

PFC-180 Series

Univerter® Power Factor Correction Module

180 Watt PFC Front End

The Univerter PFC-180 Power Factor Correction modules are extremely miniature and lightweight AC to DC converters that operate from wide range AC input voltages and frequencies with extremely high conversion efficiency and near unity power factor. These units produce an output of 375VDC. The wide input voltage and frequency range are 90 to 265VAC and 47 to 800Hz making this product suitable for land, sea and air based applications requiring line harmonic reduction or PFC. Typical applications include military and commercial aircraft power systems requiring MIL-STD-704/461 or DO-160 compliance. These compact power modules use advanced electrical design and thermal management techniques that make them suitable for rugged, environmentally challenged applications.



Compact 1/4 Brick Package
2.30 x 1.45 x 0.5 in.

FEATURES

- Optimized for Airborne and other Harsh Environment Applications
- 90-265 VAC INPUT, 47-800Hz
- 375VDC Output
- Efficiency 93% typical 115VAC, 400Hz Input, 95% typical at 230VAC, 50Hz input
- Extremely High Power Factor and Low THD
- Potted Module with Metal Substrate Technology
- -40°C to +100°C Base Plate Rated . No Output Power Derating - -55°C Optional
- Available in Lead Free ROHS Compliant or SnPb Solder Versions
- Ride-Through Time is essentially unlimited, depends only on the Bulk Cap Voltage

MODEL SELECTION

PFC-180 - -

Standard Options

(0, 1, or 2 characters):

Blank: Standard

T: Extended Operating Temp Range
 -55 to +100°C

C: Conformal coating

Solder Option (Blank or 2 characters):

Blank: SnPb Solder

LF: ROHS Compliant Lead Free Solder

Special Configurations (3 characters):

Assigned by Astrodyne

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375 VDC Output, ¼ Brick Package



ABSOLUTE MAXIMUM RATINGS Exceeding absolute maximum ratings may cause permanent damage or reduce reliability					
PARAMETER	OPTION	MINIMUM	MAXIMUM	UNITS	CONDITIONS
Input Voltage (AC1 to AC2)			265	VAC	Continuous
Input Voltage (AC1 to AC2)			311	VAC	100ms max.
Circuit-to-Case Voltage			2500	VDC	
Storage Temperature	Standard	-55	110	°C	
Operating Temperature	Standard	-40	100	°C	Baseplate
Operating Temperature	T	-55	100	°C	Baseplate
Soldering Temperature			260	°C	< 5 sec

SPECIFICATIONS

Electrical specifications apply for $V_{in} = 115V_{ac}$, 60 Hz or 400 Hz Full Load, $T_c = 25^\circ C$ and external application circuit components shown in figure 1, unless specified otherwise.

INPUT SPECIFICATIONS	MINIMUM	TYPICAL	MAXIMUM	UNITS	CONDITIONS
Input Voltage	90	115/230	265	VAC	
Input Line Frequency	47	50/60/400	800	Hz	
Power Factor		0.98 0.99 0.99			$V_{in} = 115V_{AC}$, 400 Hz, Full Load $V_{in} = 115V_{AC}$, 60 Hz, Full Load $V_{in} = 230V_{AC}$, 50 Hz, Full Load
Total Harmonic Distortion		2 2		% %	$V_{in} = 115V_{AC}$, 360 Hz, Full Load $V_{in} = 115V_{AC}$, 800 Hz, Full Load
Maximum Input Current		2.4	1.9	Arms Arms	$V_{in} = 90V_{AC}$, Full Load, $T_c = 25^\circ C$ $V_{in} = 115V_{AC}$, Full Load, $T_c = 100^\circ C$
Inrush Current		15 30		Apeak Apeak	$V_{in} = 115V_{AC}$, Full Load, Thermistor = $25^\circ C$ $V_{in} = 230V_{AC}$, Full Load, Thermistor = $25^\circ C$
Start-up Voltage		80		VAC	
*Hold-up/Ride Through time		50 200		ms ms	$V_{in} = 115V_{AC}$, Full Load, $C_{bulk} = 220\mu F$ $V_{in} = 115V_{AC}$, Full Load, $C_{bulk} = 880\mu F$

*Note ride through time is indefinite provided output is held above 220V

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OUTPUT SPECIFICATIONS	MINIMUM	TYPICAL	MAXIMUM	UNITS	CONDITIONS
Output Voltage	370	375	380	VDC	Vin = 115VAC, Tc = 25°C
Output Over Voltage Protection			415	VDC	Non-shutdown
Output Current	0		0.50	ADC	
Output Current Limit		NONE			PFC Enabled Input Current is limited by internal circuitry to approximately 4A peak
Efficiency		93		%	Vin = 115VAC, 400 Hz, Full Load
		93		%	Vin = 115VAC, 60 Hz, Full Load
		96		%	Vin = 230VAC, 50 Hz, Full Load
Output Ripple		10		V p-p	Vin = 115VAC, 60 Hz, Full Load
Vaux Output Voltage	10.0	11.0	12.0	VDC	Vaux Load = 0 to 3mA

CONTROL SPECIFICATIONS	MINIMUM	TYPICAL	MAXIMUM	UNITS	CONDITIONS
LD ENA Threshold (Vout rising)		340		VDC	
LD ENA threshold (Vout falling)		220		VDC	
LD ENA Logic Low Current			5	mA	
LD ENA Logic Low Voltage			0.5	VDC	

ISOLATION SPECIFICATIONS	MINIMUM	TYPICAL	MAXIMUM	UNITS	CONDITIONS
Input-to-Output Isolation		Non-isolated		VDC	
Input-to-Case Isolation	2500			VDC	
Output-to-Case Isolation	2500			VDC	
Circuit-to-Case Capacitance		3		nF	

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THERMAL/ MECHANICAL SPECIFICATIONS	MINIMUM	TYPICAL	MAXIMUM	UNITS	CONDITIONS
Thermal Shutdown Temperature	100	105	110	°C	Baseplate temperature
Thermal Shutdown Restart Temperature		90		°C	Baseplate temperature
Thermal Resistance, Case to Ambient		8.0		°C/W	Natural Convection in Free Air, No Heatsink, Tc = 100°C
Size	2.30 x 1.45 x 0.50			inch	1/4 Brick
Weight	2.3			oz.	
EMC COMPLIANCE – Certifications Pending					
	STANDARD			COMPLIANCE	
Conducted Emissions	RTCA DO160G MIL-STD-461E			Section 21.3 Categories L and M CE102	
Harmonics	RTCA DO160G MIL-STD-461E			Section 16 Cat. A(CF), A(NF) and A(W) CE101	
ENVIRONMENTAL COMPLIANCE – Certifications Pending					
	STANDARD			COMPLIANCE	
Shock	RTCA DO160G MIL-STD-810G			Section 7.2 Category B Method 516.6	
Vibration	RTCA DO160G MIL-STD-810G			Category S (Curve C) Method 513.6	
RELIABILITY					
	MINIMUM	TYPICAL	MAXIMUM	UNITS	CONDITIONS
MTBF Prediction		2.0		M hrs	MIL-217F GB 25°C

PIN FUNCTION/DESCRIPTION

AC1, AC2

These are the AC input terminals. The input should be connected to a suitable filter such as the FC250-5 or FM250-5 for best performance and compliance with applicable EMI/EMC standards. A suitable fuse and inrush limiting thermistor should be connected in series with the input as well.

Case

This terminal should be connected to earth.

+Out

This is the positive output terminal. It should be

connected to the positive terminal of the bulk capacitor. The 375 VDC output will appear here with respect to the . Out terminal. The hold-up capacitor value ranges are provided in the specifications.

-Out

This is the PFC negative output terminal. It should be connected directly to the negative terminal of the hold up capacitor. The hold-up capacitor must be located in close proximity to the PFC output terminals.

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LD ENA

This terminal provides logic control to downstream DC/DC converters. The LD ENA signal is active low initially. When the PFC output voltage reaches 340V it will switch logic state to open drain. If AC power is lost or removed, the LD ENA will return to the low state when the PFC output drops to 220 Vdc. For most RO DC-DC products, it is not

necessary to use the LD ENA terminal.

V AUX

This terminal provides an always on +11V pull up capable of providing 3mA. The V AUX supply voltage is derived from the output and will be present as long as the bulk cap voltage remains above 180V.

APPLICATION DIAGRAM

The connection diagram below shows proper connections of the PFC-180 module to a typical application circuit including fuse, filter, bulk capacitor and inrush limiting thermistor and 300/380V input DC-DC module.

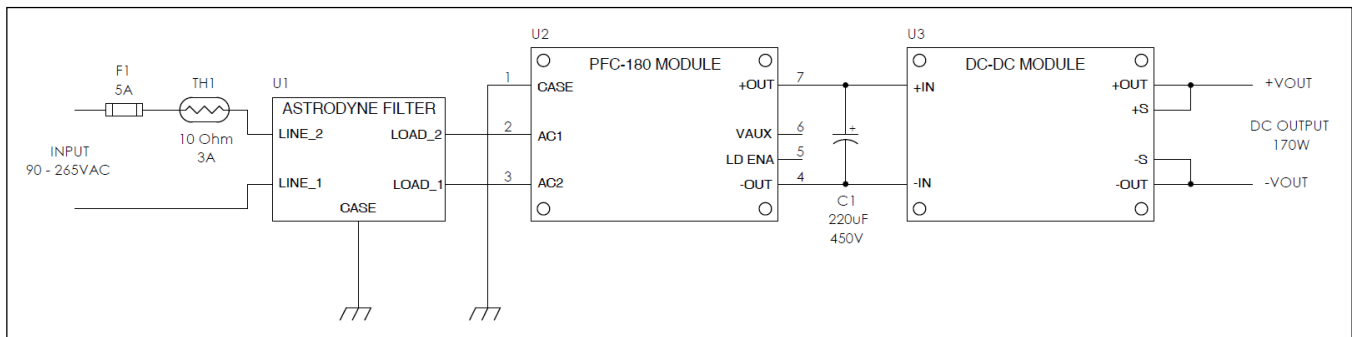


Figure 1 – Typical Application Circuit

The output is suitable for driving 300/380V input DC-DC converters up to 170W such as the QV300 Series products.

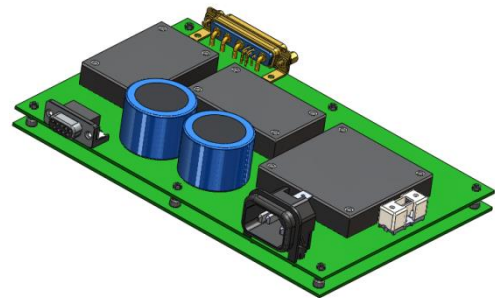
Additional applications information is available to assist in the selection of the external components.

EVALUATION BOARD

An Evaluation Board is available that demonstrates a complete AC-DC system using the PFC-180, filter and DC-DC converter.

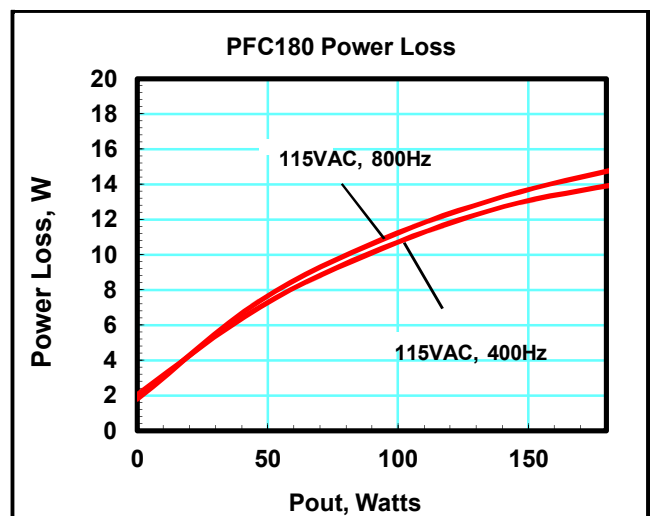
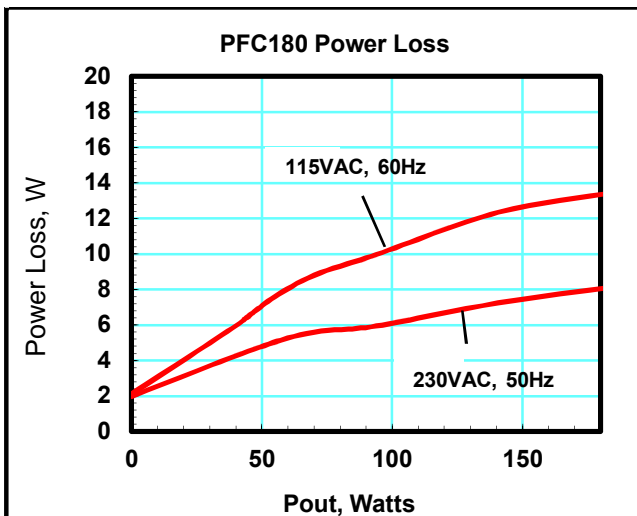
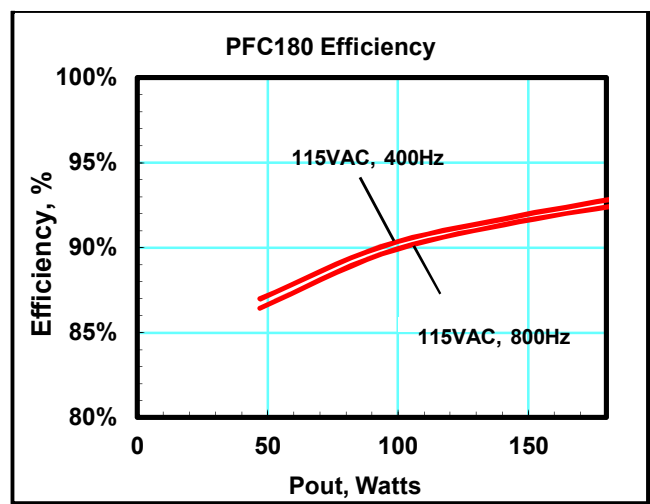
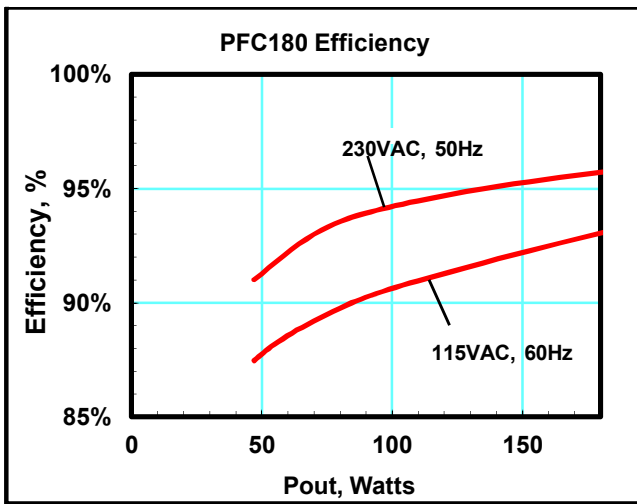
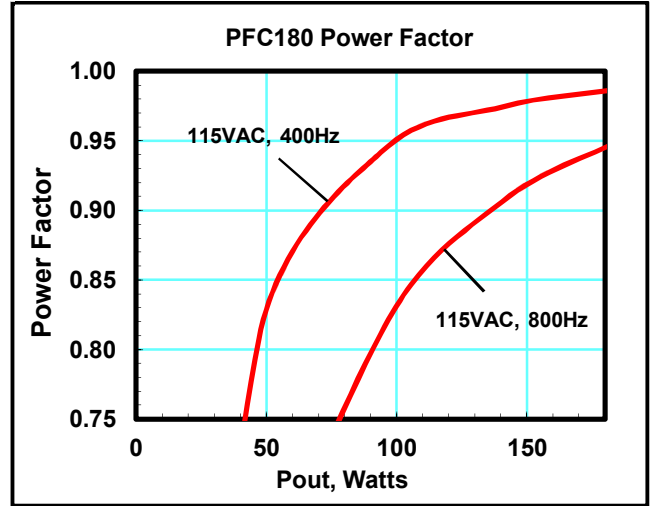
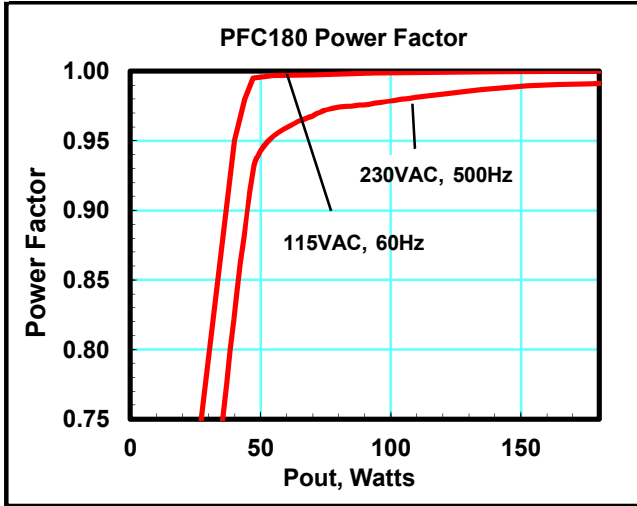
Evaluation board features :

- ~ PFC Output pinned out to 9 pin D-sub
- ~ Series or Parallel Bulk Cap connections provided
- ~ Remote Sense capability – jumpers included, sense pinned out
- ~ LED for low voltage DC Output indication included
- ~ Test points for DC-DC Output measurement included
- ~ BNC Connector for DC-DC ripple measurement included
- ~ Vaux pinned out on EB
- ~ Provision for current sharing and 3 phase operation



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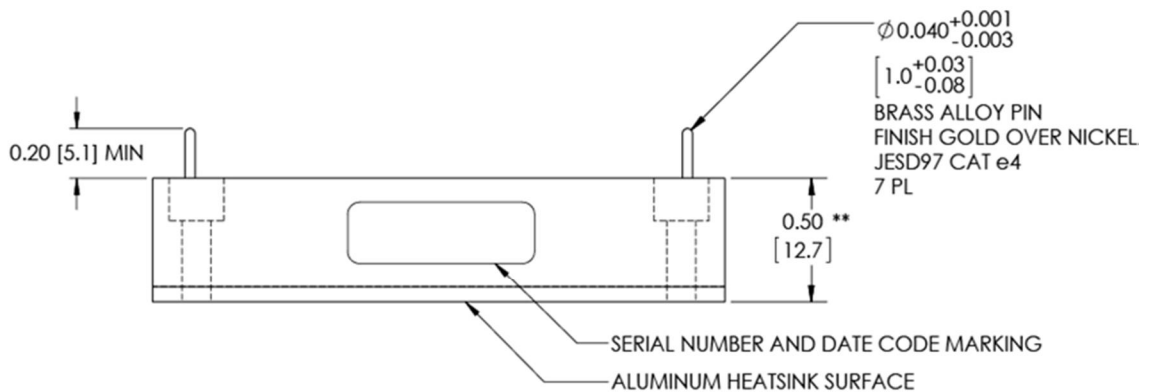
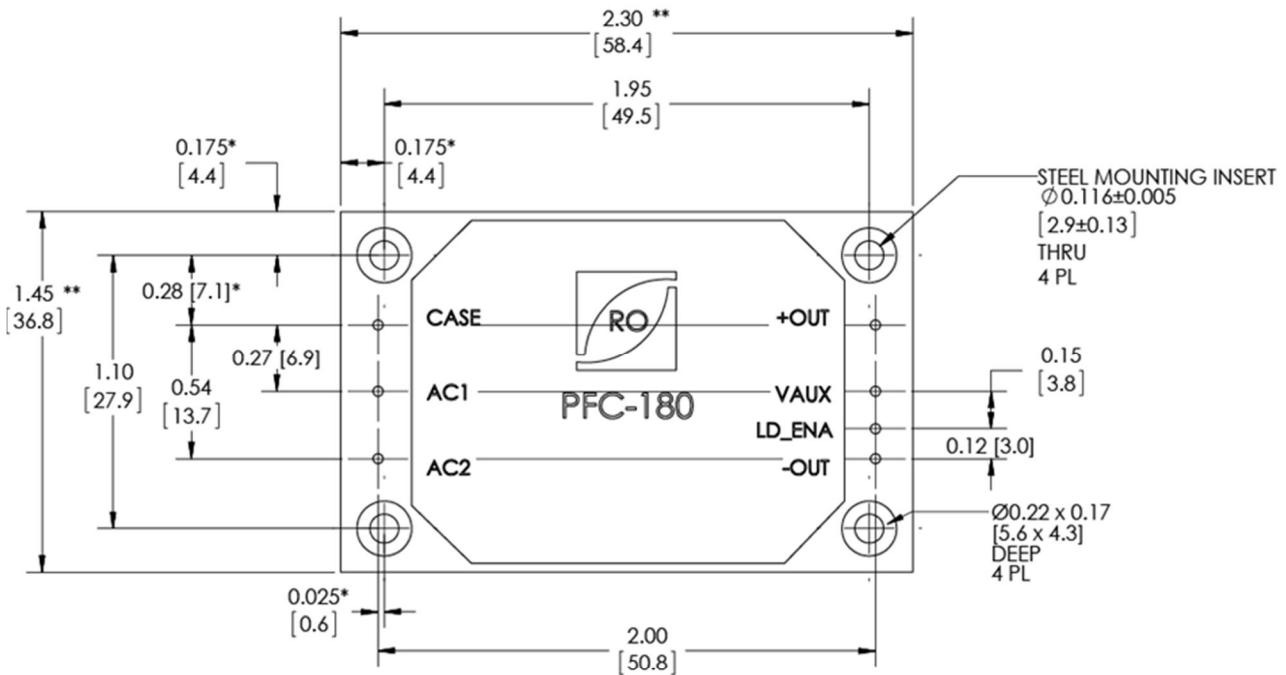
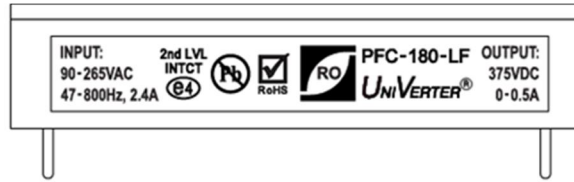


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MECHANICAL DRAWING



NOTES:

1. Projection is third angle.
2. All dimensions in inches [mm].
3. Tolerance:
 - a. Tolerance on all dimensions unless specified otherwise: ± 0.01 [0.25].
 - b. Tolerance on all dimensions marked with *: ± 0.015 [0.4].
 - c. Tolerance on all dimensions marked with **: ± 0.02 [0.5].