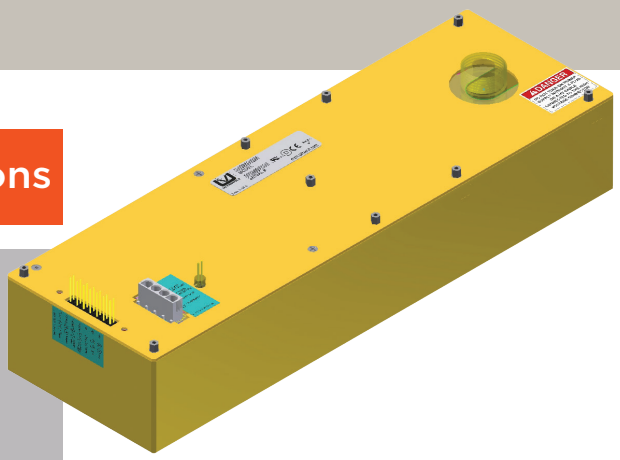
Advanced Energy®

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 Iout capability down to 0 V
- Maximum Iout 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										UNITS
Input		**All Types**									
Voltage Range	Full Power	+23 to 30									VDC
Voltage Range	Derated Power Range	15 to 23; 30 to 32									VDC
Current	Standby/Disable	< 150									mA
Current	No Load, Max Eout	< 1250									mA
Current	Max Load, Max Eout	< 13									A
Output		**40 C**			**50 C**			**60 C**			
Voltage Range	Nominal Input	0 to 40,000			0 to 50,000			0 to 60,000			VDC
Power	Nominal Input, Max Eout	60	125	250	60	125	250	60	125	250	Watts
Current	Iout, Entire Output Voltage Range	1.50	3.13	6.25	1.20	2.50	5.00	1.00	2.08	4.17	mA
Current Scale Factor	Full Load	0.30	0.63	1.25	0.24	0.50	1.00	0.20	0.42	0.83	mA/V
Voltage Monitor Scaling		10,000:1 ±2%									-
Internal Capacitance	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
Ripple	Full Load, Max Eout	< 1%									V p-p
Rise Time	Max Iout, Various C Loads and Eout	Figure A									-
Storage Capacitance	Internal	750	750	375	600	600	300	500	500	250	pF
Over-shoot	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%/< 0.02%									VDC
Stability	30 Min Warmup, Per 8 H Per Day										VDC
Programming and Controls		**All Types**									
Input Impedance	Nominal Input	+Output models 1.1 MΩ to GND, -output models 1.1 MΩ to +5 Vref									MΩ
Adjust Resistance	Typical Potentiometer Values	10 to 100 K (Pot. across Vref. and 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 and Impedance	T=+25°C	+5.00 VDC ±1%, Zout = 464 Ω ±1%									-
Enable/Disable		0 to +0.8 V disable, +2.0 to 30 enable (default = enable)									VDC
Environmental		**All Types**									
Operating	Full Load, Max Eout, 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									Gs
Vibration	Mil-Std-810, Method 514.5, Fig. 514.5C-3	10									Gs

Figure A. Rise time formulas

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

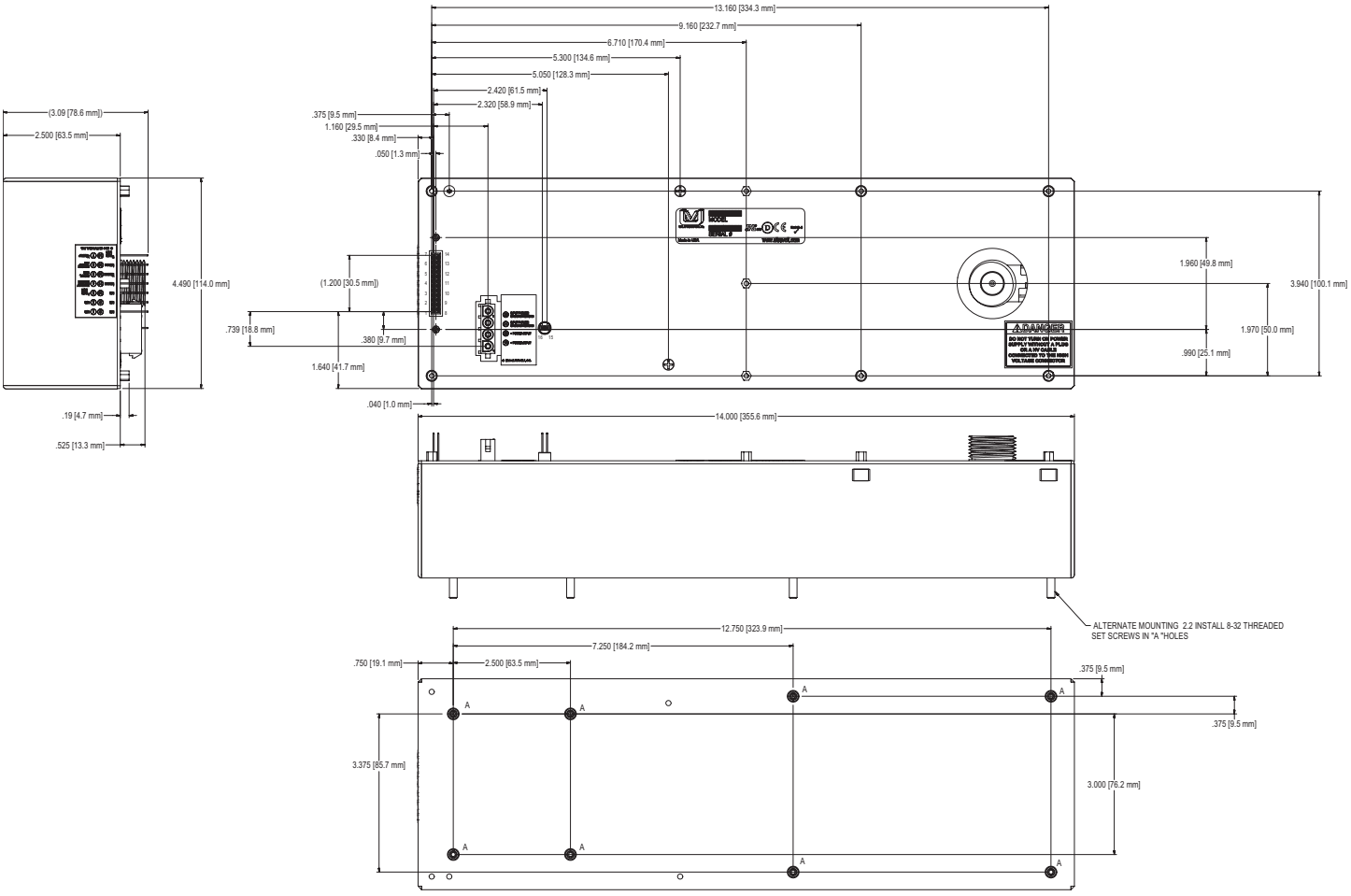
$$F = \frac{I}{CxV}$$

C = uF
E^2 = kV
J = Ws

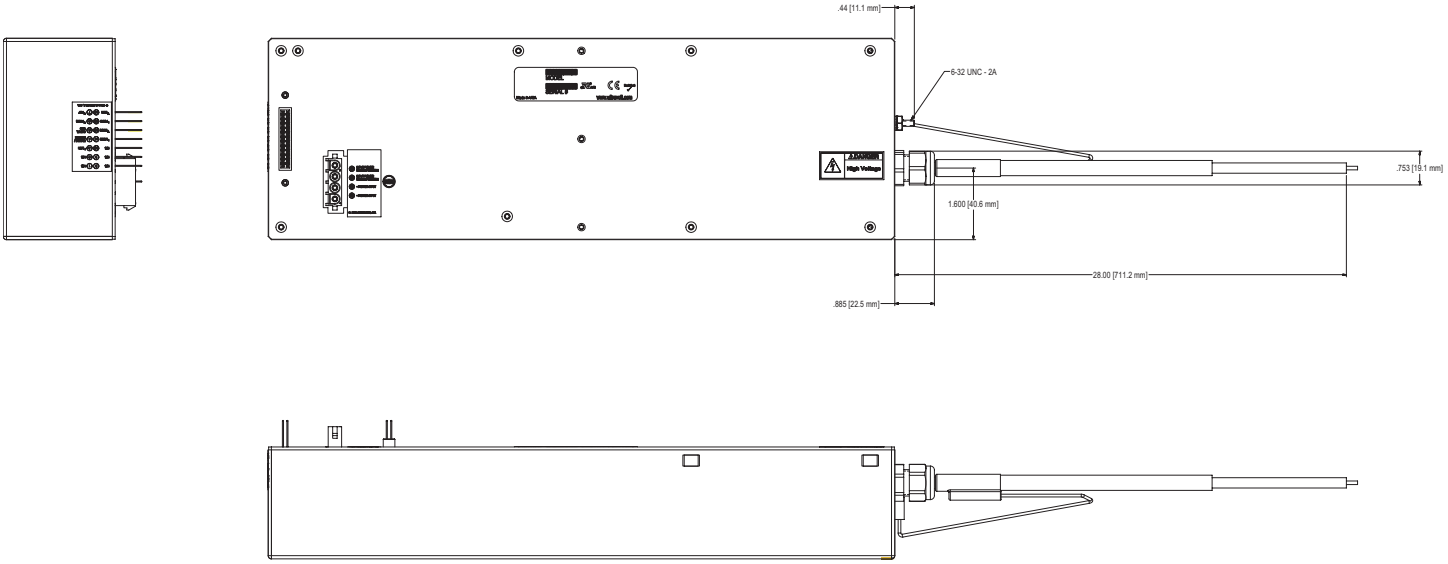
$$J = \frac{C \times E^2}{2}$$

Note: *Capacitance must include HVPS internal capacitance.*

40C AND 50C


13.160 [334.3 mm]
9.160 [232.7 mm]
6.710 [170.4 mm]
5.300 [134.6 mm]
5.050 [128.3 mm]
2.420 [61.5 mm]
2.320 [58.9 mm]
.375 [9.5 mm]
1.160 [29.5 mm]
.330 [8.4 mm]
.050 [1.3 mm]
(3.09 [78.6 mm])
2.500 [63.5 mm]
4.490 [114.0 mm]
.19 [4.7 mm]
.525 [13.3 mm]
(1.200 [30.5 mm])
.739 [18.8 mm]
.380 [9.7 mm]
1.640 [41.7 mm]
.040 [1.0 mm]
1.960 [49.8 mm]
3.940 [100.1 mm]
1.970 [50.0 mm]
.990 [25.1 mm]
14.000 [355.6 mm]
ALTERNATE MOUNTING 2.2 INSTALL 8-32 THREADED SET SCREWS IN "A "HOLES
12.750 [323.9 mm]
7.250 [184.2 mm]
.750 [19.1 mm]
2.500 [63.5 mm]
.375 [9.5 mm]
.375 [9.5 mm]
3.375 [85.7 mm]
3.000 [76.2 mm]
A

40C AND 50C WITH -WS AND 60C



PHYSICAL SPECIFICATIONS

Pins	Gold-plated 0.64 mm^2 (0.025 in^2)
	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
HV Output Connection	40C-50C LGH flying lead cable assembly required, P/N CA-50KV-1000
	60C standard 0.7 m (28″) coaxial flying lead
Construction	RTV-filled aluminum box
	Chem film per MIL-A-8625 Type II (anodizing)
Approx. Volume	0.0026 m^3 (160 in^3)
Approx. Weight	4.5 kg (10 lb)
Overall	±1.02 mm (0.040″) pin to pin 0.38 mm (0.015″)
Hole-to-Hole Location	0.76 mm (0.03″)

CONNECTIONS

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

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

IEC-60950-1

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

Manufactured in U.S.A.

Advanced Energy®

For international contact information, visit advanced-energy.com.

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FORSTAR®

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