

Introduction

In this technical note, we provide detailed information on connections, pins and leads for the UltraVolt US Series of microsize high voltage power supplies. This document augments the data sheet for the US Series. A complete data sheet can be found at advancedenergy.com/hv.

The US Series microsize units deliver 0 to 200V through 0 to 500V in a 0.1W miniature package. The input voltages available are $5 \pm 0.5\text{VDC}$ and 12 to $15 \pm 0.5\text{VDC}$ (11.5 to 15.5Vdc), depending on output wattage.

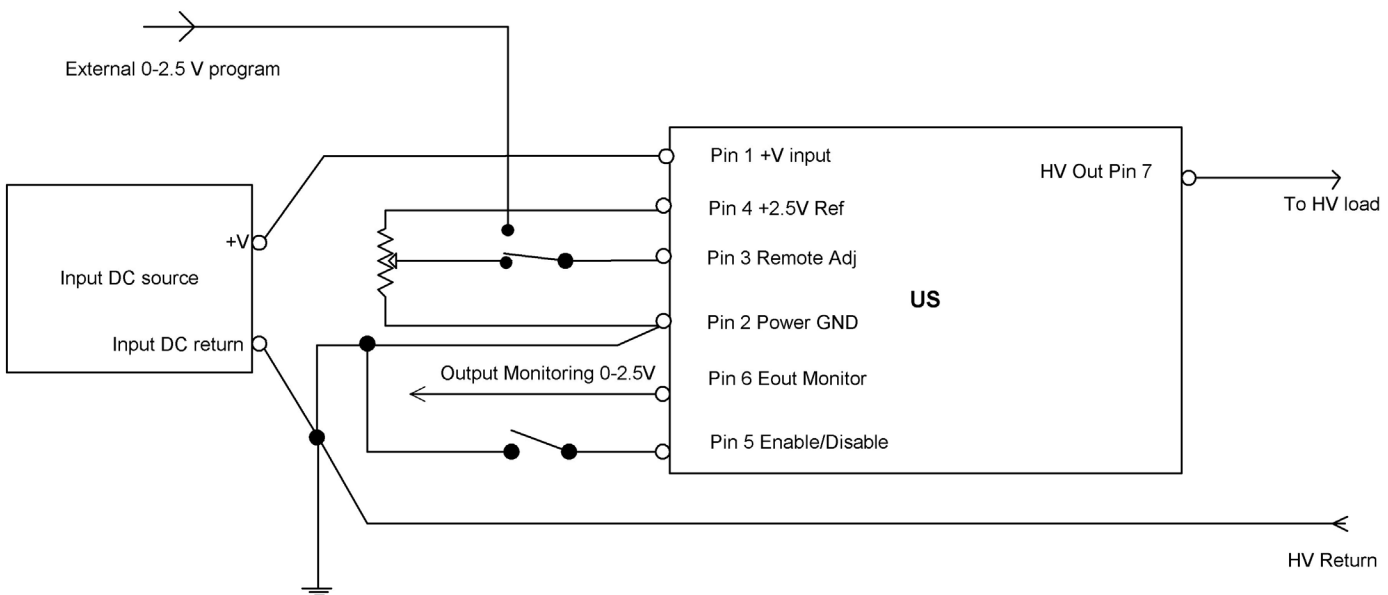


Figure 1: US Series Functional Diagram

Connections Overview

Pin 1, Positive power input:

This pin is the positive power input (5Vdc and 12 to 15VDC) 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 US Series unit (see data sheet for more details).

Pin 2, Input Power Ground Return:

This pin is the return to the input DC source. This pin should be connected to the system common; however, care should be taken in making separate paths for the signal and HV return in order to avoid interference.

Pin 3, Control Input:

This pin allows the control of the high-voltage output by a low-voltage signal. Using a 0 to 2.5V $\pm 0.5\%$ positive voltage, the high voltage can be controlled from 0 to 100%. The control 2.5V signal source can be a DAC, op amp, etc. or a voltage derived from the 2.5V internal reference (+2.5V Ref) via a potentiometer. For pin 3, input impedance is 1M Ω . If a potentiometer is used in conjunction with the internal reference, we recommend values between 10k Ω to 100k Ω . The control voltage is positive in reference to ground for units with either output polarity (positive HV or negative HV). When zero volts is provided (or not connected), no output voltage will be present.

Pin 4, Output Reference:

A +2.5V $\pm 0.5\%$ reference voltage with a temperature coefficient of 50ppm/ $^{\circ}\text{C}$ and 1mA maximum current is available. This reference voltage can be used to program the output voltage via external potentiometer or resistive divider.

Pin 5, Enable / Disable:

This pin is used to inhibit the output voltage using a logic signal. A short logic or zero logic will turn the unit ON. A logic-open collector gate is required; it should be able to sink at least 0.5mA. An internal 10k Ω pull-up resistor is provided. When pin 5 is left open or at High logic the output will turn off. By default, the unit is OFF. If this function is not used, pin 5 should be connected to pin 2 (or system return), otherwise no output voltage will be available.

Pin 6, Output voltage monitor:

This pin provides a low-voltage signal, 0 to 2.5VDC proportional with the high-voltage output (0 volts for V_{out} equals zero, 2.5V for 100% V_{out}). The voltage monitor output is buffered and has low, 1k Ω impedance. The accuracy of the signal is $\pm 0.2\%$ of full scale.

The V_{out} monitor signal is always positive in reference to ground regardless of the output voltage polarity.

Pin 7, High Voltage Output:

This is the high-voltage output (up to 500V depending on the model). The pin is located further away from the other six pins in order to provide the proper clearance for the High Voltage. When designing a system PC board the proper creepage and clearance spacing must be observed.

Flying Lead option:

Instead of pin 7, US Series units can have the high-voltage output provided via a flying lead. (See option in the [datasheet](#)).

Case metal tabs:

The US Series units are encapsulated in a tin steel case with optional tabs. The case and tabs are internally connected to the input power return. It is recommended that tabs are soldered to the system ground plate (See tab locations and dimension in the [datasheet](#)).