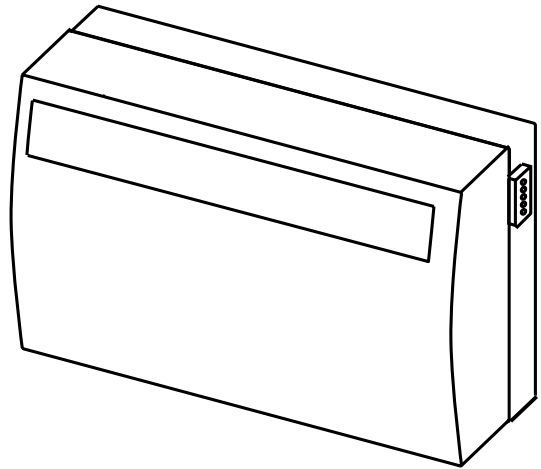


# *Andover Continuum*

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## Power Supply Reference



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### ***Andover Continuum Power Supply Reference***

**Rev. G**

**March, 2010**

Schneider Electric part number: **30-3001-702**

NetController firmware version: **1.53**

#### Related Documents:

*Andover Continuum I/O System Reference*, 30-3001-499

*Andover Continuum NetController Reference*, 30-3001-703

*Andover Continuum Enclosure and Display Module Reference*, 30-3001-711

*Smoke Control system Design Guide for Continuum*, 30-3001-734

*Andover Continuum UL 1076 Burglar Alarm System Reference*, 30-3001-800

*Andover Continuum Access Control Systems Reference*, 30-3001-746

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On October 1<sup>st</sup>, 2009, TAC became the Buildings Business of its parent company Schneider Electric. This document reflects the visual identity of Schneider Electric. However, there remain references to TAC as a corporate brand throughout the Andover Continuum software. In those instances, the documentation still refers to TAC - only to portray the use interface accurately. As the software is updated, these documentation references will be changed to reflect appropriate brand and software changes. All brand names, trademarks, and registered marks are the property of their respective owners.

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# Regulatory Notices

## Radio Interference – Federal Communications Commission

This equipment has been tested, and it complies with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions in this manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

## Radio Interference – Canadian Department of Communications

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

## Brouillage Radioélectrique – Ministère des Communications du Canada

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

## CE – Compliance to European Union (EU)



This equipment complies with the European Union (EU) standards specified in the EU EMC directive 89/336/EEC and/or the product-safety low voltage directive 73/23/EEC, governing the European community.

## **C-Tick – Australian Communications Authority (ACA)**



N1831 This equipment carries the C-Tick label and complies with EMC and radio communications regulations of the Australian Communications Authority (ACA), governing the Australian and New Zealand communities.

## **WEEE – Directive of the European Union (EU)**



This equipment and its packaging carry the waste electrical and electronic equipment (WEEE) label, in compliance with European Union (EU) Directive 2002/96/EC, governing the disposal and recycling of electrical and electronic equipment in the European community.

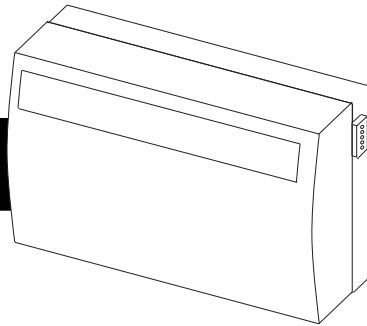
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# CONTINUUM

## Power Supplies



### Introduction

This manual describes the installation, care and use of the Andover Continuum power supply modules.

The Andover Continuum power supply modules are part of the Schneider Electric Andover Continuum Ethernet-based intelligent building system. The Andover Continuum system allows you to cost-effectively mix and match DIN rail-mounted CPU, power supply, and various combinations of I/O modules and user interfaces to meet your control and monitoring needs. The power supplies offered include an impressive array of features.

Including the standard 120/240 VAC modules, some models reduce or eliminate the impact of power failure through a built-in battery back-up system with integral charger. Another allows – 48VDC power based industries such as telecommunications to provide uninterrupted power to critical environmental monitoring and control equipment using their own battery-backed power systems.

Each module includes provision for an optional AC power indicator LED. This option is ideal if you mount your Andover Continuum system within a larger control panel or enclosure and wish to verify power to the system from a separate location.

The power supply modules feature a casing designed for natural convection cooling. Quick-release fasteners, built-into the back of the module, are provided for DIN rail mounting—no tools required. These fasteners also snap into a locked position that features integral reinforced holes for panel mounting in non-DIN situations.

## Power Module Characteristics

The following table lists the features included in the Andover Continuum power supply modules:

Model	Input Voltage	Power Output	Features
PS 120/240 AC 50*	120-240 VAC	50 W	
PS 120/240 AC 50-U* †	120-240 VAC	35 W	UPS
PS 120/240 AC 65	120-240 VAC	65 W	
PS 120/240 AC 65-U	120-240 VAC	50 W	UPS
PS 120/240 AC 85	120-240 VAC	85 W	
PS 120/240 AC 85-U †	120-240 VAC	70 W	UPS
PS -48 DC 50*	-48 VDC	50 W	DC Input
PS -48 DC 50-U	-48 VDC	50 W	DC Input, UPS
PS 120/240 AC 25	120-240 VAC	5V @25 W	

\* These units are listed for use in UL 294 applications. † These units are listed for UL 1076

### PS 120/240 AC 50-U, PS 120/240 AC 65-U, PS 120/240 AC 85-U, PS -48 DC 50-U

These modules provide 35, 70 and 50 Watts (respectively) of power for the CPU and I/O modules. They contain features that reduce or eliminate the impact of power failure. An external 24 VDC battery source may be connected to provide uninterruptible power. A built-in battery charger assures the battery is charged at all times. Using standard rechargeable lead acid batteries, this unit provides full UPS operation including all I/O modules for up to 60 minutes at 35 watts power consumption; full operation of the CPU module only (including modem and network interface) with no I/O power for 4 hours; or backup of DRAM and real-time clock only for 72 hours duration. These backup modes are selected and controlled through Schneider Electric's Plain English® programming language.

### PS 120/240 AC 50, PS 120/240 AC 65, PS 120/240 AC 85

These power supplies are non-UPS versions of the above listed modules. They supply a full 50 and 85 Watts (respectively) of power and can also be used as auxiliary power sources to power additional I/O modules directly, extending the capabilities of a typical Andover Continuum system, even to remote locations.

### PS -48 DC 50

This model accepts a -48 VDC input voltage that allows industries such as telecommunications to provide uninterrupted power to critical environmental monitoring and control equipment using their own battery-backed power systems.



## PS 120/240 AC 25

This power supply provides a +5VDC output at 25 Watts of power and is used as an external power source to power third party devices and sensors.

## Special System Characteristics

### Smoke Control Operation (UL 864)

Power Supplies available through Schneider Electric that are listed with UL for Smoke Control applications and the options pertaining to smoke control operation are the following:

Model	Input Voltage	Power Output	Features
PS 120/240 AC 65*	120-240 VAC	65 W	
PS 120/240 AC 65-U*	120-240 VAC	50 W	UPS
PS 120/240 AC 50	120-240 VAC	50 W	
PS 120/240 AC 50-U	120-240 VAC	35 W	UPS
PS 120/240 AC 25	120-240 VAC	5V @25 W	

\* **The 24VDC output is not power limited.** When the supply is not connected directly into a NetController the AC Power and Low Battery logic outputs (pins 1&2) should not be used.

### Access Control Operation (UL 294), Burglar Alarm Operation (UL 1076)

Power Supplies available through Schneider Electric that are listed with UL for Access Control and Burglar Alarm applications are the following:

Model	Input Voltage	Power Output	Features
PS 120/240 AC 85	120-240 VAC	85 W	
PS 120/240 AC 85-U	120-240 VAC	70 W	UPS
PS 120/240 AC 50	120-240 VAC	50 W	
PS 120/240 AC 50-U	120-240 VAC	35 W	UPS
PS -48 DC 50	- 48 VDC	50 W	

# Mechanical Installation

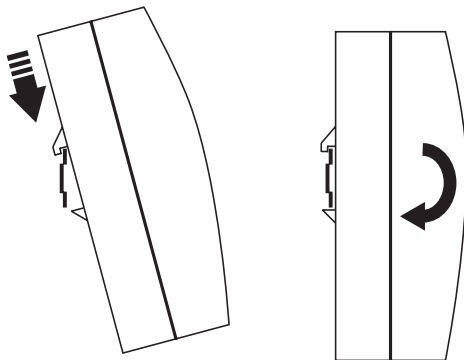
**NOTE TO INSTALLER:** This device must be properly installed to suit its intended application.

**EUROPEAN INSTALLATIONS:** These power supplies are listed as Class 1 devices intended for installation in an IP2 enclosure. The Andover Continuum Enclosure is an IP2 enclosure.

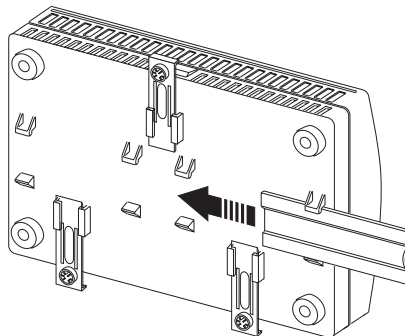
**ATTENTION: Disconnect from supply before removing!**

The power supply modules can be mounted to a standard DIN rail or be directly mounted to a panel using screws. Hardware facilitating both mounting methods is included as an integral part of the case design.

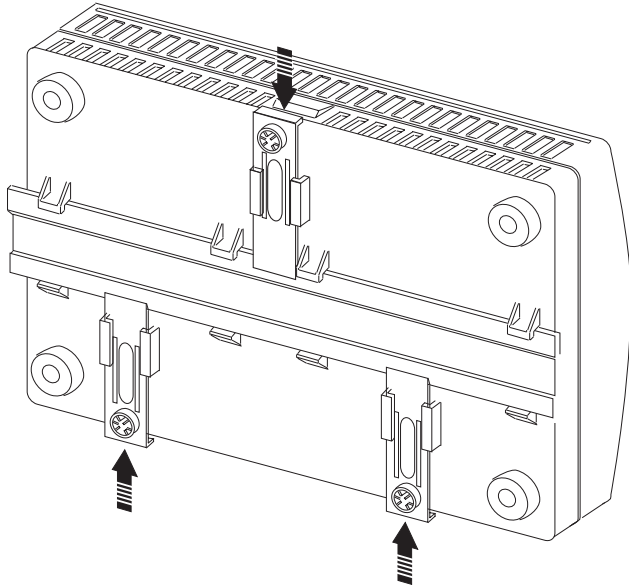
On the back of each module are molded DIN rail guide fingers. The design allows the module to easily hook onto and slide along a standard DIN rail.



Special clamps are provided on the case, allowing you to lock the module in place, once it is in position.



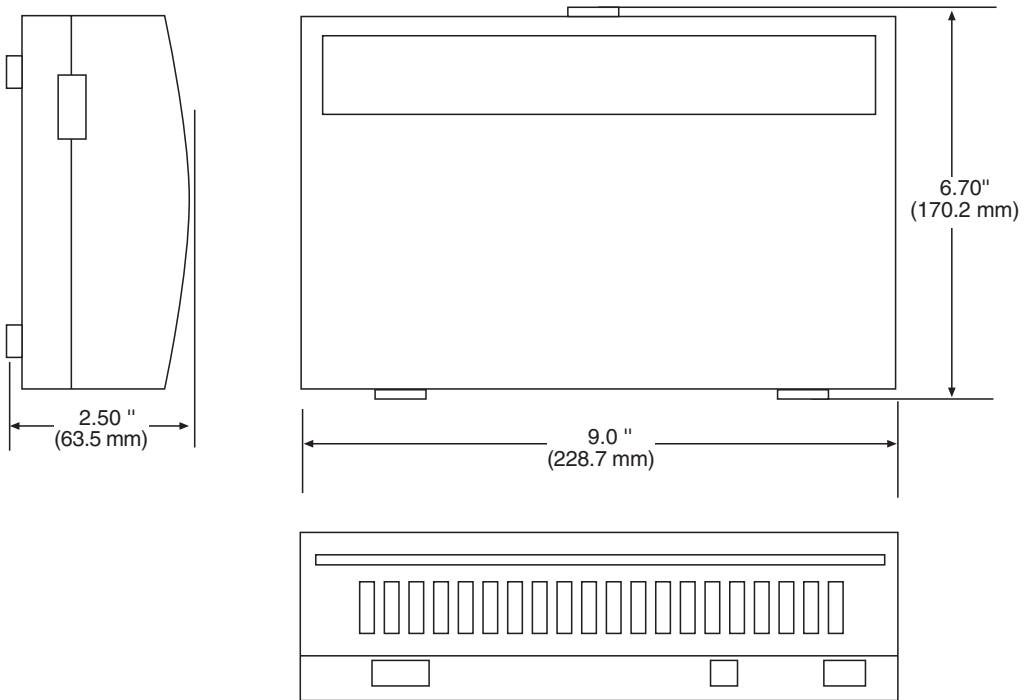
Once the module is in the desired position, it is locked to the rail by pushing the bottom clamps inward. After the bottom is secure, press the top clamp inward to complete the operation.



These clamps, when extended, provide an alternative method of mounting to the DIN rail. You can mount the module directly to a panel using the reinforced mounting holes provided on each of the clamps.

## Overall Dimensions

The overall dimensions of the power supply unit are as shown:



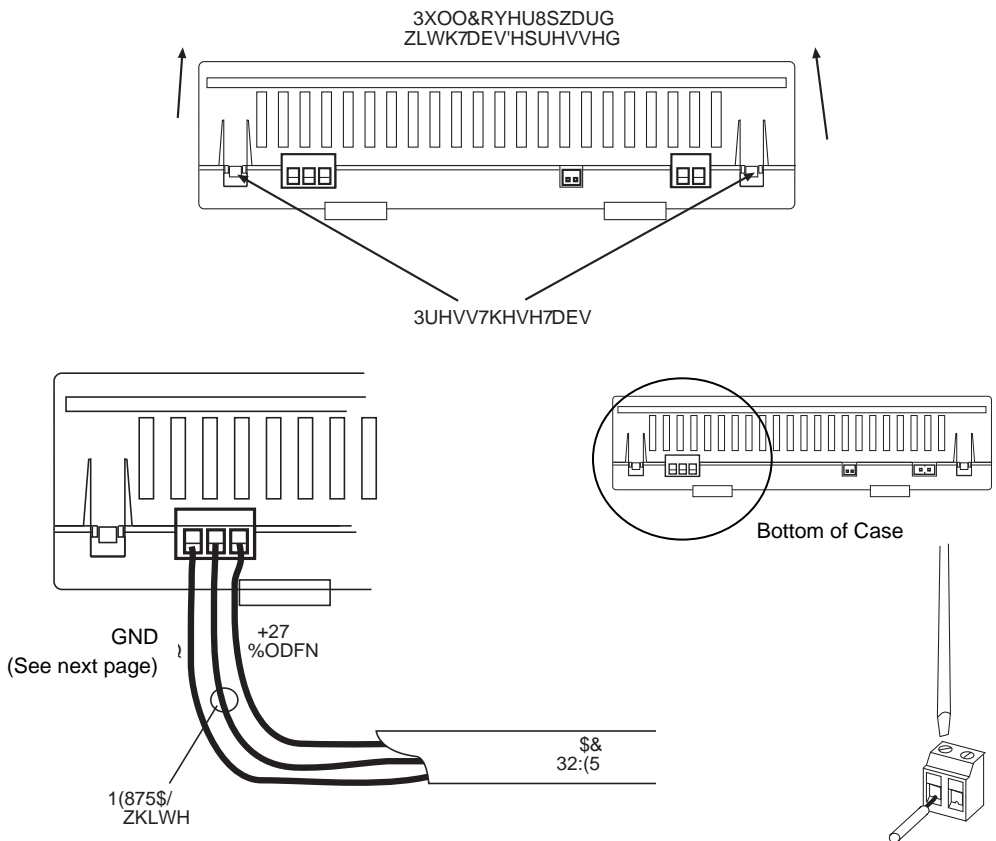
# Input Power Connection

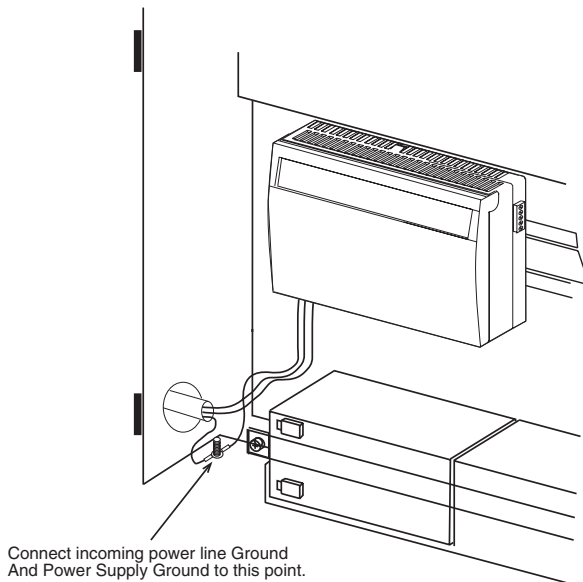
## AC Input Power Connection

**AC 50, AC 65, AC 85, AC 50-U, AC 65-U, AC 85-U, PS 120/240 AC 25**

All the PS 120/240 power supply modules are powered by an external AC source. This source is connected via three screw terminals located inside the cover at the bottom of the unit as shown below. The module should receive power from its own independent, 120-240 VAC, 50 or 60 Hz, 150 VA, unswitched circuit.

In order to access the connector you must remove the plastic cover from the case. Press both cover removal tabs inward simultaneously:





**Do not apply excessive force when connecting the AC wires to the terminals. Be careful not to twist the wire bundle after it is connected. This connector cannot be used as a strain relief!**

The AC connection consists of both terminals (Hot and Neutral) from the power-line and a third wire tied to a common Earth ground.

- High voltage AC Power wiring should be routed to the conduit opening nearest the AC power terminals.
- Do not bundle or route AC Power wiring with low voltage input or output wiring.
- Be absolutely certain that your USA installation complies with all aspects of the National Electric Code, NFPA 70. Be **especially** sure that your system is properly grounded.



**DANGER! ELECTRIC SHOCK HAZARD**

Make sure that AC power is **not** applied to the power cable while you are wiring the module, or you could receive an electrical shock that is life-threatening. **Failure to observe these instructions will result in death or serious injuries.**

**Connecting Grounds**

The power supply must be connected to true Earth ground. When used in an enclosure, be sure to connect the enclosure to Earth ground as well. The Continuum enclosure includes a special Chassis Ground stud that can be found at the lower left bottom of the inside as shown on the next page. Connect your grounds at that point.

## Building Ground Requirements

Be sure that all equipment from Schneider Electric is grounded to true Earth ground. True Earth ground protects the equipment from transients and other power surges in the area. We cannot guarantee that the controller system will operate as documented without a properly grounded installation.

An example of a sub-standard ground is a galvanized steel cold water pipe. As the pipe corrodes, it does not act as a true ground. The corrosion acts as an insulator, raising the potential of the pipe with respect to the ground.

When lightning strikes in the area of the installation, it drastically changes the potential of the Earth. Since properly grounded Schneider Electric units respond to changes in potential more rapidly than poorly grounded electrical systems, a poorly grounded building tries to reach ground through the Schneider Electric system. The surge of current can destroy electronic components on the controller board. Surges of much lower potential than lightning also impact the reliability of the equipment.

### Inspecting the Ground

*Be sure to have your grounds inspected before you begin the installation process to be sure your municipality follows the National Electrical Code. Many municipalities do not follow the code and often have substandard electrical grounds.*

Check your ground as follows:

Inspect the building power distribution panel for Earth-ground termination. If the ground termination is any of the following, it is not adequate and must be corrected:

- Does not exist.
- Is connected to a corroded or galvanized pipe.
- Is connected using a small gauge wire (less than 14 AWG).

Be sure your Schneider Electric cabinet is connected to the ground with a copper conductor that terminates at the distribution panel.

### Lightning Protection

Metal oxide varistors are built into the power supply to protect against power line transients.

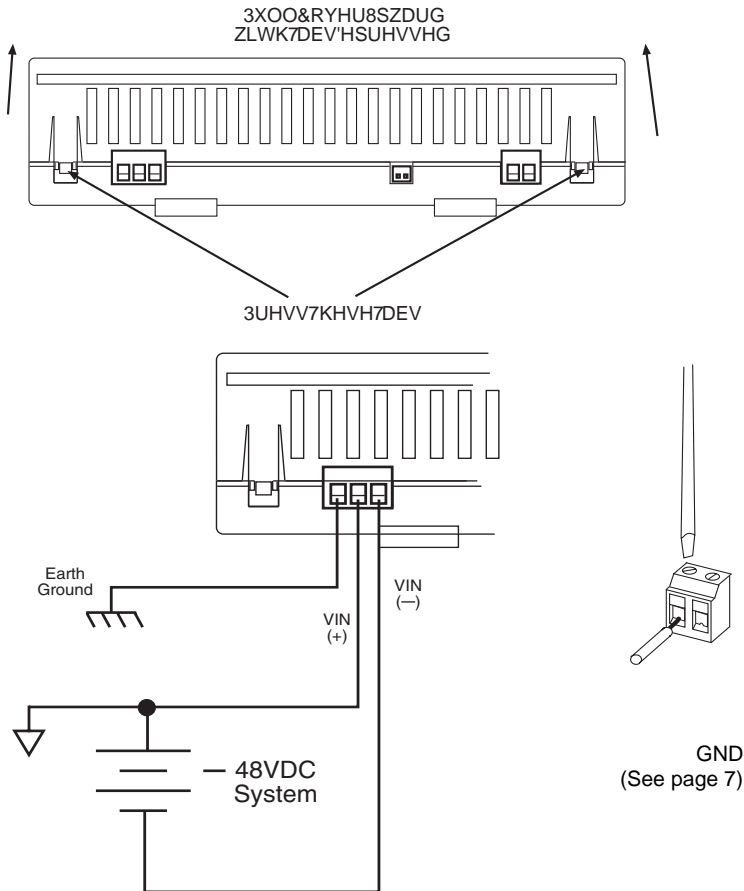
# DC Input Power Connection

## *(PS -48 DC 50, DC 50-U)*

The PS -48 DC 50 and 50-U power supply modules are powered by an external 2 Amp -48VDC Nominal Input voltage -15% / +10% UL listed source. This source is connected via three screw terminals located at the bottom of the unit as shown below.

**ATTENTION: For all applications, the external power source must be listed for to UL1481.**

In order to access the connector you must remove the plastic cover from the case. Press both cover removal tabs inward simultaneously:





# UPS Connections

The following information pertains to the AC 50-U, AC 65-U, AC 85-U and DC 50-U models only.

## Backup Battery Connection

The PS 120/240 AC 50-U, AC 65-U, AC 85-U and PS -48 DC 50-U power supplies include provisions for connecting an external lead-acid battery supply to power the system in the event of a main AC power failure.

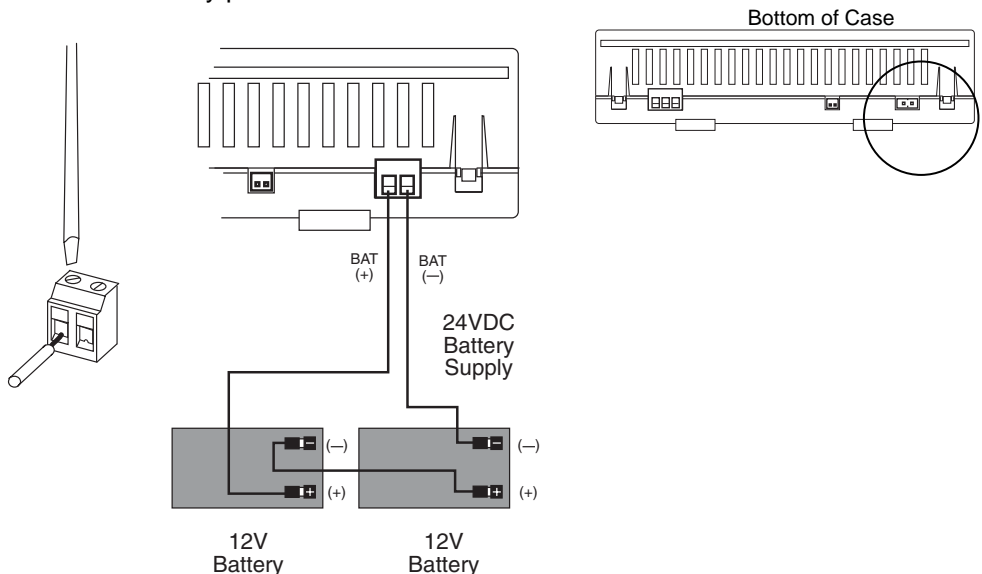
An external 24 Volt battery pack may be sized to provide the hold-up time specified by system requirements. Using standard 12V or 24V batteries, (120 to 160 W•Hr), the built-in UPS circuitry provides a backup time of 60 minutes @ 35 Watts power consumption. The integral battery charger has a worst case charging time of 48 hours with two (2) 12V, 7.0 Ahr batteries.

For UL 1076 applications, two 12 VDC 40Ahr batteries insures a supply that will power approximately 5 hours of back-up operation. For more information, obtain the Andover Continuum UL 1076 Burglar Alarm System Guide 30-3001-800.

To protect the batteries, the battery cutoff circuitry will activate at 20.4 volts.

The external battery pack connects to the module through a two-position screw terminal connector. Replacement of the external battery for maintenance purposes may be performed while the unit is AC powered without interruption of service.

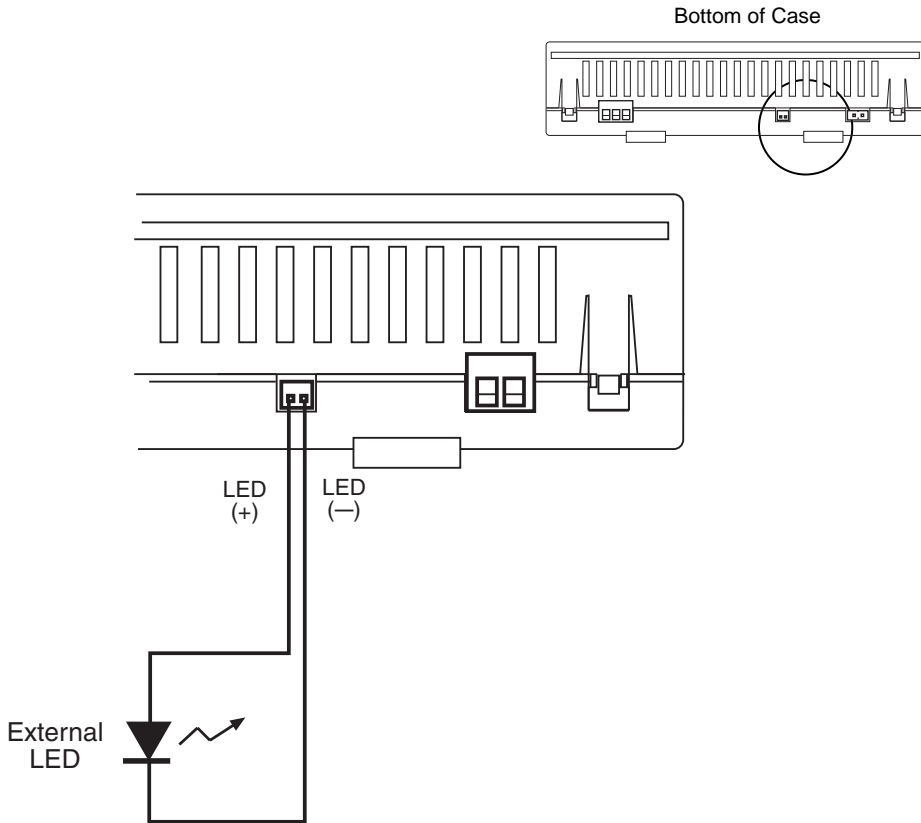
Connect the battery pack as follows:



## External Power Indicator Connection

All Andover Continuum power supply modules include a connector for an external LED power-on indicator. The signal from this connector is active when the power supply is turned on and receiving input power (AC or DC).

Connection is via a two pin removable female Molex connector # 14-56-7022 (not supplied). Wire the external LED as follows:

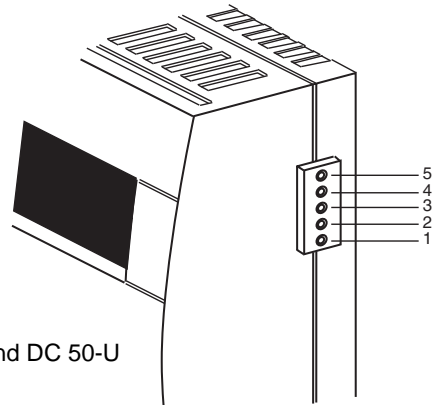


An optional cable assembly is available. Schneider Electric part number 01-0010-422 is a 2 foot (60 cm) cable that includes the LED and connector.

## Output Power Connection

The power output connector is a five pin male assembly that is designed to easily insert directly into the left side (input) connector of any CPU or I/O module. The signals within that connector are as follows:

PIN	Function
5	+VDC
4	VDC Return
3	No Connection
2	Low Battery *
1	AC Power *



\* Only on PS 120/240 AC 50-U, AC 65-U, AC 85-U and DC 50-U

All the Andover Continuum power supply modules (except the AC 25 model) generate a +24 VDC source for all other modules in the system. The PS 120/240 AC 25 power supply generates +5 VDC. This power source is located on pins 4 and 5.

The UPS versions of these supplies include two power status signals on pins 1 and 2. Their function is as follows:

- AC Power is a logic signal that is intended to communicate to an attached CPU module that AC power is available. When AC is interrupted and the power supply has switched to UPS battery mode, this signal presents a logic low to the CPU. The CPU can use this signal to start an orderly system shutdown. For more information on the use of this signal refer to the Andover Continuum CPU Reference #30-3001-703.
- Low Battery is a logic signal that is intended to communicate to an attached CPU module that the voltage of the battery has dropped below 22 Volts. When the power supply is in UPS battery mode, this signal presents a logic high to the CPU. Should the battery voltage drop, this signal switches to a logic low. The CPU uses this signal to start an orderly system shutdown. For more information on the use of this signal refer to the Andover Continuum CPU Reference #30-3001-703.

# Output Connections

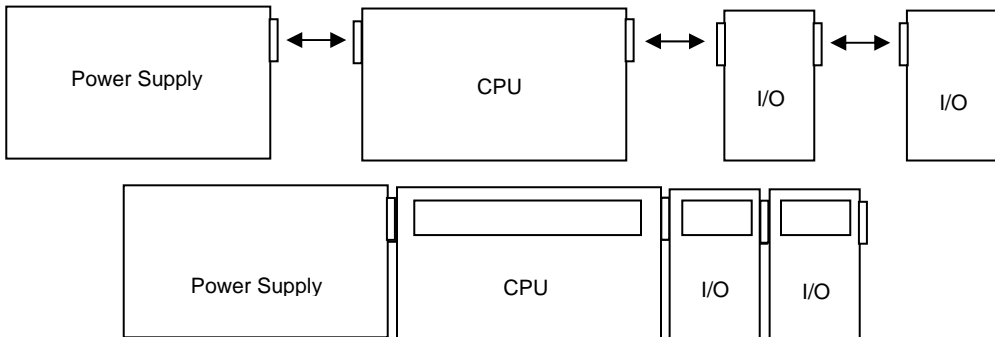
## *PS 120/240 AC 50(U), AC 65(U), AC 85(U), -48 DC 50(U)*

The PS 120/240 AC-50(U), AC 65(U), AC 85(U) and -48 DC 50(U) power supply modules directly connect to others without the use of cables through a system of built-in plugs and jacks. All modules except the power supply include two complementary module inter-connectors.

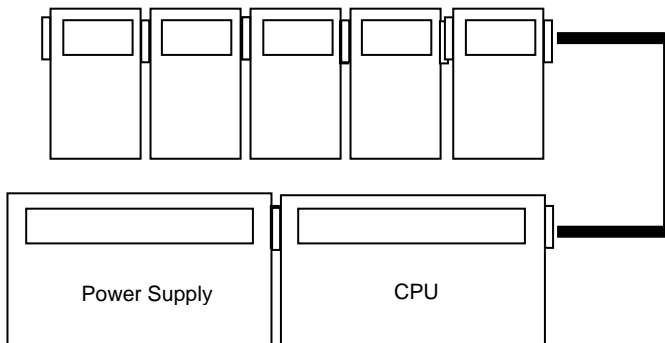
The power supply becomes the first module feeding the CPU. All other modules are then connected to the CPU.

**Important: When powering a CPU, the power supply connects directly to the left side of the CPU. Do not place any I/O modules between the power supply and the CPU.**

Creating a system is as simple as physically plugging the modules together into a stack.



In vertical extended systems, I/O modules may be located above or below other modules. In this case, cable assemblies bridge the I/O modules together.



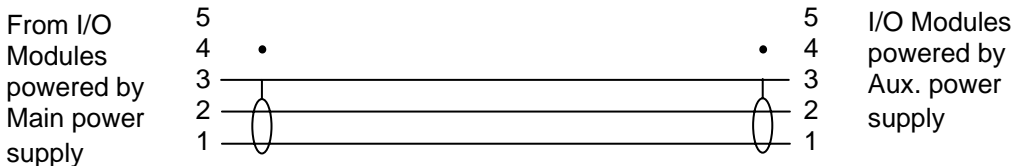
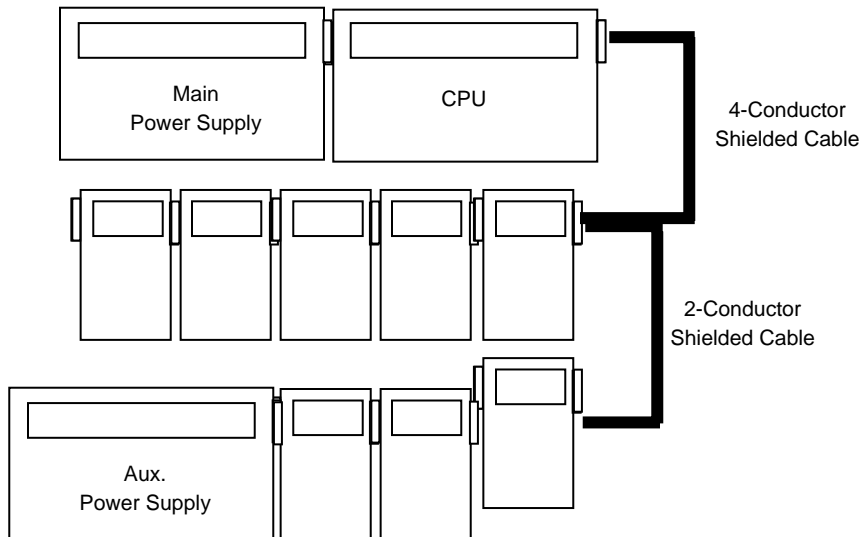
# Auxiliary Power Connection

## PS 120/240 AC 50(U), AC 65(U), AC 85(U)

In situations where a large number of I/O modules are used, the power available from one supply module may not be sufficient. In these scenarios an auxiliary power supply can be connected to supply necessary power to the extended I/O group.

All Andover Continuum power supply models can be used as auxiliary power supplies. However, the UPS versions must be modified slightly before it is used.

Generally the auxiliary power supply is added to a remotely located group of I/O modules. The I/O modules that are to be powered by the auxiliary supply still connect to the other modules so that data may flow between the functional blocks of the system, however, these I/O modules must receive power from only the auxiliary supply. A 2-conductor shielded cable eliminating the 24 VDC signals (pins 4 & 5) is connected between the last I/O module powered by the main power supply and the remotely located I/O modules powered by the auxiliary supply:



Specific information regarding cable preparation and overall system layout may be found in the Andover Continuum I/O System Reference, 30-3001-499.

# Auxiliary Supply Conversion

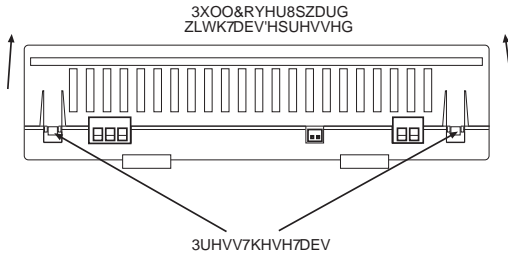
## PS 120/240 AC 50-U, AC 65-U and AC 85-U

The UPS versions of the 120/240 AC power supply include two status signals that are meant for use by a CPU module. When connecting directly to an I/O module you want to disable these signals.

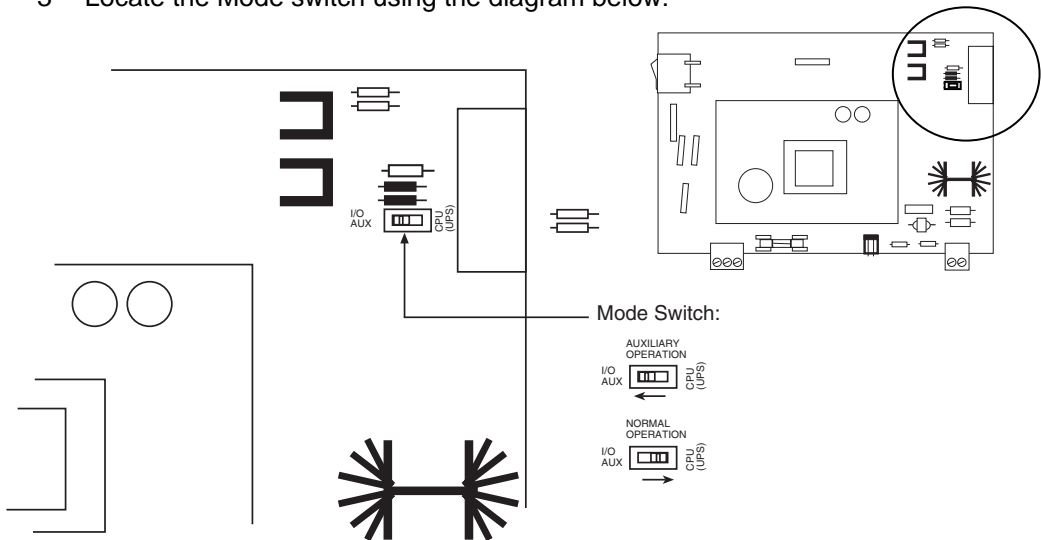
**There are two versions of the printed circuit board within the Power Supply. One includes a mode switch, the other requires components to be removed.**

On newer versions of the supply, a Mode switch inside the cover allows you to easily disable these signals. In order to access these components you must remove the plastic cover from the case.

- 1 Remove power from the unit.
- 2 Press both cover removal tabs inward simultaneously and pull up:



- 3 Locate the Mode switch using the diagram below:

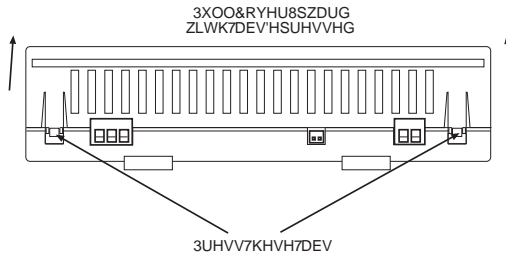


With the tip of a small screwdriver, carefully slide the switch to the AUX position. To reverse this change, simply slide the switch back to the CPU position.

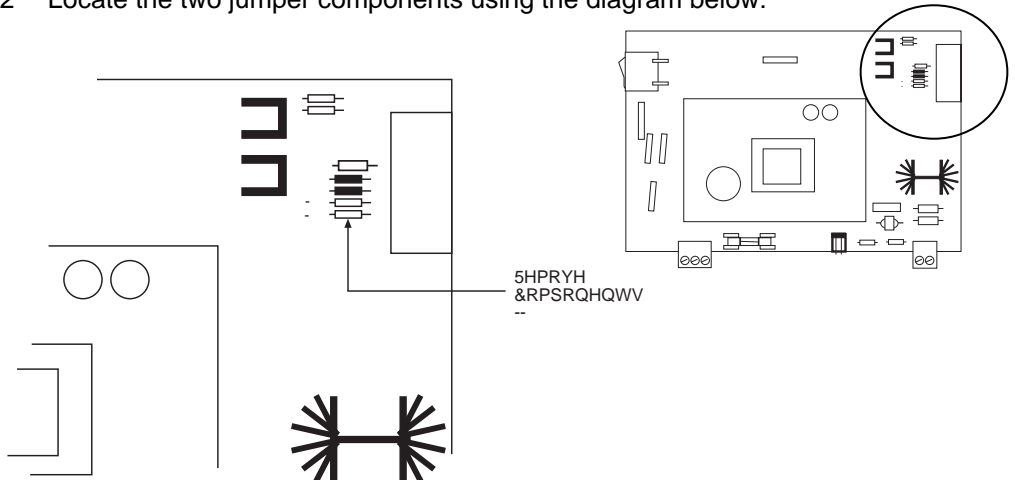
- 4 Replace the cover.

On older versions of the supply, two jumper components must be removed from the printed circuit board. In order to access these components you must remove the plastic cover from the case.

- 1 Press both cover removal tabs inward simultaneously:



- 2 Locate the two jumper components using the diagram below:

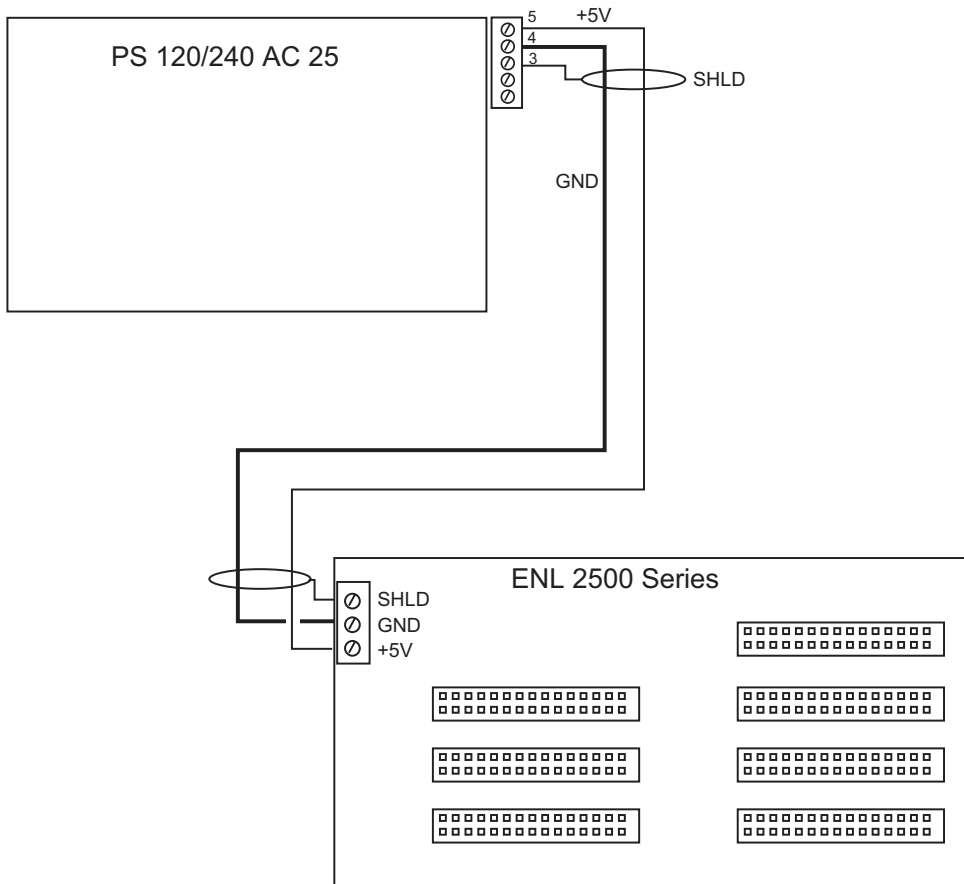


- 3 Carefully snip (cut) the wire leads of each of the two components. Be sure to snip only the leads for these components. Other components in close proximity to these are important to the operation of the supply.
- 4 Replace the cover.

## PS 120/240 AC 25 Output Connection

The PS 120/240 AC 25 is an auxiliary +5V power supply that is designed to power accessory devices such as the EnergyLink 2500 Ethernet converters.

The following is a typical connection application:





# Operation

## *Power On*

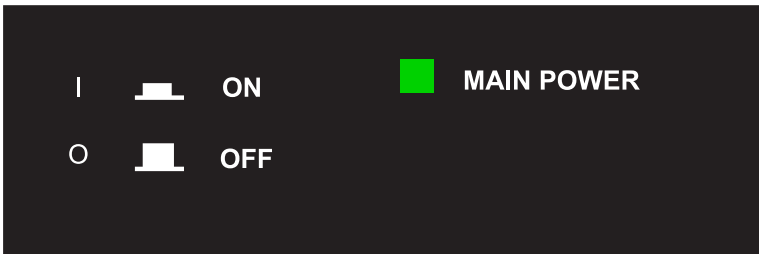
After installation, to apply power to the system, the power switch located on the left side of the power module case must be depressed.

The switch is a rocker type with each side marked according to function. Pressing the side marked with the **I** turns the power on.

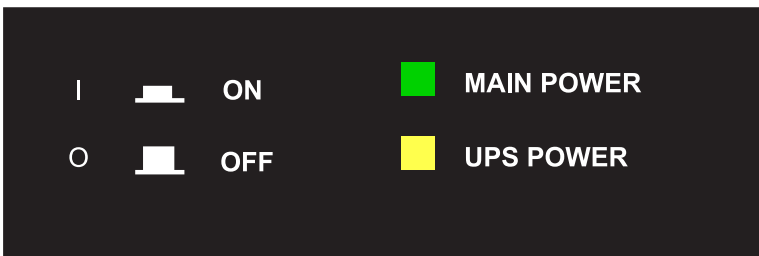
To remove power, press the side marked **O**.

## **Status Indicators**

The power supply includes a green Main Power indicator, which when illuminated indicates that primary power (AC or DC) is applied and the power switch is turned on.



The UPS model also includes another indicator reporting the presence of backup battery power. When the power supply is in UPS backup mode this indicator illuminates in a yellow color.



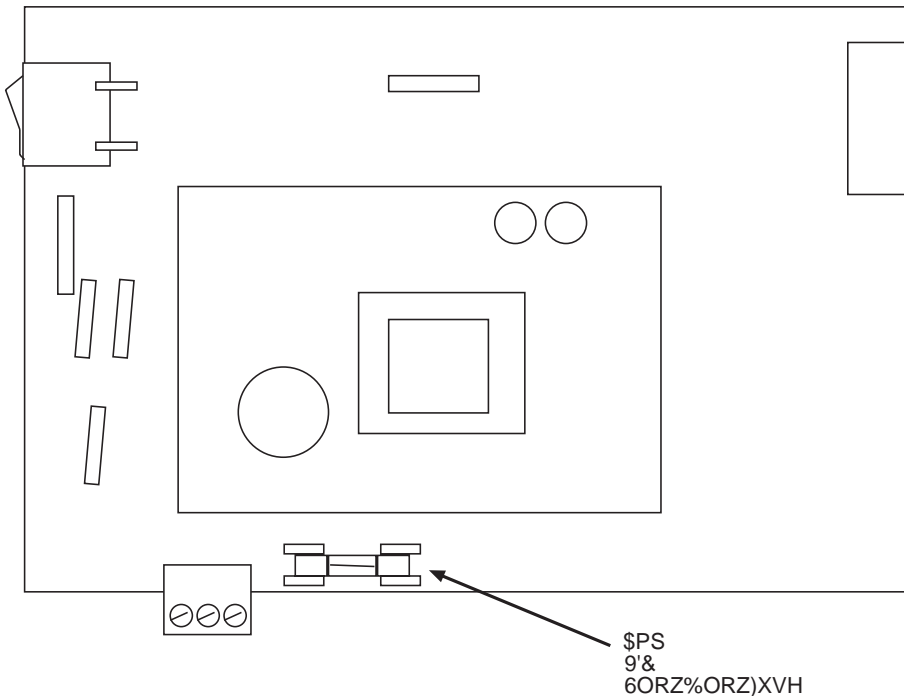
# Troubleshooting

## No Response to Power Switch

If there are no indicators displayed on the status panel after power-up, the unit is not operating. This could be due to the loss of primary AC power or other internal dysfunction.

- Check that power is available and connected properly to the AC or DC Input power terminals. This can be done using a multimeter.
- If input power appears to be OK, remove power and all other connections from the unit. Open the cover. Remove the plug-in power fuse component(s) and check for continuity with an Ohm meter. If the fuse is blown, replace it with a similar value fuse (see diagrams). After replacement, replace the cover.

## PS 120/240 AC 50, AC 65, AC 85

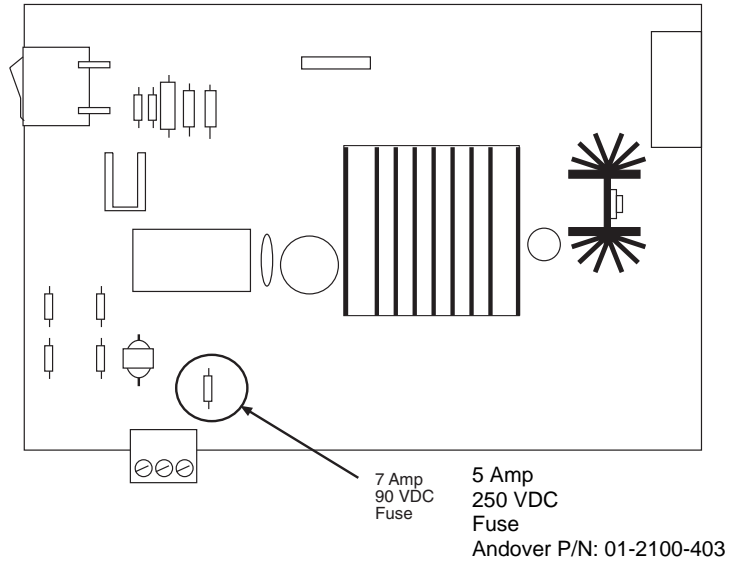


# PS 120/240 AC 50-U, AC 65-U, AC 85-U

Andover P/N: 01-2100-207

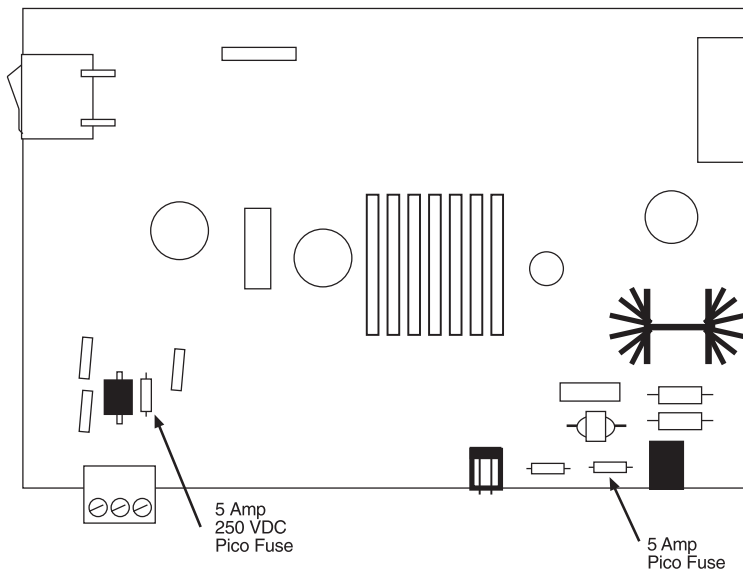
Andover P/N: 01-2100-039

## PS -48 DC 50



The UPS model includes a separate Picofuse for the battery. The fuse is inserted into socket holes on the board. To remove, gently pull the fuse from the board.

## PS -48 DC 50-U



The -48V models include a Picofuse. The fuse is inserted into socket holes on the board. To remove, gently pull the fuse from the board.



**Andover Continuum Power Supply Reference  
Document Number 30-3001-702  
Rev. G**

