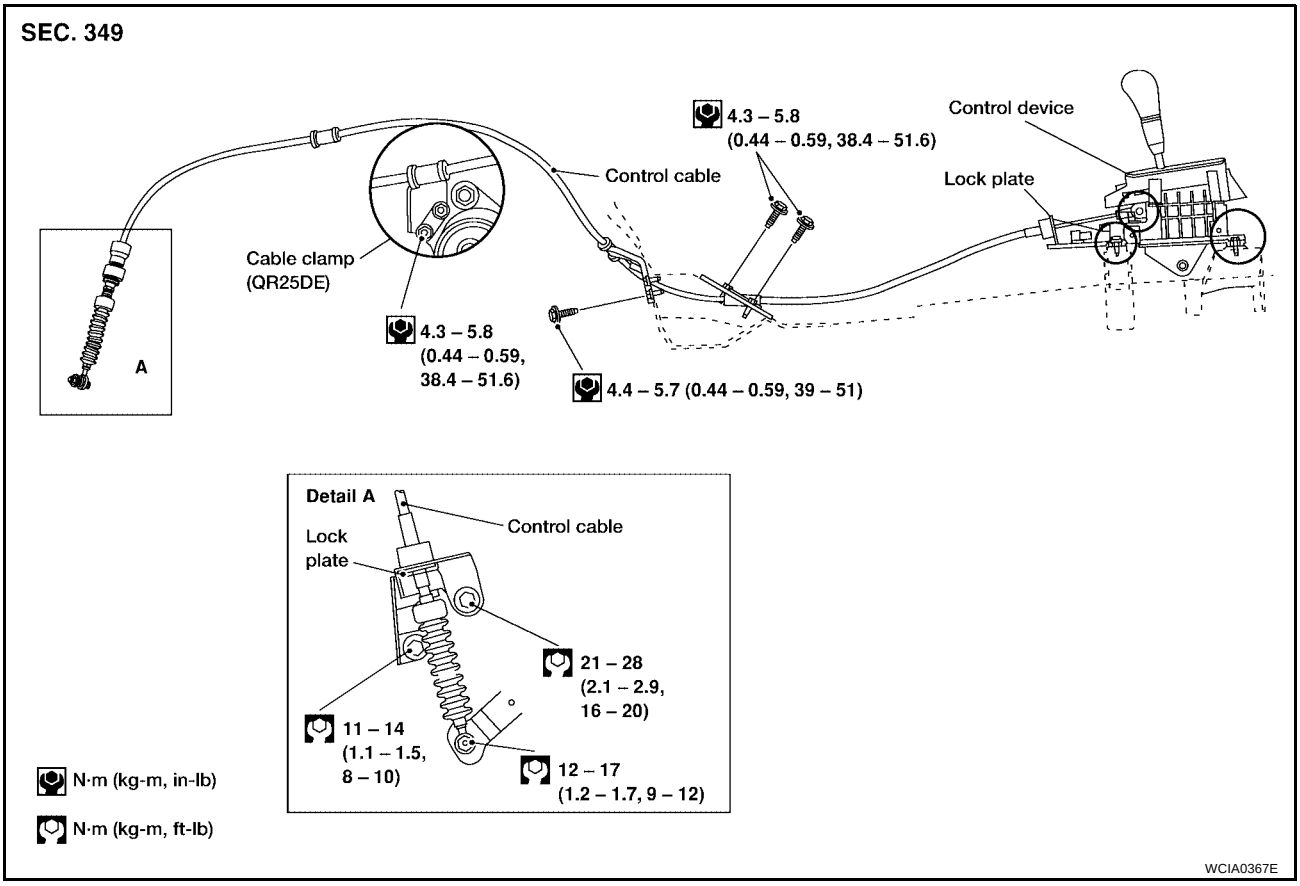
Control Device

ECS009AK



Control Cable

ECS009AL



ON-VEHICLE SERVICE

PFP:00000

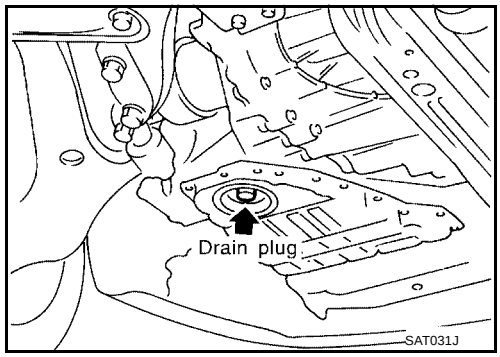
Control Valve Assembly and Accumulators

ECS009AM

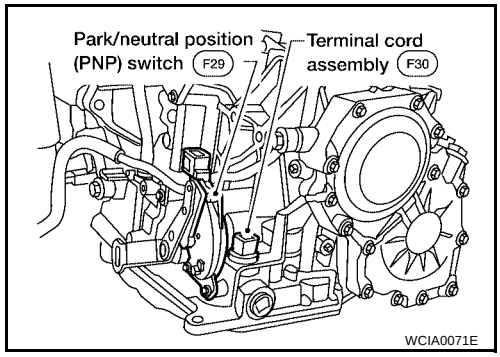
REMOVAL

1. Drain ATF from transaxle.
2. Remove oil pan and gasket using power tools.

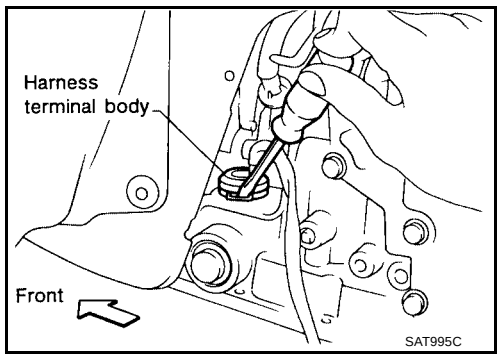
CAUTION:
Do not reuse oil pan bolts.



3. Disconnect terminal cord assembly harness connector.



4. Remove stopper ring from terminal cord assembly harness terminal body.
5. Remove terminal cord assembly harness from transaxle case by pushing on terminal body.

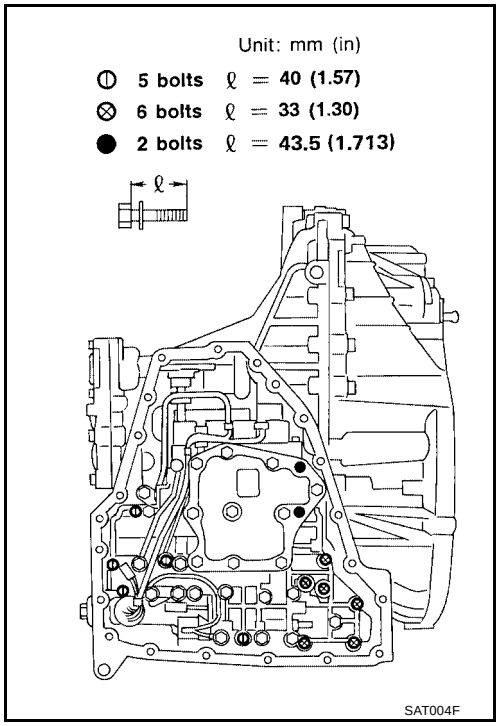


6. Remove control valve assembly by removing bolts **I** , **X** and ●. Bolt length, number and location are shown in the illustration.

CAUTION:

Do not drop manual valve and servo release accumulator return spring.

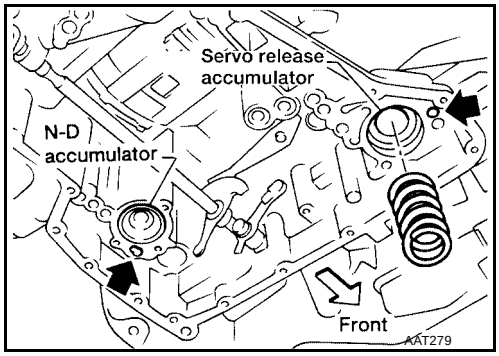
7. Disassemble and inspect control valve assembly if necessary. Refer to AT-306, "Control Valve Assembly" .



8. Remove servo release and N-D accumulators by applying compressed air if necessary.

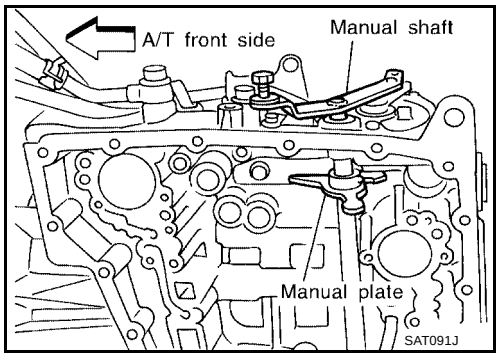
NOTE:

Hold each piston with a rag.



INSTALLATION

- Set manual shaft in Neutral, then align manual plate with groove in manual valve.
- After installing control valve assembly, make sure that selector lever can be moved to all positions.



Revolution Sensor Replacement

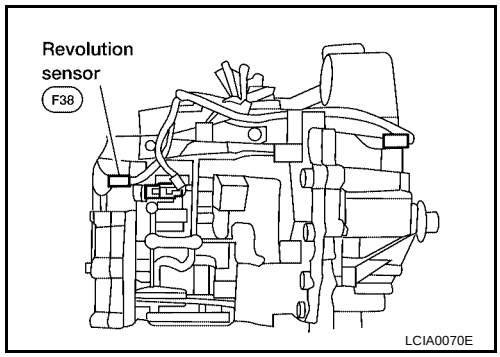
ECS009AN

1. Disconnect electrical connector.
2. Remove revolution sensor from A/T.

CAUTION:
Do not damage the revolution sensor or transaxle case.

3. Installation is in the reverse order of removal.

CAUTION:
Always use new sealing parts.



Turbine Revolution Sensor Replacement

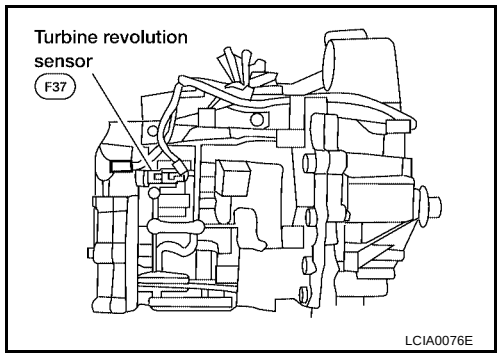
ECS009AO

1. Disconnect electrical connector.
2. Remove bolt and turbine revolution sensor from A/T.

CAUTION:
Do not damage the turbine revolution sensor or transaxle case.

3. Installation is in the reverse order of removal.

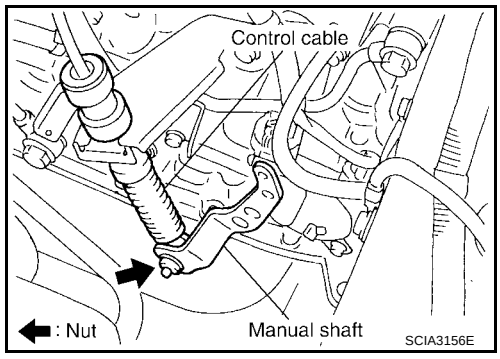
CAUTION:
Always use new sealing parts.



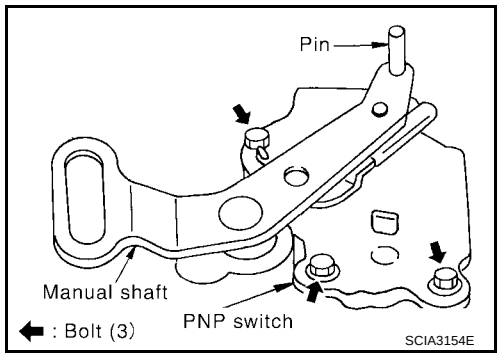
Park/Neutral Position (PNP) Switch Adjustment

ECS009AP

1. Remove control cable from manual shaft.
2. Set manual shaft in N position.



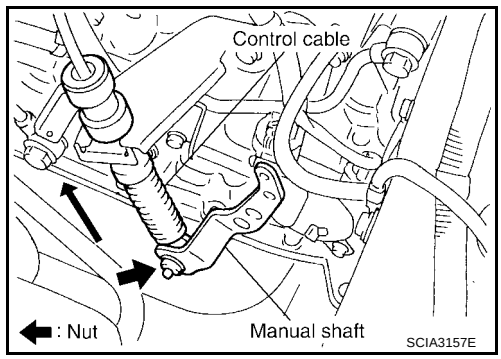
3. Loosen park/neutral position (PNP) switch bolts.
4. Insert pin into adjustment holes in both PNP switch and manual shaft as near vertical as possible.
5. Installation is in the reverse order of removal.
6. Check continuity of PNP switch. Refer to AT-113, "Diagnostic Procedure" .



Control Cable Adjustment

ECS009AQ

Move selector lever from the P position to the 1 position. You should be able to feel the detent in each position. If the detent cannot be felt or the pointer indicating the position is improperly aligned, the control cable needs adjustment.



1. Place selector lever in the P position.

   CAUTION:
   Turn wheels more than 1/4 turn and apply the parking brake.
2. Loosen control cable lock nut.
3. Secure the manual lever.
4. Push control cable in the direction of the arrow shown using specified force.

   Specified force : 9.8 N (1.0 kg, 2.2 lb)
5. Tighten control cable lock nut.
6. Move selector lever from P to 1 position. Make sure that selector lever moves smoothly.
   - **Make sure that the starter operates when the selector lever is placed in the N or P position.**
   - **Make sure that the transaxle is locked properly when the selector lever is placed in the P position.**

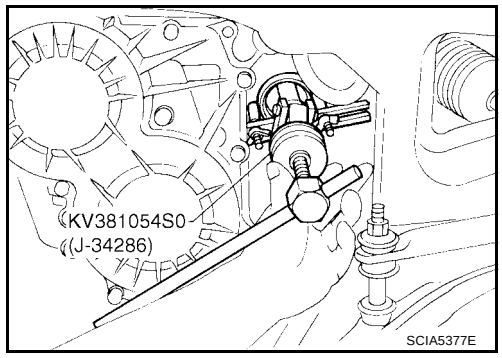
Differential Side Oil Seal Replacement

ECS009AR

1. Remove drive shaft assembly. Refer to FAX-11, "FRONT DRIVE SHAFT" .
2. Remove oil seals using Tool

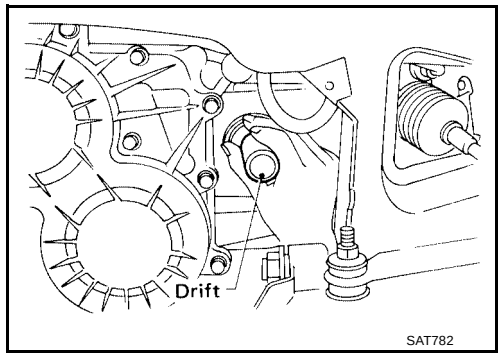
   Tool number : KV381054S0 (J-34286)

   CAUTION:
   Do not reuse oil seals.



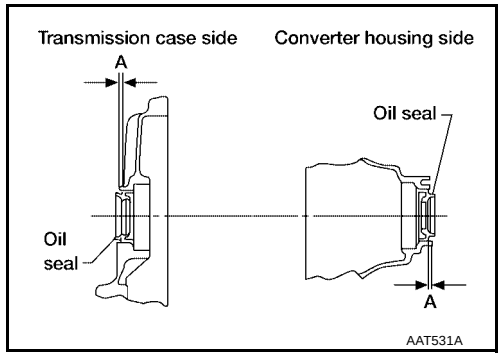
3. Install new oil seals.

   CAUTION:
   - **Do not reuse oil seals.**
   - **Apply ATF to new oil seals.**



- Install new oil seals so dimension A is within specification

  Dimension A : –0.5 mm (–0.02 in) to 0.5 mm (0.02 in)



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

AIR BREATHER HOSE

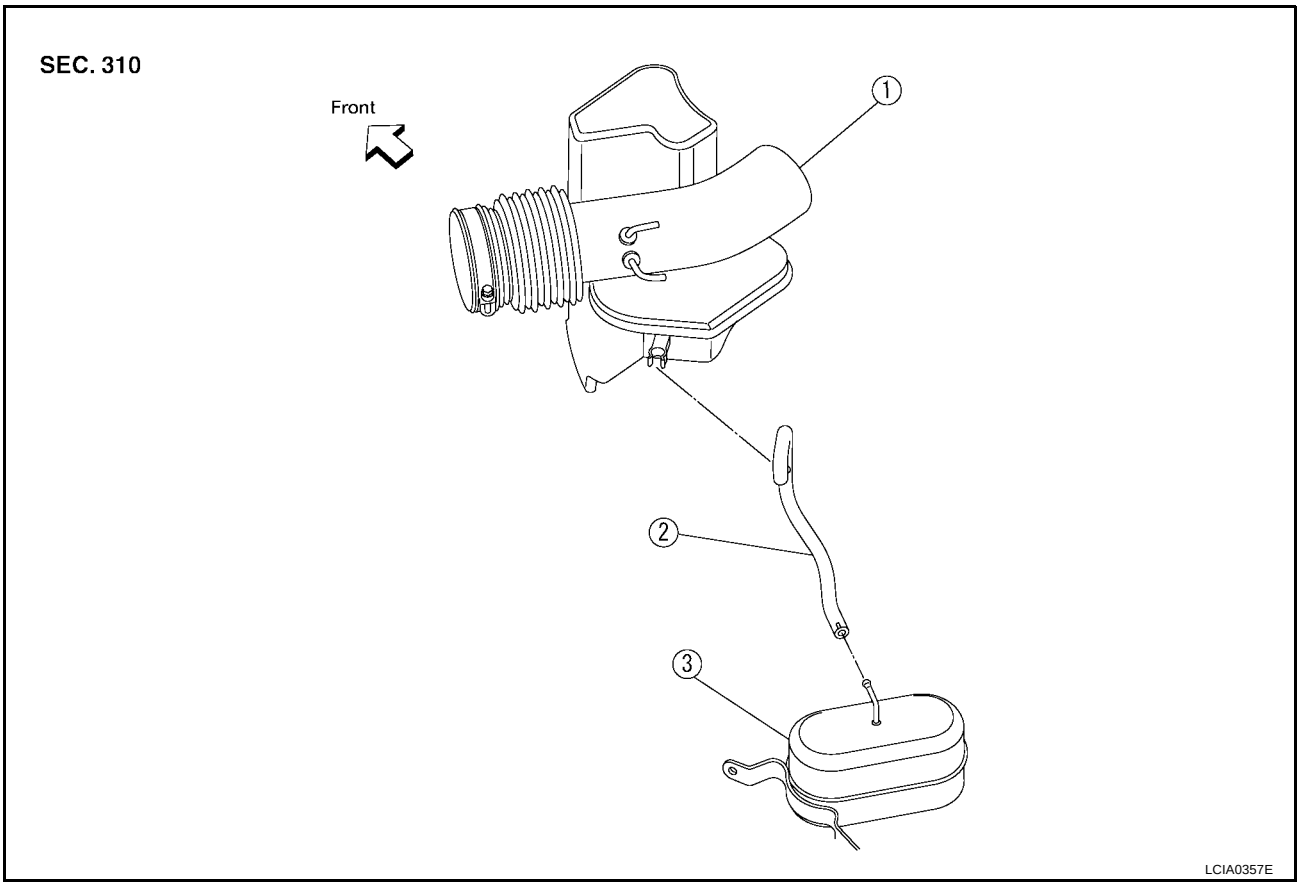
PFP:31098

Air Breather Hose - Air Duct Side

ECS009AS

REMOVAL AND INSTALLATION QR25DE MODELS

AIR BREATHER HOSE TO AIR DUCT SIDE



1. Air cleaner to electronic throttle control actuator tube
2. Air breather hose (air duct side)
3. Oil catch tank

Removal

1. Remove the air cleaner to electronic throttle control actuator tube. Refer to, EM-17, "REMOVAL" .
2. Remove the air breather hose from the oil catch tank.

Installation

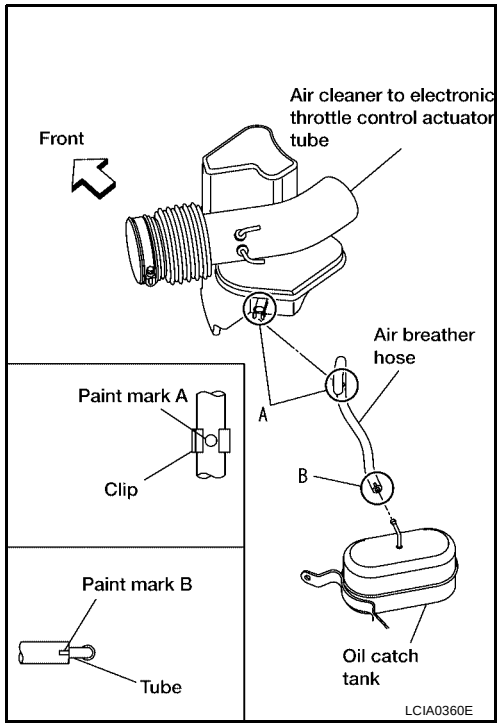
Installation is in the reverse order of removal.

CAUTION:

Do not to crush or kink the air breather hose during installation

NOTE:

- Be sure paint mark A can be seen in the clip when installing the air breather hose to the air cleaner to electronic throttle control actuator tube.
- Be sure paint mark B is facing upwards and to the end of the radius in the oil catch tank tube.
- Insert air breather hose into oil catch tank until it reaches the point where the winding radius stops.

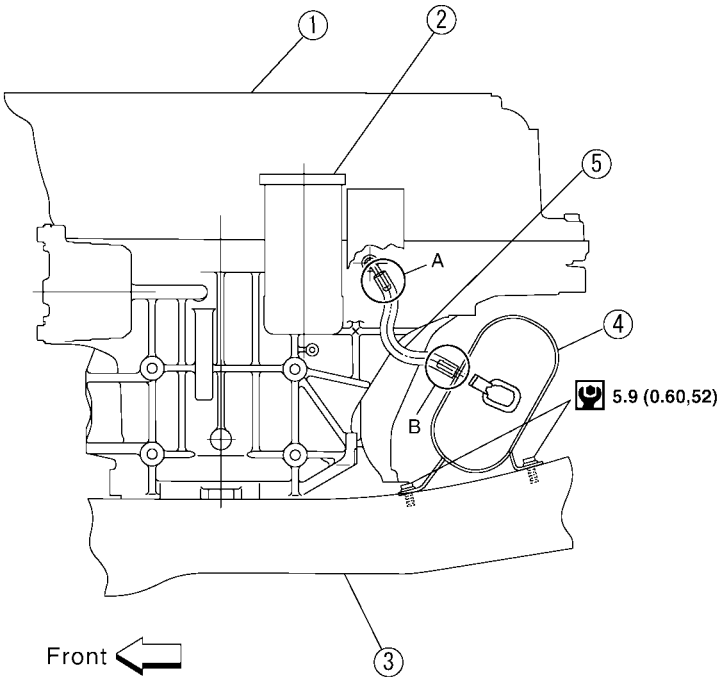


Air Breather Hose - Transaxle Side

ECS009AT

REMOVAL AND INSTALLATION (OIL CATCH TANK TO AIR DUCT)

SEC.310



: N•m (kg-m, in-lb)

WCIA0368E

1. Transaxle assembly
2. Starter motor
3. Left front side member
4. Oil catch tank
5. Air breather hose (transaxle side)

Removal

1. Remove the air cleaner to electronic throttle control actuator tube. Refer to, EM-17, "REMOVAL" .

2. Disconnect the air breather hose air cleaner to electronic throttle control actuator tube side and transaxle side of the oil catch tank.
3. Remove the oil catch tank.

Installation

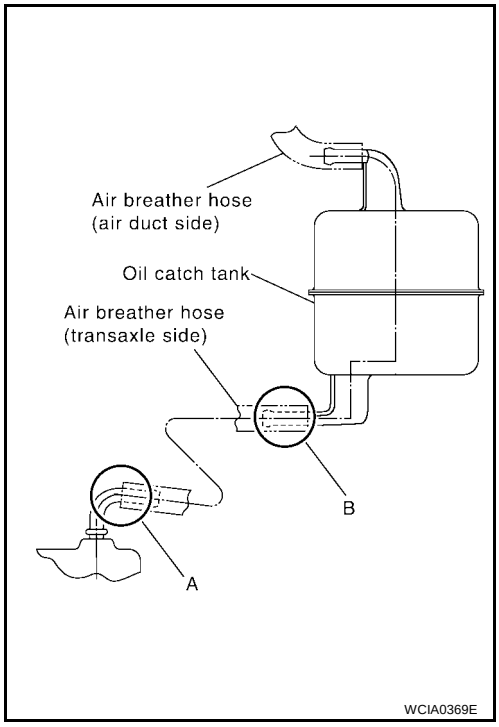
Installation is in the reverse order of removal.

CAUTION:

Do not crush or kink the air breather hose during installation.

NOTE:

- The paint marks must face upwards on installation.
- Insert air breather hose (transaxle side) B into tube stopper when installing air breather hose to the oil catch tank.
- Insert air breather hose (transaxle side) A into the point where the radius stops on the air breather hose when installing to the transaxle.



REMOVAL AND INSTALLATION

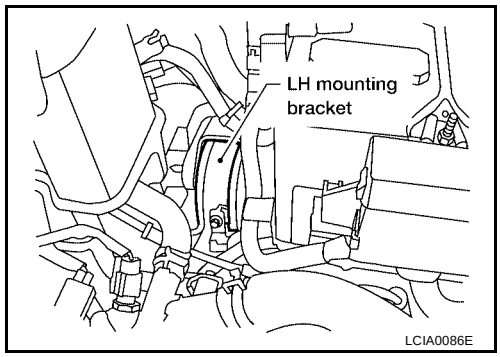
PFP:00000

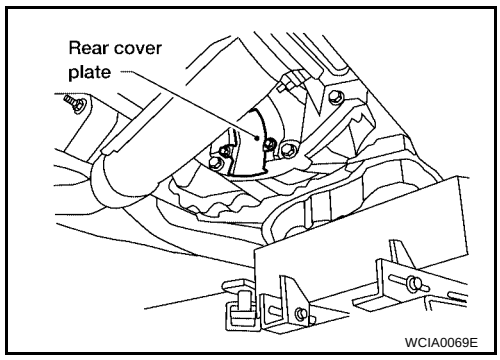
Removal

ECS009AU

1. Remove battery and bracket.
2. Remove air cleaner assembly. Refer to EM-17, "Removal and Installation" .
3. Disconnect terminal cord assembly harness connector and park/neutral position (PNP) switch harness connectors.
4. Disconnect the following connectors:
   - terminal cord assembly
   - park/neutral position (PNP) switch
   - revolution sensor
   - vehicle speed sensor
   - mass air flow sensor
   - turbine revolution sensor
   - ground
5. Remove LH mounting bracket from transaxle and body.
6. Disconnect control cable at transaxle side.
7. Remove drive shafts. Refer to FAX-11, "FRONT DRIVE SHAFT" .
8. Drain ATF from transaxle. Refer to AT-398, "Changing A/T Fluid" .
9. Remove push clips and engine undercover.
10. Disconnect fluid cooler piping.
11. Remove starter motor from transaxle. Refer to SC-17, "Removal and Installation" .
12. Support engine.
13. Remove upper transaxle to engine bolts.
14. Remove front suspension member. Refer to FSU-15, "Removal and Installation" .
15. Remove rear cover plate and torque converter to drive plate bolts.

    NOTE:
    Rotate crankshaft for access to torque convertor bolts.





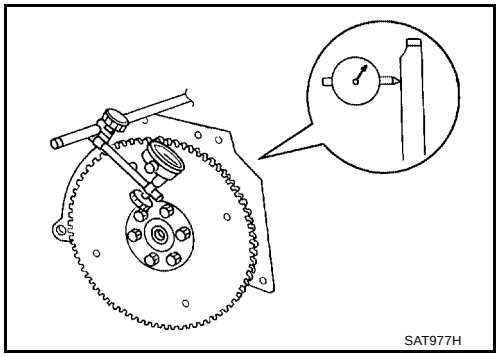
16. Support transaxle with a jack.
17. Remove lower transaxle to engine bolts.
18. Lower transaxle while supporting it with a jack.

Inspection

ECS009AV

- Check the drive plate runout as shown.

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



If this runout is out of allowance, replace drive plate and ring gear. Refer to AT-378, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

Installation

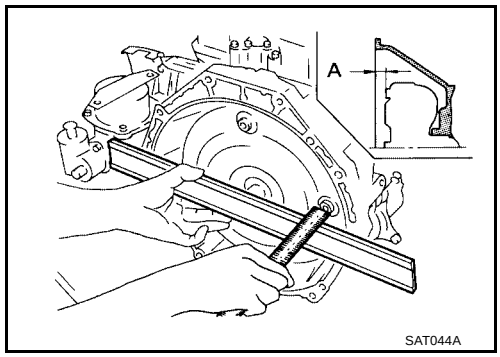
ECS009AW

CAUTION:

- **When replacing an engine or transmission you must make sure the dowels are installed correctly during re-assembly.**
- **Improper alignment caused by missing dowels may cause vibration, oil leaks or breakage of drive train components.**

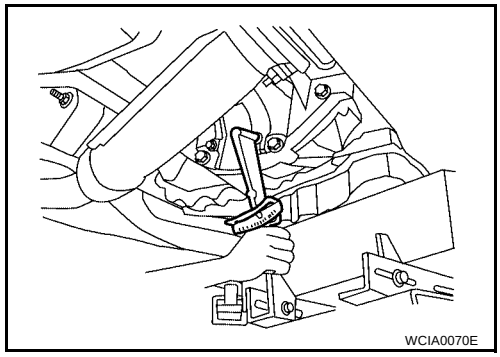
1. When connecting torque converter to transaxle, measure distance “A” to be certain that they are correctly assembled.

   Distance “A” : 14 mm (0.55 in) or more



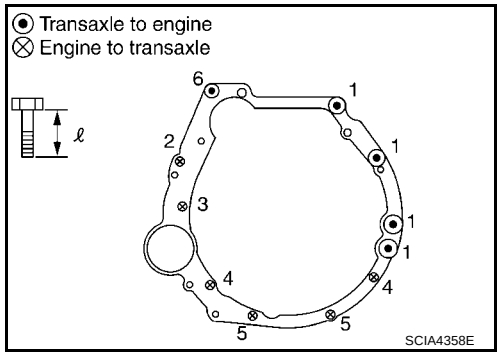
2. Install torque converter bolts to drive plate.

   NOTE:
   With converter installed, rotate crankshaft several turns to check that transaxle rotates freely without binding.



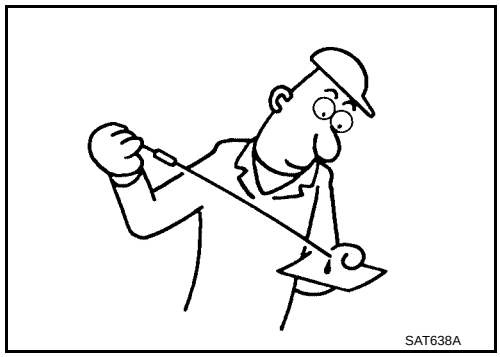
3. Tighten transaxle to engine bolts.

Bolt No.	1	2	3	4	5	6
Number of bolts	4	1	1	2	2	1
Bolt length “ℓ” mm (in)	49 (1.93)	40 (1.57)	45 (1.77)	40 (1.57)	30 (1.18)	45 (1.77)
Tightening torque N·m (kg-m, ft-lb)	75 (7.7, 55)	35 (3.3, 26)	75 (7.7, 55)	43 (4.4, 32)		35 (3.6, 26)



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

- Check fluid level in transaxle. Refer to AT-18, "Checking A/T Fluid" .
- Move selector lever through all positions to be sure that transaxle operates correctly.
  With parking brake applied, run engine at idle. Move selector lever through N to D, to 2, to 1 and to R position. A slight shock should be felt through selector knob each time transaxle is shifted.
- Perform road test. Refer to AT-78, "Road Test" .

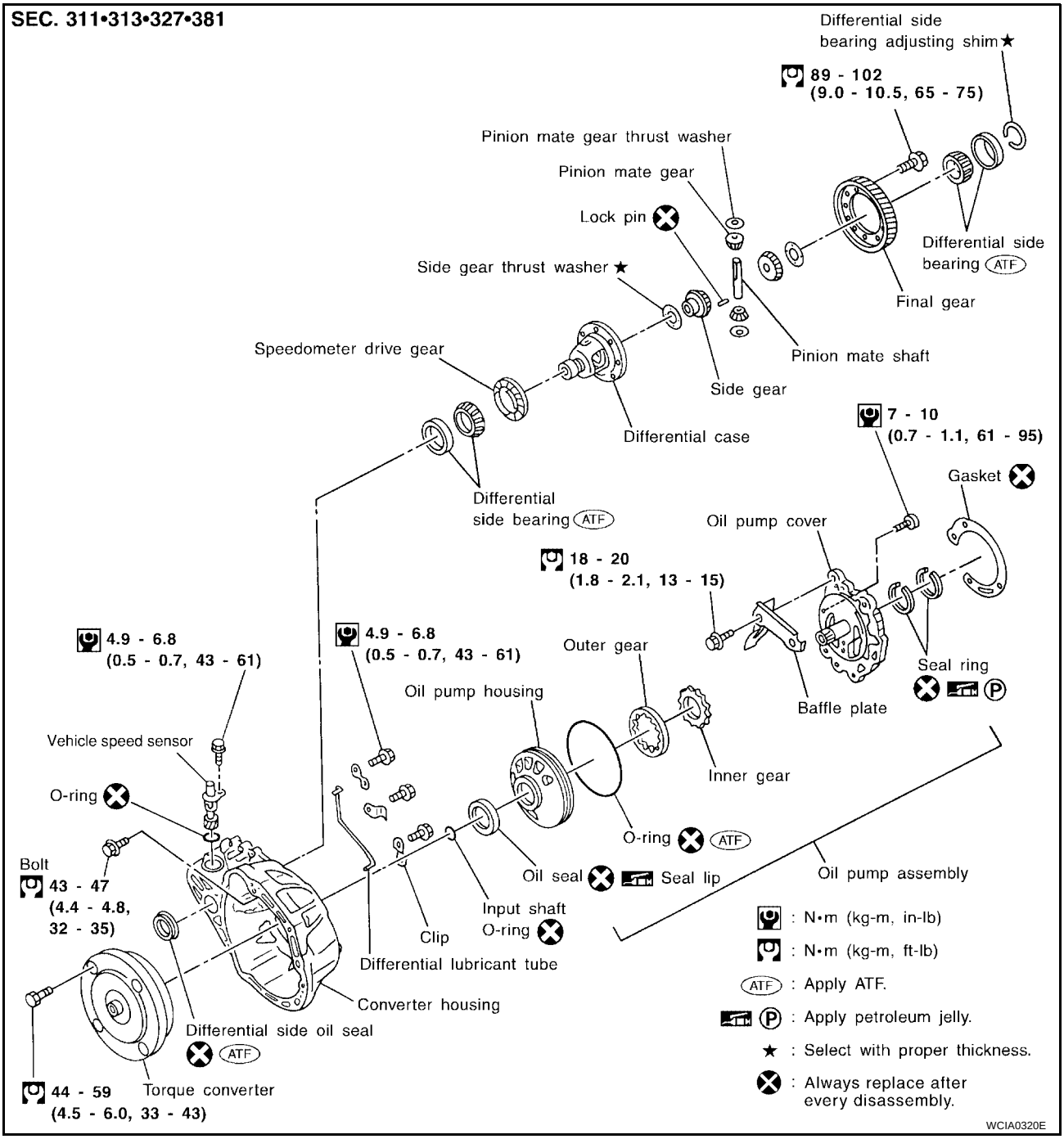


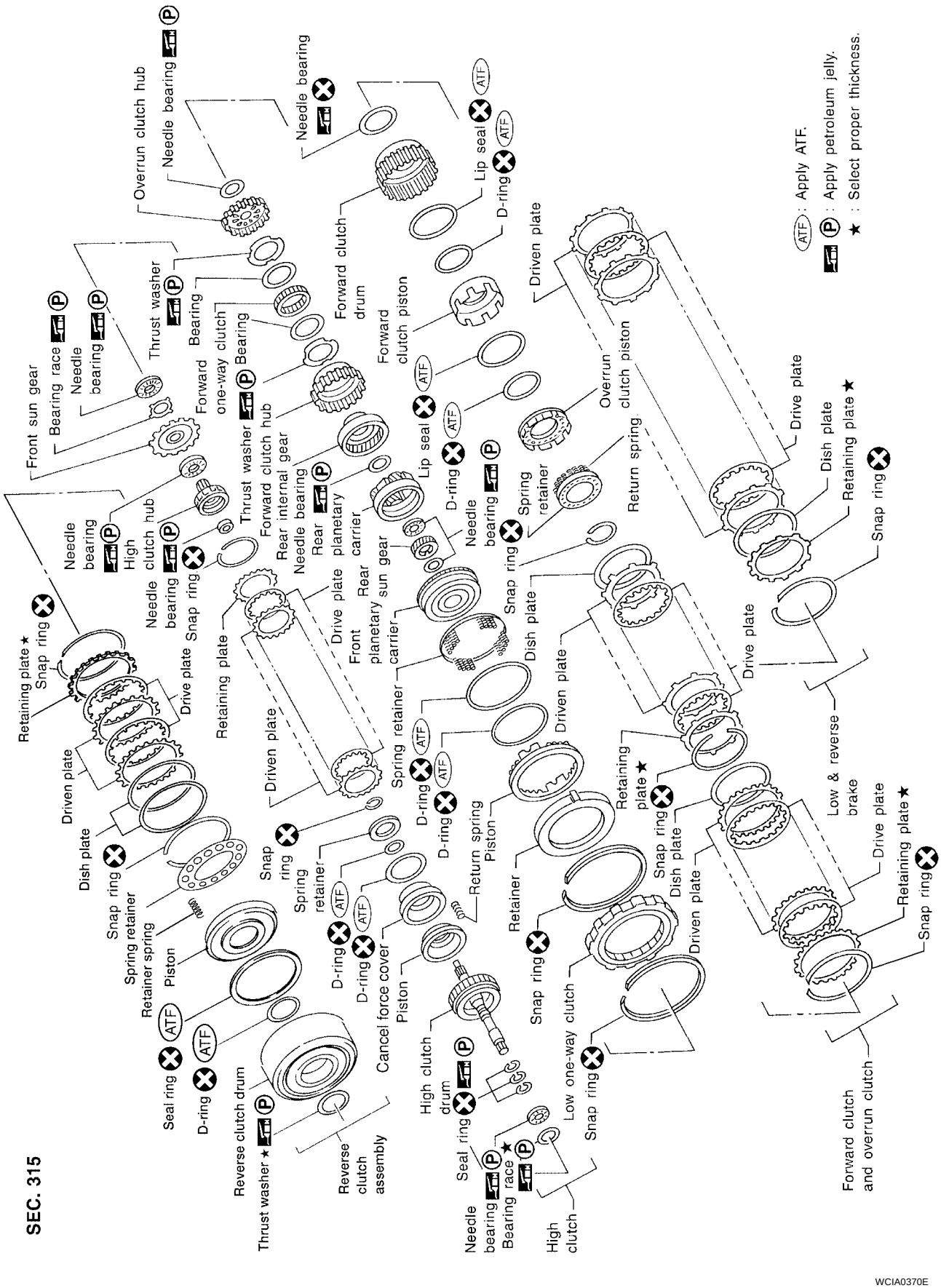
OVERHAUL

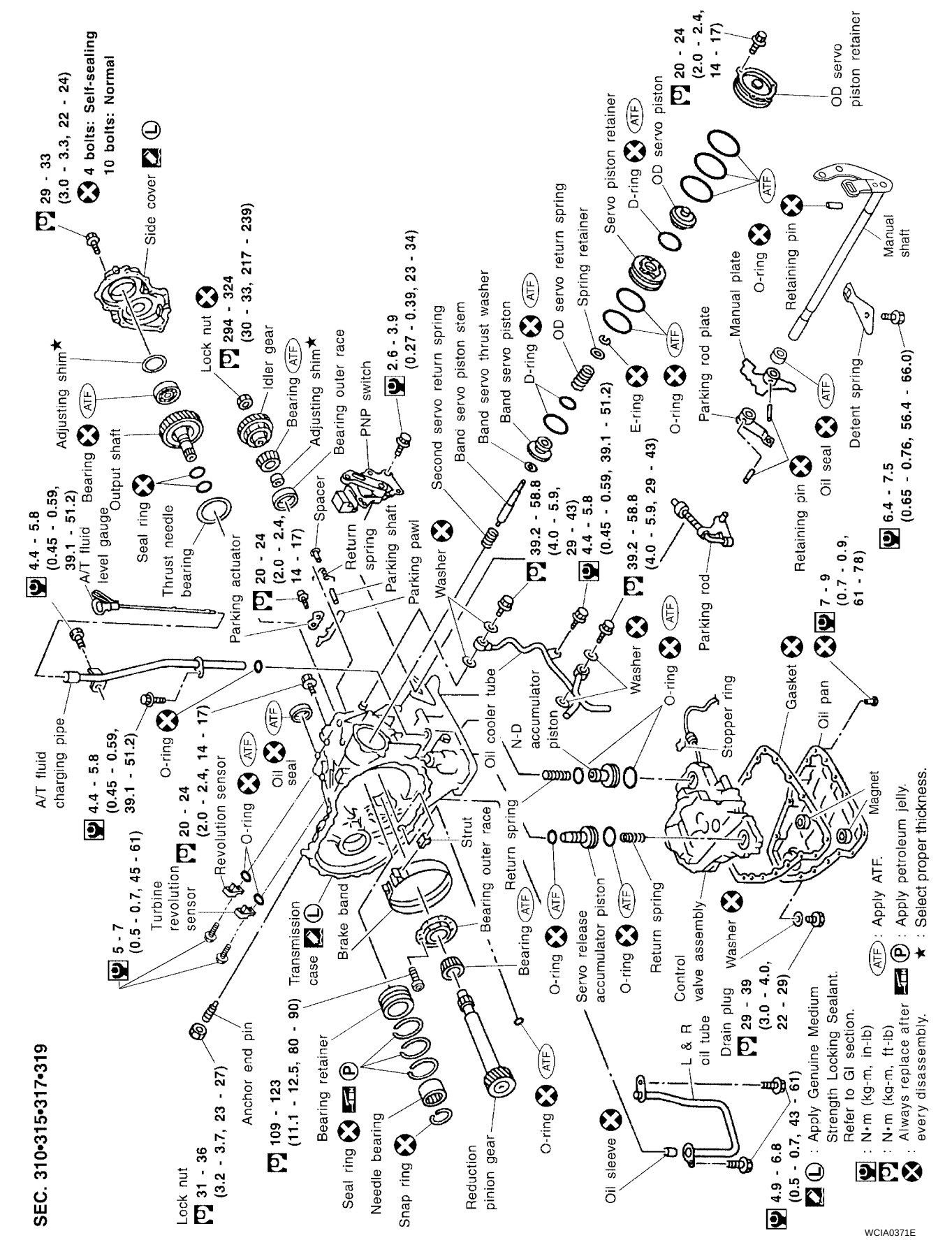
PFP:00000

Components

ECS009AX

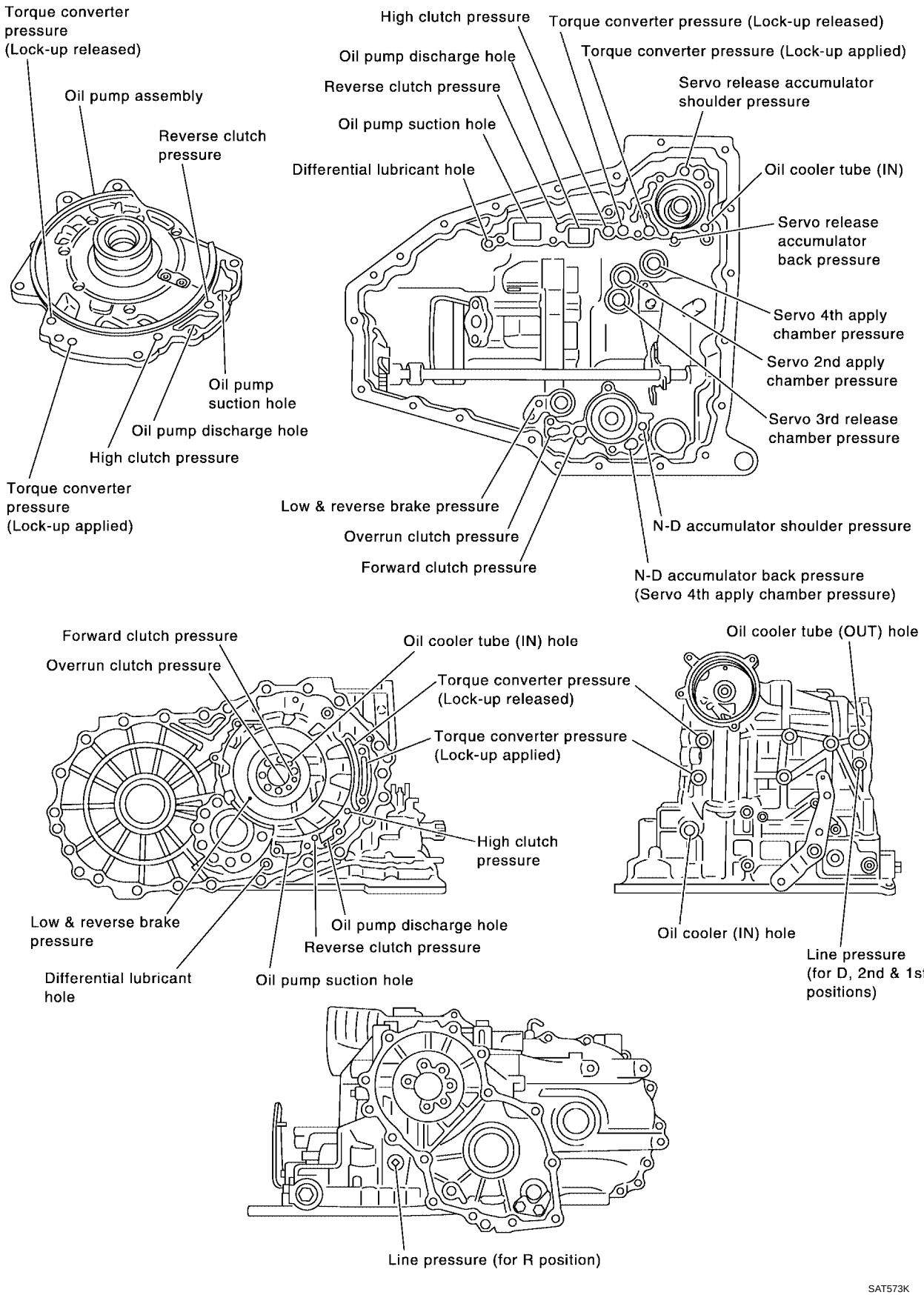



SEC. 315
WCIA0370E
Front sun gear
Bearing race
Needle bearing
Thrust washer
Overrun clutch hub
Needle bearing
Needle bearing
Bearing
Forward one-way clutch
Bearing
Forward clutch drum
Forward clutch piston
Lip seal
D-ring
Driven plate
Thrust washer
Forward clutch hub
Rear internal gear
Needle bearing
Rear planetary carrier
Lip seal
D-ring
Needle bearing
Spring retainer
Return spring
Overrun clutch piston
Needle bearing
High clutch hub
Needle bearing
Snap ring
Retaining plate
Drive plate
Front planetary carrier
Rear sun gear
Snap ring
Dish plate
Driven plate
Drive plate
Dish plate
Retaining plate
Snap ring
Retaining plate
Snap ring
Driven plate
Drive plate
Spring retainer
D-ring
D-ring
Return spring
Piston
Driven plate
Retainer
Retaining plate
Snap ring
Dish plate
Driven plate
Low & reverse brake
Drive plate
Retaining plate
Snap ring
Snap ring
Spring retainer
D-ring
D-ring
Cancel force cover
Piston
Snap ring
Low one-way clutch
Forward clutch and overrun clutch
Seal ring
D-ring
Reverse clutch drum
Thrust washer
Reverse clutch assembly
High clutch drum
Seal ring
Needle bearing
Bearing race
High clutch
Retainer spring
Piston
ATF : Apply ATF.
P : Apply petroleum jelly.
★ : Select proper thickness.


SEC. 310•315•317•319
29 - 33 (3.0 - 3.3, 22 - 24)
4 bolts: Self-sealing
10 bolts: Normal
Side cover
Adjusting shim
Bearing
Output shaft
Seal ring
Thrust needle bearing
Parking actuator
Lock nut
294 - 324 (30 - 33, 217 - 239)
Idler gear
Bearing
Adjusting shim
Bearing outer race
PNP switch
2.6 - 3.9 (0.27 - 0.39, 23 - 34)
Spacer
Return spring
Parking shaft
Parking pawl
Washer
Second servo return spring
Band servo piston stem
Band servo thrust washer
Band servo piston
D-ring
OD servo return spring
Spring retainer
Servo piston retainer
D-ring
OD servo piston
20 - 24 (2.0 - 2.4, 14 - 17)
OD servo piston retainer
4.4 - 5.8 (0.45 - 0.59, 39.1 - 51.2)
A/T fluid level gauge
A/T fluid charging pipe
O-ring
Oil seal
Revolution sensor
Turbine revolution sensor
5 - 7 (0.5 - 0.7, 45 - 61)
Transmission case
Brake band
Bearing outer race
Strut
Return spring
N-D accumulator piston
Oil cooler tube
39.2 - 58.8 (4.0 - 5.9, 29 - 43)
4.4 - 5.8 (0.45 - 0.59, 39.1 - 51.2)
Washer
O-ring
Parking rod
Stopper ring
Gasket
Oil pan
7 - 9 (0.7 - 0.9, 61 - 78)
Retaining pin
Oil seal
Detent spring
Manual plate
O-ring
Parking rod plate
Retaining pin
Manual shaft
6.4 - 7.5 (0.65 - 0.76, 56.4 - 66.0)
Lock nut
31 - 36 (3.2 - 3.7, 23 - 27)
Anchor end pin
109 - 123 (11.1 - 12.5, 80 - 90)
Bearing retainer
Seal ring
Needle bearing
Snap ring
Reduction pinion gear
Bearing
Servo release accumulator piston
Return spring
Oil sleeve
L & R oil tube
Control valve assembly
Drain plug
29 - 39 (3.0 - 4.0, 22 - 29)
Washer
Magnet
4.9 - 6.8 (0.5 - 0.7, 43 - 61)
: Apply Genuine Medium Strength Locking Sealant. Refer to GI section.
: N•m (kg-m, in-lb)
: N•m (kg-m, ft-lb)
: Always replace after every disassembly.
: Apply ATF.
: Apply petroleum jelly.
★ : Select proper thickness.
WCIA0371E

Oil Channel

ECS009AY



Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings

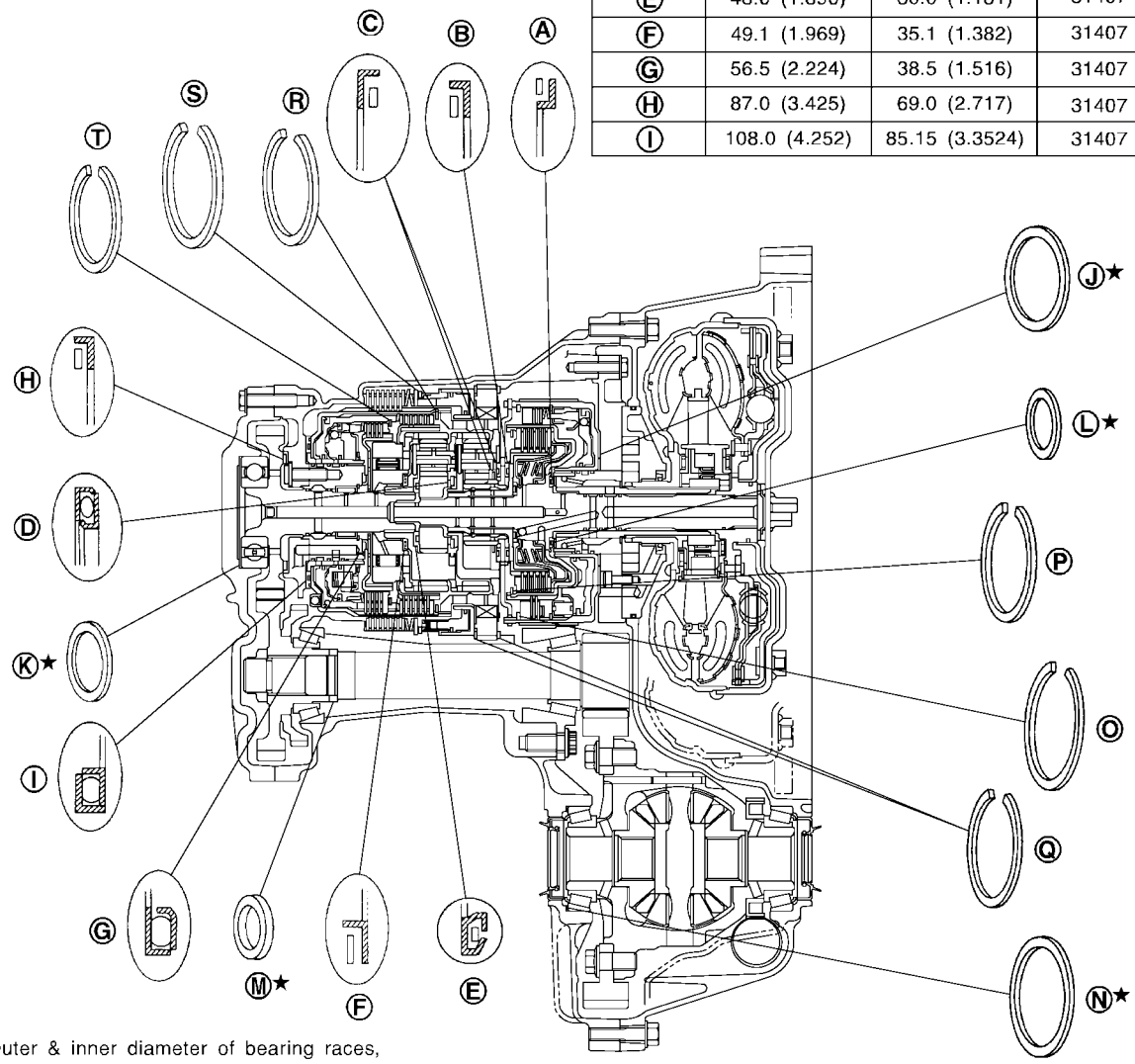
ECS009AZ

Outer diameter of thrust washers

Item number	Outer diameter mm (in)	Parts number*
Ⓙ★	76.0 (2.992)	31508 80X13 - 31508 80X20
Ⓚ★	80.0 (3.150)	31438 80X60 - 31438 80X70

Outer and inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
Ⓐ	49.1 (1.969)	35.1 (1.382)	31407 88X00
Ⓑ	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 (1.969)	35.1 (1.382)	31407 88X00
Ⓖ	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 80X24



Outer & inner diameter of bearing races, adjusting shims and adjusting spacer

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
Ⓛ★	51.0 (2.008)	36.0 (1.417)	31435 80X00 - 31435 80X06 31435 80X09 - 31435 80X14
Ⓜ★	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
Ⓝ★	75.0 (2.953)	67.0 (2.638)	31438 80X00 - 31438 80X11

★ : Select proper thickness.

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

Outer diameter of snap rings

Item number	Outer diameter mm (in)	Parts number*
Ⓞ	150 (5.91)	31506 89X00
Ⓟ	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

SCIA4972E

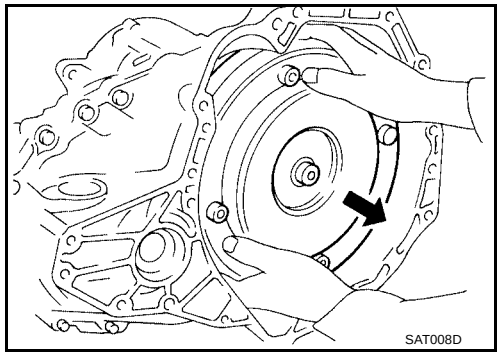
DISASSEMBLY

PFP:31020

Disassembly

ECS009B0

1. Drain the ATF from the transaxle. Refer to AT-398, "Changing A/T Fluid" .
2. Remove torque converter.

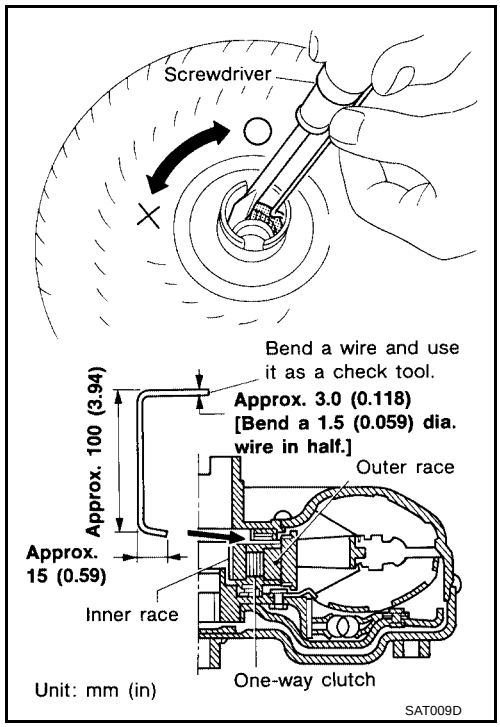


3. Check torque converter one-way clutch using check tool as shown.

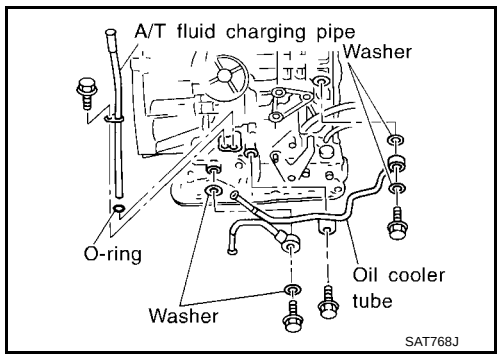
a. Insert check tool into the groove of bearing support built into one-way clutch outer race.

b. When holding bearing support with check tool, rotate one- way clutch spline using suitable tool.

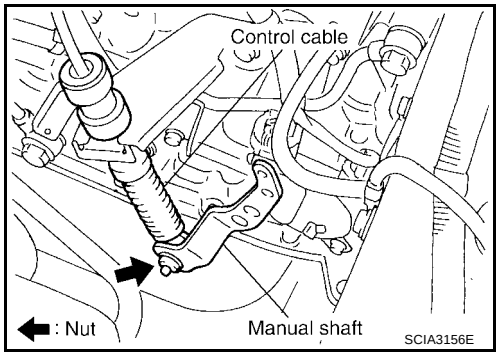
c. Make sure that inner race rotates clockwise only. If not, replace torque converter assembly.



4. Remove A/T fluid charging pipe and fluid cooler tube.



5. Set manual shaft to position P.
6. Remove park/neutral position (PNP) switch.

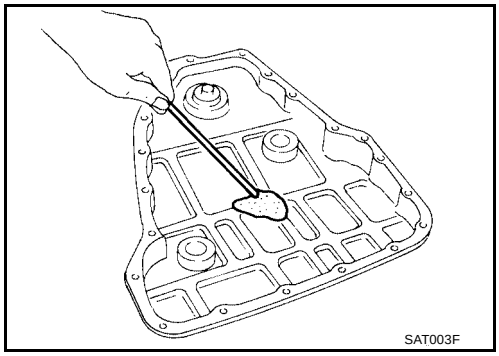


7. Remove oil pan and oil pan gasket using power tools.

   CAUTION:
   Do not reuse oil pan bolts.

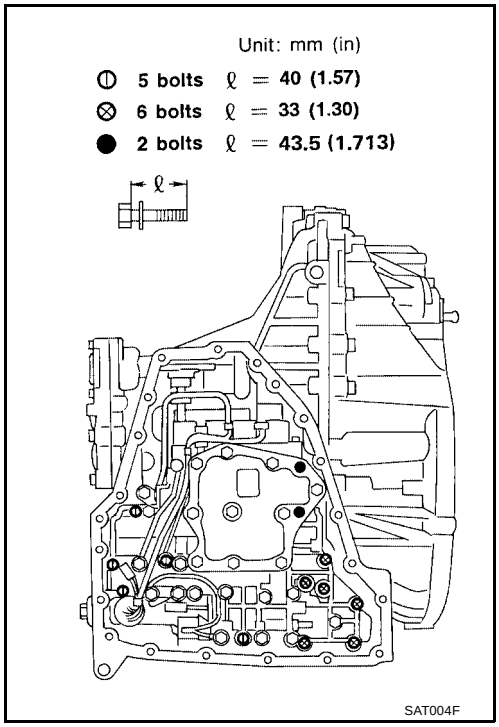
8. Check foreign materials in oil pan to help determine causes of malfunction. If the fluid is very dark, smells burned, or contains foreign particles, the frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves,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

   CAUTION:
   If frictional material is detected, replace radiator after repair of A/T. Refer to CO-13, "RADIATOR" .

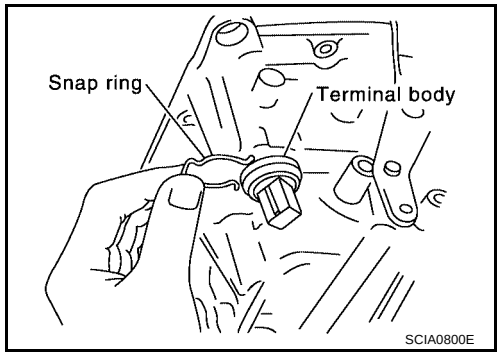


9. Remove control valve assembly according to the following procedures:

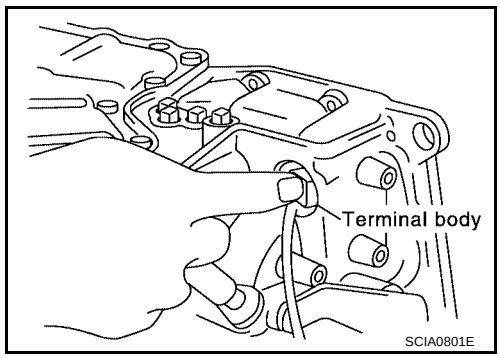
a. Remove control valve assembly bolts **I** , **X** and ●.



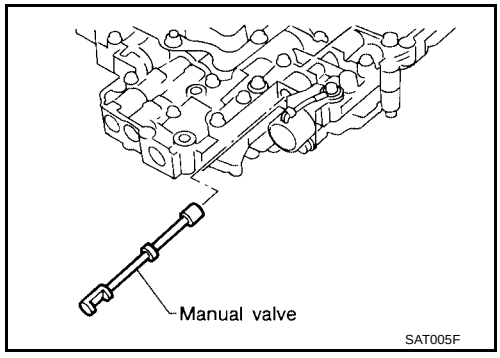
b. Remove snap ring from terminal body.



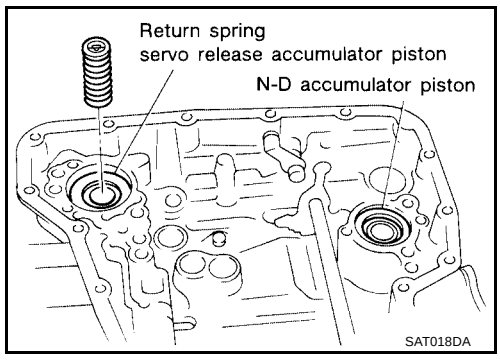
c. Push terminal body into transaxle case and draw out terminal cord assembly.



10. Remove manual valve from control valve assembly.

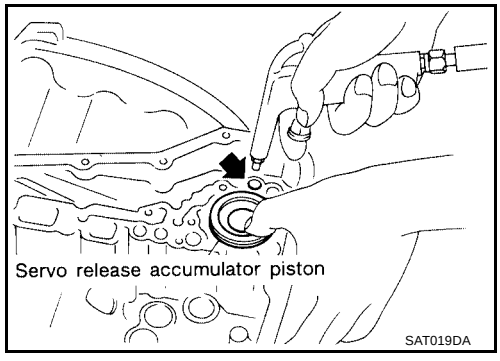


11. Remove return spring from servo release accumulator piston.

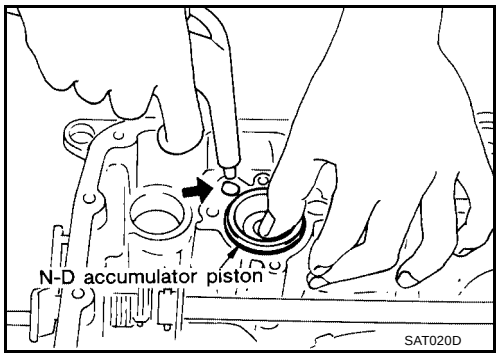


12. Remove servo release accumulator piston with compressed air.
13. Remove O-rings from servo release accumulator piston.

CAUTION:
Do not reuse O-rings.



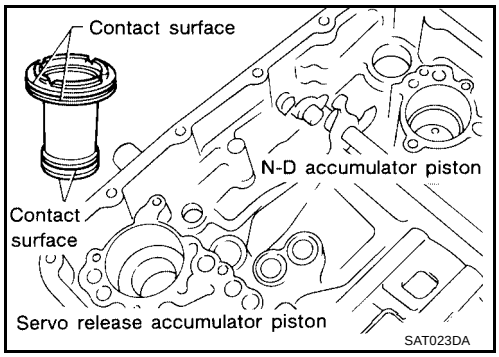
14. Remove N-D accumulator piston and return spring with compressed air.



15. Remove O-rings from N-D accumulator piston.

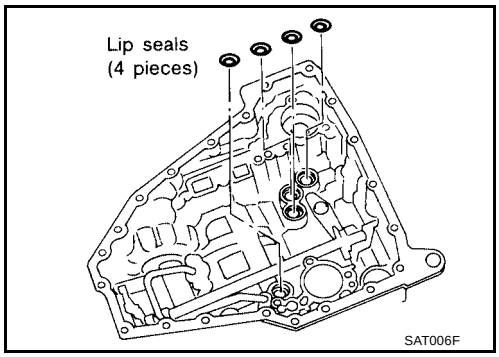
CAUTION:
Do not reuse O-rings.

16. Check accumulator pistons and contact surface of transaxle case for damage.

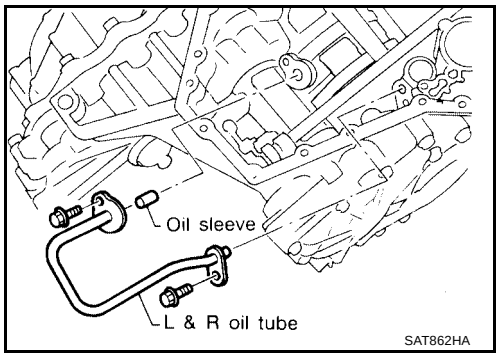


17. Check accumulator return springs for damage and free length.
18. Remove lip seals.

CAUTION:
Do not reuse lip seals.



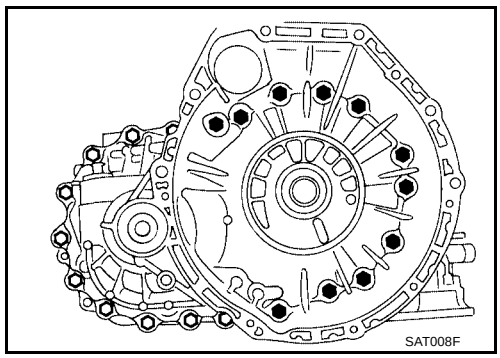
19. Remove L & R oil tube and oil sleeve.



20. Remove converter housing according to the following procedures:

a. Remove converter housing bolts using power tools.

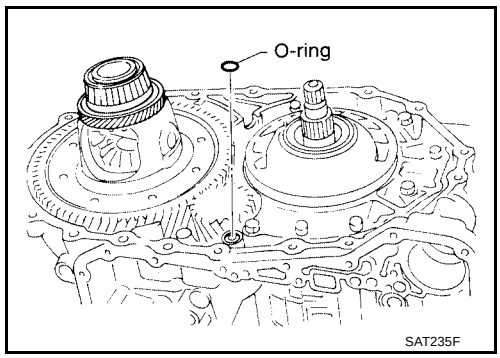
b. Remove converter housing by tapping it lightly.



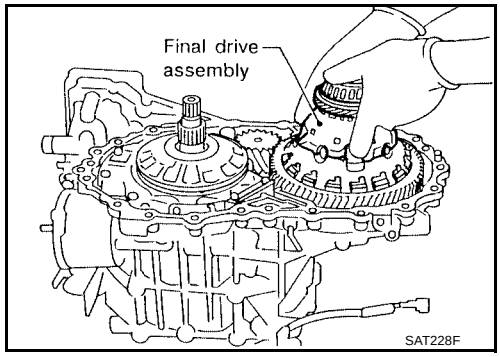
c. Remove O-ring from differential oil port.

CAUTION:

Do not reuse O-ring.

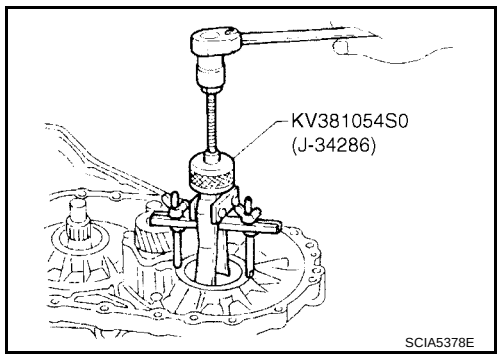


21. Remove final drive assembly from transaxle case.

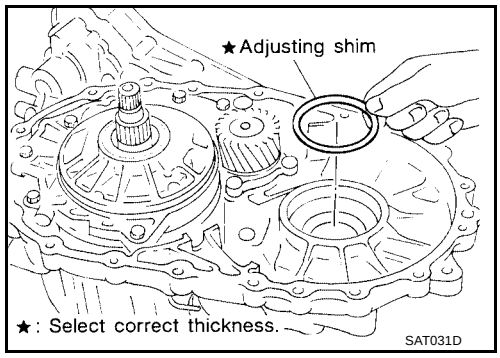


22. Remove differential side bearing outer race and side bearing adjusting shim from transaxle case using Tool.

Tool number : KV381053S0 (J-34286)

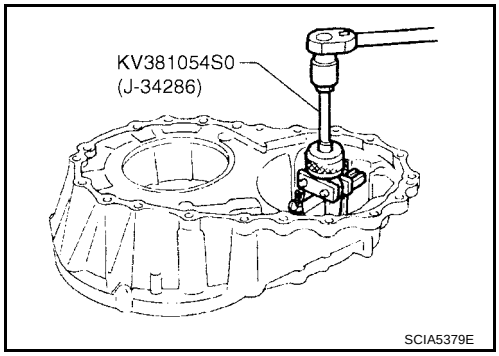


23. Remove differential side bearing adjusting shim from transaxle case.



24. Remove differential side bearing outer race from converter housing using Tool.

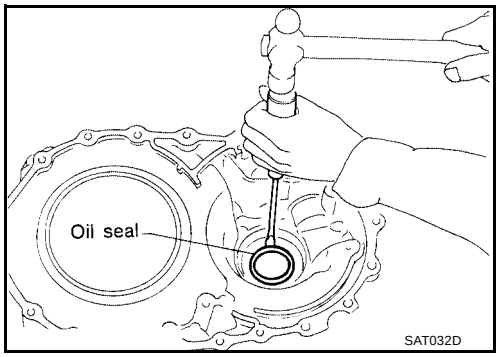
Tool number : KV381054S0 (J-34286)



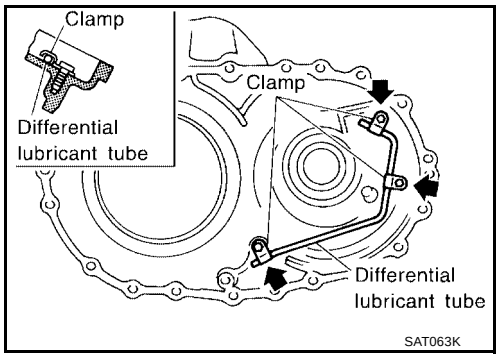
25. Remove oil seal from converter housing using suitable tool.

CAUTION:

- **Do not reuse oil seal.**
- **Be careful not to damage case.**



26. Remove differential lubricant tube from converter housing.

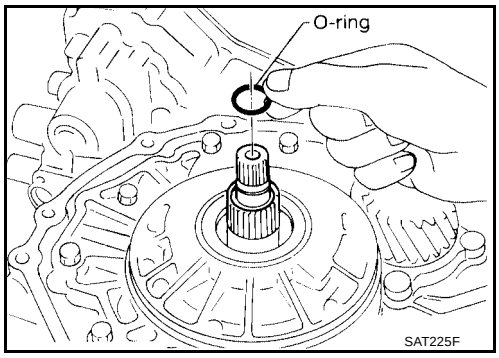


27. Remove oil pump according to the following procedures:

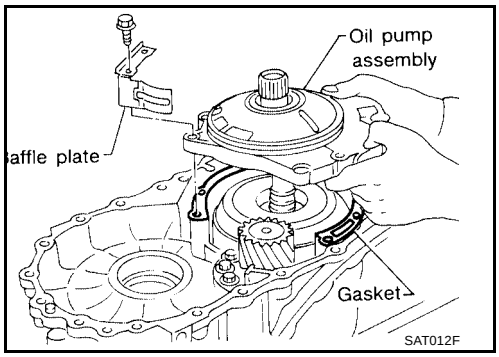
a. Remove O-ring from input shaft.

CAUTION:

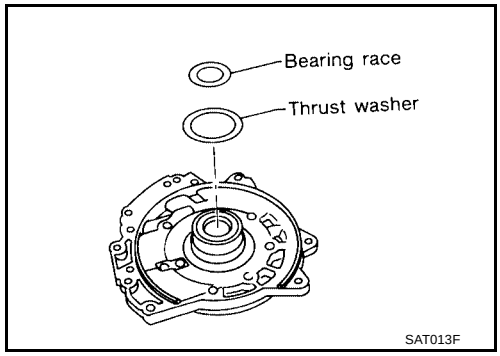
Do not reuse O-ring.



b. Remove oil pump assembly, baffle plate and gasket from transaxle case.



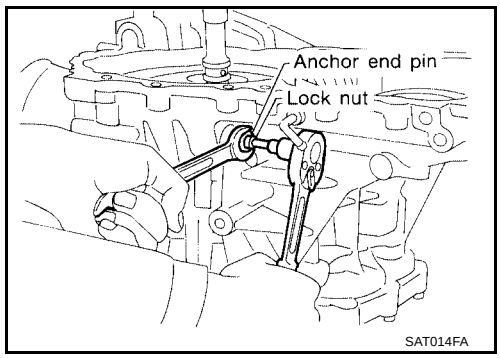
c. Remove thrust washer and bearing race from oil pump assembly.



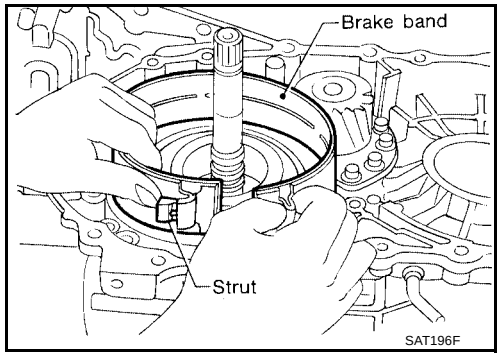
28. Remove brake band according to the following procedures:

a. Loosen lock nut, then back off anchor end pin using suitable tool.

CAUTION:
Do not reuse anchor end pin.

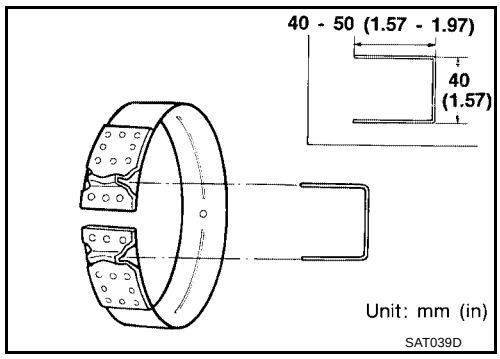


b. Remove brake band and strut from transaxle case.

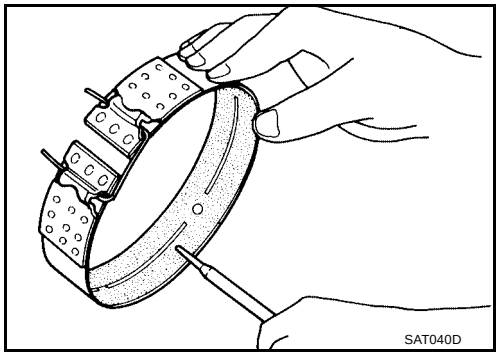


CAUTION:
To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing the brake band, always secure it with a clip as shown.

NOTE:
Leave the clip in position after removing the brake band.

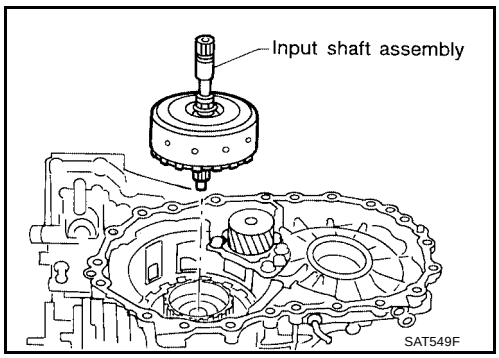


c. Check brake band facing for damage, cracks, wear or burns.

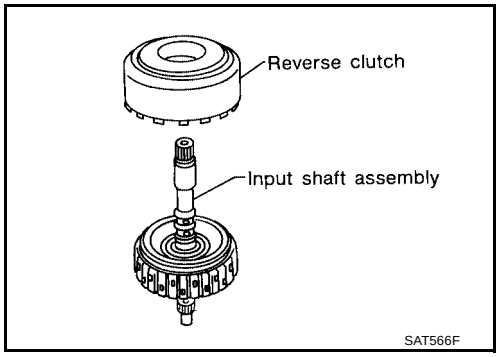


29. Remove input shaft assembly (high clutch) and reverse clutch according to the following procedures:

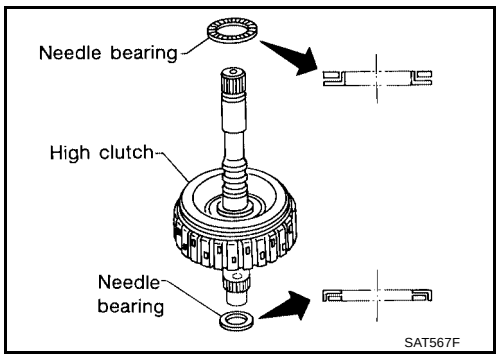
a. Remove input shaft assembly (high clutch) with reverse clutch.



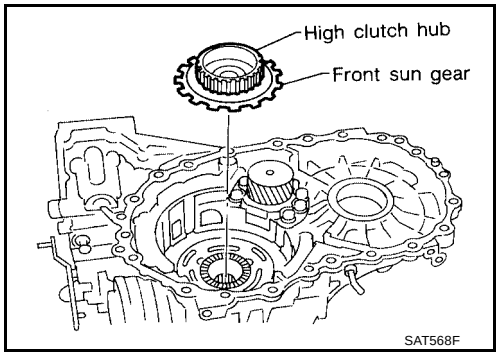
b. Remove input shaft assembly (high clutch) from reverse clutch.



c. Remove needle bearings from high clutch drum and check for damage or wear.

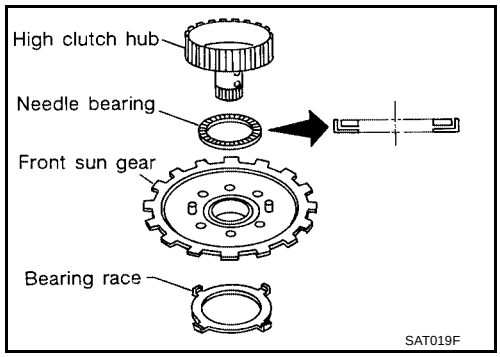


d. Remove high clutch hub and front sun gear from transaxle case.

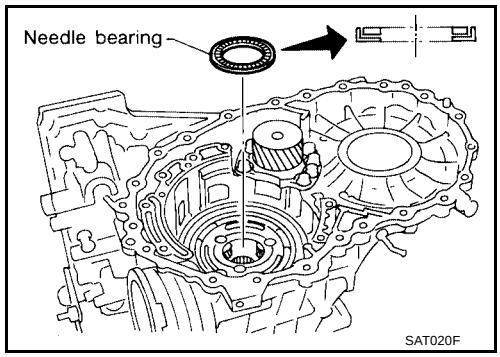


e. Remove front sun gear and needle bearing from high clutch hub and check for damage or wear.

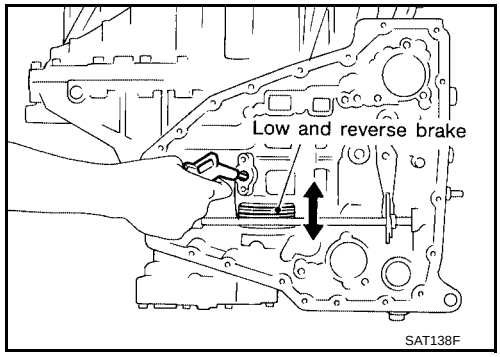
f. Remove bearing race from front sun gear and check for damage or wear.



30. Remove needle bearing from transaxle case and check for damage or wear.

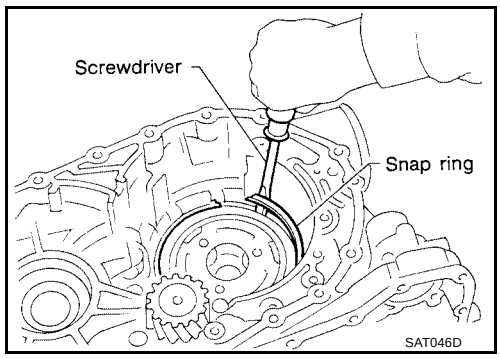


31. Apply compressed air and check to see that low and reverse brake operates.

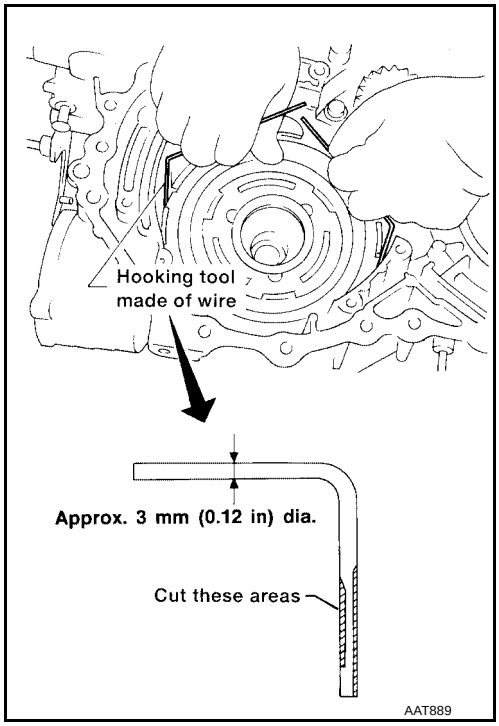


32. Remove low one-way clutch and front planetary carrier assembly according to the following procedures:

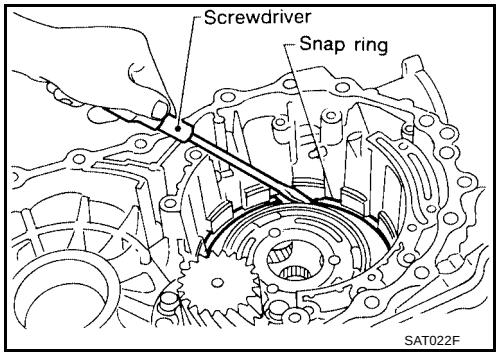
a. Remove snap ring using suitable tool.



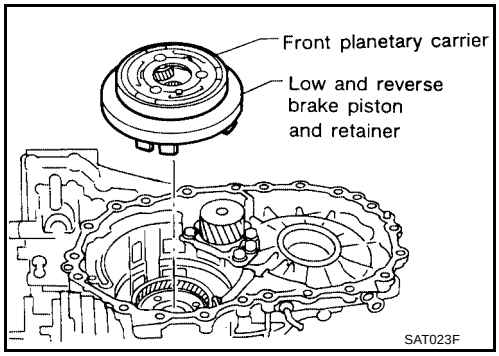
b. Remove low one-way clutch with a suitable hook made of wire.



c. Remove snap ring using suitable tool.

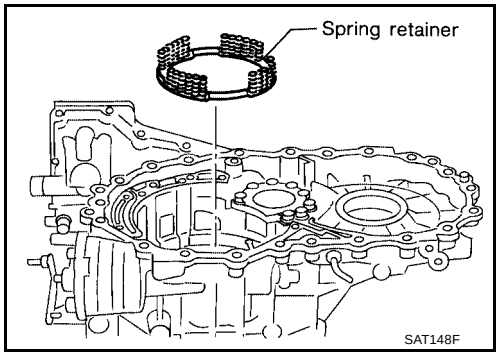


d. Remove front planetary carrier with low and reverse brake piston and retainer.

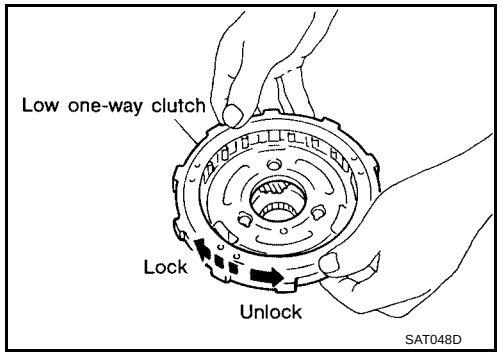


e. Remove low and reverse brake spring retainer.

CAUTION:
Do not remove return springs from spring retainer.

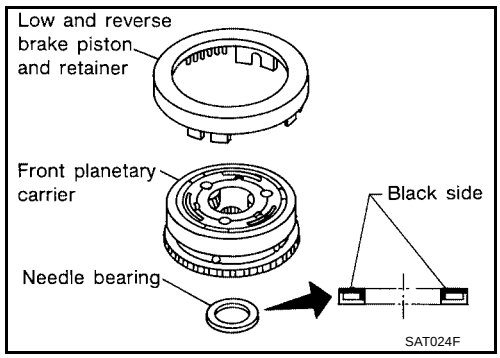


f. Check that low one-way clutch rotates in the direction of the clockwise arrow and locks in the opposite direction.



g. Remove needle bearing, low and reverse brake piston and retainer from front planetary carrier.

h. Check front planetary carrier, low one-way clutch and needle bearing for damage or wear.

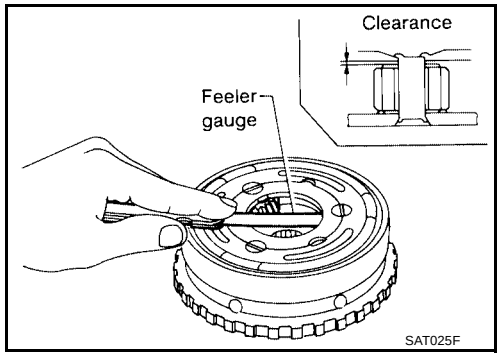


i. Check clearance between planetary gears and planetary carrier with feeler gauge.

Standard clearance : 0.20 - 0.70 mm (0.0079 - 0.0276 in)

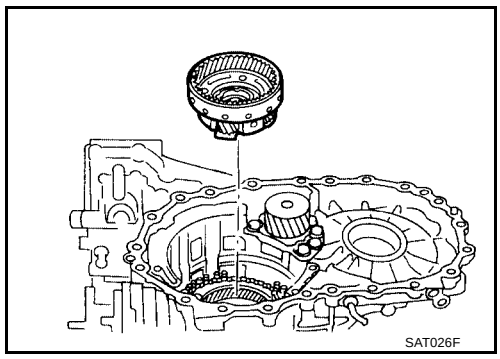
Allowable limit : 0.80 mm (0.0315 in)

Replace front planetary carrier if the clearance exceeds allowable limit.

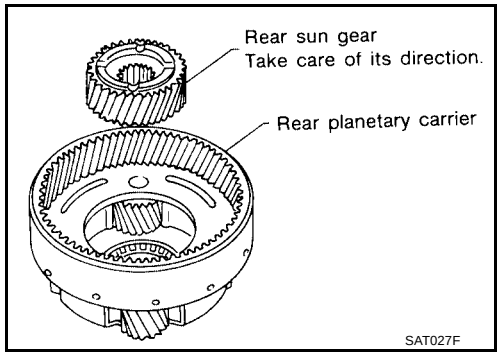


33. Remove rear planetary carrier assembly and rear sun gear according to the following procedures:

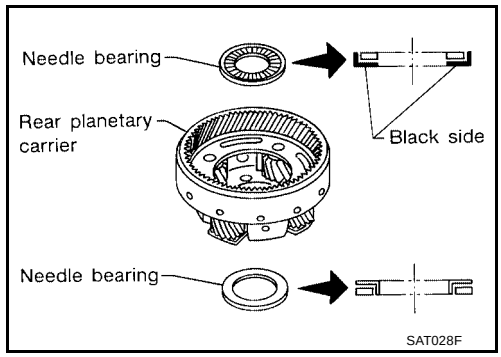
a. Remove rear planetary carrier assembly from transaxle case.



b. Remove rear sun gear from rear planetary carrier.



c. Remove needle bearings from rear planetary carrier assembly.
d. Check rear planetary carrier, rear sun gear and needle bearings for damage or wear.

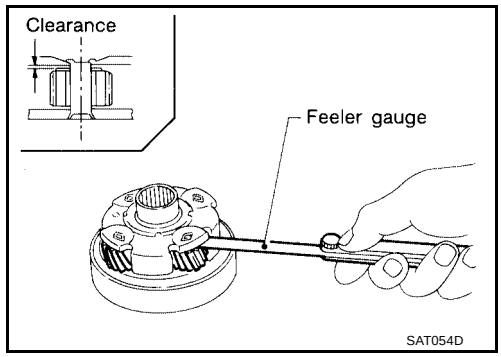


e. Check clearance between pinion washer and rear planetary carrier with feeler gauge.

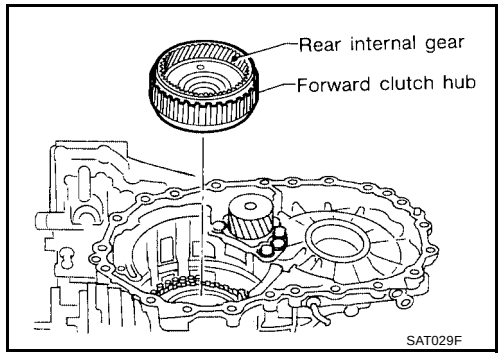
Standard clearance : **0.20 - 0.70 mm (0.0079 - 0.0276 in)**

Allowable limit : **0.80 mm (0.0315 in)**

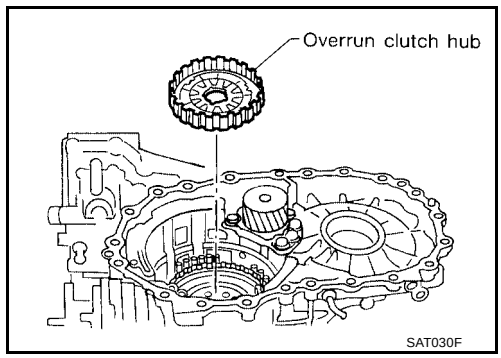
Replace rear planetary carrier if the clearance exceeds allowable limit.



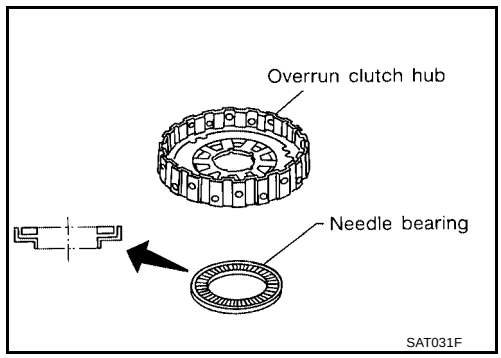
34. Remove rear internal gear and forward clutch hub from transaxle case.



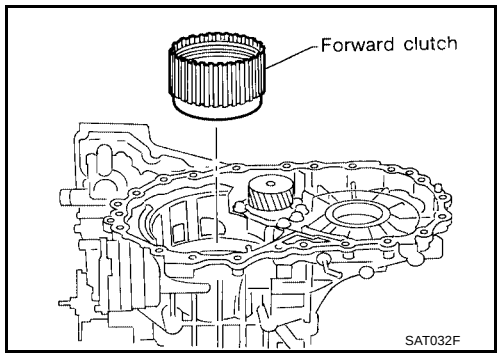
35. Remove overrun clutch hub from transaxle case.



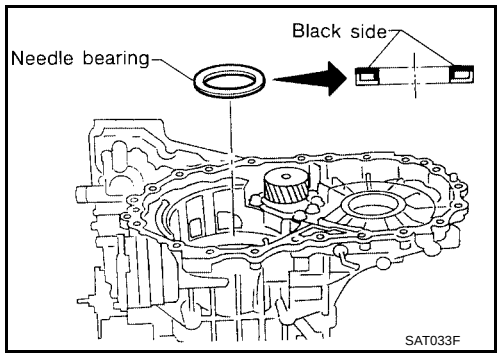
36. Remove needle bearing from overrun clutch hub and check for damage or wear.



37. Remove forward clutch assembly from transaxle case.



38. Remove needle bearing from transaxle case.

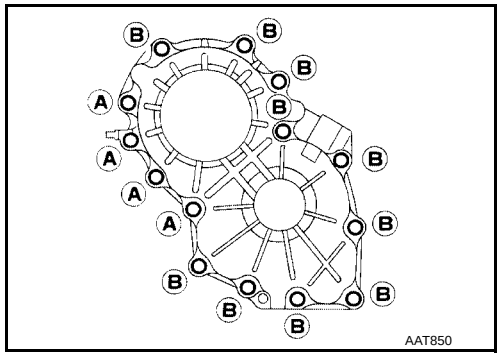


39. Remove output shaft assembly according to the following procedures:

a. Remove side cover bolts.

CAUTION:

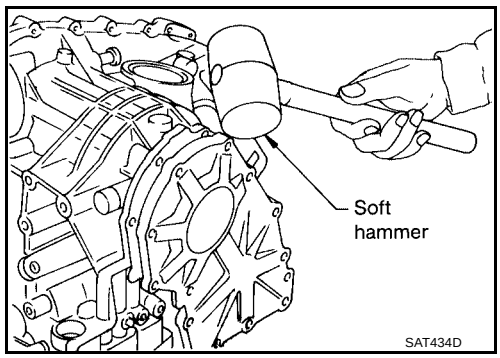
- **Do not mix bolts A and B.**
- **Do not reuse bolts A as they are self-sealing bolts.**



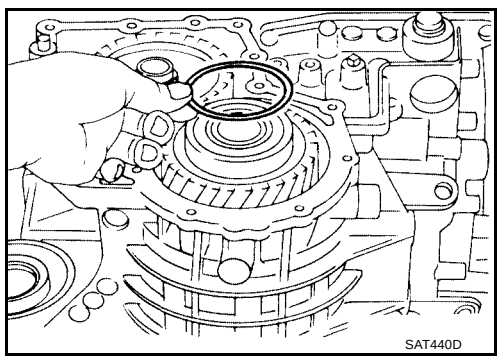
b. Remove side cover by lightly tapping it using suitable tool.

CAUTION:

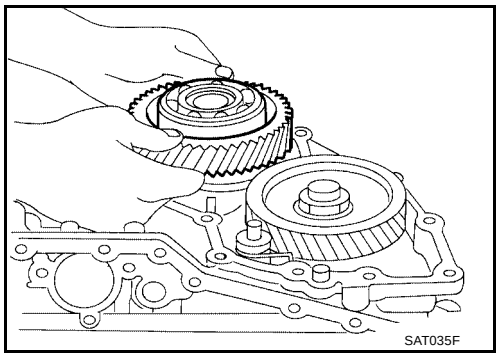
Do not drop output shaft assembly. It might come out when removing side cover.



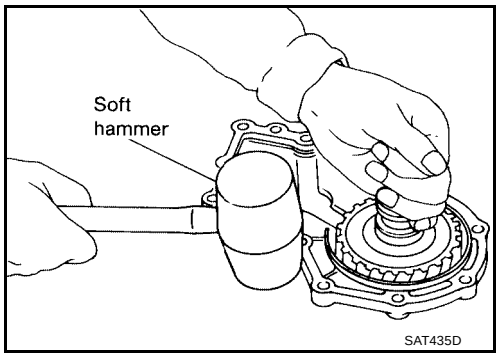
c. Remove adjusting shim.



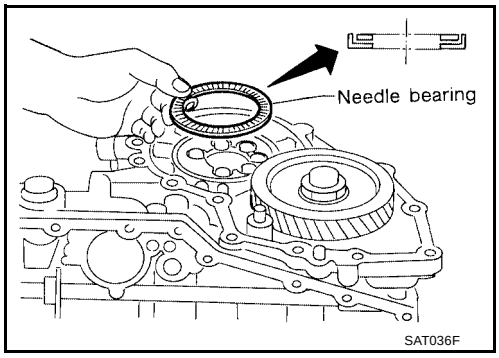
d. Remove output shaft assembly.



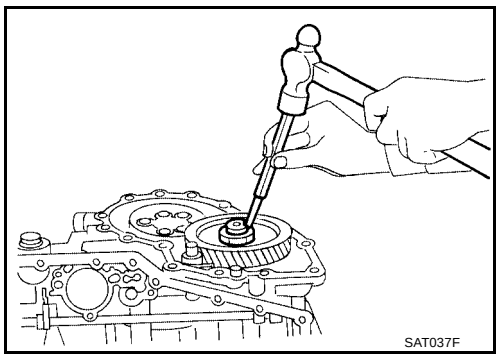
NOTE:
If output shaft assembly came off with side cover, tap cover to separate using suitable tool.



e. Remove needle bearing.

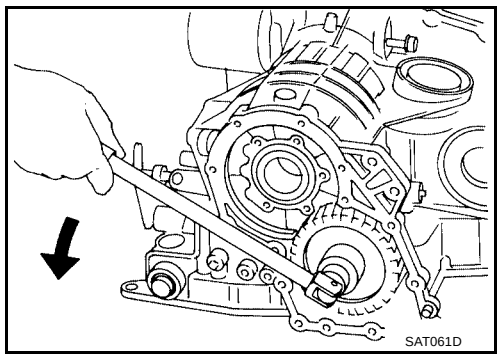


40. Disassemble reduction pinion gear according to the following procedures:
a. Set manual shaft to position P to fix idler gear.
b. Unlock idler gear lock nut using suitable tool.



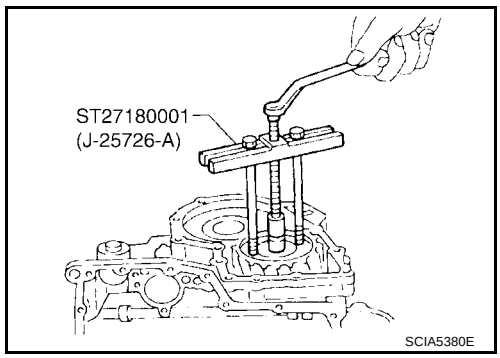
c. Remove idler gear lock nut using suitable tool.

CAUTION:
Do not reuse idler gear lock nut.

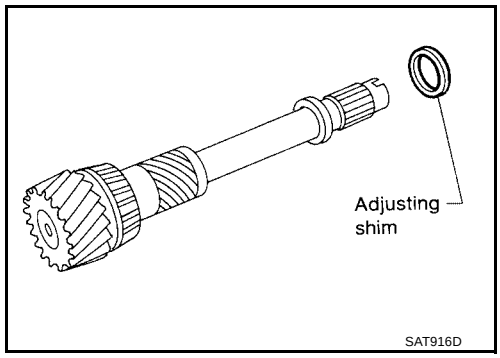


d. Remove idler gear using Tool.

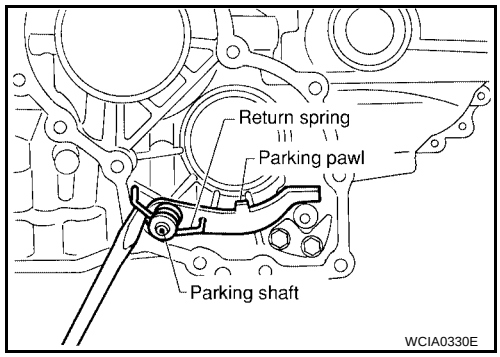
Tool number : ST27180001 (J-25726-A)



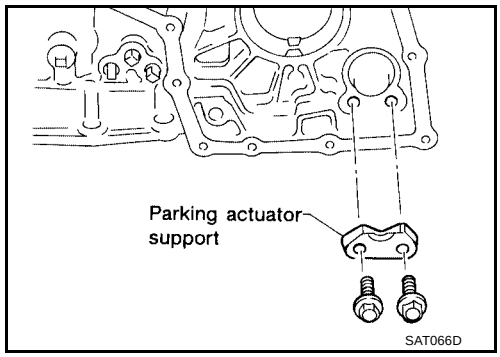
e. Remove reduction pinion gear.
f. Remove adjusting shim from reduction pinion gear.



41. Remove return spring from parking shaft using suitable tool.
42. Draw out parking shaft and remove parking pawl from transaxle case.
43. Check parking pawl and shaft for damage or wear.



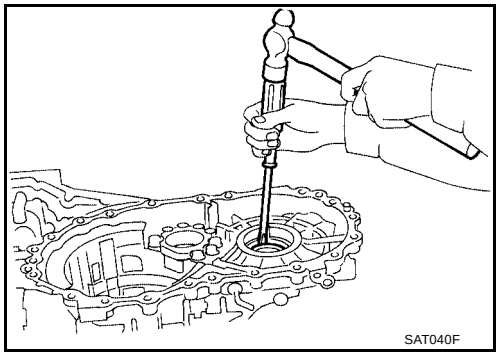
44. Remove parking actuator support from transaxle case.
45. Check parking actuator support for damage or wear.



46. Remove side oil seal from transaxle case using suitable tool.

CAUTION:

Do not reuse oil seal.



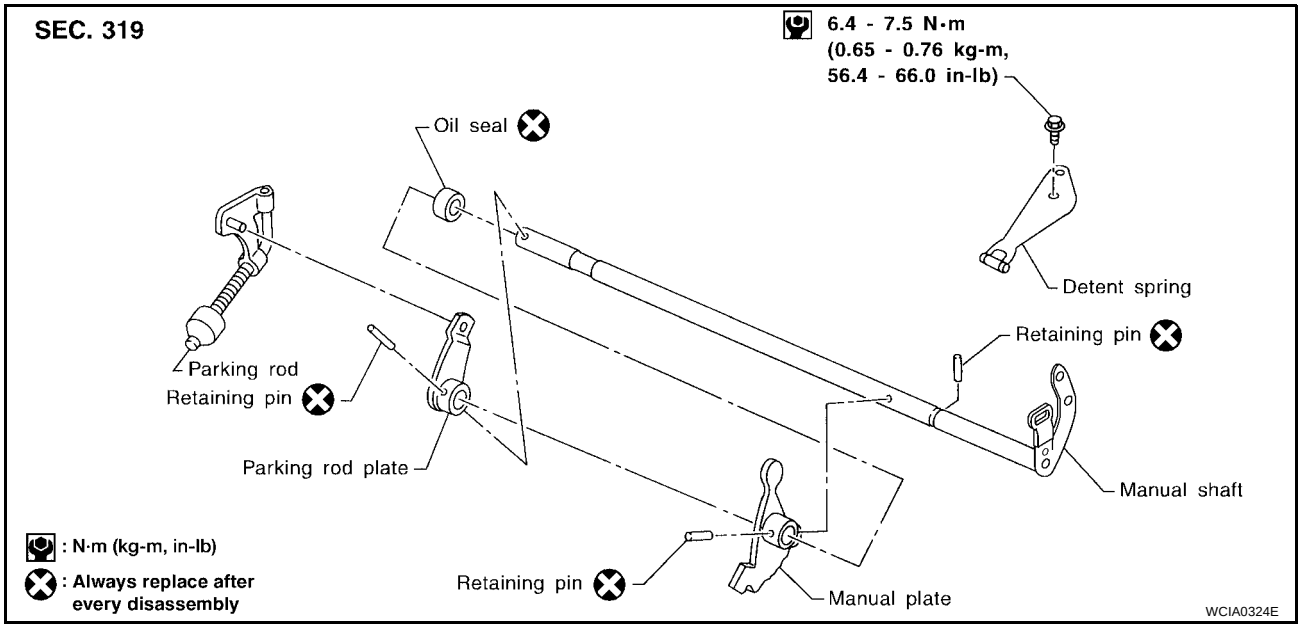
REPAIR FOR COMPONENT PARTS

PFP:00000

Manual Shaft

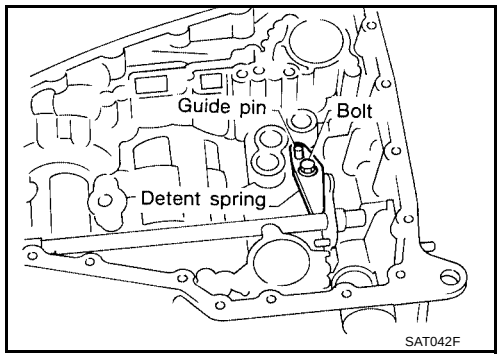
ECS009B1

COMPONENTS



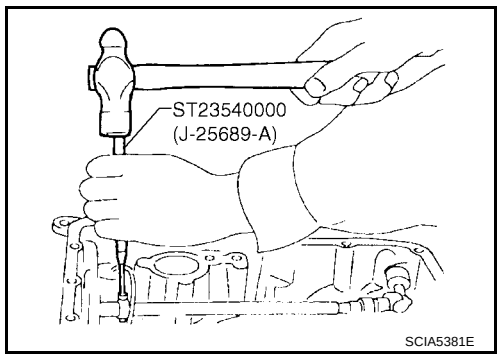
REMOVAL

1. Remove detent spring from transaxle case.



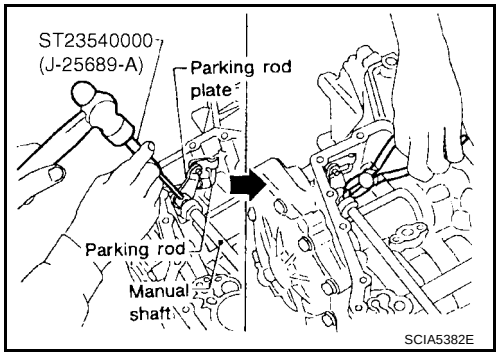
2. Drive out manual plate retaining pin using Tool.

Tool number : ST23540000 (J-25689-A)

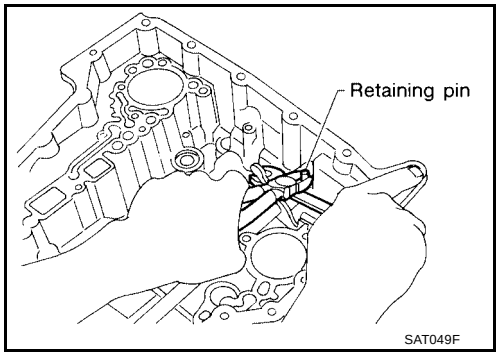


3. Drive and pull out parking rod plate retaining pin using Tool.

Tool number : ST23540000 (J-25689-A)

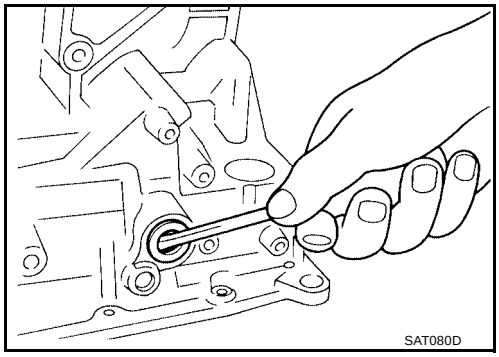


4. Remove parking rod plate from manual shaft.
5. Draw out parking rod from transaxle case using suitable tool.
6. Pull out manual shaft retaining pin using suitable tool.
7. Remove manual shaft and manual plate from transaxle case.



8. Remove manual shaft oil seal using suitable tool.

CAUTION:
- **Do not reuse oil seal.**
- **Do not damage the transaxle case.**



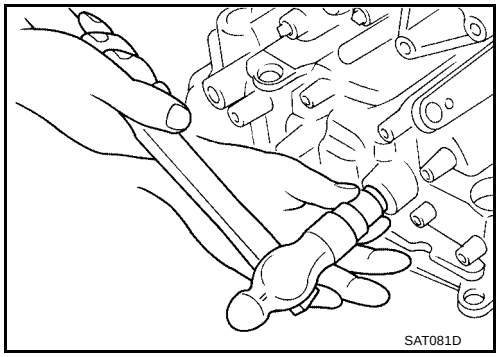
INSPECTION

- Check component parts for wear or damage. Replace if necessary.

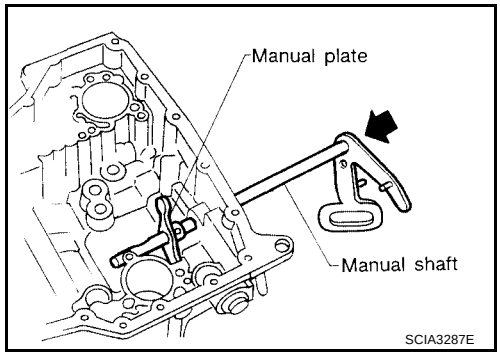
INSTALLATION

1. Install new manual shaft oil seal using suitable tool.

CAUTION:
- **Do not reuse oil seal.**
- **Apply ATF to the outer surface of new oil seal.**



2. Install manual shaft and manual plate.

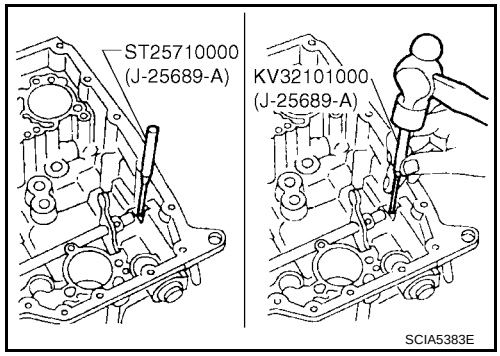


3. Align groove of manual shaft and hole of transaxle case using Tool.

Tool number : ST25710000 (J-25689-A)

4. Install manual shaft retaining pin up to bottom of hole using Tool.

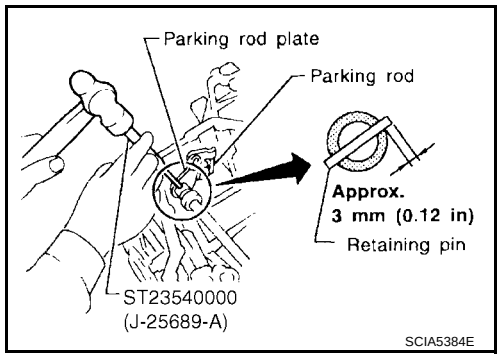
Tool number : KV32101000 (J-25689-A)



5. Install parking rod to parking rod plate.
6. Set parking rod assembly onto manual shaft and drive retaining pin using Tool.

CAUTION:

- **Do not reuse retaining pin.**
- **Both ends of pin should protrude.**

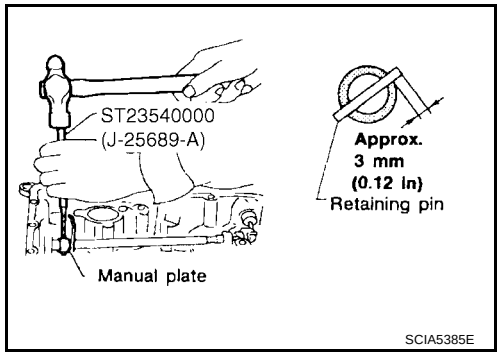


7. Drive manual plate retaining pin using Tool.

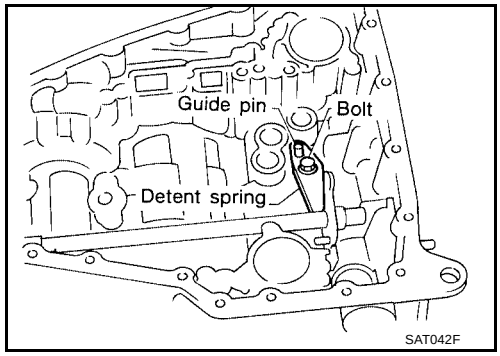
Tool number : ST23540000 (J-25689-A)

CAUTION:

- **Do not reuse retaining pin.**
- **Both ends of pin should protrude.**



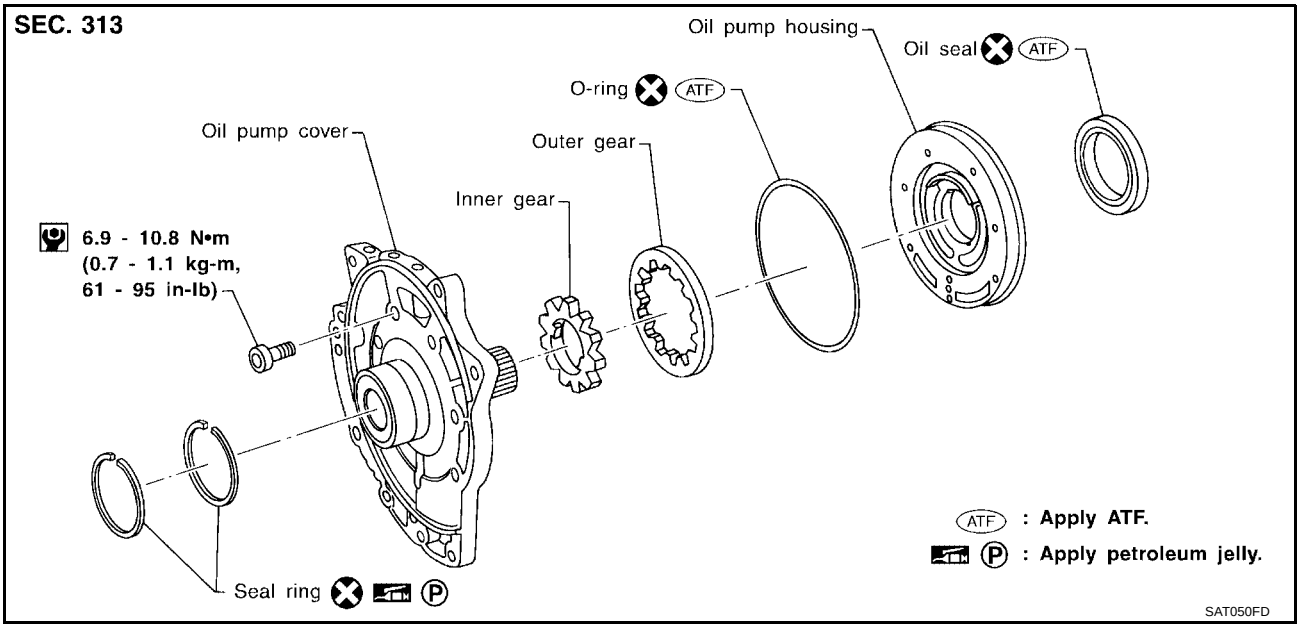
8. Install detent spring. Tighten detent spring bolts to the specified torque. Refer to AT-278, "Components" .



Oil Pump

ECS009B2

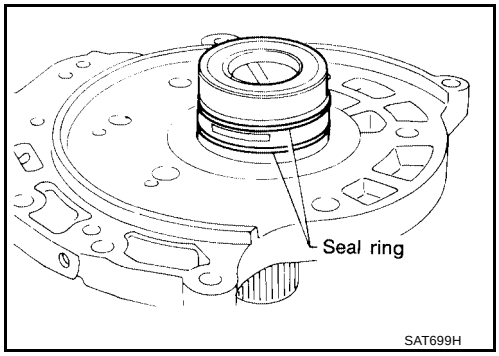
COMPONENTS



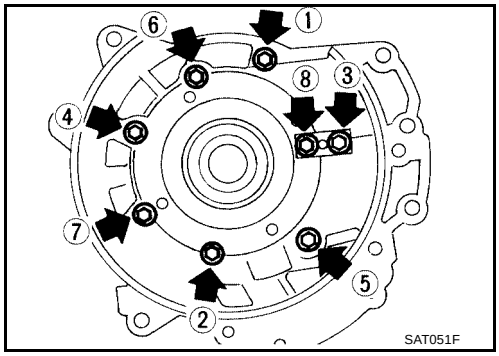
DISASSEMBLY

1. Remove seal rings.

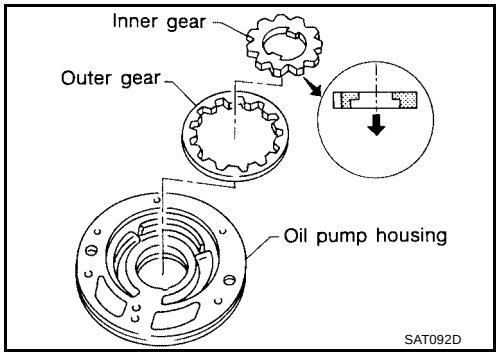
   CAUTION:
   Do not reuse seal rings.



2. Loosen bolts in a crisscross pattern and remove oil pump cover.

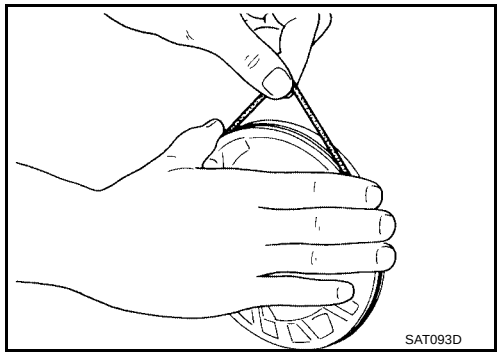


3. Remove inner and outer gear from oil pump housing.



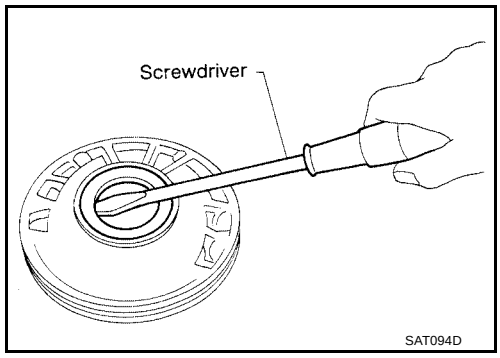
4. Remove O-ring from oil pump housing.

CAUTION:
Do not reuse O-rings.



5. Remove oil pump housing oil seal using suitable tool.

CAUTION:
Do not reuse oil seal.



INSPECTION

Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear

Check component parts for wear or damage. Replace if necessary.

Side Clearances

Measure side clearance of inner and outer gears in at least four places around each outside edge. Maximum measured values should be within specified positions.

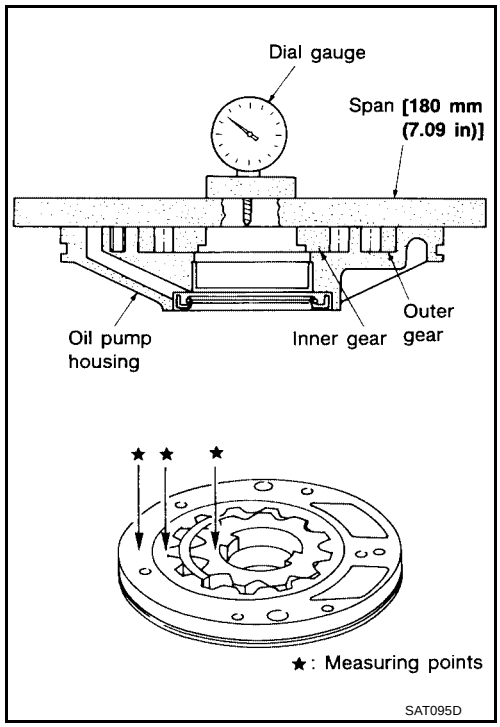
Standard clearance : 0.030 - 0.050 mm (0.0012 - 0.0020 in)

If clearance is less then specification, select inner and outer gear as a set so that clearance is within specifications.

Inner and outer gear:

Refer to AT-378, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

If clearance is more than standard, replace whole oil pump assembly except oil pump cover.

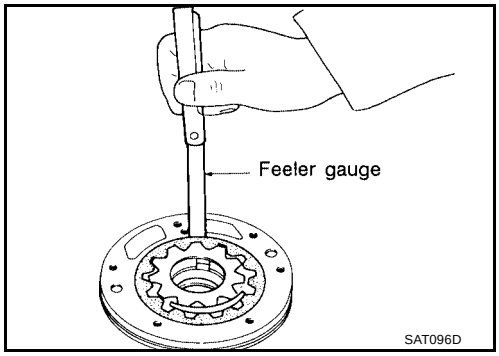


Measure clearance between outer gear and oil pump housing.

Standard clearance : **0.111 - 0.181 mm (0.0044 - 0.0071 in)**

Allowable limit : **0.181 mm (0.0071 in)**

If not within allowable limit, replace whole oil pump assembly except oil pump cover.



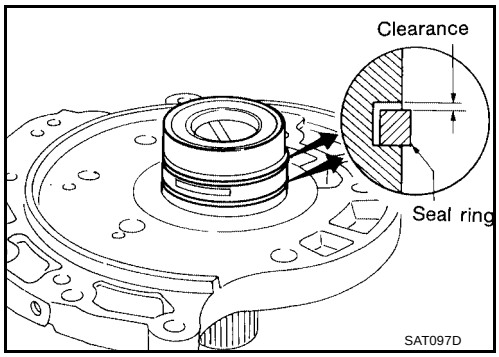
Seal Ring Clearance

Measure clearance between seal ring and ring groove.

Standard clearance : **0.1 - 0.25 mm (0.0039 - 0.0098 in)**

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

If not within allowable limit, replace oil pump cover assembly.

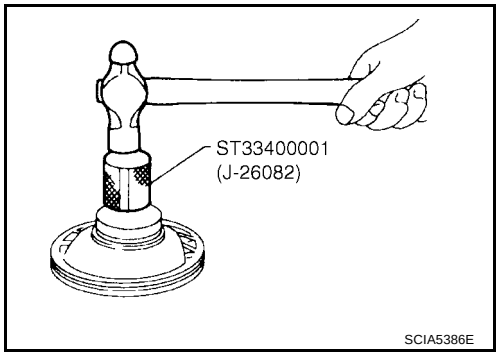


ASSEMBLY

1. Install new oil seal on oil pump housing using Tool.

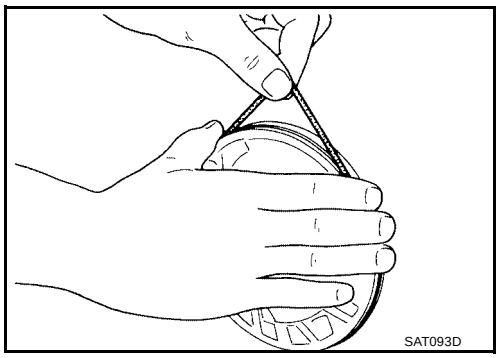
Tool number : **ST33400001 (J-26082)**

CAUTION:
Do not reuse oil seal.



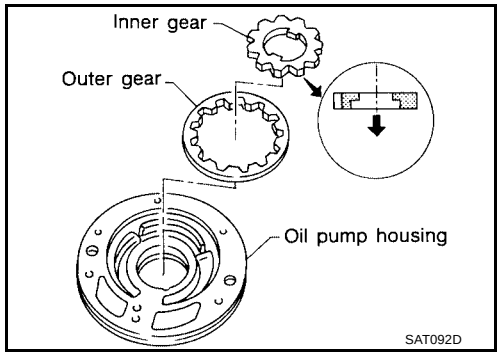
2. Install new O-ring on oil pump housing.

CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to new O-ring.**



3. Install inner and outer gears on oil pump housing as shown.

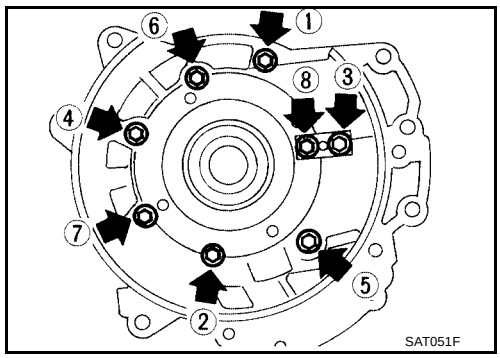
CAUTION:
Take care with the direction of inner gear.



4. Install oil pump cover on oil pump housing according to the following procedure:

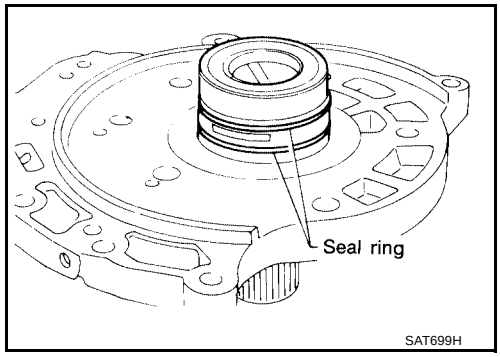
a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.

b. Tighten bolts in a crisscross pattern. Tighten oil pump cover bolts to the specified torque. Refer to AT-302, "COMPONENTS" .



5. Install new seal rings carefully after packing ring groove with petroleum jelly.

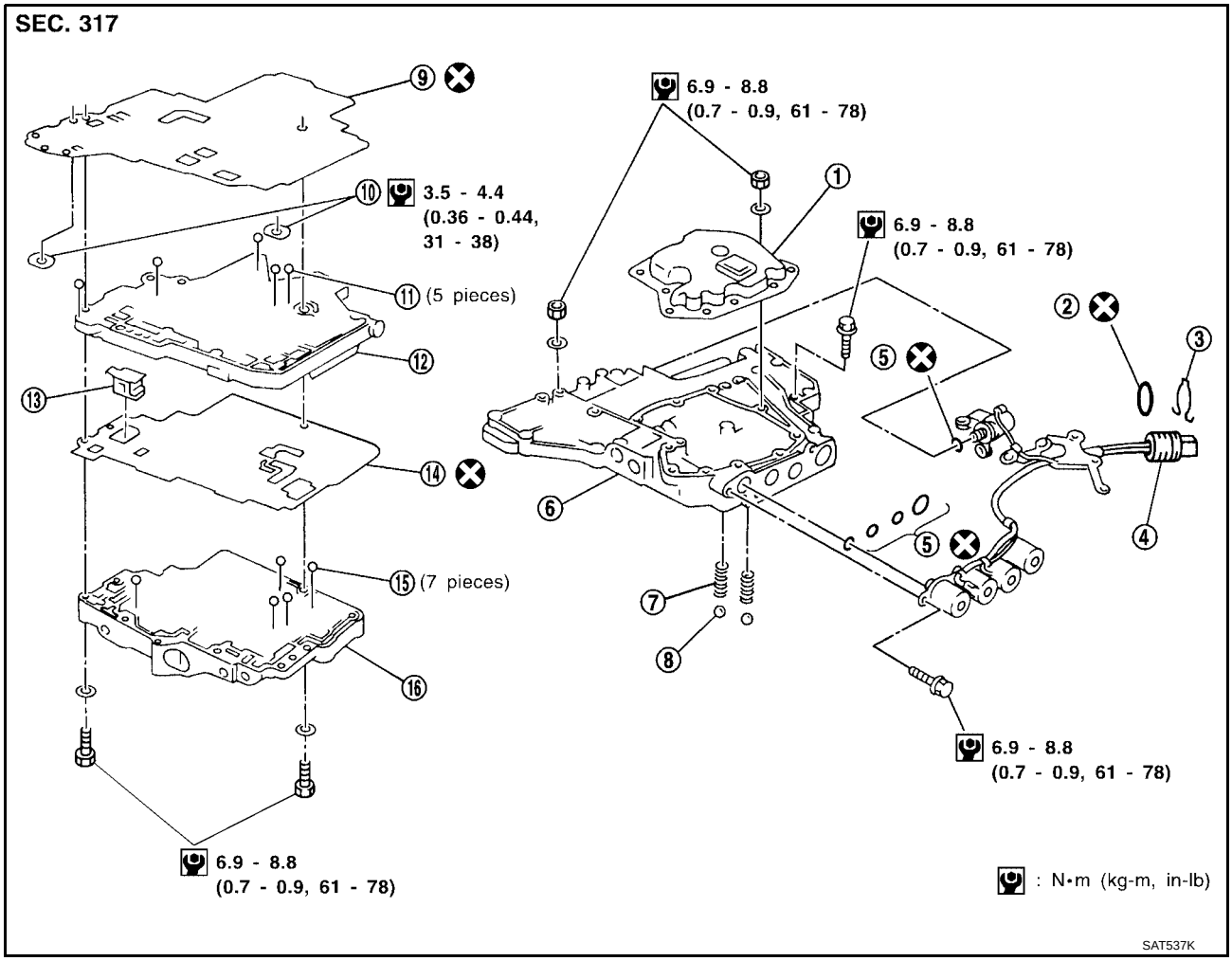
CAUTION:
- **Do not reuse seal rings.**
- **Apply petroleum jelly to new seal rings.**
- **Do not spread gap of new seal ring excessively while installing. The ring may become deformed.**



Control Valve Assembly

ECS009B3

COMPONENTS



1. Oil strainer
2. O-ring
3. Snap ring
4. Terminal body
5. O-rings
6. Control valve lower body
7. Oil cooler relief valve spring
8. Check ball
9. Separating plate
10. Support plate
11. Steel ball
12. Control valve inter body
13. Pilot filter
14. Separating plate
15. Steel ball
16. Control valve upper body

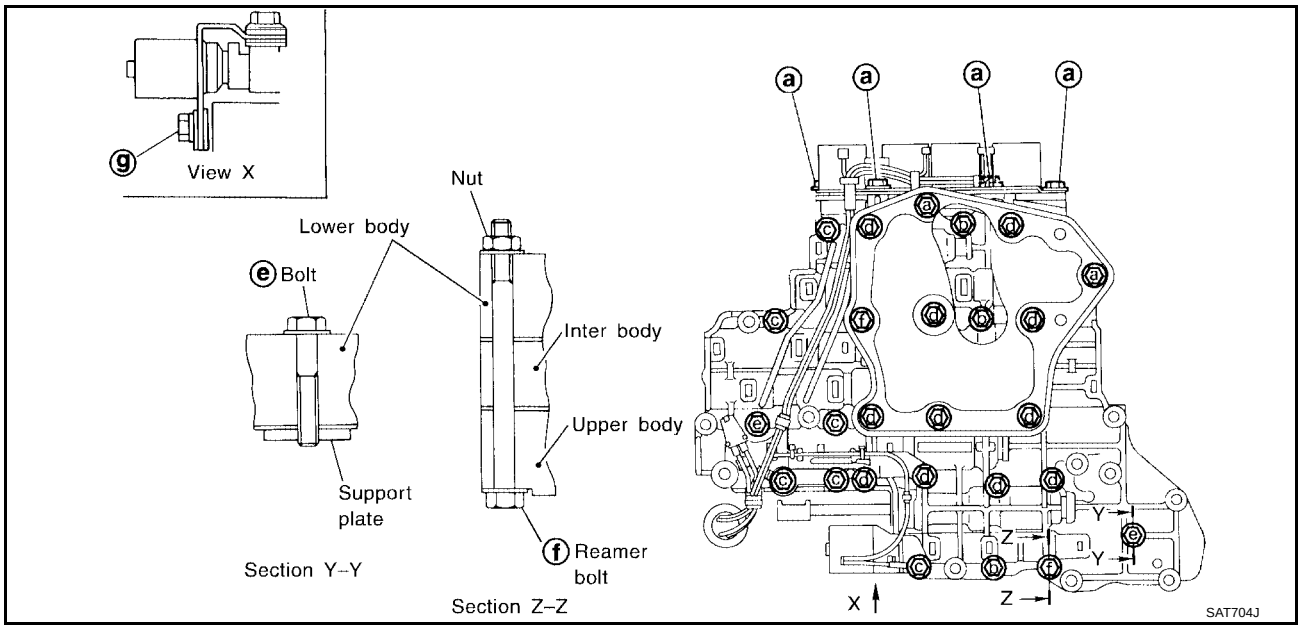
DISASSEMBLY

Disassemble upper, inter and lower bodies.

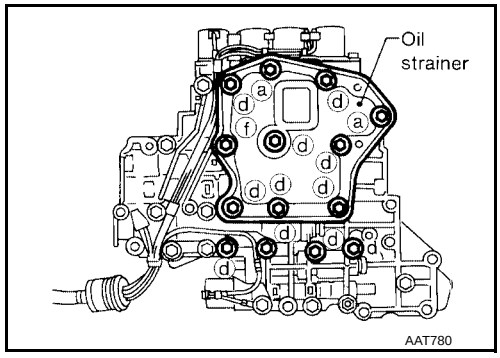
Bolt length, number and location:

Bolt symbol	a	b	c	d	e	f	g
Bolt length " ℓ " mm (in) 	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

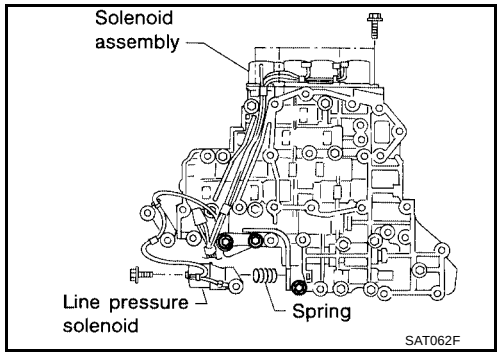
f: Reamer bolt and nut.



1. Remove bolts **a** , **d** and nut **f** and remove oil strainer from control valve assembly.

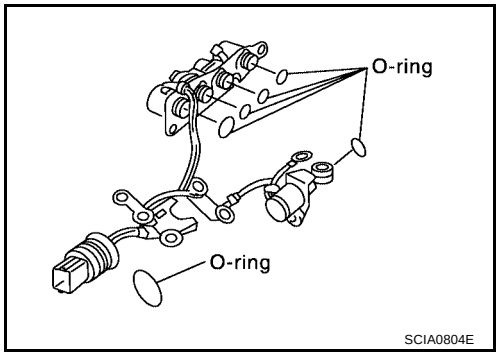


2. Remove solenoid valve assembly and line pressure solenoid valve from control valve assembly.

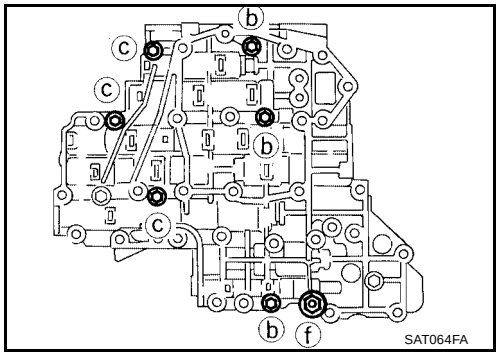


3. Remove O-rings from solenoid valves and terminal body.

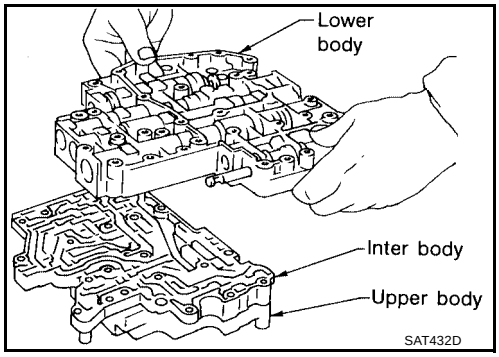
CAUTION:
Do not reuse O-rings.



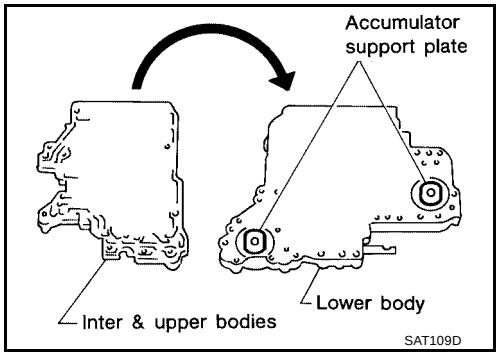
4. Place upper body facedown, and remove bolts **b** , **c** and nut **f** .



5. Remove inter body from lower body.

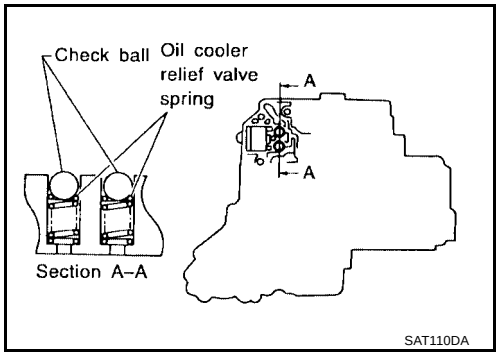


6. Turn over lower body, and remove accumulator support plate.

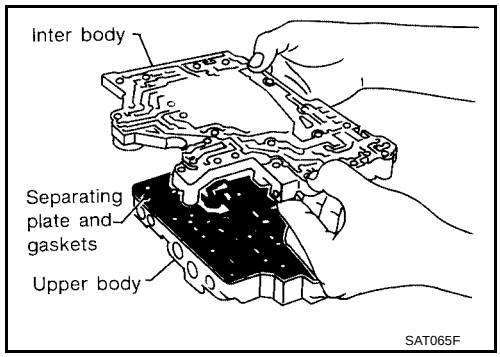


7. Remove bolts **e** , separating plate and separating gasket from lower body.
8. Remove check balls and oil cooler relief valve springs from lower body.

CAUTION:
Do not lose check balls and oil cooler relief valve springs.

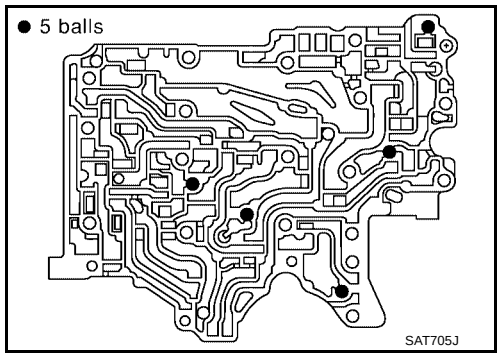


9. Remove inter body from upper body.



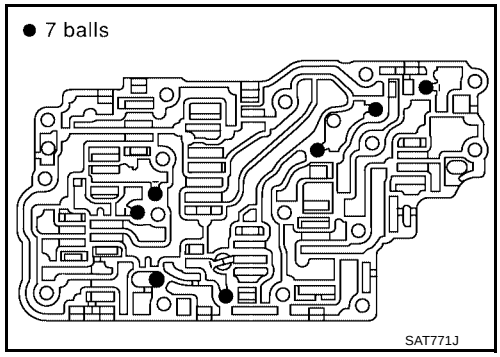
10. Check to see that steel balls are properly positioned in inter body and then remove them.

CAUTION:
Do not lose steel balls.



11. Check to see that steel balls are properly positioned in upper body and then remove them.

CAUTION:
Do not lose steel balls.

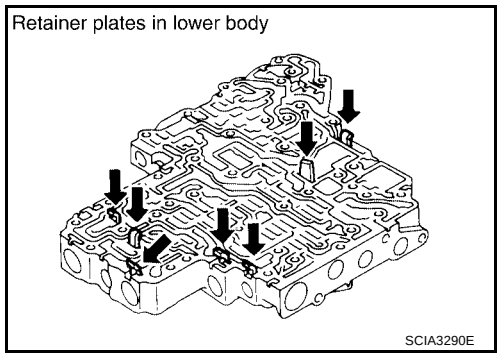


INSPECTION

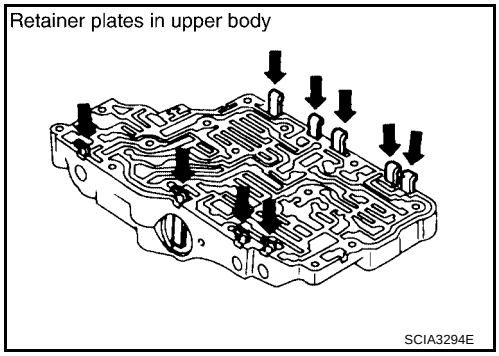
Lower and Upper Bodies

CAUTION:
Do not lose these parts.

- Check to see that retainer plates are properly positioned in lower body.



- Check to see that retainer plates are properly positioned in upper body.

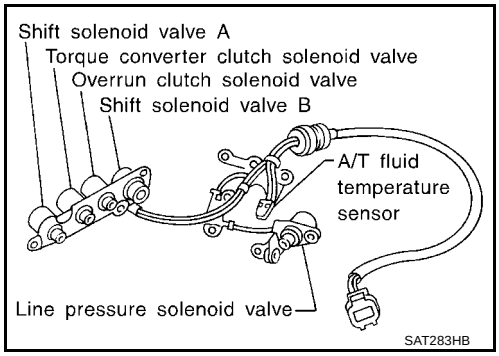


Oil Strainer

- 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

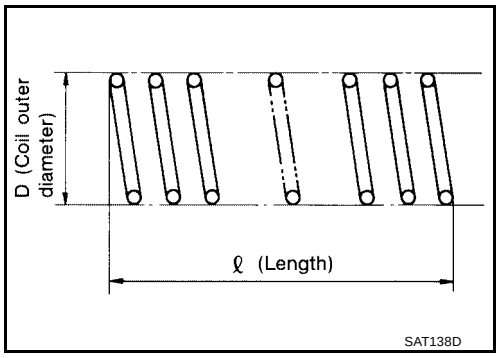
- Measure resistance.
- For shift solenoid valve A, refer to AT-175, "Diagnostic Procedure" .
- For shift solenoid valve B, refer to AT-180, "Diagnostic Procedure" .
- For line pressure solenoid valve, refer to AT-169, "Diagnostic Procedure" .
- For torque converter clutch solenoid valve, refer to AT-156, "Diagnostic Procedure" .
- For overrun clutch solenoid valve, refer to AT-188, "Diagnostic Procedure" .



Oil Cooler Relief Valve Spring

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

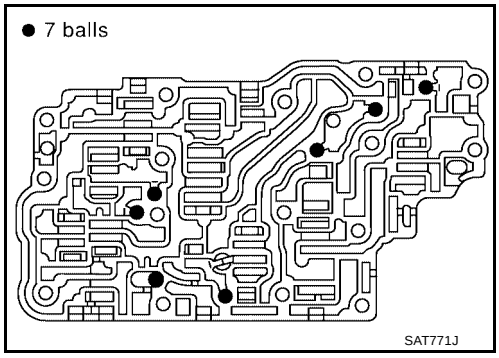
Inspection standard **: Refer to AT-379, "Control Valves" .**



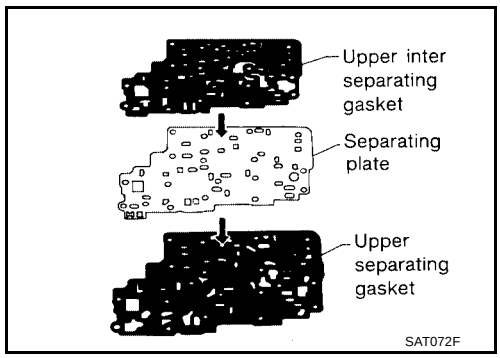
ASSEMBLY

1. Install upper, inter and lower body according to the following procedure.

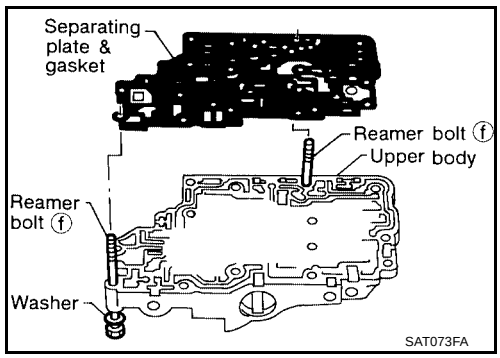
a. Place oil circuit of upper body face up. Install steel balls in their proper positions.



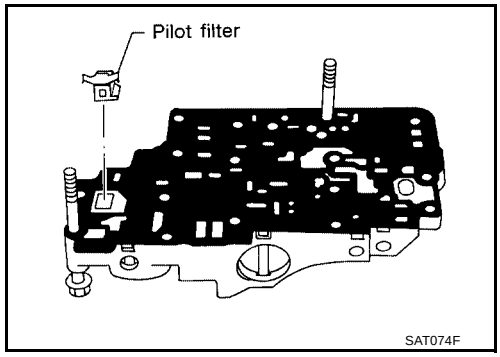
b. Install upper separating gasket, upper inter separating gasket and upper separating plate in order shown.



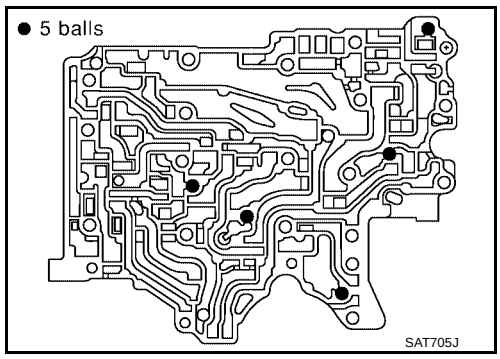
c. Install reamer bolts **f** from bottom of upper body. Using reamer bolts as guides, install separating plate and gaskets as a set.



d. Install pilot filter.

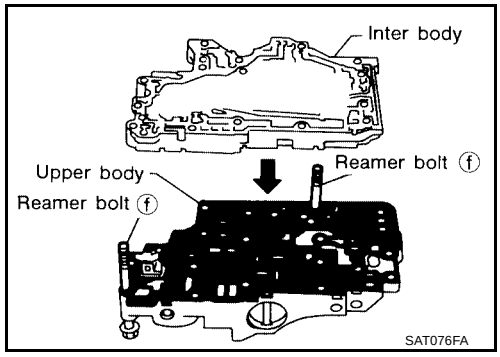


e. Place lower body as shown (side of inter body face up). Install steel balls in their proper positions.

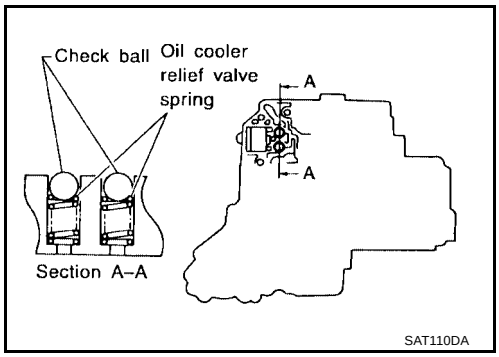


f. Install inter body on upper body using reamer bolts **f** as guides.

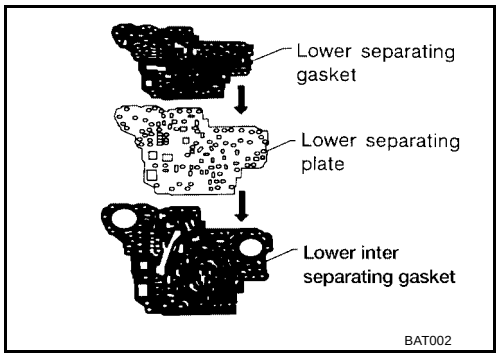
CAUTION:
Do not dislocate or drop steel check balls.



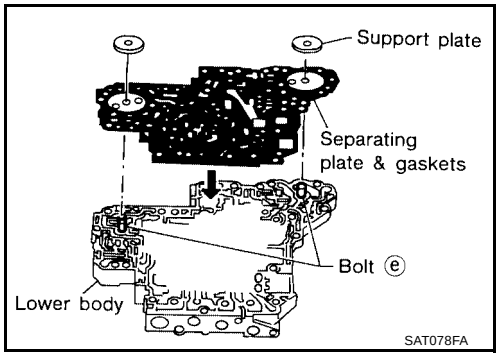
g. Install check balls and oil cooler relief valve springs in their proper positions in lower body.



h. Install lower separating gasket, lower inter separating gasket and lower separating plate in order shown.

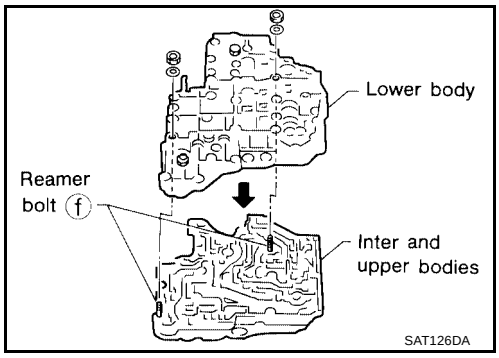


i. Install bolts **e** from bottom of lower body. Using bolts **e** as guides, install separating plate and gaskets as a set.



j. Temporarily install support plates on lower body.

k. Install lower body on inter body using reamer bolts **f** as guides and tighten reamer bolts **f** slightly.

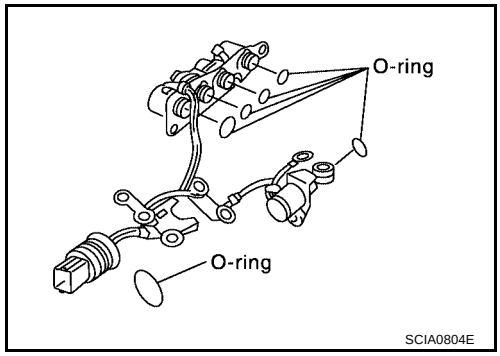


2. Install new O-rings to solenoid valves and terminal body.

CAUTION:

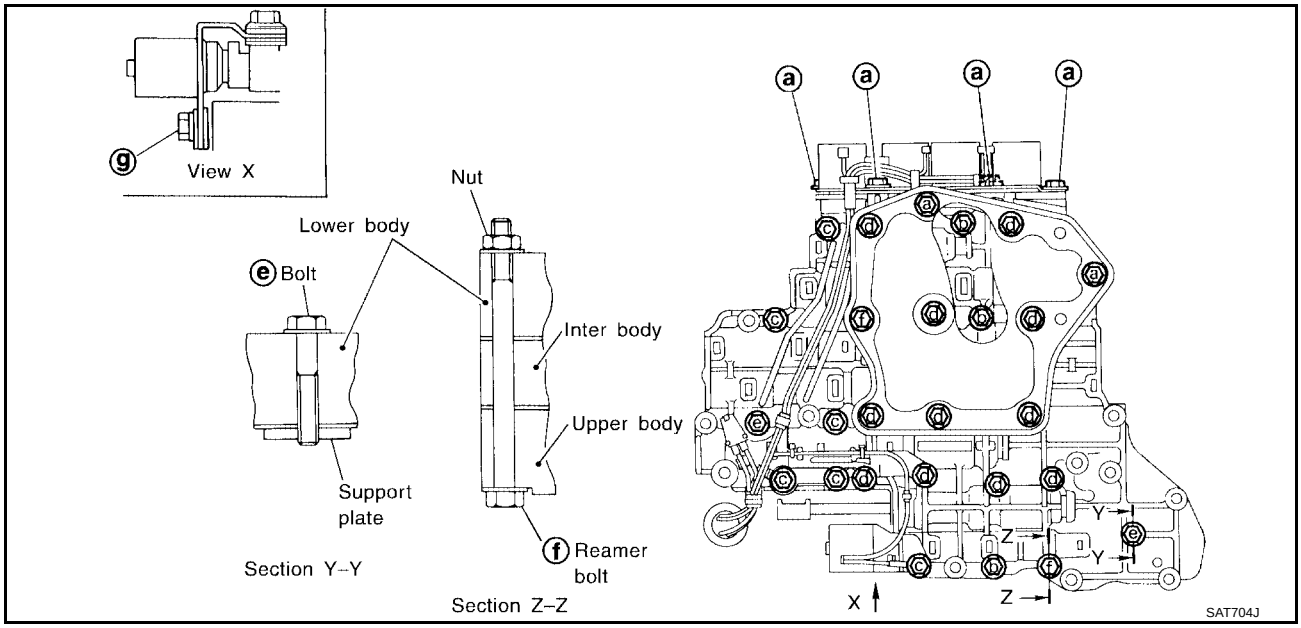
- **Do not reuse O-rings.**
- **Apply ATF to new O-rings.**

3. Install and tighten bolts according to the following procedure:



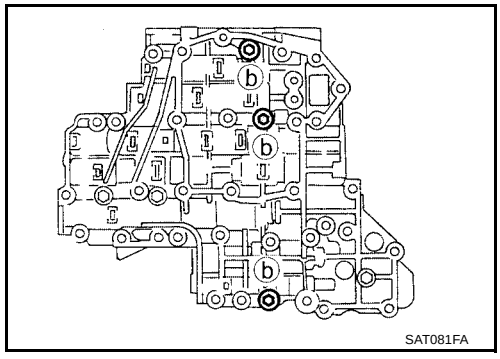
Bolt length, number and location:

Bolt symbol	a	b	c	d	e	f	g
Bolt length " ℓ " mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

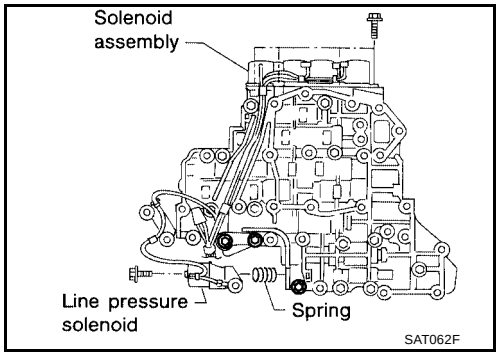


a. Install and tighten bolts **b** to specified torque.

b : 7 - 9 N-m (0.7 - 0.9 kg-m, 61 - 78 in-lb)

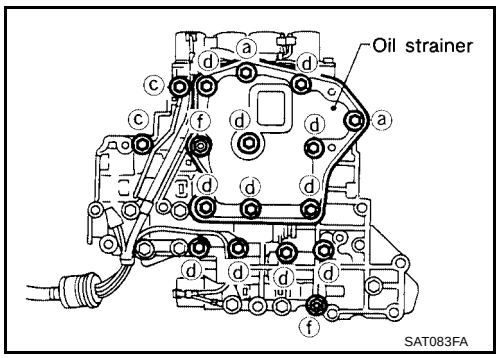


b. Install solenoid valve assembly and line pressure solenoid valve to lower body.



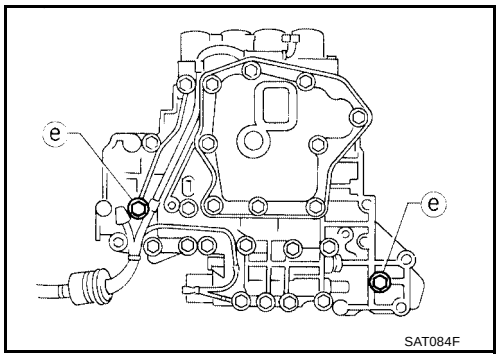
c. Set oil strainer, then tighten bolts **a** , **c** , **d** and nuts **f** to specified torque.

a, c, d, f : 7 - 9 N-m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



d. Tighten bolts **e** to specified torque.

e : 3.4 - 4.4 N-m (0.35 - 0.45 kg-m, 30.4 - 39.1 in-lb)



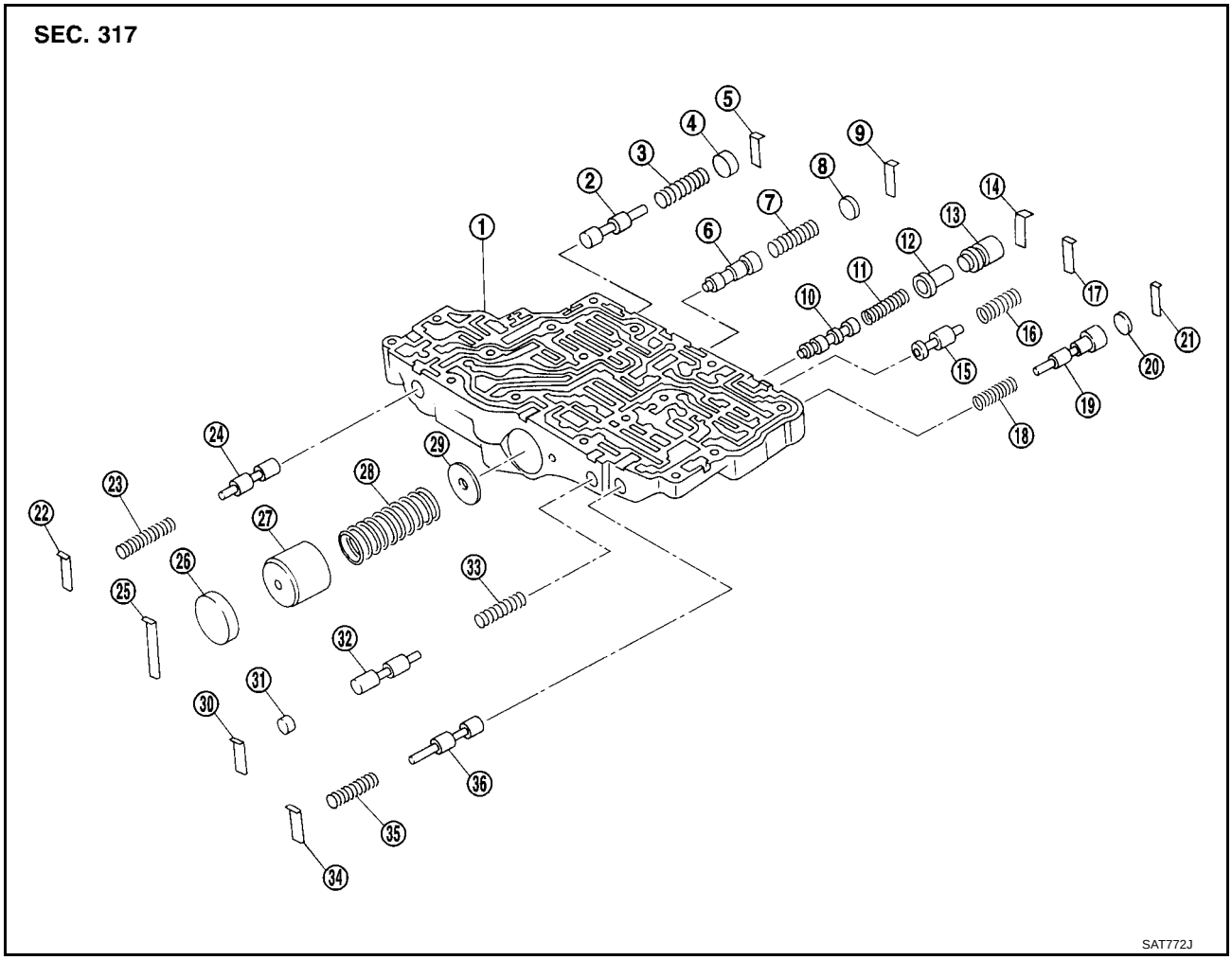
Control Valve Upper Body

ECS009B4

COMPONENTS

CAUTION:

Apply ATF to all components before installation.

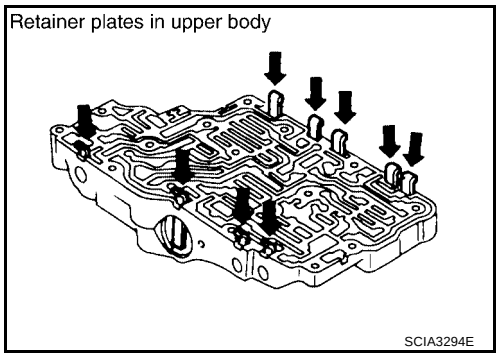


1. Upper body	2. Cooler check valve	3. Return spring
4. Plug	5. Retainer plate	6. 1-2 accumulator valve
7. Return spring	8. Plug	9. Retainer plate
10. Torque converter clutch control valve	11. Return spring	12. Torque converter clutch control plug
13. Torque converter clutch control sleeve	14. Retainer plate	15. Torque converter relief valve
16. Return spring	17. Retainer plate	18. Return spring
19. Overrun clutch reducing valve	20. Plug	21. Retainer plate
22. Retainer plate	23. Return spring	24. Pilot valve
25. Retainer plate	26. Plug	27. 1-2 accumulator piston
28. Return spring	29. 1-2 accumulator retainer plate	30. Retainer plate
31. Plug	32. 1st reducing valve	33. Return spring
34. Retainer plate	35. Return spring	36. 3-2 timing valve

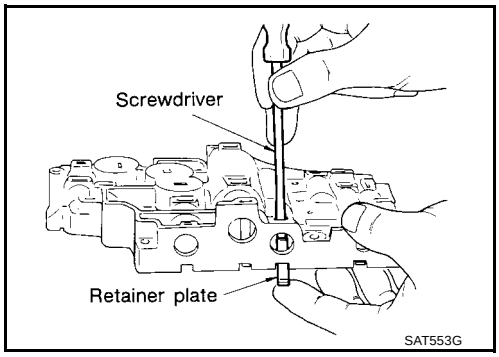
DISASSEMBLY

1. Remove valves at retainer plates according to the following procedure:

CAUTION:
Do not use a magnetic pick-up tool.

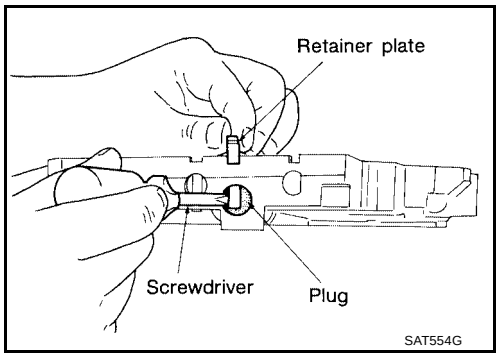


a. Remove retainer plates using suitable tool.



b. Remove retainer plates while holding spring, plugs or sleeves.

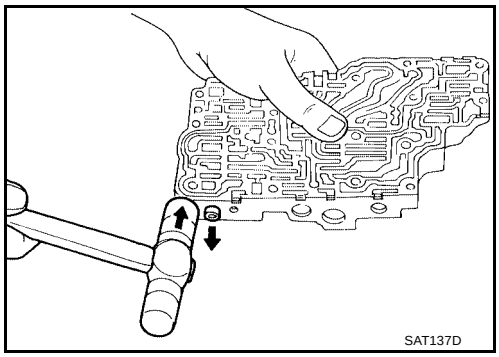
NOTE:
Remove plugs slowly to prevent internal parts from jumping out.



c. Place mating surface of valve body face down, and remove internal parts.

CAUTION:
Do not drop or damage valves and sleeves.

NOTE:
If a valve is hard to remove, place valve body face down and lightly tap it using suitable tool.

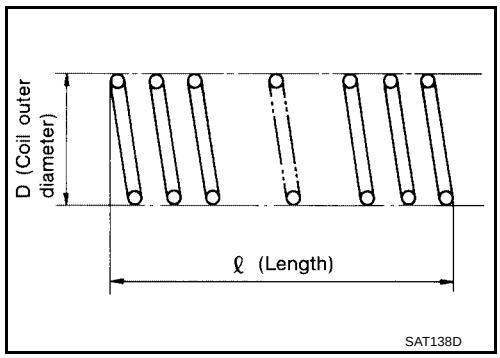


INSPECTION

Valve Spring

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

  Inspection standard : Refer to AT-379, "Control Valves" .



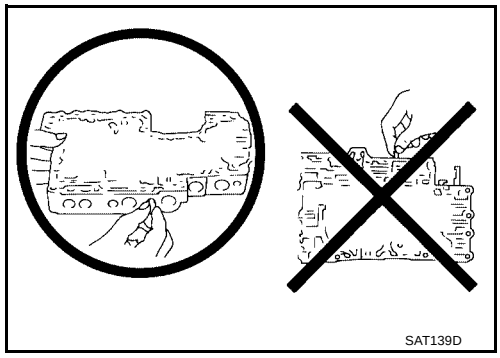
- Replace valve springs if deformed or fatigued.

Control Valves

- Check sliding surfaces of valves, sleeves and plugs.

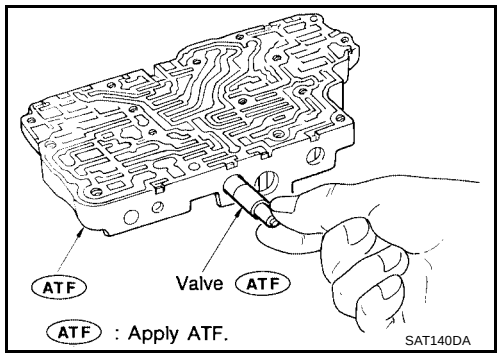
ASSEMBLY

CAUTION:
Lay control valve body down when installing valves. Do not stand the control valve body upright.

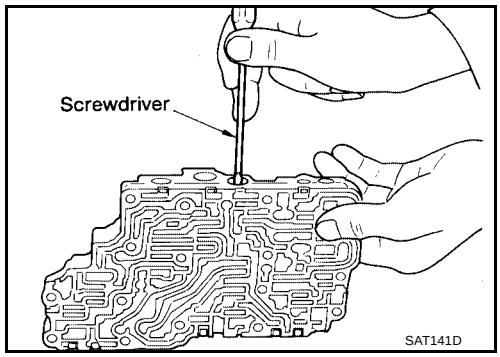


1. Lubricate the control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.

   CAUTION:
   Be careful not to scratch or damage valve body.

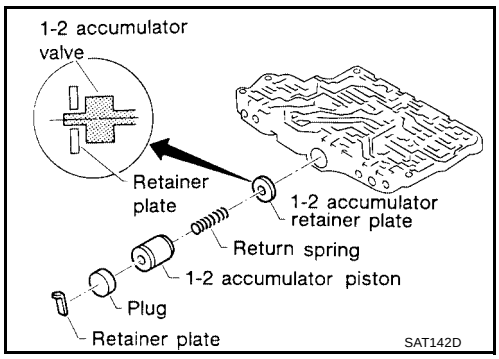


   - Wrap a small screwdriver with vinyl tape and use it to insert the valves into their proper positions.

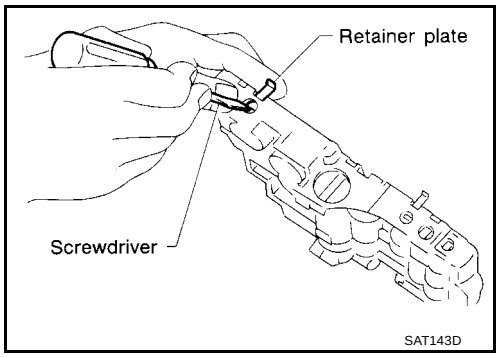


1-2 Accumulator Valve

- Install 1-2 accumulator valve. Align 1-2 accumulator retainer plate from opposite side of control valve body.
- Install return spring, 1-2 accumulator piston and plug.



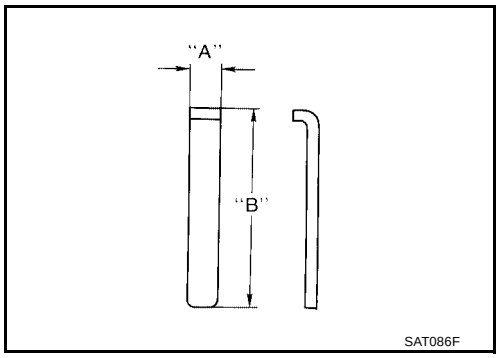
1. Install retainer plates.
   - While pushing plug or return spring using suitable tool, install retainer plate.



Retainer Plate (Upper Body)

Unit: mm (in)

No.	Name of control valve	Width A	Length B
22	Pilot valve	6.0 (0.236)	21.5 (0.846)
30	1st reducing valve		
34	3-2 timing valve		
17	Torque converter relief valve		
9	1-2 accumulator valve		38.5 (1.516)
25	1-2 accumulator piston valve		
21	Overrun clutch reducing valve		24.0 (0.945)
5	Cooler check valve		
14	Torque converter clutch control valve		28.0 (1.102)

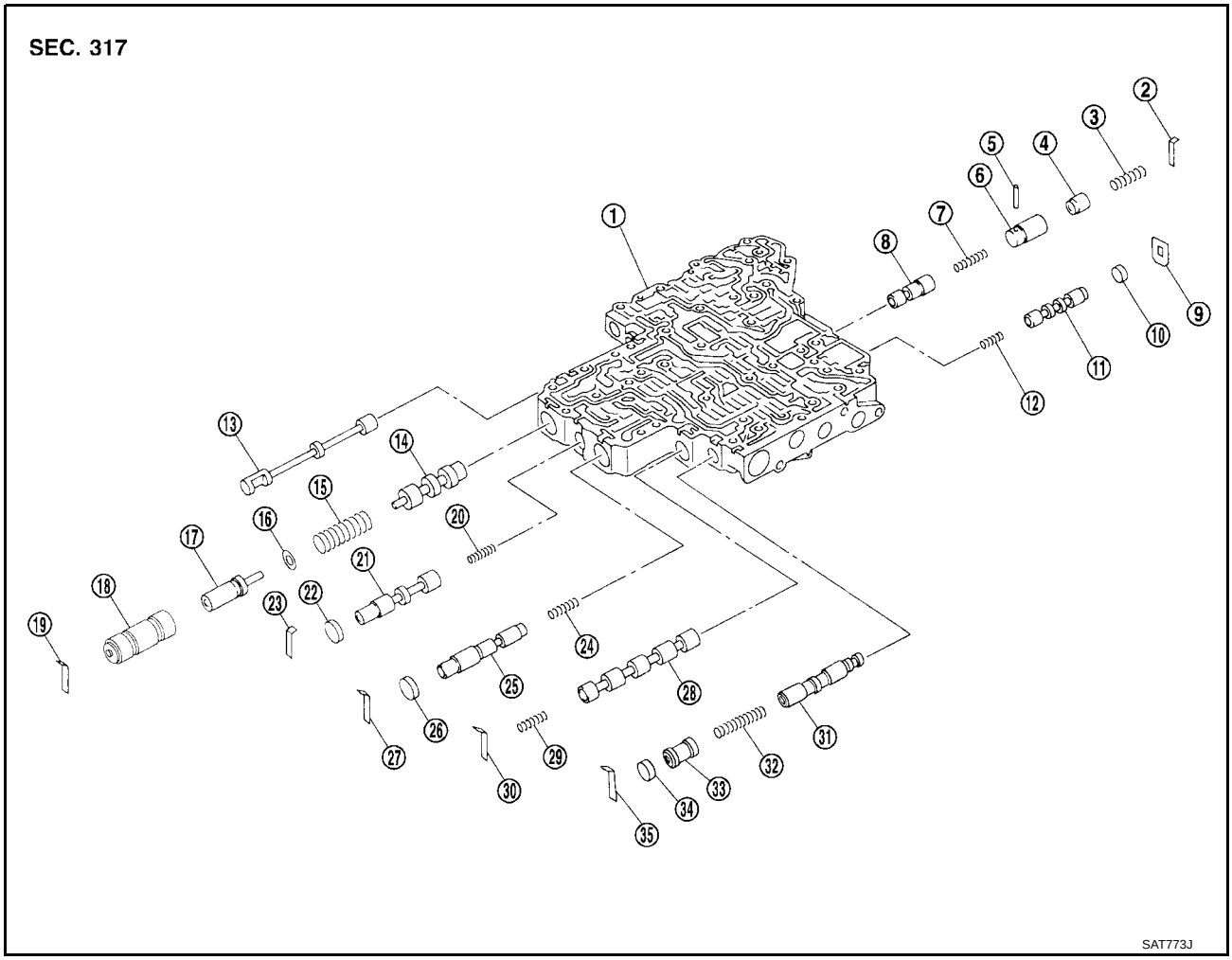


- Install proper retainer plates. Refer to AT-315, "COMPONENTS" .

Control Valve Lower Body

ECS009B5

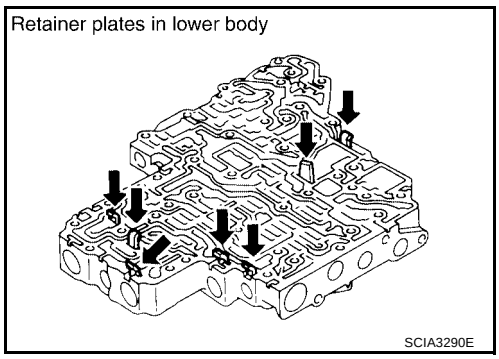
COMPONENTS



1. Lower body	2. Retainer plate	3. Return spring
4. Piston	5. Parallel pin	6. Sleeve
7. Return spring	8. Pressure modifier valve	9. Retainer plate
10. Plug	11. Shift valve B	12. Return spring
13. Manual valve	14. Pressure regulator valve	15. Return spring
16. Spring seat	17. Plug	18. Sleeve
19. Retainer plate	20. Return spring	21. Overrun clutch control valve
22. Plug	23. Retainer plate	24. Return spring
25. Accumulator control valve	26. Plug	27. Retainer plate
28. Shift valve A	29. Return spring	30. Retainer plate
31. Shuttle valve	32. Return spring	33. Plug
34. Plug	35. Retainer plate	

DISASSEMBLY

Remove valves at retainer plate. Refer to AT-319, "COMPONENTS" .



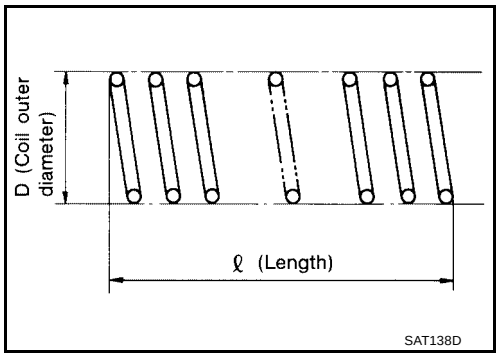
INSPECTION

Valve Springs

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

Inspection standard : Refer to AT-379, "Control Valves" .

Replace valve springs if deformed or fatigued.



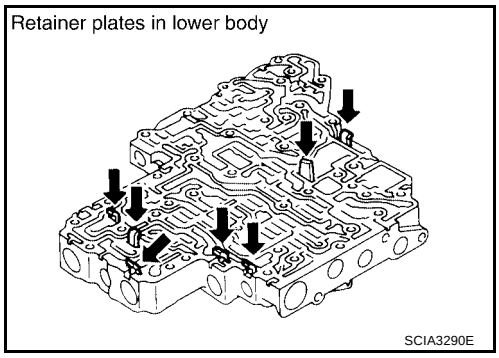
Control Valves

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

ASSEMBLY

Install control valves. Refer to AT-319, "COMPONENTS" .

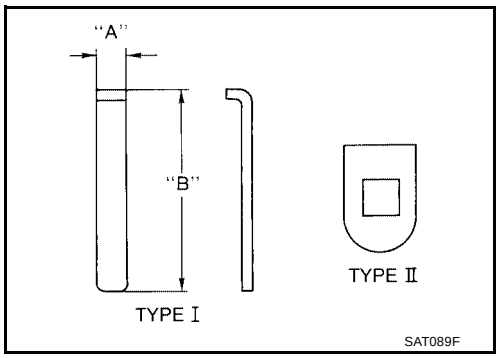
CAUTION:
Apply ATF to all components before installation.



Retainer Plate (Lower Body)

Unit: mm (in)

No.	Name of control valve and plug	Width A	Length B	Type
19	Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
27	Accumulator control valve			
30	Shift valve A			
23	Overrun clutch control valve			
2	Pressure modifier valve			
35	Shuttle valve			
9	Shift valve B	—	—	II

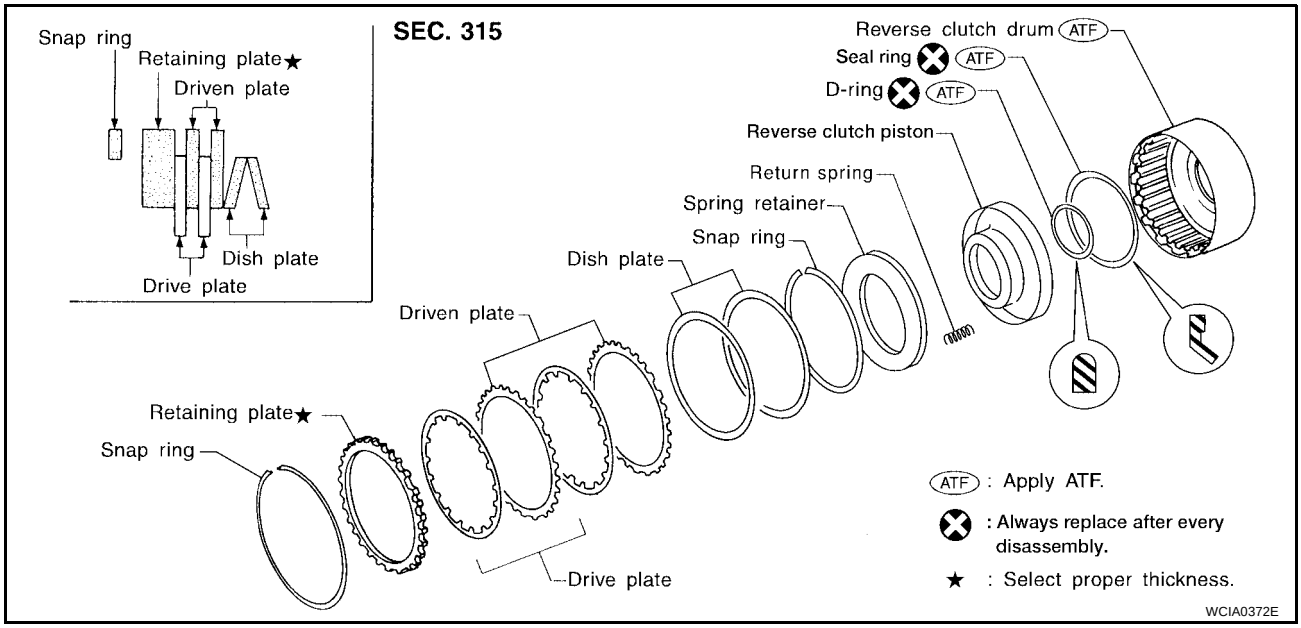


- Install proper retainer plates. Refer to AT-319, "COMPONENTS" .

Reverse Clutch

ECS009B6

COMPONENTS



DISASSEMBLY

1. Check operation of reverse clutch

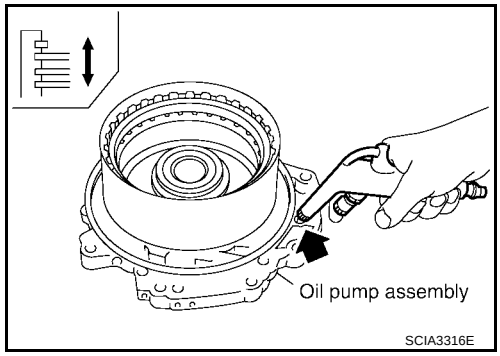
a. Install seal ring onto drum support of oil pump cover and install reverse clutch assembly. Apply compressed air to oil hole.

b. Check to see that retaining plate moves to snap ring.

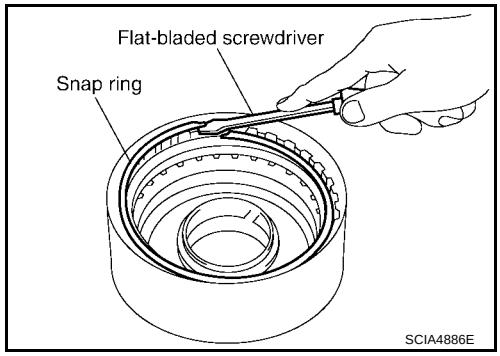
CAUTION:

If retaining plate does not contact snap ring:

- **D-ring might be damaged.**
- **Oil seal might be damaged.**
- **Fluid might be leaking past piston check ball.**



2. Remove snap ring using suitable tool.
3. Remove drive plates, driven plates, retaining plate, and dish plates.



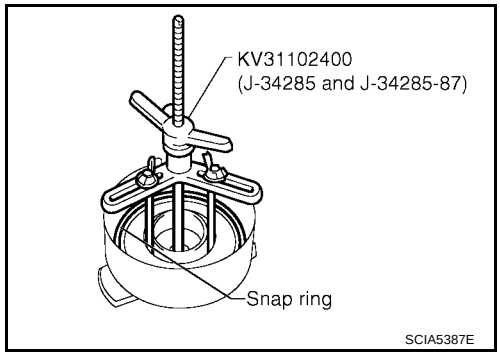
4. Remove snap ring from reverse clutch drum while compressing return springs using Tool.

Tool number : KV31102400 (J-34285 and J-34285-87)

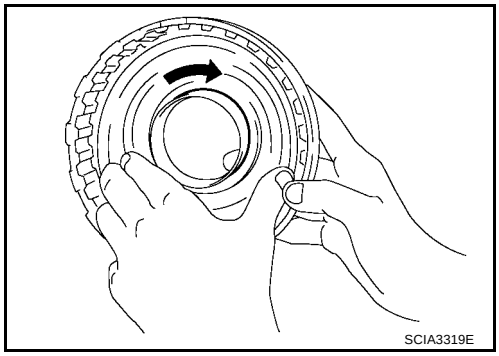
CAUTION:

- **Set Tool directly over springs.**
- **Do not expand the snap ring excessively.**

5. Remove spring retainer and return springs.



6. Remove reverse clutch piston from reverse clutch drum by turning it as shown.
7. Remove D-ring and oil seal from piston.



INSPECTION

Reverse Clutch Snap Ring, Spring Retainer and Return Springs

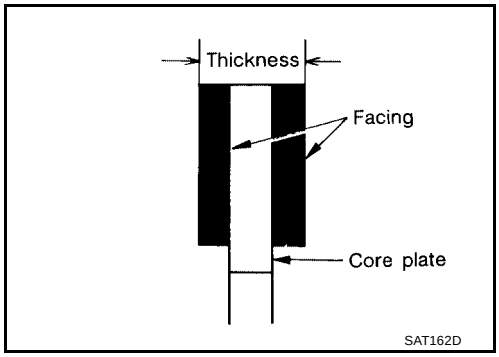
Check for deformation, fatigue or damage. If damaged, replace.

Reverse Clutch Drive Plates

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

Thickness of drive plate:
Standard value : 1.6 mm (0.063 in)
Wear limit : 1.4 mm (0.055 in)

- If not within wear limit, replace.

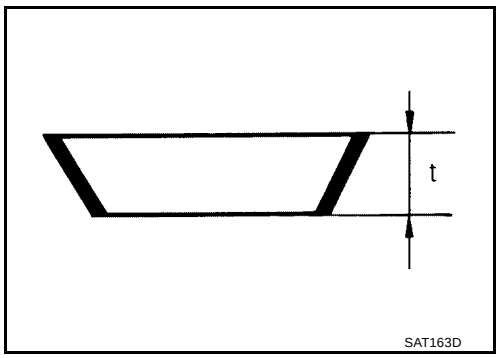


Reverse Clutch Dish Plates

- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate : 3.08 mm (0.1213 in)

- If deformed or fatigued, replace.



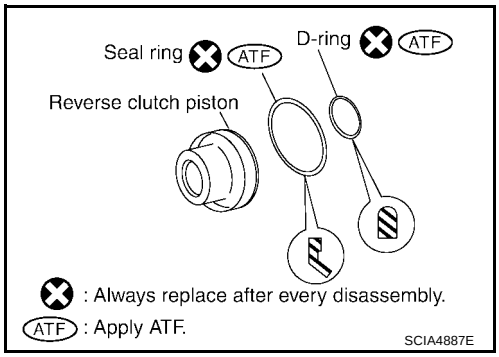
Reverse Clutch Piston

- Make sure that check balls are not stuck.
- 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

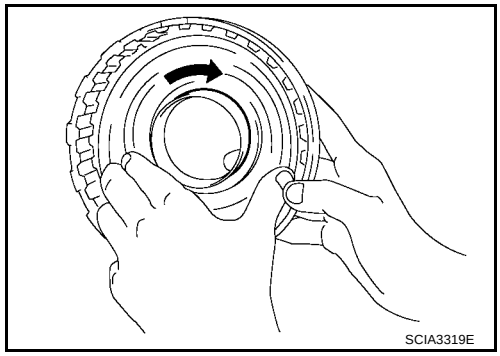
1. Install new D-ring and new seal ring on piston.

CAUTION:
- **Do not reuse D-ring and seal ring.**
- **Apply ATF to new D-ring and new seal ring.**
- **Take care with the direction of new D-ring and new seal ring.**



2. Install piston assembly by turning it slowly.

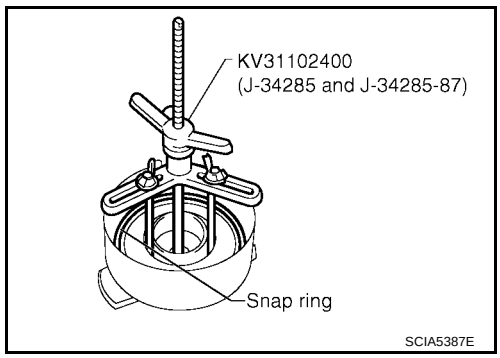
CAUTION:
Apply ATF to inner surface of drum.



3. Install return springs and spring retainer on piston using Tool.

Tool number : KV31102400 (J-34285 and J-34285-87)

CAUTION:
- **Set Tool directly over springs.**

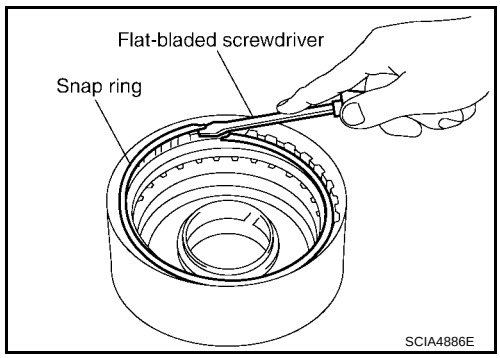


4. Set Tool on spring retainer and install snap ring while compressing return springs.
5. Install drive plates, driven plates, retaining plate and dish plates.

CAUTION:
Take care with the order of plates.

6. Install snap ring using suitable tool.

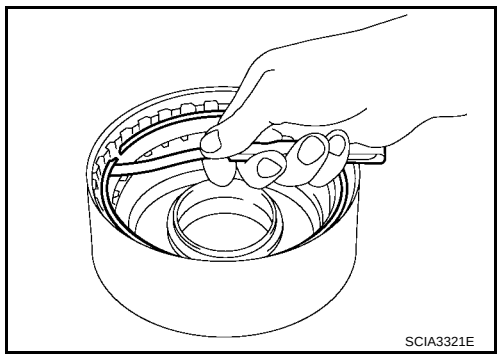
CAUTION:
Do not expand snap ring excessively.



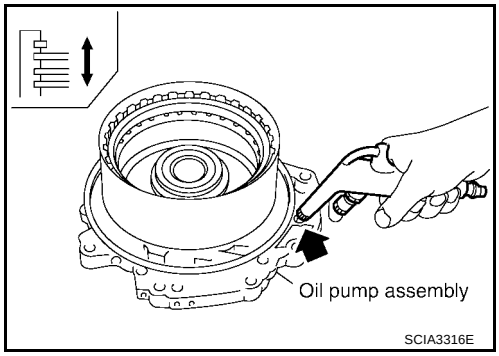
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate.

Specified clearance

Standard	**: 0.5 - 0.8 mm (0.020 - 0.031 in)**
Allowable limit	**: 1.2 mm (0.047 in)**
Retaining plate	**: Refer to AT-380, "REVERSE CLUTCH" .**



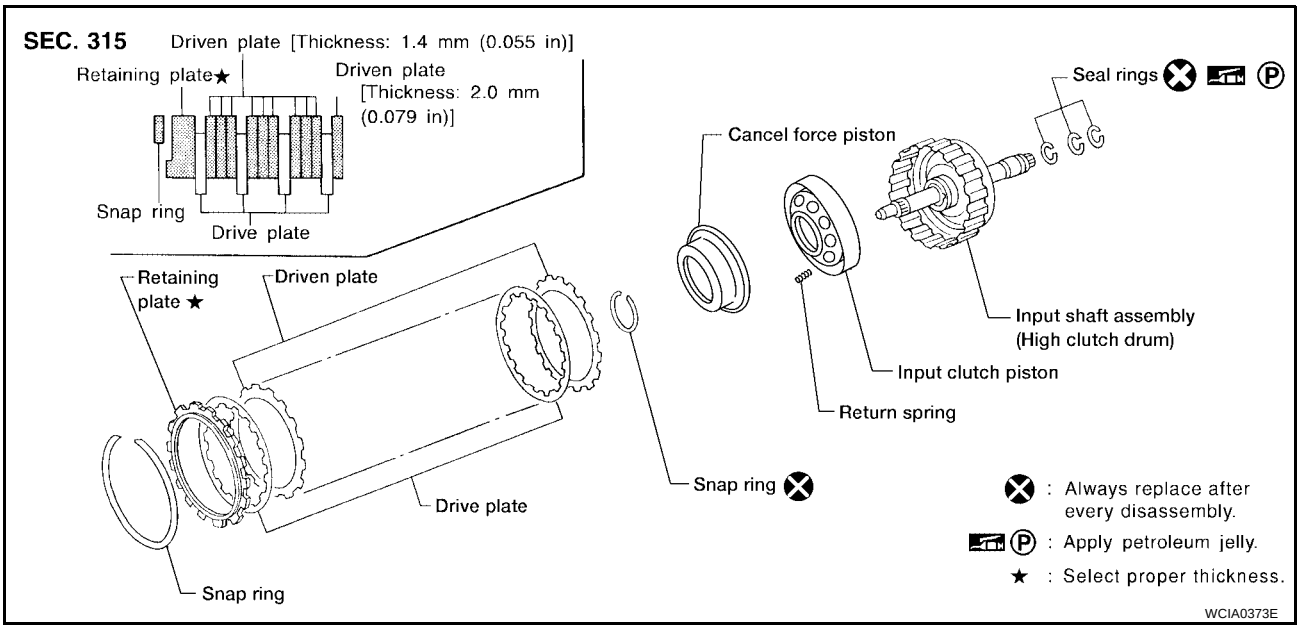
8. Check operation of reverse clutch using compressed air.



High Clutch

ECS009B7

COMPONENTS



DISASSEMBLY

1. Check operation of high clutch using compressed air.

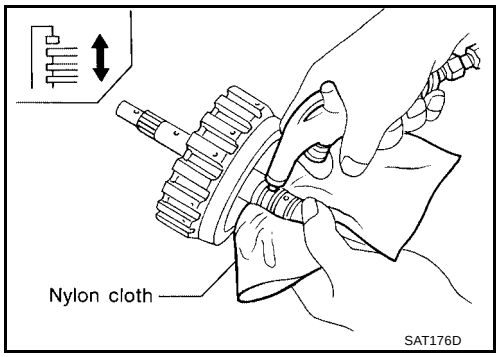
a. Apply compressed air to oil hole of input shaft while covering hole on opposite side with nylon cloth.

b. Check to see that retaining plate moves to snap ring.

CAUTION:

If retaining plate does not contact snap ring:

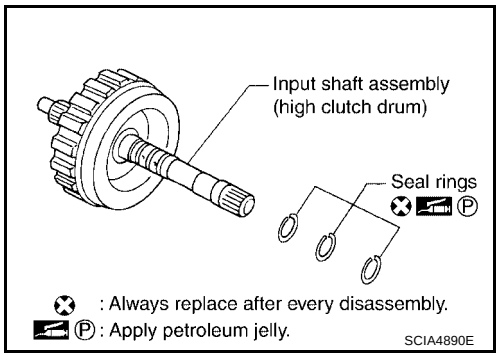
- **D-ring might be damaged.**
- **Oil seal might be damaged.**
- **Fluid might be leaking past piston check ball.**



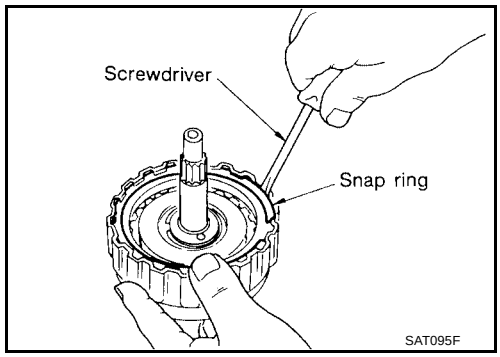
2. Remove seal rings from input shaft.

CAUTION:

Do not reuse seal rings.



3. Remove snap ring using suitable tool.
4. Remove drive plates, driven plates and retaining plate.

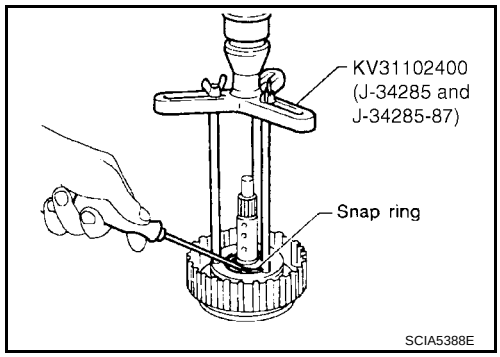


5. Remove snap ring from high clutch drum while compressing return springs using Tool.

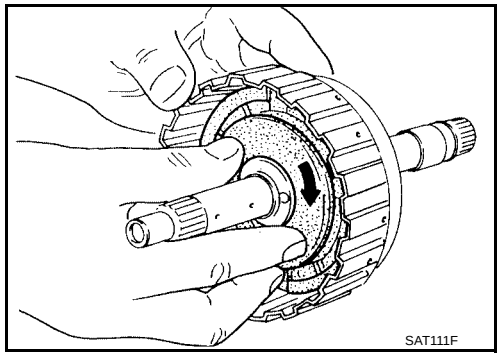
Tool number : KV31102400 (J-34285 and J-34285-87)

CAUTION:
- **Set Tool directly over springs.**
- **Do not expand snap ring excessively.**

6. Remove cancel force cover and return springs.



7. Remove piston from high clutch drum by turning it.



INSPECTION

High Clutch Snap Ring, Spring Retainer and Return Springs

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

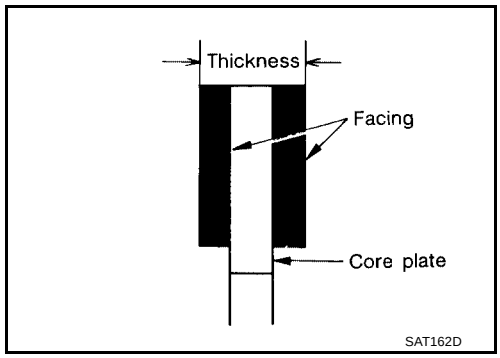
CAUTION:
Always replace the spring retainer and return springs as a set.

High Clutch Drive Plates

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

Thickness of drive plate:
Standard value : 1.6 mm (0.063 in)
Wear limit : 1.4 mm (0.055 in)

- If not within wear limit, replace.



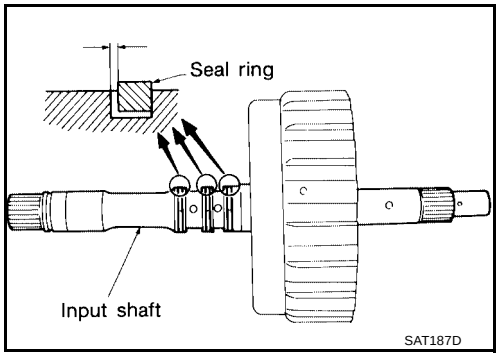
Seal Ring Clearance

- Install new seal rings onto input shaft.
- Measure clearance between seal ring and ring groove.

Standard clearance : 0.08 - 0.23 mm (0.0031 - 0.0091 in)

Allowable limit : 0.23 mm (0.0091 in)

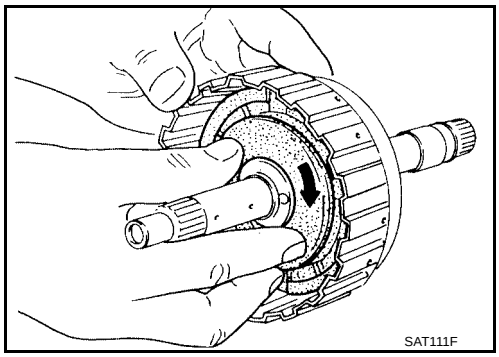
- If not within allowable limit, replace input shaft assembly.



ASSEMBLY

1. Install return springs and cancel force spring on piston.
2. Install piston assembly by turning it slowly.

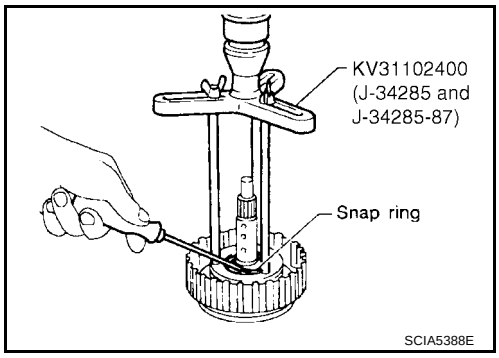
CAUTION:
Apply ATF to inner surface of drum.



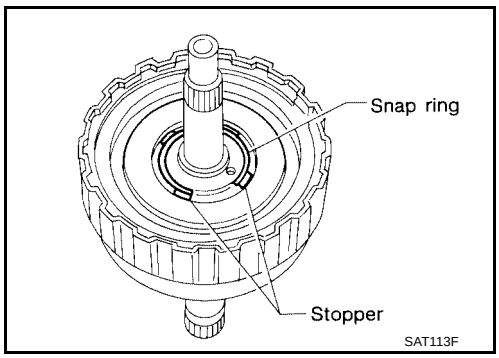
3. Install snap ring while compressing return springs using Tool.

Tool number : KV31102400 (J-34285 and J-34285-87)

CAUTION:
Set Tool directly over return springs.



CAUTION:
Do not align the snap ring gap with the spring retainer stopper.

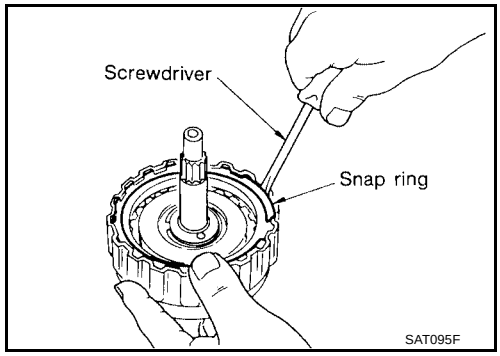


4. Install drive plates, driven plates and retaining plate.

CAUTION:
Take care with the order and direction of plates.

5. Install snap ring using suitable tool.

CAUTION:
Do not expand snap ring excessively.



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

Specified clearance

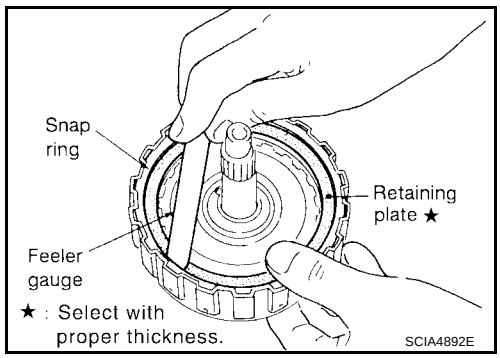
Standard : 1.8 - 2.2 mm (0.071 - 0.087 in)

Allowable limit : 2.8 mm (0.110 in)

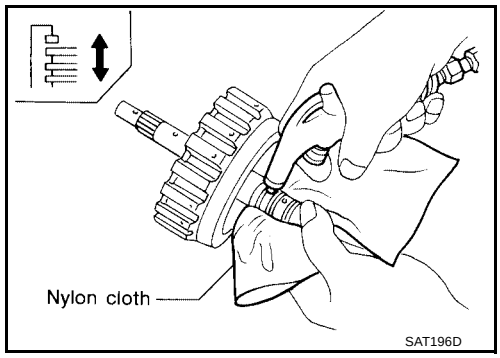
Retaining plate

: Refer to AT-380, "HIGH CLUTCH" .

: Refer to AT-380, "HIGH CLUTCH" .

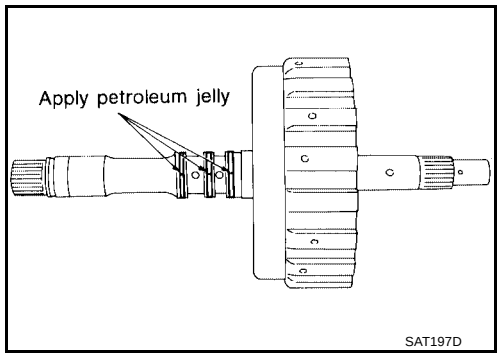


7. Check operation of high clutch.

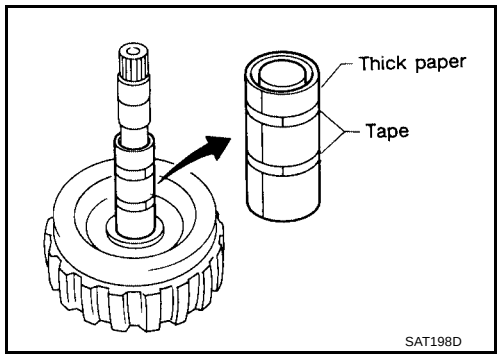


8. Install new seal rings to input shaft.

CAUTION:
- **Do not reuse seal rings.**
- **Apply petroleum jelly to new seal rings.**



- **Roll paper around new seal rings to prevent them from spreading.**

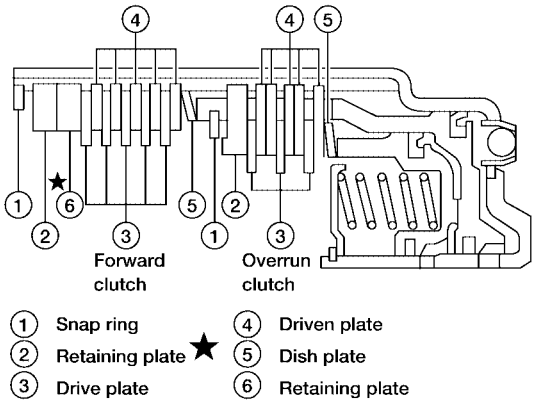


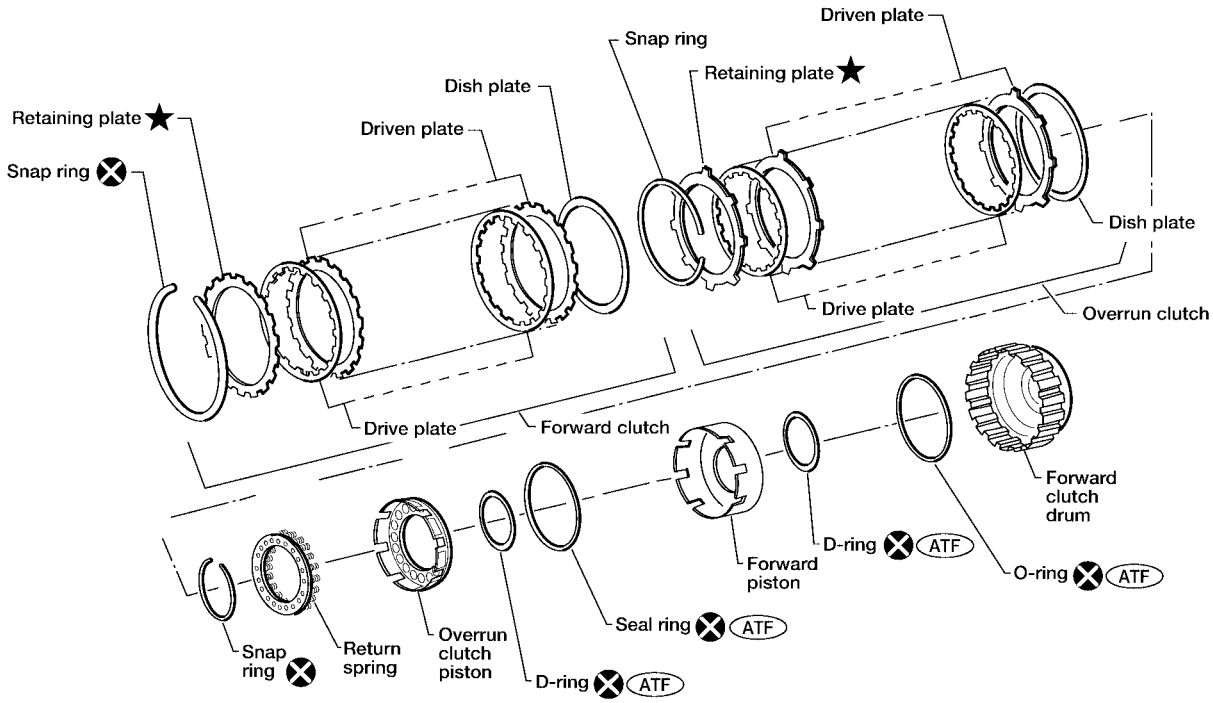
Forward and Overrun Clutches

ECS009B8

COMPONENTS

SEC. 315





ATF : Apply ATF.

★ : Select proper thickness.

⊗ : Always replace after every disassembly.

WCIA0374E

DISASSEMBLY

1. Check operation of forward clutch and overrun clutch.

a. Install bearing retainer on forward clutch drum.

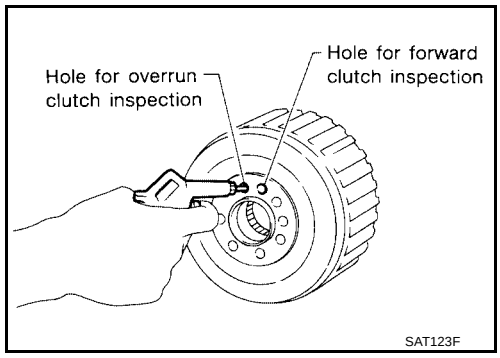
b. Apply compressed air to oil hole of forward clutch drum.

c. Check to see that retaining plate moves to snap ring.

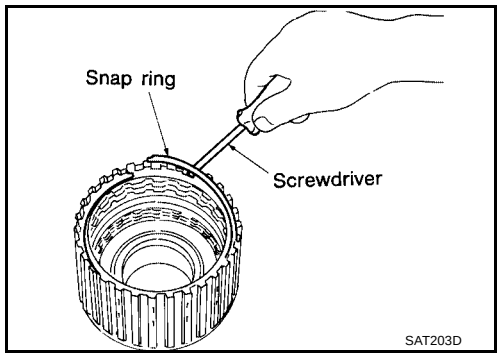
CAUTION:

If retaining plate does not contact snap ring:

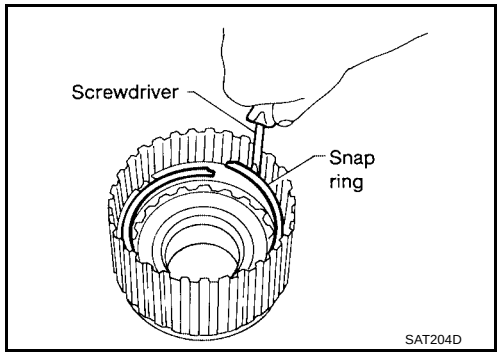
- **D-ring might be damaged.**
- **Oil seal might be damaged.**
- **Fluid might be leaking past piston check ball.**



2. Remove snap ring for forward clutch using suitable tool.
3. Remove drive plates, driven plates, retaining plate and dish plate for forward clutch.



4. Remove snap ring for overrun clutch using suitable tool.
5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.

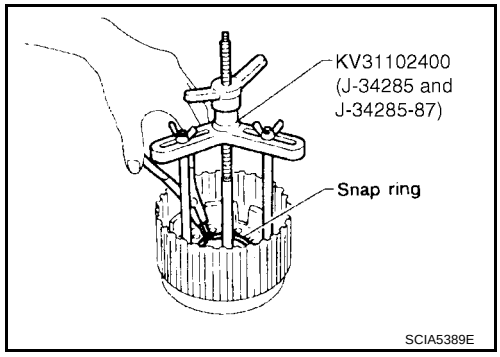


6. Remove snap ring from forward clutch drum while compressing return springs using Tool.

Tool number : KV31102400 (J-34285 and J-34285-87)

CAUTION:

- **Set Tool directly over return springs.**
- **Do not expand snap ring excessively.**

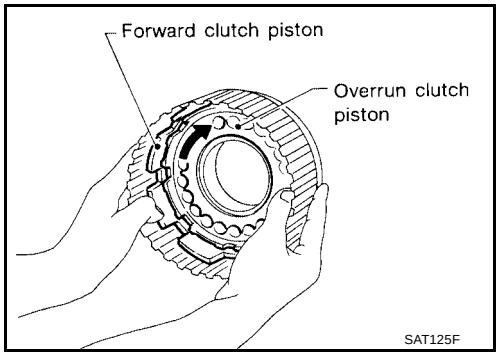


7. Remove spring retainer and return springs.

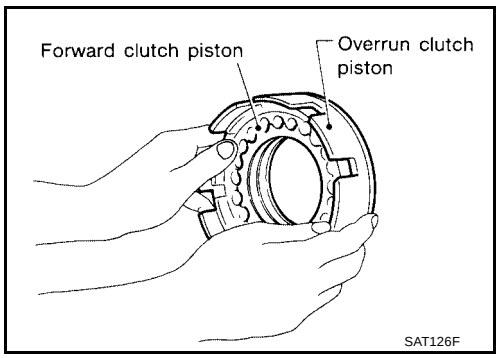
CAUTION:

Do not remove return springs from spring retainer.

8. Remove forward clutch piston with overrun clutch piston from forward clutch drum by turning it.

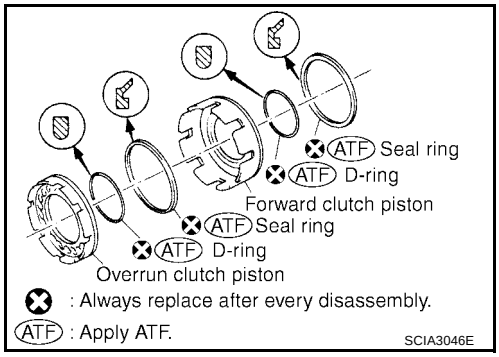


9. Remove overrun clutch piston from forward clutch piston by turning it.



10. Remove D-rings and seal rings from forward clutch piston and overrun clutch piston.

CAUTION:
Do not reuse D-rings and seal rings.



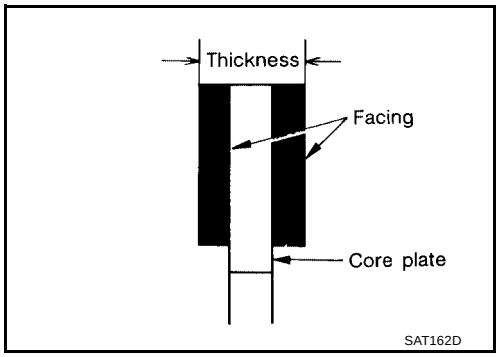
INSPECTION

Snap Rings, Spring Retainer and Return Springs

- Always replace spring retainer and return springs as a set.
- Check for deformation, fatigue or damage. Replace if necessary.

Forward Clutch and Overrun Clutch Drive Plates

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



Thickness of drive plate:

Forward clutch	
Standard value	**: 1.6 mm (0.063 in)**
Wear limit	**: 1.4 mm (0.055 in)**
Overrun clutch	
Standard value	**: 1.6 mm (0.063 in)**
Wear limit	**: 1.4 mm (0.055 in)**

- If not within wear limit, replace.

Forward Clutch and Overrun Clutch Dish Plates

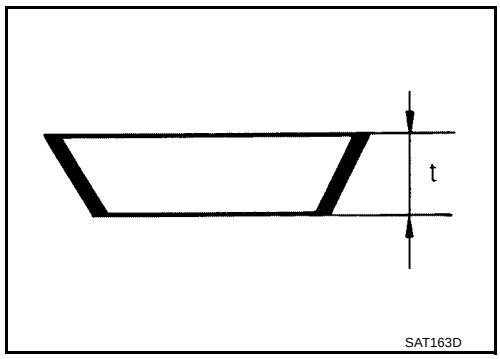
- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate

Forward clutch : 2.7 mm (0.106 in)

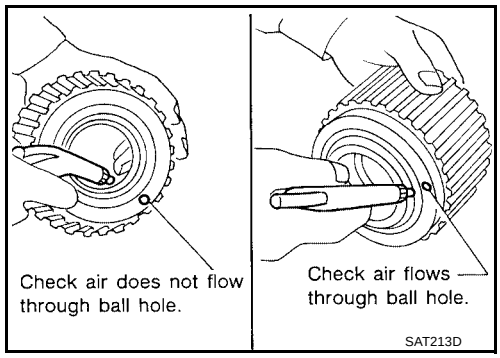
Overrun clutch : 2.7 mm (0.106 in)

- If deformed or fatigued, replace.



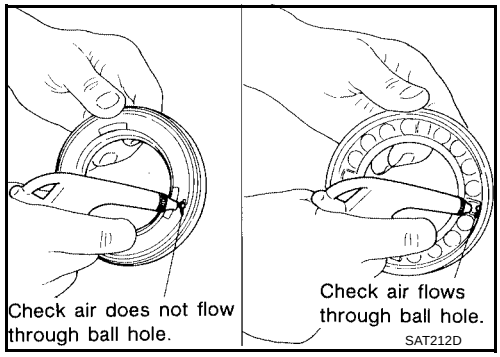
Forward Clutch Drum

- Make sure that check balls are not stuck.
- Apply compressed air to check ball oil hole from outside of forward clutch drum. Make sure air leaks past ball.
- Apply compressed air to oil hole from inside of forward clutch drum. Make sure there is no air leakage.



Overrun Clutch Piston

- Make sure that check balls are not stuck.
- 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.

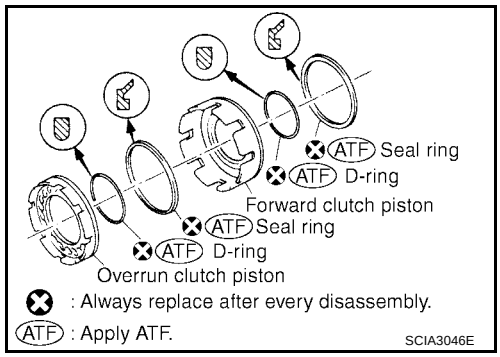


ASSEMBLY

1. Install new D-rings and new seal rings on forward clutch piston and overrun clutch piston.

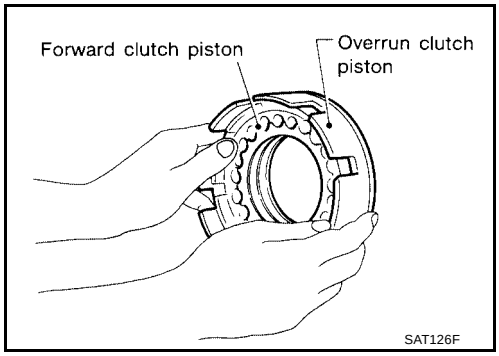
CAUTION:

- **Do not reuse D-rings and seal rings.**
- **Apply ATF to new D-rings and new seal rings.**
- **Take care with the direction of new D-rings and new seal rings.**



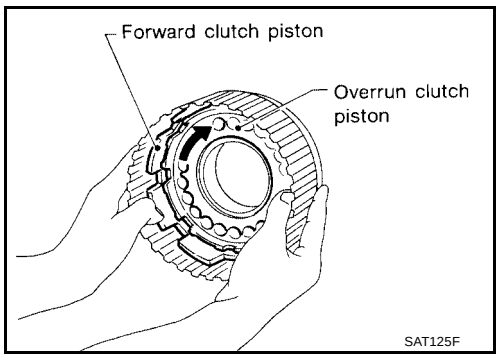
2. Install overrun clutch piston assembly on forward clutch piston by turning it slowly.

CAUTION:
Apply ATF to inner surface of forward clutch piston.

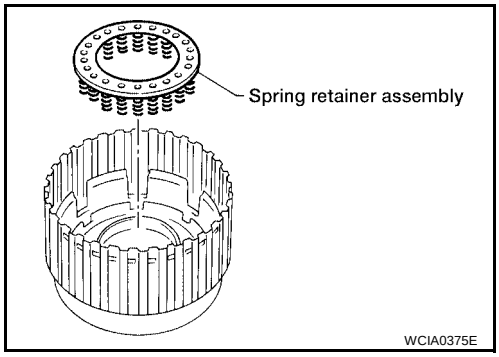


3. Install forward clutch piston assembly on forward clutch drum by turning it slowly.

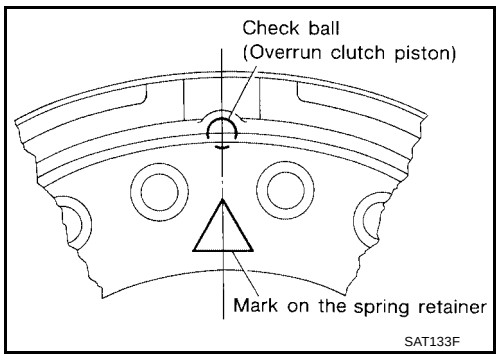
CAUTION:
Apply ATF to inner surface of drum.



4. Install spring retainer assembly on overrun clutch piston.



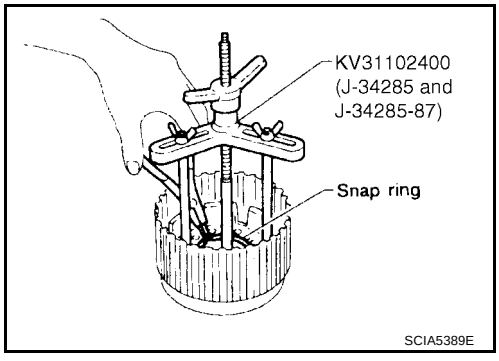
- Align the mark on spring retainer assembly with check ball in overrun clutch piston.



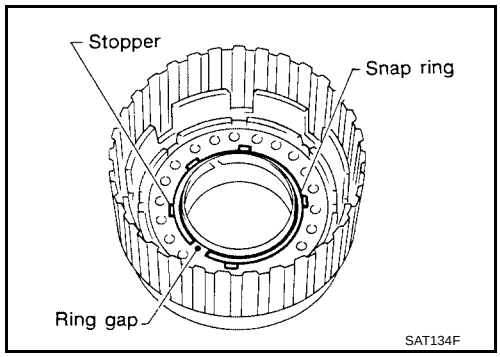
5. Install snap ring while compressing spring retainer assembly using Tool.

Tool number : KV31102400 (J-34285 and J-34285-87)

CAUTION:
- **Set Tool directly over the spring retainer assembly.**
- **Do not expand snap ring excessively.**

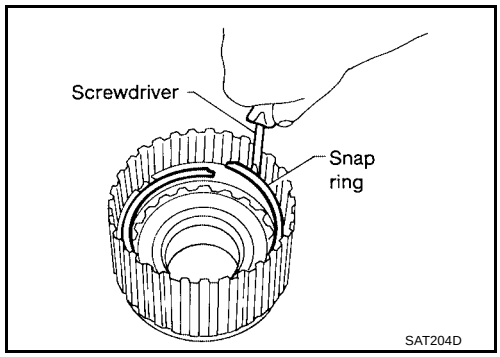


- **Do not align snap ring with the spring retainer assembly stopper.**



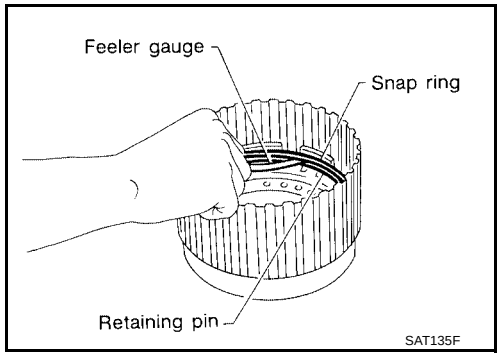
6. Install drive plates, driven plates, retaining plate and dish plate for overrun clutch and install snap ring for the overrun clutch using suitable tool.

CAUTION:
Take care with the order of plates.



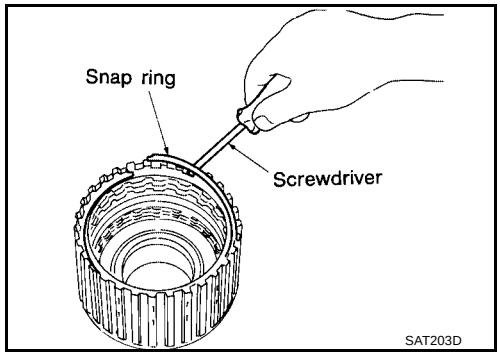
7. Measure clearance between overrun clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate.

Specified clearance	
Standard	**: 0.7 - 1.1 mm (0.028 - 0.043 in)**
Allowable limit	**: 1.7 mm (0.067 in)**
Overrun clutch retaining plate	**Refer to AT-381, "OVERRUN CLUTCH" .**



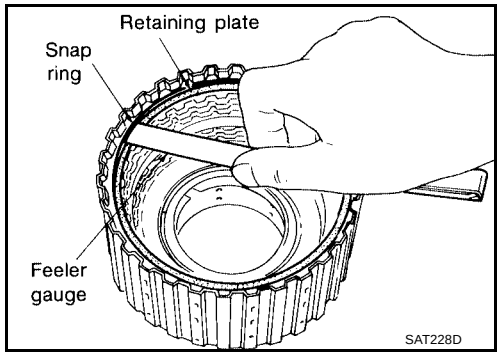
8. Install drive plates, driven plates, retaining plate and dish plate for forward clutch and install snap ring for the forward clutches using suitable tool.

CAUTION:
Take care with the order of plates.

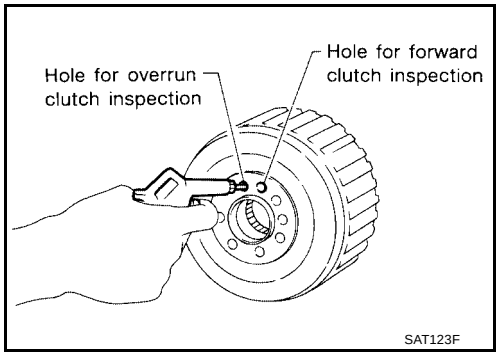


9. Measure clearance between forward clutch retaining plate and snap ring.
If not within allowable limit, select proper retaining plate.

Specified clearance	
Standard	**: 0.45 - 0.85 mm (0.0177 - 0.0335 in)**
Allowable limit	**: 1.85 mm (0.0728 in)**
Forward clutch retaining plate	**: Refer to AT-380, "FORWARD CLUTCH" .**



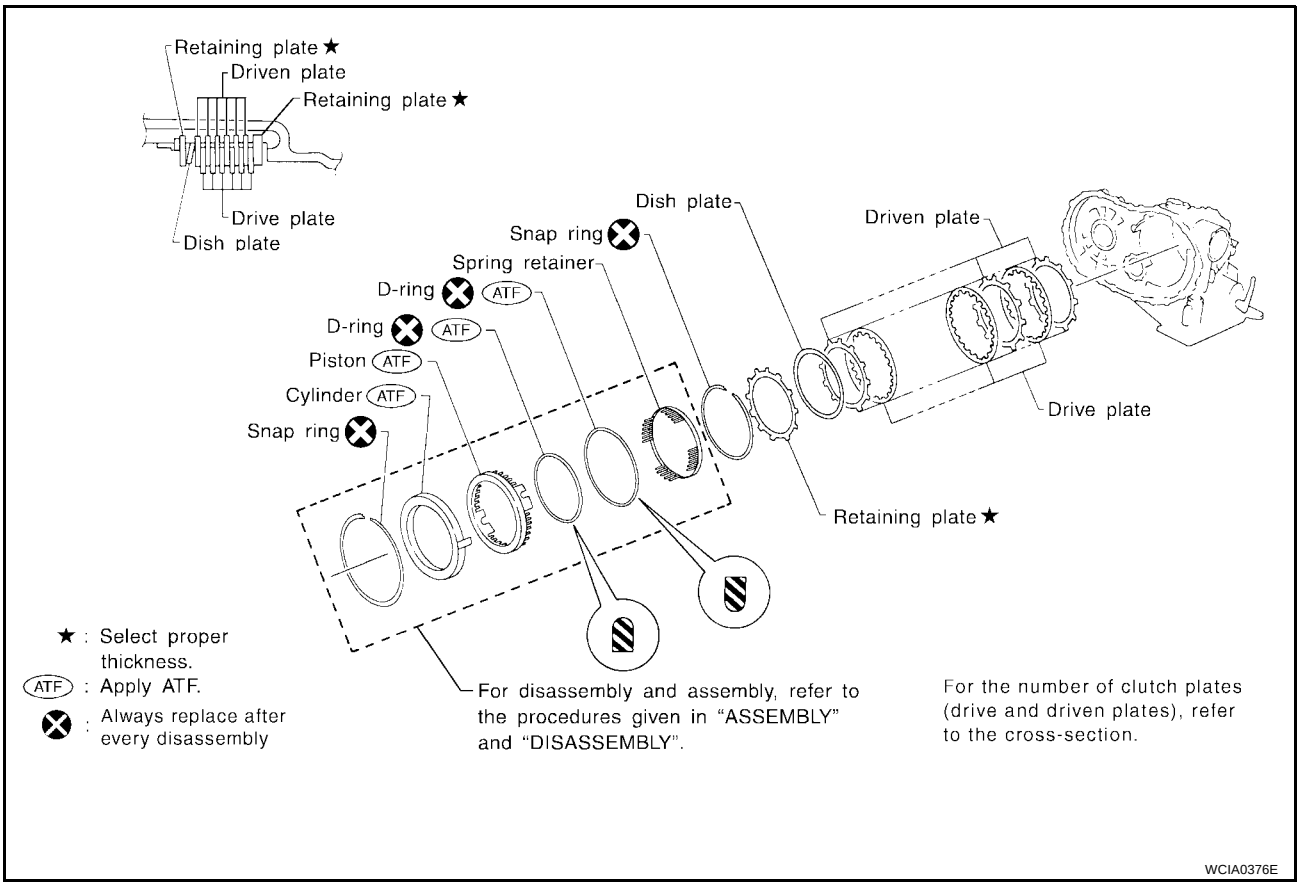
10. Check operation of forward clutch.
11. Check operation of overrun clutch.



Low & Reverse Brake

ECS009B9

COMPONENTS



DISASSEMBLY

1. Check operation of low & reverse brake.

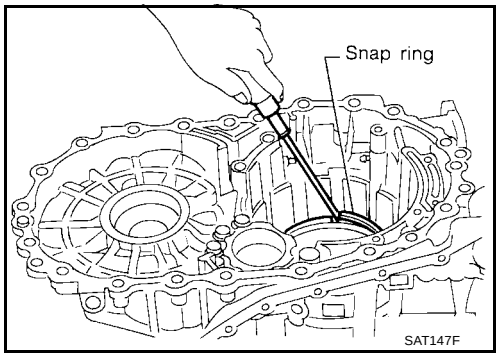
a. Apply compressed air to oil hole of transaxle case.

b. Check to see that retaining plate moves to snap ring.

CAUTION:

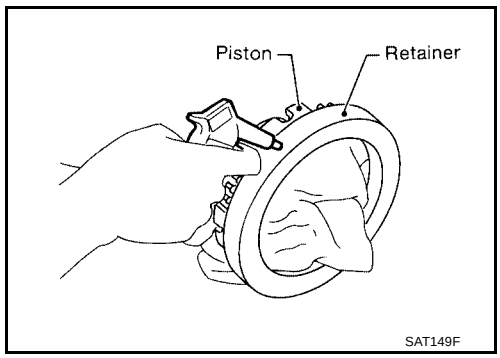
If retaining plate does not contact snap ring:

- **D-ring might be damaged.**
- **Fluid might be leaking past piston check ball.**



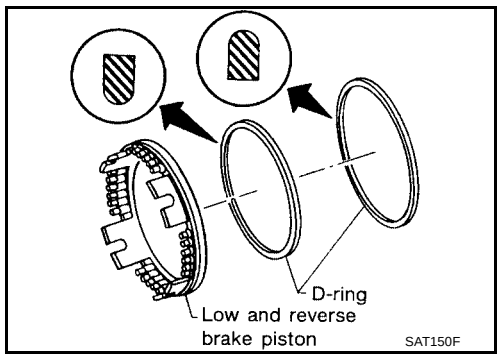
2. In order to remove piston, apply compressed air to oil hole of retainer while holding piston.

CAUTION:
Apply compressed air gradually to allow the piston to come out evenly.



3. Remove D-rings from piston and discard.

CAUTION:
Do not reuse D-rings.



INSPECTION

Low and Reverse Brake Snap Ring, Spring Retainer and Return Springs

- Check for deformation, replace if fatigue or damage.
- Always replace the spring retainer and return springs as a set.

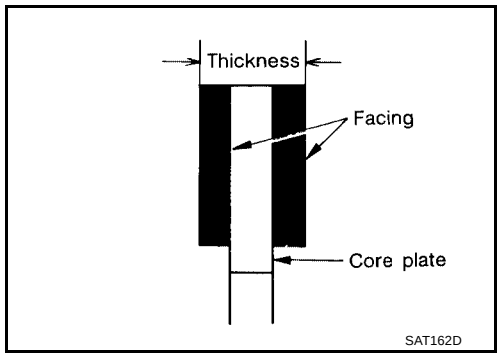
Low and Reverse Brake Drive Plate

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

Thickness of drive plate

Standard value	**: 1.8 mm (0.071 in)**
Wear limit	**: 1.6 mm (0.063 in)**

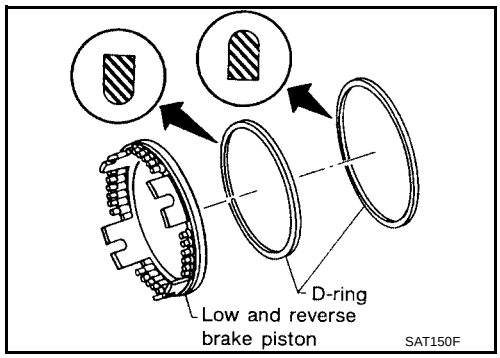
- If not within wear limit, replace.



ASSEMBLY

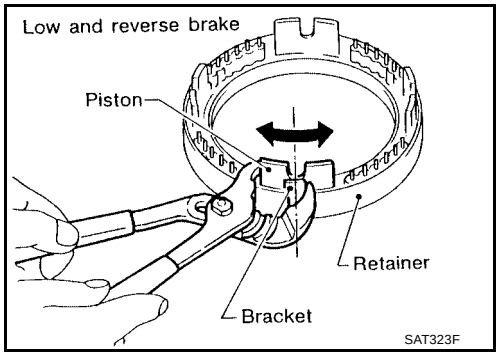
1. Install new D-rings on piston.

CAUTION:
- **Do not reuse D-rings.**
- **Apply ATF to new D-rings.**



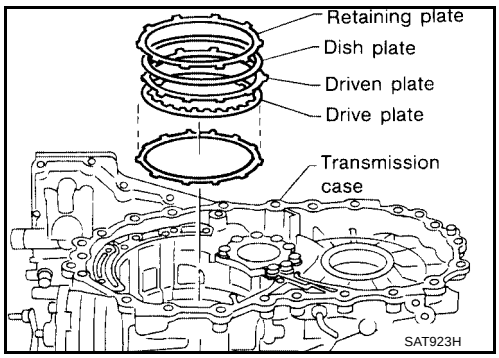
2. Set and align piston with retainer using suitable tool.

CAUTION:
This operation may be required in order to engage the protrusions of the piston to the return springs correctly.



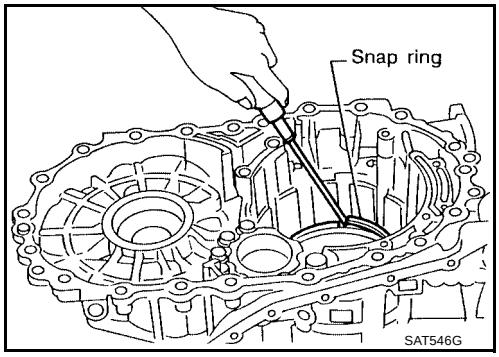
3. Install new driven plates, drive plates, retaining plate and dish plate on transaxle case.

CAUTION:
Take care with the order of plates and direction of dish plate.



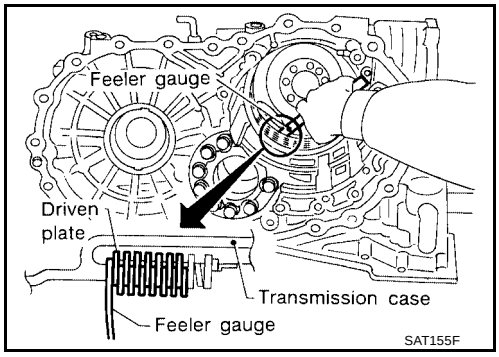
4. Install snap ring using suitable tool.

CAUTION:
Do not expand snap ring excessively.



5. Measure clearance between driven plate and transaxle case. If not within allowable limit, select proper retaining plate. (front side)

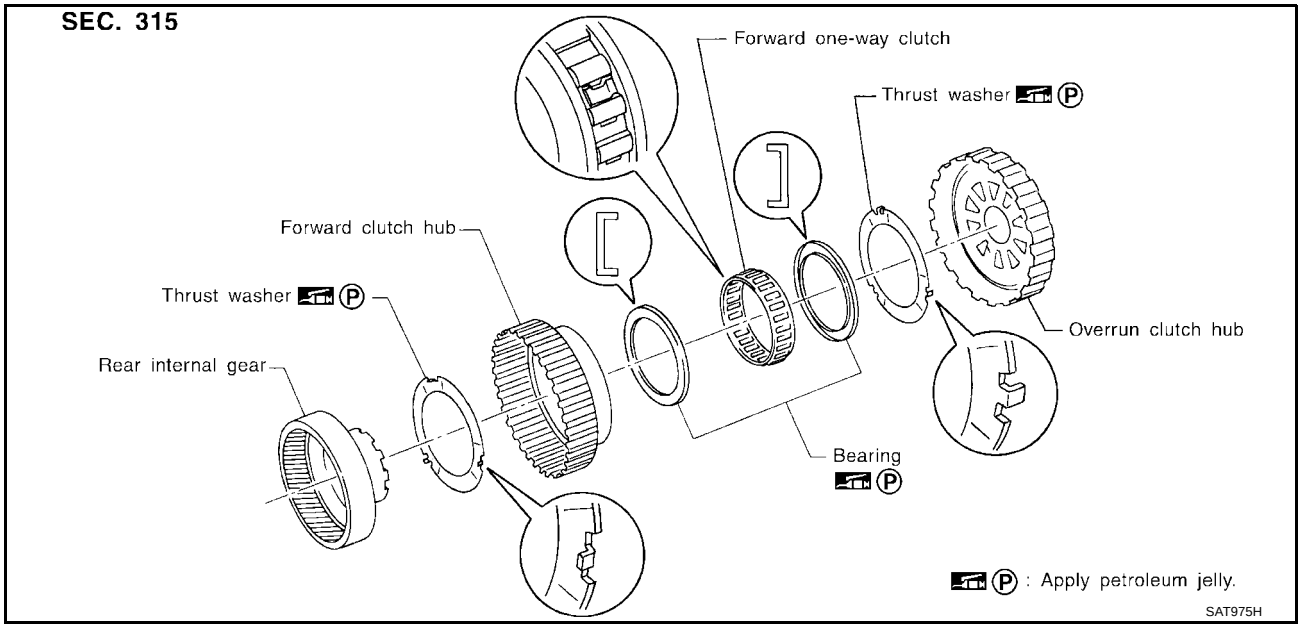
Specified clearance	
Standard	**: 1.7 - 2.1 mm (0.067 - 0.083 in)**
Allowable limit	**: 3.3 mm (0.130 in)**
Retaining plate	**Refer to AT-381, "LOW & REVERSE BRAKE" .**



Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

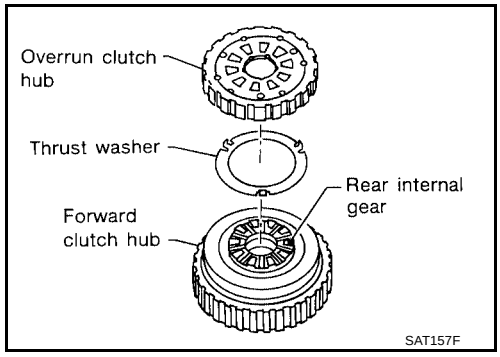
ECS009BA

COMPONENTS

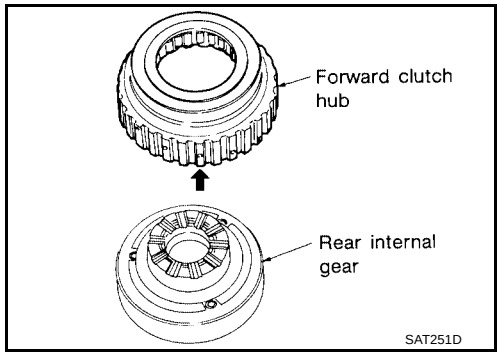


DISASSEMBLY

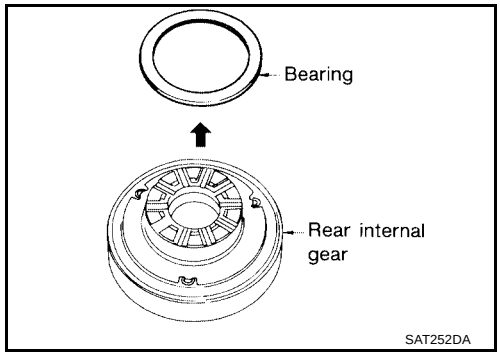
1. Remove overrun clutch hub and thrust washer from forward clutch hub.



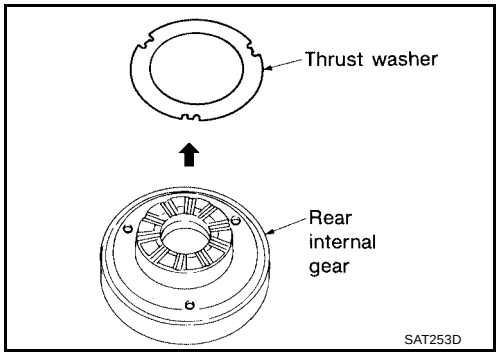
2. Remove forward clutch hub from rear internal gear.



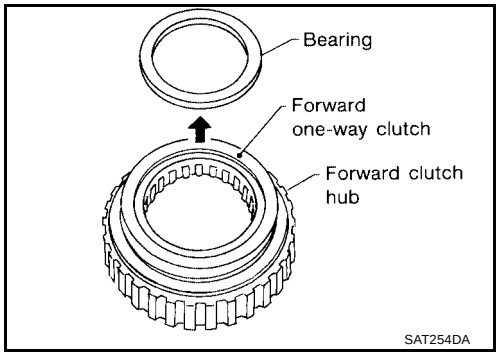
3. Remove bearing from rear internal gear.



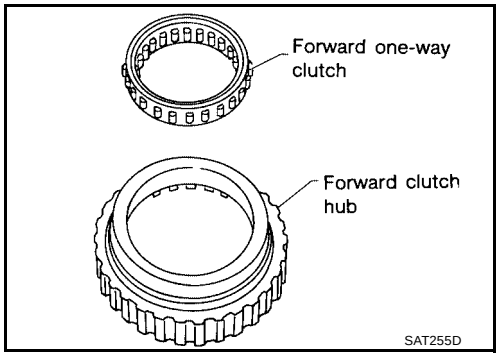
4. Remove thrust washer from rear internal gear.



5. Remove bearing from forward one-way clutch.



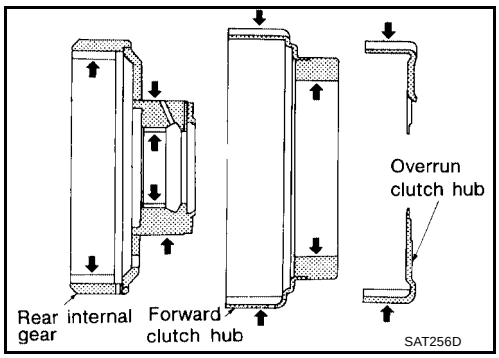
6. Remove forward one-way clutch from forward clutch hub.



INSPECTION

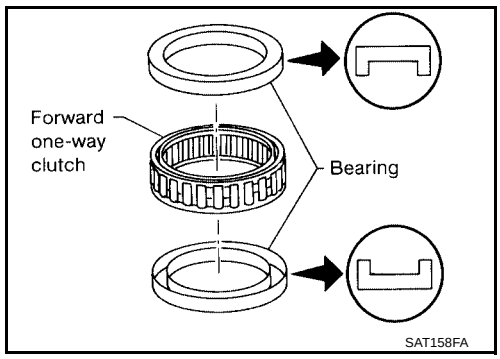
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

- Check rubbing surfaces for wear or damage.



Bearings and Forward One-Way Clutch

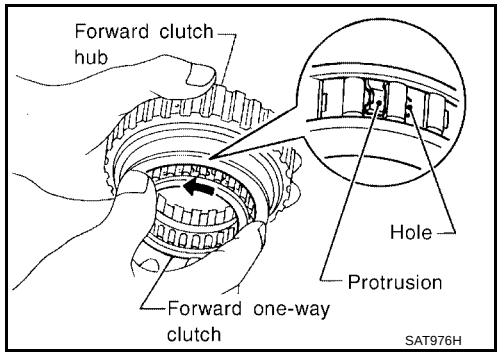
- Check bearings for deformation and damage.
- Check forward one-way clutch for wear and damage.



ASSEMBLY

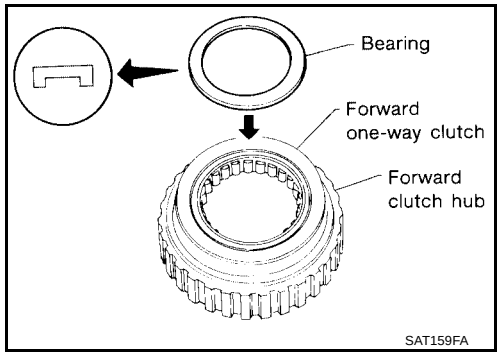
1. Install forward one-way clutch on forward clutch.

   CAUTION:
   Take care with the direction of forward one-way clutch.



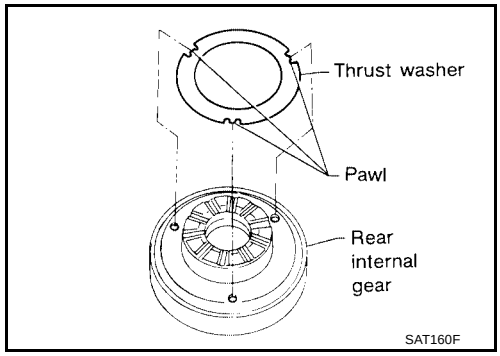
2. Install bearing on forward one-way clutch.

   CAUTION:
   Apply petroleum jelly to bearing.



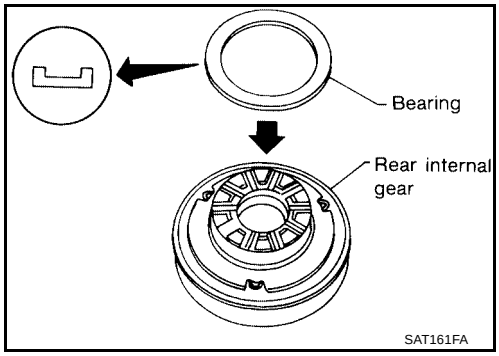
3. Install thrust washer on rear internal gear.

   CAUTION:
   - **Apply petroleum jelly to thrust washer.**
   - **Align hooks of thrust washer with holes of rear internal gear.**



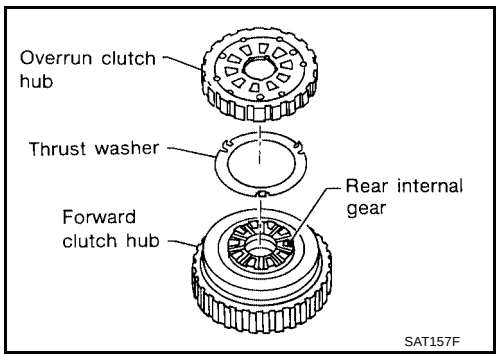
4. Install bearing on rear internal gear.

CAUTION:
Apply petroleum jelly to bearing.



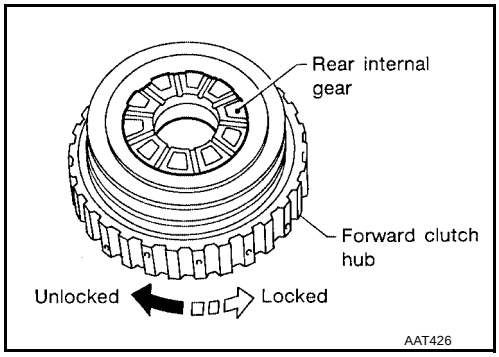
5. Install thrust washer and overrun clutch hub.

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.**



6. Install forward clutch hub on rear internal gear.

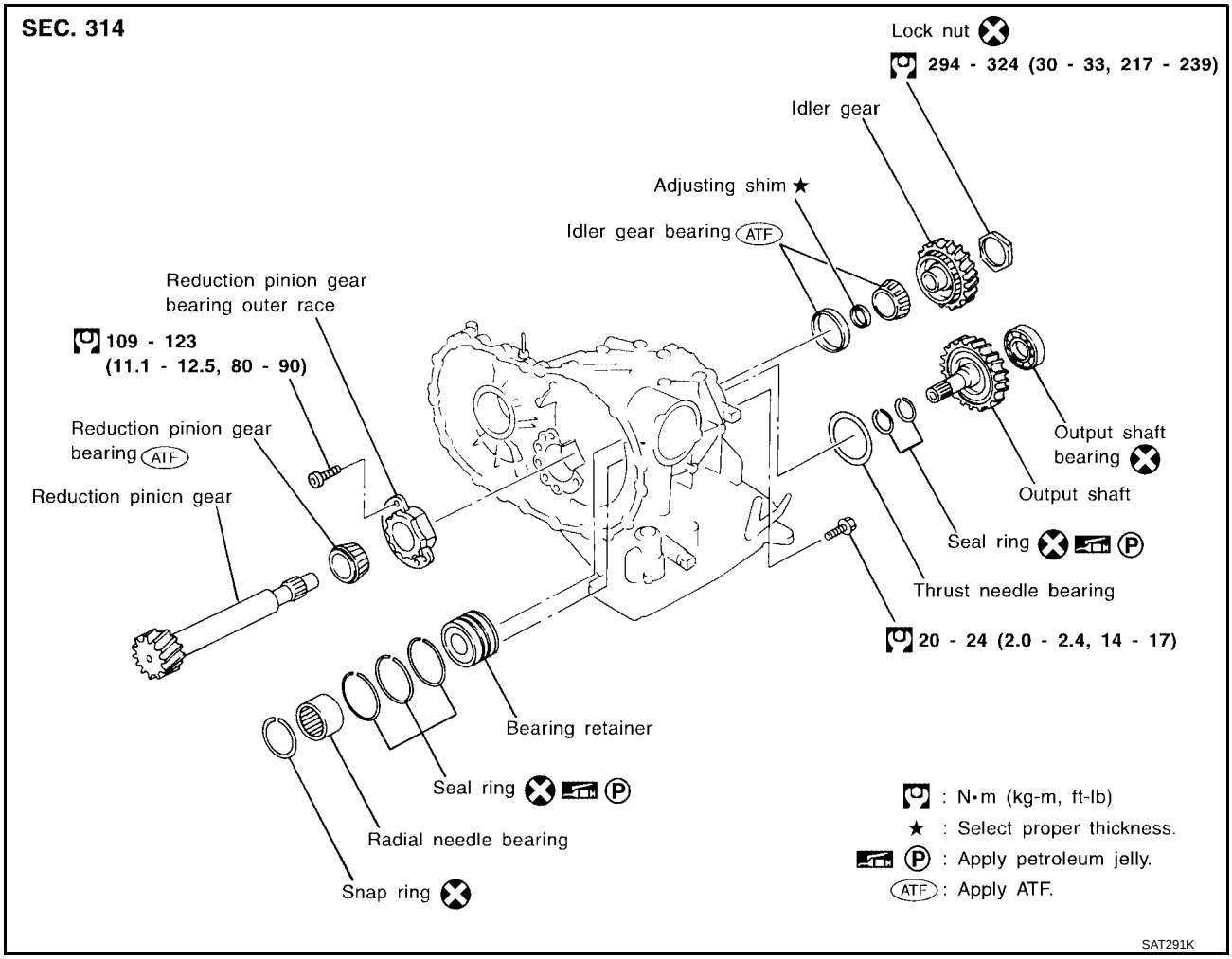
CAUTION:
- **Check operation of the forward one-way clutch.**
- **Hold the rear internal gear and turn the forward clutch hub.**
- **Check forward clutch hub for correct locking and unlocking directions as shown, if incorrect check assembly of the forward one-way clutch.**



Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer

ECS009BB

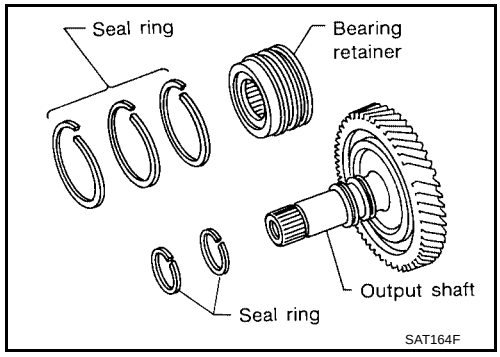
COMPONENTS



DISASSEMBLY

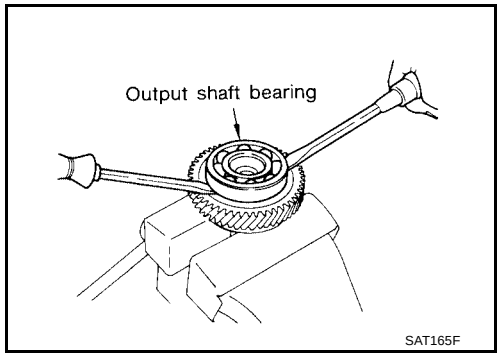
1. Remove seal rings from output shaft and bearing retainer.

CAUTION:
Do not reuse seal rings.



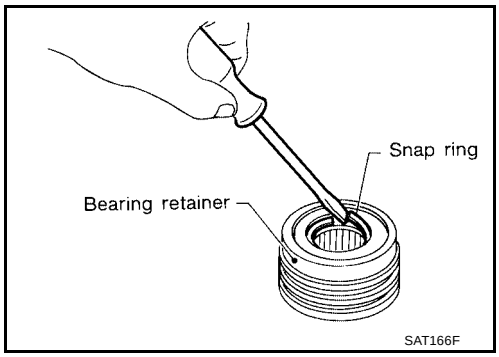
2. Remove output shaft bearing using suitable tools.

CAUTION:
- **Do not reuse output shaft bearing.**
- **Do not damage output shaft.**

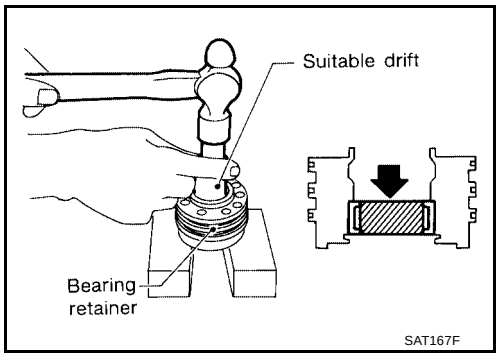


3. Remove snap ring from bearing retainer using suitable tool.

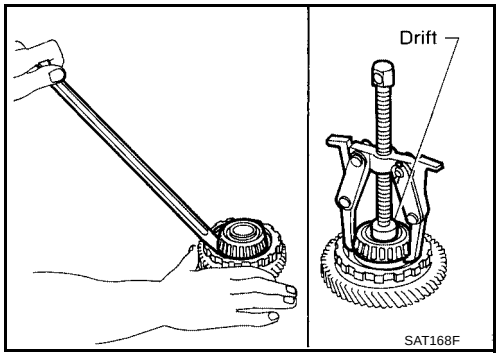
CAUTION:
Do not expand snap ring excessively.



4. Remove needle bearing from bearing retainer suitable tool.

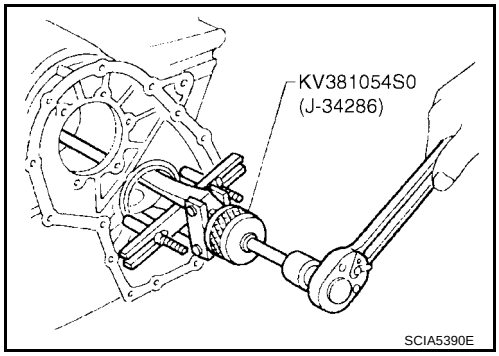


5. Remove idler gear bearing inner race from idler gear using suitable tool.

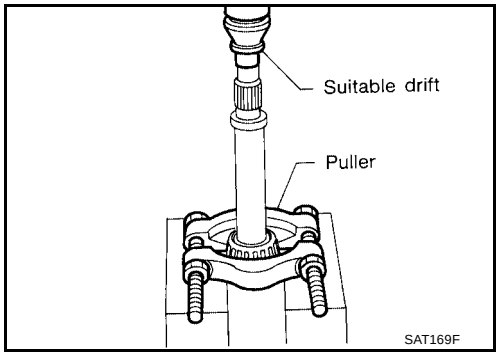


6. Remove idler gear bearing outer race from transaxle case using Tool.

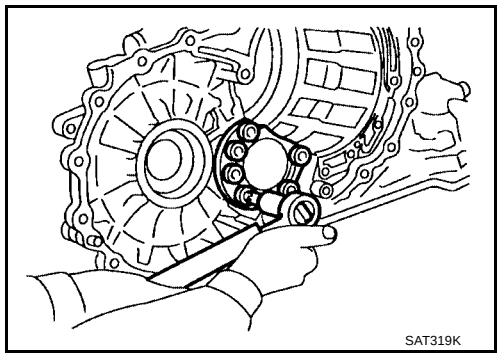
Tool number : KV381054S0 (J-34286)



7. Press out reduction pinion gear bearing inner race from reduction pinion gear using suitable tool.



8. Remove reduction pinion gear bearing outer race from transaxle case using suitable tool.



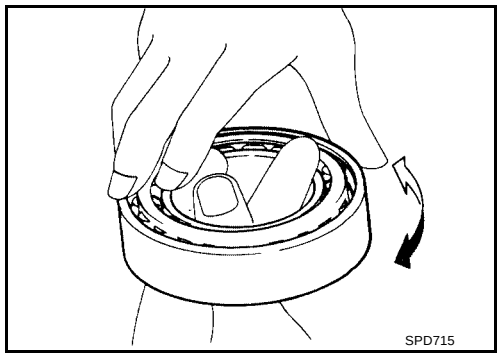
INSPECTION

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 free from noise, cracks, pitting or wear.
- **Always replace roller bearing inner and outer races as a set.**



Seal Ring Clearance

- Install new seal rings to output shaft.
- Measure clearance between seal ring and ring groove of output shaft.

Standard clearance : 0.10 - 0.25 mm (0.0039 - 0.0098 in)

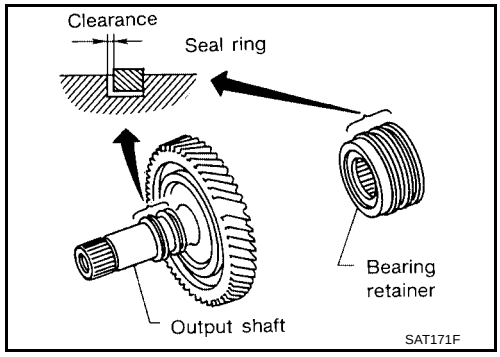
Allowable limit : 0.25 mm (0.0098 in)

- If not within allowable limit, replace output shaft.
- Install new seal rings to bearing retainer.
- Measure clearance between seal ring and ring groove of bearing retainer.

Standard clearance : 0.10 - 0.30 mm (0.0039 - 0.0118 in)

Allowable limit : 0.30 mm (0.0118 in)

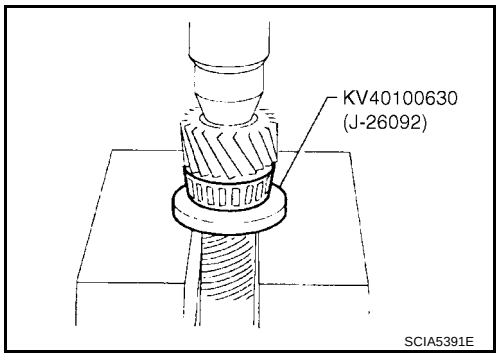
- If not within allowable limit, replace bearing retainer.



ASSEMBLY

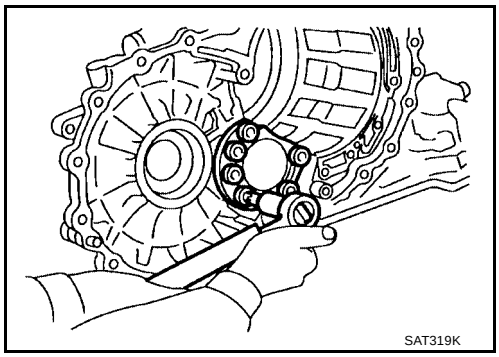
1. Press reduction pinion gear bearing inner race on reduction pinion gear using Tool.

   Tool number : KV40100630 (J-26092)



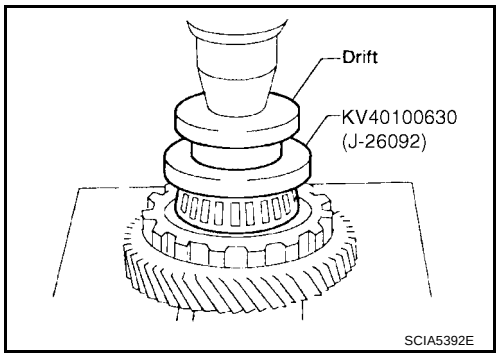
2. Install reduction pinion gear bearing outer race on transaxle case.

   Reduction pinion gear bearing outer race bolts : 109 - 123 N-m (11.1 - 12.5 kg-m, 80 - 90 ft-lb)



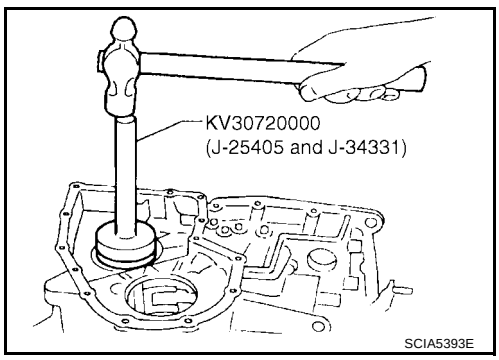
3. Press idler gear bearing inner race on idler gear using Tool.

   Tool number : KV40100630 (J-26092)



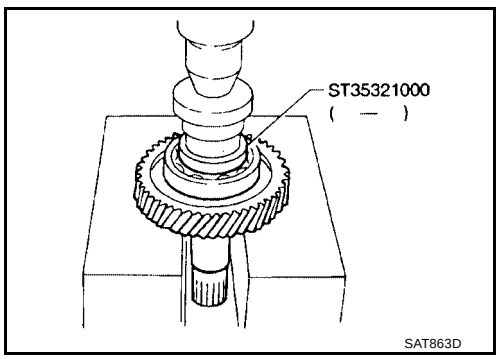
4. Install idler gear bearing outer race on transaxle case using Tool.

   Tool number : ST30720000 (J-25405 and J-34331)

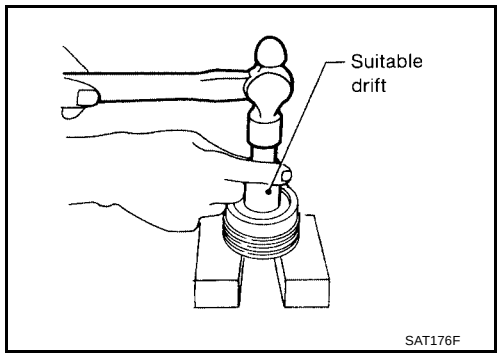


5. Press output shaft bearing on output shaft using Tool.

   Tool number : ST35321000 (—)

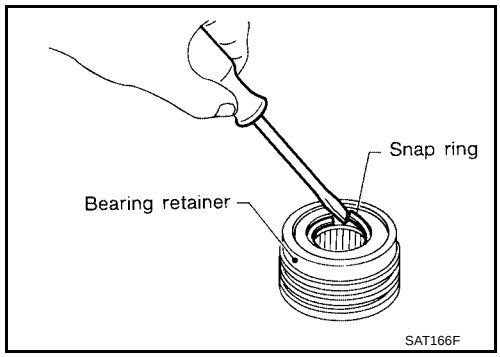


6. Press needle bearing on bearing retainer using suitable tool.



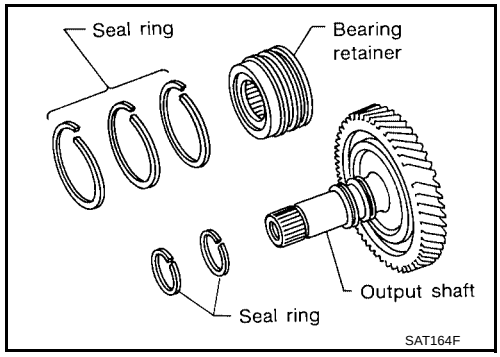
7. Install snap ring to bearing retainer using suitable tool.

CAUTION:
Do not expand snap ring excessively.

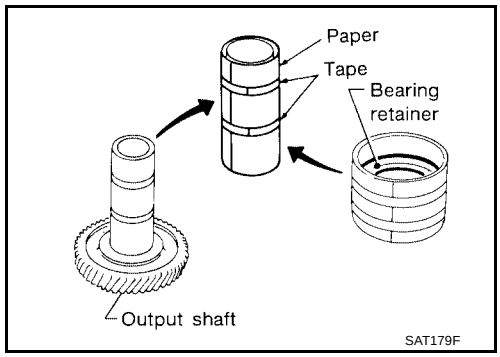


8. After packing ring grooves with petroleum jelly, carefully install new seal rings on output shaft and bearing retainer.

CAUTION:
- **Do not reuse seal rings.**
- **Apply petroleum jelly to new seal rings.**



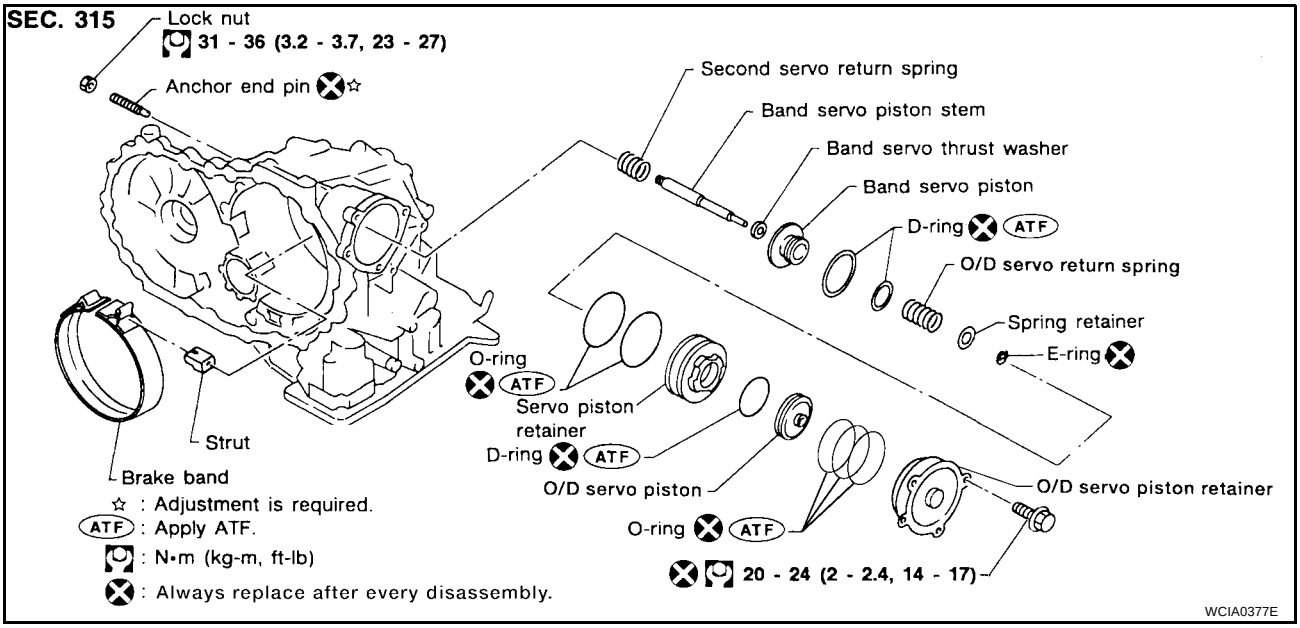
- **Roll paper around seal rings to prevent them from spreading.**



Band Servo Piston Assembly

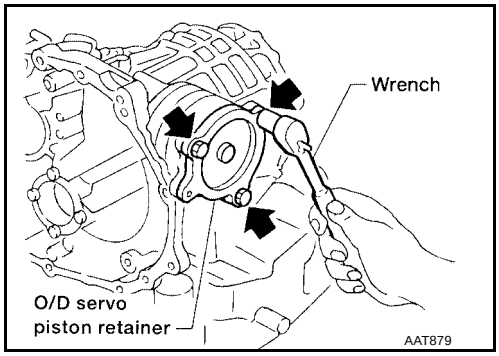
ECS009BC

COMPONENTS



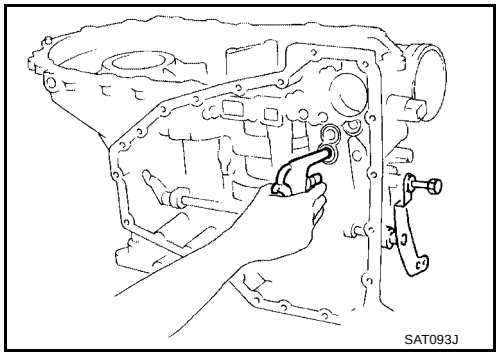
DISASSEMBLY

1. Remove band servo piston bolts using suitable tool.



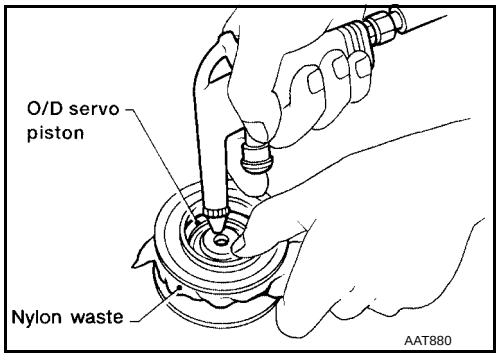
2. Apply compressed air to oil hole in transaxle case to remove O/D servo piston retainer and band servo piston assembly.

CAUTION:
Hold band servo piston assembly with a rag.

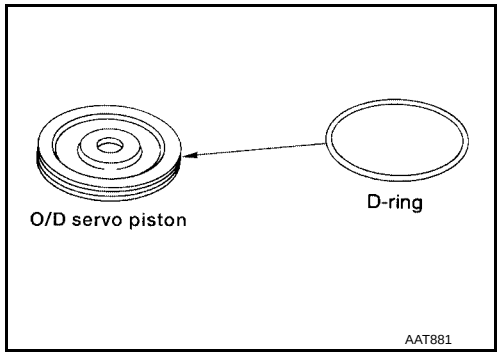


3. Apply compressed air to oil hole in O/D servo piston retainer to remove O/D servo piston from retainer.

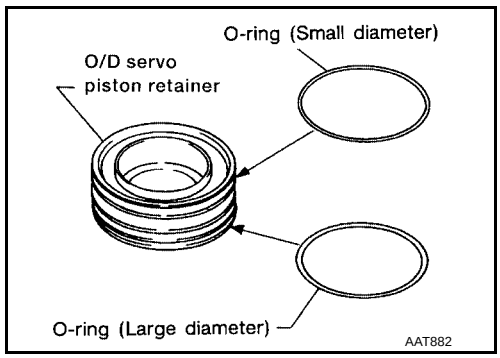
CAUTION:
Hold O/D band servo while applying compressed air.



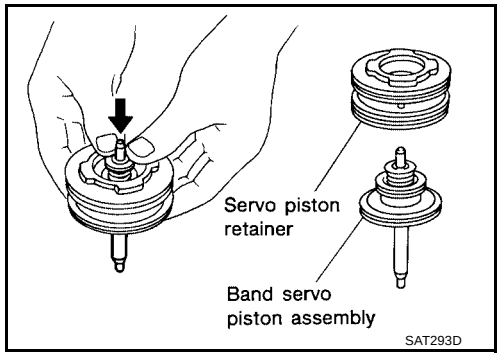
4. Remove D-ring from O/D servo piston.
CAUTION:
Do not reuse D-ring.



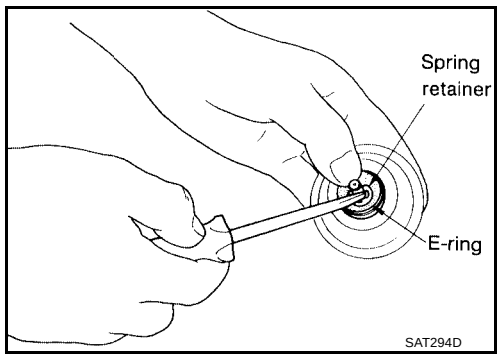
5. Remove O-rings from O/D servo piston retainer.
CAUTION:
Do not reuse O-ring.



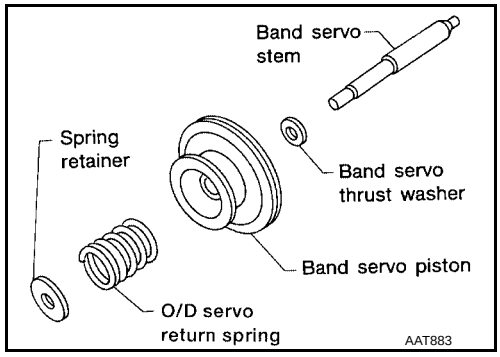
6. Remove band servo piston assembly from servo piston retainer by pushing it forward.



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

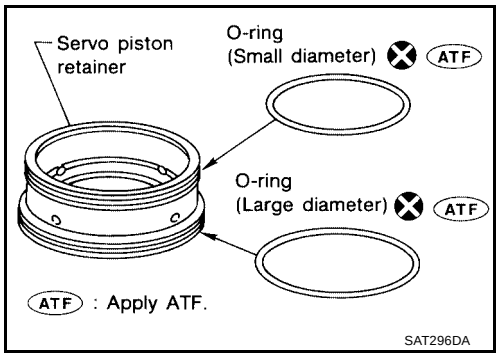


8. Remove O/D servo return spring, band servo thrust washer and band servo piston stem from band servo piston.



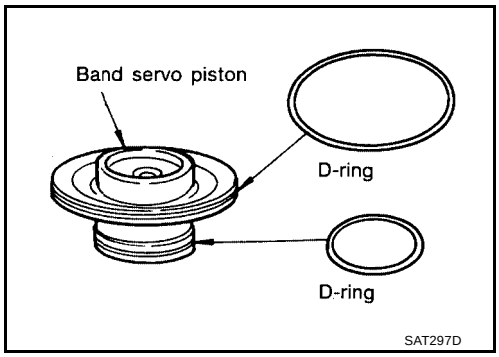
9. Remove O-rings from servo piston retainer.

CAUTION:
Do not reuse O-rings.



10. Remove D-rings from band servo piston.

CAUTION:
Do not reuse D-rings.



INSPECTION

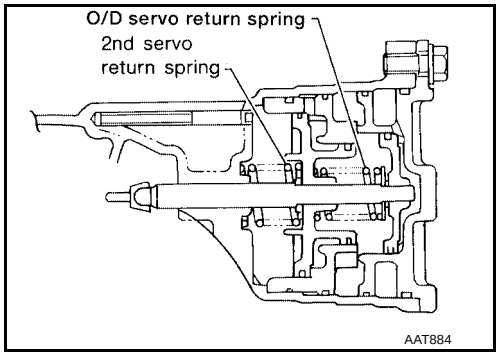
Pistons, Retainers and Piston Stem

- Check frictional surfaces for abnormal wear or damage.

Return Springs

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

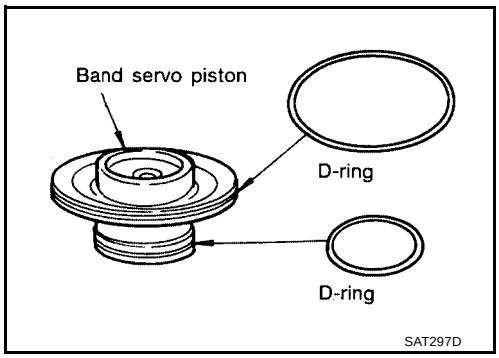
Inspection standard : Refer to AT-384, "Band Servo".



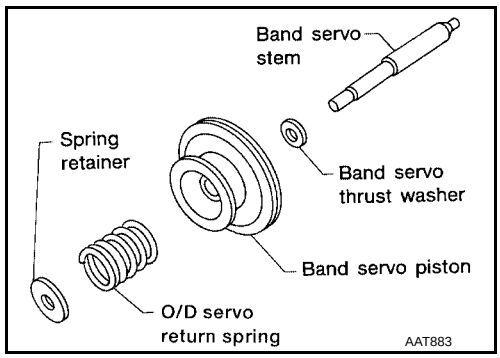
ASSEMBLY

1. Install new D-rings to servo piston retainer.

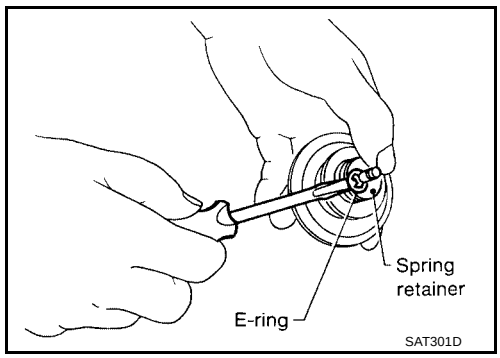
CAUTION:
- **Do not reuse D-rings.**
- **Apply ATF to new D-rings.**
- **Take care with the position of the new D-rings.**



2. Install band servo piston stem, band servo thrust washer, O/D servo return spring and spring retainer to band servo piston.



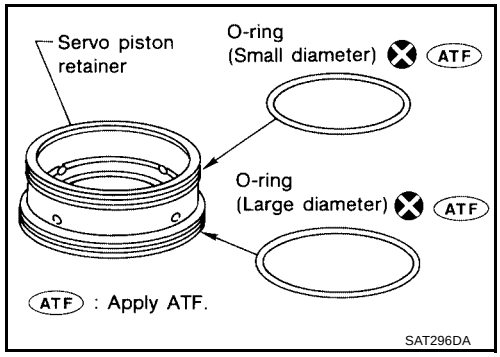
3. Place piston stem end on a wooden block. While pushing servo piston spring retainer down, install E-ring using suitable tool.



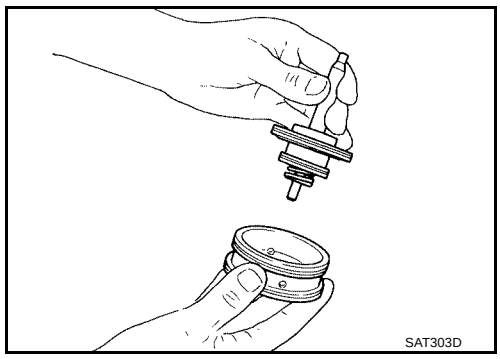
4. Install new O-rings to servo piston retainer.

CAUTION:

- **Do not reuse O-rings.**
- **Apply ATF to new O-rings.**
- **Take care with the position of the new O-rings.**



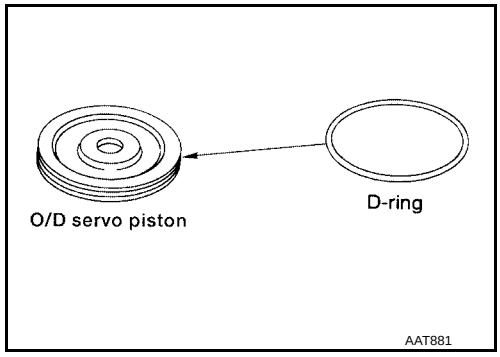
5. Install band servo piston assembly to servo piston retainer by pushing it inward.



6. Install new D-ring to O/D servo piston.

CAUTION:

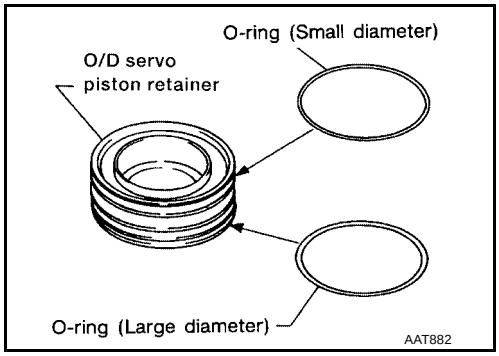
- **Do not reuse D-ring.**
- **Apply ATF to new D-ring.**
- **Take care with the position of the new D-ring.**



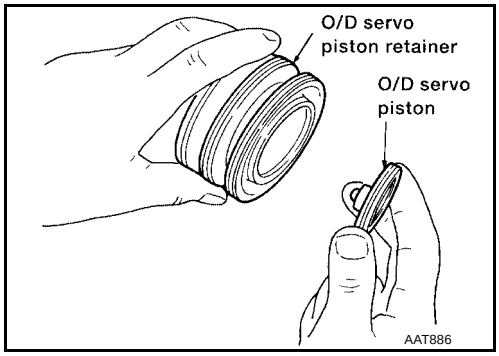
7. Install new O-rings to O/D servo piston retainer.

CAUTION:

- **Do not reuse O-rings.**
- **Apply ATF to new O-rings.**
- **Take care with the position of new O-rings.**



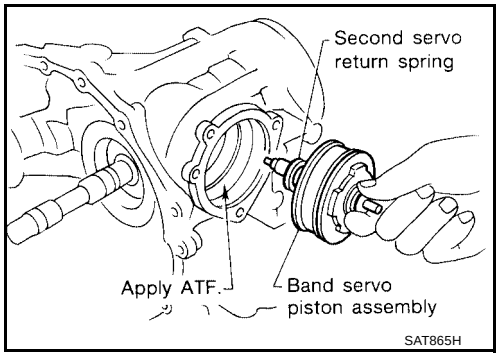
8. Install O/D servo piston to O/D servo piston retainer.



9. Install band servo piston assembly and 2nd servo return spring to transaxle case.

CAUTION:

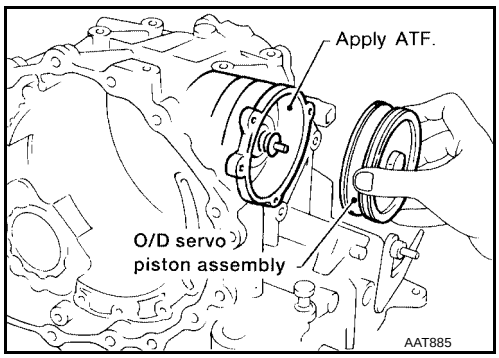
Apply ATF to O-ring of band servo piston assembly and transaxle case.



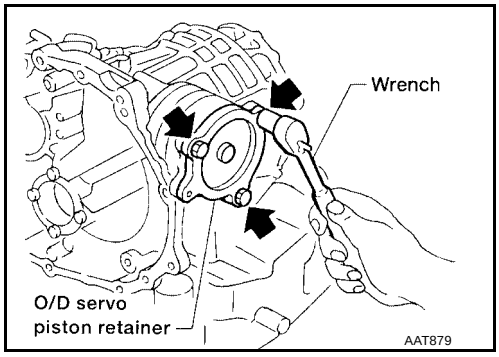
10. Install O/D servo piston assembly to transaxle case.

CAUTION:

Apply ATF to O-ring of O/D servo piston assembly and transaxle case.



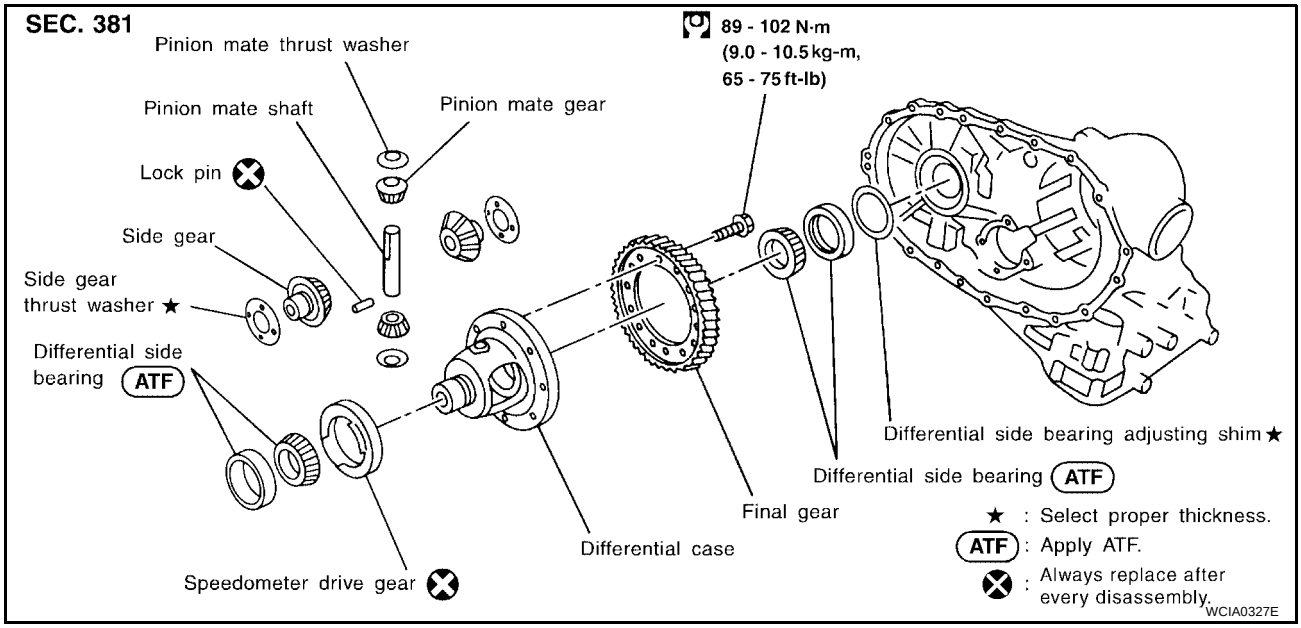
11. Install O/D servo piston retainer to transaxle case using suitable tool. Refer to AT-306, "COMPONENTS" .



Final Drive

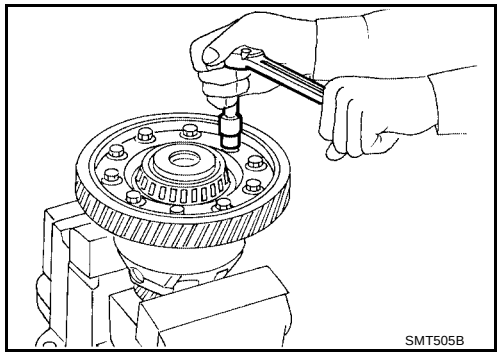
ECS009BD

COMPONENTS



DISASSEMBLY

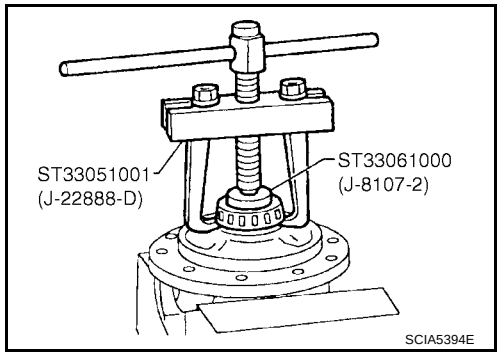
1. Remove final gear using suitable tool.



2. Press out differential side bearings using Tools.

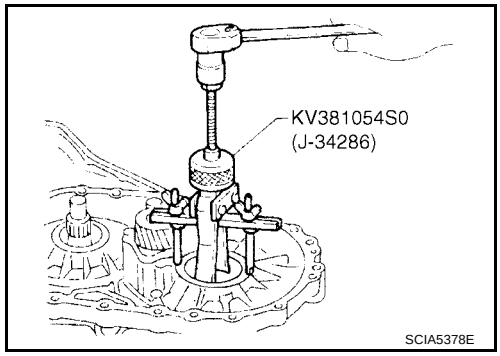
Tool number : ST3301001 (J-22888-D)
: ST33061000 (J-8107-2)

CAUTION:
Do not mix up the right and left bearings.

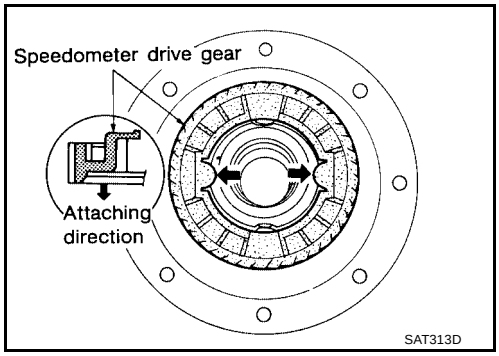


3. Remove differential side bearing outer race and side bearing adjusting shim from transaxle case using Tool.

Tool number :KV381054S0 (J-34286)

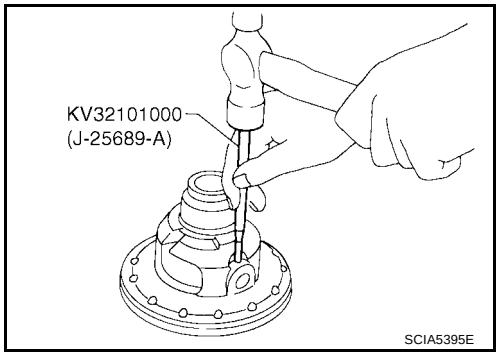


4. Remove speedometer drive gear.

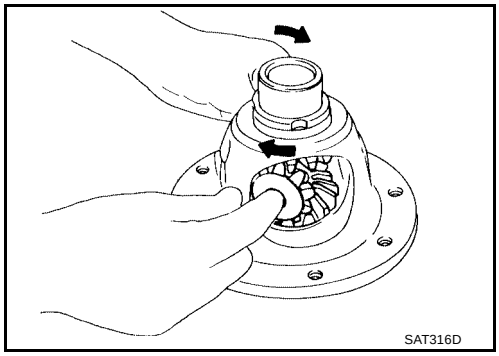


5. Drive out pinion mate shaft lock pin using Tool.

Tool number : KV32101000 (J-25689-A)



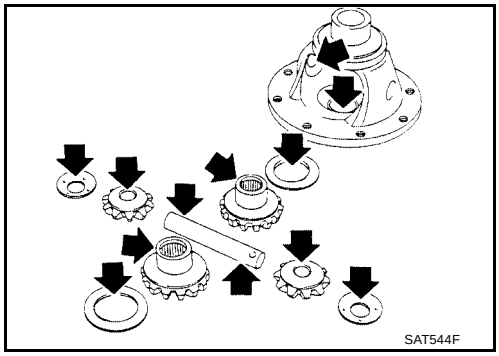
6. Draw out pinion mate shaft lock pin.
7. Remove pinion mate gears and side gears.



INSPECTION

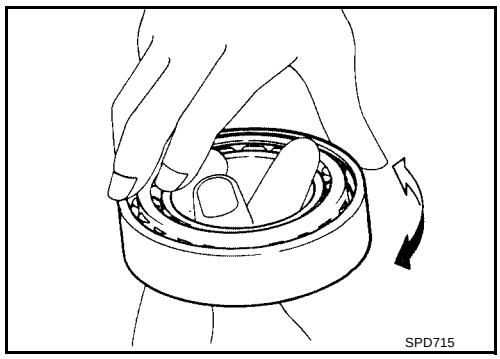
Gear, Washer, Shaft and Case

- Check mating surfaces of differential case, side gears and pinion mate gears.
- Check washers for wear.



Bearings

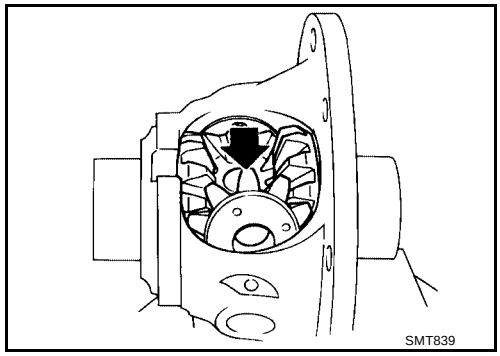
- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- When replacing taper roller bearing, replace outer and inner race as a set.



ASSEMBLY

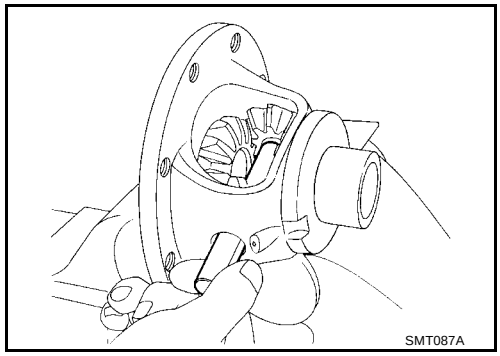
1. Attach side gear thrust washers to side gears, then install pinion mate thrust washers and pinion mate gears in place.

   CAUTION:
   Apply ATF to all parts during assembly.



2. Insert pinion mate shaft.

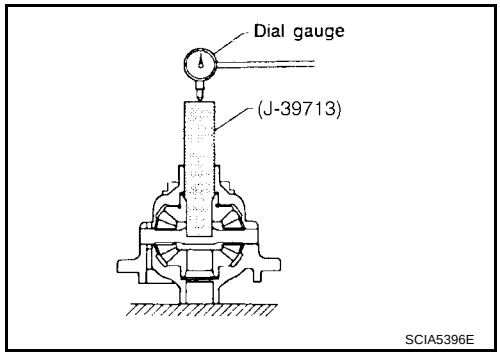
   CAUTION:
   When inserting, do not damage pinion mate thrust washers.



3. Measure clearance between side gear and differential case with washers using Tool, according to the following procedure:

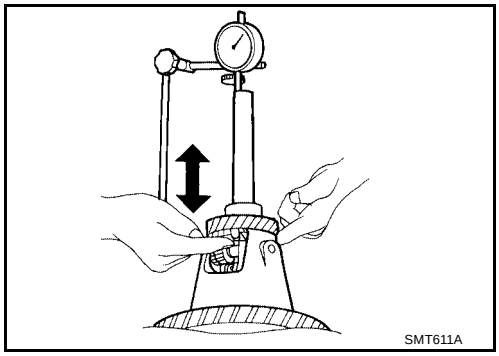
   Tool number — (J-39713)

a. Set Tool and dial indicator on side gear.



b. Move side gear up and down to measure dial indicator deflection. Always measure indicator deflection on both side gears.

Clearance between side gear and differential case with washer	**: 0.1 - 0.2 mm (0.004 - 0.008 in)**



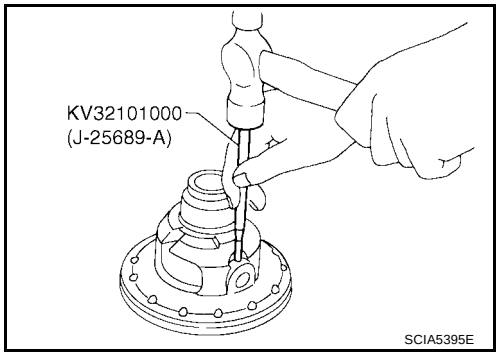
c. If not within specification, adjust clearance by changing thickness of differential side gear thrust washers.

Differential side gear thrust washers	**: Refer to AT-382, "DIFFERENTIAL SIDE GEAR THRUST WASHERS" .**

4. Install lock pin using Tool

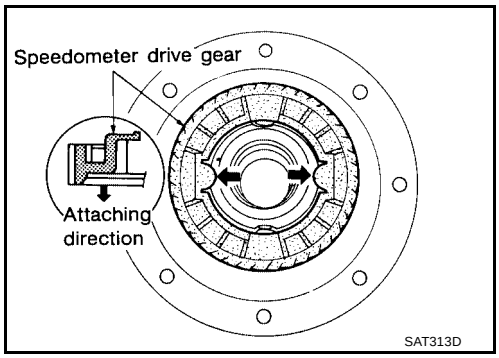
Tool number :KV32101000 (J-25689-A)

CAUTION:
Make sure the pin is flush with case.



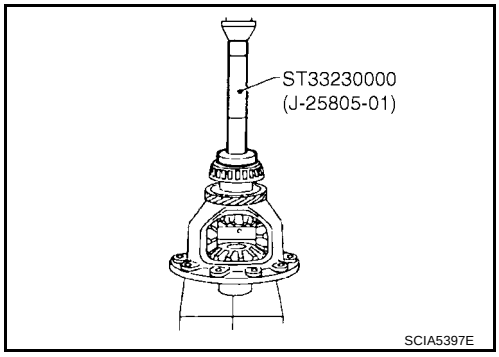
5. Install speedometer drive gear on differential case.

CAUTION:
Align the projection of speedometer drive gear with the groove of differential case.

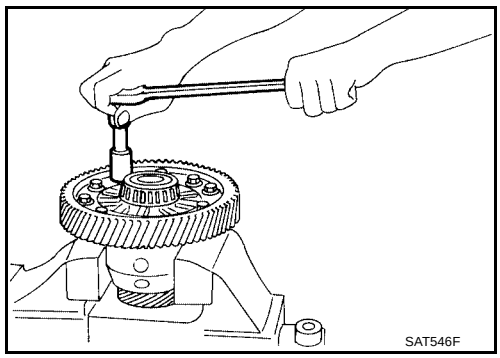


6. Press on differential side bearings using Tool.

Tool number : ST33230000 (J-25805-01)



7. Install final gear and tighten final gear bolts in a crisscross pattern to the specified torque using suitable tool. Refer to AT-351, "COMPONENTS" .



ASSEMBLY

PFP:00000

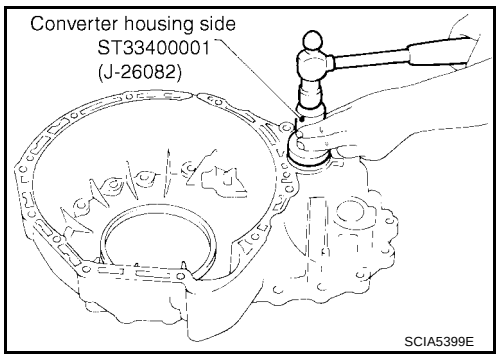
Assembly (1)

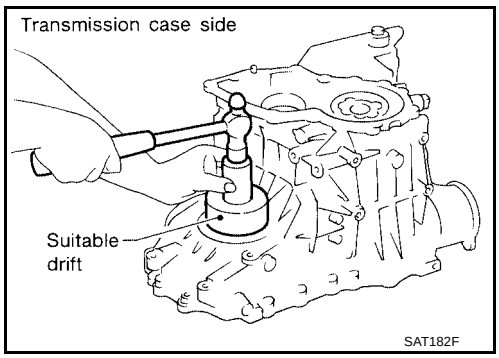
ECS009BE

1. Install new differential side oil seals on transaxle case and converter housing using Tool.

   Tool number : ST33400001 (J-26082)

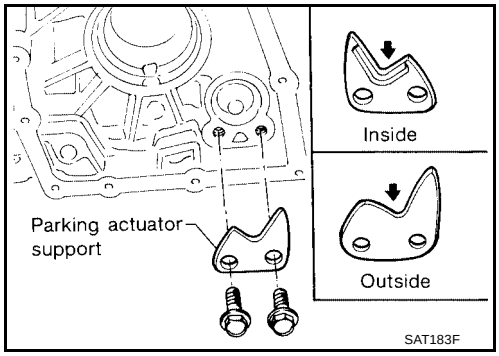
   CAUTION:
   Do not reuse oil seals.



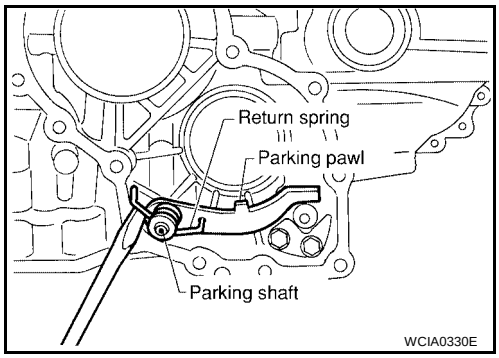


2. Install parking actuator support to transaxle case. Tighten parking actuator support bolts to the specified torque. Refer to AT-278, "Components" .

   CAUTION:
   Take care with the direction of the parking actuator support.



3. Install parking pawl on transaxle case and secure it with parking shaft.
4. Install return spring.

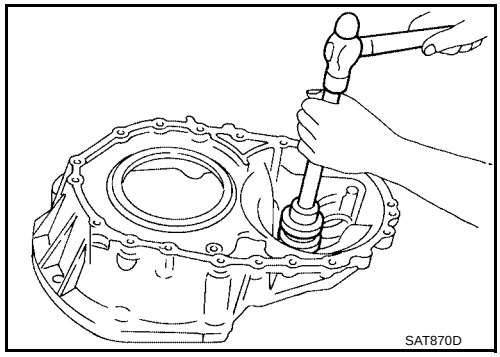


Adjustment (1)

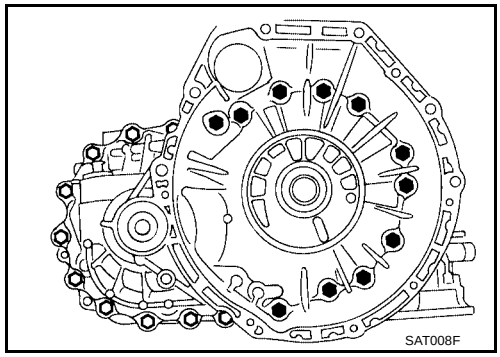
ECS009BF

DIFFERENTIAL SIDE BEARING PRELOAD

1. Install differential side bearing outer race without adjusting shim on transaxle case.
2. Install differential side bearing outer race on converter housing using suitable tool.



3. Place final drive assembly on transaxle case.
4. Install transaxle case on converter housing. Tighten transaxle case bolts to the specified torque. Refer to AT-278, "Components" .

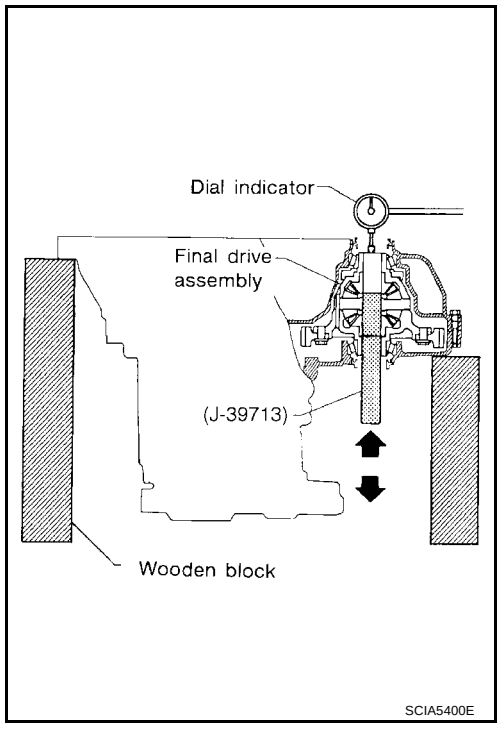


5. Attach dial indicator on differential case at converter housing side.
6. Insert Tool into differential side gear from transaxle case side.

Tool number : — (J-39713)

7. Move Tool up and down and measure dial indicator deflection.
8. Select proper thickness of differential side bearing adjusting shim(s).
Suitable shim thickness = Dial indicator deflection + Specified bearing preload

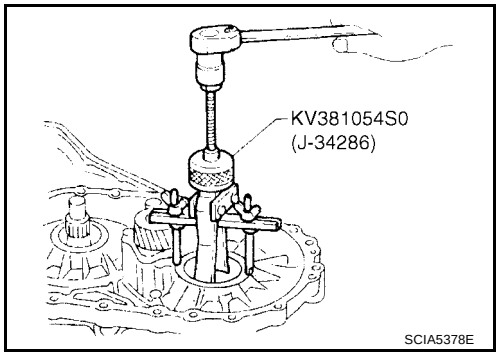
Differential side bearing preload adjusting shim	**: Refer to AT-382, "DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS" .**
Bearing preload	**: 0.05 - 0.09 mm (0.0020 - 0.0035 in)**



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 using Tool.

Tool number : KV381054S0 (J-34286)



12. Reinstall differential side bearing outer race and shim(s) selected from SDS table on transaxle case.
13. Reinstall converter housing on transaxle case and tighten transaxle case bolts to the specified torque. Refer to AT-278, "OVERHAUL" .
14. Measure turning torque of final drive assembly using Tool.

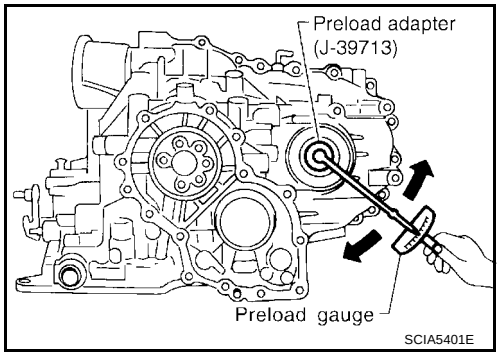
Tool number : — (J-39713)

NOTE:

- Turn the final drive assembly in both directions several times to seat the bearing rollers correctly

Turning torque of final drive assembly (New bearing) : 0.78 - 1.54 N-m (8.0 - 15.7 kg-cm, 6.9 - 13.6 in-lb)

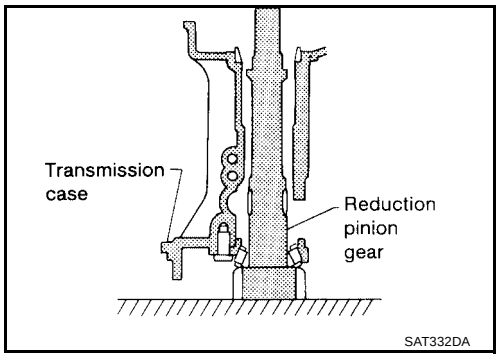
- When old bearing is being used again, turning torque will be slightly less than above.
- Make sure torque is close to the specified range.



REDUCTION PINION GEAR BEARING PRELOAD

1. Remove transaxle case and final drive assembly from converter housing.
2. Select proper thickness of reduction pinion gear bearing adjusting shim using the following procedures:

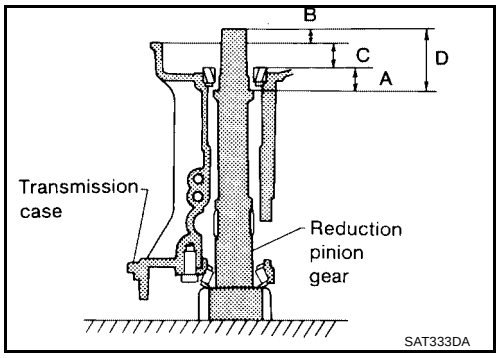
a. Place reduction pinion gear on transaxle case as shown.



b. Place idler gear bearing on transaxle case.
c. Measure dimensions “B” “C” and “D” and calculate dimension “A”.

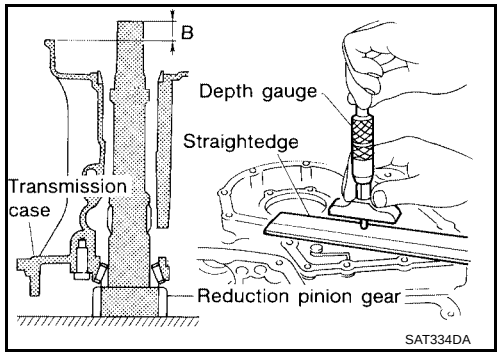
A = D – (B + C)

“A” : Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.

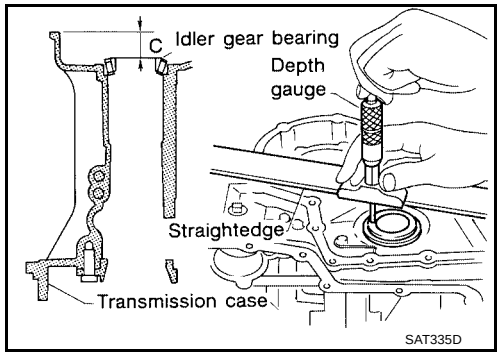


- Measure dimension “B” between the end of reduction pinion gear and the surface of transaxle case using straightedge and depth gauge.

  NOTE:
  Measure dimension “B” in at least two places.

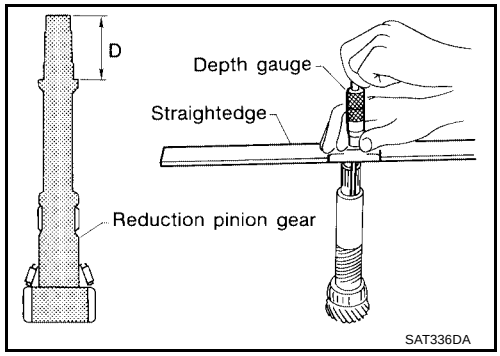


- Measure dimension “C” between the surface of idler gear bearing inner race and the surface of transaxle case using straightedge and depth gauge.
- **NOTE:**
  Measure dimension “C” in at least two places.



- Measure dimension “D” between the end of reduction pinion gear and the adjusting shim mating surface of reduction pinion gear using straightedge and depth gauge.
- **NOTE:**
  Measure dimension “D” in at least two places.
- Calculate dimension “A”.

  A = D – (B + C)



d. Measure dimension “E” between the end of idler gear and the idler gear bearing inner race mating surface of idler gear using depth gauge.

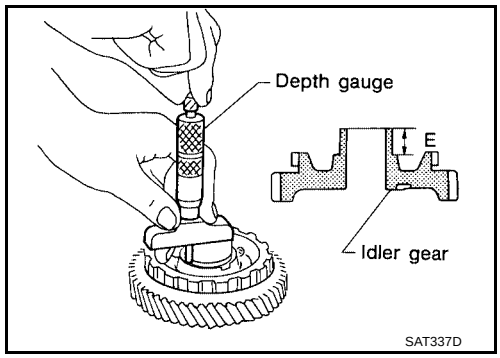
   NOTE:
   Measure dimension “E” in at least two places.

e. Select proper thickness of reduction pinion gear bearing adjusting shim.

   Proper shim thickness = A – E – 0.05 mm (0.0020 in)*

   (*: Bearing preload)

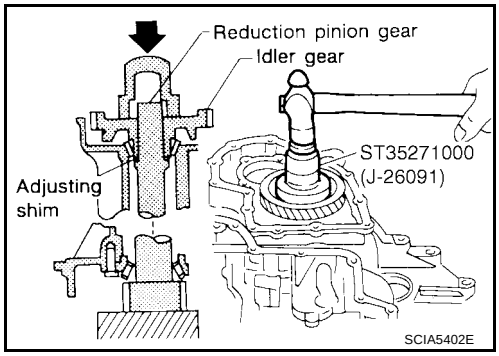
   Reduction pinion gear bearing adjusting shim : **Refer to AT-383, "REDUCTION PINION GEAR BEARING ADJUSTING SHIMS".**



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.
5. Install idler gear on reduction gear using Tool.

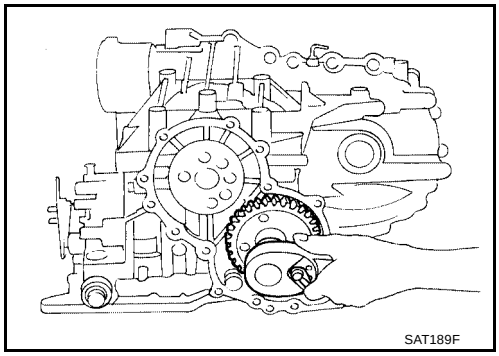
Tool number : ST35271000 (J-26091)

CAUTION:
Press idler gear until idler gear fully contacts adjusting shim.



6. Tighten idler gear lock nut to the specified torque using suitable tool. Refer to AT-278, "Components" .

CAUTION:
Lock idler gear with parking pawl when tightening lock nut.



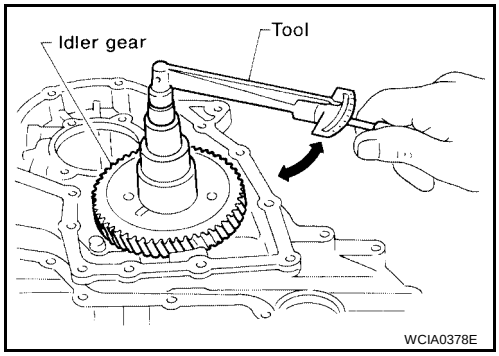
7. Measure turning torque of reduction pinion gear using Tool.

Tool number : ST3127S000 (J-25765-A)

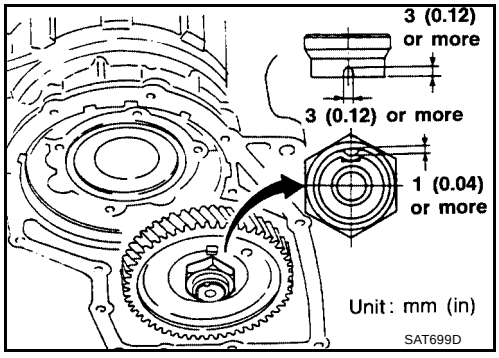
- **When measuring turning torque, turn the reduction pinion gear in both directions several times to seat bearing rollers correctly.**

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, select the correct reduction pinion gear adjusting shim.**

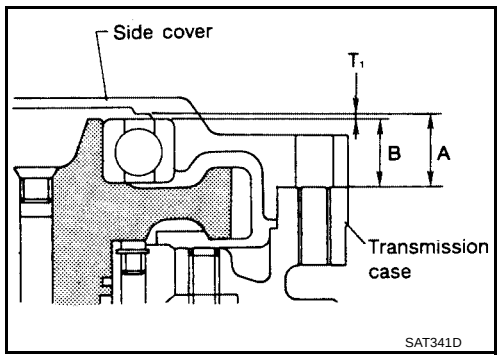


8. After properly adjusting turning torque, clinch idler gear lock nut as shown.

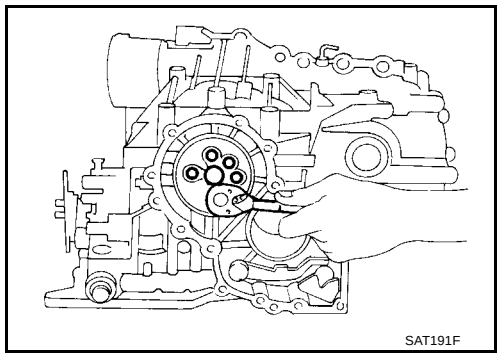


OUTPUT SHAFT END PLAY

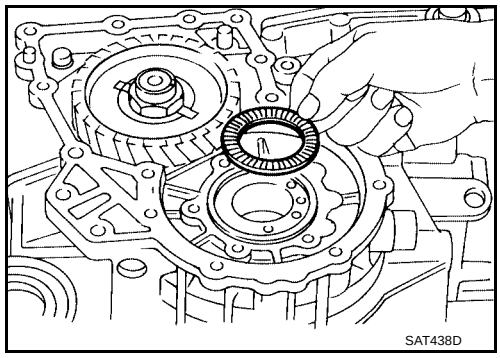
- Measure clearance between side cover and the end of the output shaft bearing.
- Select proper thickness of adjusting shim so that clearance is within specifications.



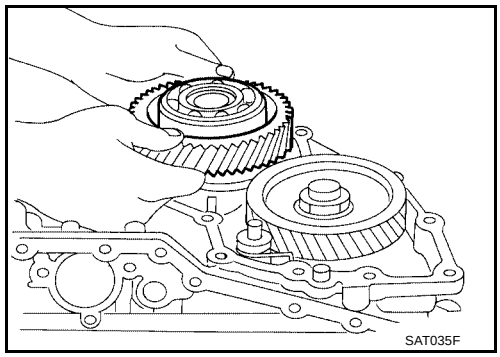
1. Install bearing retainer for output shaft using suitable tool.



2. Install output shaft thrust needle bearing on bearing retainer.



3. Install output shaft on transaxle case.

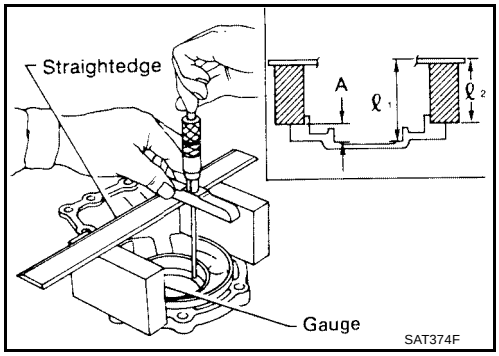


4. Measure dimensions "$\ell 1$" and "$\ell 2$" at side cover and then calculate dimension "A" using straightedge and depth gauge.
   - Measure dimension "$\ell 1$" and "$\ell 2$" in at least two places.

   "A" : **Distance between transaxle case fitting surface and adjusting shim mating surface.**

   $A = \ell 1 - \ell 2$

   $\ell 2$: **Height of gauge**

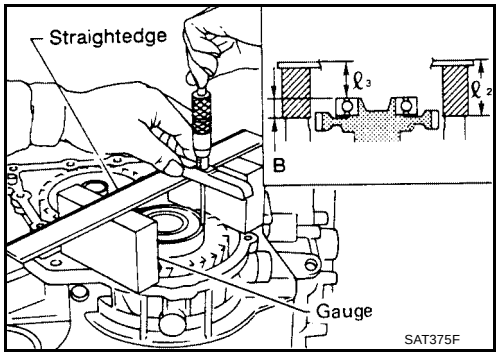


5. Measure dimensions "$\ell 2$" and "$\ell 3$" and then calculate dimension "B" using straightedge and depth gauge.
   - Measure "$\ell 2$" and "$\ell 3$" in at least two places.

   "B" : **Distance between the end of output shaft bearing outer race and the side cover fitting surface of transaxle case.**

   $B = \ell 2 - \ell 3$

   $\ell 2$: **Height of gauge**

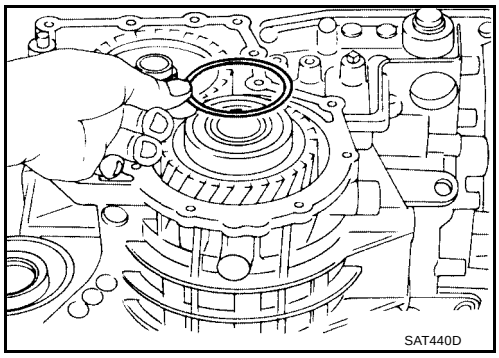


6. Select proper thickness of adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications.

   Output shaft end play (A – B) : **0 - 0.15 mm (0 - 0.0059 in)**

   Output shaft end play adjusting shims : **Refer to AT-384, "OUTPUT SHAFT ADJUSTING SHIMS" .**

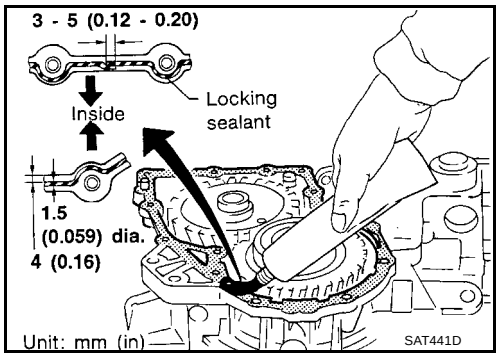
7. Install adjusting shim on output shaft bearing.



Assembly (2)

ECS009BG

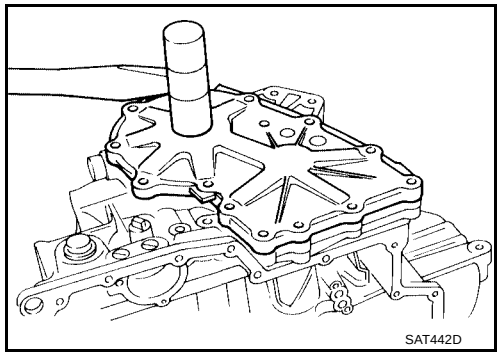
1. Apply anaerobic liquid gasket to transaxle case as shown. Refer to GI-45, "Recommended Chemical Products and Sealants" .



2. Set side cover on transaxle case using suitable tool.

CAUTION:

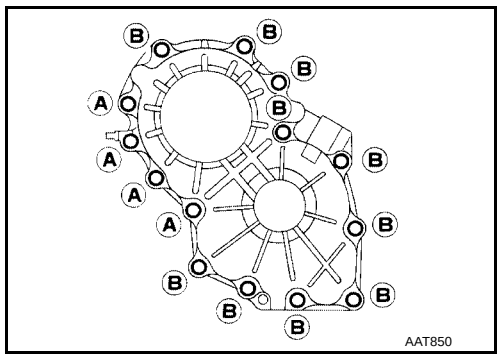
Apply locking sealant to the mating surface of transaxle case.



3. Tighten side cover bolts to specified torque. Refer to AT-278, "Components" .

CAUTION:

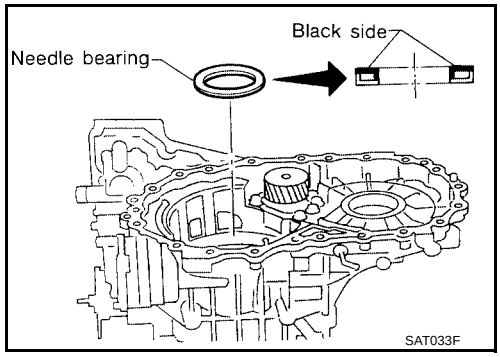
- **Do not mix bolts A and B.**
- **Do not reuse bolts A as they are self-sealing bolts.**



4. Remove paper rolled around bearing retainer.
5. Install thrust washer on bearing retainer.

CAUTION:

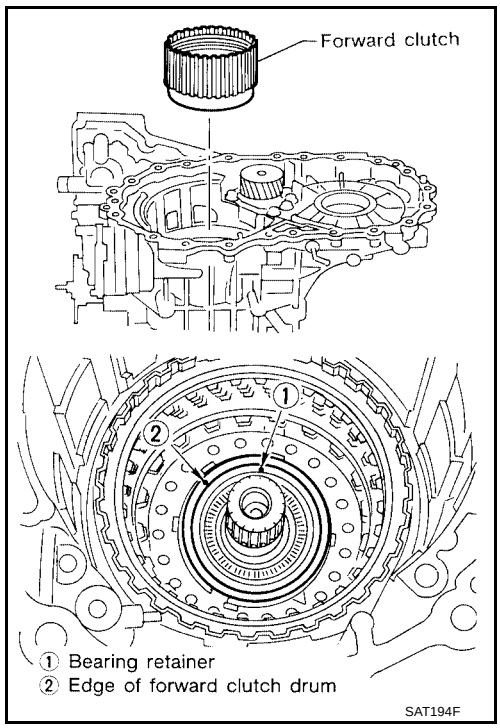
Apply petroleum jelly to thrust washer.



6. Install forward clutch assembly.

CAUTION:

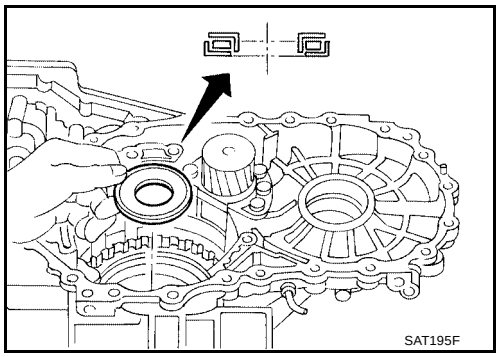
- **Align teeth of low & reverse brake drive plates before installing.**
- **Make sure that bearing retainer seal rings are not spread.**
- **If forward clutch assembly is correctly seated, points 1 and 2 are at almost same level.**



7. Install thrust needle bearing on bearing retainer.

CAUTION:

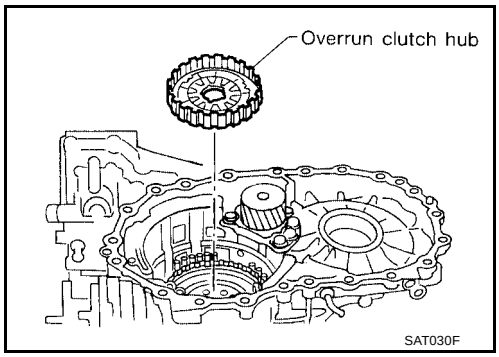
- **Apply petroleum jelly to thrust needle bearing.**
- **Take care with the direction of thrust needle bearing.**



8. Install overrun clutch hub.

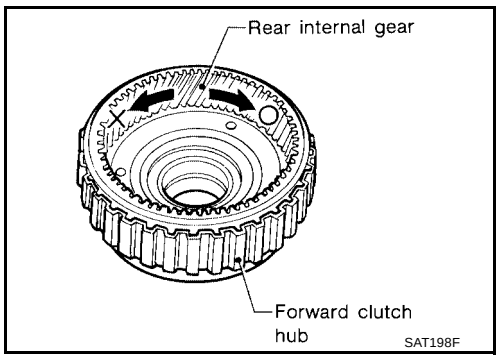
CAUTION:

- **Apply petroleum jelly to the thrust needle bearing.**
- **Align the teeth of overrun clutch drive plates before installing.**



9. Hold forward clutch hub and turn rear internal gear.

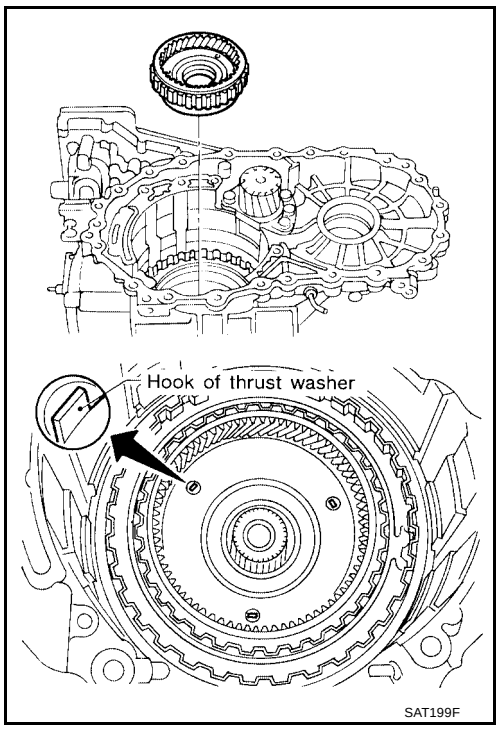
- Check overrun clutch hub for correct directions of lock and unlock.
- If not as shown, check installed direction of forward one-way clutch.



10. Install forward clutch hub and rear internal gear assembly.

CAUTION:

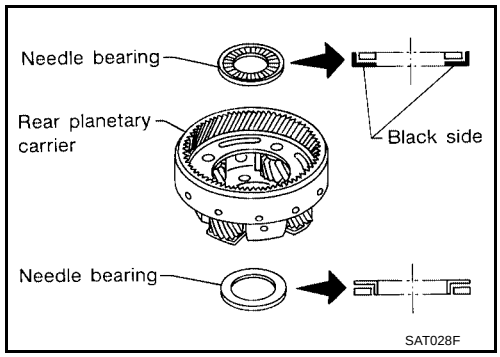
- **Align teeth of forward clutch drive plates before installing.**
- **Check that three hooks of thrust washer are correctly aligned after installing.**



11. Install rear planetary carrier assembly and rear sun gear according to the following procedures:

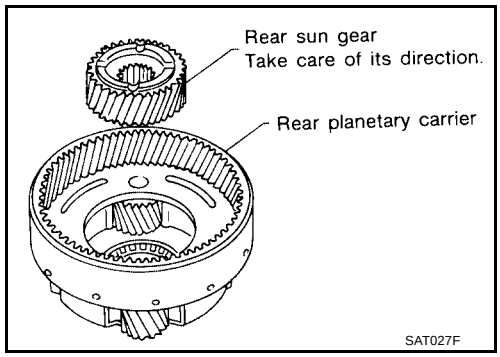
a. Install needle bearings on rear planetary carrier.

CAUTION:
- **Apply petroleum jelly to needle bearings.**
- **Take care with the direction of needle bearings.**

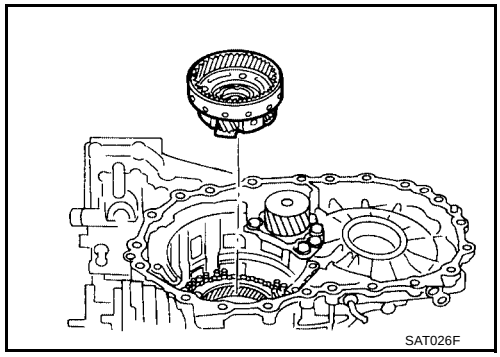


b. Install rear sun gear on rear planetary carrier.

CAUTION:
Take care with the direction of rear sun gear.

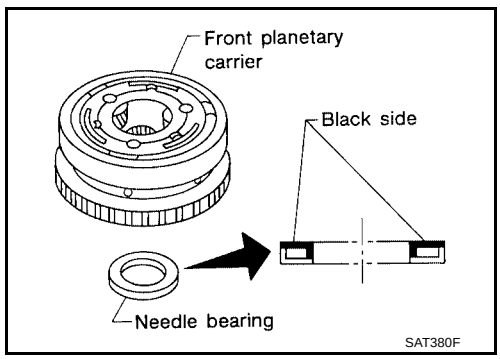


c. Install rear planetary carrier on transaxle case.



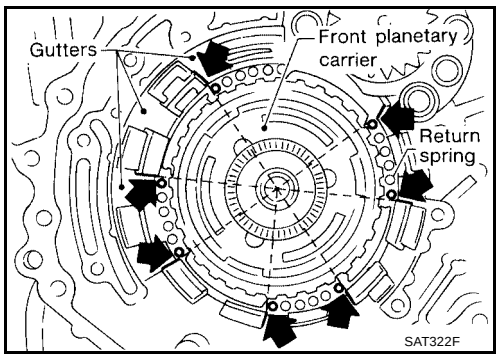
12. Install thrust needle bearing on front planetary carrier, then install them together on transaxle case.

CAUTION:
- **Apply petroleum jelly to thrust needle bearing.**
- **Take care with the direction of thrust needle bearing.**

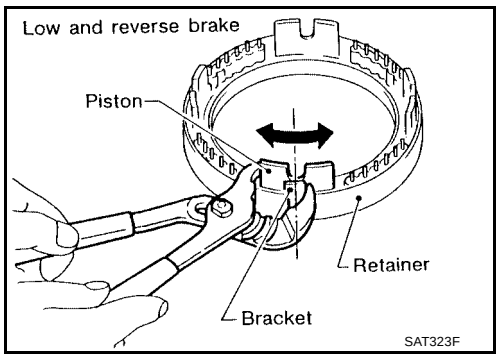


13. Install low and reverse brake piston according to the following procedures.

a. Set and align return springs to transaxle case gutters as shown in illustration.

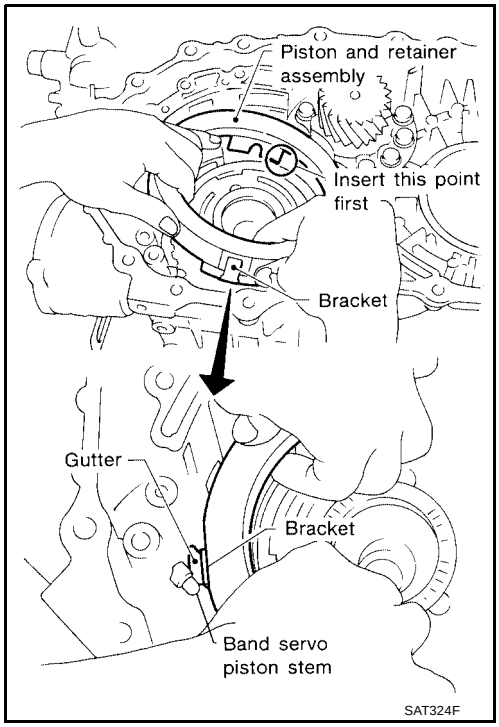


b. Set and align piston with retainer using suitable tool.



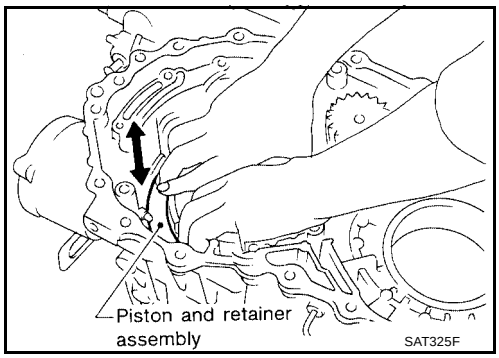
c. Install piston and retainer assembly on the transaxle case.

CAUTION:
Align bracket to specified gutter as shown.



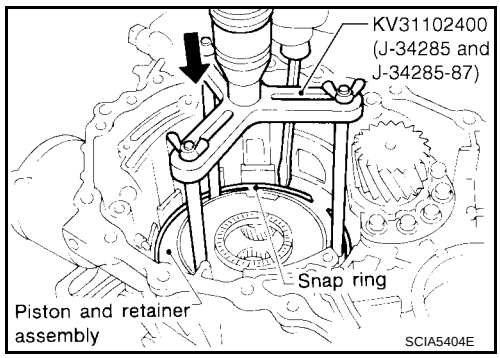
d. Check that each protrusion of piston is correctly set to corresponding return spring as follows.

- **Push piston and retainer assembly evenly and confirm they move smoothly.**
- **If they can not move smoothly, remove piston and retainer assembly and align return spring correctly as instructed in step “a”.**

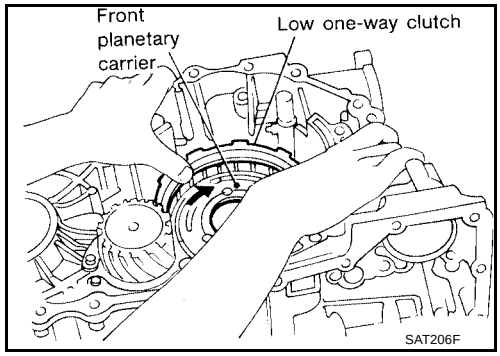


e. Push down piston and retainer assembly and install snap ring using Tool.

Tool number : KV31102400 (J-34285 and J-34285-87)



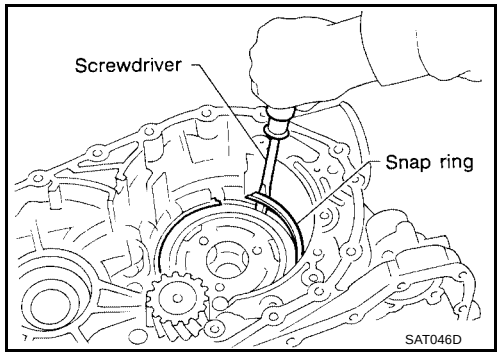
14. Install low one-way clutch to front planetary carrier by turning carrier in the direction of the arrow shown.



15. Install snap ring using screwdriver.

CAUTION:

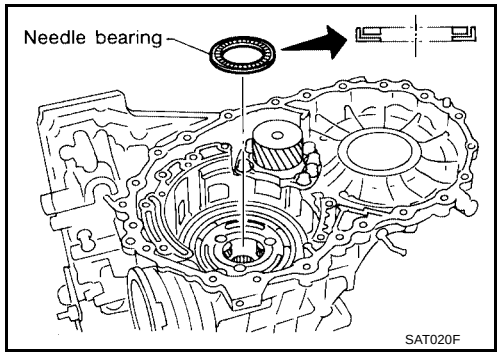
- **Forward clutch and bearing must be correctly installed for snap ring to fit into groove of transaxle case.**
- **Do not expand snap ring excessively.**



16. Install needle bearing on transaxle case.

CAUTION:

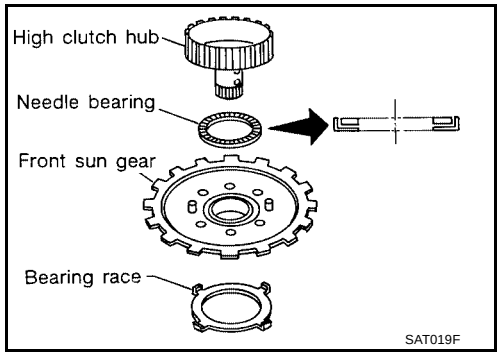
- **Apply petroleum jelly to needle bearing.**
- **Take care with the direction of needle bearing.**



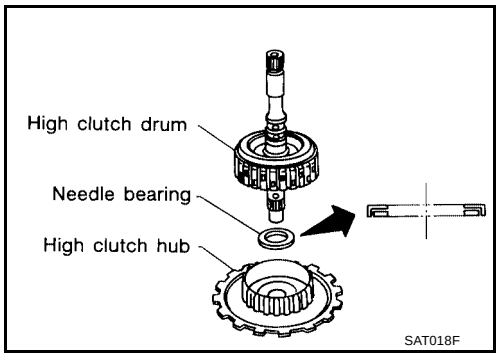
17. Install bearing race, needle bearing and high clutch hub on front sun gear.

CAUTION:

- **Apply petroleum jelly to needle bearing.**
- **Take care with the direction of needle bearing.**



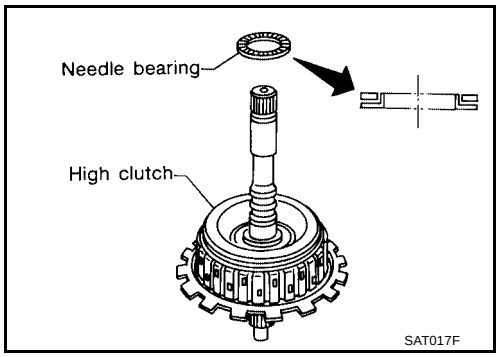
18. Install needle bearing and high clutch drum on high clutch hub.



19. Install needle bearing on high clutch drum.

CAUTION:

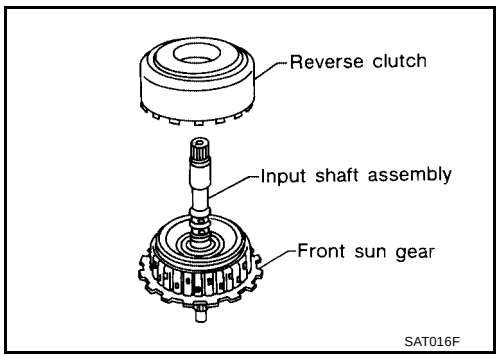
- **Apply petroleum jelly to needle bearing.**
- **Take care with the direction of needle bearing.**



20. Remove paper rolled around input shaft.
21. Install input shaft assembly in reverse clutch.

CAUTION:

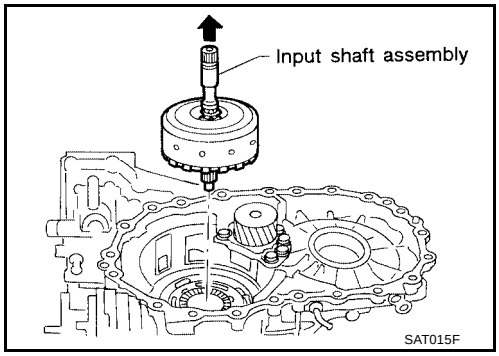
Align teeth of reverse clutch drive plates before installing.



22. Install reverse clutch assembly on transaxle case.

CAUTION:

Align teeth of high clutch drive plates before installing.



Adjustment (2)

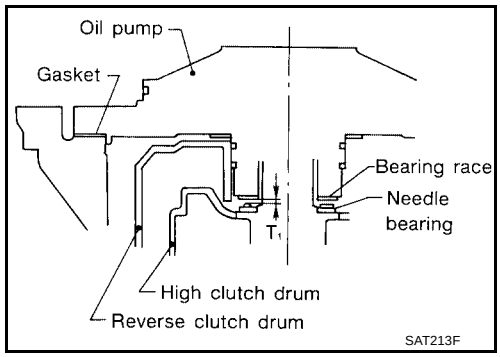
ECS009BH

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	—	●

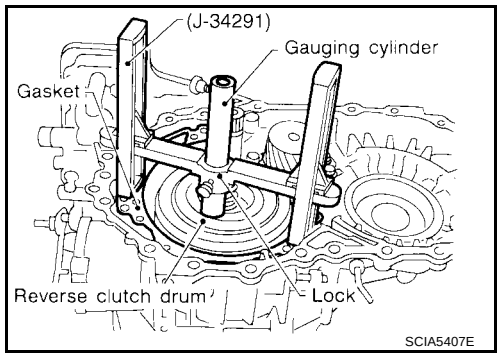
TOTAL END PLAY

1. Adjust total end play "T_1".



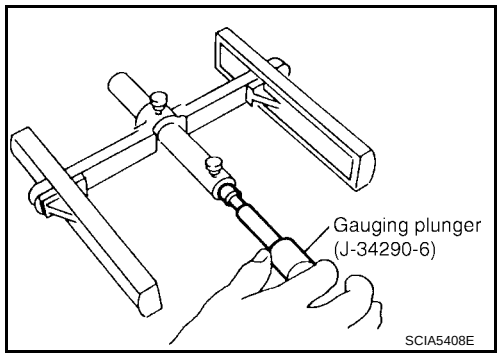
a. With original bearing race installed, place Tool onto oil pump. The long ends of legs should be placed firmly on machined surface of oil pump assembly. The gauging cylinder should rest on top of bearing race. Lock gauging cylinder in place with set screw.

Tool number : — (J-34291-A)



b. Install gauging plunger into cylinder.

Tool number : — (J-34291-25)



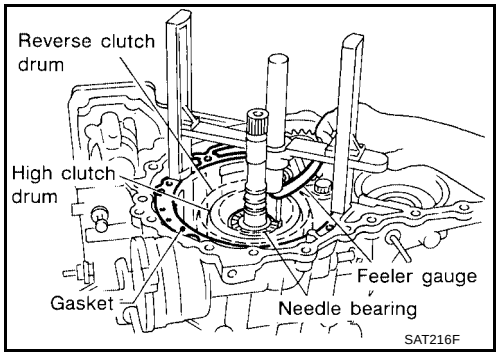
c. With needle bearing installed on high clutch drum, place Tool legs on machined surface of transaxle case (with gasket). Then allow plunger to rest on needle bearing.

d. Measure gap between cylinder and plunger. This measurement should give exact total end play.

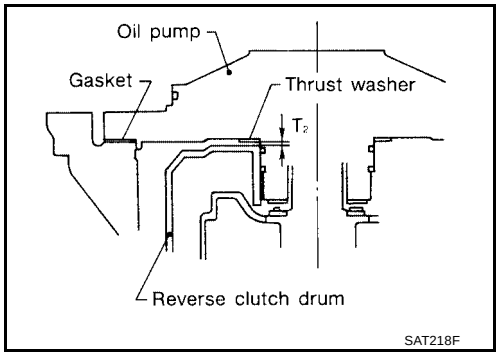
Total end play "T_1 " : 0.25 - 0.55 mm (0.0098 - 0.0217 in)

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

Available bearing race for adjusting total end play : Refer to AT-385, "BEARING RACE FOR ADJUSTING TOTAL END PLAY" .

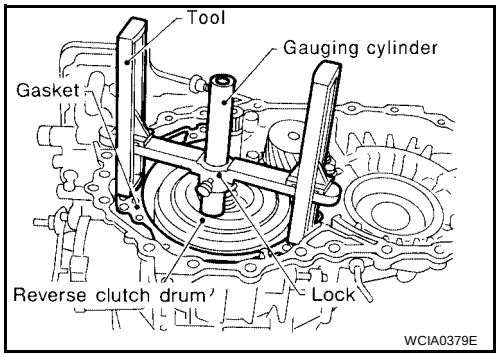


2. Adjust reverse clutch drum end play "T_2 ".



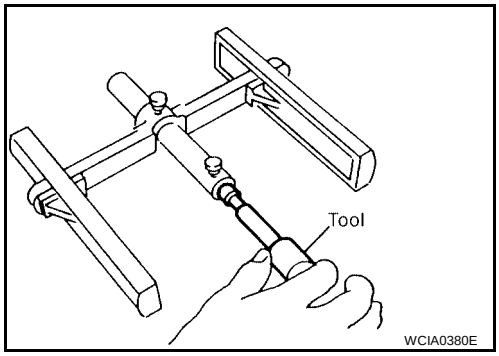
a. Place Tool on machined surface of transaxle case (with gasket). Then allow gauging cylinder to rest on reverse clutch drum. Lock cylinder in place with set screw.

Tool number : — (J-34291)



b. Install gauging plunger into cylinder, using Tool.

Tool number : — (J-34290-6)



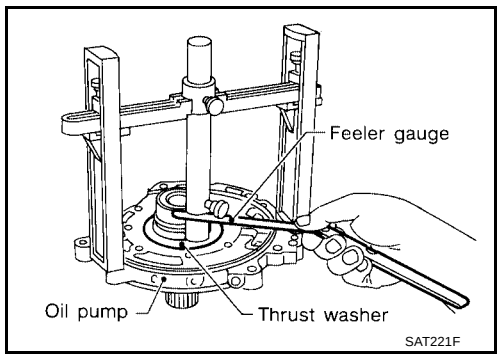
c. With original thrust washer installed on oil pump, place Tool legs onto machined surface of oil pump assembly. Then allow plunger to rest on thrust washer.

d. Measure gap between cylinder and plunger with feeler gauge. This measurement should give exact reverse clutch drum end play.

Reverse clutch drum end play "T_2" : 0.55 - 0.90 mm (0.0217 - 0.0354 in)

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

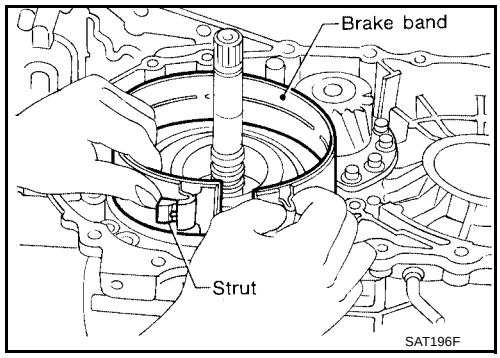
Available thrust washer for adjusting reverse clutch drum end play : Refer to AT-385, "THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH DRUM END PLAY".



Assembly (3)

ECS009BI

1. Install anchor end pin and lock nut on transaxle case.
2. Place brake band on outside of reverse clutch drum. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.

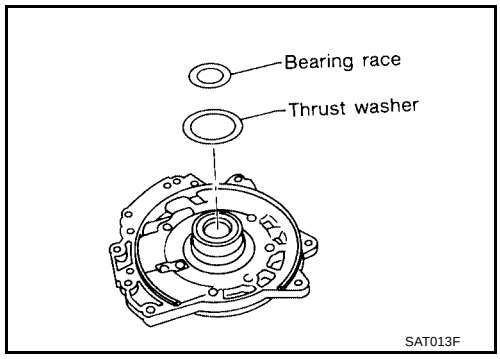


3. Place bearing race selected in total end play adjustment step on oil pump cover.

CAUTION:
Apply petroleum jelly to bearing race.

4. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.

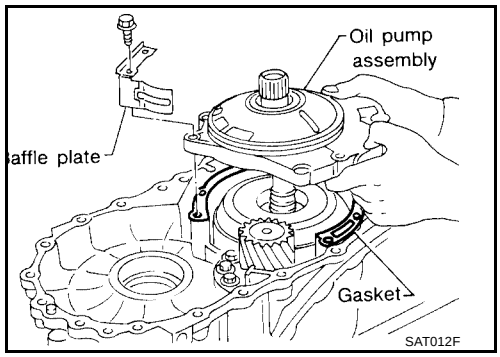
CAUTION:
Apply petroleum jelly to thrust washer.



5. Install oil pump assembly, baffle plate and gasket on transaxle case.

CAUTION:
Do not reuse gasket.

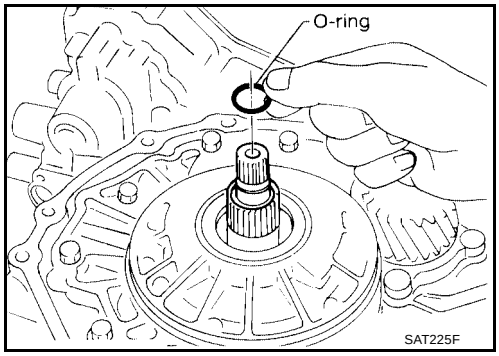
6. Tighten oil pump bolts to the specified torque.



7. Install new O-ring to input shaft.

CAUTION:

- **Do not reuse O-ring.**
- **Apply petroleum jelly to new O-ring.**



8. Adjust brake band.

a. Tighten new anchor end pin to the specified torque using suitable tool.

Anchor end pin : Refer to AT-382, "BRAKE BAND" .

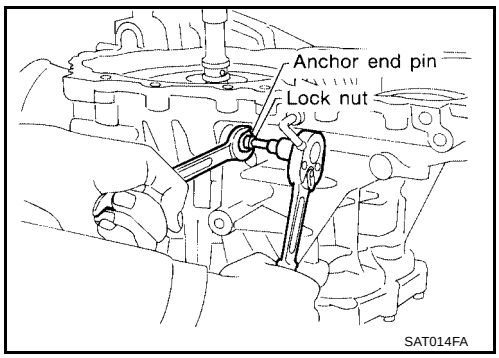
CAUTION:

Do not reuse anchor end pin.

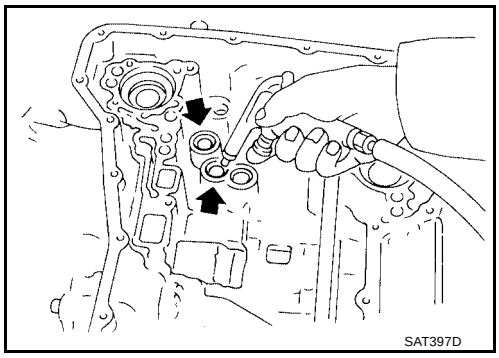
b. Back off anchor end pin two and a half turns.

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

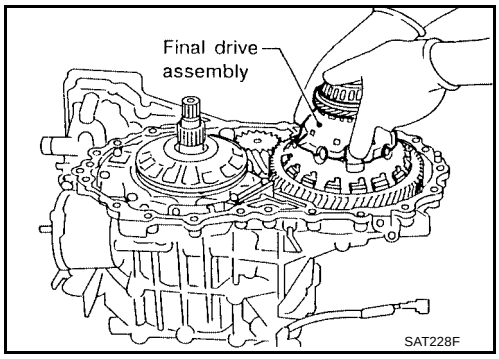
Lock nut : Refer to AT-382, "BRAKE BAND" .



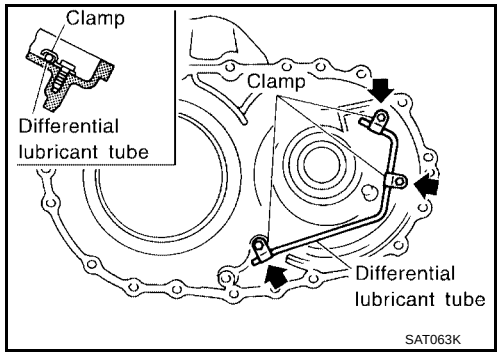
9. Apply compressed air to oil holes of transaxle case and check operation of brake band.



10. Install final drive assembly on transaxle case.



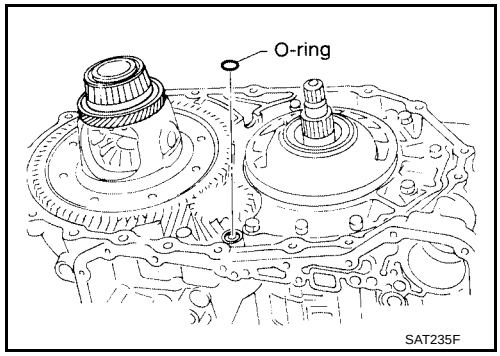
11. Install differential lubricant tube on converter housing. Tighten differential lubricant tube bolts to the specified torque. Refer to AT-278, "Components" .



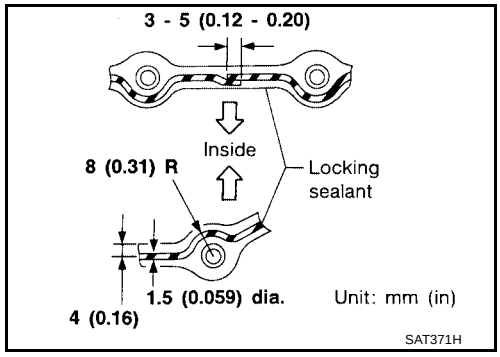
12. Install new O-ring on differential oil port of transaxle case.

CAUTION:

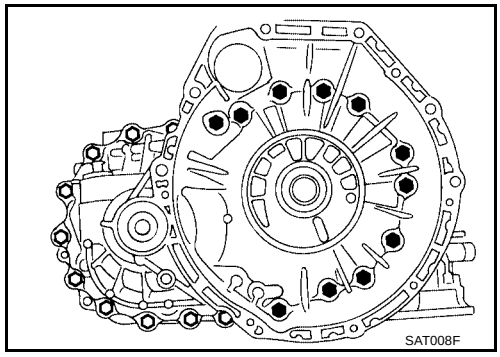
- **Do not reuse O-ring.**
- **Apply ATF to new O-ring.**



13. Install converter housing on transaxle case.
    - **Apply locking sealant to mating surface of converter housing. Refer to GI-45, "Recommended Chemical Products and Sealants" .**

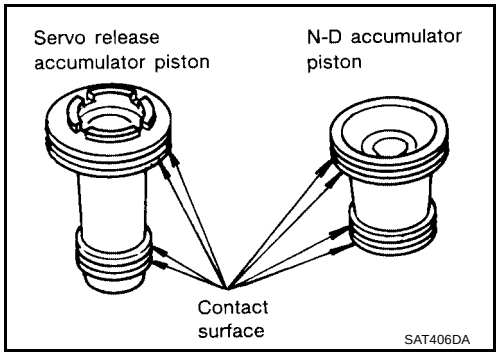


    - **Tighten converter housing bolts to the specified torque. Refer to AT-278, "Components" .**



14. Install accumulator piston.

a. Check contact surface of accumulator piston for damage.

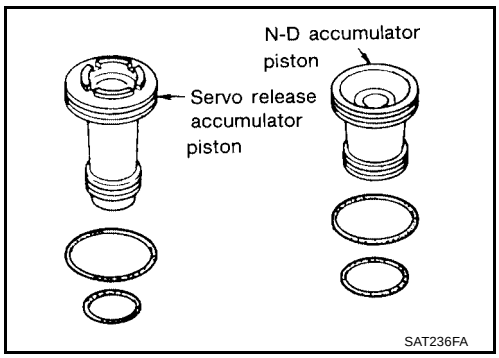


b. Install new O-rings on accumulator piston.

CAUTION:

- **Do not reuse O-rings.**
- **Apply ATF to new O-rings.**

Accumulator piston O-rings : Refer to AT-379, "O-RING" .

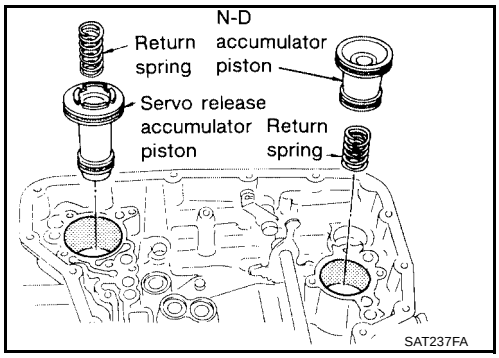


c. Install accumulator pistons and return springs on transaxle case.

CAUTION:

Apply ATF to inner surface of transaxle case.

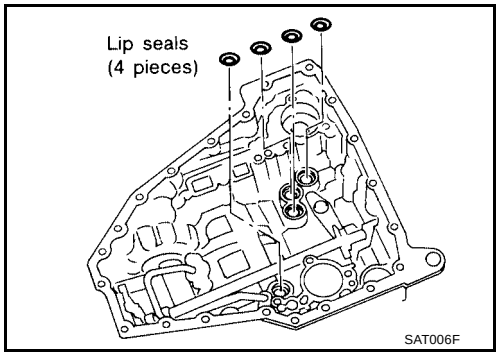
Return springs : Refer to AT-379, "RETURN SPRING" .



15. Install new lip seals for band servo oil holes on transaxle case.

CAUTION:

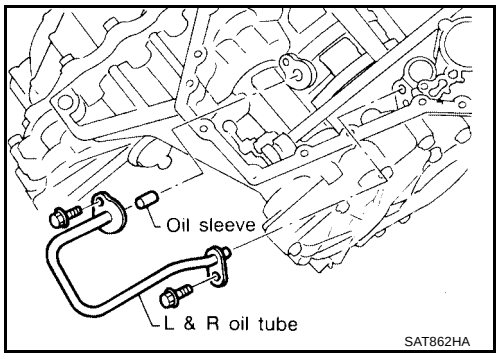
- **Do not reuse lip seals.**
- **Apply petroleum jelly to new lip seals.**



16. Install L & R oil tube and new oil sleeve. Tighten L & R oil tube bolts to the specified torque. Refer to AT-278, "Components" .

CAUTION:

Do not reuse oil sleeve.

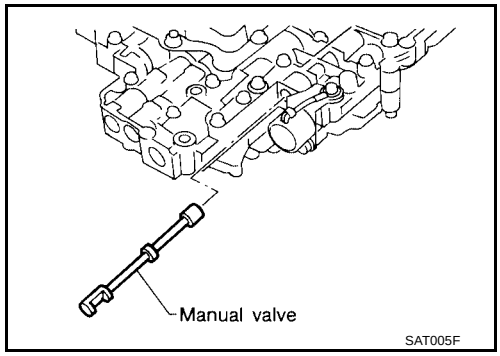


17. Install control valve assembly.

a. Insert manual valve into control valve assembly.

CAUTION:

Apply ATF to manual valve.

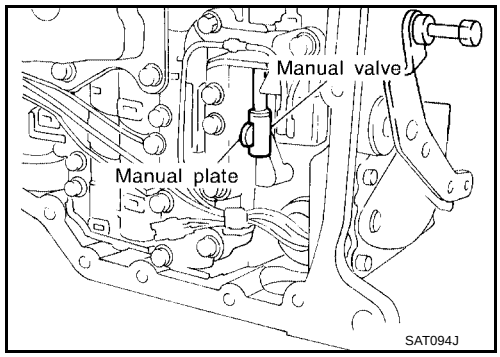


b. Set manual shaft in Neutral position.

c. Install control valve assembly on transaxle case while aligning manual valve with manual plate.

d. Pass solenoid harness through transaxle case and install terminal body on transaxle case by pushing it.

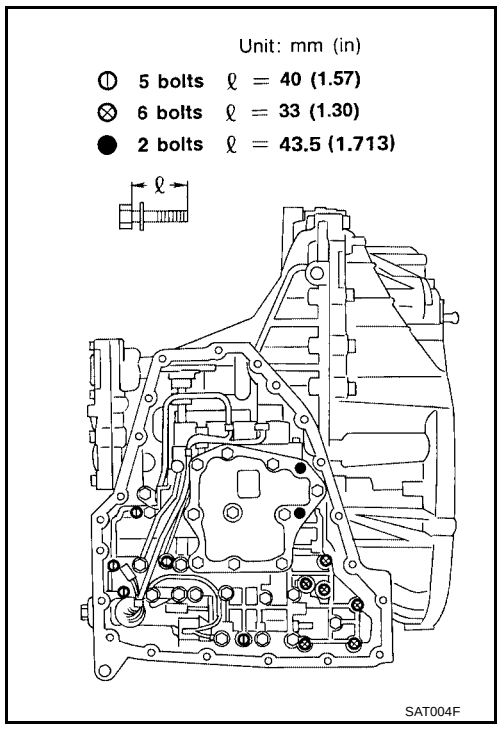
e. Install stopper ring to terminal body.



f. Tighten bolts **I** , **X** and ●.

Bolt length, number and location:

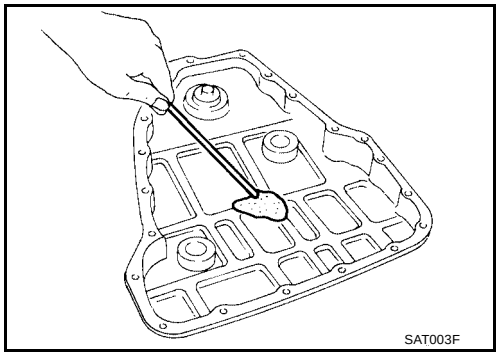
Bolt symbol	I	X	●
Bolt length " ℓ " mm (in)	40 (1.57)	33 (1.30)	43.5 (1.713)
Number of bolts	5	6	2



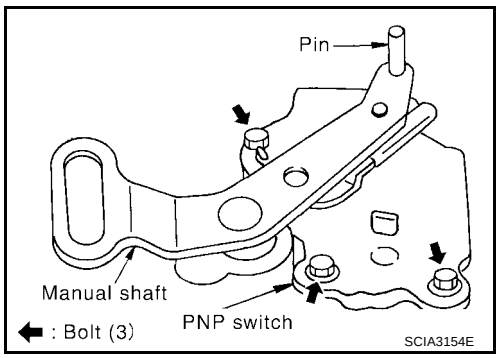
18. Install oil pan.
a. Attach a magnet to oil pan.
b. Install new oil pan gasket on transaxle case.
c. Install oil pan on transaxle case.

CAUTION:
- **Do not reuse oil pan bolts as they are self-sealing bolts.**
- **Tighten four bolts in a crisscross pattern to prevent dislocation of gasket.**

d. Tighten oil pan bolts and drain plug to the specified torque. Refer to AT-278, "Components" .

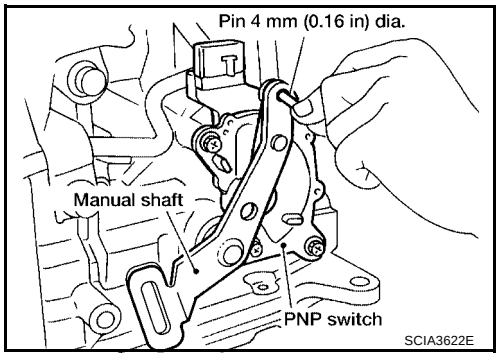

SAT003F

19. Install park/neutral position (PNP) switch.
a. Set manual shaft in P position.
b. Temporarily install PNP switch on manual shaft.
c. Move selector lever to N position.



SCIA3154E

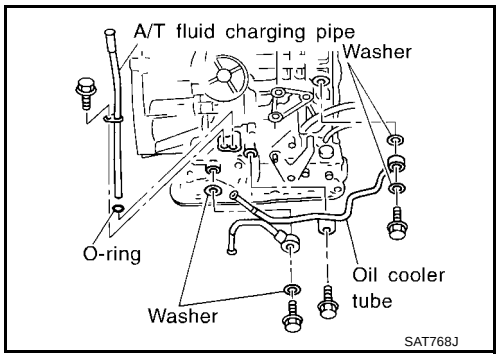
d. Use a 4 mm (0.16 in) pin for this adjustment.
i. Insert the pin straight into the manual shaft adjustment hole.
ii. Rotate PNP switch until the pin can also be inserted straight into hole in PNP switch.
e. Tighten PNP switch bolts. Refer to AT-278, "Components" .
f. Remove pin from adjustment hole after adjusting PNP switch.



SCIA3622E

20. Install A/T fluid charging pipe and fluid cooler tube with new O-rings and new washers to transaxle case. Tighten A/T fluid charging pipe and fluid cooler tube bolts to the specified torque. Refer to AT-278, "Components" .

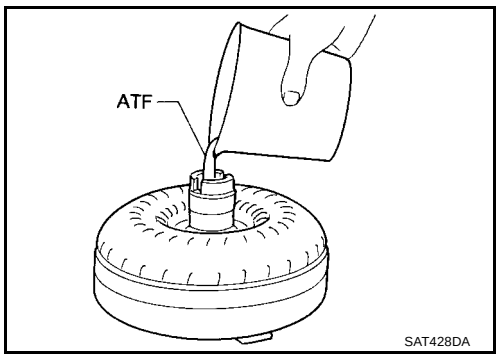
CAUTION:
Do not reuse O-rings and copper washers.



SAT768J

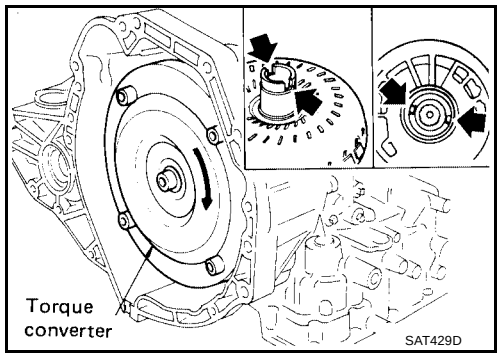
21. Install torque converter.
a. Pour ATF into torque converter.

CAUTION:
- **Approximately 1 liter (1-1/8 US qt, 7/8 Imp qt) of fluid is required for a new torque converter.**
- **When reusing old torque converter, add the same amount of fluid as was drained.**



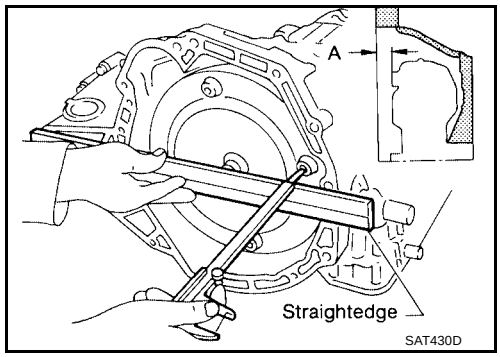
SAT428DA

b. Install torque converter while aligning notches of torque converter with notches of oil pump.



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

Distance A : 14 mm (0.55 in) or more



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ECS009BJ

Engine		QR25DE
Automatic transaxle model		RE4F04B
Automatic transaxle assembly	Model code number	89X05
Transaxle gear ratio	1st	2.785
	2nd	1.545
	3rd	1.000
	4th	0.694
	Reverse	2.272
	Final drive	4.425
Recommended fluid		Nissan Matic “D” (Continental U.S. and Alaska) or Canada Nissan Automatic Transmission Fluid*
Fluid capacity ℓ (US qt, Imp qt)		9.2 (9.3/4, 8.1/8)

*: Refer to MA-12, "RECOMMENDED FLUIDS AND LUBRICANTS" .

Shift Schedule

ECS009BK

VEHICLE SPEED WHEN SHIFTING GEARS THROTTLE POSITION — QR25DE 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	52 - 60 (32 - 37)	97 - 105 (60 - 65)	153 - 161 (95 - 100)	149 - 157 (93 - 98)	87 - 95 (54 - 59)	39 - 47 (24 - 29)
	Auto power	52 - 60 (35 - 40)	97 - 105 (60 - 65)	153 - 161 (95 - 98)	149 - 157 (93 - 98)	87 - 95 (54 - 59)	39 - 47 (24 - 29)
Half throttle	Comfort	28 - 36 (17 - 22)	57 - 65 (35 - 40)	121 - 129 (75 - 80)	61 - 69 (38 - 43)	32 - 40 (20 - 25)	15 - 23 (9 - 14)
	Auto power	38 - 46 (24 - 29)	72 - 80 (45 - 50)	121 - 129 (75 - 80)	61 - 69 (38 - 43)	43 - 51 (27 - 32)	15 - 23 (9 - 14)

VEHICLE SPEED WHEN PERFORMING AND RELEASING LOCK-UP — QR25DE MODEL

Unit: km/h (MPH)

Selector lever position	D position		3 position	
Shift pattern	Comfort	Auto power	Comfort	Auto power
Lock-up ″ON″	86 - 94 (53 - 58)	86 - 94 (53 - 58)	86 - 94 (53 - 58)	86 - 94 (53 - 58)
Lock-up ″OFF″	65 - 73 (41 - 46)	65 - 73 (41 - 46)	83 - 91 (52 - 57)	83 - 91 (52 - 57)

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

ECS009BL

Engine	Stall revolution rpm
QR25DE	2,300 - 2,750

Line Pressure

ECS009BM

Engine speed rpm	Line pressure kPa (kg/cm^2 , psi)	
	D, 2 and 1 positions	R position
	QR25DE	QR25DE
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,223 (12.6, 179)	1,918 (19.6, 278)

Control Valves

ECS009BN

CONTROL VALVE AND PLUG RETURN SPRINGS

Unit: mm (in)

Parts			Item		
			Part No.*	Free length	Outer diameter
Upper body	23	Pilot valve spring	31742-80L13	38.98 (1.535)	8.9 (0.350)
	7	1-2 accumulator valve spring	31742-80L15	20.5 (0.807)	6.95 (0.274)
	28	1-2 accumulator piston spring	31742-80L14	55.26 (2.176)	19.6 (0.772)
	33	1st reducing valve spring	31742-80X05	27.0 (1.063)	7.0 (0.276)
	35	3-2 timing valve spring	31736-01X00	23.0 (0.906)	6.65 (0.262)
	18	Overrun clutch reducing valve spring	31742-80L09	37.5 (1.476)	6.9 (0.272)
	16	Torque converter relief valve spring	31742-80L10	31.0 (1.220)	9.0 (0.354)
	11	Torque converter clutch control valve	31742-80L16	56.98 (2.243)	6.5 (0.256)
	3	Cooler check valve spring	31742-85X01	29.4 (1.157)	6.0 (0.236)
Lower body	15	Pressure regulator valve spring	31742-80L01	45.0 (1.772)	15.0 (0.591)
	20	Overrun clutch control valve spring	31762-80L00	21.7 (0.854)	7.0 (0.276)
	24	Accumulator control valve spring	31742-80L02	22.0 (0.866)	6.5 (0.256)
	29	Shift valve A spring	31762-80L00	21.7 (0.854)	7.0 (0.276)
	32	Shuttle valve spring	31762-41X04	51.0 (2.008)	5.65 (0.222)
	12	Shift valve B spring	31762-80L00	21.7 (0.854)	7.0 (0.276)
	7	Pressure modifier valve spring	31742-80L03	30.5 (1.201)	9.8 (0.386)
	3	Pressure modifier piston spring	31742-80L04	32.0 (1.260)	6.9 (0.272)
	—	Oil cooler relief valve spring	31742-80L12	17.02 (0.670)	8.0 (0.315)

*: Always check with the Parts Department for the latest parts information.
**: This part is for model code number "88X02".

Accumulator

ECS009BO

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	31605-85X00	62.8 (2.473)	21 (0.827)
N-D accumulator	31605-31X02	43.5 (1.713)	27.0 (1.063)

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

Clutch and Brakes

ECS009BP

REVERSE CLUTCH

Model code number		89X05	
Number of drive plates		2	
Number of driven plates		2	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Driven plate thickness mm (in)	Standard	1.8 (0.070)	
Clearance mm (in)	Standard	0.5 - 0.8 (0.020 - 0.031)	
	Allowable limit	1.2 (0.047)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		6.6 (0.260) 6.8 (0.268) 7.0 (0.276) 7.2 (0.283) 7.4 (0.291) 7.6 (0.299) 7.8 (0.307)	31537-89X00 31537-89X01 31537-89X02 31537-89X03 31537-89X04 31537-89X05 31537-89X06

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

HIGH CLUTCH

Model code number		89X05	
Number of drive plates		3	
Number of driven plates		9*1 + 1*2	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Allowable limit	1.4 (0.055)	
Driven plate thickness mm (in)	Standard	*1	*2
		1.4 (0.055)	2.0 (0.079)
Clearance mm (in)	Standard	1.8 - 2.2 (0.071 - 0.087)	
	Allowable limit	2.8 (0.110)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		3.0 (0.118) 3.2 (0.126) 3.4 (0.134) 3.6 (0.142) 3.8 (0.150)	31537-81X10 31537-81X11 31537-81X12 31537-81X13 31537-81X14

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

FORWARD CLUTCH

Model code number		89X05
Number of drive plates		5
Number of driven plates		5
Drive plate thickness mm (in)	Standard	1.6 (0.063)
	Allowable limit	1.4 (0.055)
Driven plate thickness mm (in)	Standard	1.8 (0.071)
Clearance mm (in)	Standard	0.45 - 0.85 (0.0177 - 0.0335)
	Allowable limit	1.85 (0.0728)

	Thickness mm (in)	Part number*
Thickness of retaining plates	3.2 (0.126) 3.4 (0.134) 3.6 (0.142) 3.8 (0.150) 4.0 (0.157) 4.2 (0.165) 4.4 (0.173)	31537-80L18 31537-80L17 31537-80L12 31537-80L13 31537-80L14 31537-80L15 31537-80L16

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

OVERRUN CLUTCH

Model code number		89X05
Number of drive plates		3
Number of driven plates		5
Drive plate thickness mm (in)	Standard	1.6 (0.063)
	Allowable limit	1.4 (0.055)
Driven plate thickness mm (in)	Standard	1.8 (0.071)
Clearance mm (in)	Standard	0.7 - 1.1 (0.028 - 0.043)
	Allowable limit	1.7 (0.067)

	Thickness mm (in)	Part number*
Thickness of retaining plates	3.0 (0.118) 3.2 (0.126) 3.4 (0.134) 3.6 (0.142) 3.8 (0.150)	31537-80L07 31537-80L08 31537-80L09 31537-80L10 31537-80L11

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

LOW & REVERSE BRAKE

Model code number		89X05
Number of drive plates		6
Number of driven plates		6
Drive plate thickness mm (in)	Standard	1.8 (0.071)
	Allowable limit	1.6 (0.063)
Driven plate thickness mm (in)	Standard	1.8 (0.071)
Clearance mm (in)	Standard	1.7 - 2.1 (0.067 - 0.083)
	Allowable limit	3.3 (0.130)

	Thickness mm (in)	Part number*
Thickness of retaining plates	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)	31667-80L00 31667-80L01 31667-80L02 31667-80L03 31667-80L04 31667-80L05 31667-80L06 31667-80L07

*: 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 (18 pcs)	31505-89X04	20.0 (0.787)	8.3 (0.327)
Low & reverse brake (24 pcs)	31505-89X02	21.6 (0.850)	6.6 (0.260)

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

BRAKE BAND

Anchor end pin tightening torque N-m (kg-m, in-lb)	4.0 - 5.8 (0.4 - 0.6, 36 - 52)
Number of returning revolutions for anchor end pin	2.5
Lock nut tightening torque N-m (kg-m, ft-lb)	31 - 36 (3.2 - 3.7, 23 - 27)

Final Drive

ECS009BQ

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 - 1.54 (8.0 - 15.7, 6.9 - 13.6)

Planetary Carrier and Oil Pump

ECS009BR

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)	31346-80L00 31346-80L01 31346-80L02
		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)	31347-80L00 31347-80L01 31347-80L02
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

ECS009BS

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)	Inner diameter mm (in)	Width mm (in)	Part number*
26 (1.024)	22.4 (0.882)	1.971 (0.078)	31525-80X02

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

Reduction Pinion Gear

ECS009BT

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	18	5.34 (0.2102)	31439-81X17
2	5.02 (0.1976)	31439-81X01	19	5.36 (0.2110)	31439-81X18
3	5.04 (0.1984)	31439-81X02	20	5.38 (0.2118)	31439-81X19
4	5.06 (0.1992)	31439-81X03	21	5.40 (0.2126)	31439-81X20
5	5.08 (0.2000)	31439-81X04	22	5.42 (0.2134)	31439-81X21
6	5.10 (0.2008)	31439-81X05	23	5.44 (0.2142)	31439-81X22
7	5.12 (0.2016)	31439-81X06	24	5.46 (0.2150)	31439-81X23
8	5.14 (0.2024)	31439-81X07	25	5.48 (0.2157)	31439-81X24
9	5.16 (0.2031)	31439-81X08	26	5.50 (0.2165)	31439-81X46
10	5.18 (0.2039)	31439-81X09	27	5.52 (0.2173)	31439-81X47
11	5.20 (0.2047)	31439-81X10	28	5.54 (0.2181)	31439-81X48
12	5.22 (0.2055)	31439-81X11	29	5.56 (0.2189)	31439-81X49
13	5.24 (0.2063)	31439-81X12	30	5.58 (0.2197)	31439-81X60
14	5.26 (0.2071)	31439-81X13	31	5.60 (0.2205)	31439-81X61
15	5.28 (0.2079)	31439-81X14	32	5.62 (0.2213)	31439-81X62
16	5.30 (0.2087)	31439-81X15	33	5.64 (0.2220)	31439-81X63
17	5.32 (0.2094)	31439-81X16	34	5.66 (0.2228)	31439-81X64

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
35	5.68 (0.2236)	31439-81X65	50	4.70 (0.1850)	31439-85X06
36	5.70 (0.2244)	31439-81X66	51	4.72 (0.1858)	31439-83X11
37	5.72 (0.2252)	31439-81X67	52	4.74 (0.1866)	31439-83X12
38	5.74 (0.2260)	31439-81X68	53	4.76 (0.1874)	31439-83X13
39	5.76 (0.2268)	31439-81X69	54	4.78 (0.1882)	31439-83X14
40	5.78 (0.2276)	31439-81X70	55	4.80 (0.1890)	31439-83X15
41	5.80 (0.2283)	31439-81X71	56	4.82 (0.1898)	31439-83X16
42	5.82 (0.2291)	31439-81X72	57	4.84 (0.1906)	31439-83X17
43	5.84 (0.2299)	31439-81X73	58	4.86 (0.1913)	31439-83X18
44	5.86 (0.2307)	31439-81X74	59	4.88 (0.1921)	31439-83X19
45	4.60 (0.1811)	31439-85X01	60	4.90 (0.1929)	31439-83X20
46	4.62 (0.1819)	31439-85X02	61	4.92 (0.1937)	31439-83X21
47	4.64 (0.1827)	31439-85X03	62	4.94 (0.1945)	31439-83X22
48	4.66 (0.1835)	31439-85X04	63	4.96 (0.1953)	31439-83X23
49	4.68 (0.1843)	31439-85X05	64	4.98 (0.1961)	31439-83X24

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

Band Servo

ECS009BU

RETURN SPRING

Unit: mm (in)

Return spring	Part number*	Free length	Outer diameter
2nd servo return spring	31605-80L05	32.5 (1.280)	25.9 (1.020)
OD servo return spring	31605-80L06	62.6 (2.465)	21.7 (0.854)

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

Output Shaft

ECS009BV

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)	Inner diameter mm (in)	Width mm (in)	Part number*
33.71 (1.327)	30.25 (1.191)	1.95 (0.077)	31525-80X09

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

END PLAY

Output shaft end play mm (in)	0 - 0.15 (0 - 0.0059)

OUTPUT SHAFT ADJUSTING SHIMS

Thickness mm (in)	Part number*
0.80 (0.0315)	31438-80X60
0.84 (0.0331)	31438-80X61
0.88 (0.0346)	31438-80X62
0.92 (0.0362)	31438-80X63
0.96 (0.0378)	31438-80X64
1.00 (0.0394)	31438-80X65
1.04 (0.0409)	31438-80X66
1.08 (0.0425)	31438-80X67
1.12 (0.0441)	31438-80X68
1.16 (0.0457)	31438-80X69
1.20 (0.0472)	31438-80X70

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

Bearing Retainer

ECS009BW

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

ECS009BX

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

ECS009BY

Reverse clutch end play mm (in)	0.61 - 1.00 (0.0240 - 0.0394)

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

ECS009BZ

Unit: mm (in)

Distance between end of converter housing and torque converter	14 (0.55)

Shift Solenoid Valves

ECS009C0

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

ECS009C1

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

ECS009C2

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

ECS009C3

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

Dropping Resistor

ECS009C4

Resistance	10 - 15 Ω

Turbine Revolution Sensor (Power Train Revolution Sensor)

ECS009C5

Condition	Judgement standard
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.*1 **CAUTION:** **Connect the diagnosis data link cable to the vehicle diagnosis connector.** *1: A circuit tester cannot be used to test this item.	240 Hz (Approx.)
When vehicle parks.	Under 1.3V or over 4.5V

INDEX FOR DTC

PFP:00024

Alphabetical Index

ECS009C6

NOTE:
If DTC U1000 is displayed with other DTCs, first perform the trouble diagnosis for DTC U1000. Refer to AT-471 .

Items (CONSULT-II screen terms)	DTC		Reference page
	OBD-II	Except OBD-II	
	CONSULT-II GST*1	CONSULT-II only "TRANSMISSION"	
A/T 1ST GR FNCTN	P0731	P0731	AT-503
A/T 2ND GR FNCTN	P0732	P0732	AT-506
A/T 3RD GR FNCTN	P0733	P0733	AT-512
A/T 4TH GR FNCTN	P0734	P0734	AT-518
A/T 5TH GR FNCTN	P0735	P0735	AT-523
A/T TCC S/V FNCTN	P0744	P0744	AT-529
ATF TEMP SEN/CIRC	P0710	P0710	AT-483
CAN COMM CIRCUIT	U1000	U1000	AT-471
ELEC TH CONTROL	—	P1726	AT-597
ENG SPD INP PERFOR	—	P0726	AT-501
FLUID TEMP SEN	P0711	P0711	AT-488
MANUAL MODE SWITCH	—	P0826	AT-586
PC SOL A(L/PRESS)	P0745	P0745	AT-532
PC SOL B(SFT/PRS)	P0775	P0775	AT-567
PC SOL C(TCC&SFT)	P0795	P0795	AT-576
PC SOL C STC ON	P0797	P0797	AT-581
PNP SW/CIRC	P0705	P0705	AT-478
SHIFT	P0780	P0780	AT-572
SHIFT SOL A	P0750	P0750	AT-537
SHIFT SOL B	P0755	P0755	AT-542
SHIFT SOL C	P0760	P0760	AT-547
SHIFT SOL D	P0765	P0765	AT-557
SHIFT SOL E	P0770	P0770	AT-562
SFT SOL C STUCK ON	P0762	P0762	AT-552
TCM POWER INPT SIG	P0882	P0882	AT-592
TCM PROCESSOR	—	P0613	AT-476
TURBINE SENSOR	P0717	P0717	AT-493
VEH SPD SE/CIR-MTR	—	P0500	AT-474
VHCL SPEED SEN-A/T	P0722	P0722	AT-497

*1: These numbers are prescribed by SAE J2012.

DTC No. Index

ECS009C7

NOTE:
If DTC U1000 is displayed with other DTCs, first perform the trouble diagnosis for DTC U1000. Refer to AT-471 .

DTC		Items (CONSULT-II screen terms)	Reference page
OBD-II	Except OBD-II		
CONSULT-II GST*1	CONSULT-II only "TRANSMISSION"		
—	P0500	VEH SPD SE/CIR-MTR	AT-474
—	P0613	TCM PROCESSOR	AT-476
P0705	P0705	PNP SW/CIRC	AT-478
P0710	P0710	ATF TEMP SEN/CIRC	AT-483
P0711	P0711	FLUID TEMP SEN	AT-488
P0717	P0717	TURBINE SENSOR	AT-493
P0722	P0722	VHCL SPEED SEN-A/T	AT-497
—	P0726	ENG SPD INP PERFOR	AT-501
P0731	P0731	A/T 1ST GR FNCTN	AT-503
P0732	P0732	A/T 2ND GR FNCTN	AT-506
P0733	P0733	A/T 3RD GR FNCTN	AT-512
P0734	P0734	A/T 4TH GR FNCTN	AT-518
P0735	P0735	A/T 5TH GR FNCTN	AT-523
P0744	P0744	A/T TCC S/V FNCTN	AT-529
P0745	P0745	PC SOL A(L/PRESS)	AT-532
P0750	P0750	SHIFT SOL A	AT-537
P0755	P0755	SHIFT SOL B	AT-542
P0760	P0760	SHIFT SOL C	AT-547
P0762	P0762	SFT SOL C STUCK ON	AT-552
P0765	P0765	SHIFT SOL D	AT-557
P0770	P0770	SHIFT SOL E	AT-562
P0775	P0775	PC SOL B(SFT/PRS)	AT-567
P0780	P0780	SHIFT	AT-572
P0795	P0795	PC SOL C(TCC&SFT)	AT-576
P0797	P0797	PC SOL C STC ON	AT-581
—	P0826	MANUAL MODE SWITCH	AT-586
P0882	P0882	TCM POWER INPT SIG	AT-592
—	P1726	ELEC TH CONTROL	AT-597
U1000	U1000	CAN COMM CIRCUIT	AT-471

*1: These numbers are prescribed by SAE J2012.

PRECAUTIONS

PFP:00001

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

ECS009C8

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

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 (OBD) System of A/T and Engine

ECS009C9

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 cable 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 A/T Assembly or TCM Replacement

ECS009CA

- When replacing A/T assembly or TCM, refer to the pattern table below and initialize TCM if necessary.

TCM INITIALIZATION PATTERNS

TCM	A/T assembly	Erasing EEPROM in TCM	Remarks
Replaced with new one	Not replaced	Not required	Not required because the EEPROM in TCM is in the default state.
	Replaced with new or old one		
Not replaced	Replaced with new or old one	Required	Required because data cannot be conformed to previous data written in the EEPROM in TCM.
Replaced with old one	Not replaced		
	Replaced with new or old one		

NOTE:
"Old one" is the TCM or A/T assembly that has been used on other vehicles.

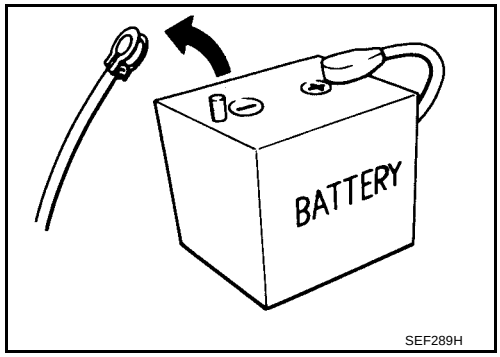
METHOD FOR TCM INITIALIZATION

1. Perform "CONSULT-II SETTING PROCEDURE". Refer to AT-462, "CONSULT-II SETTING PROCEDURE" .
2. Set the vehicle following the items listed below.
   - Ignition switch "ON".
   - Selector lever "P" or "N" position.
   - Engine not running.
   - Vehicle speed is 0 km/h (0 MPH).
   - Ignition voltage is more than 10.5V.
   - Malfunction was not detected.
3. Touch "WORK SUPPORT".
4. Touch "INITIALIZATION".
5. Initialize TCM following the direction in display.

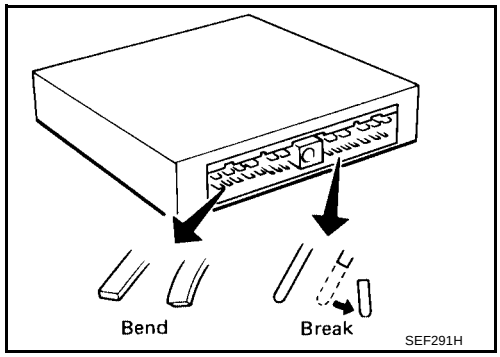
Precautions

ECS009CB

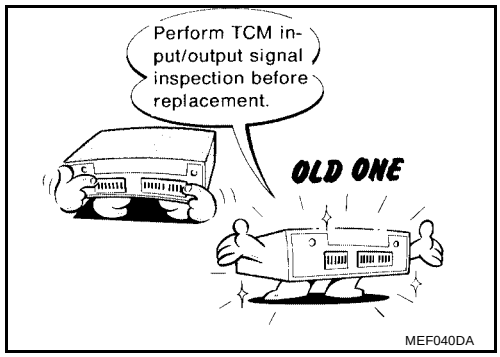
- **Before connecting or disconnecting the TCM harness connector, turn ignition switch “OFF” and disconnect negative battery cable. Because battery voltage is applied to TCM even if ignition switch is turned “OFF”.**



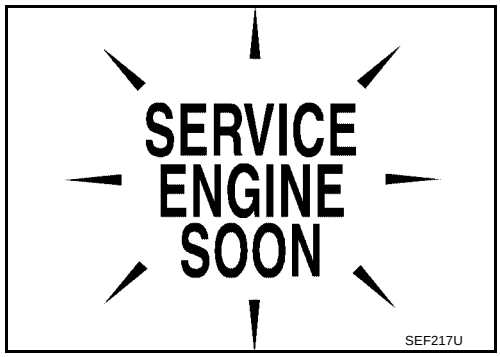
- **When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on TCM pin terminal, when connecting pin connectors.



- **Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not.** **AT-460, "TCM INSPECTION TABLE"**.



- **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.



- Always use the specified brand of A/T fluid. Refer to MA-12, "Fluids and Lubricants" .
- Use paper rags not cloth rags during work.
- After replacing the A/T fluid, dispose of the waste oil using the methods prescribed by law, ordinance, etc.
- Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.

- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transaxle.
- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should be replaced any time the transaxle is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- After overhaul, refill the transaxle with new ATF.
- When the A/T drain plug is removed, only some of the fluid is drained. Old A/T fluid will remain in torque converter and ATF cooling system.
  Always follow the procedures under “Changing A/T Fluid” in the AT section when changing A/T fluid. Refer to AT-398, "A/T FLUID" .

Service Notice or Precautions

ECS009CC

ATF COOLER SERVICE

If A/T fluid contains frictional material (clutches, bands, etc.), or if an A/T is repaired, overhauled, or replaced, inspect and clean the A/T oil cooler mounted in the radiator or replace the radiator. Flush cooler lines using cleaning solvent and compressed air after repair. Check Service Bulletins for latest A/T oil cooler cleaning procedure. For radiator replacement, refer to CO-13, "RADIATOR" .

OBD-II SELF-DIAGNOSIS

- A/T self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the A/T CHECK indicator or the malfunction indicator lamp (MIL). Refer to the table on AT-463, "SELF-DIAG RESULT 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 on AT-428, "HOW TO ERASE DTC" to complete the repair and avoid unnecessary blinking of the MIL.
- For details of OBD-II, refer to EC-653, "ON BOARD DIAGNOSTIC (OBD) SYSTEM" .
- **Certain systems and components, especially those related to OBD, may use the new style slide-locking type harness connector. For description and how to disconnect, refer to PG-66, "HARNESS CONNECTOR" .**

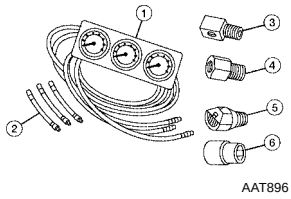
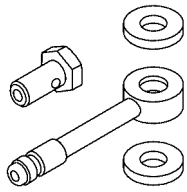
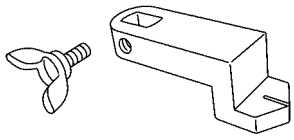
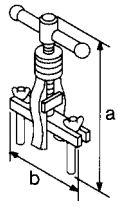
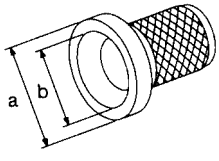
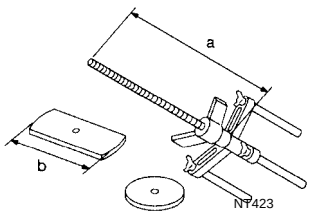
PREPARATION

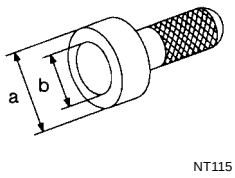
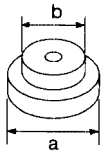
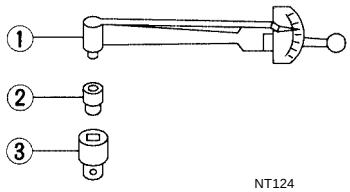
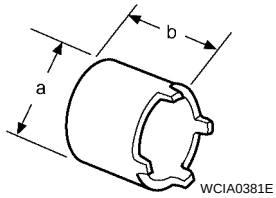
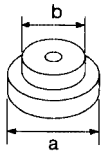
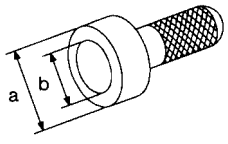
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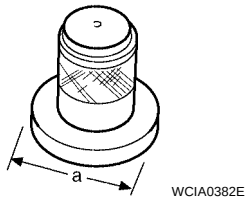
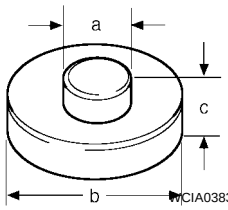
Special Service Tools

ECS009CE

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

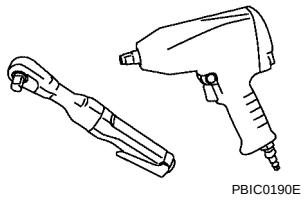
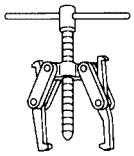
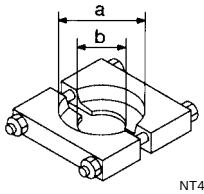
Tool number (Kent-Moore No.) Tool name	Description
(J-34301-C) Oil pressure gauge set 1 (J-34301-1) Oil pressure gauge 2 (J-34301-2) Hoses 3 (J-34298) Adapter 4 (J-34282-2) Adapter 5 (790-301-1230-A) 60° Adapter 6 (J-34301-15) Square socket  AAT896	Measuring line pressure
KV311J0010 (J-45542) Adapter  SCIA3019E	Measuring line pressure
KV991J0060 (J-45404) Alignment tool  SCIA3018E	Adjusting park/neutral position (PNP) switch
ST33290001 (J-34286) Puller  NT414	● Removing oil pump assembly ● Removing thrust roller bearing **a: 250 mm (9.84 in)** **b: 160 mm (6.30in)**
ST33400001 (J-26082) Drift  NT086	Installing differential side oil seals **a: 60 mm (2.36 in)** dia. **b: 74 mm (1.85 in) dia.**
KV31102400 (J-34285 and J-34285-87) Clutch spring compressor  NT423	Removing and installing return springs **a: 320 mm (12.60 in)** **b: 174 mm (6.85 in)**

Tool number (Kent-Moore No.) Tool name	Description
ST30720000 (J-25405) Drift  NT115	● Installing oil seal ● Installing tapered roller bearing **a: 77 mm (3.03 in) dia.** **b: 55.5 mm (2.185 in) dia.**
ST30612000 (J-25742-2) Drift  NT073	Removing outer race and adjust shim **a: 62 mm (2.44 in) dia.** **b: 40 mm (1.57 in) dia.**
ST3127S000 (J-25765-A) Preload gauge 1 GG91030000 (J-25765-A) Torque wrench 2 HT62940000 (—) Socket adapter 3 HT62900000 (—) Socket adapter  NT124	Checking differential side bearing preload
KV40102500 (J-28815) Drift  WCIA0381E	Checking side differential bearing preload **a: 60 mm (2.362 in) dia.** **b: 45 mm (1.772 in)**
ST33061000 (J-8107-2) Drift  NT073	● Removing tapered roller bearing ● Installing manual valve oil seal **a: 38.0 mm (1.496 in) dia.** **b: 28.5 mm (1.122 in) dia.**
KV38100500 (—) Drift  NT115	Installing tapered roller bearing **a: 80 mm (3.15 in) dia.** **b: 60 mm (2.362 in) dia.**

Tool number (Kent-Moore No.) Tool name		Description
KV40100621 (J-25273) Drift	 WCIA0382E	Installing outer race and adjust shim **a: 76 mm (2.992 in) dia.**
ST30022000 (—) Drift	 WCIA0383E	Installing outer race and adjust shim **a: 56 mm (2.205 in) dia.** **b: 110 mm (4.331 in) dia.** **c: 15 mm (0.591 in) dia.**

Commercial Service Tools

ECS009CF

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts
Puller  NT077	Removing tapered roller bearing
Puller  NT411	Removing tapered roller bearings **a: 60 mm (2.36 in) dia.** **b: 35 mm (1.38 in) dia.**

A/T FLUID

PFP:KLE40

Changing A/T Fluid

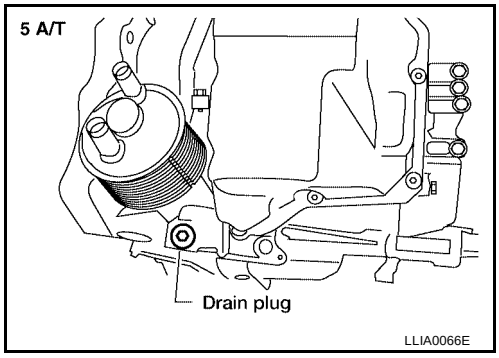
ECS00EMN

1. Run the engine to warm up the transaxle until the fluid is at full operating temperature “HOT”.

   Temperature range
   COLD : 30° – 40° C (86° – 104° F)
   HOT : 70° – 80° C (158° – 176° F)

2. Stop the engine.
3. Remove the engine undercover.
4. Drain the A/T fluid by removing the drain plug. Reinstall the drain plug to the specified torque using a new drain washer.

   Drain plug : Refer to AT-631, "REMOVAL AND INSTALLATION" .



5. Refill the transaxle with new specified A/T fluid through the A/T fluid charging pipe. Always refill the transaxle with the same volume amount that was drained out.

   CAUTION:
   Do not overfill the transaxle.

   Fluid grade and capacity : Refer to MA-12, "Fluids and Lubricants" .

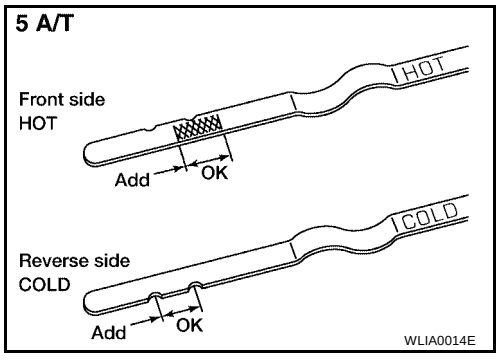
6. Run the engine at idle speed for five minutes.
7. Check fluid level and condition. Refer to AT-398, "Checking A/T Fluid" . If the fluid is still contaminated, repeat step 2 through 5.

Checking A/T Fluid

ECS00EMO

1. Warm up the engine.
2. Check for any transaxle fluid leaks.
3. Before driving, the fluid level can be checked at fluid temperature using the “COLD” range on the A/T fluid level gauge.

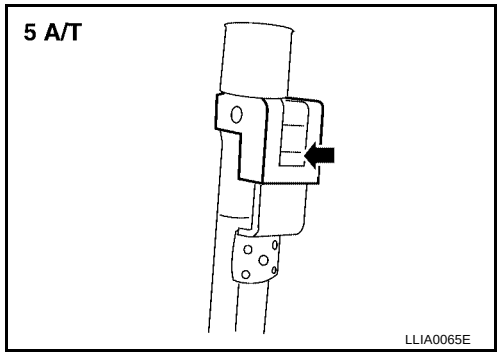
   Temperature range
   COLD : 30° – 40° C (86° – 104° F)
   HOT : 70° – 80° C (158° – 176° F)



a. Park the vehicle on a level surface and set parking brake.
b. Start the engine and move the transaxle selector lever through each gear position. Leave the selector lever in the “P” park position.

c. Check the fluid level with the engine idling.

CAUTION:
Firmly secure the A/T fluid level gauge into the A/T fluid charging pipe using the attached stopper, this will provide an accurate reading on the gauge.



d. Remove the A/T fluid level gauge and wipe it clean with a lint-free paper.

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

f. Remove the A/T fluid level gauge and note the reading. If the reading is at or below the low side of the range, add the necessary specified A/T fluid through the A/T fluid charging pipe and then re-insert the A/T fluid level gauge.

CAUTION:
- **Do not overfill the transaxle.**
- **Firmly secure the A/T fluid level gauge into the A/T fluid charging pipe using the attached stopper, this will provide an accurate reading on the gauge, and will keep the gauge in position while driving.**

4. Drive the vehicle for approximately 5 minutes at moderate speeds.

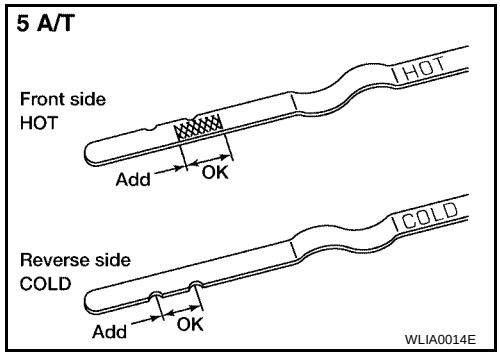
5. Re-check the fluid level at fluid temperatures using the “HOT” range on the A/T fluid level gauge.

CAUTION:
Firmly secure the A/T fluid level gauge into the A/T fluid charging pipe using the attached stopper, this will provide an accurate reading on the gauge, and will keep the gauge in position while driving.

Temperature range

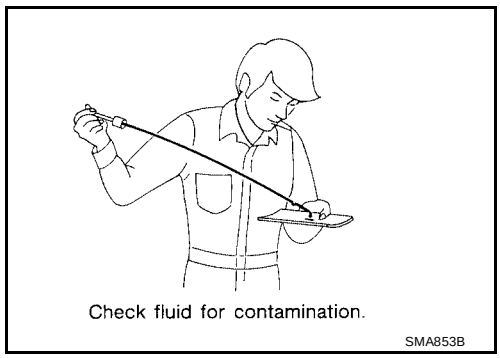
COLD : 30° – 40° C (86° – 104° F)

HOT : 70° – 80° C (158° – 176° F)



6. Check the fluid for the following conditions:

- If the fluid is very dark or smells burned, refer to the AT section for checking the operation of the transaxle. Flush the AT fluid cooling system after repairing the transaxle.
- If the fluid contains frictional material (from the clutches or bands), remove the radiator and flush the cooler lines using a cleaning solvent and compressed air after completing repairs to the transaxle. Refer to CO-34, "RADIATOR" .



A/T Fluid Cooler Cleaning

ECS00EMP

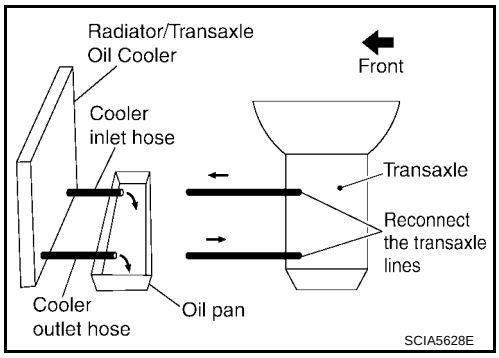
Whenever an automatic transaxle is repaired, overhauled, or replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned.
Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced A/T or, in severe cases, can block or restrict the flow of A/T fluid. In either case, malfunction of the newly serviced A/T may result.
Debris, if present, may build up as A/T fluid enters the cooler inlet. It will be necessary to back flush the cooler through the cooler outlet in order to flush out any built up debris.

A/T FLUID COOLER CLEANING PROCEDURE

1. Position an oil pan under the automatic transaxle's inlet and outlet cooler hoses.

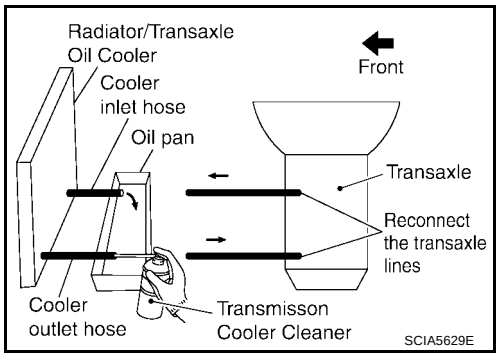
2. Identify the inlet and outlet fluid cooler hoses.
3. Disconnect the fluid cooler inlet and outlet rubber hoses from the steel cooler tubes or bypass valve.

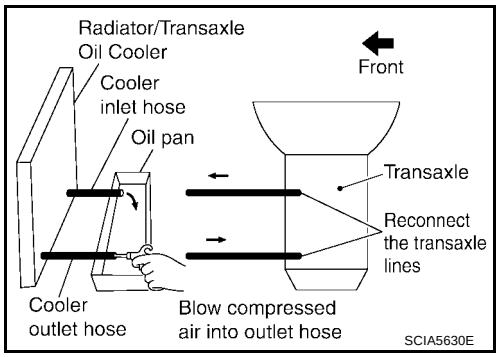
   NOTE:
   Replace the cooler hoses if rubber material from the hose remains on the tube fitting.
4. Allow any A/T fluid that remains in the cooler hoses to drain into the oil pan.



5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

   CAUTION:
   - **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
   - **Spray cooler cleaner only with adequate ventilation.**
   - **Avoid contact with eyes and skin.**
   - **Do not breath vapors or spray mist.**
6. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until fluid flows out of the cooler inlet hose for 5 seconds.
7. Insert the tip of an air gun into the end of the cooler outlet hose.
8. Wrap a shop rag around the air gun tip and of the cooler outlet hose.





9. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through the cooler outlet hose for 10 seconds to force out any remaining fluid.
10. Repeat steps 5 through 9 three additional times.
11. Position an oil pan under the banjo bolts that connect the fluid cooler steel lines to the transaxle.
12. Remove the banjo bolts.
13. Flush each steel line from the cooler side back toward the transaxle by spraying Transmission Cooler Cleaner in a continuous stream for 5 seconds.
14. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through each steel line from the cooler side back toward the transaxle for 10 seconds to force out any remaining fluid.
15. Ensure all debris is removed from the steel cooler lines.
16. Ensure all debris is removed from the banjo bolts and fittings.
17. Perform AT-400, "A/T FLUID COOLER DIAGNOSIS PROCEDURE" .

A/T FLUID COOLER DIAGNOSIS PROCEDURE

NOTE:
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

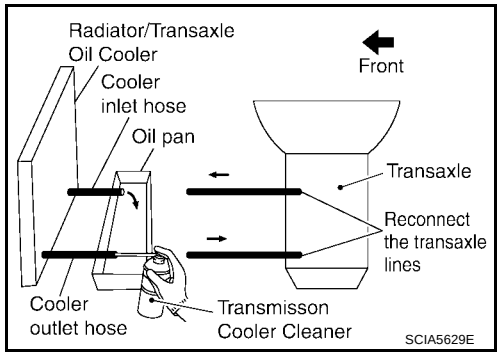
1. Position an oil pan under the automatic transaxle's inlet and outlet cooler hoses.
2. Clean the exterior and tip of the cooler inlet hose.

3. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.

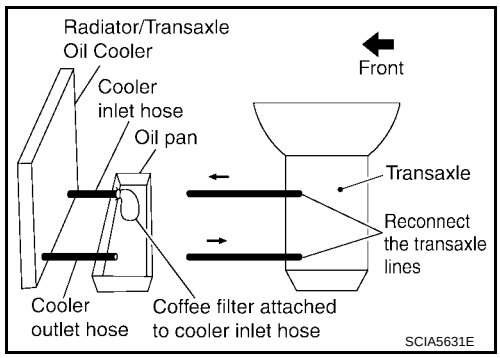
CAUTION:

- **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
- **Spray cooler cleaner only with adequate ventilation.**
- **Avoid contact with eyes and skin.**
- **Do not breath vapors or spray mist.**

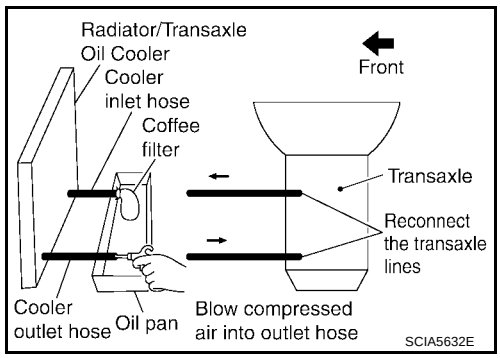
4. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until fluid flows out of the cooler inlet hose for 5 seconds.



5. Tie a common white, basket-type coffee filter to the end of the cooler inlet hose.



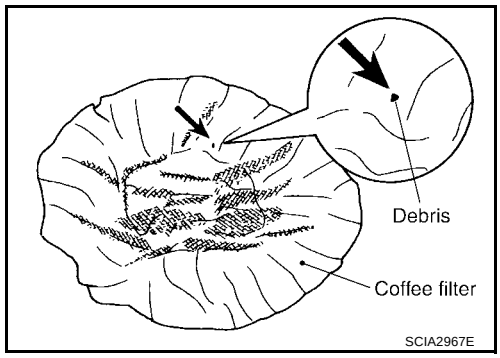
6. Insert the tip of an air gun into the end of the cooler outlet hose.
7. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
8. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through the cooler outlet hose to force any remaining A/T fluid into the coffee filter.
9. Remove the coffee filter from the end of the cooler inlet hose.
10. Perform AT-401, "A/T FLUID COOLER INSPECTION PROCEDURE" .



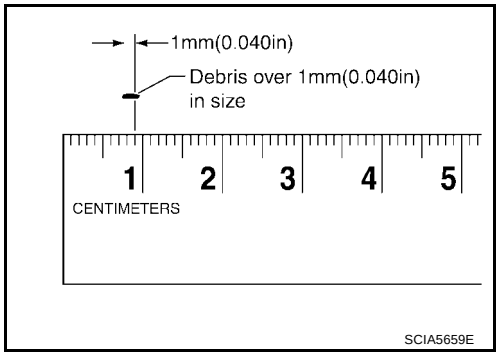
A/T FLUID COOLER INSPECTION PROCEDURE

1. Inspect the coffee filter for debris.

a. If small metal debris less than 1mm (0.040 in) in size or metal powder is found in the coffee filter, this is normal. If normal debris is found, the A/T fluid cooler/radiator can be re-used and the procedure is ended.



b. If one or more pieces of debris are found that are over 1mm (0.040 in) in size and/or peeled clutch facing material is found in the coffee filter, the fluid cooler is not serviceable. The A/T fluid cooler/radiator must be replaced and the inspection procedure is ended. Refer to CO-34, "RADIATOR" .



A/T FLUID COOLER FINAL INSPECTION

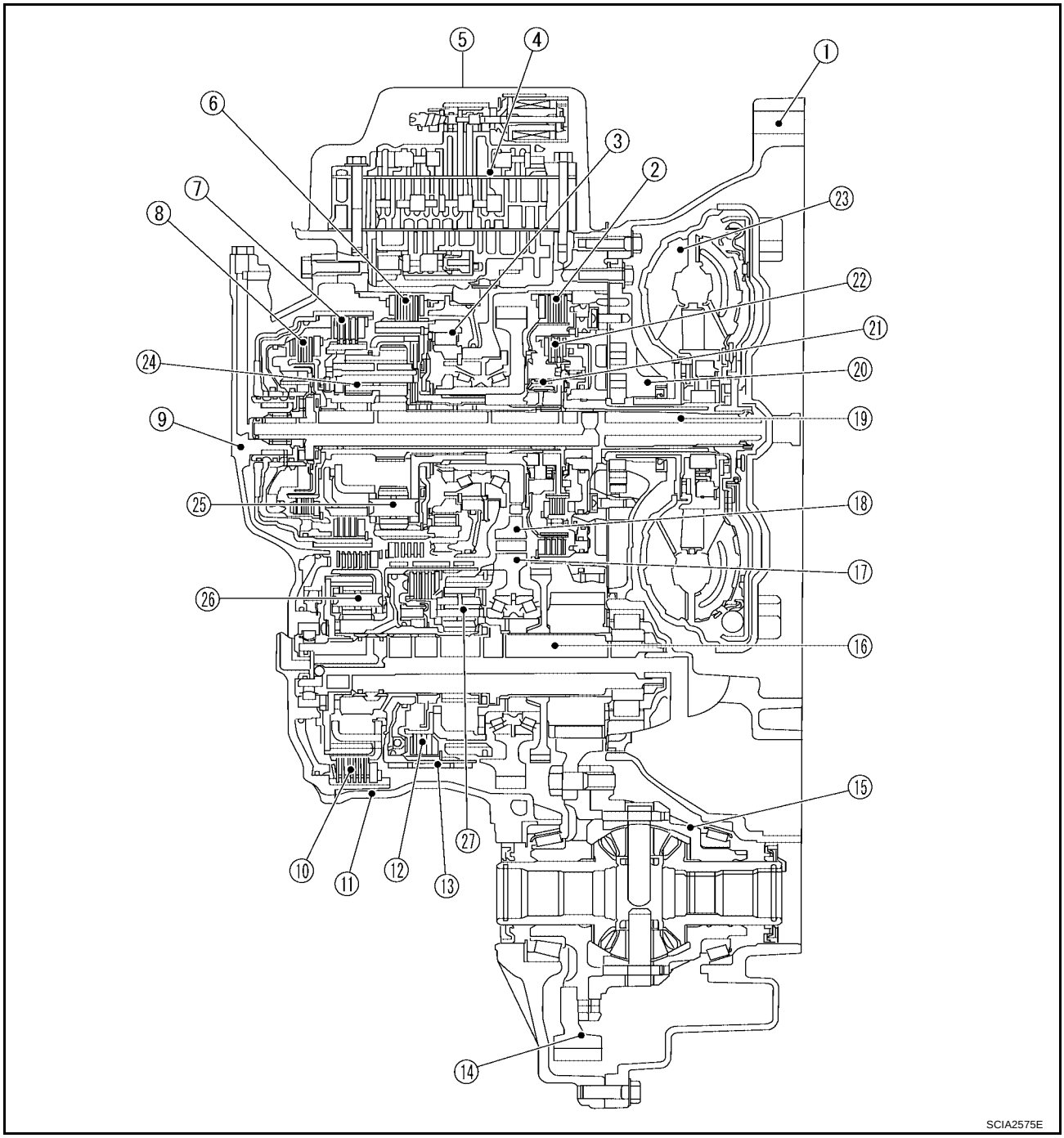
After performing all procedures, ensure that all remaining oil is cleaned from all components.

A/T CONTROL SYSTEM

PFP:31036

Cross-Sectional View

ECS009CI

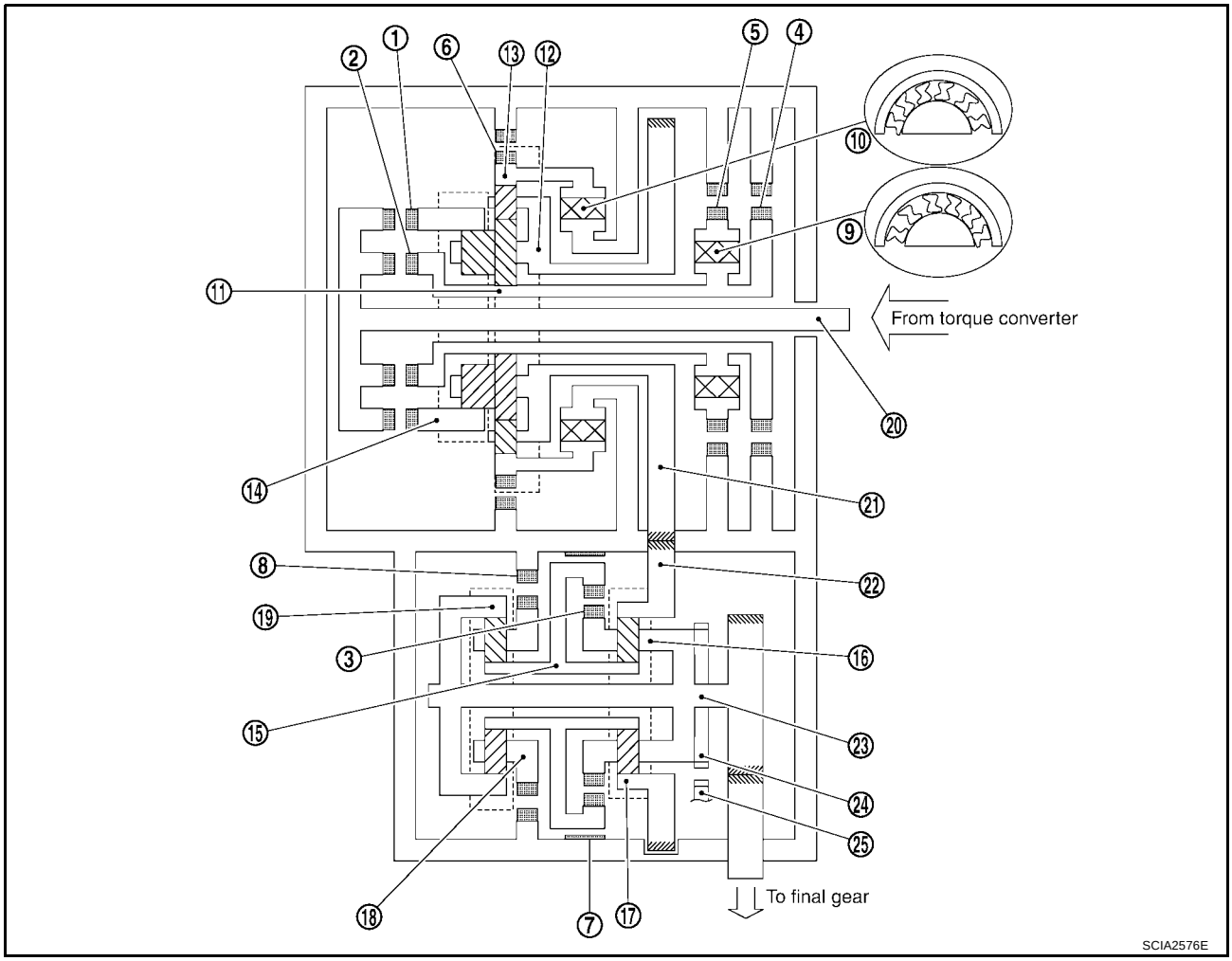


1. Converter housing
2. 2nd brake
3. One-way clutch No. 2
4. Control valve assembly
5. Side cover
6. 1st and reverse brake
7. Forward clutch
8. Direct clutch
9. Transaxle case cover
10. B5 brake
11. Transaxle case
12. U/D clutch
13. U/D brake
14. Final gear
15. Differential case
16. Output shaft
17. Counter driven gear
18. Counter drive gear
19. Input shaft
20. Oil pump
21. One-way clutch No. 1
22. 2nd coast brake
23. Torque converter
24. Main rear planetary gear
25. Main front planetary gear
26. U/D rear planetary gear
27. U/D front planetary gear

Shift Mechanism

ECS009CJ

CONSTRUCTION



1. Forward clutch
2. Direct clutch
3. U/D clutch
4. 2nd coast brake
5. 2nd brake
6. 1st and reverse brake
7. U/D brake
8. B5 brake
9. One-way clutch No. 1
10. One-way clutch No. 2
11. Main sun gear
12. Main planetary carrier
13. Main front internal gear
14. Main rear internal gear
15. U/D sun gear
16. U/D front planetary carrier
17. U/D front internal gear
18. U/D rear planetary carrier
19. U/D rear internal gear
20. Input shaft
21. Counter drive gear
22. Counter driven gear
23. Output shaft
24. Parking gear
25. Parking pawl

FUNCTION OF CLUTCH AND BRAKE

Clutch and brake components	Abbr.	Function
Forward clutch **1**	F/C	Connect input shaft **20** to main rear internal gear **10** .
Direct clutch **2**	D/C	Connect input shaft **20** to main sun gear **11** .
U/D clutch **3**	U/D.C	Connect U/D sun gear **15** to U/D front planetary carrier **16** .
2nd coast brake **4**	2nd C/B	Lock main sun gear **11** .
2nd brake **5**	2nd/B	Lock counterclockwise rotation of main sun gear **11** .
1st and reverse brake **6**	1st & R/B	Lock main front internal gear **13** .
U/D brake **7**	U/D.B	Lock U/D sun gear **15** .
B5 brake **8**	B5/B	Lock U/D rear planetary carrier **18** .
One-way clutch No. 1 **9**	O.C1	Lock counterclockwise rotation of main sun gear **11** , when 2nd brake **5** operations.
One-way clutch No. 2 **10**	O.C2	Lock counterclockwise rotation of main front internal gear **13** .

CLUTCH AND BAND CHART

Shift position		Clutch			Brake					One-way clutch		Remarks
		F/C **1**	D/C **2**	U/D.C **3**	2nd C/B **4**	2nd/B **5**	1st & R/B **6**	U/D.B **7**	B5/B **8**	O.C1 **9**	O.C2 **10**	
P									○			PARK POSITION
R			○				○		○			REVERSE POSITION
N									○			NEUTRAL POSITION
D	1st	○							○		○	Automatic shift 1 ⇔ 2 ⇔ 3 ⇔ 4 ⇔ 5
	1 ⇔ 2	○			△	△			○	△	△	
	2nd	○			○	○			○	○		
	2 ⇔ 3	○			○	○		△	△	○		
	3rd	○			○	○		○		○		
	3 ⇔ 4	○		△	○	○		△		○		
	4th	○		○	○	○				○		
	4 ⇔ 5	○	△	○	△	○				△		
	5th	○	○	○		○						
M5	5th	○	○	○		○						Locks in 5th gear*
M4	4th	○		○	○	○				○		Locks in 4th gear*
M3	3rd	○			○	○		○		○		Locks in 3rd gear*
M2	2nd	○			○	○			○	○		Locks in 2nd gear*
M1	1st	○					○		○		○	Locks in 1st gear*

○: Operates

△: In transition between applied and released.

*: Except when automated up/down shift control and up/down shift permission control are activated. Refer to AT-424, "MANUAL MODE" .

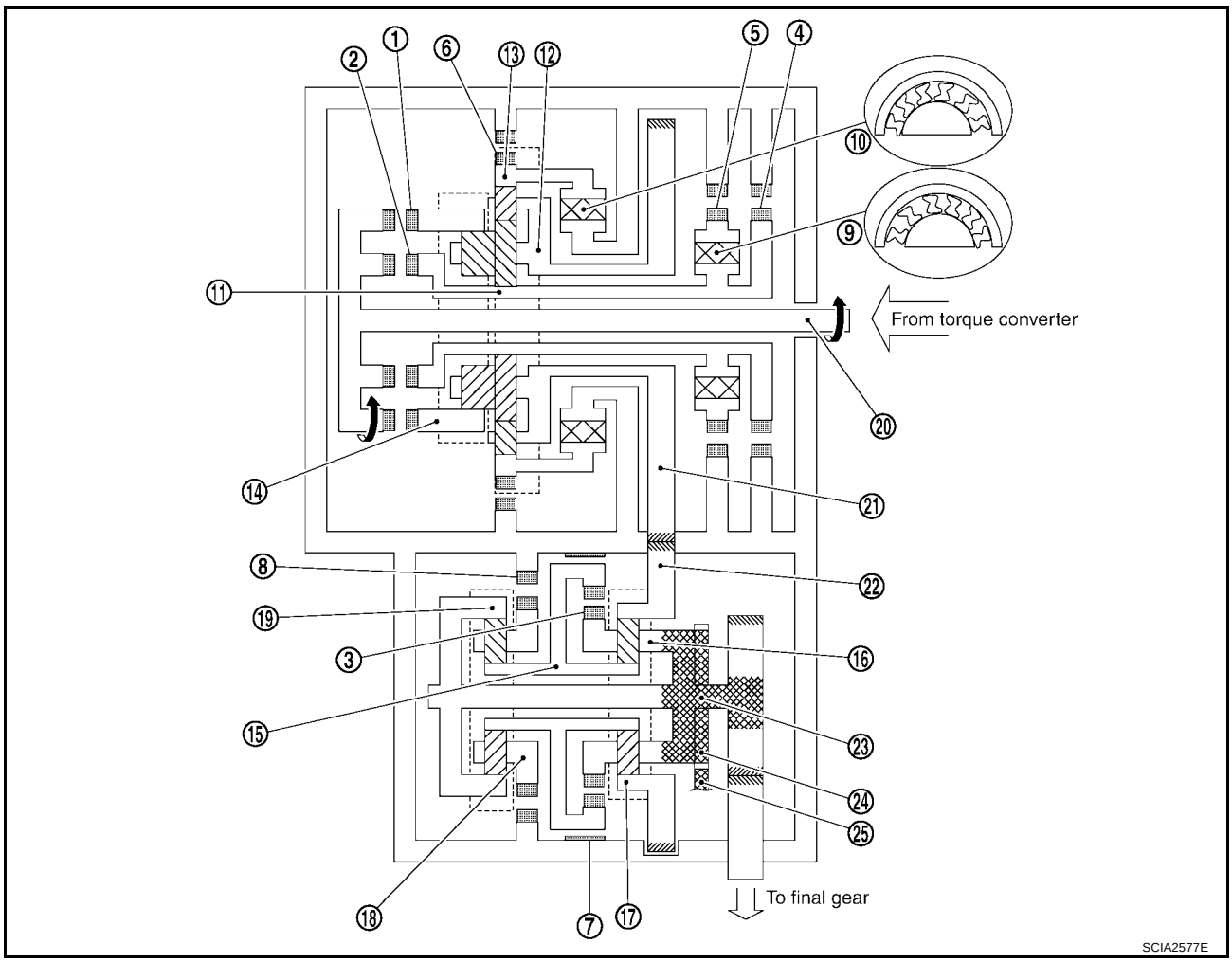
POWER TRANSMISSION

“N” position

Since both the forward clutch and the direct clutch are released, torque from the input shaft drive is not transmitted to the output shaft.

“P” position

- The same as for the “N” position, both the forward clutch and the direct clutch are released, so torque from the input shaft drive is not transmitted to the output shaft.
- The parking pole linked with the selector lever meshes with the parking gear and fastens the output shaft mechanically.

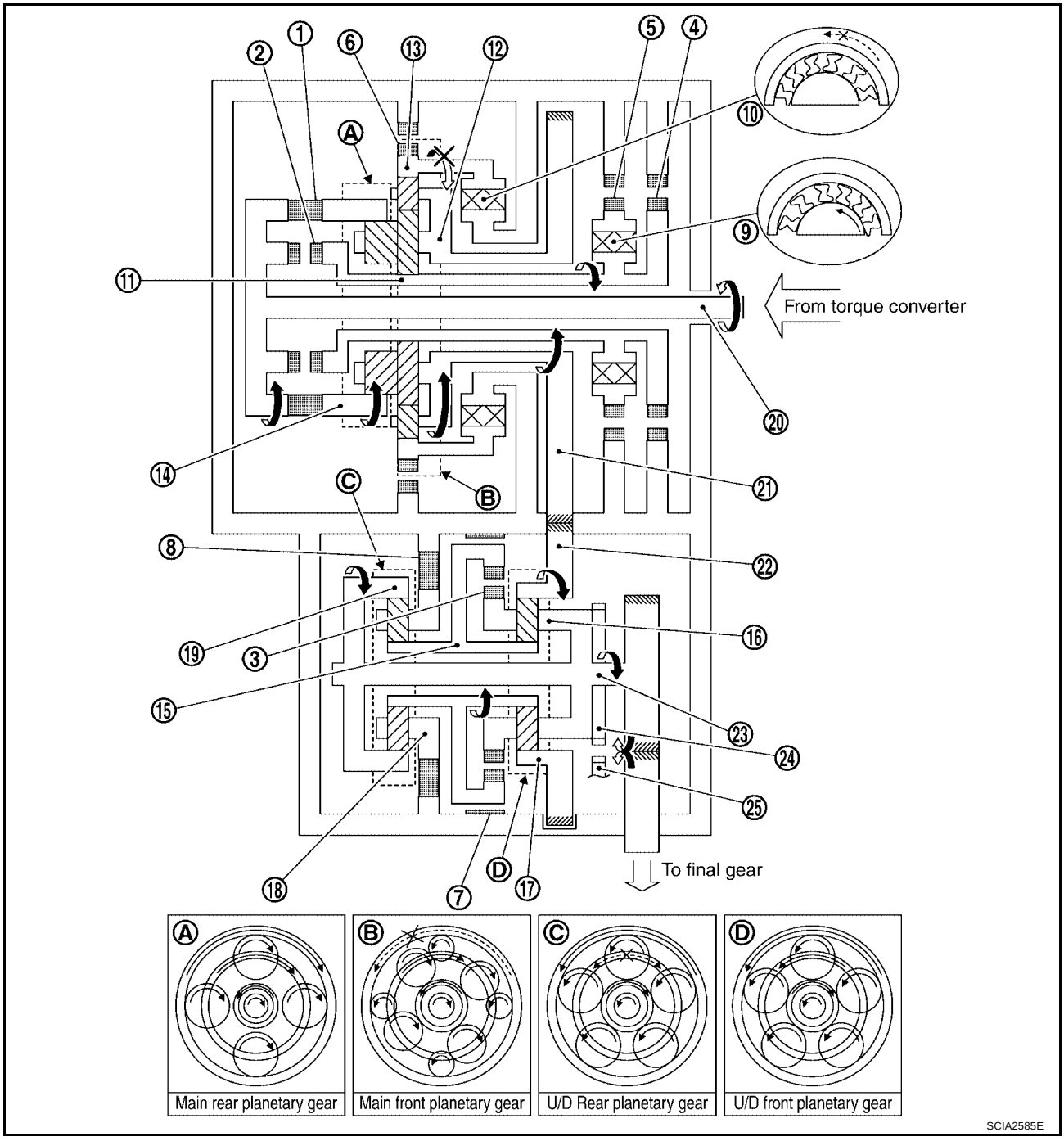


1. Forward clutch
2. Direct clutch
3. U/D clutch
4. 2nd coast brake
5. 2nd brake
6. 1st and reverse brake
7. U/D brake
8. B5 brake
9. One-way clutch No. 1
10. One-way clutch No. 2
11. Main sun gear
12. Main planetary carrier
13. Main front internal gear
14. Main rear internal gear
15. U/D sun gear
16. U/D front planetary carrier
17. U/D front internal gear
18. U/D rear planetary carrier
19. U/D rear internal gear
20. Input shaft
21. Counter drive gear
22. Counter driven gear
23. Output shaft
24. Parking gear
25. Parking pawl

“D” position 1st gear

1. Input shaft rotates clockwise.
2. Forward clutch operates. (Connect input shaft to main rear internal gear.)
3. Main rear internal gear rotates clockwise.
4. Main rear planetary pinion gear rotates itself clockwise.
5. Main front large planetary pinion gear rotates itself clockwise for rear planetary pinion and one.
6. Main front small planetary pinion gear rotates itself counterclockwise.
7. Main front internal gear is going to rotates counterclockwise.
8. One-way clutch No. 2 operates. (Lock counterclockwise rotation of main front internal gear.)
9. Main planetary carrier revolves clockwise due to reaction force of front small planetary pinion gear.
10. Counter drive gear rotates clockwise for main planetary carrier and one.
11. Counter driven gear rotates counterclockwise.
12. U/D front internal gear rotates counterclockwise for counter driven gear and one.
13. U/D front planetary pinion gear rotates itself counterclockwise.
14. U/D sun gear rotates clockwise.
15. U/D rear planetary pinion gear rotates itself counterclockwise.
16. B5 brake operate. (Lock rotation of U/D rear planetary carrier.)
17. U/D rear internal gear rotates counterclockwise.
18. U/D front planetary carrier and output shaft rotates counterclockwise for U/D rear internal gear and one.
19. Final gear clockwise.

- During deceleration, main front internal gear clockwise due to rotation itself clockwise of main front small planetary pinion gear, but driving force loses due to free of one-way clutch No. 2. Therefore, engine brake does not operate.

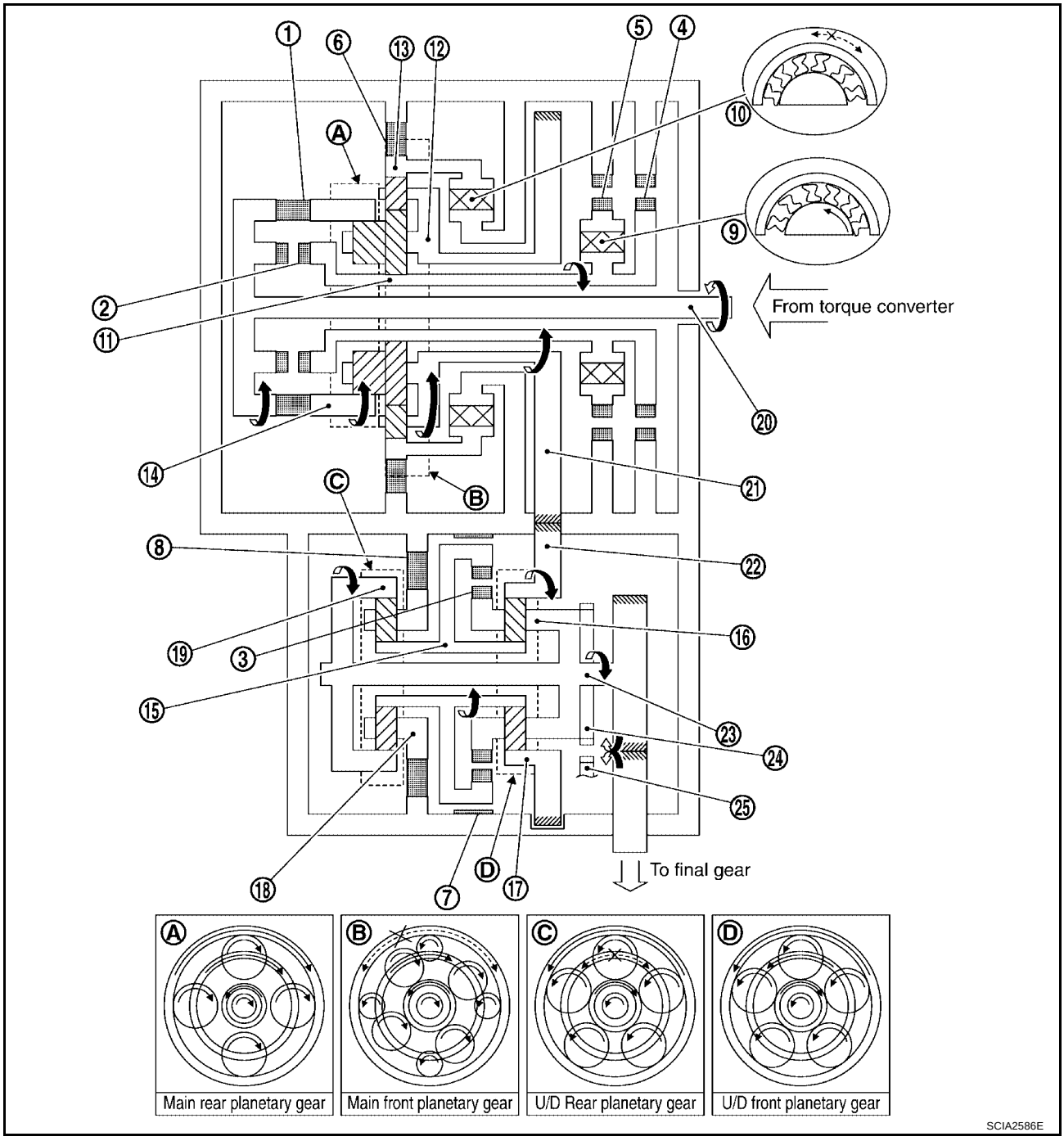


1. Forward clutch
2. Direct clutch
3. U/D clutch
4. 2nd coast brake
5. 2nd brake
6. 1st and reverse brake
7. U/D brake
8. B5 brake
9. One-way clutch No. 1
10. One-way clutch No. 2
11. Main sun gear
12. Main planetary carrier
13. Main front internal gear
14. Main rear internal gear
15. U/D sun gear
16. U/D front planetary carrier
17. U/D front internal gear
18. U/D rear planetary carrier
19. U/D rear internal gear
20. Input shaft
21. Counter drive gear
22. Counter driven gear
23. Output shaft
24. Parking gear
25. Parking pawl

“M1” position 1st gear

1. Input shaft rotates clockwise.
2. Forward clutch operates. (Connect input shaft to main rear internal gear.)
3. Main rear internal gear rotates clockwise.
4. Main rear planetary pinion gear rotates itself clockwise.
5. Main front large planetary pinion gear rotates itself clockwise for rear planetary pinion gear and one.
6. Main front small planetary pinion gear rotates itself counterclockwise.
7. Main front internal gear is going to rotates counterclockwise.
8. 1st and reverse brake operates. (Lock rotation of main front internal gear.)
9. Main planetary carrier revolves clockwise due to reaction force of front small planetary pinion gear.
10. Counter drive gear rotates clockwise for main planetary carrier and one.
11. Counter driven gear rotates counterclockwise.
12. U/D front internal gear rotates counterclockwise for counter driven gear and one.
13. U/D front planetary pinion gear rotates itself counterclockwise.
14. U/D sun gear rotates clockwise.
15. U/D rear planetary pinion gear rotates itself counterclockwise.
16. B5 brake operate. (Lock rotation of U/D rear planetary carrier.)
17. U/D rear internal gear rotates counterclockwise.
18. U/D front planetary carrier and output shaft rotates counterclockwise for U/D rear internal gear and one.
19. Final gear clockwise.

- During deceleration, driving force is connected to input shaft directly without one-way clutch. Therefore, engine brake operates.

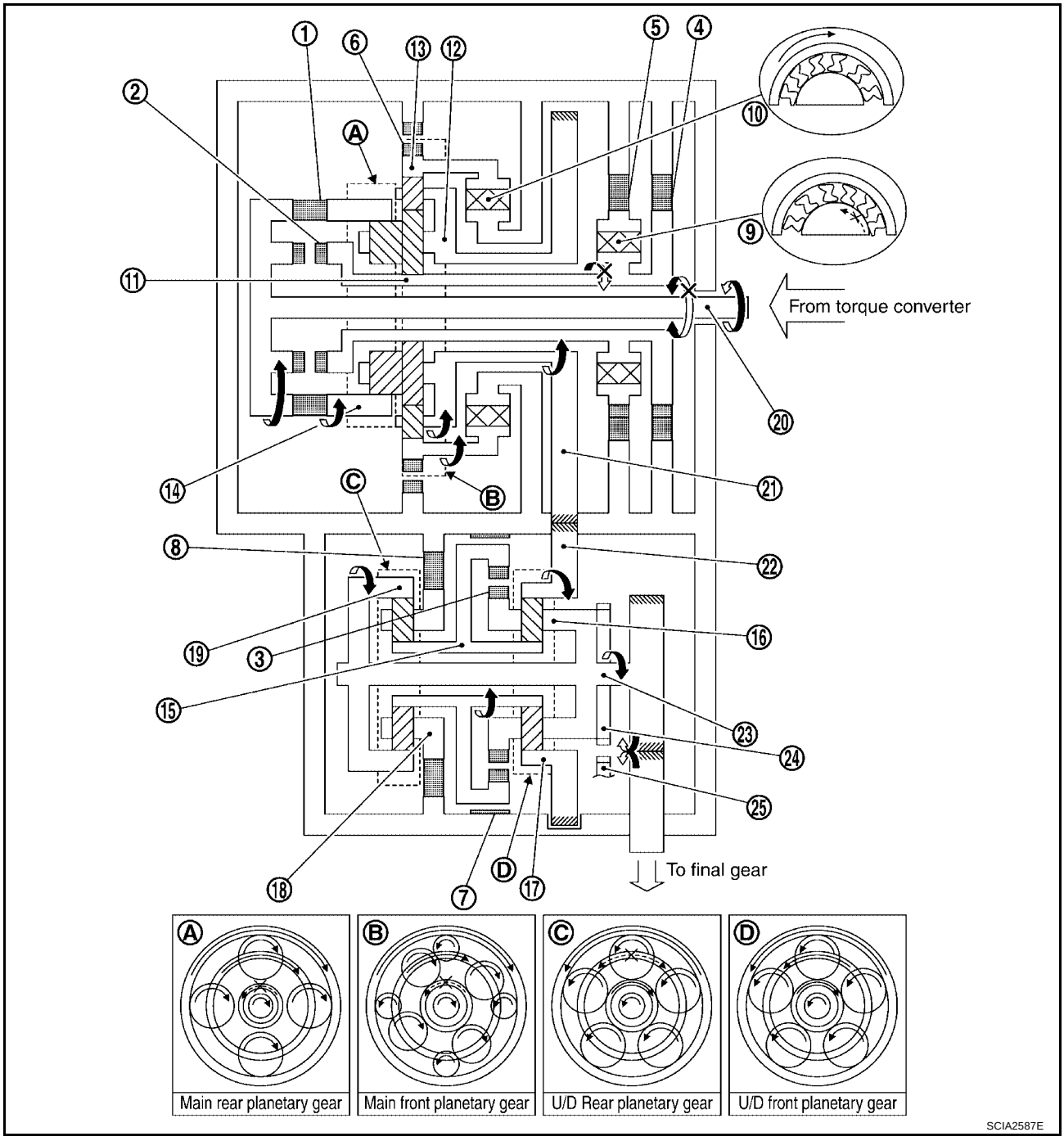


1. Forward clutch
2. Direct clutch
3. U/D clutch
4. 2nd coast brake
5. 2nd brake
6. 1st and reverse brake
7. U/D brake
8. B5 brake
9. One-way clutch No. 1
10. One-way clutch No. 2
11. Main sun gear
12. Main planetary carrier
13. Main front internal gear
14. Main rear internal gear
15. U/D sun gear
16. U/D front planetary carrier
17. U/D front internal gear
18. U/D rear planetary carrier
19. U/D rear internal gear
20. Input shaft
21. Counter drive gear
22. Counter driven gear
23. Output shaft
24. Parking gear
25. Parking pawl

“D”, “M2” positions 2nd gear

1. Input shaft rotates clockwise.
2. Forward clutch operates. (Connect input shaft to main rear internal gear.)
3. Main rear internal gear rotates clockwise.
4. Main rear planetary pinion gear rotates itself clockwise.
5. Main front large planetary pinion gear rotates itself clockwise for rear planetary pinion and one.
6. 2nd brake and 2nd coast brake operates.
7. One-way clutch No. 1 operates. (Lock rotation of main sun gear.)
8. Main planetary carrier revolves clockwise due to reaction force of front large planetary pinion gear.
9. Counter drive gear rotates clockwise for main planetary carrier and one.
10. Counter driven gear rotates counterclockwise.
11. U/D front internal gear rotates counterclockwise for counter driven gear and one.
12. U/D front planetary pinion gear rotates itself counterclockwise.
13. U/D sun gear rotates clockwise.
14. U/D rear planetary pinion gear rotates itself counterclockwise.
15. B5 brake operate. (Lock rotation of U/D rear planetary carrier.)
16. U/D rear internal gear rotates counterclockwise.
17. U/D front planetary carrier and output shaft rotates counterclockwise for U/D rear internal gear and one.
18. Final gear clockwise.

- During deceleration, driving force is connected to input shaft directly without one-way clutch. Therefore, engine brake operates.

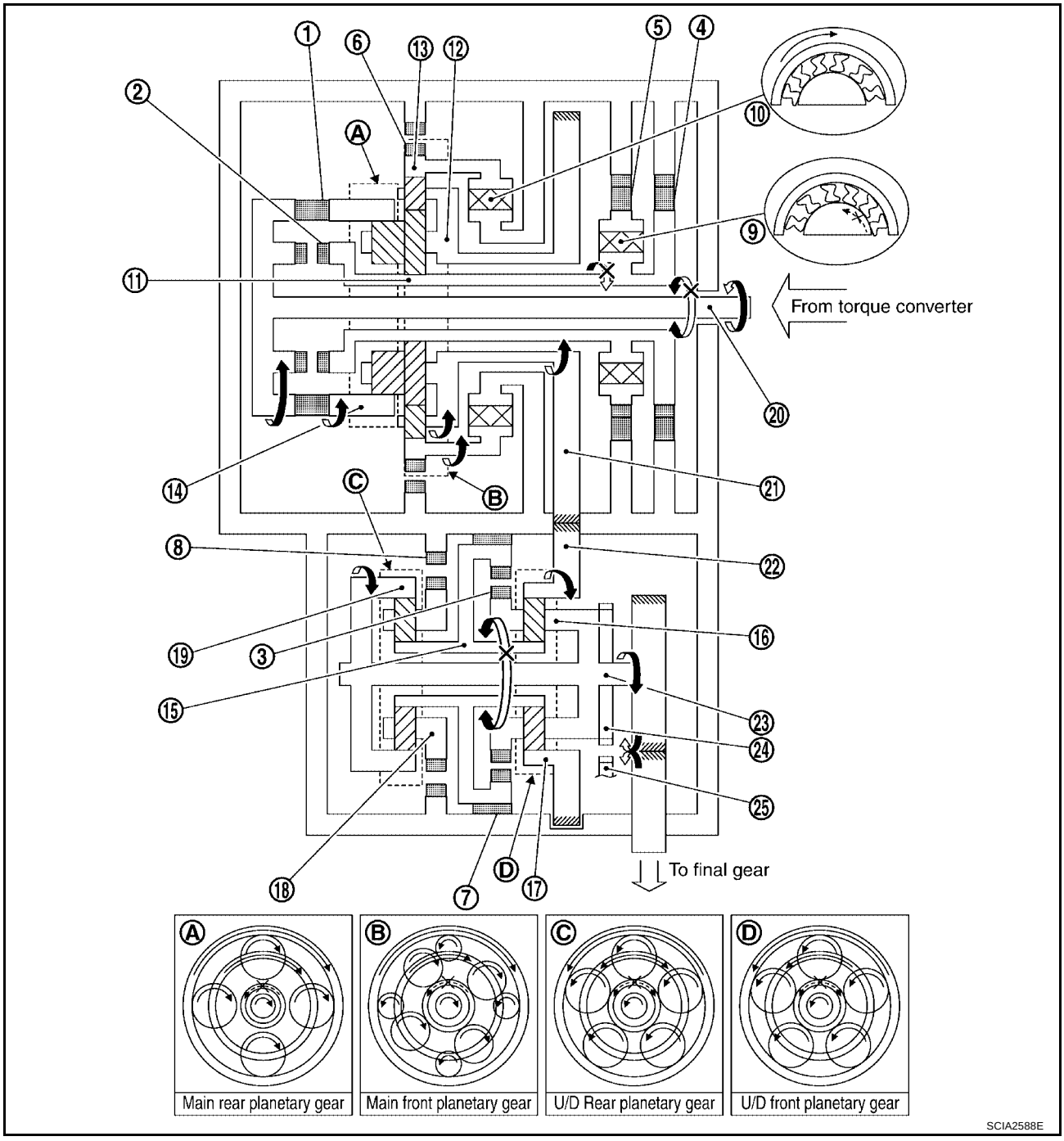


1. Forward clutch
2. Direct clutch
3. U/D clutch
4. 2nd coast brake
5. 2nd brake
6. 1st and reverse brake
7. U/D brake
8. B5 brake
9. One-way clutch No. 1
10. One-way clutch No. 2
11. Main sun gear
12. Main planetary carrier
13. Main front internal gear
14. Main rear internal gear
15. U/D sun gear
16. U/D front planetary carrier
17. U/D front internal gear
18. U/D rear planetary carrier
19. U/D rear internal gear
20. Input shaft
21. Counter drive gear
22. Counter driven gear
23. Output shaft
24. Parking gear
25. Parking pawl

“D”, “M3” positions 3rd gear

1. Input shaft rotates clockwise.
2. Forward clutch operates. (Connect input shaft to main rear internal gear.)
3. Main rear internal gear rotates clockwise.
4. Main rear planetary pinion gear rotates itself clockwise.
5. Main front large planetary pinion gear rotates itself clockwise for rear planetary pinion and one.
6. 2nd brake and 2nd coast brake operates.
7. One-way clutch No. 1 operates. (Lock rotation of main sun gear.)
8. Main planetary carrier revolves clockwise due to reaction force of front large planetary pinion gear.
9. Counter drive gear rotates clockwise for main planetary carrier and one.
10. Counter driven gear rotates counterclockwise.
11. U/D front internal gear rotates counterclockwise for counter driven gear and one.
12. U/D front planetary pinion gear rotates itself counterclockwise.
13. U/D brake operate. (Lock rotation of U/D sun gear.)
14. U/D front planetary carrier revolves counterclockwise due to reaction force of U/D front planetary pinion gear.
15. U/D rear internal gear and output shaft rotates counterclockwise for U/D front planetary carrier and one.
16. Final gear clockwise.

- During deceleration, driving force is connected to input shaft directly without one-way clutch. Therefore, engine brake operates.

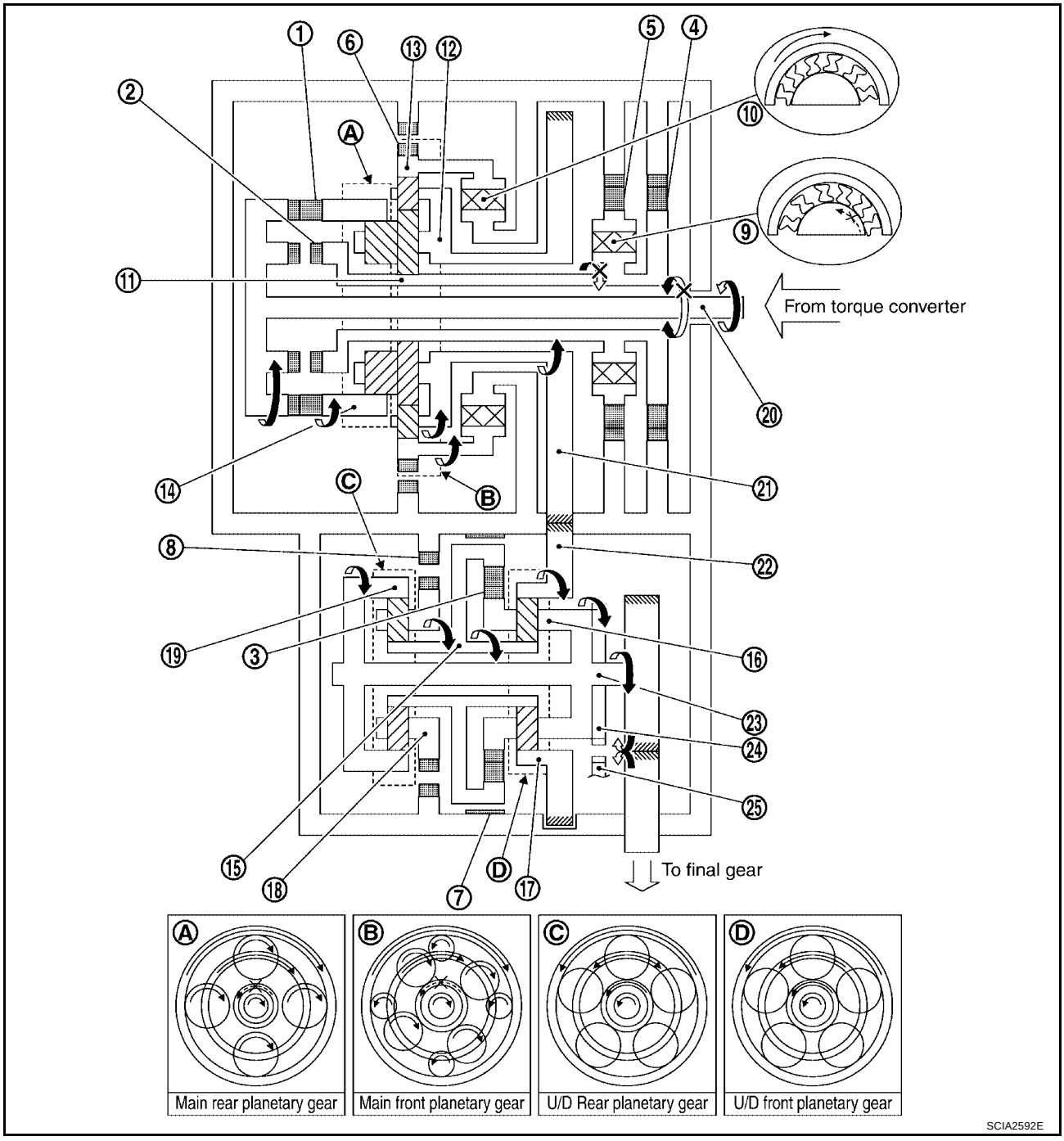


1. Forward clutch
2. Direct clutch
3. U/D clutch
4. 2nd coast brake
5. 2nd brake
6. 1st and reverse brake
7. U/D brake
8. B5 brake
9. One-way clutch No. 1
10. One-way clutch No. 2
11. Main sun gear
12. Main planetary carrier
13. Main front internal gear
14. Main rear internal gear
15. U/D sun gear
16. U/D front planetary carrier
17. U/D front internal gear
18. U/D rear planetary carrier
19. U/D rear internal gear
20. Input shaft
21. Counter drive gear
22. Counter driven gear
23. Output shaft
24. Parking gear
25. Parking pawl

“D”, “M4” positions 4th gear

1. Input shaft rotates clockwise.
2. Forward clutch operates. (Connect input shaft to main rear internal gear.)
3. Main rear internal gear rotates clockwise.
4. Main rear planetary pinion gear rotates itself clockwise.
5. Main front large planetary pinion gear rotates itself clockwise for rear planetary pinion and one.
6. 2nd brake and 2nd coast brake operates.
7. One-way clutch No. 1 operates. (Lock rotation of main sun gear.)
8. Main planetary carrier revolves clockwise due to reaction force of front large planetary pinion gear.
9. Counter drive gear rotates clockwise for main planetary carrier and one.
10. Counter driven gear rotates counterclockwise.
11. U/D front internal gear rotates counterclockwise for counter driven gear and one.
12. U/D clutch operate. (Connect U/D sun gear to U/D front planetary carrier.)
13. U/D front planetary pinion gear cannot rotate itself, and U/D unit rotates counterclockwise as one.
14. Output shaft rotates counterclockwise for U/D unit and one.
15. Final gear clockwise.

- During deceleration, driving force is connected to input shaft directly without one-way clutch. Therefore, engine brake operates.

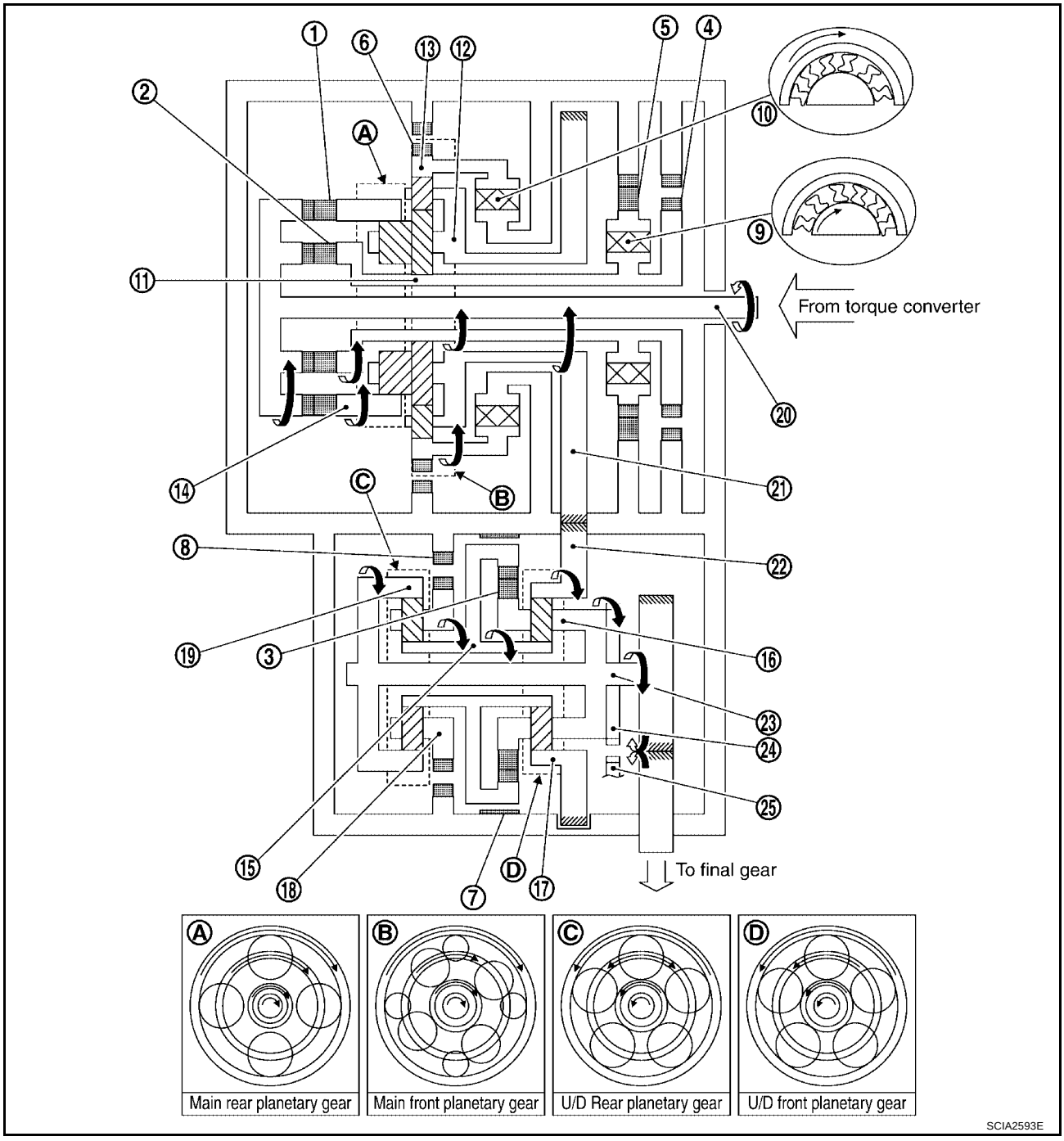


1. Forward clutch
2. Direct clutch
3. U/D clutch
4. 2nd coast brake
5. 2nd brake
6. 1st and reverse brake
7. U/D brake
8. B5 brake
9. One-way clutch No. 1
10. One-way clutch No. 2
11. Main sun gear
12. Main planetary carrier
13. Main front internal gear
14. Main rear internal gear
15. U/D sun gear
16. U/D front planetary carrier
17. U/D front internal gear
18. U/D rear planetary carrier
19. U/D rear internal gear
20. Input shaft
21. Counter drive gear
22. Counter driven gear
23. Output shaft
24. Parking gear
25. Parking pawl

“D”, “M5” positions 5th gear

1. Input shaft rotates clockwise.
2. Forward clutch operates. (Connect input shaft to main rear internal gear.)
3. Direct clutch operates. (Connect input shaft to main sun gear.)
4. Main rear planetary pinion gear cannot rotate itself, and main rear planetary unit rotates clockwise as one.
5. Main front large planetary pinion gear cannot rotate itself for main rear planetary pinion gear and one, and main front planetary unit rotates clockwise as one.
6. Counter drive gear rotates clockwise for main front planetary unit and one.
7. Counter driven gear rotates counterclockwise.
8. U/D front internal gear rotates counterclockwise for counter driven gear and one.
9. U/D clutch operate. (Connect U/D sun gear to U/D front planetary carrier.)
10. U/D front planetary pinion gear cannot rotate itself, and U/D unit rotates counterclockwise as one.
11. Output shaft rotates counterclockwise for U/D unit and one.
12. Final gear clockwise.

- During deceleration, driving force is connected to input shaft directly without one-way clutch. Therefore, engine brake operates.

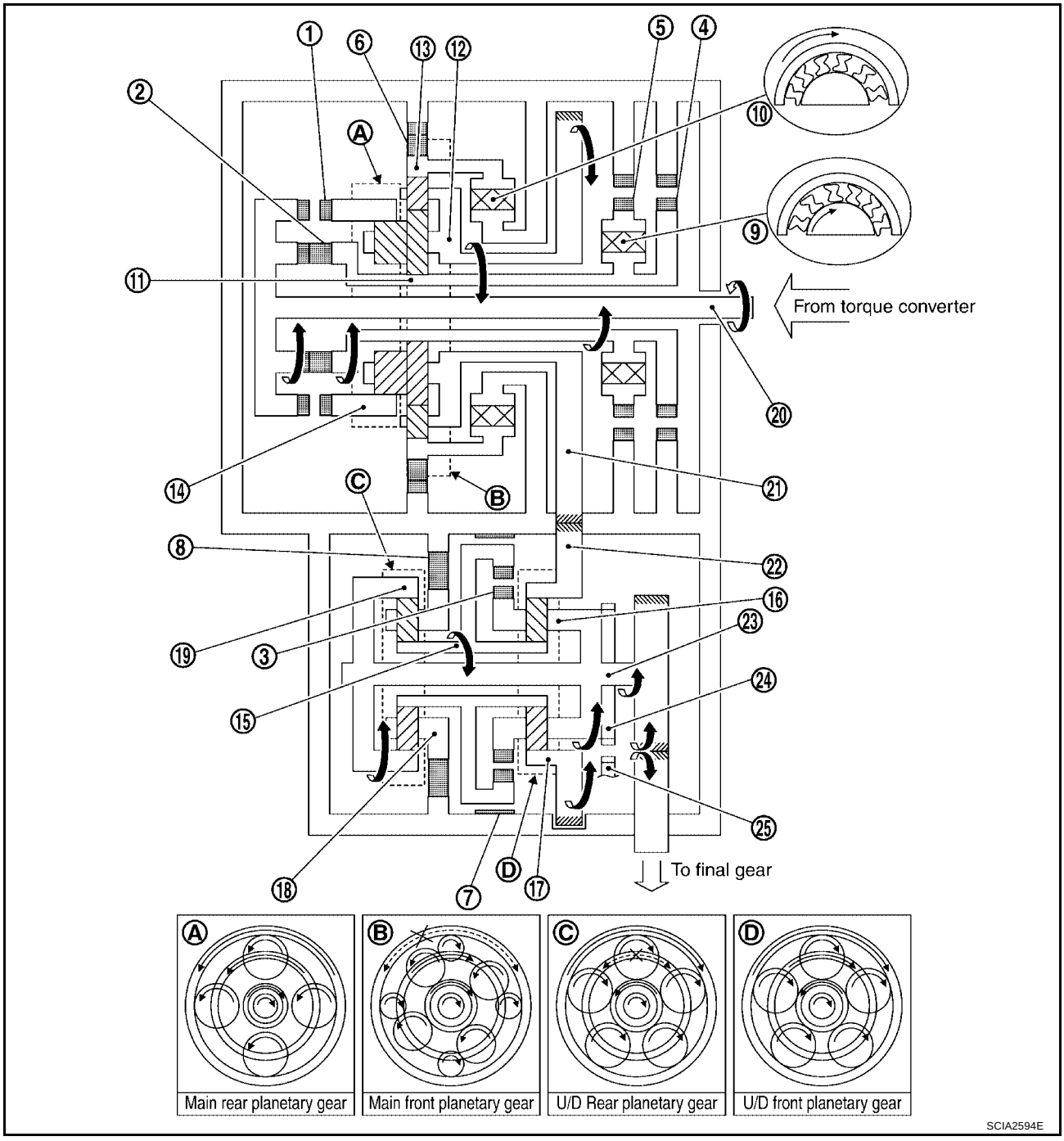


1. Forward clutch
2. Direct clutch
3. U/D clutch
4. 2nd coast brake
5. 2nd brake
6. 1st and reverse brake
7. U/D brake
8. B5 brake
9. One-way clutch No. 1
10. One-way clutch No. 2
11. Main sun gear
12. Main planetary carrier
13. Main front internal gear
14. Main rear internal gear
15. U/D sun gear
16. U/D front planetary carrier
17. U/D front internal gear
18. U/D rear planetary carrier
19. U/D rear internal gear
20. Input shaft
21. Counter drive gear
22. Counter driven gear
23. Output shaft
24. Parking gear
25. Parking pawl

“R” position

1. Input shaft rotates clockwise.
2. Direct clutch operates. (Connect input shaft to main sun gear.)
3. Main sun gear rotates clockwise.
4. Main rear planetary pinion gear rotates itself clockwise.
5. Main front large planetary pinion gear rotates itself counterclockwise for rear planetary pinion gear and one.
6. Main front small planetary pinion gear rotates itself clockwise.
7. 1st and reverse brake operates. (Lock rotation of main front internal gear.)
8. Main planetary carrier revolves counterclockwise due to reaction force of front small planetary pinion gear.
9. Counter drive gear rotates counterclockwise for main planetary carrier and one.
10. Counter driven gear rotates clockwise.
11. U/D front internal gear rotates clockwise for counter driven gear and one.
12. U/D front planetary pinion gear rotates itself clockwise.
13. U/D sun gear rotates counterclockwise.
14. U/D rear planetary pinion gear rotates itself clockwise.
15. B5 brake operate. (Lock rotation of U/D rear planetary carrier.)
16. U/D rear internal gear rotates clockwise.
17. U/D front planetary carrier and output shaft rotates clockwise for U/D rear internal gear and one.
18. Final gear counterclockwise.

- During deceleration, driving force is connected to input shaft directly without one-way clutch. Therefore, engine brake operates.



1. Forward clutch
2. Direct clutch
3. U/D clutch
4. 2nd coast brake
5. 2nd brake
6. 1st and reverse brake
7. U/D brake
8. B5 brake
9. One-way clutch No. 1
10. One-way clutch No. 2
11. Main sun gear
12. Main planetary carrier
13. Main front internal gear
14. Main rear internal gear
15. U/D sun gear
16. U/D front planetary carrier
17. U/D front internal gear
18. U/D rear planetary carrier
19. U/D rear internal gear
20. Input shaft
21. Counter drive gear
22. Counter driven gear
23. Output shaft
24. Parking gear
25. Parking pawl

TCM Function

ECS009CK

The function of the TCM is to:

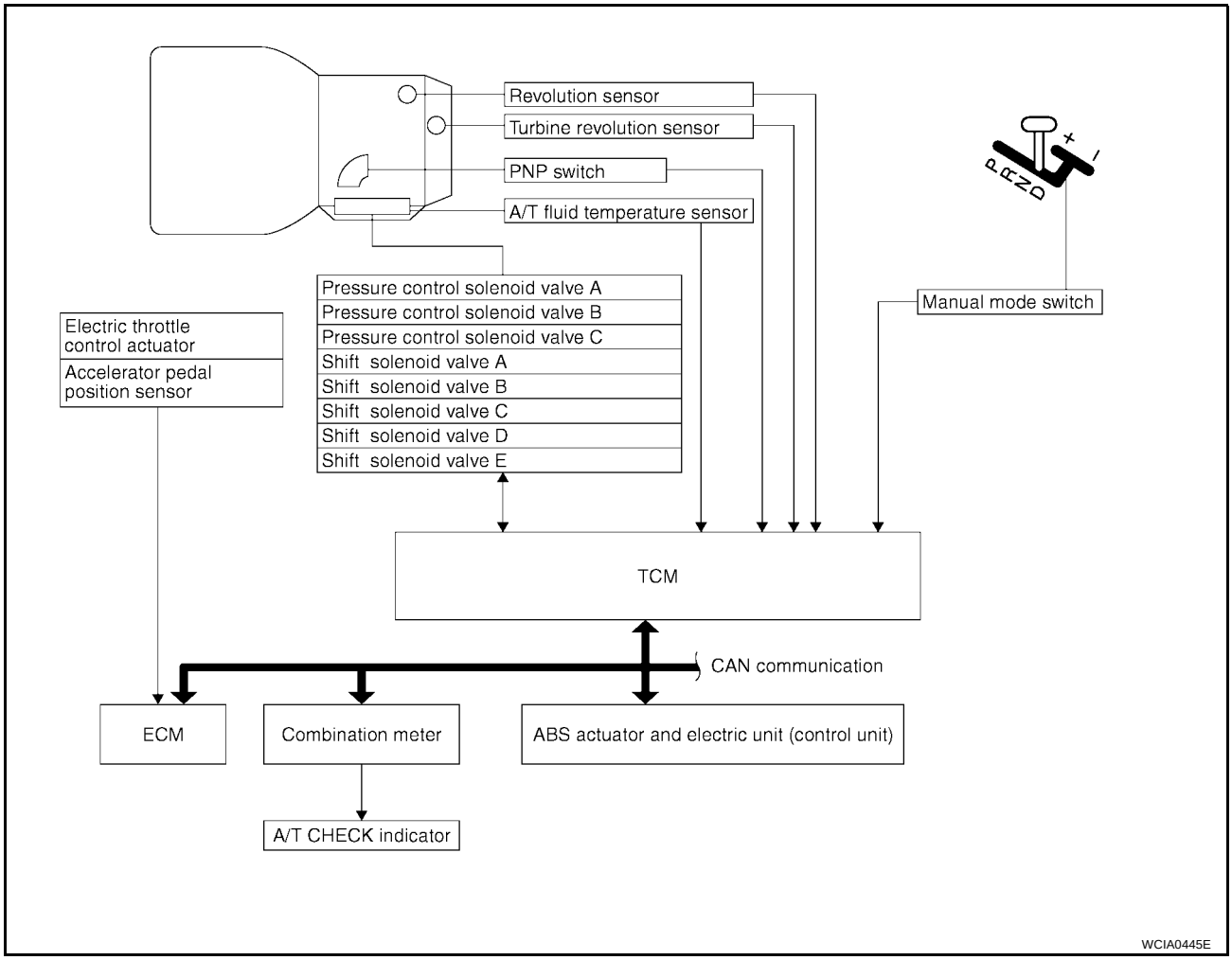
- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, lock-up operation, and engine brake operation.
- Send required output signals to the respective solenoids.

CONTROL SYSTEM OUTLINE

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

SENSORS (or SIGNAL)		TCM		ACTUATORS
PNP switch Throttle angle signal Throttle position signal Engine speed signal Engine torque signal A/T fluid temperature sensor Revolution sensor Turbine revolution sensor Vehicle speed signal Manual mode switch signal Stop lamp switch signal	⇒	Shift control Line pressure control Lock-up control Engine brake control Timing control Fail-safe control Self-diagnosis CONSULT-II communication line CAN communication line On board diagnosis	⇒	Shift solenoid valve A Shift solenoid valve B Shift solenoid valve C Shift solenoid valve D Shift solenoid valve E Pressure control solenoid valve A Pressure control solenoid valve B Pressure control solenoid valve C A/T CHECK indicator lamp

CONTROL SYSTEM DIAGRAM



Input/Output Signal of TCM

ECS009CL

Control item			Line pressure control	Vehicle speed control	Shift control	Lock-up control	Engine brake control	Fail-safe function (*3)	Self-diagnostics function
Input	Throttle angle signal(*5)		X	X	X	X	X	X	X
	Throttle position signal(*5)		X(*2)	X(*2)		X	X(*2)		X(*4)
	Revolution sensor		X	X	X	X	X	X	X
	Turbine revolution sensor		X	X	X		X	X	X
	Vehicle speed signal MTR(*1) (*5)		X	X	X	X		X	X
	Engine speed signals(*5)			X	X	X		X	X
	Engine torque signals(*5)		X	X	X	X	X		X
	PNP switch		X	X	X	X	X	X	X(*4)
	Manual mode switch			X	X		X	X	X
	Stop lamp switch signal(*5)			X		X	X		X(*4)
	A/T fluid temperature sensor			X	X	X	X	X	X
	ASCD	Operation signal(*5)		X		X	X		
		Overdrive cancel signal(*5)		X		X	X		
	TCM power supply voltage signal		X	X	X	X	X	X	X
Output	Shift solenoid valve A/B/C/D/E			X	X			X	X
	Pressure control solenoid valve A		X	X	X	X	X	X	X
	Pressure control solenoid valve B			X	X		X	X	X
	Pressure control solenoid valve C				X	X		X	X
	Self-diagnostics table(*5)								X

*1: Spare for revolution sensor
*2: Spare for throttle angle 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: CAN communications.

CAN Communication

ECS009CM

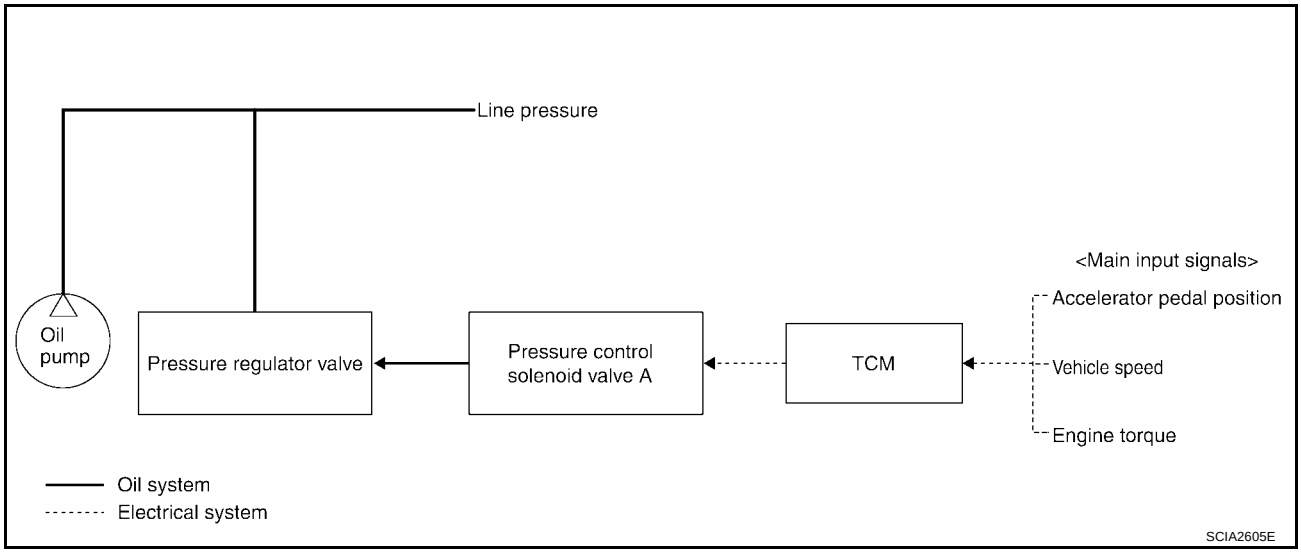
SYSTEM DESCRIPTION

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.
For details, refer to LAN-20, "CAN COMMUNICATION" .

Line Pressure Control

ECS009CN

- The pressure control solenoid valve A controls linear line pressure by control signal from TCM and line pressure for clutches and brakes to reduce shift shock.
- This pressure control solenoid valve A controls the pressure regulator valve as the signal pressure and adjusts the pressure of the operating oil discharged from the oil pump to the line pressure most appropriate to the driving state.



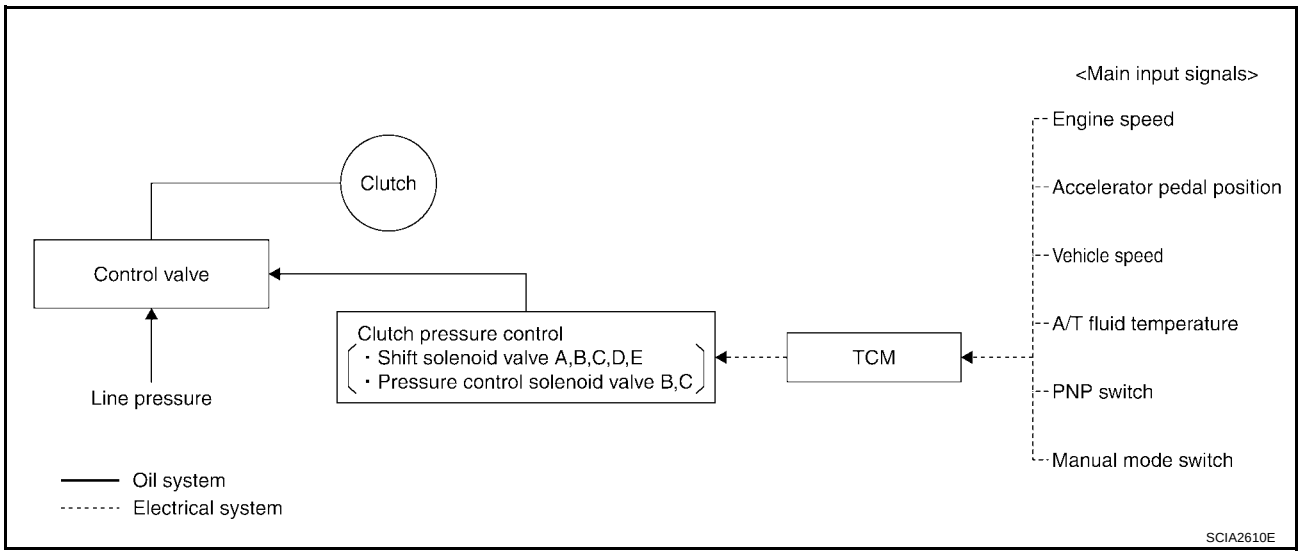
LINE PRESSURE CONTROL IS BASED ON THE TCM LINE PRESSURE CHARACTERISTIC PATTERN

In order to obtain the most appropriate line pressure characteristic to meet the current driving state, the TCM controls the pressure control solenoid valve A current and thus controls the line pressure.

Shift Control

ECS009CO

The clutch pressure control solenoid is controlled by the signals from the switches and sensors. Thus, the clutch pressure is adjusted to be appropriate to the engine load state and vehicle driving state. It becomes possible to finely control the clutch hydraulic pressure with high precision and a smoother shift change characteristic is attained.



Basically TCM programmed for economy mode, but TCM changes to several shift schedule automatically according to specified condition.

SPECIAL SHIFT MODE

Upslope Mode

When TCM detects upslope from load of engine torque and decrease of acceleration, this mode changes shift points in high-speed side according to the upslope degree and avoids busy shift of A/T.

Downslope Mode

When TCM detects downslope from increase of acceleration with accelerator full close, this mode operates moderate engine brake by changing shift points in high-speed side.

Hot Mode Control

This control lowers ATF temperature by changing shift points when the temperature is extremely high.

MANUAL MODE

Driver oneself can select favorite gear and enjoy sports driving of manual transmission sense by shifting lever from D position to manual mode position and + (up shift) / - (down shift). But lock-up control is operated automatically. Shift control is operated again by shifting from manual gear position to D position. Following control is operated when manual mode.

Automated Up Shift Control

In order to avoid the over speed of the engine, up shift operate automatically, if it becomes over a constant vehicle speed.

Automated Down Shift Control

In order to avoid the stall of the engine, down shift operate automatically, if it becomes under a constant vehicle speed.

Up Shift Permission Control

In order to avoid the stall of the engine, up shift is done only at over a constant vehicle speed.

Down Shift Permission Control

In order to avoid the over speed of the engine, down shift is done only at under a constant vehicle speed.

UP/DOWN SHIFT LEARNING CONTROL

This control learns the pressure to each clutch or brake in order to reduce shifting shock at each shifting (Up, Down, Manual down, Coast down).

N-D SHIFT CONTROL

This control improves the N-D shift quality due to controlling line pressure solenoid valve according to forward clutch piston stroke learned in N-D shift learning control and applying best hydraulic pressure to forward clutch at N-D shift.

N-D SHIFT LEARNING CONTROL

This control learns the forward clutch hydraulic pressure due to monitoring a forward clutch engaging time and a rotation change rate.

N-R SHIFT CONTROL

This control improves the N-R shift quality due to controlling shift pressure solenoid valve according to direct clutch piston stroke learned in N-R shift learning control and applying best hydraulic pressure to direct clutch at N-R shift.

N-R SHIFT LEARNING CONTROL

This control learns the direct clutch hydraulic pressure due to monitoring a direct clutch engaging time and a rotation change rate.

TORQUE REDUCTION CONTROL

This control improves the shift quality due to sending torque reduction request signal from TCM to ECM and cutting engine torque increase of shift at N-D shift, N-R shift and 1 $\Leftrightarrow$ 2 $\Leftrightarrow$ 3 $\Leftrightarrow$ 4 $\Leftrightarrow$ 5.
If accelerator pedal is depressed rapidly, this control establishes the upper limit value of engine torque and avoids engine flare at 2 $\Leftrightarrow$ 3, 3 $\Leftrightarrow$ 4 and 4 $\Rightarrow$ 2 of clutch to clutch shift.

Lock-Up Control

ECS009CP

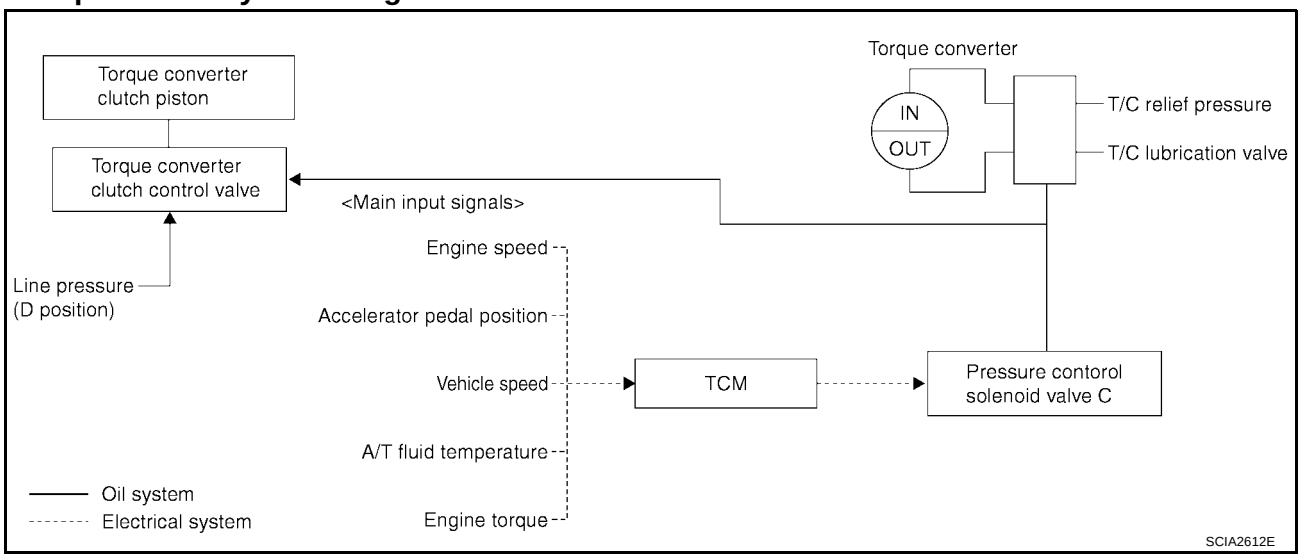
The torque converter clutch piston in the torque converter is engaged to eliminate torque converter slip to increase power transmission efficiency.
The torque converter clutch control valve operation is controlled by the pressure control solenoid valve C, which is controlled by a signal from TCM, and the torque converter clutch control valve engages or releases the torque converter clutch piston.

Lock-up Operation Condition Table

Selector lever	D position		M5 position	M4 position	M3 position
Gear position	5	4	5	4	3
Lock-up	×	–	×	×	×
Slip lock-up	×	×	–	–	–

TORQUE CONVERTER CLUTCH CONTROL 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 pressure control solenoid valve C and the lock-up apply pressure is drained.
  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 pressure control solenoid valve C and lock-up apply pressure is generated.
  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 pressure control solenoid valve C 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 pressure control solenoid valve C is varied to steadily increase the pressure control solenoid valve C pressure.
  In this way, the lock-up apply 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.

Slip Lock-up Control

- In the slip region, the pressure control solenoid valve C current is controlled with the TCM to put it into the half-clutched state. This absorbs the engine torque fluctuation and lock-up operates from low speed.
  This raises the fuel efficiency for 4th and 5th gears at both low speed and when the accelerator has a low degree of opening.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

Introduction

ECS009CQ

The A/T system has two self-diagnostic systems.
The first is the emission-related on board diagnostic system (OBD-II) performed by the TCM in combination with the ECM. The malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory but not the TCM memory.
The second is the TCM original self-diagnosis indicated by the A/T CHECK indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For detail, refer to AT-463, "SELF-DIAG RESULT MODE" .

OBD-II Function for A/T System

ECS009CR

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

One or Two Trip Detection Logic of OBD-II

ECS009CS

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. — 1st Trip
If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MIL will illuminate. — 2nd Trip
The “trip” in the “One or Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation.

OBD-II Diagnostic Trouble Code (DTC)

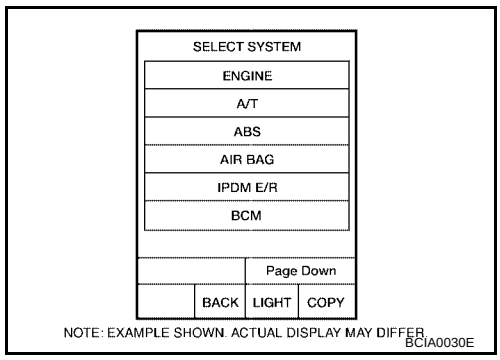
ECS009CT

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 etc. These DTC are prescribed by SAE J2012.
(CONSULT-II also displays the malfunctioning component or system.)

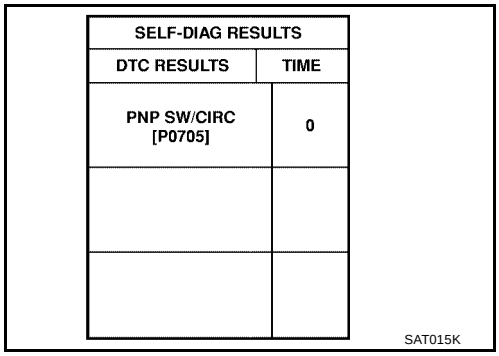
- **1st trip DTC No. is the same as DTC No.**
- **Output of the diagnostic trouble code indicates that the indicated circuit has a malfunction. However, in case of the Mode II and GST, they do not indicate whether the malfunction is still occurring or occurred in the past and returned to normal.**
 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

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

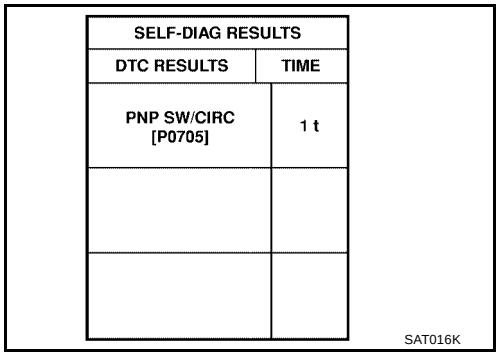


NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER
BCIA0030E

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-659, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA" .
Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

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

Both 1st trip freeze frame data and freeze frame data (along with the DTC) 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 cable is disconnected, the diagnostic trouble code will be lost within 24 hours.**
- **When you erase the DTC, using CONSULT-II or GST is easier and quicker than switching the mode selector on the ECM.**

The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to OBD-II. For details, refer to EC-654, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS" .

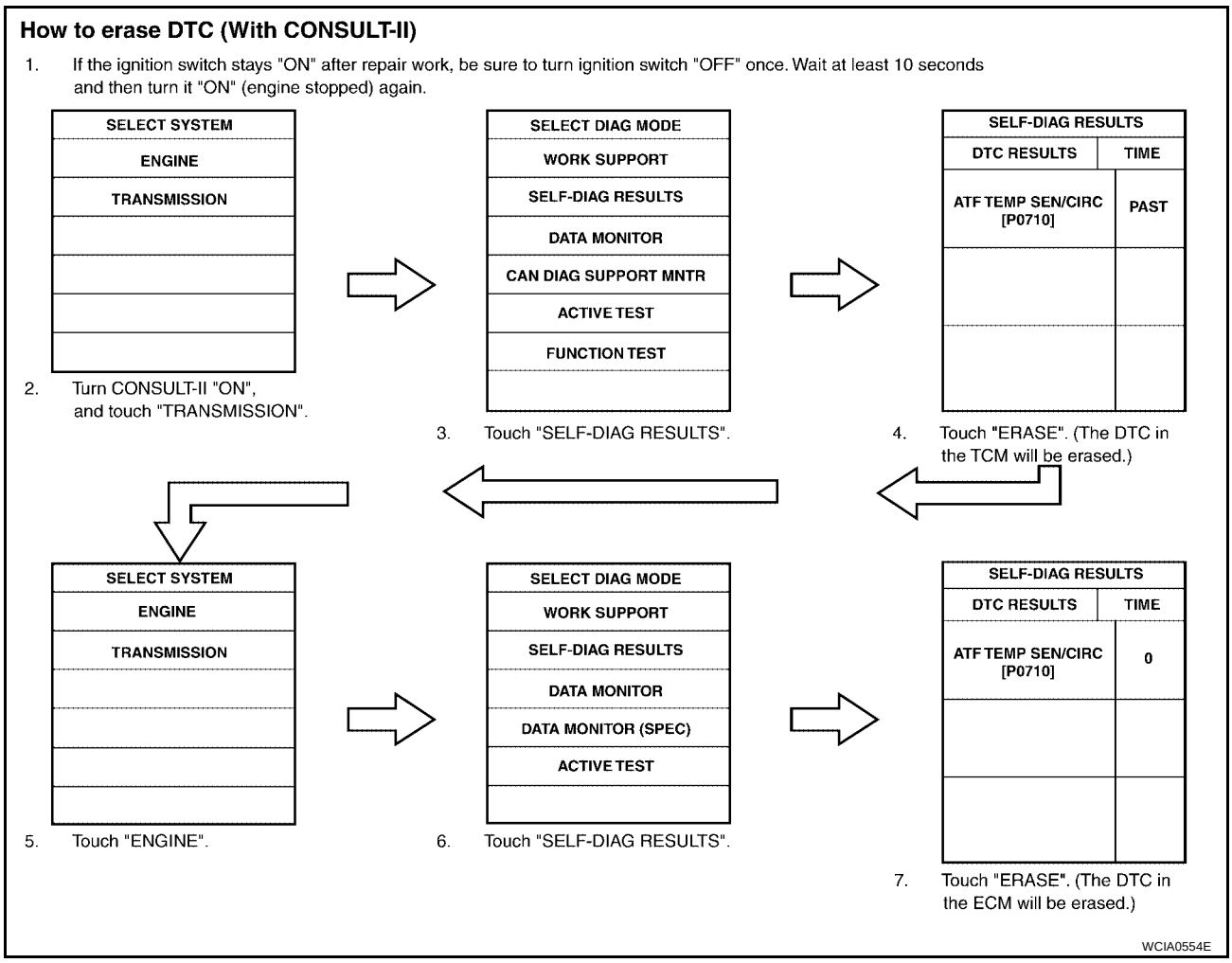
- **Diagnostic trouble codes (DTC)**
- **1st trip diagnostic trouble codes (1st trip DTC)**

- **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 is necessary to be erased for both ECM and TCM.**

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



HOW TO ERASE DTC (WITH GST)

1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 10 seconds and then turn it “ON” (engine stopped) again.
2. Erase DTC with TCM. Refer to AT-470, "Erase self-diagnosis" . (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-735, "Generic Scan Tool (GST) Function" .

HOW TO ERASE DTC (NO TOOLS)

The A/T CHECK indicator lamp is located on the instrument panel.

1. If the ignition switch stays “ON” after repair work, be sure to turn ignition switch “OFF” once. Wait at least 10 seconds and then turn it “ON” (engine stopped) again.
2. Erase DTC with TCM. Refer to AT-470, "Erase self-diagnosis" . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Erase DTC with ECM. Refer to EC-666, "How to Erase DTC" .

Malfunction Indicator Lamp (MIL)

ECS009CU

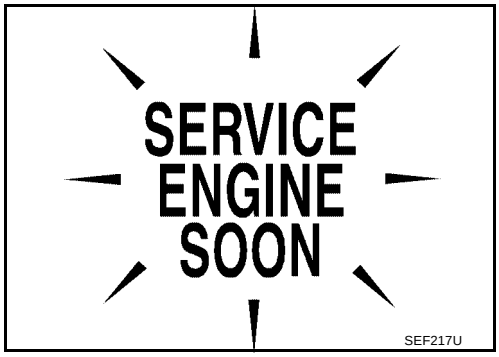
DESCRIPTION

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned “ON” without the engine running. This is a bulb check.

- If the MIL does not light up, refer to DI-31, "WARNING LAMPS" , or see EC-669, "Malfunction Indicator Lamp (MIL)" .

2. When the engine is started, the MIL should go off.
   If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



TROUBLE DIAGNOSIS

PFP:00004

DTC Inspection Priority Chart

ECS009CV

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

NOTE:
If DTC U1000 is displayed with other DTCs, first perform the trouble diagnosis for DTC U1000. Refer to AT-471 .

Priority	Detected items (DTC)
1	U1000 CAN communication line
2	Except above

Fail-Safe

ECS009CW

The TCM has an electrical fail-safe mode. This mode makes it possible to operate even if there is a malfunction in a main electronic control input/output signal circuit.
In fail-safe mode, a driving condition is selected according to the malfunctioning location, and line pressure is set at the maximum. For this reason, the customer will be subjected to uncomfortable “slipping” or “poor acceleration” of the vehicle.
In that case, handle according to the “diagnostics flow” (Refer to AT-435).

FAIL-SAFE FUNCTION

If any malfunction occurs in a sensor or solenoid, this function controls the A/T to make driving possible.

NOTE:
Line pressure is set at the maximum in fail-safe mode. Although gear position differs depending on the type of fail-safe modes, CONSULT-II indicates “5th”.

DTC	Malfunction items	Fail-safe*
P0500	Vehicle speed signal	No learning control.
P0613	TCM processor	Fail-safe mode 4
P0705	PNP switch	Fail-safe mode 4
P0710	ATF temperature sensor circuit	Sets ATF temperature data at 111°C (232°F) after 15 minutes. Inhibits lock-up control.
P0711	ATF temperature sensor function	Sets ATF temperature data at 111°C (232°F) after 15 minutes. Inhibits lock-up control.
P0717	Turbine revolution sensor	Fail-safe mode 1
P0722	Revolution sensor	Uses vehicle speed signal from combination meter as a substitute. Inhibits learning control.
P0726	Engine speed signal input circuit performance	Fail-safe mode 1
P0731	1st gear function	No 1st gear, no control for N-D shift.
P0732	2nd gear function	Fail-safe mode 1. Also, ECM restricts engine torque to prevent clutch slipping.
P0733	3rd gear function	Fail-safe mode 1. Also, ECM restricts engine torque to prevent clutch slipping.
P0734	4th gear function	Fail-safe mode 1. Also, ECM restricts engine torque to prevent clutch slipping.
P0735	5th gear function	Fail-safe mode 1. Also, ECM restricts engine torque to prevent clutch slipping.
P0744	Lock-up function	Fail-safe mode 1
P0745	Pressure control solenoid valve A	Fail-safe mode 1. Also, ECM restricts engine torque to prevent clutch slipping.

DTC	Malfunction items	Fail-safe*
P0750	Shift solenoid valve A	Any one of fail-safe modes ● Fail-safe mode 1 ● Fail-safe mode 7. Also, ECM restricts input torque to prevent clutch slipping.
P0755	Shift solenoid valve B	Any one of fail-safe modes ● Fail-safe mode 1 ● Fail-safe mode 8
P0760	Shift solenoid valve C	Any one of fail-safe modes ● Fail-safe mode 2 ● Fail-safe mode 5 ● Fail-safe mode 9
P0762	Shift solenoid valve C stuck ON	Fail-safe mode 2. Also, ECM restricts engine torque to prevent clutch slipping.
P0765	Shift solenoid valve D	Any one of fail-safe modes ● Fail-safe mode 1 ● Fail-safe mode 10. Also, ECM restricts input torque to prevent clutch slipping.
P0770	Shift solenoid valve E	Any one of fail-safe modes ● Fail-safe mode 1. Also, ECM restricts engine torque to prevent clutch slipping. ● Fail-safe mode 6. Also, ECM restricts engine torque to prevent clutch slipping.
P0775	Pressure control solenoid valve B	Fail-safe mode 3
P0780	Shift function	Fail-safe mode 1. Also, ECM restricts input torque to prevent clutch slipping.
P0795	Pressure control solenoid valve C	Fail-safe mode 1
P0797	Pressure control solenoid valve C stuck ON	Fail-safe mode 1
P0826	Manual mode switch	No manual mode control.
P0882	TCM power input signal	Fail-safe mode 1
P1726	Electric throttle control	● The accelerator opening angle is controlled by ECM according to a pre-determined accelerator angle to make driving possible. ● No lock-up, no learning control.
U1000	CAN communication circuit	Any one of fail-safe modes ● Fail-safe mode 1 ● Fail-safe mode 1. Also, ECM restricts engine torque to prevent clutch slipping. ● No learning control. ● No lock-up, no learning control, no special shift mode control.

*: For fail-safe modes 1 to 10, refer to AT-432, "Fail-safe mode list" .

Fail-safe mode list

Fail-safe mode	Selector lever	Gear position*1	Shift solenoid valve					Pressure control solenoid valve		
			A	B	C	D	E	A	B	C
Fail-safe mode 1	D position	4th	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	Manual mode: + (up shift)									
	Manual mode: - (down shift)	2nd	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
	R position	Reverse	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF

Fail-safe mode	Selector lever	Gear position*1	Shift solenoid valve					Pressure control solenoid valve		
			A	B	C	D	E	A	B	C
Fail-safe mode 2 (CONSULT-II displays “8”)	D position	3rd	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
	Manual mode: + (up shift)									
	Manual mode: - (down shift)	2nd	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
	R position	Reverse	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
Fail-safe mode 3	D position	4th	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	Manual mode: + (up shift)									
	Manual mode: - (down shift)	2nd	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
	R position	Reverse	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
Fail-safe mode 4	D position	4th	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	Manual mode: + (up shift)									
	Manual mode: - (down shift)	4th	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	R position	Reverse	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Fail-safe mode 5	D position	4th	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	Manual mode: + (up shift)									
	Manual mode: - (down shift)	4th	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	R position	Reverse	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
Fail-safe mode 6	D position	4th	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	Manual mode: + (up shift)									
	Manual mode: - (down shift)	2nd	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
	R position	Reverse	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
Fail-safe mode 7	D position	4th	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	Manual mode: + (up shift)									
	Manual mode: - (down shift)	2nd	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
	R position	Reverse*2	ON	OFF	ON	ON	OFF	OFF	OFF	OFF
Fail-safe mode 8 (CONSULT-II displays “1”)	D position	5th	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
	Manual mode: + (up shift)									
	Manual mode: - (down shift)	(2nd)*3	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
	R position	Reverse	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
Fail-safe mode 9 (CONSULT-II displays “8”)	D position	4th	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
	Manual mode: + (up shift)									
	Manual mode: - (down shift)	4th	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	R position	Reverse	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
Fail-safe mode 10 (CONSULT-II displays “6”)	D position	4th	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
	Manual mode: + (up shift)									
	Manual mode: - (down shift)	3rd	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
	R position	Reverse*2	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF

*1: CONSULT-II indicates “5th”.
*2: Reverse gear ratio difference (Gear ratio: 3.342)
*3: 3rd gear ratio difference (Gear ratio: 2.301)

How To Perform Trouble Diagnosis For Quick and Accurate Repair

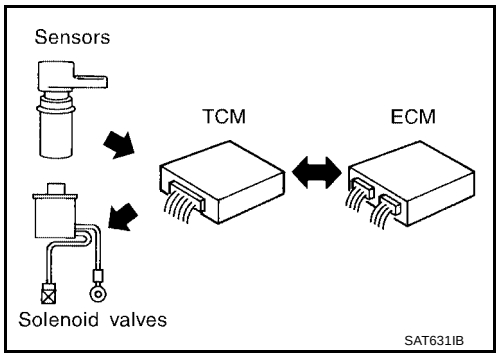
ECS009CX

INTRODUCTION

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

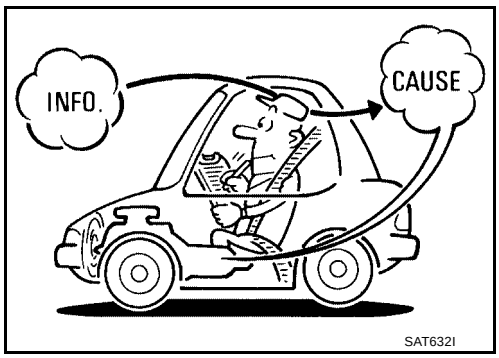
The TCM also communicates with the ECM by means of a signal sent from sensing elements used with the OBD-related parts of the A/T system for malfunction-diagnostic purposes. The TCM is capable of diagnosing malfunctioning parts while the ECM can store malfunctions in its memory.

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



It is much more difficult to diagnose an error that occurs intermittently rather than continuously. Most intermittent errors 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.

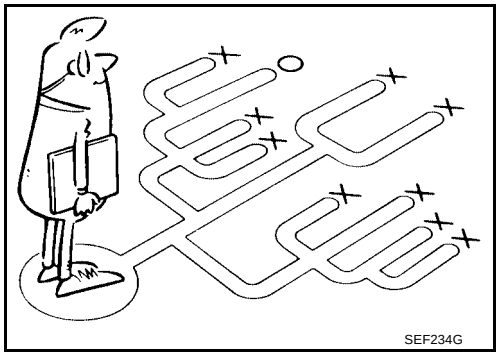
A visual check only may not find the cause of the errors. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the AT-435, "WORK FLOW" .



Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such errors, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “Diagnostic Worksheet” as shown on the example (Refer to AT-436) should be used.

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

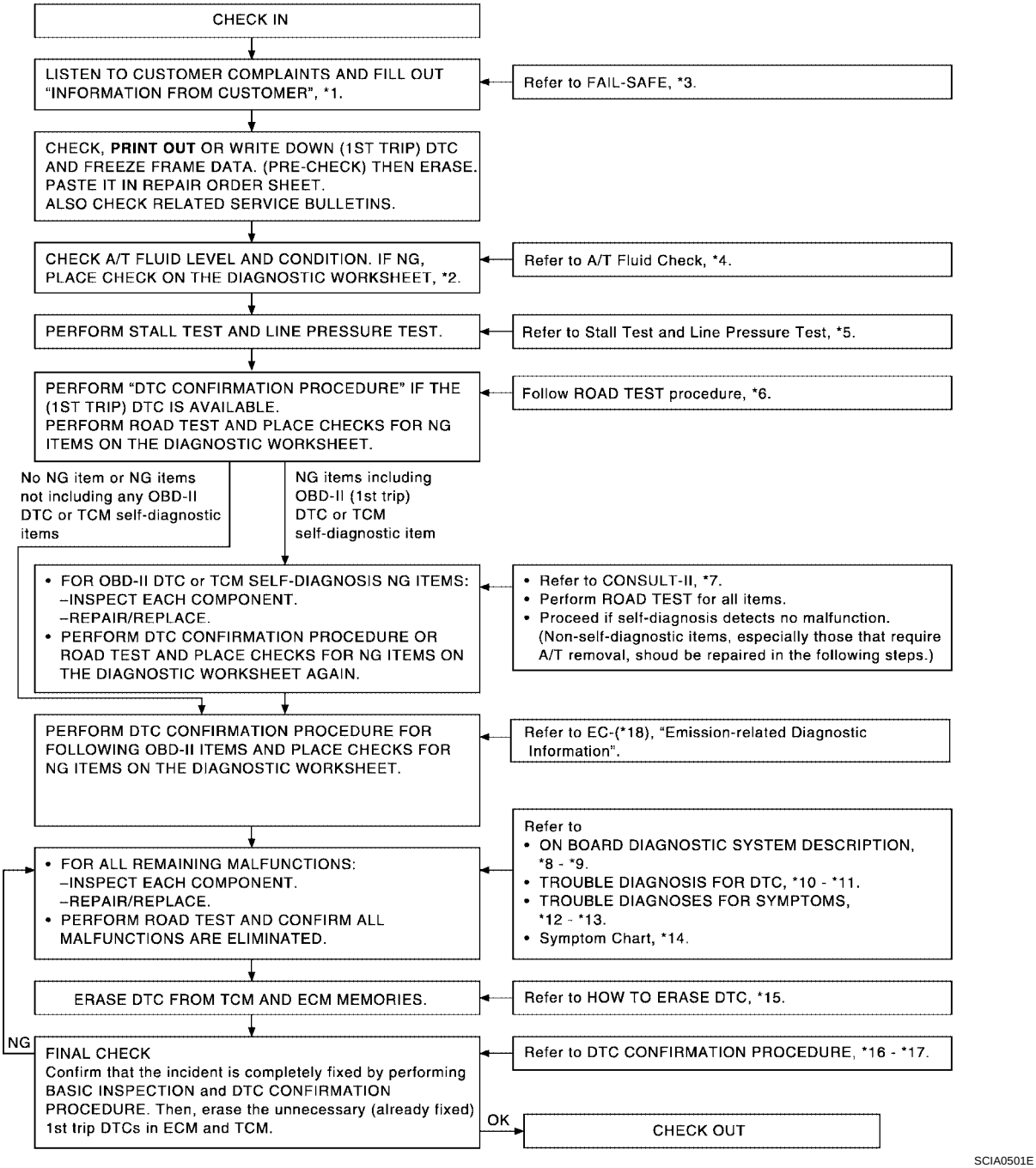
Also check related Service bulletins.



WORK FLOW

A good understanding of the malfunction conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about a malfunction. 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” (Refer to AT-436) and “Diagnostic Worksheet” (Refer to AT-436), to perform the best troubleshooting possible.

Work Flow Chart



SCIA0501E

*1. AT-436 *2. AT-436 *3. AT-431
*4. AT-441 *5. AT-441, AT-443 *6. AT-444
*7. AT-462 *8. AT-427 *9. AT-430
*10. AT-471 *11. AT-597 *12. AT-598
*13. AT-617 *14. AT-451 *15. AT-428
*16. AT-471 *17. AT-597 *18. EC-654

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 → 4th ❑ 4th → 5th)	
	❑ No down-shift (❑ 5th → 4th ❑ 4th → 3rd ❑ 3rd → 2nd ❑ 2nd → 1st)	
	❑ Lock-up malfunction	
	❑ Shift point too high or too low.	
	❑ Shift shock or slip (❑ N → D ❑ Lock-up ❑ Any drive position)	
	❑ Noise or vibration	
	❑ No kick down	
	❑ No pattern select	
	❑ Others ( )	
Malfunction indicator lamp (MIL)	❑ Continuously lit	❑ Not lit
A/T Check indicator lamp	❑ Continuously lit	❑ Not lit

Diagnostic Worksheet Chart

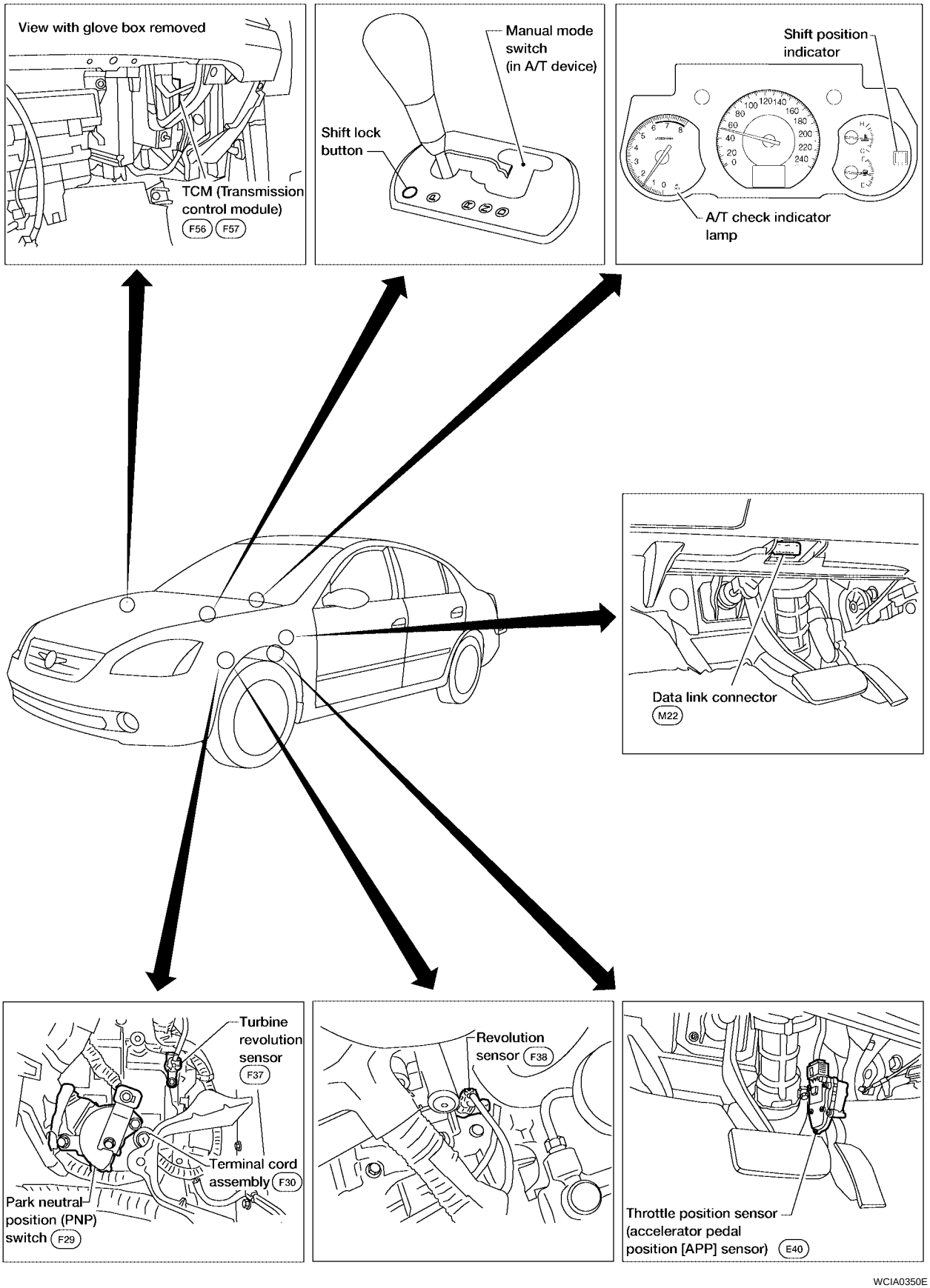
1	❑ Read the item on cautions concerning fail-safe and understand the customer's complaint.			AT-431
2	❑ A/T fluid inspection			AT-441
		❑ Leak (Repair leak location.) ❑ State ❑ Amount		
3	❑ Stall test, time lag test and line pressure test			AT-441, AT-443
		❑ Stall test		
		❑ Engine ❑ Torque converter one-way clutch ❑ Line pressure is low ❑ Forward clutch ❑ Direct clutch ❑ 1st and reverse brake	❑ B5 brake ❑ One-way clutch No. 2 ❑ Oil pump ❑ Oil strainer ❑ Oil leak for each range circuit	
		❑ Time lag test		
		❑ Line pressure is low ❑ Forward clutch ❑ Direct clutch ❑ 1st and reverse brake ❑ One-way clutch No. 2	❑ Oil pump ❑ Oil strainer ❑ Oil leak for “D” position circuit ❑ Oil leak for “R” position circuit	
		❑ Line pressure inspection - Suspected part:		

4	❑ Perform all road tests and enter checks in required inspection items.			AT-444
	4-1.	Check before engine is started		AT-445
		❑ The A/T CHECK Indicator Lamp does come on. AT-598 . ❑ Perform self-diagnostics. Enter checks for detected items.		
			❑ Vehicle speed sensor·MTR. AT-474 . ❑ TCM processor. AT-476 . ❑ PNP switch. AT-478 . ❑ A/T fluid temperature sensor circuit. AT-483 . ❑ A/T fluid temperature sensor performance. AT-488 . ❑ Turbine revolution sensor circuit. AT-493 . ❑ Vehicle speed sensor·A/T (revolution sensor) circuit. AT-497 . ❑ Engine speed input circuit performance. AT-501 . ❑ 1st gear function. AT-503 . ❑ 2nd gear function. AT-506 . ❑ 3rd gear function. AT-512 . ❑ 4th gear function. AT-518 . ❑ 5th gear function. AT-523 . ❑ Lock-up function. AT-529 . ❑ Shift function. AT-572 . ❑ Pressure control solenoid valve A. AT-532 . ❑ Pressure control solenoid valve B. AT-567 . ❑ Pressure control solenoid valve C. AT-576 . ❑ Shift solenoid valve A. AT-537 . ❑ Shift solenoid valve B. AT-542 . ❑ Shift solenoid valve C. AT-547 . ❑ Shift solenoid valve D. AT-557 . ❑ Shift solenoid valve E. AT-562 . ❑ Pressure control solenoid valve C stuck ON. AT-581 . ❑ Shift solenoid valve C stuck ON. AT-552 . ❑ Manual mode switch circuit. AT-586 . ❑ TCM power input signal. AT-592 . ❑ Electric throttle control system. AT-597 . ❑ CAN communication. AT-471 . ❑ Battery ❑ Other	
	4-2.	Idle inspection		AT-445
		❑ Engine Cannot Be Started in “P” and “N” Position. AT-600 . ❑ In “ P” Position, Vehicle Moves When Pushed. AT-600 . ❑ In “N” Position Vehicle Moves. AT-601 . ❑ Large Shock “N” to “D” Position. AT-602 . ❑ Vehicle Does Not Creep Backward In “R” Position. AT-603 . ❑ Vehicle does Not Creep Forward In “D” Position. AT-604 .		
	4-3.	Driving tests		AT-447
		Part 1		
		❑ Vehicle Cannot Be Started From D1. AT-605 . ❑ A/T Does Not Shift: D1 → D2. AT-605 . ❑ A/T Does Not Shift: D2 → D3. AT-606 . ❑ A/T Does Not Shift: D3 → D4. AT-607 . ❑ A/T Does Not Shift: D4 → D5. AT-608 . ❑ A/T Does Not Perform Lock-up. AT-609 ❑ A/T Does Not Hold Lock-up Condition. AT-610 . ❑ Lock-up Is Not Released. AT-611 .		

		Part 2		
		❑ Vehicle Cannot Be Started From D1. AT-605 . ❑ A/T Does Not Shift: D1 → D2. AT-605 . ❑ A/T Does Not Shift: D2 → D3. AT-606 . ❑ A/T Does Not Shift: D3 → D4. AT-607 .		AT-448
		Part 3		
		❑ Cannot Be Changed To Manual Mode. AT-612 . ❑ A/T Does Not Shift: 5th gear → 4th gear. AT-613 . ❑ A/T Does Not Shift: 4th gear → 3rd gear. AT-614 . ❑ A/T Does Not Shift: 3rd gear → 2nd gear. AT-614 . ❑ A/T Does Not Shift: 2nd gear → 1st gear. AT-615 . ❑ Vehicle Does Not Decelerate By Engine Brake. AT-616 . ❑ Perform self-diagnostics Enter checks for detected items.		AT-449
4	4-3		❑ Vehicle speed sensor·MTR. AT-474 . ❑ TCM processor. AT-476 . ❑ PNP switch. AT-478 . ❑ A/T fluid temperature sensor circuit. AT-483 . ❑ A/T fluid temperature sensor performance. AT-488 . ❑ Turbine revolution sensor circuit. AT-493 . ❑ Vehicle speed sensor·A/T (revolution sensor) circuit. AT-497 . ❑ Engine speed input circuit performance. AT-501 . ❑ 1st gear function. AT-503 . ❑ 2nd gear function. AT-506 . ❑ 3rd gear function. AT-512 . ❑ 4th gear function. AT-518 . ❑ 5th gear function. AT-523 . ❑ Lock-up function. AT-529 . ❑ Shift function. AT-572 . ❑ Pressure control solenoid valve A. AT-532 . ❑ Pressure control solenoid valve B. AT-567 . ❑ Pressure control solenoid valve C. AT-576 . ❑ Shift solenoid valve A. AT-537 . ❑ Shift solenoid valve B. AT-542 . ❑ Shift solenoid valve C. AT-547 . ❑ Shift solenoid valve D. AT-557 . ❑ Shift solenoid valve E. AT-562 . ❑ Pressure control solenoid valve C stuck ON. AT-581 . ❑ Shift solenoid valve C stuck ON. AT-552 . ❑ Manual mode switch circuit. AT-586 . ❑ TCM power input signal. AT-592 . ❑ Electric throttle control system. AT-597 . ❑ CAN communication. AT-471 . ❑ Battery ❑ Other	
5	❑ Inspect each system for items found to be NG in the self-diagnostics and repair or replace the malfunction parts.			
6	❑ Perform all road tests and enter the checks again for the required items.			AT-444
7	❑ For any remaining NG items, perform the “diagnostics procedure” and repair or replace the malfunction parts. See the chart for diagnostics by symptoms. (This chart also contains other symptoms and inspection procedures.)			AT-451
8	❑ Erase the results of the self-diagnostics from the TCM.			AT-470

A/T Electrical Parts Location

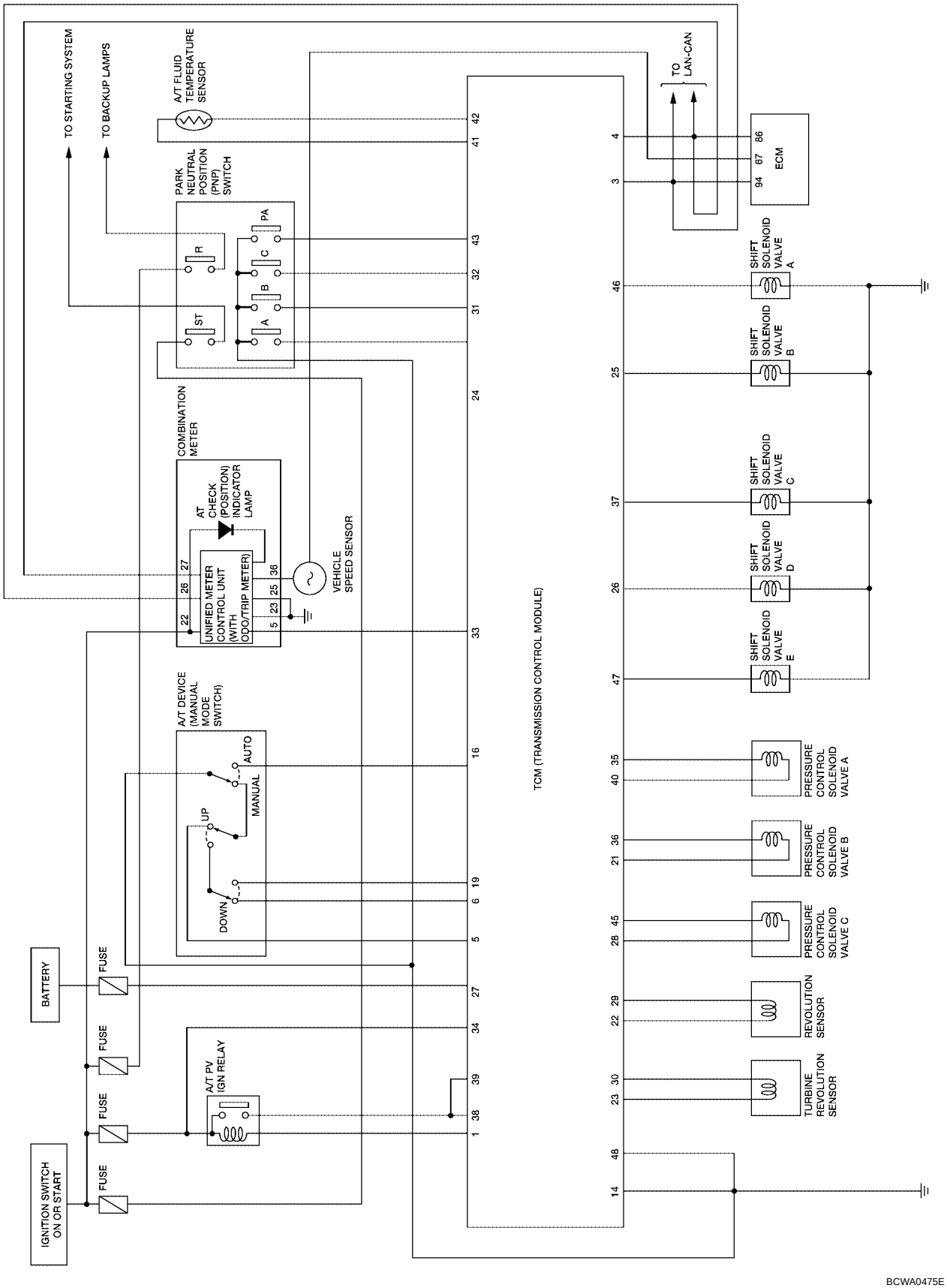
ECS009CY



WCIA0350E

Circuit Diagram

ECS009CZ



BCWA0475E

Inspections Before Trouble Diagnosis

ECS009D0

A/T FLUID CHECK

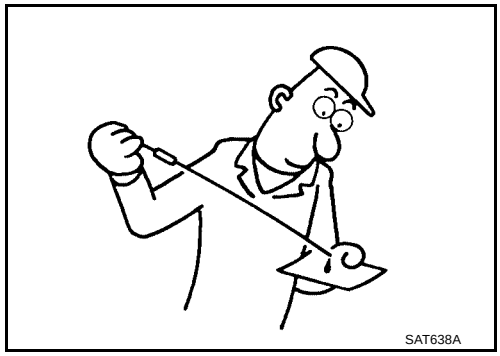
Fluid leakage and fluid level check

- Inspect for fluid leakage and check the fluid level. Refer to AT-398, "Checking A/T Fluid" .

Fluid condition check

Inspect the fluid condition.

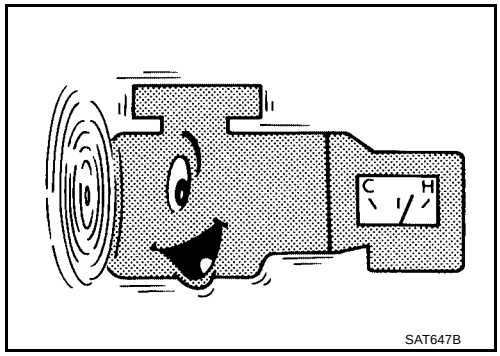
Fluid status	Conceivable Cause	Required Operation
Varnished (viscous varnish state)	Clutch, brake scorched	Replace the A/T fluid and check the A/T main unit and the vehicle for malfunctions (wire harnesses, cooler pipes, etc.)
Milky white or cloudy	Water in the fluid	Replace the A/T fluid and check for places where water is getting in.
Large amount of metal powder mixed in	Unusual wear of sliding parts within A/T	Replace the A/T fluid and check for improper operation of the A/T.


SAT638A

STALL TEST

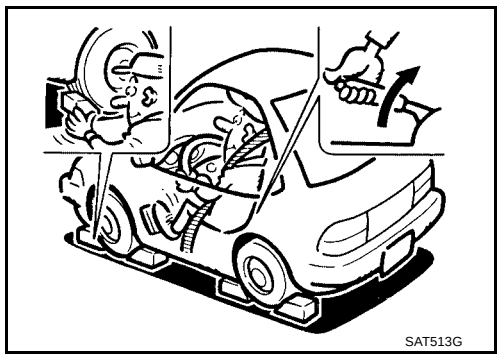
Stall test procedure

1. Inspect the amount of engine oil. Replenish the engine oil if necessary.
2. Drive for about 10 minutes to warm up the vehicle so that the A/T fluid temperature is 50 to 80°C (122 to 176°F). Inspect the amount of A/T fluid. Replenish if necessary.
3. Switch of A/C and light etc. are off.



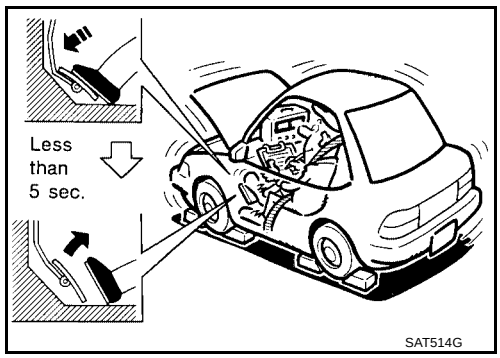
SAT647B

4. Securely engage the parking brake so that the tires do not turn.


SAT513G

5. Engine start, apply foot brake, and place selector lever in “D” position.
6. While holding down the foot brake, gradually press down the accelerator pedal.
7. Quickly read off the stall speed, then quickly remove your foot from the accelerator pedal.

   CAUTION:
   Do not hold down the accelerator pedal for more than 5 seconds during this test.
8. Move the selector lever to the “N” position.
9. Cool down the A/T fluid.



SAT514G

CAUTION:
Run the engine at idle for at least one minute.

10. Repeat step 5 through 9 with selector lever in “manual mode” and “R” positions.

Stall speed: 2,430 - 2,730 rpm

Judgement stall test

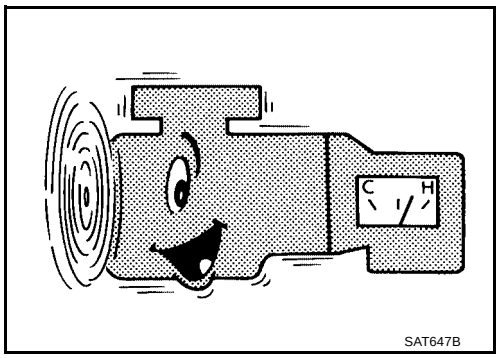
	Selector lever position		Possible cause
	D, M	R	
Stall rotation	H	O	● Line pressure is low (pressure control solenoid valve A malfunction, primary regulator valve malfunction) ● Forward clutch (slipping) ● One-way clutch No. 2
	O	H	● Line pressure is low (pressure control solenoid valve A malfunction, primary regulator valve malfunction) ● Direct clutch (slipping) ● 1st and reverse brake (slipping)
	L	L	● Engine or torque converter one-way clutch
	H	H	● Line pressure is low (pressure control solenoid valve A malfunction, primary regulator valve malfunction) ● B5 brake (slipping) ● Oil pump ● Oil strainer (clogging) ● Oil leak for each range circuit

O: Stall speed within standard value position
H: Stall speed higher than standard value
L: Stall speed lower than standard value

TIME LAG TEST

Time lag test procedure

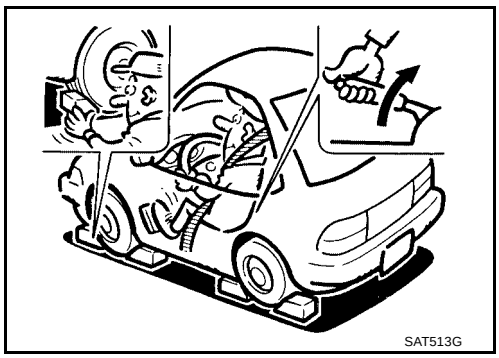
1. Inspect the amount of engine oil. Replenish the engine oil if necessary.
2. Drive for about 10 minutes to warm up the vehicle so that the A/T fluid temperature is 50 to 80°C (122 to 176°F). Check the amount of A/T fluid. Replenish if necessary.
3. Switch of A/C and light etc. are off.



SAT647B

4. Securely engage the parking brake so that the tires do not turn.
5. Engine start, apply foot brake.
6. Measure time lag by using stopwatch from moment when shift lever is shifted in “N” to “D” position and “N” to “R” position until moment slightly shock can be felt.

CAUTION:
- **Make sure to take 3 measurement and take the average value.**
- **Make sure to keep interval for more than one minute between time lag tests.**
  (That purpose is to remove clutch/brake pressure was left unfinished.)


SAT513G

Time lag:

"N" to "D" position: Less than 0.7 sec.

"N" to "R" position: Less than 1.2 sec.

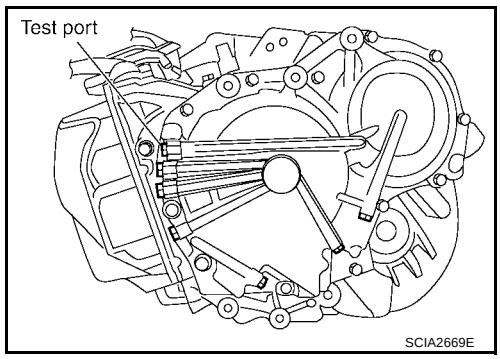
Judgement time lag test

Result of time lag test	Possible cause
Longer than standards "N" to "D" position	● Line pressure is low (pressure control solenoid valve A malfunction, primary regulator valve malfunction) ● Forward clutch (slipping) ● One-way clutch No. 2 ● Oil leak for "D" range circuit
Longer than standards "N" to "R" position	● Line pressure is low ● Direct clutch (slipping) ● 1st and reverse brake (slipping) ● Oil leak for "R" range circuit ● Oil pump ● Oil strainer (clogging)

LINE PRESSURE TEST

Line pressure test port

Location of line pressure test port is show in the figure.

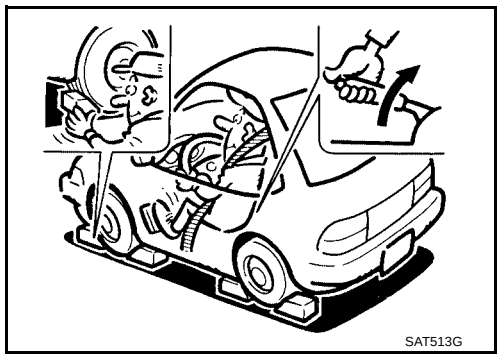


Line pressure test procedure

1. Inspect the amount of engine oil and replenish if necessary.
2. Drive the car for about 10 minutes to warm it up so that the A/T fluid reaches in range of 50 to 80°C (122 to 176°F), then inspect the amount of A/T fluid and replenish if necessary.

   NOTE:
   The automatic fluid temperature rises in range of 50 to 80°C (122 to 176°F) during 10 minutes of driving.
3. Switch of A/C and light etc. are off.
4. After warming up A/T, remove the oil pressure detection plug and install the oil pressure gauge [SST: (J34301-C)] and adapter [SST: (J45542)].

   CAUTION:
   Make sure to check no oil leak after installing oil pressure gage.
5. Securely engage the parking brake so that the tires do not turn.



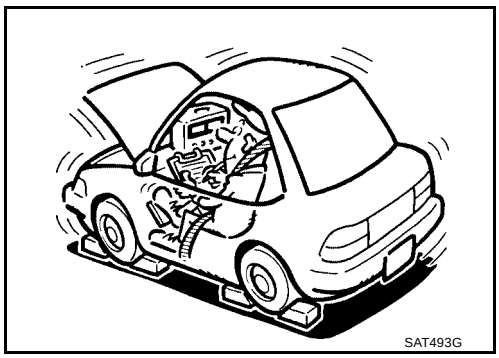
6. Start the engine, then measure the line pressure at both idle and the stall speed.

CAUTION:
- **Keep the brake pedal pressed all the way down during measurement.**
- **When measuring the line pressure at the stall speed, refer to AT-441, "STALL TEST" .**

7. After the measurements are complete, install the oil pressure detection plug and tighten to the specified torque.

:5.9 - 8.8 N·m (0.61 - 0.89 kg-m, 53 - 77 in-lb)

CAUTION:
Do not reuse O-ring.


SAT493G

Line pressure

Engine speed	Line pressure kPa (kg/cm^2 , psi)	
	D, M positions	R position
At idle speed	333 - 392 (3.4 - 4.0, 48 - 57)	500 - 608 (5.1 - 6.2, 73 - 88)
At stall speed	1,285 - 1,393 (13.1 - 14.2, 186 - 202)	1,706 - 1,981 (17.4 - 20.2, 247 - 287)

Judgement of line pressure test

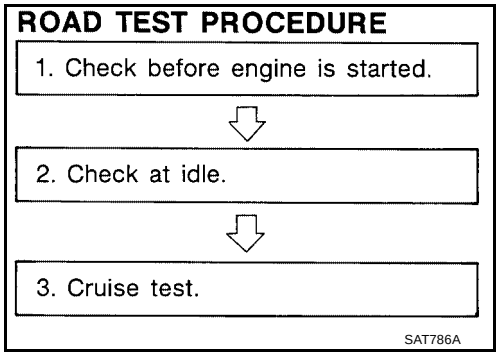
Judgement	Possible cause
Higher than standards both “D”, “M” and “R” positions	● Pressure control solenoid valve A malfunction ● Primary regulator valve malfunction
Lower than standards both “D”, “M” and “R” positions	● Pressure control solenoid valve A malfunction ● Primary regulator valve malfunction ● Oil pump malfunction ● B5 bake malfunction ● Oil leak for each range circuit malfunction
Lower than standards only “D” position	● Oil leak for “D” range circuit malfunction ● Forward clutch malfunction
Lower than standards only “R” position	● Oil leak for “R” range circuit malfunction ● Direct clutch malfunction ● 1st and reverse brake malfunction

ROAD TEST

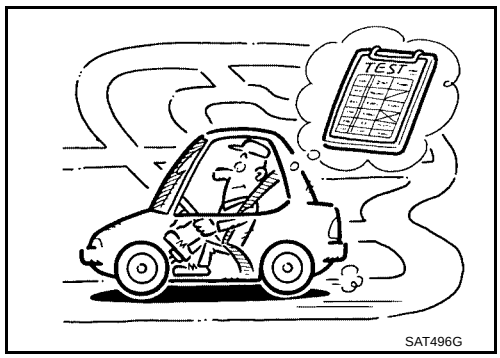
Description

- The road test inspects overall performance of the A/T and analyzes possible malfunction causes.
- The road test is perform in the following three stages.

1. Check before engine is started. Refer to AT-445 .
2. Check at idle. Refer to AT-445 .
3. Cruise test
   - Inspect all the items from Part 1 to Part 3. Refer to AT-447 , AT-448 , AT-449 .



- Before beginning the road test, check the test procedure and inspection items.
- Test all inspection items until the symptom is uncovered. Diagnose NG items when all road tests are complete.



Check Before Engine is Started

ECS009D1

1. CHECK A/T CHECK INDICATOR LAMP

1. Park vehicle on level surface.
2. Move selector lever to “P” position.
3. Turn ignition switch “OFF” and wait at least 10 seconds.
4. Turn ignition switch “ON”. (Do not start engine.)

Does A/T CHECK indicator lamp light up for about 2 seconds?

Yes >> 1. Turn ignition switch “OFF”.
2. Perform the self-diagnostics and record all NG items on the diagnostics worksheet. Refer to AT-463 , AT-468 .
3. Go to AT-445, "Check at Idle" .

No >> Stop the road test and go to AT-598, "A/T CHECK Indicator Lamp does not come on" .

Check at Idle

ECS009D2

1. CHECK STARTING THE ENGINE

1. Park vehicle on level surface.
2. Move selector lever to “P” position.
3. Turn ignition switch “OFF”.
4. Turn ignition switch “START”.

Does the engine start?

Yes >> GO TO 2.
No >> Stop the road test and go to AT-600, "Engine Cannot Be Started In “P” or “N” Position" .

2. CHECK STARTING THE ENGINE

1. Turn ignition switch “ACC”.
2. Move selector lever in “D” or “R” position.
3. Turn ignition switch “START”.

Does the engine start in either position?

Yes >> Stop the road test and go to AT-600, "Engine Cannot Be Started In “P” or “N” Position" .
No >> GO TO 3.

3. CHECK “P” POSITION FUNCTIONS

1. Move selector lever to “P” position.
2. Turn ignition switch “OFF”.
3. Disengage the parking brake.
4. Push the vehicle forward or backward.
5. Engage the parking brake.

When you push the vehicle with disengaging the parking brake, does it move?

Yes >> Enter a check mark at “Vehicle moves when pushed in “P” position” on the diagnostics worksheet, then continue the road test.
No >> GO TO 4.

4. CHECK “N” POSITION FUNCTIONS

1. Start the engine.
2. Move selector lever to “N” position.
3. Disengage the parking brake.

Does vehicle move forward or backward?

Yes >> Enter a check mark at “Vehicle moves in “N” position” on the diagnostics worksheet, then continue the road test.
No >> GO TO 5.

5. CHECK SHIFT SHOCK

1. Engage the brake.
2. Move selector lever to “D” position.

When the transaxle is shifted from “N” to “D”, is there an excessive shock?

Yes >> Enter a check mark at “Large shock when shifted from N to D” on the diagnostics worksheet, then continue the road test.
No >> GO TO 6.

6. CHECK “R” POSITION FUNCTIONS

1. Engage the brake.
2. Move selector lever to “R” position.
3. Disengage the brake for 4 to 5 seconds.

Does the vehicle creep backward?

Yes >> GO TO 7.
No >> Enter a check mark at “Vehicle does not creep backward in R position” on the diagnostics worksheet, then continue the road test.

7. CHECK “D” POSITION FUNCTIONS

Inspect whether the vehicle moves forward when the transaxle is put into the “D” position.

Does the vehicle move forward in the “D” positions?

Yes >> Go to AT-447, "Cruise Test - Part 1" , AT-448, "Cruise Test - Part 2" , and AT-449, "Cruise Test - Part 3" .
No >> Enter a check mark at “Vehicle does not move forward in D positions” on the diagnostics worksheet, then continue the road test.

Cruise Test - Part 1

ECS009D3

1. CHECK STARTING OUT FROM D1

1. Drive the vehicle for about 10 minutes to warm up the engine oil and A/T fluid.
   Appropriate temperature for the A/T fluid: 50 - 80°C (122 - 176°F)
2. Park the vehicle on a level surface.
3. Move selector lever to “P” position.
4. Start the engine.
5. Move selector lever to “D” position.
6. Press the accelerator pedal about half way down to accelerate the vehicle.

With CONSULT-II

Read off the gear positions.

Starts from D1?

Yes >> GO TO 2.
No >> Enter a check mark at “Vehicle cannot be started from D1” on the diagnostics worksheet, then continue the road test.

2. CHECK SHIFT-UP D1 → D2

Press down the accelerator pedal about half way and inspect if the vehicle shifts up (D1 → D2) at the appropriate speed.

- Refer to AT-450 .

With CONSULT-II

Read the gear position, throttle degree of opening, and vehicle speed.

Does the A/T shift-up D1 → D2 at the correct speed?

Yes >> GO TO 3.
No >> Enter a check mark at “A/T does not shift D1 → D2” on the diagnostics worksheet, then continue the road test.

3. CHECK SHIFT-UP D2 → D3

Press down the accelerator pedal about half way and inspect if the vehicle shifts up (D2 → D3) at the appropriate speed.

- Refer to AT-450 .

With CONSULT-II

Read the gear position, throttle degree of opening, and vehicle speed.

Does the A/T shift-up D2 → D3 at the correct speed?

Yes >> GO TO 4.
No >> Enter a check mark at “A/T does not shift D2 → D3” on the diagnostics worksheet, then continue the road test.

4. CHECK SHIFT-UP D3 → D4

Press down the accelerator pedal about half way and inspect if the vehicle shifts up (D3 → D4) at the appropriate speed.

- Refer to AT-450 .

With CONSULT-II

Read the gear position, throttle degree of opening, and vehicle speed.

Does the A/T shift-up D3 → D4 at the correct speed?

Yes >> GO TO 5.
No >> Enter a check mark at “A/T does not shift D3 → D4” on the diagnostics worksheet, then continue the road test.

5. CHECK SHIFT-UP D4 → D5

Press down the accelerator pedal about half way and inspect if the vehicle shifts up (D4 → D5) at the appropriate speed.

- Refer to AT-450 .

With CONSULT-II

Read the gear position, throttle degree of opening, and vehicle speed.

Does the A/T shift-up D4 → D5 at the correct speed?

Yes >> GO TO 6.

No >> Enter a check mark at “A/T does not shift D4 → D5” on the diagnostics worksheet, then continue the road test.

6. CHECK LOCK-UP

When releasing accelerator pedal from D5, check lock-up from D5 to L/U.

- Refer to AT-450 .

With CONSULT-II

Read the lock-up status.

Does it lock-up?

Yes >> GO TO 7.

No >> Enter a check mark at “A/T does not perform lock-up” on the diagnostics worksheet, then continue the road test.

7. CHECK LOCK-UP HOLD

Does it maintain lock-up status?

Yes >> GO TO 8.

No >> Enter a check mark at “A/T hold does not lock-up condition” on the diagnostics worksheet, then continue the road test.

8. CHECK LOCK-UP RELEASE

Check lock-up cancellation by depressing brake pedal lightly to decelerate.

With CONSULT-II

Read the lock-up status.

Does lock-up cancel?

Yes >> 1. Stop the vehicle.
2. Go to Cruise test - Part 2 (Refer to AT-448).

No >> Enter a check mark at “Lock-up is not released” on the diagnostics worksheet, then continue the road test. Go to Cruise test - Part 2 (Refer to AT-448).

Cruise Test - Part 2

ECS009D4

1. CHECK STARTING FROM D1

1. Move selector lever the “D” position.
2. Accelerate at half throttle.

With CONSULT-II

Read the gear position.

Does it start from D1?

Yes >> GO TO 2.

No >> Enter a check mark at “Vehicle cannot be started from D1” on the diagnostics worksheet, then continue the road test.

2. CHECK SHIFT-UP D1 → D2

Press the accelerator pedal down all the way and inspect whether or not the transaxle shifts up (D1 → D2) at the correct speed.

- Refer to AT-450 .

With CONSULT-II

Read the gear position, accelerator angle and vehicle speed.

Does the A/T shift-up D1 → D2 at the correct speed?

Yes >> GO TO 3.

No >> Enter a check mark at “Vehicle does not shift D1 → D2” on the diagnostics worksheet, then continue the road test.

3. CHECK SHIFT-UP D2 → D3

Press the accelerator pedal down all the way and inspect whether or not the transaxle shifts up (D2 → D3) at the correct speed.

- Refer to AT-450 .

With CONSULT-II

Read the gear position, accelerator angle and vehicle speed.

Does the A/T shift-up D2 → D3 at the correct speed?

Yes >> GO TO 4.

No >> Enter a check mark at “Vehicle does not shift D2 → D3” on the diagnostics worksheet, then continue the road test.

4. CHECK SHIFT-UP D3 → D4 AND ENGINE BRAKE

When the transaxle changes speed D2 → D3, return the accelerator pedal.

Does the A/T shift-up D3 → D4 and apply the engine brake?

Yes >> 1. Stop the vehicle.
2. Go to Cruise test - Part 3 (Refer to AT-449).

No >> Enter a check mark at “Vehicle does not shift D3 → D4” on the diagnostics worksheet, then continue the road test.

Cruise Test - Part 3

ECS009D5

1. MANUAL MODE FUNCTION

Move to manual mode from D position.

Does it switch to manual mode?

Yes >> GO TO 2.

No >> Continue road test and add check mark to “Cannot be changed to manual mode” on diagnostics worksheet.

2. CHECK SHIFT-DOWN

During manual mode driving, is downshift from M5 → M4 → M3 → M2 → M1 performed?

With CONSULT-II

Read the gear position.

Is downshifting correctly performed?

Yes >> GO TO 3.

No >> Enter a check mark at “Vehicle does not shift” at the corresponding position (5th → 4th, 4th → 3rd, 3rd → 2nd, 2nd → 1st) on the diagnostics worksheet, then continue the road test.

3. CHECK ENGINE BRAKE

Does engine braking effectively reduce speed in M1 position?

Yes >> 1. Stop the vehicle.
2. Perform the self-diagnostics. Refer to AT-463, "SELF-DIAG RESULT MODE" , AT-468, "Diagnostic Procedure Without CONSULT-II" .

No >> Enter a check mark at “Vehicle does not decelerate by engine brake” on the diagnostics worksheet, then continue trouble diagnosis.

Shift Schedule

ECS009D6

VEHICLE SPEED WHEN SHIFTING GEARS - 9J500 MODELS

Accelerator angle	Vehicle speed km/h (MPH) (Approx.)							
	D1 →D2	D2 →D3	D3 →D4	D4 →D5	D5 →D4	D4 →D3	D3 →D2	D2 →D1
100 %	63 (39)	100 (62)	156 (97)	230 (143)	219 (136)	150 (93)	88 (55)	43 (27)
90 %	63 (39)	100 (62)	156 (97)	230 (143)	219 (136)	150 (93)	88 (55)	43 (27)
80 %	63 (39)	100 (62)	156 (97)	230 (143)	219 (136)	150 (93)	88 (55)	43 (27)
70 %	63 (39)	100 (62)	156 (97)	230 (143)	208 (129)	149 (93)	86 (53)	43 (27)
60 %	63 (39)	100 (62)	156 (97)	230 (143	201 (125)	143 (89)	80 (50)	43 (27)
50 %	63 (39)	95 (59)	145 (90)	214 (133)	187 (116)	130 (81)	73 (45)	43 (27)
40 %	53 (33)	87 (54)	124 (77)	182 (113)	156 (97)	97 (60)	57 (35)	34 (21)
30 %	39 (24)	68 (42)	95 (59)	134 (83)	112 (70)	62 (39)	37 (23)	20 (12)
20 %	29 (18)	49 (30)	65 (40)	92 (57)	63 (39)	42 (26)	23 (14)	8 (5)
10 %	20 (12)	31 (19)	41 (25)	58 (36)	47 (29)	34 (21)	23 (14)	8 (5)

VEHICLE SPEED WHEN SHIFTING GEARS - 8Y100 MODELS

Accelerator angle	Vehicle speed km/h (MPH) (Approx.)							
	D1 →D2	D2 →D3	D3 →D4	D4 →D5	D5 →D4	D4 →D3	D3 →D2	D2 →D1
100 %	58 (36)	93 (58)	144 (89)	213 (132)	203 (126)	139 (86)	81 (50)	40 (25)
90 %	58 (36)	93 (58)	144 (89)	213 (132)	203 (126)	139 (86)	81 (50)	40 (25)
80 %	58 (36)	93 (58)	144 (89)	213 (132)	203 (126)	139 (86)	81 (50)	40 (25)
70 %	58 (36)	93 (58)	144 (89)	213 (132)	193 (120)	138 (86)	80 (50)	40 (25)
60 %	58 (36)	93 (58)	144 (89)	213 (132)	186 (116)	133 (83)	75 (47)	40 (25)
50 %	58 (36)	88 (55)	135 (84)	199 (124)	173 (108)	121 (75)	68 (42)	40 (25)
40 %	49 (30)	80 (50)	115 (71)	169 (105)	145 (90)	90 (56)	53 (33)	31 (19)
30 %	36 (22)	63 (39)	88 (55)	124 (77)	103 (64)	58 (36)	34 (21)	19 (12)
20 %	27 (17)	46 (29)	61 (38)	86 (53)	59 (37)	39 (24)	22 (14)	8 (5)
10 %	19 (12)	29 (18)	38 (24)	53 (33)	44 (27)	32 (20)	22 (14)	8 (5)

VEHICLE SPEED WHEN PERFORMING AND RELEASING COMPLETE LOCK-UP - 9J500 MODELS

Accelerator angle	Vehicle speed km/h (MPH) (Approx.)	
	Lock-up “ON”	Lock-up “OFF”
50 %	230 (143)	207 (129)
15%	115 (71)	74 (46)
0 - 8 %	70 (43)	67 (42)

- Lock-up vehicle speed indicates the speed in D position.
- Perform lock-up inspection after warming up engine.
- Lock-up vehicle speed may vary depending on the driving conditions and circumstances.

VEHICLE SPEED WHEN PERFORMING AND RELEASING COMPLETE LOCK-UP 8Y100 MODELS

Accelerator angle	Vehicle speed km/h (MPH) (Approx.)	
	Lock-up “ON”	Lock-up “OFF”
50 %	213 (132)	192 (119)
15%	106 (66)	69 (43)
0 - 8 %	65 (40)	62 (39)

- Lock-up vehicle speed indicates the speed in D position.
- Perform lock-up inspection after warming up engine.
- Lock-up vehicle speed may vary depending on the driving conditions and circumstances.

Symptom Chart

ECS009D7

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

CAUTION:
Do not remove or disassemble any RE5F22A model transaxle parts unless specified to do so in AT section.

Symptom	Condition	Diagnostic Item	Reference page
With selector lever in D position, driving is not possible.	ON vehicle	1. Fluid level and state	AT-441
		2. Control cable and PNP switch adjustment	AT-628, AT-626
		3. TCM	AT-459
		4. Pressure control solenoid valve A	AT-532
		5. Control valve assembly	AT-629
	OFF vehicle	6. Torque converter	AT-631
		7. Forward and direct clutch assembly	AT-643
		8. B5 brake	AT-670
		9. One-way clutch No.2	AT-643
With selector lever in R position, driving is not possible.	ON vehicle	1. Fluid level and state	AT-441
		2. Control cable and PNP switch adjustment	AT-628, AT-626
		3. TCM	AT-459
		4. Shift solenoid valve A	AT-537
		5. Shift solenoid valve B	AT-542
		6. Pressure control solenoid valve A	AT-532
		7. Control valve assembly	AT-629
	OFF vehicle	8. Torque converter	AT-643
		9. Forward and direct clutch assembly	AT-643
		10. 1st and reverse brake	AT-643
		11. B5 brake	AT-670
No shock at all or the clutch slips when vehicle changes speed.	ON vehicle	1. Fluid level and state	AT-441
		2. Control cable and PNP switch adjustment	AT-628, AT-626
		3. TCM	AT-459
		4. Shift solenoid valve A	AT-537
		5. Shift solenoid valve B	AT-542
		6. Shift solenoid valve E	AT-562
		7. Pressure control solenoid valve A	AT-532
		8. Pressure control solenoid valve C	AT-576
		9. Control valve assembly	AT-629
	OFF vehicle	10. Accumulator	AT-643
Time lag is large. (“N” →“ D” position)	ON vehicle	1. Fluid level and state	AT-441
		2. Actual engine torque signal	AT-501
		3. Turbine revolution sensor	AT-493
		4. TCM	AT-459
		5. Control valve assembly	AT-629
	OFF vehicle	6. Accumulator	AT-643
		7. Forward and direct clutch assembly	AT-643

Symptom	Condition	Diagnostic Item	Reference page
Time lag is large. (“N” →“ R” position)	ON vehicle	1. Fluid level and state	AT-441
		2. Actual engine torque signal	AT-501
		3. Turbine revolution sensor	AT-493
		4. TCM	AT-459
		5. Shift solenoid valve E	AT-562
		6. Control valve assembly	AT-629
	OFF vehicle	7. Forward and direct clutch assembly	AT-643
		8. 1st and reverse brake	AT-643
Engine does not start in “N”, “P” position.	ON vehicle	1. Ignition switch and starter	PG-4, SC-9
		2. Control cable adjustment	AT-628
		3. PNP switch	AT-478
Engine starts in positions other than “N” or “P”.	ON vehicle	1. Ignition switch and starter	PG-4, SC-9
		2. Control cable adjustment	AT-628
		3. PNP switch	AT-478
Engine stalls when selector lever shifted “N” → “D”, “R”.	ON vehicle	1. Fluid level and state	AT-441
		2. TCM	AT-459
		3. Shift solenoid valve D	AT-557
		4. Pressure control solenoid valve C	AT-576
		5. Control valve assembly	AT-629
Engine stall when vehicle slow down.	ON vehicle	1. Fluid level and state	AT-441
		2. TCM	AT-459
		3. Shift solenoid valve D	AT-557
		4. Shift solenoid valve E	AT-562
		5. Pressure control solenoid valve C	AT-576
		6. Control valve assembly	AT-629
Acceleration is extremely poor.	ON vehicle	1. Fluid level and state	AT-441
		2. Control cable and PNP switch adjustment	AT-628, AT-626
		3. Engine speed signal	AT-501
		4. Electric throttle control signal	AT-597
Gear does not change from D_1 → D_2 or from M_1 → M_2 .	ON vehicle	1. Fluid level and state	AT-441
		2. TCM	AT-459
		3. Electric throttle control signal	AT-597
		4. Shift solenoid valve A	AT-537
		5. Shift solenoid valve B	AT-542
		6. Shift solenoid valve C	AT-547
		7. Shift solenoid valve D	AT-557
		8. Control valve assembly	AT-629
	OFF vehicle	9. 2nd coast brake	AT-662, AT-668
		10. 2nd brake	AT-662
		11. One-way clutch No.1	AT-668
		12. One-way clutch No.2	AT-643

Symptom	Condition	Diagnostic Item	Reference page
Gear does not change from $D_2 \rightarrow D_3$ or from $M_2 \rightarrow M_3$.	ON vehicle	1. Fluid level and state	AT-441
		2. TCM	AT-459
		3. Electric throttle control signal	AT-597
		4. Shift solenoid valve B	AT-542
		5. Shift solenoid valve C	AT-547
		6. Shift solenoid valve D	AT-557
		7. Pressure control solenoid valve A	AT-532
		8. Control valve assembly	AT-629
	OFF vehicle	9. U/D brake	AT-643
		10. B5 brake	AT-670
Gear does not change from $D_3 \rightarrow D_4$ or from $M_3 \rightarrow M_4$.	ON vehicle	1. Fluid level and state	AT-441
		2. TCM	AT-459
		3. Electric throttle control signal	AT-597
		4. Shift solenoid valve B	AT-542
		5. Shift solenoid valve C	AT-547
		6. Shift solenoid valve D	AT-557
		7. Control valve assembly	AT-629
	OFF vehicle	8. U/D clutch	AT-643
		9. U/D brake	AT-643
Gear does not change from $D_4 \rightarrow D_5$ or from $M_4 \rightarrow M_5$.	ON vehicle	1. Fluid level and state	AT-441
		2. TCM	AT-459
		3. Electric throttle control signal	AT-597
		4. Shift solenoid valve B	AT-542
		5. Shift solenoid valve C	AT-547
		6. Control valve assembly	AT-629
	OFF vehicle	7. Forward and direct clutch assembly	AT-643
		8. 2nd coast brake	AT-662, AT-668
		9. One-way clutch No.1	AT-668
In D or M range, does not downshift to 1st gear.	ON vehicle	1. Fluid level and state	AT-441
		2. TCM	AT-459
		3. Electric throttle control signal	AT-597
		4. Shift solenoid valve A	AT-537
		5. Shift solenoid valve B	AT-542
		6. Shift solenoid valve C	AT-547
		7. Shift solenoid valve D	AT-557
		8. Control valve assembly	AT-629
	OFF vehicle	9. 2nd coast brake	AT-662, AT-668
		10. 2nd brake	AT-662
		11. One-way clutch No.1	AT-668
		12. One-way clutch No.2	AT-643

Symptom	Condition	Diagnostic Item	Reference page
In D or M range, does not downshift to 2nd gear.	ON vehicle	1. Fluid level and state	AT-441
		2. TCM	AT-459
		3. Electric throttle control signal	AT-597
		4. Shift solenoid valve B	AT-542
		5. Shift solenoid valve C	AT-547
		6. Shift solenoid valve D	AT-557
		7. Pressure control solenoid valve A	AT-532
		8. Control valve assembly	AT-629
	OFF vehicle	9. U/D brake	AT-643
		10. B5 brake	AT-670
In D or M range, does not downshift to 3rd gear.	ON vehicle	1. Fluid level and state	AT-441
		2. TCM	AT-459
		3. Electric throttle control signal	AT-597
		4. Shift solenoid valve B	AT-542
		5. Shift solenoid valve C	AT-547
		6. Shift solenoid valve D	AT-557
		7. Control valve assembly	AT-629
	OFF vehicle	8. U/D clutch	AT-643
		9. U/D brake	AT-643
In D or M range, does not downshift to 4th gear.	ON vehicle	1. Fluid level and state	AT-441
		2. TCM	AT-459
		3. Electric throttle control signal	AT-597
		4. Shift solenoid valve B	AT-542
		5. Shift solenoid valve C	AT-547
		6. Control valve assembly	AT-629
	OFF vehicle	7. Forward and direct clutch assembly	AT-643
		8. 2nd coast brake	AT-662, AT-668
		9. One-way clutch No.1	AT-668
Does not lock-up or lock-up is not released.	ON vehicle	1. Fluid level and state	AT-441
		2. Stop lamp switch signal	AT-617
		3. ATF temperature sensor	AT-483
		4. TCM	AT-459
		5. Shift solenoid valve C	AT-547
		6. Shift solenoid valve D	AT-557
		7. Pressure control solenoid valve C	AT-576
		8. Control valve assembly	AT-629
	OFF vehicle	9. Torque converter	AT-631

Symptom	Condition	Diagnostic Item	Reference page
Engine brake does not work.	ON vehicle	1. Fluid level and state	AT-441
		2. TCM	AT-459
		3. Shift solenoid valve E	AT-562
		4. Electric throttle control signal	AT-597
		5. Control valve assembly	AT-629
	OFF vehicle	6. 2nd coast brake	AT-662, AT-668
		7. U/D brake	AT-643
		8. B5 brake	AT-670
Shift point is high or low.	ON vehicle	1. Pressure control solenoid valve A	AT-532
		2. Engine speed signal	AT-501
		3. Electric throttle control signal	AT-597
		4. Revolution sensor	AT-497
		5. TCM	AT-459
		6. Control valve assembly	AT-629
Large shock. (“N” →“ D” position)	ON vehicle	1. Fluid level and state	AT-441
		2. Actual engine torque signal	AT-501
		3. Turbine revolution sensor	AT-493
		4. ATF temperature sensor	AT-483
		5. Shift solenoid valve A	AT-537
		6. Shift solenoid valve B	AT-542
		7. Pressure control solenoid valve A	AT-532
		8. TCM	AT-459
		9. Control valve assembly	AT-629
	OFF vehicle	10. Accumulator	AT-643
		11. Forward and direct clutch assembly	AT-643
Large shock. (“N” →“ R” position)	ON vehicle	1. Fluid level and state	AT-441
		2. Actual engine torque signal	AT-501
		3. Turbine revolution sensor	AT-493
		4. ATF temperature sensor	AT-483
		5. Shift solenoid valve E	AT-562
		6. Pressure control solenoid valve B	AT-567
		7. TCM	AT-459
		8. Control valve assembly	AT-629
	OFF vehicle	9. Forward and direct clutch assembly	AT-643
		10. 1st and reverse brake	AT-643

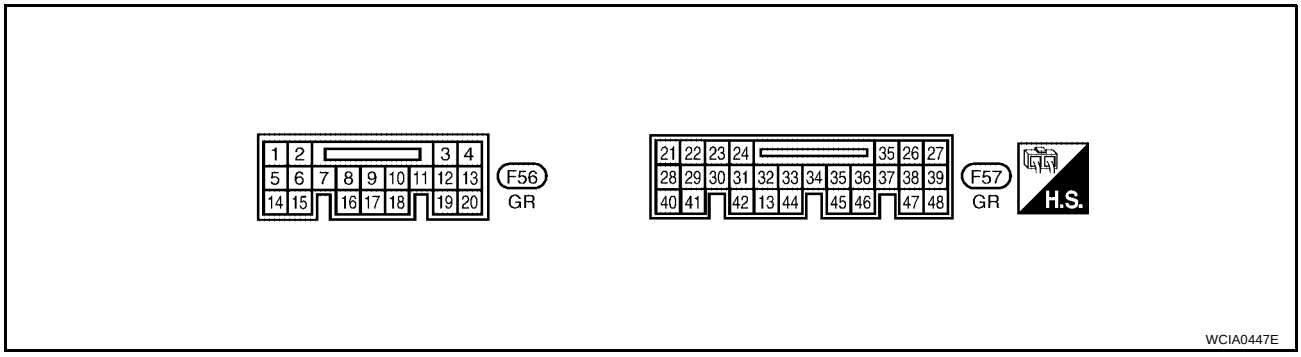
Symptom	Condition	Diagnostic Item	Reference page
Shock is too large when shift up.	ON vehicle	1. Fluid level and state	AT-441
		2. Actual engine torque signal	AT-501
		3. Turbine revolution sensor	AT-493
		4. ATF temperature sensor	AT-483
		5. TCM power input signal	AT-592
		6. Shift solenoid valve A	AT-537
		7. Shift solenoid valve B	AT-542
		8. Shift solenoid valve C	AT-547
		9. Shift solenoid valve D	AT-557
		10. Shift solenoid valve E	AT-562
		11. Pressure control solenoid valve A	AT-532
		12. Pressure control solenoid valve B	AT-567
		13. Pressure control solenoid valve C	AT-576
		14. TCM	AT-459
		15. Control valve assembly	AT-629
Shock is too large for coast down.	ON vehicle	1. Fluid level and state	AT-441
		2. Actual engine torque signal	AT-501
		3. Turbine revolution sensor	AT-493
		4. ATF temperature sensor	AT-483
		5. TCM power input signal	AT-592
		6. Shift solenoid valve A	AT-537
		7. Shift solenoid valve B	AT-542
		8. Shift solenoid valve C	AT-547
		9. Shift solenoid valve D	AT-557
		10. Shift solenoid valve E	AT-562
		11. Pressure control solenoid valve A	AT-532
		12. Pressure control solenoid valve B	AT-567
		13. Pressure control solenoid valve C	AT-576
		14. TCM	AT-459
		15. Control valve assembly	AT-629

Symptom	Condition	Diagnostic Item	Reference page
Shock is too large for kick down.	ON vehicle	1. Fluid level and state	AT-441
		2. Actual engine torque signal	AT-501
		3. Turbine revolution sensor	AT-493
		4. ATF temperature sensor	AT-483
		5. TCM power input signal	AT-592
		6. Shift solenoid valve A	AT-537
		7. Shift solenoid valve B	AT-542
		8. Shift solenoid valve C	AT-547
		9. Shift solenoid valve D	AT-557
		10. Shift solenoid valve E	AT-562
		11. Pressure control solenoid valve A	AT-532
		12. Pressure control solenoid valve B	AT-567
		13. Pressure control solenoid valve C	AT-576
		14. TCM	AT-459
		15. Control valve assembly	AT-629
Strange noise in “R”,“N” or“ D” position.	ON vehicle	1. Fluid level and state	AT-441
		2. Control valve assembly	AT-629
	OFF vehicle	3. Torque converter	AT-643
		4. Parking component	AT-634
		5. Gear system	AT-643
With selector lever in P position, vehicle does not enter parking condition or, with selector lever in another position, parking condition is not cancelled.	ON vehicle	1. PNP switch	AT-478
		2. Control cable adjustment	AT-628
		3. Control valve assembly	AT-629
	OFF vehicle	4. Parking component	AT-634
Vehicle runs with transaxle in “ P” position.	ON vehicle	1. Fluid level and state	AT-441
		2. PNP switch	AT-478
		3. Control cable and PNP switch adjustment	AT-628, AT-626
		4. Line pressure test	AT-443
Vehicle runs with transaxle in “N” position.	ON vehicle	1. Fluid level and state	AT-441
		2. PNP switch	AT-478
		3. Control cable and PNP switch adjustment	AT-628, AT-626
		4. Line pressure test	AT-443

TCM Input/Output Signal Reference Values

ECS009D8

TCM TERMINAL CONNECTOR LAYOUT



TCM INSPECTION TABLE

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
1	L/B	A/T PV IGN relay		When turning ignition switch ON.	0 - 1.5V
				When turning ignition switch OFF.	0V
3	L	CAN-H	–		–
4	P	CAN-L	–		–
5	L/Y	Manual mode switch UP (+)		Selector lever: + side	0V
				Other than the above	Battery voltage
6	L/R	Manual mode switch DOWN (-)		Selector lever: - side	0V
				Other than the above	Battery voltage
14	B	Ground	Always		0V
16	SB	Manual mode switch AUTO		Selector lever: “P”, “R”, “N” or “D” position	0V
				Selector lever: Manual shift gate position	Battery voltage
19	P/B	Manual mode switch MANUAL		Selector lever: Manual shift gate position (neutral)	0V
				Other than the above	Battery voltage
21	G/B	Pressure control solenoid valve B ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
22	L	Revolution sensor power supply		When turning ignition switch ON.	Battery voltage
				When turning ignition switch OFF.	0V
23	G	Turbine revolution sensor power supply		When turning ignition switch ON.	Battery voltage
				When turning ignition switch OFF.	0V
24	OR/B	PNP switch A		Selector lever: “P” and “R” position	0V
				Other than the above	Battery voltage
25	G/R	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in 1st or 5th gear.)	Battery voltage
				When shift solenoid valve B does not operate.	0V
26	PU/W	Shift solenoid valve D		When shift solenoid valve D operates. (When driving in 3rd, 4th or 5th gear.)	Battery voltage
				When shift solenoid valve D does not operate.	0V
27	Y/R	Power supply (Memory back-up)	Always		Battery voltage
28	W	Pressure control solenoid valve C ground		When engine is running with idle speed and setting selector lever to “P” position.	0V

Terminal	Wire color	Item	Condition		Data (Approx.)	
29	B/W	Revolution sensor		When moving at 20 km/h (12 MPH) in 1st gear.	119Hz	
30	R	Turbine revolution sensor		When moving at 20 km/h (12 MPH) in 1st gear.	371Hz	
31	BR	PNP switch B		Selector lever: “R”, “N”, “D” and manual mode position	0V	
				Other than the above	Battery voltage	
32	P/B	PNP switch C		Selector lever: “D” and manual mode position	0V	
				Other than the above	Battery voltage	
33	R/B	PNP switch PN		Selector lever: “P” and “N” position	Battery voltage	
				Other than the above	0V	
34	Y	Power supply		When turning ignition switch ON.	Battery voltage	
				When turning ignition switch OFF.	0V	
35	L/Y	Pressure control solenoid valve A		When engine is running with idle speed and setting selector lever to “P” position.	300Hz	
36	OR/B	Pressure control solenoid valve B		When engine is running with idle speed and setting selector lever to “P” position.	300Hz	
37	R/B	Shift solenoid valve C		When shift solenoid valve C operates. (When driving in 1st, 2nd, 3rd or reverse gear.)	Battery voltage	
				When shift solenoid valve C does not operate.	0V	
38	R/Y	Power supply (A/T PV IGN relay)		When turning ignition switch ON.	Battery voltage	
				Measure 3 seconds after switching “OFF” the ignition switch.	0V	
39	R/Y	Power supply (A/T PV IGN relay)		When turning ignition switch ON.	Battery voltage	
				Measure 3 seconds after switching “OFF” the ignition switch.	0V	
40	L/G	Pressure control solenoid valve A ground		When engine is running with idle speed and setting selector lever to “P” position.	0V	
41	R/Y	Fluid temperature sensor		When ATF temperature 0°C (32°F)	4.0V	9.8 kΩ
				When ATF temperature 20°C (68°F)	3.0V	4.2 kΩ
				When ATF temperature 80°C (176°F)	0.8V	0.54 kΩ
				When ATF temperature 100°C (212°F)	0.5V	0.31 kΩ
42	LG	Fluid temperature sensor ground	Always		0V	

Terminal	Wire color	Item	Condition		Data (Approx.)
43	PU/W	PNP switch PA		Selector lever: “P” and “N” position	0V
				Other than the above	Battery voltage
45	OR	Pressure control solenoid valve C		When engine is running with idle speed and setting selector lever to “P” position.	300Hz
46	W/G	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in 1st gear.)	Battery voltage
				When shift solenoid valve A does not operate.	0V
47	BR/Y	Shift solenoid valve E		When shift solenoid valve E operates. (When driving in reverse gear.)	Battery voltage
				When shift solenoid valve E does not operate.	0V
48	B	Ground	Always		0V

CONSULT-II Function (TCM)

ECS009D9

CONSULT-II can display each diagnostic item using the diagnostic test modes shown following.

TCM diagnostic mode	Description
WORK SUPPORT	Supports inspections and adjustments. Commands are transmitted to the TCM for setting the status suitable for required operation, input/output signals are received from the TCM and received data is displayed.
SELF-DIAG RESULTS	Displays TCM self-diagnosis results.
DATA MONITOR	Displays TCM input/output data in real time.
CAN DIAG SUPPORT MNTR	The result of transmit/receive diagnosis of CAN communication can be read.
ACTIVE TEST	Operation of electrical loads can be checked by sending drive signal to them.
FUNCTION TEST	Conducted by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".
ECU PART NUMBER	TCM part number can be read.

After performing “SELF-DIAGNOSTIC PROCEDURE (WITH CONSULT-II)” (Refer to AT-463), place check marks for results on the AT-436, "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. Display of solenoid valves on CONSULT-II changes at the start of shifting, while 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.

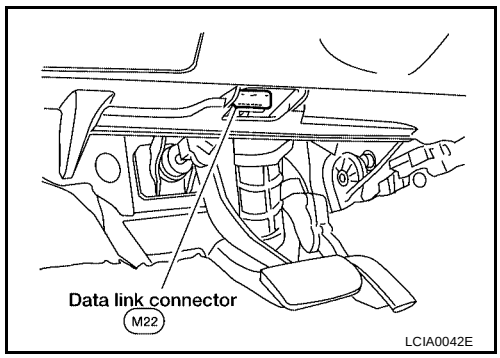
CONSULT-II SETTING PROCEDURE

CAUTION:

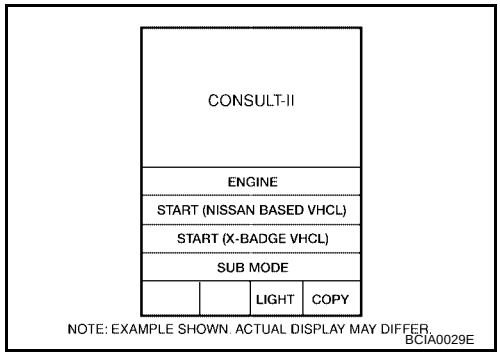
If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

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

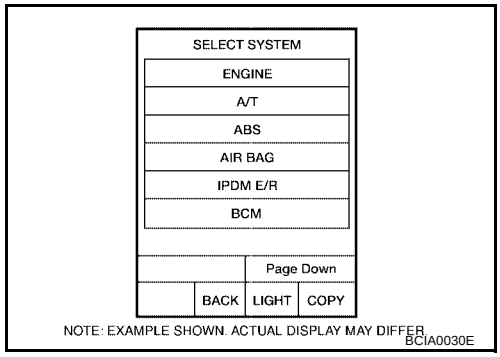
1. Turn ignition switch “OFF”.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector, which is located in driver instrument panel (lower).
3. Turn ignition switch “ON”. (Do not start engine.)



4. Touch “START (NISSAN BASED VHCL)”.



5. Touch “A/T”.
   If “A/T” is not indicated, go to GI-39, "Consult-II Data Link Connector (DLC) Circuit" .
6. Perform each diagnostic test mode according to each service procedure.



WORK SUPPORT MODE

Work item

Work item	Condition	Usage
INITIALIZATION	Under the following conditions. ● Ignition switch “ON”. ● Selector lever “P” or “N” position. ● Engine not running. ● Vehicle speed is 0 km/h (0 MPH). ● Ignition voltage is more than 10.5V. ● Malfunction was not detected.	Use to initialize TCM in a case of replacing transaxle or TCM. Refer to AT-390, "Precautions for A/T Assembly or TCM Replacement" .

SELF-DIAG RESULT MODE

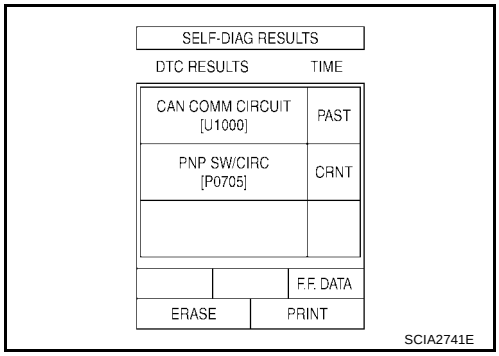
Operation procedure

1. Perform “CONSULT-II SETTING PROCEDURE”. Refer to AT-462, "CONSULT-II SETTING PROCEDURE" .

2. Touch “SELF-DIAG RESULTS”.
Display shows malfunction experienced since the last erasing operation.

NOTE:

- **The details for “TIME” are as follow:**
  - **“CRNT”: Error currently detected with TCM.**
  - **“PAST”: Error detected in the past and memorized with TCM.**
- **Touch “F.F.DATA” on “SELF-DIAG RESULTS” screen to display freeze frame data. Freeze frame data shows driving condition when malfunction is detected.**
  For freeze frame data items, refer to AT-466, "Display item list" .



Display item list

X: Applicable —: Not applicable

Items (CONSULT-II screen terms)	Malfunction is detected when...	TCM self-diagnosis		OBD-II (DTC)
		A/T CHECK indicator lamp*3	“TRANSMISSION” with CONSULT-II	MIL indicator lamp*1 , “ENGINE” with CONSULT-II or GST
CAN COMM CIRCUIT	● When a malfunction is detected in CAN communications	X	U1000*4	U1000*4
VEH SPD SE/CIRMTR	● ECM detects a malfunction in vehicle speed sensor signal, after that TCM inputs the result by CAN communication.	X	P0500	P0500
TCM PROCESSOR	● TCM processor is malfunctioning.	—	P0613	—
PNP SW/CIRC	● PNP switch signals input with impossible pattern	X	P0705	P0705
ATF TEMP SEN/CIRC	● Normal voltage is not applied to ATF temperature sensor due to open, short, and so on. ● During running, the ATF temperature sensor signal voltage is excessively high or low.	X	P0710	P0710
FLUID TEMP SEN	● ATF temperature signal does not change.	—	P0711	P0711*2
TURBINE SENSOR	● Signal from turbine revolution sensor does not input due to open, short, and so on. ● Unexpected signal input during running.	X	P0717	P0717
VHCL SPEED SEN-A/T	● Signal from revolution sensor does not input due to open, short, and so on. ● Unexpected signal input during running.	X	P0722	P0722
ENG SPD INP PERFOR	● Malfunction is detected in engine speed signal, actual engine torque signal or torque reduction signal that is output from ECM through CAN communication.	X	P0726	P0726
A/T 1ST GR FNCTN	● A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	X	P0731	P0731*2
A/T 2ND GR FNCTN	● A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	X	P0732	P0732*2
A/T 3RD GR FNCTN	● A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	X	P0733	P0733*2
A/T 4TH GR FNCTN	● A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	X	P0734	P0734*2
A/T 5TH GR FNCTN	● A/T cannot be shifted to the 5th gear position even if electrical circuit is good.	X	P0735	P0735*2
A/T TCC S/V FNCTN	● A/T cannot perform lock-up even if electrical circuit is good.	X	P0744	P0744*2

Items (CONSULT-II screen terms)	Malfunction is detected when...	TCM self-diagnosis		OBD-II (DTC)
		A/T CHECK indicator lamp*3	"TRANSMISSION" with CONSULT-II	MIL indicator lamp*1 , "ENGINE" with CONSULT-II or GST
PC SOL A(L/PRESS)	● Normal voltage is not applied to solenoid due to open, short, and so on. ● TCM detects as irregular by comparing target value with monitor value.	X	P0745	P0745
SHIFT SOL A		X	P0750	P0750
SHIFT SOL B		X	P0755	P0755
SHIFT SOL C		X	P0760	P0760
SFT SOL C STUCK ON	● Condition of shift solenoid valve C is different from monitor value, and relation between gear position and actual gear ratio is irregular.	X	P0762	P0762*2
SHIFT SOL D	● Normal voltage is not applied to solenoid due to open, short, and so on. ● TCM detects as irregular by comparing target value with monitor value.	X	P0765	P0765
SHIFT SOL E		X	P0770	P0770
PC SOL B(SFT/PRS)		X	P0775	P0775
SHIFT	● No rotation change occurs between input (turbine revolution sensor) and output (revolution sensor) and shifting time is long. ● Shifting ends immediately. ● Condition in malfunction engine revs up usually shifting.	X	P0780	P0780*2
PC SOL C(TCC&SFT)	● Normal voltage is not applied to solenoid due to open, short, and so on. ● TCM detects as irregular by comparing target value with monitor value.	X	P0795	P0795
PC SOL C STC ON	● Condition of pressure control solenoid valve C is different from monitor value, and relation between gear position and actual gear ratio or lock-up status is irregular.	X	P0797	P0797*2
MANUAL MODE SWITCH	● Manual mode switch signal is incorrectly input due to open, short, and so on.	—	P0826	—
TCM POWER INPT SIG	● Voltage supplied to TCM is too low.	—	P0882	P0882
ELEC TH CONTROL	● The electric throttle control system for ECM is in a malfunction, after that TCM inputs the result by CAN commnication.	X	P1726	P1726
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	● No NG item has been detected.	—	X	X

*1: Refer to AT-430, "Malfunction Indicator Lamp (MIL)" .

*2: These malfunctions cannot be displayed MIL if another malfunction is assigned to MIL.

*3: Indicate it when performing TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS). Refer to AT-468, "TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)" .

*4: If DTC U1000 is displayed with other DTCs, first perform the trouble diagnosis for DTC U1000. Refer to AT-471 .

DATA MONITOR MODE

Operation procedure

1. Perform "CONSULT-II SETTING PROCEDURE". Refer to AT-462, "CONSULT-II SETTING PROCEDURE" .
2. Touch "DATA MONITOR".

NOTE:
When malfunction is detected, CONSULT-II performs REAL-TIME DIAGNOSIS.
Also, any malfunction detected while in this mode will be displayed at real time.

Display item list

X: Standard —: Not applicable

Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
VHCL/S SE-A/T (km/h)	X	X	X	Vehicle speed recognized by the TCM.
VHCL/S SE-MTR* (km/h)	X	—	X	
FLUID TEMP SE* (V)	X	—	X	
FLUID TEMP* (°C)	—	—	X	
COOLAN TEMP* (°C)	—	—	X	Displays status of engine coolant temperature. Signal input with CAN communication line.
BATTERY VOLT* (V)	X	—	X	
ENGINE SPEED* (rpm)	X	X	X	Signal input with CAN communication line.
TURBINE REV* (rpm)	X	—	X	Turbine revolution computed from signal of turbine revolution sensor is displayed.
OUTPUT REV* (rpm)	—	—	X	Output revolution computed from signal of revolution sensor is displayed.
PNP SW A* (ON/OFF)	X	—	X	
PNP SW B* (ON/OFF)	X	—	X	
PNP SW C* (ON/OFF)	X	—	X	
PNP SW PA* (ON/OFF)	X	—	X	
PNP SW PN (ON/OFF)	X	—	X	
MANU MODE SW* (ON/OFF)	X	—	X	
NON M-MODE SW* (ON/OFF)	X	—	X	
UP SW* (ON/OFF)	X	—	X	
DOWN SW* (ON/OFF)	X	—	X	
RANGE SLCT SW (ON/OFF)	X	—	X	Not mounted but displayed.
BRAKE SW* (ON/OFF)	X	—	X	This means stop lamp switch signal via CAN communication line.
CLSO THL POS (ON/OFF)	X	—	X	Signal input with CAN communication line.
ASCD SIGNAL (ON/OFF)	X	—	X	
ASCD OD OFF (ON/OFF)	X	—	X	
ABS SIGNAL (ON/OFF)	X	—	X	
TCS SIGNAL (ON/OFF)	X	—	X	
TCS GEAR HOLD (ON/OFF)	X	—	X	
TCS SFT CNG (ON/OFF)	—	—	X	Requests TCM for shift schedule change.
LOCK-UP* (ON/OFF)	—	—	X	Always “ON” during lock-up, regardless of types.
SLCT LVR POSI*	—	—	X	Displays “##” in manual mode or when unknown.
MANU GR POSI	—	—	X	Displays “##” in non-manual mode or when unknown.

Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
GEAR*	—	—	X	Indicates current gear position. Also when setting in P or N position, indicate by shift solenoid valves. Displays “##” in R position or when unknown.
NEXT GR POSI	—	—	X	Displays “##” in R position or when unknown.
REDCT DEM SIG (ON/OFF)	—	—	X	Displays status of engine torque reduction demand signal.
TC SLIP RATIO	—	—	X	
SLIP REV (rpm)	—	—	X	Difference between engine speed and torque converter input shaft speed.
ACCELE ANGLE* (%)	X	X	X	Degree of opening for accelerator recognized by the TCM. For fail-safe operation, the specific value used for control is displayed.
PC SOL A OUT* (A)	—	—	X	
PC SOL A MON* (A)	—	X	X	
PC SOL B OUT* (A)	—	—	X	
PC SOL B MON* (A)	—	X	X	
PC SOL C OUT* (A)	—	—	X	
PC SOL C MON* (A)	—	X	X	
SFT SOL A OUT* (ON/OFF)	—	—	X	
SFT SOL B OUT* (ON/OFF)	—	—	X	
SFT SOL C OUT* (ON/OFF)	—	—	X	
SFT SOL D OUT* (ON/OFF)	—	—	X	
SFT SOL E OUT* (ON/OFF)	—	—	X	
SFT SOL A MON* (ON/OFF)	—	X	X	
SFT SOL B MON* (ON/OFF)	—	X	X	
SFT SOL C MON* (ON/OFF)	—	X	X	
SFT SOL D MON* (ON/OFF)	—	X	X	
SFT SOL E MON* (ON/OFF)	—	X	X	
ENGINE TORQUE* (Nm)	—	—	X	Signal input with CAN communication line.
TRQ REDCT REQ* (Nm)	—	—	X	Torque reduction request
TRQ LIMIT REQ* (Nm)	—	—	X	Torque limitation request
WO AT REQ TRQ* (Nm)	—	—	X	Engine torque without A/T request
G-RATE (G)	—	—	X	
F-SAFE MODE (OK/1 to 10)	—	X	X	Numbers indicate types of fail-safe modes. Refer to AT-432, "Fail-safe mode list" .
VDC SIGNAL (ON/OFF)	X	—	X	Signal input with CAN communication line.

Monitored item (Unit)	Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
SHIFT SCHDULE	—	—	X	The details for data of shift schedule are as follow: NOR: Normal mode UP1: Upslope 1 mode UP2: Upslope 2 mode (steeper than “UP1”) DOWN: Downslope mode HOT1: Hot 1 mode HOT2: Hot 2 mode (higher temperature than “HOT1”)
Voltage (V)	—	—	X	Displays the value measured by the voltage probe.
Frequency (Hz)	—	—	X	The value measured by the pulse probe is displayed.
DUTY-HI (high) (%)	—	—	X	
DUTY-LOW (low) (%)	—	—	X	
PLS WIDTH-HI (ms)	—	—	X	
PLS WIDTH-LOW (ms)	—	—	X	

*: Also, the items appear on CONSULT-II screen in freeze frame data mode of self-diagnostic results only if DTC is detected. For details, refer to AT-463, "SELF-DIAG RESULT MODE" .

ACTIVE TEST MODE

Test item

Test item	Condition	Description
SHIFT SOLENOID A	Under the following conditions. ● Ignition switch “ON” ● Selector lever “P” or “N” position ● Engine not running ● Vehicle speed is 0 km/h (0 MPH). ● Ignition voltage is more than 10.5V. ● Malfunction was not detected.*	Each shift solenoid operate ON/OFF by receiving the drive signal.
SHIFT SOLENOID B		
SHIFT SOLENOID C		
SHIFT SOLENOID D		
SHIFT SOLENOID E		
PRESSURE CONTROL SOL A		Each pressure control solenoid is activated by receiving the drive signal.
PRESSURE CONTROL SOL B		
PRESSURE CONTROL SOL C		

*: Except when P0711, P0731, P0732, P0733, P0734, P0735, P0744, P0762, P0780 or P0797 is detected.

NOTE:
Approximately 10 seconds after the operation is begun, “TEST IS STOPPED” will be displayed.

Diagnostic Procedure Without CONSULT-II

ECS009DA

OBD-II SELF-DIAGNOSTIC PROCEDURE (WITH GST)

Refer to EC-735, "Generic Scan Tool (GST) Function" .

OBD-II SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

Refer to EC-669, "Malfunction Indicator Lamp (MIL)" .

TCM SELF-DIAGNOSTIC PROCEDURE (NO TOOLS)

Description

As a method for locating the suspect system, when the self-diagnostics start signal is input, the memory for the malfunction location is output and the A/T CHECK indicator lamp flashes to display the corresponding DTC.

Diagnostic procedure

1. CHECK A/T CHECK INDICATOR LAMP

1. Start the engine with selector lever in “P” position. Warm engine to normal operating temperature.
2. Turn ignition switch “ON” and “OFF” at least twice, then leave it in the “OFF” position.
3. Wait 10 seconds.
4. Turn ignition switch “ON”. (Do not start engine.)
5. Does A/T CHECK indicator lamp come on for about 2 seconds?

Yes or No

Yes >> GO TO 2.
No >> GO TO AT-598, "A/T CHECK Indicator Lamp does not come on" .

2. JUDGEMENT PROCEDURE

NOTE:
After turning ignition switch “ON” (at step 6), perform within 2 seconds (while A/T CHECK indicator lamp come on.).

1. Turn ignition switch “OFF”.
2. Push shift lock release button.
3. Move selector lever from “P” to “D” position.
4. Release accelerator pedal. (Set the closed throttle position signal “ON”.)
5. Depress brake pedal. (Stop lamp switch signal “ON”.)
6. Turn ignition switch “ON”. (Do not start engine.)
7. Move the selector lever to the “N” position and release brake pedal. (Stop lamp switch signal “OFF”.)
8. Move the selector lever to “D” position and depress brake pedal. (Stop lamp switch signal “ON”.)
9. Release brake pedal. (Stop lamp switch signal “OFF”.)
10. Depress accelerator pedal fully and release it.

>> GO TO 3.

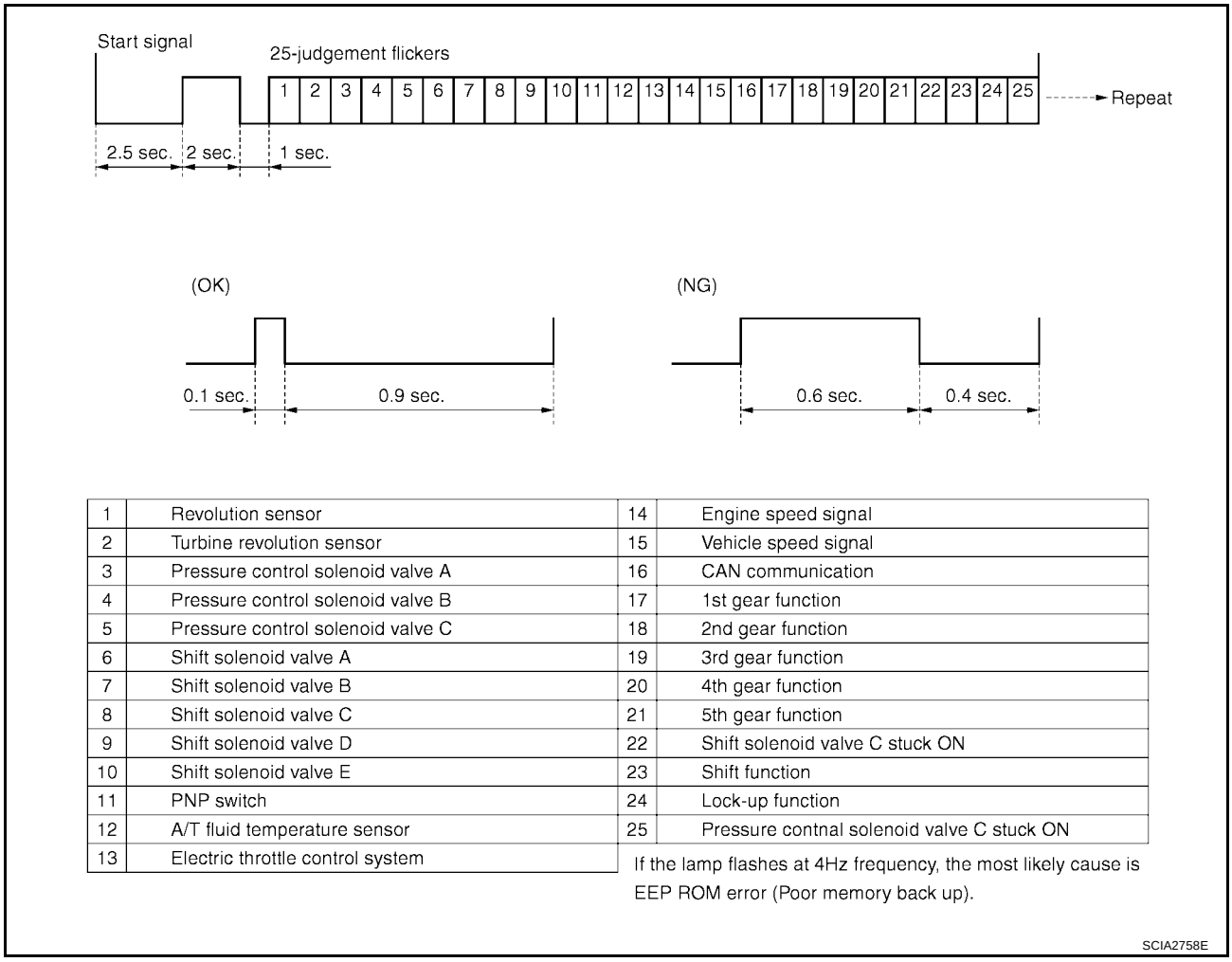
3. CHECK SELF-DIAGNOSIS CODE

Check A/T CHECK indicator lamp. Refer to AT-470, "Judgement self-diagnosis code" .
If the system does not go into self-diagnostics, refer to AT-617, "TCM Self-diagnosis Does Not Activate" .

>> **DIAGNOSIS END**

Judgement self-diagnosis code

When a malfunction is detected, the malfunction route is indicated by longer illumination of the indicator lamp.



1	Revolution sensor	14	Engine speed signal
2	Turbine revolution sensor	15	Vehicle speed signal
3	Pressure control solenoid valve A	16	CAN communication
4	Pressure control solenoid valve B	17	1st gear function
5	Pressure control solenoid valve C	18	2nd gear function
6	Shift solenoid valve A	19	3rd gear function
7	Shift solenoid valve B	20	4th gear function
8	Shift solenoid valve C	21	5th gear function
9	Shift solenoid valve D	22	Shift solenoid valve C stuck ON
10	Shift solenoid valve E	23	Shift function
11	PNP switch	24	Lock-up function
12	A/T fluid temperature sensor	25	Pressure contnal solenoid valve C stuck ON
13	Electric throttle control system		

If the lamp flashes at 4Hz frequency, the most likely cause is EEP ROM error (Poor memory back up).

SCIA2758E

Erase self-diagnosis

- In order to make it easier to find the cause of hard-to-duplicate malfunctions, malfunction information is stored into the control unit as necessary during use by the user. This memory is not erased no matter how many times the ignition switch is turned ON and OFF.
- However, this information is erased by turning ignition switch “OFF” after executing self-diagnostics or by erasing the memory using the CONSULT-II.

DTC U1000 CAN COMMUNICATION LINE

PFP:23710

Description

ECS009DB

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 malfunction 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

ECS009DC

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “CAN COMM CIRCUIT” with CONSULT-II or U1000 without CONSULT-II is detected when TCM cannot communicate to other control units.

Possible Cause

ECS009DD

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

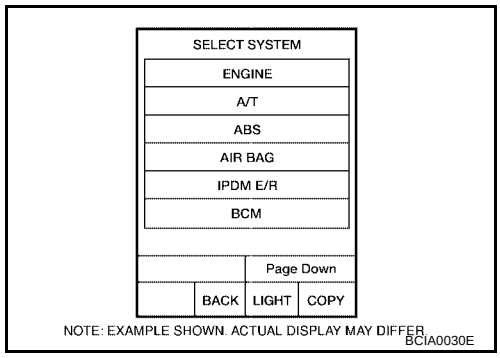
DTC Confirmation Procedure

ECS009DE

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 “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Drive vehicle and maintain the following condition for at least 6 seconds.
   SLCT LVR POSI: “D” position
5. If DTC is detected, go to AT-473, "Diagnostic Procedure" .



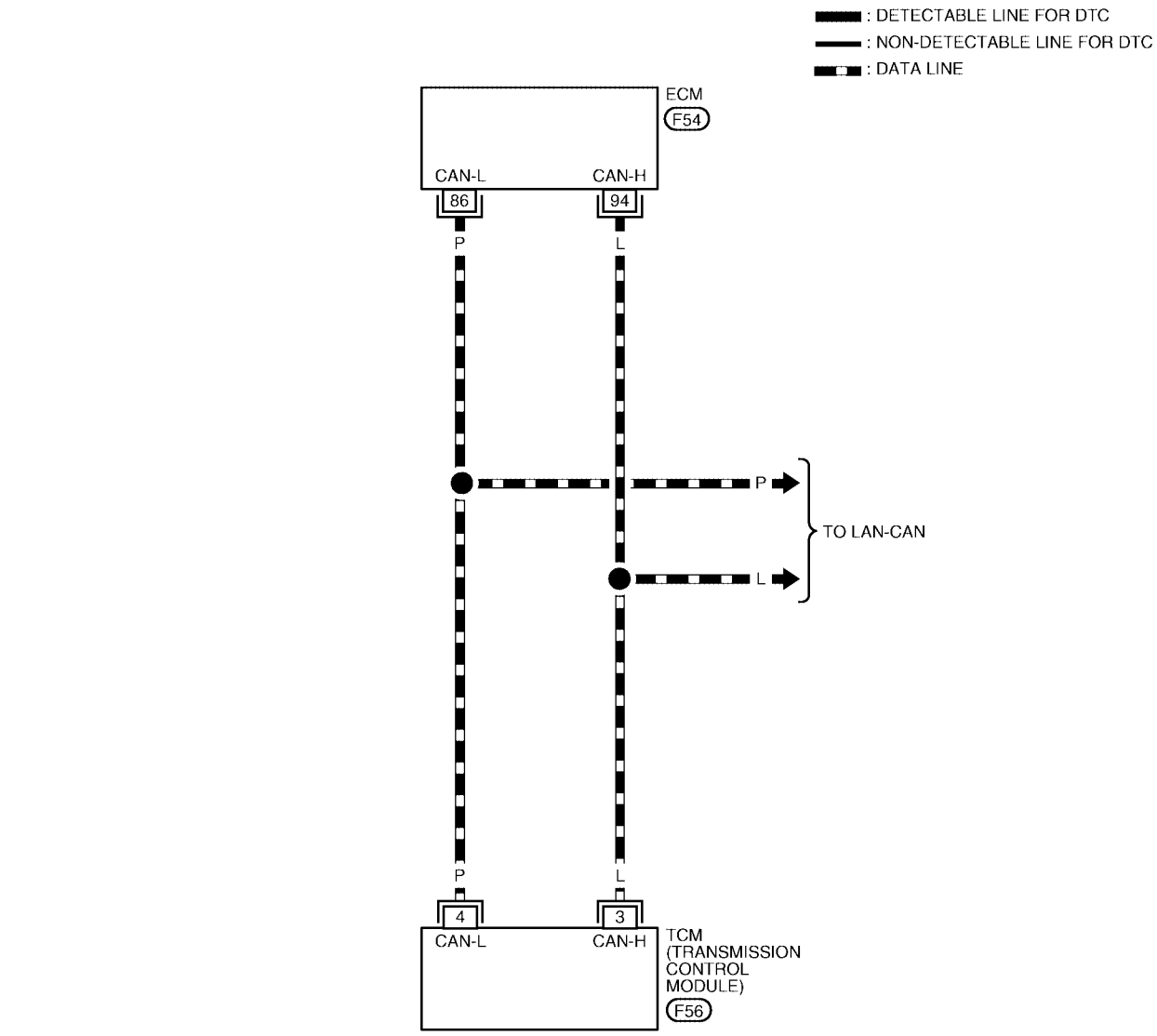
WITH GST

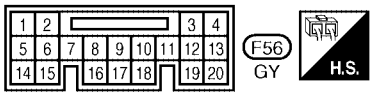
Follow the procedure “WITH CONSULT-II”.

Wiring Diagram — AT — CAN

ECS009DF

AT-CAN-01





REFER TO THE FOLLOWING.
F54 - ELECTRICAL UNITS

WCWA0187E

TCM terminals and data are reference value.

Terminal	Wire color	Item	Condition	Data (Approx.)
3	L	CAN H	–	–
4	P	CAN L	–	–

Diagnostic Procedure

ECS009DG

1. CHECK CAN COMMUNICATION CIRCUIT

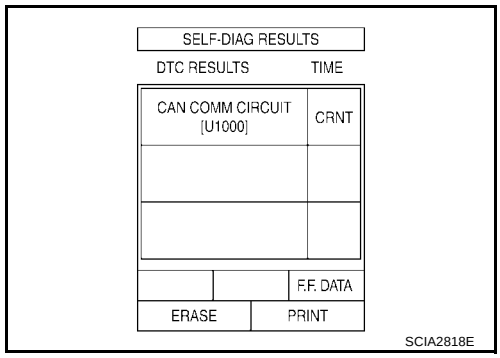
With CONSULT-II

1. Turn ignition switch “ON” and start engine.
2. Select “A/T” with “SELF-DIAG RESULTS” mode in CONSULT-II.
3. The “CAN COMM CIRCUIT” is detected.

Yes or No?

Yes >> Print out CONSULT-II screen, GO TO LAN-3, "Precautions When Using CONSULT-II" .

No >> **INSPECTION END**



DTC P0500 VEHICLE SPEED SENSOR MTR

PFP:24814

Description

ECS009DH

The vehicle speed sensor·MTR signal is transmitted from unified meter and A/C amp. to TCM by CAN communication line. The signal functions as an auxiliary device to the revolution sensor when it is malfunctioning. The TCM will then use the vehicle speed sensor·MTR signal.

On Board Diagnosis Logic

ECS009DI

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “VEH SPD SE/CIR-MTR” with CONSULT-II or 15th judgement flicker without CONSULT-II is detected when TCM does not receive the proper vehicle speed sensor MTR signal (input by CAN communication) from unified meter and A/C amp.

Possible Cause

ECS009DJ

- Harness or connectors
  (The signal circuit is open or shorted.)
- Unified meter and A/C amp.
- ABS actuator and electric unit (control unit)
- Wheel sensor

DTC Confirmation Procedure

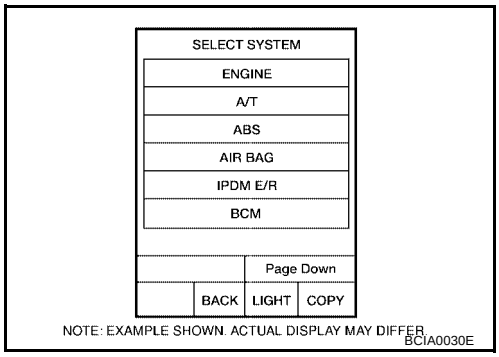
ECS009DK

CAUTION:
Always drive vehicle at a safe speed.

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 and maintain the following conditions for at least 5 consecutive seconds.
   VHCL/S SE-A/T: 30 km/h (17 MPH) or more
   ACCELE ANGLE: 10 % or less
4. If DTC is detected, go to AT-475, "Diagnostic Procedure" .



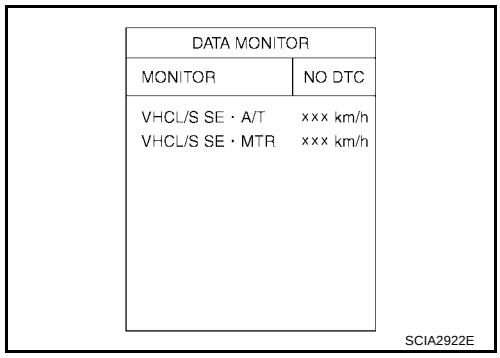
Diagnostic Procedure

ECS009DL

1. CHECK INPUT SIGNALS

With CONSULT-II

1. Start engine.
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Drive vehicle, and then make sure that the values of “VHCL/S SE-A/T” and “VHCL/S SE-MTR” are same.



OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Refer to BRC-8, "TROUBLE DIAGNOSIS" (with ABS), BRC-53, "TROUBLE DIAGNOSIS" (with TCS/ABS).

OK or NG

OK >> GO TO 3.
NG >> If NG, recheck pin terminals for damage or loose connection with harness connector.

3. CHECK DTC WITH UNIFIED METER AND A/C AMP.

Refer to DI-5, "COMBINATION METERS" .

OK or NG

OK >> GO TO 4.
NG >> If NG, recheck pin terminals for damage or loose connection with harness connector.

4. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-474, "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-459, "TCM Input/Output Signal Reference Values" .
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.

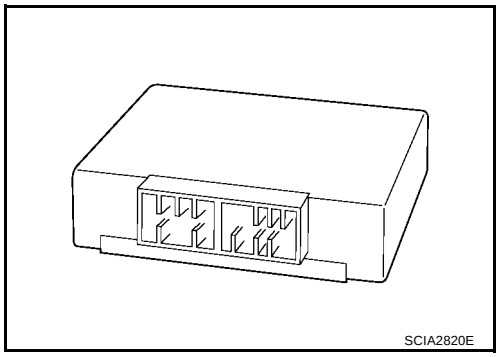
DTC P0613 TCM PROCESSOR

PFP:31036

Description

ECS009DM

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


SCIA2820E

On Board Diagnosis Logic

ECS009DN

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “TCM PROCESSOR” with CONSULT-II is detected when TCM processor is malfunctioning.

Possible Cause

ECS009DO

TCM

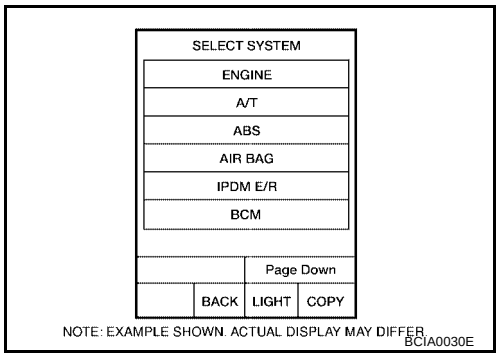
DTC Confirmation Procedure

ECS009DP

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 “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Run engine for at least 2 consecutive seconds at idle speed.
5. If DTC is detected, go to AT-477, "Diagnostic Procedure" .



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER
BCIA0030E

Diagnostic Procedure

ECS009DQ

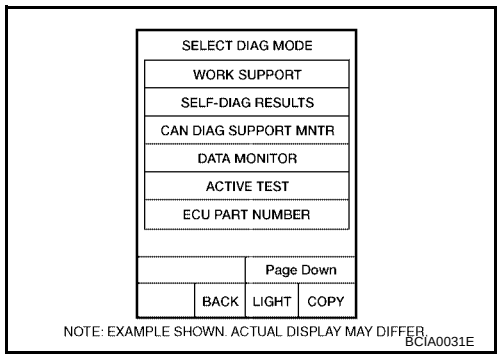
1. CHECK DTC

With CONSULT-II

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “A/T” with “SELF-DIAG RESULTS” mode in CONSULT-II.
3. Touch “ERASE”.
4. Turn ignition switch “OFF” and wait at least 10 seconds.
5. Perform DTC confirmation procedure, AT-476, "DTC Confirmation Procedure" .

Is the “TCM PROCESSOR” displayed again?

YES >> Replace TCM.
NO >> Inspection End.



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER.
BCIA0031E

DTC P0705 PARK/NEUTRAL POSITION SWITCH

PFP:32006

Description

ECS009DR

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

Selector lever	PNP switch A	PNP switch B	PNP switch C	PNP switch PA	PNP switch PN
P	ON	OFF	OFF	ON	ON
R	ON	ON	OFF	OFF	OFF
N	OFF	ON	OFF	ON	ON
D	OFF	ON	ON	OFF	OFF

On Board Diagnosis Logic

ECS009DS

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “PNP SW/CIRC” with CONSULT-II or P0705 without CONSULT-II is detected when PNP switch signals input with impossible pattern.

Possible Cause

ECS009DT

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

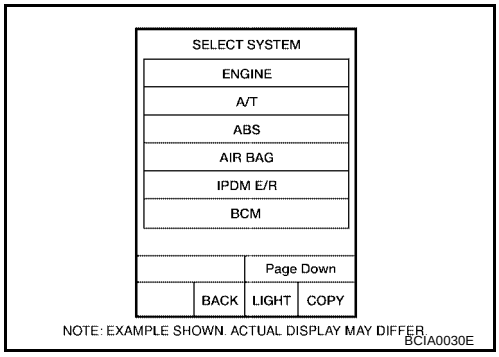
DTC Confirmation Procedure

ECS009DU

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 “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Move selector lever to each position.
   SLCT LVR POSI: “P”, “R”, “N” or “D” position
4. Wait for at least 5 consecutive seconds at each position.
5. If DTC is detected, go to AT-480, "Diagnostic Procedure" .



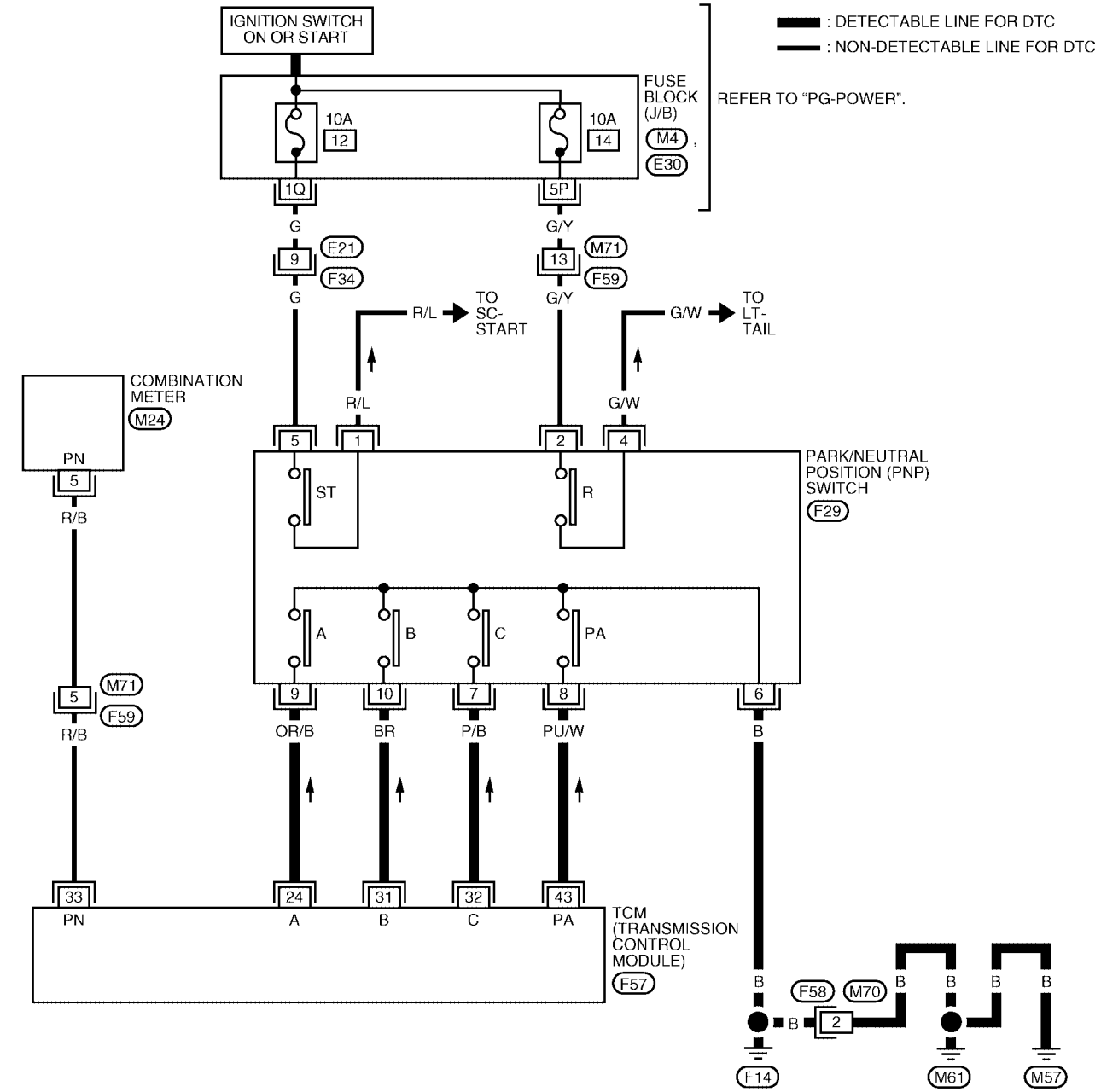
WITH GST

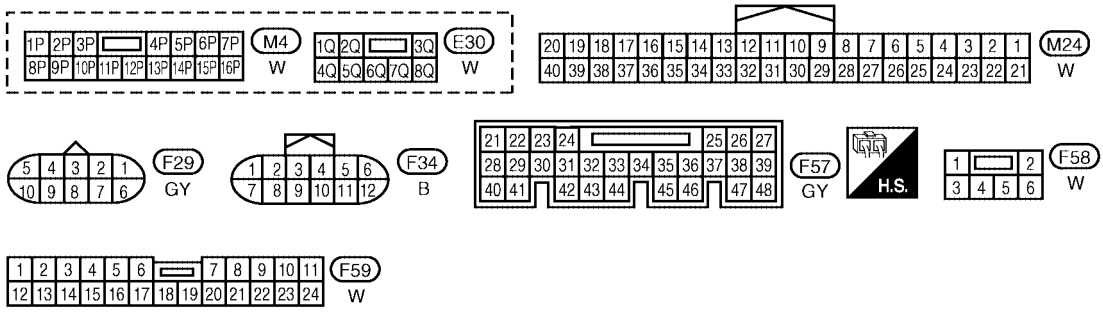
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — PNP/SW

ECS009DV

AT-PNP/SW-01





WCWA0188E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
24	OR/B	PNP switch A		Selector lever: “P” and “R” position	0V
				Other than the above	Battery voltage
31	BR	PNP switch B		Selector lever: “R”, “N”, “D” and manual mode position	0V
				Other than the above	Battery voltage
32	P/B	PNP switch C		Selector lever: “D” and manual mode position	0V
				Other than the above	Battery voltage
33	R/B	PNP switch PN		Selector lever: “P” and “N” position	Battery voltage
				Other than the above	0V
43	PU/W	PNP switch PA		Selector lever: “P” and “N” position	0V
				Other than the above	Battery voltage

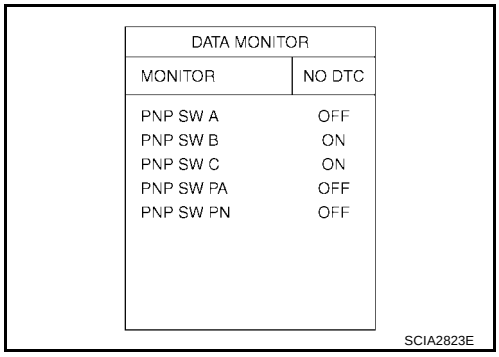
Diagnostic Procedure

ECS009DW

1. CHECK PNP SWITCH CIRCUIT

With CONSULT-II

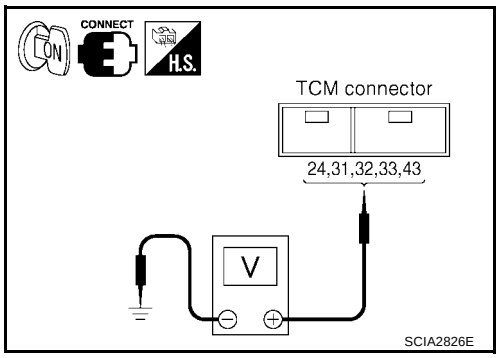
1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Move selector lever to “P”, “N”, “R” and “D” position and check the value of “PNP SW A”, “PNP SW B”, “PNP SW C”, “PNP SW PA” and “PNP SW PN”.



Selector lever	“PNP SW A”	“PNP SW B”	“PNP SW C”	“PNP SW PA”	“PNP SW PN”
P	ON	OFF	OFF	ON	ON
R	ON	ON	OFF	OFF	OFF
N	OFF	ON	OFF	ON	ON
D	OFF	ON	ON	OFF	OFF

Without CONSULT-II

1. Turn ignition switch “ON”. (Do not start engine.)
2. Move selector lever to “P“, “R”, “N”, or “D” position and check voltage between the TCM connector terminals and ground.



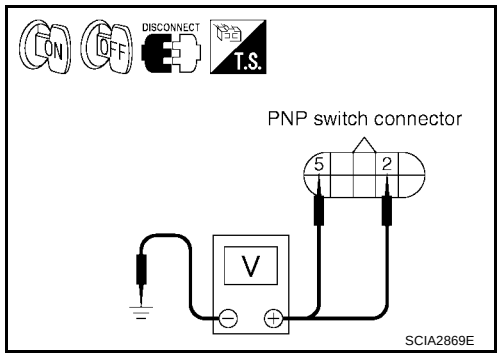
Selector lever	Connector No.	F57			
	Terminal (Wire color)				
	24 - Ground	31 - Ground	32 - Ground	33 - Ground	43 - Ground
P	0V	Battery voltage	Battery voltage	Battery voltage	0V
R	0V	0V	Battery voltage	0V	Battery voltage
N	Battery voltage	0V	Battery voltage	Battery voltage	0V
D	Battery voltage	0V	0V	0V	Battery voltage

OK or NG

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

2. CHECK PNP SWITCH POWER SOURCE CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the PNP switch connector.
3. Turn ignition switch “ON”. (Do not start engine.)
4. Check voltage between PNP switch connector terminals 2, 5 and ground.



Connector	Terminal	Voltage
F29	2 - Ground	Battery voltage
	5 - Ground	

5. Turn ignition switch “OFF”.
6. Check voltage between PNP switch connector terminals 2, 5 and ground.

Connector	Terminal (Wire color)	Voltage
F29	2 - Ground	0V
	5 - Ground	

7. If OK, check harness for short-circuit to ground or power source.

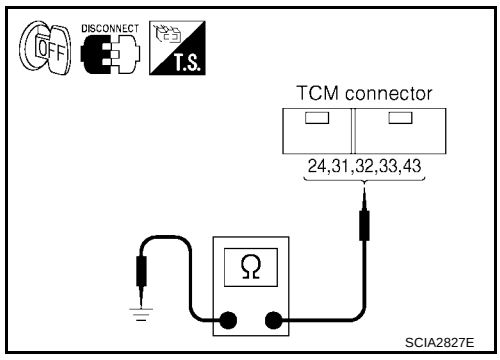
OK or NG

OK >> GO TO 3.
NG >> Check the following. If any items are damaged, repair or replace damaged parts.

- Harness for short or open between ignition switch and PNP switch
- Ignition switch and fuse
  Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .

3. CHECK HARNESS BETWEEN TCM AND PNP SWITCH

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector and PNP switch connector.
3. Check continuity between TCM connector terminals 24, 31, 32, 43 and ground.



Connector	Terminal	Condition	Continuity
F57	24 - Ground	Selector lever: “P” and “R” position	Yes
		Other than the above	No
	31 - Ground	Selector lever: “R”, “N”, “D” and manual mode position	Yes
		Other than the above	No
	32 - Ground	Selector lever: “D” and manual mode position	Yes
		Other than the above	No
	43 - Ground	Selector lever: “P” and “N” position	Yes
		Other than the above	No

4. If OK, check the following.

– Harness for short-circuit to ground or power source.
– Open or short-circuit in the harness between combination meter and TCM.

OK or NG

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

4. DETECT MALFUNCTIONING ITEM

Check the following.

- Open or short-circuit in the harness between TCM and PNP switch A, B, C, PA.
- Open or short-circuit in the harness for ground of PNP switch.
- PNP switch. Refer to AT-482, "Component Inspection" .

OK or NG

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

5. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-478, "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-459, "TCM Input/Output Signal Reference Values" .
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

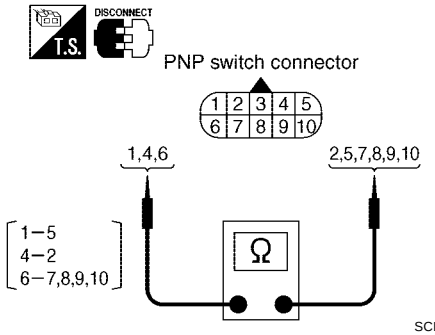
ECS009DX

PNP SWITCH

1. Check continuity between PNP switch terminals while moving selector lever. Refer to the following table.

Circuit	Starter		Reverse		Position				
	+	−	+	−	−	A	B	C	PA
Terminal No. / Lever position	5	1	2	4	6	9	10	7	8
P	○	○			○	○			○
R			○	○	○	○	○		
N	○	○			○		○		○
D					○		○	○	

○—○ : Continuity



2. If NG, check again with control cable disconnected. (Refer to Step 1 above.)
3. If OK on step 2, adjust control cable. Refer to AT-628, "Control Cable Adjustment" .
4. If NG on step 2, remove park/neutral position (PNP) switch from A/T and check continuity of park/neutral position (PNP) switch terminals. (Refer to step 1 above.)
5. If OK on step 4, adjust park/neutral position (PNP) switch. Refer to AT-626, "Park/Neutral Position (PNP) Switch Adjustment" .
6. If NG on step 4, replace park/neutral position (PNP) switch.

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

PFP:31940

Description

ECS009DY

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

On Board Diagnosis Logic

ECS009DZ

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “ATF TEMP SEN/CIRC” with CONSULT-II or P0710 without CONSULT-II is detected under the following conditions.
  - When normal voltage not applied to ATF temperature sensor due to open, short, and so on.
  - When during running, the ATF temperature sensor signal voltage is excessively high or low.

Possible Cause

ECS009E0

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

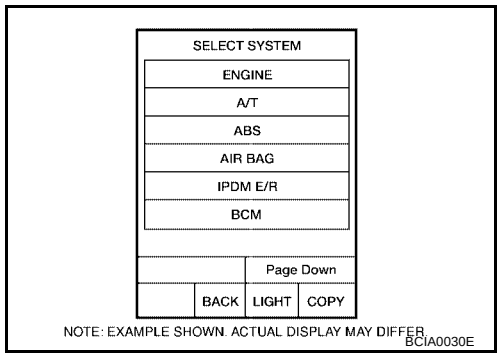
DTC Confirmation Procedure

ECS009E1

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 “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Warm up engine so that engine coolant temperature is more than 50°C (122°F).
   COOLAN TEMP: More than 50°C (122°F)
5. Maintain the following conditions for at least 16 minutes (Total). (It is not necessary to drive vehicle.)
   COOLAN TEMP: More than 50°C (122°F)
   SLCT LVR POSI: “D” position
6. If DTC is detected, go to AT-485, "Diagnostic Procedure" .



WITH GST

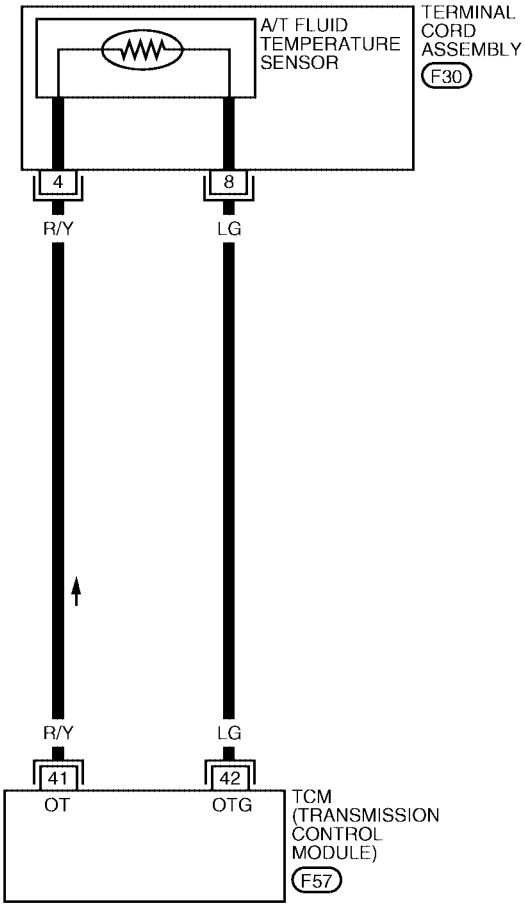
Follow the procedure “With CONSULT-II”.

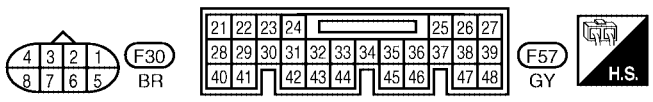
Wiring Diagram — AT — FTS

ECS009E2

AT-FTS-01

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





WCWA0189E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)	
41	R/Y	Fluid temperature sensor		When ATF temperature 0°C (32°F)	4.0V	9.8 kΩ
				When ATF temperature 20°C (68°F)	3.0V	4.2 kΩ
				When ATF temperature 80°C (176°F)	0.8V	.54 kΩ
				When ATF temperature 100°C (212°F)	0.5V	.31 kΩ
42	LG	Fluid temperature sensor ground	Always		0V	

Diagnostic Procedure

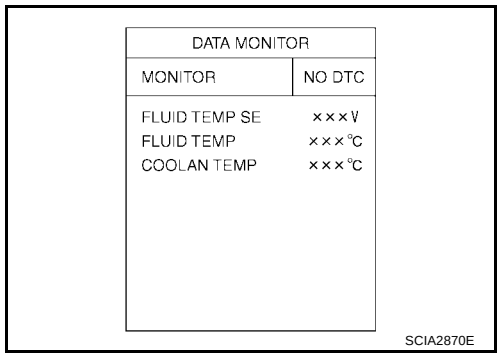
ECS009E3

1. CHECK FLUID TEMPERATURE SENSOR SIGNAL

With CONSULT-II

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

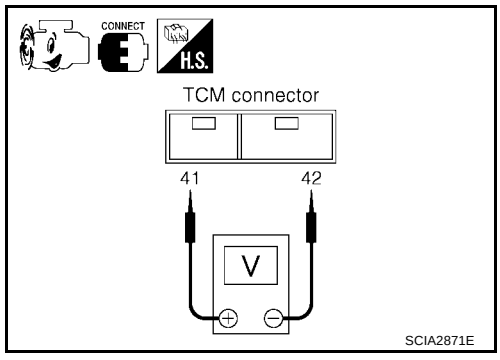
Item name	Condition	Display value (Approx.)
Fluid temperature sensor	0°C (32°F)	4.0V
	20°C (68°F)	3.0V
	80°C (176°F)	0.8V
	100°C (212°F)	0.5V



Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminals 41 and 42 while warming up A/T. Refer to AT-484, "Wiring Diagram — AT — FTS" .

Connector	Terminal	Temperature	Voltage (Approx.)
F57	41 - 42 (ground)	0°C (32°F)	4.0V
		20°C (68°F)	3.0V
		80°C (176°F)	0.8V
		100°C (212°F)	0.5V



3. Turn ignition switch “OFF”.
4. Disconnect the TCM connector.
5. Check if there is continuity between the connector terminal and ground.

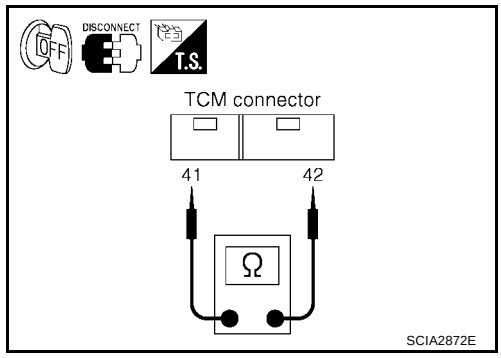
OK or NG

OK >> GO TO 6.
NG >> GO TO 2.

2. CHECK FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check resistance between terminals 41 and 42.

Connector	Terminal	Temperature	Resistance (Approx.)
F57	41 - 42 (ground)	0°C (32°F)	9.8 kΩ
		20°C (68°F)	4.2 kΩ
		80°C (176°F)	0.54 kΩ
		100°C (212°F)	0.31 kΩ



4. Check if there is continuity between the connector terminal and ground.

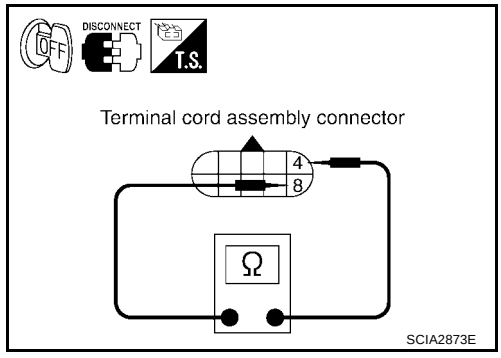
OK or NG

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

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

1. Turn ignition switch “OFF”.
2. Disconnect terminal cord assembly harness connector.
3. Check resistance between terminals 4 and 8.

Connector	Terminal	Temperature	Resistance (Approx.)
F30	4 - 8	0°C (32°F)	9.8 kΩ
		20°C (68°F)	4.2 kΩ
		80°C (176°F)	0.54 kΩ
		100°C (212°F)	0.31 kΩ



OK or NG

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

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY

Check the following.

- Open or short-circuit in the harness between TCM and terminal cord assembly.

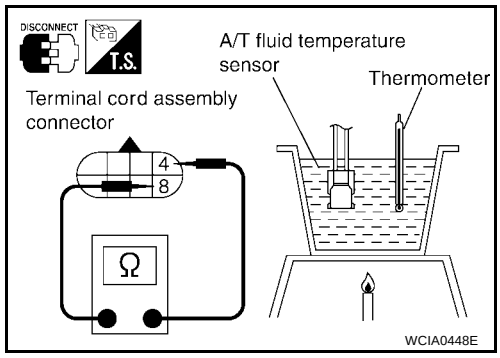
OK or NG

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

5. CHECK A/T FLUID TEMPERATURE SENSOR

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect A/T fluid temperature sensor.
3. Check resistance between terminals 4 and 8.

Connector	Terminal	Temperature	Resistance
F30	4 - 8	10°C (50°F)	5.80 - 7.09kΩ
		110°C (230°F)	0.23 - 0.26kΩ



OK or NG

OK >> GO TO 6.
NG >> Repair or replace terminal cord assembly. Refer to AT-629, "Terminal Cord Assembly" .

6. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-483, "DTC Confirmation Procedure" .

OK or NG

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

7. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
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.

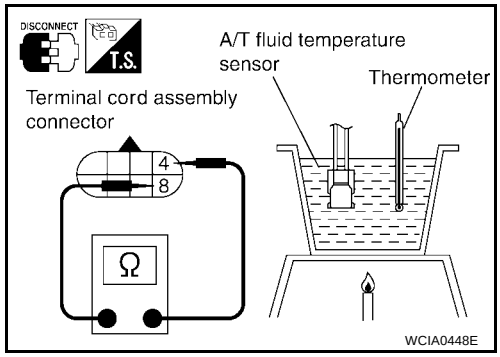
Component Inspection

ECS009E4

A/T FLUID TEMPERATURE SENSOR

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect A/T fluid temperature sensor.
3. Check resistance between terminals 4 and 8.

Connector	Terminal	Temperature	Resistance
F30	4 - 8	10°C (50°F)	5.80 - 7.09kΩ
		110°C (230°F)	0.23 - 0.26kΩ



4. If NG, repair and replace terminal cord assembly. Refer to AT-629, "Terminal Cord Assembly" .

DTC P0711 FLUID TEMPERATURE SENSOR PERFORMANCE

PFP:31940

Description

ECS009E5

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

On Board Diagnosis Logic

ECS009E6

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “FLUID TEMP SEN” with CONSULT-II or P0711 without CONSULT-II is detected when ATF temperature signal does not change.

Possible Cause

ECS009E7

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

DTC Confirmation Procedure

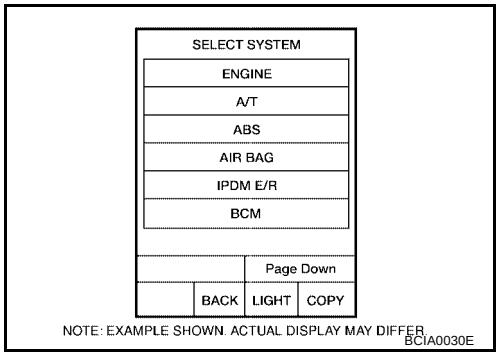
ECS009E8

CAUTION:
Always drive vehicle at a safe speed.

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 “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 15 minutes (Total). (It is not necessary to maintain continuously.)
   VHCL SPEED SE-A/T: 40 km/h (25 MPH) or more
   SLCT LVR POSI: “D” position
5. If DTC is detected, go to AT-490, "Diagnostic Procedure" .



WITH GST

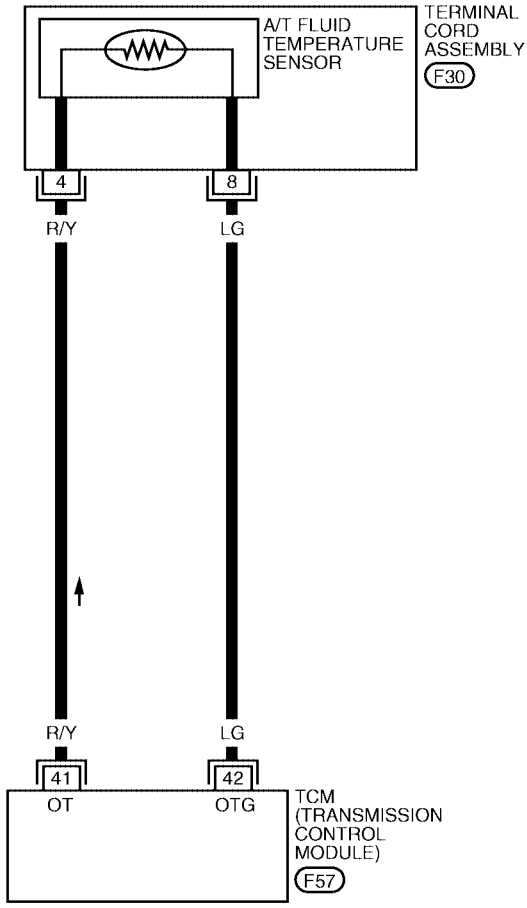
Follow the procedure “With CONSULT-II”.

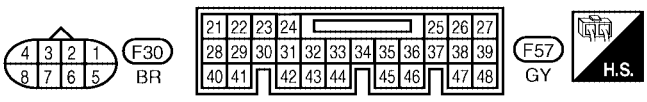
Wiring Diagram — AT — FTSP

ECS009E9

AT-FTSP-01

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





WCWA0190E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)	
41	R/Y	Fluid temperature sensor		When ATF temperature 0°C (32°F)	4.0V	9.8 kΩ
				When ATF temperature 20°C (68°F)	3.0V	4.2 kΩ
				When ATF temperature 80°C (176°F)	0.8V	.54 kΩ
				When ATF temperature 100°C (212°F)	0.5V	.31 kΩ
42	LG	Fluid temperature sensor ground	Always		0V	

Diagnostic Procedure

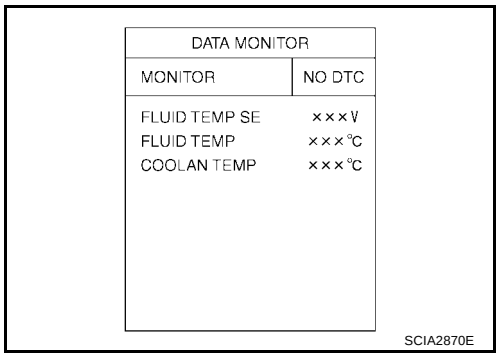
ECS009EA

1. CHECK FLUID TEMPERATURE SENSOR SIGNAL

With CONSULT-II

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

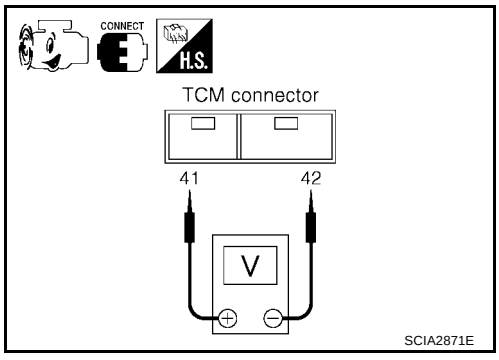
Item name	Condition	Display value (Approx.)
Fluid temperature sensor	0°C (32°F)	4.0V
	20°C (68°F)	3.0V
	80°C (176°F)	0.8V
	100°C (212°F)	0.5V



Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminals 41 and 42 while warming up A/T. Refer to AT-489, "Wiring Diagram — AT — FTSP" .

Connector	Terminal	Temperature	Voltage (Approx.)
F57	41 - 42 (ground)	0°C (32°F)	4.0V
		20°C (68°F)	3.0V
		80°C (176°F)	0.8V
		100°C (212°F)	0.5V



3. Turn ignition switch “OFF”.
4. Disconnect the TCM connector.
5. Check if there is continuity between the connector terminal and ground.

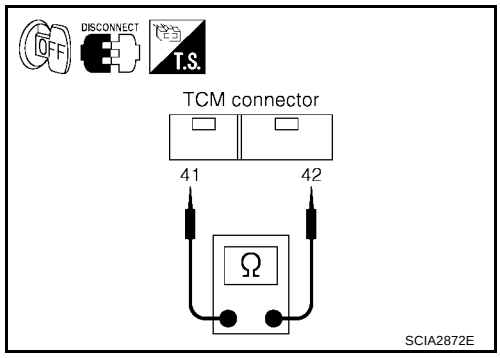
OK or NG

OK >> GO TO 6.
NG >> GO TO 2.

2. CHECK FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check resistance between terminals 41 and 42.

Connector	Terminal	Temperature	Resistance (Approx.)
F57	41 - 42 (ground)	0°C (32°F)	9.8 kΩ
		20°C (68°F)	4.2 kΩ
		80°C (176°F)	0.54 kΩ
		100°C (212°F)	0.31 kΩ



4. Check if there is continuity between the connector terminal and ground.

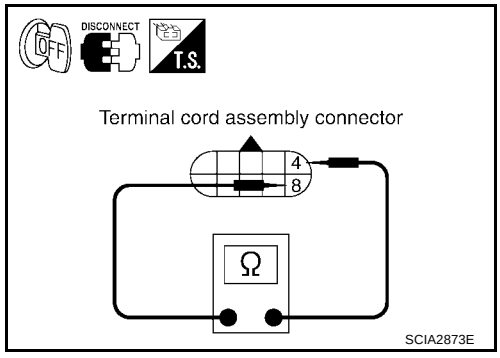
OK or NG

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

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

1. Turn ignition switch “OFF”.
2. Disconnect terminal cord assembly harness connector.
3. Check resistance between terminals 4 and 8.

Connector	Terminal	Temperature	Resistance (Approx.)
F30	4 - 8	0°C (32°F)	9.8 kΩ
		20°C (68°F)	4.2 kΩ
		80°C (176°F)	0.54 kΩ
		100°C (212°F)	0.31 kΩ



4. Reinstall any part removed.

OK or NG

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

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY

Check the following.

- Open or short-circuit in the harness between TCM and terminal cord assembly.

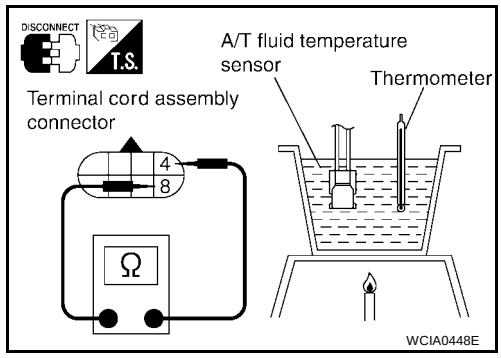
OK or NG

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

5. CHECK A/T FLUID TEMPERATURE SENSOR

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect A/T fluid temperature sensor.
3. Check resistance between terminals 4 and 8.

Connector	Terminal)	Temperature	Resistance
F30	4 - 8	10°C (50°F)	5.80 - 7.09kΩ
		110°C (230°F)	0.23 - 0.26kΩ



OK or NG

OK >> GO TO 6.
NG >> Repair or replace transmission wire. Refer to AT-629, "Terminal Cord Assembly" .

6. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-488, "DTC Confirmation Procedure" .

OK or NG

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

7. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
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.

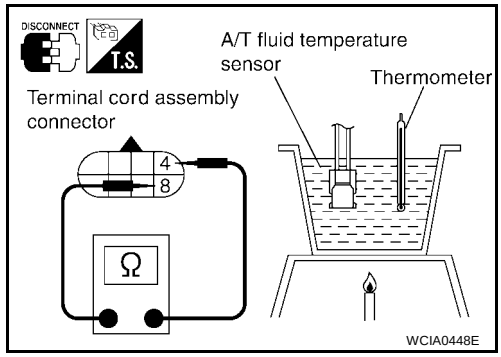
Component Inspection

ECS009EB

A/T FLUID TEMPERATURE SENSOR

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect A/T fluid temperature sensor.
3. Check resistance between terminals 4 and 8.

Connector	Terminal)	Temperature	Resistance
F30	4 - 8	10°C (50°F)	5.80 - 7.09kΩ
		110°C 230(°F)	0.23 - 0.26kΩ



4. If NG, repair or replace transmission wire. Refer to AT-629, "Terminal Cord Assembly" .

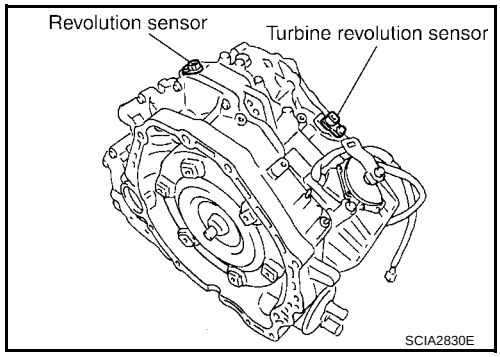
DTC P0717 TURBINE REVOLUTION SENSOR CIRCUIT

PFP:31935

Description

ECS009EC

- The turbine revolution sensor detects forward clutch drum rpm (revolutions per minute). It is located on the input side of the automatic transaxle. The revolution sensor is located on the output side of the automatic transaxle. With the two sensors, input and output rpms are accurately detected. The result is optimal shift timing during deceleration and improved shifting.
- Hall IC is installed in turbine revolution sensor, it itself handles in pulse of rectangular wave signal and transmits it to TCM due to hall effect. TCM recognizes the pulse with input rpm speed. Size of output doesn't depend on a rotation number and is fixed.



On Board Diagnosis Logic

ECS009ED

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “TURBINE SENSOR” with CONSULT-II or P0717 without CONSULT-II is detected under the following conditions.
  - When signal from turbine revolution sensor does not input due to open, short, and so on.
  - When unexpected signal input during running.

Possible Cause

ECS009EE

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

DTC Confirmation Procedure

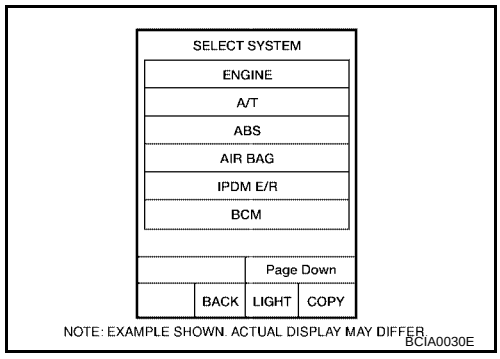
ECS009EF

CAUTION:
Always drive vehicle at a safe speed.

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.
3. Start engine.
4. Drive vehicle and maintain the following conditions for at least 1 consecutive minute.
   FLUID TEMP: More than 20°C (68°F)
   VHCL/S SE-A/T: 70 km/h (43 MPH) or more
   SLCT LVR POSI: “D” position
   GEAR: Except 1st position
5. If DTC is detected, go to AT-495, "Diagnostic Procedure" .



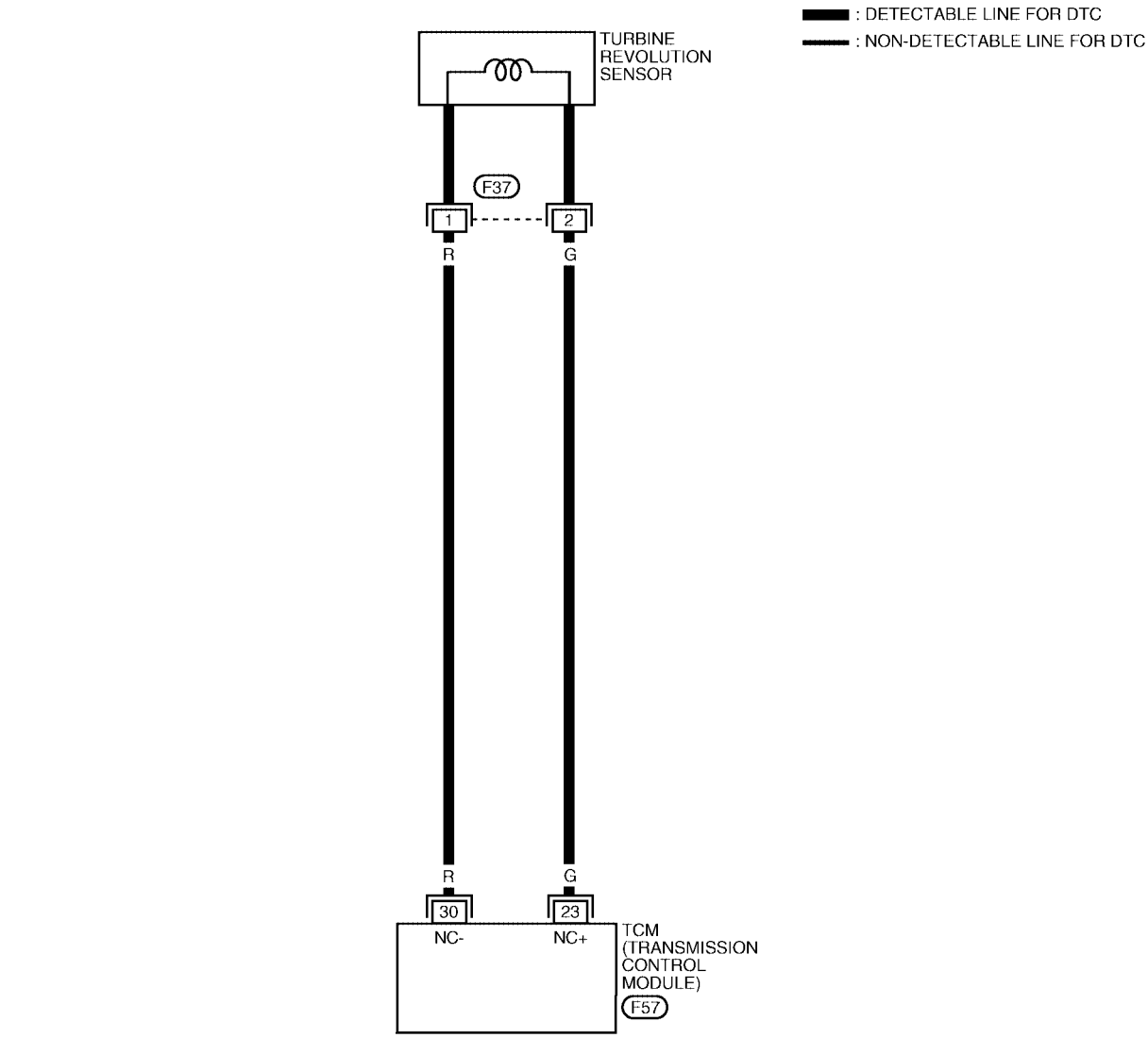
WITH GST

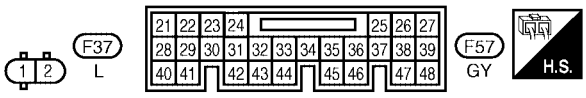
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — TRSC

ECS009EG

AT-TRSC-01





WCWA0191E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
23	G	Turbine revolution sensor power supply		When turning ignition switch ON.	Battery voltage
				When turning ignition switch OFF.	0V
30	R	Turbine revolution sensor		When moving at 20 km/h (12 MPH) in 1st gear.	371Hz

Diagnostic Procedure

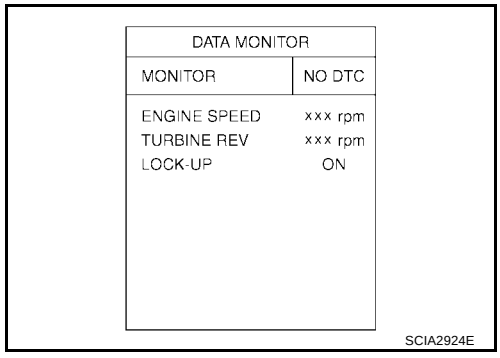
ECS009EH

1. CHECK TURBINE REVOLUTION SENSOR CIRCUIT

With CONSULT-II

1. Start engine.
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Drive vehicle and read out the value of “TURBINE REV”.

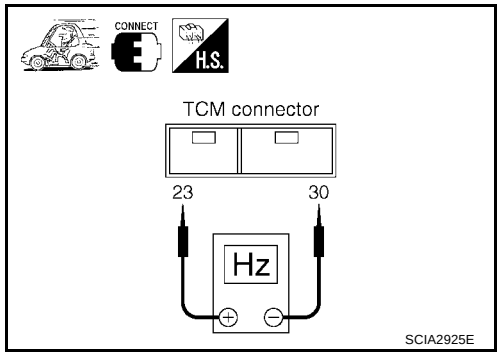
Monitor item	Condition	Specification
TURBINE REV	During driving (lock-up ON)	Approximately matches the engine speed.



Without CONSULT-II

1. Start the engine.
2. Check pulse between TCM connector terminals 23 and 30.

Connector	Terminal	Condition	Data (Approx.)
F57	2 - 30 (ground)	When moving at 20 km/h (12 MPH) in 1st gear.	371 Hz



OK or NG

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

2. DETECT MALFUNCTIONING ITEM

Check the following.

- Open or short-circuit in the harness between TCM and turbine revolution sensor.
- Turbine revolution sensor. Refer to AT-496, "Component Inspection" .

OK or NG

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

3. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-493, "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-459, "TCM Input/Output Signal Reference Values" .
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.

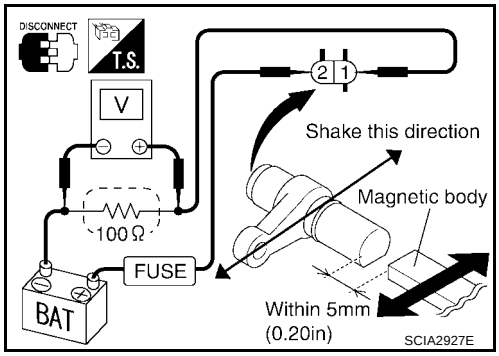
Component Inspection

ECS009EI

TURBINE REVOLUTION SENSOR

1. Remove turbine revolution sensor.
2. Connect 12V power supply and 100 Ω resistance to the terminal. (Do not mistake polarity)
3. Inspect the voltage of HIGH and LOW signal by shaking magnetic body from side to side at turbine revolution sensor tip [gap is within 5 mm (0.20 in)].

   CAUTION:
   Make sure to shake direction from bolt hole to sensor-self when shaking magnetic body. If not, voltage value cannot change.



Signal	Voltage (Approx.)
HIGH	1.2 - 1.6V
LOW	0.4 - 0.8V

4. If NG, replace turbine revolution sensor.

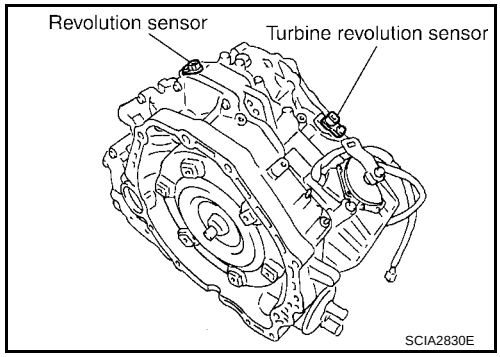
DTC P0722 VEHICLE SPEED SENSOR A/T (REVOLUTION SENSOR) CIRCUIT

PFP:31935

Description

ECS009EJ

- 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.
- Hall IC is installed in revolution sensor, it itself handles in pulse of rectangular wave signal and transmits it to TCM due to hall effect. TCM recognizes the pulse with vehicle speed. Size of output doesn't depend on a rotation number and is fixed.



On Board Diagnosis Logic

ECS009EK

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “VHCL SPEED SEN-A/T” with CONSULT-II or P0722 without CONSULT-II is detected under the following conditions.
  - When signal from revolution sensor does not input due to open, short, and so on.
  - When unexpected signal input during running.

Possible Cause

ECS009EL

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

DTC Confirmation Procedure

ECS009EM

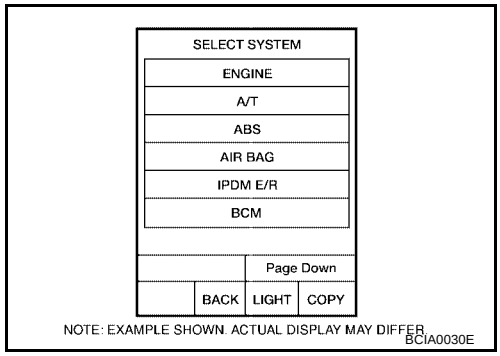
CAUTION:

- **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”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Start engine.
4. Drive vehicle and check for an increase of “VHCL/S SE-A/T” value in response to “VHCL/S SE-MTR” value.
   If the check result is NG, go to AT-499, "Diagnostic Procedure" .
   If the check result is OK, go to following step.
5. Maintain the following conditions for at least 2 consecutive minutes.
   FLUID TEMP: More than 20°C (68°F)
   VHCL/S SE-A/T: 70 km/h (43 MPH) or more
   SLCT LVR POSI: “D” position
   If the check result is NG, go to AT-499, "Diagnostic Procedure" .



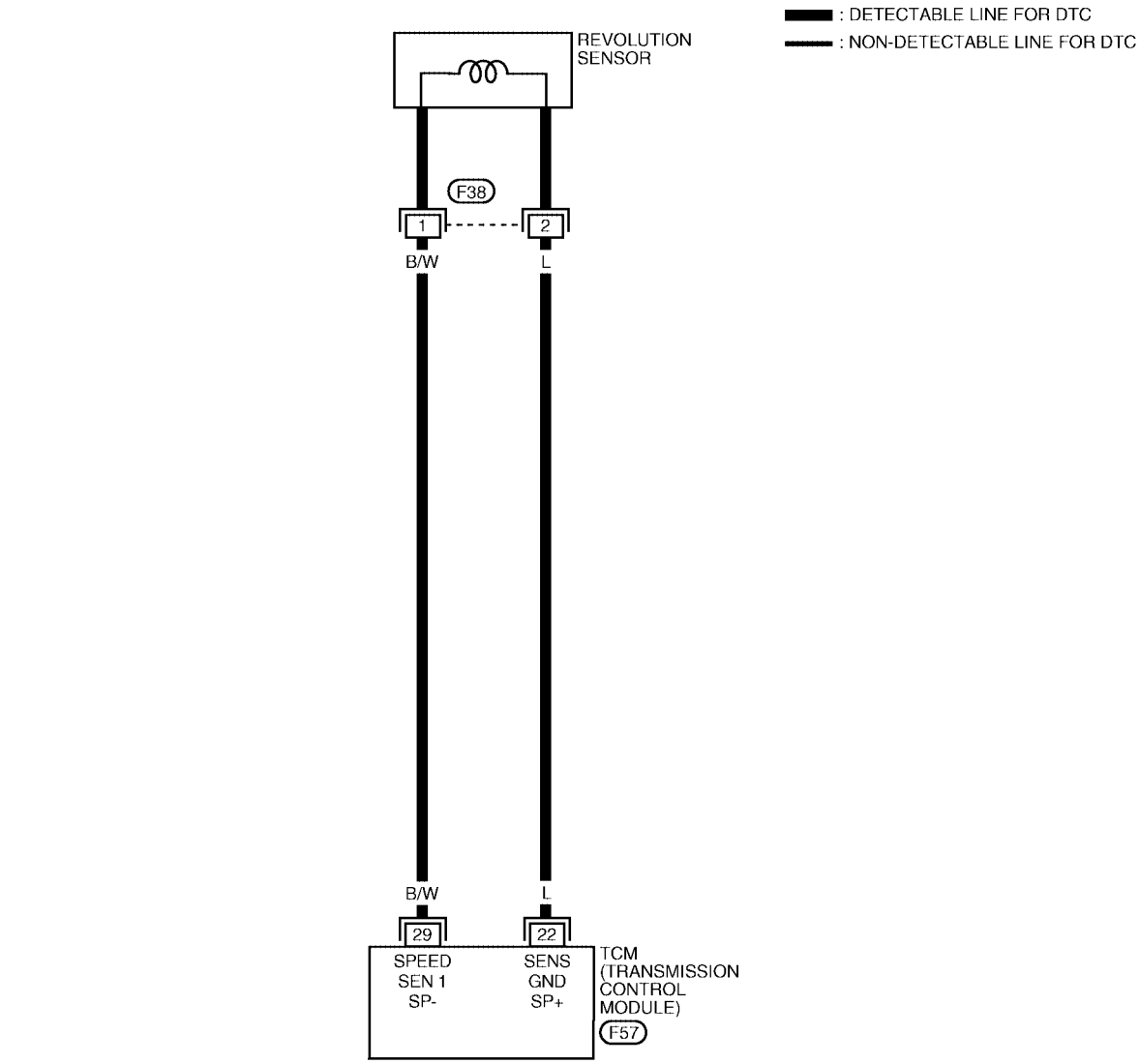
WITH GST

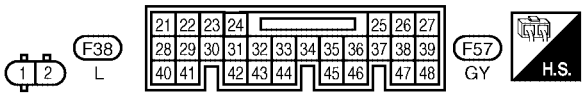
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — VSSATC

ECS009EN

AT-VSSATC-01





WCWA0192E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
22	L	Revolution sensor power supply		When turning ignition switch ON.	Battery voltage
				When turning ignition switch OFF.	0V
29	B/W	Revolution sensor		When moving at 20 km/h (12 MPH) in 1st gear.	119Hz

Diagnostic Procedure

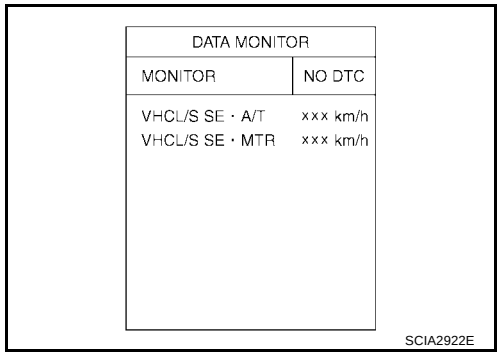
ECS009EO

1. CHECK REVOLUTION SENSOR CIRCUIT

With CONSULT-II

1. Start engine.
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Drive vehicle and read out the value of “VHCL/S SE-AT”.

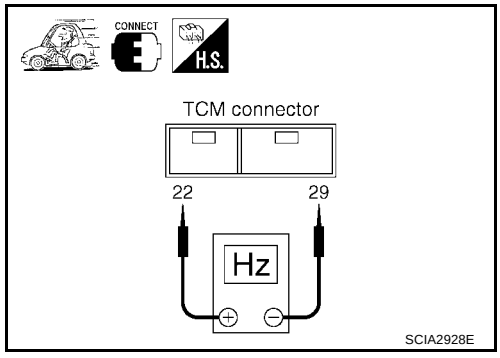
Monitor item	Condition	Specification
VHCL/S SE-AT	During driving	Approximately matches the speedometer reading.



Without CONSULT-II

1. Start the engine.
2. Check pulse between TCM connector terminals 22 and 29.

Connector	Terminal	Condition	Data (Approx.)
F57	22 - 29 (ground)	When moving at 20 km/h (12 MPH) in 1st gear.	119 Hz



OK or NG

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

2. DETECT MALFUNCTIONING ITEM

Check the following.

- Open or short-circuit in the harness between TCM and revolution sensor.
- Revolution sensor. Refer to AT-500, "Component Inspection" .

OK or NG

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

3. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-497, "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-459, "TCM Input/Output Signal Reference Values" .
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.

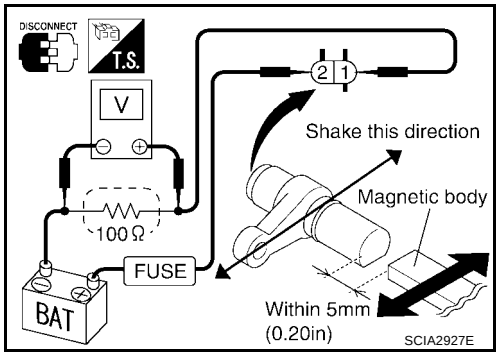
Component Inspection

ECS009EP

REVOLUTION SENSOR

1. Remove revolution sensor.
2. Connect 12V power supply and 100 Ω resistance to the terminal. (Do not mistake polarity)
3. Inspect the voltage of HIGH and LOW signal by shaking magnetic body from side to side at revolution sensor tip [gap is within 5mm (0.20 in)].

   CAUTION:
   Make sure to shake direction from bolt hole to sensor-self when shaking magnetic body. If not, voltage value cannot change.



Signal	Voltage (Approx.)
HIGH	1.2 - 1.6V
LOW	0.4 - 0.8V

4. If NG, replace revolution sensor.

DTC P0726 ENGINE SPEED INPUT CIRCUIT PERFORMANCE

PFP:31036

Description

ECS009EQ

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

On Board Diagnosis Logic

ECS009ER

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “ENG SPD INP PERFOR” with CONSULT-II or 14th judgement flicker without CONSULT-II is detected when malfunction is detected in engine speed signal, actual engine torque signal or torque reduction signal that is output from ECM through CAN communication.

Possible Cause

ECS009ES

- Harness or connectors
  (The signal circuit is open or shorted.)
- ECM

DTC Confirmation Procedure

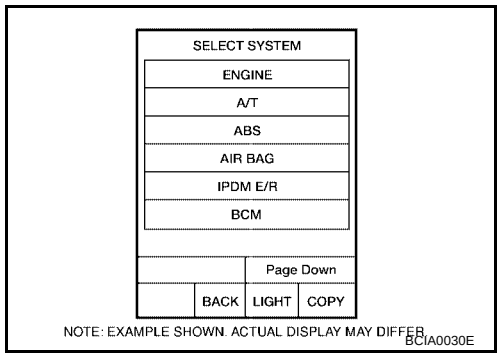
ECS009ET

CAUTION:
Always drive vehicle at a safe speed.

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 “A/T” with “DATA MONITOR” mode in CONSULT-II.
2. Start engine.
3. Drive vehicle and maintain the following conditions for at least 10 consecutive seconds.
   VHCL/S SE-A/T: 10 km/h (6 MPH) or more
   ACCELE ANGLE: More than 10 %
   SLCT LVR POSI: “D” position
4. If DTC is detected, go to AT-501, "Diagnostic Procedure" .



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER
BCIA0030E

Diagnostic Procedure

ECS009EU

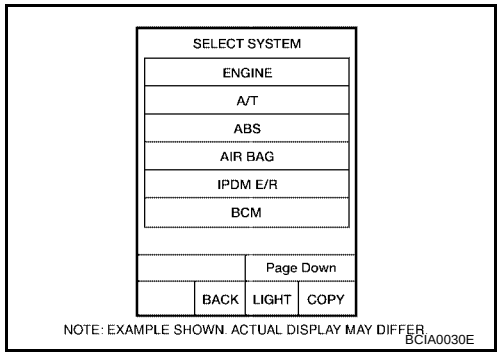
1. CHECK DTC WITH ECM

With CONSULT-II

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “ENGINE” with “SELF-DIAG RESULTS” mode in CONSULT-II. Refer to AT-462, "CONSULT-II Function (TCM)" .

OK or NG

OK >> GO TO 2.
NG >> Check the DTC detected item, go to EC-614, "INDEX FOR DTC" .
- If CAN communication line is detected, go to AT-471, "DTC U1000 CAN COMMUNICATION LINE" .

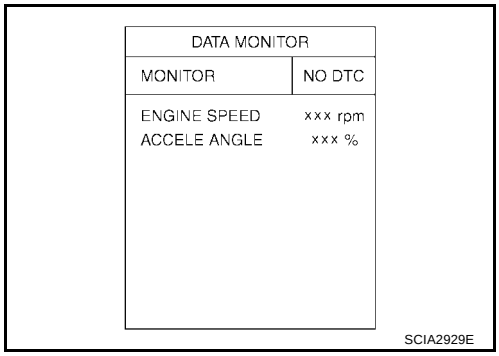


NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER
BCIA0030E

2. CHECK DTC WITH TCM

With CONSULT-II

1. Start engine.
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. While monitoring “ENGINE SPEED”, check for engine speed change corresponding to “ACCELE ANGLE”.



OK or NG

OK >> GO TO 3.
NG >> Check the ignition signal circuit.
- Refer to EC-1276, "IGNITION SIGNAL" .

3. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-501, "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-459, "TCM Input/Output Signal Reference Values" .
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

ECS009EV

- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into first gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position		Shift solenoid valve				
		A	B	C	D	E
1st	D	ON (Closed)	ON (Open)	ON (Open)	OFF (Open)	OFF (Closed)
	M1	ON (Closed)	ON (Open)	ON (Open)	OFF (Open)	ON (Open)

On Board Diagnosis Logic

ECS009EW

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “A/T 1ST GR FNCTN” with CONSULT-II or P0731 without CONSULT-II is detected when A/T cannot be shifted to the 1st gear position even if electrical circuit is good.

Possible Cause

ECS009EX

- Shift solenoid valve A
  (Off stick.)
- 2nd brake
- 2nd coast brake
- One-way clutch No.1
- One-way clutch No.2
- Hydraulic control circuit

DTC Confirmation Procedure

ECS009EY

CAUTION:

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

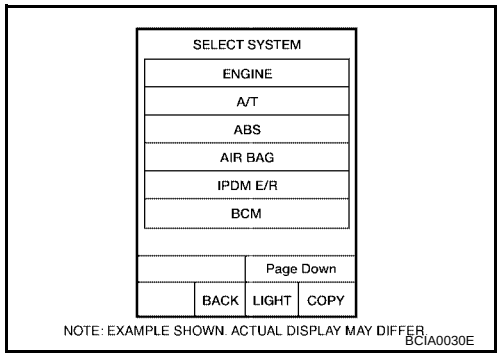
NOTE:

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. Start engine and select “A/T” with “DATA MONITOR” mode in CONSULT-II.
2. Make sure that ATF temperature is within the range below.
   FLUID TEMP: More than 20°C (68°F)
   If out of range, drive the vehicle to warm up the fluid.
3. Accelerate vehicle to maintain the following conditions for at least 12 consecutive seconds.
   SLCT LVR POSI: “D” position
   GEAR: 1st position
   [Vehicle speed and accelerator angle: 1st gear position retainable condition. (Refer to AT-702, "VEHICLE SPEED WHEN SHIFTING GEARS - 9J500 MODELS" .)]
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.



NOTE: EXAMPLE SHOWN. ACTUAL DISPLAY MAY DIFFER.
BCIA0030E

4. If DTC is detected, go to AT-505, "Diagnostic Procedure" .

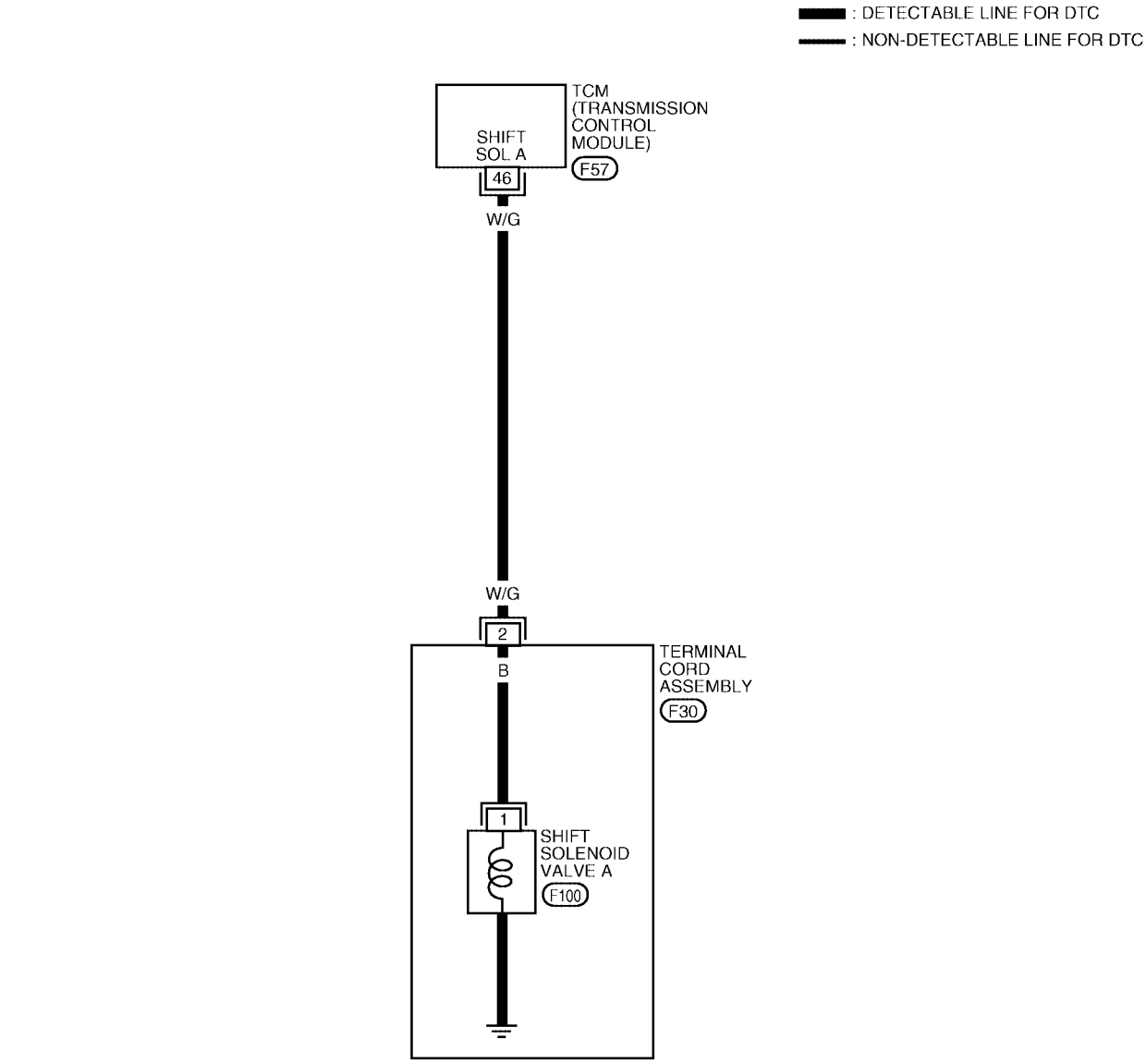
WITH GST

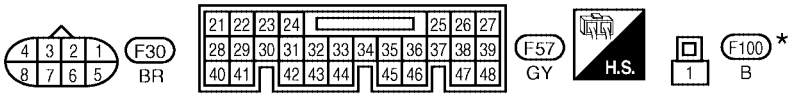
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — 1STSIG

ECS009EZ

AT-1STSIG-01





★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0193E

TCM terminal and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
46	W/G	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in 1st gear.)	Battery voltage
				When shift solenoid valve A does not operate.	0V

Diagnostic Procedure

ECS009F0

1. CHECK SHIFT SOLENOID VALVE A CIRCUIT

Perform “Diagnostic Procedure” for DTC P0750. Refer to AT-539, "Diagnostic Procedure" .

OK or NG

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

2. CHECK MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassembly A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following item:

- 2nd brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" .
- 2nd coast brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" , AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .
- One-way clutch No.1. Refer to AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .
- One-way clutch No.2. Refer to AT-643, "DISASSEMBLY" .

OK or NG

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

3. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-503, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Replace control valve assembly. Refer to AT-629, "Control Valve Assembly" .

DTC P0732 A/T 2ND GEAR FUNCTION

PFP:31940

Description

ECS009F1

- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into second gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position		Shift solenoid valve				
		A	B	C	D	E
2nd	D	OFF (Open)	OFF (Closed)	ON (Open)	OFF (Open)	OFF (Closed)
	M2	OFF (Open)	OFF (Closed)	ON (Open)	OFF (Open)	OFF (Closed)

On Board Diagnosis Logic

ECS009F2

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “A/T 2ND GR FNCTN” with CONSULT-II or P0732 without CONSULT-II is detected when A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.

Possible Cause

ECS009F3

- Shift solenoid valve A
(On stick.)
- Shift solenoid valve B
(On stick.)
- Shift solenoid valve C
(Off stick.)
- Shift solenoid valve D
(On stick.)
- Pressure control solenoid valve A
(On stick.)
- Pressure control solenoid valve C
(On stick.)
- U/D brake
- 2nd coast brake
- 2nd brake
- One-way clutch No.1
- One-way clutch No.2
- B5 brake
- Hydraulic control circuit

DTC Confirmation Procedure

ECS009F4

CAUTION:

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

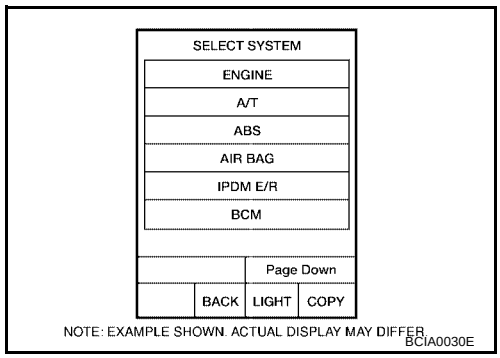
NOTE:

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. Start engine and select “A/T” with “DATA MONITOR” mode in CONSULT-II.
2. Make sure that ATF temperature is within the range below.
   FLUID TEMP: More than 20°C (68°F)
   If out of range, drive the vehicle to warm up the fluid.
3. Accelerate vehicle to maintain the following conditions for at least 12 consecutive seconds.
   SLCT LVR POSI: “D” position
   GEAR: 2nd position
   [Vehicle speed and accelerator angle: 2nd gear position retainable condition. (Refer to AT-702, "VEHICLE SPEED WHEN SHIFTING GEARS - 9J500 MODELS" .)]
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.



4. If DTC is detected, go to AT-510, "Diagnostic Procedure" .

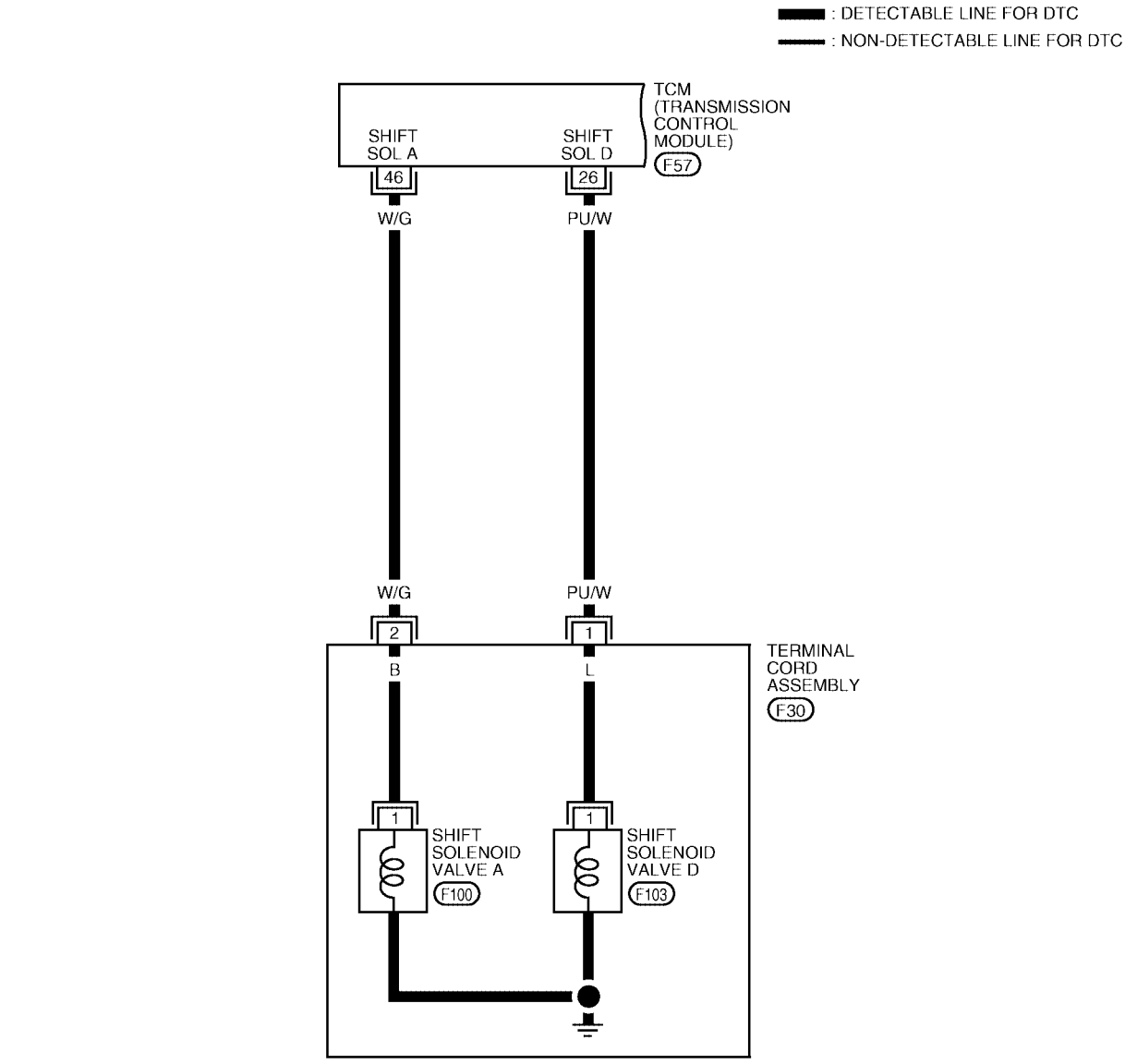
WITH GST

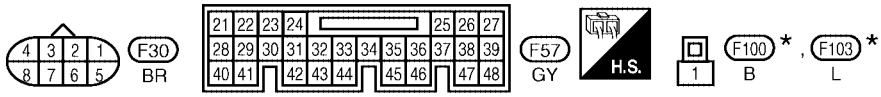
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — 2NDSIG

ECS009F5

AT-2NDSIG-01

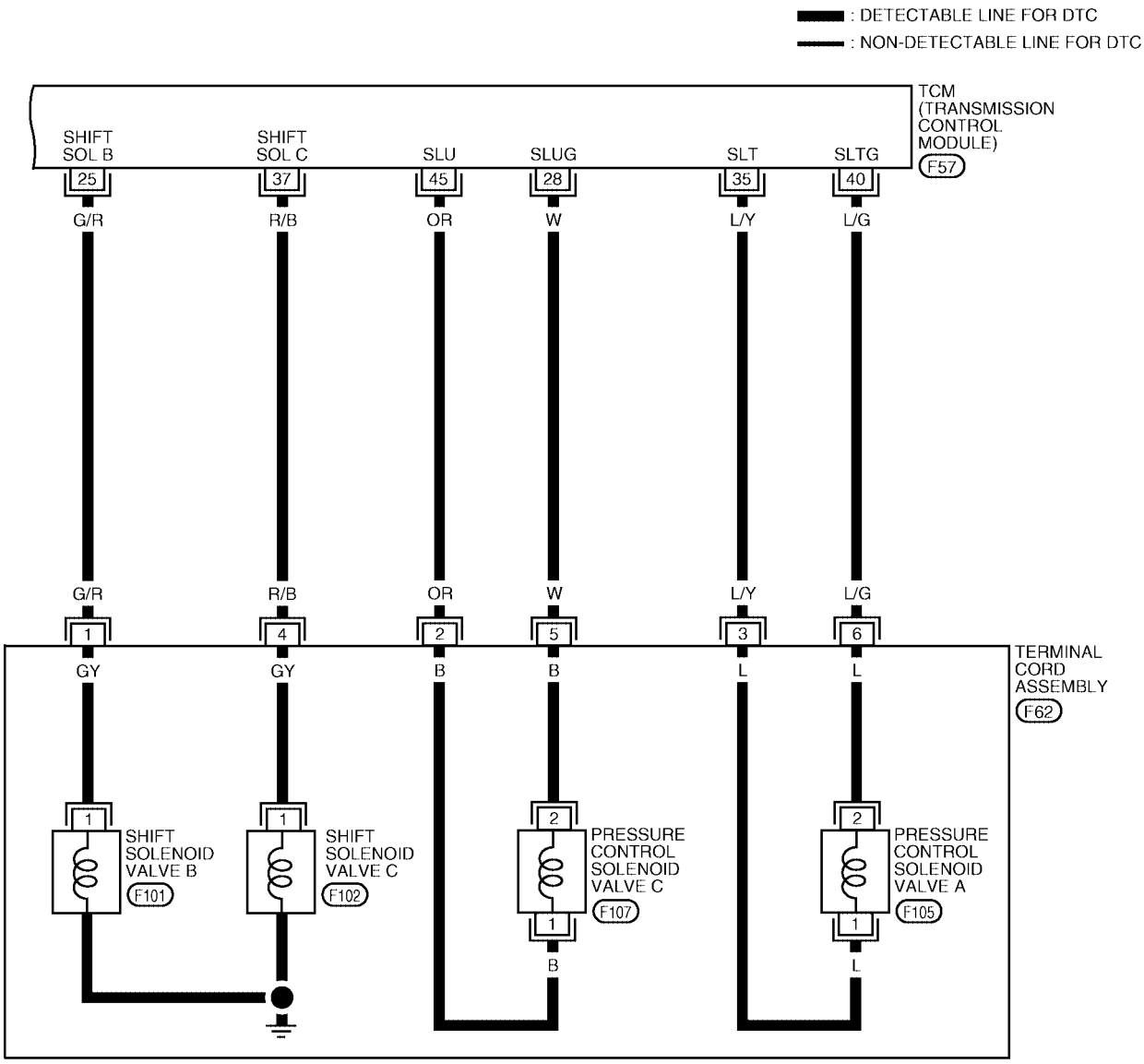


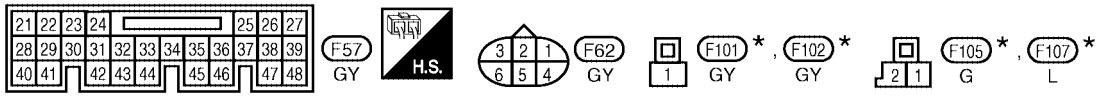


★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0194E

AT-2NDSIG-02





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0195E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
25	G/R	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in 1st or 5th gear.)	Battery voltage
				When shift solenoid valve B does not operate.	0V
26	PU/W	Shift solenoid valve D		When shift solenoid valve D operates. (When driving in 3rd, 4th or 5th gear.)	Battery voltage
				When shift solenoid valve D does not operate.	0V
28	W	Pressure control solenoid valve C ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
35	L/Y	Pressure control solenoid valve A		When engine is running with idle speed and setting selector lever to “P” position.	300Hz
37	R/B	Shift solenoid valve C		When shift solenoid valve C operates. (When driving in 1st, 2nd, 3rd or reverse gear.)	Battery voltage
				When shift solenoid valve C does not operate.	0V
40	L/G	Pressure control solenoid valve A ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
45	OR	Pressure control solenoid valve C		When engine is running with idle speed and setting selector lever to “P” position.	300Hz
46	W/G	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in 1st gear.)	Battery voltage
				When shift solenoid valve A does not operate.	0V

Diagnostic Procedure

ECS009F6

1. CHECK EACH SHIFT SOLENOID VALVE CIRCUIT

Perform “Diagnostic Procedure” for the following DTCs.

- “DTC P0750 SHIFT SOLENOID VALVE A” (Refer to AT-539, "Diagnostic Procedure" .)
- “DTC P0755 SHIFT SOLENOID VALVE B” (Refer to AT-544, "Diagnostic Procedure" .)
- “DTC P0760 SHIFT SOLENOID VALVE C” (Refer to AT-549, "Diagnostic Procedure" .)
- “DTC P0765 SHIFT SOLENOID VALVE D” (Refer to AT-559, "Diagnostic Procedure" .)

OK or NG

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

2. CHECK EACH PRESSURE CONTROL SOLENOID VALVE CIRCUIT

Perform “Diagnostic Procedure” for the following DTCs.

- “DTC P0745 PRESSURE CONTROL SOLENOID VALVE A” (Refer to AT-534, "Diagnostic Procedure" .)
- “DTC P0795 PRESSURE CONTROL SOLENOID VALVE C” (Refer to AT-578, "Diagnostic Procedure" .)

OK or NG

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

3. CHECK MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassembly A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following item:

- U/D brake. Refer to AT-643, "DISASSEMBLY" .
- 2nd coast brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" , AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .
- 2nd brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" .
- One-way clutch No.1. Refer to AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .
- One-way clutch No.2. Refer to AT-643, "DISASSEMBLY" .
- B5 brake. Refer to AT-670, "Transaxle Case Cover & B5 Brake" .

OK or NG

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

4. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-506, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Replace control valve assembly. Refer to AT-629, "Control Valve Assembly" .

DTC P0733 A/T 3RD GEAR FUNCTION

PFP:31940

Description

ECS009F7

- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into third gear position as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position		Shift solenoid valve				
		A	B	C	D	E
3rd	D	OFF (Open)	OFF (Closed)	ON (Open)	ON (Closed)	OFF (Closed)
	M3	OFF (Open)	OFF (Closed)	ON (Open)	ON (Closed)	OFF (Closed)

On Board Diagnosis Logic

ECS009F8

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

Possible Cause

ECS009F9

- Shift solenoid valve A
  (On stick.)
- Shift solenoid valve B
  (On stick.)
- Shift solenoid valve C
  (Off stick.)
- Shift solenoid valve D
  (Off stick.)
- Pressure control solenoid valve A
  (On stick.)
- B5 brake
- U/D clutch
- U/D brake
- Hydraulic control circuit

DTC Confirmation Procedure

ECS009FA

CAUTION:

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

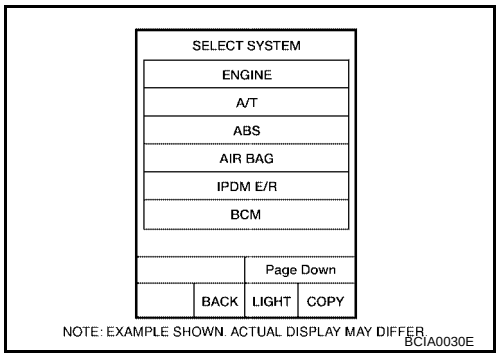
NOTE:

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. Start engine and select “A/T” with “DATA MONITOR” mode in CONSULT-II.
2. Make sure that ATF temperature is within the range below.
   FLUID TEMP: More than 20°C (68°F)
   If out of range, drive the vehicle to warm up the fluid.
3. Accelerate vehicle to maintain the following conditions for at least 10 consecutive seconds.
   SLCT LVR POSI: “D” position
   GEAR: 3rd position



[Vehicle speed and accelerator angle: 3rd gear position retainable condition. (Refer to AT-702, "VEHICLE SPEED WHEN SHIFTING GEARS - 9J500 MODELS" .)]
Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

4. If DTC is detected, go to AT-516, "Diagnostic Procedure" .

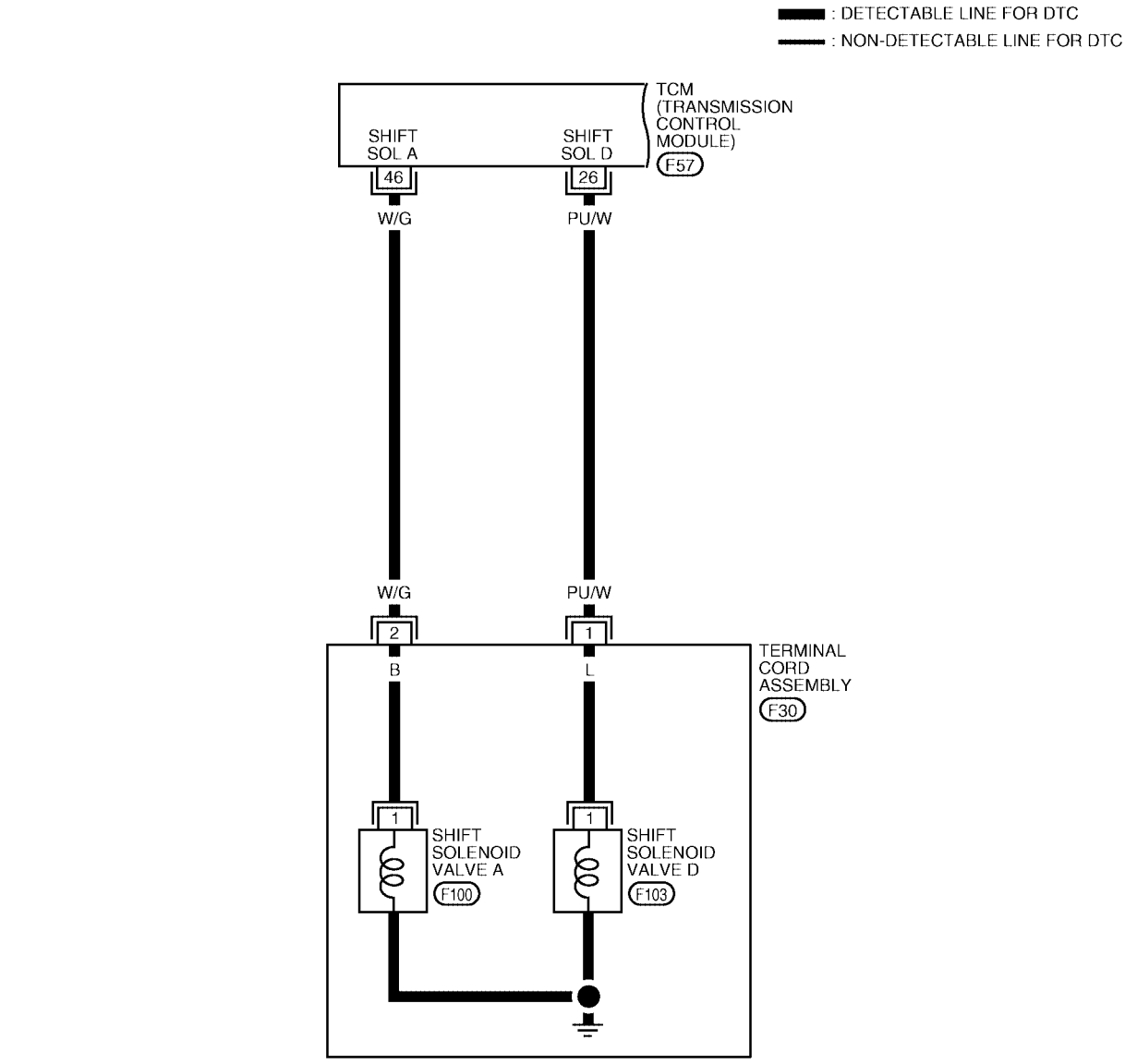
WITH GST

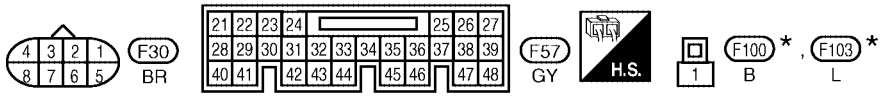
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — 3RDSIG

ECS009FB

AT-3RDSIG-01

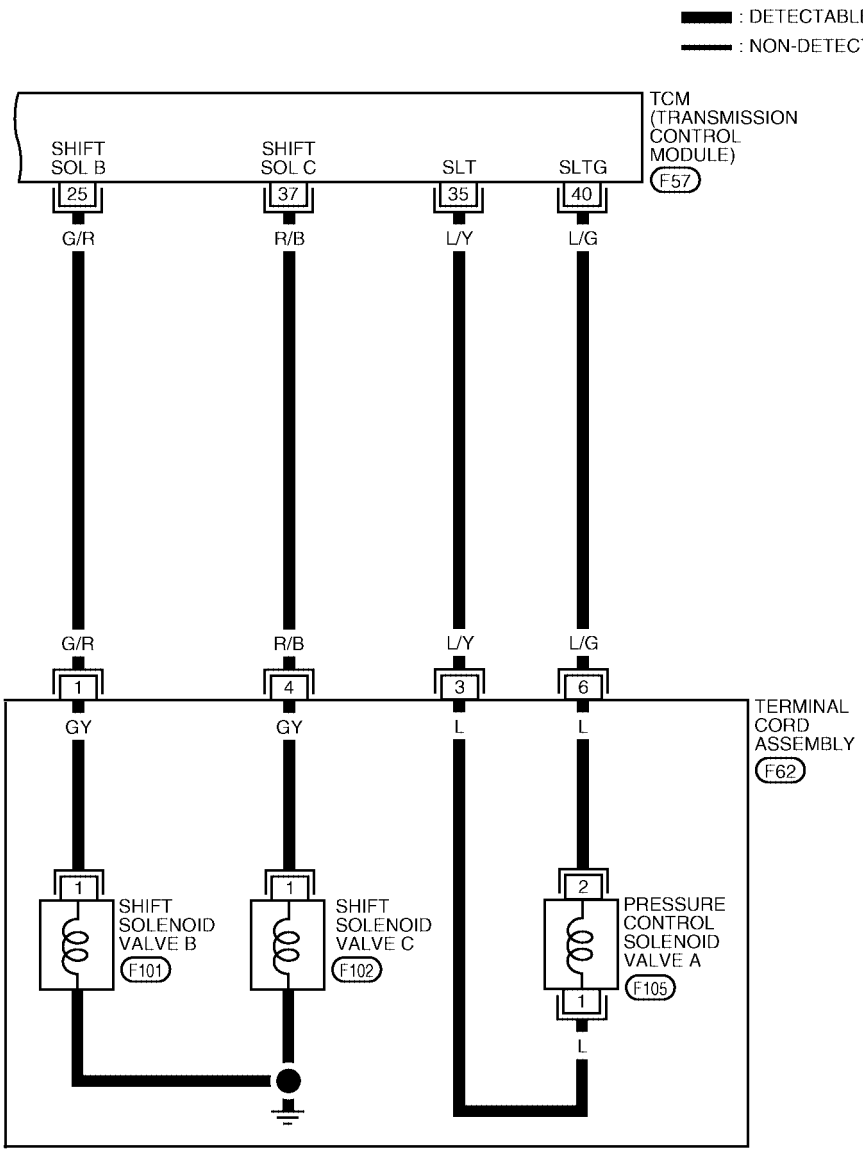


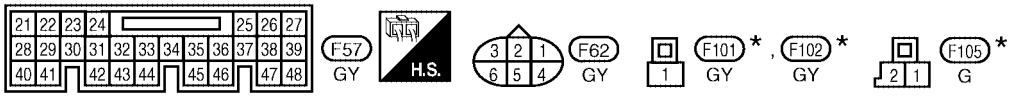


★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0196E

AT-3RDSIG-02





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0197E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
25	G/R	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in 1st or 5th gear.)	Battery voltage
				When shift solenoid valve B does not operate.	0V
26	PU/W	Shift solenoid valve D		When shift solenoid valve D operates. (When driving in 3rd, 4th or 5th gear.)	Battery voltage
				When shift solenoid valve D does not operate.	0V
35	L/Y	Pressure control solenoid valve A		When engine is running with idle speed and setting selector lever to “P” position.	300Hz
37	R/B	Shift solenoid valve C		When shift solenoid valve C operates. (When driving in 1st, 2nd, 3rd or reverse gear.)	Battery voltage
				When shift solenoid valve C does not operate.	0V
40	L/G	Pressure control solenoid valve A ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
46	W/G	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in 1st gear.)	Battery voltage
				When shift solenoid valve A does not operate.	0V

Diagnostic Procedure

ECS009FC

1. CHECK EACH SHIFT SOLENOID VALVE CIRCUIT

Perform “Diagnostic Procedure” for the following DTCs.

- “DTC P0750 SHIFT SOLENOID VALVE A” (Refer to AT-539, "Diagnostic Procedure" .)
- “DTC P0755 SHIFT SOLENOID VALVE B” (Refer to AT-544, "Diagnostic Procedure" .)
- “DTC P0760 SHIFT SOLENOID VALVE C” (Refer to AT-549, "Diagnostic Procedure" .)
- “DTC P0765 SHIFT SOLENOID VALVE D” (Refer to AT-559, "Diagnostic Procedure" .)

OK or NG

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

2. CHECK PRESSURE CONTROL SOLENOID VALVE A CIRCUIT

Perform “Diagnostic Procedure” for DTC P0745. Refer to AT-534, "Diagnostic Procedure" .

OK or NG

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

3. CHECK MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassembly A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following item:

- B5 brake. Refer to AT-670, "Transaxle Case Cover & B5 Brake" .
- U/D clutch. Refer to AT-643, "DISASSEMBLY" .
- U/D brake. Refer to AT-643, "DISASSEMBLY" .

OK or NG

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

4. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-512, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

DTC P0734 A/T 4TH GEAR FUNCTION

PFP:31940

Description

ECS009FD

- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fourth gear position 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		Shift solenoid valve				
		A	B	C	D	E
4th	D	OFF (Open)	OFF (Closed)	OFF (Closed)	ON (Closed)	OFF (Closed)
	M4	OFF (Open)	OFF (Closed)	OFF (Closed)	ON (Closed)	OFF (Closed)

On Board Diagnosis Logic

ECS009FE

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “A/T 4TH GR FNCTN” with CONSULT-II or P0734 without CONSULT-II is detected when A/T cannot be shifted to the 4th gear position even if electrical circuit is good.

Possible Cause

ECS009FF

- Shift solenoid valve A
  (On stick.)
- Shift solenoid valve B
  (On stick.)
- Shift solenoid valve C
  (On stick.)
- Pressure control solenoid valve A
  (On stick.)
- Forward and direct clutch assembly
- U/D clutch
- U/D brake
- 2nd coast brake
- One-way clutch No.1
- Hydraulic control circuit

DTC Confirmation Procedure

ECS009FG

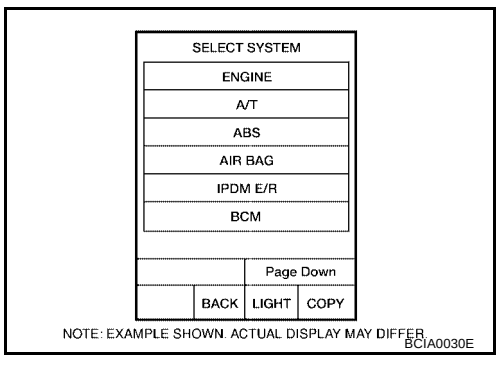
CAUTION:

- **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. Start engine and select “A/T” with “DATA MONITOR” mode in CONSULT-II.
2. Make sure that ATF temperature is within the range below.
   FLUID TEMP: More than 20°C (68°F)
   If out of range, drive the vehicle to warm up the fluid.
3. Accelerate vehicle to maintain the following conditions for at least 10 consecutive seconds.
   SLCT LVR POSI: “D” position
   GEAR: 4th position



[Vehicle speed and accelerator angle: 4th gear position retainable condition. (Refer to AT-702, "VEHICLE SPEED WHEN SHIFTING GEARS - 9J500 MODELS" .)]
Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

4. If DTC is detected, go to AT-521, "Diagnostic Procedure" .

WITH GST

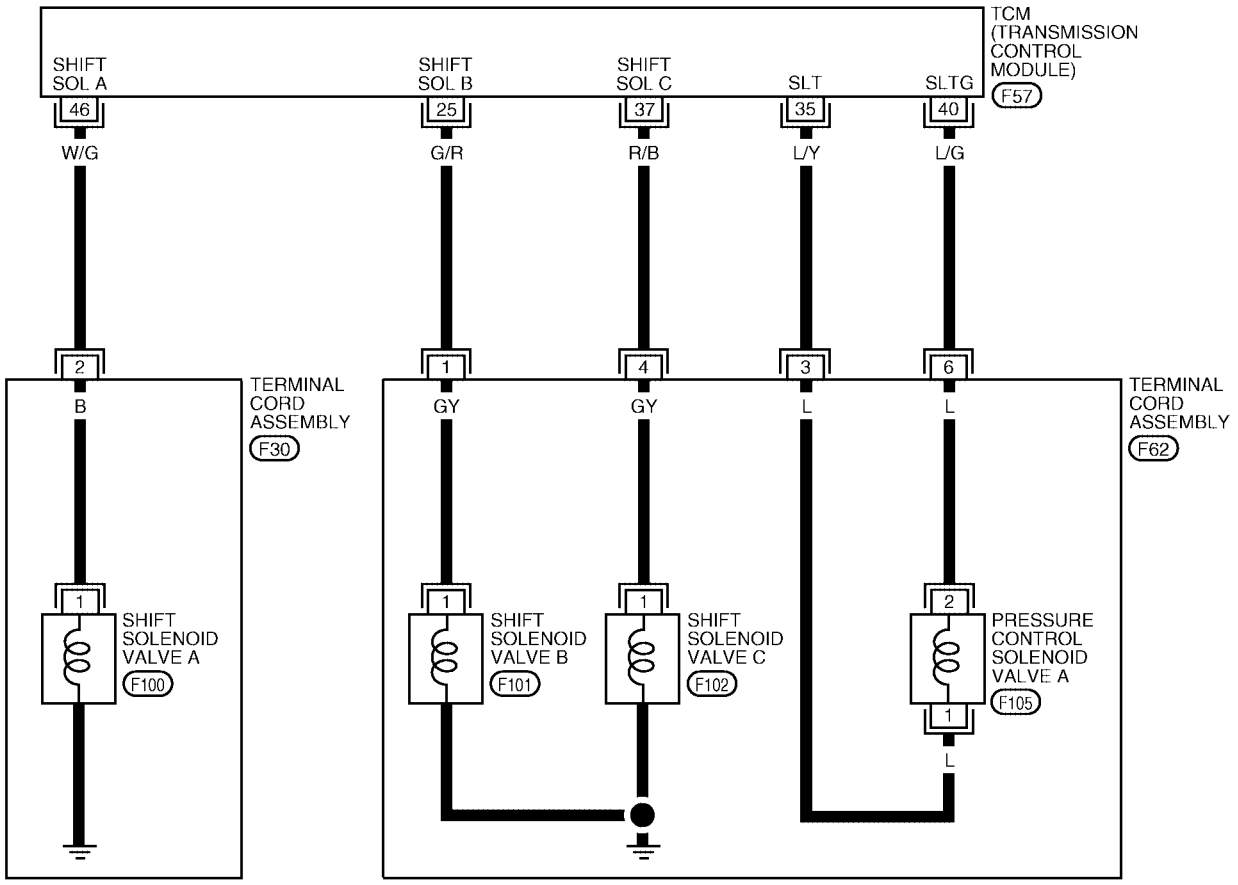
Follow the procedure “With CONSULT-II”.

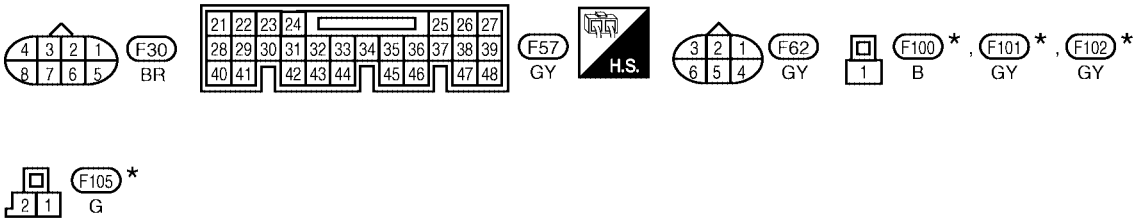
Wiring Diagram — AT — 4THSIG

ECS009FH

AT-4THSIG-01

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





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0198E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
25	G/R	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in 1st or 5th gear.)	Battery voltage
				When shift solenoid valve B does not operate.	0V
35	L/Y	Pressure control solenoid valve A		When engine is running with idle speed and setting selector lever to “P” position.	300Hz
37	R/B	Shift solenoid valve C		When shift solenoid valve C operates. (When driving in 1st, 2nd, 3rd or reverse gear.)	Battery voltage
				When shift solenoid valve C does not operate.	0V
40	L/G	Pressure control solenoid valve A ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
46	W/G	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in 1st gear.)	Battery voltage
				When shift solenoid valve A does not operate.	0V

Diagnostic Procedure

ECS009FI

1. CHECK EACH SHIFT SOLENOID VALVE CIRCUIT

Perform “Diagnostic Procedure” for the following DTCs.

- “DTC P0750 SHIFT SOLENOID VALVE A” (Refer to AT-539, "Diagnostic Procedure" .)
- “DTC P0755 SHIFT SOLENOID VALVE B” (Refer to AT-544, "Diagnostic Procedure" .)
- “DTC P0760 SHIFT SOLENOID VALVE C” (Refer to AT-549, "Diagnostic Procedure" .)

OK or NG

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

2. CHECK PRESSURE CONTROL SOLENOID VALVE A CIRCUIT

Perform “Diagnostic Procedure” for DTC P0745. Refer to AT-534, "Diagnostic Procedure" .

OK or NG

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

3. CHECK MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassembly A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following item:

- Forward and direct clutch assembly. Refer to AT-643, "DISASSEMBLY" .
- 2nd coast brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" , AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .
- U/D brake. Refer to AT-643, "DISASSEMBLY" .
- U/D clutch. Refer to AT-643, "DISASSEMBLY" .
- One-way clutch No.1. Refer to AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .

OK or NG

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

4. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-518, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

DTC P0735 A/T 5TH GEAR FUNCTION

PFP:31940

Description

ECS009FJ

- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into fifth 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		Shift solenoid valve				
		A	B	C	D	E
5th	D	OFF (Open)	ON (Open)	OFF (Closed)	ON (Closed)	OFF (Closed)
	M5	OFF (Open)	ON (Open)	OFF (Closed)	ON (Closed)	OFF (Closed)

On Board Diagnosis Logic

ECS009FK

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “A/T 5TH GR FNCTN” with CONSULT-II or P0735 without CONSULT-II is detected when A/T cannot be shifted to the 5th gear position even if electrical circuit is good.

Possible Cause

ECS009FL

- Shift solenoid valve B
  (Off stick.)
- Shift solenoid valve C
  (On stick.)
- Shift solenoid valve E
  (On stick.)
- Pressure control solenoid valve A
  (On stick.)
- Pressure control solenoid valve B
  (On stick.)
- Forward and direct clutch assembly
- Direct clutch
- 2no coast brake
- One-way clutch No.1
- Hydraulic control circuit

DTC Confirmation Procedure

ECS009FM

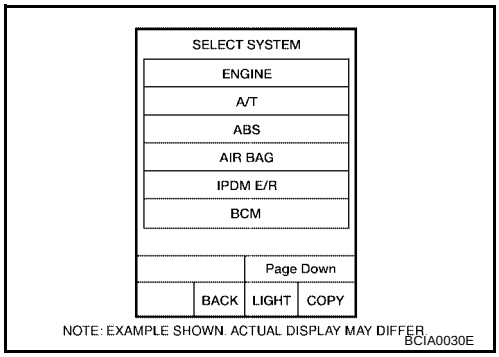
CAUTION:

- **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. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that ATF temperature is within the range below.
   FLUID TEMP: More than 20°C (68°F)
   If out of range, drive the vehicle to warm up the fluid.
3. Accelerate vehicle to maintain the following conditions for at least 12 consecutive seconds.
   SLCT LVR POSI: “D” position
   GEAR: 5th position
   [Vehicle speed and accelerator angle: 5th gear position retainable condition. (Refer to AT-702, "VEHICLE SPEED WHEN SHIFTING GEARS - 9J500 MODELS" .)]
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.



4. If DTC is detected, go to AT-527, "Diagnostic Procedure" .

WITH GST

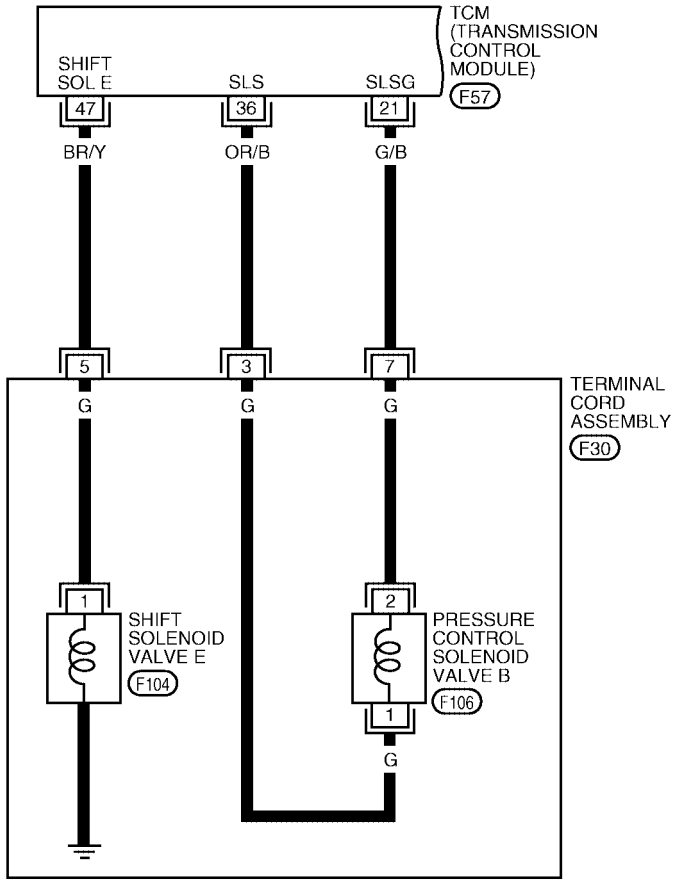
Follow the procedure “With CONSULT-II”.

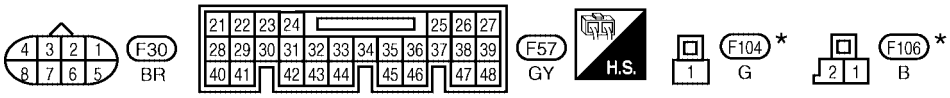
Wiring Diagram — AT — 5THSIG

ECS009FN

AT-5THSIG-01

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



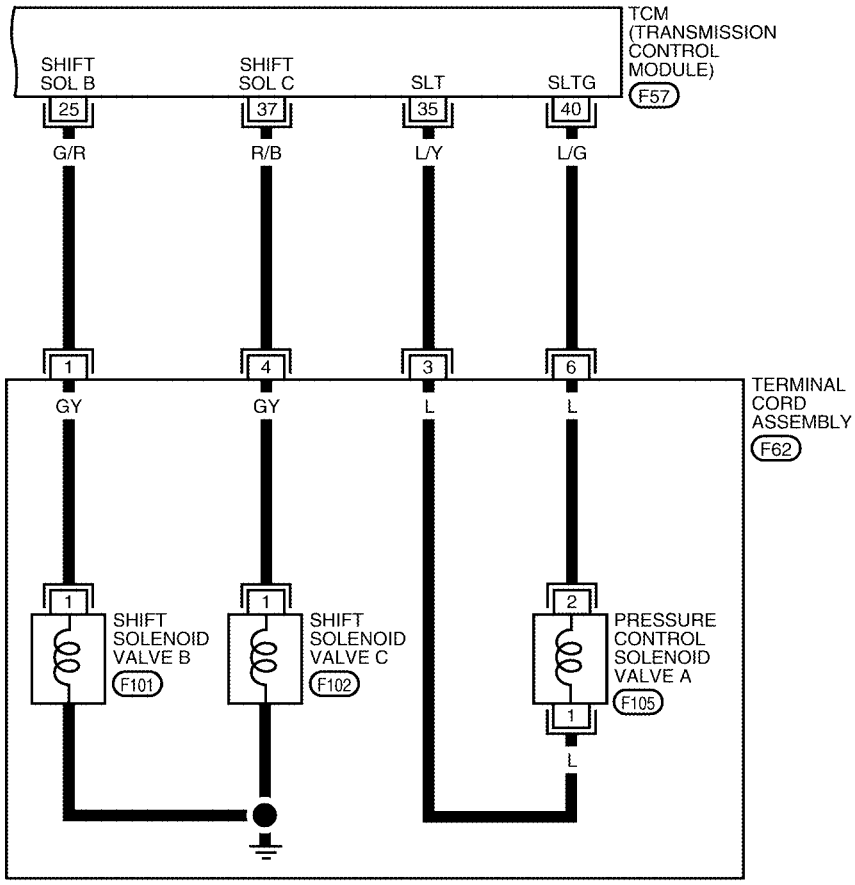


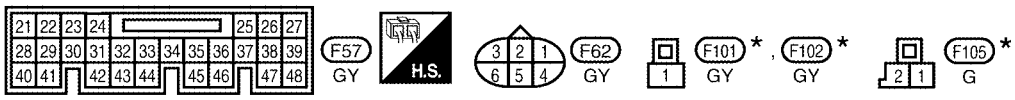
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0199E

AT-5THSIG-02

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





★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0224E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
21	G/B	Pressure control solenoid valve B ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
25	G/R	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in 1st or 5th gear.)	Battery voltage
				When shift solenoid valve B does not operate.	0V
35	L/Y	Pressure control solenoid valve A		When engine is running with idle speed and setting selector lever to “P” position.	300Hz
36	OR/B	Pressure control solenoid valve B		When engine is running with idle speed and setting selector lever to “P” position.	300Hz
37	R/B	Shift solenoid valve C		When shift solenoid valve C operates. (When driving in 1st, 2nd, 3rd or reverse gear.)	Battery voltage
				When shift solenoid valve C does not operate.	0V
40	L/G	Pressure control solenoid valve A ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
47	BR/Y	Shift solenoid valve E		When shift solenoid valve E operates. (When driving in reverse gear.)	Battery voltage
				When shift solenoid valve E does not operate.	0V

Diagnostic Procedure

ECS009FO

1. CHECK EACH SHIFT SOLENOID VALVE CIRCUIT

Perform “Diagnostic Procedure” for the following DTCs.

- “DTC P0755 SHIFT SOLENOID VALVE B” (Refer to AT-544, "Diagnostic Procedure" .)
- “DTC P0760 SHIFT SOLENOID VALVE C” (Refer to AT-549, "Diagnostic Procedure" .)
- “DTC P0770 SHIFT SOLENOID VALVE E” (Refer to AT-564, "Diagnostic Procedure" .)

OK or NG

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

2. CHECK EACH PRESSURE CONTROL SOLENOID VALVE CIRCUIT

Perform “Diagnostic Procedure” for the following DTCs.

- “DTC P0745 PRESSURE CONTROL SOLENOID VALVE A” (Refer to AT-534, "Diagnostic Procedure" .)
- “DTC P0775 PRESSURE CONTROL SOLENOID VALVE B” (Refer to AT-569, "Diagnostic Procedure" .)

OK or NG

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

3. CHECK MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassembly A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following item:

- Forward and direct clutch assembly. Refer to AT-643, "DISASSEMBLY" .
- 2nd brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" .
- One-way clutch No.1. Refer to AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .

OK or NG

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

4. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-523, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

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

PFP:31940

Description

ECS009FP

- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the torque converter clutch does not lock up as instructed by the TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

On Board Diagnosis Logic

ECS009FQ

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “A/T TCC S/V FNCTN” with CONSULT-II or P0744 without CONSULT-II is detected when A/T cannot perform lock-up even if electrical circuit is good.

Possible Cause

ECS009FR

- Shift solenoid valve D
  (Off stick.)
- Pressure control solenoid valve C
  (Off stick.)
- Torque converter clutch
- Hydraulic control circuit

DTC Confirmation Procedure

ECS009FS

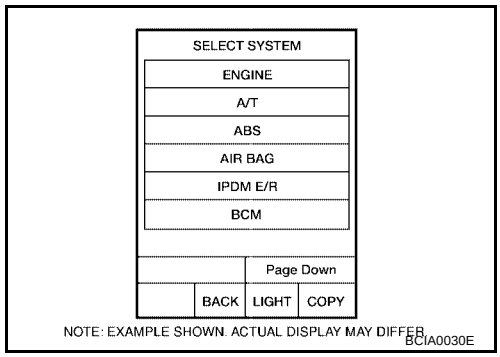
CAUTION:

- **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. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that ATF temperature is within the range below.
   FLUID TEMP: More than 20°C (68°F)
   If out of range, drive the vehicle to warm up the fluid.
3. Accelerate vehicle to more than 100 km/h (62 MPH) and maintain the following conditions for at least 12 consecutive seconds.
   SLCT LVR POSI: “D” position
   GEAR: 5th position
   SLIP REV: Less than 100 rpm
   ACCELE ANGLE: More than 5 %
   LOCK-UP: ON (Refer to AT-703, "VEHICLE SPEED WHEN PERFORMING AND RELEASING COMPLETE LOCK-UP - 9J500 MODELS" .)
   [Vehicle speed: Constant speed of more than 100 km/h (62 MPH).]
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.



4. If DTC is detected, go to AT-531, "Diagnostic Procedure" .

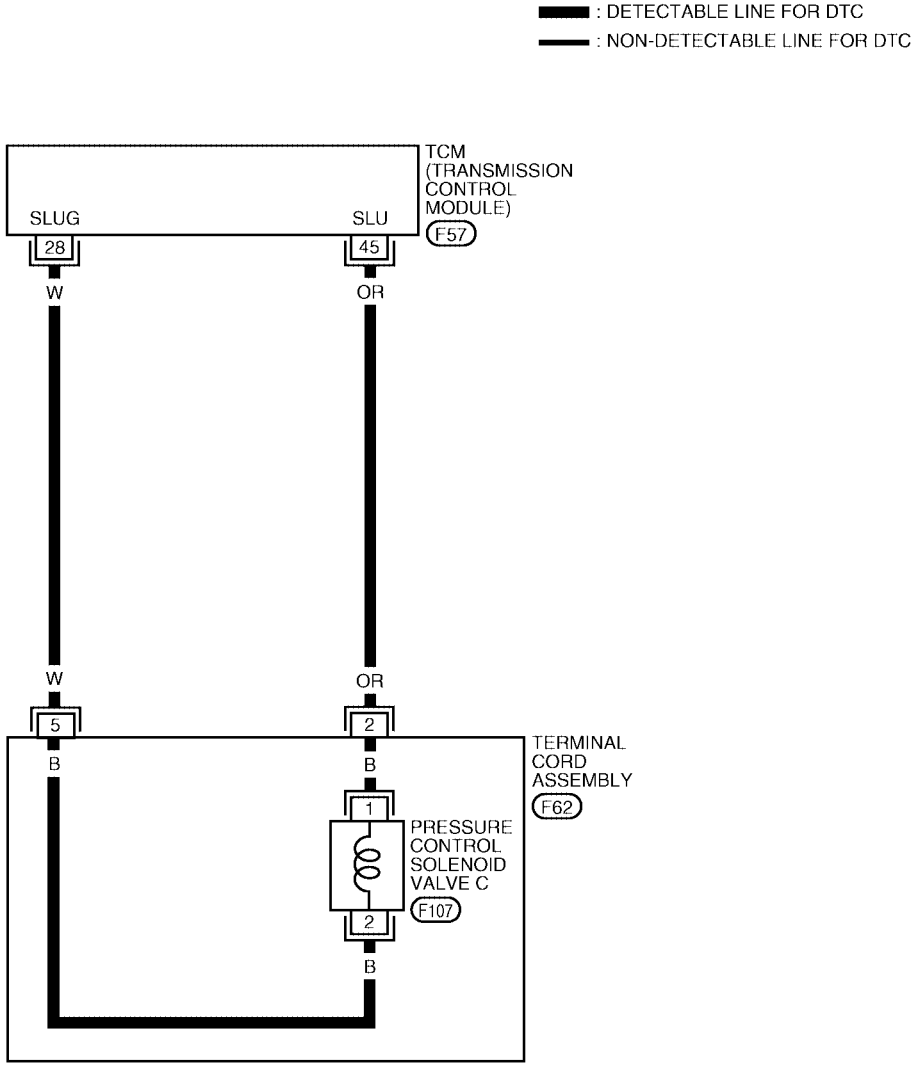
WITH GST

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — TCCSIG

ECS009FT

AT-TCCSIG-01





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0201E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
28	W	Pressure control solenoid valve C ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
45	OR	Pressure control solenoid valve C		When engine is running with idle speed and setting selector lever to “P” position.	300Hz

Diagnostic Procedure

ECS009FU

1. CHECK SHIFT SOLENOID VALVE D CIRCUIT

Perform “Diagnostic Procedure” for DTC P0765. Refer to AT-559, "Diagnostic Procedure" .

OK or NG

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

2. CHECK PRESSURE CONTROL SOLENOID VALVE C CIRCUIT

Perform “Diagnostic Procedure” for DTC P0795. Refer to AT-578, "Diagnostic Procedure" .

OK or NG

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

3. CHECK MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassembly A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following item:

– Torque converter clutch. Refer to AT-643, "DISASSEMBLY" .

OK or NG

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

4. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-529, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

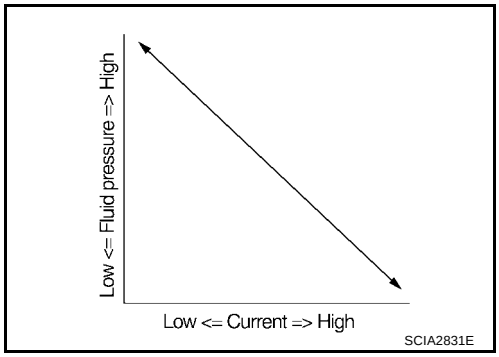
DTC P0745 PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE)

PFP:31940

Description

ECS009FV

- The pressure control solenoid valve A is normally high, 3-port linear pressure control solenoid.
- The pressure control solenoid valve A regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.



On Board Diagnosis Logic

ECS009FW

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “PC SOL A(L/PRESS)” with CONSULT-II or P0745 without CONSULT-II is detected under the following conditions.
  - When normal voltage is not applied to solenoid due to open, short, and so on.
  - When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

ECS009FX

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

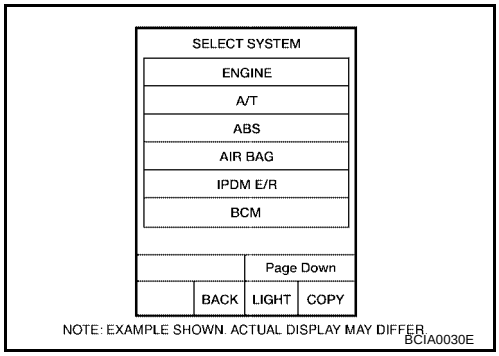
DTC Confirmation Procedure

ECS009FY

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 “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Run engine for at least 13 consecutive seconds at idle speed.
5. If DTC is detected, go to AT-534, "Diagnostic Procedure" .



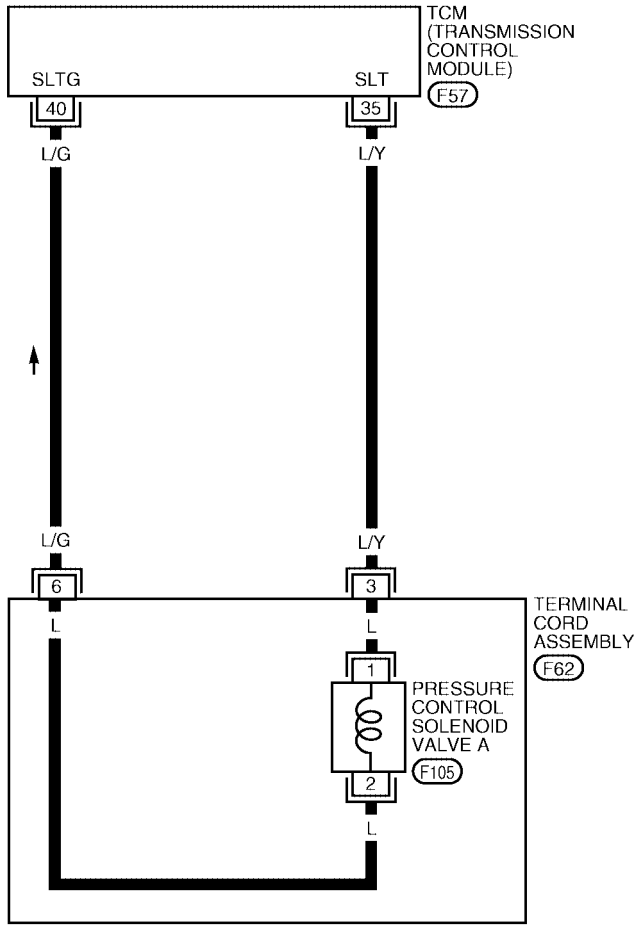
WITH GST

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — PC/A

ECS009FZ

AT-PC/A-01





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0202E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
35	L/Y	Pressure control solenoid valve A		When engine is running with idle speed and setting selector lever to “P” position.	300Hz
40	L/G	Pressure control solenoid valve A ground		When engine is running with idle speed and setting selector lever to “P” position.	0V

Diagnostic Procedure

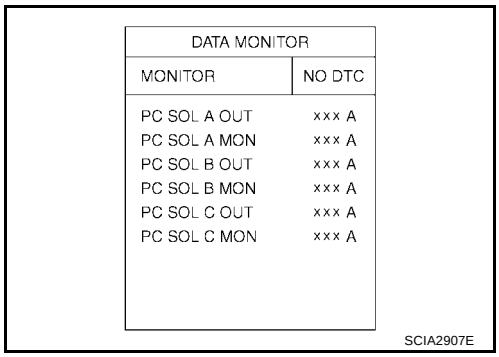
ECS009G0

1. CHECK PRESSURE CONTROL SOLENOID VALVE A SIGNAL

With CONSULT-II

1. After warming up the engine and transaxle, turn ignition switch “OFF”.
2. Turn ignition switch “ON”. (Do not start engine.)
3. Select “DATA MONITOR” mode for “A/T” with CONSULT-II.
4. Read out the value of “PC SOL A OUT” and “PC SOL A MON”.

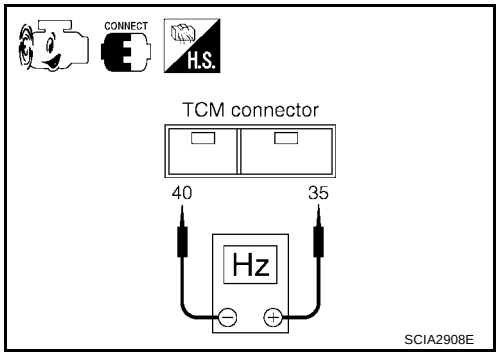
Monitor item	Condition	Display value (Approx.)
● PC SOL A OUT ● PC SOL A MON	When releasing accelerator pedal with setting selector lever to “P” position.	1.00 A
	When depressing accelerator pedal fully setting selector lever to “P” position.	0.32 A



Without CONSULT-II

1. Start the engine.
2. Check pulse between TCM connector terminals 35 and 40.

Connector	Terminal	Condition	Data (Approx.)
F57	35 - 40	When engine is running with idle speed and setting selector lever to “P” position.	300 Hz



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

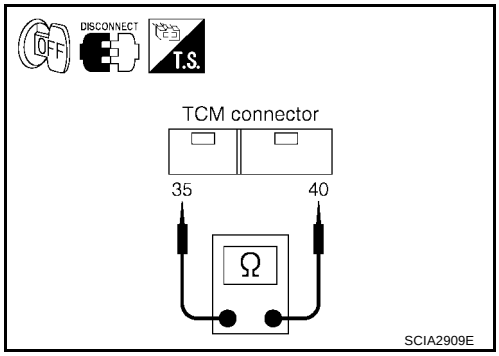
2. CHECK PRESSURE CONTROL SOLENOID VALVE A CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminals 35 and 40.

Connector	Terminal	Condition	Resistance (Approx.)
F57	35 - 40	Temperature: 20°C (68°F)	5.0 - 5.6 Ω

OK or NG

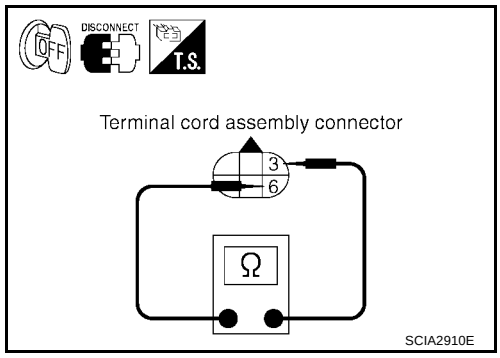
OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK TERMINAL CORD ASSEMBLY WITH PRESSURE CONTROL SOLENOID VALVE A

1. Turn ignition switch “OFF”.
2. Disconnect terminal cord assembly harness connector.
3. Check resistance between terminals 3 and 6.

Connector	Terminal	Condition	Resistance (Approx.)
F62	3 - 6	Temperature: 20°C (68°F)	5.0 - 5.6 Ω



OK or NG

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

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY

Check the following.

- Open or short-circuit in the harness between TCM and terminal cord assembly.

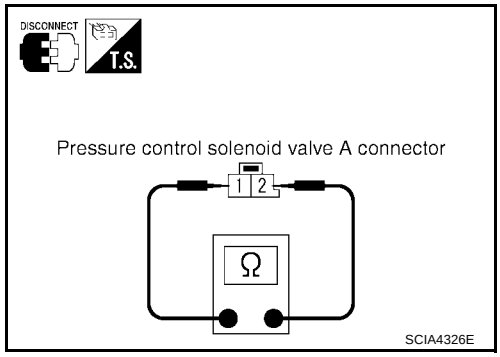
OK or NG

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

5. CHECK PRESSURE CONTROL SOLENOID VALVE A

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect pressure control solenoid valve A harness connector.
3. Check resistance between terminals 1 and 2.

Connector	Terminal	Condition	Resistance (Approx.)
F105	1 - 2	Temperature: 20°C (68°F)	5.0 - 5.6 Ω



OK or NG

OK >> GO TO 6.
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

6. CHECK HARNESS BETWEEN TERMINAL CORD ASSEMBLY AND PRESSURE CONTROL SOLENOID VALVE A

Check the following.

- Open or short-circuit in the harness between terminal cord assembly and pressure control solenoid valve A.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace transmission wire. Refer to AT-629, "Terminal Cord Assembly" .

7. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-532, "DTC Confirmation Procedure" .

OK or NG

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

8. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
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

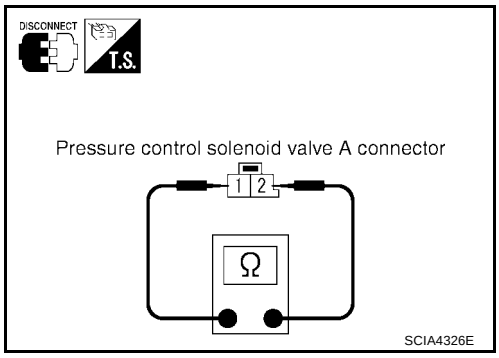
ECS009G1

PRESSURE CONTROL SOLENOID VALVE A

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect pressure control solenoid valve A harness connector.
3. Check resistance between terminals 1 and 2.

Connector	Terminal	Condition	Resistance (Approx.)
F105	1 - 2	Temperature: 20°C (68°F)	5.0 - 5.6 Ω

4. If NG, replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .



DTC P0750 SHIFT SOLENOID VALVE A

PFP:31940

Description

ECS009G2

- Shift solenoid valves are installed directly in control valve body. The shift solenoid valves operates of ON and OFF by the control signal from TCM. Combinations of 5 shift solenoid valves, A, B, C, D and E, shifts gear positions.
- The shift solenoid valve A is a normally open, ON-OFF type solenoid.

Gear position	D_1 , M_1	D_2 , M_2	D_3 , M_3	D_4 , M_4	D_5 , M_5	Reverse
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	OFF (Open)	OFF (Open)	OFF (Open)

On Board Diagnosis Logic

ECS009G3

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “SHIFT SOL A” with CONSULT-II or P0750 without CONSULT-II is detected under the following conditions.
  - When normal voltage is not applied to solenoid due to open, short, and so on.
  - When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

ECS009G4

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

DTC Confirmation Procedure

ECS009G5

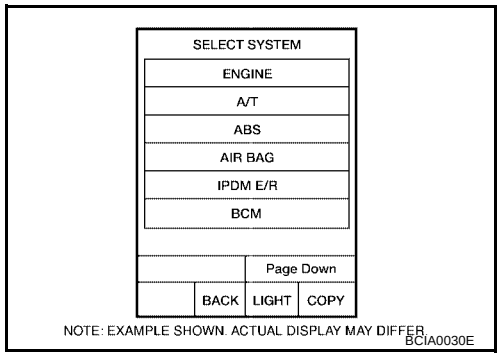
CAUTION:

- **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”. (Do not start engine.)
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Drive vehicle and allow the following conditions.
   SLCT LVR POSI: “D” position
   GEAR: 1st ⇒ 2nd position
5. If DTC is detected, go to AT-539, "Diagnostic Procedure" .



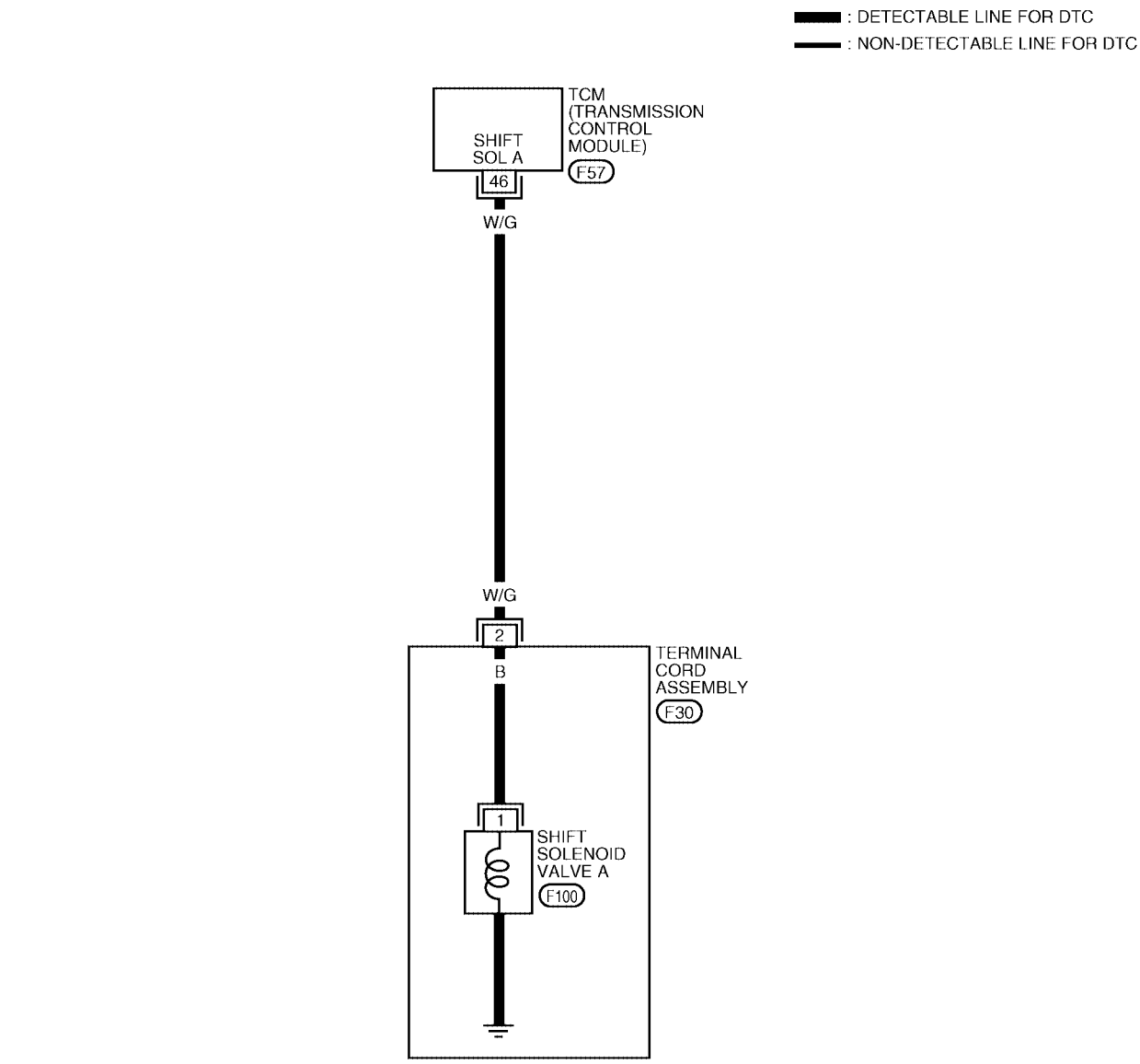
WITH GST

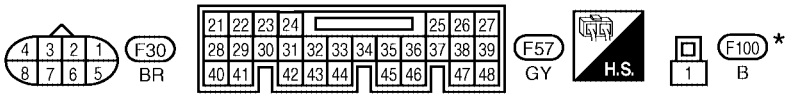
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/A

ECS009G6

AT-SSV/A-01





★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0203E

TCM terminal and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
46	W/G	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in 1st gear.)	Battery voltage
				When shift solenoid valve A does not operate.	0V

Diagnostic Procedure

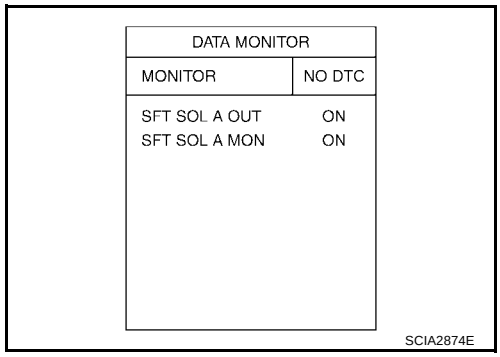
ECS009G7

1. CHECK SHIFT SOLENOID VALVE A SIGNAL

With CONSULT-II

1. Start engine.
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Drive vehicle and read out the value of “SFT SOL A OUT” and “SFT SOL A MON”.

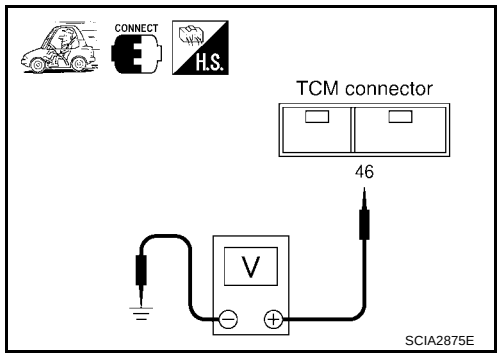
Monitor item	Condition	Indication
● SFT SOL A OUT ● SFT SOL A MON	When shift solenoid valve A operates. (When driving in 1st gear.)	ON
	When shift solenoid valve A does not operate.	OFF



Without CONSULT-II

1. Drive vehicle.
2. Check voltage between TCM connector terminal and ground.

Connector	Terminal	Condition	Voltage (Approx.)
F57	46 - Ground	When shift solenoid valve A operates. (When driving in 1st gear.)	Battery voltage
		When shift solenoid valve A does not operate.	0V



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

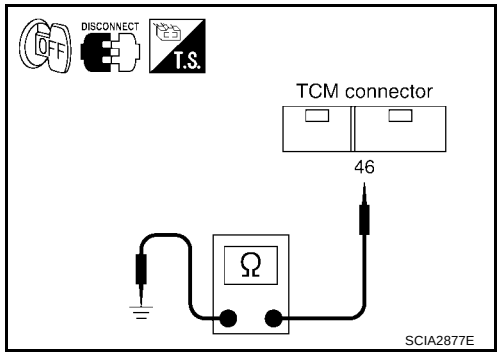
2. CHECK SHIFT SOLENOID VALVE A CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminal 46 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F57	46 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

OK or NG

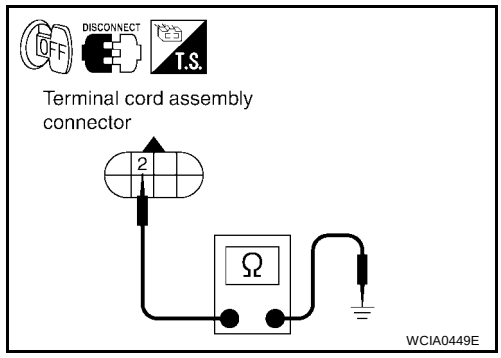
OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK TERMINAL CORD ASSEMBLY WITH SHIFT SOLENOID VALVE A

1. Turn ignition switch “OFF”.
2. Disconnect terminal cord assembly harness connector.
3. Check resistance between terminal 2 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F30	2 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω



OK or NG

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

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY

Check the following.

- Open or short-circuit in the harness between TCM and terminal cord assembly.

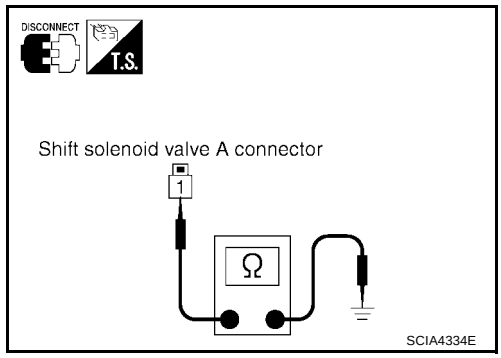
OK or NG

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

5. CHECK SHIFT SOLENOID VALVE A

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect shift solenoid valve A harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F100	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω



OK or NG

OK >> GO TO 6.
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

6. CHECK HARNESS BETWEEN TERMINAL CORD ASSEMBLY AND SHIFT SOLENOID VALVE A

Check the following.

- Open or short-circuit in the harness between terminal cord assembly and shift solenoid valve A.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace transmission wire. Refer to AT-629, "Terminal Cord Assembly" .

7. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-537, "DTC Confirmation Procedure" .

OK or NG

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

8. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
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

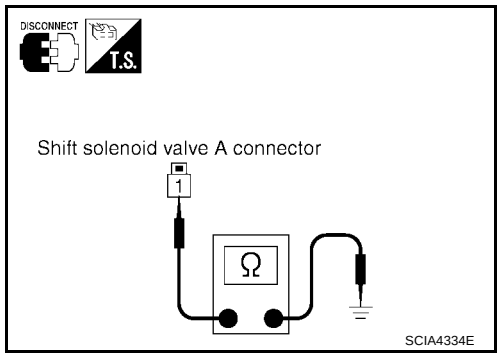
ECS009G8

SHIFT SOLENOID VALVE A

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect shift solenoid valve A harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F100	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

4. If NG, replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .



DTC P0755 SHIFT SOLENOID VALVE B

PFP:31940

Description

ECS009G9

- Shift solenoid valves are installed directly in control valve body. The shift solenoid valves operates of ON and OFF by the control signal from TCM. Combinations of 5 shift solenoid valves, A, B, C, D and E, shifts gear positions.
- The shift solenoid valve B is a normally closed, ON-OFF type solenoid.

Gear position	D_1 , M_1	D_2 , M_2	D_3 , M_3	D_4 , M_4	D_5 , M_5	Reverse
Shift solenoid valve B	ON (Open)	OFF (Closed)	OFF (Closed)	OFF (Closed)	ON (Open)	OFF (Closed)

On Board Diagnosis Logic

ECS009GA

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “SHIFT SOL B” with CONSULT-II or P0755 without CONSULT-II is detected under the following conditions.
  - When normal voltage is not applied to solenoid due to open, short, and so on.
  - When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

ECS009GB

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

DTC Confirmation Procedure

ECS009GC

CAUTION:

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

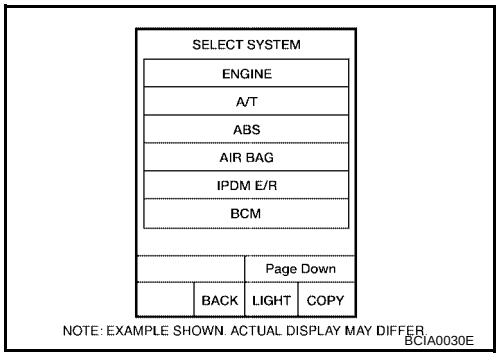
NOTE:

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”. (Do not start engine.)
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Drive vehicle and allow the following conditions.
   SLCT LVR POSI: “D” position
   GEAR: 1st ⇒ 2nd and 4th ⇒ 5th position
5. If DTC is detected, go to AT-544, "Diagnostic Procedure" .



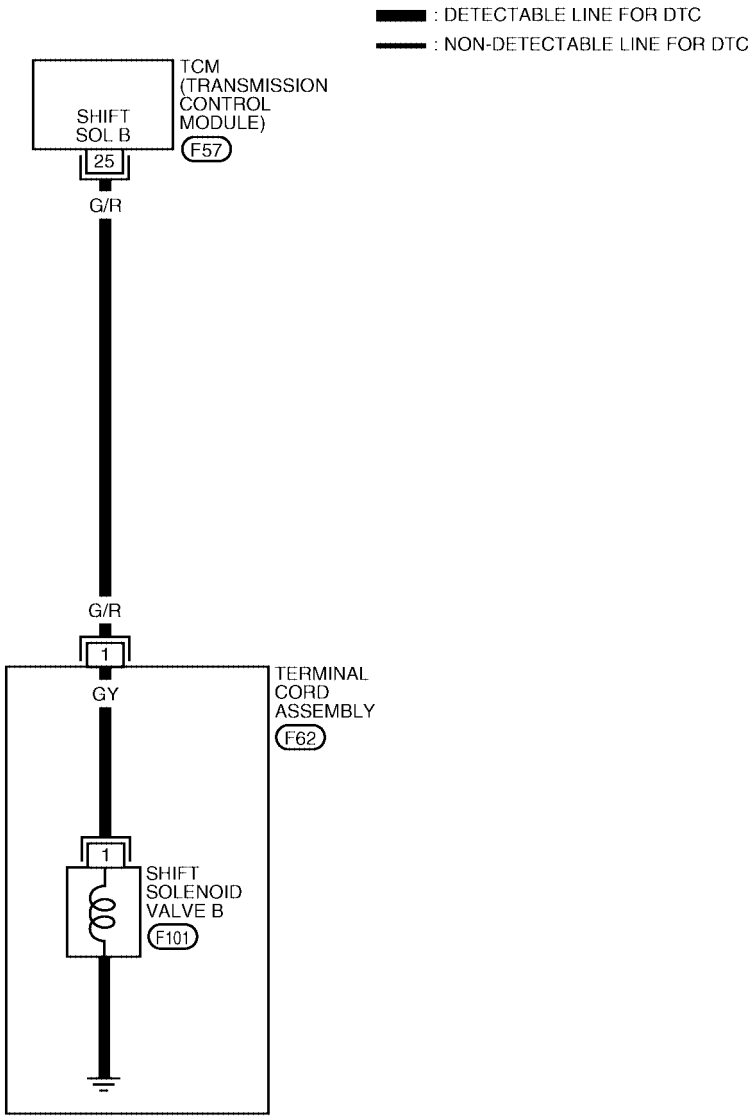
WITH GST

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/B

ECS009GD

AT-SSV/B-01





★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0204E

TCM terminal and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
25	G/R	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in 1st or 5th gear.)	Battery voltage
				When shift solenoid valve B does not operate.	0V

Diagnostic Procedure

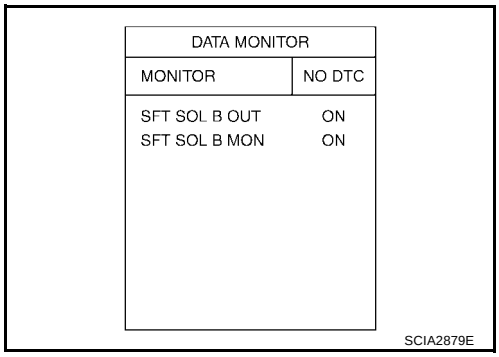
ECS009GE

1. CHECK SHIFT SOLENOID VALVE B SIGNAL

With CONSULT-II

1. Start engine.
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Drive vehicle and read out the value of “SFT SOL B OUT” and “SFT SOL B MON”.

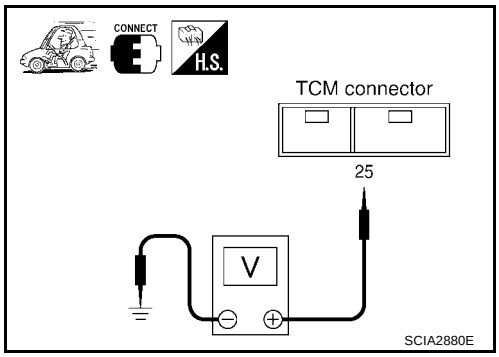
Monitor item	Condition	Indication
● SFT SOL B OUT ● SFT SOL B MON	When shift solenoid valve B operates. (When driving in 1st or 5th gear.)	ON
	When shift solenoid valve B does not operate.	OFF



Without CONSULT-II

1. Drive vehicle.
2. Check voltage between TCM connector terminal and ground.

Connector	Terminal	Condition	Voltage (Approx.)
F57	25 - Ground	When shift solenoid valve B operates. (When driving in 1st or 5th gear.)	Battery voltage
		When shift solenoid valve B does not operate.	0V



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

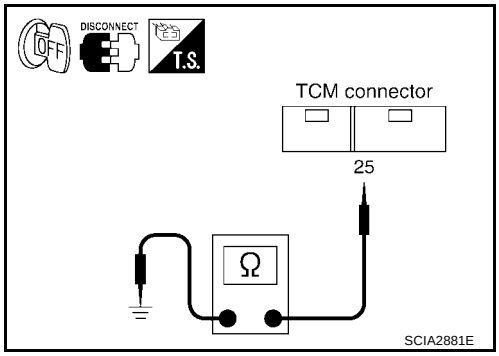
2. CHECK SHIFT SOLENOID VALVE B CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminal 25 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F57	25 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

OK or NG

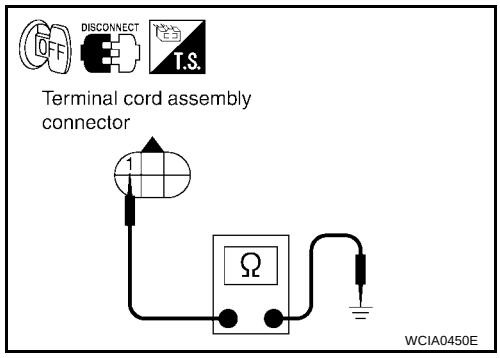
OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK TERMINAL CORD ASSEMBLY WITH SHIFT SOLENOID VALVE B

1. Turn ignition switch “OFF”.
2. Disconnect terminal cord assembly harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F62	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω



OK or NG

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

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY

Check the following.

- Open or short-circuit in the harness between TCM and terminal cord assembly.

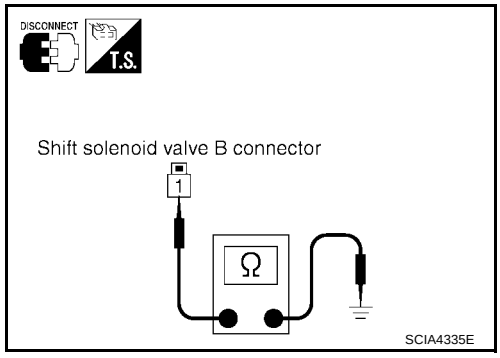
OK or NG

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

5. CHECK SHIFT SOLENOID VALVE B

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect shift solenoid valve B harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F101	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω



OK or NG

OK >> GO TO 6.
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

6. CHECK HARNESS BETWEEN TERMINAL CORD ASSEMBLY AND SHIFT SOLENOID VALVE B

Check the following.

- Open or short-circuit in the harness between terminal cord assembly and shift solenoid valve B.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace transmission wire. Refer to AT-629, "Terminal Cord Assembly" .

7. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-542, "DTC Confirmation Procedure" .

OK or NG

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

8. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
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.

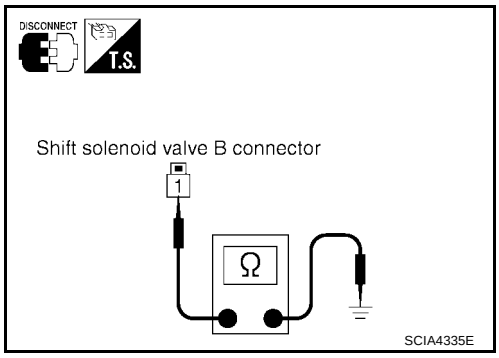
Component Inspection

ECS009GF

SHIFT SOLENOID VALVE B

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect shift solenoid valve B harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F101	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω



4. If NG, replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

DTC P0760 SHIFT SOLENOID VALVE C

PFP:31940

Description

ECS009GG

- Shift solenoid valves are installed directly in control valve body. The shift solenoid valves operates of ON and OFF by the control signal from TCM. Combinations of 5 shift solenoid valves, A, B, C, D and E, shifts gear positions.
- The shift solenoid valve C is a normally closed, ON-OFF type solenoid.

Gear position	D_1 , M_1	D_2 , M_2	D_3 , M_3	D_4 , M_4	D_5 , M_5	Reverse
Shift solenoid valve C	ON (Open)	ON (Open)	ON (Open)	OFF (Closed)	OFF (Closed)	ON (Open)

On Board Diagnosis Logic

ECS009GH

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “SHIFT SOL C” with CONSULT-II or P0760 without CONSULT-II is detected under the following conditions.
  - When normal voltage is not applied to solenoid due to open, short, and so on.
  - When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

ECS009GI

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

DTC Confirmation Procedure

ECS009GJ

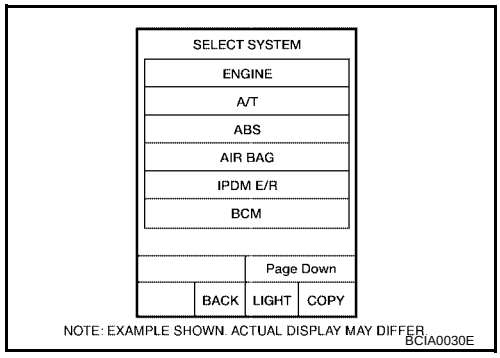
CAUTION:

- **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”. (Do not start engine.)
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Drive vehicle and allow the following conditions.
   SLCT LVR POSI: “D” position
   GEAR: 3rd ⇒ 4th position
5. If DTC is detected, go to AT-549, "Diagnostic Procedure" .



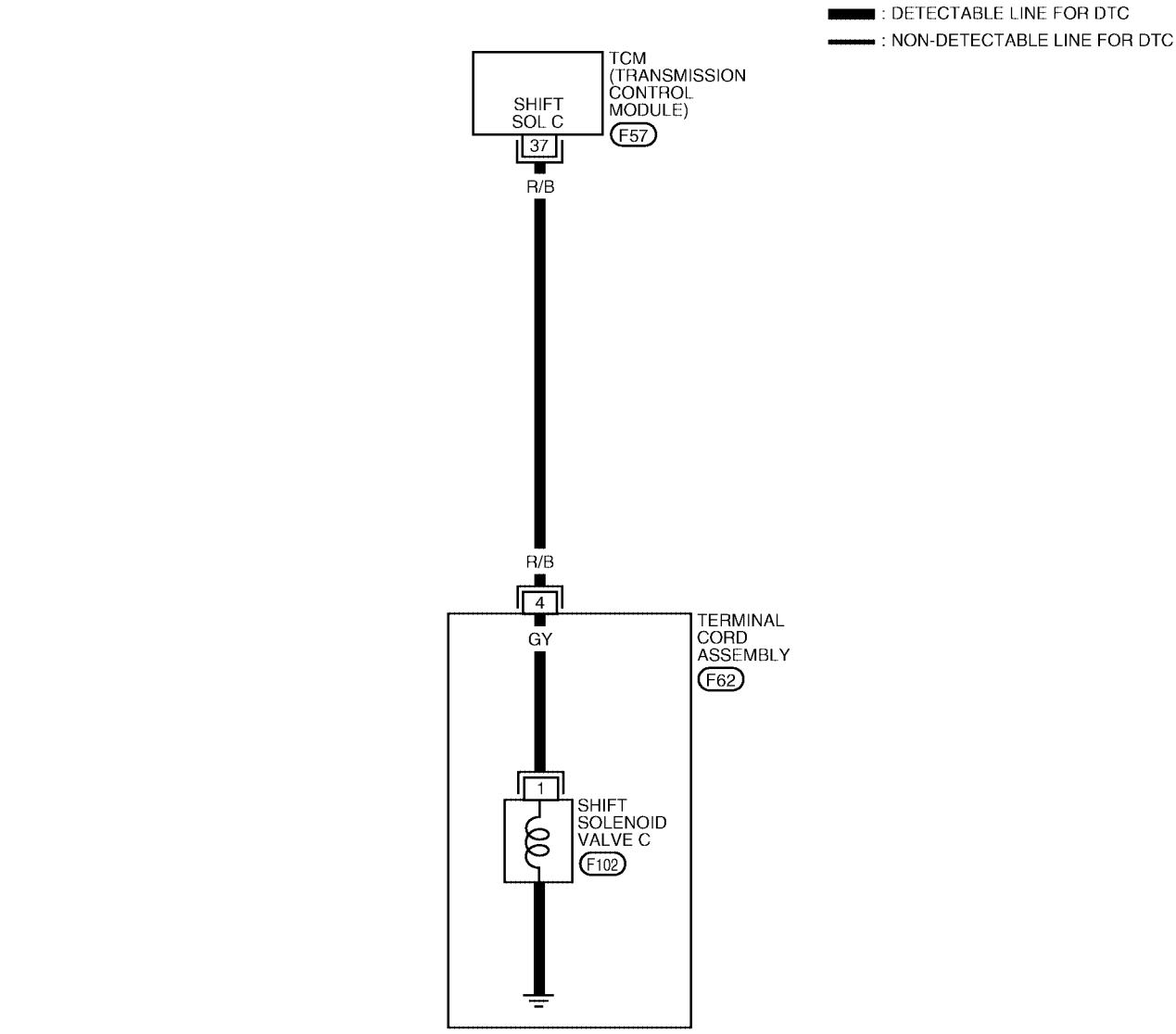
WITH GST

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/C

ECS009GK

AT-SSV/C-01





★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0205E

TCM terminal and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
37	R/B	Shift solenoid valve C		When shift solenoid valve C operates. (When driving in 1st, 2nd, 3rd or reverse gear.)	Battery voltage
				When shift solenoid valve C does not operate.	0V

Diagnostic Procedure

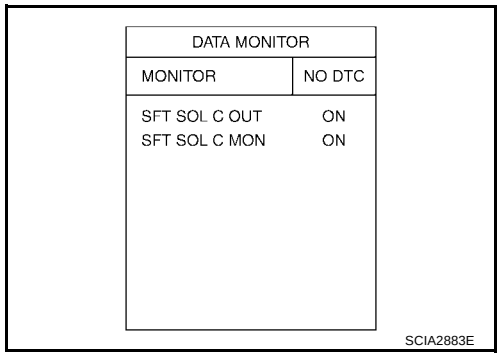
ECS009GL

1. CHECK SHIFT SOLENOID VALVE C SIGNAL

With CONSULT-II

1. Start engine.
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Drive vehicle and read out the value of “SFT SOL C OUT” and “SFT SOL C MON”.

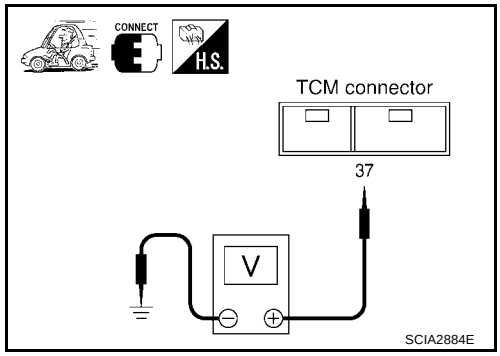
Monitor item	Condition	Indication
● SFT SOL C OUT ● SFT SOL C MON	When shift solenoid valve C operates. (When driving in 1st, 2nd, 3rd or reverse gear.)	ON
	When shift solenoid valve C does not operate.	OFF



Without CONSULT-II

1. Drive vehicle.
2. Check voltage between TCM connector terminal and ground.

Connector	Terminal	Condition	Voltage (Approx.)
F57	37 - Ground	When shift solenoid valve C operates. (When driving in 1st, 2nd, 3rd or reverse gear.)	Battery voltage
		When shift solenoid valve C does not operate.	0V



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

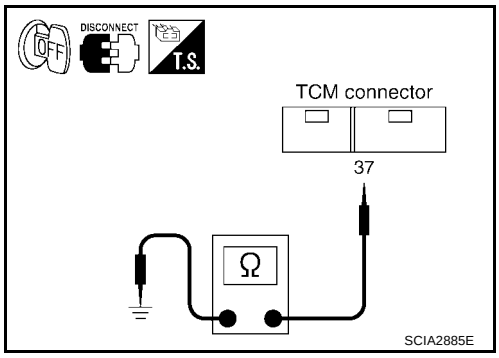
2. CHECK SHIFT SOLENOID VALVE C CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminal 37 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F57	37 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

OK or NG

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



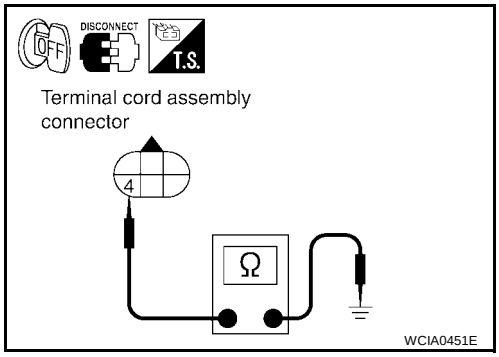
3. CHECK TERMINAL CORD ASSEMBLY WITH SHIFT SOLENOID VALVE C

1. Turn ignition switch “OFF”.
2. Disconnect terminal cord assembly harness connector.
3. Check resistance between terminal 4 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F62	4 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

OK or NG

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



4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY

Check the following.

- Open or short-circuit in the harness between TCM and terminal cord assembly.

OK or NG

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

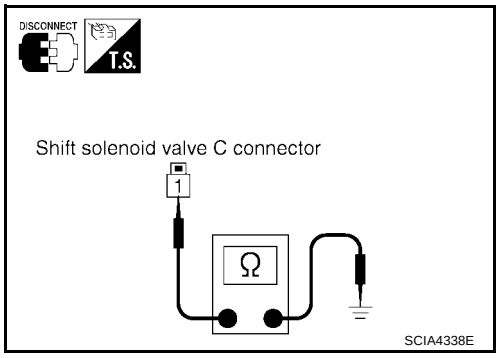
5. CHECK SHIFT SOLENOID VALVE C

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect shift solenoid valve C harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F102	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

OK or NG

OK >> GO TO 6.
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .



6. CHECK HARNESS BETWEEN TERMINAL CORD ASSEMBLY AND SHIFT SOLENOID VALVE C

Check the following.

- Open or short-circuit in the harness between terminal cord assembly and shift solenoid valve C.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace transmission wire.

7. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-547, "DTC Confirmation Procedure" .

OK or NG

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

8. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
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

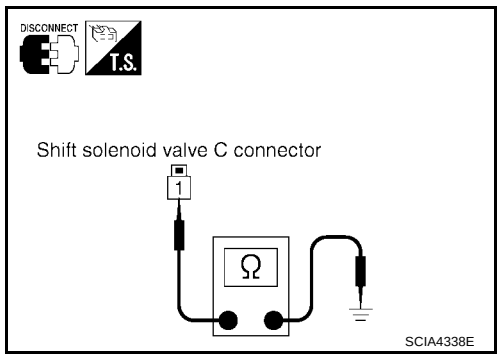
ECS009GM

SHIFT SOLENOID VALVE C

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect shift solenoid valve C harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F102	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

4. If NG, replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .



DTC P0762 SHIFT SOLENOID VALVE C STUCK ON

PFP:31940

Description

ECS009GN

- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- 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.
- Shift solenoid valves are installed directly in control valve body. The shift solenoid valves operates of ON and OFF by the control signal from TCM. Combinations of 5 shift solenoid valves, A, B, C, D and E, shifts gear positions.
- The shift solenoid valve C is a normally closed, ON-OFF type solenoid.

Gear position	D_1 , M_1	D_2 , M_2	D_3 , M_3	D_4 , M_4	D_5 , M_5	Reverse
Shift solenoid valve C	ON (Open)	ON (Open)	ON (Open)	OFF (Closed)	OFF (Closed)	ON (Open)

On Board Diagnosis Logic

ECS009GO

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “SFT SOL C STUCK ON” with CONSULT-II or P0762 without CONSULT-II is detected when condition of shift solenoid valve C is different from monitor value, and relation between gear position and actual gear ratio is irregular.

Possible Cause

ECS009GP

- Shift solenoid valve C
  (On stick.)
- Hydraulic control circuit

DTC Confirmation Procedure

ECS009GQ

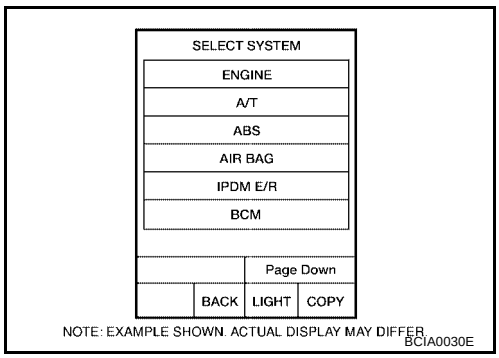
CAUTION:

- **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”. (Do not start engine.)
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Drive vehicle and allow the following conditions.
   SLCT LVR POSI: “D” position
   GEAR: 3rd ⇒ 4th position
   ACCELE ANGLE: More than 10 %
5. If DTC is detected, go to AT-554, "Diagnostic Procedure" .



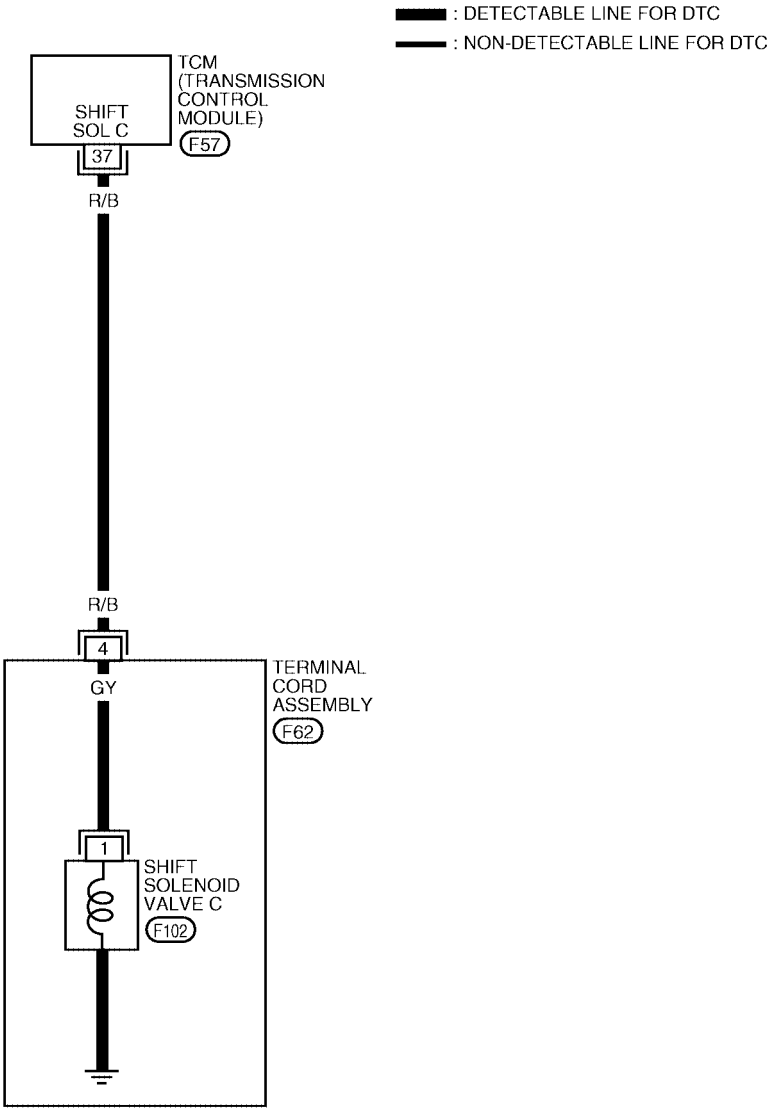
WITH GST

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/CS

ECS009GR

AT-SSV/CS-01





★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0206E

TCM terminal and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
37	R/B	Shift solenoid valve C		When shift solenoid valve C operates. (When driving in 1st, 2nd, 3rd or reverse gear.)	Battery voltage
				When shift solenoid valve C does not operate.	0V

Diagnostic Procedure

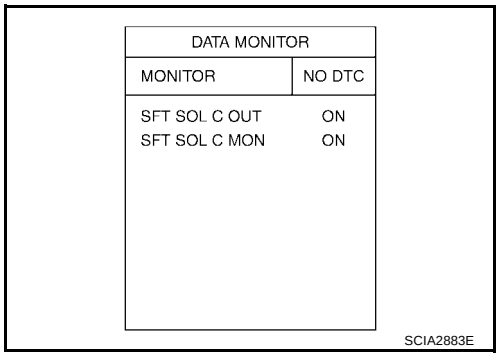
ECS009GS

1. CHECK SHIFT SOLENOID VALVE C SIGNAL

With CONSULT-II

1. Start engine.
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Drive vehicle and read out the value of “SFT SOL C OUT” and “SFT SOL C MON”.

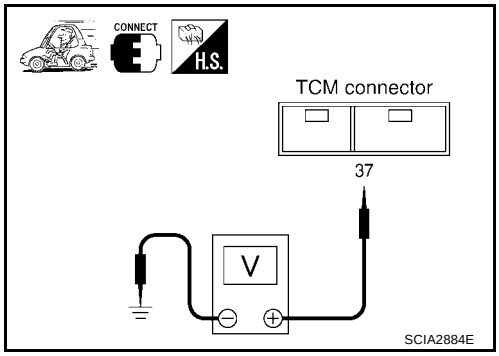
Monitor item	Condition	Indication
● SFT SOL C OUT ● SFT SOL C MON	When shift solenoid valve C operates. (When driving in 1st, 2nd, 3rd or reverse gear.)	ON
	When shift solenoid valve C does not operate.	OFF



Without CONSULT-II

1. Drive vehicle.
2. Check voltage between TCM connector terminal and ground.

Connector	Terminal	Condition	Voltage (Approx.)
F57	37 - Ground	When shift solenoid valve C operates. (When driving in 1st, 2nd, 3rd or reverse gear.)	Battery voltage
		When shift solenoid valve C does not operate.	0V



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

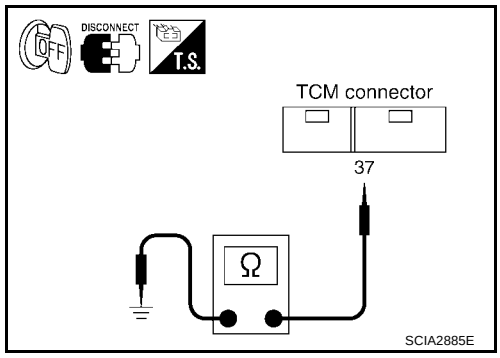
2. CHECK SHIFT SOLENOID VALVE C CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminal 37 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F57	37 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

OK or NG

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



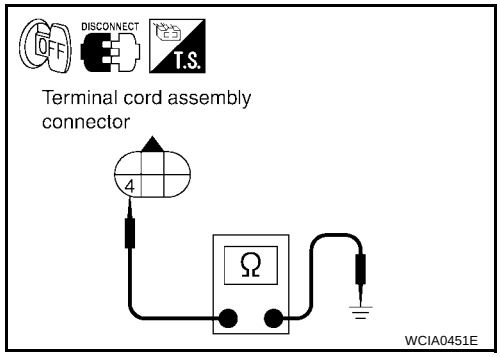
3. CHECK TERMINAL CORD ASSEMBLY WITH SHIFT SOLENOID VALVE C

1. Turn ignition switch “OFF”.
2. Disconnect terminal cord assembly harness connector.
3. Check resistance between terminal 4 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F62	4 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

OK or NG

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



4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY

Check the following.

- Open or short-circuit in the harness between TCM and terminal cord assembly.

OK or NG

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

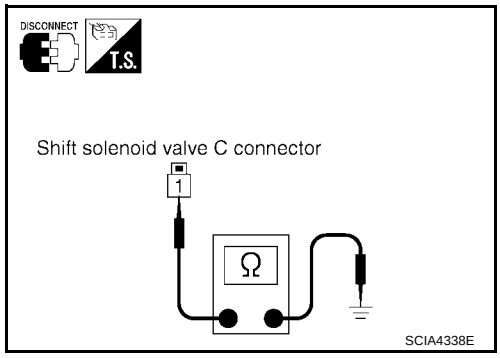
5. CHECK SHIFT SOLENOID VALVE C

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect shift solenoid valve C harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F102	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

OK or NG

OK >> GO TO 6.
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .



6. CHECK HARNESS BETWEEN TERMINAL CORD ASSEMBLY AND SHIFT SOLENOID VALVE C

Check the following.

- Open or short-circuit in the harness between terminal cord assembly and shift solenoid valve C.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace transmission wire. Refer to AT-629, "Terminal Cord Assembly" .

7. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

8. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-552, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

Component Inspection

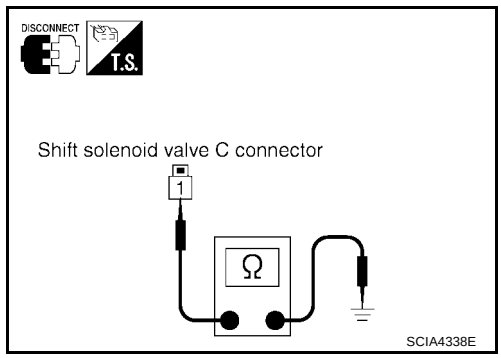
ECS009GT

SHIFT SOLENOID VALVE C

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect shift solenoid valve C harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F102	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

4. If NG, replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .



DTC P0765 SHIFT SOLENOID VALVE D

PFP:31940

Description

ECS009GU

- Shift solenoid valves are installed directly in control valve body. The shift solenoid valves operates of ON and OFF by the control signal from TCM. Combinations of 5 shift solenoid valves, A, B, C, D and E, shifts gear positions.
- The shift solenoid valve D is a normally open, ON-OFF type solenoid.

Gear position	D_1 , M_1	D_2 , M_2	D_3 , M_3	D_4 , M_4	D_5 , M_5	Reverse
Shift solenoid valve D	OFF (Open)	OFF (Open)	ON (Closed)	ON (Closed)	ON (Closed)	OFF (Open)

On Board Diagnosis Logic

ECS009GV

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “SHIFT SOL D” with CONSULT-II or P0765 without CONSULT-II is detected under the following conditions.
  - When normal voltage is not applied to solenoid due to open, short, and so on.
  - When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

ECS009GW

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

DTC Confirmation Procedure

ECS009GX

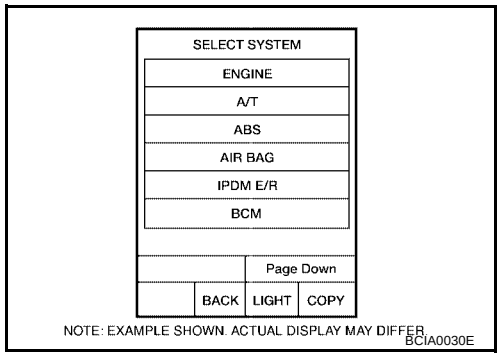
CAUTION:

- **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”. (Do not start engine.)
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Drive vehicle and allow the following conditions.
   SLCT LVR POSI: “D” position
   GEAR: 2nd ⇒ 3rd position
5. If DTC is detected, go to AT-559, "Diagnostic Procedure" .



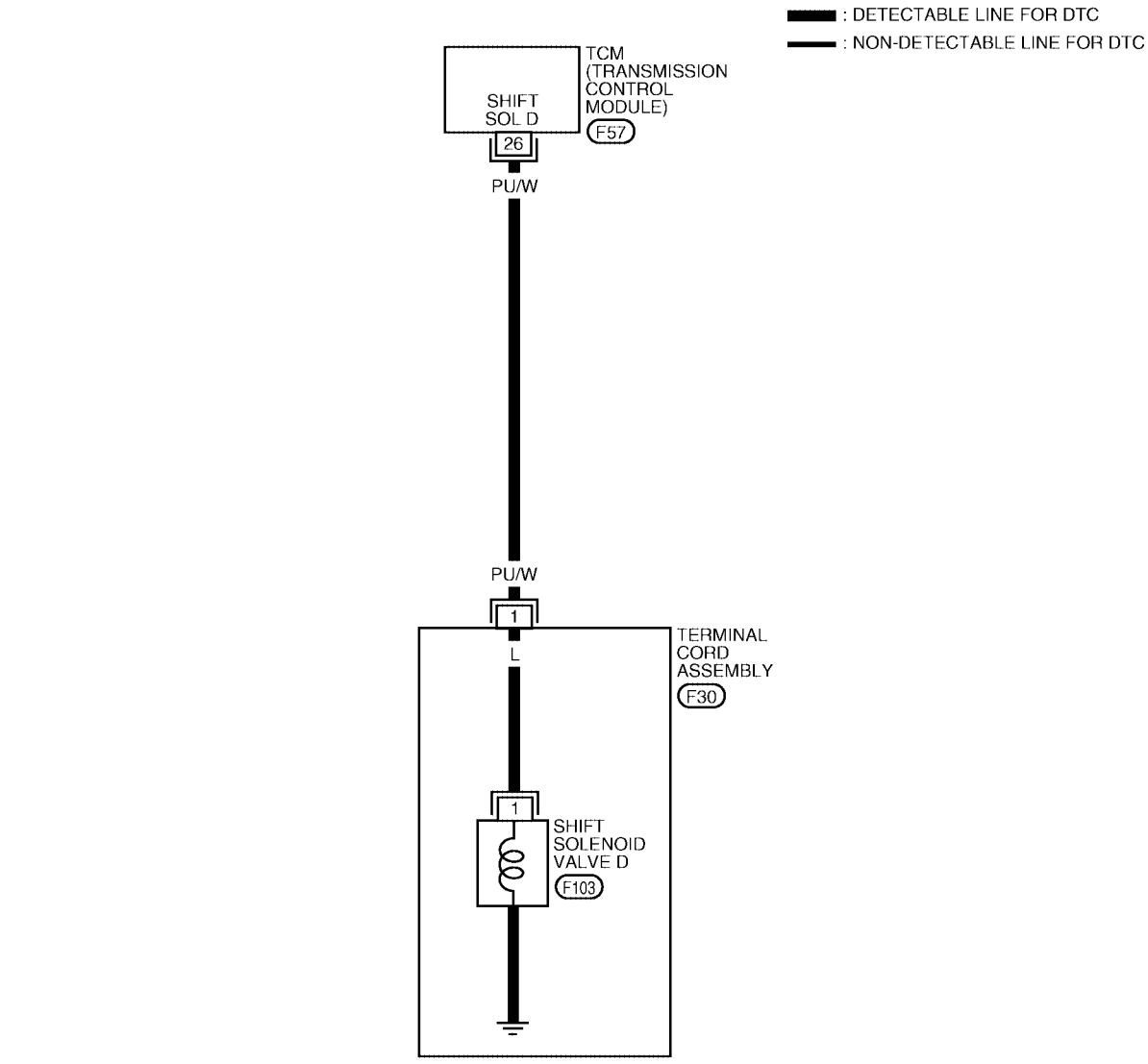
WITH GST

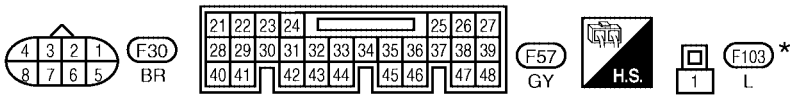
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/D

ECS009GY

AT-SSV/D-01





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0207E

TCM terminal and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
26	PU/W	Shift solenoid valve D		When shift solenoid valve D operates. (When driving in 3rd, 4th or 5th gear.)	Battery voltage
				When shift solenoid valve D does not operate.	0V

Diagnostic Procedure

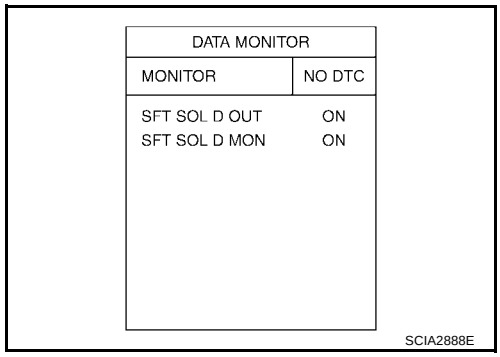
ECS009GZ

1. CHECK SHIFT SOLENOID VALVE D SIGNAL

With CONSULT-II

1. Start engine.
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Drive vehicle and read out the value of “SFT SOL D OUT” and “SFT SOL D MON”.

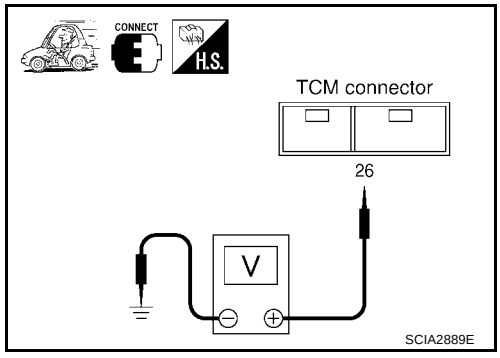
Monitor item	Condition	Indication
● SFT SOL D OUT ● SFT SOL D MON	When shift solenoid valve D operates. (When driving in 3rd, 4th or 5th gear.)	ON
	When shift solenoid valve D does not operate.	OFF



Without CONSULT-II

1. Drive vehicle.
2. Check voltage between TCM connector terminal and ground.

Connector	Terminal	Condition	Voltage (Approx.)
F57	26 - Ground	When shift solenoid valve D operates. (When driving in 3rd, 4th or 5th gear.)	Battery voltage
		When shift solenoid valve D does not operate.	0V



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

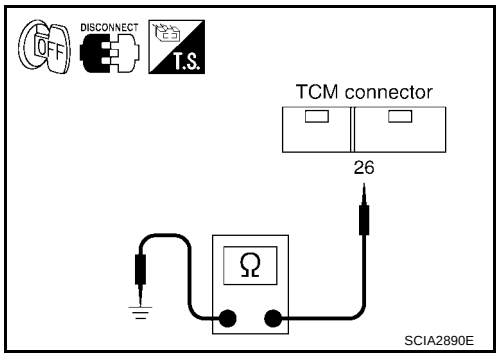
2. CHECK SHIFT SOLENOID VALVE D CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminal 26 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F57	26 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

OK or NG

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



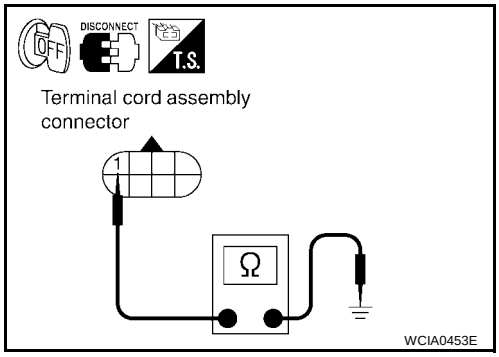
3. CHECK TERMINAL CORD ASSEMBLY WITH SHIFT SOLENOID VALVE D

1. Turn ignition switch “OFF”.
2. Disconnect terminal cord assembly harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F30	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

OK or NG

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



4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY

Check the following.

- Open or short-circuit in the harness between TCM and terminal cord assembly.

OK or NG

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

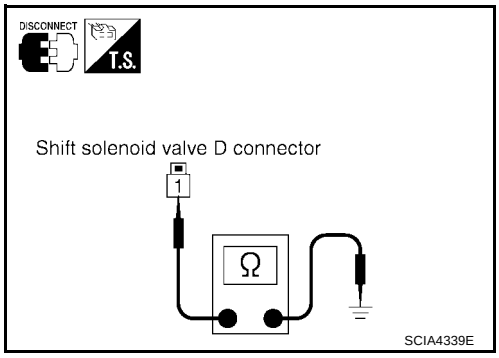
5. CHECK SHIFT SOLENOID VALVE D

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect shift solenoid valve D harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F103	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

OK or NG

OK >> GO TO 6.
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .



6. CHECK HARNESS BETWEEN TERMINAL CORD ASSEMBLY AND SHIFT SOLENOID VALVE D

Check the following.

- Open or short-circuit in the harness between terminal cord assembly and shift solenoid valve D.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace transmission wire. Refer to AT-629, "Terminal Cord Assembly" .

7. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-557, "DTC Confirmation Procedure" .

OK or NG

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

8. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
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

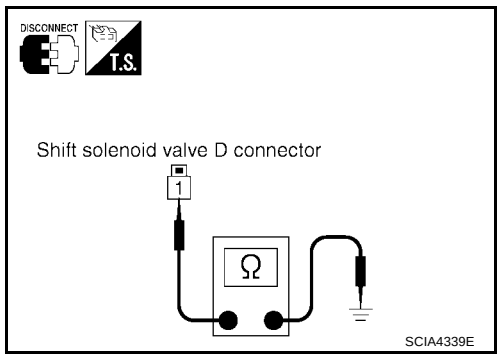
ECS009H0

SHIFT SOLENOID VALVE D

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect shift solenoid valve D harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F103	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

4. If NG, replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .



DTC P0770 SHIFT SOLENOID VALVE E

PFP:31940

Description

ECS009H1

- Shift solenoid valves are installed directly in control valve body. The shift solenoid valves operates of ON and OFF by the control signal from TCM. Combinations of 5 shift solenoid valves, A, B, C, D and E, shifts gear positions.
- The shift solenoid valve E is a normally closed, ON-OFF type solenoid.

Gear position	D_1	M_1	D_2 , M_2	D_3 , M_3	D_4 , M_4	D_5 , M_5	Reverse
Shift solenoid valve E	OFF (Closed)	ON (Open)	OFF (Closed)	OFF (Closed)	OFF (Closed)	OFF (Closed)	ON (Open)

NOTE:
The condition of shift solenoid valve E is ON (Open) with shifting $D_2 \Leftrightarrow D_3$ and $D_3 \Leftrightarrow D_4$.

On Board Diagnosis Logic

ECS009H2

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “SHIFT SOL E” with CONSULT-II or P0770 without CONSULT-II is detected under the following conditions.
  - When normal voltage is not applied to solenoid due to open, short, and so on.
  - When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

ECS009H3

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

DTC Confirmation Procedure

ECS009H4

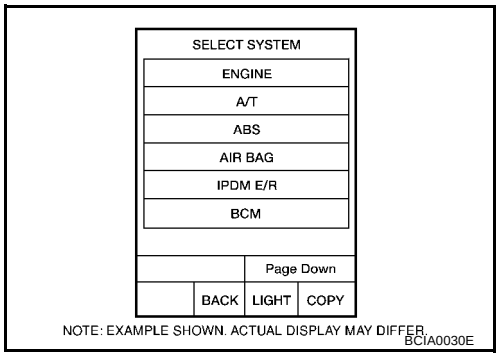
CAUTION:

- **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”. (Do not start engine.)
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Move selector lever between “N” and “R”.
   SLCT LVR POSI: “N” ⇔ “R” position
5. If DTC is detected, go to AT-564, "Diagnostic Procedure" .



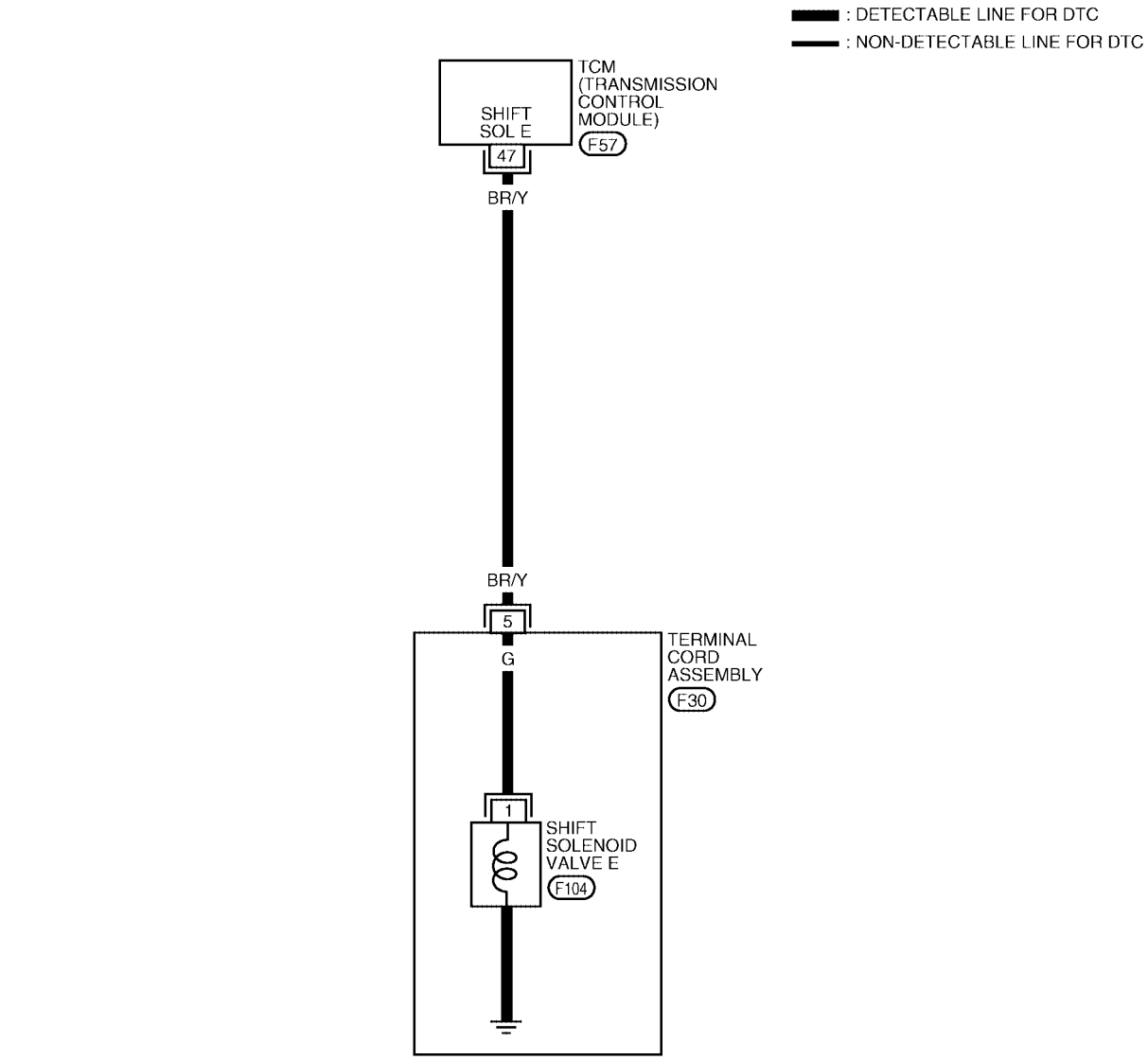
WITH GST

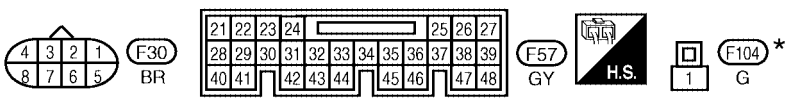
Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — SSV/E

ECS009H5

AT-SSV/E-01





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0208E

TCM terminal and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
47	BR/Y	Shift solenoid valve E		When shift solenoid valve E operates. (When driving in reverse gear.)	Battery voltage
				When shift solenoid valve E does not operate.	0V

Diagnostic Procedure

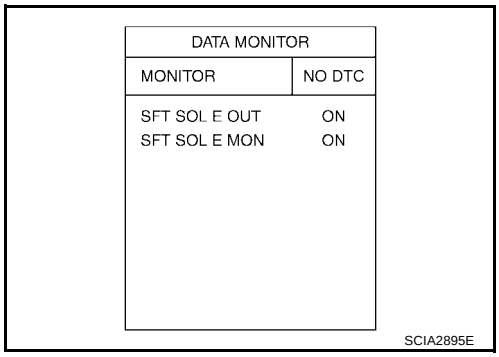
ECS009H6

1. CHECK SHIFT SOLENOID VALVE E SIGNAL

With CONSULT-II

1. Start engine.
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Drive vehicle and read out the value of “SFT SOL E OUT” and “SFT SOL E MON”.

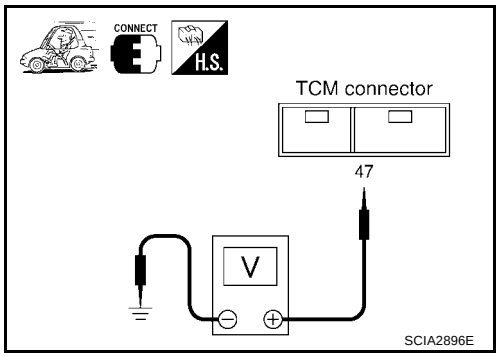
Monitor item	Condition	Indication
● SFT SOL E OUT ● SFT SOL E MON	When shift solenoid valve E operates. (When driving in reverse gear.)	ON
	When shift solenoid valve E does not operate.	OFF



Without CONSULT-II

1. Drive vehicle.
2. Check voltage between TCM connector terminal and ground.

Connector	Terminal	Condition	Voltage (Approx.)
F57	47 - Ground	When shift solenoid valve E operates. (When driving in reverse gear.)	Battery voltage
		When shift solenoid valve E does not operate.	0V



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

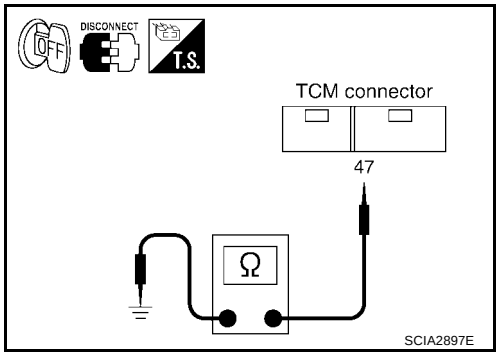
2. CHECK SHIFT SOLENOID VALVE E CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminal 47 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F57	47 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

OK or NG

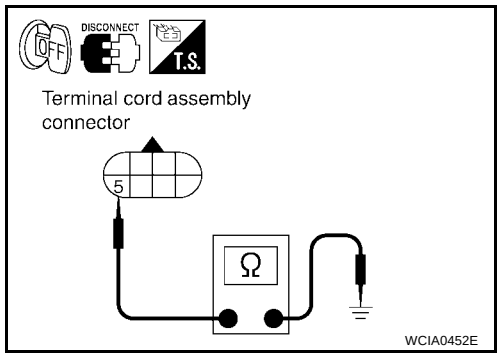
OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK TERMINAL CORD ASSEMBLY WITH SHIFT SOLENOID VALVE E

1. Turn ignition switch “OFF”.
2. Disconnect terminal cord assembly harness connector.
3. Check resistance between terminal 5 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F30	5 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω



OK or NG

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

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY

Check the following.

- Open or short-circuit in the harness between TCM and terminal cord assembly.

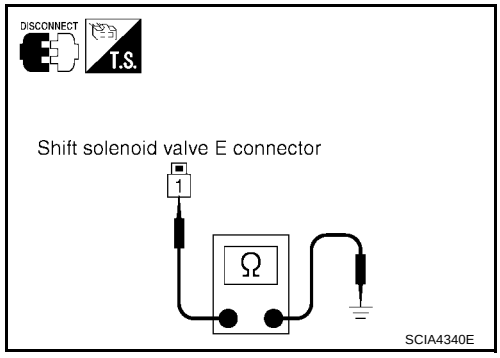
OK or NG

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

5. CHECK SHIFT SOLENOID VALVE E

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect shift solenoid valve E harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F104	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω



OK or NG

OK >> GO TO 6.
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

6. CHECK HARNESS BETWEEN TERMINAL CORD ASSEMBLY AND SHIFT SOLENOID VALVE E

Check the following.

- Open or short-circuit in the harness between terminal cord assembly and shift solenoid valve E.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace transmission wire. Refer to AT-629, "Terminal Cord Assembly" .

7. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-562, "DTC Confirmation Procedure" .

OK or NG

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

8. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
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

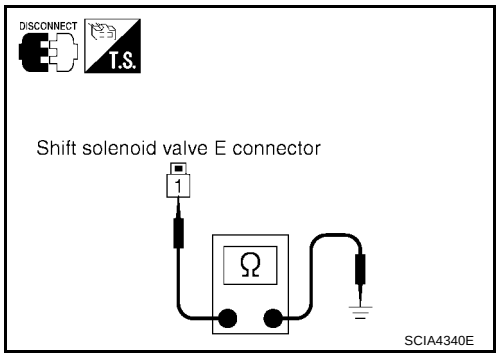
ECS009H7

SHIFT SOLENOID VALVE E

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect shift solenoid valve E harness connector.
3. Check resistance between terminal 1 and ground.

Connector	Terminal	Condition	Resistance (Approx.)
F104	1 - Ground	Temperature: 20°C (68°F)	11 - 16 Ω

4. If NG, replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .



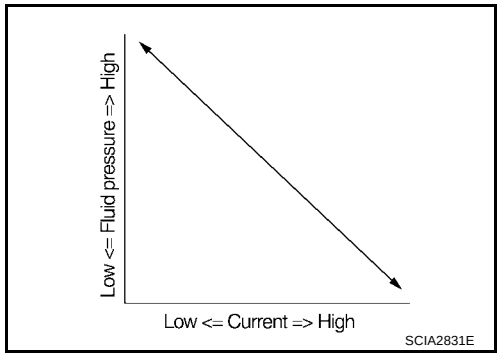
DTC P0775 PRESSURE CONTROL SOLENOID VALVE B (SHIFT PRESSURE)

PFP:31940

Description

ECS009H8

- The pressure control solenoid valve B is normally high, 3-port linear pressure control solenoid.
- The pressure control solenoid valve B controls linear shift pressure by control signal from TCM and controls 2nd coast brake directly under 2nd, 3rd, 4th and direct clutch directly under 5th and reverse.



On Board Diagnosis Logic

ECS009H9

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “PC SOL B(SFT/PRS)” with CONSULT-II or P0775 without CONSULT-II is detected under the following conditions.
  - When normal voltage is not applied to solenoid due to open, short, and so on.
  - When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

ECS009HA

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

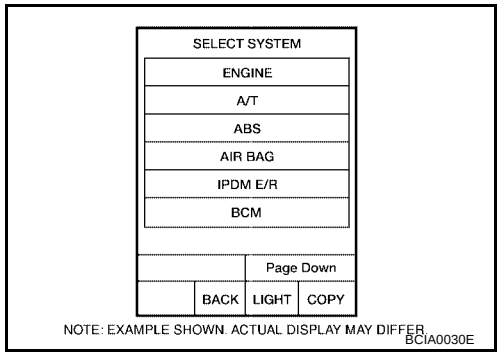
DTC Confirmation Procedure

ECS009HB

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 “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Run engine for at least 13 consecutive seconds at idle speed.
5. If DTC is detected, go to AT-569, "Diagnostic Procedure" .



WITH GST

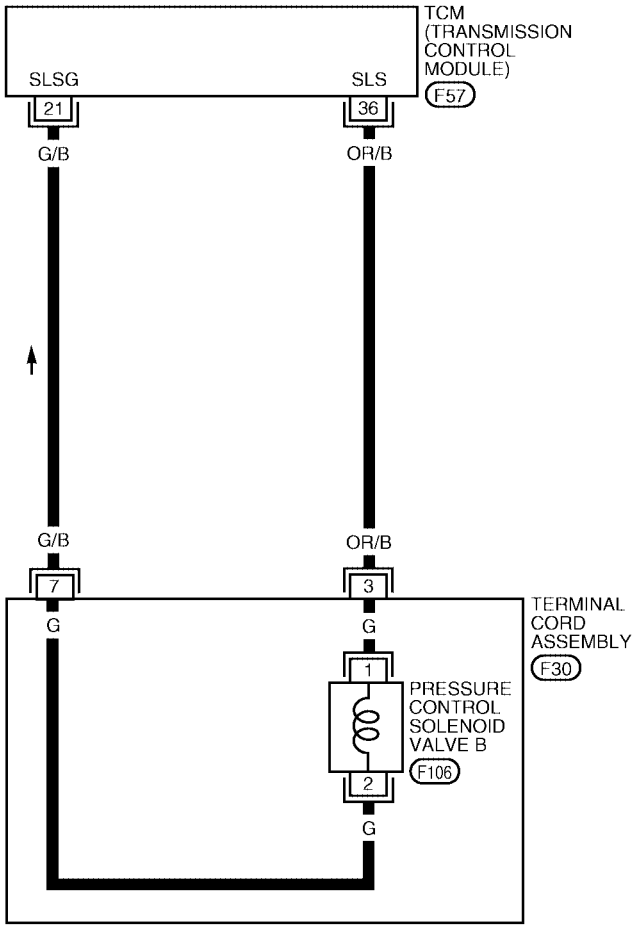
Follow the procedure “With CONSULT-II”.

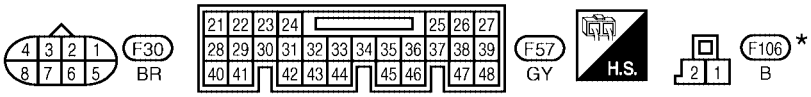
Wiring Diagram — AT — PC/B

ECS009HC

AT-PC/B-01

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





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0209E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
21	G/B	Pressure control solenoid valve B ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
36	OR/B	Pressure control solenoid valve B		When engine is running with idle speed and setting selector lever to “P” position.	300Hz

Diagnostic Procedure

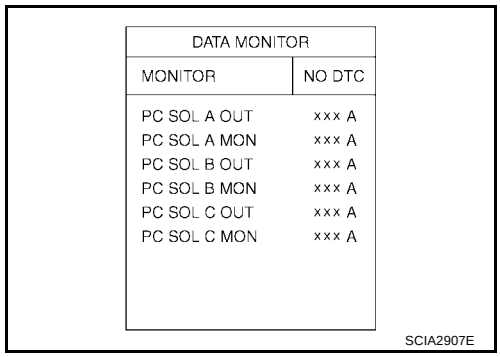
ECS009HD

1. CHECK PRESSURE CONTROL SOLENOID VALVE B SIGNAL

With CONSULT-II

1. After warming up the engine and transaxle, turn ignition switch “OFF”.
2. Turn ignition switch “ON”. (Do not start engine.)
3. Select “DATA MONITOR” mode for “A/T” with CONSULT-II.
4. Read out the value of “PC SOL B OUT” and “PC SOL B MON”.

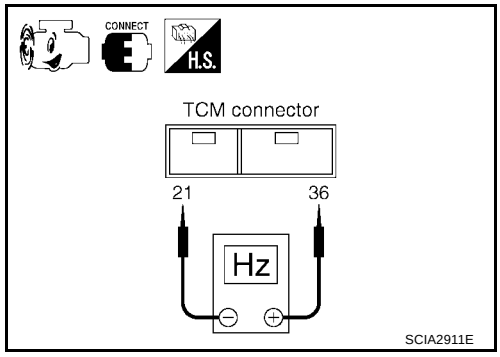
Monitor item	Condition	Display value (Approx.)
● PC SOL B OUT	Selector lever: Manual shift gate position	1.00 A
● PC SOL B MON	Other than the above.	0.30 A



Without CONSULT-II

1. Start the engine.
2. Check pulse between TCM connector terminals 21 and 36.

Connector	Terminal	Condition	Data (Approx.)
F57	36 - 21 (Ground)	When engine is running with idle speed and setting selector lever to “P” position.	300 Hz



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

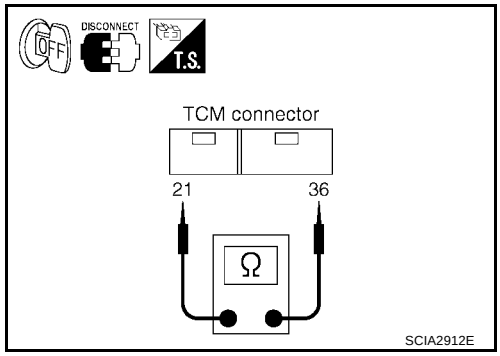
2. CHECK PRESSURE CONTROL SOLENOID VALVE B CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminals 21 and 36.

Connector	Terminal (Wire color)	Condition	Resistance (Approx.)
F57	36 - 21 (Ground)	Temperature: 20°C (68°F)	5.0 - 5.6 Ω

OK or NG

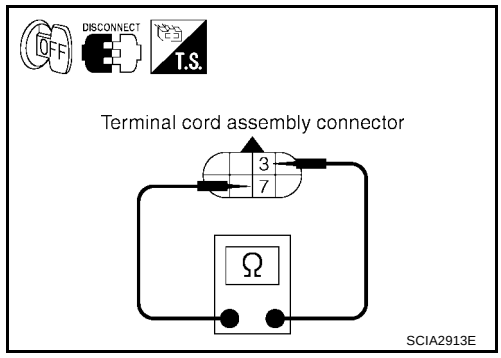
OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK TERMINAL CORD ASSEMBLY WITH PRESSURE CONTROL SOLENOID VALVE B

1. Turn ignition switch “OFF”.
2. Disconnect terminal cord assembly harness connector.
3. Check resistance between terminals 3 and 7.

Connector	Terminal	Condition	Resistance (Approx.)
F30	3 - 7	Temperature: 20°C (68°F)	5.0 - 5.6 Ω



OK or NG

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

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY

Check the following.

- Open or short-circuit in the harness between TCM and terminal cord assembly.

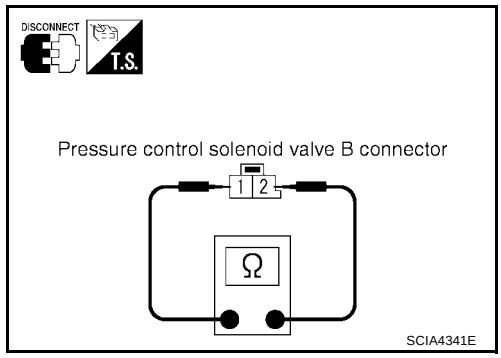
OK or NG

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

5. CHECK PRESSURE CONTROL SOLENOID VALVE B

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect pressure control solenoid valve B harness connector.
3. Check resistance between terminals 1 and 2.

Connector	Terminal	Condition	Resistance (Approx.)
F106	1 - 2	Temperature: 20°C (68°F)	5.0 - 5.6 Ω



OK or NG

OK >> GO TO 6.
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

6. CHECK HARNESS BETWEEN TERMINAL CORD ASSEMBLY AND PRESSURE CONTROL SOLENOID VALVE B

Check the following.

- Open or short-circuit in the harness between terminal cord assembly and pressure control solenoid valve B.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace transmission wire. Refer to AT-629, "Terminal Cord Assembly" .

7. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-567, "DTC Confirmation Procedure" .

OK or NG

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

8. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
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

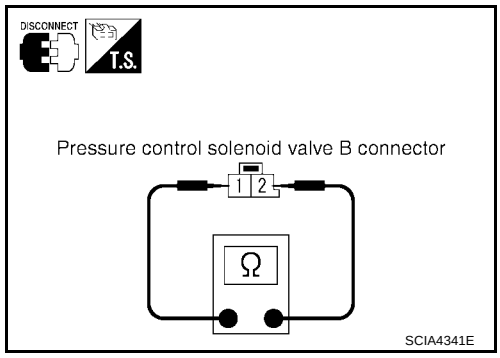
ECS009HE

PRESSURE CONTROL SOLENOID VALVE B

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect pressure control solenoid valve B harness connector.
3. Check resistance between terminals 1 and 2.

Connector	Terminal	Condition	Resistance (Approx.)
F106	1 - 2	Temperature: 20°C (68°F)	5.0 - 5.6 Ω

4. If NG, replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .



DTC P0780 SHIFT

PFP:31940

Description

ECS009HF

- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift 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.

On Board Diagnosis Logic

ECS009HG

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “SHIFT” with CONSULT-II or P0780 without CONSULT-II is detected under the following conditions.

– When no rotation change occurs between input (turbine revolution sensor) and output (revolution sensor) and shifting time is long.
– When shifting ends immediately.
– When engine revs up unusually during shifting.

Possible Cause

ECS009HH

- Shift solenoid valve D
(Off error.)
- Shift solenoid valve E
(Off error.)
- Pressure control solenoid valve A
(On/Off error.)
- Pressure control solenoid valve B
(On/Off error.)
- Pressure control solenoid valve C
(On/Off error.)
- Hydraulic control circuit

DTC Confirmation Procedure

ECS009HI

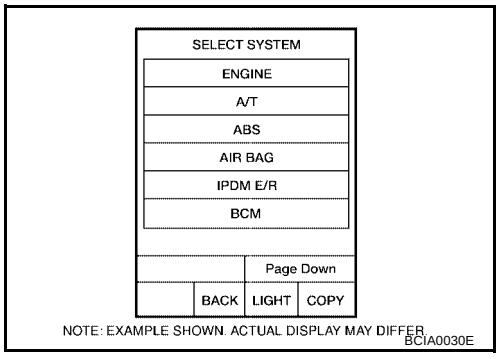
CAUTION:

- **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. Start engine and select “A/T” with “DATA MONITOR” mode in CONSULT-II.
2. Make sure that ATF temperature is within the range below.
FLUID TEMP: More than 60°C (140°F)
If out of range, drive the vehicle to warm up the fluid.
3. Drive vehicle and allow the following conditions.
SLCT LVR POSI: “D” position
GEAR: 1st ⇒ 2nd ⇒ 3rd ⇒ 4th ⇒ 5th position
(Vehicle speed: Refer to AT-702, "VEHICLE SPEED WHEN SHIFTING GEARS - 9J500 MODELS" .)
4. If DTC is detected, go to AT-575, "Diagnostic Procedure" .



WITH GST

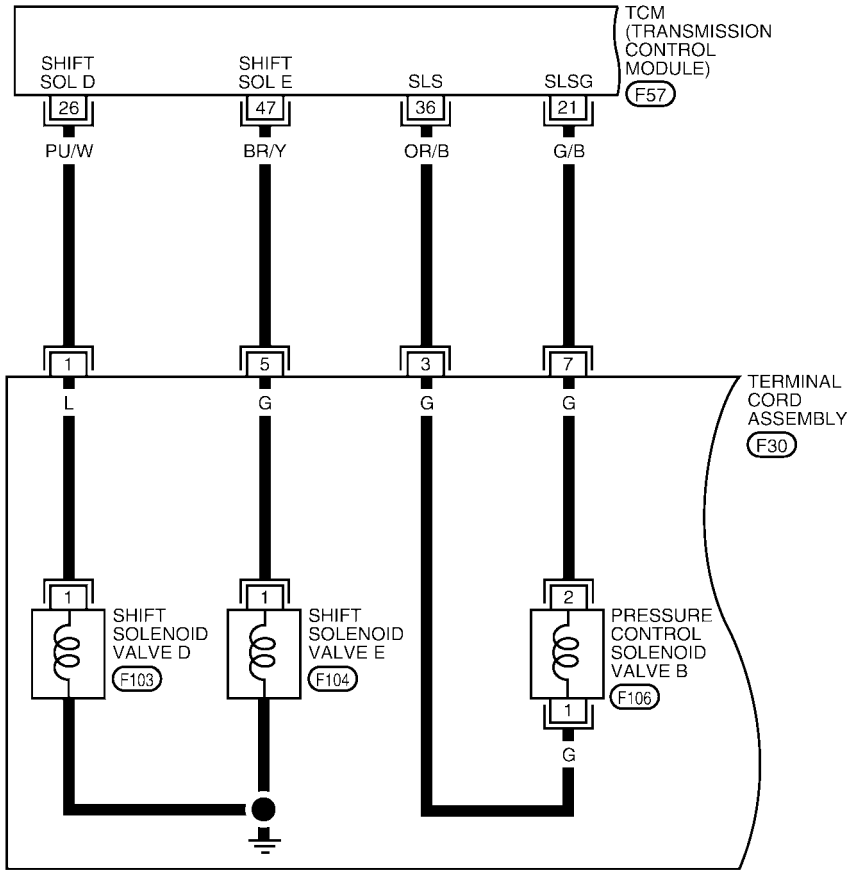
Follow the procedure “With CONSULT-II”.

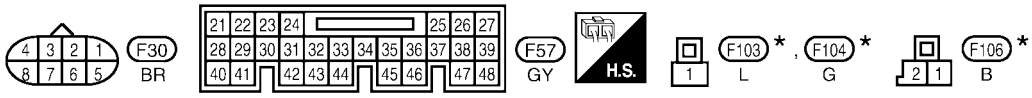
Wiring Diagram — AT — SFTFNC

ECS009HJ

AT-SFTFNC-01

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

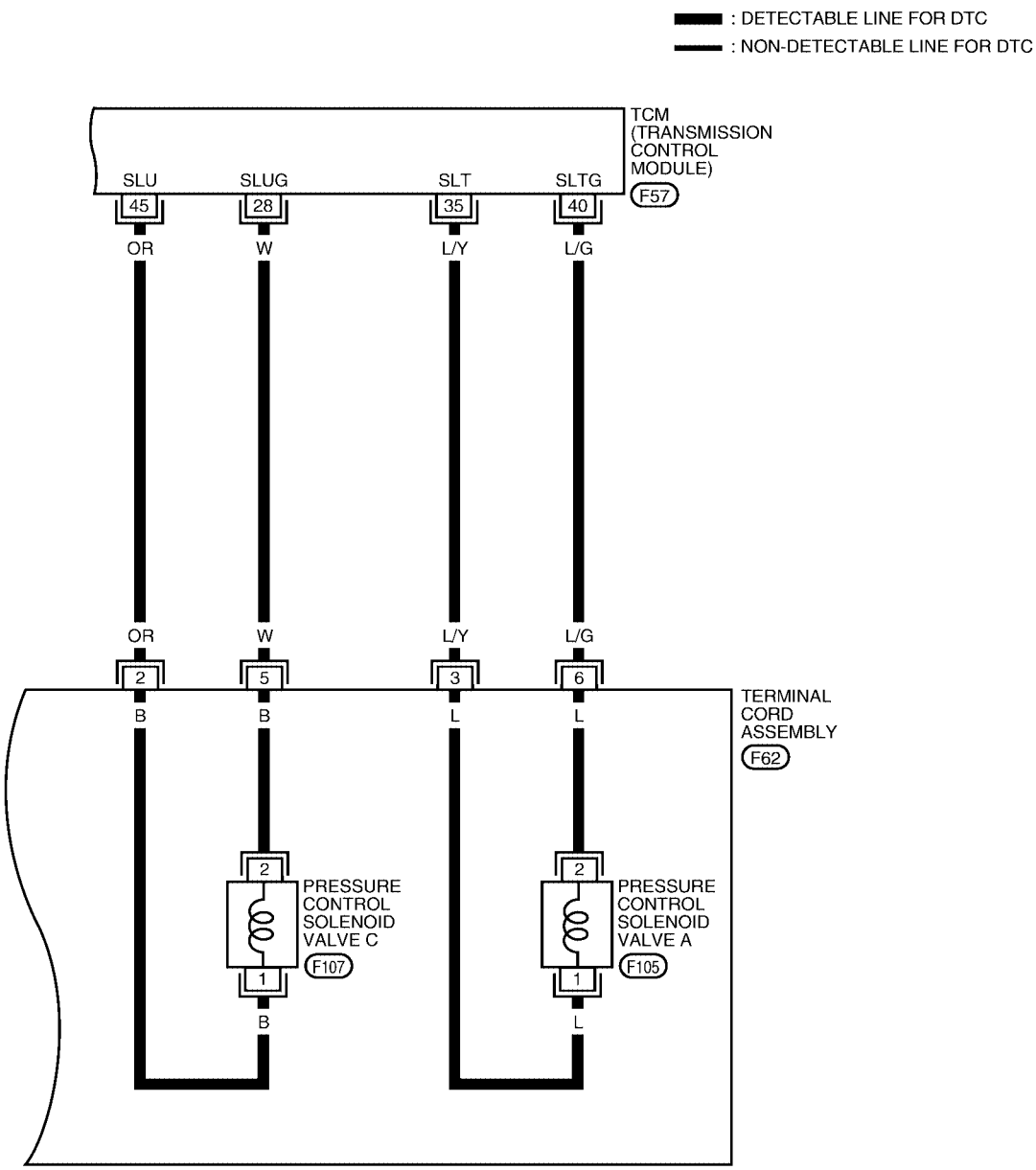


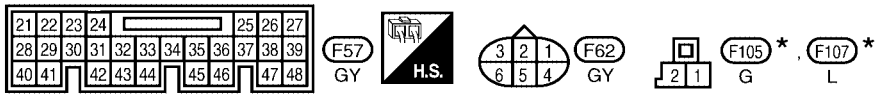


★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0210E

AT-SFTFNC-02





★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0211E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
21	G/B	Pressure control solenoid valve B ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
26	PU/W	Shift solenoid valve D		When shift solenoid valve D operates. (When driving in 3rd, 4th or 5th gear.)	Battery voltage
				When shift solenoid valve D does not operate.	0V
28	W	Pressure control solenoid valve C ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
35	L/Y	Pressure control solenoid valve A		When engine is running with idle speed and setting selector lever to “P” position.	300Hz
36	OR/B	Pressure control solenoid valve B		When engine is running with idle speed and setting selector lever to “P” position.	300Hz
40	L/G	Pressure control solenoid valve A ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
45	OR	Pressure control solenoid valve C		When engine is running with idle speed and setting selector lever to “P” position.	300Hz
47	BR/Y	Shift solenoid valve E		When shift solenoid valve E operates. (When driving in reverse gear.)	Battery voltage
				When shift solenoid valve E does not operate.	0V

Diagnostic Procedure

ECS009HK

1. CHECK EACH SHIFT SOLENOID VALVE CIRCUIT

Perform “Diagnostic Procedure” for the following DTCs.

- “DTC P0765 SHIFT SOLENOID VALVE D” (Refer to AT-559, "Diagnostic Procedure" .)
- “DTC P0770 SHIFT SOLENOID VALVE E” (Refer to AT-564, "Diagnostic Procedure" .)

OK or NG

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

2. CHECK EACH PRESSURE CONTROL SOLENOID VALVE CIRCUIT

Perform “Diagnostic Procedure” for the following DTCs.

- “DTC P0745 PRESSURE CONTROL SOLENOID VALVE A” (Refer to AT-534, "Diagnostic Procedure" .)
- “DTC P0775 PRESSURE CONTROL SOLENOID VALVE B” (Refer to AT-569, "Diagnostic Procedure" .)
- “DTC P0795 PRESSURE CONTROL SOLENOID VALVE C” (Refer to AT-578, "Diagnostic Procedure" .)

OK or NG

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

3. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-572, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

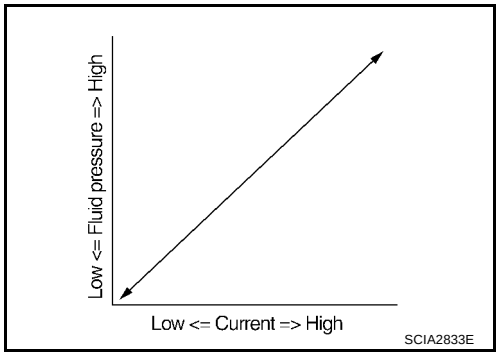
DTC P0795 PRESSURE CONTROL SOLENOID VALVE C (TCC AND SHIFT PRESSURE)

PFP:31940

Description

ECS009HL

- The pressure control solenoid valve C is normally low, 3-port linear pressure control solenoid.
- The pressure control solenoid valve C is activated to control the apply and release of the 2nd brake and 1st and reverse brake, and torque converter clutch.
- Lock-up operation, however, is prohibited when A/T fluid temperature is too low.
- When the accelerator pedal is depressed (less than 1/8) 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.



On Board Diagnosis Logic

ECS009HM

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “PC SOL C(TCC&SFT)” with CONSULT-II or P0795 without CONSULT-II is detected under the following conditions.

– When normal voltage is not applied to solenoid due to open, short, and so on.
– When TCM detects as irregular by comparing target value with monitor value.

Possible Cause

ECS009HN

- Harness or connectors
  (The solenoid circuit is open or shorted.)
- Pressure control solenoid valve C

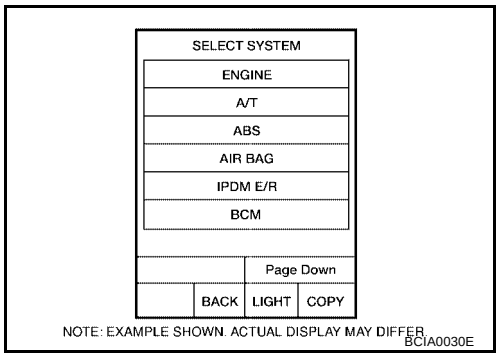
DTC Confirmation Procedure

ECS009HO

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 “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Run engine for at least 13 consecutive seconds at idle speed.
5. If DTC is detected, go to AT-578, "Diagnostic Procedure" .



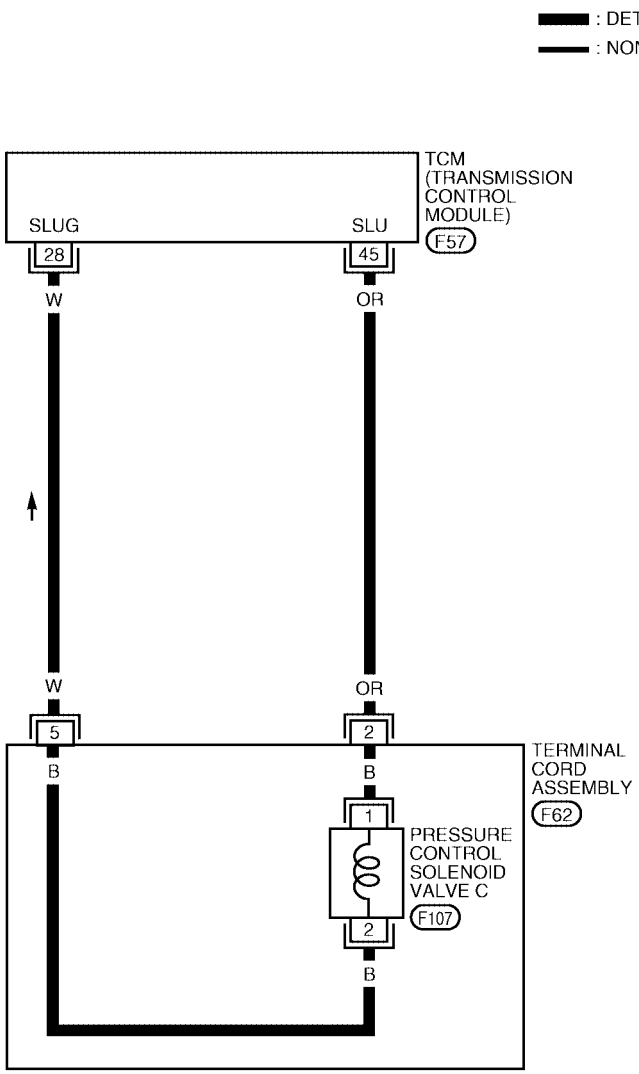
WITH GST

Follow the procedure “With CONSULT-II”.

Wiring Diagram — AT — PC/C

ECS009HP

AT-PC/C-01





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0212E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
28	W	Pressure control solenoid valve C ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
45	OR	Pressure control solenoid valve C		When engine is running with idle speed and setting selector lever to “P” position.	300Hz

Diagnostic Procedure

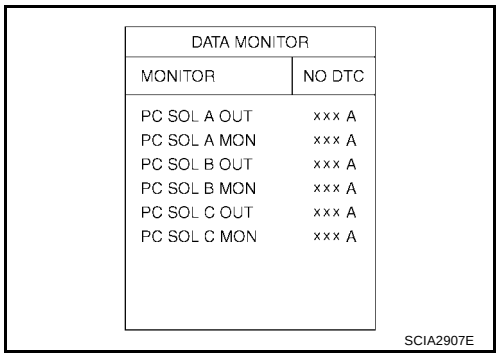
ECS009HQ

1. CHECK PRESSURE CONTROL SOLENOID VALVE C SIGNAL

With CONSULT-II

1. After warming up the engine and transaxle, turn ignition switch “OFF”.
2. Turn ignition switch “ON”. (Do not start engine.)
3. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
4. Read out the value of “PC SOL C OUT” and “PC SOL C MON”.

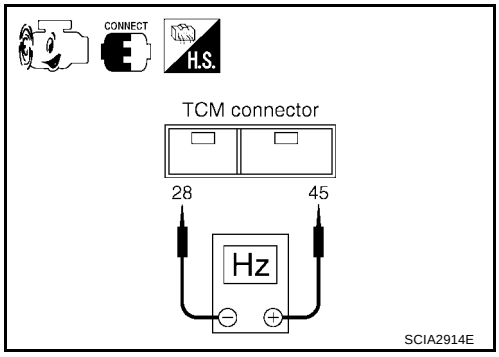
Monitor item	Condition	Display value (Approx.)
● PC SOL C OUT	Selector lever: Manual shift gate position	1.00 A
● PC SOL C MON	Other than the above.	0.20 A



Without CONSULT-II

1. Start the engine.
2. Check pulse between TCM connector terminals 28 and 45.

Connector	Terminal	Condition	Data (Approx.)
F57	45 - 28 (Ground)	When engine is running with idle speed and setting selector lever to “P” position.	300 Hz



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

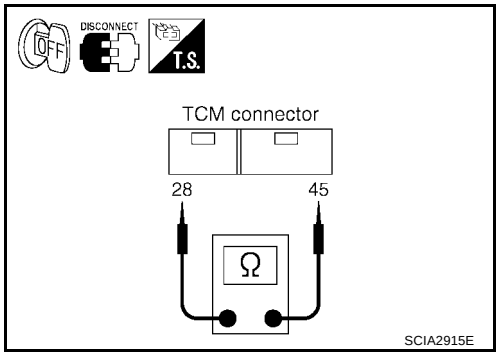
2. CHECK PRESSURE CONTROL SOLENOID VALVE C CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminals 28 and 45.

Connector	Terminal	Condition	Resistance (Approx.)
F57	45 - 28 (Ground)	Temperature: 20°C (68°F)	5.0 - 5.6 Ω

OK or NG

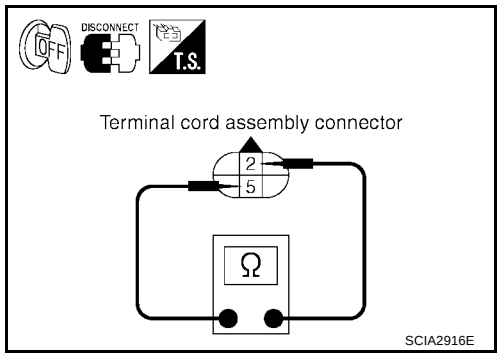
OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK TERMINAL CORD ASSEMBLY WITH PRESSURE CONTROL SOLENOID VALVE C

1. Turn ignition switch “OFF”.
2. Disconnect terminal cord assembly harness connector.
3. Check resistance between terminals 2 and 5.

Connector	Terminal	Condition	Resistance (Approx.)
F62	2 - 5	Temperature: 20°C (68°F)	5.0 - 5.6 Ω



OK or NG

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

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY

Check the following.

- Open or short-circuit in the harness between TCM and terminal cord assembly.

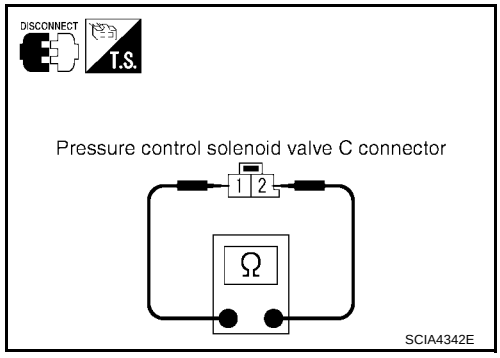
OK or NG

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

5. CHECK PRESSURE CONTROL SOLENOID VALVE C

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect pressure control solenoid valve C harness connector.
3. Check resistance between terminals 1 and 2.

Connector	Terminal	Condition	Resistance (Approx.)
F107	1 - 2	Temperature: 20°C (68°F)	5.0 - 5.6 Ω



OK or NG

OK >> GO TO 6.
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

6. CHECK HARNESS BETWEEN TERMINAL CORD ASSEMBLY AND PRESSURE CONTROL SOLENOID VALVE C

Check the following.

- Open or short-circuit in the harness between terminal cord assembly and pressure control solenoid valve C.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace transmission wire. Refer to AT-629, "Terminal Cord Assembly" .

7. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-576, "DTC Confirmation Procedure" .

OK or NG

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

8. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
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.

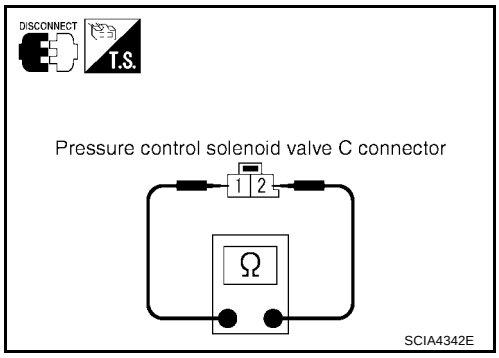
Component Inspection

ECS009HR

PRESSURE CONTROL SOLENOID VALVE C

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect pressure control solenoid valve C harness connector.
3. Check resistance between terminals 1 and 2.

Connector	Terminal	Condition	Resistance (Approx.)
F107	1 - 2	Temperature: 20°C (68°F)	5.0 - 5.6 Ω



4. If NG, replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

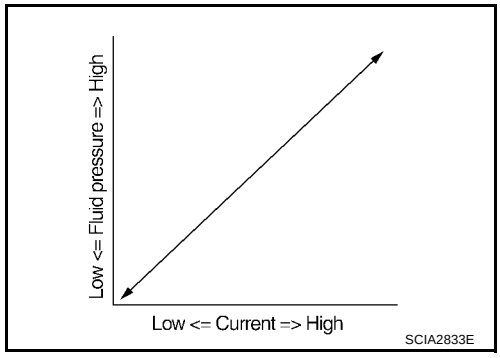
DTC P0797 PRESSURE CONTROL SOLENOID VALVE C STUCK ON

PFP:31940

Description

ECS009HS

- This malfunction will not be detected while the A/T CHECK indicator lamp is indicating another self-diagnosis malfunction.
- 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.
- The pressure control solenoid valve C is normally low, 3-port linear pressure control solenoid.
- The pressure control solenoid valve C is activated to control the apply and release of the 2nd brake and 1st and reverse brake, and torque converter clutch.
- Lock-up operation, however, is prohibited when A/T fluid temperature is too low.
- When the accelerator pedal is depressed (less than 1/8) 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.



On Board Diagnosis Logic

ECS009HT

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “PC SOL C STC ON” with CONSULT-II or P0797 without CONSULT-II is detected when condition of pressure control solenoid valve C is different from monitor value, and relation between gear position and actual gear ratio or lock-up status is irregular.

Possible Cause

ECS009HU

- Pressure control solenoid valve C
  (On stick.)
- Hydraulic control circuit

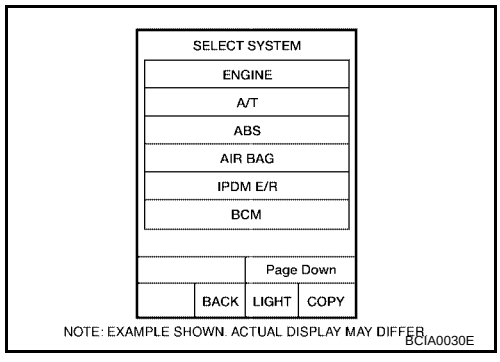
DTC Confirmation Procedure

ECS009HV

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 “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Run engine for at least 4 consecutive minutes at idle speed.
5. If DTC is detected, go to AT-583, "Diagnostic Procedure" .



WITH GST

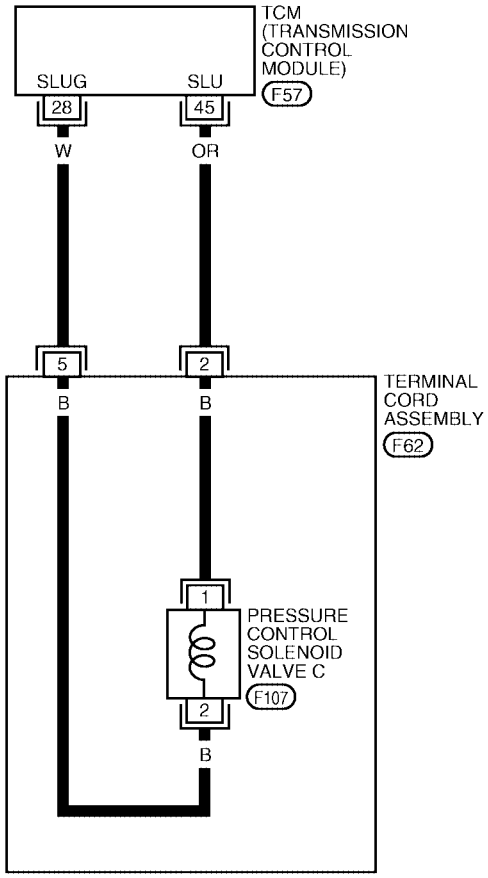
Follow the procedure “With CONSULT-II”.

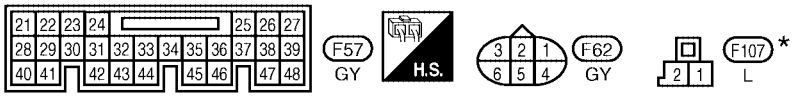
Wiring Diagram — AT — PC/CS

ECS009HW

AT-PC/CS-01

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





★: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT" OF PG SECTION.

WCWA0213E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
28	W	Pressure control solenoid valve C ground		When engine is running with idle speed and setting selector lever to “P” position.	0V
45	OR	Pressure control solenoid valve C		When engine is running with idle speed and setting selector lever to “P” position.	300Hz

Diagnostic Procedure

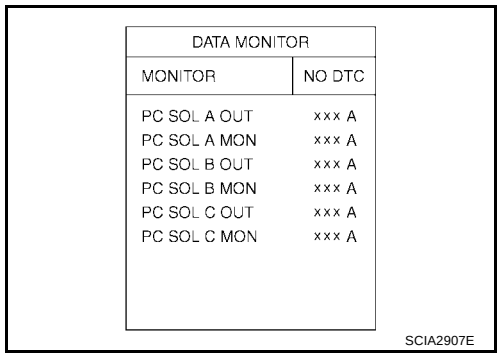
ECS009HX

1. CHECK PRESSURE CONTROL SOLENOID VALVE C SIGNAL

With CONSULT-II

1. After warming up the engine and transaxle, turn ignition switch “OFF”.
2. Turn ignition switch “ON”. (Do not start engine.)
3. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
4. Read out the value of “PC SOL C OUT” and “PC SOL C MON”.

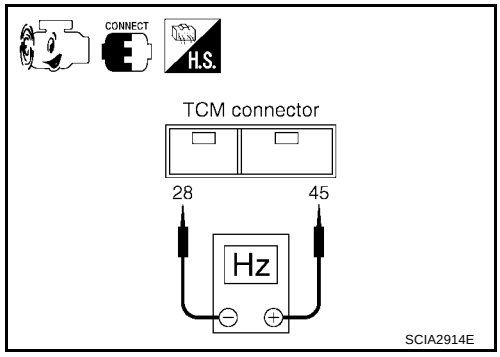
Monitor item	Condition	Display value (Approx.)
● PC SOL C OUT	Selector lever: Manual shift gate position	1.00 A
● PC SOL C MON	Other than the above.	0.20 A



Without CONSULT-II

1. Start the engine.
2. Check pulse between TCM connector terminals 28 and 45.

Connector	Terminal	Condition	Data (Approx.)
F57	45 - 28 (Ground)	When engine is running with idle speed and setting selector lever to “P” position.	300 Hz



OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

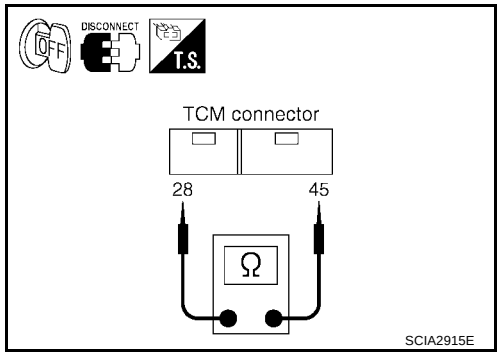
2. CHECK PRESSURE CONTROL SOLENOID VALVE C CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminals 28 and 45.

Connector	Terminal	Condition	Resistance (Approx.)
F57	45 - 28 (Ground)	Temperature: 20°C (68°F)	5.0 - 5.6 Ω

OK or NG

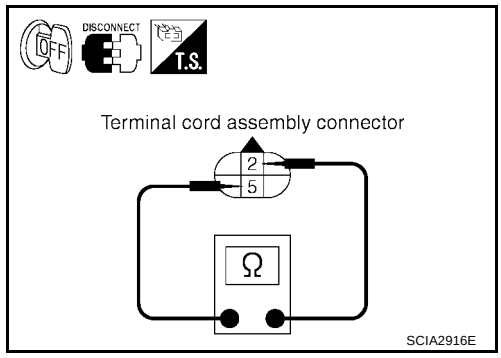
OK >> GO TO 7.
NG >> GO TO 3.



3. CHECK TERMINAL CORD ASSEMBLY WITH PRESSURE CONTROL SOLENOID VALVE C

1. Turn ignition switch “OFF”.
2. Disconnect terminal cord assembly harness connector.
3. Check resistance between terminals 2 and 5.

Connector	Terminal	Condition	Resistance (Approx.)
F62	2 - 5	Temperature: 20°C (68°F)	5.0 - 5.6 Ω



OK or NG

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

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY

Check the following.

- Open or short-circuit in the harness between TCM and terminal cord assembly.

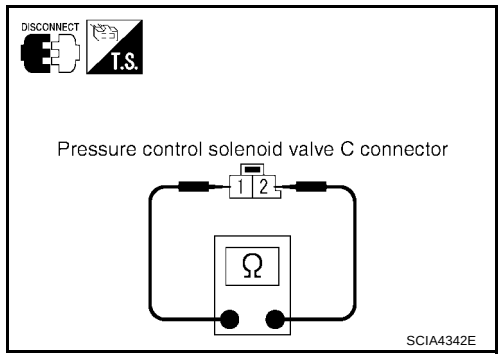
OK or NG

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

5. CHECK PRESSURE CONTROL SOLENOID VALVE C

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect pressure control solenoid valve C harness connector.
3. Check resistance between terminals 1 and 2.

Connector	Terminal	Condition	Resistance (Approx.)
F107	1 - 2	Temperature: 20°C (68°F)	5.0 - 5.6 Ω



OK or NG

OK >> GO TO 6.
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

6. CHECK HARNESS BETWEEN TERMINAL CORD ASSEMBLY AND PRESSURE CONTROL SOLENOID VALVE C

Check the following.

- Open or short-circuit in the harness between terminal cord assembly and pressure control solenoid valve C.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace transmission wire. Refer to AT-629, "Terminal Cord Assembly" .

7. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

8. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-581, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .

Component Inspection

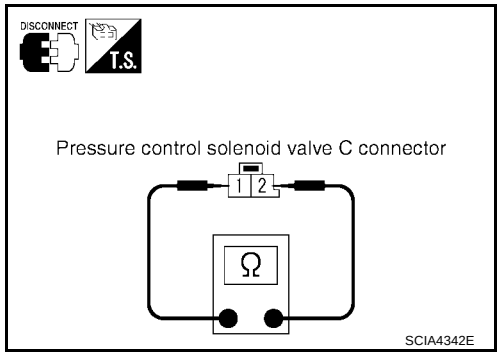
ECS009HY

PRESSURE CONTROL SOLENOID VALVE C

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect pressure control solenoid valve C harness connector.
3. Check resistance between terminals 1 and 2.

Connector	Terminal	Condition	Resistance (Approx.)
F107	1 - 2	Temperature: 20°C (68°F)	5.0 - 5.6 Ω

4. If NG, replace the control valve assembly. Refer to AT-629, "Control Valve Assembly" .



DTC P0826 MANUAL MODE SWITCH CIRCUIT

PFP:34901

Description

ECS009HZ

Manual mode switch is installed in A/T device. It sends manual mode switch, shift up and shift down switch signals to TCM.
TCM sends the switch signals to unified meter and A/C amp. by CAN communication line. Then manual mode switch position is indicated on the A/T indicator. For inspection, refer to AT-591, "Position Indicator" .

CONSULT-II Reference Value in Data Monitor Mode

ECS009I0

Monitor Item		Condition	Reference Value
MANU MODE SW	(ON/OFF)	Manual shift gate position (neutral)	ON
		Other than the above	OFF
NON M-MODE SW	(ON/OFF)	Manual shift gate position	OFF
		Other than the above	ON
UP SW	(ON/OFF)	Selector lever: + side	ON
		Other than the above	OFF
DOWN SW	(ON/OFF)	Selector lever: - side	ON
		Other than the above	OFF

On Board Diagnosis Logic

ECS009I1

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “MANUAL MODE SWITCH” with CONSULT-II is detected when TCM monitors manual mode, non manual mode, up or down switch signals, and judges as irregular when impossible input pattern occurs.

Possible Cause

ECS009I2

- Harness or connectors
  (These switches circuit is open or shorted.)
- Manual mode switch (built into A/T device)

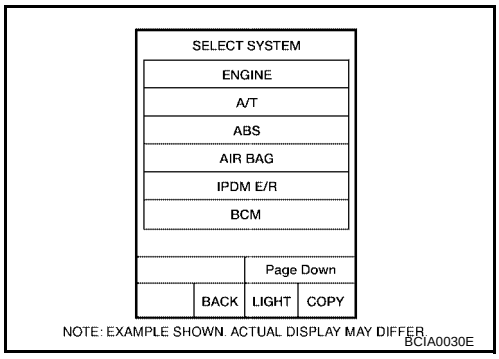
DTC Confirmation Procedure

ECS009I3

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

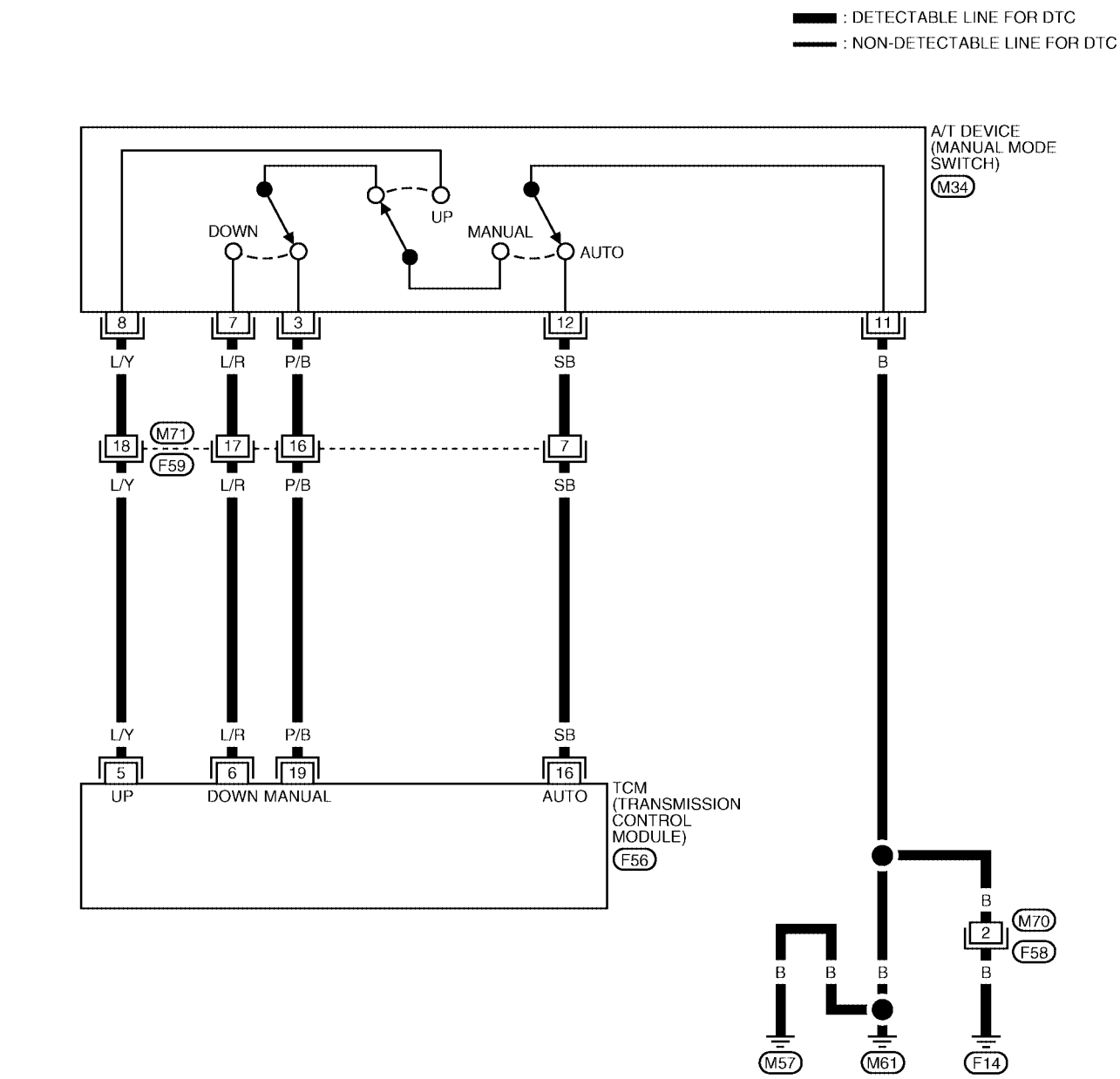
1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Move selector lever to “M” position (manual shift gate position).
4. Shift selector lever into “+ side” and “- side”.
5. Wait for at least 30 consecutive seconds.
6. If DTC is detected, go to AT-589, "Diagnostic Procedure" .

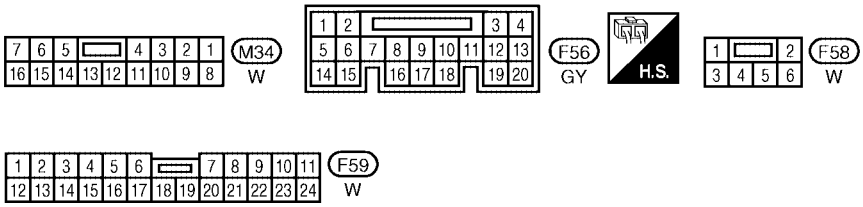


Wiring Diagram — AT — MMSW

ECS009I4

AT-MMSW-01





WCWA0214E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
5	L/Y	Manual mode switch UP (+)		Selector lever: + side	0V
				Other than the above	Battery voltage
6	L/R	Manual mode switch DOWN (-)		Selector lever: - side	0V
				Other than the above	Battery voltage
16	SB	Manual mode switch AUTO		Selector lever: “P”, “R”, “N” or “D” position	0V
				Selector lever: Manual shift gate position	Battery voltage
19	P/B	Manual mode switch MANUAL		Selector lever: Manual shift gate position (neutral)	0V
				Other than the above	Battery voltage

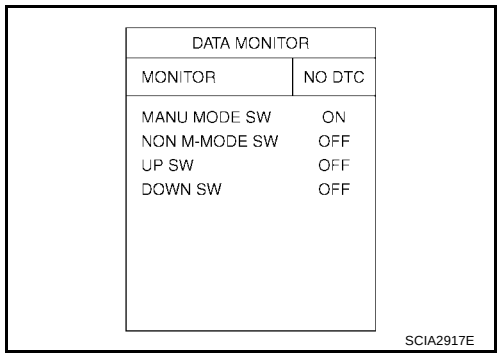
Diagnostic Procedure

ECS009I5

1. CHECK MANUAL MODE SWITCH CIRCUIT

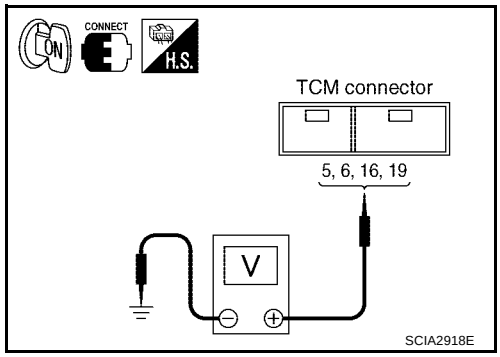
With CONSULT-II

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Read out ON/OFF switching action of the “MANU MODE SW”, “NON M-MODE SW”, “UP SW”, “DOWN SW”.



Without CONSULT-II

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



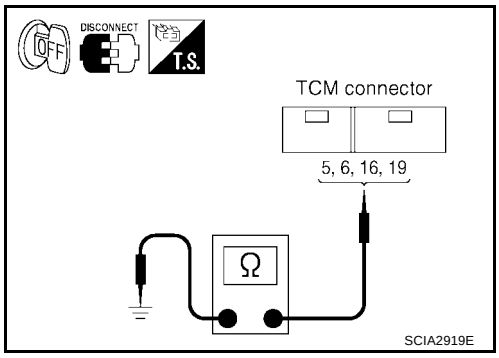
Connector No.	Terminal	Condition	Voltage (Approx.)
F56	5 - Ground	Selector lever: + side	0V
		Other than the above	Battery voltage
	6 - Ground	Selector lever: - side	0V
		Other than the above	Battery voltage
	16 - Ground	Selector lever: “P”, “R”, “N” or “D” position	0V
		Selector lever: Manual shift gate position	Battery voltage
	19 - Ground	Selector lever: Manual shift gate position (neutral)	0V
		Other than the above	Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK HARNESS BETWEEN TCM AND A/T DEVICE (MANUAL MODE SWITCH)

1. Turn ignition switch “OFF”.
2. Disconnect the TCM connector.
3. Check the continuity between TCM connector terminals 5, 6, 16, 19 and ground.



Connector No.	Terminal	Condition	Continuity
F56	5 - Ground	Selector lever: + side	Yes
		Other than the above	No
	6 - Ground	Selector lever: - side	Yes
		Other than the above	No
	16 - Ground	Selector lever: “P”, “R”, “N” or “D” position	Yes
		Selector lever: Manual shift gate position	No
	19 - Ground	Selector lever: Manual shift gate position (neutral)	Yes
		Other than the above	No

4. If OK, check harness for short-circuit to ground or power source.

OK or NG

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

3. DETECT MALFUNCTIONING ITEM

Check the following.

- Open or short-circuit in the harness between TCM and A/T device (manual mode switch).
- Open or short-circuit in the harness for ground of manual mode switch.
- Manual mode switch. Refer to AT-591, "Component Inspection" .

OK or NG

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

4. CHECK DTC

Perform “DTC Confirmation Procedure”. Refer to AT-586, "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-459, "TCM Input/Output Signal Reference Values" .
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.

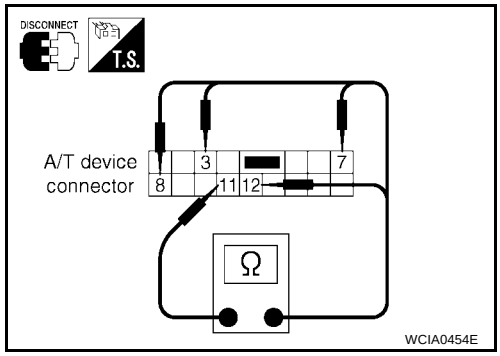
Component Inspection

ECS009I6

MANUAL MODE SWITCH

Check continuity between terminals.

Item	Position	Connector	Terminal (Unit side)	Continuity
Manual mode (select) switch	Auto	M34	11 - 12	Yes
	Manual		3 - 11	
UP switch	UP		8 - 11	
DOWN switch	DOWN		7 - 11	



Position Indicator

ECS009I7

DIAGNOSTIC PROCEDURE

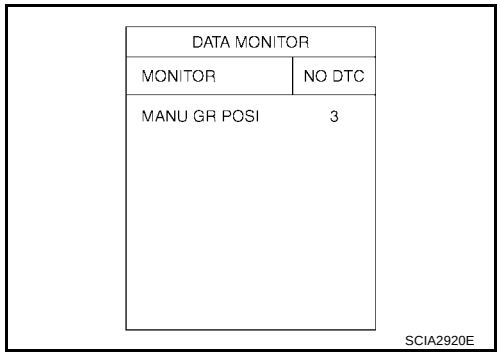
1. CHECK INPUT SIGNALS (WITH CONSULT-II)

With CONSULT-II

1. Start engine.
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II and read out the value of “MANU GR POSI”.
3. Drive vehicle in the manual mode, and make sure that the actual gear position and the meter's indication of the position mutually coincide when the selector lever is shifted to the “+ (up)” or “- (down)” side (1st ⇔ 5th gear).

OK or NG

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



2. CHECK DTC WITH TCM

Perform self-diagnosis of TCM. Refer to AT-463, "SELF-DIAG RESULT MODE" .

OK or NG

OK >> Check combination meter. Refer to DI-43, "A/T INDICATOR" .
NG >> Check the malfunctioning system.

DTC P0882 TCM POWER INPUT SIGNAL

PFP:31036

Description

ECS009I8

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

ECS009I9

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “TCM POWER INPT SIG” with CONSULT-II or P0882 without CONSULT-II is detected when voltage supplied to TCM is too low.

Possible Cause

ECS009IA

- Harness or connectors
  (Battery or ignition switch and TCM circuit is open or shorted.)
- A/T PV IGN relay

DTC Confirmation Procedure

ECS009IB

CAUTION:

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

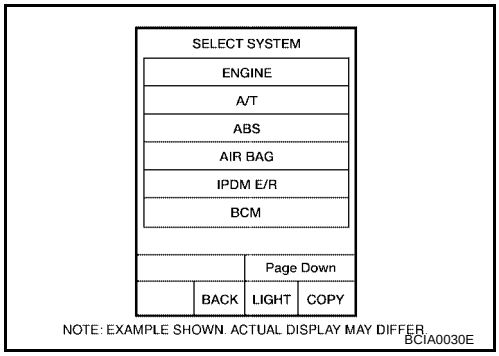
NOTE:

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.

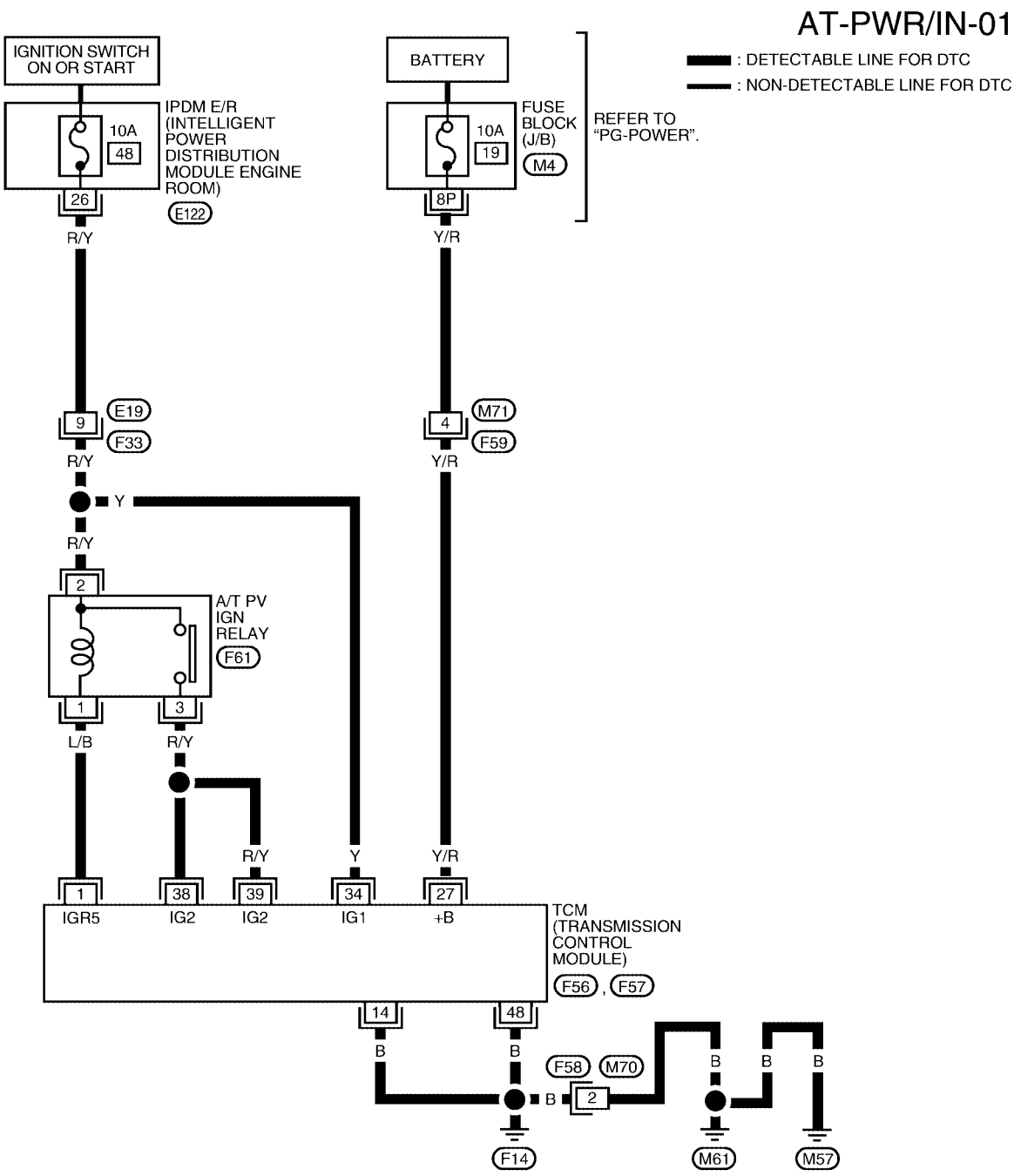
WITH CONSULT-II

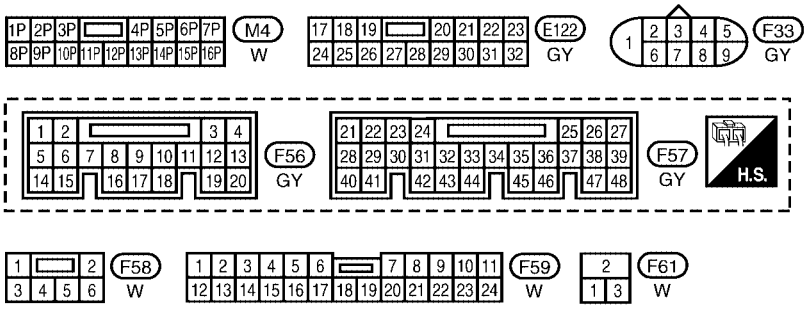
1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Start engine.
4. Depress accelerator pedal or drive vehicle and maintain the following condition for at least 20 consecutive seconds.
   TURBINE REV: More than 800 rpm
5. If DTC is detected, go to AT-595, "Diagnostic Procedure" .



Wiring Diagram — AT — PWR/IN

ECS009IC





BCWA0476E

TCM terminals and data are reference value. Measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Data (Approx.)
1	L/B	A/T PV IGN relay		When turning ignition switch ON.	0 - 1.5V
				When turning ignition switch OFF.	0V
14	B	Ground	Always		0V
27	Y/R	Power supply (Memory back-up)		When turning ignition switch ON.	Battery voltage
				When turning ignition switch OFF.	Battery voltage
34	Y	Power supply		When turning ignition switch ON.	Battery voltage
				When turning ignition switch OFF.	0V
38	R/Y	Power supply (A/T PV IGN relay)		When turning ignition switch ON.	Battery voltage
				Measure 3 seconds after switching “OFF” the ignition switch.	0V
39	R/Y	Power supply (A/T PV IGN relay)		When turning ignition switch ON.	Battery voltage
				Measure 3 seconds after switching “OFF” the ignition switch.	0V
48	B	Ground	Always		0V

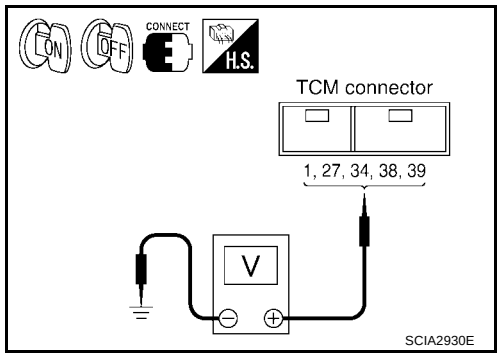
Diagnostic Procedure

ECS009ID

1. CHECK TCM POWER SOURCE CIRCUIT

1. Turn ignition switch “ON”. (Do not start engine.)
2. Check voltage between TCM terminals and ground.

Connector	Terminal	Voltage (Approx.)
F56	1 - Ground	0 - 1.5V
F57	27 - Ground	Battery voltage
	34 - Ground	
	38 - Ground	
	39 - Ground	



3. Turn ignition switch “OFF”.
4. Check voltage between TCM terminals and ground.

Connector	Terminal	Voltage (Approx.)
F56	1 - Ground	0V
F57	27 - Ground	Battery voltage
	34 - Ground	0V
	38 - Ground	0V
	39 - Ground	0V

OK or NG

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

2. DETECT MALFUNCTIONING ITEM

Check the following:

- Harness for short or open between battery and TCM terminal 27
- Harness for short or open between ignition switch and TCM terminals 1, 34, 38 and 39
- 10A fuse [No. 19, located in the fuse block (J/B) or No. 48, located in the IPDM E/R]
- Ignition switch. Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT"
- A/T PV IGN relay. Refer to AT-596, "Component Inspection"

OK or NG

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

3. CHECK TCM GROUND CIRCUIT

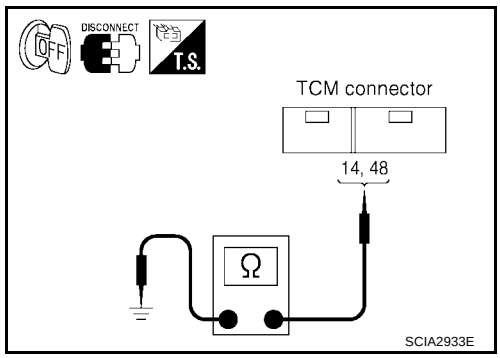
1. Turn ignition switch “OFF”.
2. Disconnect TCM harness connector.
3. Check continuity between TCM terminals 14, 48 and ground.

Continuity should exist.

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

OK or NG

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



4. CHECK DTC

Check again. Refer to AT-592, "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-459, "TCM Input/Output Signal Reference Values" .
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

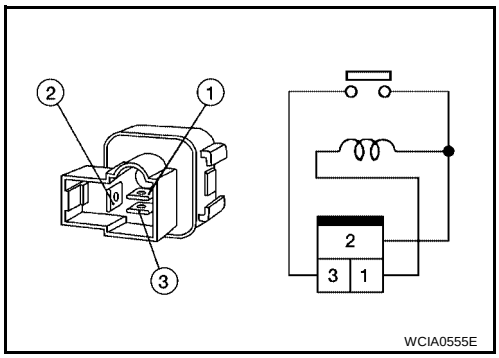
ECS009IE

A/T PV IGN RELAY

1. Apply 12V direct current between A/T PV IGN relay terminals 1 and 2.
2. Check continuity between relay terminals 2 and 3.

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

3. If NG, replace A/T PV IGN relay.



DTC P1726 ELECTRIC THROTTLE CONTROL SYSTEM

PFP:23710

Description

ECS009IF

This DTC is displayed with other DTCs regarding ECM. Perform the trouble diagnosis for other DTCs displayed. Refer to EC-689, "TROUBLE DIAGNOSIS" .
When this DTC is detected, lock-up operation and learning control are canceled.

TROUBLE DIAGNOSIS FOR SYMPTOMS

PFP:00007

A/T CHECK Indicator Lamp does not come on

ECS009IG

SYMPTOM:

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

DIAGNOSTIC PROCEDURE

1. CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Is a malfunction in the CAN communication indicated in the results?

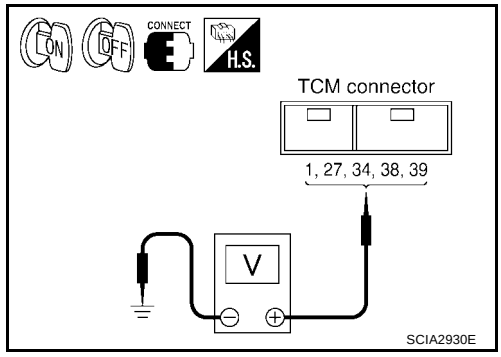
YES or NO

YES >> Check the CAN communication line. Refer to AT-471, "DTC U1000 CAN COMMUNICATION LINE" .

NO >> GO TO 2.

2. CHECK TCM POWER SOURCE CIRCUIT

1. Turn ignition switch "ON". (Do not start engine.)
2. Check voltage between TCM connector terminals and ground. Refer to AT-593, "Wiring Diagram — AT — PWR/IN" .



Connector	Terminal	Voltage (Approx.)
F56	1 - Ground	0 - 1.5V
F57	27 - Ground	Battery voltage
	34 - Ground	
	38 - Ground	
	39 - Ground	

3. Turn ignition switch "OFF".
4. Check voltage between TCM connector terminals and ground. Refer to AT-593, "Wiring Diagram — AT — PWR/IN" .

Connector	Terminal	Voltage (Approx.)
F56	1 - Ground	0V
F57	27 - Ground	Battery voltage
	34 - Ground	0V
	38 - Ground	0V
	39 - Ground	0V

OK or NG

OK >> GO TO 4.

NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

Check the following:

- Harness for short or open between battery and TCM terminal 27
- Harness for short or open between ignition switch and TCM terminals 1, 34, 38 and 39
- 10A fuse [No. 19, located in the fuse block (J/B) or No. 48, located in the IPDM E/R]
- Ignition switch. Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" .
- A/T PV IGN relay. Refer to AT-596, "Component Inspection" .

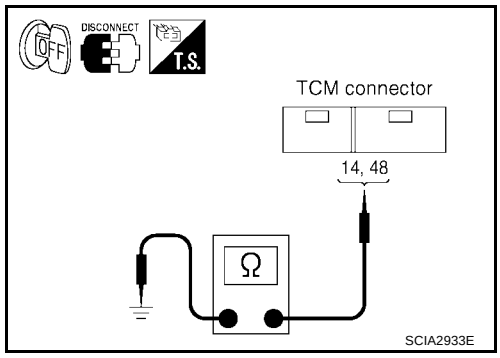
OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect the TCM harness connector.
3. Check continuity between TCM terminals 14, 48 and ground. Refer to AT-593, "Wiring Diagram — AT — PWR/IN" .
4. If OK, check harness for short-circuit to ground or the power source.



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 A/T CHECK INDICATOR LAMP CIRCUIT

1. Turn ignition switch “OFF”.
2. Check the combination meter. Refer to DI-5, "COMBINATION METERS" .

OK or NG

OK >> GO TO 6.
NG >> Replace the combination meter. Refer to DI-19, "Combination Meter" .

6. SYMPTOM CHECK

Check again.

OK or NG

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

7. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
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.

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

ECS009IH

SYMPTOM:

- **Engine cannot be started with selector lever in “P” or “N” position.**
- **Engine can be started with selector lever in “D”or “R” position.**

DIAGNOSTIC PROCEDURE

1. CHECK STARTING SYSTEM

Check starting system. Refer to SC-9, "STARTING SYSTEM" .

OK or NG

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

2. CHECK CONTROL CABLE

Check the control cable.

- Refer to AT-628, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-628, "Control Cable Adjustment" .

3. CHECK PNP SWITCH CIRCUIT

Perform self-diagnosis.

Do the self-diagnostic results indicate PNP switch?

YES >> Check the malfunctioning system. Refer to AT-478, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" .
NO >> **INSPECTION END**

In “P” Position, Vehicle Moves When Pushed

ECS009II

SYMPTOM:

Even though the selector lever is set in the “P” position, the parking mechanism is not actuated, allowing the vehicle to be moved when it is pushed.

DIAGNOSTIC PROCEDURE

1. CHECK PNP SWITCH CIRCUIT

Perform self-diagnosis.

Do the self-diagnostic results indicate PNP switch?

YES >> Check the malfunctioning system. Refer to AT-478, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" .
NO >> GO TO 2.

2. CHECK CONTROL CABLE

Check the control cable.

- Refer to AT-628, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-628, "Control Cable Adjustment" .

3. SYMPTOM CHECK

Check again.

OK or NG

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

In “N” Position, Vehicle Moves

ECS009IJ

SYMPTOM:

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

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

2. CHECK PNP SWITCH CIRCUIT

Perform self-diagnosis.

Do the self-diagnostic results indicate PNP switch?

YES >> Check the malfunctioning system. Refer to AT-478, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" .
NO >> GO TO 3.

3. CHECK CONTROL CABLE

Check the control cable.

- Refer to AT-628, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-628, "Control Cable Adjustment" .

4. CHECK SYMPTOM

Check again.

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
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.

Large Shock (“N” to “D” Position)

ECS009IK

SYMPTOM:

A noticeable shock occurs when the selector lever is shifted from the “N” to “D” position.

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- Accumulator. Refer to AT-643, "DISASSEMBLY" .
- Forward and direct clutch assembly. Refer to AT-643, "DISASSEMBLY" .

OK or NG

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

4. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

5. CHECK SYMPTOM

Check again.

OK or NG

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

Vehicle Does Not Creep Backward In “R” Position

ECS009IL

SYMPTOM:

The vehicle does not creep in the “R” position. Or an extreme lack of acceleration is observed.

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

2. CHECK CONTROL CABLE AND PNP SWITCH POSITION

Check the control cable and PNP switch position.

- Refer to AT-628, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable and PNP switch position. Refer to AT-628, "Control Cable Adjustment" or AT-626, "Park/Neutral Position (PNP) Switch Adjustment" .

3. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- Forward and direct clutch assembly. Refer to AT-643, "DISASSEMBLY" .
- 1st and reverse brake. Refer to AT-643, "DISASSEMBLY" .
- B5 brake. Refer to AT-670, "Transaxle Case Cover & B5 Brake" .
- Torque convertor. Refer to AT-643, "DISASSEMBLY" .

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

Vehicle Does Not Creep Forward In “D” Position

ECS009IM

SYMPTOM:

Vehicle does not creep forward when selecting “D” position.

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

2. CHECK CONTROL CABLE AND PNP SWITCH POSITION

Check the control cable and PNP switch position.

- Refer to AT-628, "Control Cable Adjustment" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable and PNP switch position. Refer to AT-628, "Control Cable Adjustment" or AT-626, "Park/Neutral Position (PNP) Switch Adjustment" .

3. CHECK PRESSURE CONTROL SOLENOID VALVE A CIRCUIT

Perform self-diagnosis.

Do the self-diagnostic results indicate pressure control solenoid valve A?

YES >> Check the malfunctioning system. Refer to AT-532, "DTC P0745 PRESSURE CONTROL SOLENOID VALVE A (LINE PRESSURE)" .
NO >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- Forward and direct clutch assembly. Refer to AT-643, "DISASSEMBLY" .
- One-way clutch No.2. Refer to AT-643, "DISASSEMBLY" .
- B5 brake. Refer to AT-670, "Transaxle Case Cover & B5 Brake" .
- Torque convertor. Refer to AT-643, "DISASSEMBLY" .

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

Vehicle Cannot Be Started From D1

ECS009IN

SYMPTOM:

Vehicle cannot be started from D1 on cruise test - Part 1.

DIAGNOSTIC PROCEDURE

1. CONFIRM THE SYMPTOM

Check if vehicle creeps in “R” position.

OK or NG

OK >> GO TO 2.
NG >> Refer to AT-603, "Vehicle Does Not Creep Backward In “R” Position" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 3.

3. CHECK LINE PRESSURE

Check the line pressure at the engine stall point. Refer to AT-443, "LINE PRESSURE TEST" .

OK or NG

OK >> GO TO 4.
NG >> Check the malfunctioning item. Refer to AT-444, "Judgement of line pressure test" .

4. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- Forward and direct clutch assembly. Refer to AT-643, "DISASSEMBLY" .
- One-way clutch No.2. Refer to AT-643, "DISASSEMBLY" .
- B5 brake. Refer to AT-670, "Transaxle Case Cover & B5 Brake" .

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

A/T Does Not Shift: D1 → D2

ECS009IO

SYMPTOM:

The vehicle does not shift-up from the D1 to D2 gear at the specified speed.

DIAGNOSTIC PROCEDURE

1. CONFIRM THE SYMPTOM

Check if vehicle creeps forward in “D” position and vehicle can be started from D_1.

OK or NG

OK >> GO TO 2.
NG >> Refer to AT-604, "Vehicle Does Not Creep Forward In “D” Position" , AT-605, "Vehicle Cannot Be Started From D_1" .

2. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

3. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- One-way clutch No.1. Refer to AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .
- One-way clutch No.2. Refer to AT-643, "DISASSEMBLY" .
- 2nd coast brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" , AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .
- 2nd brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" .

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

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

ECS009IP

SYMPTOM:

The vehicle does not shift-up from D_2 to D_3 gear at the specified speed.

DIAGNOSTIC PROCEDURE

1. CONFIRM THE SYMPTOM

Check if vehicle creeps forward in “D” position and vehicle can be started from D_1.

OK or NG

OK >> GO TO 2.
NG >> Refer to AT-604, "Vehicle Does Not Creep Forward In “D” Position" ,AT-605, "Vehicle Cannot Be Started From D_1" .

2. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

3. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- U/D brake. Refer to AT-643, "DISASSEMBLY" .
- B5 brake. Refer to AT-670, "Transaxle Case Cover & B5 Brake" .

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

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

ECS009IQ

SYMPTOM:

- **The vehicle does not shift-up from the D_3 to D_4 gear at the specified speed.**

DIAGNOSTIC PROCEDURE

1. CONFIRM THE SYMPTOM

Check if vehicle creeps forward in “D” position and vehicle can be started from D1.

OK or NG

OK >> GO TO 2.
NG >> Refer to AT-604, "Vehicle Does Not Creep Forward In “D” Position" , AT-605, "Vehicle Cannot Be Started From D1" .

2. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

3. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- U/D brake. Refer to AT-643, "DISASSEMBLY" .
- U/D clutch. Refer to AT-643, "DISASSEMBLY" .

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

A/T Does Not Shift: D4 → D5

ECS009IR

SYMPTOM:

- **The vehicle does not shift-up from the D4 to D5 gear at the specified speed.**

DIAGNOSTIC PROCEDURE

1. CONFIRM THE SYMPTOM

Check if vehicle creeps forward in “D” position and vehicle can be started from D1.

OK or NG

OK >> GO TO 2.
NG >> Refer to AT-604, "Vehicle Does Not Creep Forward In “D” Position" ,AT-605, "Vehicle Cannot Be Started From D1" .

2. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

3. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- Forward and direct clutch assembly. Refer to AT-643, "DISASSEMBLY" .
- 2nd coast brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" , AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .
- One-way clutch No.1. Refer to AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

A/T Does Not Perform Lock-up

ECS009IS

SYMPTOM:

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

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

2. CHECK STOP LAMP SWITCH CIRCUIT

Check the stop lamp switch circuit. Refer to BRC-8, "TROUBLE DIAGNOSIS" (with ABS), BRC-53, "TROUBLE DIAGNOSIS" (with TCS/ABS).

OK or NG

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

3. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- Torque converter. Refer to AT-643, "DISASSEMBLY" .

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

A/T Does Not Hold Lock-up Condition

ECS009IT

SYMPTOM:

The lock-up condition cannot be maintained for more than 30 seconds.

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

2. CHECK STOP LAMP SWITCH CIRCUIT

Check the stop lamp switch circuit. Refer to BRC-8, "TROUBLE DIAGNOSIS" (with ABS), BRC-53, "TROUBLE DIAGNOSIS" (with TCS/ABS).

OK or NG

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

3. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

– Torque converter. Refer to AT-643, "DISASSEMBLY" .

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

Lock-up Is Not Released

ECS009IU

SYMPTOM:

The lock-up condition cannot be cancelled even after releasing the accelerator pedal.

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

2. CHECK STOP LAMP SWITCH CIRCUIT

Check the stop lamp switch circuit. Refer to BRC-8, "TROUBLE DIAGNOSIS" (with ABS), BRC-53, "TROUBLE DIAGNOSIS" (with TCS/ABS).

OK or NG

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

3. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- Torque converter. Refer to AT-643, "DISASSEMBLY" .

OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK SYMPTOM

Check again.

OK or NG

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

Cannot Be Changed to Manual Mode

ECS009IV

SYMPTOM:

Does not change to manual mode when manual shift gate is used.

DIAGNOSTIC PROCEDURE

1. CHECK MANUAL MODE SWITCH CIRCUIT

Check the manual mode switch circuit. Refer to AT-586, "DTC P0826 MANUAL MODE SWITCH CIRCUIT" .

OK or NG

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

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> **INSPECTION END**

A/T Does Not Shift: 5th gear → 4th gear

ECS009IW

SYMPTOM:

When shifted from 5M to 4M position in manual mode, does not downshift from 5th to 4th gear.

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- Forward and direct clutch assembly. Refer to AT-643, "DISASSEMBLY" .
- 2nd coast brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" , AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .
- One-way clutch No.1. Refer to AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .

OK or NG

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

4. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

5. CHECK SYMPTOM

Check again.

OK or NG

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

A/T Does Not Shift: 4th gear → 3rd gear

ECS009IX

SYMPTOM:

When shifted from 4M to 3M position in manual mode, does not downshift from 4th to 3rd gear.

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- U/D clutch. Refer to AT-643, "DISASSEMBLY" .
- U/D brake. Refer to AT-643, "DISASSEMBLY" .

OK or NG

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

4. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

5. CHECK SYMPTOM

Check again.

OK or NG

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

A/T Does Not Shift: 3rd gear → 2nd gear

ECS009IY

SYMPTOM:

When shifted from 3M to 2M position in manual mode, does not downshift from 3rd to 2nd gear.

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- U/D brake. Refer to AT-643, "DISASSEMBLY" .
- B5 brake. Refer to AT-670, "Transaxle Case Cover & B5 Brake" .

OK or NG

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

4. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

5. CHECK SYMPTOM

Check again.

OK or NG

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

A/T Does Not Shift: 2nd gear → 1st gear

ECS009IZ

SYMPTOM:

When shifted from 2M to 1M position in manual mode, does not downshift from 2nd to 1st gear.

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Is any malfunction detected by self-diagnostic?

YES >> Check the malfunctioning system.
NO >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- 2nd coast brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" , AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .
- 2nd brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" .
- One-way clutch No.1. Refer to AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .
- One-way clutch No.2. Refer to AT-643, "DISASSEMBLY" .

OK or NG

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

4. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

5. CHECK SYMPTOM

Check again.

OK or NG

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

Vehicle Does Not Decelerate By Engine Brake

ECS009J0

SYMPTOM:

No engine brake is applied when the gear is shifted from the 2nd to 1st gear.

DIAGNOSTIC PROCEDURE

1. CHECK A/T FLUID LEVEL

Check the A/T fluid level. Refer to AT-441, "A/T FLUID CHECK" .

OK or NG

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

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis.

Do the self-diagnostic results indicate shift solenoid valve E, electric throttle control system?

YES >> Check the malfunctioning system. Refer to AT-562, "DTC P0770 SHIFT SOLENOID VALVE E" , AT-597, "DTC P1726 ELECTRIC THROTTLE CONTROL SYSTEM" .
NO >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Control valve assembly. Refer to AT-629, "Control Valve Assembly" .
2. Disassemble A/T. Refer to AT-643, "DISASSEMBLY" .
3. Check the following items:

- 2nd coast brake. Refer to AT-662, "Oil Pump, 2nd Coast Brake & 2nd Brake" , AT-668, "One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1" .
- U/D brake. Refer to AT-643, "DISASSEMBLY" .
- B5 brake. Refer to AT-670, "Transaxle Case Cover & B5 Brake" .

OK or NG

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

4. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

5. CHECK SYMPTOM

Check again.

OK or NG

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

TCM Self-diagnosis Does Not Activate

ECS009J1

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

DESCRIPTION

- **Park/neutral position (PNP) switch**
  The park/neutral (PNP) switch assembly includes a transmission range switch. The transmission range switch detects the selector lever position and sends a signal to the TCM.
- **Stop lamp switch signal**
  Detects the brake pedal state (stop lamp switch is ON or OFF) and sends a signal via CAN communication line to the TCM.
- **Closed throttle position signal**
  ECM judges throttle opening based on a signal from accelerator pedal position sensor, and sends the signal via CAN communication line to TCM.

DIAGNOSTIC PROCEDURE

1. CHECK PARK/ NEUTRAL POSITION (PNP) SWITCH CIRCUIT

Check the park/neutral position (PNP) switch circuit. Refer to AT-478, "DTC P0705 PARK/NEUTRAL POSITION SWITCH" .

OK or NG

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

2. CHECK STOP LAMP SWITCH CIRCUIT

Perform self-diagnosis for ABS actuator and electric unit (control unit). Refer to BRC-8, "TROUBLE DIAGNOSIS" (with ABS), BRC-53, "TROUBLE DIAGNOSIS" (with TCS/ABS).

OK or NG

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

3. CHECK CLOSED THROTTLE POSITION SIGNAL CIRCUIT

Perform self-diagnosis for ECM. Refer to EC-654, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS" .

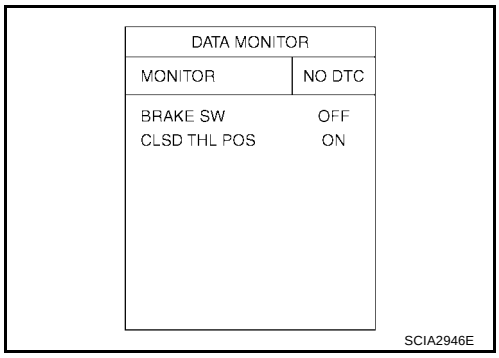
OK or NG

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

4. CHECK DATA MONITOR (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “A/T” with “DATA MONITOR” mode in CONSULT-II.
3. Depress or release accelerator pedal and read out ON/OFF signaling action of the “CLSD THL POS”.
4. Depress or release brake pedal and read out ON/OFF signaling action of the “BRAKE SW”.



OK or NG

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

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-459, "TCM Input/Output Signal Reference Values" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

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

6. CHECK CAN COMMUNICATION LINE

Check the CAN communication line. Refer to AT-471, "DTC U1000 CAN COMMUNICATION LINE" .

OK or NG

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

7. CHECK SYMPTOM

Check again.

OK or NG

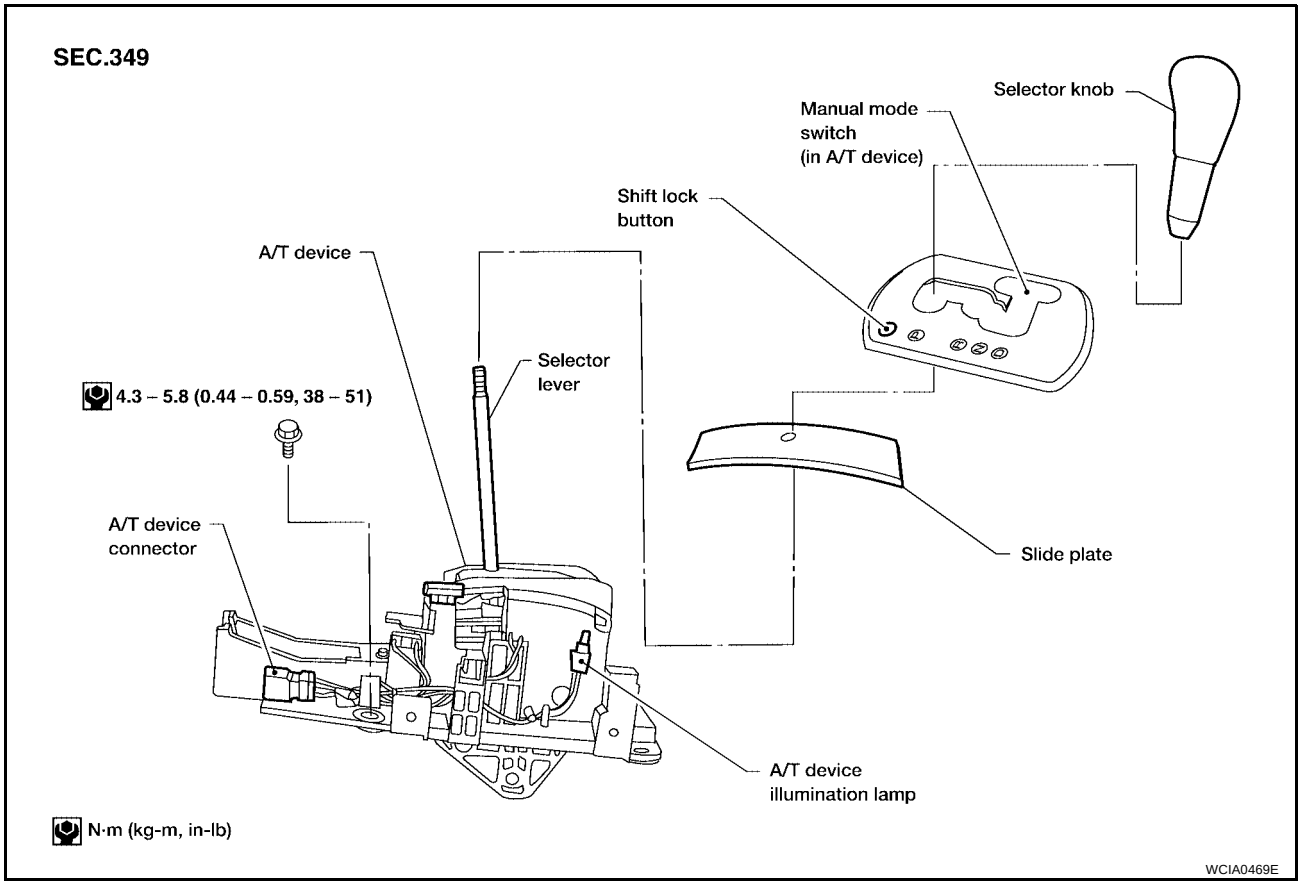
OK >> **INSPECTION END**
NG >> Replace the TCM.

SHIFT CONTROL SYSTEM

PFP:34901

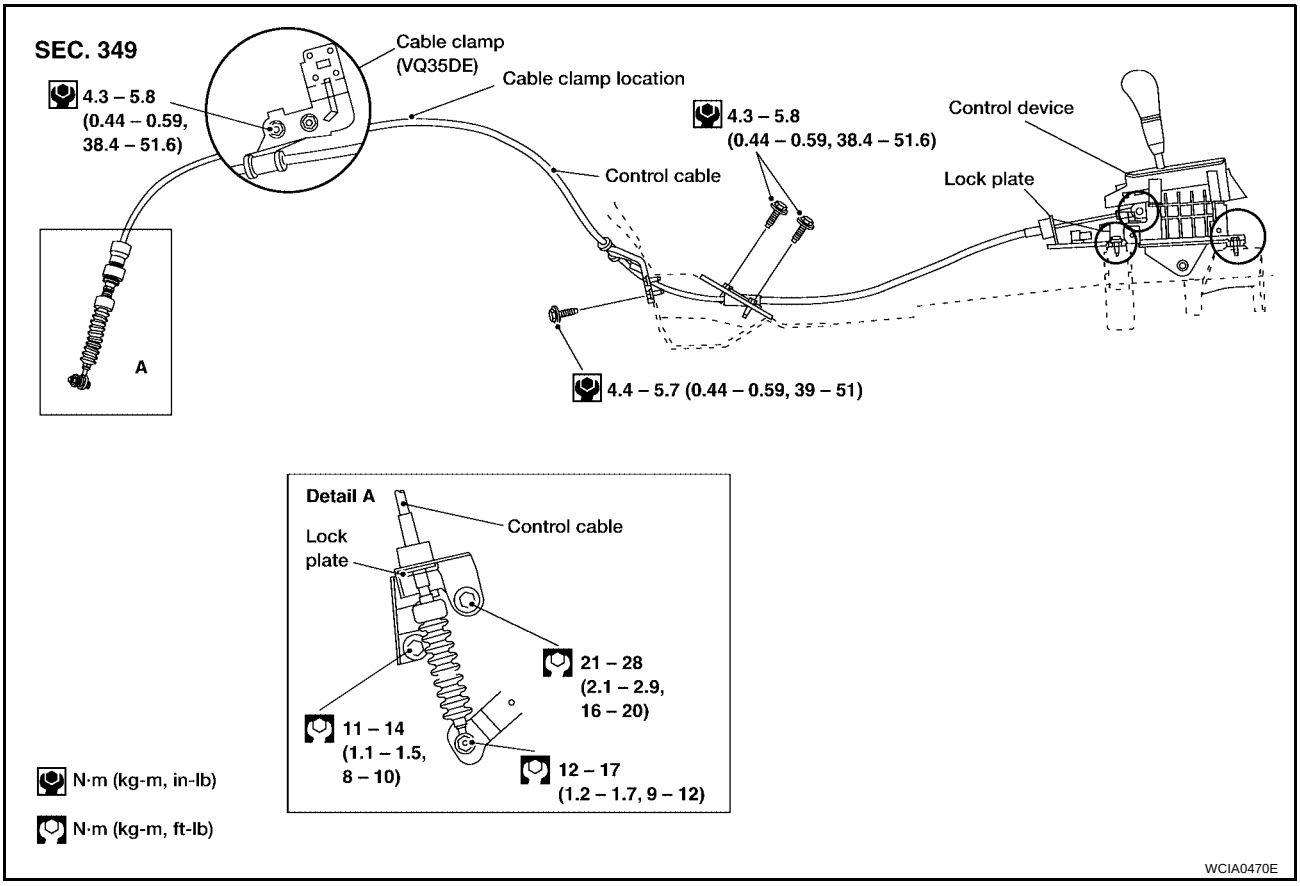
Control Device

ECS009J2



Control Cable

ECS009J3



A/T SHIFT LOCK SYSTEM

PFP:34950

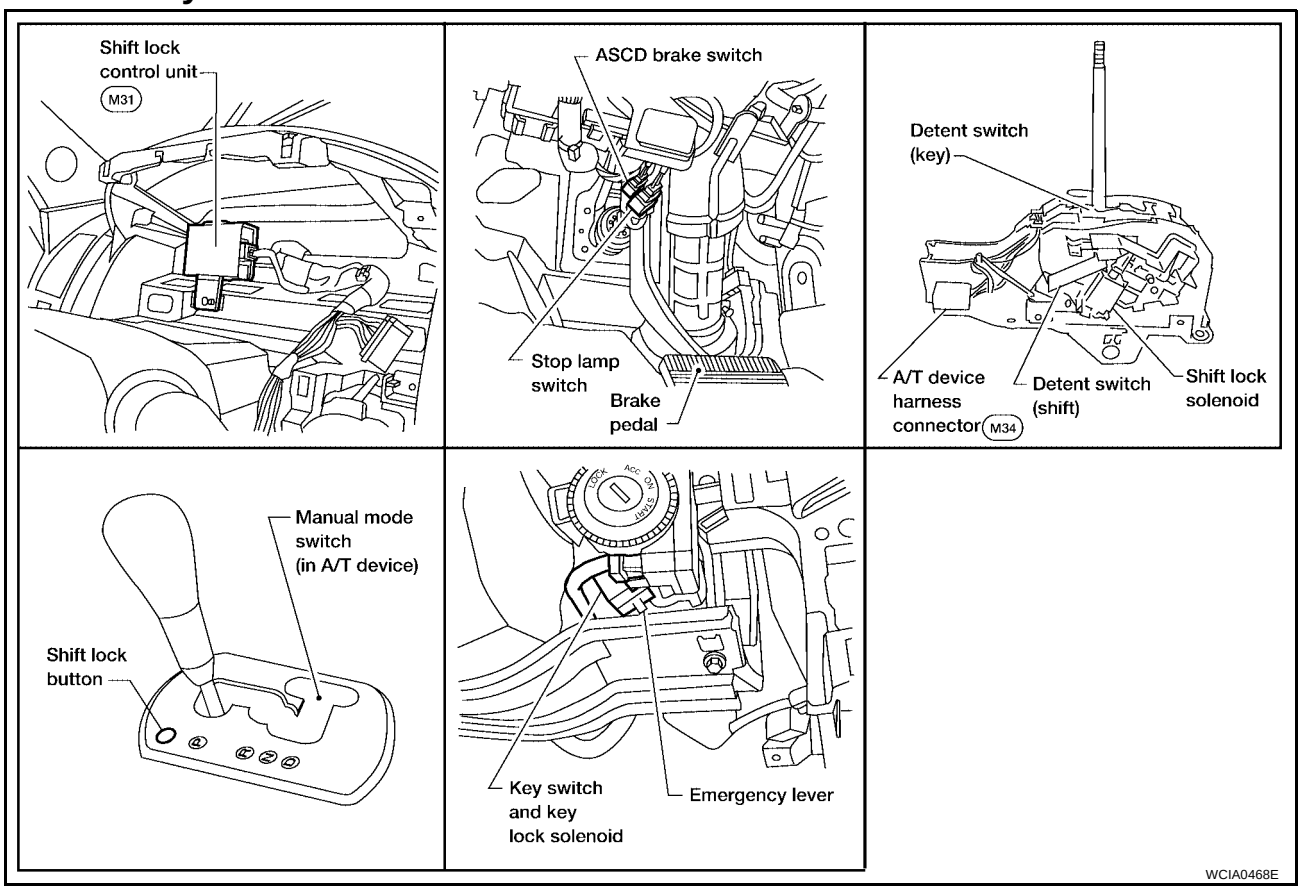
Description

ECS009J4

- The electrical key interlock mechanism also operates as a shift lock:
  With the key switch turned to ON, the selector lever cannot be shifted from “P” (parking) to any other position unless the brake pedal is depressed.
  With the key removed, the selector lever cannot be shifted from “P” to any other position.
  The key cannot be removed unless the selector lever is placed in “P”.
- The shift lock and key interlock mechanisms are controlled by the ON-OFF operation of the shift lock solenoid and by the operation of the rotator and slider located inside the key cylinder.

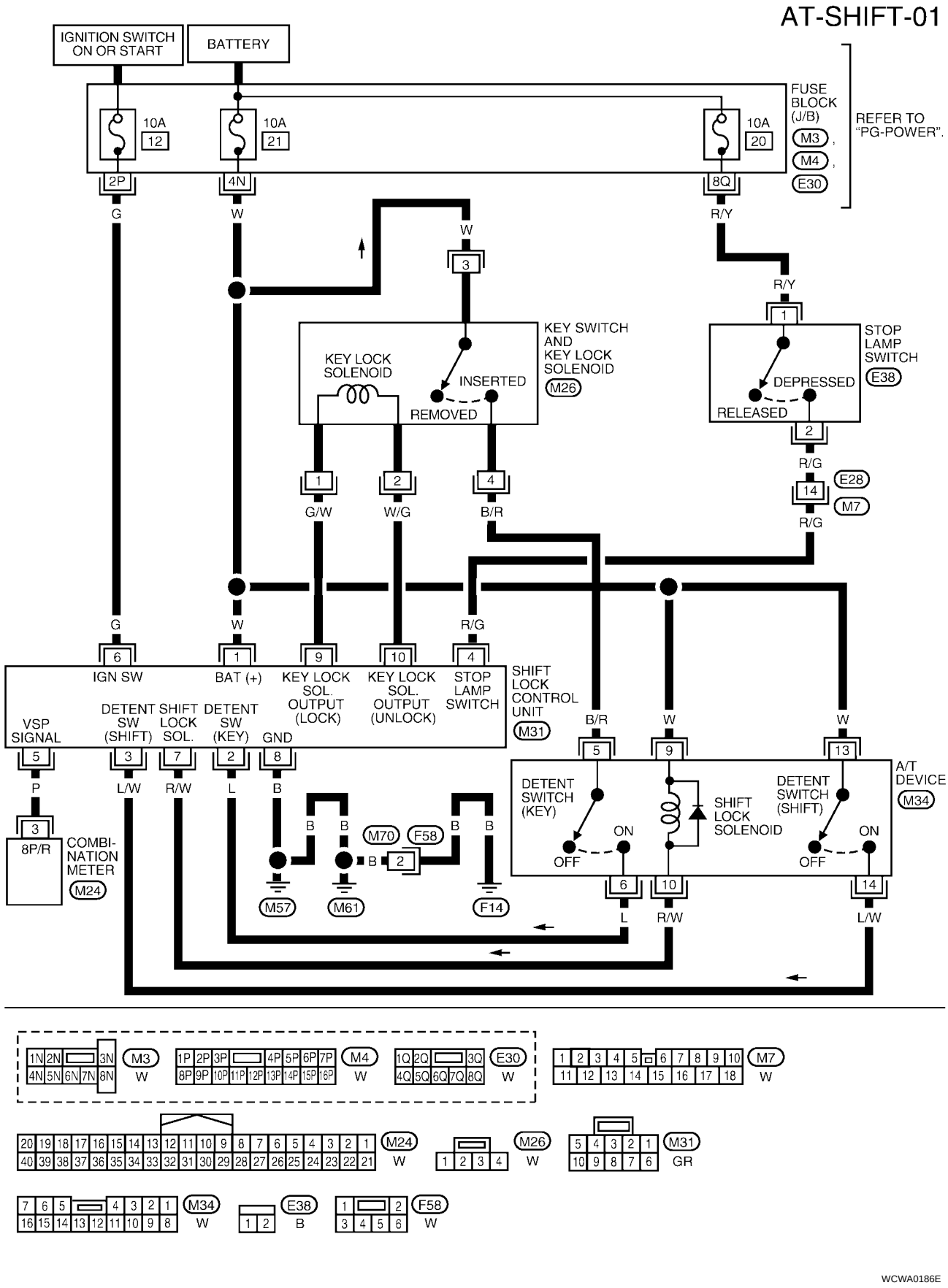
Shift Lock System Electrical Parts Location

ECS009J5



Wiring Diagram — AT — SHIFT

ECS009J6

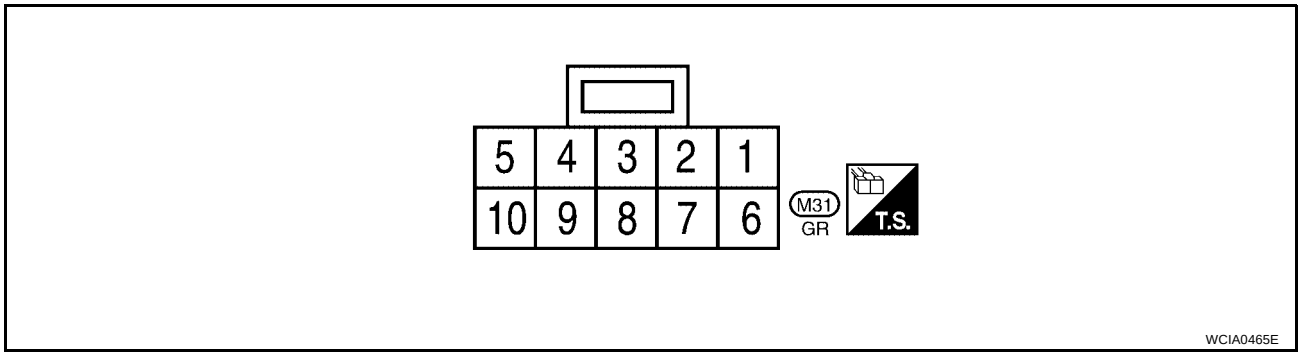


WCWA0186E

Shift Lock Control Unit Reference Values

ECS009J7

SHIFT LOCK HARNESS CONNECTOR TERMINAL LAYOUT



SHIFT LOCK CONTROL UNIT INSPECTION TABLE

Data are reference values.

Terminal No. (Wire color)		Item	Condition	Judgement standard
(+)	(-)			
1 (W)	8 (B)	Power source	Always	Battery voltage
2 (L)	8 (B)	Detent switch (key)	The position when the key is inserted and the selector lever is set to a position other than the “P” position, or when it is shifted from the “R” to the “P” position	Battery voltage
			Except the above	Approx. 0V
4 (R/G)	8 (B)	Stop lamp switch	When brake pedal is depressed	Battery voltage
			When brake pedal is released	Approx. 0V
5 (P)	8 (B)	Vehicle speed signal	—	—
6 (G)	8 (B)	Ignition signal	Ignition switch: “ON”	Battery voltage
			Ignition switch: “OFF”	Approx. 0V
7 (R/W)	8 (B)	Shift lock solenoid	When the brake pedal is depressed	Battery voltage
			Ignition switch: “ON” and vehicle speed is less than 8 km/h (5 MPH)	Approx. 0V
8 (B)	–	Ground	Always	Approx. 0V
9 (G/W)	8 (B)	Key lock signal	When the selector lever is set to a position other than the “P” position	Battery voltage for approx. 0.1 sec. (Note)
			Except the above	Approx. 0V
10 (W/G)	8 (B)	Key unlock signal	When the selector lever is set to the“ P” position	Battery voltage for approx. 0.1 sec. (Note)
			Except the above	Approx. 0V

NOTE:

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

Component Inspection

ECS009J8

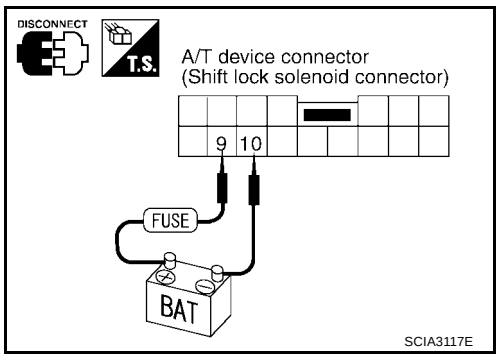
SHIFT LOCK SOLENOID

- Check operation by applying battery voltage to A/T device connector.

CAUTION:

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

Terminal
9 (Battery voltage) - 10 (Ground)

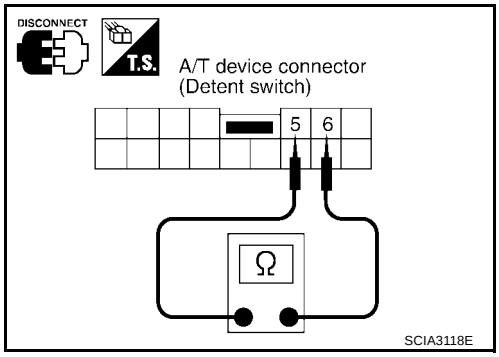


DETENT SWITCH

For Key:

- Check continuity between terminals of the A/T device connector.

Condition	Terminal	Continuity
The position when the selector lever is set to a position other than the “P” position, or when it is shifted from the “R” to the “P” position	5 - 6	Yes
Except the above		No



KEY LOCK SOLENOID

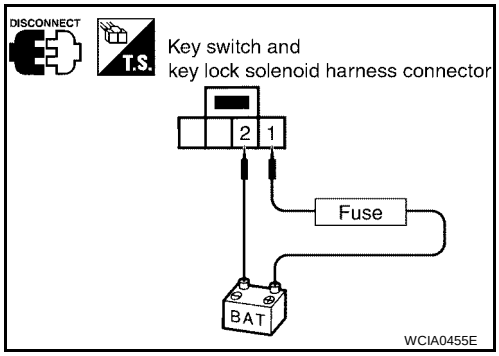
Key Lock

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

CAUTION:

Be careful not to cause burnout of the harness.

Terminal
1 (Battery voltage) - 2 (Ground)



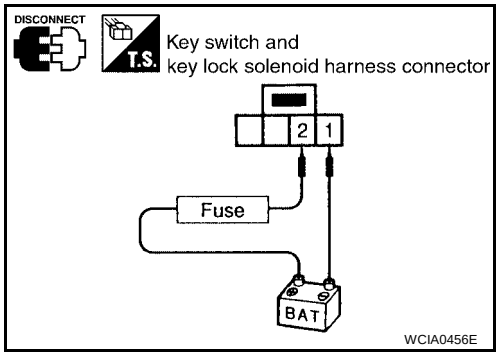
Key Unlock

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

CAUTION:

Be careful not to cause burnout of the harness.

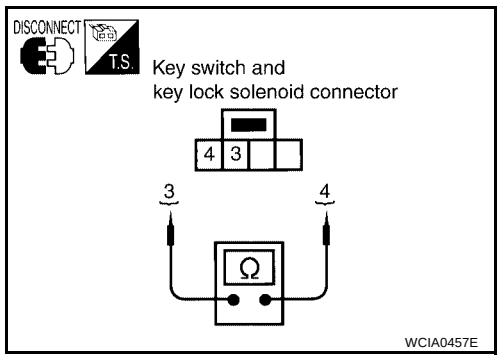
Terminal
2 (Battery voltage) - 1 (Ground)



KEY SWITCH

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

Condition	Terminal	Continuity
Key inserted	3 - 4	Yes
Key removed		No

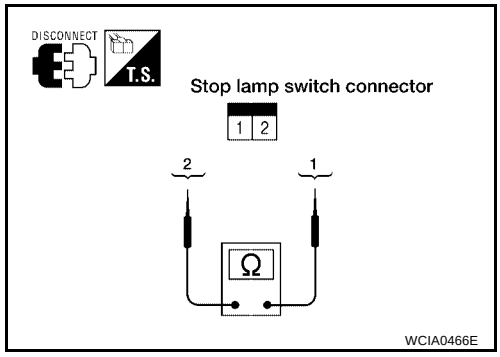


STOP LAMP SWITCH

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

Condition	Terminal	Continuity
When brake pedal is depressed	1 - 2	Yes
When brake pedal is released		No

Check stop lamp switch after adjusting brake pedal. Refer to BR-6, "Inspection and Adjustment" .



ON-VEHICLE SERVICE

PFP:00000

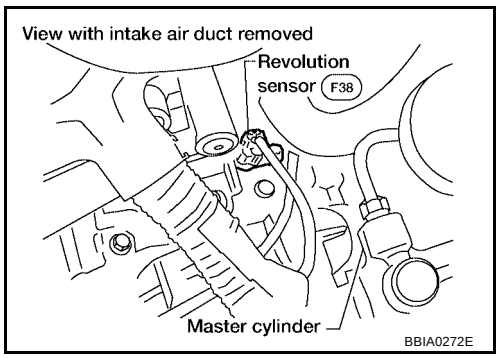
Revolution Sensor Replacement

ECS009J9

1. Remove intake air duct.
2. Disconnect electrical connector.
3. Remove revolution sensor from A/T.

   CAUTION:
   Do not damage the revolution sensor or transaxle case.
4. Installation is in the reverse order of removal.

   CAUTION:
   Do not reuse seal bolt.



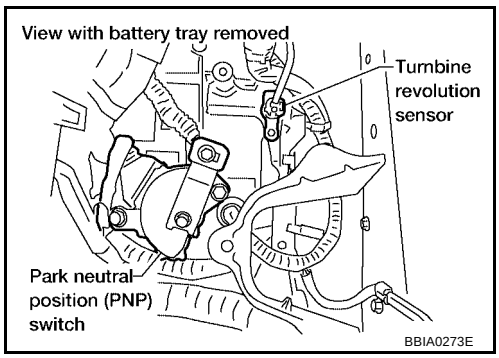
Turbine Revolution Sensor Replacement

ECS009JA

1. Remove battery and bracket.
2. Disconnect electrical connector.
3. Remove bolt and turbine revolution sensor from A/T.

   CAUTION:
   Do not damage the turbine revolution sensor or transaxle case.
4. Installation is in the reverse order of removal.

   CAUTION:
   Do not reuse seal bolt.

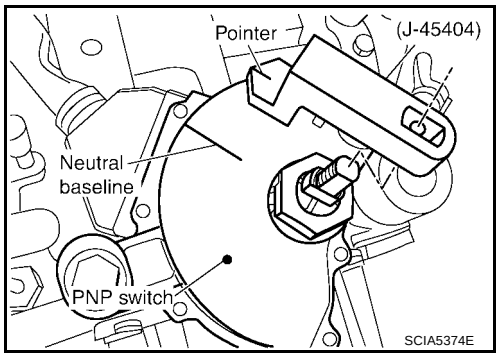


Park/Neutral Position (PNP) Switch Adjustment

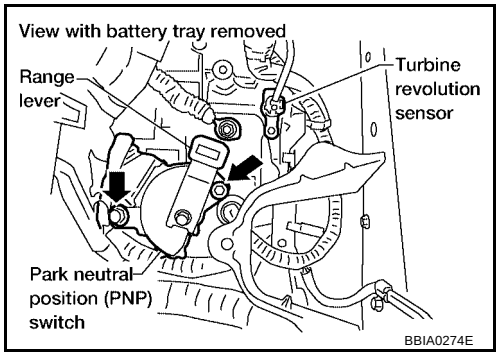
ECS009JB

1. Remove battery and bracket.
2. Remove cable from range lever.
3. Set range lever in neutral position.
4. Remove range lever and install Tool.

   Tool number : KV991J0060 (J-45404)
5. Loosen park/neutral position (PNP) switch bolts.
6. Adjust PNP switch so that Tool pointer aligns with neutral base line on PNP switch body.



7. Tighten PNP switch bolts.
8. Reinstall range lever and cable.
9. Adjust control cable. Refer to AT-628, "Control Cable Adjustment" .
10. Reinstall battery and bracket.
11. Check continuity of PNP switch. Refer to AT-482, "Component Inspection" .



ATF Cooler

ECS009JC

REMOVAL

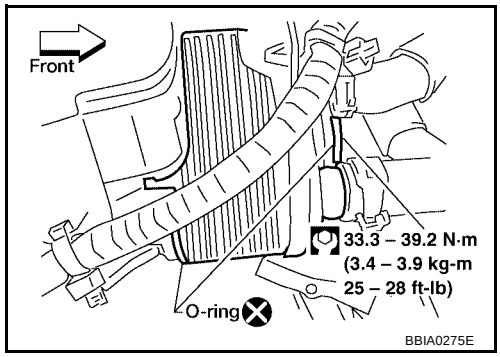
1. Drain ATF. Refer to AT-398, "Changing A/T Fluid" .
2. Drain engine coolant. Refer to MA-23, "DRAINING ENGINE COOLANT" .
3. Remove hose clamps and hoses from ATF cooler.
4. Remove bolt from ATF cooler and remove ATF cooler.

INSTALLATION

Installation is in the reverse order of removal.

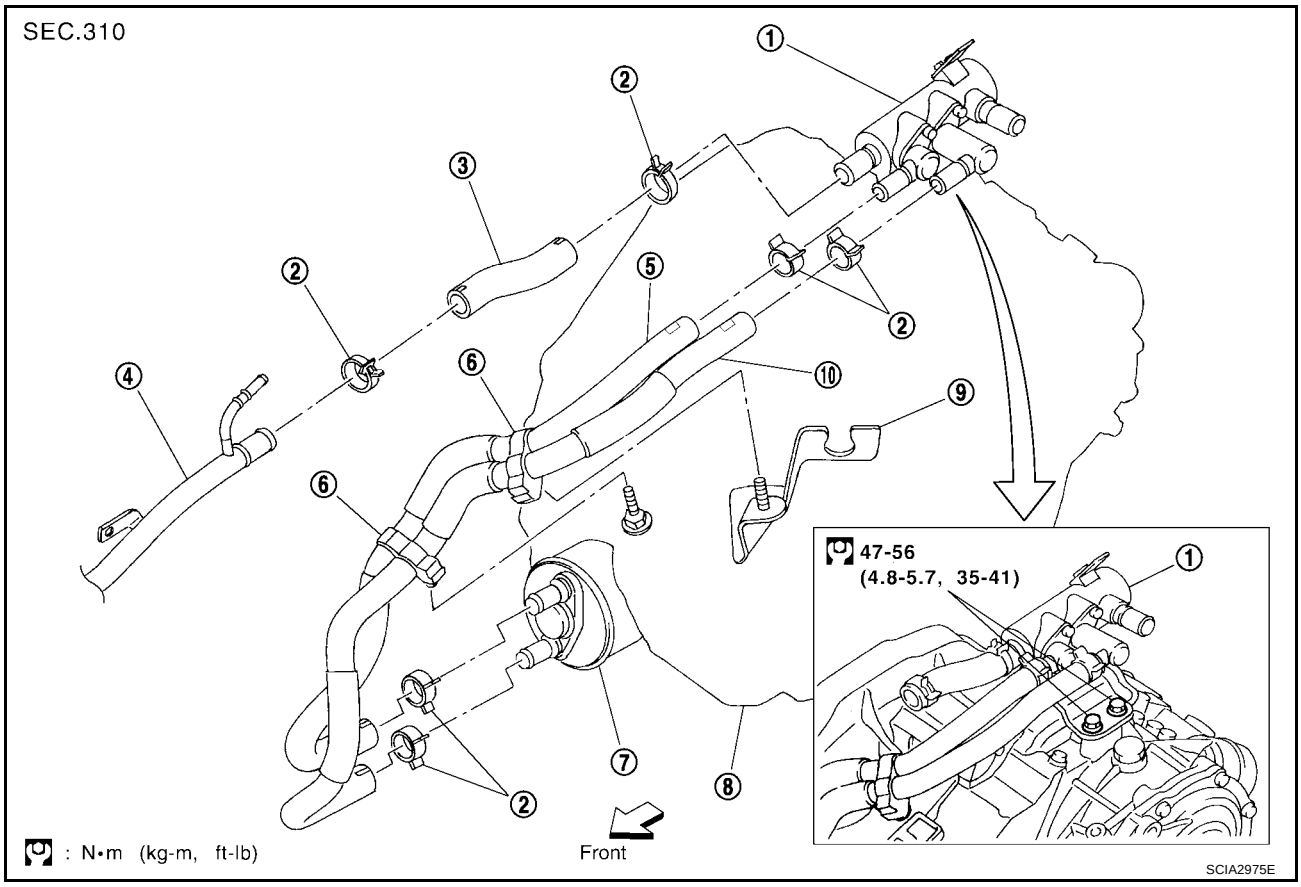
CAUTION:

Do not reuse sealing parts.



ATF Cooler Valve

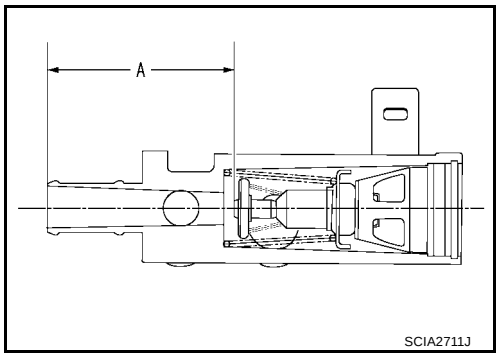
ECS009JD



1. ATF cooler valve assembly
2. Hose clamp
3. Heater hose
4. Heater pipe
5. Outlet water hose
6. Hose clip
7. ATF cooler assembly
8. Transaxle assembly
9. Control cable bracket
10. Inlet water hose

COMPONENT INSPECTION

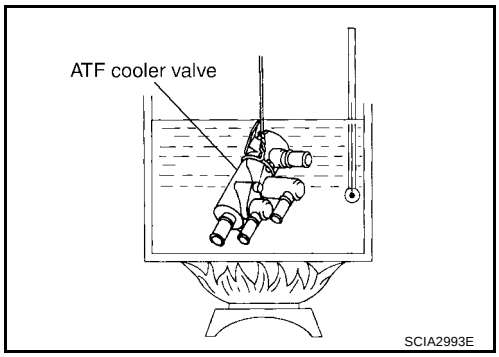
1. Make sure that ATF cooler valve is fully opened at room temperature.



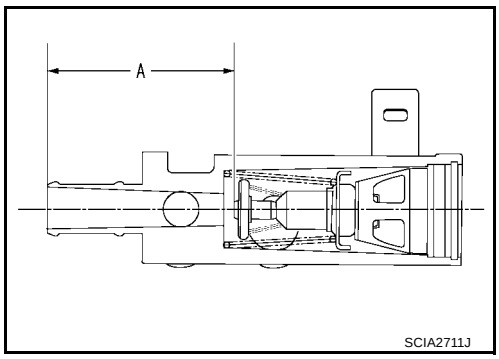
Dimension "A": More than 72.0 mm (2.835 in)

A: Distance between ATF cooler valve port end face and valve shaft end face.

2. Submerge ATF cooler valve in a water-filled container, and then heat it up with temperature of over 82°C (180°F) for 10 minutes more.



3. Make sure that ATF cooler valve is fully closed.



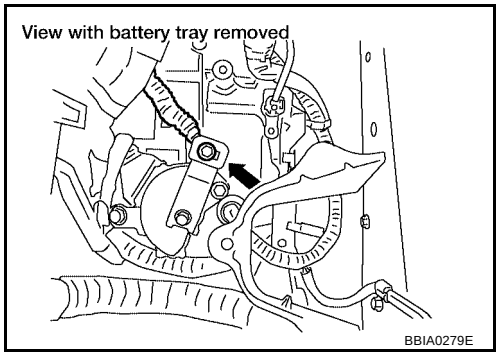
Dimension "A": Less than 66.5 mm (2.618 in)

A: Distance between ATF cooler valve port end face and valve shaft end face.

Control Cable Adjustment

ECS009JE

Move selector lever from the P position to the D position. You should be able to feel the detent in each position. If the detent cannot be felt or the pointer indicating the position is improperly aligned, the control cable needs adjustment.



1. Place selector lever in the P position.

CAUTION:
Turn wheels more than 1/4 turn and apply the parking brake.

2. Loosen control cable lock nut.
3. Using the specified force, push control cable in the direction of the arrow shown.

Specified force : 9.8 N (1.0 kg, 2.2 lb)

4. Tighten control cable lock nut.
5. Move selector lever from P to D position. Make sure that selector lever moves smoothly.
   - **Make sure that the starter operates when the selector lever is placed in the N or P position.**
   - **Make sure that the transmission is locked properly when the selector lever is placed in the P position.**

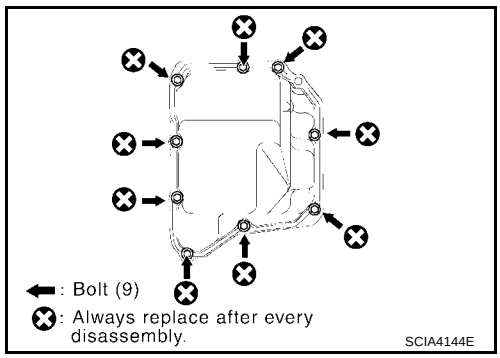
Side cover

ECS009JF

REMOVAL

1. Remove engine under cover.
2. Drain ATF. Refer to AT-398, "Changing A/T Fluid" .
3. Remove side cover bolts and side cover.

CAUTION:
Do not reuse sealing bolts.



INSTALLATION

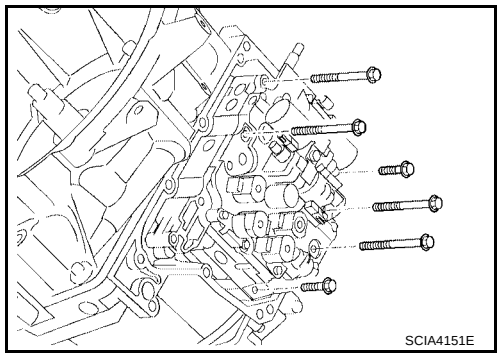
Installation is in the reverse order of removal.

Control Valve Assembly

ECS009JG

REMOVAL

1. Remove side cover. Refer to AT-629, "Side cover" .
2. Disconnect solenoid valve connectors.
3. Disconnect control valve assembly bolts and remove control valve assembly.



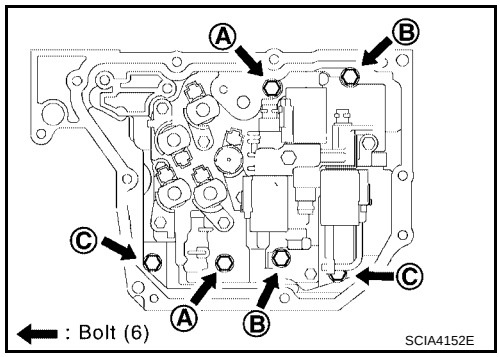
INSTALLATION

Installation is in the reverse order of removal.

- Install bolts in sequence as shown.

Specified torque : Refer to AT-634, "Components" .

Bolt symbol	Length mm (in)	Number of bolts
A	55 (2.17)	2
B	50 (1.97)	2
C	16 (0.63)	2



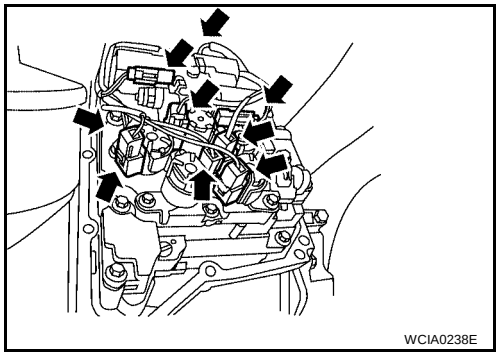
Terminal Cord Assembly

ECS009JH

REMOVAL

1. Remove PNP switch. Refer to AT-634, "Components" .
2. Remove side cover. Refer to AT-629, "Terminal Cord Assembly" .

3. Disconnect solenoid valve connectors.
4. Remove terminal cord assembly.



INSTALLATION

Installation is in the reverse order of removal.

REMOVAL AND INSTALLATION

PFP:00000

Removal

ECS009JI

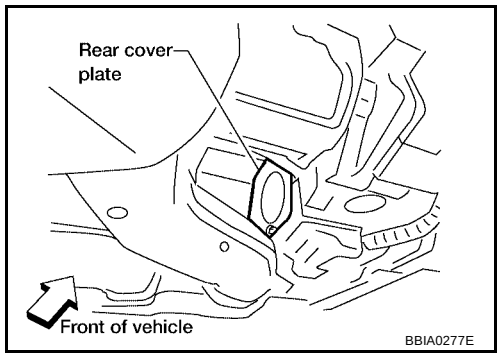
CAUTION:

- **When removing the transaxle assembly from engine, first remove the crankshaft position sensor from the assembly.**
- **Do not damage sensor edge.**

1. Drain engine coolant. Refer to MA-23, "DRAINING ENGINE COOLANT" .
2. Remove battery and bracket.
3. Remove air cleaner assembly. Refer to EM-120, "AIR CLEANER AND AIR DUCT" .
4. Disconnect the following connectors:
   - terminal cord assembly
   - park/neutral position (PNP) switch
   - revolution sensor
   - vehicle speed sensor
   - mass air flow sensor
   - turbine revolution sensor
   - ground

   NOTE:
   To prevent mis-connect, revolution sensor harness connector is color taped for identification.
5. Remove ATF cooler valve assembly bracket bolts.
6. Disconnect ATF cooler line retainers.
7. Disconnect ATF cooler lines from ATF cooler valve assembly.
8. Disconnect control cable at transaxle side.
9. Drain ATF. Refer to AT-398, "Changing A/T Fluid" .
10. Remove push clips and engine undercover.
11. Remove upper transaxle to engine bolts.
12. Support engine using suitable tool.
13. Remove drive shafts. Refer to FAX-11, "Removal and Installation" .
14. Remove crankshaft position sensor from transaxle.
15. Support transaxle with a suitable jack.
16. Remove starter motor from transaxle. Refer to FAX-11, "Removal and Installation" .
17. Remove front suspension member. Refer to FSU-15, "Removal and Installation" .
18. Remove rear cover plate and torque converter to drive plate bolts.

    NOTE:
    Rotate crankshaft for access to torque converter to drive plate bolts.
19. Remove lower transaxle to engine bolts.
20. Lower transaxle while supporting it with a jack.
21. If replacing the transaxle as a unit, remove the LH transaxle mount from the transaxle case.



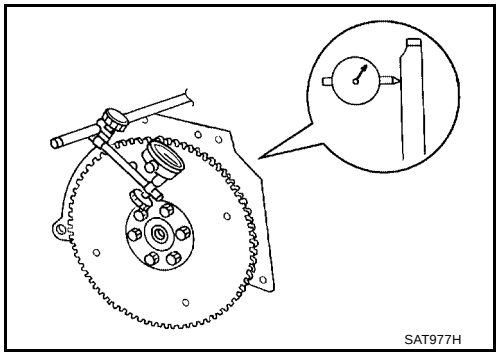
Inspection After Removal

ECS009JJ

Check the drive plate runout as shown.

If this runout is out of allowance, replace drive plate and ring gear. Refer to AT-702, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

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


SAT977H

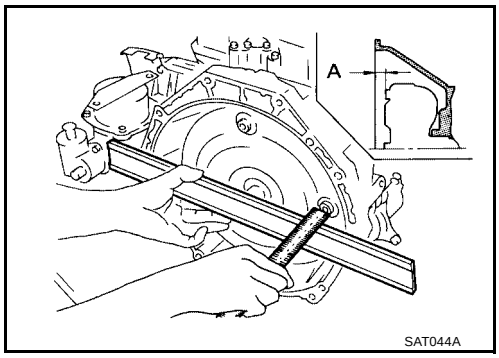
Installation

ECS009JK

CAUTION:
- **When replacing an engine or transmission you must make sure the dowels are installed correctly during re-assembly.**
- **Improper alignment caused by missing dowels may cause vibration, oil leaks or breakage of drive train components.**

1. When connecting torque converter to transaxle, measure distance “A” to be certain that they are correctly assembled.

   Distance “A” : 14.0 mm (0.551 in) or more

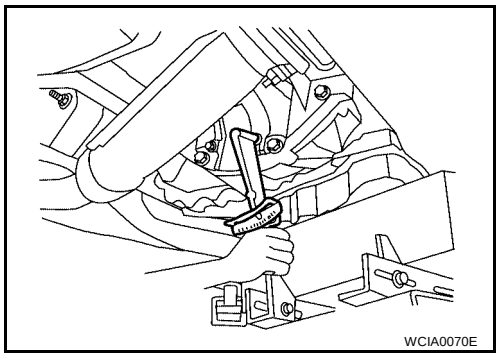


SAT044A

2. Install the torque converter to drive plate.

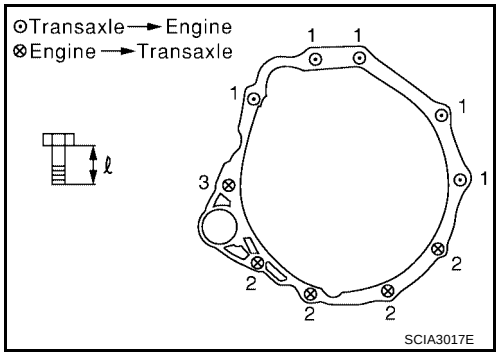
   Torque converter to drive plate bolts : 49 - 58 N·m (5.0 - 5.9 kg-m, 37 - 42 ft-lb)

   NOTE:
   With converter installed, rotate crankshaft several turns to check that transaxle rotates freely without binding.


WCIA0070E

3. Tighten bolts securing transaxle.

Bolt No.	Tightening torque N·m (kg-m, ft-lb)	ℓ mm (in)
1	70 - 79 (7.2 - 8.0, 52 - 58)	55 (2.17)
2	41.2 - 52.0 (4.2 - 5.3, 31 - 38)	40 (1.57)
3	70 - 79 (7.2 - 8.0, 52 - 58)	55 (2.17)

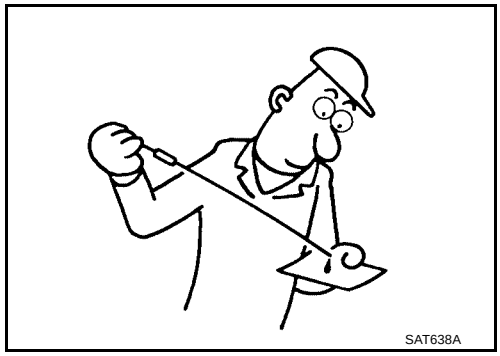


SCIA3017E

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

NOTE:
To prevent mis-connect, revolution sensor harness connector is color taped for identification.

- Check fluid level in transaxle.
- Move selector lever through all positions to be sure that transaxle operates correctly.
  With parking brake applied, run engine at idle. Move selector lever through N to D and to R position. A slight shock should be felt through selector knob each time transaxle is shifted.
- When replacing the A/T assembly, initialize TCM. Refer to AT-390, "Precautions for A/T Assembly or TCM Replacement" .
- Perform road test. Refer to AT-444, "ROAD TEST" .


SAT638A

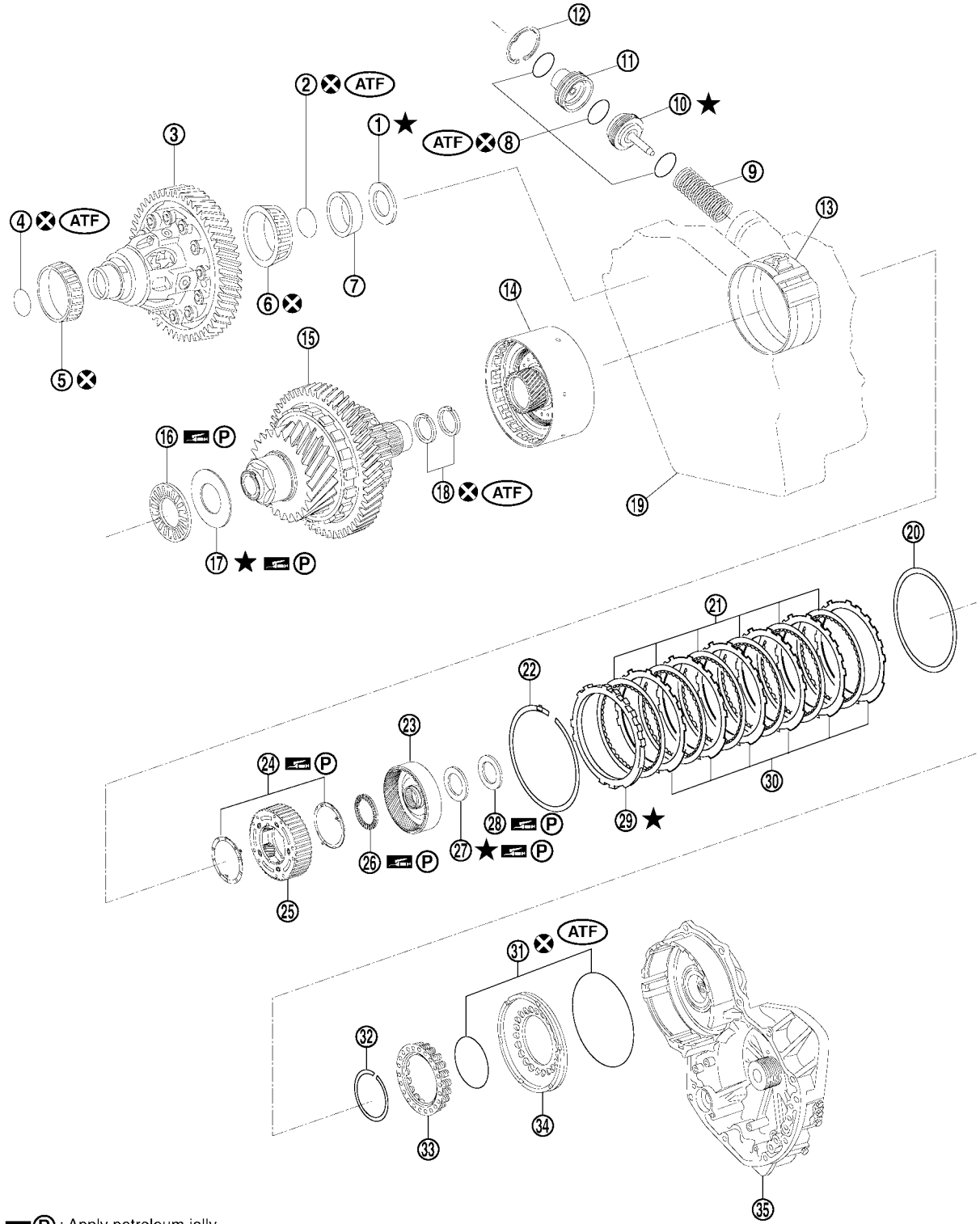
OVERHAUL

PFP:00000

Components

ECS009JL

SEC.313・314・315・316

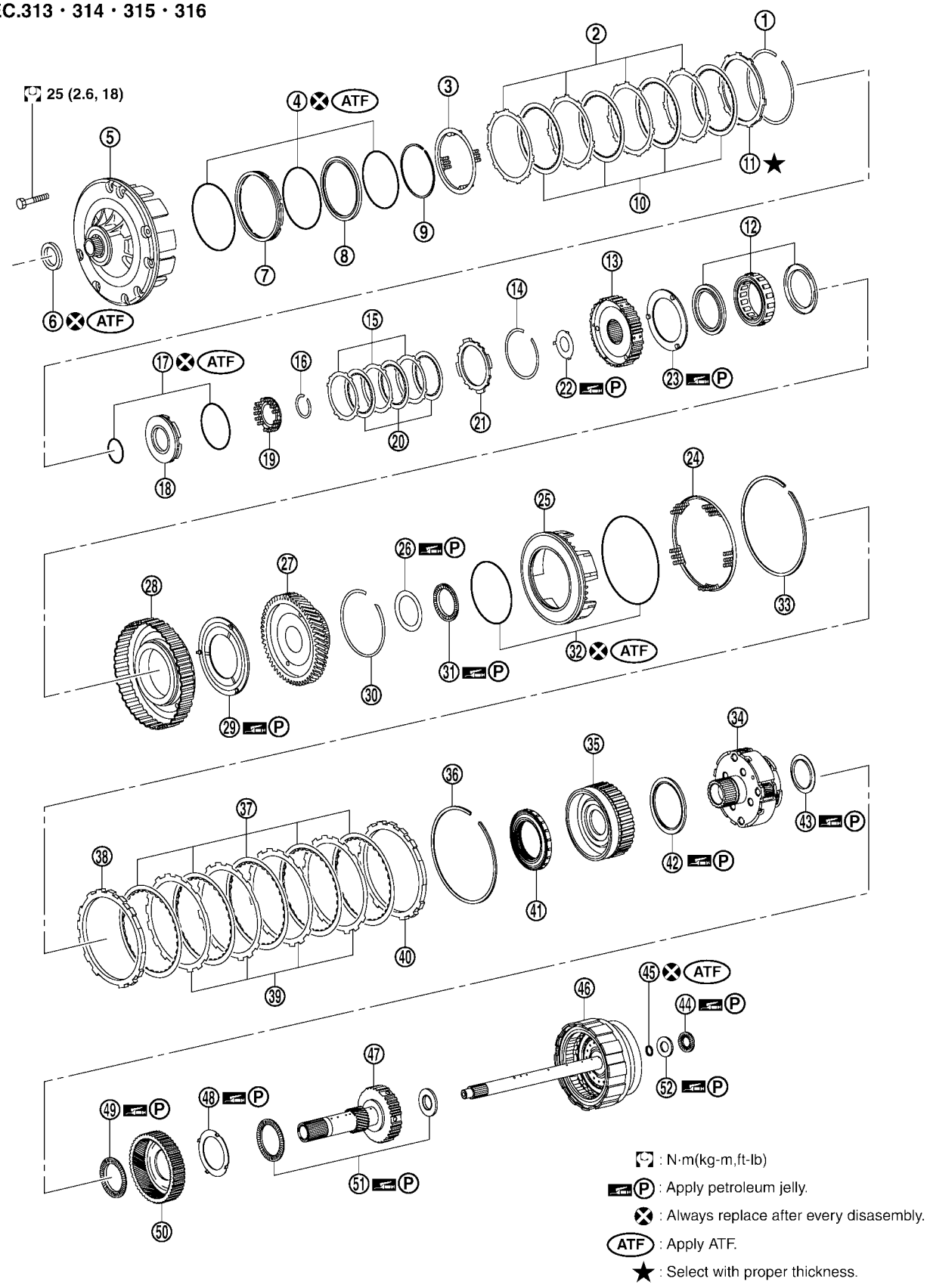


Ⓟ : Apply petroleum jelly.
ATF : Apply ATF.
★ : Select with proper thickness.
⊗ : Always replace after every disassembly

WCIA0334E

1. Adjust shim
2. O-ring
3. Differential gear assembly
4. O-ring
5. Tapered roller bearing
6. Tapered roller bearing
7. Outer race
8. O-ring
9. Compression spring
10. U/D brake piston assembly
11. U/D brake damper assembly
12. Snap ring
13. U/D brake band assembly
14. U/D clutch assembly
15. U/D gear assembly
16. Thrust needle roller bearing
17. Thrust bearing race
18. Seal ring
19. Transaxle case
20. B5 brake cushion plate
21. B5 brake disc
22. Snap ring
23. U/D RR planetary ring gear sub assembly
24. Thrust bearing race
25. U/D RR planetary carrier assembly
26. Thrust needle roller bearing
27. Adjusting shim
28. Thrust bearing race
29. B5 brake flange
30. B5 brake plate
31. O-ring
32. Snap ring
33. Return spring
34. B5 brake piston
35. Transaxle case cover

SEC.313 · 314 · 315 · 316

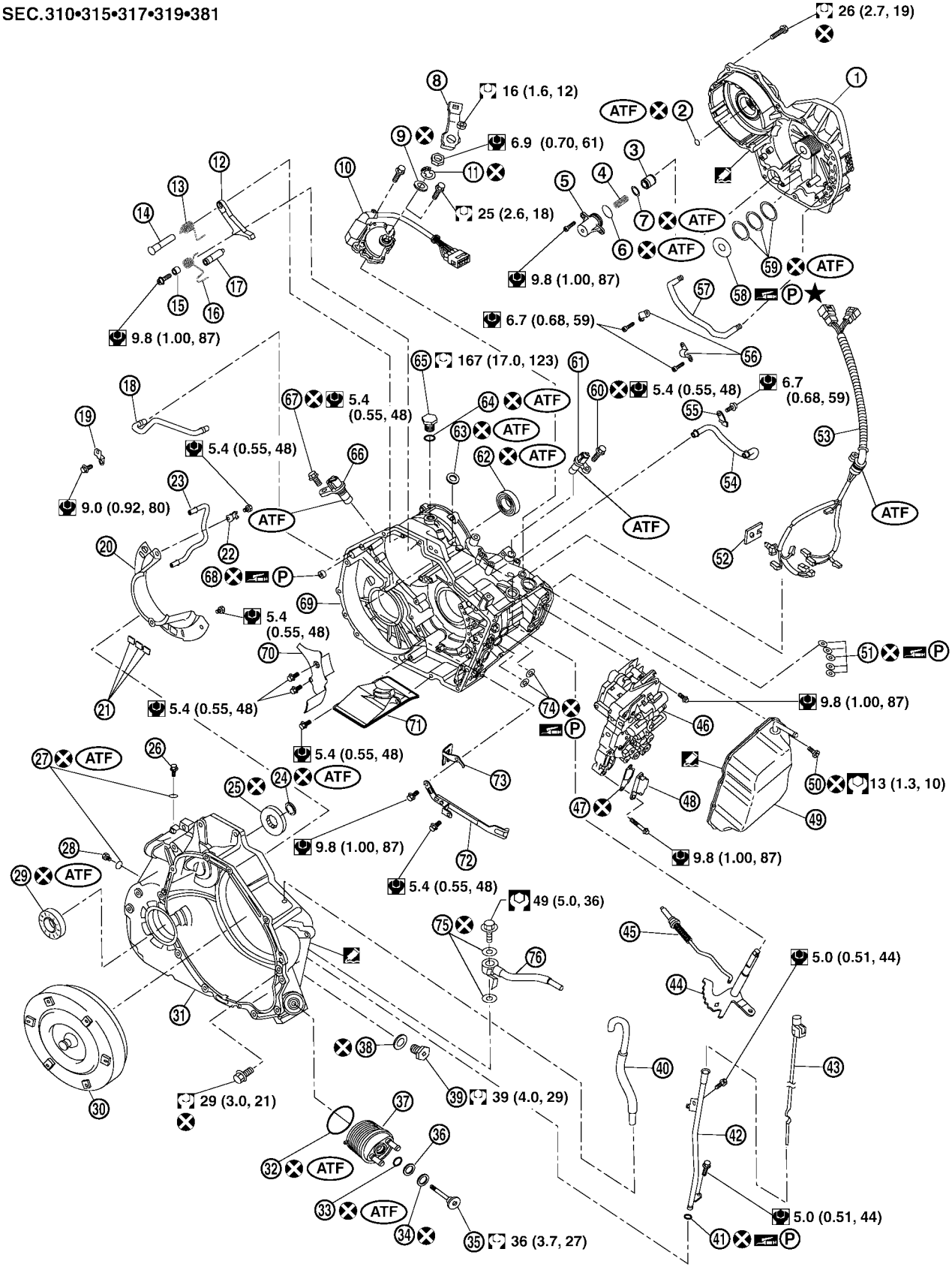


1. Snap ring
2. 2nd brake plate
3. Return spring
4. O-ring
5. Oil pump assembly
6. Oil seal
7. 2nd brake piston
8. 2nd brake sleeve
9. Snap ring

10. 2nd brake disc
11. 2nd brake flange
12. One-way clutch No.1
13. 2nd coast brake hub
14. Snap ring
15. 2nd coast brake plate
16. Snap ring
17. O-ring
18. 2nd coast brake piston
19. Return spring
20. 2nd coast brake disc
21. 2nd coast brake flange
22. Thrust washer
23. Thrust washer
24. Return spring
25. 1st and reverse brake piston
26. Thrust bearing race
27. Counter drive gear sub assembly
28. One-way clutch outer race sub assembly
29. Thrust washer
30. Snap ring
31. Thrust bearing
32. O-ring
33. Snap ring
34. Planetary gear assembly
35. FR planetary ring gear assembly
36. Snap ring
37. 1st and reverse brake disc
38. 1st and reverse brake flange
39. 1st and reverse brake plate
40. 1st and reverse brake flange
41. One-way clutch No.2
42. Thrust bearing
43. Thrust bearing race
44. Thrust needle roller bearing
45. Seal ring
46. Forward and direct clutch assembly
47. Planetary sun gear sub assembly
48. Thrust bearing race
49. Thrust needle roller bearing
50. RR planetary ring gear assembly
51. Thrust needle roller bearing
52. Thrust bearing race

9J500 MODELS

SEC.310•315•317•319•381



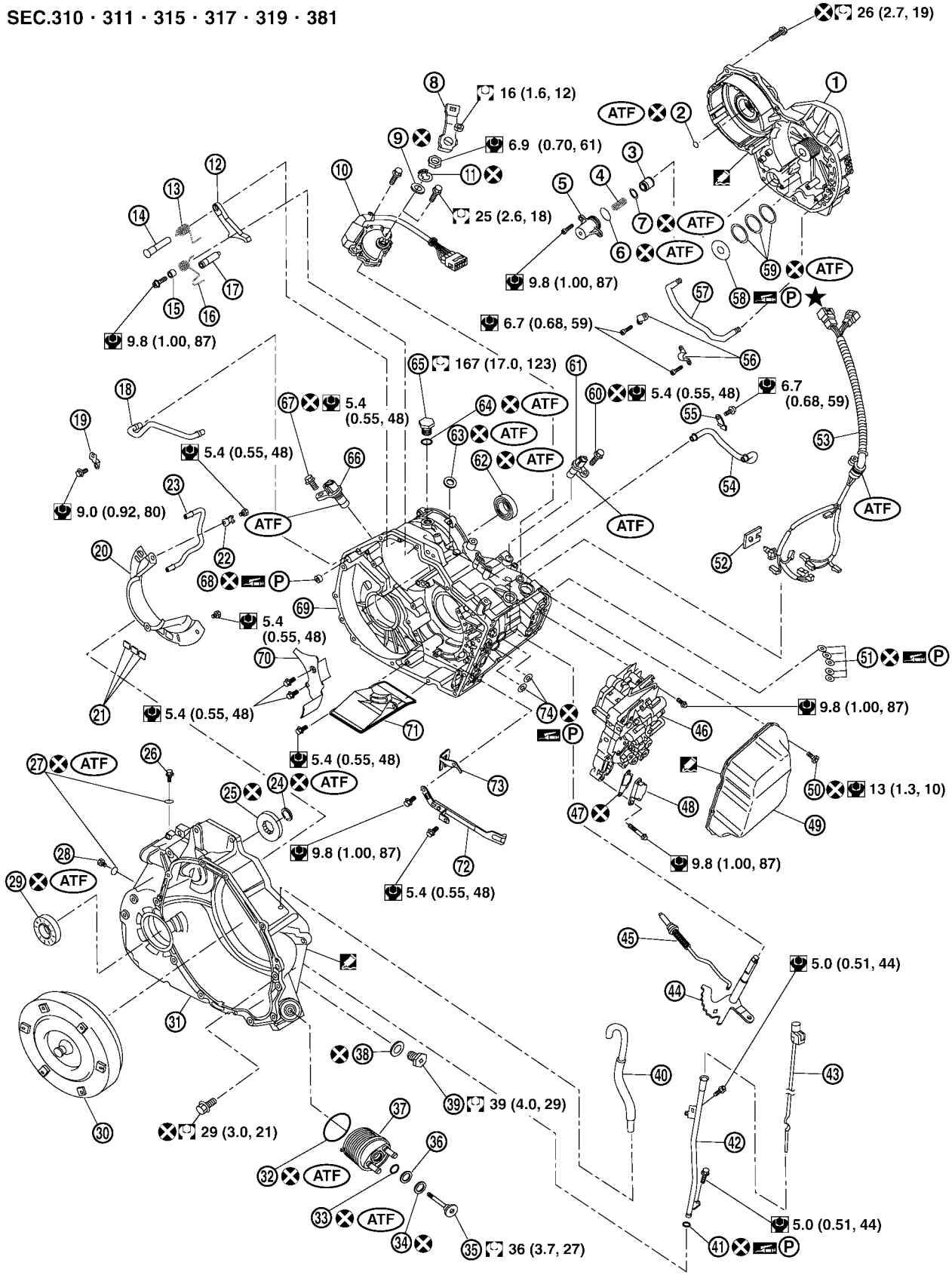
WCIA0557E

1. Transaxle case cover
2. Seal ring
3. Forward clutch accumulator piston
4. Compression spring
5. Accumulator cover
6. O-ring

7. Seal ring
8. Range lever
9. Washer plate
10. PNP switch
11. Lock washer
12. Parking lock pawl
13. Torsion spring No.1
14. Parking lock pawl shaft
15. Spring guide sleeve
16. Torsion spring No.2
17. Parking lockpin sub assembly
18. U/D brake apply tube sub assembly
19. Tube clamp
20. Oil reservoir plate
21. Oil cleaner magnet
22. Tube clamp
23. Differential gear lube apply tube
24. Seal ring
25. Thrust roller bearing
26. Straight screw plug
27. O-ring
28. Straight screw plug
29. Differential side oil seal
30. Torque converter
31. Transaxle housing
32. O-ring
33. O-ring
34. Spring washer
35. Hexagon bolt
36. Washer
37. ATF cooler assembly
38. gasket
39. Drain plug
40. Breather hose
41. O-ring
42. A/T fluid charging pipe
43. A/T fluid level gauge
44. Manual valve lever sub assembly
45. Parking lock rod sub assembly
46. Control valve assembly
47. Suction cover gasket
48. Suction cover
49. Side cover
50. Seal bolt
51. Governor apply gasket
52. Sensor clamp
53. Terminal cord assembly
54. Transaxle lube apply tube
55. Tube clamp
56. Tube clamp
57. U/D clutch apply tube sub assembly
58. Bearing race
59. Seal ring
60. Seal bolt
61. Turbine revolution sensor
62. Differential side oil seal
63. Manual valve oil seal
64. O-ring
65. Anchor bolt
66. Revolution sensor
67. Seal bolt
68. Governor apply gasket
69. Transaxle case
70. Oil reservoir plate
71. Oil strainer sub assembly
72. Manual detent spring sub assembly
73. Parking lock pawl bracket
74. Governor apply gasket
75. Copper washer
76. A/T fluid cooler tube

8Y100 MODELS

SEC.310 · 311 · 315 · 317 · 319 · 381



1. Transaxle case cover
2. Seal ring
3. Forward clutch accumulator piston
4. Compression spring
5. Accumulator cover
6. O-ring

7. Seal ring
8. Range lever
9. Washer plate
10. PNP switch
11. Lock washer
12. Parking lock pawl
13. Torsion spring No.1
14. Parking lock pawl shaft
15. Spring guide sleeve
16. Torsion spring No.2
17. Parking lockpin sub assembly
18. U/D brake apply tube sub assembly
19. Tube clamp
20. Oil reservoir plate
21. Oil cleaner magnet
22. Tube clamp
23. Differential gear lube apply tube
24. Seal ring
25. Thrust roller bearing
26. Straight screw plug
27. O-ring
28. Straight screw plug
29. Differential side oil seal
30. Torque converter
31. Transaxle housing
32. O-ring
33. O-ring
34. Spring washer
35. Hexagon bolt
36. Washer
37. ATF cooler assembly
38. gasket
39. Drain plug
40. Breather hose
41. O-ring
42. A/T fluid charging pipe
43. A/T fluid level gauge
44. Manual valve lever sub assembly
45. Parking lock rod sub assembly
46. Control valve assembly
47. Suction cover gasket
48. Suction cover
49. Side cover
50. Seal bolt
51. Governor apply gasket
52. Sensor clamp
53. Transmission wire
54. Transaxle lube apply tube
55. Tube clamp
56. Tube clamp
57. U/D clutch apply tube sub assembly
58. Bearing race
59. Seal ring
60. Seal bolt
61. Turbine revolution sensor
62. Differential side oil seal
63. Manual valve oil seal
64. O-ring
65. Anchor bolt
66. Revolution sensor
67. Seal bolt
68. Governor apply gasket
69. Transaxle case
70. Oil reservoir plate
71. Oil strainer sub assembly
72. Manual detent spring sub assembly
73. Parking lock pawl bracket
74. Governor apply gasket

Locations of Needle Bearings, Bearing Races and Thrust Washers

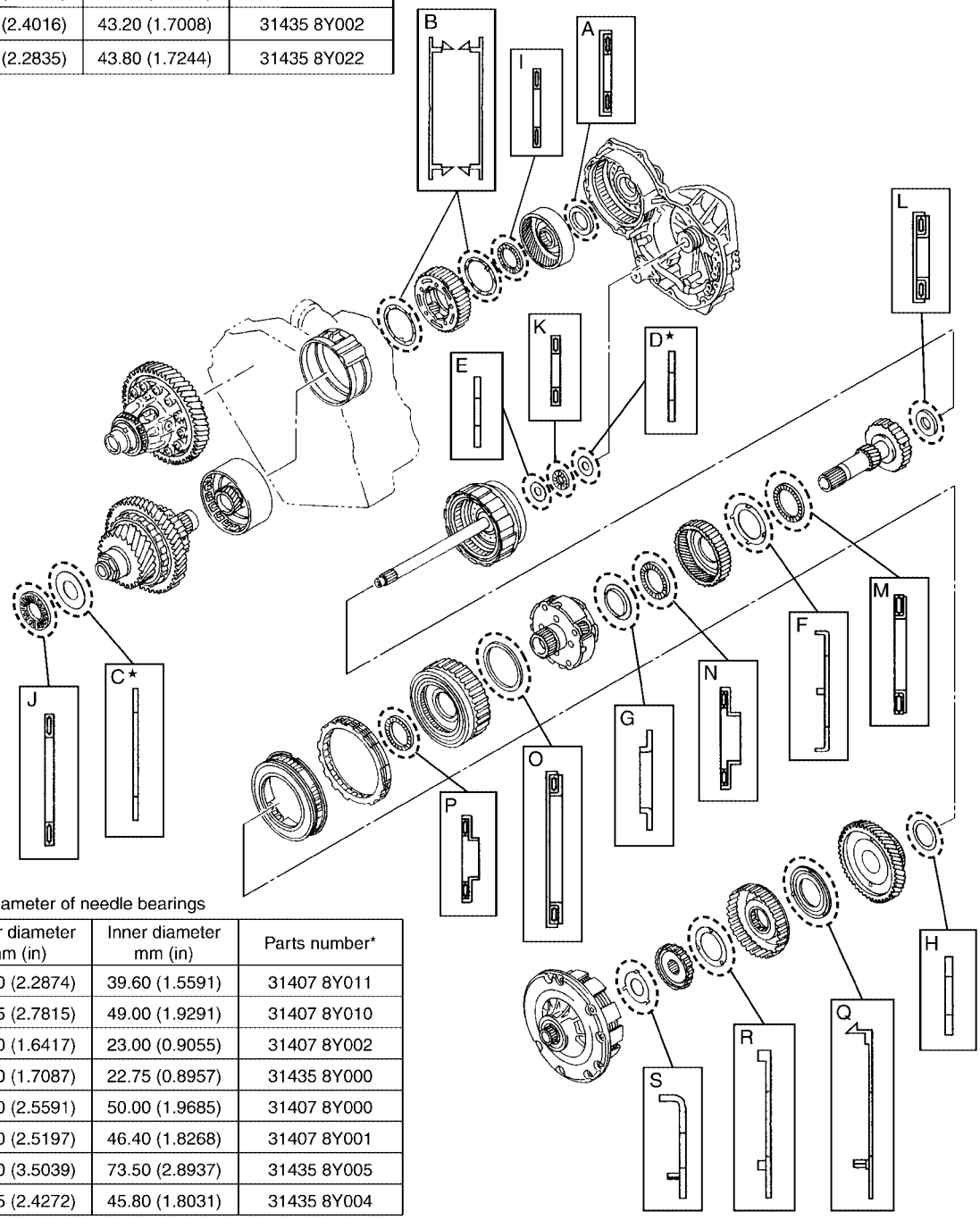
ECS009JM

Outer and inner diameter of bearing races

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
A	57.70 (2.2716)	37.00 (1.4567)	31435 8Y020
B	77.60 (3.0551)	66.80 (2.6299)	31508 8Y010
C★	71.00 (2.7953)	49.10 (1.9331)	31435 8Y021
D★	41.00 (1.6142)	22.00 (0.8661)	31435 8Y060
E	41.00 (1.6142)	13.50 (0.5315)	31435 8Y011
F	74.00 (2.9134)	53.00 (2.0866)	31435 8Y001
G	61.00 (2.4016)	43.20 (1.7008)	31435 8Y002
H	58.00 (2.2835)	43.80 (1.7244)	31435 8Y022

Outer and inner diameter of thrust washers

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
Q	99.30 (3.9094)	56.50 (2.2244)	31508 8Y000
R	77.30 (3.0433)	56.50 (2.2244)	31508 8Y001
S	74.30 (2.9252)	47.00 (1.8504)	31508 8Y002



Outer and inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Parts number*
I	58.10 (2.2874)	39.60 (1.5591)	31407 8Y011
J	70.65 (2.7815)	49.00 (1.9291)	31407 8Y010
K	41.70 (1.6417)	23.00 (0.9055)	31407 8Y002
L	43.40 (1.7087)	22.75 (0.8957)	31435 8Y000
M	65.00 (2.5591)	50.00 (1.9685)	31407 8Y000
N	64.00 (2.5197)	46.40 (1.8268)	31407 8Y001
O	89.00 (3.5039)	73.50 (2.8937)	31435 8Y005
P	61.65 (2.4272)	45.80 (1.8031)	31435 8Y004

★ : Select with proper thickness.
* : Always check with the Parts Department for the latest parts information.

WCIA0336E

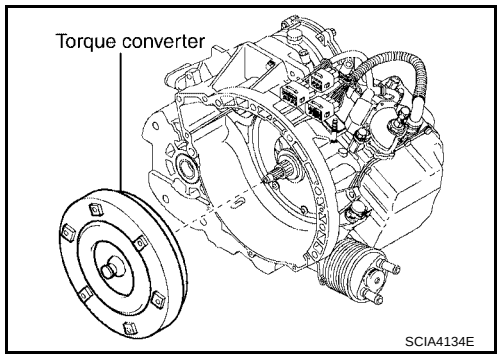
DISASSEMBLY

PFP:31020

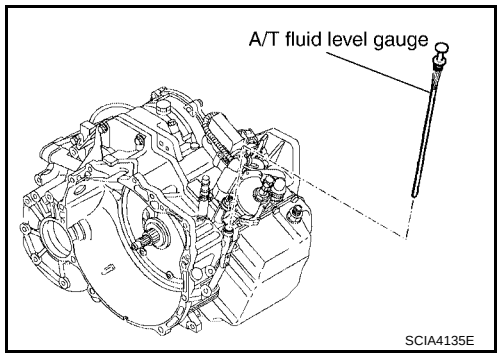
Disassembly

ECS009JN

1. Drain ATF from transaxle. Refer to AT-398, "Changing A/T Fluid" .
2. Remove torque converter from transaxle case by holding it firmly and turning while pulling straight out.

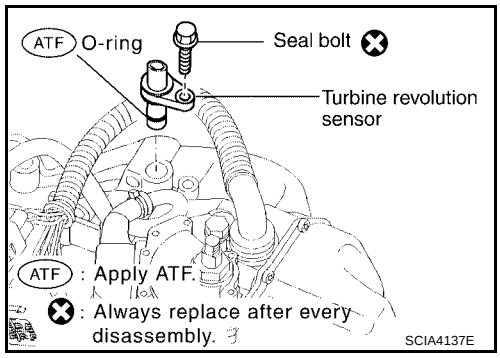


3. Remove A/T fluid level gauge.
4. Remove A/T fluid charging pipe.
5. Remove O-ring from A/T fluid charging pipe.
6. Remove air breather hose.
7. Remove A/T fluid cooler tube.



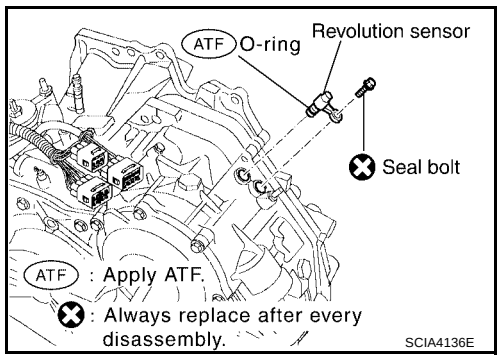
8. Remove turbine revolution sensor.

CAUTION:
Do not damage the turbine revolution sensor or transaxle case.

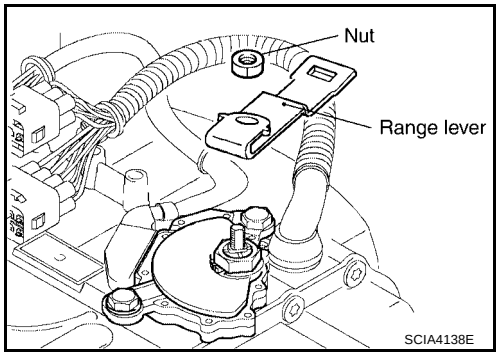


9. Remove revolution sensor.

CAUTION:
Do not damage the revolution sensor or transaxle case.

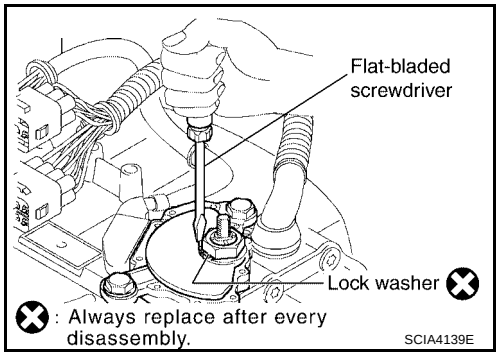


10. Remove nut and range lever.



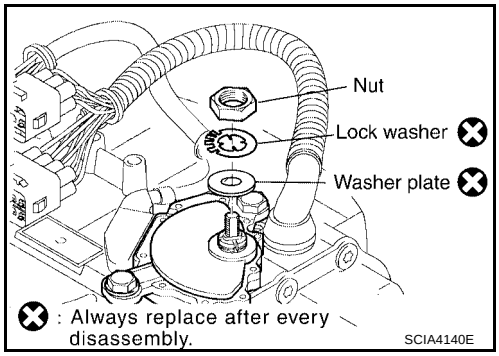
11. Pry off the lock washer using suitable tool.

CAUTION:
Do not reuse lock washer.



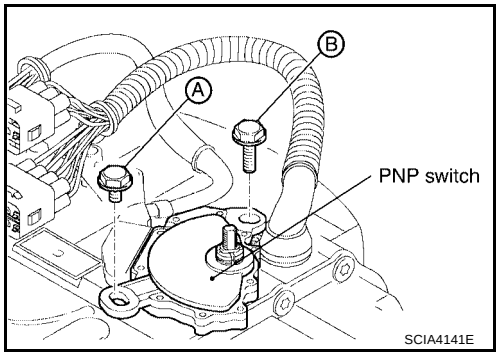
12. Loosen nut and remove lock washer.
13. Remove washer plate.

CAUTION:
Do not reuse washer plate.



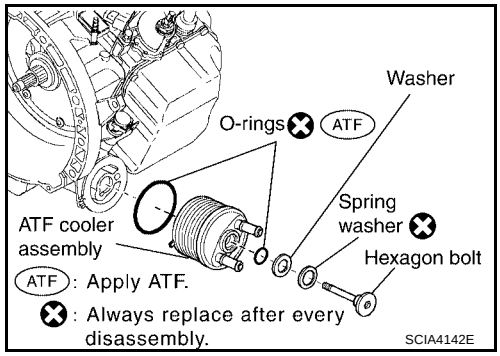
14. Remove PNP switch from transaxle case.

Bolt symbol	Length mm (in)	Number of bolts
A	20 (0.79)	1
B	33 (1.30)	1



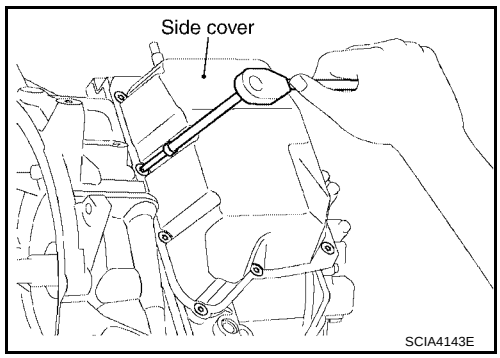
15. Remove hexagon bolt.
16. Remove ATF cooler assembly, washer and spring washer.
17. Remove O-rings from the ATF cooler assembly.

CAUTION:
Do not reuse spring washer or O-rings.

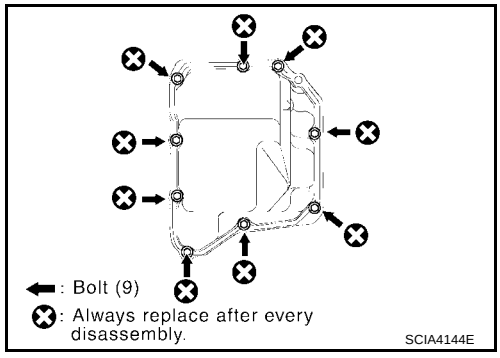


18. Remove side cover.

CAUTION:
- **Do not damage side cover or transaxle case.**

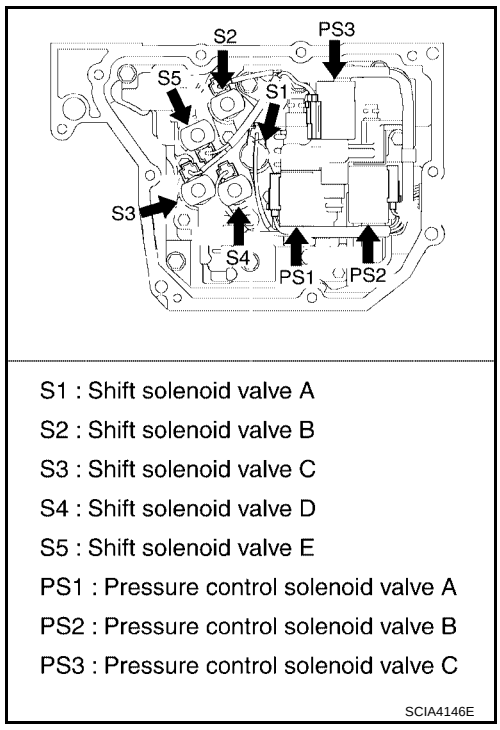


- **Do not reuse seal bolts.**

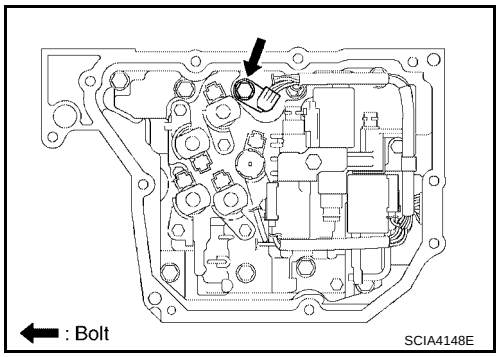


19. Disconnect solenoid connectors.

CAUTION:
Do not damage connector.

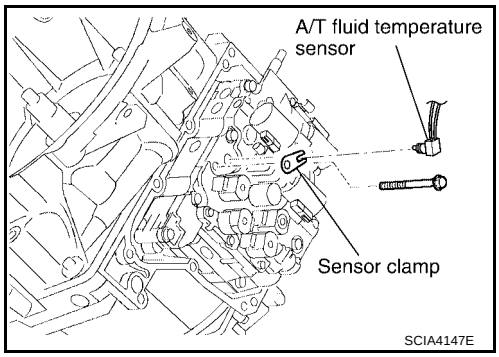


20. Remove sensor clamp bolt.

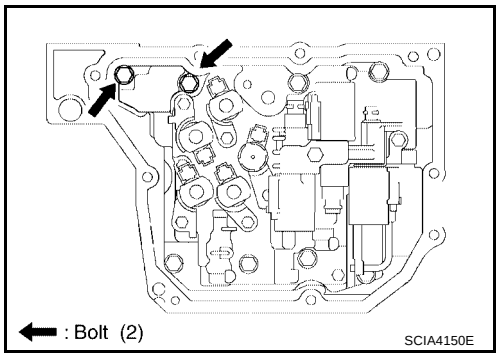


21. Remove sensor clamp and A/T fluid temperature sensor.

CAUTION:
Do not damage A/T fluid temperature sensor.

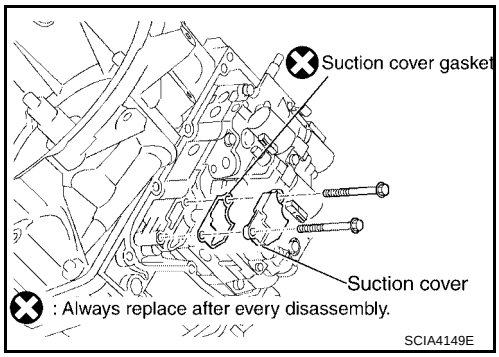


22. Remove suction cover bolts.



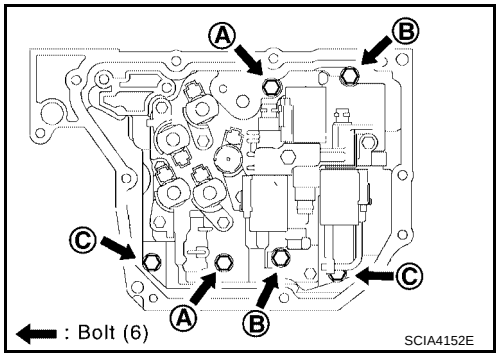
23. Remove suction cover and suction cover gasket.

CAUTION:
Do not reuse gasket.



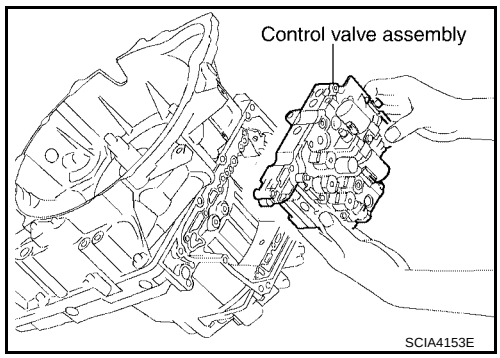
24. Remove control valve assembly bolts from transaxle case.

Bolt symbol	Length mm (in)	Number of bolts
A	55 (2.17)	2
B	50 (1.97)	2
C	16 (0.63)	2



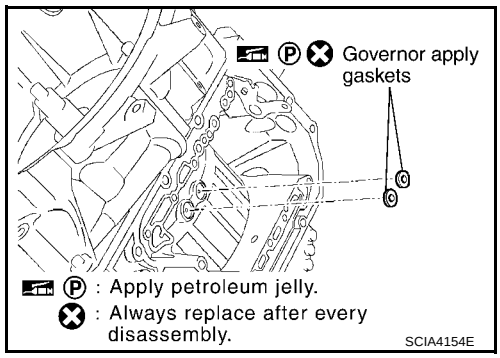
25. While holding control valve assembly, disconnect parking lock rod sub assembly from manual valve lever sub assembly and remove control valve assembly.

NOTE:
Shift position is “N”.



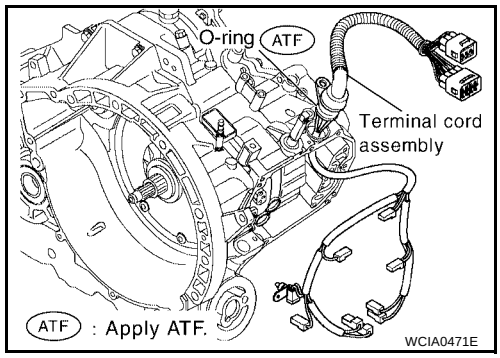
26. Remove governor apply gaskets.

CAUTION:
Do not reuse gaskets.

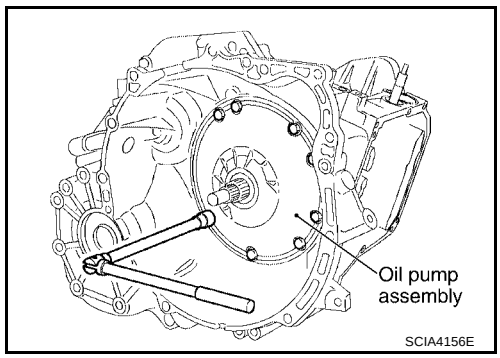


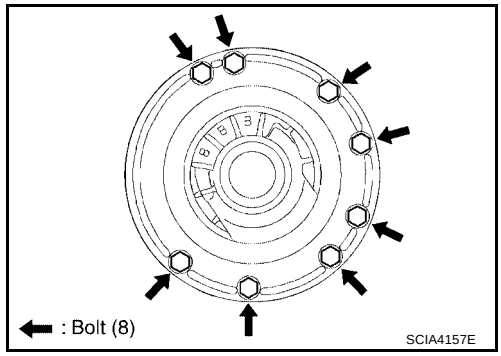
27. Remove terminal cord assembly.

CAUTION:
Do not damage solenoid connectors or A/T fluid temperature sensor.



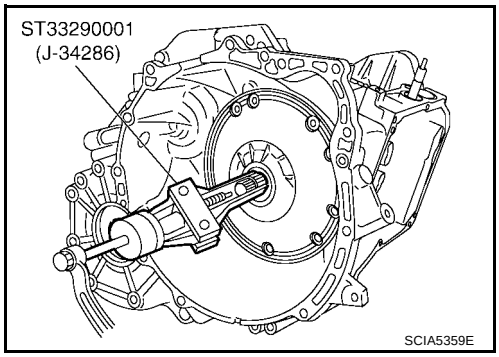
28. Remove oil pump assembly bolts from transaxle case.





29. Remove oil pump assembly using Tool.

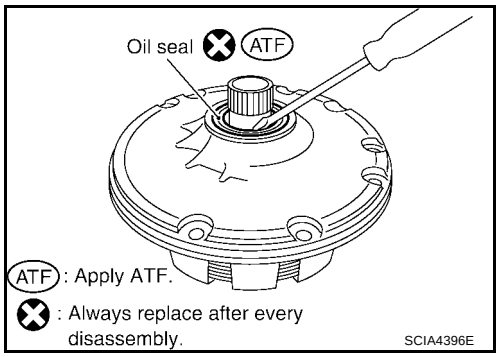
Tool number : ST33290001 (J-34286)



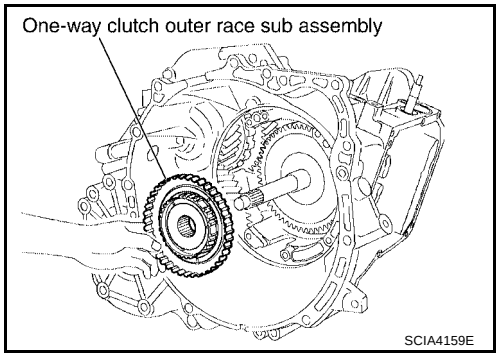
30. Remove oil seal from oil pump assembly using suitable tool.

CAUTION:

- **Do not reuse oil seal.**
- **Do not scratch oil pump assembly.**



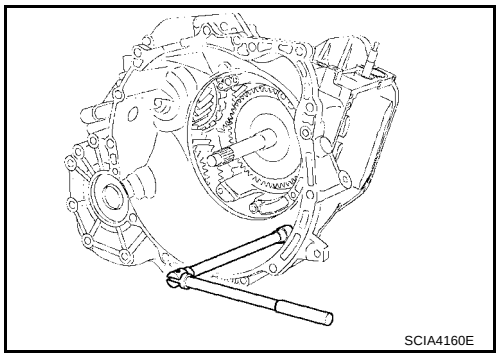
31. Remove one-way clutch outer race sub assembly.
32. Remove thrust washer.

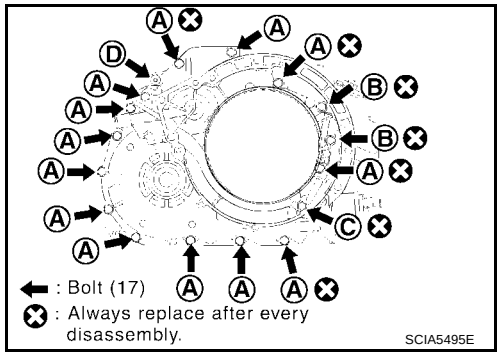


33. Remove transaxle housing bolts from transaxle case.

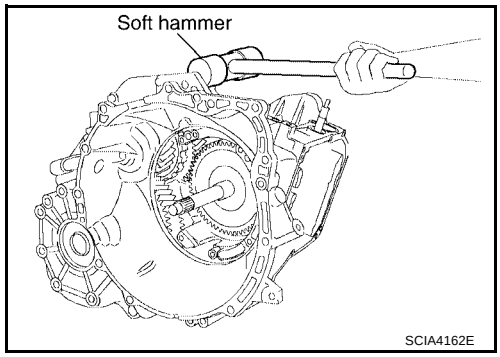
Bolt symbol	Length mm (in)	Number of bolts
A	30 (1.18)	13
B	35 (1.38)	2
C	45 (1.77)	1
D*	—	1

*:Torx bolt





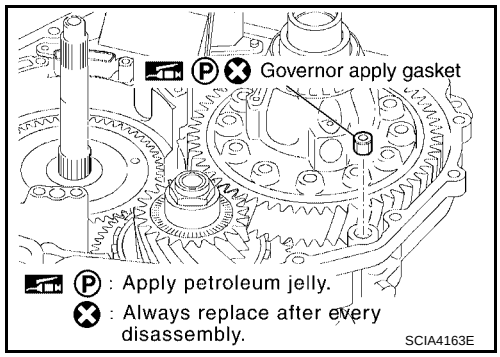
34. Remove transaxle housing using suitable tool.



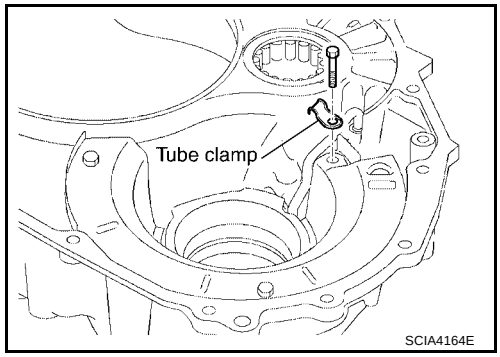
35. Remove governor apply gasket and seal ring.

CAUTION:

Do not reuse gasket and seal ring.



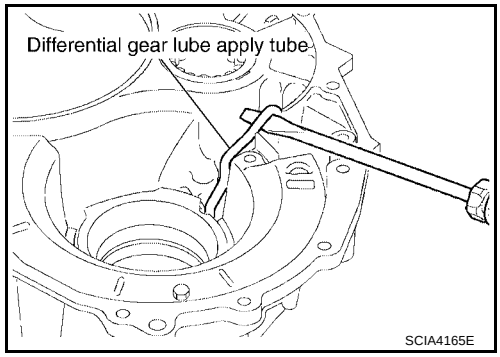
36. Remove tube clamp.



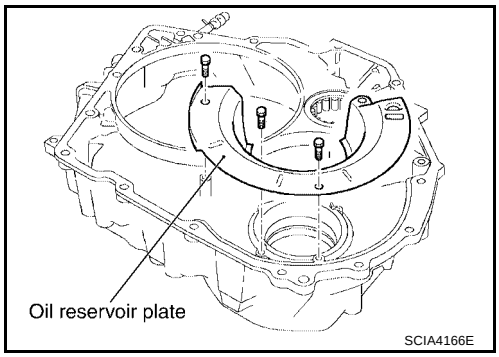
37. Remove differential gear lube apply tube using suitable tool.

CAUTION:

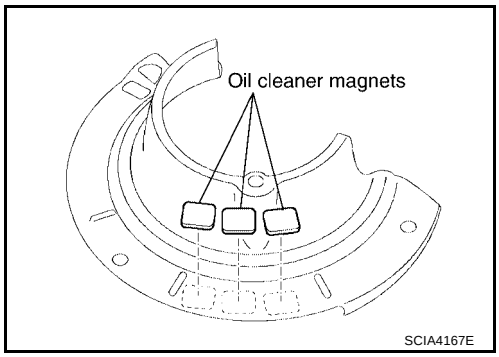
- **Do not bend or damage differential gear lube apply tube.**
- **Do not damage transaxle housing.**



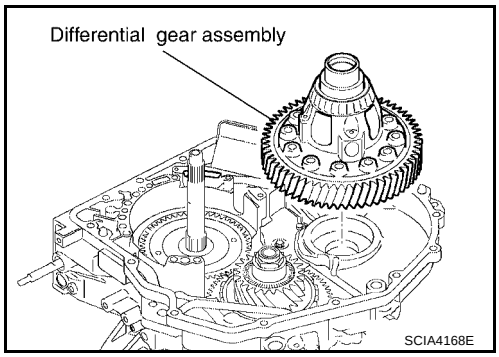
38. Remove oil reservoir plate.



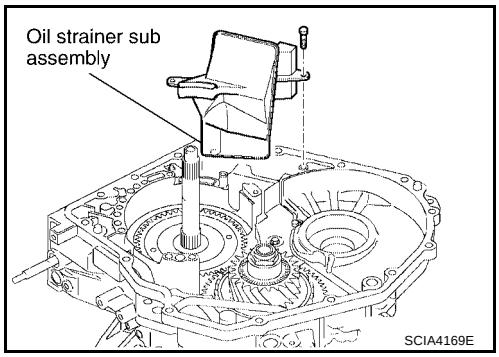
39. Remove oil cleaner magnets from oil reservoir plate.



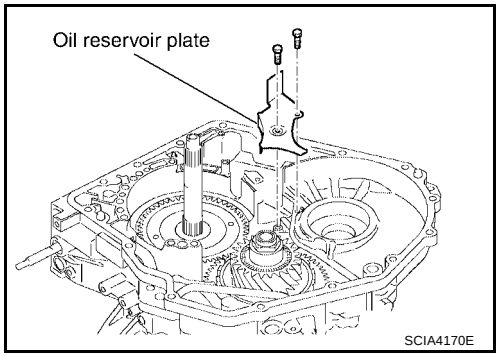
40. Remove differential gear assembly.



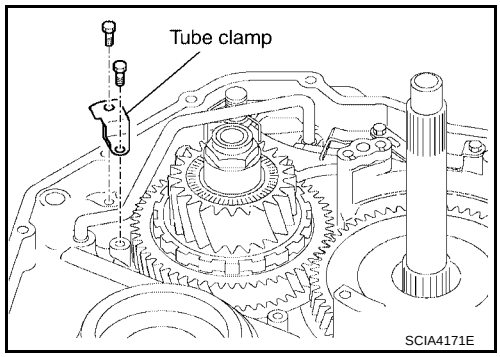
41. Remove oil strainer sub assembly.



42. Remove oil reservoir plate.



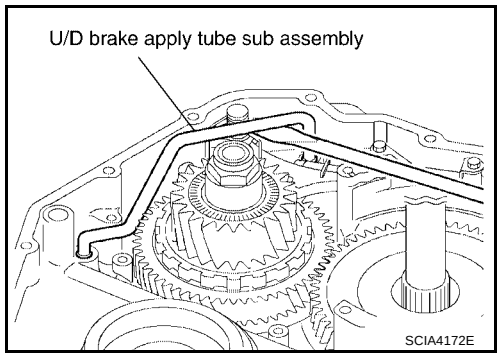
43. Remove tube clamp.



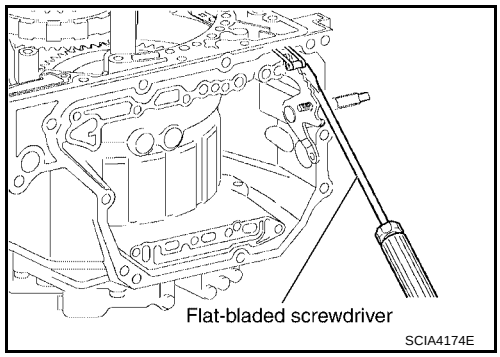
44. Remove U/D brake apply tube sub assembly using suitable tool.

CAUTION:

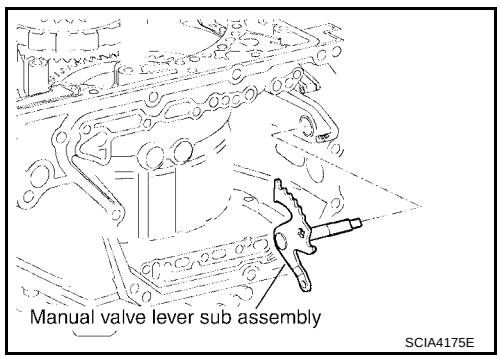
- **Do not bend or damage U/D brake apply tube sub assembly.**
- **Do not damage transaxle case.**



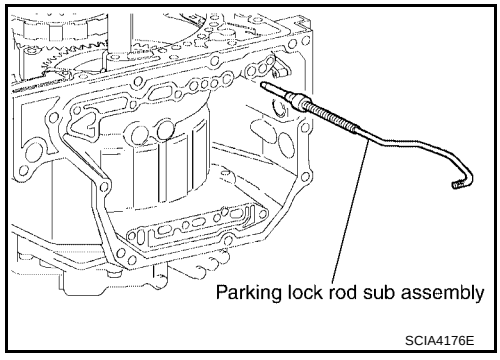
45. Disconnect manual detent spring sub assembly from manual valve lever sub assembly using suitable tool.



46. Remove manual valve lever sub assembly from parking lock rod sub assembly.

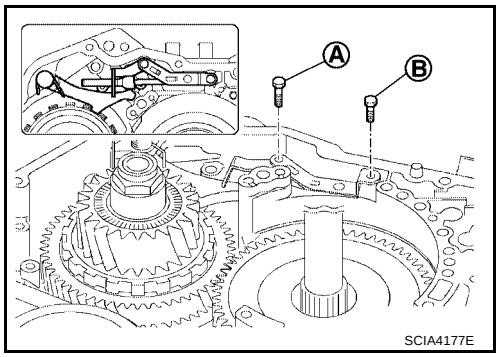


47. Remove parking lock rod sub assembly.

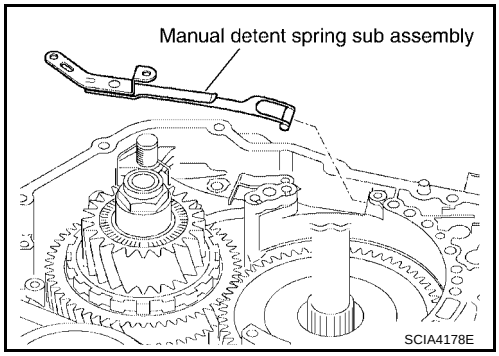


48. Remove bolts for manual detent spring sub assembly.

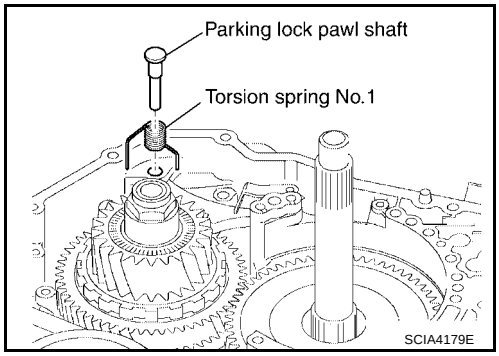
Bolt symbol	Length mm (in)	Number of bolts
A	16.7 (0.657)	1
B	14.0 (0.551)	1



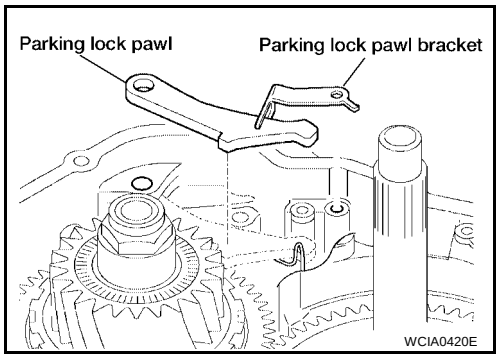
49. Remove manual detent spring sub assembly.



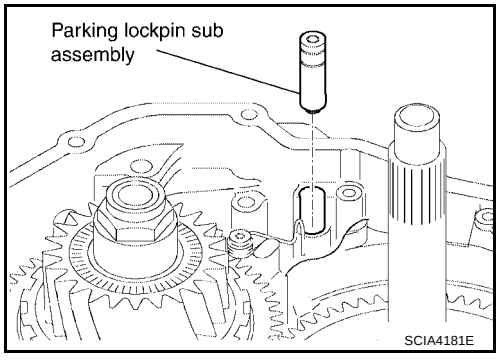
50. Remove parking lock pawl shaft and torsion spring No.1.



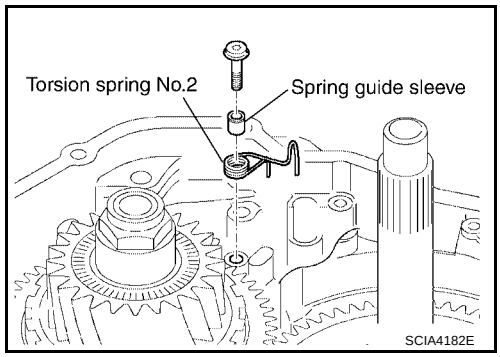
51. Remove parking lock pawl bracket and parking lock pawl.



52. Remove parking lockpin sub assembly.



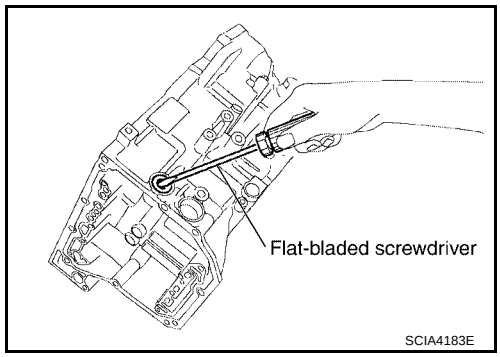
53. Remove spring guide sleeve and torsion spring No.2.



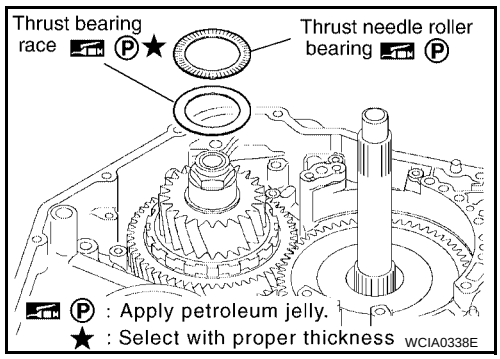
54. Remove manual valve oil seal using suitable tool.

CAUTION:

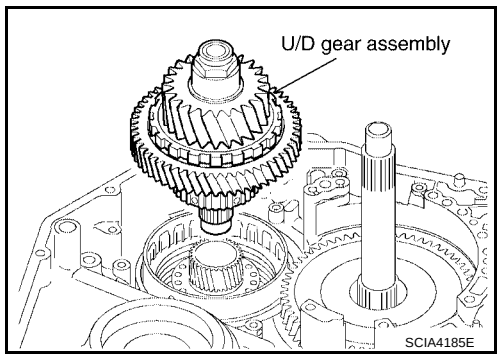
- **Do not reuse oil seal.**
- **Do not damage transaxle case.**



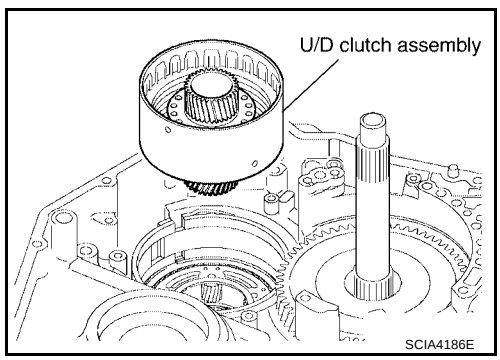
55. Remove thrust needle roller bearing and thrust bearing race from U/D gear assembly.



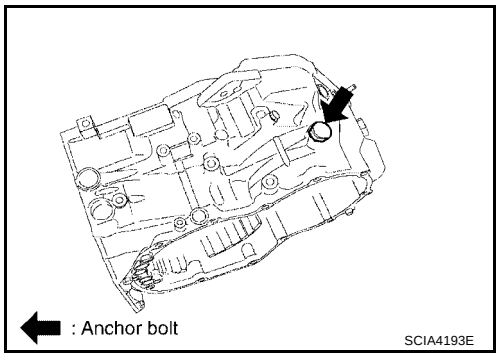
56. Remove U/D gear assembly.
57. Remove seal rings from U/D gear assembly.



58. Remove U/D clutch assembly.

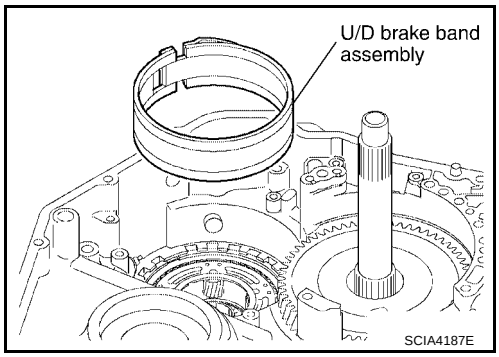


59. Remove anchor bolt.

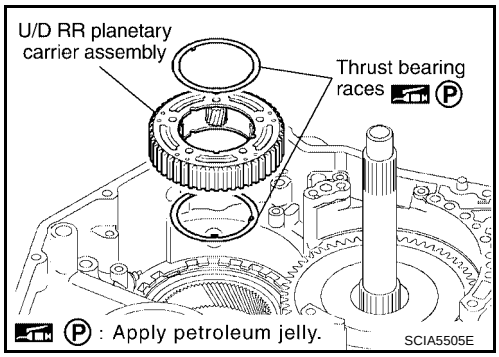


60. Remove U/D brake band assembly.

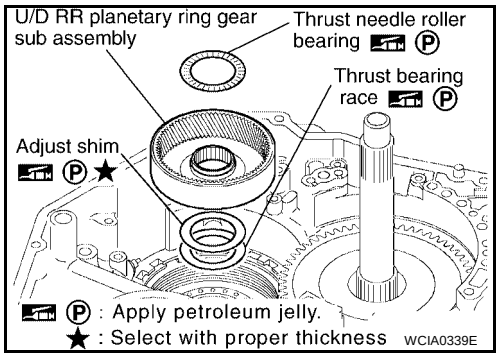
CAUTION:
Do not damage transaxle case.



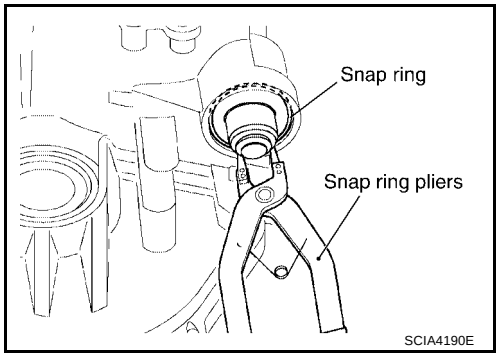
61. Remove U/D RR planetary carrier assembly and thrust bearing races.



62. Remove U/D RR planetary ring gear sub assembly.
63. Remove thrust needle roller bearing adjust shims and thrust bearing race from U/D RR planetary ring gear sub assembly.

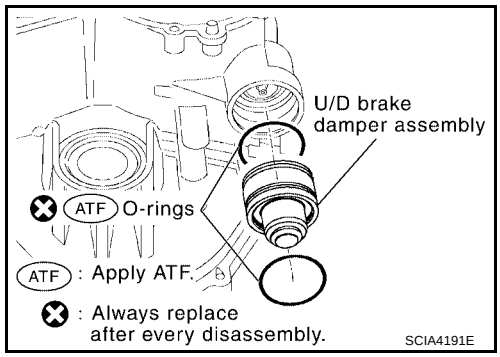


64. Remove snap ring using suitable tool.



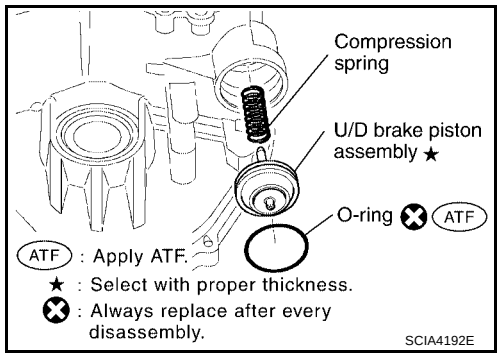
65. Remove U/D brake damper assembly.
66. Remove O-rings from U/D brake damper assembly.

CAUTION:
Do not reuse O-rings.



67. Remove U/D brake piston assembly and compression spring.
68. Remove O-ring from U/D brake piston assembly.

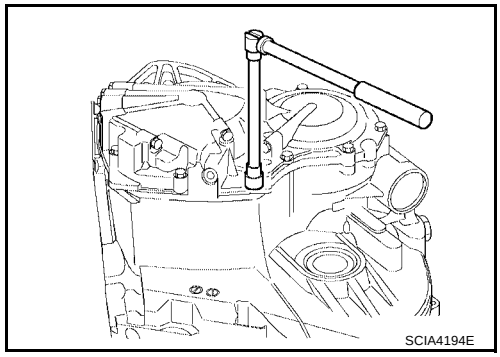
CAUTION:
Do not reuse O-ring.

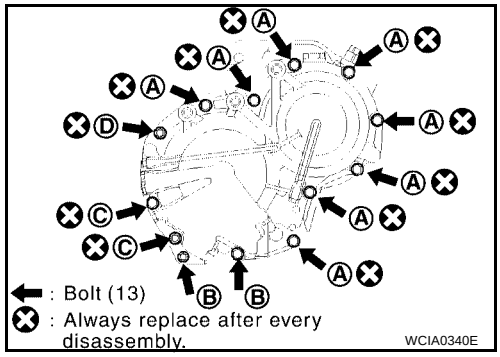


69. Remove transaxle case cover bolts from transaxle case.

Bolt symbol	Length mm (in)	Number of bolts
A	30 (1.18)	8
B	45 (1.77)	2
C	48 (1.89)	2
D*	—	1

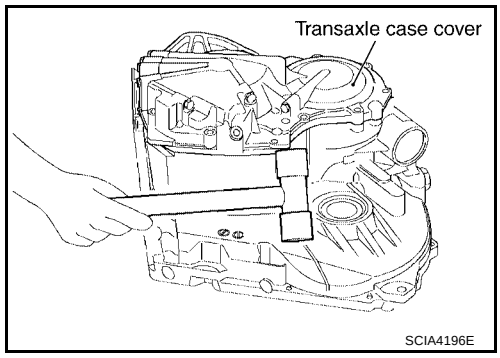
*:Stud bolt



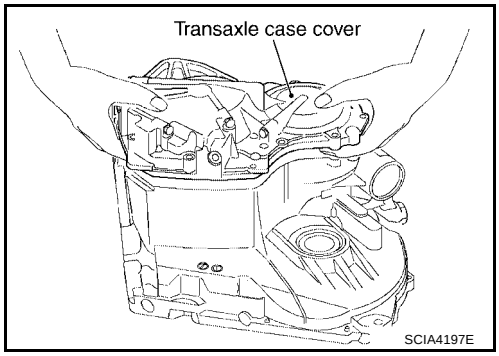


70. Remove the transaxle case cover using suitable tool.

CAUTION:
Do not damage transaxle case cover.

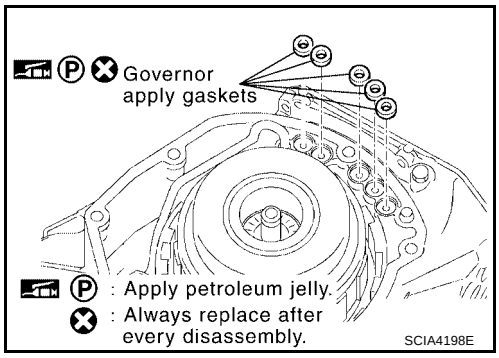


71. Remove transaxle case cover.

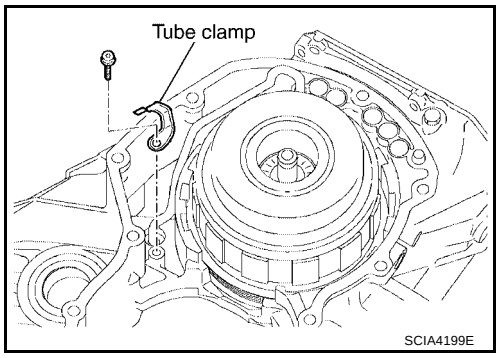


72. Remove governor apply gaskets from transaxle case.

CAUTION:
Do not reuse gaskets.

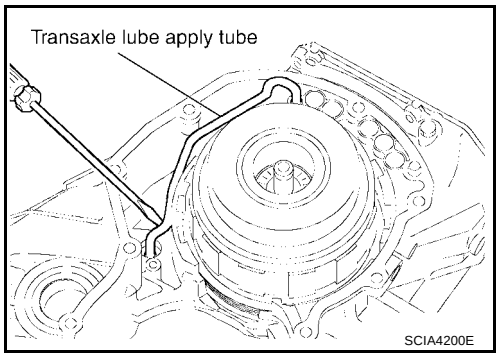


73. Remove tube clamp.



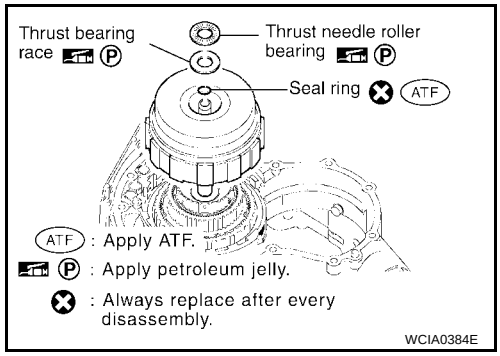
74. Remove transaxle lube apply tube using suitable tool.

CAUTION:
- **Do not bend or damage transaxle lube apply tube.**
- **Do not damage transaxle case.**

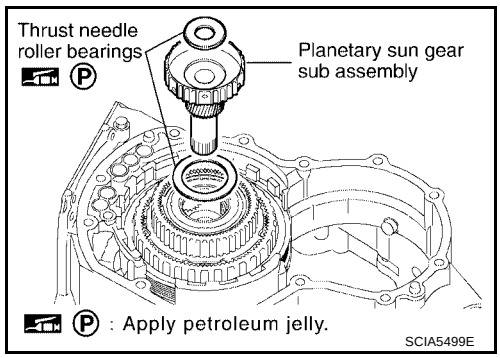


75. Remove forward and direct clutch assembly.
76. Remove thrust bearing race, thrust needle roller bearing and seal ring from forward and direct clutch assembly.

CAUTION:
Do not reuse seal ring.



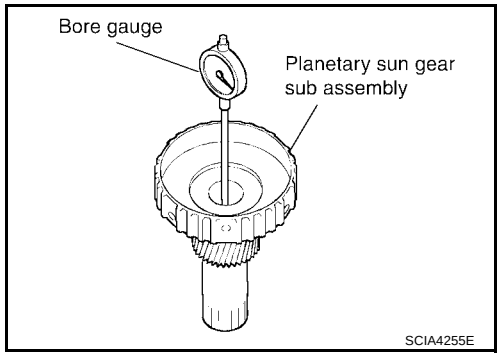
77. Remove planetary sun gear sub assembly and thrust needle roller bearings.

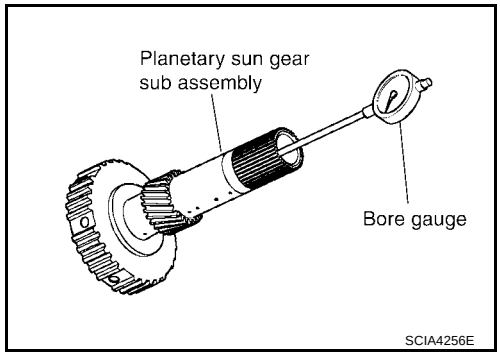


78. Measure the inner diameter of planetary sun gear sub assembly bushing using bore gauge.

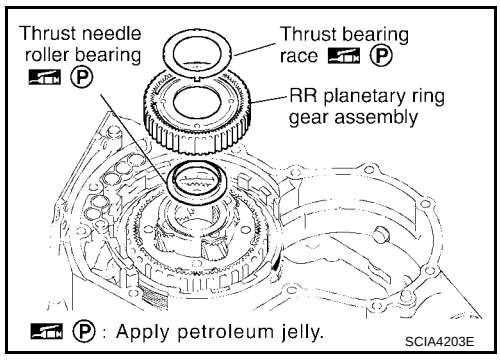
CAUTION:
Measure at different places and take an average. If it is greater than the maximum, replace it with a new planetary sun gear sub assembly.

Standard :22.200 - 22.226mm (0.8740 - 0.8750in)
Allowable limit :22.276 (0.8770in)

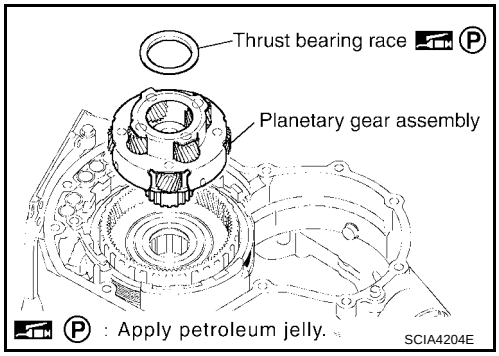




79. Remove RR planetary ring gear assembly.
80. Remove thrust needle roller bearing and thrust bearing race from RR planetary ring gear assembly.



81. Remove planetary gear assembly.
82. Remove thrust bearing race from planetary gear assembly.



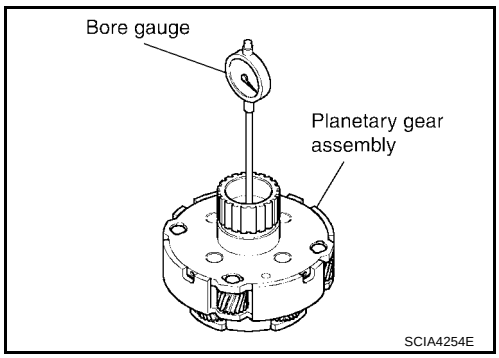
83. Measure the inner diameter of planetary gear assembly bushing using bore gauge

CAUTION:

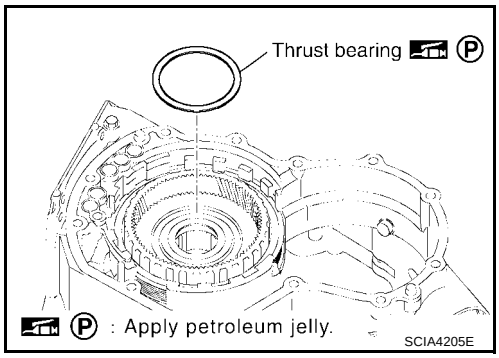
Measure at different places and take an average. If it is greater than the maximum, replace it with a new planetary gear assembly.

Standard **:30.056 - 30.082mm (1.1833 - 1.1843in)**

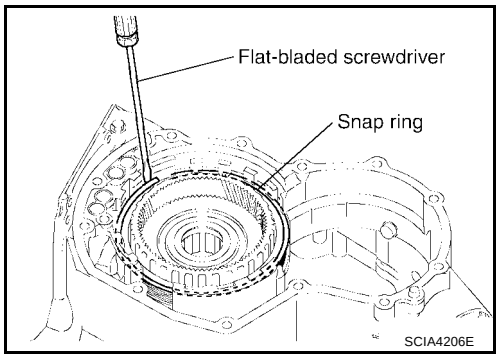
Allowable limit **:30.132 (1.1863in)**



84. Remove thrust bearing.



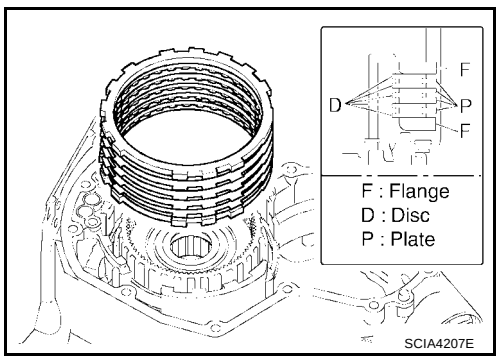
85. Remove snap ring using suitable tool.



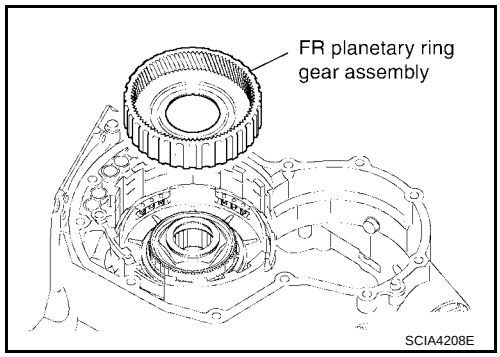
86. Remove 1st and reverse brake flanges, 1st and reverse brake discs and 1st and reverse brake plates.
    - INSPECTION
    - Check that the sliding surface of discs are not worn and burnt. If necessary, replace them.

CAUTION:

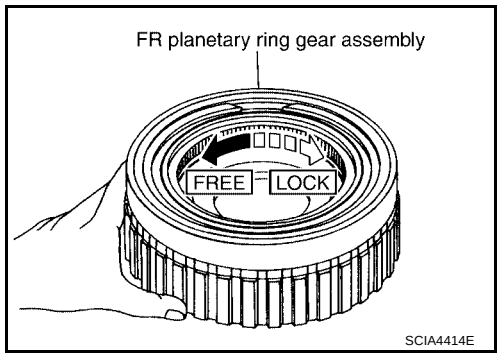
Soak new discs for at least 2 hours in A/T fluid.



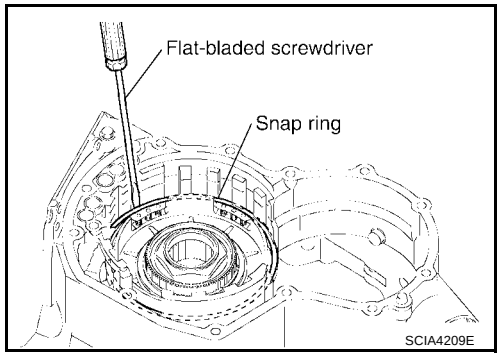
87. Remove FR planetary ring gear assembly with one-way clutch No. 2.



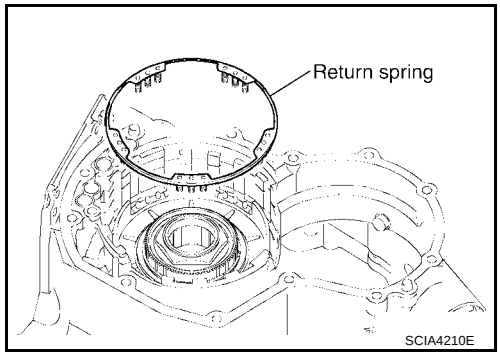
88. Make sure that the FR planetary ring gear assembly turns freely counterclockwise and locks clockwise.



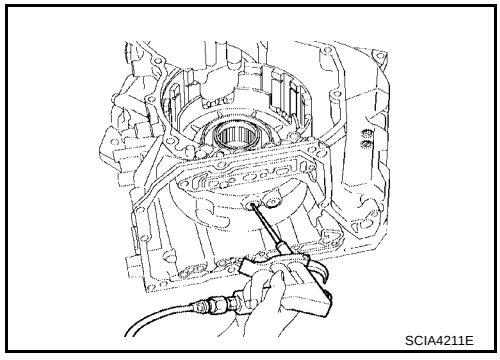
89. Remove snap ring using suitable tool.



90. Remove return spring.

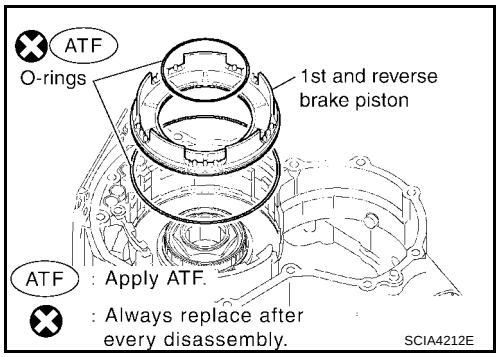


91. While pushing the piston by hand, apply compressed air (4Kg/cm^2) into the oil passage of transaxle case as shown and remove 1st and reverse brake piston.

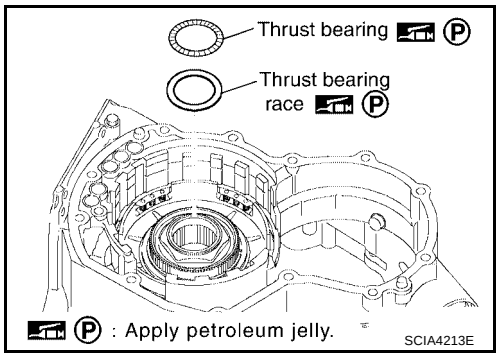


92. Remove O-rings from 1st and reverse brake piston.

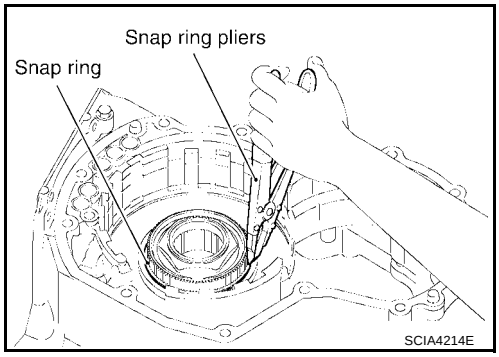
CAUTION:
Do not reuse O-rings.



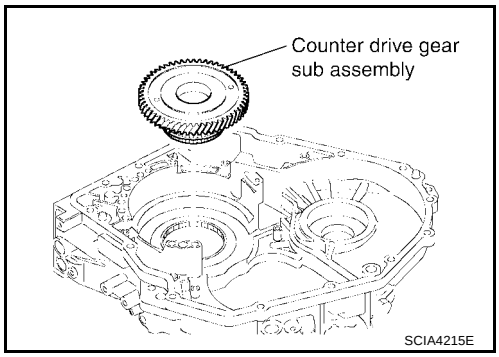
93. Remove thrust bearing and thrust bearing race from counter drive gear sub assembly.



94. Remove snap ring using suitable tool.

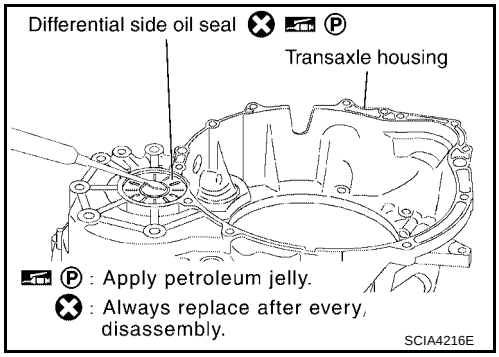


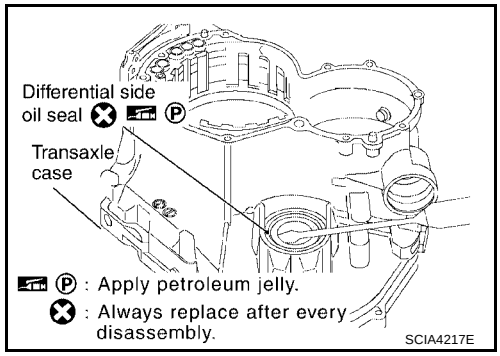
95. Remove counter drive gear sub assembly.



96. Remove differential side oil seal from transaxle case and transaxle housing using suitable tool.

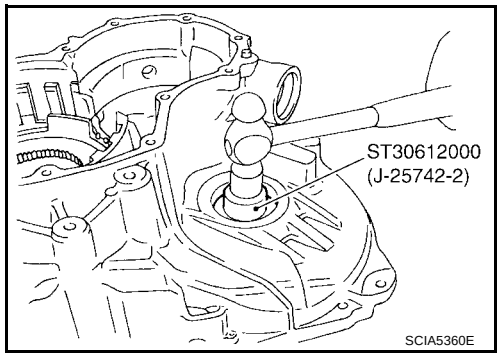
CAUTION:
- **Do not reuse oil seals.**
- **Do not scratch transaxle case and transaxle housing.**





97. Remove outer race and adjust shim from transaxle case using Tool.

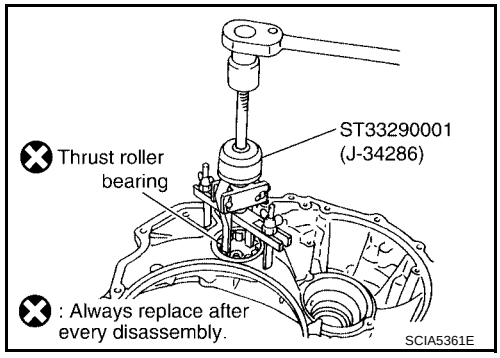
Tool number : ST30612000 (J-25742-2)



98. Remove thrust roller bearing from transaxle housing using Tool.

Tool number : ST33290001 (J-34286)

CAUTION:
Do not reuse thrust roller bearing.



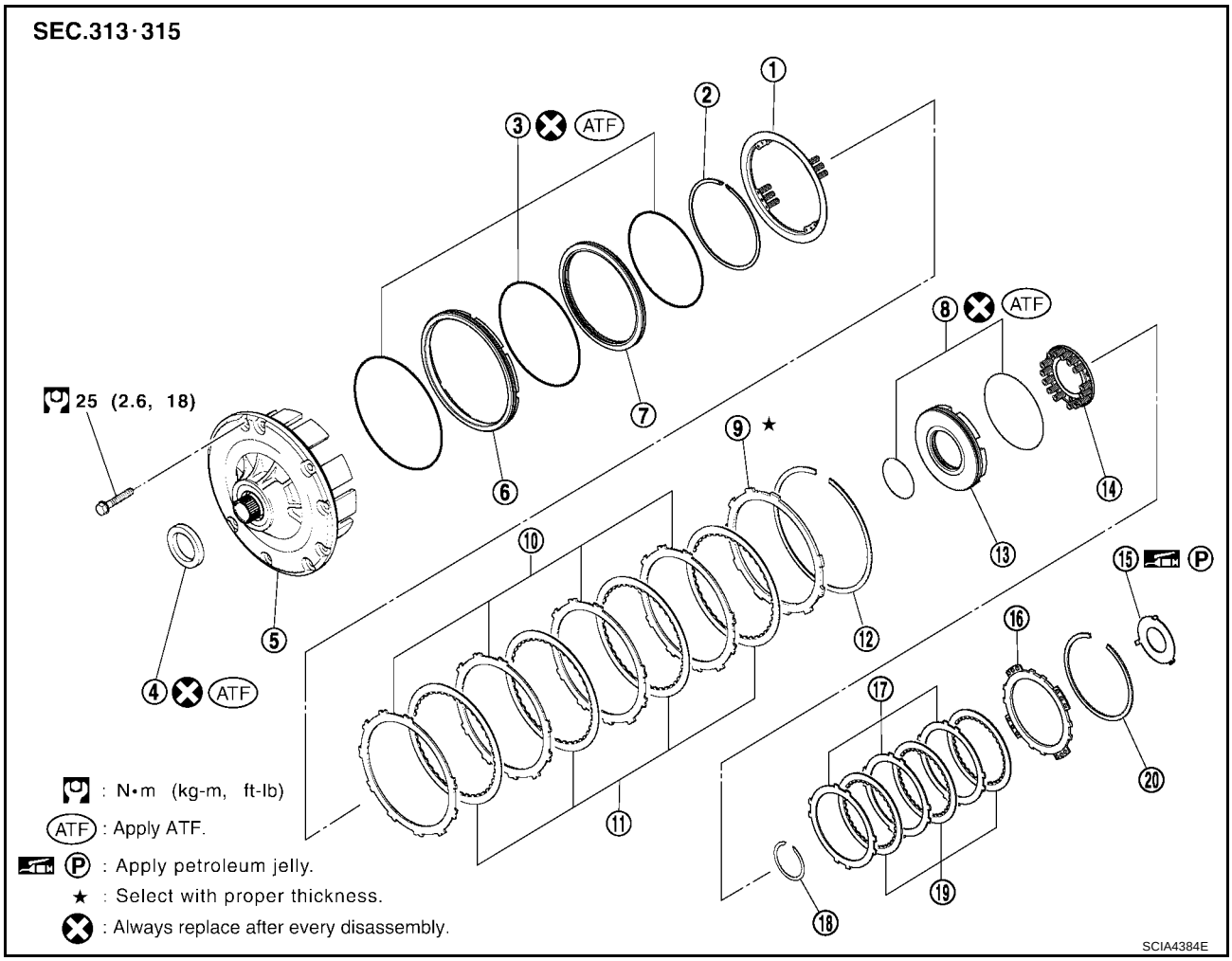
REPAIR FOR COMPONENT PARTS

PFP:00000

Oil Pump, 2nd Coast Brake & 2nd Brake

ECS009JO

COMPONENTS



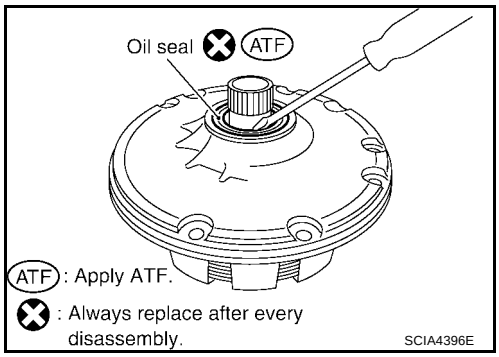
1. Return spring
2. Snap ring
3. O-ring
4. Oil seal
5. Oil pump assembly
6. 2nd brake piston
7. 2nd brake sleeve
8. O-ring
9. 2nd brake flange
10. 2nd brake plate
11. 2nd brake disc
12. Snap ring
13. 2nd coast brake piston
14. Return spring
15. Thrust washer
16. 2nd coast brake flange
17. 2nd coast brake plate
18. Snap ring
19. 2nd coast brake disc
20. Snap ring

DISASSEMBLY

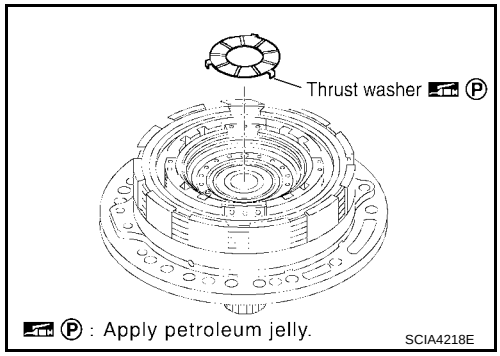
1. Remove oil seal from oil pump assembly using suitable tool.

CAUTION:

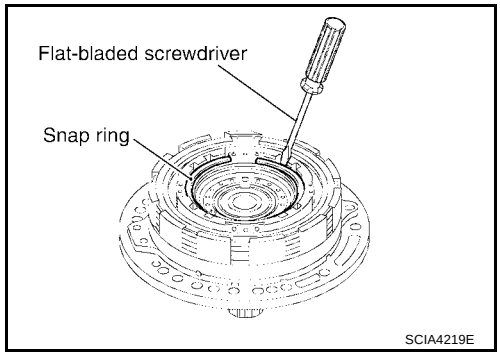
- **Do not reuse oil seal.**
- **Do not scratch oil pump assembly.**



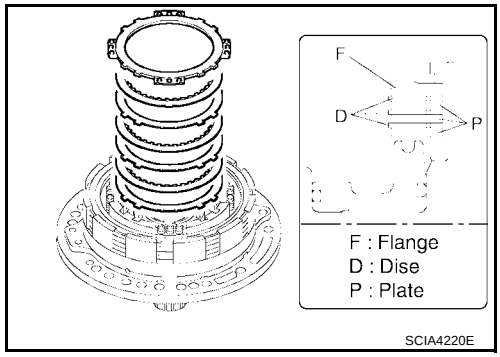
2. Remove thrust washer from oil pump assembly.



3. Remove snap ring using suitable tool.



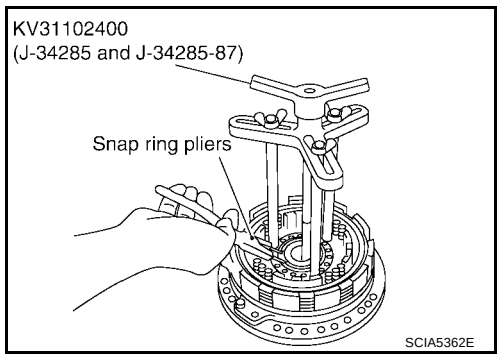
4. Remove 2nd coast brake flange, 2nd coast brake disc and 2nd coast brake plate.



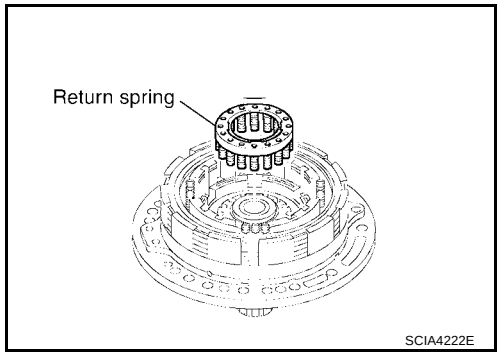
5. Compress return spring with a press using Tool.

Tool number : KV31102400 (J-34285 and J-34285-87)

6. Remove snap ring using suitable tool.



7. Remove return spring.

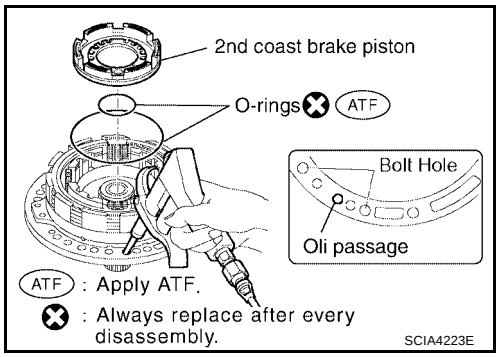


8. While pushing the 2nd coast brake piston by hand, apply compressed air (4kg/cm^2) into the oil passage as shown and remove 2nd coast brake piston.

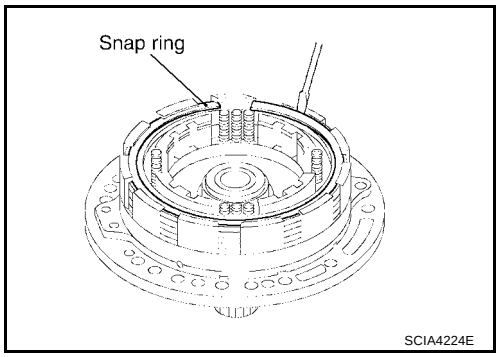
CAUTION:
Do not damage the O-ring and 2nd coast brake piston.

9. Remove O-rings from 2nd coast brake piston.

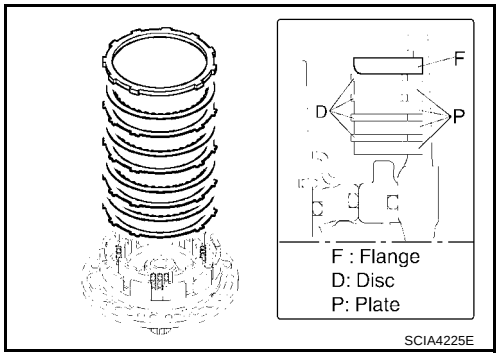
CAUTION:
Do not reuse O-rings.



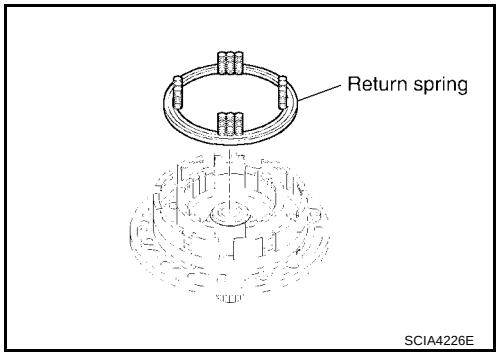
10. Remove snap ring using suitable tool.



11. Remove 2nd brake flange, 2nd brake discs and 2nd brake plates.

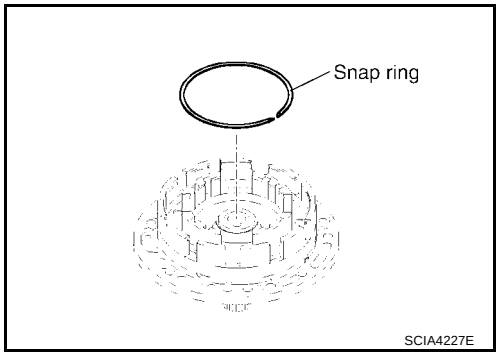


12. Remove return spring.

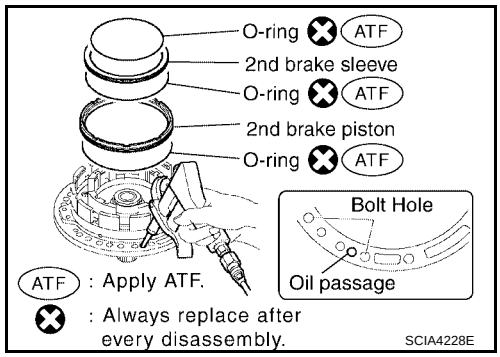


13. Remove snap ring using suitable tool.

CAUTION:
Do not damage oil pump assembly and 2nd brake piston.



14. While pushing the 2nd brake piston by hand, apply compressed air (4kg/cm^2) into the oil passage as shown and remove 2nd brake piston (With 2nd brake sleeve).
    CAUTION:
    Do not damage 2nd brake piston and 2nd brake sleeve.
15. Remove O-rings from 2nd brake piston and 2nd brake sleeve.
    CAUTION:
    Do not reuse O-rings.

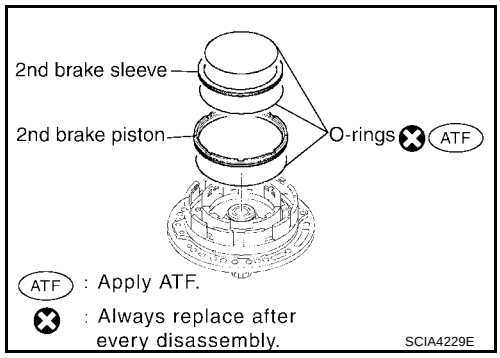


INSPECTION

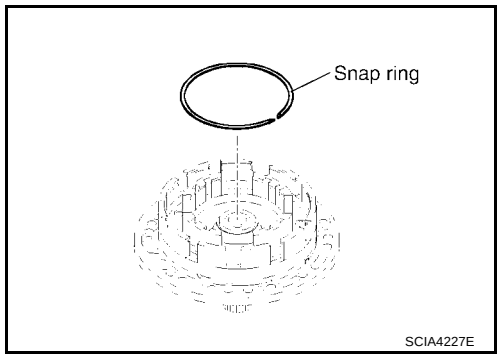
- Check that the sliding surface of disc and plate is not worn or burnt. If the disc or plate is worn or burnt, replace it
  CAUTION:
  Soak new clutch discs for at least 2 hours in ATF.

ASSEMBLY

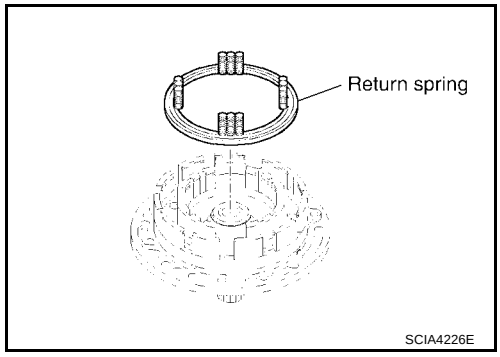
1. Install new O-rings in 2nd brake sleeve and 2nd brake piston.
   CAUTION:
   - **Do not reuse O-ring.**
   - **Apply ATF to new O-ring.**
2. Coat the inner surfaces of oil pump assembly with ATF.
3. Press 2nd brake piston and 2nd brake sleeve into oil pump assembly.



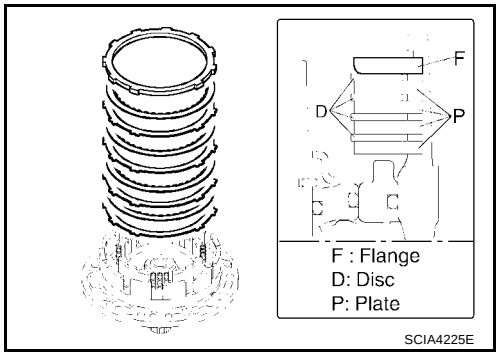
4. Install snap ring using suitable tool.
   CAUTION:
   Do not damage oil pump assembly.



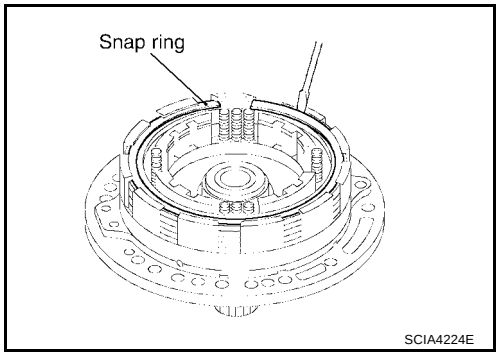
5. Place return spring on 2nd brake piston with the spring side up.



6. Install 2nd brake flange, 2nd brake discs and 2nd brake plates.



7. Install snap ring using suitable tool.

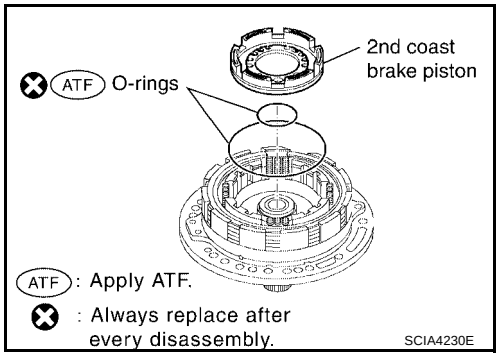


8. Install new O-rings in 2nd coast brake piston.

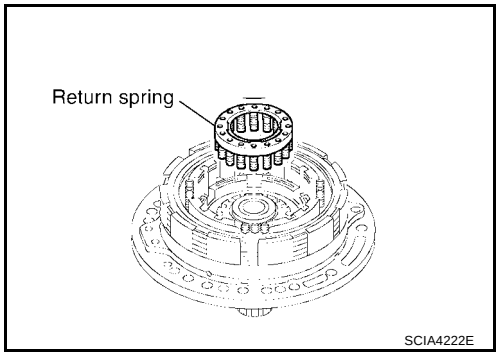
CAUTION:

- **Do not reuse O-rings.**
- **Apply ATF to new O-rings.**

9. Coat the inner surfaces of oil pump assembly with ATF.
10. Press 2nd coast brake piston into oil pump assembly.



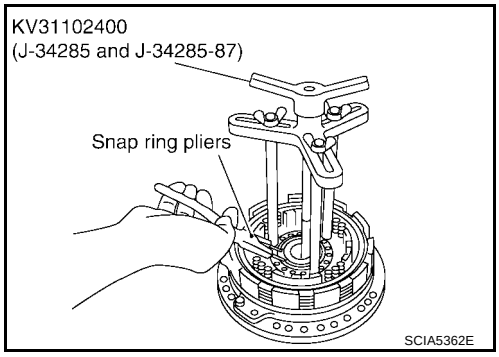
11. Install return spring.



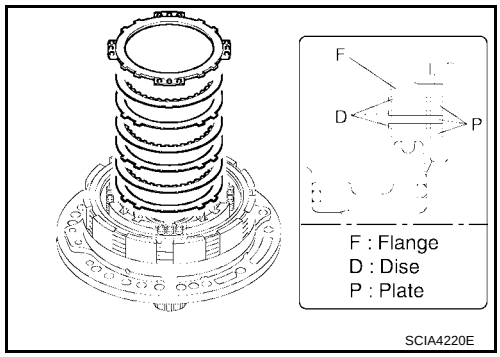
12. Compress return spring using Tool.

Tool number : KV31102400 (J-34285 and J-34285-87)

13. Install snap ring using suitable tool.



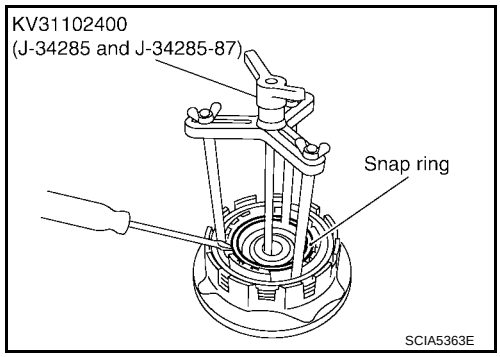
14. Install 2nd coast brake flange, 2nd coast brake disc and 2nd coast brake plate.



15. Compress return spring with a press using Tool.

Tool number : KV31102400 (J-34285 and J-34285-87)

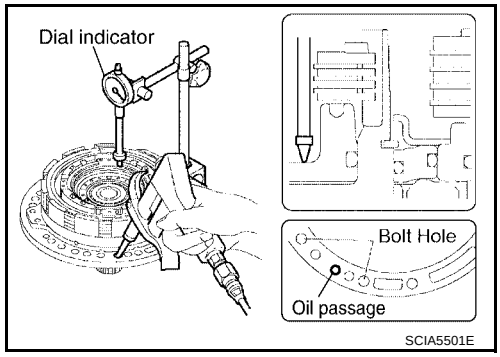
16. Install snap ring using suitable tool.



17. Set a dial indicator as shown.
18. When applying compressed air (4Kg/cm^2) into the oil passage as shown, measure 2nd brake piston stroke and check 2nd brake piston moves smoothly.

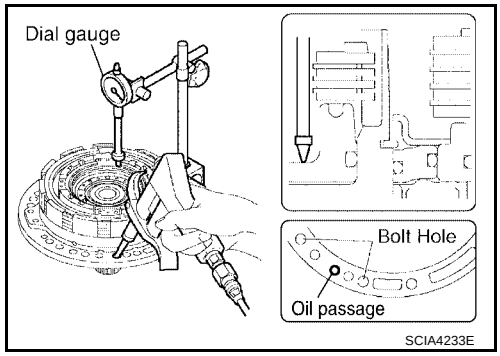
Piston stroke :1.10 - 1.50mm (0.0433 - 0.0591in)

If 2nd brake piston stroke is out standards, select another flange. Refer to AT-705, "2ND BRAKE" .



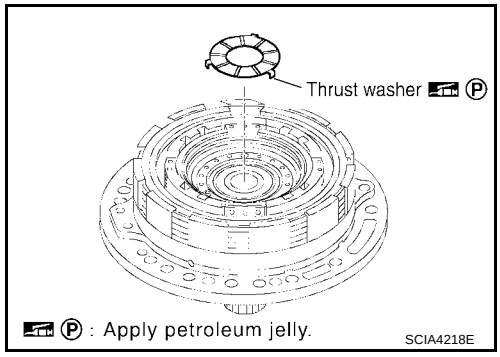
19. Set a dial indicator as shown.
20. When applying compressed air (4Kg/cm^2) into the oil passage as shown, measure 2nd coast brake piston stroke and check 2nd coast brake piston moves smoothly.

Piston stroke :0.76 - 1.44mm (0.0299 - 0.0567in)



21. Install thrust washer facing the flat surface up.

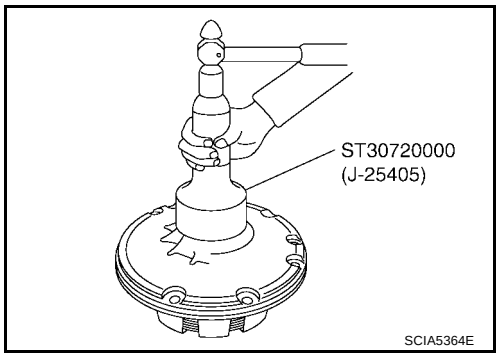
CAUTION:
Apply petroleum jelly to thrust washer.



22. Install new oil seal into oil pump assembly until it is flush with the oil pump face using Tool.

Tool number : ST30720000 (J-25405)

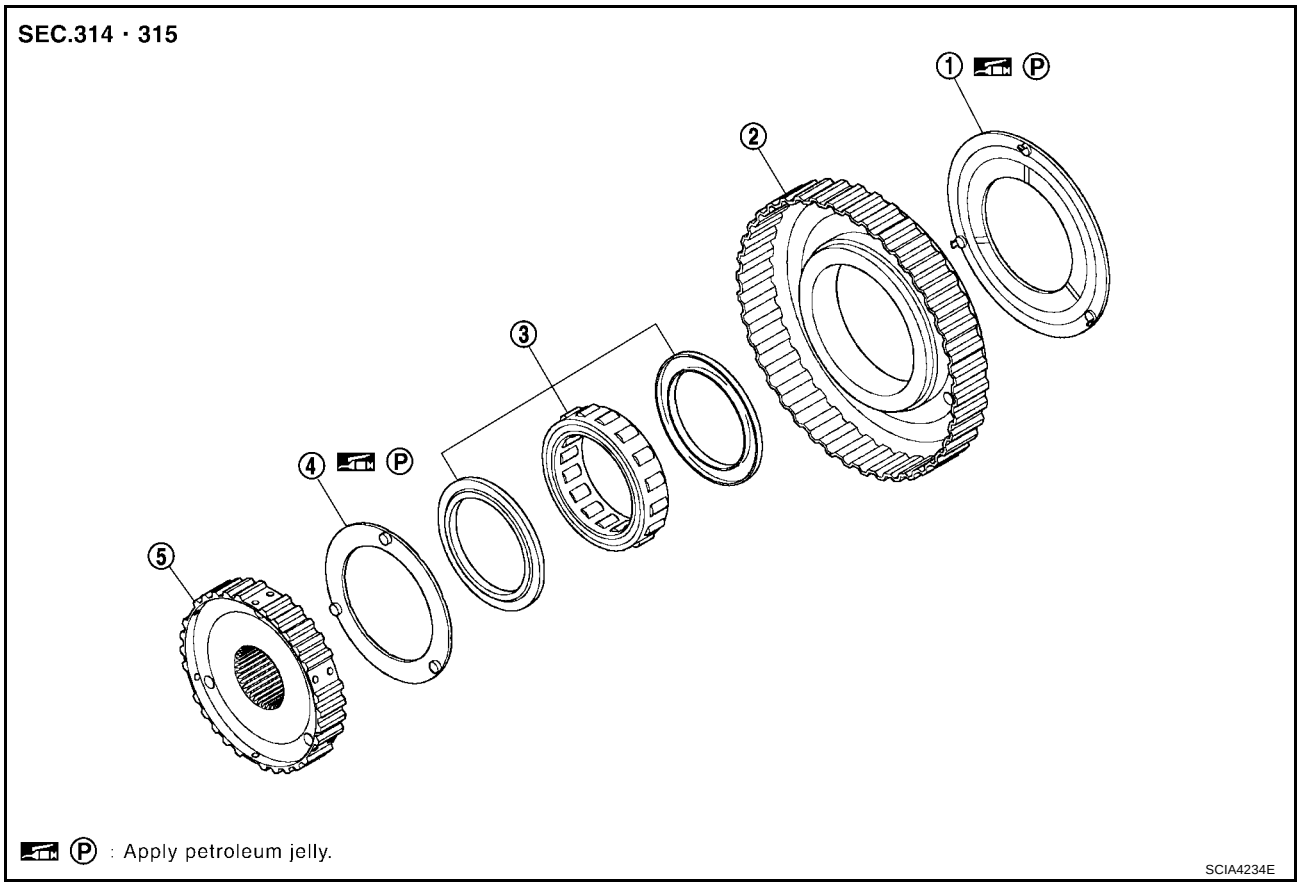
CAUTION:
- **Do not reuse oil seal.**
- **Apply ATF to new oil seal.**



One-Way Clutch Outer Race Sub Assembly & 2nd Coast Brake Hub & One-Way Clutch No.1

ECS009JP

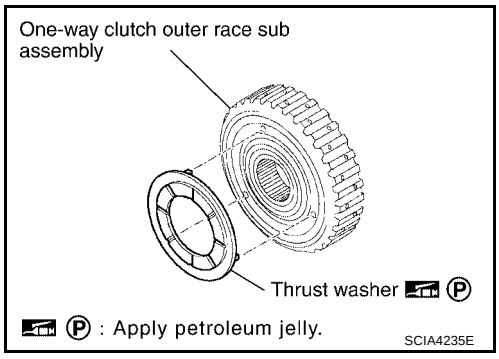
COMPONENTS



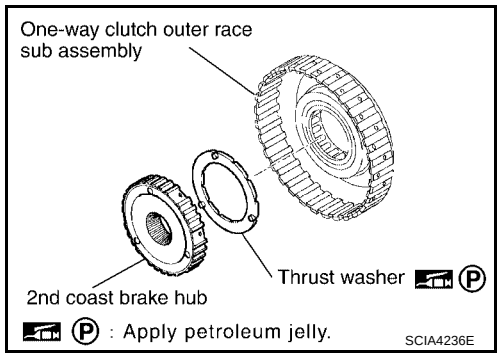
1. Thrust washer
2. One-way clutch outer race sub assembly
3. One-way clutch No.1
4. Thrust washer
5. 2nd coast brake hub

DISASSEMBLY

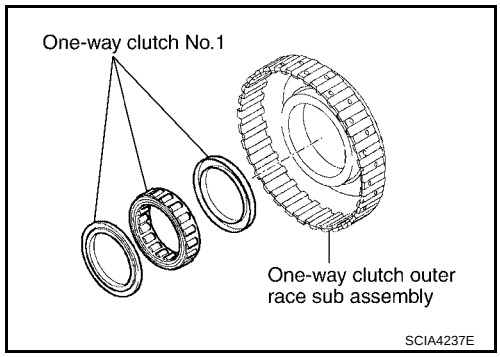
1. Remove thrust washer from one-way clutch outer race sub assembly.



2. Remove 2nd coast brake hub from one-way clutch outer race sub assembly.
3. Remove thrust washer from 2nd coast brake hub.



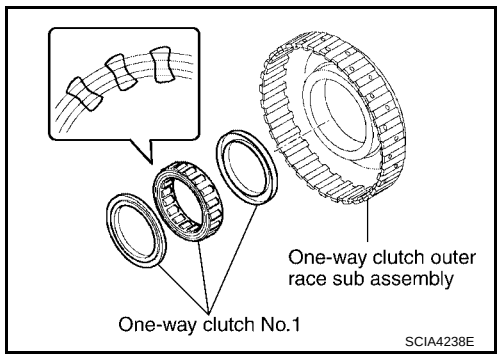
4. Remove one-way clutch No.1 from one-way clutch outer race sub assembly.



ASSEMBLY

1. Install one-way clutch No.1 into the one-way clutch outer race sub assembly.

   CAUTION:
   Take care with the direction of one-way clutch No.1.

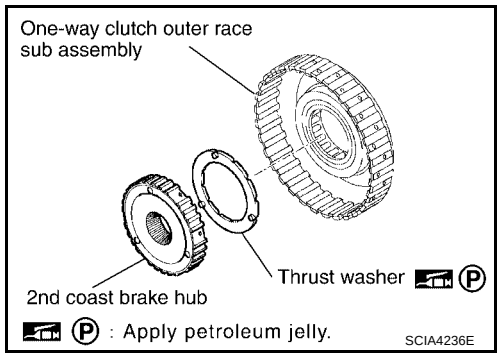


2. Install thrust washer into 2nd coast brake hub.

   CAUTION:
   - **Coat the thrust washer with grease.**
   - **Align the tab of the washer with the hollow of the 2nd coast brake hub.**

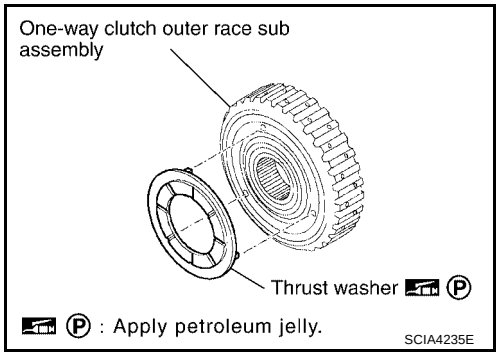
3. Install 2nd coast brake hub into one-way clutch outer race sub assembly.

   NOTE:
   While turning the 2nd coast brake hub, slide it into one-way clutch outer race sub assembly.



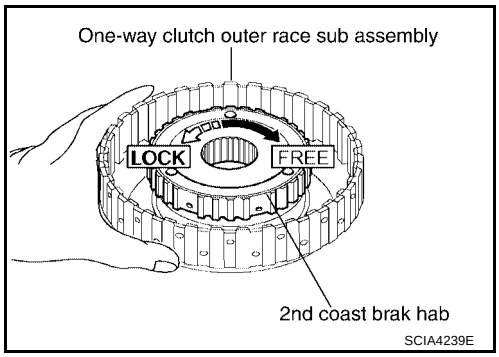
4. Coat the thrust washer with petroleum jelly. Align the tab of the washer with the hollow of the one-way clutch outer race sub assembly.

CAUTION:
Apply petroleum jelly to thrust washer.



INSPECTION

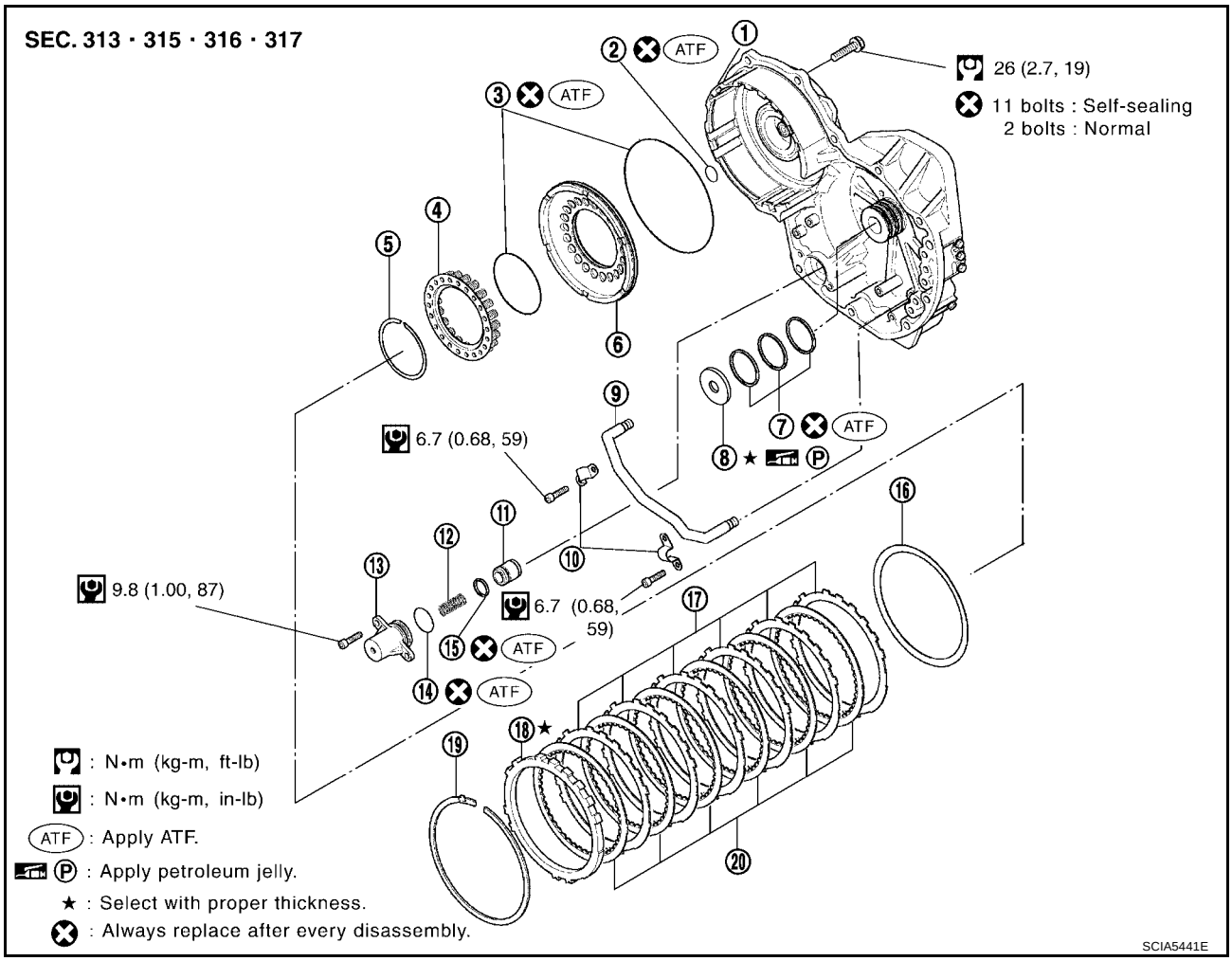
- Hold one-way clutch outer race sub assembly, and check that 2nd coast brake hub turns freely clockwise and locks counter-clockwise.



Transaxle Case Cover & B5 Brake

ECS009JQ

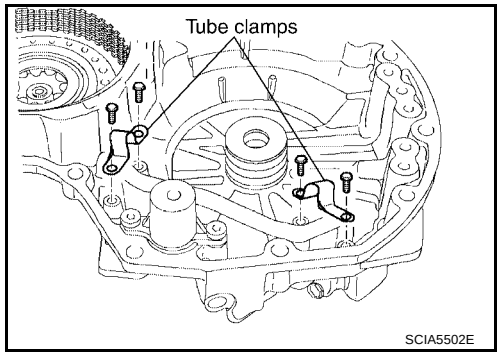
COMPONENTS



1. Transaxle case cover
2. Seal ring
3. O-ring
4. Return spring
5. Snap ring
6. B5 brake piston
7. Seal ring
8. Bearing race
9. U/D clutch apply tube sub assembly
10. Tube clamp
11. Forward clutch accumulator piston
12. Compression spring
13. Accumulator cover
14. O-ring
15. Seal ring
16. B5 brake cushion plate
17. B5 brake plate
18. B5 brake flange
19. Snap ring
20. B5 brake disc

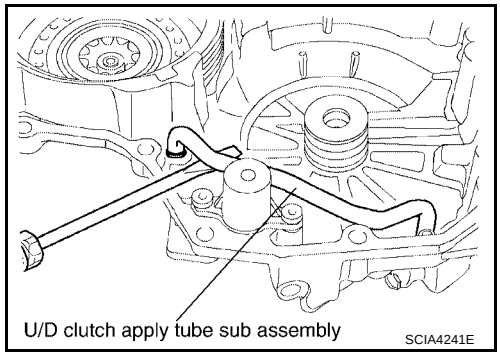
DISASSEMBLY

1. Remove tube clamps.



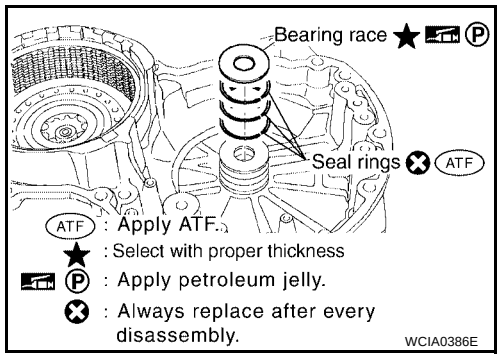
2. Remove U/D clutch apply tube sub assembly using suitable tool.

CAUTION:
Do not damage the U/D clutch apply tube sub assembly and transaxle case cover.



3. Remove bearing race and seal rings from transaxle case cover.

CAUTION:
Do not reuse seal rings.

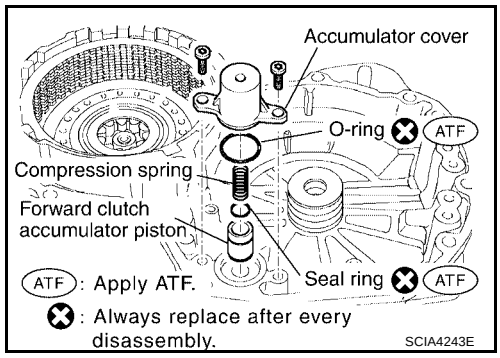


4. Remove accumulator cover, compression spring and forward clutch accumulator piston.
5. Remove O-ring from the accumulator cover.

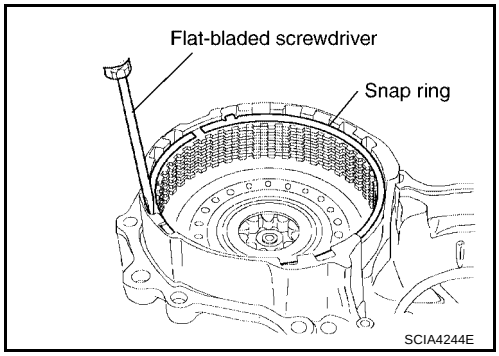
CAUTION:
Do not reuse O-ring.

6. Remove seal ring from the forward clutch accumulator piston.

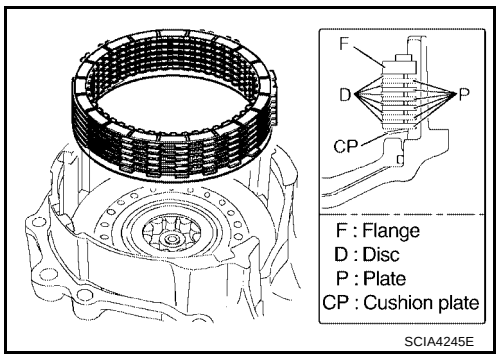
CAUTION:
Do not reuse seal ring.



7. Remove snap ring using suitable tool.



8. Remove B5 brake flange, B5 brake discs, B5 brake plates and B5 brake cushion plate.

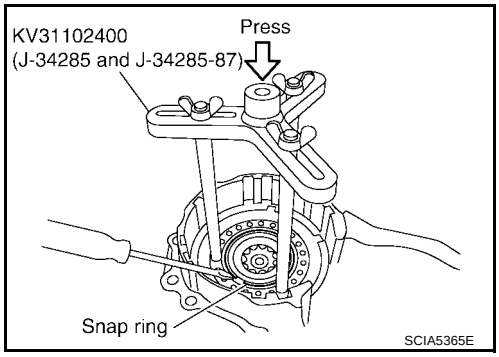


9. Compress return spring with a press using Tool.

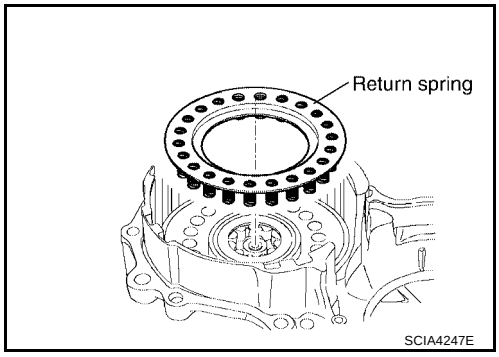
Tool number : KV31102400 (J-34285 and J-34285-87)

CAUTION:
Do not press return spring too much to avoid deformation.

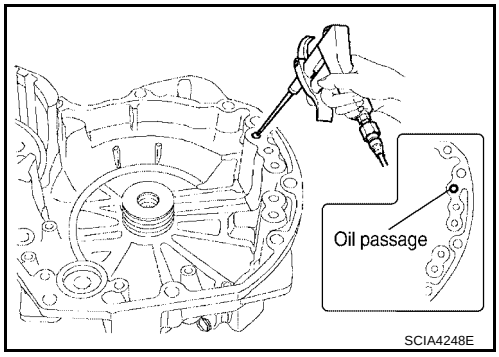
10. Remove snap ring using suitable tool.



11. Remove return spring.



12. While pushing B5 brake piston by hand, apply compressed air (4Kg/cm^2) into the oil passage as shown and remove B5 brake piston.

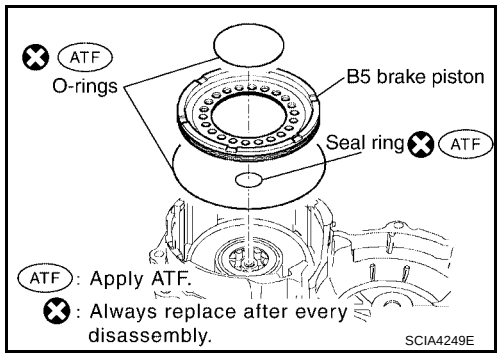


13. Remove O-rings from B5 brake piston.

CAUTION:
Do not reuse O-rings.

14. Remove seal ring from transaxle case cover.

CAUTION:
Do not reuse seal ring.



INSPECTION

- Check that the sliding surface of disc and plate is not worn or burnt. If the disc or plate is worn or burnt, replace it

CAUTION:
Soak new clutch discs for at least 2 hours in ATF.

ASSEMBLY

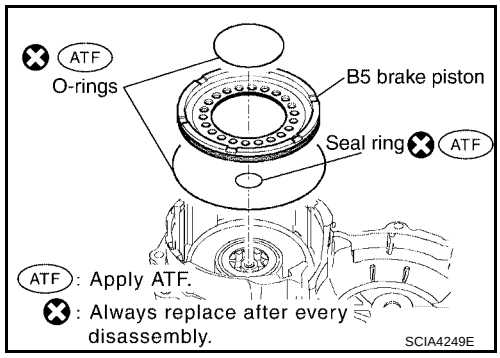
1. Install new seal ring in transaxle case cover.

CAUTION:
- **Do not reuse seal ring.**
- **Apply ATF to new seal ring.**

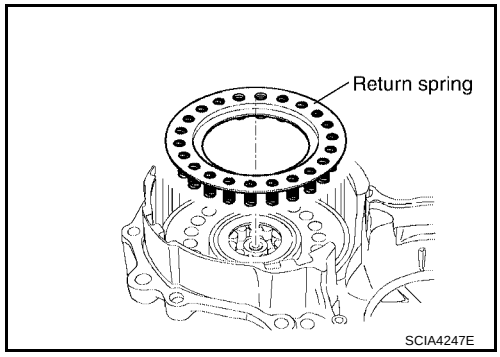
2. Install new O-rings in B5 brake piston.

CAUTION:
- **Do not reuse O-rings.**
- **Apply ATF to new O-rings.**

3. Coat the inner surface of transaxle case cover with ATF.
4. Press B5 brake piston into the transaxle case cover.



5. Place return spring on B5 brake piston.

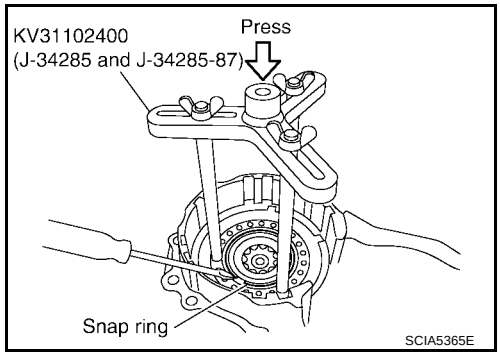


6. Compress return spring with a press using Tool.

Tool number : KV31102400 (J-34285 and J-34285-87)

CAUTION:
Do not press return spring too much to avoid deformation.

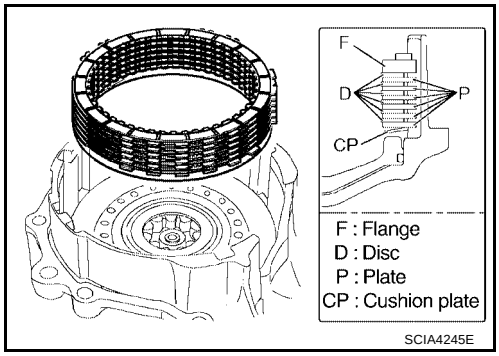
7. Install snap ring using suitable tool.



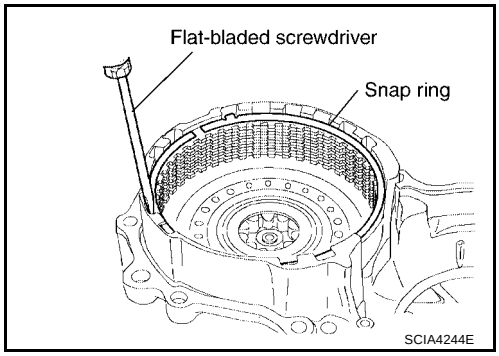
8. Install B5 brake cushion plate.

CAUTION:
Take care with direction of B5 brake cushion plate.

9. Install B5 brake flange, B5 brake plates and B5 brake discs as shown.



10. Install snap ring using suitable tool.



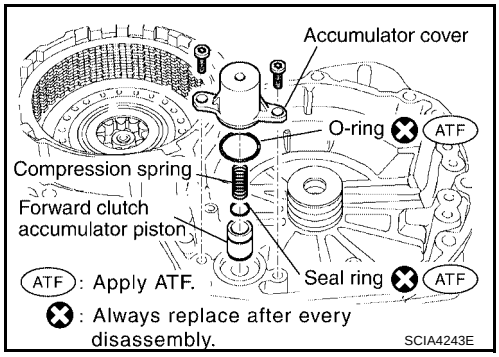
11. Install new O-ring in accumulator cover.

CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to new O-ring.**

12. Install new seal ring in forward clutch accumulator piston.

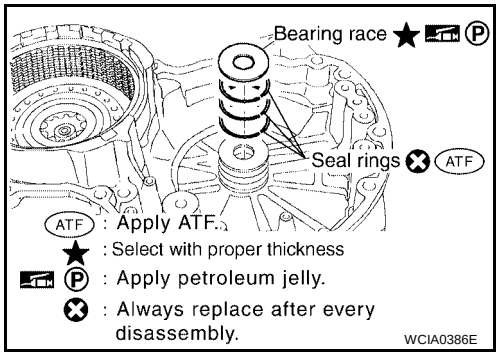
CAUTION:
- **Do not reuse seal ring.**
- **Apply ATF to new seal ring.**

13. Install forward clutch accumulator piston, compression spring and accumulator cover in transaxle case cover.
14. Tighten accumulator cover torx bolts to specified torque. Refer to AT-670, "COMPONENTS" .

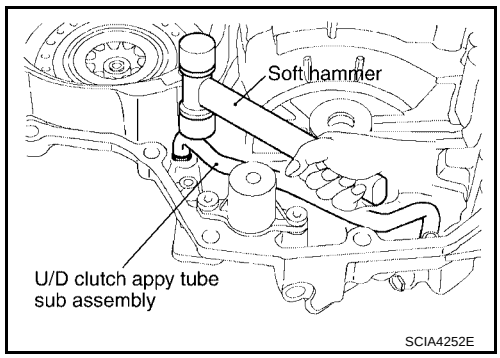


15. Install new seal rings and bearing race in transaxle case cover. Refer to AT-678, "ASSEMBLY" to select proper bearing race.

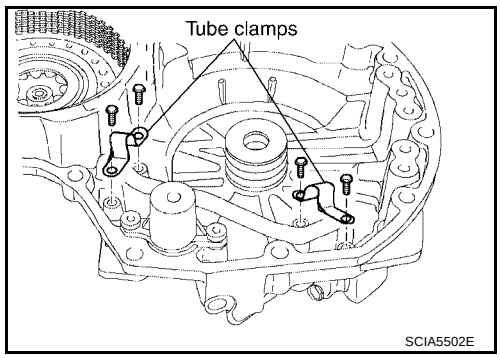
CAUTION:
- **Do not reuse seal rings.**
- **Apply ATF to new O-rings.**



16. Install the U/D clutch apply tube sub assembly using suitable tool.



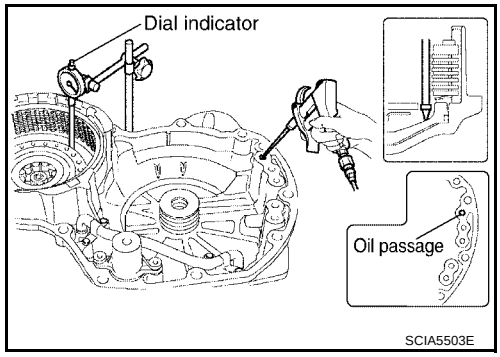
17. Tighten tube clamp bolts to specified torque. Refer to AT-670, "COMPONENTS" .



18. Set a dial indicator as shown.
19. When applying compressed air (4kg/cm^2) into the oil passage as shown, measure the B5 brake piston stroke and check the B5 brake piston moves smoothly.

    Piston stroke :2.34 - 2.70mm (0.0921 - 0.1063in)

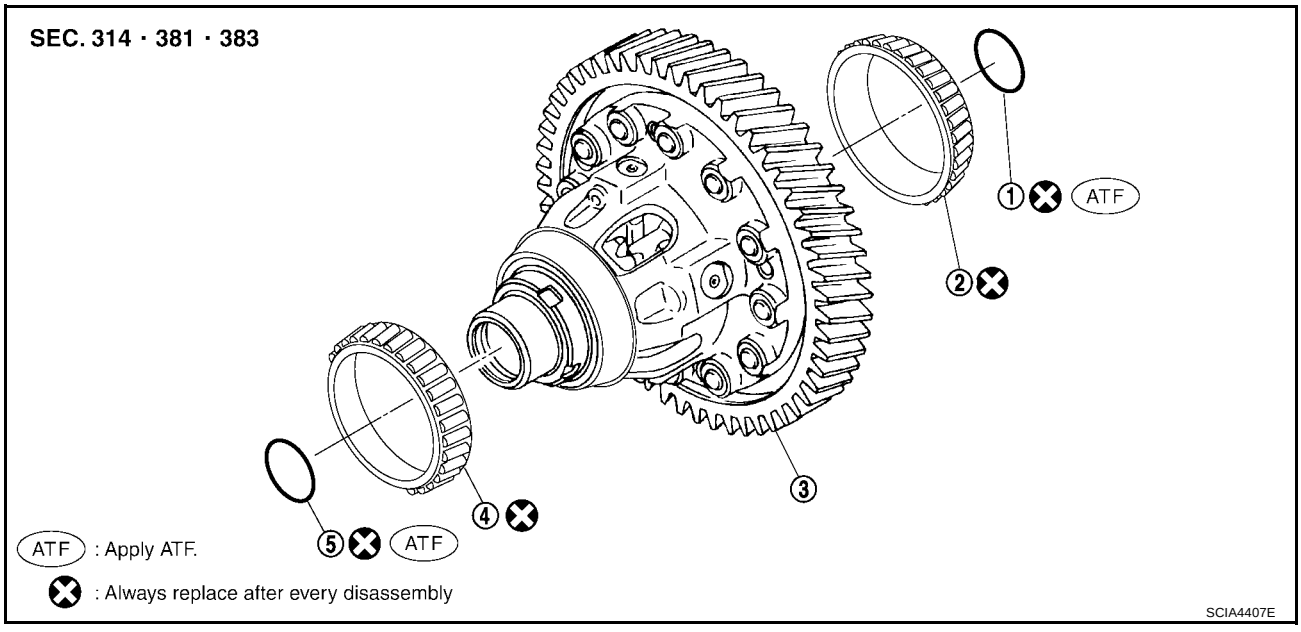
    If the B5 brake piston stroke is out standards, select another flange. Refer to AT-706, "B5 BRAKE" .



Differential Gear Assembly

ECS009JR

COMPONENTS

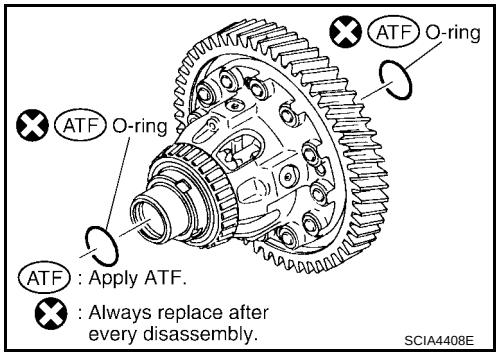


1. O-ring
2. Tapered roller bearing
3. Differential gear assembly
4. Tapered roller bearing
5. O-ring

DISASSEMBLY

1. Remove O-rings from differential gear assembly.

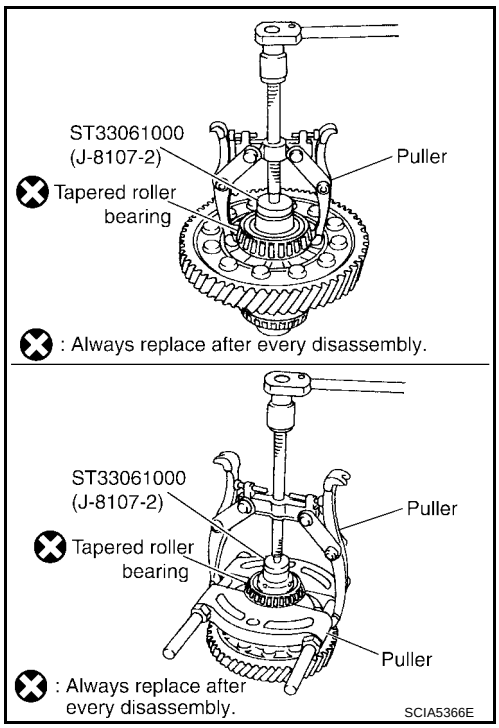
CAUTION:
Do not reuse O-rings.



2. Remove tapered roller bearings using Tool.

Tool number : ST33081000 (J-8107-2)

CAUTION:
Do not reuse tapered roller bearings.

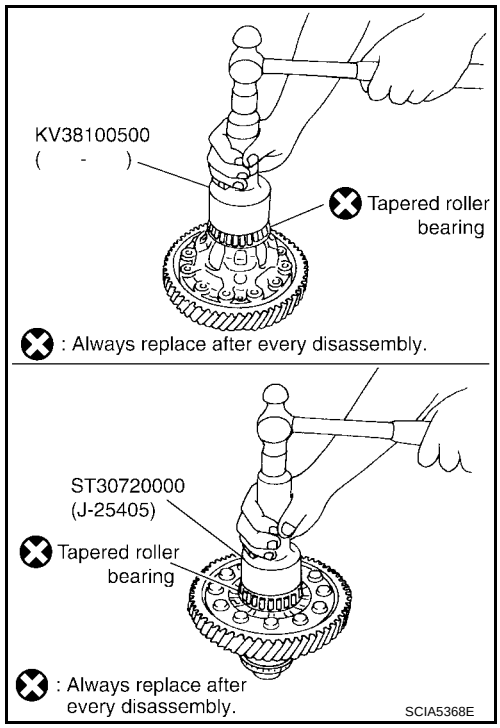


ASSEMBLY

1. Install new tapered roller bearings in differential gear assembly using Tool.

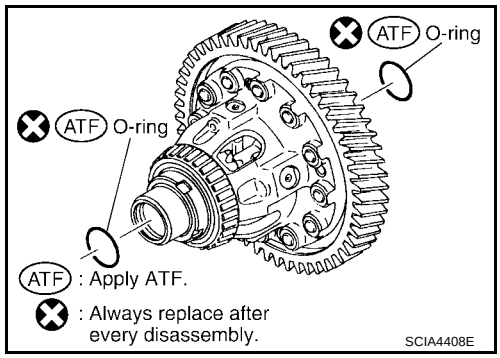
Tool number : KV38100500 (—)
: ST33720000 (J-25405)

CAUTION:
Do not reuse tapered roller bearings.



2. Install new O-rings in differential gear assembly.

CAUTION:
- **Do not reuse O-rings.**
- **Apply ATF to new O-rings.**



ASSEMBLY

PFP:00000

Assembly (1)

ECS009JS

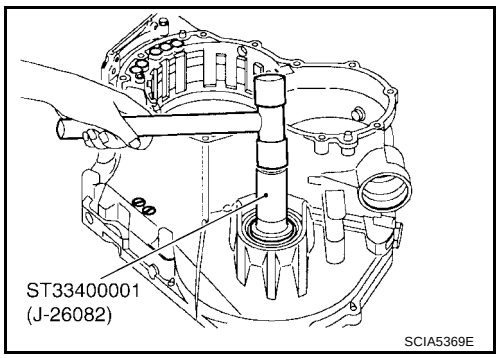
1. Install new differential side oil seal into transaxle case as specified using Tool.

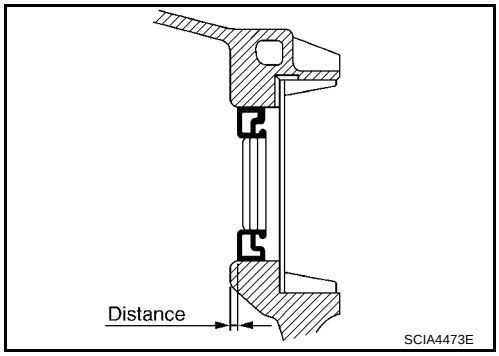
Tool number : ST33400001 (J-26082)

Distance : 3.0 - 4.0 mm (0.118 - 0.157 in)

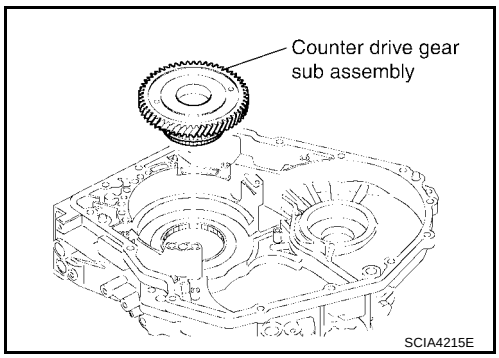
CAUTION:

- **Do not reuse differential side oil seal.**
- **Apply ATF to new differential side oil seal.**

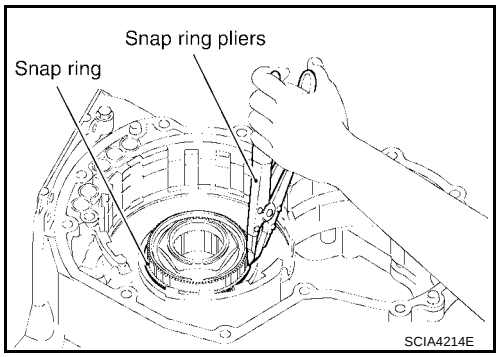




2. Install counter drive gear sub assembly.



3. Install snap ring using suitable tool.

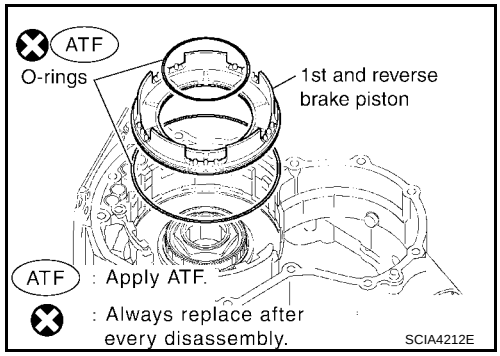


4. Install new O-rings in 1st and reverse brake piston.

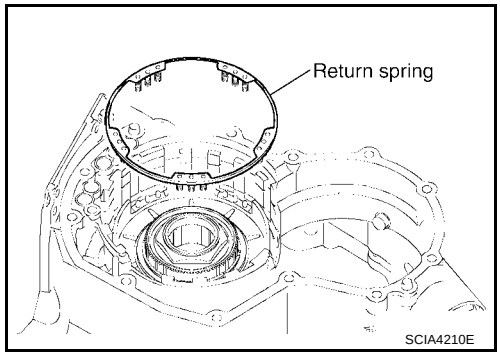
CAUTION:

- **Do not reuse O-rings.**
- **Apply ATF to new O-rings.**

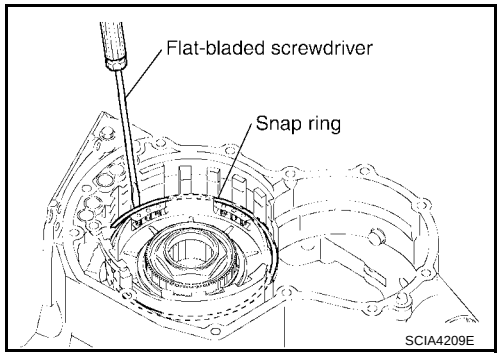
5. Coat the inner surface of transaxle case with ATF.
6. Install 1st and reverse brake piston in transaxle case.



7. Put return spring on 1st and reverse brake piston.



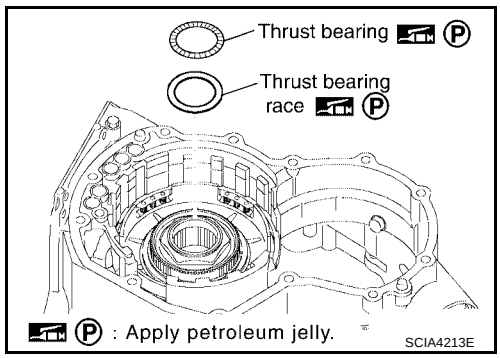
8. Install the snap ring into groove using suitable tool while compressing the return spring by hand.



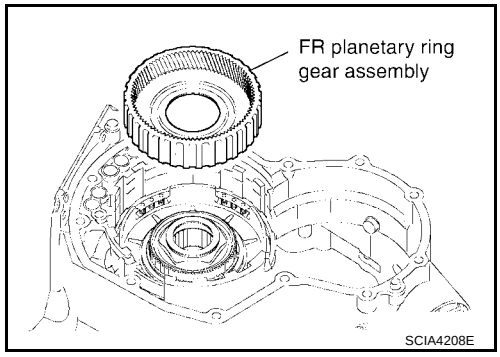
9. Put thrust bearing race and thrust bearing on counter drive gear sub assembly.

CAUTION:

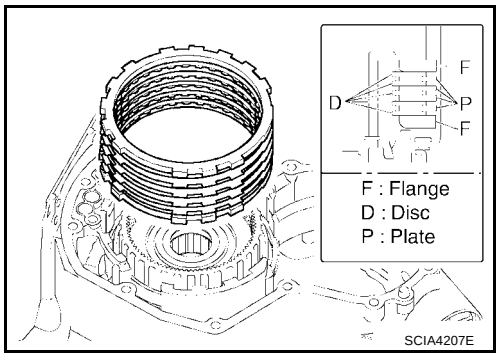
Apply petroleum jelly to thrust bearing and thrust bearing race.



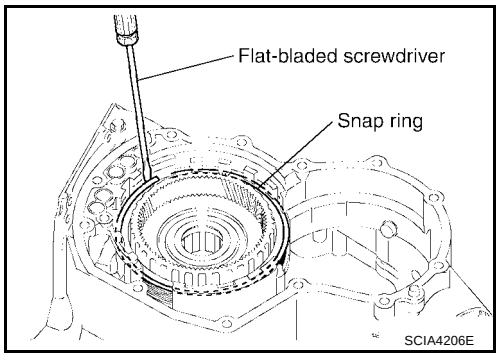
10. Install FR planetary ring gear assembly with one-way clutch No.2.



11. Install 1st and reverse brake flanges, 1st and reverse brake discs and 1st and reverse brake plates.



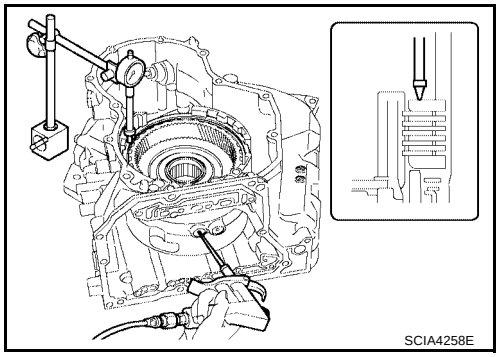
12. Install snap ring using suitable tool.



13. Set a dial indicator as shown.
14. Applying compressed air (4Kg/cm^2) and measure the 1st and reverse brake piston stroke.

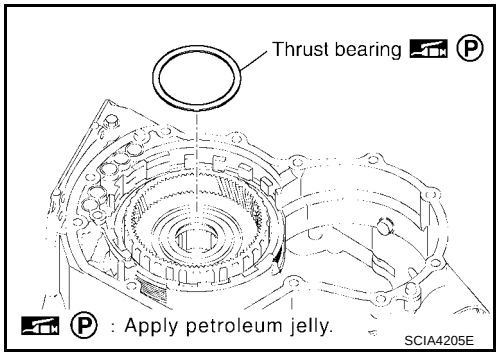
    Piston stroke : 1.39 - 2.21 mm (0.0547 - 0.0870 in)

    In a case that is out of reference, check the following items:
    - Oil pressure leak
    - Damage of O-ring
    - Wear damage of disc



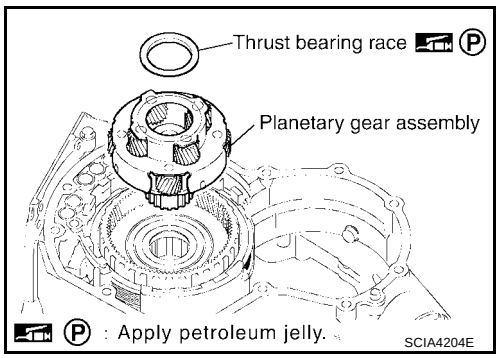
15. Install thrust bearing.

    CAUTION:
    Apply petroleum jelly to thrust bearing.



16. Install planetary gear assembly.
17. Install thrust bearing race in planetary gear assembly.

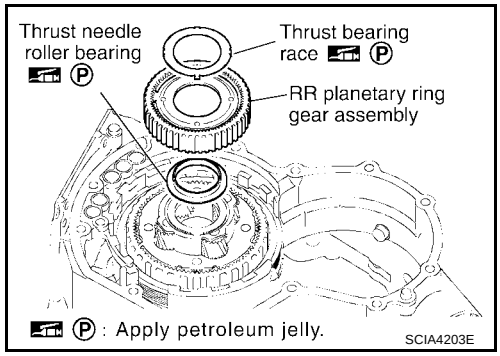
    CAUTION:
    Apply petroleum jelly to thrust bearing race.



18. Install thrust needle roller bearing and thrust bearing race in RR planetary ring gear assembly.

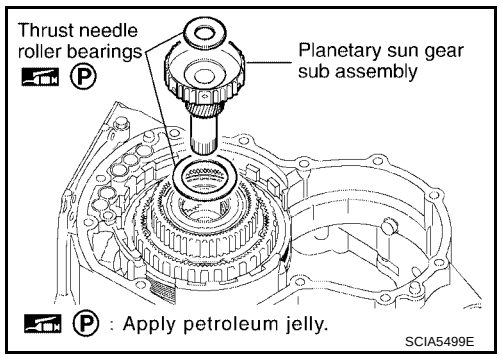
CAUTION:
Apply petroleum jelly to thrust needle roller bearing.

19. Install RR planetary ring gear assembly.



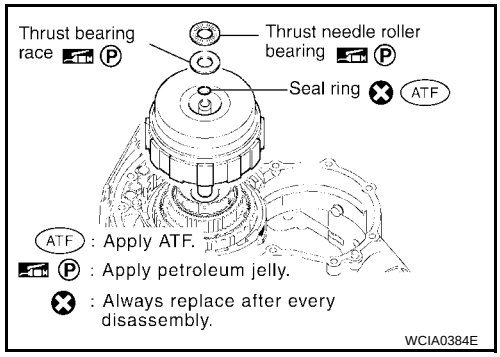
20. Install planetary sun gear sub assembly and thrust needle roller bearing.

CAUTION:
Apply petroleum jelly to thrust needle roller bearing.



21. Install forward and direct clutch assembly.
22. Install thrust bearing race, thrust needle roller bearing and new seal ring in forward and direct clutch assembly.

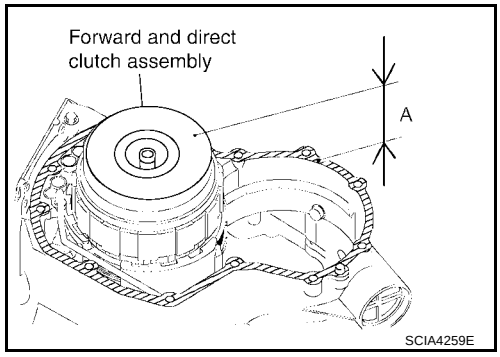
CAUTION:
- **Do not reuse seal ring.**
- **Apply ATF to new seal ring.**
- **Apply petroleum jelly to thrust needle roller bearing and thrust bearing race.**



23. Check the distance of “A”.

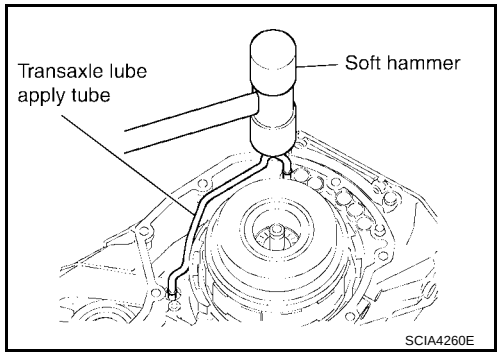
Dimension “A” : 50.850 - 51.825 mm (2.0020 - 2.0404 in)

CAUTION:
If the distance is out of standards, adjust within standards again.

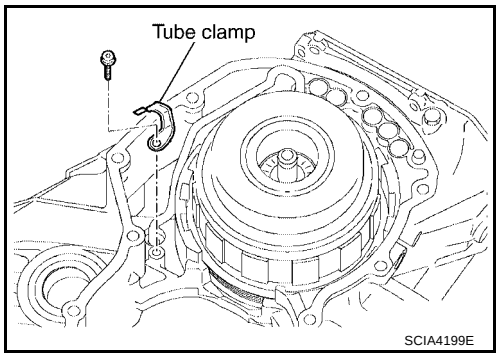


24. Install transaxle lube apply tube using suitable tool.

CAUTION:
Do not bend and damage transaxle lube apply tube.



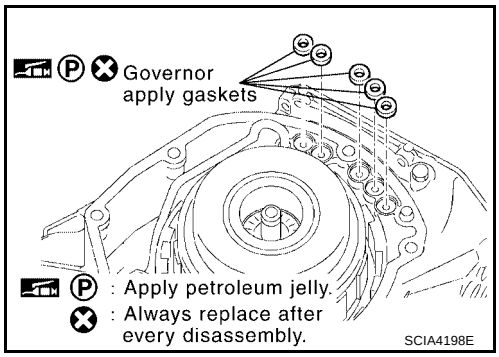
25. Tighten tube clamp bolt to specified torque. Refer to AT-634, "Components" .



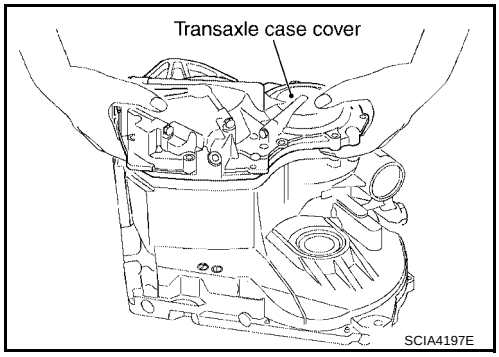
26. Install new governor apply gaskets in transaxle case.

CAUTION:

- **Do not reuse gaskets.**
- **Apply petroleum jelly to new gaskets.**



27. Install transaxle case cover in transaxle case.



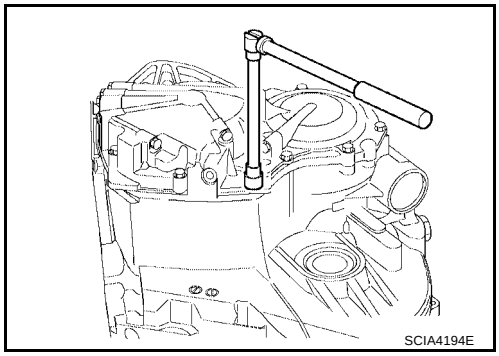
28. Tighten transaxle case cover bolts to specified torque. Refer to AT-634, "Components" .

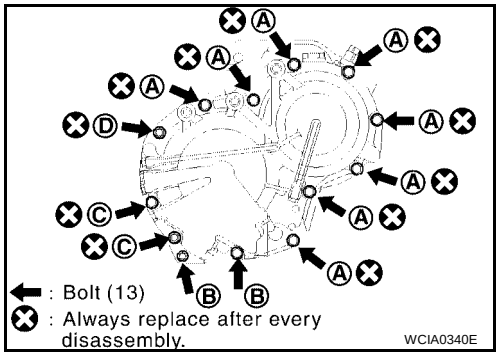
CAUTION:

Do not reuse seal bolts.

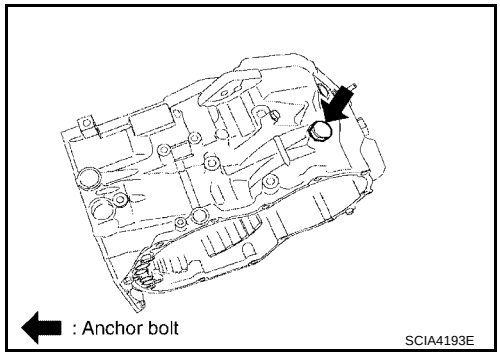
Bolt symbol	Length mm (in)	Number of bolts
A	30 (1.18)	8
B	45 (1.77)	2
C	48 (1.89)	2
D*	—	1

*:Stud bolt





29. Tighten anchor bolt to specified torque. Refer to AT-634, "Components" .

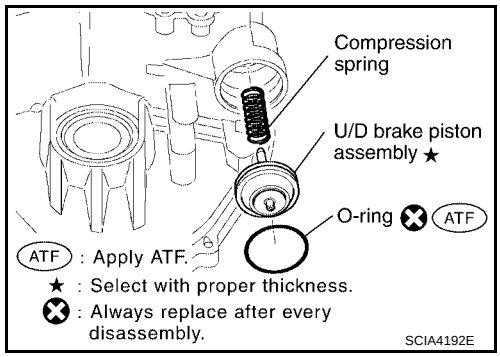


30. Install new O-ring in U/D brake piston assembly.

CAUTION:

- **Do not reuse O-ring.**
- **Apply ATF to new O-ring.**

31. Coat the inner surface of transaxle case with ATF.
32. Install compression spring and U/D brake piston assembly.

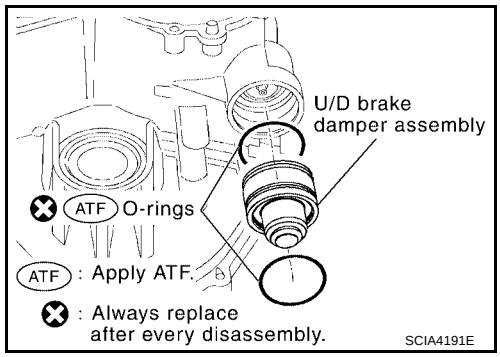


33. Install new O-rings in U/D brake damper assembly.

CAUTION:

- **Do not reuse O-rings.**
- **Apply ATF to new O-rings.**

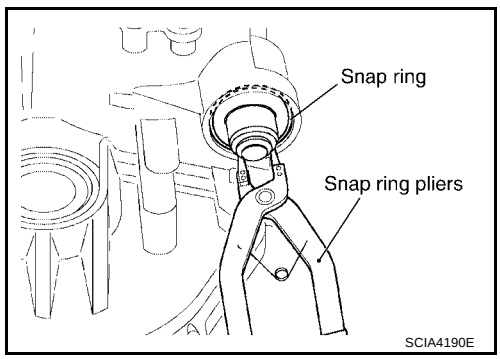
34. Install U/D brake damper assembly.



35. Install snap ring using suitable tool.

CAUTION:

If the snap ring is deformed, replace it.

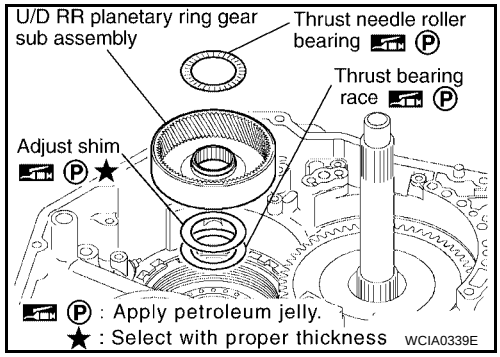


36. Install thrust needle roller bearing adjust shim and thrust bearing race in U/D RR planetary ring gear sub assembly.

CAUTION:

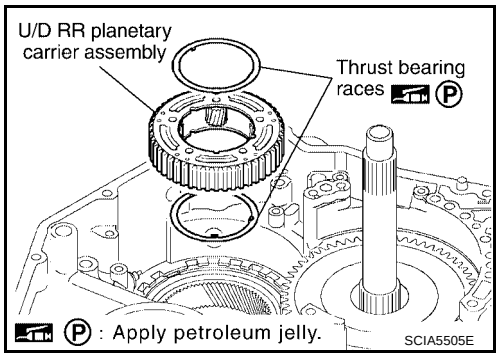
Apply petroleum jelly to adjust shim, thrust needle roller bearing and thrust bearing race.

37. Install U/D RR planetary ring gear sub assembly.

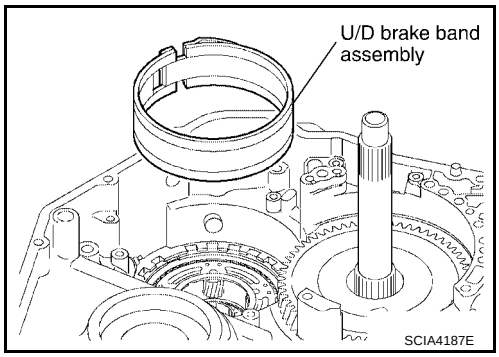


38. Install U/D RR planetary carrier assembly and thrust bearing races.

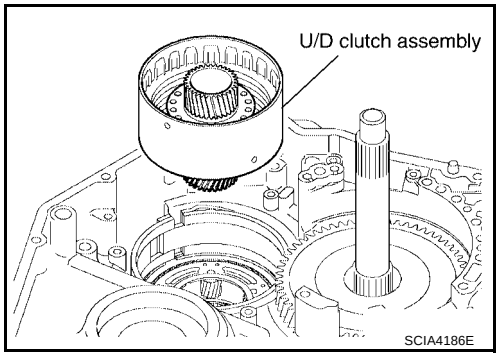
CAUTION:
Apply petroleum jelly to bearing races.



39. Install U/D brake band assembly.



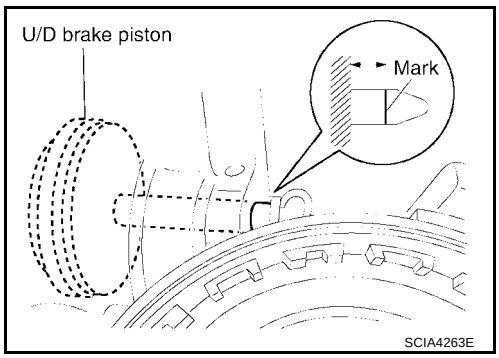
40. Install U/D clutch assembly.

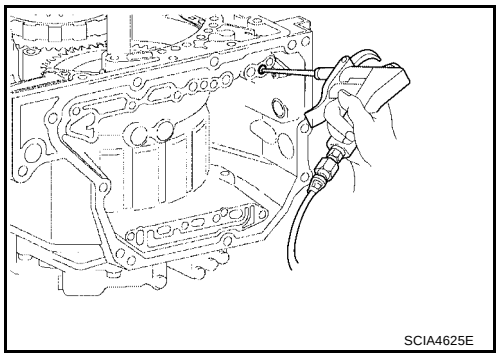


41. Measure the U/D brake piston stroke applying and releasing the compressed air (4Kg/cm^2) as shown.

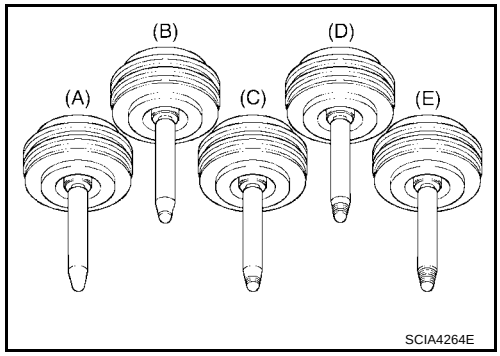
CAUTION:
Measure U/D brake piston stroke after assembling U/D clutch assembly.

Piston Stroke : 5.76 - 6.76 mm (0.2268 - 0.2661 in)





42. If the piston stroke is out of standards, select another U/D brake piston. Refer to AT-706, "U/D BRAKE" .



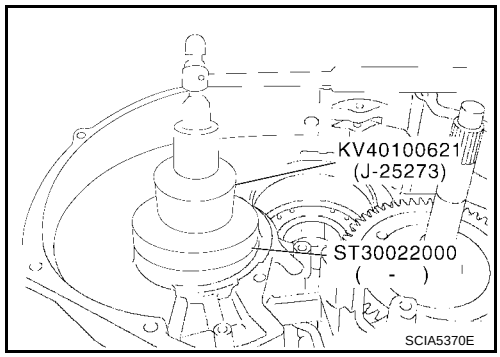
Adjustment

ECS009JT

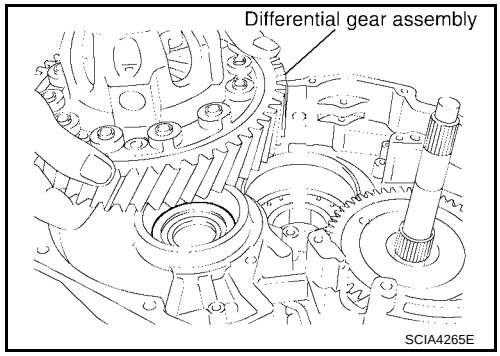
ADJUST PRELOAD OF TAPERED ROLLER BEARING

1. Install adjust shim and outer race in transaxle case using Tool.

Tool number : KV40100621 (J-25273)
: ST30022000 (—)

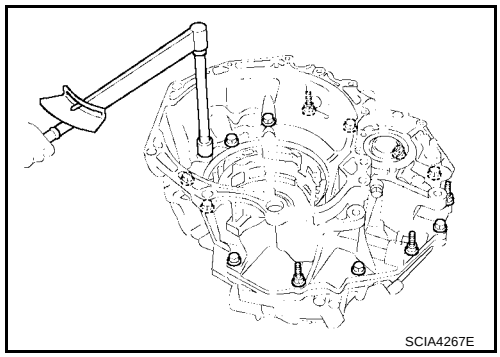


2. Install differential gear assembly in transaxle case.
3. Install transaxle housing into transaxle case.



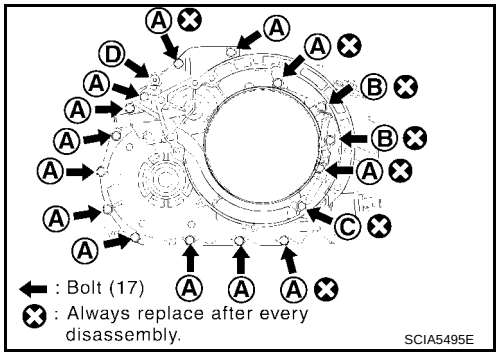
4. Tighten transaxle housing and transaxle case bolts to specified torque. Refer to AT-634, "Components" .

CAUTION:
Use old self-sealing bolts during preload checking and adjustment procedures.



Bolt symbol	Length mm (in)	Number of bolts
A	30 (1.18)	13
B	35 (1.38)	2
C	45 (1.77)	1
D*	—	1

*:Torx bolt



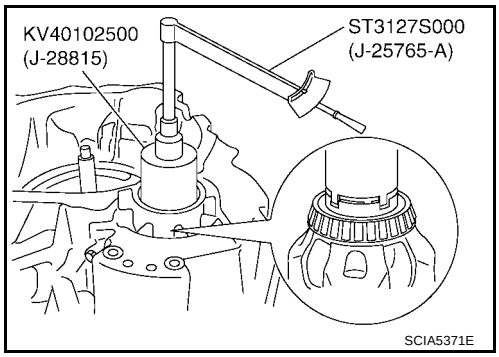
5. Measure turning torque of differential gear assembly using Tool.

Tool number : KV40102500 (J-28815)
: ST3127S000 (J-25765-A)

6. Turn differential gear assembly in both directions several times to seat bearing rollers correctly.

Turning torque : 0.7 - 1.2 N·m
(New bearing) (0.08 - 0.12kg-m, 7 - 10 in-lb)

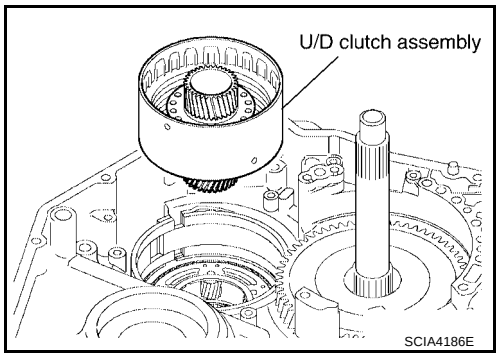
If the preload is not within specification, remove differential gear assembly from transaxle case. Re-select adjust shim. Refer to AT-707, "DIFFERENTIAL SIDE BEARING ADJUSTING SHIMS".



Assembly (2)

ECS009JU

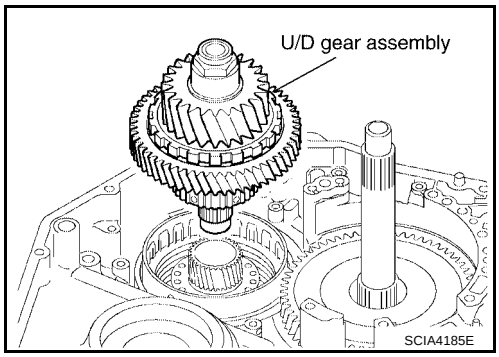
1. Remove transaxle housing and differential gear assembly from transaxle case.
2. Install U/D clutch assembly.



3. Install new seal rings in U/D gear assembly.

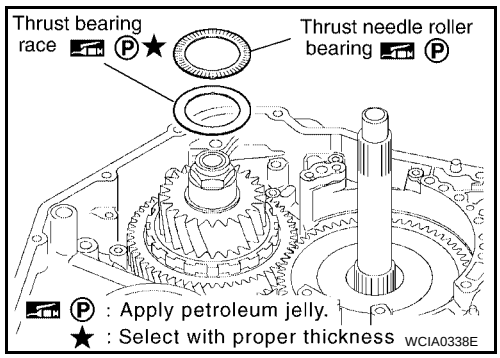
CAUTION:
- **Do not reuse seal rings.**
- **Apply ATF to new seal rings.**

4. Install U/D gear assembly.



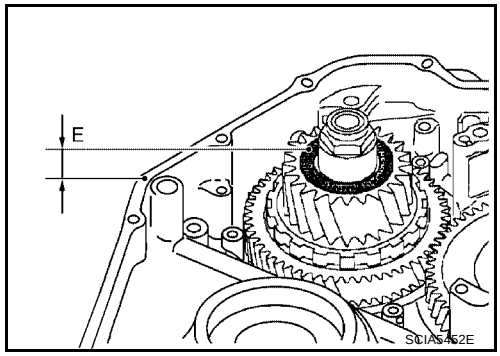
5. Install thrust needle roller bearing and thrust bearing race in U/D gear assembly.

CAUTION:
Apply petroleum jelly to thrust needle roller bearing and thrust bearing race.

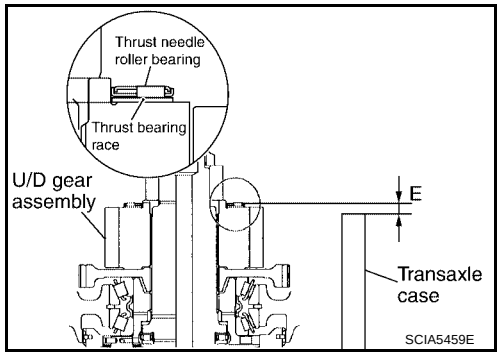


a. Make sure that measurement ″E″ is within the specifications.

Specification ″E″ : 1.269 - 1.645 mm (0.0500 - 0.0648 in)



- ″E″ is the height between the edge of the transaxle case and the roller part of thrust needle roller bearing.

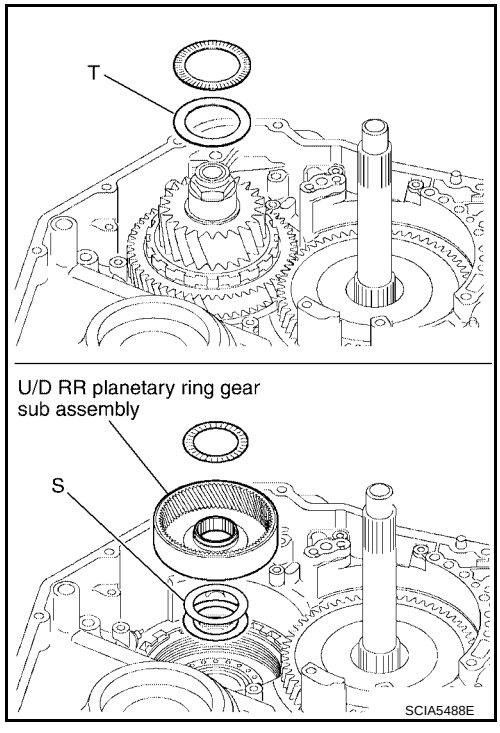


b. If measurement ″E″ is outside the specification, replace ″T″ with one that has applicable thickness. Refer to AT-707, "U/D GEAR ASSEMBLY" .

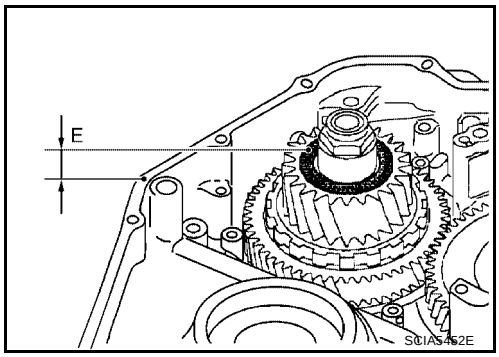
CAUTION:
When adjusting ″T″, use ″S″ of thickness 0.81 mm (0.32 in).

c. If all of ″T″ do not fit ″E″ within the specifications, replace ″S″ with one that has applicable thickness. Refer to AT-707, "U/D RR PLANETARY RING GEAR SUB ASSEMBLY" .

CAUTION:
When adjusting ″S″, use ″T″ of thickness 0.80 mm (0.31 in).



d. Make sure that measurement "E" is within specifications.

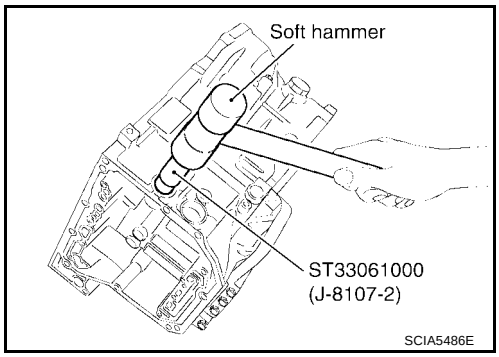


6. Install new manual valve oil seal into transaxle case until it is flush with the transaxle case face using Tool.

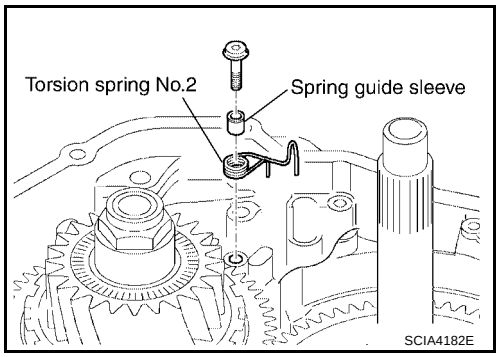
Tool number : ST33061000 (J-8107-2)

CAUSTION:

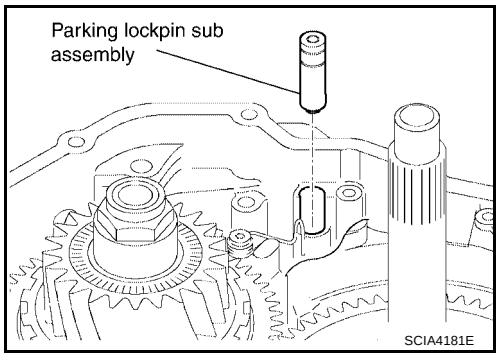
- **Do not reuse manual valve oil seal.**
- **Apply ATF to new manual valve oil seal.**



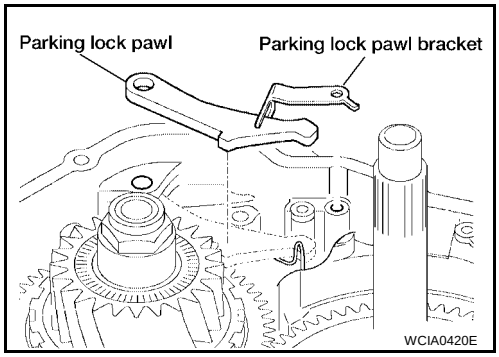
7. Install spring guide sleeve and torsion spring No.2 in transaxle case.
8. Tighten spring guide sleeve and torsion spring No.2 torx bolt to specified torque. Refer to AT-634, "Components" .



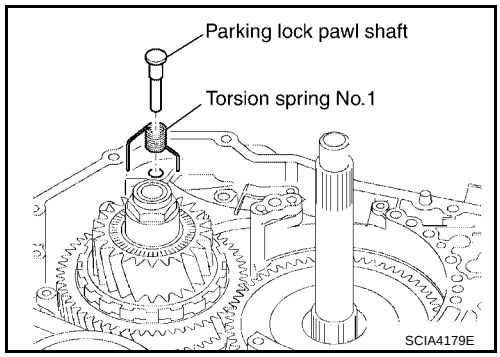
9. Install parking lockpin sub assembly.



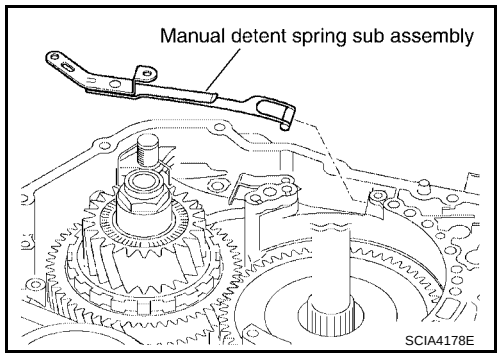
10. Install parking lock pawl bracket and parking lock pawl.



11. Install parking lock pawl shaft and torsion spring No.1.

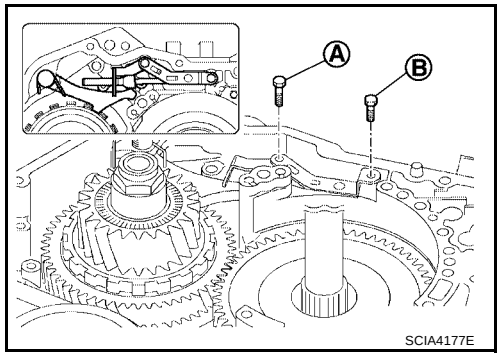


12. Install manual detent spring sub assembly.

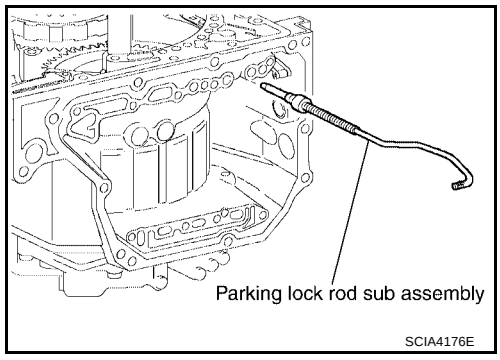


13. Temporarily tighten the bolts.

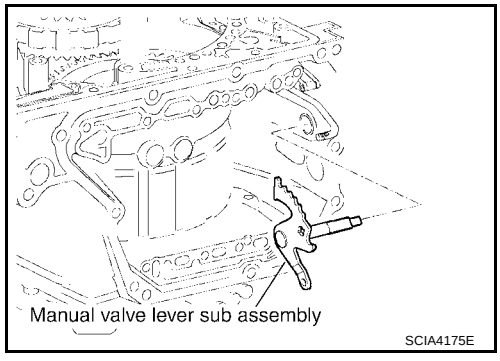
Bolt symbol	Length mm (in)	Number of bolts
A	16.7 (0.657)	1
B	14.0 (0.551)	1



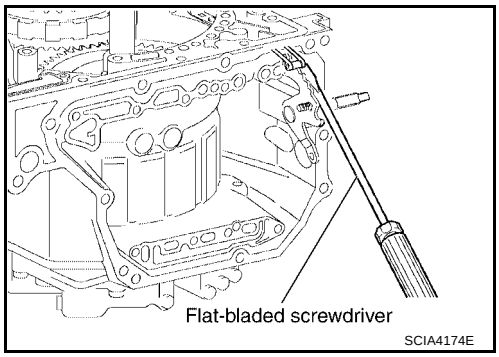
14. Install parking lock rod sub assembly.



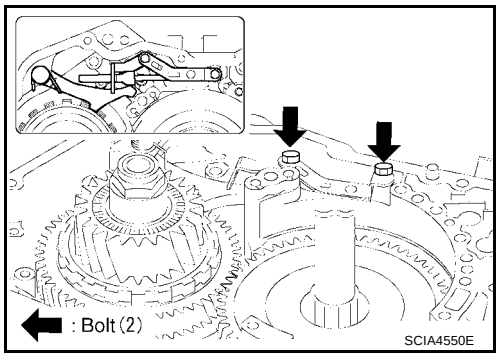
15. Install manual valve lever sub assembly connect parking lock rod sub assembly to it.



16. Connect manual detent spring sub assembly to manual valve lever sub assembly using suitable tool.



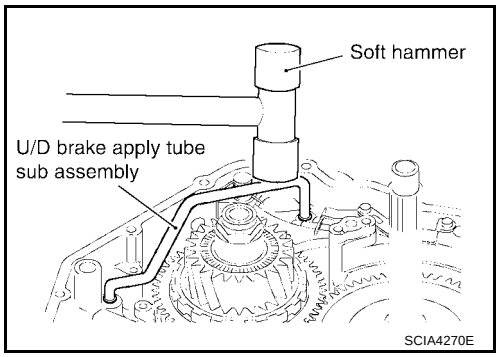
17. Tighten manual detent spring sub assembly bolts to specified torque. Refer to AT-634, "Components" .



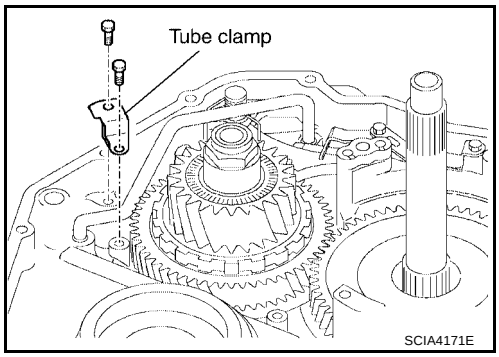
18. Install U/D brake apply tube sub assembly using suitable tool.

CAUTION:

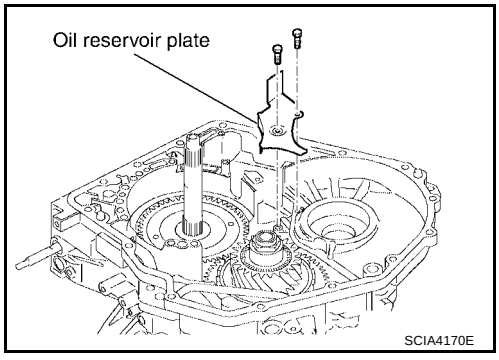
Do not damage U/D brake apply tube sub assembly.



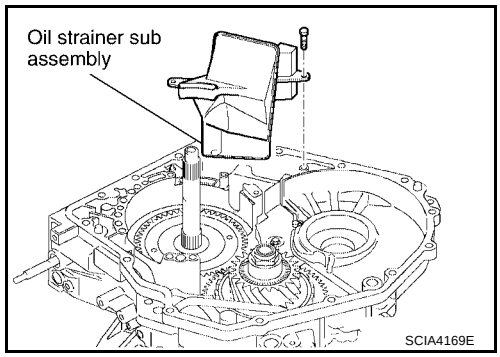
19. Tighten tube clamp bolts to specified torque. Refer to AT-634, "Components" .



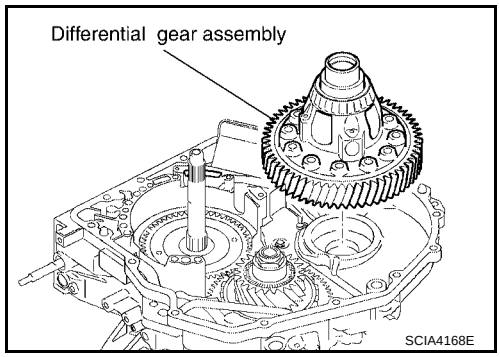
20. Install oil reservoir plate in transaxle case.
21. Tighten oil reservoir plate bolts to specified torque. Refer to AT-634, "Components" .



22. Install oil strainer sub assembly in transaxle case.
23. Tighten oil strainer sub assembly bolt to specified torque. Refer to AT-634, "Components" .



24. Install differential gear assembly.

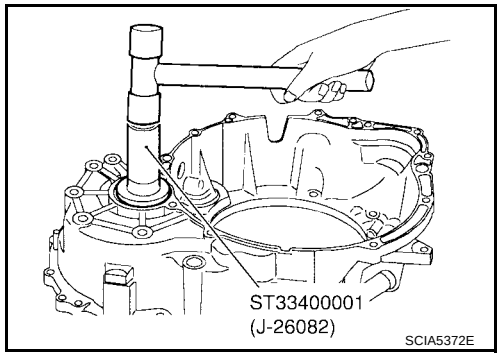


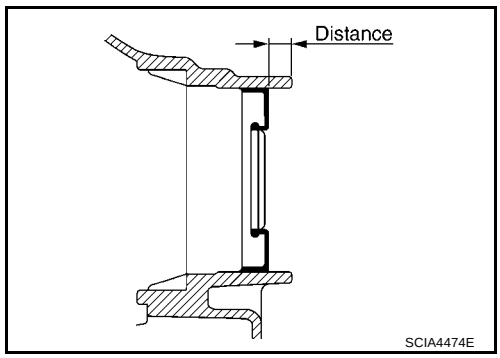
25. Install new differential side oil seal into transaxle housing as specified using Tool.

Tool number : ST33400001 (J-26082)

Distance : 14.8 - 15.8 mm (0.583 - 0.622 in)

CAUTION:
- **Do not reuse differential side oil seal.**
- **Apply ATF to new differential side oil seal.**

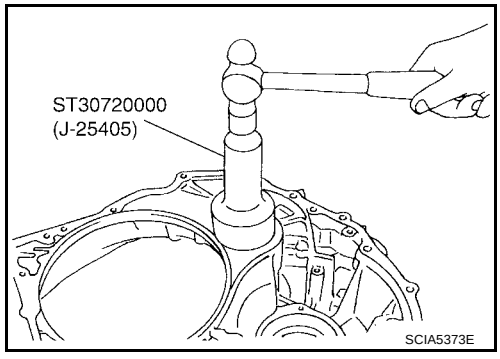




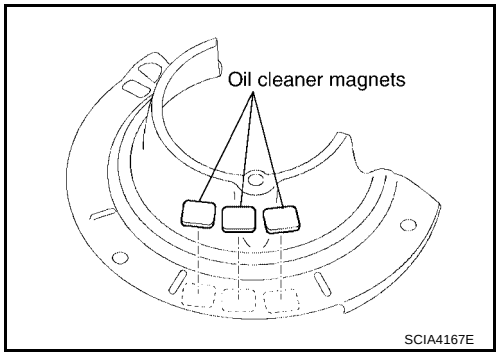
26. Install new thrust roller bearing in transaxle housing using Tool.

Tool number :ST30720000 (J-25405)

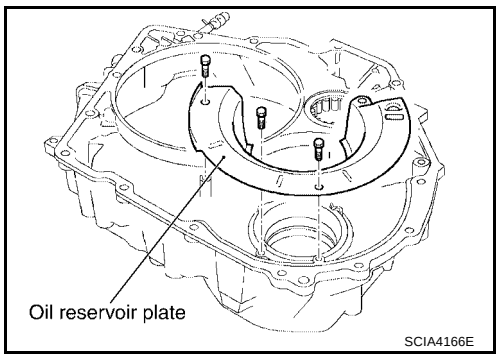
CAUTION:
Do not reuse thrust roller bearing.



27. Install oil cleaner magnets on oil reservoir plate.

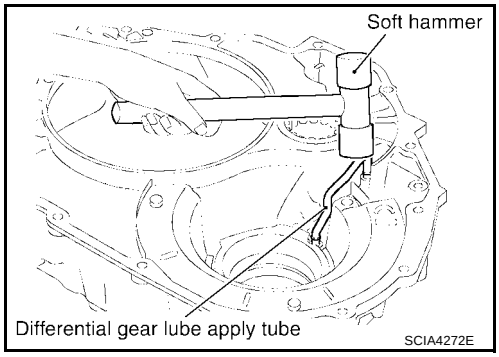


28. Install oil reservoir plate in transaxle housing.
29. Tighten oil reservoir plate bolts to specified torque. Refer to AT-634, "Components" .

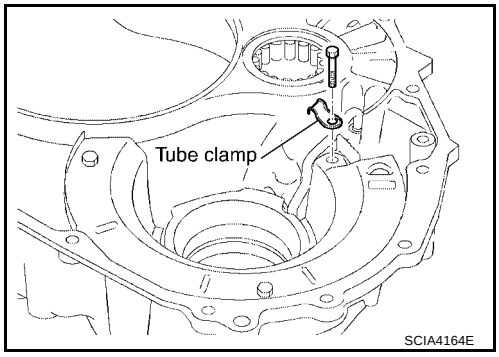


30. Install differential gear lube apply tube using suitable tool.

CAUTION:
Do not bend or damage differential gear lube apply tube.



31. Tighten tube clamp bolt to specified torque. Refer to AT-634, "Components" .

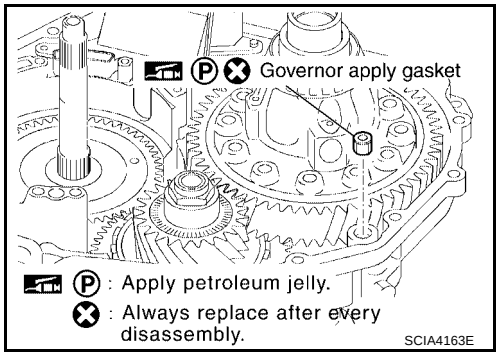


32. Install new governor apply gasket.

CAUTION:
- **Do not reuse governor apply gasket.**
- **Apply petroleum jelly to new governor apply gasket.**

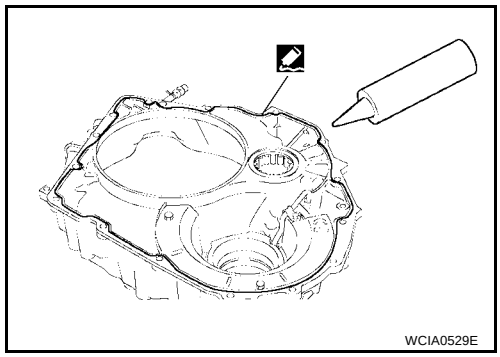
33. Install new seal ring.

CAUTION:
- **Do not reuse seal ring.**
- **Apply ATF to new seal ring.**

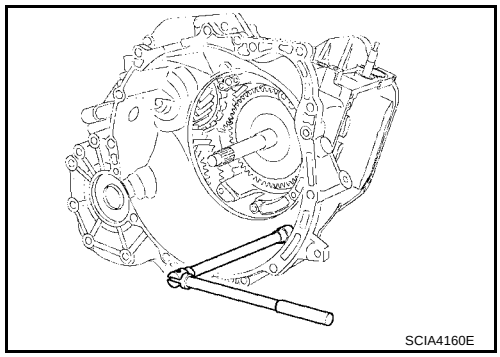


34. Apply Liquid Gasket (Three Bond 1281B) or equivalent to transaxle housing as shown. Refer to GI-45, "Recommended Chemical Products and Sealants" .

CAUTION:
Completely remove all moisture, oil and sealant from transaxle housing and transaxle case.



35. Install transaxle housing in transaxle case.

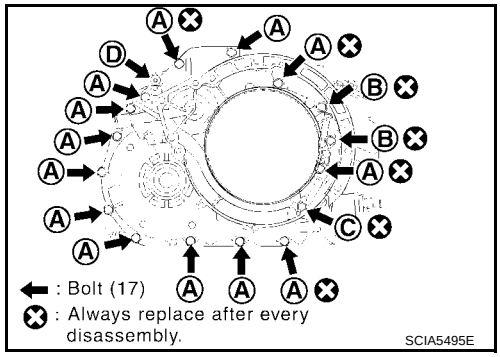


36. Tighten transaxle housing bolts to specified torque. Refer to AT-634, "Components" .

CAUTION:
Do not reuse seal bolt.

Bolt symbol	Length mm (in)	Number of bolts
A	30 (1.18)	13
B	35 (1.38)	2
C	45 (1.77)	1
D*	—	1

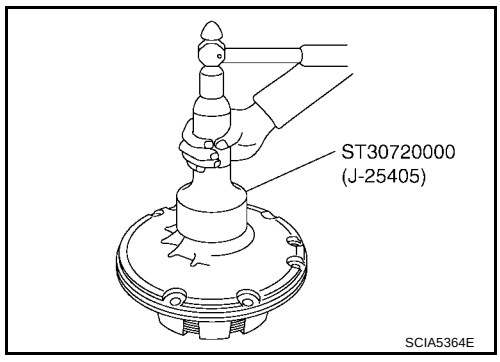
*:Torx bolt



37. Install new oil seal into oil pump assembly until it is flush with oil pump face using Tool.

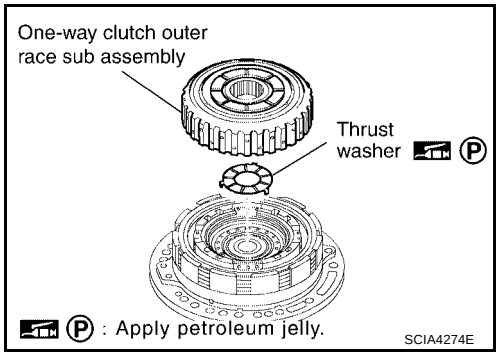
Tool number : ST30720000 (J-25405)

CAUTION:
- **Do not reuse oil seal.**
- **Apply ATF to new oil seal.**



38. Install thrust washer and one- way clutch outer race sub assembly in oil pump assembly.

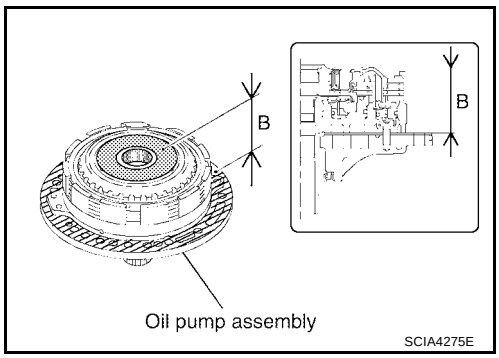
CAUTION:
Apply petroleum jelly to thrust washer.



39. Check the distance of “B”.

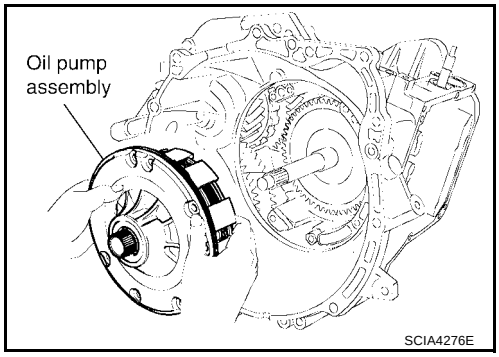
“B” : 51.09 - 51.71 mm (2.0114 - 2.0358 in)

CAUTION:
If the distance is out of standards, adjust within standards again.

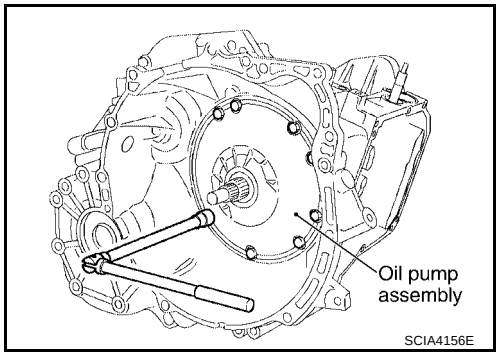


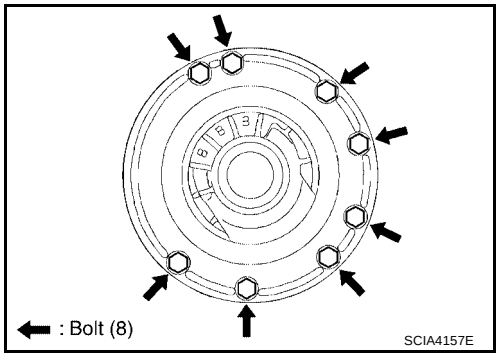
40. Place oil pump assembly through the input shaft in horizontal position, and align the bolt holes of the oil pump assembly with transaxle case. Lightly press oil pump assembly.

CAUTION:
Do not drop one-way clutch outer race sub assembly.



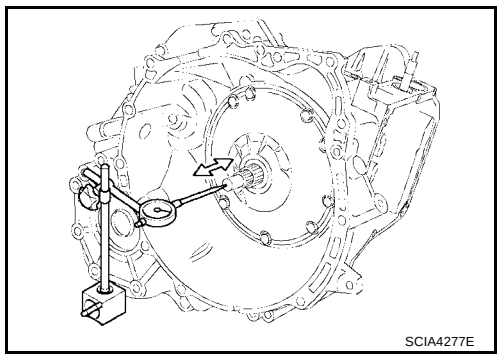
41. Tighten oil pump assembly bolts to specified torque. Refer to AT-634, "Components" .



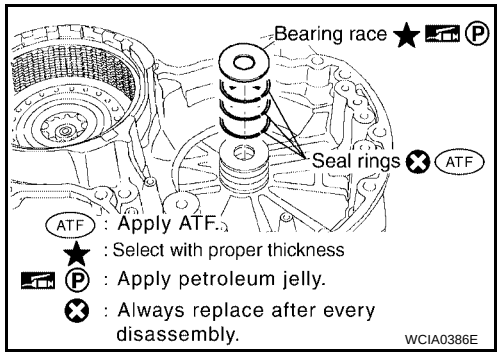


42. Set a dial indicator as shown, move the input shaft and measure the end play.

End play : 0.188 - 0.570 mm (0.0074 - 0.00224 in)

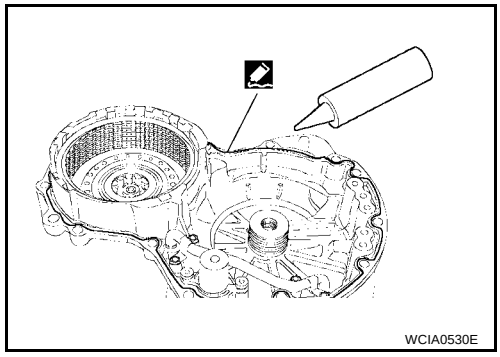


If end play is out of standards, select another thrust bearing race. Refer to AT-706, "FORWARD AND DIRECT CLUTCH ASSEMBLY" .

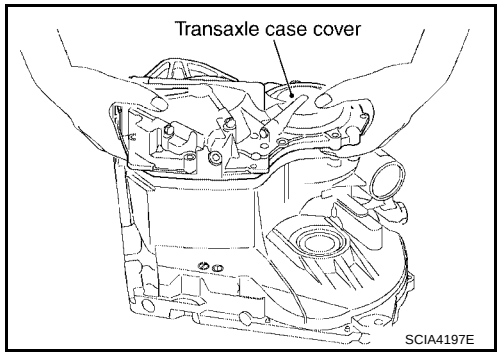


43. Remove transaxle case cover.
44. Apply Liquid Gasket (Three Bond 1281B) or equivalent to transaxle case cover as shown. Refer to GI-45, "Recommended Chemical Products and Sealants" .

CAUTION:
Completely remove all moisture, oil and sealant from transaxle case cover and transaxle.



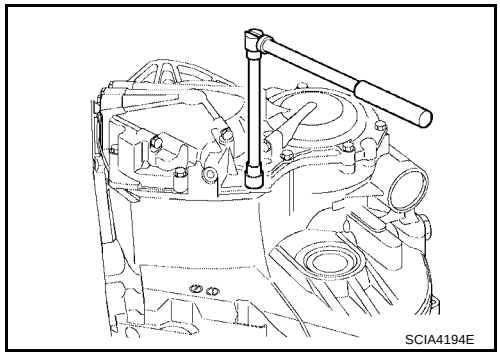
45. Install transaxle case cover in transaxle case.



46. Tighten transaxle case cover bolts to specified torque. Refer to AT-634, "Components" .

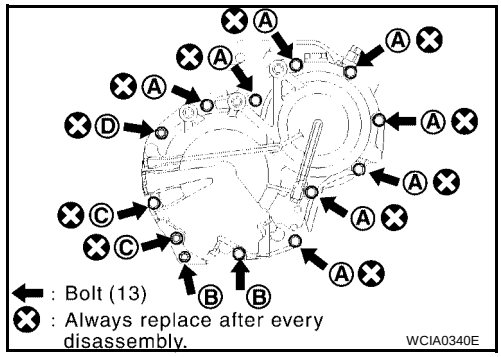
CAUTION:
Do not reuse seal bolts.

Bolt symbol	Length mm (in)	Number of bolts
A	30 (1.18)	8
B	45 (1.77)	2



Bolt symbol	Length mm (in)	Number of bolts
C	48 (1.89)	2
D*	—	1

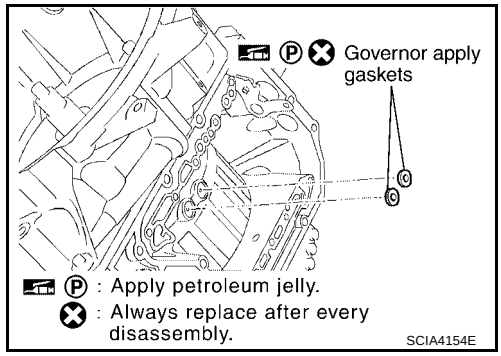
*:Stud bolt



47. Install new governor apply gaskets.

CAUTION:

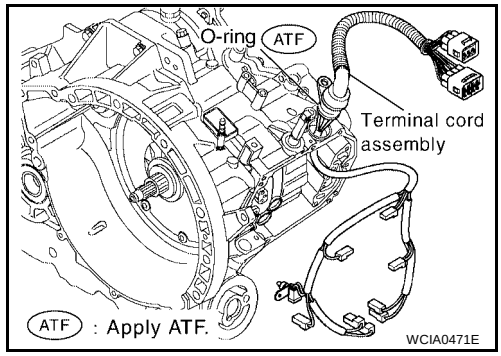
- **Do not reuse governor apply gaskets.**
- **Apply petroleum jelly to new governor apply gaskets.**



48. Install terminal cord assembly.

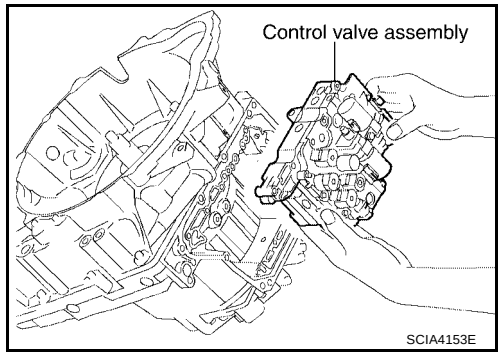
CAUTION:

- **Do not break the solenoid connector and A/T fluid temperature sensor.**
- **Apply ATF to O-ring.**



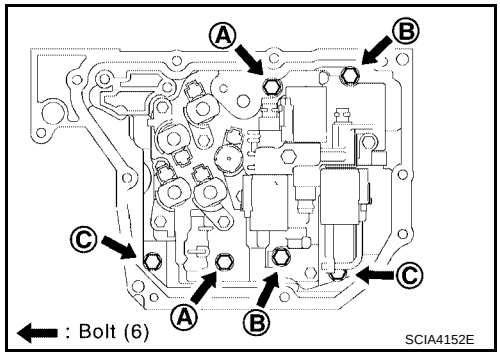
49. While holding control valve assembly, connect the parking lock rod sub assembly to manual valve lever sub assembly.

NOTE:
Shift position is “N”.



50. Tighten control valve assembly bolts to specified torque. Refer to AT-634, "Components" .

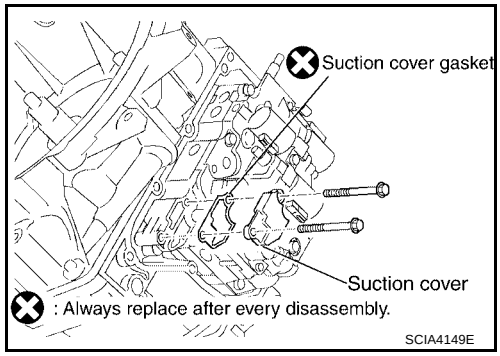
Bolt symbol	Length mm (in)	Number of bolts
A	55 (2.17)	2
B	50 (1.97)	2
C	16 (0.63)	2



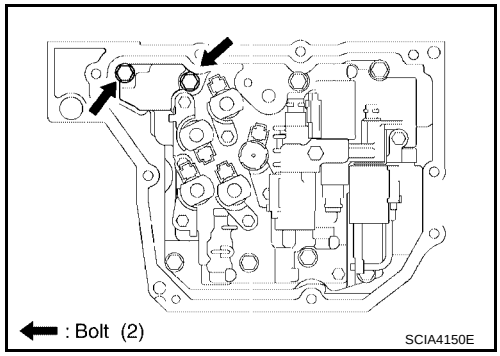
51. Install suction cover and new suction cover gasket in control valve assembly.

CAUTION:

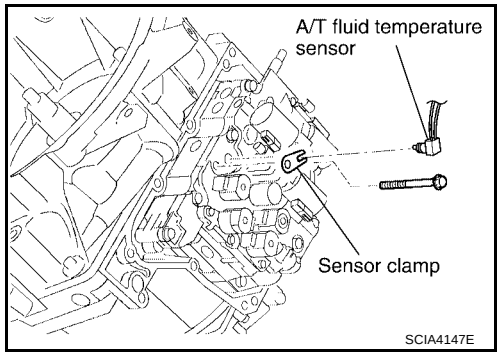
Do not reuse suction cover gasket.



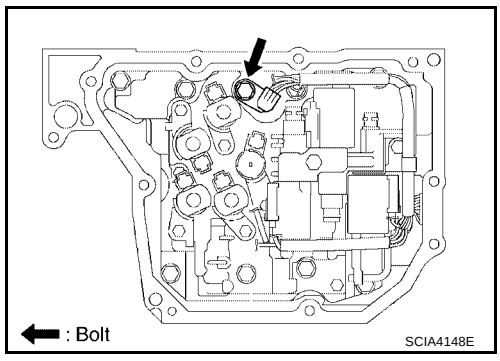
52. Tighten new suction cover bolts to specified torque. Refer to AT-634, "Components" .



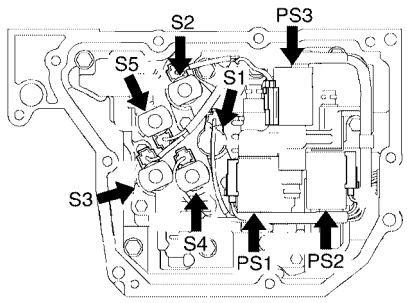
53. Install sensor clamp and A/T fluid temperature sensor in control valve assembly.



54. Tighten sensor clamp bolts to specified torque. Refer to AT-634, "Components" .



55. Connect the solenoid connectors.

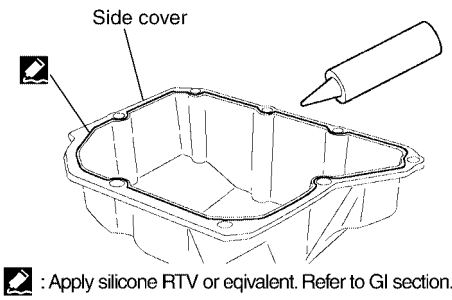


S1 : Shift solenoid valve A
S2 : Shift solenoid valve B
S3 : Shift solenoid valve C
S4 : Shift solenoid valve D
S5 : Shift solenoid valve E
PS1 : Pressure control solenoid valve A
PS2 : Pressure control solenoid valve B
PS3 : Pressure control solenoid valve C

SCIA4146E

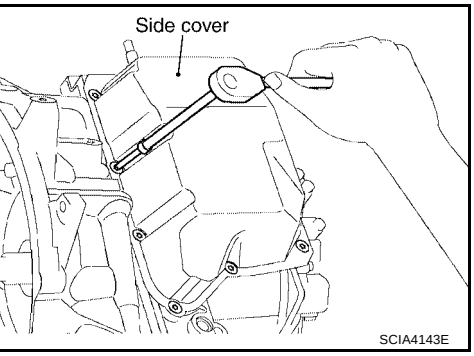
56. Apply Liquid Gasket (Three Bond 1281B) or equivalent to side cover as shown. Refer to GI-45, "Recommended Chemical Products and Sealants" .

CAUTION:
Completely remove all moisture, oil and sealant from side cover and transaxle case.



SCIA5508E

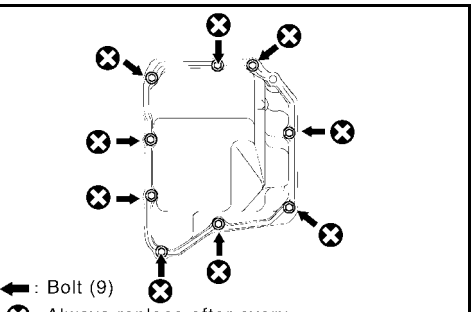
57. Install side cover in transaxle case.



SCIA4143E

58. Tighten side cover torx bolts to specified torque. Refer to AT-634, "Components" .

CAUTION:
Do not reuse seal bolt.



SCIA4144E

59. Install new O-rings in ATF cooler assembly.

CAUTION:

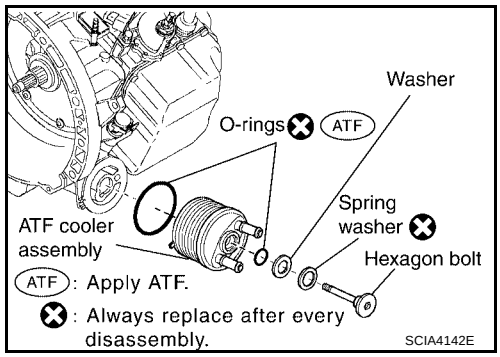
- **Do not reuse O-rings.**
- **Apply ATF to new O-rings.**

60. Install ATF cooler assembly, washer and new spring washer.

CAUTION:

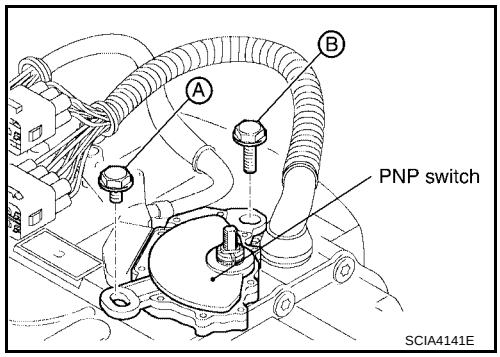
Do not reuse spring washer.

61. Tighten hexagon bolt to specified torque. Refer to AT-634, "Components" .



62. Install PNP switch to manual valve lever sub assembly.
63. Temporarily tighten the bolts.

Bolt symbol	Length mm (in)	Number of bolts
A	20 (0.79)	1
B	33 (1.30)	1

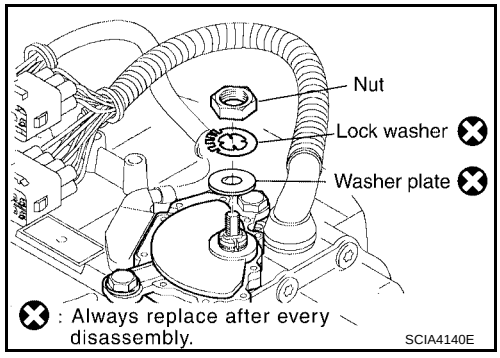


64. Install new washer plate and new lock washer.

CAUTION:

Do not reuse washer plate and lock washer.

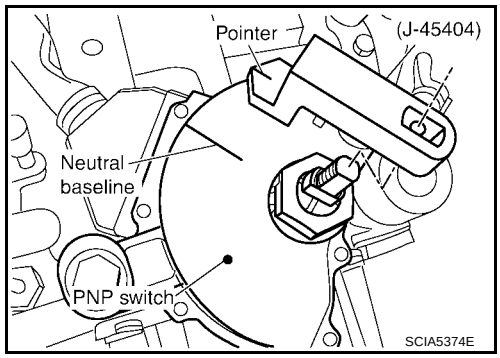
65. Tighten nut specified torque. Refer to AT-634, "Components" .



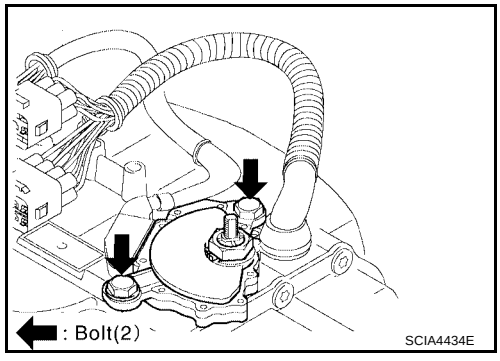
66. Install Tool.

Tool number : KV991J0060 (J-45404)

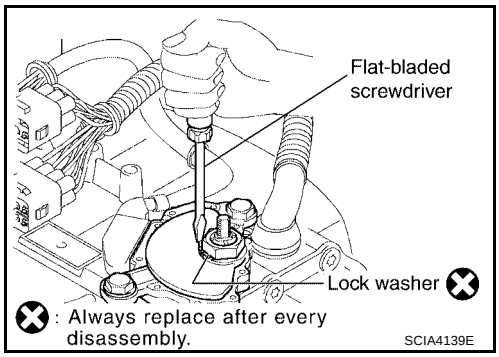
67. Adjust PNP switch so that Tool pointer aligns with neutral base line on PNP switch body.



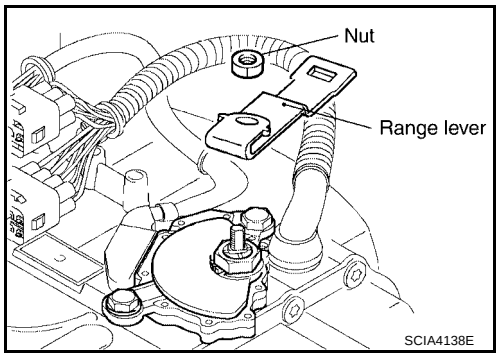
68. Tighten PNP switch bolts to specified torque. Refer to AT-634, "Components" .



69. Bend the lock washer using suitable tool.

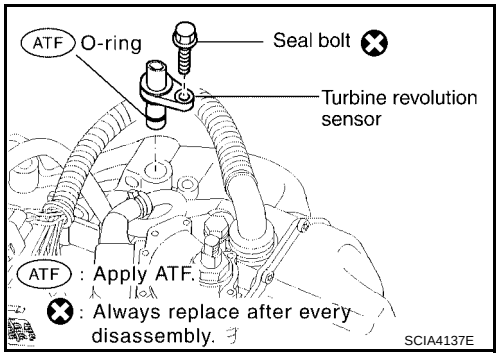


70. Install range lever in manual valve lever sub assembly.
71. Tighten range lever nut to specified torque. Refer to AT-634, "Components" .



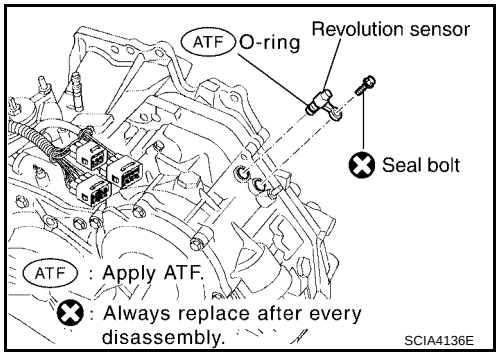
72. Install turbine revolution sensor in transaxle case.
73. Tighten new turbine revolution sensor bolt to specified torque. Refer to AT-634, "Components" .

CAUTION:
- **Do not reuse seal bolt.**
- **Apply ATF to O-ring.**



74. Install revolution sensor in transaxle case.
75. Tighten new revolution sensor bolt to specified torque. Refer to AT-634, "Components" .

CAUTION:
- **Do not reuse seal bolt.**
- **Apply ATF to O-ring.**



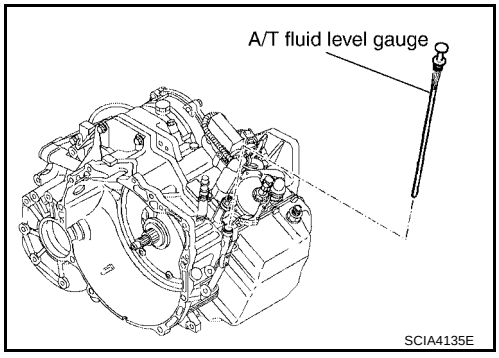
76. Install new O-ring in A/T fluid charging pipe.

CAUTION:
- **Do not reuse O-ring.**
- **Apply petroleum jelly to new O-ring.**

77. Install A/T fluid charging pipe in transaxle housing.
78. Install A/T fluid cooler tube.

CAUTION:
Do not reuse copper washer.

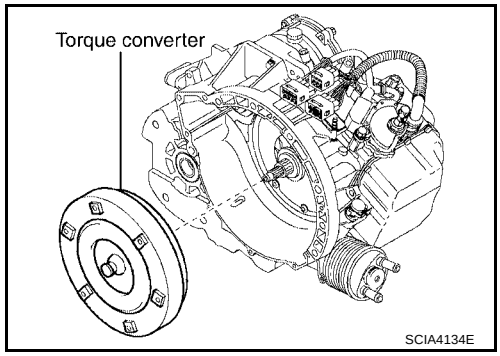
79. Tighten A/T fluid cooler tube union to specified torque. Refer to AT-634, "Components" .



80. Install air breather hose.
81. Install A/T fluid level gauge.
82. Install drain plug with new gasket to transaxle housing.

CAUTION:
Do not reuse drain plug gasket.

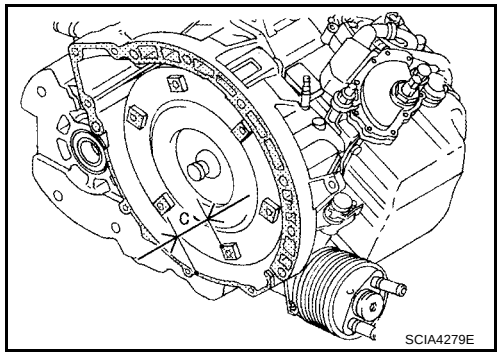
83. Tighten drain plug to specified torque. Refer to AT-634, "Components" .
84. Install torque converter.



85. Check the dimension of “C”.

Dimension “C” : 14.0 mm (0.55 in)

CAUTION:
If the distance is out of standards, adjust within standards again.



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ECS009JV

Engine		VQ35DE	
Automatic transaxle model		RE5F22A	
Automatic transaxle model code number		9J500	8Y100
Stall torque ratio		1.8: 1	
Transaxle gear ratio	1st	4.657	
	2nd	3.033	
	3rd	1.982	
	4th	1.342	
	5th	1.018	
	Reverse	5.114	
	Final drive	2.269	2.440
Recommended fluid		Genuine Nissan Matic K ATF*	
Fluid capacity ℓ (US qt, Imp qt)		7.3 (7-3/4, 6-3/8)	

CAUTION:

- **Use only Genuine Nissan Matic K ATF. Do not mix with other fluid.**
- **Using automatic transaxle fluid other than Genuine Nissan Matic K ATF will deteriorate driveability and automatic transaxle durability, and may damage the automatic transaxle, which is not covered by the warranty.**

*: Refer to MA-12, "RECOMMENDED FLUIDS AND LUBRICANTS" .

Shift Schedule

ECS009JW

VEHICLE SPEED WHEN SHIFTING GEARS - 9J500 MODELS

Accelerator angle	Vehicle speed km/h (MPH) (Approx.)							
	D1 →D2	D2 →D3	D3 →D4	D4 →D5	D5 →D4	D4 →D3	D3 →D2	D2 →D1
100 %	63 (39)	100 (62)	156 (97)	230 (143)	219 (136)	150 (93)	88 (55)	43 (27)
90 %	63 (39)	100 (62)	156 (97)	230 (143)	219 (136)	150 (93)	88 (55)	43 (27)
80 %	63 (39)	100 (62)	156 (97)	230 (143)	219 (136)	150 (93)	88 (55)	43 (27)
70 %	63 (39)	100 (62)	156 (97)	230 (143)	208 (129)	149 (93)	86 (53)	43 (27)
60 %	63 (39)	100 (62)	156 (97)	230 (143)	201 (125)	143 (89)	80 (50)	43 (27)
50 %	63 (39)	95 (59)	145 (90)	214 (133)	187 (116)	130 (81)	73 (45)	43 (27)
40 %	53 (33)	87 (54)	124 (77)	182 (113)	156 (97)	97 (60)	57 (35)	34 (21)
30 %	39 (24)	68 (42)	95 (59)	134 (83)	112 (70)	62 (39)	37 (23)	20 (12)
20 %	29 (18)	49 (30)	65 (40)	92 (57)	63 (39)	42 (26)	23 (14)	8 (5)
10 %	20 (12)	31 (19)	41 (25)	58 (36)	47 (29)	34 (21)	23 (14)	8 (5)

VEHICLE SPEED WHEN SHIFTING GEARS - 8Y100 MODELS

Accelerator angle	Vehicle speed km/h (MPH) (Approx.)							
	$D_1 \rightarrow D_2$	$D_2 \rightarrow D_3$	$D_3 \rightarrow D_4$	$D_4 \rightarrow D_5$	$D_5 \rightarrow D_4$	$D_4 \rightarrow D_3$	$D_3 \rightarrow D_2$	$D_2 \rightarrow D_1$
100 %	58 (36)	93 (58)	144 (89)	213 (132)	203 (126)	139 (86)	81 (50)	40 (25)
90 %	58 (36)	93 (58)	144 (89)	213 (132)	203 (126)	139 (86)	81 (50)	40 (25)
80 %	58 (36)	93 (58)	144 (89)	213 (132)	203 (126)	139 (86)	81 (50)	40 (25)
70 %	58 (36)	93 (58)	144 (89)	213 (132)	193 (120)	138 (86)	80 (50)	40 (25)
60 %	58 (36)	93 (58)	144 (89)	213 (132)	186 (116)	133 (83)	75 (47)	40 (25)
50 %	58 (36)	88 (55)	135 (84)	199 (124)	173 (108)	121 (75)	68 (42)	40 (25)
40 %	49 (30)	80 (50)	115 (71)	169 (105)	145 (90)	90 (56)	53 (33)	31 (19)
30 %	36 (22)	63 (39)	88 (55)	124 (77)	103 (64)	58 (36)	34 (21)	19 (12)
20 %	27 (17)	46 (29)	61 (38)	86 (53)	59 (37)	39 (24)	22 (14)	8 (5)
10 %	19 (12)	29 (18)	38 (24)	53 (33)	44 (27)	32 (20)	22 (14)	8 (5)

VEHICLE SPEED WHEN PERFORMING AND RELEASING COMPLETE LOCK-UP - 9J500 MODELS

Accelerator angle	Vehicle speed km/h (MPH) (Approx.)	
	Lock-up “ON”	Lock-up “OFF”
50 %	230 (143)	207 (129)
15%	115 (71)	74 (46)
0 - 8 %	70 (43)	67 (42)

- Lock-up vehicle speed indicates the speed in D position.
- Perform lock-up inspection after warming up engine.
- Lock-up vehicle speed may vary depending on the driving conditions and circumstances.

VEHICLE SPEED WHEN PERFORMING AND RELEASING COMPLETE LOCK-UP - 8Y100 MODELS

Accelerator angle	Vehicle speed km/h (MPH) (Approx.)	
	Lock-up “ON”	Lock-up “OFF”
50 %	213 (132)	192 (119)
15%	106 (66)	69 (43)
0 - 8 %	65 (40)	62 (39)

- Lock-up vehicle speed indicates the speed in D position.
- Perform lock-up inspection after warming up engine.
- Lock-up vehicle speed may vary depending on the driving conditions and circumstances.

Stall Speed

ECS009JX

Stall speed	2,430 - 2,730 rpm

Line Pressure

ECS009JY

Engine speed	Line pressure kPa (kg/cm^2 , psi)	
	D, M positions	R position
At idle speed	333 - 392 (3.4 - 4.0, 48 - 57)	500 - 608 (5.1 - 6.2, 73 - 88)
At stall speed	1,285 - 1,393 (13.1 - 14.2, 186 - 202)	1,706 - 1,981 (17.4 - 20.2, 247 - 287)

Time Lag

ECS009JZ

Selector lever	Time
N to D position	Less than 0.7 sec.
N to R position	Less than 1.2 sec.

Shift Solenoid Valves

ECS009K0

Shift position		Shift solenoid valve					Remarks
		A	B	C	D	E	
P		OFF (Open)	OFF (Closed)	OFF (Closed)	OFF (Open)	OFF (Closed)	PARK POSITION
R		OFF (Open)	OFF (Closed)	ON (Open)	OFF (Open)	ON (Open)	REVERSE POSITION
N		OFF (Open)	OFF (Closed)	OFF (Closed)	OFF (Open)	OFF (Closed)	NEUTRAL POSITION
D	1st	ON (Closed)	ON (Open)	ON (Open)	OFF (Open)	OFF (Closed)	Automatic shift 1 ⇔ 2 ⇔ 3 ⇔ 4 ⇔ 5
	1 ⇔ 2	OFF (Open)	OFF (Closed)	ON (Open)	OFF (Open)	OFF (Closed)	
	2nd	OFF (Open)	OFF (Closed)	ON (Open)	OFF (Open)	OFF (Closed)	
	2 ⇔ 3	OFF (Open)	OFF (Closed)	ON (Open)	ON (Closed)	ON (Open)	
	3rd	OFF (Open)	OFF (Closed)	ON (Open)	ON (Closed)	OFF (Closed)	
	3 ⇔ 4	OFF (Open)	OFF (Closed)	OFF (Closed)	ON (Closed)	ON (Open)	
	4th	OFF (Open)	OFF (Closed)	OFF (Closed)	ON (Closed)	OFF (Closed)	
	4 ⇔ 5	OFF (Open)	ON (Open)	OFF (Closed)	ON (Closed)	OFF (Closed)	
	5th	OFF (Open)	ON (Open)	OFF (Closed)	ON (Closed)	OFF (Closed)	
M5	5th	OFF (Open)	ON (Open)	OFF (Closed)	ON (Closed)	OFF (Closed)	Locks in 5th gear*
M4	4th	OFF (Open)	OFF (Closed)	OFF (Closed)	ON (Closed)	OFF (Closed)	Locks in 4th gear*
M3	3rd	OFF (Open)	OFF (Closed)	ON (Open)	ON (Closed)	OFF (Closed)	Locks in 3rd gear*
M2	2nd	OFF (Open)	OFF (Closed)	ON (Open)	OFF (Open)	OFF (Closed)	Locks in 2nd gear*
M1	1st	ON (Closed)	ON (Open)	ON (Open)	OFF (Open)	ON (Open)	Locks in 1st gear*

*: Except when automated up/down shift control and up/down shift permission control are actuated. Refer to AT-424, "MANUAL MODE" .

Solenoid Valves

ECS009K1

Solenoid valves	Resistance (Approx.)	Connector (Color)	Terminal
Shift solenoid valve A	11 - 16 Ω	(B)	1 - Ground
Shift solenoid valve B		(GY)	1 - Ground
Shift solenoid valve C		(GY)	1 - Ground
Shift solenoid valve D		(L)	1 - Ground
Shift solenoid valve E		(G)	1 - Ground
Pressure control solenoid valve A	5.0 - 5.6 Ω	(G)	1 - 2
Pressure control solenoid valve B		(B)	1 - 2
Pressure control solenoid valve C		(L)	1 - 2

Specified resistance at 20°C (68°F).

Clutch and Brakes

ECS009K2

2ND BRAKE

Number of 2nd brake plates	4	
Number of 2nd brake discs	4	
Number of 2nd brake flange	1	
Piston stroke mm (in)	1.10 - 1.50 (0.0433 - 0.0591)	
Thickness of 2nd brake flanges	Thickness mm (in)	Part number*
	3.6 (0.142) 3.8 (0.150) 4.0 (0.157)	31537-8Y011 31537-8Y012 31537-8Y013

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

2ND COAST BRAKE

Number of 2nd coast brake plates	3
Number of 2nd coast brake discs	3
Number of 2nd coast brake flange	1
Piston stroke mm (in)	0.76 - 1.44 (0.0299 - 0.0567)

B5 BRAKE

Number of B5 brake plates	6	
Number of B5 brake discs	6	
Number of B5 brake flange	1	
Number of B5 brake cushion plate	1	
Piston stroke mm (in)	2.34 - 2.70 (0.0921 - 0.1063)	
Thickness of B5 brake flanges	Thickness mm (in)	Part number*
	5.0 (0.197)	31667-8Y016
	5.1 (0.202)	31667-8Y017
	5.2 (0.205)	31667-8Y018
	5.3 (0.209)	31667-8Y019
	5.5 (0.217)	31667-8Y020

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

1ST AND REVERSE BRAKE

Number of 1st and reverse brake plates	4
Number of 1st and reverse brake discs	5
Number of 1st and reverse brake flanges	2
Piston stroke mm (in)	1.39 - 2.21 (0.0547 - 0.0870)

FORWARD AND DIRECT CLUTCH ASSEMBLY

	Thickness mm (in)	Part number*2
Thickness of thrust washer races	0.81 (0.0319)	31435 8Y060
	0.90 (0.0350)	31435 8Y061
	1.00 (0.0400)	31435 8Y062
	1.10 (0.0430)	31435 8Y063
	1.20 (0.0470)	31435 8Y064
	1.30 (0.0510)	31435 8Y065
	1.40 (0.0550)	31435 8Y066
	1.50 (0.0590)	31435 8Y067
End play mm (in)	0.188 - 0.570 mm (0.0074 - 0.0224)	

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

U/D BRAKE

Piston type	Mark	Piston length mm (in)	Part number*
A	—	63.7 (2.508)	31615 8Y005
B	1	64.2 (2.528)	31615 8Y004
C	2	64.7 (2.547)	31615 8Y003
D	3	65.2 (2.567)	31615 8Y002
E	4	65.7 (2.587)	31615 8Y001
Piston stroke mm (in)		5.76 - 6.76 mm (0.2268 - 0.2661)	

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

U/D RR PLANETARY RING GEAR SUB ASSEMBLY

	Thickness mm (in)	Part number*2
Thickness of adjust shims	0.81 (0.0319)	31435 8Y0100
	0.90 (0.0350)	31435 8Y0101
	1.00 (0.0400)	31435 8Y0102
	1.10 (0.0430)	31435 8Y0103
	1.20 (0.0470)	31435 8Y0104
	1.30 (0.0510)	31435 8Y0105
	1.40 (0.0550)	31435 8Y0106
	1.50 (0.0590)	31435 8Y0107
	1.60 (0.0630)	31435 8Y0108

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

U/D GEAR ASSEMBLY

	Thickness mm (in)	Part number*2
Thickness of thrust washers	0.80 (0.0310)	31435 8Y021
	0.90 (0.0350)	31435 8Y068
	1.00 (0.0400)	31435 8Y069
	1.10 (0.0430)	31435 8Y070
	1.20 (0.0470)	31435 8Y071
	1.30 (0.0510)	31435 8Y072
	1.40 (0.0550)	31435 8Y073
	1.50 (0.0590)	31435 8Y074

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

PLANETARY SUN GEAR SUB ASSEMBLY

Inner diameter of planetary sun gear sub assembly bushing mm (in).	Standard	22.200 - 22.226 (0.8740 - 0.8750)
	Allowable limit	22.276 (0.8770)

PLANETARY GEAR ASSEMBLY

Inner diameter of planetary gear assembly bushing mm (in).	Standard	30.056 - 30.082 (1.1833 - 1.1843)
	Allowable limit	30.132 (1.1863)

Final Drive

ECS009K3

DIFFERENTIAL SIDE BEARING ADJUSTING SHIMS

Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
1.00 (0.0394)	31438-8Y001	1.48 (0.0583)	31438-8Y013
1.05 (0.0413)	31438-8Y002	1.51 (0.0594)	31438-8Y014
1.10 (0.0433)	31438-8Y003	1.54 (0.0606)	31438-8Y015
1.15 (0.0453)	31438-8Y004	1.57 (0.0618)	31438-8Y016
1.20 (0.0472)	31438-8Y005	1.60 (0.0630)	31438-8Y017
1.25 (0.0492)	31438-8Y006	1.65 (0.0650)	31438-8Y018
1.30 (0.0512)	31438-8Y007	1.70 (0.0669)	31438-8Y019
1.33 (0.0524)	31438-8Y008	1.75 (0.0689)	31438-8Y020
1.36 (0.0535)	31438-8Y009	1.80 (0.0709)	31438-8Y021
1.39 (0.0547)	31438-8Y010	1.85 (0.0728)	31438-8Y022
1.42 (0.0559)	31438-8Y011	1.90 (0.0748)	31438-8Y023
1.45 (0.0571)	31438-8Y012		

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

TURNING TORQUE

Turning torque of final drive assembly	0.7 - 1.2 N·m (0.08 - 0.12kg-m, 7 - 10 in-lb)

A/T Fluid Temperature Sensor

ECS009K4

Condition		Voltage (Approx.)	Resistance (Approx.)
ATF temperature	0°C (32°F)	4.0V	9.8 kΩ
	20°C (68°F)	3.0V	4.2 kΩ
	80°C (176°F)	0.8V	0.54 kΩ
	100°C (212°F)	0.5V	0.31 kΩ

Turbine Revolution Sensor

ECS009K5

Condition	Signal	Voltage* (Approx.)
Connect 12V power supply and 100 Ω resistance, and then shake magnetic body.	HIGH	1.2 - 1.6V
	LOW	0.4 - 0.8V

*: Voltage with both end of 100 Ω resistance.

Revolution Sensor

ECS009K6

Condition	Signal	Voltage* (Approx.)
Connect 12V power supply and 100 Ω resistance, and then shake magnetic body.	HIGH	1.2 - 1.6V
	LOW	0.4 - 0.8V

*: Voltage with both end of 100 Ω resistance.