

FIESTA AIR INJECTION SYSTEM

Fiesta

DESCRIPTION

The air injection system used on the Fiesta is designed to reduce unburned hydrocarbon and carbon monoxide emissions. It does this by injecting fresh air into the exhaust ports to further the burning of hot exhaust gases. The air, which is pressurized by the air pump, enters the exhaust port through an external supply tube. The system consists of an air pump, a by-pass valve, a vacuum vent valve, exhaust check valve, vacuum delay valve and vacuum reservoir. Operations of each are described below.

OPERATION

AIR SUPPLY PUMP

The air pump (belt driven) takes in air from the "clean" side of the air cleaner, pressurizes it and pumps it along to the engine.

BY-PASS VALVE

During normal operation, intake manifold vacuum positions by-pass valve diaphragm and stem upward to allow air pump air to reach exhaust ports. When manifold vacuum changes (rises with deceleration or drops with acceleration), idle vacuum valve momentarily cuts off vacuum to air by-pass valve. By-pass internal spring pulls stem and diaphragm downward and air pump air is dumped to atmosphere. In case of sudden pressure buildup in valve, lower portion will unseat to dump part of the pressure while upper portion is also unseated to allow some air to exhaust ports to continue normal air pump system operation.

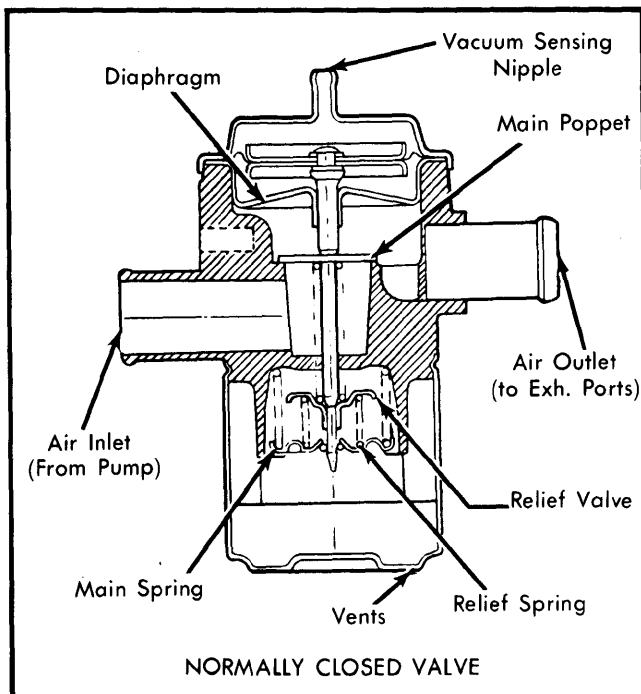


Fig. 1 Sectional View of By-Pass Valve

VACUUM VENT VALVE

The vacuum vent valve provides the make-up air for the air pump system retard delay valve and air by-pass valve during idle modes to de-activate the air pump system after a controlled period of time.

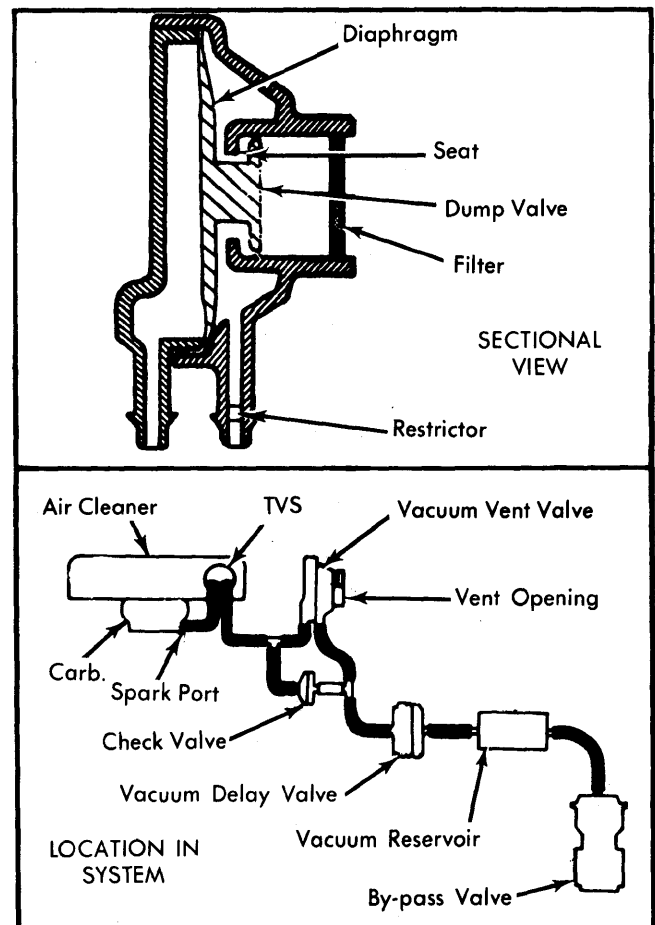


Fig. 2 Illustrating Placement and Construction of Vacuum Vent Valve

Application of vacuum from the carburetor to both ports of the vacuum vent valve causes the diaphragm in the valve to initially move left and seat the dump valve. In this position, vacuum is applied to the rest of the system.

During idle, this vacuum application is removed. The diaphragm moves right. The dump valve leaves the seat, opening the vent and allowing air to enter the system to reduce the vacuum previously applied to the retard delay valve.

CHECK VALVE

The check valve is mounted on the external air supply passage of the exhaust manifold. This is a one-way check valve which allows thermactor air to enter air supply passage, but prevents the reverse flow of exhaust gases.

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VACUUM DELAY VALVE

At normal operating temperature, when the carburetor throttle plate is above the EGR port, vacuum is available to the TVS switch (on air cleaner). Above 60°F (16°C), the TVS is open and allows passage of vacuum. Vacuum is now available to operate the EGR valve and is also directed through the vacuum delay valve. From the delay valve, manifold vacuum is applied to the by-pass valve diaphragm, closing the relief vent. Air from the air pump flows freely to the air supply passage. See Fig. 3.

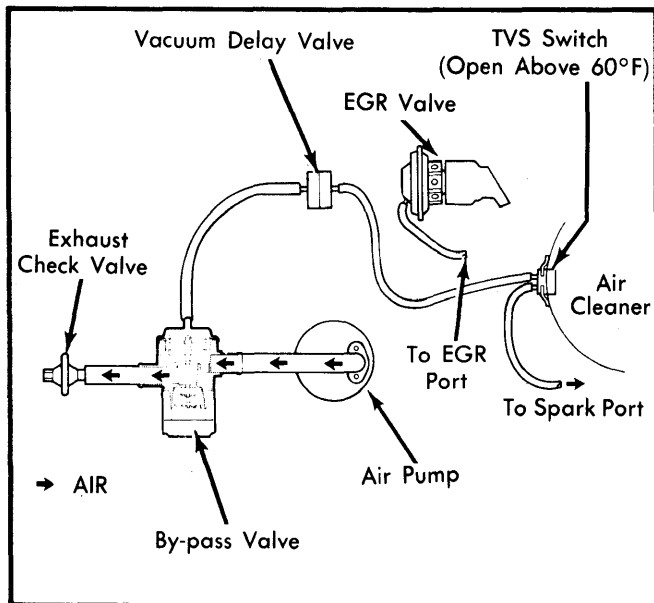


Fig. 3 Schematic of Air Pump System (Warm Engine)

TESTING

AIR PUMP TEST

1) Remove air cleaner. Check all hoses and connections for proper condition. Check air pump belt tension and adjust as necessary.

2) With transmission in neutral or "P" and parking brake set, start and warm engine to normal operating temperature. Stop engine and detach hose(s) from air pump to air by-pass valve at the by-pass valve.

3) Insert air pump pressure gauge (T75L-9486-A or equivalent) into end of hose disconnected from by-pass valve. Clamp pressure gauge in place. Connect tachometer and start engine.

4) Slowly increase engine speed to 1000 RPM, watching pressure gauge. Pressure should be 2.25 psi (15.8 kg/cm²).

NOTE — If special pressure gauge tool is not available, raise engine speed to 1500 RPM and place hand over open end of hose; air pressure should be felt and heard.

5) If air pressure does not meet indicated requirements, replace air pump and repeat test.

BY-PASS VALVE TEST

1) Set transmission in neutral or "P", apply parking brake and warm engine to normal operating temperature. Stop engine and remove air by-pass valve-to-manifold check valve hose at by-pass valve. On models which have "T" fitting, remove both hoses connecting by-pass valve to check valves. Install tachometer to engine.

2) Start engine and accelerate to 1500 RPM. Check that air flows from by-pass valve hose connections (feel with hand).

3) Remove vacuum hose from by-pass valve and plug hose. With engine still running at 1500 RPM, no air flow should be coming from by-pass valve connection (air flow will be discharged silently through exhaust ports in end of valve silencer cover). If valve does not respond as indicated, replace by-pass valve.

4) Stop engine. Remove plug from vacuum hose. Reinstall vacuum hose on by-pass valve vacuum sensing nipple. Install pressure gauge tool (T75L-9486-A or equivalent) to by-pass valve outlet, using short piece of hose. If by-pass valve has two outlets, plug one without gauge. If valve has small sensing nipple as one outlet, install gauge on this outlet.

5) Start engine and run at 1000 RPM. Observe pressure produced at test gauge. It should be 2.25 psi (15.8 kg/cm²). If not, replace valve.

VACUUM DELAY VALVE

1) Remove valve from vacuum line and attach colored end of spark delay valve to an external vacuum source.

2) Using a 24" (609 mm) piece of vacuum tubing, attach white end of valve to a vacuum gauge.

3) Apply 10 in. Hg, using the external vacuum source and note reading on gauge and time for reading to be reached.

4) Vacuum gauge should read from zero to 8 in. Hg in 14-47 seconds for a red and white valve or in 8-26 seconds for a blue and white valve.

5) If reading does not reach 8 in. Hg and/or is not within specified time range, replace spark delay valve.

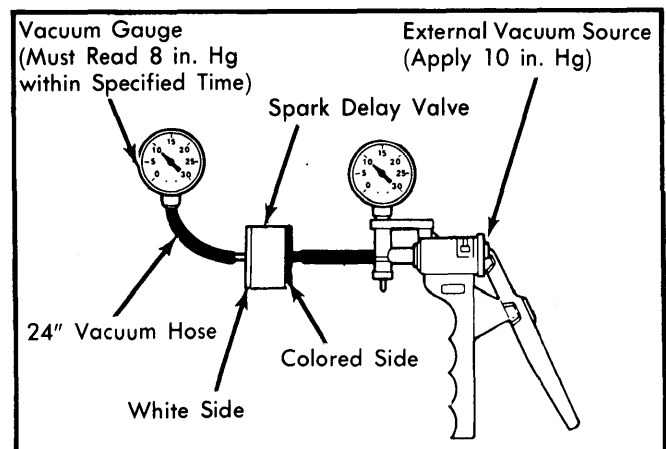


Fig. 4 Testing Vacuum Delay Valve

FIESTA AIR INJECTION SYSTEM (Cont.)

THERMAL VACUUM SWITCH (TVS)

1) Remove TVS from air cleaner. Attach small, center nipple to a 24x $\frac{1}{4}$ " piece of vacuum tubing which is connected to an external vacuum source. Leave other nipple unattached.

2) Obtain a can of R-12 refrigerant, a safety valve and a suitable piece of refrigerant hose. With safety valve closed, attach R-12 can to valve and hose to valve.

CAUTION — Be sure area is well-ventilated, wear eye protection and be sure engine is not running when working with R-12.

3) Invert R-12 can, slowly open can valve and apply liquid refrigerant to TVS to cool it to 40°F (4°C) or less.

4) Apply 16 in. Hg with external vacuum source and hold. Vacuum level must remain at 10-16 in. Hg for 60 seconds. If not, replace TVS.

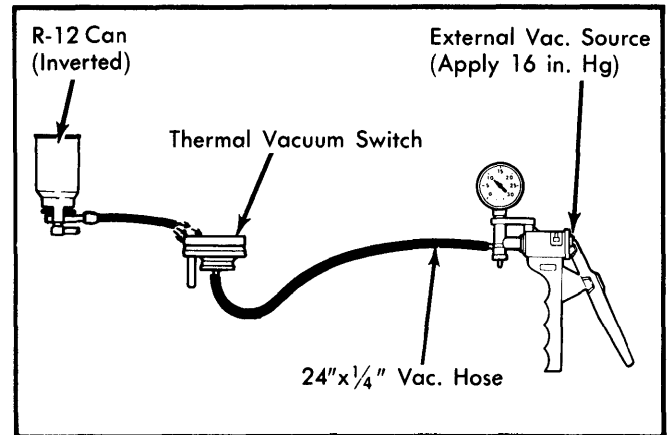


Fig. 5 Testing Thermal Vacuum Switch