

Missouri Wind and Solar Digital Charge Controller Information and Custom Programming Instructions (WHITE COVER MODELS)  
**Whether or not you will be changing the settings, read and understand these instructions thoroughly. Failure to do so can cause damage to the controller or system components.**

Remove and safely brake charging sources such as wind/solar/hydro. When in doubt, use a qualified electrician. Missouri Wind and Solar, LLC is not responsible for damages or injuries caused by misuse or improper programming.  
**DANGER! SHOCK WARNING: Wind, solar, hydro, batteries etc. may produce lethal voltages! Use extreme caution.**

**Preset controller configuration** (use ½ these voltages for a 12v system): divert relay on at 28.8 battery volts, start relay off timer at 27.2 battery volts, relay off timer 5 seconds after 27.2 volts is reached. If battery voltage does not fall below 27.2 volts, the relay will stay on.

WE RECOMMEND YOU DO NOT CHANGE THE CONTROLLER'S SETTINGS UNLESS YOU ABSOLUTELY NEED TO. READ AND UNDERSTAND ALL INSTRUCTIONS INCLUDED WITH YOUR EQUIPMENT. WARRANTY WILL BE VOID IF THE SETTINGS ARE CHANGED UNECESSARILY.

**Possible reasons to change settings:**

You have an inverter charger or other charge controller which may charge batteries to above 28.8 volts. If another charging source performs an equalize charge, you can leave the factory settings alone and safely disconnect the Missouri Wind Digital Controller while an equalize charge is taking place.

**Outback Inverter Charger/Grid feed inverters:** Typically adjust the DIG controller high volt trip point to 15 volts (12v system) or 29.5 volts (24v system).

**To change settings:**

1. Connect the small sense wires to proper battery voltage or use a dc power supply (red wire +, black wire -).

2. Wait 6 seconds.
3. Use the two black push buttons below volt meter "set" & "enter."

**You will be entering P-1 for time setting, P-3 for voltage set points.**

4. Hold "enter" until you see "P-3 display", then release.
5. Short press "set" until you see "P-1" display. This is the time setting. Time setting is recommended for experienced users as this changes the amount of time the relay is on after battery falls to 27.2v, or 13.6v.
6. Press "enter." You will see "005." This is 5 seconds. Short press "set" to move the flashing digit from left to right. Stop on the digit for the preferred setting. Press "enter" to confirm the new setting.  
*If you pass the desired digit, continue to short press "set" until you cycle back around to it.*
7. After first 3 digits are changed, press "set" to view the second set of 3 digits. This is the relay activity timer (RAT). Relay activity timer starts countdown every time the relay turns off. The RAT time period is preset at 5 seconds.

**Relay Activity Timer:** Assuming the RAT is 005 (5 seconds), when the relay has activity (turns on then off) the RAT will immediately start a countdown from 5 to 0 seconds.

If the relay turns on again before the countdown reaches 0, the relay will stay on for 10 seconds then relay off and RAT countdown starts from 5 to 0 seconds again.

If the relay turns on again before countdown reaches 0, the relay will stay on for 20 seconds then relay off and RAT countdown starts from 5 to 0 seconds again.

If the relay does not turn on again before RAT countdown reaches 0, then the next time the relay turns on again it will be on for 5 seconds.

The relay must turn on again before the RAT time reaches 0, otherwise the relay's on time will stay at 5 seconds.

The RAT's purpose is to hold the controller in divert for an increasing amount of time because your controller is repeatedly diverting within a short period of time (i.e. batteries nearing full).

Referring to the example above, 20 seconds is the maximum amount of time the relay will stay on if the conditions continue to be met. If you change the RAT (the second set of 3 digits) to 20 seconds (020 on display), then relay on time will be 20 sec, 40 sec, 80 sec, 80 sec, 80 sec., etc. *In most systems there is no need to change the RAT.*

8. The third set of digits will appear as: d-9. This means the LED display will turn off after 9 minutes if no buttons are pressed (user is not changing settings). Changing to d-0 means the display will always remain on. You can turn the display back on at any time by short pressing any button.
9. After the third set of digits, you will see your first time setting with no flashing digits. Hold "enter" until you see P-1. You are now done with the time (P-1) settings.  
**Stop, do not press any buttons or make changes.**
10. If you don't need to change the preset high or low voltage points, you still need to enter into P-3 directly after programming P-1. If this is the case, short press "set" until you

see "P-3." Press "enter."

You should see your real-time battery voltage.

**Stop. You are now done with this step.**

11. The next step is to set the high and/or low voltage set points in P-3. In most cases, only the high voltage set point needs to be changed.
12. Short press "set" until you see P-3.
13. Press "enter." You will see your real-time battery voltage.
14. Short press "set." You will see 28.8, or 14.4 with the first digit flashing.

This is the high voltage set point (**Green Light ON circuit board indicates relay on, diverting**).

15. Short press "set" to move the flashing digit left to right. Stop on the digit you want changed. Press "enter" to change it.
16. When you finish changing the first 3 digits, short press "set" to move to the next 3 digits on display. You should see 27.2, or 13.6 with first digit flashing. This is low voltage set point to start timer.
17. Short press "set" to move the flashing digit left to right. Stop on the digit you want changed. Press "enter" to change it.
18. When you're done changing the second set of 3 digits, short press "set" to move to the next 3 digits on display.

You should see 00.0 with the first digit flashing. *Make sure to leave them at 00.0. Do not change them.*

19. Short press "set" until you see dL9. This means delay of 9/10 of a second before relay on (28.8v is reached). 0-9/10 of a second.

The next set of digits after will be ONL, (**leave on ONL. It is not recommended to change this setting**).

- If you change to ONH (experienced experimenters ONLY), the relay will turn on and off in reverse.

- The relay will turn off at 28.8v and on at 27.2.
- *ONH will drain or overcharge your batteries and ruin them!!!*

1. Short press "set" one time until you see your real-time battery voltage on display. You are now in operation mode.

The controller will be using both the P-1 program and P-3 program together.

**Stop. Programming is complete.**

**TESTING:** To ensure your settings are correct, perform a voltage rise and fall test.

If you don't have a variable dc power supply then you'll need to charge your batteries with a charger, wind turbine, or solar panels until you reach your high voltage set point.

1. Ensure the relay turns on (**Green Light ON**).
2. Then, remove the charging source and apply a load to the batteries to draw them down below 27.2 volts.
3. The relay should turn off after the timer runs out. The only time the relay will be on is if the battery voltage rises to your high voltage set-point. It should remain on until the battery voltage falls below 27.2 and the timer runs out. The relay will turn off.

**If the relay is on when it should not be.** For example the relay is on below 27.2 volts for a longer period of time than your P-1 time setting.

Keep in mind that your RAT setting, if met, will increase your first P-1 time setting (see above).

**If the relay does not turn on when you reach your high voltage set point.** This would indicate that the relay was accidentally inverted where on should be off and off should be on.

Make sure you have selected the ONL (see above).

Perform your voltage rise and fall test again to ensure operation is correct.

**Note:** while in normal operation mode (you are entered into P-3 and see your real-time battery voltage) you can short press "enter" to see the timer screen instead of the voltage screen.

When low volt set-point is reached, you will see your first P-1 time setting start countdown. When finished, the RAT countdown will start.

In conclusion, it must be noted that the controller includes programs: P-1, P-2, P-3, P-4.

*P-2 and P-4 may ONLY be used by inventors or experienced users. Do not use them with a typical wind/solar/hydro charge controller scenario ESPECIALLY if your controller is pre-wired to other components, or system damage will occur.*

P-2 is similar but opposite than P-3. P-4 is "voltage overrun" whereas if your voltage is between a high and a low point, you can have relay on or off. If you chose relay off between high and low, then the relay will be on under low point and on above high point.