



# NEVO+600S-3-3-3-3

- Industrial Approvals
- Pre-Configured Nevo
- V Range (9V to 30V)



*600 watt in the palm of your hand*

The NEVO+600S-3-3-3-3 is a pre-configured modular power supply which delivers a full 600 watts without de-rating for line voltages  $\geq 120\text{V}_{\text{ac}}$  making it the ultimate power solution for products destined for the global market. Through the implementation of a fan control circuit the NEVO+ also features reduced fan noise. The NEVO+ delivers up to 600 watts from a 600 gram 5" x 3" x 1U package and consists of an input module together with four isolated output modules. The series carry full UL60950 safety approvals and comply with EN61000-3, EN61000-4 and EN550022-B EMC standards.

## MAIN FEATURES:

- ✓ No Line de-rating  $\geq 120\text{VAC}$
- ✓ Reduced fan noise
- ✓ 600 watt output
- ✓ 5" x 3" x 1U footprint
- ✓ Adjustable output voltage
- ✓ Industrial approvals
- ✓ High reliability
- ✓ High efficiency – up to 89%
- ✓ Only 0.6kg – 100W/kg
- ✓ High power density (25W/in<sup>3</sup>)
- ✓ Remote current/voltage programming
- ✓ Current output signal
- ✓ Accurate current sharing
- ✓ 5V 200mA bias supply
- ✓ RoHS compliant
- ✓ Field configurable
- ✓ Two year warranty

## SYSTEM SPECIFICATIONS

| INPUT ELECTRICAL    |                                                     |     |       |      |       |
|---------------------|-----------------------------------------------------|-----|-------|------|-------|
| Parameter           | Details                                             | Min | Typ   | Max  | Units |
| AC Input Voltage    | Nominal range is 100Vrms to 240Vrms                 | 85  |       | 264  | Vrms  |
| AC Input Frequency  | Contact factory for 400Hz operation                 | 47  | 50/60 | 63   | Hz    |
| DC Input Voltage    |                                                     | 120 |       | 370  | Vdc   |
| Power Rating        | See graphs for deratings                            |     |       | 600  | Watts |
| Input Current       | 600 Watts output at 180Vrms input                   |     |       | 6    | A     |
| Inrush Current      | 265Vrms (cold start)                                |     |       | 20   | A     |
| Fusing              | 5 x 20 Fast acting                                  |     |       | 8    | A     |
| Input Current Limit | Maintains power factor                              |     | 8     |      | A     |
| Efficiency          | See graphs                                          |     | 86    | 89   | %     |
| Idle Power          | All outputs fitted and enabled                      |     | 28    |      | Watts |
| Idle Power          | All outputs fitted and disabled                     |     | 21    |      | Watts |
| Power Factor        | Typical value for 300 Watts output at 240Vrms input |     | 0.96  | 0.99 |       |
| Holdup              | 600 Watts output at 180Vrms input                   | 17  | 20    | 21   | mS    |
| UVLO                | Turn on only                                        | 78  |       | 84   | Vrms  |
| Over Temperature    | Internally monitored, Latching                      | 115 |       | 125  | °C    |
| Reliability         | 40°C 80% load                                       |     |       | 2    | FPMH  |
| SIGNALS             | Bias Voltage                                        | 4.8 | 5     | 5.2  | V     |
|                     | Bias Current                                        | 0   |       | 200  | mA    |
|                     | Power Good Voltage                                  | 8   | 10    | 15   | V     |
|                     | Power Good Current                                  | 0   |       | 20   | mA    |
|                     | Inhibit Voltage                                     | 2   |       | 15   | V     |
|                     | Inhibit Current                                     | 0.2 |       | 1.5  | mA    |
|                     | Global Inhibit Voltage                              | 3   |       | 15   | V     |
|                     | Global Inhibit Current                              | 0.6 |       | 3    | mA    |
|                     | AC_OK Voltage                                       | 1   |       | 4    | V     |
|                     | AC_OK Current                                       | -10 |       | 20   | mA    |
|                     | AC_OK Warning                                       | 5   |       |      | mS    |

| SYSTEM OUTPUT ELECTRICAL |                                                          |  |  |     |   |
|--------------------------|----------------------------------------------------------|--|--|-----|---|
| Maximum System Current   | Achieved when all four outputs are connected in parallel |  |  | 30  | A |
| Maximum System Voltage   | Achieved when all four outputs are connected in series   |  |  | 120 | V |

### NOTES:

- Refer to the user manual when connecting units in series and/or in parallel.
- All specifications are believed to be correct at time of publication and are subject to change without notice.

| INDIVIDUAL OUTPUT ELECTRICAL           |                                                                         |       |                 |           |              |
|----------------------------------------|-------------------------------------------------------------------------|-------|-----------------|-----------|--------------|
| Parameter                              | Details                                                                 | Min   | Typ             | Max       | Units        |
| Output Voltage Range                   | See table for limits                                                    | 9     | 24              | 30        | V            |
| Rated Current                          |                                                                         |       |                 | 7.5       | A            |
| Average Output Power                   |                                                                         |       |                 | 150       | Watts        |
| Peak Output Power                      | See graph, < 5 seconds 50% duty cycle                                   |       |                 | 225       | Watts        |
| Initial Voltage Accuracy               | Factory set units                                                       | -0.5  |                 | 0.5       | %            |
| Manual Voltage Adjust                  | 11 turn potentiometer                                                   |       | 1.9             |           | V/turn       |
| Load Regulation                        | Measured at sense terminals                                             | -150  |                 | 150       | mV           |
| Line Regulation                        | Measured at sense terminals                                             | -0.1  |                 | 0.1       | %Vnom        |
| Cross Regulation                       | Measured at sense terminals                                             | -0.2  |                 | 0.2       | %Vnom        |
| Minimum Load                           |                                                                         |       |                 | 0         | Watts        |
| Temperature Coefficient                |                                                                         | -0.02 |                 | 0.02      | %/°C         |
| Ripple and Noise                       | 20MHz BW, pk-pk                                                         |       |                 | 1         | %Vnom        |
| Transient Response                     | 25% to 75% load transient at 0.5A/uS Recovery to within 10% of Vset     |       |                 | 3         | V            |
| Turn On Rise Time                      | Monotonic 10% to 90%                                                    | 1.5   |                 | 3.5       | mS           |
| Turn On Overshoot                      |                                                                         |       |                 | 0.1       | %Vset        |
| Turn On Delay                          | AC to PG<br>EN to PG                                                    |       | 600<br>15       | 750<br>20 | mS<br>mS     |
| Current Share Accuracy                 |                                                                         |       |                 | 5         | %Imax        |
| Open Sense Offset                      | Open sense, voltage offset due to bias currents                         |       |                 | 2         | %Vnom        |
| Holdup Voltage                         |                                                                         |       |                 | 25        | V            |
| Isolation to Ground                    | Each terminal                                                           |       |                 | 250       | V            |
| Over Current Protection                | % of rated current                                                      | 105   |                 | 125       | %Irated      |
| Reverse Current Protection             | % of rated current                                                      | -6    |                 | 0         | %Irated      |
| Short Circuit Protection (Hiccup Mode) | Period<br>Duty cycle<br>Voltage threshold (Measured at sense terminals) |       | 125<br>3<br>3.5 |           | mS<br>%<br>V |
| Over Voltage Protection                | Latching                                                                |       | 36              |           | V            |
| Over Temperature Protection            | Internally monitored, Latching                                          | 115   |                 | 125       | °C           |
| Sense Cable Protection                 | Positive<br>Negative                                                    | -1    |                 | 2<br>1    | V<br>V       |
| Power Good Threshold                   | Low threshold only                                                      |       | 90              |           | %Vset        |
| Current Output Signal                  | $I_{SIG} = 0.6 + I_{OUT} / (I_{RATED} * 1.25)$                          | 0     |                 | 110       | %Irated      |
| Current Limit Control                  | $I_{LMT} = (V_{CTRL} - 0.6) * I_{RATED} * 1.25$                         | 0     |                 | 110       | %Irated      |
| Remote Voltage Control                 | $V_{OUT} = V_{SET} ((1.8 - V_{CTRL}) / 0.6)$                            | 0     |                 | 300       | %Vset        |
| Bias Supply                            | 10mA max                                                                | 4.5   | 5               | 5.2       | V            |
| Reliability                            | 40°C 80% load                                                           |       |                 | 1         | FPMH         |
| Warranty                               |                                                                         |       |                 | 2         | Years        |
| Wire Size                              |                                                                         | 20    | 18              | 10        | AWG          |
| Weight                                 |                                                                         |       | 60              |           | Grams        |
| Size                                   | 60mm x 35mm x 17mm                                                      |       |                 |           |              |

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| INSTALLATION          |                       |                     |            |
|-----------------------|-----------------------|---------------------|------------|
| Parameter             | Details               | Parameter           | Details    |
| Equipment Class       | I                     | Flammability Rating | 94V-2      |
| Installation Category | II                    | IP Rating           | IP10       |
| Pollution Degree      | 2                     | RoHS Compliance     | 2002/95/EC |
| Material Group        | IIb (Indoor use only) |                     |            |

| RELIABILITY |                                  |     |     |       |
|-------------|----------------------------------|-----|-----|-------|
| Component   | Details                          | Min | Max | Units |
| Fan         | Mag Lev Std                      |     | 2.7 | FPMH  |
| Input       | Excluding Fan                    |     | 2   | FPMH  |
| Output      | See individual output datasheets |     | 1   | FPMH  |
| Warranty    |                                  |     | 2   | Years |

| SAFETY              |                                   |     |      |       |
|---------------------|-----------------------------------|-----|------|-------|
| Parameter           | Details                           | Min | Max  | Units |
| Isolation Voltage   | Input to Output                   |     | 4000 | Vac   |
|                     | Input to Chassis                  |     | 1500 | Vac   |
|                     | Output to Chassis                 |     | 250  | Vdc   |
|                     | Output to Output                  |     | 250  | Vdc   |
| Isolation Clearance | Primary to Secondary (Reinforced) | 7   |      | mm    |
|                     | Primary to Chassis (Basic)        | 2.5 |      | mm    |
| Isolation Creepage  | Primary to Secondary (Reinforced) | 12  |      | mm    |
|                     | Primary to Chassis (Basic)        | 4   |      | mm    |
| Leakage Current     | 265Vac, 63Hz, 25°C                |     | 1500 | uA    |

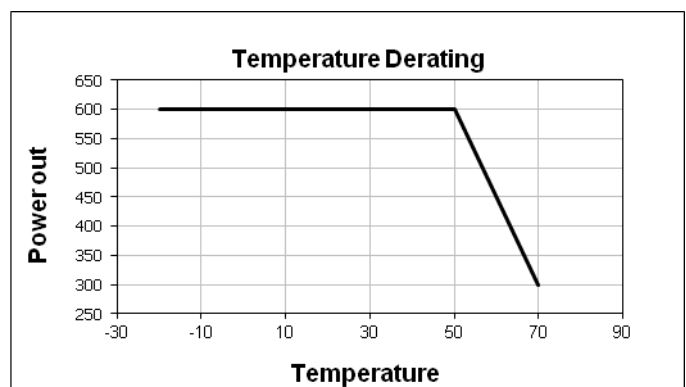
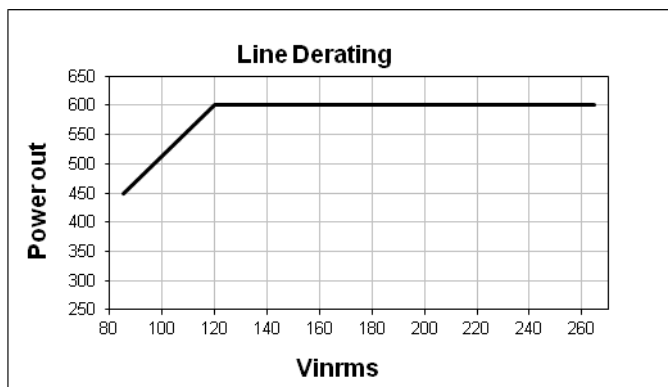
| ENVIRONMENTAL |              |                                                                      |           |          |          |
|---------------|--------------|----------------------------------------------------------------------|-----------|----------|----------|
| Storage       | Parameter    | Details                                                              | Min       | Max      | Units    |
|               | Temperature  |                                                                      | -40       | +85      | °C       |
|               | Humidity     | Relative, non-condensing                                             | 5         | 95       | %        |
|               | Altitude     |                                                                      | -200      | 5000     | m        |
|               | Air Pressure |                                                                      | 54        | 106      | kPa      |
| Operation     | Temperature  | Full Power<br>Derate input and output at<br>2.5% / °C                | -20<br>50 | 50<br>70 | °C<br>°C |
|               | Humidity     | Relative, non-condensing                                             | 5         | 95       | %        |
|               | Altitude     | (-200 to 2000m for UL60601-1)                                        | -200      | 3000     | m        |
|               | Noise Level  | Measured 1m from fan intake                                          |           | 45       | 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 |           |          |          |

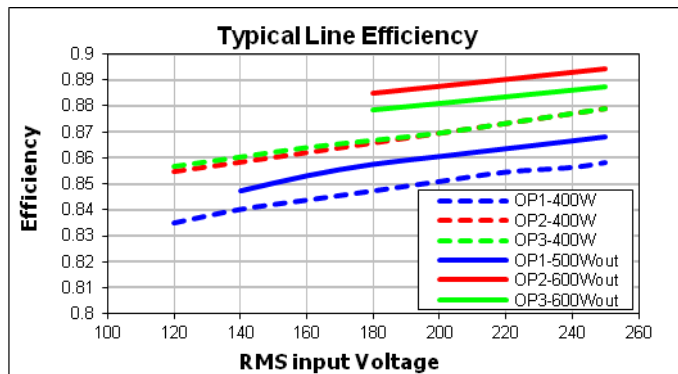
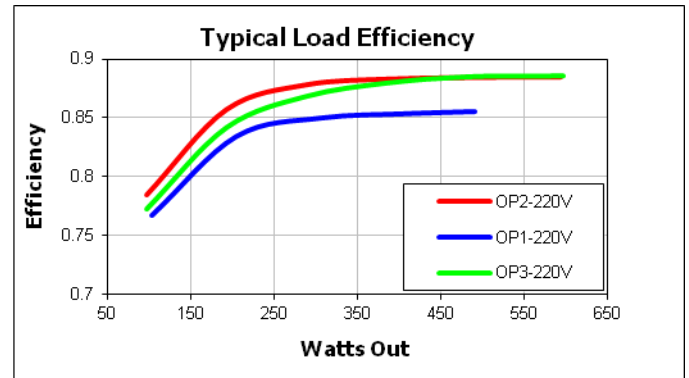
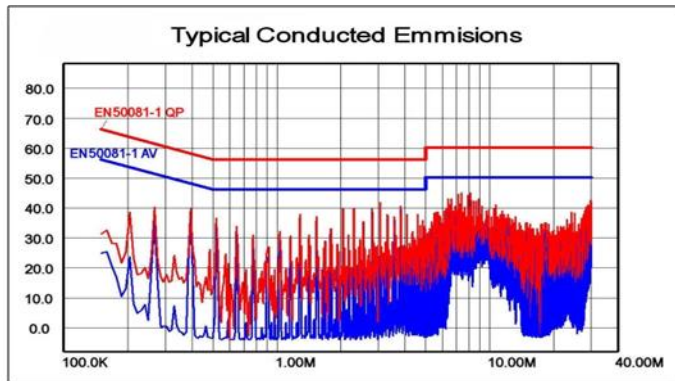
| EMC       |                            |                                     |           |
|-----------|----------------------------|-------------------------------------|-----------|
|           | Parameter                  | Standard                            | Level     |
| Emissions | Radiated Electric Field    | EN55011, EN55022, FCC               | B         |
|           | Conducted Emissions        | EN55011, EN55022, FCC               | B         |
|           | Harmonic Distortion        | EN61000-3-2                         | Compliant |
|           | Flicker & Fluctuation      | EN61000-3-3                         | Compliant |
| Immunity  | Electrostatic Discharge    | EN61000-4-2 (15kV air, 8kV contact) | 4         |
|           | Radiated RFI               | EN61000-4-3 (10 V/m)                | 3         |
|           | Fast Transient Burst       | EN61000-4-4 (4kV)                   | 4         |
|           | Input Line Surges          | EN61000-4-5 (1kV L-N, 2kV L-E)      | 3         |
|           | Conducted RFI              | EN61000-4-6 (10V)                   | 4         |
|           | Power Freq. Magnetic Field | EN61000-4-8 (10A/m)                 | 3         |
|           | Voltage Dips               | EN61000-4-11 (EN55024)              | Compliant |

| MECHANICAL |                                                                   |
|------------|-------------------------------------------------------------------|
| Parameter  | Details                                                           |
| Size       | 77.7mm x 133.7mm x 41mm<br>(all external dimensions $\pm 1.0$ mm) |
| Weight     | 360 gram + 60 gram per output module                              |
| Mounting   | Bottom or Side mounting (See diagram for details)                 |

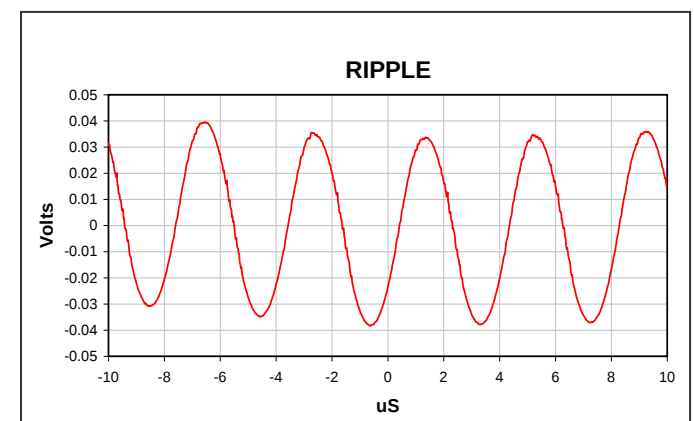
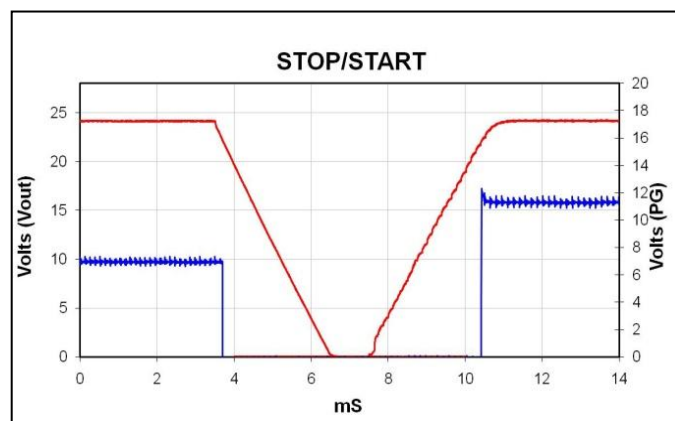
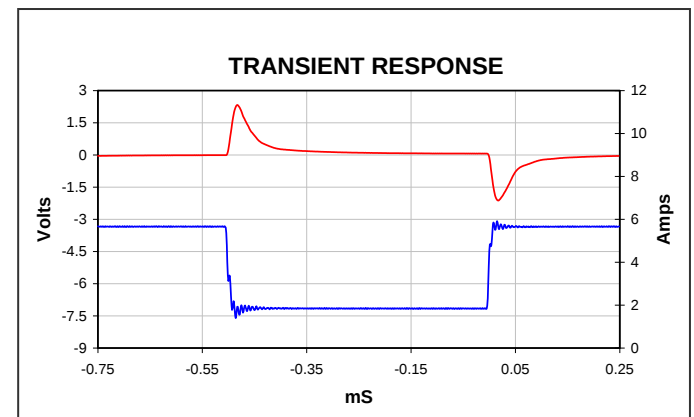
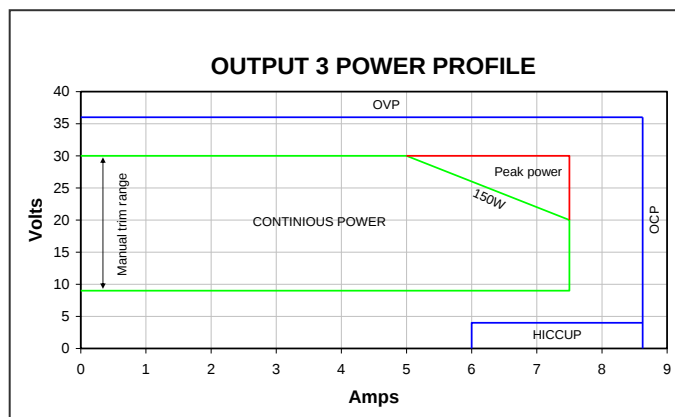
| AGENCY APPROVALS         |               |                |             |
|--------------------------|---------------|----------------|-------------|
| Standard                 | Details       | Standard       | Details     |
| IEC/EN60950-1            |               |                |             |
| UL60950-1                |               |                |             |
| CSA-C22.2 No. 60950-1-03 |               |                |             |
| CE MARK                  | LVD 73/23/EEC | UL file number | UL: E316486 |

## INPUT ELECTRICAL GRAPHS

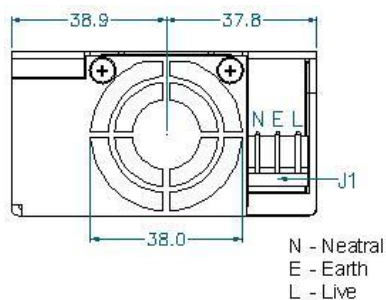




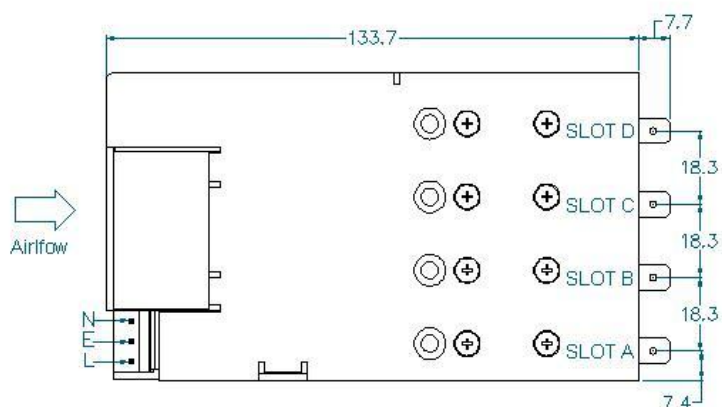
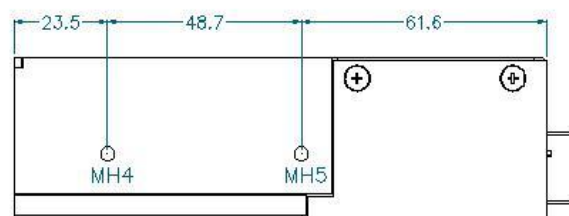
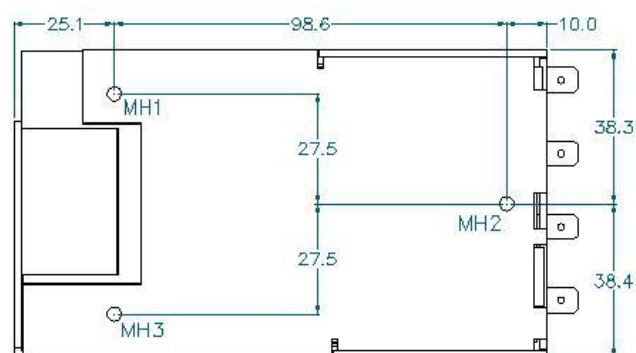
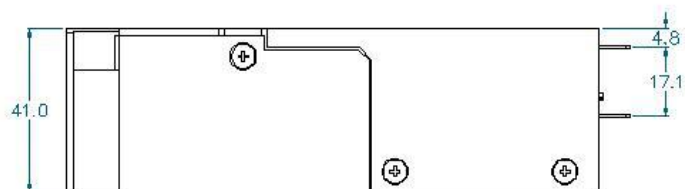
## OUTPUT ELECTRICAL GRAPHS



## MECHANICAL DIMENSIONS AND MOUNTING SCREWS

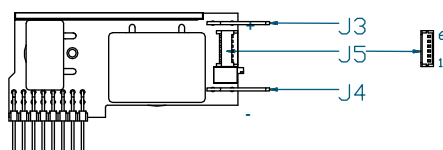
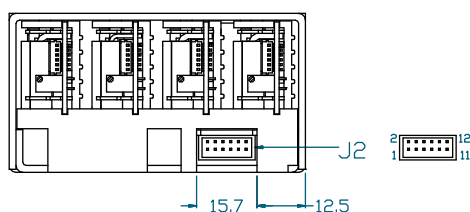
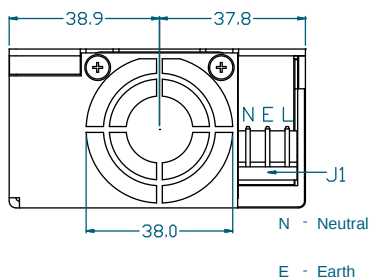


| SCREWS                  |                                      |
|-------------------------|--------------------------------------|
| MH1, MH2, MH3, MH4, MH5 |                                      |
| Screw type              | M4                                   |
| Tightening              | Tighten to 1.5 Nm                    |
| Penetration depth       | 4.00mm max including chassis         |
| OUTPUT MODULES x 8      |                                      |
| Screw type              | M3x5, C/Sink, Posi, Stainless Steel  |
| Tightening              | Tighten to 0.75 Nm                   |
| Penetration depth       | Defined by screw                     |
| CHASSIS x 5             |                                      |
| Screw type              | M3x5, C/Sink, Posi, Stainless Steel  |
| Tightening              | Tighten to 0.75 Nm                   |
| Penetration depth       | Defined by screw                     |
| FAN x 2                 |                                      |
| Screw type              | M3x24, C/Sink, Posi, Stainless Steel |
| Tightening              | Tighten to 0.75 Nm                   |
| Penetration depth       | Defined by screw                     |



## 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 200mA Bias Supply         |        |
| 12      | COM                           |        |
| J5      |                               |        |
| Circuit | Details                       |        |
| 1       | -Sense                        |        |
| 2       | +Sense                        |        |
| 3       | Voltage Control               |        |
| 4       | Current Control / Share / Out |        |
| 5       | COM                           |        |
| 6       | +5V local bias supply         |        |



| J3              |
|-----------------|
| Positive Output |
| J4              |
| Negative Output |

| REF.    | DETAILS                                                      | MANUFACTURER | TERMINAL   |
|---------|--------------------------------------------------------------|--------------|------------|
| J1      | MAINS INPUT: 3 Pin, 5.08mm, with Friction Lock, 18-24 AWG    | MOLEX        | 8701031    |
| J2      | GLOBAL SIGNALS: 12 Pin, 2mm, with Friction Lock, 24-30 AWG   | MOLEX        | 503948051  |
| J2      | IDT ALTERNATIVE FOR J2                                       | MOLEX        | 0875681263 |
| 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        | 1510210600 |

### Notes

1. Terminal and Wire current rating must exceed maximum short circuit output current. Eg. Output 1 =  $25A \times 1.25 = 31.25Amps$
2. Direct equivalents may be used for any connector parts
3. All cables must be rated 105°C min, equivalent to UL1015

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