

ULTRAVOLT FLHV SERIES

BIPOLAR HIGH VOLTAGE POWER SUPPLIES WITH PRECISION FLOATING OUTPUT

The advanced controls, high stability, and reliability of the FLHV high voltage power supplies elevate the performance of your entire system and distinguish this series from competitive offerings. These regulated, fully controlled and monitored units provide output that can float on a high voltage bias supply up to 5 kV above or below the input ground reference.

PRODUCT HIGHLIGHTS

- High input output isolation supports floating electronics on high voltage
- High output stability ($< \pm 0.5\%$) from no load to full load
- Accurate monitoring ($\pm 2.0\%$) of the floating bias supply output voltage and current
- Excellent unit-to-unit repeatability
- No pre-loading required; output will not exceed 101% of nominal under normal input conditions
- Reduced input current at no-load (quiescent)/full load (higher efficiency)
- Standard digital-ready, fully featured interface
- Programmable output operation over a range on a fixed input voltage
- Standard enable/disable control pin

TYPICAL APPLICATIONS

- Electrostatic chucks (ESC)
- Channel electron multipliers (CEM)
- Photo multiplier tubes (PMT)
- HV bias (e-beam, i-beam, energy analyzers)
- Gate supplies
- Pulse generators
- Amplifier rails
- Other floating electronics

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ELECTRICAL SPECIFICATIONS

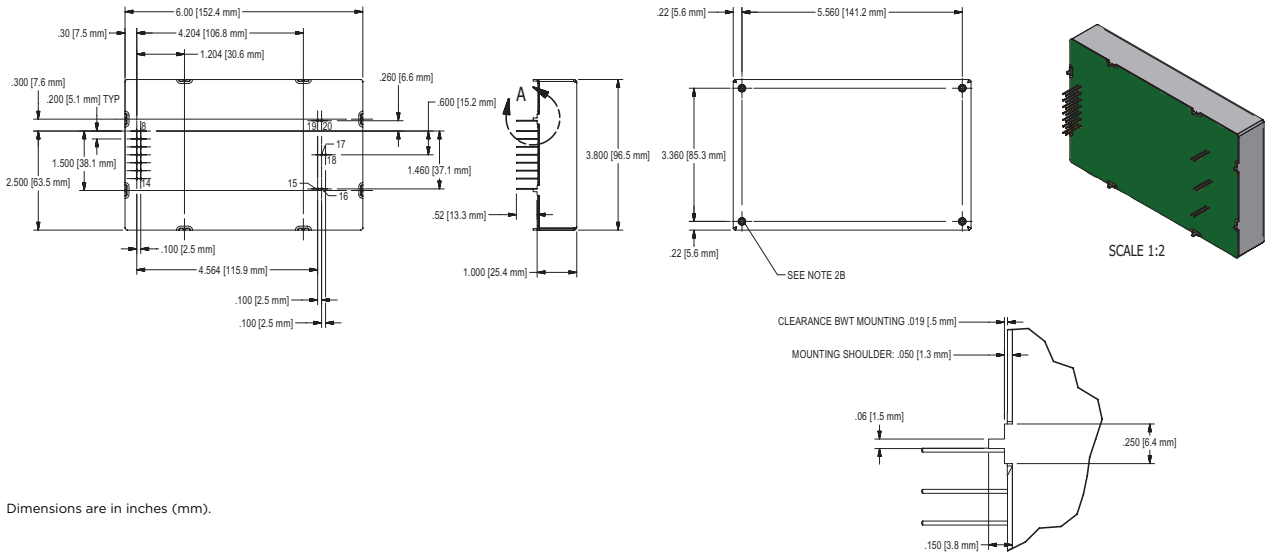
Input ¹	
Voltage	24 VDC \pm 5%
Current	Input current disabled < 250 mA
	Input current no-load < 350 mA
	Input current full load < 1 A
Protection	Input reverse polarity protection is an internal diode across the input.
	(Source power to the HVPS should be fused; time delay/slow blow, 2.0 A value)
Output	
Full Scale	1, 2, 4, and 6 kV, 15 W
Power	0 to 15 W, 100% of rated current down to 0% of output voltage
Voltage Control Range	10 to 100%
Isolation	Input ground to output center tap: \pm 5 kV indefinitely
	Isolation: 150 M Ω , 600 pF, 200 M Ω on 6 kV models
Load Regulation	\leq 0.1% across the \pm output terminals
Voltage Full-Scale Accuracy	< \pm 1% (“-BP” units across the \pm output terminals)
Current Full-Scale Accuracy	< \pm 2%
	Standard linearity: < \pm 1% + 10 mV over the output range
No-Load Operation	Voltage will not exceed 101% of nominal under normal input conditions
Ripple	< \pm 0.05% peak to peak, either + or – to CT
	< \pm 0.05% peak to peak across + to –
Stability	< \pm 0.5% for 8 hours after 30 minute warmup
Temperature Coefficient	< \pm 50 ppm max per $^{\circ}$ C; optional “-25 ppm” is < \pm 25 ppm per $^{\circ}$ C
Noise	Equal to stated ripple across a DC to 20 Mhz BW

Environmental ²	
Operational Temperature	-45 to +65 $^{\circ}$ C (-49 to +149 $^{\circ}$ F)
	-25PPM option: +10 to +45 $^{\circ}$ C (50 to 113 $^{\circ}$ F)
Storage	-55 to +105 $^{\circ}$ C (-67 to +221 $^{\circ}$ F)
Humidity	0 to 95%, non-condensing

¹ All measurements are at the HVPS; nominal inputs and outputs unless otherwise specified.

² Proper thermal management techniques are required to maintain safe case temperature at maximum power output.

MECHANICAL SPECIFICATIONS



Dimensions are in inches (mm).

Construction	
Dimensions (W x H x D)	See dimensional drawings, above.
Weight (approx.)	825.5 g (< 1.82 lb)
Case	Encapsulated tin-plated steel box
Pins	Gold-plated 0.64 cm ² (0.025 in ²)
Mounting	8 solder tabs 1.5 mm (0.060") x 2.5 mm (0.100") x 1.2 mm (0.040") thick
	4 0.138-32 UNC-2B X 0.23 full threads min (7 thds)

INTERFACE

Connections	
Pin	Function
1	Power Ground
2	Input Power
3	Buffered +Eout Current Monitor (5 mA max)
4	Enable (ON/OFF)
5	Signal Ground
6	Voltage Programming
7	+10 V REFERENCE (5 mA Max)
8	Power Ground
9	Input Power
10	Buffered -Eout Current Monitor (5 mA max)
11	Current Mode Indicator (Reg or Limit)
12	Voltage Mode Indicator
13	Current Programming (Current Limit on BP Units)
14	Buffered Voltage Monitor (5 mA Max)
15 and 16	-HV Output
17 and 18	HV Floating Ground Return (CT on BP Units)
19 and 20	+HV Output

Note: Designers can externally sum the two current monitors to create a CT current monitor.

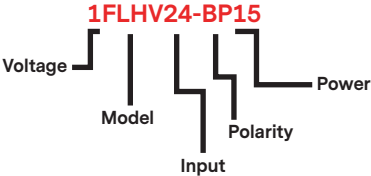
INTERFACE CONTROL PARAMETERS

Voltage Control Programming	+1 to +10 VDC = 10 to 100% ±1% full scale of nominal output voltage NOTE: Unit requires a minimum output voltage to operate properly. At Vprogram of 0 V, the output will be at 0 V.
Control Reference	+10 VDC ±0.05%, < ±5 ppm°C, source 1 mA min
Control Enable/Disable	Disable: TTL 0 or grounded Enable: TTL 1 or a voltage up to +32 VDC No connection: defaults to disable
Eout Monitor	Buffered 0 to +10 VDC = 0 to 100% ±1% full scale accuracy; measures the actual output voltage across the floating + and - HV output terminals
Current Limit Programming	0 to +10 VDC = 0 to 100% ±2% full scale of nominal output current
Iout Monitor	Buffered 0 to +10 VDC = to 0 to 100% ±2% full-scale accuracy
Mode Indicators	The CV/CC mode indicator lines reflect the output regulation status of the module. These open collector lines can sink current from an indicator such as an LED or with a pull up resistor establish a TTL bit for system monitoring.
Additional Features	Safe off requires the HV to be < 42 V after 2 sec, with no additional external capacitance or resistance.

All controls and monitors are referenced to the input power ground.

ORDERING INFORMATION

Type	1 kV output	1FLHV
	2 kV output	2FLHV
	4 kV output	4FLHV
	6 kV output	6FLHV
Input	24 VDC	24
Polarity	Bipolar output	-BP
Power	15 W output	-15W
Options	Temperature coefficient	-25PPM





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ABOUT ADVANCED ENERGY

Since 1981, Advanced Energy (AE) — and its UltraVolt® family of products — has perfected how power performs for its customers. For both end users and OEMs, AE's comprehensive portfolio of standard and custom high voltage components precisely match system specifications to deliver unparalleled energy, quality, and performance. Through close customer collaboration, design expertise, application insight, and world-class support, AE creates successful partnerships and enables customers to push the boundaries of innovation and stay ahead of evolving market needs.

PRECISION | POWER | PERFORMANCE



CAUTION:
High Voltage

Read and understand all documentation before you install, operate, or maintain Advanced Energy high voltage power supplies. Follow all safety instructions and precautions to protect against property damage and serious or possibly fatal bodily injury. Never defeat safety interlocks or grounds.

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