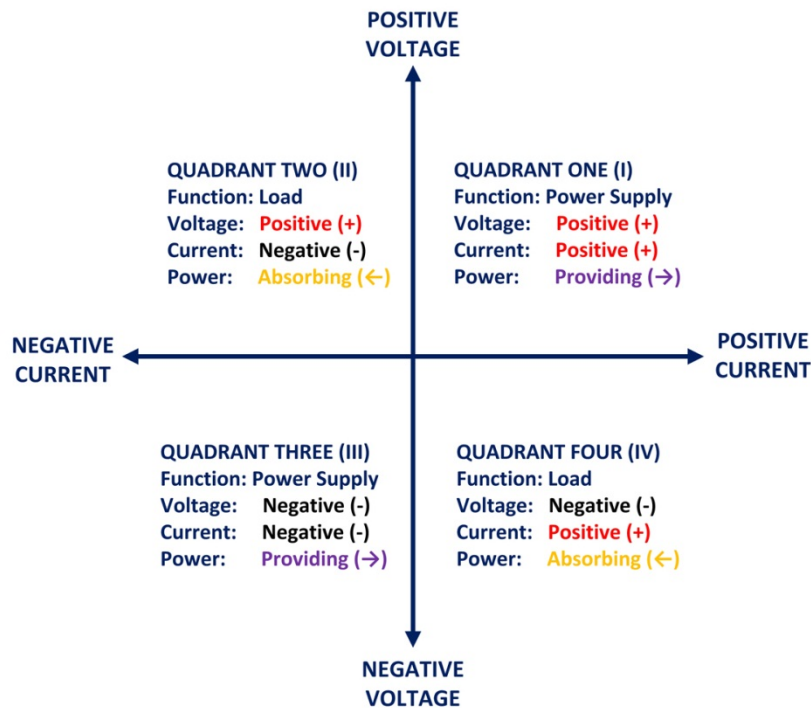


APPLICATION NOTES FOR USE WITH SPELLMAN HIGH VOLTAGE POWER SUPPLIES

Application Note Number: AN-10
Revision: 4-21-13

AN-10 Fixed polarity, reversible polarity, four quadrant operation...a simple explanation.

Most of the products Spellman manufactures and sells are DC high voltage power supplies. DC power supplies have some fundamental limitations as to their operational capability. To understand what a typical DC high voltage power supply can do with respect to output voltage, current and power convention it is helpful to use a Cartesian coordinate system as shown in the figure below.



Output current and voltage are shown on the respective horizontal and vertical axis and four operational quadrants are created.

Quadrants One and Three are the characteristic operating parameters of a power supply where power is being provided to the output. Quadrant One identifies a positive output polarity power supply whereas quadrant Three identifies a negative polarity output power supply.

Quadrants Two and Four are the characteristic operating parameters of a load where power is being absorbed from the output. This realm is typically not a functional capability of Spellman's standard DC high voltage power supplies.

Many of Spellman's power supplies do have the ability to reverse their output polarity; typically either a wiring change or a complete exchange of the high voltage output section is required. Due to this fact our units cannot smoothly and seamlessly control through zero and cross back and forth easily between quadrants One and Three. Even units like our CZE Series that have complete and distinct positive and negative output sections that use a high voltage relay to change output polarity still require the output voltage to fully decay to zero before a polarity change can be implemented.