

## How much is in my batteries?

If you are cruising, and do not want to run your engine unnecessarily, this is one of the questions you need to know the answer to.

I often think that charging batteries is a lot like filling up your car's tank before a long drive, both are reserves of fuel, the car's tank is to provide energy to run the engine, the battery is to provide energy to run the boat. But with a car, when you fill up, you know how much is in the tank to start with (fuel gauge), you have an idea how much you will need for the journey (experience) and so you know how much fuel you need to add to the tank (reading from the forecourt fuel pump). With a boat it is more likely to be, you don't know how much is in the batteries, you don't know how much you will need for the trip and you don't know how much the engine alternator is putting into the batteries. You need some kind of a fuel gauge for batteries to give you the required information.

Many boats have a voltmeter to show the voltage in the batteries, this is typically a gauge that reads from 6 Volts to 18 Volts, broken down in 1Volt increments. A fully charged battery with no load on it, and not being charged should have a voltage reading of 12.7Volts, a completely flat battery about 10.8Volts. Trying to read this information from a standard fit voltmeter is usually impossible.

Some boats are fitted with an ammeter which shows the amount of charge in Amps going into the batteries, and conversely, the amount coming out of them. Unless you start off with fully charged batteries and note the ammeter reading every say 5 minutes, you will still not know what you have left in your batteries.

What is needed is a device that can monitor what is being discharged, monitor the charging, and monitor the voltage. This is what a battery monitor does. It uses this information to show the amount of Amp Hours consumed and the state of charge of the batteries. It also tells you how long before the batteries need to be charged, based on the drain on the batteries. So, for instance, if you were doing a night passage, about 8 hours from a marina where shorepower is available and the monitor showed that you needed to start charging the batteries within 6 hours, switching off a couple of saloon lights may make it unnecessary to run the engine for battery charging before reaching the marina. All you do is switch off some lights and then check the battery monitor to see what the time remaining before charging is now.

As the cables from the batteries tend to be rather large, running them to a position where the monitor will be fitted is impractical. Instead battery monitors use a shunt which is connected across the negative cable to the domestic batteries. This measures the current flow in Amps, converts this into millivolts and sends this information to the monitor where it is converted to Amps. It therefore only requires small cables to interconnect the shunt to the monitor. Here are some examples of good quality battery monitors:

<http://www.victronenergy.com/upload/documents/BAM001003000-D-bEN.pdf>

<http://www.bepmarine.com/Contour-Matrix-DC-Monitor-86-1607.html>

These will typically show voltage(s), Amps (charging or discharging), remaining capacity (AmpHours and percentage), some even show time to run before charging required.