

## INTERNATIONAL SERIES LINEARS

Power-One produces the industry's broadest selection of linear power supplies with output voltages from 5 volts through 250 volts. Rugged technology and proven design merge to create quiet, highly regulated, dependable DC power.

The International Linear series is approved to domestic and international regulatory standards, and is CE Marked to the Low Voltage Directive (LVD).

### FEATURES

- Worldwide AC Input Capabilities: 100/120/220/230/240 VAC
- $\pm 0.05\%$  Output Regulation
- Low Output Ripple
- UL, CSA, and TÜV Approvals
- Mean Time Before Failure (MTBF) in Excess of 300,000 Hours
- CE marked to Low Voltage Directive
- 100% Burn-In
- 2 Year Warranty
- Overvoltage Protection (OVP) Standard on 5V Single Outputs, Optional for other outputs under 48V



### SINGLE OUTPUT MODELS

VOLTAGE	MODEL	VOLTAGE/ CURRENT	CASE SIZE
5V	<b>HA5-1.5/OVP-A</b>	5V @ 1.5A (Note 1)	B
	<b>HB5-3/OVP-A</b>	5V @ 3A (Note 1,5)	B
	<b>HC5-6/OVP-A</b>	5V @ 6A (Note 1,5)	C
	<b>HN5-9/OVP-A</b>	5V @ 9A (Note 1,5)	N
	<b>HD5-12/OVP-A</b>	5V @ 12A (Note 1,5)	D
	<b>HE5-18/OVP-A</b>	5V @ 18A (Note 1,5)	E
	<b>F5-25/OVP-A</b>	5V @ 25A (Note 1,5,6,10)	F
	<b>G5-35/OVP-A</b>	5V @ 35A (Note 1,5,6,10)	F
12V	<b>CP197-A</b>	5V @ 50A (Note 1,5,6)	F
	<b>HA15-0.9-A</b>	12V @ 0.9A (Note 2)	B
	<b>HB12-1.7-A</b>	12V @ 1.7A (Note 5)	B
	<b>HC12-3.4-A</b>	12V @ 3.4A (Note 5)	C
	<b>HN12-5.1-A</b>	12V @ 5.1A (Note 5)	N
	<b>HD12-6.8-A</b>	12V @ 6.8A (Note 5)	D
	<b>HE12-10.2-A</b>	12V @ 10.2A (Note 5)	E
<b>F15-15-A</b>	12V @ 16A (Note 2,5,6,10)	F	
15V	<b>HA15-0.9-A</b>	15V @ 0.9A (Note 2)	B
	<b>HB15-1.5-A</b>	15V @ 1.5A (Note 5)	B
	<b>HC15-3-A</b>	15V @ 3A (Note 5)	C
	<b>HN15-4.5-A</b>	15V @ 4.5A (Note 5)	N
	<b>HD15-6-A</b>	15V @ 6A (Note 5)	D
	<b>HE15-9-A</b>	15V @ 9A (Note 5)	E
	<b>F15-15-A</b>	15V @ 15A (Note 2,5,6,10)	F

VOLTAGE	MODEL	VOLTAGE/ CURRENT	CASE SIZE
24V	<b>HA24-0.5-A</b>	24V @ 0.5A (Note 2)	B
	<b>HB24-1.2-A</b>	24V @ 1.2A (Note 5)	B
	<b>HC24-2.4-A</b>	24V @ 2.4A (Note 5)	C
	<b>HN24-3.6-A</b>	24V @ 3.6A (Note 5)	N
	<b>HD24-4.8-A</b>	24V @ 4.8A (Note 5)	D
	<b>HE24-7.2-A</b>	24V @ 7.2A (Note 5)	E
	<b>F24-12-A</b>	24V @ 12A (Note 2,5,6,10)	F
28V	<b>HA24-0.5-A</b>	28V @ 0.5A (Note 2)	B
	<b>HB28-1-A</b>	28V @ 1A (Note 5)	B
	<b>HC28-2-A</b>	28V @ 2A (Note 5)	C
	<b>HN28-3-A</b>	28V @ 3A (Note 5)	N
	<b>HD28-4-A</b>	28V @ 4A (Note 5)	D
	<b>HE28-6-A</b>	28V @ 6A (Note 5)	E
<b>F24-12-A</b>	28V @ 10A (Note 2,5,6,10)	F	
48V	<b>HB48-0.5-A</b>	48V @ 0.5A	B
	<b>HC48-1-A</b>	48V @ 1A	C
	<b>HD48-3-A</b>	48V @ 3A (Note 5)	D
	<b>HE48-4-A</b>	48V @ 4A (Note 5)	E
120V	<b>HB120-0.2-A</b>	120V @ 0.2A	B
175-210V	<b>HB200-0.12-A</b>	175-210V @ 0.12A	B
250V	<b>HB250-0.1-A</b>	250V @ 0.1A	B

- NOTES:** 1) Overvoltage protection provided. Set at 6.2V  $\pm 0.4V$ .  
 2) Adjustable outputs: F15-15-A: 12-15V, F24-12-A: 24-28V, HA15-0.9-A: 12-15V, HA24-0.5-A: 24-28V.  
 3) Nonadjustable 3 terminal regulator.  
 4) Isolated outputs, can be referenced as positive (+) or negative (-).  
 5) Remote sense provided.

- 6) With output inhibit and parallel operation master/slave capability.  
 7) With output inhibit.  
 8) Adjustable 3 terminal regulator.  
 9) Can be made into an isolated output by removing jumper W1.  
 10) Model requires 100 LFM forced air cooling above 75% of rated output power.

## INTERNATIONAL SERIES LINEARS

### DUAL OUTPUT MODELS

VOLTAGE	MODEL	OUTPUT # 1	OUTPUT # 2	CASE SIZE
±5V	<b>HAA5-1.5/OVP-A</b>	+5V @ 1.5A (Note 1)	-5V @ 1.5A (Note 1)	AA
	<b>HBB5-3/OVP-A</b>	+5V @ 3A (Note 1)	-5V @ 3A (Note 1)	BB
	<b>HCC5-6/OVP-A</b>	5V @ 6A (Note 1,4,5)	5V @ 6A (Note 1,4,5)	CC
± 12V	<b>HAD12-0.4-A</b>	+12V @ 0.4A (Note 3)	-12V @ 0.4A (Note 3)	B
± 15V	<b>HAD15-0.4-A</b>	+15V @ 0.4A (Note 3)	-15V @ 0.4A (Note 3)	B
±12V to ±15V	<b>HAA15-0.8-A</b>	+12V @ 1A or +15V @ 0.8A (Note 5)	-12V @ 1A or -15V @ 0.8 or -5V @ 0.4A (Note 5)	AA
	<b>HBB15-1.5-A</b>	+12V @ 1.7A or +15V @ 1.5A (Note 5)	-12V @ 1.7A or -15V @ 1.5A or -5V @ 0.7A (Note 5)	BB
	<b>HCC15-3-A</b>	+12V @ 3.4A or +15V @ 3A (Note 5)	-12V @ 3.4A or -15V @ 3A (Note 5)	CC
	<b>HDD15-5-A</b>	+12V or 15V @ 5A (Note 5)	(-)12V or 15V @ 5A	E
±18V ±24V	<b>HAA24-0.6-A</b>	+18-20V @ 0.4A or +24V @ 0.6A	(-)18-20V @ 0.4A or -24V @ 0.6A	AA
	<b>HBB24-1.2-A</b>	+18-20V @ 0.9A or +24V @ 1.2A	(-)18-20V @ 0.9A or -24V @ 1.2A	BB
	<b>HCC24-2.4-A</b>	+18-20V @ 1.8A +24V @ 2.4A (Note 5)	(-)18-20V @ 1.8A -24V @ 2.4A (Note 5)	CC
5V and 12V-15V	<b>HAA512-A</b>	5V @ 2A (Note 1,4,5)	12-15V @ 0.5A (Note 4)	AA
	<b>HBB512-A</b>	5V @ 3A (Note 1,4,5)	12-15V @ 1.25A (Note 4,5)	BB
	<b>HCC512-A</b>	5V @ 6A (Note 1,4,5)	12-15V @ 2.5A (Note 4,5)	CC

### TRIPLE OUTPUT MODELS

MODEL	OUTPUT # 1	OUTPUT # 2	OUTPUT # 3	CASE SIZE
<b>HTAA-16W-A</b>	5V @ 2A (Note 1,4)	+12 to 15V @ 0.4A	(-)12 to 15V @ 0.4A or -5V @ 0.4A	AA
<b>HBAA-40W-A</b>	5V @ 3A (Note 1,4,5)	+12V @ 1A or +15V @ 0.8A (Note 5)	-12V @ 1A or -15V @ 0.8A or -5V @ 0.4A (Note 5)	BAA
<b>HCAA-60W-A</b>	+5V @ 6A (Note 1,5)	+12 to 15V @ 1A	(-)12 to 15V @ 1A or -5V @ 0.4A	D
<b>HCBB-75W-A</b>	5V @ 6A (Note 1,4,5)	+12V @ 1.7A or +15V @ 1.5A (Note 5)	-12V @ 1.7A or -15V @ 1.5A or -5V @ 0.7A (Note 5)	CBB
<b>CP131-A</b>	5V @ 8A (Note 1,4,5)	+12V @ 1.7A or +15V @ 1.5A (Note 5)	-12V @ 1.7A or -15V @ 1.5A or -5V @ 0.7A (Note 5)	131
<b>HDBB-105W-A</b>	5V @ 12A (Note 1,4,5)	+12V @ 1.5A or +15V @ 1.5A (Note 5)	-12V @ 1.7A or -15V @ 1.5A or -5V @ 0.7A (Note 5)	DBB
<b>HDCC-150W-A</b>	5V @ 12A (Note 1,4,5)	+12V @ 3.4A or +15V @ 3A (Note 5)	-12V @ 3.4A or -15V @ 3A	DCC

- NOTES:**
- |   |  |
|---|--|
| 1) Overvoltage protection provided. Set at 6.2V ±0.4V.  | 5) Remote sense provided.  |
| 2) Adjustable outputs: F15-15-A: 12-15V, F24-12-A: 24-28V,<br>HA15-0.9-A: 12-15V, HA24-0.5-A: 24-28V. | 6) With output inhibit and parallel operation master/slave capability. |
| 3) Nonadjustable 3 terminal regulator.  | 7) With output inhibit.  |
| 4) Isolated outputs, can be referenced as positive (+) or negative (-).                               | 8) Adjustable 3 terminal regulator                                     |
|   | 9) Can be made into an isolated output by removing jumper W1.          |

## INTERNATIONAL SERIES LINEARS HIGH PEAK MODELS

MODEL	OUTPUT # 1	OUTPUT # 2	OUTPUT # 3	OUTPUT #4	CASE SIZE
<b>CP323-A*</b>	+5V @ 2A (Note 1)	+12 @ 4A (Note 7)			N
<b>CP205-A*</b>	+5V @ 1A (Note 1)	-5V @ 0.5A (Note 1)	24V @ 1.5A/ or 1.7A @ PK (Note 4)		BAA
<b>CP162-A*</b>	+5V @ 3A (Note 1,5)	-5V @ 0.6A (Note 1)	24V @ 5A/ or 6APK (Note 4,5)		CP131
<b>CP510-A*</b>	+5V @ 6A (Note 1)	+12V @ 2.5A/ 7.5APK			CP510-A
<b>CP379-A*</b>	+5V @ 6A (Note 1,5,9)	-5V @ 1.2A or -12V @ 1.2A (Note 8)	24V @ 3.5A/ 8APK (Note 4,5)		CP131
<b>CP498-A*</b>	+5V @ 6A (Note 1,5)	+12V @ 5A/10APK (Note 5)	12V @ 0.5A or 5V @ 0.25A (Note 4,8)		CP131
<b>CP503-A*</b>	+5V @ 6A (Note 1)	+12V @ 1A	-12V @ 1A or -5V @ 0.5A	+24V @ 2.4A/ 4APK (Note 9)	CP131

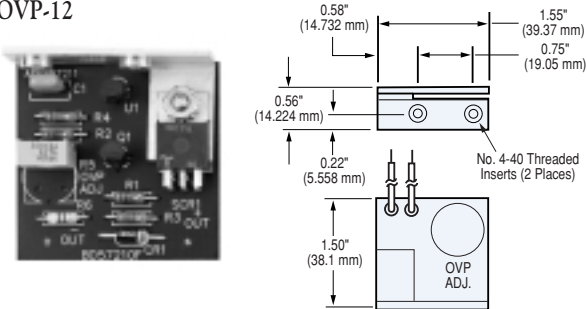
- NOTES:** 1) Overvoltage protection provided. Set at 6.2V ±0.4V.  
 2) Adjustable outputs: F15-15-A: 12-15V, F24-12-A: 24-28V, HA15-0.9-A: 12-15V, HA24-0.5-A: 24-28V.  
 3) Nonadjustable 3 terminal regulator.  
 4) Isolated outputs, can be referenced as positive (+) or negative (-).  
 5) Remote sense provided.  
 6) With output inhibit and parallel operation master/slave capability.  
 7) With output inhibit.  
 8) Adjustable 3 terminal regulator  
 9) Can be made into an isolated output by removing jumper W1.  
 \* Non-stocked standards

### OVERVOLTAGE PROTECTION OPTIONS

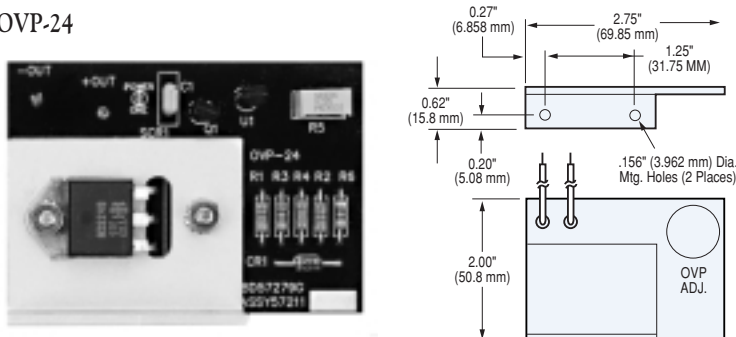
#### OVERVOLTAGE PROTECTION OPTIONS

These optional overvoltage protection modules are offered for use with Power-One's International Series Linear power supplies. Each is user adjustable from 6.4V to 34V.

#### OVP-12



#### OVP-24



#### OVP SELECTION GUIDE

MODEL	CASE SIZE	OVP MODULES REQUIRED
<b>SINGLE OUTPUT</b>	B,C,N,D	(1) OVP-12
	E,F	(1) OVP-24
<b>DUAL OUTPUT</b>	AA,B,BB,CC	(1) OVP-12 protects both outputs
	E	(1) OVP-24 protects both outputs
<b>TRIPLE OUTPUT</b>	AA,BAA,D	(1) OVP-12 protects both 12V through 15V outputs
	CBB, 131	
	DBB,DCC	
<b>PEAK CURRENT MODELS</b>	N,BAA,CBB	(1) OVP-12 protects any output not provided with built-in OVP
	131, CP340-A	
	CP510-A	

**NOTE:** Outputs with factory built-in OVP are indicated in the Voltage/Current Rating Chart for each model. OVP is not available for 48V through 250V models.

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**24 Hours/Day—7 Days/Week**

## INTERNATIONAL SERIES LINEARS

### INPUT SPECIFICATIONS

PARAMETER	CONDITIONS/DESCRIPTION	MIN	NOM	MAX	UNITS	
Input Voltage - AC (Note 1, 2)	Jumper selectable, shipped factory configured for 120VAC operation. All models must be correctly fused for proper operation.	100 VAC Tap	87	100	110	VAC
		120 VAC Tap	104	120	132	
		220 VAC Tap	191	220	242	
		240 VAC Tap	209	240	264	
Input Frequency	AC input.	47		63	Hz	
Line Regulation	Output voltage change for a 10% line change: F case models. HAD12, HAD15. Outputs with adjustable three terminal regulators. All other models.		-0.01		+0.01	%
			-1.0		+1.0	
			-0.5		+0.5	
			-0.05		+0.05	

**NOTES:** 1) Derate output current 10% for 50Hz operation.  
2) Input voltage tolerance for 230VAC operation is +15%, -10%.

### OUTPUT SPECIFICATIONS

PARAMETER	CONDITIONS/DESCRIPTION	MIN	NOM	MAX	UNITS	
Output Adjustment	Minimum output adjustment range (Note 1).	-5		+5	%	
Efficiency	5 volt outputs.		45		%	
	12 volt and 15 volt outputs.		55			
	24 volt and higher outputs.		60			
Ripple and Noise (Note 2)	F case models. 5 volt, 12 volt, and 15 volt models. All three terminal regulator outputs. 24 volt through 250 volt models.			3.0	mV <sub>PK-PK</sub>	
				5.0	mV <sub>PK-PK</sub>	
				0.2	% <sub>PK-PK</sub>	
			3.0mV <sub>PK-PK</sub> plus 0.02% of output voltage, max			
Load Regulation	Output change for a 50% load change: F case models. HAD12, HAD15. Outputs with adjustable three terminal regulators. All other models.		-0.02		+0.02	%
			-1		+1	
			-0.5		+0.5	
			-0.05		+0.05	
Transient Response	Recovery time, to within 1% of initial set point due to a 50% load change.			50	μS	

**NOTES:** 1) Voltages from 3 terminal regulator outputs are not adjustable on HAD12 and HAD15.  
2) Full load, 20MHz bandwidth.

### SAFETY, REGULATORY, AND EMI SPECIFICATIONS

PARAMETER	CONDITIONS/DESCRIPTION	MIN	NOM	MAX	UNITS
Agency Approvals	UL1950.				Approved
	CSA 1402 or CSA 22.2 No. 234/950.				
	EN60950 (TÜV).				
Dielectric Withstand Voltage	Input to output.	3750			V <sub>RMS</sub>
	Input to ground.	3750			
Electromagnetic Interference	FCC CFR title 47 Part 15 Sub-Part B - conducted. EN55022 / CISPR 22 conducted. EN55022 / CISPR 22 radiated.				Compatible with system compliance to Level B.
Leakage Current	Per EN60950 (264VAC)		23	50	μA

### INTERFACE SIGNALS AND INTERNAL PROTECTION

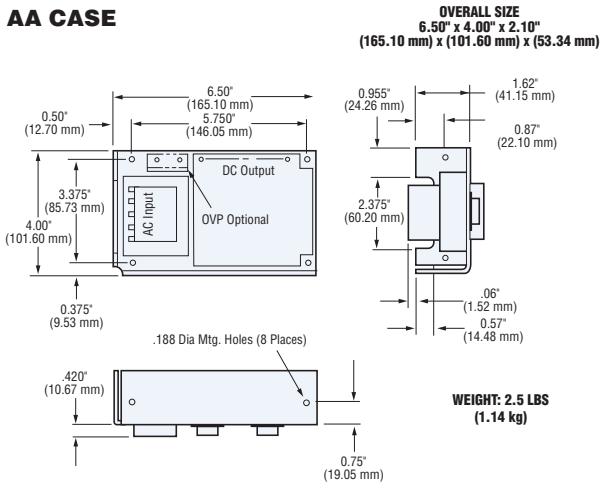
PARAMETER	CONDITIONS/DESCRIPTION	MIN	NOM	MAX	UNITS
Overvoltage Protection	Provided on 5 volt output units where indicated. Other outputs may use optional overvoltage protectors OVP-12 and OVP-24.	5.8		6.6	V
Remote Sense	Total voltage compensation for cable losses with respect to the main output. Provided on models where indicated.			250	mV
Overcurrent/Short Circuit Protection	Automatic current limit/foldback. Rated as a percentage of output power.	115	120	140	%
Master/Slave Operation	For parallel operation of up to 6 units. Master/slave pin provided on F case models only. Contact factory for application notes.				

### ENVIRONMENTAL SPECIFICATIONS

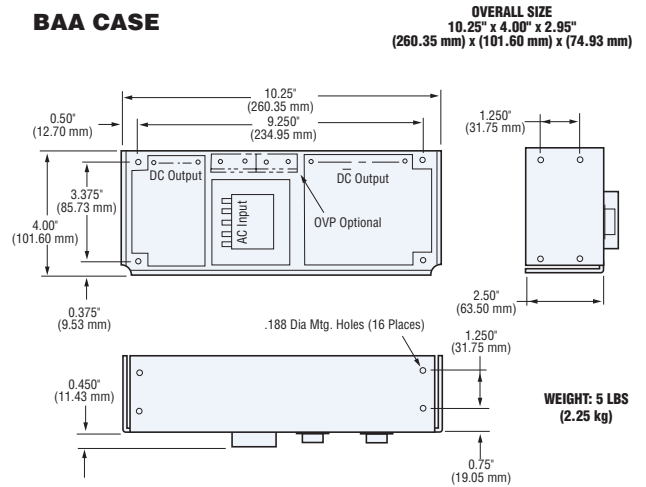
PARAMETER	CONDITIONS/DESCRIPTION	MIN	NOM	MAX	UNITS
Operating Temperature	Derate output power linearly above 50°C by 3% per °C. At 100% load At 40% load	0		50	°C
				70	°C
Storage Temperature		-40		85	°C
Temperature Coefficient	0°C to 50°C (after 15 minute warm-up). 24 hours after warm-up.		0.1	0.3	%/°C
			-0.3	+0.3	%
Shock	Operating.			20	GPK
Vibration	Random vibration from 10Hz to 2kHz, 3 axis.			6.15	GRMS

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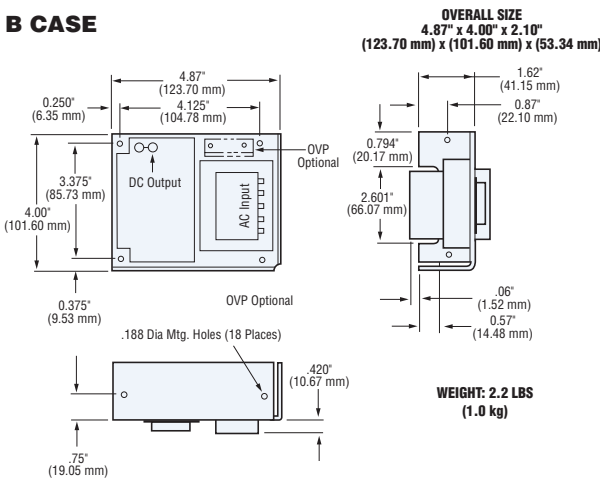
### AA CASE



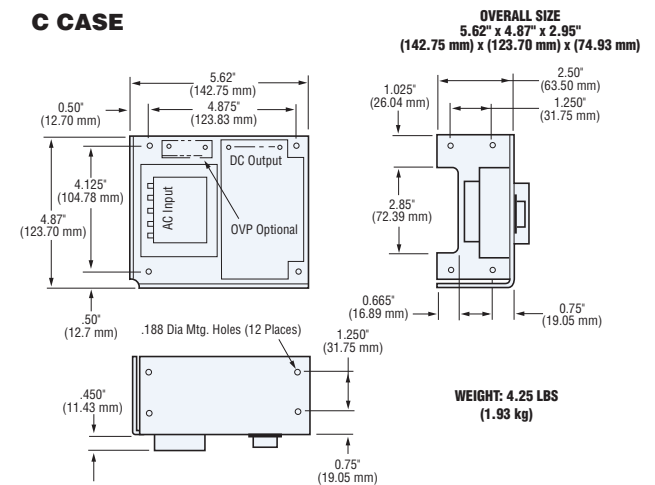
### BAA CASE



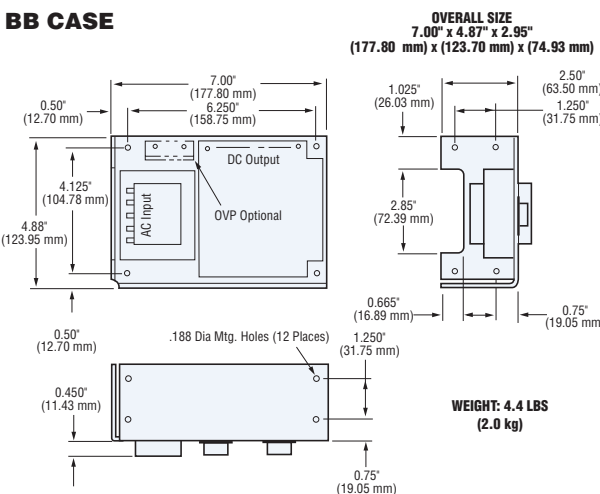
### B CASE



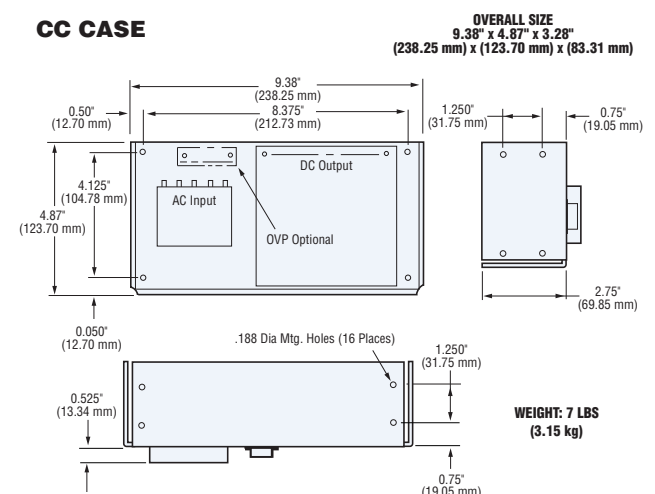
### C CASE



### BB CASE



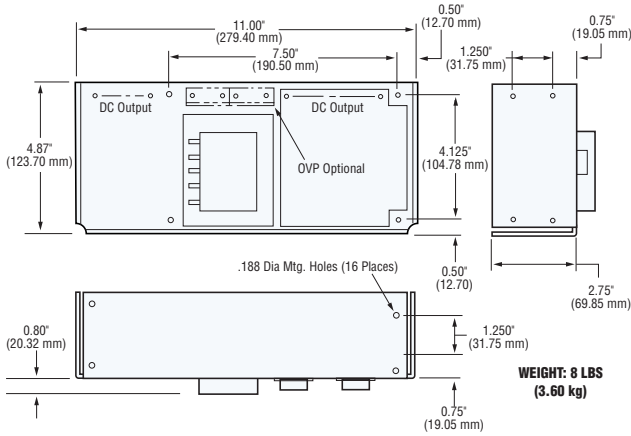
### CC CASE



# INTERNATIONAL SERIES LINEARS

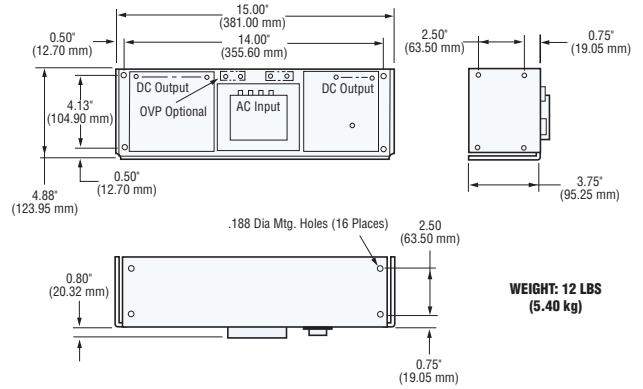
## CBB CASE

**OVERALL SIZE**  
**11.00" x 4.87" x 3.28"**  
**(279.40 mm) x (123.70 mm) x (83.91 mm)**



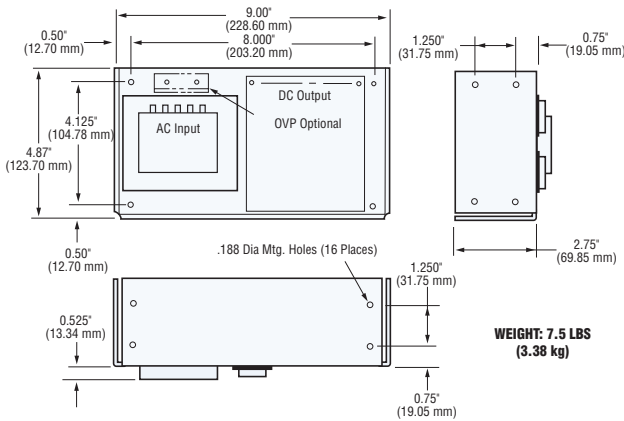
## DCC CASE

**OVERALL SIZE**  
**15.00" x 4.88" x 4.55"**  
**(381.00 mm) x (123.95 mm) x (115.57 mm)**



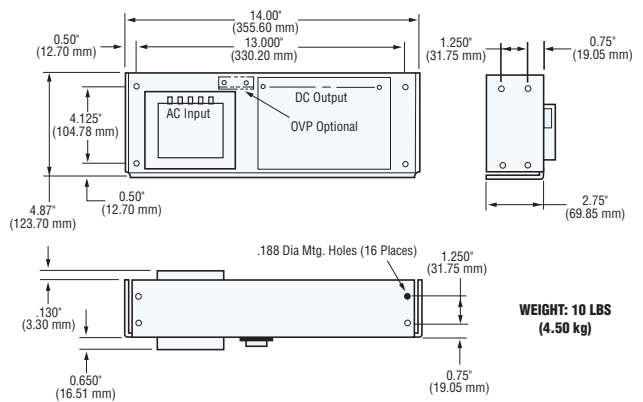
## D CASE

**OVERALL SIZE**  
**9.00" x 4.87" x 3.28"**  
**(228.60 mm) x (123.70 mm) x (83.31 mm)**



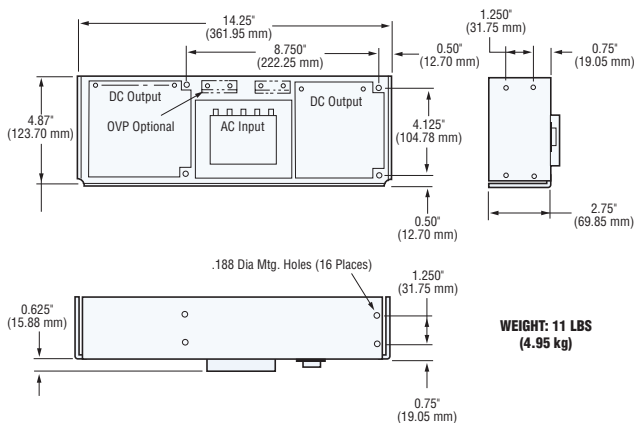
## E CASE

**OVERALL SIZE**  
**14.00" x 4.87" x 3.53"**  
**(355.60 mm) x (123.70 mm) x (89.66 mm)**



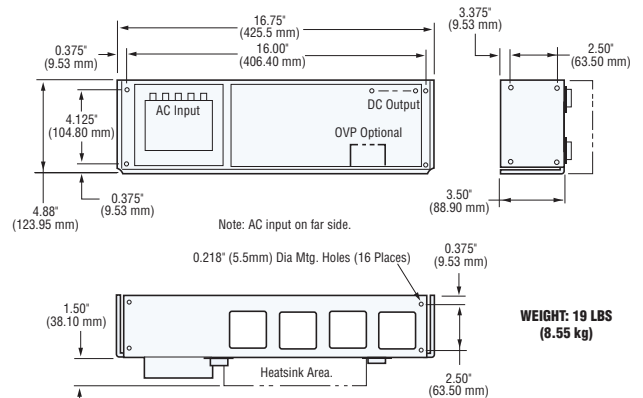
## DBB CASE

**OVERALL SIZE**  
**14.25" x 4.87" x 3.38"**  
**(361.95 mm) x (123.70 mm) x (85.85 mm)**



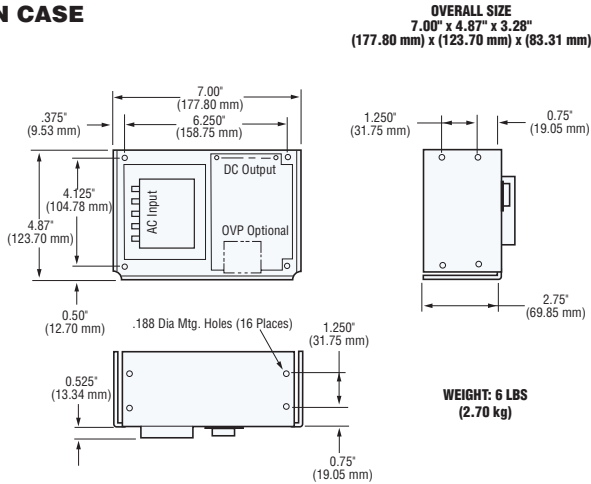
## F CASE

**OVERALL SIZE**  
**16.75" x 4.88" x 5.00"**  
**(425.5 mm) x (123.95 mm) x (127.00 mm)**

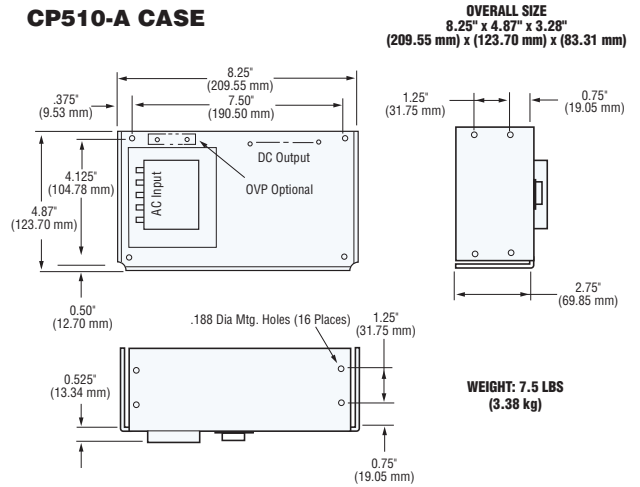


## INTERNATIONAL SERIES LINEARS

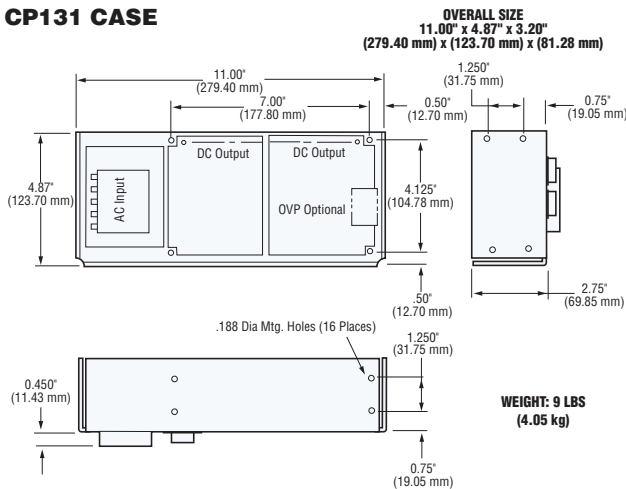
### N CASE



### CP510-A CASE



### CP131 CASE



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