APPLICATION NOTES FOR USE WITH SPELLMAN HIGH VOLTAGE POWER SUPPLIES

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Pulsing Applications and Spellman High Voltage Power Supplies

Spellman designs, manufacturers and sells DC high voltage power supplies. Typically, our power supplies are used in continuous load applications. There are some unique applications where users try to draw large bursts of current for short periods of time. These applications can be problematic as our power supplies are not designed for this type of usage. Depending upon the situation there may be ways of coming up with a workable solution, so let us see what that might look like.

Low Output Capacitance and Series Limiting Resistor

Our “high frequency” switching power supplies have considerably less output capacitance than older, traditional line frequency power conversion topologies. Additionally, to limit the short circuit discharge currents to reasonable levels we put an output limiting resistor in series with the output This low capacitance and series limiting resistor work against the case of trying to pull large pulse currents from our high voltage power supplies. There is not much internal storage capacitance to “hold up” the output voltage during these pulsed demands. Additionally, the series limiting assembly will cause large voltage drops.

Customer Supplied Buffering Capacitor

One possible way to address this issue is for the customer to place a pulse rated buffering capacitor on the output of the high voltage power supply. Assuming the user knows the magnitude and duration of the current pulses drawn, they can size the external buffering capacitor for the voltage droop they can tolerate. If this pulsed current demand is happening in a repetitive fashion, please realize it may take the tens of milliseconds for the voltage loop of the power supply to respond and correct for it. This provides reason to size the buffering capacitor erroring on the larger size of more capacitance.

Isolation Resistor

Placing an isolation resistor between the high voltage power supply output and the buffering capacitor can help prevent large pulse currents from being drawn from the power supply. Once a continuous train of pulses is established this will look like an average load to the power supply. The power supply will readjust to find a new point of equilibrium. Any change to the pulse train will look like a load change to the power supply, requiring it to take time to find the new point of equilibrium.