

Mechanical Relay Additional Information & Troubleshooting

Problem #1: Batteries not charging (Install fresh batteries in the test meter before checking anything or it won't read accurately.)

Possible Causes	Solution
Not enough wind/solar to adequately charge batteries	Add more wind and/or solar. Most batteries need at minimum 2 amps or more <i>each</i> to charge fully (even if in a string). <i>Example:</i> 8 amps may charge 4 batteries but not 8 batteries.
Brand new, bad, mismatched, old batteries or batteries low on water	Never mix & match batteries. All batteries must be the same type, size & age. You may be able to add new batteries to a bank that is 1.5 years old max, but this depends on many factors. If adding more batteries, then add to your existing bank as soon as possible. New batteries may charge and discharge quickly for the first few cycles until they break-in. Use distilled water only.
Too much power consumed from batteries and not enough being replenished	Calculate & check the load for accuracy with any of these formulas: volts X amps = watts; watts ÷ volts = amps; watts ÷ amps = volts Example: 12 volts X 125 amps = 1,500 watts

Problem #2: Rapid on/off dumping (makes "clicking" sound)

Possible Causes	Solution
Not enough batteries	Add more batteries. Small battery bank may be charging too quickly.
Brand new, bad, mismatched, old batteries or batteries low on water	Never mix & match batteries. All batteries must be the same type, size & age. You may be able to add new batteries to a bank that is 1.5 years old max, but this depends on many factors. If adding more batteries, then add to your existing bank as soon as possible. New batteries may charge and discharge quickly for the first few cycles until they break-in. Use distilled water only.
Solar panel voltage is too high	– You may have wired your solar panels in series or used too high a voltage panel. 12V batteries have a VOC of 18-22 volts, 24V panels has a VOC of 32-38 volts. – Wire the proper panels in parallel to keep the same voltage. Wire two 12V panels in series to get 24V charging, then add more series pairs in parallel if expanding.
No connection to battery	Connect sense wires to battery. Check for open breakers, disconnects, fuses ASAP.

Problem #3: Battery voltage fluctuates rapidly up & down

Possible Causes	Solution
Batteries Full, Controller Dumping	N/A - Normal
Wind turbine connected & wind is gusty	N/A - Normal
Solar Panels being intermittently shaded	Normal - Add additional solar panels if needed
Power inverter or other item drawing power from the batteries intermittently	N/A - Normal
Gas generator or inverter/charger is charging batteries	Normal - You need to adjust the charging amperage and/or peak voltage produced by this equipment. If you can't then the charge controller may engage the dump load and consume the charge as it's happening (assuming your charge controller has a dumpload. Solar only models will not.) In this case, you will need to adjust the dump/disconnect voltage of your charge controller. See charge controller instructions.
Loose, dirty, or bad connections; one or more bad batteries; batteries low on water	– Under load for some time, check each connection for excess heat. If one battery connection is hotter than the rest, it could be the connection or the battery itself. – To check the batteries, disconnect each fully charged battery and let them sit unused for 3 to 24 hours and check the voltage of each one. If you have a low battery, it might need maintenance or replacement. If your test meter has a low battery it will read inaccurately! – Disconnect wind, solar, or other charging first.

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Problem #4: Battery voltage too high (above 14.4V or 28.8V)

It may be normal to see your battery voltage to climb to 14.5-15.1 volts or more for 1-3 second intervals when the batteries are already full. There is a small delay before activating the dump cycle (indicated by the clicking sound of the relay). This is usually caused by a sudden but normal turbine wind gust, solar unshading, or inverter/charger charging. It can be beneficial to slightly overcharge your "flooded" cell batteries once per month average. This does not apply to AGM or some other type(s) of batteries. Check the battery manufacturer information on "equalize charging" or other charging recommendations. If over-charging happens for more than 3 seconds, then check the following causes & solutions below.

Possible Causes	Solution
Insufficient divert load (mainly wind turbine applications)	<ul style="list-style-type: none">• Add on more divert load for wind turbines, typically, 1-2 of our 300 watt divert load resistors or DC water heating elements in parallel to your existing dump load.• Remember: DC water heating elements that are controller by a thermostat may not be a reliable dump load.
Undersized wire going in & out of relay or too much solar and/or diversion load causing the internal contacts to overheat and "stick." If this is the case, you may not hear the "click" sound when your batteries are full. Please note that this can cause a fire hazard and should be tended to immediately!	<ul style="list-style-type: none">• Increase the size of the wire going in and out of the relay.• Tap the relay housing with a blunt object to see if it will release, and replace the relay and reduce the number of solar panels or diversion load.• If you cannot reduce the solar or divert load, then purchase an additional relay and split up your divert load and solar evenly between two relays. You must then make separate wire runs & connections to the relay for the battery, solar, and divert load. Do not wire in series from one relay to the next as this will cause both relays to fail.

Only mount relay/control boards vertically (standing up) as they will not operate horizontally (laying down).

Controller Adjustments: If you need to change the settings of the charge controller, please refer to this video on YouTube.com:

Title: Missouri Wind and Solar Digital Charge Controller Programming Link: <https://www.youtube.com/watch?v=BFaKxd6xyWo&t=1s>

Our relay and/or solenoid based controllers carry a 90 day full parts and labor, repair or replacement warranty. Should these controllers fail during normal use, we will repair or replace the unit at our expense. Should your controller fail after the warranty period has expired, we offer what we believe is a reasonable repair rate - \$35.00 flat rate repair. Should the controller fail, we will repair or replace it for \$35.00 plus shipping

Please note. The warranty service and/or flat rate repair covers manufacturing and/or design defects only. Warranty and/or flat rate repair does not cover damage due to abuse or using the controller outside of its design intentions. Damage due to rain, water, high humidity, salt spray, dropping, impact or any other external forces are not covered under any warranty or flat rate repair service. Components that have been damaged due to environmental impact will be replaced at additional cost. Heavy environmental damage may preclude repair.

The flat rate repair does not cover items that have a limited life expectancy, like solenoids and relays. If we replace your solenoids or relays, in a product past its warranty period, we will charge you the current price of the relay(s)/solenoid, in addition to the \$35.00. If the cost to repair your unit is above the flat rate repair cost, we will contact you to insure you wish to proceed with the repair of your unit.

You are responsible for all shipping cost (both ways), including import/export taxes, VAT taxes and tariffs on all repairs, both in and out of warranty.

