SITE UPTIME NETWORKÒ

FAULT-TOLERANT POWER COMPLIANCE SPECIFICATION VERSION 2.0

Fault-tolerant power equipment refers to computer or communication hardware that is capable of receiving AC input from two different AC power sources. The objective is to maintain full equipment functionality when operating from A and B power sources or from A alone or from B alone. Equipment with an odd number of external power inputs (line cords) generally will not meet this requirement. It is desirable for equipment to have the least number of external power inputs while still meeting the requirement for receiving AC input from two different AC power sources. Products requiring more than two external power inputs risk being rejected by some sites. For equipment to qualify as truly fault-tolerant power compliant, it must meet all of the following criteria as initially installed, at ultimate capacity, and under any configuration or combination of options. (The designation of A and B power sources is used for clarity in the following descriptions.)

1. If either one of two AC power sources fails or is out-of-tolerance, the equipment must still be able to start up or continue uninterrupted operation with no loss of data, reduction in hardware functionality, performance, capacity, or cooling.
2. After the return of either AC power source from a failed or out-of-tolerance condition, during which acceptable power was continuously available from the other AC power source, the equipment will not require a powerdown, IPL, or human intervention to restore data, hardware functionality, performance, or capacity.
3. The first or second AC power source may then subsequently fail no later than ten seconds after the return of the first or second AC power source from a failed or out-of-tolerance condition with no loss of data, reduction in hardware functionality, performance, capacity, or cooling.
4. The two AC power sources can be out of synchronization with each having a different voltage, frequency, phase rotation, and phase angle as long as the power characteristics for each separate AC source remain within the range of the manufacturer's published specifications and tolerances.
5. Both external AC power inputs must terminate within the manufacturer's fault-tolerant power compliant computer equipment. In the event that the external AC power input is a detachable power cord, the equipment must provide for positive retention of the female plug so the plug cannot be pulled loose accidentally. Within the equipment, the AC power train (down to and including the AC to DC power supplies) must be compartmentalized such that any power train component on either side can be safely serviced without affecting computer equipment availability or performance and without putting the AC power train of the other side at risk.
6. For single or three phase power sources, the neutral conductor in the AC power input shall not be bonded to the chassis ground inside the equipment. This will prevent circulating ground currents between the two external power sources.
7. Internal or external active AC input switching devices (e.g., mechanical or electronic transfer switches) are not acceptable.
8. A fault inside the manufacturer's equipment that results in the failure of one AC power source shall not be transferred to the second AC power source causing it to also fail.
9. An internal Uninterruptible Power System (UPS) or internal power batteries (batteries for cache memory are acceptable) or other type of energy storage equivalent is allowable only for the purpose of a prompt, orderly shutdown. The existence and volt-ampere capacity of an internal UPS or batteries and the time required for a prompt orderly shutdown must be identified.
10. For single or three-phase power sources, with both AC power inputs available and with both inputs operating at approximately the same voltage, the normal load on each power source will be shared within 10% of the average.

11. For three-phase power source configurations, the normal load on each phase will be within 10% of the average.
12. An external alarm must alert the user within 60 seconds via the equipment's software or the host's operating system when an AC power source fails or is outside the manufacturer's published tolerances. This software alarm must also create a permanent record of the abnormal condition, the time it occurred and the time it was corrected.
13. The manufacturer will supply a written certification that the equipment meets or exceeds this specification for fault-tolerant power compliance.

Version 2.0 Effective: March 1, 2002.

SITE UPTIME NETWORKÒ

FAULT-TOLERANT POWER COMPLIANCE SPECIFICATION VERSION 2.0

This Fault-Tolerant Power Compliance Specification has been established by the forty-eight members of The Uptime Institute's Site Uptime Network. The specification pertains to all computer and communication equipment critical to maintaining uninterrupted information availability. Be warned that many products claiming to be dual power compliant do not meet the performance requirements of this specification.

Incorporated in Version 2.0 is a new criterion 6. This criterion was added to address members' concerns about the potential for ground current to circulate between the two input power sources if the neutral conductor was grounded within a power supply. Intentionally grounding the neutral conductor in the power supply would be a violation of common sense and several codes. As a result, computer manufacturers have already complied with this criterion if they have a UL listing for their products. Criterion 6 has been added merely to codify what is already a standard industry practice.

Version 2.0 will supersede Version 1.2 on June 30, 2002. After June 30, 2002, hardware products will only be certified and listed if they meet Version 2.0 of the specification.

The Uptime Institute independently tests hardware products submitted by manufacturers to verify and certify conformance with the Fault-Tolerant Power Compliant Specification. A listing of currently certified products is maintained at www.uptimeinstitute.org/cert.html.

Use of the Fault-Tolerant Power Compliance Specification Version 2.0 is made available at no charge to those companies desiring to make fault tolerant compliance part of their procurement process. The specification may be quoted or reproduced in its entirety at no charge with the proviso that the Institute exclusively reserves the right to test and certify hardware products as complying with the specification. The version number must be included and copyright credit given to The Uptime Institute's Site Uptime Network whenever the specification is quoted by reference or reproduced in its entirety.

Continuing updates to this specification are expected. For the most recent version, visit The Uptime Institute's Website at www.uptimeinstitute.org/spec.html, or contact the Institute by calling (505) 986-3900.