15-Amp PWM Controller with Digital Filtering

CV-2115B and CV-2115B-SS

The CV2115 PWM controller allows you to control the speed of a motor, brightness of a lamp or other load using a potentiometer or an analog voltage level (0-5V). Use of PWM and low on-resistance MOSFETs allows for high efficiency control with minimal power loss.

Absolute Maximum Ratings:

Parameter	Max	Units
Continuous Output Current	15	A
Instantaneous Output Current	25	A
Continuous Input Voltage	30	V

Warning – operating at or above the absolute maximum ratings may damage your controller or your equipment under control.

Operating Parameters:

Parameter	Min	Typical	Max	Units
Input Voltage	8	--	26	V
Input Voltage, Transient Low (0.5 sec)	0	--	--	V
Continuous Output Current	--	--	15	A
Digital Logic Input Low Level	0	--	1.5	V
Digital Logic Input High Level	3.5	--	5	V
Digital Input Capacitance	--	0.1	--	uF
Analog Voltage Input	0.0	--	5.0	V
Potentiometer Total Resistance	1	10	100	kΩ
PWM Frequency	150	200	250	Hz
Soft Start from Disabled Mode, Ramp Rate*	--	100	--	% / s
Quiescent Current Drain	5	6	8	mA
Temperature	-40	25	+85	°C

* on CV-2115B-SS models

Pin-out:

Pin Label	Function	Active H/L
EN	PWM output enable (internal pull-up)	H = enable L = disable
POT+	Upper pin of potentiometer (5V)	--
Center	Wiper of potentiometer	--
POT-	Lower pin of potentiometer (GND)	--
OUT-	Negative output to LOAD	--
OUT+	Positive output to LOAD	--
GND in	Ground from power supply	--
V+ in	Positive Power Supply	--

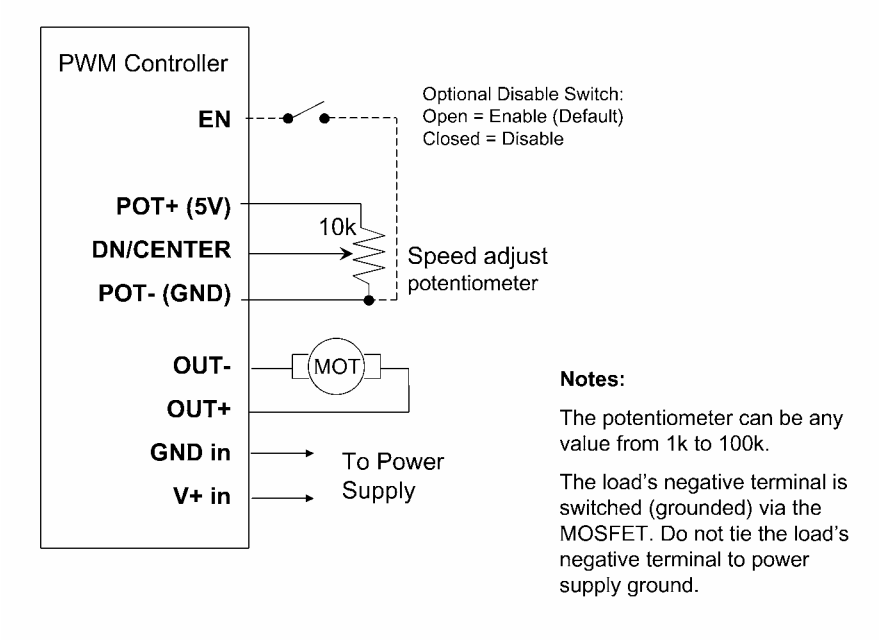

Figure 1: Connection Diagram

Operation:

A potentiometer of 1k – 100k can be used to control the pulse width. Alternatively, a varying voltage (0 – 5 V) level applied between the CENTER and POT- pins can be used as well. The voltage input is converted to a pulse width at the output (0 – 100%).

There is a built-in dead-band for potentiometer operation that sets the duty cycle to:

0% for any voltage level < 0.10 V.
100% for any voltage level > 4.90 V.

This dead-band along with digital filtering ensures smooth and reliable operation even with dirty potentiometers.

Output Enable:

The output is enabled by default and is internally pulled up. Bringing the EN pin low immediately brings the PWM output to 0%. Allowing the pin to return to high re-enables the PWM output at the previous duty cycle.

Soft Start (on CV-2115B-SS models only):

The output is automatically ramped up back to the original PWM level at a rate of 100% per second when the controller is switched from disabled to enabled. This reduces the stress placed on power supplies and mechanical linkages as motors come back up to speed, or as high temperature resistive loads heat up (such as light bulbs).

Application Notes:

PWM controllers switch currents at high frequencies to vary the average power to the load. This switching can cause undesirable RF interference. To minimize such interference, it is recommended to twist the input V+ and Ground wire pair as well as the Out+ and Out- wire pair. In addition, installation of a small capacitor from each of the two motor terminals to the metal case may reduce noise emission.

A slow blow fuse appropriately rated for the load device can help enhance safety.

This controller is not reverse-polarity protected. Ensure that it is wired correctly before applying power. Always turn off the power supply before making any changes to the wiring.

Ensure that the controller has adequate air flow for proper cooling. If operating for extended periods of time in high temperature environments, a cooling fan may be necessary.

Use the shortest possible wires between the motor and controller, and between the controller and the power source. Ensure that the wires carrying the load current are adequately sized. If operating heavy inductive loads, it may be advisable to add an appropriately rated filter capacitor at the input to the PWM controller. Inadequate power supply filtering or other causes leading to a high impedance path to the power supply will result in higher losses in the filter capacitor and wiring, reducing overall system efficiency.

30-Day Limited Warranty:

Subject to the provisions described below, CRITICAL VELOCITY ENTERPRISES, LLC ("Critical Velocity") warrants this product to be free from defects in material and workmanship for thirty (30) days from the date of purchase by the original consumer. If any part is found to be defective during the warranted period, it will be repaired or replaced with the same or functionally equivalent product by Critical Velocity, at its discretion, free of charge provided you: (1) return the failed product to Critical Velocity with shipping prepaid, and (2) provide Critical Velocity with proof of the original date of purchase. Repaired or replacement products will be returned to you with shipping charges prepaid.

Replacement products may be refurbished or contain refurbished materials. If Critical Velocity, by its sole determination, is unable to repair or replace the defective product, it will refund the purchase price of the product. This warranty does not apply if, in the judgment of Critical Velocity, the product fails due to damage from shipment, handling, storage, accident, abuse or misuse, or if it has been used or maintained in a manner not conforming to product manual instructions or has been modified in any way. Repair by anyone other than Critical Velocity will void this warranty. The maximum liability of Critical Velocity under this warranty is limited to the purchase price of the product covered by the warranty.

Except as specifically provided in this agreement or as required by law, the warranties and remedies stated above are exclusive and in lieu of all others, oral or written, express or implied. Any and all other warranties, including implied warranties of merchantability, fitness for a particular purpose and noninfringement of third party rights are expressly excluded. Critical Velocity shall not under any circumstances be liable for any special, incidental, indirect or consequential damages, including without limitation, damages resulting from use or malfunction of the products, loss of profits or revenues or costs of replacement goods, even if Critical Velocity is informed in advance of the possibility of such damages.

LIFE SUPPORT POLICY:

Critical Velocity's products are not authorized for use as critical components in life support devices or systems. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.

2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.