

TESTING

NOTE: Before testing, always check fluid level, linkage adjustment and vacuum diaphragm.

ROAD TEST

1. Check minimum throttle upshift in Drive. Transmission should start in 1st gear, shift to 2nd and then shift to 3rd as speed increases. See **SHIFT SPEEDS (MPH)** under TESTING.
2. With transmission in 3rd gear, depress accelerator through detent (to floor). Transmission should shift from 3rd to 2nd or 3rd to 1st, depending on vehicle speed. See **SHIFT SPEEDS (MPH)** under TESTING.
3. Check closed throttle downshift from 3rd to 1st by coasting down from about 30 MPH in 3rd gear. Shift should occur as shown in table. With transmission selector lever in "2" position, transmission should operate only in 2nd gear.
4. With transmission in 3rd gear and road speed above 50 MPH, transmission should shift to 2nd gear when selector lever is moved from "D" into "2" or "1". When manual shift is made below 30 MPH, transmission should shift from 2nd or 3rd to 1st.

NOTE: This check will determine if governor pressure and shift control valve are operating properly.

5. Slipping or engine speed flare-up in any gear usually indicates clutch or band problems. In most cases, the clutch or band that is slipping can be determined by noting transmission operation in all selector positions and comparing which internal units are applied in those positions. See **CLUTCH & BAND APPLICATION CHART**.

CLUTCH & BAND APPLICATION CHART

Selector Lever Position	Elements In Use
"D" (Drive)	
1st Gear	Forward Clutch & One-Way Clutch
2nd Gear	Forward Clutch & Intermediate Band
3rd Gear	Reverse-High Clutch & Forward Clutch
"L1" (Manual Low)	Forward Clutch & Low-Reverse Clutch
"R" (Reverse)	Reverse-High Clutch & Low-Reverse Clutch
"N" (Neutral)	All Clutches & Bands Released Or Ineffective
"P" (Park)	All Clutches & Bands Released Or Ineffective

LINE PRESSURE TEST

Engine Vacuum Method

1. Attach tachometer to engine. Install vacuum gauge (using "T" fitting) into manifold vacuum line at vacuum diaphragm unit. Attach a 0-400 psi pressure gauge to line pressure takeoff point at transmission. See **Fig. 4**.
2. Apply both parking and service brakes. Adjust idle speed to specified RPM. If engine idle speed cannot be brought within limits, check for a binding throttle and downshift linkage, vacuum leaks in vacuum diaphragm or vacuum leaks in all other vacuum operated units (such as power brake).

3. With engine at curb idle speed and normal operating temperature, read and record line pressure in all selector positions at specified manifold vacuum. Compare line pressures obtained in tests with pressures specified under LINE PRESSURE SPECIFICATIONS.

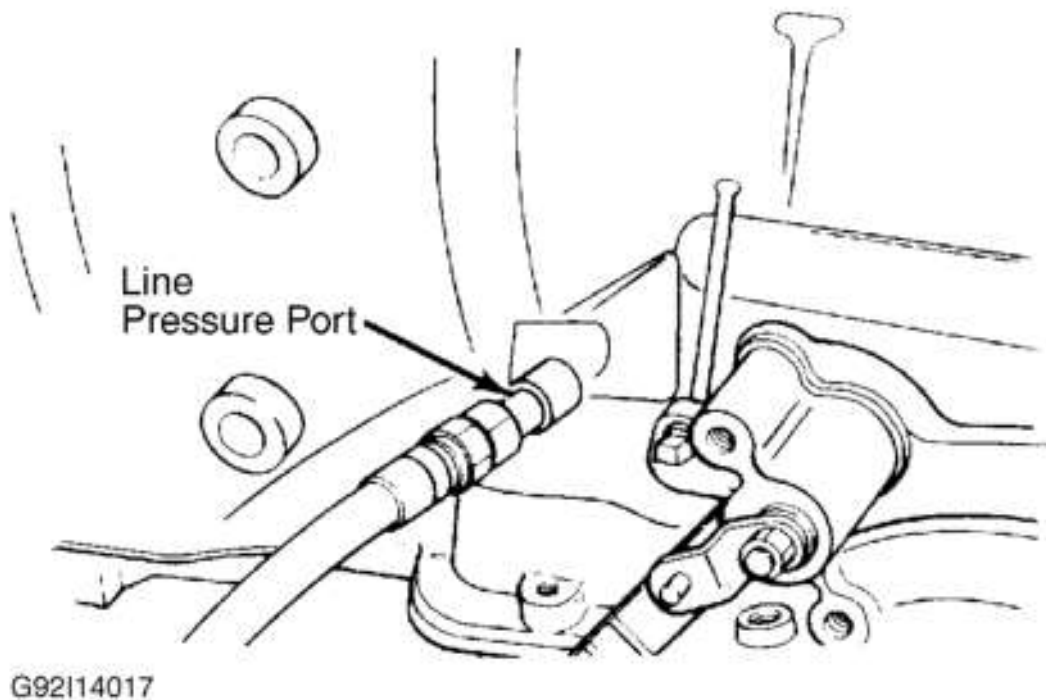


Fig. 4: Identifying Line Pressure Port
Courtesy of FORD MOTOR CO.

Vacuum Pump Method

1. Attach tachometer to engine and a 0-400 psi pressure gauge to pressure take-off point at transmission. See **Fig. 4**. Disconnect and plug manifold vacuum line at diaphragm unit.
2. Connect vacuum source to vacuum diaphragm. Apply parking and service brakes. Start engine and vacuum pump, setting vacuum to 15 in. Hg. Read and record line pressure in all shift selector positions with engine idling.
3. Increase engine speed to 1000 RPM, and reduce vacuum to 10 in. Hg. Read and record line pressure in "D", "2" and "1" shift selector positions.
4. With engine still at 1000 RPM, reduce vacuum to one in. Hg. Read and record line pressure in "D", "2", "1" and "R". Compare the line pressures obtained in the tests with the pressures given in LINE PRESSURE SPECIFICATIONS.

NOTE: Governor pressure can be checked at same time line pressure test is performed.

5. With vehicle raised and no load on engine, place selector lever in "D" and apply 10 in. Hg. Increase speed slowly while watching speedometer. Check speed at which line pressure cutback occurs. It should occur between 10-20 MPH.

6. If cutback does not occur within specifications, check shift speeds to ensure problem is governor and not a stuck cutback valve.

CAUTION: DO NOT exceed 60 MPH (speedometer speed) during test. If line pressures are not within specifications, proceed to LINE PRESSURE TEST RESULTS to determine problems.

LINE PRESSURE TEST RESULTS

Low At Idle In All Ranges

Check for low fluid level, restricted intake screen or filter, and loose oil tubes. Check for loose valve body or regulator-to-case bolts. Check for excessive leakage in front pump, case or control valve body. Check for sticking line pressure regulator valve.

Okay At Idle In All Ranges, But Low At 10 In. Hg

Check vacuum diaphragm unit. Check if control rod or throttle valve is stuck.

High At Idle In All Ranges

Check vacuum diaphragm unit, manifold vacuum line, throttle rod, and control rod. Check for sticking regulator boost valve(s).

Okay At Idle In All Ranges, Okay At 10 In. Hg, But Low At One In. Hg

Check for excessive leakage, low pump capacity or restricted oil pan screen.

Low In "P"

Check valve body pressure regulator.

Low In "R"

Check high clutch and/or reverse clutch.

Low In "N"

Check valve body for correct operation.

Low In "D"

Check for faulty forward clutch operation.

Low In "2"

Check forward clutch and servo.

Low in "1"

Check forward clutch and/or reverse clutch.

LINE PRESSURE SPECIFICATIONS

NOTE: Specifications given are guidelines only. Actual values may vary by $\pm 10\%$. See [Fig. 5](#).

LINE PRESSURE

Transmission Model	Range	15-17" Hg Vac. (Idle)	10" Hg Vac. (P. Throttle)	0.5" Hg Vac. (WOT Stall)
All 4.9L	P, N, D, 2, 1 R	50 - 80 65 - 120	75 - 110 120 - 170	155 - 170 245 - 265
All 5.8L	P, N, D, 2, 1 R	50 - 65 60 - 100	75 - 100 120 - 170	155 - 170 245 - 265
All 7.5L	P, N, D, 2, 1 R	55 - 95 85 - 145	100 - 120 155 - 185	155 - 185 245 - 275

NOTE: Above line pressures are applicable to all altitudes.

LINE PRESSURE (HIGH ALTITUDE APPLICATIONS)

24.5" Hg. Absolute Barometric Pressure (At 5000 Ft.)				
All With High Altitude Vacuum Diaphragm (Aneroid)	P, N, D, 2, 1 R	50 - 65 60 - 95	60 - 100 105 - 150	135 - 165 200 - 255

29.5" Hg. Absolute Barometric Pressure (At Sea Level)				
All With High Altitude Vacuum Diaphragm (Aneroid)	P, N, D, 2, 1 R	50 - 80 60 - 130	80 - 120 130 - 180	155 - 185 245 - 275

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Fig. 5: Line Pressure Specifications
Courtesy of FORD MOTOR CO.

VACUUM DIAPHRAGM UNIT

Vacuum Supply & Diaphragm Check

1. Disconnect vacuum line at diaphragm unit, and install a vacuum gauge in vacuum line using a "T" fitting. If transmission fluid is present in vacuum hose, diaphragm is leaking and vacuum diaphragm unit must be replaced. With engine idling, gauge must show a steady vacuum. If reading is low, unplug vacuum hose at diaphragm and plug. If vacuum is now acceptable, replace diaphragm. If vacuum is still not acceptable, check for vacuum leak or poor engine vacuum.
2. If reading is okay, rapidly accelerate engine momentarily. Vacuum must drop rapidly at acceleration and return upon deceleration. If vacuum reading does not change or changes slowly, vacuum line is

plugged, restricted or connected to reservoir supply.

VACUUM REGULATOR VALVE (VRV) 7.3L DIESEL

Operational Check & Adjustment

1. Shut engine off. Disconnect 2 port vacuum connector from VRV located on left side of fuel injection pump. Remove throttle cable from lever on right side of pump.
2. Remove throttle return spring. Install one end of spring over throttle lever ball stud and other end over throttle cable support bracket.
3. Attach a vacuum pump to upper port of VRV on vacuum supply side. Attach a vacuum gauge to lower port of VRV (labeled TRANS on VRV). Apply and maintain 20 in. Hg to VRV. See **Fig. 6**.
4. Pump vacuum up as it bleeds off. Cycle throttle lever 5 times from idle to wide open throttle with vacuum applied. Insert Gauge Block (T83T-7B200-AH) or .515" gauge block between pump boss and throttle wide open stop. Ensure lever stop is against block. Gauge attached to lower port should indicate 6-8 in. Hg. If reading is incorrect, adjust VRV to 7 in. Hg.
5. To adjust, loosen 2 adjustment screws that attach VRV to fuel injection pump. Rotate VRV until proper vacuum is obtained and tighten adjusting screws. If VRV cannot be adjusted to proper specifications, replace VRV and repeat procedure in step 2).
6. Remove gauge block. Reattach throttle return spring and throttle cable. Apply and maintain 20 in. Hg to VRV. While maintaining vacuum, cycle the throttle lever from idle to wide open throttle 5 times. Vacuum gauge **MUST** indicate at least 13 in. Hg with throttle at idle position.
7. If vacuum gauge indicates less than 13 in. Hg, VRV must be replaced and procedure for adjustment must be repeated. After final adjustment, remove vacuum pump and gauge from VRV and reattach vacuum connector.
8. Start engine. Check throttle operation and transmission shift linkage.

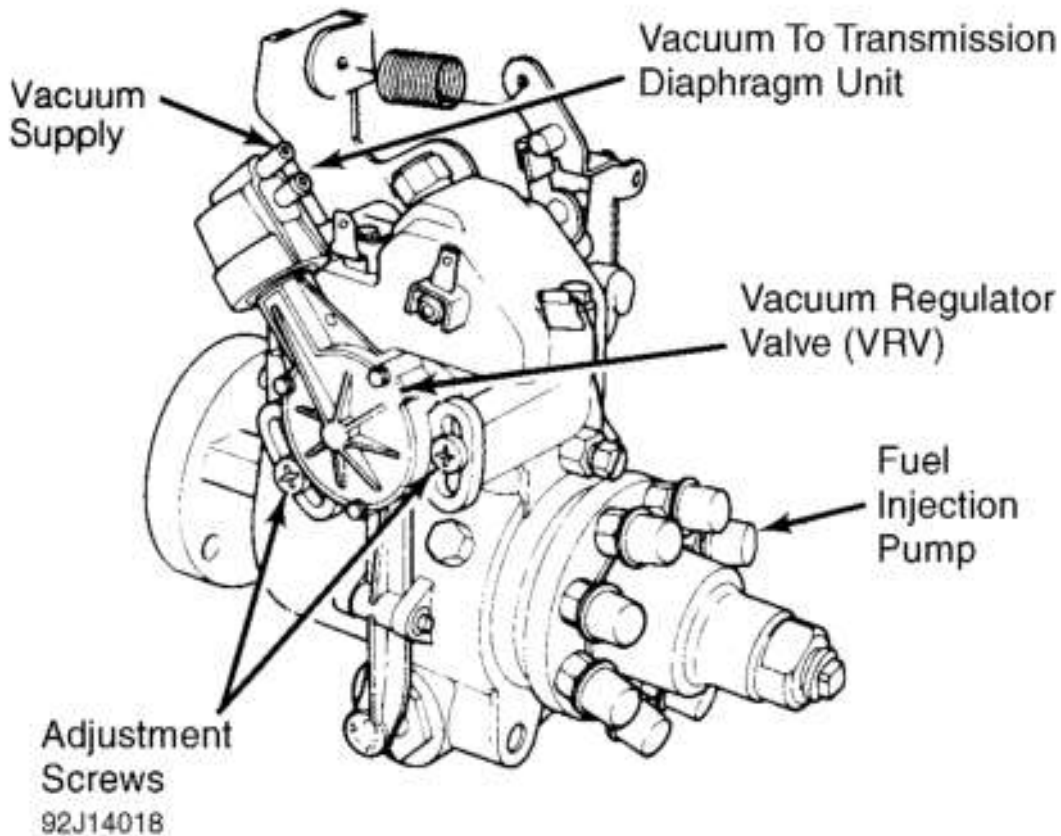


Fig. 6: Vacuum Regulator Valve (7.3L Diesel)
Courtesy of FORD MOTOR CO.

STALL SPEED TEST

CAUTION: DO NOT hold throttle open longer than 5 seconds at a time during testing. If engine speed exceeds maximum limit of stall speed, release throttle immediately as clutches or bands are slipping.

Testing Procedure

Install tachometer, and fully apply parking and service brakes. Start engine and run at curb idle at normal operating temperature. Stall transmission in each driving range at full throttle. Note maximum RPM obtained. Engine speed should be within limits shown in appropriate STALL SPEEDS table.

NOTE: Allow a cooling period of 15 seconds with transmission in Neutral and engine speed at 1000 RPM between each test.

STALL SPEEDS 1988 MODELS

Engine	Stall Speed - RPM Range
4.9L EFI	1610-1868
5.0L EFI	2092-2443

5.8L EFI	2312-2666
7.3L Diesel	1715-1966
7.5L EFI	2049-2362

STALL SPEEDS 1989 MODELS

Engine	Stall Speed - RPM Range
4.9L EFI	1610-1868
5.0L EFI	2092-2443
5.8L EFI	2312-2666
7.5L EFI	2049-2362

STALL SPEEDS 1990 MODELS

Engine	Stall Speed - RPM Range
4.9L EFI	1563-1855
5.0L EFI	2101-2457
5.8L EFI	2216-2605
7.5L EFI	1944-2277

STALL SPEEDS 1991-92 MODELS

Engine	Stall Speed - RPM Range
4.9L PFI	1560-1870
5.0L PFI	1616-1871
5.8L 4V	1569-1729
7.3L Diesel	1700-1860
7.5L PFI	1610-1871

STALL SPEED TEST RESULTS

Stall Speed Too High

In "D", "2", "1", and "R": general transmission problems are indicated and a line pressure test should be made to locate faulty unit(s). In "D" only: planetary one-way clutch slippage is indicated. In "D", "2", and "1": forward clutch slippage is indicated. In "R" only: high and/or reverse clutch slippage indicated.

Stall Speed Too Low

Converter stator one-way clutch faulty. Ensure engine performance is satisfactory before condemning converter assembly. Converter cannot be overhauled and must be replaced if defective.

SHIFT SPEEDS (MPH)

NOTE: Following table is approximate. See Fig. 7. Shift speeds may vary due to production tolerances, rear axle ratios and emission control equipment.

NOTE: Specifications given are for 1991 models; all models are similar. Specifications may vary by $\pm 10\%$ year to year.

Throttle Opening	Drive Range	Shift	Low Limit MPH	High Limit MPH
Minimum Throttle	D	1-2	6	16
Minimum Throttle	D	2-3	9	23
Closed Throttle	D	3-1	6	8
Closed Throttle	1	2-1	23	36
Part Throttle (To Detent)	D	1-2	25	44
Part Throttle (To Detent)	D	2-3	41	69
Max. Downshift (To Detent)	D	3-2	28	57
Wide Open Throttle (WOT)	D	1-2	34	47
Wide Open Throttle (WOT)	D	2-3	59	74
Max. Downshift (WOT)	D	3-2	50	65
Max. Downshift (WOT)	D	3-1	22	34

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Fig. 7: C-6 Shift Speed Chart

AIR PRESSURE CHECKS

1. A no-drive condition can exist, even with correct transmission fluid pressure, because of inoperative clutches or bands. Erratic shifts could be caused by stuck governor valve. Inoperative units can be located through a series of checks by substituting air pressure for fluid pressure to determine location of malfunction.
2. To make air pressure checks, remove oil pan and drain transmission fluid. Remove control valve body and apply air at points noted. See **Fig. 8**. Check unit operations as follows:

Forward Clutch

Apply air pressure to transmission case forward clutch passage. A dull thud can be heard when clutch piston is applied, or movement of piston can be felt by placing a finger on input shell.

Governor

Apply air pressure to governor line pressure passage and listen for sharp clicking or whistling noise, indicating governor valve movement.

Reverse-High Clutch

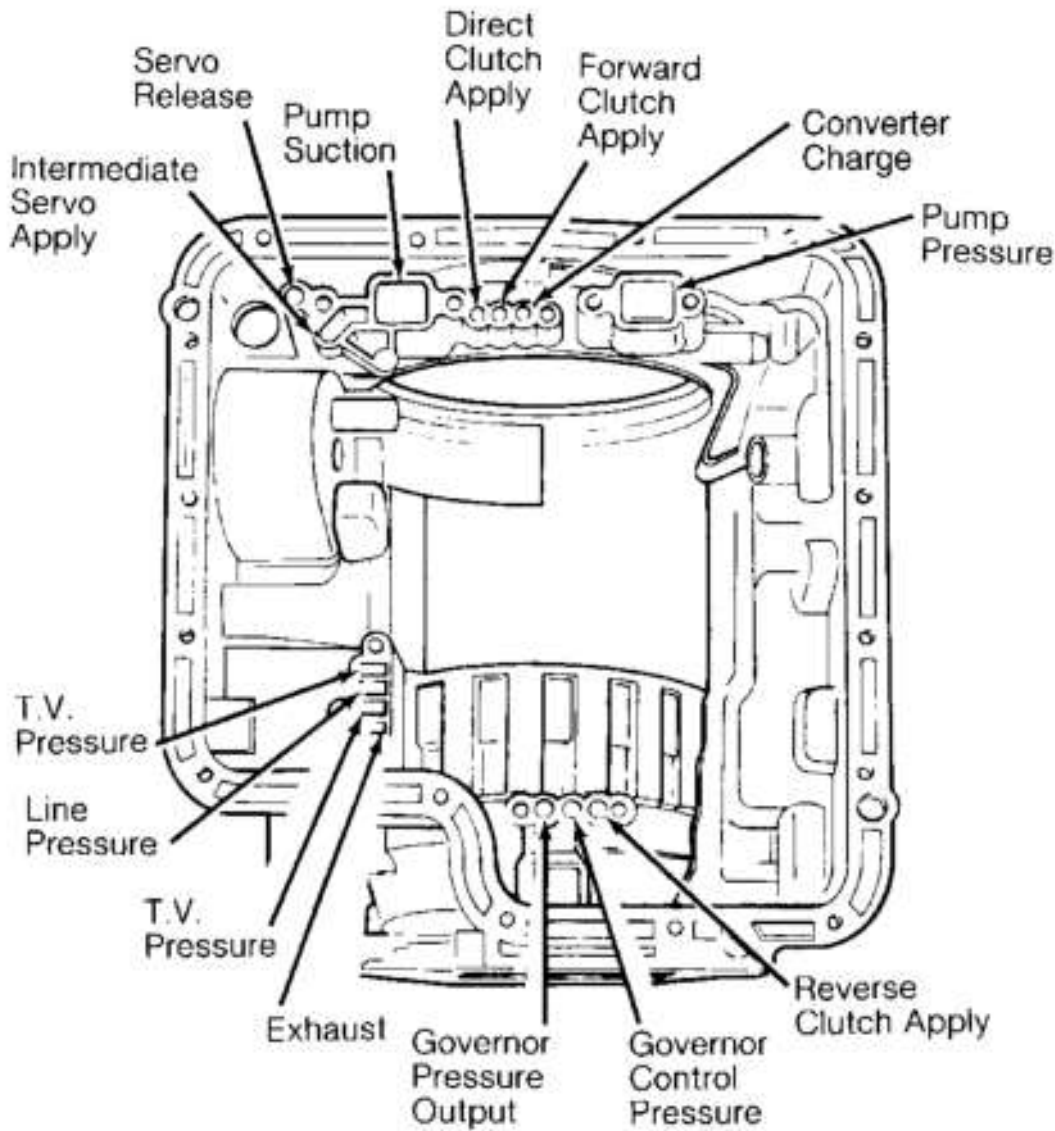
Apply air pressure to reverse-high clutch passage. Dull thud should be heard when clutch piston is applied. If thud is not heard, place finger tips on clutch drum. Movement should be felt.

Intermediate Servo

Hold air nozzle in intermediate servo apply passages. Operation of servo will be indicated by tightening of intermediate band around drum. With air still applied at apply passage, use 2nd air nozzle to apply air at the servo release passage. Band should now release (combination of air pressure and spring on release side of piston should overcome apply pressure).

Low-Reverse Clutch

Apply air pressure to reverse clutch apply passage. A dull thud should be heard if clutch is operating properly.



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Fig. 8: Identifying Pressure Ports With Valve Body Removed
Courtesy of FORD MOTOR CO.