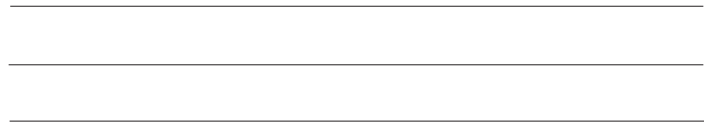
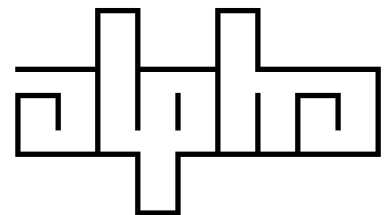


APP60S

Service Power Supply



Operator's Manual



IMPORTANT SAFETY INSTRUCTIONS CONTAINED IN THIS MANUAL



CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, AND ENSURE THE SAFE OPERATION OF THIS UNIT, THE FOLLOWING SYMBOLS HAVE BEEN PLACED THROUGHOUT THE MANUAL. WHERE THESE SYMBOLS APPEAR, SERVICING SHOULD BE PERFORMED ONLY BY QUALIFIED PERSONNEL.



DANGEROUS VOLTAGE

A DANGEROUS VOLTAGE EXISTS IN THIS AREA OF THE POWER SUPPLY. USE EXTREME CAUTION.



ATTENTION

IMPORTANT OPERATING INSTRUCTIONS. THIS PROCEDURE SHOULD BE PERFORMED ONLY BY QUALIFIED SERVICE PERSONNEL.

SAVE THESE INSTRUCTIONS

IMPORTANT SAFETY PRECAUTIONS



POWER SUPPLIES SHOULD BE SERVICED ONLY BY QUALIFIED PERSONNEL.



POWER SUPPLIES CONTAIN MORE THAN ONE LIVE CIRCUIT. EVEN THOUGH AC IS NOT PRESENT AT THE INPUT, IT MAY BE PRESENT AT THE OUTPUT.

WHEN USING AN EXTERNAL SERVICE DISCONNECT, VERIFY THAT IT IS EQUIPPED WITH A HIGH MAGNETIC CIRCUIT BREAKER PROPERLY RATED (AMPERAGE) FOR USE WITH THE POWER SUPPLY.

WHEN IN STORAGE, BATTERIES SHOULD BE CHARGED AT LEAST ONCE EVERY THREE MONTHS TO ENSURE OPTIMUM PERFORMANCE AND BATTERY LIFE.

WEAR EYE PROTECTION, SUCH AS SAFETY GLASSES OR A FACE SHIELD, WHENEVER WORKING WITH BATTERIES.

USE GLOVES WHEN HANDLING BATTERIES. BATTERY ELECTROLYTE IS ACIDIC AND MAY CAUSE BURNS.

NEVER SMOKE NEAR BATTERIES. SPARKS, FLAMES OR OTHER SOURCES OF IGNITION MAY CAUSE A BATTERY EXPLOSION.

ALWAYS CARRY A SUPPLY OF WATER, SUCH AS A WATER JUG, TO WASH THE EYES OR SKIN IN THE EVENT OF EXPOSURE TO BATTERY ELECTROLYTE.

USE PROPER LIFTING TECHNIQUES WHENEVER HANDLING THE ENCLOSURE, POWER MODULE OR BATTERIES. GROUP 31 SIZE BATTERIES, USED IN THE MAJORITY OF CABLE TELEVISION APPLICATIONS, CAN WEIGH AS MUCH AS 70 LBS.

USE A BUCKET TRUCK, OR SUITABLE SAFETY EQUIPMENT SUCH AS A SAFETY HARNESS AND CLIMBING SPIKES, WHEN SERVICING POLE INSTALLATIONS.

ALWAYS SWITCH THE POWER SUPPLY'S BATTERY CIRCUIT BREAKER TO OFF BEFORE DISCONNECTING BATTERY CABLES. THIS GREATLY REDUCES THE CHANCE OF SPARK AND POSSIBLE BATTERY EXPLOSION.

DO NOT ALLOW LIVE BATTERY WIRES TO CONTACT THE ENCLOSURE OR POWER SUPPLY CHASSIS. POSSIBLE EXPLOSION OR FIRE CAN OCCUR.

BEFORE PLACING A CURRENT LOAD ON THE BATTERIES, (SUCH AS WHEN SWITCHING THE POWER SUPPLY TO STANDBY), USE THE ENCLOSURE DOOR AS A SHIELD IN THE EVENT OF A BATTERY EXPLOSION.

INSPECT BATTERIES FOR SIGNS OF CRACKS, LEAKING OR SWELLING.

WHEN REPLACING BATTERIES, ALWAYS USE THOSE OF AN IDENTICAL TYPE. NEVER INSTALL OLD OR UNTESTED BATTERIES.

CHECK THE BATTERY'S DATE CODE. BATTERIES OLDER THAN SEVERAL YEARS SHOULD NOT BE USED.

AVOID THE USE OF UNINSULATED TOOLS OR OTHER CONDUCTIVE MATERIALS WHEN HANDLING BATTERIES OR WORKING INSIDE THE ENCLOSURE.

SPENT OR DAMAGED BATTERIES ARE CONSIDERED ENVIRONMENTALLY UNSAFE. ALWAYS RECYCLE USED BATTERIES.

APP60S Service Power Supply

Table of Contents

1.	INTRODUCTION	1
1.1	The APP60S Service Power Supply	
1.2	Theory of Operation	
1.3	Specifications	
1.4	Unpacking and Inspection	
2.	APP60S FRONT PANEL	4
2.1	Ammeter	
2.2	AC Output Fuse	
2.3	AC Input Fuse	
2.4	AC LINE Indicator	
2.5	30 / 60 VAC Switch	
2.6	ON / OFF Switch	
2.7	"Jones" Connector	
2.8	AC Line Cord	
3.	INSTALLATION AND OPERATION	6
3.1	APP60S Installation and Power Module Removal	
4.	TROUBLE-SHOOTING AND REPAIR	8
4.1	Repair Instructions	
4.2	Parts Ordering Instructions	
4.3	Trouble-shooting Guide	

LIST of ILLUSTRATIONS

Fig. 1	APP60S Front Panel	4
Fig. 2	PME and PWE Pole-mount Enclosures	6
Fig. 3	UPE and UPE/M Ground-mount Enclosures	6
Fig. 4	SPI (Service Power Inserter)	6
Fig. 5	APP60S Installation and Wiring Diagram	7

1.1 THE APP60S SERVICE POWER SUPPLY

The APP60S Service Power Supply is a portable device used to provide temporary power for Alpha AP Series standby power supplies and XP Series uninterruptible power supplies while they are being serviced. The APP60S can be used in either pole or ground-mount enclosures to provide signal processing equipment in Cable Television and Broadband LAN distribution systems with current-limited, regulated AC power.

The APP60S Service Power Supply contains a front panel ammeter to measure the output current to the load; an output fuse to protect against excessive short circuit currents; a "LINE" indicator to verify AC input power from the utility; an input fuse to provide additional voltage protection; and a 30/60 VAC switch for output voltage selection (48/60 for 50 Hz units).

UL Listed and CSA Approved, the APP60S Service Power Supply is designed to be rugged, reliable and versatile. Alpha Technologies, recognized as an international market leader in the field of backup power, offers complete technical support and prompt, reliable service to ensure that your power supply continues to provide years of trouble-free operation.

1.2 Theory of Operation

The APP60S Service Power Supply contains a ferroresonant transformer and a resonant capacitor. During AC LINE operation, utility power is fed into the primary winding of the ferroresonant transformer, T1. An AC capacitor, C1, forms the resonant circuit of the ferroresonant transformer which provides excellent noise and spike attenuation, short circuit current limiting, and output voltage regulation. Note: The ferroresonant transformer produces a "quasi" square wave output which resembles a rounded square wave.

During LINE operation, AC power enters the APP60S where it is regulated (at the required output voltage) and passed onto the load via the SPI (Service Power Inserter) located inside the power supply enclosure. A switch, located on the SPI, toggles output power from the power supply requiring service to the APP60S.



IMPORTANT NOTE:

WHEN MEASURING THE OUTPUT VOLTAGE OF FERRORESONANT TRANSFORMERS, USE ONLY A TRUE RMS AC VOLTMETER. NON-RMS READING METERS ARE CALIBRATED TO RESPOND TO PURE SINE WAVES AND WILL NOT PROVIDE AN ACCURATE READING WHEN MEASURING A "QUASI" SQUARE WAVE OUTPUT.

1. INTRODUCTION

1.3 Specifications

MODEL	APP60S	APP60S E	APP6014S-J5
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Input

Voltage (VAC)	120 ±15%	220/240 ±15%	100/115 ±15%
Frequency (Hz)	60	50	50
Current Max. (A)	9	4.8	12

Output

Voltage (VAC)	60/30 ±5%	60/30 (60/48) ±5%	30/60 ±5%
Current (A)	14	14	14
Power (VA)	840	840	420/840

Output Current Limit 150% of maximum output rating

Efficiency 90% typical @ rated load

Operating Temperature Range -40° to +122° F (-40° to +50° C)

Dimensions 7" W x 10" H x 13" D (170mm x 250mm x 330mm)

Weight 34 lbs. (15 kg)

Finish ASA 61 Gray Epoxy Powder Paint

Specifications @ 77° F (25° C)

1.4 Unpacking and Inspection

Carefully remove the APP60S from its shipping container. Make sure that the following items have been included:

1. APP60S Service Power Supply.
2. Operator's Manual.

Inspect the contents. If items are damaged or missing, contact Alpha Technologies and the shipping company immediately. Most shipping companies have only a short claim period.

SAVE THE ORIGINAL SHIPPING CONTAINER.

In the event a unit needs to be returned for service, it should be packaged in its original shipping container. If the original container is not available, make sure the unit is packed with at least three inches of shock-absorbing material to prevent shipping damage. Note: Do not use popcorn-type material. Alpha Technologies is not responsible for damage caused by improper packaging on returned units.

READ THE OPERATOR'S MANUAL.



Become familiar with the APP60S Service Power Supply. Review the illustrations contained in the manual before proceeding. If you have questions regarding the safe installation or operation of this unit, contact Alpha Technologies or your nearest Alpha representative.

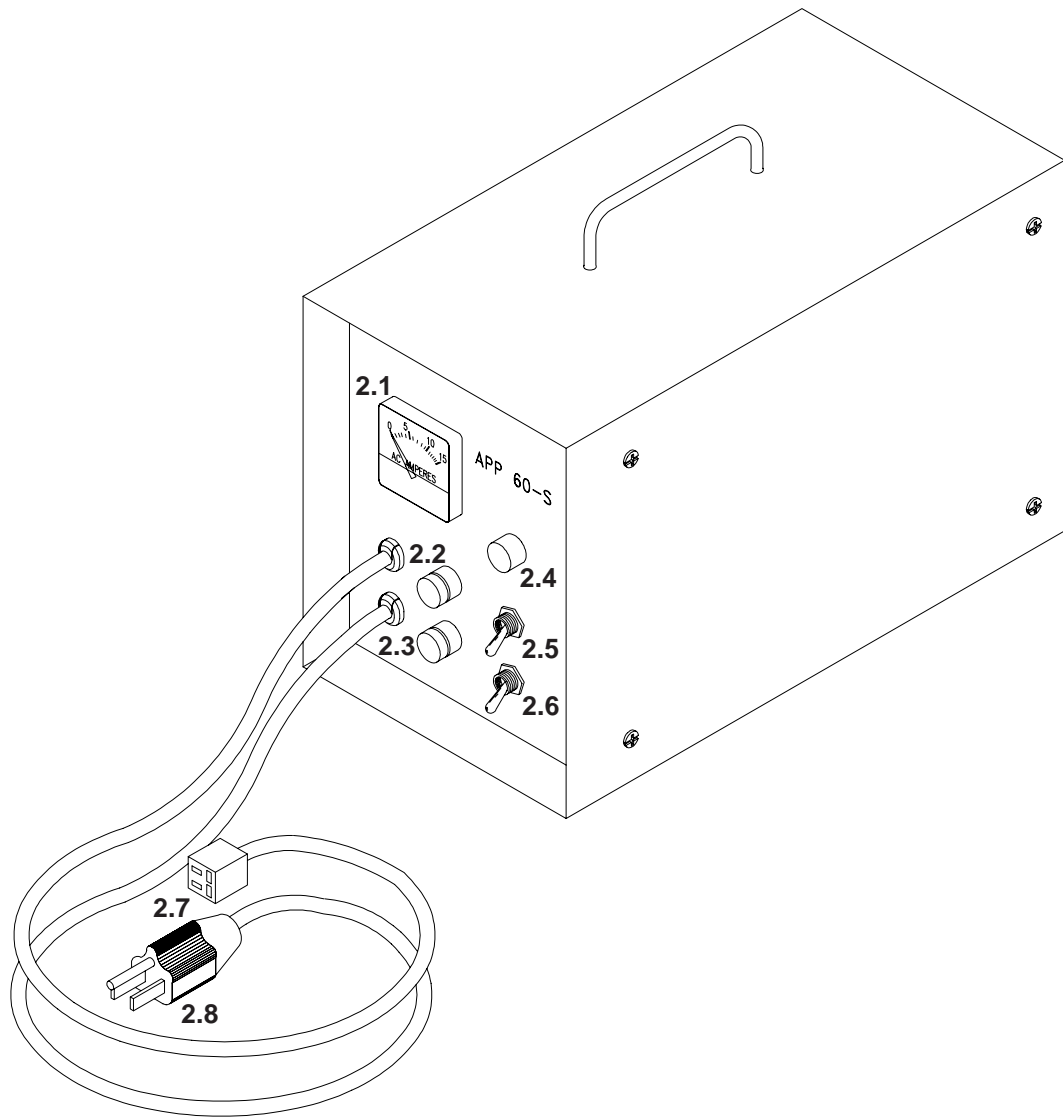


TO ENSURE OPERATOR SAFETY

1. Power supplies should be serviced only by qualified personnel and always in accordance with applicable electrical codes.
2. Use eye protection whenever working around batteries.
3. Use a bucket truck, or suitable climbing equipment such as a safety harness and climbing spikes, whenever installing or servicing pole-mount installations.

2. APP60S

3.1 APP60S Installation and Power Module Removal



APP60S Service Power Supply

- 2.1 Ammeter
- 2.2 AC Output Fuse
- 2.3 AC Input Fuse
- 2.4 AC LINE Indicator
- 2.5 30 / 60 VAC Switch
- 2.6 ON / OFF Switch
- 2.7 "Jones" Connector
- 2.8 AC Line Cord

3.1 APP60S Installation and Power Module Removal

2.1 Ammeter

The front panel ammeter displays output current flowing from the power module into the load. It is extremely useful in determining the status of the plant during maintenance and trouble-shooting. When there is no load at the output, the ammeter reads zero. When the meter reads above the rated output of the APP60S, such as 18 or 20 Amps, an overload or short circuit condition may exist in the load.

2.2 AC Output Fuse

The 15 Amp AC output fuse protects the load from excessive durations of short circuit current. If the front panel ammeter reads zero, indicating no output to the load, this fuse should be checked and replaced if necessary.

2.3 AC Input Fuse

The 12 Amp AC input fuse protects the APP60S from short circuit conditions, especially when it is used in conjunction with a generator during outage conditions. If the unit does not come ON when power is applied, first verify that the unit is plugged into the convenience outlet and that the main AC circuit breaker is in the ON position. Then check the input fuse and replace it if necessary.

2.4 AC LINE Indicator (Green)

The AC LINE indicator displays the presence of utility AC at the input. If the indicator does not light when the unit is switched ON, first verify that the unit is plugged into the convenience outlet and the main AC circuit breaker is in the ON position. If necessary, check the AC input fuse and replace it if necessary.

2.5 30 / 60 VAC Switch

The 30 / 60 VAC switch is used to select the desired output voltage. For 50 Hz applications, the switch is configured for 48 / 60 VAC.

2.6 ON / OFF Switch

The ON / OFF switch is used to apply or remove power from the APP60S.

2.7 "Jones" Connector

The APP60S "Jones" connector plugs directly into the Service Power Inserter's mating connector to provide output power to the load. Note: The SPI's "ALT/ON" switch must be in the "ALT" position to accept power from the APP60S.

2.8 AC Line Cord

The APP60S AC line cord plugs directly into the enclosure's convenience outlet.

3. INSTALLATION AND OPERATION

3.1 APP60S Installation and Power Module Removal



POWER MODULES SHOULD BE SERVICED ONLY BY QUALIFIED PERSONNEL.



POWER MODULES CONTAIN MORE THAN ONE LIVE CIRCUIT. EVEN THOUGH AC IS NOT PRESENT AT THE INPUT, IT MAY BE PRESENT AT THE OUTPUT.



NOTE: Before powering down a module, always switch the battery breaker OFF (or remove the battery fuse) before removing AC, otherwise the module will transfer into inverter operation.

Procedure

1. Plug the APP60S "Jones" connector into the enclosure's SPI (Service Power Inserter).
2. Plug the APP60S power cord into the enclosure's convenience outlet. Set the 30/60 VAC selector switch to the desired voltage and switch the APP60S ON.
3. Toggle the SPI's "ALT/ON" switch to "ALT". This transfers output power from the module to the APP60S which can now be used to maintain regulated, non-standby power to the cable plant until a replacement power module has been installed.
4. Switch the battery breaker on the power module OFF (or remove the battery fuse).
5. Unplug the power module's LINE cord from the enclosure's convenience outlet.
6. Wait approximately 1 minute for the power module's capacitors to fully discharge.
7. Disconnect the wires from the side of the power module.



CAUTION: Do not let exposed battery cables come in contact with the chassis or enclosure.

8. Remove the hold-down screw (AM Series modules only) and carefully slide the module out of the enclosure.



CAUTION: The ferroresonant transformer generates heat and may cause burns if handled with bare hands.

9. Reverse this procedure when re-installing a module.



NOTE: Always test the power module for proper operation before toggling the SPI's "ALT/ON" switch back to the "ON" position.

3. INSTALLATION AND OPERATION

3.1 APP60S Installation and Power Module Removal

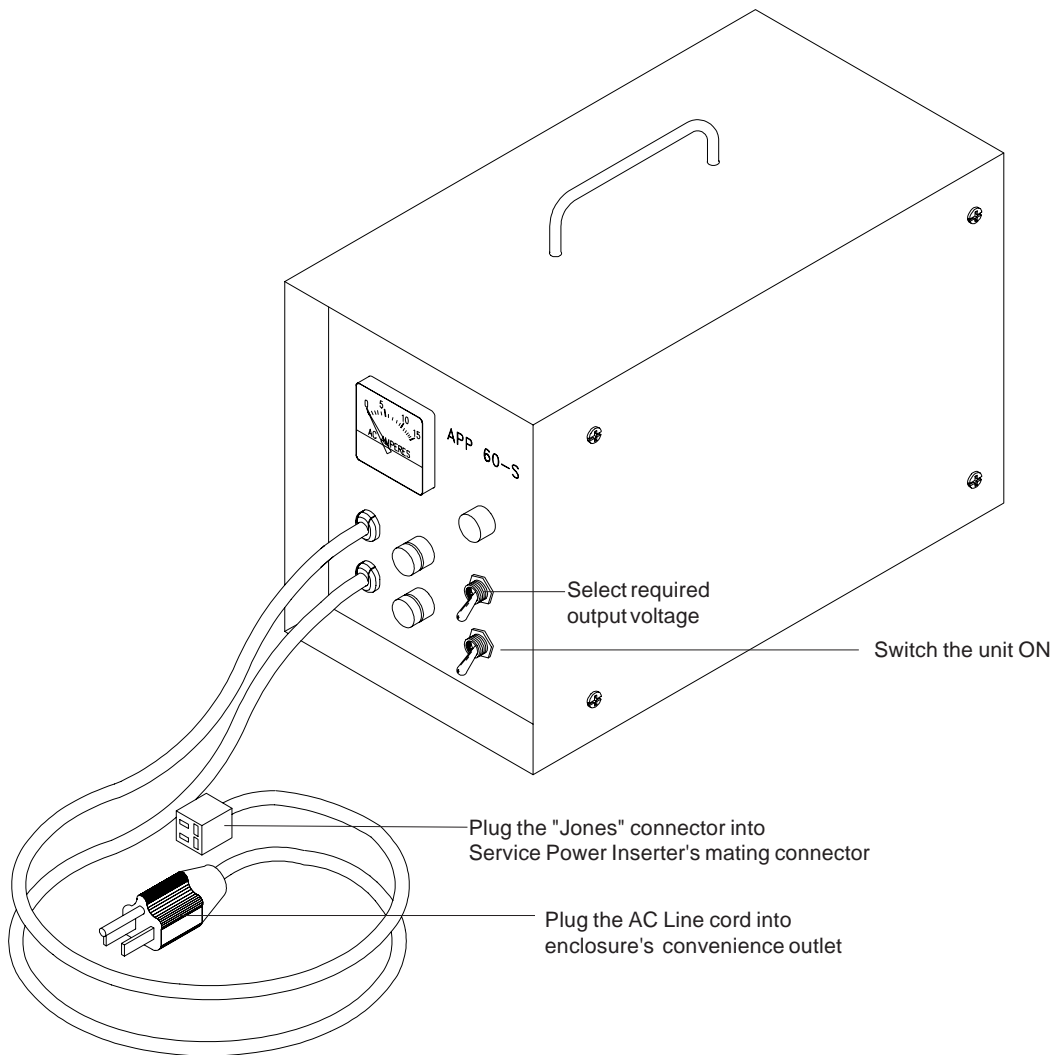
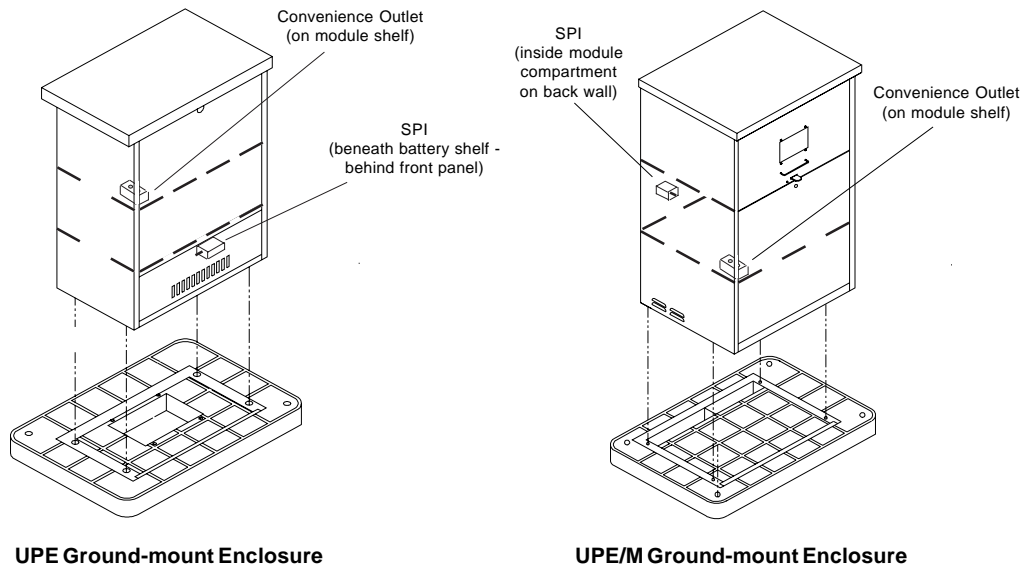
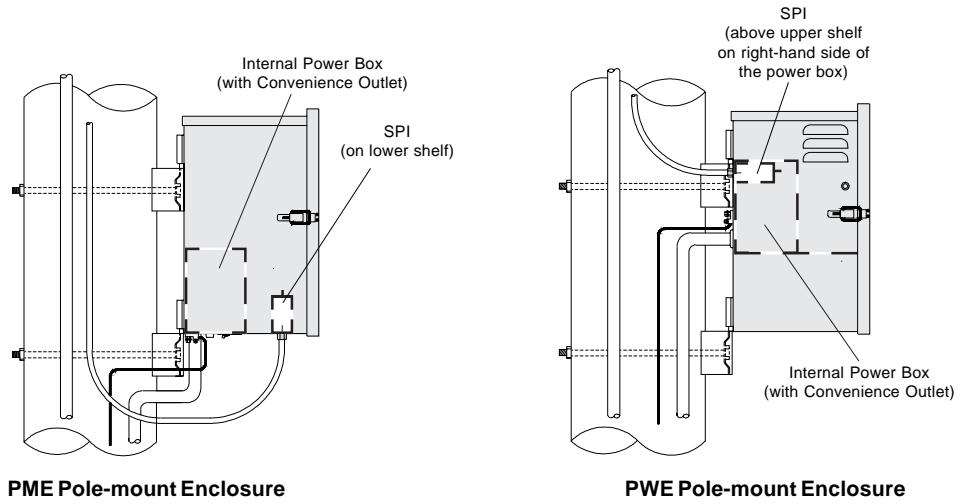


Fig. 5
APP60S Installation and Wiring

3. INSTALLATION AND OPERATION

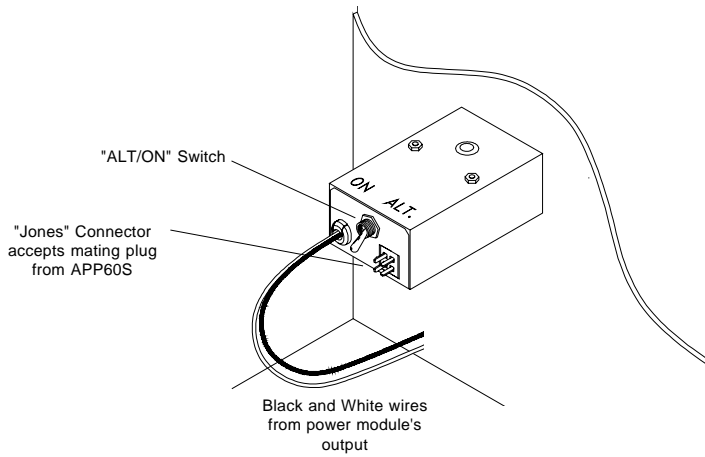
3.1 APP60S Installation and Power Module Removal



**Location of SPI and Convenience Outlet
(inside Alpha Enclosures)**

3. INSTALLATION AND OPERATION

3.1 APP60S Installation and Power Module Removal



SPI Service Power Inserter
(shown in PWE and UPE/M enclosures)

4. TROUBLE-SHOOTING AND REPAIR

TROUBLE-SHOOTING AND REPAIR

The trouble-shooting guide is designed to display typical symptoms, causes and solutions, starting with the most obvious and working systematically through the unit. Alpha Technologies recommends that the power supply's maintenance log accompany units brought in for bench service to aid the technician in trouble-shooting the problem.

4.1 Repair Instructions

On units returned to Alpha Technologies for repair, a Return Material Authorization (RMA) should first be obtained from Alpha's Customer Service Department. The RMA should be clearly marked on the unit's original shipping container. If the original container is no longer available, the unit should be packed with at least 3 inches of shock-absorbent material. Note: Do not use popcorn type packing material. Returns should be prepaid and insured (COD and freight collect can not be accepted without prior approval). Note: It is recommended that any information pertaining to the nature of the power supply failure or problem, along with a copy of power supply's maintenance log, be included with the returned unit.

4.2 Parts Ordering Instructions

When ordering parts from Alpha Technologies, contact the Customer Service Department directly at (206) 647-2360; or (604) 430-1476 (Canada and International).

4.3 TROUBLE-SHOOTING GUIDE

SYMPTOM

No output to cable;
No AC line power;
Green "AC LINE" indicator OFF:

PROBABLE CAUSE

AC Line cord unplugged.

AC input circuit breaker tripped (or input fuse open).

Utility power outage.

REMEDY

Plug in AC Line cord.

Reset AC circuit breaker (or replace 12 A fuse).

Use voltmeter to verify 120 VAC at receptacle. Connect generator if extended power outage.

SYMPTOM

No output to cable;
AC line power available;
Green "AC LINE" indicator ON;
and/or ammeter reads "0":

PROBABLE CAUSE

AC output fuse open.

SPI "ALT/ON" switch in wrong position.

"Jones" connector loose or not connected to SPI.

Loose seizure screw inside SPI.

REMEDY

Replace 15 A fuse.

Move switch to "ALT" position.

Check connection.

Tighten screw.

SYMPTOM

Incorrect output voltage;
and/or ammeter reads excessive current (above rated output of APP60S):

PROBABLE CAUSE

30 / 60 VAC switch in wrong position.

Wrong type of voltmeter used.

Under-loaded output (less than 1 Amp).

Over-loaded output.

Short exists in load.

MOV shorted in SPI.

REMEDY

Move switch to required position.

Use true RMS meter.

Connect load.

Reduce load.

Locate and remove short.

Replace SPI.

[Power]

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