## Introduction

In this technical note, we provide the connections, pins, and leads for the UltraVolt D Series of microsize high-voltage power supplies. This document augments the datasheet. A complete datasheet can be found at advancedenergy.com/hv.

The D Series microsize units deliver 0 to 1kV through 0 to 6kV in a 1, 2, 4 or 6W miniature package.  The input voltages available are 15 ±1.5 VDC and 24 ±2 VDC depending on type.
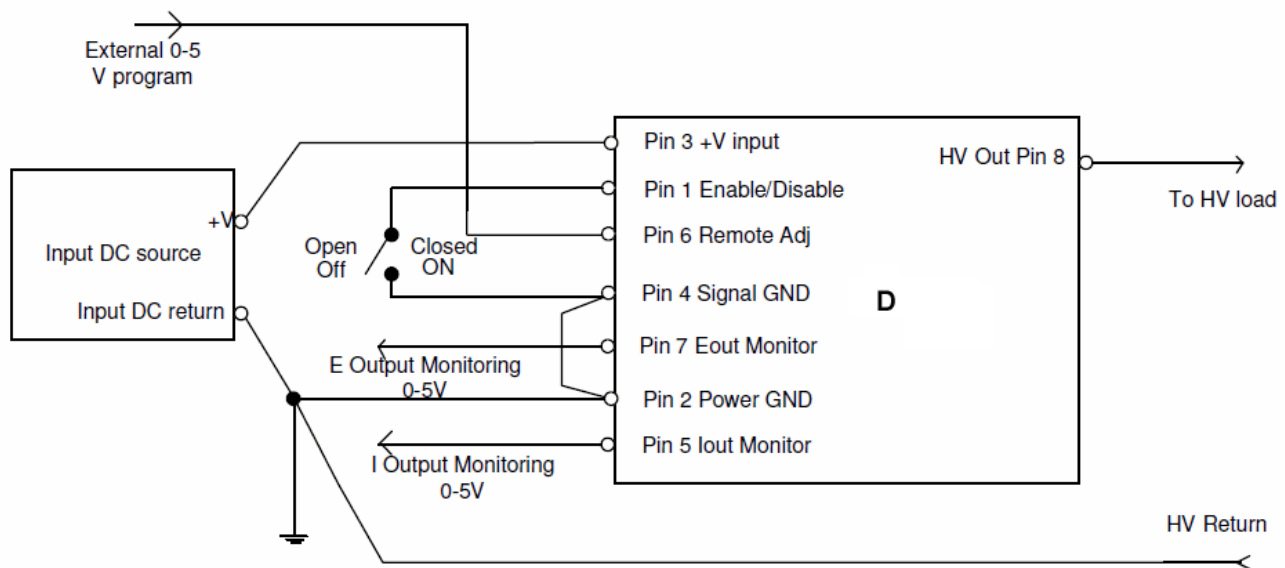


Figure 1: D Series Functional Diagram

## Connections Overview

### Pin 1, Enable / Disable:

This pin is used to inhibit the output voltage using a logic signal. A short or zero logic will turn the unit ON. An open collector logic gate is required; it should be able to sink at least 0.5mA. An internal pull-up resistor is provided.  When pin 1 is left open or at logic High the output will turn OFF.  By default the unit is OFF.  If this function is not used, Pin 1 should be connected to Pin 4 (or system return); otherwise no output voltage will be available.

### Pin 2, Input Power Ground Return:

This pin is the return to the input DC source. The connection to this pin is also used in the system as the HV return.

**Pin 3, Positive power input:**

This pin is the positive power input (15 or 24VDC) coming from the system AC/DC, DC/DC or Battery low-voltage power source. The input source must be capable of providing at least 120% of the maximum input current required by the D Series unit at full load (see datasheet for more details).

**Pin 4, Signal Ground Return:**

This pin is used as the return for the voltage control signal, voltage monitor signal, and current monitor signal. It is provided as a separate ground for low-power signals in order to avoid any interference with the HV Return and Input DC Return. Do not use this pin as a direct connection to the HV Return. This pin is internally connected to Power GND (Input Power Ground return).

**Pin 5, Output Current (Iout) monitor:**

The analog buffered output signal, 0-5VDC, is proportional with the output current draw (Pin 5 output impedance = 1kΩ). The signal goes from zero to five volts for output currents from zero to maximum (see datasheet for Iout max). Accuracy of the signal is ±2%.

**Pin 6, Control Input (Remote Adjust):**

This pin allows the control of the high-voltage output by a low-voltage signal. Using a 0 to 5V ±0.1% positive DC voltage, the high voltage can be controlled from 0 to 100%. The control 5V signal source can come from a DAC, op amp, etc.

Pin 6 input impedance is 94kΩ. This signal is clamped to 5.3V for protection against overdrive. When zero volts is provided (or pin 6 is not connected), no output voltage will be present.

**Pin 7, Output Voltage Monitor:**

This pin provides a low-voltage 0 to 5V signal proportional with the HV output voltage. The +5V level equals 100% output voltage (see datasheet for Max $E_{out}$). The signal is positive in reference to Signal Ground regardless of the output-voltage polarity. This signal is buffered with an output impedance of 1kΩ. The accuracy of the voltage monitor is ±0.2%.

**Pin 8, High Voltage Output:**

This is the high-voltage output (up to 6kV depending on the model). The pin is located farther away from the other seven pins in order to provide the proper clearance for the high-voltage circuit. When designing a system PC board, adequate creepage and clearance spacing must be observed.

**Case metal tabs:**

D Series units are encapsulated in a tinned steel case with mounting tabs. The case and tabs are internally connected to the Input DC Return. It is recommended that tabs are soldered to the system ground plane. (See tab locations and dimension in the datasheet).