AMX SERIES

Single and Three Phase Linear AC Power Sources

Models from 500 VA to 12,000 VA

CE ETL LISTED

PACIFIC® POWER SOURCE

SmartSource™
PRECISION AC Power Sources
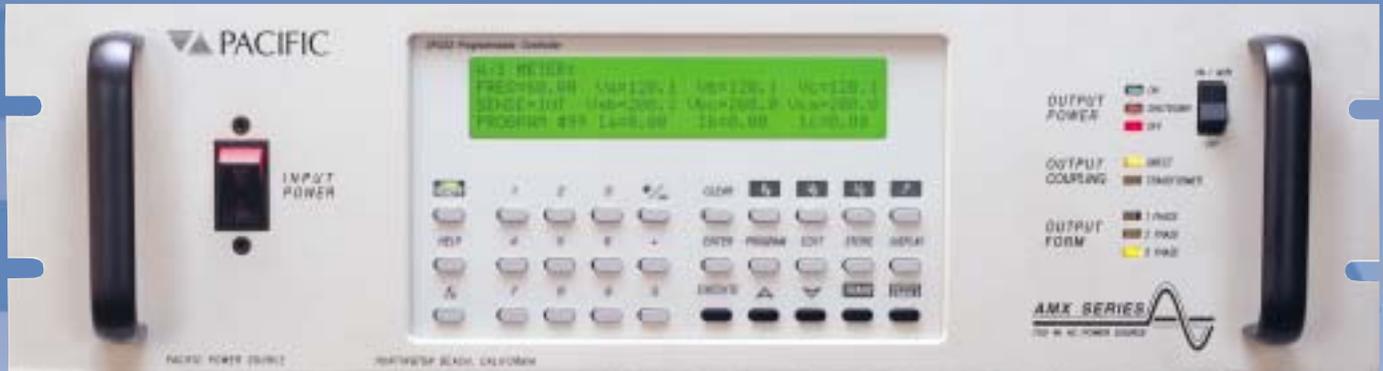
TAKE CONTROL OF YOUR AC TEST POWER

The AMX Series is a family of High Performance Linear AC power sources covering the power range of 500 VA to 12 kVA. The product line offers both single and three phase models. Units are conservatively designed and rated output power is based on the most severe combination of input line, output voltage, power factor, and temperature. This approach to product design allows the AMX Series to excel when delivering the high peak load currents demanded in the AC test environment. Great emphasis has been placed on low acoustic noise, ease of installation, and maximum power per cubic inch of rack space. Control and operating features provide a high degree of application versatility and ease of use for the test engineer. Applications range from simple, manually controlled frequency conversion to harmonic testing and sophisticated bus programmable transient simulation.

An exceptionally broad bandwidth (50 kHz small signal) combined with peak/RMS current of 4-6:1 give the AMX Series the ability to produce high quality, low distortion output power into the most dynamic loads.

Pacific Model 308AMX with UPC Controller

KEY FEATURES PROVIDE APPLICATION VERSATILITY

- IEEE-488.2 or RS-232C with SCPI compatibility
- LabVIEW for Windows®/LabWindows® drivers
- Waveform Creation by Harmonic Synthesis Option
- Graphical Analysis (Voltage and Current)
- Harmonic Analysis (Voltage and Current) Option
- Metering of RMS and Peak Values
- Continuous Self Calibration (CSC)
- Line Sync Option
- 6:1 Peak Current Capability

- Low Impedance for IEC555 Testing
- Programmable Output Impedance Option
- Up to 0-300 VAC Direct Coupled Output
- 1 Phase / 3 Phase Switch Selectable Output
- 20-5000 Hz Full Power Bandwidth
- Power Levels from 500 VA to 12 kVA
- Externally Referenced Meter Calibration
- CE or ETL Mark available

DESIGN PROVIDES TOTAL CONTROL OF AC POWER

- All AMX Series power source models may be equipped with either a programmable Oscillator/Controller (UPC type) or a manually controlled Oscillator (UMC type).
- Single phase power source models may be controlled to operate on either a 0-135 VAC range or a 0-270 VAC range. Some models can operate to 150/300 Volts. Three phase models are switchable to 3ø/2ø/1ø output power form.
- Total control of the output power form and the selection of either the direct output or the optional transformer output is available from the front panel or by computer interface.
- All operating functions may be controlled from either the front panel or from a remote RS-232 or IEEE 488.2/ SCPI interface. LabVIEW for Windows® and LabWindows® Instrument Drivers are provided.

SPECIAL AMX SERIES OPERATING FEATURES

CONTINUOUS SELF CALIBRATION

Provides for exceptional accuracy of the AC output voltage. When enabled, accuracy improves to ±0.03% referenced to the power source internal voltmeter.

PROGRAMMABLE DYNAMIC OUTPUT IMPEDANCE (OPTIONAL)

Provides positive or negative output impedance. The output voltage waveform at the right is flattened as a result of a high peak load current drawn by an electronic load at the peak of the sinewave.

Engaging the dynamic output impedance (Z_o) feature dynamically compensates, as shown at the right, for the distribution or transformer losses up to ±10% of the output voltage.

Oscillograph of voltage and current waveform at load due to distribution losses. THD=6.6%

Same conditions as above with programmable Z_o engaged. THD=0.25%

WAVEFORM LIBRARY

Up to 99 different waveforms may be stored in the waveform library for execution as part of a steady state test program or for substitution in any output phase as part of a transient test program. Memory location #1 is a non-editable high resolution sine wave. Locations 2-16 are editable and may be substituted in any output phase. Locations 19-99 are factory stored, non editable waveforms that may be copied to 2-16 for editing and execution.
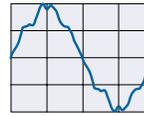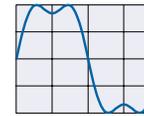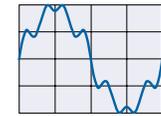
THD=8.7%   THD=22.2%   THD=18.1%

WAVEFORM EDIT

Provides the ability to modify a stored waveform by specifying the waveform amplitude desired at each specific phase angle. This method can be used to quickly create spikes, dropouts, notches and other sub-cycle wave conditions. The resulting modified waveform can be stored for execution.

```
EDIT WAVEFORM: NUMBER=16   RANGE=2-16
STARTING PHASE ANGLE=0     0-359.5°
ENDING PHASE ANGLE=0       0-359.5°
VOLTAGE IN PERCENT=-100    (+/-)0-100%
```

WAVEFORM EDIT

WAVEFORM ANALYSIS (OPTIONAL)

Provides a numeric display of the harmonic structure of a voltage or current waveform. The waveform is sampled at 512 samples per cycle using a 12 bit A/D converter. The resulting high fidelity waveform is analyzed for its harmonic structure up through the 51st harmonic. Data presented includes the magnitude of each harmonic in %, the total harmonic distortion, and the odd and even harmonic distortion in %.
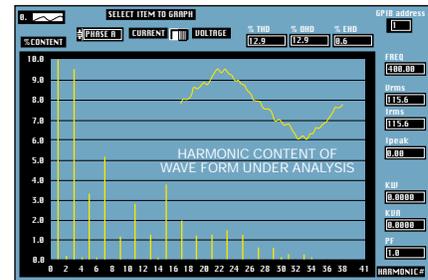
HARMONIC CONTENT OF METERED WAVEFORM

WAVEFORM SYNTHESIS (OPTIONAL)

Provides the ability to quickly create virtually any AC Test Waveform that may be required by building it out of harmonics. The process is as simple as keying in the harmonic multiple, the amplitude, and the phase angle for each desired harmonic up through the 51st. If desired, waveforms may also be created in the time domain by making entries from the front panel or by downloading from a host PC.

```
WAVEFORM SYNTHESIS:   WAVEFORM #2
HARMONIC:     2nd    3rd   4th  5th   6th
CONTENT:      .1%    0%    0%   0%    0%
ØANGLE:       0°     0°    0°   0°    0°
```

WAVEFORM SYNTHESIS

TIME BASED TRANSIENTS

Provide the ability to create and execute on command, transients that occur linearly over a specified time segment to modify output voltage or frequency.

CYCLE BASED TRANSIENTS

Provide the ability to create and execute, on command, transients that substitute a selected waveform in the output for 1 to 100 cycles. The waveform being substituted can be selected and/or modified from the waveform library. Substitution is for an integer number of cycles, regardless of frequency.
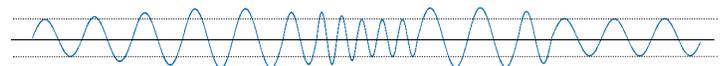
TIME BASED TRANSIENTS
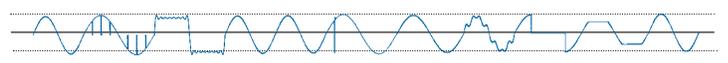
CYCLE BASED TRANSIENTS

METERING

```
V/I METER:                    ENTRY: 120.0
FREQ=60.00  Va=120.0  Vb=120.0  Vc=120.0
SENSE=INT  Vab=208.0 Vbc=208.0 Vca=208.0
MANUAL MODE  Ia=06.00  Ib=06.22  Ic=06.15
```

```
POWER METER:    PHASE A    PHASE B    PHASE C
KVA              0.720      0.746      0.738
KW               0.720      0.746      0.738
PF               1.000      1.000      1.000
```

```
AMPS METER:     PHASE A    PHASE B    PHASE C
RMS              0.720      0.746      0.738
PEAK             1.044      1.119      1.383
CREST FACTOR     1.45       1.50       1.90
```

WAVEFORM CONTROL/ANALYSIS

```
EDIT WAVEFORM: NUMBER=16        RANGE=2-16
STARTING PHASE ANGLE=0          0-359.5°
ENDING PHASE ANGLE=0            0-359.5°
VOLTAGE IN PERCENT=-100         (+/-)0-100%
```

```
WAVEFORM SYNTHESIS:  WAVEFORM #2
HARMONIC:   2nd    3rd    4th    5th    6th
CONTENT:    .1%    0%     0%     0%     0%
ØANGLE:     0°     0°     0°     0°     0°
```

```
ØA CURRENT THD=17.8 % OHD=17.8 EHD=0.3%
HARMONIC:   2nd    3rd    4th    5th    6th
CONTENT:    .1%   17.8%   0%     0%     0%
ØANGLE:     0°     0°     0°     0°     0°
```

FUNCTION KEY
PROVIDES ACCESS TO SPECIAL FUNCTIONS

```
SETUP:  PRESS  1 FOR PROGRAM SETUP
               2 FOR WAVEFORM SETUP
               3 FOR GENERAL SETUP
               4 FOR CALIBRATION MENU
```

PROGRAM SETUP
• Copy a program
• Delete a program
• Erase all memory, reset CPU

WAVEFORM SETUP
• Edit a waveform
• Copy a waveform
• Waveform synthesis

GENERAL SETUP
• UPC setup
• LCD setup
• UPC status
• Power source status
• Range control
• Slew rate setup

CALIBRATION MENU
• Execute externally referenced calibration
• View calibration constants

SPECIAL FUNCTIONS ACCESSED THROUGH

• **SENSE**	Establishes either local or remote sense for me
• **CSC**	Continuous self calibration – provides for exce
• **PROGRAM Z₀**	Programmable output impedance dynamically distribution losses. Can simulate a soft power g
• **TRANSITION TIME**	Permits control of the transition time when cha
• **FREQUENCY LIMITS**	Sets min and max programmable frequency lin
• **VOLTAGE LIMITS**	Sets min and max programmable voltage limits

INFORMATIVE 160 CHARACTER LCD DISPLAY
• Soft green backlight
• Adjustable

PARAMETER SELECT KEYS
Select phase voltages and operating frequency when manual control is desired. The selected parameter is indicated by the LCD display. The clear key erases entries and keeps erasing with repeated pressing until the basic V/I screen is displayed.
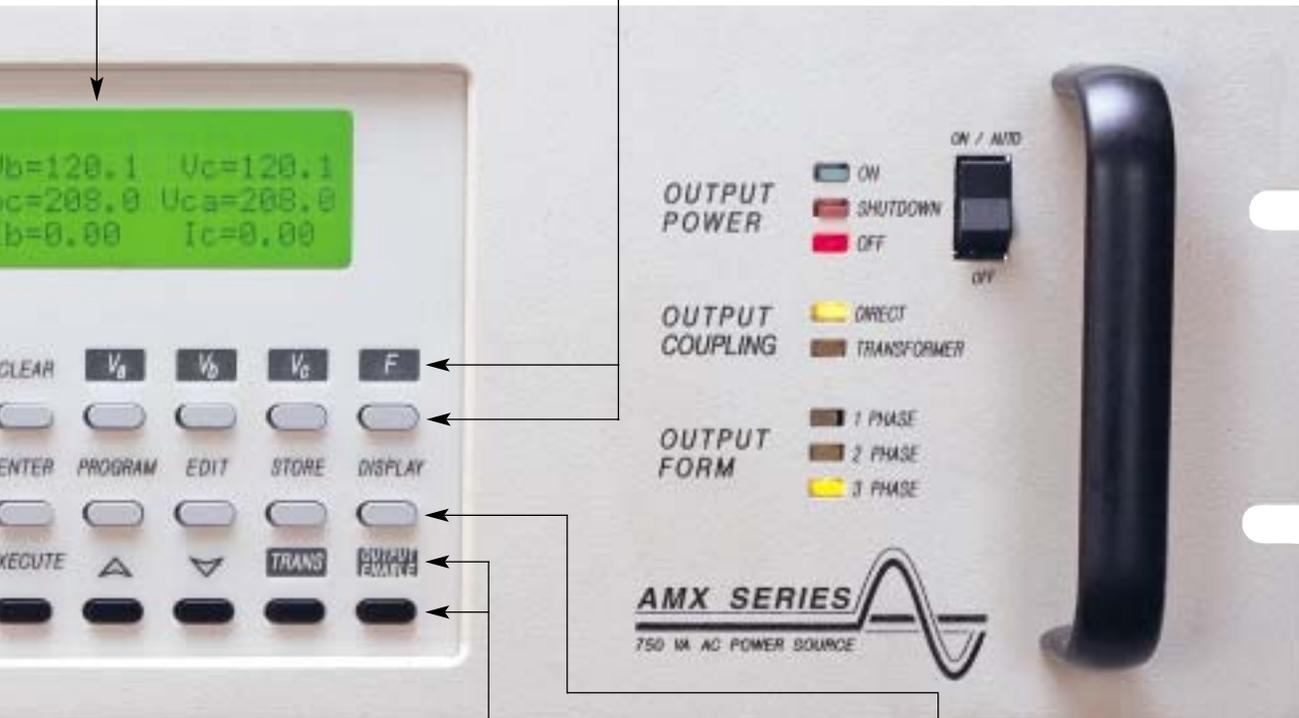
UPC SETUP MENU

...etering and CSC.

...ptional voltage accuracy.

...compensates for output transformer or line
...grid.

...anging the output voltage and frequency.

...nits.

...s.

EXECUTE KEY
Instantly executes a stored program that has been selected with the program key.

SLEW KEYS
Smoothly change the designated voltage or frequency parameters. Rates are separately programmable.

TRANSIENT (TRANS) KEY
Turns time based or cycle based transients On or Off. Indicator is On when transient is executed.

OUTPUT ENABLE KEY
Turns the output contactor of the power source On or Off. Indicator is On when the contactor is closed.

ENTER KEY
Stores new parameter data that has been keyed in.

PROGRAM KEY
Selects 1 of 99 programs for edit or execution.

EDIT KEY
Selects the program edit mode and prompts for new entry.

STORE KEY
Stores a program upon completion of editing.

DISPLAY KEY
Sequences through each metering screen:

• V/I Meter
• Power Meter
• AMPS Meter
• Waveform Analysis (option)

AMX POWER SOURCE MODELS

MODEL	RATED POWER (VA)	MAX POWER (VA)	OUTPUT FORM Note 1	OUTPUT VOLTS-MAX (V_{RMS}) Note 2	OUTPUT AMPS (A_{RMS}) Note 3	OUTPUT AMPS (A_{PEAK})	INPUT POWER FORM Note 4	PANEL HEIGHT (IN.)	WEIGHT (LBS.)
105AMX	500	800	1ϕ	135/270	4/2	40/20	1ϕ	5 $1/4$	65
108AMX	750	1200	1ϕ	135/270	6/3	40/20	1ϕ	5 $1/4$	65
112AMX	1200	1400	1ϕ	150/300	10/5	40/20	1ϕ	5 $1/4$	65
125AMX	2500	3900	1ϕ	150/300	20/10	90/45	3ϕ	10 $1/2$	110
140AMX	4000	6400	1ϕ	135/270	32/16	140/70	3ϕ	14	170
305AMX	500	950	3ϕ	135/270 135 (L-N)	4/2 1.5 PER ϕ	45/15 15 PER ϕ	1ϕ	5 $1/4$	65
308AMX	750	1200	3ϕ	135/270 135 (L-N)	6/2 2 PER ϕ	45/15 15 PER ϕ	1ϕ	5 $1/4$	65
312AMX	1200	1450	3ϕ	150/300 150 (L-N)	10/3.3 3.3 PER ϕ	45/15 15 PER ϕ	1ϕ	5 $1/4$	70
320AMX	2000	3000	3ϕ	135/270 135 (L-N)	18/6 6 PER ϕ	60/20 20 PER ϕ	3ϕ	8 $3/4$	100
345AMX	4500	7250	3ϕ	135/270 135 (L-N)	36/12 12 PER ϕ	165/55 55 PER ϕ	3ϕ	14	175
360AMX	6000	9700	3ϕ	135/270 135 (L-N)	48/16 16 PER ϕ	210/70 70 PER ϕ	3ϕ	14	185
390AMX	9000	14500	3ϕ	135/270 135 (L-N)	72/24 24 PER ϕ	330/110 110 PER ϕ	3ϕ	28 (2 each x 14")	175 x 2
3120AMX	12000	19400	3ϕ	135/270 135 (L-N)	96/32 32 PER ϕ	420/140 140 PER ϕ	3ϕ	28 (2 each x 14")	185 x 2

Notes:

1. All single phase units are operable with dual voltage ranges as listed. All three phase units are operable as single phase with dual voltage range capability or as three phase. Output voltage ranges and 1ϕ / 3ϕ conversions are selected by front panel or bus command.
2. Output voltage ranges listed are for standard units. V_{MAX} is achievable with nominal input voltage at full load. Other voltage ranges are available with the output magnetics option.
3. Current ratings at 125 V_{RMS} output.
4. Input power frequency is 47-63 Hz. Single Phase: 100, 110, 120, 208, 220, 230, 240, VAC ± 10%. Three phase: 208, 220, 240, 380, 400, 416 VAC ± 10%.(480 VAC option available)
5. Single phase input is available as an option for three phase input units.

POWER SOURCE SPECIFICATIONS

Output Frequency:	20 to 5000 Hz. Full Power
Line Regulation:	0.1% max for a 10% line change
Load Regulation:	0.25% 20 to 2000 Hz. 0.5% 2000 to 5000 Hz. Can be improved to less than 0.03% with CSC engaged.
Output Distortion:	0.1% THD from 20 to 1000 Hz 0.25% THD from 1000 to 5000 Hz
Ripple and Noise:	-72 dB
Response Time:	5μsec. typical to a step load change. Small signal bandwidth is 5 Hz. to 50 kHz, typical.

MECHANICAL SPECIFICATIONS

All models are designed for operation in 19 inch equipment racks. Models above 1800 VA have side handles for ease of handling.

Mounting:	Standard 19 inch rack. Slide rails are available as an option for all models.
Height:	See model table above for panel height.
Depth:	Will not exceed 24 inches from the front panel to the rear of the chassis.
Cooling:	Forced air, front or side intakes, rear exhaust with auto fan speed control for low acoustic noise operation.

POWER SOURCE SPECIFICATIONS

AMX Series Power sources can be equipped with output transformers to provide an alternate output voltage range. Selection of direct or transformer coupled range is performed by the controller via front panel or bus command. The standard frequency range for transformer coupled outputs is 45 to 5000 Hz. Standard output ratios are 1.5:1, 2.0:1, and 2.5:1. Transformer outputs are supplied internally or externally via a Magnetics Module. Consult the factory for additional information regarding special output ranges not listed.

UPC CONTROLLER SPECIFICATIONS

The UPC controller is essentially a 3φ AC arbitrary waveform generator and Precision AC metering system. Each waveform stored in the UPC is encoded with 12 bit amplitude and 10 bit time resolution for each cycle. The waveform for each phase may be independently selected and may be independently varied in amplitude and phase angle with respect to phase A.

The UPC output metering samples the output volts and amps at 512 samples per measurement using a 12 bit A/D converter. This technique provides exceptional metering accuracy and resolution (20 bits), and delivers a high-fidelity waveform back to a host computer for analysis.

The UPC includes a remote GPIB interface compatible with IEEE 488.2 and SCPI. An available option is an RS-232 serial port that operates up to 38.4 kBaud.

Frequency : 20.00 to 5000 Hz ± 0.01%

Voltage Direct : Programmable, 0-V_{MAX} in 0.1 volt steps (see table on page 6)

Voltage Transformer : Multi-range units are equipped with output transformers. When alternate range is selected, voltage at transformer output is programmable in steps of 0.5 volts.

Accuracy Command Voltages : Executed voltage is within ± 50 mv (0.03%) of command voltage, referenced to the internal voltmeter with CSC engaged.

Accuracy Command Frequency : ± 0.01%, 20-5000 Hz

Output Z_o (Optional) : Dynamic output impedance (Z_o) is programmable, 0 to ± Z_o max. in 0.1% steps. Z_o value in milliohms varies with different models but usually results in a ± 10% change in output voltage at maximum load amps.

Phase Angle : Phase Angle (φ) of Phases B and C relative to Phase A is programmable from 0-359° in 1° increments ± 0.5°.

Current Limit : Current limit is programmable from 0 to I_{PEAK} maximum of the power source. Accuracy is ± 1%, resolution ± 0.05%.

Library Steady State Programs : Stores up to 99 steady state parameter sets consisting of waveform, voltage, frequency, φ angle and current limit. Can be executed by program number from the front panel or the bus.

Library Transient Programs : Stores up to 99 transient programs - one associated with each steady state program. Allows for changes in volts and frequency vs. time, or waveform changes by cycle count.

Library Waveform : Stores up to 99 waveforms that can be edited and executed in any manner and in any output phase.

Voltmeter : Range - 0-354 volts L-N
0-708 volts L-L
Resolution - 0.10V_{AC} to front panel
0.001V_{AC} to remote interface
Accuracy - ± 0.25% of reading ± 0.1% of range (50-500Hz)

Ammeter : Range - 300% of system current rating
Resolution - 0.01A_{AC} to front panel
0.001A_{AC} to remote interface
Accuracy - ± 0.25% of reading ± 0.1% of range (50-500Hz)

Power Meter: Range - Based on ammeter range
Resolution - 1.0 watts or VA to front panel
0.001 Watts or VA to remote interface
Accuracy - ± 1% of Full Scale

Power Factor: & Crest Factor : Calculated and displayed to three significant digits.

Ext. Input: Each phase is algebraically summed with UPC waveform and amplified 25X to the direct output.

Amplitude Mod. Input : ± 10 volt input for each phase modulates the output ± 100%

Sync Outputs: 1) Zero crossing, Phase A
2) Transient start-stop
3) True when Transient is enabled
4) Clock - 1024 times the output freq.

Command Response Time : Average time to start of parameter change from bus command (end of string character) is 50 ms.

Ramp transition time to final value is settable from 250 µs to 300 sec.

Waveform Synthesis : Permits waveform creation by entering % amplitude and phase angle for the 2nd through the 51st harmonics.

Waveform Analysis : Reports voltage and current waveform harmonic content in % and phase angle for the 2nd through the 51st harmonics. Displays THD, OHD, EHD in %.

MANUAL CONTROL OF AC POWER

Provide easy manual control with Pacific's UMC-31 Manual AC Power Controller.

UMC-31 Manual Controller

- Obtain precision frequency and phase conversion for manufacturing and test.
- Provide high quality, general purpose lab power where test versatility is required.
- Achieve low cost and power form flexibility for power supply tests.

The UMC-31 provides operational control and high quality oscillator signals for both single and three phase Power Sources.

SPECIFICATIONS UMC-31 CONTROLLER

Phase: Select single, split, or three phase operation by internal jumper. Phase angles are fixed at 120° and 240° for three phase operation.

Frequency: Select 50, 60, or 400 Hz fixed or a variable frequency mode of 45 to 500 Hz.

Voltage: 0-V_{MAX} via 10 turn potentiometer on the front panel.

Metering: Autoranging Volts, Amps, and Frequency.

CALL FOR TECHNICAL AND APPLICATION ASSISTANCE

Pacific's technical people are committed to assist you. We are a technically oriented company that designs, manufactures, and services leading edge AC Test Power equipment. We understand your requirement for strong applications support and we provide it!

When you call, here are a few of the services we will provide for you:
- Access to both the PPS factory and your local technical support people.
- An opportunity to discuss and define your AC power needs and objectives.
- A discussion and written presentation of your technical, performance, and cost alternatives.
- Comprehensive product literature and product specifications for appropriate equipment.
- A list of customers who have purchased and used similar Pacific equipment.

For Application Engineering Assistance	
Contact the factory directly **PACIFIC** POWER SOURCE 17692 Fitch, Irvine, CA 92614 Phone: 949-251-1800 • Fax: 949-756-0756 TOLL FREE: 800-854-2433 E-Mail: sales@pacificpower.com WEB: www.pacificpower.com	or consult your local PPS Representative.

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