

# 1974-79 EXHAUST EMISSION SYSTEMS

## Ford Motor Co. Exhaust Gas Recirculation

### 1976-79 Courier

#### DESCRIPTION

The Exhaust Gas Recirculation (EGR) System used on all Courier models is designed to reintroduce a small amount of exhaust gases into the combustion cycle, thereby reducing combustion temperatures and reducing the generation of oxides of nitrogen (NOx). The amount of exhaust gases reintroduced and the timing of the combustion cycle are controlled by various factors such as engine vacuum and temperature. The EGR system's main components are the EGR valve, thermo valve(s), three-way solenoid valve (if equipped), and vacuum amplifier.

#### OPERATION

##### EGR CONTROL VALVE

The EGR control valve is controlled by engine vacuum. With vacuum applied to valve, valve opens and allows exhaust gases to enter intake manifold. With no vacuum applied to valve, valve closes and no recirculation will occur.

##### THERMO VALVE

Thermo valve senses engine coolant temperature, and allows or denies vacuum to EGR valve, depending on engine temperature. Below 131°F (55°C), thermo valve is closed and no vacuum from intake manifold reaches EGR valve. Above this temperature, valve is open and EGR function occurs.

**NOTE:** On 1979 California vehicles with 2.0L engine, two thermo valves are used, one of which is connected to the air control valve and not the EGR.

##### THREE-WAY SOLENOID

On 1976-78 models, power to three-way solenoid is controlled by coolant thermo switch. When coolant temperature is below 109°F (43°C), the switch will close and energize three-way solenoid. This will close vacuum passage to EGR valve. When coolant temperature is above 122°F (50°C), the thermo switch opens and de-energize three-way solenoid, allowing vacuum to reach EGR valve.

Used on all 1979 models, except California 2.3L engine. The solenoid on 2.0L engines is electrically connected to engine speed switch and is energized to open and allow vacuum to pass normally when predetermined vehicle speed is reached. On Federal 2.3L engines, solenoid is connected to choke control knob. Position of choke knob determines whether solenoid is energized or not.

##### VACUUM AMPLIFIER

The vacuum amplifier supplies varying amounts of vacuum to the EGR valve. This provides a finer control of the amount of exhaust gas recirculation during different engine operating conditions.

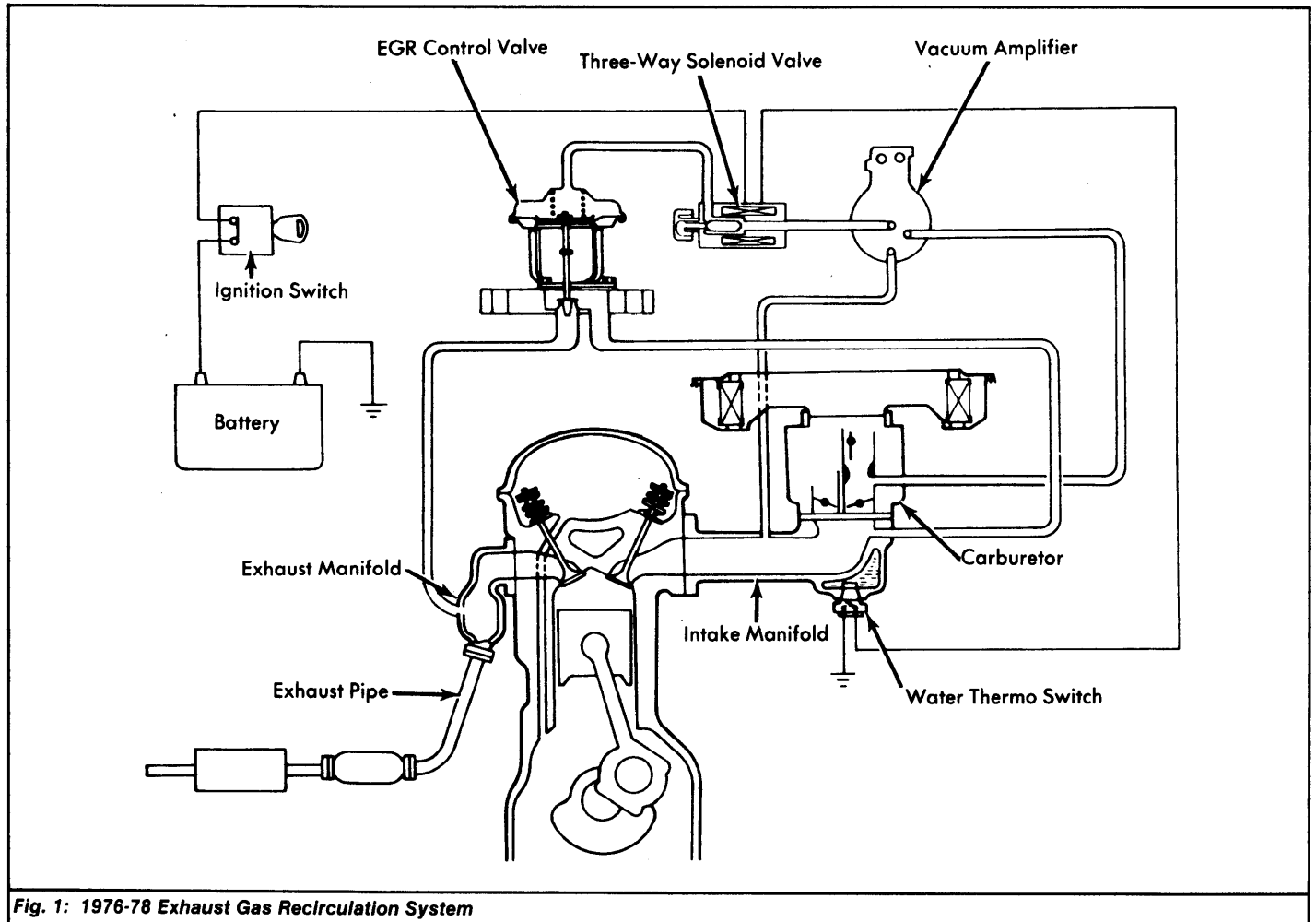


Fig. 1: 1976-78 Exhaust Gas Recirculation System

# 1974-79 EXHAUST EMISSION SYSTEMS

## Ford Motor Co. Exhaust Gas Recirculation (Cont.)

### TESTING

#### EGR VALVE

- 1) Start and run engine at idle. Detach EGR valve vacuum hose from valve. Attach EGR hose directly to manifold vacuum source. Engine should stall or idle roughly.
- 2) If not, turn engine off and remove EGR valve and pipe from engine. Clean passages with brush and wire. Reinstall items and repeat test. If engine still does not run rough or stall, replace EGR valve. When system functions as indicated, return vacuum hose to original position.

#### THERMO VALVE

- 1979 Models** - 1) Remove thermo valve from bottom of intake manifold. Place in container of water with thermometer. Slowly heat up water.
- 2) When cold, no air should pass through valve (blow through vacuum line still attached to thermo valve fittings). When water reaches at least 115°F (45°C), air should pass through valve. If not, replace thermo valve.

#### THREE WAY SOLENOID

- 1976-78 Models** - 1) Disconnect electrical leads from thermo valve and connect jumper wire to thermo valve harness connectors to complete circuit. Turn ignition on.
- 2) Disconnect vacuum hose from EGR valve and blow into hose. Check for air discharge from three-way solenoid relief port. If there is no air discharge, replace solenoid valve.

#### VACUUM AMPLIFIER

- 1) Start and warm engine to normal operating temperature. Detach vacuum amplifier hose from thermo valve and connect vacuum gauge to this hose. Detach vacuum amplifier hose from carburetor.
- 2) Depress accelerator pedal several times, then allow engine to return to idle. Vacuum gauge should read 2.0-2.4 in. Hg.
- 3) Connect amplifier hose back to carburetor. Increase engine speed to 3500 RPM. Vacuum gauge should now read 3.54 in. Hg. If amplifier does not test as indicated, it should be replaced.

### MAINTENANCE

#### EGR SYSTEM

- 1976-78 Models** - 1) Every 12,500 miles the EGR warning lamp on instrument panel will come on. When lamp comes on, the EGR valve should be inspected and tested. After servicing EGR system, the EGR warning lamp switch should be reset.
- 2) To reset switch, remove EGR switch cover. Switch is located behind speedometer. Slide switch knob in the opposite direction and the lamp

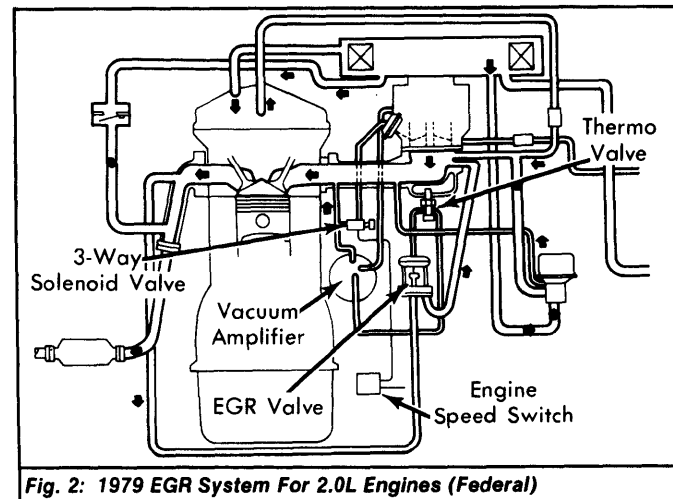


Fig. 2: 1979 EGR System For 2.0L Engines (Federal)

will go out. Every 25,000 miles, the EGR valve should be removed and cleaned.

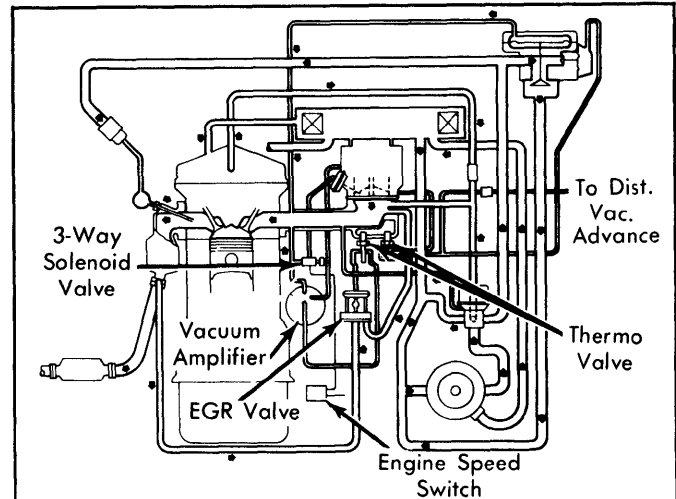


Fig. 3: 1979 2.0L Engine EGR System (Calif.)

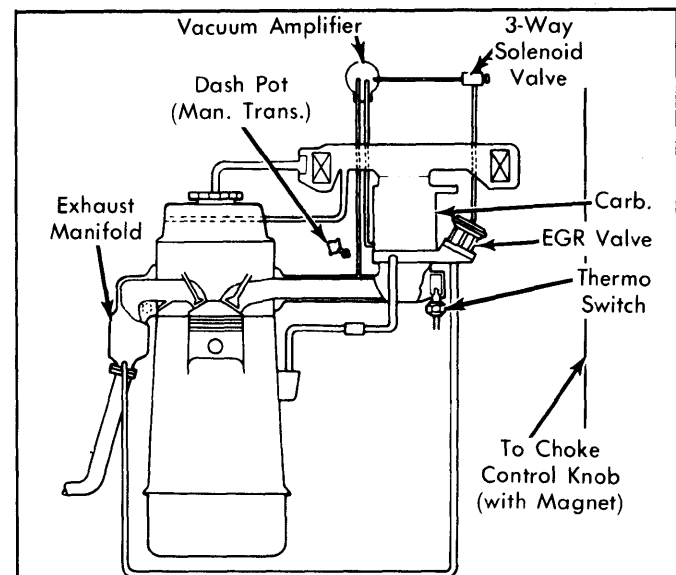


Fig. 4: 1979 2.3L Engine EGR System (Federal)

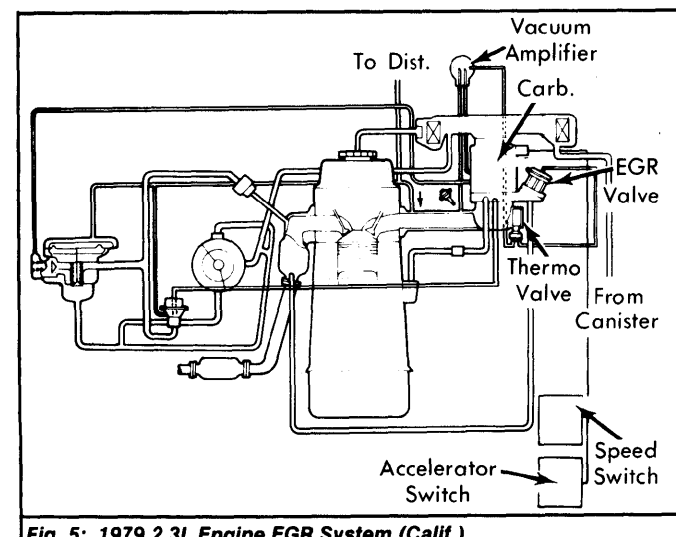


Fig. 5: 1979 2.3L Engine EGR System (Calif.)