

# Fans (cont'd)

## – How the Circuit Works

### Manual A/C

The fans use two control units: the fan control unit and the radiator fan control module. The fan system has two speeds: LOW and HIGH. Refer to the Service Manual Section 23 (Radiator and Condenser Fan Controls) for testing and troubleshooting procedures.

The radiator fan control module can turn on the condenser and radiator fan motors anytime during the first 30 minutes after the engine has been shut off. The engine oil temperature switch will close when the engine oil temperature is above 101–109°C (214–228°F). The engine oil temperature switch input to the radiator fan control module causes it to energize the condenser fan relay. This, in turn, allows battery voltage through fuse 50 to energize the condenser and radiator fan motors, and both motors then run at low speed. They can begin running as soon as five seconds after the engine is turned off.

### Low-Speed Operation

Both fans will come on and run at low speed when the radiator fan control sensor measures coolant temperature between 78°C (172°F) and 84°C (183°F). They will keep running until the coolant temperature falls below 78°C (172°F).

The radiator fan control module will then energize and ground the coil of the condenser fan relay causing its contacts to close. This allows battery voltage through fuse 50 to energize the condenser fan motor through the radiator fan main relay and the radiator fan motor. Both fan motors will then run at low speed.

### High Speed Operation

Both fans will come on and run at high speed when the radiator fan control sensor measures coolant temperature at 90°C (194°F). They will continue running at high speed until the coolant temperature falls below 84°C (183°F). With the ignition switch in ON (II), the fans begin running when the radiator fan control module grounds both the radiator fan relay and radiator fan main relay coils (through the fan control unit), energizing both relays.

The radiator fan motor will then be powered through fuse 47 and the closed contacts of the radiator fan relay. The condenser fan motor will be powered through fuse 50 and the closed contacts of the condenser fan relay. The condenser fan motor will

have a direct path to ground through the radiator fan main relay and the radiator fan motor.

### Climate Control

The A/C ON input at cavity (A3) of the fan control unit is grounded through the A/C triple pressure switch and the climate control unit at G303. The fan control unit supplies two input signals to the powertrain or engine control module (PCM with A/T, ECM with M/T). It indicates that the A/C system has been turned on and that the engine idle speed must be increased.

The fan control unit and the PCM (A/T) or ECM (M/T) are grounded at the (PDSW) terminals through the middle pressure switch in the A/C triple pressure switch at G153.

When the ignition switch is in ON (II), the PCM (A/T) or ECM (M/T) energizes the A/C compressor clutch relay by providing a ground for it. The compressor clutch is then energized through fuse 3, and the closed contacts of the clutch relay.

The fan control unit uses the radiator fan control sensor to measure the engine's coolant temperature:

- When the radiator's coolant temperature is above 84°C (183°F), both the condenser and radiator fans will run at low speed.
- When the radiator's coolant temperature is above 90°C (194°F), the fan control unit causes both fans to run at high speed.
- When the radiator's temperature exceeds 109°C (268°F), the fan control unit, through the PCM (A/T) or ECM (M/T) deenergizes the clutch relay and the compressor clutch.

When the refrigerant pressure becomes too high (due to blockage), or too low (due to leakage), the A/C triple pressure switch will open. This prevents the clutch relay and compressor clutch from energizing.

The radiator fan control sensor will disengage the air conditioning system if the coolant temperature exceeds 110°C (230°F).

Refer to the Service Manual Section 23 (Radiator and Condenser Fan Controls) for testing and troubleshooting procedures.