1975-79 EXHAUST EMISSION SYSTEMS
Chrysler Corp. Exhaust Gas Recirculation

DESCRIPTION

Exhaust Gas Recirculation (EGR) allows a predetermined amount of hot exhaust gas to recirculate and dilute incoming air/fuel mixture. This diluting of the mixture reduces high heat peaks during combustion, thereby reducing NOx emissions.

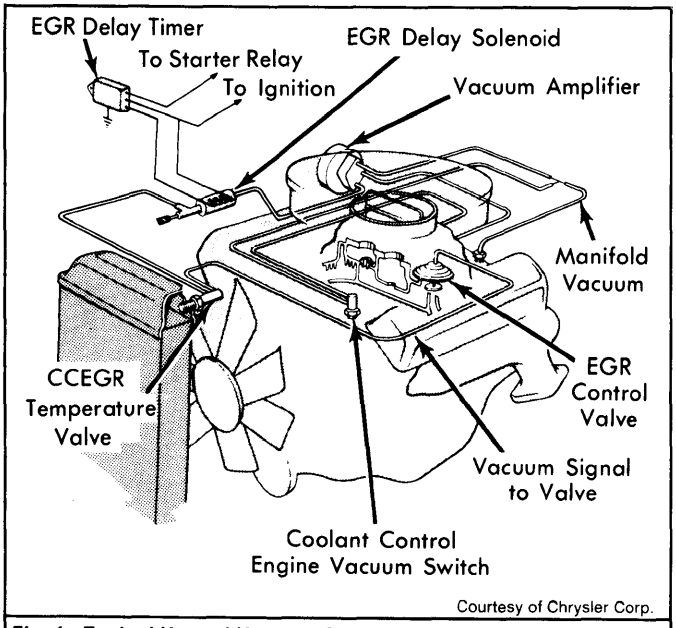

Fig. 1: Typical Venturi Vacuum Control EGR System

OPERATION

Two different EGR systems are used: Venturi Vacuum Control and Ported Vacuum Control. The EGR valve used with each system is identical; the difference is in the method of controlling vacuum to the valve. Only the Ported Vacuum Control system is used on 1978-79 Omni and Horizon; other Chrysler Corp. vehicles may use either type of system.

Venturi Vacuum Control System - 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 a level required to operate EGR valve. Elimination of EGR 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, permitting EGR valve to be closed at wide open throttle.

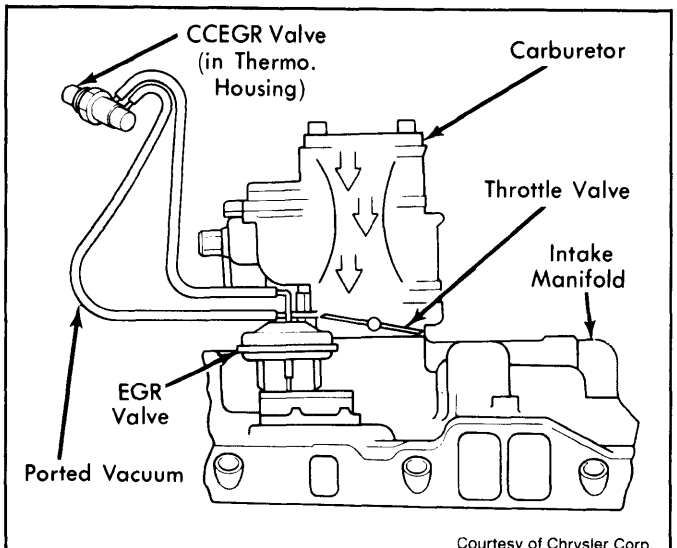

Fig. 2: Ported Vacuum Control EGR System; Omni & Horizon Shown

Ported Vacuum Control System - A slot type port in carburetor throttle body, which is exposed to an increasing percentage of manifold vacuum as throttle valve opens, provides vacuum directly to EGR valve. The flow rate is dependent on manifold vacuum, throttle position, and exhaust gas backpressure. EGR at wide open throttle is eliminated by calibrating valve opening point above manifold vacuum available at wide open throttle as port vacuum cannot exceed manifold vacuum.

COOLANT CONTROL EGR VALVE (CCEGR)

This valve is used with the EGR system to delay EGR operation until engine warmup is achieved. Valve is located in different places and valve opening temperature (to allow EGR operation) varies according to color code. See CCEGR APPLICATION & TEMPERATURE CHART.

CCEGR APPLICATION & TEMPERATURE CHART

Location	Color Code	Opening Temp. (°F)
Rad. Top Tank	Blue	75
Engine [1]	Black	98
	Yellow	125
	Red	150

[1] - Location on the engine varies with engine: cylinder head on 6-cyl.; int. manifold on 318 and 360 V8; water pump housing on 400 and 440 V8.

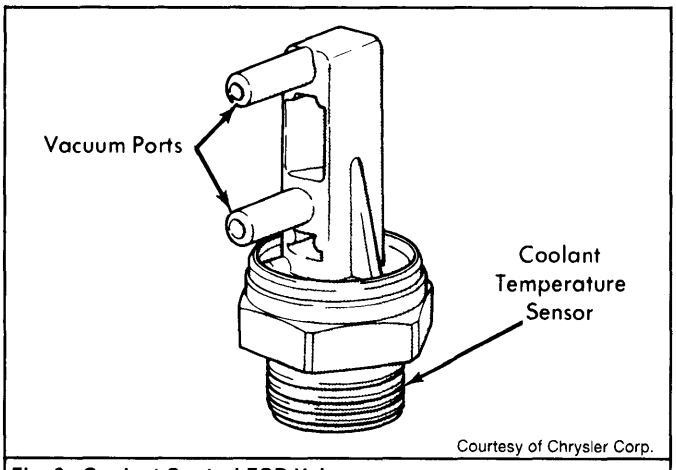

Fig. 3: Coolant Control EGR Valve

EGR DELAY TIMER

Vehicles are equipped with EGR delay system which consists of an electrical timer which in turn is connected to an engine-mounted solenoid. The purpose of this delay device is to not allow EGR function for a preset amount of time following ignition turn on (this system is overridden by the CCEGR valve if cold engine start is made). Time delay is according to different applications. See EGR DELAY TIMER APPLICATION CHART.

NOTE: On the 360 2-Bbl. applications, the time delay system serves the dual function of controlling EGR start and idle enrichment.

Chrysler Corp. Exhaust Gas Recirculation (Cont.)

EGR DELAY TIMER APPLICATION CHART

Application	Delay (Seconds)
Black Color	35
Orange Color	60
Red Color	90

CHARGE TEMPERATURE SWITCH (CTS)

1979 Models - A Charge Temperature Switch (CTS) is installed on a branch of the intake manifold on some 6-cylinder and V8 models. When air/fuel mixture temperature in intake manifold is low (below 60°F) the CTS switch closes, allowing no EGR timer function and no EGR valve operatin. Above 60°F air/fuel mixture temperature, timer and EGR valve operation are allowed.

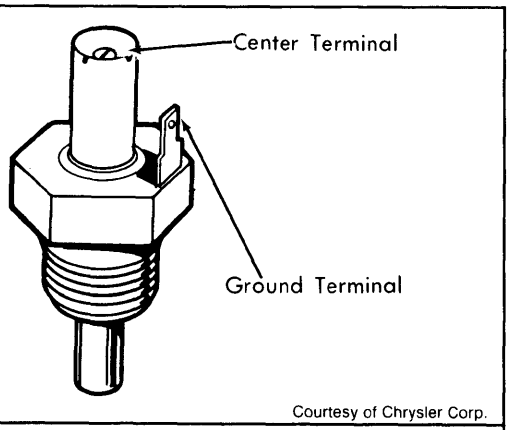

Fig. 4: 1979 Charge Temperature Switch

EGR CTS TIMER

1979 Models - Timer used with the CTS, replaces previously used EGR Delay Timer. It is NOT interchangeable with earlier year units. Timers are color-coded Black, Orange and Red to correspond with various applications.

TESTING

CCEGR VALVE (ALL MODELS)

1) Remove CCEGR valve from vehicle and place it in an ice bath to bring temperature of coolant sensing portion to below 40°F.
2) Attach a vacuum pump with gauge to the CCEGR nipple corresponding to the Blue stripe hose (exc. Omni and Horizon), or to the Yellow stripe hose (Omni and Horizon).
3) Apply vacuum of 10 in. Hg. Note gauge for one minute. There should be NO MORE THAN a one inch drop in vacuum reading within this time. If so, replace valve.

EGR DELAY TIMER SYSTEM

Omni & Horizon - 1) Check all of system for proper hose and wiring connections.
2) With ignition switch off, remove wiring connector from the time delay solenoid valve. Connect an indicating light type circuit tester across wiring connector terminals just removed.
3) Start engine. Tester light should go on and remain on for amount of time as shown in color code application chart.
4) If light does not go on, remains on indefinitely, or does not react within time limit shown after engine start up, replace timer, then repeat test.

CAUTION: To avoid overload of timer, tester current draw should not exceed 0.5 amp. A typical automotive 12-volt tester is satisfactory for this test, or a shop-made tester using instrument panel size bulb.

EGR TIME DELAY SOLENOID

Omni & Horizon - 1) Make sure all vacuum hose connections are correct and not leaking. Disconnect electrical plug from solenoid valve.
2) Connect either solenoid terminal to a ground and the other one to the battery positive terminal to activate the solenoid valve. This shuts off control vacuum to the EGR system.

NOTE: You should hear a "click" from the solenoid as it is connected to the battery positive terminal.

3) To test valve operation, let engine idle, then increase engine speed to about 2000 RPM. Watch EGR control valve stem, it should move. If not, replace the delay solenoid.

SERVICING

EGR VALVE

1) Inspect valve for deposits with particular attention to the poppet and seat area. If deposits exceed a thin film, valve should be cleaned.
2) Cleaning is aided by applying a liberal amount of manifold heat control solvent to the poppet and seat area, allowing deposits to soften.
3) Use an external vacuum source to open the poppet and then scrape deposts from this area.
4) If wear of stem or other moving components is noted, valve should be replaced.

CAUTION: Extreme care should be taken when using solvent cleaners to prevent spilling of solvent on valve diaphragm.

NOTE: Do not push valve stem manually, use an external vacuum source only.

MAINTENANCE REMINDER LIGHT

Every 15,000 miles an EGR maintenance lamp on the dash will light. At this time, the EGR system should be checked for correct operation. After EGR inspection, reset switch. To reset, locate mileage counter in-line with speedometer cable. Using a small screwdriver, rotate screw 1/4 turn until light goes off.

TROUBLE SHOOTING

NOTE: All tests must be made with engine fully warm and running for at least 2 minutes.

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, BUT OPERATES NORMALLY ON EXTERNAL VACUUM SOURCE

1) Disconnect CCEGR valve and by-pass valve with short length of $^{3}/_{16}$" tubing. If normal movement of EGR valve is restored, replace CCEGR valve (if system has two CCEGR valves, test both separately).

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2) On Venturi Vacuum type systems, disconnect Orange and Blue (or unstriped) hoses at time delay solenoid valve and by-pass valve with short piece of tubing.
3) If normal EGR stem movement is restored, reconnect hoses to valve and disconnect electrical plug from solenoid. If EGR valve stem does not move, solenoid should be replaced. If valve stem does move, timer should be further tested as previously described.
4) If plugged passages are suspected with the Ported Vacuum type system, carburetor should be removed and slots inspected and cleaned as necessary. Recheck for normal EGR operation.
5) If plugged passages are suspected with the Venturi Vacuum system, carburetor cleaner should be used to clean deposits from venturi passage. Use light air pressure to verify that passage is open.
6) To check for defective vacuum control unit (Venturi Vacuum systems), remove venturi signal hose from carburetor. With engine at idle, apply approximately 2 in. Hg to the signal hose. Engine speed should drop at least 150 RPM and EGR valve stem should move 1/8" or more. If not, replace vacuum amplifier.

ROUGH IDLE, NO IDLE OR DIES ON RETURN TO IDLE

EGR Valve Open At Idle - 1) On Venturi Vacuum systems, disconnect and plug hose from EGR valve. If idle is unsatisfactory, replace EGR valve. If okay, reconnect hose to valve and disconnect from carburetor. If idle is okay, clean venturi tap. If idle not okay, replace vacuum control unit.
2) On Ported Vacuum systems, disconnect and plug hose from EGR valve. If idle is not okay, replace EGR valve. If idle is still rough, install vacuum gauge on ported signal tap. If more than 1" of vacuum, check idle setting. If vacuum is okay, check linkage and carburetor for binding.

ROUGH IDLE, NO IDLE OR DIES ON RETURN TO IDLE

EGR Valve Closed At Idle - If removal of vacuum hose from EGR valve does not correct rough idle, remove EGR valve and inspect to insure that poppet is seated. Clean deposts on valve or replace valve.

DEEP BOGG, DIESOUTS AND/OR STUMBLES DURING FIRST 30 SECONDS

1) Stop engine, disconnect and reconnect hose to EGR valve, then restart engine.
2) Immediately open throttle and observe EGR valve stem for motion. If it moves back during first 35 seconds (Black color code) or 90 seconds (Red color code) after start, EGR time delay system is defective.
3) Check hose connections to time delay solenoid and timer. If OK, disconnect electrical plug from solenoid valve. Energize solenoid by grounding either terminal and connecting other terminal to battery positive post.
4) Disconnect and reconnect hose to EGR valve. If EGR valve stem moves, solenoid valve is defective and should be replaced. If valve does not move, time delay module should be tested.

NOTE: The following checks apply to 1979 models only.

NO EGR VALVE OPERATION (WARM ENGINE)

Check hose routing and solenoid operation. Remove connector wire from CTS center terminal and wait 90 seconds. If EGR valve is now operating, replace CTS.

EGR VALVE OPERATING (COLD ENGINE)

Check hose routing and EGR solenoid operation. Remove center wire from CTS. Using ohmmeter between center terminal and ground terminal of CTS, check for less than 10 ohms. If open circuit is shown, replace CTS. If CTS checks okay, look for open circuit between CTS and ground connection.

NOTE: Maximum torque for CTS is 60 INCH lbs.