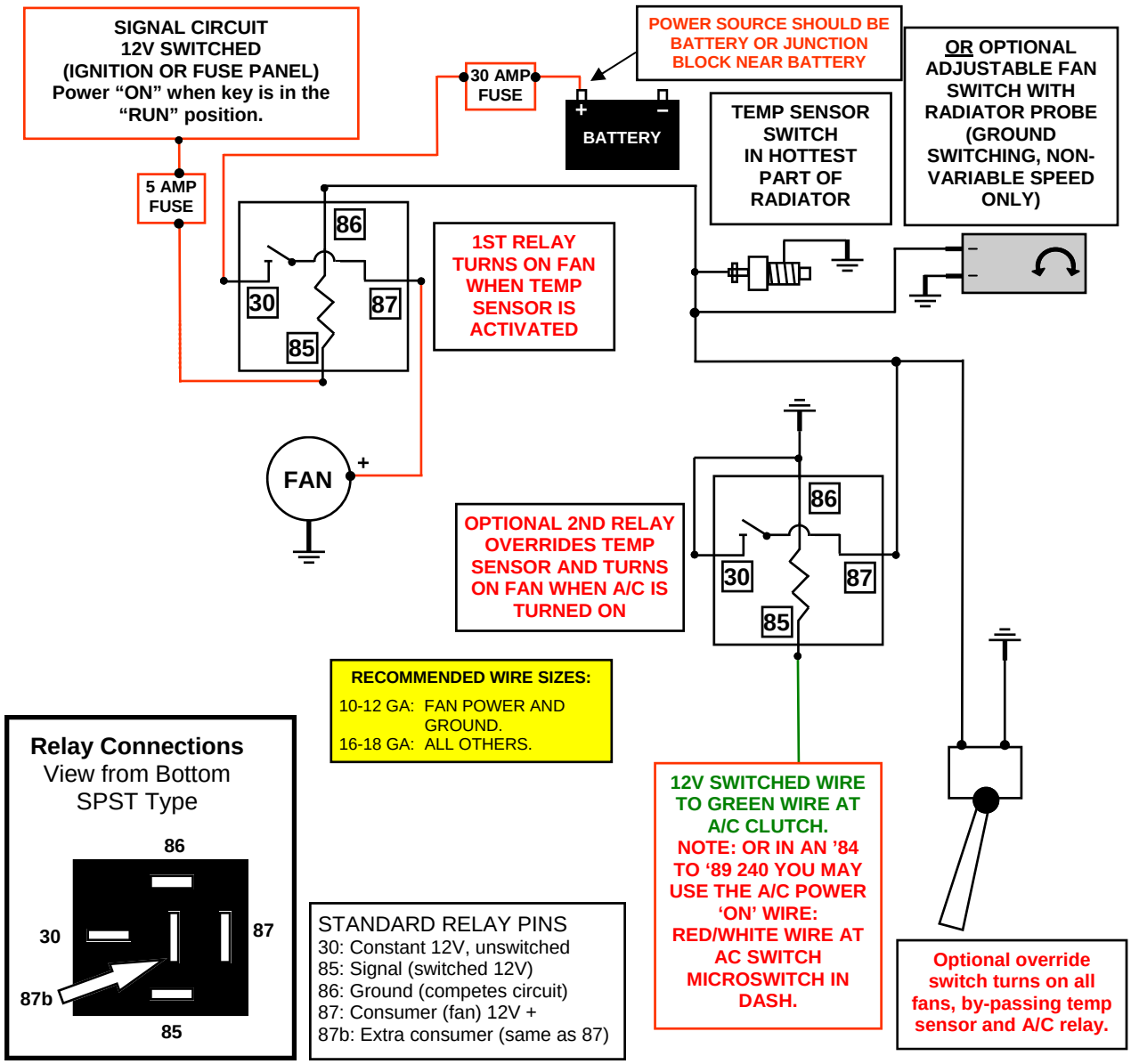
Suggested Electric Fan Wiring Diagrams

These diagrams show the use of relays, ON/OFF sensors, ON/OFF switches and ON/OFF fan controllers. Nothing here should be confused with the latest generation of VARIABLE SPEED CONTROLLERS, which generally have higher technology, such as a soft start feature, but not necessarily better durability.

Suggested Primary Cooling Fan - Single Speed

Using Ground Switching Devices Only for Primary Activation. A Ground Switched Device is one that provides a grounded output upon activation instead of a voltage output.

Updated: 02/13/2014



SPST vs SPDT Relays. What's the difference?

Single Pole, Single Throw (SPST): This relay will be identified as having a middle 87b spade (or no middle spade at all). This is the most common relay used for fog lights or other simple circuits. If there is a middle 87b pin, it will have power whenever there is power to the 87 (whenever relay is "activated"). This way the middle 87b pin may be used as an extra power output.

Single Pole, Double Throw (SPDT): If you have a relay with an 87a pin in the middle spot, it is a SPDT relay, sometimes called a "changeover relay." This type of relay will work for this application also, but you will not use pin 87a. In a changeover relay, the 87a pin will be "HOT" anytime the 87 pin is "OFF," so long as power is connected to pin 30.

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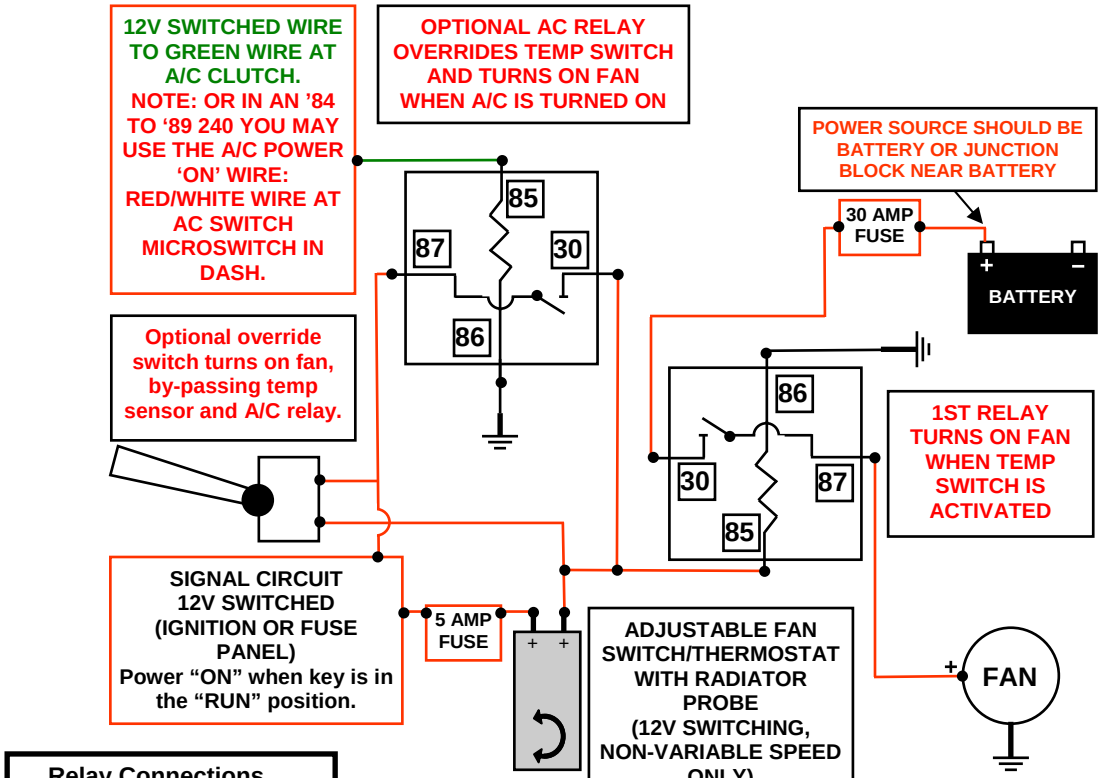
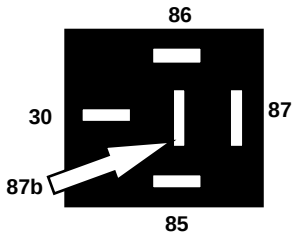
Suggested Primary Cooling Fan - Single Speed

Using 12 Volt Switching Devices Only for Primary Activation

NOTE: Most stand-alone adjustable thermostats (i.e.: Hayden, Flex-a-Lite or Perma-Cool brands) provide a 12 volt output when activated. Also many do not require an external relay for minimal operation. External relays shown in these diagrams provide options for additional features, such as an AC override and/or manual override.



Relay Connections
View from Bottom
SPST Type



STANDARD RELAY PINS
30: Constant 12V, unswitched
85: Signal (switched 12V)
86: Ground (competes circuit)
87: Consumer (fan) 12V +
87b: Extra consumer (same as 87)

RECOMMENDED WIRE SIZES:
10-12 GA: FAN POWER AND GROUND.
16-18 GA: ALL OTHERS.

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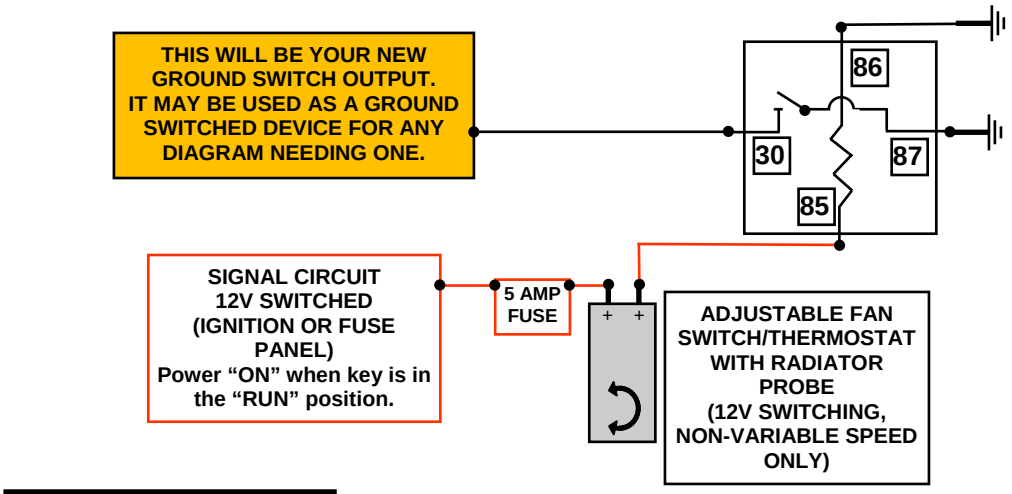
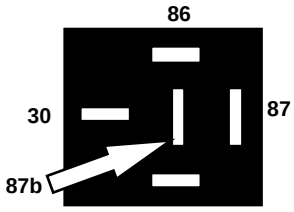
Converting a 12 Volt Switch into a Ground Switch

If you have an adjustable thermostat that uses 12 VOLT SWITCHING, such as the popular Hayden brand thermostats, you may use it with any diagram showing a need for a GROUND SWITCHED DEVICE if you follow these steps to convert it using a simple SPST relay.



Relay Connections
View from Bottom
SPST Type



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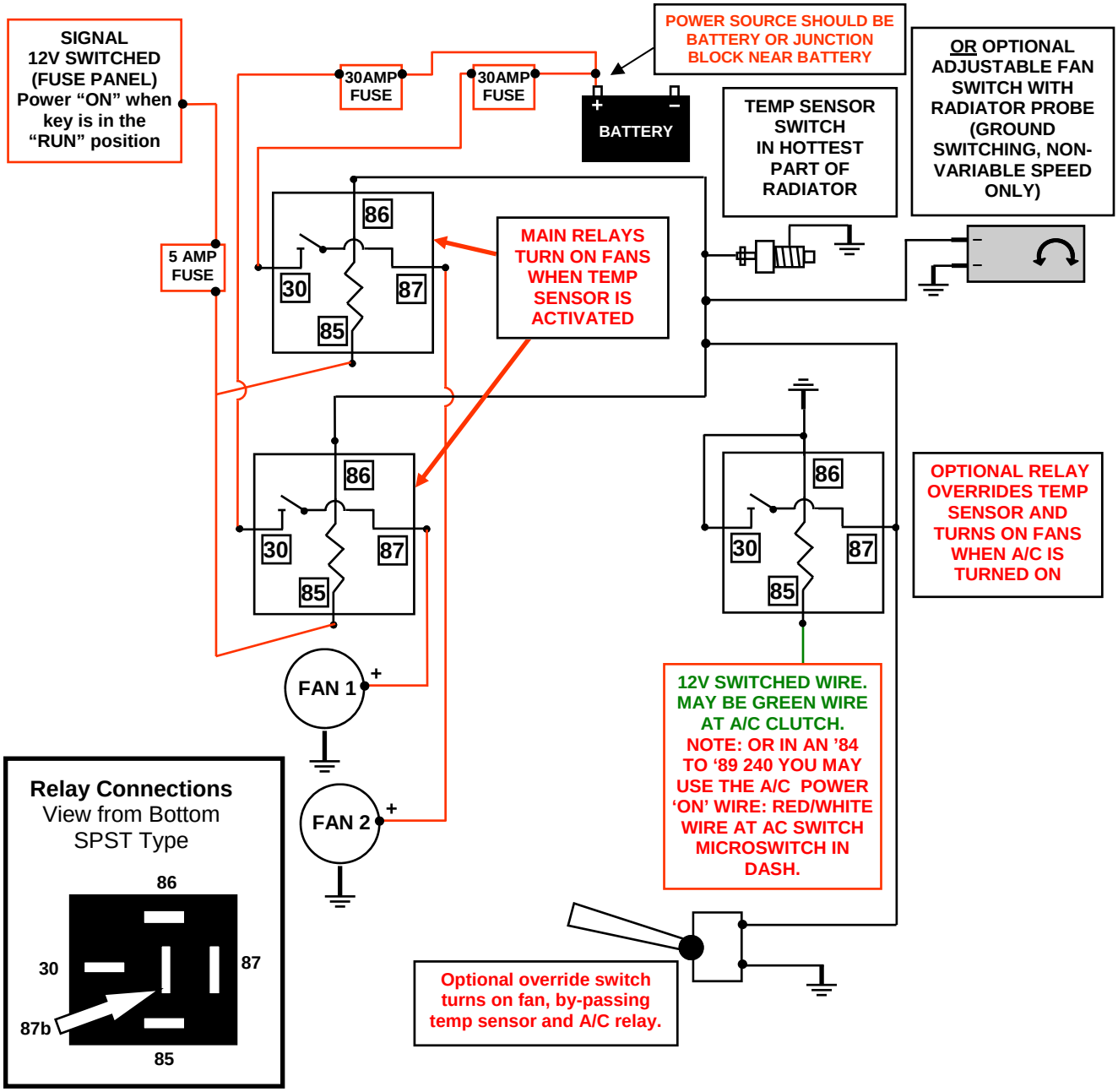
PRIMARY COOLING FAN
DUAL FANS (with Dual Relays)
Using Ground Switched Devices Only for Primary Activation

Using dual relays for two fans is not required. You could use one relay. However two relays will divide the load and if a relay fails, you will still have one fan running.



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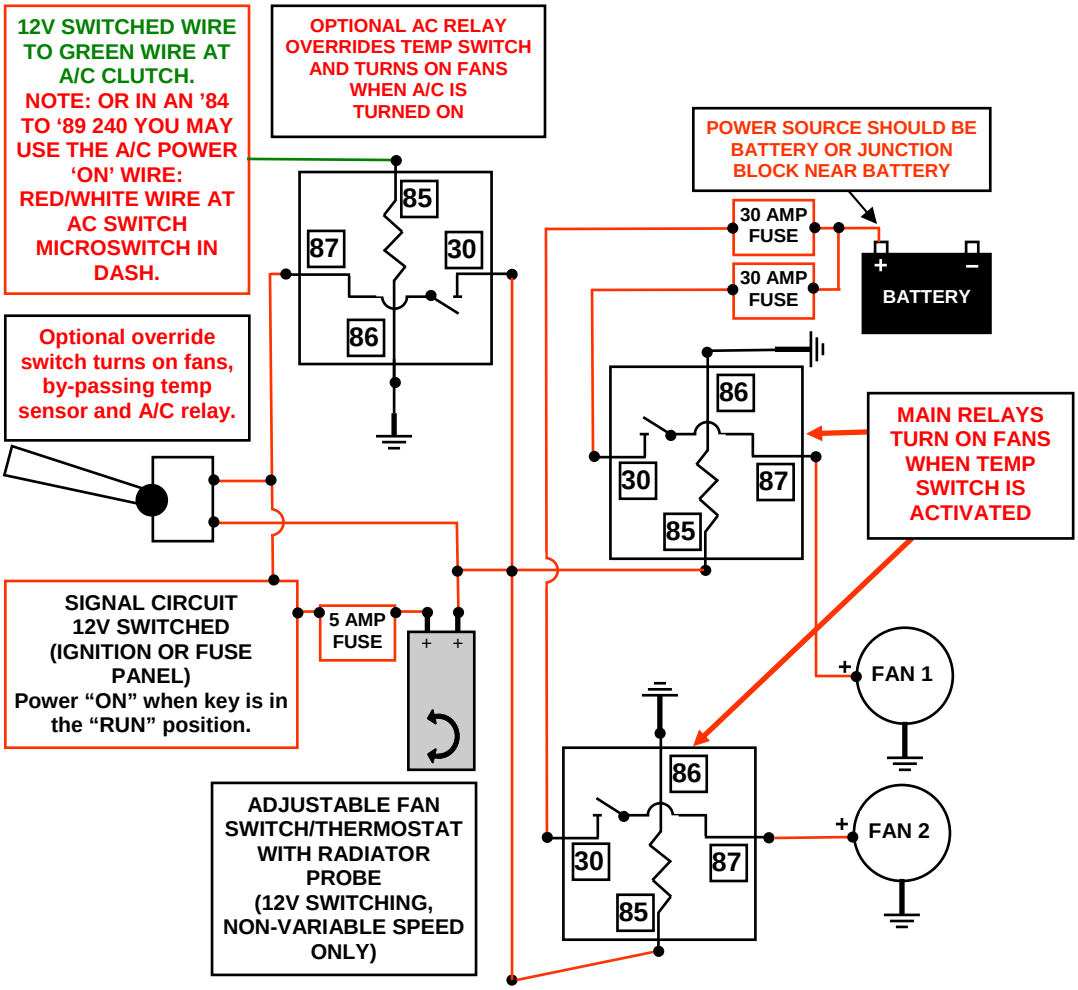
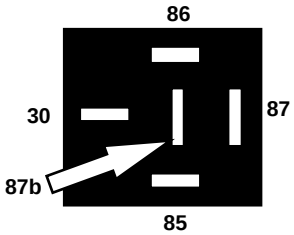


Relay Connections
View from Bottom
SPST Type



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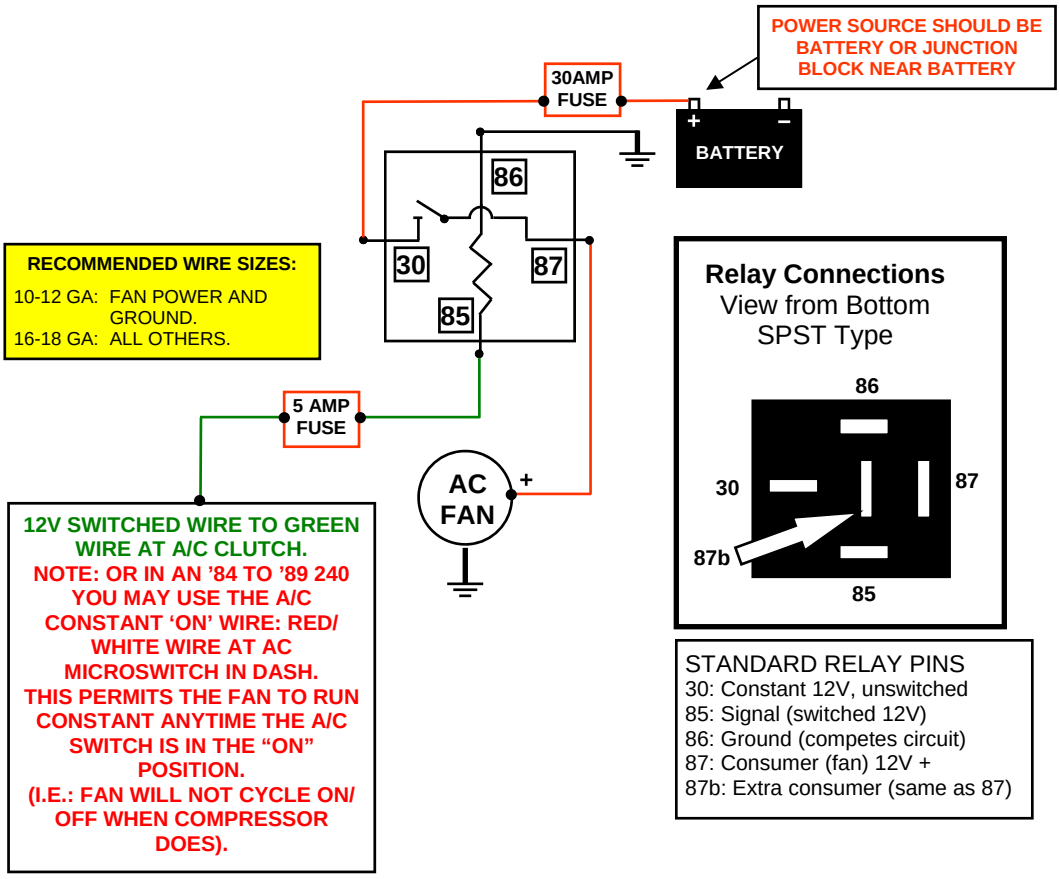
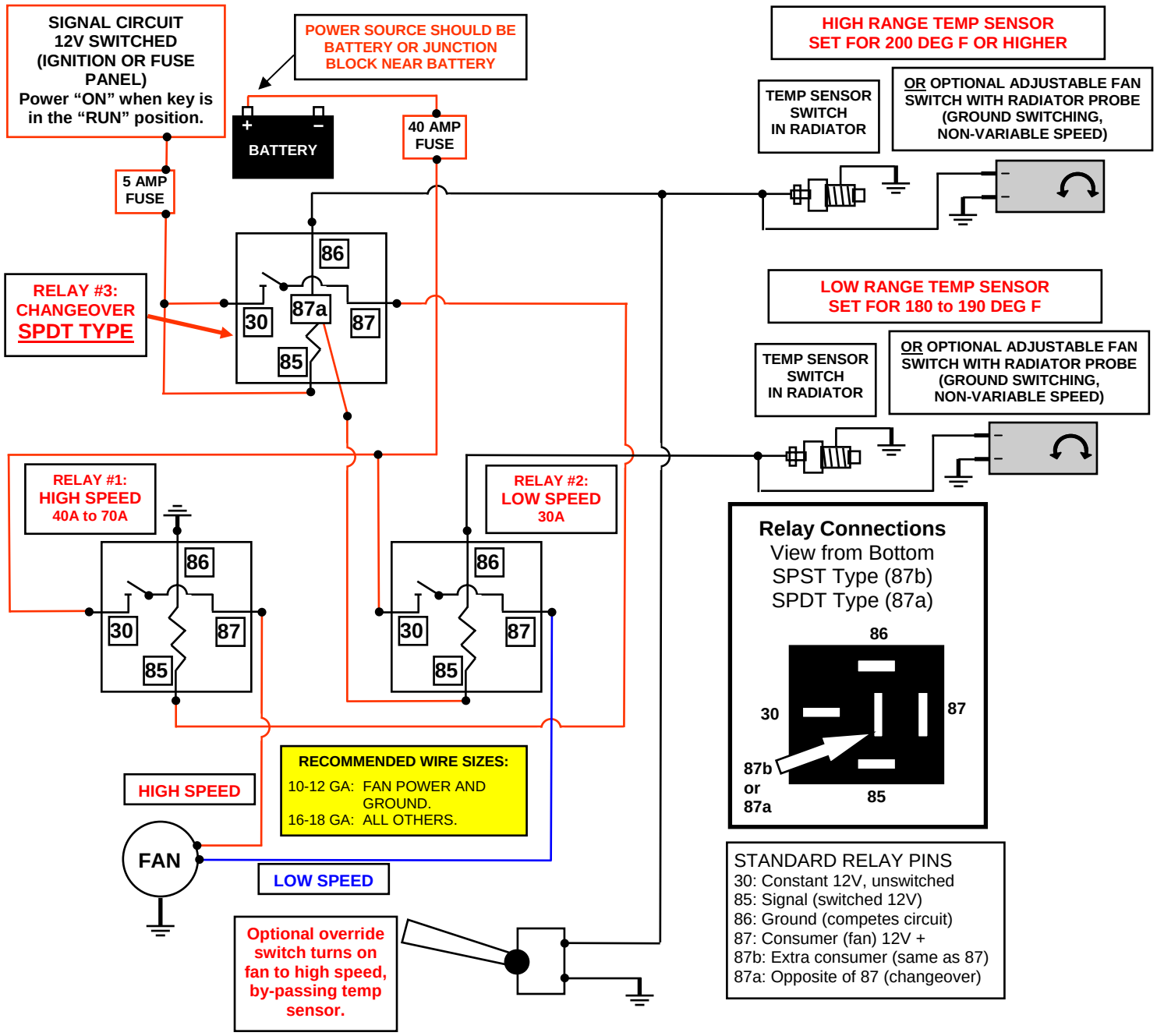
SINGLE A/C FAN ONLY
Pusher for A/C Condenser

This diagram works well if you only wish to add a single fan to the front of your A/C condenser. It will not come on at a particular temperature, but only when the A/C is turned on.



Primary Cooling Fan - Two Speed Type

Using Ground Switched Devices Only for Primary Activation



TWO SPEED FAN CIRCUITRY SIMPLIFIED

This is not as confusing as it looks. A two-speed fan may be used as long as you use THREE relays and TWO temperature sensors set for different set points.

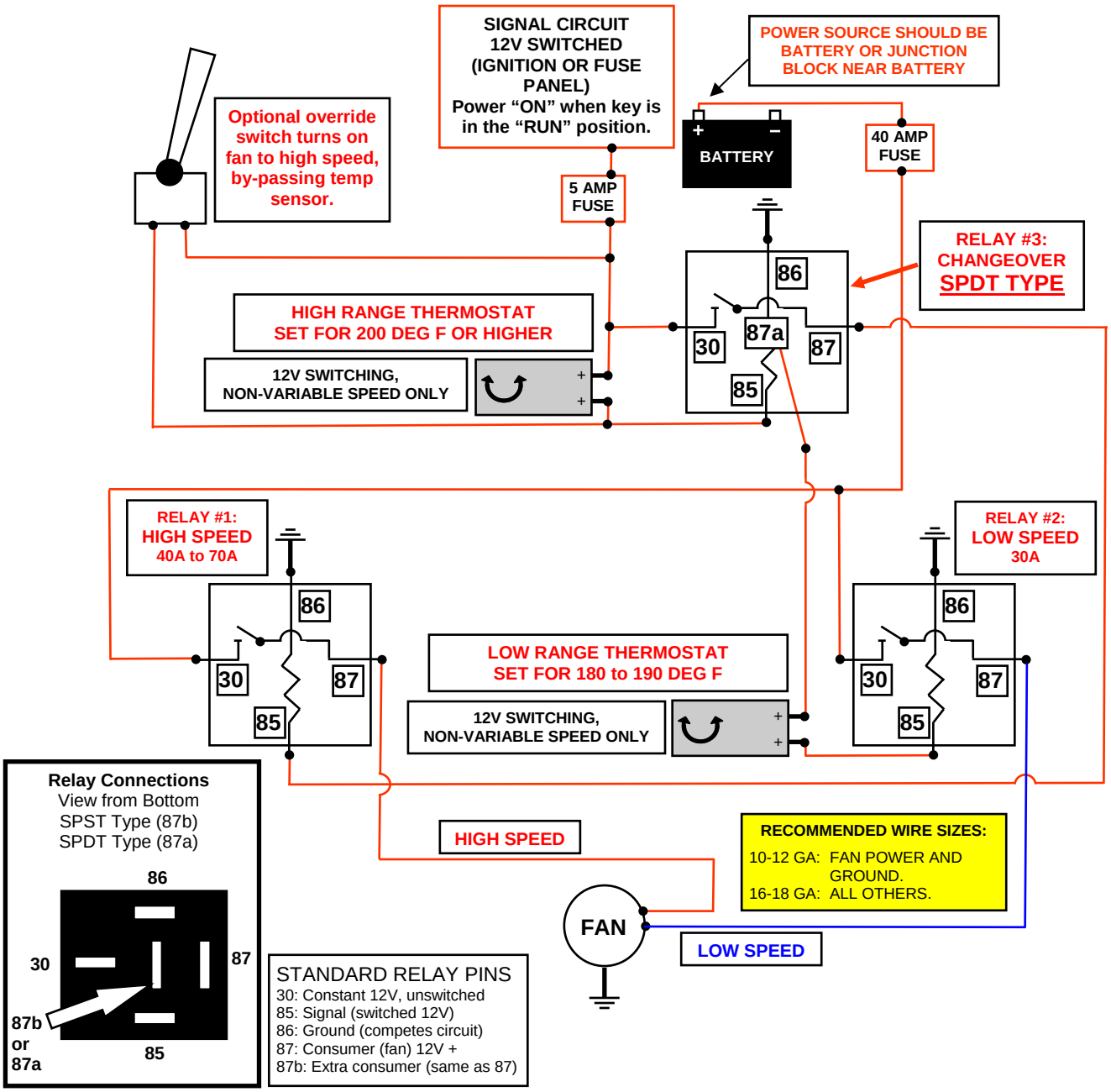
The fan will remain off until your low temperature set point is reached, activating the low speed relay. If your temperature climbs higher, the second sensor high set point will activate the changeover relay, sending power to the high speed relay, while at the same time shutting off the low speed circuit. This way you can be sure only one circuit will be on at a time.

The high speed relay capacity will depend on the fan. Most 16 inch or smaller fans can get by with a 40A relay for the high speed. A larger fan, such as the 18 to 19 inch Ford Taurus/T-Bird/Lincoln Mk VIII fans, should use a 70A relay. These fans generally use 35 to 40 amps, so power and ground cables for these big fans should be at least 10 GA.

Simple radiator coolant sensors may be used as long as they are different temperature ranges. Or simple electric adjustable ON/OFF fan controllers can be purchased from Summit Racing for about $35 each.

Primary Cooling Fan - Two Speed Type

Using 12 Volt Switching Devices Only for Primary Activation



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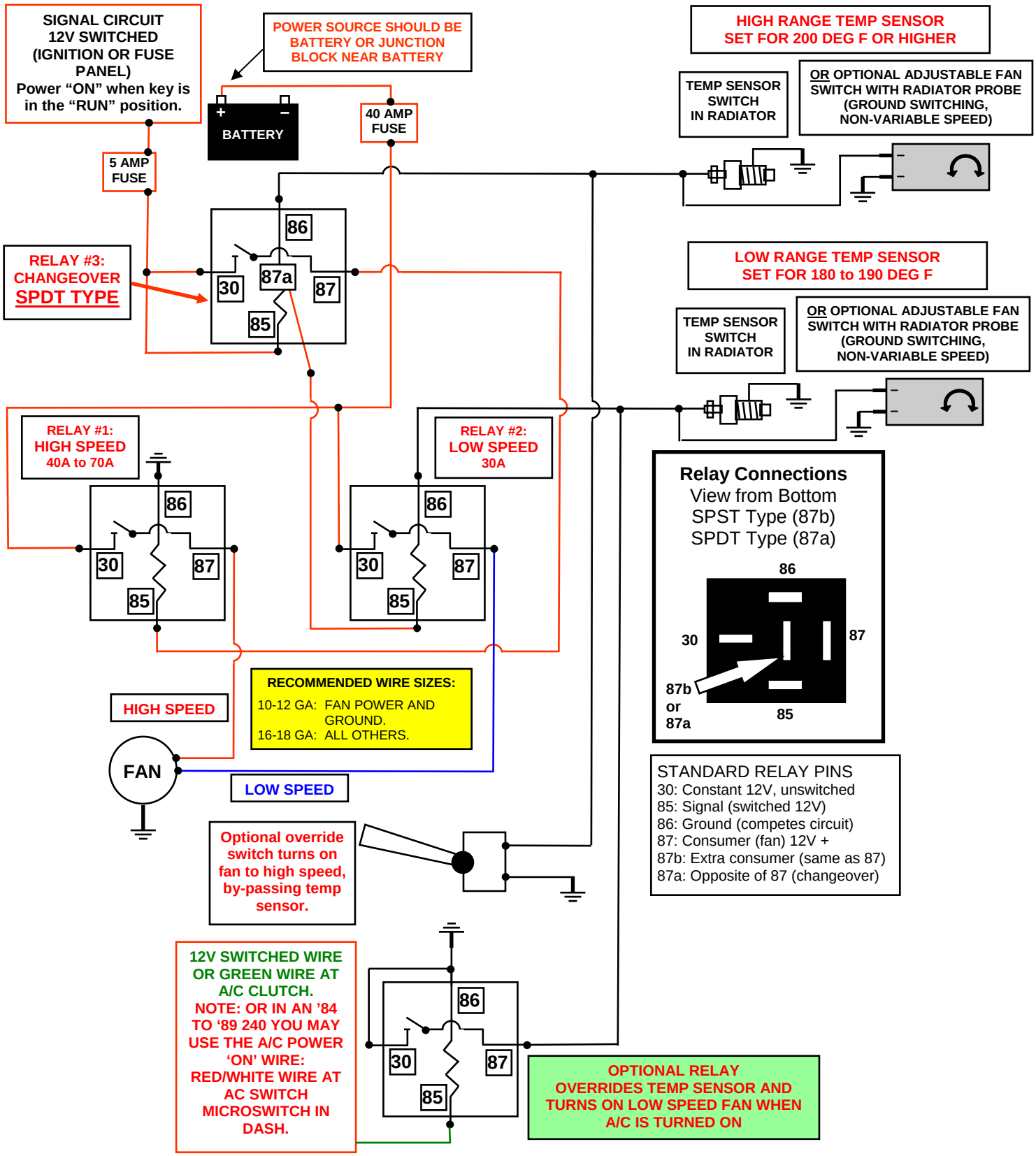
For the diagram above, simple electric adjustable ON/OFF 12 volt switched fan controllers can be purchased from Summit Racing for about $35 each.

Primary Cooling Fan - Two Speed Type

Using Ground Switched Devices Only for Primary Activation

Same as diagram on Page 7, except I have added a circuit at the bottom for your AC to activate the LOW SPEED FAN.



Primary Cooling Fan - Two Speed Type

Using 12 Volt Switching Devices Only for Primary Activation

Same as diagram on Page 7, except I have added a circuit at the bottom for your AC to activate the LOW SPEED FAN.