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BATTERIES AND WATER

Battery water use is usually a result of high charge rate, which translates as higher system voltage than is required to recharge the battery during the time of operation. Here we go again...Please let me again state that my background it in teaching adults and I look to the offering of what I know only as a means of payment for the help which has been and hopefully will be forthcoming. I am not an expert, and as I grow older the depth of my ignorance becomes more and more evident.

In the spirit of service:

A vehicle battery is really a storage tank for electricity. The head which we call voltage or electrical pressure (depth of material stored) tries to force the material (electricity) to flow out of the tank. In order to add to the amount in the tank sufficient pressure must be applied to force the material back into the tank. In order to charge, recharge, whatever, the battery we must apply a sufficient voltage to do two things:

1) Overcome the physical resistance of the battery.
2) Over come the battery voltage present.

In a fully charged battery the physical resistance of the battery is low because the electrolyte (acid and water) is at the highest concentration so it is easier to pass current (electricity) through the battery. That is to say, it is easier with respect to the physical resistance of the battery. In a dead battery, the electrolyte is close to pure water so the resistance is high and it is hard with respect to physical resistance to pass current through the battery.

As a battery is charged or maintained some of the current flow through the battery will not contribute to charging the battery but will simply act to break down some of the water into hydrogen and oxygen. This is why the water level will need to be topped up from time to time in many

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applications.

During charging of a dead battery the physical resistance of the battery is high but progressively (but no in a directly linear ratio) becomes lower. During charging of the battery, the battery voltage becomes progressively higher but again, not in a directly liner ratio.

What this all means is that water will be consumed during all charging whether it is due to use of a charger or when being done by the bike's charging system. The higher the charging voltage beyond the more voltage which will be available to overcome the physical resistance of the battery and the battery's voltage so a higher current flow will result (faster charging rate) This is good during recharging because charging will happen faster as we have a higher voltage to push current into the battery but can become an issue once the battery is fully charged.

When the battery is fully charged it will have a high voltage (12.8 volts is a fully charged battery) plus it will surface charge (a light charge with no real capacity present on the surface of the plates) up to 13.2 or 13.4 volts in some cases. This surface charge will act to reduce the current flow through the fully charged battery even further reducing over charging however unless something else intervenes some overcharging will occur. Over charging will do the work of breaking down water and heating the battery. In modern automotive systems a temperature sensor is present to measure battery temperature (old ones went buy voltage regulator temperature) and will act to reduce charging voltage when the battery is warmer. It is necessary to reduce charging voltage as the battery temperature becomes higher because higher temperatures mean that the electrolyte expands, is in lower concentration and so battery voltage/physical resistance falls slightly. Unless charging voltage is reduced the higher voltage will result in over charging, more heating and water loss.

The KLR charging system is not very complex and it lacks the ability to reduce charging voltage as the battery temperature rises so on long rides; at higher temperatures we can expect to see water use. It is useful to measure system voltage across the battery when the battery is fully charged at a few temperatures. This recorded information can help to determine if you regulator is beginning to malfunction or perhaps the battery is on the way out.

When charging a battery by use of a battery charger here are some suggestions:

1) Do the charging according the reference charts which give the charging rate and time according to cell specific gravity, temperature

Shim Value Table
SuperBrace
Swingarm Maint
Torque Values
Tube Valve Tools
Valve Adjustment
Vista-Cruise Lock
Water Pump Seals
Wheel Alignment

and battery capacity.

Or

2) Simply do what your bike does, connect the charger, connect a voltmeter across the battery in parallel with the charger. Why the voltmeter? Just make sure that the battery voltage does not exceed the bike's charging voltage, in other words keep the charging voltage below 14.5 volts. Periodic checks to ensure that the battery temperature stays under 125 F, not more than warm to touch will keep you out of trouble. What do if the voltage rises above 14.5 or so? Easy! Connect some sort of resistance between the charger and the battery. Handy resistances are an old headlight sealed beam. Too high a voltage? How about a tail light bulb, then? An old sealed beam or tail light bulb will give three different charging rates. Method two is the one I use and recommended to students as is required no reference and simply duplicates what the bike does.

A final recommendation: Do not connect the charger's leads directly to the battery! Connect one charger lead to the battery and then connect a jumper wire to the other battery terminal. Now connect the jumper wire to the charger. I like to have something to screen me from the battery when charging in case it explodes. You won't like having one explode close by, trust me on this one! Monitor the voltage closely for a bit and then periodically after that and all will be well. When finished charging, switch off the charger, then disconnect the charger from the jumper lead. Now
disconnect jumper lead and charger from the battery. Why? Connecting and disconnecting to the battery will create spark at the first connection disconnected and the last one connected. We don't want that spark to be close to the battery and maybe ignition the hydrogen/oxygen mixture produced by charging.