AMERICAN HIGH VOLTAGE

V Series
100 Watt High Voltage Power Supply

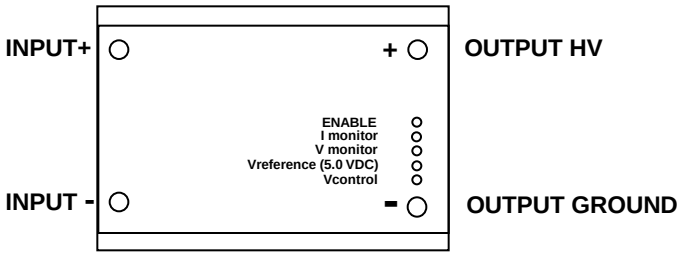
General Description

The V Series are 100 Watt high voltage power modules. They offer floating outputs regulated to greater than 0.1% all V modules are both voltage and resistance programmable down to 30% of the maximum output voltage. In addition a user adjustable multi-turn trimpot is available for setting the maximum output voltage. All V units have internal filtering which reduces conducted emissions on both the input and output lines. The V series is protected against short circuits by a 2 second "try again" circuitry. They find use in all high powered circuitry. Standard input voltage is 24 +/- 3 VDC.

Features

- 100 Watts output power to 5kV
- Encapsulated
- High Efficiency 80% typical
- Many input voltages (24V)
- Regulated and programmable

Connection Diagram
(DC input unit shown)



Top View

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Electrical Characteristics

(at 25 degrees C unless otherwise specified)

Parameter	Conditions	Value			Units
		Min	Typical	Max	
Supply Voltage*:	24 VDC model	21	24	27	VDC
Input Current:	No Load (24 VDC model):	0.09	0.10	0.12	Amperes
	Full 100 W Load (24 VDC model):	5.3	5.5	6	Amperes
Output Ripple:	No Load (all models): Full Load (all models):	0.4 % 0.8 %	0.5% 1 %	0.5 % 1.5 %	Vpp Vpp
Load Regulation:	No Load to Full Load Half Load to Full Load	0.08 % 0.08 %	0.1 % 0.1 %	0.1 % 0.1 %	V_{NL}/V_L VNL/VL
Output Linearity	No Load		1%		$\frac{\Delta V_{OUT}}{\Delta V_{OUT\ (ideal)}}$
Output Linearity	Full Load (all models):		1%		$\frac{\Delta V_{OUT}}{\Delta V_{OUT\ (Ideal)}}$
Short Circuit Current:	24 VDC model	try again		10	Amperes
Power Efficiency:	Full Load	77%	80%	83%	$\frac{P_{OUT}}{P_{IN}}$
Temperature Drift:	No Load Full Load			200 200	ppm/Deg C ppm/Deg C
Thermal Rise:	No Load (case) Full Load (case)			15 35	degrees C degrees C
Slew Rate (10% - 90%)	No Load Full Load			100 120	mS mS
Slew Rate (90% - 10%)	No Load Full Load			200 100	mS mS
Drain Out Time	No Load (5 TC)			150	mS

* Other input voltages available: 15VDC, 28VDC and 48VDC

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Electrical Characteristics

(at 25 degrees C unless otherwise specified)

Parameter	Conditions	Value			Units
		Min	Typical	Max	
Vcontrol impedance	Open circuit		10K		Ohms
Isolation	Vin return to Vout ground		1,000		Volts
Vmonitor*	Units with output ≤ 1,000 volts Units with output > 1,000 volts		100:1 1,000:1		Vout/Vmon Vout/Vmon
I monitor*	Units with output ≥ 100 mA Units with output < 100 mA		-10:1 -100:1		Imon/Iout Imon/Iout
Enable Pin*	Unit enabled Unit shut off		> 2.5 < 0.5		VDC VDC
Internal Trimpot	Resistance		10K		Ohms
Trimpot adjustment	Minimum output (Vcon = Vref) Maximum output (Vcon = Vref)		30% 100%		Vmax Vmax
Try-again	Current trip point Oscillation period	125%	 2		Imax seconds
Reference*	Output Current max Thermal drift	4.95	5.00 10 100	5.05	VDC mA ppm/deg C

*** With respect to output ground**

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Physical Characteristics

(at 25 degrees C unless otherwise specified)

Parameter	Conditions	Value	Units
Dimensions (case)	MKS	76.2 W x 146.1L x 41.28H	mm
	English	3 W x 5.75 L x 1.625 H	inches
Volume:	MKS	460	cm^3
	English	28.03	$inch^3$
Mass:	MKS	900	grams
	English	32	oz
Packaging:	Solid Epoxy Thermosetting		
Finish	Smooth Dial-Phthalate Case		
Terminations:	Gold Plated Brass pins (5)	Control and Monitor pins	
	6-32 Machine screw (2)	Power input	
	0.1" Teflon Terminals (2)	HV output	

Environmental Characteristics

(at 25 degrees C unless otherwise specified)

Parameter	Conditions	Value	Units
Temperature Range	base plate temperature	-40 degrees to + 71 degrees	Celsius
	base plate temperature	-40 degrees to + 160 degrees	Fahrenheit
Shock:	MIL-STD-810 Method 516	40 g's	Proc IV
Altitude:	pins sealed against corona	-350 to + 16,700	meters
	pins sealed against corona	-1,000 to +55,000	feet
Vibrations:	MIL-STD-810 Method 514	20 g's	Curve E
Thermal Shock	MIL-STD-810 Method 504	-40 deg C to + 71 deg C	Class 2

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Models Available (as of January 2020):

(Vin = 24 VDC)

Model	Output Voltage Range	Polarity	Power (max)
V-1P	0 – 100 VDC	positive	100 Watts
V-2P	0 – 200 VDC	positive	100 Watts
V-3P	0 – 300 VDC	positive	100 Watts
V-5P	0 – 500 VDC	positive	100 Watts
V-10P	0 – 1,000 VDC	positive	100 Watts
V-1N	0 – -100 VDC	negative	100 Watts
V-2N	0 – -200 VDC	negative	100 Watts
V-3N	0 – -300 VDC	negative	100 Watts
V-5N	0 – -500 VDC	negative	100 Watts
V-10N	0 – -1,000 VDC	negative	100 Watts

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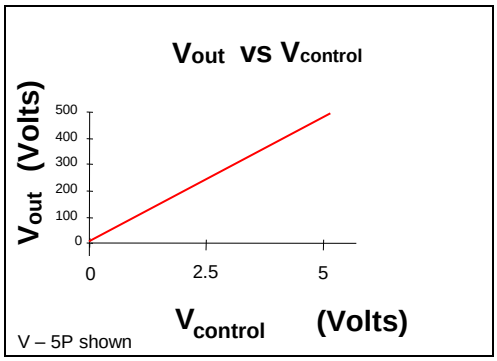
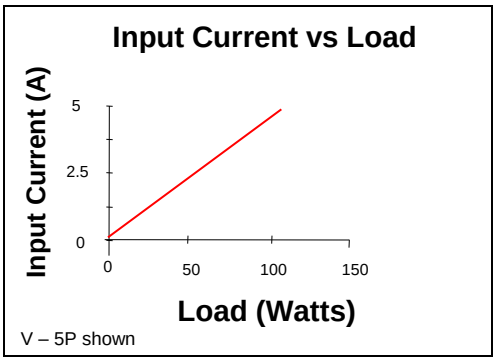
V Series Performance Charts





V Series Application Notes

The V Series high voltage power supplies have a standard input voltage of 24 VDC. All models have efficiencies that approach 80% at full load. There are NO internal connections between the input and output pins. As can be seen from the above, the output voltage is approximately linear with respect to control voltage which is placed into the Vcontrol pin. As shown in Figure 1 below, the easiest operation of the V series is made by utilization of its own 5.0 VDC internal reference. By connecting the reference pin to the Vcontrol pin, full output may be obtained. This output may be adjusted down by turning the user accessible trimpot located on the output side of the power supply. This 10 turn trimpot may be used to lower down the output voltage to less than 30% of maximum. Capacitor C1 is utilized to reduce conducted emissions from appearing on the input power line. Values of 10 uF to 100 uF are recommended. The unit may be shut off by connecting the ENABLE pin to output ground.

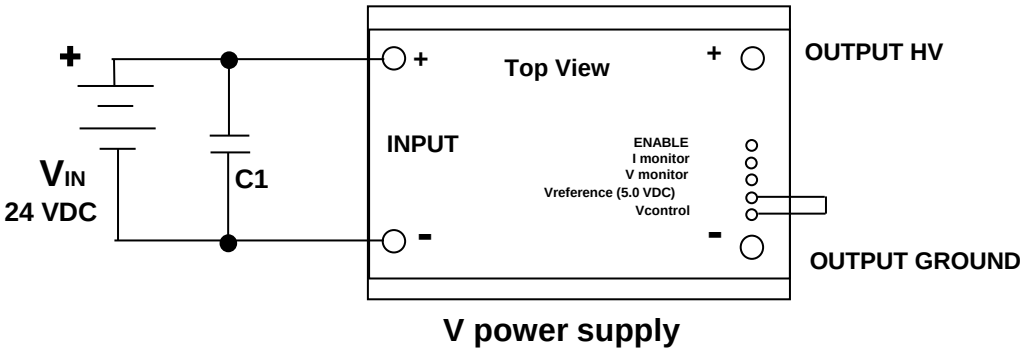


Figure 1: Basic V hookup schematic (24 VDC input shown)

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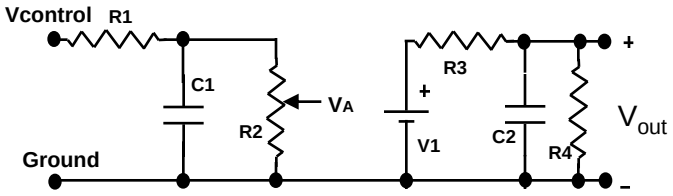
Equivalent V Circuit Model



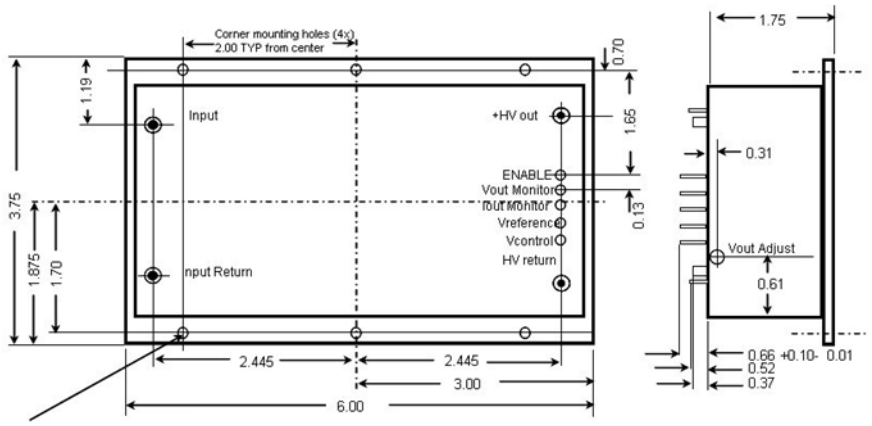
Equivalent V series HVPS Circuit Model

R1 = 100 *Ohms*
R2 = 10K *Ohms (timpot)*
R3 = (0-.005 x Vout $_{max}$) *Ohms*
R4 = (0.2 x Vout $_{max}^{2}$) *Ohms*
C1 = (0.01 x 10^{-6}) *Farads*
C2 = (0.05 x Iout$_{max}$ / Vout$_{max}$) *Farads*
V1 = (VA x Vout$_{max}$ / 5.0) *Volts*

For example V-5P :

Vout**max** = 500V
Pout**max** = 100 W
Iout**max** = 0.2 A
R1 = 100 Ohms
R2 = 10K Ohms
R3 = 2.5 Ohms
R4 = 50K
C1 = 0.01 uF
C2 = 20 uF

Outline Drawing: (inches (millimeters))



Ordering Information:

V - ZX

Z = Output voltage 1 = 100VDC
X = Output Polarity P or N

Example:

V – 2P : Maximum output = +200 VDC 24 VDC input
V – 5N: Maximum output = -500 VDC 24 VDC input