

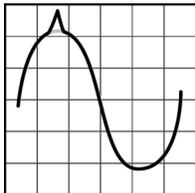


## Protecting Test Equipment, Computers and Electronics From Power Problems in Industrial Environments

Power problems occur every day in every setting, but test equipment, computers and electronics in industrial environments are especially vulnerable. Fluctuating and extreme industrial power demands increase power problems that threaten your equipment, your productivity and your financial health. Dependable protection doesn't need to be expensive or complicated: a wide range of affordable solutions prevent power problems before they become major headaches. Tripp Lite surge suppressors and UPS systems provide your equipment with safe, reliable power around the clock, keeping your facility up and running at peak capacity.

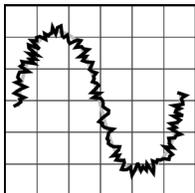
### Power Problems in Industrial Environments

Power problems cost the U.S. economy up to \$188 billion per year in equipment damage and lost productivity, and industrial facilities are especially hazardous for unprotected test equipment, computers and electronics. When powerful machinery pushes circuits to the limit, common power problems are amplified:



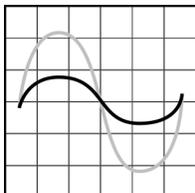
#### Surge / Spike

Surges and spikes are short-term voltage increases. They cause catastrophic equipment damage, data corruption and incremental damage that degrades equipment performance. The incidence of surges and spikes rises with heightened thunderstorm activity, lightning strikes, power fluctuations caused by extreme demand and outages followed by sudden power restoration.



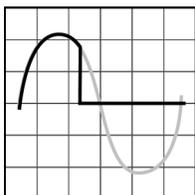
#### Line Noise

Line noise encompasses electromagnetic interference, radio frequency interference, harmonic distortion and waveform irregularities in line power. It causes incremental electronic circuit damage, data corruption and audio/video quality problems. Line noise increases with utility and facility power fluctuations and usage of powerful motors and fans that introduce interference in local electrical circuits. Thunderstorm activity, fluorescent lighting, signal relay towers and power lines also contribute to line noise.



#### Brownout

A brownout is a voltage deficiency that occurs when power demand exceeds power availability. Brownouts cause equipment failures, incremental damage, decreased stability and data loss. Brownouts become more frequent as demand for electricity rises beyond capacity, forcing utilities to lower line voltage. Repeated local brownouts also occur as air conditioners, electrical motors, assembly lines and other power-hungry machines start and stop, burdening facility electrical circuits and lowering line voltage.



#### Blackout

A blackout is a complete loss of power. Blackouts cause reduced productivity, lost revenue, system crashes and data loss. Blackouts increase in frequency and duration as high winds, lightning strikes, wildfires, snowstorms and floods disrupt or destroy power lines and other power distribution equipment. During peak demand, utility companies are forced to institute rolling blackouts. Unplanned outages occur as the aging, overtaxed electrical grid and facility circuits are overwhelmed by ever-increasing electrical loads.

\* Source: Electric Power Research Institute

## Industrial Facility Power Protection Solutions

Tripp Lite provides affordable solutions that keep your facility up and running by stopping damaging power problems before they harm test equipment, spectrum analyzers, bench power supplies, copiers, printers, computers, oscilloscopes and other valuable electronics. Solutions are available for any size application, from home to enterprise business, and offer five levels of protection, ranging from **Category 1** (protection against several common power problems) to **Category 5** (the most complete protection available against all power problems).

### Category 1—Surge Suppressors

Tripp Lite surge suppressors provide heavy-duty surge/spike protection and line noise filtration. Isobar® surge suppressors include the most robust surge-blocking architecture available, incorporating more and substantially stronger protective components inside all-metal housings. They also include isolated filter banks that eliminate interference between devices plugged into the same surge suppressor. Protect It™ surge suppressors provide strong, economical protection in high-impact plastic housings. More than 80 surge suppressor models are available in a wide variety of form factors with up to 12 outlets and various data line protection options (Tel/Modem, Coaxial, Ethernet).

### Category 2—Standby UPS Systems

Tripp Lite's Internet Office® and BC series of standby UPS systems provide surge/spike/noise protection like surge suppressors, and they add battery backup to keep connected equipment operating without interruption during blackouts. They also provide limited brownout protection by switching to battery. Select models include data line protection and communication ports that enable automatic shutdown of connected computers during extended blackouts.

### Category 3—Line-Interactive UPS Systems

In addition to the protection features offered by standby UPS systems, Tripp Lite's Digital, OmniSmart™, VS and AVR series of line-interactive UPS systems add Automatic Voltage Regulation (AVR). AVR allows the UPS system to adjust voltage to safe levels during brownouts without switching to battery power, reducing battery wear and preserving charge levels for blackout protection.

### Category 4—SmartPro® UPS Systems

Tripp Lite's SmartPro series of line-interactive UPS systems offers advanced AVR for improved brownout protection and enhanced microprocessors for more complex communications with connected computers. Select models include network card slot, expandable battery backup runtime and pure sine wave power from battery, ensuring maximum stability for connected equipment.

### Category 5—SmartOnline™ UPS Systems

Tripp Lite's SmartOnline UPS systems offer the best protection available against all power problems. True on-line operation with continuous AC-to-DC-to-AC double power conversion completely isolates sensitive electronics from power problems. Precision-regulated output power with pure sine waveform guarantees maximum stability for connected equipment. All models include network card slot and expandable battery backup runtime.

### Mobile and Emergency Power

In addition to surge suppressors and UPS systems, Tripp Lite offers inverters that turn your vehicle into a high quality power generator, at a fraction of the cost of traditional generators. Inverters convert the energy stored in your vehicle's battery to AC power usable by computers, tools, battery chargers and other equipment designed for household current, allowing you to use them on the road, at remote sites and during emergencies and extended blackouts.

## How to Choose the Best Solution for Your Needs

UPS systems are the best defense for equipment that requires battery backup, such as computers, security systems and servers. Surge suppressors are a cost-effective alternative for equipment that doesn't require battery backup, such as copiers, printers and power tools. Inverters are a mobile supplement to UPS systems and surge suppressors, not a replacement.

Refer to the chart below to determine what kind of protection best matches your needs and use Tripp Lite's product selector guides at [www.tripplite.com/selector/](http://www.tripplite.com/selector/) to find solutions appropriate for your equipment, considering factors like the number of outlets, wattage requirements and more.



ISOBAR8ULTRA Surge Suppressor

### Summary of Protection Features

Protection Type					
	Category 1: Surge Suppressor	Category 2: Standby UPS	Category 3: Line-Interactive UPS	Category 4: SmartPro UPS	Category 5: SmartOnline UPS
Surge/Spike	Good	Good	Good	Good	Best
Line Noise	Good	Good	Good	Good	Best
Brownout	None	Limited	Good	Better	Best
Blackout	None	Good	Good	Better	Best
Additional Features					
Expandable Runtime	n/a	No	One Model	Select Models	All Models
Communications	n/a	Basic (Select Models)	Basic	Advanced	Advanced
Voltage Regulation	n/a	No	Yes	Advanced	Advanced
Pure Sine Wave Power	n/a	No	No	Select Models	All Models
On-Line Operation	n/a	No	No	No	Yes
Ideal Applications	All equipment that does not require battery backup or brownout protection in office or industrial environments.	Basic personal computers, peripherals and test equipment in small office or industrial environments.	Computers, small servers and test equipment in small, medium and large office or industrial environments.	Workstations, servers and test equipment in small, medium and large office or industrial environments.	Mission-critical networking, servers, security, telecom and test equipment in medium, large and enterprise office or industrial environments.

