1974-79 EXHAUST EMISSION SYSTEMS
Ford Motor Co. Deceleration Control System

1976-79 Courier

DESCRIPTION

All models are equipped with a deceleration control system which is designed to maintain a balanced air/fuel mixture during periods of vehicle deceleration. System components vary depending on vehicle application.

1977-78 MODELS

1.8L Engine (Federal) - The deceleration control system consists of an air by-pass valve, and anti-stall dashpot, a throttle opener system consisting of a servo diaphragm and vacuum control valve.
1.8L Engine (California) - The deceleration control system consists of an anti-afterburn valve and a throttle opener system consisting of a servo diaphragm and vacuum control valve.
2.3L Engine - The deceleration control system consists of an air by-pass valve, a coasting richer valve, and on manual transmission equipped models, an anti-stall dashpot.

1979 MODELS

2.0L Engines - Deceleration control system consists of throttle positioner system and anti-afterburn valve (Federal) or air by-pass valve (California).
2.3L Engines - Deceleration control system consists of coasting richer solenoid valve, accelerator switch and vehicle speed switch. On California models only, an air by-pass valve and dashpot are also used.

OPERATION

ANTI-AFTERBURN VALVE

During sudden deceleration, a rich air/fuel mixture is immediately introduced into combustion chambers and some of it passes unburned into the exhaust manifold. Air supplied by the air pump leans this mixture. This could cause abnormal combustion, or afterburning, in the exhaust system. To prevent this, the anti-afterburn valve will only allow air from the air pump into intake manifold according to changes in engine load. This keeps air intake at proper levels so air/fuel mixture is properly burned in cylinder. This valve is controlled by intake manifold vacuum.

AIR BY-PASS VALVE

The air by-pass valve is located between the air injection pump outlet and the check valve to help prevent abnormal combustion in the exhaust system. During sudden deceleration, a high amount of unburned gases are discharged through the engine into the exhaust manifold. To prevent this condition, the air by-pass valve senses the high intake manifold vacuum and diverts air from the pump back into pump inlet hose instead of the exhaust manifold.

COASTING RICHER VALVE

The coasting richer valve is controlled by two switches: the vehicle speed switch and the accelerator switch. In order for valve to operate, both switches must be closed. When coasting richer valve is activated, solenoid in valve is retracted, opening a fuel passage in the secondary system of the carburetor. This feeds additional fuel into the lean mixture created in the intake manifold by deceleration action.
Vehicle Speed Switch - This switch closes the coasting richer circuit at speeds above approximately 17-23 MPH. At speeds below this range, the circuit is opened.
Accelerator Switch - This switch closes the coasting richer circuit whenever the accelerator pedal is in the released position. Depressing the accelerator pedal opens the circuit.

ANTI-STALL DASHPOT

The dashpot, mounted on the intake manifold, prevents the primary throttle lever from closing the throttle plates in the carburetor instantly by the force of the throttle return spring when the accelerator pedal is suddenly released.

THROTTLE POSITIONER SYSTEM

On deceleration, on improper air/fuel mixture results. Operated by intake manifold vacuum and electrically connected to engine speed switch, the throttle positioner servo diaphragm keeps throttle plate slightly open to maintain an adequate air/fuel ratio.

When engine speed is above 1700 RPM on 1979 models, speed switch opens throttle positioner circuit, allowing 3-way solenoid valve to energize and permit vacuum to servo diaphragm. Below 1700 RPM, solenoid is not energized and no vacuum passes to servo diaphragm. If equipped with air conditioning, 3-way solenoid is energized whenever A/C control is on. This establishes a slightly higher engine speed.

TESTING

1976-78 THROTTLE POSITIONER SYSTEM

Servo Diaphragm - 1) Visually inspect all vacuum hoses for damage and proper routing. Disconnect vacuum control valve-to-intake manifold vacuum line at "T" fitting near air injection system control valve.
2) Disconnect air control valve vacuum line and connect it to "T" fitting so intake manifold vacuum can be applied directly to servo diaphragm. Disconnect vacuum hose from distributor and connect tachometer to engine.
3) Start engine. Engine speed should raise to 1400-1500 RPM. If not, adjust speed by turning adjusting screw on servo diaphragm throttle lever until specified RPM is obtained. Reconnect vacuum hoses to original positions.
Vacuum Control Valve - 1) Ensure all vacuum hoses are in good condition and properly routed. Disconnect intake manifold vacuum hose from anti-afterburn valve or air by-pass valve at "T" fitting and plug hose. Attach vacuum gauge to "T" fitting.
2) Start engine and raise engine speed to 3000 RPM. Quickly release throttle while observing vacuum gauge. If vacuum control valve is functioning properly, gauge should reach highest reading shortly after releasing throttle, then drop to 22.4 in. Hg for a few seconds before dropping to a normal vacuum reading.
3) If reading is not within specifications, loosen locking screw and turn vacuum control valve adjusting screw until proper reading is obtained. Tighten locking screw and return all hoses to original positions.

1979 THROTTLE POSITIONER SYSTEM

1) Start engine and set idle speed. Detach Black/White or Brown/Red wire (as equipped) from 3-way solenoid. Engine speed should increase to 1000 RPM (Federal) or 1100 RPM (Calif.).
2) If not, 3-way solenoid or servo diaphragm is improperly operating. See SERVO DIAPHRAGM testing below. Replace units as required.
Servo Diaphragm - 1) Check hoses for proper routing and condition. Start engine and set idle speed. Turn engine off, detach vacuum hose from distributor and plug hose.
2) Disconnect vacuum line at vacuum amplifier and vacuum hose at 3-way solenoid. Connect vacuum hose from servo diaphragm to vacuum amplifier so intake manifold vacuum is applied directly to servo diaphragm.
3) Connect tachometer to engine. Start engine and idle. Note that engine speed should increase to 1000 RPM for Federal vehicles or to 1100 RPM for California vehicles.
4) If not, adjust engine speed by turning adjusting screw on servo diaphragm throttle lever until proper speed is obtained. *See Fig. 1.* Reconnect all hoses to original position.

Ford Motor Co. Deceleration Control System (Cont.)

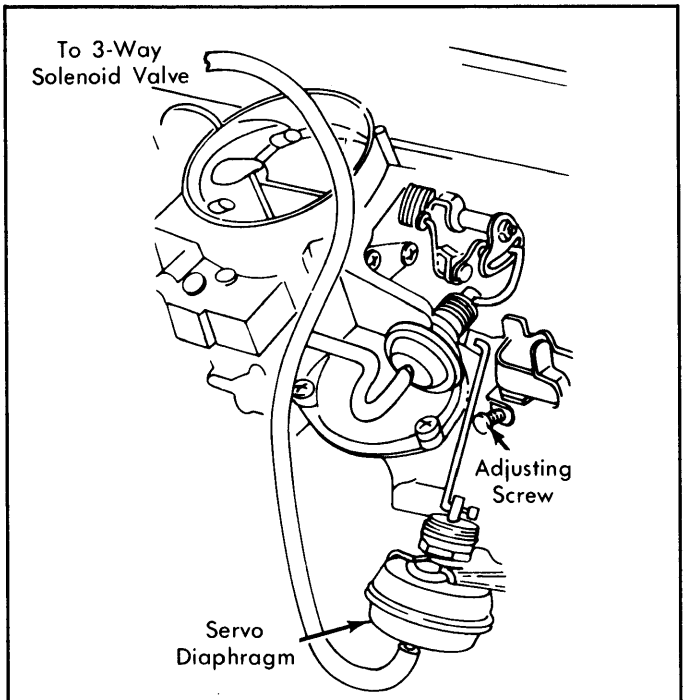

Fig. 1: Adjusting Throttle Positioner Servo Diaphragm

ANTI-AFTERBURN VALVE

1) Disconnect anti-afterburn valve inlet hose and run engine at idle speed. Press a finger tightly over inlet hose opening. This should not cause engine speed to vary.

2) Hold a finger lightly over inlet hose opening. Increase engine speed and quickly release accelerator. Air should flow inward for a few seconds. If the valve passes air inward for longer than 3 seconds, or does not pass air at all, replace the anti-afterburn valve.

AIR BY-PASS VALVE

Disconnect air hose from side of air by-pass hose. Start engine, raise speed above 2000 RPM, then release throttle. Air flow should be noticed from valve connection, if by-pass valve is operating properly. *See Fig. 2.*

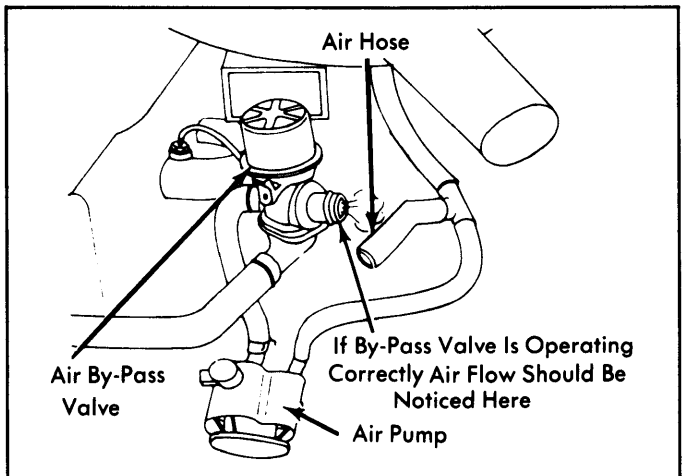

Fig. 2: Testing Air By-Pass Valve

COASTING RICHER CIRCUIT

Coasting Richer Valve - 1) Start engine and run at idle. Disconnect coasting richer valve electrical connector from carburetor. Connect valve electrical connector to battery. *See Fig. 3.* If engine speed immediately rises to 950-1200 RPM, valve is operating correctly.

2) Connect a test light to coasting richer valve electrical lead. Raise rear of vehicle and position on safety stands. Start engine and raise vehicle speed to 30 MPH. Release accelerator pedal. The test light should come on and remain lit until vehicle speed falls below 17-23 MPH.

3) If coasting richer circuit is operating properly, no further tests are necessary. If circuit does not operate, test the following components:

Accelerator Switch - The accelerator switch is actuated by a throttle lever link on carburetor. When checking the switch with a test light, the test light should be on when accelerator pedal is fully released and off when pedal is depressed.

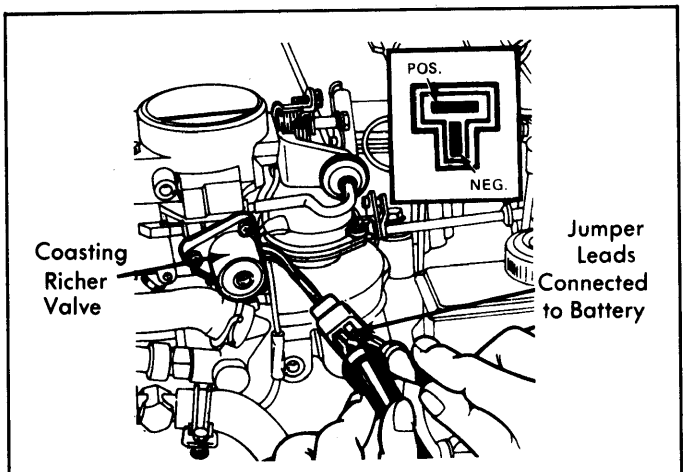

Fig. 3: Testing Coasting Richer Valve

Vehicle Speed Switch - 1) If accelerator switch is operating properly, remove instrument cluster and attach a test light to speedometer switch relay. *See Fig. 4.*

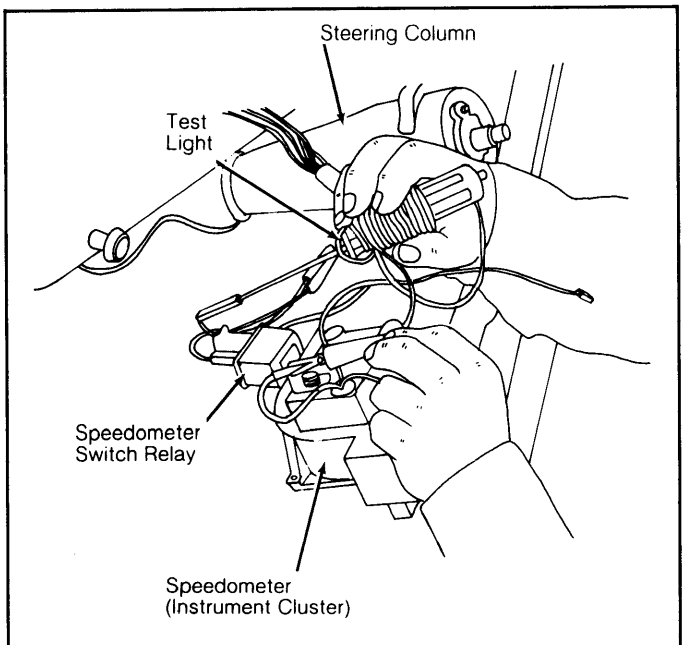

Fig. 4: Testing Speedometer Switch Relay

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2) Reconnect speedometer cable and ground wire. Raise rear of vehicle and position on safety stands. Start engine and depress accelerator pedal to accelerate engine and ensure that test light is on at speeds above 17-23 MPH and that light is off at speeds below this range.
Speedometer Switch Relay - Check speed relay to ensure that relay operates at 17-23 MPH.

ADJUSTMENTS

ANTI-STALL DASHPOT

NOTE: Engine idle speed and carburetor air/fuel mixture must be properly set before dashpot is adjusted.

1977-79 Models - 1) With engine at normal operating temperature, remove air cleaner and attach a tachometer to engine.
2) Move throttle lever until it contacts dashpot rod. Engine speed should read 2400-2600 RPM (2100-2300 RPM for California vehicles). If speed is not within specifications, loosen dashpot lock nut.
3) Hold throttle lever to maintain the correct engine speed, then turn dashpot until dashpot rod contacts throttle lever. Tighten lock nut and recheck dashpot adjustment. Repeat adjustment as necessary.