

System Ground vs Equipment Ground

Troubleshooting electrical equipment failure requires a basic understanding of ground testing and proper grounding and bonding practice. While surge suppression has become critical to overcoming a wide range of power quality and communication related problems, grounding is far more difficult to effectively retrofit. Surge suppression works best when the grounding system is properly engineered, installed, and tested. This posting briefly explains the basic differences between a System Ground and an Equipment Ground when troubleshooting equipment failure.

System grounding helps detect and clear ground faults. System grounding is the intentional connection of a phase or neutral conductor to earth for the purpose of controlling the voltage to ground, within predictable limits. Equipment grounding is a conductive return path for ground-fault current to the System ground. It cannot be expected that any conducting circuit connected to the earth will protect a person from an electrical shock.

System ground encompasses systems like generators, transformers, or batteries, where the meaning of grounding is to provide a connection from one conductor of the system to an electrode that is buried in the earth. However, not all systems are grounded nor is the electrode always in the earth. System grounding means: the connection of earth ground to the neutral points of current carrying conductors, the neutral point of a circuit, transformer, or system, either solidly grounded or with a current-limiting device.

When referring to **equipment ground**, the term grounding can have various meanings. It may mean bonding or it may mean a direct connection to the earth. The latest revisions of the NEC have made a significant effort to distinguish the two terms. The term bonded (bonding) is by definition “connected to establish electrical continuity and conductivity.” **Ground** by definition is “the earth” and **Grounded** (Grounding) by definition is “connected (connecting) to ground or to a conductive body that extends the ground connection.”

Definitions out of the way, equipment-grounding conductors serve a **vital** role in the reliability of the overall electrical system. The equipment-grounding conductor is used to ground the noncurrent-carrying metal parts of equipment. It's function is to keep equipment as close as possible to the system ground potential AND provide a safe path for ground-fault current to flow. Troubleshooting electrical equipment failure frequently begins with **testing** the dedicated equipment grounding-conductors for **differences in ground potential** and for continuity to system ground.