

Mechanical System Tests

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 positions.

NOTICE:

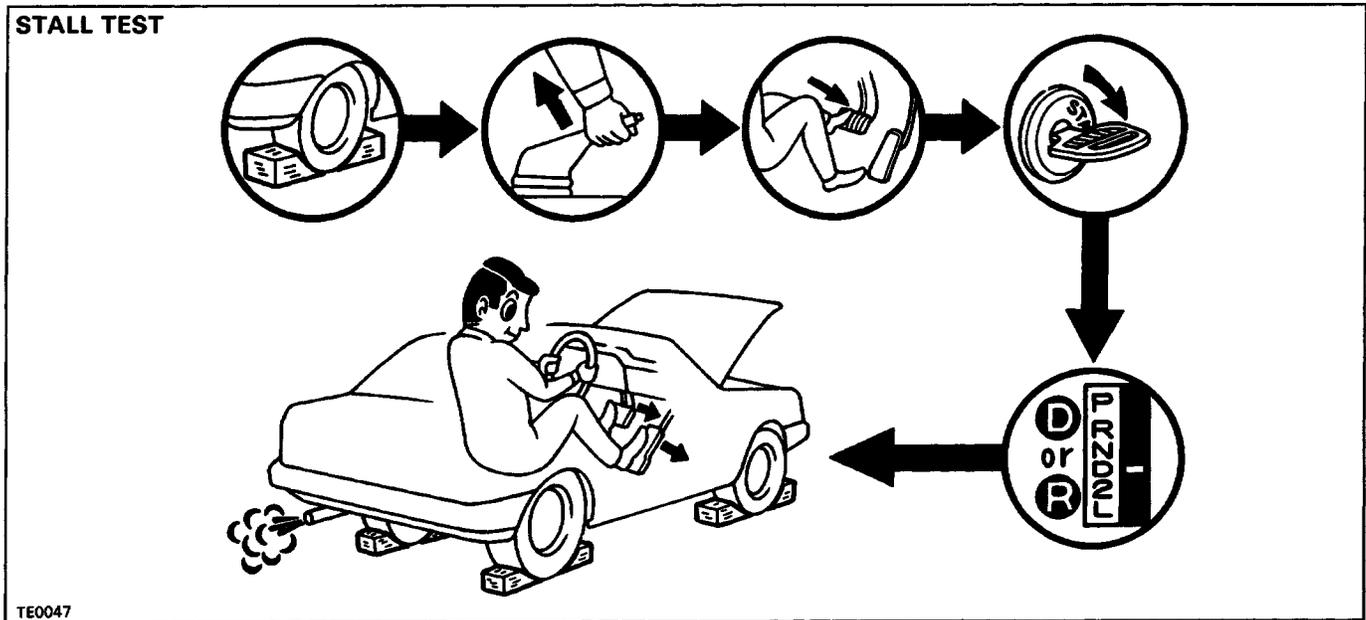
- Perform the test at normal operation fluid temperature (50 – 80°C or 122 – 176°F).
- Do not continuously run this test longer than 5 seconds.
- To ensure safety, conduct this test in a wide, clear, level area, which provides good traction.
- The stall test should always be carried out in pairs. One should observe the conditions 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) Step down strongly on the brake pedal with your left foot.
- (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.
Stall speed: A241 E (5S–FE) rpm 2,500 – 2,800 rpm
A243L (4A–FE) rpm 2,300 – 2,800 rpm
- (g) Perform the same test in R position.

EVALUATION

- (a) If the stall speed is the same for both positions without the front 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 position 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 position 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 position are higher than specified:
 - Line pressure too low
 - Improper fluid level
 - Underdrive brake slipping



TIME LAG TEST

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

NOTICE:

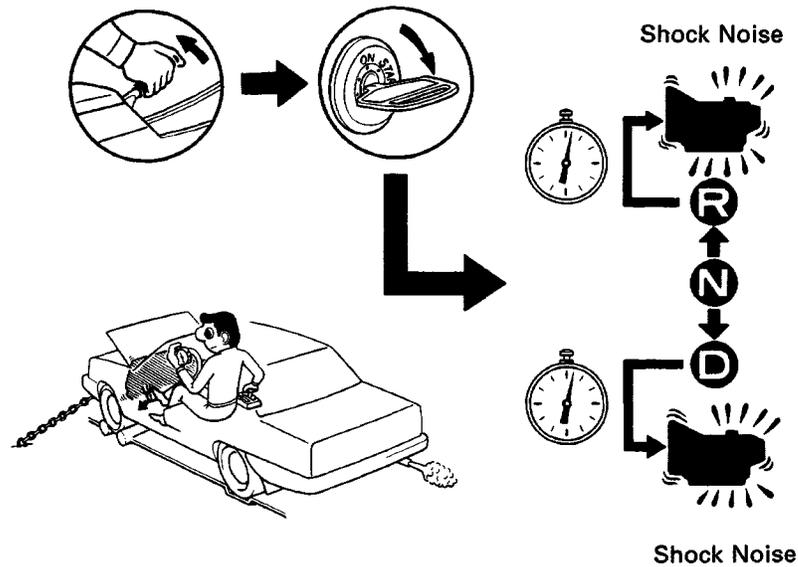
- Perform the test. at normal operating fluid temperature (5p – 80°C or 122 –176°F)
- Be sure to allow one minute interval between tests.
- Make three measurements and take the average value.

MEASURE TIME LAG

- Fully apply the parking brake.
- Start the engine and check the idle speed.
 - Idle speed (N position) : 5S–FE 650 – 750 rpm
 - 4A–FE 750 – 850 rpm
- 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**
- In the same manner, measure the time lag for N → R.
 - Time lag: Less than 1.5 seconds**

EVALUATION

- 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
- If N → R time lag is longer than specified:
 - Line pressure too low
 - Direct clutch worn
 - First and reverse brake worn
 - Underdrive brake worn

TIME LAG TEST

Q00585

HYDRAULIC TEST**PREPARATION**

- Warm up the transaxle fluid.
- 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 – 80°C or 122 – 175°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

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

ATM Type	Line pressure			
	D position		R position	
	Idling	Stall	Idling	Stall
A241 E	373-422	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)
A243L	13.8-4.3, 54 -61y	902-1,049 (9.2-10.7, 131-152)	549-706 (5.6 - 7.2, 80 -102)	1.412 - 1.667 (14.4 - 17.0, 205 - 242)

If the measured pressure are not up to specified values, recheck the throttle cable adjustment and perform the test.

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:

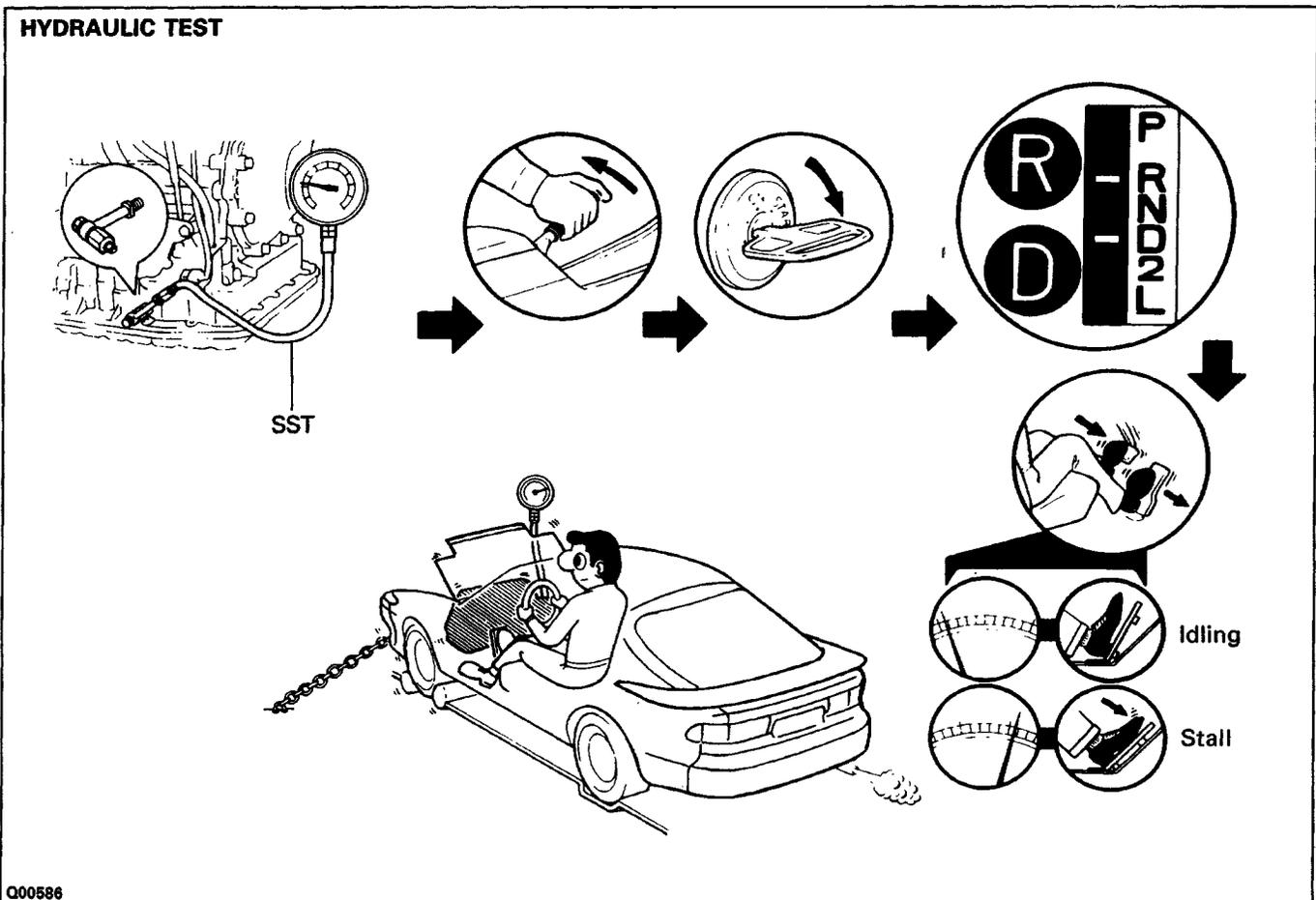
- Throttle cable out of adjustment
- Throttle valve defective
- Regulator valve defective
- Oil pump defective
- Underdrive one-way clutch not operating properly

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

- D position circuit fluid leakage
- Forward clutch defective
- Underdrive one-way clutch not operating properly

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

- R position circuit fluid leakage
- Direct clutch defective
- First and reverse brake defective
- Underdrive one-way clutch not operating properly.



Road Test (A241 E)

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

1. D POSITION TEST IN NORM AND PWR PATTERN POSITIONS

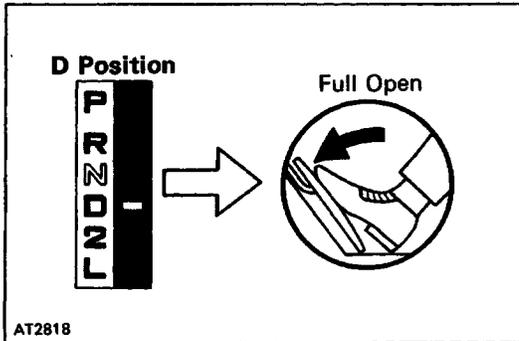
Shift into the D position and hold the accelerator pedal constant at the full throttle valve opening position.

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 AT-46)
Conduct a test under both Normal and Power patterns.

HINT:

- There is no O/D up–shift and lock–up when the engine coolant temp. is below 53°C (127°F).
- When the engine 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.

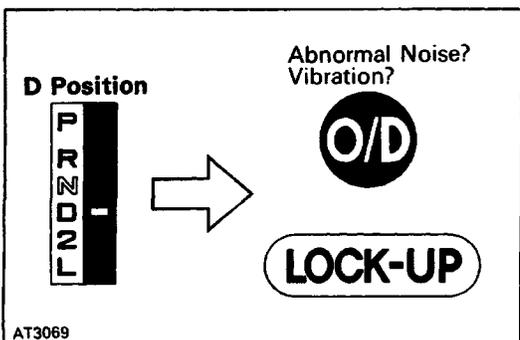
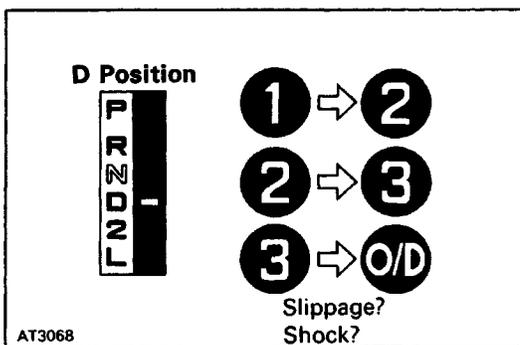
EVALUATION

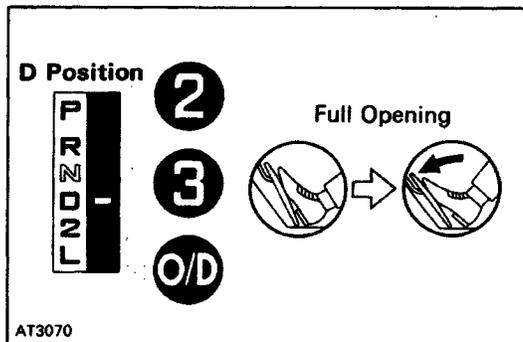
If the shock is excessive:

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

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

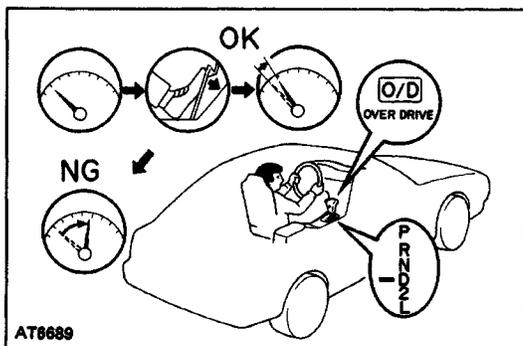
HINT: The check for the cause of abnormal noise and vibration must be made with extreme care as it could also be due to loss of balance in the drive shaft, tire torque converter, etc.





(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. (See page AT-45)

(e) Check for abnormal shock and slip at kick-down.

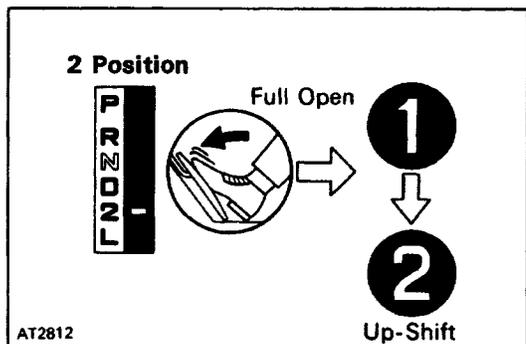


(f) Check for the lock-up mechanism.

(1) Drive in D position, O/D gear, at a steady speed (lock-up ON) of about 66 – 70 km/h (41 – 43 mph) (NORM).

(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 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 it shown on the automatic shift schedule. (See page AT-45)

HINT:

- To prevent overrun, the transmission shifts up into 3rd gear at around 162 km/h (101 mph).

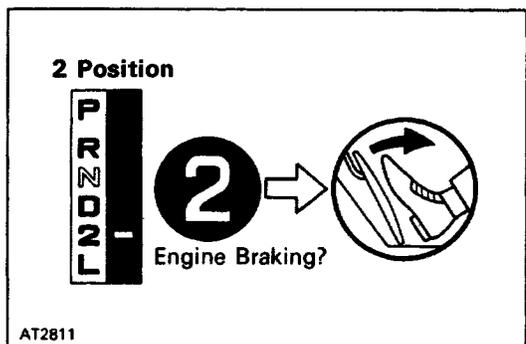
- In position 2, there will be no lock-up to 2nd gear.

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

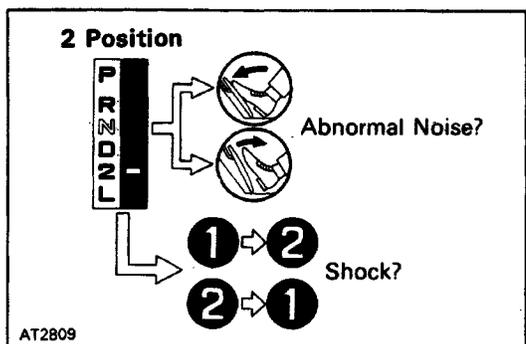
EVALUATION

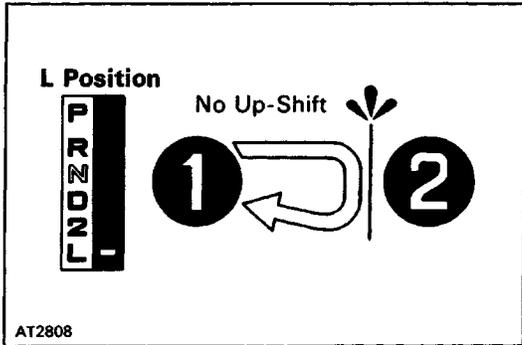
If there is no engine braking effect:

- Second coast brake is defective



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

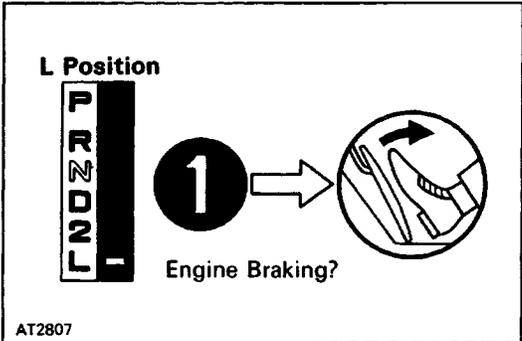




3. L POSITION TEST

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

HINT: To prevent overrun, the transmission up-shifts into 2nd gear at around 53 km/h (33 mph).

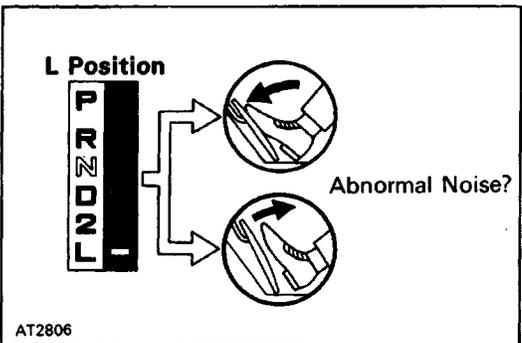


(b) While running in the L position, release the accelerator pedal and check the engine braking effect.

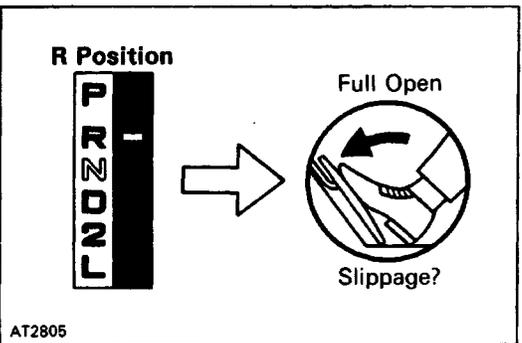
EVALUATION

If there is no engine braking effect:

- First and reverse brake is defective .

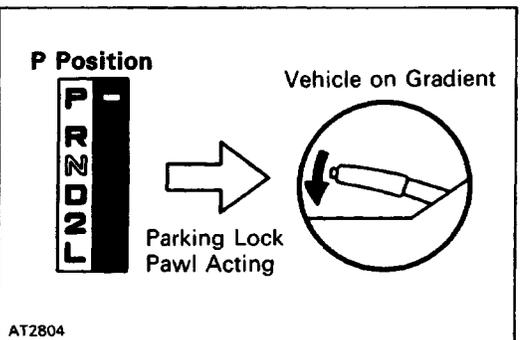


(c) Check for abnormal noise during acceleration and deceleration.



4. R POSITION TEST

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



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.

Road Test (A243L)

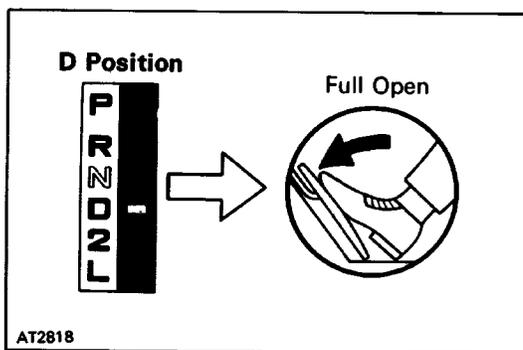
NOTICE: Perform this test at normal fluid temperature (50 – 80°C or 122 – 176°F).

INSPECTION OF AUTOMATIC SHIFT POINT

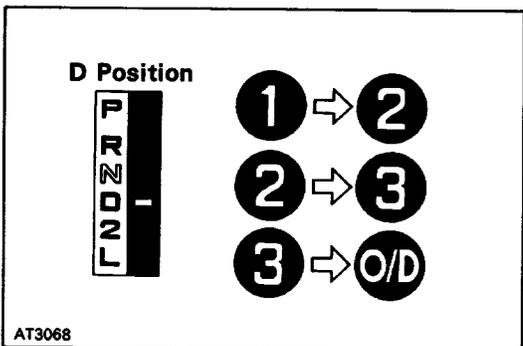
1. D POSITION TEST

Shift into D position and while driving with the accelerator pedal held constant at the throttle valve full open, check on the following points:

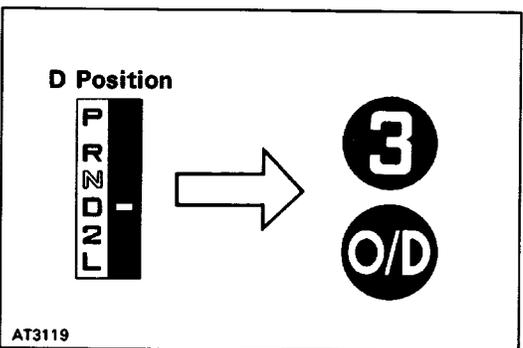
- (a) Check to see that the 1–2, 2–3 and 3–0/D up–shifts take place and also that the shift points conform to those shown in the automatic shift schedule (See page AT-45 or 46)



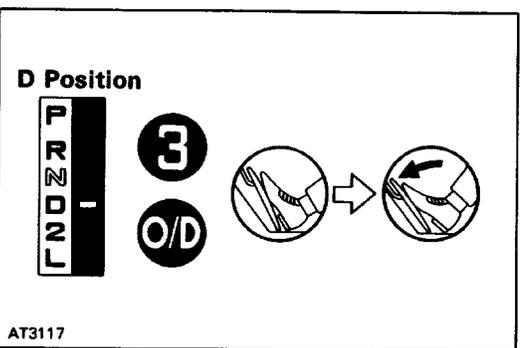
AT2818



AT3068



AT3119



AT3117

EVALUATION

- (1) If there is no 1–2 up–shift:
- Governor valve is defective.
 - 1–2 shift valve stuck.
- (2) If there is no 2–3 up–shift:
- 2–3 shift valve stuck.
- (3) If there is no 3–0/D up–shift (throttle valve openings less than 86%):
- 3–4 shift valve is stuck.
 - Solenoid valve or circuit defective.
- (4) If the shift point is defective:
- Throttle cable out–of adjustment.
 - Throttle valve, 1–2 shift valve, 2–3 shift valve, 3–4 shift valve, etc. defective.
- (b) In the same manner, check the shock and the slip at 1–2, 2–3 and 3–0/D up–shifts.

EVALUATION:

If the shock is severe:

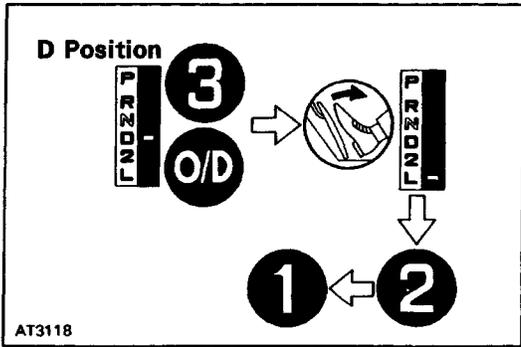
- Line pressure is too high.
 - Accumulator is defective.
 - Check ball is defective.
- (c) Run in the 3rd gear or O/D of D position and check the abnormal noise and vibration.
HINT: Check for cause of abnormal noise and vibration must be made with extreme care as they could also be due to unbalance in the drive shaft, differential, tires, torque converter, etc.
- (d) While running in the 3rd gear or O/D of D position, check to see that the possible kick–down vehicle speed limits for the 3–1, 3–2, 0/D–3 and 0/D–2 kick–downs conform to those indicated in the automatic shift schedule.

EVALUATION:

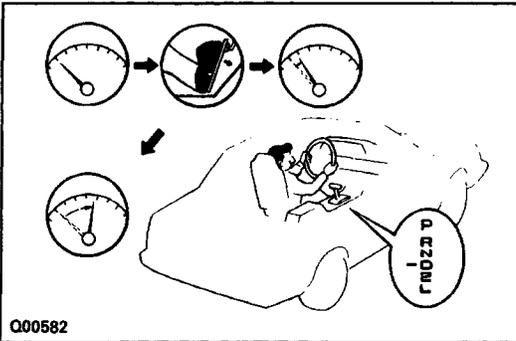
If the possible kick–down vehicle speed limit is defective:

- Throttle cable out–of adjustment.
- Throttle valve, 1–2 shift valve, 2–3 shift valve, 3–4 shift valve, etc. defective.

(e) Check for abnormal shock and slip at kick–down.

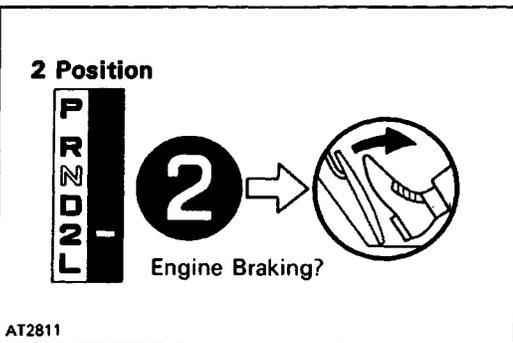


(f) While running more than 46 km/h (29 mph) in the O/D of D position, release your foot from the accelerator pedal and shift into L position. Then check to see if the 2-1 down-shift point conform to those indicated in the automatic shift schedule. (See page AT-45 or 46)



2. INSPECT LOCK-UP MECHANISM

- (a) Drive in D position, at a steady speed (Lock-up ON) or about 75 km/h (47 mph) (A243L).
- (b) Lightly depress the accelerator pedal and check that the engine speed does not change abruptly. If there is a big jump in engine rpm, there is no lock-up.

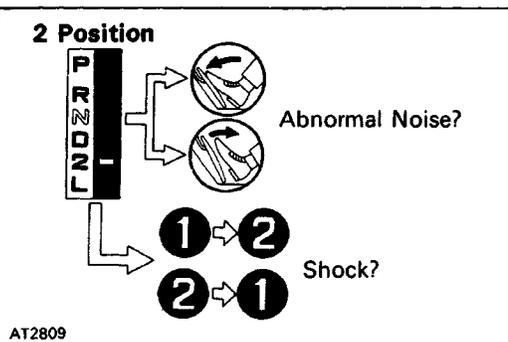


3. 2 POSITION TEST

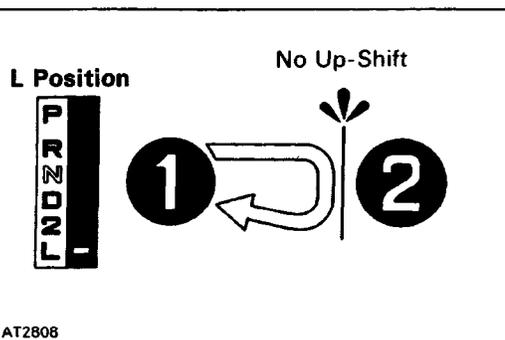
- (a) While running in 2 position, 2nd gear, release the accelerator pedal and check the engine braking effect.

EVALUATION

If there is no engine braking effect:
9 Second coast brake is defective:

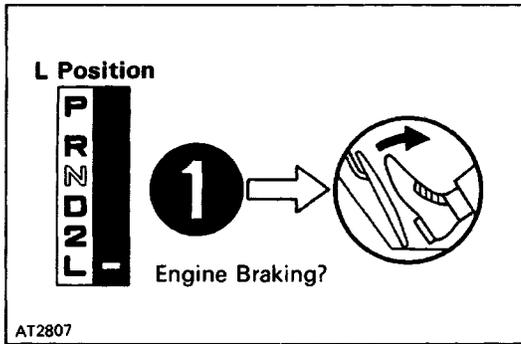


- (b) Check the abnormal noise during acceleration and deceleration.
- (c) Check the shock at up-shift and down-shift.



4. L POSITION TEST

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

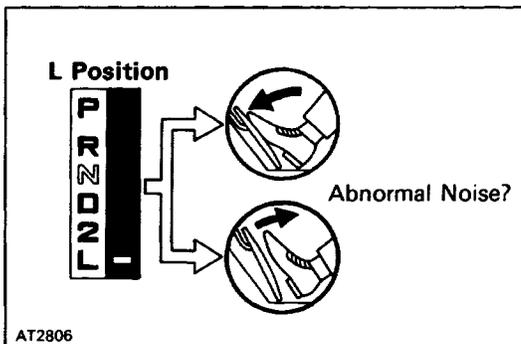


(b) While running in L position, release the accelerator pedal and check the engine braking effect.

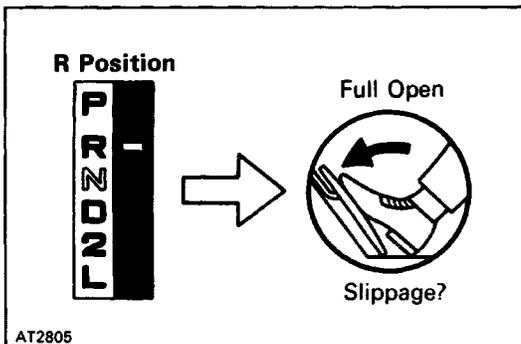
EVALUATION

If there is no engine braking effect:

- First and reverse brake defective:

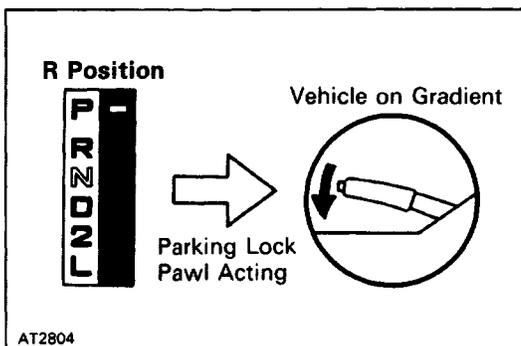


(c) Check the abnormal noise during acceleration and deceleration.



5. R POSITION TEST

Shift into R position and, while running at full throttle, check the slippage.



6. P POSITION TEST

Stop the vehicle on a gradient (more than 9%) and, after shifting into P position, release the parking brake. Then check to see that the parking lock pawl prevents the vehicle from moving.