



Underachieving Alternator: Part 2

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I read your Boatek article in the March issue, where you recommended several remedies for Underachieving Alternators. I found that I needed to connect the regulator remote sense wire to the battery instead of the output terminal of the alternator. This greatly improved the output amps, but now I have another problem. The belt is wearing out after just a few hours of operation. You warned against using an automotive alternator, so I have to admit that I am using a 100 amp automotive alternator. Should I give up and pay the big price of a marine after-market alternator?

I normally don't recommend using automotive alternators, but in your case, don't give up just yet. You have already gotten past many of the most common problems with automotive alternators such as:

Over-rated output: You are satisfied with the output of the alternator, and it hasn't burned itself up in several hours of high output operation. Many will burn out in less than an hour, if presented with a big battery bank to charge and a regulator that demands full output.

Integrated voltage regulator: Many automotive alternators have built-in regulators that do not allow you to use remote voltage sense, or otherwise control the output.

Mounting problems: It is often difficult to find a mounting bracket for any engine/alternator combination.

Your problem with belts wearing out is common in the case of using only one belt with a 100amp alternator. You can run a 100amp alternator with only one belt, but only if you do everything right. You certainly need dual belts with an alternator that is any larger. Several things can cause your problem:

Low belt tension: Your belt should be rather tight, because of the high load. If you can turn the alternator by hand using the cooling fins, it's too loose. If you notice a reduction in output after the belt starts to wear, or even break-in, it's probably due to slipping, which will destroy a belt very quickly.

Wrong belt: You probably had to hunt for a belt that worked, in an auto parts store. Make sure that the belt you are using is filling up the entire space available in the engine and alternator sheaves. It's best if you can avoid using belts that are under 1/2 inch wide. If the alternator sheave is narrower than the engine sheave, take the alternator to an alternator shop and ask them to swap sheaves for a wider one. Then get a belt that fills both sheaves.

There is a surprising amount of difference between a run-of-the-mill belt and a heavy duty or industrial grade belt. Buy the best belt that you can. Some belts last five times longer than others!

Wrong ratio: A larger diameter sheave on your engine will allow a given belt to deliver more horsepower. Try to get a larger sheave for your engine. This will increase the speed of the belt, allowing you to transmit more power. If the sheave you are using is a bolt-on extra, look anywhere for a larger one. If you are using the OEM pulley/damper, don't replace it with anything but an OEM supplied part.

Poor Alignment: Excess belt wear can be caused by poor alignment. Hold a straight edge against the flat side of each sheave and extend it toward the other sheave(s) it should point to the same part of the other sheaves. I don't have a good rule of thumb for how close it has to be, so aim for right-on. Some brackets can be loosened, adjusted and then tightened to make them line up.

Rusted sheaves: Rust on the working surface of a sheave looks harmless enough. In fact, it looks like it might help with added friction. I have seen rust accumulate on an unused sheave in a couple of months that caused dramatic belt wear.

Hopefully, you have found your problem in this list. If so, pat yourself on the back for getting an automotive alternator to work on a boat. Each of the problems that I have listed is just as likely with a high-dollar marine aftermarket alternator, so your choice of alternator didn't cause this round of problems. To insure continued success, consider these improvements:

Separate engine sheave: If you replaced the original alternator with the big one, you should consider using a separate add-on sheave dedicated to the alternator. The original alternator can be left in place, adding charging power and redundancy. You can avoid extra stress of high belt tension on your water pump. You can choose a bigger engine sheave, or you can go to dual belts will no extra trouble. Having only two sheaves on the path of the belt allows for more degrees of belt contact, reducing the tension required to transmit the power.

De-rate your alternator: Your automotive alternator is working harder than it was designed for. You might want to use a regulator that allows you to set a reduced max output current, or a regulator with a temperature sensor. Setting a maximum current of 80amps will reduce heat generated by 36%! You won't lose as much charging power as you might think, because your remote sense connection will keep the alternator putting out 80 amps until the batteries are almost charged.

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