1974-79 EXHAUST EMISSION SYSTEMS
Porsche Exhaust Gas Recirculation

All Models

DESCRIPTION

The exhaust gas recirculation system is designed to lower the formation of NOx emissions. This is done by recycling some exhaust gas back into the combustion chamber. This action lowers the high temperature in the combustion chambers which lead to NOx formation.

911 SC & TURBO CARRERA

1978-79 Models - The EGR system for these models consists of an EGR valve, an EGR filter (Turbo Carrera), and various tubing and vacuum connections (including a connection to the exhaust pipe for EGR take-off). *See Fig. 1.*

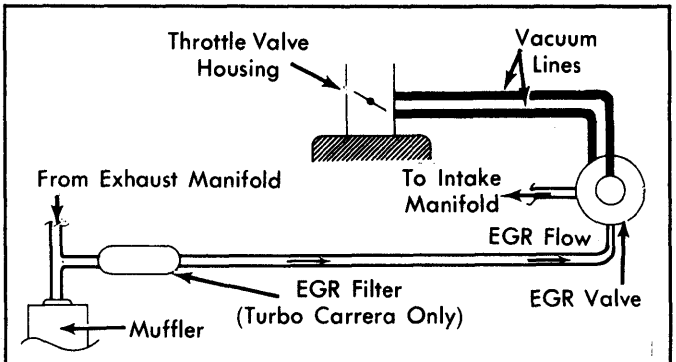

Fig. 1: Porsche 911 SC & Turbo Carrera EGR System

912E & 914

1975-76 Models - The EGR system on these models consists of a vacuum operated EGR valve, exhaust pipes and a vacuum hose. The exhaust gases flow directly into throttle valve.

924

1978-79 Models - The EGR system on 924 models consists of an EGR valve, a cold temperature thermal switch, a vacuum amplifier, a vacuum reservoir, and various connecting lines (including a connection to the exhaust pipe ahead of the catalytic converter for sampling exhaust gas). *See Fig. 2.*

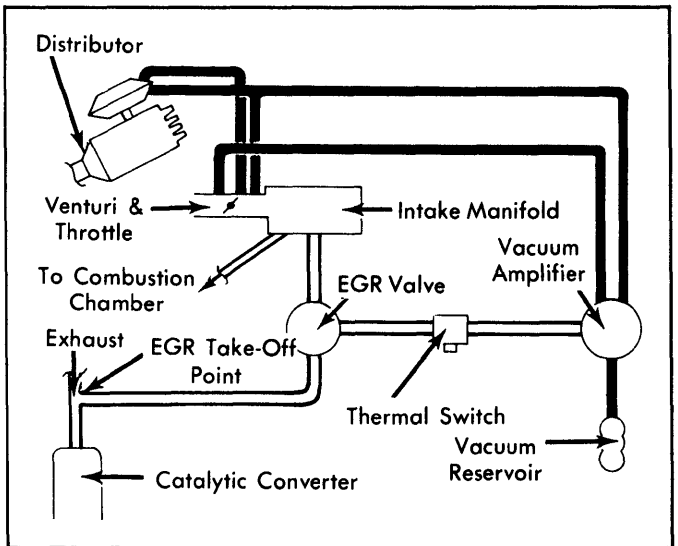

Fig. 2: Porsche 924 EGR System

928

1978-79 Models - The EGR system for 928 models consists of an EGR valve mounted on the exhaust manifold (for direct exhaust gas sampling), a cold temperature thermal switch, a vacuum amplifier (with a connection for sensing exhaust backpressure), and necessary tubing and vacuum lines. *See Fig. 3.*

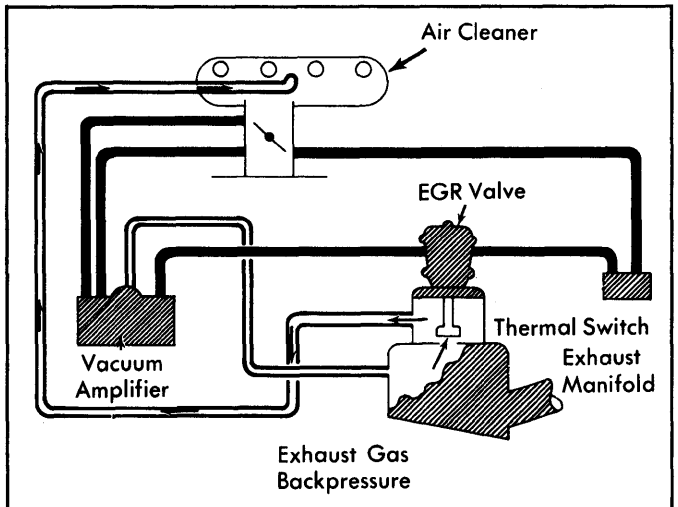

Fig. 3: Porsche 928 EGR System

OPERATION

911 SERIES & TURBO CARRERA

1975-77 Models - A limited amount of exhaust gas is drawn from exhaust system ahead of muffler. Exhaust gases then travel through EGR filter to EGR vacuum valve, which regulates amount and time of exhaust gases routed to engine. The EGR vacuum valve is controlled by vacuum through a pair of hoses on throttle valve assembly.

1978-79 Models - Exhaust gas is drawn from a connection in the exhaust system ahead of the muffler or catalytic converter. The amount of exhaust gas which flows from this connection is in response to a vacuum signal from the EGR valve. On Turbo Carrera, an EGR filter is installed in line between the EGR take-off point and the EGR valve.

The position of the throttle valve determines the amount of vacuum signal applied to the EGR valve. There are two connections: a ported and venturi vacuum connection. These two vacuum signals act on the top and bottom of the EGR valve diaphragm to balance and maintain the proper exhaust gas flow according to engine operating mode.

Once the exhaust gas reaches the EGR valve, it is channeled into the intake manifold where it is mixed in the combustion chamber with the air/fuel mixture. Lower temperatures resulting from the addition of exhaust gas helps lower formation of NOx emissions.

912, 914 & 924

1975-77 Models - In partial load range, EGR valve diaphragm is raised by intake manifold vacuum. This opens EGR valve and allows exhaust gases to flow into engine. This dilution of the incoming air/fuel mixture lowers peak combustion temperatures to reduce the formation of oxides of nitrogen (NOx). The EGR system includes a service interval warning light which is activated every 30,00 miles.

1978-79 Models - Below a preset temperature (cold engine), the thermal vacuum valve is closed, stopping vacuum from the vacuum amplifier from reaching the EGR valve. While the valve is closed, exhaust gas cannot pass into the combustion chamber. At normal operating temperature, the thermal valve is open and vacuum passes to the EGR valve. Recirculation now occurs.

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1974-79 EXHAUST EMISSION SYSTEMS
Porsche Exhaust Gas Recirculation (Cont.)

The vacuum signal received from the vacuum amplifier originates at the throttle housing. There are two connections to the distributor vacuum advance unit and one directly to the vacuum amplifier.

During certain engine modes, the vacuum signal is transferred to the vacuum amplifier where it is strengthened enough to operate the EGR valve. The vacuum reservoir is used to accomplish recycling when engine vacuum suddenly goes to a low level.

928

1978-79 Models - This system operates similar to that on the 924 models, except the placement of the thermal switch is different, resulting in slightly different vacuum flow. Below normal operating temperature, the thermal switch is closed, blocking off the vacuum path from the throttle valve housing. No recirculation occurs.

Above normal operating temperature, the thermal switch opens, and vacuum reaches the EGR valve. Acting in response to this vacuum signal, and in response to the vacuum signal received from the vacuum amplifier, the EGR valve will open, close or modulate to determine exhaust gas recirculation.

The vacuum amplifier works on two vacuum signals, one ported and one venturi, from the throttle valve housing, and in response to an exhaust gas backpressure signal. The balance of the vacuum and exhaust backpressure determine the amount of vacuum applied to the EGR valve to balance the vacuum signal from the throttle valve housing to reach full open, modulated or full closed position of the EGR valve.

TESTING

EGR VALVE

1975-76 912E & 914 Models - With engine idling, allow by-pass line between muffler and EGR valve to become hot. Increase engine speed to 4200 RPM. Exhaust gas line between EGR valve and intake system must now become hot also. If not, check for defective EGR valve, plugged EGR or vacuum lines, or for plugged vacuum bore in throttle valve housing.

1977 924 Models - **1)** Remove EGR valve from engine. Apply vacuum to valve and observe that valve stem lifts off seat. If not, replace EGR valve.

2) Coolant switch should remain closed at coolant temperatures below 140°F (60°C). No vacuum should be allowed to flow to EGR valve. The EGR valve should remain closed and EGR system should not operate.

3) With coolant temperatures above 140°F (60°C), temperature switch should open. This should allow EGR valve to open if vacuum is high enough. The EGR valve should remain closed during full throttle and idle.

1978-79 924 Models - Remove EGR valve from its mounting. Attach a vacuum source to the connection leading to vacuum amplifier. Block off connection to intake manifold. Apply vacuum to EGR valve and watch valve stem. If it moves in response to vacuum application, valve is operating properly. If not, replace valve.

COOLANT (THERMAL) SWITCH

1978-79 Models - **1)** Attach a hand-held vacuum pump to vacuum amplifier side of thermal switch. Attach a vacuum gauge to EGR valve side of switch. With switch cold, apply vacuum to switch. No vacuum should be noted on vacuum gauge. If vacuum passes when switch is cold, replace switch.

2) Bring engine to normal operating temperature to warm up switch. Apply vacuum to switch. Vacuum should be noted on vacuum gauge. If vacuum does not register on gauge, switch is stuck closed and must be replaced.

MAINTENANCE

SERVICE INTERVAL WARNING LIGHT

1975-77 912E, 914 & 924 Models - **1)** The elapsed mileage odometer is located below dashboard and is connected to speedometer. If warning light does not come on at 30,000 miles, and bulb and wiring are okay, the unit is defective.

2) The elapsed mileage odometer may be reset by pressing pin on housing. *See Fig. 4*. The service interval warning light should not be on after resetting odometer.

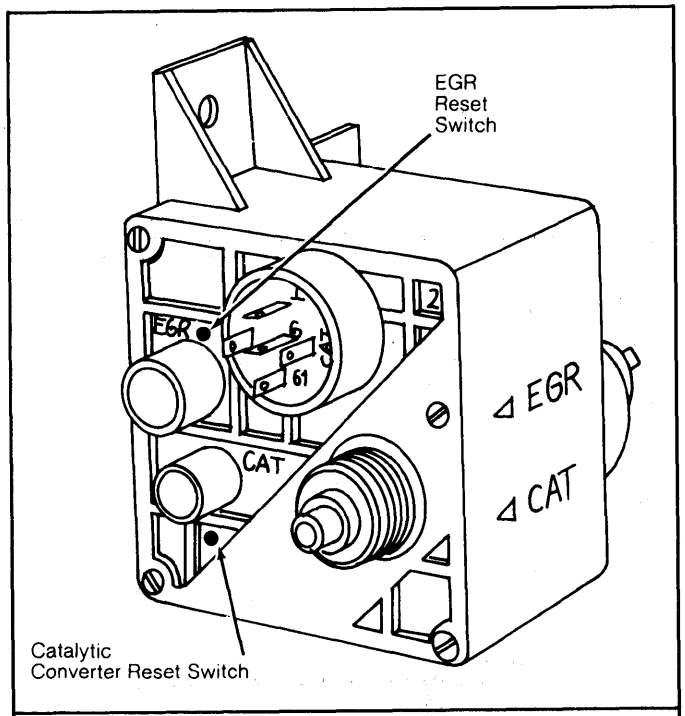

Fig. 4: Resetting Service Interval Warning Light

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