

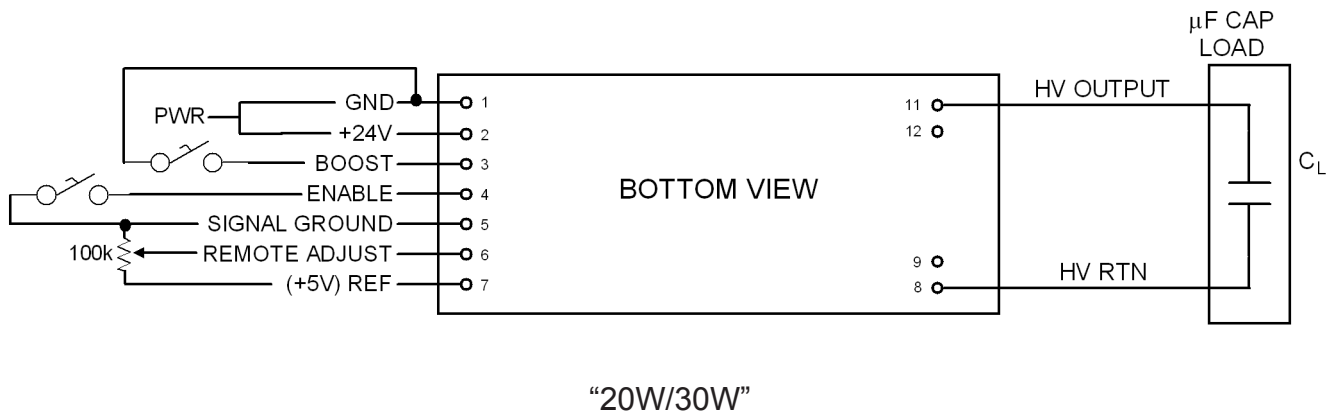
“C” Product Notes

UltraVolt’s “A” Series units are designed for DC-bias applications with feedback compensation optimized for dynamic loading. Multiple tuned and untuned LC and RC filters provide low ripple without a need for external capacitors. “A” Series units are applicable to low-speed, capacitor-charging applications. When calculating T_{rise} , the output charge current available is 66% of rated I_{out} and capacitance-to-charge should have the “A” Series unit’s internal capacitance added.

UltraVolt’s “C” Series units are designed specifically for pulsed loads and high-speed charging of small and large capacitive loads. DC and AC feedback loops are compensated to provide fast rise time with low overshoot. Current-limit circuits are enhanced to get in and out of limit as fast as possible to maintain high average charge currents while protecting the high-voltage power supply (HVPS) power stage. When calculating “C” Series T_{rise} , the output charge current available is 100% of rated I_{out} . “C” Series units have $\frac{1}{2}$ to $\frac{1}{10}$ of the filter capacitance of “A” Series units, allowing more energy to go to the load capacitance (see Fig. F in the “C” Series datasheet). When using a “C” Series unit in a DC-bias application, an external capacitor is recommended for filtering.

CONNECTIONS:

Note: **CAP LOAD MUST RETURN** to HV Ground Return (pin 8).



If the HVPS is to be grounded to the case, it should also be grounded via pin 8.

ENABLE:

Using *Enable/Disable* (pin 4) to activate the power supply after input power has been applied permits the user to use TTL logic to control HV outputs, (i.e. “1” state = ON, “0” state = OFF). This can be helpful in setting up redundant interlocks or shutting off the HVPS prior to firing a high-energy load. It also acts as an easy method to measure rise time by connecting the oscilloscope external sweep trigger input to the *Enable/Disable* (pin 4) prior to generating a positive “1” rise command (see Application Note: Remote Control of High Voltage Power Supplies).

RISE TIME:

Rise times are measured from start of discharge to the time required to rise within 99% of final regulated output. All rise-time data, however, is taken at +24VDC because different input-voltage

sources have somewhat different effects on rise time/overshoot (depending on capacitive load used).

The rise time required to charge an external capacitor load (C_L) can be computed in accordance with the formula shown below:

$$T = \frac{(C_L + C_{int}) \text{ Volts}}{I_{short}}$$

Where:

T = Rise time in milliseconds to within 1% of final value (using an enable command)

C_L = External load capacitance in micro farads

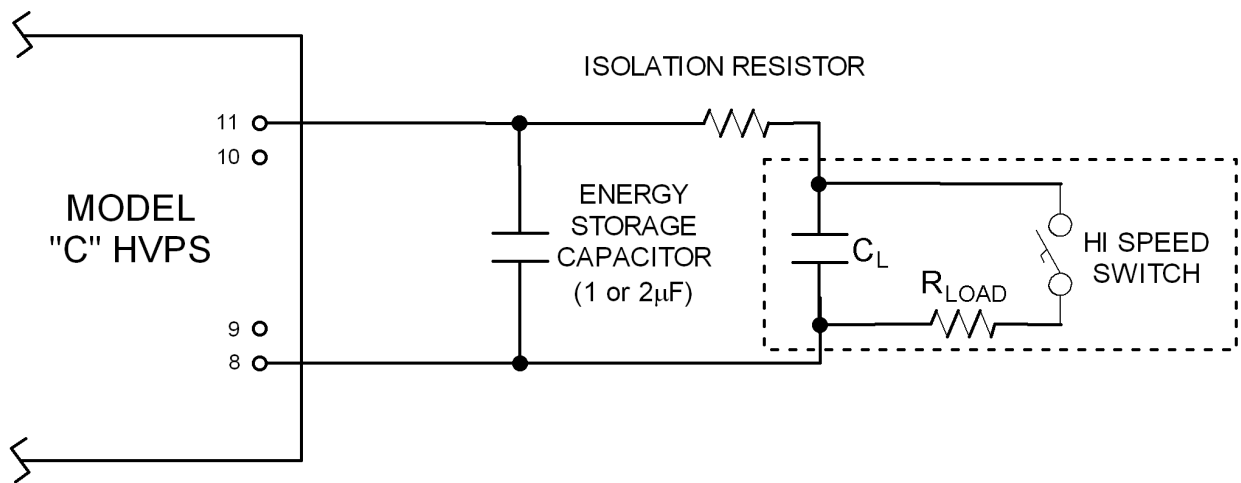
C_{int} = Internal supply capacitance (see UV HVPS datasheet Fig. F)

Volts = Voltage in volts to which the capacitor is charged, starting from 0 volts

I_{short} = The output current of the “C” Series power supply in milliamperes when measured under output short-circuit conditions.

HIGH CURRENT PULSED APPLICATIONS:

In cases when large transient discharges of small duration are applied to the output of a “C” Series unit, the user may wish to isolate the “C” Series power supply from the load C_L . This is typically done to place a more average current demand on the high-voltage power supply, keeping peak currents below the HVPS current-limit point. This allows the HVPS to provide the maximum average power to the load by adding a filter cap directly across the *HV Output* (pins 10 & 11) and *HV Ground Return* (pins 8 & 9). A 10Ω to 1kΩ resistor can then be added between the HV output and the load C_L . This will also reduce the tendency to introduce overshoot in the output waveform, which could cause a ringing on the HV output when driving certain types of loads (see diagram below).



Note: The energy-storage capacitor and the isolation resistor control “pulse droop” during high-discharge-current conditions and average the peak current, thereby reducing the amount of time the HVPS is in peak current limit.