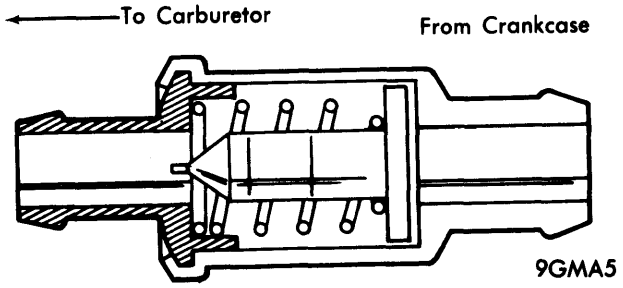
Crankcase Ventilation Systems

GENERAL MOTORS

DESCRIPTION

All 1965-67 engines are equipped either with "Positive" or "Closed Positive" crankcase ventilation systems. All 1968-74 engines are equipped with "Closed Positive" ventilation systems. Both "Positive" and "Closed Positive" ventilation systems utilize manifold vacuum to draw fumes and contaminating vapors into combustion chamber where they are burned. The "Positive" system consists of a vented oil filler cap, Positive Crankcase Ventilation Valve (PCV Valve), and a hose attached between PCV valve and intake manifold. The "Closed Positive" system consists of a non-vented oil filler cap, hose from carburetor air cleaner to rocker arm cover, a flame arrester, installed in hose between air cleaner and engine, and either a fixed orifice (1965), or a PCV valve (all other years) located in line from crankcase (rocker arm cover) to intake manifold.

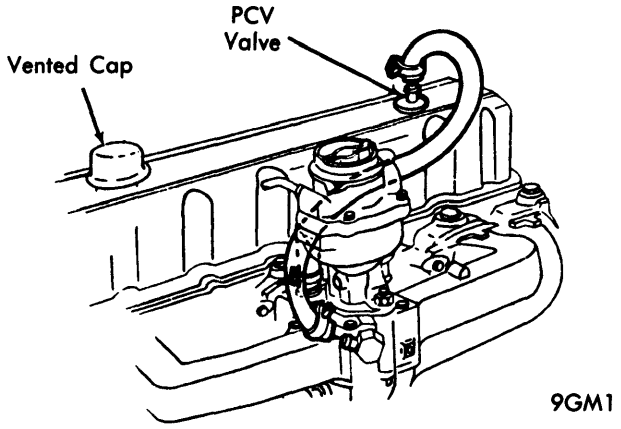


POSITIVE CRANKCASE VENTILATION VALVE

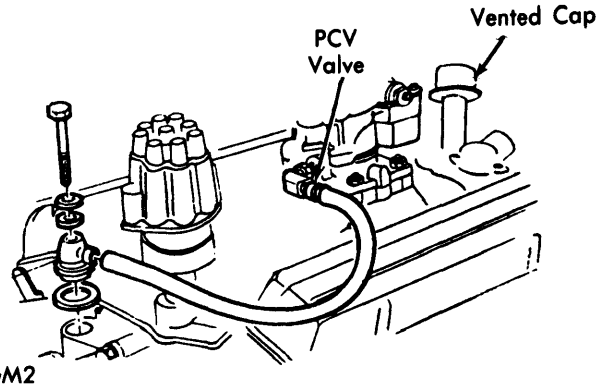
OPERATION

"Positive" Ventilation System – Air enters system through vented oil filler cap and circulates through engine. Ventilated air mixes with crankcase fumes and is drawn into intake manifold through PCV valve by manifold vacuum. PCV valve, located between crankcase and manifold, insures that air/fuel mixture will not be leaned excessively under conditions of high vacuum during engine idle. At higher engine speeds, manifold vacuum lowers and the PCV valve opens to allow more air flow. At full throttle, excess fumes escape through filler cap.

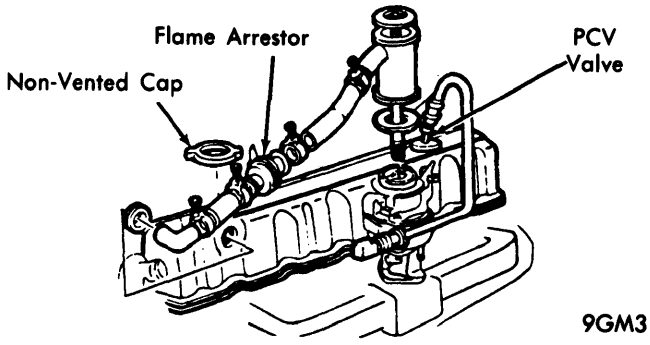
"Closed Positive" Ventilation System – Air enters system through air cleaner to rocker arm cover and circulates through engine crankcase. Fresh air mixes with crankcase fumes and is drawn into intake manifold through PCV valve and hose by manifold vacuum. The PCV valve, located between crankcase and intake manifold, insures that air/fuel mixture will not be leaned excessively under conditions of high manifold vacuum during engine idle. At higher engine speeds, manifold vacuum lowers, and PCV valve opens to allow more air flow. At full throttle, excess fumes are routed through hose to carburetor air cleaner, combined with air/fuel mixture, and burned in the engine.



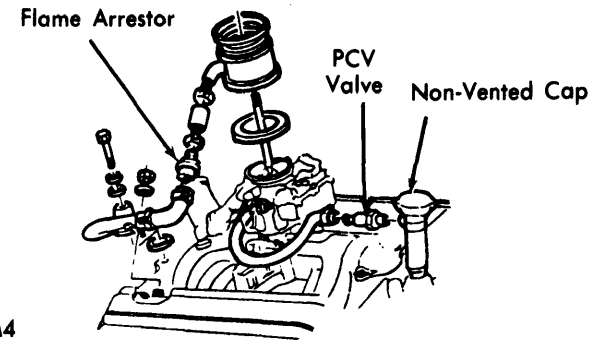
POSITIVE IN-LINE ENGINE (TYPICAL)



POSITIVE V-8 ENGINE (TYPICAL)



CLOSED POSITIVE IN-LINE ENGINE (TYPICAL)



CLOSED POSITIVE V-8 ENGINE (TYPICAL)

GENERAL MOTORS (Cont.)

SYSTEM CHECKING

The following difficulties may indicate a malfunctioning PCV valve:

1) Engine stalls frequently after stops, runs rough after restart.

2) Engine loses power and surges at speeds above idle.

3) Engine has a rich rolling idle, produces black smoke at tailpipe.

4) Idle speed fluctuates, but engine does not stall.

Testing PCV Valve

1) Connect tachometer and vacuum gauge to engine, set parking brake, start engine and adjust idle speed and mixture.

2) Disconnect ventilation hose at PCV valve, block opening of valve and read engine RPM change.

3) A change of less than 50 RPM indicates a plugged PCV valve.

SERVICE PROCEDURES

Inspect all hoses for obstruction or internal ruptures of rubber which could seal off passage. Also check for cracks or deterioration of rubber. Inspect rubber grommets at rocker arm covers for evidence of deterioration; replace if not in good condition to prevent leakage of gases. Inspect PCV valve for carbon build-up internally, if build-up is evident, valve should be replaced. If valve appears to be in good condition, clean with suitable solvent and blow out with air pressure. Flame arrester should be washed in solvent and blown out with air. A badly plugged arrester should be replaced. On engines equipped with "Positive" ventilation, vented oil filler cap should be washed with solvent and dried with air pressure.