

# MS Series

## Solid State Frequency Converter

### **High Performance AC Power for Today's Electronic Loads**

Pacific's unique master/slave configuration allows up to ten 62.5 kVA mainframes to be paralleled in the field. Any mainframe may be designated as the master. A failed unit is automatically disconnected from the power grid providing unmatched mission reliability.

### **Pacific's MS Series Power Source Systems Feature:**

- Maximum system reliability.
- Lower installation cost.
- Lower maintenance cost.
- Unmatched performance/price ratio.
- Rugged, powerful output.
- All frequency operation.
- Facility/test power flexibility.
- Simple display and diagnostics.
- Uninterruptible Power Source configuration (UMS Option) readily available.



**62.5 to >625 kVA  
47 to 500 Hz**



**MAXIMIZE  
PERFORMANCE AND VERSATILITY  
VIRTUALLY ELIMINATE DOWNTIME**

*The Power of Expertise*



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# True Advantages

## Solid State Technology

## Unmatched Price/Performance Ratio

*Pacific Power Source's MS Series equipment is a family of High Performance Line Conditioners/Frequency Converters designed to provide highly flexible, yet reliable, AC power ranging from 62.5 to >625 kVA. Using field-proven double conversion methods, the MS Series provides unmatched power quality without sacrificing size or efficiency.*

Input AC power is rectified to DC by a special input power supply section. This minimizes input current distortion and prevents the load power factor from reflecting back onto the utility line. The DC is then converted back to AC by a high frequency, solid state, pulse-width modulated switch-mode inverter under the control of a highly stable digital oscillator. The result is exceptional system performance with maximum reliability.

### Rugged, Powerful Output

- **350 Amps of Pulse Current** is delivered by each 3060-MS for driving non-linear loads. This eliminates the need to oversize facility power as is common to rotary or low quality PWM power systems.
- **Load Power Factor** is not an issue. The 3060-MS will drive virtually any load without damage or risk.
- **Excellent Regulation** and response time eliminates load "cross talk." Voltage sags common to other conversion methods are eliminated with 150 microsecond response time to a 50% load step. The output recovers to  $\pm 3\%$  of nominal within less than 1/10th of a cycle at 400 Hz.

### Maximum Reliability

- **Each 3060-MS** is capable of operating as either the master or slave in a multi-cabinet parallel system. Calculated single cabinet MTBF is greater than five years.
- **Mission Reliability** is ensured. The parallel system architecture is such that a failed slave unit automatically removes itself from the power grid. Should the master unit fail, the operator can select any other paralleled unit as the new master from the front panel and restore system operation.

### Simple/Informative Display

- **Measures** volts, amps, watts and kVA for each input and output phase.
- **Efficiency** is continuously monitored, allowing system performance verification.
- **Internal Diagnostics** assist in quickly locating failed components, resulting in extremely low MTTR.
- **Power Generation** circuits are separate from display and diagnostics. A failure in the display logic will not affect output power quality. Output power cannot be interrupted by system interrogation.
- **Audible and Visual Alarms** alert the operator to any conditions requiring attention.

### Low Cost of Ownership

- **Lower Maintenance Costs** are achieved through built-in diagnostics that minimize MTTR. Quick and easy repair is facilitated with a small complement of local spares.
- **Input Power Factor** is a constant 0.95 lagging, regardless of load. The MS Series actually corrects PF reflected back to the utility, eliminating PF penalties.
- **Low Installation Cost.** The MS Series fits through standard doorways. Audible noise is limited to cooling fans. There is no 400 Hz whine that requires noise isolation. Solid state design with a forklift base eliminates the need for concrete pads and vibration isolators common to rotary installations.

### Facility/Test Power Flexibility

- **Power Levels Grow** with demand. Units may be added or removed from the power grid as required.
- **Variable Frequency** range of 47–500 Hz, as well as switch selectable fixed frequency operation of 50, 60 or 400 Hz, is standard on every model.
- **External Input** is provided as a standard feature. This allows operation as a variable frequency test power amplifier.
- **UPC-32 Programmable Controller Option** is available to provide steady state and transient control of output power from the RS-232 or GPIB bus.

# The 3060-MS Delivers High Quality AC Power for All Applications

## Electrical Specifications

### OUTPUT

<b>Power</b>	62.5 kVA/50 kW for each 3060-MS.
<b>Voltage</b>	0–120/208, 3 phase. May be loaded either WYE or Delta. Other optional voltages and configurations are available, such as: 0–240, single or split phase.
<b>Current</b>	175 Arms per phase continuous. 350 Apk per phase for non-linear loads.
<b>Overload (kW)</b>	110% for 1 hour. 125% for 10 minutes. 150% for 10 seconds.
<b>Frequency</b>	Selectable, crystal-based frequencies of 50, 60 or 400 Hz, variable oscillator range of 47 to 500 Hz, and external oscillator input are all standard.
<b>Distortion</b>	1% maximum THD, 50/60 Hz. 2% maximum THD, 400 Hz.
<b>Load Regulation</b>	±1% with AGC enabled.
<b>Line Regulation</b>	±1% maximum for ±10% line voltage change.
<b>Load Transient Response and Recovery Time</b>	150 microseconds for 50% load step and 300 microseconds for 100% load step.
<b>Load Power Factor</b>	Any. Unit delivers full rated kVA into any power factor.
<b>Load Balance Restrictions</b>	None. Each phase is independently regulated.
<b>Isolation</b>	Input is fully isolated from output and frame ground.
<b>Protection</b>	Integral electronic current limiting with auto recovery. Output CB optional.

### INPUT

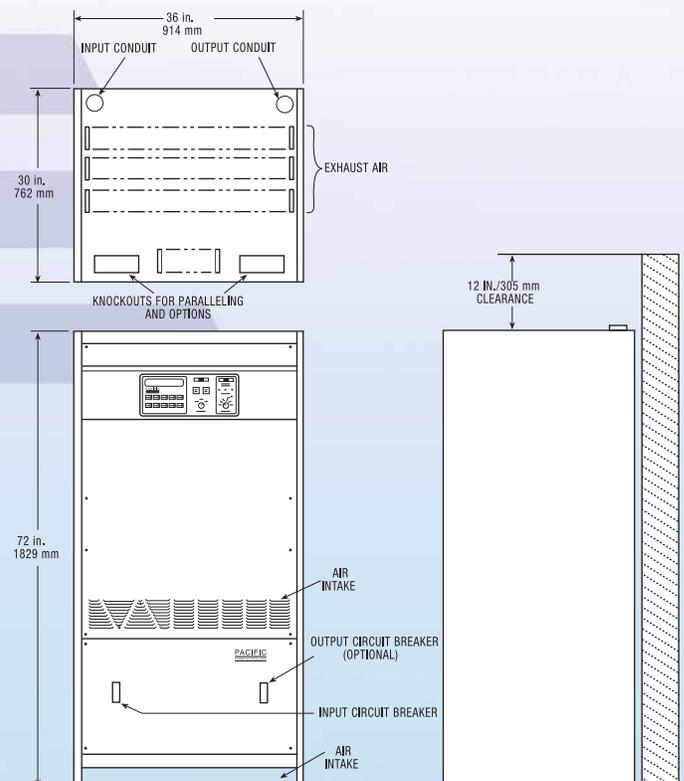
<b>Voltage</b>	208, 240, 380, 400, 416 and 480 VAC, 3 phase Delta ± 10%.	
<b>Frequency</b>	47–63 Hz.	
<b>Power Factor</b>	0.95 lagging.	
<b>Protection</b>	Input CB Standard. Slow turn-on circuit is provided to limit inrush current.	
<b>Recommended Input Service</b>	<b>Input VAC</b>	<b>Arms</b>
	480	80
	416	100
	400	100
	380	100
	240	175
	208	175

## Physical Specifications

<b>Size</b>	36" W × 30" D × 72" H (see diagram).
<b>Weight</b>	715 kg (1575 lbs.).
<b>Ventilation</b>	Self-contained fans; bottom intake, top exhaust. 1,200 CFM.
<b>Noise Level</b>	65 dbA at 3 feet.
<b>Efficiency</b>	85 to 90%.
<b>Ambient Temperature</b>	0° to +50°C (32° to 122°F) operating. –10° to +70°C (+14° to +158°F) storage.
<b>Service Access</b>	Unit is designed for front access. Power cabling is routed through either top or bottom knock-outs.

## Additional Features

- Run time meter.
- Auto restart.
- RS-232 serial port for remote monitoring and diagnostics.
- Programmable voltage and frequency alarm set points.
- Optional GPIB Interface with SCU/UPC-32 Programmable Controller.
- Local automatic gain control. Remote sense optional.
- ETL listing (available on standard MS Series cabinet only).
- CE label available.



## UMS Option MS Series Battery Support Systems

The battery support system for a single cabinet UMS installation (62.5 kVA, 50 kW) consists of 30 sealed, maintenance free, immobilized electrolyte batteries installed in a Zone 4 cabinet. The UMS system DC voltage regulator provides for automatic charging of the battery system to maintain the proper float voltage.

A battery disconnect is located in the center of the battery cabinet front door.

Battery support time at full load (50 kW) is approximately 15 minutes. The waveform quality at the end of the battery support time meets the requirements of MIL-STD 1399, section 300A, Types I, II and III power forms.

### On-Line, No-Risk Battery Test

This feature of the UMS system provides the ability to perform a battery test on command from the front panel or RS-232 serial port. Test results are displayed on the front panel and are available over the serial port as a part of the system diagnostics. A battery failure during the test will not cause the system to drop the load or distort the output waveform.

## High Power Programmable AC Test System/Utility Line Disturbance Simulator

Add Pacific's M3235 SCU-UPC32 Programmable Controller option and convert your 3060-MS into a fully featured AC Power Test System. When controlled by the SCU-UPC32 Programmable Controller, the AC Power Source will offer almost any combination of waveform, voltage, and/or frequency variation experienced on the local AC Mains.

Pacific Power Source has long been the leader in programmable AC Power Sources. Using a combination of software and hardware features, the operator may generate line harmonics, frequency shifts, voltage transients and other power line disturbances for application to the equipment under test.

The UPC controller is essentially a 3 phase AC arbitrary waveform generator and precision AC metering system. 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.



## The Leader in Power Technology

As a privately held, leading manufacturer of high-quality AC Power Conversion Equipment, Pacific Power Source, Inc. offers standard catalog products that range in power from 500 VA to >625 kVA. Low-power products include line conditioners, frequency converters and Programmable AC Power Sources. High-power systems include programmable power test equipment, power line conditioners, frequency converters and uninterruptible AC Power Sources.

Founded in 1971, the Irvine, California, company was an early pioneer in the development of linear solid-state power conversion for use in high-reliability applications. The company now manufactures both advanced linear and broadband switching types of AC Power Sources.

### For Application Engineering Assistance

Contact the factory directly



Consult your local PPS Representative

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