

## Re: Full Bridge SMPS With High No Load Voltage?

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- *From:* "Paul Mathews" <[optoeng@xxxxxxxxxxxxxxxx](mailto:optoeng@xxxxxxxxxxxxxxxx)>
  - *Date:* 25 Jan 2006 10:00:33 -0800
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Jeremy Samuels wrote:

> In my attempt to build an inverter-style plasma cutter, I have run into  
> a problem. How can a full bridge SMPS create a high (270 VDC) near  
> open circuit voltage, but have a relatively low load voltage (90 vdc at  
> 25+ amps)? The high voltage is used to start the arc, and the lower  
> voltage is used to maintain the arc. I'm planning to use a CCM PFC  
> with an output of 220 vdc into a full bridge (current mode, fs=25khz).  
> See <http://www.northerntool.com/downloads/manuals/164686.pdf> for  
> similar power supply requirements.  
>  
> Thanks.

It's not uncommon to use some parallel source of high voltage that has a comparatively high output impedance. When the heavy arc current starts to flow, the high voltage effectively collapses to the voltage provided by the low impedance supply. This is sometimes done with additional windings on the main transformer, sometimes done as a completely separate circuit. In either case, you can add circuitry to actually switch off the HV when the arc starts if you like. It may or may not be necessary to prevent the HV output from inhibiting LV circuitry through negative feedback. Many such circuits don't have negative feedback, but run at a conversion ratio determined by feedforward (line input) only.

Paul Mathews

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- *References:*
  - ◆ **[Full Bridge SMPS With High No Load Voltage?](#)**
    - ◇ *From:* Jeremy Samuels
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