JEEP EXHAUST GAS RECIRCULATION

DESCRIPTION

Purpose of Exhaust Gas Recirculation (EGR) System is to limit formation of oxides of nitrogen by diluting intake charge with a metered amount of exhaust gas, thereby reducing the peak temperatures of gases in engine combustion chambers. Exhaust gas introduced is inert, and much cooler than combustion temperature. Since it will not burn, peak combustion temperature is lowered. The EGR system consists of a diaphragm actuated flow control valve (EGR valve), Coolant Temperature Override Switch (CTO) and connecting hoses. In addition vehicles built before March 15, 1973 are equipped with a Low Temperature Vacuum Signal Modulator (Exc. V8 with Man. Trans.) and a High Temperature Vacuum Signal Modulator. California vehicles equipped with 360" engines with automatic transmission (Exc. Heavy-Duty Trucks), are equipped with an Exhaust Back Pressure Sensor.

OPERATION

When EGR Valve receives a vacuum signal from Coolant Temperature Override Switch, valve opens, metering gases from exhaust crossover passage into intake manifold. At 115°F or higher, center and lower ports of CTO switch open (top port is unconnected and not used) and vacuum signal reaches EGR valve. Signals are further regulated by High and Low Temperature Vacuum Modulators. Below 60°F the Low Temperature Vacuum Signal Modulator opens, causing a decrease in amounts of exhaust gases being recycled, or if underhood air temperature reaches 115°F, High Temperature Vacuum Signal Modulator opens, and reduction of recirculated exhaust gases also occurs.

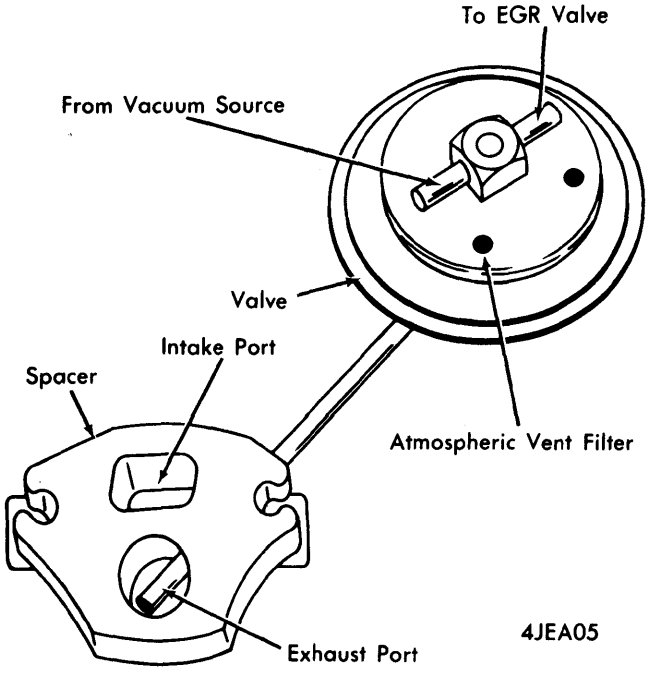
EGR Valve – EGR valve is located on a machined surface at rear of intake manifold on V8 engines and on side of intake manifold on 6-cylinder engines. Valve is held in a normally closed position by a coiled spring located above diaphragm. A special fitting is provided at carburetor to route ported vacuum through hose connections to a fitting on valve which is located above diaphragm. A passage in intake manifold directs exhaust gas from exhaust cross over passage (V8 engine) or from below heat riser area (6-cylinder) to EGR valve. When diaphragm is actuated by vacuum, pintle is pulled off its seat and exhaust gas is metered through another passage in intake manifold (V8) to floor of manifold below carburetor (6-cylinder) or to sidewall of manifold below carburetor.

CTO Switch – CTO switch is located at coolant passage of intake manifold (adjacent to oil filler tube) on V8 engines or at left front side of cylinder block on 6-cylinder engines. The outer port of switch is open and not used. Inner port is connected by a hose to EGR port at carburetor. Center port is connected to EGR valve. When coolant temperature is below 115°F, no vacuum signal is applied to EGR valve; therefore, no exhaust gas will flow through valve. When coolant temperature reaches 115°F, both the inner and center port of switch are open and a vacuum signal is applied to EGR valve.

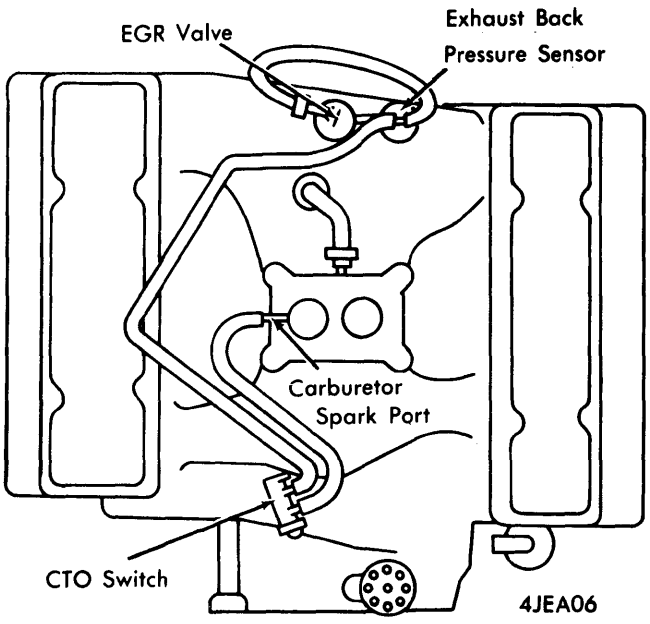
Low Temperature Vacuum Signal Modulator – Located at left side of upper crossmember, just ahead of radiator and is connected to EGR vacuum signal hose. When ambient temperatures are below 60°F, modulator opens, causing a weakened vacuum signal to EGR valve resulting in a decreased amount of exhaust gas recirculation.

High Temperature Vacuum Signal Modulator – Located at right front fender inner panel or on firewall just to right of battery. This modulator operates when underhood temperatures reach 115°F, causing a weakened vacuum signal to EGR valve, resulting in a decrease in amount of exhaust gas recirculated.

Exhaust Back Pressure Sensor – This device consists of a diaphragm valve, spacer and metal tube. Metal tube connects valve to spacer. EGR valve is mounted to spacer portion of sensor, and is modulated by sensor. Vacuum signal passes through CTO switch (when coolant temperature exceeds 115°F) to valve portion of sensor where it is modulated by exhaust back pressure.



EXHAUST BACK PRESSURE SENSOR



EGR SYSTEM (360" WITH BACK PRESSURE SENSOR)

JEEP EXHAUST GAS RECIRCULATION (Cont.)

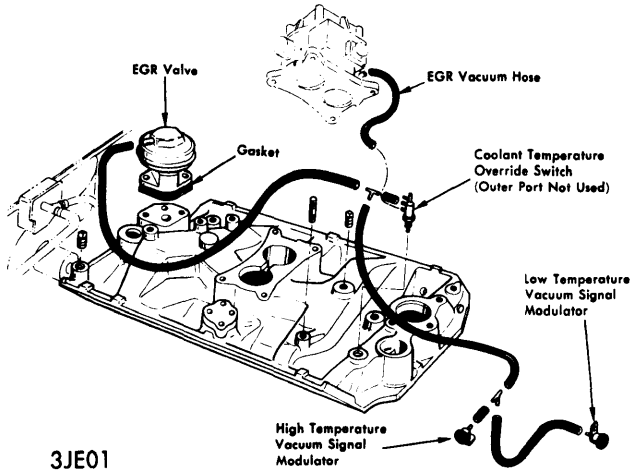
MAINTENANCE & TESTING

Inspection of EGR System is required at every 10,000 mile interval. If leaded fuel is used, clean EGR valve each time system is inspected. If unleaded fuel is used, cleaning is required every 25,000 miles.

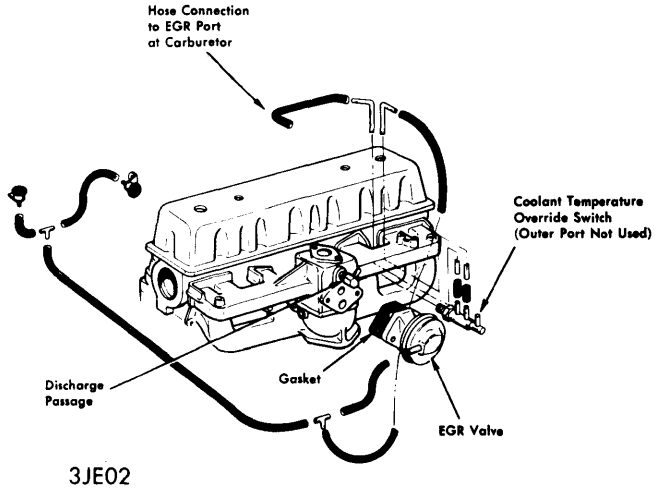
EGR Valve – With engine at normal operating temperature and running at curb idle speed, manually compress EGR diaphragm, lifting pintle off its seat. This should cause a sudden drop in engine RPM (approximately 200 RPM) indicating that EGR valve is closing off exhaust from intake passage when no vacuum is applied. If there is no change in engine RPM but engine idles properly, EGR passage to intake manifold is blocked. If engine is idling poorly, and lifting pintle off of its seat does not affect idle RPM, there is probably full time exhaust gas recirculation caused by EGR valve sticking open, a defective EGR valve, or a flaw in intake manifold.

CTO Switch – Check vacuum lines for leaks and correct routing. *NOTE – Engine coolant temperature must be below 100°F to perform test.* Disconnect vacuum line at EGR valve and connect vacuum gauge to line. Operate engine at approximately 1500 RPM; no vacuum should be indicated on gauge. If vacuum is indicated, replace CTO switch. Operate engine until coolant temperature exceeds 115°F. Accelerate engine to 1500 RPM; carburetor ported vacuum should be indicated on vacuum gauge. If not replace CTO switch.

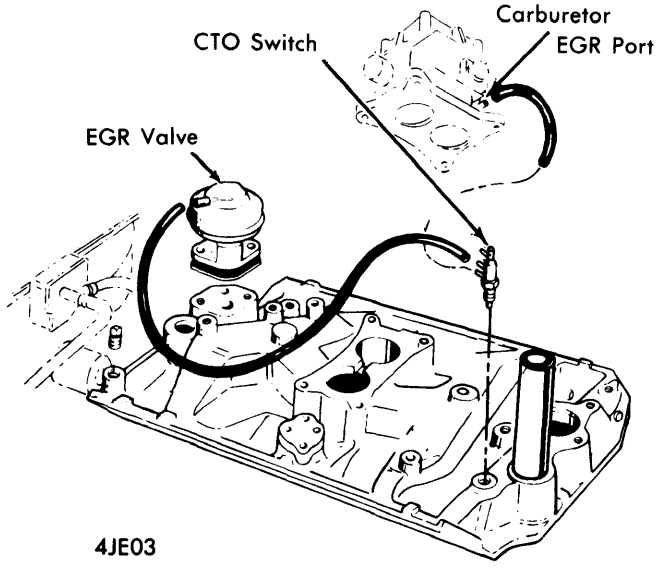
Exhaust Back Pressure Sensor – Install a "T" in vacuum line between EGR valve and Exhast Back Pressure Sensor and attach a vacuum gauge to "T". Start engine and allow to idle. No vacuum should be indicated. Accelerate engine to 2000 RPM and observe vacuum gauge for following: if coolant temperature is below 115°F, no vacuum should be indicated. If coolant temperature is above 115°F, carburetor ported vacuum should be indicated. If no vacuum was indicated during test, be sure vacuum is being applied to inlet side of sensor. Then remove sensor and inspect spacer port and tube for restrictions. Restrictions caused by carbon or lead deposits can be removed with spiral wire brush. Otherwise, replace Back Pressure Sensor.



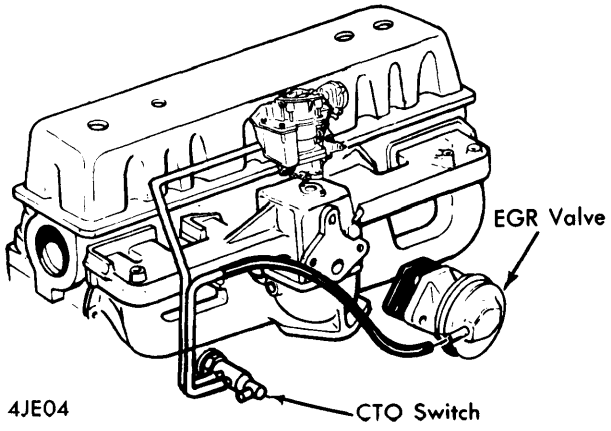
1973 EGR SYSTEM (V8)



1973 EGR SYSTEM (6-CYLINDER)



1974 EGR SYSTEM (V8)



1974 EGR SYSTEM (6-CYLINDER)