



AC Electricity On Your Boat - A Power To Understand and Respect

Protect Your Boat & Your Crew with an Isolation Transformer

- Prevents galvanic corrosion with no electronic components
- Eliminates need for polarity alarms on 120 Volt shorelines
- Eliminates neutral connection on 120/240 Volt shorelines
- Significantly reduces in-water shock/drowning hazard

What are the benefits of adding an isolation transformer to a new or older boat?

When AC shore power is utilized on board, you are electrically connecting your boat to marina neighbors and docks. The connections are made via the water (through underwater metal parts) and via the shore power safety ground, possibly creating AC current in the water when there is a serious problem on your boat or an adjacent boat.

To reduce or eliminate electrical interactions between your boat, neighboring boats and/or the marina itself, you need to have some method of electrically "isolating" your boat. One method of isolation is a "galvanic" isolator installed in the shore power safety ground. A galvanic isolator blocks low-voltage (up to approximately 1.4 volts) DC currents from flowing through the shore power safety ground wire.

A problem the galvanic isolator can't handle is a DC voltage of more than approximately 1.4 volts. This will cause current to flow and create serious galvanic corrosion damage to underwater metals. Galvanic isolators don't always isolate the boat from DC current in the shore power connection.

A marine isolation transformer eliminates all physical electrical connections between the boat's wiring and the shore wiring. Isolation transformers not only prevent galvanic corrosion but also protect onboard electrical systems and electronics from potential shore side hazards including reverse polarity, "lost neutrals" on 120/240 systems, voltage transients, spikes and electrical noise.

Charles Marine isolation transformers meet the newest ABYC (American Boat and Yacht Council) E-11 standards requiring transformers to be fully encapsulated with a full current carrying shield that is capable of handling a required 5000 ampere fault, the ability to pass a 4000 volt dielectric test and additionally required "vibration and mechanical shock" standards. Charles units are UL Marine Listed to ABYC and NFPA (National Fire Protection Association) standards.

Should I be concerned about in-water shock hazards?

According to a recently released USCG report, there have been reports of 21 fatalities caused by electric shock drownings in the past seven years.

The flow of electrical current from a boat to the water may be caused by faulty appliances, defective wiring or poor workmanship. This provides a voltage source that allows current to flow through the water to ground to complete the circuit. This creates an electric field around the boat that could possibly shock, paralyze and drown any swimmer that enters the electric field (when in fresh water), or simply electrocute the swimmer (when in salt water) if touching underwater gear. Having an isolation transformer on board your boat will significantly reduce in-water shock/drowning hazards.

CHARLES ISOLATION TRANSFORMERS

Features:

- UL Marine Listed to ABYC and NFPA Standards
- Fully Encapsulated (Low Noise Level, Ignition Protected (except ISO-BOOST)
- Moisture Resistant, Shock and Vibration Resistant
- Oversized Copper Windings - Highly Efficient
- Full Current Carrying Shield per ABYC E-11
- Segregated Wiring Compartments
- Convenient & Secure Mounting Means
- Complete Design & Installation Instructions
- Inherent Surge Suppression
- Custom Capabilities
- In-Depth Technical Support



Available in 30, 50 and 100 amp Versions

"The most serious problem with marina shore-power systems is grounding. The marina's ground is way off by a main panel somewhere, and those big yellow wires running to the docked boats are more often like a nasty tangle of Christmastime extension cords than a well-wired building. Junction boxes and outlets corrode, and if either path to ground isn't up to snuff, a short or fault may fail to push enough juice back up the line to trip a breaker. Now this shore-power issue is much more complex than I can go into here - but at the moment, the safest move appears to be the isolation provided by a transformer."

Ben Ellison, Electronics Editor, Power & Motoryacht
April '07 - "Bird on a Wire"

"The ultimate solution for most of these problems is the isolation transformer. Once installed, the isolation transformer acts much like its own power supply, similar to a generator or an inverter, or a utility company, for that matter. Where the galvanic isolator attempts to block DC current from coming aboard, like the walls around a medieval fortress, the isolation transformer severs this connection altogether, much like digging a moat around the same fort, filling it with water and crocodiles, and pulling up the drawbridge."

Steve D'Antonio, Editor, Passage Maker Magazine
**April '06 - "Galvanic Isolators and Isolation Transformers...
and Why You Need Them"**

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