

Tech Tips

Dual Circuit Cooling Fan System

Installation of the **Derale Adjustable Fan Switch (DAFS)**

If you are here you already know why. You want to have more control of your engine temperature since the factory GM default cooling fan temperature set points are potentially too high resulting in overheating and power loss in severely hot climates and under AC operation.

As suggested by 3rd Gen Member "Willie" in his article [GM Cooling Systems](#) ideally there would be a couple of times you might want to revert to the stock GM settings:

1. During vehicle emissions testing.
2. During extreme cold weather conditions for purposes of heater and defrost operations.

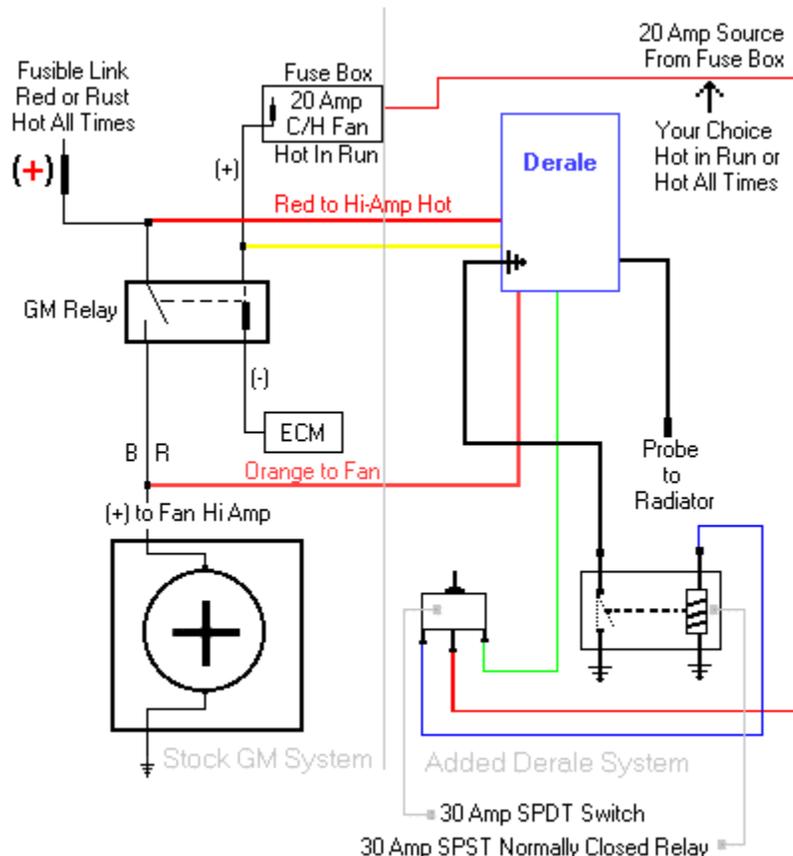
Additionally, if you could leave the GM fan system intact, it would provide a nice backup in case of DAFS component failure.

Please read definitions under [Auto Electric Basics](#) to gain a better understanding of the terminology I have used in this article. Also, you might consider doing this mod in conjunction with other [Cooling System Mods](#) recommended.

Here is a listing of the parts you will need:

Derale Adjustable Fan Switch (Part #16759)
 SPST 30 Amp Relay that is Normally Closed
 SPDT 30 amp switch
 Extra Wires (match gauge and color to Derale unit)
 Ring connectors (for 12-14 and 16-18 gauge wire) 3/8" and 1/2"
 Heat shrink tubing.
 Solder gun and solder.
 GM plastic split conduit (Optional)

Okay, now on to the good part, lets look at the circuit:



To the left of the gray centerline is the stock GM system, to the right is the DAFS and its component additions. The beauty of this system is that your **stock GM system will still be functional** and you will be able to change between the two cooling systems at the flip of a switch.

Derale suggests that it replace the stock GM system and use the following wiring instructions:

Red Wire to attach to the positive (+) side of battery.

Orange Wire to attach to positive fan lead.

Yellow Wire to attach to a switched ignition source (Hot in Run).

Green Wire to attach to positive wire on AC clutch.

Black Wire to attach to good chassis ground.

We won't do that.

We will alter this configuration as follows:

Red Wire taps into GM Hi-Amp hot wire from fusible link.

Orange Wire taps into GM Hi-Amp B/R (+) wire running to fan from relay.

Yellow Wire taps into GM hot in run wire coming from 20 Amp source from fuse box.

Green Wire attaches to one of the toggle switch post.

Black Wire attaches to the out side of the hi-amp output of the relay.

We also add:

Blue Wire (you choose color) from switch terminal to positive side of lo-amp relay input.

Red Wire (you choose color) noted on right side of graphic goes to fuse box and supplies common (+) lo-amp voltage to toggle switch.

Please note: you may choose Hot in Run or Hot all Times, but **be cautioned in Hot all Times your fan can run with car switched off**. The only reason for providing this option is for drag racing purposes to cool off engine in between runs.

It is recommended you hook this lead to a Hot in Run source to prevent unexpected battery drain.

Theory of Operation

Since the GM system kicks on at about 234° and the DAFS is factory pre-set at 170° (totally adjustable ±) the best that could happen is the GM system never again kicks on. It is a moot point that the GM fan system is concurrently hooked up because the DAFS will over ride it and control when the fan operates.

Only in the event of DAFS failure or by your choice (manual over ride switch) would the GM system be deployed. Additionally by using a normally closed relay and a toggle with the middle position (off) the DAFS is the **default system** and it is **with no current** running through the switch and the new relay **not energized**.

This should provide a more stable, dependable, safer circuit. The relay requires a (+) & (-) lo-amp source to energize, and when it does it breaks ground to the DAFS disabling it and returning your system to the stock GM operation.

Lets look at what happens when we toggle between different switch positions:

Function 1: Flip the switch one way (red wire):

Power from a fuse box source goes into the switch, out of the switch via the blue wire, into the positive lo-amp input of the relay, energizing solenoid, breaking ground (disabling) the DAFS for stock GM operation

Function 2: Flip the switch the other way (same red wire):

Lo-amp, (+) power is routed to green wire of DAFS which results in **manual fan operation** mode. Since the GM system was never disabled **your AC clutch operation works as it always did**, allowing you to use the AC operation green wire of the DAFS for manual fan control.

Function 3: Middle toggle:

Relay de-energizes and closes (switch current is off), therefore, the DAFS takes control of the cooling fan.

That's all there is to it!

Be sure to check your cooling system to verify all components are operating according to GM specifications before performing the DAFS installation.

I am always open to critique and suggestions for improvements, so feel free to [email me your comments](#). I'm sure there are other ways to achieve the same results.

Thanks to Matt_Ky & Willie (fellow Third Gen Members) , contributors to this article.

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