

**62.5kVA**  
**50, 60, 400 or 47-500 Hz**

Direct Coupled Output (3Ø): 0-120<sub>V<sub>L-N</sub></sub> / 0-208<sub>V<sub>L-L</sub></sub>  
 Output Transformer options available for higher voltage ranges.

### System Summary:

- Power: 50kV/62.5kVA per Chassis
- Output Voltage 0-120<sub>V<sub>L-N</sub></sub> / 0-208<sub>V<sub>L-L</sub></sub> 3 Phase Wye or Delta. Optional External Output Transformers Available to meet higher voltage range requirements.
- Single or Split Phase Output Configurations Available.
- Current: Paralled Systems to 1750A/Phase
- Frequency Range: 50, 60 or 400Hz fixed , 47-500Hz Variable or 20-1000Hz Variable with SCU/UPC32 Option.

### System Features:

- Voltage and Frequency Conversion.
- Highly Flexible and Expandable Power Architecture with Unique Master/Slave Configuration up to 625 kVA.
- Very High Current Capability.
- Low Voltage Distortion.

### Included with Standard Delivery:

- 3060-MS Solid State Frequency Converter.
- User Manuals.



The **Model 3060-MS** is a high power solid state frequency converter consisting of one to ten 50 kW/62.5 kVA, 3 phase AC Power Sources. The MS Series offers reliable voltage and frequency conversion and power monitoring for facilities power and/or AC power test applications. By adding the external SCU/UPC-32 Universal Programmable Controller, the MS Series can be operated as a fully featured programmable AC Power Source complete with arbitrary waveform generation and AC transient programming.

### Maximum System Flexibility and Reliability

Capable of operating as either the master or slave in a multi-cabinet parallel system. Easy to reconfigure to meet changing test needs.

### Control and Monitor Panel

The 3060-MS is equipped with simple to use front panel controls for setting output voltage and frequency. This panel also provides read back on both AC input and AC output Frequency, Voltage, Current and Power as well as diagnostic information on system status and operation. For general frequency conversion facility power applications, the front panel controls provide all necessary setting and monitoring capabilities. For AC power test and development applications, the external SCU/UPC-32 programmable controller may be added as an option.



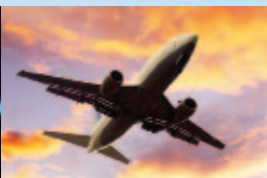
Optional SCU/UPC32 M993235 Remote Controller



THE POWER OF EXPERTISE



FREQUENCY CONVERSION



AEROSPACE



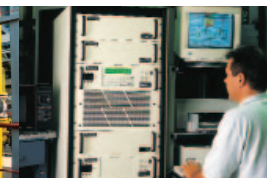
R & D



MILITARY



MANUFACTURING



CUSTOM

## True Advantages

### Solid State Technology

#### Rugged, Powerful Output

- **350 Amps of Pulse Current** per phase is delivered by each 3060-MS for driving non-linear loads. This eliminates the need to oversize facility power as is common for 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 providing configuration flexibility.
- **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

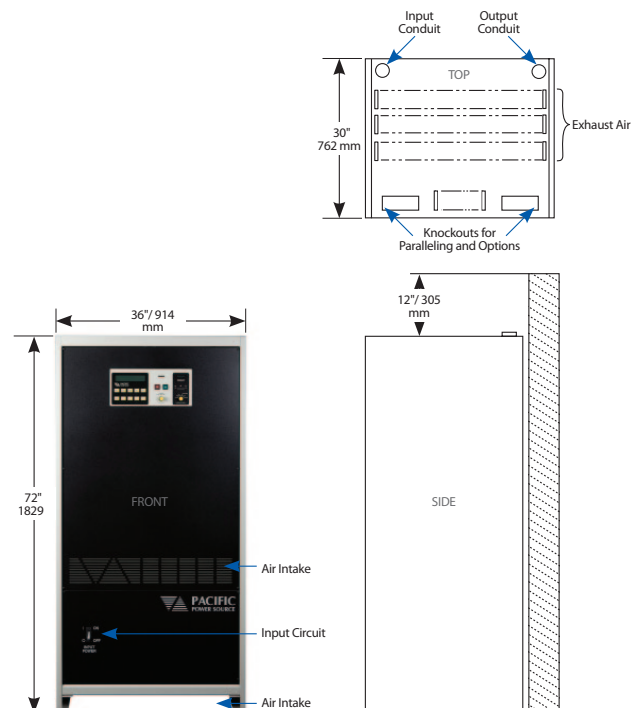
- **Measures** volts, amps, watts and kVA for each input and output phase.
- **Efficiency** is continuously monitored, allowing system performance verification.
- Internal Diagnostics assist in quickly locating failed components, resulting in extremely low MTTR.
- **Power Generation** circuits are separate 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 0.9 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. Casters are optional if desired.

#### 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.



## AC Output Specifications

POWER	62.5kVA/50kW for each 3060-MS
VOLTAGE (Nominal)	Direct Coupled: 0-120/208V, 3-phase External Transformer Options: Consult factory for details.
CURRENT RMS	175 A <sub>RMS</sub> /Phase continuous Pf < 0.8=175A <sub>RMS</sub> /Phase Pf 1.0=140A <sub>RMS</sub> /Phase
OVERLOAD (KW)	110% for 1 hour, 125% for 10 minutes, 150% for 10 seconds
FREQUENCY	50Hz, 60Hz or 400Hz Fixed settings 47 - 500 Hz Variable
VOLTAGE THD	< 1% max. Vthd at 50 or 60Hz < 2% max. Vthd at 400Hz
LOAD REGULATION	±1% @ 50/60Hz, ±2% @ 400Hz with Automatic Gain Control (AGC) enabled
LINE REGULATION	±1% maximum for ±10% line voltage change
LOAD TRANSIENT RESPONSE AND RECOVERY TIME	150 microseconds for 50% load step and 300 microseconds for 100% load step.
LOAD POWER FACTOR	Delivers full rated kVA into any Power Factor load.
LOAD BALANCE RESTRICTION	None. Each phase is independently regulated
ISOLATION	An input transformer with an electrostatic shield provides isolation between the input and output of the system.
OVER CURRENT PROTECTION	Integral electronic current limiting with auto recovery. Output Circuit Breaker is optional.

## Measurements (with optional SCU/UPC32)

VOLTAGE (True RMS)	Range	0-354V <sub>L-N</sub> 0-708V <sub>L-L</sub>
	Resolution	0.1 VAC to front panel. 0.001 VAC to remote interface.
	Accuracy	±0.2% of range +cal.ref.
CURRENT (True RMS)	Range	4,000Apk
	Resolution	0.01A to front panel. 0.001A to remote interface.
	Accuracy	±0.2% of range +cal.ref.
POWER	Measures True Power (kW), Apparent Power (kVA) Power Factor and Crest Factor.	
	Range	1.4MW / 1.4MVA
	Resolution	1.0 Watt
POWER/CREST FACTOR	Calculated and displayed to three significant digits.	

## Parameter Settings (with optional SCU/UPC32)

FREQUENCY	Range	20 to 1000 Hz
	Resolution	4 significant digits, e.g. 400.0
	Accuracy	±0.01%,
VOLTAGE	Range	0 to VMAX
	Resolution	0.1 VAC steps.
	Accuracy	±0.2% of range +cal.ref.
CURRENT LIMIT	Range	0 to I <sub>RMS</sub> max
	Resolution	±0.05%
	Accuracy	±3%, FS
PROGRAMMABLE OUTPUT IMPEDANCE	Dynamic output impedance (Zo) is programmable, ± Zo, MAX in 0.1% steps. Zo value in milliohms and typically results in a ±10% change in output voltage at maximum rated load current.	

## Input Power Requirements

INPUT VOLTAGE	208 VACΔ	240 VACΔ	380 VACΔ	400 VACΔ	416 VACΔ	480 VACΔ
	±10%	±10%	±10%	±10%	±10%	±10%
RECOMMENDED SERVICE CURRENT	175 A <sub>RMS</sub>	175 A <sub>RMS</sub>	100 A <sub>RMS</sub>	100 A <sub>RMS</sub>	100 A <sub>RMS</sub>	80 A <sub>RMS</sub>
INPUT FREQUENCY	47-63 Hz					
POWER FACTOR	0.85 lagging typical					
PROTECTION	Input CB Standard. Slow Turn-On Circuit is provided to limit inrush current					

## Mechanical Specifications

HEIGHT	72" / 1829 mm
WIDTH	36" / 914 mm
DEPTH	30" / 762 mm
WEIGHT	1,557 lbs. / 715 kg
INSTALLATION CLEARANCE	36" at front of cabinet for service, 12" top, 0" side and rear

## General Specifications

OPERATING TEMP	Operating: 0° to +40°C (32° to 104°F) – Storage: -10° to +70°C (+14° to +158°F)
RELATIVE HUMIDITY	0 to 95% non-condensing
NOISE LEVEL	65 dbA at 3 feet
EFFICIENCY	85 % typical at full load
COOLING/ VENTILATION	Self-Contained fans; bottom intake, top exhaust, 1200 CFM.
HEAT DISSIPATION AT FULL LOAD	20 kBTU/HR (6 kW/HR)
SERVICE ACCESS	Unit is designed for front access. Power Cabling is routed through either top or bottom knock-outs.
CERTIFICATION	CE, ETL (Optional)
ALTITUDE	Operating 6000 Ft. Storage 40,000 Ft.

## Protection and Safety

AC Power Source is protected against Overcurrent, Short Circuit, and Overtemperature.	
AUDIBLE & VISUAL ALARMS	Alter operator to any conditions requiring attention.

## Typical MS Options

/CE	CE Mark. Includes Output Circuit Breaker (/OCB)
/CSTB	Casters
/OCB	Output Circuit Breaker
/M99575	Split Phase Output Configurations (50 kw)
/M99583	Split Phase Output Configurations (32 kw)

## Options for SCU/UPC32 Equipped MS Systems Only

/G	GPIO Interface, SCPI Commands & IEEE488.2 (standard)
/S	RS232 Interface. SCPI Commands, Baudrate up to 38.4 kbps. (Replaces GPIO, no cost option)
UPC-Studio	Windows AC Power Source control Software (no cost option) UPC Test Manager License (cost option) required for Avionics or IEC test options listed below:
ABD0100	License for Avionics Test Sequences according to norm ABD0100.8.1. Requires UPC-Test Manager Option.
A350	License for Avionics Test Sequences according to norm Airbus A350. Requires UPC-Test Manager Option.
DO160	License for Avionics Test Sequences according to norm DO160 Version E - Requires UPC-Test Manager Option.
IEC-AC-4XX	IEC 61000-4 AC Immunity Test Sequences. Includes 4-11, 4-14, 4-27, 4-28 and 4-34. Excludes 4-13 Option.
SCU/UPC32-413	IEC 61000-4-13 Inter Harmonic Generator. Required to run 4-13 tests. Includes 4-13 software.
DRIVERS	LabView™ and LabWindows™ drivers available

## UMS Option

### MS Series Battery Support Systems

With the addition of the UMS Battery Backup option, the 3060-MS can be converted to an uninterruptible Power Source (UPS). The UMS 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.

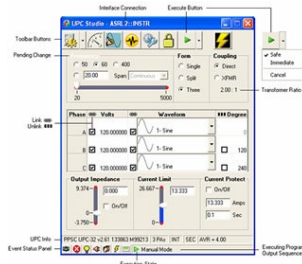
### On-Line, No-Risk Battery Test

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.

## UPC Manager Software Suite

### Master the Power of the Wave!

UPC Manager Software gives you the tools necessary to quickly and easily operate your AC Power Source. With our complete, graphical interface, control all areas of your AC Power Source testing with simple presets, user prompts, test sequences, test plans and custom reports.



### UPC Features

- Simple and Comprehensive programming
- Execute and Monitor the output values using the internal power analyser
- Create arbitrary waveforms, import waveforms captured on external instruments, freehand draw, enter harmonic and phase angle content, create ringwaves, random noise, clipping and other custom waveshapes.

## SCU-UPC32 Programmable Controller



The UPC controller is a 3-Phase 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 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 IEEE488.2 and SCPI.



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## The Leader in AC 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 frequency converters and Programmable AC Power Sources. High-power systems include programmable power test equipment, 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.

