

Mechanical System Tests

STALL TEST

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

NOTICE:

- Perform the test at normal operating 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.

MEASURE STALL SPEED

- (a) Check the four wheels and fully apply the parking brake.
- (b) Mount an engine tachometer.
- (c) Keep your left foot pressed firmly on the brake pedal, and start the engine.
- (d) Shift into the D position. Step all the way down on the accelerator pedal with your right foot. Quickly read the highest engine RPM at this time.

Stall speed: 1,900 ±150 RPM

- (e) Perform the same test in the R position.

EVALUATION

- (a) If the engine 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 at the D position is higher than specified:

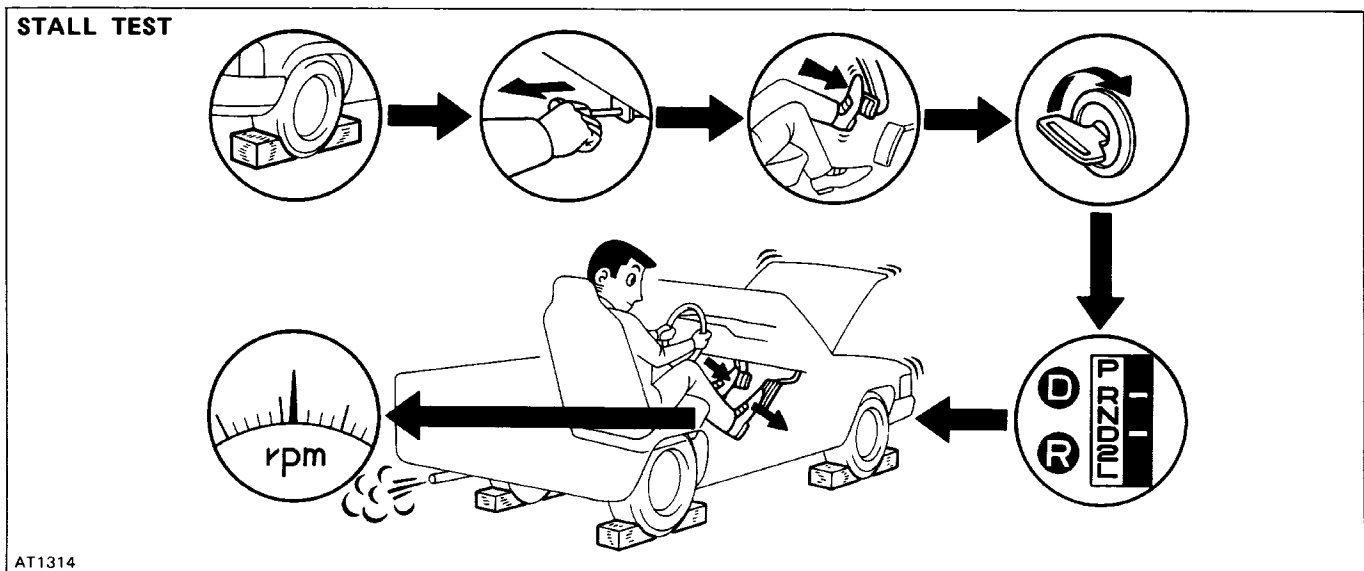
Line pressure too low
 Front clutch slipping
 No.2 one-way clutch not operating properly
 O/D one-way clutch not operating properly

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

Line pressure too low
 Rear clutch slipping
 No.3 brake slipping
 O/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



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 O/D direct clutch, front clutch, rear clutch and No.3 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

- Fully apply the parking brake.
- Start the engine and check the idle speed.

Idle speed: 750 RPM

(N position)

- 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.

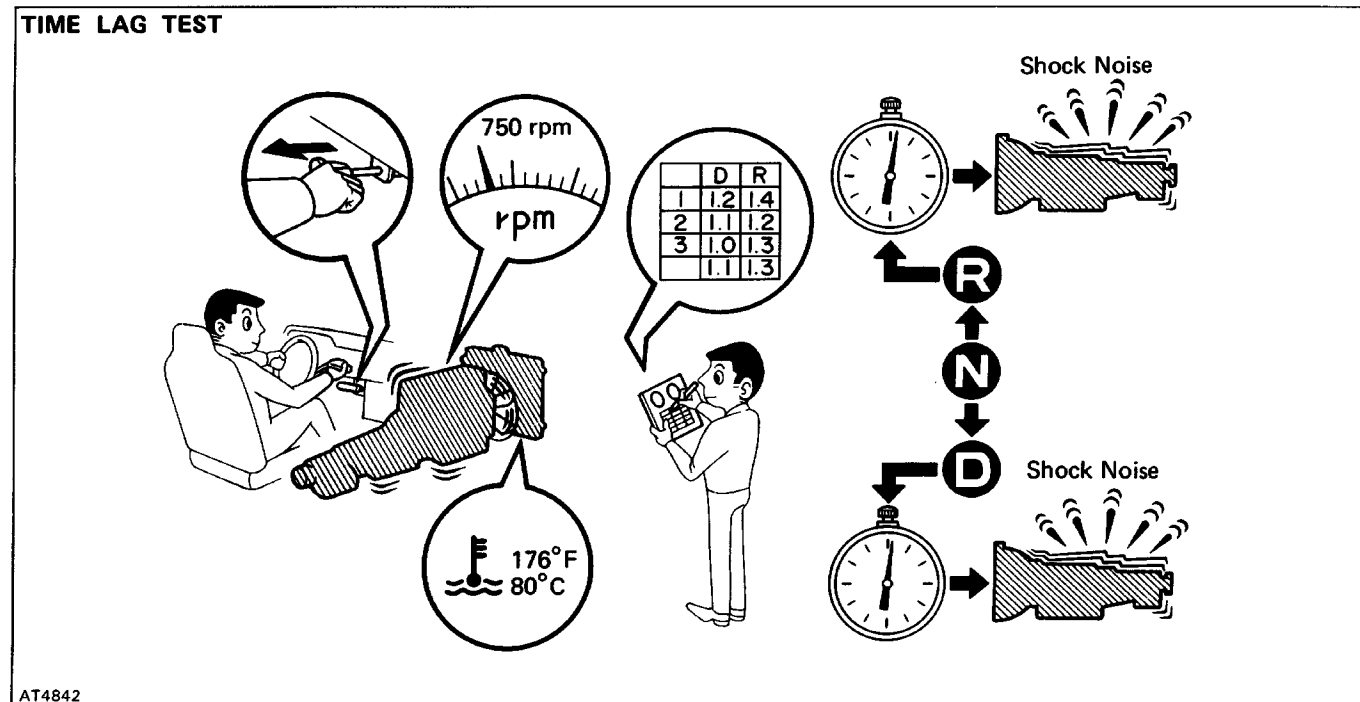
Time lag: Less than 1.2 seconds

- In 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
 - Front clutch worn
 - O/D one-way clutch not operating properly
- If N–R time lag is longer than specified:
 - Line pressure too low
 - Rear clutch worn
 - No.3 brake worn
 - O/D one-way clutch not operating properly



HYDRAULIC TEST**1. PREPARATION**

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

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

2. MEASURE LINE PRESSURE

- (a) Fully apply the parking brake and chock the four wheels.
- (b) Start the engine and check the idle speed.
- (c) Shift into the D position, keep your left foot pressed firmly on the brake pedal and while manipulating the accelerator pedal with the right foot, measure the line pressure at the engine speeds specified in the table.
- (d) In the same manner, perform the test in the R position.

kPa (kgf/cm²,psi)

D position		R position	
Idling	Stall	Idling	Stall
441 – 500 (4.5 – 5.1, 64 – 73)	990 – 1,167 (10.1 – 11.9, 144 – 169)	667 – 745 (6.8 – 7.6, 97 – 108)	1,471 – 1,863 (15.0 – 19.0, 213 – 270)

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

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

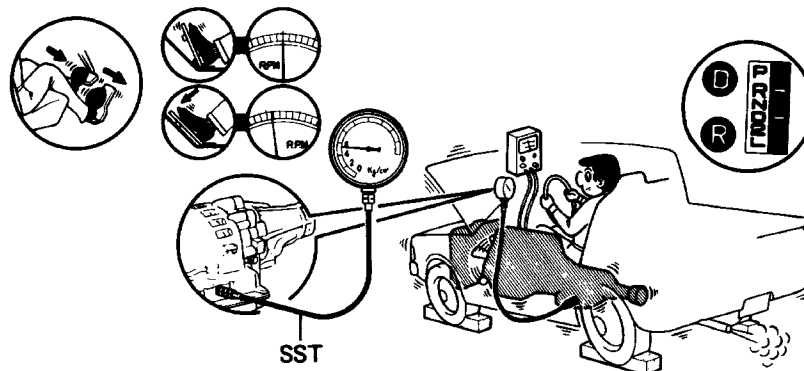
- D position circuit fluid leakage
- Front clutch defective

- (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

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

- R position circuit fluid leakage
- No.3 brake defective
- Rear clutch defective

LINE PRESSURE TEST

3. MEASURE GOVERNOR PRESSURE

- (a) Check the parking brake to see that it is not applied.
- (b) Start the engine.
- (c) Shift into the D position and measure the governor pressure at the speeds specified in the table.

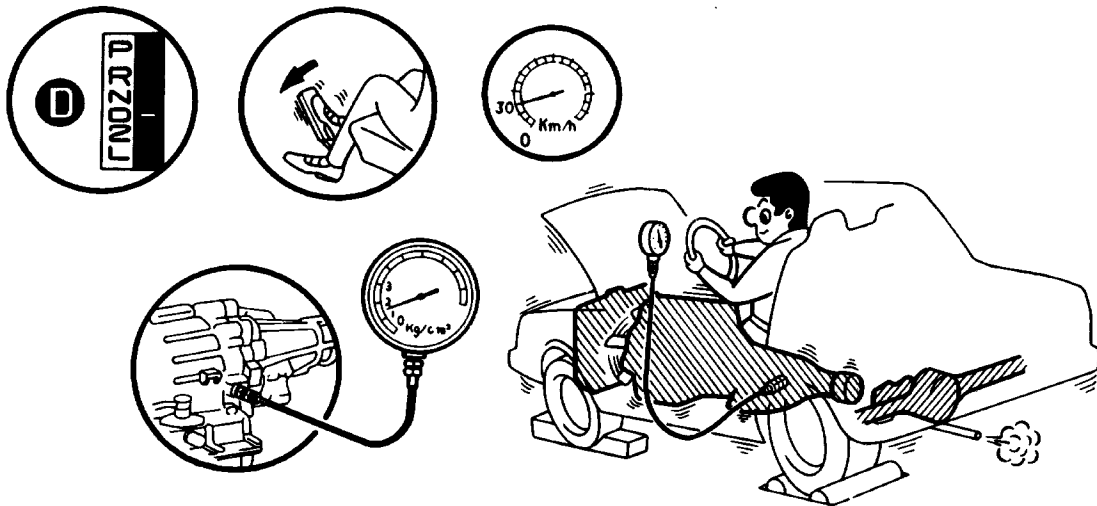
EVALUATION

If governor pressure is defective:

- Line pressure defective
- Fluid leakage in governor pressure circuit
- Governor valve operation defective

Output shaft	Vehicle speed (Reference only)		Governor pressure
	P195175R14	P205/75R 14	
1,000 RPM	32 km/h (20 mph)	32 km/h (20 mph)	88 – 147 kPa (0.9 – 1.5 kgf/cm ² , 13 – 21 psi)
1,800 RPM	57 km/h (35 mph)	58 km/h (36 mph)	157 – 216 kPa (1.6 – 2.2 kgf/cm ² , 23 – 31 psi)
3,500 RPM	111 km/h (69 mph)	113 km/h (70 mph)	402 – 520 kPa (4.1 – 5.3 kgf/cm ² , 58 – 75 psi)

GOVERNOR PRESSURE TEST



ROAD TEST

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

1. D POSITION TEST

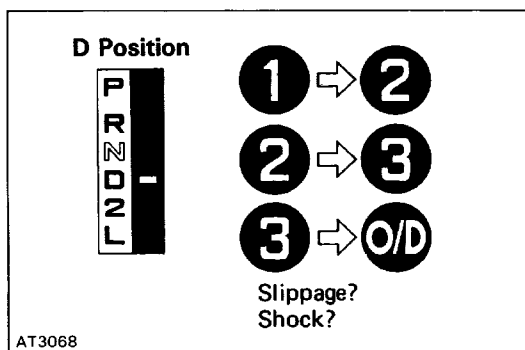
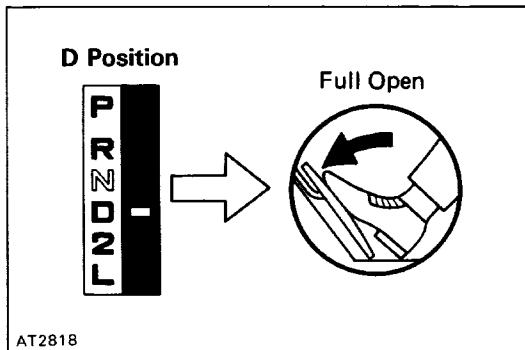
Shift into the D position and while driving with the accelerator pedal held constant at the throttle valve full open and the O/D switch ON, check on the following points:

(a) Check to see that the 1–2, 2–3 and 3–O/D up-shifts take place and also that the shift points conform to those shown in the automatic shift schedule.

HINT: 3–O/D up-shift does not take place with a throttle valve opening of more than 86% or engine coolant temperature below 50°C (122°F).

EVALUATION

- (1) If there is no 1–2 up-shift:
 - Governor valve is defective
 - 1–2 shift valve is stuck
- (2) If there is no 2–3 up-shift:
 - 2–3 shift valve is stuck
- (3) If there is no 3–O/D up-shift (throttle valve opening 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., are defective

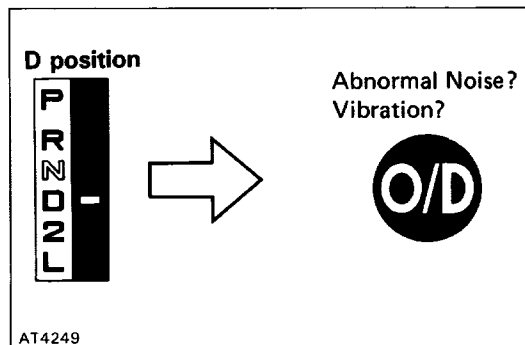


- (b) In the same manner, check the shock and slip at 1–2, 2–3 and 3–O/D up-shifts.

EVALUATION

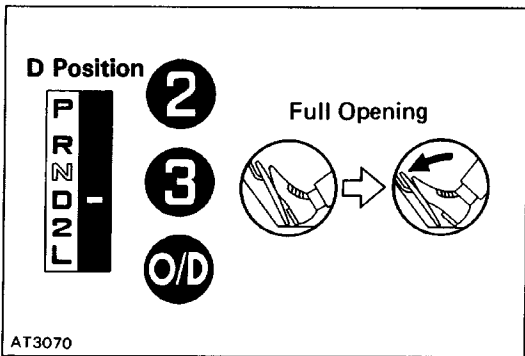
If the shock is excessive:

- Line pressure is too high
- Accumulator is defective



- (c) Run in the 3rd gear or O/D of D position and check for abnormal noise and vibration.

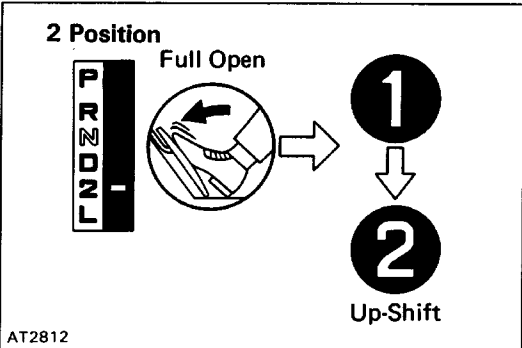
HINT: Check for cause of abnormal noise and vibration must be made with extreme care as they could also be due to unbalance in the propeller shaft, differential, tires, torque converter clutch, etc.



(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.

HINT: O/D-3 kick-down is always possible with a throttle valve opening of more than 86%.

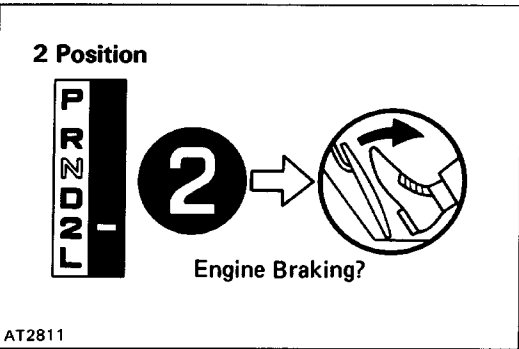
(e) Check for abnormal shock and slip at kick-down.



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, 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.

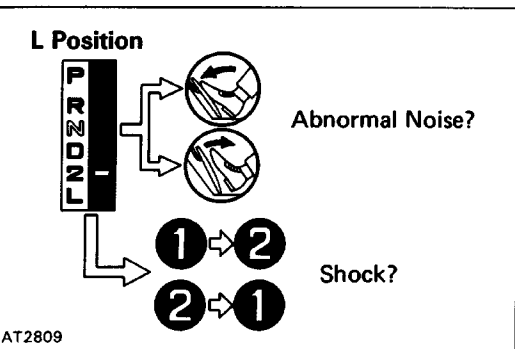


(b) While running in the 2 position and 2nd gear, release the accelerator pedal and check the engine braking effect.

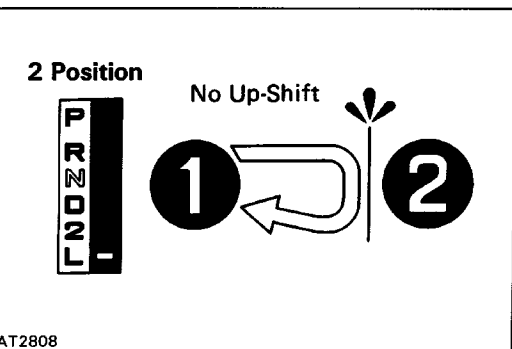
EVALUATION

If there is no engine braking effect:

- No. 1 brake is defective

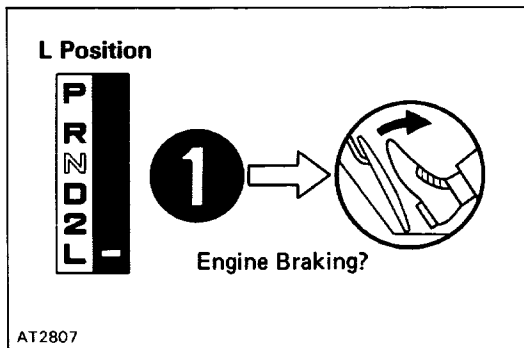


(c) Check for abnormal noise at acceleration and deceleration, and for shock at up-shift and down-shift.



3. L POSITION TEST

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

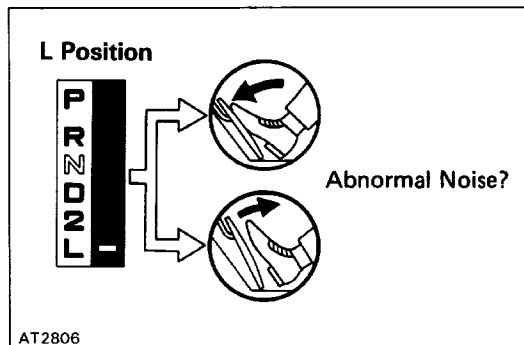


- (b) While running in the L position, release the accelerator pedal and check the engine braking effect.

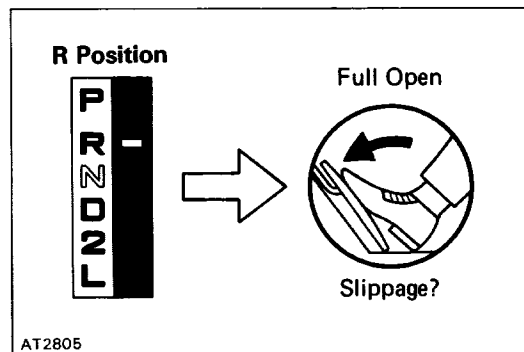
EVALUATION

If there is no engine braking effect:

- No-3 brake is defective

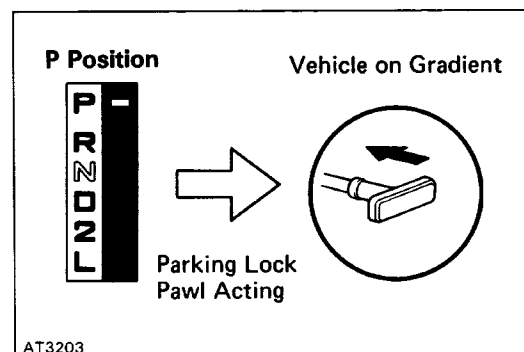


- (c) Check for abnormal noise during acceleration and deceleration.



4. R POSITION TEST

Shift into the R position and, while starting at wide open 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.