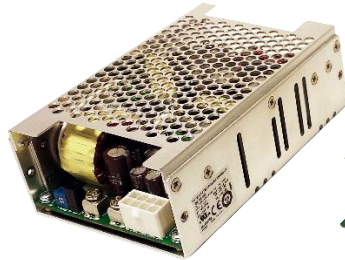


# 200 WATTS

## MULTI OUTPUT AC-DC

### 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 3<sup>rd</sup> ed. Medical Cert.
- IEC 60950-1 2<sup>nd</sup> ed. ITE Certification
- IEC 62368-1 2<sup>nd</sup> ed. Certification
- IEC 60601-1-2 4<sup>th</sup> 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

**UL** Underwriters Laboratories  
File E137708/E140259

UL 62368-1:2014, 2<sup>nd</sup> Edition  
CAN/CSA-C22.2 No. 62368-1-14  
AAMI/ANSI ES60601-1:2005/(R) 2012  
CAN/CSA-C22.2 No. 60601-1:2014



CB Reports/Certificates (including all National and Group Deviations)

IEC 62368-1:2014, 2<sup>nd</sup> Edition  
IEC 60601-1:2005/A1:2012



TUV SUD America

EN 62368-1:2014, 2<sup>nd</sup> Edition  
EN 60601-1:2006/A1:2013



Low Voltage Directive  
RoHS Directive (Recast)

(2014/35/EU of February 2014)  
(2015/863/EU of March 2015)



Electrical Equipment (Safety) Regulations 2016 SI No. 1101  
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.

# GRN-200

## OUTPUT SPECIFICATIONS

|                                     |  |   |
|-------------------------------------|--|---|
| Output Power at 50°C <sub>(1)</sub> | 135W   | Convection Cooled, Open Frame                 |
| (See Derating Chart)                | 200W   | 300LFM Forced Air, Open Frame <sup>(14)</sup> |
| Voltage Centering <sup>(15)</sup>   | Output 1:  | ± 0.5% (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)                   |
|                                     | Outputs 2:   | ±6% (4001-4002 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 <sup>(6)</sup>       | 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% maximum deviation. |   |
| Overvoltage Protection              | Latching, between 110% and 150% of rated output voltage.   |   |
| Overpower Protection                | 110-150% rated P <sub>OUT</sub> , 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 <sup>(5)</sup>         | 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 <sub>IN</sub> , no load                  |  |
|                     | <500mW, 115/230 V <sub>IN</sub> , 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<br>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  |  |

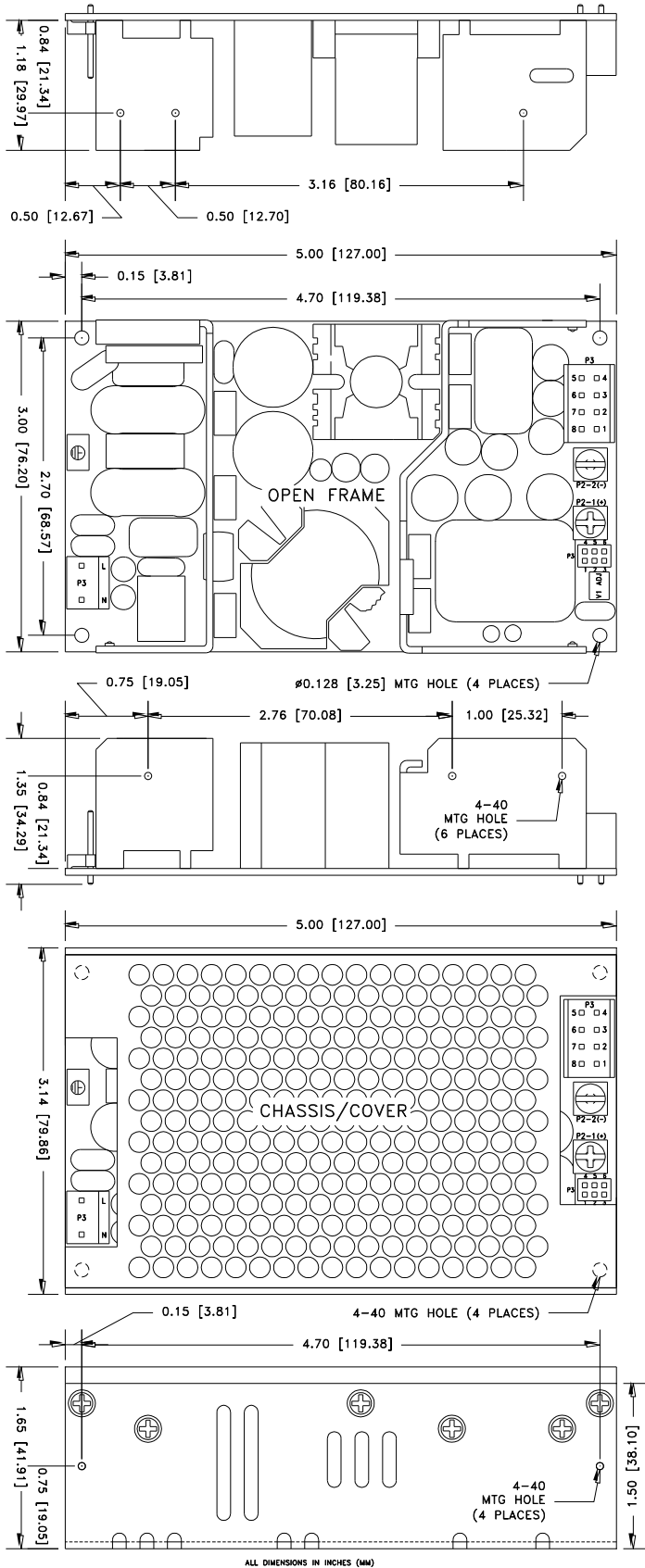
## GENERAL SPECIFICATIONS

|                                       |  |  |
|---------------------------------------|--|--|
| 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 <sup>(7, 8)</sup> |  |  |
| 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 <sup>(13)</sup> |  |
| Switching Frequency                   | PWM:65 KHz/PFC:Variable  |  |
| Remote Sense <sup>(9)</sup>           | 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, 4<sup>TH</sup> 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 <sub>T</sub> , 0.5 cycles, 0-315°   | 100/240V A/A |
|                                   |               | 0% U <sub>T</sub> , 1 cycles, 0°         | 100/240V A/A |
|                                   |               | 40% U <sub>T</sub> , 10/12 cycles, 0°    | 100/240V B/A |
|                                   |               | 70% U <sub>T</sub> , 25/30 cycles, 0°    | 100/240V B/A |
| Voltage Interruptions             | EN 61000-4-11 | 0% U <sub>T</sub> , 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                                |              |

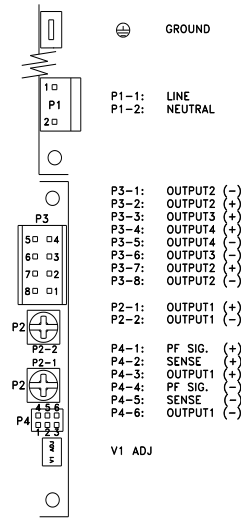
## GRN-200 SERIES MECHANICAL SPECIFICATIONS



## DERATING REQUIREMENTS

- Derate Output 1 (3.3-5V) current rating 33% when convection cooled.
- Derate Outputs 2-4 (12-24V) current rating 25% when convection cooled.
- Derate Total Output Power linearly from 100% load at 50°C to 50% load at 70°C.
- Derate Total Output Power linearly from 100% load at 90V<sub>IN</sub> to 90% load at 85V<sub>IN</sub>.
- 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

- Each output can deliver its rated current but Total Output Power must not exceed 200W, as determined by the cooling method.
- 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.
- Sufficient area must be provided around power supply to allow natural movement of air to develop in convection-cooled applications.
- 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.
- 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.
- 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.
- 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 1<sup>st</sup> Edition are not exceeded during a production-line dielectric strength test of the assembled end product. Please consult factory for further information.
- 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.
- 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.
- Maximum screw penetration into bottom chassis mounting holes is 0.100 inches. Maximum screw penetration into side chassis mounting holes is 0.188 inches.
- 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.
- Common RF shielding precautions may need to be taken to assure emissions compliance. Refer to Operating Instructions for additional information.
- 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.
- 300LFM minimum of airflow must be maintained one inch above all points of top-side components or cover when forced-air cooling is required.
- A 3% increase above nominal voltage of Output 1 is required to meet ±5% centering of Output 2 on 4002 only.

## MAX P<sub>OUT</sub> vs. AMBIENT TEMPERATURE/INPUT VOLTAGE

