

May the Force be with you – or maybe not if the computer thinks it's not needed right now...

(how changes to charging systems in modern vehicles affect us)



From the department of fixing things that are not broken, it seems that several vehicle manufactures now use special variable-output alternators that are under control of temperature and engine management systems. No longer will you be able to simply pop a bonnet and check for around 14V at the battery terminals with the engine running as a simple measure of charging system integrity.

There are now 'Temperature Compensating Alternators' that appear in new Falcon's, Hiluxes, Prado's and Klugers. These charge batteries to 14V when the engine is cold, but folds the output to around 13.4V when the engine has warmed up.

Additionally there are another range of alternators under direct microprocessor control that will vary the output between 12.3V and 15V depending upon conditions (and internal whim) The Range Rovers, Nissan Navara's & Pathfinders, Pajero's Land Rovers and Mazda's now do this. The car computer will turn down the alternator charging if it thinks that the battery ought to be charged, or if the engine is idling, or if the driver is accelerating. I'm sure that drivers can really feel that 2% energy boost pushing them harder into the upholstery as they power away at the lights.

So what's the big deal and who really cares? There are a couple of important issues here. . In the past you could easily check the integrity of your charging system by placing a meter on the battery and run the engine. If around 14.0 to 14.2V was present, then it was highly likely that any engine starting difficulties were probably caused by battery deterioration or failure. Now with smart charging systems in control, you are going to have a harder time determining if it is because of a battery failure, an alternator failure, or key components are all intact but the car computer just doesn't like you and is sulking.

This has special significance for campers and Radio Amateurs as a lot of these people like to run a second vehicle battery. Many such installations used Voltage Sensitive Relays (VSR's) to link a **second battery** to the **main battery** when it sees the battery voltage is rising after a successful engine start. These will automatically disconnect when the engine is off so that a fridge etc won't flatten the battery used to start the car. With these new alternator systems and traditional battery linking technology, your second battery may not get a decent charge if it does not link to the primary battery when it should.



Additionally, there are current sensors in the negative battery terminal on many of these vehicles to allow the car computer knows how much energy is being drawn. Running auxiliary fridges and batteries may trigger engine faults and messages if the computer thinks the vehicle is drawing current when it shouldn't be.

So what is to be done with a car that conspires against your best efforts to maintain a measure of outdoor freedom? How do you fight a panel of automotive engineers that are made to stay up all night (eating take-out food) until they dream up a spurious function or facility to add to next year's model to help differentiate it from last years model? The answer is not much. There is little we can do to make vehicle manufacturers return to 'conventional' hardware.

At least we can be aware that these systems are now in play when diagnosing vehicle problems, otherwise conventional wisdom would conclude that low charging voltages are faults that need to be addressed immediately.

Like the old saying goes, being fore-warned is being for-armed and if we had four arms we'd all be better at soldering...