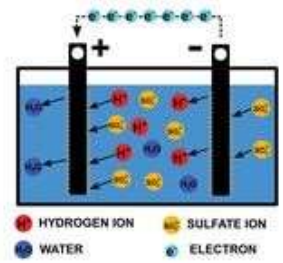
Charge!

By: Mary 'Trooper' Kirkpatrick, Senior Road Captain

Making sure your bike starts and can get you through the challenges of a long ride, is essential to enjoying your travels! Getting the right 'charge', maintaining that 'charge' and knowing what to do when you have no 'charge' is what you will find in the following paragraphs. Much of this is known to you all, but for those of us who 'tend' to need 'recharges' of information, I hope this will come in handy. Enough of the 'shifty' word use and on to the facts…

Battery Basics



In a conventional lead-acid battery, the negative plate is coated with sponge lead while the positive plate is coated with lead dioxide. The sulfuric acid electrolyte contains charged ions of sulfate and hydrogen. As the battery is being discharged, sulfate ions move to the negative plate and react with the spongy lead, which forms hydrogen ions and electrons. The electrons flow out of the negative terminal and into the positive terminal, creating an electrical current. At the positive plates, the oxygen in the lead dioxide reacts with the electrons and hydrogen ions to form water. Both reactions create lead sulfate, which collects on the plates. When the battery is charged, the whole process is reversed. *Andrew Trevitt*,. Stated in Cycle World, 2 Nov 2016.

Bike Battery Types, according to White Dog Bikes Blog:

A motorcycle battery is basically an electrical storage devices that stores electrical energy by using a reversible chemical reaction between the lead and the acid in a battery.

Battery Electrolyte (also known as Battery Acid) is a mixture of sulfuric acid and distilled water (Distilled is required so that any impurities in the water is eliminated and will not affect the reaction!) which is added to motorcycle batteries and is used as a conductor between the lead in the battery and the battery acid to create an electrical charge.

The following are the three types of batteries that are typically used in motorcycles:

Type 1. Lead Acid: These are also known as 'Wet Cell', 'Flooded Cell' and Conventional' or VRLA (Valve Regulated Lead Acid) Batteries. You can tell that you have this type of battery because it will have a row of plastic stoppers in the top. Typically, three stoppers indicate a 6 volt battery and 6 stoppers indicate a 12 volt battery. Many of them will have a battery acid level indicator on the front and will have a white/opaque plastic lower casing. These batteries will usually be identified with a number that will start with the letters YB, CB, or GB. Because they are not 'sealed, they tend to leak gasses from the reaction and corrode the battery terminals. You will find that you will be doing maintenance checks and periodically will be topping off the battery with DISTILLED WATER as the water portion of the battery acid dissipates over time. These are not used much any more, but you may find one on those older bikes that you are keeping for the memories!

Over the years, maintenance-free versions of the lead-acid battery have been developed, which are sealed and do not require venting during normal use (though they do have a safety vent in case overcharging causes an excess of pressure inside the battery). Absorbed glass mat (AGM) technology, used in most motorcycle OEM applications today, uses a very fine fiberglass mat between the electrodes inside the battery, which absorbs the acid to prevent spillage; in addition, any oxygen created when the battery is charged is retained inside the battery, where it can recombine with an active material to form water.

Type 2: Maintenance Free Batteries: Also known as 'Sealed' or 'Dry Cell' Batteries. These batteries do not need to be checked or maintained. They usually have a black case, (sometimes blue or grey) and have a stopper sunk into the top. They are hermetically sealed (a seal that will not allow any gas or moisture in or out) and the identifying numbers for these will begin with the letters YTX,CTX, or GTX.

Type 3: Gel Motorcycle Batteries: Also known as 'Gel Filled' or 'Gel Acid' Batteries. These batteries are filled with a gel state acid and are also hermetically sealed. They do not require any maintenance and are normally in a black, blue or grey casing. The identifying numbers will begin with the letters YT,CT, GT, or YTZ, CTZ or GTZ. For more reading on this information go to: Different Kinds of Motorbike Battery - Motorcycle Battery Types (whitedogbikes.com)

What to Consider when choosing your Charge!

Long ago, motorcycles did not even need batteries to function. Points and a condenser served as the ignition system, the engine was started with a swift kick of a lever, and Bluetooth was what you got after eating blueberries. Now, however, your bike most likely has electric start, an elaborate lighting system, electronic ignition and fuel injection, and any number of electric and electronic accessories and riding aids. Your battery must be able to start the engine, power all those accessories when the engine's generator can't keep up (under extended idling, for example), and help protect the delicate electronics from surges and spikes in the system.

Aside from voltage and physical size, there are two important specifications for a motorcycle battery. One is the amp-hour (Ah) rating, which indicates the battery's ability to provide current for an extended period of time. This value is based on 10-hour and 20-hour ratings; for example, an 18 Ah (10HR) battery will provide 1.8 amps of current for 10 hours. The second important specification is cold cranking amps (CCA), which reflects the battery's ability to provide current and start your bike in low temperatures. A touring bike loaded down with electrical accessories, such as heated grips or aftermarket lights, will require a battery with a high amp-hour rating that can power those devices as you idle along in traffic, whereas starting your high-compression Panigale (Ducati) on a cold spring morning calls for something with a good CCA rating

Now… Maintenance. Does Free really mean FREE?

If you use your bike regularly, the only maintenance you need worry about is to keep the terminals clean for a good contact. It's when you don't ride regularly and let your bike sit for extended periods of time (like over the winter) that your battery will need some attention. Even when your bike's ignition is in the "off" position, there is still some draw from the electrical system to power accessories, such as a clock or alarm, which can discharge the battery over time. As well, a lead-acid battery can self-discharge when not in use.

As a lead-acid battery discharges, lead sulfate is produced as a by-product and coats the electrode plates. This reduces their effective surface area, reducing the battery's capacity. Normal charging reverses this process, but leave your battery too long before charging and enough lead sulfate can be produced that charging will not be able to reverse that process—your battery will fail from this condition, called sulfation. A discharged battery is also susceptible to internal corrosion, which can cause the connections inside to break, rendering your battery useless.

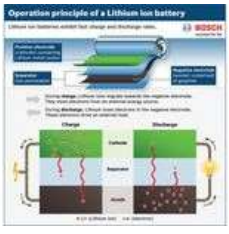
Another issue of leaving a conventional battery in a discharged state is that the acid inside turns to water, which in turn can freeze and rupture the case of the battery. And finally, if you let your battery go completely dead—sometimes referred to as deeply discharged—active material falls off the electrode plates and accumulates at the bottom. If enough material collects, it can short the plates, again leaving the battery useless.

For these reasons, attention must be paid to keeping the battery charged. Charging while still in the bike is suggested due to the list of electronic systems on the bike. NOTE: A garden-variety automotive charger can overwhelm your small motorcycle battery; if the battery can't absorb that high rate of charge, it can overheat (which creates hydrogen gas which in turn may trip the safety valve on a sealed battery or even boil all the electrolyte away). Overcharging can also corrode the electrode plates and terminals. Most **"smart"** chargers will charge a fully depleted battery quickly and then hold a voltage that will not cause gassing or self-discharge over time.

Now, just a short view of the newest technology in batteries… Lithium.

There is more development in process, but here is a short version of what lithium contains and of what it may offer in the future:

The name lithium-ion refers to the process involved: Lithium ions move back and forth between the electrodes as the battery charges and discharges. There are many different types of lithium-ion batteries, with various amounts of nickel, manganese, cobalt, and iron used in conjunction with lithium to form the positive electrode. Some offer very high energy density but have safety concerns, with thermal runaway (and fire) being an issue. The biggest advantage of a lithium-iron battery over lead-acid is energy density. In typical applications, the lead-acid battery in your bike can be replaced with a lithium-iron equivalent with as little as one quarter the weight, saving up to several pounds. Lithium-ion batteries require internal electronic circuitry to protect the cells from overcharging or completely discharging, current surges, and extreme temperatures. Most manufacturers of lithium-iron aftermarket batteries require specific chargers be used, as standard chargers may be incapable of correctly reading the voltage of the battery and applying the correct charge and may supply more voltage than the lithium-iron cells can absorb; both conditions can damage the battery. Lithium-iron batteries are also significantly more expensive than lead-acid batteries, and some parts (notably the wires and components in the protection circuitry) can't be recycled.



For more details:

[Motorcycle Batteries, Lithium Motorcycle Battery | Cycle World]