

## Battery Troubleshooting

Batteries have a hard life on a boat as they are not used as regularly as most car batteries, and when they are used, they are subjected to deep drain when starting an engine. If your battery fails to start the engine, it may have been drained as a result of unexpected use while the boat was left, or it could just be a failing battery.

To check whether there is a load on the battery even though you think everything is switched off, disconnect the positive terminal and connect a multi-meter between the terminal and the cable. If there is a current flowing, something must be draining the battery and you need to track down the culprit. If you do not have a multi-meter (these are very useful and cost less than £10 from B&Q or Screwfix), use a festoon bulb instead. A festoon bulb is the type of bulb with a metal connector at each end, and are used in car interior lights and navigation lights. If the filament glows even slightly, there is a current drain, and you need to find it. There may be a short circuit or short to ground somewhere, or there may be a device left switched on.

If you suspect the battery may be faulty, firstly visually inspect for obvious problems, such as damaged cases, corroded terminals or cables, loose terminals or low electrolyte. If all appears OK, then you will need to check the voltage.

If you have just recharged your battery, then a phenomenon known as "surface charge" will cause the battery voltage to be higher than normal. To ensure accurate readings, you must eliminate any surface charge before testing. Use one of the following methods:

1. Allow the battery to sit for six hours with no load or charger connected
2. Apply a 25 amp load for three minutes and wait five minutes
3. With a battery load tester, apply a 150 amp load for 10-15 seconds

The battery under test must be disconnected from any load or charger when testing. This is referred to as "Open Circuit". To determine the battery's state-of-charge using a multi-meter, the following readings will indicate the level of charge

- 12.70 - 100%
- 12.45 - 75%
- 12.24 - 50%
- 12.06 - 25%
- 11.89 - 0%

If the state-of-charge is below 75% the battery needs to be recharged before proceeding.

Replace the battery, if one or more of the following conditions occur:

- If the battery will not recharge to a 75% or more state-of-charge level
- If digital voltmeter connected to the battery terminals indicates 0 volts, you have an open cell
- If the digital voltmeter indicates 10.45 to 10.65 volts you have a shorted cell. (A shorted cell is caused by plates touching or sediment build-up between plates).