Performing a System Check and Basic Troubleshooting

Basic system troubleshooting is safe and easy - even for the novice system-owner.

Not only that - it’s a great way to get to know your system, and to be able to describe problems if you need to get help from a more knowledgeable technician who isn’t on site.

If you don’t have the confidence to undertake these tests yourself, find someone who does. Ideally someone who has a bit of power system experience - or some experience of DIY electronics in a boat or vehicle. They’ll help you to be able to do it yourself.

You’ll need a digital multimeter; a Phillips head screwdriver with an insulated handle; and small slot-head screwdriver. You may also need a spanner or socket set, and a torch.

It is a good idea to wear gloves if you are working on wet-cell batteries - and to wear eye protection. It’s also a good idea to remove metal jewellery.

Basic Observations

The first thing to do is a basic observation.

With a notebook handy, write the date, and the system location. If you have a camera, take a quick photo as this can be useful later if things change.

Photos should include as much as possible of the system in a single frame …then a close up of any specific components you might be working on, or have concerns about.

If you are doing a system report to present to another technician, get photos of the major component ID tags, showing serial and model numbers.

Make the wiring between components visible if you can, by carefully removing covers.

Only go as far as you feel safe. Never work on AC voltages unless you are qualified. DC systems of up to 48V are generally safe to work with if you take sensible precautionsl.

Looking at the system: Are there any lights on? What colour are they; are they blinking or solid? Note them all down - particularly if you don’t know what they mean! Does anything look damaged, burned, melted, loose or broken? Did you notice any smells - or signs of insects or rodents?

Are there any sounds - buzzing or ticking that you haven’t noticed before …or silence where there used to be sound?

None of these necessarily indicate a problem, but they should be noted as they’ll help you become more familiar with normal operation.

You should be able to gently tug on all the wires and have them stay securely in place.

Loose wires are a common source of faults. If you feel a wire might be loose, or has some wiggle - or obviously if it comes free entirely - you will need to secure it properly. In this case it’s best to shut the system down. Loose wires can lead to electrical arcing or sparks. And exposed wires may have the potential to give you an electric shock.

The safe way to shutdown a system is to first begin at the termini and work toward the batteries:

Turn off all loads at their switches. Turn off the inverter if there is one ...then turn off the solar panel supply. Turn off all the remaining switches, finally, disconnecting the main fuse, or system isolator.

Now you should be able to safely tug on all the system wiring connections to make sure they are firmly in place and making a good connection.

If a wire does come loose, inspect it closely: Does it have damage to the copper strands? If so, use some pliers to remove the damage, peeling back some of the insulation.

Wherever there are plugs and sockets, or lugs and bolts, check their connections. We want to make sure that all connections are good.

....multimeter testing

Battery cell voltages,

Battery interconnection and takeoff corrosion

PV voltage, PV Polarity,

.... exporting system info from MPPT via VictronConnect

... more

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