

# MPU/MDU150 Series

## AC-DC Power Supplies



The innovative MPU products incorporate Power Factor Correction (PFC) with a low-profile package designed to meet 1U height constraints. The MPU150-4530G and MPU150-4350G provide high current +3.3 V and +5 V on a single platform to support mixed-mode, high-speed digital circuitry. Bel Power Solutions unique dual converter architecture combines high reliability with exceptional regulation.

All multiple output models feature remote sense on outputs V1 and V2 to provide independent compensation of output cable losses. Other standard features include independent current sharing on V1 and V2, thermal shutdown, and remote inhibit. Airflow of 300 linear feet per minute (LFM) is required to deliver the full power density of 3.0 watts per cubic inch.

The MDU150 Series provides the same benefits as the MPU150 Series, with nominal 48 volt DC input.

### Key Features & Benefits

- RoHS Compliant
- Power Factor Correction (PFC)
- Low-profile height fits 1U constraints
- Dual main outputs provide 3.3 V and 5 V for mixed mode applications
- Single wire current sense on outputs V1 and V2
- Remote sense on outputs V1 and V2
- Overtemperature, overload, and overvoltage protection
- Available with metric or SAE mountings
- Greater than 340000 Hours MTBF
- MDU150 models have 48 VDC input



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# MPU/MDU150 Series

## 1. AC INPUT, SINGLE OUTPUT MODEL SELECTION

180 W with 300 LFM Forced-Air Cooling

| MODEL <sup>6</sup> | OUTPUT VOLTAGE | ADJUSTMENT RANGE | MAXIMUM OUTPUT CURRENT <sup>1</sup> | LINE REGULATION | LOAD REGULATION | RIPPLE & NOISE % pk-pk <sup>2</sup> | INITIAL SETTING ACCURACY |
|--------------------|----------------|------------------|-------------------------------------|-----------------|-----------------|-------------------------------------|--------------------------|
| MPU150-S259G       | 12V            | 11.6V to 16V     | 15A <sup>3</sup>                    | 0.1%            | 1%              | 1%                                  | 11.97V to 12.03V         |
| MPU150-S262G       | 24V            | 22.8V to 29.2V   | 7.5A <sup>3</sup>                   | 0.1%            | 1%              | 1%                                  | 23.95V to 24.05V         |
| MPU150-S261G       | 48V            | 45V to 56V       | 3.75A <sup>3</sup>                  | 0.1%            | 1%              | 1%                                  | 47.9V to 48.1V           |

## 2. AC INPUT, MULTIPLE-OUTPUT MODEL SELECTION

150 W with 300 LFM Forced-Air Cooling - Isolated V3 and V4 can be used as positive or negative outputs

| MODEL <sup>6</sup> | OUTPUT VOLTAGE | ADJUSTMENT RANGE | OUTPUT CURRENT <sup>1</sup> | LINE REGULATION | LOAD REGULATION | RIPPLE & NOISE % pk-pk <sup>2</sup> | INITIAL SETTING ACCURACY |
|--------------------|----------------|------------------|-----------------------------|-----------------|-----------------|-------------------------------------|--------------------------|
| MPU150-3300G       | +3.3V          | 3.15V to 3.80V   | 35A                         | 0.6%            | 1.5%            | 1.5%                                | 3.28V to 3.32V           |
|                    | +5V            | 5.0V to 5.5V     | 20A                         | 0.4%            | 3%              | 1%                                  | 4.98V to 5.02V           |
|                    | +12V           | Fixed            | 2A                          | 0.4%            | 3%              | 1%                                  | 11.76V to 12.24V         |
| MPU150-3524G       | +5V            | 5.0V to 5.5V     | 17.5A                       | 0.4%            | 1%              | 1%                                  | 4.98V to 5.02V           |
|                    | +12V           | 10.8V to 13.2V   | 4A                          | 0.4%            | 3%              | 1%                                  | 11.94V to 12.06V         |
|                    | +24V           | Fixed            | 2A                          | 0.4%            | 3%              | 1%                                  | 23.52V to 24.48V         |
| MPU150-4000G       | +5V            | 5.0V to 5.5V     | 30A <sup>4</sup>            | 0.4%            | 1%              | 1%                                  | 4.98V to 5.02V           |
|                    | +12V           | 10.8V to 13.2V   | 8A                          | 0.4%            | 1%              | 1%                                  | 11.94V to 12.06V         |
|                    | 12V            | 10.8V to 13.2V   | 3A                          | 0.4%            | 1%              | 1%                                  | 11.94V to 12.06V         |
|                    | 5V             | 5.0V to 5.5V     | 2A                          | 0.4%            | 1%              | 1%                                  | 4.98V to 5.02V           |
| MPU150-4230G       | +2.5V          | 2.25V to 3.0V    | 30A <sup>4</sup>            | 0.8%            | 2%              | 2%                                  | 2.49V to 2.51V           |
|                    | +3.3V          | 3.15V to 3.8V    | 15A <sup>4</sup>            | 0.6%            | 1.5%            | 1.5%                                | 3.28V to 3.32V           |
|                    | 12V            | 10.8V to 13.2V   | 4A <sup>5</sup>             | 0.4%            | 1%              | 1%                                  | 11.94V to 12.06V         |
|                    | 5V             | 5.0V to 5.5V     | 2A <sup>5</sup>             | 0.4%            | 1%              | 1%                                  | 4.98V to 5.0V            |
| MPU150-4350G       | +3.3V          | 3.15V to 3.80V   | 30A <sup>4</sup>            | 0.6%            | 1.5%            | 1%                                  | 3.28V to 3.32V           |
|                    | +5V            | 5.0V to 5.5V     | 15A <sup>4</sup>            | 0.4%            | 1%              | 1%                                  | 5.00V to 5.04V           |
|                    | 12V            | 10.8V to 13.2V   | 3A <sup>5</sup>             | 0.4%            | 7%              | 1%                                  | 11.94V to 12.06V         |
|                    | 12V            | 10.8V to 13.2V   | 3A <sup>5</sup>             | 0.4%            | 7%              | 1%                                  | 11.94V to 12.06V         |
| MPU150-4530G       | +5V            | 5.0V to 5.5V     | 30A <sup>4</sup>            | 0.4%            | 1%              | 1%                                  | 4.98V to 5.02V           |
|                    | +3.3V          | 3.15V to 3.60V   | 15A <sup>4</sup>            | 0.6%            | 1.5%            | 1.5%                                | 3.28V to 3.32V           |
|                    | 12V            | 10.8V to 13.2V   | 3A <sup>5</sup>             | 0.4%            | 7%              | 1%                                  | 11.94V to 12.06V         |
|                    | 12V            | 10.8V to 13.2V   | 3A <sup>5</sup>             | 0.4%            | 7%              | 1%                                  | 11.94V to 12.06V         |

### NOTES:

<sup>1</sup> The MPU/MDU150 products require a minimum of 300 LFM of forced-air cooling under ALL load conditions. It is recommended that the airflow be applied from the input side of the power supply blowing towards the output.

<sup>2</sup> Maximum peak-to-peak noise expressed as a percentage of output voltage, 20 MHz bandwidth.

<sup>3</sup> Total power of 180 Watts.

<sup>4</sup> Total current between V1 and V2 is 30A, maximum rating.

<sup>5</sup> Total current between V3 and V4 is 5A, maximum rating.

<sup>6</sup> Non-G models use lead solder exemption and are not recommended for new designs.

# MPU/MDU150 Series

## 3. DC INPUT MODEL SELECTION

150 W with 300 LFM Forced-Air Cooling - Isolated V3 and V4 can be used as positive or negative outputs

| MODEL <sup>6</sup> | OUTPUT VOLTAGE | ADJUSTMENT RANGE | OUTPUT CURRENT <sup>1</sup> | LINE REGULATION | LOAD REGULATION | RIPPLE & NOISE % pk-pk <sup>2</sup> | INITIAL SETTING ACCURACY |
|--------------------|----------------|------------------|-----------------------------|-----------------|-----------------|-------------------------------------|--------------------------|
| MDU150-3300G       | +3.3V          | 3.15V to 3.80V   | 35A                         | 0.6%            | 1.5%            | 1.5%                                | 3.28V to 3.32V           |
|                    | +5V            | 5.0V to 5.5V     | 20A                         | 0.4%            | 3%              | 1%                                  | 4.98V to 5.02V           |
|                    | +12V           | N/A              | 2A                          | 0.4%            | 3%              | 1%                                  | 11.76V to 12.24V         |
| MDU150-4000G       | +5V            | 5.0V to 5.5V     | 30A <sup>3</sup>            | 0.4%            | 1%              | 1%                                  | 4.98V to 5.02V           |
|                    | +12V           | 10.8V to 13.2V   | 8A                          | 0.4%            | 1%              | 1%                                  | 11.94V to 12.06V         |
|                    | 12V            | 10.8V to 13.2V   | 3A                          | 0.4%            | 1%              | 1%                                  | 11.94V to 12.06V         |
| MDU150-4230G       | 5V             | 5.0V to 5.5V     | 2A                          | 0.4%            | 1%              | 1%                                  | 4.98V to 5.02V           |
|                    | +2.5V          | 2.25V to 3.0V    | 30A <sup>3</sup>            | 2%              | 2%              | 2%                                  | 2.49V to 2.51V           |
|                    | +3.3V          | 3.15V to 3.8V    | 15A <sup>3</sup>            | 1.5%            | 1.5%            | 1.5%                                | 3.28V to 3.32V           |
|                    | 12V            | 10.8V to 13.2V   | 3A                          | 1%              | 1%              | 1%                                  | 11.94V to 12.06V         |
| MDU150-4350G       | 5V             | 5.0V to 5.5V     | 2A                          | 1%              | 1%              | 1%                                  | 4.98V to 5.0V            |
|                    | +3.3V          | 3.15V to 3.8V    | 30A <sup>5</sup>            | 1.5%            | 1.5%            | 1%                                  | 3.28V to 3.32V           |
|                    | +5V            | 5.0V to 5.5V     | 15A <sup>5</sup>            | 1%              | 1%              | 1%                                  | 5.00V to 5.04V           |
|                    | 12V            | 10.8V to 13.2V   | 3A <sup>4</sup>             | 7%              | 7%              | 1%                                  | 11.94V to 12.06V         |
| MDU150-4530G       | 12V            | 10.8V to 13.2V   | 3A <sup>4</sup>             | 7%              | 7%              | 1%                                  | 11.94V to 12.06V         |
|                    | +5V            | 5.0V to 5.5V     | 30A <sup>3</sup>            | 0.4%            | 1%              | 1%                                  | 4.98V to 5.02V           |
|                    | +3.3V          | 3.15V to 3.60V   | 15A <sup>3</sup>            | 0.6%            | 1.5%            | 1.5%                                | 3.28V to 3.32V           |
|                    | 12V            | 10.8V to 13.2V   | 3A <sup>4</sup>             | 0.4%            | 7%              | 1%                                  | 11.94V to 12.06V         |
|                    | 12V            | 10.8V to 13.2V   | 3A <sup>4</sup>             | 0.4%            | 7%              | 1%                                  | 11.94V to 12.06V         |

### NOTES:

<sup>1</sup> The MPU/MDU150 products require a minimum of 300 LFM of forced-air cooling under ALL load conditions. It is recommended that the airflow be applied **from the input side of the power supply blowing towards the output**.

<sup>2</sup> Maximum peak-to-peak noise expressed as a percentage of output voltage, 20 MHz bandwidth.

<sup>3</sup> Total current between V1 and V2 is 30A, maximum rating.

<sup>4</sup> Total current between V3 and V4 is 5A, maximum rating.

<sup>5</sup> Total current between V1 and V2 is 40A, maximum rating.

<sup>6</sup> Non-G models use lead solder exemption

## 4. ORDERING INFORMATION

| OPTIONS                             | SUFFIXES TO ADD TO PART NUMBER   |
|-------------------------------------|--|
| Metric Mounting                     | Add "M" as a suffix to the model number to order chassis with M4 x 0.7 mounting inserts. |
| RoHS lead solder exempt             | No RoHS suffix character required.   |
| RoHS compliant for all 6 substances | Add "G" as the last character of the part number.  |

# MPU/MDU150 Series

## 5. MPU150 INPUT SPECIFICATIONS

| PARAMETER            | CONDITIONS / DESCRIPTION  | MIN                              | NOM        | MAX       | UNITS            |
|----------------------|---|----------------------------------|------------|-----------|------------------|
| Input Voltage - AC   | Continuous input range.   | 85                               | 264        | 264       | VAC              |
| Input Frequency      | AC input.   | 47                               | 63         | 63        | Hz               |
| Hold-up Time         | After last AC line peak at 150 watts.   | MPU150-4350G<br>All other models | 17.5<br>20 |           | ms               |
| Input Current        | 85 VAC at full rated load.  | MPU150                           |            | 3.0       | A <sub>RMS</sub> |
| Input Protection     | Non-user serviceable internally located AC input line fuse.   |                                  |            |           |                  |
| Inrush Surge Current | Internally limited by thermistor. Vin = 230 VAC, one cycle, 25°C.   |                                  |            | 35        | A <sub>PK</sub>  |
| Power Factor         | Per EN61000-3-2.  | 0.95                             |            |           | W/V <sub>A</sub> |
| Operating Frequency  | Switching frequency of main output transformer.<br>Switching frequency of secondary transformer.<br>Switching frequency of Power Factor Correction circuit. | 100<br>65<br>60                  |            | 120<br>90 | kHz              |

## 6. MDU150 INPUT SPECIFICATIONS

| PARAMETER            | CONDITIONS / DESCRIPTION   | MIN       | NOM | MAX | UNITS            |
|----------------------|--|-----------|-----|-----|------------------|
| Input Voltage - DC   | Continuous input range.  | 36        | 75  | 75  | VDC              |
| Brown Out Protection | Lowest DC input voltage that regulation is maintained with full rated loads.                     | 34        |     |     | VDC              |
| Hold-up Time         | At 150 watts, over DC input range.   | 20        |     |     | ms               |
| Input Current        | 36 VDC at full rated load.   |           |     | 6.4 | A <sub>RMS</sub> |
| Input Protection     | Non-user serviceable internally located AC input line fuse.                                      |           |     |     |                  |
| Operating Frequency  | Switching frequency of main output transformer.<br>Switching frequency of secondary transformer. | 100<br>70 |     |     | kHz              |
| Inrush Current       | Consult factory.   |           |     |     |                  |

## 7. OUTPUT SPECIFICATIONS

| PARAMETER              | CONDITIONS / DESCRIPTION   | MIN   | NOM         | MAX | UNITS                      |
|------------------------|--|---|-------------|-----|----------------------------|
| Efficiency             | Full Rated Load, 110 VAC.<br>Varies with distribution of loads among outputs.  | 65  | 75          |     | %                          |
| Minimum Load, V1       | Minimum load required to maintain regulation on, V2 at maximum load.<br>Minimum load required on single output models.                                     | Triple output models V1<br>Quad output models V1<br>Single output models V1 | 4<br>3<br>0 |     | A                          |
| Minimum Load, V3       | Minimum load required to maintain regulation on V4 at maximum load.  | Quad output models V3<br>Triple output models V3                            | 0.3<br>0    |     | A                          |
| Ripple and Noise       | Full load, 20 MHz bandwidth.   |   |             |     | See Model Selection Charts |
| Output Power           | With 300 LFM forced air cooling.<br>(Note 1)   | 150   |             |     | Watts                      |
| Overshoot / Undershoot | Output voltage overshoot/undershoot at turn-on.  | 0   | 3           | 5   | %                          |
| Regulation             | Varies by output. Total regulation includes: line changes over the specified. Input range, changes in load starting at 20% load and changing to 100% load. |   |             |     | See Model Selection Charts |
| Transient Response     | Recovery time, to within 1% of initial set point due to a 50-100% load change, 5% max. deviation.  |   |             | 500 | µs                         |
| Turn-on Delay          | Time required for initial output voltage stabilization.  |   | 2           |     | s                          |
| Turn-on Rise Time      | Time required for output voltage to rise from 10% to 90%.  |   | 50          |     | ms                         |

**NOTE 1:** This product is not rated for convection applications.

# MPU/MDU150 Series

## 8. INTERFACE SIGNALS AND INTERNAL PROTECTION

| PARAMETER                                  | CONDITIONS / DESCRIPTION   | MIN                | NOM  | MAX  | UNITS |
|--|--|--------------------|------|------|-------|
| Overvoltage Protection                     | Latch style overvoltage protection.<br>Available on V1, V2, all models, and V3 on all models except MPU150-3300G.  | 2.5 V output, V1   | 3.0  | 3.25 |       |
|  |  | 3.3 V output, V1   | 4.1  | 4.65 |       |
|  |  | 3.3 V output, V2   | 3.8  | 4.2  |       |
|  |  | 5 V output, V1, V2 | 6.0  | 6.4  | V     |
|  |  | 12 V output, V2    | 14   | 16   |       |
|  |  | 12 V output, V3    | 14   | 19   |       |
|  |  | MPU150-4350G       | 4.3  | 4.65 |       |
| Overload Protection                        | Fully protected against output overload and short circuit.<br>Automatic recovery upon removal of overload condition.   | 3.3 V output, V1   |      |      |       |
|  |  |                    |      |      |       |
| Overtemperature Protection                 | System shutdown due to excessive internal temperature, automatic reset.  |                    |      |      |       |
| Output Good Signal, Low to High Transition | TTL compatible signal available for V1. Pull-up resistor is 10kΩ.<br>Signal is high when output is above the specified limits.<br>Signal shall remain low for 20 ms following loss of Output Good. | 3.3 V              | 3.16 | 3.25 | V     |
|  |  | 5 V                | 4.75 | 4.90 |       |
| Input Power Fail Warning                   | TTL compatible logic signal. Time before regulation dropout due to loss of input power. May be used as independent PSOK signal in redundant applications.  |                    | 5    |      | ms    |
| Current Share                              | Accuracy of shared current with up to 6 parallel units. Single wire current share on V1 and V2 with return via -Sense return.  |                    | 10   |      | %     |
| Remote Sense                               | Available on V1 and V2. Total voltage compensation for cable losses with respect to the main output.   |                    |      | 500  | mV    |
| Inhibit                                    | Output voltage is inhibited by application of an external high (5V) signal.  |                    |      |      |       |

## 9. SAFETY, REGULATORY, AND EMI SPECIFICATIONS

| PARAMETER                    | CONDITIONS / DESCRIPTION  | MIN  | NOM          | MAX                       | UNITS |
|------------------------------|---|--|--------------|---------------------------|-------|
| Safety Approvals             | Approved to the latest edition of the following standards:<br>CSA/UL60950-1, EN60950-1 and IEC60950-1 |  |              |                           |       |
| Dielectric Withstand Voltage | Input to output per EN60950.  | MPU150<br>MDU150   | 2600<br>1544 |                           | VDC   |
| Electromagnetic Interference | FCC CFR title 47 Part 15 Sub-Part B - Conducted.<br>EN55022 / CISPR 22 Conducted.                     | B<br>B   |              |                           | Class |
| ESD Susceptibility           | Per EN61000-4-2, level 4.   |  | 8            |                           | kV    |
| Radiated Susceptibility      | Per EN61000-4-3, level 3.   |  | 10           |                           | V/M   |
| EFT/Burst                    | Per EN61000-4-4, level 3.   |  | ±2           |                           | kV    |
| Input Transient Protection   | Per EN61000-4-5, class 3.   | MPU150: Line to Line<br>MPU150: Line to Ground<br>MDU150: Line to Line<br>MDU150: Line to Ground | 1            |                           |       |
|                              |   |  | 2            |                           |       |
| Insulation Resistance        | Input to output.  | MPU150: Line to Line<br>MPU150: Line to Ground<br>MDU150: Line to Line<br>MDU150: Line to Ground | 0.5          |                           |       |
|                              |   |  | 0.5          |                           |       |
| Leakage Current              | Per EN60950.  | Dual output MPU150 at 264 VAC<br>Single and triple output MPU150 at 264 VAC<br>MDU150 at 72 VDC  |              | 22<br>1.7                 | mA    |
|                              |   |  |              | (Not required by EN60950) |       |

# MPU/MDU150 Series

## 10. ENVIRONMENTAL SPECIFICATIONS

| PARAMETER               | CONDITIONS / DESCRIPTION                   | MIN                         | NOM    | MAX        | UNITS            |
|-------------------------|--|-----------------------------|--------|------------|------------------|
| Altitude                | Operating.<br>Non-Operating.               |                             |        | 10k<br>40k | ASL Ft.          |
| Operating Temperature   | Derate linearly above 50°C by 2.5% per °C. | At 100% load<br>At 50% load | 0<br>0 | 50<br>70   | °C               |
| Storage Temperature     |  |                             | -55    | 85         | °C               |
| Temperature Coefficient | 0°C to 70°C (after 15 minute warm-up).     |                             |        | ±0.02      | ±0.05 %/°C       |
| Relative Humidity       | Non-Condensing.                            |                             | 5      | 95         | %RH              |
| Shock                   | Peak acceleration.                         |                             |        | 20         | G <sub>PK</sub>  |
| Vibration               | Random vibration, 10Hz to 2kHz, 3 axis.    |                             |        | 6          | G <sub>RMS</sub> |

## 11. MECHANICAL SPECIFICATIONS

| PARAMETER  | DESCRIPTION  |
|------------|--|
| Dimensions | 8.00" x 4.20" x 1.50" (203.2mm x 106.7mm x 38.1mm) |
| Weight:    | 2 lb (0.89 kg)                                     |

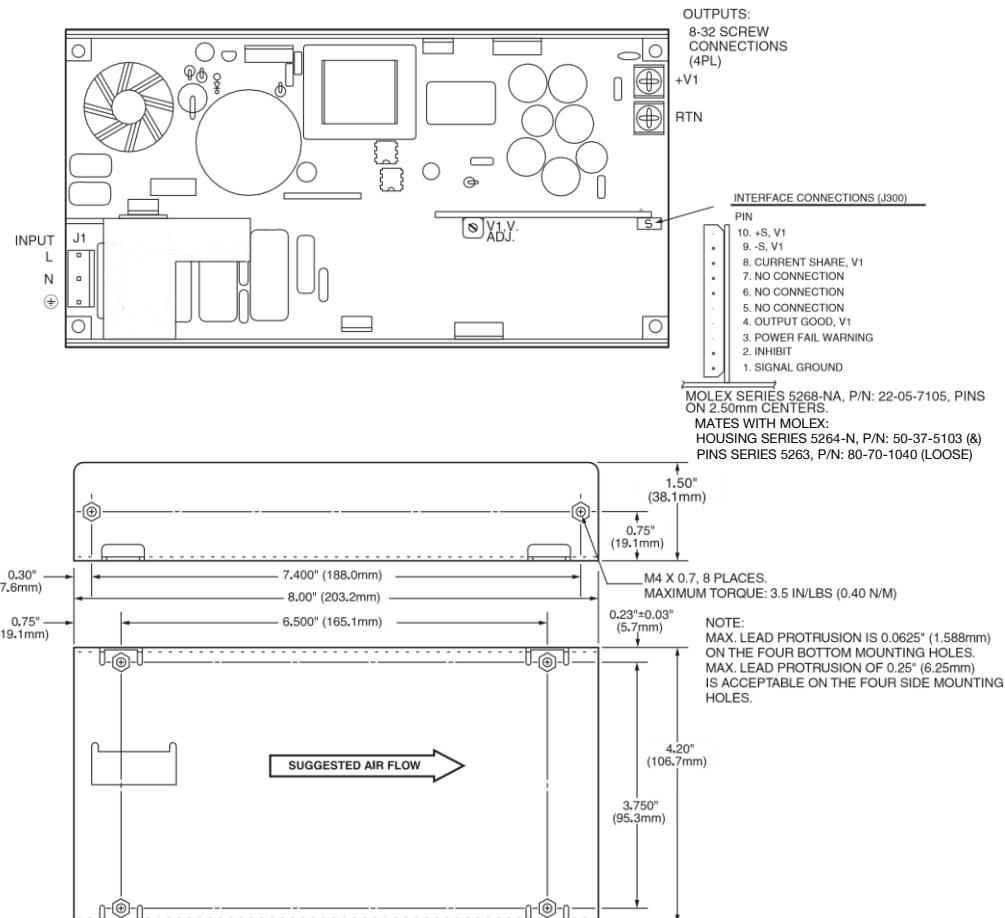


Figure 1. Mechanical Drawing - Single Output

# MPU/MDU150 Series

| CONNECTOR          | MOLEX SERIES | HOUSING    | PIN SERIES | PINS (LOOSE) | PINS (CHAIN) | WIRE GAUGE |
|--------------------|--------------|------------|------------|--------------|--------------|------------|
| J1<br>(ALL MODELS) | 41695        | 09-50-8051 | 6838       | 08-50-0189   | 08-50-0187   | 18-20AWG   |
|                    | 41695        | 09-50-8051 | 2478       | 08-50-0106   | 08-50-0105   | 18-20AWG   |
|                    | 2139         | 09-50-3051 | 2478       | 08-50-0106   | 08-50-0105   | 18-20AWG   |
| J300               | 5264-N       | 50-37-5103 | 5263       | 08-70-1040   | 08-70-1039   | 22-28AWG   |

CHASSIS: 0.063" (1.6mm) ALUMINUM ALLOY, WITH CLEAR FINISH

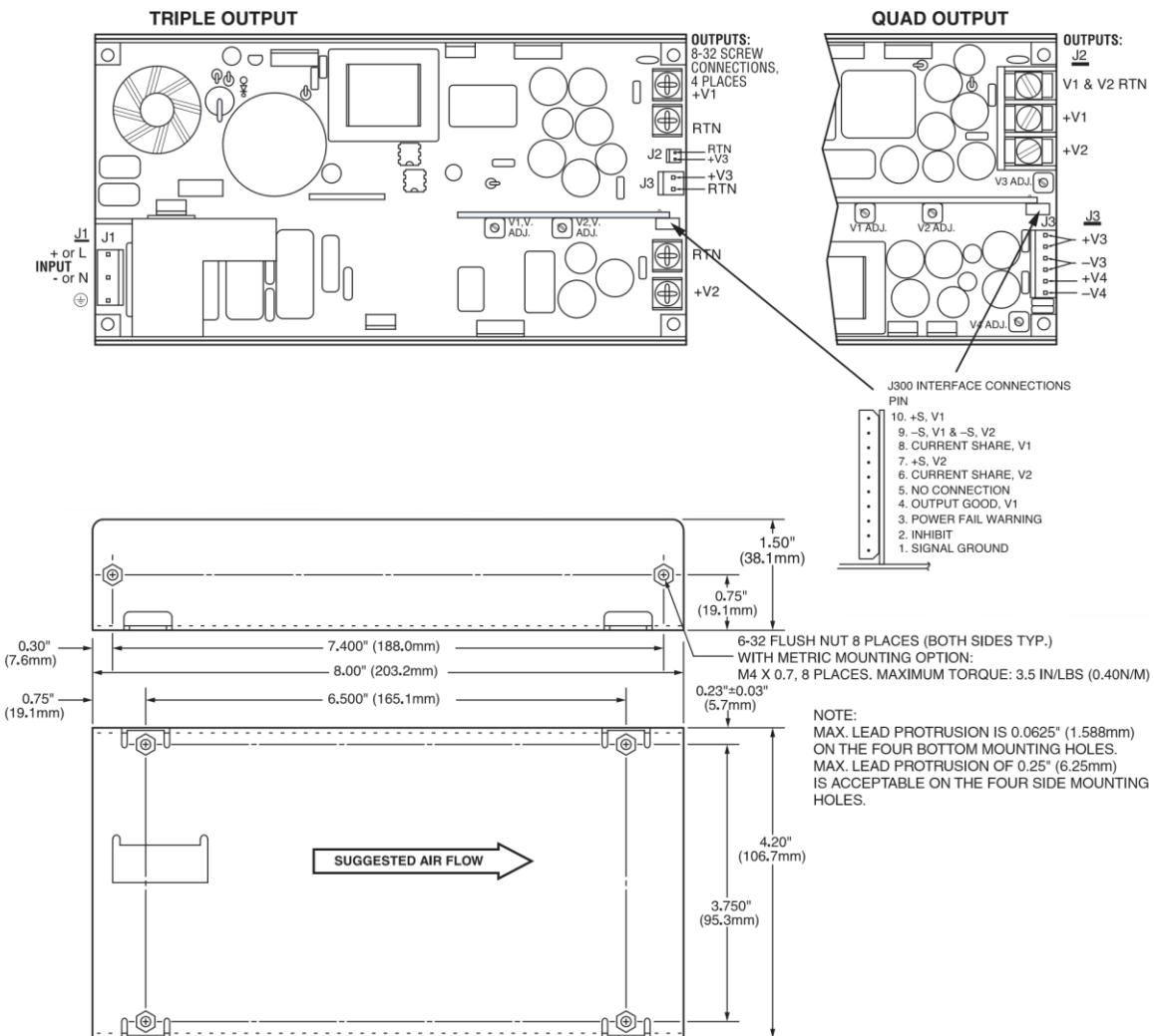


Figure 2. Mechanical Drawing - Triple & Quad Output

# MPU/MDU150 Series

| CONNECTOR          | MOLEX SERIES | HOUSING    | PIN SERIES | PINS (LOOSE) | PINS (CHAIN) | WIRE GAUGE |
|--------------------|--------------|------------|------------|--------------|--------------|------------|
| J1 (ALL MODELS)    | 41695        | 09-50-8051 | 6838       | 08-50-0189   | 08-50-0187   | 18-20AWG   |
|                    | 41695        | 09-50-8051 | 2478       | 08-50-0106   | 08-50-0105   | 18-20AWG   |
|                    | 2139         | 09-50-3051 | 2478       | 08-50-0106   | 08-50-0105   | 18-20AWG   |
| J2 (TRIPLE OUTPUT) | 5051-N       | 22-01-1022 | 2759       | 08-50-0114   | 08-50-0113   | 22-30AWG   |
|                    | 5051-N       | 22-01-1022 | 2759       | 08-65-0805   | 08-65-0804   | 22-30AWG   |
| J3 (TRIPLE OUTPUT) | 41695        | 09-50-8021 | 6838       | 08-50-0189   | 08-50-0187   | 18-20AWG   |
|                    | 41695        | 09-50-8021 | 2478       | 08-50-0106   | 08-50-0105   | 18-20AWG   |
|                    | 2139         | 09-50-3021 | 2478       | 08-50-0106   | 08-50-0105   | 18-20AWG   |
| J3 (QUAD OUTPUT)   | 41695        | 09-50-8061 | 6838       | 08-50-0189   | 08-50-0187   | 18-20AWG   |
|                    | 41695        | 09-50-8061 | 2478       | 08-50-0106   | 08-50-0105   | 18-20AWG   |
|                    | 2139         | 09-50-3061 | 2478       | 08-50-0106   | 08-50-0105   | 18-20AWG   |
| J300               | 5264-N       | 50-37-5103 | 5263       | 08-70-1040   | 08-70-1039   | 22-28AWG   |

CHASSIS: 0.063" (1.6mm) ALUMINUM ALLOY, WITH CLEAR FINISH

For more information on these products consult: [tech.support@psbel.com](mailto:tech.support@psbel.com)

**NUCLEAR AND MEDICAL APPLICATIONS** - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.

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