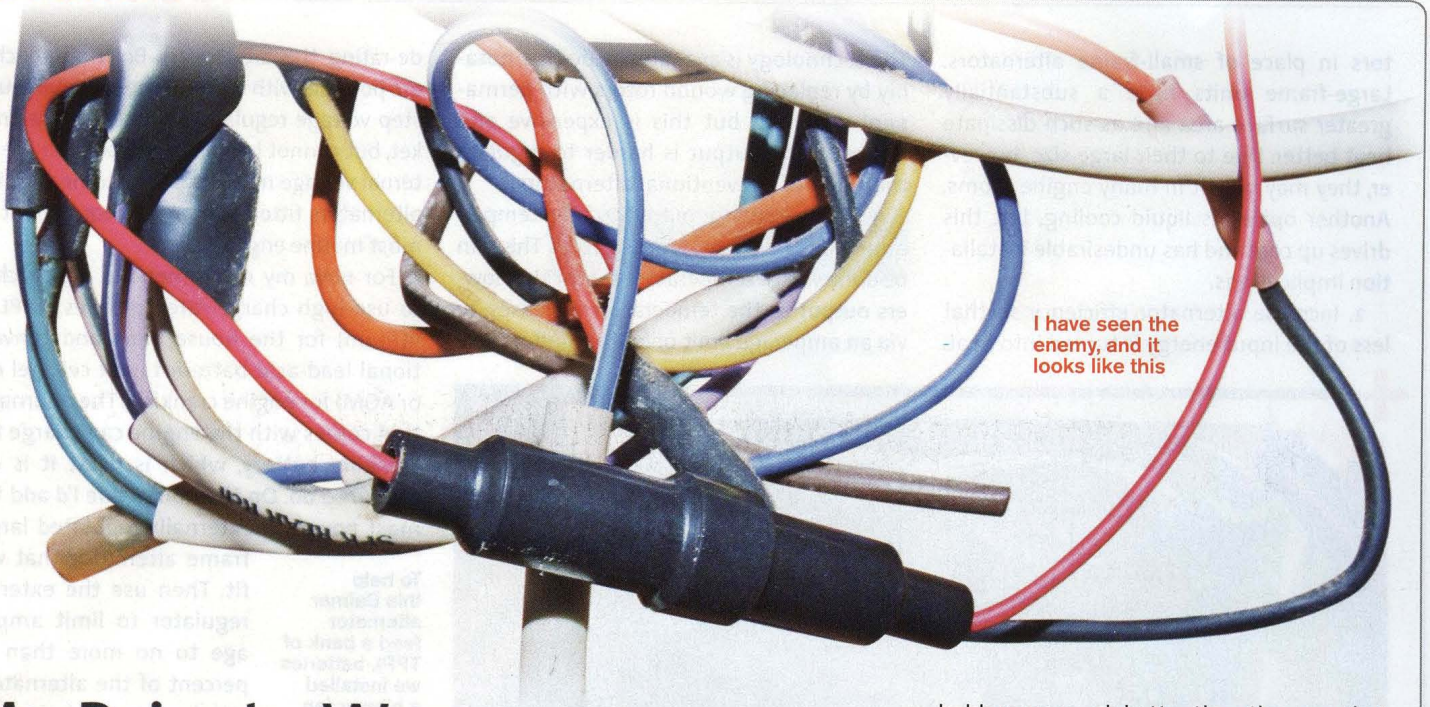
UPGRADE FUSE BLOCK



My Private War Against In-line Fuses

Complete with a roadmap to a lasting peace

BY CLARK BEEK

As a marine electrician I've found that in-line fuse holders are the most common cause of problems I encounter with modern electronics equipment. Quality marine electronics are generally very reliable, as long as their electrical connections are sound and there is no voltage drop in the ship's power supply. Unfortunately, all electronic devices come from the factory with in-line fuse holders on their power leads, and there, my friends, is the rub.

Let's face it: in-line fuse holders are cheap and chintzy. They have tiny corrosion-prone springs (like those found in ballpoint pens) and cheesy little soldered contacts. Any drop of water that tracks along the wire flows directly into the guts of the fuse holder and quickly wreaks havoc. Diagnosing these problems is aggravating, because you can't get the probes of a voltmeter into a fuse holder without disassembling it. The holders dangle in open spaces where they are prey to movement and vibration, and since they hang off the backs of electronic devices they are hard to get to, usually lost behind a console or in a tangle of wires.

In case you haven't figured it out yet, I absolutely hate these things. They are the bane of my existence and in my opinion have no place on a properly wired boat. I've spent many an hour chasing down a bad connection to a stereo, a GPS receiver, or a radar set, only to find in the end a sad, cracked, corroded little in-line fuse holder hiding away in some forgotten nest of wiring.

In-line fuses do serve an important purpose, and manufacturers are right to provide circuit protection for their devices, but most fuse holders are too cheap to do the job well. Some aftermarket in-line fuse holders are much better than the ones that come standard on new electronics—a few are even waterproof—but they still leave much to be desired.

The obvious seamanlike solution would be to supply power to electronic devices from proper circuit breakers similar to those on the main distribution panels found on most modern boats. But therein lies the other rub: they don't make circuit breakers that small. Many electronic devices require circuit protection as low as 1 amp, sometimes even half an amp. The smallest circuit breakers available for standard panels are rated at 5 amps, which is too high to adequately protect sensitive electronics.

Glass fuses are the only way to provide

The glass fuses must stay, but the lame in-line fuse holders must go

PHOTOS BY CLARK BEEK

RESOURCES

Ancor Marine/Marino, ancor.com

Blue Sea Systems, bluesea.com

Cole Hersee, colehersee.com

Hella Marine, hellamarine.com

Sea-Dog Line, sea-dog.com

this kind of low-amperage protection. So the glass fuses must stay. But I still say the in-line fuse holders must go!

The solution I install on almost every boat I work on is a secondary fuse block, just for electronics. This is a fairly simple upgrade and is well within the capabilities of a DIY sailor equipped with some basic tools.

Several manufacturers make marine-quality glass-fuse blocks, but I like Blue Sea Systems' six-position AGC Fuse Block with Ground (part number 5015), which comes with a plastic cover for protection and spaces for labels. This fuse block could serve as the main distribution panel on a small boat, but for our purposes it's an electronics sub-panel. Six positions are usually enough for most boats, since they will accommodate the requisite GPS receiver, depthsounder, stereo, VHF radio and radar set. If not, a second fuse block can easily be daisy-chained from the first.

Once you have your glass-fuse block, mount it close to your electronics in an accessible, visible, but protected location. Wire the fuse block to an appropriately sized breaker (15 amps seems to be standard) or fuse on your main distribution panel. This breaker can be labeled "Electronics" or "Sailing Instruments." You may as well feed the fuse block with some fairly big wire, say 10 or 12 gauge, to provide a low-resistance path and plenty of capacity.

Now comes the fun part: cut all the in-line fuse holders off your electronic devices and bury them deep in the nearest landfill. As you do so, be sure to save the fuses themselves and note their sizes. These fuses, if they're still working, can now be mounted in the new fuse block.

On many boats, the electronics are all mounted in about the same place. However, you may well have to extend some of the power leads using heat-shrink butt connectors and quality marine wire. Crimp marine-quality ring connectors to the ends of the power leads for each device—positive and negative—then screw the leads to the corresponding positive and negative terminals on the fuse block. Ideally, you should protect each crimp with heat-shrink tubing, or use heat-shrink terminals. To achieve the lowest-resistance connections, you should crimp, solder and heat-shrink.

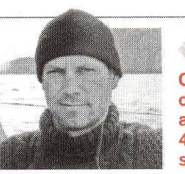
Some devices, like my Furuno GPS, come with fuses on both the positive and negative leads. I wanted to keep all my fuses under one roof, so I had to customize my fuse block. I removed the positive bus bar and cut off one end to provide an isolated negative fuse holder, then used a wire jumper to connect the negative bus to this fuse holder.

Once you are finished, test each circuit and label each fuse accordingly.

Now each of your fuses is held in place by a sturdy, tin-plated copper holder, instead of a chintzy spring-loaded thing with funny little nubs. The leads connect to the fuse block with proper screw-down ring terminals, and all of the fuses for all of your electronics are in one easy-to-reach place.

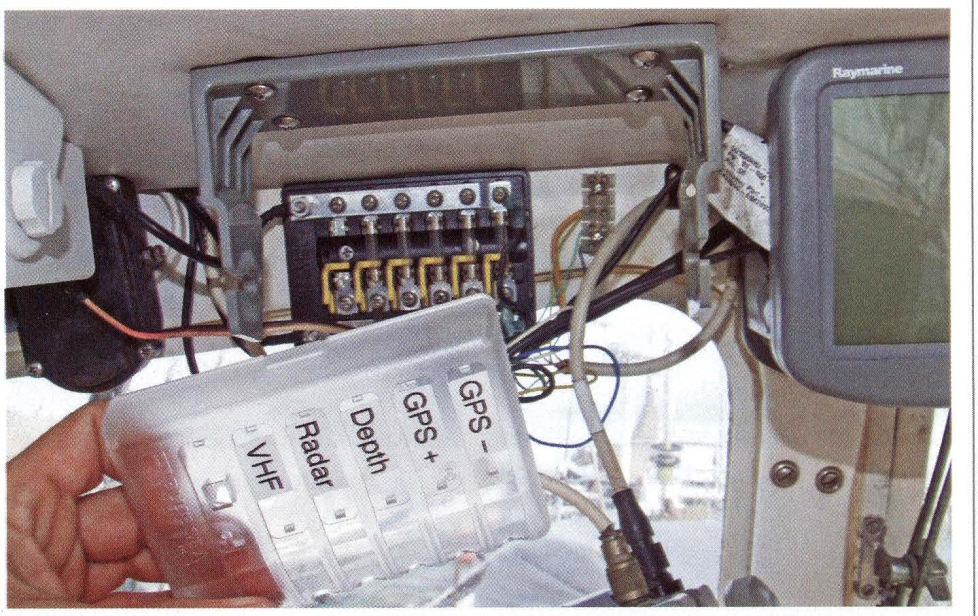
This upgrade, costing around $35 for the fuse block and maybe another $30 in wire, terminals and peripheral hardware, is guaranteed to save you many headaches (like having your GPS go dead while entering a dicey harbor at night) and will tidy up and tame all the wiring to your most important devices onboard.

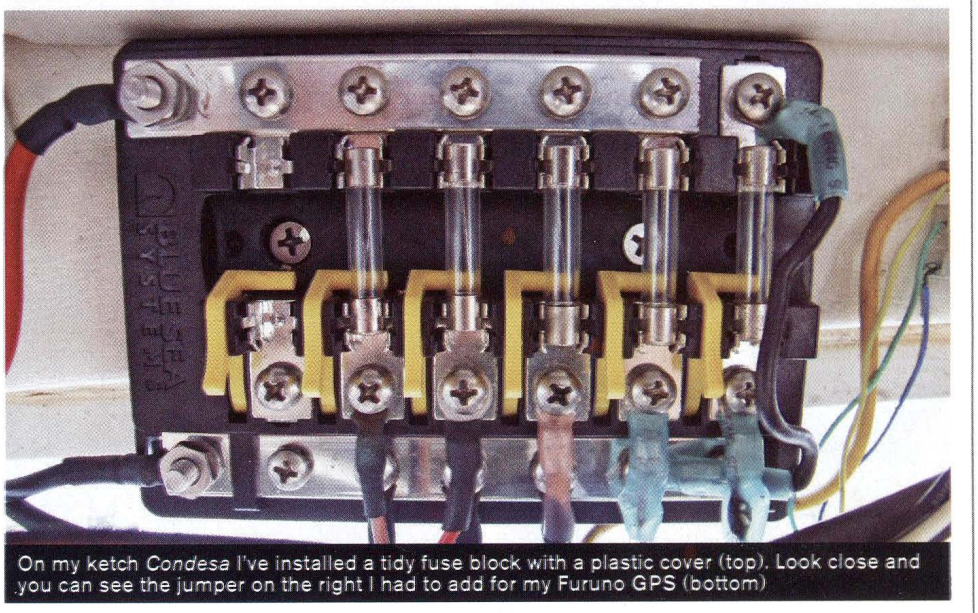
It is the manufacturer's duty to provide circuit protection for their devices with these annoying in-line fuse holders. It is your duty as a self-respecting boatowner to chop them off and replace them with something seamanlike.



Clark Beek, a frequent *SAIL* contributor, recently completed a circumnavigation aboard his 40ft ketch *Condesa*. He now sails out of San Francisco

FUSE BLOCK UPGRADE





On my ketch *Condesa* I've installed a tidy fuse block with a plastic cover (top). Look close and you can see the jumper on the right I had to add for my Furuno GPS (bottom)