

An incomplete installation

Replacing a worn out battery in a car, would probably be ranked as one of the easiest repair jobs any mechanic would be asked to do. But in some cases, you would be wrong. New technology has come to most parts of a car, and now it has taken battery replacement to a higher level. eXponentia's Steve Carter gives you all the details, for you to successfully adapt to the new technology.



Steve Carter, eXponentia

Some problems that your customers come to you for help with are very easy to diagnose and the proper solution is easy to carry out. Let's say a customer brings in their late model Citroen/Peugeot, complaining that the engine seems to turn over more slowly in the morning lately, but seems to be fine at any other time. You recall that the nights have been getting colder, and you know they are going to get colder still. Even though you might expect a battery to last longer than this original factory battery apparently has, you suspect that the battery is nearing the end of its life and needs to be replaced.

A quick load test confirms your suspicions, the battery has lost a good portion of its original power and will not last long with the coming cold weather. You very appropriately tell your customer that their battery is nearly spent and needs to be replaced. You install a proper sized replacement battery, start up the engine and all seems well. Your customer is happy to pay for the battery and thinks that that is the last they will have to worry about the car starting in the morning. Off they go and everybody is happy, for now.

But the customer and the car will be back in a few days, and your once happy customer will not be happy then. The car will be turning over slowly, or maybe it won't even start at all. These are the worst times for both you and your customer. Each may suspect that the other has done something wrong. The customer might think that either they were sold a poor quality battery, or that the weak battery was only a symptom, not the cause, of the problem with their car. You might think that they left their lights on and that is why the battery is dead again.

Not wanting to offend, you say nothing and recharge the battery. After it has been charged, you load test it and all appears to be well. At this point you might send them back on their way, but you think that just maybe there is another problem with the car, so you use your trusty multi-meter and quickly discover that at idle, the battery voltage is 12.7V. Even at 2500 rpm the battery voltage is still 12.7V.

You come to the conclusion that there is something wrong with the alternator, so you replace it. But replacing the alternator will not solve this problem. From the moment you replaced the battery, you were sliding down a slope to certain failure.

The original battery was worn out. You correctly diagnosed that, and it was the only problem with the car when it was first brought to you. When the car left your garage the first time, the battery was in good working order, but the alternator was never going to charge it. There was nothing wrong with the alternator.

The problem was that you did not properly install the battery. After you fastened the cables, it is a vital step to attach a scan tool to the car and inform the Engine Control Unit (ECU) that a new battery has been installed. Until that has been done, the charging system will not put any current back into the battery, assuring that the battery will soon be discharged and will not start the car.

Smart Charging

This Citroen/Peugeot, and many more models on the road, are equipped with a 'smart charging' system. In the coming years, most cars will have this technology. Just as many other system and components have been improved and redesigned to increase reliability and reduce emissions, the battery has also been redesigned for modern requirements.

In the battery of a 'smart charging' system, there is a

chip that collects data about the current condition of the battery, such as temperature, state of charge, current flow, date of manufacture, etc. The information monitored by the chip is communicated to the ECU. The ECU makes decisions about when to recharge the battery and how quickly to do it. The system is smart enough to turn on and off the alternator to varying degrees, to put back in just what is needed to bring the battery to its optimum state with the aim of extending the battery life as much as possible, nothing more and nothing less. Providing any more than what is precisely needed would only overheat the battery and take power away from the engine, resulting in a shorter battery life and higher fuel consumption and emissions.

When a new battery is installed, the ECU needs to be told it's new. If not, the new chip and its data will be ignored because it has abruptly changed. The system sees that the data has changed, it can't reconcile the change with what it expects to see and will err on the side of caution, by not charging the battery at all.

The solution to this problem is simple once you know about this new technology. Technology will effect everything on a car given enough time. We will have more about diagnosing smart charging systems and provide greater detail in a future issue

And that 12.7V at idle or even at 2500 rpm? Perfectly normal.

