

Interfacing with the UMHV Series

Ultra-Miniature High Voltage DC to DC Converter

Introduction

This application note is intended to provide the pin assignments, input requirements, and output characteristics for the **UMHV Series** ultra-miniature high voltage power supplies. This document should be used in conjunction with the product specification sheet to form a complete usage manual for the **UMHV Series** modules.

The **UMHV Series** is a family of ultra-miniature single-output DC to DC converters supplying up to 5kV in 0.125 cubic inches (0.5" x 0.5" x 0.5"). The nominal input voltages are 5Vdc and 12Vdc. See product specification sheet for specific models.

Functional Diagram

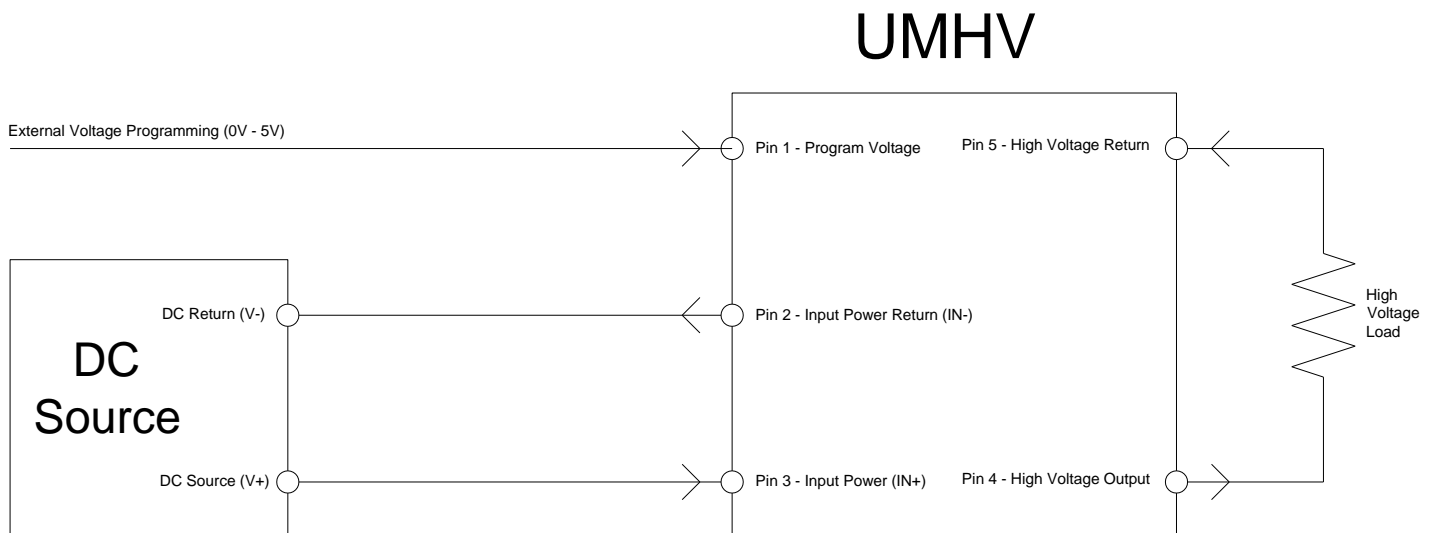


Figure 1. UMHV Series Functional Diagram, Positive Polarity Model

Pin Overview

Pin assignments are referenced from Figure 1 above.

Pin 1 – Program Voltage:

This pin is used to control the high voltage output of the device by using a low voltage analog signal. An input of 0Vdc to +5Vdc will linearly control the high voltage output from 0 to 100% of the max rated output as described in the product specification sheet for the chosen module. This pin has an input impedance of 10k Ω \pm 2%. The programming voltage signal can be from a wide variety of sources as long as those sources have a common ground return to the UMHV module, including operational amplifiers, digital to analog converters, and potentiometers.

Pin 2 – Input Power Return (IN-):

This pin is the return ground path to the input DC source that powers the module. This pin is also used as the return ground path for the program voltage signal. Since the input voltage is isolated from the output voltage, this pin is not the same as the return path for the high voltage output.

Pin 3 – Input Power (IN+):

This pin is the power input for the UMHV module supplied by the DC source. This source must be capable of providing the input voltage and maximum input current necessary for operation of the UMHV module. These requirements vary by model and can be found in the Model Selection Guide table of the product specification sheet. Some examples of acceptable DC sources are batteries, AC/DC supplies, and DC/DC supplies.

Pin 4 – High Voltage Output:

This pin is the high voltage output of the UMHV module. This pin supplies an output power of 0.5W at single polarity voltages up to \pm 5kV. Refer to product specification sheet for specific model max ratings. The output adjusts linearly in response to the signal from the Program Voltage.

Pin 5 – High Voltage Return:

This pin provides a return path to the UMHV module for the high voltage output from the high voltage load. This return path is not internally connected to the Input Power Return, and the High Voltage Output is referenced from this point. This pin may be externally connected to the Input Power Return if the isolation is not needed.



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Design Considerations

PCB Layout:

Always use best practices when designing the system PC board. The UMHV series can range up to $\pm 5\text{kV}$ depending on model, so proper creepage and clearance spacing must be observed. If possible, PCB routing is recommended on higher voltage modules to isolate the high voltage output from the lower voltage pins. Avoid placing traces under the module, especially critical signal traces. Ground planes and/or power planes are recommended, but take caution to eliminate these layers near the High Voltage Output.

Soldering:

The UMHV series of modules is rated for hand soldering only. Unit damage may occur in convection or wave soldering machines. Module should be soldered to PCB using a temperature not to exceed 600°F for no longer than 5 seconds. Inspect all solder connections for conformance to industry standards.

Cleaning:

If contaminants are present on the unit or the connections, it is imperative to be cleaned prior to operation. The UMHV series are encased in a Thermoset plastic (Diallyl Phthalate) housing. Be sure any solvents used are compatible with the housing material and solder used.

Customization:

The UMHV series can be manufactured with modifications, if necessary. Contact the factory for information on wire outputs, custom voltage outputs, metal shielding, or other requests.

About HVM Technology

HVM Technology is the leading manufacturer of miniature high voltage products used in today's most advanced equipment. We design, manufacture and market high performance products for a variety of applications in the military, aerospace, scientific and analytical fields. Our expertise in high voltage miniaturization enables our customers to design the technology of the future.

HVM TECHNOLOGY 360 McKenna Ave, New Braunfels TX, 78130
Tel: (830) 626-5552/ www.hvmtech.com/ email: sales@hvmtech.com