



Isolated Power System Design & Installation Guidelines

The purpose of this document is to provide guidance to designers, specifiers, installers, and users of Isolated Power Systems (IPS) as manufactured by PG LifeLink, Inc., Erlanger, KY, USA. Additional information describing technical descriptions and detailed operational instructions are available separately by contacting us at 1-800-287-4123, or via email at sales@pglifelink.com. Technical consultations and training seminars may also be available in your area.

Design:

- Standard isolation panels are available in 3, 5, 7.5, and 10 kVA sizes. 15 and 25 kVA are reserved for special applications such as portable laser and x-ray equipment loads. A maximum of 16 branch circuits are allowable per isolation transformer.
- Panels should be located as close as possible to point of use to reduce leakage current associated with the circuit conductors. Generally, panels are installed inside the room or just outside in an adjacent corridor. An IPS is only permitted to serve one room (with the exception of high voltage x-ray/laser panels). When installed outside of the room, a remote annunciator is required to notify staff inside the room of an alarm from the Line Isolation Monitor.
- The Patient Care Vicinity is the primary focus for personnel fault protection. This area centers on the normal location of the surgical table/patient bed, extending 6 feet horizontally beyond the patient perimeter and vertically from the floor up to the ceiling. Line powered, portable or ceiling mounted equipment which may extend into this area such as service booms, pendants, monitors, c-arms, and surgical lights should be fed from an un-grounded isolated power system for protection against line-to-ground faults without power interruption. Fixtures and equipment which do not extend down below the ceiling including overhead lighting should not be connected to IPS. Non-medical equipment such as personal computers, monitors, communication, and A/V equipment that is not intended to enter the patient care vicinity should be fed from regular grounded power circuits with GFCI protection instead of IPS
- Avoid placing devices such as fluorescent lighting ballasts or commercial-grade power supplies with low pass filter networks or surge protection circuits (TVSS or MOV line to ground) on isolated power. These devices have high levels of capacitive coupling from line to ground and can raise the system Total Hazard Current. If in doubt, verify with device manufacturer if equipment is compatible with medical isolated power systems. In general, only "Medical Grade" equipment should be connected.
- Certain devices are not compatible with IPS and therefore should not be installed on IPS branch circuits. These include:
 - GFCI, AFCI, Surge Protected, or Isolated Ground type receptacles
 - Certain Medical-Grade power strips with loss-of-neutral or loss-of-ground sensing circuits

Installation:

- Special low leakage wire should always be used for branch circuit wiring. XPLE type insulation such as XHHW wire is recommended with a dielectric constant of less than 3.5. Standard type insulation such as THHN may be used for the incoming primary and the ground wires only.
- Code (NFPA 70 - Article 517.160) requires secondary circuits to be colored brown and orange, with a distinctive stripe in a contrasting color. The brown wire is connected to the L2 bus and the hot side (brass screw) of a standard NEMA receptacle. The orange wire, L1 is connected to the silver screw where neutral would be connected. Polarity should be maintained throughout the installation.
- The Code also has special requirements for redundant bonding in and around patient care areas of health care facilities. All installers should be familiar with NFPA 70 – NEC -Article 517, and NFPA 99 – Health Care Facilities Code – Chapter 6 Electrical.
- Conduit runs for branch circuits should be as short and direct as possible to minimize accumulated leakage current in the circuit conductors. Generally, 400-450 feet is the maximum recommended cumulative length of for all branch conductors from a single transformer. Avoid unnecessary bends and junctions.
- Do not use pulling compounds to lubricate inside of conduit. This will break down the insulation properties and raise leakage current. A dry talc powder may be used. It is typical to use conduit with a slightly larger diameter to ease pulling and avoid damage to wire insulation. An interior coating of PVC may also be used.
- Isolated power circuits must be kept separate from other circuits. Do not share conduit or raceway with non-isolated circuits, or isolated circuits from another system.
- Each receptacle and equipment grounding connector must be connected back to Reference Ground Bus inside Isolation Panel to maintain Equipotential grounding system. If multiple panels serve the same space, they must be bonded together.

