

MERCEDES-BENZ AIR INJECTION

230, 250, 280 SL, 300 S & 300 SL (1968-69)

DESCRIPTION

The system consists of an air pressure pump with centrifugal filter and pressure control valve, as well as connecting pipes, air distributor, back pressure valve and dump valve with an air line to intake manifold. The distributor and carburetor have been changed.

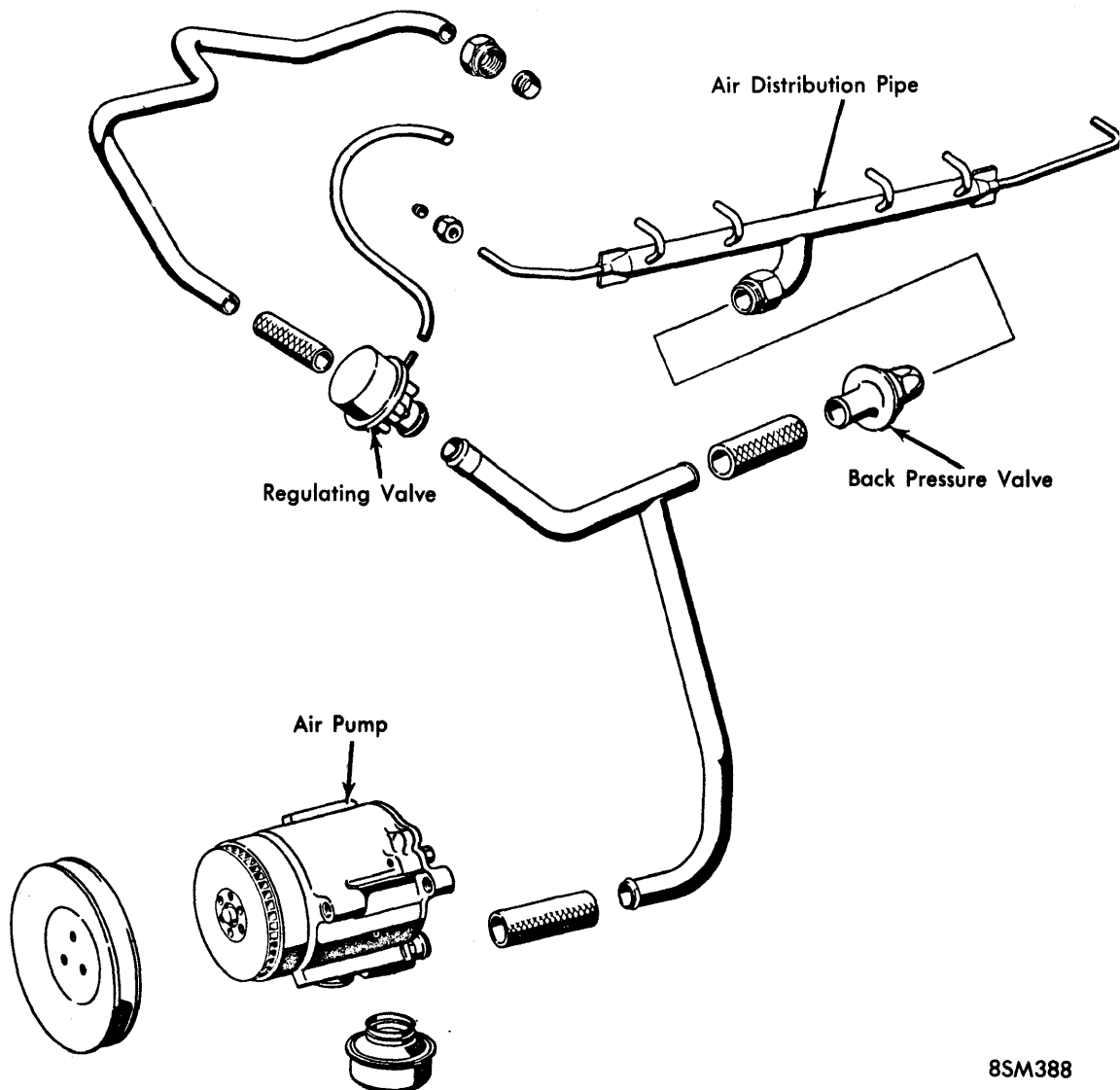
OPERATION

The air pump drives compressed air to the air distribution pipe via a return check valve. Each exhaust port is provided with the same volume of air by way of a connection at the cylinder head. To prevent backfiring during deceleration, additional air is supplied to the intake manifold from the air distribution pipe, controlled by a vacuum regulated valve.

Air Pump – Pump is of the vane type, closed by a cast iron cover in the rear. The rotor is mounted off center

in the cylindrical bore of the housing. Arranged in the center of the rotor are two plastic blades mounted centrifugally to the cylinder bore and dividing space between bore and rotor into two chambers. One rotor bearing located in the front of the housing incorporates a hub attached to the rotor shaft. Centrifugal air filter and drive pulley are mounted to this hub. A second rotor bearing is placed in the rear cover which also incorporates the air outlet. A pressure check valve is mounted on the side of the housing.

Operation of Air Pump – Air enters through centrifugal filter. Rotating fan blade traverses across the chamber, forcing the air to the air outlet while new air enters in the rear of the blade. This air volume is now transferred by the second blade, etc. Each blade completes one pumping cycle per rotor revolution. Blade ends do not contact the walls of the housing, they may however, contact during the break-in period. Air pump and centrifugal filter are maintenance free. The air pump cannot be repaired, but must be replaced when inoperative. Pressure control valve may be exchanged.



MERCEDES-BENZ AIR INJECTION SYSTEM

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MERCEDES-BENZ AIR INJECTION (Cont.)

Air Distribution – Compressed air travels through return check valve to distribution pipe, and by individual lines, to each exhaust port in the cylinder head. Cylinder head is provided with pipe fittings on outside and bores entering the exhaust ports directly above the exhaust valves. Here, the air mixes with the exhaust gases.

Regulating Valve – Intake side of regulating valve is connected to air distribution line, outlet side to intake manifold. Also connected to intake manifold is vacuum control line. At idle, steady speed and during acceleration the vacuum is not sufficient for opening the valve, therefore the total air volume travels to the exhaust ports. During deceleration, increased vacuum enables the diaphragm to lift momentarily thus opening the valve against the air flow. This permits compressed air to enter the intake manifold. Amount of air that enters intake manifold is in proportion to the vacuum obtained at closing of the throttle valve.

Back Pressure Valve – The back pressure valve prevents hot gases from entering into the air line system and the air pump. It is in operation when the air pump is not functioning or when the pressure control valve is defective.

Distributor – The centrifugal advance curve has been extended to the lower range. The spark advance at high RPM remains as before. At lower RPM the spark has been retarded. The vacuum adjustment remains unchanged in direction "advance" applicable at partial load. Adjustment: Basic ignition time is to be adjusted at $n = 4500$ RPM (without vacuum) by rotating the distributor. Centrifugal spark advance has to be checked at the specified RPM.

Carburetor – Solex Type INAT 35/40 carburetors, manufactured within very close tolerances, are used. For additional information, refer to Carburetor Section.

TESTING

Air Pump – Check drive belt for tension, retighten if required.

Air Output Check – Remove hose from air outlet and check air output while engine is running.

Pressure Control Valve – At idle speed with air system closed, check valve for leaks. Valve plunger must not cause any noise. When closing air outlet, valve must discharge air. A valve jammed in closed position will damage air pump.

Air Pump Noise – When diagnosing noise problems, check drive belt tension. By removing drive belt, cause of noise may be located. *NOTE* – During break-in period, rotor blades may cause a slight whistling or squealing which will disappear after a short period.

Back Pressure Valve (Test for Functioning) – Remove air hose located in front of valve. No exhaust gases must escape while engine is running. Using a dull pin, check if the valve plate lifts from its seat and permits air to pass through.

Regulating Valve (Performance Test) – Remove air hose in front of valve. At idle speed, no air must pass through valve. In case of a leaky valve, air will leak into intake manifold causing uneven idling or stalling of engine. When returning to idle speed following brief acceleration, valve should draw air for approximately $\frac{1}{2}$ – 1 second. A valve jammed in closed position causes backfire on deceleration. *NOTE* – Both above tests can be performed with a vacuum gauge used in the following manner: Remove air hose in front of valve and connect vacuum gauge. At idle speed reading should show no vacuum. Vacuum reading must be present for $\frac{1}{2}$ – 1 second when quickly returning to idle speed after accelerating.

Air Distribution – All air pipes and connections may be checked for leaks with soap bubbles.

TROUBLE SHOOTING

1) **Insufficient Supply at Air Pump** – A) Drive belt too loose. Tighten drive belt. B) Air pump seized. Replace air pump. C) Pressure check valve stuck in open position. Replace pressure check valve. D) Pressure check valve stuck in closed position, plastic blades bent. Replace air pump.

2) **Pressure Check Valve Discharges at Idle Speed** – A) Pressure check valve stuck in open position. Replace pressure check valve. B) Back pressure valve stuck in closed position. Replace back pressure valve.

3) **Rubber Hoses of Air Injection System and Air Pump Burned** – Back pressure valve stuck in open position. Replace back pressure valve.

4) **Backfire in Exhaust System During Deceleration** – A) Regulating valve stuck in closed position. Replace regulating valve. B) Vacuum line between regulating valve and intake manifold disconnected, leaking or jammed. Connect or replace vacuum line.

5) **Poor Engine Performance With Correct Carburetor and Ignition Adjustment** – Regulating valve stuck in open position. Replace regulating valve.