



ULTRAVOLT® HVA SERIES
PRECISION HIGH VOLTAGE AMPLIFIER





Precision high voltage amplifier

The HVA series of DC-to-DC high voltage power supplies operates a precision filter/divider and linear HV switch to produce a high voltage amplifier (HVA). These modules provide a high-resolution, programmable, high voltage DC to full scale waveform capability greater than 1 kHz output. This is optimized for bias applications while providing excellent line regulation, load regulation, dynamic response, and stability. It can both source and sink current.

- › DC, reversible, and amplifier modes
- › Fast slew rate (40 V/μs) and high bandwidth
- › Can both source and sink current
- › Bipolar models available at 0 to 5 kV
- › Unipolar models available at 0 to 10 kV
- › PPM level line and load regulation
- › 50 ppm temperature coefficient (25 ppm optional)
- › Available reduced ripple option
- › Differential precision 0 to 10 VDC control input
- › Precision output voltage and current monitors
- › UL/cUL recognized component; CE Mark (LVD and RoHS)

TYPICAL APPLICATIONS

DRIVERS	<p><i>PZT ACTUATORS</i></p> <p><i>MEMS DEVICES</i></p> <p><i>ELECTROACTIVE POLYMERS</i></p> <p><i>ELECTORHEOLOGICAL MATERIALS</i></p> <p><i>ELECTROHYDRODYNAMICS</i></p> <p><i>ELECTROSTATIC CHUCK</i></p> <p><i>POCKELS CELLS</i></p> <p><i>LASER & ELECTRO-OPTIC MODULATION</i></p> <p><i>ELECTROPHORESIS</i></p>
AMPLIFIERS	<p><i>BEAM DEVICES SUCH AS MASS SPECTROMETERS AND ELECTRON MICROSCOPES AS ELECTROSTATIC DEFLECTION/FOCUSING, FLOCKING, COATING, ELECTROSPINNING, PRECIPITATION, AND ELECTROCOALESCENCE</i></p>



PARAMETER	CONDITIONS	MODELS						UNITS
Input		All Types						
Voltage Range	Full Power	24 VDC \pm 10%						VDC
Current	Standby/Disable	< 70 unipolar, < 105 bipolar						mA
Current	Full Load, Max Eout	< 420						mA
Current	No Load, Max Eout	< 400						mA
Output*		1 kV/\pm1 kV	2 kV/\pm2 kV	4 kV/\pm4 kV	\pm5 kV	6 kV	10 kV	
Power	Nominal Input, Max Eout	0.25	0.5	1	1	1	1	W
Current	out Entire Voltage Range	250	250	250	200	167	100	μ A
Ripple	Full Load, Max Eout	0.05	0.05	0.05	0.03	0.03	0.01	%V pp
Ripple with -F Option	Full Load, Max Eout	0.0125	0.0125	0.0125	0.0075	0.0075	0.0025	%V pp
Voltage Monitor	Normal Operating Conditions	0 to 10 \pm 0.5%						VDC
Current Monitor	Normal Operating Conditions	0 to 10 \pm 1%						VDC
Line Regulation	Vin Min to Vin Max, Max Eout	< 0.01						%
Load Regulation	No Load to Full Load, Max Eout	< 0.01						%
Programming and Controls		All Types						
Input Impedance	Normal Operating Conditions	10						M Ω
Adjust Voltage	Differential	0 to +10						VDC
HV ON/OFF (Enable/Disable)		0 to +0.8 V disable, +2.5 to +10 enable (default = disable)						VDC
Reference Voltage	T = +25°C, Initial Value	+10.00 \pm 0.05%						VDC
Max Source Current	T = +25°C	5						mA
Environmental		All Types						
Operating	Full Load, Max Eout, Case Temp.	+10 to +45						°C
Temperature Coefficient	Over the Specified Temperature	50 PPM or 25 PPM						PPM/°C
Thermal Shock	Mil-Std 810, Method 503.4-2	-40 to +65						°C
Storage	Non-Operating, Case Temp.	-40 to +100						°C
Humidity	All Conditions, Standard Package	0 to 95%, non-condensing						-
Altitude	Standard Package, All Conditions	Sea level through 10,000						ft
Shock	Mil-Std-810, Method 516, Proc. 4	20						Gs
Vibration	Mil-Std-810, Method 514, Fig. 514-3	10						Gs

*Units listed without polarity can be ordered as positive (+) or negative (-). Units listed as (\pm) are bipolar. Contact AE for preset fixed outputs or other requirements.

SAMPLE HVA SERIES WAVEFORMS

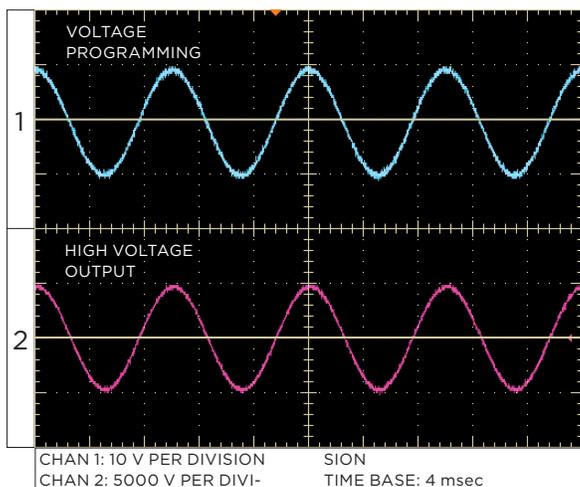


Figure A. 5HVA24-BP1 sine wave input

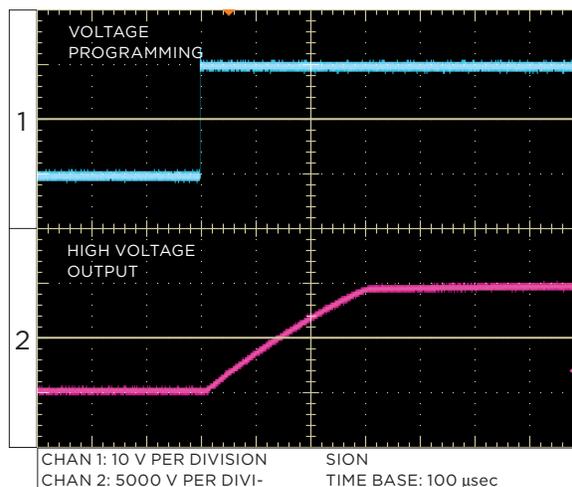


Figure B. 5HVA24-BP1 10 kV step wave input with no load

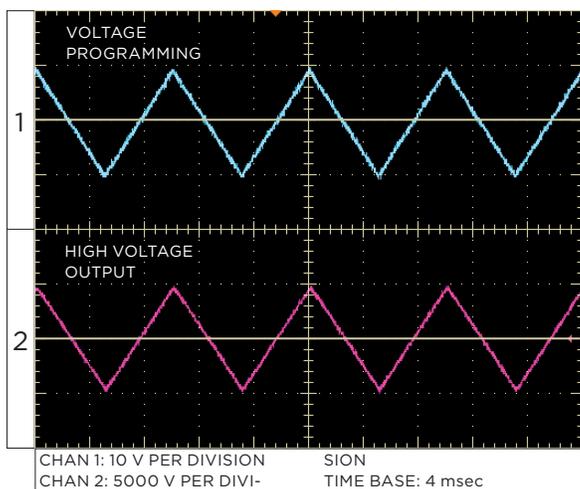


Figure C. 5HVA24-BP1 triangle wave input

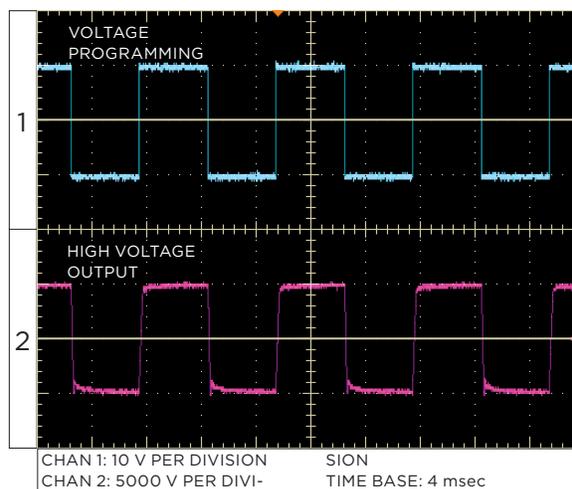


Figure D. 5HVA24-BP1 square wave input

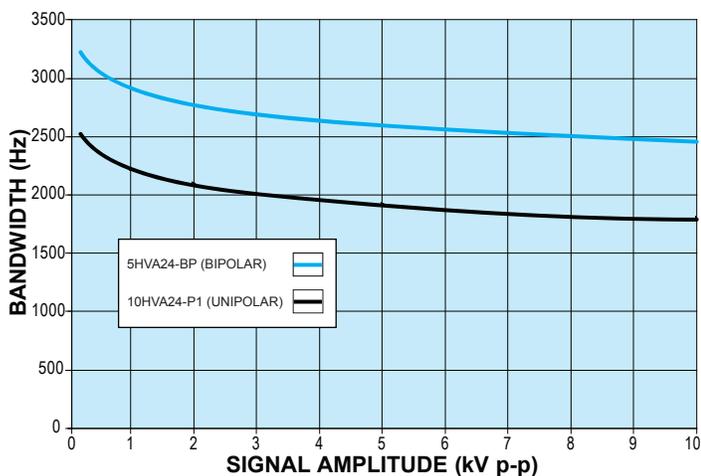


Figure E. Bandwidth vs. signal amplitude with no load

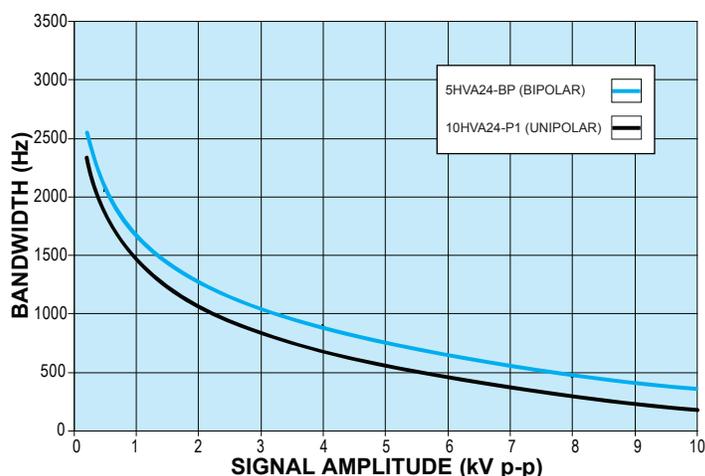
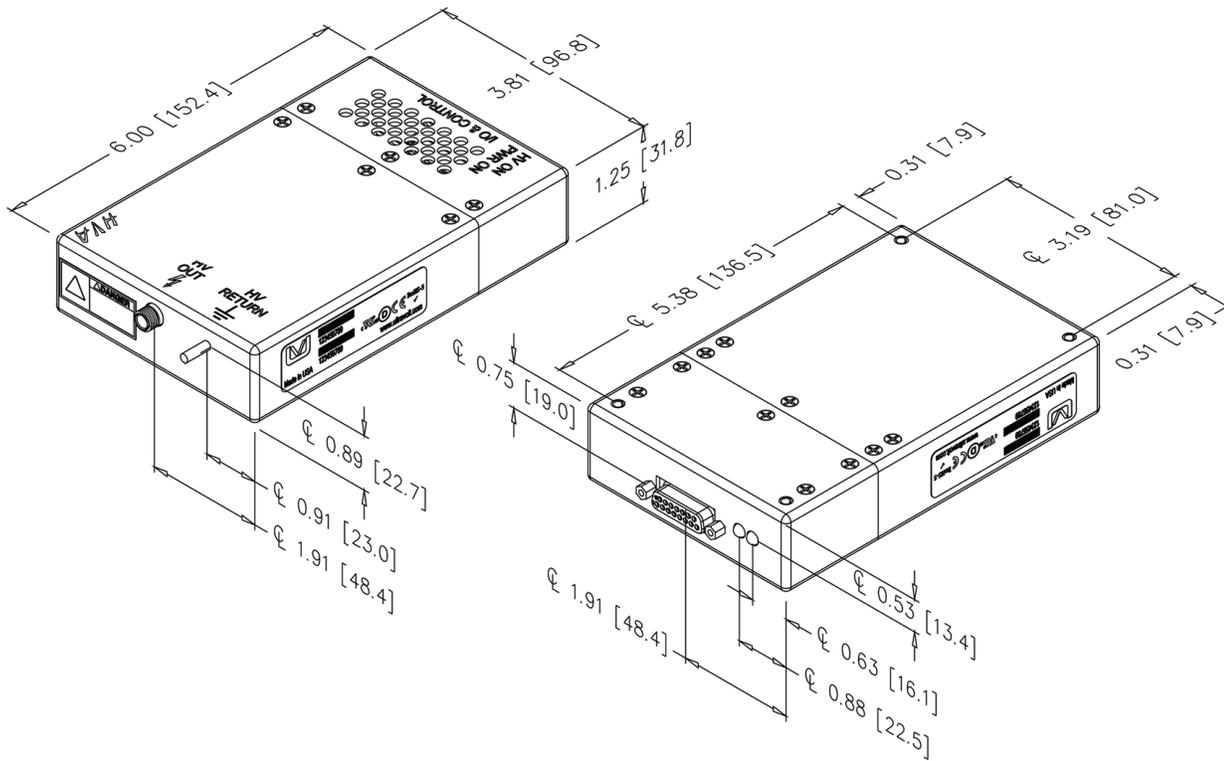


Figure F. Bandwidth vs. signal amplitude with 100 pF load



PHYSICAL SPECIFICATIONS

Construction	Aluminum alloy 5052-H32
	Anodize MIL-A-8625E blue
Size	
Volume	468.34 cc (28.58 in ³)
Weight	0.68 kg (1.5 lb)
Connections	
Sub-miniature D	15-pin, female
HV Connector	LGH1/2L
HV Return	#6-32 x 0.437 long threaded post



UV-HVA INPUT CONNECTOR PINOUT FUNCTIONS

pin	DESCRIPTION	function
1	Reference Voltage	+10.00 V precision reference
2	Voltage Programming -	0 to +10 V or 0 to -10 V to program full output voltage, depending on polarity. Programming input is differential between pins 2 and 3.
3	Voltage Programming +	
4	Voltage Monitor	0 to ±10 V represents 0 to ± full output voltage
5	N/C	No connection
6	Signal Ground	Reference all control signals here.
7	Input Power	+24 V input power
8	Input Power	
9	Power Ground	Input power return
10	Power Ground	
11	Enable	TTL high to enable, low to disable, default is OFF
12	Current Monitor	0 to ±10 V represents 0 to ± full output current
13	Current Limit Adjust	0 to +10 V sets current limit from 0 to full rated output current
14	N/C	No connection
15	Signal Ground	Reference all control signals here.

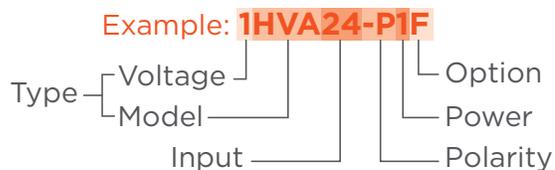
ORDERING INFORMATION

Type	0 to 1000 VDC Output	1HVA
	0 to 2000 VDC Output	2HVA
	0 to 4000 VDC Output	4HVA
	0 to 5000 VDC Output (Bipolar Only)	5HVA
	0 to 6000 VDC Output (Unipolar Only)	6HVA
	0 to 10000 VDC Output (Unipolar Only)	10HVA
Input	24 VDC Nominal	24
Polarity	Positive Output	-P
	Negative Output	-N
	Bipolar Output	-BP
Power	1 W Output	1
Option	Ripple Stripper® Output Filter	-F
	25 PPM Temperature Coefficient	-25PPM
Connections	LGH	Standard
	5 kV SHV Type	-SHV-5kV
	10 kV, BNC Type	-BNC-10kV

Popular accessories ordered with this product include our full range of high voltage output connectors. (See Accessories and Connectors datasheet.)



Non-RoHS compliant units are available.
Please contact the factory for more information.





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