

## Understanding Mod-3 on a C90 With Wiring Diagrams

By DrJones18LC

I do not have a C90 at my disposal (or audio/video equipment for that matter) so I can't make a live step by step how-to on doing Mod-3. Maybe someone else will do that in the future. I can however use part of the C90 wiring diagram and go through the procedure step by step so you can get a better handle on it. You are greatly encouraged to consult the service manual to see where the parts in question are *and* what they look like, and to ask as many questions as needed on the forum to understand exactly what you're doing before you attempt the mod on your bike.

**\*Disclaimer\* It is entirely up to you to fully understand exactly what you're doing before attempting this mod. If you don't understand it DON'T DO IT!**

### **What is Mod-3?**

Mod-3 consists of some simple modifications to the charging system that will accomplish a few things. It will give the battery a larger lower resistance path to the charging system so the battery will see the highest charging voltage possible. It will increase the ground path for the wiring harness. By removing some of the electrical connectors it will make the system more reliable. It will bypass a poor undersized connection in the starter relay plug that could potentially leave you stranded with no power.

Mod-3 supersedes all previous versions of “The Charging Mod” and “The Red Wire Mod” by combining both of those mods into one single mod that is easier to do, and keeps all the electrical currents where they should be.

### **Making Connections**

Without a doubt soldering is the best way to make connections in the charging circuit. *When done properly* soldering makes a connection that is not only strong, but increases the surface area of the connection. That's important in a circuit that carries high current.

That being said, the best connection is the one that ***you*** can make **correctly!** If you can make good crimp connections by all means do that. If you don't mind the way it looks you can use wire nuts. Wire nuts make a strong connection as long as you twist them good and tight, and tape them up well to keep them from twisting off. Whatever method you use make sure the connections are well insulated.

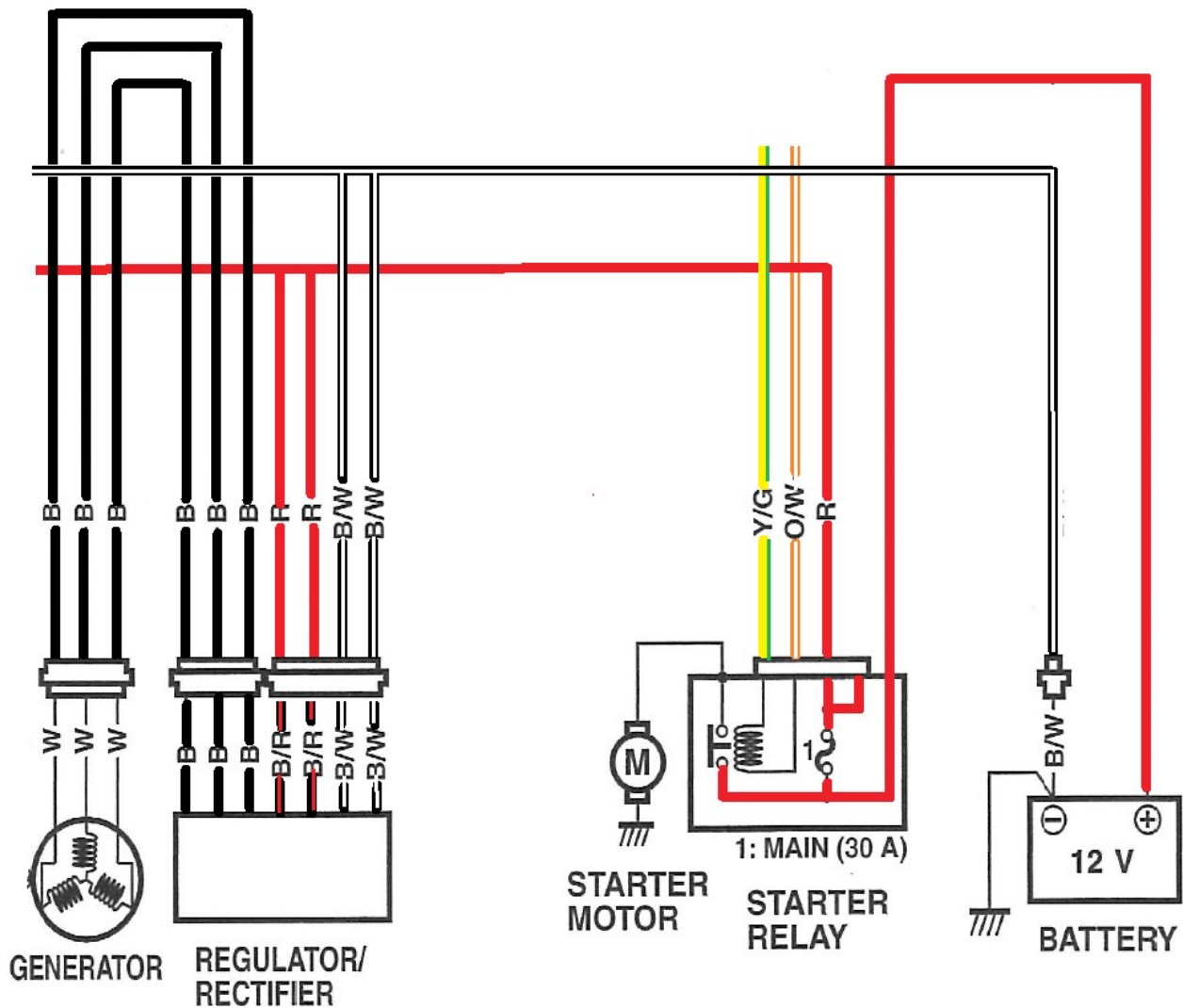
Avoid using spade terminals. The OEM connectors are spade terminals and we're trying to eliminate them to keep the resistance down and increase the reliability of the system. No point in cutting out the plugs if you're going to connect them back together the exact same way.

**The very first thing to do before attempting this mod is...**

# **Disconnect the negative battery cable!**

## The Charging System

Below is the section of the wiring diagram we're going to use to run you through the steps of Mod-3. It contains all the components involved with the charging system, along with the color codes.. Take a minute and get acquainted with the components and how they are wired together.



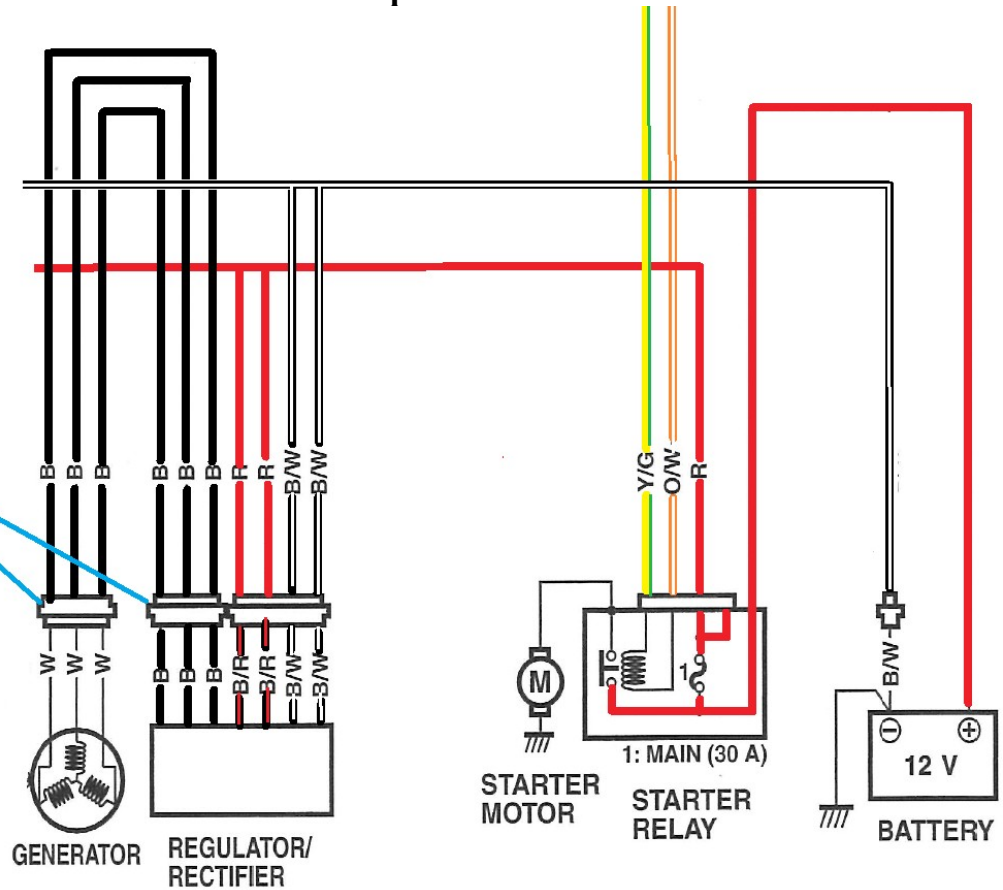
The little symbol coming off the negative battery terminal and at the bottom of the starter motor that looks like a little broom or rake is the symbol for engine ground. (or chassis ground) The large negative battery cable actually runs between these two points on the bike. Since the negative battery terminal connects directly to the engine via one of the starter bolts any wire you attach directly to the engine will be grounded.

The B/W wire that comes off the negative battery terminal in the diagram is the one and only ground for the entire wiring harness on a stock bike. (it actually comes off the negative battery cable at the starter bolt on the bike) With the exception of the starter motor, oil pressure switch, and ignition coils through the spark plugs, everything else on the bike gets its ground from this one small wire. This is one of the things we will address.

**\*It may interest you to know that absolutely nothing on a stock bike gets its ground through the frame\***

## First step

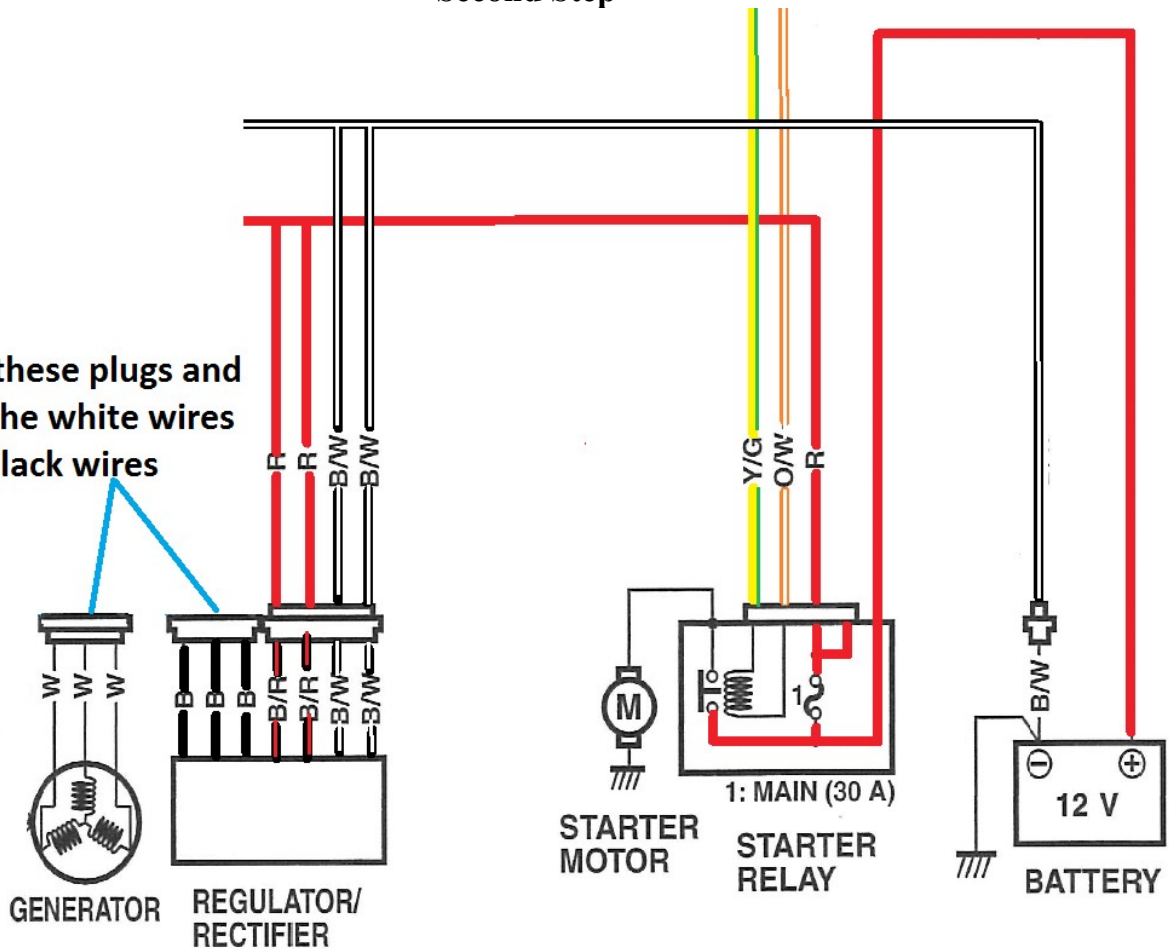
Unplug These  
Connectors  
Eliminating  
The Loop of  
Black Wires



The Regulator/Rectifier (R/R) and Stator (generator) plugs are under the left side engine bubble cover. Notice the stator is connected to the R/R via a long loop of black wires. This loop goes from the stator, up under the fuel filler neck somewhere, and back down to the R/R. There is absolutely no good reason for this ridiculous loop of wire. There is however very good reason to eliminate it. Unplug those two connectors and tie the ends up out of the way. We won't be using them anymore.

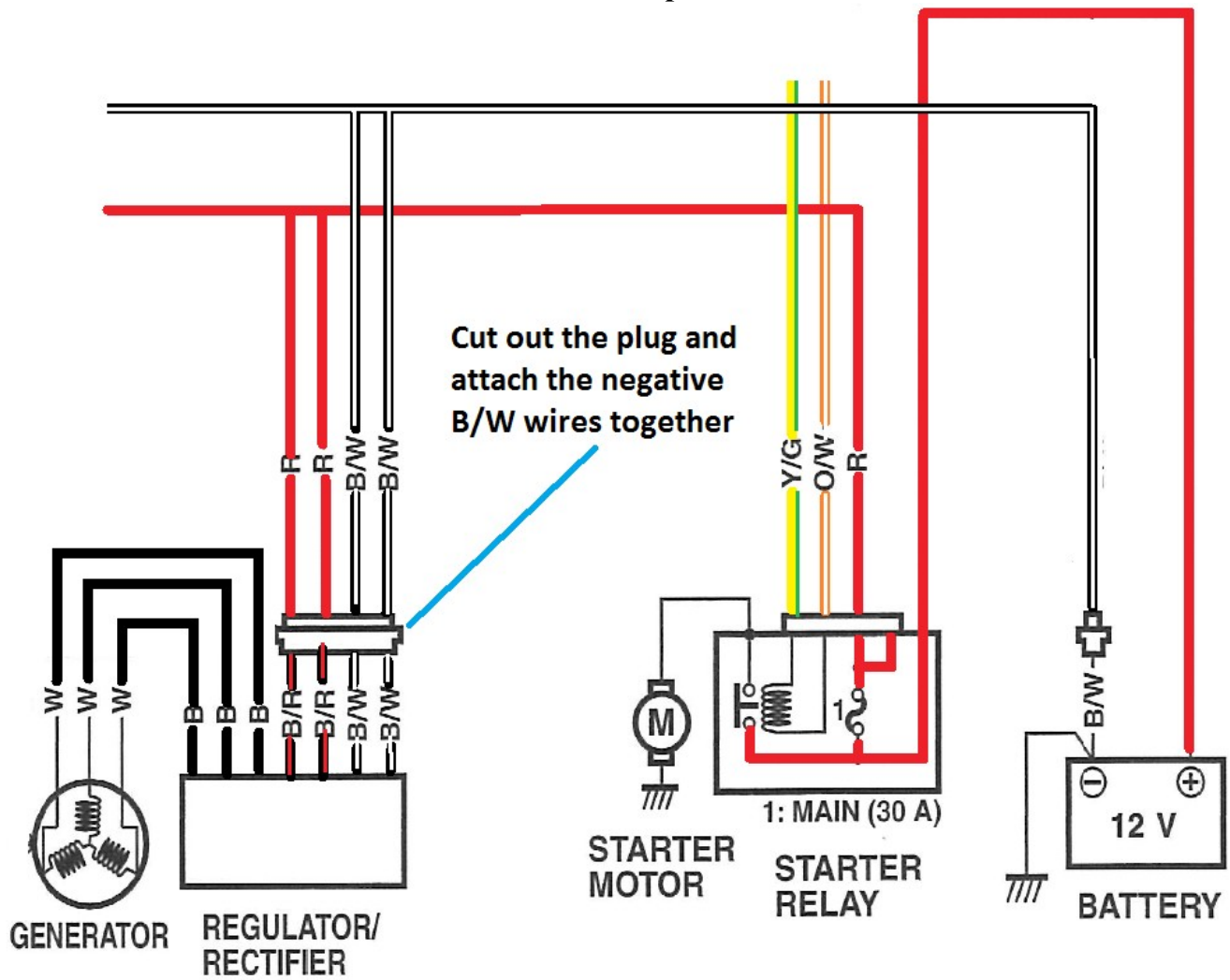
## Second Step

Cut off these plugs and attach the white wires to the black wires



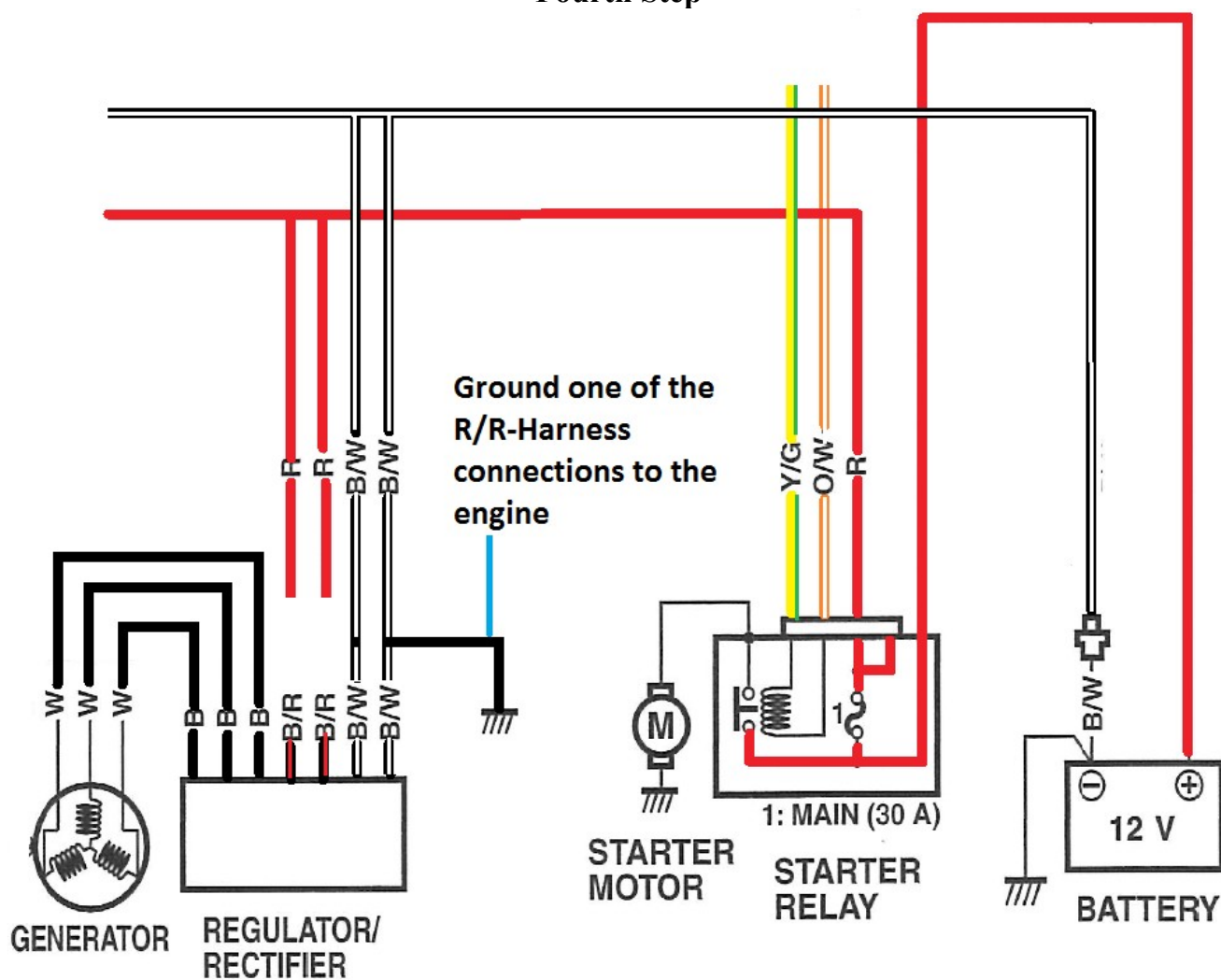
You now have two plugs to eliminate. The stator plug that has three white wires connected to it that come through a grommet from the front chrome cover that was to the immediate left of the bubble cover you removed, and the plug from the three black wires at the R/R. Cut them off as close to the plugs as you can. There isn't a lot of extra wire to play with. Once that is done you connect the three white stator wires directly to the three black wires from the R/R. It doesn't matter which white wire you attach to which black wire. Just make sure you end up with three white to black connections. The following page shows what you should end up with.

### Third Step



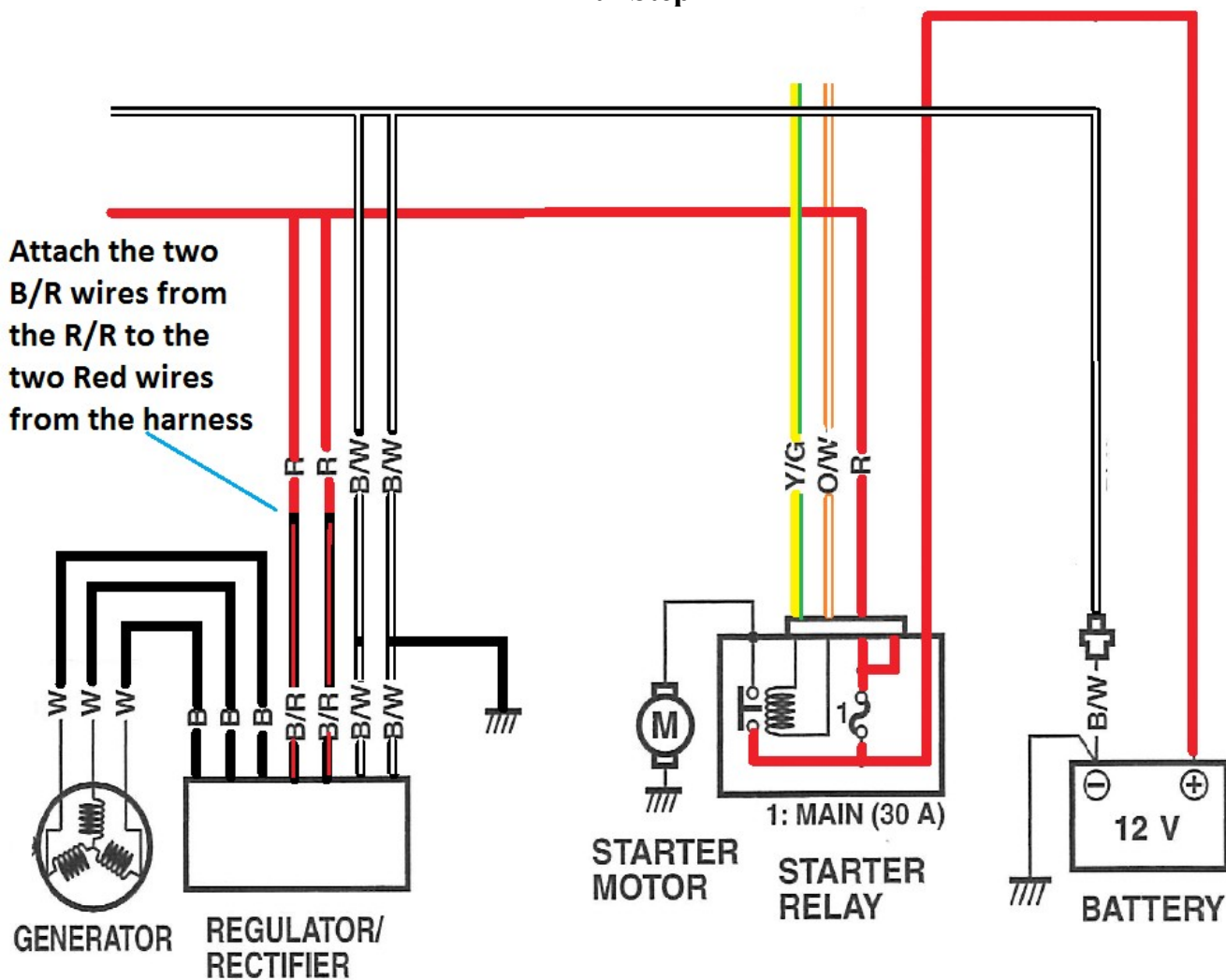
The next step is to cut out the plug that connects the R/R to the main wiring harness and connect the negative B/W wires together.

### Fourth Step



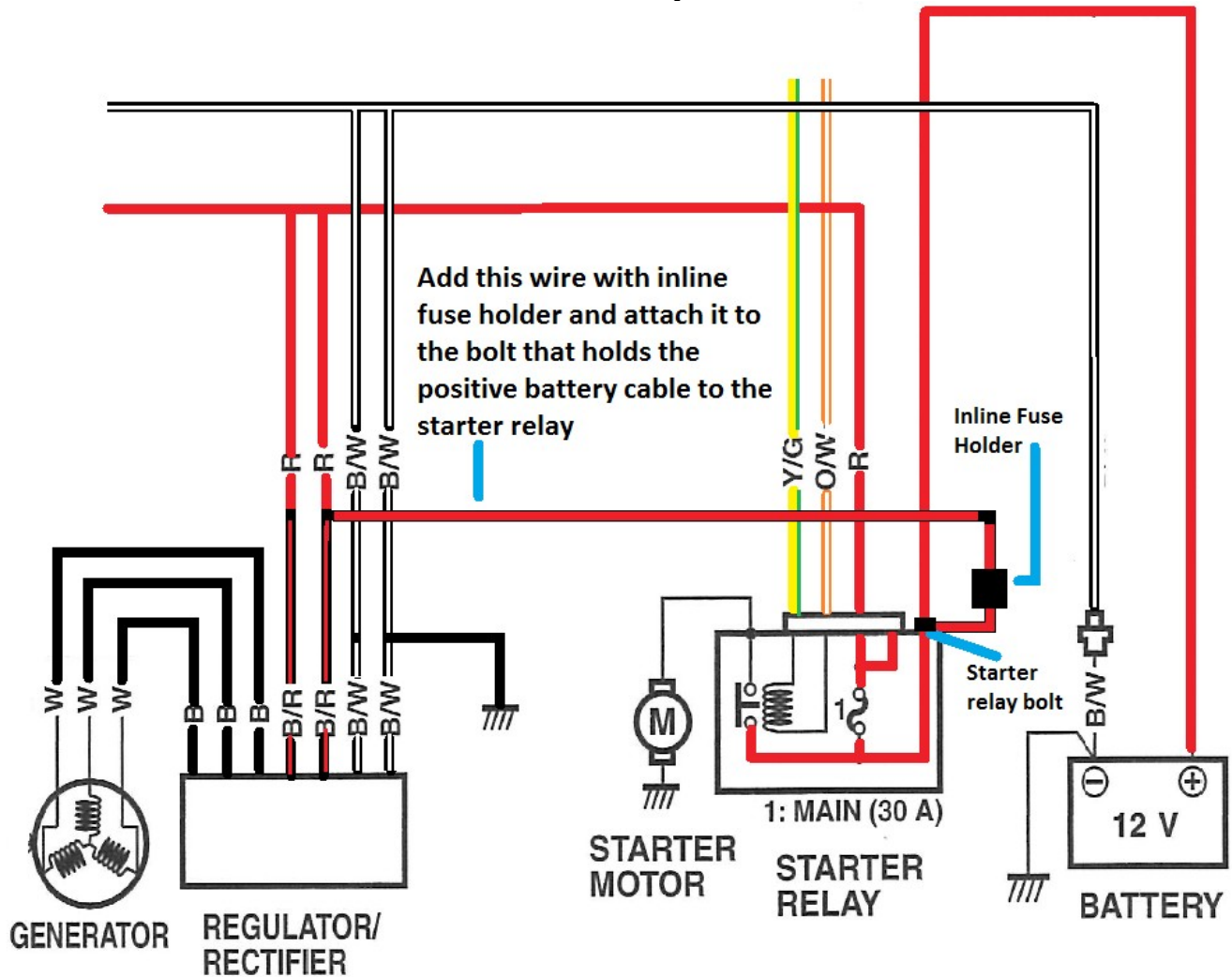
With the B/W wires connected together use one pair and ground them to an engine bolt. If the wires are long enough you can make their connection with a ring terminal and attach it directly to the engine. Most people use one of the clutch slave cylinder bolts. If they aren't long enough add a little piece of 12ga. wire and ground that to the engine.

## Fifth Step



Attach the two positive B/R wires from the R/R to the two Red wires from the wiring harness. In the next step you will add the low resistance bypass wire from one of the B/R-Red wire connections to the starter relay where it will go through an inline fuse holder with a ring terminal and attach it to the bolt that connects the positive battery cable to the starter relay. The starter relay is located under the left faux tank cover.

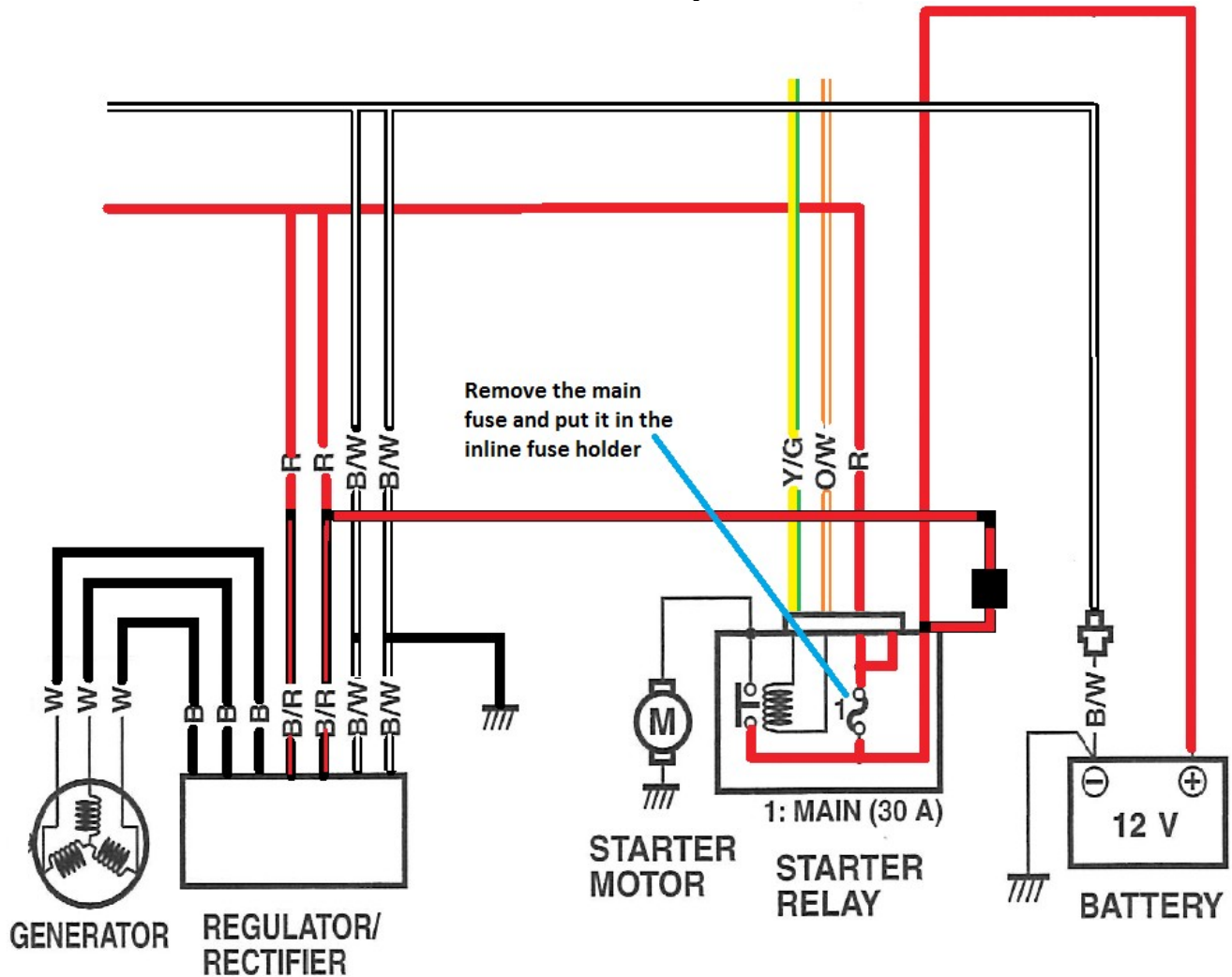
## Sixth Step



This is the last wire you need to run for the mod. You take a piece of 12ga. wire and attach it to one of the B/R-Red wire pairs and run it up to the starter relay under the left faux tank cover. Pick the most direct path that will be out of the way and protected. You also need to give it some extra protection by covering it with some plastic split loom. You do not want to take a chance on this wire either melting on something or rubbing and wearing through and shorting out on something. When we're done this will be the only path that connects the positive battery terminal to the wiring harness.



## Seventh Step

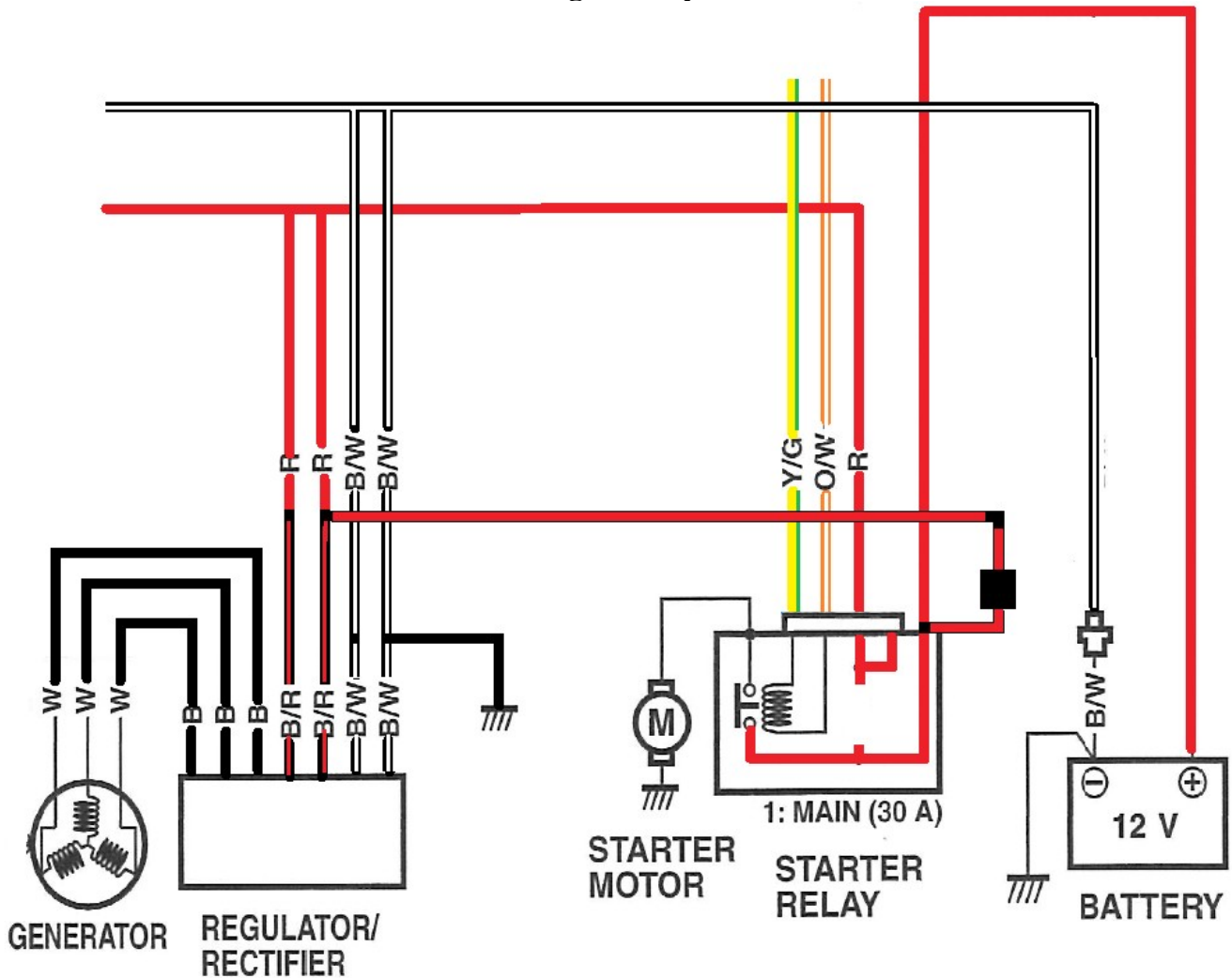


Now you have to pull the main fuse out of the starter relay. There are usually two fuses in the starter relay. One is a spare. The main fuse (which is the one you need to remove) is right next to the positive battery cable bolt. (the one you attached the inline fuse holder to in the last step) Once you remove the main fuse install it in the new inline fuse holder. This is now the new main fuse.

Removing the main fuse from the starter relay disables the path through the small red wire coming out of the top of the starter relay plug. That tiny wire (and the undersized pin connection in the plug itself) was all that connected the battery to the positive side of the wiring harness.

If ever you find yourself out on the road and your new inline fuse holder bites the dust for some reason (hey it happens) you can simply remove the fuse from it and reinstall it in the starter relay. That activates the original path back through the relay to the positive side of the harness and will get you going again until you can make the necessary repair. It's nice to have a backup plan!

## Eighth Step



This is what you should end up with. You are now done with Mod-3. You have eliminated the plugs making the system more reliable while reducing resistance, added an increased path to ground, added a larger low resistance path between the charging system and the battery, and eliminated the undersized path through the starter relay plug.

At this point you can reconnect the negative battery cable. Start the bike and take some voltage readings at the battery. You should see a definite improvement.

**If everything is working properly button the bike back up and go ride!**