

3. Performance Test

A: STALL TEST

1. GENERAL

The stall test is of extreme importance in diagnosing the condition of the automatic transmission and the engine. It should be conducted to measure the engine stall speeds in all shift ranges except the P and N ranges.

Purposes of the stall test

- 1) To check the operation of the automatic transmission clutch.
- 2) To check the operation of the torque converter.
- 3) To check engine performance.

2. TEST METHODS

Preparations before test

- ① Check that throttle valve opens fully.
 - ② Check that engine oil level is correct.
 - ③ Check that coolant level is correct.
 - ④ Check that ATF level is correct.
 - ⑤ Check that differential gear oil level is correct.
 - ⑥ Increase ATF temperature to 60 to 80°C (140 to 176°F) by idling the engine for approximately 30 minutes (with select lever set to "N" or "P").
- 1) Install an engine tachometer at a location visible from the driver's compartment and mark the stall speed range on the tachometer scale.
 - 2) Place the wheel chocks at the front and rear of all wheels and engage the parking brake.
 - 3) Move the manual linkage to ensure it operates properly, and shift the select lever to the D range.
 - 4) While forcibly depressing the foot brake pedal, gradually depress the accelerator pedal until the engine operates at full throttle.

- 5) When the engine speed is stabilized, read that speed quickly and release the accelerator pedal.
- 6) Shift the select lever to Neutral, and cool down the engine by idling it for more than one minute.
- 7) Record the stall speed.
- 8) Perform the stall tests with the select lever in the 3, 2 and R ranges.

a. Do not continue the stall test for MORE THAN FIVE SECONDS at a time (from closed throttle, fully open throttle to stall speed reading). Failure to follow this instruction causes the engine oil and ATF to deteriorate and the clutch and brake band to be adversely affected.

Be sure to cool down the engine for at least one minute after each stall test with the select lever set in the P or N range and with the idle speed lower than 1,200 rpm.

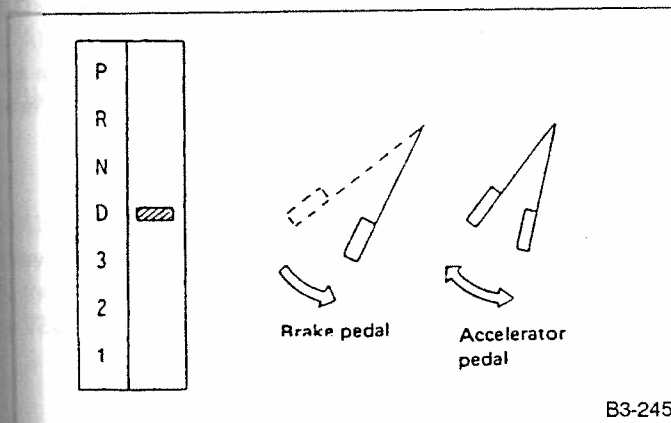
b. If the stall speed is higher than the specified range, attempt to finish the stall test in as short a time as possible, in order to prevent the automatic transmission from sustaining damage.

Specifications

Stall speed (at sea level):	
Non-TURBO	2,550 — 2,950 rpm
TURBO	2,850 — 3,250 rpm

3. EVALUATION

Stall speed (at sea level)	Position	Cause
Less than specifications	D, R, 2	<ul style="list-style-type: none"> • Throttle valve not fully open • Erroneous engine operation • Torque converter's one-way clutch slipping
Greater than specifications	D only	<ul style="list-style-type: none"> • Line pressure too low • Forward clutch slipping • One-way clutch (1-2) malfunctioning • One-way clutch (3-4) malfunctioning
	R only	<ul style="list-style-type: none"> • Line pressure too low • Reverse clutch slipping • Low & reverse brake slipping
	2 only	<ul style="list-style-type: none"> • Line pressure too low • Forward clutch slipping • Brake band slipping
	R, D, 2	<ul style="list-style-type: none"> • Line pressure too low • ATF insufficient



B3-245

Fig. 117

B: TIME LAG TEST**1. GENERAL**

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 forward clutch, reverse clutch, low & reverse brake, forward one-way clutch and low one-way clutch.

CAUTION:

(a) Perform the test at normal operation fluid temperature (60 to 80°C or 140 to 176°F).

(b) Be sure to allow a one minute interval between tests.

(c) Make three measurements and take the average value.

2. TEST METHODS

1) Fully apply the parking brake.

2) Start the engine.

Check idling speed (A/C OFF)

"N" range: 700± 100 rpm

3) 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

4) In same manner, measure the time lag for "N" → "R".

Time lag: Less than 1.5 seconds

3. EVALUATION

1) If "N" → "D" time lag is longer than specified:

- Line pressure too low
- Forward clutch worn
- Low one-way clutch not operating properly

2) If "N" → "R" time lag is longer than specified:

- Line pressure too low
- Reverse clutch worn
- Low & Rev. brake worn
- Forward one-way clutch not operating properly

C: LINE PRESSURE TEST**1. GENERAL**

If the clutch or the brake band shows a sign of slippage or shifting sensation is not correct, the line pressure should be checked.

- Excessive shocks during upshifting or shifting takes place at a higher point than under normal circumstances, may be due to the line pressure being too high.

- Slippage or inability to operate the car may, in most cases, be due to loss of oil pressure for the operation of the clutch, brake band or control valve.

1) Line pressure measurement (under no load)

a. Before measuring line pressure, jack-up front wheels (front-wheel-drive model) or all wheels (4-wheel drive model).

b. Maintain temperature of ATF at approximately 60 to 80°C (140 to 176°F) during measurement.

(ATF will reach the above temperature after idling the engine for approximately 30 minutes with shift lever in "N" or "P".)

2) Line pressure measurement (under heavy load)

a. Before measuring line pressure, apply both foot and parking brakes with all wheels chocked (Same as for "stall" test conditions).

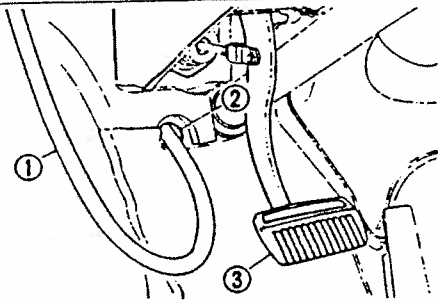
b. Measure line pressure when select lever is in "R", "D", "2" and "1" with engine under stall conditions.

c. Measure line pressure within 5 seconds after shifting the select lever to each position. (If line pressure needs to be measured again, allow the engine to idle and then stop. Wait for at least one minute before measurement.)

d. Maintain the temperature of ATF at approximately 60 to 80°C (140 to 176°F) during measurement. (ATF will reach the above temperature after idling the engine for approximately 30 minutes with the shift lever in "N" or "P".)

2. TEST METHODS

1) Temporarily attach the OIL PRESSURE GAUGE ASSY (498575400) to a suitable place in the driver's compartment, remove the blind plug located in front of the toeboard and pass the hose of the GAUGE ASSY to the engine compartment.

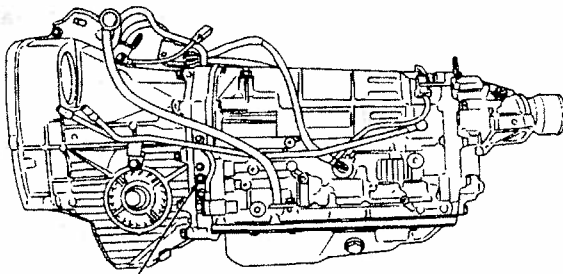


- 1 Pressure gauge hose
- 2 Hole in toe board (blank cap hole)
- 3 Brake pedal

B3-246

Fig. 118

2) Remove the test plug and install OIL PRESSURE GAUGE ADAPTER (498897200) instead.



—Test plug location

C3-060

Fig. 119

- 3) Connect OIL PRESSURE GAUGE ADAPTER (498897200) with OIL PRESSURE GAUGE ASSY (498575400).
- 4) Start the engine and warm it up.
- 5) Check line pressure in accordance with the following chart.

3. EVALUATION

Under no load: "P", "R", "D", "3", "2" and "1"

Under full load: "R", "D", "3", "2" and "1"

(With engine running at stall speed)

<Standard line pressure>

Unit: kPa (kg/cm², psi)

	Min. line pressure	Max. line pressure
Range	600 — 800 rpm	Stall rpm
P	441 — 569 (4.5 — 5.8, 64 — 82)	—
R	588 — 686 (6.0 — 7.0, 85 — 100)	1,422 — 1,589 (14.5 — 16.2, 206 — 230)
N	441 — 569 (4.5 — 5.8, 64 — 82)	—
D	441 — 569 (4.5 — 5.8, 64 — 82)	1,128 — 1,255 (11.5 — 12.8, 164 — 182)
3	441 — 569 (4.5 — 5.8, 64 — 82)	1,128 — 1,255 (11.5 — 12.8, 164 — 182)
2	441 — 569 (4.5 — 5.8, 64 — 82)	1,128 — 1,255 (11.5 — 12.8, 164 — 182)
1	441 — 569 (4.5 — 5.8, 64 — 82)	1,128 — 1,255 (11.5 — 12.8, 164 — 182)
Accelerator pedal	Full-closed	Fully-open

D: TRANSFER CLUTCH PRESSURE TEST

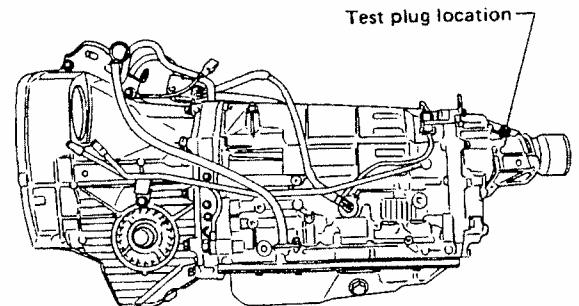
Check transfer clutch pressure in accordance with the following chart in the same manner as with line pressure.

Under no load: "R" and "D" ranges

Under heavy load:

"R" and "D" ranges in AWD mode

"R" and "D" ranges in FWD mode



C3-061

Fig. 120

Unit: kPa (kg/cm², psi)

	AWD mode		FWD mode
	Low pressure side	High pressure side	High pressure side
Range	600 — 800 rpm	Stall rpm	Stall rpm
R	49 — 78 (0.5 — 0.8, 7 — 11)	716 — 785 (7.3 — 8.0, 104 — 114)	0 (0, 0)
D	49 — 78 (0.5 — 0.8, 7 — 11)	716 — 785 (7.3 — 8.0, 104 — 114)	0 (0, 0)
Accelerator pedal	Fully-closed	Fully-open	Fully-open

If oil pressure is not produced or if it does not change in the AWD mode, the duty solenoid C or transfer valve assembly may be malfunctioning. If oil pressure is produced in the FWD mode, the problem is similar to that in the AWD mode.

E: ROAD TEST

1. GENERAL

Road tests should be conducted to properly diagnose the condition of the automatic transmission.

When performing test, do not exceed posted speed limit.

2. CHECKING FOR SHIFT PATTERNS

Check "kick-down" and engine brake operation.

D-range: 1st ⇌ 2nd ⇌ 3rd ⇌ 4th

**3-range: 1st ⇌ 2nd ⇌ 3rd ⇌ 4th (Manual switch OFF)
2nd ⇌ 3rd ⇌ 4th (Manual switch ON)**

**2-range: 1st ⇌ 2nd ⇌ 3rd ⇌ 4th (Manual switch OFF)
2nd ⇌ 3rd ⇌ 4th (Manual switch ON)**

1-range: 1st ⇌ 2nd ⇌ 3rd ⇌ 4th

3. CHECK FOR THE 4WD FUNCTION

If "tight-corner braking" occurs when the steering wheel is fully turned at low speed:

1) Determine the applicable trouble code and check the corresponding duty solenoid C (transfer) for improper operation.

2) If the solenoid is operating properly, check transfer clutch pressure.

3) If oil pressure is normal but "tight-corner braking" occurs:

Check the transfer control valve for sticking, and the transfer clutch facing for wear.

(Refer to Disassembly and Inspection of the Transmission.)

4. AUTOMATIC SHIFT CHARACTERISTICS

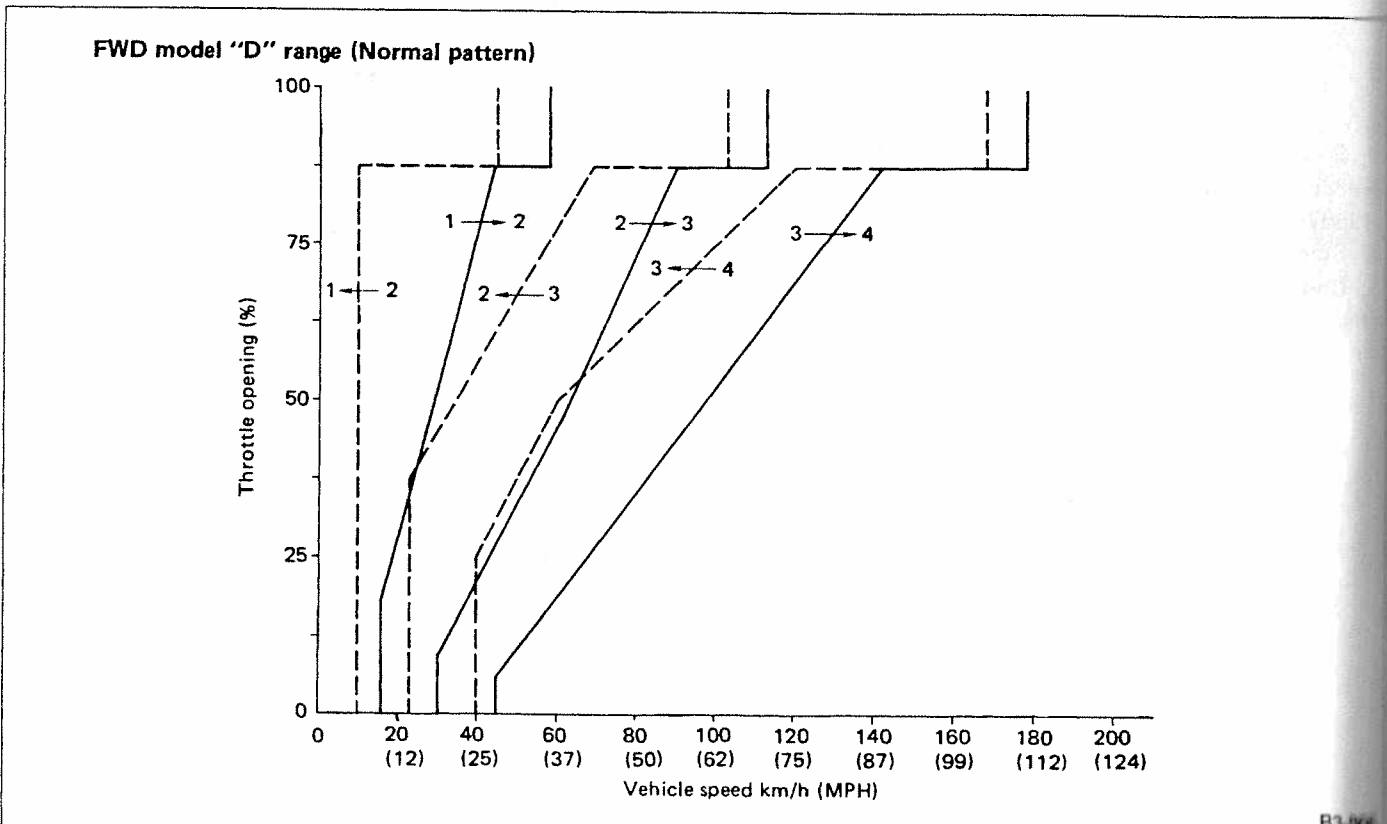
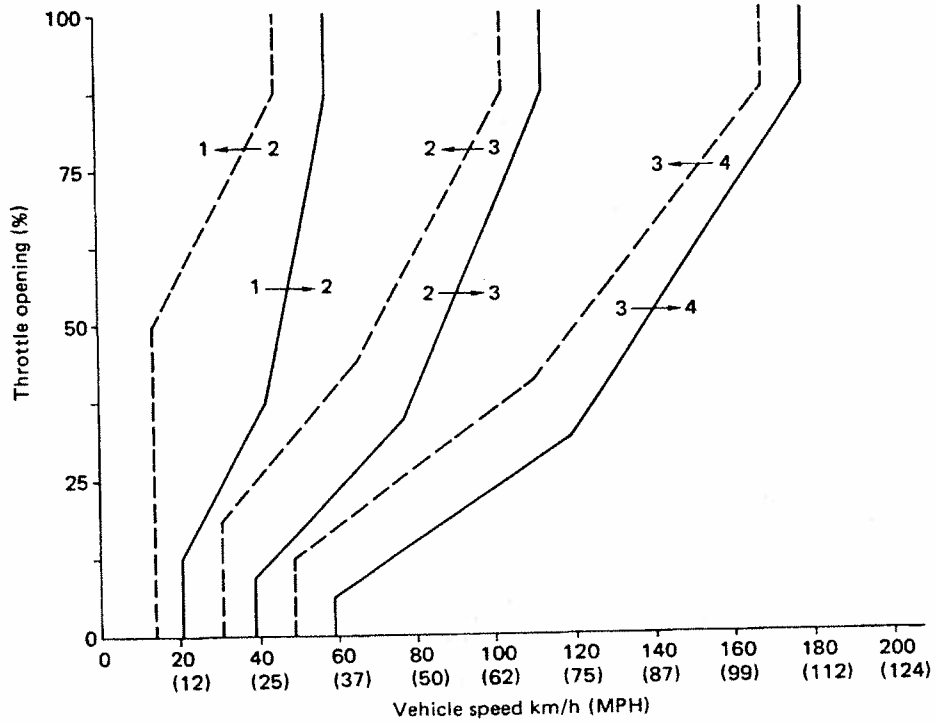


Fig. 121

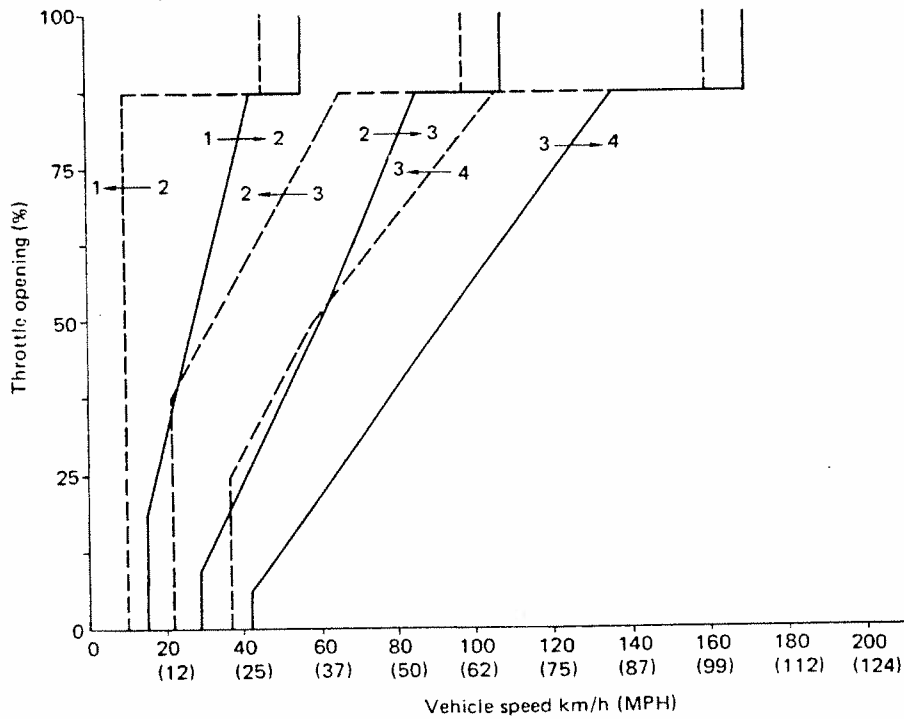
FWD model "D" range (Power pattern)



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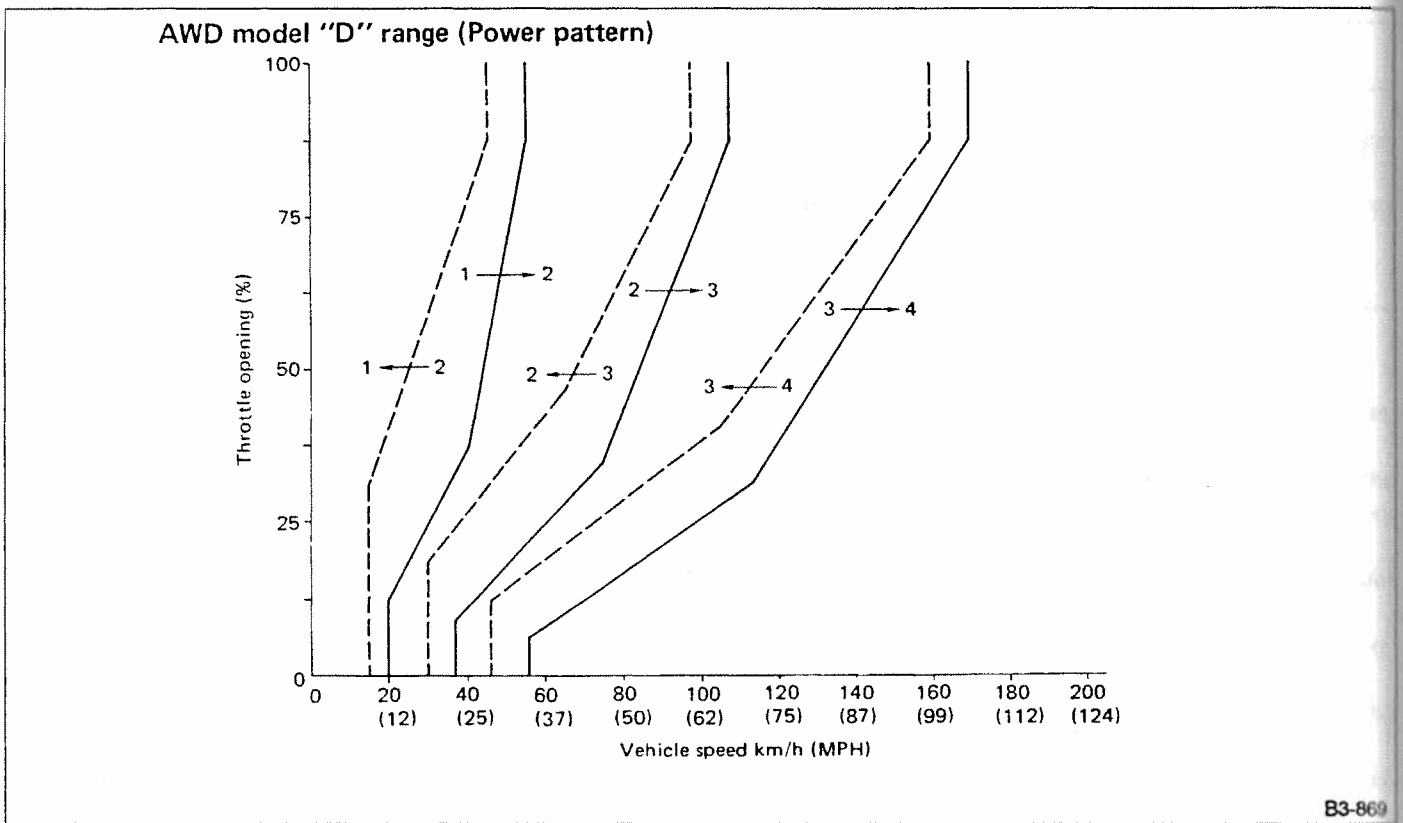
Fig. 122

AWD model "D" range (Normal pattern)



B3-868

Fig. 123



B3-869

Fig. 124