# MPU/MDU200 Series
## AC-DC Power Supplies



The MPU200/MDU200 Series is based upon the proven architecture of the MPU150/MDU150 product line. The MPU products incorporate Power Factor Correction (PFC) with a low-profile package designed to meet 1U height constraints. In this series, 200 watts of continuous output power is provided with single or multiple output units suited for distributed power or central power applications. The series provides high current +3.3V and +5V on a single platform to support mixed-mode, high-speed digital circuitry.

The Bel Power Solutions 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 quad-model outputs, thermal shutdown, and remote inhibit. Airflow of 300 linear feet per minute (LFM) is required to deliver the full power density of greater than 4.0 watts per cubic inch.

### Key Features & Benefits

- RoHS Compliant
- Power Factor Correction (PFC)
- Same size, airflow, and construction as MPU150/MDU150 with over 33% more power
- Single-wire current sense on quad model outputs V1 and V2
- Remote sense on quad model outputs V1 and V2
- Current share and N+1 redundancy (standard on all models)
- Overtemperature, overload, and overvoltage protection
- Available with SAE mountings
- MDU200 models have 48 VDC input

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# MPU/MDU200 Series

## 1. AC INPUT, SINGLE OUTPUT MODEL SELECTION

200W/225 W PK with 300 LFM Forced-Air Cooling [1]

| MODEL[7] | OUTPUT VOLTAGE | ADJUSTMENT RANGE | MAXIMUM OUTPUT CURRENT [2] | PEAK OUTPUT CURRENT [2] | LINE REGULATION | LOAD REGULATION | RIPPLE & NOISE % pk-pk [3] | INITIAL SETTING ACCURACY |
|---|---|---|---|---|---|---|---|---|
| MPU200-1012G | 12V | 11.6V to 16V | 17.0A | 19.0A | 0.1% | 1% | 1% | 11.97V to 12.03V |
| MPU200-1024G | 24V | 22.8V to 29.2V | 8.35A | 9.4A | 0.1% | 1% | 1% | 23.95V to 24.05V |
| MPU200-1048G | 48V | 45V to 56V | 4.2A | 4.7A | 0.1% | 1% | 1% | 47.9V to 48.1V |

## 2. AC INPUT, MULTIPLE OUTPUT MODEL SELECTION

200 W with 300 LFM Forced-Air Cooling [1] - Isolated V3 and V4 can be used as positive or negative outputs

| MODEL[7] | OUTPUT VOLTAGE | ADJUSTMENT RANGE | MAXIMUM OUTPUT CURRENT [2] | LINE REGULATION | LOAD REGULATION | RIPPLE & NOISE % pk-pk [3] | INITIAL SETTING ACCURACY |
|---|---|---|---|---|---|---|---|
| MPU200-4530G | +5V | 5.0V to 5.5V | 30A [4] | 0.4% | 1% | 1% | 4.98V to 5.02V |
| | +3.3V | 3.15V to 3.60V | 15A [4] | 0.6% | 1.5% | 1.5% | 3.28V to 3.32V |
| | 12V | 10.8V to 13.2V | 8A [5] | 0.4% | 10% | 1% | 11.94V to 12.06V |
| | 12V | 10.8V to 13.2V | 4A [5] | 0.4% | 10% | 1% | 11.60V to 12.40V |

## 3. DC INPUT, SINGLE OUTPUT MODEL SELECTION

200 W with 300 LFM Forced-Air Cooling [1]

| MODEL[7] | OUTPUT VOLTAGE | ADJUSTMENT RANGE | MAXIMUM OUTPUT CURRENT [2] | PEAK OUTPUT CURRENT [2] | LINE REGULATION | LOAD REGULATION | RIPPLE & NOISE % pk-pk [3] | INITIAL SETTING ACCURACY |
|---|---|---|---|---|---|---|---|---|
| MDU200-1012G | 12V | 11.6V to 16V | 17.0A | 19.0A | 0.1% | 1% | 1% | 11.97V to 12.03V |
| MDU200-1024G[6] | 24V | 22.8V to 29.2V | 8.35A | 9.4A | 0.1% | 1% | 1% | 23.95V to 24.05V |
| MDU200-1048G | 48V | 45V to 56V | 4.2A | 4.7A | 0.1% | 1% | 1% | 47.9V to 48.1V |

Isolation Diode Option - Offered on single-output models. Add "D" at the end of the part number if an isolation diode is needed.

**NOTES:**

1. This product is not rated for convection applications.
2. The MPU/MDU200 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**.
3. Maximum peak-to-peak noise expressed as a percentage of output voltage, 20 MHz bandwidth.
4. Total current for V1 and V2 is not to exceed 35A.
5. Total power on V3 and V4 is not to exceed 100W.
6. Derating is required on output voltages above 27VDC. Consult factory.
7. Non-G models use lead solder exemption and are not recommended for new designs.

## 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 M3 x 0.7 mounting inserts. Consult factory for availability. |
| Isolation Diode | Offered on single-output models. Add "D" to the part number suffix if an isolation diode is needed. Consult factory for availability. |
| 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. |

## 5. MPU200 INPUT SPECIFICATIONS

| PARAMETER | CONDITIONS / DESCRIPTION | MIN | NOM | MAX | UNITS |
|---|---|---|---|---|---|
| Input Voltage - AC | Continuous input range. | 85 | | 264 | VAC |
| Input Frequency | AC input. | 47 | | 63 | Hz |
| Hold-up Time | After last AC line peak at 200 watts | 15 | | | ms |
| Input Current | 85 VAC at full rated load. | | | 4.0 | $A_{RMS}$ |
| 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 | $A_{PK}$ |
| Power Factor | Per EN61000-3-2. | 0.95 | | | W/VA |
| 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><br>60 | 120<br>90 | kHz |

## 6. MDU200 INPUT SPECIFICATIONS

| PARAMETER | CONDITIONS / DESCRIPTION | MIN | NOM | MAX | UNITS |
|---|---|---|---|---|---|
| Input Voltage - DC | Continuous input range. | 36 | | 75 | VDC |
| Brown Out Protection | Lowest DC input voltage that regulation is maintained with full rated loads. | 34 | | | VDC |
| Hold-up Time | At 200 watts, over DC input range. | 15 | | | ms |
| Input Current | 36 VDC at full rated load. | | | 8.35 | $A_{RMS}$ |
| Input Protection | Non-user serviceable internally located AC input line fuse. | | | | |
| Inrush Surge Current | Consult factory. | | | | |
| Operating Frequency | Switching frequency of main output transformer.<br>Switching frequency of secondary transformer. | | 100<br>70 | | kHz |

## 7. OUTPUT SPECIFICATIONS

| PARAMETER | CONDITIONS / DESCRIPTION | | MIN | NOM | MAX | UNITS |
|---|---|---|---|---|---|---|
| Efficiency | Full Rated Load, 110 VAC (MPU) or 48 VDC (MDU). 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. | Quad output model V1<br>Single output models V1 | 3<br>0 | | | A |
| Minimum Load, V3 | Minimum load required to maintain regulation on V4 at maximum load. | Quad output model V3 | 0.3 | | | A |
| Ripple and Noise | Full load, 20 MHz bandwidth. | | | See Model Selection Charts | | |
| Overshoot / Undershoot | Output voltage overshoot/undershoot at turn-on. | | | | 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%. | MPU200<br>MDU200 | | 50<br>80 | | ms |

## 8. INTERFACE SIGNALS AND INTERNAL PROTECTION

| PARAMETER | CONDITIONS / DESCRIPTION | | MIN | NOM | MAX | UNITS |
|---|---|---|---|---|---|---|
| Overvoltage Protection | Latch style overvoltage protection. | MPU200-4530G 3.3 V output<br>MPU200-4530G 5 V output<br>MPU200-4530G 12 V output<br>MDU200/MPU200-1012G V1<br>MDU200/MPU200-1024G V1<br>MDU200/MPU200-1048G V1 | 3.8<br>6.0<br>14<br>17.0<br>32.0<br>58.0 | | 4.2<br>6.4<br>19<br>20.5<br>38.0<br>62.7 | V |
| Overload Protection | Fully protected against output overload and short circuit. Automatic recovery upon removal of overload condition. | | | | | |
| Overtemperature Protection | System shutdown due to excessive internal temperature, automatic reset. | | | | | |
| Output Good Signal (Transition from Low to High) | TTL compatible signal available for V1. Internal pull-up resistor is 475 Ω. Signal is high when output is above the specified limits. Signal shall remain low for 20 ms following loss of Output Good. | 3.3 V<br>5 V | 3.16<br>4.75 | 3.25<br>4.95 | | V |
| | | MDU200/MPU200-1012G 12 V<br>MDU200/MPU200-1024G 24 V<br>MDU200/MPU200-1048G 48 V | 10.5<br>21.5<br>43.0 | 11.9<br>23.5<br>47.0 | | V |
| 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 (5 V) 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: CSA/UL60950-1, EN60950-1 and IEC60950-1 | | | | | |
| Dielectric Withstand Voltage | Input to output per EN60950. | MPU200<br>MDU200 | 2600<br>1414 | | | 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. | MPU200: Line to Line<br>MPU200: Line to Ground<br>MDU200: Line to Line<br>MDU200: Line to Ground | 1<br>2<br>0.5<br>0.5 | | | kV |
| Insulation Resistance | Input to Output. | | | 10 | | MV |
| Leakage Current | Per EN60950. | MPU200 Quad Output Model<br>MPU200 Single Output Models<br>MDU200 at 72 VDC (Not required by EN60950) | | | 2.2<br>1.7<br>N/A | mA |

## 10. ENVIRONMENTAL SPECIFICATIONS

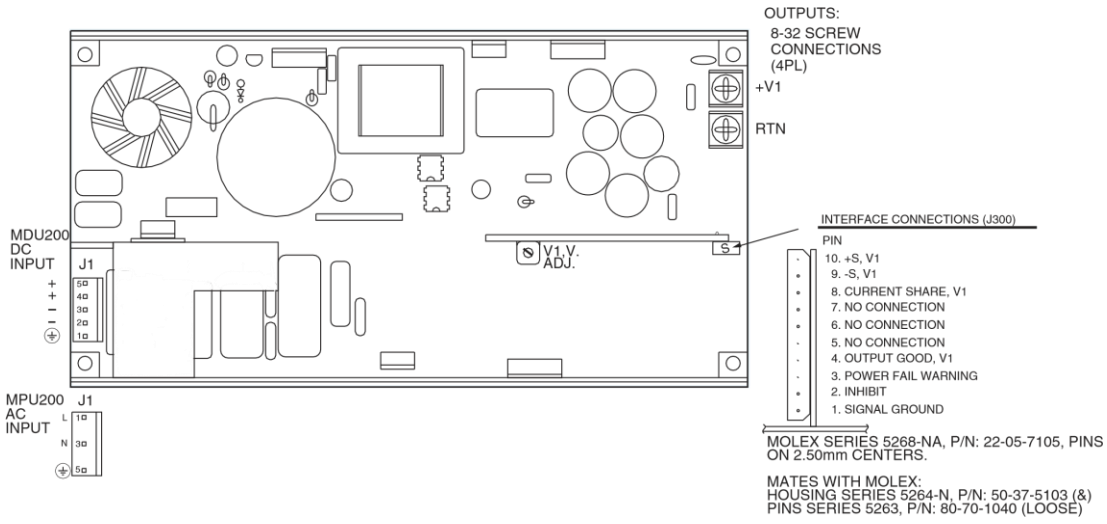
| PARAMETER | CONDITIONS / DESCRIPTION | | MIN | NOM | MAX | UNITS |
|---|---|---|---|---|---|---|
| Altitude | Operating.<br>Non-Operating. | | | | 10k<br>40k | ASL Ft. |
| Operating Temperature | Derate linearly above 50°C by 2.5% per °C. | At 100% load<br>At 50% load | 0<br>0 | | 50<br>70 | °C |
| 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 | $G_{PK}$ |
| Vibration | Random vibration, 10 Hz to 2 kHz, 3 axis. | | | | 6 | $G_{RMS}$ |

## 11. OPTIONS

| PARAMETER | CONDITIONS / DESCRIPTION |
|---|---|
| Metric Mounting | Add “M” as a suffix to the model number to order chassis with M3 x 0.7 mounting inserts. Consult factory for availability. |
| Isolation Diode | Offered on single-output models. Add “D” to the part number suffix if an isolation diode is needed. Consult factory for availability. |

## 12. 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) |



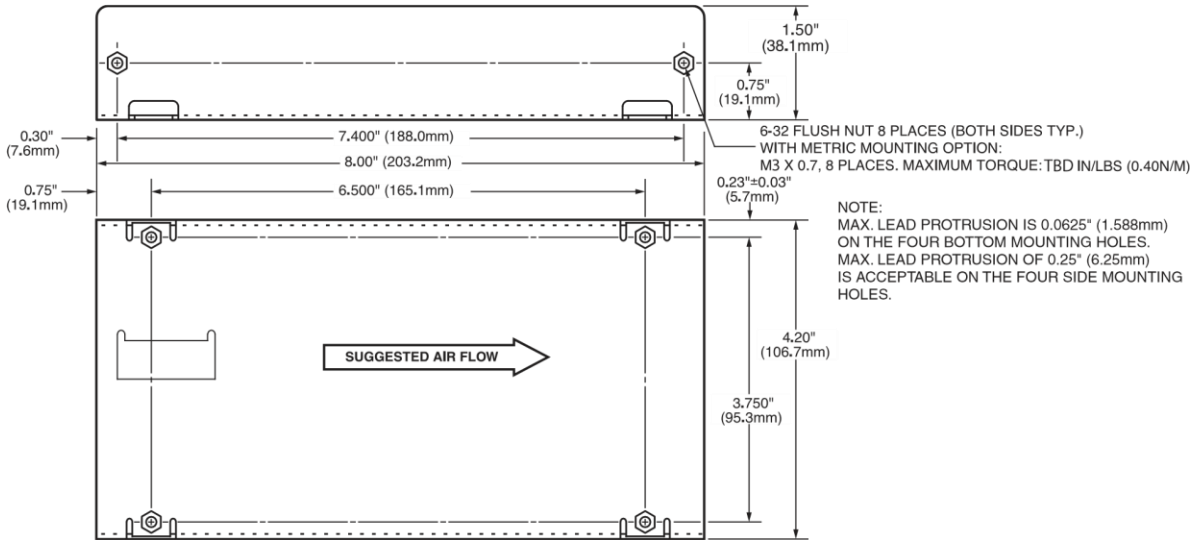
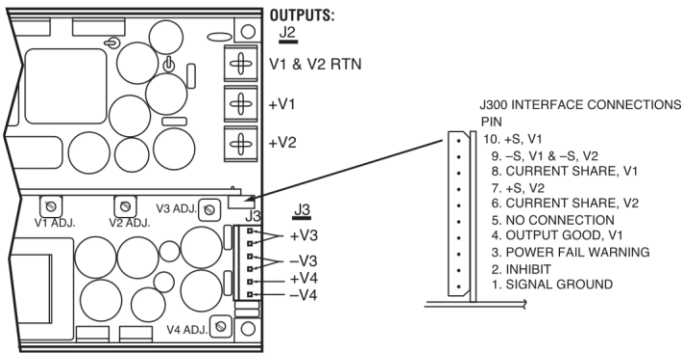



*Figure 1. Mechanical Drawing – Single Output*

| 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 | 18-20 AWG |
| | 41695 | 09-50-8051 | 2478 | 08-50-0106 | 08-50-0105 | 18-20 AWG |
| | 2139 | 09-50-3051 | 2478 | 08-50-0106 | 08-50-0105 | 18-20 AWG |
| J300 | 5264-N | 50-37-5103 | 5263 | 08-70-1040 | 08-70-1039 | 22-28 AWG |

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



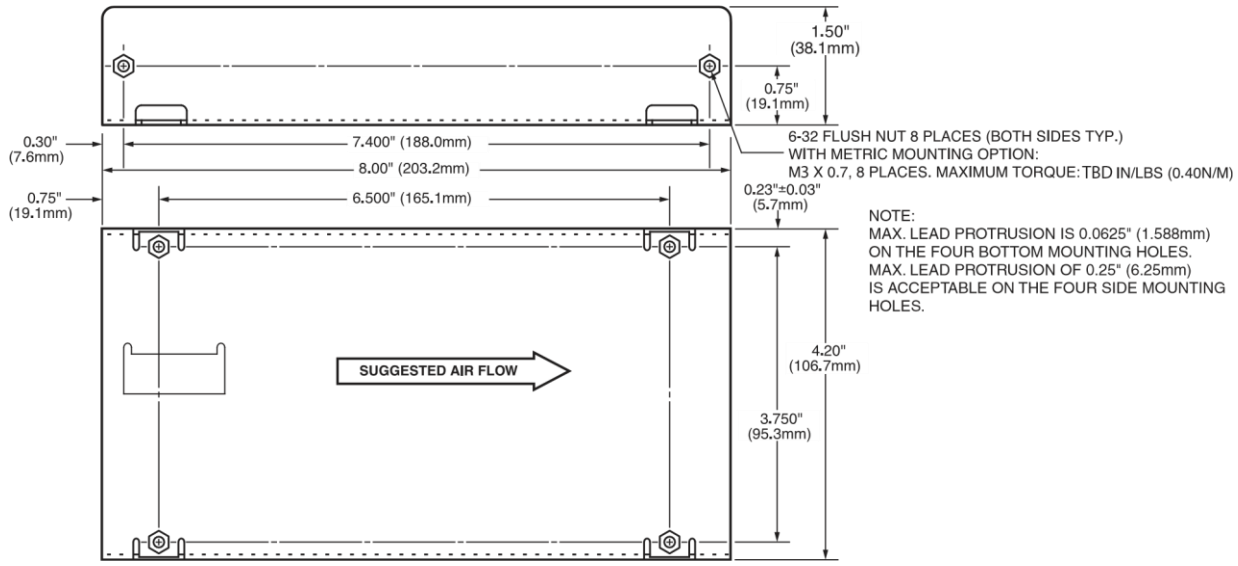



*Figure 2. Mechanical Drawing – Quad Output*

| 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**

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