

Mechanical System Tests

STALL TEST

The object 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 ranges.

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

- Chock the front and rear wheels.
- Mount an engine tachometer.
- Fully apply the parking brake.
- Step down strongly on the brake pedal with your left foot.
- Start the engine.
- Shift into the D range. Step all the way down on the accelerator pedal with your right foot. Quickly read highest engine rpm at this time.

Stall speed: 2L 2100 ± 150 rpm
 3L, 1RZ, 2RZ 2250 ± 150 rpm
 2RZ-E 2300 ± 150 rpm

- Perform the same test in the R range.

EVALUATION

- If the engine speed is the same for both ranges 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 could be faulty.

- If the stall speed at the D range is higher than specified:

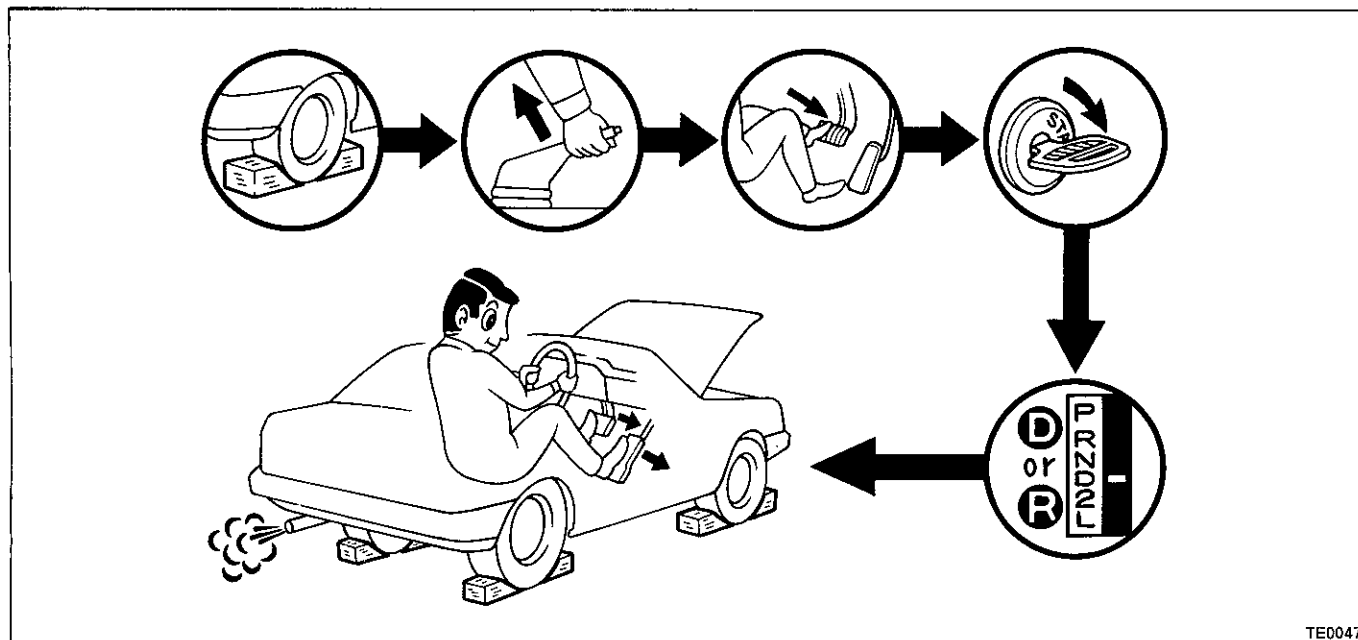
- Line pressure too low
- Forward clutch slipping
- No.2 one-way clutch not operating properly
- O/D one-way clutch not operating properly

- If the stall speed at the R range is higher than specified:

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

- If the stall speed in both R and D ranges are higher than specified:

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



TIME LAG TEST

If 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 (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: All Models 800 rpm

(N range)

- Shift the shift lever from N to D range. Using a stop watch, measure the time it takes from shifting the lever until the shock is felt.

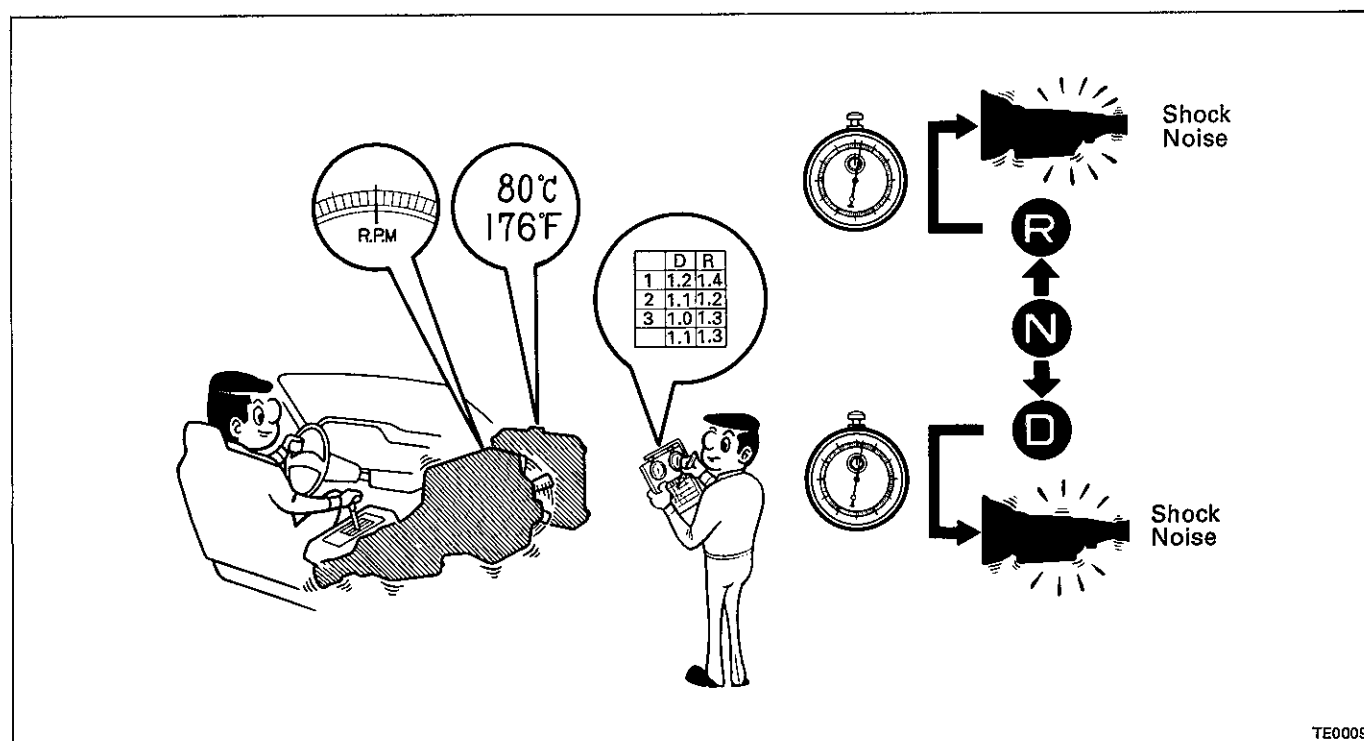
Time lag: Less than 1.2 seconds

- 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
 - Forward clutch worn
 - O/D 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
 - O/D one-way clutch not operating properly



HYDRAULIC TEST

1. PREPARATION

- Warm up the transmission fluid.
- Chock the front wheels.
- Jack up rear of the vehicle and support it on stands.
- Remove the transmission case test plugs and mount hydraulic pressure gauges.

SST 09992-00094 (Oil pressure gauge)

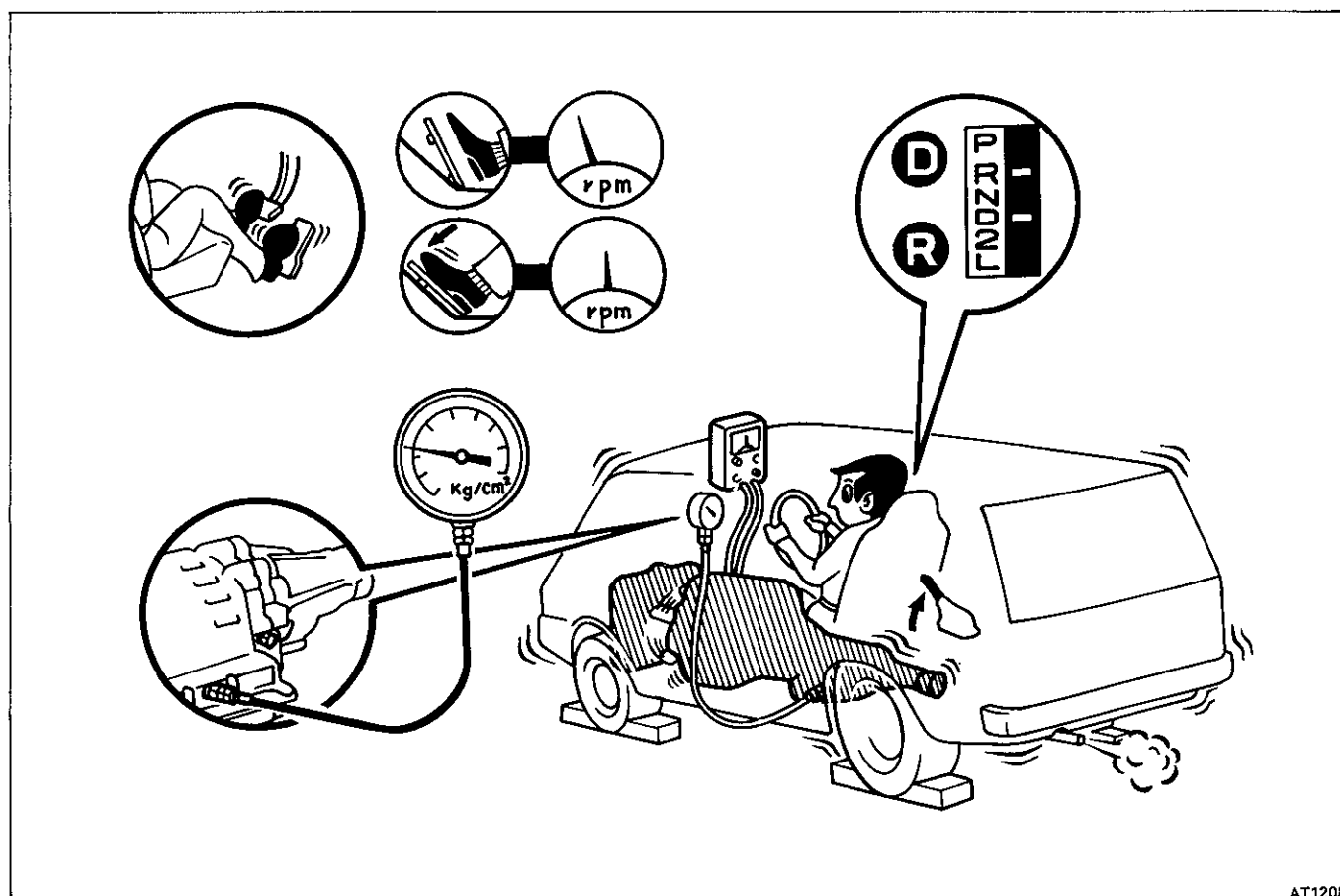
NOTICE: Perform the test at normal operation fluid temperature (50 – 80°C or 122 – 176°F).

2. MEASURE LINE PRESSURE

- Fully apply the parking brake and chock the four wheels.
- Start the engine and check the idle speed.
- Shift into the D range, step down strongly on the brake pedal with your left foot and while manipulating the accelerator pedal with the right foot, measure the line pressure at the engine speeds specified in the table.
- In the same manner, perform the test in the R range.

kg/cm² (psi, kPa)

Engine	D range		R range	
	Idling	Stall	Idling	Stall
1RZ 2RZ	3.6 – 4.1 (51 – 58, 353 – 402)	10.5 – 12.2 (149 – 173, 1,030 – 1,196)	5.1 – 5.8 (72 – 82, 500 – 569)	14.5 – 18.2 (206 – 258, 1,422 – 1,785)
2L 3L	3.5 – 4.4 (50 – 62, 343 – 431)	11.2 – 13.2 (159 – 187, 1,098 – 1,294)	4.6 – 6.7 (65 – 95, 451 – 657)	15.0 – 19.0 (213 – 270, 1,471 – 1,863)
2RZ-E	4.5 – 5.1 (64 – 72, 441 – 500)	10.1 – 11.9 (143 – 169, 990 – 1,167)	6.8 – 7.6 (97 – 108, 667 – 745)	15.0 – 19.0 (213 – 270, 1,471 – 1,863)



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

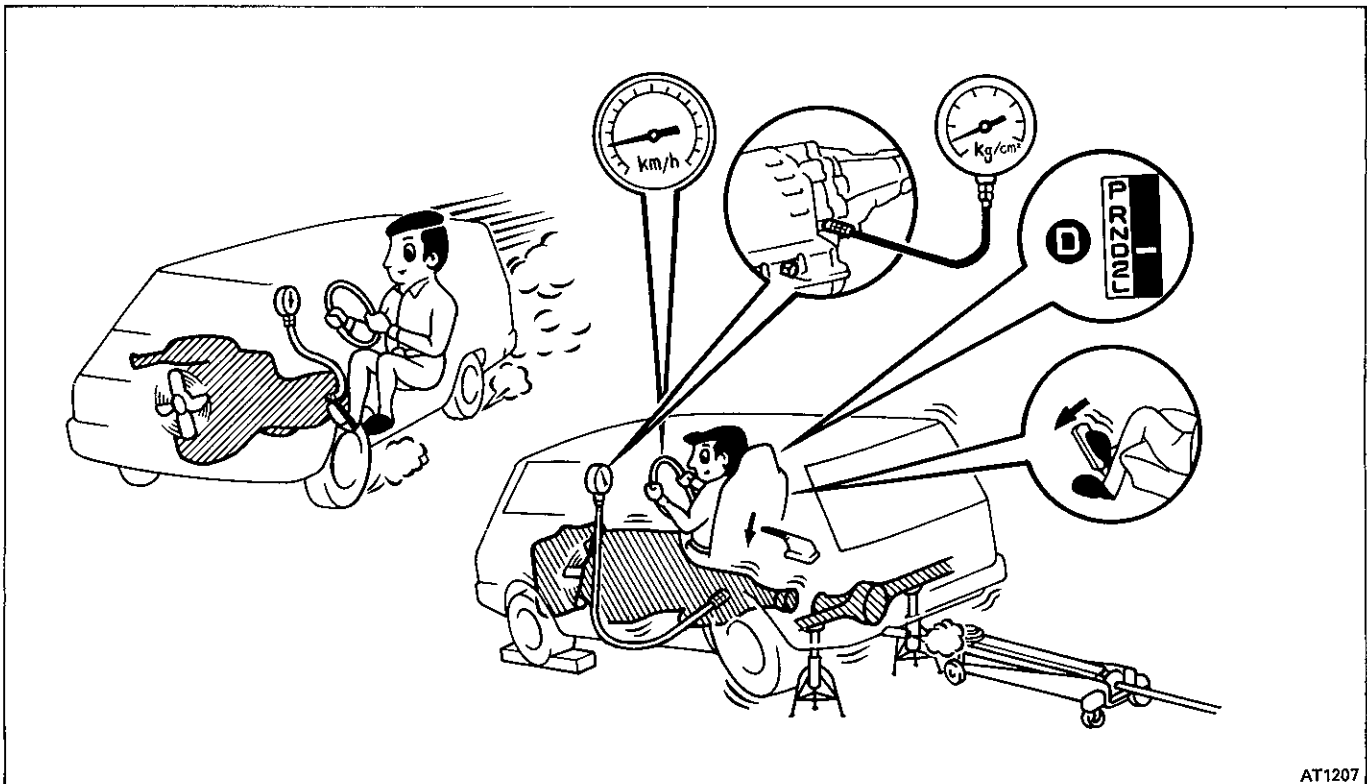
EVALUATION

- (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
 - O/D direct clutch defective
- (c) If pressure is low in the D range only:
- D range circuit fluid leakage
 - Forward clutch defective
- (d) If pressure is low in the R range only:
- R range circuit fluid leakage
 - First and reverse brake defective
 - Direct clutch defective

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 range and measure the governor pressure at the speeds specified in the table.

NOTICE: Measurement can be made with the 1,000 rpm test, but if tests are to be made at 1,800 rpm and 3,500 rpm, it would be safer to test on a road or chassis dynamometer because an onstand test could be hazardous.



Engine	Output shaft	Vehicle speed (Reference only)		Governor pressure
2L 3L	1,000 rpm	24km/h	(15 mph)	1.0 – 1.5 kg/cm ² (14 – 21 psi, 98 – 147 kPa)
	1,800 rpm	44km/h	(27 mph)	1.9 – 2.4 kg/cm ² (27 – 34 psi, 186 – 235 kPa)
	3,500 rpm	85km/h	(53 mph)	4.6 – 5.1 kg/cm ² (65 – 72 psi, 451 – 500 kPa)
1RZ	1,000 rpm	24km/h	(15 mph)	1.4 – 1.9 kg/cm ² (20 – 27 psi, 137 – 186 kPa)
	1,800 rpm	44km/h	(27 mph)	2.2 – 2.6 kg/cm ² (31 – 37 psi, 216 – 255 kPa)
	3,500 rpm	85km/h	(53 mph)	4.5 – 5.3 kg/cm ² (64 – 75 psi, 441 – 520 kPa)
2RZ 2RZ-E	1,000 rpm	26km/h	(16 mph)	1.4 – 1.8 kg/cm ² (20 – 26 psi, 137 – 177 kPa)
	1,800 rpm	47km/h	(29 mph)	2.4 – 2.8 kg/cm ² (34 – 40 psi, 235 – 275 kPa)
	3,500 rpm	91km/h	(56 mph)	5.1 – 5.9 kg/cm ² (72 – 84 psi, 500 – 579 kPa)

EVALUATION

If governor pressure is defective:

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

ROAD TEST

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

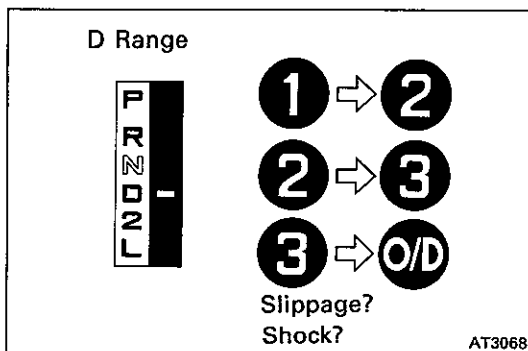
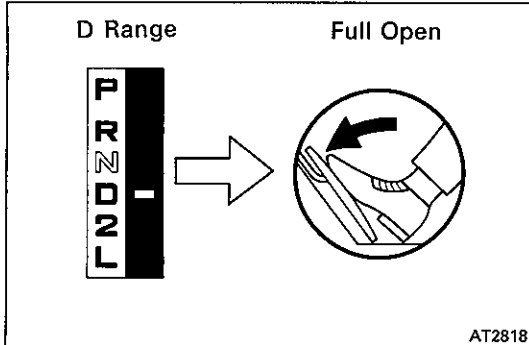
1. D RANGE TEST

Shift into the D range 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 schedule. (See page AT-27)

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

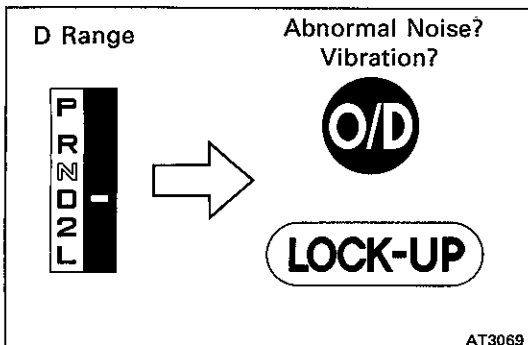


- (b) In the same manner, check the shock and slip at 1 → 2, 2 → 3, 3 → O/D up-shifts.

EVALUATION:

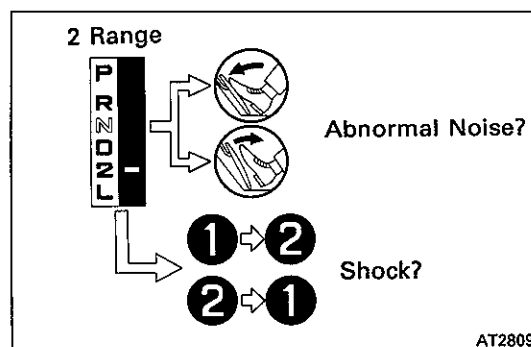
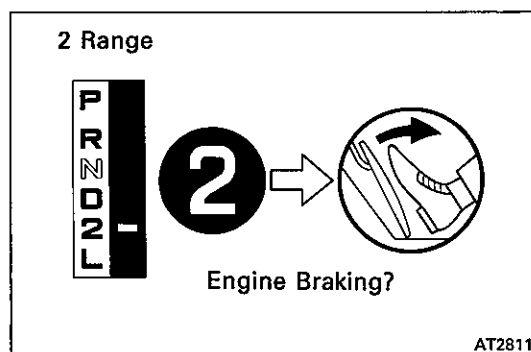
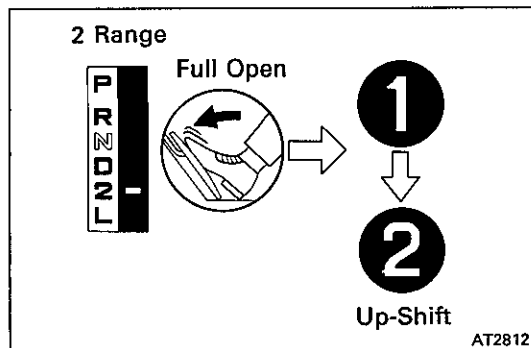
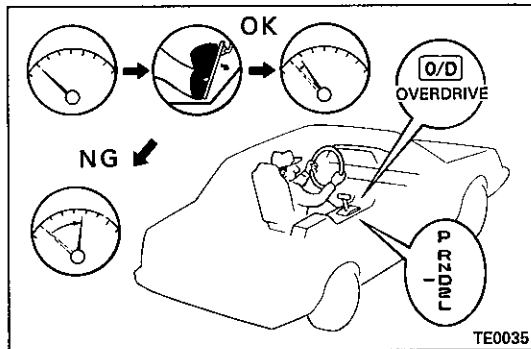
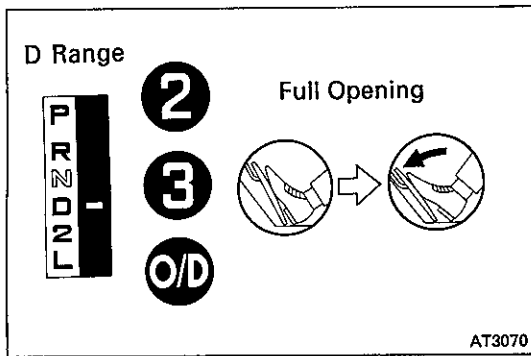
If the shock is excessive:

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



- (c) Run in the 3rd gear or O/D of D range 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, 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 AT-27).
- (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).
- (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, 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-27).

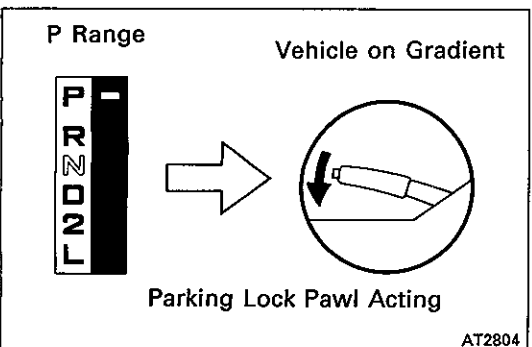
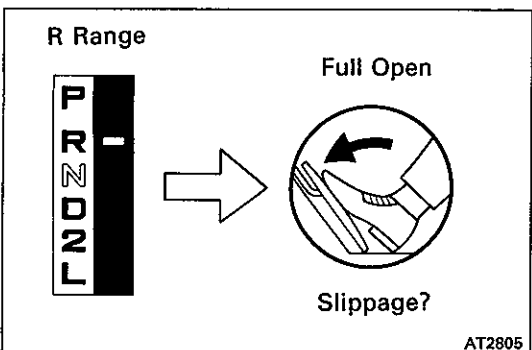
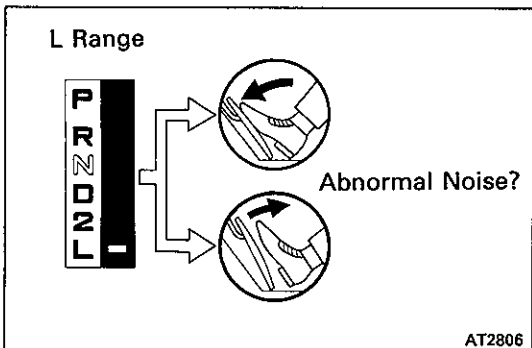
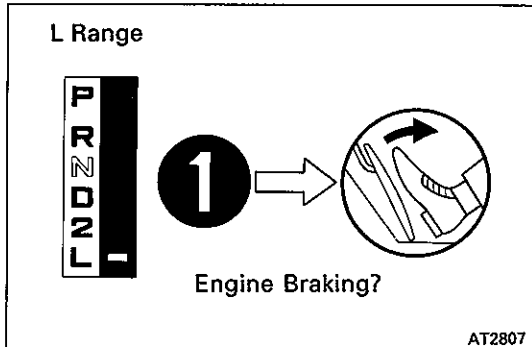
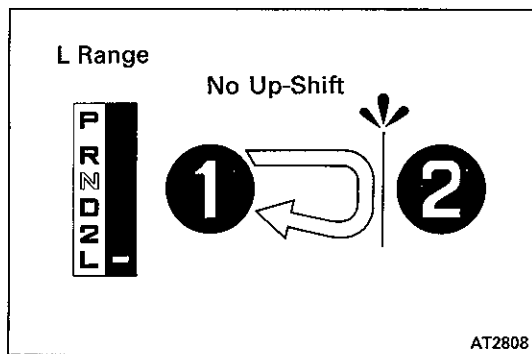
- (b) While running in the 2 range and 2nd gear, release the accelerator pedal and check the engine braking effect.

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.

- (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 the R range and, while starting at full throttle, check for slipping.

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.