

**VOXPOWER**

NEVO+600 Series

INSTALLATION MANUAL

AC/DC Configurable Power Supplies

PLEASE READ THIS INSTALLATION MANUAL CAREFULLY BEFORE INSTALLING THIS PRODUCT AND KEEP THIS MANUAL FOR FUTURE REFERENCE.

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Important installation information

This NEVO+600 series of configurable power supplies are intended for use within end customer applications which restrict access to un-authorized personnel. The instructions in this manual and all warning labels on the product must be adhered to carefully.

SAFETY	The NEVO+600S/SL and NEVO+600M/ML series are designed in accordance with the relevant safety requirements of IEC/EN/UL/CSA 62368-1, IEC/EN/UL/CSA 60950-1, IEC/EN/UL/CSA 60601-1. Low voltage Directive LVD 2014/35/EU and EMC directive EMC 2014/30/EU. All NEVO+600 series power supplies must be installed correctly in a controlled environment which restricts access to any un-authorized personnel. Equipment and system manufacturers must protect service personnel against unintentional contact with the output terminals.	
HAZARDS	Dangerous voltages are present within the power supply. It should only be handled by qualified personnel when the power supply has been disconnected from the mains supply voltage for more than 3 minutes. External surfaces of the power supply may become extremely hot during and after operation. Appropriate care should be taken. If series and/or parallel combinations of outputs exceed safe voltage and/or energy levels, the final equipment manufacturer must provide the appropriate protection for both users and service personnel.	
DE-RATINGS	Ambient Temperature	<ul style="list-style-type: none"> The input module power must be de-rated by 2.5%/°C above 50°C ambient up to a maximum ambient temperature of 70°C.
	Input Voltage	<ul style="list-style-type: none"> Standard & Medical (S/M) - The input module power must be de-rated by 4.28W/V_{RMS} below 120 V_{RMS} (600W @ 120 V_{RMS}, 450W @ 85 V_{RMS}) Low Noise (SL/ML) - The input module power must be de-rated by 3.21W/V_{RMS} below 120 V_{RMS} (450W @ 120 V_{RMS}, 338W @ 85 V_{RMS}) <p>Remember to take the appropriate de-rating into consideration before specifying any NEVO+600 power supply for an application. If in any doubt, please contact Vox Power directly or your local Vox Power representative.</p>
HEALTH AND SAFETY	To comply with section 6 of the health and safety at work act, a label that is clearly visible to service personnel must be placed on the final equipment. These labels warn that surfaces of the power supply may be hot and should not be touched when the product is operating.	
FUSING	The power supply has internal single pole fusing in the L (Live) line. Fuses are not replaceable. Damaged units should be returned to Vox Power for analysis and repair. For Medical (60601-1) installations, the end application should provide an appropriately rated external fuse in the Neutral line. DC operation is not covered by safety approvals. Contact Vox Power for details.	
SERVICING	The power supply contains no user serviceable parts. Repairs must be carried out by authorised personnel only. Contact Vox Power for further information.	
APPROVAL LIMITATIONS	NORTH AMERICA - When this product is used with 180V _{AC} -253V _{AC} mains where no neutral is present, connect the two live wires to L (Live) and N (Neutral) on the input connector.	
COOLING	For proper cooling of the power supply, the air intake and outlet must not be impeded. Allow 50mm clearance at both ends and position cabling appropriately.	
EARTH TERMINAL MARKING	To comply with the requirements of IEC/EN/UL/CSA 62368-1, IEC/EN/UL/CSA 60950-1 & IEC/EN/UL/CSA 60601-1, where the incoming wiring earth is intended for connection as the main protective earth conductor and where the terminals for such a connection is not supplied on a component or subassembly, the user shall add an appropriate label displaying a protective earth symbol in accordance with IEC60417-5019 (2006-08) directly adjacent to the terminal. The label should be durable and legible and should withstand the 15 second rub test as per UL60950-1 section 1.7.15.	
WARRANTY	Contact your sales agent or Vox Power for product repairs. See Vox Power standard terms and conditions for warranty conditions.	
PRODUCT LABELS	The external product label contains information relevant to the power system. The label contains input voltage, maximum input current, input frequency, maximum output power, fuse rating and type, serial number, approvals and product part number in form NEVO+600xx-yyy-zzz.	
NEVO+ OUTPUT MODULES	Each output module label contains information relevant to that output. The label contains voltage adjustment range, maximum output current, serial number, approvals and the part number in format OPx.	
OTHER	<ul style="list-style-type: none"> A label warning that external surfaces are hot during operation and that the unit should be allowed to cool down properly should be placed on the unit where such a label is clearly visible. The NEVO+600 series is designed to comply with EMC standards but it does not imply that the end system will comply. To prolong the life of the unit, use in dust free environment. Units can sometimes be damaged during transit. In the event of transit damage, DO NOT connect power to the unit. Contact your sales agent or Vox Power. Always use adequately sized cables and ensure good crimp connections. Use cable supports to minimise stress on connectors. Avoid excessive shock or vibration. 	

Specifications

INPUT MODULE SPECIFICATION SUMMARY													
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 ³	Standard (S/SL) Medical (M/ML)									120		370	V _{DC}
Output Power Rating	Standard & Medical (S/M) - De-rate linearly from 600Watts at 120V _{RMS} to 450Watts at 85V _{RMS} Low Noise (SL/ML) - De-rate linearly from 450Watts at 120V _{RMS} to 338Watts at 85V _{RMS}									120		300	
Input Current	Standard & Medical (S/M) - 600Watts output at 120Vrms input Low Noise (SL/ML) - 450Watts output at 120Vrms input											6	Amps
Fusing	Live line fused (5x20 Fast acting)											5	Amps
Power Factor	Typical value for 300 Watts output at 240Vrms input										0.96	0.99	
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
Notes	1. NEVO+ input modules can only be used with NEVO+ output modules and must not be used for any other purpose. 2. Only use a power source of the type indicated on the product label. 3. Not covered by safety approvals. Contact Vox Power.												

OUTPUT MODULE SPECIFICATION SUMMARY												
MODEL	Output Voltage			Output Current	Rated Power	Peak 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
OP8	23.2V	24V	24.7V	3.125A	2x 75W	2x 75W	±100mV	±24mV	±48mV	480mV _{PP}	0.75	AFG
OPA2	4.5V	12V	15V	25A	300W	375W	±100mV	±12mV	±24mV	120mV _{PP}	0.5	ABCDEFGH
OPA3	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

SAFETY SPECIFICATIONS												
Parameter	Details									Max	Units	
Isolation Voltages	Input to Output (2 MOPP). Do not perform test on assembled unit ⁽¹⁾ Input to Chassis (1 MOPP) Global signals (J2) to Output/Chassis Output to Output/Chassis (Standard modules)									4000	V _{AC}	
										1500	V _{AC}	
										250	V _{DC}	
Earth Leakage Current	INDUSTRIAL: Normal condition, 264Vac, 63Hz, 25°C MEDICAL: Normal condition, 264Vac, 63Hz, 25°C									1500	uA	
Touch Leakage Current	Standard modules NC/SFC									20/200	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

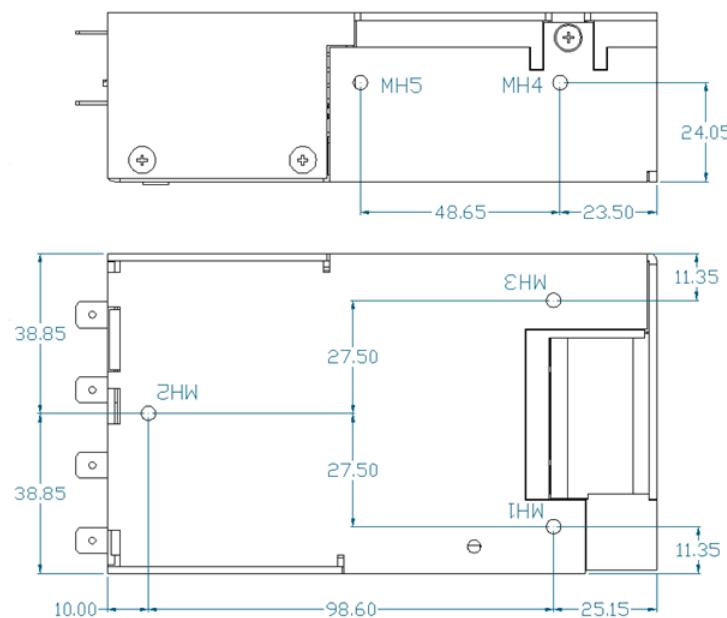
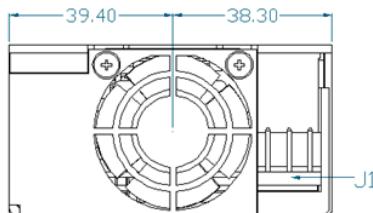
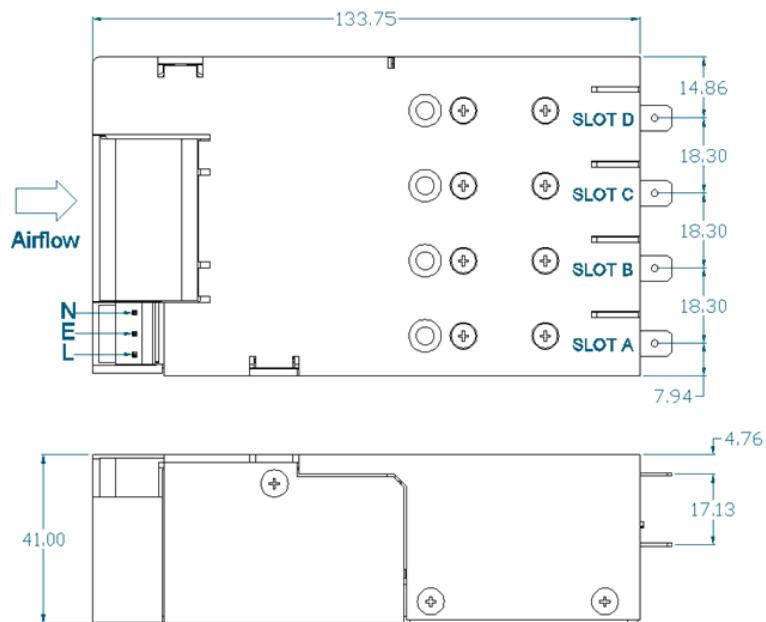
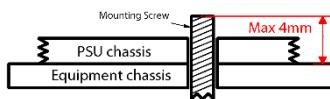
INSTALLATION SPECIFICATIONS												
Parameter	Details				Parameter	Details						
Equipment class	I				Flammability Rating					94V-2		
Overvoltage category	II				Ingress protection rating					IP10		
Material Group	IIIB (indoor use only)				ROHS compliance					2011/65/EU & 2015/863/EU		
Pollution degree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

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 ⁽¹⁾							°C
Humidity	Relative, non-condensing	5	95	5	95							%
Altitude		-200	5000	-200	5000 ⁽²⁾							m
Air Pressure		52	106	52 ⁽²⁾	106							kPa
Noise Level	Standard Versions (S/M) - Variable. Measured 1m from fan intake. Low Noise Versions (SL/ML) - Variable. Measured 1m from fan intake.	-	-	36	62							dBA
Shock	3000 bumps at 10G (16ms) half sine wave	-	-	18	42							
Vibration	1.5G 10 to 200Hz sine wave, 20G for 15min in 3 axes random vibration											
Notes	1. Derate input and all outputs at 2.5%/°C above 50°C. 2. 3000m & 68kPa for IEC/UL60601-1.											

Mechanical Dimensions and Mounting

Location	Details	SCREWS	Penetration	Tightening
Output Module Mount: 2 per module	M3 POZI CSK		5mm max length	0.5NM
Input module Mount: MH1 - 3 (Bottom) MH4 - 5 (Side)	M4		4mm max, including chassis	0.5NM
Top Cover Mount:	5x M3 POZI CSK 1x M2.5 POZI CSK		5mm max length, 4mm max length	0.5NM

Mounting Screw Penetration Depth

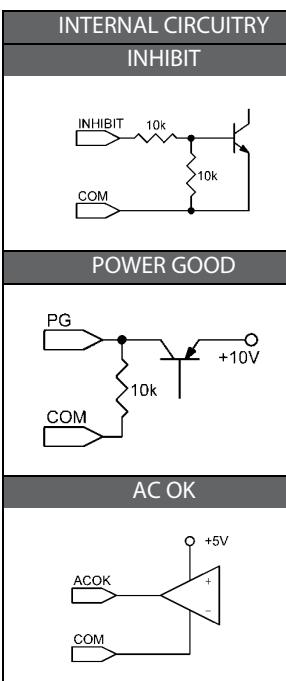
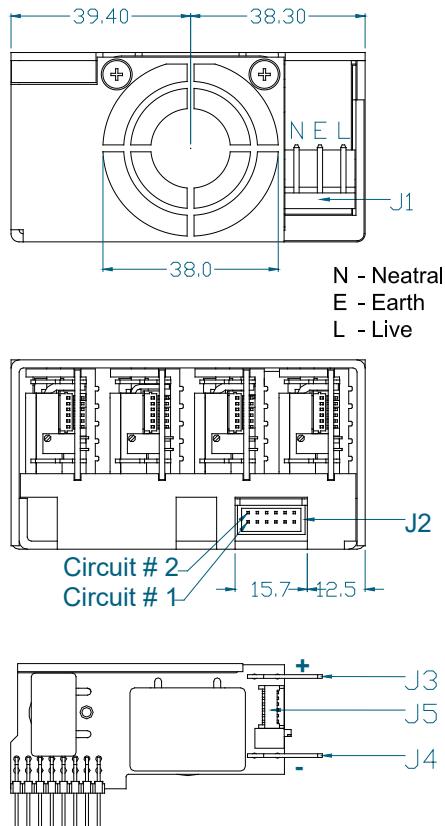


Unless stated otherwise, all dimensions are in millimetres and in accordance with DIN2768-1/2 CLASS C

Airflow direction cannot be reversed

Connector details

PINOUTS	
Circuit	Details
J1 – Mains Input	
1	Live
2	Earth
3	Neutral
J2 – Global Signals	
1	Slot A - Power Good
2	Slot A - Inhibit
3	Slot B - Power Good
4	Slot B - Inhibit
5	Slot C - Power Good
6	Slot C - Inhibit
7	Slot D - Power Good
8	Slot D - Inhibit
9	Global Inhibit (GINH)
10	AC OK
11	+5V (Bias Supply 1A)
12	COM
J3 - Output Power	
	Positive Output
J4 - Output Power	
	Negative Output
J5⁽⁴⁾ - Output Signals	
1	- Sense
2	+ Sense
3	V _{CONTROL}
4	I _{CONTROL}
5	COM
6	+5V (Bias Supply 10mA)



Unless stated otherwise, all dimensions are in millimetres and in accordance with DIN2768-1/2 CLASS C

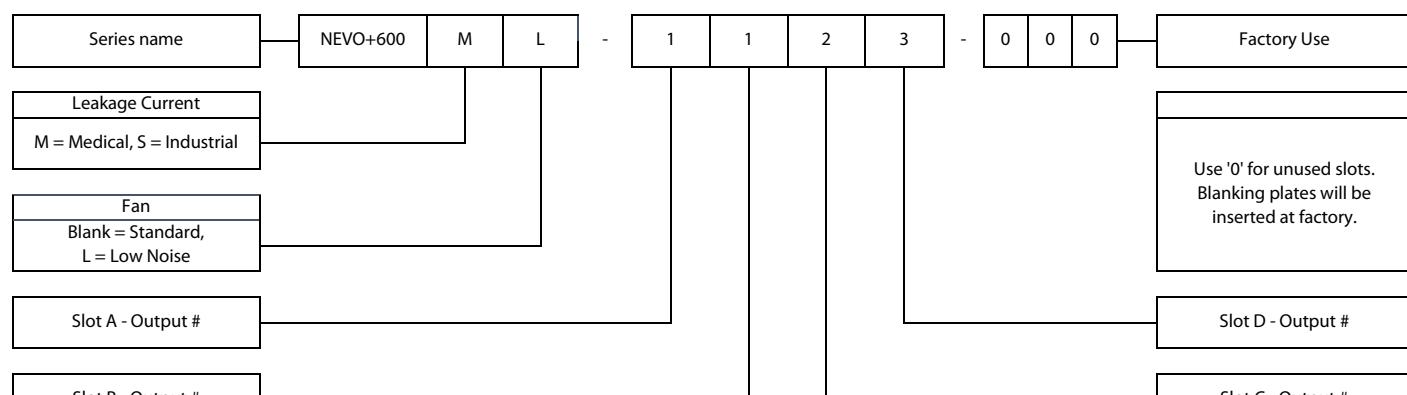
MATING CONNECTORS

Ref.	Details	Manufacturer	Housing	Terminal
J1 - Mains Input	3 Pin, 5.08mm with friction lock, 18-24AWG	MOLEX ⁽²⁾	010013036	8701031
J2 - Global Signals	12 Pin, 2mm, 24-30 AWG, WIRE TO BOARD	MOLEX ⁽²⁾	0511101251	0503948051
J3,4 ⁽³⁾ – Output Power	Faston/Quick-Connect Tab – Size 6.35x0.8mm	VARIOUS ⁽²⁾		VARIOUS
J5 - Output Signals	6 PIN, 1.25mm, with Friction Lock, 28-30AWG	MOLEX ⁽²⁾	1510210600	50058800

Notes

- 1. Terminal and wire current rating must exceed maximum short circuit output current. Eg. Output 1 = $25A \times 1.25 = 31.25$ Amps
- 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 NUMBERS AND ORDERING INFORMATION



Industrial input module has IEC approvals (IEC60950 & IEC62368), Medical input module has medical approvals (IEC60601). Contact your Distributor or Vox Power for special configuration requirements. The factory may allocate a 3 digit suffix to identify such requirements. When ordering an input unit with no outputs inserted, use NEVO+600M/ML or NEVO+600S/SL.