



Medical



Industrial

FEATURES AND BENEFITS

Output Power of 660W with airflow	UL/CSA/IEC/IEC60601-1 Am1 IEC62368-1
440W Convection Cooled	-20°C to 80°C Operating Temperature Range
4" X 6" X 1.6" Size	Meets 4th Edition/Heavy Industrial EMC Less
Universal 85-264Vac Input Range	than 100uA Leakage Current
Meets Class B Emissions Levels	Class I and Class II Input versions available
7+ Years Electrolytic Capacitor Life	3 Years Warranty



MODEL SELECTION

Model Number	Nominal Output Voltage	Output Current (w/air)	Output Power (w/air) ¹	Output Current (convection)	Output Power (convection)	Output Current (conduction)	Output Power (conduction)	Standby Output	Terminations	
									Input	Output
NGB660S12K	12V	46.2A	560W	30.6A	370W	38.9A	470W	5Vdc @ 1A	Screw Terminals (Class I)	Screw Terminals
NGB660S15K	15V	37.0A	560W	24.5A	370W	31.1A	470W			
NGB660S24K	24V	27.2A	660W	18.2A	440W	21.5A	520W			
NGB660S48K	48V	13.6A	660W	9.1A	440W	10.7A	520W			
NGB660S12C	12V	46.2A	560W	30.6A	370W	38.9A	470W	5Vdc @ 1A	Screw Terminals (Class II)	Screw Terminals
NGB660S15C	15V	37.0A	560W	24.5A	370W	31.1A	470W			
NGB660S24C	24V	27.2A	660W	18.2A	440W	21.5A	520W			
NGB660S48C	48V	13.6A	660W	9.1A	440W	10.7A	520W			

*5Vs output current: 1A @300LFM; 0.5A@convection and conduction

*Airflow: >=300LFM

INPUT

AC Input	80VAC-264VAC, single phase, 47Hz-63Hz
Input Current	7.0A max. at 115Vac - 3.5A max. at 230Vac
Inrush Current	264VAC, cold start: will not exceed 40A peak
Input Fuses	6.3A, 250VAC fuse in both line and neutral
Earth Leakage Current	<500µA@ 264VAC, 60 Hz input, NC
Patient Leakage Current (Output to Earth)	<100uA/500µA @264VAC, 60Hz input, NC/SFC
Efficiency	>90%, typical
No Load Input Power	<0.5W

SAFETY

UL	UL62368-1, UL60601-1, 3rd Edition, Am1 Complies with BF rated application requirements
CSA	CAN/CSA-C22.2 No. 62368-1, 60601-1, Am1
Demko	EN62368-1 EN60601-1-1, 3rd Edition, Complies with BF rated application requirements
CB Report	Design to meet 5000m and 50°C, 93% RH with 120 h (Tropical standard) according to GB4943 1-2011, IEC62368-1, IEC60601-1 Am1, Complies with BF rated application requirements



OUTPUT

Output Power	See model list above
Peak Rating	TBD
Ripple and Noise	1% of Vout on all other models
Load Regulation	2%
Line Regulation	1%
Total Regulation	5%
Minimum Load	Not required
Initial Set Point Tolerance	±1 %
Output Adjustability	5%
Overshoot	<5% overshoot at turn-on, <1% overshoot at turn-off, under all conditions
Monotonic Wave form	PSU shall have monotonic wave forms on the main output at start up, shut down and fault (OVP, OCP, OTP, OPP, SCP) triggered shutdown
Transient Response	500µs response time for return to within 0.5% of final value for any 50% load step over the range of 25% to 100% of rated load, $\Delta i/\Delta t < 0.2A/\mu s$. Max. voltage deviation is ±3.5% of final value
Capacitive Load	1000µF

RELIABILITY

MTBF	>500K hours
Warranty	3 Years
REACH	REACH compliance required
ROHS	Product is ROHS compliant
Electrolytic Capacitor Lifetime	All specified Electrolytic Capacitors shall exceed 10 year life based on operating at 25°C ambient temp., 24 hrs/day, 365 days/year, 6 power up cycles/day.

PROTECTION

Overvoltage Protection	115% to 155% of nominal output voltage. Hiccup Mode
Short Circuit Protection	Short across the output terminals will not cause damage to the unit. Latch-off Mode
Thermal Protection	Will shutdown upon an over temperature condition, auto-recovery
Overload Protection	130%–180% of rated output current value, Hiccup Mode

ISOLATION

Insulation Safety Rating	Input-Ground: 1500VAC, 1 MOPP Input-Output: 4500VAC, 2 MOPP Output-Ground: 1500VAC, 1 MOPP
Electric Strength Test Voltage (HIPOT)	Input-Ground: 1500VAC Input-Output: 4500VAC Output-Ground: 1500VAC

ENVIROMENT

Operating Temperature Range	-20°C to +80°C
Power Derating over temperature	Derate output power above 50°C - see derating table for details
Relative Humidity	5% to 95%, non-condensing
Altitude	Operating: -500m to 5,000m Non-operating: -500m to 12,192meters
Storage Temperature	-40°C to +85°C
Vibration	Operating: 0.003g/Hz, 1.5 grams overall, 3 axes, 10 min/axis, 5Hz-500Hz. Non-Operating.: Random waveform, 3mins /axis, 3 axes and Sine waveform, Vib. frequency / acceleration:10Hz-500Hz / 1g, sweep rate of 1 octave/minutes, Vibration time of 10 sweeps/axes, 3 axes. Transportation Vibration: Random vib. per MIL-STD-810E, Method 514.4, Cat. 1, Figure 514.4-1, 1hr in each of three axes.
Shock (IEC 60068-2-27)	Operating: Half-sine, 20gpk, 10mS, 3 axes, 6 shocks total. Non-Operating: Half-sine waveform, impact acceleration of 50G, Pulse duration of 6mS, Number of shocks: 3 for each of the three axis
Audible Noise	<20dbA



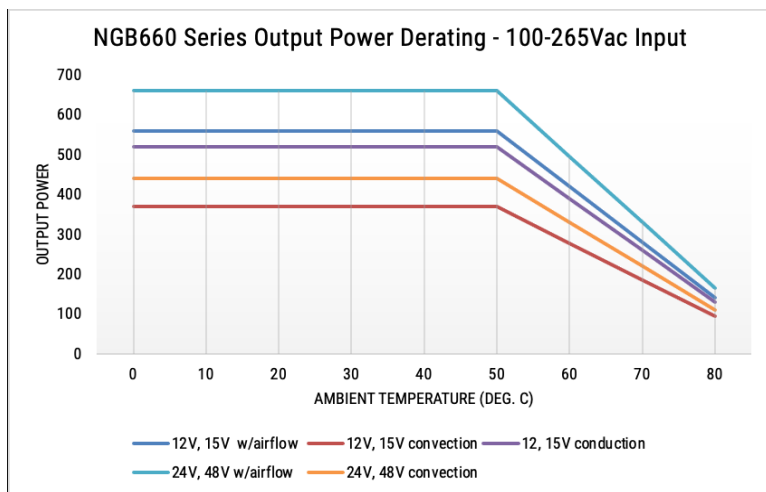
UNIT PACKAGING REQUIREMENTS

Inserted Instructions	Instruction Sheet to be provided with all units packaged in individual unit box if used
Individual Unit Packing	Units can be packed in egg crate type cartons for production quantities. Individual product shipments should include an individual unit box
Master Carton Shipping Box	16 units per master carton. Only anti-static packing material may be used inside the box. Exterior box sealing tape shall be anti-static type.
Individual Carton Packing Box (when used)	Individual carton must be labelled with ROHS sticker and individual label showing unit serial number, bar code, manufacturing date, bar code, and Manufacturing part number, bar code, country of origin.

MECHANICAL SPECIFICATIONS

Dimensions	W: 4" x L: 6" x H: 1.6"
Input Connector	See table below
Output Connector	See table below
Unit Weight	830g

POWER DERATING



Notes:

1. Performance criteria are based on EN55024. According to the standards, performance criteria are defined as following:

- A – Normal performance during and after the test
- B – Temporary degradation, self-recoverable
- C – Temporary degradation, operator intervention required to recover the operation
- D – Permanent damage

2. Class II models meet Class A radiated emissions. Class B can be met with added ferrite on input cable. Consult SL Power for details.

3. 100% dip for 20mS Criteria A @ 80% load; 30% dip for 500mS Criteria A @ 80% load.

ENVIROMENT

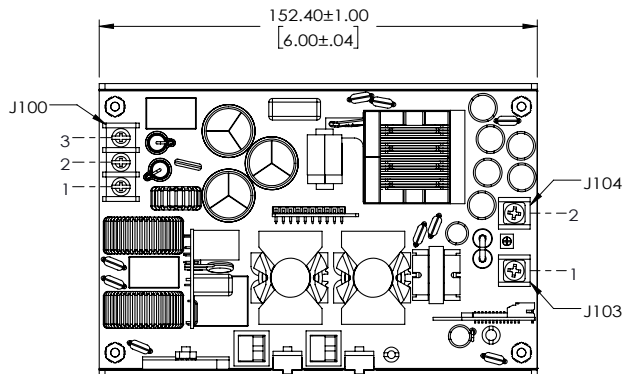
Conducted Emissions	EN55011/15/32: Class B, CISPR11/15/32: Class B, FCC Part 15.107, Class B, Measured at 10%, 50%, and 100% load steps; 6db margin typ, at 120VAC and 230VAC
Radiated Emissions ²	EN55011/15/32: Class B, CISPR11/15/32: Class B, FCC Part 15.107, Class B, Measured at 10%, 50%, and 100% load steps; 3db margin typ, at 120VAC and 230VAC
Harmonic Current Emissions	IEC61000-3-3
Voltage Fluctuations & Flicker	EN55024/IEC61000-4-2, Level 4: ±8kV contact, ±15kV air, Criteria A IEC60601-1-2, 4th Edition, Table 4
Electro Static Discharge Immunity	EN55022/EN61000-4-3, 10V/m, 80MHz - 2.7GHz, 80% AM at 1kHz IEC60601-1-2, 4th Edition, Table 4
Radiated RF EM Fields Susceptibility	EN55022/EN61000-4-3, 10 V/m, 80MHz - 2.7GHz, 80% AM at 1kHz IEC60601-1-2, 4th Edition, Table 4
Electrical Fast Transients / Bursts	EN55024/IEC61000-4-4, Level 4, ±4kV, 100Khz rep rate, 40A, Criteria A IEC60601-1-2, 4th Edition, Table 5
Surges Line to Line (DM) and Line to Ground (CM)	EN55024/IEC61000-4-5, Level 4, ±2kV DM, ±4kV CM, Criteria A Surpasses IEC60601-1-2, 4th Edition requirements
Conducted Disturbances induced by RF Fields	EN55022/IEC61000-4-6, 3V/m – Level 4, 0.15 to 80MHz; and 12V/m) in ISM and amateur radio bands between 0.15MHz and 80MHz, 80% AM at 1KHz IEC60601-1-2, 4th Edition, Table 5
Rated Power Frequency Magnetic Fields Test	EN55024/IEC1000-4-8, Level 4: 30A/m, 50Hz/60Hz IEC60601-1-2, 4th Edition, Table 4
Voltage Dips ³	EN55024/IEC/EN61000-4-11: --100% dip for 10 mS, at 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°: --100% dip for 20mS, 0°, Criteria B --100% dip for 500mS (250/300 cycles), Criteria B -- 60% dip for 100mS, Criteria B -- 30% dip for 500mS, Criteria B IEC60601-1-2, 4th Edition, Table 5
Common Mode Noise: High Freq. (100KHz-20MHz)	500mA pk-pk



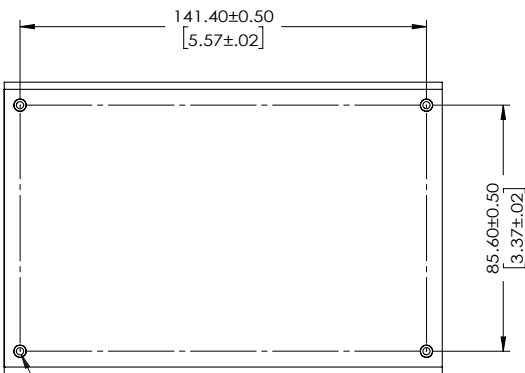
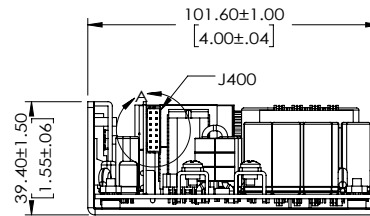
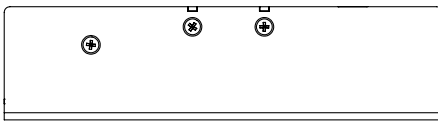
SYSTEM TIMING SPECIFICATIONS

Label	Parameter	Min	Typ	Max	Unit
T1	Turn-On Time – Main outputs	500		1000	mSec
T2	Turn-On Time – 5Vsb output			100	mSec
T3	Rise Time, 10% Vmain to Vmain in regulation			100	mSec
T4	Hold up time - All outputs stay within regulation after loss of AC @ 80% Load	20			mSec
T5	Hold up time - Vsb - stays within regulation after loss of AC	100			mSec
T6	Turn-On Time at -20°C		300		mSec

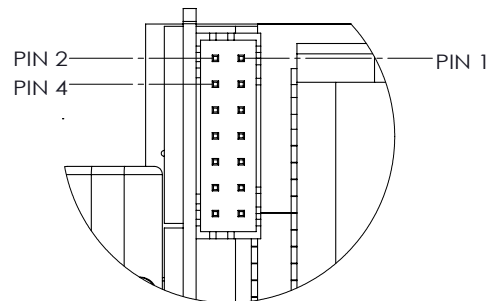
OUTLINE DRAWING



Air Flow Direction →



Screw(M3x0.5) penetration
3.5mm Max.



SECTION A
SCALE 3:1

CONNECTOR INFORMATION

	CONN	PIN #	ASSIGNMENT	MATING CONNECTOR	MATING PIN
INPUT	J100	1	AC LINE	Molex: 19141-0052/0053	
		2	NEUTRAL		
		3	GROUND		
OUTPUT	J103	1	+Vout	Molex:19141-0058/ 0063/0065/0059/ 0064/0066	
	J104	2	-Vout		
	J400	1	RTN	LANDWIN: 2050S1400 OR JST PHDR-14VS	LANDWIN: 2053T021N
		2	NA		
		3	S+		
		4	RTN		
		5	NA		
		6	DC OK		
		7	NA		
		8	ON_OFF		
		9	NA		
		10	NA		
		11	RTN		
		12	NA		
13	5VSB				
14	5VSB				