

NEVO+600M

MEDICAL DATASHEET

AC/DC Modular Configurable PSU



600W

Powerful

5" x 3" x 1.61"

Small

600g

Light

600 Watts in the palm of your hand

The NEVO+600M configurable power supply is the smallest in its class, the ultimate power solution for demanding medical applications where size, power density and weight are vital factors. Weighing only 600 grams, the compact 5" x 3" x 1.61" package delivers up to 600 Watts, equating to a power density of 25 Watts per cubic inch.

The 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. A low noise fan option is available for use in even the quietest of environments.



MAIN FEATURES & BENEFITS

- | | | |
|--|---|---|
| • Powerful 600 Watt | • Wide output voltage adjust range | • Accurate current sharing |
| • Small 5" x 3" x 1.61", 25W/in ³ | • Remote current/voltage programming | • Standard 5V 1A bias supply |
| • Weighs only 600g when fully configured | • Constant current & voltage operation | • Low noise fan option |
| • User & field configurable | • Efficiency up to 90% | • Series tracker & I ² C options |
| • Up to 8 isolated outputs | • Intelligent fan control for optimised airflow | • Supplier & technology consolidation |
| • 300W dual slot output modules | • Parallel & series connection of modules | • 24-hour samples from distribution |
| • Instant fully safety approved power solutions based on proven technology | | • Expert technical support |
| • Approved to latest safety standards: IEC/UL60601-3 rd Ed & IEC/UL60601-1-2 4 th Ed (EMC) | | • 3 year warranty |

APPLICATIONS



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



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 600Watts at 120V _{RMS} to 450Watts at 85V _{RMS} | | | 600 | Watts |
| Input Current | 600Watts output at 120 V _{RMS} input | | | 6 | 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 | 600Watts 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 Fan | | | 1,207 2.7 | FPMH 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 | ABCDEFGF |
| OP2 | 4.5V | 12V | 15V | 15A | 150W | 225W | ±100mV | ±12mV | ±24mV | 120mV _{PP} | 0.5 | ABCDEFGF |
| OP3 | 9V | 24V | 30V | 7.5A | 150W | 225W | ±150mV | ±24mV | ±48mV | 240mV _{PP} | 0.5 | ABCDEFGF |
| OP4 | 18V | 48V | 58V | 3.75A | 150W | 217.5W | ±300mV | ±48mV | ±96mV | 480mV _{PP} | 0.5 | ABCDEFGF |
| 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 | ABCDEFGFH |
| OPA3 ⁽³⁾ | 9V | 24V | 30V | 15A | 300W | 450W | ±150mV | ±24mV | ±48mV | 240mV _{PP} | 0.5 | ABCDEFGFH |
| 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 and before 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. | | | | | | | | | | | | |
| Note 5. Minimum Output levels achievable when using V-control and I-control may be >0 due to the minimum on-time of the PWM controllers. | | | | | | | | | | | | |

| 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, 264V _{AC} , 63Hz, 25°C | 209 | 300 | uA |
| Touch Leakage Current | Output to Earth. Standard modules 264V _{AC} , 63Hz, 25°C NC/SFC | 13/209 | 20/250 | uA |
| Patient Leakage Current | Standard modules 264V _{AC} , 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 | IIlb (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. | - | - | 36 | 62 | 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 | | | | | |

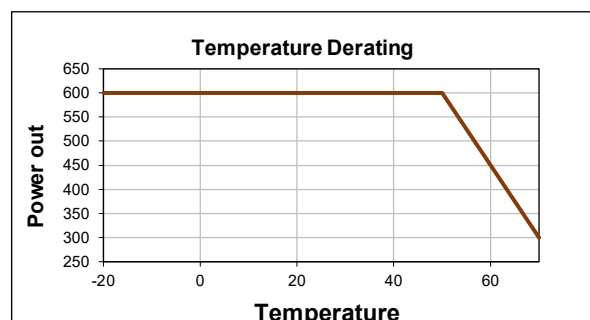
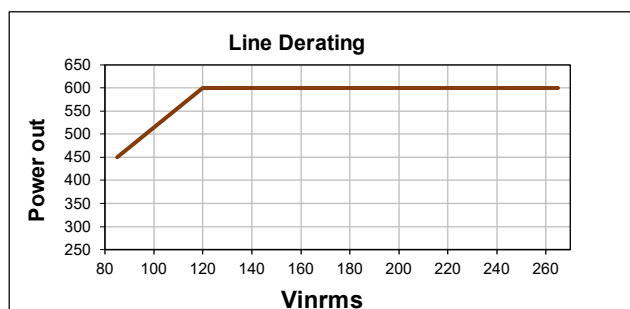
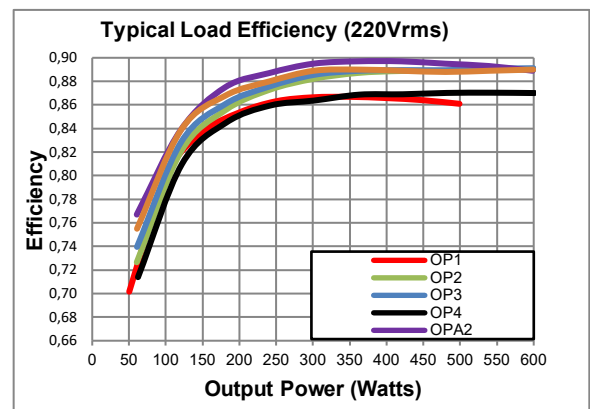
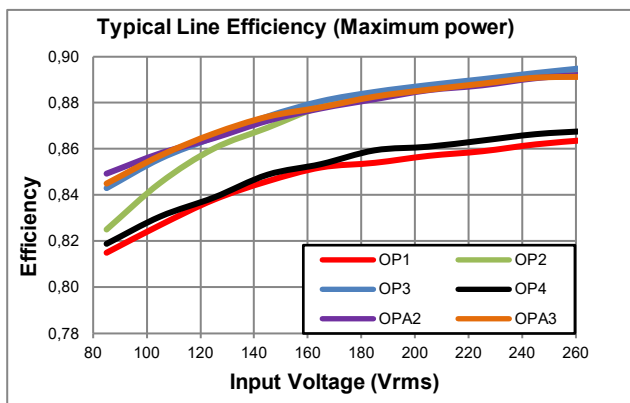
| ELECTROMAGNETIC COMPLIANCE – EMISSIONS | | |
|--|--------------------------------------|-------------------|
| Phenomenon | Basic EMC Standard | Test Details |
| Radiated emissions, electric field | EN55011/32, FCC | Class B compliant |
| Conducted emissions | EN55011/32, FCC part 15, CISPR 32/11 | 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) |

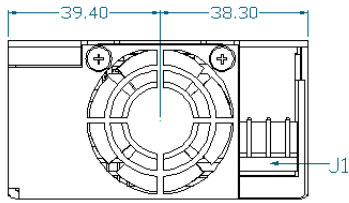
- Notes:
1. Criterion A = No degradation of performance or loss of function.
Criterion B = Temporary degradation of performance or loss of function is allowed, provided the function is self-recoverable.
Criterion C = Temporary loss of function is allowed but requires operator intervention to recover.
 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 | |

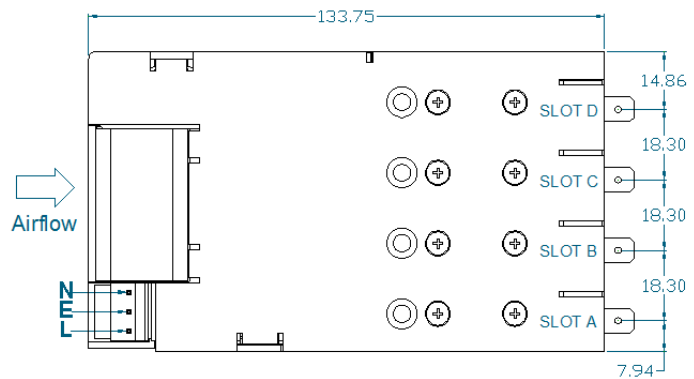
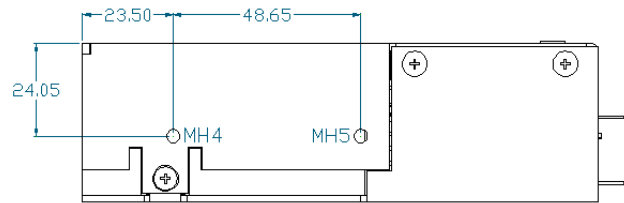
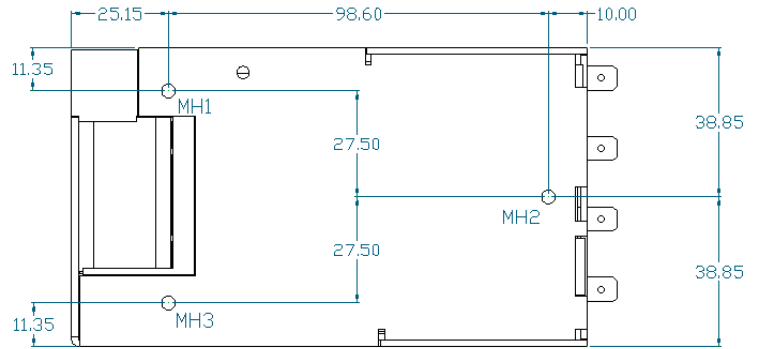
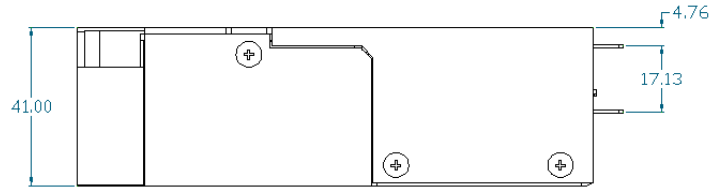
CB certificate and report available on request



MECHANICAL DIMENSIONS AND MOUNTING SCREWS



N - Neutral
E - Earth
L - Live

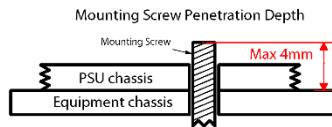


Airflow direction cannot be reversed

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 |

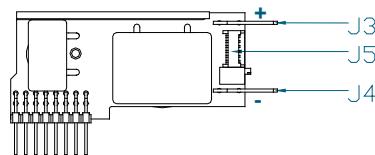
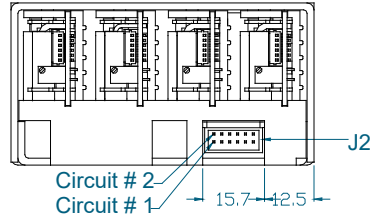
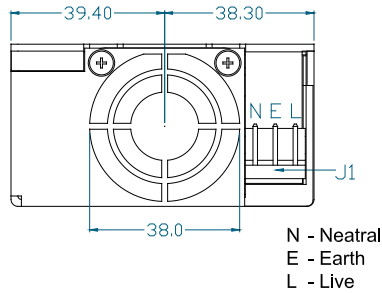
FAN x 2

| | |
|-------------------|--------------------------------------|
| Screw type | M3x30, C/Sink, Posi, Stainless Steel |
| Tightening | Tighten to 0.50 Nm ⁽¹⁾ |
| Penetration depth | Defined by screw |

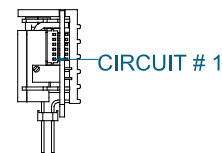
1. Torque settings are for general reference only. The torque settings shown in the datasheet are the insert manufacturers recommended values.

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 |

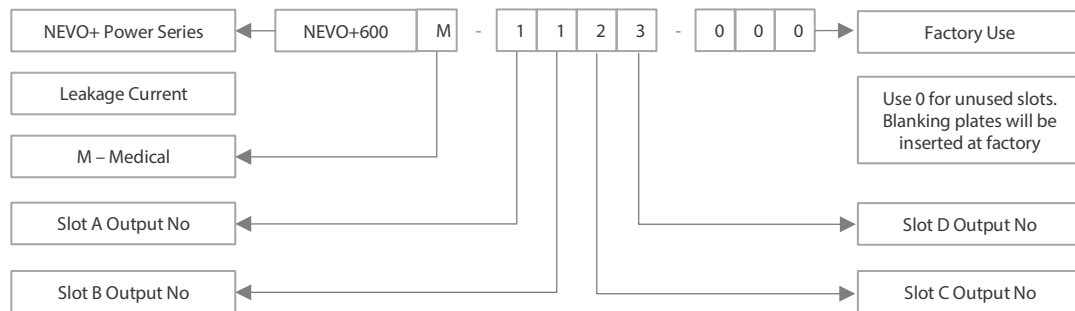


| REF. | DETAILS | MANUFACTURER | HOUSING | TERMINAL |
|---------------------|---|--------------|------------|------------|
| J1 | MAINS INPUT: 3 Pin, 5.08mm, with Friction Lock, 18-24 AWG | MOLEX | 10013036 | 0008701031 |
| J2 | GLOBAL SIGNALS: 12 Pin, 2mm, without Friction Lock, 24-30 AWG | MOLEX | 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+600M.

All specifications are believed to be correct at time of publishing. Vox Power Ltd reserves the right to make changes to any of its products and to change or improve any part of the specification, electrical or mechanical design or manufacturing process without notice. Vox Power Ltd does not assume any liability arising out of the use or application of any of its products and of any information to the maximum extent permitted by law. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any products of Vox Power Ltd. VOX POWER LTD DISCLAIMS ALL WARRANTIES AND REPRESENTATIONS OF ANY KIND WHETHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF SUITABILITY, FITNESS FOR PURPOSE, MERCHANTABILITY AND NON-INFRINGEMENT.

Please consult your local distributor or Vox Power directly to ensure that you have the latest revision before using the product and refer to the latest relevant user manual for further information relating to the use of the product. Vox Power Ltd products are not intended for use in connection with life support systems, human implantations, nuclear facilities or systems, aircraft, spacecraft, military or naval missile, ground support or control equipment used for the purpose of guidance navigation or direction of any aircraft, spacecraft or military or naval missile or any other application where product failure could lead to loss of life or catastrophic property damage. The user will hold Vox Power Ltd harmless from any loss, cost or damage resulting from its breach of these provisions.