

## 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  |
| HD88105W-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.

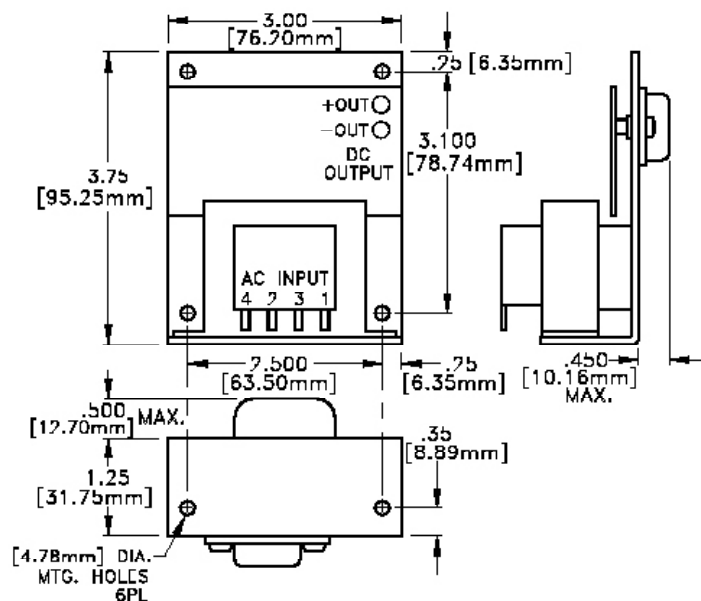
Outputs rated at 9 to 15V, 12 to 15V, or 18 to 24V are user adjustable outputs.

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

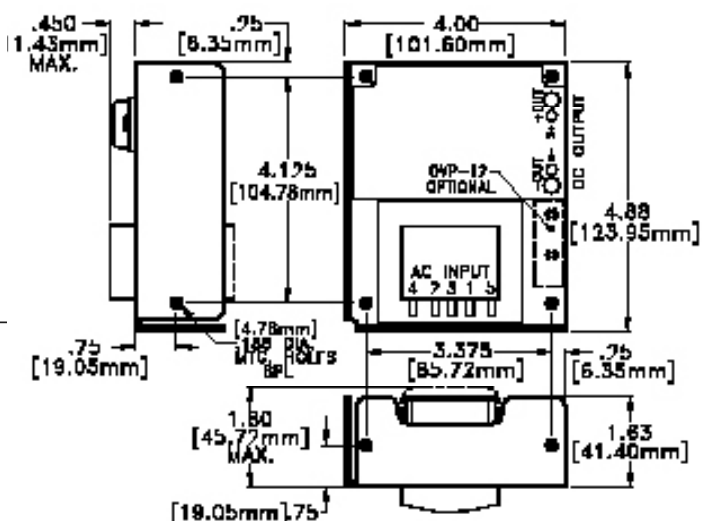
## FIXED DISK SERIES

Both models without UL, CSA or TUV

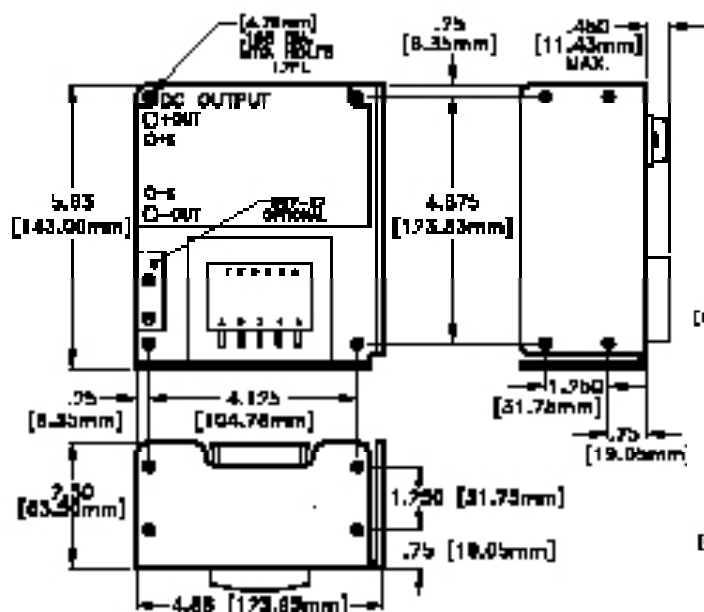
| Commercial Model (Dual) | Output 1   | Output 2            | Output 3          | Case |
|-------------------------|------------|---------------------|-------------------|------|
| CP379-A+G               | +5 V @ 6 A | + 24 V @ 3.5/6 A PK | -5 or -12 @ 1.2 A | NBB  |
| CP498-A+G               | +5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



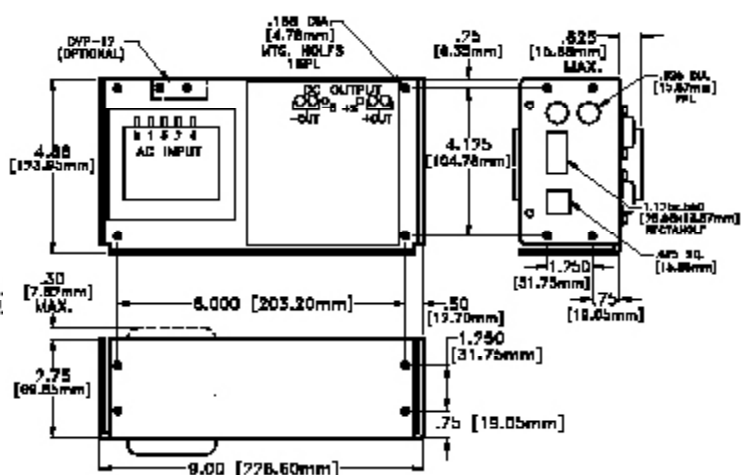
**A CASE (WT. 1 LB.)**



**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 includes the following dimensions and labels:

- 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:** .375 [9.53mm], .675 [16.80mm]
- Bottom Right:** .675 [16.80mm]
- Bottom Center:** .375 [9.53mm], .675 [16.80mm]
- Bottom Left:** .30 [7.62mm] MAX., .350 [88.90mm]
- Internal Dimensions:** 16.75 [425.41mm], 16.000 [406.40mm], 4.88 [123.95mm], 4.125 [104.78mm], 2.500 [63.50mm]
- Labels:** CLEARANCE, AC INPUT
- Detail A-A:** A cross-sectional view of the PCB assembly, showing the internal layers and components.

[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

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OUTPUT 95

OUTPUT 96

OUTPUT 97

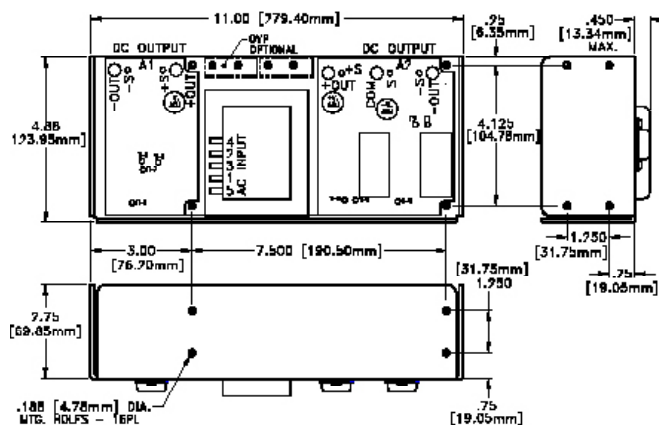
OUTPUT 98

OUTPUT 99

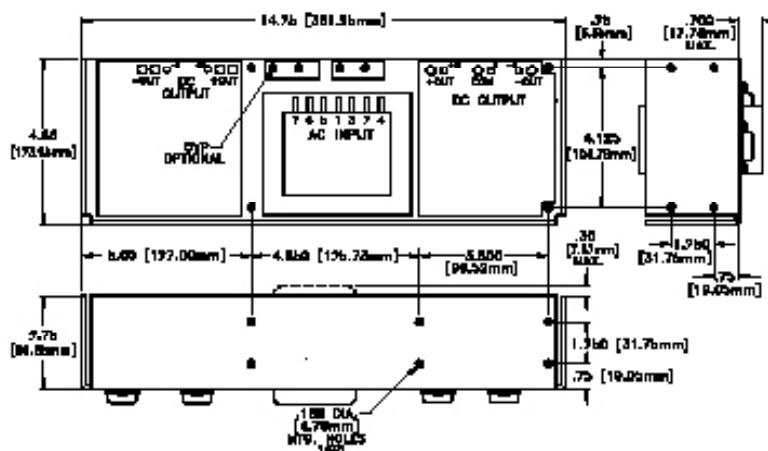
OUTPUT 100

[illegible]

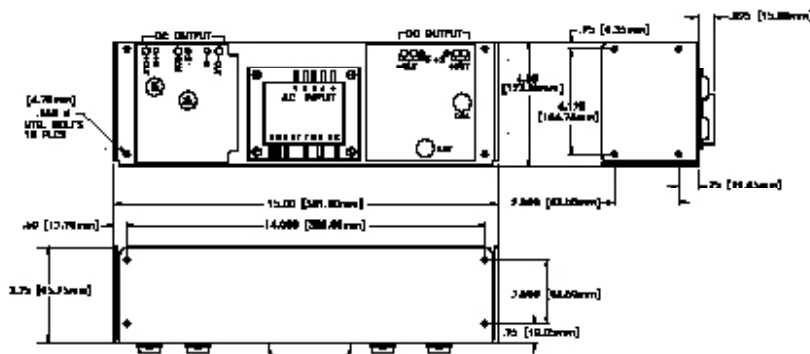
### CBB CASE (WT. 8 LB.)



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



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



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

