Nine power problems

And their UPS solutions

Eaton UPSs address any of the nine power protection problems to fulfill power protection, distribution and management needs in the office, computer networking, data center, telecommunications, healthcare and industrial markets. Low-cost products such as the Eaton 3105, 5110 and EX UPSs protect general desktop systems for small office/home office (SOHO) applications. The line-interactive and online UPSs such as the Eaton 5125, Evolution, EX, MX, MX Frame and BladeUPS are designed to safeguard a myriad of mission-critical systems including network servers and power hungry blade servers.

ver Problem		Definition*	Cause*	Solution	
Power Failure		A total loss of utility power	Can be caused by a number of events: lightning strikes, downed power lines, grid over- demands, accidents and natural disasters.	SUPS	
Power Sag	NN	Short-term low voltage	Triggered by the startup of large loads, utility switching, utility equipment failure, lightning and power service that's too small for the demand. In addition to crashes, sags can damage hardware.	ase Series 5 UPS	S
Power Surge (Spike)		Short-term high voltage above 110% of nominal	Can be caused by a lightning strike and can send line voltages to levels in excess of 6,000 volts. A spike almost always results in data loss or hardware damage.	Single-ph	
Under-voltage (Brownout)	NN	Reduced line voltage extended periods few minutes to days	Can be caused by an intentional utility voltage reduction to conserve power during peak demand periods or other heavy loads that exceed supply capacity.	Single-ph	Series 9 UP
Over-voltage	M	Increased line voltage for extended periods of a few minutes to a few days	Triggered by a rapid reduction in power loads, heavy equipment being turned off, or by utility switching. The results can potentially damage hardware.		ree-phase \$
Electrical Line Noise		High frequency waveform caused by EMI interference	Can be caused by either RFI or EMI interference generated by transmitters, welding devices, SCR driven printers, lightning, etc.		le- and Th
Frequency Variation	M	A change in frequency stability	Resulting from generator or small co-generation sites being loaded and unloaded. Frequency variation can cause erratic operation, data loss, system crashes and equipment damage.		Sing
Switching Transient	NM	Instantaneous under-voltage (notch) in the range of nanoseconds	Normal duration is shorter than a spike and generally falls in the range of nanoseconds.		
Harmonic Distortion		Distortion of the normal line waveform, generally transmitted by nonlinear loads	Switch mode power supplies, variable speed motors and drives, copiers and fax machines are examples of non-linear loads. Can cause communication errors, overheating and hardware damage.		
	wer Problem Power Failure Power Sag Power Surge (Spike) Under-voltage (Brownout) Over-voltage Electrical Line Noise Frequency Variation Switching Transient Harmonic Distortion	Aver ProblemPower FailureImage: Comparison of the second	wer ProblemDefinition*Power FailureImage: Comparison of the normal line waveform, generally transmitted by nonlinear loadsA total loss of utility powerPower SagImage: Comparison of the normal line waveform, generally transmitted by nonlinear loadsShort-term low voltagePower SurgeImage: Comparison of the normal line waveform, generally transmitted by nonlinear loadsShort-term high voltage abovePower SurgeImage: Comparison of the normal line waveformReduced line voltage extended periods few minutes to daysUnder-voltageImage: Comparison of the normal line waveformIncreased line voltage for extended periods of a few minutes to a few daysOver-voltageImage: Comparison of the normal line waveformA change in frequency stabilityFrequencyImage: Comparison of the normal line waveform, generally transmitted by nonlinear loadsDistortion of the normal line waveform, generally transmitted	Weer Problem Definition* Cause* Power Failure A total less of utility power Can be caused by a number of events: lightning strikes, downed power lines, grid over- domands, accidents and natural disasters. Power Sag Image: Short-term low voltage Triggered by the startup of large loads, utility switching, utility equipment failure, lightning and power service that's too small for the demand. In addition to crashes, sags can damage hardware. Power Sarge Image: Short-term high voltage above (Spike) Short-term high voltage above 110% of nominal Can be caused by a lightning strike and can send line voltages to levels in excess of 6,000 volts. A spike almost always results in data loss or hardware damage. Under-voltage (Brownout) Image: Reduced line voltage extended periods few minutes to days Can be caused by a intentional utility voltage reduction to conserve power during peak demand periods or other heavy loads that exceed supply capacity. Over-voltage Imcreased line voltage for extended periods of a few minutes to a few days Triggered by a rapid reduction in power loads, heavy equipment being turned off, or by utility switching. The results can potentially damage hardware. Electrical Line Noise High frequency varieform caused by EMI interference Can be caused by either RFI or EMI interference generated by transmitters, welding devices, SCR driven printers, lightning, etc. Switching Transient Instantaneous under-voltage (noteth) in the range of nanoseconds Norma	Weer Problem Definition* Cause* Solution Power Failure Image: A total loss of utility power Can be caused by a number of events: lightning strikes, downed power lines, grid overdemads, accidents and natural disasters. Image: A total loss of utility power Can be caused by a number of events: lightning strikes, downed power failure, lightning and power service that's too small for the demand. In addition to crashes, sags can damage hardware. Image: A total power service that's too small for the demand. In addition to crashes, sags can damage hardware. Image: A total power service that's too small for the demand. In addition to crashes, sags can damage hardware. Image: A total power service that's too small for the demand. In addition to crashes, sags can damage hardware. Image: A total power service that's too small for the demand. In addition to crashes, sags can damage. Image: A total power service that's too small for the demand. In addition to crashes, sags can damage. Image: A total power service that's too small for the demand. In addition to crashes, sags can damage. Image: A total power service that's too small for the demand. In addition to crashes, sags can damage. Image: A total power service that's too small for the demand. In addition to crashes, sags can damage. Image: A total power service that's too small for the demand. In addition to crashes, sags can damage. Image: A total power service that's too small for the demand. In addition to crashes, sags can damage. Image: A total power service that's too small for the demand. In addition to crashes, sags can damage. Image: A total power service that's too small crecomercice that's too small crecomercice tha

*Reference IEEE E-050R & old FIPS PUB 94