1982 Exhaust Emission Systems

VOLVO ELECTRONIC IDLE SPEED CONTROL

Gasoline Models

DESCRIPTION

All Gasoline models are equipped with an electronic idle speed control system which maintains a constant idle speed under all conditions. The control unit monitors engine speed and actuates an air control valve which by-passes throttle valve and allows extra air to engine. This air supply is varied to maintain idle speed. System includes the control unit, air control valve, throttle switch, coolant sensor, and connecting wiring and hoses.

OPERATION

The constant idle speed system controls an air control valve which by-passes additional air around the air flow throttle valve. Idle speed is maintained by the amount of air injected into the intake manifold, behind the air flow throttle valve. System components operate as follows:

ELECTRONIC CONTROL UNIT

The electronic control unit processes information received from the engine coolant temperature sensor, throttle switch and distributor. After receiving information on coolant temperature, throttle position and engine speed, the control unit sends electrical impulses to the air control valve to regulate idle speed.

AIR CONTROL VALVE

The air control valve consists of a small electric motor mounted between connecting hoses at the air flow throttle valve. The electric motor rotates clockwise or counterclockwise, depending on electrical signals received from the electronic control unit. The control valve is rotated to increase or decrease the amount of air which is taken from in front of the throttle valve, by-passed around the throttle valve and injected into the intake manifold, behind the throttle valve.

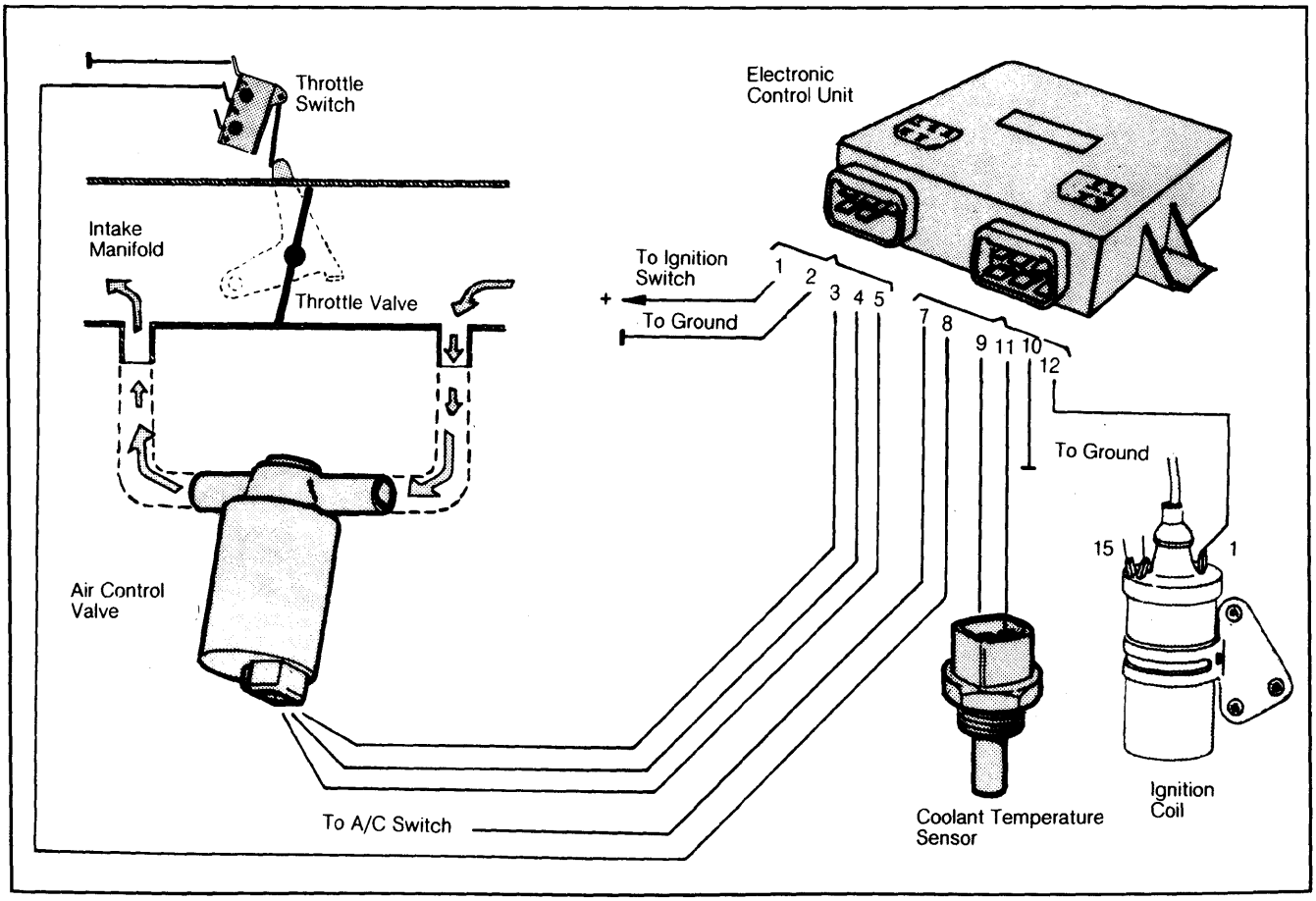
THROTTLE SWITCH

The throttle switch is a small electrical switch which is activated by the throttle lever to inform the electronic control unit when the throttle valve is at the idle position. On V6 engines, the electrical circuit between the throttle switch and electronic control unit is closed at idle position. On all other engines, the ground circuit between the throttle switch and electronic control unit is interrupted at idle position.

COOLANT TEMPERATURE SENSOR

The coolant temperature sensor provides an electrical impulse to the electronic control unit at low coolant temperatures. At low temperatures, the electronic control unit activates the air control valve to provide more air to increase the engine speed.

Fig. 1: Volvo Electronic Idle Speed Control System



VOLVO ELECTRONIC IDLE SPEED CONTROL (Cont.)

IGNITION COIL

Terminal 1 on the ignition coil is connected to the electronic control unit to provide the unit with engine speed information.

TESTING

THROTTLE SWITCH

1) To test throttle switch circuitry, connect voltmeter across terminals "1" and "2" (both terminals on V6 engine). With ignition on and engine stopped, voltmeter reading at idle should be 2-8 volts (0 volts on V6 engine).

2) Above idle position, voltmeter reading should be 0 volts (2-8 volts on V6 engine). If throttle switch does not respond as outlined, test switch operation as follows:

3) With voltmeter still connected, ignition on and engine stopped, insert feeler gauge as shown in *Fig. 2*.

4) Using feeler gauge listed in Throttle Switch Voltage Reading chart should produce voltages indicated in chart. If not, replace throttle switch and adjust as follows:

5) After replacing throttle switch, connect voltmeter and turn ignition on with engine stopped. On V6 engine, insert .012" (0.3 mm) feeler gauge as shown in *Fig. 2*. Loosen lock nut and turn adjusting screw on throttle lever until meter reading drops to 0 volts. Tighten lock nut.

6) On all other models, insert .016" (0.4 mm) feeler gauge. Loosen throttle switch retaining screws until reading is indicated on voltmeter. Tighten retaining screws.

THROTTLE SWITCH VOLTAGE READING

Application	Feeler Gauge In. (mm)	Voltmeter Reading
4-Cylinder		
Exc. Turbo	.008 (0.2)	Any
	.035 (0.9)	0 Volts
Turbo	.008 (0.2)	Any
	.045 (1.1)	0 Volts
V6	.008 (0.2)	0 Volts
	.024 (0.6)	Any

AIR CONTROL VALVE (ACV)

1) Disconnect ACV harness. Resistance measured between terminals 3 and 4, and terminals 4 and 5 should be 20 ohms.

2) Warm engine to operating temperature. Ground Blue/White ACV test connector (located near coil). ACV valve will close and engine speed should drop to about 600-650 RPM.

COOLANT TEMPERATURE SENSOR

Measure resistance between coolant temperature sensor terminals. Resistance for 4-cylinder engines at 68°F (20°C) should be 2100-2900 ohms and 270-390 ohms at 176°F (80°C). Resistance for V6 engines at 68°F (20°C) should be 8500-11500 ohms and 770-1320 ohms at 176°F (80°C).

ECU CIRCUITS

1) Locate ECU at right kick panel. Unplug both ECU harness connectors. Turn ignition on. Ensure 12 volts are present at terminal No. one. Ensure terminal No. 2 has continuity to ground.

2) Connect a tachometer between terminal No. 12 and ground. Start engine. Tachometer should indicate engine RPM.

3) Some models with A/C have a White/Green or Red wire attached to terminal No. 7. If so, turn A/C on and ensure 12 volts are present on terminal No. 7.

NOTE: During A/C operation, the engine speed should increase 150 RPM.

4) Using jumper wires, connect one jumper wire between terminals No. one and 4. Connect the other jumper wire between terminals No. 2 and 5. Start engine. If engine speed increases to 1600-2400 RPM, ACV is okay. If not, check wiring and ACV.

5) Repair or replace any defective components or circuits. Remove jumper wires. Connect all harness connectors. Check to see if idle speed control system is working. If not, ensure all connectors are clean and tight. If no problems are found, replace ECU.

Fig. 2: Testing Throttle Switch Operation