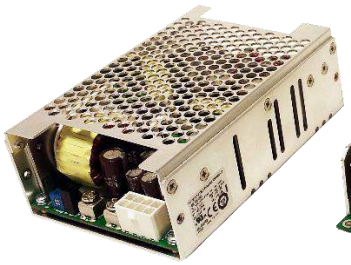
# 200 WATTS

## MULTI OUTPUT AC-DC

# GRN-200

### FEATURES:

- **Compact 3.0" x 5.0" x 1.3" Size**
- **3 Year Warranty**
- **Universal 85-264V Input**
- **Dual, Triple or Quad Outputs**
- **90% Peak Efficiency**
- **86% Average Efficiency**
- **<300mW No Load Input Power**
- **RoHS Compliant**
- **IEC 60601-1 3rd ed. Medical Cert.**
- **IEC 60950-1 2nd ed. ITE Certification**
- **IEC 62368-1 2nd ed. Certification**
- **IEC 60601-1-2 4th ed. EMC**
- **Class B Emissions per EN55011/32**
- **-20 to +70°C Operating Temperature**
- **Optional Power Fail Warning**
- **Optional Chassis/Cover**



CHASSIS/COVER

OPEN FRAME

## SAFETY SPECIFICATIONS

| | | |
|---|---|---|
| c UL us | Underwriters Laboratories<br>File E137708/E140259 | UL 62368-1:2014, 2nd Edition<br>CAN/CSA-C22.2 No. 62368-1-14<br>AAMI/ANSI ES60601-1:2005/(R) 2012<br>CAN/CSA-C22.2 No. 60601-1:2014 |
| IECEE CB SCHEME | CB Reports/Certificates (including all National and Group Deviations) | IEC 62368-1:2014, 2nd Edition<br>IEC 60601-1:2005/A1:2012 |
| TUV SUD | TUV SUD America | EN 62368-1:2014, 2nd Edition<br>EN 60601-1:2006/A1:2013 |
| CE | Low Voltage Directive<br>RoHS Directive (Recast) | (2014/35/EU of February 2014)<br>(2015/863/EU of March 2015) |
| UK CA | Electrical Equipment (Safety) Regulations 2016 SI No. 1101<br>Restriction of the Use of Certain Hazardous Substances in EEE Regulations 2012 SI No. 3032 + 2019 SI No.492 | |

## MODEL LISTING

| MODEL | OUTPUT 1 | OUTPUT 2 | OUTPUT 3 | OUTPUT 4 |
|---|---|---|---|---|
| GRN-200-4001 | +3.3V/30A | +5V/8A | +12V/2A | -12V/2A |
| GRN-200-4002 | +5V/30A | +3.3V/8A | +12V/2A | -12V/2A |
| GRN-200-4003 | +5V/30A | +24V/3A | +12V/2A | -12V/2A |
| GRN-200-4004 | +5V/30A | +24V/3A | +15V/2A | -15V/2A |
| GRN-200-4005 | +24V/6A | +5V/8A | +12V/2A | -12V/2A |
| GRN-200-3001 | +5V/30A | +12V/6A | | -12V/2A |
| GRN-200-3002 | +5V/30A | +15V/5A | | -15V/2A |
| GRN-200-3003 | +5V/30A | | +24V/1.5A | -24V/1.5A |
| GRN-200-2001 | +5V/30A | +24V/3A | | |
| GRN-200-2002 | +5V/30A | +12V/6A | | |
| GRN-200-2003 | +12V/12A | -12V/6A | | |
| GRN-200-2004 | +15V/10A | -15V/5A | | |

## ORDERING INFORMATION

Consult factory for alternate output configurations.
Please specify the following optional features when ordering:

CH - Chassis
CO - Cover
BF - Type BF
PF - Power Fail Warning
IO - Isolated Outputs

All specifications are maximum at 25°C, 200W unless otherwise stated, may vary by model and are subject to change without notice.

## OUTPUT SPECIFICATIONS

| | | |
|---|---|---|
| Output Power at 50°C(1) | 135W | Convection Cooled, Open Frame |
| (See Derating Chart) | 200W | 300LFM Forced Air, Open Frame(14) |
| Voltage Centering(15) | Output 1: | ± 0.5% (all outputs at 50% load) |
| | Output 2: | ± 6.0% (4005, all outputs at 50% load) |
| | Outputs 2-4: | ± 5.0% (all outputs at 50% load) |
| Voltage Adjust Range | Output 1: | 95-105% |
| Load Regulation | Output 1: | ± 0.5% (0-100% load change) |
| | Output 2: | ±6% (4001,4002,4005 20-100% load change) |
| | Outputs 2-4: | ± 5.0% (10-100% load change) |
| Source Regulation | Outputs 1-4: | 0.5% |
| Cross Regulation | Outputs 2-4: | 5.0% |
| Ripple & Noise(6) | Outputs 1-4: | 1.0% or 100mV p-p, 20MHz BW |
| Turn on Overshoot | None | |
| Transient Response | Output recovers to within 1% of initial set point due to a 50-100-50% step load change, 500µs maximum, 4% dev. | |
| Overvoltage Protection | Latching, between 110% and 150% of rated output voltage. | |
| Overpower Protection | 110-150% rated $P_{OUT}$, cycle on/off, auto recovery | |
| Hold Up Time | 16ms minimum, full power | |
| Start Up Time | <1 sec., 115/230V Input | |
| Output Rise Time | 25ms typical | |
| Minimum Load(5) | No minimum load required | |

## INPUT SPECIFICATIONS

| | |
|---|---|
| Protection Class | I |
| Source Voltage | 85 – 264 Volts AC (see derating chart) |
| Frequency Range | 47 – 63 Hz |
| Input Protection | Dual internal 5A time delay fuses, 1500A breaking capacity |
| Peak Inrush Current | 40A max |
| Peak Efficiency | Up to 90% |
| Average Efficiency | 86% (Avg. of 25%, 50%, 75%, 100% rated load) |
| No Load Input Power | <300mW, 115/230 $V_{IN}$, no load<br><500mW, 115/230 $V_{IN}$, no load (PF Option) |

## ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| Ambient Operating Temp. Range | -20°C to + 70°C, Derating (see derating Chart) |
| Ambient Storage Temp. Range | - 40°C to + 85°C |
| Operating Relative Humidity Range | 20-90% non-condensing |
| Altitude | 5,000m ASL – Operating / 12,192m ASL – Non-Operating |
| Temperature Coefficient | 0.02%/°C |
| Vibration (MIL-STD-810G) | 2.5G swept sine, 10-2000Hz, 1octave/min, 3 axis, 1 hour each |
| Shock (MIL-STD-810G) | 20G, 11ms, 3 axis |

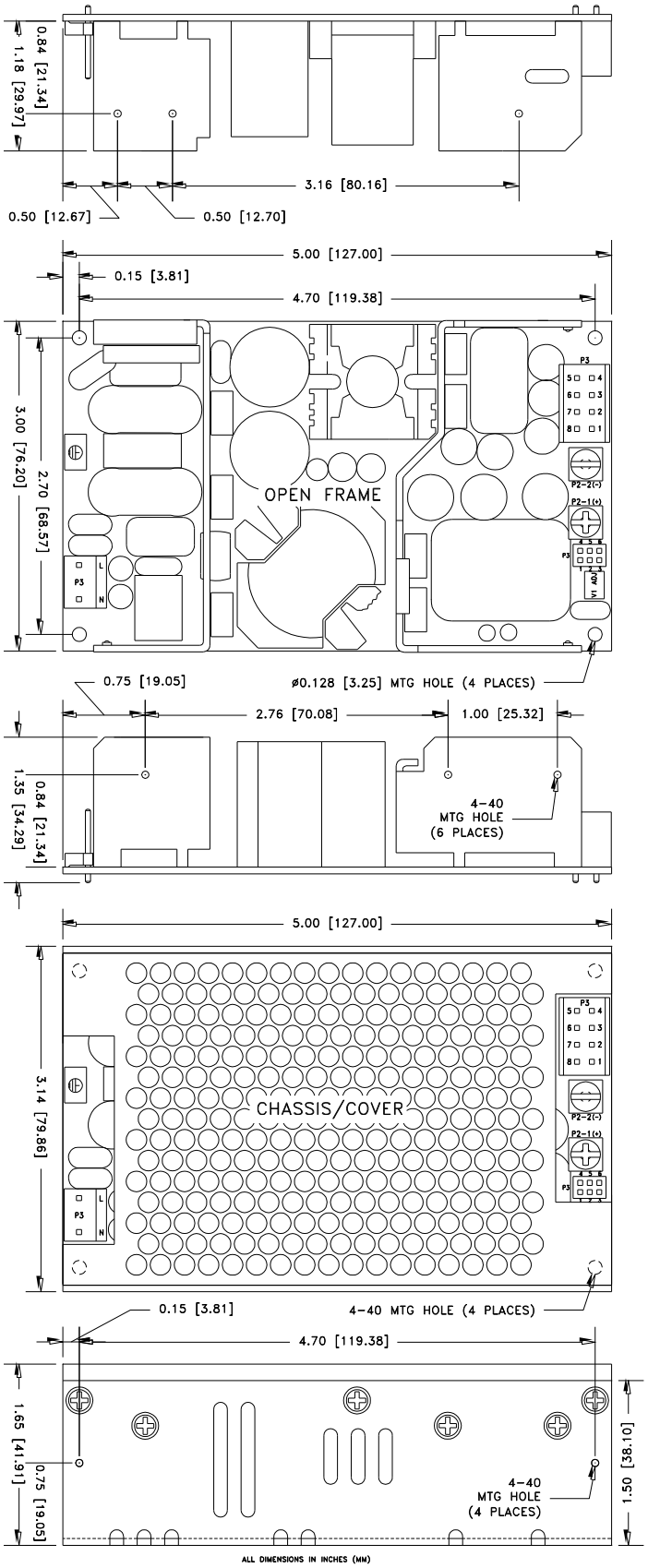
## GENERAL SPECIFICATIONS

| | |
|---|---|
| Means of Protection | |
| Primary to Secondary | 2MOPP (Means of Patient Protection) |
| Primary to Ground | 1MOPP (Means of Patient Protection) |
| Secondary to Ground | Operational Insulation (1MOPP w/ Option BF) |
| Dielectric Strength(7, 8) | |
| Reinforced Insulation | 5656 VDC (4000VAC) |
| Basic Insulation | 2121 VDC (1500VAC) |
| Operational Insulation | 707 VDC (500VAC)/2121VDC(1500VAC) w/ Option BF |
| Leakage Current | |
| Earth Leakage | <300µA NC, <1000µA SFC |
| Touch Current | <100µA NC, <500µA SFC |
| Patient Leakage Current | <100µA NC, <500µA SFC w/Option BF |
| Power Fail Signal | Logic low with input power failure 9ms prior to loss of Output 1(13) |
| Switching Frequency | PWM:65 KHz/PFC:Variable |
| Remote Sense(9) | 250mV compensation of output cable losses (output 1) |
| Mean-Time Between Failures | >200,000 HOURS, MIL-HDBK-217F, 25° C, GB |
| Weight | 1.0 lb. Open frame / 1.16 lb. Chassis and cover |

## EMC SPECIFICATIONS (IEC 60601-1-2:2014, 4TH ed./IEC 61000-6-2:2005)

| | | | |
|---|---|---|---|
| Electrostatic Discharge | EN 61000-4-2 | ±8KV contact / ±15KV air discharge | A |
| Radiated Electromagnetic Field | EN 61000-4-3 | 80MHz-2.7GHz, 10V/m, 80% AM | A |
| Electrical Fast Transients/Bursts | EN 61000-4-4 | ±2 KV, 5KHz/100KHz | A |
| Surge Immunity | EN 61000-4-5 | ±2 KV line to earth / ±1 KV line to line | A |
| Conducted Immunity | EN 61000-4-6 | 0.15 to 80MHz, 10V, 80% AM | A |
| Magnetic Field Immunity | EN 61000-4-8 | 30A/m, 60 Hz. | A |
| Voltage Dips | EN 61000-4-11 | 0% $U_T$, 0.5 cycles, 0-315° | 100/240V A/A |
| | | 0% $U_T$, 1 cycles, 0° | 100/240V A/A |
| | | 40% $U_T$, 10/12 cycles, 0° | 100/240V B/A |
| | | 70% $U_T$, 25/30 cycles, 0° | 100/240V B/A |
| Voltage Interruptions | EN 61000-4-11 | 0% $U_T$, 300 cycles, 0° | 100/240V B/B |
| Radiated Emissions | EN 55011/32 | Class B | |
| Conducted Emissions | EN 55011/32 | Class B | |
| Harmonic Current Emissions | EN 61000-3-2 | Class A | |
| Voltage Fluctuations/Flicker | EN 61000-3-3 | Compliant | |

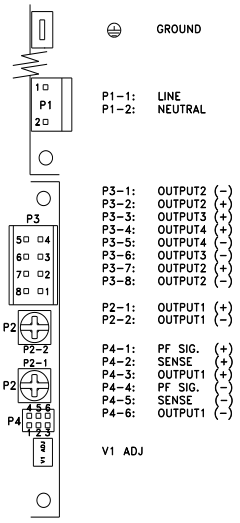
## GRN-200 SERIES MECHANICAL SPECIFICATIONS




## DERATING REQUIREMENTS

- Derate Output 1 current rating 33% when convection cooled.
- Derate Outputs 2-4 current rating 25% when convection cooled.
- Derate Total Output Power linearly from 100% load at 50ºC to 50% load at 70ºC.
- Derate Total Output Power linearly from 100% load at 90$V_{IN}$ to 90% load at 85$V_{IN}$.
- Derate Total Output Power 10% when convection cooled using Chassis or Chassis/Cover.
- Derate Total Output Power 10% when forced-air cooled using Chassis or Chassis/Cover.

## CONNECTOR SPECIFICATIONS




**Ground:** 0.187 quick disconnect terminal.

**P1:** 0.156 friction lock header mates with Molex 09-50-3031 or equivalent crimp terminal housing with Molex 08-50-0189 or equivalent crimp terminal.

**P3:** 5566 Mini-Fit Jr. header mates with 5557 Mini-Fit Jr. or equivalent crimp housing with 5556 Mini-Fit or equivalent crimp terminal.

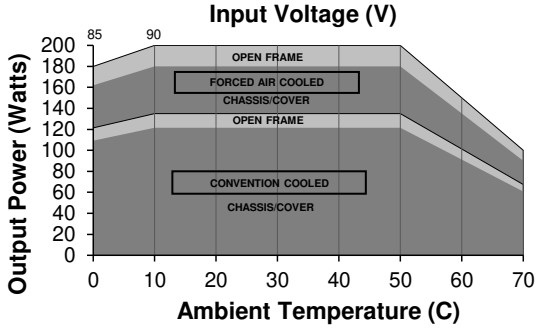
**P2:** 6-32 screw down terminal mates with #6 ring tongue terminal. (10 in-lb Max)

**P4:** 0.100 friction lock header mates with Molex 22-55-2061 or equivalent crimp terminal housing with Molex 71851 or equivalent crimp terminal.

## APPLICATIONS INFORMATION

1. Each output can deliver its rated current but Total Output Power must not exceed 200W, as determined by the cooling method.
2. Generally, adequate cooling is provided when semiconductor case temperatures do not exceed 70°C rise and transformer temperature does not exceed 60°C rise at any specified ambient temperature.
3. Sufficient area must be provided around power supply to allow natural movement of air to develop in convection-cooled applications.
4. This product is intended for use as a professionally-installed component within information technology, industrial, and medical equipment and is not intended for stand-alone operation.
5. Minimum load is not required for reliable operation; however, a 10% load may be required on Output 1 when loading Outputs 2, 3 or 4.
6. 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 (tip-and-barrel method), 20MHz bandwidth.
7. This product was type-tested and safety-certified using the dielectric strength test voltages listed in Table 6 of IEC 60601-1:2005. In consideration of Clause 8.8.3, care must be taken to ensure that the voltage applied to a reinforced insulation does not overstress different types and levels of insulation. Primary and secondary-to-ground capacitors may need to be disconnected prior to performing a dielectric strength test on the power supply or the end product. It is highly recommended that the DC test voltages listed in DVB.1, Annex DVB of UL 60601-1 1st Edition are not exceeded during a production-line dielectric strength test of the assembled end product. Please consult factory for further information.
8. 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.
9. Remote-Sense terminals may be used to compensate for cable losses up to 400mV, depending on model. The use of a twisted pair, decoupling capacitors and an appropriately-rated low-impedance capacitor connected across the load will increase noise immunity.
10. Maximum screw penetration into bottom chassis mounting holes is 0.100 inches. Maximum screw penetration into side chassis mounting holes is 0.188 inches.
11. To comply with emissions specifications, all four mounting hole pads must be electrically connected to a common metal chassis. Chassis/Cover option is recommended. Refer to Operating Instructions for additional information.
12. Common RF shielding precautions may need to be taken to assure emissions compliance. Refer to Operating Instructions for additional information.
13. Power Fail (AC-Good) feature provides a logic-low warning signal from an open collector transistor output 9-15ms prior to loss of output from AC failure.
14. 300LFM minimum of airflow must be maintained one inch above all points of top-side components or cover when forced-air cooling is required.
15. A 3% increase above nominal voltage of Output 1 is required to meet ±5% centering of Output 2 on 4002 only.

## MAX $P_{OUT}$ vs. AMBIENT TEMPERATURE/INPUT VOLTAGE

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