

- 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
- Indefinite output short-circuit protection
- Output current monitor
- Fixed Frequency Low Stored Energy Design
- >430,000 hour MTBF @65°C
- **UL-1950, CUL-950, IEC-950 Recognized**



#### GENERAL INFORMATION:

The “A” Series of High Voltage Regulated DC-DC converters address 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 providing high reliability and low cost.

#### DESIGN METHODOLOGY:

The “A” converters utilize a dual ended forward converter topology with a nominal switch frequency of <100kHz. A precision reference is provided so the remote control can program the power supply for a specific voltage. Once input voltage stabilizes, Under-voltage lockout is released. As soon as enable is raised above a TTL 1, the converter begins to switch. The soft-start circuit brings the converter to full power over a 1mS period, reducing surges on the source supply. A constant frequency PWM regulation system controls the MOSFET push-pull power stage which drives the high voltage transformer. The power stage is protected from output current overloads or short circuits via a secondary current limit circuit. High voltage is developed by a multistage multiplier while feedback voltage is developed and sent to the CTRL circuit to maintain regulation. Internal filters are provided to reduce input current ripple and output voltage ripple.

#### WIDE INPUT RANGE:

The “A” Series is designed for full power operation at up to 90% efficiencies. A wide input range of +11 to +16 VDC or +23 to +30 VDC will maintain full power output without derating. The derated input range is +9 to +32VDC. See Application Note 16 for protection information.

#### WIDE OUTPUT RANGE:

The “A” Series is a non-isolated, unipolar converter. Positive or negative output must be specified. Output voltage is adjustable from 0 to 62, 125, 250, 500, 1kV, 2kV, 4kV, or 6kV. As the output voltage is reduced towards 0, the maximum current capability remains unchanged.

#### OUTPUT CURRENT MONITOR:

The “A” Series features an output current monitor. Current from the high voltage multiplier can be monitored by reading the voltage appearing between Output Monitor pin 3 and Signal Ground Return pin 5. Internal voltage dividers create a small linear offset voltage. See Application Note 13.

#### REMOTE CONTROL:

The “A” Series is remotely programmed with 0 to +5 VDC to produce an output voltage. Input may be from a control voltage, DAC, variable or fixed resistor. On a negative output converter the programming logic of the remote adjust would be inverted, i.e.: +5 to 0 VDC. Connections are on the converter for the internal reference, analog remote adjust and the signal ground. The reference is +5.0 VDC, temperature compensated with a 464 ohm output impedance. See Figure E & F or Application Note 1 for more information.

#### STANDBY MODE:

The “A” converters also have an enable function. When the enable is TTL 0 (<+0.7V  $I_{\text{sink}}=1\text{mA}$ ) the converter is in a standby mode and input current is reduced to < 30 mA. All functions other than the internal reference are shut down. If the enable pin is left unconnected, TTL 1, or at greater voltages up to +32 VDC the converter operate normally. The open circuit output voltage from the Enable pin is < +5 VDC. In the inhibit mode 1 mA will have to be sunk for proper shutdown.

#### MECHANICAL:

“A” Series converters are in PCB mountable plastic cases requiring a footprint of 5.5 In<sup>2</sup> and only 4.3 In<sup>3</sup> of volume. Mounting plates and brackets are available for chassis mounting. This Series is also available in an RF-Tight metal PCB/chassis mount package. See Application Note 6 for thermal considerations and mounting configurations. All models are available with optional six-sided wrap-around Mu-Metal Shielding.

#### ENVIRONMENTAL:

The “A” Series provides full power operation at case temperatures from -40 to +65°C. All units receive a 24-hour burn-in prior to final testing. Extended temperature range is available along with other enhanced capabilities. Please contact the factory.



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FAX 631-471-4696

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# "A" SERIES

## HIGH VOLTAGE POWER SUPPLY

Typical Characteristics:

Parameter	Conditions	Models		Units						
<b>Input:</b>										
		<b>12V</b>		<b>24V</b>						
Voltage Range	Full Power	+ 11 to 16		+ 23 to 30						
Voltage Range	Derated Power Range	+ 9 to 32		+ 9 to 32						
Current	Standby / Disable	< 30		< 30						
Current	No Load, Max Eout	< 100		< 90						
Current	Max Load, Extended Input Voltage	Figures A & B		Figures A & B						
AC Ripple Current	Nominal Input, Full Load	< 80		< 80						
<b>Output:</b>										
		<b>1/16A</b>	<b>1/8A</b>	<b>1/4A</b>	<b>1/2A</b>	<b>1A</b>	<b>2A</b>	<b>4A</b>	<b>6A</b>	
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	lout 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
Ripple	Full Load, Max Eout	.02 .03 .05	.02 .015 .04	.01 .14 .2	.003 .02 .03	.02 .10 .15	.01 .05 .15	.025 .075 .18	.035 .20 .30	%V p-p
Dynamic Load Regulation	1/2 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
Voltage Derating	Max lout, Extended Input Voltage	Figures C & D								Graph
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
<b>Remote Programming:</b>										
<b>All Types</b>										
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 Linearity	0% to 100%	Figure E								Graph
Adjust Voltage	Referenced to signal ground	Figure E (0 to +5 VDC)								Graph
Adjust Logic	0 to +5 for +Out, +5 to 0 for -Out	+4.64 VDC for +Output or +0.36 for -Output = Nominal Eout								
<b>Reference:</b>										
<b>All Types</b>										
Output Voltage	T=+25°C, Initial Value	+ 5.00 ± 2%								VDC
Output Impedance	T=+25°C	464 ± 1%								Ω
Stability	Over Full Temperature Range	Figure F								Graph
<b>Enable:</b>										
<b>All Types</b>										
Power Supply On	Floated, or voltage ≥ TTL High	+2.4 to 32								VDC
Power Supply Off	Grounded, or voltage ≤ TTL Low	0 to + 0.7 ± 0.2 (Isink 1mA minimum)								VDC
<b>Temperature:</b>										
<b>All Types</b>										
Operating	Full Load, Max Eout, Case Temp.	-40 to +65								°C
Storage	Non-Operating, Case Temp.	-55 to +105								°C
Coefficient	Over the Specified Temperature	± 50								PPM/°C
Thermal Shock	Mil-Std 810, Method 504, Class 2	-40 to +65								°C
<b>Altitude:</b>										
<b>All Types</b>										
Operating	Standard Package	Sea Level through Vacuum								
Non-operating	Standard Package	Sea Level through Vacuum								
<b>Shock &amp; Vibration:</b>										
		<b>Standard</b>	<b>- C Option</b>							
Shock	Mil-Std-810, Method 516, Proc. 4	20	40		G's					
Vibration	Mil-Std-810, Method 514, Fig. 514-3	10	20		G's					
<b>Packaging:</b>										
		<b>Standard</b>	<b>- C Option</b>							
Material	Outer construction	Plastic (DAP) Mil-M-14F SDG-F		6063T52 Aluminum Mil-C-5541 Class 1A						
Length	Not including pins or mounting pts	3.70 ± 0.050 (94.0)		4.00 ± 0.025 (101.6)	In (mm)					
Width	Not including pins or mounting pts	1.50 ± 0.050 (38.1)		2.00 ± 0.025 (50.8)	In (mm)					
Height	Not including pins or mounting pts	0.77 ± 0.050 (19.6)		1.00 ± 0.025 (25.4)	In (mm)					
Volume	Not including pins or mounting pts	4.30 (70.5)		8.00 (131.1)	In <sup>3</sup> (cc)					
Weight	Overall	5.0 (142)		10.0 (284)	Oz (g)					

Specifications subject to change without notice



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# "A" SERIES

## HIGH VOLTAGE POWER SUPPLY

Typical Performance Characteristics:

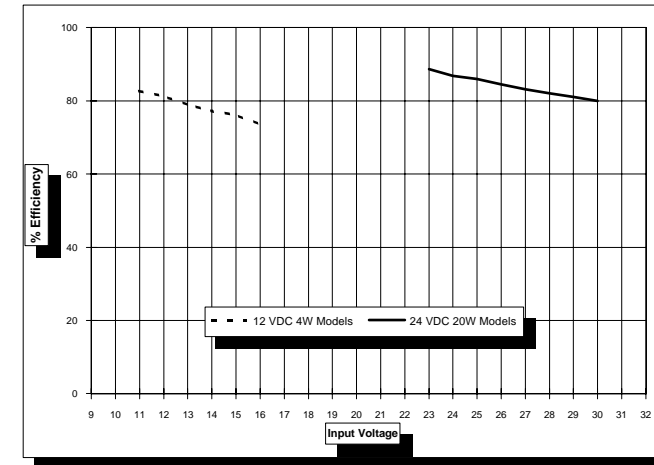


Fig. A  
DC Efficiency vs. Input Voltage Range

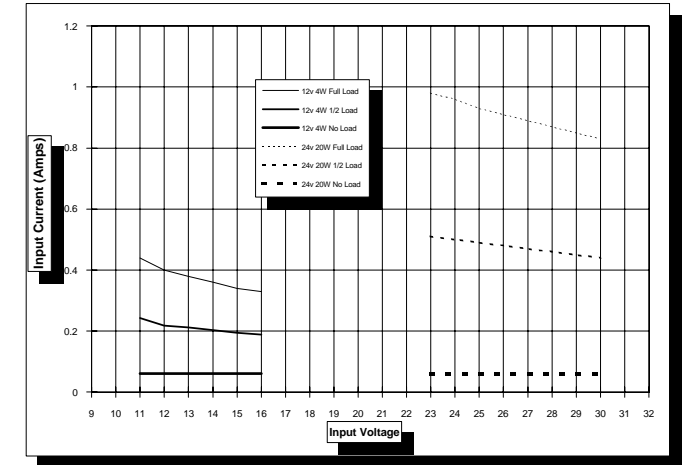


Fig. B  
Input Current vs. Input Voltage Range

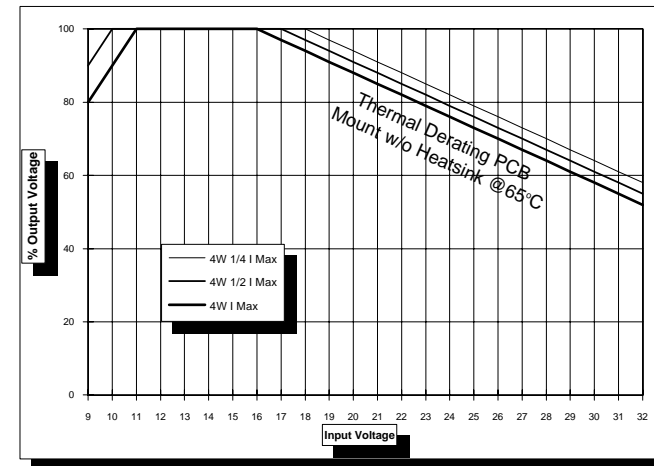


Fig. C  
Output Voltage vs. 12V/4 Watt Extended Input Voltage  
(Up to 65°C Chassis Mount w/o Heatsink)

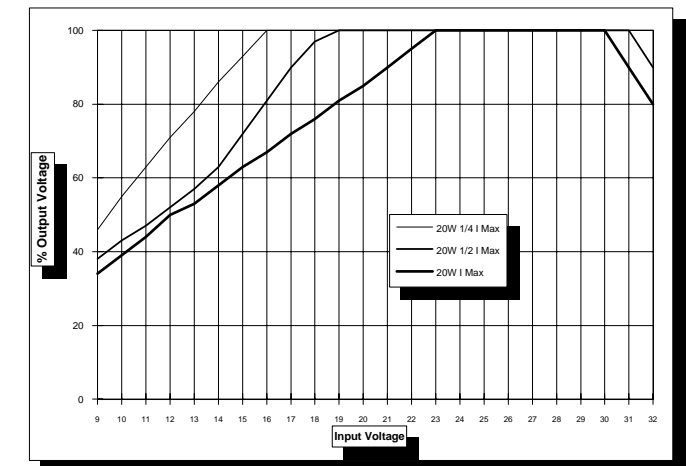


Fig. D  
Output Voltage vs. 24V/20 Watt Extended Input Voltage  
(Up to 65°C Chassis Mount w/o Heatsink)

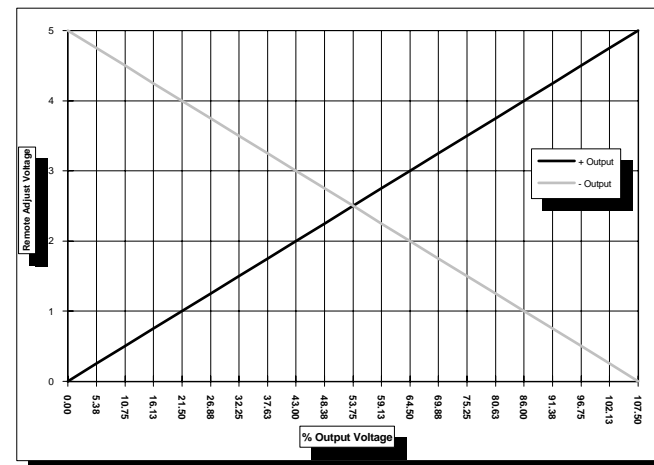


Fig. E  
Remote Control Characteristics

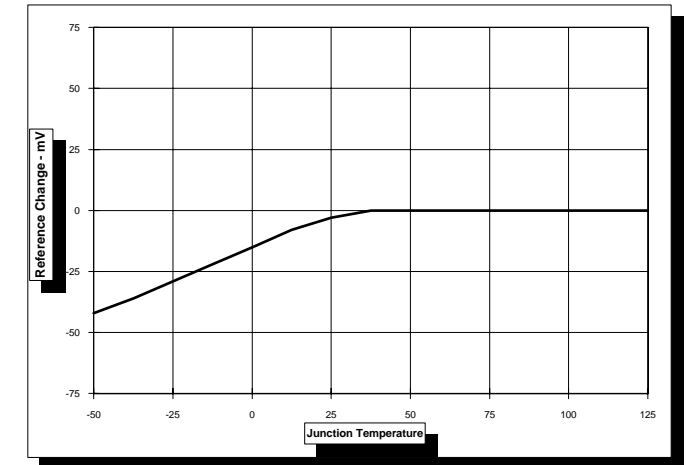


Fig. F  
Reference Stability



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# "A" SERIES

## HIGH VOLTAGE POWER SUPPLY

### PLASTIC CASE

#### CONSTRUCTION:

Epoxy Filled DAP Box  
 Certified to MIL-M-14F  
 SDG-F

#### TOLERANCE:

Overall  $\pm 0.050$ "  
 Pin to Pin  $\pm 0.015$ "

#2-56 Standoffs may not be flush to cover

#### NOTE:

20 & 30 Watt versions are an additional 0.062" in height

Contact UV Customer Service for drawings on models equipped with -E or -H options.

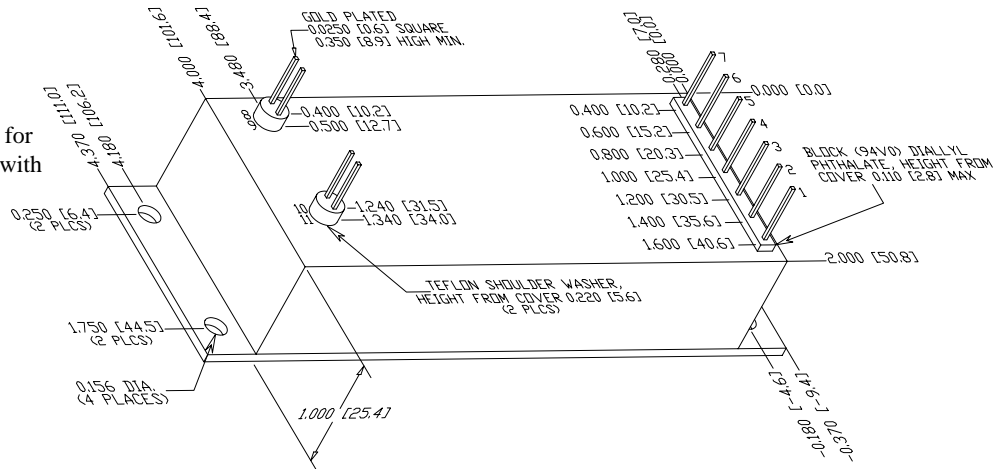
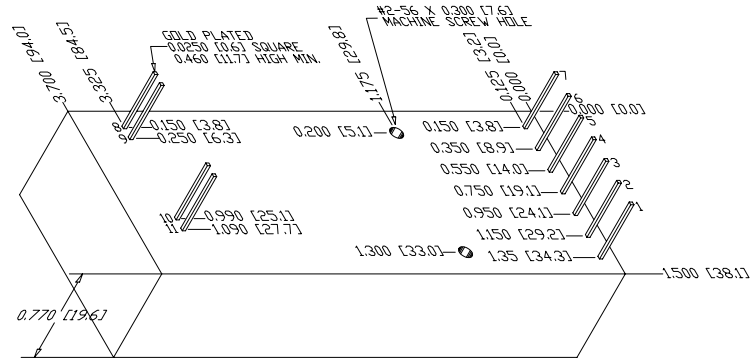
### METAL CASE

#### CONSTRUCTION:

Epoxy Filled Aluminum Box  
 Chem Film per MIL-C-5541  
 Class 1A

#### TOLERANCE:

Overall  $\pm 0.025$ "  
 Pin to Pin  $\pm 0.015$ "



#### Connections

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
10 - HV Output
11 - HV Output

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

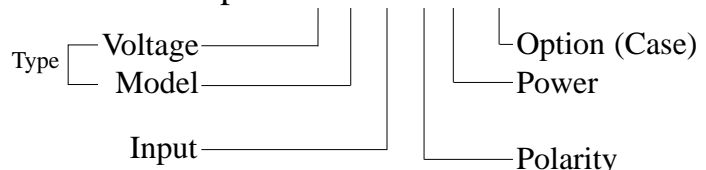


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#### Ordering Information

<b>Type:</b>	0 to 62 VDC Output	<b>1/16A</b>
	0 to 125 VDC Output	<b>1/8A</b>
	0 to 250 VDC Output	<b>1/4A</b>
	0 to 500 VDC Output	<b>1/2A</b>
	0 to 1,000 VDC Output	<b>1A</b>
	0 to 2,000 VDC Output	<b>2A</b>
	0 to 4,000 VDC Output	<b>4A</b>
	0 to 6,000 VDC Output	<b>6A</b>
<b>Input:</b>	12VDC Nominal	<b>12</b>
	24VDC Nominal	<b>24</b>
<b>Polarity:</b>	Positive Output	<b>-P</b>
	Negative Output	<b>-N</b>
<b>Power:</b>	Watts Output (12 V Only)	<b>4</b>
	Watts Output (24 V Only)	<b>20</b>
	Watts Output (24 V Only)	<b>30</b>
<b>Case:</b>	Plastic Case - Diallyl Phthalate	<b>STD</b>
	'Eared' Chassis Mounting Plate	<b>-E</b>
	RF Tight Aluminum Case	<b>-C</b>
<b>Heat Sink:</b>	.400" High (Sized to Fit Case)	<b>-H</b>
<b>Shield:</b>	Six-sided Mu-Metal Shield	<b>-M</b>
<b>Ripple Stripper®:</b>	Integral Output Filter (See F Series DS)	<b>-F</b>

Example: 1/2A24-P20-C



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# Bipolar High Power "C" SERIES

## HIGH VOLTAGE POWER SUPPLY

- 8 Models from 0 to ±125 Volts through 0 to ±6kV
- 125 or 250 Watts of total output power
- Dual Independently Controlled Outputs
- Output Current and Voltage Monitors
- Maximum Iout down to 0 Volts
- 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



### GENERAL INFORMATION:

The Bi-Polar "C" series line of regulated DC to DC high voltage converters is an extension to the High Power "C" series. Bi-Polar "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 into 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. See the High Power "C" series datasheet for detailed specifications.

### COMPATIBILITY:

The Bi-polar "C" series matches the standard UltraVolt 60 watt / 125 watt High Power "C" series for all electrical functions & design methodology including: wide input range, remote control, enable/disable, output monitors, and local +5 Vdc reference output.

### HIGH VOLTAGE OUTPUT:

The Bi-Polar "C" series, like all high power "C" units, are non-isolated converters. Output range is adjustable independently from 0 to ±125, ±250, ±500, ±1kV, ±2kV, ±4kV, or ±6kV on all 60Wx2 and 125Wx2 models. As the output voltage is reduced towards 0, the maximum current capability remains unchanged.

Internal capacitance is kept to a minimum to facilitate fast rise applications. Most fast rise applications involve charging a storage capacitor, which also acts as an additional output filter/storage capacitor. If your application is continuous DC bias power an external filter/storage capacitor should be added. Contact UV CSD for recommended capacitor values.

### OUTPUT CURRENT & VOLTAGE MONITORS:

The Bi-Polar "C" series units contain two pairs of output voltage & current monitors, one pair for the + HVPS, one pair for the - HVPS. See the high power "C" series data sheet along with the Application Note 13 and Connection Drawing #3 for more details.

### HV & LV CONNECTIONS:

Each independent HVPS in Bi-Polar "C" series has a dedicated input power & control connector. These connectors are standard dual row 7 pin headers. Each HVPS also has a dedicated HV ground return 2-pin header and HV output 2-pin header.

Wire harness connections can be made via J-hooked and soldered leads, AMP Mod-U connectors with high-current pins, or other wire applied header connectors.

PCBs can be mounted directly to HVPS with the headers plugged into PCB sockets or soldered directly to the PCB. Direct mounted PCBs can use factory or user supplied standoffs mounted directly to the (7) #4-40 & (4) #2-56 PEM nuts provided on top of the HVPS.

### MECHANICAL:

The Bi-Polar "C" series converters are packaged in aluminum enclosures. Both the 125w(60wx2) and the 250w(125Wx2) versions use the 38in<sup>3</sup> package. Chassis wall mounting is facilitated with the four #8-32 studs. Thermal grease or elastomer should be used prior to mounting. Optional flush mount bracket kit allows the unit to be surface mounted with the #8 studs removed. Optional vertical mounting bracket & finned heatsink allow the units to be stacked side by side.

### ENVIRONMENT:

The high power Bi-Polar "C" series provides full power at case temperature from -40 to +65°C. Extended temperature range is available along with enhanced capabilities. Please contact the factory. All units receive a 24-hour burn in prior to final testing.



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# Bipolar High Power "C" SERIES

## DUAL OUTPUT HIGH VOLTAGE POWER SUPPLY

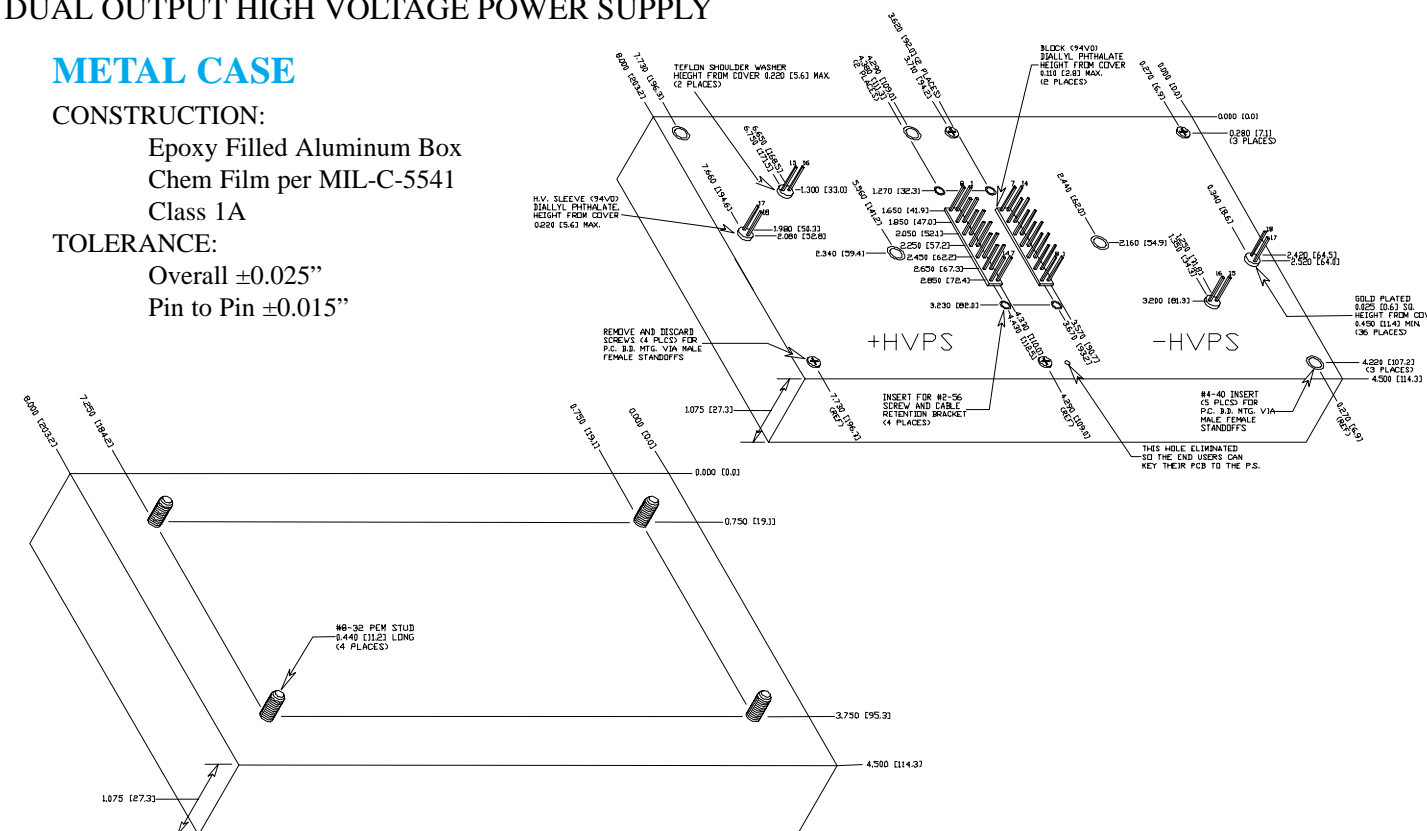
### METAL CASE

#### CONSTRUCTION:

Epoxy Filled Aluminum Box  
Chem Film per MIL-C-5541  
Class 1A

#### TOLERANCE:

Overall ±0.025"  
Pin to Pin ±0.015"



### Ordering Information

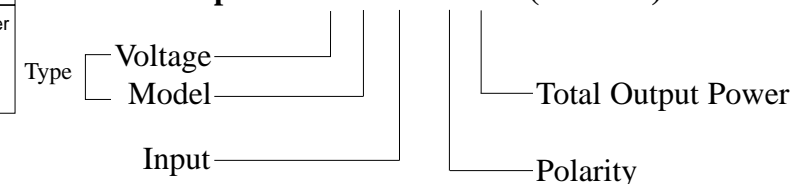
#### + HVPS Connections

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 - N/C
12 - N/C
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)

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)
HeatSink:	.400" High (Sized to Fit Case)	-H
PCB Support:	(7) 0.187" Standoffs on top cover	-Z11

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



#### - 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 - N/C
12 - N/C
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)



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- 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 & current monitors
- >400,000 hour MTBF @65°C
- Fixed Frequency Low Stored Energy Design
- **UL-1950, CUL-950, IEC-950 Recognized**



### GENERAL INFORMATION:

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 AP-10 for more charging information.

### DESIGN METHODOLOGY:

The “C” converters utilize a dual ended forward converter topology with a nominal switching frequency of <100 kHz. A precision reference is provided so the remote control can program the power supply for a specific voltage. A soft-start circuit brings the converter to full power over a 1ms period, reducing surges on the source supply. A constant frequency PWM regulation system controls the MOSFET push-pull power stage and high voltage transformer. The power stage is protected from output current overloads or short circuits via a secondary current limit circuit. This current limit is optimized for low impedance capacitor charging. The high voltage developed in the multistage multiplier generates feedback voltage which is sent to the CTRL circuit to maintain regulation. The AC feedback networks are configured for maximum speed of rise with little or no overshoot into capacitive loads.

### WIDE INPUT VOLTAGE RANGE:

The “C” Series is designed for full DC power operation at up to 92% efficiencies. A wide input range of +23 to +30 VDC maintains full output power. The derated input range is +9 to +32 VDC. See Application Note AP-16 for protection information.

### WIDE OUTPUT RANGE:

The “C” Series is a non-isolated, unipolar converter. Positive or negative output must be specified. Output voltage is adjustable from 0 to 62, 125, 250, 500, 1kV, 2kV, 4kV or 6kV. As the output voltage is reduced towards 0, the maximum current capability remains unchanged.

### OUTPUT VOLTAGE & CURRENT MONITORS:

The “C” Series features a 100:1 voltage monitor. Units 2kV or higher have a 100 Megohm/1.1 Megohm divider, units below 2kV use a 10 Megohm/102k divider. The monitor output impedance is calibrated for use with a 10 Megohm input impedance meter. Overall accuracy is  $\pm 2.0\%$  with a temperature coefficient of  $\pm 200$  ppm per °C. The Voltage Monitor is output on pin 9 and referenced to Signal Ground pin 5.

Current from the high voltage multiplier can be monitored by reading the voltage appearing between Output Monitor pin 3 and Signal Ground pin 5. See Application Note AP-13.

### REMOTE CONTROL:

The “C” Series is remotely programmed with 0 to +5 VDC to produce an output voltage. Input may be from a control voltage, DAC, variable or fixed resistor. On a negative output converter the programming logic of the remote adjust would be inverted, i.e.: +5 to 0 VDC. Connections are on the converter for the internal reference, analog remote adjust and the signal ground. The reference is +5.0 VDC, temperature compensated with a 464 ohm output impedance. See Figure E and Application Note AP-1 for more information.

### ENABLE/DISABLE:

The “C” converters also have an enable function. When the enable is TTL 0 (<+0.7v Isink=1mA) the converter is in a standby mode and input current is reduced to < 30 mA. All functions other than the internal reference are shut down. If the enable pin is left unconnected, TTL 1, or at greater voltages up to +32 VDC the converter will initiate soft-start before beginning to operate normally. The open circuit output voltage from the enable pin is < +5 VDC. In the inhibit mode 1mA will have to be sunk for proper shutdown.

### MECHANICAL:

“C” Series converters are in PCB mountable plastic cases requiring a footprint of 5.5 In<sup>2</sup> and only 4.3 In<sup>3</sup> of volume. Mounting plate and brackets are available for chassis mounting. This Series is also available in an RF-Tight metal PCB/chassis mount package. See Application Note AP-6 for thermal considerations and mounting configurations. All models are available with optional six-sided wrap-around Mu-Metal Shielding.

### ENVIRONMENTAL:

The “C” Series provides full power operation at case temperatures from -40 to +65°C. All units receive a 24-hour burn-in prior to final testing. Extended temperature range is available along with other enhanced capabilities. Please contact the factory.



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# “C” SERIES

## HIGH VOLTAGE POWER SUPPLY

### Typical Characteristics:

Parameter	Conditions	Models	Units
<b>Input:</b>			
<b>All Types</b>			
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, Extended Input Voltage	Figures A & B	Graph
AC Ripple Current	Nominal Input, Full Load	< 80	mA p-p
<b>Output:</b>			
		<b>1/16C</b> <b>1/8C</b> <b>1/4C</b> <b>1/2C</b> <b>1C</b> <b>2C</b> <b>4C</b> <b>6C</b>	
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   10   15   5   7.5   3.3   5	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
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	V p-p
Overshoot	C Load, 0 Eout to Full Eout	< 1V   < 1V   < 1V   < 1V   < 1V   < 1V   < 2V   < 2V   < 2V   < 2V   < 0.1%   < 0.1%   < 0.1%   < 0.1%   < 0.1%   < 0.1%	V pk
Voltage Derating	Max Iout, Extended Input Voltage	Figures C	Graph
Rise Time	Max Iout, Various C Loads & Eout	Figures D & F	Table
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
<b>Output Voltage Monitor</b>			
<b>All Types</b>			
Voltage	Full Eout Range, Full Iout Range	10.00	V per kV
Proportionality	Full Eout Range, Full Iout Range	± 0.1%	V per kV
<b>Remote Programming:</b>			
<b>All Types</b>			
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 Linearity	0% to 100%	Figure E	Graph
Adjust Voltage	Referenced to signal ground	Figure E (0 to +5 VDC)	Graph
Adjust Logic	0 to +5 for +Out, +5 to 0 for -Out	+4.64 VDC for +Output or +0.36 for -Output = Nominal Eout	
<b>Reference:</b>			
<b>All Types</b>			
Output Voltage	T=+25°C, Initial Value	+ 5.00 ± 2%	VDC
Output Impedance	T=+25°C	464 ± 1%	Ω
Stability	Over Full Temperature Range	See "A" Series Datasheet Figure F	Graph
<b>Enable:</b>			
<b>All Types</b>			
Power Supply On	Floated, or voltage ≥ TTL High	+2.4 to 32	VDC
Power Supply Off	Grounded, or voltage ≤ TTL Low	0 to + 0.7 ± 0.2 (Isink 1mA minimum)	VDC
<b>Temperature:</b>			
<b>All Types</b>			
Operating	Full Load, Max Eout, Case Temp.	-40 to +65	°C
Storage	Non-Operating, Case Temp.	-55 to +105	°C
Coefficient	Over the Specified Temperature	± 50	PPM / °C
Thermal Shock	Mil-Std 810, Method 504, Class 2	-40 to +65	°C
<b>Altitude:</b>			
<b>All Types</b>			
Operating	Standard Package	Sea Level through Vacuum	
Non-operating	Standard Package	Sea Level through Vacuum	
<b>Shock &amp; Vibration:</b>			
		<b>Standard</b>	<b>- C Option</b>
Shock	Mil-Std-810, Method 516, Proc. 4	20	40
Vibration	Mil-Std-810, Method 514, Fig. 514-3	10	20
<b>Packaging:</b>			
		<b>Standard</b>	<b>- C Option</b>
Material	Outer construction	Plastic (DAP) Mil-M-14F SDG-F	6063T52 Aluminum Mil-C-5541 Class 1A
Length	Not including pins or mounting pts	3.70 ± 0.050 (94.0)	4.00 ± 0.025 (101.6)
Width	Not including pins or mounting pts	1.50 ± 0.050 (38.1)	2.00 ± 0.025 (50.8)
Height	Not including pins or mounting pts	0.77 ± 0.050 (19.6)	1.00 ± 0.025 (25.4)
Volume	Not including pins or mounting pts	4.30 (70.5)	8.00 (131.1)
Weight	Overall	5.0 (142)	10.0 (284)

Specifications subject to change without notice



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# “C” SERIES

## HIGH VOLTAGE POWER SUPPLY

### Typical Performance Curves:

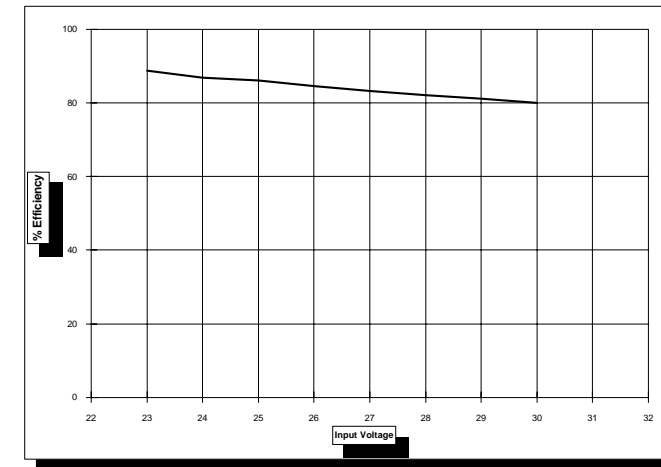


Fig. A  
DC Efficiency vs. Input Voltage Range (20W Units)

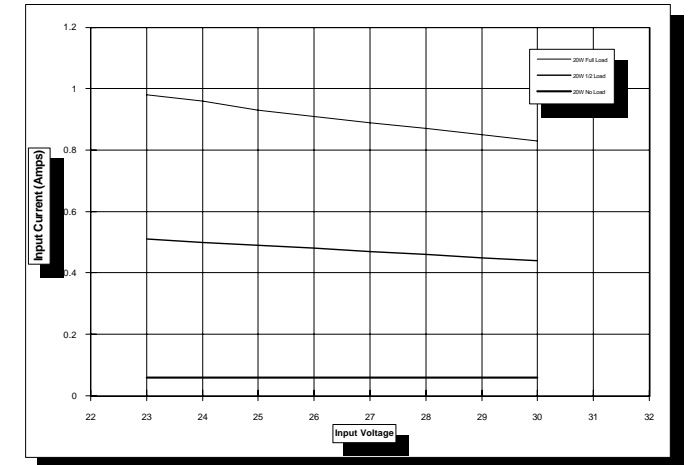


Fig. B  
Input Current vs. Input Voltage Range (20W Units)

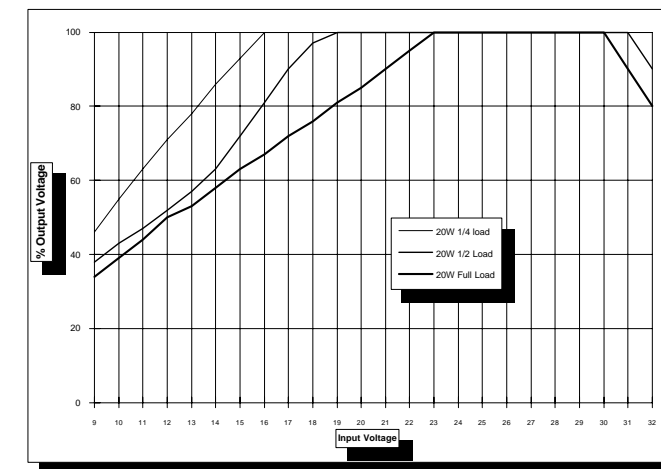


Fig. C  
Output Voltage vs. 24V/20 Watt Extended Input Voltage (Up to 65°C PCB Mount w/o Heatsink)

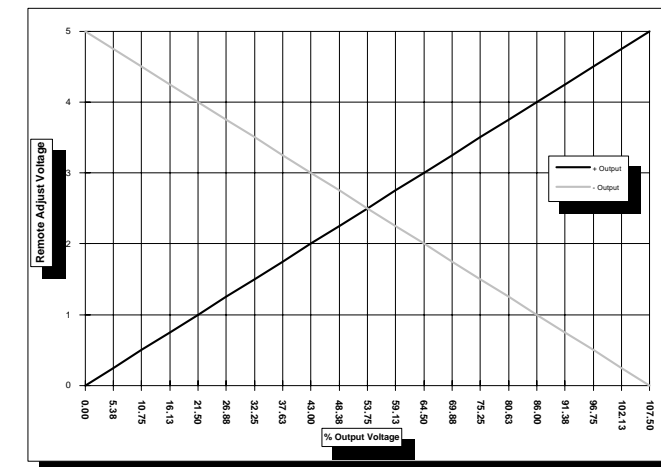


Fig. E  
Remote Control Characteristics

$$T = \frac{C \times V}{I} \quad I = C \times V \times F \quad F = \frac{I}{C \times V} \quad J = \frac{C \times E^2}{2}$$

$$C = \mu F \quad V = \text{Volts} \quad I = \text{mA} \quad T = \text{mS}$$

$$C = \mu F \quad V = \text{kV} \quad I = \text{mA} \quad F = \text{Hz}$$

$$C = \mu F \quad V = \text{kV} \quad I = \text{mA} \quad F = \text{Hz}$$

$$C = \mu F \quad E^2 = \text{kV} \quad J = \text{Ws}$$

NOTES:  
Capacitance must include HVPS internal Capacitance  
For very light capacitive loads the HVPS exhibit calculated rise times due to the pulse by pul

Fig. D  
Rise Time Formulas

Model	20W	30W
1/8C	0.50 uF	0.50 uF
1/4C	0.15 uF	0.15 uF
1/2C	0.16 uF	0.16 uF
1C	0.033 uF	0.018 uF
2C	0.009 uF	0.009 uF
4C	0.010 uF	0.010 uF
6C	0.0064 uF	0.0064 uF

Fig. F  
Internal Storage Capacitance



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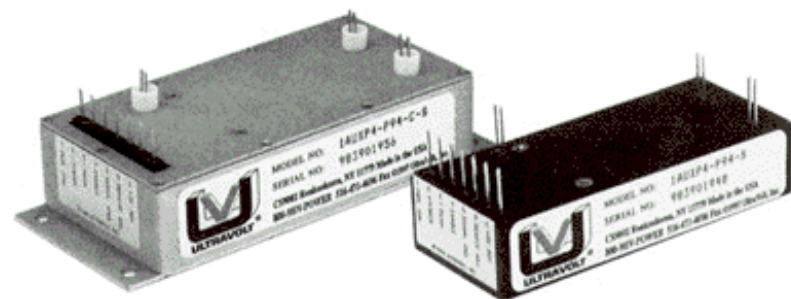
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# DUAL OUTPUT "AUX" SERIES

## HIGH VOLTAGE POWER SUPPLY

- Adds a Second + or - HV Output
- Encapsulated with "A" or "C" Series HVPS
- Fixed Regulated Output
- Creates a 4.9 in<sup>3</sup> Dual Output Supply!
- Fixed frequency low stored energy design
- High Power Density
- Output Short-Circuit Protected



### GENERAL INFORMATION:

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 the 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 are: Bi-Polar outputs, ionization/strike, trigger coils, pulse generator or amplifiers, tube elements such as G1, G2, Cathode, etc.

### 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  $\pm 10\%$  for 4W units and 24 to 28Vdc  $\pm 5\%$  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  $\pm 5\%$ . Line regulation error is  $< 0.1\%$ , Load regulation error is  $< 0.1\%$  per 100uA. The output has a temperature co-efficient of  $\pm 0.11\%$  per oC. 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 .025" square IDC pins. These pins can be used for PCB mounting or direct wiring.

### COMPATIBILITY:

The "AUX" series match the standard "A" and "C" series for design methodology, remote control, enable/disable, reference, shock and vibration. Designed and built utilizing a state of the art power conversion topology, these units feature surface mount technology and encapsulation techniques providing high reliability and low cost. Base power supply output current rating remains at full value. Nominal input voltage should be used for maximum efficiency.

### SHIELDING:

All models are available with optional six-sided wrap-around Mu-Metal Shielding. This shielding attenuates magnetic and electrostatic emissions, while shielding ripple reduction circuitry from outside noise. The high voltage power supply dimensions change by only 0.010"

### PACKAGING:

The Auxiliary board is designed to be added to the "A" or "C" Series High Voltage Power Supply modules. The Combined plastic package is UltraVolt's 4.9in<sup>3</sup> plastic PCB mountable box with a footprint of only 5.5in<sup>2</sup>. As always, optional six-sided Mu-Metal shielding, mounting brackets, mounting plates and RF-Tight chassis-mount ruggedized enclosures are available.

### ENVIRONMENT:

The "AUX" Series meets the same environmental specifications for temperature, shock and vibration as the "A" and "C" series. All units receive a 24-hour burn-in prior to final test. Extended temperature range is available along with other enhanced capabilities. Please contact the factory.



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# DUAL OUTPUT "AUX" SERIES

## HIGH VOLTAGE POWER SUPPLY

### PLASTIC CASE

#### CONSTRUCTION:

Epoxy Filled DAP Box  
Chem Film per MIL-M-14F  
SDG-F

#### TOLERANCE:

Overall  $\pm 0.050$ "  
Pin to Pin  $\pm 0.015$ "

#2-56 Standoffs may not be flush to cover

#### NOTE:

20 & 30 Watt versions are an additional 0.062" in Height

Contact UV Customer Service for Drawings on models equipped with -E or -H options.

### METAL CASE

#### CONSTRUCTION:

Epoxy Filled Aluminum Box  
Chem Film per MIL-C-5541  
Class 1A

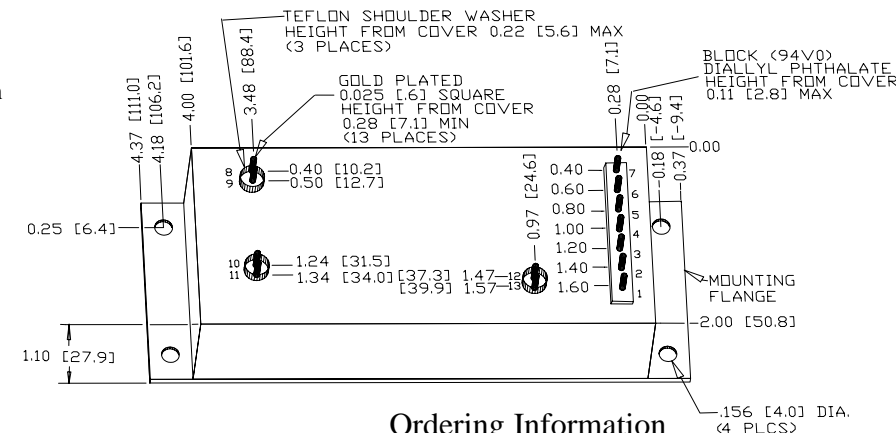
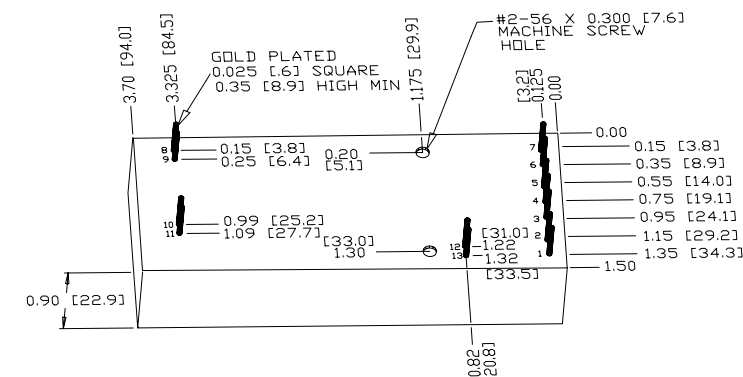
#### TOLERANCE:

Overall  $\pm 0.025$ "  
Pin to Pin  $\pm 0.015$ "

### Connections

1 - Input Power Ground Return
2 - Positive Power Input
3 - Iout Monitor
4 - Enable/Disable
5 - Signal Ground Return
6 - Remote Adjust Input
7 - +5V Reference Output
8 - HV Ground Return
9 - HV Ground Return
10 - HV Output
11 - HV Output
12 - AUX HV Output
13 - AUX HV Output

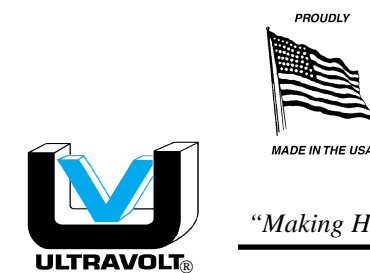
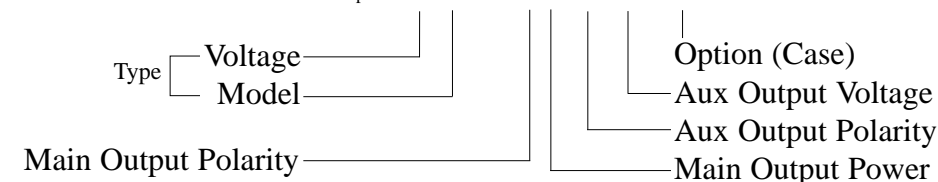
All grounds joined internally. Power supply mounting points isolated from internal grounds by  $> 100k\Omega$ , .01uF / 50V (Max) on all models except -M, -C, and -M-E configurations which are  $0\Omega$ .



### Ordering Information

Type:	0 to 62 VDC Main Output	<b>1/16A or 1/16C</b>
	0 to 125 VDC Main Output	<b>1/8A or 1/8C</b>
	0 to 250 VDC Main Output	<b>1/4A or 1/4C</b>
	0 to 500 VDC Main Output	<b>1/2A or 1/2C</b>
	0 to 1,000 VDC Main Output	<b>1A or 1C</b>
	0 to 2,000 VDC Main Output	<b>2A or 2C</b>
	0 to 4,000 VDC Main Output	<b>4A or 4C</b>
	0 to 6,000 VDC Main Output	<b>6A or 6C</b>
AUX Output:	2mA @ 47, 94, 141, 188, 235, 282, 329	<b>-VVV</b>
	1mA @ 450, 600, 750, 900, 1050	
Polarity:	Positive Output	<b>-P</b>
	Negative Output	<b>-N</b>
Power:	Watts Output (12V Only)	<b>4</b>
	Watts Output (24V Only)	<b>20</b>
	Watts Output (24V Only)	<b>30</b>
Case:	Plastic Case - Diallyl Phthalate	<b>STD</b>
	"Eared" Heatsink Plate (Pastic Case)	<b>-E</b>
	RF Tight Aluminum Case	<b>-C</b>
Heatsink:	.400" high (sized to fit case)	<b>-H</b>
Shield:	Six-Sided Mu-Metal Shield	<b>-M</b>

Example: 2AUX-P4-N450-C



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Rev. D 8/99



# High Power "8C/10C/12C/15C" SERIES

HIGH VOLTAGE POWER SUPPLY

Typical Characteristics:

Parameter	Conditions	Models	Units				
<b>Input:</b>							
<b>All Types</b>							
Voltage Range	Full Power	+ 23 to 30	VDC				
Voltage Range	Derated Power Range	+ 11 to 32	VDC				
Current	Standby / Disable	< 40	MA				
Current	No Load, Max Eout	< 500	MA				
Current	Max Load, Extended Input Voltage	See Figures B High Power "C" Datasheet	Graph				
AC Ripple Current	Nominal Input, Full Load	< 50	mA p-p				
<b>Output:</b>							
		<b>8C</b>	<b>10C</b>	<b>12C</b>	<b>15C</b>		
Voltage Range	Nominal Input	0 to 8,000	0 to 10,000	0 to 12,000	0 to 15,000	VDC	
Power	Nominal Input, Max Eout	60    125	60    125	60    125	60    125	Watts	
Current	Iout, Entire Output Voltage Range	7.5    15.5	6    12.5	5    10.5	4    8.3	mA	
Internal Capacitance	Capacitance / 95% Decay (50Meg Load)	2800 / 700	2000 / 575	2000 / 650	2000 / 650	pF / mS	
Ripple	Full Load, Max Eout, Cload ≥ 0.5uF	< 1.0				V p-p	
Overshoot	C Load, 0 Eout to Full Eout	< 0.1%				V pk	
Voltage Derating	Max Iout, Extended Input Voltage	Figure C				Graph	
Rise Time	Max Iout, Various C Loads & Eout	Figures D & F				Table	
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	
<b>Output Voltage Monitor</b>				<b>All Types</b>			
Voltage	Full Eout Range, Full Iout Range	1.00 (1GΩ / 1.1MΩ Divider with 10 MΩ meter)				V per kV	
Proportionality	Full Eout Range, Full Iout Range	± 0.08%				V per kV	
<b>Remote Programming:</b>				<b>All Types</b>			
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 Linearity	0% to 100%	Figure E				Graph	
Adjust Voltage	Referenced to signal ground	Figure E (0 to +5 VDC)				Graph	
Adjust Logic	0 to +5 for +Out, +5 to 0 for -Out	+4.64 VDC for +Output or +0.36 for -Output = Nominal Eout					
<b>Reference:</b>				<b>All Types</b>			
Output Voltage	T=+25°C, Initial Value	+ 5.00 ± 2%				VDC	
Output Impedance	T=+25°C	464 ± 1%				Ω	
Stability	Over Full Temperature Range	See "A" Series Datasheet Figure F				Graph	
<b>Enable:</b>				<b>All Types</b>			
Power Supply On	Floated, or voltage ≥ TTL High	+2.4 to 32				VDC	
Power Supply Off	Grounded, or voltage ≤ TTL Low	0 to + 0.7 ± 0.2 (Isink 1mA minimum)				VDC	
<b>Temperature:</b>				<b>All Types</b>			
Operating	Full Load, Max Eout, Case Temp.	-40 to +65				°C	
Storage	Non-Operating, Case Temp.	-55 to +105				°C	
Coefficient	Over the Specified Temperature	± 50				PPM / °C	
Thermal Shock	Mil-Std 810, Method 504, Class 2	-40 to +65				°C	
<b>Altitude:</b>				<b>All Types</b>			
Operating	Standard Package	Sea Level through Vacuum					
Non-operating	Standard Package	Sea Level through Vacuum					
<b>Shock &amp; Vibration:</b>				<b>All Types</b>			
Shock	Mil-Std-810, Method 516, Proc. 4	20				G's	
Vibration	Mil-Std-810, Method 514, Fig. 514-3	10				G's	
<b>Packaging:</b>				<b>All Types</b>			
Material	Outer construction	6063T52 Aluminum Mil-C-5541 Class 1A					
Length	Not including pins or mounting pts	8.00 ± 0.025 (203.2±.6)				In (mm)	
Width	Not including pins or mounting pts	4.50 ± 0.025 (114.3±.6)				In (mm)	
Height	Not including pins or mounting pts	1.075 ± 0.025 (27.3±.6)				In (mm)	
Volume	Not including pins or mounting pts	38.7 (634)				In³ (cc)	
Weight	Overall	2.6 (1.18)				Lbs (kg)	

# High Power "8C/10C/12C/15C" SERIES

HIGH VOLTAGE POWER SUPPLY

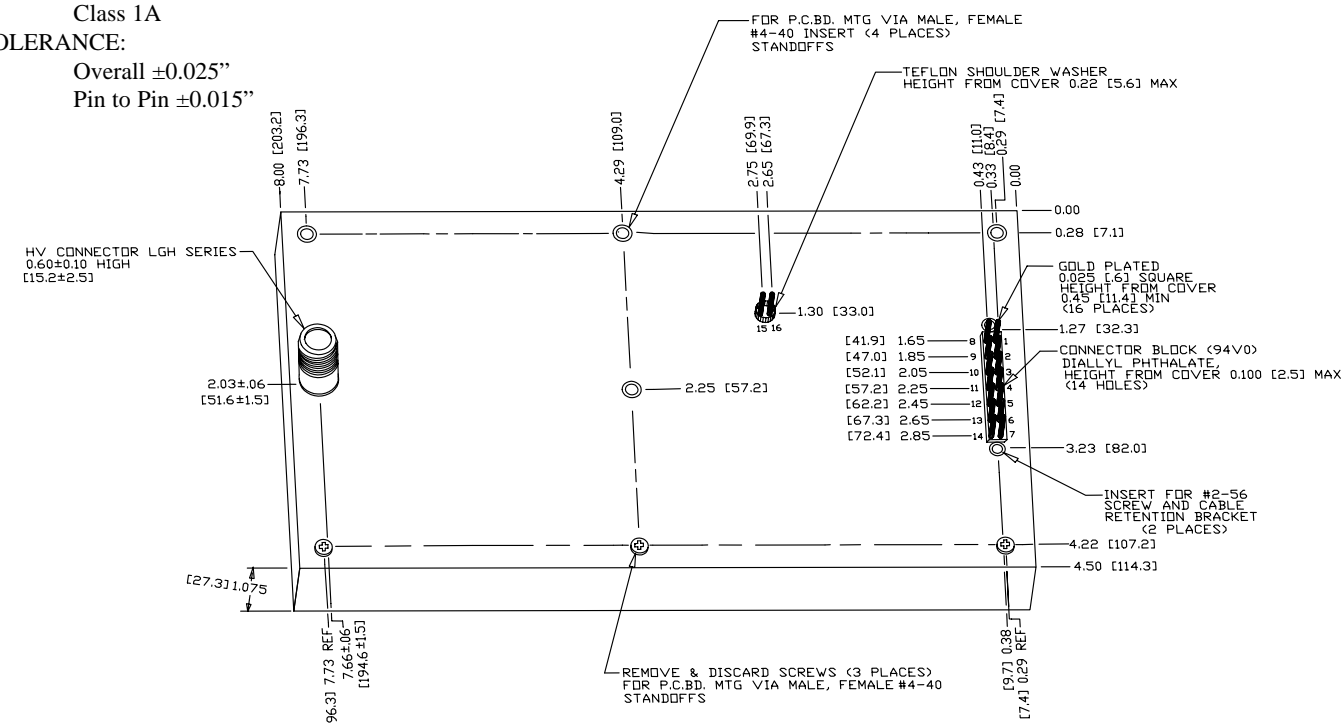
## METAL CASE

CONSTRUCTION:

Epoxy Filled Aluminum Box  
Chem Film per MIL-C-5541  
Class 1A

TOLERANCE:

Overall ±0.025"  
Pin to Pin ±0.015"



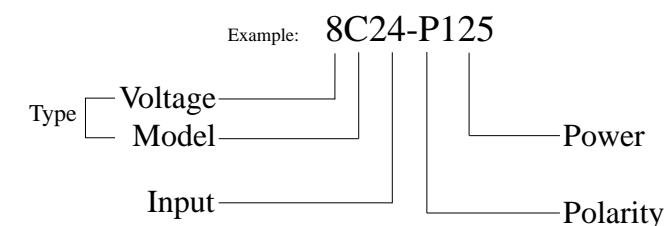
## Connections

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 - N/C
12 - N/C
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 / 50V (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
Input:	24VDC Nominal	24
Polarity:	Positive Output	-P
	Negative Output	-N
Power:	60 Watts Output	60
	125 Watts Output	125
Heat Sink:	.400" High (Sized to Fit Case)	-H



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# TRIPLE OUTPUT "AUX" SERIES

## HIGH VOLTAGE POWER SUPPLY

- Adds Focus and Grid Outputs
- Encapsulated within "10A to 35A" Series
- Adjustable Regulated Outputs
- Creates a 6.5 in<sup>3</sup> Triple Output Supply
- Fixed frequency low stored energy design
- High Power Density
- Output Short Circuit Protected

### GENERAL INFORMATION:

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 to 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, E Beam Bias.

### 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  $\pm 10\%$  for 4W units and 24 to 28Vdc  $\pm 5\%$  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  $\pm 5\%$ . Line regulation error is  $< 0.1\%$ , Load regulation error is 0.5V per  $\mu A$ . The outputs have a temperature co-efficient of  $+0.11\%$  per  $^{\circ}C$ . Each "AUX" output has a current capability of 0 to  $\pm 25\mu A$ , 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 $\pm 200$ PPM
450V	650V $\pm 408$ PPM
600V	800V $\pm 537$ PPM
750V	950V $\pm 626$ PPM
900V	1100V $\pm 690$ PPM
1050V	

The "AUX" Grid HV output is via pin #10 on an additional pair of standard .025" 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.

### COMPATIBILITY:

The "AUX" series match the standard "10A to 35A" series for design methodology, remote control, enable/disable, reference, shock and vibration. Designed and built utilizing a state of the art power conversion topology, these units feature surface mount technology and encapsulation techniques providing high reliability and low cost. Base power supply output current rating remains at full value. Nominal input voltage should be used for maximum efficiency. Output current monitor is rescaled to accommodate the "AUX" current.

### SHIELDING:

All models are available with optional six-sided wrap-around Mu-Metal Shielding. This shielding attenuates magnetic and electrostatic emissions, while shielding ripple reduction circuitry from outside noise. The high voltage power supply dimensions change by only 0.010"

### PACKAGING:

Since the Auxiliary board is designed to fit inside of the "10A to 35A" footprint the width and length remain unchanged. To accommodate the adjust pots all 4w units are 1.175"  $\pm 0.050$ " high, 15w and 30w units 1.235"  $\pm 0.050$ " high. Standard packaging is our plastic PCB mountable box. As always, optional six-sided Mu-Metal shielding, chassis mounting brackets and mounting plates are available.

### ENVIRONMENT:

The "AUX" Series meets the same environmental specifications for temperature, shock and vibration as the "10A to 35A" series. All units receive a 24-hour burn-in prior to final test. Extended temperature range is available along with other enhanced capabilities. Please contact the factory.



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 RONKONKOMA, NY 11779  
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 FAX 516-471-4696  
 "Making High Voltage Easier"

# TRIPLE OUTPUT "AUX" SERIES

## HIGH VOLTAGE POWER SUPPLY

### PLASTIC CASE

#### CONSTRUCTION:

- Epoxy Filled DAP Box
- Chem Film per MIL-M-14F
- SDG-F

#### TOLERANCE:

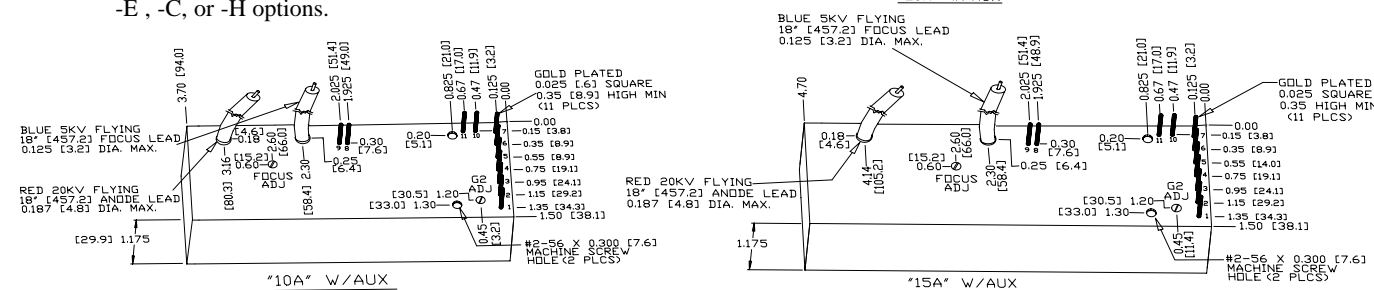
- Overall  $\pm 0.050$ "
- Pin to Pin  $\pm 0.015$ "

#2-56 Standoffs may not be flush to cover

#### NOTE:

20 & 30 Watt versions are an additional 0.062" in Height

Contact UV Customer Service for Drawings on models equipped with -E, -C, or -H options.



### Connections

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

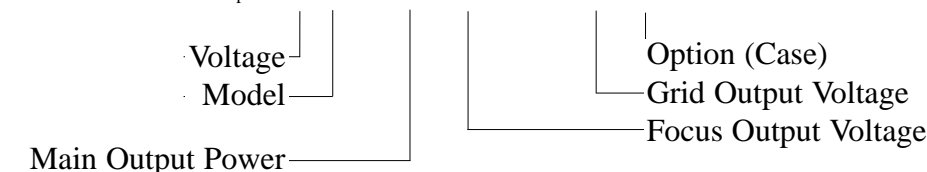
All grounds joined internally. Power supply mounting points isolated from internal grounds by  $>100k\Omega$ , .01 $\mu F$  / 50V (Max) on all models except -M, -C and -M-E configurations which are 0 $\Omega$ .

### Ordering Information

Type:	0 to 10.7kVDC Main Output (Focus AUX Operational 8kV to 10.7kV)	<b>10AUX</b>
	0 to 16.1kVDC Main Output (Focus AUX Operational 11kV to 16.1kV)	<b>15AUX</b>
	0 to 21.5kVDC Main Output (Focus AUX Operational 16kV to 21.5kV)	<b>20AUX</b>
	0 to 26.8kVDC Main Output (Focus AUX Operational 21.5kV to 26.8kV)	<b>25AUX</b>
	0 to 32.2kVDC Main Output (Focus AUX Operational 26.8kV to 32.2kV)	<b>30AUX</b>
	0 to 37.6kVDC Main Output (Focus AUX Operational 28.2kV to 37.6kV)	<b>35AUX</b>
Focus Output:	See Table on Pg. 1	<b>-Fvvv</b>
Grid Output:	See Table on Pg. 1	<b>-Gvvv</b>
	Temperature Compensated AUX	<b>-TC</b>
Power:	Watts Output (12V Only)	<b>4</b>
	Watts Output (24V Only)	<b>20</b>
	Watts Output (24V Only)	<b>30</b>
Case:	Plastic Case - Diallyl Phthalate	<b>STD</b>
	"Eared" Heatsink Plate (Pastic Case)	<b>-E</b>
Heatsink:	.400" high (sized to fit case)	<b>-H</b>
Shield:	Six-Sided Mu-Metal Shield	<b>-M</b>
Wire Options:	Anode Flying Lead Terminated with Connector	<b>-ATxx</b>
	Anode Flying Lead Shielded	<b>-AS</b>
	Anode Flying Lead Protected	<b>-AP</b>
	Focus Flying Lead Terminated with Connector	<b>-FTxx</b>



Example: 15AUX4-F1200-G450-M



"Making High Voltage Easier"

Rev. D 8/99

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