

# 45 WATTS

## MULTI OUTPUT AC-DC

### FEATURES:

- Compact 2.5" x 4.25" x 1.0" Size
- 3 Year Warranty
- Universal 85-264V Input
- Dual, Triple or Quad Outputs
- 86% Peak Efficiency
- 85% Average Efficiency
- <1W No Load Input Power
- IEC 60601-1 3<sup>rd</sup> ed. Medical Cert.
- 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
- 0-70°C Operating Temperature
- RoHS Compliant
- Optional Chassis/Cover



CHASSIS/COVER



OPEN FRAME

### SAFETY SPECIFICATIONS

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-45-4001	+3.3V/5.0A	+5.0V/5.0A	+12V/1.0A	-12V/1.0A
GRN-45-4002	+5.0V/5.0A	-5.0V/5.0A	+12V/1.0A	-12V/1.0A
GRN-45-4003	+5.0V/5.0A	+24V/1.0A	+12V/1.0A	-12V/1.0A
GRN-45-4004	+5.0V/5.0A	+24V/1.0A	+15V/1.0A	-15V/1.0A
GRN-45-3001	+5.0V/5.0A		+12V/1.0A	-12V/1.0A
GRN-45-3002	+5.0V/5.0A		+15V/1.0A	-15V/1.0A
GRN-45-2001	+5.0V/5.0A	+24V/1.0A		
GRN-45-2002	+5.0V/5.0A	+12V/2.0A		
GRN-45-2003	+12V/2.0A	-12V/2.0A		
GRN-45-2004	+15V/2.0A	-15V/2.0A		

### ORDERING INFORMATION

Consult factory for alternate output configurations.  
 Consult factory for positive, negative or floating outputs.<sup>(14)</sup>  
 Please specify the following optional features when ordering:

CH - Chassis  
 CO - Cover  
 OVP - Overvoltage Protection  
 I/O - Isolated Outputs (consult factory)

All specifications are maximum at 25°C/45W unless otherwise stated, may vary by model and are subject to change without notice.

# GRN-45

## OUTPUT SPECIFICATIONS

Output Power at 50°C <sub>(1)</sub> (See Derating Chart)	45W	85-264 V <sub>IN</sub>
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%-160% rated P <sub>OUT</sub> , 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 <sup>(5)</sup>	No minimum load required	

## INPUT SPECIFICATIONS

Protection Class	I
Source Voltage	85 - 264 VAC (see derating chart)
Frequency Range	47 - 63 Hz
Input Protection <sup>(6)</sup>	Internal 2A time delay fuse, 1500A breaking capacity
Peak Inrush Current	50A max. at 230 V
Peak Efficiency	86%
Average Efficiency	85% (Avg. of 25%, 50%, 75%, and 100% rated load)
Light Load Efficiency	85%, 115/230 V <sub>IN</sub> , 33% power
No Load Input Power	<1W, 115/230 V <sub>IN</sub> , no load

## ENVIRONMENTAL SPECIFICATIONS

Cooling	Free air convection
Ambient Operating Temperature Range	0°C to +70°C
Derating	see power rating chart
Ambient Storage Temp. Range	-40°C to +85°C
Operating Relative Humidity Range	20-90% non-condensing
Altitude	3,000m ASL - Operating 12,192m 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, 3 each direction.

## GENERAL SPECIFICATIONS

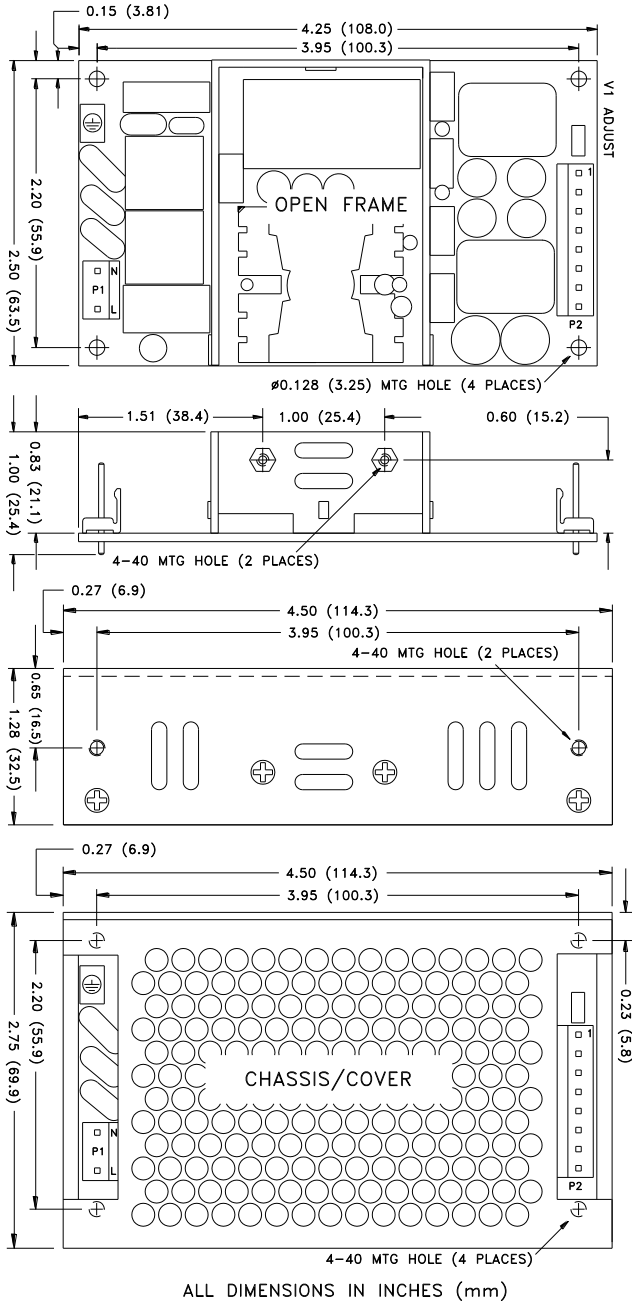
Means of Protection	Primary to Secondary: 2MOPP (Means of Patient Protection) Primary to Ground: 1MOPP (Means of Patient Protection) Secondary to Ground: Operational Insulation (Consult factory for 1MOPP)
Dielectric Strength <sup>(8, 9)</sup>	Reinforced Insulation: 5656 VDC, Primary to Secondary Basic 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	>400,000 hours, MIL-HDBK-217F, 25° C, GB
Weight	0.48 lbs. Open frame / 0.62 lbs. 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° 0% U <sub>T</sub> , 1 cycles, 0° 40% U <sub>T</sub> , 10/12 cycles, 0° 70% U <sub>T</sub> , 25/30 cycles, 0°	100/240V A/A 100/240V A/A 100/240V B/A 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	

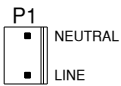
# GRN-45 MULTI MECHANICAL SPECIFICATIONS

# APPLICATIONS INFORMATION



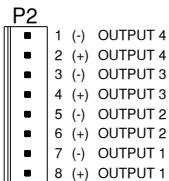
ALL DIMENSIONS IN INCHES (mm)

## 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 770849-8 or equivalent crimp terminal housing with Tyco 3-640707-1 or equivalent crimp terminal.



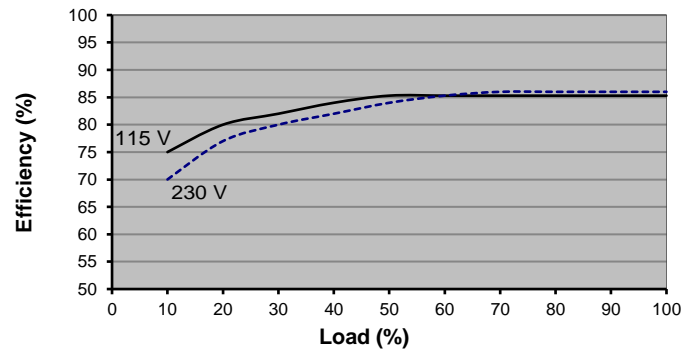
Ground

0.187 quick disconnect terminal

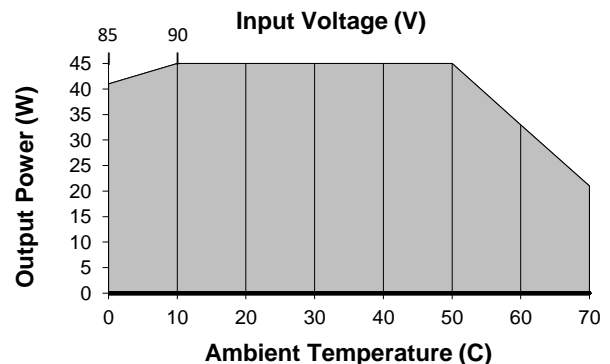
- Each output can deliver its rated current but Total Output Power must not exceed 45W.
- Generally, adequate cooling is provided when semiconductor case temperatures do not exceed 70°C rise and transformer temperature does not exceed 60°C rise at any specified ambient temperature.
- Sufficient area 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 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.
- Maximum screw penetration into bottom chassis mounting holes is 0.100 inches. Maximum screw penetration into side chassis mounting holes is 0.188 inches.
- Common RF shielding precautions may need to be taken to assure emissions compliance. Refer to operating instructions for additional information.
- 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 and must share a common return with V4.
  - V4 can be configured negative or floating with respect to V1 and must share a common return with V3.

## TYPICAL EFFICIENCY vs. LOAD

(Model GRN-45-3001 Efficiency shown)



## MAX P<sub>OUT</sub> 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<sub>IN</sub> to 90% load at 85V<sub>IN</sub>.