



## APPLICATION NOTES FOR USE WITH SPELLMAN HIGH VOLTAGE POWER SUPPLIES

Application Note Number: AN-27

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### What Does the Fault “Regulation Error” Mean?

#### **Situation:**

Many of Spellman’s rack mount power supplies have a dead front style fault diagnostic display on the front panel. This display will provide information on the normal operation of the power supply like Voltage Mode, Current Mode, External Interlock Open, External Interlock Closed and various other normal operating parameters of the power supply. This display will also show when faults or problems occur with the power supply, with Regulation Error being one of them.

#### **Regulation Error:**

If one of the two controlling loops (be it voltage mode or current mode, dependent on voltage /current programming parameters and load impedance) is in active control of the power supply, the unit is behaving normally. If neither the voltage loop nor the current is in active control, then both loops are saturated in a vein attempt to make the voltage/current/power being requested, causing the power supply to shutdown displaying a “Regulation Error” fault.

#### **How Spellman Tests the Regulation Error Circuit:**

Spellman puts a full rated resistive voltage/current load on the output of the unit under test, demanding full output voltage/current and power. We then lower the AC input voltage using a variac so the AC input voltage falls below the low line parameters (typically -10% or more of the nominal rated AC input voltage). Here we are ‘starving’ the power supply with less than adequate AC input power to make full rated output power. Both the voltage loop and current loop saturate trying to maintain output power, creating a temporary “Regulation Error” fault.

The fault can be cleared by pressing the green front panel HV OFF button, (or cycling the AC input power) and bringing the AC input voltage back up to nominal levels.

#### **Regulation Error Faults in the Field:**

The first thing to check if you experience a Regulation Error fault in the field is confirm the AC input voltage is in the nominal range. If you still experience a Regulation Error fault there is a good chance something has broken or damaged inside the power supply preventing it from making full voltage/current/power. Typically, in this case you will need to contact the Spellman Customer Service group and arrange for the power supply to be returned to the factory for repair.

<https://www.spellmanhv.com/en/Contact-Us/Customer-Service>