

12V 24V 36V 10A PWM DC Motor Speed Controller Installation on Fantastic Fan Model 1250

Fantastic Fan Model 1250, standard roof vent fan on NuCamp TaB 320 travel trailers, draws 4-Amps maximum so many PWM Controllers will work. I used the 10A model only because the 5-Amp model ordered earlier was lost in shipment and I decided to order the replacement from a different company and they did not have a 5-Amp model. A 5-Amp model might have smaller heatsinks and might allow vertical PWM Board location instead of the angle placement needed with the 10-Amp model.

Parts & Tools

PWM Board uniquegoods 12V 24V 36V 10A PWM DC Motor Speed Controller
Adjustable Driver Variable Speed Switch CCMHCW
<https://www.amazon.com/gp/product/B00QA6E4QO>
or similar. Must have Speed Adjustment potentiometer attached by wires.

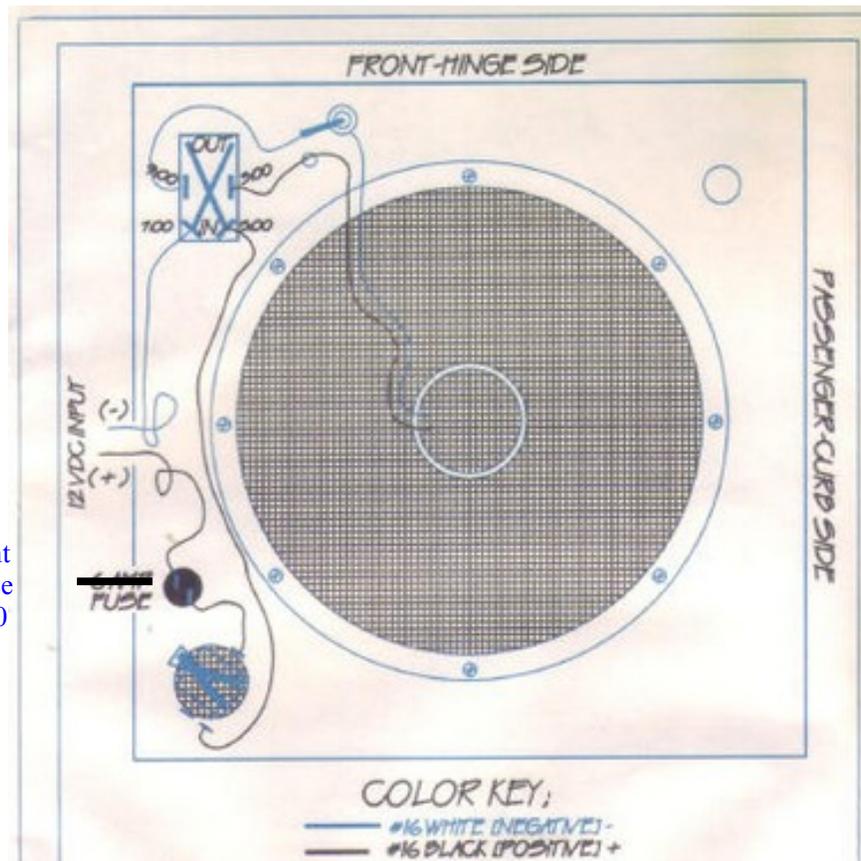
16-AWG Wire (would guess ~5 feet); *Fan has 16-AWG in it.*

Heat Shrink & heat gun or Electrical Tape; Soldering Iron; Pliers; Drill; Wire cutter; Wire Stripper
Two Phillips Head Screw drivers; small'ish and smaller . . . mine aren't size marked

Overview

Fan Model 1250 has a 3-speed switch and manual lid lift. Fan Model 4000R is about the same and has wiring diagrams on the web.

Different
Size Fuse
On 1250

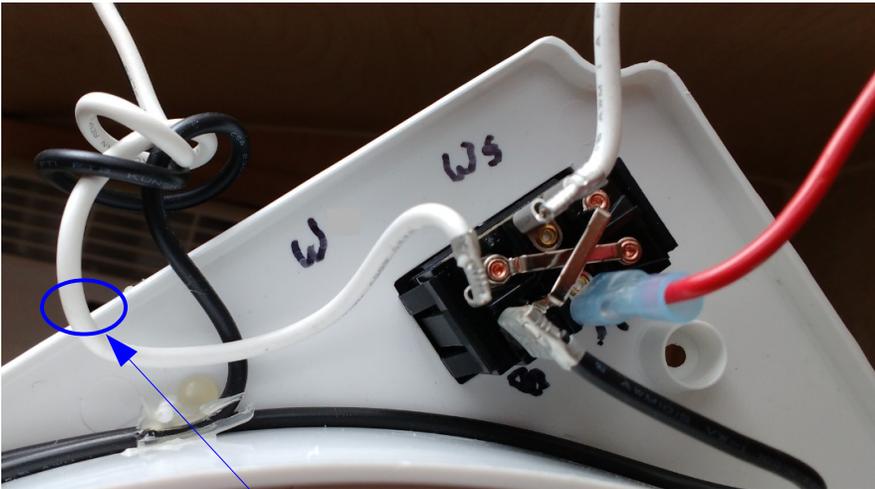


Conversion to variable speed operation replaces the 3-speed section of the On/Off Speed Selector switch with a PWM Controller printed circuit board 'PCB' or 'Board' and a Potentiometer 'POT'. Once converted adjusting the POT changes fan speed while the Fan Fuse, Reversing Switch, and On/Off function of the on/off speed selector switch all remain operational.

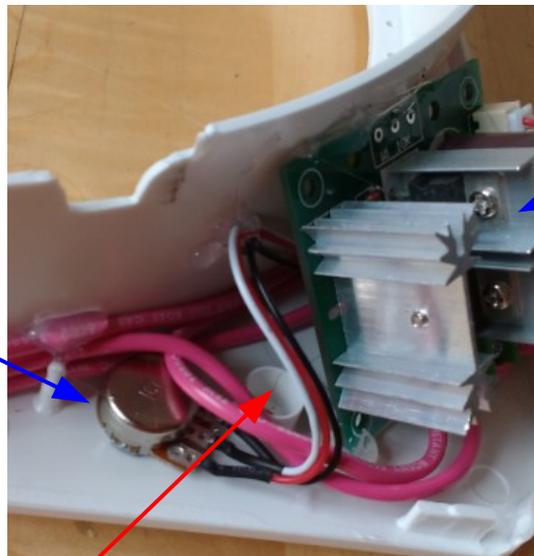
Model 1250 On/Off Speed Selector switch is a resistive voltage controller. Selecting the speed positions [1] [2] [3] changes the value of resistance between Battery +12V and the Fan motor causing the Fan to receive different voltage levels (power). Resistive voltage controllers generate lots of heat and waste energy; have high current draw. And when used in a stepped method limit the fan speeds to set RPM of each step (switch position).

PWM, Pulse Width Modulated, voltage controllers use solid state components to switch the voltage on (+12V) and off (zero V) quickly. How long the voltage is on compared to off defines the average voltage available to the Fan motor. Adjusting the POT changes the on/off *duty cycle* and gives us the variable speed control. A side benefit of the switching operation is lower current draw . . . +12V is off for some period of time at all duty cycle settings.

Installation Highlights

<p style="text-align: center;">REMOVE FAN FUSE at MAIN DC FUSE BOX</p> <p>Remove snap in Bug Screen</p> <p>Remove, unscrew, Lid Open / Height Adjust Handle</p> <p>Remove, unscrew, Lid Lock handle</p> <p>Remove, unscrew, all mounting screws on screen/control Panel</p> <p>Let panel hang by Wires (attached near Reverse switch)</p>	<p style="text-align: center;"><u>Confirm Fan will not turn on</u></p> <p style="text-align: center;">SAVE All Knobs & Screws for re-installation</p> <p style="text-align: center;"><u>FOUR Wires</u> Battery +12V Battery Ground Motor Unit + Motor Unit -</p>
	<p style="text-align: center;">LABEL Reverse Switch Wire Positions</p> <p>Cut glue (or pull) to release Black wire</p> <p>Using Pliers disconnect the TWO White and One Red wires from the Reversing switch</p> <p>Trace Black wire from glue point to Fan Fuse and disconnect</p> <p>Cut the White Wire (Battery Ground) about 2-inches from the Tab Terminal. SAVE the short connector piece for later use.</p>

Completed Project except for final connection to trailer Battery **Reference Pictures**

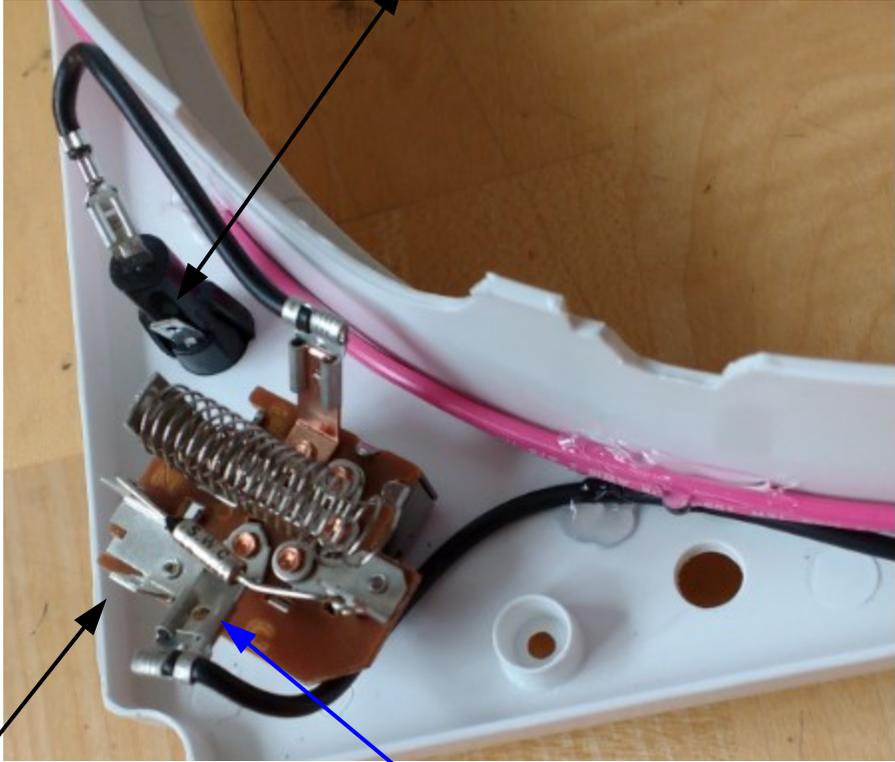


PWM Board

POT Speed Selector

NOTE:
Place Board so the
Mounting Screw Fitting
is 100% unblocked.

Original BLACK, Battery +12V
Will reconnect to Fuse

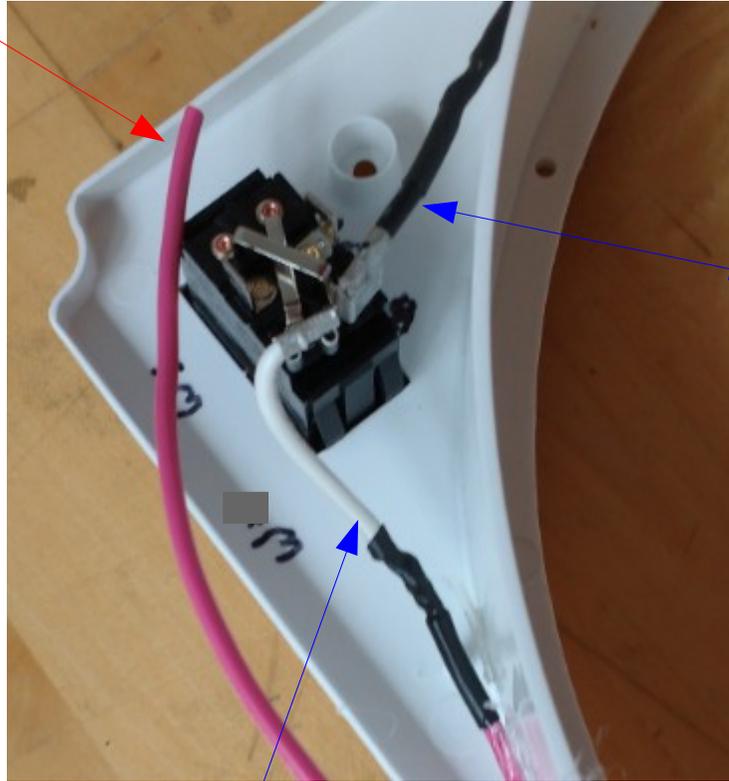


Original Black Jump, +V
To Reverse Switch
was connected here.

**On/Off +12V
Now Goes to PWM Board
Power + Terminal**

blank space

**To Be Connected to
Battery Ground (White) Wire
is
PWM Board Power -**



**Old Black +V
Jumper wire
Spliced to new wire
now is
PWM Board Motor +**

**Old White Ground 'terminal end'
Spliced to new wire
now is
PWM Board Motor -**

blank space

PWM Board Wiring

POWER +	<p>Wire to the On/Off Position (Tab) of the on/off speed selector switch</p> <p>Method:</p> <p>Remove Black V+ Jumper wire between on/off speed selector switch and the Reversing Switch</p> <p>Cut the jumper wire in half. SAVE both.</p> <p>Splice new wire to one of the Jumper wire pieces, Route this new made wire From: on/off speed selector switch, On/Off Tab using connector To: PWM Board screw terminal POWER +</p>
POWER -	<p>Will be wired to the trailer Battery Ground Wire <i>(the white one, we cut the terminal off of).</i></p> <p>Method:</p> <p>Using new wire cut a length that will reach from the PWM location to the Reverse switch location + a couple of inches.</p> <p>Attach one end to the PWM Board screw terminal POWER -</p>
MOTOR +	<p>Wire to the Reverse Switch V+ terminal</p> <p>Method:</p> <p>Using the other half of the jumper wire (cut in the above Power+ step) Splice new wire to the Jumper wire end. Route this new made wire From: Reverse Switch, Original Black position terminal To: PWM Board screw terminal MOTOR +</p>
MOTOR -	<p>Wire to the Reverse Switch Ground terminal</p> <p>Method:</p> <p>Using the ~2-inch piece of white wire with a terminal end Splice new wire to the wire end. Route this new made wire From: Reverse Switch, Original White position terminal To: PWM Board screw terminal MOTOR -</p>

Final Step

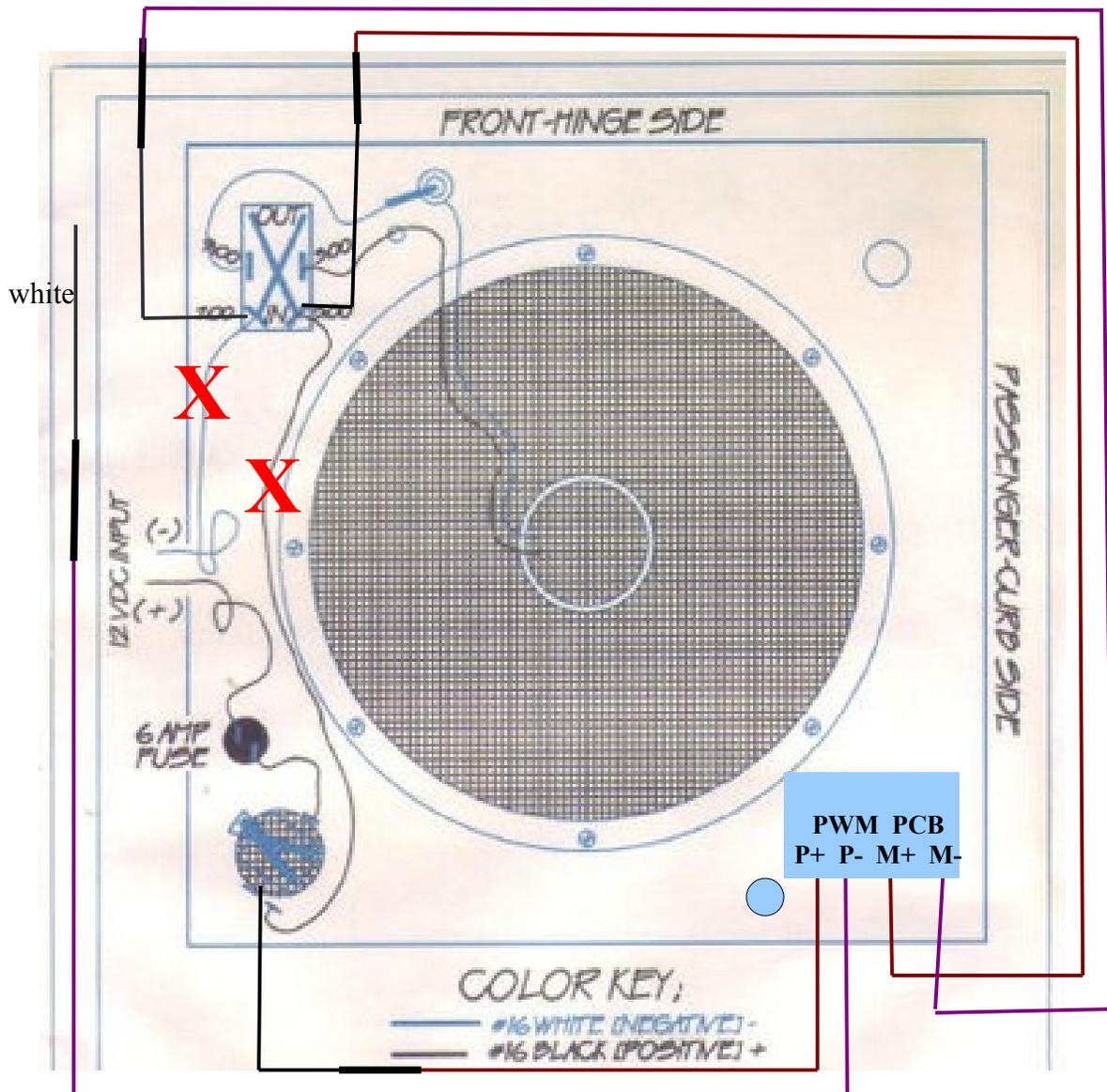
Connect the White & Red wires from the Fan Motor to the Reversing Switch

Connect the Trailer's Black wire with the terminal back to the Fuse on the Fan Panel

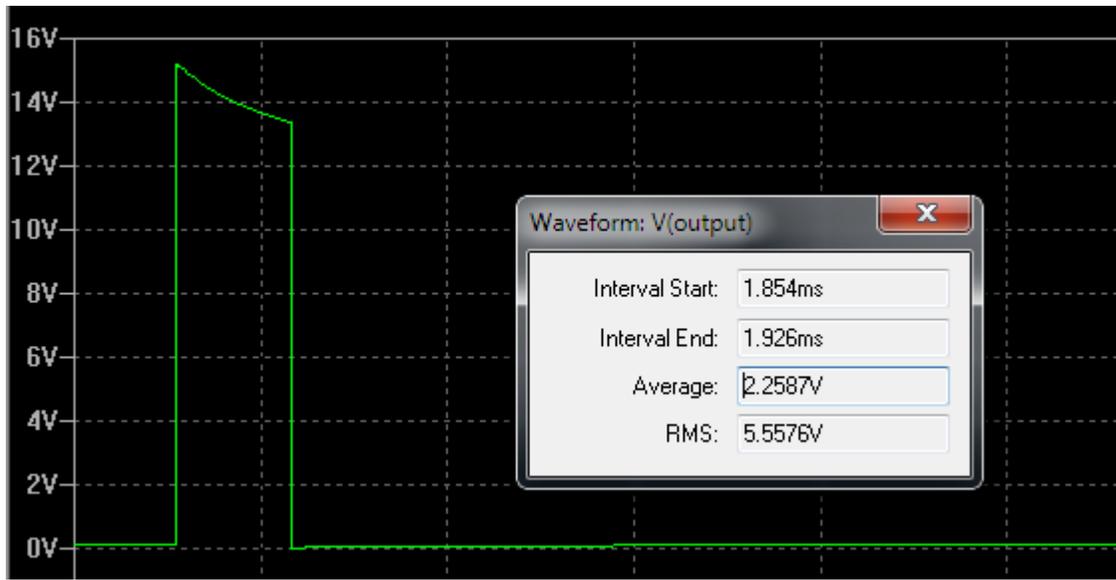
Splice the new PWM Board POWER- wire to the Trailer Ground (white) wire.
I used an electrical speed nut for this connection.

Re-install all the darn screws

Not to Scale



PWM At 12% Duty Cycle



PWM At 88% Duty Cycle

