

## International + Linears

### Summary:

- World-wide ac input ranges and safety standards
- Industry standard packages
- Commercial UL/CSA TUV/IEC approved—models to UL/CSA 60950; EN/IEC60950-1
- Burn-in with cycling; 3-year warranty
- Capacitors have highest CV & ripple current ratings
- Medical Approved to UL2601-1/60601-1, IEC60601-1 and CSA601.1
- Medical leakage 10  $\mu$ A
- MTBF 200,000+ hours per MIL-HDBK-217D (most units)
- All electrolytic caps rated at 105°C
- Transformer insulation meets Class F (155°C)
- Exceed FCC and CISPR22, Class B conducted emissions
- RoHS Compliant models available (G suffix)
- $\text{C}\text{E}$  marked to LVD



### SPECIFICATIONS

**Ac Input**  
100, 120 and 240 Vac: +10%, -13%; 215 Vac: +12%, -11%; 47 to 63Hz. Tolerance for 230 Vac operation is +15%, -10%. Derate output current 10% for 50 Hz operation.

**Dc Output**  
See voltage rating chart. Adjustment range  $\pm 5\%$  minimum except HA series.

**Line Regulation**  
 $\pm 0.05\%$  for a 10% change.

**Load Regulation**  
 $\pm 0.05\%$  for a 50% load change.

**Output Ripple**  
3 mV +0.05% of output voltage, peak to peak maximum. All "3-terminal regulator" outputs: 3 mV +0.2% peak to peak maximum.

**Transient Response**  
<50 microseconds for 50% load change.

**Short Circuit Protection**  
Automatic current limit/foldback.

**Overvoltage Protection**  
Built-in on all 5 V models, set at 6.2 V  $\pm 0.4$  V. Other models use optional over-voltage protection.

#### Remote Sensing

Provided on all models; open sense lead protection built-in (except HA & HTAA series).

#### Stability

$\pm 0.05\%$  for 24 hours after warmup.

#### Temperature Rating

0 to 50°C full rated, derated linearly to 40% at 70°C.

#### Temperature Coefficient

$\pm 0.01\%/^{\circ}\text{C}$  maximum.

#### Efficiency

5 V units: 45%; 12 and 15 V units: 55%; 20 and 24 V units: 60%.

#### Logic Inhibit and Current-Share

F & G models.

#### Medical Shock and Vibration

Per Mil-Std-810D, Method 514.3, Category 1, Procedure 1.  
Per Mil-Std-810D, Method 516.3, Procedure III.

#### Storage

-40 to +85  $^{\circ}\text{C}$ .

| Commercial Model (Single) | Medical Model | Voltage | Current | Case |
|---------------------------|---------------|---------|---------|------|
| HB2-3-A+G                 |               | 2 V     | 3 A     | B    |
| HC2-6-A+G                 |               | 2 V     | 6 A     | C    |
| HE2-18-A+G                |               | 2 V     | 18 A    | E    |
|                           | ML5-1-OV-A    | 5 V     | 1.0 A   | L    |
| HA5-1.5-OV-A+G            |               | 5 V     | 1.5 A   | B    |
| HB5-3-OV-A+G              |               | 5 V     | 3 A     | B    |
| HC5-6-OV-A+G              |               | 5 V     | 6 A     | C    |
| HN5-9-OV-A+G              |               | 5 V     | 9 A     | N    |
| HD5-12-OV-A+G             |               | 5 V     | 12 A    | D    |
| HE5-18-OV-A+G             |               | 5 V     | 18 A    | E    |
| F5-25-OV-A+*G             |               | 5 V     | 25 A    | F    |
| G5-35-OV-A+ *(1)          |               | 5 V     | 35 A    | G    |
| CP197-A+G                 |               | 5 V     | 50 A    | G    |
|                           | ML12-0.5-A    | 12 V    | 0.5 A   | L    |
| HA15-0.9-A+ (12 V)G       |               | 12 V    | 0.9 A   | B    |
| HB12-1-7-A+G              | MB12-1-7-A    | 12 V    | 1.7 A   | B    |
| HC12-3.4-A+G              | MC12-3.4-A    | 12 V    | 3.4 A   | C    |
| HN12-5.1-A+G              |               | 12 V    | 5.1 A   | N    |
| HD12-6.8-A+G              | MD12-6.8-A    | 12 V    | 6.8 A   | D    |
| HE12-10-2-A+G             |               | 12 V    | 10.2 A  | E    |
|                           |               |         |         |      |
|                           | ML15-0.4-A    | 15 V    | .4 A    | L    |
| HA15-0.9-A+G              |               | 15 V    | 0.9 A   | B    |
| HB15-1.5-A+G              | MB15-1.5-A    | 15 V    | 1.5 A   | B    |
| HC15-3-A+G                | MC15-3-A      | 15 V    | 3 A     | C    |
| HN15-4.5-A+G              |               | 15 V    | 4.5 A   | N    |
| HD15-6-A+G                | MD15-6-A      | 15 V    | 6 A     | D    |
| HE15-9-A+G *              |               | 15 V    | 9 A     | E    |
| F15-15-A+G *              |               | 15 V    | 15 A    | F    |
|                           |               |         |         |      |
| HA24-0.5-A+G              |               | 24 V    | 0.5 A   | B    |
| HB24-1.2-A+G              | MB24-1.2-A    | 24 V    | 1.2 A   | B    |
| HC24-2.4-A+G              | MC24-2.4-A    | 24 V    | 2.4 A   | C    |
| HN24-3.6-A+G              |               | 24 V    | 3.6 A   | N    |
| HD24-4.8-A+G              | MD24-4.8-A    | 24 V    | 4.8 A   | D    |
| HE24-7.2-A+G *            |               | 24 V    | 7.2 A   | E    |
| F24-12-A+G *              |               | 24 V    | 12 A    | F    |
| HA24-0.5-A+ (28 V)G       |               | 28 V    | 0.5 A   | B    |
| HB28-1-A+G                | MB28-1-A      | 28 V    | 1 A     | B    |
| HC28-2-A+G                | MC28-2-A      | 28 V    | 2 A     | C    |
| HN28-3-A+G                |               | 28 V    | 3 A     | N    |
| HD28-4-A+G                | MD28-4-A      | 28 V    | 4 A     | D    |
| HE28-6-A+G *              |               | 28 V    | 6 A     | E    |
| F24-12-A+(28 V)G *        |               | 28 V    | 10 A    | F    |
| HB48-0.5-A+G              |               | 48 V    | 0.5 A   | B    |
| HC48-1-A+G                |               | 48 V    | 1 A     | C    |
| HD48-3-A+G **             |               | 48 V    | 3 A     | D    |
| HE48-4-A+G                |               | 48 V    | 4 A     | E    |
| F48-6-A+G *               |               | 48 V    | 6 A     | F    |

Notes:

1. All single output models have isolated outputs.
2. Model G5-50-OV-A+ not RoHS compliant

| Commercial Model (Dual) | Medical Model | Output 1                | Output 2                 | Case |
|-------------------------|---------------|-------------------------|--------------------------|------|
| HAA5-1.5-OV-A+G         |               | 5 V @ 1.5 A             | 5 V @ 1.5 A              | AA   |
| HBB5-3-OV-A+G           |               | 5 V @ 3 A               | 5 V @ 3 A                | BB   |
| HCC5-6-OV-A+G           |               | 5 V @ 6 A               | 5 V @ 6 A                | CC   |
| HAA512-A+G              | MAA512-A      | 5 V @ 2 A               | 9 to 15 V (adj) @ 0.5 A  | AA   |
| HBB512-A+G              | MBB512-A      | 5 V @ 3 A               | 9 to 15 V (adj) @ 1.2 A  | BB   |
| HCC512-A+G **           | MCC512-A      | 5 V @ 6 A               | 9 to 15 V (adj) @ 2.5 A  | CC   |
| HAA524-A+G **           | MAA524-A      | 5 V @ 2 A               | 18 to 24 V (adj) @ 0.3 A | AA   |
| HBB524-A+G              | MBB524-A      | 5 V @ 3 A               | 18 to 24 V (adj) @ 0.8 A | BB   |
| HCC524-A+G              | MCC524-A      | 5 V @ 6 A               | 18 to 24 V (adj) @ 2 A   | CC   |
| HAD12-0.4-A+G           |               | +12 V @ 0.4 A           | -12 V @ 0.4 A            | B    |
|                         | MLL12-0.25-A  | +12 V @ 0.25 A          | -12 V @ 0.25 A           | L    |
|                         | MLL15-0.2-A   | +15 V @ 0.2 A           | -15 V @ 0.2 A            | L    |
| HAD15-0.4-A+G           |               | +15 V @ 0.4 A           | -15 V @ 0.4 A            | B    |
| HAA15-0.8-A+G           | MAA15-0.8-A   | +15 V @ 0.8 A           | -15 V @ 0.8 A ***        | AA   |
| HBB15-1.5-A+G           | MBB15-1.5-A   | +15 V @ 1.5 A           | -15 V @ 1.5 A ***        | BB   |
| HCC15-3-A+G             | MCC15-3-A     | +15 V @ 3 A             | -15 V @ 3 A ***          | CC   |
| HDD15-5-A+G             |               | +15 V @ 5 A             | -15 V @ 5 A ***          | E    |
| HAA24-0.6-A+G           |               | +18 to 24 V @ 0.4/0.6 A | -18 to 24 V @ 0.4/0.6 A  | AA   |
| CP323-A+G               |               | +5 V @ 2 A              | +12 V @ 4 A              | BB   |

\*\* May require fan cooling

\*\*\* No. 2 output usable at -5 V, rate at 1/2 of 15 V current rating.

| Commercial Model (Triple) | Medical Model | Output 1    | Output 2                | Output 3                    | Case |
|---------------------------|---------------|-------------|-------------------------|-----------------------------|------|
|                           | MTLL-5W-A     | 5 V @ 0.5 A | +12 to 15 V @ 0.1 A     | -12 to 15 V @ 0.1 A ***     | L    |
| HTAA-16W-A+G              | MTAA-16W-A    | 5 V @ 2 A   | +12 to 15 V @ 0.4/0.4 A | -12 to 15 V @ 0.4/0.4 A *** | AA   |
| HBAA40W-A+G               | MBAA40W-A     | 5 V @ 3 A   | +12 to 15 V @ 1/0.8 A   | -12 to 15 V @ 1/0.8 A ***   | BAA  |
| HCB8105W-A+G **           |               | 5 V @ 3 A   | +12 to 15 V @ 3.4/3.0 A | -12 to 15 V @ 3.4/3.0 A *** | CBB  |
| HCAA60W-A+G               | MCAA60W-A     | 5 V @ 6 A   | +12 to 15 V @ 1/0.8 A   | -12 to 15 V @ 1/0.8 A ***   | D    |
| HCB875W-A+G               | MCB875W-A     | 5 V @ 6 A   | +12 to 15 V @ 1.7/1.5 A | -12 to 15 V @ 1.7/1.5 A *** | CBB  |
| CP131-A+G                 |               | 5 V @ 8 A   | +12 to 15 V @ 1.7/1.5 A | -12 to 15 V @ 1.7/1.5 A *** | NBB  |
| HDB8105W-A+G *            |               | 5 V @ 12 A  | +12 to 15 V @ 1.7/1.5 A | -12 to 15 V @ 1.7/1.5 A *** | DBB  |
| HDCC150W-A+G *            |               | 5 V @ 12 A  | +12 to 15 V @ 3.4/3 A   | -12 to 15 V @ 3.4/3 A ***   | DCC  |

\*Requires fan cooling

\*\* May require fan cooling

\*\*\*No. 3 output usable at -5 V, rate at 1/2 of 15 V current rating.

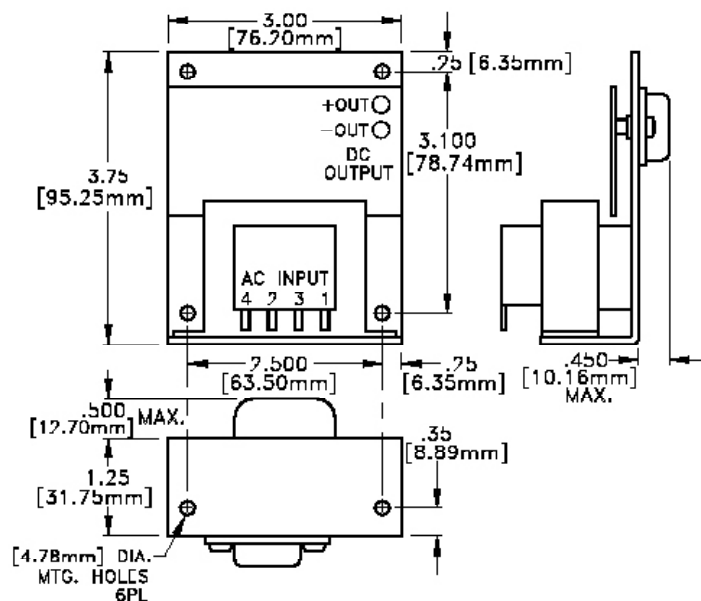
Outputs rated at 9 to 15V, 12 to 15V, or 18 to 24V are user adjustable outputs.

All outputs without + or - sign are isolated outputs and may be referenced as either a positive or negative output.

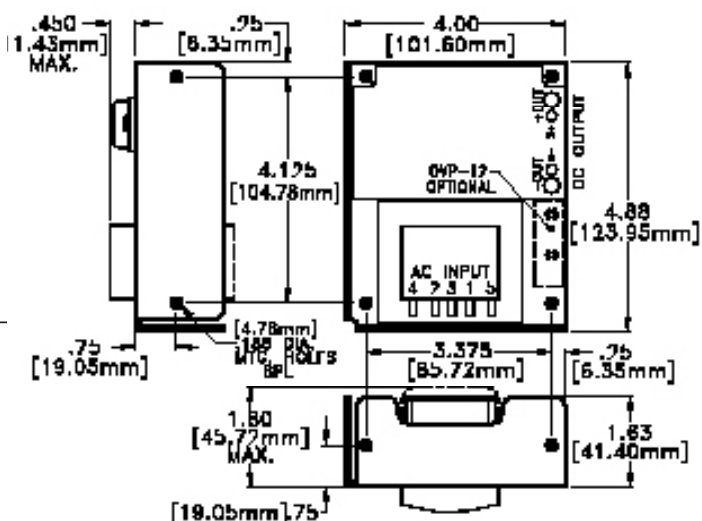
## FIXED DISK SERIES

Both models without UL, CSA or TUV

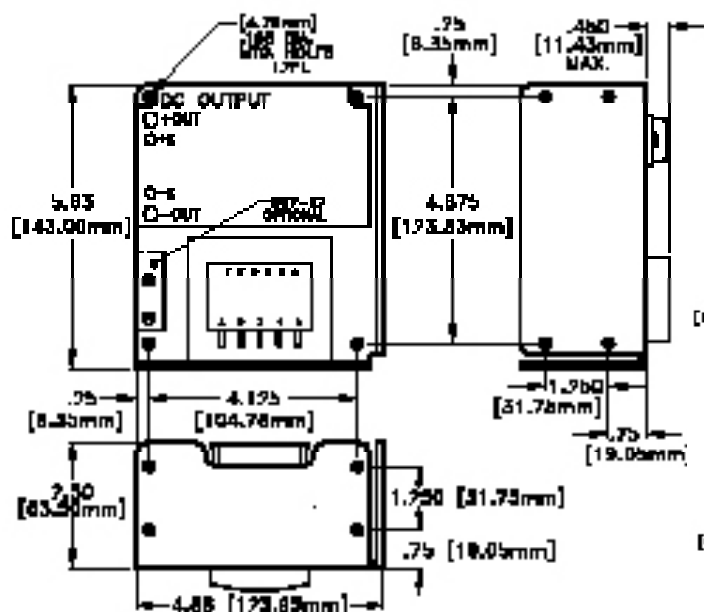
| Commercial Model (Dual) | Output 1   | Output 2            | Output 3          | Case |
|-------------------------|------------|---------------------|-------------------|------|
| CP379-A+G               | +5 V @ 6 A | + 24 V @ 3.5/6 A PK | -5 or -12 @ 1.2 A | NBB  |
| CP498-A+G               | +5 V @ 6 A | + 12 V @ 5/10 A PK  | -12 V @ 0.5 A     | NBB  |



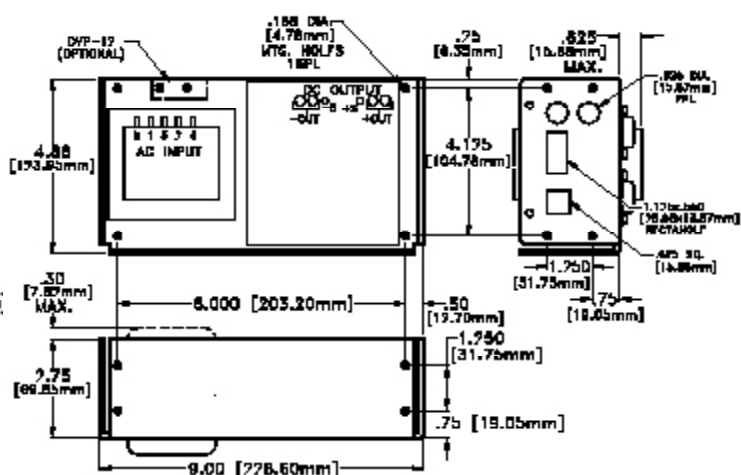
**A CASE (WT. 1 LB.)**



**B CASE (WT. 2 LB.)**



**C CASE (WT. 4 LB.)**



**D CASE (WT. 7.5 LB.)**

**F CASE**  
(WT. F5: 14 LB.; F15, 24: 18 LB.)

Technical drawing of the front view of the PCB assembly. The drawing shows the following dimensions and features:

- Top Left:** .718 [5.54mm] DIA. MTG. HOLES (18 PLACES)
- Top Center:** D.C. OUTPUT
- Top Right:** .375 [9.53mm], .150 [38.10mm] MAX.
- Right Side:** 4.88 [123.95mm], 4.125 [104.78mm], 2.500 [63.50mm], .375 [9.53mm], .675 [16.80mm]
- Bottom Left:** .30 [7.62mm] MAX., 3.50 [88.90mm]
- Bottom Center:** 16.75 [425.41mm], 16.000 [406.40mm]
- Bottom Right:** 2.500 [63.50mm], .675 [16.80mm]
- Bottom Center:** CLFARANCE
- Bottom Right:** DETAIL A-A

[illegible]

10 [2.54mm] MAX  
LEAD PROTRUSION

4.75 [107.95mm]

3.750 [95.25mm]

.25 [6.35mm]

.75 [6.35mm]

1.70 [43.18mm]

7.750 [69.85mm]

3.25 [82.55mm]

.155 [3.96mm] # MTC. HOLFS  
4 PLCS.

1 J1 7

OUTPUT 1

OUTPUT 2

OUTPUT 3

OUTPUT 4

OUTPUT 5

OUTPUT 6

OUTPUT 7

OUTPUT 8

OUTPUT 9

OUTPUT 10

OUTPUT 11

OUTPUT 12

OUTPUT 13

OUTPUT 14

OUTPUT 15

OUTPUT 16

OUTPUT 17

OUTPUT 18

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OUTPUT 87

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OUTPUT 89

OUTPUT 90

OUTPUT 91

OUTPUT 92

OUTPUT 93

OUTPUT 94

OUTPUT 95

OUTPUT 96

OUTPUT 97

OUTPUT 98

OUTPUT 99

OUTPUT 100

188 DUA  
(4.76mm)  
188, 180L'S  
18PL

OPTIONAL

4.88  
[123.95mm]

4.125  
[104.78mm]

7.80  
[198.12mm]

4.375  
[111.75mm]

7.70  
[195.58mm]

9.34  
[238.26mm]

1.250  
[31.75mm]

.70  
[17.78mm]

.95  
[24.13mm]

.875 MAX  
[22.23mm]

1.350  
[34.29mm]

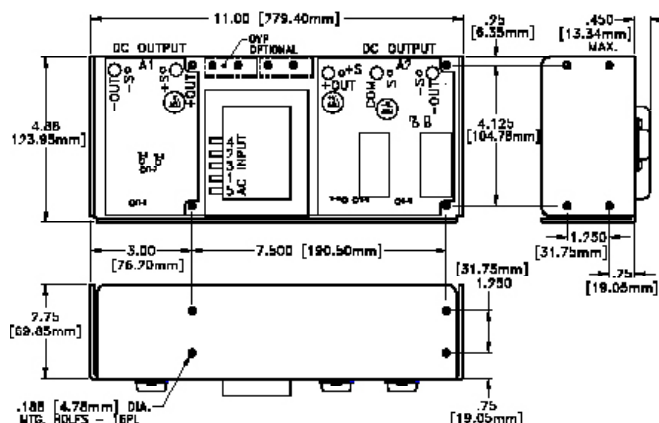
.75  
[19.05mm]

OUTPUT 1 OUTPUT 2  
DC OUTPUT

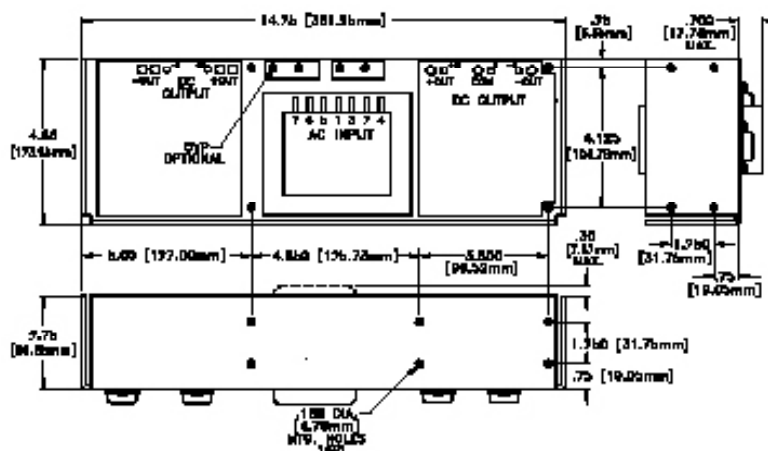
1 2 3 4 5 6 7 8 9 10

[illegible]

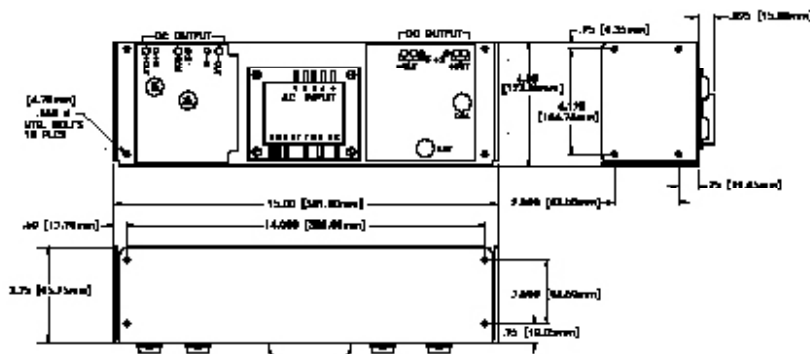
### CBB CASE (WT. 8 LB.)



### DBB CASE (WT. 11 LB.)



### DCC CASE (WT. 12 LB.)



### NBB CASE (WT. 12 LB.)

