

Galvanic Isolators: The Facts

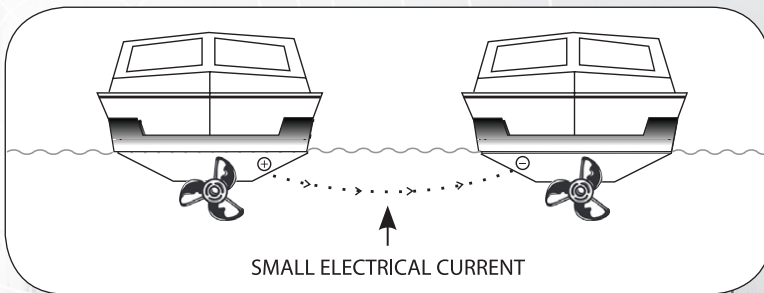
Why do I need one?

1. Safety and Convenience (leave shore power connected)
2. Economical Corrosion prevention
3. Protect against stray currents
4. Peace of mind

Why now? No one really bothered before!

▶ OK Lets make it simple:

When two or more boats sit together in the water (or one boat and one jetty!) There is a tendency for a small electrical current to flow between the metal components of the two hulls. This occurs when dissimilar metals i.e. skin fittings, propellers, shafts etc are in close proximity to one another connected effectively by the water:



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This in itself does not create a problem as the current drawn is usually very small: The amount of current flowing is dependent on the type of metals, the area of the metals, the proximity of the hulls and finally the composition of the water, i.e. the salt content or metallic content of the water. The action of this small current flow creates a small problem! As all metals have different rates of corrosion a metal at one end of the Galvanic (corrosion) Scale will dissolve faster than one at the other end of the scale. If for example we have a brass skin fitting on one Hull and a stainless propeller shaft on the adjacent boat, the brass fitting will undoubtedly disappear before the propshaft!

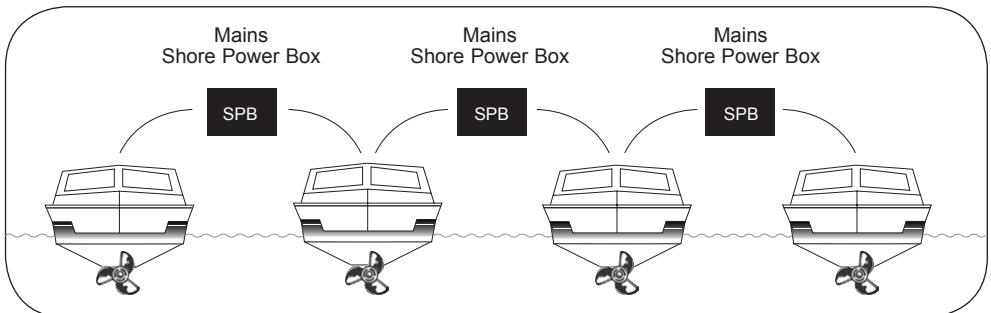
As a second example, a greater problem may exist with a large metal boat moored alongside a small cruiser with elderly skin fittings: It takes no imagination to see who wins that battle!

Most boat owners are familiar with "Anodes" (or "Sacrificial Anodes" to be technical). These are large lumps of metal usually zinc/magnesium etc, at the far end of the Galvanic Scale, clamped to the underwater hull and designed to erode away in preference to your more valuable underwater skin fittings. These anodes are an essential protection to corrosion and should be checked regularly for deterioration: Once they are gone so is your protection! In reality it may take years to have any major deterioration.

So what's changed?

Simple: Most modern marinas now offer electrical shore power: Brilliant for winter nights and making a brew, but not so good for Galvanic currents!

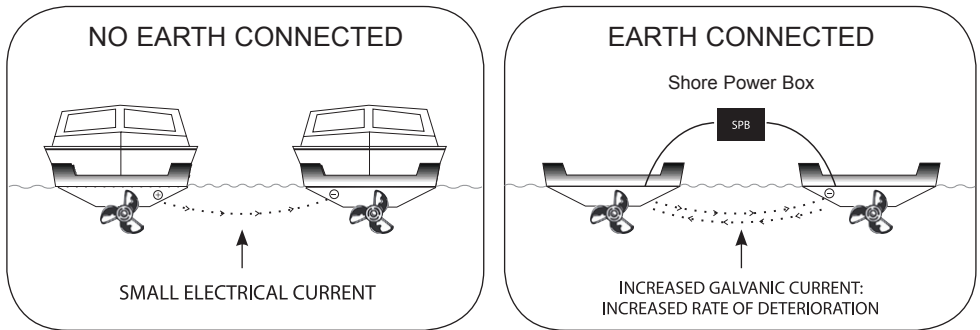
Why: When we connect to shore power (mains power) we connect all our boats together via the earth (green) cable in the shore power leads:



This earth cable is essential for our safety and also ensures correct operation of the shore power and vessels fuses and electrical trips: It is vital that this earth connection remains in circuit at all times: Removal can be fatal! In the event of a major electrical defect, lack of proper earth connections can be lethal to not only yourselves but to your immediate neighbours and even swimmers near the vessel!

Unfortunately it becomes obvious that the earth cable now present between adjacent boats makes an excellent conductor between them, thus allowing the easy passage of electrical current between the vessels. This in turn increases the rate of deterioration of fittings:

Thus we have the problem! We have created a giant battery!



The rate of erosion is affected by several factors:

- A. The amount of salt or other minerals in the water
- B. The areas of metal involved
- C. The types of metals involved
- D. The proximity of the vessels
- E. Construction material of the jetties
- F. The temperature of the water

It is not unknown in extreme conditions for skin fittings to deteriorate within a few weeks through Galvanic corrosion. Although this rate of loss is rare, it is obvious there is a problem in need of redress.



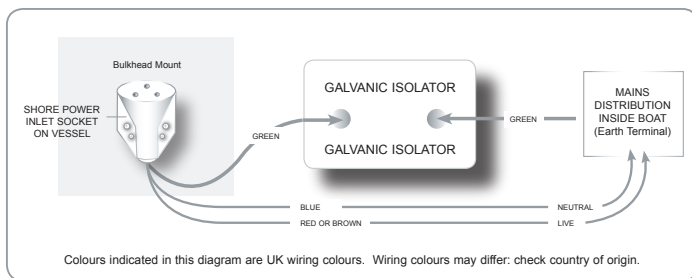
Solution...

The “Galvanic Isolator”

This simply installed device is fitted “In line” with the green earth cable inside the vessel. It effectively creates a break in the earth connecting circuit between vessels thus stopping any Galvanic flow and controlling erosion of fittings. The external shore power cable remains untouched. Should a fault develop on the boat or via a defect on the shore power of the marina this clever device “Turns On” and allows the earth protection circuits to conduct and in turn activate the electronic safety devices ensuring full protection from danger. The unit itself is fully solid state and requires no maintenance.

Is it easy to fit?

Yes: It is a simple matter of locating the earth cable immediately behind the shore power mains input plug on the vessel, (usually the green wire) this cable is then cut and the two wires are connected to terminal posts on the isolator and the unit screwed onto a secure bulkhead. Job done! Problem solved!



The live (red or brown) and neutral (blue) cables are not touched. Under “no fault” condition the unit is cold. Should a major fault occur, the isolator “turns on” and connects the earth terminals together; the electrical safety trips in the shore power distribution unit now sense the fault and disconnect the electrical power thus ensuring safety. During this process the isolator dissipates heat generated by the increased current flow through its “Heat Fins”. This action is measured in milliseconds, but as an additional safety precaution we recommend fitting the isolator away from any points of ignition and in a well ventilated position. The isolator automatically resets itself to protection mode once the fault has been rectified.

All isolators have varying voltage and current ratings. It is our recommendation that the minimum current rating be 50 amps RMS and ideally 70 amps RMS and voltage ratings of 250 Volts to allow safety margins: Isolators of significantly lower ratings are on the market and in the event of major electrical failure can create a fire hazard!

We hope this factsheet has been of help and wish you many years of trouble free sailing.

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