DESCRIPTION

When using a regulated power supply for a drive, it is possible that regenerative energy will cause problems when rapidly decelerating a load from high speed. Under these conditions, the kinetic energy of that load is transferred back through the drive electronics to the power supply connection. This increase in voltage can trip the overvoltage protection of a switching power supply, causing it to shut down.

For this reason AutomationDirect offers a "Regen Clamp" module for our stepper/servo drive products. With this module one or more stepper/servo drives can be protected from "Over Voltage" conditions by placing the clamp module between the power supply and the drive. The clamp tracks the input power supply and will operate from 12 to 80 volts. No adjustments are needed.

The Regen Clamp is designed to handle a wide range of conditions. The voltage input matches the needs of the SureStep stepper drives and SureServo servo drives by providing 12 to 80 VDC capabilities. More than one stepper/servo drive can be connected to the clamp module, with the potential to handle an entire multi-axis system.

FEATURES

The STP-DRVA-RC-050A Regen Clamp is mounted on a heat sink and has a 50 watt power resistor for continuous current handling (50W continuous, 800W peak).

WARNING! When connecting the clamp, do NOT reverse the wires. A reverse connection will destroy your drive.

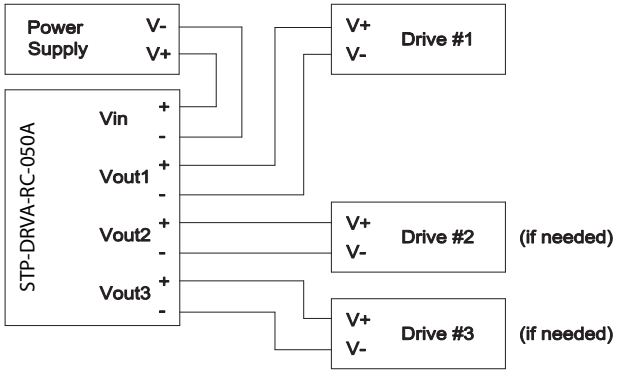
Sure Step™ Regen Clamp Specifications	
Part Number	**STP-DRVA-RC-050A**
Voltage Range	10 to 80 VDC, no user adjustments
Input Current (RMS)	15A
Output Current (RMS)	8.0 A max/channel, 15A max total
Clamp Circuit Activation Voltage	1–1.6 V (V_{out}-V_{in})
Clamp Circuit Inactivation Voltage	0.3–0.7 V (V_{out}-V_{in})
Internal Regen Power Resistor	10Ω, 50W
Peak Power	800W
Continuous Power	50W
Removable Connectors	6-pin screw terminal block accepts 12–18 AWG wire. Degson: 2-pin power input connector, 2EDGKM-5.08-02P-14-00A(H) 6-pin power output connector, 15EDGK-3.81-06P-14-00A(H) Spares available in kit STP-CON-4.
Indicators	Green LED: Indicates power supply voltage is present. Red LED: Indicates that the clamp is operating.
Heat Sinking Method	Natural or customer supplied fan-forced cooling
Operating Temperature	0–40 °C [32–104 °F]
Maximum Ambient Humidity	Maximum 90% non-condensing
Weight	238g [8.4 oz]

CONNECTING THE REGENERATION CLAMP

Connect the power supply V+ terminal to the regen clamp terminal labeled V_{in}+ and the power supply V- terminal to the regen clamp V_{in}-. Then connect the regen clamp V_{out}+ to the drive terminal V+ and the regen clamp V_{out}- to the drive terminal V-. The STP-DRVA-RC-050A has a maximum of 3 channels to allow for connecting up to 3 drives. All drives must be operated by the same power supply voltage. You cannot power different drives at different voltage levels. Use AWG18 or AWG20 wires.

CIRCUIT DIAGRAM

The regeneration circuit is designed to provide a wide range of voltage clamping operation with a simple and reliable design. The block diagram gives a simplified view of the circuit design showing the major parts.



TERMINAL BLOCK

A 2-pin input power connector and a 6-pin drive connector provide easy connection access to the clamp. The terminals are designed for wire sizes from 18–20 AWG.

INTERNAL POWER RESISTOR

The regen clamp includes a built-in 10 ohm 50W power resistor for dissipating the regenerated energy from the motor. This resistor will "sink" up to 8 amps when using an 80 volt power supply, but only 2.4 amps when using a 24 volt supply.

FILTER CAPACITOR

A large capacitor is added across the voltage output to smooth out operation and allow the "clamp" to work at a low switching frequency.

OVER-VOLTAGE SENSE CIRCUIT

This part of the clamp senses when an over-voltage occurs.

The clamp will turn on when the "V_{out}" exceeds the "V_{in}" by approximately 1–1.6 volts. The clamp turns off when "V_{out}" drops to about 0.3–0.7 volts below "V_{in}".

INDICATOR LEDS

A solid green LED is used to indicate power supply input, and a flashing or solid red LED is used to indicate when the clamp is active.

Dimensions

STP-DRVA-RC-050A

Dimensions = in[mm]