

Interfacing with UltraVolt High Voltage Power Supplies High Power C Series & High Power 8C-30C Series

Introduction

In this Technical Note, we provide tips for interfacing with the interconnection pins and leads of the High Power C and High Power 8C–30C Series. This document augments the data sheets for each of the series. Complete product data sheets can be found by visiting advancedenergy.com/hv.

A few remarks about these UltraVolt series:

- The High Power C Series delivers 0 to 125 volts through 0 to 6 kV at power levels of 60-watts, 125-watts, or 250-watts maximum.
- The High Power 8C–30C Series deliver 0 to 8 kV through 0 to 30 kV at power levels of 60-watts or 125-watts maximum.

An Overview of the Connections

Pin 1 and 8 – Input Power Ground Return: These pins are the Input Power Ground for the 60-watt and 125-watt models. 250-watt units have a separate power connector to handle the higher input currents. Refer to the specific data sheets for details.

Pin 2, 9, and 10 (HPC 60W or 125W) – Positive Power Input: These pins are the Positive Power Input for the 60-watt and 125-watt 1/8C through 6C units. The input voltage range is 23Vdc to 30Vdc; however, these power supplies will perform over a wider range of input voltage with proper de-rating. See the data sheet for de-rating information.

Pins 2 and 9 (HP 8C–30C) – Positive Power Input: These pins are the input power for 8C through 30C units. The input voltage range is 23Vdc to 30Vdc; however, these power supplies will perform over a wider range of input voltages with proper de-rating. See the data sheet for de-rating information.

Pins 2, 9, and 10 (HPC 250W) – No connection: These pins are not used in the 250-watt High Power C Series. All 250-watt units have an additional 4-pin connector to handle the higher input current. Refer to the data sheet for details.

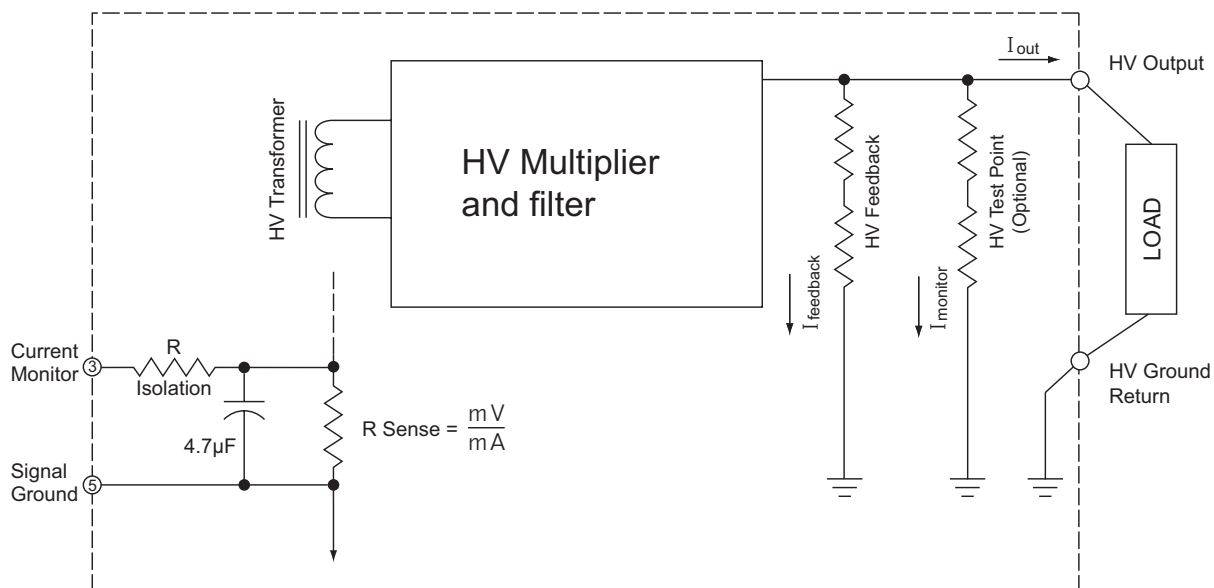


Figure 1. Current Monitoring Circuitry — a Simplified Diagram

Pin 3 – I_{out} Monitor: This pin serves as the I_{out} Monitor pin, as depicted in Figure 1. Scale factors vary and are unique to each model. The HV Multiplier in each high-voltage power supply is grounded through the R_{sense} resistor, as shown in Figure 1. The HV Feedback resistors and the HV Test Point resistors are returned to ground and are seen by the power supply as an internal load. This internal load is the source of an offset on the I_{out} monitor that must be accounted for when making output current measurements. Refer to the individual models' data sheets for details.

Pin 4 – Enable/Disable: The enable function is the same for all models. A HIGH signal enables and a LOW signal disables the output. If pin 4 is left open, the power supply defaults to an enabled state. The data sheet has detailed information on logic levels.

Pin 5 – Signal Ground Return: The signal ground should be used as the reference point for both the remote adjust and the monitors. Do not return the HV load here. If input current is allowed to flow through the signal return path, offsets and errors may occur in the control and monitoring functions.

Pin 6 – Remote Adjust Input: The remote adjust pin allows the high-voltage power supply to be programmed from 0% output voltage to 107.5% of rated output voltage. Positive power supplies are scaled so 4.64V on the remote adjust will result in 100% of output voltage, while 5.00V will provide 107.5% of full voltage. The remote adjust pin has an input impedance of 1.1MΩ; this resistor to ground is provided to program the power supply to zero output if the control pin is left open. See Figure 3A.

A negative power supply has the opposite sense on the control voltage (see Figure 2 below). 0V on the remote adjust programs the power supply for 107.5% of rated voltage and 0.32V provides 100% output. Driving the remote adjust pin to 5.00V on a negative power supply will program zero output voltage. A 1.1MΩ resistor pull-up to the V_{ref} pin internally provides zero output voltage if the control pin is left open. See Figure 3B.

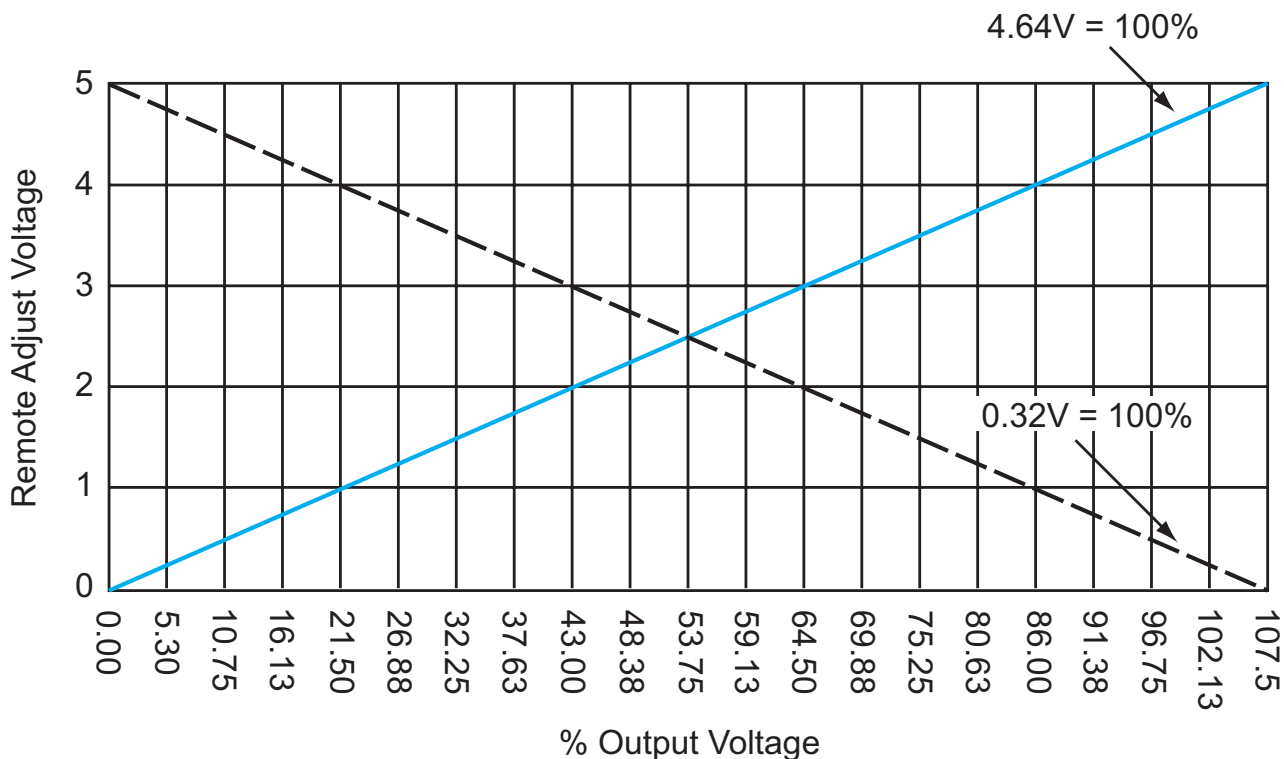


Figure 2. Remote Adjust Inputs — Negative and Positive High Voltage Supplies

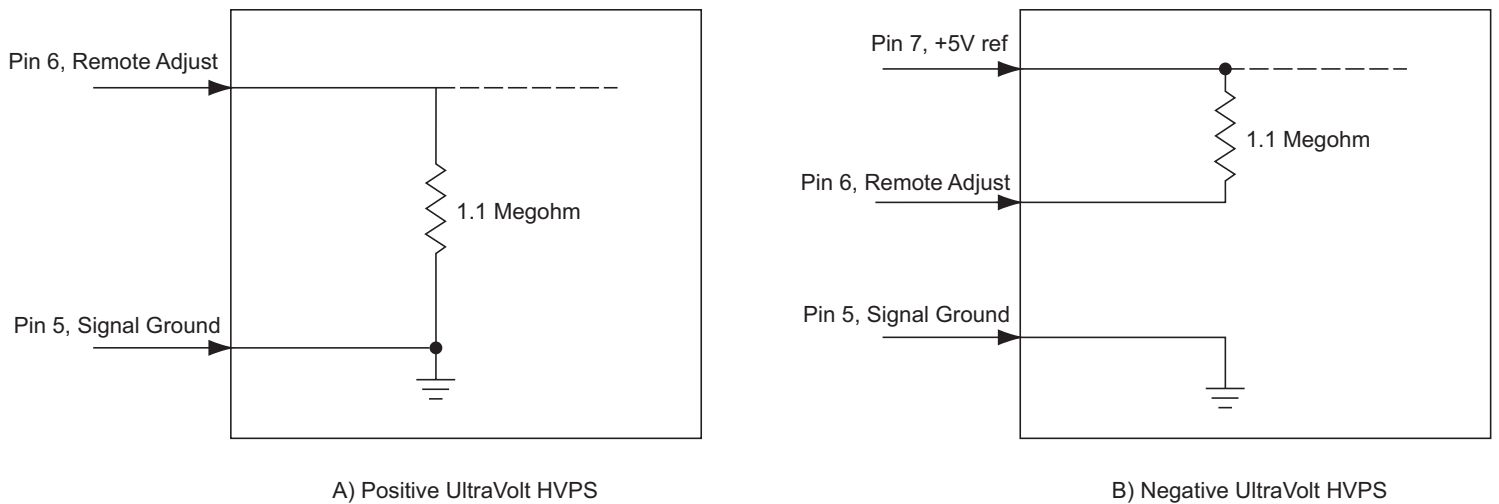


Figure 3. Remote Adjust Inputs

Pin 7 – +5VDC Reference Output: A +5VDC reference voltage is provided for programming the power supply. The reference voltage has an output impedance of 464Ω. See the data sheet of your model for characteristics.

Pins 11, 12, and 13 – No Connection

Pin 14 – E_{out} Monitor (Output voltage monitor): The E_{out} Monitor is accomplished with a high-voltage divider resistor set. The scale factor is model dependent and will be either a 100:1 or 1000:1 ratio. The divider resistor set is designed to be properly scaled with a 10MΩ input-impedance meter connected to the circuit. It is possible to shunt the lower divider resistor to create different scale factors. The resistor values are available in the model-specific data sheets.

Pins 15 and 16 – High Voltage Ground Return: Internally, the Power Ground, the HV Ground, and the Signal Ground are common. The high-voltage load return should be connected here.

Pins 19 and 20 – Positive Power Input: These pins are the input power for 250-watt units due to the higher input current at this power level. The input voltage range is 23Vdc to 30Vdc; however, these power supplies will perform over a wider range of input voltages with proper de-rating. See the data sheet for de-rating information.

Pins 21 and 22 – Input Power Ground Return: These pins are the input power return for 250-watt units and must be used as power ground for the higher input currents.