



## **SEVERE-DUTY COOLING KIT PART #68843**



**Note: These instructions cover the installation procedure for the Radiator only. For proper wiring and setup of the PWM Controller and electric fans, please refer to the PWM Controller installation instructions included with this kit.**

### **INSTALLATION INSTRUCTIONS**

#### **1. Install Preparation**

Let the engine cool completely. Disconnect the battery.

#### **2. Drain Coolant**

Open the radiator drain plug and remove the radiator cap. Collect old coolant in a suitable container.

#### **3. Remove Old Radiator and Fan Clutch**

Disconnect upper and lower radiator hoses. Detach transmission cooler lines (if applicable). Unplug the fan and sensor connectors. Unbolt and remove the old radiator and fan clutch.

#### **4. Install New Radiator and Fan Kit**

Lower the new radiator and fan kit into place carefully. Reconnect all hoses and lines. Install mounting brackets and secure the radiator and fan kit.

#### **5. Add Coolant**

Fill with the correct type and mixture of coolant. Reinstall the radiator cap.

#### **6. Install PWM Fan Controller (Use Included PWM Controller instructions)**

**Before installation, review the PWM Controller instructions for proper controller installation and fan wiring for the Radiator and Fan Kit.**

**Warning:** Because there are no running cooling fans at this point, steps 7 and 8 should be done after the installation of the PWM controller to ensure no overheating.

#### **7. Bleed the Cooling System**

Start the engine & let it reach operating temperature. Check for leaks & ensure proper coolant circulation.

#### **8. Final Checks**

Recheck coolant level after the engine cools.



# INSTALLATION INSTRUCTIONS PWM ELECTRIC FAN CONTROLLER PART # 16797



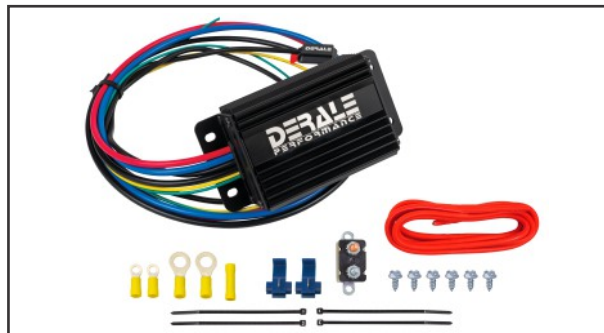
**Please read these instructions completely before beginning installation**

## KIT CONTENTS

| QTY. | DESCRIPTION                      |
|------|----------------------------------|
| 1    | PWM Fan Controller               |
| 1    | Sensor (Pre-wired to controller) |
| 1    | 50 Amp Circuit Breaker           |
| 6    | #10 Sheet Metal Screw            |
| 1    | 2ft 10 AWG Red Wire              |
| 1    | Yellow Butt Connector            |
| 2    | Yellow 5/16" Ring Terminal       |
| 2    | Yellow #10 Ring Terminal         |
| 2    | Blue Wire Tap Connector          |
| 4    | 4" Wire Ties                     |

## TOOLS NEEDED

Drill  
5/32" Drill Bit  
Multimeter / Test Light  
Standard Screw Driver  
5/16" Nut Driver  
Standard Screw Driver  
(1/8" wide blade)  
Wire Stripper  
Wire Crimping Tool



## IMPORTANT NOTES

This fan controller has been completely quality control tested prior to final packaging.

### MAXIMUM CAPACITY: 70 AMPS

This controller will operate multiple fans with a combined maximum amperage up to 70 amps. On dual fan applications, it is important to know your fan(s) amp draw before installing, if fan(s) exceed 70 amps, all warranty will be void.

### AUTO RESETTING CIRCUIT BREAKER

The fan controller utilizes a 50 amp auto resetting circuit breaker to protect the fan(s) and controller circuit. In the event of an electrical issue, the breaker will "trip" and open the connection between the battery and the controller. The circuit breaker will automatically reset once the issue has been corrected. If installing fan(s) exceeding 50 amps in total you must use a fuse or circuit breaker suitable for your systems amp draw.

### MAIN POWER CONNECTIONS

The positive and negative wires feeding the fan controller MUST be connected directly to the vehicles battery.

This is very important because the controller requires a clean signal, do not connect directly to the fuse panel, starter or the alternator.

### VEHICLES BATTERY LOCATION

If the vehicles battery is located more than 5 feet from the fan controller, the signal could encounter some interference or noise, which causes a dirty signal. In some cases, a larger 6 gauge wire may be required. Please contact our technical support team for more information. (323) 266-3850 or [techsupport@usmotorworks.com](mailto:techsupport@usmotorworks.com)

### TEMP SENSOR

This unit is equipped with a newly released aluminum temp sensor that reacts 50% quicker than previous models. It uses 3M double stick tape to adhere right to the radiator tank, therefore getting a very accurate temperature reading. The surface preparation is critical; surface must be absolutely free of dirt, oil, peeling paint or any contaminants to ensure a proper bond.

**Important:** The ideal application temperature range is 70°F to 100°F (21°C to 38°C). The minimum suggested application temperature is 50°F (10°C). At 70°F approximately 50% of the ultimate bond strength will be achieved after 20 minutes, 90% after 24 hours and 100% after 72 hours.

### OVERRIDE CIRCUIT

The fan controller has an override circuit (Green Wire) available that when activated, will ramp up the electric fans to 60% running speed. As the engine temperature increases the fans will increase accordingly.

### WIRE CONNECTIONS

Crimp connections are critical to the function of this controller, please ensure that all connections are made using quality crimpers. After each crimp has been completed, tug wires, there should be no movement within the connector. Ground connectors are crucial. If grounding to chassis we do not recommend using self tapping screws as they tend to loosen over time.

### COOL DOWN FUNCTION

This PWM fan controller is designed with a cool down function that will allow the electric fan(s) to run for 20 seconds after the vehicle has been turned off.

## **FAN CONTROLLER INSTALLATION**

1. Choose a convenient location, preferably along the vehicles core support near the battery. Take in to consideration sensor placement & wire routing requirements. Avoid mounting near HOT engine components or a location that would be in direct contact with any road debris.
2. Using the fan controller as a template, mark and drill four 5/32" holes in the proper location.
3. Using four #10 sheet metal screws supplied, secure the unit in place.

## **CIRCUIT BREAKER MOUNTING**

1. Choose a convenient location for the circuit breaker that is between the fan controller and the battery.
2. Using the circuit breaker as a template, mark and drill two 5/32" holes in the proper locations.
3. Using the remaining two #10 sheet metal screws supplied, secure the circuit breaker in place.

## **SENSOR INSTALLATION**

- 1) Determine the desired mounting location of the sensor, somewhere on the radiator near the water inlet. (See Diagram #1)
- 2) Route the path of the sensor wires from the controller to the radiator. If necessary, you can lengthen or shorten the wires using an automotive grade 22-gauge wire.
- 3) Once you have routed the wires and have the sensor location chosen, clean and dry the area with alcohol, making sure there is no left over residue.
- 4) Remove the Red 3M backing paper from the sensor and install the sensor in the desired location, applying firm pressure for at least 15 seconds.

**NOTE:** This unit uses 3M double stick tape to adhere right to the radiator tank, therefore getting a very accurate temperature reading. The surface preparation is critical; surface must be absolutely free of dirt, oil, peeling paint or any contaminants to ensure a proper bond.

The Ideal application temperature range is 70°F to 100°F (21°C to 38°C). The Minimum suggested application temperature is 50°F (10°C). At 70°F approximately 50% of ultimate bond strength will be achieved after 20 minutes, 90% after 24 hours and 100% after 72 hours.

## **WIRING**

Before starting, disconnect the negative (-) cable on the vehicles battery.

Using the electrical connectors and wire ties provided, follow the instructions below.

**WARNING:** The positive and negative wires feeding the controller MUST be connected directly to the vehicles battery.

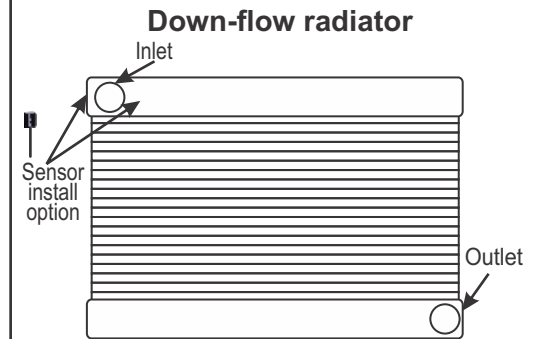
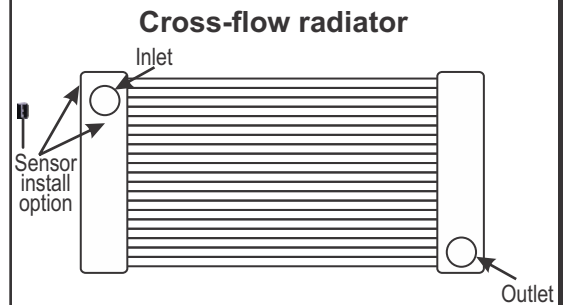
This is very important because the controller requires a clean signal, do not connect directly to the fuse panel, starter or the alternator. **Improper installation will void the warranty.**

1. Using a yellow 5/16" ring terminal & 10 AWG Red Wire supplied, connect one end of the Red Wire to the vehicles positive (+) terminal on the battery.
2. Route the 10 AWG Red Wire now connected to the battery to the circuit breaker previously installed and cut the wire to the appropriate length.
3. Using a yellow #10 ring terminal, connect the 10 AWG Red Wire to the "BAT" (Copper Colored) terminal on the circuit breaker.
4. Using a yellow #10 ring terminal, connect the auxiliary side "AUX" (Silver Colored) of the circuit breaker to the length of 10 AWG Red Wire of the controller wire harness.
5. Using a Yellow Butt Connector connect the Blue Wire from the controllers wire harness to the Positive Wire(s) of the Electric Fan(s) being controlled.
6. Using the 5/16 Yellow Ring Terminal connect the 10 AWG Black Wire from the controllers wire harness direct to the batteries negative terminal.
7. Connect the electric fan(s) being controlled direct to the negative stud or a good chassis ground. Use the shortest wire route possible.

**NOTE:** Grounding point MUST be separate from mounting screws for control module.

8. Using a Blue Wire Tap connector attach the Yellow Wire to a Positive (+) switched ignition source.

## **Diagram #1**



### **Green Wire: Override Circuit (Optional)**

The green wire is designed to work in two different configurations. When used, this will allow the electric fan(s) to be turned on regardless of the temperature of the cooling system. The fan speed will quickly ramp up to 60% and will operate between 60 and 100% as temperature increases and decreases. Connect the Green wire to either option A or B below.

**Note:** Use of the Override is optional and not required for the PWM controller to work properly.

- A. A/C Override - Using the blue wire tap connector provided, attach the green wire to a positive (+) 12V output on the A/C Switch on the dash (must be powered the entire time the A/C is on).
- B. Manual Switch Override - Attach the green wire to the 12V output on the manual switch (not provided.)

### **VEHICLE TESTING**

1. Before you start the vehicle, make sure all wires are safely zip tied and away from any moving parts.
2. Start the vehicle.
3. If the manual override function is being used, turn on the A/C or manual switch. Electric fan(s) will ramp up to 60%.
4. Turn off the manual override or A/C function and allow the engine to warm up, fans will ramp up slowly as the vehicle warms up.

### **ADJUSTING THE TURN-ON TEMPERATURE**

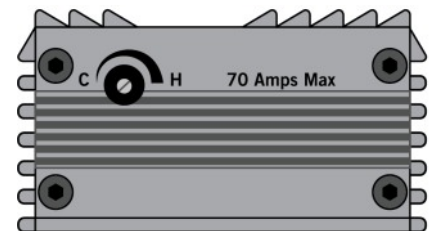
The PWM Controller is factory set at approximately 180°F. Therefore Fans will adjust speed to maintain 180°F fluid temperature. Using the adjustment screw on side of the controller the temperature can be adjusted to maintain fluid temperatures from 130°F - 230°F. Follow the directions below to make adjustments to the temperature.

1. Remove the rubber plug from the side of the fan controller
2. Using a 1/8" blade screwdriver, follow the instructions below:

**If your engine is running too cool:** Turn the adjustment screw **CLOCKWISE** in increments of 2 FULL turns, then test before repeating.

**If your engine is running too hot:** Turn the adjustment screw **COUNTER-CLOCKWISE** in increments of 2 FULL turns, then test before repeating.

**Diagram #2**



### **WIRE COLOR QUICK REFERENCE GUIDE**

**Red Wire:** Battery Positive (+)

**Black Wire:** Battery Negative (-)

**Blue Wire:** Fan Positive (+)

**Yellow Wire:** Positive (+) Switched Ignition Source

**Green Wire:** A/C Override or Manual Override 12V Positive (+)

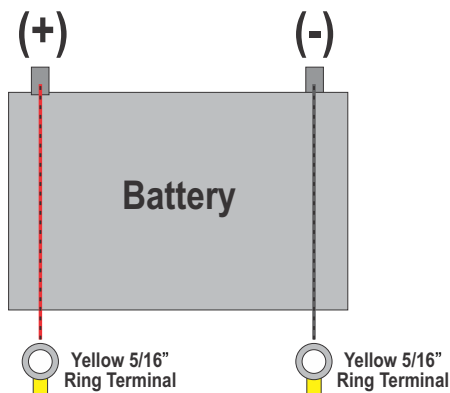
(Page 3)



**Please direct all technical questions to our Derale tech line at (323) 266-3850**



**Warning:** Installation of accessories should only be undertaken by those with mechanical knowledge and are familiar with working on vehicles. Always use eye protection (goggles, safety glasses or shield). Park the vehicle in a well lit area, on level ground and apply the parking brake. Only work on a cold vehicle that has been sitting overnight, failure to do so will result in severe burns and injury. Before starting the vehicle, make sure no tools or any other items are left under hood that could interfere with or be drawn into moving parts of the engine. Failure to follow instructions can lead to severe damage and personal injury.



**IMPORTANT**  
Positive and Negative Controller wires must be connected to the vehicles battery

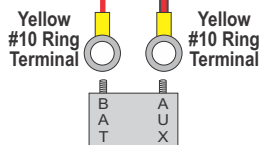
## PWM Fan Controller

**Green Wire**  
Optional  
Override Circuit  
12 (+)

**Yellow Wire**  
Positive (+)  
switched ignition  
source

Black Wire

Red Wire



**Circuit Breaker**

**Sensor Wire**

**Radiator (Sensor Placement)**

Inlet

Sensor install option

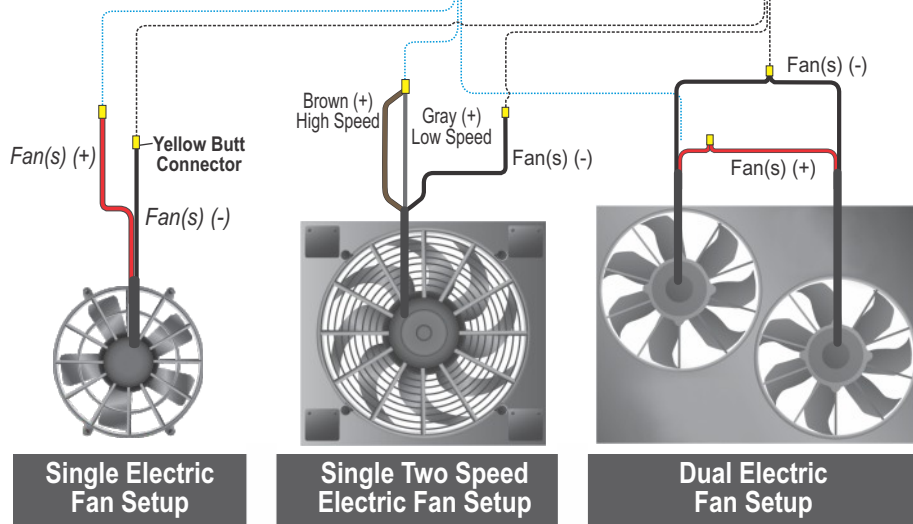
Outlet

### Blue Wire

Connect the Blue Wire from the wire harness to the Positive (+) Wire(s) of the Electric Fan(s).

### Fan(s) (-)

Connect the Negative (-) wires on the electric fan(s) to a good chassis ground.



Derale  
Performance  
PART # 16797

Customer Service  
323-266-3850

# **ATTENTION**

**If you have any  
technical questions  
about this controller  
please contact  
Deraile Performance.**

**Phone: (323) 266-3850**

**Email:**

**[techsupport@usmotorworks.com](mailto:techsupport@usmotorworks.com)**