Technical Note

Truecharge

512-0049-01-01 Rev 1

Using a Truecharge with a GFCI Outlet

Overview

Ground Fault Current Interrupt sockets, or breakers, are commonly used in damp environments such as marina docks. Their purpose is to detect a difference in Hot and Neutral power line current and trip a breaker if the current exceeds 5 milli-amperes (the safe limit). In theory the GFCI should quickly shut off the AC power if a person is being shocked due to touching a Hot line (defective appliance chassis/metal), and ground (for example, the boat's metal deck or railing). The GFCI typically shuts off the power within 50 milli-seconds, in time to prevent any serious harm to the average adult.

Where does Ground Fault Current come from?

Ground fault current can result not only from a direct metal-to-metal short but also from deteriorated electrical wiring on a boat. Ground fault current is often referred to as “leakage current”. Every wire and electrical connection on the boat has the potential to leak a small current due to dampness, oil/dust contamination in sockets, wire insulator breakdown due to weathering including prolonged ultraviolet exposure (sunlight). The more wiring and connections there are in the boat the greater the “cumulative” leakage may be. If your boat has several “leaky” AC sockets, or connection boxes that total up to 4 mA, adding one more appliance (for example, a battery charger), or leaky wiring connection could trip the GFCI. GFCIs are **not** to trip at 3 mA (>40kR leakage resistance, Hot to Ground), **may** trip at 4 mA(30kR), **should** trip at 5 mA (25kR), and **must** trip at 6 mA (20kR). If you isolate and test the GFCI using the above information and still find that either of these tests fail, the GFCI is likely defective and should be replaced. There must be no connection to the GFCI for this test to be valid, since the boat's wiring can add leakage to the above test resistor leakage currents.

Note:

This test should be performed by a certified electrician, as 120 VAC does represent a shock hazard.

A reverse AC connection indicator on the control panel of the boat adds leakage current up to 4 mA on some installations. This primes the GFCI to trip with even the smallest of added leakage from one appliance or connection.

The Trueharge battery charger typically leaks 0.5 - 1 milliamperes which is far below the GFCI trip point. If you find the GFCI tripping when connecting AC to the charger, turn off all power in the system and try isolating/disconnecting the rest of the circuit down stream from the GFCI. Connect only the charger directly to the GFCI socket. If it does not trip, then, one by one add the other circuit branches into the GFCI supply circuit until you find the offending part of the circuit that trips the breaker. Clean up or replace the socket or connection in doubt. A certified marine electrician would be able to assist if you have difficulty isolating the leakage.

If you direct connect the Truecharge to the dock GFCI outlet and still find it trips, make sure the Truecharge chassis is not contacting any metal part on the boat. Ensure the DC wiring is not connected to the Truecharge chassis, and try to power up the TC again. If the TC still trips there may be a defect in the AC GFCI socket itself. Try connecting to another GFCI. If it does not trip, replace the previous socket. If a second GFCI trips use a GFCI test kit and millimeter to test the trip points of the GFCI as per above.

If all of these tests show no system defect, contact Xantrex for further assistance.

Part number: 512-0049-01-01 Rev 1

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