1982 Exhaust Emission Systems

MERCEDES-BENZ ELECTRONIC IDLE SPEED CONTROL

380 Series

DESCRIPTION

Mercedes-Benz 380 models are equipped with an electronic idle speed control which maintains a constant idle speed under all engine operating conditions. A pre-set fast idle is controlled when the engine coolant is cold, then the idle speed is lowered and and held steady even when engine loads vary.

The system includes the idle speed adjuster, idle air distributor, idle speed control unit, temperature control switch and connecting hoses.

OPERATION

The idle speed control system controls a variable air bleed into the intake system. Idle speed is maintained by increasing or decreasing the air, which is injected through an insulating sleeve around each fuel injector.

A constant 750 RPM is maintained when engine coolant is below 107°F (40°C), and a 500 RPM idle is maintained when engine coolant is above this temperature. System components operate as follows:

IDLE SPEED ADJUSTER

The idle speed adjuster is an electrically controlled solenoid that opens and closes an orifice. With the ignition off, the orifice is completely open. With the ignition on and engine not running, the orifice is open and the adjuster is operated by 0-1.5 volts from the control unit,

When the engine is running, the orifice is decreased in size as the adjuster receives 4-5 volts. At 5 volts, the orifice is closed. When engine speed is over 900 RPM, the orifice is kept slightly open by 4.5 volts so that the engine will not stall if the throttle is closed suddenly.

INTAKE AIR DISTRIBUTOR

The air distributor is a system of tubing that connects the mixture control unit with each fuel injector. The idle speed adjuster controls how much air enters this system, and the cold-start valve injects additional fuel during warm-up. The air distributor terminates in a sleeve around each fuel injector that ensures the injected air mixes with the injected fuel.

ELECTRONIC CONTROL UNIT

The control unit receives voltage from the voltage supply relay (No. 29). It also has inputs from ignition system (to determine idle speed), a coolant sensor, air injection system and fuel injection feedback control unit. It provides an output signal to idle speed adjuster which varies from 1 to 5 volts, at a frequency of 200 cycles per second.

NOTE: The electronic control unit is located in a sealed box in front of cowl air intake grille.

TESTING

1) Warm engine to normal operating temperature. Stop engine and disconnect plug from idle speed adjuster. Measure voltage across terminals in connector. If battery voltage is present, go to step **4)**.

2) If no voltage is present, remove connector from control unit and measure voltage across terminals 2 (+) and 4 (-). If battery voltage is not present, check wiring and voltage supply relay. If battery voltage is present, check continuity of wiring from control unit to idle speed adjuster. Repair if required.

3) Connect wiring harness to control unit and measure voltage at idle speed adjuster connector again. If no voltage is present, replace control unit.

4) Connector at idle speed adjuster should be unplugged slightly so voltage readings can be measured while system is operating. Start engine and idle. Measure voltage across terminals at idle speed adjuster. If no voltage, replace control unit.

5) If voltage measured was 4-6 volts, disconnect coolant temperature sensor and place jumper wires across connector terminals. Idle speed should increase to 750 RPM. If so, the system is okay. If not, go to next step.

6) Disconnect idle speed adjuster. With engine running briefly apply battery voltage (using jumper wires) to idle speed adjuster terminals. If idle speed drops or engine stalls, replace control unit. If idle speed does not drop, replace idle speed adjuster.

CAUTION: Do not apply battery voltage for more than 5 seconds to idle speed adjuster terminals.

Fig. 1: Electronic Idle Speed Control System