
306 Cooling Fan Operation Principle

Relays, Switches & Sensor

Manufacturer Reed Relays & Switches Solid State Relay, OKI Reeds



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— Introduction —

This page explains the basic principle of the various operating modes of the Peugeot 306 cooling fans.

The example we are using here is the two speed twin fans controlled by a cooling fan ECU. Vehicle manufactured 1996 with A/C and 30 fuse box.

This system is used in most Australian models with **petrol** engines. Although the basic circuit remains the same in later models the fuse and wire numbers will be different.

— Overview of the system —

The engine cooling fan system is made up of the following parts. 2 fan motors, 3 relays, control unit and the coolant temperature thermistor (NTC).

The fans have 2 functions.

1. To provide engine cooling in slow or stationary traffic conditions.
2. To provide constant airflow for the condenser when the A/C is operating.

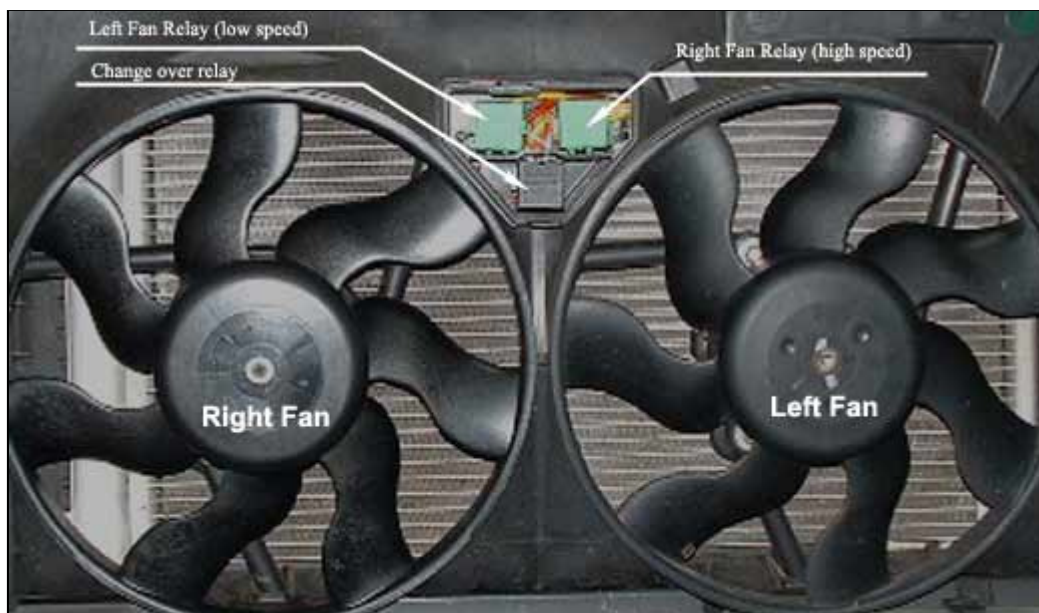
The 2 fan motors always run together and have 2 speeds available. At low speed the motors' power circuit is switched in series and at high speed the circuit is changed over to parallel. A ballast resistor is therefore not required. The switching of the power circuit is done by the 3 relays which, are controlled by the control unit.

The following tasks can be performed by the control unit: Switching of the fan relays, illuminating the "STOP" warning light, illuminate the warning light on the temperature gauge, prevent the A/C compressor from operating under extreme engine temperature or under full engine load, timed post cooling when engine is shut down with the fans operating.

In order to carry out these tasks it receives inputs from the coolant temperature sensor, the air conditioning control panel, the refrigerant pressostat and the engine ECU.

— Fan and relay layout —

Use this graphic to identify and relate the components to the diagrams.



Potential Relay

Potential Relays Power Relays For Starting Motors and Compressors



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— Location Of Components —

Control Unit

The cooling fan control unit is located under the left guard below the head light. Remove the inner guard cover to gain access.

Temperature Sensor

The temperature sensor is mounted on the heater tank on the cylinder head at the bell housing end. The sensor is brown with a brown 2 way connector.

Fuses (power)

Fuse 33 and 34 in the fuse box near the battery.

Fuses (relay coils)

Fuse box with 30 fuses in passengers compartment.

Fuse 7, battery + to left fan relay and control unit.

Fuse 3, ignition + to right fan relay and change over relay.

Fuse 2, ignition + to control unit.

Earth connection 1

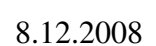
On the left chassis rail in front and below the battery carrier.

A/C Control Unit

Integrated in the control panel on the dash board.

— System at rest diagram —

Wiring diagram

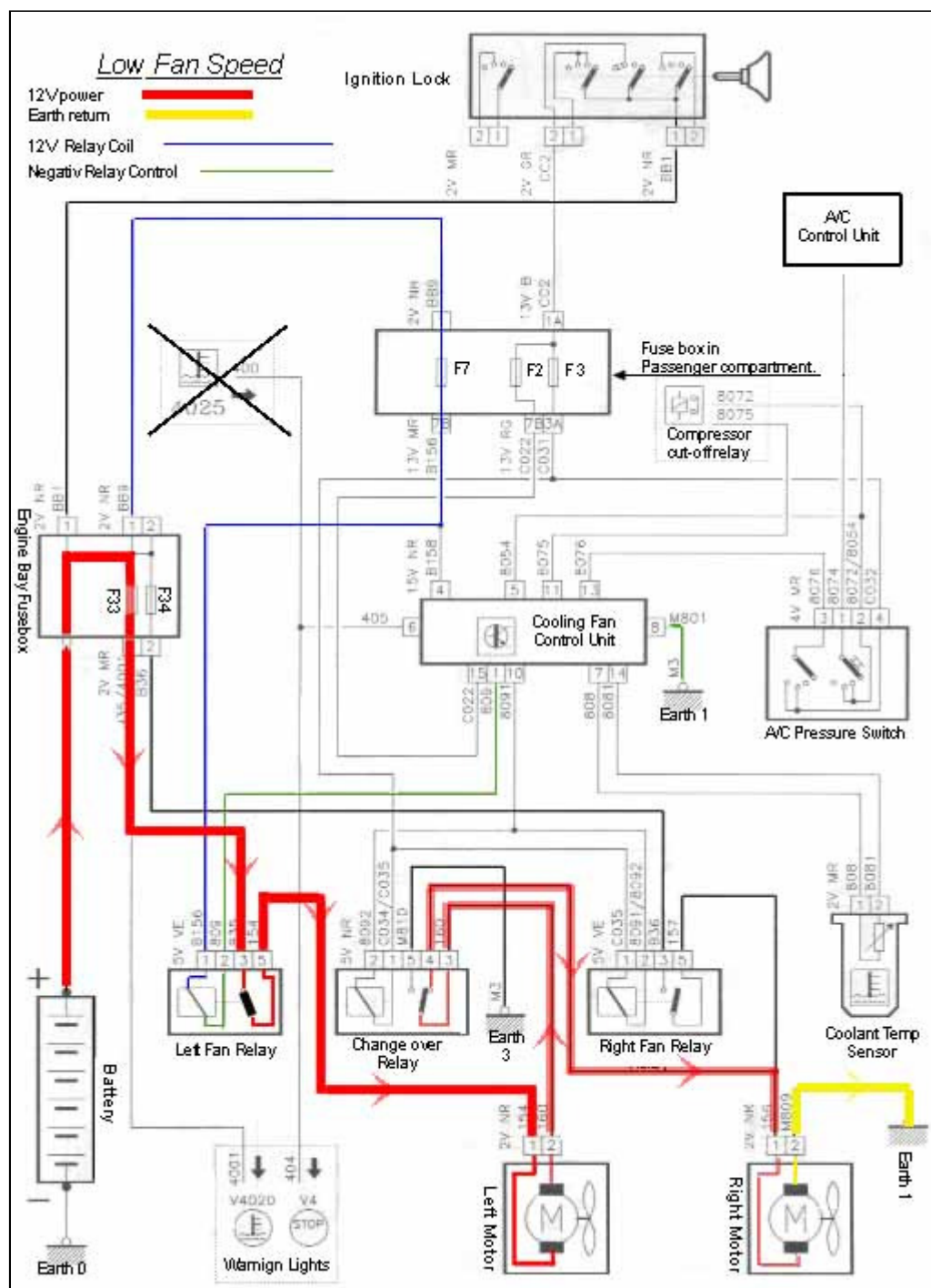


When the coolant temperature reaches the threshold (about 97°) the control unit provides an earth for the relay coil and the contacts are now closed. This completes the power circuit for both fans.

The power circuit starts at the battery, to the engine bay fuse box through fuse 33, to pin 3 at the "left fan relay", out at pin 5 of the relay to the left fan motor, from here to the "change over relay". The change over relay is at rest and provides a path between pin 3 and 4 to the right fan motor, the circuit is complete at pin 2 of the right fan motor when returning to earth.

The fans are switched in series and run at ½ speed. The voltage drop between the 2 fans is indicated in the diagram below with a lighter colour trace.

In the low speed configuration we have one circuit for both fans. The motors operate in series.



— High Speed Operation —

Condition for high speed call

The high fan speed is called for:

1. When the engine temperature reaches 107°C.
2. When the A/C refrigerant high pressure threshold is reached.
3. When the temperature sensor circuit goes faulty. (open circuit)

Power circuit explained

All 3 relays are now energised.

See the low fan speed operation above for the "left fan relay" control.

The "change over relay" and the "right fan relay" are provided with ignition 12V via fuse 3 from the fuse box in the passenger compartment. (fuse 7 for a 13 fuse box).

When the coolant temperature reached the threshold, (about 107°C) the control unit switched the "change over relay" and the "right fan relay" to earth.

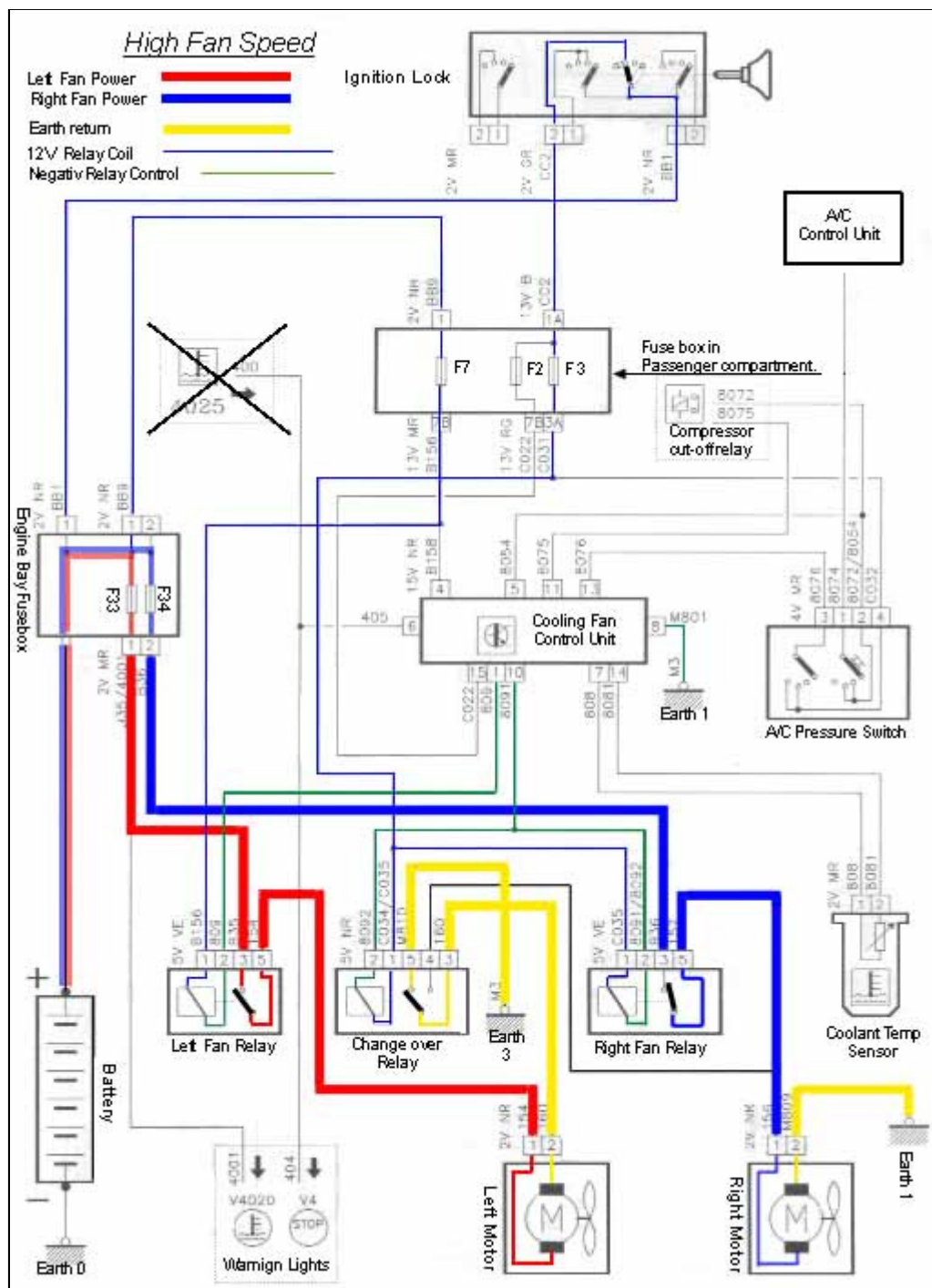
Left fan circuit, red trace.

The left fan motor is supplied with current from the battery via fuse 33 and the "left fan relay" (same as in low speed operation), from the motor the path leads to the "change over relay". This relay is now energised and directs the current to earth.

Right fan circuit, blue trace.

The right fan motor is supplied with current from the battery via fuse 34 and the "right fan relay". From the motor the current returns to earth; this completes the circuit.

In the high speed configuration we have a separate circuit for each fan. The motors operate in parallel.



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