1974-79 EXHAUST EMISSION SYSTEMS
Mercedes-Benz Air Injection System

1979 All Models

NOTE: For 1974-78 models, see AIR INJECTION SYSTEMS article in this section.

DESCRIPTION

Two different types of air injection systems are used by Mercedes-Benz vehicles. Both systems reduce exhaust emissions by injecting fresh air into the cylinder head exhaust ports to aid in the combustion of exhaust gases. All Federal 450 models use a pulse-air type system that does not require an air pump. All other models use the conventional air pump type system. System components differ according to vehicle models and application.

On Federal 280 models, system consists of a belt-driven air pump, pressure relief valve, diverter valve, two check valves, and a thermo valve. On California 280 models, system consists of a belt-driven air pump, pressure relief valve, diverter valve, two check valves, and two thermo valves.

On Federal 450 models, the pulse-air type system consists of a check valve, fresh air hose (connecting check valve to air cleaner), air injection lines, and injection passages in the cylinder heads. *See Fig. 1.* On California 450 and 6.9 models, system consists of a belt-driven air pump, diverter valve, 2 check valves and a thermo valve.

OPERATION

PULSE-AIR SYSTEM

When the engine is running, air is drawn from air cleaner to exhaust valves via the air injection passages. The check valve draws fresh air from the clean side of the air cleaner past a one-way diaphragm made of high temperature material.

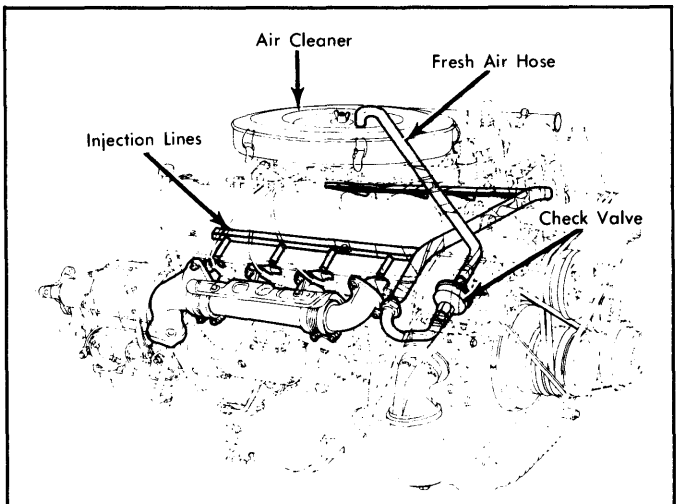

Fig. 1: 450 Pulse-Air Injection System (Federal)

Negative pressure (vacuum) pulses in the exhaust ports and manifold passages cause the diaphragm to open and allow fresh air to mix with exhaust gases. If the exhaust pressure is positive, the diaphragm closes, and no exhaust gas can flow past the valve and into the air cleaner.

The check valve is more efficient at idle and slow engine RPM when the negative pulses are maximum. At higher engine speeds the check valve remains closed.

The exhaust gas/fresh air mixture flows through the exhaust pipes and into the catalytic converter. The oxygen in the air combines with hot exhaust gas and this furthers the catalyst reaction in the converter.

AIR PUMP SYSTEMS

Air is drawn into the air pump through a centrifugal filter which is incorporated into the pump. From the pump the air is routed to the pressure relief valve (if equipped), where the excess air delivered by the pump at high engine RPM is discharged into the atmosphere when the line pressure exceeds 3.9 psi (.27 kg/cm²). The air is then routed to the diverter valve, where it depends on the engine coolant temperature and vehicle application.

On California 280 series, air is injected into the small catalytic converters when coolant temperature is below 63°F (17°C) or above 122°F (50°C). Air is injected into the cylinder head exhaust ports via the check valve when coolant temperature is between 63°F and 122°F (17°C and 50°C).

On all other models, air is discharged to the atmosphere when coolant temperature is below 63°F (17°C). Air is injected into the cylinder head exhaust ports via the check valve when coolant temperature is above 63°F (17°C).

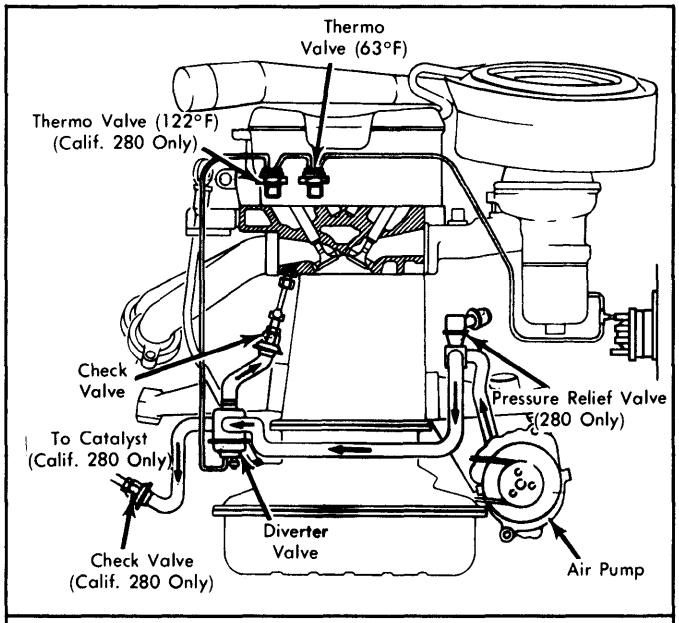

Fig. 2: 280 Air Injection System (Calif.)

From the exhaust ports, the exhaust gas/injected air mixture flows through the exhaust pipes and into the catalytic converter. The oxygen in the injected air combines with hot exhaust gas and this furthers the catalyst reaction in the converter.

System check valve(s) is used to prevent the flow of hot exhaust gases back into the system. Some systems also use an in-line check valve from intake manifold to thermo valve. This acts as a spark delay when vacuum levels are intermittently reached.

TESTING

CHECK VALVE

450 Models (Federal) - Remove fresh air hose from air cleaner and cover hose opening with finger. Vacuum should be felt and also be audible. If no vacuum is present, replace the check valve.

AIR INJECTION SYSTEM

280 Models (Calif.) - 1) With engine at normal operating temperature, connect a CO meter to exhaust gas back-pressure line. Read and record exhaust gas CO value.

2) Next, disconnect vacuum line from straight connection of the 122°F (50°C) thermo valve and connect it to straight connection of the 63°F (17°C) thermo valve. *See Fig. 2.*

Mercedes-Benz Air Injection System (Cont.)

3) Again check CO value of exhaust gas. System is functioning properly if CO value decreases from first reading. If not, check all vacuum lines and connections for damage and leaks and repair as necessary.
4) If all vacuum lines and connections are okay, and the thermo valves are operating properly, replace diverter valve.
All Other Models - 1) With engine at normal operating temperature, connect a CO meter to exhaust gas back-pressure line. Read and record exhaust gas CO value.
2) Next, disconnect and plug vacuum line from straight connection of thermo valve. Again check CO value of exhaust gas. System is functioning properly if exhaust gas CO value increases when vacuum line is disconnected. If not, check condition of all system vacuum lines and connections. Repair as necessary.
3) If all vacuum lines and connections are okay, and thermo valve is functioning correctly, replace diverter valve.

THERMO VALVES

280 Models (Calif.) - 1) Check for presence of vacuum at straight connection of the 63°F (17°C) thermo valve. If vacuum is present, thermo valve is operating properly.
2) If no vacuum is felt, disconnect vacuum line from angular connection of the valve and check for vacuum at end of line. If vacuum is present, replace thermo valve. If no vacuum is felt, disconnect other end of vacuum line from intake manifold and blow out manifold vacuum port.
3) Next, check operation of the 122°F (50°C) thermo valve in the same manner. Valve should be open with engine coolant temperature below 122°F (50°C) and closed with coolant temperature above 122°F (50°C). If not, replace thermo valve.
All Other Models - Disconnect vacuum line from straight connection of thermo valve. Check for presence of vacuum at connection. Thermo valve is functioning correctly if vacuum is felt at valve connection. If no vacuum is felt, and vacuum to valve is okay, replace thermo valve.