

FRANKENSTEIN –PART II

ELECTRICITY IN BOATS

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In part I of this series, we talked about electrical safety. That is a good article to know by heart, since we concluded that too much electricity was not good for a heart! In this article we will look at two devices that will help you diagnose electrical problems on your boat. Both devices can be purchased or made at home. They are not expensive and are easy to make, so take your pick, although I recommend buying.

The first device looks like a screwdriver. It has a plastic handle, but instead of a screwdriver blade attached to it, there is a long metal piece which looks like the business end of an ice pick. Also attached to the handle will be an insulated wire about three feet long with an alligator clip on the end. The handle itself is transparent and hollow and a 12 volt light bulb is mounted inside it. If you connect the alligator clip to a ground wire and the end of the “ice pick,” or probe, to another wire at 12 volts (a hot wire) the bulb will light up. When you buy one of these voltage checkers (hardware stores, auto parts stores, Walmart, K-Mart, etc.) make sure you try it out on your car battery or a boat battery. Connect the alligator clip to one of the battery terminals and touch the probe to the other terminal. The light should light up and it should be pretty bright. Take it off the battery and take the plastic handle off (it usually screws off). Pull the light bulb out and note what kind it is so you can buy a spare bulb. Keep both the probe and the spare bulb in a zip-loc bag on your boat inside a dry-box with your other tools.

Now suppose you are out fishing and your depthfinder doesn't turn on when you push the power button. Your other electronics are on so you know you have power, but it isn't getting to the depthfinder. First make sure your connections into the depthfinder are good and tight. Then check the in-line fuse or the breaker in the breaker panel. (Some boats have one or the other of these, some boats have both. Some have neither and this is a real bad idea!) If the fuse and the breaker are ok, then you need to get out your voltage probe. Take off the power connection from the back of the depthfinder. Which one is that? There are usually two wire “bundles” connected to a depthfinder: one for power wires and one for the transducer. The latter connector usually has several pins depending on how many functions your unit does, such as depth, water temperature, boat speed and so on. The power connector usually has only two pins, for positive and for ground so the unit will have a potential difference as we noted in the last article. Connect your alligator clip to ground (on a breaker panel or the main power panel or the negative terminal of a battery) and touch the end of the probe to each pin (or pin hole) in the power connector. If the light comes on for one of the pins, then you have power going to the unit. Look at your unit carefully and make sure there is no corrosion on its connectors or on the wire connectors. Reconnect the power connector and try turning it on again. If it still doesn't come on, then the problem is most likely inside the unit.

If the probe light doesn't come on when you touch the power connector pins with the probe, then there is no power getting to your unit. Now you use your voltage probe to check the connections that the power wires (usually a red wire for positive and a black wire for ground) make with the breaker panel or with the battery. You are looking for a loose connection or a corroded connection, or even a broken wire. Somewhere between the battery and the depthfinder is a gap where the battery voltage can't get across. Your voltage probe will show you where there is voltage and where there isn't. In between those two places is your problem.

REMEMBER NOT TO TOUCH THE CONNECTIONS, PINS, BARE WIRES, AND BATTERY TERMINALS WITH YOUR HANDS! You want the electricity to go through the voltage probe, not through your heart.

At this point I need to remind you that I have been a teacher for forty something years, giving lectures and tests. If you have read the above paragraphs and decided that sounds too complicated (and dangerous) to do all this checking, then you haven't done too well on my "entrance test." Not to worry!! It isn't that hard to check these voltages, but like any other skill, you need to practice. So, a little homework is in order. You will need your boat, a wiring diagram for your boat if you have one, your new voltage probe, some paper and a pencil and maybe a flashlight. The wiring diagrams that come with new boats are usually not very good, and if you bought a used boat, you probably don't have one at all. No problem! You are going to make your own.

Most center console boats in the 17 to 24 feet range have similar wiring. There will be a battery or batteries (two are a good idea!) in the stern of the boat. Wires from the battery terminals will be connected to two metal plates, forming a panel, in the stern. One plate will be connected to the positive terminal of the battery and the other to the negative (ground) terminal. The panel will have several places where you can connect other wires, to a bilge pump, a washdown pump or a live well pump, for instance. Two wires, a positive and a ground, will go from this panel to another one in the console. (If you have an electronics box under a T-Top, two wires will also go to a panel in it.)

The panel in the console will have power wires running from it to each device mounted in your console, like your GPS. In the electronics box, wires will go from the panel to devices mounted there, like your VHF radio. If you have a wiring diagram for your boat, compare it with the actual panels and wires you see on your boat. Wires are not easy to see and follow in a house, a car and a boat. The difference is that your house, hopefully, is not going to be going up and down six feet with a thunderstorm coming down on you while you try to trace wires. Ditto your car. The best way to trace wires in your boat and learn what goes where is when it is on the trailer in your driveway, NOT 25 miles out in the thunderstorm! You want to learn as much as possible under good conditions so you can fix things quickly in an emergency.

Start at the battery. Put your probe across the terminals and make sure the light comes on. Note how bright it is. Look at the wires connected to the battery terminals and follow them. Sketch the battery and the wires and where they go on your paper. Record the color of the wires and which battery terminal they come from. If the wires go into a "pipe" and come out in the boat's console, continue to trace them and sketch them. Do they go to a breaker or fuse panel? Are the wires labeled? Test the voltage across the panel with your probe. Try to trace all the wires to the connections to your radio, depthfinder, and GPS. Figure out the wires that go to the horn, the bilge pump, the baitwell pump, navigation lights and so on. The more you know about the wiring, the quicker you will be able to diagnose and fix problems. Make a clear, labeled, sketch of all the wiring you can find and make sure you keep a copy of that on the boat in a zip-loc so it will be there when you need it. Keep your eye out for corrosion, sharp kinks in wires and loose connections. Clean off the corrosion and spray with something like Corrosion-X, straighten out the kinks (wires can break more easily at a bad kink, just like the wire you tie on a king mack lure), and tighten the connections. Note any fuses and write down what kind of fuses they are on your sketch. Make sure you have replacements on board. I keep mine in their boxes labeled (with an indelible pen) "radio," "GPS," and so on.

The more you know about your boat, the safer you will be out on the water. You can't cover all possibilities and sooner or later you will need a tow, but the more things you can fix, the less likely you will be to get in bad trouble.

The second tool is called a continuity checker. This can be made easily at home with a C battery, a C battery holder clip, a flashlight bulb and a socket for it, a piece of wood about the shape of a 12 inch ruler, some wire and some tape. Tape the battery clip and the bulb socket to the wood, run a wire from one terminal of the battery to the bulb socket. (There will be two connections to the bulb socket; it doesn't matter which one you

use.) Connect a wire to the other connection on the bulb socket and put an alligator clip on the other end. Connect a wire to the other terminal of the battery and connect an alligator clip to its other end. These last two wires should be long enough to allow you to connect one alligator clip to one end of the boat and the other clip to the other end.

To test your checker, connect the two alligator clips together: the bulb should turn on. What this device allows you to do is find out whether a wire going from the stern of the boat to the console is broken somewhere in the middle. You don't need the boat battery to be on for this kind of checking. Connect one clip to one end of the wire to be tested and connect the other clip to the other end of the wire. (To make sure you are getting accurate results, disconnect at least one end of the wire from its panel.) If the wire is not broken, you will get "continuity" and the bulb will light up. If the wire is broken, the bulb will not light up and you will need to replace the wire. If you want to keep the checker on your boat, include a spare battery and bulb.

There are other devices which are very useful for checking electricity, such as a multimeter. This device, as its name implies, can check a variety of values: AC and DC current and voltage, resistance, and, in some cases even quantities like capacitance and inductance. If you are a do-it-yourselfer and want something you can use with your house and car wiring as well as your boat, you might want to look into a multimeter. They are more complicated and harder to use than the devices above, however. The best way to go is to have simple, durable tools and a thorough understanding of the wiring in your boat.

If you are working on your boat wiring and come up against something puzzling, bring your question to a Club meeting. Most of us codgers, even the "Jolly" ones, have gone through the exercises described above and will be glad to try to help. If there are a lot of questions, we might try to see if we have enough room to put them, with answers, in the newsletter.

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