



gen series catalogue

*The Modular Power Solution of Choice
for Mission Critical Applications*

- ***Highest Efficiency***
- ***Highest Reliability***
- ***Highest Power Density***



Xgen Product Selector

The Xgen series of user configurable power supplies with its unique plug and play architecture allows system designers to define and build 'instant' custom power solutions with industry leading 17W/in³ power density and up to 90% efficiency.

Xgen powerPacs

The application specific 4 slot and 6 slot *powerPacs* provide up to 12 isolated DC outputs from 200W up to 1340W. The table below summarises the *powerPacs* by application and power level. Please refer to the specific product datasheets for full specifications.

| Application | Slots | 200W | 400W | 600W | 700W | 750W | 800W | 900W | 1000W | 1200W | 1340W |
|----------------------|--------|------|------|------|------|------|------|------|-------|-------|-------|
| Standard | 4 Slot | XLA | XLB | XLC | | XLD | | | | | |
| | 6 Slot | | XCA | | XCB | | | | XCC | XCD | XCE |
| Medical | 4 Slot | XMA | XMB | XMC | | XMD | | | | | |
| | 6 Slot | | XVA | | XVB | | | | XVC | XVD | XVE |
| Low Noise Standard | 4 Slot | XKA | XKB | XKC | | | | | | | |
| | 6 Slot | | XQA | | | | | XQB | | XQC | |
| Low Noise Medical | 4 Slot | XRA | XRB | XRC | | | | | | | |
| | 6 Slot | | XZA | | | | | XZB | | XZC | |
| Ultra Quiet Standard | 4 Slot | XTA | XTB | | | | | | | | |
| | 6 Slot | | XBA | XBB | | | | XBC | | | |
| Ultra Quiet Medical | 4 Slot | XNA | XNB | | | | | | | | |
| | 6 Slot | | XWA | XWB | | | | XWC | | | |
| Hi-Temp | 6 Slot | | XHA | XHB | | | | | | | |

Xgen powerMods

High Efficiency Plug and Play DC output modules to provide a wide range of DC output voltages from 1.0V up to 58.0V.

| MODEL | V _{trim} | V _{min} | V _{nom} | V _{max} | I _{max} | Watts |
|-------|-------------------|------------------|------------------|------------------|------------------|----------|
| Xg1 | | 1.0 | 1.5 | 2.5 | 3.6 | 50A 125W |
| Xg2 | | 1.5 | 3.2 | 5.0 | 6.0 | 40A 200W |
| Xg3 | | 4.0 | 6.0 | 12.0 | 15.0 | 20A 240W |
| Xg4 | | 8.0 | 12.0 | 24.0 | 30.0 | 10A 240W |
| Xg5 | | 8.0 | 28 | 48.0 | 58.0 | 6A 288W |
| Xg7 | | | 5.0 | 24.0 | 28.0 | 5A 120W |
| Xg8 | V ₁ | | 5.0 | 24.0 | 28.0 | 3A 72W |
| | V ₂ | | 5.0 | 24.0 | 28.0 | 3A 72W |

Standard Xgen product options include: Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information.



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6 Slot

| | |
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Section 1.1 About Excelsys

About

Your Global Partner for Mission Critical Modular Power Supplies

Excelsys Technologies brings over 20 years experience of modular power supply development and applications support in our revolutionary Xgen series of products. We serve original equipment manufacturers globally from our head office in Ireland, our additional sales offices in USA and China and our network of qualified and experienced distributors in over 30 countries worldwide. Together we have established Excelsys as the brand of choice for customers seeking the highest performing, most reliable and most cost efficient modular power solutions available in the market.

Serving Your Markets, Delivering Your Solutions...

Whatever your application, our dedicated teams of Sales and Applications Engineers are ready to assist you in defining and implementing the optimum modular power solution to meet your custom requirements. Some of the industries where Excelsys have demonstrated success include:



MEDICAL

Medical power supply design and manufacturing demands the highest safety and quality standards. The medically certified solutions in the Xgen Platform are the solutions of choice for variety of applications including:

**Clinical Diagnostic Equipment • Medical Lasers • X-ray Machines • CT-Scanners • MRI Scanners
Dialysis Equipment • Skin Treatment and Regeneration • Cryotherapy Equipment • Cancer Treatment Equipment**



INDUSTRIAL

Excelsys Technologies designs and manufactures power supplies that meet the rigorous demands of the industrial sector. Our products are ideal for a variety of industrial, automation and test & measurement applications including:

Industrial Lasers • Optical Inspection Equipment • Electronic Microscopes • Printer & Paper Binder Equipment • Wafer Fabrication • High-End Camera Equipment • Industrial Cutting Equipment



COMMUNICATIONS

The Xgen range of modular power supplies meet the high reliability and stringent space requirements (1U) of the communications electronics sector and are used across a wide number of applications including:

Wireless Telephony Equipment • Bulk Power System • Base Stations • Data Communications



HI-REL COTS

Excelsys designs and manufactures COTS (Commercial Off The Shelf) power supplies that meet the high reliability and often harsh operating environments of the military electronics industry and are ideal for use in a variety of applications including:

**Radar Systems • Data Acquisition (Ground Based and Mobile) • Communications Equipment
Test & Measurement Equipment**

Excelsys: Our commitment to you...

As a global supplier of modular power supplies, Excelsys combines the latest technology, management methods and a total customer service philosophy to provide the best performing and highest reliability solutions for your business.

Working closely with both our customers and channel partners we are committed to ensuring our products provide the lowest total cost of power supply ownership over the life of your system.



Section 1.2

Overview

The Xgen series brings OEM power supplies to a new paradigm, combining technical excellence with logistics simplicity to provide the world's most flexible, high efficiency, high reliability modular power supply. Xgen continues the Excelsys tradition of providing an instant, no compromise power solution for any application where a unique set of voltage and current requirements is needed.

The Xgen power supply is the most flexible modular power supply in the world. This power supply family ranges in power from 200W to 1340W and is used throughout various industries including Medical, Industrial, Communications and Military.

Need a custom power supply in a hurry?

CUSTOM POWER Xgen is a true Plug & Play multiple-output power supply. Any one of more than 30 million configurations can be assembled anywhere, in under 5 minutes, from standard, volume-produced modules. This is the new-paradigm: a custom power supply available in 5 minutes from standard parts.

Too much heat generated in your equipment?

Difficult to maintain your equipment at the right temperature?

EFFICIENCY Xgen has industry unrivalled efficiency, exceeding 90%. This means that less than half of the amount of waste heat is created in comparison to conventional multiple output power sources with efficiencies of 80% and lower. It also guarantees increased system reliability.

Not enough space available in your equipment?

Is space at a premium, making design and manufacture difficult and compromised?

SPACE Xgen has industry unrivalled power density for a full functionality AC/DC power supply, at 17W/in³. You can get 1340W of multiple-output power source in 1U rack space. Its high power density minimises weight and maximises available space in your design for other components and general accessibility.

Looking for a cost-effective long term solution for all your power supply requirements?

COST-EFFECTIVE Xgen is configured from standard subassemblies that are manufactured in volume in our world class manufacturing facility. This allows Excelsys to provide you with all the benefits of Xgen at a world class competitive price. Contact Excelsys or one of our distributors for details.

Worried about meeting all relevant standards - EMC, Safety, etc?

STANDARD APPROVALS



Xgen series models are fully compliant with all relevant standards. Standard parts meets the requirements EN60950, UL60950, CSA22.2, EN61000-3-x and EN61000-4-x. Additionally our medically approved range meet the requirements of EN60601 and UL60601 3rd edition for medical applications.



Slimline Power Supply

User Configurable 1U Size



PLUG & PLAY POWER next generation power solution

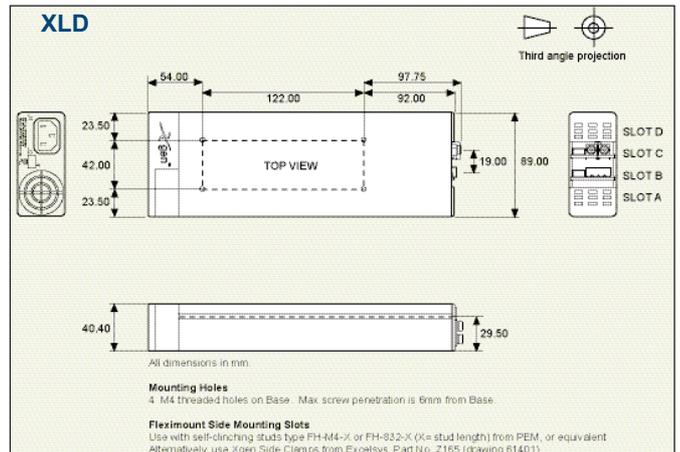
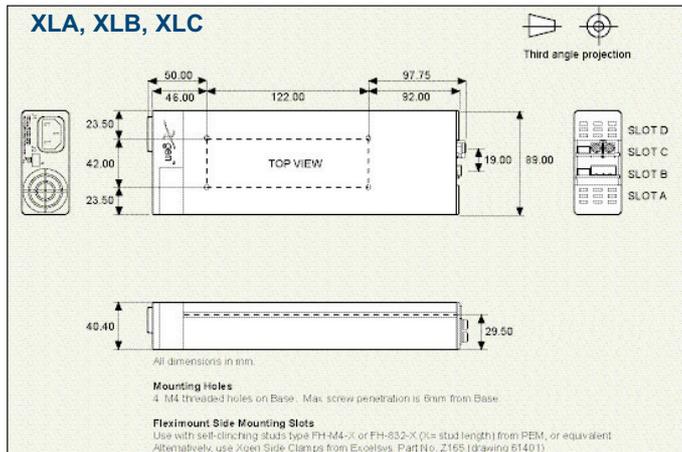
FEATURES & OPTIONS

- Ultra high efficiency, up to 89%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- Visual LED indicators
- 5V bias standby voltage provided
- SEMI F47 Compliant
- Standard Xgen product options include: Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Industrial machines
- Test and measurement
- Automation equipment
- Printing
- Telecommunications

MECHANICAL SPECIFICATIONS



Note: See diagrams on pages 34-37

The XL family of power supplies provides up to 750W in a slimline 1U package. Providing up to 8 isolated outputs, the XL family is the most flexible power supply in its class and brings affordable configurable power to the 200-750W market.

The slimline product boasts unrivalled power density saving valuable system space. Combined with ultra high efficiencies, the XL family provides system designers with flexible instant solutions that significantly shorten design-in time and simplify integration.

The XL family consists of 4 powerPac models in 200W, 400W, 600W and 750W power levels. Each powerPac model may be populated with up to 4 powerMods selected from the table of powerMods shown below.

All configurations carry full safety agency approvals, UL60950, EN60950 and are CE marked.

powerMods

| MODEL | Vmin | Vnom | Vmax | Imax | Watts |
|--------|-------|------|------|------|----------|
| | Vtrim | Vpot | | | |
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 50A 125W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 40A 200W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 20A 240W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 10A 240W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 6A 288W |
| Xg7 | | 5.0 | 24.0 | 28.0 | 5A 120W |
| Xg8 v1 | | 5.0 | 24.0 | 28.0 | 3A 72W |
| v2 | | 5.0 | 24.0 | 28.0 | 3A 72W |

powerPacs

| MODEL | Watts |
|-------|-------|
| XLA | 200W |
| XLB | 400W |
| XLC | 600W |
| XLD | 750W |

SPECIFICATION applies to configured units consisting of **powerMods** inserted into the appropriate **powerPac**

| Parameter | Conditions/Description | Min | Nom | Max | Units |
|----------------------------------|---|--------------|--------------------------|---------------------------------|------------------|
| Input Voltage Range | Universal Input 47-440Hz | 85 120 | | 264 380 | VAC VDC |
| Power Rating | XLA:200W, XLB:400W, XLC:600W, XLD:750W See Section 4.11 for line voltage deratings | | | | |
| Input Current | XLA 85VAC in 200W out XLB 85VAC in 400W out XLC 85VAC in 400W out XLD 85VAC in 525W out | | 4.0 6.0 7.5 7.5 | | A A A A |
| Inrush Current | 230VAC, 25°C | | | 50 | A |
| Undervoltage Lockout | Shutdown | 65 | | 74 | VAC |
| Fusing | XLA 250V 5 x 20mm XLB 250V 5 x 20mm XLC, XLD 250V 5 x 20mm | | | F5A HRC F6.3A HRC F8A HRC | |
| OUTPUT | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| powerMod Power | As per <i>powerMod</i> table | | | | |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per <i>powerMod</i> table Electronic: See Section 4.6 | | | | |
| Minimum Load | | | 0 | | A |
| Line Regulation | For ±10% change from nominal line | | | ±0.1 | % |
| Load Regulation | For 25% to 75% load change | | | ±0.2 | % |
| Cross Regulation | | | | ±0.2 | % |
| Transient Response | For 25% to 75% load change Voltage Deviation Settling Time | | | 10 250 | % µs |
| Ripple and Noise | 20MHz 100mV or 1.0% pk-pk | | | | |
| Overvoltage Protection | 1st level: Vset Tracking. 2nd level: Vmax (Latching) | 110 | | 125 | % |
| Overcurrent Protection | Straight line with hiccup activation at <30% of Vnom See Section 4.6 | 110 | | 120 | % |
| Remote Sense | Max. line drop compensation. (except Xg7, Xg8) | | | 0.5 | VDC |
| Overshoot | | | | 2 | % |
| Turn-on Delay | From AC In and Global Enable / powerMod Enable XLA, XLB, XLC From AC In and Global Enable / powerMod Enable XLD | | | 700 / 6 1000 / 6 | ms ms |
| Rise Time | Monotonic | | | 5 | ms |
| Hold-up Time | For nominal output voltages at full load XLA, XLB, XLC/XLD | 20/15 | | | ms |
| Output Isolation | Output to Output / Output to Chassis | 500 / 500 | | | VDC |
| GENERAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to Output Input to Chassis | 3000 1500 | | | VAC VAC |
| Efficiency | 230VAC, 750W @ 24V | | 89 | | % |
| Safety Agency Approvals | EN60950, UL60950, CSA22.2 No.950 UL File No. E181875 | | | | |
| Leakage Current | 250VAC, 60Hz, 25°C | | | 1.5 | mA |
| Signals | See Section 4.9 | | | | |
| Bias Supply | Always on. Current 250mA. 500mA option available | 4.8 | 5.0 | 5.2 | VDC |
| Reliability | Failures per million hours at 40°C and full load <i>powerMod</i> See Section 4.12. <i>powerPac</i> excludes fans <i>powerPac</i> | | | 0.958 0.92 | fpmh fpmh |
| EMC | | | | | |
| Parameter | Standard | | Level | | Units |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | | Level B | | |
| Radiated | EN55011, EN55022, FCC | | Level B | | |
| Harmonic Distortion | EN61000-3-2 Class A | | Compliant | | |
| Flicker & Fluctuation | EN61000-3-3 | | Compliant | | |
| Immunity | | | | | |
| Electrostatic Discharge | EN61000-4-2 | | Level 2 | | |
| Radiated Immunity | EN61000-4-3 | | Level 3 | | |
| Fast Transients-Burst | EN61000-4-4 Level 3 | | | | |
| Input Line Surges | EN61000-4-5 | | Level 3 | | |
| Conducted Immunity | EN61000-4-6 | | Level 3 | | |
| Voltage Dips | EN61000-4-11, SEMI F47 compliant. See note 8. | | Compliant | | |
| ENVIRONMENTAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | | -20 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Derating | See Section 4.11 for full temperature deratings | | | | |
| Relative Humidity | Non-condensing | 5 | | 95 | %RH |
| Shock | 3000 Bumps, 10G (16ms) half sine | | | | |
| Vibration | 1.5G | 10 | | 200 | Hz |

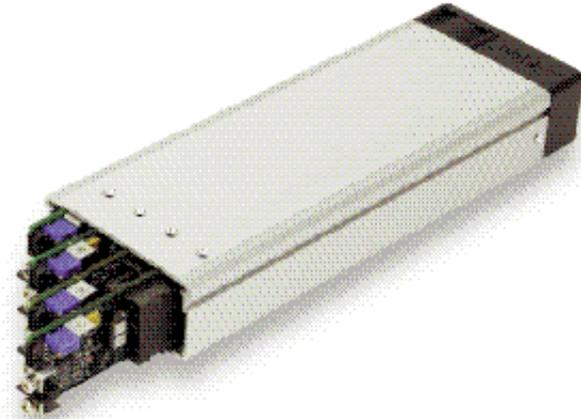
NOTES

1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
3. All specifications at nominal input, full load, 25°C unless otherwise stated.
4. XLD: 800W peak for 1s; Duty cycle 7%. *powerMod* output power must not exceed normal ratings.
5. When powering inductive or capacitive loads, it is recommended to use a blocking diode on the output.
6. Conformal Coating option: See Sections 3.1 and 4.10 for details.
7. For section references above go to the Xgen Designers Manual.
8. SEMI F47 compliant at input voltages >160VAC. Consult Excelsys for details.



Medical Power Supply

User Configurable 1U size



PLUG & PLAY POWER next generation power solution

FEATURES & OPTIONS

- EN60601-1 3rd edition approved
- Less than 300µA leakage current
- 150µA option available
- 4000VAC isolation
- Ultra high efficiency, up to 89%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- 5V bias standby voltage provided
- Standard Xgen product options include:
 - Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Radiological imaging
- Clinical diagnostics
- Medical lasers
- Clinical chemistry

The XM family of medically approved power supplies provides up to 750W in a slimline 1U package. The XM family carries the latest safety agency approvals to EN60601-1 and UL60601-1 3rd Edition, meeting the stringent creepage and clearance requirements in this compact package. Providing up to 8 isolated outputs, the XM family is the most flexible power supply in its class and brings affordable configurable power to the 200-750W medical market.

The XM family consists of 4 *powerPac* models in 200W, 400W, 600W and 750W power levels. Each *powerPac* model may be populated with up to 4 *powerMods* selected from the table of *powerMods* shown below. Simply select your appropriate *powerPac* and *powerMods* to get your instant custom power solution.

This slimline product boasts unrivalled power density, providing significant system space savings. Combined with ultra-high efficiencies, the XM family provides system designers with flexible instant solutions that significantly shorten system design-in time.

powerMods

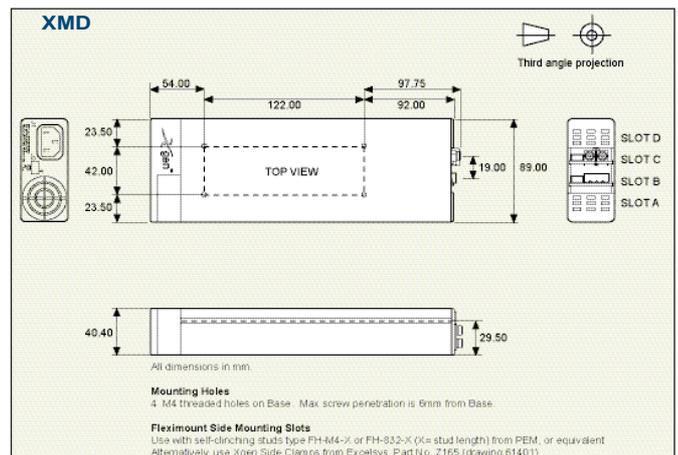
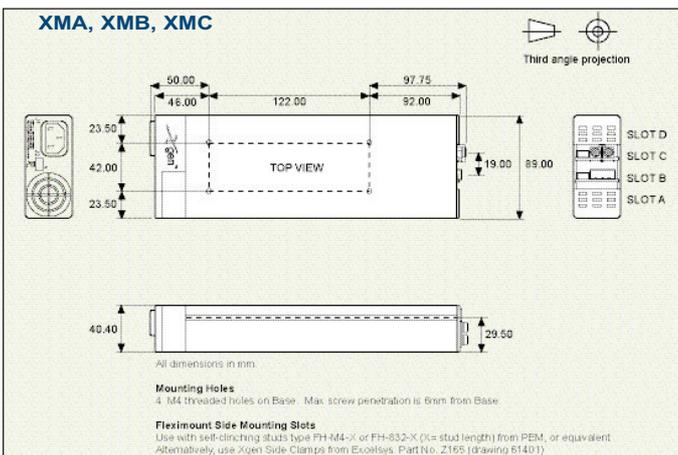
| MODEL | Vmin Vtrim | Vnom Vpot | Vmax | Imax | Watts |
|--------|---------------|--------------|------|------|----------|
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 50A 125W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 40A 200W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 20A 240W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 10A 240W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 6A 288W |
| Xg7 | | 5.0 | 24.0 | 28.0 | 5A 120W |
| Xg8 v1 | | 5.0 | 24.0 | 28.0 | 3A 72W |
| v2 | | 5.0 | 24.0 | 28.0 | 3A 72W |

powerPacs

| | MODEL | Watts |
|----|-------|-------|
| XM | XMA | 200W |
| | XMB | 400W |
| | XMC | 600W |
| | XMD | 750W |

MECHANICAL SPECIFICATIONS

Note: See diagrams on pages 34-37



SPECIFICATION applies to configured units consisting of *powerMods* plugged into the appropriate *powerPac*

| INPUT | | | | | |
|----------------------------------|---|--|--------------------------|---------------------------------|------------------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Input Voltage Range | Universal Input 47-440Hz | 85 120 | | 264 380 | VAC VDC |
| Power Rating | XMA:200W, XMB:400W, XMC:600W, XMD:750W See Section 4.11 for line voltage deratings | | | | |
| Input Current | XMA XMB XMC XMD | 85VAC in 200W out 85VAC in 400W out 85VAC in 400W out 85VAC in 525W out | 4.0 6.0 7.5 7.5 | | A A A A |
| Inrush Current | 230VAC, 25°C | | | 50 | A |
| Undervoltage Lockout | Shutdown | 65 | | 74 | VAC |
| Fusing | XMA XMB XMC, XMD | 250V 5 x 20mm 250V 5 x 20mm 250V 5 x 20mm | | F5A HRC F6.3A HRC F8A HRC | |
| OUTPUT | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| powerMod Power | As per <i>powerMod</i> table | | | | |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per <i>powerMod</i> table Electronic: See Section 4.6 | | | | |
| Minimum Load | | | 0 | | A |
| Line Regulation | For ±10% change from nominal line | | | ±0.1 | % |
| Load Regulation | For 25% to 75% load change | | | ±0.2 | % |
| Cross Regulation | | | | ±0.2 | % |
| Transient Response | For 25% to 75% load change Voltage Deviation Settling Time | | | 10 250 | % µs |
| Ripple and Noise | 20MHz 100mV or 1.0% pk-pk | | | | |
| Overvoltage Protection | 1st level: Vset Tracking. 2nd level: Vmax (Latching) | 110 | | 125 | % |
| Overcurrent Protection | Straight line with hiccup activation at <30% of Vnom See Section 4.6 | 110 | | 120 | % |
| Remote Sense | Max. line drop compensation. (except Xg7, Xg8) | | | 0.5 | VDC |
| Overshoot | | | | 2 | % |
| Turn-on Delay | From AC in and Global Enable / powerMod Enable XMA, XMB, XMC From AC in and Global Enable / powerMod Enable XMD | | | 700 / 6 1000 / 6 | ms ms |
| Rise Time | Monotonic | | | 5 | ms |
| Hold-up Time | For nominal output voltages at full load XMA,XMB, XMC/XMD | 20/15 | | | ms |
| Output Isolation | Output to Output / Output to Chassis | 500 / 500 | | | VDC |
| GENERAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to Output Input to Chassis | 4000 1500 | | | VAC VAC |
| Efficiency | 230VAC, 750W @ 24V | | 89 | | % |
| Safety Agency Approvals | EN60601-1, UL60601-1 3rd Edition, CSA601-1 UL File no. E230761 | | | | |
| Leakage Current | 250VAC, 60Hz, 25°C 250VAC, 60Hz, 25°C Option 04 | | | 300 150 | µA µA |
| Signals | See Section 4.9 | | | | |
| Bias Supply | Always on. Current 250mA. 500mA option available | 4.8 | 5.0 | 5.2 | VDC |
| Reliability | Failures per million hours at 40°C and full load <i>powerMod</i> See Section 4.12. <i>powerPac</i> excludes fans <i>powerPac</i> | | | 0.958 0.92 | fpmh fpmh |
| Parameter | Standard | Level | | Units | |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | | Level B | | |
| Radiated | EN55011, EN55022, FCC | | Level B | | |
| Harmonic Distortion | EN61000-3-2 Class A | | Compliant | | |
| Flicker & Fluctuation | EN61000-3-3 | | Compliant | | |
| Immunity | | | | | |
| Electrostatic Discharge | EN61000-4-2 | | Level 2 | | |
| Radiated Immunity | EN61000-4-3 | | Level 3 | | |
| Fast Transients-Burst | EN61000-4-4 | | Level 3 | | |
| Input Line Surges | EN61000-4-5 | | Level 3 | | |
| Conducted Immunity | EN61000-4-6 | | Level 3 | | |
| Voltage Dips | EN61000-4-11 | | Compliant | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | | -20 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Derating | See Section 4.11 for full temperature deratings | | | | |
| Relative Humidity | Non-condensing | 5 | | 95 | %RH |
| Shock | 3000 Bumps, 10G (16ms) half sine | | | | |
| Vibration | 1.5G | 10 | | 200 | Hz |

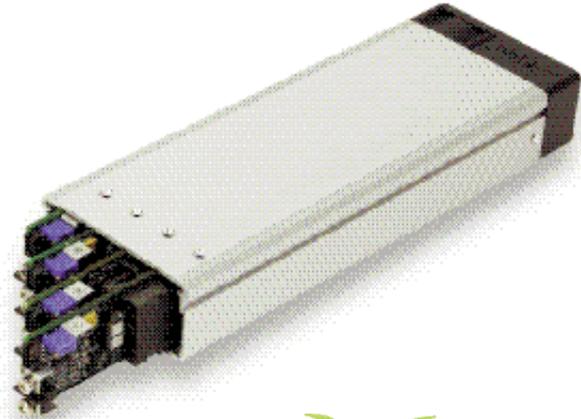
NOTES

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4. XMD: 800W peak for 1s; Duty cycle 7%. *powerMod* output power must not exceed normal ratings.
5. When powering inductive or capacitive loads, it is recommended to use a blocking diode on the output.
6. For section references above go to the Xgen Designers Manual.



Slimline Power Supply

User Configurable 1U size



PLUG & PLAY POWER next generation power solution

FEATURES & OPTIONS

- Low Acoustic noise 39.8dBA
- Ultra high efficiency, up to 89%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- Visual LED indicators
- 5V bias standby voltage provided
- SEMI F47 Compliant
- Standard Xgen product options include: Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Audio Equipment
- Test and measurement
- Telecommunications

The XK family of low acoustic noise power supplies provides up to 600W in a slimline 1U x 260mm x 89mm package. Providing up to 8 isolated outputs, the XK family is the most flexible power supply in its class and brings affordable configurable power to the 200-600W market.

Ideal for acoustic sensitive applications, the XK boasts unrivalled power density saving valuable system space. Combine with ultra high efficiencies, the XK family provides system designers with flexible instant solutions that significantly shorten and simplify system design-in time.

The XK family consists of 3 *powerPac* models in 200W, 400W and 600W power levels. Each *powerPac* model may be populated with up to 4 *powerMods* selected from the table of *powerMods* shown below.

All configurations carry full safety agency approvals, UL60950, EN60950 and are CE marked.

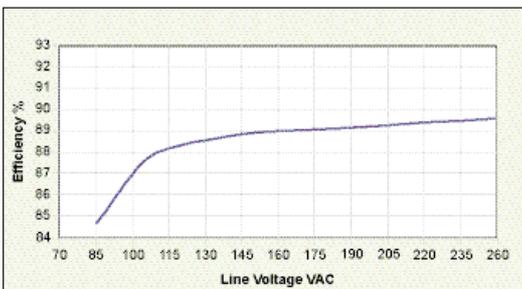
powerMods

| MODEL | Vmin Vtrim | Vnom Vpot | Vmax | Imax | Watts |
|--------|---------------|--------------|------|------|----------|
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 50A 125W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 40A 200W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 20A 240W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 10A 240W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 6A 288W |
| Xg7 | 5.0 | 24.0 | 28.0 | 5A | 120W |
| Xg8 v1 | 5.0 | 24.0 | 28.0 | 3A | 72W |
| v2 | 5.0 | 24.0 | 28.0 | 3A | 72W |

powerPacs

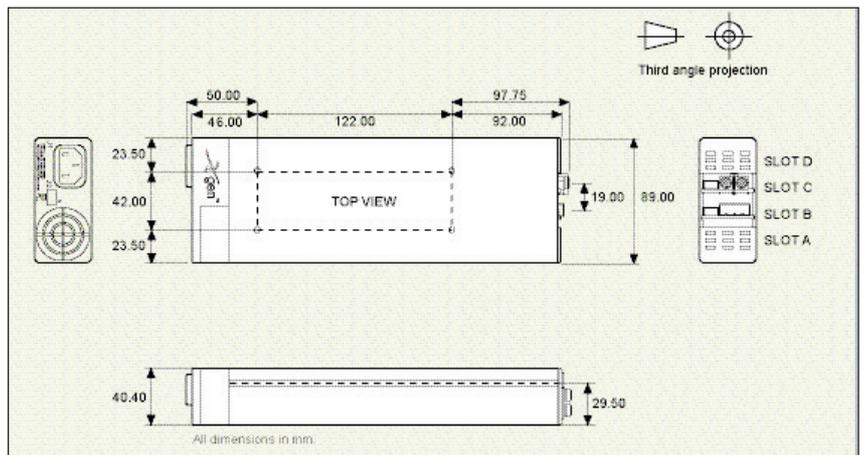
| MODEL | Watts |
|-------|-------|
| XKA | 200W |
| XKB | 400W |
| XKC | 600W |

EFFICIENCY (typical)



MECHANICAL SPECIFICATIONS

Note: See diagrams on pages 34-37



SPECIFICATION applies to configured units consisting of *powerMods* plugged into the appropriate *powerPac*

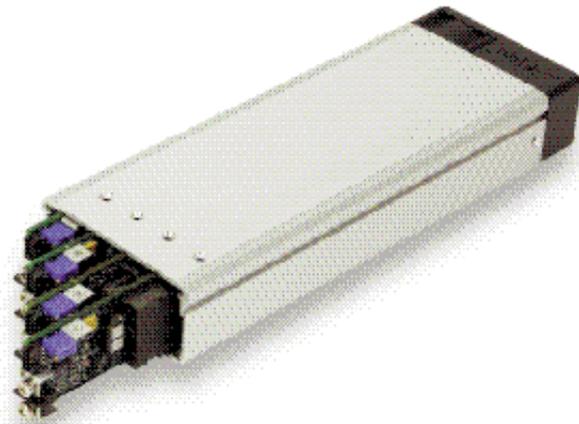
| INPUT | | | | | |
|----------------------------------|---|---|-------------------|---------------------------------|--------------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Input Voltage Range | Universal Input 47-440Hz | 85 120 | | 264 380 | VAC VDC |
| Power Rating | XKA:200W, XKB:400W, XKC:600W See Section 4.11 for line voltage deratings | | | | |
| Input Current | XKA XKB XKC | 85VAC in 200W out 85VAC in 400W out 85VAC in 400W out | 4.5 5.5 7.5 | | A A A |
| Inrush Current | 230VAC, 25°C | | | 50 | A |
| Undervoltage Lockout | Shutdown | 65 | | 74 | VAC |
| Fusing | XKA XKB XKC | 250V 5 x 20mm 250V 5 x 20mm 250V 5 x 20mm | | F5A HRC F6.3A HRC F8A HRC | |
| OUTPUT | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| powerMod Power | As per <i>powerMod</i> table | | | | |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per <i>powerMod</i> table Electronic: See Section 4.6 | | | | |
| Minimum Load | | | 0 | | A |
| Line Regulation | For ±10% change from nominal line | | | ±0.1 | % |
| Load Regulation | For 25% to 75% load change | | | ±0.2 | % |
| Cross Regulation | | | | ±0.2 | % |
| Transient Response | For 25% to 75% load change Voltage Deviation Settling Time | | | 10 250 | % µs |
| Ripple and Noise | 20MHz 100mV or 1.0% pk-pk | | | | |
| Overvoltage Protection | Two-level. 1st level: Vset Tracking. 2nd level: Vmax (Latching) | 110 | | 125 | % |
| Overcurrent Protection | Straight line with hiccup activation at <30% of Vnom See Section 4.6 | 110 | | 120 | % |
| Remote Sense | Max. line drop compensation. (except Xg7, Xg8) | | | 0.5 | VDC |
| Overshoot | | | | 2 | % |
| Turn-on Delay | From AC in and Global Enable / powerMod Enable | | | 700 / 6 | ms |
| Rise Time | Monotonic | | | 5 | ms |
| Hold-up Time | For nominal output voltages at full load | 20 | | | ms |
| Output Isolation | Output to Output / Output to Chassis | 500 / 500 | | | VDC |
| GENERAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to Output Input to Chassis | 3000 1500 | | | VAC VAC |
| Efficiency | 230VAC, 600W @ 24V | | 89 | | % |
| Safety Agency Approvals | EN60950, UL60950, CSA22.2 No.950 UL File No. E181875 | | | | |
| Leakage Current | 250VAC, 60Hz, 25°C | | | 1.5 | mA |
| Signals | See Section 4.9 | | | | |
| Bias Supply | Always on. Current 250mA. 500mA option available | 4.8 | 5.0 | 5.2 | VDC |
| Reliability | Failures per million hours at 40°C and full load <i>powerMod</i> See Section 4.12. <i>powerPac</i> excludes fans <i>powerPac</i> | | | 0.958 0.92 | fpmh fpmh |
| EMC | | | | | |
| Parameter | Standard | Level | | Units | |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | | Level B | | |
| Radiated | EN55011, EN55022, FCC | | Level B | | |
| Harmonic Distortion | EN61000-3-2 Class A | | Compliant | | |
| Flicker & Fluctuation | EN61000-3-3 | | Compliant | | |
| Immunity | | | | | |
| Electrostatic Discharge | EN61000-4-2 | | Level 2 | | |
| Radiated Immunity | EN61000-4-3 | | Level 3 | | |
| Fast Transients-Burst | EN61000-4-4 | | Level 3 | | |
| Input Line Surges | EN61000-4-5 | | Level 3 | | |
| Conducted Immunity | EN61000-4-6 | | Level 3 | | |
| Voltage Dips | EN61000-4-11, SEMI F47 compliant. See note 7. | | Compliant | | |
| ENVIRONMENTAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | | -20 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Derating | See Section 4.11 for full temperature deratings | | | | |
| Relative Humidity | Non-condensing | 5 | | 95 | %RH |
| Acoustic Noise | Measured from distance of 1m | | 39.8 | | dBA |
| Shock | 3000 Bumps, 10G (16ms) half sine | | | | |
| Vibration | 1.5G | 10 | | 200 | Hz |

NOTES

1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
3. All specifications at nominal input, full load, 25°C unless otherwise stated.
4. When powering inductive or capacitive loads, it is recommended to use a blocking diode on the output.
5. Conformal Coating option: See Sections 3.1 and 4.10 for details.
6. For section references above go to the Xgen Designers Manual.
7. SEMI F47 compliant at input voltages >160VAC. Consult Excelsys for details.



Medical Power Supply
Low Acoustic Noise 1U size



Low Acoustic Noise Medical

PLUG & PLAY POWER
next generation power solution

FEATURES & OPTIONS

- Low Acoustic noise 39.8dBA
- EN60601-1 3rd edition approved
- Less than 300µA leakage current
- 150µA option available
- 4000VAC isolation
- Ultra high efficiency, up to 89%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- 5V bias standby voltage provided
- Standard Xgen product options include:
Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Radiological imaging
- Clinical diagnostics
- Medical lasers
- Clinical chemistry

The XR family of low acoustic noise medically approved power supplies provides up to 600W in a slimline 1u x 260mm x 89mm package. Ideal for acoustic sensitive medical equipment, the XR family carries full safety agency approvals to EN60601-1 and UL60601-1 3rd Edition, meeting the stringent creepage and clearance requirements in this compact package. Providing up to 8 isolated outputs, the XR family is the most flexible power supply in its class and brings affordable configurable power to the 200-600W medical market.

The XR family consists of 3 *powerPac* models in 200W, 400W and 600W power levels. Each *powerPac* model may be populated with up to 4 *powerMods* selected from the table of *powerMods* shown below. Simply select your appropriate *powerPac* and *powerMods* to get your instant custom power solution.

This slimline product boasts unrivalled power density, providing significant system space savings. Combined with ultra-high efficiencies, the XR family provides system designers with flexible instant solutions that significantly shorten system design-in time.

powerMods

| MODEL | V _{min} V _{trim} | V _{nom} V _{pot} | V _{max} | I _{max} | Watts |
|--------|---------------------------------------|--------------------------------------|------------------|------------------|----------|
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 50A 125W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 40A 200W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 20A 240W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 10A 240W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 6A 288W |
| Xg7 | | 5.0 | 24.0 | 28.0 | 5A 120W |
| Xg8 v1 | | 5.0 | 24.0 | 28.0 | 3A 72W |
| v2 | | 5.0 | 24.0 | 28.0 | 3A 72W |

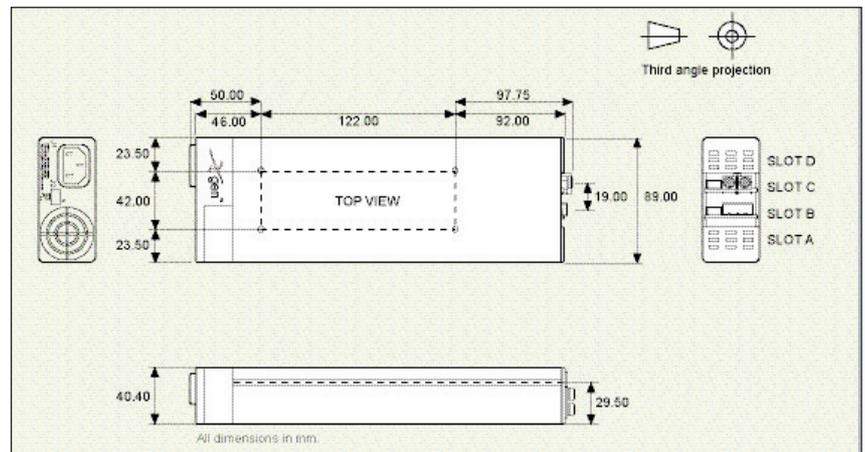
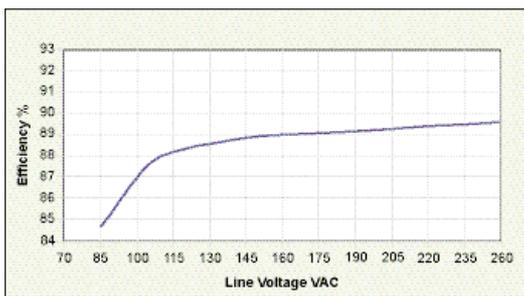
powerPacs

| MODEL | Watts |
|-------|-------|
| XRA | 200W |
| XR B | 400W |
| XRC | 600W |

MECHANICAL SPECIFICATIONS

Note: See diagrams on pages 34-37

EFFICIENCY (typical)



SPECIFICATION applies to configured units consisting of *powerMods* plugged into the appropriate *powerPac*

| INPUT | | | | | |
|----------------------------------|---|---|-------------------|---------------------------------|--------------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Input Voltage Range | Universal Input 47-440Hz | 85 120 | | 264 380 | VAC VDC |
| Power Rating | XRA:200W, XRB:400W, XRC:600W See Section 4.11 for line voltage deratings | | | | |
| Input Current | XRA XRB XRC | 85VAC in 200W out 85VAC in 400W out 85VAC in 400W out | 4.5 5.5 7.5 | | A A A |
| Inrush Current | 230VAC, 25°C | | | 50 | A |
| Undervoltage Lockout | Shutdown | 65 | | 74 | VAC |
| Fusing | XRA XRB XRC | 250V 5 x 20mm 250V 5 x 20mm 250V 5 x 20mm | | F5A HRC F6.3A HRC F8A HRC | |
| OUTPUT | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| powerMod Power | As per <i>powerMod</i> table | | | | |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per <i>powerMod</i> table Electronic: See Section 4.6 | | | | |
| Minimum Load | | | 0 | | A |
| Line Regulation | For ±10% change from nominal line | | | ±0.1 | % |
| Load Regulation | For 25% to 75% load change | | | ±0.2 | % |
| Cross Regulation | | | | ±0.2 | % |
| Transient Response | For 25% to 75% load change Voltage Deviation Settling Time | | | 10 250 | % µs |
| Ripple and Noise | 20MHz 100mV or 1.0% pk-pk | | | | |
| Overvoltage Protection | 1st level: Vset Tracking. 2nd level: Vmax (Latching) | 110 | | 125 | % |
| Overcurrent Protection | Straight line with hiccup activation at <30% of Vnom See Section 4.6 | 110 | | 120 | % |
| Remote Sense | Max. line drop compensation. (except Xg7, Xg8) | | | 0.5 | VDC |
| Overshoot | | | | 2 | % |
| Turn-on Delay | From AC in and Global Enable / powerMod Enable | | | 700 / 6 | ms |
| Rise Time | Monotonic | | | 5 | ms |
| Hold-up Time | For nominal output voltages at full load | 20 | | | ms |
| Output Isolation | Output to Output / Output to Chassis | 500 / 500 | | | VDC |
| GENERAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to Output Input to Chassis | 4000 1500 | | | VAC VAC |
| Efficiency | 230VAC, 600W @ 24V | | 89 | | % |
| Safety Agency Approvals | EN60601-1, UL2601-1, CSA601-1 UL File No. E230761 | | | | |
| Leakage Current | 250VAC, 60Hz, 25°C 250VAC, 60Hz, 25°C Option 04 | | | 300 150 | µA µA |
| Signals | See Section 4.9 | | | | |
| Bias Supply | Always on. Current 250mA. 500mA option available | 4.8 | 5.0 | 5.2 | VDC |
| Reliability | Failures per million hours at 40°C and full load <i>powerMod</i> See Section 4.12. <i>powerPac</i> excludes fans <i>powerPac</i> | | | 0.958 0.92 | fpmh fpmh |
| EMC | | | | | |
| Parameter | Standard | | Level | | Units |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | | Level B | | |
| Radiated | EN55011, EN55022, FCC | | Level B | | |
| Harmonic Distortion | EN61000-3-2 Class A | | Compliant | | |
| Flicker & Fluctuation | EN61000-3-3 | | Compliant | | |
| Immunity | | | | | |
| Electrostatic Discharge | EN61000-4-2 | | Level 2 | | |
| Radiated Immunity | EN61000-4-3 | | Level 3 | | |
| Fast Transients-Burst | EN61000-4-4 | | Level 3 | | |
| Input Line Surges | EN61000-4-5 | | Level 3 | | |
| Conducted Immunity | EN61000-4-6 | | Level 3 | | |
| Voltage Dips | EN61000-4-11 | | Compliant | | |
| ENVIRONMENTAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | | -20 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Derating | See Section 4.11 for full temperature deratings | | | | |
| Relative Humidity | Non-condensing | 5 | | 95 | %RH |
| Acoustic Noise | Measured from distance of 1m | | 39.8 | | dBA |
| Shock | 3000 Bumps, 10G (16ms) half sine | | | | |
| Vibration | 1.5G | 10 | | 200 | Hz |

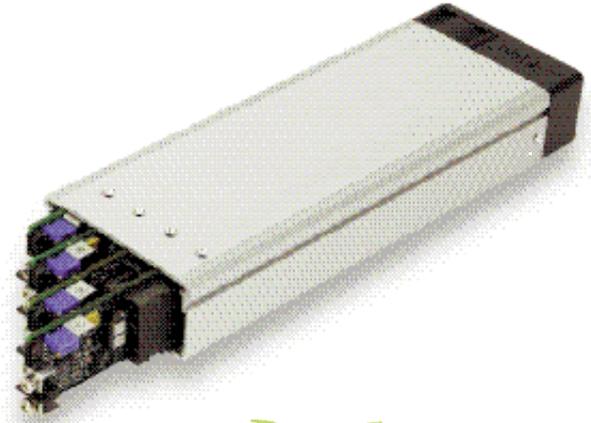
NOTES

1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
3. All specifications at nominal input, full load, 25°C unless otherwise stated.
4. When powering inductive or capacitive loads, it is recommended to use a blocking diode on the output.
5. For section references above go to the Xgen Designers Manual.



Ultra Low Noise Power Supply

Ultra-high efficiency 1U size



PLUG & PLAY POWER next generation power solution

FEATURES & OPTIONS

- Low Acoustic noise 37.3dBA
- Ultra high efficiency, up to 89%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- Visual LED indicators
- 5V bias standby voltage provided
- Standard Xgen product options include: Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Audio Equipment
- Test and measurement
- Telecommunications
- For Medical applications, See XN

The XT family of Ultra Low Noise power supplies provides up to 400W in an extremely compact 1U x 260mm x 89mm package. With efficiencies of up to 90%, the XT family employs an innovative plug & play architecture that allows users to instantly configure a custom power solution in less than 5 minutes!

Ideal for acoustic sensitive applications such as audio applications, the XT family provides unmatched efficiency and high power density, made possible through the combination of low loss technologies and the best field-proven technologies in planar magnetics and surface mount electronics.

The XT family consists of 2 *powerPac* models ranging in power levels from 200W to 400W. Each model may be populated with up to 4 *powerMods* selected from the table of *powerMods* shown below.

All configurations carry full safety agency approvals, UL60950, EN60950 and are CE marked.

powerMods

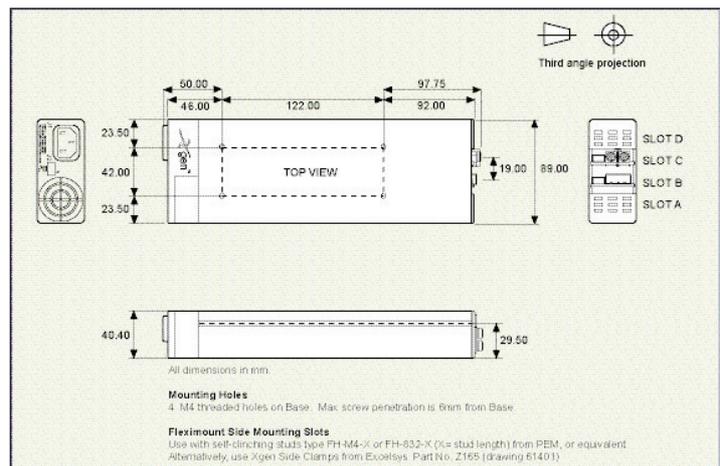
| MODEL | V _{trim} | V _{min} | V _{nom} | V _{max} | I _{max} | Watts |
|--------|-------------------|------------------|------------------|------------------|------------------|-------|
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 41.6A | 104W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 33.2A | 166W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 16.67A | 200W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 8.33A | 200W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 5A | 240W |
| Xg7 | | 5.0 | 24.0 | 28.0 | 4.17A | 100W |
| Xg8 v1 | | 5.0 | 24.0 | 28.0 | 2.5A | 60W |
| v2 | | 5.0 | 24.0 | 28.0 | 2.5A | 60W |

powerPacs

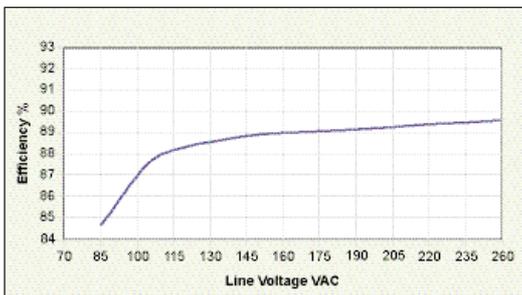
| | MODEL | Watts |
|----|-------|-------|
| XT | XTA | 200W |
| | XTB | 400W |

powerMod Maximum Power Outputs (W) have been derated to operate with XT range of Ultra Low-Noise Power Supplies. See Section 4.11 Xgen Designers Manual for full derating details.

MECHANICAL SPECIFICATIONS



EFFICIENCY (typical)



SPECIFICATION applies to configured units consisting of *powerMods* plugged into the appropriate *powerPac*

| INPUT | | | | | |
|--------------------------|---|--------------|----------------------|---------------|--------------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Input Voltage Range | Universal Input 47-440Hz | 85 120 | | 264 380 | VAC VDC |
| Power Rating | XTA:200W, XTB:400W See Section 4.11 for line voltage deratings | | | | |
| Input Current XTA XTB | 85VAC in 200W out 85VAC in 283W out | | 4.5 5.0 | | A A |
| Inrush Current | 230VAC, 25°C | | | 50 | A |
| Undervoltage Lockout | Shutdown | 65 | | 74 | VAC |
| Fusing XTA XTB | 250V 250V | | F5A HRC F6.3A HRC | | |
| OUTPUT | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| <i>powerMod</i> Power | As per <i>powerMod</i> table | | | | |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per <i>powerMod</i> table Electronic: See Section 4.6 | | | | |
| Minimum Load | | | 0 | | A |
| Line Regulation | For ±10% change from nominal line | | | ±0.1 | % |
| Load & Cross Regulation | For 25% to 75% load change | | | ±0.2 | % |
| Transient Response | For 25% to 75% load change Voltage Deviation Settling Time | | | 10 250 | % µs |
| Ripple and Noise | 20MHz 100mV or 1.0% pk-pk | | | | |
| Overvoltage Protection | 1st level: Vset Tracking. 2nd level: Vmax (Latching) | 110 | | 125 | % |
| Overcurrent Protection | Straight line with hiccup activation at <30% of Vnom See Section 4.6 | 110 | | 120 | % |
| Remote Sense | Max. line drop compensation. (except Xg7, Xg8) | | | 0.5 | VDC |
| Overshoot | | | | 2 | % |
| Turn-on Delay | From AC in and Global Enable / <i>powerMod</i> Enable | | | 700 / 6 | ms |
| Rise Time | Monotonic | | | 5 | ms |
| Hold-up Time | For nominal output voltages at full load. XTA & XTB | 20 / 15 | | | ms |
| Output Isolation | Output to Output / Output to Chassis | 500 / 500 | | | VDC |
| GENERAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to Output Input to Chassis | 3000 1500 | | | VAC VAC |
| Efficiency | 230VAC, 400W @ 24V | | 90 | | % |
| Safety Agency Approvals | EN60950, UL60950, CSA22.2 No.950 UL File No. E181875 | | | | |
| Leakage Current | 250VAC, 60Hz, 25°C | | | 1.5 | mA |
| Signals | See Section 4.9 | | | | |
| Bias Supply | Always on. Current 250mA. 500mA option available | 4.8 | 5.0 | 5.2 | VDC |
| Reliability | Failures per million hours at 40°C and full load <i>powerMod</i> See Section 4.12. <i>powerPac</i> excludes fans <i>powerPac</i> | | | 0.958 0.92 | fpmh fpmh |
| EMC | | | | | |
| Parameter | Standard | Level | | Units | |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | | Level B | | |
| Radiated | EN55011, EN55022, FCC | | Level B | | |
| Harmonic Distortion | EN61000-3-2 Class A | | Compliant | | |
| Flicker & Fluctuation | EN61000-3-3 | | Compliant | | |
| Immunity | | | | | |
| Electrostatic Discharge | EN61000-4-2 | | Level 2 | | |
| Radiated Immunity | EN61000-4-3 | | Level 3 | | |
| Fast Transients-Burst | EN61000-4-4 | | Level 3 | | |
| Input Line Surges | EN61000-4-5 | | Level 3 | | |
| Conducted Immunity | EN61000-4-6 | | Level 3 | | |
| Voltage Dips | EN61000-4-11 | | Compliant | | |
| ENVIRONMENTAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | | -20 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Derating | See Section 4.11 for full temperature deratings | | | | |
| Relative Humidity | Non-condensing | 5 | | 95 | %RH |
| Acoustic Noise | Measured from distance on 1m | | 37.3 | | dBA |
| Shock | 3000 Bumps, 10G (16ms) half sine | | | | |
| Vibration | 1.5G | 10 | | 200 | Hz |

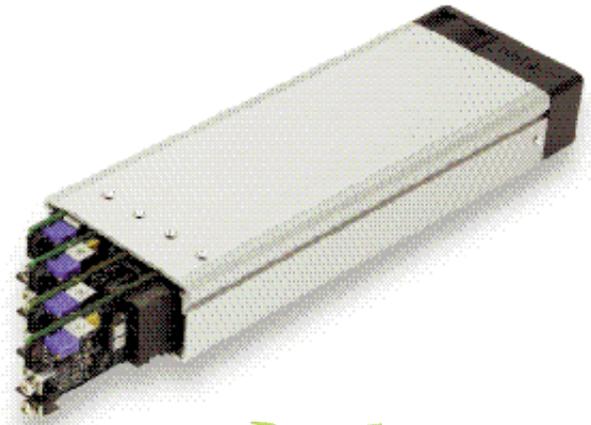
NOTES

1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
3. All specifications at nominal input, full load, 25°C unless otherwise stated.
4. When powering inductive or capacitive loads, it is recommended to use a blocking diode on the output.
5. Conformal Coating option: See Sections 3.1 and 4.10 for details.
6. For section references above go to the Xgen Designers Manual.



Medically Approved Ultra Low Noise Power Supply

Ultra-high efficiency 1U size



PLUG & PLAY POWER next generation power solution

FEATURES & OPTIONS

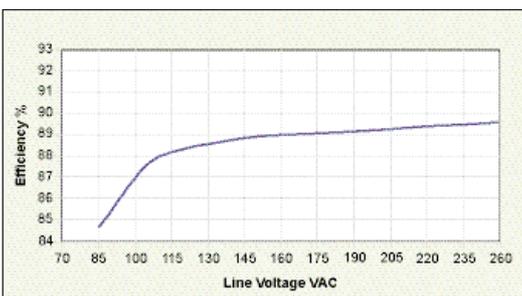
- Low Acoustic noise 37.3dBA
- EN60601-1 3rd edition approved
- Less than 300µA leakage current
- 150µA option available
- 4000VAC isolation
- Ultra high efficiency, up to 89%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- 5V bias standby voltage provided
- Standard Xgen product options include:
Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Clinical diagnostic equipment
- Medical lasers
- Dialysis equipment

- For Standard applications see XT

EFFICIENCY (typical)



The XN family of medically approved Ultra Low Noise power supplies provides up to 400W in an extremely compact 1U package. Providing up to 8 isolated DC outputs, the XN family employs innovative plug & play architecture allowing users to instantly configure a custom power solution in less than 5 minutes!

The XN family consists of 3 *powerPacs* ranging in power levels from 200W to 400W peak and 7 *powerMods* DC output modules. Simply select the appropriate *powerPac* and up to 4 *powerMods* from the tables below to complete your custom power supply.

The XN family boasts ultra-high efficiencies (up to 90%). The significant system space savings and reduced heat dissipation radically simplify system design.

All configurations carry full safety agency approvals including UL60601-1, EN60601-1 3rd Edition and are CE marked.

powerMods

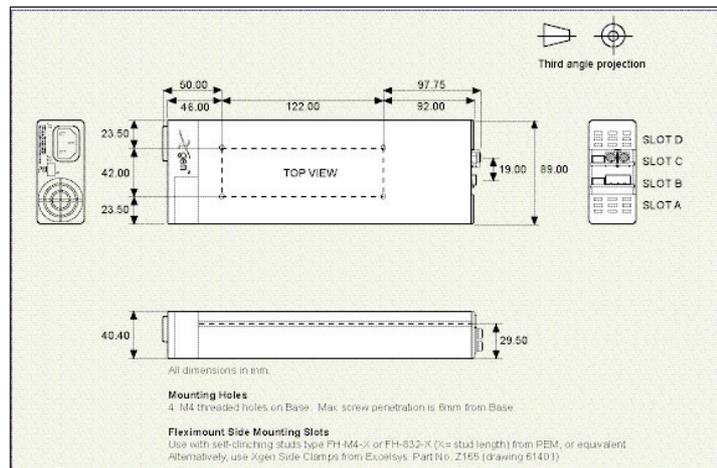
| MODEL | Vmin | | Vnom | Vmax | Imax | Watts |
|--------|-------|------|------|------|--------|-------|
| | Vtrim | Vpot | | | | |
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 41.6A | 104W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 33.2A | 166W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 16.67A | 200W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 8.33A | 200W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 5A | 240W |
| Xg7 | | 5.0 | 24.0 | 28.0 | 4.17A | 100W |
| Xg8 v1 | | 5.0 | 24.0 | 28.0 | 2.5A | 60W |
| Xg8 v2 | | 5.0 | 24.0 | 28.0 | 2.5A | 60W |

powerPacs

| | MODEL | Watts |
|--|-------|-------|
| | XNA | 200W |
| | XNB | 400W |

powerMod Maximum Power Outputs (W) have been derated to operate with XN range of Ultra Low-Noise Power Supplies. See Section 4.11 Xgen Designers' Manual for full derating details.

MECHANICAL SPECIFICATIONS



SPECIFICATION applies to configured units consisting of *powerMods* plugged into the appropriate *powerPac*

| INPUT | | | | | |
|--------------------------|---|--------------|----------------------|---------------|--------------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Input Voltage Range | Universal Input 47-440Hz | 85 120 | | 264 380 | VAC VDC |
| Power Rating | XNA:200W, XNB:400W See Section 4.11 for line voltage deratings | | | | |
| Input Current XNA XNB | 85VAC in 200W out 85VAC in 283W out | | 4.5 5.0 | | A A |
| Inrush Current | 230VAC, 25°C | | | 50 | A |
| Undervoltage Lockout | Shutdown | 65 | | 74 | VAC |
| Fusing XNA XNB | 250V 250V | | F5A HRC F6.3A HRC | | |
| OUTPUT | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| <i>powerMod</i> Power | As per <i>powerMod</i> table | | | | |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per <i>powerMod</i> table Electronic: See Section 4.6 | | | | |
| Minimum Load | | | 0 | | A |
| Line Regulation | For ±10% change from nominal line | | | ±0.1 | % |
| Load & Cross Regulation | For 25% to 75% load change | | | ±0.2 | % |
| Transient Response | For 25% to 75% load change Voltage Deviation Settling Time | | | 10 250 | % µs |
| Ripple and Noise | 220MHz 100mV or 1.0% pk-pk | | | | |
| Overvoltage Protection | Two-level. 1st level: Vset Tracking. 2nd level: Vmax (Latching) | 110 | | 125 | % |
| Overcurrent Protection | Straight line with hiccup activation at <30% of Vnom See Section 4.6 | 110 | | 120 | % |
| Remote Sense | Max. line drop compensation. (except Xg7, Xg8) | | | 0.5 | VDC |
| Overshoot | | | | 2 | % |
| Turn-on Delay | From AC in and Global Enable / <i>powerMod</i> Enable | | | 700 / 6 | ms |
| Rise Time | Monotonic | | | 5 | ms |
| Hold-up Time | For nominal output voltages at full load. XNA & XNB | 20 / 15 | | | ms |
| Output Isolation | Output to Output / Output to Chassis | 500 / 500 | | | VDC |
| GENERAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to Output Input to Chassis | 4000 1500 | | | VAC VAC |
| Efficiency | 230VAC, 400W @ 24V | | 90 | | % |
| Safety Agency Approvals | EN60601-1 3rd Edition, UL60601-1, CSA601-1 UL File No. E230761 | | | | |
| Leakage Current | 250VAC, 60Hz, 25°C 250VAC, 60Hz, 25°C option 04 | | | 300 150 | µA µA |
| Signals | See Section 4.9 | | | | |
| Bias Supply | Always on. Current 250mA. 500mA option available | 4.8 | 5.0 | 5.2 | VDC |
| Reliability | Failures per million hours at 40°C and full load <i>powerMod</i> See Section 4.12. <i>powerPac</i> excludes fans <i>powerPac</i> | | | 0.958 0.92 | fpmh fpmh |
| EMC | | | | | |
| Parameter | Standard | Level | | Units | |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | | Level B | | |
| Radiated | EN55011, EN55022, FCC | | Level B | | |
| Harmonic Distortion | EN61000-3-2 Class A | | Compliant | | |
| Flicker & Fluctuation | EN61000-3-3 | | Compliant | | |
| Immunity | | | | | |
| Electrostatic Discharge | EN61000-4-2 | | Level 2 | | |
| Radiated Immunity | EN61000-4-3 | | Level 3 | | |
| Fast Transients-Burst | EN61000-4-4 | | Level 3 | | |
| Input Line Surges | EN61000-4-5 | | Level 3 | | |
| Conducted Immunity | EN61000-4-6 | | Level 3 | | |
| Voltage Dips | EN61000-4-11 | | Compliant | | |
| ENVIRONMENTAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | | -20 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Derating | See Section 4.11 for full temperature deratings | | | | |
| Relative Humidity | Non-condensing | 5 | | 95 | %RH |
| Acoustic Noise | Measured from distance on 1m | | 37.3 | | dBA |
| Shock | 3000 Bumps, 10G (16ms) half sine | | | | |
| Vibration | 1.5G | 10 | | 200 | Hz |

NOTES

1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
3. All specifications at nominal input, full load, 25°C unless otherwise stated.
4. When powering inductive or capacitive loads, it is recommended to use a blocking diode on the output.
5. For section references above go to the Xgen Designers Manual.



AC/DC Power Supply

Ultra-high efficiency 1U size



Standard



PLUG & PLAY POWER
next generation power solution

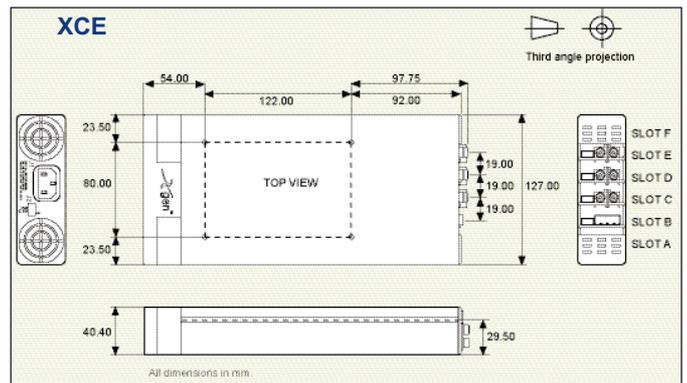
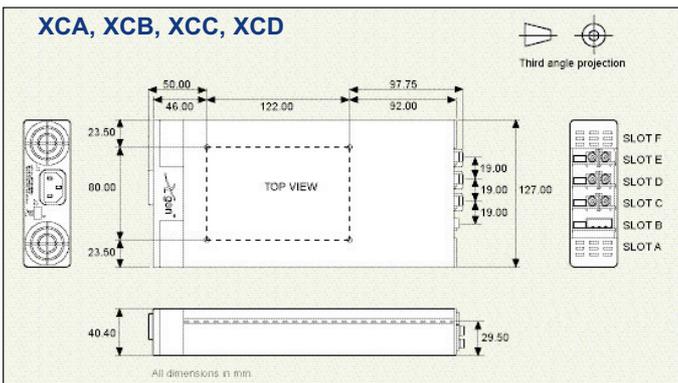
FEATURES & OPTIONS

- Ultra high efficiency, up to 90%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- Visual LED indicators
- 5V bias standby voltage provided
- SEMI F47 Compliant
- Standard Xgen product options include: Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Industrial machines
- Test and measurement
- Automation equipment
- Printing
- MIL-COTS applications

MECHANICAL SPECIFICATIONS



Note: See diagrams on pages 34-37

The XC family of power supplies provides up to 1340W in a slimline 1U package. Providing up to 12 isolated outputs, the XC family is the most flexible power supply in its class and brings affordable configurable power to the 400-1340W market. The slimline product boasts unrivalled power density saving valuable system space.

Combined with ultra high efficiencies, the XC family provides system designers with flexible instant solutions that significantly shorten and simplify system design-in time.

The XC family consists of 5 *powerPac* models in 400W, 700W, 1000W, 1200W and 1340W power levels. Each *powerPac* model may be populated with up to 6 *powerMods* selected from the table of *powerMods* shown below.

All configurations carry full safety agency approvals, UL60950, EN60950 and are CE marked.

powerMods

| MODEL | Vmin Vtrim | Vnom Vpot | Vmax | Imax | Watts |
|--------|---------------|--------------|------|------|----------|
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 50A 125W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 40A 200W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 20A 240W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 10A 240W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 6A 288W |
| Xg7 | | 5.0 | 24.0 | 28.0 | 5A 120W |
| Xg8 v1 | | 5.0 | 24.0 | 28.0 | 3A 72W |
| Xg8 v2 | | 5.0 | 24.0 | 28.0 | 3A 72W |

powerPacs

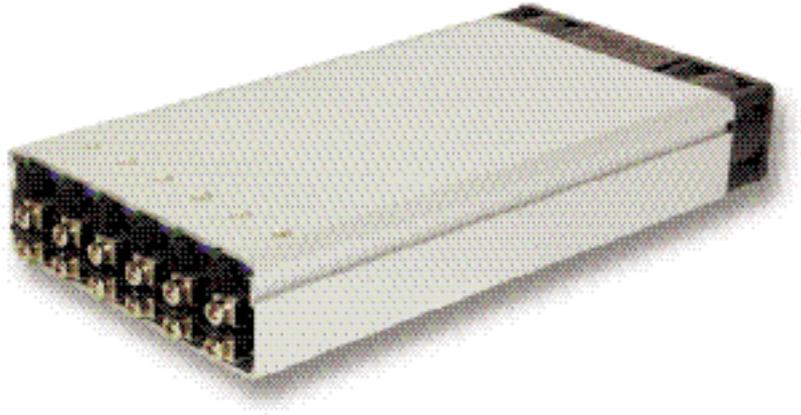
| MODEL | Watts |
|-------|-------|
| XCA | 400W |
| XCB | 700W |
| XCC | 1000W |
| XCD | 1200W |
| XCE | 1340W |

XC



Medically Approved

Ultra-high efficiency 1U size



PLUG & PLAY POWER
next generation power solution

FEATURES & OPTIONS

- EN60601-1 3rd edition approved
- Less than 300µA leakage current
- 150µA option available
- 4000VAC isolation
- Ultra high efficiency, up to 89%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- 5V bias standby voltage provided
- Standard Xgen product options include:
Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Clinical diagnostic equipment
- Medical lasers
- Dialysis equipment

The XV family of medically approved power supplies provides up to an incredible 1340W in an extremely compact 1U package. Providing up to 12 isolated DC outputs, the XV family employs innovative plug & play architecture allowing users to instantly configure a custom power solution in less than 5 minutes!

The XV family consists of 5 *powerPacs* ranging in power levels from 400W to 1450W peak and 7 *powerMods* DC output modules. Simply select the appropriate *powerPac* and up to 6 *powerMods* from the tables below to complete your custom power supply.

The XV family boasts an industry leading power density of 17W/in³ and ultra-high efficiencies (up to 90%). The significant system space savings and reduced heat dissipation radically simplify system design.

All configurations carry full safety agency approvals including UL60601-1, EN60601-1 3rd Edition and are CE marked.

powerMods

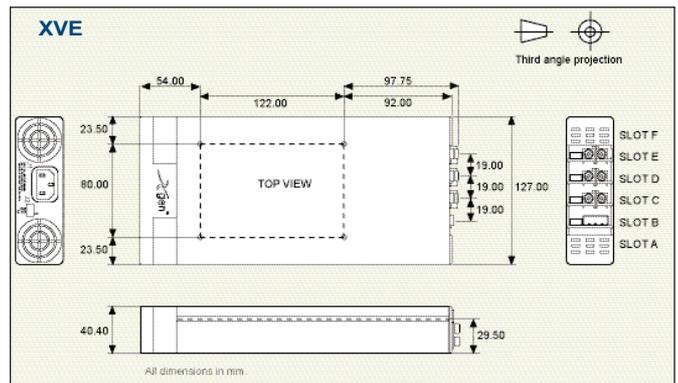
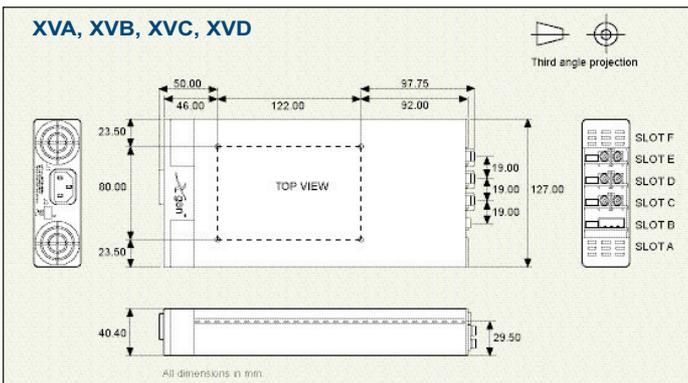
| MODEL | Vmin Vtrim | Vnom Vpot | Vmax | Imax | Watts |
|--------|---------------|--------------|------|------|----------|
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 50A 125W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 40A 200W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 20A 240W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 10A 240W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 6A 288W |
| Xg7 | | 5.0 | 24.0 | 28.0 | 5A 120W |
| Xg8 v1 | | 5.0 | 24.0 | 28.0 | 3A 72W |
| v2 | | 5.0 | 24.0 | 28.0 | 3A 72W |

powerPacs

| MODEL | Watts |
|-------|-------|
| XVA | 400W |
| XVB | 700W |
| XVC | 1000W |
| XVD | 1200W |
| XVE | 1340W |

MECHANICAL SPECIFICATIONS

Note: See diagrams on pages 34-37



SPECIFICATION applies to configured units consisting of *powerMods* plugged into the appropriate *powerPac*

| INPUT | | | | | |
|------------------------------------|---|---|----------------------------|---|------------------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Input Voltage Range | Universal Input 47-440Hz | 85 120 | | 264 380 | VAC VDC |
| Power Rating | XVA:400W, XVB:700W, XVC:1000W, XVD:1200W, XVE:1340W See Section 4.11 for line voltage deratings | | | | |
| Input Current | XVA XVB XVC, XVD XVE | 85VAC in 400W out 85VAC in 700W out 85VAC in 850W out 85VAC in 1000W out | 7.5 9.5 11.5 14.0 | | A A A A |
| Inrush Current | 230VAC @ 25°C | | | 25 | A |
| Undervoltage Lockout | Shutdown | 65 | | 74 | VAC |
| Fusing | XVA XVB XVC, XVD XVE | 250V 250V 250V 250V | | F8A HRC F10A HRC F12A HRC F15A HRC | |
| OUTPUT | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| powerMod Power | As per <i>powerMod</i> table | | | | |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per <i>powerMod</i> table Electronic: See Section 4.6 | | | | |
| Minimum Load | | | 0 | | A |
| Line Regulation | For ±10% change from nominal line | | | ±0.1 | % |
| Load & Cross Regulation | For 25% to 75% load change | | | ±0.2 | % |
| Transient Response | For 25% to 75% load change Voltage Deviation Settling Time | | | 10 250 | % µs |
| Ripple and Noise | 20MHz 100mV or 1.0% pk-pk | | | | |
| Overvoltage Protection | Two-level. 1st level: Vset Tracking. 2nd level: Vmax (Latching) | 110 | | 125 | % |
| Overcurrent Protection | Straight line with hiccup activation at <30% of Vnom See Section 4.6 | 110 | | 120 | % |
| Remote Sense | Max. line drop compensation. (except Xg7, Xg8) | | | 0.5 | VDC |
| Overshoot | | | | 2 | % |
| Turn-on Delay | From AC in and Global Enable / powerMod Enable XVA,XVB,XVC,XVD From AC in and Global Enable / powerMod Enable XVE | | | 700 / 6 1000 / 6 | ms ms |
| Rise Time | Monotonic | | | 5 | ms |
| Hold-up Time | For nominal output voltages at full load. XVA,XVB,XVC / XVD,XVE | 20 / 15 | | | ms |
| Output Isolation | Output to Output / Output to Chassis | 500 / 500 | | | VDC |
| GENERAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to Output Input to Chassis | 4000 1500 | | | VAC VAC |
| Efficiency | 230VAC, 1340W @ 24V | | 90 | | % |
| Safety Agency Approvals | EN60601-1, UL2601-1, CSA601-1 UL File No. E230761 | | | | |
| Leakage Current | 250VAC, 60Hz, 25°C 250VAC, 60Hz, 25°C Option 04 | | | 300 150 | µA µA |
| Signals | See Section 4.9 | | | | |
| Bias Supply | Always on. Current 250mA. (30mA for XVE) 500mA option available | 4.8 | 5.0 | 5.2 | VDC |
| Reliability | Failures per million hours at 40°C and full load <i>powerMod</i> See Section 4.12. <i>powerPac</i> excludes fans <i>powerPac</i> | | | 0.958 0.946 | fpmh fpmh |
| EMC | | | | | |
| Parameter | Standard | Level | | Units | |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | | Level B | | |
| Radiated | EN55011, EN55022, FCC | | Level B | | |
| Harmonic Distortion | EN61000-3-2 Class A | | Compliant | | |
| Flicker & Fluctuation | EN61000-3-3 | | Compliant | | |
| Immunity | | | | | |
| Electrostatic Discharge | EN61000-4-2 | | Level 2 | | |
| Radiated Immunity | EN61000-4-3 | | Level 3 | | |
| Fast Transients-Burst | EN61000-4-4 | | Level 3 | | |
| Input Line Surges | EN61000-4-5 | | Level 3 | | |
| Conducted Immunity | EN61000-4-6 | | Level 3 | | |
| Voltage Dips | EN61000-4-11 | | Compliant | | |
| ENVIRONMENTAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | | -20 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Derating | See Section 4.11 for full temperature deratings | | | | |
| Relative Humidity | Non-condensing | 5 | | 95 | %RH |
| Shock | 3000 Bumps, 10G (16ms) half sine | | | | |
| Vibration | 1.5G | 10 | | 200 | Hz |

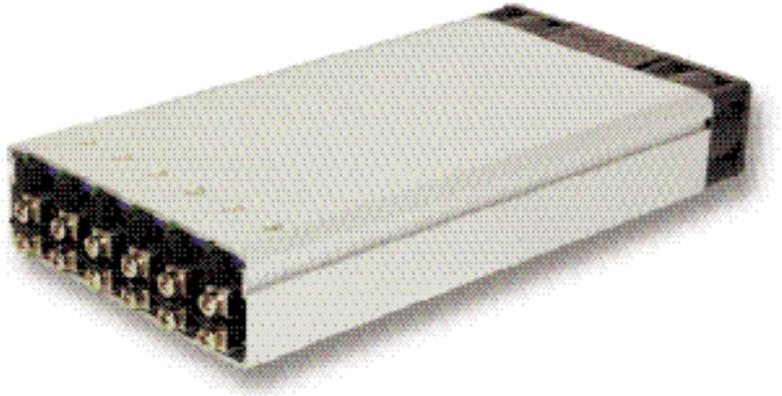
NOTES

1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
3. All specifications at nominal input, full load, 25°C unless otherwise stated.
4. XVE: 1450W peak for 10s; Duty cycle 8%. *powerMod* output power must not exceed normal ratings.
5. When powering inductive or capacitive loads, it is recommended to use a blocking diode on the output.
6. For section references above go to the Xgen Designers Manual.



Low Acoustic Noise Power Supply

Ultra-high efficiency 1U size



PLUG & PLAY POWER next generation power solution

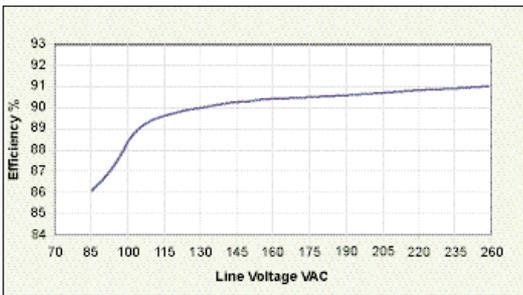
FEATURES & OPTIONS

- Low Acoustic noise 42.7dBA
- Ultra high efficiency, up to 89%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- Visual LED indicators
- 5V bias standby voltage provided
- SEMI F47 Compliant
- Standard Xgen product options include: Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Audio Equipment
- Test and measurement
- Telecommunications

EFFICIENCY (typical)



The XQ family of low acoustic noise power supplies provides up to 1200W in an extremely compact 1U x 260mm x 127mm package. Boasting industry leading power density of 15W/in³ and efficiencies of up to 90%, the XQ family employs an innovative plug & play architecture that allows users to instantly configure a custom power solution in less than 5 minutes!

Ideal for acoustic sensitive applications such as audio applications, the XQ family provides unmatched efficiency and high power density, made possible through the combination of low loss technologies and the best field-proven technologies in planar magnetics and surface mount electronics.

The XQ family consists of 3 *powerPac* models ranging in power levels from 400W to 1200W. each model may be populated with up to 6 *powerMods* selected from the table of *powerMods* shown below.

All configurations carry full safety agency approvals, UL60950, EN60950 and are CE marked.

powerMods

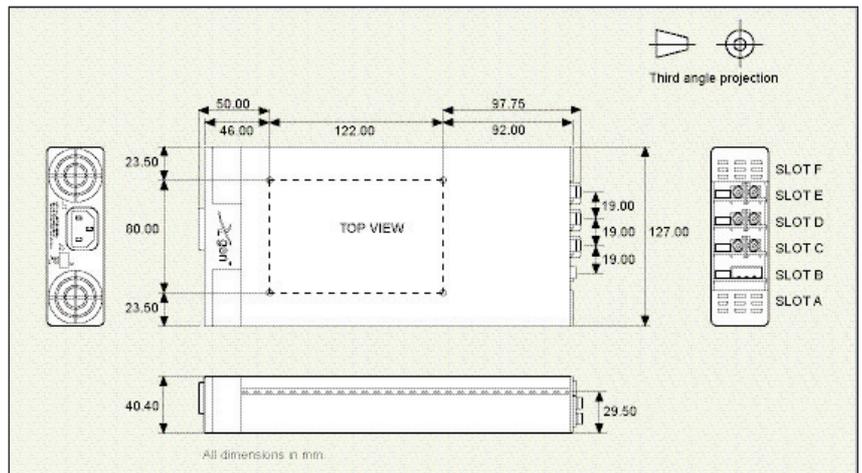
| MODEL | Vmin Vtrim | Vnom Vpot | Vmax | Imax | Watts |
|--------|---------------|--------------|------|------|----------|
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 50A 125W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 40A 200W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 20A 240W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 10A 240W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 6A 288W |
| Xg7 | 5.0 | 24.0 | 28.0 | 5A | 120W |
| Xg8 v1 | 5.0 | 24.0 | 28.0 | 3A | 72W |
| Xg8 v2 | 5.0 | 24.0 | 28.0 | 3A | 72W |

powerPacs

| MODEL | Watts |
|-------|-------|
| XQA | 400W |
| XQB | 900W |
| XQC | 1200W |

MECHANICAL SPECIFICATIONS

Note: See diagrams on pages 34-37



SPECIFICATION applies to configured units consisting of *powerMods* plugged into the appropriate *powerPac*

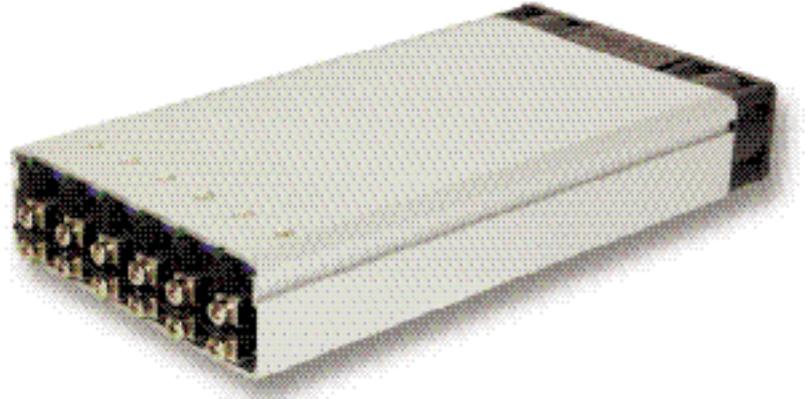
| INPUT | | | | | |
|-------------------------|---|---|---------------------|---------------------------------|--------------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Input Voltage Range | Universal Input 47-440Hz | 85 120 | | 264 380 | VAC VDC |
| Power Rating | XQA:600W, XQB:900W, XQC:1200W See Section 4.11 for line voltage deratings | | | | |
| Input Current | XQA XQB XQC | 85VAC in 400W out 85VAC in 850W out 85VAC in 850W out | 7.5 11.5 11.5 | | A A A |
| Inrush Current | 230VAC @ 25°C | | | 25 | A |
| Undervoltage Lockout | Shutdown | 65 | | 74 | VAC |
| Fusing | XQA XQB XQC | 250V 250V 250V | | F8A HRC F12A HRC F12A HRC | |
| OUTPUT | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| <i>powerMod</i> Power | As per <i>powerMod</i> table | | | | |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per <i>powerMod</i> table Electronic: See Section 4.6 | | | | |
| Minimum Load | | | 0 | | A |
| Line Regulation | For ±10% change from nominal line | | | ±0.1 | % |
| Load & Cross Regulation | For 25% to 75% load change | | | ±0.2 | % |
| Transient Response | For 25% to 75% load change | | | 10 | % |
| Ripple and Noise | 20MHz 100mV or 1.0% pk-pk | | | 250 | µs |
| Overvoltage Protection | 1st level: Vset Tracking. 2nd level: Vmax (Latching) | 110 | | 125 | % |
| Overcurrent Protection | Straight line with hiccup activation at <30% of Vnom See Section 4.6 | 110 | | 120 | % |
| Remote Sense | Max. line drop compensation. (except Xg7, Xg8) | | | 0.5 | VDC |
| Overshoot | | | | 2 | % |
| Turn-on Delay | From AC in and Global Enable / <i>powerMod</i> Enable | | | 700 / 6 | ms |
| Rise Time | Monotonic | | | 5 | ms |
| Hold-up Time | For nominal output voltages at full load. XQA, XQB/XQC | 20 / 15 | | | ms |
| Output Isolation | Output to Output / Output to Chassis | 500 / 500 | | | VDC |
| GENERAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to Output Input to Chassis | 3000 1500 | | | VAC VAC |
| Efficiency | 230VAC, 1200W @ 24V | | 90 | | % |
| Safety Agency Approvals | EN60950, UL60950, CSA22.2 No.950 UL File No. E181875 | | | | |
| Leakage Current | 250VAC, 60Hz, 25°C | | | 1.5 | mA |
| Signals | See Section 4.9 | | | | |
| Bias Supply | Always on. Current 250mA. 500mA option available | 4.8 | 5.0 | 5.2 | VDC |
| Reliability | Failures per million hours at 40°C and full load See Section 4.12. <i>powerPac</i> excludes fans | | | 0.958 0.946 | fpmh fpmh |
| EMC | | | | | |
| Parameter | Standard | | Level | | Units |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | | Level B | | |
| Radiated | EN55011, EN55022, FCC | | Level B | | |
| Harmonic Distortion | EN61000-3-2 Class A | | Compliant | | |
| Flicker & Fluctuation | EN61000-3-3 | | Compliant | | |
| Immunity | | | | | |
| Electrostatic Discharge | EN61000-4-2 | | Level 2 | | |
| Radiated Immunity | EN61000-4-3 | | Level 3 | | |
| Fast Transients-Burst | EN61000-4-4 | | Level 3 | | |
| Input Line Surges | EN61000-4-5 | | Level 3 | | |
| Conducted Immunity | EN61000-4-6 | | Level 3 | | |
| Voltage Dips | EN61000-4-11, SEMI F47 compliant. See note 7. | | Compliant | | |
| ENVIRONMENTAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | | -20 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Derating | See Section 4.11 for full temperature deratings | | | | |
| Relative Humidity | Non-condensing | 5 | | 95 | %RH |
| Acoustic Noise | Measured from distance of 1m | | 42.7 | | dBA |
| Shock | 3000 Bumps, 10G (16ms) half sine | | | | |
| Vibration | 1.5G | 10 | | 200 | Hz |

NOTES

1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
3. All specifications at nominal input, full load, 25°C unless otherwise stated.
4. When powering inductive or capacitive loads, it is recommended to use a blocking diode on the output.
5. Conformal Coating option: See Sections 3.1 and 4.10 for details.
6. For section references above go to the Xgen Designers Manual.
7. SEMI F47 compliant at input voltages >160VAC. Consult Excelsys for details.



Medical Power Supply
Low Acoustic Noise 1U size



Medical Low Acoustic Noise

PLUG & PLAY POWER
next generation power solution

FEATURES & OPTIONS

- Low Acoustic noise 42.7dBA
- EN60601-1 3rd edition Approved
- Less than 300µA leakage current
- 150µA option available
- 4000VAC isolation
- Ultra high efficiency, up to 89%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- 5V bias standby voltage provided
- Standard Xgen product options include:
Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Clinical diagnostic equipment
- Medical lasers
- Dialysis equipment

The XZ family of low acoustic noise medically approved power supplies provides up to 1200W in an extremely compact 1U x 260mm x 127mm package. Boasting industry leading power density of 15W/in³ and efficiencies of up to 90%, the XZ family employs an innovative plug & play architecture that allows users to instantly configure a custom power solution in less than 5 minutes!

Ideal for acoustic sensitive medical applications the XZ family provides unmatched efficiency and high power density, made possible through the combination of low loss technologies and the best field-proven technologies in planar magnetics and surface mount electronics.

The XZ family consists of 3 *powerPacs* models ranging in power levels from 400W to 1200W. Each model may be populated with up to 6 *powerMods* selected from the table of *powerMods* shown below.

All configurations carry full safety agency approvals, UL60601-1, EN60601-1 3rd Edition and are CE marked.

powerMods

| MODEL | V _{trim} | V _{min} | V _{nom} | V _{max} | I _{max} | Watts |
|--------|-------------------|------------------|------------------|------------------|------------------|-------|
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 41.6A | 104W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 33.2A | 166W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 16.67A | 200W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 8.33A | 200W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 5A | 240W |
| Xg7 | | 5.0 | 24.0 | 28.0 | 4.17A | 100W |
| Xg8 v1 | | 5.0 | 24.0 | 28.0 | 2.5A | 60W |
| v2 | | 5.0 | 24.0 | 28.0 | 2.5A | 60W |

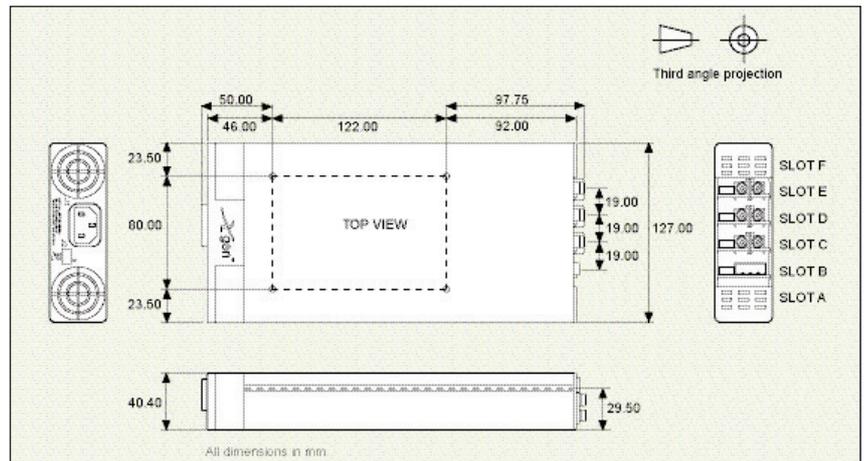
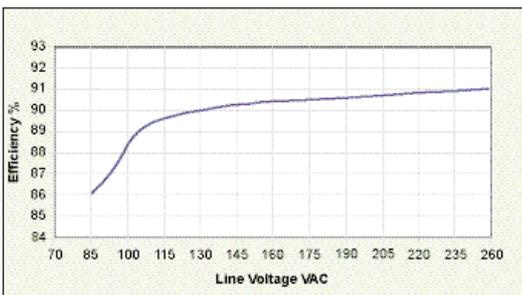
powerPacs

| MODEL | Watts |
|-------|-------|
| XZA | 400W |
| XZB | 900W |
| XZC | 1200W |

MECHANICAL SPECIFICATIONS

Note: See diagrams on pages 34-37

EFFICIENCY (typical)



SPECIFICATION applies to configured units consisting of *powerMods* plugged into the appropriate *powerPac*

| INPUT | | | | | |
|------------------------------------|---|---|---------------------------------|----------------|--------------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Input Voltage Range | Universal Input 47-440Hz. | 85 120 | | 264 380 | VAC VDC |
| Power Rating | XZA:600W, XZB:900W, XZC:1200W See Section 4.11 for line voltage deratings | | | | |
| Input Current | XZA XZB XZC | 85VAC in 400W out 85VAC in 850W out 85VAC in 850W out | 7.5 11.5 11.5 | | A A A |
| Inrush Current | 230VAC @ 25°C | | | 25 | A |
| Undervoltage Lockout | Shutdown | 65 | | 74 | VAC |
| Fusing | XZA XZB XZC | 250V 250V 250V | F8A HRC F12A HRC F12A HRC | | |
| OUTPUT | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| powerMod Power | As per <i>powerMod</i> table | | | | |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per <i>powerMod</i> table Electronic: See Section 4.6 | | | | |
| Minimum Load | | | 0 | | A |
| Line Regulation | For ±10% change from nominal line | | | ±0.1 | % |
| Load & Cross Regulation | For 25% to 75% load change | | | ±0.2 | % |
| Transient Response | For 25% to 75% load change | | | 10 250 | % µs |
| Ripple and Noise | 20MHz 100mV or 1.0% pk-pk | | | | |
| Overvoltage Protection | 1st level: Vset Tracking. 2nd level: Vmax (Latching) | 110 | | 125 | % |
| Overcurrent Protection | Straight line with hiccup activation at <30% of Vnom See Section 4.6 | 110 | | 120 | % |
| Remote Sense | Max. line drop compensation. (except Xg7, Xg8) | | | 0.5 | VDC |
| Overshoot | | | | 2 | % |
| Turn-on Delay | From AC in and Global Enable / powerMod Enable | | | 700 / 6 | ms |
| Rise Time | Monotonic | | | 5 | ms |
| Hold-up Time | For nominal output voltages at full load. XZA, XXB/XZC | 20 / 15 | | | ms |
| Output Isolation | Output to Output / Output to Chassis | 500 / 500 | | | VDC |
| GENERAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to Output Input to Chassis | 4000 1500 | | | VAC VAC |
| Efficiency | 230VAC, 1200W @ 24V | | 90 | | % |
| Safety Agency Approvals | EN60601-1, UL60601-1 3rd Edition, CSA601-1 UL File no. E230761 | | | | |
| Leakage Current | 250VAC, 60Hz, 25°C 250VAC, 60Hz, 25°C Option 04 | | | 300 150 | µA µA |
| Signals | See Section 4.9 | | | | |
| Bias Supply | Always on. Current 250mA. 500mA option available | 4.8 | 5.0 | 5.2 | VDC |
| Reliability | Failures per million hours at 40°C and full load See Section 4.12. <i>powerPac</i> excludes fans | | | 0.958 0.946 | fpmh fpmh |
| EMC | | | | | |
| Parameter | Standard | Level | | Units | |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | | Level B | | |
| Radiated | EN55011, EN55022, FCC | | Level B | | |
| Harmonic Distortion | EN61000-3-2 Class A | | Compliant | | |
| Flicker & Fluctuation | EN61000-3-3 | | Compliant | | |
| Immunity | | | | | |
| Electrostatic Discharge | EN61000-4-2 | | Level 2 | | |
| Radiated Immunity | EN61000-4-3 | | Level 3 | | |
| Fast Transients-Burst | EN61000-4-4 | | Level 3 | | |
| Input Line Surges | EN61000-4-5 | | Level 3 | | |
| Conducted Immunity | EN61000-4-6 | | Level 3 | | |
| Voltage Dips | EN61000-4-11 | | Compliant | | |
| ENVIRONMENTAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | | -20 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Derating | See Section 4.11 for full temperature deratings | | | | |
| Relative Humidity | Non-condensing | 5 | | 95 | %RH |
| Acoustic Noise | Measured from distance of 1m | | 42.7 | | dBA |
| Shock | 3000 Bumps, 10G (16ms) half sine | | | | |
| Vibration | 1.5G | 10 | | 200 | Hz |

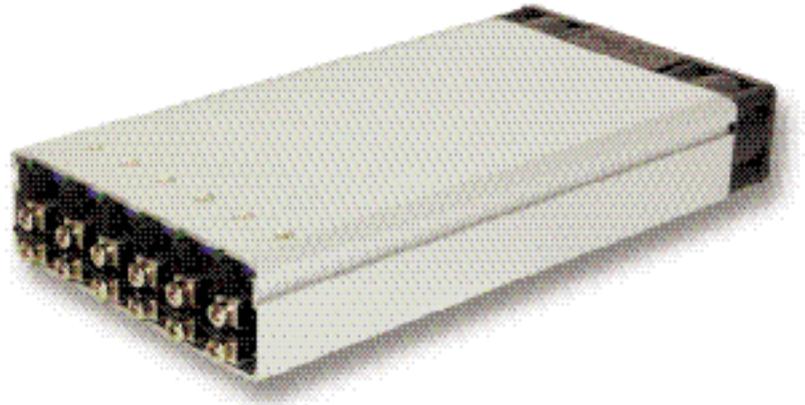
NOTES

1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
3. All specifications at nominal input, full load, 25°C unless otherwise stated.
4. See Xgen Designers Manual for detailed power ratings.
5. When powering inductive or capacitive loads, it is recommended to use a blocking diode on the output.
6. For section references above go to the Xgen Designers Manual.



Ultra Low Noise Power Supply

Ultra-high efficiency 1U size



PLUG & PLAY POWER next generation power solution

FEATURES & OPTIONS

- Low Acoustic noise 38.3dBA
- Ultra high efficiency, up to 89%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- Visual LED indicators
- 5V bias standby voltage provided
- Standard Xgen product options include: Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Audio Equipment
- Test and measurement
- Telecommunications
- For Medical applications, See XW

The XB family of Ultra Low Noise power supplies provides up to 800W in an extremely compact 1U x 260mm x 127mm package. With efficiencies of up to 90%, the XB family employs an innovative plug & play architecture that allows users to instantly configure a custom power solution in less than 5 minutes!

Ideal for acoustic sensitive applications such as audio applications, the XB family provides unmatched efficiency and high power density, made possible through the combination of low loss technologies and the best field-proven technologies in planar magnetics and surface mount electronics.

The XB family consists of 3 *powerPac* models ranging in power levels from 400W to 800W. Each model may be populated with up to 6 *powerMods* selected from the table of *powerMods* shown below.

All configurations carry full safety agency approvals, UL60950, EN60950 and are CE marked.

powerMods

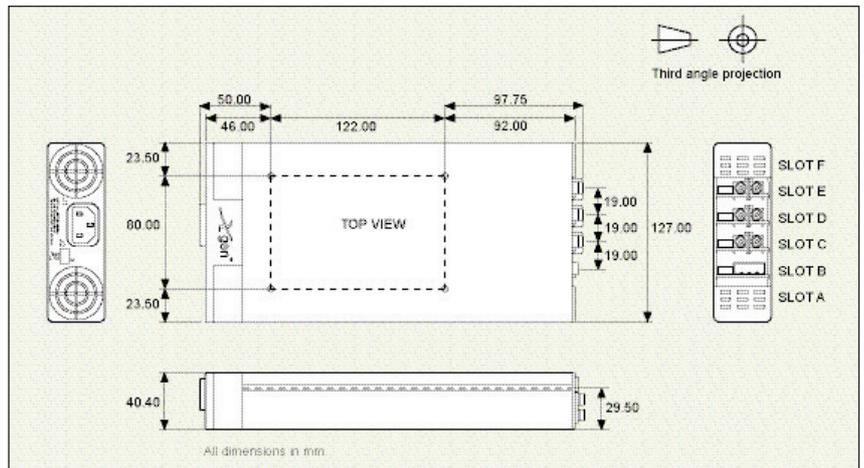
| MODEL | Vmin Vtrim | Vnom Vpot | Vmax | Imax | Watts |
|--------|---------------|--------------|------|------|-------------|
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 41.6A 104W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 33.2A 166W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 16.67A 200W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 8.33A 200W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 5A 240W |
| Xg7 | | 5.0 | 24.0 | 28.0 | 4.17A 100W |
| Xg8 v1 | | 5.0 | 24.0 | 28.0 | 2.5A 60W |
| v2 | | 5.0 | 24.0 | 28.0 | 2.5A 60W |

powerPacs

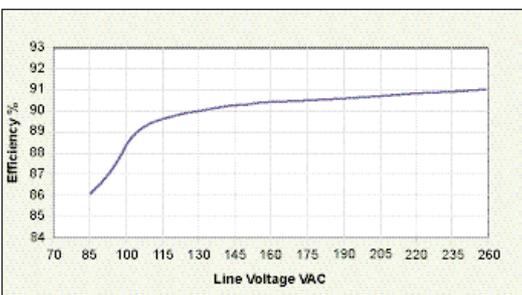
| | MODEL | Watts |
|----|-------|-------|
| XB | XBA | 400W |
| | XBB | 600W |
| | XBC | 800W |

powerMod Maximum Power Outputs (W) have been derated to operate with XB range of Ultra Low-Noise Power Supplies. See Section 4.11 Xgen Designers' Manual for full derating details.

MECHANICAL SPECIFICATIONS



EFFICIENCY (typical)

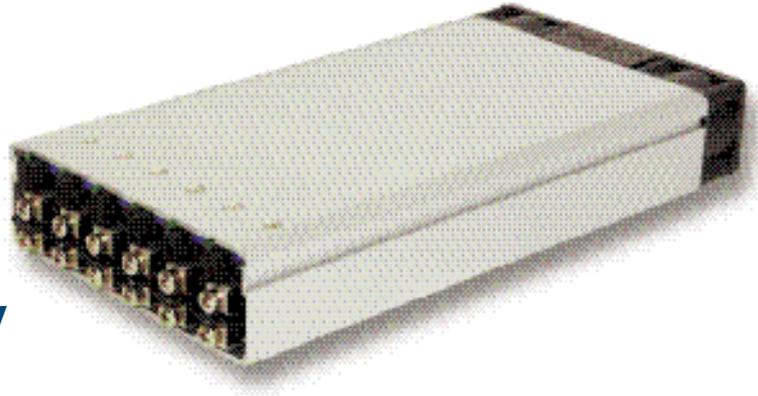


SPECIFICATION applies to configured units consisting of *powerMods* plugged into the appropriate *powerPac*

| INPUT | | | | | |
|------------------------------------|---|---|--------------------|---------------------------------|--------------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Input Voltage Range | Universal Input 47-440Hz. | 85 120 | | 264 380 | VAC VDC |
| Power Rating | XBA:400W, XBB:600W, XBC:800W See Section 4.11 for line voltage deratings | | | | |
| Input Current | XBA XBB XBC | 85VAC in 400W out 85VAC in 600W out 85VAC in 625W out | 7.5 9.5 11.5 | | A A A |
| Inrush Current | 230VAC @ 25°C | | | 25 | A |
| Undervoltage Lockout | Shutdown | 65 | | 74 | VAC |
| Fusing | XBA XBB XBC | 250V 250V 250V | | F8A HRC F10A HRC F12A HRC | |
| OUTPUT | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| powerMod Power | As per <i>powerMod</i> table | | | | |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per <i>powerMod</i> table Electronic: See Section 4.6 | | | | |
| Minimum Load | | | 0 | | A |
| Line Regulation | For ±10% change from nominal line | | | ±0.1 | % |
| Load & Cross Regulation | For 25% to 75% load change | | | ±0.2 | % |
| Transient Response | For 25% to 75% load change Voltage Deviation Settling Time | | | 10 250 | % µs |
| Ripple and Noise | 20MHz 100mV or 1.0% pk-pk | | | | |
| Overvoltage Protection | 1st level: Vset Tracking. 2nd level: Vmax (Latching) | 110 | | 125 | % |
| Overcurrent Protection | Straight line with hiccup activation at <30% of Vnom See Section 4.6 | 110 | | 120 | % |
| Remote Sense | Max. line drop compensation. (except Xg7, Xg8) | | | 0.5 | VDC |
| Overshoot | | | | 2 | % |
| Turn-on Delay | From AC in and Global Enable / <i>powerMod</i> Enable | | | 700 / 6 | ms |
| Rise Time | Monotonic | | | 5 | ms |
| Hold-up Time | For nominal output voltages at full load | 20 | | | ms |
| Output Isolation | Output to Output / Output to Chassis | 500 / 500 | | | VDC |
| GENERAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to Output Input to Chassis | 3000 1500 | | | VAC VAC |
| Efficiency | 230VAC, 800W @ 24V | | 90 | | % |
| Safety Agency Approvals | EN60950, UL60950, CSA22.2 No.950 UL File No. E181875 | | | | |
| Leakage Current | 250VAC, 60Hz, 25°C | | | 1.5 | mA |
| Signals | See Section 4.9 | | | | |
| Bias Supply | Always on. Current 250mA. 500mA option available | 4.8 | 5.0 | 5.2 | VDC |
| Reliability | Failures per million hours at 40°C and full load <i>powerMod</i> See Section 4.12. <i>powerPac</i> excludes fans <i>powerPac</i> | | | 0.958 0.946 | fpmh fpmh |
| EMC | | | | | |
| Parameter | Standard | Level | | Units | |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | | Level B | | |
| Radiated | EN55011, EN55022, FCC | | Level B | | |
| Harmonic Distortion | EN61000-3-2 Class A | | Compliant | | |
| Flicker & Fluctuation | EN61000-3-3 | | Compliant | | |
| Immunity | | | | | |
| Electrostatic Discharge | EN61000-4-2 | | Level 2 | | |
| Radiated Immunity | EN61000-4-3 | | Level 3 | | |
| Fast Transients-Burst | EN61000-4-4 | | Level 3 | | |
| Input Line Surges | EN61000-4-5 | | Level 3 | | |
| Conducted Immunity | EN61000-4-6 | | Level 3 | | |
| Voltage Dips | EN61000-4-11 | | Compliant | | |
| ENVIRONMENTAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | | -20 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Derating | See Section 4.11 for full temperature deratings | | | | |
| Relative Humidity | Non-condensing | 5 | | 95 | %RH |
| Acoustic Noise | Measured from distance of 1m | | 38.3 | | dBA |
| Shock | 3000 Bumps, 10G (16ms) half sine | | | | |
| Vibration | 1.5G | 10 | | 200 | Hz |

NOTES

1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
3. All specifications at nominal input, full load, 25°C unless otherwise stated.
4. When powering inductive or capacitive loads, it is recommended to use a blocking diode on the output.
5. Conformal Coating option: See Sections 3.1 and 4.10 for details.
6. For section references above go to the Xgen Designers Manual.



Medically Approved Ultra Low Noise Power Supply

Ultra-high efficiency 1U size



PLUG & PLAY POWER next generation power solution

FEATURES & OPTIONS

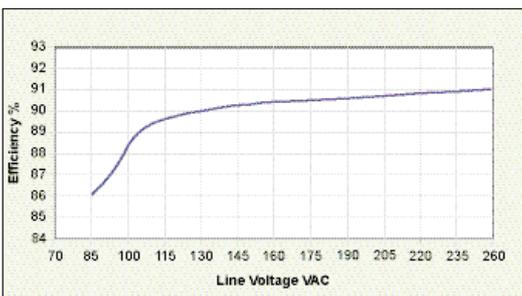
- Low Acoustic noise 38.3dBA
- EN60601-1 3rd edition Approved
- Less than 300µA leakage current
- 150µA option available
- 4000VAC isolation
- Ultra high efficiency, up to 89%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- 5V bias standby voltage provided
- Standard Xgen product options include:
Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Clinical diagnostic equipment
- Medical lasers
- Dialysis equipment

- For Standard applications see XB

EFFICIENCY (typical)



The XW family of medically approved Ultra Low Noise power supplies provides up to 800W in an extremely compact 1U package. Providing up to 12 isolated DC outputs, the XW family employs innovative plug & play architecture allowing users to instantly configure a custom power solution in less than 5 minutes!

The XW family consists of 3 *powerPacs* ranging in power levels from 400W to 800W peak and 7 *powerMods* DC output modules. Simply select the appropriate *powerPac* and up to 6 *powerMods* from the tables below to complete your custom power supply.

The XW family boasts ultra-high efficiencies (up to 90%). The significant system space savings and reduced heat dissipation radically simplify system design.

All configurations carry full safety agency approvals including UL60601-1, EN60601-1 3rd Edition and are CE marked.

powerMods

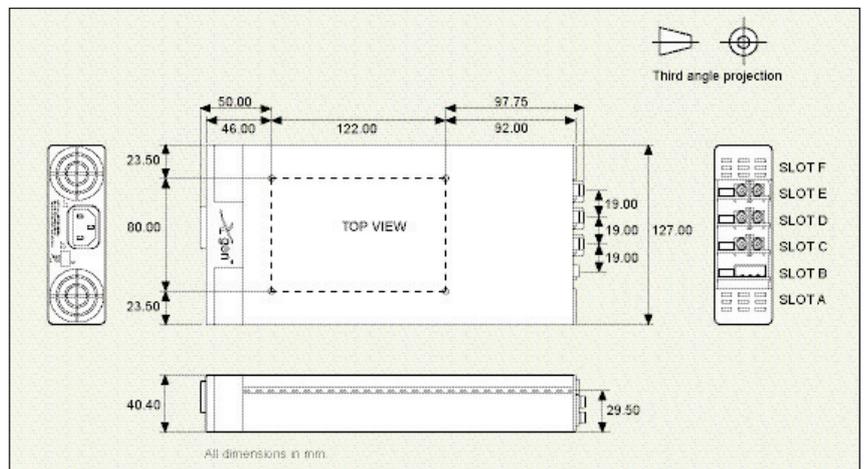
| MODEL | Vmin | | Vnom | Vmax | Imax | Watts |
|-------|-------|------|------|------|--------|-------|
| | Vtrim | Vpot | | | | |
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 41.6A | 104W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 33.2A | 166W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 16.67A | 200W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 8.33A | 200W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 5A | 240W |
| Xg7 | | 5.0 | 24.0 | 28.0 | 4.17A | 100W |
| Xg8 | v1 | 5.0 | 24.0 | 28.0 | 2.5A | 60W |
| | v2 | 5.0 | 24.0 | 28.0 | 2.5A | 60W |

powerPacs

| | MODEL | Watts |
|----|-------|-------|
| XW | XWA | 400W |
| | XWB | 600W |
| | XWC | 800W |

powerMod Maximum Power Outputs (W) have been derated to operate with XW range of Ultra Low-Noise Power Supplies. See Section 4.11 Xgen Designers' Manual for full derating details.

MECHANICAL SPECIFICATIONS



SPECIFICATION applies to configured units consisting of **powerMods** plugged into the appropriate **powerPac**

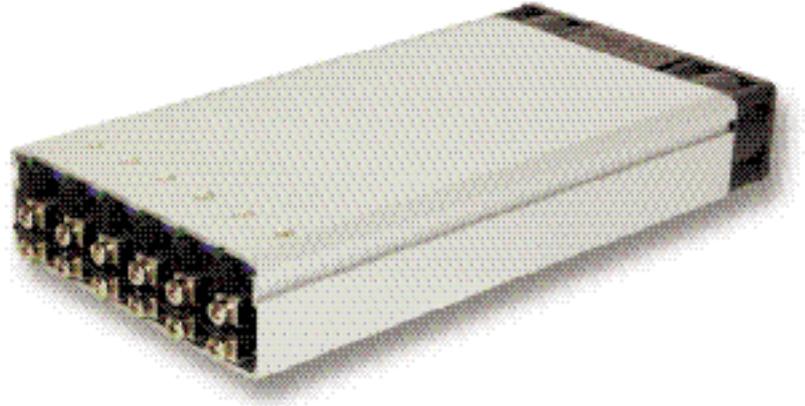
| INPUT | | | | | |
|------------------------------------|---|---|--------------------|---------------------------------|--------------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Input Voltage Range | Universal Input 47-440Hz. | 85 120 | | 264 380 | VAC VDC |
| Power Rating | XWA:400W, XWB:600W, XWC:800W See Section 4.11 for line voltage deratings | | | | |
| Input Current | XWA XWB XWC | 85VAC in 400W out 85VAC in 600W out 85VAC in 625W out | 7.5 9.5 11.5 | | A A A |
| Inrush Current | 230VAC @ 25°C | | | 25 | A |
| Undervoltage Lockout | Shutdown | 65 | | 74 | VAC |
| Fusing | XWA XWB XWC | 250V 250V 250V | | F8A HRC F10A HRC F12A HRC | |
| OUTPUT | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| powerMod Power | As per <i>powerMod</i> table | | | | |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per <i>powerMod</i> table Electronic: See Section 4.6 | | | | |
| Minimum Load | | | 0 | | A |
| Line Regulation | For ±10% change from nominal line | | | ±0.1 | % |
| Load & Cross Regulation | For 25% to 75% load change | | | ±0.2 | % |
| Transient Response | For 25% to 75% load change Voltage Deviation Settling Time | | | 10 250 | % µs |
| Ripple and Noise | 20MHz 100mV or 1.0% pk-pk | | | | |
| Overvoltage Protection | Two-level. 1st level: Vset Tracking. 2nd level: Vmax (Latching) | 110 | | 125 | % |
| Overcurrent Protection | Straight line with hiccup activation at <30% of Vnom See Section 4.6 | 110 | | 120 | % |
| Remote Sense | Max. line drop compensation. (except Xg7, Xg8) | | | 0.5 | VDC |
| Overshoot | | | | 2 | % |
| Turn-on Delay | From AC in and Global Enable / powerMod Enable | | | 700 / 6 | ms |
| Rise Time | Monotonic | | | 5 | ms |
| Hold-up Time | For nominal output voltages at full load | 20 | | | ms |
| Output Isolation | Output to Output / Output to Chassis | 500 / 500 | | | VDC |
| GENERAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to Output Input to Chassis | 4000 1500 | | | VAC VAC |
| Efficiency | 230VAC, 800W @ 24V | | 90 | | % |
| Safety Agency Approvals | EN60601-1 3rd Edition, UL60601-1, CSA601-1 UL File No. E230761 | | | | |
| Leakage Current | 250VAC, 60Hz, 25°C 250VAC, 60Hz, 25°C option 04 | | | 300 150 | µA µA |
| Signals | See Section 4.9 | | | | |
| Bias Supply | Always on. Current 250mA. 500mA option available | 4.8 | 5.0 | 5.2 | VDC |
| Reliability | Failures per million hours at 40°C and full load <i>powerMod</i> See Section 4.12. <i>powerPac</i> excludes fans <i>powerPac</i> | | | 0.958 0.946 | fpmh fpmh |
| EMC | | | | | |
| Parameter | Standard | Level | | Units | |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | | Level B | | |
| Radiated | EN55011, EN55022, FCC | | Level B | | |
| Harmonic Distortion | EN61000-3-2 Class A | | Compliant | | |
| Flicker & Fluctuation | EN61000-3-3 | | Compliant | | |
| Immunity | | | | | |
| Electrostatic Discharge | EN61000-4-2 | | Level 2 | | |
| Radiated Immunity | EN61000-4-3 | | Level 3 | | |
| Fast Transients-Burst | EN61000-4-4 | | Level 3 | | |
| Input Line Surges | EN61000-4-5 | | Level 3 | | |
| Conducted Immunity | EN61000-4-6 | | Level 3 | | |
| Voltage Dips | EN61000-4-11 | | Compliant | | |
| ENVIRONMENTAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | | -20 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Derating | See Section 4.11 for full temperature deratings | | | | |
| Relative Humidity | Non-condensing | 5 | | 95 | %RH |
| Acoustic Noise | Measured from distance of 1m | | 38.3 | | dBA |
| Shock | 3000 Bumps, 10G (16ms) half sine | | | | |
| Vibration | 1.5G | 10 | | 200 | Hz |

NOTES

1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
3. When powering inductive or capacitive loads, it is recommended to use a blocking diode on the output.
4. All specifications at nominal input, full load, 25°C unless otherwise stated.
5. For section references above go to the Xgen Designers Manual.



Hi-Temp Power Supply
Ultra-high efficiency 1U size



PLUG & PLAY POWER
next generation power solution

FEATURES & OPTIONS

- Ultra high efficiency, up to 89%
- Extra low profile: 1U height (40mm)
- Plug & Play Power - allows fast custom configuration
- Individual output control signals
- All outputs fully floating
- Series / Parallel of multiple outputs
- Few electrolytic capacitors (all long life)
- Visual LED indicators
- 5V bias standby voltage provided
- SEMI F47 Compliant
- Up to 600W at 70degC
- Standard Xgen product options include:
Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information

APPLICATIONS INCLUDE

- Industrial equipment
- Telecommunications
- Outdoor display systems

The XH family of high temperature power supplies provides up to 600W in an extremely compact 1U x 260mm x 127mm package. Designed as a configurable power supply, the XH family employs the innovative plug and play architecture that allows users to instantly configure a custom power solution in less than 5 minutes.

The XH family is ideal for use in harsh environments where there can be high ambient temperatures and wide temperature fluctuations. Operation at higher temperatures is made possible through employment of leading edge technologies and cooling techniques, making it possible for the XH to achieve unprecedented efficiencies of up to 90%.

The XH family consists of 2 *powerPac* models ranging in power levels from 400W to 600W. Each model may be populated with up to 6 *powerMods* selected from the table of powerMods shown below. All configurations carry full safety agency approvals. UL60950 and EN60950 2nd edition and carry the CE Mark.

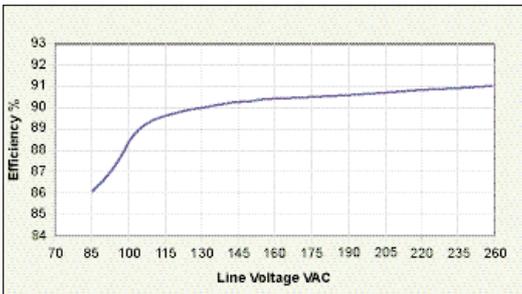
powerMods

| MODEL | Vmin Vtrim | Vnom Vpot | Vmax | I _{max} | Watts |
|--------|---------------|--------------|------|------------------|----------|
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 26A 65W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 25A 100W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 10A 120W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 5A 120W |
| Xg5 | 8.0 | 28 | 48.0 | 58.0 | 3A 144W |
| Xg7 | | 5.0 | 24.0 | 28.0 | 2.5A 60W |
| Xg8 v1 | | 5.0 | 24.0 | 28.0 | 1.5A 36W |
| v2 | | 5.0 | 24.0 | 28.0 | 1.5A 36W |

powerPacs

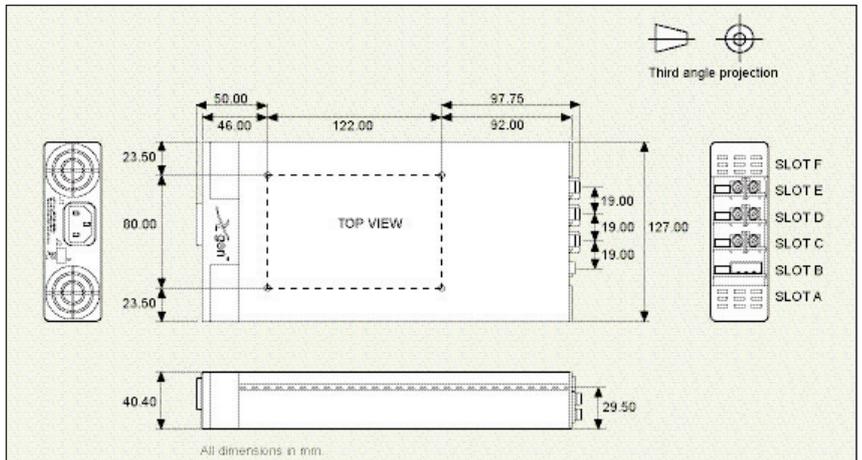
| | MODEL | Watts |
|----|-------|-------|
| XH | XHA | 400W |
| | XHB | 600W |

EFFICIENCY (typical)



MECHANICAL SPECIFICATIONS

Note: See diagrams on pages 34-37

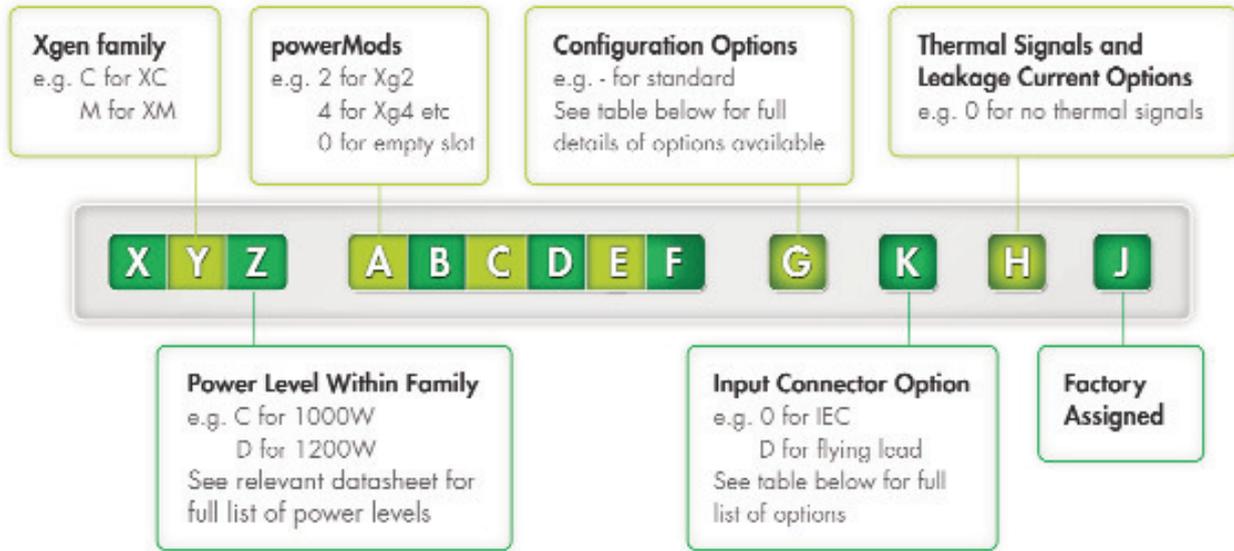


SPECIFICATION applies to configured units consisting of *powerMods* plugged into the appropriate *powerPac*

| INPUT | | | | | |
|--------------------------|---|--------------|----------------------|----------------|--------------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Input Voltage Range | Universal Input 47-440Hz | 85 120 | | 264 380 | VAC VDC |
| Power Rating | XHA:400W, XHB:600W See Section 4.11 for line voltage deratings | | | | |
| Input Current XHA XHB | 85VAC in 400W out 85VAC in 600W out | | 6.5 7.5 | | A A |
| Inrush Current | 230VAC @ 25°C | | | 25 | A |
| Undervoltage Lockout | Shutdown | 65 | | 74 | VAC |
| Fusing XHA XHB | 250V 250V | | F10A HRC F12A HRC | | |
| OUTPUT | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| <i>powerMod</i> Power | As per <i>powerMod</i> table | | | | |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per <i>powerMod</i> table Electronic: See Section 4.6 | | | | |
| Minimum Load | | | 0 | | A |
| Line Regulation | For ±10% change from nominal line | | | ±0.1 | % |
| Load & Cross Regulation | For 25% to 75% load change | | | ±0.2 | % |
| Transient Response | For 25% to 75% load change Voltage Deviation Settling Time | | | 10 250 | % µs |
| Ripple and Noise | 20MHz 100mV or 1.0% pk-pk | | | | |
| Overvoltage Protection | 1st level: Vset Tracking. 2nd level: Vmax (Latching) | 110 | | 125 | % |
| Overcurrent Protection | Straight line with hiccup activation at <30% of Vnom See Section 4.6 | 110 | | 120 | % |
| Remote Sense | Max. line drop compensation. (except Xg7, Xg8) | | | 0.5 | VDC |
| Overshoot | | | | 2 | % |
| Turn-on Delay | From AC in and Global Enable / <i>powerMod</i> Enable | | | 700 / 6 | ms |
| Rise Time | Monotonic | | | 5 | ms |
| Hold-up Time | For nominal output voltages at full load. | 20 | | | ms |
| Output Isolation | Output to Output / Output to Chassis | 500 / 500 | | | VDC |
| GENERAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to Output Input to Chassis | 3000 1500 | | | VAC VAC |
| Efficiency | 230VAC, 600W @ 24V | | 90 | | % |
| Safety Agency Approvals | EN60950, UL60950, CSA22.2 No.950 UL File No. E181875 | | | | |
| Leakage Current | 250VAC, 60Hz, 25°C | | 300 | | mA |
| Signals | See Section 4.9 | | | | |
| Bias Supply | Always on. Current 250mA. 500mA option available | 4.8 | 5.0 | 5.2 | VDC |
| Reliability | Failures per million hours at 40°C and full load <i>powerMod</i> See Section 4.12. <i>powerPac</i> excludes fans <i>powerPac</i> | | | 0.958 0.946 | fpmh fpmh |
| EMC | | | | | |
| Parameter | Standard | | Level | | Units |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | | Level B | | |
| Radiated | EN55011, EN55022, FCC | | Level B | | |
| Harmonic Distortion | EN61000-3-2 Class A | | Compliant | | |
| Flicker & Fluctuation | EN61000-3-3 | | Compliant | | |
| Immunity | | | | | |
| Electrostatic Discharge | EN61000-4-2 | | Level 2 | | |
| Radiated Immunity | EN61000-4-3 | | Level 3 | | |
| Fast Transients-Burst | EN61000-4-4 | | Level 3 | | |
| Input Line Surges | EN61000-4-5 | | Level 3 | | |
| Conducted Immunity | EN61000-4-6 | | Level 3 | | |
| Voltage Dips | EN61000-4-11, SEMI F47 compliant. See note 7. | | Compliant | | |
| ENVIRONMENTAL | | | | | |
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | Full Load | -20 | | +70 | °C |
| Storage Temperature | | -40 | | +85 | °C |
| Derating | See Section 4.11 for full temperature deratings | | | | |
| Relative Humidity | Non-condensing | 5 | | 95 | %RH |
| Shock | 3000 Bumps, 10G (16ms) half sine | | | | |
| Vibration | 1.5G | 10 | | 200 | Hz |

NOTES

1. This product is not intended for use as a stand alone unit and must be installed by qualified personnel.
2. The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.
3. All specifications at nominal input, full load, 25°C unless otherwise stated.
4. When powering inductive or capacitive loads, it is recommended to use a blocking diode on the output.
5. Conformal Coating option: See Sections 3.1 and 4.10 for details.
6. For section references above go to the Xgen Designers Manual.
7. SEMI F47 compliant at input voltages >160VAC. Consult Excelsys for details.



Section 3.1 Configuring your Xgen

The Xgen series of user configurable power supplies combine feature rich AC input front-ends (*powerPacs*) with slide-in output DC output modules (*powerMods*). The plug and play architecture allows system designers to define and build ‘instant’ custom power solutions with industry leading 17W/in³ power density and up to 90% efficiency.

Configured units may be specified and ordered using the part numbering system shown below.

OPTION CODES EXPLAINED

G CONFIGURATION CODES

- “-” Standard. No additional configuration
Standard output voltages and no options
- “C” Conformal Coating
(see Section 4.10 *powerPac* Options for details)
- “P” Preset. Voltage Adjustments, Series, Parallel Outputs
- “R” Extra Ruggedisation for Shock and Vibration
(see Section 4.10 *powerPac* Options for details)
- “S” Conformal Coating and Extra Ruggedisation for Shock and Vibration
(see Section 4.10 *powerPac* Options for details)

K INPUT CONNECTOR CONFIGURATION CODES

- “0” Standard IEC Input Connector (see Section 3.3 for details)
- “D” Input Cable Option (see Section 3.3 for details)

H THERMAL AND LEAKAGE CURRENT CONFIGURATION CODES

- “1” Thermal Signals: Fan Fail and Overtemperature Warning
(see Section 4.10 *powerPac* Options for details)
- “2” Reverse Fan
(see Section 4.10 *powerPac* Options for details)
- “3” Thermal Signals + Reverse Fan
(see Section 4.10 *powerPac* Options for details)
- “4” 150µA Leakage Current (medical versions only)
- “5” 150µA Leakage Current + Thermal Signals
(medical versions only)

- “6” 150µA Leakage Current + Reverse Fan
(medical versions only)
- “7” 150µA Leakage Current + Thermal Signals + Reverse Fan
(medical versions only)

Example:

XVD234580-D4A contains

XVD *powerPac*: 1200W medically approved

Powermods Xg2:5V/40A, Xg3:12V/20A, Xg4:24V/10A,
Xg5:48V/6A, Xg8:24V/3A, 24V/3A

Option D : Input cable option

Option 4: 150µA leakage current option

A: Factory assigned unique identifier

Section 3.2 Additional Xgen Flexibility and Signals

Voltage Adjustment - Local

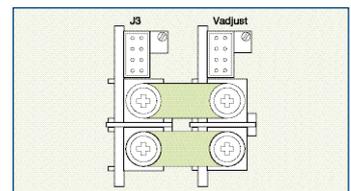
The multi-turn potentiometer that adjusts each output within the specified range may be accessed via the output panel of the power supply. Clockwise rotation increases output voltage. Resolution is approximately 5% of nominal voltage (V_{nom}) per turn.

Voltage Adjustment - Remote (resistive / electronic)

The output voltage may be adjusted or trimmed by means of an external resistor or potentiometer network connected to the Vtrim pin. Dynamic voltage adjustment/programming is also possible. See Section 4.6 for more details on trimming voltage.

Parallel Connection

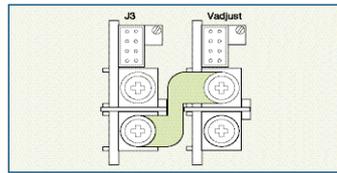
To achieve increased current capacity, simply parallel outputs using the standard parallel links. See Section 4.6 for parallel connection instructions.



Parallel Links available to order.
Part Number XP1

Series Connection

To achieve increased output voltages, simply series outputs using standard series links, paying attention to the requirements to maintain SELV levels if required in your system.



Series Links available. Part Number XS1

Current Limit Adjustment

The output current limit setting may be adjusted (downwards only) by means of an external resistor connection to the Itrim pin. See page Section 4.6 for detail.

Inhibit/Enable

Inhibiting may be implemented either globally or on a per-module basis (*powerPac* or *powerMod* inhibiting). Reverse logic (enabling) may also be implemented. See Section 4.7 and 4.9 for details.

AC Fail

Open collector signal indicating that the input voltage has failed or is less than 80Vac. This signal changes state giving 5ms of warning before loss of output regulation. See Section 4.9 for details.

Configure using the Online Configurator

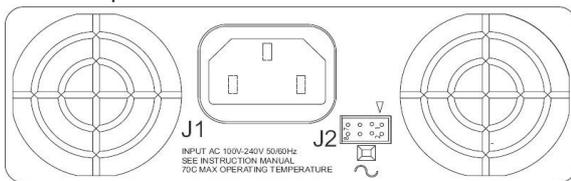
Our sales and applications team will be delighted to assist you in defining the best power supply for your application. You can also use the Online Configurator at www.excelsys.com

For some specific configurator examples please refer to Section 3.5, Configuration Examples.

Section 3.3 Connectors

Input Connectors

The Xgen series has a variety of input connector options to ease system integration. These include IEC, Input cables (3wire), IEC to Screw Adaptor.



Input Connections powerPac

Input Connector and Signals Pinout J2 powerPac

| Pin | J1 | J2 |
|-----|---------|----------------|
| 1 | Line | Common |
| 2 | Neutral | +5V Bias |
| 3 | Earth | not used |
| 4 | | AC Fail |
| 5 | | Fan Fail * |
| 6 | | Global Enable |
| 7 | | Temp Alarm* |
| 8 | | Global Inhibit |

* Option 01

J1 Mating Connector:

IEC320 type female plug rated 13A. Locking IEC cable and connector: Schaffner EMC part number IL13-US1-SVT-3100-183.

J2 Signals Mating Connector:

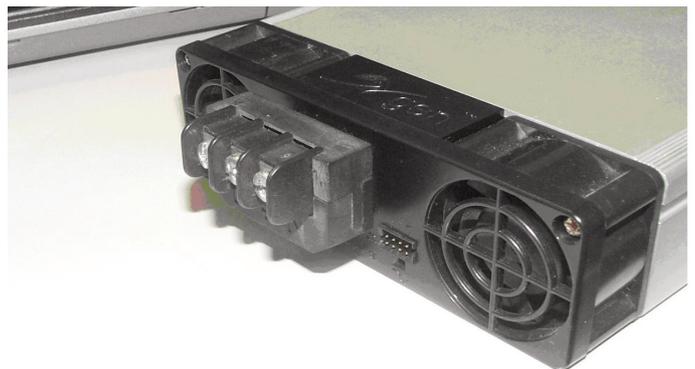
Housing: Molex p/n 51110-0850 (Non Locking), 51110-0860

Input Cable Option (Option D)

Xgen is also available with an input cable connection option allowing greater flexibility when mounting Xgen in the system. Input cables are 300mm in length and come supplied with Faston connectors. See Section 3.4 for mechanical drawings.

IEC to Screw Terminal Adaptor

Some applications may require a screw terminal input rather than the standard IEC320 connector provided with the Xgen (except XCE and XLD). For such applications, Excelsys can offer the XE1, the IEC to Screw terminal adaptor accessory plug. This is a press fit connector that plugs securely into the Xgen *powerPac* and provides the system integrator with screw terminals for mains connection. See photos for correct insertion of XE1.

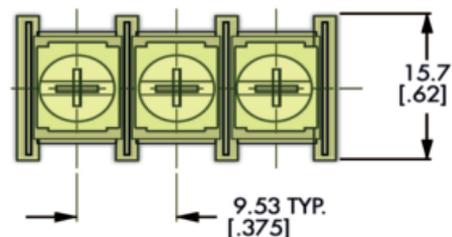


Dimensional Drawings

Correct pin positions are indented to assist connection. Pins are indented to indicate the correct connection

1. Live (L)
2. Earth Centre (Earth)
3. Neutral (N)
4. Screw size M3

Max Torque to be used on screws is 1.5Nm



For applications where spade terminal inputs are required, Excelsys recommend the use of the Schurter IEC Appliance plug 4787.

Lockable IEC Power Cord

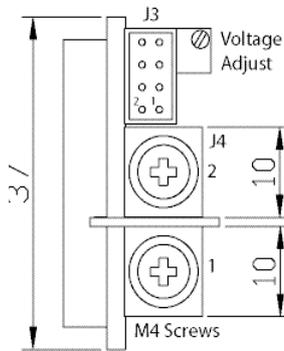
Excelsys recommends that a lockable IEC power cord is used in applications that are subject to vibration. Excelsys recommends the use of Schaffner IL13 or equivalent.

Output Connectors

The Xgen output *powerMods* connection details are shown below. Type A connectors are for single output *powerMods* Xg1 to Xg7. Type B connector for Dual output Xg8 *powerMod*.

The pinout connections and diagrams of the Xgen power and signal connectors are as follows

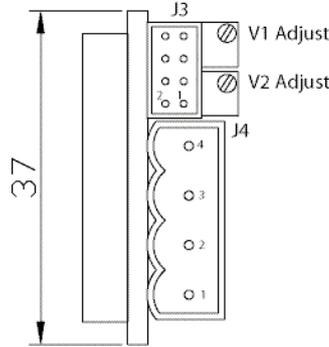
TYPE A Xg1-Xg7



J4 Connector : M4 Screw

J3 Connector Mating Connector
Housing: Locking Molex 51110-0860
Non Locking Molex 51110-0850
Crimp Terminal: Molex p/n 50394

TYPE B : Xg8



J4Connector : Camden 9200/4A

J3 Connector Mating Connector
Housing: Locking Molex 51110-0860
Non Locking Molex 51110-0850
Crimp Terminal: Molex p/n 50394

Output Connector Pinout

| Pin | J4 (type A) | J4 (type B) |
|-----|-------------|-------------|
| 1 | -Vout | -V2 |
| 2 | +Vout | +V2 |
| 3 | | -V1 |
| 4 | | +V1 |

J4 Mating Connectors:

Type A: M4 Screw Terminals

Type B: Camden p/n CTB9200/4A

Output Signals Connector Pinout

| Pin | J2 (powerPac) | J3 (powerMod) Xg1-Xg5 Type A | J3 (powerMod) Xg7 Type A | J3 (powerMod) Xg8 Type B |
|-----|------------------|------------------------------------|--------------------------------|--------------------------------|
| 1 | common | +sense | not used | -pg (V2) |
| 2 | +5V bias | -sense | not used | +pg (V2) |
| 3 | | V trim | not used | inhibit (V2) |
| 4 | ac fail | I trim | common | common (V2) |
| 5 | fan fail* | +inhibit/enable | -pg | -pg (V1) |
| 6 | global enable | -inhibit/enable | +pg | +pg (V1) |
| 7 | temp alarm* | +power good | inhibit | inhibit (V1) |
| 8 | global inhibit | -power good | common | common (V1) |

*Option 01 only

J3 *powerMod* Signals Mating Connector:

Housing: Molex p/n 51110-0850 (Non Locking), 51110-0860 (Locking) or equivalent

Crimp Terminal: Molex p/n 50394

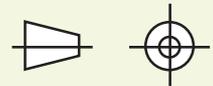
(Locking) or equivalent

Crimp Terminal: Molex p/n 50394

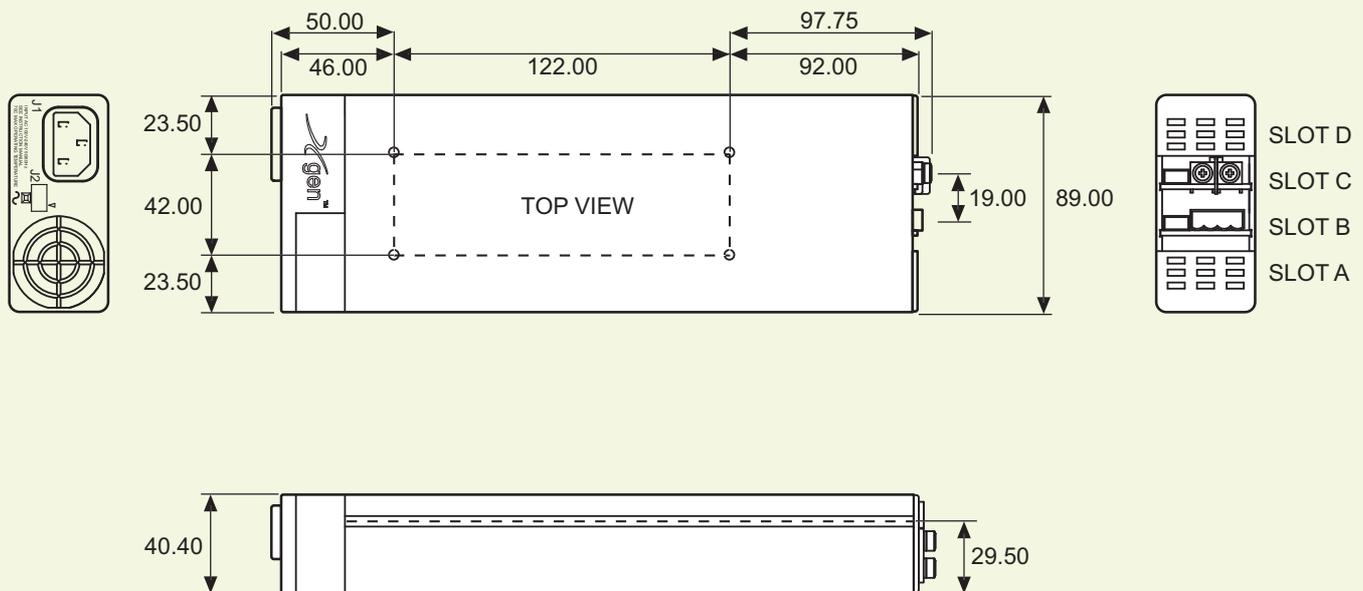
Section 3.4

Mechanical Drawings

XL, XM, XK, XR, XT, XN (except XLD and XMD)



Third angle projection



All dimensions in mm.

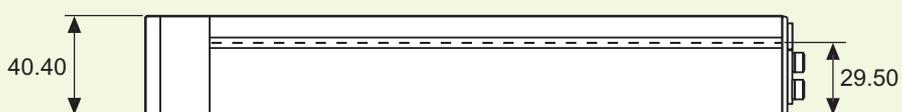
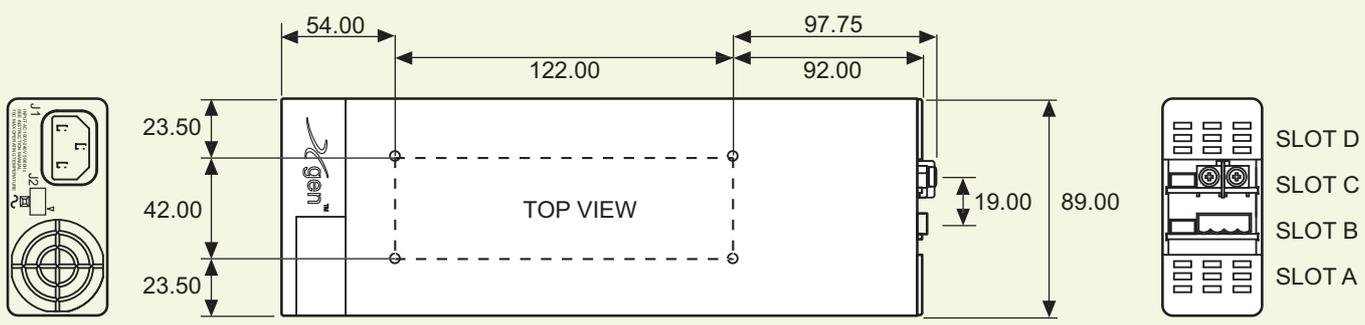
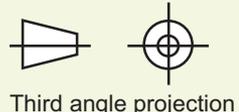
Mounting Holes

4 M4 threaded holes on Base. Max screw penetration is 6mm from Base.

Fleximount Side Mounting Slots

Use with self-clinching studs type FH-M4-X or FH-832-X (X= stud length) from PEM, or equivalent
Alternatively, use Xgen Side Clamps from Excelsys. Part No. Z165 (drawing 61401)

XLD, XMD



All dimensions in mm.

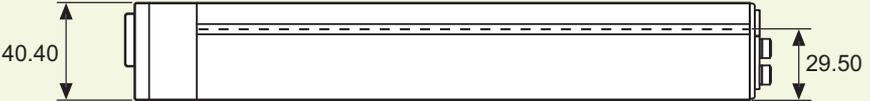
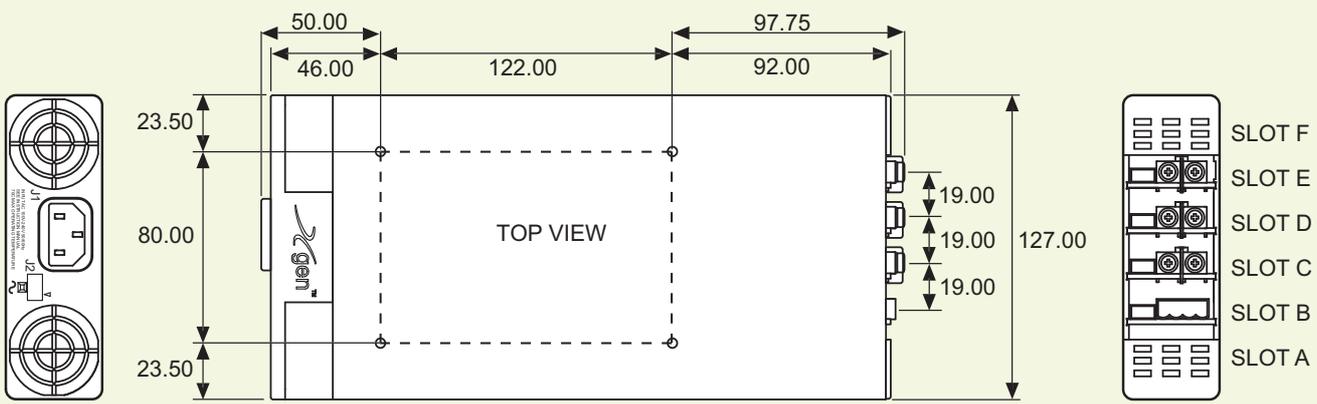
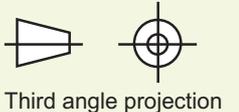
Mounting Holes

4 M4 threaded holes on Base. Max screw penetration is 6mm from Base.

Fleximount Side Mounting Slots

Use with self-clinching studs type FH-M4-X or FH-832-X (X= stud length) from PEM, or equivalent
Alternatively, use Xgen Side Clamps from Excelsys. Part No. Z165 (drawing 61401)

XC, XV, XQ, XZ, XB, XW, XH (except XCE and XVE)



All dimensions in mm.

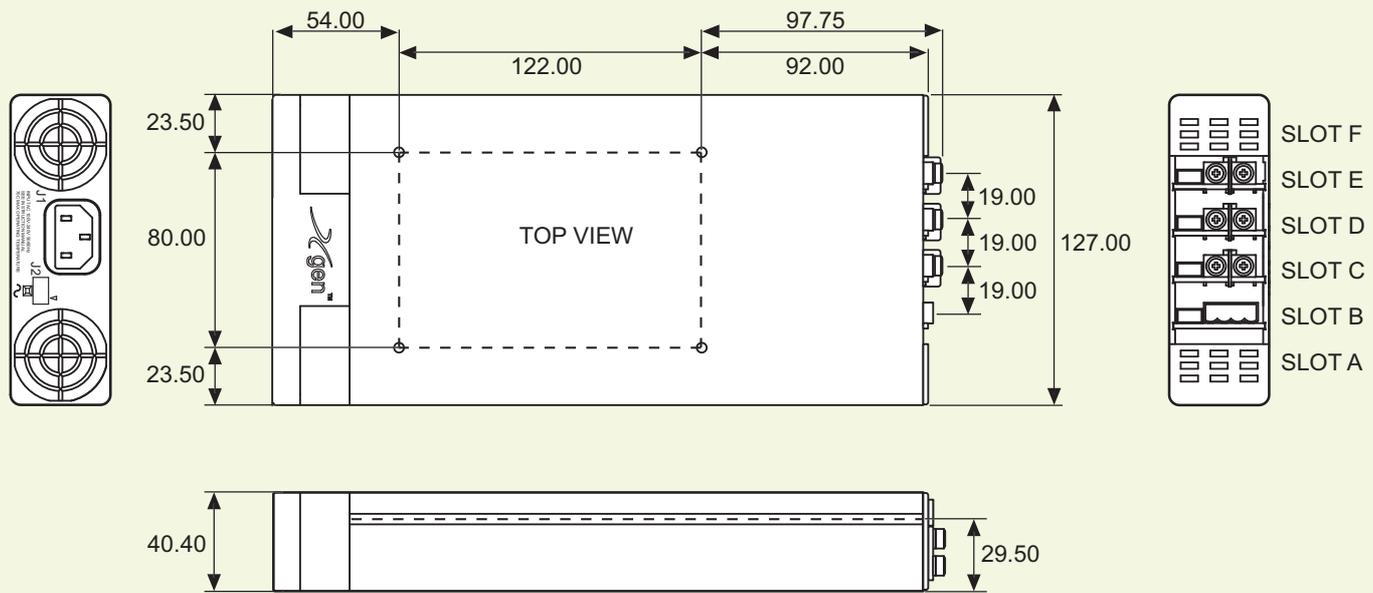
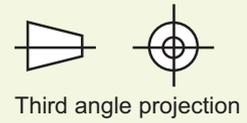
Mounting Holes

4 M4 threaded holes on Base. Max screw penetration is 6mm from Base.

Fleximount Side Mounting Slots

Use with self-clinching studs type FH-M4-X or FH-832-X (X= stud length) from PEM, or equivalent
Alternatively, use Xgen Side Clamps from Excelsys. Part No. Z165 (drawing 61401)

XCE, XVE



All dimensions in mm.

Mounting Holes

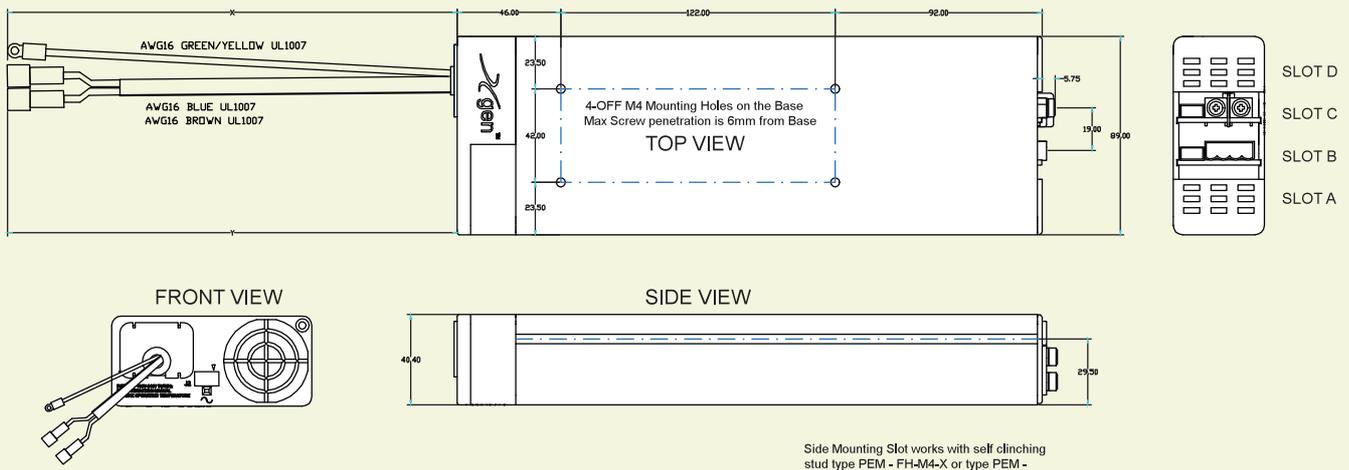
4 M4 threaded holes on Base. Max screw penetration is 6mm from Base.

Fleximount Side Mounting Slots

Use with self-clinching studs type FH-M4-X or FH-832-X (X= stud length) from PEM, or equivalent Alternatively, use Xgen Side Clamps from Excelsys. Part No. Z165 (drawing 61401)

4 slot Input Cable Version (Option D)

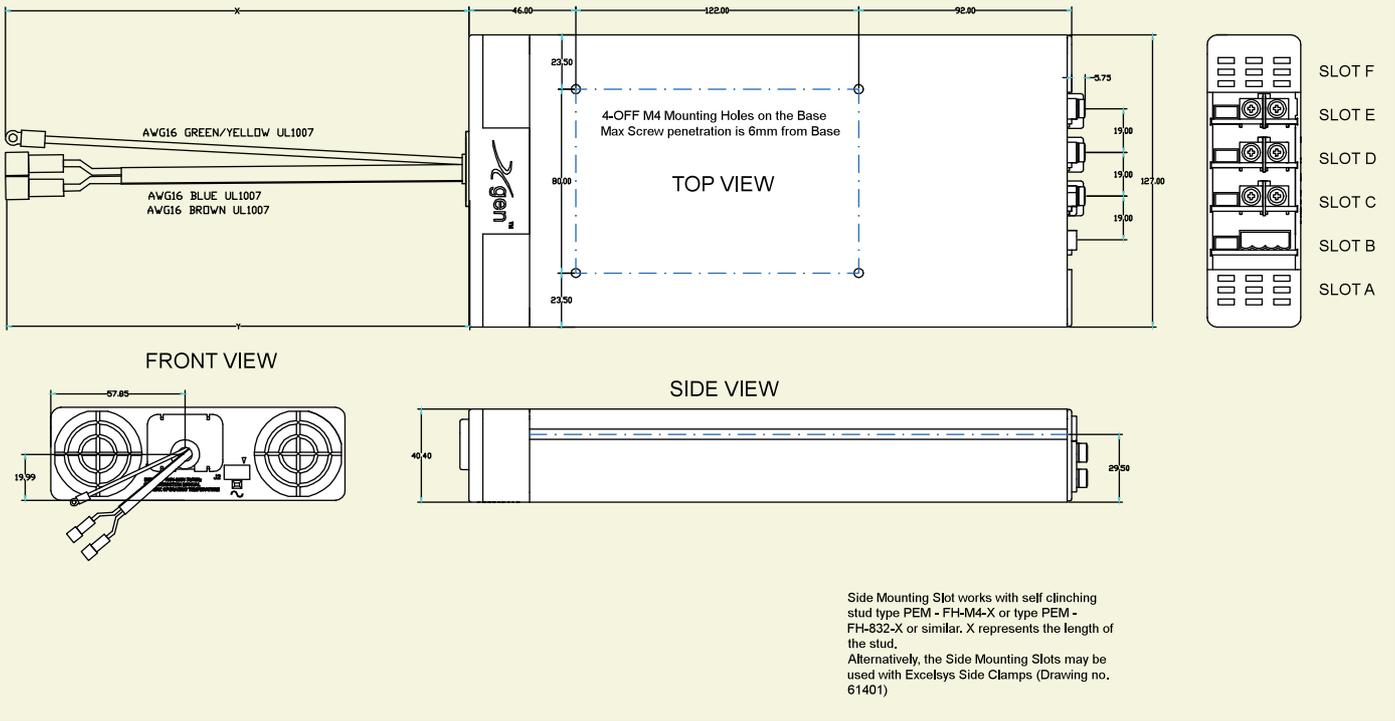
Standard cable length 300mm, please contact factory for alternative lengths



Side Mounting Slot works with self clinching stud type PEM - FH-M4-X or type PEM - FH-832-X or similar. X represents the length of the stud. Alternatively, the Side Mounting Slots may be used with Excelsys Side Clamps (Drawing no. 61401)

6 slot Input Cable Version (Option D)

Standard cable length 300mm, please contact factory for alternative lengths



Xgen Mounting Options

To ease system integration there are three methods of mounting the Xgen in a system.

1. Base Plate Mounting

The unit can be mounted in the system via the mounting holes present on the Xgen base. See mechanical drawings for mounting hole positions. Use M4 mounting screws. Ensure that maximum screw penetration from base does not exceed 6mm.



2. Fleximount System A

Using the side mounting clips accessory shown, the clip can be positioned at the user defined position along the slide rail on the side of the Xgen. The clip is then mounted to the system base plate. Use M4 mounting screws to fix mounting clip to system base. Excelsys part number Z165.

3. Fleximount System B

Using the slide rail on side of the Xgen, self clenching studs can be placed at a user defined position. Recommend: PEM FH-M4-X or FH-832-X or equivalent.

Section 3.5 Configuration Examples

When configuring your Xgen, it is important to observe the power ratings of individual *powerMods* and *powerPacs* in order to ensure the best performance of the Xgen in the system. Operating ambient temperature around the power supply and input voltage can impact the performance of a power supply in a system. The examples set out below illustrate the flexibility of the Xgen for many applications, whilst also providing the optimum solution for system designers. Our sales and applications team will be delighted to assist you in defining the best power supply for your application. You can also use the Online Configurator at www.excelsys.com

| | Output 1 | Output 2 | Output 3 | Output 4 | Output 5 |
|-------|----------|----------|----------|----------|----------|
| Volts | 24V | 12V | 5V | 15V | -15V |
| Amps | 25A | 12A | 4A | 2A | 2A |

Example 1

Max Ambient Temp: 25°C
Input Voltage: 90-264VAC
Medically Approved (EN60601-1)

I. Select *powerMods*

Output 1: 24V@25A 3 x Xg4 connected in parallel
Output 2: 12V@12A Xg3
Output 3: 5V@4A Xg7
Output 4: 15V@2A V1 of Xg8, Adjust to 15V
Output 5: -15V@2A V2 of Xg8, Adjust to 15V

II. Calculate the power required

Power = Volt x Current
Output 1: 600W
Output 2: 144W
Output 3: 20W
Output 4: 30W

Output 5: 30W Total: 824W

III. Select *powerPac*

824W at 90VAC in at 25°C, and carry medical approvals
XVC: 1000W medically approved *powerPac* (XV) delivers 850W at 85VAC.
Refer to *powerPac* derating curves Section 4.11.

IV. Select *powerMod* slot position

Refer to *powerMod* derating curve Section 4.11.
At 25°C all *powerMods* can be configured in any slot position.

V. Define part number

All *powerMods* are within their ratings in all slot positions.
XVC444780

| | Output 1 | Output 2 | Output 3 | Output 4 | Output 5 |
|-------|----------|----------|----------|----------|----------|
| Volts | 24V | 5V | 12V | 24V | 18V |
| Amps | 15A | 30A | 15A | 1.5A | 1.5A |

Example 2

Max Ambient Temp: 40°C
Input Voltage: 90-264VAC
Low Acoustic Noise
Standard Safety Approvals (EN60950)

I. Select *powerMods*

Output 1: 24V@15A 2 x Xg4 connected in parallel
Output 2: 5V@30A Xg2
Output 3: 12V@15A Xg3
Output 4: 24V@1.5A V1 of Xg8,
Output 5: 18V@1.5A V2 of Xg8, Adjust to 18V

II. Calculate the power required

Power = Volt x Current
Output 1: 360W
Output 2: 150W
Output 3: 180W
Output 4: 36W
Output 5: 29W Total: 756W

III. Select *powerPac*

756W at 90VAC in at 40°C, and low noise
XQB: 900W low noise *powerPac* (XQ) delivers 850W at 85VAC
Refer to *powerPac* derating curves Section 4.11.

IV. Select *powerMod* slot position

Refer to *powerMod* derating curve Section 4.11.
At 40°C, Xg4 delivers 240W in all slot positions.
At 40°C Xg2 delivers 167W in slot A, 160W Slot B, 200W in Slots C, D, E and F.
At 40°C, Xg3 delivers 240W in all slot positions.
powerMods can be configured in any slot position.
At 40°C, Xg8 delivers 80W in slot B, 96W in Slots A,C,D,E,F

V. Define part number

All *powerMods* are within their ratings in all slot positions
XQB234480-00

| | Output 1 | Output 2 | Output 3 | Output 4 | Output 5 |
|-------|----------|----------|----------|----------|----------|
| Volts | 24V | 12V | 3.3V | 12V | 12V |
| Amps | 60A | 30A | 30A | 8A | 8A |

Example 3

Max Ambient Temp: 40°C
Input Voltage: 200-240VAC

Standard Approvals: (EN60950)

I. Select *powerMods*

| | |
|--------------------|-------------------------------|
| Output 1: 24V@60A | 6 x Xg4 connected in parallel |
| Output 2: 12V@30A | 2 x Xg3 connected in parallel |
| Output 3: 3.3V@30A | Xg2, Adjust to 3.3V |
| Output 4: 12V@8A | Xg3 |
| Output 5: 12V@8A | Xg3 |

II. Calculate the power required

Power = Volt x Current

Output 1: 1440W

Output 2: 360W

Output 3: 99W

Output 4: 96W

Output 5: 96W

Total: 2091W

III. Select *powerPac*

2091W at 200VAC in at 40°C, and carry standard approvals

XCD: 1200W *powerPac* (XC) delivers 1200W at 200VAC.

Refer to *powerPac* derating curves Section 4.11.

Requires an XCD and XCC *powerPac* to achieve 2091W.

IV. Select *powerMod* slot position

Refer to *powerMod* derating curve Section 4.11.

At 40°C, Xg4 delivers 240W in all slot positions.

At 40°C, Xg3 delivers 240W in all slot positions.

powerMods can be configured in any slot position.

At 40°C Xg2 delivers 167W in slot A, 160W Slot B, 200W in Slots C, D, E and F.

V. Define part number

All *powerMods* are within their ratings in all slot positions.

Divide the power consumption over the two *powerPacs* ensuring that no *powerPac* exceed its power rating.

XCC233444 to deliver 3.3V@30A, 12V@30A, 24V@30A

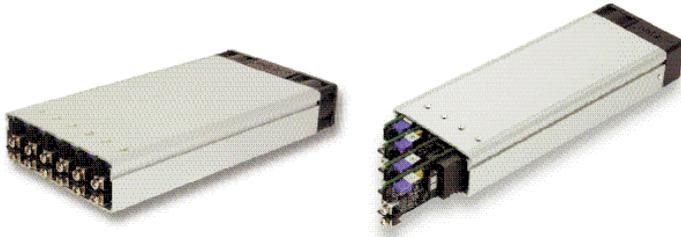
XCC444330 to deliver 24V@30A, 12V@8, 12V@8A

Parallel connect modules over two *powerPacs* using the same method as outlined in Section 4.6.

Xgen

DESIGNERS' MANUAL

This Xgen Designers' Manual has been prepared by Excelsys experts to assist qualified engineers and technicians in understanding the correct system design practices necessary to achieve maximum versatility and performance from any of the Xgen series family of products.



Section 4.1 Overview of Xgen Series

The Xgen series allows users to instantly configure high efficiency, off-line power supplies. Although very small in size, (40.4mm high, 260mm long and either 89mm or 127mm wide) the Xgen series provides up to 1340W of output power. The chassis has 4 or 6 slots and can provide up to 12 isolated outputs.

A complete power supply is configured by selecting and inserting up to six DC output modules called *powerMods* to build a power supply that offers the advantages of a custom supply, but is assembled from standard and modular building blocks continuing the Excelsys tradition of industry leading configurable power supplies.

Manufactured in world class power supply facilities, the Xgen series is completely user configurable. If output requirements change, i.e. more power or a different output voltage is needed, upgrading is easy: simply unlock a single screw and replace the slide-in *powerMod* assembly with the preferred alternative. Allowing additional flexibility, *powerMods* can be connected in parallel to increase output power, or in series for higher voltages (subject to staying within isolation ratings and giving due consideration to any SELV requirements).

A user-friendly interface on connector J3 of each *powerMod* provides control and output sequencing capability, in addition to useful status indicators. Please consult our Excelsys applications team if you have other special requirements.

The plug-together architecture facilitates 'instant' custom power solutions with industry leading $17W/in^3$ power density and up to 90% conversion efficiency. Available in two package sizes, with a variety of application specific *powerPacs*, the Xgen series provides a standard off-the-shelf solution for specific application requirements.

Standard Features

- Input Voltage: 85V to 264Vac 47 to 63 Hz
- Outputs: Up to 12 isolated outputs
- Full power output to 40°C; Derating to 70°C

- Low inrush current
- Conducted EMI meets EN 55022 Level B
- AC Fail status signal
- Output sequencing capability
- Global shutdown capability
- Overcurrent protection standard on all outputs.
- Overvoltage protection on all outputs
- Over temperature limiting on all *powerMods* and *PowerPacs*
- Safety Agency Approvals: CE Mark, UL, CSA
- DC OK (Power Good) status signal
- Wide output voltage adjustment range
- RoHS compliant

Optional Features

- Thermal signals suite (Overtemp and FanFail signals)
- Reversed fan airflow direction
- Conformal coating
- Ultra low leakage current
- Ruggedised for extreme shock and vibration
- Alternative input connectors

Section 4.2 Installation Considerations

Xgen series models may be mounted on any of three surfaces using standard M4 screws. The chassis comes with four mounting points on the base. Maximum allowable torque is 2Nm. The maximum penetration depth is 6mm. Additionally, the fleximount™ system on both side walls of the *powerPac* chassis facilitates flexible mounting.

When selecting a mounting location and orientation, the unit should be positioned so air flow is not restricted. Maintain a 50mm minimum clearance at both ends of the Xgen power supply and route all cables so airflow is not obstructed. The standard unit draws air in on the input side and exhausts air out the load side. If airflow ducting is used, avoid sharp turns that could create back pressure.

Avoid excessive bending of output power cables after they are connected to the Xgen *powerMods*. For high current outputs, use cable-ties to support heavy cables and minimise mechanical stress on output studs. Be careful not to short-out to neighboring output studs. Xgen *powerMods* are supplied with spring washers on all output screws. These (or equivalents) should be used and thread locking compounds are not required. The maximum torque recommended on output connectors is 4Nm. Avoid applications in which the unit is exposed to excessive shock or vibration levels that exceed the specified levels. In such applications, a shock absorption mounting design is required.

Section 4.3 Xgen Mounting Considerations

- Always fill all output slots of the Xgen. If a slot is not filled with a *powerMod*, it should be filled with an Empty Slot Cover (part numbers XB1, XB2 or XB3). Empty Slot covers are plastic assemblies whose main function is to fill up an empty slot. Excessive airflow escape from an empty slot may degrade thermal performance and result in overheating and damage to the Xgen unit. Refer to Section 4.11 for optimum positioning of *powerMods*.
- Do not unplug *powerMods* while input power is applied to the *powerPac*. The Xgen series is not designed for hot-plug applications.
- Do not restrict airflow to the unit. The cooling fan draws air into the unit and forces it out at the output terminals.

- Always ensure that output screws are properly torqued before applying power to the *powerPac*.
- Positive and negative power cables should be arranged as a twisted pair to minimise inductance.
- Wait 4 minutes after shutting off power before inserting or removing *powerMods*.
- Xgen assemblies do not have user serviceable components. They must be returned to the factory for repairs. Contact Customer Service for a RMA number before returning the unit. Do not attempt to repair or modify the power supply in any manner other than the exchange of *powerMods* as described in this Designers' Manual.
- Use proper size wires to avoid overheating and excessive voltage drop.

is achieved by the most advanced high efficiency converters resulting in reduced size for magnetics and capacitors; excellent line and load regulation; wide adjustment range for output and low EMI/RFI emission.

At initial power-up, the Xgen outputs are disabled to eliminate inrush current and a low-power flyback converter operating with PWM current mode control converts the high voltage DC bus into regulated low voltage to power the internal housekeeping circuits and cooling fans. Once the bus potential is within operating parameters, the AC Fail signal is activated indicating that the input power is ok, and allows the installed *powerMod* outputs to come up. An auxiliary bias supply of 5 Vdc is provided for peripheral use on interface connector J2. In the case of medically approved supplies, this bias supply has medical isolation (4000VAC).

Section 4.4 Theory of Operation

The Xgen is comprised of an appropriate *powerPac* and a selection of *powerMod* DC output modules selected to deliver the exact volts and amps requirements of the the system designer. See Operational Block Diagram.

The Xgen *powerPac* modules consist of a fan-cooled semi-enclosed chassis containing circuitry for an off-line single phase AC front end, EMI filter, cooling fan, customer interface and associated housekeeping circuits. Input AC mains voltage (L1/N, L2 and GND) is applied to an IEC320 type input connector and then through an EMI filter designed to meet EN 55022 Level B. For medical applications, the EMI filter also ensures the power supply meets the low earth leakage current requirements of EN60601-1 3rd Edition.

Inrush current limited by an active soft start cct. Current is limited by a combination of thermistors (on the Xgen 4 slot), and thermistors and SCR's (on the Xgen 6 slot). This stage is then followed by a high frequency switching input current shaping boost converter feeding the ZVS (Zero Voltage Switching) resonant switching stage. The ZVS stage supplies power to a variety of *powerMod* assemblies that provide the desired low voltage, regulated outputs. Conversion in the output assemblies

Section 4.5 Configuration (and Reconfiguration)

powerMods may be easily added, replaced, or moved by sliding the assemblies in or out of a *powerPac* chassis.

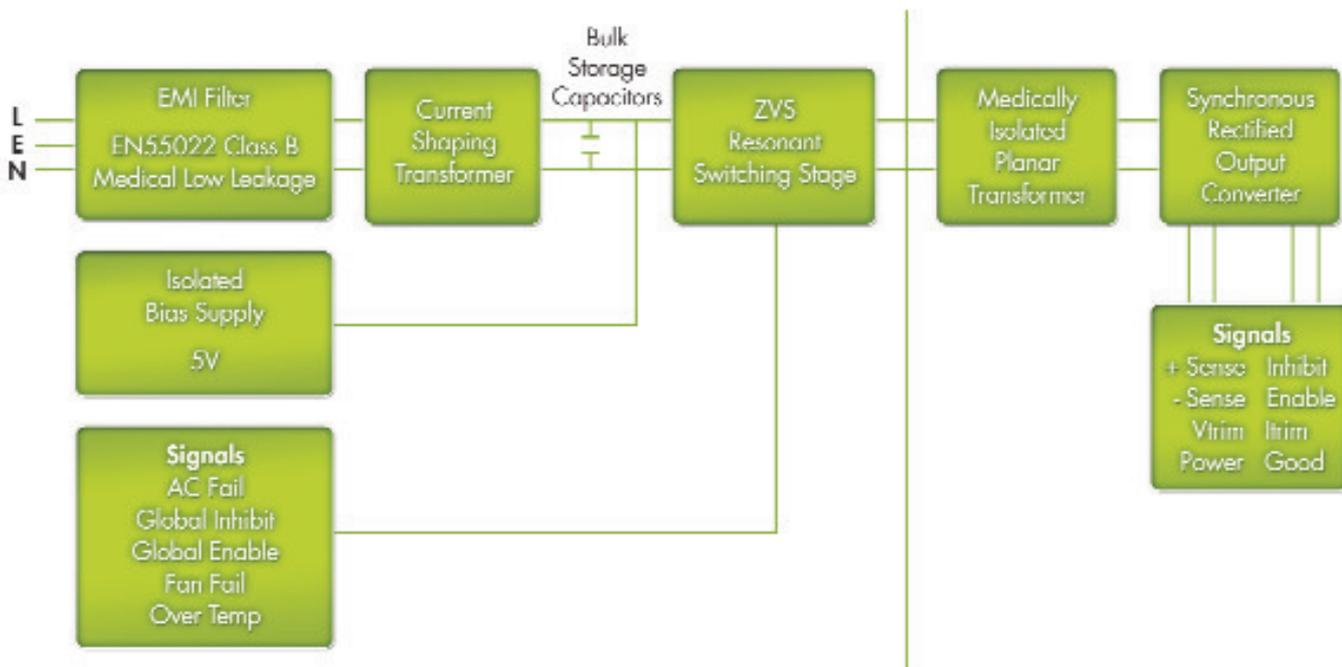
Prior to removing or installing a *powerMod* module, remove power from the *powerPac* and wait 4 minutes. Failure to do so can result in personal injury and/or damage to the supply. Take standard ESD precautions when handling *powerMods*.

Configuring the Xgen is as easy as 1,2,3!

1. Select the appropriate *powerMods* for your application.
2. Calculate your power requirements.
3. Select your appropriate *powerPac* for power and application from the wide range of *powerPacs*.

Removing *powerMods*

powerMods may be removed by removing the screw on the top surface. Once this screw has been removed the *powerMod* will slide out of the chassis. Once a *powerMod* has been removed, the empty slot MUST be filled with either another *powerMod* or an empty slot cover. If the slot is left empty, it will provide an airflow escape and may cause inadvertent shutdown of the unit.



Operational Block Diagram

Installing powerMods

powerMods may be installed in empty slots by simply sliding in the new powerMod, pushing the module 'home' until the mounting bracket lines up with the hole in the Top Panel, then securing the module with the M3 x 6 countersunk screw provided. Power and interface connections can be made after the powerMod has been installed.

powerMods may be paralleled for more power using bus bars (Paralleling Links) across the positive and negative output terminals. See Section 4.6 for details.

Section 4.6

powerMod Operation

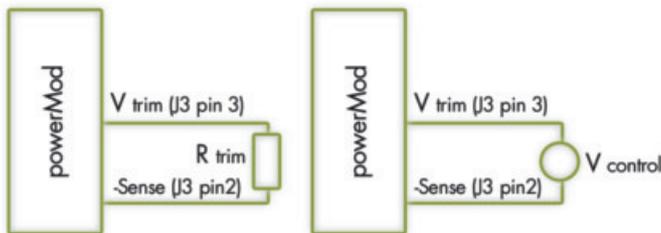
The Xgen series of products have been designed to allow maximum flexibility in meeting the unique requirements of individual users. The inherent flexibility resulting from modularity concepts is further enhanced by this flexibility. Although the products are very versatile, care should always be taken to ensure that the proper procedures are followed.

Voltage Adjustment

The Xgen series has been designed with maximum user flexibility as a key objective. With regards to voltage adjustment this has been achieved by the wide range of adjustment on each of the powerMod models. Voltage adjustment may be achieved by:

1. Front-panel potentiometer adjustment
2. Remote resistive programming
3. Remote voltage programming

See diagrams for details on external connections to the V trim pin (J3 pin3) required for remote voltage programming.



Remote Output Voltage Adjustment of powerMods

Remote Voltage Programming using a Voltage Source

Using an external Voltage source ($V_{control}$), the powerMod output voltage may be adjusted over a wide range. The powerMod output voltage may be programmed by referring to the Voltage Programming Graph and applying the formula below to set the powerMod output voltage to the required level.

$$V_{output} = K \times V_{control} \quad (1)$$

The appropriate K factor for different powerMods are in the 'Remote Output Voltage Adjustment' table.

Important: $V_{control}$ must not exceed 2.5V.

Example.

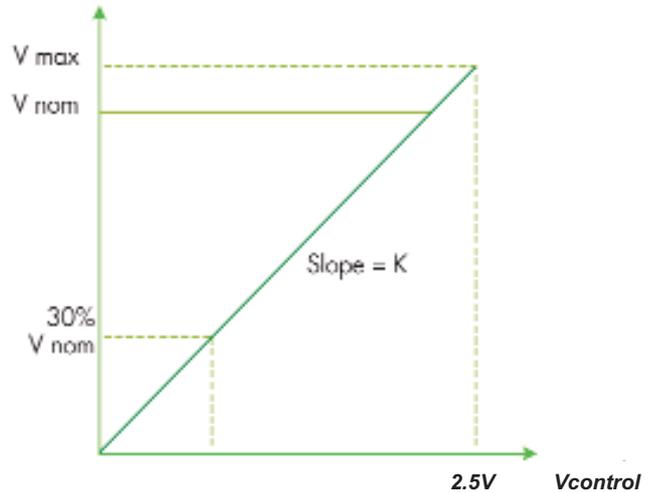
Using a powerMod Xg4, what external voltage must be applied to Vtrim pin in order to set powerMod output voltage to 20V.

$$V_{output} = 20V, K=12.5$$

$$\text{Using equation (1); } V_{output}/K=V_{control}$$

$$20V/12.5 = 1.6V.$$

$$V_{control} = 1.6V$$



Remote Output Voltage Adjustment of powerMods

| powerMod | K |
|----------|------|
| Xg1 | 1.56 |
| Xg2 | 2.5 |
| Xg3 | 6.23 |
| Xg4 | 12.5 |
| Xg5 | 24.2 |

Remote Output Voltage Adjustment Table

Remote Voltage Programming using a Resistor.

The powerMod output voltage can be adjusted downward using a remote potentiometer or reduced, using an external resistance.

Calculation of the the external resistance depends on the actual initial voltage setting of the powerMod (via the onboard potentiometer). The preferred method is to set the powerMod voltage to its maximum rating. e.g. Xg4 set to 30V. This will allow the widest possible adjustment range of the output voltage.

powerMod set to V_{max}

$$R_{trim} = \frac{[3700V_{out} - 250K]}{[2.5K - V_{out}]} \quad (2)$$

Example.

Using a powerMod Xg4, determine the resistance value to be applied to Vtrim pin in order to set powerMod output voltage to 20V.

$$K \text{ for Xg4} = 12.5$$

$$V_{out} = 20V$$

Using equation (2)

$$R_{trim} = 6300 \text{ ohm}$$

Alternatively if the powerMod voltage is set to new level via the on-board potentiometer to another level e.g. 21V then the following formula must be used to calculate the value of R_{trim}

$$R_{trim} = \frac{1000V_{out} [(4.275 + V_p(1.96 - 4V_p)) - K(0.1V_p + 0.051)]}{K(V_p + 0.51) - 0.604V_{out}} \quad (3)$$

| <i>powerMod</i> | Vmin | Vnom | Vmax | I _{max} | I _{limit} adjust Min Max | Current Limit On set SC* | Current Limit Foldback | V _{trim} Range Min Max | I _{trim} Range Min Max | OVP1 Tracking % of V _{set} | OVP2 Latching % of V _{max} | Remote Sense | J3 Signals | |
|-----------------|-------|-------|-------|------------------|---|-----------------------------------|------------------------------|--|--|---|---|-----------------|---|--|
| Xg1 | 1.5V | 2.5V | 3.6V | 50A | 5A 55.0A | 55.0A 58.0A | Yes | 1.0V 3.6V | 5A 50A | 110-115% | 110-125% | 0.5V | +Sense V _{trim} Inhibit +PG | -Sense I _{trim} Enable -PG |
| Xg2 | 3.2V | 5.0V | 6.0V | 40A | 4A 44.0A | 44.0A 46.0A | Yes | 1.0V 6.0V | 4A 40A | 110-115% | 110-125% | 0.5V | +Sense V _{trim} Inhibit +PG | -Sense I _{trim} Enable -PG |
| Xg3 | 6.0V | 12.0V | 15.0V | 20A | 2A 22.0A | 22.0A 23.0A | Yes | 4.0V 15.0V | 2A 20A | 110-115% | 110-125% | 0.5V | +Sense V _{trim} Inhibit +PG | -Sense I _{trim} Enable -PG |
| Xg4 | 12.0V | 24.0V | 30.0V | 10A | 1A 11.0A | 11.0A 12.0A | Yes | 8.0V 30.0V | 1A 10A | 110-115% | 110-125% | 0.5V | +Sense V _{trim} Inhibit +PG | -Sense I _{trim} Enable -PG |
| Xg5 | 28.0V | 48.0V | 58.0V | 6A | 0.7A 6.66A | 6.6A 7.0A | Yes | 8.0V 58.0V | 0.7A 6A | 110-115% | 110-125% | 0.5V | +Sense V _{trim} Inhibit +PG | -Sense I _{trim} Enable -PG |
| Xg7 | 5.0V | 24.0V | 30.0V | 5A | No | 5.5A 6.0A | No | No | No | No | 110-125% | No | +PG -PG Inhibit Common | +PG |
| Xg8 V1 | 5.0V | 24.0V | 28.0 | 3A | No | 3.3A 4.0A | No | No | No | No | 110-125% | No | +PG -PG | +PG -PG |
| Xg8 V2 | 5.0V | 24.0V | 28.0 | 3A | No | 3.3A 4.0A | No | No | No | No | 110-125% | No | Inhibit Common | Inhibit Common |

Output powerMod Summary Specifications

where V_p is the *powerMod* setpoint voltage expressed as a proportion of the total trim range and can be calculated using formula (4).

$$V_p = \frac{(V_{set} - 0.844K)}{1.656K} \quad (4)$$

Example.
To set *powerMod* Xg4 to 15V when *powerMod* V_{set} is 21V.

K=12.5

$$\begin{aligned} \text{Using equation (4)} \quad V_p &= \frac{V_{set} - 0.844K}{1.656K} \\ &= \frac{21 - 0.844(12.5)}{1.656(12.5)} \end{aligned}$$

V_p = 0.5048

V_{out} = 15V

$$R_{trim} = \frac{1000V_{out}[(4.275 + V_p(1.96 - 4V_p)) - K(0.1V_p + 0.051)]}{[K(V_p + 0.051) - 604V_{out}]}$$

R_{trim} = 17,212 ohm

The power rating of the trim resistor can be as low as 100mW

Over Current Protection (OCP)

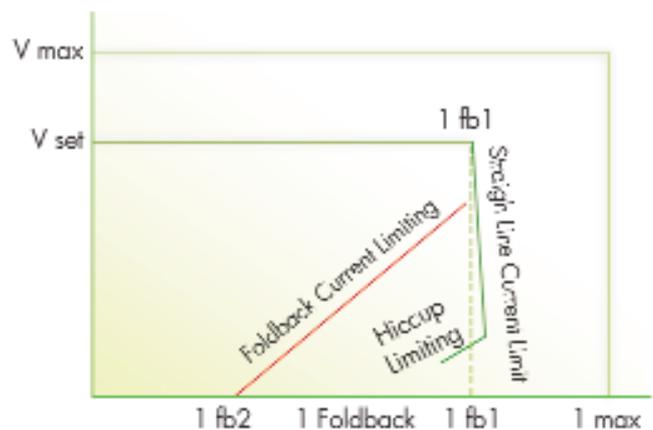
A variety of over current protection methods are possible with the Xgen series. See the 'Output *powerMod* Summary' table which

indicates the available current limit modes on each *powerMod*. *powerMods* Xg1 to Xg5 can have Straight-line current limit or Foldback current limit. See 'Output *powerMod* Summary Specifications' table for nominal current limit values.

Simple external application circuits may be used to achieve programmable *foldback* current and *user programmable* current limit levels (reduced). See Current Limit Programming diagrams and Foldback Programmable Current Limit diagram. The default current limit characteristic is Straight Line Current Limit.

Programming Current Limit

The current limit can be programmed to your requirements (in both Straight line and Foldback modes).



Current Limit Characteristics

Designer Manual

Straight line Current Limit can be programmed using an external voltage source or resistor/potentiometer. Connection between the Itrim pin (J3 pin4 and the -Vout terminal will set the current limit to the desired level.

Straight Line Current Limit Using a Voltage Source

The formula below will calculate the required external control voltage required to set the current limit of a *powerMod*:

If Current Limit is Less than 85% of Maximum Current

$$I_{trim} = F I_{lim} + CF - 0.53 \quad (5)$$

If Current Limit is Greater than 85% of Maximum Current:

$$I_{trim} = \frac{F I_{lim} + CF - 1.325}{0.558} \quad (6)$$

Where F is a conversion factor for each powerMod and CF is a correction factor.

Example:

To set the current limit of Xg2 to 20A, determine the external voltage to be applied to the Itrim pin.

$I_{lim} = 20A$
 $F = 0.0445$ for Xg2
 $CF = 0.993$ for Xg2
 $I_{max} = 40A$ for Xg2 ($I_{max} = \text{max current rating of Xg2}$)

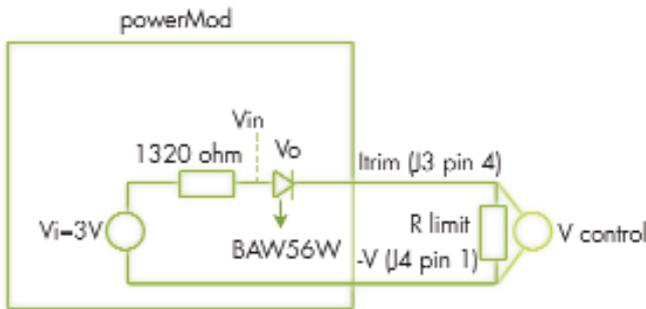
$$\frac{I_{lim}}{I_{max}} = \frac{20}{36} = 55.5\% \text{ (less than 85\%)}$$

Using equation (5)

$$I_{trim} = F I_{lim} + CF - 0.53$$

$$I_{trim} = 1.35V$$

Note that application of any voltage >2.5V to Itrim will not increase current limit beyond the *powerMods* normal current limit.



Current Limit Programming

| powerMod | F | CF |
|----------|--------|-------|
| Xg1 | 0.0325 | 0.995 |
| Xg2 | 0.0445 | 0.993 |
| Xg3 | 0.0891 | 0.969 |
| Xg4 | 0.1167 | 0.965 |
| Xg5 | 0.2888 | 0.967 |

Current Limit Adjustment Table

Straight Line Current Limit Using an External Resistor

The formula below will calculate the required external resistor value required to set the current limit of a *powerMod*:

If Current Limit is Less than 85% of Maximum Current:

$$R_{Itrim} = \frac{1320 I_{trim}}{2.47 - I_{trim}} \quad (7)$$

If Current Limit is Greater than 85% of Maximum Current:

$$R_{Itrim} = \frac{1320 I_{trim}}{1.675 - 0.558 I_{trim}} \quad (8)$$

Example:

To set the current limit of Xg2 to 20A, what resistance must be placed between the Itrim pin and -V.

$I_{lim} = 20A$
 $F = 0.0445$ for Xg2
 $CF = 0.993$ for Xg2
 $I_{max} = 40A$ for Xg2

$$\frac{I_{lim}}{I_{max}} = \frac{20}{40} = 50\% \text{ (less than 85\%)}$$

Using equation (5)

$$I_{trim} = F I_{lim} + CF - 0.53$$

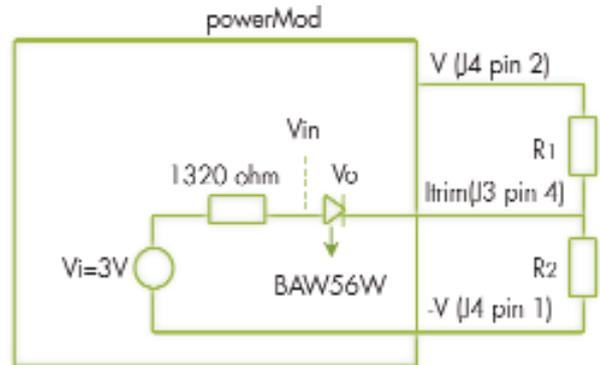
$$I_{trim} = 1.35V$$

Using equation (7)

$$R_{Itrim} = \frac{1320 I_{trim}}{2.47 - I_{trim}}$$

$$R_{Itrim} = 1,591\text{ohms}$$

Foldback Current Limit Programming



Foldback Current Limit

Foldback Current Limit can be achieved using the circuit below. The onset of Foldback current limit (I_{fb1}) can be programmed using the formula below as can the actual end point (I_{fb2}). To set the final Foldback current limit point (I_{fb2}), the value R_1 in parallel with R_2 is equivalent to R_{Itrim} in the previous Straight Line current limit example.

To set I_{fb1} , point, we must calculate the ratio of R_1 to R_2 . To get the value of R_1 :

$$R_1 = \frac{(R_{Itrim})V_{out}}{[F I_{fb1}(1 + \frac{R_{Itrim}}{1320}) - 2 \frac{R_{Itrim}}{1320} + 1 - VD]} \quad (9)$$

$$R_2 = \frac{(R_1)(R_{Itrim})}{R_1 - R_{Itrim}} \quad (10)$$

VD is the voltage drop across BAW56W. This can be assumed to be 0.53V for most calculations, however it will vary slightly due to temperature. Refer to BAW56W datasheet for further details.

If Current Limit is Less than 85% of Maximum Current:
 $VD=0.53$ (11)

If Current Limit is Greater than 85% of Maximum Current:
 $VD=1.325 - 0.442I_{trim}$ (12)

Example:

To set the foldback current limit of an Xg2 set at 5V to the following levels, $I_{fb1} = 30A$ and $I_{fb2} = 20A$, determine the values of R_1 to R_2 required.

$F = 0.0445$ for Xg2
 $CF = 0.993$ for Xg2
 $I_{max} = 40A$ for Xg2
 $\frac{I_{lim}}{I_{max}} = \frac{20}{40} = 55.5\%$ (less than 85%)
 $I_{lim} = 20$

Using equation (5) $I_{trim} = F I_{lim} = CF - 0.53$
 $I_{trim} = 1.35$

Using equation (7) $R_{ltrim} = \frac{1320 I_{trim}}{2.47 - I_{trim}}$
 $R_{ltrim} = 1,591$ ohms

To calculate the ratio of R_1 to R_2 use the formula above

Use equation (11) to get the value of VD
 $VD = 0.53$

Use equation (9) to get the value of R_1

$$R_1 = \frac{R_{ltrim} V_{out}}{F_{fb1} (1 + \frac{R_{ltrim}}{1320}) - \frac{2R_{ltrim}}{1320} + 1 - VD}$$

$R_1 = 7998$ ohm

Use equation (10) to get the value of R_2

$$R_2 = \frac{(R_1)(R_{ltrim})}{R_1 - R_{ltrim}}$$

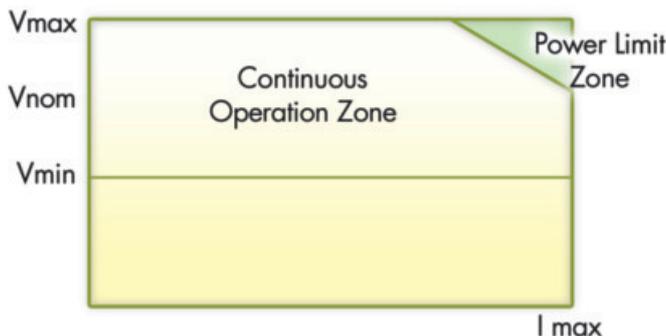
$R_2 = 1998$ ohm

Over Voltage Protection (OVP)

Over-voltage protection is implemented on each Xgen *powerMod* output. OVP level is fixed relative to V_{max} (110-125%). OVP is Latching and it may be reset by removing and reinstating AC power from the Xgen *powerPac* input.

Power Limit

Each *powerMod* has a number of levels of protection in order to ensure that Xgen is not damaged if used in overload conditions. See graph below.



Output powerMod Power Limit

When V_{set} is less than or equal to V_{nom} , current limit is employed at the current limit set point. However if V_{set} is greater than V_{nom} , the power limit is employed to ensure that the *powerMods* does not exceed its power rating.

e.g. Xg4 is adjustable between 12V and 30V. I_{max} is 10A. Power rating is 240W.

At 24V the *powerMod* can deliver 10A continuously, i.e 240W. At 30V, the *powerMod* can still deliver 240W, however this equates to 8A continuous.

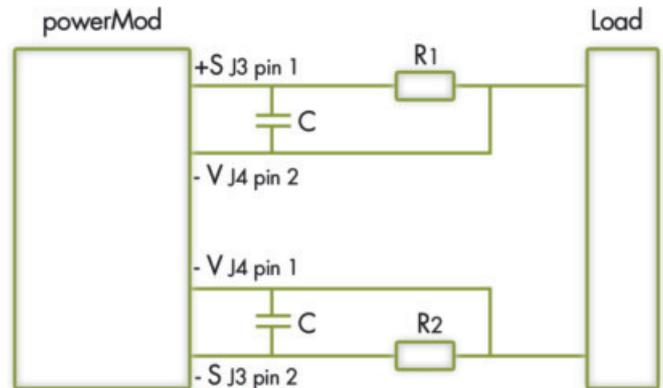
Remote Sense

To compensate for voltage drops in the output leads, use remote sensing. Remote sensing is available on all single output and on the first output (V1) of the dual output module.

Remote sensing may be implemented by connecting the Positive Sense pin (J3 pin1) to the positive side of the remote load and the Negative Sense pin (J3 pin2) to the negative side of the remote load. The maximum line drop, which can be compensated for by remote sensing, is 0.5V, subject to not exceeding the maximum module voltage at the output terminals.

Observe the following precautions when remote sensing:

1. Use separate twisted pairs for power and sense wiring.
2. Route the sensing leads to prevent pick up, which may appear as ripple on the output.
3. Never disconnect the output power rail with the sensing still connected to the load.



Remote Sense of Output Voltage

In certain applications where there is a high dynamic impedance along the power leads to the sensing point, remote sensing may cause system instability. This system problem can be overcome by using resistors in the sense leads (Positive sense lead: $R_1 = 100\text{ohm}$, Negative sense lead: $R_2 = 10\text{ohm}$), together with local AC sensing, by using 22uF capacitors between the remote sense pins and the output terminals.

The resistance of the power cables must be so that the voltage drop across the cables is less than 0.5V (to ensure remote sensing operates correctly).

$$R_{cable} < \frac{0.5}{I_{out}}$$

e.g. for an Xg2, 5V/40A. The R_{cable} must be less than 12.5mohms.

Measurement of Ripple & Noise

As with all switched mode power supplies, it is important to ensure that the correct method is used to verify ripple & noise. Care should be taken to ensure that a loop antenna is not formed by the tip and ground lead of the oscilloscope probe as this would lead to erroneous readings consisting mainly of pickup from remnant radiation in the vicinity of the output connectors. Excelsys recommends the use of a x1 probe with the ground sheath of the probe tip used for ground connection.

In some applications, further erroneous readings may result from CM currents. These can be reduced by looping a few turns of the scope lead through a suitable high permeability ferrite ring.

As most loads powered by a power supply will have at least small values of differential capacitors located near the load, Excelsys also recommends the use of small value of capacitance (approx 1uF) positioned at the point of measurement.

Minimising System Noise

There are a number of causes of poor system noise performance. Some of the more common causes are listed below.

- a. Insufficient de-coupling on the PCB or load.
- b. Faulty wiring connection or poor cable terminations.
- c. Poor system earthing.

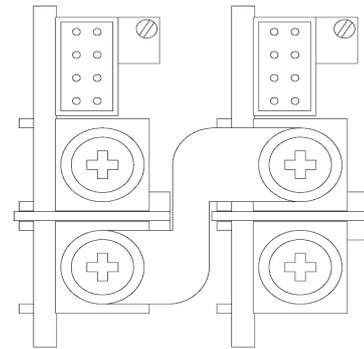
There are some simple steps to eliminate, reduce or identify the causes of high frequency noise,

- a. Is the noise conducted or radiated? If changing the position of the power supply or screening improves performance, the noise is likely to be radiated. See Section 4.14 EMC (Electro Magnetic Characteristics).
- b. Twist all pairs of power and sense cables separately.
- c. Ground connections (zero Volt) should be made with the shortest possible wiring via a capacitor to the nearest point on the chassis.

Series Connection of powerMod outputs

It is possible to connect modules in series to increase output voltage. Outputs are rated SELV (Safety Extra Low Voltage), that is, that output voltages are guaranteed to be less than 60, volts. Stacking output modules can exceed SELV, the user must take appropriate precautions. Series connected output voltage must not exceed 150VDC.

It is good practice to stack modules with similar output current limits, so that in case of short circuit the outputs collapse together.

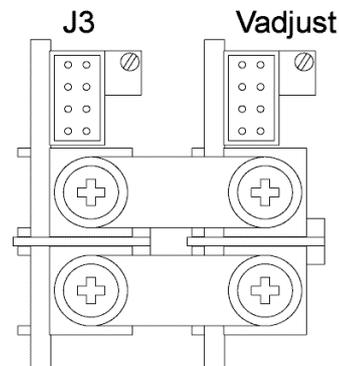


Series Connection of powerMods

If remote sensing is required, the exterior sense connections should connect to the load at point of use, and the interior connections to the local sense. Special links for series connection modules (part number XS1) to reduce wiring complexity can be specified and fitted by the installer or added at the factory.

Parallel Connection of powerMod outputs

powerMods may be paralleled to increase output current. Only powerMods of the same type may be paralleled and the installer should adjust the setting on each powerMod separately to the same value. i.e within 0.1% of the set voltage. Excelsys supplies special parallel link connection bars (part number XP1) for parallel connection to reduce wiring complexity. These can be fitted by the installer or added at the factory. When connecting powerMods in parallel, please observe the following steps.



Parallel Connection of powerMods

1. Attach the negative Parallel Link.
2. Ensure powerMod DIP switch on each powerMod is switched to Ishare ON.
3. Set the voltage of powerMod 1 to the correct output required.
4. Measure the voltage difference (dV) between the positive terminals of the powerMods and adjust powerMod to minimise dV (typically 5mV).
5. Attach the positive parallel link.

This ensures current sharing between paralleled modules and is the recommended mode for paralleling powerMods. Current sharing is proportional to the dV (difference between the voltage settings of the powerMods).

The percentage of current sharing is calculated as follows:

$$I_{share\ error\%} = \frac{10000dV}{1.5V_{max}} \quad (10)$$

Remote Sense can be implemented as with a single *powerMod*. Simply connect the sense pins of the paralleled *powerMods*. Bring the sense connections from one of the *powerMods* to the load.

For Remote Voltage Adjustment (via *Vtrim* pin) of *powerMods*, please contact factory.

powerMod Start-Up and Shutdown

powerMods are designed such that when input power is applied, all outputs rise to their set point voltage simultaneously. Likewise, when input power is removed all outputs commence to drop simultaneously and reach Zero potential simultaneously.

Outputs can be sequenced using the enable function in order to allow controlled start up if required.

See plots for start-up and shutdown characteristics.



Ch1 5.00V Bw Ch2 5.00V Bw M 1.00ms A Ch3 17.5V Ch3 5.00V

Output powerMod Start-Up



Ch1 5.00V Bw Ch2 5.00V Bw M 1.00ms A Ch3 17.5V Ch3 5.00V

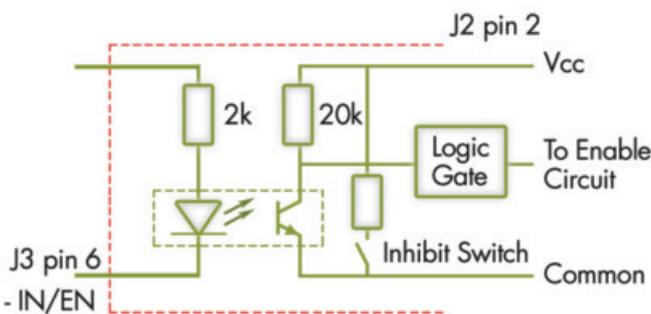
Output powerMod Shutdown

**Section 4.7
powerMod Signals**

powerMod Enable/Inhibit

Each *powerMod* may be enabled/inhibited by means of an appropriate signal applied to an opto-isolated input on pins J3 pin 5 (positive) and J3 pin 6 (negative), on *powerMods* Xg1 to Xg5. Inhibit is available by means of an appropriate signal applied to an opto-isolated input on J3 pin7 on Xg7, on J3 pin 3 and pin 7 on Xg8. The output voltage of the *powerMod* will be fully inhibited to 0V.

| | Xg1 to Xg5 | Xg7, Xg8 |
|------------------------------|------------|----------|
| Maximum signal input voltage | 12V | 0.8V |
| Minimum signal input voltage | 3V | 0V |
| Minimum current required is | 1.7mA | |



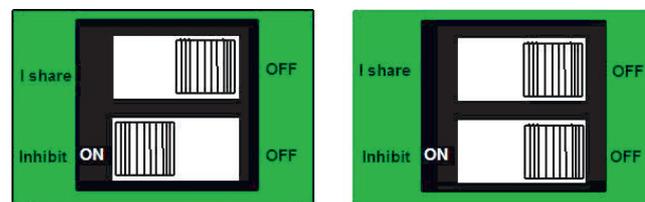
Remote Inhibit/Enable of Output

The *powerMod* can be configured to be NORMALLY ON or NORMALLY OFF by appropriate setting of the DIP switch on the *powerMod*. (note the default mode is NORMALLY ON).

INHIBIT ON/ENABLE OFF is the standard position. The *powerMod* will deliver output voltage when mains is applied (and *powerPac* is enabled). The *powerMod* requires an external signal to disable the output.

E.g. 5V applied between +IN/EN and -IN/EN pins will disable the *powerMod*, (bring output to 0V).

This may be changed to 'ENABLE' by setting of the DIP switch to the INHIBIT OFF/ENABLE ON position.



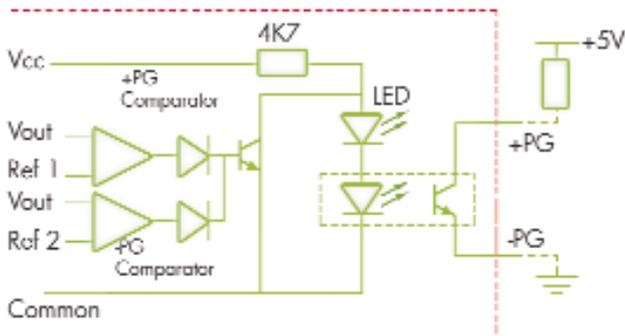
Inhibit ON/ENABLE OFF. Normally ON Inhibit OFF/ENABLE ON. Normally OFF

DIP Switch Setting on Output powerMods

DIP switches are only available on *powerMods* Xg1 to Xg5.

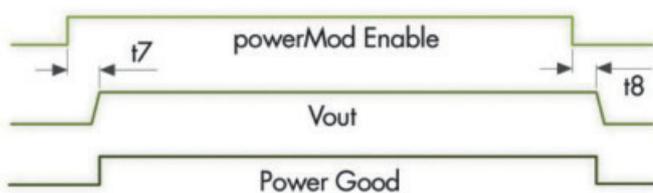
powerMod Power Good Signal

Each *powerMod* contains an internal comparator which monitors the output voltage and determines whether this voltage is within normal operation limits. When the output voltage is within normal limits, the Power Good signal is activated.



Output powerMods Power Good Signal

For Xg1-Xg5, an opto-isolated signal is generated and available on J3 pin 7 and J3 pin 8. (opto-transistor ON = Good).
 For Xg7, signal is available on J3 Pin 6 and J3 Pin5.
 For Xg8, V1 signal available on J3 Pin 6 and J3 Pin 5. V2 signal is available on J3 Pin 2 and J3 Pin 1.
 Maximum collector current is 2mA.
 Maximum Collector voltage is 30V.
 $T7 < 6ms$
 $T8 < 6ms$



Output powerMod Signals

powerMod LED Indicator

The LED indicator on each powerMod module gives a visual indication of the information contained in the Power Good signal above.

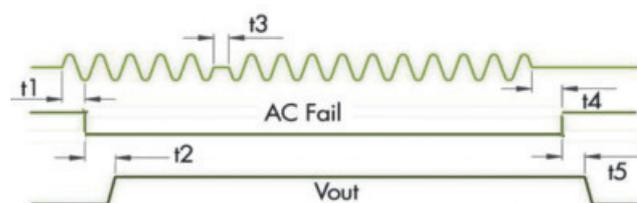
**Section 4.8
powerPac Operation**

The Xgen powerPac provides the front end input power to the Xgen powerMods. This is available in two package sizes and a number of power ratings. See Section 4.11, Power Ratings for more detail.

Bias Voltage

A SELV isolated bias (always on) voltage of 5V @ 250mA (30mA on XCE and XVE models) is provided on J2 pin 2 relative to J2 pin 1 (common) and may be used for miscellaneous control functions. 5V @ 500mA available on request.

For medical applications, this bias supply voltage has 4000VAC isolation.



Mains AC Fail Signal

AC Fail

AC Mains Fail signal is implemented by an Opto-isolated signal with a maximum sink current of 4mA. During normal operation the transistor is ON. When the input voltage is lost or goes below 80Vac, the opto-transistor is turned OFF at least 5mS before loss of output regulation (at nominal powerMod voltage or below).

- $80ms < t1 < 600ms$
- $80ms < t2 < 100ms, 400ms$ for XLD, XMD, XCE and XVE.
- $t3 = 10ms$
- $t4 > 10ms$
- $t5 > 2ms$

Global Inhibit

A global inhibit function may be implemented via simple contact closure as shown. This function inhibits ALL powerMod outputs except the auxiliary bias voltage. Global inhibit also shuts down the powerPac fans.

Global Enable

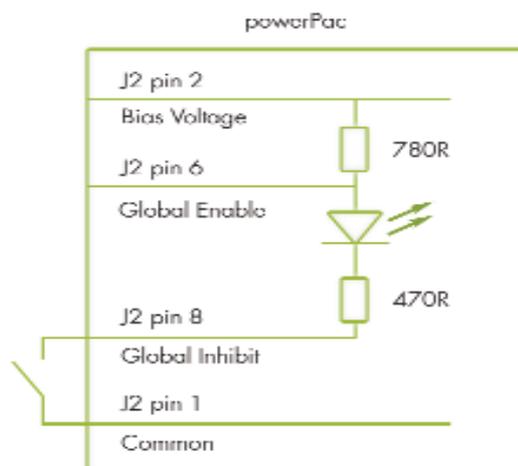
A global enable function may be implemented via simple contact closure as shown in the diagram. Ensure that J2 pin 8 and J2 pin 1 are connected prior to contact closure. This function enables ALL powerMod outputs and the powerPac fans. Refer to the diagram above and product datasheets for Turn-on Delay specifications.

Global Inhibit Using an External Signal

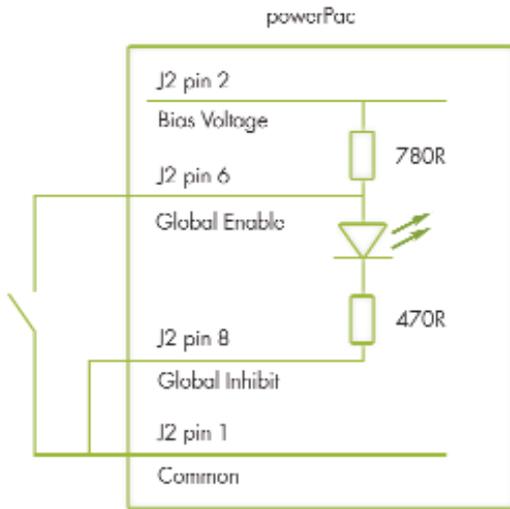
A global inhibit function may be implemented using a signal from the system using the diagram shown. This function inhibits ALL powerMod outputs. Global inhibit also shuts down the powerPac fans.

Global Enable Using an External Signal

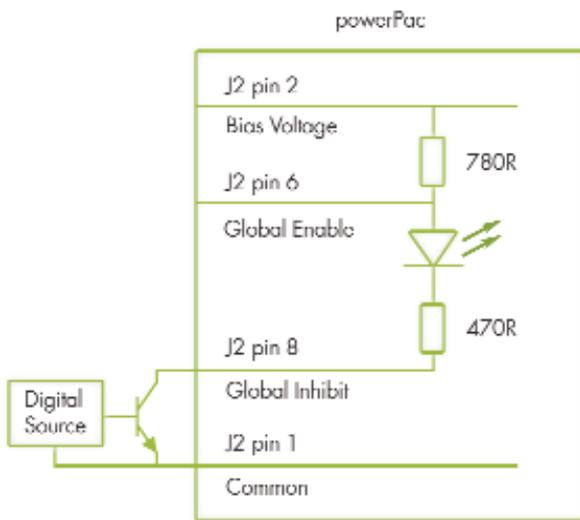
A global enable function may be implemented using a signal from the system using the diagram shown. This function enables ALL powerMod outputs. Refer to the diagram above and product datasheets for Turn-on Delay specifications.



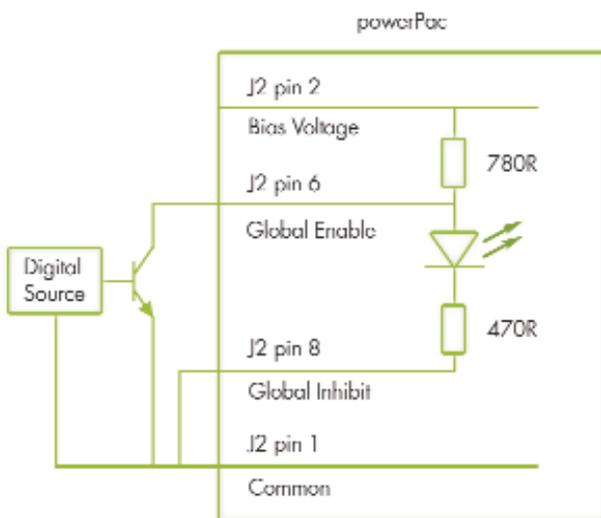
Global Inhibit Using Bias Supply Voltage



Global Enable Using Bias Supply Voltage



Global Inhibit Using an External Signal

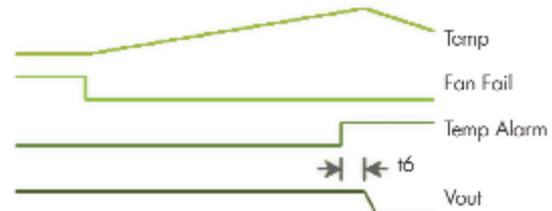


Global Enable Using an External Signal

Section 4.9 powerPac (Global) Signals

AC Fail

AC Mains Fail signal is implemented by an Opto-isolated signal with a maximum sink current of 4mA. During normal operation the transistor is ON. When the input voltage is lost or goes below 80Vac, the opto-transistor is turned OFF at least 5mS before loss of output regulation (at nominal powerMod voltage or below).



Over-temperature and Fan Fail

80ms < t1 < 600ms

80ms < t2 < 100ms, 400ms for XLD, XMD, XCE and XVE.

t3 = 10ms

t4 > 10ms

t5 > 2ms

Global Inhibit

A global inhibit function may be implemented via simple contact closure as shown. This function inhibits ALL powerMod outputs except the auxiliary bias voltage. Global inhibit also shuts down the powerPac fans.

Global Enable

A global enable function may be implemented via simple contact closure as shown in the diagram. Ensure that J2 pin 8 and J2 pin 1 are connected prior to contact closure. This function enables ALL powerMod outputs and the powerPac fans. Refer to the diagram above and product datasheets for Turn-on Delay specifications.

Global Inhibit Using an External Signal

A global inhibit function may be implemented using a signal from the system using the diagram shown. This function inhibits ALL powerMod outputs. Global inhibit also shuts down the powerPac fans.

Global Enable Using an External Signal

A global enable function may be implemented using a signal from the system using the diagram shown. This function enables ALL powerMod outputs. Refer to the diagram above and product datasheets for Turn-on Delay specifications.

Section 4.10 powerPac Options

Temperature Alarm (Option 01)

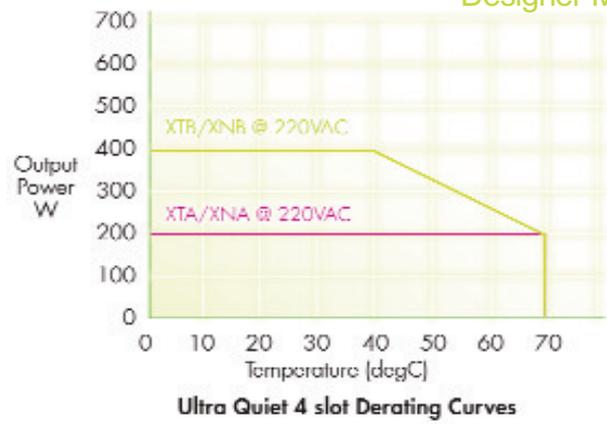
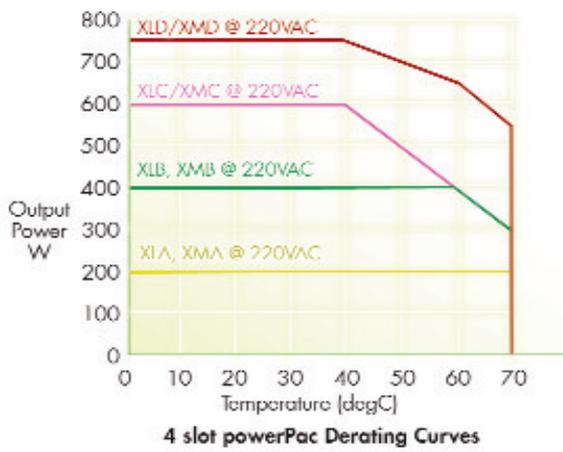
Open collector signal indicating that excessive temperature has been reached due to fan failure or operation beyond ratings. This signal is activated at least 10ms prior to system shutdown.

Fan Fail (Option 01)

Open collector signal indicating that at least one of the powerPac fans has failed. This does not cause power supply shutdown. The power supply will continue to operate until 10ms after the temperature alarm signal is generated.

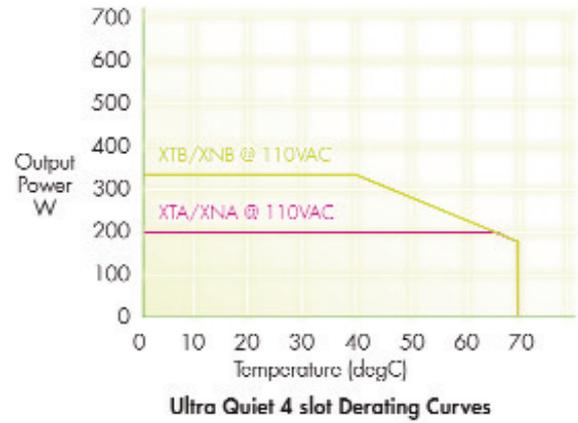
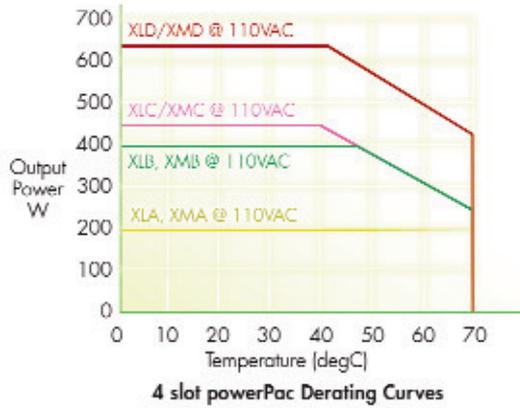
Reverse Fan (Option 02)

The Xgen series is available with reverse air flow direction. This is ideal to expel air from the system and works particularly well with the internal fan cooling built into the overall system. Contact



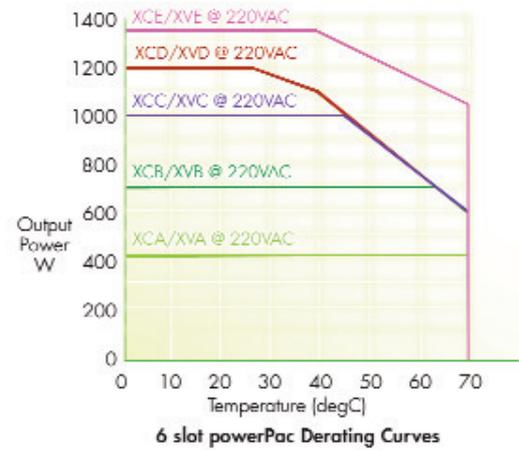
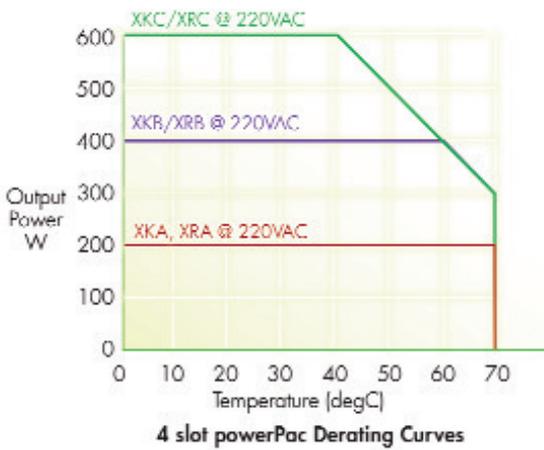
XLA/XLB/XLC/XLD and XMA/XMB/XMC/XMD @ 220VAC Derating

XTA/XTB and XNA/XNB @ 220VAC Derating



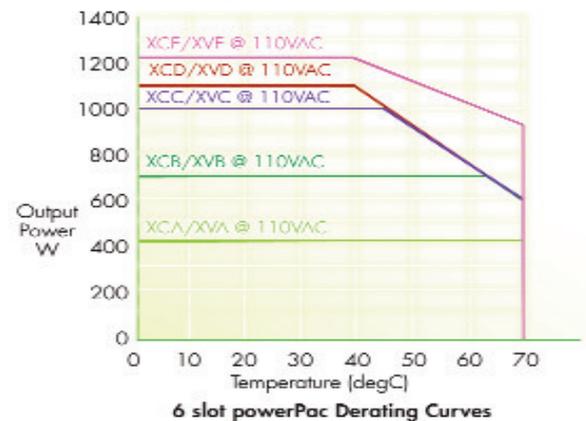
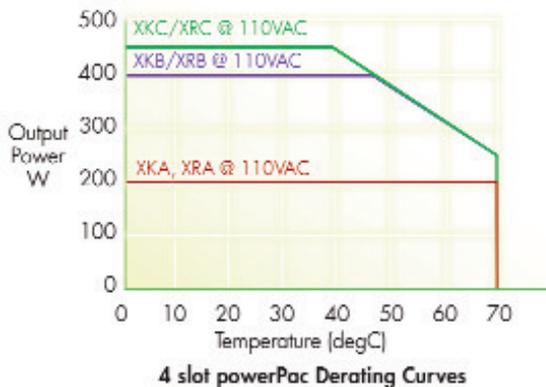
XLA/XLB/XLC/XLD and XMA/XMB/XMC/XMD @ 110VAC Derating

XTA/XTB and XNA/XNB @ 110VAC Derating



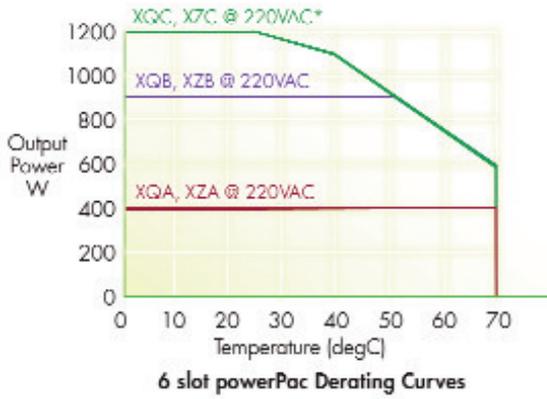
XKA/XKB/XKC and XRA/XRB/XRC @ 220VAC Derating

XCA/XCB/XCC/XCD/XCE and XVA/XVB/XVC/XVD/XVE Derating @ 220VAC Derating

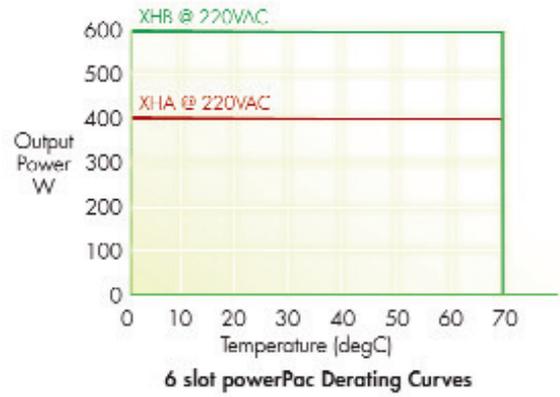


XKA/XKB/XKC and XRA/XRB/XRC @ 110VAC Derating

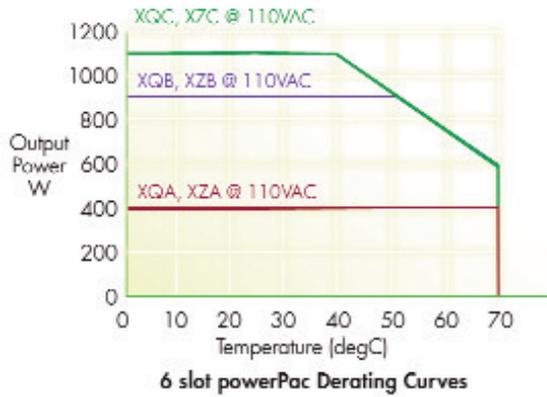
XCA/XCB/XCC/XCD/XCE and XVA/XVB/XVC/XVD/XVE Derating



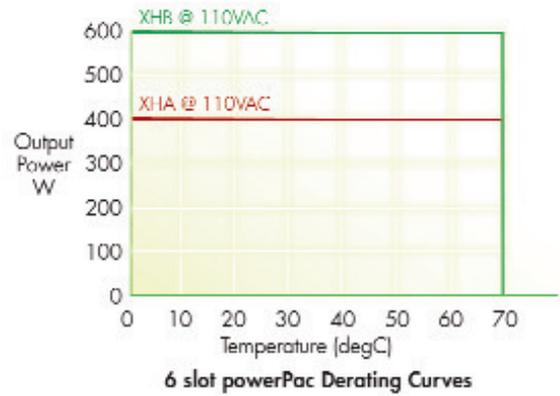
XQA/XQB/XQC and XZA/XZB/XZC @ 220VAC Derating



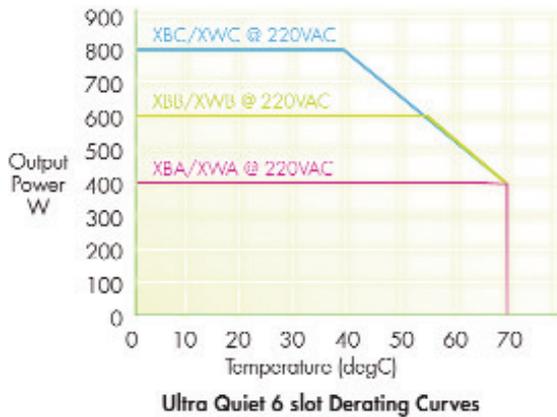
XHA/XHB @ 220VAC Derating



XQA/XQB/XQC and XZA/XZB/XZC @ 110VAC Derating



XHA/XHB @ 110VAC Derating



XBA/XBB/XBC and XWA/XWB/XWC @ 220VAC Derating

XCE and XVE powerPac considerations

1. XCE and XVE can deliver 1450W for a duration of 10s with an 8% duty cycle.
2. When 6 powerMods are operated in parallel, the XCE output power must be derated to 1280W.
3. At operation above 40°C, it is necessary to apply minimum load to the outputs. See table for minimum load requirements.

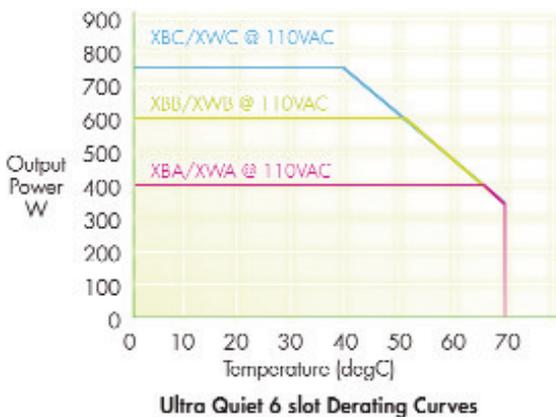
| T ambient (°C) | Min Load (W) |
|----------------|--------------|
| 40 | 0 |
| 50 | 100 |
| 60 | 175 |
| 70 | 250 |

XVC/XVE minimum load requirements

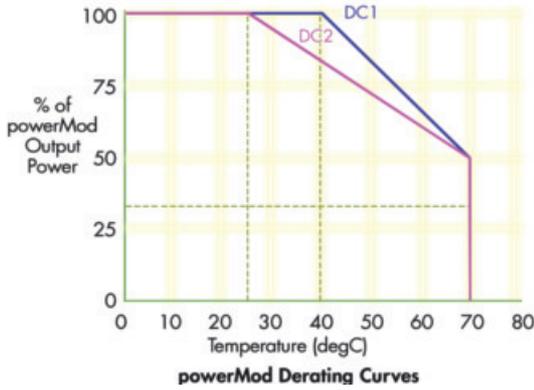
powerMod Derating

All powerMods may be used in any powerPac slot position. When used in different slot locations, the appropriate temperature derating curve must be observed as set out in the following tables. Derating is independent of Input voltage. Using the following derating curves will ensure that the Xgen is populated with powerMods in the best locations to optimise system performance.

| PowerMod | Max Power (W) | | |
|----------|--------------------------------------|----------|-----------------------|
| | All Models Except XH, XB, XW, XT, XN | Model XH | Models XB, XW, XT, XN |
| Xg1 | 125 | 65 | 104 |
| Xg2 | 200 | 100 | 166 |
| Xg3 | 240 | 120 | 200 |
| Xg4 | 240 | 120 | 200 |
| Xg5 | 288 | 144 | 240 |
| Xg7 | 120 | 60 | 100 |
| Xg8 | 72/72 | 36/36 | 60/60 |



XBA/XBB/XBC and XWA/XWB/XWC @ 110VAC Derating



powerMod Temperature Derating

| Product | Slot | Xg1 | Xg2 | Xg3 | Xg4 | Xg5 | Xg7 | Xg8 |
|---------|------|------|------|-----|-----|-----|-----|-----|
| 4 Slot | A | DC2 | DC2 | DC2 | DC1 | DC1 | DC1 | DC1 |
| | B | DC2* | DC2* | DC2 | DC1 | DC1 | DC1 | DC1 |
| | C | DC2 | DC2 | DC1 | DC1 | DC1 | DC1 | DC1 |
| | D | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 |
| 6 Slot | A | DC1 | DC2 | DC1 | DC1 | DC1 | DC1 | DC1 |
| | B | DC2* | DC2* | DC1 | DC1 | DC1 | DC2 | DC2 |
| | C | DC2 | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 |
| | D | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 |
| | E | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 |
| | F | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 |

* Device can deliver 95% of rated power at 25degC

powerMod Slot Position Derating

| Product | Slot | Xg1 | Xg2 | Xg3 | Xg4 | Xg5 | Xg7 | Xg8 |
|---------|------|-----|------|-----|-----|-----|-----|-----|
| 4 Slot | A | DC1 | DC2 | DC1 | DC1 | DC1 | DC1 | DC1 |
| | B | DC2 | DC2 | DC1 | DC1 | DC1 | DC1 | DC1 |
| | C | DC2 | DC2 | DC1 | DC1 | DC1 | DC1 | DC1 |
| | D | DC1 | DC2 | DC1 | DC1 | DC1 | DC1 | DC1 |
| 6 Slot | A | DC1 | DC2 | DC1 | DC1 | DC1 | DC1 | DC1 |
| | B | DC2 | DC2* | DC1 | DC1 | DC1 | DC1 | DC2 |
| | C | DC2 | DC2 | DC1 | DC1 | DC1 | DC1 | DC2 |
| | D | DC2 | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 |
| | E | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 |
| | F | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 | DC1 |

* Device can deliver 95% of rated power at 25degC

powerMod Slot Position Derating for Ultra Quiet XT/XN/XB/XW Series

Acoustic Noise

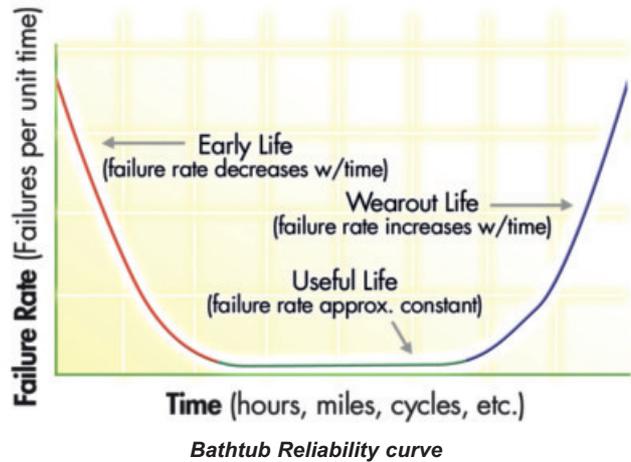
Xgen power supplies can be used in a wide variety of applications. Certain applications are more sensitive to audible noise than others. The table below sets out the measured

Acoustic Noise measurements of Xgen powerPacs

| powerPac | [dBA] | amb [dBA] |
|------------------------|-------|-----------|
| Standard XL, XM | 45.8 | 27.4 |
| Quiet Fan XK, XR | 39.8 | 27.5 |
| Ultra Low Noise XT, XN | 37.3 | 27.3 |
| XLD, XMD | 52.8 | 27.3 |

| powerPac | [dBA] | amb [dBA] |
|------------------------|-------|-----------|
| Standard XC, XV | 49.5 | 27.3 |
| Quiet Fan XQ, XZ | 42.7 | 27.5 |
| Ultra Low Noise XB, XW | 38.3 | 27.4 |
| XCE, XVE | 56.5 | 27.3 |

acoustic noise of the various versions of Xgen. All acoustic noise measurements have been conducted in an anechoic chamber at a distance of 1m. Please refer to the powerPac and powerMod derating curves in Section 4.11 when calculating the output power required by the system.



Section 4.12 Reliability

The 'bath-tub' curve shows how the failure rate of a power supply develops over time. It is made up of three separate stages. Immediately after production, some units fail due to defective components or production errors. To ensure that these early failures do not happen while in the possession of the user, Excelsys carries out a burn-in on each unit, designed to ensure that all these early failures are detected at Excelsys. After this period, the power supplies fail very rarely, and the failure rate during this period is fairly constant. The reciprocal of this failure rate is the MTBF (Mean Time Between Failures).

At some time, as the unit approaches its end of life, the first signs of wear appear and failures become more frequent. Generally 'lifetime' is defined as that time where the failure rate increases to five times the statistical rate from the flat portion of the curve.

In summary, the MTBF is a measurement of how many devices fail in a period of time (i.e. a measure of reliability), before signs of wear set in. On the other hand, the lifetime is the time after which the units fail due to wear appearing.

The MTBF may be calculated mathematically as follows:

MTBF = Total x t / Failure , where

Total is the total number of power supplies operated simultaneously.

Failure is the number of failures.

t is the observation period.

MTBF may be established in two ways, by actual statistics on the hours of operation of a large population of units, or by calculation from a known standard such as Telecordia SR-332 and MIL-HDBK-217 and its revisions.

Determining MTBF by Calculation

MTBF, when calculated in accordance with Telecordia, MIL-HDBK-217 and other reliability tables involves the summation of the failure rates of each individual component at its operating temperature.

The failure rate of each component is determined by multiplying a base failure rate for that component by its operating stress level.

The result is FPMH, the failure rate per million operating hours for that component.

Then FPMH for an assembly is simply the sum of the individual component FPMH.

Total FPMH = FPMH1 + FPMH2 + +FPMHn

$$MTBF \text{ (hours)} = \frac{1,000,000}{FPMH}$$

In this manner, MTBF can be calculated at any temperature. The Xgen series has the following failure rates at 40°C and full load, based on Telecordia SR-332 standard.

- powerMod* 0.958 failures per million hours
- 4slot *powerPac* 0.92 failures per million hours
- 6slot *powerPac* 0.946 failures per million hours

The figures for the *powerPac* excludes fans.

Example:
 What is the MTBF of XLB4400-00
 XLB FPMH = 0.92
 Xg4 FPMH = 0.958
 Total FPMH = 2.88
 MTBF = 347,000 hours at 40°C

MTBF and Temperature

Reliability and MTBF are highly dependent on operating temperature. The figures above are given at 40°C. For each 10°C decrease, the MTBF increases by a factor of approximately 2. Conversely, however, for each 10°C increase, the MTBF reduces by a similar factor. Therefore, when comparing manufacturer's quoted MTBF figures, look at the temperature information provided.

**Section 4.13
 Safety Approvals**

Low Voltage Directive (LVD) 2006/95/EC

The LVD applies to equipment with an AC input voltage of between 50V and 1000V or a DC input voltage between 75V and 1500V. The Xgen series is CE marked to show compliance with the LVD.

The relevant European standard for XC, XL, XH, XK, XT, XB and XQ models is EN60950 (Information technology). The 2nd Edition of this standard is now published and all relevant Excelsys power supplies are certified to the latest edition as well as the 1st Edition.

The relevant European standard for XV, XM, XR, XZ, XN and XW medical models is EN60601-1 (Medical Devices Directive). The 3rd Edition of this standard is published and all Excelsys medically approved power supplies are certified to this latest edition as well as the 2nd Edition. With appropriate packaging, the Xgen can also meet the requirements of EN61010-1 for industrial scientific measuring equipment and process control.

XC, XL, XH, XK, XT, XB and XQ models are certified to comply with the requirements of IEC950, EN60950, UL60950 (1st and 2nd Editions), and CSA 22.2 no. 234 and IEC1010, when correctly installed in a limited access environment.

The XV, XM, XR, XZ, XN and XW models are certified to comply

with the requirements of IEC601-1, EN60601-1, UL60601-1 (2nd and 3rd Editions) and CSA601-1, for non-patient connect applications.

powerMods Xg2, Xg3, Xg4 and Xg5 are capable of providing hazardous energy levels (>240 VA). Equipment manufacturers must provide adequate protection to service personnel.

Environmental Parameters

The Xgen series is designed for the following parameters:
 Material Group IIIb, Pollution Degree 2
 Installation Category 2
 Class I
 Indoor use (installed, accessible to Service Engineers only).
 Altitude: -155 metres to +2000 metres from sea level.
 Humidity: 5 to 95% non-condensing.
 Operating temperature -20°C to 70°C
 Derate to 70°C. See *powerPac* Derating for details.

Approval Limitations

Use in North America

When this product is used on 180 to 253 Volts AC mains with no neutral, connect the two live wires to L (live) and N (neutral) terminals on the input connector.

Standard

Creepage Distances XC, XL, XH, XK, XQ, XT, XB models
 Primary mains circuits to earth: 2.5mm spacing
 Primary mains circuits to secondary: 5mm spacing

Dielectric strength XC, XL, XH, XK, XQ, XT, XB models
 Primary mains circuits to chassis: 1500VAC
 Primary mains circuits to secondary: 3000VAC

Medical

Creepage Distances XV, XM, XR, XZ, XN, XW models
 Primary mains circuits to earth: 4mm spacing
 Primary mains circuits to secondary: 8mm spacing

Dielectric strength XV, XM, XR, XZ, XN, XW models
 Primary mains circuits to chassis: 1500VAC
 Primary mains circuits to secondary: 4000VAC

The primary to secondary test is not possible with modules fitted to the unit, as damage to the EMI capacitors will occur.

Output Isolation

Outputs are each isolated 500V DC to each other and 500 V DC to chassis.

**Section 4.14
 Electro Magnetic Characteristics**

EMC Directive 2004/108/EC

Component Power Supplies such as the Xgen series are not covered by the EMC directive. It is not possible for any power supply manufacturer to guarantee conformity of the final product to the EMC directive, since performance is critically dependent on the final system configuration. System compliance with the EMC directive is facilitated by Xgen compliance with several of the requirements as outlined in the following paragraphs. Although the Xgen product series meet these requirements, the CE mark does not cover this area.

EMISSIONS

Power Factor (Harmonic) Correction

The Xgen series incorporates active power factor correction and therefore meets the requirements of EN61000-3-2. Power factor: 0.98

EN61000-3-3 Flicker & Voltage Fluctuation Limits

Xgen power supplies meet the requirements of the limits on voltage fluctuations and flicker in low voltage supply systems.

EN55022 Class B Conducted Emissions

Under appropriate test conditions, the Xgen series meets the requirements of EN55022 Class B, without the need for external filtering.

IMMUNITY

The Xgen series has been designed to meet, and tested to, the immunity specifications outlined below:

EN61000-4-2 Electrostatic Discharge Immunity

8kV Air discharge applied to Enclosure
6kV Contact with Enclosure

EN61000-4-3 Radiated Electromagnetic Field

10Volts/metre 80MHz to 2.5GHz applied to Enclosure

EN61000-4-4 Fast Transients-Burst Immunity

+/-2kV

EN61000-4-5 Input Surge Immunity

+/-2kV Common Mode 1.2/50 S (Voltage); 8/20uS (Current)
+/- 1kV Differential Mode 1.2/50 S (Voltage) 8/20 S (Current)

EN61000-4-6 Conducted Immunity

10 V/m 150KHz to 80MHz

EN61000-4-11 Voltage Dips

| | | |
|-----|-------|------------|
| 0% | 1s | Criteria B |
| 40% | 100ms | Criteria B |
| 70% | 10ms | Criteria A |

Further details on all tests are available from Excelsys.

Guidelines for Optimum EMC Performance

The Xgen series is designed to comply with European Normative limits (EN) for conducted and radiated emissions and immunity when correctly installed in a system. See performance levels attained above. However, power supply compliance with these limits is not a guarantee of system compliance. System EMC performance can be impacted by a number and combination items. Design consideration such as PCB layout and tracking, cabling arrangements and orientation of the power supply amongst others all directly contribute to the EMC performance of a system.

Cabling arrangements and PCB tracking layouts are the greatest contributing factors to system EMC performance. It is important that PCB tracks and power cables are arranged to minimise current carrying loops that can radiate, and to minimise loops that could have noise currents induced into them. All cables and PCB tracks should be treated as radiation sources and antenna and every effort should be made to minimise their interaction

- Keep all cable lengths as short as possible.
- Minimise the area of power carrying loops to minimise radiation, by using twisted pairs of power cables with the maximum twist possible.
- Run PCB power tracks back to back.
- Minimise noise current induced in signal carrying lines, by twisted pairs for sense cables with the maximum twist possible.
- Do not combine power and sense cables in the same harness

- Ensure good system grounding. System Earth should be a "starpoint". Input earth of the equipment should be directed to the "starpoint" as soon as possible. The power supply earth should be connected directly to the "starpoint". All other earths should go to the "starpoint".

TECHNICAL RESOURCES



CONSULT AN ENGINEER

Our experienced applications engineering team are ready to provide design consultancy support including product recommendations to deliver optimal systems performance, and most importantly reduced time to market. We are committed to providing you with the highest performing, most reliable power solution ensuring the lowest total cost of ownership for you.

To contact one of our team please e-mail support@excelsys.com or telephone:

North America and Canada: +1 972 771 4544

Europe and Asia: +353 21 4354716



ONLINE RESOURCES

Our website www.excelsys.com hosts a wide range of easily accessible resources to support your power supply decision making. This includes:

- **Application Notes:** Supporting system designers in the integration of the Excelsys power supplies into their system.
- **Safety and Environmental Certification:** All our power supplies carry full international safety agency approvals including UL and EN for information technology and medical power supplies. To ease the system safety approvals we have provided our UL and CB certificates and we have also included our declarations of conformity. All Excelsys power supplies are REACH and RoHS compliant. Visit our Safety and Environmental section online where you can download our UL and CB safety certifications, and declarations of conformity to simplify system compliance.

- **EMI Characterisation:** Excelsys power supplies are component power supplies and as such are not subject to the EMC directive for EMI, however in order to ease system integration, Excelsys Technologies has carried out extensive EMI characterization of our products against the relevant standards.
- **HALT (Highly Accelerated Life Testing):** Poor reliability, low MTBF, frequent field returns, high in-warranty costs and customer dissatisfaction are often the result of design and/or process weaknesses, even if a product has successfully passed qualification tests and burn-in. Excelsys Technologies subjects all our products to the HALT (Highly Accelerated Life Testing) process to uncover design and/or process weaknesses. During the HALT process, the product is subjected to progressively higher stress levels brought on by thermal dwells, vibration, rapid temperature transitions and combined environments.
- **White Papers:** Excelsys team of experienced power supply designers have an extensive knowledge of power supplies, technology and the challenges facing system designers. In conjunction with the Xgen Designers' Manual, and Application Notes, we also prepare White Papers on topics that are relevant to system designers.
- **Designers' Manual:** The Xgen Designers' Manual has been prepared to assist engineers and technicians in understanding correct design practices necessary to achieve the maximum versatility and performance from any of the Xgen family of products. Whatever your application, be it industrial electronics, medical equipment, automation equipment etc., the Xgen Designers' Manual provides the system designer with easy to implement integration instructions. The Designers' Manual is available in Section 4 of this catalogue or you can download it from the Excelsys website.
- **Datasheets:** There is an Xgen for every application. All data sheets can be viewed in Section 2 of this catalogue or downloaded online.

Design your own Power Supply with our Xgen Configurator

Whatever your power supply needs, Excelsys has a solution for you! Design your power supply using our Online Configurator. Simply input your volts and amps requirements, and we will do the rest. The Online Configurator will configure a power supply to meet your exact power requirements and it's available to ship immediately from our stocking distributors or can be ordered from our Online Shop.



MEDICAL

Xgen Product Selector

The Xgen series of user configurable power supplies with its unique plug and play architecture allows system designers to define and build 'instant' custom power solutions with industry leading 17W/in³ power density and up to 90% efficiency.

Xgen powerPacs

The application specific 4 slot and 6 slot *powerPacs* provide up to 12 isolated DC outputs from 200W up to 1340W. The table below summarises the *powerPacs* by application and power level. Please refer to the specific product datasheets for full specifications.

| Application | Slots | 200W | 400W | 600W | 700W | 750W | 800W | 900W | 1000W | 1200W | 1340W |
|----------------------|--------|------|------|------|------|------|------|------|-------|-------|-------|
| Standard | 4 Slot | XLA | XLB | XLC | | XLD | | | | | |
| | 6 Slot | | XCA | | XCB | | | XCC | XCD | XCE | |
| Medical | 4 Slot | XMA | XMB | XMC | | XMD | | | | | |
| | 6 Slot | | XVA | | XVB | | | XVC | XVD | XVE | |
| Low Noise Standard | 4 Slot | XKA | XKB | XKC | | | | | | | |
| | 6 Slot | | XQA | | | | | XQB | XQC | | |
| Low Noise Medical | 4 Slot | XRA | XRB | XRC | | | | | | | |
| | 6 Slot | | XZA | | | | | XZB | XZC | | |
| Ultra Quiet Standard | 4 Slot | XTA | XTB | | | | | | | | |
| | 6 Slot | | XBA | XBB | | | XBC | | | | |
| Ultra Quiet Medical | 4 Slot | XNA | XNB | | | | | | | | |
| | 6 Slot | | XWA | XWB | | | XWC | | | | |
| Hi-Temp | 6 Slot | | XHA | XHB | | | | | | | |

Xgen powerMods

High Efficiency Plug and Play DC output modules to provide a wide range of DC output voltages from 1.0V up to 58.0V

| MODEL | Vmin | | Vnom | Vmax | Imax | Watts |
|--------|-------|------|------|------|------|-------|
| | Vtrim | Vpot | | | | |
| Xg1 | 1.0 | 1.5 | 2.5 | 3.6 | 50A | 125W |
| Xg2 | 1.5 | 3.2 | 5.0 | 6.0 | 40A | 200W |
| Xg3 | 4.0 | 6.0 | 12.0 | 15.0 | 20A | 240W |
| Xg4 | 8.0 | 12.0 | 24.0 | 30.0 | 10A | 240W |
| Xg5 | 8.0 | 24.0 | 48.0 | 58.0 | 6A | 288W |
| Xg7 | | 5.0 | 24.0 | 28.0 | 5A | 120W |
| Xg8 v1 | | 5.0 | 24.0 | 28.0 | 3A | 72W |
| | v2 | | 5.0 | 24.0 | 3A | 72W |



Standard Xgen product options include: Conformal Coating, Low Acoustic Noise, Low Leakage Current, Extra Ruggedisation, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See Section 4.10 for more information.

Xgen Product Selector

Technical Resources

Application Notes: Supporting system designers in the integration of the Xgen power supplies into their system. Support functions include:

Safety and Environmental Certification: All our power supplies carry full international safety agency approvals including UL and EN for information technology and medical power supplies. To ease the system safety approvals we have provided our UL and CB certificates and we have also included our declarations of conformity. Visit our Safety and Environmental section online where you can download our UL and CB safety certifications, and declarations of conformity to simplify system compliance.

EMI Characterisation: Excelsys power supplies are component power supplies, and as such are not subject to the EMC directive for EMI, however in order to ease system integration, Excelsys Technologies has carried out extensive EMI characterization of our products against the relevant standards.

HALT (Highly Accelerated Life Testing): Poor reliability, low MTBF, frequent field returns, high in-warranty costs, and customer dissatisfaction are often the result of design weaknesses. Excelsys Technologies subjects all our products to the HALT (Highly Accelerated Life Testing) process to uncover design and/or process weaknesses. During the HALT process, the product is subjected to progressively higher stress levels brought on by thermal dwells, vibration, rapid temperature transitions and combined environments. These stimuli are well beyond the expected operating field environments

The Xgen series of user configurable power supplies is the most flexible power supply in the world. By combining the Xgen input front-ends (powerPacs) with slide-in output DC output modules (powerMods) you can create a custom power supply. The plug and play architecture allows system designers to define and build 'instant' custom power supplies. Leading 17W/in³ power density and up to 90% efficiency.

Xgen powerPacs

The application specific 4 slot and 6 slot powerpacs provide up to 12 isolated DC outputs from 200W to 900W. This table summarises the powerPacs by application and power level. Please refer to the specific product data sheets for more details.

| Application | Slots | 200W | 400W | 600W | 700W | 750W | 800W | 900W |
|----------------------|--------|------|------|------|------|------|------|------|
| Standard | 4 Slot | XLA | XLB | XLC | XLD | | | |
| | 6 Slot | | XCA | XCB | | | | |
| Medical | 4 Slot | XMA | XMB | XMC | | XMD | | |
| | 6 Slot | | XVA | | XVB | | | |
| Low Noise Standard | 4 Slot | XKA | XKB | XKC | | | | |
| | 6 Slot | | | XQA | | | | XQB |
| Low Noise Medical | 4 Slot | XRA | XRB | XRC | | | | |
| | 6 Slot | | | ZXA | | | | XZB |
| Ultra Quiet Standard | 4 Slot | XTA | XTB | | | | | |
| | 6 Slot | | XBA | XBB | | | XBC | |
| Ultra Quiet Medical | 4 Slot | XNA | XNB | | | | | |
| | 6 Slot | | XWA | XWB | | | XWC | |
| Hi-Temp | 6 Slot | | XHA | XHB | | | | |

Xgen powerMods

High Efficiency Plug and Play DC output modules to provide a wide range of DC output voltages for your system.

| MODEL | Vmin | Vnom | Vmax | I _{max} | I _{min} | Type | Watts |
|-------|------|------|------|------------------|------------------|------|-------|
| Xg1 | 1.0 | 2.5 | 3.6 | 50A | 0A | A | 125W |
| Xg2 | 1.5 | 5.0 | 6.0 | 40A | 0A | A | 200W |
| Xg3 | 4.0 | 12.0 | 15.0 | 20A | 0A | A | 240W |
| Xg4 | 8.0 | 24.0 | 30.0 | 10A | 0A | A | 240W |
| Xg5 | 8.0 | 48.0 | 58.0 | 6A | 0A | A | 288W |
| Xg7 | 5.0 | 24.0 | 30.0 | 5A | 0A | A | 120W |
| Xg8 | V1 | 5.0 | 24.0 | 28.0 | 3A | 0A | 72W |
| | V2 | 5.0 | 24.0 | 28.0 | 3A | 0A | 72W |

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Standard Xgen product options include: Conformal Coating, Low Acoustic noise, Low Leakage Current, Connector, Cabling & Mounting options, Thermal Signals and Reverse Fans. See section 4.10 for more details.

| MODEL | Vmin | Vnom | Vmax | I _{max} | I _{min} | Type | Watts |
|-------|------|------|------|------------------|------------------|------|-------|
| Xg1 | 1.0 | 2.5 | 3.6 | 50A | 0A | A | 125W |
| Xg2 | 1.5 | 5.0 | 6.0 | 40A | 0A | A | 200W |
| Xg3 | 4.0 | 12.0 | 15.0 | 20A | 0A | A | 240W |
| Xg4 | 8.0 | 24.0 | 30.0 | 10A | 0A | A | 240W |
| Xg5 | 8.0 | 48.0 | 58.0 | 6A | 0A | A | 288W |
| Xg7 | 5.0 | 24.0 | 30.0 | 5A | 0A | A | 120W |
| Xg8 | V1 | 5.0 | 24.0 | 28.0 | 3A | 0A | 72W |
| | V2 | 5.0 | 24.0 | 28.0 | 3A | 0A | 72W |

Excelsys Technologies
519 Interstate 30, #309
Rockwall
TX 75087
USA

t: +1 972 771 4544
f: +1 972 421 1805