

Understanding Mod-3 on a C90 Using Wiring Diagrams

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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 wiring 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 "Charging Mods" and "The Red Wire Mod" by combining both of those mods into one single mod that is easier to do, and more importantly keeps all the electrical currents where they should be.

For more info about what Mod-3 will and *will not* do, go to the forum and click on the **FAQ'S/Answers (read only)** folder, then click on and read "**Things To Understand About Mod-3**".

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 like this that carries high current.

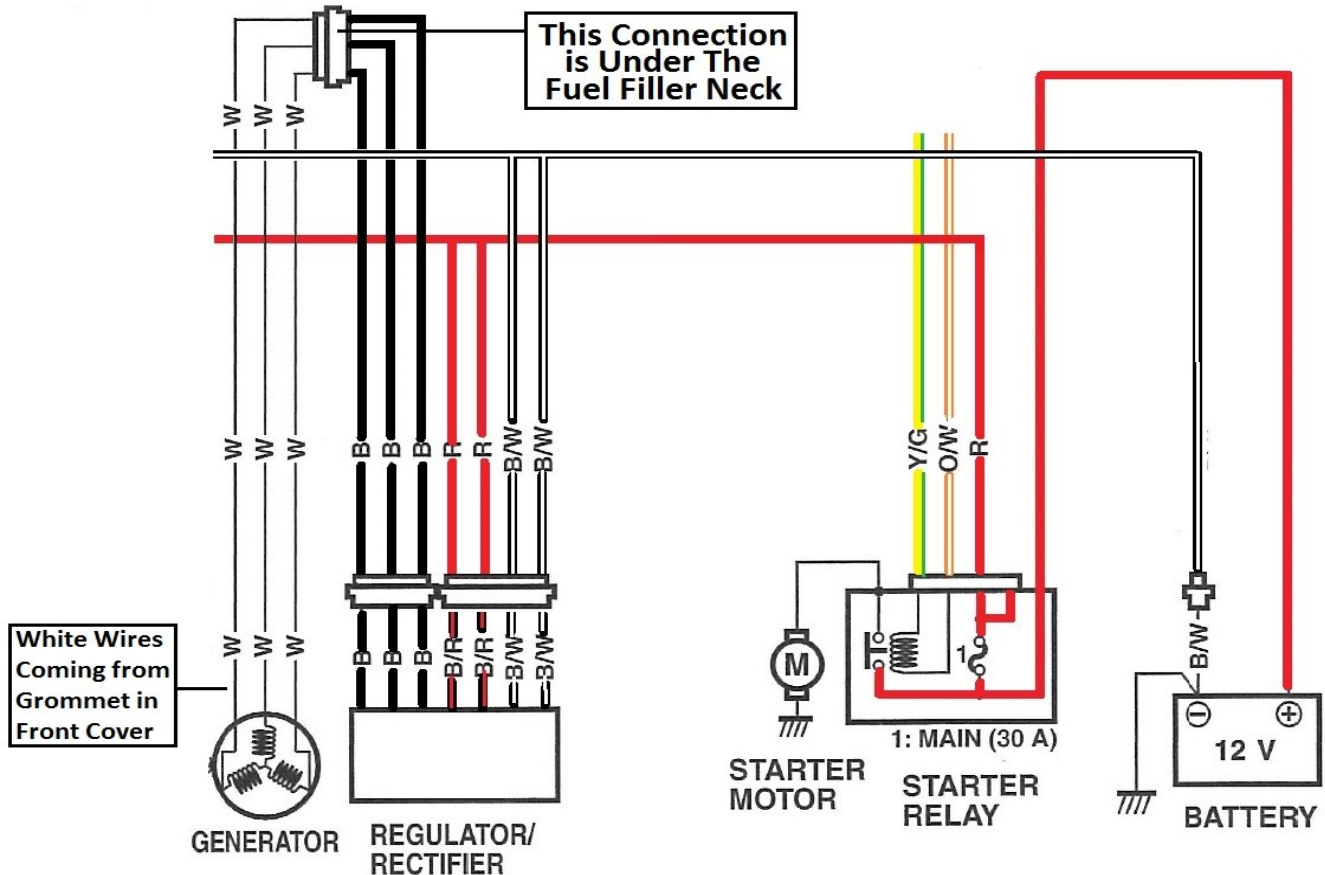
That being said, the best connection is the one that *you* can make **correctly!** If you can make good crimp connections by all means do that. If you don't mind the way it looks (and why would you since it's all covered up anyway) you can use wire nuts. Wire nuts make a strong connection with a lot of surface area as long as you twist them good and tight, and tape them up well to keep them from backing off. Whatever method you use make sure the connections are clean, tight, and 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 just going to turn around and reconnect the wires 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 a slightly modified 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.

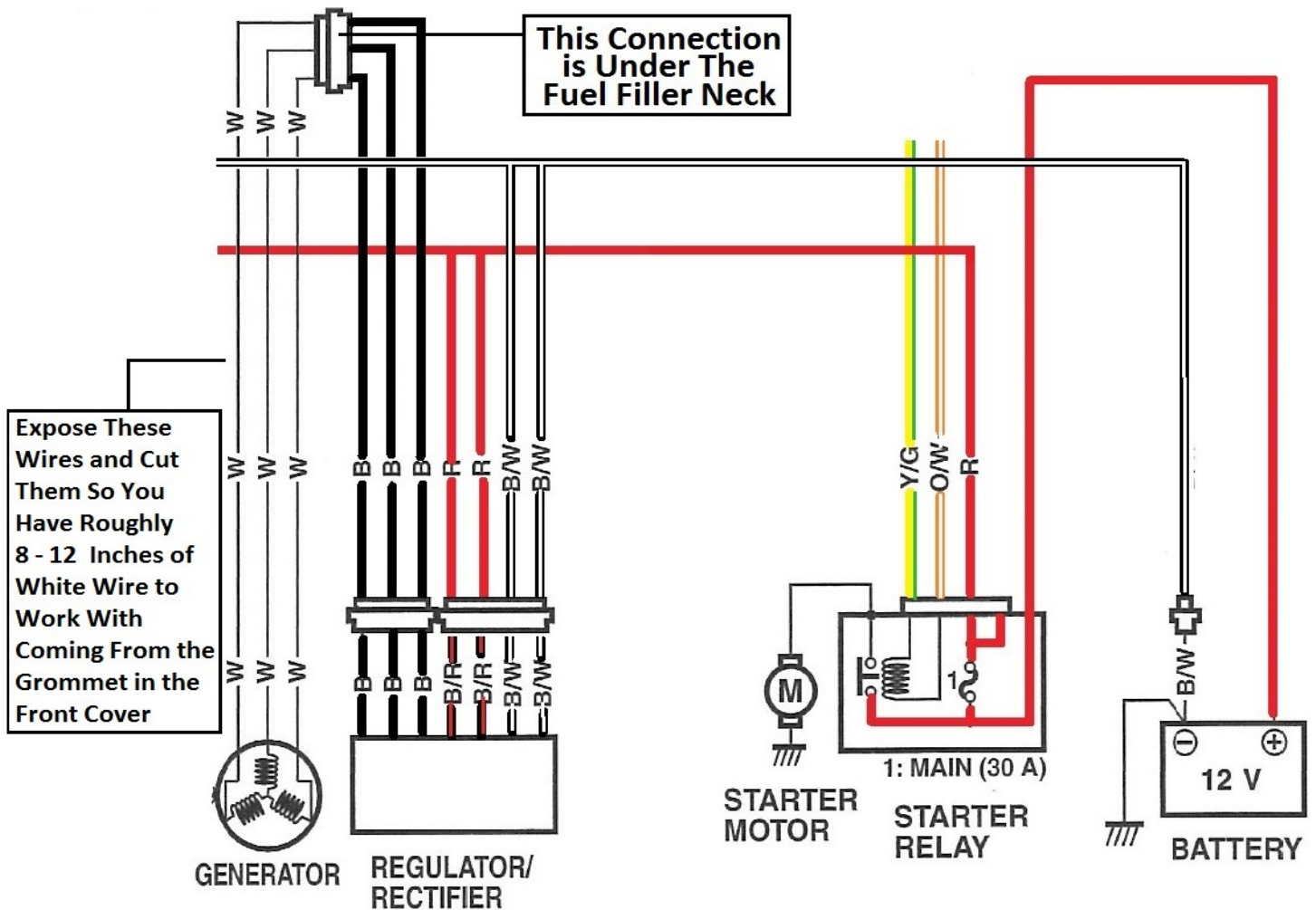


The little symbol coming off the negative battery terminal and at the bottom of the starter motor that looks like a little broom or rake is the symbol for engine ground. (or chassis ground) The large negative battery cable actually runs between these two points on the bike. Since the negative battery terminal/cable 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, Neutral 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.

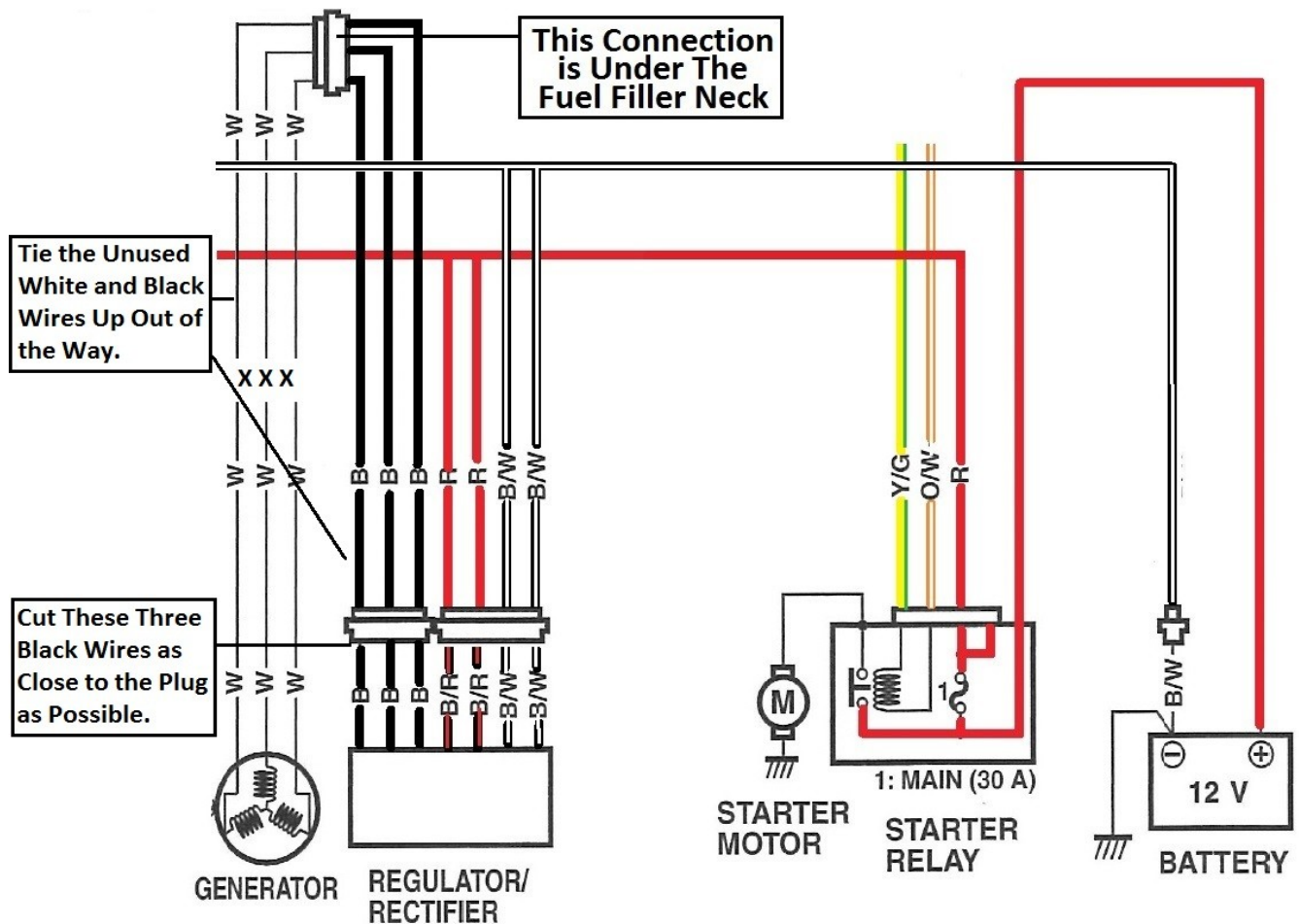
It may interest you to know that absolutely *nothing* on a stock bike gets its ground through the frame

First step



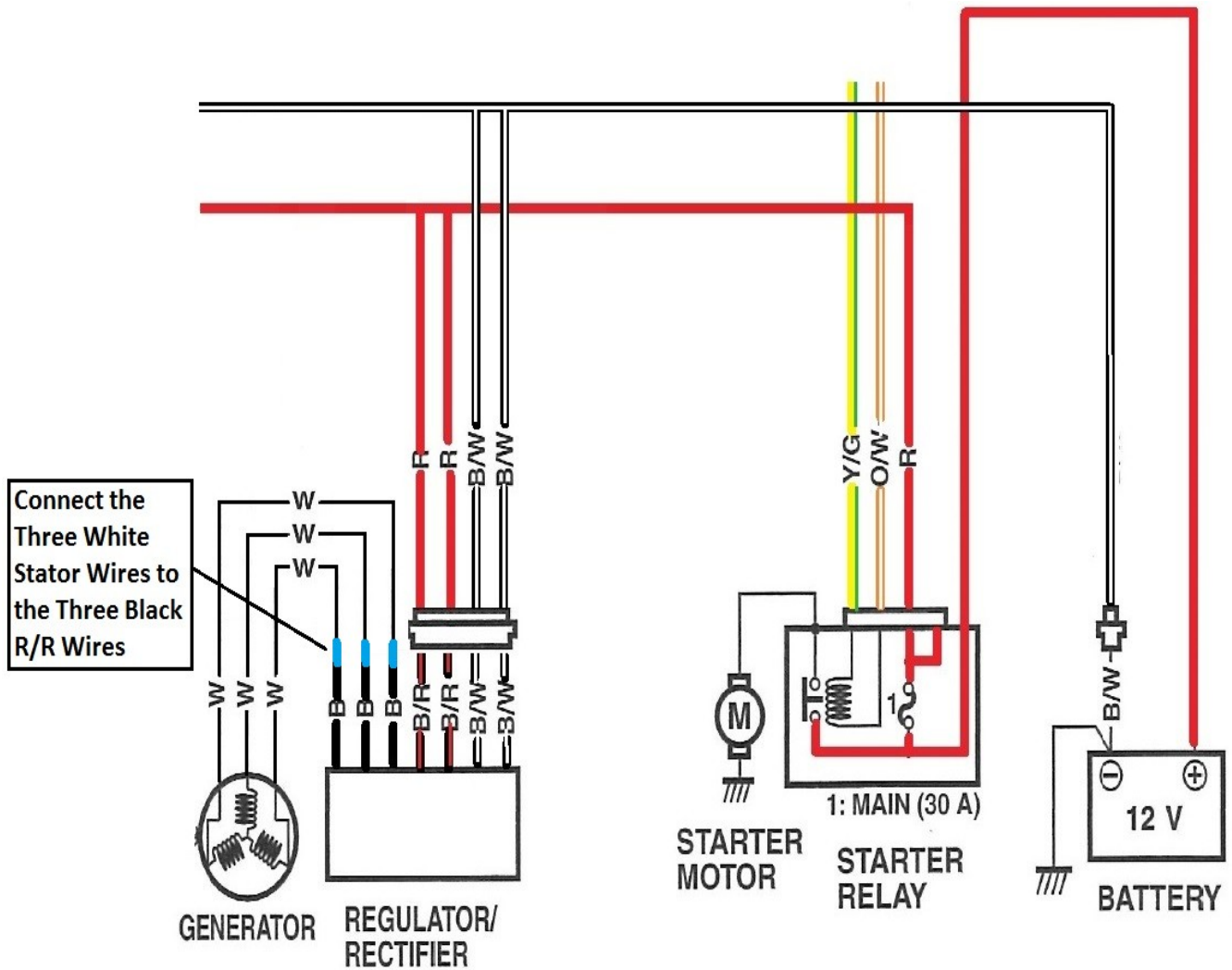
The Regulator/Rectifier (R/R) and Stator (generator) plugs are under the left side engine bubble cover. Notice the Stator is connected to the R/R via a long loop of White and Black wires. This loop goes from the Stator, up under the fuel filler neck, and back down to the R/R. There is absolutely no good reason for this long loop of wire. There is however very good reason to eliminate it. Find the three White wires coming from the Stator grommet in the front cover. Uncover them and cut them leaving yourself plenty of wire to work with. They are going to be connected directly to the three Black wires coming from the R/R.

Second Step



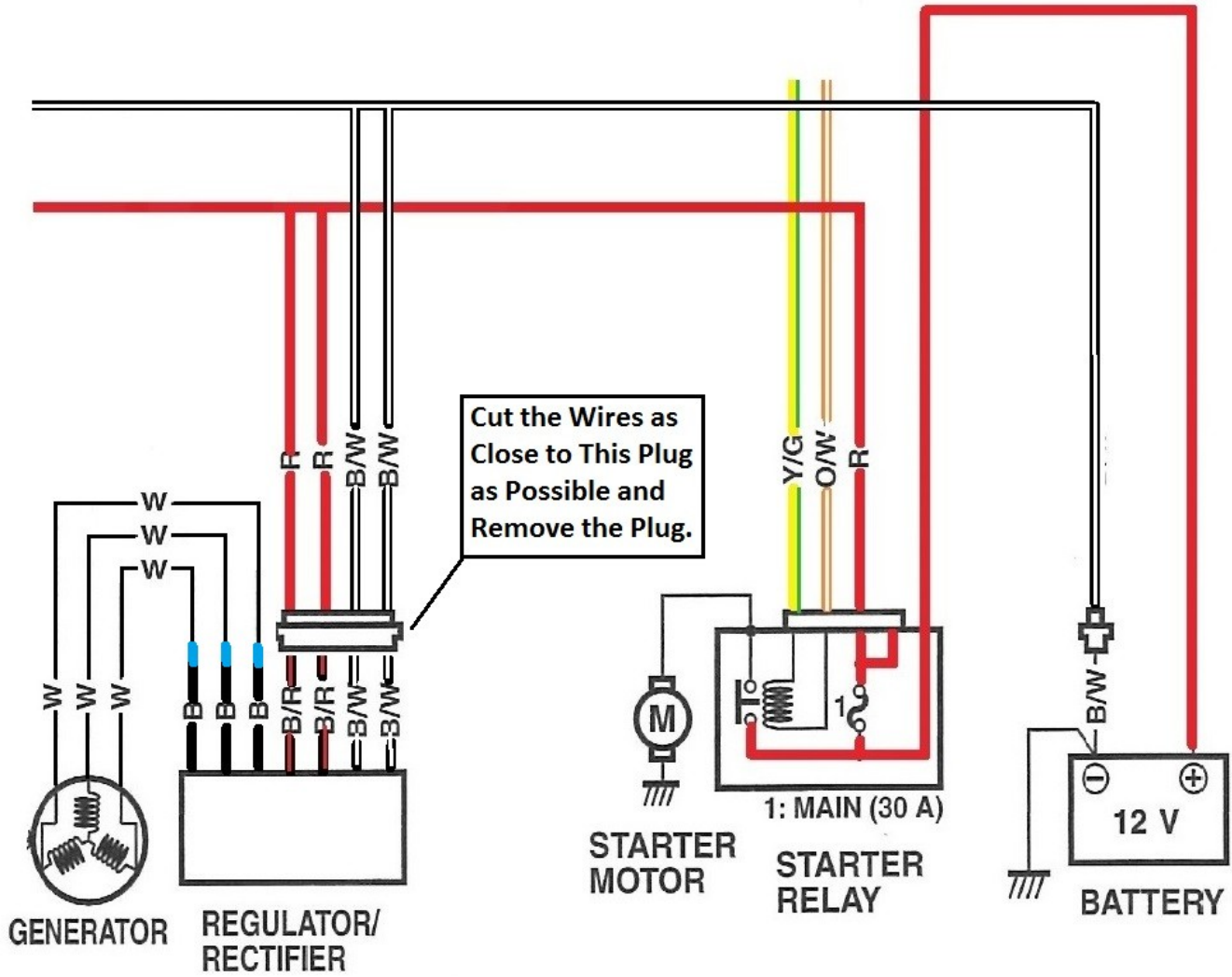
You now have to cut the three Black wires at the R/R plug as close to the plug as you can as there isn't a lot of extra wire to play with. Tie up the unused White and Black wires out of the way as we won't be needing them anymore. Once that is done you connect the three White Stator wires directly to 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



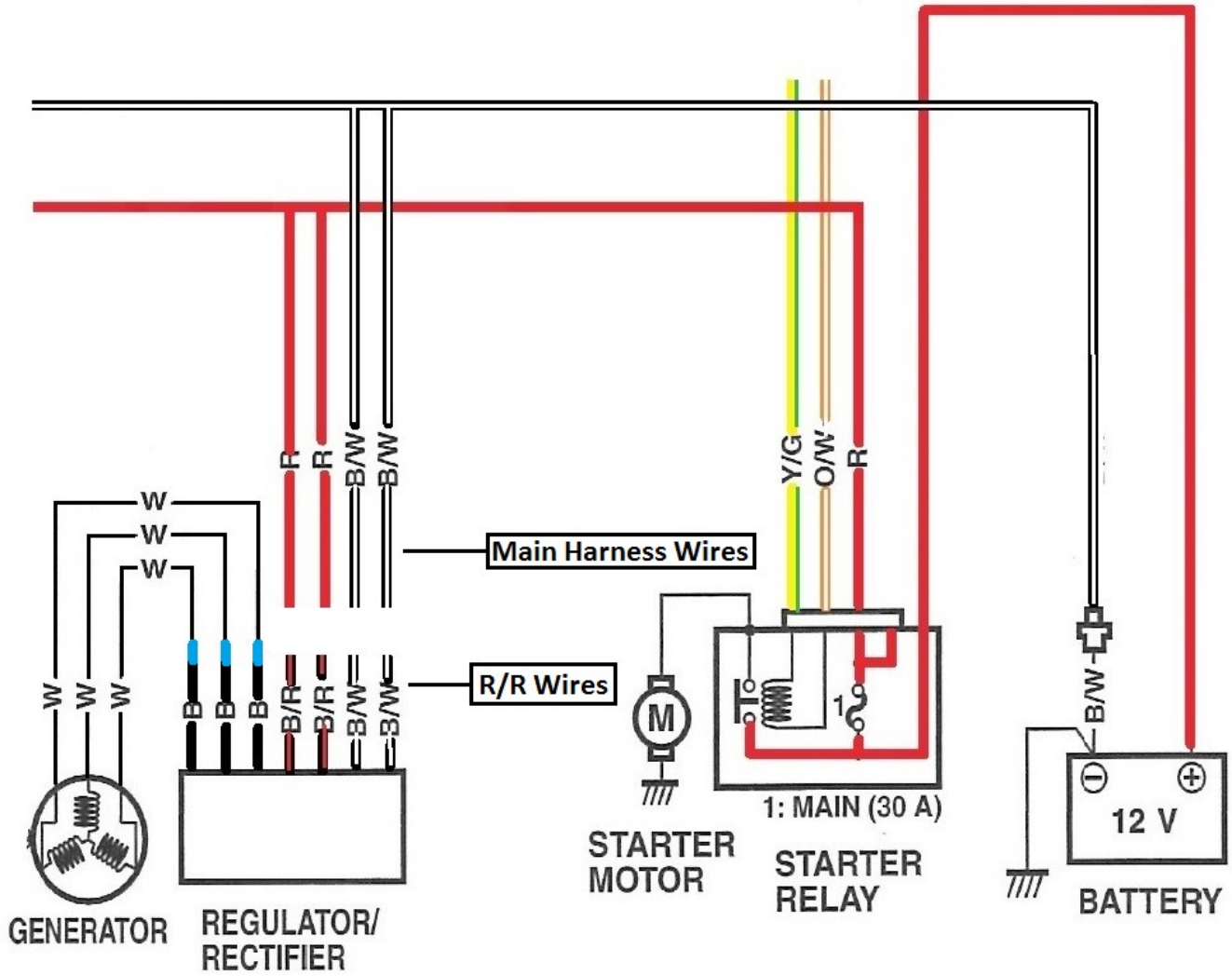
In the above diagram the “Blue” area represents the connections of the three White Stator wires directly to the three Black R/R wires. Any new connection we make from here on out will be highlighted in Blue.

Fourth Step



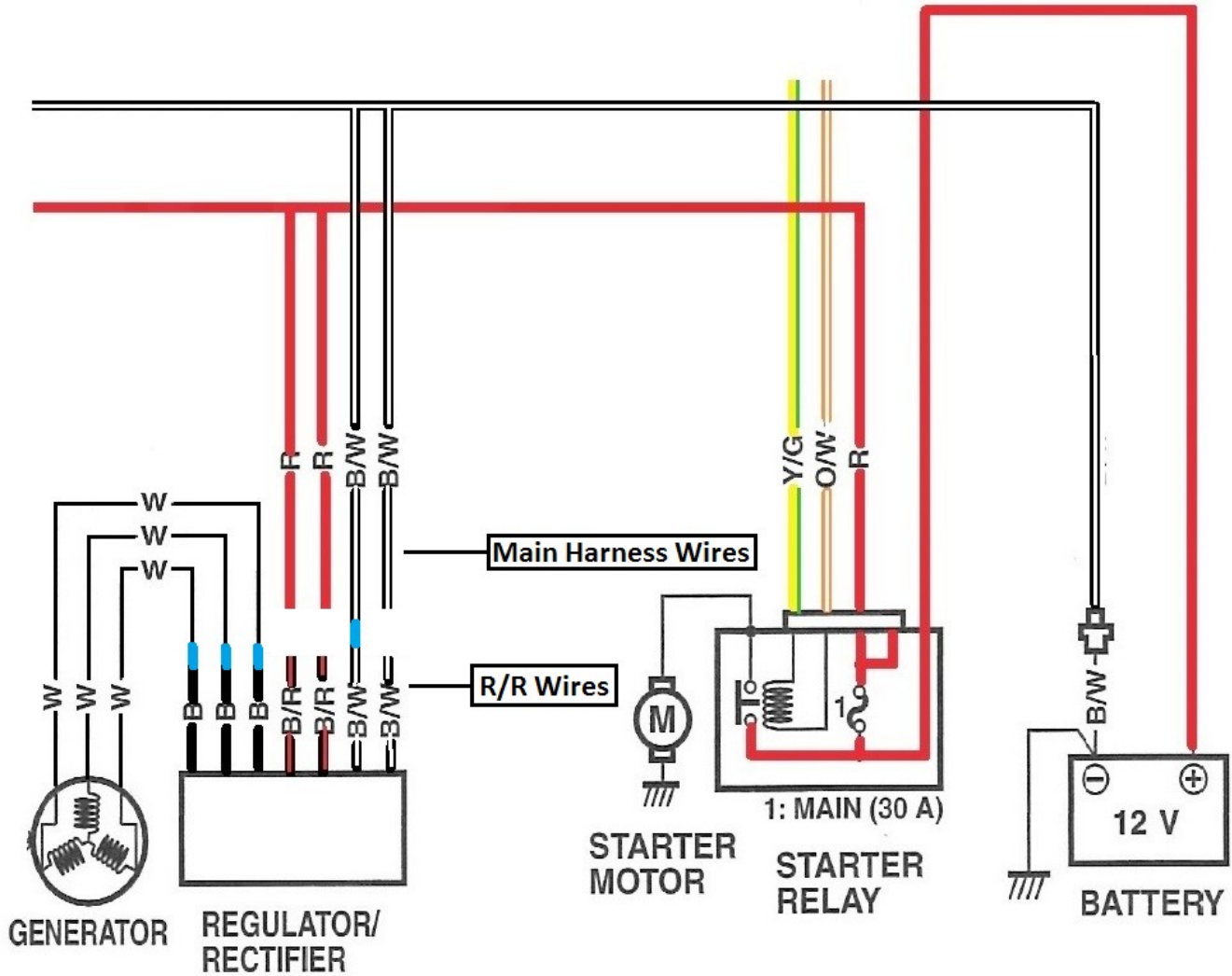
Cut the wires from the plug shown above on both sides as close to the plug as possible. Discard the plug.

Fifth Step



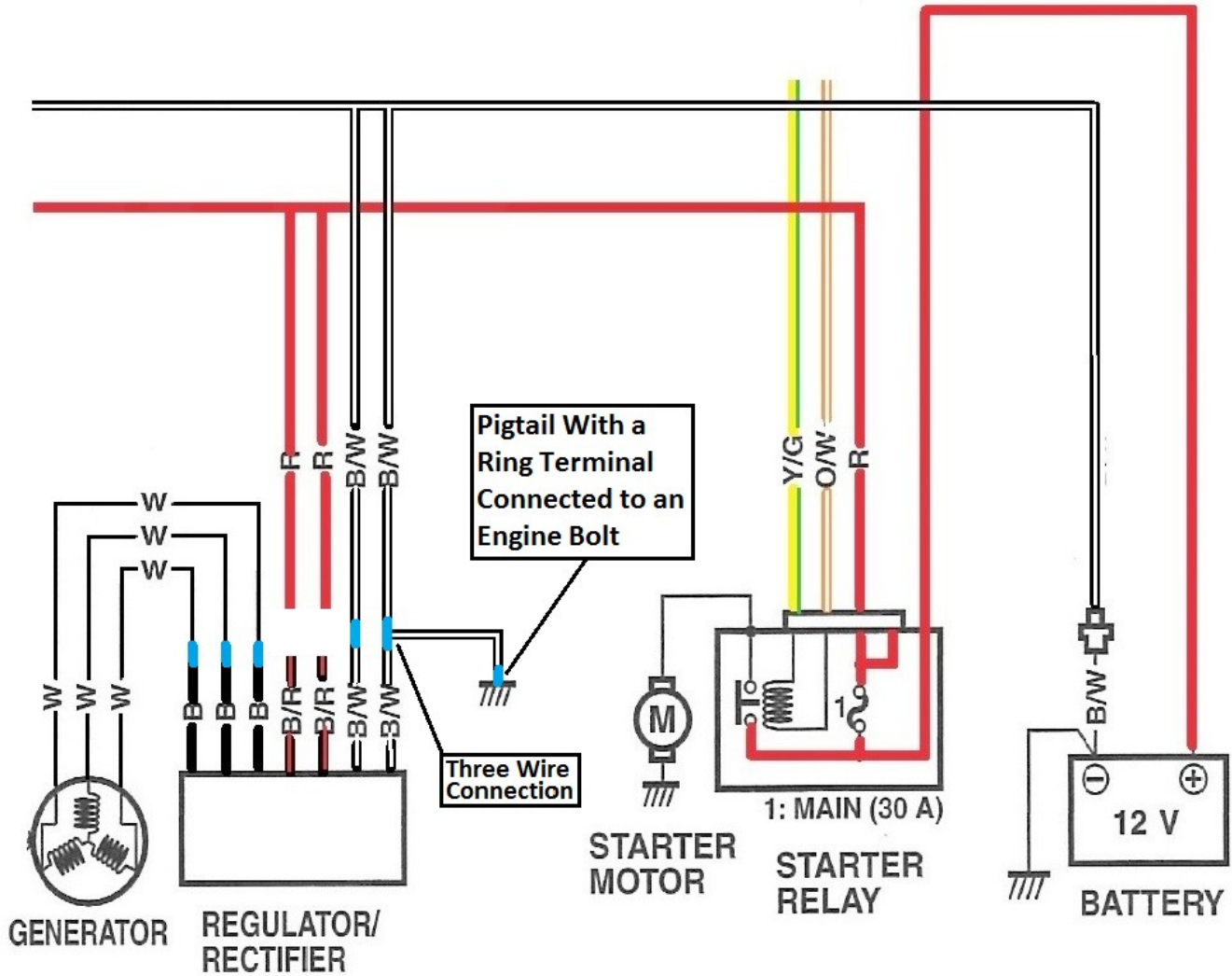
We now have to make connections between the R/R wires and the Main Harness wires. The following pictures will show each connection one at a time.

Sixth Step



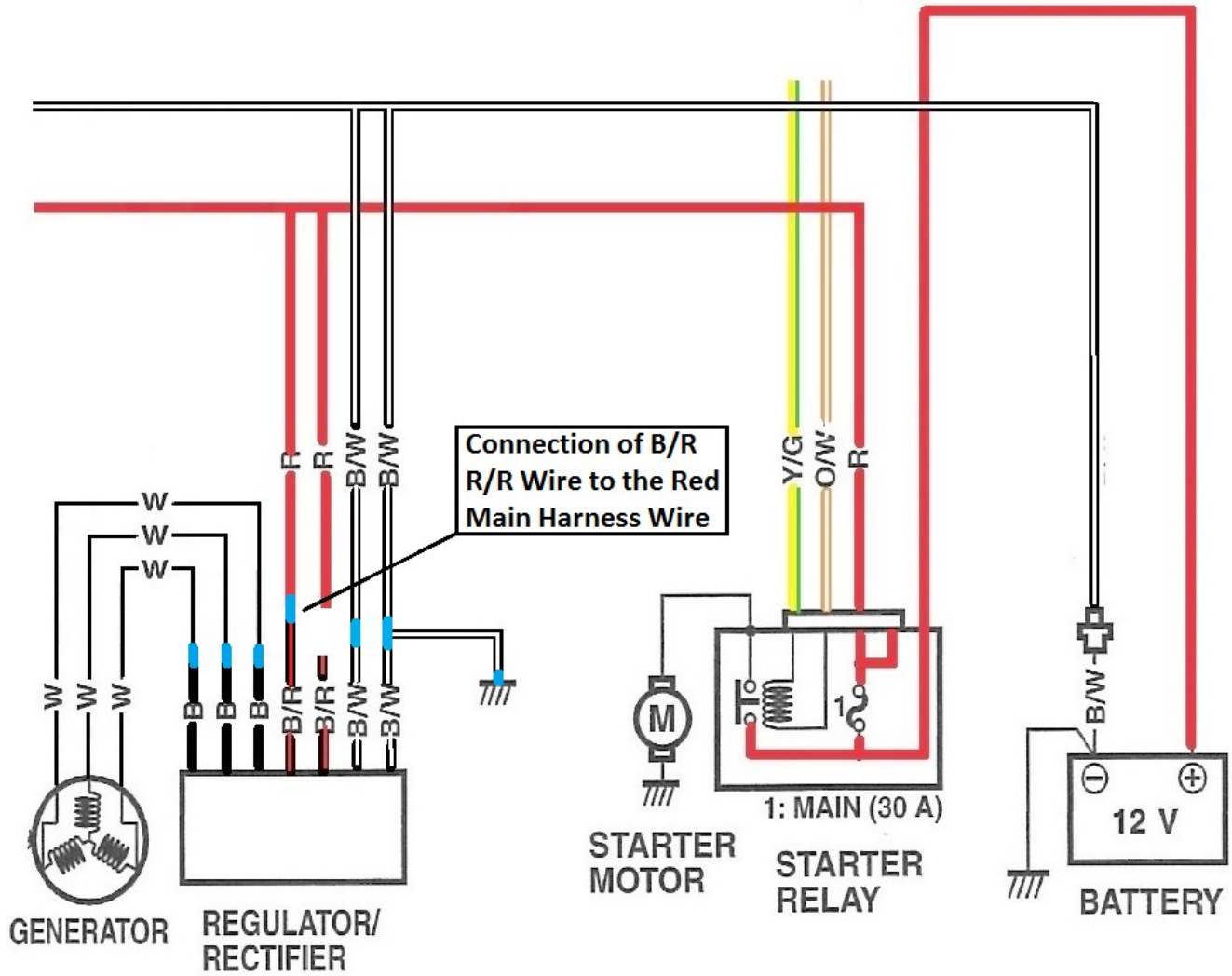
Take one B/W R/R wire and connect it to one B/W Main Harness Wire. Again, the blue line is the connection.

Seventh Step



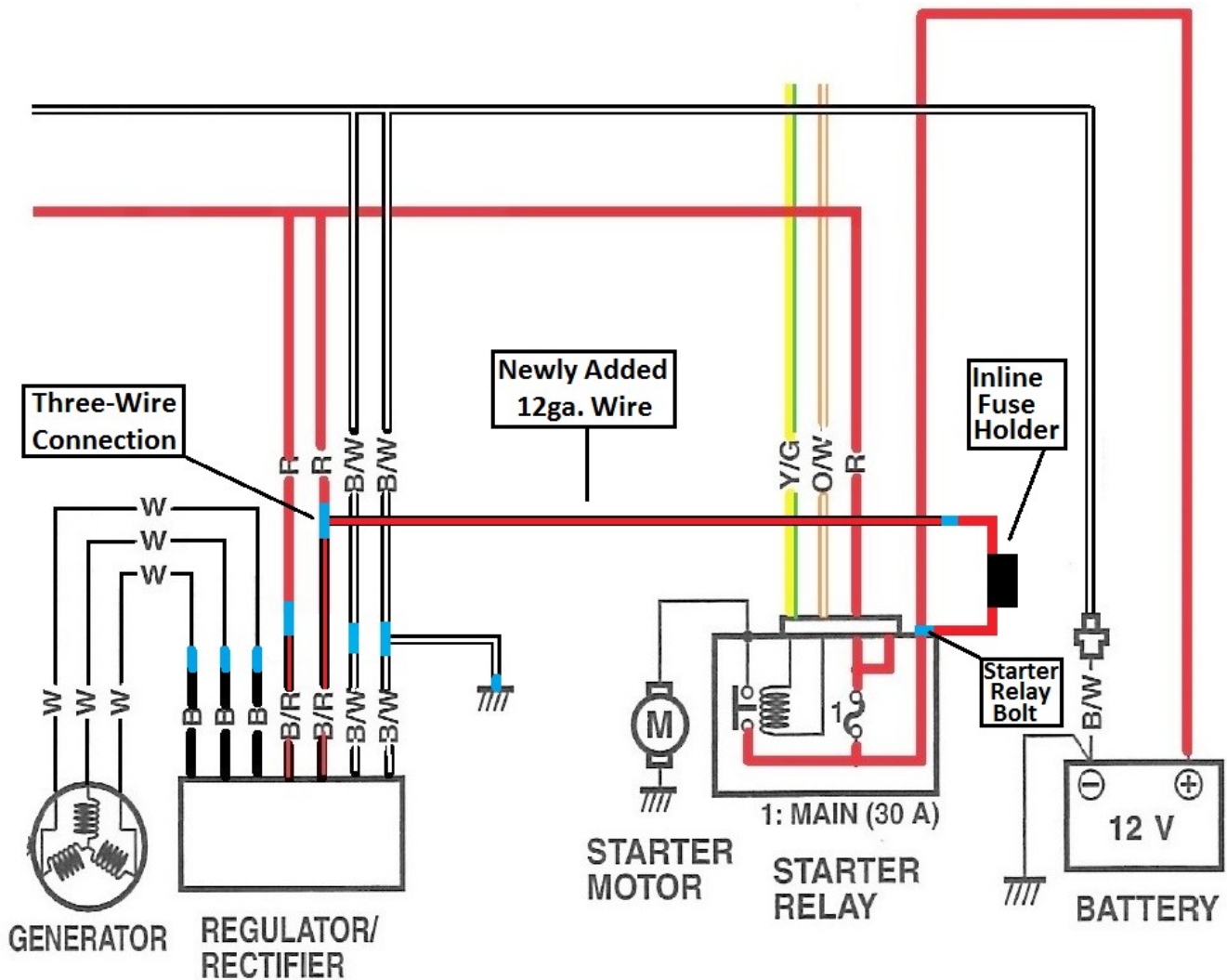
The above shows the three-wire connection between the remaining B/W R/R and Main Harness wires along with an added pigtail. The pigtail is just a small piece of 12 gauge wire with a ring terminal attached to it so that you can connect it to an engine bolt. (most use one of the Clutch Slave Cylinder bolts) This connection increases the ground path between the Charging System and the Battery.

Eighth Step



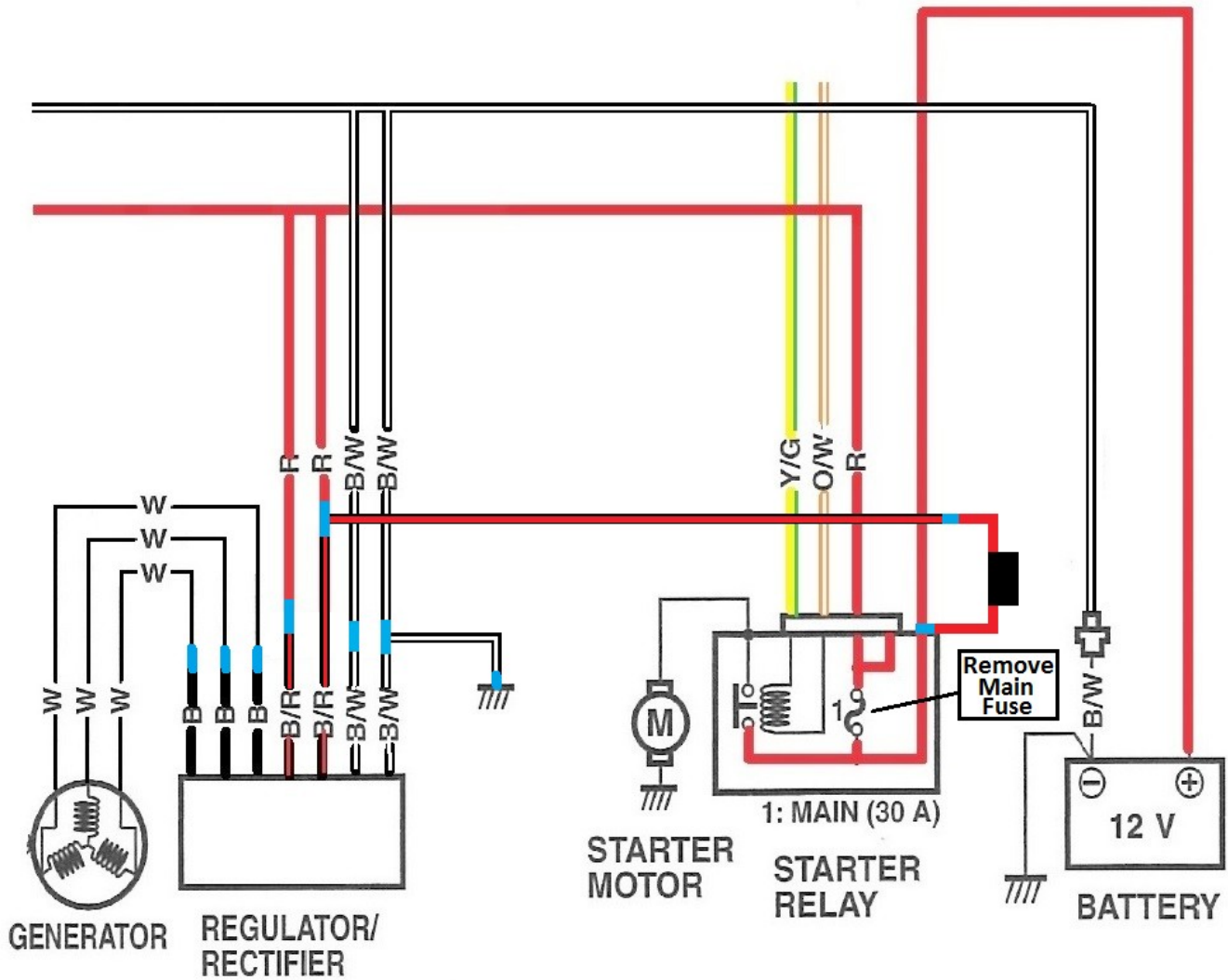
The next connection you make is one of the B/R R/R wires directly to one of the Red Main Harness Wires. It doesn't matter which B/R wire you choose to connect to which Red Main Harness Wire.

Ninth Step



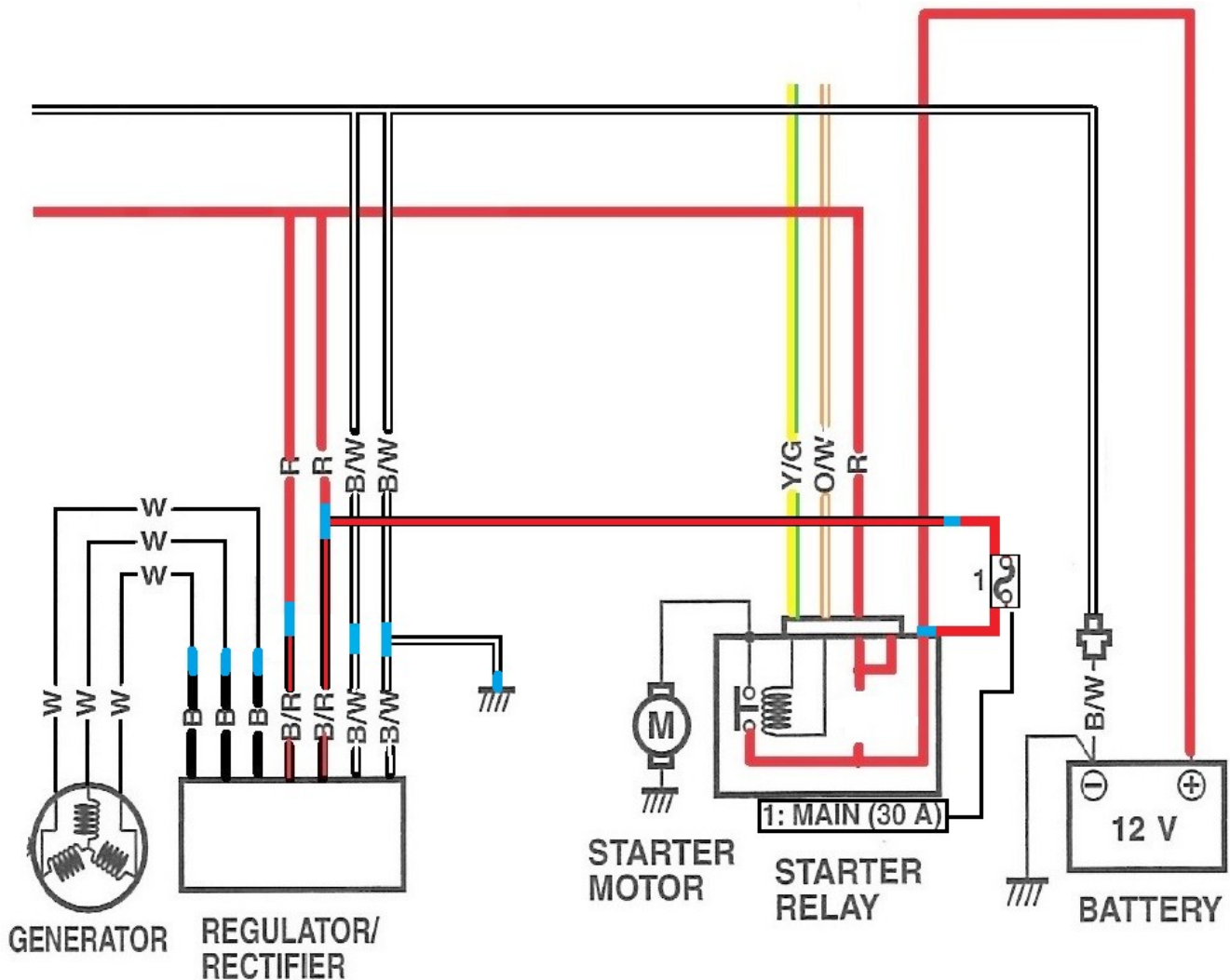
In this step you take the remaining Red Harness Wire, the remaining B/R R/R Wire, and add a new length of 12 gauge wire to it connecting all three together. The newly added wire in this three-wire connection gets run up out of the top of the bubble cover, along the frame rail or other suitable path, and cut to length to reach the Starter Relay Bolt. On the end of this wire you attach an Inline Fuse Holder. On the other end of the Inline Fuse Holder you attach a ring terminal sized to fit the Starter Relay Bolt and connect it there. The new 12 gauge wire should be protected along its length with some plastic split loom to keep it from rubbing and shorting out on anything. Any short in this wire will blow the main fuse and cause a loss of all power to the bike, so make sure it's well protected from anything sharp or excessive heat.

Tenth Step



In this step you remove the main fuse from the Starter Relay. You will see two fuses in the Starter Relay. One is a spare and not connected to anything. The one you need to remove is the one that is right next to the connection of the large Red Positive Battery Cable. It is the same connection you attached the ring terminal to in the previous step.

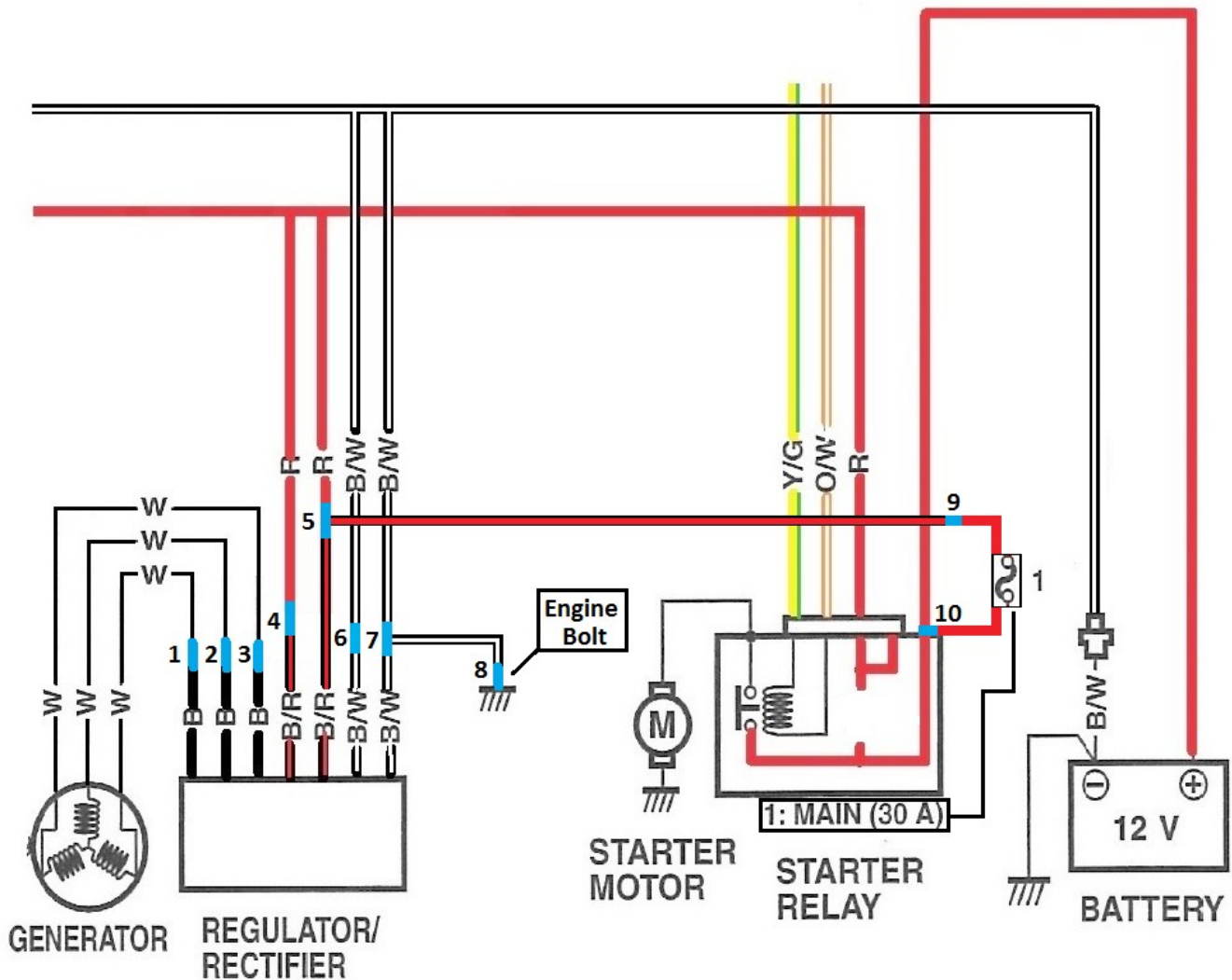
Final Step



The last step in the mod is to take the Main Fuse you removed in the previous step and place it in the new Inline Fuse Holder. This is now your new Main Fuse as shown above.

The old path from the Battery to the Main Harness was through the Small Red Wire coming out of the plug in the top of the Starter Relay. (shown above next to the O/W and Y/G wires) Since we took the Main Fuse out of the relay that path is now disabled. The new 12 gauge wire with the Inline Fuse Holder is now the new path between the Battery and the R/R-Main Harness.

This is it!



The above diagram shows all the connections you should have made in blue. Next to each connection is a number. You should have made 10 connections in all. Go back and count them. Once you verify you've made all the connections you can now reconnect the negative battery cable and start the bike. Take voltage readings **directly at the battery terminals** at idle and around 2500rpms.. You should see a definite improvement.

If you do not see an improvement, or if the voltage is *lower* than it was before, go back and check all your connections. Mod-3 is only as good as the connections you make.

**If all is well congrats!
Button it all back up and go for a ride!**