tech tips

TECHNICAL INFORMATION AND PRODUCT SOLUTIONS

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Proper Fault Detection in Ground Safety Wiring

When using a power conditioner or UPS to protect loads against electrical problems, it is important to know whether there are any problems within the AC power circuit you are connecting the ONEAC product to.
Note: ONEAC strongly recommends that the only way to be sure of proper electrical wiring is to verify the wiring at the wall outlet, using the proper electrical testing equipment, before a conditioner is plugged-in.

Most important for the safety of the end user as well as for the proper conditioning of the power line, is an effective path to ground. The National Electrical Code requires an effective grounding path and defines it as:

> The path to ground from circuits, equipment and metal enclosures for conductors shall (1) be permanent and electrically continuous, (2) have capacity to conduct safely any fault current likely to be imposed on it, and (3) have sufficiently low impedance to limit the voltage to ground and facilitate the operation of the circuit protective devices.
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> 1996 National Electrical Code 250.51

Equipment manufacturers generally require that the maximum total impedance of an effective grounding path should not exceed 0.5 ohms.

Some manufacturers of power conditioners and UPSs feature LED site wiring indicators on their equipment which might erroneously imply that a safe ground connection has been made. Specifically, Powervar and American Power Conversion, are two manufacturers who claim that the “Electrical Wiring Fault Indicator” or “amber flashing LED” feature in their product detects a missing ground among other wiring faults. Their promotional literature suggests that this feature “saves customers the expense of hiring electricians” to verify site electrical wiring.

ONEAC believes that LED indicator lights which imply a simplified check on safety aspects of wiring may provide an end user with a false sense of safety when an effective grounding path may not truly be in place.

During product tests conducted in 1994 and again in April of 1997, the Powervar’s LED circuit did not detect a high impedance ground connection. In fact, the Powervar LED still indicated a valid ground connection even when the impedance inserted in the ground line exceeded 500 ohms. Similar tests were conducted on APC UPSs and again, a valid ground connection was indicated despite the high value of impedance inserted in the ground wire.

To their credit, Powervar specifically notes in their operating instructions for the ABC 78VA through 2.4kVA power conditioner, that “the LED is not intended to test general wiring integrity.” Curiously, this statement is contrary to the claims presented in their promotional literature.

ONEAC does not use indicator lights to imply safe ground detection so as to not provide a false sense of safety when wiring problems may exist within the user’s facility.

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