

EXCELSYS ULTIMOD SERIES

UNIQUE IN FLEXIBILITY, UNRIVALLED IN PERFORMANCE,
ULTRA-COST COMPETITIVE



Advanced Energy's UltiMod series, part of our Excelsys product line, brings modular power supplies to a new paradigm, combining technical excellence with logistics simplicity to exceed the most demanding requirements from any industry. The UltiMod range of power supplies offers unrivalled performance and demonstrates our global leadership in product reliability, efficiency and cost competitiveness. The UX4 delivers up to 600 W and can be populated with up to four powerMods, and the UX6 delivers up to 1200 W and can be populated with up to 6 powerMods.

PRODUCT HIGHLIGHTS

- Highest efficiency — up to 91%
- User and field configurable
- Standard medical features
 - Leakage current < 300 μ A (< 150 μ A optional)
 - 2 MOPP
 - 4 KV Isolation
- Lowest acoustic noise
- -40°C startup temperature
- Extra ruggedized optional
 - Vibration: MIL-STD-810G
- No minimum load
- Extra-low profile < 1U height
- All outputs fully floating
- Series/parallel of multiple outputs
- 5 V isolated standby voltage
- Active PFC (Power Factor Correction)
- Product options: Conformal coating, low leakage current, connector, cabling and mounting options, and reverse fans additional ruggedization

TYPICAL APPLICATIONS

- Medical**
- Clinical diagnostic and dialysis equipment, medical lasers, radiological imaging, clinical chemistry
- Industrial**
- Test and measurement, industrial machines, automation and audio equipment, printing, telecommunications

AT A GLANCE

| | UX4 | UX6 |
|--------------|-------|--------|
| Power | 600 W | 1200 W |
| Slots | 4 | 6 |

Certifications

Medical

- UL/EN60601-1 3rd edition
- UL/EN60601-1-2 4th edition (EMC)

Industrial

- UL/EN60950 2nd edition
- IEC62368-1 2nd edition

ELECTRICAL SPECIFICATIONS

| powerMods | | | | | | | |
|-----------|----------|------------------------|--------------------------|----------------------|-----------|--------------|------------|
| Model | Vnom (V) | Set Point Adjust Range | Dynamic Vtrim Range (v) | I _{max} (A) | Power (W) | Remote Sense | Power Good |
| XgA | 12.0 | 10.8-15.6 | — | 12.5 | 150 | — | — |
| XgB | 24.0 | 19.2-26.4 | — | 8.3 | 200 | — | — |
| XgC | 36.0 | 28.8-39.6 | — | 5.6 | 200 | — | — |
| XgD | 48.0 | 38.5-50.4 | — | 4.2 | 200 | — | — |
| XgE/Xg7 | 24.0 | 5.0-28.0 | — | 5.0 | 120 | — | — |
| XgF/Xg8 | 24.0 | 5.0-28.0 | — | 3.0 | 72 | — | Yes |
| | 24.0 | 5.0-28.0 | — | 3.0 | 72 | — | Yes |
| XgG | 2.5 | 1.5-3.6 | 1.15-3.6 | 40.0 | 100 | Yes | Yes |
| XgH | 5.0 | 3.2-6.0 | 1.5-6.0 | 36.0 | 180 | Yes | Yes |
| XgJ | 12.0 | 6.0-15.0 | 4.0-15.0 | 18.3 | 220 | Yes | Yes |
| XgK | 24.0 | 12.0-30.0 | 8.0-30.0 | 9.2 | 220 | Yes | Yes |
| XgL | 48.0 | 28.0-58.0 | 8.0-58.0 | 5.0 | 240 | Yes | Yes |
| Xg1 | 2.5 | 1.5-3.6 | 1.15-3.6 | 50.0 | 125 | Yes | Yes |
| Xg2 | 5.0 | 3.2-6.0 | 1.5-6.0 | 40.0 | 200 | Yes | Yes |
| Xg3 | 12.0 | 6.0-15.0 | 4.0-15.0 | 20.0 | 240 | Yes | Yes |
| Xg4 | 24.0 | 12.0-30.0 | 8.0-30.0 | 10.0 | 240 | Yes | Yes |
| Xg5 | 48.0 | 28.0-58.0 | 8.0-58.0 | 6.0 | 288 | Yes | Yes |
| XgM | 5.0 | 3.2-6.0 | 1.0-6.0 | 40.0 | 200 | Yes | Yes |
| XgN | 12.0 | 6.0-15.0 | 1.0-15.0 | 20.0 | 240 | Yes | Yes |
| XgP | 24.0 | 12.0-30.0 | 1.0-30.0 ¹ | 10.0 | 240 | Yes | Yes |
| XgQ | 48.0 | 24.0-58.0 | 1.0 to 58.0 ² | 6.0 | 288 | Yes | Yes |
| XgR | 24.0 | 12.0-30.0 | 8.0-30.0 | 10.0 | 240 | — | Yes |
| XgT | 48.0 | 28.0-58.0 | 8.0-58.0 | 6.0 | 288 | — | Yes |

| Input | | | | | | |
|----------------------|---------------------------|------|----------|-------|-------|--|
| Parameter | Conditions/Description | Min | Nom | Max | Units | |
| Input Voltage Range | Universal Input 47-440 Hz | 85 | — | 264 | VAC | |
| | | 120 | — | 380 | VDC | |
| Power Rating | UX4: See derating curves | — | 600 | — | W | |
| | UX6: See derating curves | — | 1200 | — | W | |
| Input Current | UX4 | — | 7.5 | — | A | |
| | UX6 | — | 11.5 | — | — | |
| Inrush Current | 230 VAC @ 25°C UX6/UX4 | — | — | 25/50 | A | |
| Undervoltage Lockout | Shutdown | 65 | — | 74 | VAC | |
| Power Factor | 110 VAC @ full load | 0.98 | 0.99 | — | — | |
| Fusing | UX4 | — | F8A HRC | — | — | |
| | UX6 | — | F12A HRC | — | — | |

ELECTRICAL SPECIFICATIONS (CONTINUED)

| Output | | | | | |
|---------------------------|--|---------|-----|------|-------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| powerMod Power | As per powerMod table | — | — | — | — |
| Output Adjustment Range | Manual: Multi-turn potentiometer. As per powerMod table. Dynamic: As per powerMod table | — | — | — | — |
| Minimum Load | | — | 0 | — | A |
| Load and Cross Regulation | For 25% to 75% load change | — | — | ±0.2 | % |
| Transient Response | For 25% to 75% load change: Voltage deviation; XgA-XgD | — | — | 2.5 | µs |
| | Settling time: XgA-XgD | — | — | 500 | % |
| | Voltage deviation: XgE-XgL, Xg1-Xg8 | — | — | 10 | µs |
| | Settling time: XgE-XgL | — | — | 250 | — |
| Ripple and Noise | 20 MHz 100 mV or 1.0% pk-pk (except 150 mV XgA) | — | — | — | % |
| Overshoot Protection | Latching | 105 | — | 170 | % |
| Overcurrent Protection | Straight line with hiccup activation at < 30% of Vnom. | 105 | — | 170 | % |
| Line Regulation | For ±10% change from nominal line | — | — | ±0.1 | VDC |
| Remote Sense | Max. line drop compensation (except XgA, B, C, D, E, F) | — | — | 0.5 | % |
| Overshoot | | — | — | 2 | ms |
| Rise Time | Monotonic | — | 15 | — | ms |
| Turn-On Delay | From AC in and global enable | — | 700 | — | ms |
| | powerMod enable | — | 2 | — | ms |
| Hold-Up Time | For nominal output voltages at full load | 15 | — | 20 | VDC |
| Output Isolation | Output to output/output to chassis | 500/500 | — | — | — |

| General | | | | | |
|-------------------------|--|------|-----|-------|--------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Isolation Voltage | Input to output; contact Advanced Energy for Hi-Pot instructions | 4000 | — | — | VAC |
| | Input to chassis | 1500 | — | — | VAC |
| Efficiency | 230 VAC, 1200 W @ 24 V | — | 90 | 91 | % |
| Safety Agency Approvals | EN60601-1 3rd Edition, UL60601-1, CSA601, UL File No. E230761 | — | — | — | — |
| | EN60950 2nd Edition, CSA C22.2 No. 60950-1, UL File No. E181875 | — | — | — | — |
| | IE62368-1 2nd Edition | — | — | — | — |
| Leakage Current | 250 VAC, 60 Hz, 25°C | — | — | 300 | µA |
| | 250 VAC, 60 Hz, 25°C (Option 04) | — | — | 150 | µA |
| Weight | See weight calculators on Advanced Energy website | — | — | — | — |
| Signals | See section 4.9 of catalog | — | — | — | — |
| Bias Supply | Always on, current 500 mA | 4.8 | 5 | 5.2 | VDC |
| Reliability | Telcordia SR-332 at 40°C and full load powerMod | — | — | 0.959 | fpmh |
| | Telcordia SR-332 at 40°C and full load powerPac (excludes Fans) | — | — | 0.95 | fpmh |
| MTBF | UX4 with two XgA's @ full load. Telcordia SR-332, Issue 1 May 2001, ground benign, ambient temperature of 40°C | 670 | — | — | kHours |

ELECTRICAL SPECIFICATIONS (CONTINUED)

| EMC | | | | | |
|-------------------------|---|-----------|-----------|---|---|
| Parameter | Conditions/Description | Criteria | | | |
| Emissions | | | | | |
| Conducted | EN55011, EN55022, FCC | Class B* | | | |
| Radiated | EN55011, EN55022, FCC | Class 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 ¹ | — | Compliant | — | — |

| Environmental | | | | | |
|-----------------------|---|-----|-----------|-----|-------|
| Parameter | Conditions/Description | Min | Nom | Max | Units |
| Operating Temperature | Operates to specification below -20°C after 10 min warmup | -40 | — | 70 | °C |
| Storage Temperature | | -40 | — | 85 | °C |
| Derating | See page 6 and 7 for full temperature deratings | — | — | — | — |
| Relative Humidity | Non-condensing | 5 | — | 95 | %RH |
| Acoustic Noise | Measured from distance of 1m; UX4/UX6. See page 58 of catalog | — | 39.8/42.7 | — | dBA |
| Shock | | 60 | — | — | G |
| Vibration | MIL-STD 810G | — | — | — | — |
| Altitude | Operational: 2000 m, Storage: 8000 m | — | — | — | — |

¹ SEMI F47 compliant at input voltages > 160 VAC. Consult Advanced Energy for details.

² Visit www.advancedenergy.com for configuration, ordering and contact information.

³ Product is not UL/EN certified for 120-380VDC input operation. Consult Advanced Energy for details.

* See designer's manual and product catalog for more information on Class B compliance.

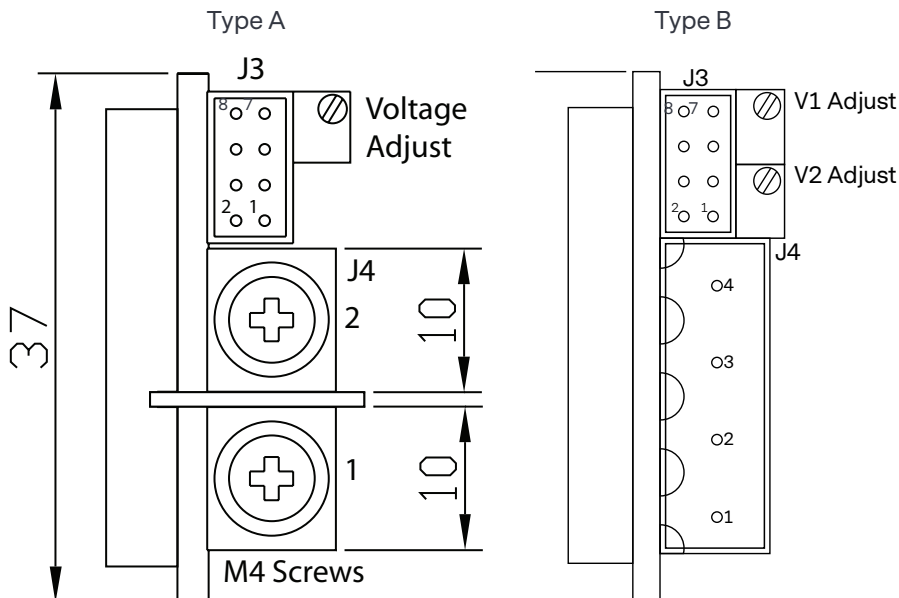
INTERFACE

The output powerMods connection details are shown below. Type A connectors are for single output powerMods XgA-XgT and Xg1-Xg7. The Type B connector is for the dual output XgF/Xg8 powerMod. The power and signal connectors are as follows:

| Output Signals and Power Connector Pinout | | | | | | | |
|---|--------------|-----------------|-----------------|----------|--------------|----------|----------|
| Pin | J3 | J3 | J3 | J3 | J3 | J4 | J4 |
| Module | (XgA to XgD) | (XgG-XgQ) | (XgR-XgT) | (XgE) | (XgF) | (Type A) | (Type B) |
| | | (Xg1-Xg5) | | (Xg7) | (Xg8) | — | — |
| 1 | not used | +Sense* | not used | not used | -pg (V2) | -Vout | 0 |
| 2 | Common | -Sense* | -Vtrim | not used | +pg (V2) | +Vout | 0 |
| 3 | not used | Vtrim | +Vtrim | not used | Inhibit V2) | — | 0 |
| 4 | not used | Itrim | Itrim | Common | Common (V2) | — | 0 |
| 5 | +Inhibit | +Inhibit/enable | +Inhibit/enable | -pg | -pg (V1) | — | — |
| 6 | -Inhibit | -Inhibit/enable | -Inhibit/enable | +pg | +pg (V1) | — | — |
| 7 | not used | +pg | +pg | Inhibit | Inhibit (V1) | — | — |
| 8 | not used | -pg | -pg | Common | Common (V1) | — | — |

*remote sense not present on XgR and XgT powerMods

| Output Mating Connectors | |
|--------------------------|--|
| J3 | Locking Molex 51110-0860; Non Locking Molex 51110-0850; Crimp Terminal: Molex p/n 50394. Or Molex 51110-0856, includes locking tab and polarization keying |
| J4 (Type A) | M4 screw (8 mm) |
| J4 | (Type B) Connector(s): Camden CTB9200/4A or Wurth Elektronik 691 352 710 004 |



| Type A : powerMods | Type B: powerMod |
|--------------------|------------------|
| XgA to XgE | XgF/Xg8 |
| XgG to XgT | — |
| Xg1 to Xg7 | — |

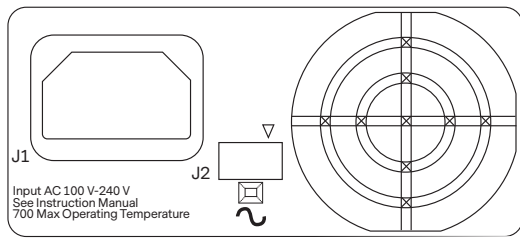
INTERFACE (CONTINUED)

The UltiMod series has a variety of input connector options to ease system integration. These include IEC, input cables (3-wire) and IEC to screw terminal adaptor.

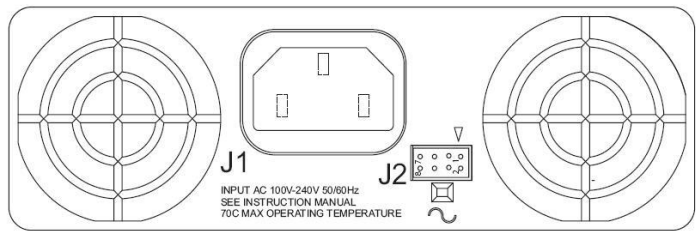
| Input Mating Connectors | |
|-------------------------|--|
| J1 | IEC320 type female plug rated 13, locking IEC cable and connector: Schaffner EMC part number IL13-US1-SVT-3100-183. |
| J2 | Locking Molex 51110-0860; non locking 51110-0850; Crimp Terminal: Molex p/n 50394: Or Molex 51110-0856, includes locking tab and polarization keying |

Input Cable (Option D)
 The UltiMod series is also available with an input cable connection option allowing greater flexibility when mounting the UltiMod in the system. Individually insulated input cables are 300 mm in length and come supplied with Faston connectors.

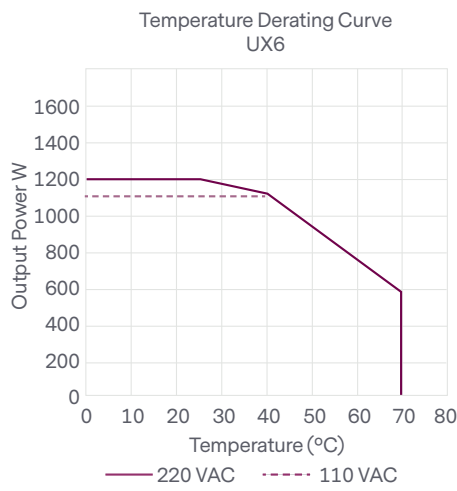
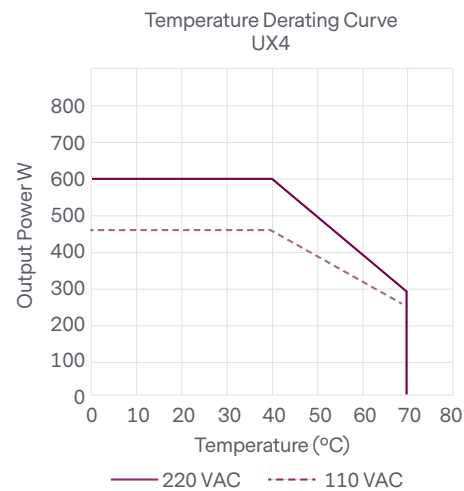
IEC to Screw Terminal Adaptor
 Some applications may require a screw terminal input rather than the standard IEC320 connector provided with the UltiMod. For such applications, Advanced Energy can offer the XE1, the IEC to Screw terminal adaptor accessory plug.
 This is a press fit connector that plugs securely into the UltiMod powerPac and provides the system integrator with screw terminals for mains connection. Recommended IEC to Faston/Terminal Lugs Schurter P/N 4788.8000.



J1 and J2 Connectors UX4



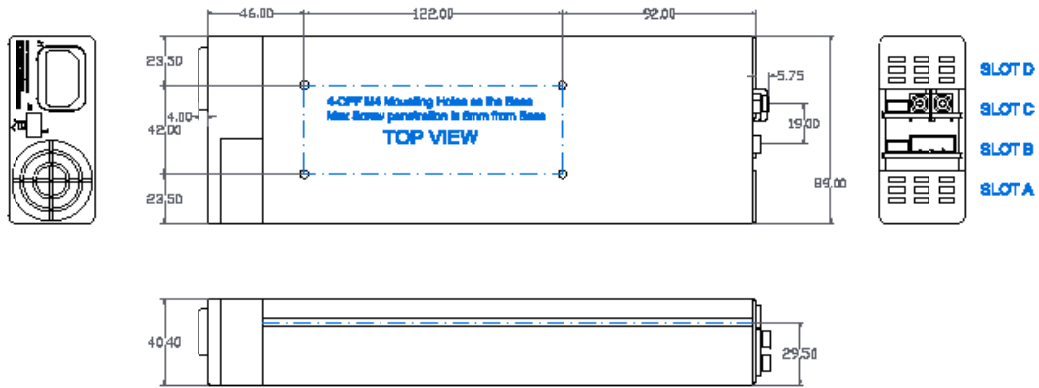
J1 and J2 Connectors UX6



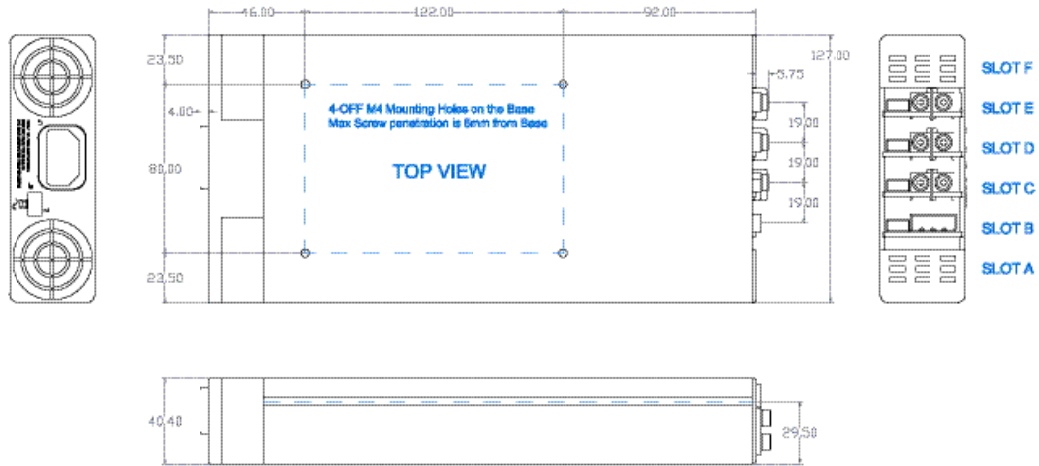
| Pin | J1 | J2 |
|-----|---------|----------------|
| 1 | Line | Common |
| 2 | Neutral | +5V bias |
| 3 | Earth | not used |
| 4 | — | AC fail |
| 5 | — | Fan fail |
| 6 | — | Global enable |
| 7 | — | Temp alarm |
| 8 | — | Global inhibit |

MECHANICAL DRAWINGS

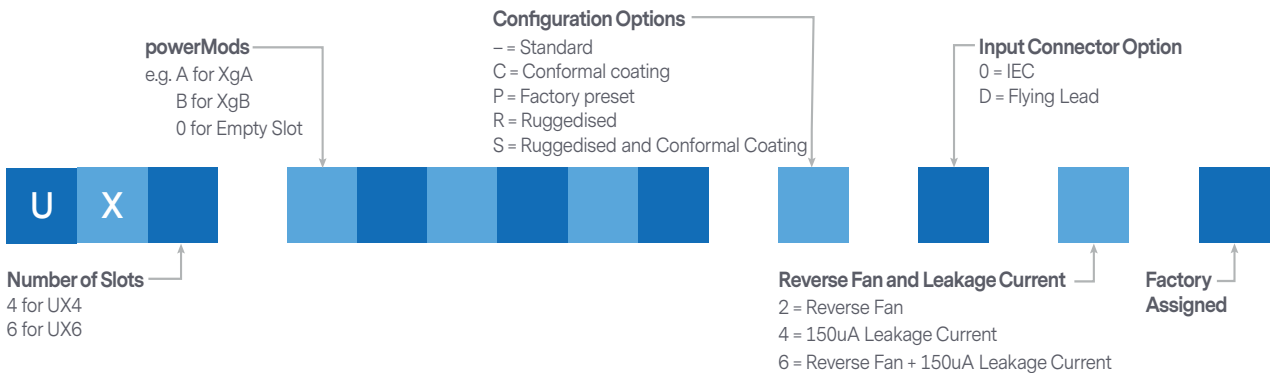
UX4



UX6



CONFIGURATION





ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

AE's power solutions enable customer innovation in complex semiconductor and industrial thin film plasma manufacturing processes, demanding high and low voltage applications, and temperature-critical thermal processes.

With deep applications know-how and responsive service and support across the globe, AE builds collaborative partnerships to meet rapid technological developments, propel growth for its customers and power the future of technology.

PRECISION | POWER | PERFORMANCE



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