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HPC Radiator Fan Control Module with Sensor -102001-



The HPC Radiator Fan Controllers provide control over one or more electric radiator fan(s). The module uses a temperature sensor installed in the engine or radiator to determine when to energize relays to turn on the fan(s). The temperature setting is easily adjustable by rotation of a potentiometer located inside the module. In addition, the module also has a remote override wire which may be connected to an existing air conditioning system or an override toggle switch to turn on the fan(s).

The HPC Fan Control Kits are an excellent solution to many needs

- Racers requiring lower than stock temperatures
- Hot Rods and custom built vehicles
- Upgrading factory systems

Features

- More reliable than temperature switches or radiator probe systems
- Adjustable temperature range from 140-220 °F (60-105 °C)
- Easy to integrate with factory and aftermarket A/C systems
- OE style sensor and weatherproof connectors
- Failsafe design runs fan(s) if sensor circuit faults

This manual covers the *102001* (Fan control module supplied with sensor & pigtails, adjustable temperature). The customer must supply all additional wire, fuses, fuse holders, relays, terminals, connectors and hardware. For kits including all these components see the *102002-102005* series which include wiring harnesses as a kit at www.hpcontrols.ca. For custom built wiring harnesses, contact sales@hpcontrols.ca with your requirements.

Important Notes

Installation should only be attempted by someone who is completely comfortable with automotive wiring and general cooling system operation. Professional installation is highly recommended.

This kit **REQUIRES** a spare 3/8" NPT port (M12x1.5 sensor is available separately, see optional accessories below) on the vehicles head, intake manifold or radiator that enters the water jacket for the coolant temperature sensor to be mounted. Often engines will have a spare port for bleeding air from the system. This kit does not make use of the radiator fin probe type sensor as these sensors may cause damage to the radiator, are more likely to succumb to damage and less accurate. The sensor included in the kit is a factory style temperature sensor that provides better accuracy and longevity. If no spare port is free this kit will **NOT** be able to be installed in the vehicle. See the installation instructions for more information.

Failure to properly follow the instructions in this manual could result in severe personal injury or may damage the vehicle, either electrically and/or mechanically. If you are uncomfortable, have a professional install it for you.

It is also recommended to have a coolant temperature gauge or at least a functioning temperature-warning lamp. Failure to properly install, test and monitor for correct operation of the fan kit could result in severe engine damage due to overheating. Watch your gauges.

Harris Performance Controls accepts no liability for injury, damages or otherwise caused by or related to the installation and use of its products.

The use of after market electronic devices will void most new vehicle manufacture warranties. If your vehicle is still under warranty, please contact the warranty provider to determine whether the use of this device is compliant with their warranty terms.

Please ensure all parts of the particular kit you have ordered have been included. A list of included components can be found in the 'What's Included' section.

Read the entire contents of this manual before proceeding with installation. If anything is unclear, contact Harris Performance Controls at support@hpcontrols.ca for clarification.

What's Included

1 HPC Fan Control Module
1 5-pin Pigtail with 18" Wire
1 2-pin Pigtail with 8' Wire

1 3/8" NPT Coolant Temperature Sensor
1 Coolant Temperature Sensor Pigtail
1 Instruction Booklet

Optional Accessories

102012 – 12x1.5 Metric Thread Temperature Sensor



102035 - 1/2" NPT to 3/8" NPT Bushing Adapter
102034 - 3/4" NPT to 3/8" NPT Bushing Adapter

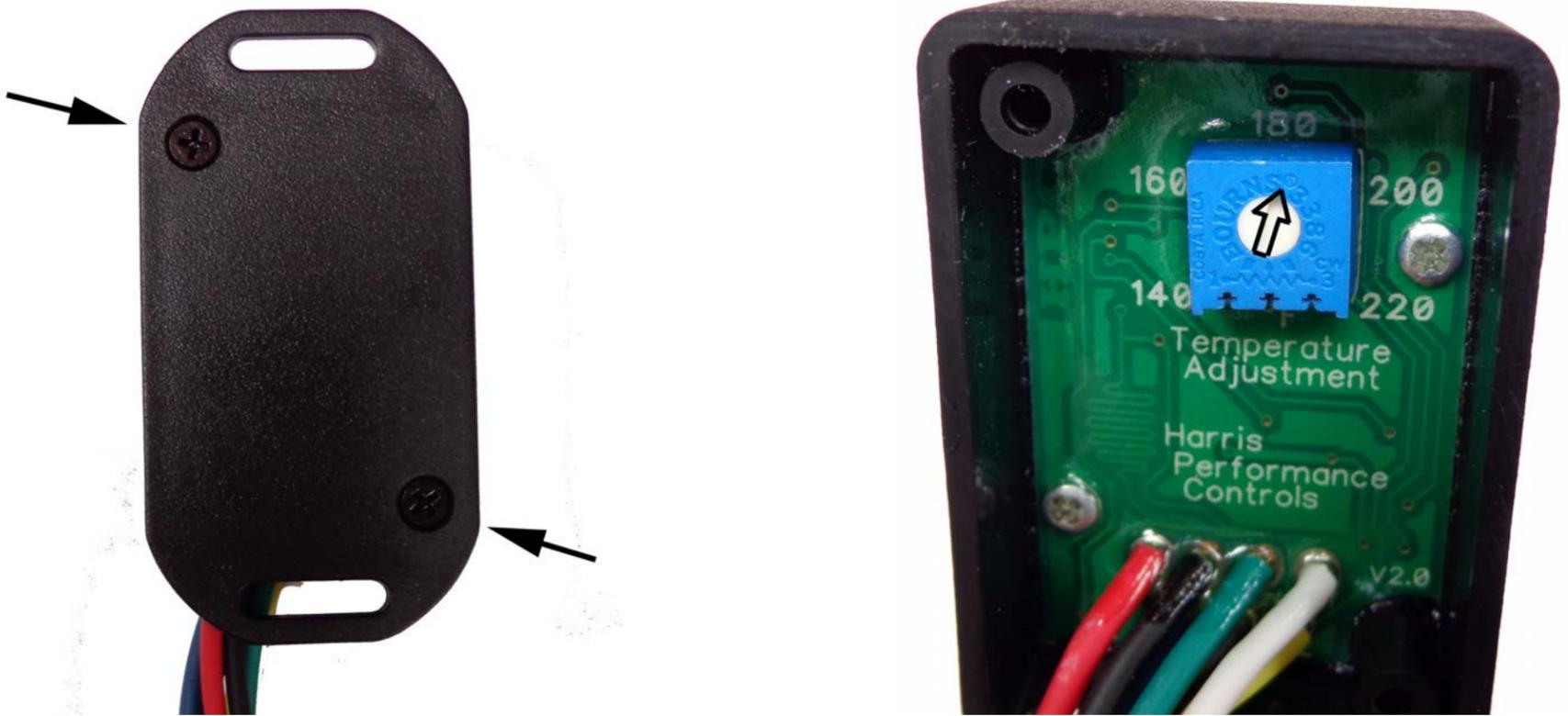


102010 - External Trigger Expander Wire – allows for two high speed and one low speed isolated inputs



Temperature Setting and Operation

The fan control module temperature is adjustable from 140F to 220°F. To set temperature, remove two Phillips screws from the back side of the module. The potentiometer within can be easily turned with a small screwdriver to the desired temperature. Pointer exaggerated for clarity.



The temperature setting is the temperature that the low speed fan will engage at. The fan will turn off when the temperature drops 10°F below the set point. The secondary fan (if equipped) will engage at 10°F over the set point, turning off once the temperature drops back to the set point. Generally speaking, if the sensor is in the engine the temperature setting should be at least 10°F over the thermostat temperature to ensure the fan does not run continuously. If mounted in the radiator the setting may be lower.

When using dual fans in two speed configuration, these are the low and high speed settings.

	ON	OFF
FAN 1	Set Temp	Set Temp – 10°F
FAN 2	Set Temp + 10°F	Set Temp

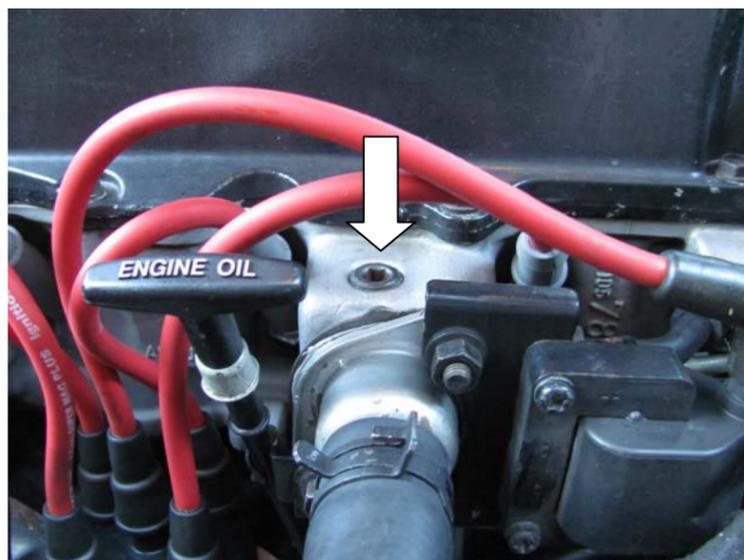
The remote input wire (blue wire) will engage the fans when it is grounded. If the wire is connected directly to ground, either through an override switch or A/C system, the system will run all fans at full speed.

Installation Instructions

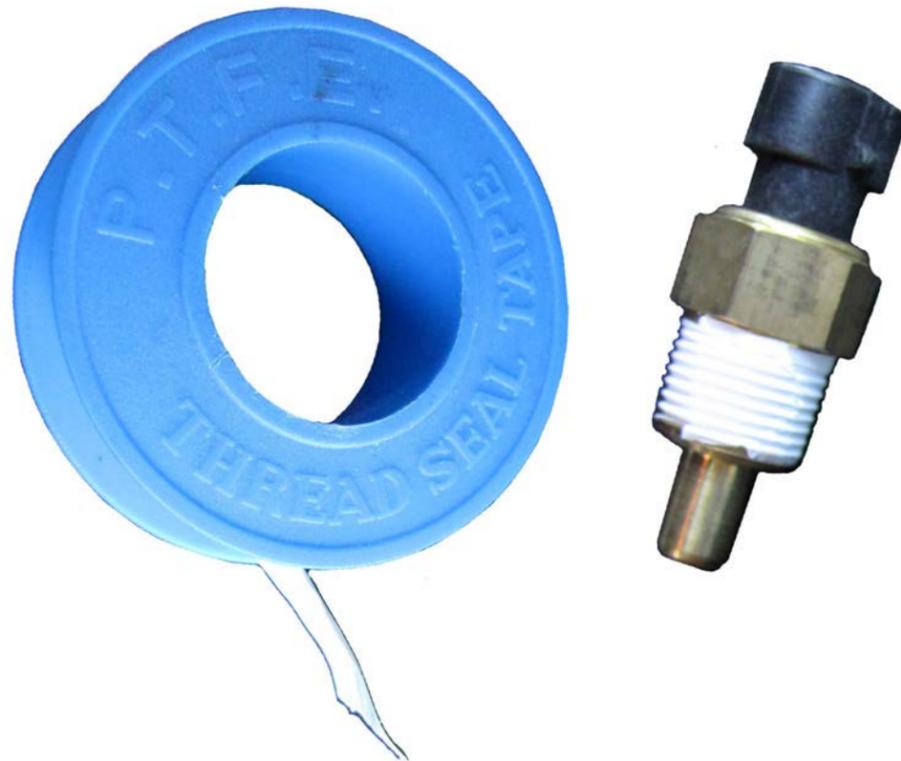
Ensure you have the correct tools for the job. Read the instructions completely before starting to ensure you are properly equipped for the job. Disconnect the vehicles battery before beginning.

Ensure you have enough wire to reach to your coolant temperature sensor, fan(s), battery and the location that you will mount the relays and control module.

- 1. Set desired temperature.** Refer to temperature setting and operation information above.
- 2. Install the temperature sensor.** Locate a free 3/8" NPT port in the cylinder head or intake manifold or radiator that enters the coolant jacket. The closer to the top of the engine or thermostat the better the reading will be.



If there is a plug in the location currently, remove it. If there is a plug of a larger size, you will need a reducer bushing to reduce the hole to 3/8" NPT. These can be obtained from HPC at www.hpcontrols.ca or most hardware or plumbing stores. It is recommended that brass be used when possible. If required, a M12x1.5 temperature sensor may be purchased separately from HPC, see optional accessories above. Do not remove an existing sensor, as doing so will either disable a dash light/gauge or compromise the ECU's ability to correctly meter fuel and other functions. Install the sensor with Teflon tape or thread sealer to avoid leaks.



3. Route wires to the coolant temperature sensor, battery, relays and fans. Refer to the wiring diagrams in the end of this manual to determine how to wire your desired configuration. The suggested wire colors and wire gauges are listed in these diagrams.

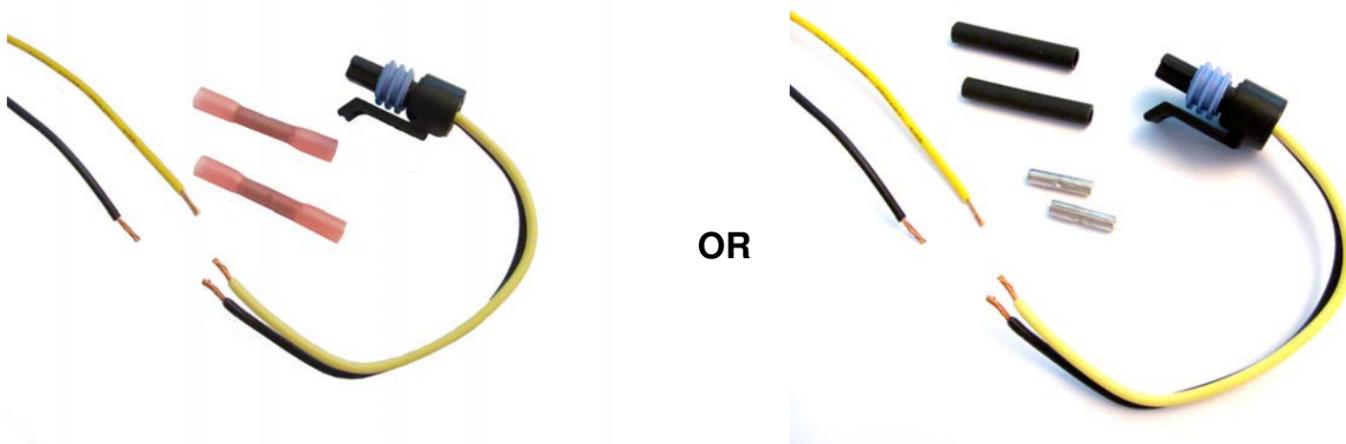
The yellow and black wire harness should be routed from the control module to the temperature sensor. Tuck wires inside existing loom where possible for protection. Trim excess wire if desired.

The radiator fan supply wires are suggested to be 12 AWG and fused at 30 amps. This may be changed based on the radiator fan manufactures recommendation.

Cover exposed wires with wire looming. Failure to do so may cause abrasion or damage from heat. Harnesses should not be in direct contact with a hot engine. Secure wires with wire ties so that they are away from sources of heat or abrasion.

4. Make electrical connections. Connect the components as per the wiring diagrams at the end of this manual. If crimping the connections, it is suggested the connections be covered with adhesive lined shrink tubing or similar. This will provide a waterproof connection. Ensure to use adequate crimping pressure if using this method. The wire connections may also be soldered and then covered with shrink tubing if desired. Plug in the temperature sensor now.

RED	Switched 12V
BLACK	Ground
GREEN	High speed fan relay
WHITE	Low speed fan relay
BLUE	Override switch circuit



5. Mount the controller and relays. Choose a location for the relay(s) and control module in the engine bay away from significant sources of heat. The ideal location is beside the battery on the inner fender. Ensure the chosen location is far from the exhaust manifold and will not interfere with the routing of other wires, hoses, etc. To mount the control module and relay(s) self-tapping screws may be used. Be certain that the location chosen to drill is safe and that there is nothing directly behind it that the screws may damage such as vapor canisters, harnesses, etc. Alternatively, wire ties may be used to secure the components.

6. Connect the blue remote turn on wire (Optional). This wire may be connected to the grounding side of a ground triggered air conditioner relay or extended into the cabin to act as a manual override. If being used as a manual override, wire the other side of the switch to a ground so as to short the wire to ground. See wiring diagram at the end of the manual. Otherwise, leave the wire disconnected for normal operation.

If more than one trigger source is desired, a trigger expander may be purchased separately from HPC, see optional accessories above. This allows for two isolated trigger sources such as A/C and toggle switch, and additionally allows for a low speed trigger, applicable when running two fans.

Now all the electrical connections should be complete and all equipment installed. Verify all connections are secure and that there are no leaks from the temperature sensor. Install the relays and fuses now if not already done.

Test for correct operation.

Re-connect the battery and turn ignition on. To verify fan(s) are functioning, unplug the temperature sensor. The fan(s) should now be running at full speed. Plug the sensor back in, the fan(s) should stop.

Start the vehicle. Watch the temperature gauge as the engine warms up. Once it reaches the fan turn-on temperature, ensure the fan does cycle and that the engine cools down and the fan shuts off. Remember, there will be some variance between a vehicles temperature gauge and when the fans start due to sensor placement and the sensors themselves.

If the fan(s) do not start, shut off engine; do not allow it to overheat. Refer to the troubleshooting section below.

Troubleshooting

The fan control module is programmed to fail-safe if the temperature sensor is either disconnected, shorted or reads outside the normal range. In this scenario, the fans will run at full speed.

No green light on module.

- No ignition power. Check circuit fuse and confirm power with test light.
- Bad ground.

Blue light on module flashing.

- Temperature sensor circuit shorted to ground, 12v or disconnected.
- Faulty temperature sensor. Check resistance against chart to right.

Fan does not come on, blue light on module lit.

- Check power to fuses and to relays. Repair broken wires or bad connections.
- Bad relay contacts. Replace relay.
- Bad fan motor.

Fan does not come on, blue light on module not lit.

- Incorrect temperature setting, try lowering 10°F and retest.
- Coolant sensor in air pocket or incorrectly installed.

Fan comes on at correct temp, and does not shut off.

- Temperature set too low. Turn off temp must be above thermostat temp.
- Undersized cooling fan.
- Stuck thermostat or other cooling system limitation.

Fan stays on always with ignition off.

- Check that green light on module turns off. If not, connect power feed to a switched ignition circuit.
- Relay contact welded shut. Replace relay.

Fan stays on always when ignition on.

- Remote turn on wire grounded, disconnect blue wire and recheck.
- If blue light flashing, see above.

Fuse supplying fan blows immediately.

- Damaged wiring.
- Bad/Shorted fan motor.

Fuse supplying fan blows after some time.

- Worn out fan motor drawing too much current.

Temperature sensor

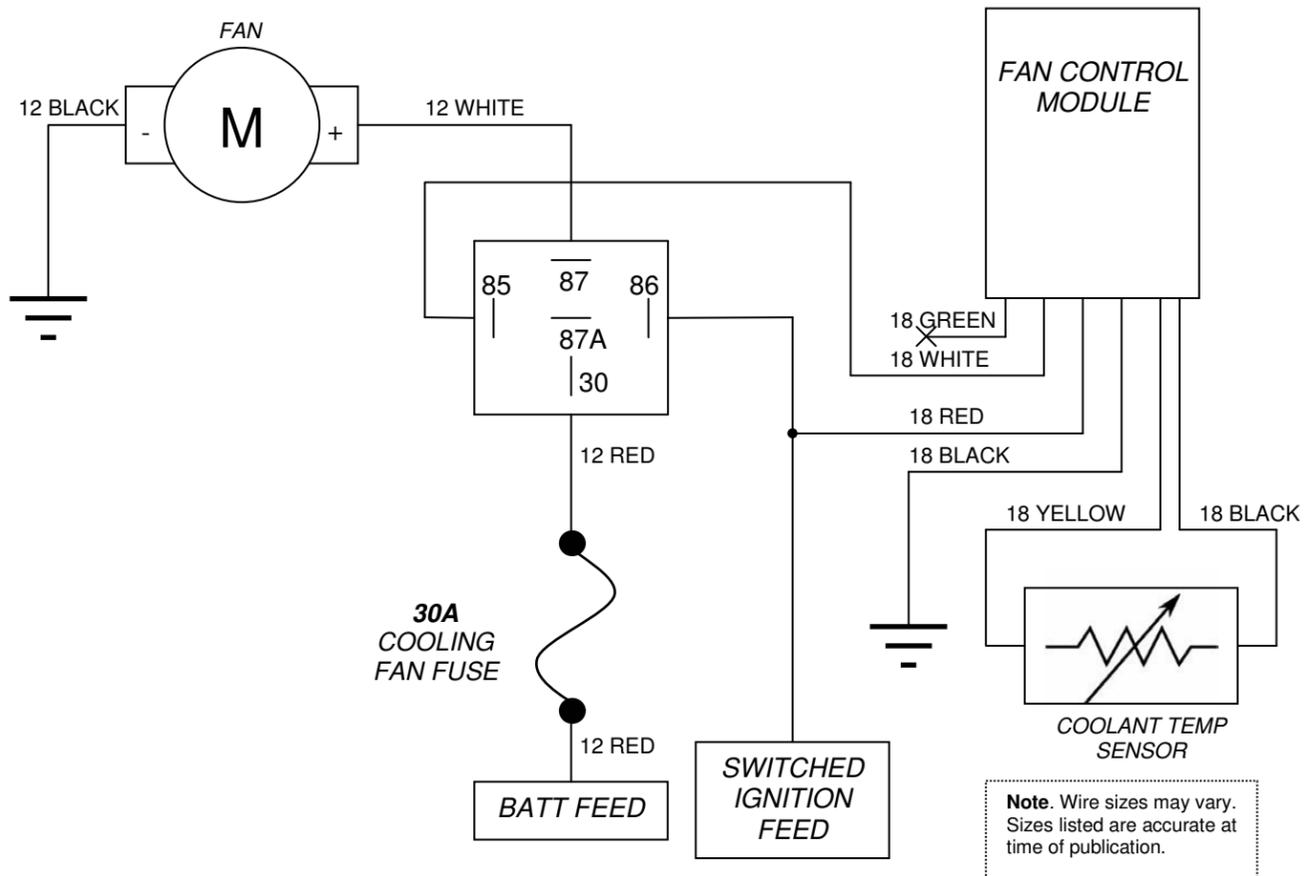
Temperature vs. Resistance		
20 °F	-7 °C	11k-15k Ω
60 °F	16 °C	3.9k-4.5k Ω
100 °F	38 °C	1.5k-1.7k Ω
140 °F	60 °C	650-730 Ω
180 °F	83 °C	302-334 Ω
220 °F	105 °C	159-172 Ω

If the above fail to resolve the issue, it may be due to a failed control module or another problem.

Please contact support@hpcontrols.ca for assistance.

Wiring Diagrams

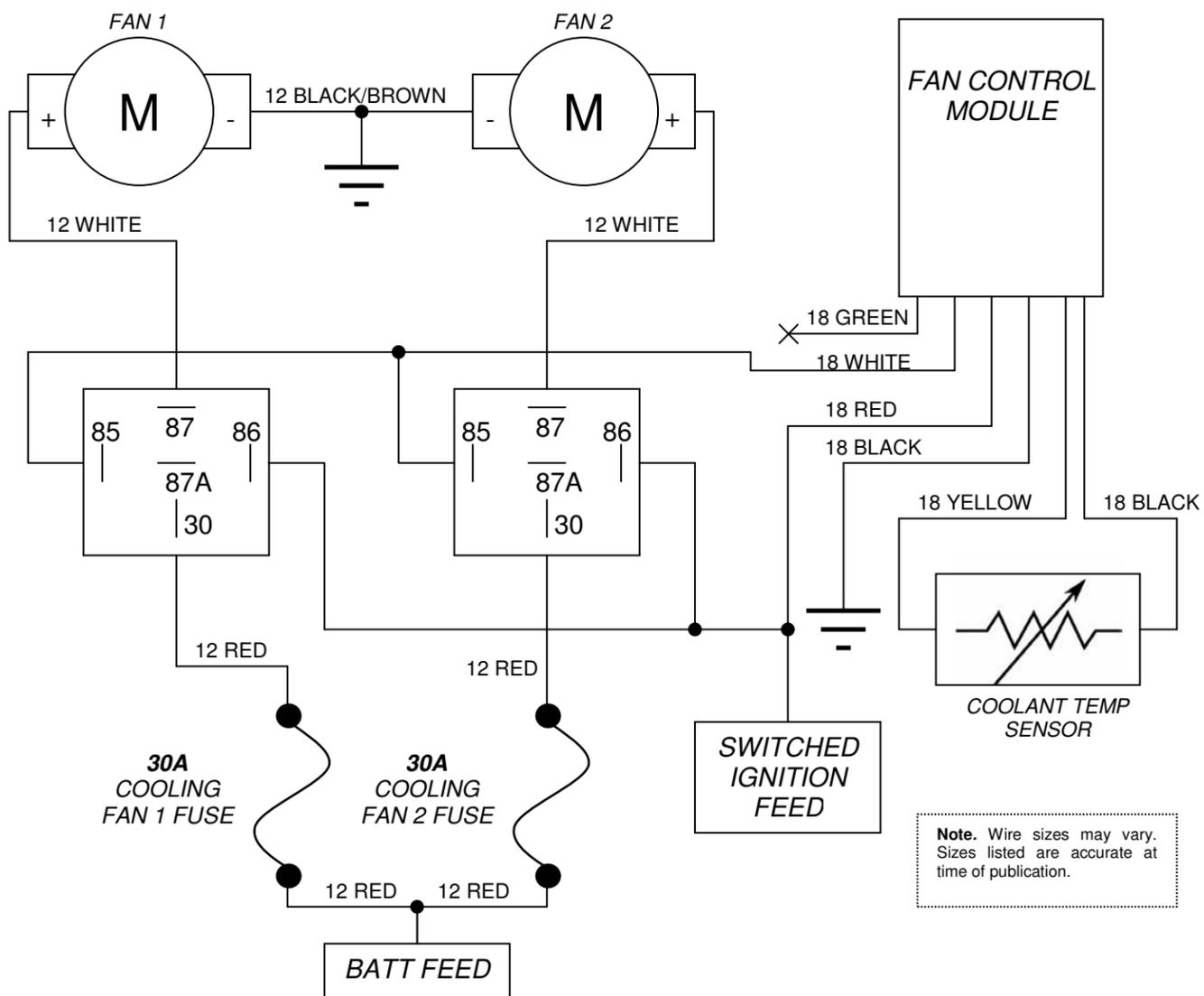
Single Fan Configuration



In this configuration, the one fan is run at the lower of the fan on/off points. If desired, the fan may be operated at the high fan on/off points by connecting the green wire, instead of the white wire to the relay.

Simple Dual Fan Configuration

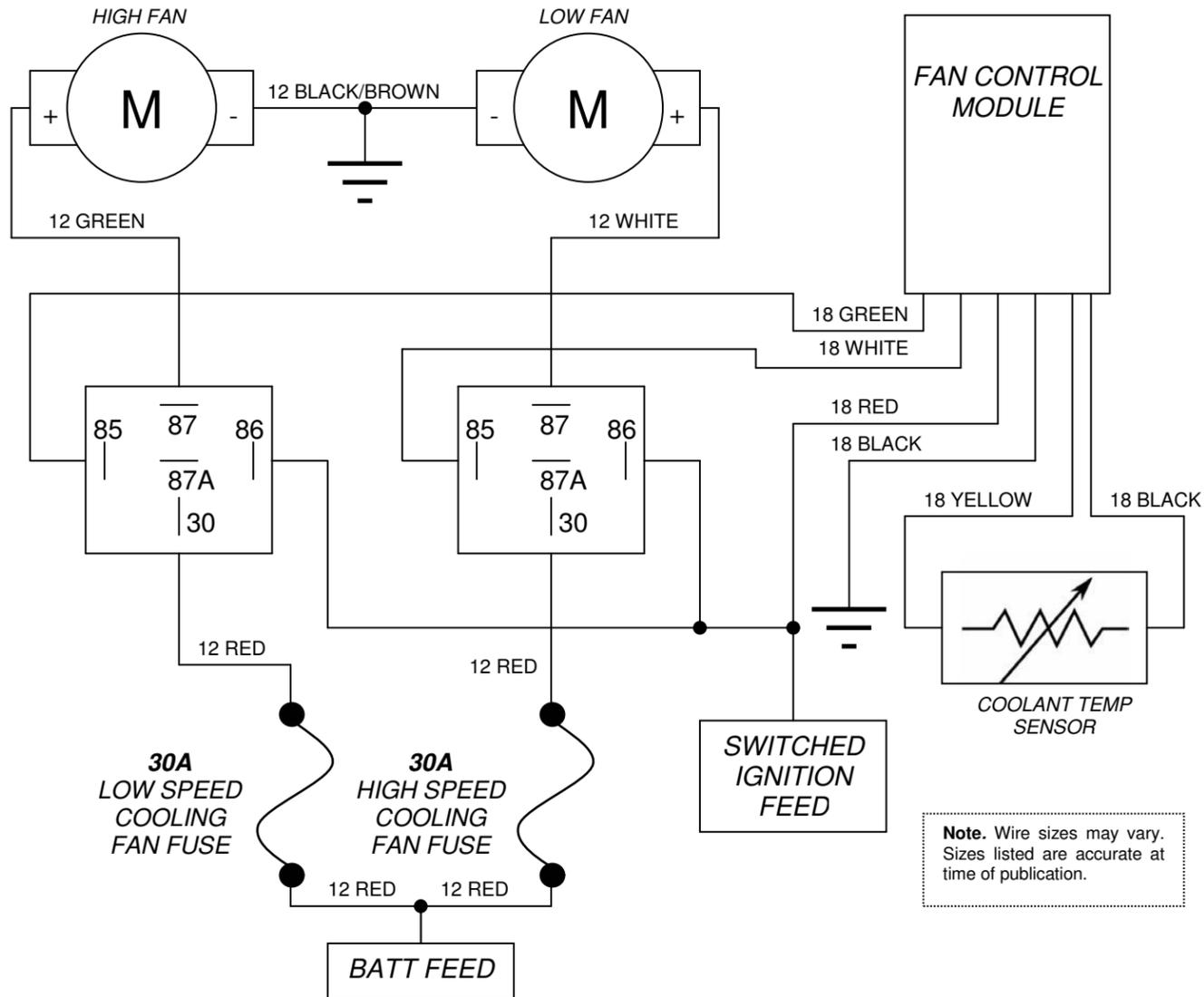
Both fans run at same time.



In this configuration, two fans are connected, but operate on the same control signal from the fan control module. This means they both turn on and off at the same time. As with the single fan schematic, the relays can be connected to the green wire instead of the white wire if running them at a higher temperature is desired. If staggered turn on points, or two speed operation is desired, refer the diagrams below.

Dual Fan Configuration – Sequential

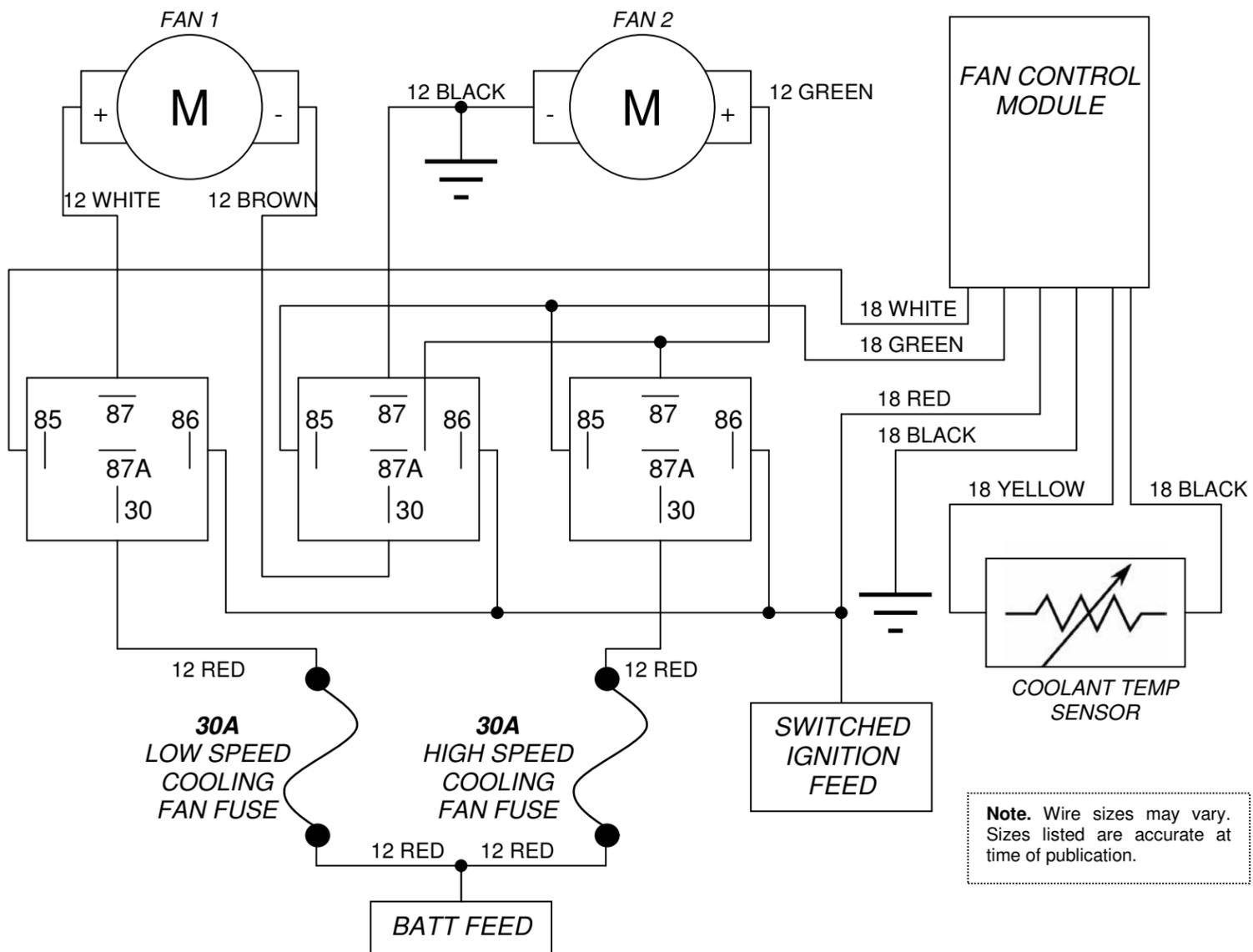
One runs at lower temperature, the second turns on at higher temperatures.



In this configuration two fans are connected using separate relays. The low fan turns on at lower temperatures, joined by the higher fan at higher engine temperatures. It is suggested that the fan shroud either have a divider between the fans, or that the fans have their own fan shrouds so that efficiency is not compromised.

Dual Fan Configuration – Two Speed Control

Both fans run at low speed (series) at low temp, high speed (parallel) at high temp.



This configuration is the preferred method of fan control for systems with two radiator fans. It allows both fans to be connected in series at lower temperatures and parallel at higher temperatures. This allows the fans to run at a lower speed and consequently operate far quieter. The other benefit of this setup is that at low speed, the fans will be drawing only half of the normal current load of a single fan. Three relays are required to accomplish this series/parallel switching, however only two fuses are required.

