



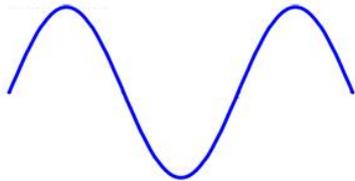
# Power Protection Basics

by Orion Power Systems

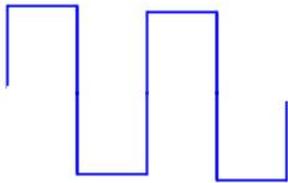


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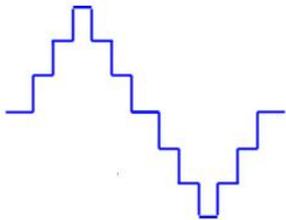
# Alternating Current waveforms



Sine Wave- This is the wave form of good clean utility power. More expensive to produce with a ups system.



Square wave- This is the wave form produced by low quality inverters. Examples would be camping inverters, etc. Produces excessive heat with long term use.



Stepped Square Wave - Much cleaner than square wave and produces less heat. Not recommended for long run time applications.

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*What type of wave form do I need ?*

# Watts, Volts, and Amps

One of the most basic electrical formulas is :  $\text{Watts} = \text{Volts} \times \text{Amps}$

Volts and Amps have an inverse relationship. When you raise the volts, you must lower the amps for a given watt rating.

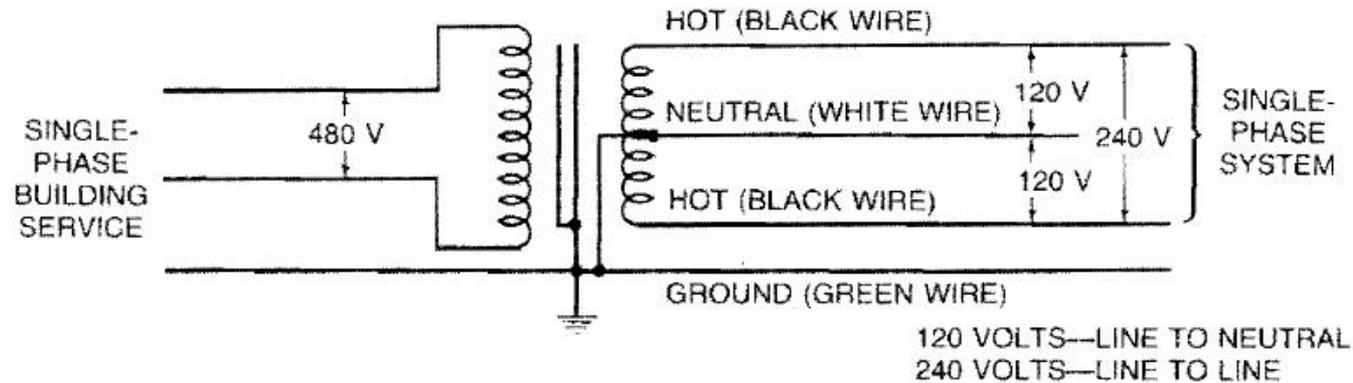
Why does this matter ? When you raise the volts, you reduce the amps. The lower the amps (or current) the less copper you need. The less copper the lower your cost.

Example:  $1000\text{W} = 500 \text{ V} \times 2 \text{ Amps}$   
or  $1000\text{W} = 2\text{V} \times 500 \text{ Amps}$

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*Why does the utility use such high voltages ?*

# Single Phase Wiring

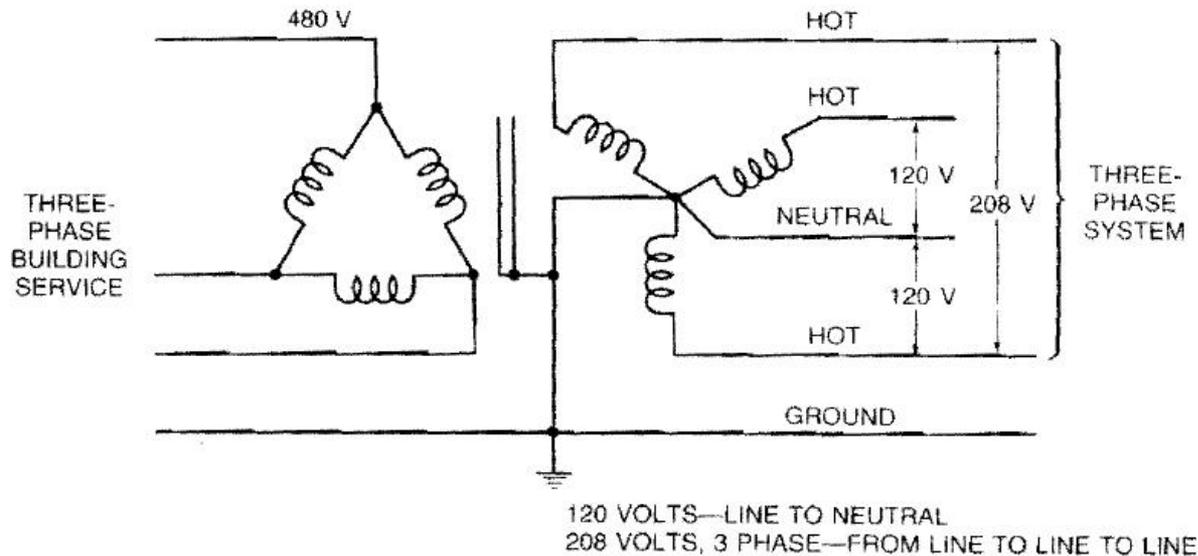


Single phase wiring is commonly found in residences and small office buildings. The most common voltage in this type of wiring is 120/240V.

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*Is most computer equipment single or three phase ?*

# Three Phase Wiring

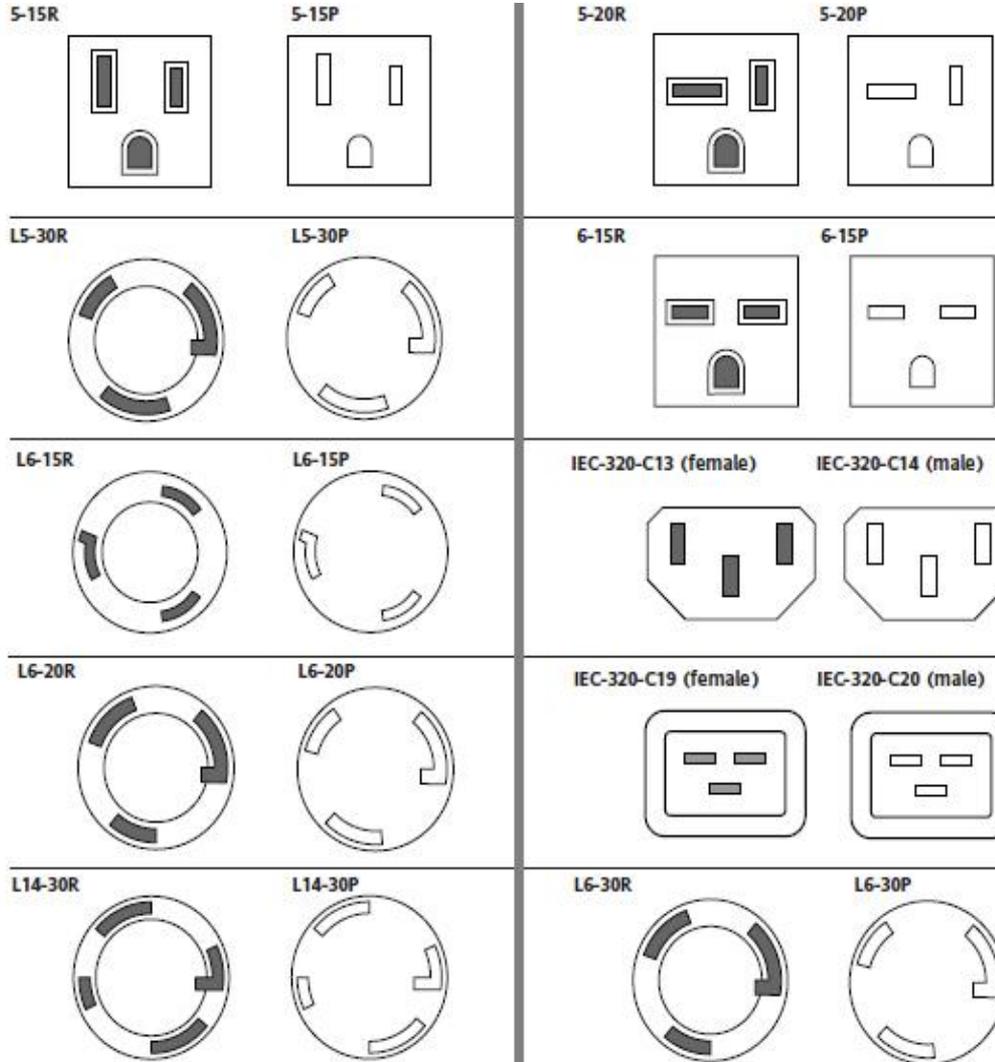


Three phase wiring is almost never in residences and almost exclusively commercial. You can pull single power from a three phase electrical panel. In this case the building service is 480V Delta and is transformed to 120Y208V.

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*Why is commercial power three-phase ?*

# U.S. Plugs and Receptacles

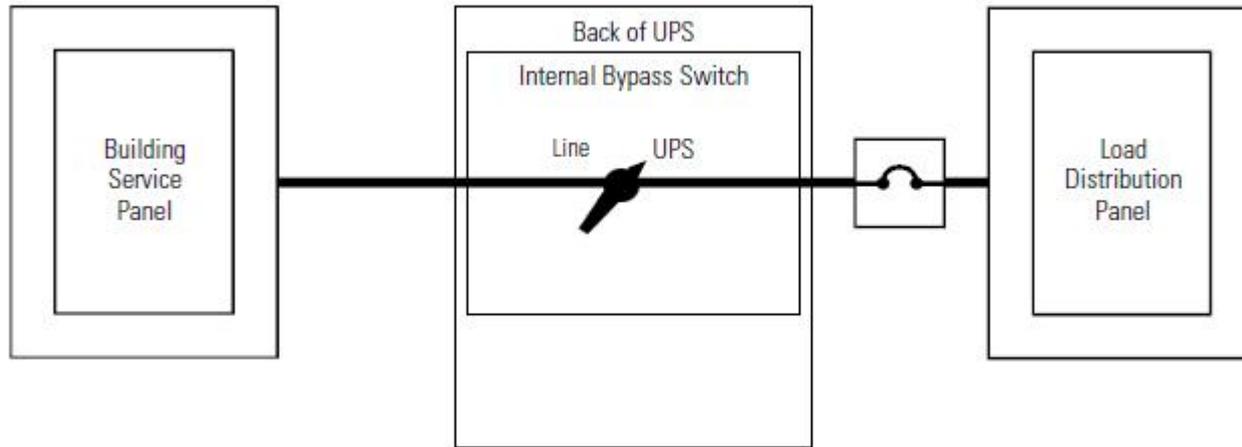


NEMA Receptacle Examples  
NEMA 5-15R

5 = 120V  
15 = 15 Amps  
R = Receptacle

NEMA L6-30P  
L = Locking  
6 = 208/240V  
30 = 30 Amps  
P = Plug

# Hardwired Installation



Hardwired installation is typically reserved for larger ups systems 6kVA and above. The input and output of the UPS System is permanently attached to the electrical panels in the building. This setup is ideal when the devices to be protected are scattered throughout the building. Hardwired installations must be performed by licensed electricians.

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*Bypass switches are recommended for hardwired installations because if the UPS fails, there is no way to get power to the critical loads.*

# Most common power problems.

- 1) Surges
- 2) Blackouts
- 3) Brownouts
- 4) Overvoltage
- 5) Line noise

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*How can I protect my equipment from these power problems ?*

# UPS Systems - The Answer to power problems.

A UPS System can protect against all 5 major power problems. There is a wide variety of UPS systems available, so for many the task of selecting a UPS can be daunting.

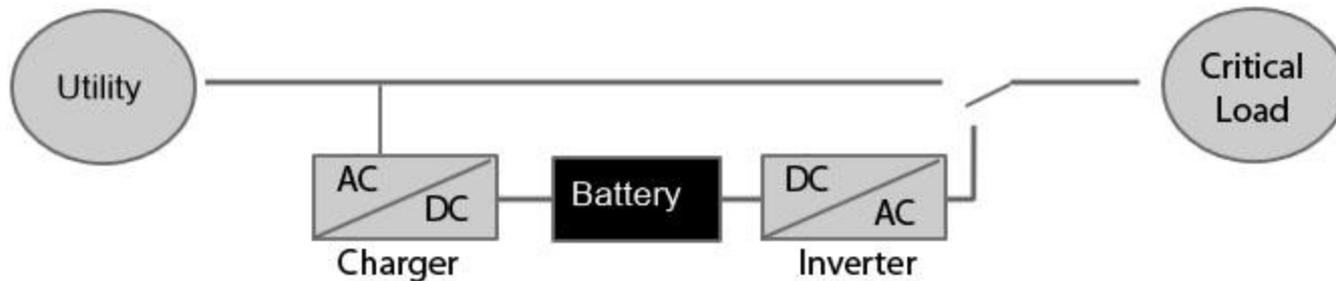


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*Fact: UPS Systems are available with 4 major design types - Standby, Line Interactive, Double Conversion, Ferro Hybrid.*

# Stand-by UPS Systems

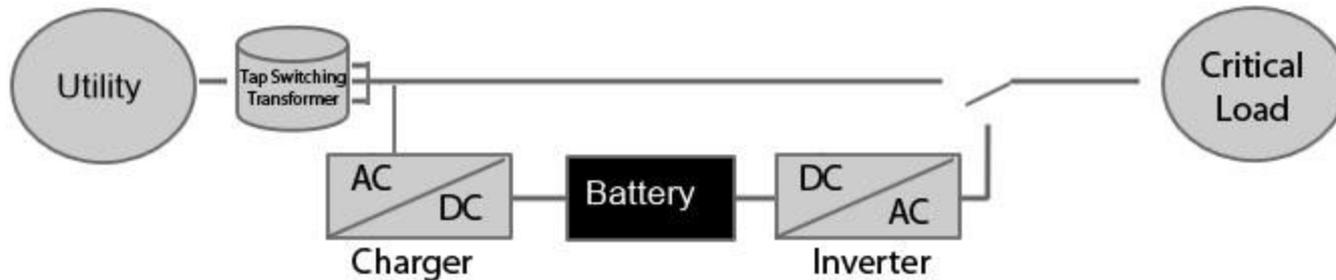
Stand-by UPS Systems are the least expensive and most basic type of UPS. They protect against all 5 power problems, but cannot handle brownouts or overvoltages for extended periods.



*Stand-by UPS systems are typically used with Workstations and PCs. Orion's Office Max is a stand-by ups..*

# Line Interactive UPS Systems

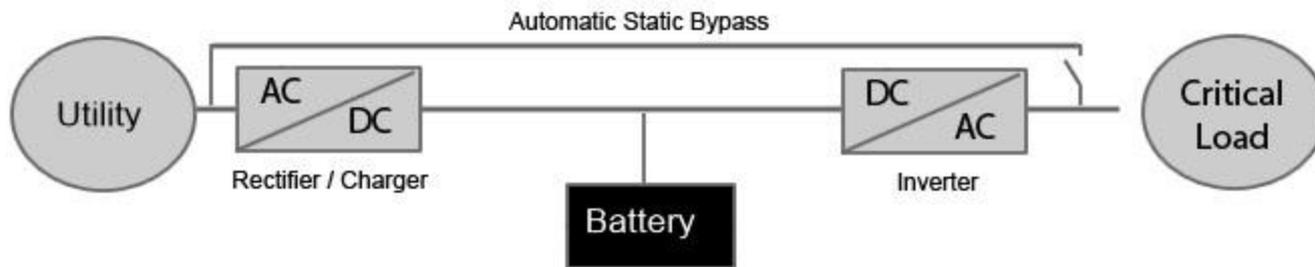
Line Interactive ups systems provide excellent overall power protection and are ideal for computer applications. They protect against all 5 power problems, but are not a good fit for power quality sensitive applications such as lab equipment.



*Orion Power's Office Pro LCD uses line-interactive design and is ideal for small servers and other business applications.*

# Double Conversion UPS Systems

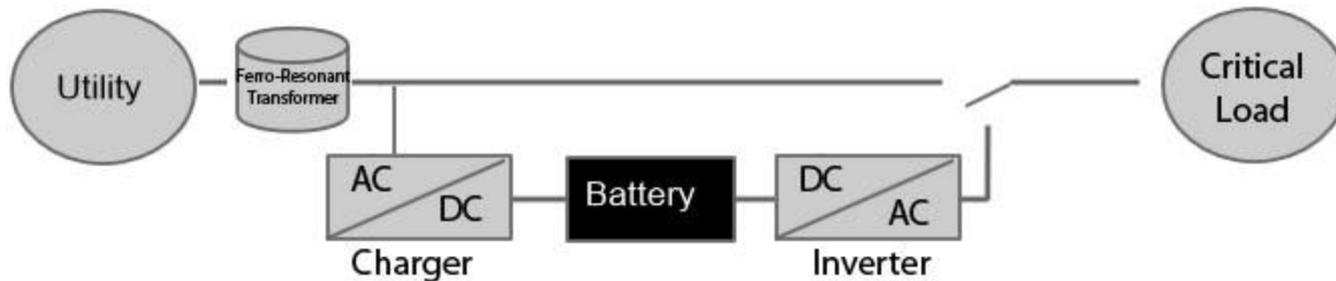
True online double conversion UPS Systems are the industry standard for mission critical applications or where power quality must be precise. Double conversion systems typically regulate voltage +/- 3% or better and output a true sine-wave.



*Orion Power Systems Online RT/RTX and Online SCR2 offer double conversion protection up to 20kVA.*

# Ferro Hybrid UPS Systems

Ferro Hybrid UPS Systems use a FerroResonant transformer to clean and regulate the power. This design provides excellent power quality, but the bulky transformer makes this UPS impractical in many applications.



*Orion Power Systems does not offer a Ferro UPS System.*

# Questions to ask when selecting a UPS System

- 1) How many Watts of power does the equipment to be protected consume ?
- 2) How many minutes of backup time is needed ?
- 3) What is the voltage of the equipment, 120V or 208V ?
- 4) What is the application / environment ?



*Questions ? Call Orion Power technical support for any questions before or after the sale at 877-385-1654.*



## Sales and Product Information.



[www.orionpowersystems.com](http://www.orionpowersystems.com)

# Orion Product Family

## UPS Systems 600VA - 20kVA

of



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*Orion manufactures UPS Systems, power distribution, and surge protection.*

# About Us

Orion Power Systems is a Jacksonville, FL based manufacturer of high-quality power conditioning and protection systems to customers nationwide.

Cornerstones of Orion Power Systems:

1. Offer value priced power protection without sacrificing quality or customer service
2. Allow distributors, dealers, and resellers to make a reasonable profit

Orion offers:

- UPS Systems from 600VA to 20kVA
- Power distribution
- Communications
- Extended warranty and repair services

# What makes us different ?



## **SUPERIOR QUALITY IS NO ACCIDENT:**

1. Manufactured to ISO:9001 standards to ensure the utmost quality.
2. We load test every rack/tower system in our Jacksonville, FL facility to ensure no out of box failures. No one else does that !



**37 MONTH NO-HASSLE WARRANTY:** Unsurpassed warranty and support with 37 months coverage on ups electronics and 24 months on battery. If a unit fails within the warranty period, Orion will send a new one and take back the bad one at no cost to the customer.



**COST SAVINGS:** Orion Power Systems ups systems cost 30-40% less than APC and the other big brands. Lower overhead and lower advertising costs mean more margin and a competitive advantage. Over the period of a year, the savings / profit increases really add up.

# Get industry leading features

Orion Power Systems is always striving to provide our customers with the latest features and technology at an affordable price.

All our ups systems feature

- Hot swappable user replaceable batteries
- 37 Month warranty
- LIFETIME load protection guarantee
- Free shutdown and monitoring software with every system
- LED / LCD display depending on model
- SNMP management (Online RT, Online SCR2)
- Rack / Tower form factor allows one unit to do either job  
(Online RT and Online SCR2 6,10, and 20 kVA)
- Built-in network surge protection (MaxOffice, Office Pro LCD, Online RT  
)

# Orion Power Systems Models

## Office Series - MaxOffice 600VA



### MaxOffice 600VA

The Orion Power Systems MaxOffice series provides maximum surge protection and battery backup in a compact design.

#### Main features

- 37 month silver warranty
- 860 joule surge protection
- Wall mount capability
- Network surge included
- Monitoring software
- (3) outlets ups (3) surge only

#### Applications

Computers, phone systems, routers, small electronics.

# Orion Power Systems Models

## Office Series - Office Pro LCD 1000VA - 2000VA



### Office Pro LCD

Office Pro LCD is a budget friendly line-interactive ups with stepped sine output.

### Main features

- Easy to read LCD
- AVR for brownouts and overvoltages
- 37 month silver warranty
- 860 joule surge protection
- Hot-swappable batteries
- Network surge included
- Monitoring software
- (8) outlets on ups

### Applications

Workstations, small servers, video recorders, any other IT equipment.



# Orion Power Systems Models

Online RT / RTX - Rack / Tower 1000VA - 3000VA



## Online RT / RTX

The Online RT / RTX Series is an advanced true-online ups for rack / tower applications. The RT series has no extended battery capability, the RTX allows up to 4 external battery packs.

### Main features

- True online at line interactive price point
- Advanced LCD display
- True online power quality
- 37 month Gold warranty
- Hot-swappable batteries
- Network surge included
- Free Monitoring software
- Compact design fits in all racks

Applications - IT, security, lab analyzers, medical, and more.

# Orion Power Systems Models

Online RT / RTX - Rack / Tower 1000VA - 3000VA (Cont.)



## Advanced LCD Display

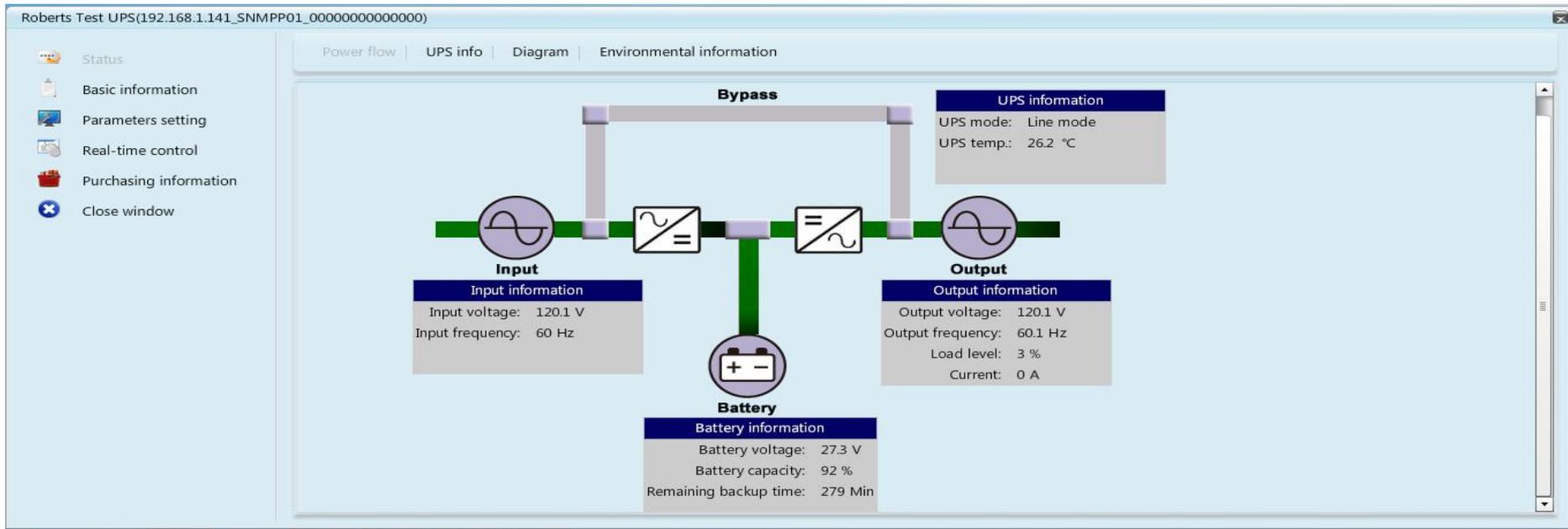
Online RT / RTX provides all the data you need right on the display.

## Includes

- Load and battery capacity percentage
- Runtime remaining in minutes
- Operating mode (Online, bypass, ECO, or frequency conversion)
- Bad battery
- Alarm Silence
- Load segment condition
- Alarm codes

# Orion Power Systems Models

## Online RT / RTX - Rack / Tower 1000VA - 3000VA (Cont.)



### SNMP Communications

Online RT / RTX provides the latest features for advanced SNMP management. Main features include:

- Mimic display to show operation and data
- User controllable load segment allows reboot of stuck routers, etc. without shutting down entire ups
- SNMP allows alerts for battery change date, also stores warranty expiration date.
- Runtime remaining in minutes in the software

# Orion Power Systems Models

## Online SCR2 - Rack / Tower 10kVA - 20kVA



### Online SCR2

The Online SCR2 provides the latest in transformerless design to offer improved efficiency, compact size, and lighter weight than competing models.

#### Main features

- Cost 20-40% less than competitors
- True online power quality
- 37 month Gold warranty
- Hot-swappable batteries
- Transformerless design
- Free Monitoring software
- Modular means easy maintenance
- TAA compliant
- Rear mounted bypass standard
- 10kVA can be paralleled to provide 20kVA

Applications - IT servers, storage, networking gear, lab equipment, medical devices.

# Orion Power Systems Models

## Panel Surge Pro



## Panel Surge Pro

The Orion Panel Surge Pro provides building wide protection from spikes, transients, and surges. Cheap prevention of catastrophic surge damage.

### Main features

- Protect the entire building from surges
- First line of defense
- Includes audible alarm in case of failure
- 80 kA surge rating
- High performance EMI / RFI filtering
- 10 Year warranty
- LED status indication via solid state diagnostics plus remote indication contacts
- Surface mount
- Thermal and short circuit fusing
- UL 1449 3rd Edition Listed

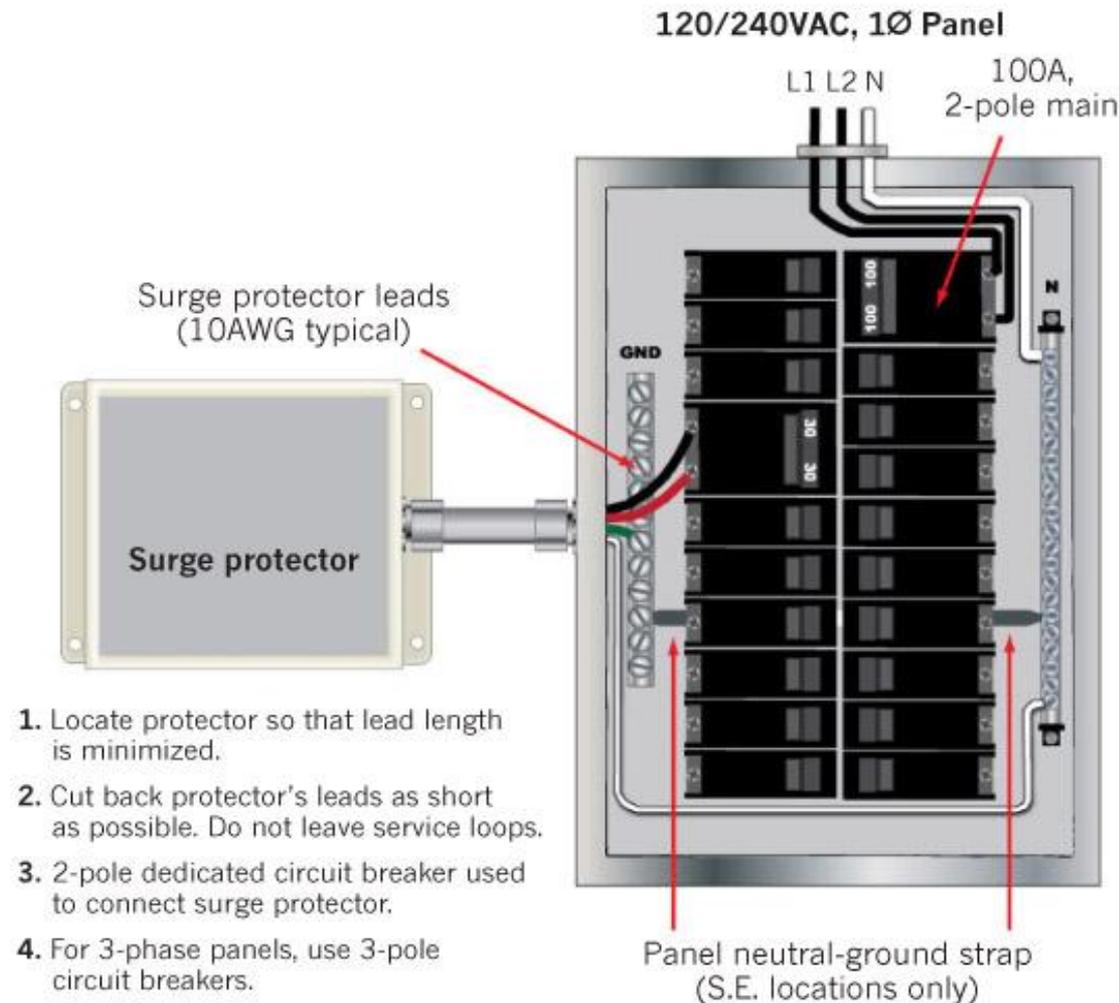
# Orion Power Systems Models

## Panel Surge Pro Sample Installation

### Panel Surge Pro

The Orion Panel Surge Pro allows easy installation to protect service panels.

- Mounts next to panel
- Uses an empty circuit breaker
- Use shortest leads possible to create minimal resistance
- Installed by licensed electricians only
- Diverts surge to ground



# Orion Power Systems Models

## Value Series PDUs

The Orion Power Systems Value Series PDUs offer affordable power distribution for both vertical and horizontal rackmount installation at an affordable price point.

OPS-HVPDU-15A12 - 1U Horizontal or 0U Vertical (12) 5-15R

OPS-VPDU-15A24 - 0U Vertical (24) 5-15R

OPS-VPDU-20A24 - 0U Vertical (24) 5-20R



# Orion Power Systems Models

## Communication and Software



WinPower & ViewPower Pro software:

- Works with Windows XP, Vista, Vers. 7, 8 , Mac, Linux
- Included FREE with all models
- Logging of power events and shutdown capability
- Email and SMS capability

SNMP Management Card

- Works with Online RT and Online SCR2
- Logging of power events and shutdown capability
- Shuts down multiple servers over network
- Email and SMS capability
- UPS becomes node on your network
- Works with Network Operations Center software

# Ideal Markets

## Who needs the Orion ups systems ?

**Security** - Head end DVR, POE switches, and computers.

**Data closets** - Universities, hospitals, and large corporate campuses typically use VOIP and have network closets spread throughout. Each closet will have a 1-3kVA rack mount ups along with an SNMP monitoring card. More critical closets will often have a 6-10kVA ups along with extra battery packs. Larger universities will often have hundreds of 1 to 3kVA ups systems spread throughout their campus.

**Integrators** - Integrators typically build the ups into their solution. An example would be a Kiosk manufacturer that installs a ups with every kiosk they build. Redbox has a ups in every kiosk they install. Other examples, voting machines, bank teller machines.

**Lab equipment** - Lab measuring equipment like mass spectrometers typically runs tests for hours and cannot afford an outage. One power blink result in hours of lost test data. Customers are typically law enforcements labs, hospital labs, universties.

**OEM applications** - A manufacturer that includes a ups with every product they sell. An example would be IBM, they include a ups with every computer they sell.

**Phone Systems** - Typically use a ups with battery packs so they can continue operating for hours.

# Need help or more info ?

Go to : [www.orionpowersystems.com](http://www.orionpowersystems.com)

Dropbox has price books, brochures, and manuals.

Youtube Video channel.

Call 877-385-1654.

Thank You !