



## PREVENTITIVE LOW-COST SOLUTIONS

Several no-cost or low-cost steps may be taken to overcome or reduce power quality problems. (A qualified electrician may be needed to perform some of these functions.) Inspect the wiring to ensure that it's in good condition, properly sized and properly grounded. Many power quality problems originate from faulty or undersized neutrals.

Check that proper wire sizes are used to accommodate the circuit loads.

Make sure all wire connections are secure. Loose connections frequently create unpredictable problems.

Is the correct voltage being supplied at your premises? If in doubt contact your utility for assistance.

Check that sensitive equipment is on a separate circuit within the facility to avoid disturbances caused by other equipment (coffee makers, copy machines, etc.). In some cases, a dedicated circuit may be required, running directly from the fuse or breaker panel to a specific piece of equipment, making it impossible to connect other equipment to it.

Periodic back-up of important electronic data to permanent storage is one the best ways to protect your programs and valuable data. Relatively inexpensive software programs which periodically back up your data are readily available.

If your computers or other electronic devices do not have surge protection, it may be a good idea to unplug them during thunderstorms.

Static electricity can cause loss of your data or damage to the computer. Anti-static sprays and mats are available to reduce the impact. Static electricity can be minimized by maintaining at least 50% relative humidity or by installing computer-grade carpeting. If you have problems with a computer monitor wavering, try moving it around your office until you find a spot where it operates normally.

## **MODERATE COST SOLUTIONS:**

These devices may be used to provide additional protection:

Surge suppressors either limit impulses or divert them to ground, so they are not passed through to sensitive equipment. Exact protection capabilities vary with the quality of the device. Surge suppressors are relatively inexpensive, so it makes sense to install them as insurance to reduce the potential of equipment damage, particularly from lightning strikes. Look for suppressors that have protection on all wires: line, neutral and ground.

Isolation transformers are specifically designed to prevent electrical noise on the power line from being passed through to the protected equipment. Isolation transformers do not regulate voltage, or protect against sags and surges. In some cases, large computer equipment includes protective equipment as part of the computer's power supply. For more information, consult your computer supplier.

## **HIGHER COST SOLUTIONS:**

Line conditioners or power conditioners provide several types of protection in one device. Conditioners often combine the properties of an isolation transformer, a surge suppressor and a voltage regulator (to maintain a steady voltage). The term "power conditioner" is applied rather loosely and may not perform all three functions. You should be careful to get equipment, which provides the degree of protection you need.

The On-Line Uninterruptible Power Supply (UPS) is the only device, which provides reliable protection from all power disturbances. Typically, these self-contained units provide 5 to 10 minutes of battery power to allow you time to properly shut down the sensitive equipment that is critical to your operation during a power outage. They are ideal for use with minicomputers and small control systems since they can be placed close to the equipment they protect and require no special installation or ventilation. For the best protection against all power disturbances, the UPS must be "on-line" type, and not simply "standby power supply" (SPS).

In view of the cost of this equipment, professional advice is recommended.



#### **WHERE TO GO FOR HELP:**

To get the best performance from sensitive electrical equipment, you should be prepared for power disturbances. Ensure that your building's electrical system is designed to accommodate the desired equipment and then consider protective equipment to provide the level of reliability required.

Your computer/equipment supplier can provide information on your equipment's tolerance to power disturbances. In addition, your electrical contractor may be able to provide help in ensuring your electrical system is adequate for the intended equipment. Your electric utility may be able to determine the origin of the disturbances or assist in finding a consultant who specializes in power quality investigations and solutions.