

Q: How do I troubleshoot for no spark at the plugs during cranking?

A: In many cases, complete absence of spark is caused by a breakdown within the primary ignition circuit that exists in the boat's electrical system; external to the engine. This part of the ignition circuit starts at the large battery terminal on the starter solenoid, runs to the ignition switch, and then comes back to the positive terminal of the coil.

To check for a break in the primary circuit within the boat's part of the system, proceed as follows:

1) Use a volt/ohm meter to check for the presence of 12 volts between the positive terminal of the coil and ground (with the ignition switch on). It's best to continue checking voltage at the positive terminal of the coil while cranking the starter. The voltage may fluctuate between 10 and 12 volts as the points open and close. If you do not have power at the positive terminal of the coil, troubleshoot the primary ignition circuit within your boat's electrical system. If you do have normal voltage at the positive terminal of the coil, go to step (2) to check the engine mounted part of the primary ignition system.

NOTE: If you don't have access to a voltmeter, you can connect a jumper wire (14 gauge or so) between the big battery terminal on the starter solenoid and the positive terminal of the coil. Connecting this jumper wire is the same as turning on the ignition switch (so you can't let it installed if you're not running the engine) and it will by-pass any problem that might exist in the circuit described in above, including the ignition switch itself.

2) Remove the distributor cap and rotate the engine until the points are closed. Remove the secondary lead from the center of the distributor cap, and hold it approximately 1/4" from the cylinder head. Take a pencil or other pointed (non-electrical) tool, and open and close the points. Each time you open the points you should see a small amount of 12 volt arcing at the points themselves, and a strong secondary discharge between the end of the coil lead and the head. If there is no secondary discharge in this test, the problem is most likely a defective coil.

NOTE: With electronic ignition installed, perform steps (5) and (6). Each time you rotate the distributor across the point where the test light goes off in step (6); there should be a secondary discharge from the coil lead to the head.

3) If you observed a good secondary spark in the preceding step, your problem is likely in the secondary part of the system, down stream of the coil. It's rather difficult to separate problems within this part of the secondary ignition system. For this reason, it's usually best to simply start replacing these secondary components one at a time starting with the plugs, distributor cap, the wiring harness, and finally the rotor.

4) If you now have a good spark at each of the plugs, and the engine still won't start, you'll have to check for proper timing of the engine. In this case, continue with steps 5 through 7.

5) Remove all spark plugs and rotate the engine in a counterclockwise direction until you begin to feel compression in the first cylinder. Stop turning at the first sign of compression, and then continue to slowly rotate the engine while observing the roll pin in the center of the flywheel. Stop turning when the roll pin is vertical. The engine is now set with the first cylinder at Top Dead Center (TDC) of its compression stroke.

6) Connect a 12 volt timing light across the primary terminals of the coil and rotate the housing of the distributor a small distance in each direction (with the ignition switch on) to locate the point where the light turns off. Retighten the hold-down bracket. This is the point in the engine rotation where the secondary discharge occurs which will be sent to the number one cylinder (at the flywheel end of the engine).

NOTE: On late model engines, it's most convenient if the tip of the rotor is pointing directly away from the block at the TDC of the number one cylinder. In this orientation, there will be proper clearance between the distributor cap and the alternator belt. On early model engines, the tip of the rotor should be pointing aft when at number one TDC to insure good clearance between the belt and the retaining clips of the cap.

7) Be certain that the plug wires are installed in the proper locations. With the engine still at the number one TDC position, the lead to the first cylinder (at the flywheel end) should be installed in the post of the distributor cap located directly over the tip of the rotor.

8) The remaining plug wires are installed in a clockwise orientation around the distributor cap in the order of the engine's firing sequence (1, 2, 4, and 3). This means that the plug lead from the distributor cap post directly to the right of number one goes to the second cylinder from the flywheel, the next post to the fourth cylinder (at the transmission end), and the lead from the next post to number three. You should then be back at the post for cylinder number one.