NEVO+600ML

LOW NOISE MEDICAL DATASHEET

AC/DC Modular Configurable PSU

450W
Powerful

5" x 3" x 1.61"
Small

600g
Light

The NEVO+600ML configurable low-noise power supply is the smallest in its class and the ultimate power solution for demanding medical applications where size, weight and audible noise are vital factors. The low noise fan allows you to use this innovative power supply in the quietest and most controlled environments. Weighing only 600 grams, the compact package of 5" x 3" x 1.61" delivers up to 450 Watts with minimal audible noise.

The NEVO+600 input module can accommodate up to four isolated output modules, ranging from 75W dual output to 150W or 300W single output, which can easily be configured into a high power 5"x 3" single output power supply or a multiple output power supply with up to eight isolated outputs.

MAIN FEATURES & BENEFITS

3 YEAR WARRANTY

LOW NOISE

- Powerful 450 Watt
- Small 5" x 3" x 1.61"
- Weighs only 600g when fully configured
- Minimal audible noise
- User & field configurable
- Up to 8 isolated outputs
- 300W dual slot output modules
- Wide output voltage adjust range
- Remote current/voltage programming
- Constant current & Voltage operation
- Efficiency up to 90%
- Intelligent fan control for optimised airflow
- Parallel & series connection of modules
- Accurate current sharing
- Standard 5V 1A bias supply
- Series tracker & I^2C options
- Supplier & technology consolidation
- 24-hour samples from distribution
- Instant fully safety approved power solutions based on proven technology
- Approved to latest safety standards: IEC/UL60601-3rd Ed & IEC/UL60601-1-2 4th Ed (EMC)
- Expert technical support
- 3 year warranty

APPLICATIONS

MEDICAL · LAB & ANALYSIS · DISPLAY · LED · LASER · ROBOTICS · COMM

- Medical & diagnostic equipment
- Test & Measurement equipment
- Robotics
- Oil & Gas
- Telecommunications
- Laboratory & Analysis equipment
- Display
- Avionics
- Lasers
- LED lighting
- Retrofit of legacy PSUs

SAFETY UL COMPLIANT · SAFETY CE COMPLIANT · ENVIRONMENTAL Conflict Minerals COMPLIANT · ENVIRONMENTAL Proposition 65 COMPLIANT · ENVIRONMENTAL REACH COMPLIANT · ENVIRONMENTAL RoHS Directive (EU) 2015/863 COMPLIANT · ENVIRONMENTAL SCIP COMPLIANT · ENVIRONMENTAL TSCA COMPLIANT · ENVIRONMENTAL GreenSoft Technology, Inc. VERIFIED

SPECIFICATIONS

INPUT MODULE SPECIFICATIONS

Parameter	Details	Min	Typical	Max	Units
AC Input Voltage	Nominal range is $100V_{RMS}$ to $240V_{RMS}$	85		264	V_{RMS}
AC Input Frequency	Contact factory for 400Hz operation.	47	50/60	63	Hz
DC Input Voltage	Not covered by safety approvals. Contact Vox Power.	120		300	V_{DC}
Output Power Rating	De-rate linearly from 450Watts at $120V_{RMS}$ to 338Watts at $85V_{RMS}$			450	Watts
Input Current	450Watts output at 120 V_{RMS} input			5	Amps
Input Current Limit	Maintains power factor		8		Amps
Inrush Current	$265V_{RMS}$, 25°C (cold start)			20	Amps
Fusing	Live line fused (5x20 Fast acting)			8	Amps
Efficiency	See graphs		86	89	%
No load Power consumption	All outputs fitted and disabled/enabled		21/28		Watts
Power Factor	Typical value for 300 Watts output at 240Vrms input		0.96	0.99	
Holdup	450Watts output at $120V_{RMS}$ input	17	20	21	mS
UVP	Turn on under voltage protection	78		84	V_{RMS}
Over temperature	Internally monitored.	115		125	°C
Reliability [1]	Input module			1.207	FPMH
	Fan			2.7	FPMH
Warranty	Standard terms and conditions apply			3	Years
Size	133.7 (L) x 77.7 (W) x 41.0 (H). See diagram for tolerance details				mm
Weight	360 + 60 per output module				Grams
Note 1.	30˚C base & ambient, 100% load, SR332 Issue 2 Method I, Case 3, Ground, Fixed, Controlled				

GLOBAL SIGNALS SPECIFICATIONS

Parameter	Details	Min	Typical	Max	Units
Bias Voltage	One isolated Bias Output available	4.8	5	5.2	Volts
Bias Current	Hiccup type current limit	0		1	Amps
AC_OK Voltage	Low output level High output level	0 3.5	0.2 4.5	1 5.2	Volts
AC_OK Current		-10		20	mA
Power Good Voltage	Low output level. internal 10kΩ pull down. High output level. PNP open collector.	0 8	0 10	0 15	Volts
Power Good Current	Open collector output. Current source only. All Slots.			20	mA
Global Inhibit Voltage	Low input level High input level	0 3		1 15	Volts
Global Inhibit Current	5k input impedance.	0.6		3	mA
Inhibit Voltage	Low input level. All slots. High input level. All slots.	0 2.5		1 15	Volts
Inhibit Current	10k input impedance. All slots.	0.25		1.5	mA

OUTPUT MODULE SPECIFICATION SUMMARY

MODEL	Output Voltage			Output Current	Rated Power	Peak [4] Power	Load Reg.	Line Reg.	Cross Reg.	Ripple & Noise	FPMH [1]	Feature Set [2]
	Min.	Nom.	Max.									
OP1	1.5V	**5V**	7.5V	25A	125W	187.5W	±50mV	±5mV	±10mV	$50mV_{PP}$	0.5	ABCDEFG
OP2	4.5V	**12V**	15V	15A	150W	225W	±100mV	±12mV	±24mV	$120mV_{PP}$	0.5	ABCDEFG
OP3	9V	**24V**	30V	7.5A	150W	225W	±150mV	±24mV	±48mV	$240mV_{PP}$	0.5	ABCDEFG
OP4	18V	**48V**	58V	3.75A	150W	217.5W	±300mV	±48mV	±96mV	$480mV_{PP}$	0.5	ABCDEFG
OP5	3.3V	**12V**	15V	5A	2x 75W	2x 75W	±50mV	±12mV	±24mV	$240mV_{PP}$	0.75	AFG
OPA2[3]	4.5V	**12V**	15V	25A	300W	375W	±100mV	±12mV	±24mV	$120mV_{PP}$	0.5	ABCDEFGH
OPA3[3]	9V	**24V**	30V	15A	300W	450W	±150mV	±24mV	±48mV	$240mV_{PP}$	0.5	ABCDEFGH

Note 1. Output module, 30˚C base, 100% load, SR332 issue 2 Method I, Case 3, Ground, Fixed, Controlled
Note 2. A = Remote Sense, B = External Voltage control, C = External constant current control, D = Current output signal, E = Current share, F =Over Voltage protection, G = Over Temperature Protection, H = Dual Slot module
Note 3. Can only be used with NEVO+600 chassis with date codes from 2048 onwards. e.g. 2048C080000 can use A2 or A3 module, 2047C089999 cannot use A2 or A3 module.
Note 4. Individual Output Module Peak Power available < 5 seconds @ 50% duty cycle, Overall Input Module power must remain within specified limits.

SAFETY SPECIFICATIONS

Parameter	Details	Typical	Max	Units
Isolation Voltages	Input to Output (2 MOPP). Do not perform test on assembled unit[1]		4000	V_{AC}
	Input to Chassis (1 MOPP)		1500	V_{AC}
	Global signals (J2) to Output/Chassis		250	V_{DC}
	Output to Output/Chassis (Standard modules)		250	V_{DC}
Earth Leakage Current	Normal condition, 264Vac, 63Hz, 25°C	209	300	uA
Touch Leakage Current	Output to Earth. Standard modules 264Vac, 63Hz, 25°C NC/SFC	13/209	20/250	uA
Patient Leakage Current	Standard modules 264Vac, 63Hz, 25°C NC/SFC[2]		-----	uA

Note 1. Testing an assembled unit to $4000V_{AC}$ may cause damage. Please refer to application note (APN-002) on Vox Power website or contact Vox Power representative.
Note 2. Not Applicable

INSTALLATION SPECIFICATIONS

Parameter	Details	Parameter	Details
Equipment class	I	Flammability Rating	94V-2
Overvoltage category	II	Ingress protection rating	IP10
Material Group	IIIb (indoor use only)	ROHS compliance	2011/65/EU & 2015/863/EU
Pollution degree	2	Intended usage environment	Home Healthcare

ENVIRONMENTAL SPECIFICATIONS

Parameter	Details	Non-Operational		Operational		Units
		Min	Max	Min	Max	
Air Temperature	Operational limits subject to appropriate de-ratings	-40	+85	-20	70	°C
Humidity	Relative, non-condensing	5	95	5	95	%
Altitude		-200	5000	-200	3000	m
Air Pressure		52	106	69	106	kPa
Noise Level	Variable. Measured 1m from fan intake.	-	-	18	42	dBA
Shock	3000 bumps at 10G (16ms) half sine wave					
Vibration	1.5G 10 to 200Hz sine wave, 20G for 15min in 3 axes random vibration					

Notes: 1. Additional power derating may be necessary at high altitudes to ensure component temperatures remain within specification.

ELECTROMAGNETIC COMPLIANCE – EMISSIONS

Phenomenon	Basic EMC Standard	Test Details
Radiated emissions, electric field	EN55011/32, FCC	Class B compliant
Conducted emissions	EN55011/32, FCC part 15, CISPR 32/11	Class B compliant
Harmonic Distortion	IEC61000-3-2	Compliant
Flicker & Fluctuation	IEC61000-3-3	Compliant

ELECTROMAGNETIC COMPLIANCE – IMMUNITY

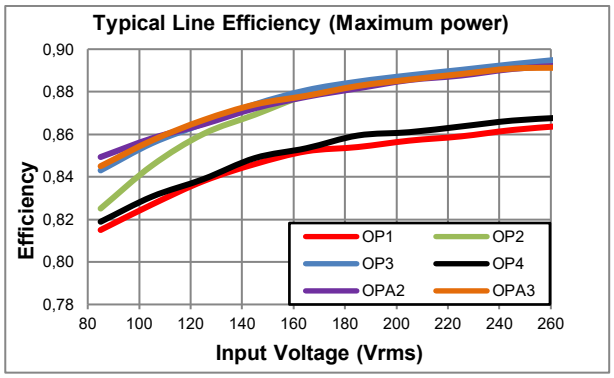
Phenomenon	Basic EMC Standard	Test Details
Electrostatic discharge	IEC61000-4-2	Test level 4: 15kV air, 8kV contact
Radiated RF EM fields	IEC61000-4-3	Test Level 3: (10V/m, 80MHz-2.7GHz) sine wave AM 80% 1kHz
Proximity fields from RF wireless communications equipment	IEC61000-4-3	Test levels as per IEC60601-1-2:2014 Table 9
Electrical Fast Transients/bursts	IEC61000-4-4	Test Level 3: (2kV Power, 1kV I/O) 5kHz(ed3) & 100kHz(ed4)
Surges	IEC61000-4-5	Test Level 3: 1kV L-N, 2kV L-E
Conducted disturbances induced by RF fields	IEC61000-4-6	Test Level 3: 10V, 0.15 to 80Mhz sine wave AM 80% 1kHz
Power Frequency Magnetic Fields	IEC61000-4-8	Test level 4: 30A/m 50Hz
Voltage Dips	IEC61000-4-11& SEMI-F47-0706 [2]	0% 10ms, 0% 20ms, 80% 1s, 80% 10s, 90% continuous (Criterion A) 70% 0.5s, 40% 0.2s (Criterion A at 240V and Criterion B at 100V)
Voltage interruptions	IEC61000-4-11	0% 250/300 cycle as per IEC60601-1-2:2014 (Criterion B)

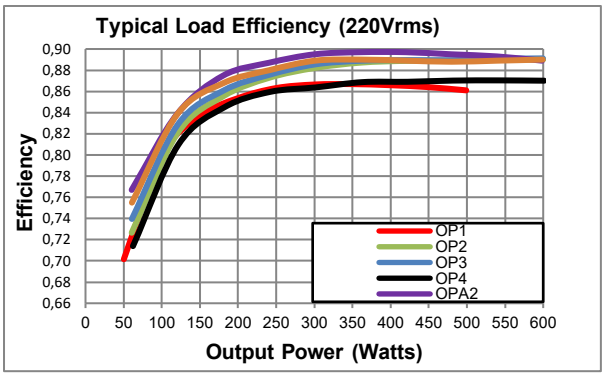
Notes:
1. Criterion A = No degradation of performance or loss of function.
Criterion B = Temporary degradation of performance or loss of function is allowed, provided the function is self-recoverable.
Criterion C = Temporary loss of function is allowed but requires operator intervention to recover.
2. Tested at nominal range (100V to 240V). Line deratings applied where appropriate.

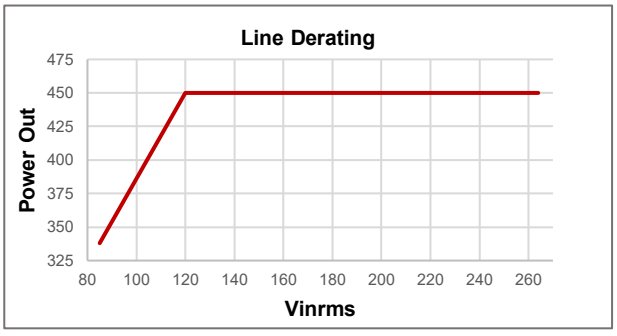
AGENCY APPROVALS

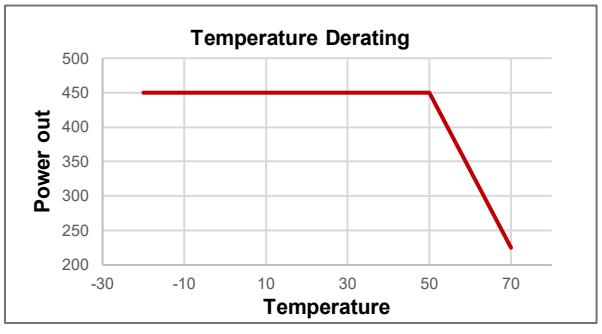
Standard	Details	File
IEC 60601-1:2005 + CORR1 2006 + CORR2: 2007 + A1:2012	Medical electrical equipment Part 1: General requirements for basic safety and essential performance	UL: E316486
EN60601-1:2006 + A11:2011 + A1:2013 + A12:2014	Medical electrical equipment Part 1: General requirements for basic safety and essential performance	
CAN/CSA-C22.2 No. 60601-1 (2008)	Medical Electrical Equipment Part 1: General Requirements for Basic Safety and Essential Performance	
ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10)	Medical Electrical Equipment Part 1: General Requirements for Basic Safety and Essential Performance	
CE MARK	LVD 2014/35/EU, EMC 2014/30/EU, RoHs 2011/65/EU & 2015/863/EU	

CB certificate and report available on request

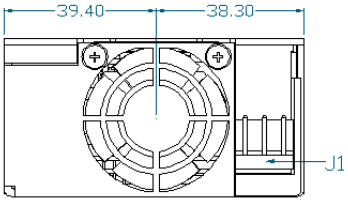




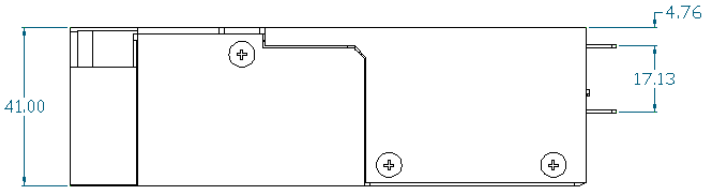


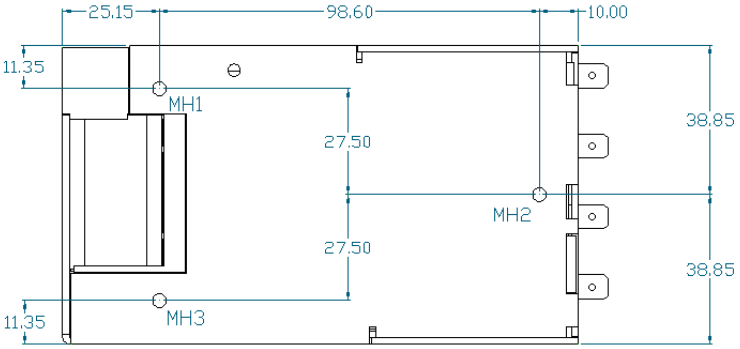


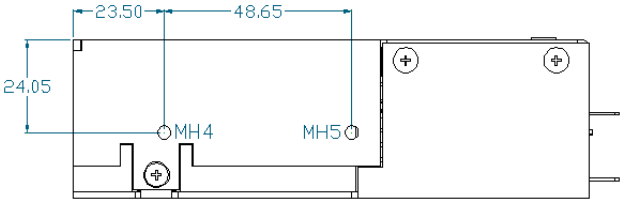
MECHANICAL DIMENSIONS AND MOUNTING SCREWS

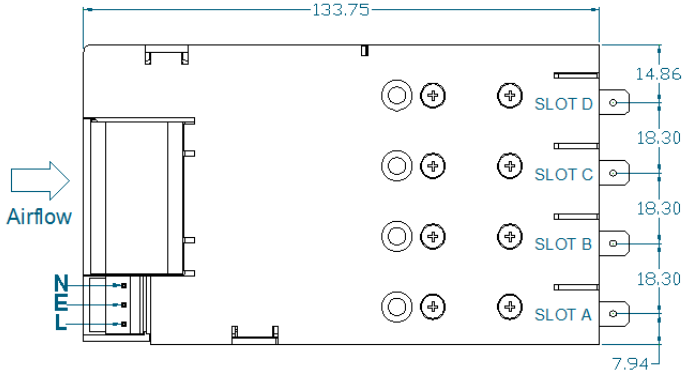


N - Neutral
E - Earth
L - Live

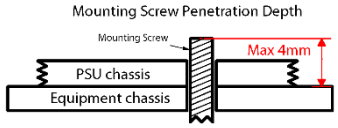








SCREWS	
MH1, MH2, MH3, MH4, MH5	
Screw type	M4
Tightening	Tighten to 0.5 Nm [1]
Penetration depth	4.00mm max including chassis



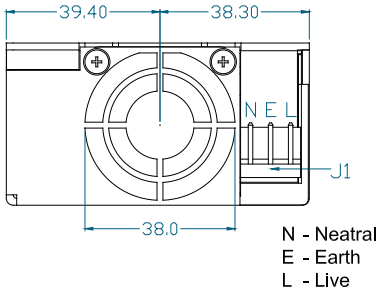
OUTPUT MODULES x 8	
Screw type	M3x5, C/Sink, Posi, Stainless Steel
Tightening	Tighten to 0.50 Nm [1]
Penetration depth	Defined by screw
CHASSIS x 5	
Screw type	M3x5, C/Sink, Posi, Stainless Steel
Tightening	Tighten to 0.50 Nm [1]
Penetration depth	Defined by screw
FAN x 2	
Screw type	M3x30, C/Sink, Posi, Stainless Steel
Tightening	Tighten to 0.50 Nm [1]
Penetration depth	Defined by screw

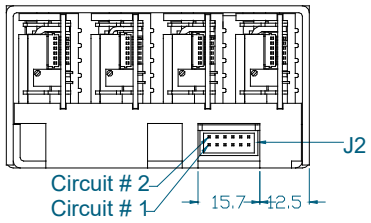
1. Torque settings are for general reference only. The torque settings shown in the datasheet are the insert manufacturers recommended values.

Airflow direction cannot be reversed

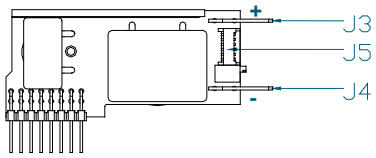
CONNECTORS

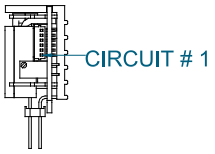
PINOUTS J1		
Circuit	Details	
1	Live	
2	Earth	
3	Neutral	
J2		
Circuit	Details	
1	Power good	Slot A
2	Inhibit	
3	Power good	Slot B
4	Inhibit	
5	Power good	Slot C
6	Inhibit	
7	Power good	Slot D
8	Inhibit	
9	Global inhibit	
10	AC OK	
11	+5V 1A bias supply	
12	COM	
J5[4]		
Circuit	Details	
1	-Sense	
2	+Sense	
3	Voltage control	
4	Current control / share / out	
5	COM	
6	+5V 10mA local bias supply	





J3
Positive output
J4
Negative output

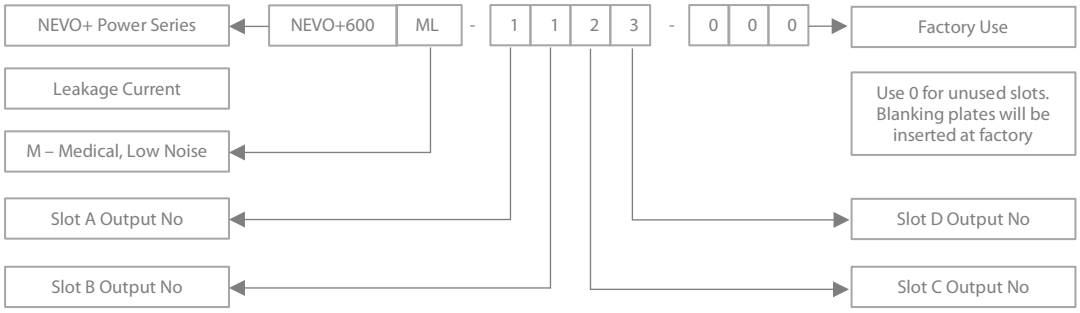




REF.	DETAILS	MANUFACTURER	HOUSING	TERMINAL
J1	MAINS INPUT: 3 Pin, 5.08mm, with Friction Lock, 18-24 AWG	MOLEX	10013036	0008701031
J2	GLOBAL SIGNALS: 12 Pin, 2mm, without Friction Lock, 24-30 AWG	MOLEX	511101251	0503948051
J3/4[1]	OUTPUT POWER TERMINAL: TAB SIZE 6.35mmx0.8mm	VARIOUS		VARIOUS
J5	OUTPUT SIGNALS: 6 Pin, 1.25mm, with Friction lock, 28-32 AWG	MOLEX	0510210600	0500588000

Notes
1. Terminal and wire current rating must exceed maximum short circuit output current. E.g. Output 1 = 25A*1.25 = 31.25Amps
2. Direct equivalents may be used for any connector parts
3. All cables must be rated 105°C min, equivalent to UL1015
4. Pinout is for single output types only

PART NUMBERING SYSTEM



Our design team will assist with value add requirement if an application requires standard/non-standard accessories or non-nominal voltage settings. Once approved, the factory will issue a 3 or 4 digit code for your specific configuration which can be used for all future orders of the same configuration. When ordering an input unit with no outputs inserted, simply order NEVO+600ML