Technical Brief - Strategies for Monitoring DC Current

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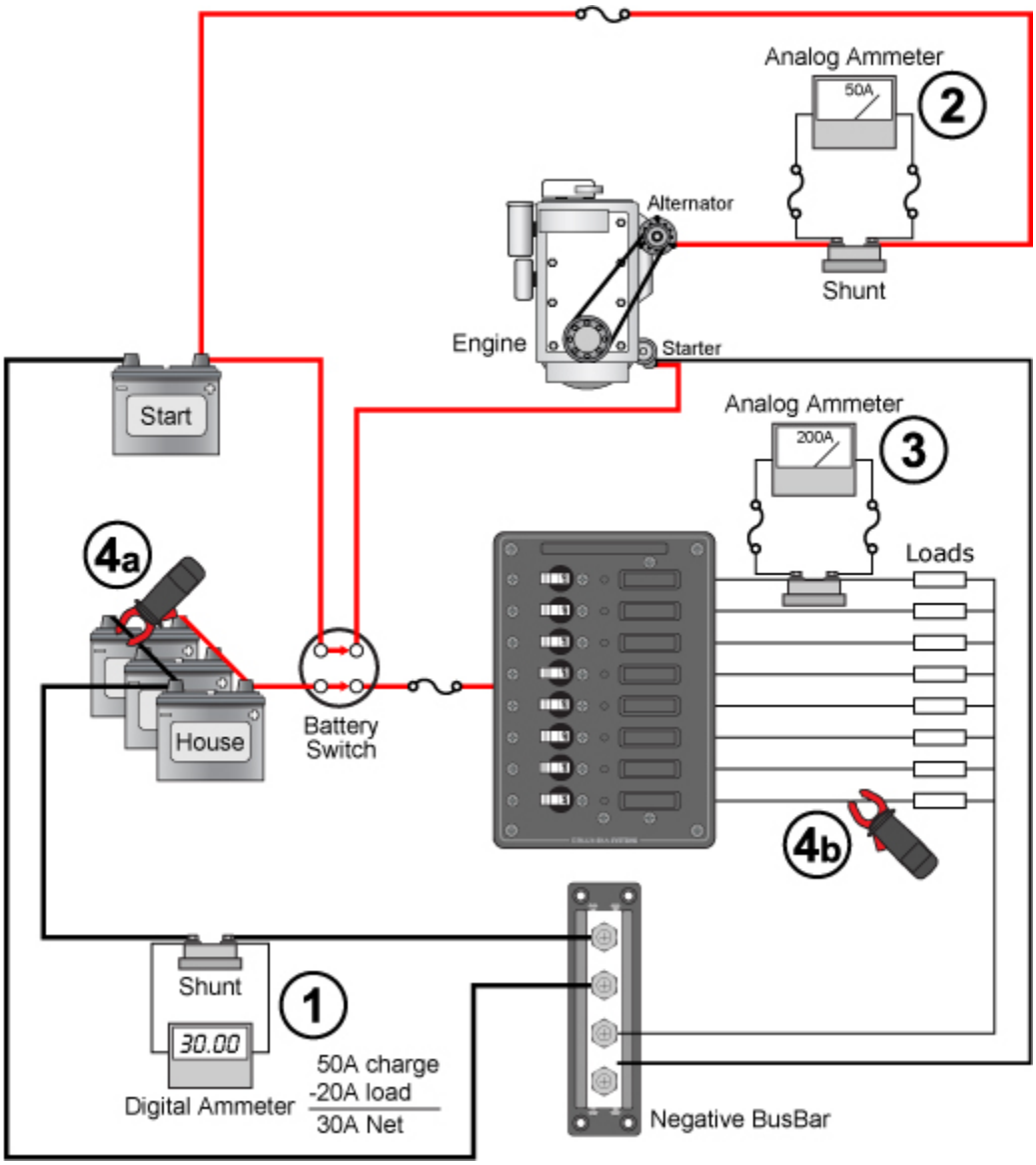
There are various reasons to monitor DC current in boats. The most common are to check charger output, whether battery banks are receiving a net charge, and load demands placed on the batteries. Here are strategies for monitoring DC current:

1. Monitor total load demand and net charge supplied to the House battery
2. Monitor alternator output
3. Monitor an individual load during its operation—high current can indicate a problem
4. Occasionally monitor various locations in the circuit using a hand-held clamp meter to isolate problems



1. Monitor Total Load Demand, and Net Charge to House Battery

Install a digital ammeter between the negative terminal of the House battery bank and the negative bus. A digital ammeter can measure positive and negative current, and makes it easier to notice small value

changes. This meter will read the net charge or discharge to the House battery bank. For example, if there is 20 Amps of total load demand and the alternator is supplying 50 Amps, there is a net charge of 50 - 20 = 30A—the meter will read 30 Amps—an indication that the battery bank is being charged. If the load exceeds 50 Amps, all of the alternator output is being used by the loads—there is no charge to the battery bank. When the engine is not running, this meter indicates the total loads on the House battery bank. When the engine is running, this meter shows how much charging current is available to the House battery bank after the load consumes some of the alternator capacity.

2. Monitor Alternator Output
Install an analog ammeter in the positive side of the alternator output circuit. An analog meter is less expensive than a digital meter, and makes it easier to spot trends at a glance and at a distance. This meter will monitor the total alternator output—for example, if the alternator is supplying 50 Amps, this meter will read 50 Amps. Failure of the alternator meter to show charging right after engine starting is a clue to check belts and the charging circuit. If running an engine just to charge batteries, adjust RPM to the point that charger output doesn't increase—this will result in the engine running at the lowest effective charging RPM.

Using strategies 1 and 2 together provides information about the total alternator output, and the amount of charging current provided to the House battery bank.

3. Monitor One Load
There are situations where it is desirable to monitor the current being used by one load. A good indication of load demand on a motor such as a power winch or windlass is how much current it uses. Current use provides an indication of demand on a motor. If a load typically draws 200 Amps, and it is drawing 300 Amps, there may be a problem—for example, a bow thruster could be clogged with seaweed. The overload could damage the motor or other components.

4. Monitor with Hand-Held Clamp Meter
There are many measurements that should be made occasionally in the DC circuit. These measurements do not require permanently-installed meters, a hand-held clamp meter works well. For example, the first metering strategy described above will provide an indication of the current going into a battery bank, but it does not indicate the current flowing into each individual battery. A clamp meter can be used to measure each battery (4a in the circuit diagram). Also if total current load is higher than expected, use a clamp meter to measure current use at each load to isolate a problem (4b in the circuit diagram).