

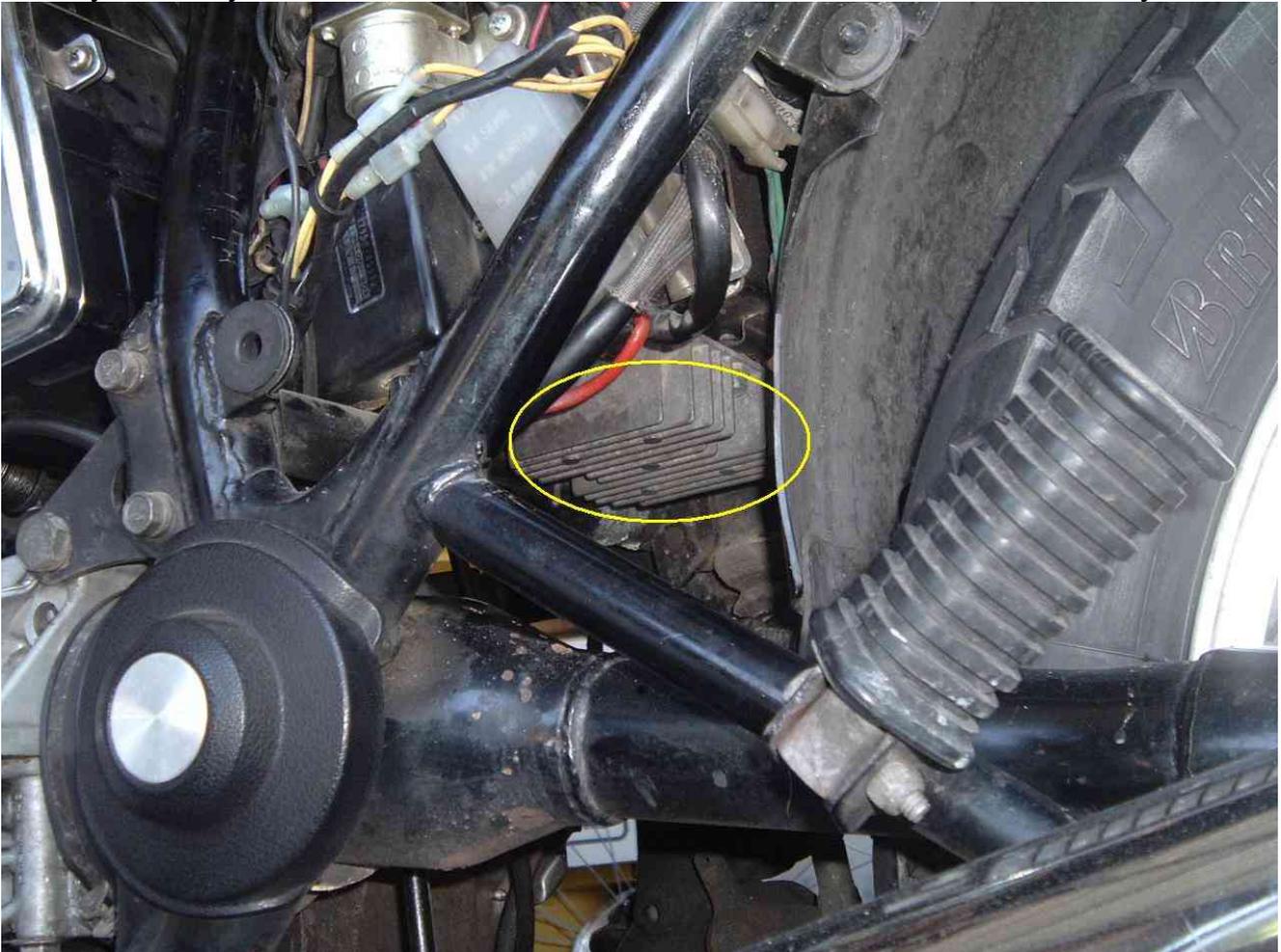
# Regulator/Rectifier Replacement

by BassCliff

Hello to my dear GS riding friends.

It's really not that hard to replace your regulator/rectifier. I will assume that you have read [The Stator Papers](#) on the [GS Resources website](#). You have determined that the regulator/rectifier unit is at fault and that's why you have a dead battery. The charging system on these GS motorcycles is a weak spot, but that can be rectified. One of the best things to do is to clean all of the electrical connections on the bike; wiring harness connectors, battery terminals, fusebox, etc, *everything* from the headlight bucket to the tail light. The next thing to do is to eliminate any resistance on the ground connection of your regulator/rectifier (hereby known as "r/r"). To do this, simply run the ground connection from the r/r directly to the negative terminal of the battery. Note that you may have to solder and splice in some extra wire and add a ring connector.

On my motorcycle, the r/r unit is located on the bottom side of the battery box.



Please note that this is not the stock Suzuki part. I use Honda r/r units as they are better designed to dissipate the heat generated during its rectifying and regulating duties. Here is a picture of a stock part on the left and a Honda upgrade part on the right.

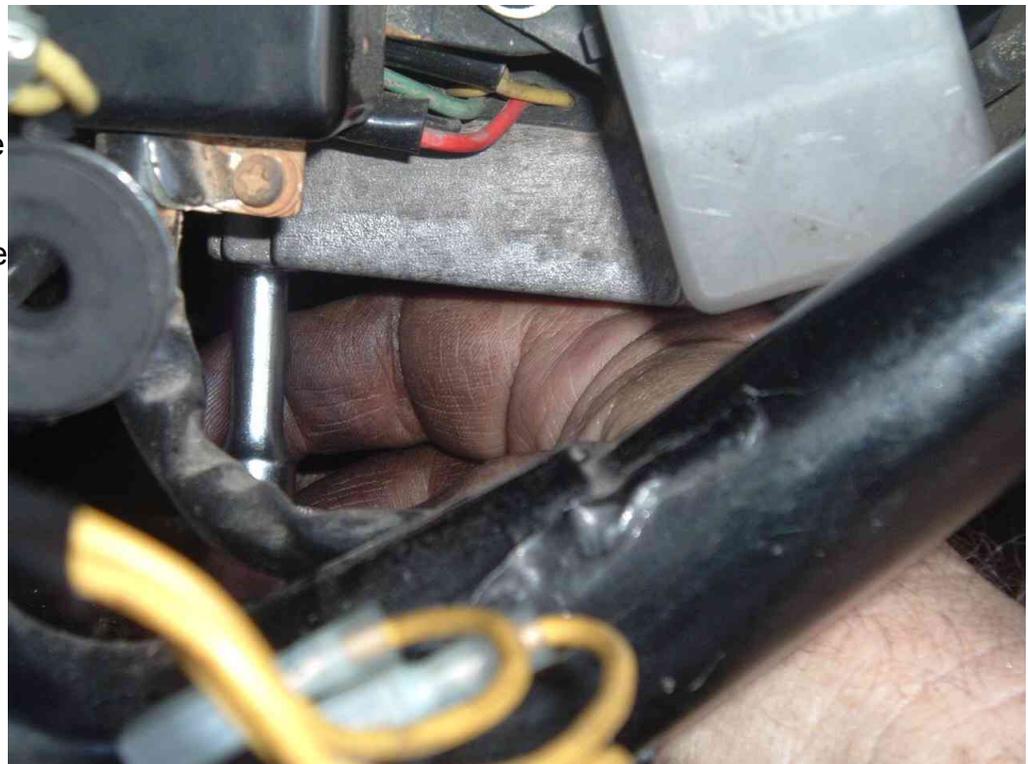


Other r/r parts from other motorcycles will also work on these old GS motorcycles, later model Honda CBR parts, later model Suzuki GSXR parts, etc. Please check with an experienced GSR member before using a part you picked up from ebay. Some parts have 5 wires, some 6, some 7, and you have to know how to connect the wires properly. Generally, the three yellow wires connect to the three wires from the stator. The ground wire should get connected directly to the negative battery terminal. The red wire gets connected to the hot wire in the bike's wiring harness that leads through the fuse box and eventually to the positive battery terminal. On 6 wire units, that wire is a "sense" wire which gets connected to a switched 12v source to help regulate the proper output. On 7 wire units (3-yellow, 2-red, 2-green/ground), there is no sense wire but both grounds and hot wires are connected at different places. We will talk about the 5 and 6 wire units.

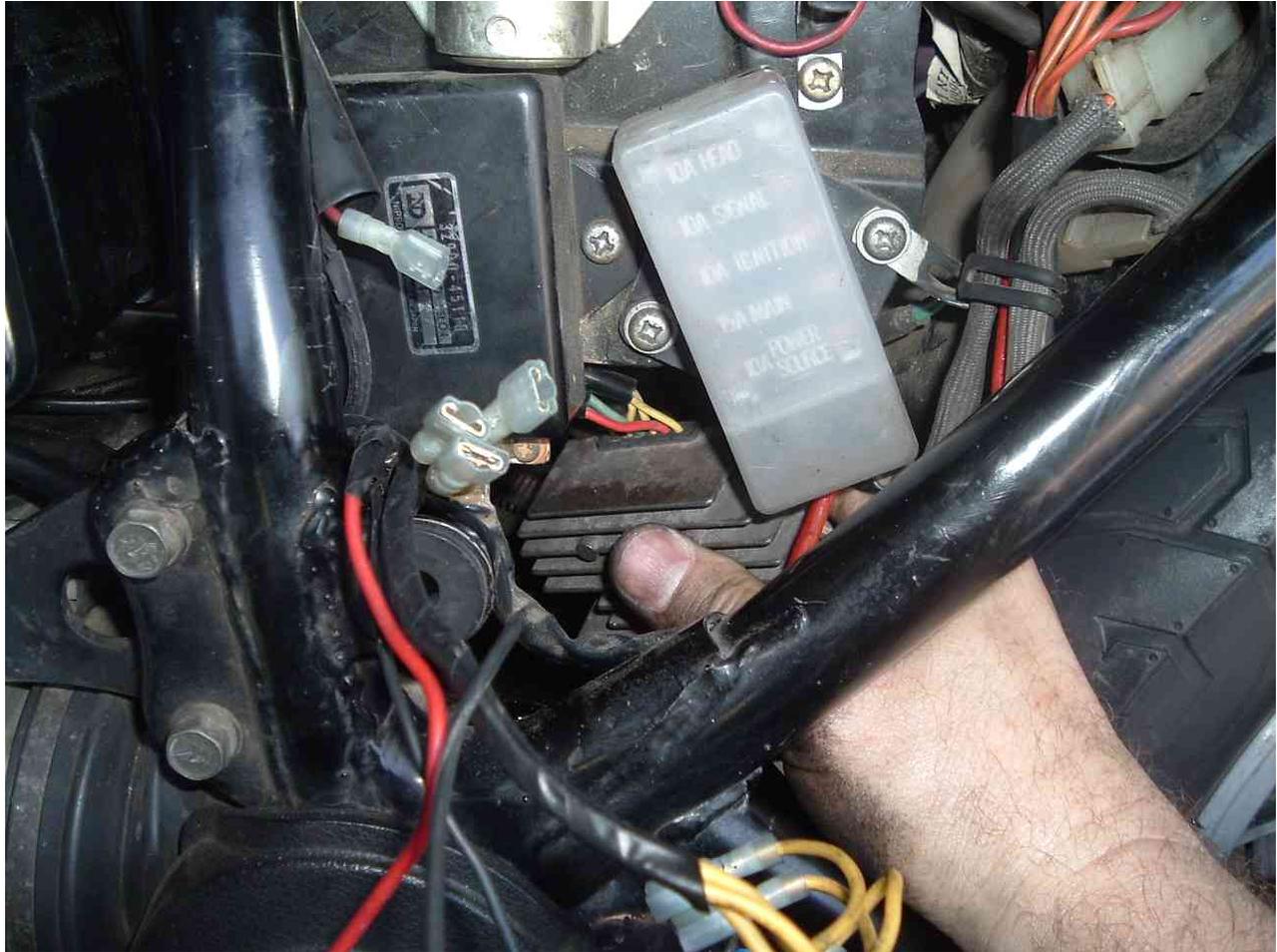
It's a tight squeeze under the battery box. I have a 1/4" socket set that just barely fits under there. Perhaps a stubby socket driver would be desirable, but I don't have one. There are two bolts holding the r/r unit to the bottom of the battery box. The one closest to the rear wheel is a little easier. It takes a 10mm socket.



Usually what I end up doing is using the socket driver just to loosen the bolt a little. Then I will take the socket and a short extension to finish the job as illustrated here on the bolt nearer the engine (*really hard to get to*).



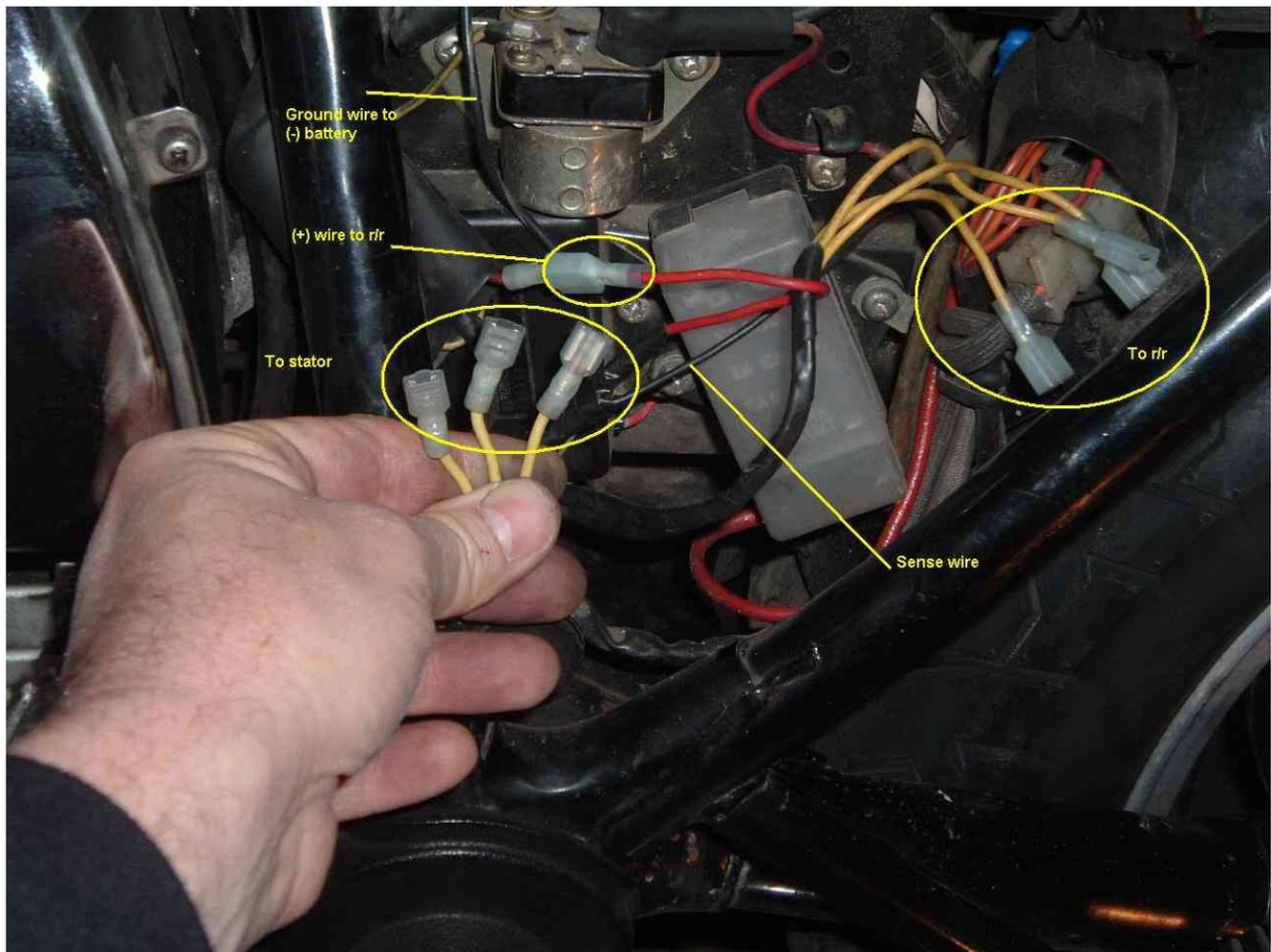
Here is the r/r unit hanging loose and ready to be taken out. Take care to ensure all of the extraneous wiring comes along without damaging anything else. It's a tight fit. By now you should have disconnected all of the r/r wires.



Please note in the picture above that I have replaced all of the original bullet connectors with spade connectors. Some riders will even solder and shrink-tube the connections between the stator and r/r in order to eliminate that point of failure. Oxidized connections add resistance to the electrical circuits and can make your charging system work harder to supply the proper voltage. This is why it is important to clean all of your electrical connections.

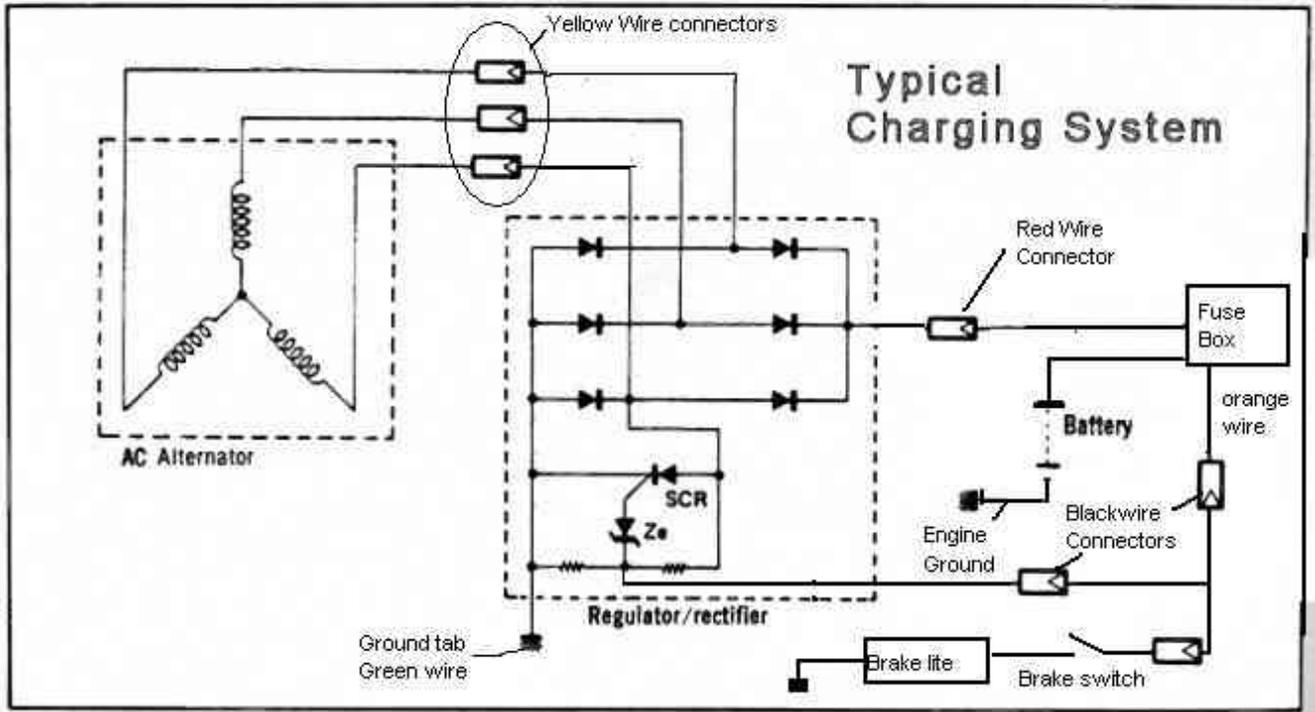
Put your new r/r in place, replace the bolts and route the wiring accordingly. Once you get the component in place you may want to cut the wires to length and crimp or solder new connectors.

Here is a picture of the 6 wire r/r unit and its associated connectors.



On this 6 wire r/r unit, the three yellow wires connect to the output wires from the stator. It doesn't matter which goes where, they're all the same output/input. The red wire from the r/r connects to the red wire in the wiring harness. The ground wire (which is green on the Honda parts) will be connected directly to the negative (-) terminal of the battery. The black wire (sense wire) gets connected to a switched (by the ignition switch) 12v power source, most often the brake light switch. This is located near the rear brake master cylinder. See the diagram below for proper connection of this part. Mr. duaneage, a GSR forum member, supplies tested, used Honda r/r units to GSR riders for a reasonable price.

Note that on the 5 wire units, there is no "sense" wire to connect. The unit regulates itself and does not monitor voltage in the bike's wiring harness.



After it's all back together, I like to straighten up and secure the wiring so that it doesn't rattle around, vibrate, and possibly rub off the insulation causing a short.



You may have noticed that there are a couple of extra wires (circled in yellow above, white/green and white/red) that I have disconnected, cut back, and taped off out of the way. In the original circuit, Suzuki ran one leg of the stator through the headlight switch. The reason being that when you switched off your headlight while riding, one of the stator legs would be disabled. This would allow less voltage to be dumped into your charging system when the headlight was off and keep the battery from overcharging and possibly boiling out all of that nice distilled water and possibly cooking your battery. Since my bike doesn't even have a headlight switch (the headlight is on all the time) I can eliminate that loop of wire, simplify the circuit, and cut out the unnecessary resistance.

That's about it. I told you it was pretty easy. I just wish I had smaller hands to work in those tight places. For those of you who have your r/r units on the side of the battery box, life is a little easier. Some riders even move their r/r units to the front of the bike, mounted to the frame. This puts the r/r out in the open air for better cooling.

Be sure and visit the community at <http://www.thegsresources.com>.

Thank you for your indulgence,

BassCliff