KEY POWER PROBLEMS AND THEIR SOLUTIONS

INTRODUCTION

All electrical systems are prone to downtime, damage, and data loss, especially when left exposed without a proper power protection plan in place. The importance of clean, reliable, and continuous power is vital for the technology we depend on in our everyday lives. Equipment faces potential danger daily, whether from severe weather, poor voltage quality, or any number of factors that can cause equipment degradation or instantaneous loss of power and data. This white paper goes in detail and describes the most common power problems and their causes, how they affect applications, and the range of power protection solutions to safeguard users' equipment.

THE COST OF POWER PROBLEMS

The effects of poor power quality impact every system of every size, and will cause equipment downtime, damage and/or data loss unless protected. Sudden power loss, power disruption, and even subtle power disturbances in many instances are responsible for system lockups and system failures, resulting in immediate and unrecoverable loss of critical data and damage to electronic hardware used in various enterprise systems. Common mode voltage and power failures account for significant computer data loss, which can be greatly reduced with the proper power solution.

The Electric Power Research Institute (EPRI) estimates that power outages and other power problems cost the U.S. economy up to $188 billion per year, an unnecessary expense for users who can take proactive steps to protect their equipment. Instances, such as blackouts can knock computers off-line, causing business and productivity downtime, which costs time and money when equipment does not receive proper power.

High voltage transient conducted through the commercial power distribution network also destroy sensitive electronic equipment or otherwise degrade the performance and reliability of it without users even knowing the cause. On average, one transient of 100 to 1000 volts occurs every day in a typical electrical environment. These transients often exceed the voltage tolerances of electronic components resulting in the loss of useable semiconductor material, leaving behind less material to handle the current needs of the circuit, which in turn further degrades performance over time until failure occurs. Determining the cause is difficult to impossible since the damage is internal to the component and no outward signs of degradation or failure may be present.

THE FIVE KEY PROBLEMS

While power irregularities are inevitable, their effects should not affect your systems if the proper steps are taken to protect them. Something as simple as a power surge may not seem detrimental—in fact, it may go unnoticed until equipment fails. At the other end of the spectrum, blackouts can cause entire systems to immediately crash.

1.) HIGH VOLTAGE TRANSIENTS

Significant amounts of energy that cause catastrophic component failure are a direct result of a high voltage transient. This high voltage transient is a spike of electrical current which can originate from the utility company or a lightning strike.

Common causes of high voltage transients:

- Lightning strikes
- Faulty wiring
- Electrical overload
- Power outage and/or blackout
- Grid switching

Problems caused by high voltage transients:

- Lost in productivity
- Equipment damage
- Loss in revenue

2.) LINE NOISE

In all electronic applications, noise is created by using AC power. Electrical line noise can erode sensitive electronic components as it can also impede with the operation of digital circuits.

Common causes of line noise:

- Dimmer switchers
- Elevators
- Office equipment
- Copiers
- Variable Speed Drives

Problems caused by line noise:

- Board failure/equipment damage
- Electronic degradation

3.) VOLTAGE SAG & SWELL

A voltage sag & swell is caused by an over or under voltage within or outside of your facility. Typically caused by some loading event.

Common causes of voltage sag and swell:

- Heavy power draw within the area or facility
- Inferior electrical circuit design
- Ineffective utility service
- Grid switching

Problems caused by voltage sag and swell:

- Active data loss
- Electronic degradation

4.) COMMON MODE VOLTAGE

Common mode voltage are disturbances from neutral to ground resulting in common mode voltage. These disturbances are highly troublesome to microprocessor applications.

Common causes of common mode voltage:

- Elevators
- Dimmer switches
- Copiers/office equipment

5.) POWER OUTAGE/BLACKOUT

A blackout or a power outage is the total loss of utility power to an area and is the most severe form of power outage that can occur. Outages may last from less than a second to weeks depending on the nature of the blackout.

Common causes of blackouts/power outages:

- Severe weather
- Accidental AC line disconnection
- Tripped circuit breakers

Problems caused by blackouts/power outages:

- Loss of both revenue & productivity
- Data loss
- System downtime
- Hardware damage

THE SOLUTION

Our power quality solutions protect equipment and offer varying levels of protection, ranging from protection against common hazards like common mode voltage and line noise, to the most complete protection available against all hazards.

NXT Power Integrity Power Conditioner Line
The biggest challenge for today's computers is common-mode voltage, which can lead to everything from equipment lock-up, data losses and more. Our power conditioners incorporate a low impedance isolation transformer that will protect your sensitive equipment when common mode voltage becomes apparent.

Our models also feature a surge diverter and a power line filter to eliminate noise, spikes and transients therefore further protecting your equipment from catastrophic damage. The Integrity line of Power Conditioners (Domestic, International and Medical line) provides complete protection from power line disturbances.

NXT Power Integrity Single Phase Power Conditioner Line
Our NXT Power Single-Phase 208/240V Power Conditioners can save you time and frustration from downtime. Designed for use with large power loads or those applications with dual-voltage

requirements. Design for small or mid-range computer systems, medical diagnostic systems, simulators, etc., or other critical equipment which requires more power.

When electrical noise is generated on the line or by the load, thanks to the low impedance isolation transformer found in our conditioners, our NXT Power Integrity power conditioners protect your system from all the problems caused by power disturbances, ranging from *"No Trouble Found"* service calls to the loss of data and hardware damage.

NXT Power Integrity 3-phase Phase Power Conditioner Line
Our NXT Power Integrity 3-Phase Conditioners combine a low impedance isolation transformer, as well as a surge diverter and power line filter to eliminate noise, spikes, and transients before they have a chance to create catastrophic damage on your equipment. Our 3-Phase Conditioners provides clean, noise-free power to three-phase electronic systems used in a range of industries.

Standard equipment will include emergency machine off (EMO), casters, and lockout/tagout breaker. All North American models have UL and cUL listings. International models are safety-agency listed and carry the CE mark.

NXT Power Integrity Max Series UPS Line
Our NXT Power Integrity Series UPS Line delivers solutions to meet the electrical requirements in today's harsh environments. You will have the capability to custom design the output receptacle panel and your input line cord. These options allow the Integrity Series to offer fast and simple on-site connection to your equipment. Many UPS companies must over size their power protection systems to drive todays electronic systems which in turn can result in higher costs.

The NXT Power Integrity Series UPS Line is built to power sophisticated computer loads - systems with high inrush current peripherals and high crest factors, so over sizing is never an issue. In the end, saving you money on your power protection investment. We incorporated the essential building blocks of power conditioning; a surge diverter, a low impedance isolation transformer, a noise filter, a voltage & frequency regulator, and a battery to ensure the ultimate protection for your systems.

CONCLUSION

Power protection is a concern for every application, and the risks are not going to go away. Protect your critical electronic systems from potentially irreparable damage with an optimized power protection solution provided by NXT Power.

NXT Power provides power protection solutions you can rely on every minute of every day. Your electronic systems are vulnerable to every power problem out there: power outages, lightning, common mode voltage and high voltage transients.

We at NXT Power manufacture the highest quality of power quality solutions for both North American and International electronic equipment. We deliver clean and reliable power to protect your systems to give you and your business piece of mind.