ULTIMOD SERIES

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



Advanced Energy's UltiMod series 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 six powerMods.

PRODUCT HIGHLIGHTS

- Highest efficiency — up to 91%
- User and field configurable
- Standard medical features
  - Leakage current < 300 µA (< 150 µA 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
- 3 years Warranty

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

- UKCA Mark

ELECTRICAL SPECIFICATIONS

powerMods								
Model	Vnom (V)	Set Point Adjust Range (V)	Dynamic Vtrim Range (V)	Imax (A)	Power (W)	Capacitive Loading (mF) [1,2]	Remote Sense	Power Good
XgA	12.0	10.8-15.6	—	12.5	150	10	—	—
XgB	24.0	19.2-26.4	—	8.3	200	4	—	—
XgC	36.0	28.8-39.6	—	5.6	200	2	—	—
XgD	48.0	38.5-50.4	—	4.2	200	1	—	—
XgE/Xg7	24.0	5.0-28.0	—	5.0	120	2.5	—	Yes
XgF/Xg8	24.0	5.0-28.0	—	3.0	72	1.5	—	Yes
	24.0	5.0-28.0	—	3.0	72	1.5	—	Yes
XgG	2.5	1.5-3.6	1.15-3.6	40.0	100	700	Yes	Yes
XgH	5.0	3.2-6.0	1.5-6.0	36.0	180	550	Yes	Yes
XgJ	12.0	6.0-15.0	4.0-15.0	18.3	220	100	Yes	Yes
XgK	24.0	12.0-30.0	8.0-30.0	9.2	220	20	Yes	Yes
XgL	48.0	28.0-58.0	8.0-58.0	5.0	240	10	Yes	Yes
Xg1	2.5	1.5-3.6	1.15-3.6	50.0	125	900	Yes	Yes
Xg2	5.0	3.2-6.0	1.5-6.0	40.0	200	600	Yes	Yes
Xg3	12.0	6.0-15.0	4.0-15.0	20.0	240	120	Yes	Yes
Xg4	24.0	12.0-30.0	8.0-30.0	10.0	240	25	Yes	Yes
Xg5	48.0	28.0-58.0	8.0-58.0	6.0	288	25	Yes	Yes
XgM	5.0	3.2-6.0	1.0-6.0	40.0	200	850	Yes	Yes
XgN	12.0	6.0-15.0	1.0-15.0	20.0	240	400	Yes	Yes
XgP	24.0	12.0-30.0	1.0-30.0	10.0	240	200	Yes	Yes
XgQ	48.0	24.0-58.0	1.0-58.0	6.0	288	100	Yes	Yes
XgR	24.0	12.0-30.0	8.0-30.0	10.0	240	25	—	Yes
XgT	48.0	28.0-58.0	8.0-58.0	6.0	288	15	—	Yes

Note 1: A diode or other blocking element would be recommended for Xg1-5 and XgG-Q modules if the load capacitance is large to prevent reverse energy during shutdown.
Note 2: Maximum capacitive load of the module to ensure monotonic startup.

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	85 VAC in 400 W out	—	7.5	—	A
	UX6	85 VAC in 850 W out	—	11.5	—	—
Inrush Current		230 VAC @ 25°C UX6/UX4	—	—	25/50	A
Undervoltage Lockout	UX4 UX6	Shutdown	56 65	— —	63 74	VAC VAC
Power Factor		110 VAC @ full load	0.98	0.99	—	—
Fusing	UX4	250 V	—	F8A HRC	—	—
	UX6	250 V	—	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	%
	Settling time: XgA-XgD	—	—	500	µs
	For 25% to 75% load change: Voltage deviation: XgE-XgT, Xg1-Xg8	—	—	10	%
	Settling time: XgE-XgT,Xg1-Xg8	—	—	250	µs
Ripple and Noise	20 MHz 100 mV or 1.0% pk-pk (except 150 mV XgA)	—	—	—	—
Over-Voltage Protection	Latching	105	—	170	%
Over-Current Protection	Straight line with hiccup activation at < 30% of Vnom.	105	—	170	%
Line Regulation	For ±10% change from nominal line	—	—	±0.1	%
Remote Sense	Max. line drop compensation (except XgA, B, C, D, E, F)	—	—	0.5	VDC
Overshoot		—	—	2	%
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	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; 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 (Low leakage Option)	—	—	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.Telecordia 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 UX4	EN55011, EN55022, FCC, Class B	Compliant
UX6[1]	EN55011, EN55022, FCC, Class A	Compliant
Radiated	EN55011, EN55022, FCC, Class B	Compliant
Harmonic Distortion	EN61000-3-2 Class A	Compliant
Flicker & Fluctuation	EN61000-3-3	Compliant
Immunity		
Electrostatic Discharge	EN61000-4-2, level 4, 8 kV contact, 15 kV air	A
Radiated Immunity	EN61000-4-3, level 3, 10V/m 80-2700 MHz	A
Fast Transients-Burst	EN61000-4-4,Level 3, ±2kV	A
Input Line Surges	EN61000-4-5, level 3, 1 kV DM, 2 kV CM	A
Conducted Immunity	EN61000-4-6, Level 3, 10 V/m 150KHz to 80MHz	A
Voltage Dips	EN61000-4-11, SEMI F47 compliant[2]	A & B Compliant

[1] Please use the XCD power-pac if Class B Conducted Emissions are required.

[2] SEMI F47 compliant at input voltages > 160 VAC.

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 catalog	—	39.8/42.7	—	dBA
Shock		60	—	—	G
Vibration	MIL-STD 810G	—	—	—	—
Altitude	Operational: 2000 m, Storage: 8000 m	—	—	—	—

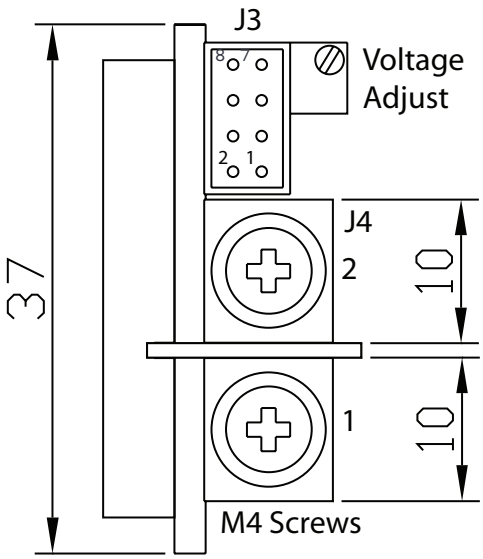
INTERFACE

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:

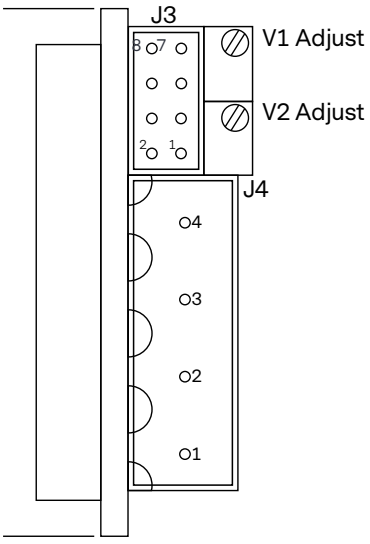
Output Signals and Power Connector Pinout							
Pin	**J3**	**J3**	**J3**	**J3**	**J3**	**J4**	**J4**
Module	(XgA-XgD)	(XgG-XgQ)	(XgR-XgT)	(XgE)	(XgF)	(Type A)	(Type B)
		(Xg1-Xg5)		(Xg7)	(Xg8)	—	—
1	not used	+Sense	not used	not used	-pg (V2)	-Vout	-Vout 2
2	Common	-Sense	-Vtrim	not used	+pg (V2)	+Vout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

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) Max Torque 0.74 Nm
J4	(Type B) Connector(s): Camden CTB9200/4A or Wurth Elektronik 691 352 710 004

Type A



Type B



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

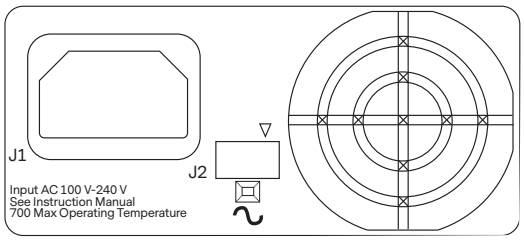
INTERFACE (CONTINUED)

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.

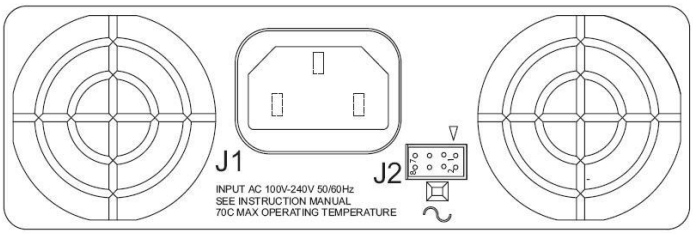
Input Mating Connectors	
J1	IEC320 type female plug rated 13, locking IEC cable and connector: Schaffner EMC part number IL13-US1-SVT-3100-183.
J2	Locking Molex 51110-0860; non locking 51110-0850; Crimp Terminal: Molex p/n 50394: Or Molex 51110-0856, includes locking tab and polarization keying

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.

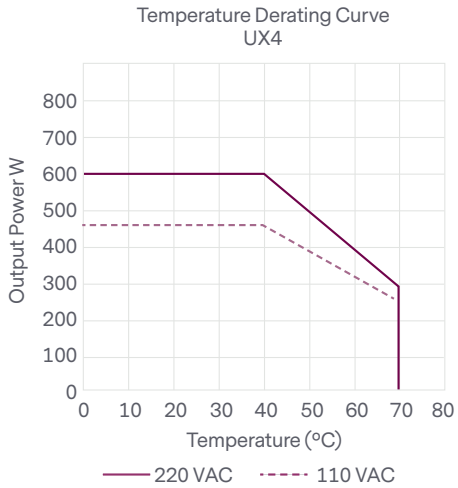
IEC to Screw Terminal Adaptor
Some applications may require a screw terminal input rather than the standard IEC320 connector provided with the UltiMod. For such applications, Advanced Energy can offer the XE1, the IEC to Screw terminal adaptor accessory plug.
This is a press fit connector that plugs 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.

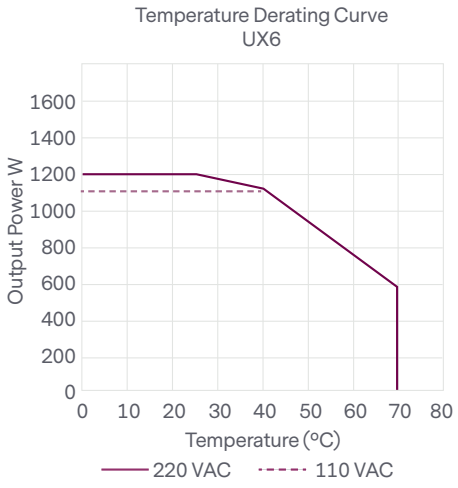


J1 and J2 Connectors UX4



J1 and J2 Connectors UX6

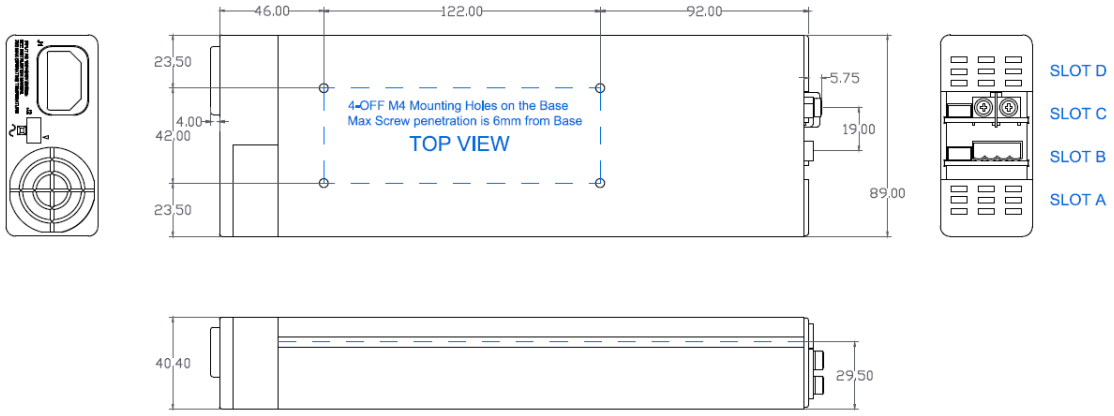




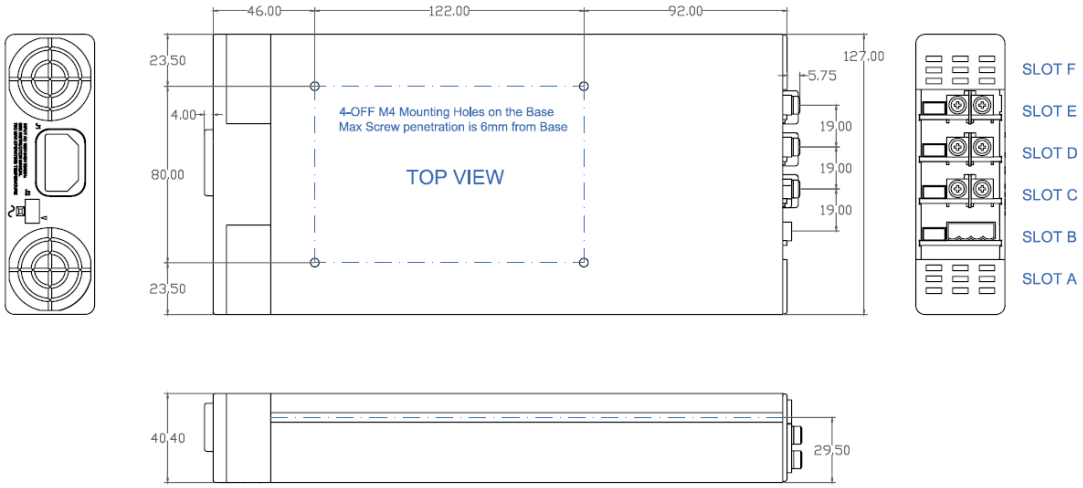
Pin	J1	J2
1	Line	Common
2	Neutral	+5V bias
3	Earth	not used
4	—	AC fail
5	—	Fan fail
6	—	Global enable
7	—	Temp alarm
8	—	Global inhibit

MECHANICAL DRAWINGS

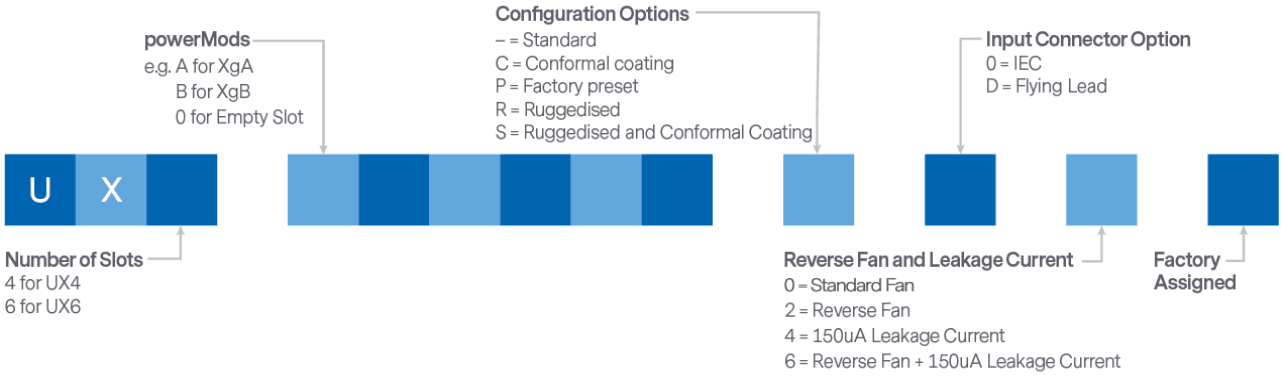
UX4



UX6



CONFIGURATION



Configuration example for Ultimod part number: UX4CGD0-D4

UX4 powerPac – 600W

Slot1: XgC 36V/5.6A module; Slot2: XgG 2.5V@40A module; Slot3: XgD 48V/4.2A module; Slot4: Empty slot

Option D (Flying lead input cable) & Option 4 (150uA leakage current)

ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than four 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.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

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For international contact information,
visit advancedenergy.com.

powersales@aei.com (Sales Support)
productsupport.ep@aei.com (Technical Support)
+1 888 412 7832

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