1974 FORD MOTOR CO.
EXHAUST GAS RECIRCULATION (EGR) SYSTEM

DESCRIPTION

Exhaust Gas Recirculation (EGR) System is designed to reintroduce small amounts of exhaust 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, temperature and on 460" Police Interceptor by vehicle speed. Two types of exhaust gas introduction are used; spacer entry and floor entry with EGR valve mounted on spacer block between carburetor and manifold or on some V8 models at rear of intake 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

EGR/CSC (Cold Start Cycle) regulates both distributor spark advance and EGR valve operation according to coolant temperature, by sequentially switching vacuum signals. When engine coolant temperature is below 82°F, EGR/CSC valve admits carburetor EGR port vacuum (occuring at about 2500 RPM) directly to distributor advance diaphragm, through one-way check valve. At same time, EGR/PVS valve shuts off carburetor EGR vacuum to EGR valve and transmission diaphragm.

When engine coolant temperature is 95°F and above, EGR/PVS valve is actuated and directs carburetor EGR vacuum to EGR valve and transmission instead of distributor. At temperatures between 82°F and 95°F, EGR/PVS valve may be open, closed or in mid-position. SDV valve 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 because of the following; time delay of SDV valve and re-routing of EGR port vacuum, if engine temperature is 95°F or higher. The check valve blocks off vacuum signal from SDV valve to EGR/PVS valve so that carburetor spark vacuum will not be dissipated when EGR/PVS valve is actuated above 95°F.

TESTING

SYSTEM OPERATIONAL TEST

Bring engine to normal operating temperature. Connect a vacuum gauge at distributor advance vacuum hose.

1) Run engine to 1500 RPM, there should be no vacuum. If vacuum is present, replace SDV valve.

2) Wait 40 seconds, there should be vacuum. If there is no vacuum, check vacuum source back to carburetor spark port. If vacuum source checks out, replace SDV valve.

3) Disconnect hose from black side of check valve, there should be vacuum. If there is no vacuum or vacuum drops, replace check valve.

4) Return to idle and reconnect hose at distributor. Connect gauge to hose at black side of check valve. Turn engine to 2500 RPM, there should be no vacuum. If vacuum is present, replace EGR/PVS valve.

5) Return to idle and reconnect hose at check valve. Connect gauge to hose at EGR valve. Run engine to 2500 RPM, there should be vacuum. If there is no vacuum, check vacuum source back to carburetor EGR port.

EGR SYSTEM (ON VEHICLE)

Check all vacuum hoses to make sure they are open and in good condition. Remove EGR vacuum supply hose from EGR valve and install a vacuum hose from EGR valve to an external gauge (in increments of 1 in. Hg with .10 in. Hg graduations) with a variable vacuum source of 10 in. Hg capacity.

1) Start engine and stabilize temperature. Gradually apply vacuum to EGR valve, while observing movement of EGR valve stem. Valve stem should be seen to move with ½-1 in. Hg. If valve does not start to open, replace it.

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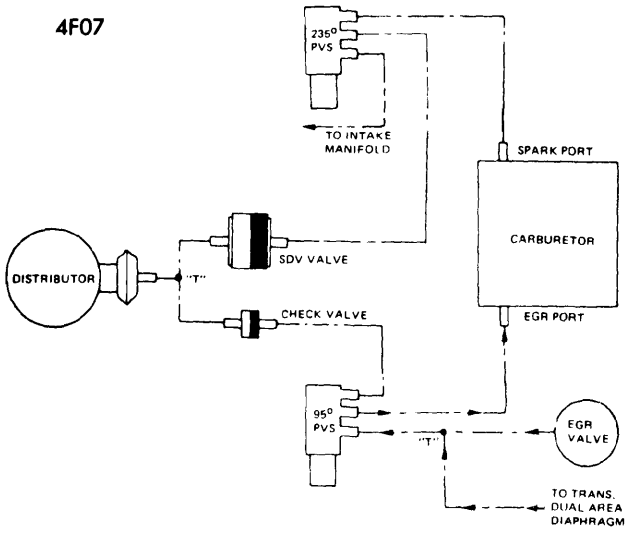

EGR/CSC SYSTEM (ABOVE 95°F)

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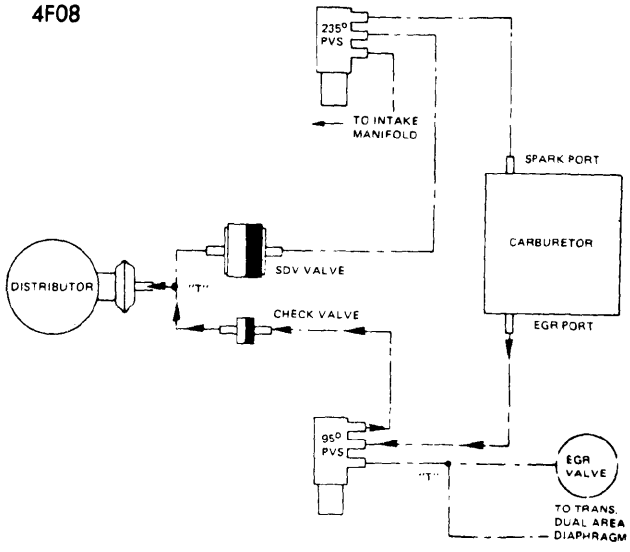

EGR/CSC SYSTEM (BELOW 82°F)

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EXHAUST GAS RECIRCULATION (EGR) SYSTEM (Cont.)

2) With engine at idle, apply at least 8 in. Hg vacuum to EGR valve. Engine should roughen, RPM should decrease and/or stop completely. If idle quality does not change, there is no EGR flow and something is plugging EGR system. Clean system and repeat test.

3) With engine "OFF", apply 8 in. Hg for a minimum of 30 seconds. Replace EGR valve, if out of specification. Restart engine and stabilize temperature. If engine idle quality is not acceptable, EGR valve may not be sealing properly. If this condition is encountered, install a new EGR valve and gasket.

4) Recheck idle condition. If there is no improvement problem is elsewhere, replace original EGR valve and check other components of system.

CARBURETOR EGR PORT(S)

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.

VENTURI VACUUM AMPLIFIER

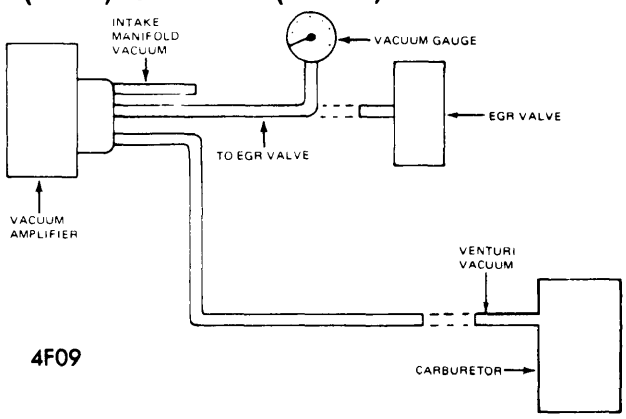
Amplifiers have built-in calibrations, and no external adjustments are required. If an amplifier test reveals a malfunction, replace amplifier.

NOTE — Amplifier output bias may be either O in.Hg or 2 in. Hg depending on engine application.

1) Operate engine until normal operating temperature is reached. Remove hose at EGR valve (see illustration). Connect vacuum gauge to EGR hose. Gauge must read in increments of at least 1 in. Hg graduations.

2) Remove hose at carburetor venturi and leave disconnected. With engine at curb idle speed, vacuum gauge reading should be within ±.3 in. Hg of proper bias for specifications other than 0 in. Hg bias. For 0 in. Hg bias, reading should be 0-.5 in. Hg bias. If out of specification, replace amplifier.

3) Depress accelerator and release after engine has reached 1500-2000 RPM. After engine has returned to idle, vacuum must return to proper bias value. If bias has changed, replace amplifier. If vacuum shows a marked increase (greater than 1 in. Hg) during acceleration period, amplifier should be replaced.



VENTURI VACUUM AMPLIFIER (BIAS TEST)

4) Reconnect venturi hose at carburetor with engine at curb idle RPM. If a sizeable increase in output vacuum is observed, (more than .5 in. Hg above step 2), check idle speed.

5) Check amplifier reservoir and connections as follows; disconnect external reservoir hose at amplifier and plug hose, depress accelerator rapidly to 1500-2000 RPM. Vacuum should increase to 4 in. Hg or more. If out of specification, replace amplifier.

SYSTEM CLEANING

EGR VALVE

CAUTION — Do not strike or pry on valve diaphragm housing or supports, as this may damage valve operating mechanism and/or change valve calibration.

Check orifice in EGR valve body for deposits. A small hand drill may be used to clean hole if plugged. Use care not to damage or enlarge hole. Valves which are riveted or permanently assembled should be replaced if highly contaminated. Valves which can be disassembled, separate diaphragm from main body. Clean valve plates, stem and mounting plate with a small power driven wire brush. Remove deposits between stem and valve disc by using a steel blade or shim approximately .028" thick in a sawing motion around stem shoulder at both sides of disc. Poppet must wobble and move axially before reassembly. Clean cavity and passages in main body of valve.