Please read these instructions carefully before installing your new PWM Motor Controller.
This controller is suitable for controlling cooling fans, blowers, fuel pumps, and other devices with BRUSHED DC motors in various applications.
It can be customized using our Configuration Utility software or can be preprogrammed by our staff for an easy "plug and play" installation.
If your unit has already been preprogrammed, please refer to the wiring instructions on the back of this instruction sheet.

It's important to wire the controller directly to the battery with appropriate circuit protection for your load.

Operation

The PWM motor controller runs a brushed DC motor at the speed required based on the selected input.

For example…
If the PWM unit is controlling a cooling fan the unit will spin the fan at a speed correlating to the engine coolant temperature.

If the unit is configured to turn the fan on at 50% speed at 150 degrees and 100% speed at 200 degrees…
-when the coolant temp reaches 150 degrees the fan will spin full speed for the "Motor Start Run Time"
--Typically this is 0.25 seconds, and is required to ensure the fan motor and wiring is healthy.
--If the fan motor had failed and we started the fan at 50% speed there's a chance the fuse would not blow, and the wiring would get hot and possibly start a fire.
-the fan then runs at 50% speed until the engine coolant temperature increases
-as the coolant temp increases the fan speed increases, until the coolant temp reaches 200 degrees, at which time the fan is running full speed

If the AC override input (Blue wire; pin 4), or the manual override input (Tan wire; pin 5) is triggered…
-the fan runs at 100% full speed, and a ground output is sent out the Secondary Relay Output (Yellow wire; pin 6)
--this output triggers a relay to turn on a secondary cooling fan (the secondary fan is either ON or OFF; it is not PWM)

Status LED

The Status LED, located in the top corner of the unit, is used to provide a visual indication of what the PWM controller is doing.

LED Color	motor speed
No Color	ignition is OFF (if Ignition Input is Enabled)
Red	0%, ignition is ON (if Ignition Input is Enabled); motor is off
Green (slow flash)	50%
Green (moderate flash)	65%
Green (fast flash)	85%
Green/Blue (fast flash; alternating)	100% (Secondary Relay Output is sending a ground signal to trigger secondary relay.)
Blue (solid)	100% (AC override or Manual Override Input has been triggered, motor runs at 100% full speed, regardless of configured settings. Secondary Relay Output is sending a ground signal to trigger secondary relay.)

Main Power Inputs // Outputs

Connect the B+ to the +12V positive side of the battery. Connect B- to the negative side of the battery.
Connect the motor + and - to the main brushed motor you are wanting to control. (brushed fan or pump)
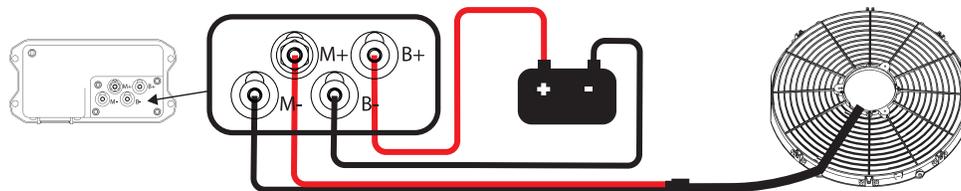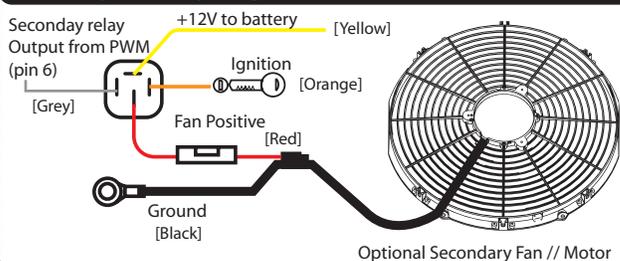

Main Connector Pinout Detail

The main 12-pin connector comes standard with hardware and blanking pins.
Depending on your applicationsome connections may not be used.

Pin #	Wire Color	Function	Required/Optional	Notes
1	YELLOW	RS 485-	Optional	Required if using GUI and RS485 cable
2	ORANGE	RS485+	Optional	Required if using GUI and RS485 cable
3	LIGHT GREEN	PWM Input	Optional	Required if using PWM input from ECU
4	BLUE	Air Conditioning Input -OR-manual switch	Optional	Required if using air conditioning or manual override switch
5	TAN	Override/Trinary Input	Optional	Required if using manual override switch or AC trinary switch
6	YELLOW	Secondary Relay Output	Optional	Required if triggering a secondary relay

Pin #	Wire Color	Function	Required/Optional	Notes
7	BLACK	Sensor Ground Supply	Optional	Required if using 0-5V analog sensor
8	GREY	Temp Sensor Input	Optional	Required if using resitive or 0-5V sensor
9	PURPLE	Sensor +5V Supply	Optional	Required if using resitive or 0-5V sensor
10	ORANGE	+12V Ignition Input	Optional	Required if using ignition to turn ON/OFF device
11	WHITE	CAN H	Optional	Required if recieving CAN data from ECU
12	LIGHT BLUE	CAN L	Optional	Required if recieving CAN data from ECU

please note, these wire colors may not be representative of wires included

Options

Secondary Motor Relay Wiring

Seconday relay Output from PWM (pin 6)   +12V to battery   [Yellow]
[Grey]
Ignition   [Orange]
Fan Positive   [Red]
Ground   [Black]
Optional Secondary Fan // Motor

Resistive Temperature Sensor Options

Wiring Detail

PWM Pin #	Wire Color	Function
8	Grey	Temp Sensor Input
9	Purple	+5v Sensor Supply

CWI Temp Sensor   GM 3/8 NPT Sensor (12146312)   GM 3/8 Metric Sensor (15326388)

Manual Override Switch Wiring

Manual Override Switch Input from PWM (pin 5)   +12V or ground

This is configurable in the GUI for either +12V or Ground activation

0-5V Analog Sensor Options

Wiring Detail

PWM Pin #	Wire Color	Function
7	Black	Sensor Ground
8	Grey	Temp Sensor Input
9	Purple	+5v Sensor Supply

CWI Pressure Sensor

AC Compressor or Trinary Wiring

AC compressor connector   AC Input Input from PWM (pin 4)
Ground   AC ON signal

From AC ON Switch   Trinary Switch   To PWM Override Input (pin 5)
MUST configure Override Input as Ground in the GUI
Ground   To AC Compressor
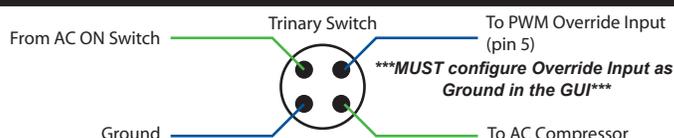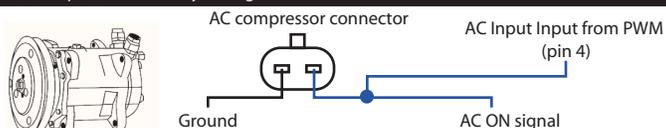
The CWI Performance PWM motor controller can be configured for a variety of applications. As such the Graphical User Interface (GUI) is a very powerful tool that allows you to change the operating parameters to suit your specific requirements.

These instructions provide a detailed explanation of each parameter and how one can utilize the GUI to configure the controller.

Basic Operation

To change the configuration settings the PWM controller must first be connected to +12V and ground (please reference the PWM Wiring instructions) and be connected to a PC based laptop running our PWM Configuration Utility software, via a RS485-to-Serial adapter cable.

How to Connect and change Settings:
1-connect the PWM controller to +12V and ground.
2-connect the RS485-to-USB Serial adapter cable to the PC and plug it into the PWM controller
3-Open the "Configuration Utility" software (this software is an EXE program and does not need to be installed. It runs when the program is opened)
4-select the "Port Number" from the dropdown box
****If you do not know the COM port the RS485-to-USB Serial adapter cable is using please refer to the "How to Locate COM Port Assignments via Device Manager" instructions***
5-Ensure the vehicle ignition is turned OFF.
6-click the "Open" button
--If the connection between the PC and the RS485-to-USB Serial adapter cable is successful "COM'X' Open Successfully" will be displayed at the bottom of the app. (where 'X' is the COM port number assigned by Windows)
--If the connection between the RS485-to-USB Serial adapter cable and the PWM controller is successful the Firmware Version number will be displayed in the Firmware Version box.
7-click "Get All"
--All boxes under the "Get All" button will be populated, displaying how the controller is currently configured
8-change the settings to whatever is required for your application by selecting the desired settings via the dropdown boxes
9-click each "Verify" button for the corresponding setting to check that each setting was configured correctly

Port Number: Use this to select the COM port the PC is using for the S485-to-USB Serial adapter cable
Firmware Version: The current firmware that is running on the PWM controller
Open: Establishes communication between the Configuration Software, the S485-to-USB Serial adapter cable and the PC

Input Configuration

Once connected you will be able to configure your inputs.
The Inputs selected changes the available settings in the output configuration area. (If an option is not available it will be greyed out)

Ignition Input:
Enabled = PWM controller will turn ON/OFF with the ignition input
Disabled = PWM controller will remain ON at all times
Input Selection: Select Input Type
Analog Sensor = Any resistive or 0-5V analog sensor (coolant temp sensor, fuel pressure sensor, etc)
PWM = Allows the PWM controller to receive a PWM signal from an external source (Engine Control Unit, etc)
CAN-bus = Allows the PWM controller to receive sensor data over the vehicle CAN bus
Analog Selection: Select which analog sensor you will be using (this option will be greyed out if using PWM or CAN input)
-CWI Temp Sensor
-GM Temp Sensor (3/8" NPT version; part # 12146312 or equivalent)
-GM Temp Sensor (metric version; part # 15326388 or equivalent)
-0-5V Analog Sensor
PWM Input Frequency: When utilizing the PWM Input Selection, this feature allows you to select what frequency is being supplied by the ECU
-80Hz
-100Hz
-120Hz (typically used with GM or Holley Engine Control Units)
PWM Input Inverted: Select this to Invert PWM Signal (if signal from ECU is decreasing as temp increases)
Override Input: The Override Input can be configured as a +12V or Ground input. It runs the motor at 100% speed when triggered.
This input should be used when the AC system utilizes a trinary switch. Typically the trinary switches ground to control a cooling fan.
--+12V
-Ground

Output Configuration

Now that you have set up your input settings the corresponding output options will be available.

Motor Start Run Time: When the fan is commanded to turn on the controller spins the fan at 100% speed for the times below.
This feature is implemented to ensure the fuse blows should the motor be damaged or unable to spin.
-0.25 seconds
-0.5 seconds
-0.75 seconds
-1.0 seconds
Motor Start (50% Speed): This setting controls at what point the motor runs at 50% speed
(this option will be greyed out if using PWM or CAN input)
-75-150 degrees
Motor 100% Speed: This setting controls at what point the motor runs at 100% speed
(this option will be greyed out if using PWM or CAN input)
-155-220 degrees
PWM Output Frequency: This sets the frequency supplied to the motor.
Please reference the PWM frequency supplied by the motor manufacturer; failure to select the appropriate frequency can result in motor failure
-100Hz
-500Hz
-1KHz
-5KHz
-14KHz (typically used for cooling fans)
-20KHz (typically used for fuel pumps)

File Configuration

This area allows you to save and open a previously configured software file, allowing you to flash multiple units quickly with the same configuration.

To save a configuration file:
1-establish a connection between the computer and device
2-select the desired settings using the dropdown selections
3-click "Verify" to check that each setting was configured correctly
4-click "Save As File", choose a location to save the file and give it a unique name

To program a connected unit:
1-establish a connection between the computer and device
2-click "Open File" and select the config file you have previously saved
3-click "Set All" and the unit will automatically load the configuration

Open File: Open saved configuration file
Save As File: Save current configuration to file
Set All: Sends opened saved config file to controller
Get All: Acquires the settings currently configured in the controller

How to Locate COM Port Assignments via Device Manager

If you do not know what COM port the PC has assigned to the RS485-to-USB Serial adapter cable please follow these instructions.

The short way:
1-in the Search box at the bottom of the screen type "Device Manager"
--this opens the Device Manager box
2-click the arrow next to "Ports (COM and LPT) to display what is plugged into the PC
3-the RS485-to-USB Serial adapter cable is named "USB Serial Port (COM X)" ***where "X" is the COM port number***

The long way:
1-open any folder
2-to the left of the folder should be a list of folders and drives, locate "This PC"
3-right click "This PC"
4-select "Manage"
depending on your version of Windows you may have to click "Show More Options" to show the "Manage" button
--This opens the Computer Management box
5-select "Device Manager" on the left
6-click the arrow next to "Ports (COM and LPT) to display what is plugged into the PC
7-the RS485-to-USB Serial adapter cable is named "USB Serial Port (COM X)" ***where "X" is the COM port number***

Looking to customize your PWM controls? Simply Download our free PWM Configurator on our website: https://creativewerksinc.com/product/pwm-controller