

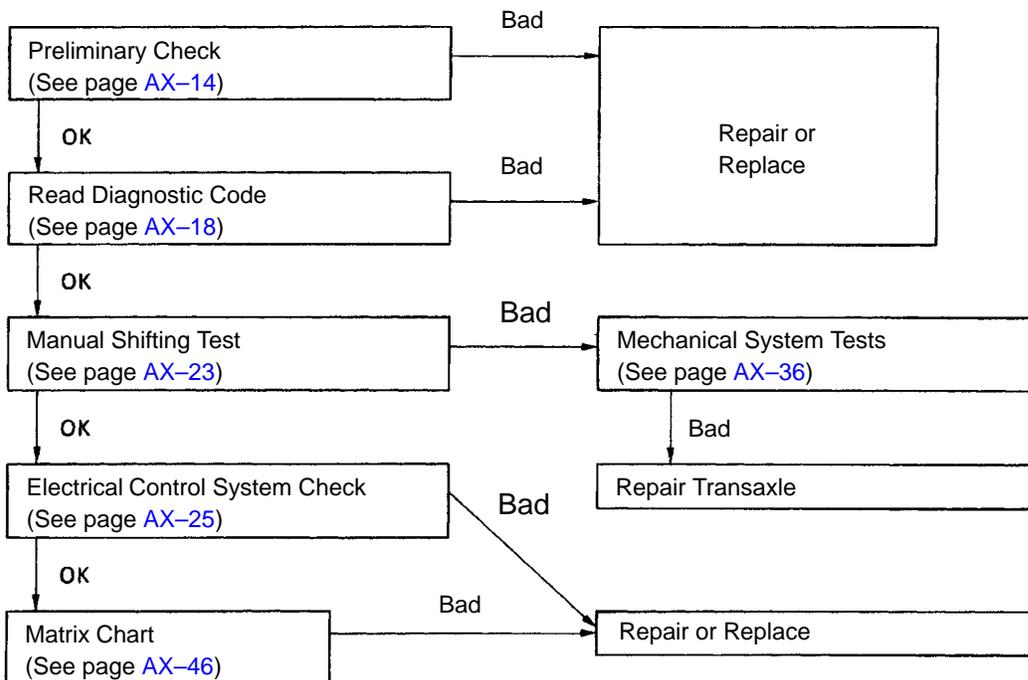
TROUBLESHOOTING

Trouble occurring in the ECT can stem from one of three sources: the engine, the ECT electronic control unit or the transmission itself. Before troubleshooting, determine in which these three sources the problem lies, and begin troubleshooting with the simplest operation, gradually working up in order or difficulty.

BASIC TROUBLESHOOTING

AX08P-01

Before troubleshooting and ECT, first determine whether the problem is electrical or mechanical. To do this, just refer to the basic troubleshooting flow-chart provided below. If the cause is already known, using the basic troubleshooting chart below along with the general troubleshooting chart on the following page should speed the procedure.



W01003

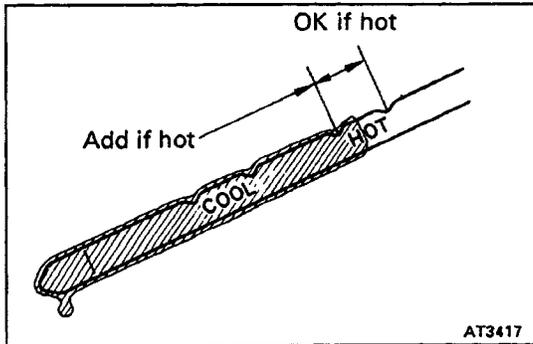
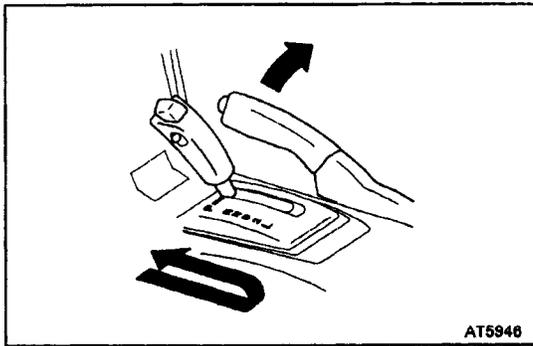
GENERAL TROUBLESHOOTING

NOTICE: Refer to A241 E Automatic Transaxle Repair Manual (Pub. No. RM291 U) when * mark appears in the column for page numbers.

Problem	Possible cause	Remedy	Page
Fluid discolored or smells burnt	Fluid contaminated Torque converter faulty Transaxle faulty	Replace fluid Replace torque converter Disassemble and inspect transaxle	AX-14 AX-66 ★
Vehicle does not move in any forward range or reverse	Shift cable out of adjustment Valve body or primary regulator faulty Parking lock pawl faulty Torque converter faulty Converter drive plate broken Oil strainer intake screen blocked Transaxle faulty	Adjust shift cable Inspect valve body Inspect parking lock pawl Replace torque converter Replace drive plate Clean screen Disassemble and inspect transaxle	AX-15 ★ ★ AX-66 AX-66 ★ ★
Shift lever position incorrect	Shift cable out of adjustment Manual valve and lever faulty Transaxle faulty	Adjust shift cable Inspect valve body Disassemble and inspect transaxle	AX-15 ★ ★
Harsh engagement into any drive range	Throttle cable out of adjustment Valve body or primary regulator faulty Accumulator pistons faulty Transaxle faulty	Adjust throttle cable Inspect valve body inspect accumulator pistons Disassemble and inspect transaxle	AX-15 ★ ★
Delayed 1-2, 2-3 or 3-O/D up-shift, or down-shifts from O/D-3 or 3-2 and shift back to O/D or 3	Electronic control faulty Valve body faulty Solenoid valve faulty Throttle cable out of adjustment	Inspect electronic control Inspect valve body Inspect solenoid valve Adjust throttle cable	AX-25 ★ AX-33 AX-15
Slips on 1-2, 2-3 or 3-O/D up-shift, or slips or shudders on acceleration	Shift cable out of adjustment Throttle cable out of adjustment Valve body faulty Solenoid valve faulty Transaxle faulty	Adjust shift cable Adjust throttle cable Inspect valve body Inspect solenoid valve Disassemble and inspect transaxle	AX-15 AX-15 ★ AX-33 ★
Drag, binding or tie-up on 1-2, 2-3, or 3-O/D up-shift	Shift cable out of adjustment Valve body faulty Transaxle faulty	Adjust shift cable Inspect valve body Disassemble and inspect transaxle	AX-15 ★ ★

NOTICE: Refer to A241 E Automatic Transaxle Repair Manual (Pub. No. RM291 U) when * mark appears in the column for page numbers.

Problem	Possible cause	Remedy	Page
No lock-up in 2nd, 3rd or O/D	Electronic control faulty Valve body faulty Solenoid valve faulty Transaxle faulty	Inspect electronic control Inspect valve body Inspect solenoid valve Disassemble and inspect transaxle	AX-25 ★ AX-33 ★
Harsh down-shift	Throttle cable out of adjustment Throttle cable and cam faulty Accumulator pistons, faulty Valve body faulty Transaxle faulty	Adjust throttle cable Inspect throttle cable and cam Inspect accumulator pistons Inspect valve body Disassemble and inspect transaxle	AX-15 ★ ★ ★ ★
No down-shift when coasting	Valve body faulty Solenoid valve faulty Electronic control faulty	Inspect valve body Inspect solenoid valve Inspect electronic control	★ AX-33 AX-25
Down-shift occurs too quickly or too late while coasting	Throttle cable faulty Valve body faulty Transaxle faulty Solenoid valve faulty Electronic control faulty	Inspect throttle cable Inspect valve body Disassemble and inspect transaxle Inspect solenoid valve Inspect electronic control	AX-15 ★ ★ AX-33 AX-25
No O/D-3, 3-2 or 2-1 kick-down	Solenoid valve faulty Electronic control faulty Valve body faulty Throttle cable out of adjustment	Inspect solenoid valve Inspect electronic control Inspect valve body Adjust throttle cable	AX-33 AX-25 ★ AX-15
No engine braking in 2 or L range	Solenoid valve faulty Electronic control faulty Valve body faulty Transaxle faulty	Inspect solenoid valve Inspect electronic control Inspect valve body Disassemble and inspect transaxle	AX-33 AX-25 ★ ★
Vehicle does not hold in P range	Shift cable out of adjustment Parking lock pawl and spring faulty	Adjust shift cable Inspect cam and spring	AX-15 ★



PRELIMINARY CHECK

1. CHECK TRANSAXLE FLUID LEVEL

HINT: The vehicle must have been driven so that the engine and transaxle are at normal operating temperature. (fluid temperature: 70–80°C or 158–176°F)

- Park the vehicle on a level surface, set the parking brake.
- With the engine idling and the brake pedal depressed, shift the shift lever into each gear from the P range to L range smoothly and return to P range.

HINT: Depress the brake pedal.

- Pull out the transaxle dipstick and wipe it clean.
- Push it back fully into the tube.
- Pull it out and check that the fluid level is in the HOT range.

If the level is at the low side of the hot range, add fluid.

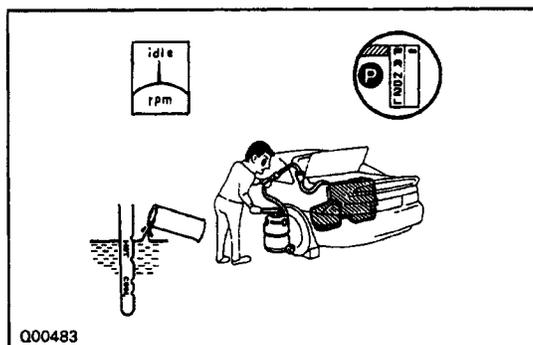
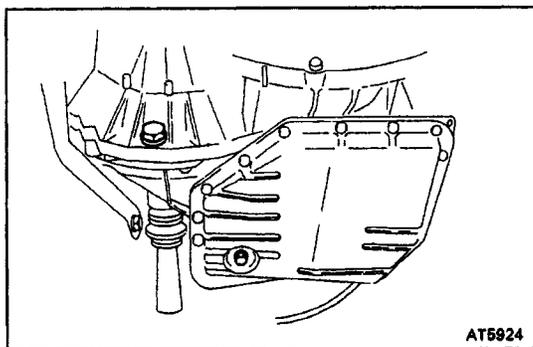
Fluid type:

ATF DEXRON® II

NOTICE: Do not overfill.

2. CHECK FLUID CONDITION

If the fluid smells burnt or is black, replace it.



3. REPLACE ATF

NOTICE: Do not overfill.

- Remove the drain plug, gasket and drain the fluid.
- Install a new gasket and the drain plug securely.
- Add new fluid through the filler tube.

Fluid:

ATF DEXRON® II

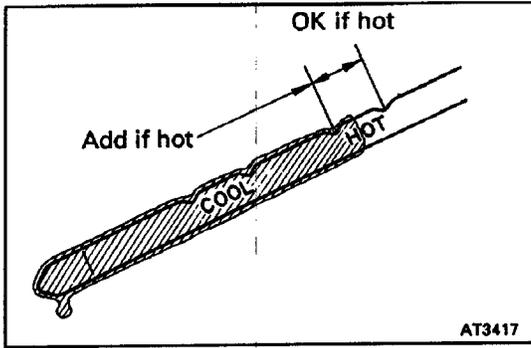
Capacity:

8.0 liters (8.5 US qts, 7.0 Imp.qts)

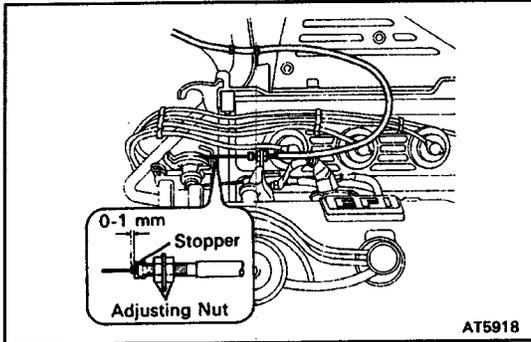
Drain and refill:

3.3 liters (3.5 US qts, 2.9 Imp.qts)

- Start the engine and shift the selector into all positions from P through L and then shift into P.
- With the engine idling, check the fluid level. Add fluid up to the COOL level on the dipstick.



- (f) Check the fluid level with the normal fluid temperature (158–176 °F or 70–80 °C) and add as necessary.
NOTICE: Do not overfill.

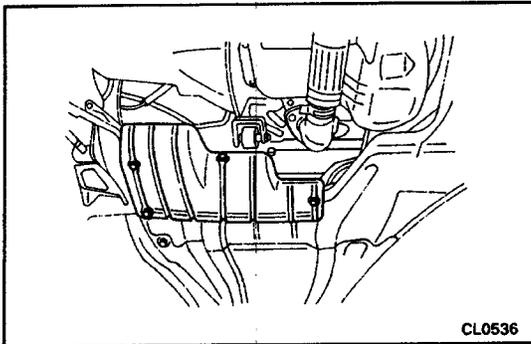


4. INSPECT AND ADJUST THROTTLE CABLE

- (a) Check that the throttle valve is fully closed.
- (b) Check that the inner cable is not slack.
- (c) Measure the distance between the outer cable end and stopper on the cable.

**Standard boot and cable stopper distance:
 0–1 mm (0–0.04 in.)**

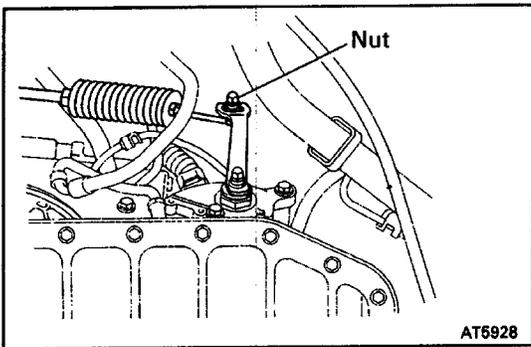
If the distance is not standard, adjust the cable by the adjusting nuts.



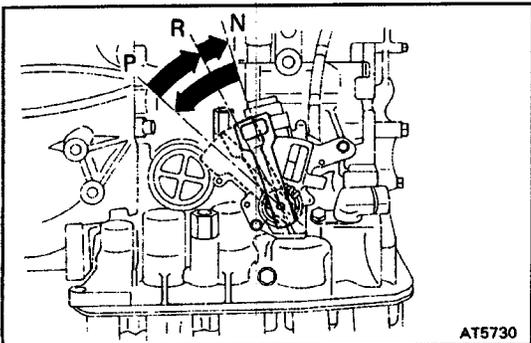
5. INSPECT AND ADJUST SHIFT CABLE

When shifting the shift lever from the N position to other positions, check that the lever can be shifted smoothly and accurately to each position and that the position indicator correctly indicates the position.
 If the indicator is not aligned with the correct position, carry out the following adjustment procedure.

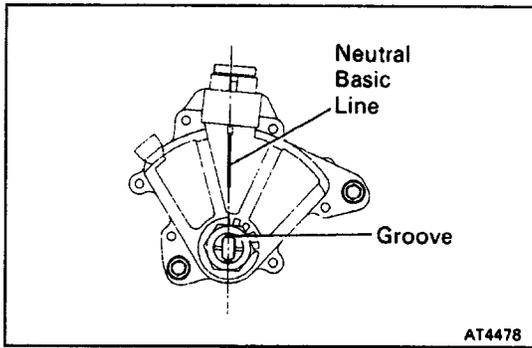
- (a) Remove the No.1 engine under cover.



- (b) Loosen the swivel nut on manual shift lever.



- (c) Push the manual shift lever fully toward the right side of the vehicle.
- (d) Return the lever two notches to NEUTRAL position.
- (e) Set the shift lever to N.
- (f) While holding the lever lightly toward the R range side, tighten the swivel nut.
- (g) Install the No.1 engine under cover.



6. ADJUST PARK/NEUTRAL SWITCH

If the engine will start with the shift selector in any range other than N or P range, adjustment is required.

- (a) Loosen the park/neutral switch bolts and set the shift selector to the N range.
- (b) Align the groove and neutral basic line.
- (c) Hold in position and tighten the bolts.

Torque:

5.4 N-m (55 kgf-cm, 48 in.-M)

7. INSPECT IDLE SPEED (N RANGE)

Idle speed:

800 rpm

DIAGNOSIS SYSTEM

DESCRIPTION

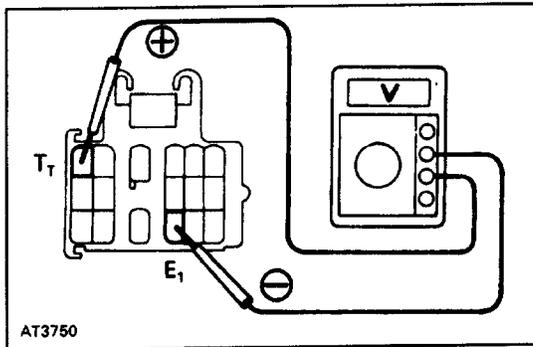
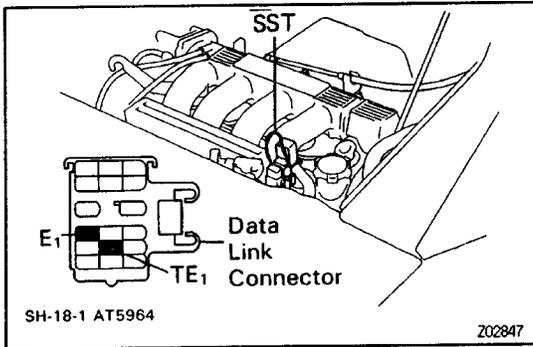
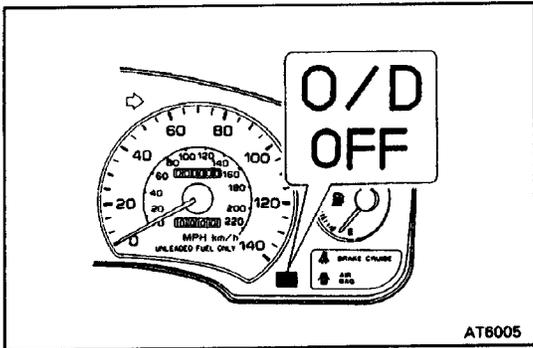
1. A self-diagnosis function is built into the electrical control system. Warning is indicated by the overdrive OFF indicator light.

HINT: Warning and diagnostic codes can be read only when the overdrive switch is ON. If OFF, the overdrive OFF light is lit continuously and will not blink.

 - (a) If a malfunction occurs within the speed sensors (No. 1 or 2) or solenoids (No. 1 or 2), the overdrive OFF light will blink to warn the driver. However, there will be no warning of a malfunction with lock-up solenoid.
 - (b) The diagnostic code can be read by the number of blinks of the overdrive OFF indicator light when terminals TE, and E, are connected. (See page AX-25)
 - (c) The throttle position sensor or brake signal are not indicated, but inspection can be made by checking the voltage at terminal TT of the data link connector.
 - (d) The signals to each gear can be checked by measuring the voltage at terminal TT of the data link connector while driving.
2. The diagnostic code (trouble code) is retained in memory by the PCMT and due to back-up voltage, is not canceled out when the engine is turned off. Consequently, after repair, it is necessary to turn the ignition switch off and remove the EFI fuse (1 5A) or disconnect the PCMT connector to cancel out the diagnostic (trouble) code. (See page AX-19)

HINT:

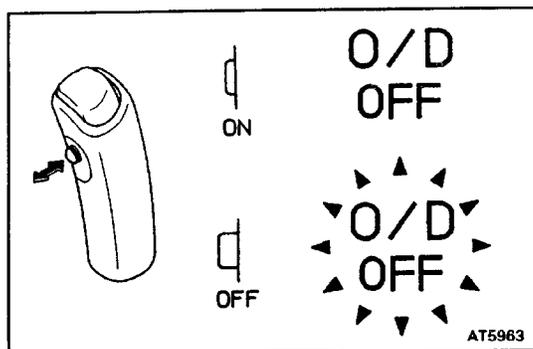
- Low battery voltage will cause faulty operation of the diagnosis system. Therefore, always check the battery first.
- Use a voltmeter and ohmmeter that have an impedance of at least 10 kΩ/V.

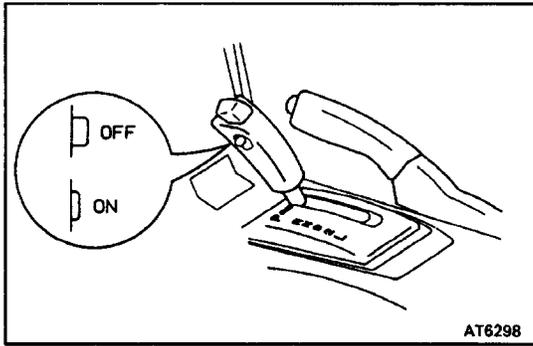


CHECK "O/D OFF" INDICATOR LIGHT

1. Turn the ignition switch ON.
2. The "O/D OFF" light will come on when the O/D switch is placed at OFF.
3. When the O/D switch is set to ON, the "O/D OFF" light should go out.

If the "O/D OFF" light flashes when the O/D switch is set to ON, the electronic control system is faulty.



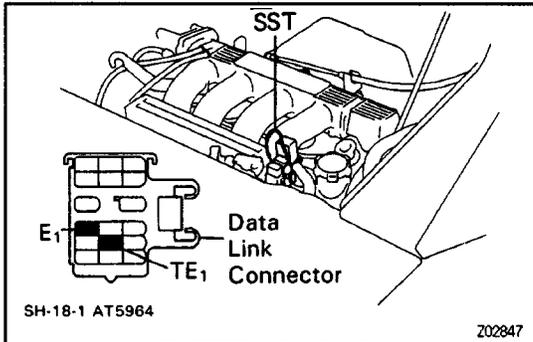


READ DIAGNOSTIC CODE

1. TURN IGNITION SWITCH AND O/D SWITCH TO ON

Do not start the engine.

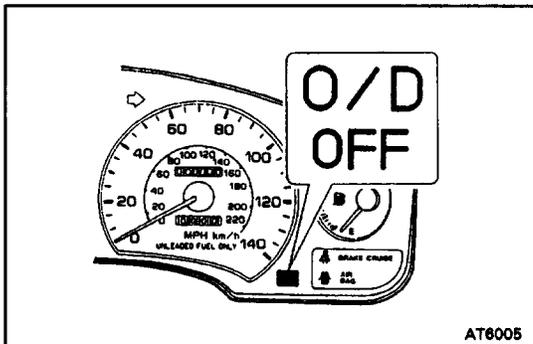
HINT: Warning and diagnostic codes can be read only when the overdrive switch is ON. If OFF, the overdrive OFF light will light continuously and will not blink.



2. CONNECT TE, AND E1 TERMINALS OF DATA LINK CONNECTOR

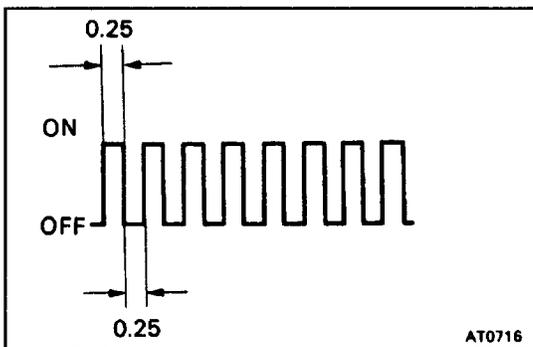
Using SST, connect terminals TE, and E1 of the datalink connector.

SST 09843-18020



3. READ DIAGNOSTIC CODE

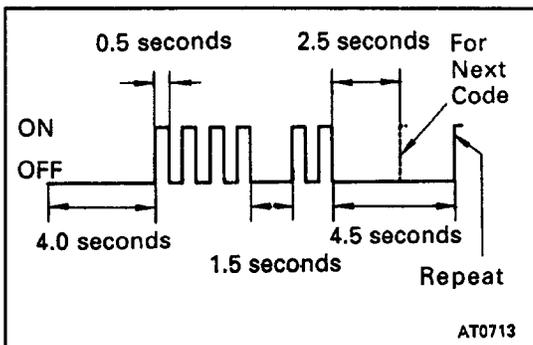
Read the diagnostic code as indicated by the number of times the O/D OFF light flashes.



(Diagnostic Code Indication)

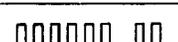
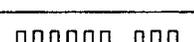
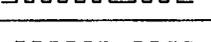
- If the system is operating normally, the light will flash 2 times per second.
- In the event of a malfunction, the light will flash 1 time per second. The number of blinks will equal the first number and, after 1.5 seconds pause, the second number of the two digit diagnostic code. If there are two or more codes, there will be a 2.5 seconds pause between each.

HINT: In the event of several trouble codes occurring simultaneously, indication will began from the smaller value and continue to the larger.



4. REMOVE SST

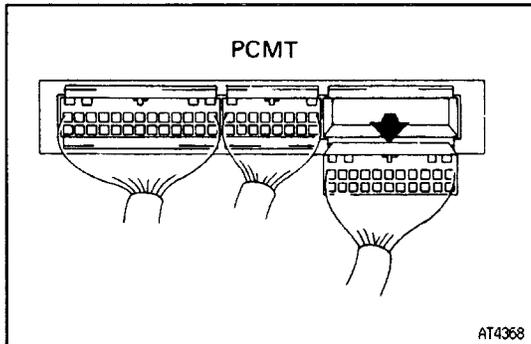
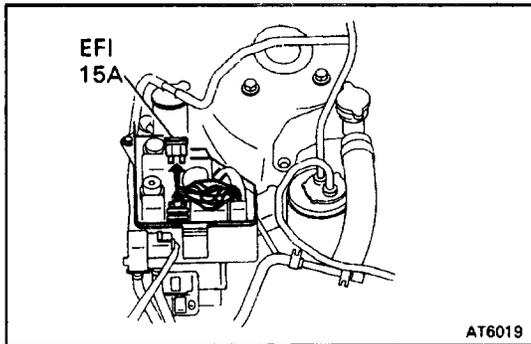
DIAGNOSTIC CODES

Code No.	Light Pattern	Diagnosis System
-		Normal
42		Defective No. 1 speed sensor (in combination meter)- severed wire harness or short circuit
61		Defective No. 2 speed sensor (in ATM)- severed wire harness or short circuit
62		Severed No. 1 solenoid or short circuit- severed wire harness or short circuit
63		Severed No.2 solenoid or short circuit- severed wire harness or short circuit
64		Severed lock-up solenoid or short circuit- severed wire harness or short circuit

AT2020

V00775

HINT: If codes 62, 63, or 64 appear, there is an electrical malfunction in the solenoid. Causes due to mechanical failure, such as a stuck valve, will not appear.



CANCEL OUT DIAGNOSTIC CODE

1. After repair of the trouble area, the diagnostic code retained in memory by the PCMT must be canceled by removing the EFI fuse (1 5A) for 10 seconds or more, depending on ambient temperature (the lower the temperature, the longer the fuse must be left out) with the ignition switch OFF.

HINT:

Cancellation can be also done by removing the battery negative (-) terminal, but in this case other memory systems will be also canceled out. The diagnostic code can be also canceled out by disconnecting the PCMT connector.

If the diagnostic code is not canceled out, it will be retained by the PCMT and appear along with a new code in event of future trouble.

2. After cancellation, perform a road test to confirm that a "normal code" is now read on the O/D OFF light.

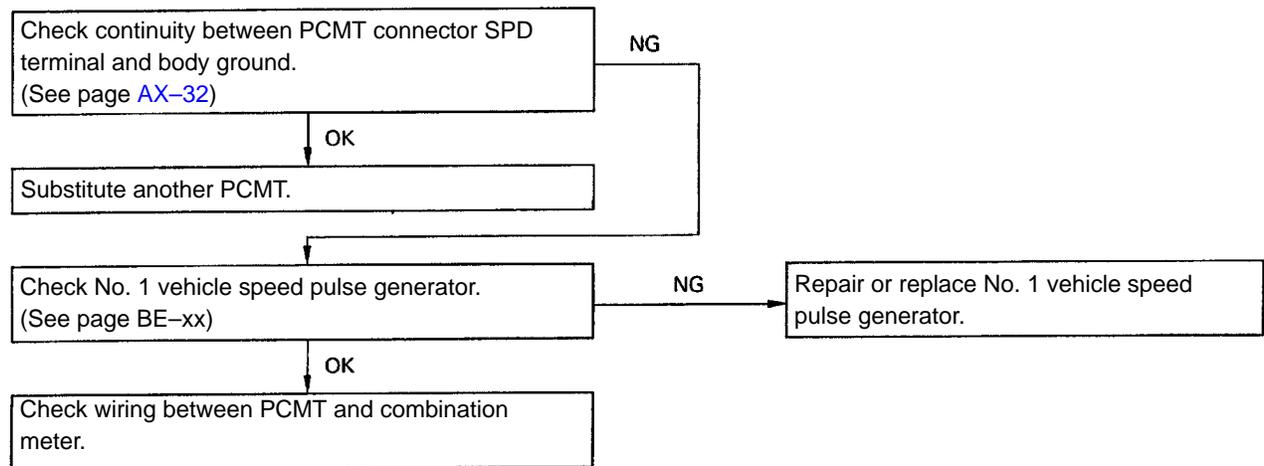
TROUBLESHOOTING FLOW-CHART

HINT:

- If diagnostic code Nos.42, 61, 62 or 63 are output, the overdrive OFF indicator light will begin to blink immediately to warn the driver. However, an impact or shock may cause the blinking to stop; but the code will still be retained in the PCMT memory until canceled out.
- There is no warning for diagnostic code No.64.
- In the event of a simultaneous malfunction of both No.1 and No.2 speed sensors, no diagnostic code will appear and the fail-safe system will not function. However, when driving in the D range, the transmission will not up-shift from first gear, regardless of the vehicle speed.

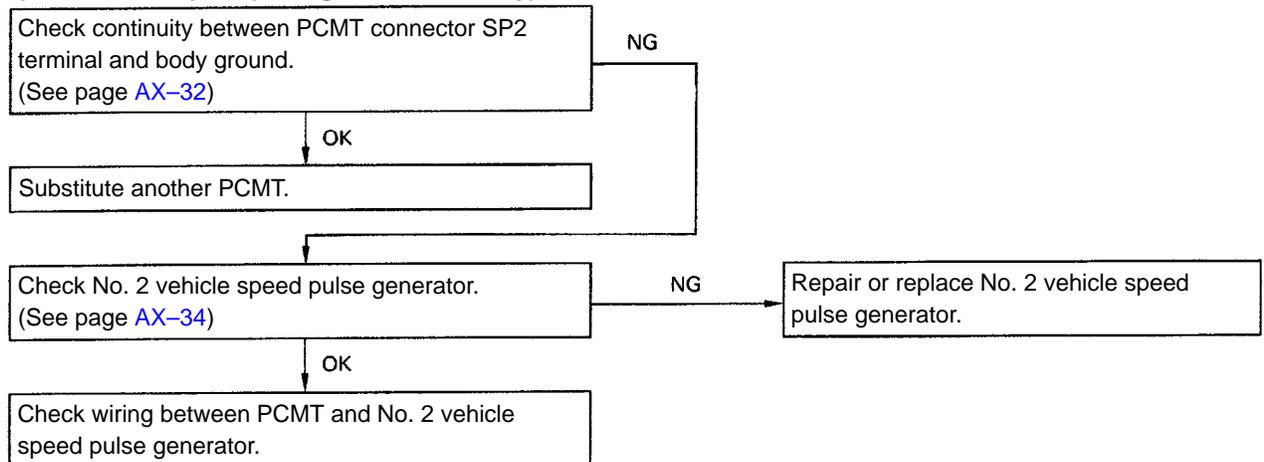
Diagnostic code 42

(No. 1 vehicle speed pulse generator circuitry)

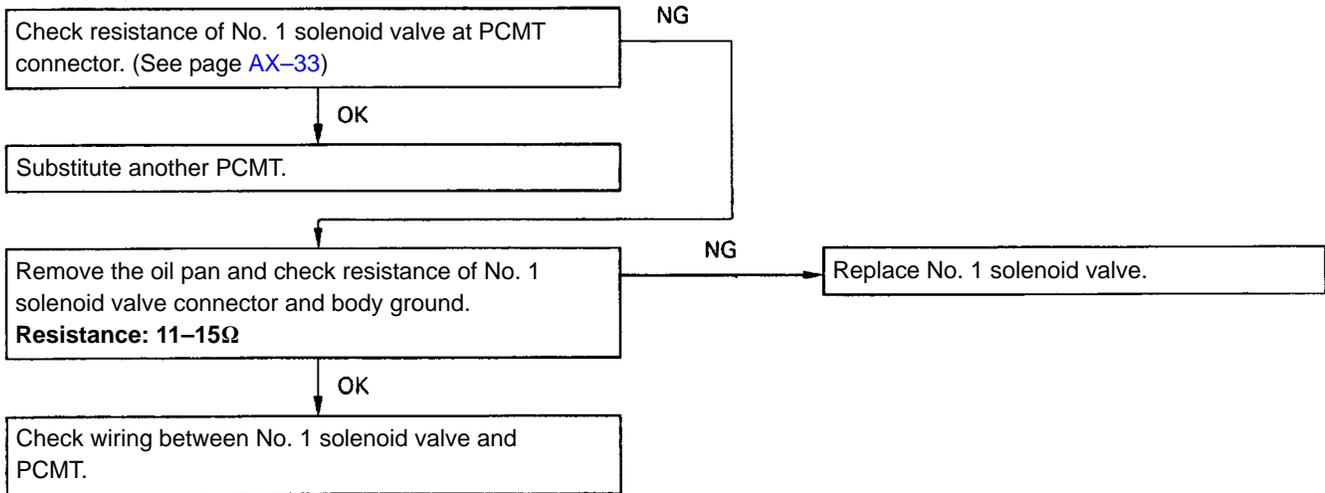


Diagnostic code 61

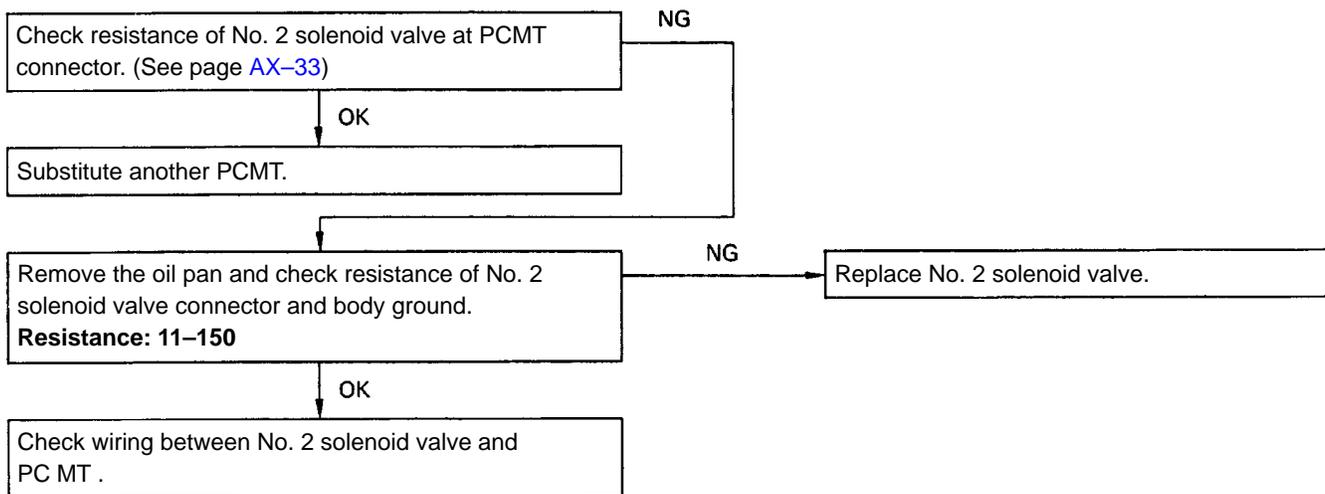
(No. 2 vehicle speed pulse generator circuitry)



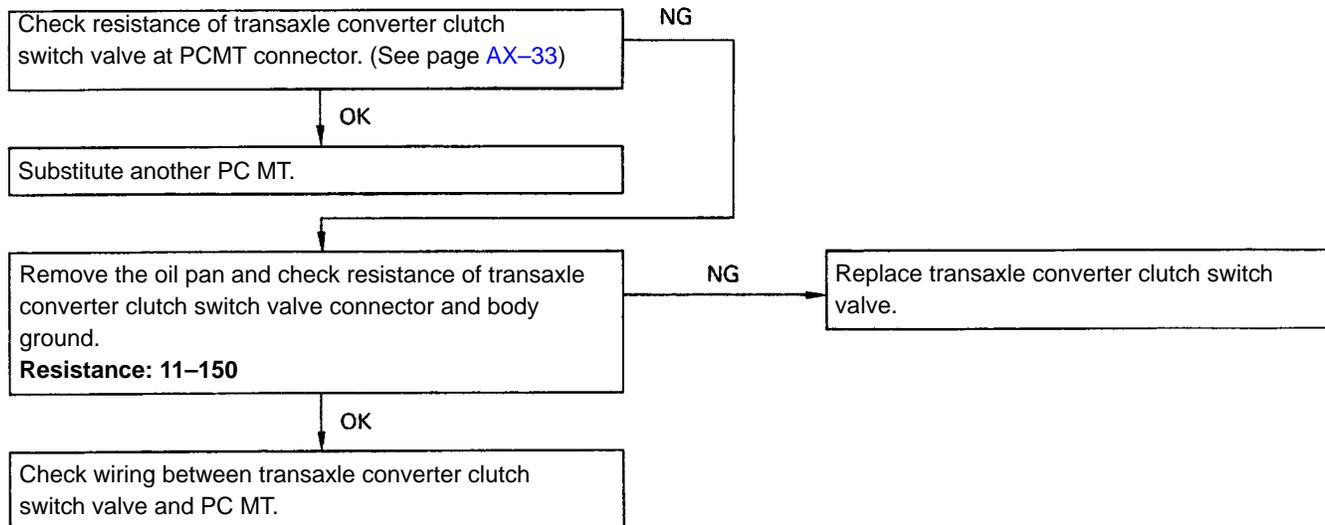
Diagnostic code 62 (No. 1 solenoid circuitry)

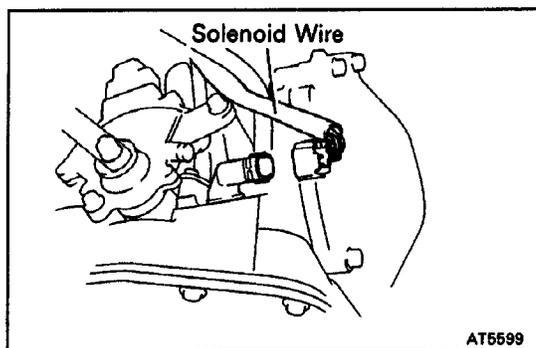


Diagnostic code 63 (No. 2 solenoid valve circuitry)



**Diagnostic code 64
(Transaxle converter clutch switch valve circuitry)**





MANUAL SHIFTING TEST

HINT: With this test, it can be determined whether the trouble lies within the electrical circuit or is a mechanical problem in the transaxle.

1. DISCONNECT SOLENOID WIRE

2. INSPECT MANUAL DRIVING OPERATION

Check that the shift and gear positions correspond with the table on next page.

HINT: If the L, 2 and D range gear positions are difficult to distinguish, perform the following road test.

- While driving, shift through the L, 2 and D ranges.

Check that the gear change corresponds to the shift position.

- If any abnormality is found in the above test, the problem lies in transaxle

3. CONNECT SOLENOID WIRE

4. CANCEL OUT DIAGNOSTIC CODE

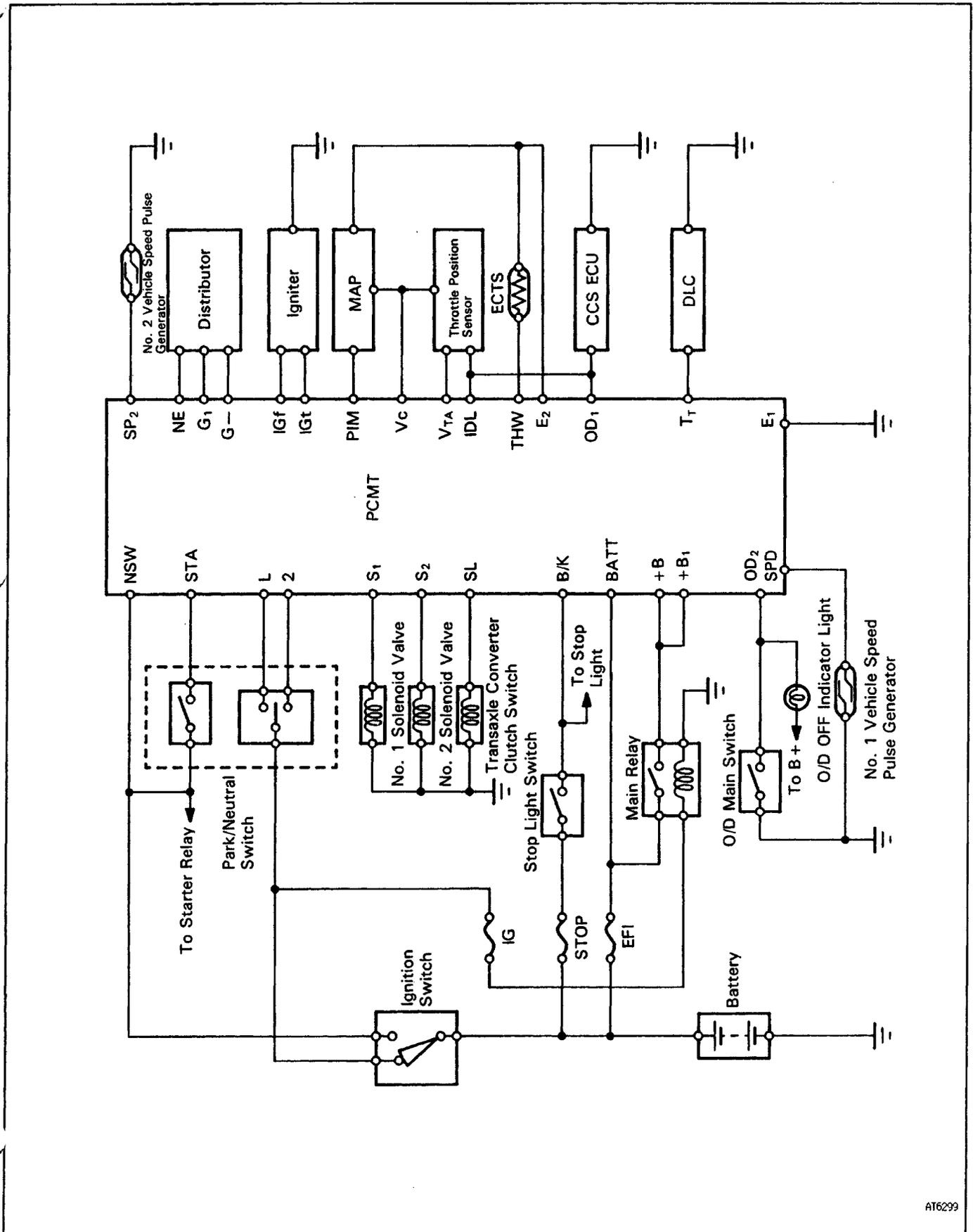
(See page [AX-20](#))

REFERENCE: Possible gear positions in accordance with solenoid operating conditions.

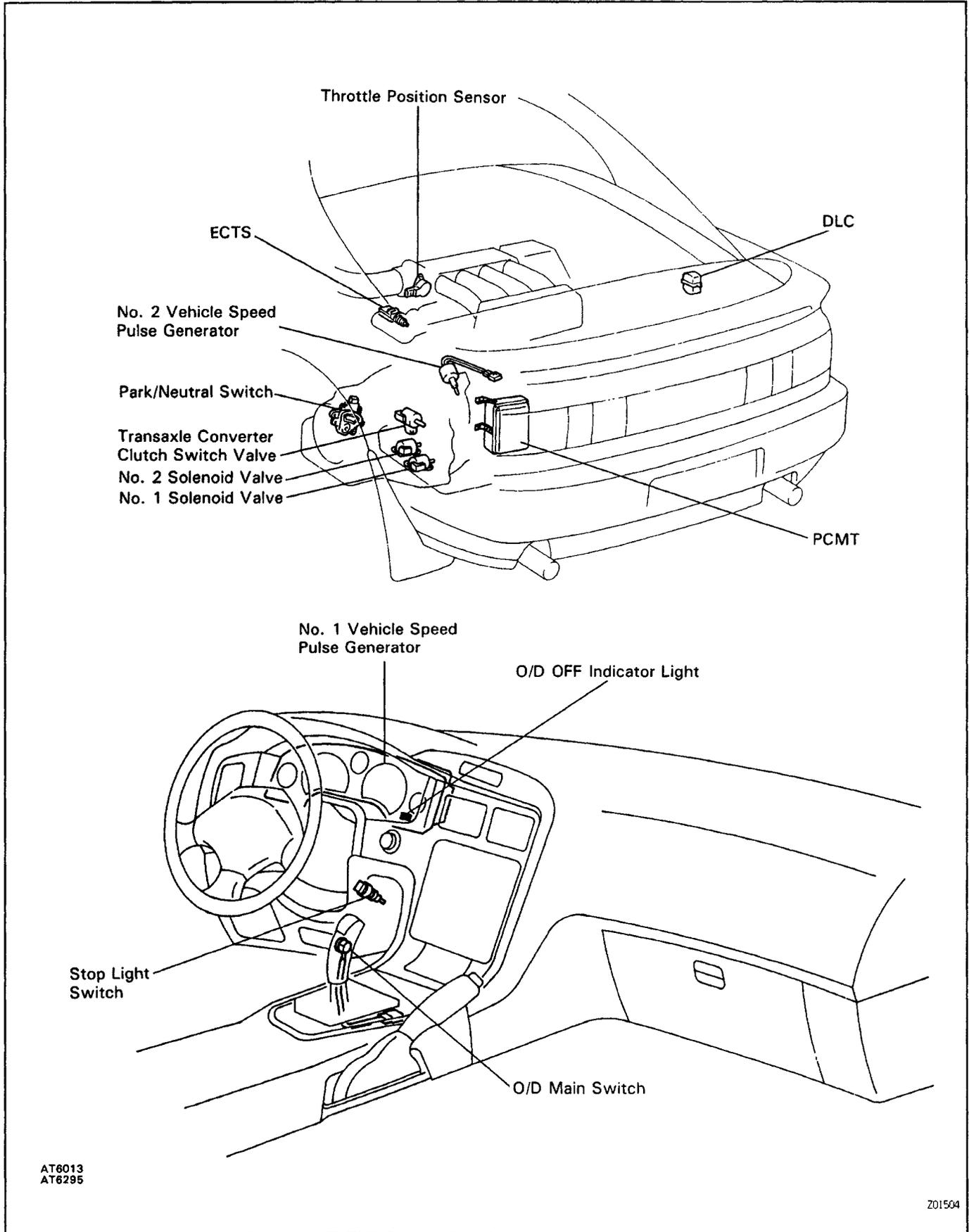
Range	NORMAL			No. 1 SOLENOID MALFUNCTIONING			No. 2 SOLENOID MALFUNCTIONING			BOTH SOLENOIDS MALFUNCTIONING		
	Solenoid Valve		Gear Position	Solenoid Valve		Gear Position	Solenoid Valve		Gear Position	Solenoid Valve		Gear Position
	No. 1	No. 2		No. 1	No. 2		No. 1	No. 2		No. 1	No. 2	
D range	ON	OFF	1st	X	ON	3rd	ON	X	1st	X	X	O/D
	ON	ON	2nd	X	ON	3rd	OFF	X	O/D	X	X	O/D
	OFF	ON	3rd	X	ON	3rd	OFF	X	O/D	X	X	O/D
	OFF	OFF	O/D	X	OFF	O/D	OFF	X	O/D	X	X	O/D
2 range	ON	OFF	1st	X	ON	3rd	ON	X	1st	X	X	3rd
	ON	ON	2nd	X	ON	3rd	OFF	X	3rd	X	X	3rd
	OFF	ON	3rd	X	ON	3rd	OFF	X	3rd	X	X	3rd
L range	ON	OFF	1st	X	OFF	1st	ON	X	1st	X	X	1st
	ON	ON	2nd	X	ON	2nd	ON	X	1st	X	X	1st

X: Malfunctions

ELECTRONIC CONTROL CIRCUIT

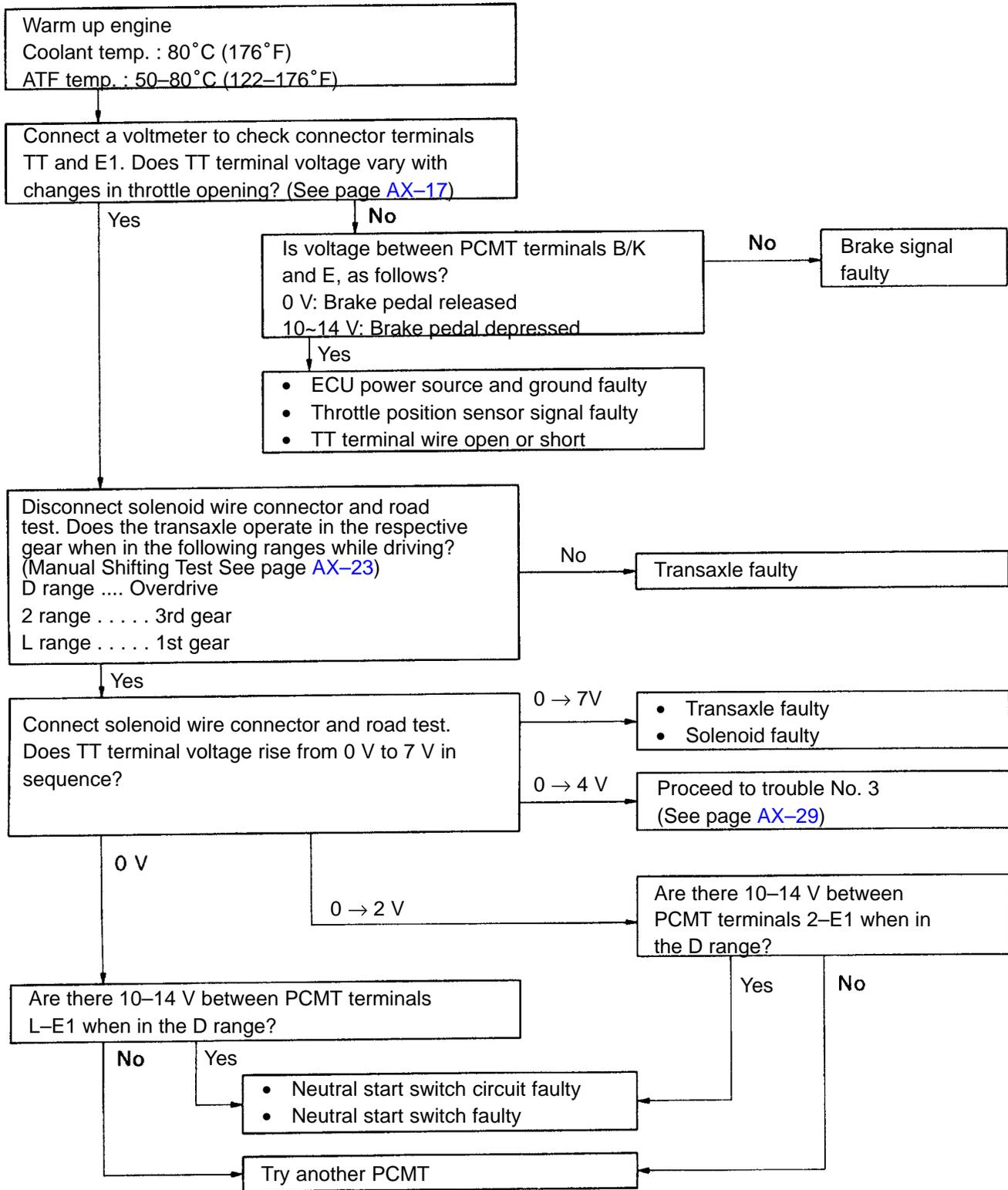


ELECTRONIC CONTROL COMPONENTS



TROUBLESHOOTING FLOW-CHART

Trouble No. 1 No shifting



Trouble No. 2 Shift point too high or too low

Warm up engine
 Coolant temp.: 80°C (176°F)
 ATF temp.: 50-80°C (122-176°F)

Connect a voltmeter to check connector terminals Tt and E1. Does TT terminal voltage vary with changes in throttle opening? (See page AX-17)

Yes

- Faulty PCMT
- Faulty transaxle

No

Is voltage between PC11AT terminals B/K and E, as follows?
 0 V: Brake pedal released
 10-14 V: Brake pedal depressed

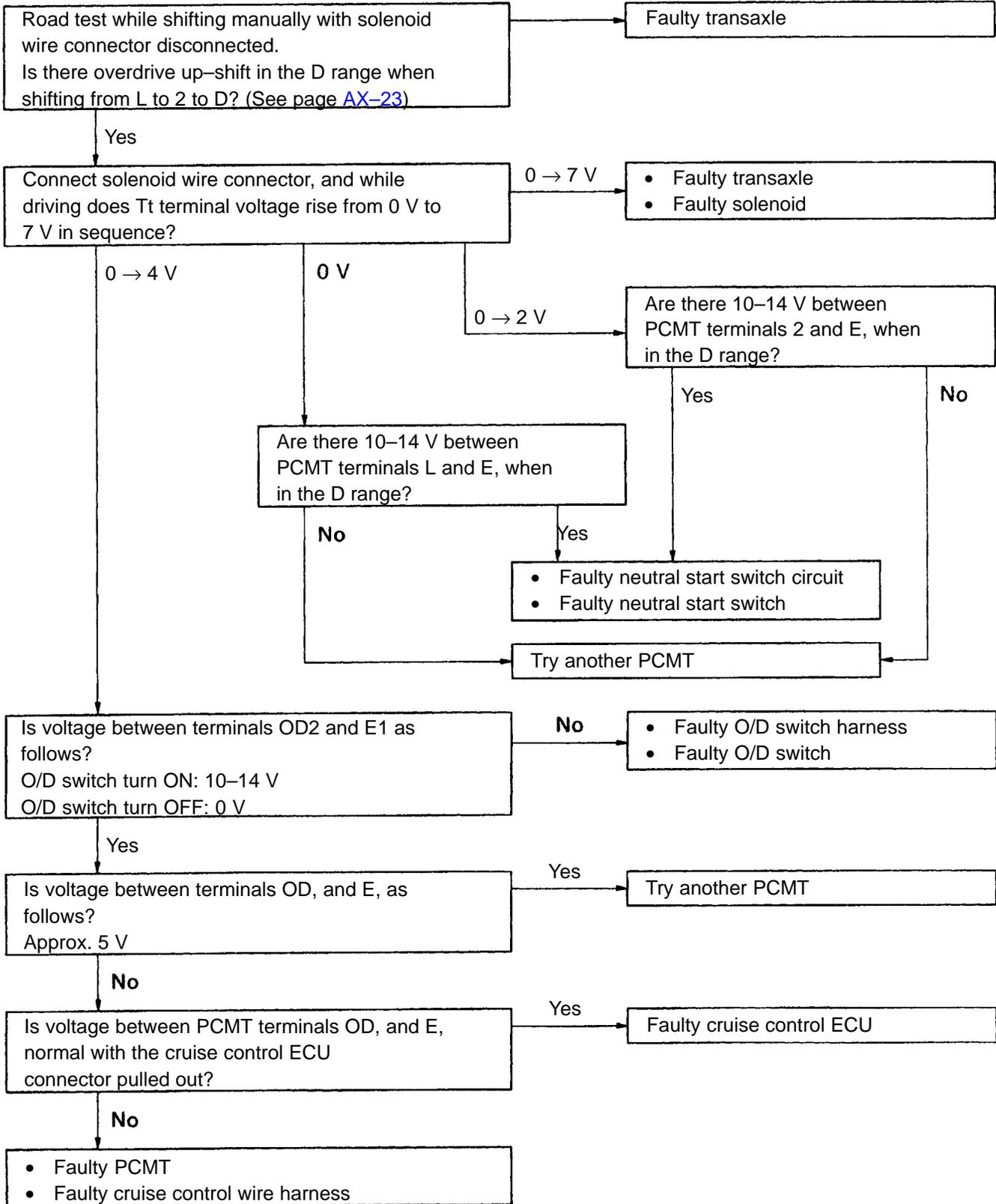
No

Brake signal faulty

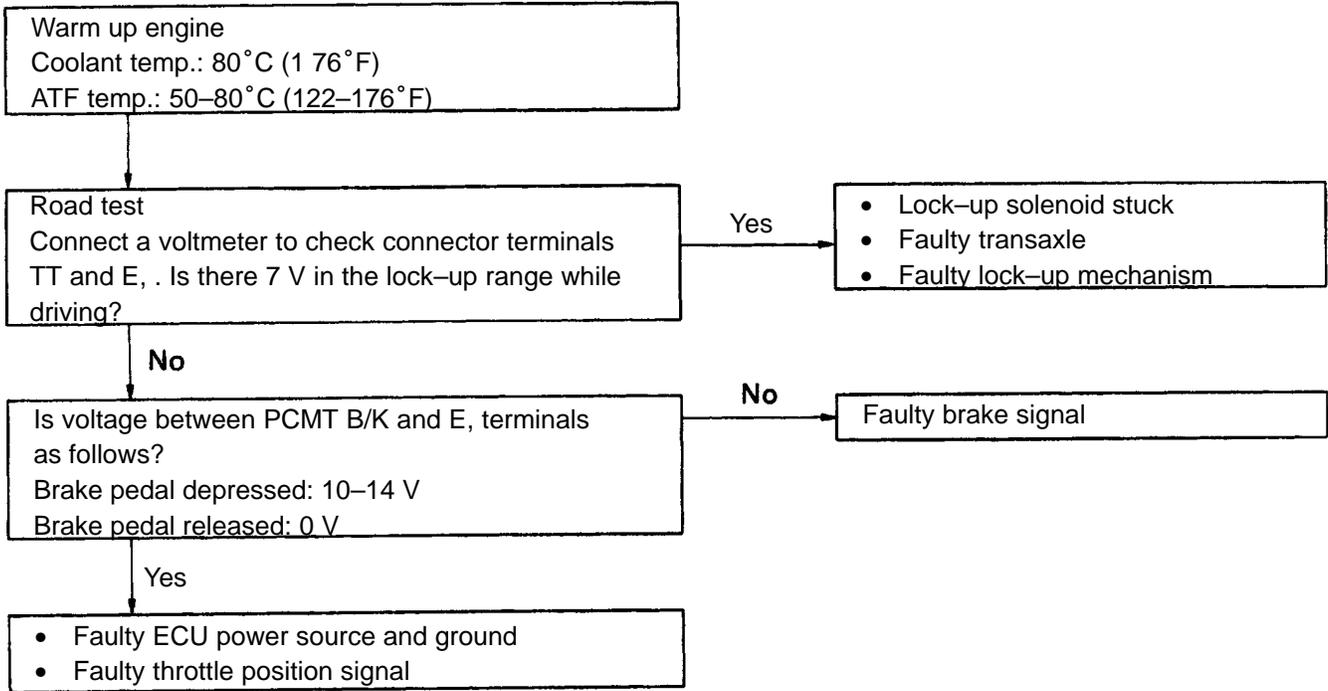
Yes

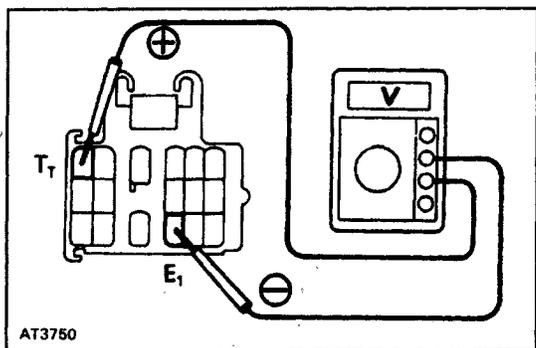
- ECU power source and ground faulty
- Throttle position sensor signal faulty
- TT terminal wire open or short

Trouble No. 3 No up-shift to overdrive (After warm-up)



Trouble No. 4 No lock-up (After warm-up)



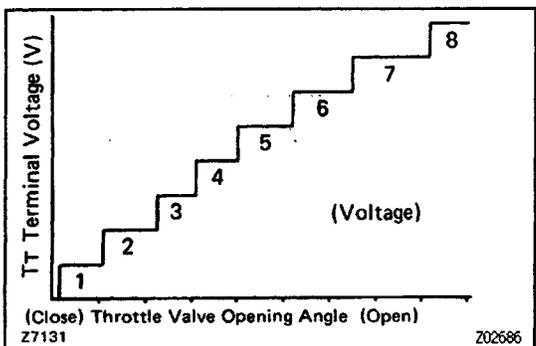


TT TERMINAL VOLTAGE INSPECTION

AX06W-01

1. INSPECT THROTTLE POSITION SENSOR SIGNAL

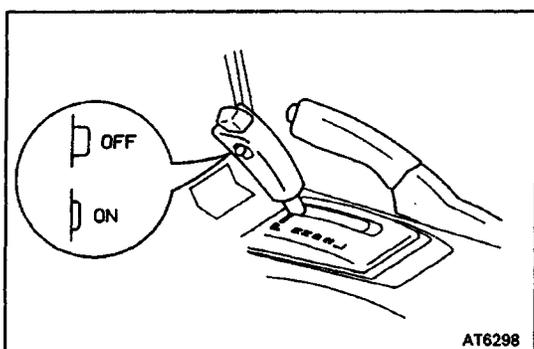
- (a) Turn the ignition switch to ON. Do not start the engine.
- (b) Connect a voltmeter to check connector terminals TT and E1.



- (c) While slowly depressing the accelerator pedal, check that TT terminal voltage rises in sequence. If the voltage does not change in proportion to the throttle opening angle, there is a malfunction in the throttle position sensor or circuit.

2. INSPECT BRAKE SIGNAL

- (a) Depress the accelerator pedal until the TT terminal indicates 8 V.
- (b) Depress the brake pedal and check the voltage reading from the TT terminal.
 - Brake pedal depressed 0 V
 - Brake pedal released 8 V
 If not as indicated, there is a malfunction in either the stop light switch or circuit.



3. INSPECT EACH UP-SHIFT POSITION

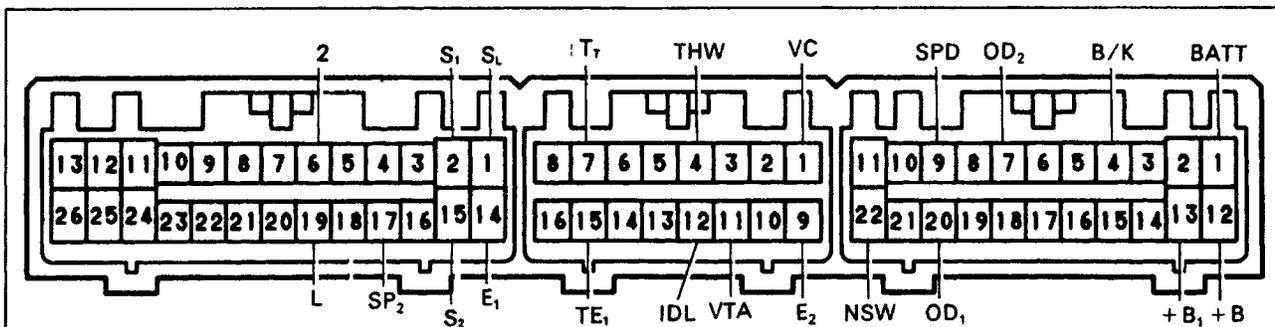
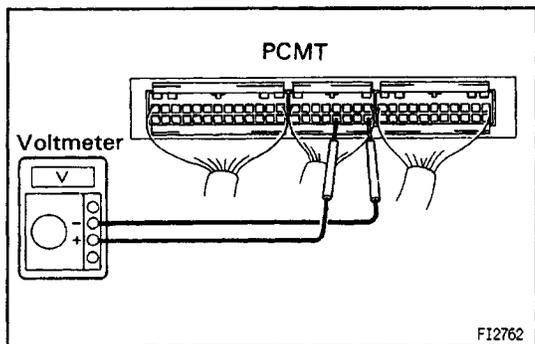
- (a) Warm up the engine.
 - Coolant temperature:**
80°C (176°F)
- (b) Turn the O/D switch to "ON".
- (c) Place the pattern select switch in "Normal" and the shift lever into the D range.
- (d) During a road test (about 10 km/h or 6 mph) check that voltage at the TT terminal is as indicated below for each up-shift position. If the voltage rises from 0 V to 7 V in the sequence shown, the control system is okay. The chart on the left shows the voltmeter reading and corresponding gears. HINT: Determine the gear position by a light shock or change in engine rpm when shifting.

TT Terminal (V)	Gear position
	1st
	2nd
	3rd
	O/D
	O/D Lock u p

ELECTRONIC CONTROL COMPONENTS INSPECTION

1. INSPECT VOLTAGE OF PCMT

- (a) Turn on the ignition switch.
- (b) Measure the voltage at each terminal.

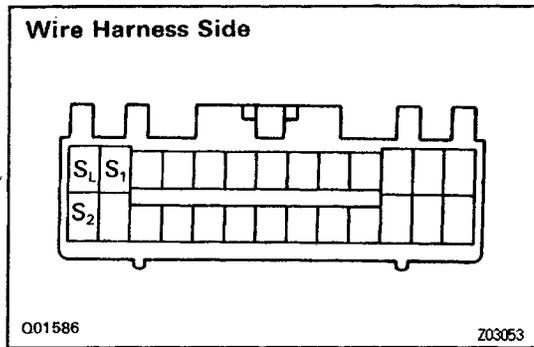


Vd-64-2

Terminal	Measuring condition	Voltage (V)	
S ₁ - E ₁	Ignition switch turned ON	0 - 1.5	
S ₂ , S ₁ - E ₁	Ignition switch turned ON	0 - 1.5	
STP - E ₁	Brake pedal is depressed	7.5 - 14	
	Brake pedal is released	0 - 1.5	
THW - E ₂	Coolant temp. 80°C (176°F)	0.2 - 1.0	
IDL - E ₂	Throttle valve fully closed	0 - 3	
	Throttle valve open	9 - 14	
VTA - E ₂	Throttle valve fully closed	0.3 - 0.8	
	Throttle valve open	3.2 - 4.9	
VC - E ₂	_____	4.5 - 5.5	
OD ₁ - E ₁	Ignition switch ON	9 - 14	
OD ₂ - E ₁	O/D main switch turned ON (O/D switch ON)	9 - 14	
	O/D main switch turned OFF (O/D switch OFF)	0 - 3	
SPD - E ₁	Cruise control main switch OFF	Standing still	0 - 2
		Vehicle moving	0.2 - 2 ↔ 4.5 - 5.5
SP ₂ - E ₁	Standing still	0 - 2	
	Vehicle moving	0.2 - 2 ↔ 4.5 - 5.5	

Terminal	Measuring condition	Voltage (v)
NSW - E ₁	N range	0 - 3
	Except N range	9 - 14
2 - E ₁	2 range	7.5 - 14
	Except 2 range	0 - 2
L - E ₁	L range	7.5 - 14
	Except L range	0 - 2
+B (+B ₁) - E ₁	-	9 - 14
BATT - E ₁	-	9 - 14

V00810

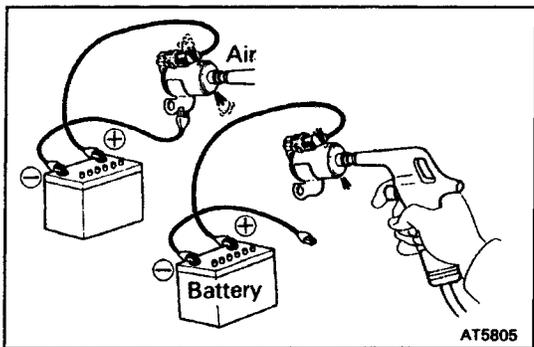


2. INSPECT SOLENOID

- (a) Disconnect the connector from PCMT.
- (b) Measure the resistance between S₁, S₂, S_L and ground.

Resistance:
11-150 Ω

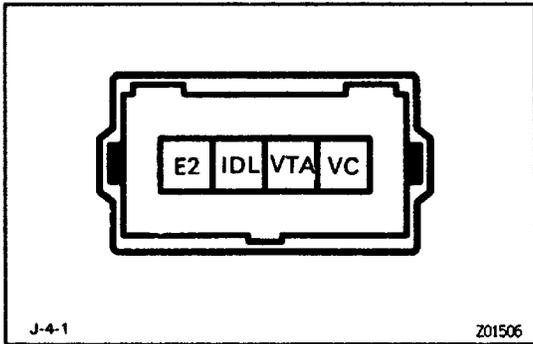
- (c) Apply battery voltage to each terminal. Check that an operation noise can be heard from the solenoid.



3. CHECK SOLENOID SEALS

If there is foreign material in the solenoid valve, there will be no fluid control even with solenoid operation. Check No.1, No.2 solenoid and Transaxle converter clutch switch.

- Apply 490 kPa (5 kg/cm², 71 psi) of compressed air, check that the solenoid valves do not leak the air.
- When supply battery voltage to the solenoids, check that the solenoid valves open.

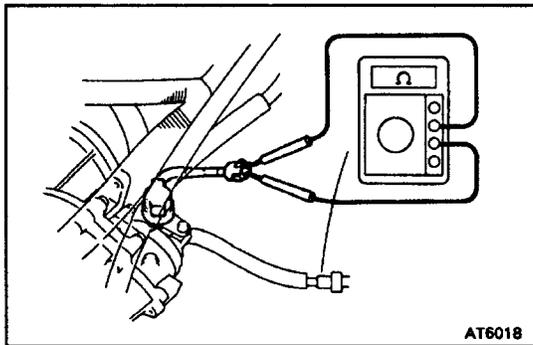


4. INSPECT THROTTLE POSITION SENSOR

Using an ohmmeter, check the resistance between terminals.

Terminal	Throttle valve condition	Resistance (kΩ)
IDL-E ₂	Fully closed	0-0.1
	Open	Infinity
VC-E ₂	-	3-7
VTA-E ₂	Fully closed	0.2-0.8
	Fully open	3.3-10

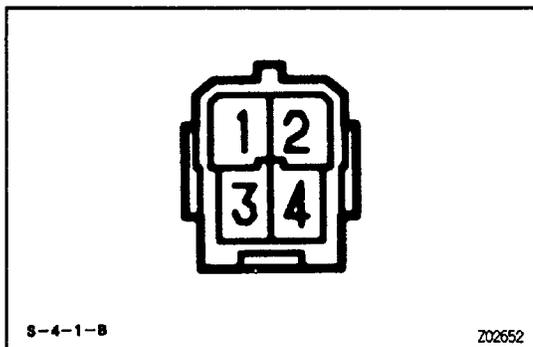
V00812



5. INSPECT NO.2 VEHICLE SPEED PULSE GENERATOR

- (a) Jack up the front wheel on one side.
- (b) Connect an ohmmeter between the terminals.
- (c) Spin the wheel and check that the meter needle deflects from 0Ω to ∞ Ω.

6. INSPECT NO.1 VEHICLE SPEED PULSE GENERATOR
(See page BE-73)



7. INSPECT O/D SWITCH

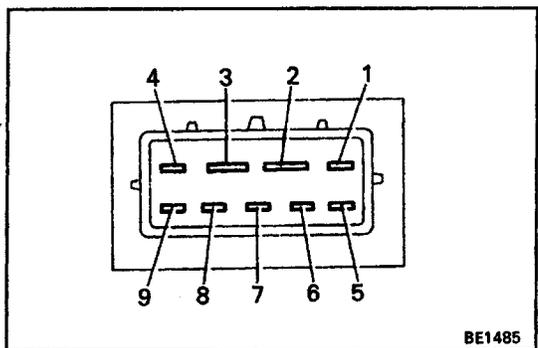
Using an ohmmeter, check the continuity of the terminals for each switch position.

SW position	Terminal	
	1	3
ON		
OFF	○	○

V00814

8. INSPECT PARK/NEUTRAL SWITCH

Check that there is continuity between terminals.



Range \ Terminal	2	3	6	1	5	7	8	9	4
P	○	○	○	○					
R			○	○	○				
N	○	○	○	○		○			
D			○	○			○		
2			○					○	
L			○						○

V00954

9. INSPECT ENGINE COOLANT TEMPERATURE SENSOR

(See page EG-305)

STALL TEST

The object of this test is to check the overall performance of the transaxle and engine by measuring the stall speeds in the D and R ranges.

NOTICE:

- Perform the test at normal operation fluid temperature (50–80°C or 122–176°F).
- Do not continuously run this test longer than 5 seconds.
- To ensure safety, conduct this test in a wide, clear, level area which provides good traction.
- The stall test should always be carried out in pairs. One should observe the condition of wheels or wheel stoppers outside the vehicle while the other is performing the test.

MEASURE STALL SPEED

- (a) Chock the front and rear wheels.
- (b) Connect a tachometer to the engine.
- (c) Fully apply the parking brake.
- (d) Keep your left foot pressed firmly on the brake pedal.
- (e) Start the engine.
- (f) Shift into the D range. Step all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

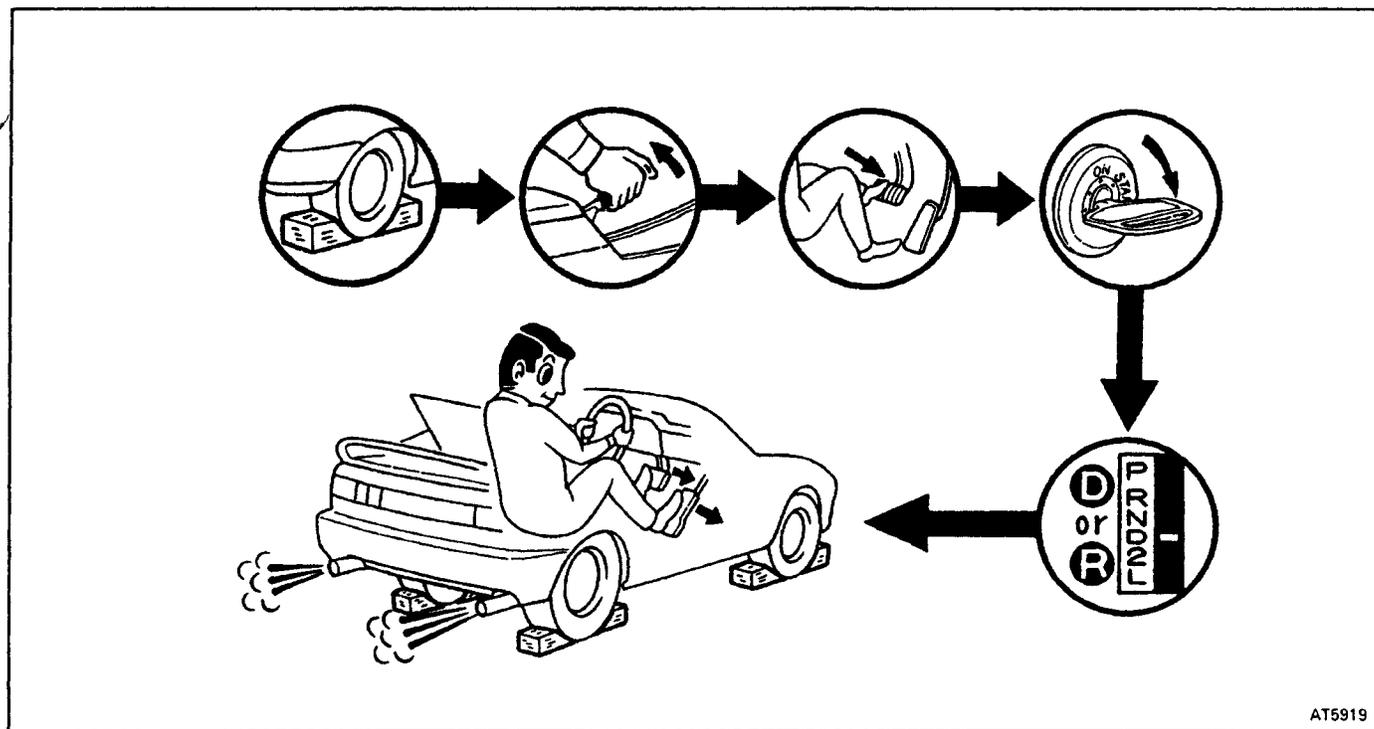
Stall speed:

2,650 ± 150 rpm

- (g) Perform the same test in R range.

EVALUATION

- (a) If the stall speed is the same for both ranges without the rear wheels rotating but lower than specified value:
 - Engine output may be insufficient
 - Stator one-way clutch is not operating properly
- (b) If the stall speed in D range is higher than specified:
 - Line pressure too low
 - Forward clutch slipping
 - No.2 one-way clutch not operating properly
 - Underdrive one-way clutch not operating properly
- (c) If the stall speed in R range is higher than specified:
 - Line pressure too low
 - Direct clutch slipping
 - First and reverse brake slipping
 - Underdrive brake slipping
- (d) If the stall speed in both R and D ranges are higher than specified:
 - Line pressure too low
 - Improper fluid level
 - Underdrive brake slipping



AT5919

TIME LAG TEST

When the shift lever is shifted while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the underdrive clutch, forward clutch, direct clutch and first and reverse brake.

NOTICE:

- Perform the test at normal operating fluid temperature (50–80°C or 122–176°F).
- Be sure to allow one minute interval between tests.
- Make three measurements and take the average value.

MEASURE TIME LAG

(a) Fully apply the parking brake.

(b) Start the engine and check the idle speed.

Idle speed (N range):

700 ± 150 rpm

(c) Shift the shift lever from N to D position. Using a stop watch, measure the time it takes from shifting the lever until the shock is felt.

Time lag:

Less than 1.2 seconds

(d) In the same manner, measure the time lag for N to R.

Time lag:

Less than 1.5 seconds

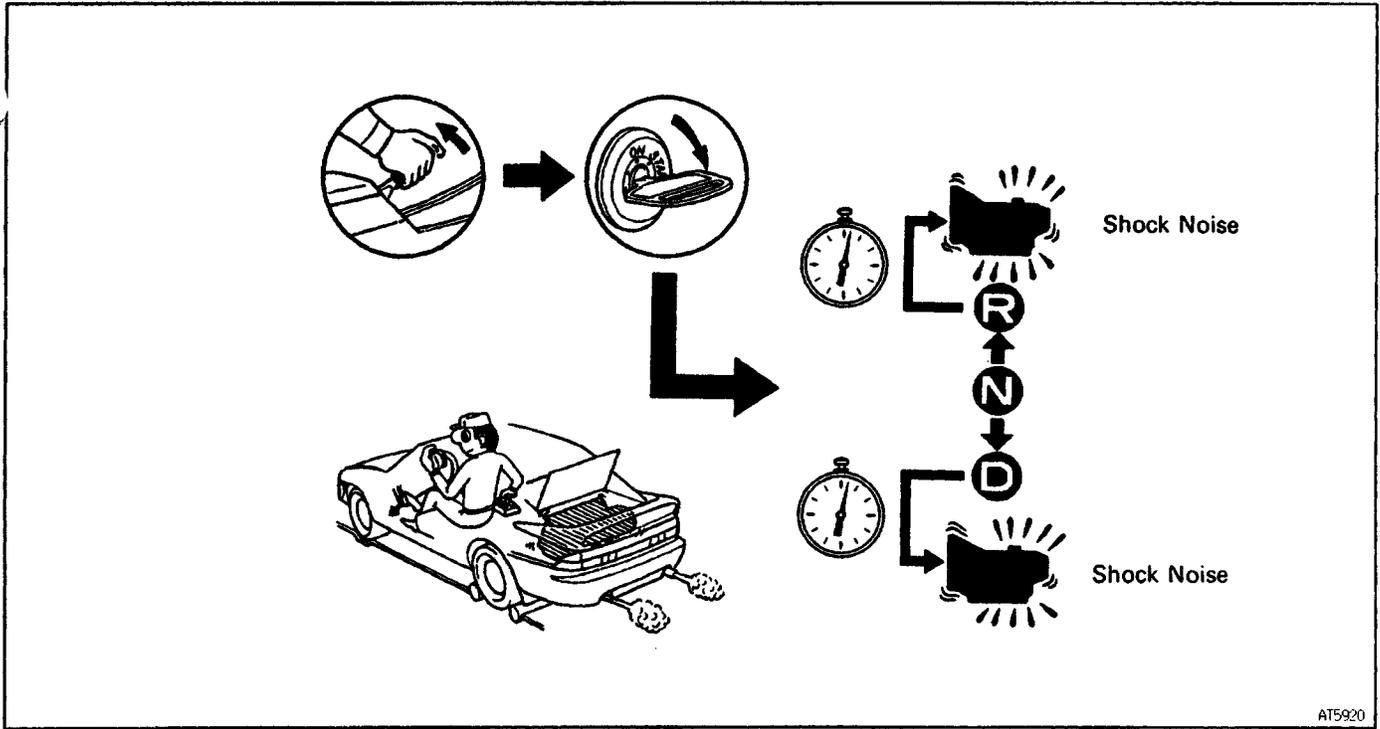
EVALUATION

(a) If N→D time lag is longer than specified:

- Line pressure too low
- Forward clutch worn
- No.2 and underdrive one-way clutch not operating properly

(b) If N→R time lag is longer than specified:

- Line pressure too low
- Direct clutch worn
- First and reverse brake worn
- Underdrive brake worn



AT5920

HYDRAULIC TEST

PREPARATION

- (a) Warm up the transaxle fluid.
- (b) Remove the transaxle case test plug and connect the hydraulic pressure gauge.
SST 09992-00094 (Oil pressure gauge)

CAUTION:

- Perform the test at normal operating fluid temperature (50–90°C or 122–176°F).
- The line pressure test should always be carried out in pairs. One should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is performing the test.

MEASURE LINE PRESSURE

- (a) Fully apply the parking brake and chock the front wheels.
- (b) Start the engine and check idling rpm.
- (c) Step down strongly on the brake pedal with your left foot and shift into D range.
- (d) Measure the line pressure when the engine is idling.
- (e) Press the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.
- (f) In the same manner, perform the test in R range.

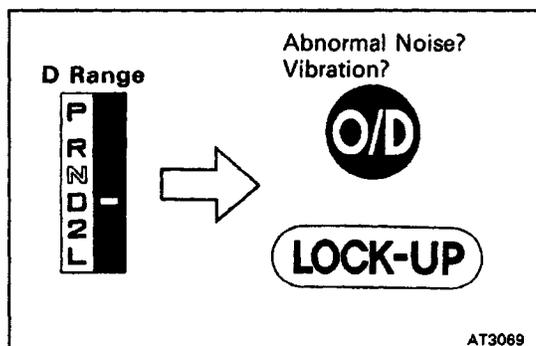
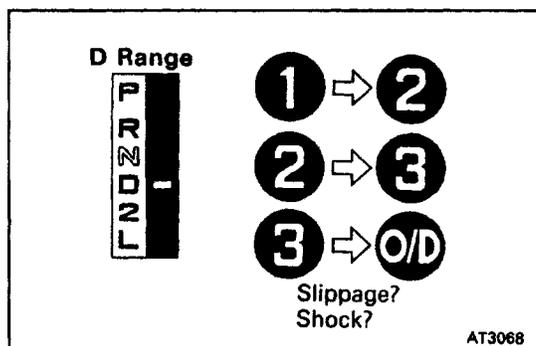
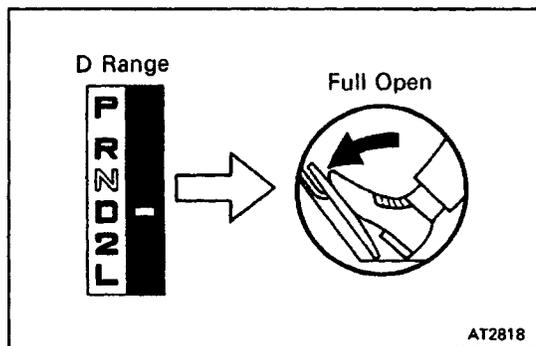
Type	Line pressure				kPa (kg/cm ² , psi)
	D range		R range		
	Idling	Stall	Idling	Stall	
A241 E	373 – 422 (3.8 – 4.3, 54 – 61)	716 – 863 (7.3 – 8.8, 104 – 125)	637 – 794 (6.5 – 8.1, 92 – 115)	1,334 – 1,579 (13.6 – 16.1, 193 – 229)	

W00953

If the measured pressures are not up to specified value, recheck the throttle cable adjustment and perform a retest.

EVALUATION

- (a) If the measured values at all ranges are higher than specified:
 - Throttle cable out of adjustment
 - Throttle valve defective
 - Regulator valve defective
- (b) If the measured values at all ranges are lower than specified:
 - Throttle cable out of adjustment
 - Throttle valve defective
 - Regulator valve defective
 - Oil pump defective
 - Underdrive one-way clutch not operating properly
- (c) If pressure is low in the D range only:
 - D range circuit fluid leakage
 - Forward clutch defective
 - Underdrive one-way clutch not operating properly
- (d) If pressure is low in the R range only:
 - R range circuit fluid leakage



ROAD TEST

NOTICE: Perform the test at normal operating fluid temperature (50–80°C or 122–176°F).

1. D RANGE TEST IN NORM AND PWR PATTERN RANGES

Shift into the D range and hold the accelerator pedal constant at the full throttle valve opening position.

Check the following:

- (a) 1–2, 2–3 and 3–O/D up-shifts should take place, and shift points should conform to those shown in the automatic shift schedule. (See page AX-45).

HINT:

- There is no O/D up-shift and lock-up when the coolant temp. is below 53°C (127°F).
- When the coolant temp. is below 60°C (140°F), the shift point is lower than specified in the automatic shift schedule.

EVALUATION

- (1) If there is no 1→2 up-shift:
- No.2 solenoid is stuck
 - 1–2 shift valve is stuck
- (2) If there is no 2→3 up-shift:
- No. 1 solenoid is stuck
 - 2–3 shift valve is stuck
- (3) If there is no 3→O/D up-shift:
- 3–4 shift valve is stuck
- (4) If the shift point is defective:
- Throttle valve, 1–2 shift valve, 2–3 shift valve, 3–4 shift valve etc., are defective
- (5) If the lock-up is defective:
- Lock-up solenoid is stuck
 - Lock-up relay valve is stuck
- (b) In the same manner, check the shock and slip at the 1→2, 2→3 and 3→O/D up-shifts.

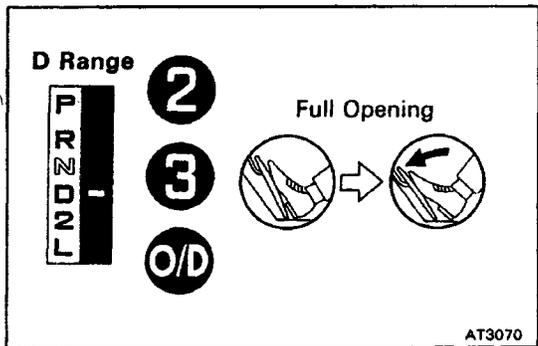
EVALUATION

If the shock is excessive:

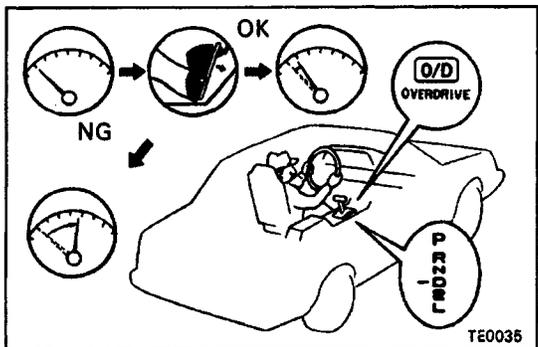
- Line pressure is too high
- Accumulator is defective
- Check ball is defective

- (c) Run at the D range lock-up or O/D gear and check for abnormal noise and vibration.

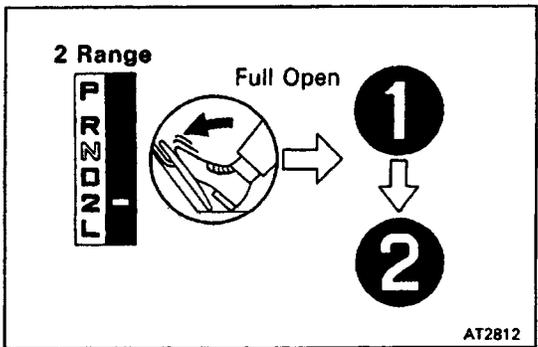
HINT: The check for the cause of abnormal noise and vibration must be made with extreme care as it could also be due to loss of balance in the drive shaft, tire torque converter, etc.



- (d) While running in the D range, 2nd, 3rd and O/D gears, check to see that the possible kick-down vehicle speed limits for 2-1, 3-2 and O/D-3 kick-downs conform to those indicated on the automatic shift schedule. (See page AX-45)
- (e) Check for abnormal shock and slip at kick-down.



- (f) Check for the lock-up mechanism.
- (1) Drive in D range, O/D gear, at a steady speed (lock-up ON) of about 64-71 km/h (40-44 mph).
- (2) Lightly depress the accelerator pedal and check that the engine rpm does not change abruptly. If there is a big jump in engine rpm, there is no lock-up.



2. 2 RANGE TEST

Shift into the 2 range and, while driving with the accelerator pedal held constantly at the full throttle valve opening position, push in one of the pattern selectors and check on the following points.

- (a) Check to see that the 1-2 up-shift takes place and that the shift point conforms to it shown on the automatic shift schedule. (See page AX-45)

HINT:

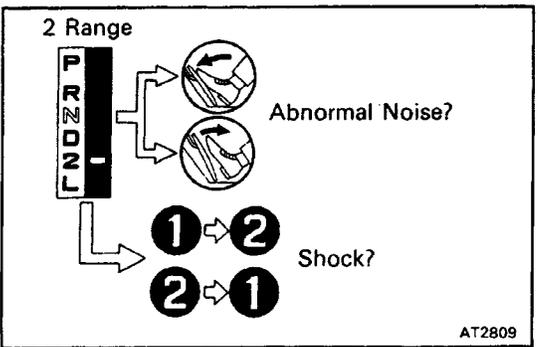
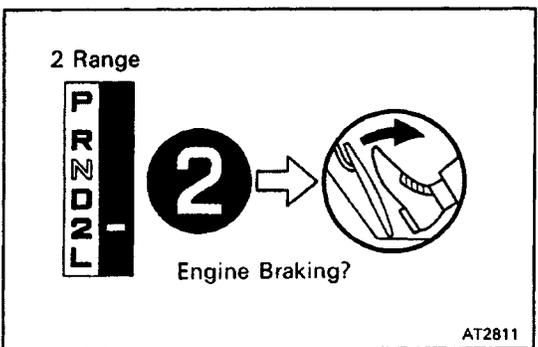
- To prevent overrun, the transmission shifts up into 3rd gear at around 109 km/h (68 mph).
- In range 2, there will be no lock-up to 2nd gear.

- (b) While running in the 2 range and 2nd gear, release the accelerator pedal and check the engine braking effect.

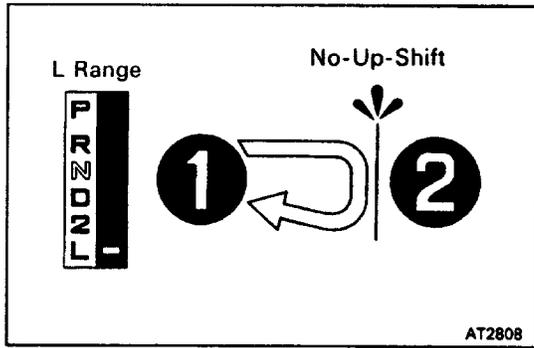
EVALUATION

If there is no engine braking effect:

- Second coast brake is defective

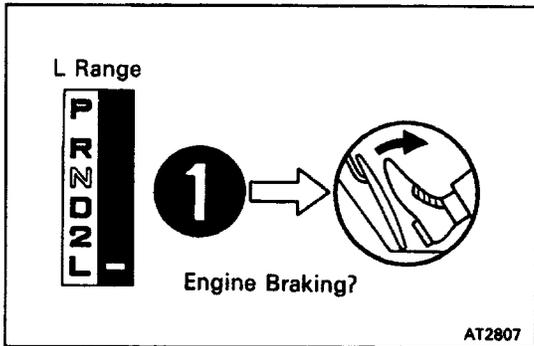


- (c) Check for abnormal noise at acceleration and deceleration, and for shock at up-shift and down-shift.



3. L RANGE TEST

- (a) While running in the L range, check to see that there is no up-shift to 2nd gear.
 HINT: To prevent overrun, the transmission up-shifts into 2nd gear at around 59 km/h (37 mph).

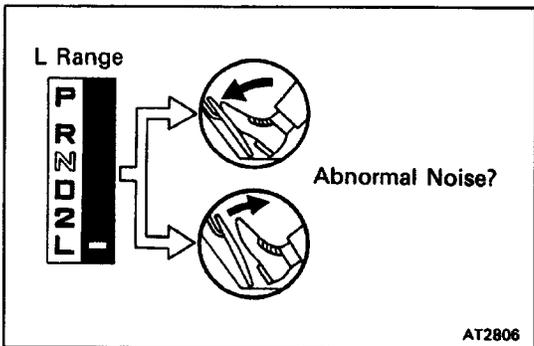


- (b) While running in the L range, release the accelerator pedal and check the engine braking effect.

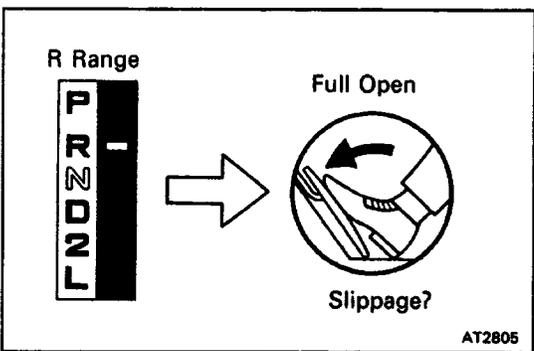
EVALUATION

If there is no engine braking effect:

- First and reverse brake is defective

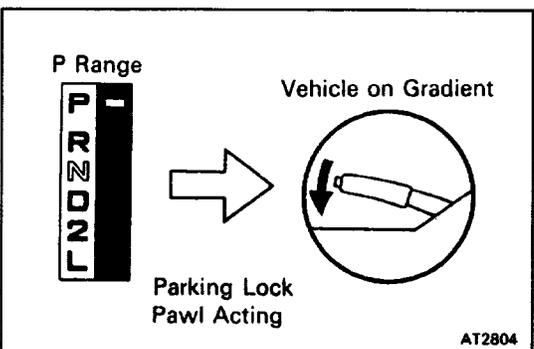


- (c) Check for abnormal noise during acceleration and deceleration.



4. R RANGE TEST

Shift into R range and, while starting at full throttle, check for slippage.



5. P RANGE TEST

Stop the vehicle on a gradient (more than 5°) and after shifting into the P range, release the parking brake. Then check to see that the parking lock pawl holds the vehicle in place.

AUTOMATIC SHIFT SCHEDULE

	Throttle valve fully open			[] Fully closed			km/h (mph)	
	1→2	2→3	3→O/D	[3→O/D]	[O/D→31]	O/D→3	3→2	2→1
D range	53 - 59 (33 - 37)	98 - 109 (61 - 68)	131 - 143 (81 - 89)	44 - 50 (27 - 31)	18 - 23 (11 - 14)	125 - 137 (78 - 85)	93 - 104 (58 - 65)	42 - 48 (26 - 30)
2 range	53 - 59 (33 - 37)	-	-	-	-	-	-	42 - 49 (26 - 30)
L range	-	-	-	-	-	-	-	47 - 53 (29 - 33)

	Throttle valve opening 5%		km/h(mph)
	Lock-up ON	Lock-OFF OFF	
	O/D	O/D	
D range	64 - 71 (40 - 44)	59 - 65 (37 - 40)	

V01060

HINT:

- (1) In the 2 and L ranges, all stages lock-up is OFF.
- (2) In the following cases, the lock-up will be released regardless of the lock-up pattern.
 - When the throttle is completely closed.
 - When the brake switch is ON.
- (3) Shift up to O/D will not occur when the engine coolant temp. is below 53°C (127° F).

AUTOMATIC TRANSAXLE - TROUBLESHOOTING

See Page		AX-25	*	*	*	*	*	*	*	*	*	*	*	AX-66	*	AX-49	*	*	*	*	*	*		
Parts Name		Electrical control system check	Accumulator control valve	2nd coast bake (81)	CZ accumulator	U/D clutch (C3)	U / D brake (B ₁)	U / D planetary gear	B4 accumulator	C3 accumulator	2nd coast modulator valve	82 accumulator	1st and reverse brake	Lock-up relay valve	Torque converter	U / D one-way clutch (F3)	Oil strainer	Pressure relief valve	Direct clutch (C2)	Forward clutch (C ₁)	No. 2 one-way clutch (F2)	Second brake (B2)	No. 1 one-way clutch (F ₁)	Low coast modulator valve
Trouble																								
Harsh engagement	1st → 2nd-3rd → O/D	1																						
	2nd → 3rd		1	2																				
	3rd → O/D				1	2	3	4																
	O/D → 3rd								1	2														
	3rd → 2nd								1	2	3	4	5											
No lock-up		1												2	3									
No lock-up OFF		1												2	3									
Slip or shudder	Forward & Reverse (After warm-up)				3									1	2									
	Forward & Reverse (Directly after E/G start)													1		3	2							
	"R" range				2								3					1						
	1st																		1	2				
	2nd			1																	2	3		
	2nd → 3rd (up-shift)																		1					
	3rd																		1					
O/D						1																		
No engine braking	1st → 3rd				1																			
	1st											2											1	
	2nd		1							2														

See Page	Parts Name	Trouble	AX-25	*	*	*	*	*	AX-66	*	*	*	*	*
			Electrical control system check	2nd coast brake (B ₁)	U/D clutch (C ₃)	U/D brake (B ₄)	U / D planetary gear	1st and reverse brake (B ₃)	Torque converter	Direct Clutch (C ₂)	Forward clutch (C ₁)	Second brake (B ₂)	1-2 shift valve	2-3 shift valve
Large shock during lock-up			1						2					
E/G stalls when starting off and stopping			1						2					
No kick-down			1								2	3	4	
Poor acceleration	All-ranges							1						
	O/D			1		2								
	Other than O/D				1	2								
	Other than 2nd		1								2			
	1st and 2nd								1					
	1st and "R"						1	a						
	"R"									1				