CHRYSLER CORP. EXHAUST GAS RECIRCULATION

DESCRIPTION

Exhaust gas recirculation allows a predetermined amount of hot exhaust gas to recirculate and dilute incoming air/fuel mixture. This reduces peak flame temperature during combustion, thereby reducing NOx emission. System consists of an EGR valve, timer, vacuum solenoid, vacuum amplifier, charge temperature switch (light duty), CCEGR valve (heavy duty) and an EGR maintenance reminder.

OPERATION

EGR system controls vacuum under varying conditions to EGR valve. The EGR valve is a vacuum actuated poppet type used to modulate exhaust gas flow from manifold crossover into incoming air/fuel mixture.

A vacuum tap at throat of carburetor venturi is used to provide control vacuum. Because of the low amount of vacuum, it is necessary to use a vacuum amplifier to increase vacuum to the level required for EGR valve operation.

Elimination of recycle at wide open throttle is accomplished by a dump diaphragm which compares venturi and manifold vacuum to determine when wide open throttle is reached. At wide open throttle, the internal reservoir is "dumped", limiting output to EGR valve opening point. Opening point is set above manifold vacuum available at wide open throttle, allowing closure of EGR valve at wide open throttle.

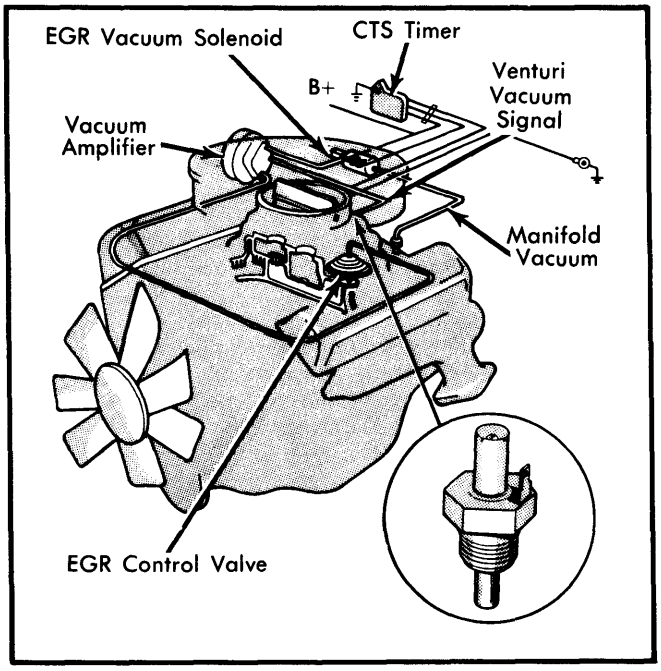

Fig. 1 Chrysler Corp. Exhaust Gas Recirculation System Schematic

EGR TIMER

The EGR timer is a delay system consisting of an electrical timer mounted on dash panel in engine compartment which controls an engine-mounted solenoid. Solenoid is connected by vacuum hoses between carburetor venturi signal nipple and vacuum amplifier. Purpose of timer system is to prevent EGR operation for a short period after ignition is turned on. Time interval is between 35 and 90 seconds, depending upon application. Timer operation is overridden by CCEGR valve. On CTS systems, timing function begins after switch opens to permit EGR operation.

NOTE – *Although similar in appearance, timers used on CTS systems are not interchangeable with those used on CCEGR systems.*

COOLANT CONTROL EGR (CCEGR) VALVE (HEAVY DUTY EMISSIONS ONLY)

CCEGR valve is used with EGR system to delay EGR operation until engine warm-up is achieved. Valve location and opening temperature varies according to vehicle model and engine type. On models with CCEGR valve in the radiator tank, opening temperature is 59°F. On models with valve in thermostat housing, opening temperature is 108-125°F.

CHARGE TEMPERATURE SWITCH (CTS) (LIGHT DUTY EMISSIONS ONLY)

A Charge Temperature Switch (CTS) is installed on a branch of engine intake manifold. When air/fuel mixture temperature is below 60°F, as sensed by CTS, switch closes, allowing no EGR timer function and no EGR valve operation. Above 60°F, air/fuel mixture temperature, timer and EGR switch operation are allowed.

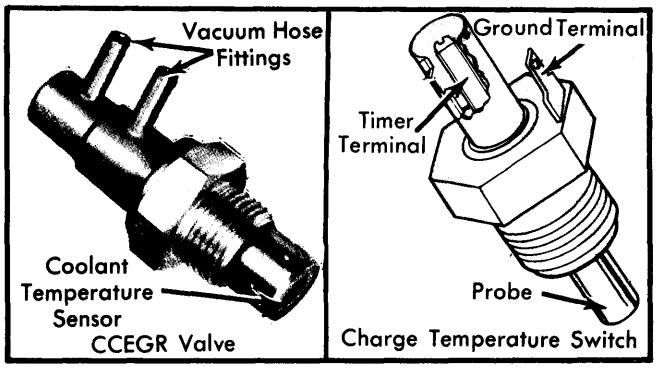

Fig. 2 CCEGR Valve & Charge Temperature Switch

TESTING

EGR SYSTEM OPERATION

1) With transmission in neutral, parking brake on and engine at normal operating temperature, allow engine to idle with throttle closed. Then, quickly accelerate engine to approximately 2,000 RPM while watching EGR valve stem. Stem should move when engine is accelerated. If not, refer to "Trouble Shooting" in this article.

2) Once EGR valve movement has been obtained, it is necessary to determine if EGR is actually taking place. On CCEGR systems, disconnect EGR valve-to-CCEGR valve hose at CCEGR valve. On CTS systems, disconnect hose from EGR valve-to-CTS valve. On all systems, disconnect air cleaner-to-carburetor hose at carburetor.

3) With engine idling at normal operating temperature, hold free end of EGR valve hose tightly against opening of carburetor connector (from which air cleaner hose was removed). With hose on connector, engine idle speed should drop about 150 RPM and may stall. This shows that EGR is taking place.

4) If speed does not change or change is less than minimum, exhaust deposits are in EGR valve or intake manifold passages. Remove valve for inspection and cleaning. Inspect manifold passages and clean as required.

CHRYSLER CORP. EXHAUST GAS RECIRCULATION (Cont.)

NOTE – *When cleaning valve, do not allow cleaning solvents on diaphragm. Do not push on diaphragm to operate valve, use vacuum only.*

EGR DELAY SYSTEM TEST

1) If equipped with Delay System, stop engine, then restart. Immediately open throttle to approximately 1,000 RPM and watch EGR valve stem for movement.

2) If it moves during first 30 seconds after starting, EGR time delay system is defective.

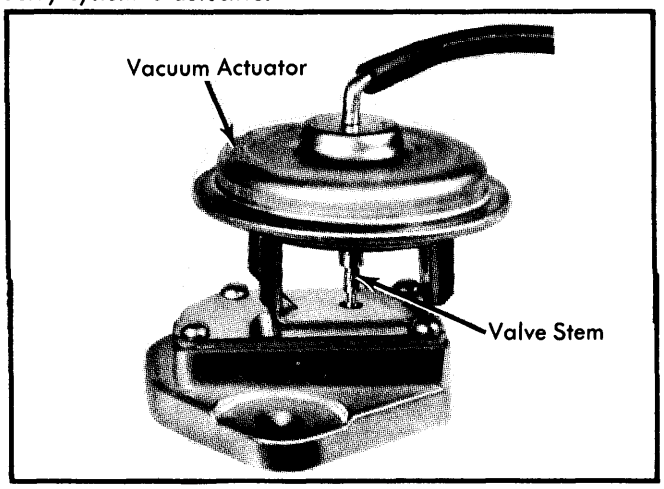

Fig. 3 Chrysler Corp. EGR Valve

3) Check hose connections to time delay solenoid valve. If okay, detach electrical plug from solenoid valve and energize valve by grounding either terminal and connecting the other terminal to the positive battery post.

4) If EGR valve stem moves on this test, solenoid valve is defective and must be replaced.

5) If EGR valve stem did not move, EGR timer control should be replaced. If this does not correct the problem, check wiring for proper connections.

EGR MAINTENANCE REMINDER

NOTE – *Reminder system consists of either a mechanical or electrical counter attached to the speedometer, and a reminder light on the instrument panel. The following test applies to mechanical counters only. There are no test procedures for electronic counters.*

With ignition switch "ON", disconnect leads from switch wiring harness connector. If lamp turns off, switch is defective and should be replaced. If lamp does not go off, check for short in wiring or incorrect wiring connections. With electrical leads disconnected and ignition "ON", connect a jumper wire between terminals in connector that lead to reminder lamp. If lamp turns on, switch is defective. If lamp does not turn on, check for burned out bulb, open in wiring at connector or incorrect wiring connection.

EGR REMINDER SWITCH RESET

EGR reminder switch must be reset whenever the reminder light comes on at the instrument panel. Switch is reset by inserting a small screwdriver into the hole on top of the switch and turning slightly. This closes the switch contacts and turns off the light. Switch is located behind instrument panel near speedometer.

TROUBLE SHOOTING

EGR VALVE STEM DOES NOT MOVE ON SYSTEM TEST

1) Check for correct hose connections and leak check to confirm all hoses are in good condition.

2) Check EGR valve for ruptured diaphragm or frozen valve stem by connecting external vacuum source of 10 in. Hg or greater to valve diaphragm. If no valve movement occurs, replace valve. If valve opens 1/8", pinch off supply hose to check for diaphragm leakage. Valve should remain open 30 seconds or longer. If leakage occurs, replace valve.

EGR VALVE STEM DOES NOT MOVE ON TEST; OPERATES OKAY WITH EXTERNAL VACUUM APPLIED

1) Check for defective CCEGR valve or CTS as follows:

- On CCEGR systems, by-pass CCEGR valve and connect vacuum amplifier directly to EGR valve. If EGR valve now operates normally, replace CCEGR valve.
- On CTS systems, by-pass EGR solenoid and connect vacuum amplifier directly to EGR valve. If EGR valve operates normally, reconnect EGR solenoid hoses and remove wire from timer terminal of CTS. If EGR valve operates within 90 seconds, replace CTS.

2) In Venturi Vacuum Control System, remove venturi vacuum hose from carburetor nipple. With engine at idle, apply two in. Hg vacuum to hose. Engine speed should drop 150 RPM or more and EGR valve stem should move 1/8" or more. If this does not occur, replace vacuum control valve.

3) If vacuum control amplifier operates normally in previous test, plugged vacuum tap to carburetor is indicated. Use suitable carburetor solvent to remove deposits from passage and clear with light air pressure.

NOTE – *Do not use drills or wires to clear carburetor control passages for either type of control system as calibration of precision orifices may be altered resulting in unsatisfactory vehicle operation.*

ROUGH IDLE, SLOW IDLE, OR STALL ON RETURN TO IDLE

1) Disconnect hose from EGR valve and plug hose. Recheck idle. If satisfactory, replace vacuum control amplifier.

2) If vacuum hose removal does not correct, remove EGR valve and inspect to insure poppet is seated. Clean poppet seat, replace if poppet does not seat correctly.

POOR COLD DRIVEABILITY, ROUGH IDLE OR STALLS ON RETURN TO IDLE

CCEGR valve or EGR control valve could be leaking. Check by performing leak test and replace valves as necessary.

WEAK PERFORMANCE ON WIDE OPEN THROTTLE

Disconnect hose from EGR valve and plug hose. Road test vehicle, if performance is restored, replace vacuum control amplifier.