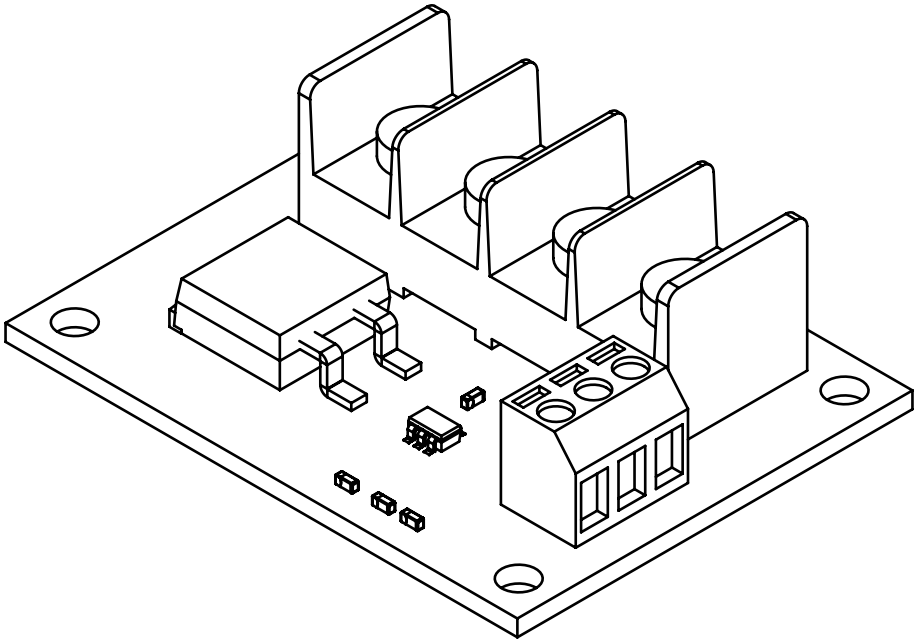
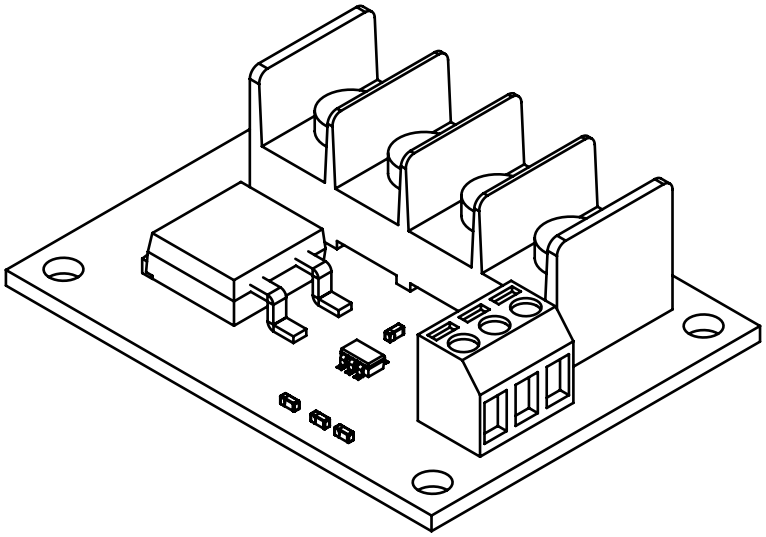


VClamp - Voltage Clamp

Data Sheet Version 1.1

Feature Overview:

- 60 Amps Peak Clamping
- 60VDC Peak Operation
- TTL Control
- Air and Conduction Cooling
- 3.3v Compliant Control Outputs
- 5v Tolerant Control Inputs
- Status LED



Device Overview

The VClamp adapter will allows a switching power supply to be with either RoboClaw or MCP motor controllers. During coasting or slow down excessive voltages can be generated at the power input. The excess voltages can cause certain power supplies to shut down due to over voltage. The VClamp can dissipates the excess energy through a braking resistor.

The VClamp can be controlled by RoboClaw or MCP and is activated when the maximum set voltage of the RoboClaw or MCP is exceeded. VClamp is also ideal in battery system where the regenerative voltages need to be controlled to prevent over charging.

Control Interface

VClamp is controlled by a simple ON/OFF interface. A low signal on its control input will activate it, turning on the MOSFET. When the VClamp is active the excess voltage will be sent through a connected power resistor which will then be bled off as heat.

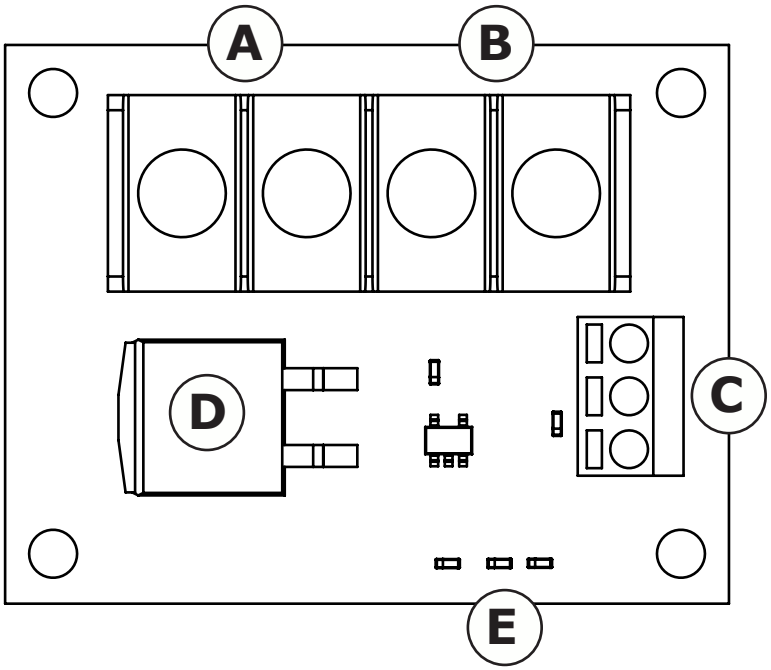
Limits

VClamp can dissipate up to 60 amps at 60VDC. This is limited by the type of braking resistor used and if the resistor has a heat sink.

Function

During a regeneration period, when the maximum set voltage is exceed by 1V RoboClaw or MCP will automatically turn on the VClamp. It will stay active until the voltage settles to the maximum voltage that was previously set.

Hardware Overview:

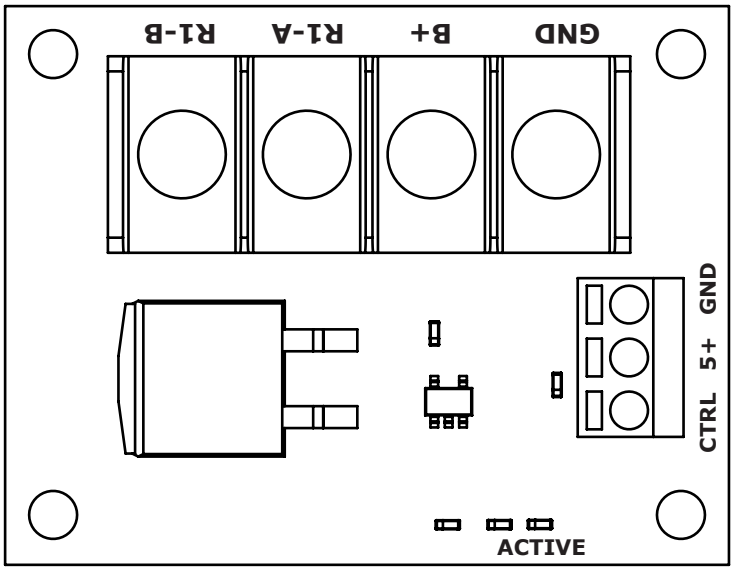


ID	Function	Description
A	Resistor Terminals	Braking resistor used for power dissipation.
B	Main Power	Main power connection. Positive and GND connections.
C	Control Inputs	Control input.
D	MOSFET	Part Number: BUK965R8-100E,118
E	Status LED	Status LED indicates when clamping MOSFET is active.

Functional Overview

The R1-A and R1-B screws terminals are used to connect the braking resistor. The B+ and GND connections on the main screw terminal are tied to the main power source. The control interface screw terminals provide a connection for control signal (CTRL), signal ground and 5VDC to power VClamp. CTRL is an active LOW and is internally pulled-up with a 10K resistor to keep it off when no signal is applied. A low input on CTRL will turn the MOSFET (BUK965R8-100E,118) on.

When VClamp is active and the MOSFET is on the led marked ACTIVE will be lit. Any excess voltage will be bled off as heat via the attached braking resistor to ground.



Name	Function
GND	Main supply voltage ground terminal.
B+	Main supply voltage positive terminal.
R1-A	Dissipation braking resistor terminal.
R1-B	Dissipation braking resistor terminal.
CTRL	Active LOW to turn on VClamp.
5+	5VDC required to operate VClamp.
GND	Signal ground.
ACTIVE	Status LED. On when VClamp is active.

Resistor Selection

The resistor needs to be sized based on the running voltage and potential current that will need to be dissipated. Below is an example chart of potential resistor values and wattages. The resistors can be sourced from suppliers such as DigiKey. The excess energy will be turned into heat. The recommended resistors below have an aluminum shell for mounting to help dissipate the excess heat.

Designator	Part	Resistance	12VDC	24VDC	36VDC	48VDC	60VDC
R1	KAL50FB1R00	1 Ohm	12A	24A	36A	48A	60A
R1	KAL50FB2R00	2 Ohm	6A	12A	18A	24A	30A
R1	KAL50FB3R00	3 Ohm	X	6A	9A	12A	15A
R1	KAL50FB5R00	5 Ohm	X	X	7.2A	9.6A	12A

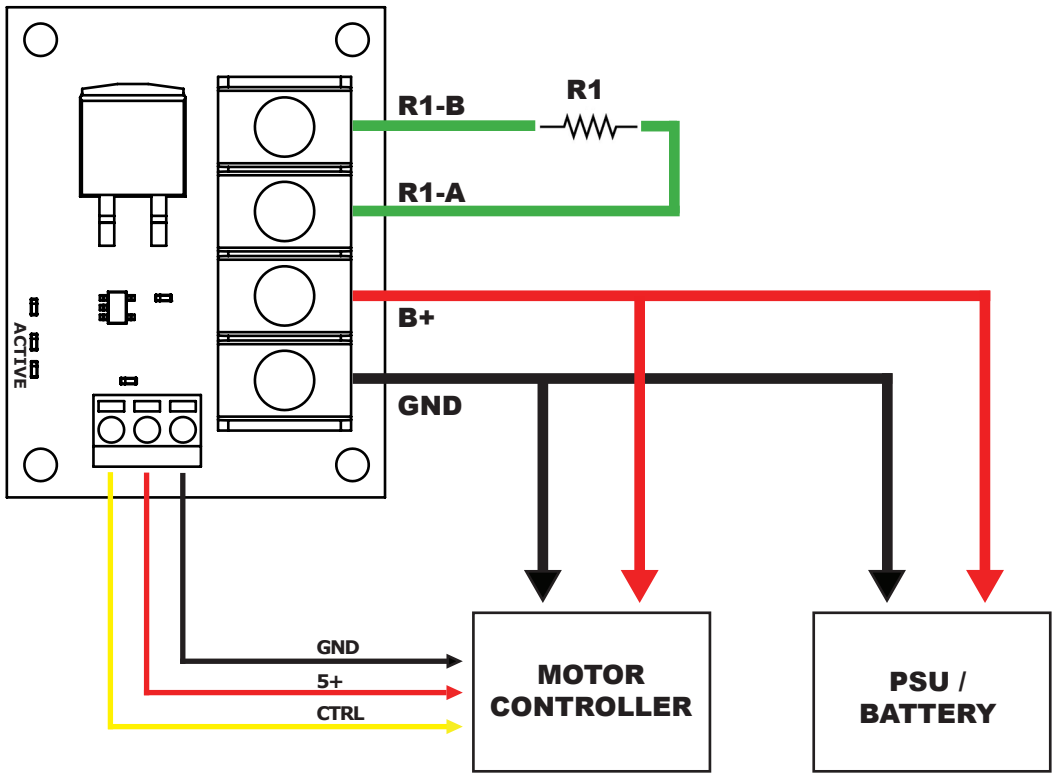
RoboClaw and MCP Software Setup

Each of the auxiliary pins on RoboClaw or MCP have a drop down option in Motion Studio. One of these options will be VClamp. Set the desired auxiliary pin to VClamp and select the invert option for the pin. Then set the battery maximum voltage to at least 1 to 2 volts above. Refer to the VClamp application note for more information.

Wiring

The wiring schematic below illustrates how to properly wire the VClamp. R1 is the braking resistor. R1 will turn the excess energy into heat. The VClamp can be controlled directly by the motor controller or separate control system such as an external microcontroller. B+ and GND from the main screw terminal connect directly to the motor controller power source.

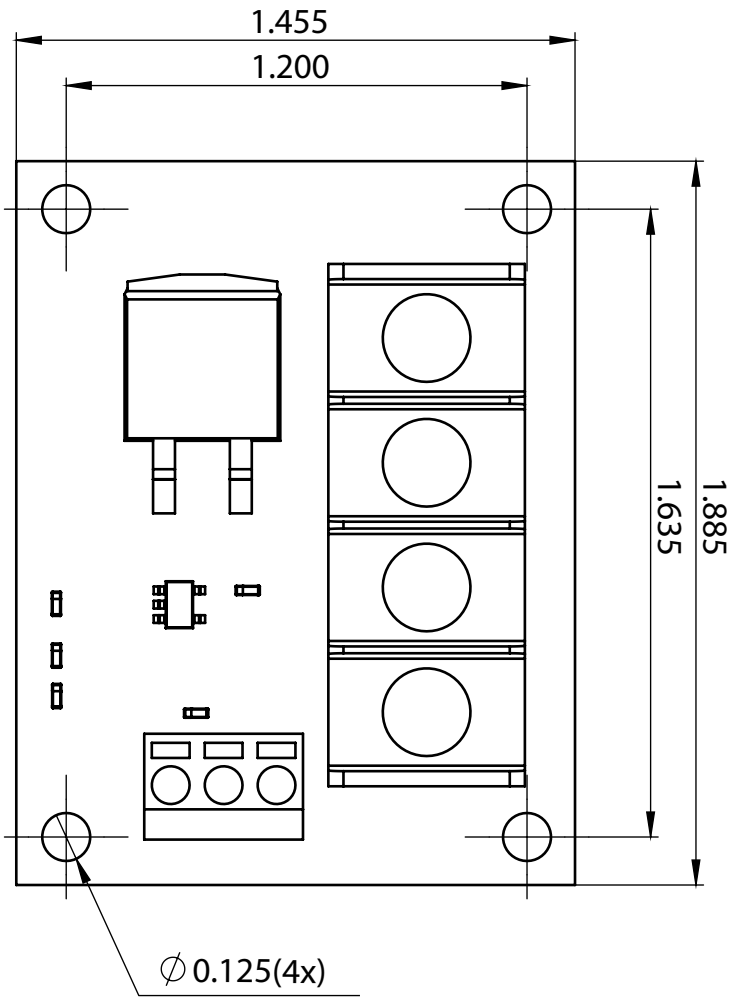
The below schematic outlines the basic setup for VClamp. It does not take into account proper safety such as a fuse or contactor in the system. Refer to the motor controller's data sheet, manual and application notes.

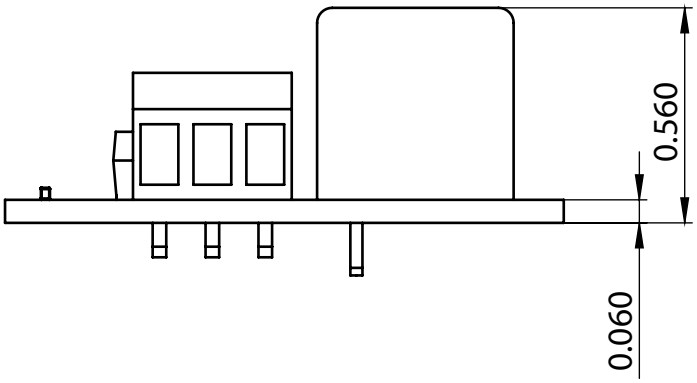


Mechanical Specifications

Characteristic	Model	Min	Typ	Max	Rating
Weight	VClamp		0.8 (22)		Oz (g)

Dimensions





Electrical Specifications

Characteristic	Min	Typ	Max	Rating
Battery	6		60	VDC
Current			60	A
On Resistance		5.8		mOhm
Logic Circuit Current Draw		10mA		mA
Input Low	-0.3		0.8	VDC
Input High	2		5	VDC
Temperature Range	-55		150	°C
Humidity Range			100 (1)	%

Notes:

1. Condensing humidity will damage the device.

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