"LAMP ON" ….*Bad Alternator??*

No-charge indicator lights, also known as 'idiot lights' have been and continues to be a source of misunderstanding for some rebuilders and many installers alike. Without understanding how the system in question works, wasted time and money is the price paid along with frustration resulting in an "unhappy camper." All of us have heard it said "I put three on and none of them worked!" "I put the 4th one on and it worked, so they must be bad alternators"….at least so it appears….right? **NOT NECESSARILY!**

Of course there are other possible situations with all the various makes and models that would make the point, but the following is of interest to all of us, because it is a scenario that could play out on any of the millions of GM applications produced from 1986 to the present. The alternator families for this discussion include CS130, CS130D and the late model AD series. Following is a case we experienced recently.

> In April of this year a customer purchased and installed an alternator in a 2003 Chevy Silverado 2500 but says "the charge light is on, but only at idle, and everything on" The installer says that with his foot on the brake, transmission in Drive, and everything on, the lamp would come on; but as soon as he would accelerate the lamp would go off and stay off. Frustrated, after seeing the same thing with the second alternator he assumed he was getting bad alternators from his supplier. The alternators in question were returned for analysis and deemed 'perfect'. How can this be? Doesn't the light on mean a bad alternator?
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> In this case, NO. An understanding of the basics and how GM alternators and their regulators work will explain. When the customer was asked: What was the charging voltage when the light was on, the answer was "I don't know". The alternator in this case is rated at 105A, and has an excellent performance curve, with a capacity of about 70 amps at engine idle. **Here is the key:** If for any reason the system load exceeds alternator output for any given rpm, the power will then come from the battery, and as the battery becomes depleted, ***the system voltage will begin to fall.*** As soon as the voltage drops to 11.3 volts, the charge light will come on because the regulator is designed to do this. So, now we are back to the question: What was the voltage when the light came on? No doubt it was at or below 11.3. When the customer put the transmission in gear, the brake on, with all loads turned on, this merely accelerates this function, because engine rpm will drop another 300 or so rpm. With system voltage decreased, alternator capacity is decreased even further because of lower field current. But when the rpm is increased, and alternator capacity is thereby increased above the system demand, the light will go out….just as stated by the customer.

By now you are asking: **What caused system voltage to fall?**

In this case, it was reported to be the battery, so naturally the 3rd alternator worked just fine. If the battery is in poor condition or defective, it can't be brought up to 12.6V, a greater than normal amount of the alternator's current output is being consumed by a battery that can never be brought to full charge. Depending on how bad the battery is it is not unusual to see 30-40 amps going to the battery; that along with all the other loads it's just not possible to maintain the normal system voltage. If not corrected, the alternator will soon fail. The same will happen with a discharged battery.

Are there other causes other than the alternator that can cause a "light on"?

YES!

Consider the following:

1. **Drive Belt:** If for any reason the alternator belt is ***slipping*** system voltage will be low. Belt tension should be rechecked after 20min warm up, especially with a new belt since a little stretch is normal. Failure to do this not only will cause voltage to fall off but also can transmit excess heat to the front bearing of the alternator resulting in premature bearing failure.

2. **Add-on Accessories:** If the original charging system is not able to meet the power requirements, that is if the current required for additional (non-factory) loads is greater than the capacity of the alternator at any given rpm, ***especially at idle***, then voltage will fall.

But what if the Lamp is On, and the alternator has become inoperative, does that mean it was defective of manufacture? ***Again, not necessarily!*** Look for highlights on this topic in a future article.

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