EXCELSYS XF SERIES

THE MODULAR POWER SOLUTION OF CHOICE FOR HI REL AND MIL-COTS APPLICATIONS

Advanced Energy's XF series, part of our Excelsys product line, provides up to an incredible 1000 W in an extremely compact 268 mm x 127 mm x 1U package. Designed for use in harsh operating environments, the XF series is conformal coated and ruggedized to withstand extremes in shock and vibration as well as operation over a wide temperature range of -55 to 70°C. EMC characterization, shock and vibration, and thermal stress reports are available.

PRODUCT HIGHLIGHTS

- Conformal coated and ruggedized as standard
- Anti-vibration compound
- 47 to 440 Hz input frequency
- 1.15 V to 58 V standard output voltages
- All outputs fully floating
- Extra low profile: 1U height (40 mm)
- Ultra high efficiency, up to 90%
- 5-year warranty
- Plug and play power
  - Allows fast custom configuration
  - Outputs completely field configurable with option to factory fix
- Series and parallel outputs for higher voltages/ currents
- Parallel powerpacs for higher power
- OVP, OTP, OCP as standard
- 5 V/250 mA bias standby voltage provided
- Individual output control
- Active PFC (Power Factor Correction)

TYPICAL APPLICATIONS

- Harsh industrial electronics
- Fixed and mobile radar (naval- and ground-based)
- Communications
- Military electronics
- Test and measurement

AT A GLANCE

PowerPac

	XFA	XFB	XFC	XFN
Power	400	700	1000	1000
Slots	6	6	6	6
Operating Temperature	-55 to 70°C	-55 to 70°C	-55 to 70°C	-40 to 70°C

Parameters

268 mm x 127 mm x 1U

Certifications

- MIL-STD-810G: Shock and Vibration
- MIL-STD-461F (CE101 and CE102): EMC characterised
- UL60950
- UL62368
- SEMI F47**

MODELS

powerMods*							
Model	Vnom (V)	Set Point Adjust Range (V)	Dynamic Vtrim Range (V)	Imax (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	—	Yes
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	1.0-3.6	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	1.0-3.6	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	10.0	240	Yes	Yes
XgQ	48.0	24.0-58.0	1.0-58.0	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

*When ordering individual powerMods for use with the XF Series add the suffix C for conformal coating

ELECTRICAL SPECIFICATIONS

Input					
Parameter	**Conditions/Description**	**Min**	**Nom**	**Max**	**Units**
Input Voltage Range	Input frequency: 47 to 440 Hz. See note 10	85	—	264	VAC
		120	—	380	VDC
Power Rating	XFA	—	—	400	W
	XFB	—	—	700	W
	XFC	—	—	1000	W
	XFN	—	—	1000	W
Input Current	XFA: 85 VAC in 400 W out	—	7.5	—	A
	XFB: 85 VAC in 700 W out	—	9.5	—	A
	XFC: 85 VAC in 765 W out	—	11.5	—	A
	XFN: 85 VAC in 765 W out	—	11.5	—	A
Inrush Current	230VAC @ 25°C	—	—	25	A
Undervoltage Lockout	Shutdown	65	—	74	VAC
Power Factor	110 VAC @ full load	0.98	0.99	—	—
Fusing	XFA: 250 V	—	F8A HRC	—	—
	XFB: 250 V	—	F10A HRC	—	—
	XFC: 250 V	—	F12A HRC	—	—
	XFN: 250 V	—	F12A HRC	—	—

Output					
Parameter	**Conditions/Description**	**Min**	**Nom**	**Max**	**Units**
powerMod Power	As per powerMod table	—	—	—	—
Output Adjustment Range	Manual or electronic as per powerMod table	—	—	—	—
Minimum Load	—	—	0	—	A
Line Regulation	For ±10% change from nominal line	—	—	±0.1	%
Load and Cross Regulation	For 25% to 75% load change	—	—	±0.2	%
Transient Response	For 25% to 75% load change	—	—	—	—
	Voltage deviation	—	—	10	%
	Settling time	—	—	250	µs
Ripple and Noise	20 MHz 100 mv or 1.0% pk-pk (except 150mV XgA)	—	—	—	—
Overvoltage Protection	Vmax (latching)	—	—	170	%
Overcurrent Protection	Straight line with hiccup activation at < 30% of Vnom	105	—	170	%
Remote Sense	Max. line drop compensation (see powerMod table)		—	0.5	VDC
Overshoot	—	—	—	2	%
Turn-On Delay	From AC In/powerMod Enable signal	—	—	1000/6	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

ELECTRICAL SPECIFICATIONS (CONTINUED)

General					
Parameter	**Conditions/Description**	**Min**	**Nom**	**Max**	**Units**
Isolation Voltage	Primary to secondary	3000	—	—	VAC
	Input to chassis	1500	—	—	VAC
Efficiency	230 VAC, 1000 W @ 24V	—	90	—	%
Safety Agency Approvals	EN60950, UL60950, CSA22.2 No.950 UL File No. E181875	—	—	—	—
Earth Leakage Current	230 VAC, 50 Hz, 25°C	—	—	—	mA
Bias Supply	Always ON. Current 250 mA.	4.8	5.0	—	VDC
Weight	powerPac	—	1.2	—	kg
	Typical powerMod	—	0.1	—	kg
Reliability	Telcordia SR-332 at 40°C and full load powerMod	—	—	.959	fpmh
	Telcordia SR-332 at 40°C and full load powerPac (excludes fans)	—	—	0.95	fpmh
	MIL-STD-217F at 30°C and full load powerMod	—	—	12.99	fpmh
	MIL-STD-217F at 30°C and full load powerPac (excludes fans)	—	—	10.2	fpmh

Environmental					
Parameter	**Conditions/Description**	**Min**	**Nom**	**Max**	**Units**
Operating Temperature	XFA, XFB, XFC	-55	—	+70	°C
	XFN operates to specification below -20°C after 10 min warm-up	-40	—	+70	°C
Storage Temperature		-55	—	+75	°C
Derating	See the product catalog for full temperature derating	—	—	—	—
Acoustic Noise	Measured from distance of 1 m	—	56.5	—	dBA
Relative Humidity	Non-condensing	5	—	95	%RH
Shock	3000 Bumps, 10 G (16 ms) half sine	—	—	—	—
Vibration	1.5G: MIL-STD-810G	10	—	500	Hz
Altitude	Operational: 4000 m, Storage: 8000 m	—	—	—	—

ELECTRICAL SPECIFICATIONS (CONTINUED)

EMC		
Parameter	**Standard**	**Level**
Emissions		
Conducted	EN55011, EN55022, FCC: Class B	Compliant
Radiated	EN55011, EN55022, FCC: Class B	Compliant
Harmonic Distortion	EN61000-3-2 Class A	Compliant
Flicker and Fluctuation	EN61000-3-3	Compliant
Immunity		
Electrostatic Discharge	EN61000-4-2: Level 2	Compliant
Radiated RFI	EN61000-4-4: Level 3 & MIL-STD-461F. See note 6.	Compliant
Fast Transients - Burst	EN61000-4-4: Level 3	Compliant
Input Line Surges	EN61000-4-5: Level 3 & MIL-STD-1399	Compliant
Conducted RFI	EN61000-4-6: Level 3 & MIL-STD-461F. See note 6.	Compliant
Voltage Dips	EN61000-4-11 & MIL-STD-70, SEMI F47 compliant. See note 7.	Compliant

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

[1] All specifications at nominal input, full load, 25°C unless otherwise stated.

[2] This product is not intended for use as a stand alone unit and must be installed by qualified personnel.

[3] The specifications contained herein are believed to be correct at time of publication and are subject to change without notice.

[4] Derating required below -40°C.

[5] With certain configurations when powering inductive or capacitive loads, it is recommended to use a blocking diode on the output. Consult Advanced Energy for further detail.

[6] An external filter is required to meet certain conducted and radiated emissions requirements for MIL-STD-461F.

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

[8] Consult Advanced Energy for module derating at temperatures from -40°C to -55°C.

[9] Product is not UL/EN certified for 120-380 VDC input operation.

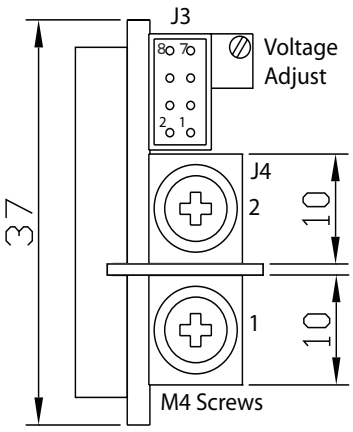
[10] No safety approval for operation above 63 Hz

MECHANICAL SPECIFICATIONS

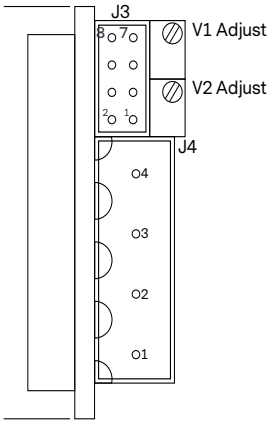
Output Connectors

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:

Type A



Type B



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

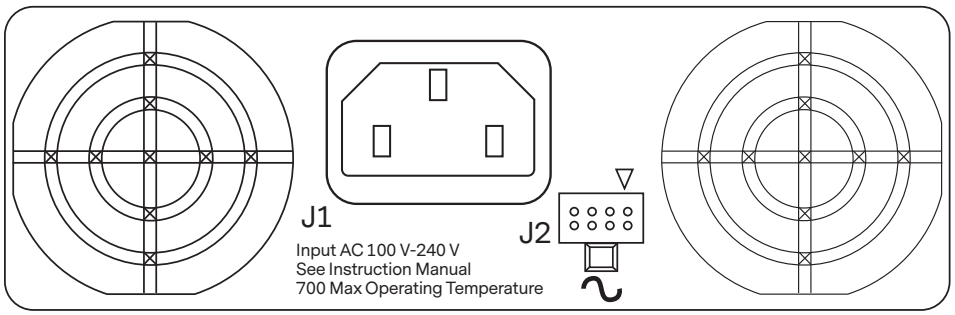
Output Signals and Power Connector Pinout							
Pin	J3	J3	J3	J3	J3	J4	J4
Module	(XgA-XgD)	(XgG-XgQ)	(XgR-XgT)	(XgE)	(XgF)	(Type A)	(Type B)
		(Xg1-Xg5)		(Xg7)	(Xg8)	—	—
1	not used	+Sense	not used	not used	-pg (V2)	-Vout	-V2
2	Common	-Sense	-Vtrim	not used	+pg (V2)	+Vout	+V2
3	not used	Vtrim	+Vtrim	not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

MECHANICAL SPECIFICATIONS (CONTINUED)

Input Connectors

Advanced Energy modular power supplies have a variety of input connector options to ease system integration. These include IEC, Input cables (3-wire) and IEC to Screw Terminal Adaptor.



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

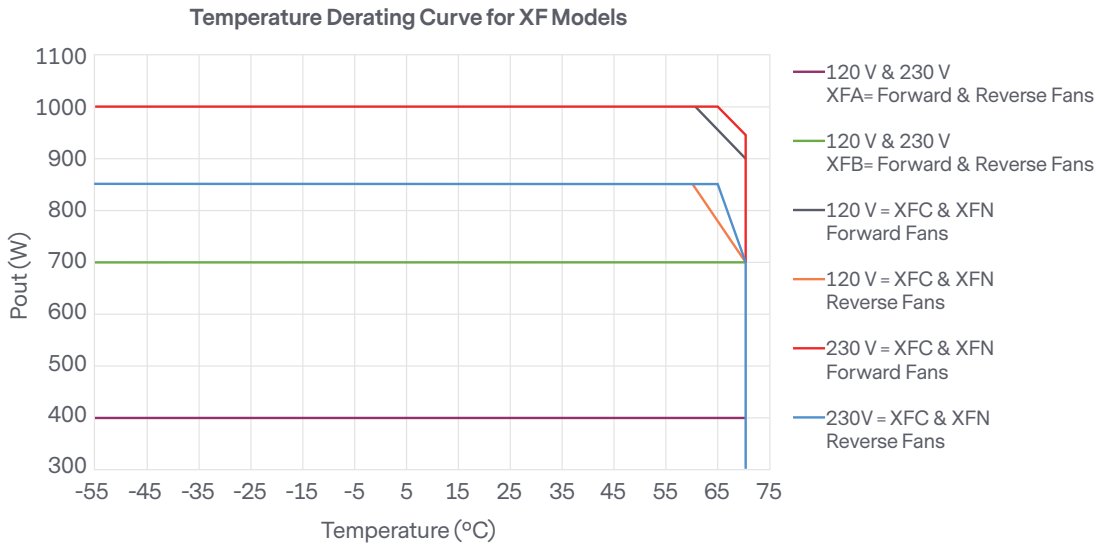
Input Mating Connectors	
J1	IEC320 type female plug rated 13, locking IEC cable and connector: Schaffner EMC part number IL13-US1-SVT-3100-183
J2	Locking Molex 51110-0860; non locking 51110-0850; Crimp Terminal: Molex p/n 50394: Or Molex 51110-0856, includes locking tab and polarization keying

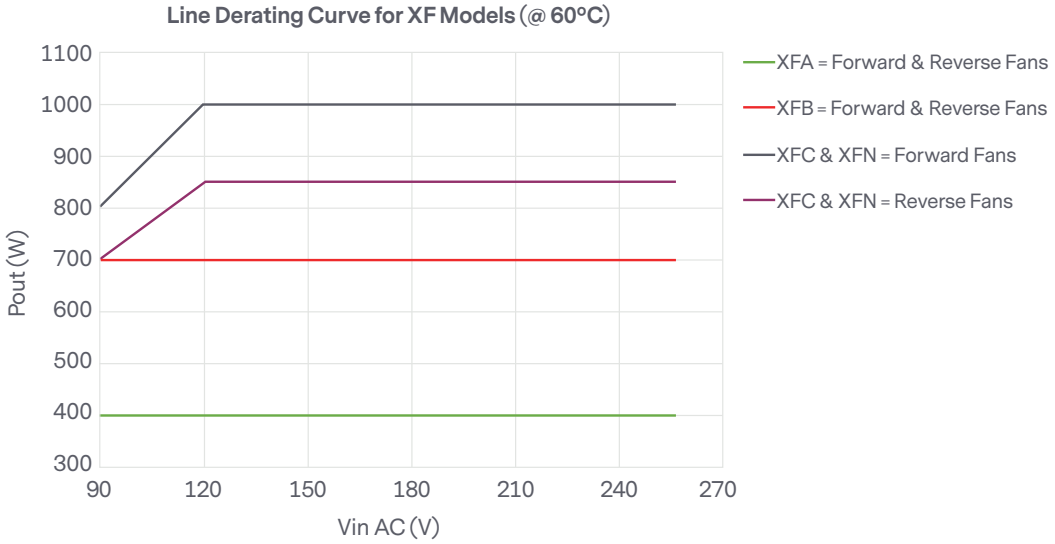
Input Cable (Option D)

Advanced Energy modular power supplies are also available with an input cable connection option allowing greater flexibility when mounting the power supply in the system. Individually insulated input cables are 300 mm in length and come supplied with Faston connectors.

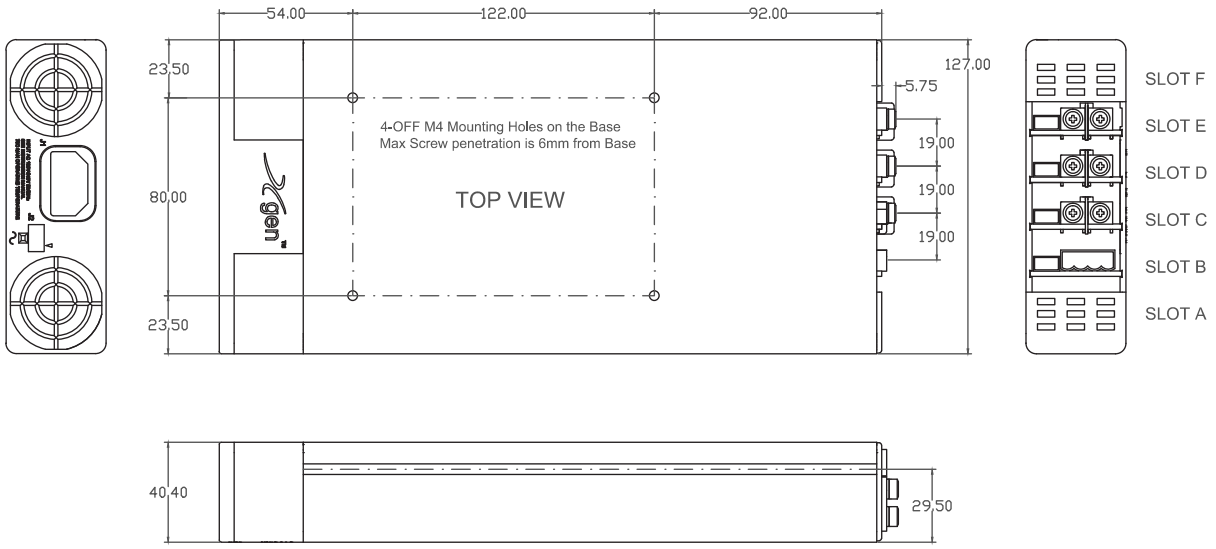
MECHANICAL SPECIFICATIONS (CONTINUED)

XF Series Derating Curves

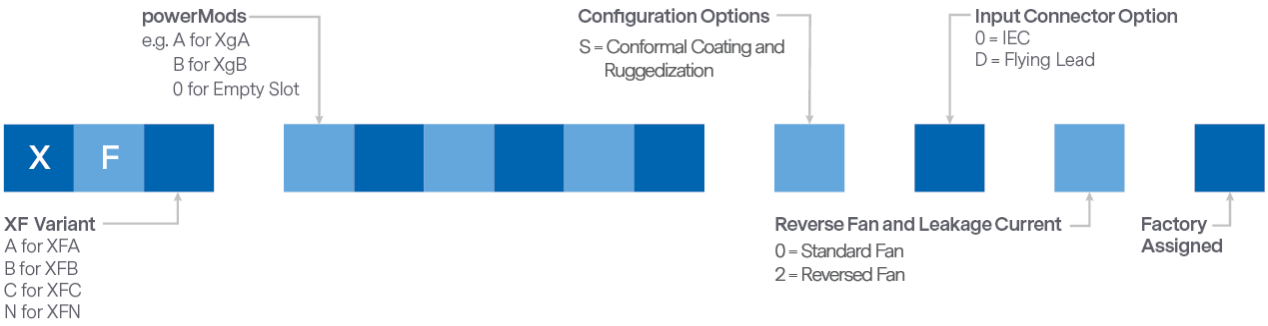




MECHANICAL DRAWINGS



CONFIGURATION



Configuration example for XF part number XFCAAABB0S00 specifies the following product:
XFC Powerpac - 1000W

Slot1: XgA, 12V@12.5A module

Slot2: XgA, 12V@12.5A module

Slot3: XgA, 12V@12.5A module

Slot4: XgB, 24V@8.3A module

Slot5: XgB, 24V@8.3A module

Slot6: Empty slot

Option S: Conformal Coating and Extra Ruggedization for Shock and Vibration

Option 0: IEC Input Connector

Option 0: Standard Fan

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.

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Advanced Energy

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