

# ALFA TECH: 164 COOLING FAN RELAYS AND FUSES

*An earlier Q&A column touched on a second fuse for the 164 cooling fan circuit, promising an article at a later date. It is now a later date, so here is the article:*

Experiencing engine cooling problems, a 164 owner came into the repair shop with two slightly-used radiators in the trunk of his 164 and a new one in place under the hood. Several other owners had connected a switch to be operated by the driver when the temperature rises. Another had wired the radiator fan to run full-time with the ignition.

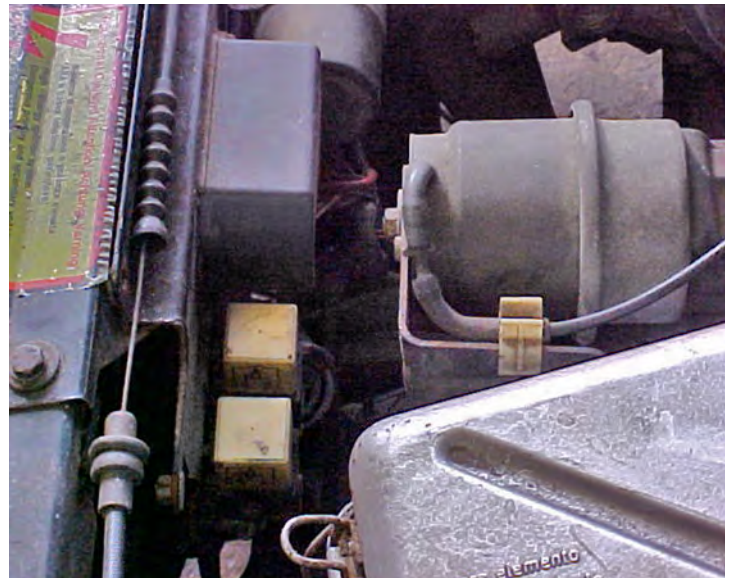
In fact, the 164's radiator fan is quite reliable and easy to maintain. Two fuses control the fan's operation: one at position "Z" in the fuse box enables the fan circuit, the other is a 40-amp strip fuse located on the firewall in front of the driver. The 40-amp fuse does the heavy carrying of power to the fan. If the fan is not working at all, look first to the strip fuse.



40-amp fuse at the firewall

The cooling fan system is a two-speed design. Low speed is called for when engine temperature reaches about 200 degrees. The fan switch on the side of the radiator closes and energizes the low-speed relay, providing the fan motor a ground. The low speed is also called for by the air conditioning system to cool the refrigerant condenser.

If the fan does not come on until the gauge



Fan circuit relays

temperature is alarming, the problem is usually a failed low-speed resistor, which has a habit of burning out or overheating at the wiring contact. The resistor is located at the top left corner of the metal fan shroud, hidden by the bracket holding the ignition coil and two pairs of relays. The outboard pair of relays (under a black cover) is for the fan, the low-speed relay being the outboard one.

With high ambient temperature and the air



This is what the resistor looks like (with winter salt)

conditioning in use the fan at low speed may not be able to accomplish sufficient cooling. In that case the switch on the radiator will close and energize the fan's high-speed relay. Persistently high temperature readings with the cooling fan circuit operating properly generally indicate an inefficient radiator.

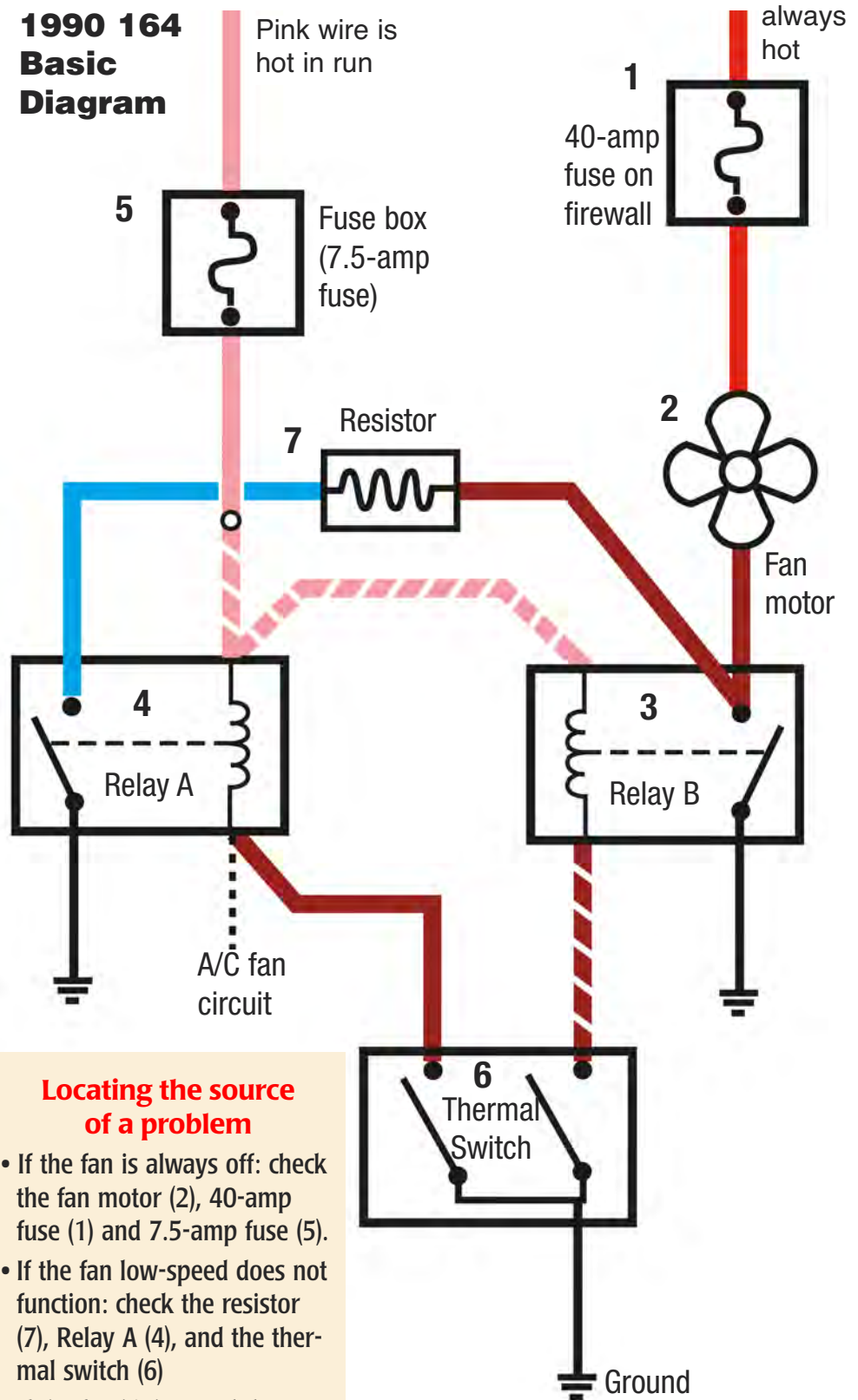
Within an hour of writing this article, another 164 came into the shop with the radiator fan wire cut and soldered into the ignition circuit

**The descriptions here are intended as a basic outline of the system. For detailed information, consult the 164 repair manual.**

### GENERAL SYSTEM DESCRIPTION

Current flows from the battery through the 40-amp fan fuse (1) on the firewall to the electric cooling fan (2). With the ignition set to 'run', voltage runs to the coil of fan relays (3 & 4) and through the primary fuse box and 7.5-amp fuse (5). When engine coolant reaches approximately 130 degrees C, the thermal switch (6) closes to allow current through a fan relay (4). The fan motor (2) is grounded through the resistor and the fan runs. If coolant temperature continues to rise, switch (6) closes so that it grounds one of the relays (3). Powering the relay causes closure of a contact which cuts-off the resistor (7) and the fan motor (2) runs at a higher speed. The fan can also be turned on by the air conditioning system (dotted line).

### 1990 164 Basic Diagram



### Locating the source of a problem

- If the fan is always off: check the fan motor (2), 40-amp fuse (1) and 7.5-amp fuse (5).
- If the fan low-speed does not function: check the resistor (7), Relay A (4), and the thermal switch (6)
- If the fan high-speed does not function: check the fan thermal switch (6).