

TROUBLESHOOTING INTERMITTENT SHUTDOWNS

If your engine starts and runs fine most of the time, but stops intermittently, it will probably be more difficult to identify the basic system that is failing. For this reason, in the case of intermittent failures, the most important thing on which to focus is learning to interpret the "dying messages" from your engine.

As in developing any new skill, it's always good to start with something with which you are familiar. In this connection, most people can tell the difference between running out of gas (as in a car), and what would happen if someone accidentally turned off the ignition switch.

Running out of fuel usually results in a rather "soft and gentle" shut-down. Small missing sensations may be noticed that gradually get worse until the engine finally stops.

If the ignition switch were inadvertently turned off, the shut-down would be very sudden - perhaps even "startling".

These first two messages from your engine would then be very different:

1) Message one: *"I'm starving for fuel"*.

2) Or message two: *"My spark stopped suddenly as if my primary ignition circuit opened up"* (which would feel the same to the engine as if someone really had turned off the ignition key).

Familiar causes of fuel starvation include dirt in the carburetor, clogged fuel tank vent line, faulty fuel pump (or electrical connections in the case of electric pumps), clogged filters, etc.

If the "dying message" drags on long enough, you can try pulling on about half choke before the engine quits completely. If you can affect the engine performance (even a little bit) with the choke, it is good confirmation that you're correctly hearing a "fuel starvation message".

If the message continues to indicate that someone inadvertently turned off the ignition switch, the likely cause of the shut down is an open circuit somewhere in the primary ignition system - frequently in the boat's circuitry.

IMPORTANT NOTE: During most troubleshooting work, it is frequently necessary to turn the engine over on the starter with the engine NOT STARTING. Be sure to close the raw water thru-hull valve during these times so as to avoid filling the exhaust system with raw water until it backs up into the exhaust manifold, and into the combustion chambers of the engine.

To confirm an ignition failure message, remove the coil lead (the high tension one) from the center terminal of the distributor cap as soon as possible after shut-down, and hold the end of the lead close to the block or head (about 3/8" away). Check for spark between the coil lead and head as you turn the engine over on the starter.

If you see no spark, refer to the troubleshooting section of Chapter 3 of the Service Manual.

NOTE: Remember that many faulty connections within the primary ignition system will work after they cool - usually within a half an hour or so. Therefore, even if you do see a spark in the preceding step, don't completely abandon your first assessment that the problem may be in the ignition system.

If preliminary checks of the fuel system indicate that the engine is in fact getting fuel, it would be a good idea to perform a few ignition checks. Faulty connections within the boat's primary ignition circuit are particularly hard to pin down. It is frequently necessary to install a "diagnostic" jumper wire between the coil (positive terminal) and the positive battery cable at the starter solenoid. If the intermittent shut-downs cease, you've confirmed that the problem is somewhere in the boat's ignition system.

Another distinguishing feature of a shut-down could be that it is neither soft nor sudden, but that it hesitates (stopping and starting) sharply in an almost aggravating way. The engine may even back-fire or "pop" a bit in this mode.

This third dying message would be rather specific:

3) *"My coil is breaking down when it gets hot", or "My condenser worked loose on its mount, or "There's a very loose connection somewhere in my primary ignition circuit"* (possibly an intermittent short to ground). These messages frequently suggest that the problem is heat related.

A fourth distinguishing feature (fortunately extremely rare) is that the shut-down may be accompanied by signs of mechanical failure: i.e. loud noises, loss of oil pressure, severe overheating, etc.

The message here would be quite clear:

4) *"Help, I'm self destructing!"*

In addition to the foregoing specific messages, there are, what may be called, "near-death experiences" which are also important in clarifying which of the preceding four messages the engine is sending:

1) Do the shut-downs repeat at some predictable time interval? And, is it possible to restart the engine after some predictable interval of time following a shut-down?

These observations would suggest that the shut-downs are heat related and would relate to message 3, or possibly resulting from a partial vacuum in the fuel tank (from a clogged vent line). This last condition would relate back to message 1.

2) Do shut-downs occur during some predictable operating condition? This observation would suggest a sticky float valve in the carburetor, although this is not a common problem.

And finally, in a different context completely, there is my favorite question: *"Have you performed any maintenance on the engine recently?"*

It always provides me with a bit of tension releasing amusement when I'm told: "Why yes, I just replaced the plugs, points, and condenser last week, - so I know that the problem can't be in that area!" (Not necessarily so)! Whenever you experience problems after performing maintenance, always go back over every step of your work to see if you overlooked something. This is one of the most fertile places to find reasons for intermittent shutdowns.