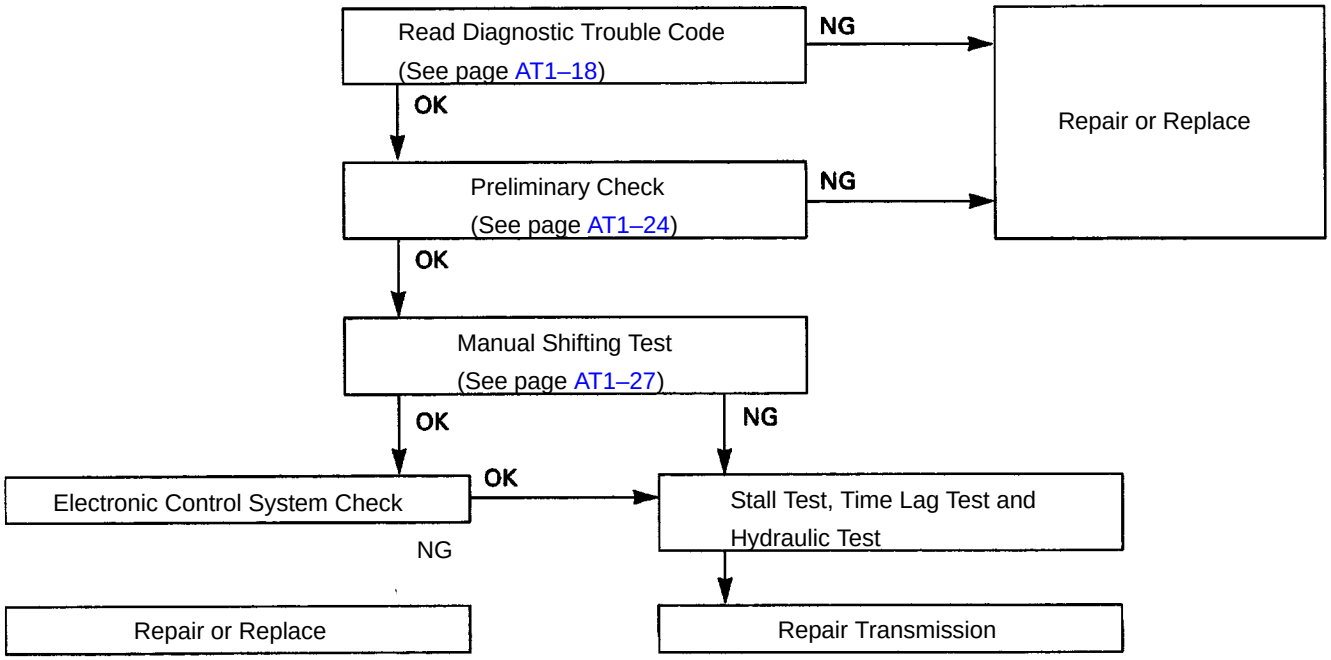
TROUBLESHOOTING

BASIC TROUBLESHOOTING

Before troubleshooting an electronically controlled transmission, 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 a long with the general troubleshooting chart on the following page should speed the procedure.

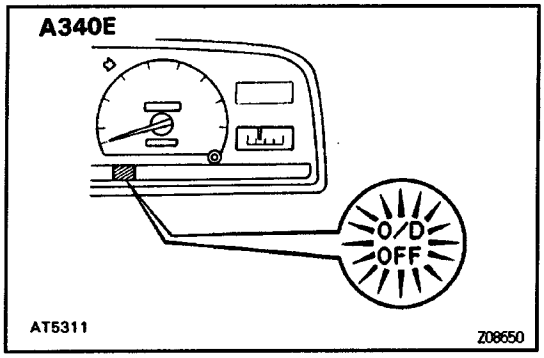


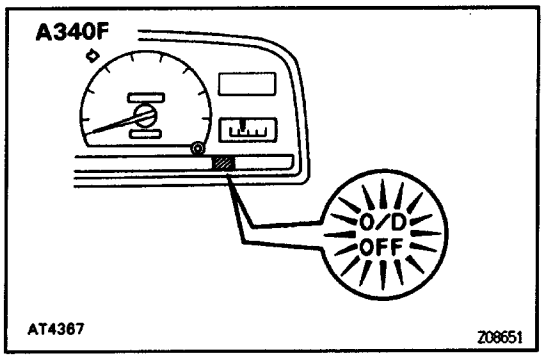
NOTICE: Refer to A340E, A340F, A340H Automatic Transmission Repair Manual (Pub. No. RM391 U) when ★ mark appears in the column for page numbers.

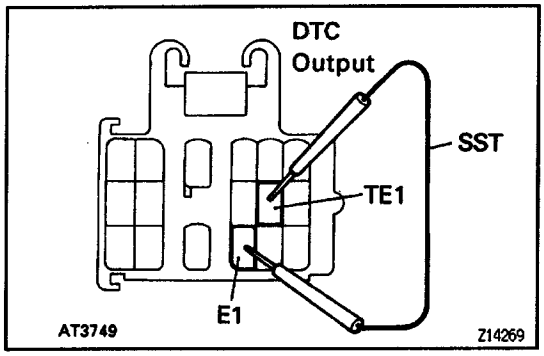
Problem	Possible Cause	Remedy	Page
Fluid discolored or smells burnt	Fluid contaminated Torque converter clutch faulty Transmission faulty	Replace fluid Replace torque converter clutch Disassemble and inspect transmission	AT1–24 AT1–71 ★
Vehicle does not move in any forward position of reverse	Manual linkage out of adjustment Valve body or primary regulator faulty Parking lock pawl faulty Torque converter clutch faulty Converter drive plate broken oil pump intake screen blocked Transmission faulty	Adjust linkage Inspect valve body Inspect parking lock pawl Replace torque converter clutch Replace drive plate Clean screen Disassemble and inspect transmission	AT1–26 ★ AT1–62 AT1–71 AT1–74 ★ ★
Shift lever position incorrect	Manual linkage out of adjustment Manual valve and lever faulty Transmission faulty	Adjust linkage Inspect valve body Disassemble and inspect transmission	AT1–26 ★ ★
Harsh engagement into any drive position	Throttle cable out of adjustment Valve body or primary regulator faulty Accumulator piston faulty Transmission faulty	Adjust –throttle cable Inspect valve body Inspect accumulator pistons Disassemble and inspect transmission	AT1–25 ★ ★ ★
Delayed 1–2, 2–3 or 3–O/D up–shift, or down–shift, from O/D–3 or 3–2 and shifts back to O/D or 3	Electronic control faulty Valve body faulty Solenoid valve faulty	Inspect electronic control Inspect valve body Inspect solenoid valve	AT1–28,29 ★ AT1–39
Slips on 1–2, 2–3 or 3–O/D up–shift, or slips or shudders on acceleration	Manual linkage out of adjustment Throttle cable out of adjustment Valve body faulty Solenoid valve faulty Transmission faulty	Adjust linkage Adjust throttle cable Inspect valve body Inspect solenoid valve Disassemble and inspect transmission	AT1–26 AT1–25 ★ AT1–39 ★
Drag, binding or tie–up on 1–2, 2–3 or 3–O/D up–shift	Manual linkage out of adjustment Valve body faulty Transmission faulty	Adjust linkage Inspect valve body Disassemble and inspect transmission	AT1–26 ★ ★

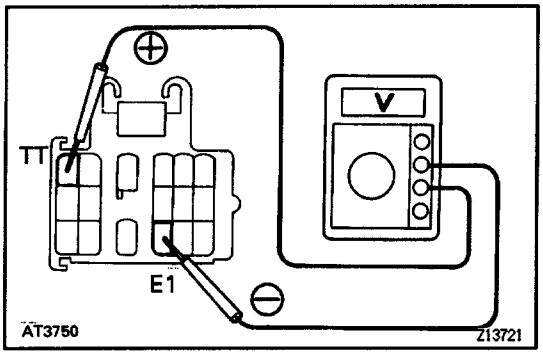
NOTICE: Refer to A340E. A340F, A340H Automatic Transmission Repair Manual (Pub. No. RM391 U) when ★ mark appear: in the column for page number:.

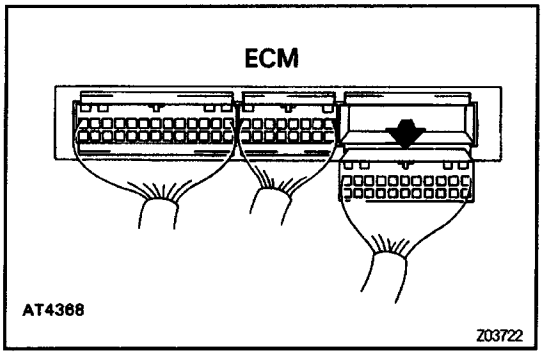
Problem	Possible cause	Remedy	Page
No lock–up in 2nd, 3rd or O/D	Electronic control faulty	Inspect electronic control	AT1–28,29
	Valve body faulty	Inspect valve body	★
	Solenoid valve faulty	Inspect solenoid valve	AT1–39
	Transmission faulty	Disassemble and Inspect transmission	★
Harsh down–shift	Throttle cable out of adjustment	Adjust throttle cable	AT1–25
	Throttle cable and cam faulty	Inspect throttle cable and cam	AT1–63
	Accumulator pistons faulty	Inspect accumulator pistons	★
	Valve body faulty	Inspect valve body	★
	Transmission faulty	Disassemble and inspect transmission	★
No down–shift when coasting	Valve body faulty	Inspect valve body	★
	Solenoid valve faulty	Inspect solenoid valve	AT1–39
	Electronic control faulty	Inspect electronic control	AT1–28,29
Down–shift occurs too quickly or too late while coasting	Throttle cable faulty	Inspect throttle cable	AT1–25
	Valve body faulty	Inspect valve body	★
	Transmission faulty	Disassemble and inspect transmission	★
	Solenoid valve faulty	Inspect solenoid valve	AT1–39
	Electronic control faulty	Inspect electronic control	AT1–28,29
No O/D–3, 3–2 or 2–1 kick–down	Solenoid valve faulty	Inspect solenoid valve	AT1–39
	Electronic control faulty	Inspect electronic control	AT1–28,29
	Valve body faulty	Inspect valve body	★
No engine braking in 2 or L position	Solenoid valve faulty	Inspect solenoid valve	AT1–39
	Electronic control faulty	Inspect electronic control	AT1–28,29
	Valve body faulty	Inspect valve body	★
	Transmission faulty	Disassemble and inspect transmission	★
Vehicle does not hold in P	Manual linkage out of adjustment	Adjust linkage	AT1–26
	Parking lock pawl cam and spring faulty	Inspect cam and spring	AT1–62
(A340F) No H2–H4, H4–L4, L4–H4 or H4–H2 change gear position of transfer	Transfer linkage out of adjustment	Adjust linkage	AT1–26
	Transfer faulty	Disassemble and inspect transfer	★











DIAGNOSIS SYSTEM

DESCRIPTION

1. A self–diagnosis function is built into the electrical control system. Warning is indicated by the O/D OFF indicator light.
   HINT: Warning and DTC can be read only when the O/D main switch is ON. If OFF, the O/D OFF light is lit continuously and will not blink.

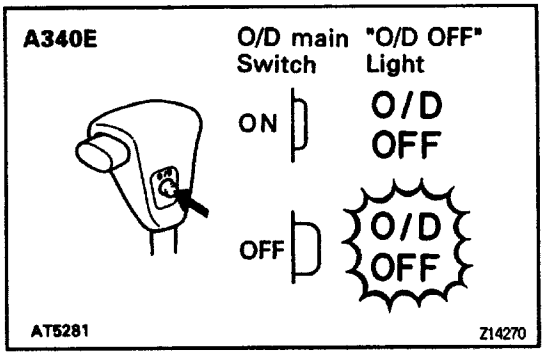
(a) If a malfunction occurs within the vehicle speed sensors (No. 1 or 2) or solenoids (No. 1 or 2), the O/D OFF light will blink to warn the driver.
However, there will be no warning of a malfunction with lock–up solenoid.

(b) The DTC can be read by the number of blinks of the 0/D OFF indicator light when terminals TE1 and E1 are connected with SST. (See page AT1–18)

(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 DLC1.

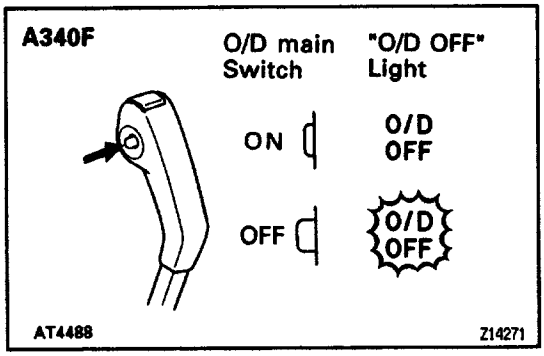
(d) The signals to each gear can be checked by measuring the voltage at terminal TT of the DLC1 while driving.

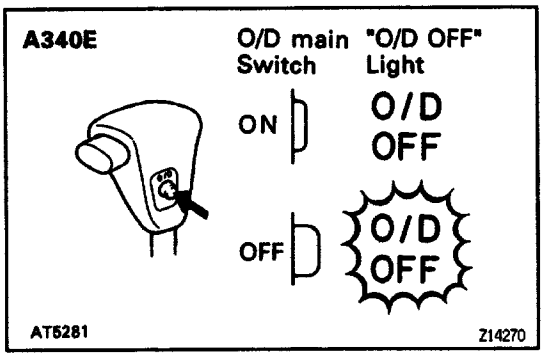
2. The DTC is retained in memory by the ECM and due to back – up voltage, is not canceled out when the engine is turned off. Consequently, after repair, it is necessary to turn the ignition switch off and remove the EFI fuse (11 5A) or disconnect the ECM connector to cancel out the DTC. (See page AT1–21)
   HINT:
   - Low battery positive 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 main switch is placed at OFF.
3. When the O/D main switch is set to ON, the ’O/D OFF” light should go out.
   If the ’O/D OFF’ light flashes when the O/D main switch is set to ON, the electronic control system is faulty.



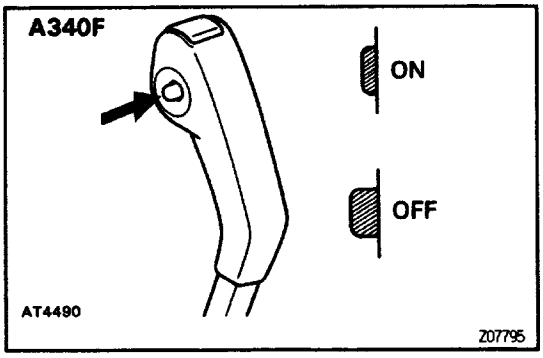


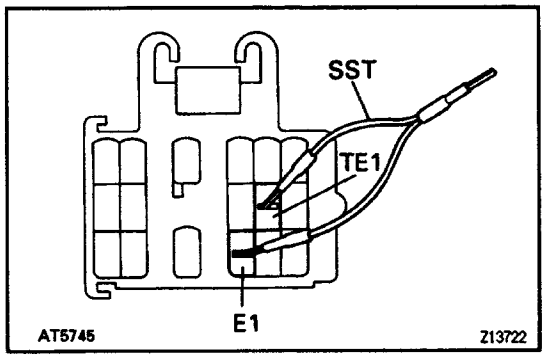
READ DIAGNOSTIC TROUBLE CODE

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

Do not start the engine.

HINT: Warning and DTC can be read only when the O/D main switch is ON. If OFF, the O/D OFF light will light continuously and will not blink.

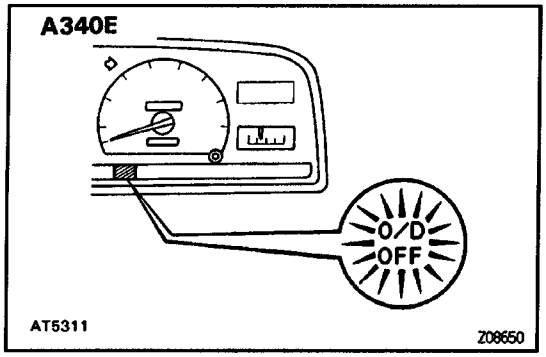


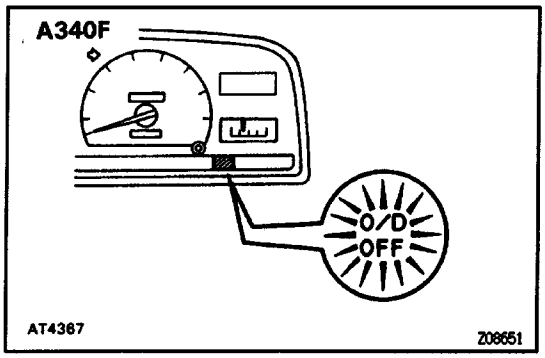


2. CONNECT TE1 AND E1 TERMINALS OF DLC1

Using SST, connect terminals TE1 and E1 of the DLC 1.

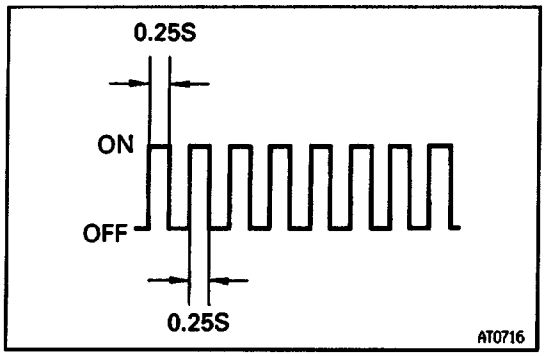
SST 09843–18020





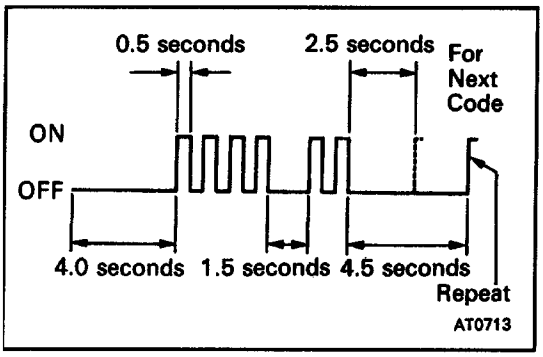
3. READ DIAGNOSTIC TROUBLE CODE

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



Diagnostic Trouble 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 2 digit DTC. If there are 2 or more codes, there will be a 2.5 seconds pause between each.



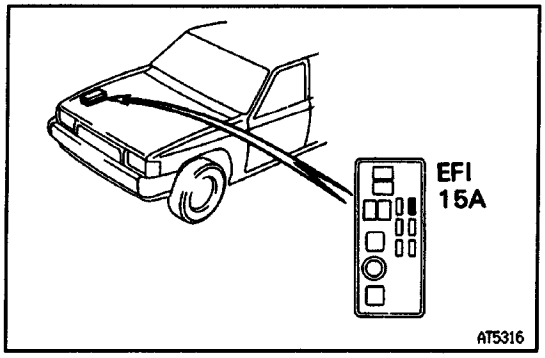
HINT: In the event of several trouble codes occurring simultaneously, indication will began from the smaller value and continue to the larger.

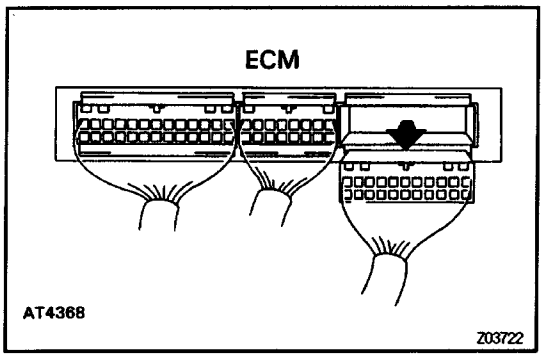
4. REMOVE SST

DIAGNOSTIC TROUBLE CODE

Code No.	Light Pattern	System
–		Normal
42		Defective No. 1 vehicle speed sensor (in combination meter) – severed wire harness or short circuit
61		Defective No.2 vehicle 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

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 TROUBLE CODE

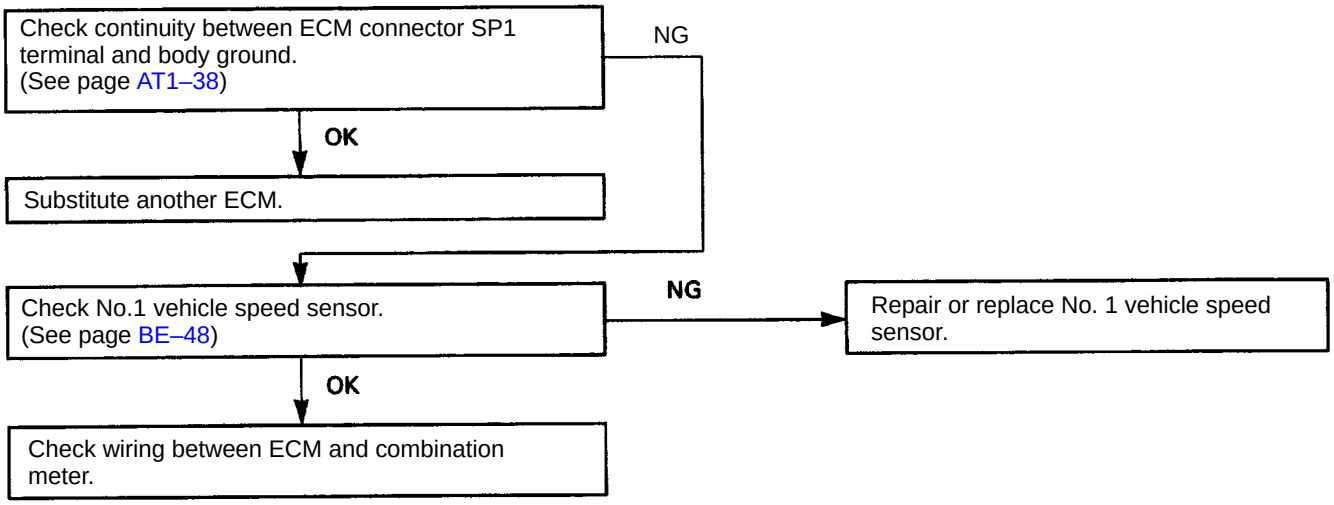
1. After repair of the trouble area, the DTC retained in memory by the ECM must be canceled by removing the EFI fuse (1 5A) for 10 seconds or more, depending on ambient temperature (the lower the temperature, the longer the fuse must be left out) with the ignition switch OFF.
   HINT:
   - Cancellation can be also done by removing the negative (–) terminal cable from the battery, but in this case other memory systems will be also canceled out.
   - The DTC can be also canceled out by disconnecting the ECM connector.
   - If the DTC is not canceled out, it will be retained by the ECM 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

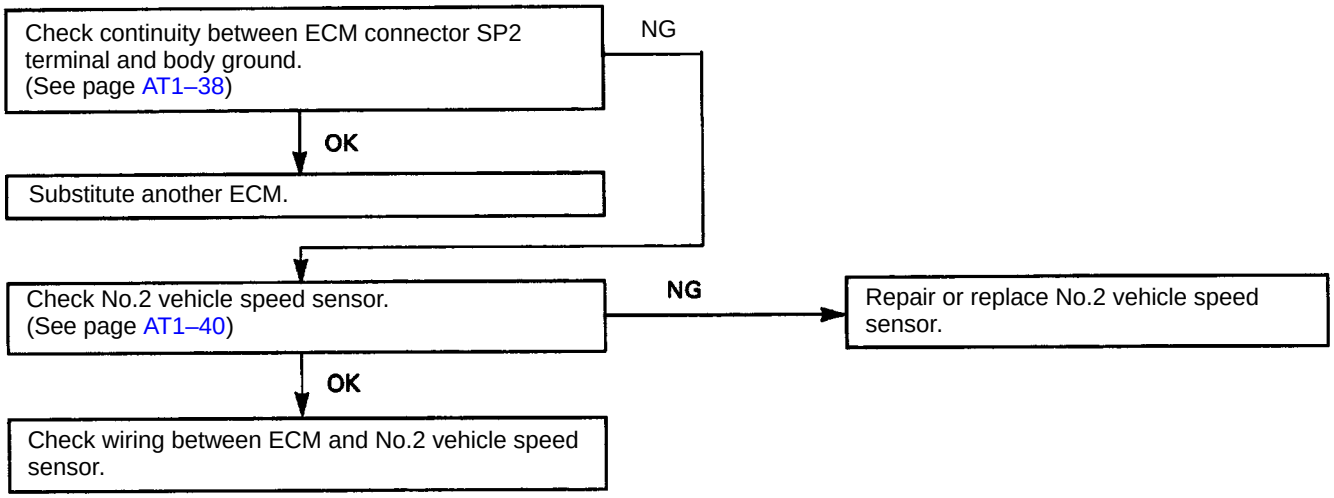
HINT:

- If DTC Nos.42, 61, 62 or 63 are output, the 0/D 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 ECM memory until canceled out.
- There is no warning for DTC No.64.
- In the event of a simultaneous malfunction of both No.1 and No.2 vehicle speed sensors, no DTC will appear and the fail–safe system will not function. However, when driving in the D position, the transmission will not up–shift from first gear, regardless of the vehicle speed.

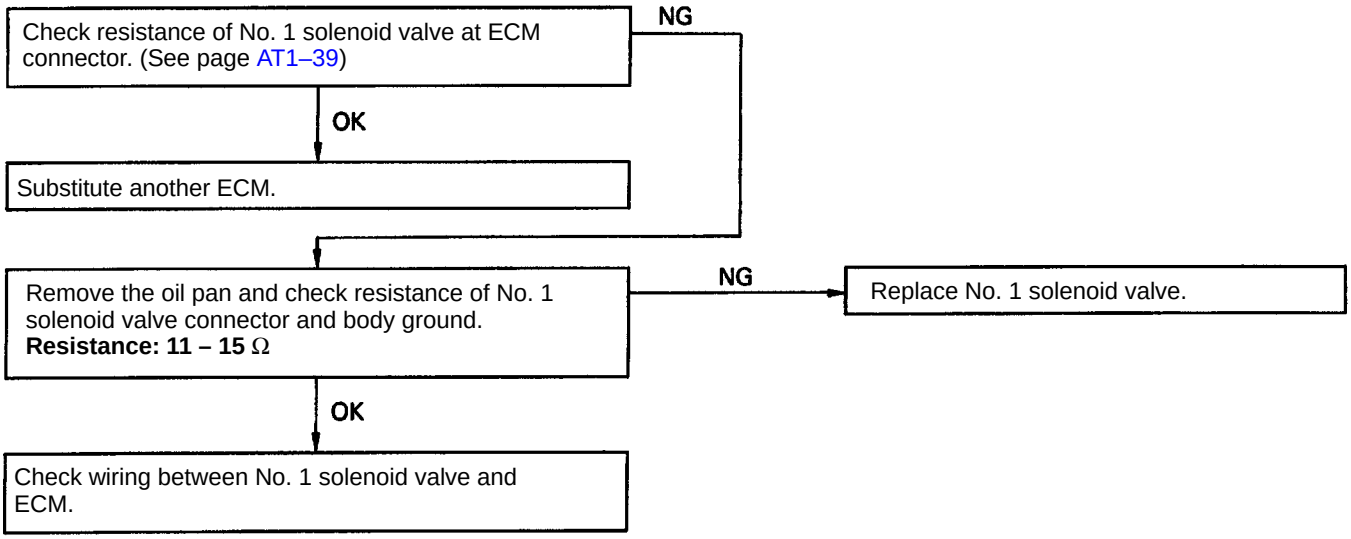
Diagnostic trouble code 42 (No. 1 vehicle speed sensor circuitry)



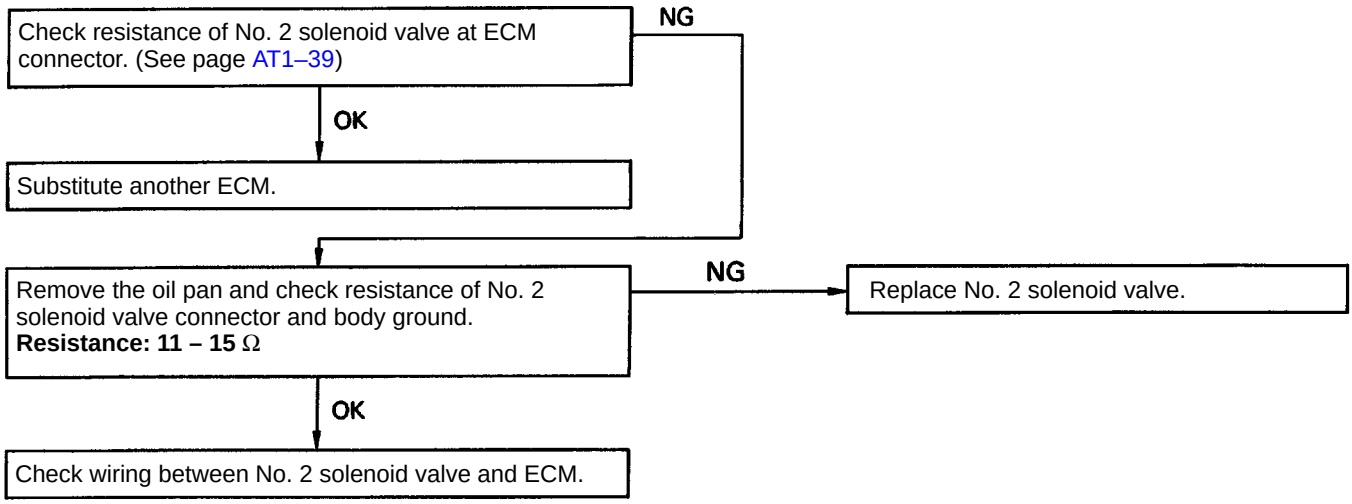
Diagnostic trouble code 61 (No.2 vehicle speed sensor circuitry)



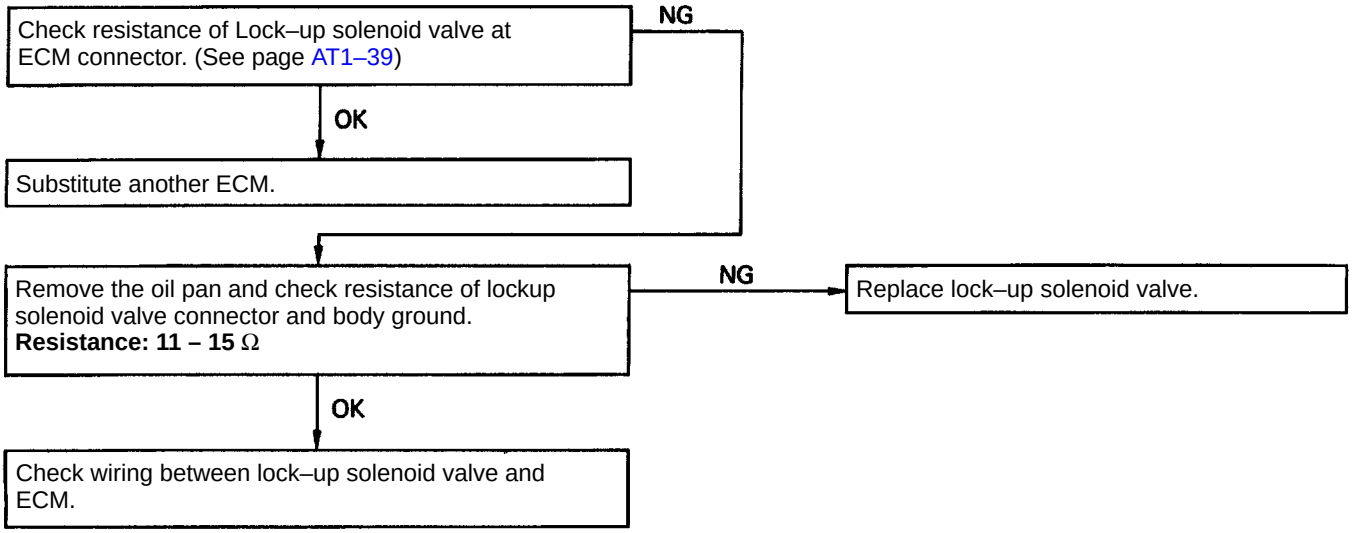
Diagnostic trouble code 62 (No. 1 solenoid valve circuitry)



Diagnostic trouble code 63 (No. 2 solenoid valve circuitry)



Diagnostic trouble code 64 flock–up solenoid valve circuitry)



PRELIMINARY CHECK

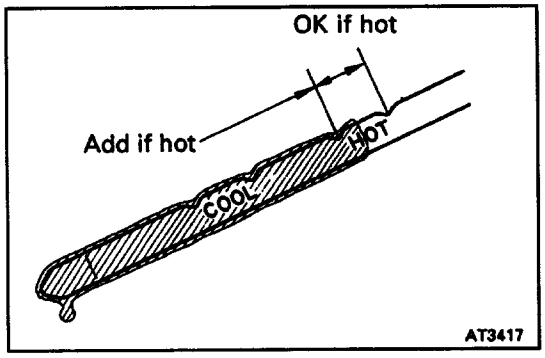
1. CHECK FLUID LEVEL

HINT:

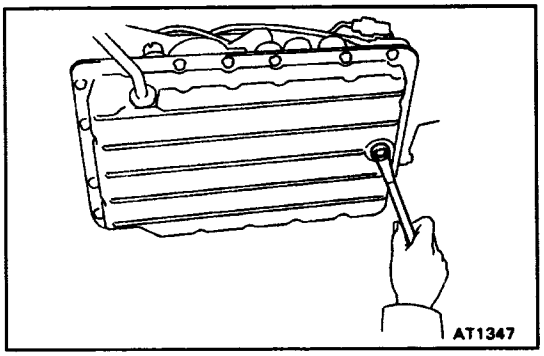
- The vehicle must have been driven so that the engine and transmission are at normal operating temperature.

Fluid temperature: 70–80˚C (158–176˚F)

- Only use the COOL range on the dipstick as a rough reference when the fluid is replaced or the engine does not run.



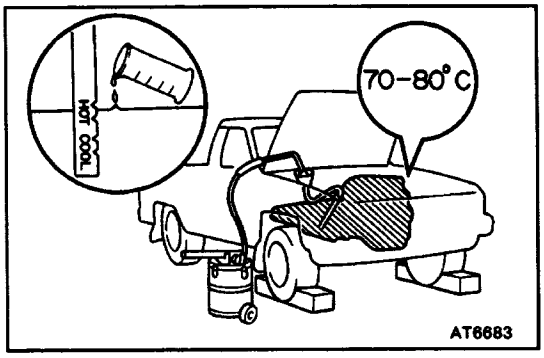
(a) Park the vehicle on a level surface, set the parking brake.
(b) With the engine idling, shift the shift lever into all positions from P to L position and return to P position,
NOTICE: Depress brake pedal.
(c) Pull out the transmission dipstick and wipe it clean.
(d) Push it back fully into the pipe.
(e) Pull it out and check that the fluid level is in the HOT range.
If the level is at the low side, 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 as following procedures.

(a) Remove the drain plug and drain the fluid.
(b) Reinstall the drain plug securely.
(c) With the engine OFF, add new fluid through the oil filler pipe.
Fluid type:
ATF DEXRON® II



Capacity:

Dry fill

A340E

7.2 liters (7.6 US qts, 6.3 Imp.qts)

A340F

7.6 liters (8.0 US qts, 6.7 Imp.qts)

Drain and refill:

A340E

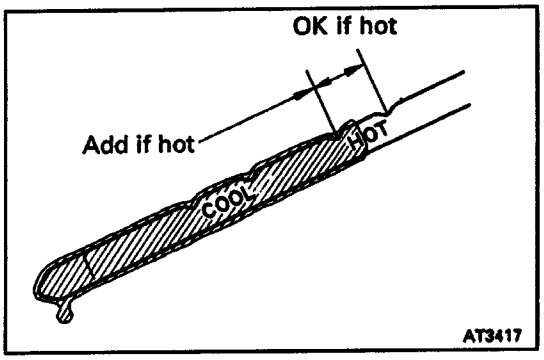
1.6 liters (1.7 US qts, 1.4 Imp.qts)

A340F

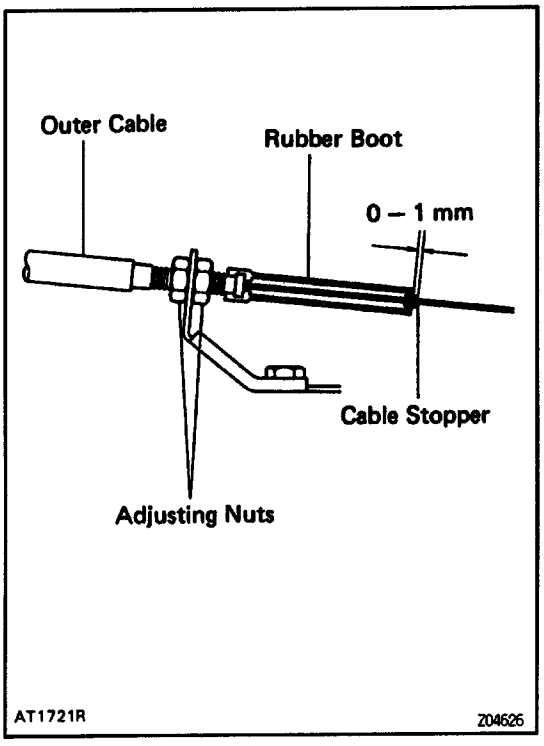
2.0 liters (2.1 US qts. 1.8 Imp.qts)

(d) Start the engine and shift the shift lever into all positions from P to L position and then shift into P position.

(e) 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 operating temperature 70 – 80˚ C (158 –176˚ F) and add as necessary.
NOTICE: Do not overfill.

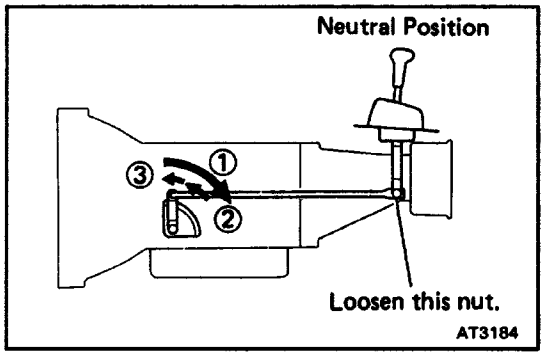


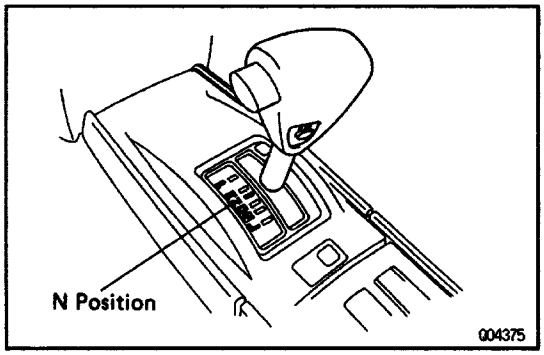
3. INSPECT THROTTLE CABLE

(a) Depress the accelerator pedal all the way and check that the throttle valve opens fully.
HINT: If the valve does not open fully, adjust the accelerator cable.

(b) Fully depress the accelerator pedal.

(c) Measure the distance between the end of the boot and stopper on the cable.
Standard distance:
0–1 mm (0–0.04 in.)
If the distance is not standard, adjust the cable by the adjusting nut.



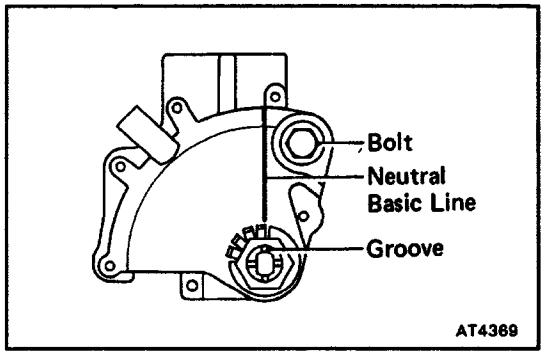


4. INSPECT SHIFT LEVER POSITION

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 procedures.

(a) Remove the nut on the shift lever.
(b) Push the control shaft lever fully downward.
(c) Return the control shaft lever 2 notches to N position.
(d) Set the shift lever to N position.
(e) While holding the shift lever lightly toward the R position side, adjust the control shaft lever nut.
(f) Tighten the control shaft lever nut.
(g) Start the engine and make sure that the vehicle moves forward when shifting the lever from the N to D position and reverse when shifting it to the R position.



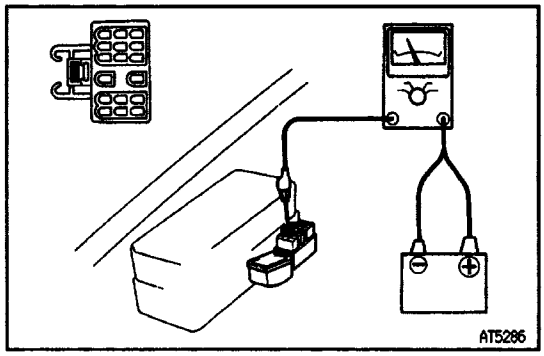
5. INSPECT PARK/NEUTRAL POSITION SWITCH

Check that the engine can be started with the shift lever only in the N or P position, but not in other positions.

If not as stared above, carry out the following adjustment procedures.

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

Torque: 13 N–m (130 kgf–cm, 9 ft–lbf)

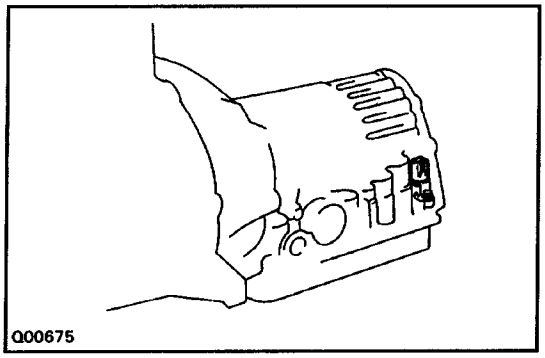


6. INSPECT IDLE SPEED (N POSITION)

Connect a tachometer test probe to the check connector 1 terminal IG (–), inspect the idle speed.

Idle speed:

A340E – 800 ± 50 rpm
A340F – 750 ± 60 rpm
(In N position and air conditioner OFF)



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 transmission.

1. DISCONNECT SOLENOID WIRE

2. INSPECT MANUAL DRIVING OPERATION

Check that the shift and gear position correspond with the table below.

Shift position	D	2	L	R	P
Gear position	O/D	3rd	1st	Reverse	Pawl Lock

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

- While driving, shift through the L, 2 and D position. Check that the gear change corresponds to the shift position.
- If any abnormality is found in the –above test, the problem lies in transmission itself.

3. CONNECT SOLENOID WIRE

4. CANCEL OUT DIAGNOSTIC TROUBLE CODE

(See page AT1–21)

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

Position	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 position	ON	OFF	1st	×	ON (OFF)	3rd (O/D)	ON	×	1st	×	×	O/D
	ON	ON	2nd	×	ON	3rd	OFF (ON)	×	O/D (1st)	×	×	O/D
	OFF	ON	3rd	×	ON	3rd	OFF	×	O/D	×	×	O/D
	OFF	OFF	O/D	×	OFF	O/D	OFF	×	O/D	×	×	O/D
2 position	ON	OFF	1st	×	ON (OFF)	3rd (O/D)	ON	×	1st	×	×	3rd
	ON	ON	2nd	×	ON	3rd	OFF (ON)	×	3rd (1st)	×	×	3rd
	OFF	ON	3rd	×	ON	3rd	OFF	×	3rd	×	×	3rd
L position	ON	OFF	1st	×	OFF	1st	ON	×	1st	×	×	1st
	ON	ON	2nd	×	ON	2nd	ON	×	1st	×	×	1st

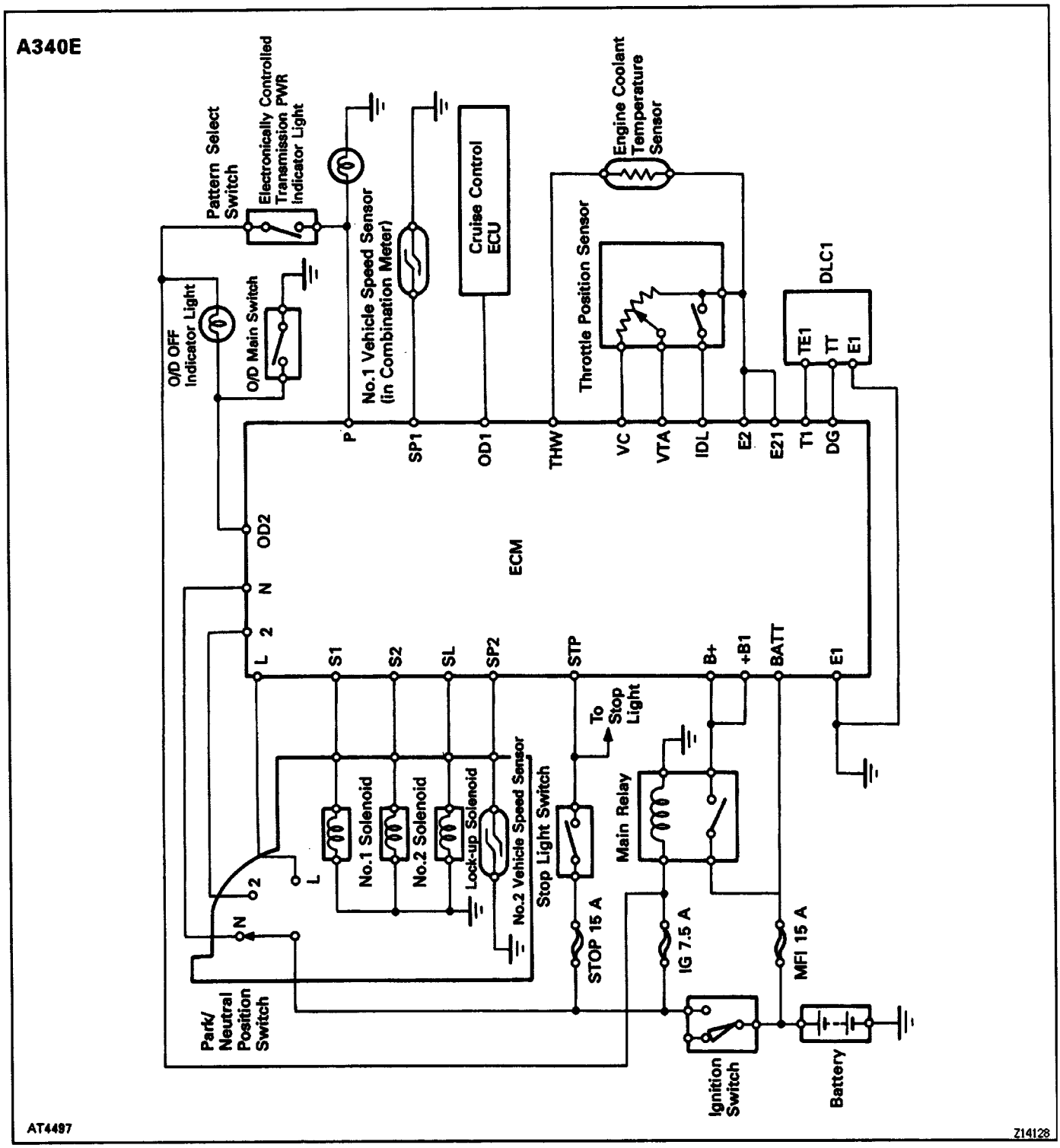
( ): No fail–safe function x : Malfunctions

ELECTRONIC CONTROL SYSTEM

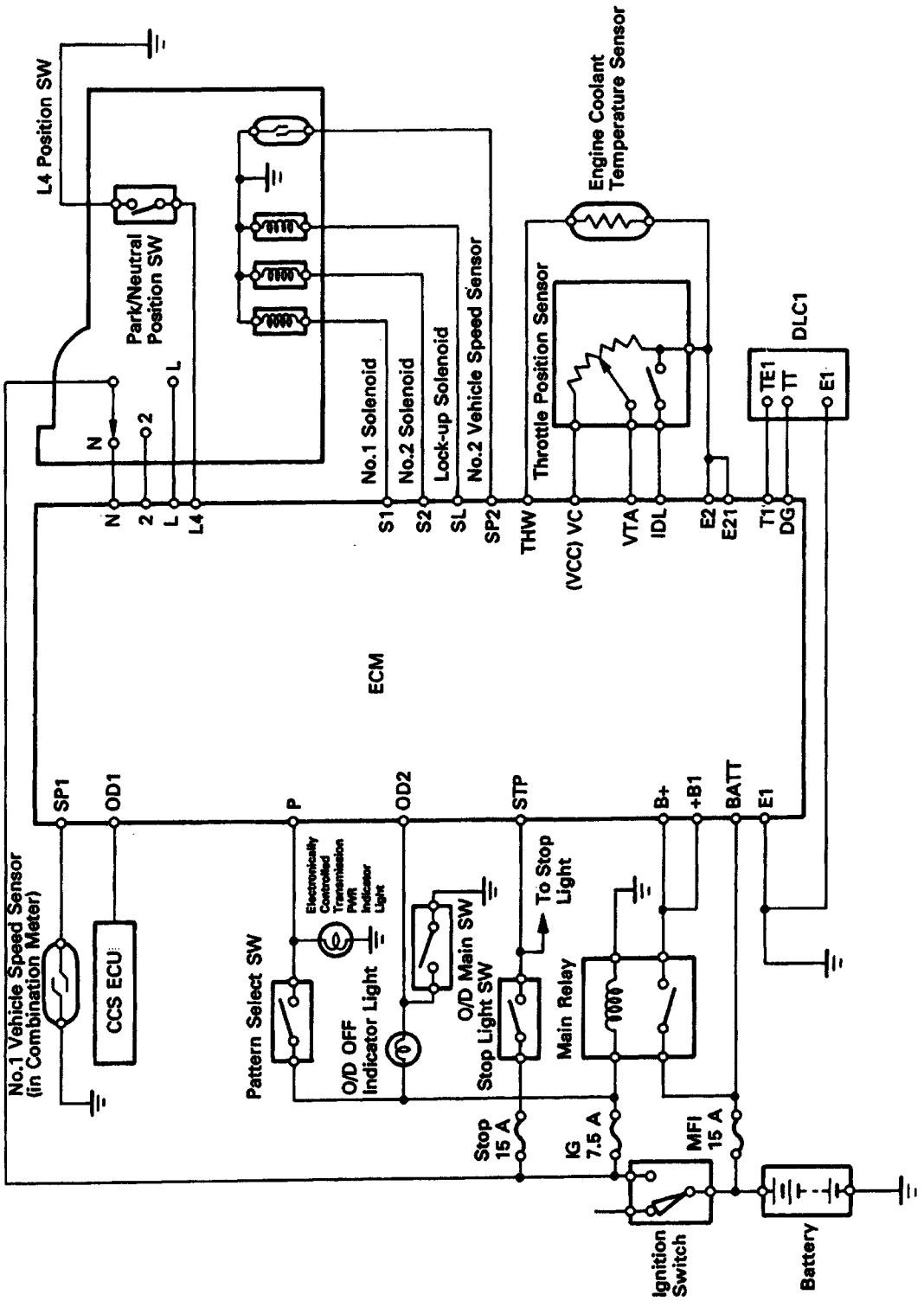
PRECAUTION

Do not open the cover or the case of the ECM and various computer unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)

ELECTRONIC CONTROL CIRCUIT



A340F



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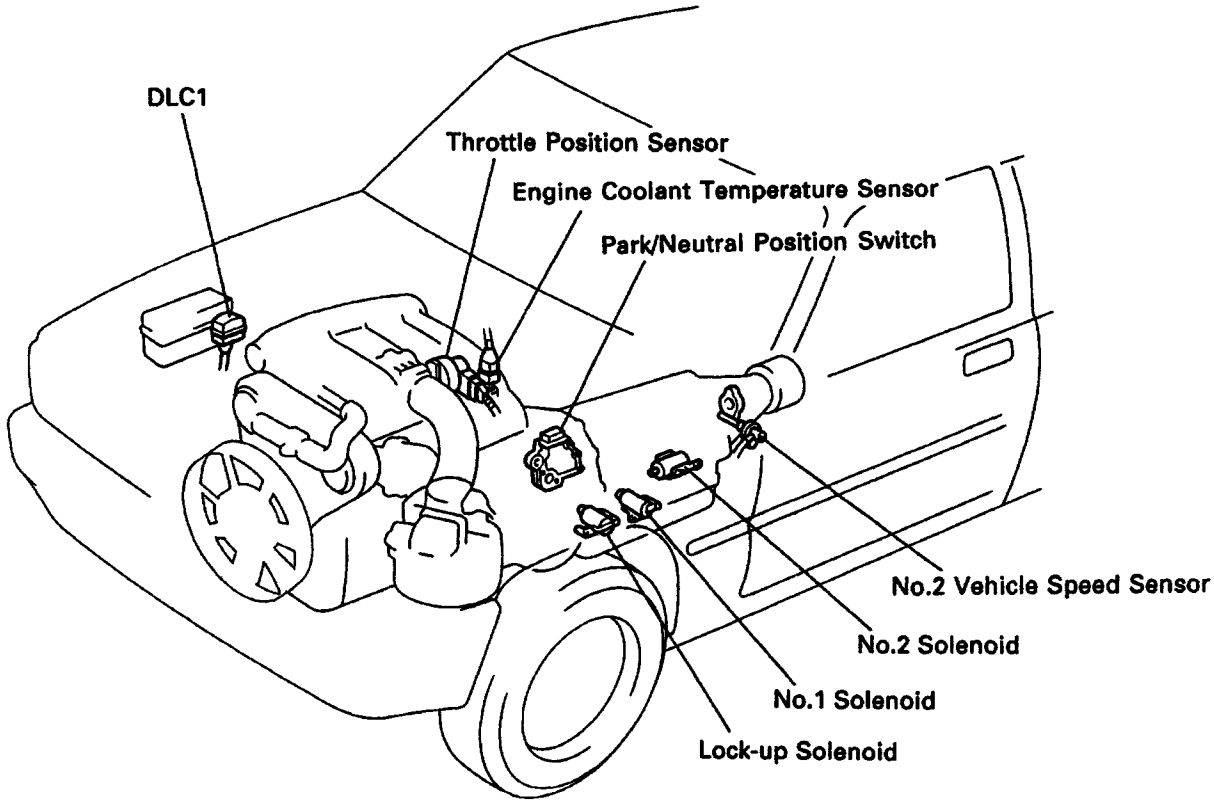
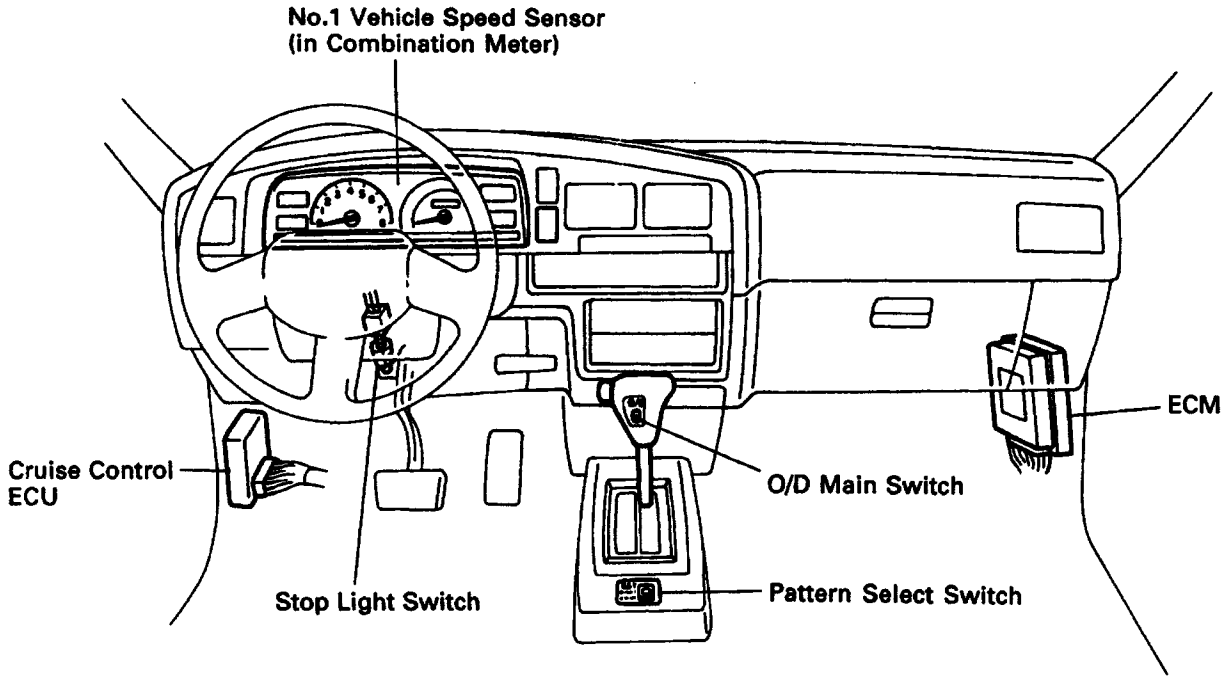
Z14129

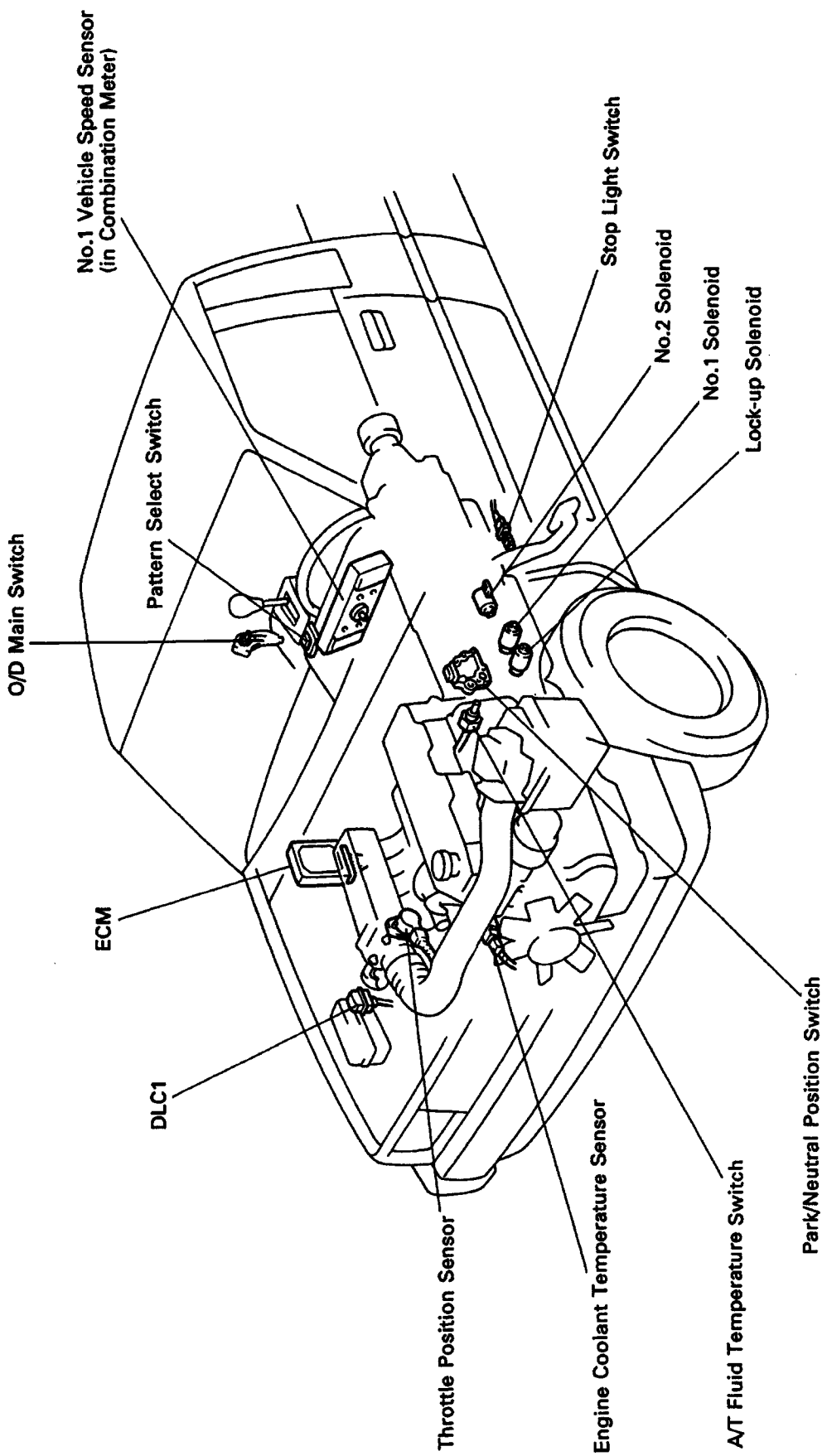
ELECTRONIC CONTROL COMPONENTS

A340E





A340F

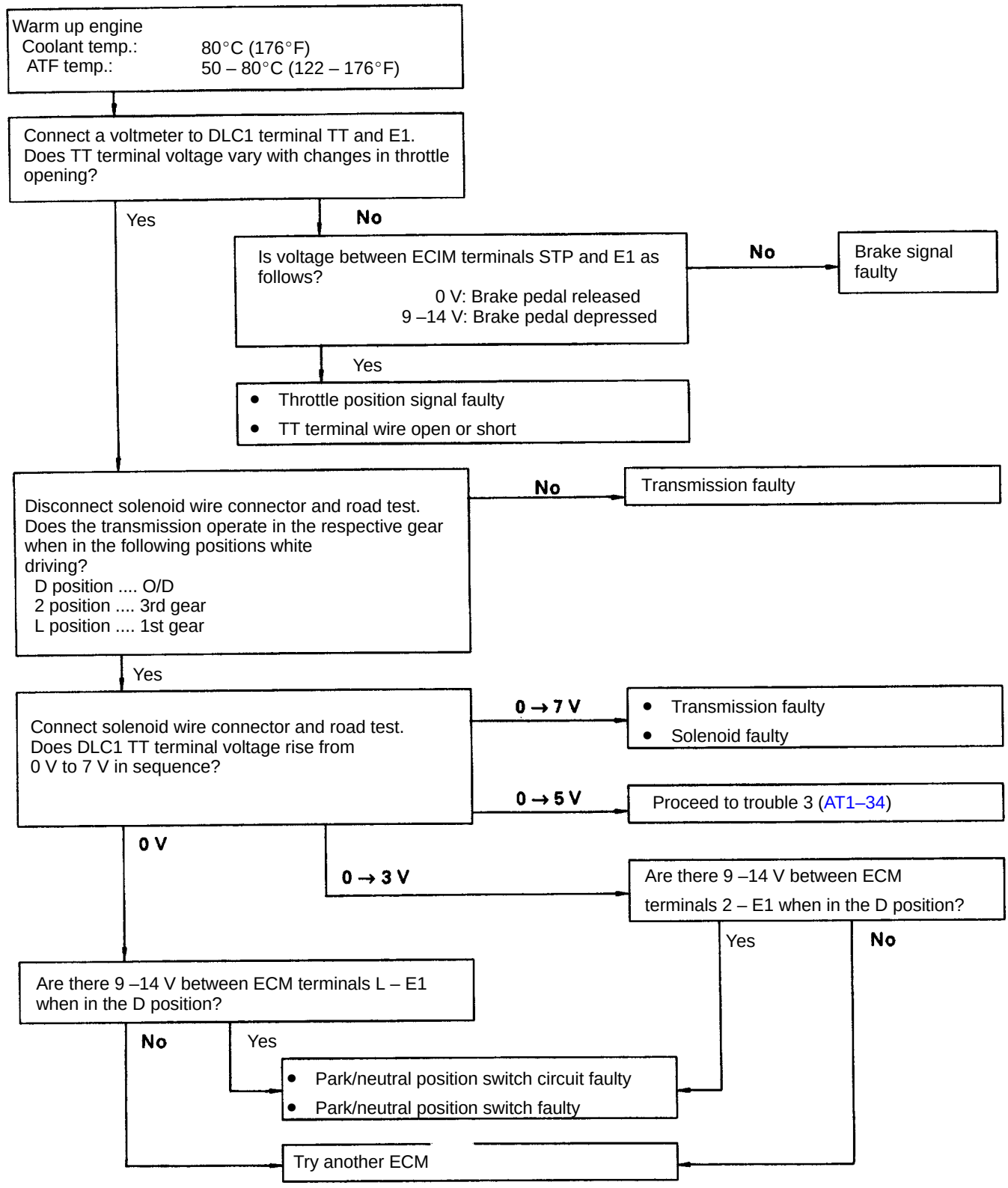


AT5747

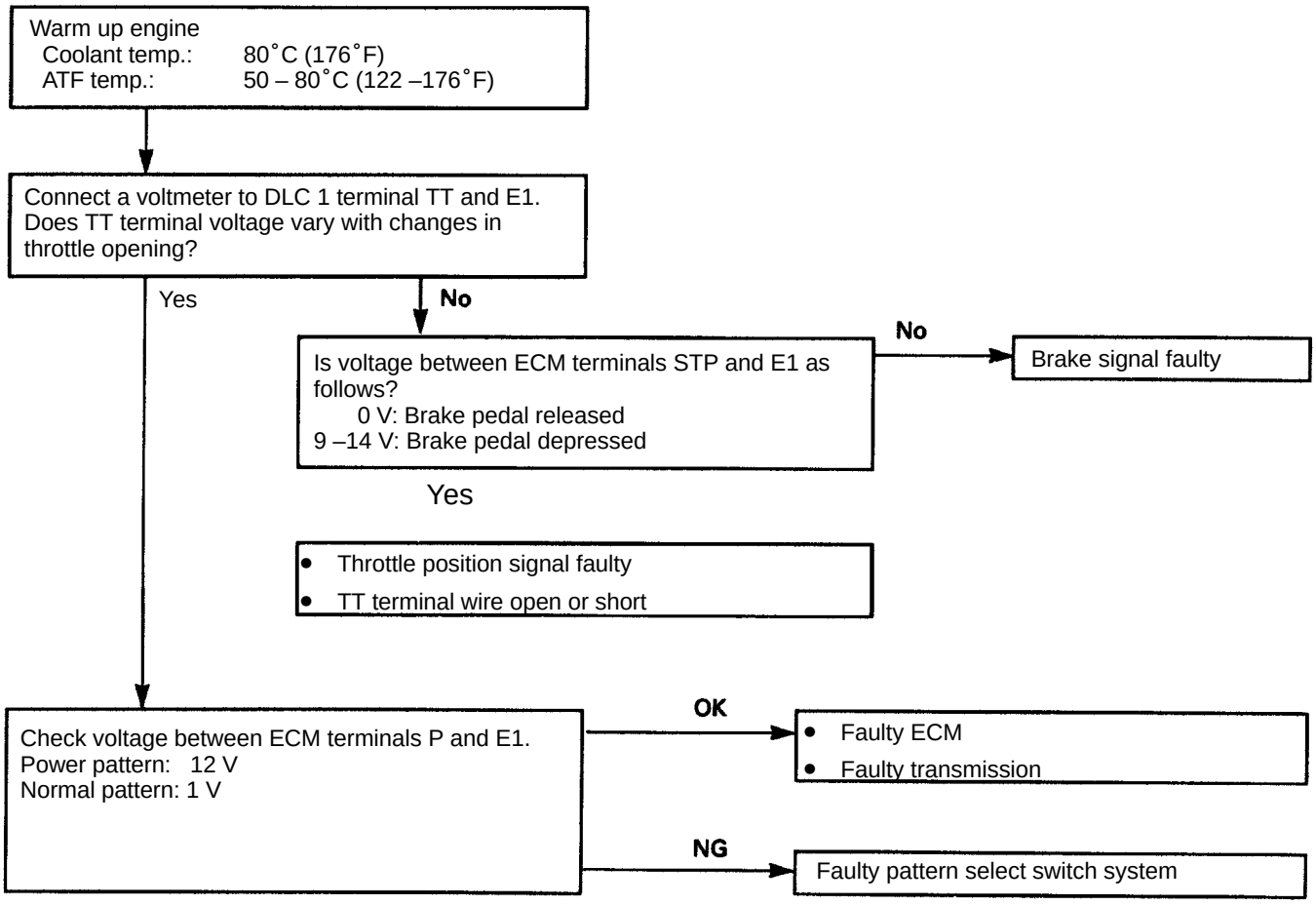
Z14131

TROUBLESHOOTING FLOW–CHART

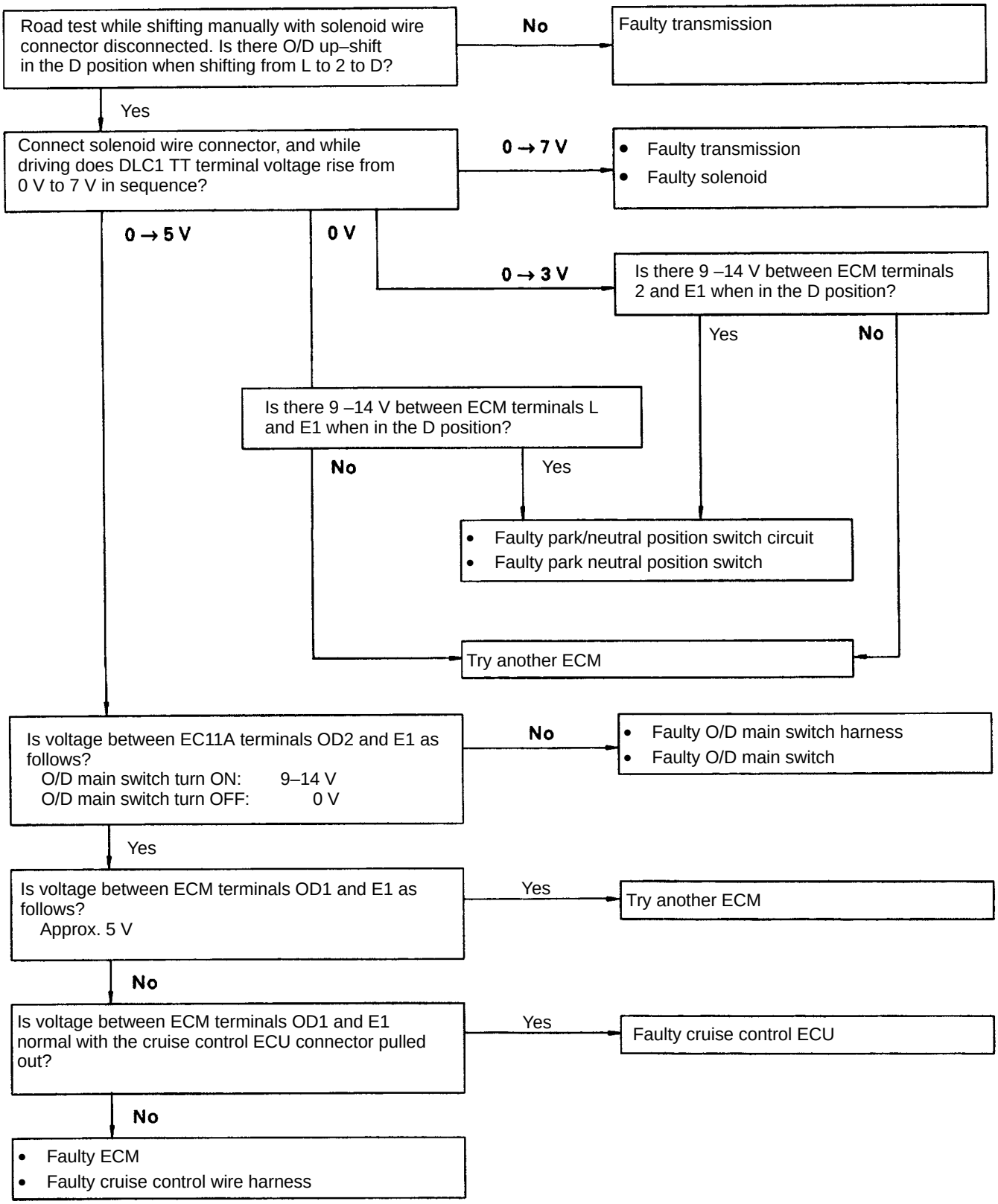
Trouble No. 1 No Shifting



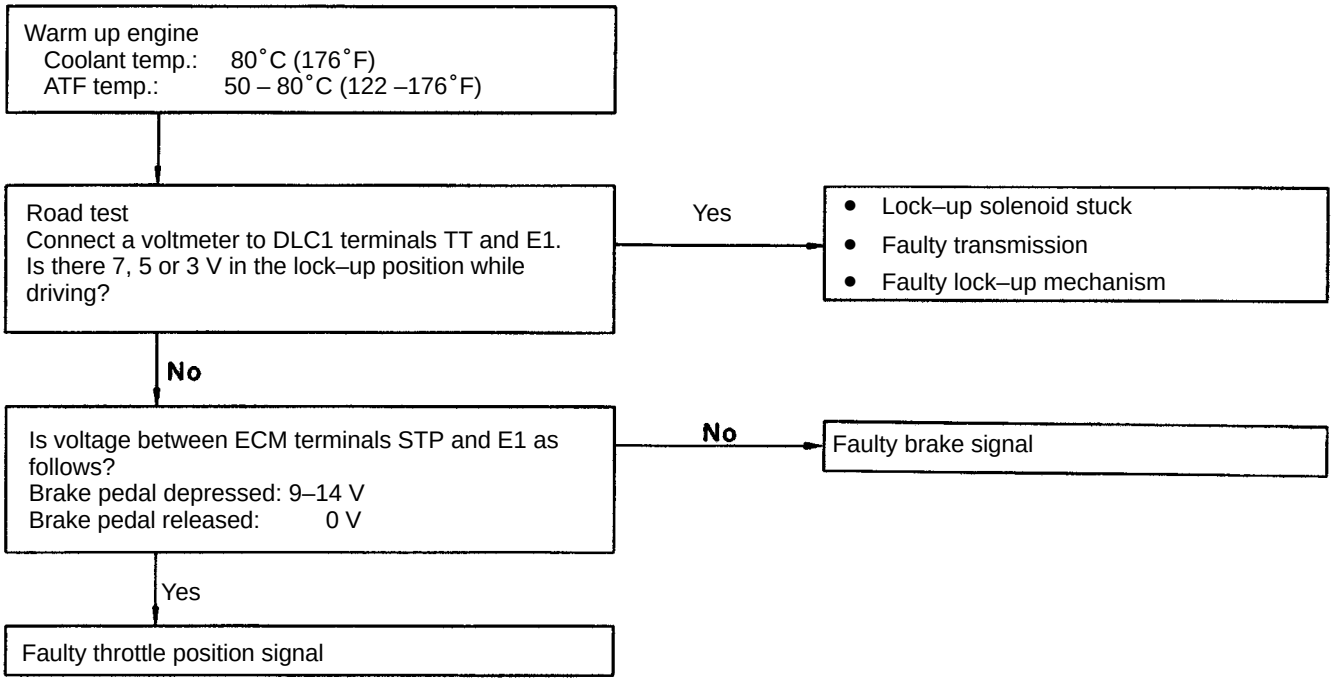
Trouble No.2 Shift point too high or too low

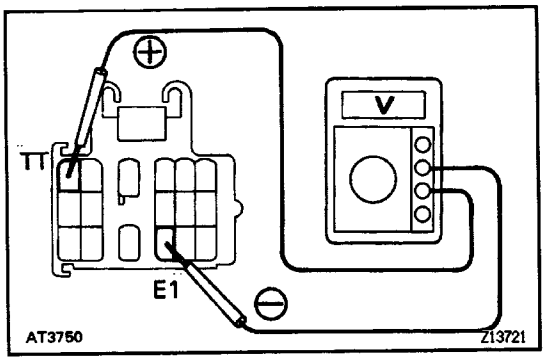


Trouble No.3 No up–shift to overdrive (After warm–up)



Trouble No.4 No look–up (After warm–up)



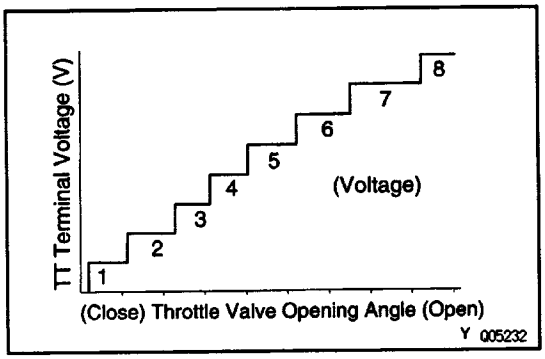


TT TERMINAL VOLTAGE INSPECTION

1. INSPECT THROTTLE POSITION SENSOR SIGNAL

(a) Turn the ignition switch to ON. Do not start the engine.

(b) Connect a voltmeter to DLC1 terminals TT and E1.

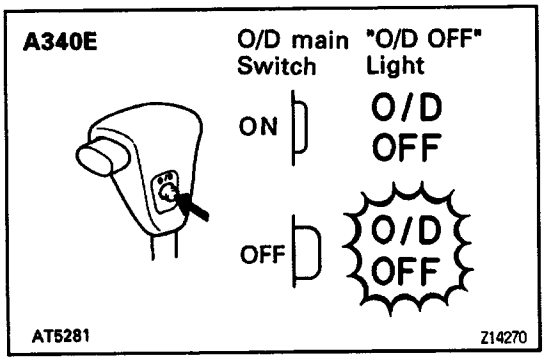


(c) While slowly depressing the accelerator pedal, check that TT terminal voltage rises in sequence.
If the voltage does not change in proportion to the throttle opening angle, there is a malfunction in the throttle position sensor or circuit.

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.



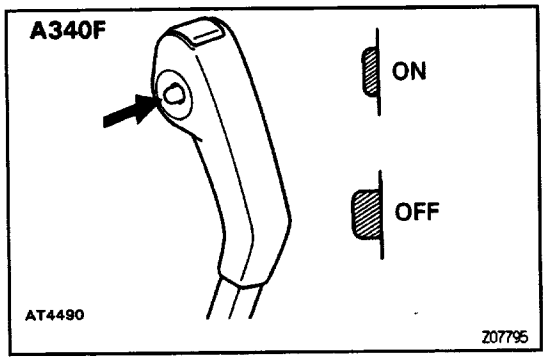
3. INSPECT EACH UP–SHIFT POSITION

(a) Warm up the engine.
Engine coolant temperature:
80° C (176° F)

(b) Turn the O/D main switch to ”ON”.

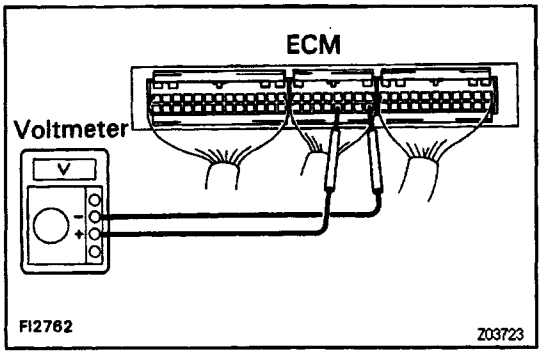
(c) Place the pattern select switch in ”Normal” and the shift lever into the D position.

(d) During a road test (about 10 km/h, 6 mph) check the 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.



TT Terminal (V)	Gear Position
0	1st
2	2nd
3	2nd Lock-up
4	3rd
5	3rd Lock-up
6	O/D
7	O/D Lock-up

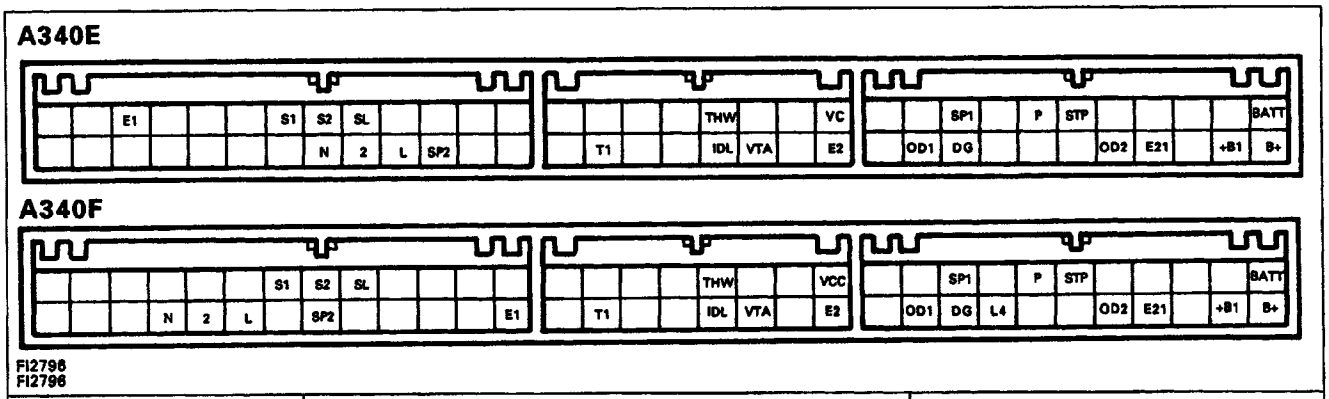
HINT: Determine the gear position by a light shock or change in RPM when shifting. The lock– up clutch will turn ON only infrequently during normal
2nd and 3rd gear operation. To trigger this action, press the accelerator pedal to 50% or more of its stroke. At less than 5096, the voltage may change in the sequence 2 V – 4 V – 6 V – 7 V.



ELECTRONIC CONTROL COMPONENTS INSPECTION

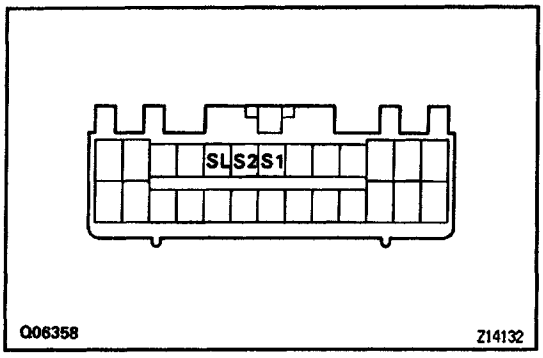
1. INSPECT VOLTAGE OF ECM

(a) Remove the cowl side trim of passenger side.
(b) Turn the ignition switch ON.
(c) Measure the voltage at each terminal.



Terminal	Measuring condition		Voltage (V)
S1 – E1			9 – 14
S2, SL – E1			0
P – E1	PWR pattern		9 – 14
	NORM pattern		0 – 2
STP – E1	Brake pedal is depressed		9 – 14
	Brake pedal is released		0
THW – E2 (E21)	Engine coolant temp. 80°C (176°F)		0.1 – 1.0
IDL – E2 (E21)	Throttle valve fully closed		0
	Throttle valve open		9 – 14
VTA – E2 (E21)	Throttle valve fully closed		0.1 – 1.0
	Throttle valve fully open		3 – 5
VC (VCC) – E2 (E21)	—		4 – 6
OD1 – E1			5
OD2 – E1	O/D main switch turned ON		9 – 14
	O/D main switch turned OFF		0
SP1 – E1	Cruise control main switch OFF	Standing still	0 or 5
		Vehicle moving	2 – 3
SP2 – E1	Standing still		0 or 5
	Vehicle moving		2 – 3

Terminal	Measuring condition	Voltage (V)
N – E1	N position	9 – 14
	Except N position	0 – 2
2 – E1	2 position	9 – 14
	Except 2 position	0 – 2
L – E1	L position	9 – 14
	Except L Position	0 – 2
A340F L4 – E1	Transfer shift position H2 or H4	9 – 14
	Transfer shift position L4	0
B + (+B1) – E1	—	9 – 14
BATT – E1		9 – 14



2. INSPECT SOLENOID

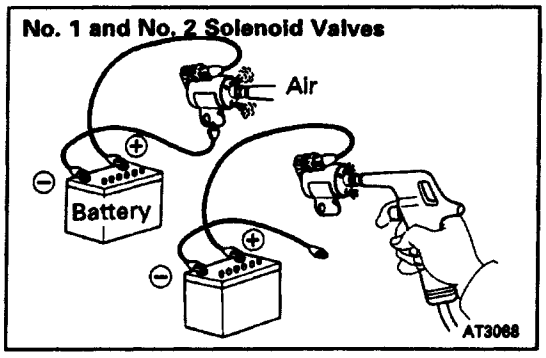
(a) Disconnect the connector from ECM.

(b) Measure the resistance between S 1, S 2, SL and ground.

Resistance:

11–15Ω

(c) Apply battery positive 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.

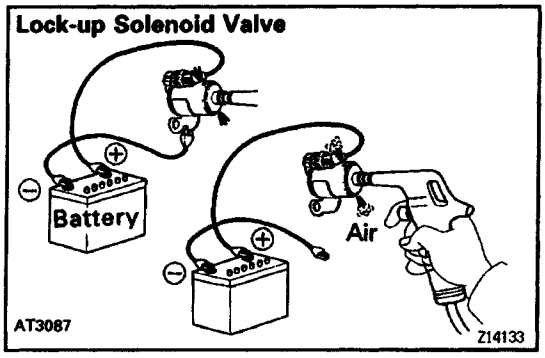
(a) Check No.1 and No.2 solenoid valves.

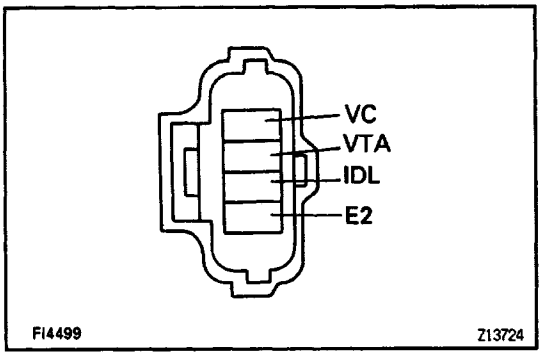
- Applying 490 kPa (5 kgf/cm2, 71 psi) of compressed air, check that the solenoid valves do not leak.
- When supply battery positive voltage to the solenoids, check that the solenoid valves open.

(b) Check the lock–up solenoid valve.

- Applying 490 kPa (5 kgf/cm2, 71 psi) of cornpressed air, check that the solenoid valve opens.
- When supply battery positive voltage to the solenoid, check that the solenoid valve does not leak the air.

If malfunction is found during voltage inspection (step 1.), inspect the components listed below.

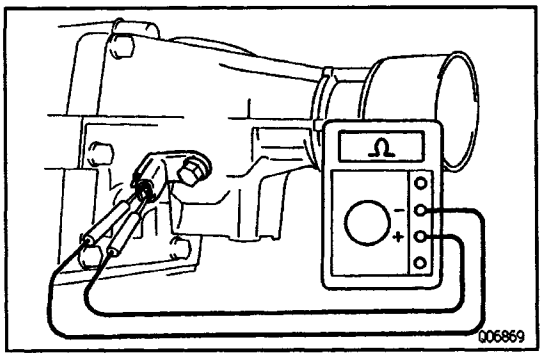




4. INSPECT THROTTLE POSITION SENSOR

Using an ohmmeter, check the resistance between terminals.

Tester condition to terminal	Throttle valve condition	Resistance (kΩ)
IDL – E2	Fully closed	Less than 2.3
IDL – E2	Open	Infinity
VC – E2	–	3.9 – 9.0
VTA – E2	Fully closed	0.47 – 6.1
VTA – E2	Fully opened	3.1 – 12.1

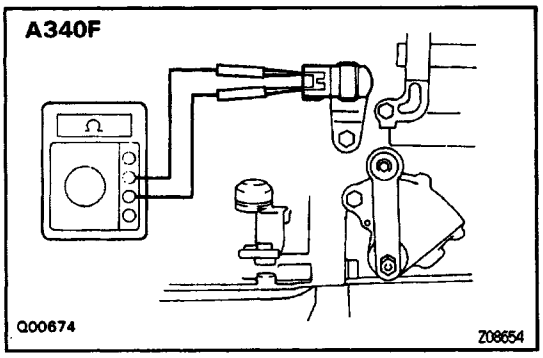


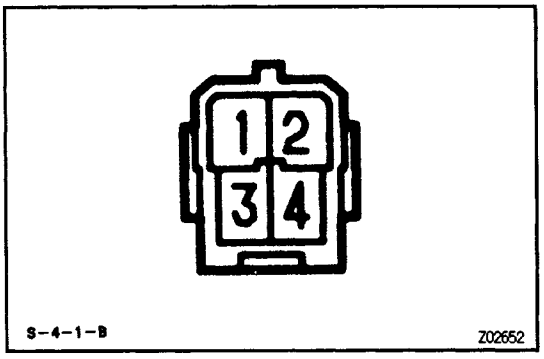
5. INSPECT NO.2 VEHICLE SPEED SENSOR

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

6. INSPECT N4.1 VEHICLE SPEED SENSOR

(See page BE–48)

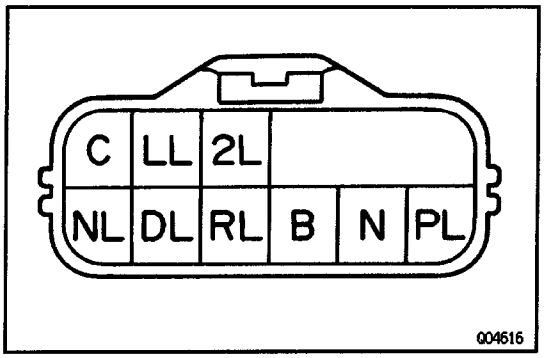




7. INSPECT O/D MAIN SWITCH

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

Switch position	Tester condition to terminal number	Specified value
ON	–	No continuity
OFF	1 – 3	Continuity



8. INSPECT PARK/NEUTRAL POSITION SWITCH

Check that there is continuity between terminals.

Shift position	Tester condition to terminal	Specified value
P	B – N PL – C	Continuity
R	RL – C	Continuity
N	B – N NL – C	Continuity
D	DL – C	Continuity
2	2L – C	Continuity
L	LL – C	Continuity

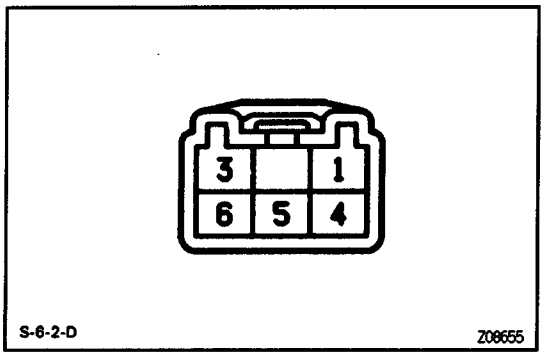
9. INSPECT ENGINE COOLANT TEMPERATURE SENSOR

22R–E:

(See page EG1–194)

3VZ–E:

(See page EG2–246)

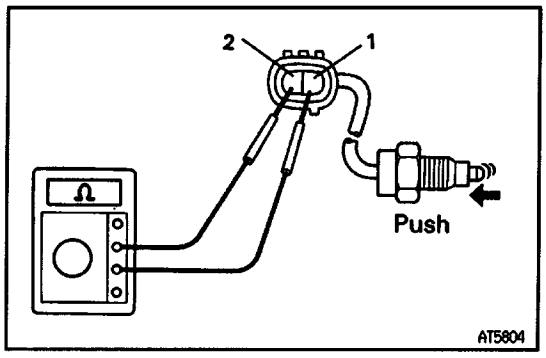


10. INSPECT PATTERN SELECT SWITCH

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

HINT: As there are diodes inside, be careful of the tester prove polarity.

Switch position	Tester condition to terminal number	Specified value
PWR	4 – 6	Continuity
NORM	, –	No continuity



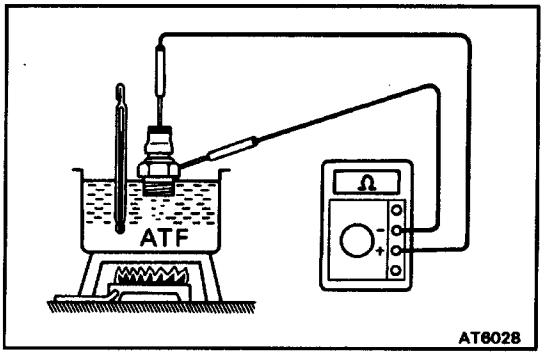
11. A340F:

INSPECT TRANSFER POSITION SWITCH

Check that there is continuity between each terminal, as shown.

Switch position	Specified value
Push	Continuity
Free	No continuity

If operation is not as specified, replace the switch.



12. A340F:

INSPECT TRANSMISSION FLUID TEMPERATURE SWITCH

Check that there is continuity at the temperature of 145–155°C (325–343°F).

If continuity is not as specified, replace the switch.

STALL TEST

The objective of this test is to check the overall performance of the transmission and engine by measuring the stall speeds in the D and R positions.

NOTICE:

- **Do the test at normal operating fluid temperature 50–80˚C (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 conditions of wheels or wheel stoppers outside the vehicle while the other I: doing 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 position. Step all the way down on the accelerator pedal with your right foot.

Quickly read the stall speed at this time.

NOTICE: Release the accelerator pedal and stop test if the rear wheels begin to rotate before the engine speed reaches specified stall speed.

Stall speed:

A340E – 2,450 t 150 rpm

A340F – 2,200 t 150 rpm

(g) Do the same test in R position.

EVALUATION

(a) If the stall speed is the same for both positions but lower than specified value:

- Engine output may be insufficient
- Stator one–way clutch is not operating properly

HINT: If more than 600 rpm below the specified value, the torque converter clutch could be faulty.

(b) If the stall speed in D position is higher than specified:

- Line pressure too low
- Forward clutch slipping
- No.2 one–way clutch not operating properly
- 0/D one–way clutch not operating properly

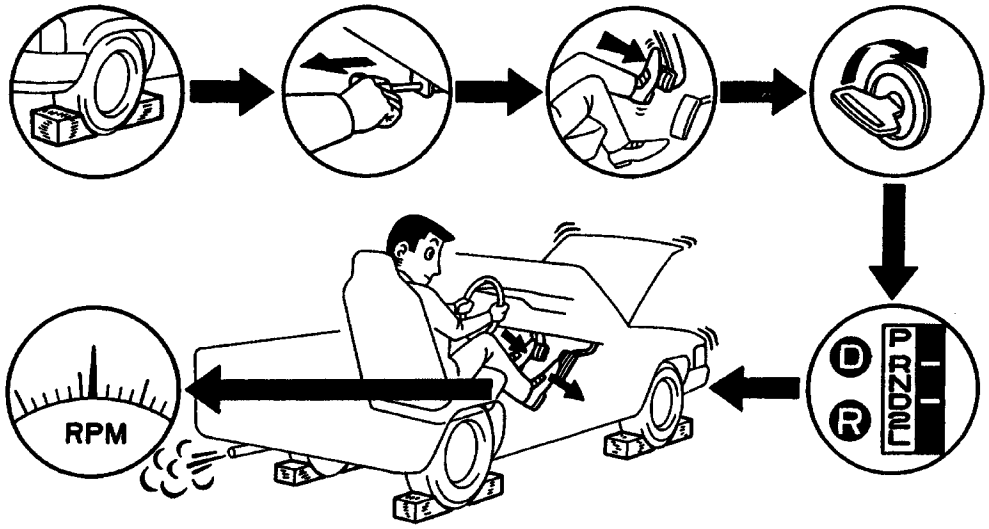
(c) If the stall speed in R position is higher than specified:

- Line pressure too low
- Direct clutch slipping
  First and reverse brake slipping
- 0/D one–way clutch not operating properly

(d) If the stall speed in both R and D positions are higher than specified:

- Line pressure too low
- Improper fluid level
- O/D one–way clutch not operating properly

STALL TEST



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 0/D direct clutch, forward clutch, direct clutch and first and reverse brake.

NOTICE:

- **Do the test at normal operating fluid temperature 50–80˚C (122–176˚F).**
- **Be sure to allow one minute Interval between tests.**
- **Make 3 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 position and air conditioner OFF):

A340E – 800 ± 50 rpm

A340F – 750 ± 50 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 same manner, measure the time lag for N→R.

Time lag:

Less than 1.5 seconds

EVALUATION

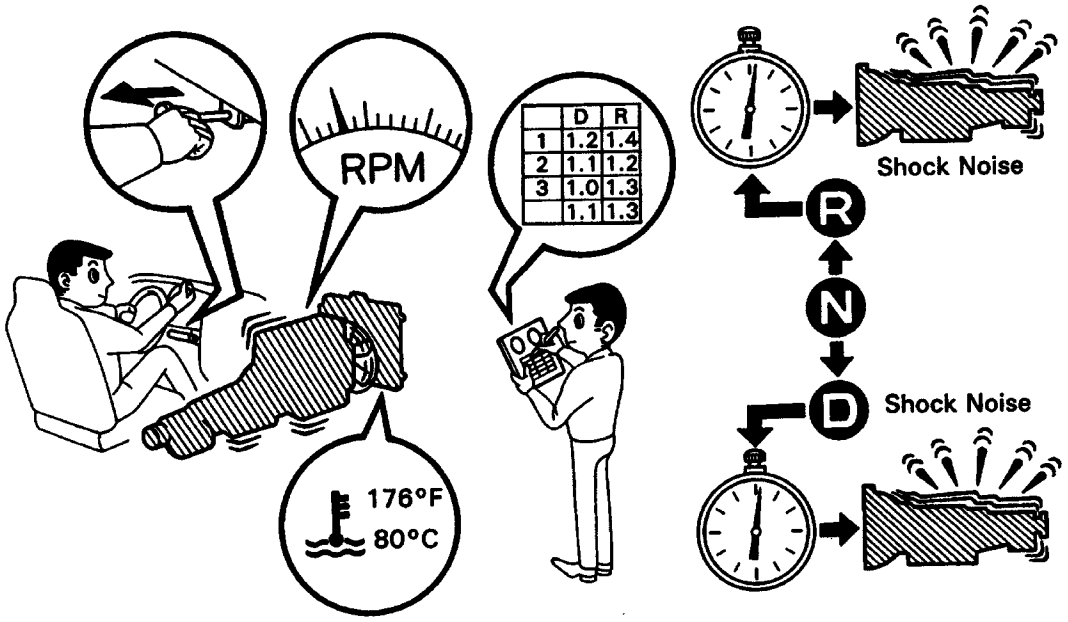
(a) If N → D time lag is longer than specified:

- Line pressure too low
- Forward clutch worn
- O/D 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
- O/D one–way clutch not operating properly

TIME LAG TEST



HYDRAULIC TEST

PREPARATION

(a) Warm up the transmission fluid.

(b) Remove the transmission case test plug and connect the hydraulic pressure gauge.

SST 09992–00094

NOTICE:

- **Do the test at normal operating fluid temperature 50–80°C (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 doing the test.**

MEASURE LINE PRESSURE

(a) Fully apply the parking brake and chock the 4 wheels.

(b) Start the engine and check idling speed.

(c) Keep your left foot pressed firmly on the brake pedal and shift into D position.

(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.

NOTICE: Release the accelerator pedal and atop test if the rear wheels begin to rotate before the engine speed reaches specified stall speed.

(f) In the same manner, do the test in R position.

Line pressure kPa (kgf/cm2, psi)	D position	R position
Idling	**363–422 (3.7–4.3, 53–61)**	**490–588 (5.0–6.0, 71–85)**
Stall	**932–1,177 (9.5–12.0, 135–171)**	**1,294–1,638 (13.2–16.7, 188–238)**

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

EVALUATION

(a) If the measured values at all positions are higher than specified:

- Throttle cable out of adjustment
- Throttle valve defective
- Regulator valve defective

(b) If the measured values at all positions are lower than specified:

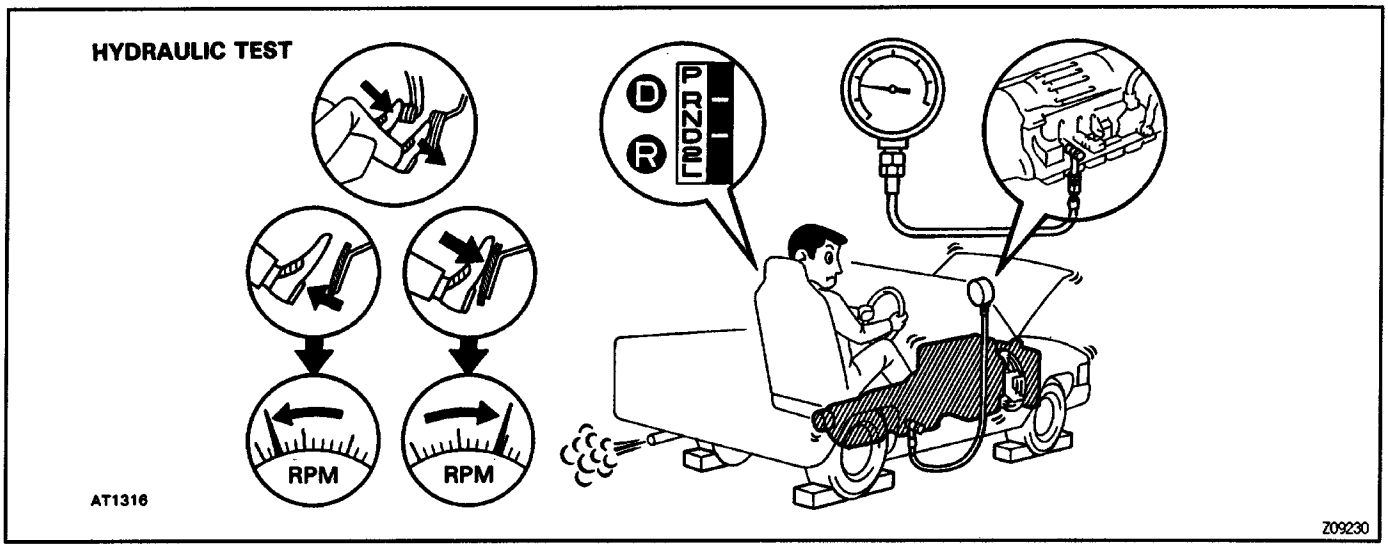
- Throttle cable out of adjustment
- Throttle valve defective
- Regulator valve defective
- Oil pump defective
- O/D direct clutch defective

(c) If pressure is low in the D position only:

- D position circuit fluid leakage
- Forward clutch defective

(d) If pressure is low in the R position only:

- R position circuit fluid leakage
- Direct clutch defective
- First and reverse brake defective



ROAD TEST

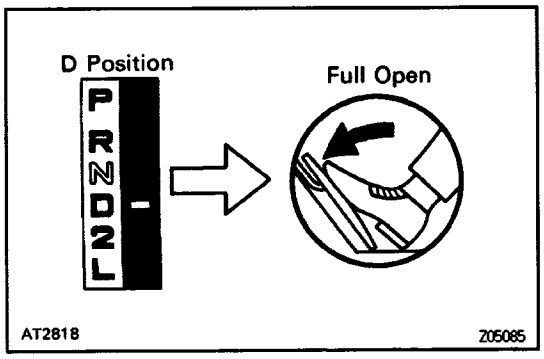
NOTICE: Do this test at normal operating fluid temperature 50 – 80˚C (122 –176˚F).

1. D POSITION TEST IN NORM AND PWR PATTERN POSITION

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

Check the following:

Conduct a test under both Normal and Power pattern.



(a) 1 –2, 2–3 and 3–0/D up–shifts should take place, and shift points should conform to those shown in the automatic shift schedule.

HINT: There is no O/D up–shift or lock–up when the coolant temperature is below60˚C (140˚F).

EVALUATION

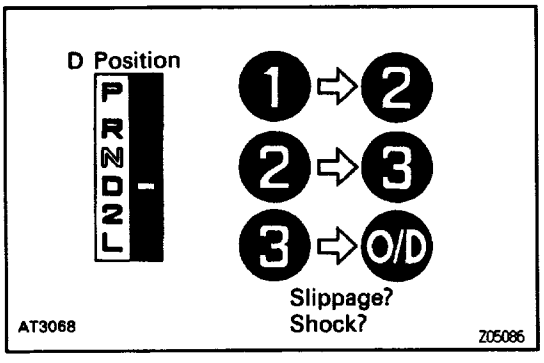
(1) If there is no 1→2 up–shift:
- No.2 solenoid is stuck.
- 1 – 2 shift valve is stuck.

(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.

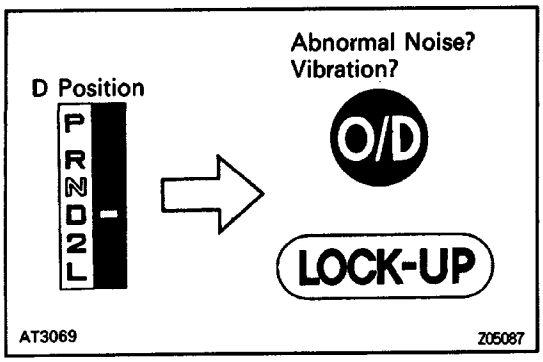
(5) If the lock–up is defective:
- Lock–up solenoid is stuck.
- Lock–up relay valve is stuck.



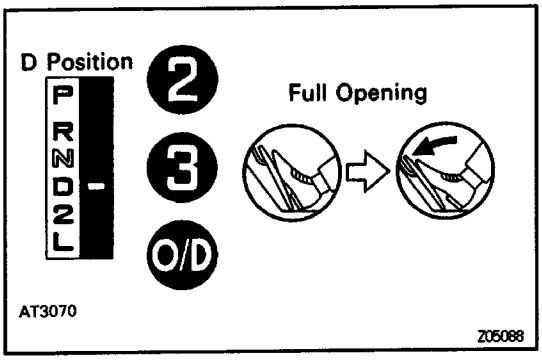
(b) In the same manner, check the shock and slip at the 1 →2 , 2→3, and 3→O/D up–shifts.

EVALUATION

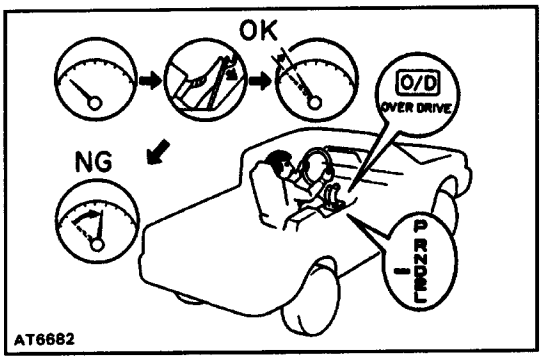
If the shock is excessive:
- Line pressure is too high.
- Accumulator is defective.
- Check ball is defective.



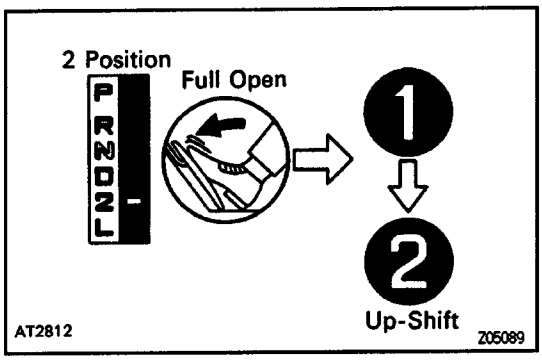
(c) Run at the D position lock–up or O/D gear and check for abnormal noise and vibration.
HINT: The check for the cause of abnormal noise and vibration must be made with extreme care as it could also be due to loss of balance in the propeller shaft, differential, torque converter clutch, etc.



(d) While running in the D position, 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.
(e) Check for abnormal shock and slip at kick–down.



(f) Check for the lock– up mechanism.
(1) Drive in D position, O/D gear, at a steady speed (lock–up ON) of about 75 km/h (47 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.

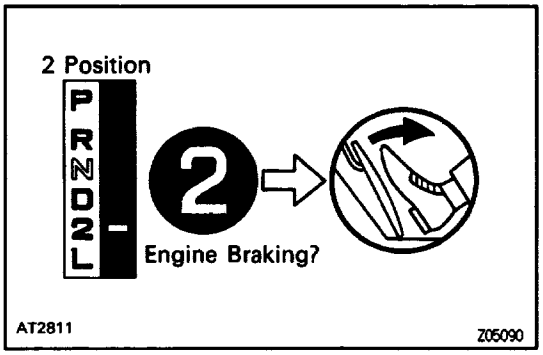


2. 2 POSITION TEST

Shift into the 2 position 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 that shown on the automatic shift schedule.
HINT:

- There is no O/D up–shift and lock–up in the 2 position.
- To prevent overrun, the transmission up–shifts into 3rd gear at around 100 km/h (62 mph) or more.

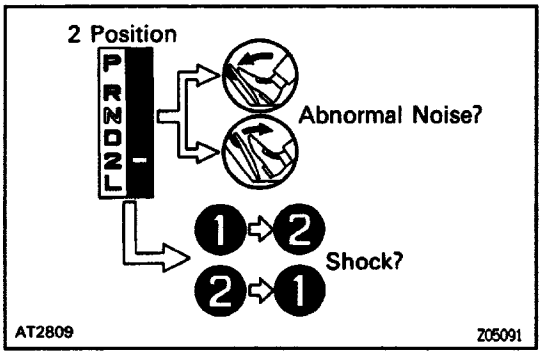


(b) While running in the 2 position and 2nd gear, release the accelerator pedal and check the engine braking effect.

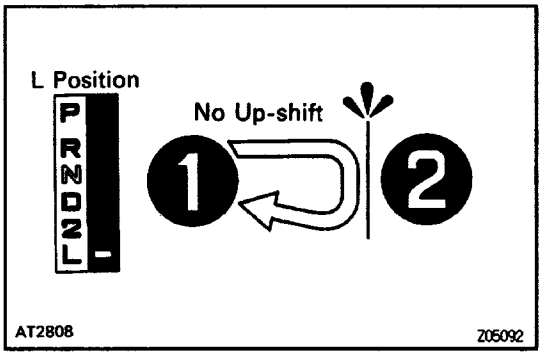
EVALUATION

If there is no engine braking effect:

- Second coast brake is defective.

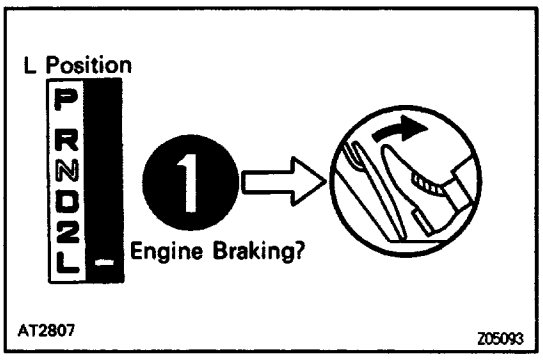


(c) Check for abnormal noise during acceleration and deceleration, and for shock at up–shift and down–shift.



3. L POSITION TEST

(a) While running in the L position, check to see that there is no up–shift to 2nd gear.

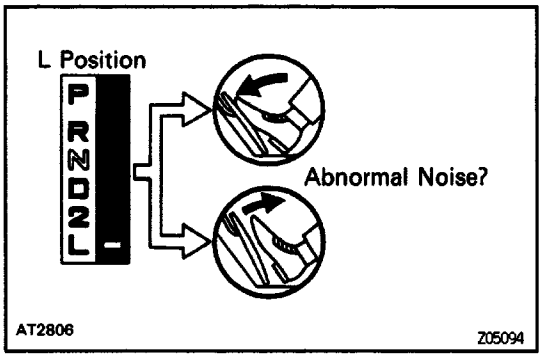


(b) While running in the L position, release the accelerator pedal and check the engine braking effect.

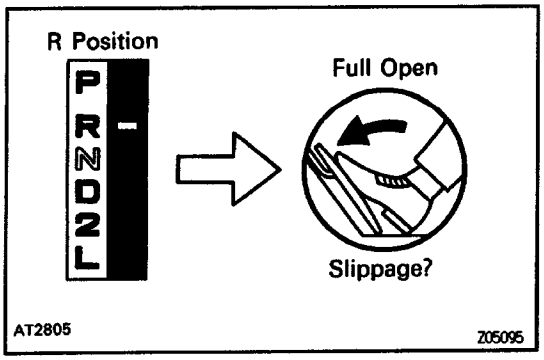
EVALUATION

If there is no engine braking effect:

- First and reverse brake is defective.

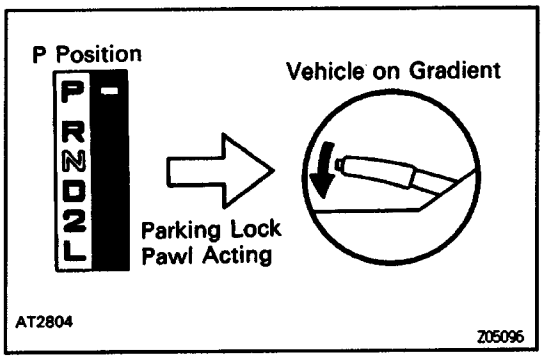


(c) Check for abnormal noise during acceleration and deceleration.



4. R POSITION TEST

Shift into the R position and, while starting at full throttle, check for slipping.



5. P POSITION TEST

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

AUTOMATIC SHIFT SCHEDULE

A340E:

SHIFT POINT

Shift position	Shifting point		Vehicle speed km/h (mph)
D (NORM)	Throttle valve fully opened	1→2	58–62 (36–39)
		2→3	103–111 (64–69)
		3→O/D	143–151 (89–94)
		O/D→3	136–144 (85–90)
		3→2	95–99 (59–62)
		2→1	46–49 (28–30)
	Throttle valve fully closed	3→O/D	41–46 (25–29)
		O/D→3	25–29 (16–18)
D (PWR)	Throttle valve fully opened	1→2	58–62 (36–39)
		2→3	113–120 (70–75)
		3→O/D	147–154 (91–96)
		O/D→3	140–149 (87–93)
		3→2	105–112 (65–70)
		2→1	45–49 (28–30)
	Throttle valve fully closed	3→O/D	45–49 (28–30)
		O/D→3	25–29 (16–18)
2 (NORM and PWR)	Throttle valve fully opened	1→2	50–54 (31–34)
		2→3	120–127 (75–79)
		3→2	113–121 (70–75)
		2→1	45–49 (28–30)
L (NORM and PWR)	Throttle valve fully opened	3→2	96–104 (60–65)
		2→1	55–59 (34–37)

LOCK–UP POINT

D position Throttle valve opening 5%	Lock–up ON km/h (mph)	Lock–up OFF km/h (mph)
*3rd Gear (NORM)	75–79 (47–49)	68–72 (42–45)
*3rd Gear (PWR)	65–69 (40–43)	58–62 (36–39)
O/D Gear (NORM)	75–79 (47–49)	65–69 (40–43)
O/D Gear (PWR)	75–79 (47–49)	68–72 (42–45)

* : O/D main switch OFF

A340F:

SHIFT POINT

Shift position	Shifting point		Vehicle speed km/h (mph)
D (NORM)	Throttle valve fully opened	1→2	44–48 (27–30)
		2→3	93–99 (58–61)
		3→O/D	134–141 (83–87)
		O/D→3	128–135 (79–84)
		3→2	87–94 (54–58)
		2→1	40–43 (25–27)
	Throttle valve fully closed	3→O/D	35–39 (22–24)
		O/D→3	21–25 (13–16)
D (PWR)	Throttle valve fully opened	1→2	47–51 (29–32)
		2→3	93–99 (58–61)
		3→O/D	148–155 (92–96)
		O/D→3	143–149 (89–92)
		3→2	87–94 (54–58)
		2→1	41–45 (25–28)
	Throttle valve fully closed	3→O/D	50–53 (31–33)
		O/D→3	21–25 (13–16)
2 (NORM and PWR)	Throttle valve fully opened	1→2	43–46 (27–29)
		2→3	103–109 (64–68)
		3→2	97–103 (60–64)
		2→1	38–42 (24–26)
L (NORM and PWR)	Throttle valve fully opened	3→2	82–89 (51–55)
		2→1	47–51 (29–32)

LOCK– UP POINT

D position Throttle valve opening 5%	Lock–up ON km/h (mph)	Lock –up OFF km/h (mph)
*3rd Gear (NORM)	41–45 (25–28)	38–42 (24–26)
*3rd Gear (PWR)	55–59 (34–37)	50–53 (31–33)
O/D Gear (NORM)	59–63 (37–39)	55–59 (34–37)
O/D Gear (PWR)	75–79 (47–49)	70–73 (43–45)

* : O/D main switch OFF

HINT:

(1) Lock–up will occur in 2nd gears unless the throttle valve opening is greater than 50%.

(2) There is no lock–up in the 2 and L positions.

(3) In the following cases, the lock–up will be released regardless of the lock–up pattern.

- When the throttle is completely closed.
- When the stop light switch is ON.

TROUBLESHOOTING MATRIX CHART

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

ON–VEHICLE

See page / Parts name / Trouble		AT1–74	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	AT1–38
		Parking lock pawl	Low coast modulator valve	1 – 2 Shift valve	2 – 3 Shift valve	2nd coast modulator valve	Accumulator control valve	Throttle valve	Lock–up relay valve	Primary regulator valve	No.1 solenoid	No.2 solenoid	Lock–up solenoid	Co accumulator	C2 accumulator	B2 accumulator	B2 accumulator	Manual valve	3–4Shift valve	ECM
Does not move in any forward gear																				
Does not move i n reverse position																				
Does not move in any forward position or reverse position		4		.				3		1								2		
No up–shift	1st → 2nd			1							2	3								
	2nd → 3rd				1						2	3								
	3rd → O/D										2	3							1	
No down–shift	O/D → 3rd											2							1	
	3rd → 2nd				1						2									
	2nd → 1st			1								2								
Shift point too high or too low																				1
Up-shift 3rd → O/D with O/D main switch OFF																				1
Harsh engagement	"N" → "R"														2					
	"N" → "D"																			
	"N" → "L"		1																	
	1st → 2nd ("D" position)						2										3			
	1st → 2nd ("2" position)						2										3			
	1st → 2nd → 3rd → O/D							1		2										
	2nd → 3rd						2								3					
	3rd → O/D						2									3				
	O/D → 3rd													2						
	3rd → 2nd														2					
Slip	Forward & Reverse									1										
	"R" position																			
	1st																			
	2nd																			
	3rd																			
	O/D																			
No engine braking	1st ("L" position)		1																	
	2nd ("2" position)					1														
No kick–down				1	1						2	2							1	
Poor acceleration										2										
No lock–up									2				1							

★ : Refer to A340E, A340F, A340H Automatic Transmission Repair Manual. (Pub. No. RM391 U)

OFF–VEHICLE

See page / Parts name / Trouble		AT1–74	★	★	★	★	★	★	★	★	★	★	★	★	★	★
		Torque converter clutch	Oil pump	O/D brake (Bo)	Second coast brakerB,1	Second brake (B2)	First and reverse brake (BO	O/D direct clutchrCo)	Forward clutch (CI)	Direct clutch (C2)	O/D one–way clutch (FO)	No. 1 one–way clutch (FI)	No. 2 one–way clutch (F2)	Front planetary gear	Rear planetary gear
Does not move in an forward position									1						
Does not move in reverse position							2			1					
Does not move in any forward position reverse position		1	2								5			3	4
No up–shift	1st → 2nd					1						2			
	2nd → 3rd									1					
	3rd → O/D			1											
No down–shift	O/D → 3rd									1					
	3rd → 2nd					1						2			
	2nd → 1st												1		
Harsh engagement	"N" → "R"						2			1					
	"N" → "D"								1						
	"N" → "L"						1								
	1st → 2nd ("D" position)					1						1			
	1st → 2nd ("2" position)				1	2						3			
	2nd → 3rd									1					
	3rd → O/D			1											
	O/D → 3rd							1							
	3rd → 2nd									1					
Slip	Forward & Reverse	1	2								3				
	"R" position						2			1	3				
	1st								1				2		
	2nd					1						2			
	3rd									1					
	O/D			1											
No engine braking	1st ("L" position)						1								
	2nd ("2" position)				1										
Poor acceleration		1	2												
No lock–up		1													

★ : Refer to A340E, A340F, A340H Automatic Transmission Repair Manual. (Pub. No. RM391 U)