MERCEDES-BENZ 250 & 250C ENGINE MODIFICATION

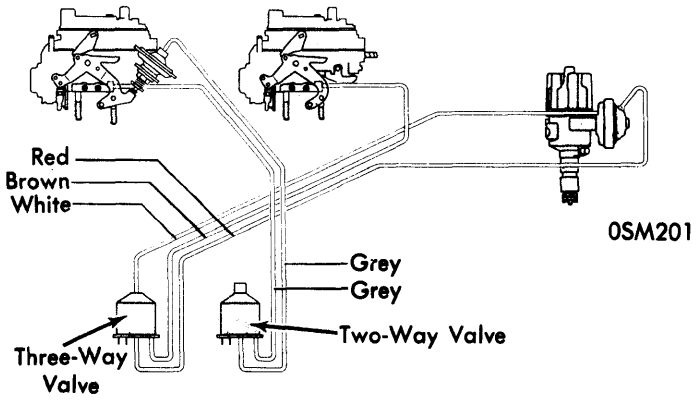
250 & 250 C (1972)

DESCRIPTION

The engine modification system used on Mercedes-Benz 250 & 250 C models consists of the following components: An RPM switch, relay box, two-way valve, three-way valve, and two temperature switches. The oil temperature switch opens at 17°C (63°F) and the coolant temperature switch opens at 100°C (212°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 temperature. This valve is controlled, through a relay, by the oil temperature switch, the coolant temperature switch and the RPM switch. Conditions which affect advance or retard of distributor control unit are as follows:

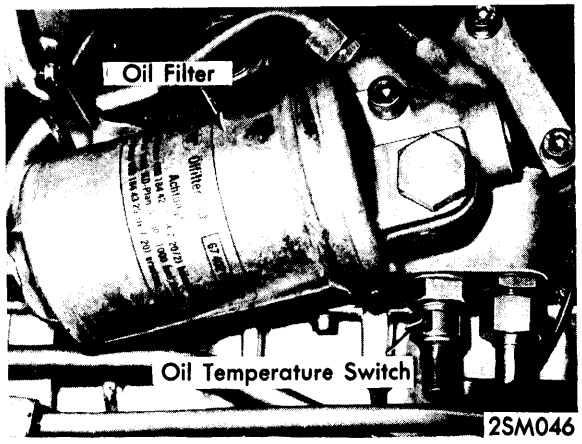


VACUUM SYSTEM SCHEMATIC

1) When oil temperature is above 17°C (63°F), and coolant temperature is below 100°C (212°F), both temperature switches will be open. If engine speed drops below 2200 RPM when both switches are open, the RPM switch will actuate a three-way valve, causing intake manifold vacuum to be directed towards the retarding end of the distributor control, and timing will be retarded. If engine speed rises above 2500 RPM when both switches are open, the RPM switch will open. This causes manifold vacuum to be directed towards the advancing end of the distributor control, and timing will be advanced.

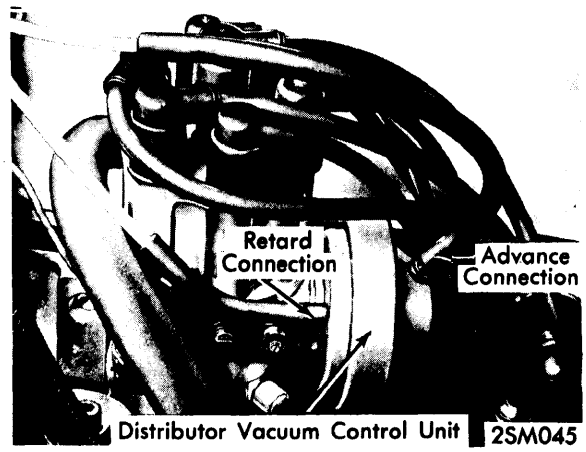
2) When oil temperature is below 17°C (63°F), or coolant temperature is above 100°C (212°F), the affected switch will close. This causes RPM switch and three-way valve to be de-energized. Manifold vacuum is then directed towards the advancing end of the distributor control and timing will be advanced.

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

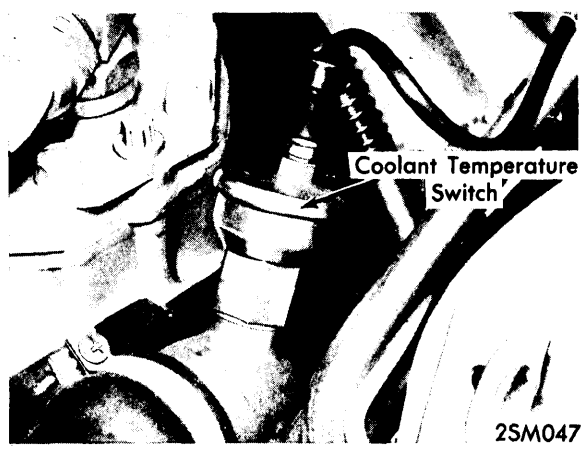


OIL TEMPERATURE SWITCH

1) When oil temperature is above 17°C (63°F) and coolant temperature is below 100°C (212°F), both temperature switches are open. If engine speed exceeds 2000 RPM while both 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.



DISTRIBUTOR VACUUM CONTROL



COOLANT TEMPERATURE SWITCH

MERCEDES-BENZ 250 & 250C ENGINE MODIFICATION (Cont.)

2) If both temperature switches are open and engine speed falls below 1800 RPM, the RPM switch will interrupt current flow to two-way valve. This allows manifold vacuum to pass to throttle control. Plunger will be pulled in and throttle valves will close to normal idling position.

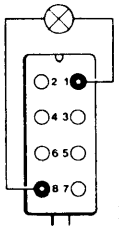
3) When oil temperature is below 17°C (63°F) or coolant temperature is above 100°C (212°F), the affected switch will close. This causes RPM switch and two-way valve to be de-energized. Manifold vacuum is then allowed to pass to throttle control. Plunger is pulled in and throttle valves will close to normal idling position.

Carburetor Choke Control – Bi-metal automatic chokes are activated simultaneously in both carburetors. Choke control is pre-tensioned at factory and should be set to large mark after carburetor overhaul.

MAINTENANCE

Checking Ignition Changeover – With tachometer and timing light connected, and engine oil temperature above 17°C (63°F), coolant temperature below 100°C (212°F), start engine and increase engine RPM. At speeds in excess of approximately 2500 RPM, the distributor vacuum control will advance the ignition timing. At speeds below approximately 2200 RPM, it will retard the ignition timing.

Checking Throttle Valve Operation – With tachometer connected, and engine oil temperature above 17°C (63°F), coolant temperature below 100°C (212°F), start engine and increase speed to 2500 RPM. Release accelerator linkage and observe throttle control on carburetor. At speeds in excess of 1800 RPM the adjustment screw of the throttle control should rest against the accelerator linkage. At speeds below 1800 RPM the vacuum will cause adjustment screw to be pulled away from the accelerator linkage.

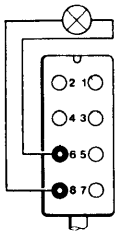


2SM048

RELAY BOX CONNECTOR (TESTING OIL TEMPERATURE SWITCH)

Checking 17°C (63°F) Oil Temperature Switch – Remove cable connector from relay box and connect test light to terminals 1 and 8. Turn on ignition. Test light should only light if oil temperature is below 17°C (63°F).

Checking 100°C (212°F) Coolant Temperature Switch – Remove cable connector from relay box and connect test light to terminals 6 and 8. Turn on ignition. Test light should light only when coolant temperature is above 100°C (212°F).



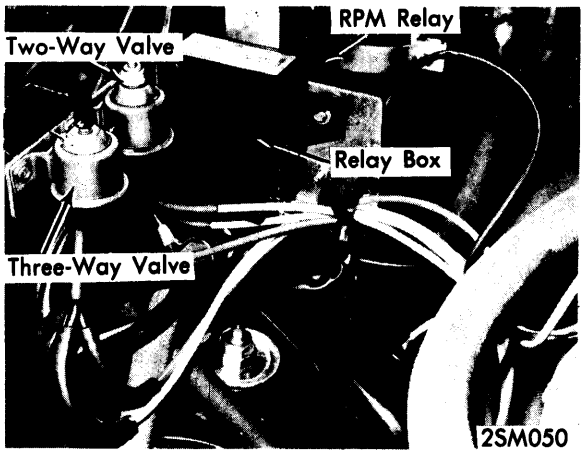
2SM049

RELAY BOX CONNECTOR (TESTING COOLANT TEMPERATURE SWITCH)

CAUTION – Use voltmeter when checking RPM relay. Using a test lamp may result in damage to the RPM relay.

Checking RPM Relay – The RPM relay consists of two switches. One has a switch point of 1800-2000 RPM for throttle valve lift and the other has a switch point of 2200-2500 for ignition changeover. Test switch points with voltmeter as follows:

1) To check switch point for throttle valve lift, remove cable connector from two-way valve and connect voltmeter between terminals. Start engine and increase RPM. At engine speeds over approximately 2000 RPM, the voltmeter should indicate 13 volts.



2SM050

VALVE & RELAY LOCATIONS

2) To check switch point for ignition changeover, remove cable connection from three-way valve and connect voltmeter. Start engine and increase RPM. At speeds over 2500 RPM, voltmeter should indicate approximately 0 volts.