



**ULTRAVOLT® -F OPTION**  
RIPPLE STRIPPER® OUTPUT FILTERS





# Reduced ripple for HV power supplies

The -F option Ripple Stripper® output filter adds additional ripple-reduction circuitry internally to DC-to-HV DC high voltage power supply modules prior to encapsulation at the factory.

For greater performance, the optional shield should be used when available. Output regulation is not changed; on certain models an output voltage monitor is also added to the module. Please see the corresponding data sheets for additional specifications: A, 10A-40A, RS, and HVA.

## Features

- › Ripple Stripper® output filter
- › Reduces high voltage output ripple
- › On A, 10A-40A, HVA series units:
  - Encapsulated with power supplies
  - Fixed-frequency, low-stored-energy design
  - Adds output voltage monitor (A series only)
  - 400,000 h MTBF at 65°C (A series example)
  - UL/cUL recognized component; CE Mark (LVD and RoHS)
- › On RS series units:
  - Encapsulated with power supplies
  - CE Mark (LVD and RoHS)

## Typical Applications

- › Scanning electron microscopes (SEM)
- › Mass spectrometry
- › Pulse generators
- › Laser electro-optic modulation
- › Fiber-optic telecom detectors
- › Particle physics detectors
- › Laser range finder detectors
- › Detectors
- › Geiger-Muller tubes (GM)
- › Avalanche photo diodes (APD)
- › Photo multiplier tubes (PMT)
- › Channel electron multipliers › Silicon detectors (SiD)
- › Silicon photomultipliers (SiPM)
- › Multi-pixel photon counters (MPPC)
- › Ionization chamber detectors
- › Thin-film bias
- › ATE leakage testing
- › Bias supplies



## 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 WITH EXTERNAL CAP
1/16 A 12	62 V	4 W	< 0.002%	< 0.002%	0.5 uF/Metal Film
1/16 A 24	62 V	20 W	< 0.003%	< 0.004%	0.5 uF/Metal Film
1/16 A 24	62 V	30 W	< 0.006%	< 0.006%	0.5 uF/Metal Film
1/8 A 12	125 V	4 W	< 0.002%	< 0.0048%	0.5 uF/Metal Film
1/8 A 24	125 V	20 W	< 0.008%	< 0.0056%	0.5 uF/Metal Film
1/8 A 24	125 V	30 W	< 0.006%	< 0.006%	0.5 uF/Metal Film
1/4 A 12	250 V	4 W	< 0.0012%	< 0.0052%	0.047 uF/Metal Film
1/4 A 24	250 V	20 W	< 0.004%	< 0.0028%	0.047 uF/Metal Film
1/4 A 24	250 V	30 W	< 0.0032%	< 0.005%	0.047 uF/Metal Film
1/2 A 12	500 V	4 W	< 0.0006%	< 0.001%	0.022 uF/Metal Film
1/2 A 24	500 V	20 W	< 0.002%	< 0.0138%	0.022 uF/Metal Film
1/2 A 24	500 V	30 W	< 0.025%	< 0.0016%	0.022 uF/Metal Film
1 A 12	1 kV	4 W	< 0.0010%	< 0.0010%	0.05 uF/Metal Film
1 A 24	1 kV	20 W	< 0.0010%	< 0.0008%	0.05 uF/Metal Film
1 A 24	1 kV	30 W	< 0.003%	< 0.002%	0.05 uF/Metal Film
2 A 12	2 kV	4 W	< 0.0036%	< 0.0007%	4700 pF/X7R
2 A 24	2 kV	20 W	< 0.0063%	< 0.0038%	4700 pF/X7R
2 A 24	2 kV	30 W	< 0.015%	< 0.004%	4700 pF/X7R
4 A 12	4 kV	4 W	< 0.0063%	< 0.0004%	1500 pF/X7R
4 A 24	4 kV	20 W	< 0.0051%	< 0.0088%	1500 pF/X7R
4 A 24	4 kV	30 W	< 0.0094%	< 0.0026%	1500 pF/X7R
6 A 12	6 kV	4 W	< 0.0135%	< 0.0003%	1500 pF/X7R
6 A 24	6 kV	20 W	< 0.0086%	< 0.0012%	1500 pF/X7R
6 A 24	6 kV	30 W	< 0.02%	< 0.004%	1500 pF/X7R

Note: From 0 to 62 VDC to 6 kV applies only to the A series.

## 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 M $\Omega$  input impedance meter. Units 2 kV or higher have a 100/1.1 M $\Omega$  divider; units below 2 kV use a 10 M $\Omega$ /102 K divider. Overall accuracy is  $\pm 2.5\%$  with a temperature coefficient of  $\pm 200$  ppm per  $^{\circ}\text{C}$ .

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

Output monitor scale factors for -F option units are:

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

Contact the factory for boosted current monitor options.

Note: From 0 to 62 VDC to 6 kV applies only to the A series.

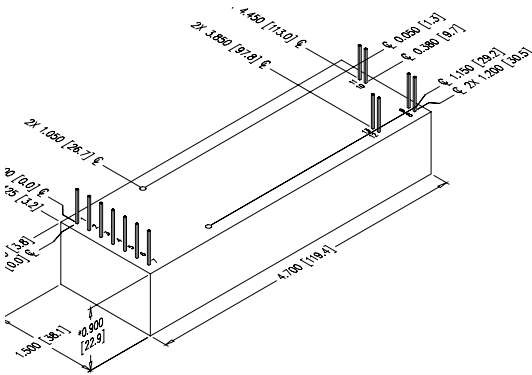
## HIGH VOLTAGE OUTPUT CONNECTION

Square 0.635 mm (0.025") 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.

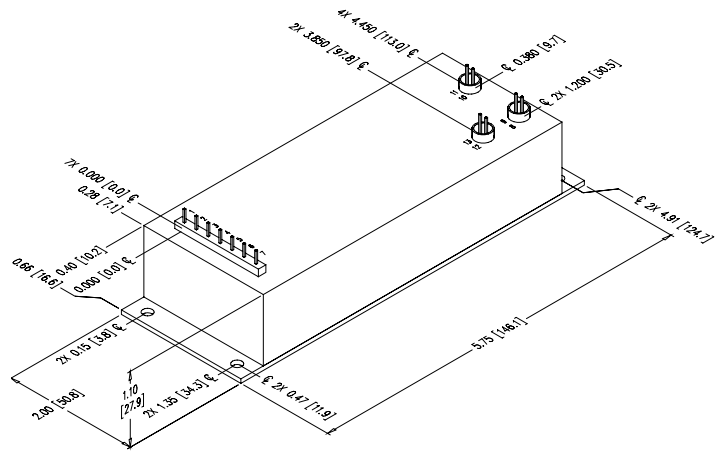




## STANDARD CASE



## WITH -C OPTION



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

## PHYSICAL SPECIFICATIONS

<b>Construction</b>	Epoxy-filled DAP box certified to ASTM-D-5948 With -C option: aluminum alloy 5052-H32 Finish: MIL-A-8625 Type II (anodizing)
<b>Volume</b>	70.5 cc (4.30 in <sup>3</sup> ) With -C option: 131.1 cc (8.00 in <sup>3</sup> )
<b>Weight</b>	142 g (5.0 oz) With -C option: 284 g (10.0 oz)
<b>Tolerance</b>	
<b>Overall</b>	1.27 mm (±0.050")
<b>Pin to Pin</b>	0.38 mm (±0.015")
<b>Mounting Hole Location</b>	0.64 mm (±0.025")

Notes: 20 W and 30 W versions are an additional 1.57 mm (0.062") in height.  
-M equipped units are an additional 0.76 mm (0.030") for each dimension.  
Contact Advanced Energy for drawings of models equipped with -E or -H.  
From 0 to 62 VDC to 6 kV applies only to the A series.



**RoHS COMPLIANT** 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	+5 VDC REFERENCE OUTPUT
8 and 9	HV GROUND RETURN
10 and 11	HV OUTPUT
12 and 13	EOUT MONITOR

All grounds joined internally. Power supply mounting points isolated from internal grounds by  $> 100\text{ k}\Omega$ ,  $0.01\text{ }\mu\text{F}/50\text{ V}$  (max) on all models except -M, -C, and -M-E configurations which are  $0\text{ }\Omega$ .

## ORDERING INFORMATION

Accessory	Ripple Stripper® Output Filter	-F
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Popular accessories ordered with this product include CONN-KIT-F and BR-2 mounting bracket kit. Compatible with all standard module options. See Options and Accessories data sheet for more information.

Example: **1/2A12-P4-F**

└─ Ripple Stripper®  
output filter



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