

IEEE RECOMMENDED DESIGN/INSTALLATION PRACTICES

Std 1100-1999 (Emerald Book)

Protect Against Downtime of Equipment

3.4.3 Surge Protection

Surges can have many effects on equipment, ranging from no detectable effect to complete destruction. In general, electromechanical devices withstand voltage surges until a dielectric breakdown occurs, while electronic devices can have their operation upset before failure occurs. At intermediate levels, progressively more intense upset occurs until breakdown takes place. While electromechanical devices can generally tolerate voltages of several times their rating for short durations, few solid-state devices can tolerate much more than twice their normal rating.

Reduce Operating Costs

8.4.2.5 Surge Protective Device Considerations

Recommended practice is that surge protective devices be applied to service entrance electrical switchboards and panel boards, and panel boards located on the secondary of separately derived systems that support information technology equipment, telephone, telecommunications, signaling, television, or other form of electronic load equipment (refer to 8.6 for further details). These devices may be installed externally or internally to the switchboard or panel board.

Protect Against Lightning Related Damage

8.6 Lightning/Surge Protection Considerations

Large transients on the power system originating outside of the user's facility, associated with lightning or major power-system events, are best initially diverted at the service entrance of a facility. While such protection might not be mandated by codes at present, trends indicate that a growing number of standards, guidelines, and application documents support a recommendation for this protection.

Transients generated within the premises can best be diverted by surge protective devices located close to the internal source of the transients, or close to the electronic load equipment if this is not possible. Best results are obtained if both locations are protected. This possibility of multiple location protection raises the issue of coordination of cascaded devices, an emerging concern in the application of surge protective devices in the power system of end-user facilities.

Return on Investment

IEEE C62.41-1991 Paragraph 2.2.7

The cost of surge protection can be small, compared to overall system cost and benefits in performance. Therefore, added quality and performance in surge protection may be chosen as a conservative engineering approach to compensate for unknown variables in the other parameters. This approach can provide excellent performance in the best interest of the user, while not significantly affecting overall system cost.

UPS Surge Protection

IEEE C62.41-1991 Paragraph 9.11.3 (Page 220)

Lightning and other transient voltage producing phenomena are harmful to most UPS equipment and to sensitive electronic load equipment (e.g., via an unprotected static-switch bypass path around a UPS). Therefore, it is recommended practice that both the rectifier-charger input circuit to the UPS and the associated UPS bypass circuits (including the manual maintenance bypass circuit) be equipped with effective Category "B" TVSS protection as specified in IEE Std C62.41-1991 (9).

The required protection should be attached in both the line-to-line and line-to-ground modes. Low-inductance connections should be employed for this protection. TVSS devices should be connected to the available equipment grounding conductors, not to isolated grounding conductors.