

110 WATTS

MULTI OUTPUT AC-DC

FEATURES:

- Compact 3.0" x 5.0" x 1.25" Size
- 3 Year Warranty
- Universal 85-264V Input
- Dual, Triple or Quad Outputs
- 87% Peak Efficiency
- 85% Average Efficiency
- <1W No Load Input Power
- IEC 60601-1 3rd ed. Medical Cert.
- IEC 60950-1 2nd ed. ITE Certification
- IEC 60601-1-2 4th ed. EMC
- Class B Emissions per EN55011/32
- 0-70°C Operating Temperature
- RoHS Compliant
- Optional Chassis/Cover



CHASSIS/COVER



OPEN FRAME

SAFETY SPECIFICATIONS

	Underwriters Laboratories File E137708/E140259	UL 60950-1:2007, 2 nd Edition AAMI/ANSI ES60601-1:2005(R) 2012
		CB Reports/Certificates (including all National and Group Deviations) IEC 60950-1/A2:2013, 2 nd Edition IEC 60601-1:2005/A1:2012
	UL Recognition Mark for Canada File E137708/E140259	CAN/CSA-C22.2 No. 60950-1-07, 2 nd Edition CAN/CSA-C22.2 No. 60601-1:2014
	TUV	EN 60950-1/A2:2013, 2 nd Edition EN 60601-1:2006/A1:2013
	Low Voltage Directive RoHS Directive (Recast)	(2014/35/EU of February 2014) (2011/65/EU of June 2011)

MODEL LISTING

MODEL	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4
GRN-110-4001	+3.3V/10A	+5V/5A	+12V/2A	-12V/2A
GRN-110-4002	+5V/10A	-5V/5A	+12V/2A	-12V/2A
GRN-110-4003	+5V/10A	+24V/2A	+12V/2A	-12V/2A
GRN-110-4004	+5V/10A	+24V/2A	+15V/2A	-15V/2A
GRN-110-3001	+5V/12A		+12V/3A	-12V/3A
GRN-110-3002	+5V/12A		+15V/3A	-15V/3A
GRN-110-2001	+5V/12A	+24V/3A		
GRN-110-2002	+5V/12A	+12V/5A		
GRN-110-2003	+12V/5A	-12V/5A		
GRN-110-2004	+15V/4A	-15V/4A		

ORDERING INFORMATION

Consult factory for alternate output configurations.
Consult factory for positive, negative or floating outputs.^(1,3)
Please specify the following optional features when ordering:

CH - Chassis
CO - Cover
OVP - Overvoltage Protection
I/O - Isolated Outputs

All specifications are maximum at 25°C/110W unless otherwise stated, may vary by model and are subject to change without notice.

GRN-110

OUTPUT SPECIFICATIONS

Output Power at 50°C ₍₁₎ (See Derating Chart)	110W	85-264 V _{IN}
Voltage Centering	Output 1: ±0.5% Outputs 2 - 4: ±5.0%	(All outputs at 50% load)
Voltage Adjust Range	Output 1: 95-105%	
Load Regulation	Output 1: ±0.5% Outputs 2 - 4: ±5.0%	(0-100% load change) (10-100% load change)
Source Regulation	Outputs 1 - 4: 0.5%	
Cross Regulation	Outputs 2 - 4: 5.0%	
Ripple & Noise	Outputs 1 - 4: 1.0%	
Turn On Overshoot	<1%	
Transient Response	Output recovers to within 1% of initial set point due to a 50% step load change, 500µs maximum, 4% maximum deviation.	
Overvoltage Protection	Latching, Output 1 between 110% and 150% of rated output voltage (optional)	
Overpower Protection	110%-150% rated P _{OUT} , cycle on/off, auto recovery	
Hold-Up Time	16ms typical, full power, 115V input	
Start-Up Time	1 sec., 115/230V input	
Output Rise Time	25ms typical	
Minimum Load(s)	No minimum load required	

INPUT SPECIFICATIONS

Protection Class	-	
Source Voltage	85 - 264 VAC (see derating chart)	
Frequency Range	47 - 63 Hz	
Input Protection(s)	Internal 4A time delay fuse, 1500A breaking capacity	
Peak Inrush Current	40A max at 230 V	
Peak Efficiency	87%	
Average Efficiency	85% (Avg. of 25%, 50%, 75% and 100% rated load)	
Light Load Efficiency	85%, 115/230 V _{IN} , 33% power	
No Load Input Power	<1W, 115/230 V _{IN} , no load	

ENVIRONMENTAL SPECIFICATIONS

Cooling	Free air convection	
Ambient Operating	0°C to +70°C	
Temperature Range	Derating: see power rating chart	
Ambient Storage Temp. Range	-40°C to +85°C	
Operating Relative Humidity Range	20-90% non-condensing	
Altitude	10,000 ft. ASL	Operating
	40,000 ft. ASL	Non-operating
Temperature Coefficient	0.02%/°C	
Vibration	2.5G swept sine, 7-2000Hz, 1 octave/min, 3 axis, 1 hour each.	
Shock	20g, 11 ms, 3 axis.	

GENERAL SPECIFICATIONS

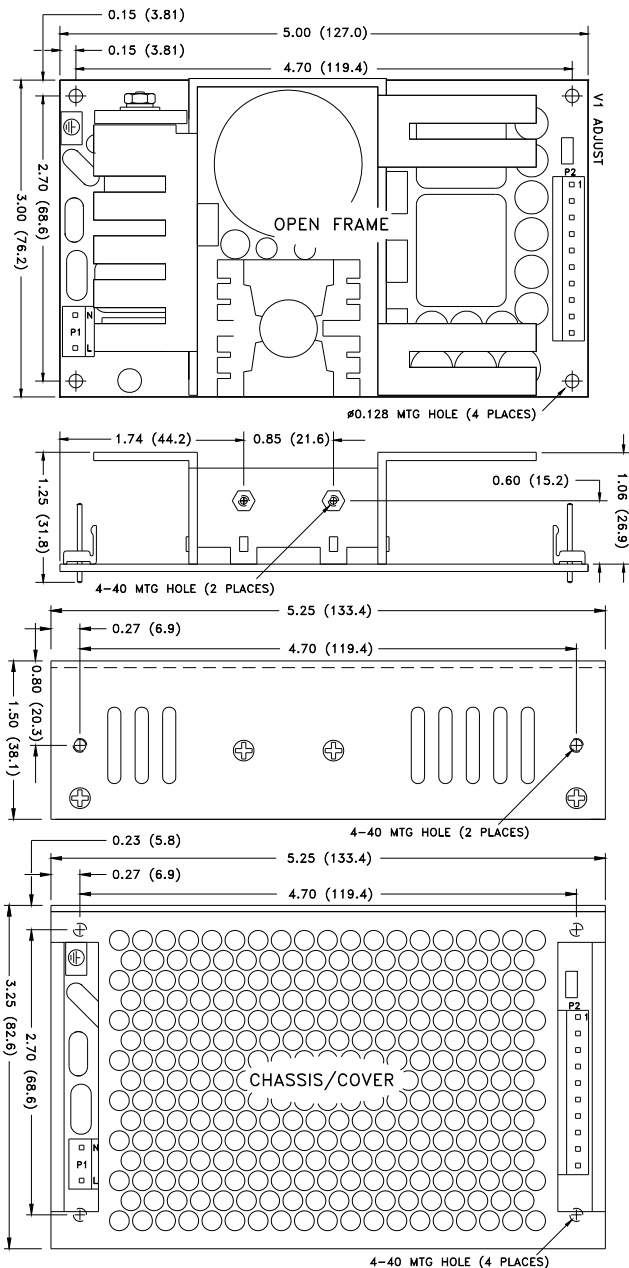
Means of Protection	Primary to Secondary: 2MOPP (Means of Patient Protection) Primary to Ground: 1MOPP (Means of Patient Protection) Secondary to Ground: Operational Insulation (consult factory for 1MOOP or 1MOPP)	
Dielectric Strength ^(6, 9)	Reinforced Insulation: 5656 VDC, Primary to Secondary Basic Insulation: 2121 VDC, Primary to Ground Operational Insulation: 707 VDC, Secondary to Ground	
Leakage Current	Earth Leakage: <300µA NC, <1000µA SFC Touch Current: <100µA NC, <500µA SFC	
Switching Frequency	100 KHz	
Mean-Time Between Failures	>250,000 hours, MIL-HDBK-217F, 25° C, GB	
Weight	0.79 lbs.	Open frame / 1.00 lbs. 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 _r , 0.5 cycles, 0-315°	100/240V A/A
		0% U _r , 1 cycles, 0°	100/240V A/A
		40% U _r , 10/12 cycles, 0°	100/240V B/A
		70% U _r , 25/30 cycles, 0°	100/240V B/A
Voltage Interruptions	EN 61000-4-11	0% U _r , 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 (<100W P _{IN})	
Voltage Fluctuations/Flicker	EN 61000-3-3	Compliant	

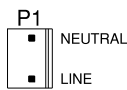
GRN-110 MULTI MECHANICAL SPECIFICATIONS

APPLICATIONS INFORMATION

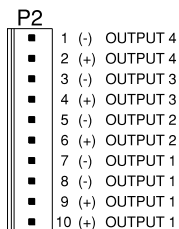


ALL DIMENSIONS IN INCHES (mm)

CONNECTOR SPECIFICATIONS



AC Input
0.156 friction lock header mates with Tyco 640250-3 or equivalent crimp terminal housing with Tyco 3-640706-1 or equivalent crimp terminal.



DC Output
0.156 friction lock header mates with Tyco 1-770849-0 or equivalent crimp terminal housing with Tyco 3-640707-1 or equivalent crimp terminal.

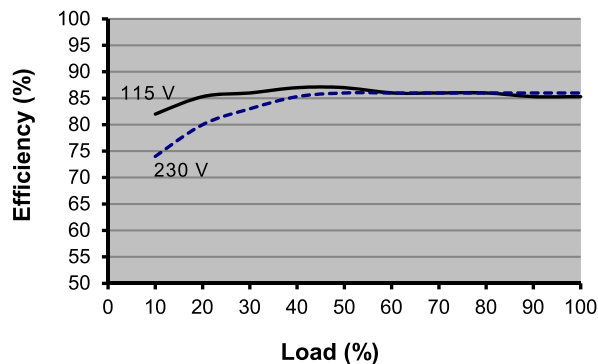


Ground 0.187 quick disconnect terminal

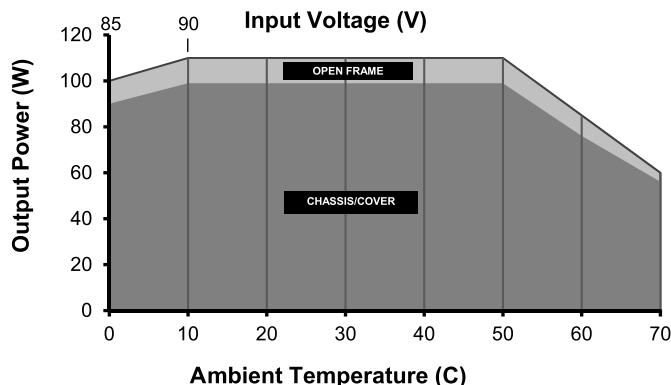
- Each output can deliver its rated current but Total Output Power must not exceed 110W.
- Generally, adequate cooling is provided when semiconductor case temperatures do not exceed 70°C rise and transformer temperature does not exceed 60°C rise at any specified ambient temperature.
- Sufficient area 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.
- This product includes only one fuse in the input circuit. In consideration of clause 8.11.5 of IEC 60601-1-1:2005, a second fuse may be required in neutral conductor of the end product.
- 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), 20 MHz bandwidth.
- This product was type-tested and safety-certified using the dielectric strength test voltages listed in Table 6 of IEC60601-1:2005. In consideration of clause 8.8.3, care must be taken to insure 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 type test on the power supply or the end product. It is highly recommended that the DC test voltage listed in DVB.1, annex DVB of UL60601-1 1ST 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.
- 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.
- Optional Output Configuration (consult factory).
 - V2 can be configured positive, negative or floating with respect to V1.
 - V3 can be configured positive or floating with respect to V1.
 - V4 can be configured positive, negative or floating with respect to V1.

TYPICAL EFFICIENCY vs. LOAD

(Model GRN-110-3001 Efficiency shown)



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



Derating requirements - Derate from 100% load at 50°C to 50% load at 70°C.
 - Derate from 100% load at 90V_{IN} to 90% load at 85V_{IN}.
 - Derate 10% with Chassis/Cover option.