

Point of Use Power Conditioning

Specifying and applying power conditioning is a complex task. First, one must determine the **type** of power conditioning that is required to correct the power quality problems that are being experienced. Next, one must determine which **manufacturer** of a given power conditioning product is reputable and suitable for a given application. Finally, the power conditioner must be properly **installed** so as to provide optimum protection.

Locating a power conditioning device is a critical first step that affects the type, the manufacturer, and installation techniques. Ignoring this important step can result in misapplication, wasted power conditioning dollars, and continued power quality problems.

Facility Protection

It is a common misconception that a facility protection scheme can cure all power problems. Locating a Surge Suppressor, Power Conditioner, or UPS system at a central point (distribution panel or service entrance) seems to be a good way to protect a large number of devices with a single protective device.

Facility-wide, central protection does make sense in a number of instances:

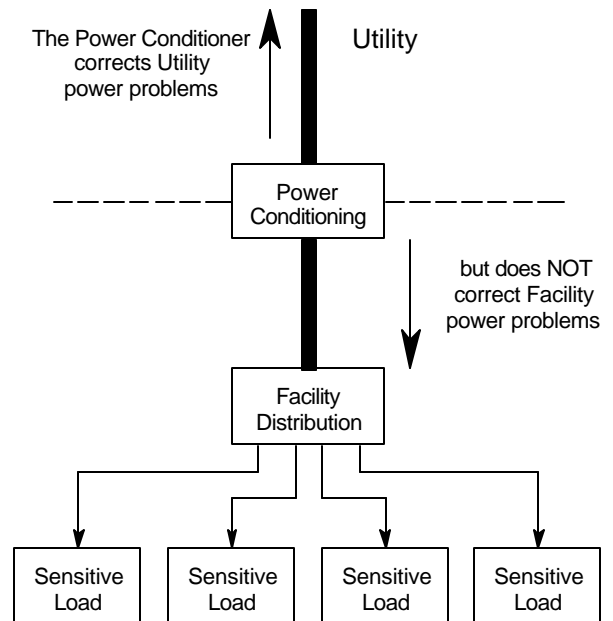
Transient Voltages: Clamping and dissipating these damaging impulses at the service entrance prevents transient currents from flowing through the facility power, data, and ground systems.

UPS Systems: Use of a centralized UPS system reduces the need for maintenance and battery monitoring of multiple UPS systems scattered throughout the building.

Voltage Regulation: Correcting chronically high or low voltages at the service entrance can assure that facility voltage remains at or near nominal levels in spite of daily or seasonal utility fluctuations.

Application Note - AN-12

A centralized UPS, Voltage Regulator, or Surge Suppressor is a good first step to provide high quality power to centralized loads.



Limitations of Facility Protection

It is a common misconception that power problems originate "out there", that is, outside of the end-user's facility. In reality, many power problems are created within the facility. Building wiring problems, switching loads, and loads with high harmonic currents cause many of the power problems that affect sensitive equipment.

Impulses, high frequency noise, and common-mode voltages are almost always caused within the facility.

Facility-wide protection does almost *nothing* to correct power problems that are internally generated. In some cases, the high output impedance of many types of power conditioners can make these problems worse!

Point of Use Power Protection

Power Conditioning that is specified and installed at the Point of Use has many benefits. Power conditioning equipment at this location will protect the sensitive load from disturbances created by the Utility, and also those created within the facility by other loads.

Grounding and noise attenuation is also best done at the point of use. Ground loops and radiated noise pickup can occur between a main facility power conditioner and the sensitive equipment. A Point of Use power conditioner eliminates these problems.

There are potential problems with widespread Point of Use protection.

1. Separate power conditioning can be expensive at multiple points throughout the facility
2. UPS systems and similar systems take up a lot of floorspace, often not available at the point of use.
3. UPS systems require regular inspection and maintenance, multiplied by the number of devices in the building.

Distributed Power Protection

A well-designed power protection philosophy requires both Facility-wide and Point of Use power protection.

Facility-wide Protection: A main panel TVSS device will protect all facility loads from lightning-induced or utility switching transients. If the utility voltage stability is a problem, a facility voltage regulator may be required. Finally, for critical loads, an Uninterruptible Power Supply, feeding a special UPS distribution within the building, could be required.

Point of Use Protection: Critical loads should be protected by small, individual power conditioners. These should include filtering, surge suppression, and isolation, in order to assure proper grounding and noise attenuation. This device protects against the types of power problems that are generated within the building.

TEAL Electronics designs compact, small footprint power conditioners ideal for use at the Point of Use.

Facility-Wide Protection

1. TVSS addresses large utility impulses
2. Voltage Regulator corrects utility voltage fluctuations
3. UPS may be required for critical loads

Point of Use Conditioning

1. Isolation Transformer improves equipment grounding
2. Filtering and TVSS attenuate facility and load generated disturbances

