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 File E137708/E140259	UL 62368-1:2014, 2nd Edition CAN/CSA-C22.2 No. 62368-1-14, 2nd Edition AAMI/ANSI ES60601-1:2005/(R) 2012(R)2021 CAN/CSA-C22.2 No. 60601-1:2014:2022
IECEE CB SCHEME	CB Reports/Certificates (including all National and Group Deviations)	IEC 62368-1:2014, 2nd Edition IEC 60601-1:2005/A1:2012
TUV SUD	TUV SUD America	EN 62368-1:2014, 2nd Edition EN 60601-1:2006/A1:2013
CE	Low Voltage Directive RoHS Directive (Recast)	(2014/35/EU of February 2014) (2015/863/EU of March 2015)
UK CA	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.

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 <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

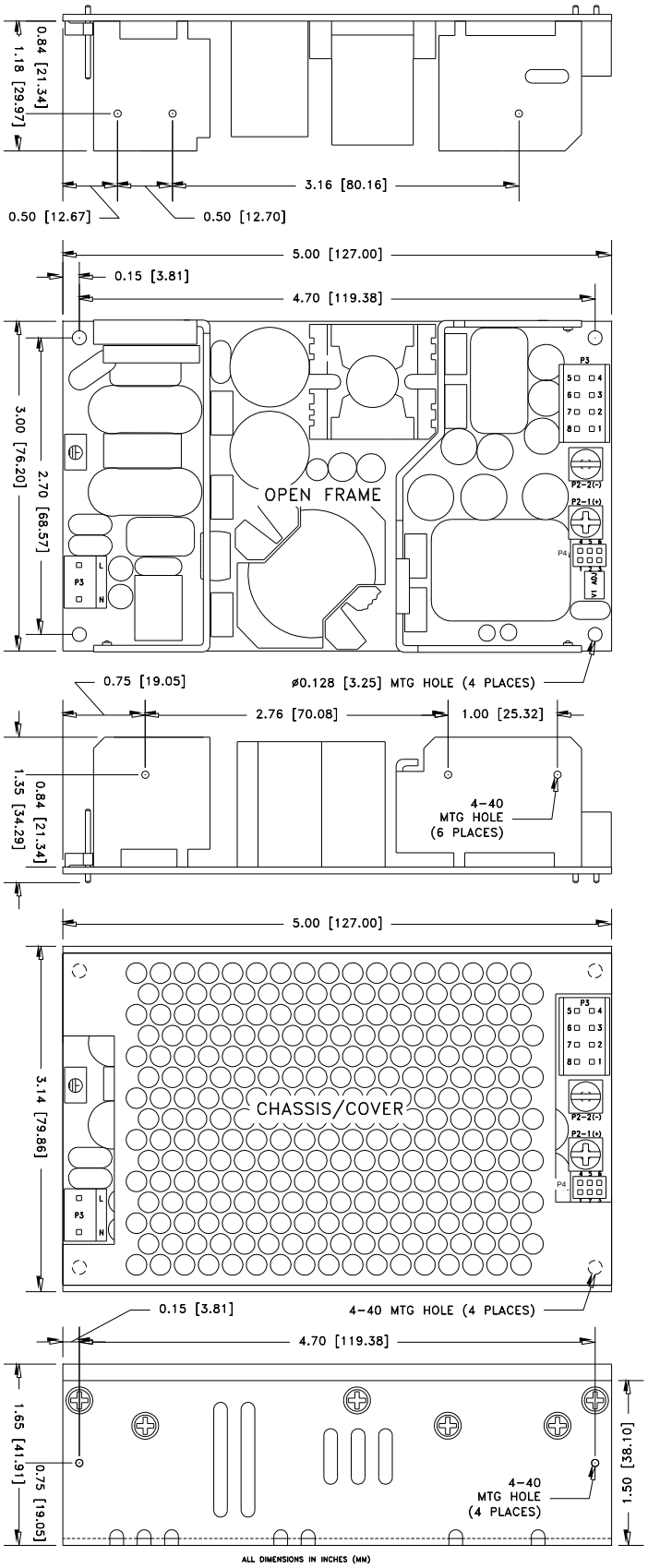
GENERAL SPECIFICATIONS

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	

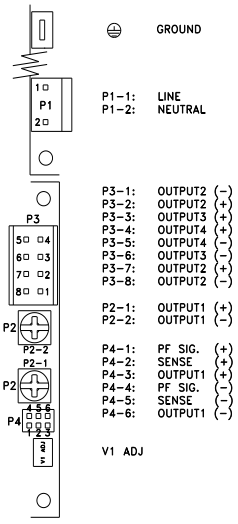
GRN-200 SERIES MECHANICAL SPECIFICATIONS



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 90V_{IN} to 90% load at 85V_{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.

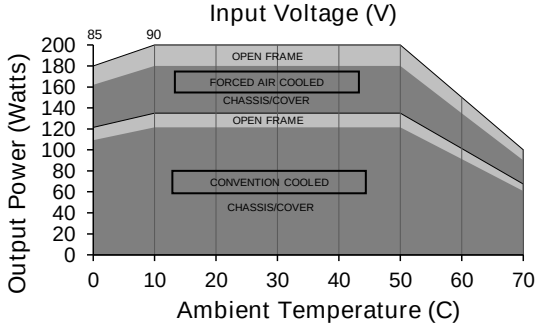
P2: 6-32 screw down terminal mates with #6 ring tongue terminal. (10 in-lb Max)

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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