MERCEDES-BENZ 250 & 280S ENGINE MODIFICATION

250 & 280 S (1970-71)

DESCRIPTION

Mercedes-Benz 250/8 and 280 S/8 engine modification system consists of; RPM switch, relay box, two-way valve, three-way valve, front and rear choke covers and three temperature switches. One temperature switch opens at 17°C (63°F), the second at 100°C (212°F) and the third at 65°C (149°F).

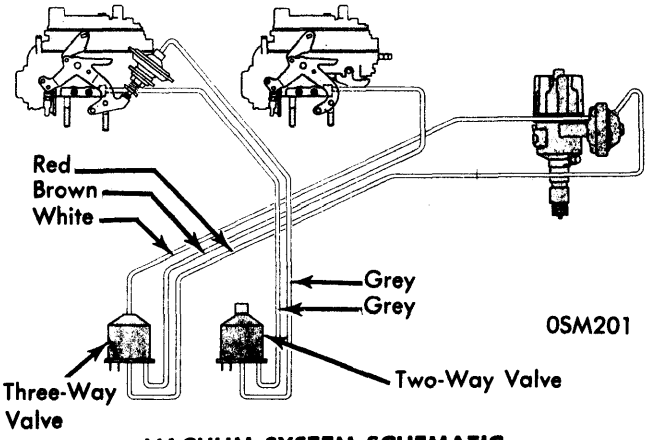
OPERATION

Ignition Changeover – A three-way valve, installed in vacuum line between intake manifold and vacuum unit on distributor, advances or retards ignition timing depending on engine speed and water temperature. Three-way valve is controlled, through the relay, by the 17°C (63°F) cylinder head temperature switch, the 100°C (212°F) thermostat housing temperature switch and the RPM switch. Conditions which affect advancing or retarding of distributor control unit are as follows:

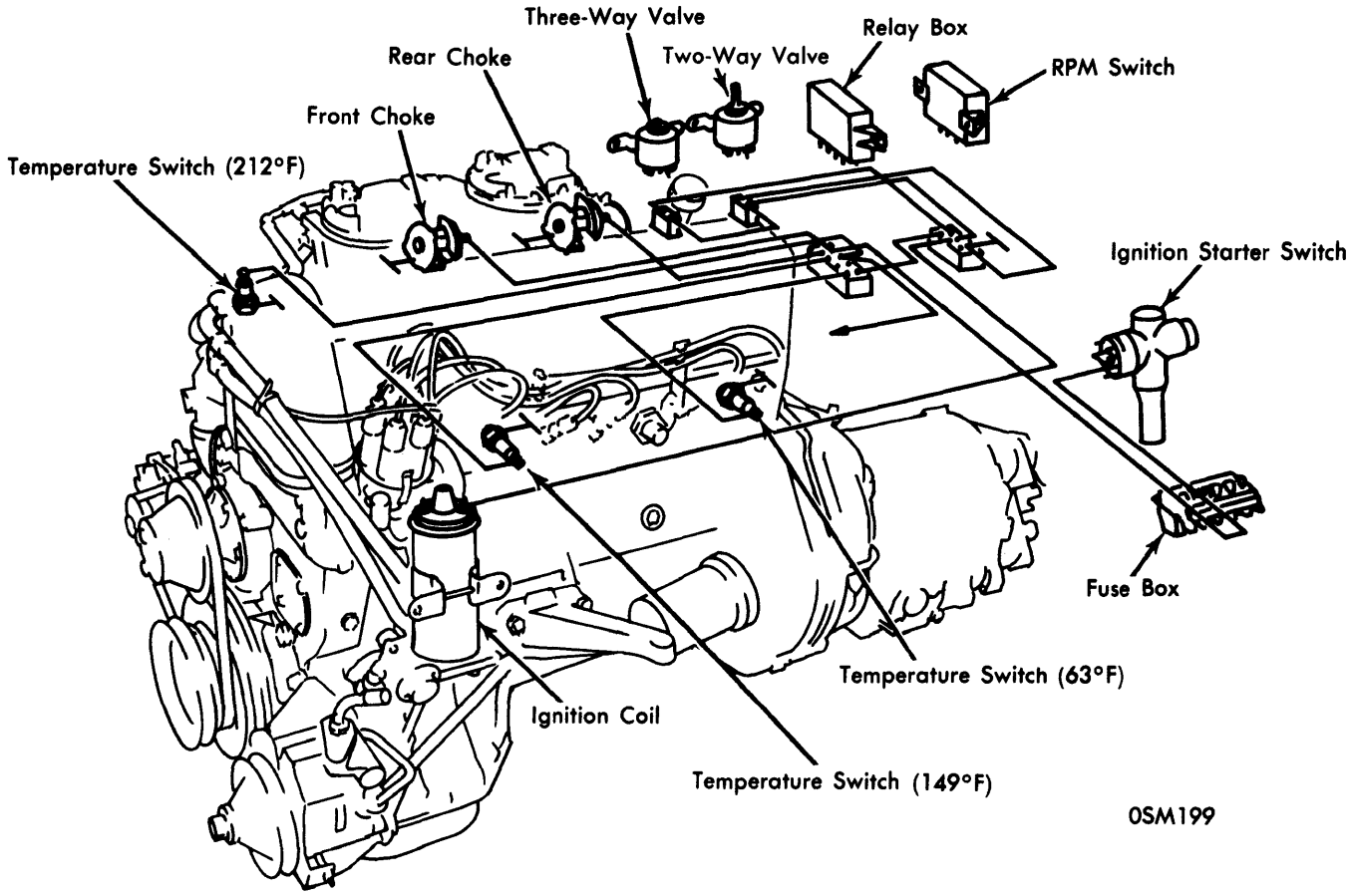
1) Both temperature switches are open when cooling water temperature is between 17°C (63°F) and 100°C (212°F). If engine speed drops below 2200 RPM, while both temperature switches are open, the RPM switch will actuate the three-way valve. This will direct intake manifold vacuum towards retarding end of distributor control.

2) If both temperature switches are open, due to cooling water temperature being between 17°C (63°F) and 100°C (212°F), and engine speed rises above 2400 RPM, the RPM switch will open causing the three-way valve to be de-energized. Manifold vacuum will then be directed towards advancing end of distributor control.

3) When cooling water temperature is below 17°C (63°F) or above 100°C (212°F), the affected temperature switch is closed causing RPM switch and three-way valve to be de-energized. Manifold vacuum is then directed towards advancing end of distributor control.



VACUUM SYSTEM SCHEMATIC



MERCEDES-BENZ 250/8 EXHAUST EMISSION SYSTEM

MERCEDES-BENZ 250 & 280S ENGINE MODIFICATION (Cont.)

Throttle Valve Operation – A two-way valve, installed in vacuum line between throttle control on carburetor and intake manifold, holds throttle slightly open when decelerating. Two-way valve is controlled by RPM switch, 17°C (63°F) temperature switch in cylinder head and the 100°C (212°F) temperature switch in the thermostat housing. Operation is as follows:

1) When cooling water temperature is between 17°C (63°F) and 100°C (212°F) both temperature switches are open. If engine speed rises above 2000 RPM, while both temperature switches are open, the RPM switch will actuate the two-way valve. This will shut-off vacuum between intake manifold and throttle control, allowing plunger in throttle control to remain extended, holding throttle slightly open.

2) If both temperature switches are open, due to cooling water temperature being between 17°C (63°F) and 100°C (212°F), and engine speed falls below 1800 RPM, the RPM switch will interrupt current flow to two-way valve. This will allow manifold vacuum to pass to throttle control. Plunger will be pulled in and throttle valves will return to normal idling position.

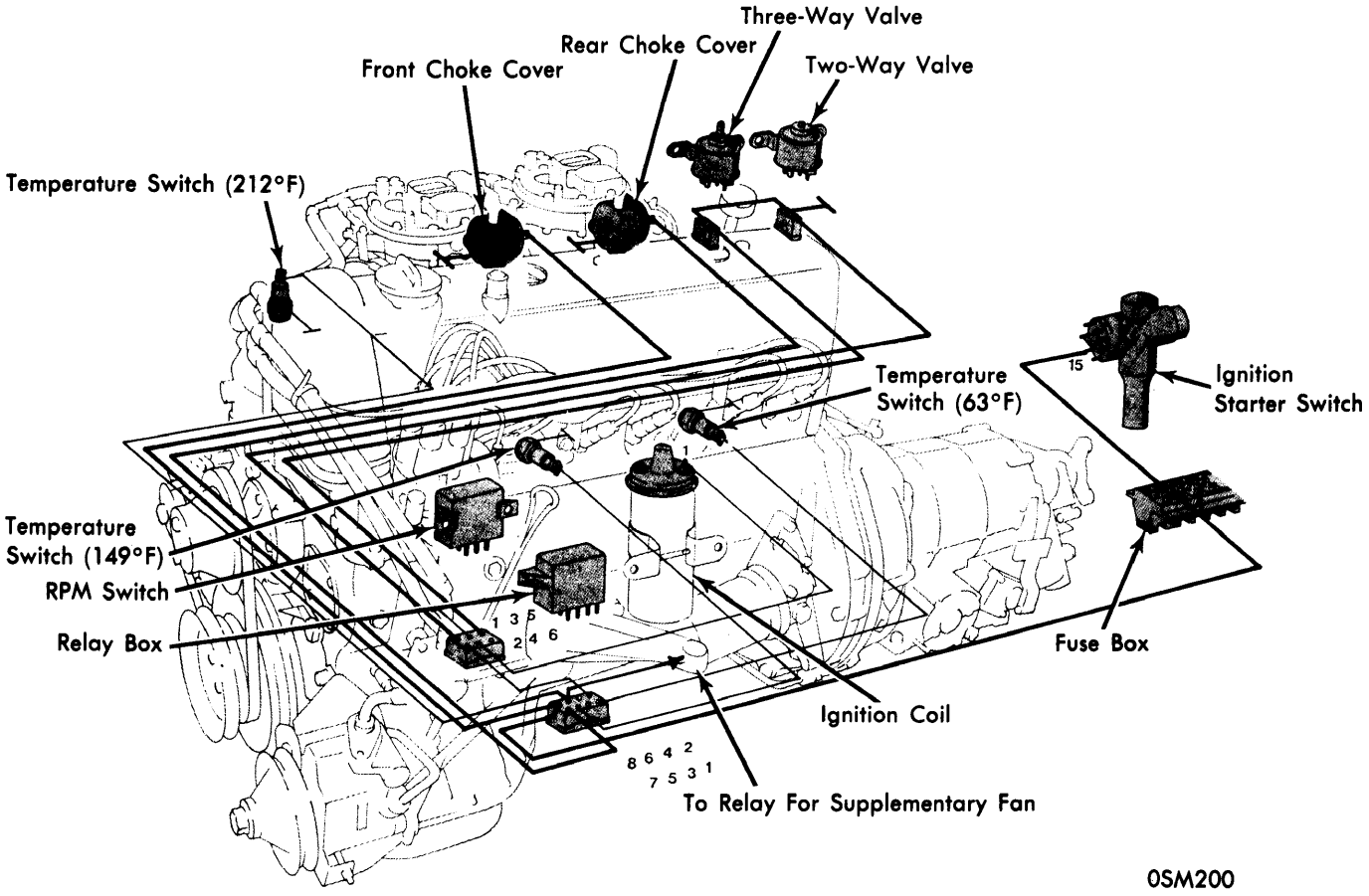
3) When cooling water temperature is below 17°C (63°F) or above 100°C (212°F), the affected temperature switch is closed causing RPM switch and two-way valve to be de-energized. This will allow intake manifold vacuum to pass to throttle control. Plunger is pulled in and throttle valves will return to normal idling position.

Carburetor Choke System – When ignition key is turned on, current flows through relay and immediately starts to open choke on front carburetor. Choke on rear carburetor does not begin to open until 65°C (149°F) temperature switch is activated.

MAINTENANCE

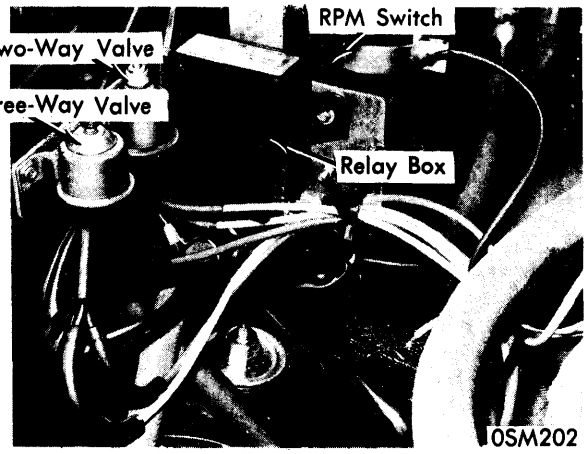
Checking Ignition Changeover – *NOTE – Check applies when cooling water temperature is between 17°C (63°F)* and 100°C (212°F). Connect timing light, start engine and increase engine RPM. Above 2400 RPM vacuum should operate advance side of distributor control. Below 2200 RPM vacuum should operate retard side of distributor control.

Checking Throttle Valve Operation – *NOTE – Check applies when cooling water temperature is between 17°C (63°F) and 100°C (212°F).* Connect tachometer, start engine and increase speed to 2500 RPM. Release accelerator linkage and observe throttle control on carburetor. Above 1800 RPM throttle control plunger should rest against throttle valve lever. Below 1800 RPM plunger on throttle control is pulled in by vacuum allowing throttle valve lever to return to its normal idling position.



MERCEDES-BENZ 250 & 280 S ENGINE MODIFICATION (Cont.)

Checking 17°C (63°F) Temperature Switch – Remove connector from relay box, connect test lamp to terminals 1 and 8. Turn on ignition, test lamp should light up only when cooling water temperature is below 17°C (63°F).



COMPONENT LOCATIONS 250/8 (280 S/8 SIMILAR)

Checking 100°C (212°F) Temperature Switch – Remove connector from relay box, connect test lamp to terminals 6 and 8. Turn on ignition, test lamp should light up only when cooling water temperature is above 100°C (212°F).

Checking RPM Switch – *NOTE – Use voltmeter only for checking RPM switch. Using test lamp may result in damage to switch.* Procedures for checking RPM switch are as follows:

1) Remove connector from two-way valve. Connect voltmeter to connector, start engine and increase speed. Above approximately 2000 RPM voltmeter should indicate approximately 13 volts. Below 1800 RPM voltmeter should indicate 0 volts.

2) Remove connector from three-way valve. Connect voltmeter to connector, start engine and increase speed. Above approximately 2400 RPM voltmeter should indicate 0 volts. Below 2200 RPM voltmeter should indicate approximately 13 volts.