1974-79 EXHAUST EMISSION SYSTEMS
Ford Motor Co. Exhaust Gas Recirculation

1975-78 Capri, Capri II

DESCRIPTION

The Exhaust Gas Recirculation (EGR) system is designed to reintroduce small amounts of exhaust gases into combustion cycle, thus reducing generation of oxides of nitrogen (NOx). The amount of exhaust gas reintroduced and timing cycle are controlled by engine vacuum and temperature. Spacer entry system has EGR valve mounted on spacer block between carburetor and manifold.

A venturi vacuum amplifier is used to change a relatively weak vacuum signal in throat of carburetor to a strong manifold vacuum signal at EGR valve. A relief valve is also used to dump or cancel output EGR signal whenever venturi vacuum is equal to, or greater than manifold vacuum. This allows EGR valve to close at or near wide open throttle, when maximum engine power is required.

OPERATION

The EGR cold start cycle regulates both distributor spark advance and EGR valve operation according to coolant temperature. *See Figs. 1 and 2.* When engine coolant temperature is below 82°F (28°C), the EGR Ported Vacuum Switch (PVS) admits carburetor ported vacuum directly to distributor advance diaphragm, through one-way check valve. At the same time, the PVS shuts off carburetor EGR vacuum to EGR valve and transmission diaphragm.

When engine coolant temperature is above 95°F (35°C), the PVS is actuated and directs vacuum to EGR valve and transmission instead of distributor. At temperatures between 82-95°F (28-35°C), the PVS may be open, closed or in mid-position. The Spark Delay Valve (SDV) delays carburetor spark vacuum to distributor advance diaphragm for a predetermined time. During normal acceleration, little or no vacuum is admitted to distributor advance diaphragm until acceleration is completed.

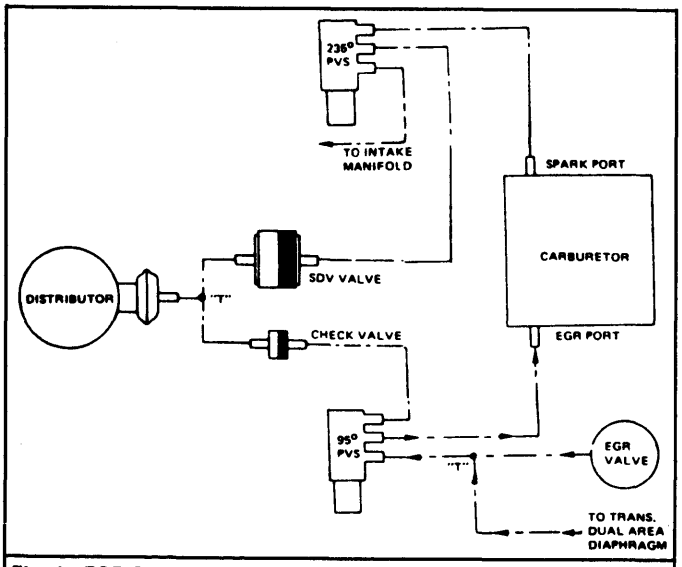

Fig. 1: EGR System Operation Above 95°F (35°C)

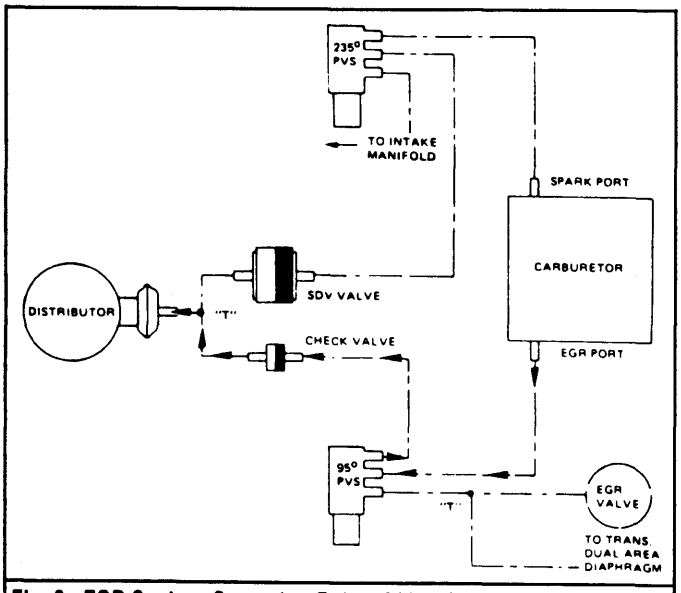

Fig. 2: EGR System Operation Below 82°F (28°C)

TESTING

EGR SYSTEM

1) Check all vacuum hoses to make sure they are in good condition. Remove EGR vacuum supply hose from EGR valve and install a vacuum hose from EGR valve to a hand-held vacuum pump and gauge. Start engine and stabilize temperature.
2) Gradually apply vacuum to EGR valve, while observing movement of EGR valve stem. Valve stem should be seen to move at 1 in. Hg. If valve does not start to open, it must be replaced. With engine off, apply 8 in. Hg to EGR valve. Vacuum should hold for a minimum of 30 seconds. If not, replace EGR valve.
3) With engine at idle, apply at least 8 in. Hg to EGR valve. Valve stem should move to full extent of its travel. Engine should run rough or stall. If not, there is something plugging EGR system. Clean system and repeat test.
4) Restart engine and stabilize temperature. If engine idles roughly, EGR valve may not be sealing properly. Install a new EGR valve and gasket. Recheck idle condition. If there is no improvement, problem is elsewhere, reinstall original EGR valve and check other components.

CARBURETOR EGR PORTS

1) Attach a vacuum gauge directly to EGR source on carburetor. With engine running, open throttle quickly to at least 1/2 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.

VENTURI VACUUM AMPLIFIER

NOTE: Amplifier output bias may be 0-3 in. Hg depending on engine application.

Single Vacuum Plug Design - 1) Remove output hose from amplifier (EGR valve-to-vacuum amplifier hose) and connect hose to a vacuum gauge. *See Fig. 3.* Remove reservoir vacuum hose and "T" it with the source vacuum line.
2) Momentarily increase engine speed to 1500-2000 RPM. With engine at idle, remove vacuum hose at carburetor venturi. Vacuum gauge reading should be within 0.3 in. Hg of bias value. If not, replace vacuum amplifier.
3) Depress accelerator pedal and release after engine speed has reached 1500-2000 RPM. If vacuum gauge shows an increase of 1 in. Hg or more during acceleration, replace vacuum amplifier.
4) Connect venturi hose to carburetor. If vacuum gauge reading increases more than 0.5 in. Hg check idle speed and correct if necessary. Rapidly increase engine speed to 1500-2000 RPM and note vacuum gauge reading. Vacuum should increase to above 4 in. Hg during acceleration and return to specified bias at idle. If not, replace vacuum amplifier.

Dual Vacuum Plug Design - 1) Remove output hose from amplifier (EGR valve-to-vacuum amplifier hose) and connect hose to vacuum gauge. *See Fig. 4.* Remove reservoir vacuum hose and "T" it with the source vacuum line.

1974-79 EXHAUST EMISSION SYSTEMS
Ford Motor Co. Exhaust Gas Recirculation (Cont.)

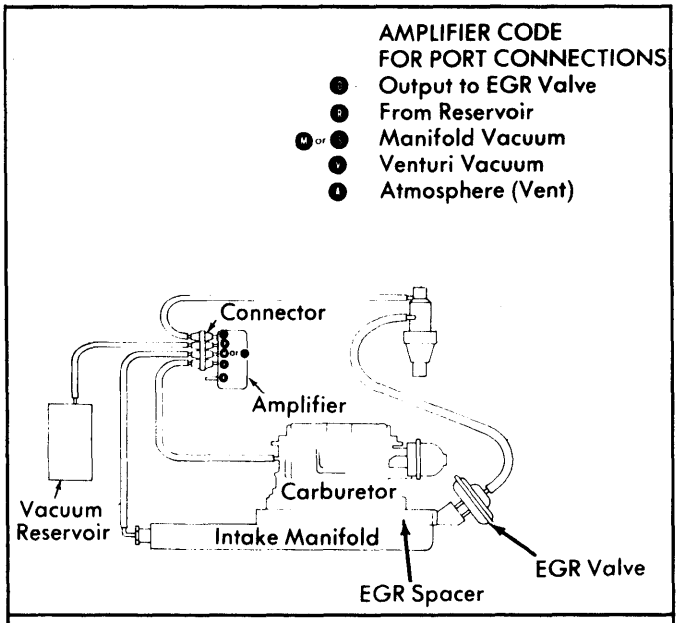

Fig. 3: Single Connector Vacuum Amplifier

2) Momentarily increase engine speed to 1500-2000 RPM. With engine at idle, remove vacuum hose at carburetor venturi. Vacuum gauge reading should be within 0.3 in. Hg of bias value. If not, replace vacuum amplifier.

3) Depress accelerator pedal and release after engine speed has reached 1500-2000 RPM. If vacuum gauge shows an increase of 1 in. Hg or more during acceleration, replace vacuum amplifier.

4) Connect venturi hose to carburetor. If vacuum gauge reading increases more than 0.5 in. Hg, check idle speed and correct if necessary. Rapidly increase engine speed to 1500-2000 RPM and note vacuum reading. Vacuum should increase above 4 in. Hg during acceleration and return to specified bias at idle. If not, replace vacuum amplifier.

5) Connect vacuum reservoir port of vacuum amplifier to manifold vacuum, "S" port to spark port vacuum, "V" port to venturi vacuum, and "C" port to a vacuum gauge.

6) Increase engine speed to 1500-2000 RPM and allow engine to return to idle. Remove vacuum hose at venturi and check spark port vacuum. Vacuum gauge should read less than 0.5 in. Hg. If not, replace vacuum amplifier.

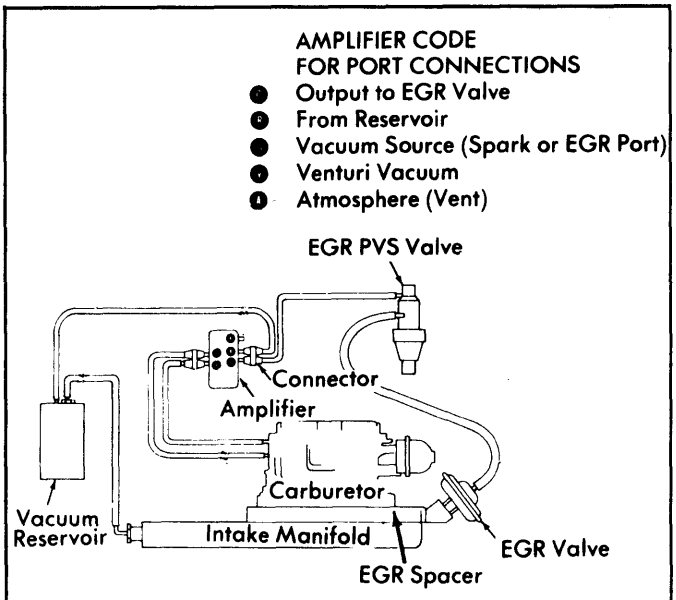

Fig. 4: Dual Connector Vacuum Amplifier

VACUUM RESERVOIR

1) If vacuum reservoir does not use an external check valve, disconnect reservoir to amplifier hose. Evacuate reservoir to 14 in. Hg and trap vacuum. Vacuum should hold within 1 in. Hg for one minute. If not, replace vacuum reservoir.

2) If reservoir utilizes an external check valve, apply 15 in. Hg at "T" between check valve and reservoir (amplifier side of "T"). Vacuum should remain trapped within 1 in. Hg for one minute. If not, remove hose to reservoir at "T" and apply 15 in. Hg of vacuum to reservoir.

3) Vacuum should remain trapped within 1 in. Hg for one minute. If not, replace reservoir. If reservoir is okay, inspect check valve by removing hose to check valve at "T" and apply 15 in. Hg of vacuum. Vacuum should remain trapped within 1 in. Hg for one minute. If not, replace check valve.