

PF600-1

600 Watt Single Output High Density AC/DC Converter



- 90-264VAC Input Range
- Power Factor Corrected
- Harmonic Correction to EN61000-3-2
- 600W Over 90-264VAC Range
- High Efficiency - up to 89%
- Safety Isolated Output
- -10°C to +100°C Baseplate
- 48V Output
- Remote ON/OFF Control
- DC Good Signal
- Auxiliary Output
- 300kHz Fixed Frequency
- cUL, VDE Approved to 60950-1



The PF600-1 AC-DC converter provides a fully integrated, high density, high performance solution for the front-end of a distributed power architecture (DPA). This unit will deliver the full-rated 600W of output power over the entire input range of 90-264VAC while providing harmonic correction to EN61000-3-2.

Unlike competitive offerings, the PF600 provides a **fully-isolated output**, permitting implementations with either isolated or non-isolated DC-DC converters.

The wide-range input voltage of 85-264VAC facilitates use in products designed for global deployment. The isolated output permits the user to polarize the output as the need for the specific application dictates.

The high-efficiency architecture and baseplate-cooled design simplify thermal management. The low-profile package makes this an ideal choice for 1U chassis applications where density and efficiency are strategic design

considerations.

Proprietary design techniques combined with automated manufacturing in fully ISO-9001 approved facilities results in a compact, reliable, and efficient product that provides a cost-effective solution.

With global safety agency approvals, the PF600 is a comprehensive solution to a complex problem bounded by the competing pressures of development cycle time, efficiency, cost and packaging.

SPECIFICATIONS, ALL MODELS

	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT	Input Operating Voltage	V_{in}	All line, load ⁽¹⁾ , & environmental	90		264	VAC
	Input Frequency	f		47		66	Hz
	Power Factor	PF	>25% load	0.95	0.99	1.0	
	Inrush Current	I_i	240VAC, average over 1 cycle			10	A _{rms}
	Input Current Harmonics		Complies with EN61000-3-2				
	Efficiency	η	90VAC input, 600W load		86		%
	η	264VAC input, 600W load		89		%	

Note1: Full output power available at input voltages above 90VAC; derate output linearly to 550W at 85 VAC input.

	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
OUTPUT	Output Power	P_o	90-264VAC	0		600	W
	Output Voltage	V_o	All line, load, temp, & 90% transient load step	36	48	59	VDC
			5%-100% load, static load, 0-100°C	44.5	48	50.5	VDC
	Output Current	I_o		0		12.5	A
	Output Holdup	t_h	470uF Bulk Capacitor, full load		20		msec
	Ripple and Noise (PARD)		100kHz-20MHz, 50 Ω , no output caps		850		mV _{pp}
	Low Frequency Ripple		470 μ F bulk cap, full load		2.2		V _{pp}
	Overload Protection		Output short circuit			16	20
Duty Cycle, on/off					35/1600		msec

GENERAL SPECIFICATIONS

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Isolation	SELV to EN60950				
Input to Output		4242			VDC
Input to Baseplate		2121			VDC
Output to Baseplate		707			VDC
Quiescent Input Power	Standby output unloaded				
	Shutdown condition (thermal or external)				
	105VAC input		1.5		W
	230 VAC input		2.5		W
Output enabled but unloaded	105VAC input		44		W
	230VAC input		42		W
Startup Delay			1	2	Sec
Auxiliary Output					
Voltage (V_{aux})		10	12	14	VDC
Current (I_{aux})		0	--	50	mA
Ripple and Noise				500	mVpp
Protection	Current Limited				
Input Protection	External Fusing, recommended value			10	A
Temperature	Baseplate Temperature				
Operating		-10		+100	°C
Storage		-55		+125	°C
Shutdown		+100		+125	°C
Switching Frequency		255	300	345	kHz
Weight			260		g

ABSOLUTE MAXIMUM RATINGS

Values beyond these ratings may damage or permanently degrade the unit

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Input Voltage					
RMS				280	V
Peak, continuous				400	V
Peak, single event				500	V
Temperature		-55		+125	°C
Signal Inputs and Outputs					
Voltage		-0.3		+15	V
Current		-10		+10	mA

ADDITIONAL FEATURES

Remote ON/OFF

Isolated signal pair (INH+, pin 10 and INH-, pin 11) provides for output inhibit function. Open or logic High (>3V) enables the output; short between the pair or a logic Low (<0.5V) inhibits the output. Standby output remains active during inhibit.

DC OK

An open-drain logic output (DCOK+, pin 12) referenced to the power output return (Vo-, pin 7) monitors the output voltage. During normal operation, this is a logic Low until the output voltage falls below 36.0V min / 39.5V max. High impedance when the unit is unpowered and until output has risen above 38.0V min / 41.5V max for a period between 140ms and 460ms. A separate return pin (DCOK-, pin 13) is provided for this signal, with a low-value resistor to the Output return.

Temperature Monitor

The open circuit voltage present between the inhibit pin (INH+, pin 10) and inhibit return pin (INH-, pin 11) falls as the internal temperature rises. This voltage does not exceed 10V; the converter will be disabled when this voltage falls below approximately 3V. Additional information is available in Application Note ACAN-16.

Holdup

Output holdup is in direct proportion to the value of the bulk capacitance placed across pins C+ (pin 4) and C- (pin 5). Minimum value required is 100uF; maximum value is 1000uF. Ripple current rating for this capacitor is >3A_{rms} at 300kHz. Typical holdup using a 470uF cap is 20msec. Additional information is available in Application Note ACAN-10.

Auxiliary Output

An auxiliary output (V_{aux}) is provided (Aux+, pin 8 and Aux-, pin 9) as a bias for auxiliary circuitry. The nominal output voltage is 12V, but may rise to 14V at no load and may fall to 10V at full load. This output is present when the input exceeds about 30VAC and, with a 470uF bulk capacitor across the C+ (pin 4) and C- (pin 5) terminals, remains in specification for at least 4 seconds after collapse of the main output (V_o) when the input is removed. This output is powered from the bulk capacitor which remains charged during shutdown periods. Maximum output current from V_{aux} is 50mA. Overload of this current-limited output may affect the operation of the PF600. The output is isolated from all other connections; SELV to EN60950.

Passive Load Share

The output voltage of the PF600-1 falls moderately in response to both temperature and load current. Consequently, the combined effect contributes to balancing of the total load current among units connected in parallel. This response is commonly referred to as “passive load sharing” or “droop sharing”. Additional information on parallel operation of the PF600-1 is available in Application Note ACAN-09.

Output Current Limit

Output current limit inception occurs between 13.1A and 15.6A (115% \pm 10%) at working output voltages. Over the full range of output voltage, the available current will be between 6A and 20A. When the output voltage falls under an overload condition, the output is disabled after a short time (typically 35ms at short circuit) and retries at intervals of about 2 seconds until the overload condition is cleared.

Thermal Shutdown

Thermal protection occurs at 100°C minimum at the baseplate. A small degree of hysteresis is included to ensure clean switching. See absolute maximum ratings.

Input Protection

An input fuse is required external to the PF600 module. Recommended maximum rating is 10A, 250V HBC. A filter and other voltage-limiting circuitry is required at the input when the unit is to be supplied from AC mains. These are necessary not only for EMC compliance, but also to prevent differential transient voltages from being applied between the input terminals of the module that could damage the unit. Additional information on input protection is available in Application Notes ACAN-12 and ACAN-13.

Input Undervoltage Protection

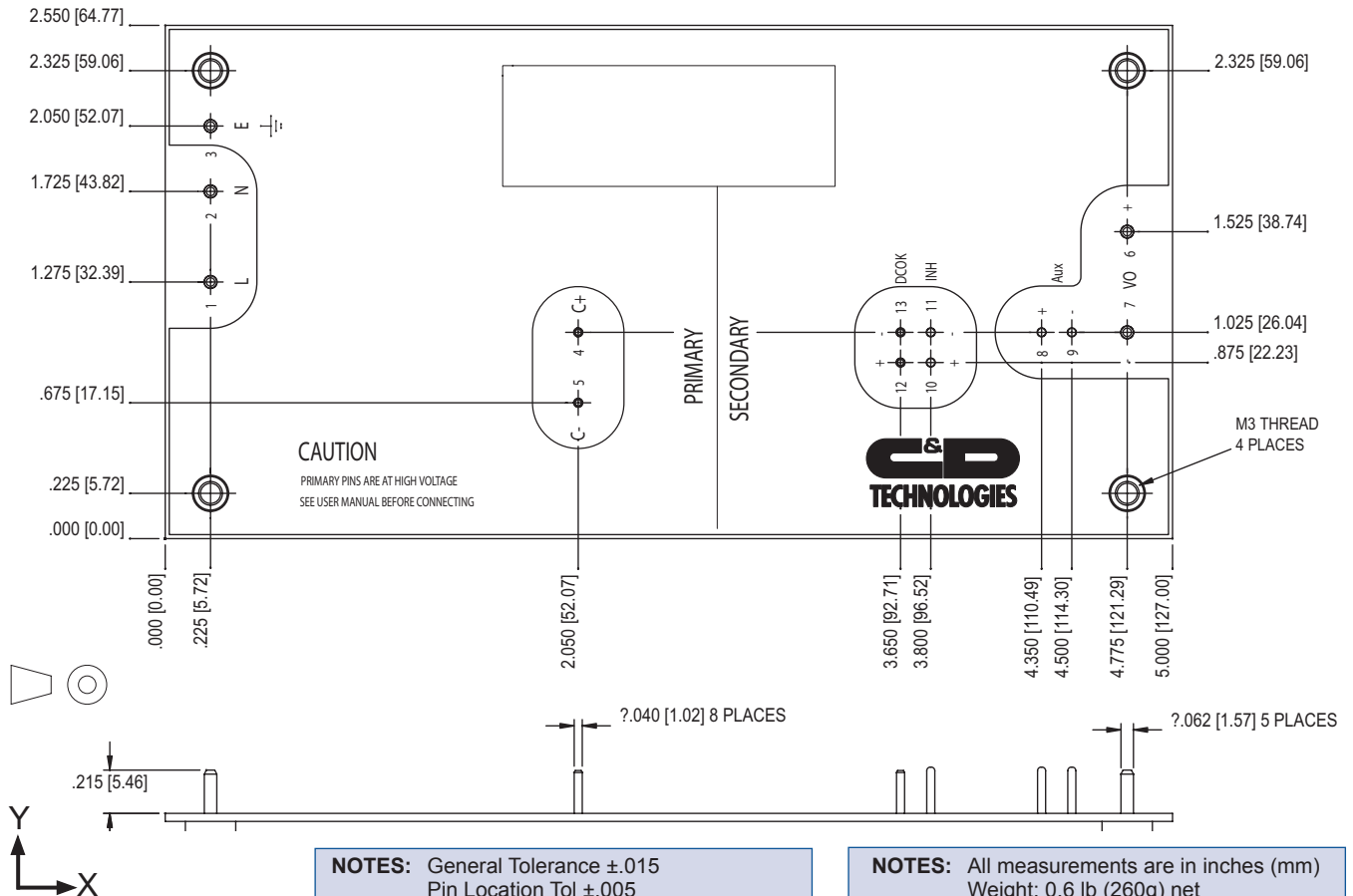
No damage will result from operation at voltages below the specified operating range. Available power will decrease below 90V, and at a voltage below 85V (typically 82VAC) the main output is switched off.

EMC

Requires an external filter to achieve compliance with EN55022 and FCC conducted and radiated levels at the input or other standards as dictated by the application. Complies with EN61000-3-2 limits for harmonic currents at input. EN55082-1 and EN55082-2 at levels to be determined. Additional information on EMI filtering is available in Application Note ACAN-14 (pending).

For additional support or application notes for the PF600-1, please visit our website at <http://www.cd-poweronline.com/products/appnotes.asp> or call your local representative.

MECHANICAL



TERMINATIONS

The table below delineates the pin designations and functions:

Ref	Name	Function	Pin Diameter	Direction	X pos in. (mm)	Y pos in. (mm)
P1	L	Input line	.060"	In	0.187 (4.76)	1.215 (30.85)
P2	N	Input neutral	.060"	In	0.187 (4.76)	1.690 (42.92)
P3	E	Input earth ground	.060"	Baseplate	0.187 (4.76)	2.002 (50.85)
P4	C+	Capacitor positive	.040"	In/Out	2.008 (51.01)	1.040 (26.41)
P5	C-	Capacitor negative	.040"	In/Out	2.008 (51.01)	0.627 (15.93)
P6	Vo+	Positive output	.060"	Out	4.715 (119.75)	1.490 (37.84)
P7	Vo-	Negative output (2mm)	.060"	Out	4.715 (119.75)	0.990 (25.14)
P8	Aux+	Auxiliary output positive	.040"	Out	4.310 (109.48)	0.990 (25.14)
P9	Aux-	Return for P8, isolated from other pins	.040"	Out	4.465 (113.40)	0.990 (25.14)
P10	INH+	Inhibit/temperature monitor	.040"	In/out	3.442 (87.42)	0.831 (21.11)
P11	INH-	Return for P10, isolated from other pins	.040"	In/out	3.442 (87.42)	0.990 (25.14)
P12	DCOK+	"Output good" signal, negative-going	.040"	Out	3.600 (91.44)	0.831 (21.11)
P13	DCOK-	Return for P12, connected to P7 via 47W	.040"	Ref	3.600 (91.44)	0.990 (25.14)

Power Electronics Division, Americas
3400 E Britannia Drive, Tucson, Arizona 85706
Tel: 800.547.2537 Fax: 520.295.4197

C&D Technologies, EMEA/Asia-Pacific
Milton Keynes MK14 5BU UK
Tel: +44 (0)1908 615232 Fax: +44 (0)1908 617545

Any data, prices, descriptions or specifications presented herein are subject to revision by C&D Technologies, Inc. without notice. While such information is believed to be accurate as indicated herein, C&D Technologies, Inc. makes no warranty and hereby disclaims all warranties, express or implied, with regard to the accuracy or completeness of such information. Further, because the product(s) featured herein may be used under conditions beyond its control, C&D Technologies, Inc. hereby disclaims all warranties, either express or implied, concerning the fitness or suitability of such product(s) for any particular use or in any specific application or arising from any course of dealing or usage of trade. The user is solely responsible for determining the suitability of the product(s) featured herein for user's intended purpose and in user's specific application. C&D Technologies, Inc. does not warrant or recommend that any of its products be used in any life support or aviation or aerospace applications.