FORD MOTOR CO. EXHAUST GAS RECIRCULATION (EGR) SYSTEM

DESCRIPTION

The exhaust gas recirculation system (EGR) is designed to reintroduce small amounts of exhaust gas into the combustion cycle, thus reducing the amounts of NOx emissions. The amount of exhaust gas recycled and the timing of the cycle are controlled by such factors as engine vacuum, exhaust system backpressure and temperature.

Typical systems consist of an EGR valve, a spacer plate on which the valve is mounted (usually under the carburetor), a vacuum amplifier, a check valve, and a ported vacuum switch (PVS).

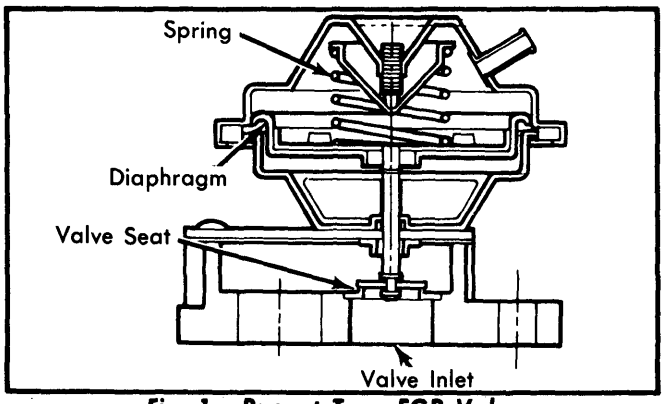

Fig. 1 Poppet Type EGR Valve

OPERATION

EGR VALVE

The EGR valve used with every system is a vacuum-operated valve. When the valve is open, exhaust gas recirculation can occur. When closed, the valve seals off all exhaust gas movement. Four types of these valves are used:

Poppet Type – This is a rapid-opening valve. The flow rate through the valve is limited by the size of the valve orifice or the opening in the spacer plate.

Internal Tapered Stem Type – This valve uses a pintle which moves the tapered portion of the valve up and down against the valve seat. Gas flow rate is determined by the amount of movement of the taper off of the seat.

NOTE – *EEC equipped models utilize a pintle position sensor mounted on top of the EGR valve. This provides additional signals to the computer to allow more precise EGR flow.*

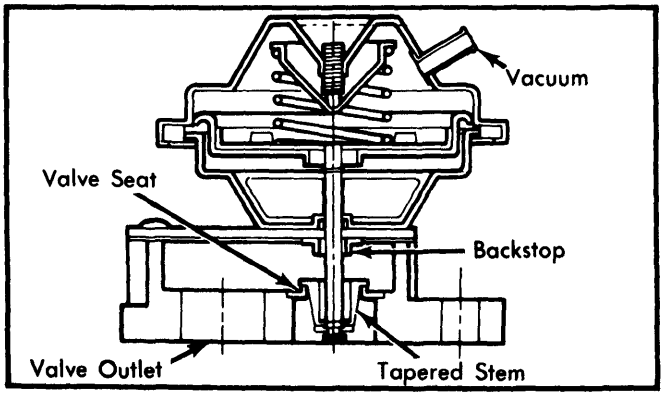

Fig. 2 Internal Tapered Stem Type EGR Valve

Integral Backpressure Transducer Type – This valve combines an exhaust gas backpressure transducer within the diaphragm housing of a typical EGR valve. This device modulates EGR flow by venting the available vacuum in relation to the exhaust backpressure. The backpressure is sensed in the valve between the opening and poppet/tapered stem. Flow rate is dependent on source vacuum, exhaust pressure, control setting and orifice size.

EGR LOAD CONTROL (WOT) VALVE

Controls and closes EGR valve when engine requires maximum power at or near wide open throttle (WOT). Senses venturi vacuum at a predetermined level and causes valve to close or to open when engine load is reduced from WOT.

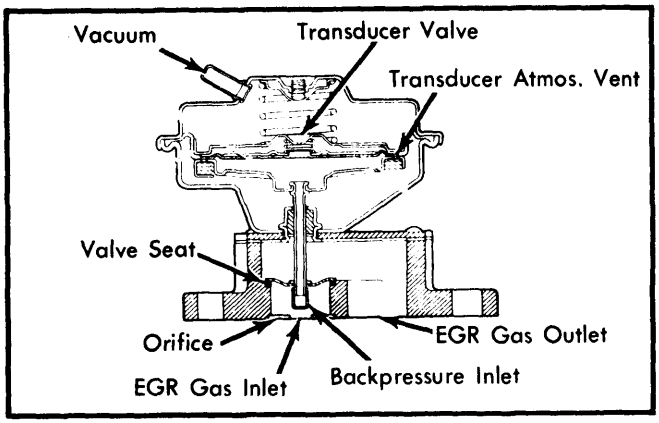

Fig. 3 Integral Backpressure Transducer Type EGR Valve

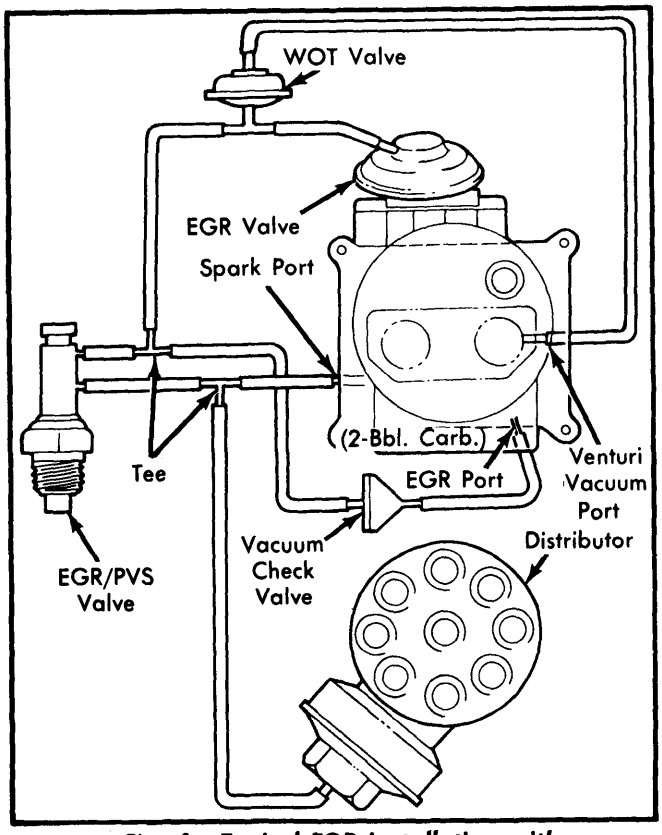

Fig. 4 Typical EGR Installation with Vacuum Load Control (WOT) Valve

FORD MOTOR CO. EXHAUST GAS RECIRCULATION (EGR) SYSTEM (Cont.)

EGR COOLANT SPARK CONTROL (EGR/CSC)

At cold start, below PVS opening temperature, the ported vacuum switch connects carburetor EGR vacuum signal to the distributor through the check valve (bypassing the spark delay valve). When PVS opening temperature is reached, EGR port vacuum switches from the distributor to the EGR valve. EGR valve operation is controlled by carburetor EGR spark port and spark advance is controlled by the spark vacuum port acting through the cooling PVS and spark delay valve.

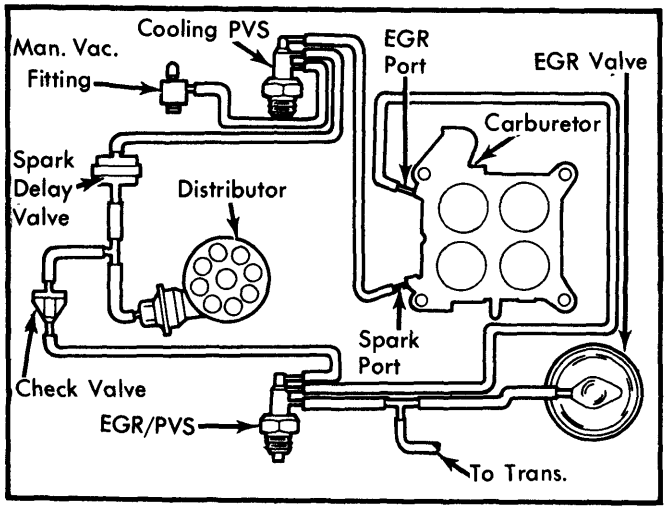

Fig. 5 EGR Coolant Spark Control (EGR/CSC) System

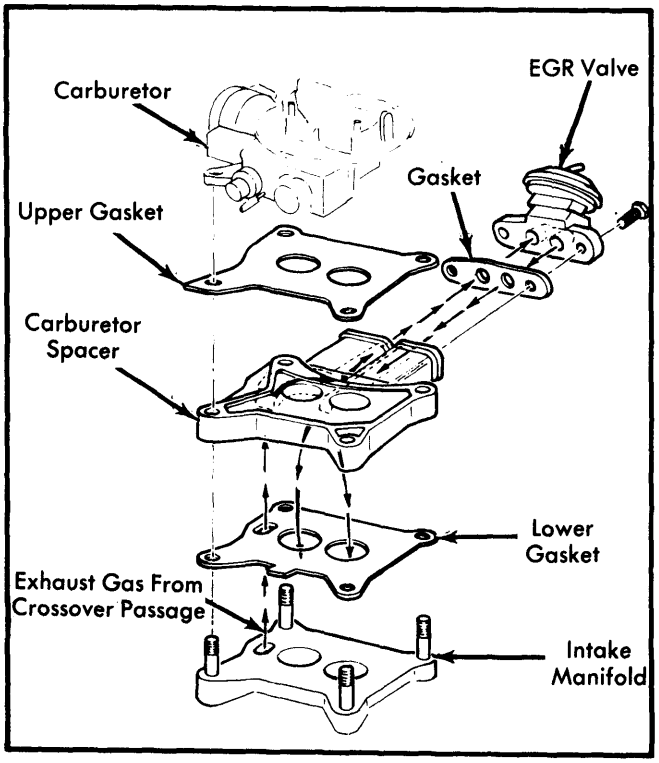

Fig. 6 Spacer Components for EGR Mounting (Typical)

TESTING

EGR SYSTEM (ON VEHICLE)

Integral BPS Type – Remove air cleaner and position so TVS switch vacuum hoses are left connected.

1) Inspect EGR vacuum hose routing for proper connection *(see Vacuum Diagrams in this section).*

2) Visually inspect valve for obvious external defects, such as broken support brackets or diaphragm vacuum nipple. Check for blowouts of gaskets.

3) With engine at normal operating temperature and in neutral, open and close the throttle. See that the stem and diaphragm moves upward, oscillates, and moves downward when the engine returns to idle.

4) If no movement or improper oscillation, disconnect vacuum supply hose between EGR vacuum load control valve and TVS, at vacuum load control valve, and connect a vacuum gauge to the hose. Raise engine speed to 1200-1500 RPM and check for at least 4.0 in. Hg. If less than 4.0 in. Hg, perfrom EGR PVS check, air cleaner TVS check, and carburetor EGR port or spark port procedure.

5) Remove vacuum hose between EGR vacuum load control valve and backpressure transducer at load control valve. Connect vacuum gauge to port on load control valve. Remove hose from venturi port on carburetor to vacuum load control valve at valve. Raise idle speed to 1200-1500 RPM. If less than 4.0 in. Hg, replace EGR vacuum load control valve.

6) If more than 4.0 in. Hg, apply vacuum from external source to venturi port of load control valve. If decal on valve is blue, apply 3.0 in. Hg., if red, apply 4.5 in. Hg. Replace load control valve if vacuum does not drop less than 2.0 in. Hg or if vacuum drops to less than 2.0 in. Hg but does not return to greater than 4.0 in. Hg when external vacuum is removed.

CAUTION – Do not exceed ½ throttle or 3000 RPM when opening or closing throttle.

CARBURETOR EGR PORTS

1) Attach a vacuum gauge directly to EGR source on carburetor. With engine running, open throttle quickly to at least ½ open position. Avoid overspeeding engine.

2) Observe vacuum gauge for a quick rise and fall as throttle is opened and closed. If vacuum is evident, EGR port is open. If no vacuum is evident, EGR port in carburetor is plugged or restricted and should be cleaned.