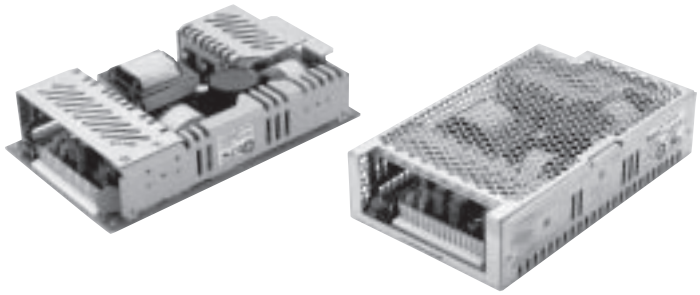
BRAVO ELECTRO COMPONENTS

# IPD (Integrated Power Designs) REL-185 Series

- 185 Watt Medical / ITE Aproved Power Supply
- 1~4 Outputs ranging from 3.3~48 VDC

## Description:

- High Efficiency
- Advanced SMT Design
- Universal 85-264VAC Input
- Compact 4.2"x 7.0"x 1.5" Size
- Fits 1U Applications
- Optional Chassis and Cover
- EMC Immunity Compliance to EN 61000-6-2, EN 60601-1-2
- EMC Emissions Compliance to EN 55011/22, Class B
- Safety Certified to EN 60950, EN 60601-1-2
- Harmonic Current perEN 61000-3-2



## OUTPUT SPECIFICATIONS

| | | |
|---|---|---|
| Total Output Power at 50°C | 135W<br>185W | Convection Cooled<br>300 LFM Forced Air |
| Output Voltage Centering (50% load) | Output 1:<br>Output 2:<br>Output 3:<br>Output 4: | ± 0.5%<br>± 5.0%<br>± 5.0%<br>± 5.0% |
| Output Voltage Adjust Range | Output 1: | 95 - 105% |
| Load Regulation | Output 1:<br>Output 2:<br>(4001, 4, 5, 2001)<br>(4002, 4003)<br>Output 3:<br>Output 4: | 0.5% (10-100% load change)<br>5.0% (10-100% load change)<br>10.0% (20-100% load change)<br>15.0% (20-100% load change)<br>5.0% (10-100% load change)<br>5.0% (10-100% load change) |
| Source Regulation | Outputs 1-4: | 0.5% |
| Cross Regulation | Outputs 2-4: | 6.0% |
| Output Noise<br>Source Freq.<br>Switching Freq.<br>Total (20 MHz) | <br>Outputs 1-4:<br>Outputs 1-4:<br>Outputs 1-4: | <br>0.5%<br>1.0%<br>1.0% |
| Turn On Overshoot | None | |
| Transient Response<br>Voltage Deviation<br>Recovery Time<br>Load Change | Outputs 1-4<br>5.0%<br>500µS<br>50% to 100% | |
| Output Overvoltage Protection | Output 1: 110% to 150% | |
| Output Overpower Protection | 110-160% rated Pout, cycle on/off, auto recovery | |
| Hold Up Time | 16 mS min., Full Power, 85V Input | |
| Start Up Time | 5 Seconds, 120V Input | |

## INPUT SPECIFICATIONS

| | |
|---|---|
| Source Voltage | 85 - 264 Volts AC |
| Frequency Range | 47-63 Hz |
| Peak Inrush Current | 40A |
| Efficiency | 82% Typ., Full Power, 230V, varies by model |
| Power Factor | 0.95 (Full Power, 230V) |

## ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| Ambient Operating Temperature Range | 0° C to +70° C<br>Derating: See Power Rating Chart |
| Ambient Storage Temperature Range | -40° C to +85° C |
| Temperature Coefficient | Outputs 1-4: 0.02%/°C |
| Vibration | MIL-STD-810E, Method 514.4, Category 1 |
| Shock | Transit Drop per MIL-STD-810E Method 516.4 Procedure IV |

## GENERAL SPECIFICATIONS

| | |
|---|---|
| Dielectric Strength | 5656 VDC, Primary to Secondary, 1 Sec.<br>2121 VDC, Primary to Ground, 1 Sec.<br>707 VDC, Secondary to Ground, 1 Sec. |
| Leakage Current | <300uA Earth Leakage Current<br><100uA Patient Leakage Current |
| Power Fail Signal | Logic low with input power failure 10mS minimum prior to output one dropping 1% |
| Remote On/Off (optional) | Contact closure shuts off all outputs |
| Remote Sense | 250mV compensation of output cable losses |
| Mean-Time Between Failures | 100,000 Hours min., MIL-HDBK-217F, 25° C, GB |
| Weight | 1.70 Lbs. Open Frame<br>2.70 Lbs. Chassis and Cover |

## MODEL LISTING

| MODEL | OUTPUT 1(8) | OUTPUT 2(8) | OUTPUT 3(7) | OUTPUT 4(7) |
|---|---|---|---|---|
| REL-185-4001 | +3.3V/20A(1) | +5V/10A | +12V/2A | -12V/2A |
| REL-185-4002 | +5V/20A(1) | +3.3V/10A | +12V/2A | -12V/2A |
| REL-185-4003 | +5V/20A(1) | +3.3V/10A | +15V/2A | -15V/2A |
| REL-185-4004 | +5V/20A(1) | -5V/10A | +12V/2A | -12V/2A |
| REL-185-4005 | +5V/20A(1) | -5V/10A | +15V/2A | -15V/2A |
| REL-185-4006 | +5V/20A(1) | +24V/3A | +12V/2A | -12V/2A |
| REL-185-4007 | +5V/20A(1) | +24V/3A | +15V/2A | -15V/2A |
| REL-185-3001 | +5V/20A(1) | +12V/5A | | -12V/3A |
| REL-185-3002 | +5V/20A(1) | +15V/4A | | -15V/3A |
| REL-185-2001 | +3.3V/20A(1) | +5V/10A | | |
| REL-185-2002 | +5V/20A(1) | +12V/8A | | |
| REL-185-2003 | +5V/20A(1) | +24V/4A | | |
| REL-185-2004 | +12V/10A | -12V/6A | | |
| REL-185-2005 | +15V/8A | -15V/5A | | |
| REL-185-1001 | 2.5V/37A(2) | | | |
| REL-185-1002 | 3.3V/37A(2) | | | |
| REL-185-1003 | 5V/37A(2) | | | |
| REL-185-1004 | 12V/15.4A | | | |
| REL-185-1005 | 15V/12.3A | | | |
| REL-185-1006 | 24V/7.7A | | | |
| REL-185-1007 | 28V/6.6A | | | |
| REL-185-1008 | 48V/3.8A | | | |

## ELECTROMAGNETIC COMPATIBILITY SPECIFICATIONS

| | | |
|---|---|---|
| Electrostatic Discharge | EN 61000-4-2 | ±4kV Contact Discharge<br>±-8kV Air Discharge |
| Radiated Electromagnetic Field | EN 61000-4-3 | 26–1000 MHz, 10V/M, 80% AM |
| EFT/Bursts | EN 61000-4-4 | ±2 kV |
| Surges | EN 61000-4-5 | ±2 kV Line to Earth<br>±1 kV Line to Line |
| Conducted Immunity | EN 61000-4-6 | .15 to 80MHz, 10V, 80% AM |
| Voltage Dips | EN 61000-4-11 | 95% Dip, 10ms<br>30% Dip, 500ms |
| Voltage Interruptions | EN 61000-4-11 | 95% Reduction, 5s |
| Radiated Emissions | EN 55022/11 | Class B |
| Conducted Emissions | EN 55022/11 | Class B |
| Harmonic Current Emissions | EN 61000-3-2 | Class A |
| Voltage Fluctuations and Flicker | EN 61000-3-3 | |

## SAFETY SPECIFICATIONS

| | | |
|---|---|---|
| c UL us | Underwriters Laboratories<br>File E137708 | UL 60950 Third Edition<br>UL 2601-1 Second Edition<br>CB Report per IEC 60950(1999) Third Edition including all National Deviations<br>CB Report per IEC 60601-1(1988) Second Edition A1, A2 |
| c UL us | UL Recognition<br>Mark For Canada<br>File E137708 | CAN/CSA-C22.2 No. 60950-00<br>CAN/CSA-C22.2 No. 601-1-M90 |
| TÜV | TUV | EN 60950/2000<br>EN 60601-1/A2:1995 |
| CE | | Low Voltage Directive |

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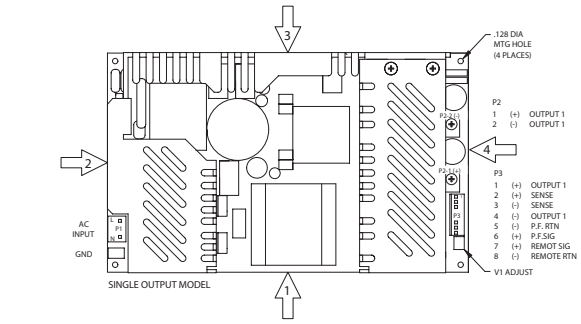
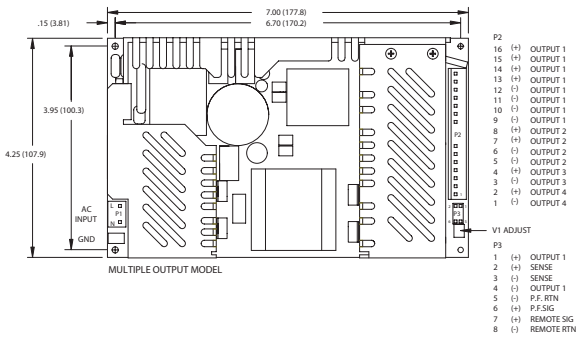
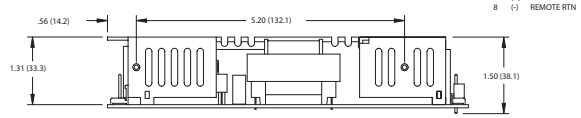
## REL-185 SERIES MECHANICAL SPECIFICATIONS

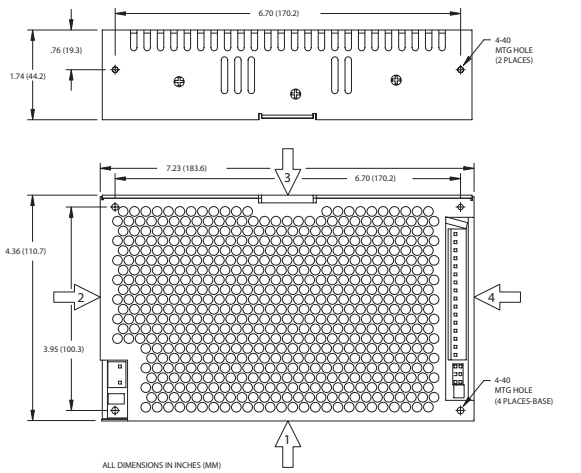
OPEN FRAME




CHASSIS & COVER



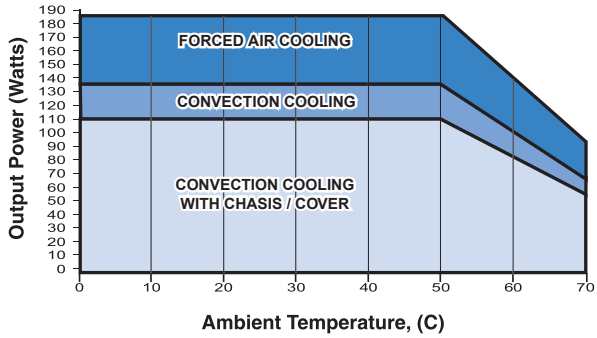

## RECOMMENDED AIR FLOW DIRECTION

1 – Optimum 2 – Good 3 – Good 4 - Fair

## APPLICATIONS INFORMATION

1. Rated 15A maximum with convection cooling.
2. Rated 27A maximum with convection cooling.
3. Total power must not exceed 135 watts with convection cooling on open frame models except where noted.
4. Total power must not exceed 185 watts with 300 LFM forced air cooling on open frame models.
5. Total power must not exceed 110 watts with convection cooling and chassis/cover option.
6. Total power must not exceed 185 watts with 300 LFM forced air cooling and chassis/cover option.
7. Total current from Outputs 3 & 4 must not exceed 3 amps with convection cooling.
8. Total current from Outputs 1 & 2 must not exceed 20 amps with convection cooling.
9. Semiconductor case temperatures must not exceed 110°C.
10. Each output can deliver its rated current but total output power must not exceed maximum power as determined by the cooling method stated above.
11. Sufficient area must be provided around convection cooled power supplies to allow natural movement of air to develop.
12. 300 linear feet per minute of airflow must be maintained one inch above any point of the heatsink in the direction shown when forced air cooling is required.
13. This product is intended for use as a professionally installed component within information technology and medical equipment.
14. A minimum load of 10% is required on output one to ensure proper regulation of remaining outputs.
15. Remote sense terminals may be used to compensate for cable losses up to 250mV. The use of a twisted pair is recommended as well as a decoupling capacitor (0.1 - 10µF) and a capacitor of 100µF/amp connected across the load side.
16. Peak to peak output ripple and noise is measured directly at the output terminals of the power supply, without the use of the probe ground lead or retractable tip, 20 MHz bandwidth.
17. This power supply has been safety approved and final tested using a DC dielectric strength test. Please consult factory before performing an AC dielectric strength test.
18. Maximum screw penetration into bottom chassis mounting holes is .100 inches.
19. Maximum screw penetration into side chassis mounting holes is .250 inches.
20. To meet emissions specifications, all four mounting hole ground pads must be electrically connected to a common metal chassis. Chassis/cover option recommended.

## MAXIMUM OUTPUT POWER VS. AMBIENT TEMPERATURE




## CONNECTOR SPECIFICATIONS

| | | |
|---|---|---|
| P1 | AC Input | .156 friction lock header mates with Molex 09-50-3031 or equivalent crimp terminal housing with Molex 2478 or equivalent crimp terminal. |
| P2 | DC Output (Single) | 6-32 screw down terminal mates with #6 ring tongue terminal. |
| P2 | DC Output (Multiple) | .156 friction lock header mates with Molex 09-50-3161 or equivalent crimp terminal housing with Molex 2478 or equivalent crimp terminal. |
| G | Ground | .187 quick disconnect terminal. |
| P3 | Option/Sense (Single) | .100 breakaway header mates with Molex 50-57-9008 or equivalent crimp terminal housing with Molex type 71851 or equivalent crimp terminal. |
| P3 | Option/Sense (Multiple) | .100 breakaway header mates with Molex 22-55-2061 or equivalent crimp terminal housing with Molex type 71851 or equivalent crimp terminal. |