



**ULTRAVOLT® HIGH-POWER  
40C TO 60C SERIES**

40 TO 60 KV HIGH VOLTAGE CAP-CHARGING SUPPLIES





# Single-output

DC to high  
voltage DC  
modules for  
capacitor charging  
and DC power

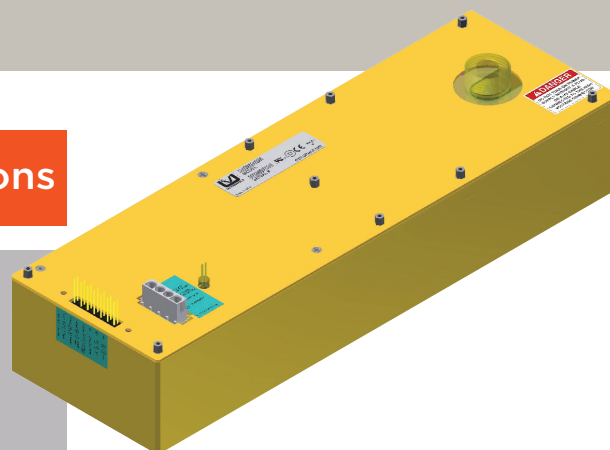
The high-power 40C to 60C line of high voltage regulated DC-to-DC converters is an extension of the C series, directly addressing the high-power-density needs of > 30 W applications from 40 to 60 kV. This high power density is especially suited to high-energy systems with large capacitances, fast repetition rates, or high continuous-DC-power requirements.

## Features

- › 3 models from 0 to 40 kV through 0 to 60 kV
- › 60, 125, or 250 W output power
- › Maximum lout capability down to 0 V
- › Maximum lout during charge/rise time
- › Output short-circuit protection
- › Very fast rise with very low over-shoot
- › High efficiency
- › High power density
- › Output current and voltage monitors
- › > 200,000 hour MTBF at 65°C
- › Fixed-frequency, low-stored-energy design
- › Optional digital-ready higher-performance interface (-I5/-I10)

## Typical Applications

- › Pulsed laser
- › Ion pump
- › Plasma generator
- › Electrostatic precipitator
- › Deposition
- › HV amplifier bias
- › HV cap charger
- › HV pulse generator
- › HV test equipment
  - Insulation testing (hi-pot)
  - Time-domain-resolver (TDR)
  - Motor winding tester or cable thumper





PARAMETER	CONDITIONS	All Types									UNITS
<b>Input</b>		<b>All Types</b>									
<b>Voltage Range</b>	Full Power	+23 to 30									VDC
<b>Voltage Range</b>	Derated Power Range	15 to 23; 30 to 32									VDC
<b>Current</b>	Standby/Disable	< 150									mA
<b>Current</b>	No Load, Max Eout	< 1250									mA
<b>Current</b>	Max Load, Max Eout	< 13									A
<b>Output</b>		<b>40 C</b>			<b>50 C</b>			<b>60 C</b>			
<b>Voltage Range</b>	Nominal Input	0 to 40,000			0 to 50,000			0 to 60,000			VDC
<b>Power</b>	Nominal Input, Max Eout	60	125	250	60	125	250	60	125	250	Watts
<b>Current</b>	Iout, Entire Output Voltage Range	1.50	3.13	6.25	1.20	2.50	5.00	1.00	2.08	4.17	mA
<b>Current Scale Factor</b>	Full Load	0.30	0.63	1.25	0.24	0.50	1.00	0.20	0.42	0.83	mA/V
<b>Voltage Monitor Scaling</b>		10,000:1 ±2%									-
<b>Internal Capacitance</b>	Capacitance/95% Decay (50 Meg Load)	750/104	750/104	375/52	600/84	600/84	300/42	500/70	500/70	250/35	pF/mS
<b>Ripple</b>	Full Load, Max Eout	< 1%									V p-p
<b>Rise Time</b>	Max Iout, Various C Loads and Eout	Figure A									-
<b>Storage Capacitance</b>	Internal	750	750	375	600	600	300	500	500	250	pF
<b>Over-shoot</b>	C Load, 0 Eout to Full Eout	< 1%									V pk
<b>Line Regulation</b>	Nom. Input, Max Eout, Full Power	< 0.01%									VDC
<b>Static Load Regulation</b>	No Load to Full Load, Max Eout	< 0.01%									VDC
<b>Stability</b>	30 Min Warmup, Per 8 H Per Day	< 0.01%/< 0.02%									VDC
<b>Programming and Controls</b>		<b>All Types</b>									
<b>Input Impedance</b>	Nominal Input	+Output models 1.1 MΩ to GND, -output models 1.1 MΩ to +5 Vref									MΩ
<b>Adjust Resistance</b>	Typical Potentiometer Values	10 to 100 K (Pot. across Vref. and signal GND, wiper to adjust)									Ω
<b>Adjust Logic</b>	0 to +5 for +Out, +5 to 0 for -Out	+4.64 VDC for +output or +0.36 for -output = nominal Eout									-
<b>Output Voltage and Impedance</b>	T=+25°C	+5.00 VDC ±1%, Zout = 464 Ω ±1%									-
<b>Enable/Disable</b>		0 to +0.8 V disable, +2.0 to 30 enable (default = enable)									VDC
<b>Environmental</b>		<b>All Types</b>									
<b>Operating</b>	Full Load, Max Eout, Case Temperature	-40 to +65									°C
<b>Coefficient</b>	Over the Specified Temperature	±50 (±25 optional)									PPM/°C
<b>Thermal Shock</b>	Mil-Std-810, Method 503-4, Proc. II	-40 to +65									°C
<b>Storage</b>	Non-Operating, Case Temp.	-55 to +105									°C
<b>Humidity</b>	All Conditions, Standard Package	0 to 95% non-condensing									-
<b>Altitude</b>	Standard Package, All Conditions	Sea level through 70,000									ft
<b>Shock</b>	Mil-Std-810, Method 516.5, Proc. IV	20									Gs
<b>Vibration</b>	Mil-Std-810, Method 514.5, Fig. 514.5C-3	10									Gs

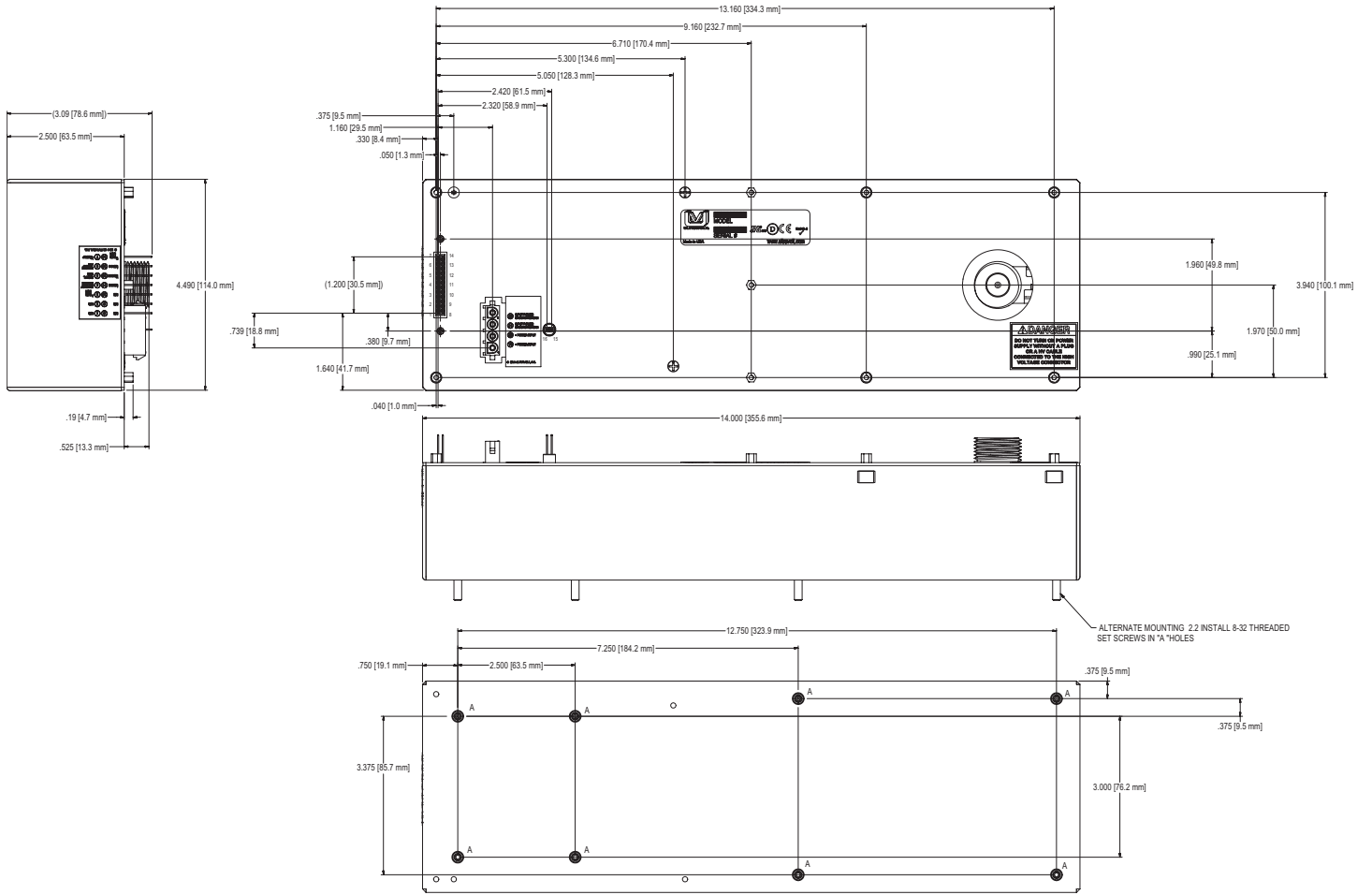
Figure A. Rise time formulas

$$\begin{array}{llll}
 C = \mu\text{F} & & C = \mu\text{F} & & C = \mu\text{F} \\
 V = \text{Volts} & & V = \text{kV} & & V = \text{kV} \\
 I = \text{mA} & T = \frac{C \times V}{I} & I = \text{mA} & I = C \times V \times F & I = \text{mA} \\
 T = \text{mS} & & F = \text{Hz} & & F = \text{Hz} \\
 & & & & F = \frac{I}{C \times V} \\
 & & & & C = \mu\text{F} \\
 & & & & E^2 = \text{kV} \\
 & & & & J = \text{Ws} \\
 & & & & J = \frac{C \times E^2}{2}
 \end{array}$$

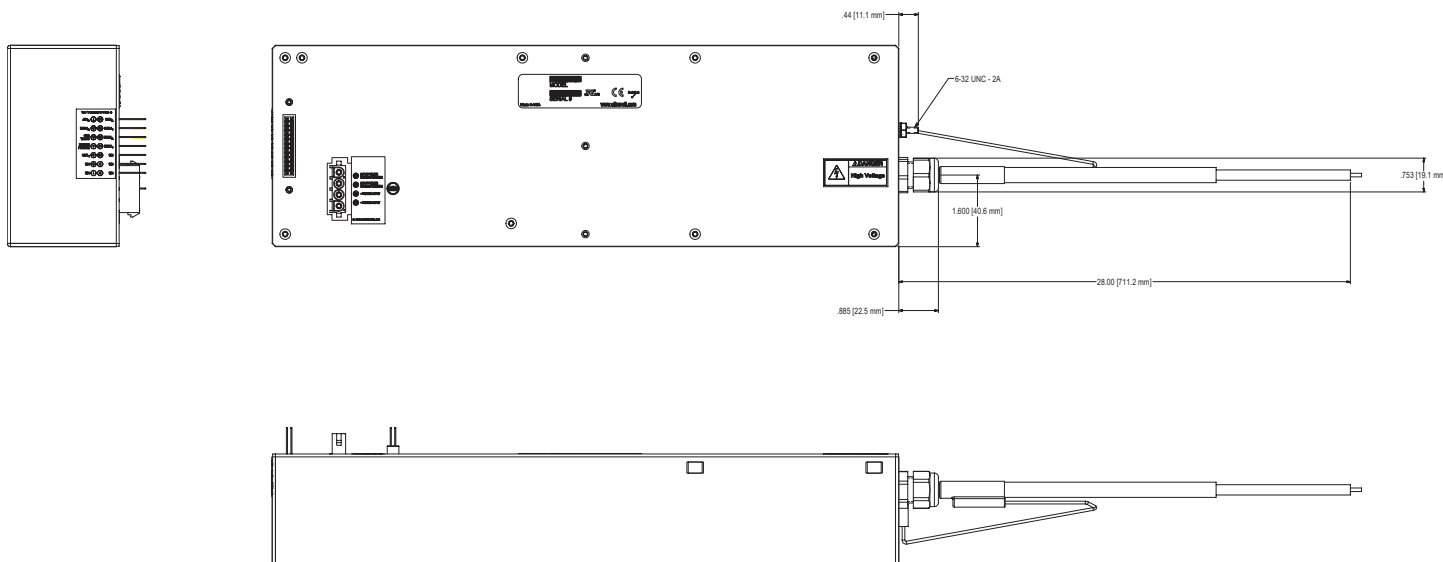
**Note:** Capacitance must include HVPS internal capacitance.



# 40C AND 50C



## 40C AND 50C WITH -WS AND 60C



### PHYSICAL SPECIFICATIONS

<b>Pins</b>	Gold-plated 0.64 mm <sup>2</sup> (0.025 in <sup>2</sup> )
	Center of pins and mounting holes located from center of pin 1
	Pins 1 through 14 spacing: 2.54 mm x 5.08 mm (0.100" x 0.200") on center, height from cover 7.11 mm (0.280") min
	Pins 15 and 16 spacing: 2.54 mm (0.100") on center, height from cover 11.43 mm (0.450") min
<b>HV Output Connection</b>	40C-50C LGH flying lead cable assembly required, P/N CA-50KV-1000
	60C standard 0.7 m (28") coaxial flying lead
<b>Construction</b>	RTV-filled aluminum box
	Chem film per MIL-A-8625 Type II (anodizing)
<b>Approx. Volume</b>	0.0026 m <sup>3</sup> (160 in <sup>3</sup> )
<b>Approx. Weight</b>	4.5 kg (10 lb)
<b>Overall</b>	±1.02 mm (0.040") pin to pin 0.38 mm (0.015")
<b>Hole-to-Hole Location</b>	0.76 mm (0.03")

## CONNECTIONS

Pin	Function
<b>21 and 22</b>	Input-power ground return
<b>19 and 20</b>	Positive power input
<b>3</b>	Iout monitor
<b>4</b>	Enable/disable
<b>5</b>	Signal ground return
<b>6</b>	Remote adjust input
<b>7</b>	+5 VDC reference output
<b>10</b>	N/C (or arc detect option)
<b>11, 12, and 13</b>	N/C
<b>14</b>	Eout monitor
<b>15 and 16</b>	HV ground return

• All grounds joined internally. Power-supply mounting points isolated from internal grounds by > 100 kΩ, 0.01 μF/500 V (max).

## ORDERING INFORMATION

<b>Type</b>	40,000 VDC Output	40C
	50,000 VDC Output	50C
	60,000 VDC Output	60C
<b>Input</b>	24 VDC Nominal	24
<b>Polarity</b>	Positive Output	-P
	Negative Output	-N
<b>Power</b>	60 W Output	60
	125 W Output	125
	250 W Output	250
<b>Heat Sink</b>	1.02 cm (0.400") High (Sized to Fit Case)	-H
<b>PCB Support</b>	(5) 0.47 cm (0.187") Standoffs on Top Cover	-Z11
<b>Enhanced Interface</b>	5 V Controls and Monitors	-I5
	10 V Control and Monitors	-I10
<b>Options</b>	Arc Detect*	-AD
	Arc Quench*	-AQ

\* Available only with I5 or I10 options

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

Example: **40C24-P125-I5**



Non-RoHS compliant units are available. Please contact the factory for more information.  
Manufactured in U.S.A.



For international contact information, visit [advanced-energy.com](http://advanced-energy.com).

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### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

moschip.ru\_6

moschip.ru\_9