



APPLICATION NOTES FOR USE WITH SPELLMAN HIGH VOLTAGE POWER SUPPLIES

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High Voltage Power Supply Programming Resolution Explained

Most high voltage power supplies manufactured by Spellman are programmable, that is the user can set the output typically anywhere from zero to 100% of rated output voltage (or current). This is usually accomplished via one of the following means:

Local Front Panel Control
Remote Control – Analog Signal
Remote Control – Digital Signal

Local Front Panel Control

Local control refers to the use of an onboard potentiometer(s) to program the output voltage/current. Some modules have customer accessible potentiometers (MPS, PCM, SLM, etc.) that allow the user to program the voltage/current. Most of Spellman's rack mount units have a full feature front panel where locking counting dials are provided to set desired the voltage/current.

So if the power supply control circuitry is analog in nature and the front panel potentiometer(s) are used to program the power supply, the potentiometer(s) determines the programming resolution obtained.

Cermet (ceramic/metal) or plastic film potentiometers the wiper can be set closer to the desired value since the resistive element presents a continuous contact surface, as opposed to discrete turns of a wire as in a wire wound potentiometer which yields a fundamental resolution limitation.

Most modular power supplies that have local programming capabilities employ cermet or plastic film potentiometers, so these units could technically have "near infinite resolution" as specified by the manufacturer. The potentiometer used on most rack units is a wire wound Bourns 3590 5k Ω , 10 turn potentiometer which has a resolution specification of 0.025%.

If the module or rack power supply has a standard digital interface (RS-232, Ethernet or USB) the power supply control circuitry is digital in nature. Even if a front panel generated analog signal is used to control the power supply, this signal will be digitized at the bit resolution employed by the digital interface and control circuitry.

Remote Control – Analog Signal

If the power supply control circuitry is analog in nature and a remotely generated analog signal is used to program the power supply, this customer generated analog signal will determine the programming resolution obtained.

If the module or rack power supply has a standard digital interface (RS-232, Ethernet or USB) the power supply control circuitry is digital in nature. Even if an analog signal is provided to the power supply, this signal will be digitized at the bit resolution employed by the digital interface and control circuitry. So the resolution limitation could be either the customer generated analog signal or the bit resolution of the power supply, whichever is greater.

Remote Control – Digital Signal

If the module or rack power supply has a standard digital interface (RS-232, Ethernet or USB) the power supply control circuitry is digital in nature. Programming the power supply via one of the digital interfaces will result in a resolution limited by the bit resolution employed in the digital circuitry and control circuitry of the power supply.