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MODULES
PRODUCT CATALOG 2014

Single Output - Multi-Output - Isolated Low Voltage - Amplifiers - Filaments

ULTRAVOLT®
Making High Voltage Easier!®

TABLE OF CONTENTS

SINGLE OUTPUT HIGH VOLTAGE POWER SUPPLIES

STANDARD

PRECISION

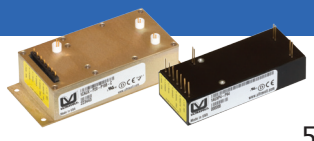
MICROSIZE/MICROPOWER

⚠ Failure to operate UltraVolt High Voltage Power Supplies correctly and to follow all operating instructions may create an electrical shock hazard, which can result in personal injury or loss of life, and/or damage to equipment or other property.

CONSTANT POWER

AC-DC HIGH VOLTAGE CONVERTERS

MULTI-OUTPUT HIGH VOLTAGE MODULES



HIGH VOLTAGE AMPLIFIERS

ISOLATED LOW VOLTAGE POWER SUPPLIES

LOW VOLTAGE FILAMENT SUPPLY

OPTIONS AND ACCESSORIES

SAFETY, COMPLIANCES, & WARRANTY

AA SERIES

High Voltage Biasing Supply

The AA Series of high-voltage regulated DC-DC converters addresses the needs of the miniature PCB-mount regulated high voltage power supply user. Designed and built utilizing state-of-the-art power-conversion topology, these units feature surface-mount technology and encapsulation techniques that provide high reliability and performance. Typical applications for the AA Series include the following: bias supplies, detectors, piezos, amplifiers, and photomultiplier tubes (PMT).

- 22% smaller than standard A Series
- 8 models from 0 to 62V through 0 to 6kV
- 4, 20 or 30 watts of output power
- Maximum Iout capability down to 0 Volts
- Wide input voltage range
- Indefinite output short-circuit protection
- Output current & voltage monitors
- Fixed-frequency, low-stored-energy design
- >1,250,000 hour MTBF @65°C
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

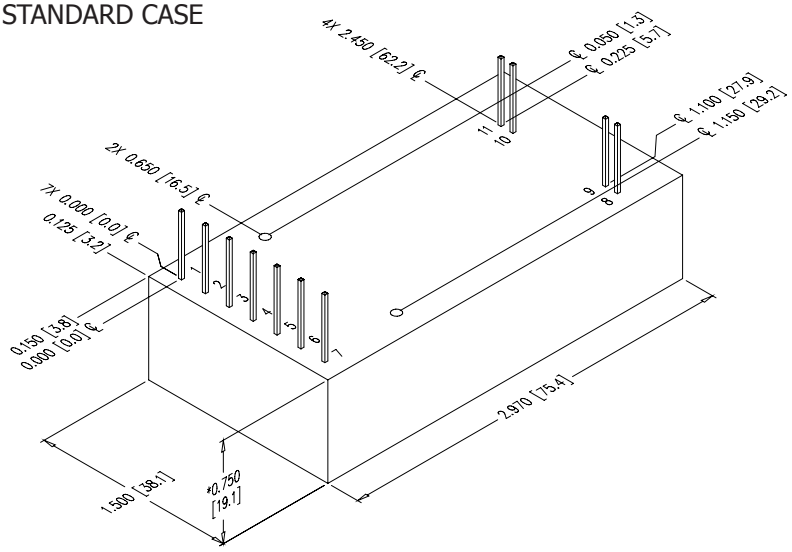
PARAMETER	CONDITIONS	MODELS																								UNITS
INPUT		12V												24V												
Voltage Range	Full Power	+ 11 to 16												+ 23 to 30												VDC
Voltage Range	Derated Power Range	+ 9 to 32												+ 9 to 32												VDC
Current	Standby / Disable	< 30												< 30												mA
Current	No Load, Max Eout	< 100												< 90												mA
Current	Max Load, Max Eout	~ 400												~ 1350												mA
AC Ripple Current	Nominal Input, Full Load	< 80												< 80												mA p-p
OUTPUT		1/16AA			1/8AA			1/4AA			1/2AA			1AA			2AA			4AA			6AA			
Voltage Range	Nominal Input	0 to 62			0 to 125			0 to 250			0 to 500			0 to 1,000			0 to 2,000			0 to 4,000			0 to 6,000			VDC
Nominal Input Voltage / Model		12	24	24	12	24	24	12	24	24	12	24	24	12	24	24	12	24	24	12	24	24	12	24	24	VDC
Power	Nominal Input, Max Eout	4	20	30	4	20	30	4	20	30	4	20	30	4	20	30	4	20	30	4	20	30	4	20	30	Watts
Current	Iout Entire Output Voltage Range	64	320	480	32	160	240	16	80	120	8	40	60	4	20	30	2	10	15	1	5	7.5	0.67	3.3	5	mA
Current Scale Factor	Full Load	42.67	969.7	960	11.64	237	258	3.27	70.48	72.7	.79	17.78	17.65	.37	4.60	4.62	.192	1.52	1.52	.090	.752	.76	.066	.490	.50	mA/V
Voltage Monitor Scaling		10:1 ± 2% into 10MΩ												100:1 ± 2% into 10MΩ												-
Ripple	Full Load, Max Eout	0.03	0.06	0.15	0.03	0.038	0.038	0.023	0.04	0.05	0.01	0.01	0.011	0.026	0.048	0.073	0.01	0.011	0.046	0.042	0.050	0.070	0.035	0.024	0.046	%V p-p
Dynamic Load Regulation	½ to Full Load, Max Eout per .1mA	<.12	<.12	<.12	<.12	<.12	<.12	<.20	<.20	<.20	<.50	<.50	<.50	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<4.0	<4.0	<4.0	<6.0	<6.0	<6.0	V pk
Line Regulation	Nom. Input, Max Eout, Full Power	< 0.01 %																								VDC
Static Load Regulation	No Load to Full Load, Max Eout	< 0.01%																								VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.01% / < 0.02%																								VDC
PROGRAMMING & CONTROLS		ALL TYPES																								
Input Impedance	Nominal Input	+ Output Models 1.1MΩ to GND, - Output Models 1.1MΩ to +5 Vref																								MΩ
Adjust Resistance	Typical Potentiometer Values	10K to 100K (Pot across Vref. & Signal GND, Wiper to Adjust)																								Ω
Adjust Logic	0 to +5 for +Out, +5 to 0 for - Out	+4.64 VDC for +Output or +0.36 for -Output = Nominal Eout																								-
Output Voltage & Impedance	T=+25°C	+ 5.00VDC ± 2%, Zout = 464Ω ± 1%																								-
Enable/Disable		0 to +0.5 Disable, +2.4 to 32 Enable (Default = Enable)																								VDC
ENVIRONMENTAL		ALL TYPES																								
Operating	Full Load, Max Eout, Case Temp.	-40 to +65																								°C
Coefficient	Over the Specified Temperature	±50 (±25 Optional)																								PPM/°C
Thermal Shock	Mil-Std 810, Method 503-4, Proc. II	-40 to +65																								°C
Storage	Non-Operating, Case Temp.	-55 to +105																								°C
Humidity	All Conditions, Standard Package	0 to 95% non-condensing																								-
Altitude	Standard Package, All Conditions	Sea Level through Vacuum																								-
Shock	Mil-Std-810, Method 516.5, Proc. IV	20																								G's
Vibration	Mil-Std-810, Method 514.5, Fig.514.5C-3	10																								G's

Specifications subject to change without notice.

AA SERIES

High Voltage Biasing Supply

STANDARD CASE



CONSTRUCTION

Epoxy-filled DAP box certified to ASTM-D-5948

SIZE

Volume 3.34in^3 (54.8 cc)
Weight 4.0oz (114g)

TOLERANCE

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole location ±0.025" (0.64)

NOTES

20W and 30W versions are an additional 0.062" (1.57) in height.
-M equipped units are an additional 0.030" (0.76) for all dimensions.
Contact UltraVolt's Customer Service Department for drawings of models equipped with -E or -H options.

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

CONNECTIONS	
PIN	FUNCTION
1	Input-Power Ground Return
2	Positive Power Input
3	Iout Monitor
4	Enable/Disable
5	Signal Ground Return
6	Remote Adjust Input
7	+5VDC Reference Output
8	HV Ground Return
9	Eout Monitor
10 & 11	HV Output

All grounds joined internally. Power-supply mounting points isolated from internal grounds by >100kΩ, .01uF / 50V (Max) on all models except -M (20W and above), -M-E, and -M-H configurations which are 0Ω.

ORDERING INFORMATION		
Type	0 to 62 VDC Output	1/16AA
	0 to 125 VDC Output	1/8AA
	0 to 250 VDC Output	1/4AA
	0 to 500 VDC Output	1/2AA
	0 to 1,000 VDC Output	1AA
	0 to 2,000 VDC Output	2AA
	0 to 4,000 VDC Output	4AA
	0 to 6,000 VDC Output	6AA
Input	12VDC Nominal	12
	24VDC Nominal	24
Polarity	Positive Output	-P
	Negative Output	-N
Power	Watts Output (12 V Only)	4
	Watts Output (24 V Only)	20
	Watts Output (24 V Only)	30
Case	Plastic Case - Diallyl Phthalate	(Standard)
	'Eared' Chassis Mounting Plate	-E
Heat Sink	.500" High (sized to fit case)	-H
Shield	Six-sided Mu-Metal Shield	-M
Temp. Coefficient	25PPM Temperature Coefficient	-25PPM
Enhanced Interface	5V Control and Monitors	-I5
	10V Control and Monitors (24Vin only)	-I10

Note: For more information on the enhanced interface options, download the I5/I10 Option datasheet.

IEC-60950-1

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

Manufactured in USA

Example: 1/2AA24-P30-M

Type — Voltage — Model — Input — Option (Mu-Metal) — Power — Polarity

Popular accessories ordered with this product include CONN-KIT and BR-18 mounting bracket kit.

Rev. X 10/14

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A SERIES
High Voltage Biasing Supply

The A Series of high-voltage regulated DC-DC converters addresses the needs of the miniature PCB-mount regulated high voltage power supply user. Designed and built utilizing state-of-the-art power-conversion topology, these units feature surface-mount technology and encapsulation techniques that provide high reliability and performance. Typical applications for the A Series include the following: bias supplies, electrostatic detectors, mass spectrometry, and photomultiplier tubes (PMTs).

- 8 models from 0 to 62V through 0 to 6kV
- 4, 20 or 30 watts of output power
- Maximum Iout capability down to 0 Volts
- Wide input voltage range
- Available with Ripple Stripper® Filter (-F Option)
- Indefinite output short-circuit protection
- Output current monitor
- Fixed-frequency, low-stored-energy design
- >430,000 hour MTBF @65°C
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

PARAMETER	CONDITIONS	MODELS																								UNITS
INPUT		**12V**												**24V**												
Voltage Range	Full Power	+ 11 to 16												+ 23 to 30												VDC
Voltage Range	Derated Power Range	+ 9 to 32												+ 9 to 32												VDC
Current	Standby / Disable	< 30												< 30												mA
Current	No Load, Max Eout	< 100												< 90												mA
Current	Max Load, Max Eout	~ 400												~ 1350												mA
AC Ripple Current	Nominal Input, Full Load	< 80												< 80												mA p-p
OUTPUT		**1/16A**			**1/8A**			**1/4A**			**1/2A**			**1A**			**2A**			**4A**			**6A**			
Voltage Range	Nominal Input	0 to 62			0 to 125			0 to 250			0 to 500			0 to 1,000			0 to 2,000			0 to 4,000			0 to 6,000			VDC
Nominal Input Voltage		12	24	24	12	24	24	12	24	24	12	24	24	12	24	24	12	24	24	12	24	24	12	24	24	VDC
Power	Nominal Input, Max Eout	4	20	30	4	20	30	4	20	30	4	20	30	4	20	30	4	20	30	4	20	30	4	20	30	Watts
Current	Iout Entire Output Voltage Range	64	320	480	32	160	240	16	80	120	8	40	60	4	20	30	2	10	15	1	5	7.5	0.67	3.3	5	mA
Current Monitor Scaling	Full Load	0.985	3.90	7.40	438.4	1860.5	2891.5	213.3	1000	1481.5	123.1	506.3	740.7	55.56	243.9	400	31.75	129.9	211.3	16.4	66.7	85.2	12.9	48.5	56.8	mA/V
Voltage Monitor Scaling	With -Y5 option	10:1 ± 2% into 10MΩ												100:1 ± 2% into 10MΩ												-
Ripple	Full Load, Max Eout	.02	.03	.05	.013	.015	.016	.01	.04	.048	.001	.02	.017	.038	.071	.15	.01	.05	.065	.019	.057	.022	.018	.073	.112	%V p-p
Ripple with -F-M Option*	Full Load, Max Eout, 300pF bypass Cap	.002	.004	.006	.0048	.0056	.006	.0052	.0028	.005	.001	.0138	.0016	.001	.0008	.002	.0007	.0038	.004	.0004	.0088	.0026	.0003	.0012	.004	%V p-p
Dynamic Load Regulation	½ to Full Load, Max Eout per .1mA	<.12	<.12	<.12	<.12	<.12	<.12	<.20	<.20	<.20	<.50	<.50	<.50	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<4.0	<4.0	<4.0	<6.0	<6.0	<6.0	V pk
Line Regulation	Nom. Input, Max Eout, Full Power	< 0.01 %																								VDC
Static Load Regulation	No Load to Full Load, Max Eout	< 0.01%																								VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.01% / < 0.02%																								VDC
PROGRAMMING & CONTROLS		**ALL TYPES**																								
Input Impedance	Nominal Input	+ Output Models 1.1MΩ to GND, - Output Models 1.1MΩ to +5 Vref																								MΩ
Adjust Resistance	Typical Potentiometer Values	10K to 100K (Pot across Vref. & Signal GND, Wiper to Adjust)																								Ω
Adjust Logic	0 to +5 for +Out, +5 to 0 for - Out	+4.64 VDC for +Output or +0.36 for -Output = Nominal Eout																								-
Output Voltage & Impedance	T=+25°C	+ 5.00VDC ± 2%, Zout = 464Ω ± 1%																								-
Enable/Disable		0 to +0.5 Disable, +2.4 to 32 Enable (Default = Enable)																								VDC
ENVIRONMENTAL		**STANDARD**												**-25PPM OPTION**												
Operating	Full Load, Max Eout, Case Temp.	-40 to +65												+10 to +45												°C
Coefficient	Over the Specified Temperature	±50												+25												PPM/°C
Thermal Shock	Mil-Std 810, Method 503-4, Proc. II	-40 to +65																								°C
Storage	Non-Operating, Case Temp.	-55 to +105																								°C
Humidity	All Conditions, Standard Package	0 to 95% non-condensing																								-
Altitude	Standard Package, All Conditions	Sea Level through Vacuum (Vacuum may require -P2 option, contact factory for details.)																								-
Shock	Mil-Std-810, Method 516.5, Proc. IV	20 (Standard), 40 (-C Option)																								G's
Vibration	Mil-Std-810, Method 514.5, Fig.14.5C-3	10 (Standard), 20 (-C Option)																								G's

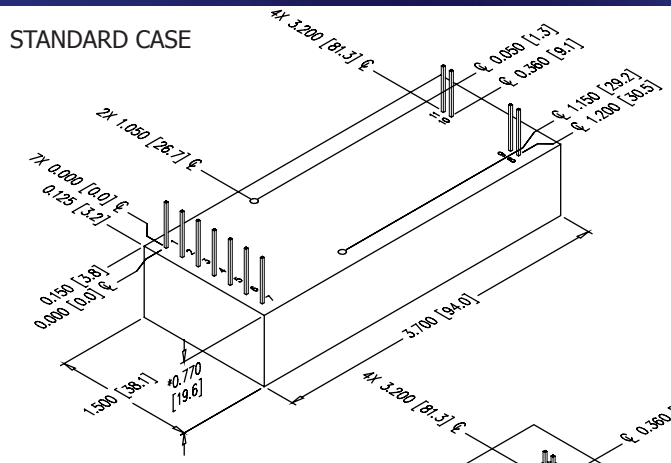
*Note: For additional information on the reduced ripple option, see -F Option datasheet.

Specifications subject to change without notice.

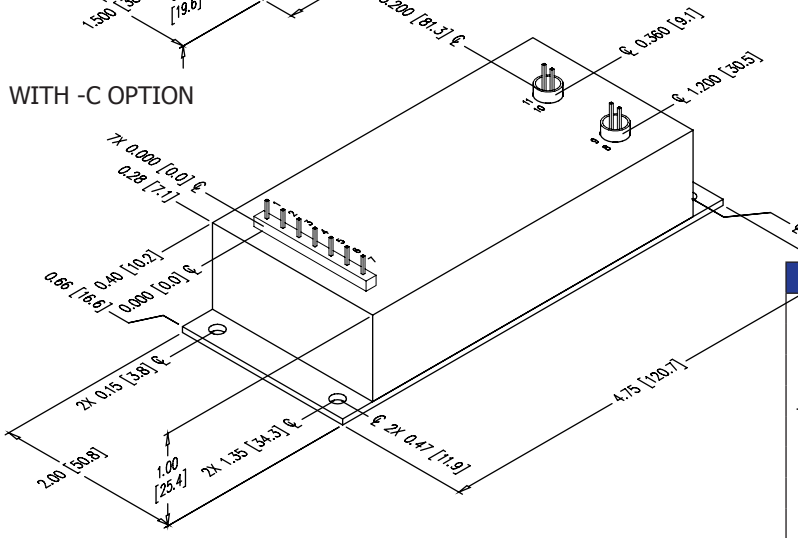
A SERIES

High Voltage Biasing Supply

STANDARD CASE



WITH -C OPTION



RoHS COMPLIANT

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

Manufactured in USA

CONNECTIONS	
PIN	FUNCTION
1	Input-Power Ground Return
2	Positive Power Input
3	Iout Monitor
4	Enable/Disable
5	Signal Ground Return
6	Remote Adjust Input
7	+5VDC Reference Output
8	HV Ground Return
9	HV Ground Return or Eout Monitor (-Y5)
10 & 11	HV Output

All grounds joined internally. Power-supply mounting points isolated from internal grounds by >100kΩ, .01uF / 50V (Max) on all models except -M (20W and above), -M-E, -M-C, and -M-H configurations which are 0Ω.

Popular accessories ordered with this product include CONN-KIT and BR-1 mounting bracket kit.

CONSTRUCTION

Epoxy-filled DAP box certified to ASTM-D-5948 with -C Option:
Aluminum Alloy 5052-H32, Finish: MIL-A-8625 Type II (Anodizing)

SIZE

Volume 4.30in^3 (70.5cc), w/ -C Option: 8.00in^3 (131.1cc)
Weight 5.0oz (142g), w/ -C Option: 10.0oz (284g)

TOLERANCE

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole location ±0.025" (0.64)

NOTES

20W and 30W versions are an additional 0.062" (1.57) in height.
-M equipped units are an additional 0.030" (0.76) for each dimension.
Contact UltraVolt's Customer Service Department for drawings of models equipped with -E or -H options.

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

CE c UL us

IEC-60950-1

ORDERING INFORMATION		
Type	0 to 62 VDC Output	1/16A
	0 to 125 VDC Output	1/8A
	0 to 250 VDC Output	1/4A
	0 to 500 VDC Output	1/2A
	0 to 1,000 VDC Output	1A
	0 to 2,000 VDC Output	2A
	0 to 4,000 VDC Output	4A
	0 to 6,000 VDC Output	6A
Input	12VDC Nominal	12
	24VDC Nominal	24
Polarity	Positive Output	-P
	Negative Output	-N
Power	Watts Output (12 V Only)	4
	Watts Output (24 V Only)	20
	Watts Output (24 V Only)	30
Case	Plastic Case - Diallyl Phthalate	(Standard)
	'Eared' Chassis Mounting Plate	-E
	RF-Tight Aluminum Case	-C
Heat Sink	.400" High (sized to fit case)	-H
Ripple Stripper®	Integral Output Filter*	-F
Shield	Six-sided Mu-Metal Shield	-M
Voltage Monitor	Optional Eout Monitor	-Y5
Iout Monitor Boost	Boosted Iout Monitor Signal Level	-Y10
Temp. Coefficient	25PPM Temperature Coefficient	-25PPM
Enhanced Interface	5V Control and Monitors	-I5
	10V Control and Monitors (24Vin only)	-I10
Option	Flying Lead for HV Output	-W
	Shielded Flying Lead for HV Output	-WS

*Note: For additional information on the reduced ripple option, see -F Option datasheet.

Example: 1/2A12-P4-M

Type — Voltage — Model — Input — Option (Mu-Metal) — Power — Polarity

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C SERIES

High Voltage Cap-Charging Supply

The C Series of high-voltage regulated DC-DC converters are designed for fast rise-time/charging applications utilizing state-of-the-art power conversion topology. Surface-mount technology and encapsulation techniques provide high reliability and low cost. See Application Note 10 for more charging information. Typical applications for the C Series include the following: cap-charging, pulsed power, test equipment, mass spectrometry and automated test equipment (ATE).

- 8 models from 0 to 62 Volts through 0 to 6kV
- 20 or 30 watts of output power
- Maximum Iout capability down to 0 Volts
- Maximum Iout during charge/rise time
- Indefinite output short-circuit protection
- Very fast rise with very low overshoot
- Output voltage and current monitors
- >400,000 hour MTBF @65°C
- Fixed-frequency, low-stored-energy design
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

PARAMETER	CONDITIONS	MODELS																UNITS
INPUT		**ALL TYPES**																
Voltage Range	Full Power	+ 23 to 30																VDC
Voltage Range	Derated Power Range	+ 9 to 32																VDC
Current	Standby / Disable	< 30																mA
Current	No Load, Max Eout	< 90																mA
Current	Max Load, Max Eout	20W: 950, 30W: 1425																mA
AC Ripple Current	Nominal Input, Full Load	< 80																mA p-p
OUTPUT		**1/16C**		**1/8C**		**1/4C**		**1/2C**		**1C**		**2C**		**4C**		**6C**		
Voltage Range	Nominal Input	0 to 62		0 to 125		0 to 250		0 to 500		0 to 1,000		0 to 2,000		0 to 4,000		0 to 6,000		VDC
Power	Nominal Input, Max Eout	20	30	20	30	20	30	20	30	20	30	20	30	20	30	20	30	Watts
Current	Iout, Entire Output Voltage Range	320	480	160	240	80	120	40	60	20	30	10	15	5	7.5	3.3	5	mA
Current Scale Factor	Full Load	TBD	TBD	2540	4210	1096	2000	1142	1667	307	476	159	259	94	112	51	86	mA/V
Voltage Monitor Scaling		100:1 ± 2% into 10MΩ																-
Ripple	Full Load, Max Eout, Cload ≥0.5uF	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	V p-p
Overshoot	C Load, 0 Eout to Full Eout	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 4.0	< 4.0	< 6.0	< 6.0	V pk
Rise Time	Max Iout, Various C Loads & Eout	Figure A																-
Storage Capacitance	Internal	TBD	TBD	0.50	0.50	0.15	0.15	0.16	0.16	0.033	0.018	0.009	0.009	0.010	0.010	0.0064	0.0064	uF
Line Regulation	Nom. Input, Max Eout, Full Power	< 0.01 %																VDC
Static Load Regulation	No Load to Full Load, Max Eout	< 0.01%																VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.01% / < 0.02%																VDC
PROGRAMMING & CONTROLS		**ALL TYPES**																
Input Impedance	Nominal Input	+ Output Models 1.1MΩ to GND, - Output Models 1.1MΩ to +5 Vref																MΩ
Adjust Resistance	Typical Potentiometer Values	10K to 100K (Pot across Vref. & Signal GND, Wiper to Adjust)																Ω
Adjust Logic	0 to +5 for +Out, +5 to 0 for - Out	+4.64 VDC for +Output or +0.36 for -Output = Nominal Eout																-
Output Voltage & Impedance	T=+25°C	+ 5.00VDC ± 2%, Zout = 464Ω ± 1%																-
Enable/Disable		0 to +0.5 Disable, +2.4 to 32 Enable (Default = Enable)																VDC
ENVIRONMENTAL		**STANDARD**								**-25PPM OPTION**								
Operating	Full Load, Max Eout, Case Temp.	-40 to +65								+10 to +45								°C
Coefficient	Over the Specified Temperature	±50								±25								PPM/°C
Thermal Shock	Mil-Std 810, Method 503-4, Proc. II	-40 to +65																°C
Storage	Non-Operating, Case Temp.	-55 to +105																°C
Humidity	All Conditions, Standard Package	0 to 95% non-condensing																-
Altitude	Standard Package, All Conditions	Sea Level through Vacuum (Vacuum may require -P2 option, contact factory for details)																-
Shock	Mil-Std-810, Method 516.5, Proc. IV	20 (Standard), 40 (-C Option)																G's
Vibration	Mil-Std-810, Method 514.5, Fig.514.5C-3	10 (Standard), 20 (-C Option)																G's

Specifications subject to change without notice.

C = uF
V = Volts
I = mA
T = mS

$$T = \frac{C \times V}{I}$$

C = uF
V = kV
I = mA
F = Hz

$$I = C \times V \times F$$

C = uF
V = kV
I = mA
F = Hz

$$F = \frac{I}{C \times V}$$

C = uF
E^2 = kV
J = Ws

$$J = \frac{C \times E^2}{2}$$

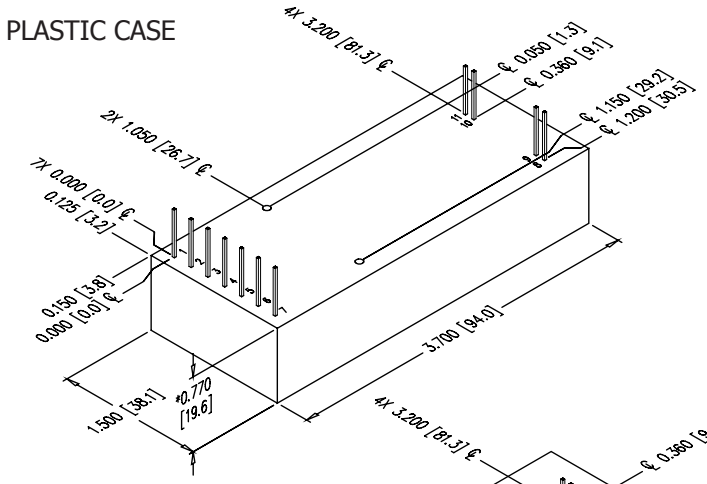
Figure A - Rise Time Formulas

NOTES: Capacitance must include HVPS internal Capacitance.

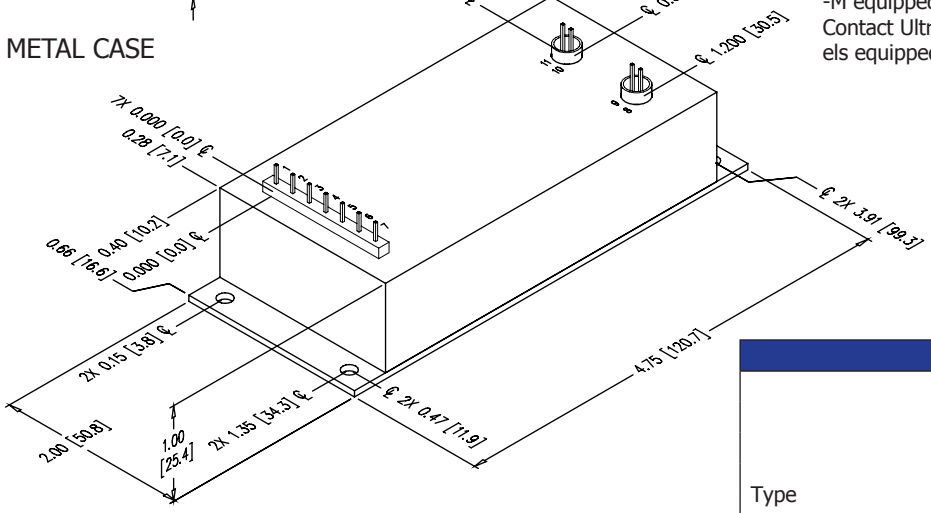
C SERIES

High Voltage Cap-Charging Supply

PLASTIC CASE



METAL CASE



CONSTRUCTION

Epoxy-filled DAP box certified to ASTM-D-5948
With -C option, Aluminum box, Chem film per MIL-A-8625 Type II (Anodizing)

SIZE

Volume 4.30in^3 (70.5cc), w/ -C Option: 8.00in^3 (131.1cc)
Weight 5.0oz (142g), w/ -C Option: 10.0oz (284g)

TOLERANCE

Overall ±0.050" (1.27), Pin to Pin ±0.015" (0.38), Mounting hole location ±0.025" (0.64) (Plastic case)
Overall ±0.025" (0.64), Pin to Pin ±0.015" (0.38), Hole to Hole location ±0.025" (0.64) (Metal case)

NOTES

20W and 30W versions are an additional 0.062" (1.57) in height.
-M equipped units are an additional 0.030" (0.76) for each dimension.
Contact UltraVolt's Customer Service Department for drawings of models equipped with -E or -H options.

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

CE cULus IEC-60950-1

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

Manufactured in USA

CONNECTIONS	
PIN	FUNCTION
1	Input-Power Ground Return
2	Positive Power Input
3	Iout Monitor
4	Enable/Disable
5	Signal Ground Return
6	Remote Adjust Input
7	+5VDC Reference Output
8	HV Ground Return
9	Eout Monitor
10 & 11	HV Output

All grounds joined internally. Power-supply mounting points isolated from internal grounds by >100kΩ, .01uF / 50V (Max) on all models except -M, -M-C, -M-E, and -M-H configurations which are 0Ω.

ORDERING INFORMATION		
Type	0 to 62 VDC Main Output	1/16C
	0 to 125 VDC Main Output	1/8C
	0 to 250 VDC Main Output	1/4C
	0 to 500 VDC Main Output	1/2C
	0 to 1,000 VDC Main Output	1C
	0 to 2,000 VDC Main Output	2C
	0 to 4,000 VDC Main Output	4C
	0 to 6,000 VDC Main Output	6C
Input	24VDC Nominal (20W & 30W)	24
Polarity	Positive Output	-P
	Negative Output	-N
Power	Watts Output	20
	Watts Output	30
Case	Plastic Case - Diallyl Phthalate	(Standard)
	'Eared' Heatsink Plate (plastic case)	-E
	RF-Tight Aluminum Case	-C
Heatsink	.400" High (sized to fit case)	-H
Shield	Six-sided Mu-Metal Shield	-M
Temp. Coefficient	25PPM Temperature Coefficient	-25PPM

Contact the factory for boosted current monitor options.

Example: 1/2C24-P20-C

Type — Voltage — Model — Input — Option — Power — Polarity

Popular accessories ordered with this product include CONN-KIT and BR-1 mounting bracket kit.

Rev. W 10/14

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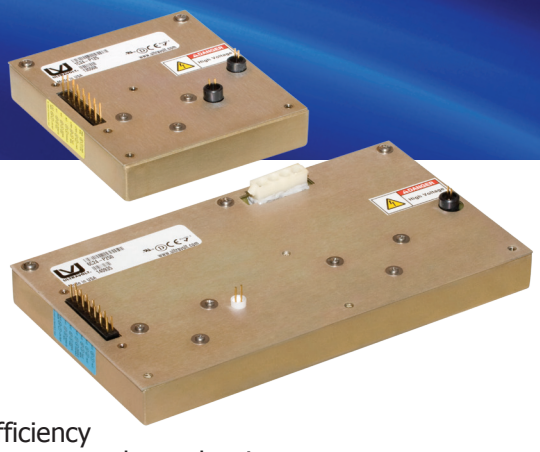
HIGH POWER C SERIES

High Voltage Cap-Charging Supply



This High Power line of high-voltage regulated DC to DC converters is an extension of the C Series, directly addressing the high power density needs of >30 watt applications. High Power C units provide up to 60/125/250 watts. This high power density is especially suited to high-energy systems with large capacitances, fast repetition rates, or high continuous-DC-power requirements. See Application Note 10 for more charging information. Typical applications for the High Power C Series include the following: laser, cap-charging, pulsed power, pulse generator, and test equipment.

- 7 models from 0 to 125 Volts through 0 to 6kV
- 60, 125, or 250 watts of output power
- Maximum Iout capability down to 0 Volts
- Maximum Iout during charge/rise time
- Output short-circuit protection
- Very fast rise with very low overshoot
- High efficiency
- High power to voltage density
- Very low profile
- Output current & voltage monitors
- >200,000 hour MTBF @65°C
- Fixed-frequency, low-stored-energy design
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

PARAMETER	CONDITIONS																						UNITS
INPUT		**ALL TYPES**																					
Voltage Range	Full Power	+ 23 to 30																					VDC
Voltage Range	Derated Power Range	+ 11 to 32																					VDC
Current	Standby / Disable	< 40																					mA
Current	Max Load, Max Eout	60W: 3, 125W: 6 250W: 12																					A
Current	No Load, Max Eout	1/8C to 1C: < 300, 2C to 6C: < 500																					mA
AC Ripple Current	Nominal Input, Full Load	< 50																					mA p-p
OUTPUT		1/8C			1/4C			1/2C			1C			2C			4C			6C			
Voltage Range	Nominal Input	0 to 125			0 to 250			0 to 500			0 to 1,000			0 to 2,000			0 to 4,000			0 to 6,000			VDC
Power	Nominal Input, Max Eout	60	125	250	60	125	250	60	125	250	60	125	250	60	125	250	60	125	250	60	125	250	Watts
Current	Iout, Entire Output Voltage Range	480	1000	2000	240	500	1000	120	250	500	60	125	250	30	62	125	15	31	62	10	21	42	mA
Current Scale Factor	Full Load	400	833	1667	200	417	833	109	208	417	50	114	227	26	52	104	11.5	26	52	6.2	17.7	35	mA/V
Voltage Monitor Scaling		100:1 ±2% into 10MΩ																					-
Ripple	Full Load, Max Eout, Cload ≥0.5uF	< 1.0																					%V p-p
Overshoot	C Load, 0 Eout to Full Eout	< 1																					%V pk
Rise Time	Max Iout, Various C Loads & Eout	Figure A																					-
Storage Capacitance	Internal	0.90	0.90	1.80	0.90	0.90	1.80	0.43	0.43	0.85	0.019	0.019	0.038	0.019	0.019	0.038	0.013	0.013	0.026	0.013	0.013	0.026	uF
Line Regulation	Nom. Input, Max Eout, Full Power	< 0.01%																					VDC
Static Load Regulation	No Load to Full Load, Max Eout	< 0.01%																					VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.01% / < 0.02%																					VDC
PROGRAMMING & CONTROLS		**ALL TYPES**																					
Input Impedance	Nominal Input	+ Output Models 1.1MΩ to GND, - Output Models 1.1MΩ to +5 Vref																					MΩ
Adjust Resistance	Typical Potentiometer Values	10K to 100K (Pot across Vref. & Signal GND, Wiper to Adjust)																					Ω
Adjust Logic	0 to +5 for +Out, +5 to 0 for - Out	+4.64 VDC for +Output or +0.36 for -Output = Nominal Eout																					-
Output Voltage & Impedance	T=+25°C	+ 5.00VDC ± 2%, Zout = 464Ω ± 1%																					-
Enable/Disable (ON/OFF)		0 to +0.5 Disable, +2.4 to 32 Enable (Default = Enable)																					VDC
ENVIRONMENTAL		**ALL TYPES**																					
Operating	Full Load, Max Eout, Case Temp.	-40 to +65																					°C
Coefficient	Over the Specified Temperature	±50 (±25 Optional)																					PPM/°C
Thermal Shock	Mil-Std 810, Method 503-4, Proc. II	-40 to +65																					°C
Storage	Non-Operating, Case Temp.	-55 to +105																					°C
Humidity	All Conditions, Standard Package	0 to 95% non-condensing																					-
Altitude	Standard Package, All Conditions	Sea Level through 70,000																					ft
Shock	Mil-Std-810, Method 516.5, Proc. IV	20																					G's
Vibration	Mil-Std-810, Method 514.5, Fig.514.5C-3	10																					G's

Specifications are subject to change without notice.

C = uF
V = Volts
I = mA
T = mS

$$T = \frac{C \times V}{I}$$

C = uF
V = kV
I = mA
F = Hz

$$I = C \times V \times F$$

C = uF
V = kV
I = mA
F = Hz

$$F = \frac{I}{C \times V}$$

C = uF
E² = kV
J = Ws

$$J = \frac{C \times E^2}{2}$$

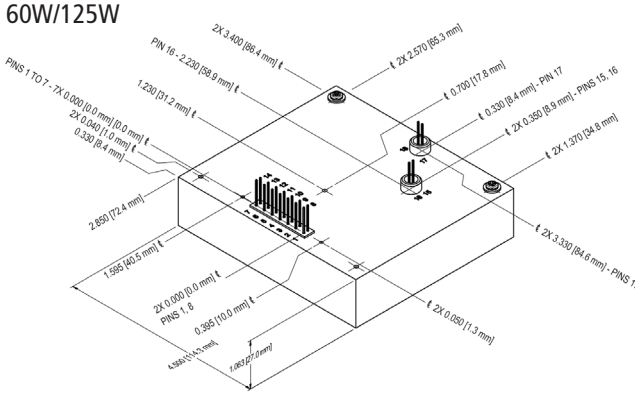
Figure A - Rise Time Formulas

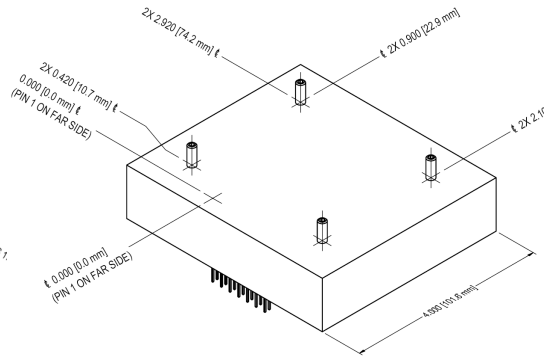
NOTE: Capacitance must include HVPS internal Capacitance.

HIGH POWER C SERIES

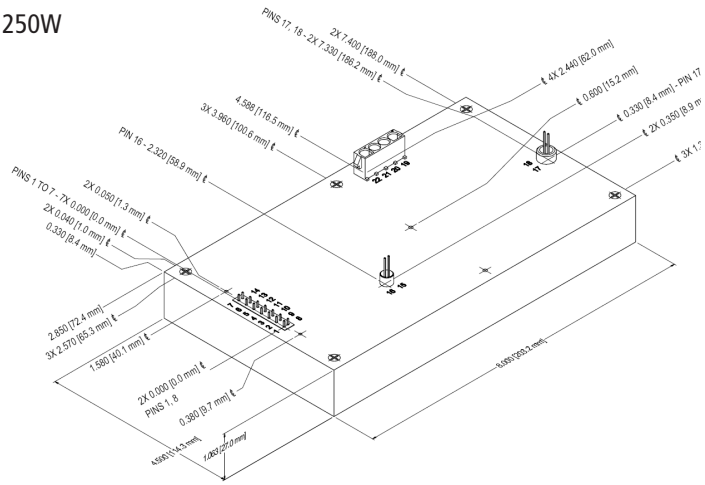
High Voltage Cap-Charging Supply

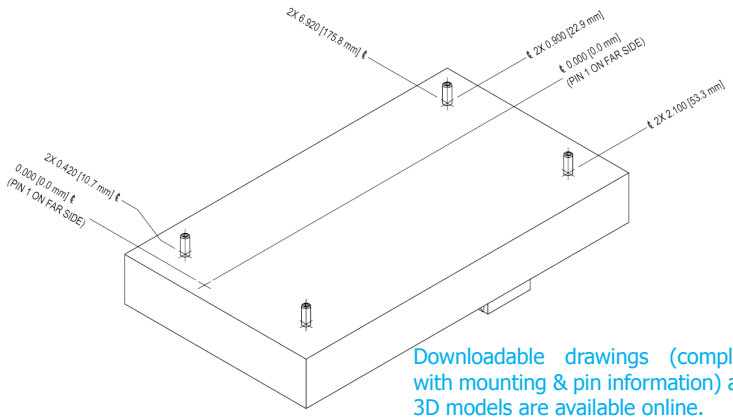
60W/125W





250W





Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

CONSTRUCTION

Epoxy-filled Aluminum Box
Chem film per MIL-A-8625 Type II (Anodizing)

SIZE

Volume:
60W/125W: 19.35in^3 (317cc)
250W: 38.7in^3 (634cc)
Weight:
60W/125W: 1.4 lbs (.64kg)
250W: 2.6 lbs (1.18kg)

TOLERANCE

Overall ±0.025" (0.64)
Pin to Pin ±0.015" (0.38)
Hole to Hole location ±0.025" (0.64)

CONNECTIONS	
PIN	FUNCTION
1 & 8	Input Power Ground Return
2 & 9	Positive Power Input
3	Iout Monitor
4	Enable/Disable
5	Signal Ground Return
6	Remote Adjust Input
7	+5VDC Reference Output
10, 11, 12, & 13	N/C
14	Eout Monitor
15 & 16	HV Ground Return
17 & 18	HV Output

All grounds joined internally. Power-supply mounting points isolated from internal grounds by >100kΩ, .01uF / 50V (Max).

HIGH POWER PIN CONNECTIONS (250 WATT UNITS)	
PIN	FUNCTION
2, 9, & 10	N/C
19 & 20	Positive Power Input
21 & 22	Input Power Ground Return

CE cULus IEC-60950-1

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

Manufactured in USA

Example: 1/2C24-P125

Type — Voltage — Model — Input — Power — Polarity

ORDERING INFORMATION		
Type	0 to 125 VDC Output	1/8C
	0 to 250 VDC Output	1/4C
	0 to 500 VDC Output	1/2C
	0 to 1,000 VDC Output	1C
	0 to 2,000 VDC Output	2C
	0 to 4,000 VDC Output	4C
	0 to 6,000 VDC Output	6C
Input	24VDC Nominal	24
Polarity	Positive Output	-P
	Negative Output	-N
Power	60 Watts Output	60
	125 Watts Output	125
	250 Watts Output	250
Heat Sink	.400" High (sized to fit case)	-H
PCB Support	(5 or 7) 0.187" standoffs on top cover	-Z11
Enhanced Interface	5V Control and Monitors	-I5
	10V Control and Monitors	-I10
Options	25PPM Temperature Coefficient	-25PPM

Note: For more information on the enhanced interface options, download the I5/I10 Option datasheet.

Popular accessories ordered with this product include CONN-KIT-HP250, CONN-KIT-HP and the BR-8 mounting bracket kit.

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HIGH POWER 8C-30C SERIES

8kV to 30kV High Voltage Cap-Charging Supplies

This High Power line of high-voltage regulated DC to DC converters is an extension of the C Series, directly addressing the high power density needs of >30 watt applications. High Power 8C - 30C units provide up to 60/125/250 watts. This high power density is especially suited to high-energy systems with large capacitances, fast repetition rates, or high continuous-DC-power requirements. See Application Note 10 for more changing information. Typical applications for the High Power 8C-30C Series include the following: laser, cap-charger, pulse generators, Q-switch, and TDR test equipment.

- 7 models from 0 to 8kV through 0 to 30kV
- 60, 125, or 250 watts of output power
- Maximum Iout capability down to 0 Volts
- Maximum Iout during charge/rise time
- Output short-circuit protection
- Very fast rise with very low overshoot
- High efficiency
- High power to voltage density
- Very low profile
- Output current & voltage monitors
- >200,000 hour MTBF @65°C
- Fixed-frequency, low-stored-energy design
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

PARAMETER	CONDITIONS																						UNITS
INPUT		**ALL TYPES**																					
Voltage Range	Full Power	+ 23 to 30																					VDC
Voltage Range	Derated Power Range	60W, 125W: + 11 to 30, 250W: 15-30																					VDC
Current	Standby / Disable	< 40																					mA
Current	No Load, Max Eout	8C to 15C < 500, 20C to 25C < 600																					mA
Current	Max Load, Max Eout	60W: 3.25, 125W: 6.5, 250W: 13																					A
AC Ripple Current	Nominal Input, Full Load	< 50																					mA p-p
OUTPUT		**8C**			**10C**			**12C**			**15C**			**20C**			**25C**			**30C**			
Voltage Range	Nominal Input	0 to 8,000			0 to 10,000			0 to 12,000			0 to 15,000			0 to 20,000			0 to 25,000			0 to 30,000			VDC
Power	Nominal Input, Max Eout	60	125	250	60	125	250	60	125	250	60	125	250	60	125	250	60	125	250	60	125	250	Watts
Current	Iout, Entire Output Voltage Range	7.5	15.5	31.2	6	12.5	25	5	10.5	20.8	4	8.3	16.7	3	6.25	12.5	2.4	5	10	2	4.17	8.33	mA
Current Scale Factor	Full Load	4.7	14.2	6.25	4.1	10.9	5	4.0	7.4	4.17	4.0	7.5	3.33	.65	.653	2.5	.65	.650	2	.65	.642	1.67	mA/V
Voltage Monitor Scaling		60W & 125W Models - 1000:1 ± 2% into 10MΩ; 250W Models - 10,000:1 ± 2%																					-
Internal Capacitance	Capacitance / 95% Decay (50Meg Load)	4400/ 659	2200/ 330	1500/ 225	2933/ 439	1467/ 220	1500/ 225	2933/ 439	1467/ 220	750/ 112	2200/ 330	1100/ 165	750/ 112	1320/ 200	880/ 132	750/ 112	1100/ 165	733/ 110	500/ 75	825/ 125	550/ 85	500/ 75	pF/mS
Ripple	Full Load, Max Eout	< 1%												< 1%									V p-p
Rise Time	Max Iout, Various C Loads & Eout	Figure A																					-
Storage Capacitance	Internal	4400	2200	1500	2933	1467	1500	2933	1467	750	2200	1100	750	1320	880	750	1100	733	500	825	550	500	pF
Overshoot	C Load, 0 Eout to Full Eout	< 1%																					V pk
Line Regulation	Nom. Input, Max Eout, Full Power	< 0.01%																					VDC
Static Load Regulation	No Load to Full Load, Max Eout	< 0.01%																					VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.01% / < 0.02%																					VDC
PROGRAMMING & CONTROLS		**ALL TYPES**																					
Input Impedance	Nominal Input	+ Output Models 1.1MΩ to GND, - Output Models 1.1MΩ to +5 Vref																					MΩ
Adjust Resistance	Typical Potentiometer Values	10K to 100K (Pot across Vref. & Signal GND, Wiper to Adjust)																					Ω
Adjust Logic	0 to +5 for +Out, +5 to 0 for - Out	+4.64 VDC for +Output or +0.36 for -Output = Nominal Eout																					-
Output Voltage & Impedance	T=+25°C	+ 5.00VDC ± 1%, Zout = 464Ω ± 1%																					-
Enable/Disable		0 to +0.8V Disable, +2.0 to 32 Enable (Default = Enable)																					VDC
ENVIRONMENTAL		**ALL TYPES**																					
Operating	Full Load, Max E out, Case Temperature	-40 to +65																					°C
Coefficient	Over the Specified Temperature	±50 (±25 Optional)																					PPM/°C
Thermal Shock	Mil-Std-810, Method 503-4, Proc. II	-40 to +65																					°C
Storage	Non-Operating, Case Temp.	-55 to +105																					°C
Humidity	All Conditions, Standard Package	0 to 95% non-condensing																					-
Altitude	Standard Package, All Conditions	Sea Level through 70,000																					ft
Shock	Mil-Std-810, Method 516.5, Proc. IV	20																					G's
Vibration	Mil-Std-810, Method 514.5, Fig.514.5C-3	10																					G's

Specifications subject to change without notice.

C = uF
V = Volts
I = mA
T = mS

$$T = \frac{C \times V}{I}$$

C = uF
V = kV
I = mA
F = Hz

$$I = C \times V \times F$$

C = uF
V = kV
I = mA
F = Hz

$$F = \frac{I}{C \times V}$$

C = uF
E^2 = kV
J = Ws

$$J = \frac{C \times E^2}{2}$$

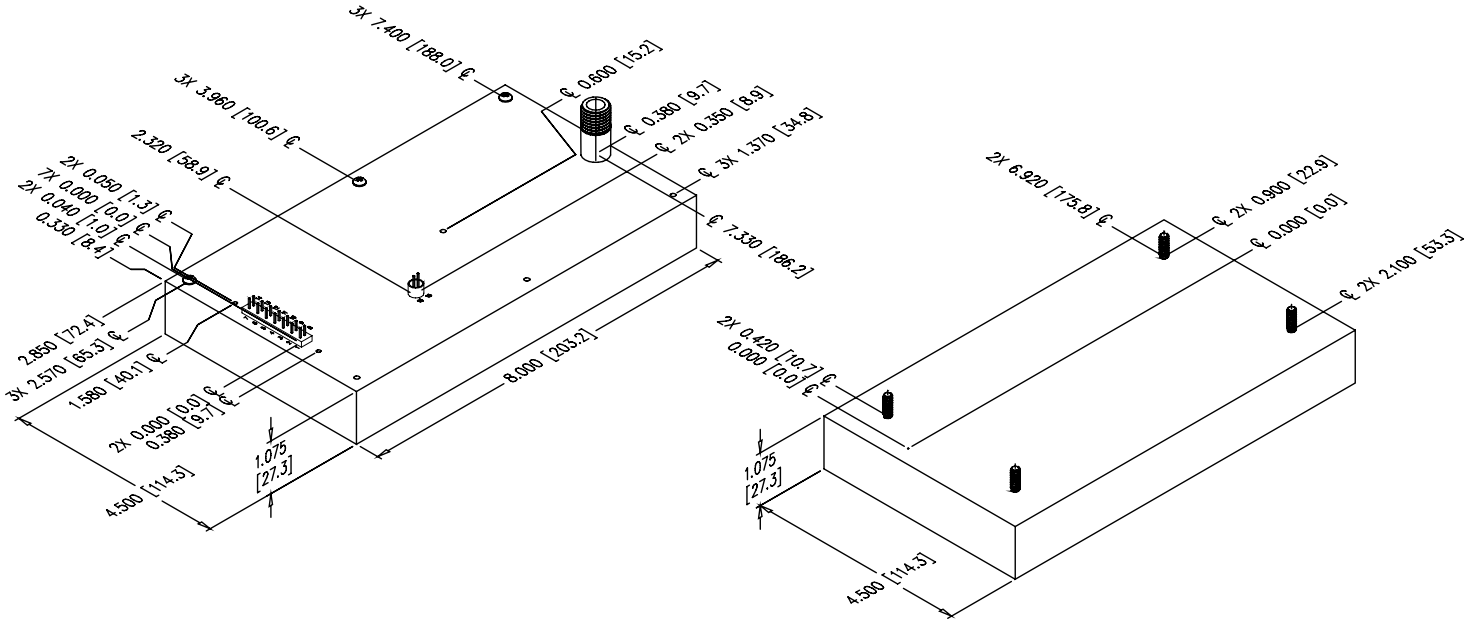
Figure A - Rise Time Formulas

NOTES: Capacitance must include HVPS internal Capacitance.

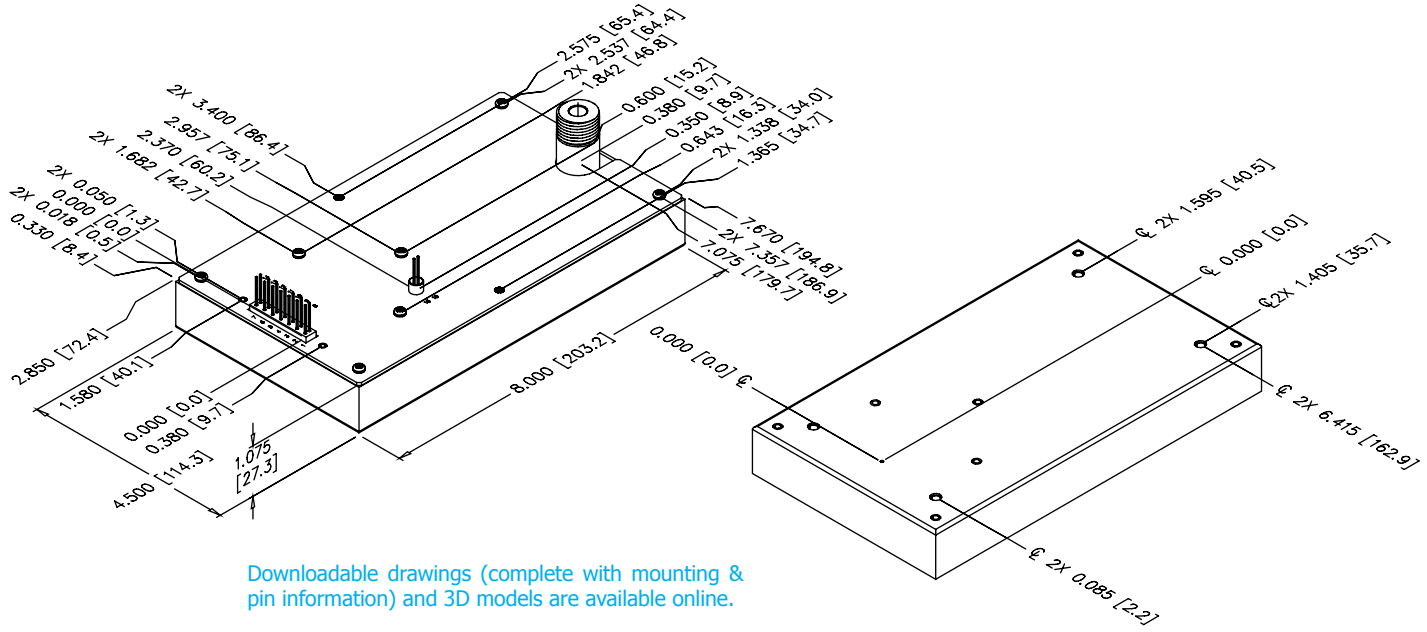
HIGH POWER 8C-30C SERIES

8kV to 30kV High Voltage Cap-Charging Supplies

8C TO 15C - 60/125W



20C TO 30C - 60/125W

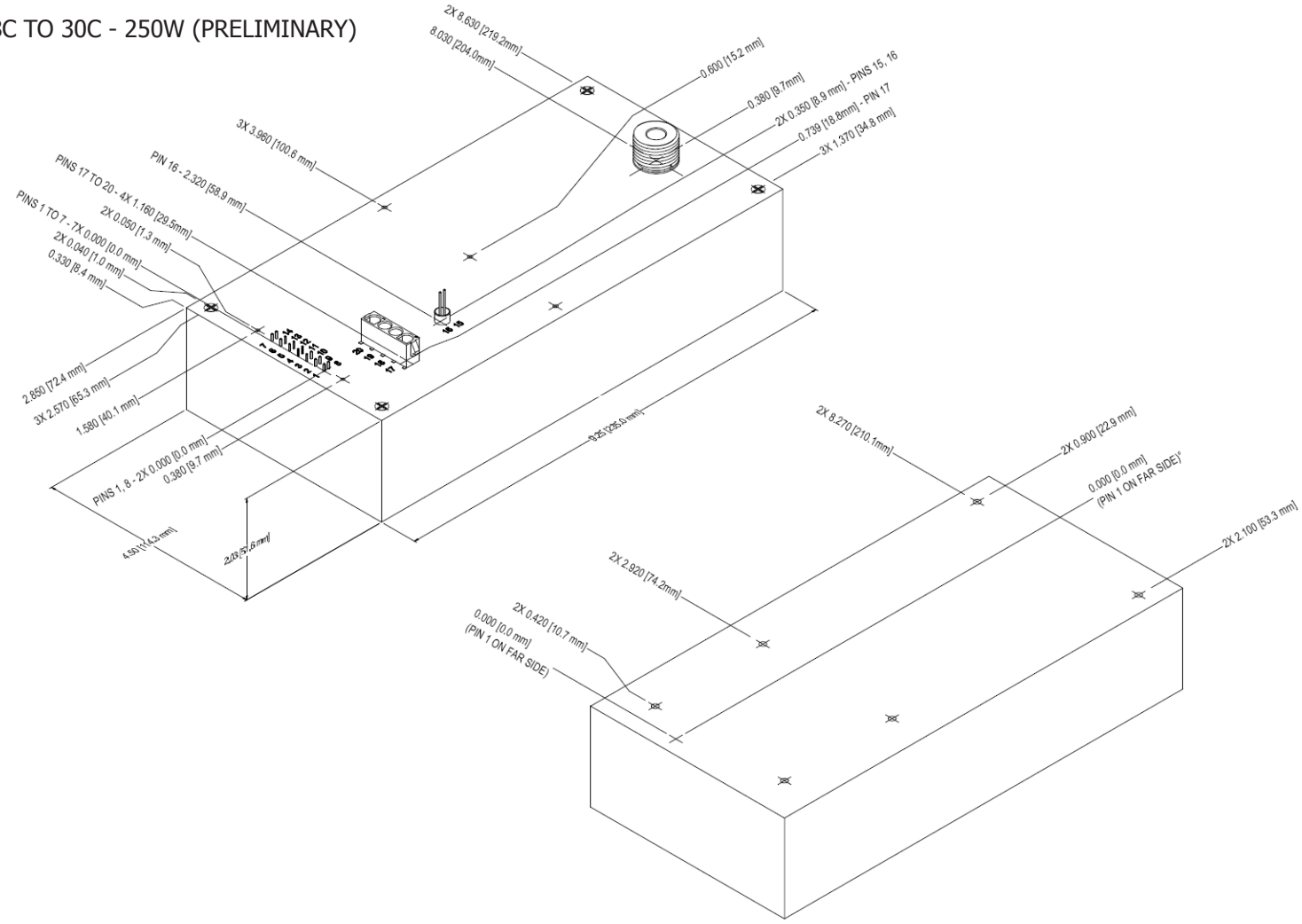


Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

HIGH POWER 8C-30C SERIES

8kV to 30kV High Voltage Cap-Charging Supplies

8C TO 30C - 250W (PRELIMINARY)



CONSTRUCTION

Epoxy-filled Aluminum Box
Chem film per MIL-A-8625 Type II (Anodizing)

SIZE - 60 & 125W MODELS

Volume 38.7 in³ (634cc)
Weight 2.6 lbs. (1.18kg)

SIZE - 250W MODELS

Volume 84.5 in³ (1386cc)
Weight 5.6 lbs. (1.18kg)

TOLERANCE

Overall ±0.025" (0.64)
Pin to Pin ±0.015" (0.38)
Hole to hole location ±0.025" (0.64)

PINS

Gold-plated 0.025 (0.64) sq.
The center of the pins and mounting holes are located from the center of pin 1
Pins 1 thru 14 spacing 0.100 (2.54) x 0.200 (5.08) on center, height from cover 0.280 (7.11) min
Pins 15 and 16 spacing 0.100 (2.54) on center, height from cover 0.450 (11.43) min

HV OUTPUT CONNECTION

Unit requires an LGH flying lead connector for proper operation:
8C to 15C (60W & 125W Models) = CA-20KV-1000
20C to 30C (60W & 125W Models) = CA-40KV-1000
8C to 30C (250W Models) = CA-40KV-1000

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HIGH POWER 8C-30C SERIES

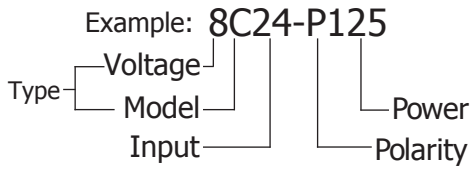
8kV to 30kV High Voltage Cap-Charging Supplies

CONNECTIONS	
PIN	FUNCTION
1 & 8	Input-Power Ground Return
2 & 9	Positive Power Input
3	Iout Monitor
4	Enable/Disable
5	Signal Ground Return
6	Remote Adjust Input
7	+5VDC Reference Output
10	N/C (or Arc Detect option)
11, 12, & 13	N/C
14	Eout Monitor
15 & 16	HV Ground Return

All grounds joined internally. Power-supply mounting points isolated from internal grounds by >100kΩ, .01uF / 500V (Max).

ORDERING INFORMATION		
Type	0 to 8,000 VDC Output	8C
	0 to 10,000 VDC Output	10C
	0 to 12,000 VDC Output	12C
	0 to 15,000 VDC Output	15C
	0 to 20,000 VDC Output	20C
	0 to 25,000 VDC Output	25C
	0 to 30,000 VDC Output	30C
Input	24VDC Nominal	24
Polarity	Positive Output	-P
	Negative Output	-N
Power	60 Watts Output	60
	125 Watts Output	125
	250 Watts Output	250
Heat Sink	.400" High (sized to fit case)	-H
PCB Support	(5) 0.187" standoffs on top cover	-Z11
Enhanced Interface	5V Controls and Monitors	-I5
	10V Control and Monitors	-I10
Options	Arc Detect	-AD
	Arc Quench	-AQ
	25PPM Temperature Coefficient	-25PPM

Note: For more information on the enhanced interface options, download the I5/I10 Option datasheet.



Popular accessories ordered with this product include CONN-KIT-HP, BR-7 and BR-8 mounting bracket kits and our full range of high voltage output connectors (see Accessories & Connectors datasheet).

CE cULus IEC-60950-1

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

Manufactured in USA

Rev. AB 12/14

10A-25A SERIES

10kV to 25kV High Voltage Biasing Supplies

The 10A-25A Series of regulated, high-voltage DC-DC converters are an extension of the A Series, directly addressing the needs of the miniature PCB or chassis-mount ≥10kV application. Designed and built utilizing state-of-the-art power conversion topology, these units feature surface-mount technology and encapsulation techniques providing high reliability and low cost. Typical applications for the 10A-25A Series include the following: electrophoresis, mass spectroscopy, electron microscopes, plasma and cathode ray tubes (CRT).

- 0 to 10kV, 15kV, 20kV, or 25kV output
- 4, 15 or 30 watts of output power
- Maximum Iout capability down to 0 Volts
- Wide input voltage range
- Indefinite output short-circuit protection
- Output current & voltage monitors
- Fixed-frequency, low-stored-energy design
- >450,000 hour MTBF @65°C
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

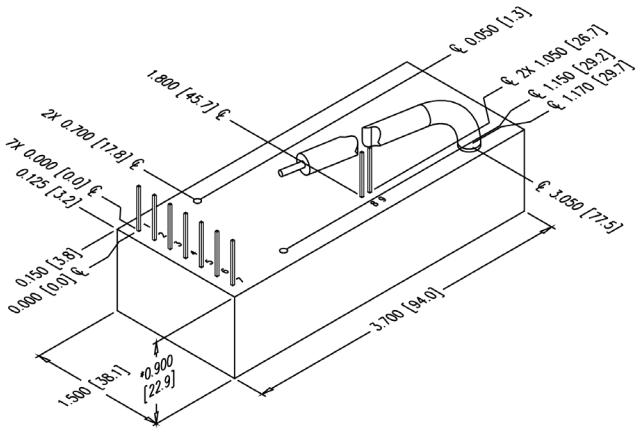
PARAMETER	CONDITIONS	MODELS												UNITS
INPUT		12V						24V						
Voltage Range	Full Power	+ 11 to 16						+ 23 to 30						VDC
Voltage Range	Derated Power Range	+ 9 to 32						+ 9 to 32						VDC
Current	Standby / Disable	< 30						< 30						mA
Current	No Load, Max Eout	10A < 0.20, 15A/20A/25A < 0.25						10A < 0.17, 15A < 0.20, 20A < 0.21, 25A < 0.25						A
Current	Max Load, Max Eout	~ 500						~ 1600						mA
AC Ripple Current	Nominal Input, Full Load	< 80						< 80						mA p-p
OUTPUT		10A			15A			20A			25A			
Voltage Range	Nominal Input	0 to 10,000			0 to 15,000			0 to 20,000			0 to 25,000			VDC
Nominal Input Voltage		12	24	24	12	24	24	12	24	24	12	24	24	VDC
Power	Nominal Input, Max Eout	4	15	30	4	15	30	4	15	30	4	15	30	Watts
Current	Iout Entire Output Voltage Range	0.40	1.5	3.0	0.26	1.0	2.0	0.20	0.75	1.5	0.16	0.60	1.2	mA
Current Scale Factor	Full Load	0.167	0.184	0.381	0.158	0.181	0.378	0.152	0.178	0.184	0.145	0.175	0.183	mA/V
Voltage Monitor Scaling		1000:1 ± 2% into 10MΩ												-
Ripple	Full Load, Max Eout, 300pF bypass Cap.	0.012	0.039	0.076	0.024	0.043	0.080	0.020	0.031	0.080	0.020	0.080	0.051	%V p-p
Ripple with -F-M Option	Full Load, Max Eout, 300pF bypass Cap.	0.008	0.034	0.072	0.021	0.028	0.073	0.010	0.018	0.039	0.010	0.040	0.040	%V p-p
Dynamic Load Regulation	½ to Full Load, Max Eout per 0.1mA	<5.0	<5.0	<5.0	<7.5	<7.5	<7.5	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	V pk
Line Regulation	Nom. Input, Max Eout, Full Power	< 0.01 %												VDC
Static Load Regulation	No Load to Full Load, Max Eout	< 0.01%												VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.01% / < 0.02%												VDC
PROGRAMMING & CONTROLS		ALL TYPES												
Input Impedance	Nominal Input	+ Output Models 1.1MΩ to GND, - Output Models 1.1MΩ to +5 Vref												MΩ
Adjust Resistance	Typical Potentiometer Values	10K to 100K (Pot across Vref. & Signal GND, Wiper to Adjust)												Ω
Adjust Logic	0 to +5 for +Out, +5 to 0 for - Out	+4.64 VDC for +Output or +0.36 for -Output = Nominal Eout												-
Output Voltage & Impedance	T=+25°C	+ 5.00VDC ± 2%, Zout = 464Ω ± 1%												-
Enable/Disable		0 to +0.5 Disable, +2.4 to 32 Enable (Default = Enable)												VDC
ENVIRONMENTAL		STANDARD						-25PPM						
Operating	Full Load, Max Eout, Case Temp.	-40 to +65						+10 to +45						°C
Coefficient	Over the Specified Temperature	± 50						± 25						PPM/°C
Thermal Shock	Mil-Std 810, Method 503-4, Proc. II	-40 to +65												°C
Storage	Non-Operating, Case Temp.	-55 to +105												°C
Humidity	All Conditions, Standard Package	0 to 95% non-condensing												-
Altitude	Standard Package, All Conditions	Sea Level through Vacuum (Vacuum may require -P2 option, contact factory for details.)												-
Shock	Mil-Std-810, Method 516.5, Proc. IV	20 (Standard), 40 (-C Option)												G's
Vibration	Mil-Std-810, Method 514.5, Fig.514.5C-3	10 (Standard), 20 (-C Option)												G's

Specifications subject to change without notice.

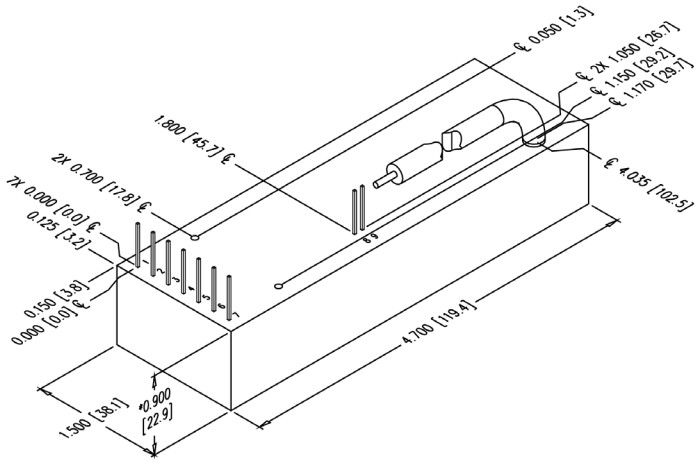
10A-25A SERIES

10kV to 25kV High Voltage Biasing Supplies

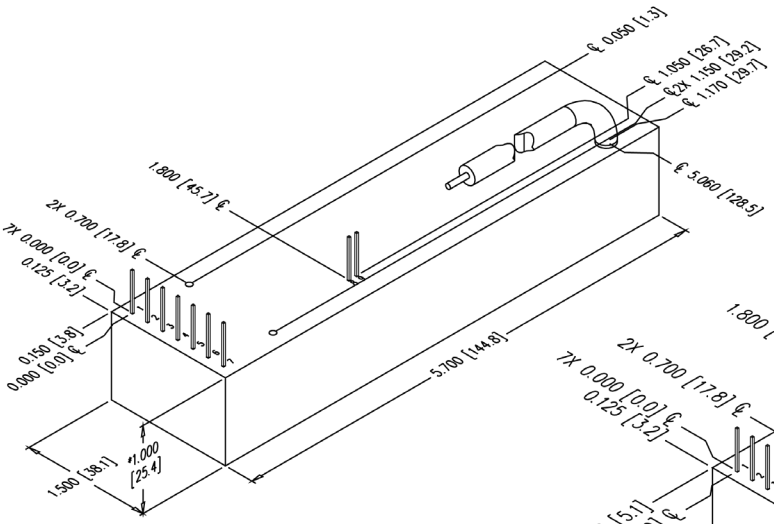
10A SERIES STANDARD CASE

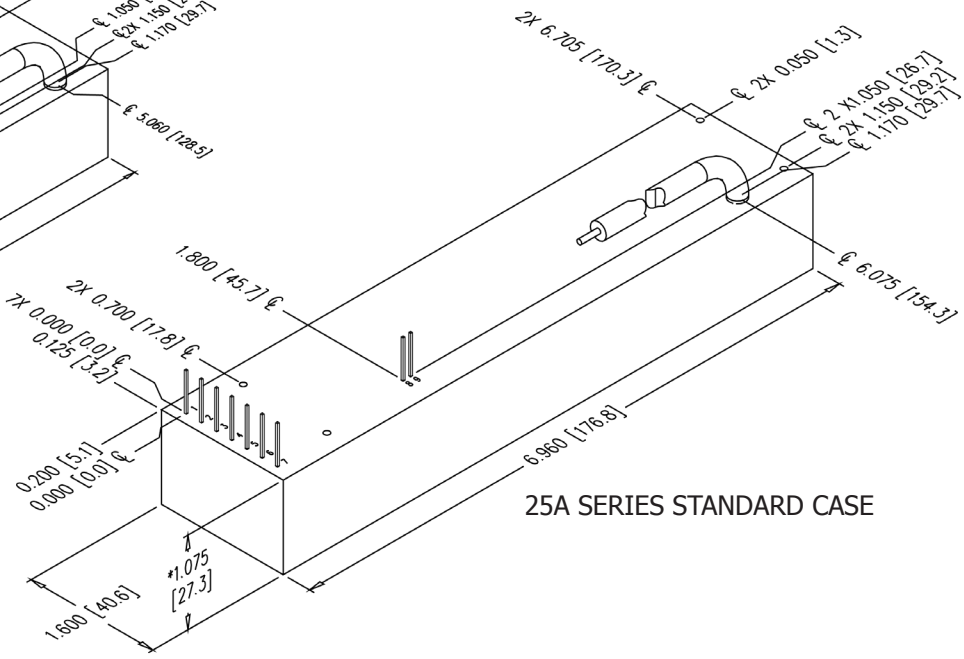


15A SERIES STANDARD CASE



20A SERIES STANDARD CASE





25A SERIES STANDARD CASE

CONSTRUCTION

Epoxy-filled DAP box certified to ASTM-D-5948 with -C Option:
Aluminum Alloy 5052-H32, Finish: MIL-A-8625 Type II (Anodizing)

SIZE

Volume:
10A: 4.90 in³ (80.31cc), w/-C Option 8.80 in³ (144.23cc)
15A: 6.35 in³ (104.08cc), w/-C Option 11.00 in³ (180.29cc)
20A: 8.55 in³ (140.13cc), w/-C Option 14.40 in³ (236.02cc)
25A: 11.70 in³ (191.76cc), w/-C Option 20.00 in³ (327.80cc)
Weight:
10A: 6.00 oz (170.10g), w/-C Option 11.50 oz (326.02g)
15A: 8.00 oz (226.80g), w/-C Option 14.00 oz (396.89g)
20A: 11.00 oz (311.84g), w/-C Option 19.00 oz (538.64g)
25A: 15.00 oz (452.24g), w/-C Option 22.00 oz (623.69g)

TOLERANCE

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole locations ±0.025" (0.64)

NOTES

Standard case length, width, and height specs are ±0.050" (1.27)
-C Option case length, width and height specs are ±0.025" (0.635)
15W and 30W versions are an additional 0.070" (1.78) in height.
-M equipped units are an additional 0.030" (0.76) for each dimension.
Contact UV Customer Service for drawings of models equipped with -E , -C, or -H options.

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

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10A-25A SERIES

10kV to 25kV High Voltage Biasing Supplies

CONNECTIONS	
PIN	FUNCTION
1	Input-Power Ground Return
2	Positive Power Input
3	Iout Monitor
4	Enable/Disable
5	Signal Ground Return
6	Remote Adjust Input
7	+5VDC Reference Output
8	HV Ground Return
9	Eout Monitor

All grounds joined internally. Power-supply mounting points isolated from internal grounds by >100kΩ, .01uF / 50V (Max) on all models except -M (15W and above), -M-E, -M-C, and -M-H configurations which are 0Ω.

ORDERING INFORMATION		
Type	0 to 10,000 VDC Output	10A
	0 to 15,000 VDC Output	15A
	0 to 20,000 VDC Output	20A
	0 to 25,000 VDC Output	25A
Input	12VDC Nominal (4W only)	12
	24VDC Nominal (15W and 30W only)	24
Polarity	Positive Output	-P
	Negative Output	-N
Power	Watts Output (12Vin Only)	4
	Watts Output (24Vin Only)	15
	Watts Output (24Vin Only)	30
Case	Plastic Case - Diallyl Phthalate	(Standard)
	'Eared' Chassis Mounting Plate (Plastic Case)	-E
	RF-Tight Aluminum Enclosure	-C
Heat Sink	.400" High (sized to fit case)	-H
Shield	Six-sided Mu-Metal Shield	-M
Ripple Stripper®	Integral Output Filter (See -F Option Datasheet) and Mu-Metal	-F-M
Options	Shielded Flying Lead for HV Output	-WS
Lead Options	Protected Flying Lead	-AP
	Terminated Flying Lead (Contact Customer Service)	-ATxx
Temp. Coefficient	25PPM Temperature Coefficient	-25PPM
Enhanced Interface (10A models only)	5V Control and Monitors	-I5
	10V Control and Monitors	-I10

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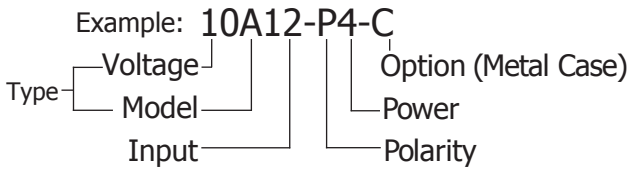
RoHS COMPLIANT Non-RoHS compliant units are available. Please contact the factory for more information.

Manufactured in USA



Popular accessories ordered with this product include CONN-KIT, BR-2, BR-3, and BR-5 mounting bracket kits, and our full range of high voltage output connectors (see Accessories & Connectors datasheet).

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30A-40A SERIES

30kV to 40kV High Voltage Biasing Supplies

The 30A-40A Series of regulated, high-voltage DC-DC converters are an extension of the A Series, directly addressing the needs of the miniature PCB or chassis-mount ≥30kV application. Designed and built utilizing state-of-the-art power conversion topology, these units feature surface-mount technology and encapsulation techniques providing high reliability and low cost. Typical applications for the 30A-40A Series include the following: electrostatic discharge testers, plasma, electrostatic, x-ray, and wire testers.

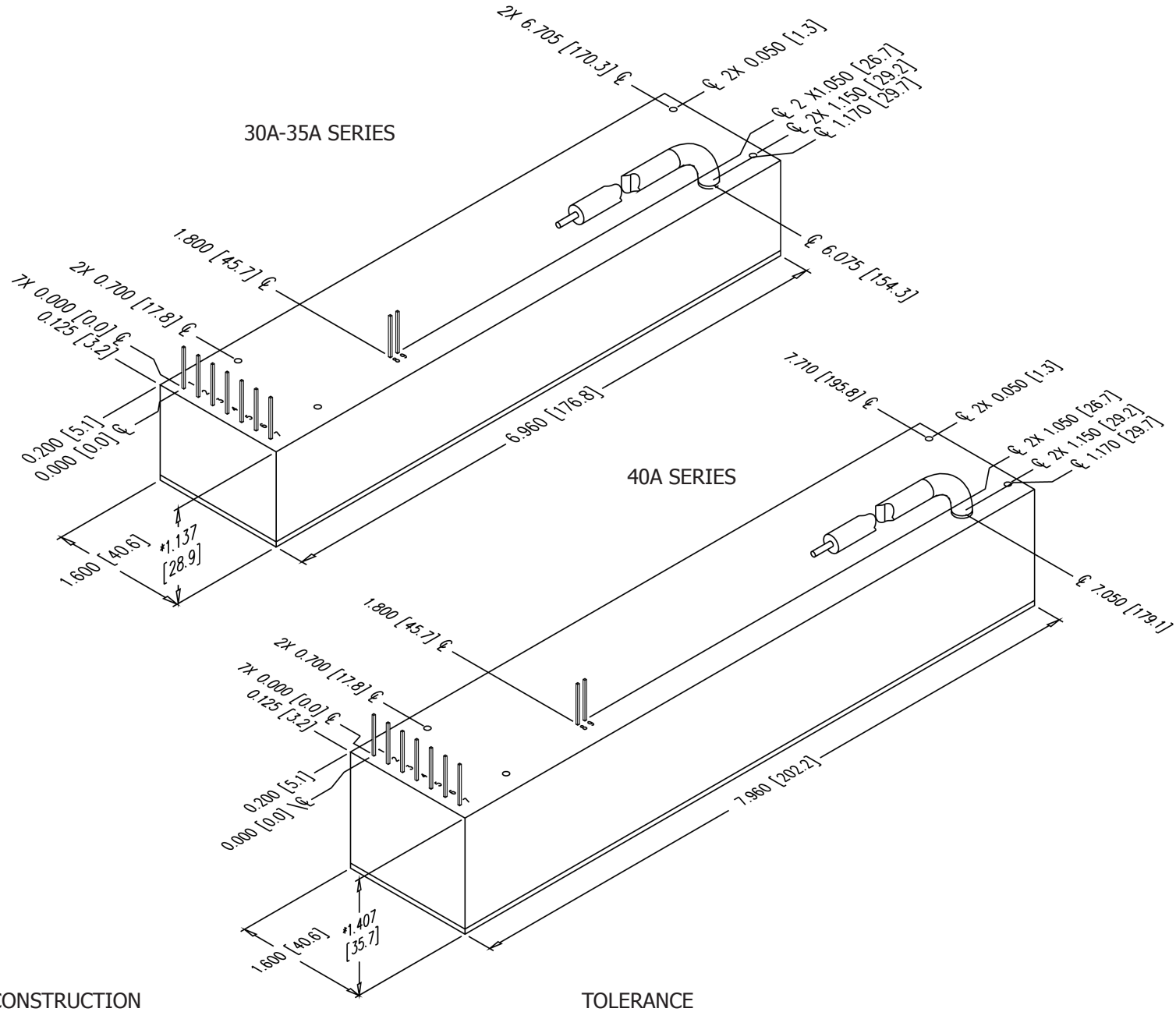
- 0 to 30kV, 35kV or 40kV output
- 4, 15 or 30 watts of output power
- Maximum Iout capability down to 0 Volts
- Wide input voltage range
- Indefinite output short-circuit protection
- Output current & voltage monitors
- Fixed-frequency, low-stored-energy design
- >400,000 hour MTBF @65°C
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

PARAMETER	CONDITIONS	MODELS									UNITS
INPUT		12V			24V						
Voltage Range	Full Power	+ 11 to 16			+ 23 to 30						VDC
Voltage Range	Derated Power Range	+ 9 to 32			+ 9 to 32						VDC
Current	Standby / Disable	< 30			< 30						mA
Current	No Load, Max Eout	30A < 0.25, 35A < 0.35, 40A < 0.38			30A < 0.30, 35A < 0.20, 40A < 0.38						A
Current	Max Load, Max Eout	~ 800			~1800						mA
AC Ripple Current	Nominal Input, Full Load	< 80			< 80						mA p-p
OUTPUT		30A			35A			40A			
Voltage Range	Nominal Input	0 to 30,000			0 to 35,000			0 to 40,000			VDC
Nominal Input Voltage / Model		12	24	24	12	24	24	12	24	24	VDC
Power	Nominal Input, Max Eout	4	15	30	4	15	30	4	15	30	Watts
Current	Iout Entire Output Voltage Range	0.13	0.50	1.0	0.11	0.42	0.86	0.10	0.37	0.75	mA
Current Scale Factor	Full Load	.140	.173	.181	.158	.179	.184	.077	.089	.092	mA/V
Voltage Monitor Scaling		1000:1 ± 2% into 10MΩ									-
Ripple	Full Load, Max Eout, 300pF bypass Cap.	0.025	0.039	0.058	0.025	0.040	0.075	0.030	0.060	0.064	%V p-p
Ripple with -F-M Option	Full Load, Max Eout, 300pF bypass Cap.	0.021	0.028	0.048	0.016	0.034	0.040	0.007	0.025	0.053	%V p-p
Dynamic Load Regulation	½ to Full Load, Max Eout per 0.1mA	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	V pk
Line Regulation	Nom. Input, Max Eout, Full Power	< 0.01 %									VDC
Static Load Regulation	No Load to Full Load, Max Eout	< 0.01%									VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.01% / < 0.02%									VDC
PROGRAMMING & CONTROLS		ALL TYPES									
Input Impedance	Nominal Input	+ Output Models 1.1MΩ to GND, - Output Models 1.1MΩ to +5 Vref									MΩ
Adjust Resistance	Typical Potentiometer Values	10K to 100K (Pot across Vref. & Signal GND, Wiper to Adjust)									Ω
Adjust Logic	0 to +5 for +Out, +5 to 0 for - Out	+4.64 VDC for +Output or +0.36 for -Output = Nominal Eout									-
Output Voltage & Impedance	T=+25°C	+ 5.00VDC ± 2%, Zout = 464Ω ± 1%									-
Enable/Disable		0 to +0.5 Disable, +2.4 to 32 Enable (Default = Enable)									VDC
ENVIRONMENTAL		STANDARD			-25PPM						
Operating	Full Load, Max Eout, Case Temp.	-40 to +65			+10 to +45						°C
Coefficient	Over the Specified Temperature	± 50			± 25						PPM/°C
Thermal Shock	Mil-Std 810, Method 503-4, Proc. II	-40 to +65									°C
Storage	Non-Operating, Case Temp.	-55 to +105									°C
Humidity	All Conditions, Standard Package	0 to 95% non-condensing									-
Altitude	Standard Package, All Conditions	Sea Level through Vacuum (Vacuum may require -P2 option, contact factory for details.)									-
Shock	Mil-Std-810, Method 516.5, Proc. IV	20 (Standard), 40 (-C Option)									G's
Vibration	Mil-Std-810, Method 514.5, Fig.514.5C-3	10 (Standard), 20 (-C Option)									G's

Specifications subject to change without notice.

30A-40A SERIES

30kV to 40kV High Voltage Biasing Supplies



CONSTRUCTION

Epoxy-filled DAP box certified to ASTM-D-5948 with -C Option:
Aluminum Alloy 5052-H32, Finish: MIL-A-8625 Type II (Anodizing)

SIZE

Volume:
30A/35A: 12.66 in³ (207.46cc), w/-C Option 20.00 in³ (327.80cc)
40A: 17.92 in³ (293.66cc), w/-C Option 27.00 in³ (442.53cc)
Weight:
30A/35A: 15.00 oz (425.24g), w/-C Option 22.00 oz (623.69g)
40A: 21.00 oz (595.34g), w/-C Option 30.00 oz (850.49g)

TOLERANCE

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole locations ±0.025" (0.64)

NOTES

-M equipped units are an additional 0.030" (0.76) for each dimension.
Contact UV Customer Service for drawings of models equipped with -E , -C, or -H options.

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

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30A-40A SERIES

30kV to 40kV High Voltage Biasing Supplies

CONNECTIONS	
PIN	FUNCTION
1	Input-Power Ground Return
2	Positive Power Input
3	Iout Monitor
4	Enable/Disable
5	Signal Ground Return
6	Remote Adjust Input
7	+5VDC Reference Output
8	HV Ground Return
9	Eout Monitor

All grounds joined internally. Power-supply mounting points isolated from internal grounds by >100kΩ, .01uF / 50V (Max) on all models except -M (15W and above), -M-E, -M-C, and -M-H configurations which are 0Ω.

ORDERING INFORMATION		
Type	0 to 30,000 VDC Output	30A
	0 to 35,000 VDC Output	35A
	0 to 40,000 VDC Output	40A
Input	12VDC Nominal (4W only)	12
	24VDC Nominal (15W and 30W only)	24
Polarity	Positive Output	-P
	Negative Output	-N
Power	Watts Output (12 V Only)	4
	Watts Output (24 V Only)	15
	Watts Output (24 V Only)	30
Case	Plastic Case - Diallyl Phthalate	(Standard)
	'Eared' Heatsink Plate (Plastic Case)	-E
	RF-Tight Aluminum Enclosure	-C
Heatsink	.400" High (sized to fit case)	-H
Shield	Six-sided Mu-Metal Shield	-M
Ripple Stripper®	Integral Output Filter (See -F Option Data Sheet) and Mu-Metal	-F -M
Lead Options	Shielded Flying Lead	-AS
	Protected Flying Lead	-AP
	Terminated Flying Lead (Contact Customer Service)	-ATxx
Temp. Coefficient	25PPM Temperature Coefficient	-25PPM

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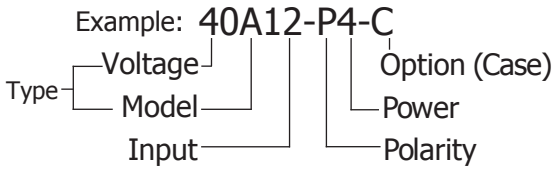
RoHS COMPLIANT

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

Manufactured in USA



Popular accessories ordered with this product include CONN-KIT, BR-5 and BR-9 mounting bracket kits, and our full range of high voltage output connectors (see Accessories & Connectors datasheet).

Rev. X 10/14

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E SERIES

Precision High Voltage Power Supply

The E Series of precision high-voltage power supplies has very low ripple, excellent linearity, and very stable temperature characteristics. Models in this series are offered with a 10ppm temperature coefficient and reference. The control and monitoring functions are available on a standard DB15 female connector.

Typical applications for the E Series include the following: mass spectrometry, electron beams, ion beams, and contraband detection.

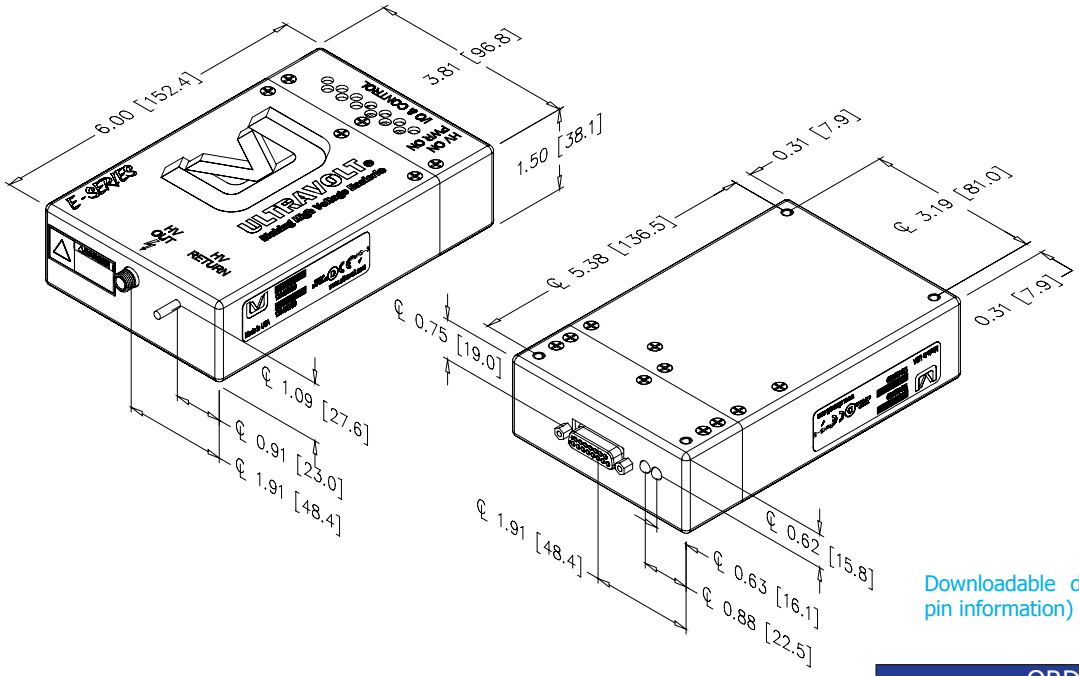
- Precision output voltage from 0 to 1kV thru 0 to 15kV
- 4, 15/20, or 30 watts of output power
- Maximum Iout capability down to 0 Volts
- Current regulation standard
- Wide input voltage range
- Output current monitor
- As low as 10ppm temperature coefficient and reference
- PPM level ripple
- PPM level regulation and stability

PARAMETER	CONDITIONS	MODELS																		UNITS
INPUT		**ALL TYPES**																		
Voltage Range	Full Power	+ 23 to 30																		VDC
Current	Standby / Disable	< 50																		mA
Current	No Load, Max Eout	< 325																		mA
Current	Full Load, Max Eout	2.5																		A
AC Ripple Current	Nominal Input, Full Load	< 10																		mA p-p
OUTPUT		**1E**			**2E**			**4E**			**6E**			**10E**			**15E**			
Voltage Range	Nominal Input	0 to 1,000			0 to 2,000			0 to 4,000			0 to 6,000			0 to 10,000			0 to 15,000			VDC
Nominal Input Voltage / Model		24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	VDC
Power	Nominal Input, Max Eout	4	20	30	4	20	30	4	20	30	4	20	30	4	15	30	4	15	30	Watts
Current	Iout Entire Output Voltage Range	4	20	30	2	10	15	1	5	7.5	0.67	3.3	5	0.4	1.5	3	0.26	1	2	mA
Voltage Monitor	Normal Operating Conditions	0 to 10 ±0.5%																		VDC
Current Monitor	Normal Operating Conditions	0 to 10 ±0.1%																		VDC
Ripple	Full Load, Max Eout	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	PPM
Line Regulation	Nom. Input, Max Eout, Full Power	< 25ppm or < 10ppm																		VDC
Static Load Regulation	No Load to Full Load, Max Eout	<25ppm or < 10ppm																		VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 25ppm or < 10ppm																		VDC
PROGRAMMING & CONTROLS		**ALL TYPES**																		
Input Impedance	Nominal Input	10																		MΩ
Adjust Accuracy & Adjust Linearity	10% to 100%	0.5%																		%
Adjust Voltage	Differential	0 to +10																		VDC
Output Voltage	T= +25°C, Initial Value	+10.00 ± 0.05%																		VDC
Max Source Current	T= +25°C	1																		mA
Output Impedance	Normal Operating Conditions	Buffered, low impedance, 2mA max for source/sink current																		-
Enable/Disable		0 to +0.8 Disable, +2.5 to 10 Enable (Default = Disable)																		VDC
ENVIRONMENTAL		**ALL TYPES**																		
Operating	Full Load, Max Eout, Case Temp.	+10 to +45																		°C
Temperature Coefficient	Over the Specified Temperature	± 25 or ± 10																		PPM/°C
Thermal Shock	Mil-Std 810, Method 504, Class 2	-40 to +65																		°C
Storage	Non-Operating, Case Temp.	-55 to +105																		°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																		G's
Vibration	Mil-Std-810, Method 514, Fig. 514-3	10																		G's

Specifications subject to change without notice.

E SERIES

Precision High Voltage Power Supply



CONSTRUCTION

Material: Aluminum Alloy 5052-H32
Finish: Anodize MIL-A-8625E Blue

SIZE

Volume 34.29 in³ (561.9cc)
Weight 2.4lbs (1.1kg)

TOLERANCE

Overall ± 0.030" (1.27)
Pin to Pin ± 0.015" (0.38)
Mounting Hole Location ± 0.025" (0.64)

CONNECTIONS

D-Sub 15 Pin Female
HV Connector, LGH1/2L
HV Return, #6-32 x 0.437 Long Threaded Post

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

RoHS COMPLIANT

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

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Manufactured in USA

E SERIES INPUT CONNECTOR PINOUT AND FUNCTIONS		
PIN	DESCRIPTION	FUNCTION
1	Reference Voltage	(+)10.00V precision reference
2	Voltage Programming -	0 to 10 volts to program full output voltage Programming input is differential between pins 2 and 3
3	Voltage Programming +	
4	Voltage Monitor	0 to +10 volts represents 0 to full output voltage
5	Voltage Mode Indicator	Open drain active low when in voltage control
6	Signal Ground	Reference all control signals here
7	Input Power	+23 to +30V
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 volts represents 0 to full output current
13	Current Programming	0 to +10 volts sets current from 0 to full rated output current
14	Current Mode Indicator	Open drain active low when in current control
15	Signal Ground	Reference all control signals here

NOTE: Use stud next to High Voltage output connector as HV Return, a secure ground connection here is critical to safety and proper operation.

ORDERING INFORMATION		
Type	0 to 1,000 VDC Output	1E
	0 to 2,000 VDC Output	2E
	0 to 4,000 VDC Output	4E
	0 to 6,000 VDC Output	6E
	0 to 10,000 VDC Output	10E
	0 to 15,000 VDC Output	15E
Input	24V Input	24
Polarity	Positive Output	-P
	Negative Output	-N
Power	4 Watts Output	4
	15 Watts Output (10kV & 15kV only)	15
	20 Watts Output (1kV to 6kV only)	20
	30 Watts Output	30
Performance Level	10ppm Line/Load Regulation, Stability, and Temp. Co.	-10PPM
	25ppm Line/Load Regulation, Stability, and Temp. Co.	-25PPM
Connectors	LGH	(Standard)
	5kV, SHV Type	-SHV-5KV
	10kV, BNC Type	-BNC-10KV

Example: 2E24-P20-10PPM

Type — Voltage — Model — Input — Polarity — Power — Performance Level

Popular accessories ordered with this product include our full range of high voltage output connectors (see Accessories & Connectors data sheet).

Rev. K 10/14

1800 Ocean Avenue, Ronkonkoma, NY 11779
Phone: 1-631-471-4444 Fax: 1-631-471-4696 www.ultravolt.com

XS SERIES

Extra-small High Voltage Biasing Supply

The XS Series of extra-small high-voltage power supplies is the smallest **regulated** DC-DC high-voltage power supply for applications that require a bias voltage ranging from 0 to 100V. At only 0.08in³ (1.3cc), these modules are ideal for use in size-critical applications.

- Output from 0 to 100V
- 100 milliwatts of output power
- Tight line/load regulation
- Output current limit protection
- 5 Volts DC Input
- Extra-small and lightweight
- PCB flat mounting
- Temperature coefficient <50ppm/°C
- Low ripple (<50mV peak to peak)
- Low noise due to metal shielding

Typical applications for the XS Series include the following:

Bias Supplies	Thin-film
Avalanche Photo Diodes (APD)	Ultrasonic
Silicon Photomultipliers (SiPM)	
Multi-pixel Photon Counter (MPPC)	

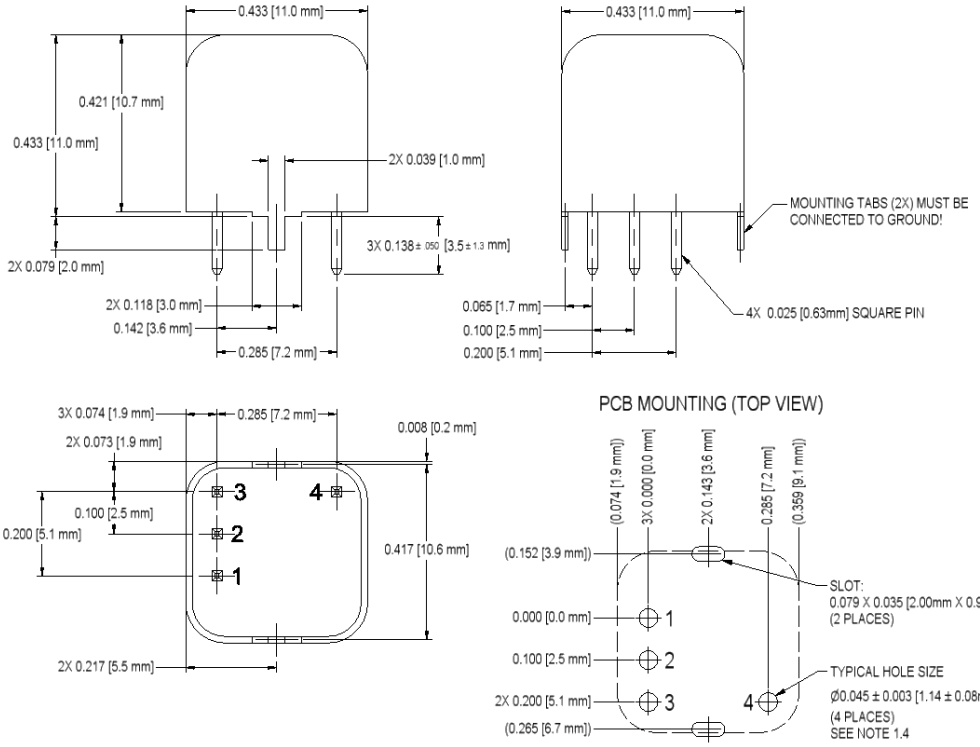
Please contact UltraVolt's customer service department for an analysis of your requirements.

PARAMETER	SPECIFICATION	UNITS
Input voltage Vin (pins 1 & 2)	5VDC ±0.5 (recommended) maximum: 12Vdc (reverse: -0.2V)	VDC
Input current	For 0V output voltage: <1.6 For 100V, no load: <3 At full output voltage, full load: <50	mA
HV output Vout (pin 4)	0 to 100 programmable	VDC
Output Power	0 to 100	mW
Polarity	Fixed positive or negative	-
HV setting (pin 3)	Via external voltage source 0/2.5V Accuracy: ±2% at full scale	-
Max. output current Iout	1 nominal	mA
Load voltage regulation	±0.01% of full output voltage for no load to full load	-
Line voltage regulation	±0.01% of full output voltage over specified input voltage range	-
Residual ripple	<50mV peak-to-peak – ripple can be reduced to less than 10mV by adding an external 100nF small CMS capacitor	-
Temperature coefficient	<50	PPM/°C
Output HV monitoring	Not available on this product	-
Output reference voltage	Not available on this product	-
HV power ON/OFF	Not available on this product	-
Operating temperature	-10 to +65, Full load, Max Eout, Case Temp	°C
Storage temperature	-10 to +70	°C
Safeguards	• Output current internally limited • Soft start feature: low overshoot	-
Shielding	Ground return is to metal enclosure	-

Specifications subject to change without notice.

XS SERIES

Extra-small High Voltage Biasing Supply



CONSTRUCTION

Steel, tin plated, thickness 0.02" (0.5)
Insulation: fully potted in an epoxy resin

SIZE

Volume: 0.081in³ (1.331cc)
Weight: 0.176oz (5g)

TOLERANCE

Overall ±0.030" (0.76)
Pin to Pin ±0.015" (0.38)
Pin to Tab ±0.020" (0.51)
Tabs to Tab ±0.020" (0.51)
Tab features ±0.020" (0.51)

PINS

Gold Plated 0.025" (0.63) sq.
Length > 0.079" (2)
Spacing 0.1" (2.54)

DRAWING VIEWS

Third angle projections

CONNECTIONS	
PIN	FUNCTION
1	Positive Power Input
2	Ground Return
3	Remote Adjust Input
4	HV Output

Note: Mounting tabs must be connected to ground.

ORDERING INFORMATION		
Type	0 to 100 VDC Output	0.1XS
Input	5VDC Nominal	5
Power	Watts Output	0.1
Case	Steel, Tin Plated	(Standard)
Polarity	Positive Output	-P
	Negative Output	-N

IEC-60950-1

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

Example: 0.1XS5-P0.1

Type — Voltage, Model, Input, Power, Polarity

Popular accessories ordered with this product include the PCB-CONN-XS.

Rev. E 2/14

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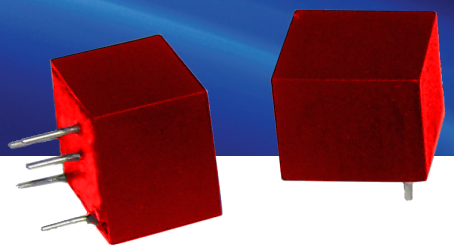
PXS SERIES

Proportional Extra-small High Voltage Power Supply



The PXS Series of proportional extra-small high voltage power supplies has excellent load regulation characteristics as well as superior temperature stability characteristics. The small size of the units, ease of control, and high stability, make the PXS Series optimal for hand-held devices, portable equipment, and other small high-voltage projects.

Typical applications for this series include the following:

Bias supply for PZT actuators, MEMS devices, Capillary Electrophoresis, ink jet printing, capacitor charging, and detectors such as Pin Diodes, Avalanche Photo Diodes (APD).

Rail Supplies for beam devices such as mass spectrometry, and electron microscopes as well as drivers for Piezoelectric devices (PZT).

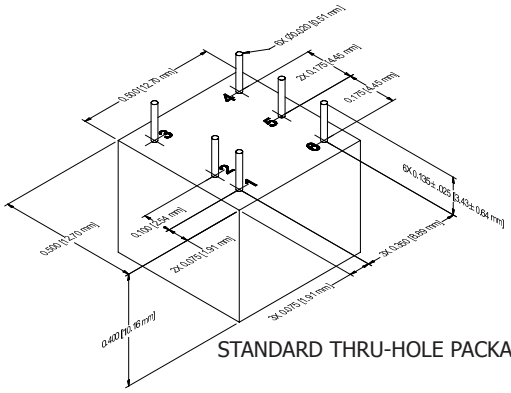
- Ultra-miniature size 0.1 cubic inch (1.6cc)
- Unipolar models 0 to 50V through 300V
- Bipolar models 0 to ±25V through ±150V
- Proportional or fixed output voltage
- Output power of 0 to 1.5 watts or 3 watts
- Excellent load regulation
- Efficiency as high as 90%
- 1000V of isolation from input to output
- Output can be floated up to 1kV
- No heat sink or electrical derating required
- Lower ripple available with Mu-Metal shielding (-M option)

PARAMETER	CONDITIONS	MODELS												UNITS
INPUT		**ALL TYPES**												
Voltage Range	Proportional Output Range & Fixed Output	2.5 to 3.47 = 75% to 105% Max, 3.3 = 100%		3.0 to 5.25 = 60% to 105% Max, 5.0 = 100%		4.5 to 9.45 = 50% to 105% Max, 9.0 = 100%		6.0 to 12.6 = 50% to 105% Max, 12.0 = 100%		7.5 to 15.75 = 50% to 105% Max, 15.0 = 100%		18.0 to 25.2 = 75% to 105% Max, 24.0 = 100%		21.0 to 29.4 = 75% to 105% Max, 28 = 100%		VDC
Current	Standby / Disable	< 10												mA
Current	No Load, Max Eout	3.3V: < 140mA, 28V: < 40mA												mA
Current	Max Load, Max Eout	3.3V: < 600mA, 28V: < 100mA												A
OUTPUT (UNIPOLAR)		**50V**		**100V**		**150V**		**200V**		**250V**		**300V**		**VDC**
Voltage, Fixed	Nominal Input	50		100		150		200		250		300		VDC
Voltage Range Proportional	XX% to 105%, Model Specific	25 to 52.5		50 to 105		75 to 157.5		100 to 210		125 to 262.5		150 to 315		VDC
Power	Nominal Input, Max Eout	1.5	3	1.5	3	1.5	3	1.5	3	1.5	3	1.5	3	W
Current	Iout Entire Output Voltage Range	30	60	15	30	10	20	7.5	15	6	12	5	10	mA
OUTPUT (BIPOLAR)		**±25V**		**±50V**		**±75V**		**±100V**		**±125V**		**±150V**		**VDC**
Voltage, Fixed	Nominal Input	±25		±50		±75		±100		±125		±150		VDC
Voltage Range Proportional	XX% to 105%, Model Specific	±12.5 to ±26.25		±25 to ±52.5		±37.5 to ±78.75		±50 to ±105		±62.5 to ±131.25		±75 to ±157.5		VDC
Power	Nominal Input, Max Eout	1.5	3	1.5	3	1.5	3	1.5	3	1.5	3	1.5	3	W
Current	Iout Entire Output Voltage Range	30	60	15	30	10	20	7.5	15	6	12	5	10	mA
OUTPUT		**ALL TYPES**												
Isolation	Input to Output	100 MΩ minimum at 1000												VDC
Ripple	Full Load, Max Eout	< 1%												%V p-p
Dynamic Load Regulation	½ to Full Load, Max Eout	< 5%												VDC
Line Regulation	Nom. Input, Max Eout, Full Power	Unregulated: Output directly proportional to input, Excellent tracking see TN-XX												-
Static Load Regulation	No Load to Full Load, Max Eout	1.5 Watt < 6%; 3 Watt < 10%												VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 5%												VDC
PROGRAMMING & CONTROLS		**ALL TYPES**												
Enable/Disable		0 to +0.7 Disable, +2.9 to +5V or Vin (whichever is less) (Default = Enable)												-
ENVIRONMENTAL		**ALL TYPES**												
Operating	Full Load, Max Eout, Case Temp.	1.5 Watt -55 to +85; 3 Watt -55 to +60												°C
Storage	Non-Operating, Case Temp.	-55 to +125												°C
Temperature Coefficient	Over the Specific Temperature	200												PPM/°C
Humidity	All Conditions, Standard Package	0 to 95% non-condensing												-
Shock	Mil-Std-810, Method 516.5, Proc. IV	20												G's
Vibration	Mil-Std-810, Method 514.5, Fig.514.5C-3	10												-

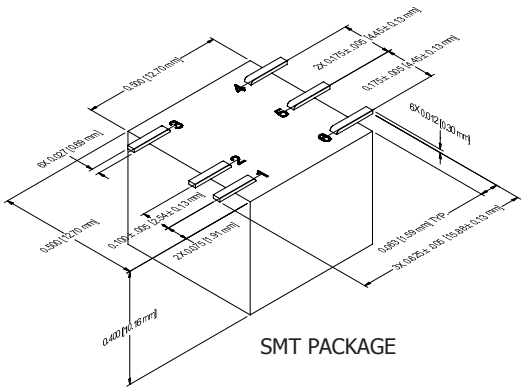
Specifications subject to change without notice.

PXS SERIES

Proportional Extra-small High Voltage Power Supply



STANDARD THRU-HOLE PACKAGE



SMT PACKAGE

CONNECTIONS		
PIN	FUNCTION (-BP)	FUNCTION (-FL)
1	-Vin	-Vin
2	Enable	Enable
3	+Vin	+Vin
4	+Vout	+Vout
5	Center tap / Common	-Vout
6	-Vout	N/A

RoHS COMPLIANT

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

NOTE:

Output is isolated from the input by 1kV
Either output can be floating ground or grounded
Thereby setting output polarity to + or -

The PXS Series only has intermittent short circuit protection

CONSTRUCTION

Epoxy filled Red DAP box certified to ASTM-D-5948

SIZE

L x W x H = 0.500 (12.7mm) x 0.500 (12.7mm) x 0.400 (10.2mm)
Volume: 0.1in³ (1.639cc)
Weight: 0.127oz (3.6g)

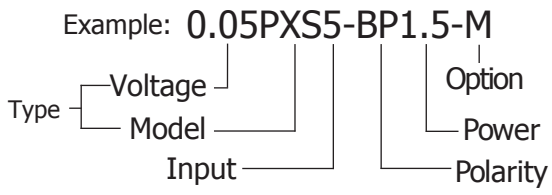
TOLERANCE

All dimensions have a tolerance of ±0.010 [0.25mm] unless otherwise specified.

PINS

Standard Thru-hole: Brass, tin over nickel plated, 0.020 [0.51mm] Round
SMT: Copper, tin plated, 0.012 [0.30mm] x 0.027 [0.69mm]

ORDERING INFORMATION		
Type (Nominal)	25VDC Output (Bipolar only)	0.025PXS
	50VDC Output	0.05PXS
	75V Output (Bipolar only)	0.075PXS
	100V Output	0.1PXS
	125V Output (Bipolar only)	0.125PXS
	150V Output	0.15PXS
	200V Output (Unipolar only)	0.2PXS
	250V Output (Unipolar only)	0.25PXS
	300V Output (Unipolar only)	0.3PXS
Input	3.3VDC Nominal (1.5 watt only)	3.3
	5VDC Nominal	5
	9VDC Nominal	9
	12VDC Nominal	12
	15VDC Nominal	15
	24VDC Nominal	24
	28VDC Nominal	28
Case	Through Hole Pins	(Standard)
	SMT Pins	-SMT
Polarity	Floating Output	-FL
	Bipolar Output (Floating Center Tap)	-BP
Power	1.5 Watts Output	1.5
	3 Watts Output	3
Option	Mu-Metal Shield	-M



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US SERIES

Microsize, Micropower High Voltage Power Supply

At only 0.35in³ (5.75cc), the highly-compact microsize US Series is specially designed to meet the needs of design engineers working with commercial, military, industrial, and research applications. These modules allow customers with critical size requirements access to voltages up to 500V.

- 4 models from 0 to 200V, 300V, 400V, or 500V
- 100 milliwatts of output power
- Tight line/load regulation
- Arc and short circuit protection
- 5 or 12 Volts DC Input
- TTL enable/disable
- Miniature and lightweight
- PCB flat mounting
- Temperature coefficient of 50ppm/°C
- Optional flying lead for HV output
- Low ripple
- Low noise due to metal shielding
- 2.5V reference

Typical applications for the US Series include the following:

Bias Supplies	Fiber-optic Telecommunications
Avalanche Photo Diodes (APD)	Particle Physics
Silicon Photomultipliers (SiPM)	Laser Range Finders

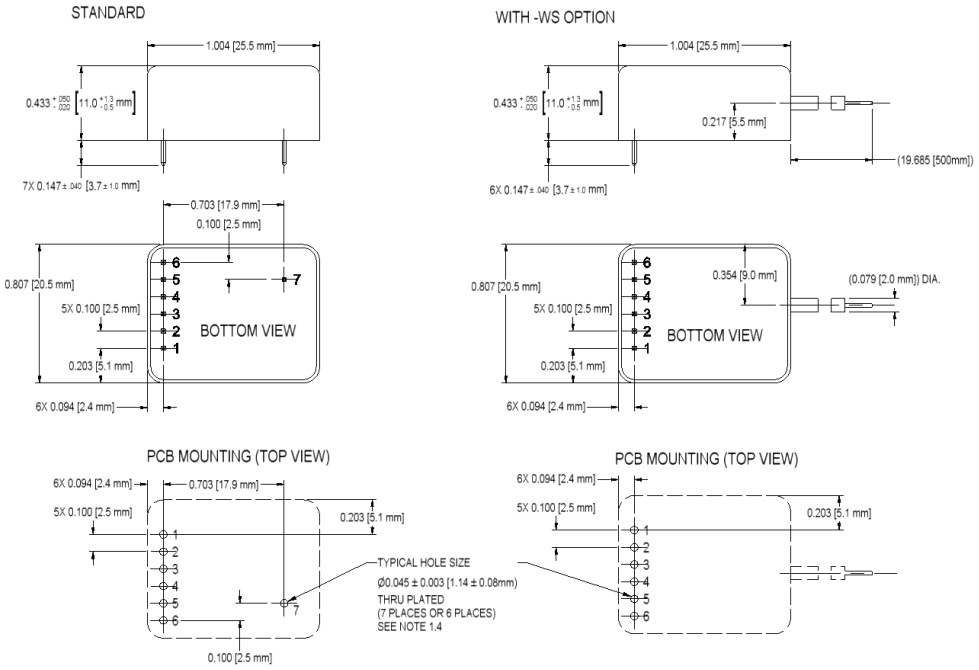
Please contact UltraVolt's customer service department for an analysis of your requirements.

PARAMETER	SPECIFICATION				UNITS
Input voltage Vin (pins 1 & 2)	5VDC ±0.5 or 12 to 15 ±0.5				VDC
Input current	Inhibition mode: <5 at full output voltage, full load:				mA
	<65 (200Vout)	<60 (300Vout)	<55 (400Vout)	<50 (500Vout)	mA
Polarity	Fixed positive or negative				
Output Voltage	0 to 200	0 to 300	0 to 400	0 to 500	VDC
Output Current	500	330	250	200	uA
HV setting (pin 3)	Via external potentiometer, minimum resistance 10kΩ or Via external voltage source 0/2.5V ±0.5% at full scale, and input impedance >1MΩ				-
Load voltage regulation	±0.01% of full output voltage for no load to full load				-
Line voltage regulation	±0.01% of full output voltage over specified input voltage range				-
Residual ripple	<0.01% peak-to-peak at full output voltage and current				-
Temperature coefficient	<50				PPM/°C
Output HV monitoring (pin 2)	0/2.5V signal Accuracy : ±0.2% Output impedance : 1kΩ				-
Output reference voltage (pin 4 - optional)	2.5V ±0.5%, TC:50ppm/°C, Max. output current : 1mA				-
HV power ON/OFF (pin 5)	ON: 0 volt, connected to ground OFF: not connected Open collector compatible				-
Operating temperature	-10 to +65, Full load, Max Eout, Case Temp				°C
Storage temperature	-40 to +70				°C
Safeguards	Output current internally limited Soft start feature: the start is guaranteed with no overshoot				-

Specifications subject to change without notice.

US SERIES

Microsize, Micropower High Voltage Power Supply



CONSTRUCTION

Steel, tin plated, thickness 0.02" (0.5)
Insulation: fully potted in an epoxy resin

SIZE

Volume: 0.351in³ (5.750cc)
Weight: 0.459oz (13g)

TOLERANCE

Overall ±0.030" (0.76)
Pin to Pin ±0.015" (0.38)
Case to Pin ±0.030" (0.76)

NOTES

Pin length > 0.078" (2), spacing 0.1" (2.54)
Optional lead: coaxial cable (RG178), diameter = 0.079" (2), length = 19.685" (500)

DRAWING VIEWS

Third angle projections

CONNECTIONS	
PIN	FUNCTION
1	Positive Power Input
2	Power Ground
3	Remote Adjust Input
4	+2.5VDC Reference Output
5	Enable/Disable
6	Eout Monitor
7	HV Output

Note: Mounting tabs must be connected to ground.

RoHS COMPLIANT

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

ORDERING INFORMATION		
Type	0 to 200 VDC Output	0.2US
	0 to 300 VDC Output	0.3US
	0 to 400 VDC Output	0.4US
	0 to 500 VDC Output	0.5US
Input	5VDC Nominal	5
	12VDC Nominal	12
Power	Watts Output	0.1
Case	Steel, Tin Plated Case	(Standard)
Polarity	Positive Output	-P
	Negative Output	-N
Option	Output voltage lead wire	-WS

Example: 0.5US5-P0.1-WS

Type — Voltage — Model — Input — Polarity — Power — Option

Popular accessories ordered with this product include the PCB-CONN-US.

IEC-60950-1

Rev. F 2/14

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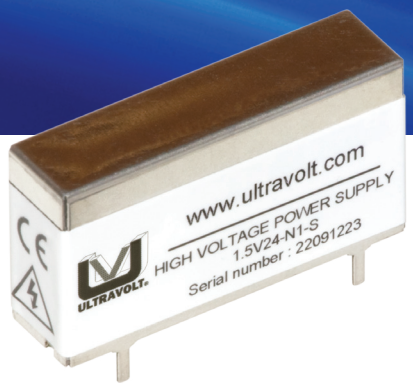
V SERIES

Vertical, Microsize High Voltage Biasing Supply



The vertical, microsize V Series is the ideal solution for applications that require a bias voltage ranging from 0 to 3000V and very small current, at only 0.84in³ (13.8cc). With a footprint under 1in² (2.54cm²), these modules are perfect for applications with limited board space.

- 7 models from 0 to 600V, 1000V, 1250V, 1500V, 2000V, 2500V, or 3000V
- 0.5, 0.8, or 1 watt of output power
- Tight line/load regulation
- Arc and continuous short circuit protection
- Self restoring output voltage
- Low cost
- Miniature and lightweight
- Voltage monitoring
- Low ripple (0.01% peak to peak)
- Optional flying lead for HV output

Typical applications for the V Series include the following:

Bias Supplies	Scanning Electron Microscopes (SEM)
Avalanche Photo Diodes (APD)	Photomultiplier Tubes (PMT)

Please contact UltraVolt's customer service department for an analysis of your requirements.

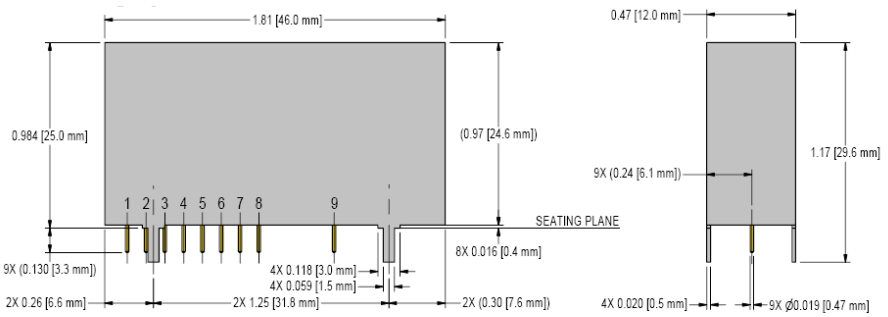
PARAMETER	SPECIFICATION												UNITS
Input voltage Vin (pins 1 & 2)	5 ± 0.5 (2-3kV ONLY) 12 ± 1, 15 ± 1 (600V-1.5kV ONLY), or 24 ± 2												VDC
Input Voltage	5 (2-3kV Only)			12			15 (600V-1.5kV ONLY)			24			V
Input Current	No load: 55, Full load: 450			No load: 45, Full load: 200			No load: 40, Full load: 190			No load: 35, Full load: 160			mA
Polarity	Fixed positive and fixed negative												-
Output Voltage	0 to 600			0 to 1000			0 to 1250			0 to 1500			VDC
Input Voltage	12	15	24	12	15	24	12	15	24	12	15	24	VDC
Output Power	0.5	0.8	1	0.5	0.8	1	0.5	0.8	1	0.5	0.8	1	W
Output Current	0.83	1.33	1.67	0.5	0.8	1	0.4	0.64	0.8	0.33	0.53	0.67	mA
Output Voltage	0 to 2000			0 to 2500			0 to 3000						VDC
Input Voltage	5	12	24	5	12	24	5	12	24				VDC
Output Power	0.5	0.8	1	0.5	0.8	1	0.5	0.8	1				W
Output Current	0.25	0.40	0.50	0.20	0.32	0.40	0.167	0.267	0.333				mA
HV setting	10K to 100K (Potentiometer Across Vref. & Signal Ground, Wiper to Adjust)												-
Load voltage regulation	<0.01% of full output voltage for no load to full load												VDC
Line voltage regulation	<0.01% of full output voltage over specified input voltage range												VDC
Residual ripple	<0.01% at full load												Vpk-pk
Temperature coefficient	100ppm/°C for the maximum output voltage after starting and over temperature range 0 to 50°C												-
Output Voltage Monitor (600V-1500V)	+1V/1kV max. or -1V/-1kV max. according to model polarity output impedance = 200kΩ ±1%												-
Output Voltage Monitor (2kV-3kV)	12-24V Input Only: 0 to +5V±2% 5V Inputs: 0 to +2.5V±2%												VDC
Reference Voltage	12-24V Input Only: 5V ±1%, TC:100ppm/°C, max. output current: 1mA 5V Inputs: 2.5V ±1%, TC:100ppm/°C, max. output current: 1mA												-
Operating temperature	-10 to +65, Full load, Max Eout, Case Temp												°C
Storage temperature	-20 to +70												°C
Safeguards	Arc and short circuit protection												-
Options	• Flying wire for HV output • Suitable for use with an external potentiometer												-
Enhanced Interface (-EI) Option (2kV-3kV Only)	Enable/Disable (ON/OFF): 0V to +0.5V Enable, +2.4V to V_input Disable (Default = Disable)												-
	Output Current Monitor (5V Input Only): 0 to +2.5V±2% Output Current Monitor (12-24V Input): 0 to +5.0V±2%												-

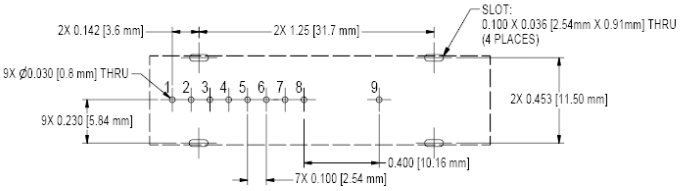
Specifications subject to change without notice.

V SERIES

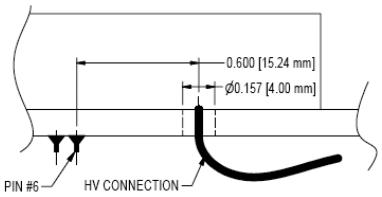
Vertical, Microsize High Voltage Biasing Supply

Note: Pins 7 & 8 are available for 2k-3kV units with Enhanced Interface option ONLY





PCB MOUNTING (TOP VIEW)



FLYING LEAD OPTION "-WS"

CONNECTIONS	
PIN	FUNCTION
1	Positive Power Input
2	Power Ground
3	Signal Ground
4	Remote Adjust Input
5	Reference Voltage
6	Voltage Monitor
7	Current Monitor (Available with -EI Option ONLY)
8	Enable (Available with -EI Option ONLY)
9	HV Output

Note: Mounting tabs must be connected to ground.

RoHS COMPLIANT

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

CE cULus IEC-60950-1

CONSTRUCTION

Steel, tin plated, thickness 0.02" (0.5)
Insulation: fully potted in an epoxy resin

SIZE

Volume: 0.84in³ (13.8cc)
Weight: 1.23oz (35g)

TOLERANCE

Overall ±0.0030" (0.76)
Pin to Pin ±0.015" (0.38)
Tabs location ±0.020" (0.51)
Tab to Tab ±0.010" (0.25)

NOTES

0.019" (0.47) round pins, length: 0.12" (3), spacing: 0.1" (2.54)
PCB mounting through 4 mounting tabs: Length: 0.2" (5), width: 0.059" (1.5), thickness: 0.02" (0.5)
Optional flying lead for HV output: Coaxial cable (RG178), diameter = 0.079" (2) length = 19.685" (500)

DRAWING VIEWS

Third angle projections

ORDERING INFORMATION		
Type	0 to 600 VDC Output	0.6V
	0 to 1,000 VDC Output	1V
	0 to 1,250 VDC Output	1.25V
	0 to 1,500 VDC Output	1.5V
	0 to 2,000 VDC Output	2V
	0 to 2,500 VDC Output	2.5V
	0 to 3,000 VDC Output	3V
Input	5VDC Nominal (2-3kV Only)	5
	12VDC Nominal	12
	15VDC Nominal (600V-1.5kV Only)	15
	24VDC Nominal	24
Power	0.5 Watt Output	0.5
	0.8 Watt Output	0.8
	1 Watt Output	1
Case	Tin Steel Case	(Standard)
Polarity	Positive Output	-P
	Negative Output	-N
Option	Shielded Flying Lead for HV Output (600V-1.5kV Only)	-WS
	Flying Lead for HV Output (2-3kV Only)	-W
	Current Monitor/Enable Pin (2-3kV Only)	-EI

Example: 1.5V24-P1-WS

Type — Voltage — Model — Input — Power — Polarity — Option

Popular accessories ordered with this product include the PCB-CONN-M/V.

*The V Series is not available in all territories. Please contact an UltraVolt Applications Engineer for details concerning sales in your area.

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Phone: 1-631-471-4444 Fax: 1-631-471-4696 www.ultravolt.com

M SERIES

Miniature, Microsize High Voltage Biasing Supply

The miniature, microsize M Series is the ideal solution for applications that need a biasing voltage ranging from 0 to 3000V and very small current, at only 1.00in³ (16.4cc). At less than 0.5in (12.7mm) in height, these modules are ideal for low profile applications.

- 7 models from 0 to 600V, 1000V, 1250V, 1500V, 2000V, 2500V, or 3000V
- 0.5, 0.8, or 1 watt of output power
- Tight line/load regulation
- Arc and continuous short circuit protection
- Self restoring output voltage
- Low cost
- Miniature and lightweight
- Voltage monitoring
- Low ripple (0.01% peak to peak)
- Optional flying lead for HV output

Typical applications for the M Series include the following:

Bias Supplies	Electrostatic chuck (E-chuck)
Avalanche Photo Diodes (APD)	Photomultiplier Tubes (PMT)

Please contact UltraVolt's customer service department for an analysis of your requirements.

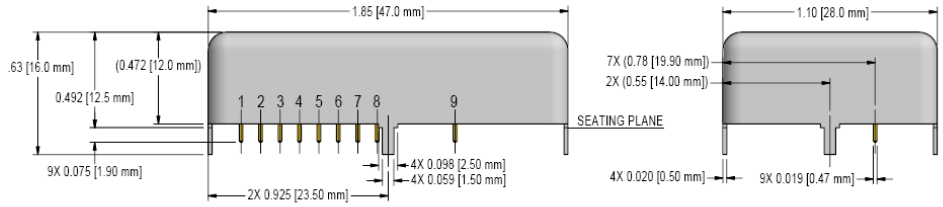
PARAMETER	SPECIFICATION												UNITS
Input Voltage Vin (pins 1 & 2)	5 ±0.5 (2kV-3kV ONLY), 12 ±1, 15 ±1 (600V-1.5KV ONLY), or 24 ±2												VDC
Input Voltage	5 (2kV-3kV ONLY)			12			15 (600V-1.5kV ONLY)			24			V
Input Current	No load: 55, Full load: 450			No load: 45, Full load: 200			No load: 40, Full load: 190			No load: 35, Full load: 160			mA
Polarity	Fixed positive and fixed negative												-
Output Voltage	0 to 600			0 to 1000			0 to 1250			0 to 1500			VDC
Input Voltage	12	15	24	12	15	24	12	15	24	12	15	24	VDC
Output Power	0.5	0.8	1	0.5	0.8	1	0.5	0.8	1	0.5	0.8	1	W
Output Current	0.83	1.33	1.67	0.5	0.8	1	0.4	0.64	0.8	0.33	0.53	0.67	mA
Output Voltage	0 to 2000			0 to 2500			0 to 3000						VDC
Input Voltage	5	12	24	5	12	24	5	12	24				VDC
Output Power	0.5	0.8	1	0.5	0.8	1	0.5	0.8	1				W
Output Current	0.25	0.40	0.50	0.20	0.32	0.40	0.167	0.267	0.333				mA
HV setting	10K to 100K (Potentiometer Across Vref. & Signal Ground, Wiper to Adjust)												-
Load voltage regulation	<0.01% of full output voltage for no load to full load												VDC
Line voltage regulation	<0.01% of full output voltage over specified input voltage range												VDC
Residual ripple	<0.01% at full load												Vpk-pk
Temperature coefficient	100ppm/°C for the maximum output voltage after starting and over temperature range 0 to 50°C												-
Output Voltage Monitoring (600V-1500V)	+1V/1kV max. or -1V/-1kV max. according to model polarity output impedance = 200kΩ ±1%												-
Output Voltage Monitoring (2kV-3kV)	12-24V Input Only: 0 to +5V±2% 5V Inputs: 0 to +2.5V±2%												VDC
Reference voltage	12-24V Input Only: 5V ±1%, TC:100ppm/°C, max. output current: 1mA 5V Inputs: 2.5V ±1%, TC:100ppm/°C, max. output current: 1mA												-
Operating temperature	-10 to +65, Full Load, Max Eout, Case Temp												°C
Storage temperature	-40 to +70												°C
Safeguards	Arc and short circuit protection												-
Options	• Flying Lead for HV output • Suitable for use with an external potentiometer												
Enhanced Interface (-EI) Option (2kV-3kV Only)	Enable/Disable (ON/OFF): 0V to +0.5V Enable, +2.4V to V_input Disable (Default = Disable)												-
	Output Current Monitor (5V Input Only): 0 to +2.5V±2% Output Current Monitor (12-24V Input): 0 to +5.0V±2%												-

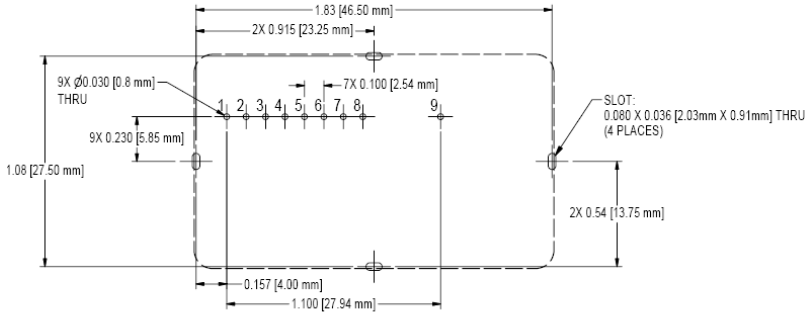
Specifications subject to change without notice.

M SERIES

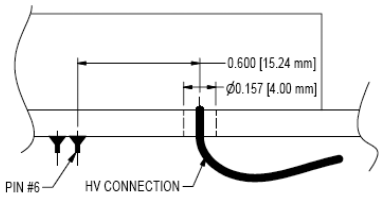
Miniature, Microsize High Voltage Biasing Supply

Note: Pins 7 & 8 are available for 2k-3kV units with Enhanced Interface option ONLY





PCB MOUNTING (TOP VIEW)



FLYING LEAD OPTION "-WS"

CONNECTIONS	
PIN	FUNCTION
1	Positive Power Input
2	Power Ground
3	Signal Ground
4	Remote Adjust Input
5	Reference Voltage
6	Voltage Monitor
7	Current Monitor (Available with -EI Option ONLY)
8	Enable (Available with -EI Option ONLY)
9	HV Output

Note: mounting tabs must be connected to ground.

RoHS COMPLIANT

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

CONSTRUCTION

Steel, tin plated thickness 0.02" (0.5)
Insulation: fully potted in an epoxy resin

SIZE

Volume: 1.00in³ (16.4cc)
Weight: 1.23oz (35g)

TOLERANCE

Overall ±0.030" (0.76)
Pin to Pin ±0.015" (0.38)
Pin to Tab ±0.020" (0.51)
Tab to Tab ±0.010" (0.25)

NOTES

0.019" (0.47) round pins, length: 0.12" (3), spacing: 0.1" (2.54)

PCB mounting through 4 mounting tabs: Length: 0.2" (5), width: 0.059" (1.5), thickness: 0.02" (0.5)

Optional flying lead for HV output: Coaxial cable (RG178), diameter = 0.079" (2), length = 19.685" (500)

DRAWING VIEWS

Third angle projections

ORDERING INFORMATION		
Type	0 to 600 VDC Output	0.6M
	0 to 1,000 VDC Output	1M
	0 to 1,250 VDC Output	1.25M
	0 to 1,500 VDC Output	1.5M
	0 to 2,000 VDC Output	2M
	0 to 2,500 VDC Output	2.5M
	0 to 3,000 VDC Output	3M
Input	5VDC Nominal (2-3kV Only)	5
	12VDC Nominal	12
	15VDC Nominal (600V-1.5kV Only)	15
	24VDC Nominal	24
Power	0.5 Watt Output	0.5
	0.8 Watt Output	0.8
	1 Watt Output	1
Case	Tin Steel Case	(Standard)
Polarity	Positive Output	-P
	Negative Output	-N
Option	Shielded Flying Lead for HV Output (600V-1.5kV Only)	-WS
	Flying Lead for HV Output (2-3kV Only)	-W
	Current Monitor/Enable Pin (2-3kV Only)	-EI

Example: 1.5M24-P1-WS

Type: Voltage, Model — Input — Power — Polarity — Option

Popular accessories ordered with this product include the PCB-CONN-M/V.

CE c UL us IEC-60950-1

*The M Series is not available in all territories. Please contact an UltraVolt Applications Engineer for details concerning sales in your area.

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GMA SERIES

High Voltage Power Supply

The GMA Series of proportional DC to DC high-voltage power supply modules provides designers a miniature low-cost PCB mount solution with a nominal performance HV output.

The GMA Series operates from an input voltage of 1.2VDC to 12VDC or 2.4 to 24VDC. By proportionally controlling the input voltage to the module over this input range, an output range of 10% to 100% is generated. The 8 models in the GMA series range from 10V to 100VDC through 300V to 3kV output voltage with 0 to 1.5 watts of output power.

Optional Isolation of the HV output from the LV input is available at 100V, allowing the designer to ground the HV output at a remote point and to introduce a current sense resistor if needed. Optional low noise models deliver ≤0.1% pk-pk ripple through the use of an output filter & shielded enclosure.

GMA Series units are protected against reversed polarity inputs, output short circuit and open circuit conditions. These converters are fully encapsulated in UL Listed GE RTV627 and are 100% tested before shipment.

Typical applications for this series include the following:

Drivers for pulse generators, PZT actuators, MEMS devices, laser & electro-optic modulation, ink jet printing and electrophoresis.

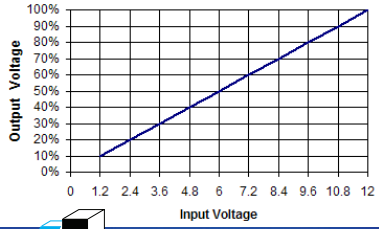
Bias Supply for general purposes, detectors, Geiger-Muller tubes, Avalanche Photo Diode (APD), PMT, SiD, beam deflection and focusing in mass spectrometry (Ion Beam) and electron microscopes (E-Beam).

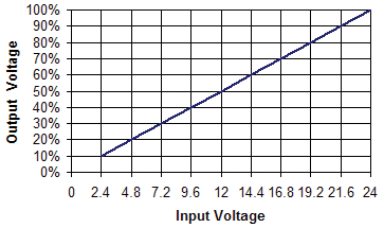
- 8 models from 10V to 100VDC through 300V to 3kV DC
- Proportional – HV output tracks the input to within 10%
- Output power of 0 to 1.5 Watts - No minimum load!
- Output ripple of ≤1.0% Vpk-pk, <0.1% with "-F-M" option
- Output regulation 10% typical, 20% max

- 100V of isolation from input to output ("-ISN" option)
- No heat sink or electrical derating required
- Efficiency >50% at full load

- See the PXS & RS Series for higher performance.
- >280,000 hour MTBF @40°C per Mil-HDBK-217F-N2
- CE Mark (LVD & RoHS)

PARAMETER	CONDITIONS	MODELS								UNITS
INPUT		12V				24V				
Voltage Range	Full Power	1.2 to 12				2.4 to 24				VDC
Current	No Load, Nominal Eout	Typically 33mA to 56mA for 12V Units; 19mA to 32mA for 24V Units								mA
Current	Nominal Load, Nominal Eout	Typically 225mA for 12V Units; Typically 125mA for 24V Units								mA
OUTPUT		100V	200V	300V	500V	1000V	1500V	2000V	3000V	
Voltage	Nominal Input	10 to 100	20 to 200	30 to 300	50 to 500	100 to 1,000	150 to 1,500	200 to 2,000	300 to 3,000	VDC
Power	Nominal Input, Max Eout	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	W
Current	Iout Entire Output Voltage Range	15	7.5	5	3	1.5	1	0.75	0.5	mA
OUTPUT		ALL TYPES								
Voltage Adjust	Proportional	Input Voltage of 10% to 100% programs the Output Voltage 10% to 100% ±10% full scale								V
Ripple	Full Load, Max Eout	≤1%								%V p-p
Ripple with "-F-M" Option	Full Load, Max Eout, 300pF bypass cap, 25% to 50% reduction	≤0.1%								%V p-p
Line Regulation	Nom. Input, Max Eout, Full Power	Output is proportional to input over a 10% to 100% input range, with a variation of +10% of rated output voltage								VDC
Static Load Regulation	No Load to Full Load, Max Eout	Typically < 10% (for a zero to 1.5W Load Change) maximum 20%								VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.10%								VDC
ENVIRONMENTAL		ALL TYPES								
Operating	Full Load, Max Eout, Case Temp.	-20 to +60								°C
Temperature Coefficient	Over the Specified Temperature	400								PPM/°C
Storage	Non-Operating, Case Temp.	-40 to +85								°C
Humidity	Non-Condensing	0 to 90% Non-Condensing								-

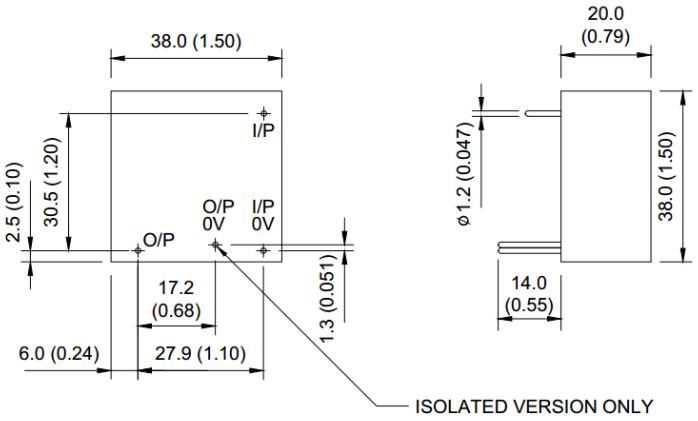




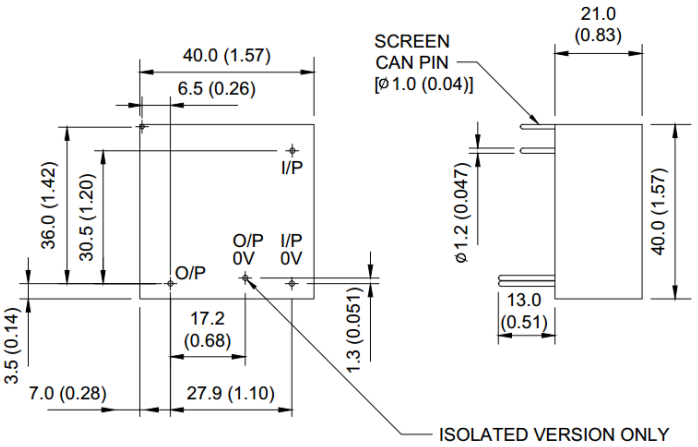
Specifications subject to change without notice.

GMA SERIES
High Voltage Power Supply

STANDARD VERSION



SHIELDED VERSION



CONSTRUCTION

Black ABS case

Insulation: Fully Encapsulated in RTV silicon.

SIZE

Dimensions:

Standard: 1.5" x 1.5" x 0.79" [38mm x 38mm x 20mm]

Shielded: 1.58" x 1.58" x 0.86" [40mm x 40mm x 21mm]

Volume: 1.77 in³ [28.88 CC]
Weight: 2oz [60g]

Tolerance:

TBD

NOTES:

Isolated version 100V maximum.

CONNECTIONS	
PIN	FUNCTION
I/P	Input Power
I/P 0V	Input Power Ground
O/P 0V	HV Output Power Ground (Isolated Version)
O/P	HV Output

These component power supplies meet the requirements of EC Directive 73/23/EEC (LVD)

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

ORDERING INFORMATION		P/N	ALT P/N
Output	0 to 100 VDC	0.1	100
	0 to 200 VDC	0.2	200
	0 to 300 VDC	0.3	300
	0 to 500 VDC	0.5	500
	0 to 1,000 VDC	1	1k
	0 to 1,500 VDC	1.5	1k5
	0 to 2,000 VDC	2	2k
	0 to 3,000 VDC	3	3k
Model	Series Name	GMA	GMA
Input	12 V	12	12
	24 V	24	24
Polarity	Postive Output	-P	-P
	Negative Output	-N	-N
Power	0 to 1.5W Output	1.5	
Options	Ripple Stripper Output Filter & Shielded Case	-F-M	-S
	100V Input / Output Isolation	-ISN	-I

Contact the factory for other output requirements!

Example: 0.2GMA12-P1.5-M

Type — Output — Model — Input — Polarity — Power — Option

Alternate Part # Example: GMA12-200PS

Type — Model — Input — Output — Polarity — Option

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RS SERIES
Rail Supply

The RS Series of "Rail Supply" DC to DC high voltage power supplies enable designers to provide a low cost nominal performance Bipolar High Voltage 10Watt power source to amplifier and pulser circuits as well as other applications.

This single device solution is available in (12) models from ±50VDC to ±700VDC fixed output or over a range of 50% to 100% under proportional input or analog programmable control. Together with an output center tap isolated to ±2.5kV, designers can optimize the bias voltage for their applications quickly and easily.

These PCB or chassis mount modules are designed and built utilizing state-of-the-art power-conversion topology, manufacturing process, and encapsulation techniques that provide high reliability.

Typical applications for this series include the following:

Drivers for pulse generators, PZT actuators, MEMS devices, laser & electro-optic modulation, and Electrophoresis.

Amplifiers for beam devices such as mass spectrometry, Ion Beam, and electron microscopes.

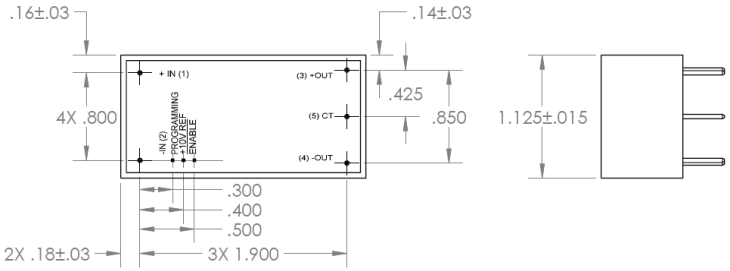
- 12 Bipolar models 0 to ±50 to ±700VDC or 100 to 1400VDC Unipolar
- Proportional, programmable, or fixed output voltage
- Output power of 0 to 10 Watts - No minimum load!
- Excellent accuracy ≤±1%
- Excellent load regulation <0.5%
- Output ripple of ≤±0.5% Vpk-pk
- 2500V of isolation from input to output
- No heat sink or electrical derating required
- Complimentary to the 1.5/3Watt PXS Series
- >840,000 hour MTBF per Belcor TR332

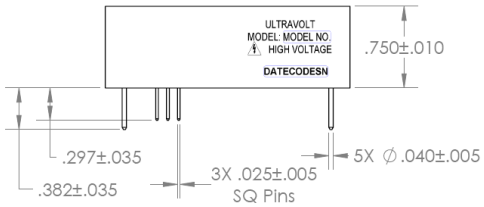
PARAMETER	CONDITIONS	MODELS						UNITS
INPUT		24V						
Voltage Range	Full Power	24VDC ±5% for 100% of Nominal Output Voltage (See output full scale accuracy for tolerance)						VDC
Current	Standby / Disable	< 10						mA
Current	No Load, Max Eout	< 120 (Typically 30 to 100 depnding on model)						mA
Current	Max Load, Max Eout	< 650 (Typically 500 to 640 depnding on model)						mA
OUTPUT (BIPOLAR)		±50V	±75	±100	±150	±200	±250	VDC
Voltage, Fixed	Nominal Input	50	75	100	150	200	250	VDC
Voltage Range Proportional	50% to 100%	25-50	37.5-75	50-100	75-150	100-200	125-250	VDC
Power	Nominal Input, Max Eout	10	10	10	10	10	10	W
Current	Iout Entire Output Voltage Range	100	66	50	33	25	20	mA
OUTPUT (BIPOLAR)		±300	±350	±400	±500	±600	±700	VDC
Voltage, Fixed	Nominal Input	300	350	400	500	600	700	VDC
Voltage Range Proportional	50% to 105%, Model Specific	150-300	175-350	200-400	250-500	300-600	350-700	VDC
Power	Nominal Input, Max Eout	10	10	10	10	10	10	W
Current	Iout Entire Output Voltage Range	16	14	12.5	10	8.3	7.1	mA
OUTPUT		ALL TYPES						
Isolation	Input to Output	100 MΩ minimum at ±2,500						VDC
Ripple	Full Load, Max Eout	≤ ±0.5%						%V p-p
Ripple with -F-M Option	Full Load, Max Eout, 300pF bypass cap, 25% to 50% reduction	TBD						
Dynamic Load Regulation	½ to Full Load, Max Eout	< ±0.5%						VDC
Line Regulation	Nom. Input, Max Eout, Full Power	Unregulated: Output directly proportional to input, Excellent tracking see TN-XX						-
Static Load Regulation	No Load to Full Load, Max Eout	≤ ±0.5%						VDC
Stability	30 Min. warmup, per 8 hr/ per day	< ±2%						VDC
PROGRAMMING & CONTROLS								
Enable/Disable		TTL 0 or grounded unit is enabled, TTL 1 or any voltage to +32V or floating unit is disabled						-
Adjust Logic		0 to +10VDC, 50% to 100% of Nominal HV output ±1% of Full Scale (proportional if no connection)						-
Reference		+10VDC @ 1mA, ±1.0% <±50PPM °C						-
ENVIRONMENTAL		ALL TYPES						
Operating	Full Load, Max Eout, Case Temp.	-45 to +65						°C
Storage	Non-Operating, Case Temp.	-55 to +105						°C
Temperature Coefficient	Over the Specific Temperature	< 150						PPM/°C
Humidity	All Conditions, Standard Package	0 to 95% non-condensing						-
Shock	Mil-Std-810, Method 516.5, Proc. IV	20						G's
Vibration	Mil-Std-810, Method 514.5, Fig.514.5C-3	10						-

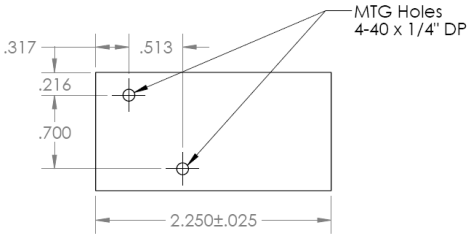
Specifications subject to change without notice.

RS SERIES

Rail Supply







CONNECTIONS	
PIN	FUNCTION
1	(+) Input
2	(-) Input
3	(+) Output
4	(-) Output
5	Center Tap
6	Programming
7	+10V Reference
8	Enable/Disable

RoHS COMPLIANT

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

NOTE:

Output is isolated from the input by 2.5kV

CONSTRUCTION

Epoxy filled Red DAP box certified to ASTM-D-5948

SIZE

L x W x H = 2.25 (57.15mm) x 1.125 (28.58mm) x .75 (19mm)
Volume: 1.90 in³ (31cc)
Weight: 55.2g

TOLERANCE

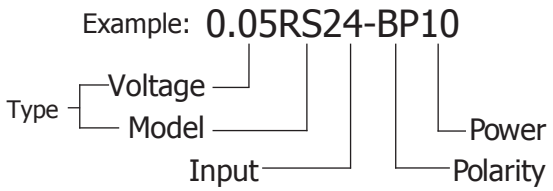
All dimensions have a tolerance of ±0.010 [0.25mm] unless otherwise specified.

PINS

Standard Thru-hole: Brass, tin over nickel plated, 0.020 [0.51mm] Round

ORDERING INFORMATION		
Type (Nominal)	50VDC Output	0.05RS
	75V Output	0.075RS
	100V Output	0.1RS
	150V Output	0.15RS
	200V Output	0.2RS
	250V Output	0.25RS
	300V Output	0.3RS
	350V Output	0.35RS
	400V Output	0.4RS
	500V Output	0.5RS
	600V Output	0.6RS
	700V Output	0.7RS
Input	24VDC Nominal	24
Polarity	Bipolar Output	-BP
Power	10 Watts Output	10
Options	Flying lead for HV Ouput	-W
	Shielded Flying Lead for HV Output	-WS
	Ripple Striper® output filter with (5) sided mu-metal shield.	-F-M

Contact the factory for preset fixed outputs or other requirements



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D SERIES

Microsize High Voltage Biasing Supply

The D Series of high voltage power supplies is designed to meet the needs of customers with low-profile applications. These ultra-compact modules are adapted to controlling photo detectors that require high-bias voltages and currents. D Series PCB-mount high-voltage power supplies feature a lightweight design, state-of-the-art surface-mount technology, and five-sided metal enclosures.

- 4 models from 0 to 1kV through 0 to 6kV
- 1, 2, 4 or 6 watts of output power
- 15 or 24 Volts DC Input
- Low profile and lightweight
- PCB flat mounting
- Adjustable from 0 to full output
- Tight line/load regulation
- Output current limit protection
- Low ripple (<0.02% peak to peak)
- Buffered voltage and current monitoring

Typical applications for the D Series include:

Avalanche Photo Diodes (APD)	Image Intensifiers (II)
Electrostatic Chuck (E-chuck)	Insulator Testing
E-Beam Lithography and Welding	Lithography
Focused Ion Beam (FIB)	Microchannel Plates (MCP)
Gas Chromatography	Photodiodes (PD)
Geiger Muller Tubes (GM Tubes)	Photomultiplier Tubes (PMT)
General Laboratory	Scanning Electron Microscopes
High Voltage Testing	Spectrometer

Please contact UltraVolt's customer service department for an analysis of your requirements.

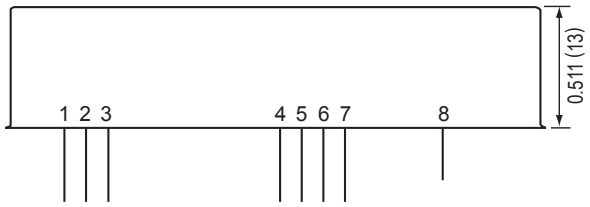
PARAMETERS	SPECIFICATIONS																UNITS
Input voltage Vin (pins 2 & 3)	15VDC ±1.5V or 24VDC ±2V, according to type																VDC
Input current	Example for a 15VDC, output 6000V, 1mA model: inhibition mode: 27mA at no load & HV = 6000V 46mA, at full load < 630mA																-
Polarity	fixed positive or negative																-
Output Voltage	0 to 1000				0 to 2000				0 to 4000				0 to 6000				VDC
Output Power	1	2	4	6	1	2	4	6	1	2	4	6	1	2	4	6	W
Output Current	1	2	4	6	0.5	1	2	3	0.25	0.5	1	1.5	0.17	0.33	0.67	1	mA
Programming (pins 4 & 6)	Via external voltage source 0 to +5V ±0.1% at full scale, and input impedance = 94kΩ																-
Max. output current Iout	Limited to 110% of nominal current																-
Load voltage regulation	±0.01% of full output voltage for no load to full load																-
Line voltage regulation	±0.01% of full output voltage over specified input voltage range																-
Residual ripple	< 0.02% peak-to-peak at full load																-
Temperature coefficient	100																PPM/°C
Output HV monitoring (pin 7) {still operating in inhibition mode}	Analog 0 to +5V buffered output signal, accuracy ±0.2% Output impedance = 1kΩ Temperature coefficient: 50ppm/°C for ≤ 4kV units, 100ppm/°C for 6kV units																-
Output current monitoring (pin 5) {still operating in inhibition mode}	Analog 0 to +5V buffered output signal, accuracy ±2% Output impedance = 1kΩ Temperature coefficient: 100ppm/°C																-
HV ON/OFF (pin 1)	To disable (opened remote interlock) or enable (closed remote interlock)																-
Operating temperature	-10 to +65, Full load, Max Eout, Case Temp																°C
Storage temperature	-10 to +70																°C
Safeguards	• Protected against reverse Vin • Auto inhibition if Tcase > 75°C								• Soft start feature: the start is guaranteed with no overshoot • HV setting internally limited to 5.3V								-

Specifications subject to change without notice.

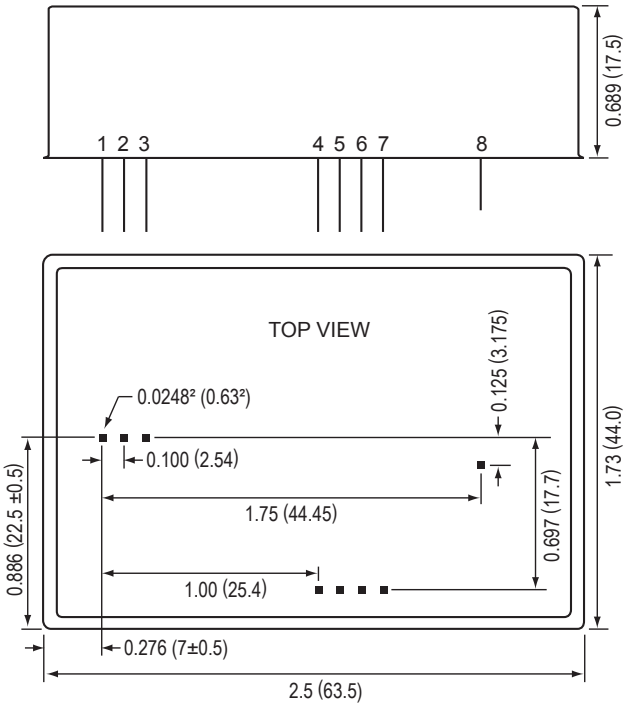
D SERIES

Microsize High Voltage Biasing Supply

1-4KV, 1-4W



1-4KV, 6W AND 1-6KV, 1-6W



CONSTRUCTION

Tin Steel Plate, thickness 0.5mm
Insulation: fully potted in an epoxy resin

SIZE

Volume:
1-4kV, 1-4W: 2.21 in³ (36.2cc)
1-4kV, 6W and 1-6kV, 1-6W: 2.97 in³ (48.6cc)
Weight:
1-4kV, 1-4W: 2.54 oz (72g)
1-4kV, 6W and 1-6kV, 1-6W: 3.00 oz (85g)

TOLERANCE

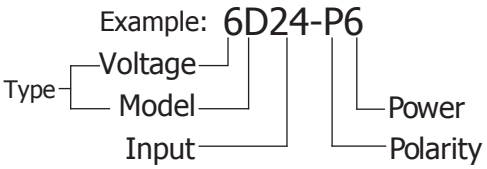
Overall ±0.0118" (0.3)
Pin to pin ±0.0039" (0.1)
Case to pin ±0.0591" (1.5)

NOTES

Standard case length, width, and height specs are ±0.050" (1.27)
Pin length > 0.24" (6), spacing 0.1" (2.54)

ORDERING INFORMATION		
Type	0 to 1,000 VDC Output	1D
	0 to 2,000 VDC Output	2D
	0 to 4,000 VDC Output	4D
	0 to 6,000 VDC Output	6D
Input	15VDC Nominal	15
	24VDC Nominal	24
Power	Watts Output	1
	Watts Output	2
	Watts Output	4
	Watts Output	6
Case	Tin Steel Case	(Standard)
Polarity	Positive Output	-P
	Negative Output	-N

CONNECTIONS	
PIN	FUNCTION
1	Enable/Disable
2	Power Ground
3	Positive Power Input
4	Signal Ground
5	Iout Monitor
6	Remote Adjust Input
7	Eout Monitor
8	HV Output



CE cULus IEC-60950-1

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

Rev. E 2/14

*The D Series is not available in all territories. Please contact an UltraVolt Applications Engineer for details concerning sales in your area.

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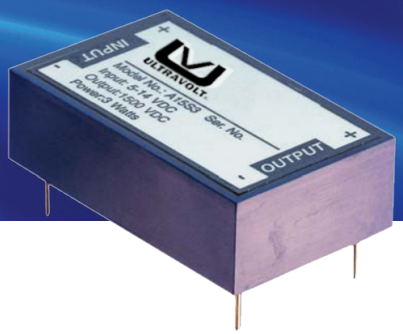
PM SERIES

High Voltage Power Supply



The PM Series of proportional DC to DC high voltage power supply modules provides designers a miniature low cost PCB mount solution with a nominal performance isolated HV output.

The PM Series operates from an input voltage of 5VDC to 12VDC with either positive or negative polarity to ground. By proportionally controlling the input voltage to the module over this input range an output range of 40% to 100% is generated. The 5 models in the PM Series range from 400V to 1kV through 1.6kV to 4kV output voltage with 0 to 3W of output power.

The isolation of the HV output from the LV input is rated at 2kV allowing the designer to ground either terminal to set the HV polarity as well as to ground the HV output at a remote point. Low noise models deliver 50% lower ripple through the use of a shielded enclosure with a polarity dependent filter therefore these models have a fixed HV output polarity.

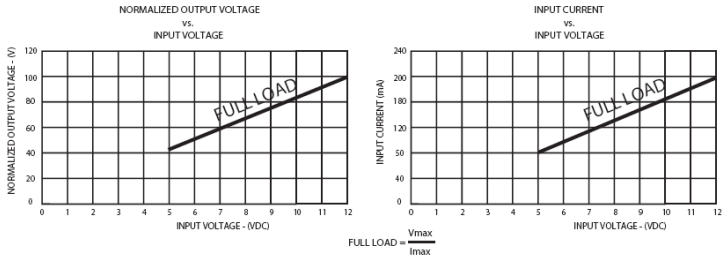
PM Series units are protected against reversed polarity inputs, output short circuit and open circuit conditions. These converters are fully encapsulated in UL listed GE RTV627 and 100% tested before shipment.

Typical applications for this series include the following:

Drivers for pulse generators, PZT actuators, MEMS devices, laser & electro-optic modulation, Ink Jet printing and Electrophoresis.

Bias Supply for general purposes, Detectors, Geiger-Muller tubes, APD, Photo multiplier tube (PMT), SiD, beam deflection and focusing in mass spectrometry (Ion Beam) and electron microscopes (E-Beam).

TYPICAL PERFORMANCE @ 25°C



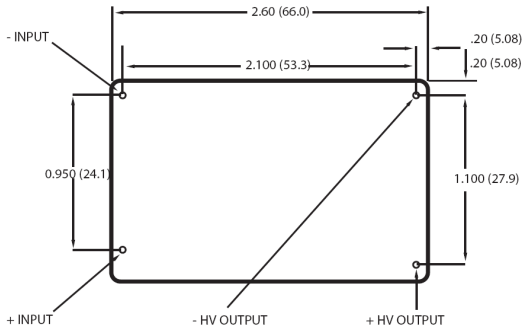
- 5 models from 0 to 1kV DC to 4kV DC
- Proportional – HV output tracks the input to within 10%
- Output power of 0 to 3 watts - No minimum load!
- Output ripple of ≤0.5% Vpk-pk, <0.25% with "-F-M" Option
- Output regulation TBD% typical, TBD% max
- 2,000V of isolation from input to output
- No heat sink or electrical derating required
- Efficiency > TBD% at full load
- See the PXS & RS Series for higher performance.
- TBD hour MTBF @40°C per Mil-HDBK-217F-N2
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

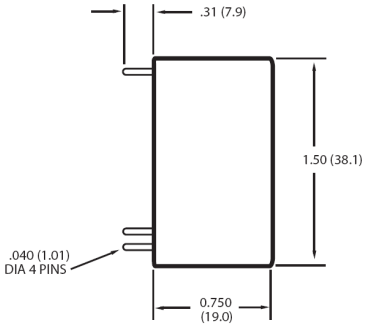
PARAMETER	CONDITIONS	MODELS					UNITS
INPUT							
Voltage Range	Full Power	5 to 12					VDC
Current	No Load, Max Eout	Typically 40mA to 60mA					mA
Current	Max Load, Max Eout / Nominal	200					mA
OUTPUT		1000	1500	2000	3000	4000	
Voltage	Nominal Input	400 to 1,000	600 to 1,500	800 to 2,000	1,200 to 3,000	1,600 to 4,000	VDC
Power	Nominal Input, Max Eout	3	3	3	3	3	W
Current	Iout Entire Output Voltage Range	3	2	1.5	1	0.75	mA
OUTPUT		ALL TYPES					
Voltage Adjust	Proportional	Input Voltage of 40% to 100% programs the Output Voltage 40% to 100% ±10% full scale					V
Ripple	Full Load, Max Eout	0.5%					%V p-p
Ripple with "-F-M" Option	Full Load, Max Eout, 300pF bypass cap, 25% to 50% reduction	0.25%					%V p-p
Line Regulation	Nom. Input, Max Eout, Full Power	Output is proportional to input over a 40% to 100% input range, with a variation of +10% of rated output voltage					VDC
Static Load Regulation	No Load to Full Load, Max Eout	Typically 5% 1/2 Load to Full Load, < 10% (for a zero to 3W Load Change) maximum 20%					VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.10%					VDC
ENVIRONMENTAL		ALL TYPES					
Operating	Full Load, Max Eout, Case Temp.	-20 to +85					°C
Temperature Coefficient	Over the Specified Temperature	250					PPM/°C
Storage	Non-Operating, Case Temp.	-40 to +85					°C
Humidity	Non-Condensing	0 to 90% Non-Condensing					-
Vibration	Mil-Std-810, Method 514.5, Fig.14.5C-3	20					G's
Shock	Mil-Std-810, Method 516.5, Proc. IV	40					G's

Specifications subject to change without notice.

PM SERIES
High Voltage Power Supply

Drawing dimensions are in inches (mm)





CONSTRUCTION

Black ABS case

Insulation: Fully Encapsulated in RTV silicon.

SIZE

Dimensions (L x W x H):

1.5" x 2.5" x 0.75" [38mm x 63.5mm x 19mm]

Volume: 2.8 in³ [45.884 CC]
Weight: 4oz [114g]

Tolerance

NOTES

CONNECTIONS	
PIN	FUNCTION
I/P	Input Power
I/P 0V	Input Power Ground
O/P 0V	Output Power Ground
O/P	Output Power

ORDERING INFORMATION		P/N	ALT P/N
Output	0 to 1,000 VDC	1	10
	0 to 1,500 VDC	1.5	15
	0 to 2,000 VDC	2	20
	0 to 3,000 VDC	3	30
	0 to 4,000 VDC	4	40
Model	Series Name	PM	A
Input	5V to 12V	12	
Polarity	Postive Output	-P	
	Negative Output	-N	
Power	0 to 3W Output	3	3
Option	Ripple Stripper Output Filter & Shielded Case	-F-M	S

Contact the factory for other output requirements!

Example: 0.2PM12-P3-F-M

Type — Output — Model — Input — Polarity — Power — Option

These component power supplies meet the requirements of EC Directive 73/23/EEC (LVD)

RoHS COMPLIANT

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

Alternate Part# Example: A10S3

Type — Model — Output — Option — Power

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PMT SERIES

High Voltage Power Supply

The PMT Series DC to DC high voltage power supply modules is intended for use with SideWindow and/or Front Window Photo-Multipliers. These high quality, compact devices can be mounted directly to PMT's such as the 931A and IP28

The PMT Series are small, low costsolid state powersupplies capable of providing 0 to 1250VDC. The output voltage varies directly with the amount of input voltage applied.

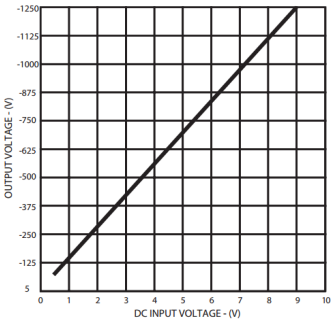
These devices have an integral voltage-divider network of approximately 5 mega ohms, no by-pass capacitors, and an integralsocket which fits all 28 mm (1-1/8") diameter, 9-stage photomultipliers having small shell submagnal bases.

The PMT Series devices feature a very low DC leakage socket for exceptional perfomance. Models that incorporate a built-in pre-amplier are available. These units are specified by a 'PA' designation following the Part Number.

The PMT Series high voltage converters are fully encapsulated in UL approved GE RTV627, 100% tested before shipment, and protected by warranty against defectsin material or workmanship.

Typical applications for this series include the following:
PMT detectors in analytical instruments, process control, security, and environmental monitors.

TYPICAL PERFORMANCE @ 25°C



- PMT Socket - directly attach detector
- 125 to 1250 VDC high voltage bias
- 9 Stage dynode bias built in
- Output ripple of <0.05% Vpk-pk
- Output proportional to input

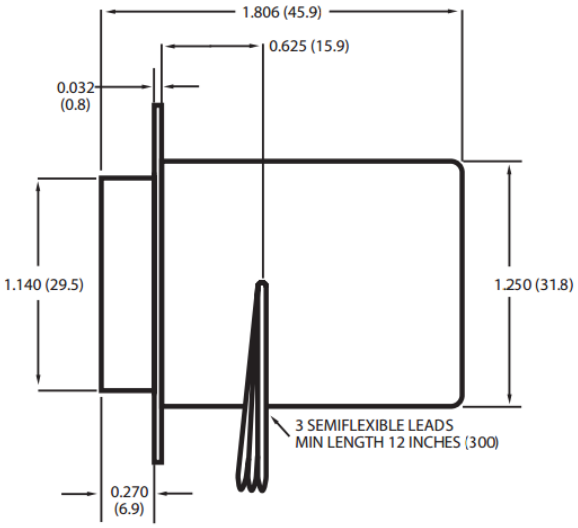
- Optional built-in pre-amplifier
- Singal output on coaxial lead

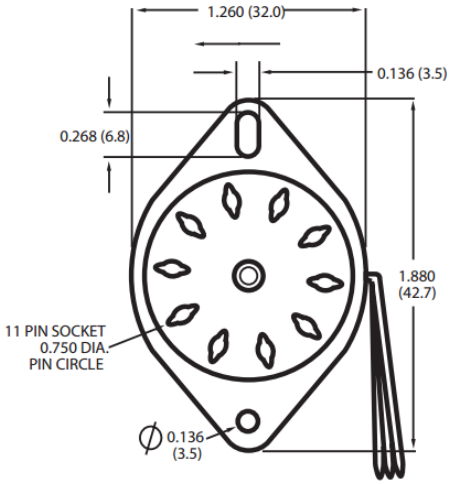
- >TBD hour MTBF @40°C per Mil-HDBK-217F-N2
- UL, cUL, CE, IEC-60950-1, and Demko Recognized

PARAMETER	CONDITIONS	MODELS	UNITS
INPUT			
Voltage Range	Full Power	1 to 9	VDC
Current	Max Load, Max Eout / Nominal	< 100	mA
OUTPUT		1250	
Voltage	Nominal Input	125 to 1250 ± TBD % (Negative)	VDC
OUTPUT		ALL TYPES	
Voltage Adjust	Proportional	Input Voltage of 40% to 100% programs the Output Voltage 40% to 100% ±10% full scale	V
Ripple	Full Load, Max Eout	< 0.05%	%V p-p
Line Regulation	Nom. Input, Max Eout, Full Power	Output is proportional to input over a 40% to 100% input range, with a variation of +10% of rated output voltage	VDC
Static Load Regulation	No Load to Full Load, Max Eout	Typically 5% 1/2 Load to Full Load, < 10% (for a zero to 3W Load Change) maximum 20%	VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.10%	VDC
OUTPUT SIGNAL		ALL TYPES	
Analog Output Signal	Standard Unit	0 to TBD VDC, DC offset <3nA	-
Analog Output Signal	≥ 5V Input	0 to TBD VDC, buffered	-
ENVIRONMENTAL		ALL TYPES	
Operating	Full Load, Max Eout, Case Temp.	-20 to +85	°C
Temperature Coefficient	Over the Specified Temperature	250	PPM/°C
Storage	Non-Operating, Case Temp.	-40 to +85	°C
Humidity	Non-Condensing	0 to 90% Non-Condensing	-
Vibration	Mil-Std-810, Method 514.5, Fig.14.5C-3	20	G's
Shock	Mil-Std-810, Method 516.5, Proc. IV	40	G's

Specifications subject to change without notice.

PMT SERIES
High Voltage Power Supply





CONNECTIONS	
LEAD	FUNCTION
Red	Voltage (Vin)
Black	Ground
Coax	Anode Output Signal

These component power supplies meet the requirements of EC Directive 73/23/EEC (LVD)

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

CONSTRUCTION

Black ABS case

Insulation: Fully Encapsulated in RTV silicon.

SIZE

Dimensions (L x W x H):

1.3" x 1.9" x 1.25" [33mm x 48.3mm x 31.75mm]

Volume: 3.1 in³ [50.8 CC]
Weight: 2.3oz [114g]

Tolerance

NOTES

ORDERING INFORMATION		P/N	ALT P/N
Output	125V to 1,250 VDC (Negative)	1.25	1250
Model	Series Name	PMT	B
Input	0 to 9 VDC	9	
Socket	Size	28MM	
Dynode	# of stages	9S	
Option	The PA model incorporates a built-in signal pre-amplifier.	-PA	PA

Contact the factory for other PMT sockets, # of dynodes, output voltage monitor, or output requirements!

Example: 1.25PMT9-28MM-9S-PA

Type — Output — Model — Input — Option

Alternate Part# Example: B1250PA

Type — Model — Output — Option

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CP SERIES

Constant Power High Voltage Supply

The CP series of high-voltage regulated DC-DC converters is optimized for "tri-mode" operation in bias applications, charging applications, and pulsed power applications and provides excellent line and load regulation, dynamic response, and stability. The CP Series operates in constant-voltage, constant-current, or constant-power modes and features buffered current, voltage, and power monitors. Typical applications for these modules include strike-and-run, plasma, and electrophoresis.

- 6 models from 0 to 1kV through 0 to 15kV
- 10W maximum output power level
- 0 to +10V remote programming for all modes
- +10V compensated reference
- Tight line and load regulation
- Operates in constant-voltage, constant-current, or constant-power modes

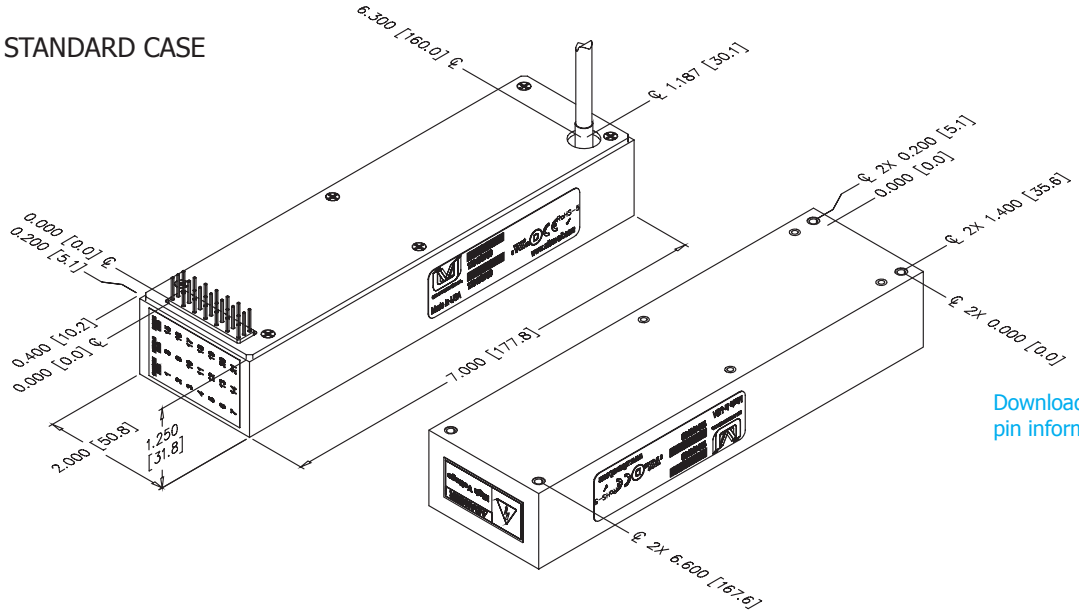
PARAMETER	CONDITIONS	MODELS						UNITS
INPUT		ALL TYPES						
Voltage Range	Full Power	+24 ± 10%						VDC
Current	Standby / Disable	< 70						mA
Current	Full Load, Max Eout	< 925						mA
Current	No Load, Max Eout	< 375						mA
AC Ripple Current	Nominal Input, Full Load	< 30						mA p-p
OUTPUT		1CP	2CP	4CP	6CP	10CP	15CP	
Voltage Range		0 to 1,000	0 to 2,000	0 to 4,000	0 to 6,000	0 to 10,000	0 to 15,000	VDC
Power	Nominal Input, Max Eout	10						W
Current	Vout = Eout Max	10	5	2.5	1.67	1	0.67	mA
Current	Vout = 10% Eout Max	100	50	25	16.7	10	6.7	mA
Ripple	Full load, Max Vout	TBD	TBD	TBD	TBD	50	55	V p-p
Ripple	Full load, Max Iout	TBD	TBD	TBD	TBD	60	55	V p-p
Line Regulation	Vin Min to Vin Max, Max Eout	< 0.01 %						VDC
Load Regulation	No Load to Full Load, Max Eout	< 0.01%						VDC
PROGRAMMING & CONTROLS		ALL TYPES						
Input Impedance	Normal Operating Conditions, All Inputs	10						MΩ
Enable/Disable		0 to +2 Disable, +3 to 10 Enable (Default = Enable)						VDC
Output Voltage	T=+25°C, Initial Value	10.5 ± 0.2%						VDC
Output Impedance	T=+25°C	Buffered, low impedance, 3mA max						-
Stability	Over Full Temperature	5						PPM/°C
ENVIRONMENTAL		ALL TYPES						
Operating	Full Load, Max Eout, Case Temp.	-40 to +65						°C
Coefficient	Over the Specified Temperature	±100						PPM/°C
Thermal Shock	Mil-Std 810, Method 503-4, Proc. II	-40 to +65						°C
Storage	Non-Operating, Case Temp.	-55 to +105						°C
Humidity	All Conditions, Standard Package	0 to 95% non-condensing						-
Altitude	Standard Package, All Conditions	Sea Level through Vacuum						-
Shock	Mil-Std-810, Method 516.5, Proc. IV	20						G's
Vibration	Mil-Std-810, Method 514.5, Fig.14.5C-3	10						G's

Specifications subject to change without notice.

CP SERIES

Constant Power High Voltage Supply

STANDARD CASE



CONSTRUCTION

Epoxy-filled Aluminum Alloy Box,
Anodized Gold

SIZE

Volume 17.5in^3 (286.77 cc)
Weight 1.4lb (0.64kg)

TOLERANCE

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole location ±0.025" (0.64)

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

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

Manufactured in USA

CP SERIES PIN ASSIGNMENTS AND FUNCTIONS		
PIN	FUNCTION	DESCRIPTION
1	Power Ground	Input Power Return
2	Input Power	Input Power (+24V ± 10%)
3	Current Monitor	0 to 10V is equal to 0 to full rated output current
4	Enable	High to enable, low to disable, default or open is enabled
5	Signal Ground	Monitor and Programming Return, return the monitor and programming circuitry to this pin
6	Voltage Programming	0 to 10V programs 0 to full rated output voltage
7	Reference Voltage	10.5V precision voltage reference
8	Power Ground	Input Power Return
9	Input Power	Input Power (+24V ± 10%)
10	N/C	
11	Current Mode Indicator	Open drain indicator, active (pulled low) when unit is in current regulation
12	Voltage Mode Indicator	Open drain indicator, active (pulled low) when unit is in voltage regulation
13	Current Programming	0 to 10V programs 0 to full rated output current
14	Voltage Monitor	0 to 10V is equal to 0 to full rated output voltage
15, 16, 17, & 18	N/C	
19	Power Mode Indicator	Open drain indicator, active (pulled low) when unit is in power regulation
20	Power Monitor	0 to 10V is equal to 0 to full rated power
21	Power Programming	0 to 10V programs 0 to full rated output power

ORDERING INFORMATION		
Type	0 to 1,000 VDC Output	1CP
	0 to 2,000 VDC Output	2CP
	0 to 4,000 VDC Output	4CP
	0 to 6,000 VDC Output	6CP
	0 to 10,000 VDC Output	10CP
	0 to 15,000 VDC Output	15CP
Input	24VDC Nominal	24
Polarity	Positive Output	-P
	Negative Output	-N
Power	10 Watt Output	10

Example: 1CP24-P10
Type — Voltage — Model — Input — Power — Polarity

Popular accessories ordered with this product include CONN-KIT-CP and our full range of high voltage output connectors (see Accessories & Connectors datasheet).

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B SERIES

High Voltage Power Supply

The B Series of high-voltage regulated AC-DC converters addresses the need for an AC line operated, fully integrated, chassis mount, fixed-output regulated high-voltage power supply with nominal performance and limited functions. Designed and built utilizing state-of-the-art power-conversion topology, these units feature design, manufacturing process, and encapsulation techniques that provide high reliability.

Typical applications for the B Series include the following:

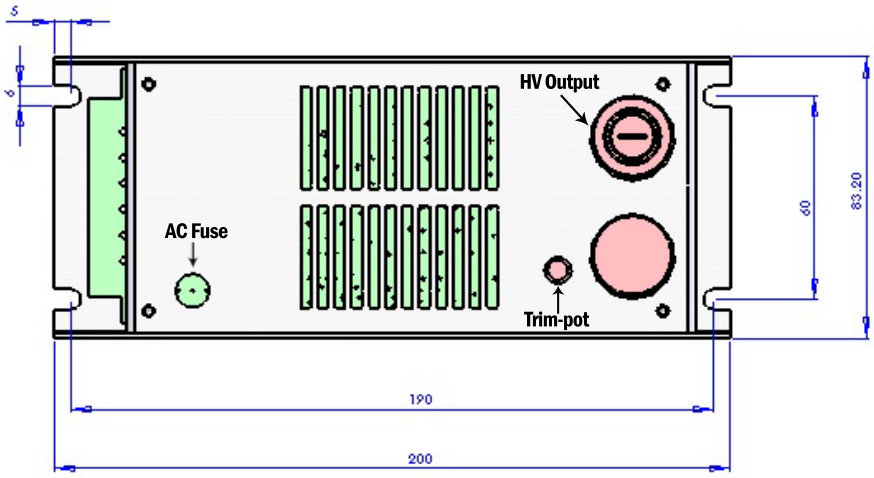
Bias supplies, isolation testers, electrostatics, air ionization, air & oil precipitators, ozone generators, UV lamps, capacitor charging, and flash lamps.

- Lower cost than a (2) module AC-DC & DC-DC solution
- 12 models provide fixed outputs of 1kV to 12kV
- ±10% output adjustment range
- 4, 20, 30 or 50 watts of output power
- Input of 115VAC or 230VAC
- Indefinite output short-circuit protection
- Output arc protection
- Fault monitor with isolated relay contacts
- Variable-frequency, low-stored-energy design
- CE, designed for UL, cUL, IEC-61010-1

PARAMETER	CONDITIONS	MODELS																								UNITS
INPUT																										
Voltage Range	Full Power	115 (100 to 130VAC)												230 (200 to 260VAC)												VAC
Frequency	All Modes	50 to 400																								Hz
Current	No Load, Max Eout	< TBD																								mA
Current	Max Load, Max Eout	< 500 @ 115VAC																								mA
Inrush Current	Nominal Input, Full Load	< TBD																								A
OUTPUT		1kV				2kV				3kV				4kV				5kV				6kV				
Voltage	Nominal Input	1,000				2,000				3,000				4,000				5,000				6,000				VDC
Power	Nominal Input, Max Eout	4	20	30	50	4	20	30	50	4	20	30	50	4	20	30	50	4	20	30	50	4	20	30	50	W
Current	Iout Entire Output Voltage Range	4	20	30	50	2	10	15	25	1.3	6.6	10	16.6	1	5	7.5	12.5	.8	4	6	10	.6	3.3	5	8.3	mA
OUTPUT		7kV				8kV				9kV				10kV				11kV				12kV				
Voltage	Nominal Input	7,000				8,000				9,000				10,000				11,000				12,000				VDC
Power	Nominal Input, Max Eout	4	20	30	50	4	20	30	50	4	20	30	50	4	20	30	50	4	20	30	50	4	20	30	50	W
Current	Iout Entire Output Voltage Range	.57	2.86	4.23	7.14	.5	2.5	3.75	6.25	.44	2.22	3.33	5.55	.4	2	3	5	.36	1.82	2.73	4.55	.33	1.67	2.5	4.17	mA
OUTPUT		ALL TYPES																								
Voltage Adjust		±10%																								V
Ripple	Full Load, Max Eout	< 0.45%																								%V p-p
Line Regulation	Nom. Input, Max Eout, Full Power	< 0.10%																								VDC
Static Load Regulation	No Load to Full Load, Max Eout	< 0.10%																								VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.10%																								VDC
FAULT MONITOR		ALL TYPES																								
Isolated Relay		OK= Normally open & common connected, Fault= Normally closed & common connected																								
ENVIRONMENTAL		ALL TYPES																								
Operating	Full Load, Max Eout, Case Temp.	0 to +40																								°C
Temperature Coefficient	Over the Specified Temperature	400																								PPM/°C
Storage	Non-Operating, Case Temp.	-40 to +85																								°C
Humidity	Non-Condensing	0 to 90% Non-Condensing																								-

Specifications subject to change without notice.

B SERIES
High Voltage Power Supply



CONSTRUCTION
Aluminum

SIZE
Dimensions:

7.87" (200mm) x 3.15" (80mm) x 1.57" (40mm)

Volume: 38.92in³ (637.78cc)

Weight: 1.21 lbs (0.55 kg)

Tolerance
±1.0mm

NOTES
Fault monitor is an isolated relay:
OK - Normally Open & Common connected.
FAULT - Normally Closed & Common connected.

Contact the factory for other preset fixed outputs

CONNECTIONS	
PIN	FUNCTION
1	AC Live
2	AC Neutral
3	Earth Ground
4	Fault - Common
5	Fault - N.C.
6	Fault - N.O.

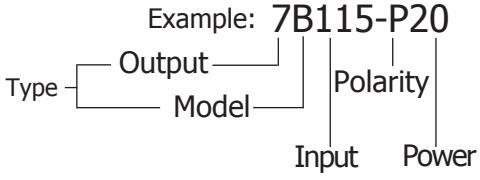
CE

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

Rev. 3 2/14

ORDERING INFORMATION		
Output	0 to 1,000 VDC	1
	0 to 2,000 VDC	2
	0 to 3,000 VDC	3
	0 to 4,000 VDC	4
	0 to 5,000 VDC	5
	0 to 6,000 VDC	6
	0 to 7,000 VDC	7
	0 to 8,000 VDC	8
	0 to 9,000 VDC	9
	0 to 10,000 VDC	10
	0 to 11,000 VDC	11
	0 to 12,000 VDC	12
Model	Series Name	B
Input	115 VAC	115
	230 VAC	230
Polarity	Postive Output	-P
	Negative Output	-N
Power	0 to 4W Output	4
	0 to 20W Output	20
	0 to 30W Output	30
	0 to 50W Output	50

Contact the factory for other output requirements!



*The B Series is not available in all territories. Please contact an UltraVolt Applications Engineer for details concerning sales in your area.

ESP SERIES

Electrostatic Precipitator HV Power Supply

The ESP Series of high-voltage regulated AC-DC converters addresses the need for a nominal-performance, stand alone HV module to power Electro-Static-Precipitators operating in air or oil in higher reliability 24/7 applications & environments such as medical, industrial, agriculture, food processing & food service.

The modules are AC line operated, fully protected from the harsh output characteristics of this application, with limited interface features and performance to control cost. The modules have dual, high-voltage outputs to power the Ionizer and Collector.

There are two chassis mount packages: A covered U frame unit with input & output connectors to facilitate speed of production and field service, and a flying lead unit connectorless installations. Designed and built utilizing state-of-the-art power-conversion topology these units feature design, manufacturing process, and encapsulation techniques that provide high reliability.

- Ionizor / collector outputs of 12kV/6kV or 8kV/4kV.
- HV can be a limited adjustment range or fixed.
- 10, 20, 30 or 50 watts of output power
- Indefinite output short-circuit protection & arc protection
- No minimum load required.

Typical applications for this series include the following:

Electrostatic air cleaners in medical products for patient room & surgical suite use, in industrial products for manufacturing process dust & pollution control, agriculture products for barn dust and pollution control, food processing products for reducing bacteria, and food service products to collect particles & oil from air filters.

Electrostatic oil separators in industrial products for manufacturing process to remove particles from cleaning & cooling fluids, in food service products to remove particles from cooking oil.

- Input of 115VAC or 230VAC
- Fault monitor
- Power indicator
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

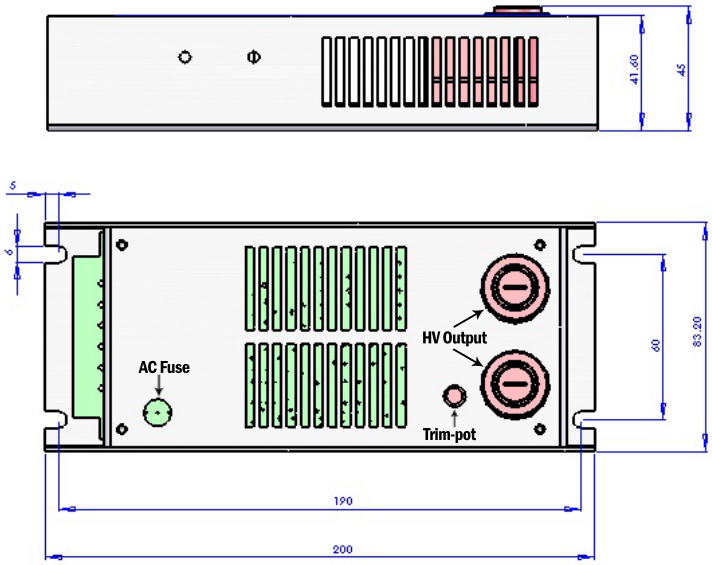
PARAMETER	CONDITIONS	MODELS														UNITS
INPUT		ESP1								ESP2						
Voltage Range	Full Power	115 or 230								115 or 230						VAC
Voltage Range	Derated Power Range	100 to 130 or 200 to 260								100 to 130 or 200 to 260						VDC
Current	No Load, Max Eout	< TBD								< TBD						mA
Current	Max Load, Max Eout	< 500								< 400						mA
Inrush Current	Nominal Input, Full Load	< TBD								< TBD						A
OUTPUT		ESP1								ESP2						
Voltage	Nominal Input	8kV / 4kV				12kV / 6kV				8kV / 4kV			12kV / 6kV			VDC
Voltage Adjust		Adjustable ±10%				Adjustable ±10%				Adjustable 7.3kV to 9.3kV			Adjustable 10.8kV to 13.2kV			VDC
Power	Nominal Input, Max Eout	10	20	30	50	10	20	30	50	10	20	30	10	20	30	Watts
Ionizor Current	Iout Entire Output Voltage Range	1.25	2.5	3.75	6.25	0.83	1.67	2.5	4.17	1.25	2.5	3.75	0.83	1.67	2.5	mA
Ionizor Ripple	Full Load, Max Eout	< 0.45%								< 0.60%						%V p-p
Line Regulation	Nom. Input, Max Eout, Full Power	< 0.10%								< 0.10%						VDC
Static Load Regulation	No Load to Full Load, Max Eout	< 0.10%								< 0.10%						VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.10%								< 0.10%						VDC
FAULT MONITOR		ALL TYPES														
ESP1	Isolated Relay	OK= Normally open & common connected, Fault= Normally closed & common connected														
ESP2	Indicator Bias Voltage	Any neon bulb (T1.1, T2, T3 100 to 250VAC)														
ENVIRONMENTAL		ALL TYPES														
Operating	Full Load, Max Eout, Case Temp.	0 to +40														°C
Coefficient	Over the Specified Temperature	400 (ESP1); 500 (ESP2)														PPM/°C
Storage	Non-Operating, Case Temp.	-40 to +85														°C
Humidity	All Conditions, Standard Package	0 to 90% non-condensing														-
Altitude	Standard Package, All Conditions	0 to 10k FT (3kM)														-

Specifications subject to change without notice.

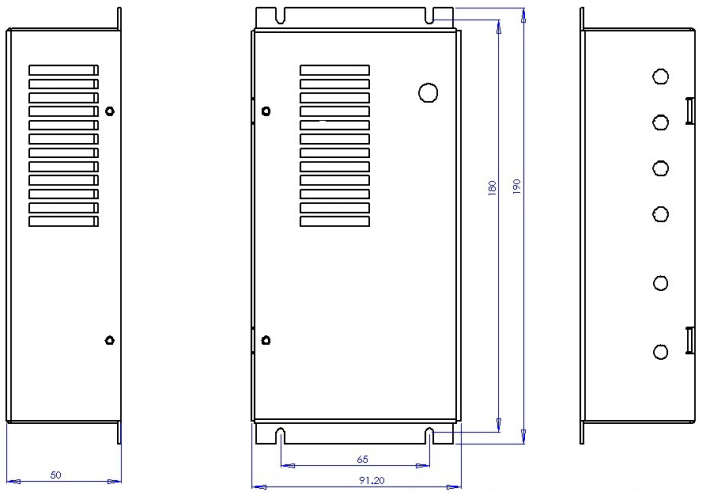
ESP

Electrostatic Precipitator HV Power Supply

ESP1



ESP2



CONSTRUCTION

ESP1: Aluminum
ESP2: Steel

SIZE

ESP1

200mm x 80mm x 40mm
Weight: 1.21 lbs (0.55 kg)

ESP2

90mm x 170mm x 50mm
Weight: 1.72 lbs (0.78 kg)

TOLERANCE

±1.0mm

NOTES

Contact the factory for other preset fixed outputs.

ESP1

CONNECTIONS	
PIN	FUNCTION
1	AC Live
2	AC Neutral
3	Earth Ground
4	Fault - Common
5	Fault - N.C.
6	Fault - N.O.

ESP2

CONNECTIONS	
WIRE	FUNCTION
Blue	AC Live
White	AC Neutral
Green/Yellow	Earth Ground
Black	Neon Fault Indicator
Red	Neon Fault Indicator
HV White	Collector Output
HV Red	Ionizor Output

CE

RoHS COMPLIANT

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

ORDERING INFORMATION		
Output	8kV / 4kV (ionizor/collector)	8
	12kV / 6kV (ionizor/collector)	12
Model	ESP1 Series	ESP1
	ESP2 Series	ESP2
Input	115 VAC	-115
	230 VAC	-230
Polarity	Positive	-P
	Negative	-N
Power	10	10
	20	20
	30	30
	50 (ESP1 Only)	50

Example: 12ESP1-115-P30

Type — Voltage / Model — Input — Power — Polarity

*The ESP Series is not available in all territories. Please contact an UltraVolt Applications Engineer for details concerning sales in your area.

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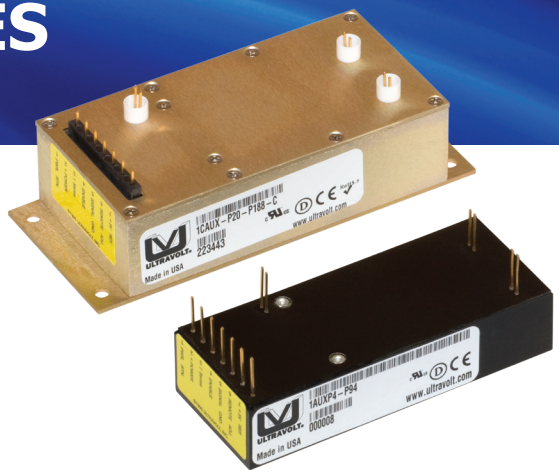
DUAL OUTPUT AUX SERIES

High Voltage Biasing Supply



The AUX Series accessory provides a second fixed HV output in addition to the adjustable main high-voltage power-supply output. This second output is set for a specific fixed voltage at the factory. The AUX output is achieved by adding a daughter board inside either 1/16A to 6A or 1/16C to 6C high-voltage power supplies.

This AUX board is encapsulated with the main high voltage power supply. All of the advantages of the base power supply remain. Typical applications include the following: Bipolar outputs, ionization/strike, trigger coils, pulse generator or amplifiers, tube elements such as G1, G2, cathode, and spark gap initiator.

- Adds a second + or - HV output
- Fixed regulated output
- Encapsulated with A or C Series HVPS
- Creates a 4.9 in^3 dual-output supply
- Fixed-frequency, low-stored-energy design
- High power density
- Output short-circuit protected
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

HIGH VOLTAGE AUX OUTPUT

The AUX output is a non-isolated, unipolar output. Positive or negative output must be specified. The polarity of this AUX is not dependent on the polarity of the base HVPS.

Full capability is available over an input range of 12 to 15VDC ±10% for 4W units and 24 to 28VDC ±5% for 20W/30W units. The AUX fixed output is fully functional when the main output voltage is adjusted from 100% to 75%. As the main output is adjusted from 75% to 50% the AUX output current is reduced from 100% to 0%. The manufactured tolerance on the fixed output is ±5%. Line regulation error is < 0.1%; load regulation error is < 0.1% per 100uA. The output has a temperature co-efficient of ±0.11% per °C.

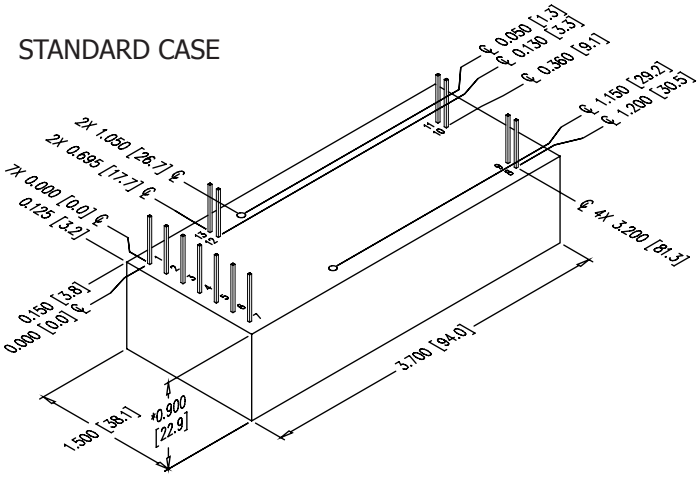
Fixed outputs available are:

47V @ 2mA	450V @ 1mA
94V @ 2mA	600V @ 1mA
141V @ 2mA	750V @ 1mA
188V @ 2mA	900V @ 1mA
235V @ 2mA	1050V @ 1mA
282V @ 2mA	
329V @ 2mA	

Note: Specified AUX output should be <40% of the main output.

The AUX HV output connection is via an additional pair of standard .025in (0.635mm) square IDC pins. These pins can be used for PCB mounting or direct wiring. High voltage connector and cable options are available.

STANDARD CASE



CONSTRUCTION

Epoxy-filled DAP box, certified to ASTM-D-5948
Plastic box

TOLERANCE

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole location ±0.025" (0.64)

NOTES

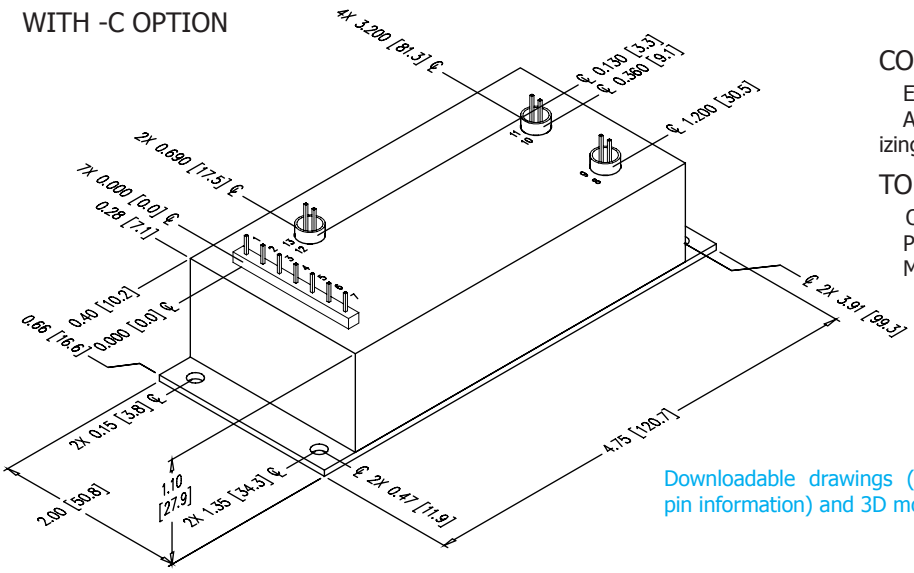
20W and 30W versions are an additional 0.062" (1.57) in height.
-M equipped units are an additional 0.030" (0.76) for each dimension.
Contact UltraVolt's Customer Service Department for drawings of models equipped with -E or -H options.

Specifications subject to change without notice.

DUAL OUTPUT AUX SERIES

High Voltage Biasing Supply

WITH -C OPTION



CONSTRUCTION

Epoxy-filled DAP box, certified to ASTM-D-5948
Aluminum box, Chem film per MIL-A-8625 Type II (Anodizing)

TOLERANCE

Overall ±0.025" (0.64)
Pin to Pin ±0.015" (0.38)
Mounting hole location ±0.025" (0.64)

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

IEC-60950-1

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

Manufactured in USA

CONNECTIONS	
PIN	FUNCTION
1	Input-Power Ground Return
2	Positive Power Input
3	Iout Monitor
4	Enable/Disable
5	Signal Ground Return
6	Remote Adjust Input
7	+5VDC Reference Output
8	HV Ground Return
9	HV Ground Return or Eout Monitor (-Y5 only)
10 & 11	HV Output
12 & 13	AUX HV Output

All grounds joined internally. Power-supply mounting points isolated from internal grounds by >100kΩ, .01uF / 50V (Max) on all models except -M (20W and above), -M-E, -M-C, and -M-H configurations which are 0Ω.

ORDERING INFORMATION		
Type	0 to 62 VDC Main Output	1/16AUX or 1/16CAUX
	0 to 125 VDC Main Output	1/8AUX or 1/8CAUX
	0 to 250 VDC Main Output	1/4AUX or 1/4CAUX
	0 to 500 VDC Main Output	1/2AUX or 1/2CAUX
	0 to 1,000 VDC Main Output	1AUX or 1CAUX
	0 to 2,000 VDC Main Output	2AUX or 2CAUX
	0 to 4,000 VDC Main Output	4AUX or 4CAUX
	0 to 6,000 VDC Main Output	6AUX or 6CAUX
AUX Output	2mA @ 47, 94, 141, 188, 235, 282, 329	-VVV
	1mA @ 450, 600, 750, 900, 1050	
Polarity	Positive Output	-P
	Negative Output	-N
Power	Watts Output (12 V Only)	4
	Watts Output (24 V Only)	20
	Watts Output (24 V Only)	30
Case	Plastic Case - Diallyl Phthalate	(Standard)
	'Eared' Heatsink Plate (plastic case)	-E
	RF-Tight Aluminum Case	-C
Heat Sink	.400" High (sized to fit case)	-H
Shield	Six-sided Mu-Metal Shield	-M
Voltage Monitor	Optional Eout Monitor (A Series only)	-Y5

*Optional boosted current monitor available. Contact the factory for more details.

Example: 2AUX-P4-N450-C

- Type: Voltage, Model
- Main Output Polarity
- Main Output Power
- AUX Output Polarity
- AUX Output Voltage
- Option (Case)

Popular accessories ordered with this product include CONN-KIT-F and BR-1 mounting bracket kit.

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TRIPLE OUTPUT AUX SERIES

High Voltage Biasing Supply

The AUX Series accessory provides second and third adjustable positive HV outputs in addition to the adjustable main positive high-voltage power supply output. The AUX outputs are set for a specific voltage range at the factory. One output is referred to as the Focus, one as the Grid. The AUX is achieved by adding a daughter board inside the 10A-35A high-voltage power supply. This AUX board is encapsulated with the main high-voltage power supply in a special taller enclosure to accommodate the height of the adjust pots. Typical applications are: CRT Raster Display, X-Y CRT Display, and E Beam Bias.

- Adds Focus and Grid outputs
- Encapsulated within 10A-35A Series
- Adjustable regulated outputs
- Creates a 6.5 in^3 triple output supply
- Fixed-frequency, low-stored-energy design
- High power density
- Indefinite output short-circuit protection
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

HIGH VOLTAGE AUX OUTPUTS

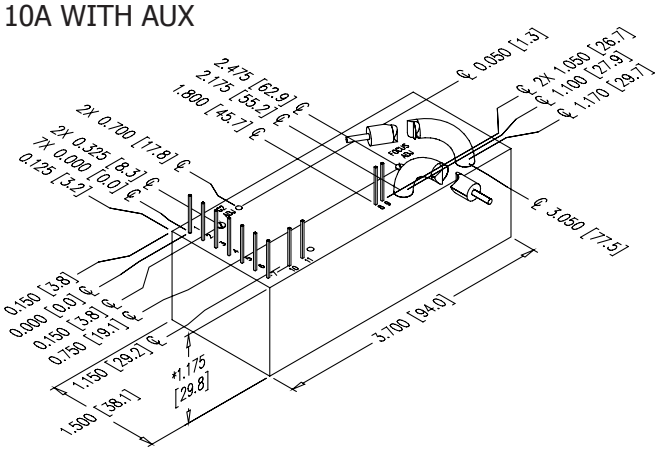
The AUX outputs are non-isolated, positive, unipolar outputs. Full capability is available over an input range of 12 to 15VDC ±10% for 4W units and 24 to 28VDC ±5% for 15W/30W units. The Focus AUX output voltage is fully functional when the main output is within the range specified on the ordering information table. The manufactured tolerance on the output voltage range provided is ±5%. Line regulation error is <0.1%. Load regulation error is 0.5V per uA. The outputs have a temperature co-efficient of +0.11% per °C. Each AUX output has a current capability of 0 to ±25uA, contact factory for higher current. Each AUX output can be adjusted using an internal single-turn potentiometer. The potentiometer adjusts from a factory-set voltage down to 450VDC lower.

Specific outputs available are:

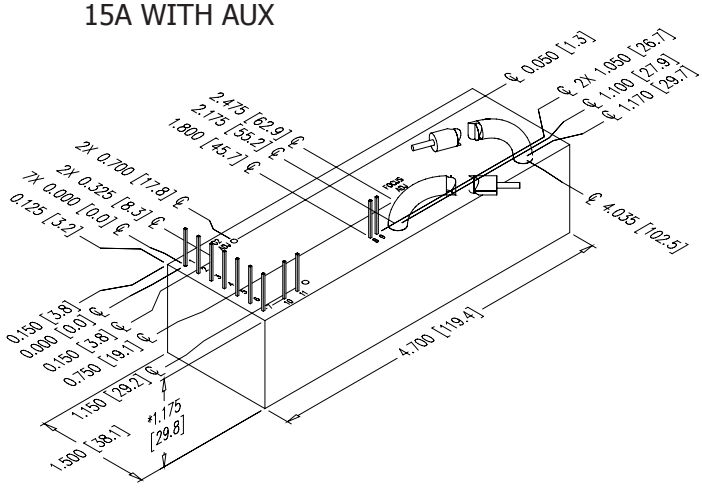
Standard TC:	Compensated TC:
300V	500V ± 200PPM
450V	650V ± 408PPM
600V	800V ± 537PPM
750V	950V ± 626PPM
900V	1100V ± 690PPM
1050V	

The AUX Grid HV output is via pin 10 on an additional pair of standard .025in (0.635mm) square IDC pins. These pins can be used for PCB mounting or direct wiring. The AUX Focus HV output is via an 18" long flying lead. High voltage connector and cable options are available.

10A WITH AUX



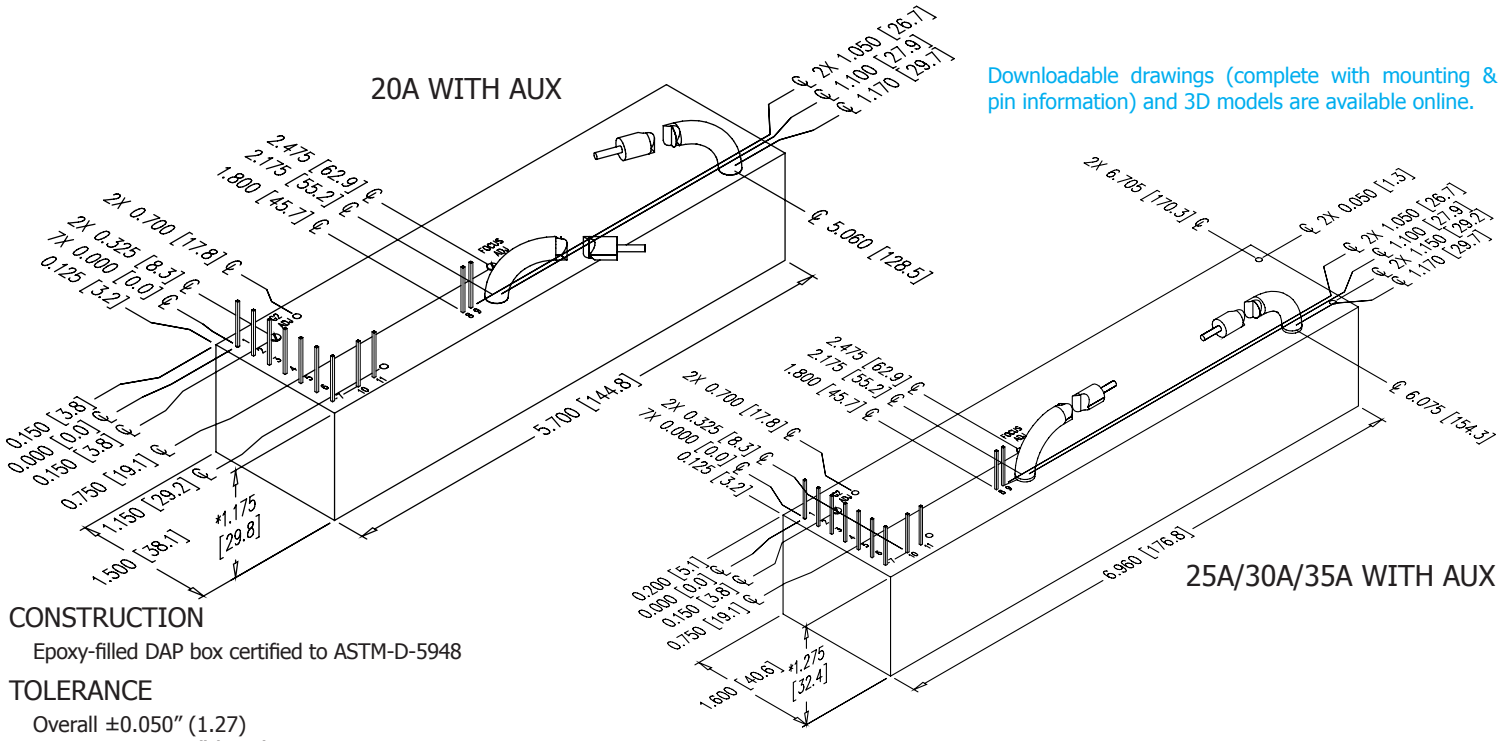
15A WITH AUX



Specifications subject to change without notice.

TRIPLE OUTPUT AUX SERIES

High Voltage Biasing Supply



Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

CONSTRUCTION

Epoxy-filled DAP box certified to ASTM-D-5948

TOLERANCE

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole location ±0.025" (0.64)

NOTES

20W and 30W versions are an additional 0.062" (1.57) in height. -M equipped units are an additional 0.030" (0.76) for each dimension.
Contact UltraVolt's Customer Service Department for drawings of models equipped with -E or -H options.

IEC-60950-1

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

CONNECTIONS	
PIN	FUNCTION
1	Input-Power Ground Return
2	Positive Power Input
3	Iout Monitor
4	Enable/Disable
5	Signal Ground Return
6	Remote Adjust Input
7	+5VDC Reference Output
8	HV Ground Return
9	Eout Monitor
10	AUX Grid HV Output
11	Spare

All grounds joined internally. Power-supply mounting points isolated from internal grounds by >100kΩ, .01uF / 50V (Max) on all models except -M (15W and above), -M-C, -M-E, and -M-H configurations which are 0Ω.

ORDERING INFORMATION		
Type	0 to 10.7kVDC Main Output (Focus AUX Operational 8kV to 10.7kV)	10AUX
	0 to 16.1kVDC Main Output (Focus AUX Operational 11kV to 16.1kV)	15AUX
	0 to 21.5kVDC Main Output (Focus AUX Operational 16kV to 21.5kV)	20AUX
	0 to 26.8kVDC Main Output (Focus AUX Operational 21.5kV to 26.8kV)	25AUX
	0 to 32.2kVDC Main Output (Focus AUX Operational 26.8kV to 32.2kV)	30AUX
	0 to 37.6kVDC Main Output (Focus AUX Operational 28.2kV to 37.6kV)	35AUX
Focus Output	See Table on Pg. 1	-Fvvv
Grid Output	See Table on Pg. 1	-Gvvv
	Temperature Compensated AUX	-TC
Power	Watts Output (12 V Only)	4
	Watts Output (24 V Only)	20
	Watts Output (24 V Only)	30
Case	Plastic Case - Diallyl Phthalate	(Standard)
	RF Tight Aluminum Case	-C
	'Eared' Heatsink Plate (Plastic Case)	-E
Heat Sink	.400" High (sized to fit case)	-H
Shield	Six-sided Mu-Metal Shield	-M
Wire Options	Anode Flying Lead Terminated with Connector	-ATxx
	Anode Flying Lead Shielded	-AS
	Anode Flying Lead Protected	-AP
	Focus Flying Lead Terminated with Connector	-FTxx

*Optional boosted current monitor available. Contact the factory for more details.

Example: 15AUX4-F1200-G450-C
Type — Voltage — Model — Main Output Power
Option (Case) — Grid Output Voltage — Focus Output Voltage

Popular accessories ordered with this product include CONN-KIT-F and BR-6 mounting bracket kit.

Manufactured in USA

Rev. P 10/14

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Phone: 1-631-471-4444 Fax: 1-631-471-4696 www.ultravolt.com

BIPOLAR HIGH POWER C SERIES

Dual-Output High Voltage Power Supply

The Bipolar C Series line of regulated DC-to-DC high-voltage converters is an extension of the High Power C Series. Bipolar C Series units contain a pair of + and - standard-product, 60-watt or 125-watt High Power C Series assemblies, providing a total of 125 watts or 250 watts. By encapsulating a module pair within one case, the cost of testing, potting, burn-in, and system integration is reduced.

The ± HV output pair is packaged in UltraVolt's 4.5" x 8" x 1.1" standard case. This high power density is especially suited to high-energy pulsers, amplifiers, and discharge devices with large capacitance, fast repetition rates, or high current loads. See Application Note 10 for more charging information. Typical applications for the Bipolar C Series include the following: cap-charging, pulsed power, ultrasound, amplifiers, and pulse generators.

- 7 models from 0 to ±125 Volts through 0 to ±6kV
- 125 or 250 watts of total output power
- Dual, independently controlled outputs
- Output current & voltage monitors
- High efficiency
- Maximum Iout capability down to 0 Volts
- Low profile
- Fast Trise with very low overshoot
- High power to voltage density
- >200,000 hour MTBF @65°C
- Output short-circuit protection
- Fixed-frequency, low-stored-energy design
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

PARAMETER	CONDITIONS														UNITS
INPUT		ALL TYPES													
Voltage Range	Full Power	+ 23 to 30													VDC
Voltage Range	Derated Power Range	+ 11 to 32													VDC
Current	Standby / Disable	< 40													mA
Current	Max Load, Max Eout	125W: 3, 250W: 6													A
Current	No Load, Max Eout	1/8C to 1C: < 600, 2C to 6C: < 1000													mA
AC Ripple Current	Nominal Input, Full Load	< 50													mA p-p
OUTPUT		1/8C		1/4C		1/2C		1C		2C		4C		6C		
Voltage Range	Nominal Input	0 to ±125		0 to ±250		0 to ±500		0 to ±1,000		0 to ±2,000		0 to ±4,000		0 to ±6,000		VDC
Power	Nominal Input, Max Eout	125	250	125	250	125	250	125	250	125	250	125	250	125	250	Watts
Current	Iout, Entire Output Voltage Range	1000	2000	500	1000	250	500	125	250	62	125	31	62	21	42	mA
Current Scale Factor	Full Load	833	1667	417	833	208	417	114	227	52	104	26	52	17.7	35	mA/V
Voltage Monitor Scaling		100:1 ±2% into 10MΩ														-
Ripple	Full Load, Max Eout, Cload ≥0.5uF	< 1.0		< 1.0		< 1.0		< 1.0		< 1.0		< 1.0		< 1.0		V p-p
Rise Time	Max Iout, Various C Loads & Eout	Figure A														-
Storage Capacitance	Internal	0.90	0.90	0.90	0.90	0.43	0.43	0.019	0.019	0.019	0.019	0.013	0.013	0.013	0.013	uF
Overshoot	C Load, 0 Eout to Full Eout	< 1V		< 1V		< 1V		< 1V		< 1V		< 1V		< 1V		V pk
Line Regulation	Nom. Input, Max Eout, Full Power	< 0.01%														VDC
Static Load Regulation	No Load to Full Load, Max Eout	< 0.01%														VDC
Stability	30 Min. warmup, per 8 hr/ per day	< 0.01% / < 0.02%														VDC
ENVIROMENTAL		ALL TYPES														
Input Impedance	Nominal Input	+ Output Models 1.1MΩ to GND, - Output Models 1.1MΩ to +5 Vref														MΩ
Adjust Resistance	Typical Potentiometer Values	10K to 100K (Pot across Vref. & Signal GND, Wiper to Adjust)														Ω
Adjust Logic	0 to +5 for +Out, +5 to 0 for - Out	+4.64 VDC for +Output or +0.36 for -Output = Nominal Eout														-
Output Voltage & Impedance	T=+25°C	+ 5.00VDC ± 2%, Zout = 464Ω ± 1%														-
Enable/Disable		0 to +0.5 Disable, +2.4 to 32 Enable (Default = Enable)														-
TEMPERATURE & HUMIDITY		ALL TYPES														
Operating	Full Load, Max Eout, Case Temp.	-40 to +65														°C
Coefficient	Over the Specified Temperature	±50														PPM/°C
Thermal Shock	Mil-Std 810, Method 503-4, Proc. II	-40 to +65														°C
Storage	Non-Operating, Case Temp.	-55 to +105														°C
Humidity	All Conditions, Standard Package	0 to 95% non-condensing														-
Altitude	Standard Package, All Conditions	Sea Level through Vacuum (Vacuum may require -P1 or -S1 options, contact factory for details.)														-
Shock	Mil-Std-810, Method 516.5, Proc. IV	20														G's
Vibration	Mil-Std-810, Method 514.5, Fig.514.5C-3	10														G's

Specifications subject to change without notice.

BIPOLAR HIGH POWER C SERIES

Dual-Output High Voltage Power Supply

C = uF
V = Volts
I = mA
T = mS

$$T = \frac{C \times V}{I}$$

C = uF
V = kV
I = mA
F = Hz

$$I = C \times V \times F$$

C = uF
V = kV
I = mA
F = Hz

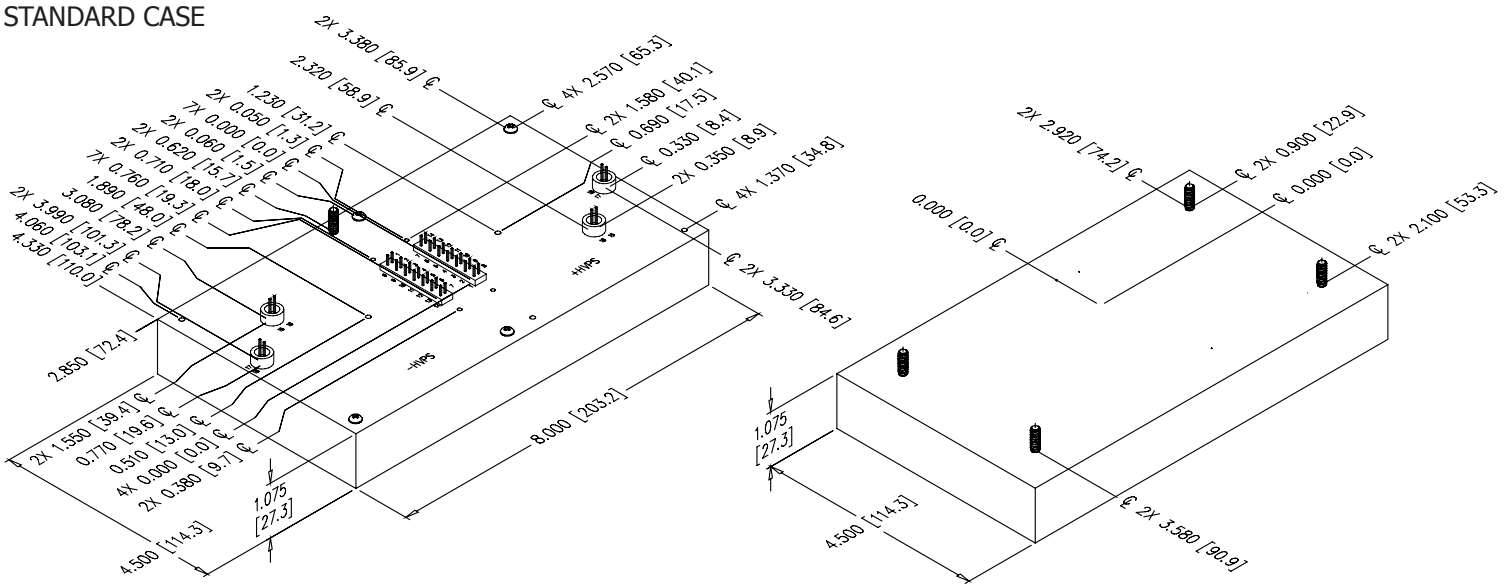
$$F = \frac{I}{C \times V}$$

C = uF
E^2 = kV
J = Ws

$$J = \frac{C \times E^2}{2}$$

Figure A - Rise Time Formulas
NOTES: Capacitance must include HVPS internal Capacitance.

STANDARD CASE



CONSTRUCTION

Epoxy-filled Aluminum Box
Chem film per MIL-A-8625 Type II (Anodizing)

SIZE

Volume 38.7in^3 (634 cc)
Weight 2.45lbs (1.1kg)

TOLERANCE

Overall ±0.025" (0.64)
Pin to Pin ±0.015" (0.38)
Hole to hole location ±0.025" (0.64)

+ HVPS CONNECTIONS
1 & 8 - Input Power Ground Return
3 - Iout Monitor
4 - Enable/Disable
5 - Signal Ground Return
6 - Remote Adjust Input
7 - +5 VDC Reference Output
2, 9, & 10 - Positive Power Input
11, 12, & 13 - N/C
14 - Eout Monitor
15 & 16 - HV Ground Return
17 & 18 - HV Output
All grounds joined internally. Power supply mounting points isolated from internal grounds by >100kW, .01uF / 50V (Max)

- HVPS CONNECTIONS
1 & 8 - Input Power Ground Return
3 - Iout Monitor
4 - Enable/Disable
5 - Signal Ground Return
6 - Remote Adjust Input
7 - +5 VDC Reference Output
2, 9, & 10 - Positive Power Input
11, 12, & 13 - N/C
14 - Eout Monitor
15 & 16 - HV Ground Return
17 & 18 - HV Output
All grounds joined internally. Power supply mounting points isolated from internal grounds by >100kW, .01uF / 50V (Max)

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

ORDERING INFORMATION		
Type	0 to 125 VDC Output	1/8C
	0 to 250 VDC Output	1/4C
	0 to 500 VDC Output	1/2C
	0 to 1,000 VDC Output	1C
	0 to 2,000 VDC Output	2C
	0 to 4,000 VDC Output	4C
	0 to 6,000 VDC Output	6C
Input	24VDC Nominal	24
Polarity	Negative & Positive Output	-NP
Power	125 Watts Output	125 (60Wx2)
	250 Watts Output	250 (125Wx2)
Heat Sink	.400" High (sized to fit case)	-H
PCB Support	(7) 0.187" Standoffs on top cover	-Z11

Example: 1/2C24-NP125(60Wx2)

Type — Voltage — Model — Input — Polarity — Total Output Power

Popular accessories ordered with this product include CONN-KIT-HP, and BR-7 and BR-8 mounting bracket kits.

IEC-60950-1

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

Manufactured in USA

Rev. M 10/14

1800 Ocean Avenue, Ronkonkoma, NY 11779
Phone: 1-631-471-4444 Fax: 1-631-471-4696 www.ultravolt.com

HVA SERIES

Precision High-Voltage Amplifier

The HVA Series of DC-to-DC high-voltage power supplies operates a precision filter/divider & 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 1kHz output. The HVA Series is optimized for bias applications while providing excellent line regulation, load regulation, dynamic response, and stability. The HVA Series can both source and sink current!

Typical applications for this series include the following:

Drivers for PZT actuators, MEMS devices, electroactive polymers, electrorheological materials, electrohydrodynamics, electrostatic chuck, pockels cells, laser & electro-optic modulation, electrophoresis.

Amplifiers for beam devices such as mass spectrometry, and electron microscopes as well as electrostatic deflection/focusing, flocking, coating, electrospinning, precipitation and electrocoalescence.

- Can both source and sink current
- PPM level line & load regulation
- Bipolar models available at 0 to 5kV
- Differential precision 0 to 10VDC control input
- Precision voltage and current monitors
- Unipolar models available at 0 to 10kV
- 25ppm temperature coefficient (15ppm optional)
- Operates in DC, reversible, and amplifier modes
- Fast slew rate (40V/µs) and high bandwidth
- Reduced ripple option available

PARAMETER	CONDITIONS	MODELS						UNITS
INPUT		ALL TYPES						
Voltage Range	Full Power	24VDC ± 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*		1kV/±1kV	2kV/±2kV	4kV/±4kV	±5kV	6kV	10kV	
Power	Nominal Input, Max Eout	0.25	0.5	1	1	1	1	W
Current	Iout Entire Voltage Range	250	250	250	200	167	100	uA
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 ± 0.5%						VDC
Current Monitor	Normal Operating Conditions	0 to 10 ± 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 & CONTROLS		ALL TYPES						
Input Impedance	Normal Operating Conditions	10						MΩ
Adjust Voltage	Differential	0 to +10						VDC
HV ON/OFF (Enable/Disable)		0 to +0.8V Disable, +2.5 to +10 Enable (Default = Disable)						VDC
Reference Voltage	T = +25°C, Initial Value	+10.00 ± 0.05%						VDC
Max Source Current	T = +25°C	1						mA
ENVIRONMENTAL		ALL TYPES						
Operating	Full Load, Max Eout, Case Temp.	+10 to +45						°C
Temperature Coefficient	Over the Specified Temperature	±25PPM or ±15PPM (Optional)						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						G's
Vibration	Mil-Std-810, Method 514, Fig. 514-3	10						G's

*Units listed without polarity can be ordered as positive (+) or negative (-). Units listed as (±) are bipolar.

Specifications subject to change without notice.

HVA SERIES

Precision High-Voltage Amplifier

Sample "HVA" Series Waveforms:

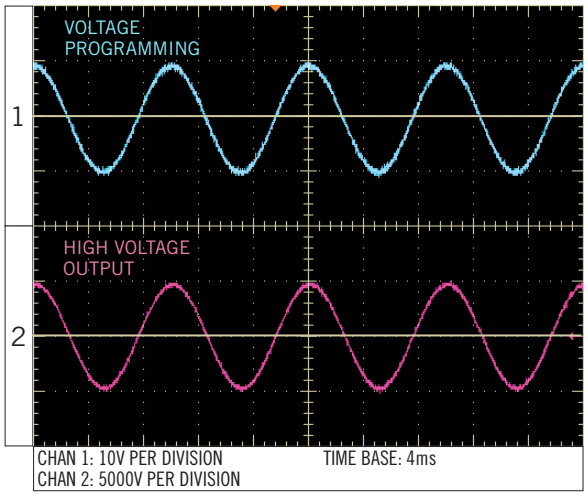


Figure A:
5HVA24-BP1 Sine Wave Input

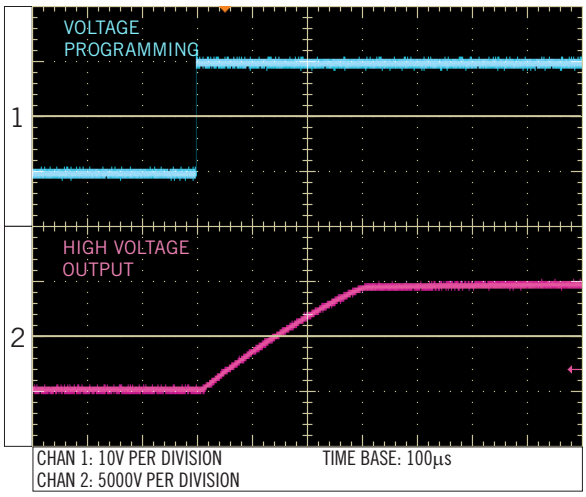


Figure B:
5HVA24-BP1 10kV Step Wave Input w/ No Load

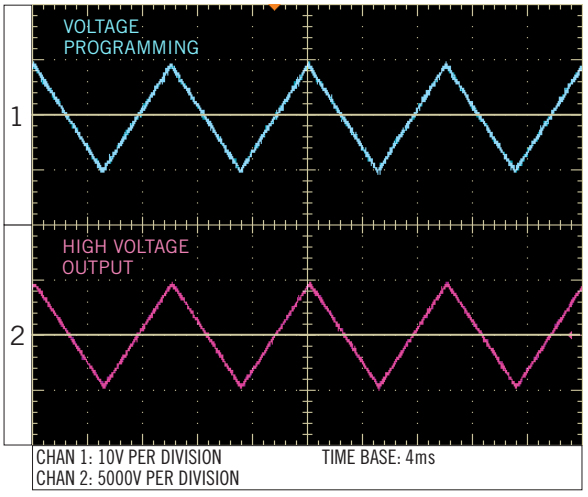


Figure C:
5HVA24-BP1 Triangle Wave Input

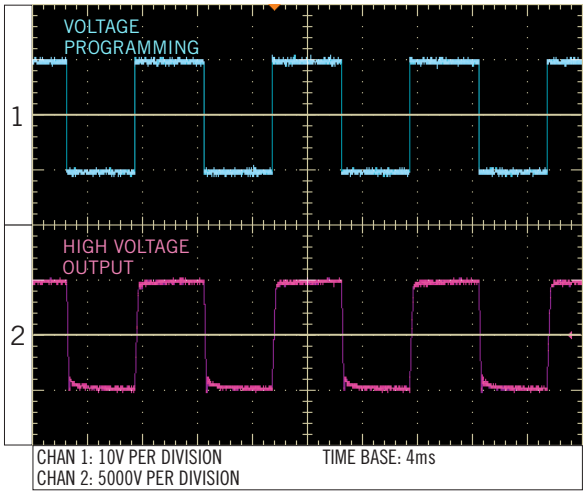


Figure D:
5HVA24-BP1 Square Wave Input

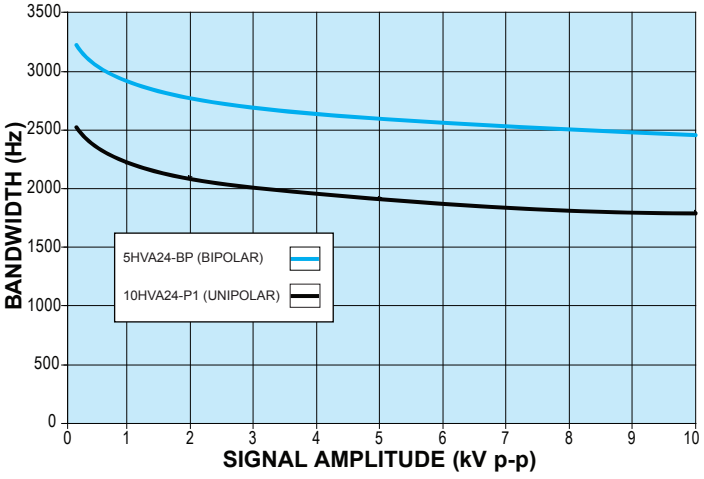


Figure E:
Bandwidth vs. Signal Amplitude with No Load

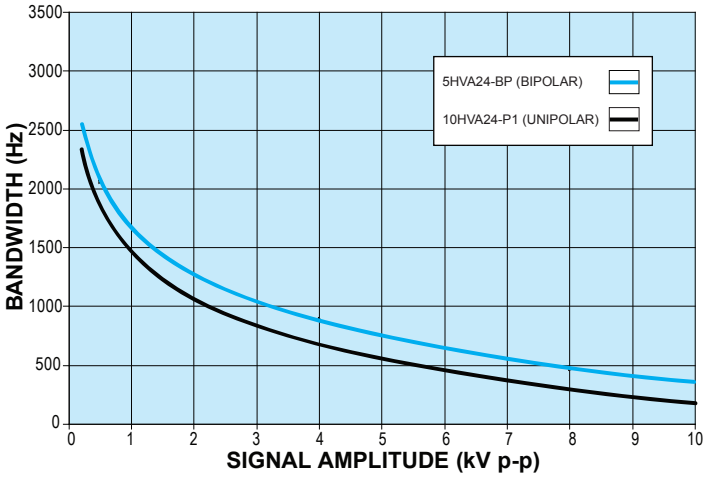
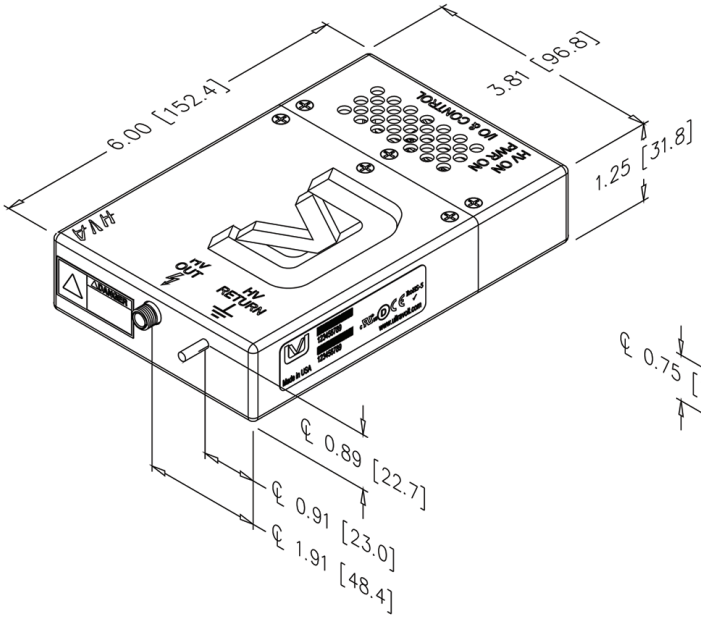


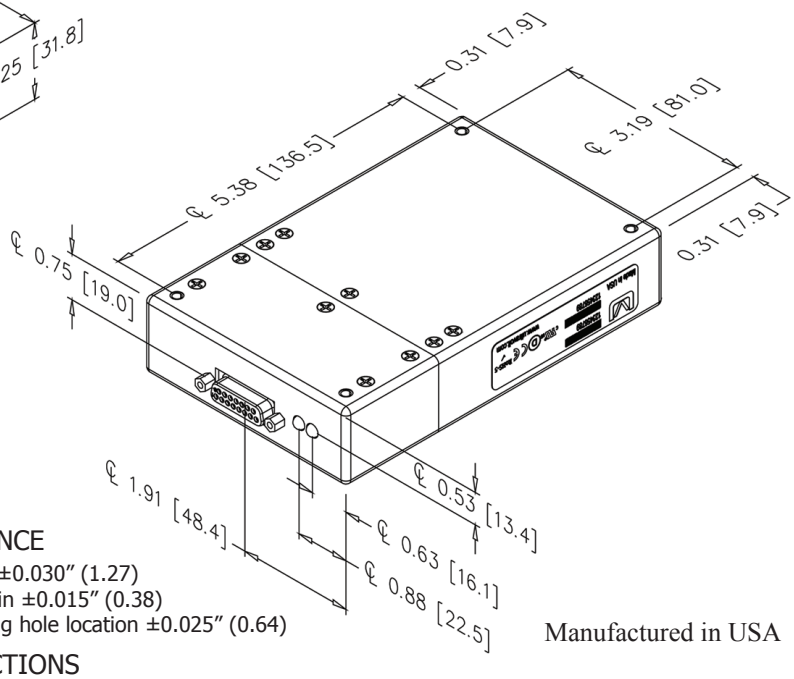
Figure F:
Bandwidth vs. Signal Amplitude with 100pF Load

HVA SERIES

Precision High-Voltage Amplifier



Downloadable drawings (complete with mounting & pin information) and 3D models are available online.



CONSTRUCTION

Material: Aluminum Alloy 5052-H32
Finish: Anodize MIL-A-8625E Blue

SIZE

Volume 28.58 in³ (468.34cc)
Weight 1.5 lbs. (0.68kg)

TOLERANCE

Overall ±0.030" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole location ±0.025" (0.64)

CONNECTIONS

D-Sub 15 Pin Female
HV Connector, LGH1/2L
HV Return, #6-32 x 0.437 Long Threaded Post

Manufactured in USA

RoHS COMPLIANT

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

UV-HVA INPUT CONNECTOR PINOUT FUNCTIONS		
PIN	DESCRIPTION	FUNCTION
1	Reference Voltage	+10.00V precision reference
2	Voltage Programming -	0 to +10V or 0 to -10V 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 ±10V represents 0 to ± full output voltage
5	N/C	No connection
6	Signal Ground	Reference all control signals here
7	Input Power	+24V 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 ±10V represents 0 to ± full output current
13	Current Limit Adjust	0 to +10V 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 1,000 VDC Output	1HVA
	0 to 2,000 VDC Output	2HVA
	0 to 4,000 VDC Output	4HVA
	0 to 5,000 VDC Output (Bipolar Only)	5HVA
	0 to 6,000 VDC Output (Unipolar Only)	6HVA
	0 to 10,000 VDC Output (Unipolar Only)	10HVA
Input	24VDC Nominal	24
Polarity	Positive Output	-P
	Negative Output	-N
	Bipolar Output	-BP
Power	1 Watt Output	1
Option	Ripple Stripper® Output Filter	-F
	15ppm temperature coefficient	-15PPM
Connections	LGH	Standard
	5kV SHV Type	-SHV-5kV
	10kV, BNC Type	-BNC-10kV

Example: 1HVA24-P1-F
Voltage
Model
Input
Polarity
Power
Option

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

Rev. G 10/14

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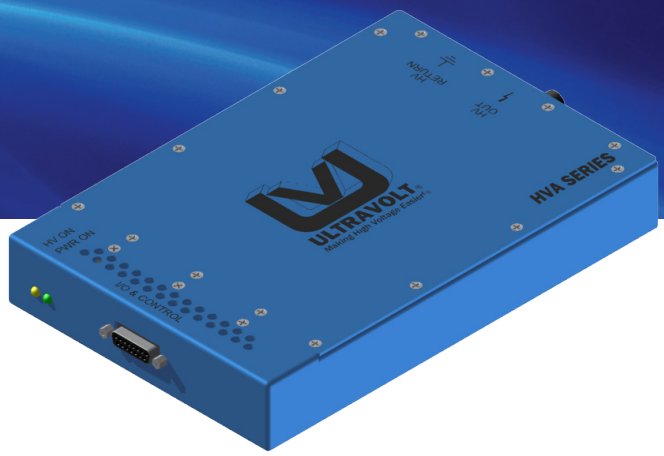
10HVA-20HVA SERIES

Precision High-Voltage Amplifier



PRELIMINARY DATASHEET

The 10HVA-20HVA Series of DC-to-DC high-voltage power supplies operates a precision filter/divider & linear HV switch to produce a High-Voltage Amplifier (HVA). These modules provide a high-resolution, high-voltage DC to full scale waveform capability greater than 500 Hz output. 10/15/20kV HVA modules are optimized for bias applications while providing excellent line regulation, load regulation, dynamic response, and stability. The HVA Series can both source and sink current operating linearly through 0V with low ripple and noise over the entire output range!

Typical applications for this series include the following:

Drivers for electrohydrodynamics, electrostatic chuck, Pockel's cells, laser & electro-optic modulation, electrophoresis.

Amplifiers for ion beam and electron beam devices such as mass spectrometry, and electron microscopes as well as electrostatic deflection/focusing, flocking, coating, electrospinning, precipitation and electrocoalescence.

- Bipolar models available at 0 to 10kV, 15kV, 20kV
- Unipolar models available at 0 to 15kV & 20kV
- Operates in DC, reversible, and amplifier modes
- Fast slew rate (40V/µs) and high bandwidth at an excellent value
- Can both source and sink current

- PPM level line & load regulation
- 25ppm temperature coefficient (15ppm optional)
- Reduced ripple option available

- Differential precision 0 to 10VDC control input
- Precision voltage and current monitors

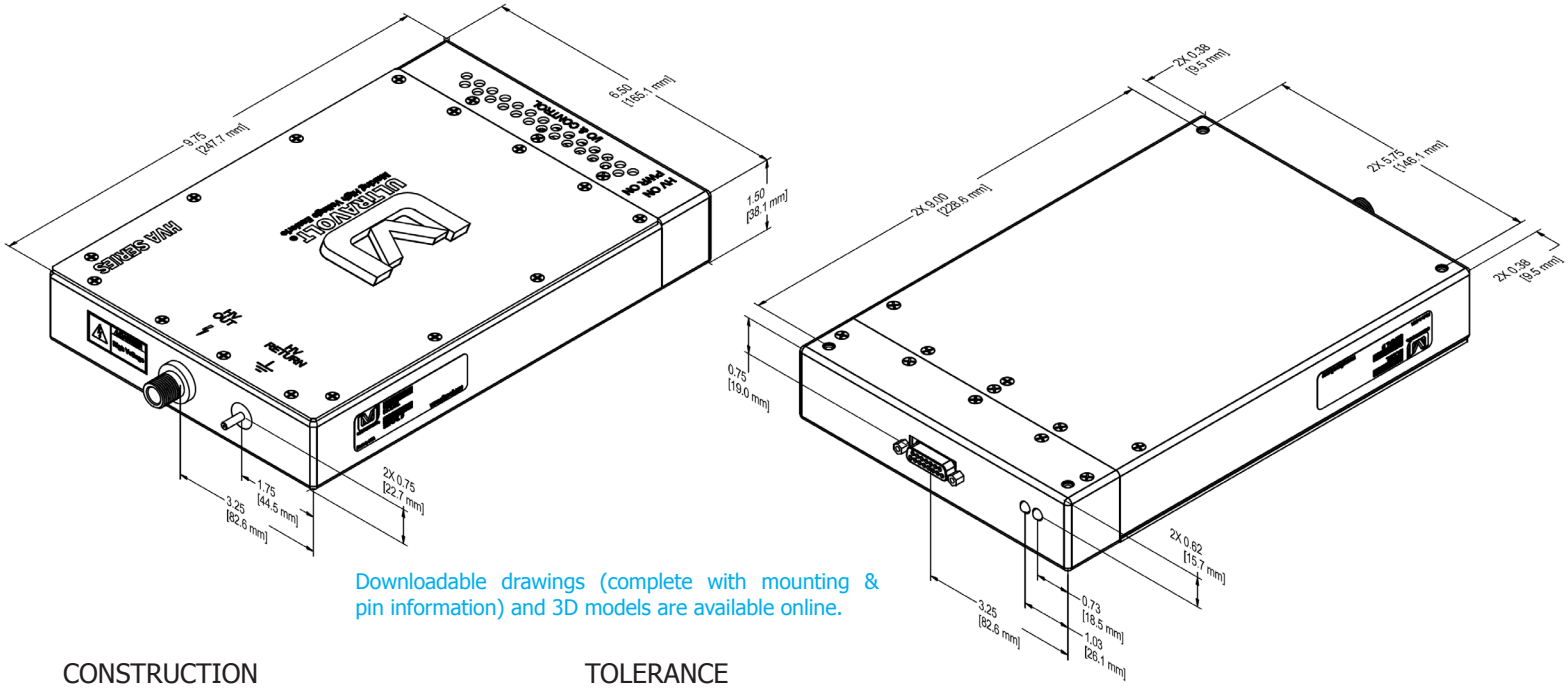
PARAMETER	CONDITIONS	MODELS					UNITS
INPUT		ALL TYPES					
Voltage Range	Full Power	24VDC ± 10%					VDC
Current	Standby / Disable	<70 unipolar, <105 bipolar					mA
Current	Full Load, Max Eout	1W=525 / 2W=TBD	1W=950 / 2W=TBD		1W=850 / 2W=TBD		mA
Current	No Load, Max Eout	400	700		650		mA
OUTPUT*		±10kV	15kV/±15kV		20kV/±20kV		
Power	Nominal Input, Max Eout	1	1	1.5	1	2	W
Current	Iout Entire Voltage Range	100	66	100	50	100	uA
Ripple	Full Load, Max Eout	0.05	0.05	0.05	0.05	0.05	%V pp
Ripple with -F Option	Full Load, Max Eout	0.0125	0.0125	0.0125	0.0125	0.0125	%V pp
Voltage Monitor	Normal Operating Conditions	0 to 10 ± 0.5%					VDC
Current Monitor	Normal Operating Conditions	0 to 10 ± 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 & CONTROLS		ALL TYPES					
Input Impedance	Normal Operating Conditions	10					MΩ
Adjust Voltage	Differential	0 to +10					VDC
HV ON/OFF (Enable/Disable)		0 to +0.8V Disable, +2.5 to +10 Enable (Default = Disable)					VDC
Reference Voltage	T = +25°C, Initial Value	+10.00 ± 0.05%					VDC
Max Source Current	T = +25°C	1					mA
ENVIRONMENTAL		ALL TYPES					
Operating	Full Load, Max Eout, Case Temp.	+10 to +45					°C
Temperature Coefficient	Over the Specified Temperature	±25PPM or ±15PPM (Optional)					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					G's
Vibration	Mil-Std-810, Method 514, Fig. 514-3	10					G's

*Units listed without polarity can be ordered as positive (+) or negative (-). Units listed as (±) are bipolar.

Specifications subject to change without notice.

10HVA-20HVA SERIES

Precision High-Voltage Amplifier



Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

CONSTRUCTION

Material: Aluminum
Finish: Blue Anodized

SIZE

Volume: 95.06in³ (1557.8cm³)
Weight: TBD

TOLERANCE

Overall: ± 0.030in (1.27mm)
Mounting hole location: ± 0.025in (0.64mm)

CONNECTIONS

D-Sub 15 Pin Female
HV Connector, LGH1Li
HV Return, #6-32 x 0.437 Long Threaded Post

Manufactured in USA

RoHS COMPLIANT

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

UV-HVA INPUT CONNECTOR PINOUT FUNCTIONS		
PIN	DESCRIPTION	FUNCTION
1	Reference Voltage	+10.00V precision reference
2	Voltage Programming -	0 to +10V or 0 to -10V 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 ±10V represents 0 to ± full output voltage
5	N/C	No connection
6	Signal Ground	Reference all control signals here
7	Input Power	+24V 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 ±10V represents 0 to ± full output current
13	Current Limit Adjust	0 to +10V sets current limit from 0 to full rated output current
14	N/C	No connection
15	Signal Ground	Reference all control signals here

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

ORDERING INFORMATION		
Type	0 to 10,000 VDC Output	10HVA
	0 to 15,000 VDC Output	15HVA
	0 to 20,000 VDC Output	20HVA
Input	24VDC Nominal	24
Polarity	Positive Output	-P
	Negative Output	-N
	Bipolar Output	-BP
Power	1 Watt Output	1
	1.5 Watt Output @ 15kV Only	1.5
	2 Watt Output @ 20kV Only	2
Option	Ripple Stripper® Output Filter	-F
	15ppm temperature coefficient	-15PPM
Connections	LGH1Li	Standard
	Flying Lead for HV Output	-W
	Shielded Flying Lead for HV Output	-WS

Contact the factory for other output requirements!

Example: 20HVA24-BP2-F

- 20HVA — Voltage / Model
- 24 — Input
- BP — Polarity
- 2 — Power
- F — Option

Rev. 2 10/14

1800 Ocean Avenue, Ronkonkoma, NY 11779
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FL SERIES

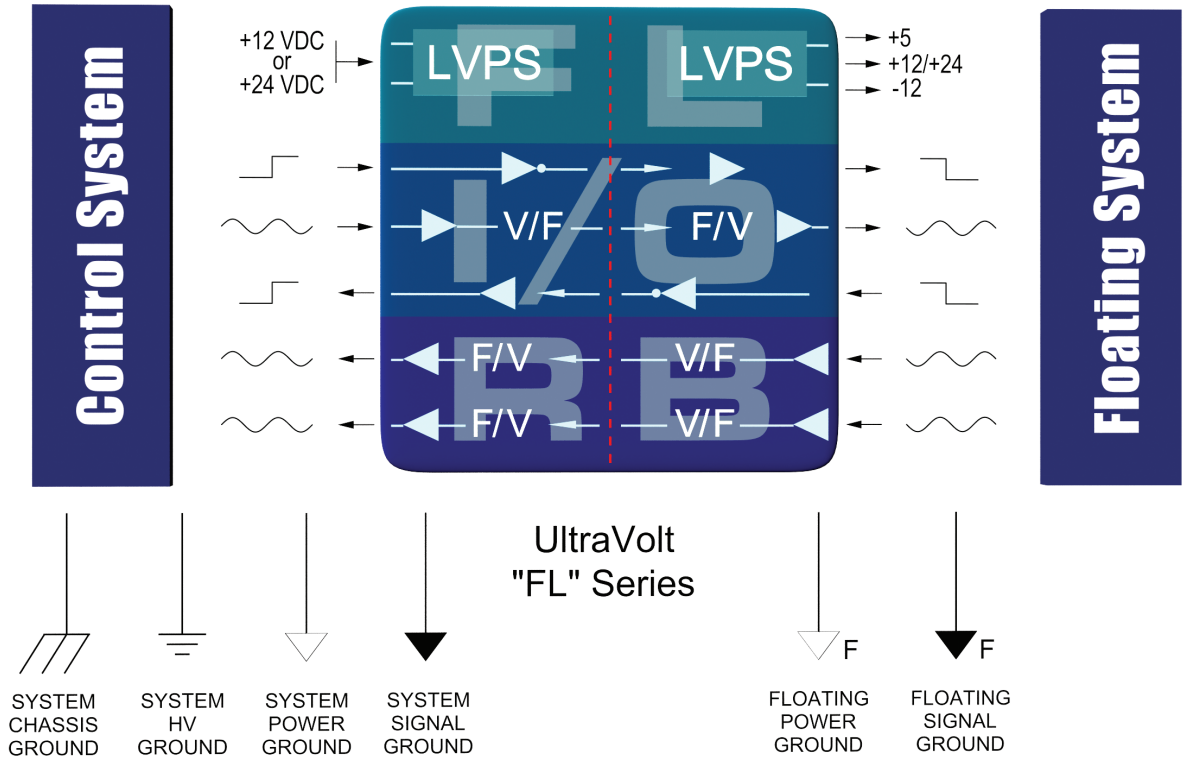
Floating Hot Deck LVPS With Isolated Digital and Analog I/O

The FL Series of floating-hot-deck, low-voltage power supplies offers an integrated solution for systems requiring LV power & controls with high-voltage isolation. Combining a highly isolated, DC-to-DC, multi-output low-voltage power supply (LVPS) with an advanced isolated digital & analog I/O topology, the FL sub-system provides both power and controls to floating-hot-deck circuitry. This solution, when combined with one or more UV HVPS or other circuitry, can provide high-performance solutions for applications such as:

Floating/Stacked Ion or E-Beam Biases	Floating Filament Bias
Floating Pulsers & Gated Grids	Floating Capacitance Meters
Floating High Side Current Monitors	Floating Leakage Testers

Please contact UltraVolt's customer service department for an analysis of your requirements.

- Isolated up to 15kV
- DC leakage current of <10nA
- AC leakage capacitance of <40pF
- 3 regulated floating LV power outputs
- Isolated digital I/O to and from floating hot deck
- Isolated analog I/O to and from floating hot deck
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)



Specifications subject to change without notice.

FL SERIES

Floating Hot Deck LVPS With Isolated Digital and Analog I/O

PARAMETER	CONDITIONS	MODELS		UNITS
INPUT POWER:		**12V MODELS**	**24V MODELS**	
Voltage Range	Full Power	+12 ± 5%	+24 ± 5%	VDC
Voltage Range	Derated Power Range	+10.8 to +16	+21.6 to +30	VDC
Current	Standby (Disabled)	< 90	< 50	mA
Current	No Load	< 0.15	< 0.15	A
Current	Max Load	< 1.60	< 1.40	A
AC Ripple Current	Nominal Input, Full Load	< 80	< 100	mA p-p
LOCAL CONTROLS: REFERENCE		**ALL TYPES**		
Output Voltage	T = +25°C, Initial value	+5.1 ± 1%		VDC
Output Impedance	T = +25°C	464 ± 1%		Ω
Stability	Over full temperature range	0.2		mV/°C
LOCAL CONTROLS: LVPS ENABLE / DISABLE		**ALL TYPES**		
Power supply on	Open, or a voltage above TTL high	+2.4 to 32		VDC
Power supply off	Grounded, or a voltage below TTL low	0 to + 0.7 ± 0.2 (Isink 1mA minimum)		VDC
INPUT / OUTPUT ISOLATION:		**12V MODELS**	**24V MODELS**	
Isolation Voltage	Continuous	15	15	kV
Leakage Current	All inputs to all outputs	< 10 std, < 100 "-E"	< 10 std, < 100 "-E"	nA
Leakage Capacitance	All inputs to all outputs	< 40 std, < 50 "-E"	< 50 std or "-E"	pF
ISOLATED POWER OUTPUTS:		**15FL12-12W**	**15FL24-24W**	
Output #1 Power	Nominal input, max Iout	12	24	W
Output #1 Voltage	Nominal input voltage range	+12 ± 2%	+24 ± 2%	VDC
Output #1 Current	Minimum to Maximum	0 to 1	0 to 1	A
Output #1 Line Regulation	Nominal input range, full load	< 0.1%	< 0.1%	VDC
Output #1 Load Regulation	No load to full load	< 0.1%	< 0.1%	VDC
Output #1 Ripple	Full load	< 2%	< 1%	V p-p
Output #2 Voltage	Nominal input voltage range	-15 ± 1	-15 ± 1	VDC
Output #2 Current	Minimum > Maximum	0 to 10	0 to 10	mA
Output #2 Line Regulation	Nominal input range, full load	< 0.1%	< 0.1%	VDC
Output #2 Load Regulation	No load to full load	< 2%	< 2%	VDC
Output #2 Ripple	Full load	< 2%	< 2%	V p-p
Output #3 Voltage	Nominal input voltage range	+5.6 ± 6%	+5.6 ± 6%	VDC
Output #3 Current	Minimum > Maximum	0 to 10	0 to 10	mA
Output #3 Line Regulation	Nominal input range, full load	< 1 %	< 1 %	VDC
Output #3 Load Regulation	No load to full load	< 1 %	< 1 %	VDC
Output #3 Ripple	Full load	< 1 %	< 1 %	V p-p
ISOLATED CONTROLS: TTL CHANNEL "UP"		**ALL TYPES WITH "-I/O" OPTION**		
Local input	Source voltage, sink current	10MΩ internal pull up to +15V <1V low, >2.5V high		VDC
Isolated output	Inverted & buffered TTL	Open collector with internal 1kΩ pull up to +5V Can sink 10mA max		VDC
Baud Rate	Varying duty cycle	DC to >300		kHz
ISOLATED CONTROLS: ANALOG CHANNEL "UP"		**ALL TYPES WITH "-I/O" OPTION**		
Local input voltage	Range	0 to + 5		VDC
Local input impedance		10 Meg		Ω
Isolated output voltage	Range	0 to + 5		VDC
Isolated output impedance		Buffered low impedance		-
Initial offset error		< ± 1%		mV
Gain error	Full scale	< ± 2%		VDC
Linearity error	0 to full scale	< ± 1%		VDC
Stability	30 min. warm-up, per 8 hrs / per day	< 0.01% / < 0.02%		VDC
Temperature Coefficient	0 to +55°C	< ± 50		ppm/°C
Bandwidth	Symmetric or asymmetric signal	DC to 30 (-3dB point is 47 Hz)		Hz

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FL SERIES

Floating Hot Deck LVPS With Isolated Digital and Analog I/O

'-RB' ISOLATED CONTROLS: TTL CHANNEL "DOWN"				
PARAMETER	CONDITIONS	ALL TYPES WITH "-I/O-R/B" OPTION		UNITS
Isolated 'Hot Deck' Input	Source voltage, sink current	10MΩ internal pull up to +15V <1V low, >2.5V high		VDC
Local output	Inverted & Buffered TTL	Open collector with internal 1kΩ pull up to +5V Can sink 10mA max		VDC
Bandwidth	Varying duty cycle	DC to >300		kHz
ISOLATED CONTROLS: ANALOG CHANNELS #1 & #2 "DOWN"				
PARAMETER	CONDITIONS	ALL TYPES WITH "-I/O-R/B" OPTION		UNITS
Isolated 'Hot Deck' +Input	Range	0 to +5, 0 to +10 with >+15VDC input power		VDC
Isolated 'Hot Deck' -Input	Range	0 to –5, 0 to -10 with >+15VDC input power		VDC
Isolated 'Hot Deck' + or - Input impedance	Signal source	> 10 Meg		Ω
Local output +voltage	Range	0 to +5, 0 to +10 with >+15VDC input power		VDC
Local output -voltage	Range	0 to –5, 0 to -10 with >+15VDC input power		VDC
Local output impedance	Signal source	Buffered low impedance		Ω
Initial offset error	Signal source	< ± 5		mVDC
Gain error	Full scale	< ± 1%		VDC
Linearity error	0 to full scale	< ± 1%		VDC
Stability	30 min. warm-up, per 8 hrs / per day	< 0.01% / < 0.02%		VDC
Temperature Coefficient	-20 °C to +55 °C	< ± 50		ppm/°C
Bandwidth	Symmetric or asymmetric signal	DC to 30 (-3dB point is 47Hz)		Hz
TEMPERATURE:	CONDITIONS	ALL TYPES		
Operating	Full load, case measurement	-20 to +55		°C
Storage	Non-operating, case measurement	-55 to +85		°C
Thermal shock	Mil-Std-810, Method 503-4, Proc. II	-20 to +55		°C
ALTITUDE:		ALL TYPES		
Operating	All operating conditions	Sea level to Vacuum		
Storage	Non-operating	Sea level to Vacuum		
SHOCK & VIBRATION:		STANDARD	- R/B OPTION	
Shock	Mil-Std-810, Method 516.5, Proc IV	20	20	G's
Vibration	Mil-Std-810, Method 514.5, Fig. 514.5C-3	10	10	G's

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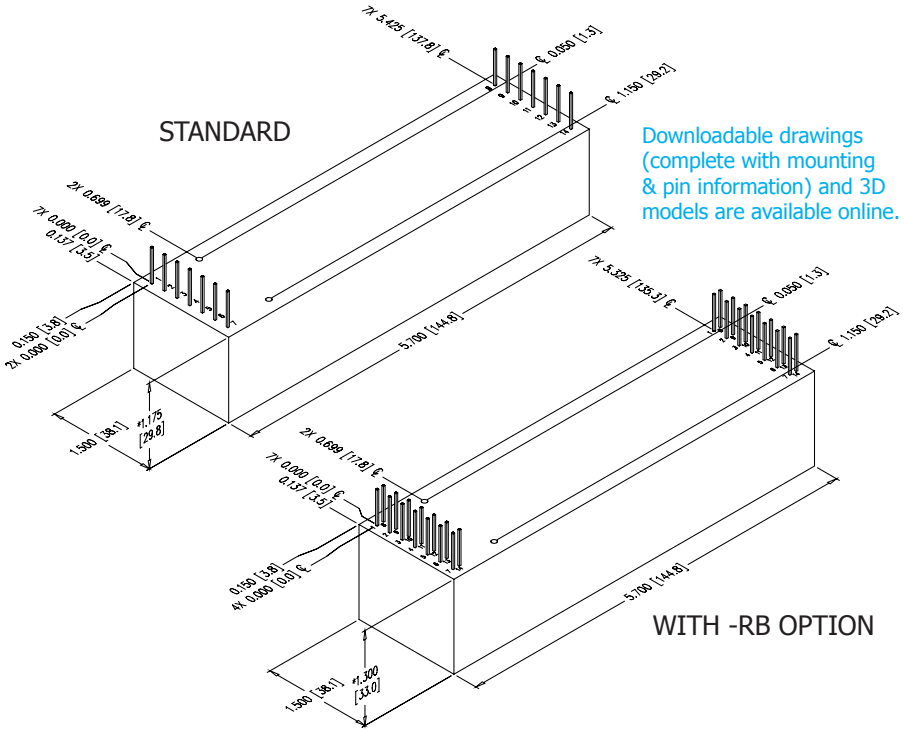
FL SERIES

Floating Hot Deck LVPS With Isolated Digital and Analog I/O



Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

CONSTRUCTION

Epoxy-filled DAP box certified to ASTM-D-5948

SIZE

Volume: Standard: 10 in³ (163.9cc)
-R/B Option: 11.1 in³ (182cc)

Weight: Standard: 12.0 oz (340.2g)
-R/B Option: 13.3 oz (377.1g)

TOLERANCE

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole locations ±0.025" (0.64)

NOTES

24-watt versions are an additional 0.062" (1.57) in height.
-M equipped units are an additional 0.030" (0.76) in height.
Contact UV Customer Service for drawings of models equipped with -E options.

CE cULus IEC-60950-1

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

LOCAL CONNECTIONS	
PIN	FUNCTION
1	Input Power Ground Return
2	Positive Power Input
3	LVPS Enable/Disable Input
4	TTL Up/HVPS Enable/Disable (-I/O Only)
5	Signal Ground Return
6	Analog Up/ HVPS Remote Programming Input (-I/O Only)
7	+5V Reference Output

ISOLATED/FLOATING CONNECTIONS	
PIN	FUNCTION
8	Floating PWR Ground Return
9	Floating +12VDC or +24VDC Output
10	Floating -15VDC Output
11	Floating TTL Up/HVPS Enable/Disable (-I/O Only)
12	Floating Signal Ground Return
13	Floating Analog Up/HVPS Remote Programming Input (-I/O Only)
14	Floating +5.6V Reference Output

ADDITIONAL LOCAL CONNECTIONS (-R/B OPTION)	
PIN	FUNCTION
8	+Iout monitor output (Analog Down Channel 1)
9	-Iout monitor output (Analog Down Channel 1)
10	+Eout monitor output (Analog Down Channel 2)
11	-Eout monitor output (Analog Down Channel 2)
12 & 13	N/C (reserved for future use)
14	TTL output (Digital Down Channel 1)

ADDITIONAL ISOLATED CONNECTIONS (-R/B ONLY)	
PIN	FUNCTION
1	Floating +Iout monitor input (Analog Down Channel 1)
2	Floating -Iout monitor input (Analog Down Channel 1)
3	Floating +Eout monitor input (Analog Down Channel 2)
4	Floating -Eout monitor input (Analog Down Channel 2)
5 & 6	N/C (reserved for future use)
7	Floating TTL input (Digital Down Channel 1)

ORDERING INFORMATION		
Type	15kV Isolation	15FL
Input Voltage	12VDC Nominal	12
	24VDC Nominal	24
Power	Watts Output (12 V Only)	-12W
	Watts Output (24 V Only)	-24W
Options	(1) Digital Up Channel & (1) Analog Up Channel	-I/O
	(1) Digital Down Channel & (2) Analog Down Channels	-RB
	Partial Mu-Metal Shield	-M
Case	Plastic Case - Diallyl Phthalate	Standard
	'Eared' Chassis Mounting Plate	-E

Manufactured in USA

Example: 15FL12-12W-I/O

Type — Isolation — Model — Input — Power — Option

Rev. Q 10/14

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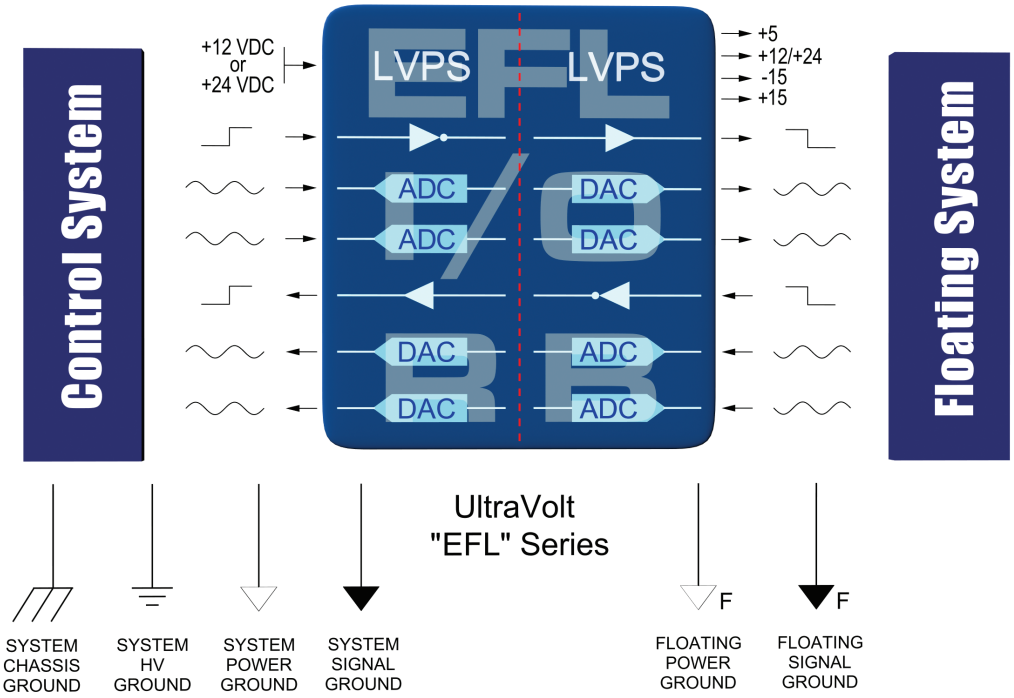
EFL SERIES

Enhanced Floating Hot Deck LVPS With Isolated Digital and Analog I/O

The EFL Series of floating-hot-deck, low-voltage power supplies offers an integrated solution for systems requiring LV power & controls with high-voltage isolation. Combining a highly isolated, DC-to-DC, multi-output low-voltage power supply (LVPS) with an advanced isolated digital & analog I/O topology, the EFL sub-system provides both power and controls to floating-hot-deck circuitry. This solution, when combined with one or more UV HVPS or other circuitry, can provide high-performance solutions for applications such as:

Floating/Stacked Ion or E-Beam Biases	Floating Filament Bias
Floating Pulsers & Gated Grids	Floating Capacitance Meters
Floating High Side Current Monitors	Floating Leakage Testers

- Precision analog control
- Linearity of ±0.05% and accuracy of ±0.2%
- 10ppm temperature coefficient
- Isolated up to 15kV or 30kV
- Isolation resistance of 150GΩ (15kV) or 2GΩ (30kV)
- 4 regulated floating LV power outputs
- Isolated digital and analog I/O to and from floating hot deck



NORMAL, HALF QUIET, AND QUIET MODES:

All EFLs feature a mode control. Three different models, Normal, Half-Quiet, and Quiet, are selectable via the voltage level at the mode pin. A voltage between -1.0V and +0.8V keeps the unit in Normal mode; the up and down analog channels follow their inputs. If the mode feature is not used, the mode pin must be grounded for the EFL to operate properly.

A voltage more negative than -4.00V places the EFL in Half-Quiet mode. The up channels do not respond to changes in their inputs in Half-Quiet mode.

A voltage greater than +3.75V and less than +5.0V places the EFL in Quiet mode. In Quiet mode, the up and down channels do not respond to changes in their inputs.

The voltage level at the mode pin must not exceed +5.0V at any time. Please contact UltraVolt's customer service department for an analysis of your requirements.

Note: If a voltage >0.8V is applied to the mode pin, it must source less than 400uA.

Specifications subject to change without notice.

EFL SERIES

Enhanced Floating Hot Deck LVPS With Isolated Digital and Analog I/O

PARAMETER	CONDITIONS	MODELS			UNITS
INPUT POWER		12W	24W	36W (15kV only)	
Voltage Range	Full Power	+12 ± 5%	+24 ± 10%	+24 ± 10%	VDC
Current	Standby (Disabled)	< 150	< 100	< 100	mA
Current	No Load	< 0.50	< 0.50	< 0.50	A
Current	Max Load	< 2.50	< 2.30	< 3.00	A
AC Ripple Current	Nominal Input, Full Load	< 50	< 50	< 50	mA p-p
LOCAL CONTROLS: REFERENCE		ALL TYPES			
Output Voltage	T = +25°C, Initial value	+5.1 ± 2%			VDC
Output Impedance	T = +25°C	464 ± 1%			Ω
Stability	Over full temperature range	0.4			mV/°C
LOCAL CONTROLS: LVPS ENABLE / DISABLE		ALL TYPES			
Power supply on	Open, or a voltage above TTL high (Isource <400uA)	+3.2 to 5			VDC
Power supply off	Grounded, or a voltage below TTL low	< 0.8 (Isink 1mA minimum)			VDC
INPUT / OUTPUT ISOLATION:		15EFL		30EFL	
Isolation Voltage	Continuous	15		30	kV
Isolation Resistance	All inputs to all outputs	150		2	GΩ
Leakage Capacitance	All inputs to all outputs	< 40 std, < 50 "-E"		< 40 std.	pF
ISOLATED POWER OUTPUTS:		12W	24W	36W (15kV only)	
Output #1 Power	Nominal input, max Iout	12	24	36	W
Output #1 Voltage	Nominal input voltage range	+12 ± 2%	+24 ± 2%	+24 ± 2%	VDC
Output #1 Current	Minimum to Maximum	0 to 1	0 to 1	0 to 1.5	A
Output #1 Line Regulation	Nominal input range, full load	< 0.1 %	< 0.1 %	< 0.1 %	VDC
Output #1 Load Regulation	No load to full load	< 0.25 %	< 0.30 %	< 0.40 %	VDC
Output #1 Ripple	Full load	< 2.5 %	< 1.5 %	< 1.5 %	V p-p
Output #2 & #4 Voltage	Nominal input voltage range	±15 ± 5 %	±15 ± 5 %	±15 ± 5 %	VDC
Output #2 & #4 Current	Minimum to Maximum	0 to 50	0 to 50	0 to 50	mA
Output #2 & #4 Line Regulation	Nominal input range, full load	< 0.3 %	< 0.3 %	< 0.3 %	VDC
Output #2 & #4 Load Regulation	No load to full load	< 5 %	< 1 %	< 1 %	VDC
Output #2 & #4 Ripple	Full load	< 2.5 %	< 2.5 %	< 2.5 %	V p-p
Output #3 Voltage	Nominal input voltage range	+5.1 ± 1%	+5.1 ± 1%	+5.1 ± 1%	VDC
Output #3 Current	Minimum to Maximum	500	500	500	mA
Output #3 Line Regulation	Nominal input range, full load	< 1 %	< 1 %	< 1 %	VDC
Output #3 Load Regulation	No load to full load	< 1 %	< 1 %	< 1 %	VDC
Output #3 Ripple	Full load	< 4 %	< 4 %	< 4 %	V p-p
ISOLATED CONTROLS: TTL CHANNEL "UP"		ALL TYPES			
Local input	Source voltage, sink current	0 ≤ 0.5 (Isink 3mA minimum) 1 ≥ 2.4 (300uA max or open collector)			VDC
Isolated output	Inverted & buffered TTL	1 ≥ 2.4, 0 ≤ 0.55 ± (Sources 0.8 mA, Sinks 3 mA)			VDC
Baud Rate	Duty cycle	< 15			ms
ISOLATED CONTROLS: ANALOG CHANNEL "UP"*		12V	24V		
Local input voltage	Range	0 to + 5	0 to + 10		VDC
Isolated output voltage	Range	0 to + 5	0 to + 10		VDC
Local input impedance		20.0 K			Ω
Initial offset error		< ± 2			mV
Gain error	Full scale	< ± 0.2 %			VDC
Linearity error	Full scale	< ± 0.05 %			VDC
Stability	30 min. warm-up, per 8 hrs / per day	< 0.02%			VDC
Temperature Coefficient	0 to +55 °C	< ± 10			ppm/°C
Bandwidth	Symmetric or asymmetric signal	DC to 4			Hz

*Note: Analog Channel UP parameters are valid for outputs in the range of 10% to 100% of maximum.

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EFL SERIES

Enhanced Floating Hot Deck LVPS With Isolated Digital and Analog I/O

'-RB' ISOLATED CONTROLS: TTL CHANNEL "DOWN"			
PARAMETER	CONDITIONS	ALL TYPES	UNITS
Isolated 'Hot Deck' Input	Source voltage, sink current	0 ≤ 0.5 (Isink 1mA Minimum) 1 ≥ 2.4 (300uA max or open collector)	VDC
Local output	Inverted & Buffered TTL	1 > 2.4 (Sources 0.8mA) 0 < 0.55 (Sinks 10mA)	VDC
Propagation Delay	Duty cycle	< 15	ms
ISOLATED CONTROLS: ANALOG CHANNELS #1 & #2 "DOWN"**			
PARAMETER	CONDITIONS	ALL TYPES	UNITS
Isolated 'Hot Deck' +Input	Range	0 to +5 for 12V and 0 to +10 for 24V	VDC
Isolated 'Hot Deck' -Input	Range	0 to –5 for 12V and 0 to –10 for 24V	VDC
Isolated 'Hot Deck' + or - Input impedance	Signal source	> 10	MΩ
Local output +voltage	Range	0 to +5 for 12V and 0 to +10 for 24V	VDC
Local output -voltage	Range	0 to –5 for 12V and 0 to –10 for 24V	VDC
Initial offset error	Signal source	< ± 2	mVDC
Gain error	Full scale	< ± .2%	VDC
Linearity error	Full scale	< ± .05%	VDC
Stability	30 min. warm-up, per 8 hrs / per day	< 0.01% / < 0.02%	VDC
Temperature Coefficient	-20 °C to +55 °C	< ± 10	ppm/°C
Bandwidth	Symmetric or asymmetric signal	DC to 4	Hz
TEMPERATURE:	CONDITIONS	ALL TYPES	
Operating	Full load, case measurement	-20 to +55	°C
Storage	Non-operating, case measurement	-55 to +85	°C
Thermal shock	Mil-Std-810, Method 503-4, Proc. II	-20 to +55	°C
ALTITUDE:		ALL TYPES	
Operating	All operating conditions	Sea level to Vacuum	-
Storage	Non-operating	Sea level to Vacuum	-
SHOCK & VIBRATION:		ALL TYPES	
Shock	Mil-Std-810, Method 516.5, Proc IV	20	G's
Vibration	Mil-Std-810, Method 514.5, Fig. 514.5C-3	10	G's

**Note: Analog Channels #1 & #2 DOWN parameters are valid for outputs in the range of 10% to 100% of maximum.

LOCAL CONNECTIONS	
PIN	FUNCTION
1	Input Power Ground Return
2	Positive Power Input
3	LVPS Enable/Disable/Sync In
4	TTL Up
5	Signal Ground Return
6	Analog Up Channel 1
7	+5V Reference Output
8	Analog Down Channel 1, +
9	Analog Down Channel 1, -
10	Analog Down Channel 2, +
11	Analog Down Channel 2, -
12	Analog Up Channel 2
13	Mode
14	TTL Output (Inverted Digital Down Channel 1)

ISOLATED/FLOATING CONNECTIONS	
PIN	FUNCTION
1	Analog Down Channel 1, +
2	Analog Down Channel 1, -
3	Analog Down Channel 2, +
4	Analog Down Channel 2, -
5	+15VDC Output
6	Analog Up Channel 2
7	Floating TTL input (Digital Down Channel 1)
8	Floating PWR Ground Return
9	Floating +12VDC or +24VDC Output
10	Floating -15VDC Output
11	Floating TTL Up
12	Floating Signal Ground Return
13	Floating Analog Up Channel 1
14	Floating +5.1VDC Reference Output

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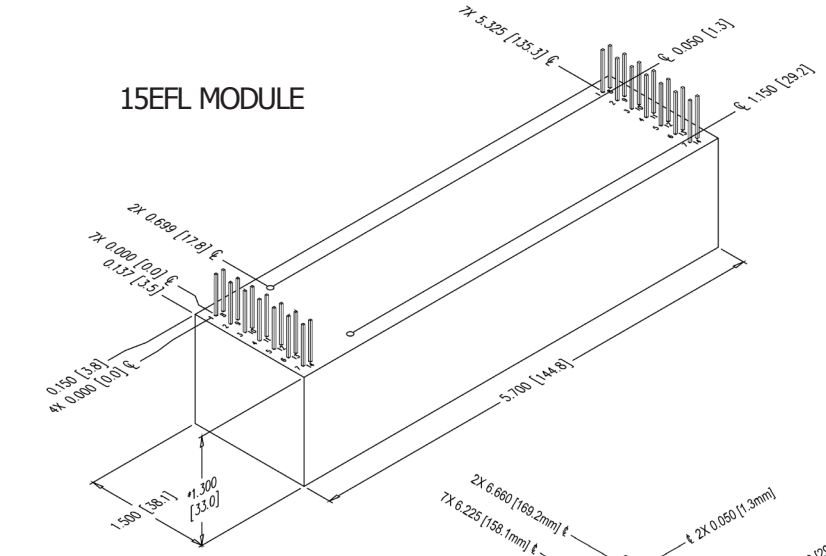
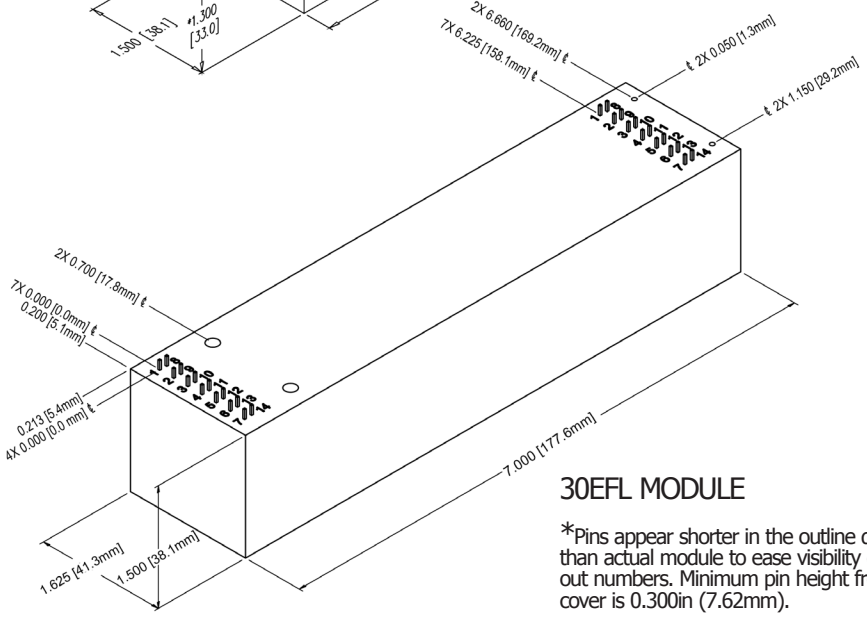
EFL SERIES

Enhanced Floating Hot Deck LVPS With Isolated Digital and Analog I/O

15EFL MODULE





30EFL MODULE

*Pins appear shorter in the outline drawing than actual module to ease visibility of pin out numbers. Minimum pin height from the cover is 0.300in (7.62mm).

CONSTRUCTION

Epoxy-filled DAP box certified to ASTM-D-5948

SIZE

Volume:
15EFL: 11.1 in³ (181.9cc)
30EFL: 16.8 in³ (275.3cc)

Weight:
15EFL: 13.3 oz (377.1g)
30EFL: 20.1 oz (569.8g)

TOLERANCE

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
15EFL: Mounting hole locations ±0.025" (0.64)
30EFL: Mounting hole locations ±0.030" (0.76)

NOTES

15EFL: 24W and 36W versions are an additional 0.062" (1.57) in height. Contact UV Customer Service for drawings of models equipped with -E option.
30EFL: 24W version is an additional 0.073" (1.85) in height.
All Types: -M equipped units are an additional 0.030" (0.76) in height.

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

RoHS COMPLIANT

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

Manufactured in USA

ORDERING INFORMATION		
Type	15kV Isolation	15EFL
	30kV Isolation	30EFL
Input Voltage	12VDC Nominal	12
	24VDC Nominal	24
Power	Watts Output (12Vin Only)	-12W
	Watts Output (24Vin Only)	-24W
	Watts Output (15kVout, 24Vin Only)	-36W
Standard Features	(1) Digital Up Channel & (2) Analog Up Channels	-I/O
	(1) Digital Down Channel & (2) Analog Down Channels	-R/B
Options	Partial Mu-Metal Shield	-M
Case	Plastic Case - Diallyl Phthalate	Standard
	'Eared' Chassis Mounting Plate (15kV only)	-E

Example: 15EFL12-12W-I/O-RB

Type — Isolation
Model
Input
Power

Rev. H 10/14

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FIL SERIES

Precision Filament Supply

The FIL Series is a non-isolated precision filament supply. This line of regulated DC-DC converters addresses the needs of the high precision and high stability power supply user. Designed and built utilizing a state-of-the-art power-conversion topology, these units feature surface-mount technology and encapsulation techniques that provide high reliability and low cost. The FIL Series supply allows users to properly operate the filament to maximize performance and extend its life. Typical applications for this series include precision filaments for mass spectrometry, electron beams, and test equipment.

- High precision and high stability
- 15PPM temperature coefficient
- 0 to 5VDC
- 0 to 3 Amps of current
- Maximum Iout capability down to 0 Volts
- Programmable voltage and current controls
- Indefinite output short-circuit protection
- Buffered output current & voltage monitors
- Excellent linearity & accuracy of control
- Current mode and voltage mode indicator
- Synchronizable

PARAMETER	CONDITIONS	MODELS	UNITS
INPUT		ALL TYPES	
Operating Range	All Conditions	+24 ± 10	VDC
Current	Full Load Output	900mA Typical	mA
OUTPUT		ALL TYPES	
Voltage Range	Nominal Input	0 to 5	VDC
DC Current Range	Nominal Input	0 to 3	Amps
Voltage Range	Derated	0 to 5.7	VDC
DC Current Range	Derated	0 to 3.3	Amps
Voltage Monitor Scaling	Full Load	10	VDC
Current Monitor Scaling	Full Load	10	VDC
PROGRAMMING & CONTROLS		ALL TYPES	
Input Impedance	Nominal Input	+ Output Models 10MΩ to GND	MΩ
Adjust Resistance	Typical Potentiometer Values	10K to 100K (Pot across Vref. & Signal GND, Wiper to Adjust)	Ω
Adjust Voltage	Referenced to signal ground	0 to +10 VDC	VDC
Accuracy	In current control	±0.1%	Amps
Offset	Voltage control	0.04%	VDC
Offset	Current control	0.001%	Amps
Output Voltage	T=+25°C, Initial Value	+10.0V ± 0.05%	VDC
Enable/Disable		0 to +0.5 Disable, +2.4 to 10 Enable (Default = Enable)	VDC
ENVIRONMENTAL		ALL TYPES	
Operating	Full Load, Max Eout, Case Temp.	+10 to +45	°C
Coefficient	Over the Specified Temperature	≤ 15	PPM/°C
Thermal Shock	Mil-Std 810, Method 503-4, Proc. II	-40 to +65	°C
Storage	Non-Operating, Case Temp.	-55 to +85	°C
Altitude	Standard Package, All Conditions	Sea Level through Vacuum	-
Shock	Mil-Std-810, Method 516.5, Proc. IV	20	G's
Vibration	Mil-Std-810, Method 514.5, Fig.514.5C-3	10	G's

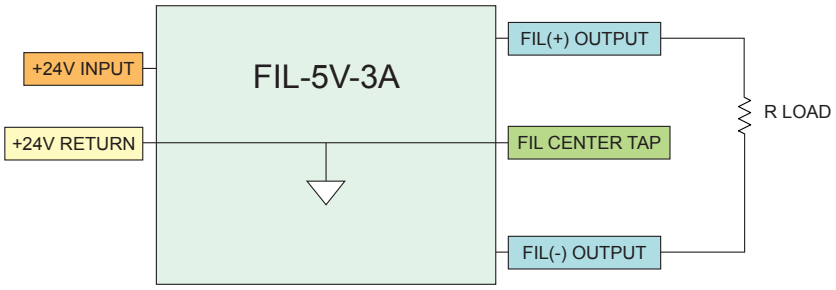
Specifications subject to change without notice.

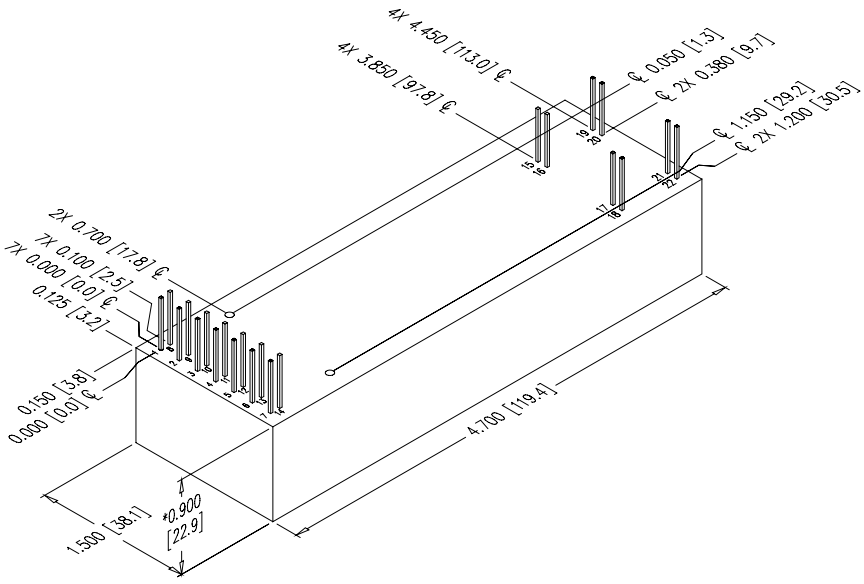
FIL SERIES

Precision Filament Supply

INPUT/OUTPUT WIRING DIAGRAM

The filament power supply load should be connected between the FIL(+) output and the FIL(-) output, load current should not flow through the center tap, which is common with the (+)24V return. The FIL(-) or FIL(+) outputs should not be grounded.





CONSTRUCTION

Epoxy-filled DAP box certified to ASTM-D-5948

SIZE

Volume:
6.35 in³ (104cc)
Weight:
6.75 oz (191g)

TOLERANCE

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole locations ±0.025" (0.64)

NOTES

-M equipped units are an additional 0.030" (0.76) in height. Contact UV Customer Service for drawings of models equipped with -E or -H options.

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

CONNECTIONS	
PIN	FUNCTION
1 & 8	Input-Power Ground
2 & 9	Positive Power Input
3	Iout Monitor
4	Enable/Disable
5	Signal Ground
6	Voltage Programming
7	+10.0V Reference Output
10	Sync In
11	Imode Indicator
12	Vmode Indicator
13	Current Programming
14, 17, & 18	Vout Monitor
15 & 16	Fil Output (-)
19 & 20	Fil Output (+)
21 & 22	Center Tap

All grounds joined internally.

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

Manufactured in USA

ORDERING INFORMATION		
Type	0 to 5 VDC Output	FIL-5V
Current	Current Output (0 to 3A)	-3A
Case	'Eared' Chassis Mounting Plate	-E
Heat Sink	.400" High (sized to fit case)	-H
Shield	Six-sided Mu-Metal Shield	-M

Example: FIL-5V-3A-M

Model
Output Voltage
Output Current
Option (Mu-Metal)

Rev. E 10/14

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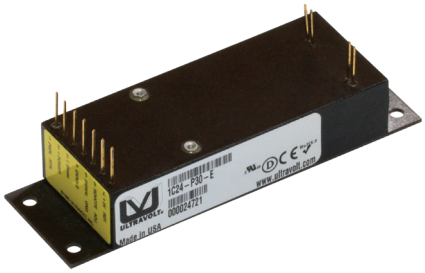
ULTRAVOLT PRODUCT OPTIONS

-H: HEAT SINK

For PCB-mounted A and C Series plastic package units in extended temperature environments.

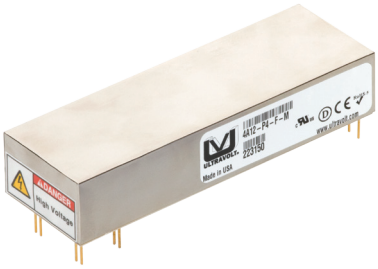
-C: RF-TIGHT ALUMINUM ENCLOSURE

For ruggedized PCB or chassis mounting of any A or C Series unit. At frequencies greater than 500kHz, this option will reduce radiated RFI emissions 2-3 orders of magnitude.



-E: "EARED" MOUNTING PLATE

For chassis mounting any A, AA, or C Series plastic package unit. Requires additional length, but no additional width.

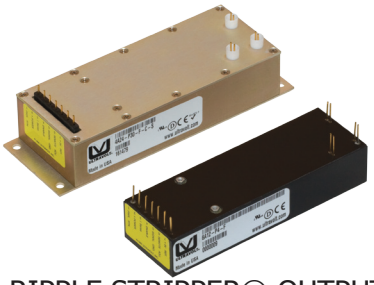


-M: SIX-SIDED MU-METAL SHIELD

Six-sided wrap-around feature is compatible with all accessories. At frequencies from 1Hz through 600Hz, this option will reduce radiated RFI & EMI emissions by 4-5 orders of magnitude.

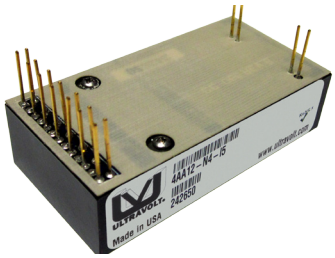
-25PPM: REDUCED TEMP. COEFFICIENT

Maintains a 25PPM temperature coefficient on both the output voltage and output voltage monitor (when present). Available on A, AA, C, and 10A-40A Series units.



-F: RIPPLE STRIPPER® OUTPUT FILTER

For the A, 10A-25A, or 30A-40A Series units. Reduces ripple 10 to 100 times. For greater performance, the -M Option should be used.



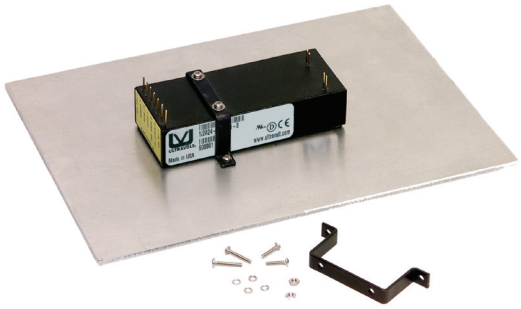
-I5/-I10: ENHANCED INTERFACE OPTIONS

For the AA, A, High Power C, 10A-25A Series modules, and F Option. Enhanced interface options that feature a +5V/+10V control and monitoring and constant voltage/constant current auto-crossover.

Specifications subject to change without notice.

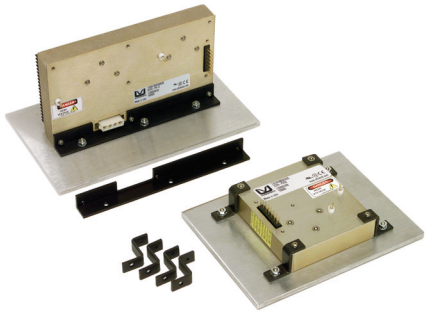
ULTRAVOLT PRODUCT ACCESSORIES

PRODUCT ACCESSORIES



BR-1 & BR-2: BRACKET KITS

For chassis mounting any A or C Series plastic package unit. Requires additional width, but no additional length.



BR-7 & BR-8: BRACKET KITS

For chassis mounting High Power C Series units.

BR-18: BRACKET KIT

For chassis mounting any AA Series plastic package unit. Requires additional width, but no additional length.

SYSTEM ACCESSORIES

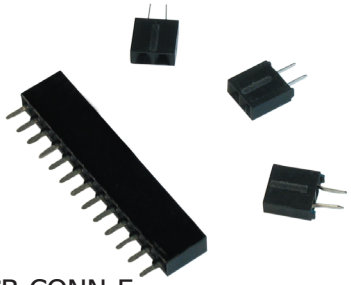
USB-HV-RACK

USB control for an HV Rack® system. Enables users to control and monitor an HV Rack system via a PC.

LOW VOLTAGE CONNECTORS & KITS

CONN-KIT-FL

Wire Harness Kit for FL Series Units
AMP#2-87499-3 Qty 2, #1-87309-4 Qty 15

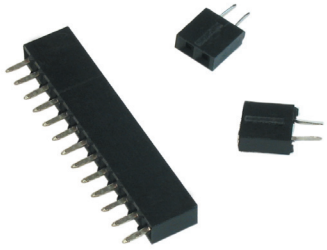


PCB-CONN-F

PCB-Mount Connector Kit
Allows HVPS to be mounted after PCB assembly.
AMP#534998-1 Qty 3, #1-535541-1 Qty 1

CONN-KIT-HP250

Wire Harness Kit for 250W C Series Units
AMP#2-87456-2 Qty 1, #87499-3 Qty 2, #1-87309-4 Qty 18,
#1-480702-0 Qty 1, #350705-1 Qty 4

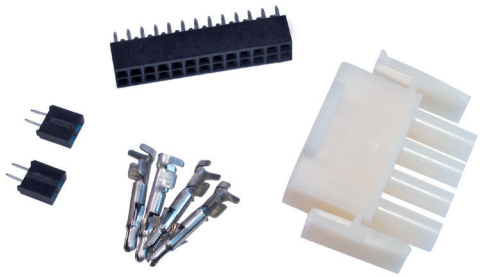


PCB-CONN-STD

PCB-Mount Connector Kit
Allows HVPS to be mounted after PCB assembly.
AMP#534998-1 Qty 2, #1-535541-1 Qty 1

CONN-KIT-HP

Wire Harness Kit for 60W/125W C Series Units
AMP#2-87456-2 Qty 1, #87499-3 Qty 2, #1-87309-4 Qty 18

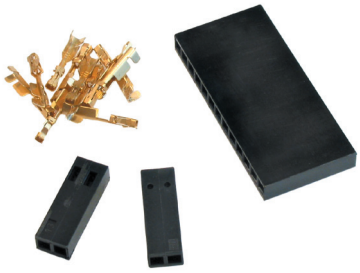


PCB-CONN-HP

PCB-Mount Connector Kit
AMP#1-534998-3 Qty 1, #534998-1 Qty 2,
#1-480702-0 Qty 1, #350705-1 Qty 4

CONN-KIT-F

Wire Harness for -F Equipped Units
AMP#2-87499-3 Qty 1, #87499-3 Qty 3, #1-87309-4 Qty 14

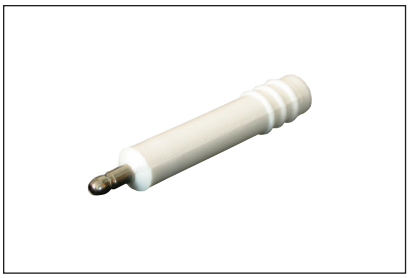


CONN-KIT

Wire Harness for A and C Series Units
AMP#2-87499-3 Qty 1, #87499-3 Qty 2, #1-87309-4 Qty 12

HIGH VOLTAGE CONNECTORS & CABLES

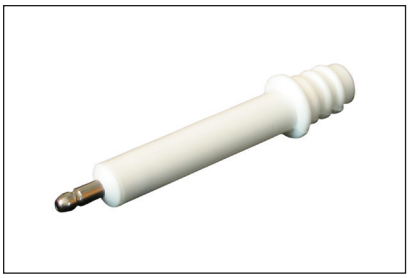
Industry Standard Connectors & Cables



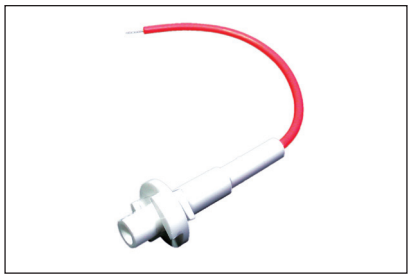
UV Option Part #: -AT20
UV Connector Part #: CN-20KV-1000
Manufacturer: Alden
Manufacturer Part #: A000.140
Mates to: CA-15KV-1000

UV Option Part #: -AT24
UV Connector Part #: CN-35KV-1000
Manufacturer: Alden
Manufacturer Part #: F311-1
Mates to: CA-30KV-1000 or CN-35KV-1001

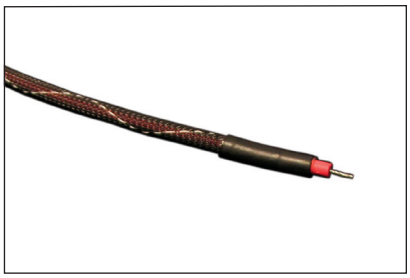
UV Option Part #: -AT50
UV Connector Part #: CN-30KV-1001
Manufacturer: Caton
Manufacturer Part #: 14203-LX
Mates to: N/A



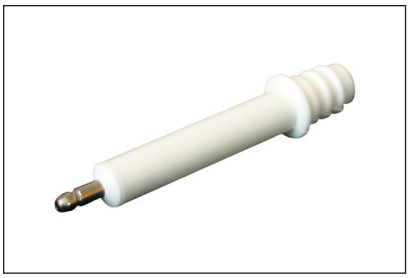
UV Option Part #: -AT21
UV Connector Part #: CN-30KV-1000
Manufacturer: Alden
Manufacturer Part #: F800.165
Mates to: CA-30KV-1001 or CN-35KV-1000



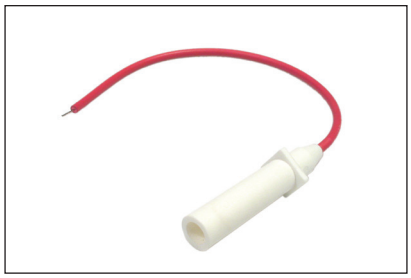
UV Cable Assembly Part #: CA-40KV-1002
Manufacturer: Alden
Manufacturer Part #: B110YX10
Mates to: CN-40KV-1000



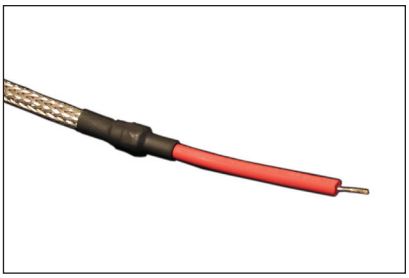
-AP Option
Anode Lead Protective Wrap:
Expandable, non-fraying, braided sleeving over HV flying lead



UV Option Part #: -AT23
UV Connector Part #: CN-35KV-1001
Manufacturer: Alden
Manufacturer Part #: F800.187
Mates to: CA-30KV-1001 or CN-35KV-1000

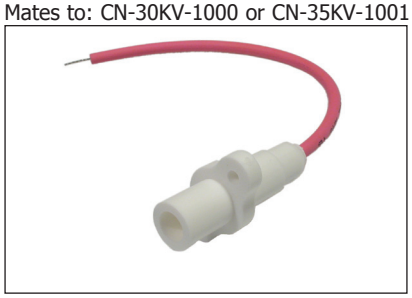


UV Cable Assembly Part #: CA-30KV-1001
Manufacturer: Alden
Manufacturer Part #: F404B9
Mates to: CN-30KV-1000 or CN-35KV-1001



-AS Option
Anode Lead Shield:
Braided shield over HV flying lead

UV Option Part #: -AT22
UV Connector Part #: CN-40KV-1000
Manufacturer: Alden
Manufacturer Part #: B200.200
Mates to: CA-40KV-1002

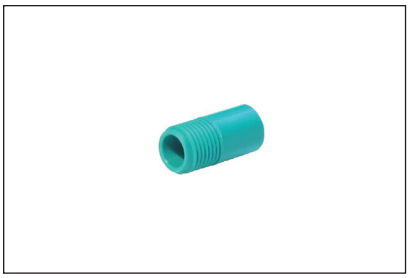


UV Cable Assembly Part #: CA-15KV-1000
Manufacturer: Alden
Manufacturer Part #: A400B
Mates to: CN-20KV-1000

UV Option Part #: -AT6
UV Connector Part #: LR-1000
Manufacturer: Amp or Jetron
Manufacturer Part #: 8-34142-1
Mates to: #6 stud

HIGH VOLTAGE CONNECTORS & CABLES

MILSPEC/Ruggedized High Altitude Connectors



UV Option Part #: -AT10
UV Connector Part #: CN-10KV-1000
Manufacturer: Amp or Jetron
Manufacturer Part #: LGH1/2
Mates to: N/A

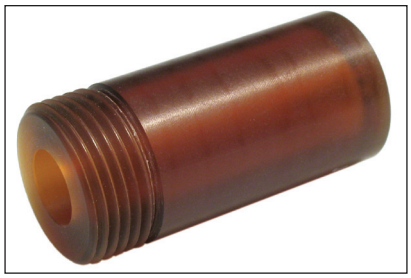
UV Option Part #: -AT11
UV Connector Part #: CN-15KV-1000
Manufacturer: Amp or Jetron
Manufacturer Part #: LGH1/2L
Mates to: CA-17205-L4

UV Option Part #: -AT12
UV Connector Part #: CN-20KV-1001
Manufacturer: Amp or Jetron
Manufacturer Part #: LGH1
Mates to: CA-20KV-1001 or CA-20KV-1000

UV Option Part #: -AT13
UV Connector Part #: CN-25KV-1000
Manufacturer: Amp or Jetron
Manufacturer Part #: LGH1L
Mates to: CA-25KV-1000

UV Option Part #: -AT14
UV Connector Part #: CN-30KV-1002
Manufacturer: Amp or Jetron
Manufacturer Part #: LGH2
Mates to: CA-30KV-1002CA-30KV-1002

UV Option Part #: -AT15
UV Connector Part #: CN-40KV-1002
Manufacturer: Amp or Jetron
Manufacturer Part #: LGH3
Mates to: CA-40KV-1000 or CA-40KV-1006



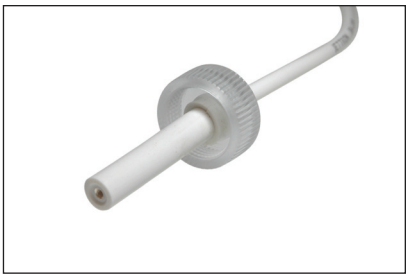
UV Option Part #: -AT16
UV Connector Part #: CN-50KV-1000
Manufacturer: Amp or Jetron
Manufacturer Part #: LGH4
Mates to: CA-50KV-1000 or CA-50KV-1002

UV Cable Assembly Part #: CA-17205-L4
Manufacturer: Jetron
Manufacturer Part #: 57-119-3
Mates to: CN-15KV-1000

UV Cable Assembly Part #: CA-20KV-1000
Manufacturer: Jetron
Manufacturer Part #: 56-185-14
Mates to: CN-20KV-1001

UV Cable Assembly Part #: CA-25KV-1000
Manufacturer: Jetron
Manufacturer Part #: 56-335-2
Mates to: CN-25KV-1000

UV Cable Assembly Part #: CA-40KV-1000
Manufacturer: Jetron
Manufacturer Part #: 56-158
Mates to: CN-40KV-1002



UV Cable Assembly Part #: CA-50KV-1000
Manufacturer: Jetron
Manufacturer Part #: 56-155
Mates to: CN-50KV-1000

-F OPTION

Ripple Stripper® Output Filter

The -F Option Ripple Stripper® Output Filter features a ripple-reduction circuit added internally to 62V through 6kV A Series high-voltage power supply modules prior to encapsulation at the factory.

While adding a minimum of output capacitance and output impedance, output ripple is reduced >10 times! Output voltage regulation remains at <0.01% no load to full load. Also included is an Output Voltage Monitor. For greater performance the optional, wrap-around Mu-Metal shield should be used. The Ripple Stripper® accessory is also available on the 10A-25A Series and 30A-40A Series. Please see the corresponding data sheets for specifications.

- Ripple Stripper® Output Filter
- Ultra-low output ripple
- Output voltage monitor
- Encapsulated with A Series power supplies
- Fixed-frequency, low-stored-energy design
- >400,000 Hrs MTBF @ 65°C
- UL/cUL Recognized Component; CE Mark (LVD & RoHS)

HIGH VOLTAGE OUTPUT

Square .025in (0.635mm) pins are used for high-voltage output and high-voltage return. These pins can be used for PCB mounting or for direct wiring. High voltage connector and cable options are available.

OUTPUT VOLTAGE MONITOR

The -F Option features a 100:1 voltage monitor on pins 12 and 13 referenced to Signal Ground pin 5. The monitor output impedance is calibrated for use with a 10 MegΩ input impedance meter. Units 2kV or higher have a 100 MegΩ/1.1 MegΩ divider; units below 2kV use a 10 MegΩ/102k divider. Overall accuracy is ± 2.5% with a temperature coefficient of ±200 ppm per °C.

For applications requiring a different scale factor, such as an ADC compatible design, an external resistor may be added in parallel with the output.

OUTPUT CURRENT MONITOR

Iout Monitor Scale Factors for -F Option units are:

MODEL W/ -F OPTION	4 WATT	20 WATT	30 WATT
1/16A with -F	-	-	-
1/8A with -F	438.4mA/V	1860mA/V	2891.6mA/V
1/4A with -F	213.3mA/V	1000mA/V	1481.5mA/V
1/2A with -F	123mA/V	506mA/V	740.7mA/V
1A with -F	55.6mA/V	243.9mA/V	400mA/V
2A with -F	31.7mA/V	129.9mA/V	211.3mA/V
4A with -F	15.6mA/V	66.7mA/V	85.2mA/V
6A with -F	11.3mA/V	48.5mA/V	56.8mA/V

*Contact the factory for boosted current monitor options.

Typical applications include scanning electron microscopes (SEM), photomultiplier tubes (PMT), particle accelerators and channel electron multipliers.

HIGH VOLTAGE OUTPUT RIPPLE LEVELS

The -F Option strips the typical output ripple on A Series high-voltage power supplies down to:

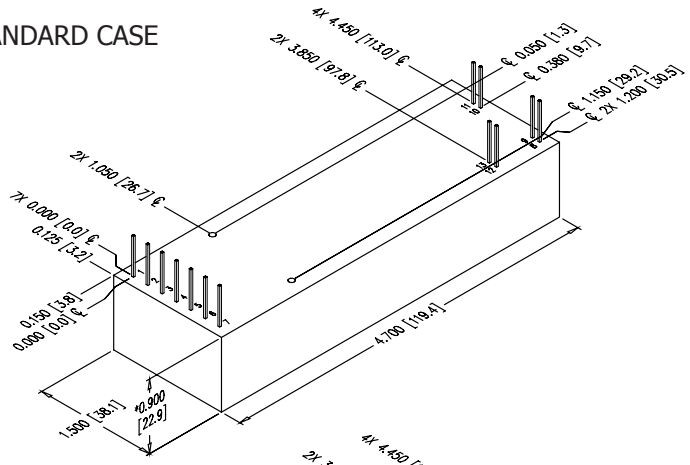
MODEL	VOLTAGE	POWER	WITH -F	WITH -F-M	50% LOWER THAN -F-M RIPPLE W/ EXT. CAP
1/16A12	62V	4W	<0.002%	<0.002%	.5uF / Metal Film
1/16A24	62V	20W	<0.003%	<0.004%	.5uF / Metal Film
1/16A24	62V	30W	<0.006%	<0.006%	.5uF / Metal Film
1/8A12	125V	4W	<0.002%	<0.0048%	.5uF / Metal Film
1/8A24	125V	20W	<0.008%	<0.0056%	.5uF / Metal Film
1/8A24	125V	30W	<0.006%	<0.006%	.5uF / Metal Film
1/4A12	250V	4W	<0.0012%	<0.0052%	.047uF / Metal Film
1/4A24	250V	20W	<0.004%	<0.0028%	.047uF / Metal Film
1/4A24	250V	30W	<0.0032%	<0.005%	.047uF / Metal Film
1/2A12	500V	4W	<0.0006%	<0.001%	.022uF / Metal Film
1/2A24	500V	20W	<0.002%	<0.0138%	.022uF / Metal Film
1/2A24	500V	30W	<0.025%	<0.0016%	.022uF / Metal Film
1A12	1kV	4W	<0.0010%	<0.0010%	.05uF / Metal Film
1A24	1kV	20W	<0.0010%	<0.0008%	.05uF / Metal Film
1A24	1kV	30W	<0.003%	<0.002%	.05uF / Metal Film
2A12	2kV	4W	<0.0036%	<0.0007%	4700pF/X7R
2A24	2kV	20W	<0.0063%	<0.0038%	4700pF/X7R
2A24	2kV	30W	<0.015%	<0.004%	4700pF/X7R
4A12	4kV	4W	<0.0063%	<0.0004%	1500pF/X7R
4A24	4kV	20W	<0.0051%	<0.0088%	1500pF/X7R
4A24	4kV	30W	<0.0094%	<0.0026%	1500pF/X7R
6A12	6kV	4W	<0.0135%	<0.0003%	1500pF/X7R
6A24	6kV	20W	<0.0086%	<0.0012%	1500pF/X7R
6A24	6kV	30W	<0.02%	<0.004%	1500pF/X7R

Specifications subject to change without notice.

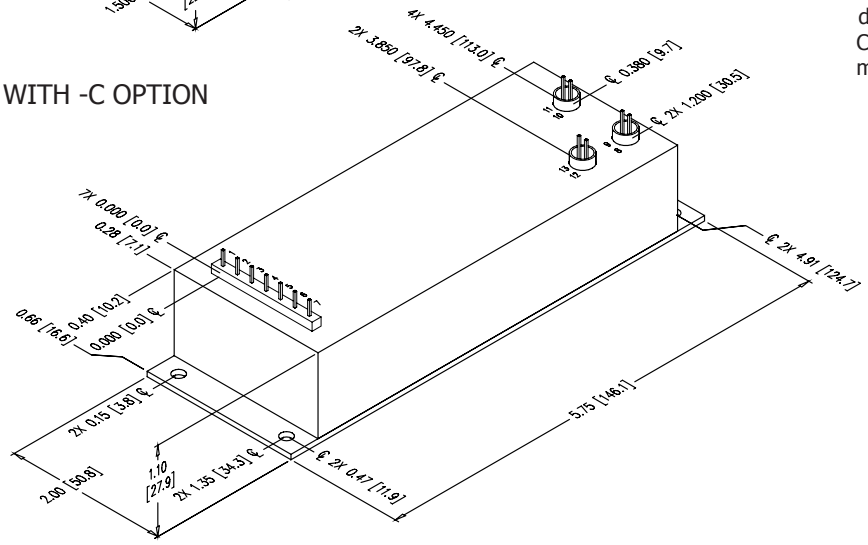
-F OPTION

Ripple Stripper® Output Filter

STANDARD CASE



WITH -C OPTION



CONSTRUCTION

Epoxy-filled DAP box certified to ASTM-D-5948 with -C Option: Aluminum Alloy 5052-H32, Finish: MIL-A-8625 Type II (Anodizing)

SIZE

Volume 4.30in^3 (70.5 cc), w/ -C Option: 8.00in^3 (131.1 cc)
Weight 5.0oz (142g), w/ -C Option: 10.0oz (284g)

TOLERANCE

Overall ±0.050" (1.27)
Pin to Pin ±0.015" (0.38)
Mounting hole location ±0.025" (0.64)

NOTES

20W and 30W versions are an additional 0.062" (1.57) in height.
-M equipped units are an additional 0.030" (0.76) for each dimension.
Contact UltraVolt's Customer Service Department for drawings of models equipped with -E or -H options.

Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

IEC-60950-1

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

Manufactured in USA

CONNECTIONS	
PIN	FUNCTION
1	Input Power Ground Return
2	Positive Power Input
3	Iout Monitor
4	Enable/Disable
5	Signal Ground Return
6	Remote Adjust Input
7	+5VDC Reference Output
8 & 9	HV Ground Return
10 & 11	HV Output
12 & 13	Eout Monitor

All grounds joined internally. Power-supply mounting points isolated from internal grounds by >100kΩ, .01uF / 50V (Max) on all models except -M, -C, and -M-E configurations which are 0Ω.

ORDERING INFORMATION		
Accessory	Ripple Stripper® Output Filter	-F

*Compatible with all standard module options. See Options & Accessories data sheet for more information..

Example: 1/2A12-P4-F

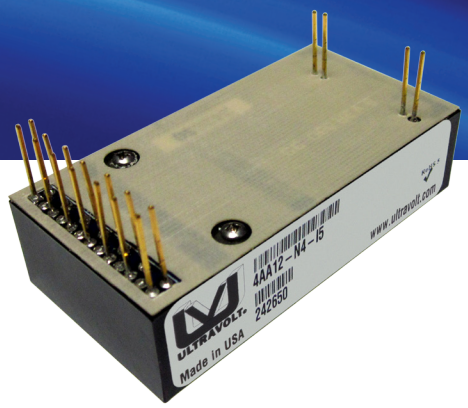
Ripple Stripper® Output Filter

Popular accessories ordered with this product include CONN-KIT-F and BR-2 mounting bracket kit.

Rev. F 10/14

-I5 OPTION & -I10 OPTION

Enhanced Interface Options



The –I5 and –I10 enhanced interface options further standardize and simplify the process of interfacing control electronics, both analog and digital, to an UltraVolt high voltage power supply. The interface features fixed ranges of calibrated control voltages and buffered monitor signals, eliminating the need for external scaling resistors or op-amps to achieve standard control ranges. Therefore, output control is always 0 to +5VDC (-I5) or 0 to +10VDC (-I10) for 0 to full scale output of positive or negative models. Likewise, output monitors are always 0 to +5VDC (-I5) or 0 to +10VDC (-I10) for 0 to full scale output. The current monitor is nulled to eliminate currents related to HV regulation and monitoring circuits. In conjunction with features such as constant current programming and constant voltage/constant current (CV/CC) auto crossover critical applications can be supported without additional circuitry.

The -I5 Option and -I10 Option are available on AA Series, A Series, High Power C Series, 10A Series modules, and F Option. Either option fits within the standard package size of the modules. On the AA Series and 10A Series models a double row header replaces the single row of pins.

For additional information on interfacing with the -I5 Option and -I10 Option, please review the -I5/-I10 Options Technical Note.

- Buffered, low output impedance and nulled current monitor
- Buffered, low output impedance voltage monitor
- Programming accuracy of ±1% full scale
- 0 to +5V or 0 to +10V remote programming for all polarites
- 0 to +5V or 0 to +10V remote programming for all modes
- +5V or +10V reference, ±0.05%, 5PPM/°C
- Constant voltage / constant current (CVCC) auto-crossover
- Current and voltage mode indicators

Typical applications for the -I5 Option or -I10 Option include: bias supplies, detectors, piezos, amplifiers, photomultiplier tubes (PMT), laser, cap-charging, pulsed power, pulse generators, test equipment, high pot testers, automated test equipment (ATE), and electrostatic precipitators.

PARAMETER	CONDITIONS	MODELS		UNITS
OUTPUT		-I5	-I10 (24Vin ONLY)	
Voltage Monitor Scale Factor	0 to Output Voltage	0 to +5 ± 1% Full Scale	0 to +10 ± 1% Full Scale	VDC
Current Monitor Scale Factor	0 to Output Current	0 to +5 ± 1% Full Scale	0 to +10 ± 1% Full Scale	VDC
PROGRAMMING & CONTROLS		ALL TYPES		
Input Impedance	Nominal Input	10MΩ to GND	10MΩ to GND	-
Adjust Resistance	Typical Potentiometer Values	10K to 100K (Pot across Vref. & Signal GND, Wiper to Adjust)		Ω
Adjust Logic	0 to 100% of Output	0 to +5.00 ± 1% Full Scale	0 to +10.00 ± 1% Full Scale	VDC
Reference Voltage	T=+25°C	+ 5.00 ± 0.1%	+10.00 ± 0.1%	VDC
Enable/Disable (ON/OFF)		0 to +0.5 Disable, +2.4 to 32 Enable (Default Open Circuit= Disabled)		VDC
Current Mode Indicator		Open drain indicator, active (pulled low) when unit is in current regulation, 100mA max current sink		-
Voltage Mode Indicator		Open drain indicator, active (pulled low) when unit is in voltage regulation, 100mA max current sink		-
Output Voltage Offset		± 0.2% of Max Vout		-

*All other specifications are in accordance with the specific model base datasheet. Specifications are subject to change without notice.

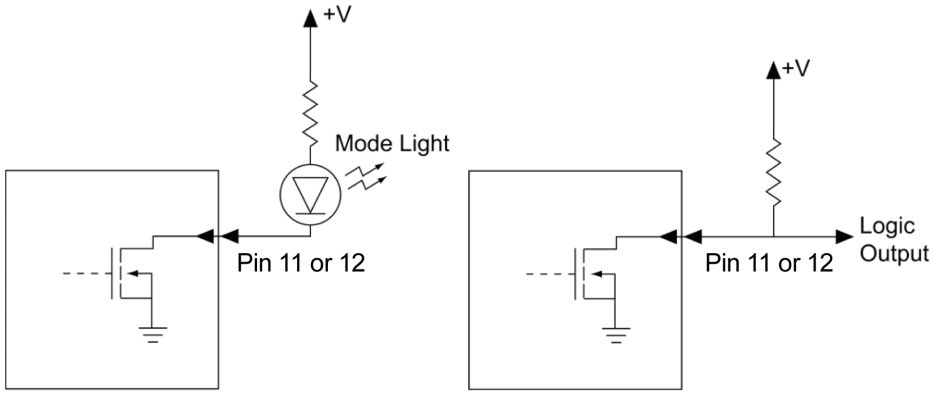
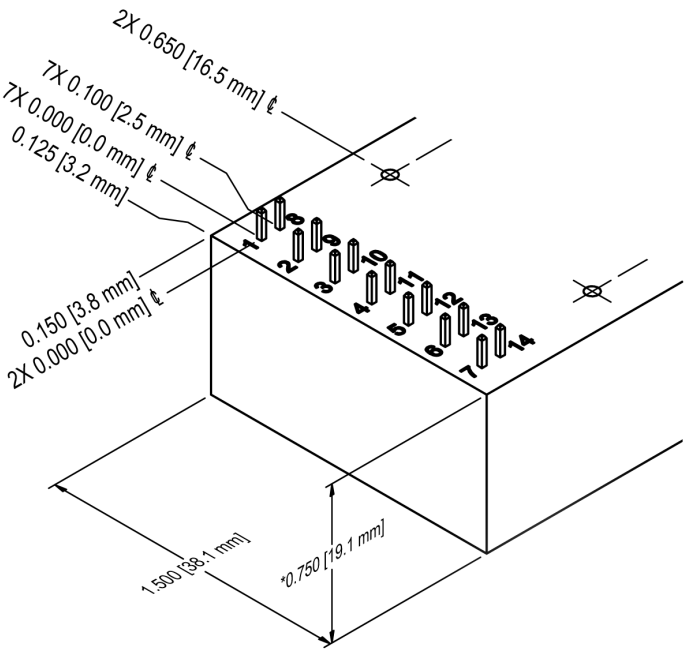


Figure 1: Typical Mode Indicator on the -I5 Option and -I10 Option

-I5 OPTION & -I10 OPTION

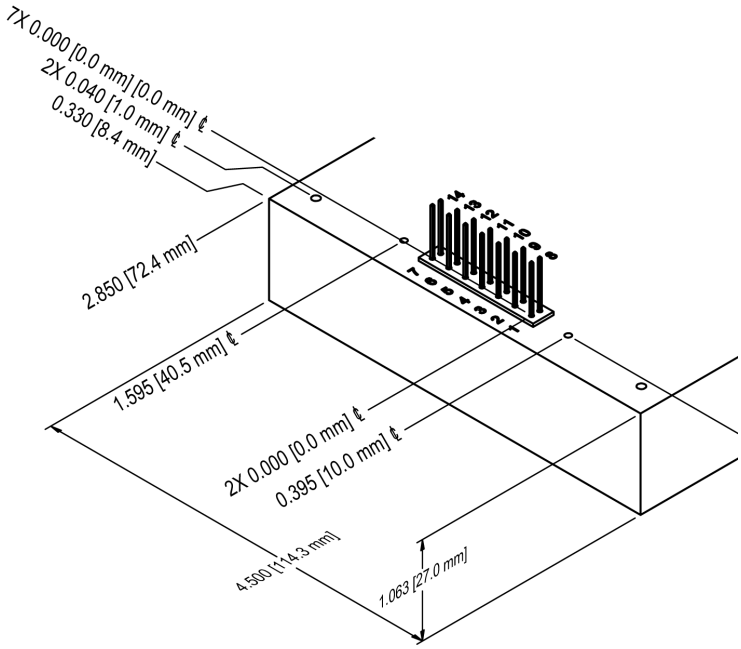
Enhanced Interface Options

I5/I10 ON AA SERIES & 10A SERIES



Downloadable drawings (complete with mounting & pin information) and 3D models are available online.

I5/I10 ON HIGH POWER C SERIES



CONNECTIONS	
PIN	FUNCTION
1	Power Ground
2	Input Power
3	Buffered Current Monitor (5mA Maximum)
4	Enable (ON/OFF)
5	Signal Ground
6	Voltage Programming
7	Reference Voltage (5mA Maximum Sourcing)
8	Power Ground/HV Return
9	Input Power
10	N/C
11	Current Mode Indicator
12	Voltage Mode Indicator
13	Current Programming
14	Buffered Voltage Monitor (5mA Maximum)
15 & 16	HV Ground Return
17 & 18	HV Output

CE cULus IEC-60950-1

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

Manufactured in USA

ORDERING INFORMATION	
5V Control & Monitors	-I5
10V Control & Monitors (24Vin only)	-I10

*The -I5 option and -I10 option are compatible with all standard module options.

Example: 1AA24-P20-I10

Option (Enhanced Interface)

Rev. G 10/14

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SAFETY AND COMPLIANCES

Certifications & Standards

IEC 60950-1, IEC 6110-1, EN 60950-1, IPC-A-610, J-STD-001

MIL-I-45208, MIL-Q-9858, MIL-STD-45662, ASTM B488, AMS 2422, IPC-2221, IPC-2222, IPC-2615, IPC-4101, IPC-4562, IPC-6012, IPC-9252, IPC-A-600, IPC-CM-770, IPC-D-325, IPC-SM-782, IPC-SM-840, J-STD-003, and MIL-STD-1686

WARRANTY AND REPAIR POLICY

UltraVolt understands working in high voltage with new applications and new staff is sometimes unpredictable and can lead to damaged hardware. To support our customers' efforts, UltraVolt established a policy noting if a customer manages to cause one of our units to fail, UltraVolt will repair/replace the first unit accidentally damaged at no charge. If additional units are damaged during the warranty period, UltraVolt will provide replacements at half price. This is just another way UltraVolt is "Making High Voltage Easier!"®

ULTRAVOLT, INC. WARRANTY

Warranty: The Seller warrants all goods supplied hereunder will conform to any sample approved by the parties and will be the kind described herein or in any specification, performance requirement, or drawing approved by the Seller, and will be of merchantable quality and free from defects in material or workmanship under normal use and prescribed maintenance for a period of one (1) year from the date of shipment. To the extent the Buyer does not furnish the Seller with written specifications, the goods will be manufactured in accordance with the standards recommended by the IPC-Association Connecting Electronics Industries. This warranty shall not apply to any goods delivered hereunder that have been damaged or subjected to alteration nor shall it apply to negligible treatment after delivery or to any defects attributed to artwork or drawings furnished by the Buyer. Also, unless specifically stated, the warranty does not extend to the electrical performance of any assemblies or subassemblies to which the goods furnished hereunder are affixed, but restricted to the electrical continuity properties of such goods.

The Seller's only obligation for breach of this warranty shall be the repair or replacement, without charge, of any goods or parts thereof that within such one (1) year period is proven to the Seller's satisfaction to have been defective, provided (1) the Buyer shall have notified the Seller of the defect within such one (1) year period and (2) the Seller shall have the option of requiring the return of the defective material or goods at the Buyer's expense to establish the claim provided; however, the Seller will bear any transportation costs incurred in repairing or replacing any goods that are shown to be defective during the warranty period. The cost of any repairs made by the Seller to goods no longer covered by this warranty shall be borne by the Buyer. The Buyer must contact the UltraVolt Customer Service Department prior to the return of any material(s) to obtain an RMA number which will be used to track the material. Material found to be out of warranty will be repaired or replaced at the Seller's discretion based on quantity (please contact the Customer Service Department for more information). The Seller shall in no event be liable for the Buyer's manufacturing costs, lost profits, good will, or any other special, consequential, incidental, or other damages resulting from a breach of the foregoing warranty. There are no other warranties expressed or implied (including the warranty of merchantability) that extend beyond the warranty set forth herein or that extend beyond the description of the goods contained herein.

Specifications subject to change without notice.