Safeshore Marine

Marine Galvanic Isolators

A non technical supplement for the technically inquisitive. (I really would like to know a little more!)
The concept of galvanic corrosion is a complex one. We hope our enclosed leaflets explain the basic problem & its cure . For the more technically minded here's a little more info :
The galvanic isolator is like a switch. It fits in the "earth" circuit of your boat shore power line & the switch is "open circuit"...(turned off). This makes a break in the earth wire & stops the flow of any current through the "earth" wire. This now protects your vessel from contact with other boats so galvanic current cannot flow from one boat to another. It also protects you from defective shore power low level earth leaks.(Sometimes the shore power 240 volt "live" cable leaks voltage to the earth cable via damp plugs & sockets or leaky cables: This is known as stray current leakage & puts unwanted voltages directly onto your props & shafts etc & if the voltage is high this can be devastating to your metal ware!). Most galvanic isolators have a "switch on threshold" of 1.2 volts. When a leak occurs or an appliance on board the vessel goes faulty the 1.2 volt threshold is reached & the isolator "turns on". This re-connects your earth wire & the trips blow thus preventing electric shock. Unfortunately in most vessels there will be some form of A.C. mains leakage through damp wiring, poor installations, defects in battery chargers , fridges & air con units etc . There may also be D.C. Leaks from bilge switches , leaky D.C. wiring etc. Any leakage within the vessel will pass to the earth wire & will then present itself across the isolator. Should this combined leakage exceed 1.2 volts the isolator will turn on for safety but will then no longer protect your vessel. If you choose to use a conventional 1.2 volt isolator then you must make regular checks with a meter & ensure that the combined voltages (A.C. + D.C.) across the isolator do not exceed 1.2 volts. Some isolator manufacturers attempt to by pass the A.C. leaks by fitting a capacitor inside the isolator. This is not practical as it is impossible to fit a single capacitor to bypass varying frequencies of A.C. which may be present.
Many appliances : Tvs, computers , low voltage lighting etc now used switch mode power supplies. Very efficient but unfortunately they also emit high frequency pulses which also find there way onto your earth wire. (RFI for the technical minded). These again add to any existing leaks & may turn on the isolator.

Gi70 sm/smi & Gi100smi isolators take galvanic isolation to a higher level.

They have a "turn on" threshold of 2.4 volts giving increased levels of protection by blocking high level galvanic & leakage currents. In the case of a serious leak from on board the vessel (or from defective shore power supplies) the status monitoring will illuminate either one or both led indicators. Should a single led (light emitting diode) illuminate the problem is a D.C. leak, Should both leds illuminate then the problem is A.C. leakage. The status monitor is "fault driven" & does not require additional 12 volt feed.

So how do I know if the isolator is working correctly?

We supply a PP3 battery clip with every status monitoring isolator. To test the isolator condition & functions simply apply the 9 volt battery across the terminals of the isolator. One of the leds will illuminate. Reverse the battery clip wires (you are now supplying a reverse battery voltage across the isolator) the other led will illuminate. This has tested both the isolator & the status monitor functions. When you apply the 9 volts "fault" voltage the isolator senses the voltage and switches on connecting your vessel to earth. When this happens the 9 volts from the pp3 is reduced to 2.4 volts due to the clamping action of the isolator & the led illuminates indicating a simulated leak condition on the vessel . By repeating the test but reversing the connections across the isolator you can check the isolator conduction in the reverse direction. (Galvanic isolators are bi-polar devices & work in both directions.) Please note: A **fully charged** pp3 is required for this test: Should the led illuminate & extinguish immediately the pp3 is not fully charged & should be replaced.

Under normal operating conditions both leds will be extinguished : Any illumination will indicate a leak condition on the vessel or defective shore power.

Need to know more? : Email or phone our help lines 9.00 am to 5.30pm.