



ST Arc Intervention Circuitry Functionality

Spellman's ST power supply series have an arc intervention feature that senses arc currents via a fast acting current sense transformer. The purpose of the arc intervention circuitry is to prevent power supply damage from continuous, long term arcing.

Internal series limiting assemblies limit short circuit discharge currents. Knowing what these levels are, Spellman can set the trip point for the arc detection circuitry that will protect the power supply from excessive arcing, while allowing normal power supply functionality.

Finding the proper balance between protection and sensitivity is crucial to provide a unit that functions properly. Making the circuit too sensitive will yield a unit that trips off due to small arc events. Making the circuit too insensitive risks damaging the internal short circuit limiters from thermal overload due to excessive arcing.

If unique arc sensing is required (beyond the capability of the ST's arc intervention circuitry) Spellman recommends the customer implement this functionality external to the power supply with their own circuitry, or consult the factory for possible customization.

The ST arc intervention protocol consists of four distinct parts:

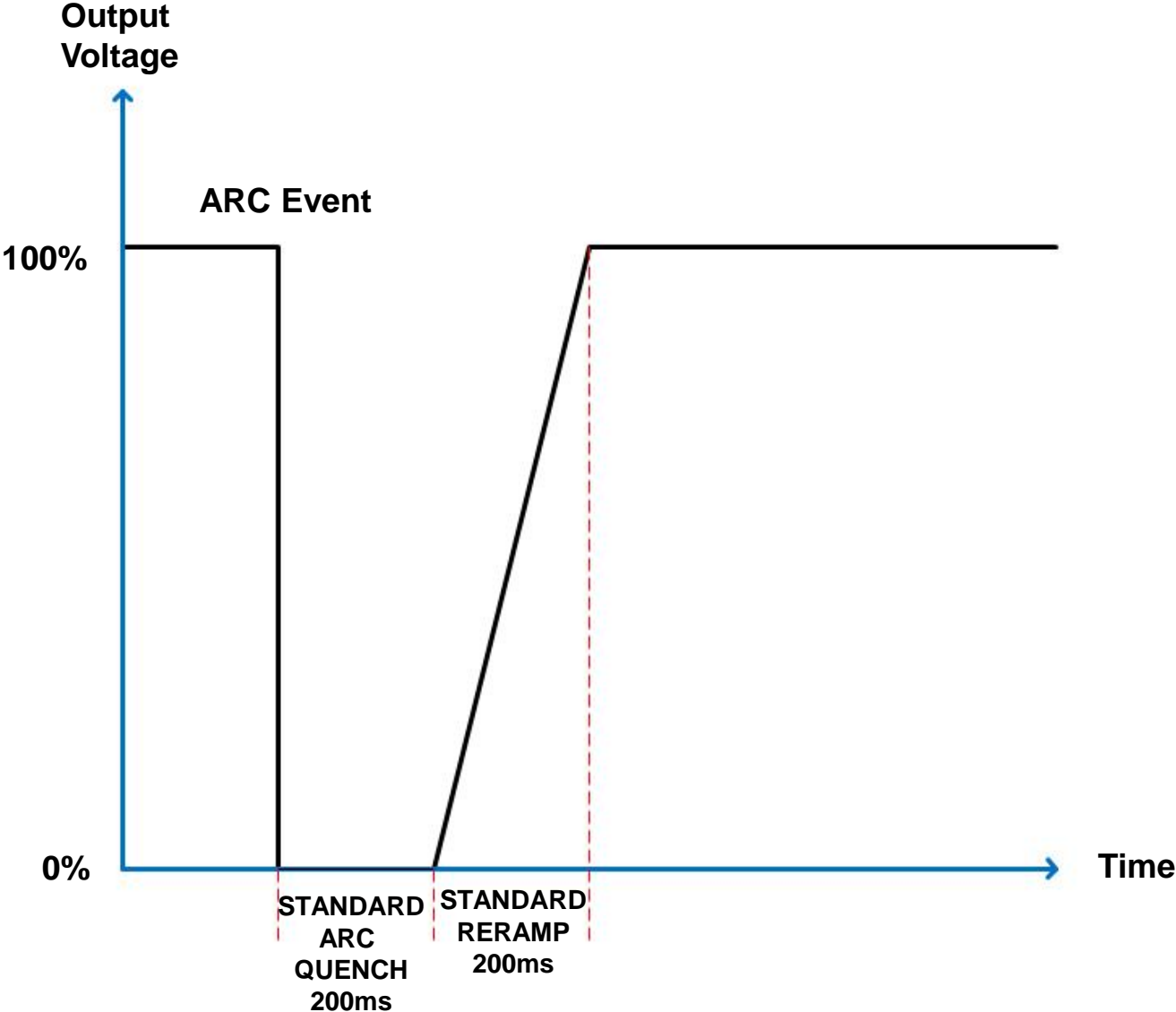
ARC SENSE: A current transformer is used to sense the high voltage return current. The magnitude of the arc discharge current is level sensed to determine if an arc has occurred. Arc events can be sensed in the microsecond timeframe.

ARC QUENCH: The instant an arc is detected the main oscillator is gated off for a “Quench” time period. This is to allow the arc gap to extinguish or quench. The standard quench time is 200ms.

RERAMP: After the arc quench time, the high voltage is re-enabled with a linear ramp. The controlled reapplication of output voltage can help to prevent another arc from occurring. The standard ramp time after the quench time period is 200ms.

ARC COUNT: Each arc event is loaded into an arc counting circuit. If four arcs occur in a roughly 10 second time period, the power supply will shut down with an “ARC” fault.

Standard ST Arc Recovery



If 4 arcs occurs in a 10 second time period the power supply will trip off with an “ARC” fault latched on the front panel diagnostic display. User intervention is required to clear the fault and reapply high voltage. If 4 arcs do **not** occur in the 10 second time period, any counts loaded into the counter are cleared. A new 10 second time window is opened when the next arc occurs and the cycle repeats.

The standard arc intervention circuitry can be modified, but the customer needs to understand and take responsibility that change(s) could pose risk of thermal overload of the internal arc limiting assemblies. Consult the factory if you feel you need customized arc intervention circuitry.

ARC SENSE: The arc sense feature can be disabled, rendering any and all protective arc intervention circuitry non operational. Caution is suggested if selecting this option.

ARC QUENCH: The arc quench time period can be shortened, lengthened or removed entirely.

RERAMP: The reramp time period can be shortened, lengthened or removed entirely.

ARC COUNT: The number of arcs counted and be increased, decreased or disabled. The time window can be increased, decreased or disabled.

It is imperative that both Spellman and the user jointly understand the behavior and limitations of our power supplies during dynamic arcing conditions.

Our standard arc intervention circuitry may require customization for proper use in a specific application.

Feel free to contact Spellman to review your requirements.

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