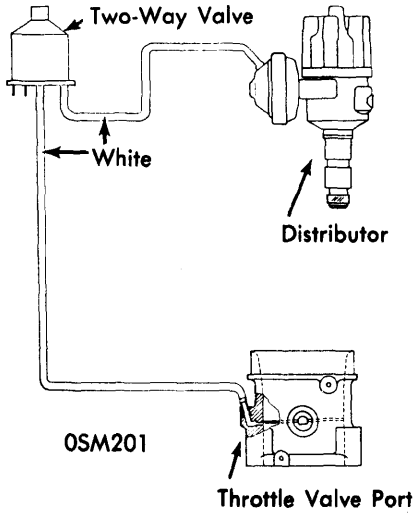
MERCEDES-BENZ 1972 ENGINE MODIFICATION WITH FUEL INJECTION

280 SE, 280 SE/4.5, 280 SEL/4.5 (1972)
300 SEL/4.5, 350 SL & 600 (1972)

DESCRIPTION

The emission systems used on models with fuel injection are similar in function, however some of the components differ. The 280 SE and 600 models utilize a 17°C (100°F) oil temperature switch and a 100°C (212°F) coolant temperature switch, while all other models have only the 100°C (212°F) coolant switch. A gulp valve is used on 280 SE and 600 models only. This valve provides additional air to the intake manifold during periods of deceleration. A Throttle solenoid is used on 280 SE models only. The solenoid prevents engine from stalling when engaging transmission. All fuel injection models incorporate a two-way valve in the vacuum line to control ignition timing vacuum advance and retard. An RPM relay is used on 280 SE and 600 models.



VACUUM SYSTEM SCHEMATIC

OPERATION

Ignition Retard – 1) At oil temperatures over 17°C (280 SE) and coolant temperatures under 100°C (All) the temperature switch or switches are open. On 280 SE models, should the speed drop below 2200 RPM when the switches are open, the RPM relay activates the two-way valve and ignition timing is retarded.

2) On all other models, the ignition will be retarded only when throttle valve is closed and coolant temperature is below 100°C (212°F).

3) The ignition retard will be cancelled when any of the following conditions exist: Oil temperature below 17°C (280 SE), engine speed over 2500 RPM (280 SE), coolant temperature over 100°C (All), air conditioning switched on (All except 280 SE) fourth gear of transmission engaged (280 SE).

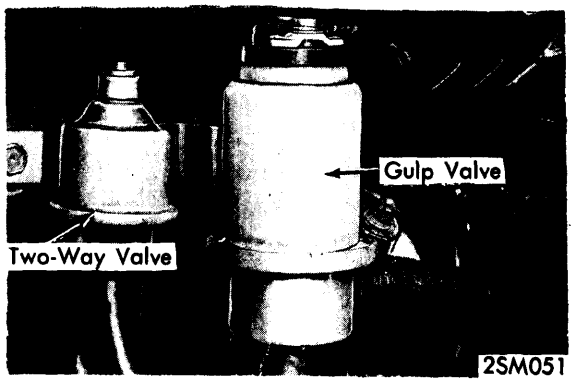
Additional Air Intake – This system is utilized only on models 280 SE and 600. When correct conditions are met, an additional supply of air is delivered to the engine by the gulp valve through the supplementary air line from the air filter. All of the conditions below must be present:

1) Oil Temperature above 17°C (63°F).

2) Accelerator pedal in idle position.

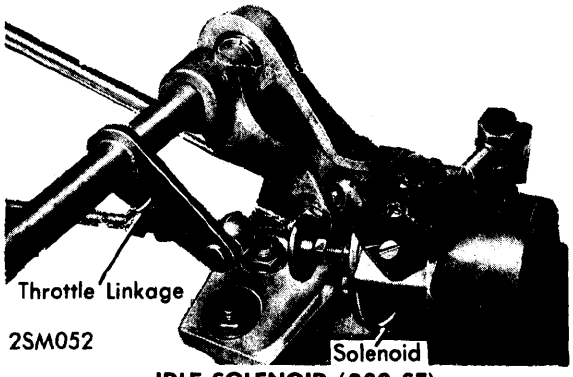
3) Engine speed at time of deceleration over 2900 RPM (280 SE only).

4) Transmission in 3rd or 4th gear (600 only).



TWO-WAY VALVE & GULP VALVE (280 SE & 600)

Idle Speed Stabilizer (280 SE Only) – When the engine speed drops below 600 RPM due to load factor of power steering, air conditioner or engaging of reverse gear, the idle solenoid is activated by the RPM relay. Also, whenever automatic transmission selector lever is moved to "S" or "D", an oil pressure switch in the transmission will activate the solenoid. The solenoid does not activate when engine speed exceeds 1100 RPM, as the RPM relay will de-activate the solenoid.



IDLE SOLENOID (280 SE)

Fuel Shut-Off – On 280 SE models, a shut-off solenoid will pull main rack of fuel injection pump to zero delivery when ignition is shut off. On all models with 4.5 engine, the fuel injection control unit will shut off fuel delivery when decelerating, dependent upon temperature and engine speed. At lower coolant temperatures, the fuel injection will be cut off at a somewhat higher engine speed than with higher coolant temperatures.

MAINTENANCE

Ignition Change-Over (All 4.5 V8) – 1) To test the ignition changeover, connect timing light and tachometer and check that ignition timing is at 5° ATDC. Connect wire of 100°C (212°F) switch to ground. The ignition should advance by 12° and the RPM should increase by about 200 RPM.

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2) Attach connector plug to 100°C (212°F) switch and switch on air conditioning. This should cause an advance in the ignition and an increase of approximately 100 RPM engine speed.

3) Remove cable connector and connect test light to terminal B+ and terminal of the 100°C (212°F) switch. At a coolant temperature of below 100°C the light should stay out. With a coolant temperature of above 100°C, the lamp should light.

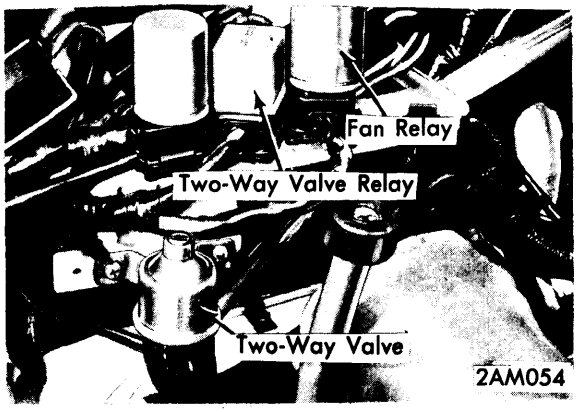
4) Connect test lamp to plug for two-way valve and switch on ignition. Ground wire of 100°C (212°F) switch. If test lamp lights, the relay functions properly.

Ignition Change-Over (280 SE) – 1) The following checks must be made at an oil temperature above 17°C (63°F) and a coolant temperature below 100°C (212°F).

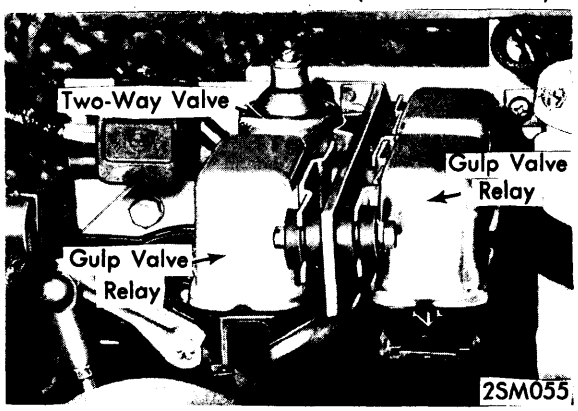
2) Connect a timing light and tachometer, start engine. The ignition retard will be cancelled at approximately 2500 RPM, and the ignition timing will advance by about 20°.

3) To check ignition changeover during an upshift from 3rd to 4th gear, the vehicle must be on a dynamometer. During a downshift from 4th to 3rd (under 2500 RPM), the distributor control must shift to ignition retard.

Ignition Change-Over (Model 600) – Connect timing light and tachometer and start engine. Ignition timing should be 5° ATDC at 600 RPM. Connect wire of 100°C (212°F) switch to ground. This should advance the ignition by 12° and raise engine speed by approximately 200 RPM. Switching on the air conditioning should also advance the ignition timing.

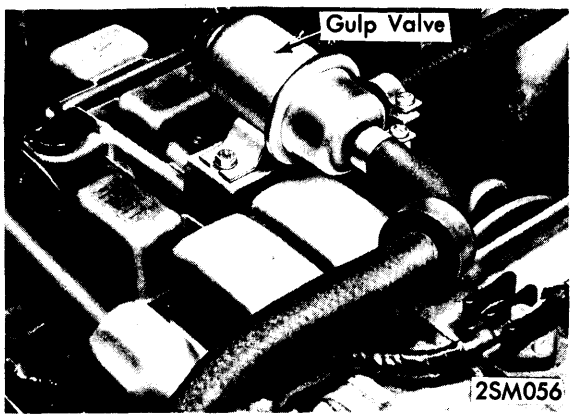


TWO-WAY VALVE & RELAYS (4.5 V8 MODELS)



TWO-WAY VALVE & RELAYS (600)

Testing Additional Air Intake (Gulp Valve) – 1) Connect test lamp to gulp valve. Test must be made with vehicle on a dynamometer. Drive model 280 SE in 3rd or 4th gear and model 600 in 1st, 2nd, 3rd, and 4th gears. The test lamp should not light when depressing accelerator. Release accelerator to decelerate vehicle. Test light should light up at speeds above 15 MPH (280 SE) or engine speeds over 2900 RPM.



GULP VALVE (600)

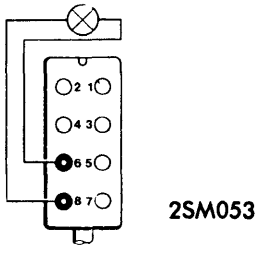
2) To check mechanical functioning of valve, remove air line from air filter to valve at gulp valve. A suction should be noticed at speeds above 15 MPH (280 SE) when decelerating in 3rd or 4th gear. At engine speeds above 2900 RPM (model 600) suction should be felt at gulp valve when decelerating in any gear.

Idle Speed Stabilization (280 SE Only) – Before performing test, vehicle must have parking brake and service brakes on. Attach test lamp to idle solenoid and run engine at idle speed. Perform the following checks separately:

1) Switch on air conditioning, turn power steering to full lock and engage reverse gear. If engine RPM drops below 600 RPM, the test lamp should light. At engine speeds over 1000 RPM, the test lamp should go out.

2) Place selector lever of transmission in position "S" or "D". At engine speeds up to approximately 2600 RPM, the test lamp should light. At engine speeds over 2900 RPM, the test lamp should go out.

Checking 17°C (63°F) Oil Temperature Switch – Remove plug from relay and connect test light to terminals 5 and B+ (model 600) or terminals 6 and 8 (280 SE). Test light should only light if oil temperature is below 17°C (63°F).



RELAY BOX CABLE CONNECTOR (TESTING OIL TEMPERATURE SWITCH)

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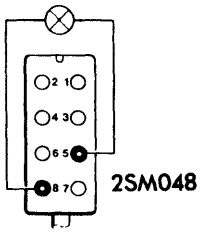
Checking 100°C (212°F) Coolant Temperature Switch – Remove cable connector from relay box and connect test lamp to terminals 5 and 8 (280 SE) or terminals B+ and switch (600). Test lamp should light up only at temperatures over 100°C (212°F).

NOTE – Use voltmeter when checking relay. Use of test lamp may result in damage to RPM relay.



RELAY BOX CABLE CONNECTOR (TESTING COOLANT TEMPERATURE SWITCH)

Checking RPM Relay (280 SE) – The RPM relay consists of two RPM switches. One has a switch point of 2200-2500 for ignition changeover, the other has a switch point of 2600-2900 for additional air intake. Test switch points with voltmeter as follows:

1) To check switch point for ignition changeover, remove cable connector from two-way valve and connect voltmeter. Start engine and increase RPM. At engine speeds over approximately 2500 RPM the voltmeter should indicate 13 volts. At speeds below approximately 2200 RPM, the voltmeter should indicate zero.

2) To check switch point for additional air intake, remove connector from relay box and connect voltmeter to terminal 4 and ground. Below approximately 2600 RPM, the voltmeter should indicate 13 volts. Above approximately 2900 RPM, the voltmeter should indicate zero volts. Remove wire connector from relay box and attach voltmeter to terminal 2 and ground. At engine speed of about 600 RPM the voltmeter should indicate 13 volts and above 1000 RPM it should indicate zero volts.