HONDA Z50 Roll Your Own Lighting

This page contains a step by step guide to winding your own stator coils on your Z50R or motorcycles with the same/similar type stator.

Parts Lists

Before you start you are going to need to acquire a few items:

- Flywheel puller; Motion Pro 08-0026 Flywheel Puller or similar.
- Gasket for the flywheel cover. (*may not be necessary*)
- 1 lb of 18 AWG magnet wire
- Head lamp assembly. Get a halogen unit it's worth the extra money. Available from:
    - BajaDesigns
    - Dennis Kirk
    - Parts Express (from your local dealer)
    - Other vendors
- Regulator or regulator/rectifier assembly. Available from:
    - Baja Designs
    - Other vendors

Stator Notes

All factory wiring on the stator is done on terminals that are molded into the corners of the plastic stator frame overmoulding. They are electrically connected together internally in the plastic in pairs. There are spare terminals just for this purpose. Check them out with an ohm meter and you will see they are connected. All of our wiring will begin and end taking advantage of the "spare" terminals. One terminal is connected to ground.

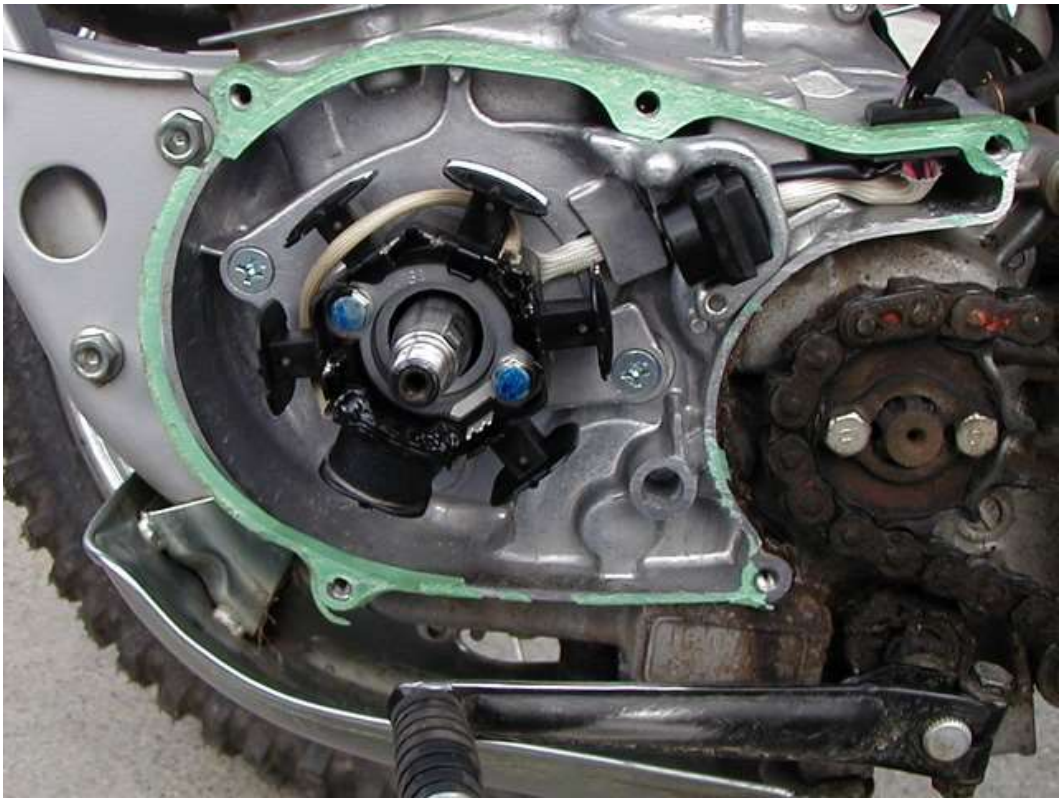
Step-by-step Instructions

1. Clean the bike. Remove the seat, side panels, and gas tank. Wash the frame down good. Dirt is your enemy.
2. Remove the flywheel cover/chain guard. Clean the goo out of the chain guard while you have the cover off.
3. Remove the flywheel nut using an air impact wrench and 17mm impact socket. If you don't have an impact wrench you will have to use a flywheel holder.
4. Pull the flywheel. Note that the threads on the flywheel and puller are left hand thread. They are also very fine and can be easily damaged. Lube the puller with WD-40 before threading it into the flywheel. When you are done store the puller carefully. Don't let it clank around in your toolbox. You will ruin the threads and it will destroy the next flywheel you try to pull.

Flywheel Puller

5 Carefully set the flywheel aside where the magnets won't pick up metal chips.

The Stator Assembly is now exposed. You will notice that there are 5 laminated cores that do not contain coils. We will be winding our magnet wire onto these cores to make the alternator.



Stator in the bike, before modification

6 Follow the wire harness up the frame and unplug it. There are only 2 wires. Carefully remove the harness from the clips in the frame and pull it clear of the frame.

7 Remove the Stator/Trigger coil assembly from the engine. The stator/trigger coil assembly is held to the engine with 2 large Phillips screws. You will need a hand impact driver to loosen up these screws as they are incredibly tight. After removing them I noted that they DO NOT HAVE Loctite. Pull the stator assembly from the engine and carefully remove the rubber grommet from its slot in the engine case.

Stator before modification

8 Remove the Stator from the trigger coil frame. In order to do a good job winding the stator you will have to remove it from its frame. The stator has wiring connected to the solder terminals. There is a black wire with a red stripe connecting the stator to the wiring harness. Carefully unsolder this wire from the terminal on the stator. Remove the 2 bolts that hold the stator to the frame. This will free the stator from the trigger coil frame assembly.

9 Remove the Magneto wire from its terminal. The lone wire from the Magneto coil is looped through the unused laminations. Unsolder it being careful not to cut it. You will need all of its length later when we re attach it. This wire has a sleeve on it. Slide the sleeve off and save it.

10 Get ready to wind the coils. You are going to be constructing a Series Wound AC Alternator by winding magnet wire on the cores. All of the cores are wound in series. There will be no cuts in the wire. Wind one core and move right on to the next core until you are done.

Each post will be wound with 65 turns of wire. In order to get all of the wire to fit the wire must be wound very tightly and snuggly. A sloppy job winding will result in fewer turns on the core and less output voltage.

Important: Note the direction that you wind the first core. If you wind the first core Clockwise (CW) when you have reached 65 turns you will start winding the second core Counter Clockwise (CCW), the third core CW, the fourth core CCW, and the fifth, last

core, will be wound CW. If you wind all of the cores in the same direction it will not work.

Note: It is important to count the turns properly. Mark an X with a Sharpie marker on one side of the stator. Each time the X comes around call out the Turn #. When you count 10 turns have a helper wrote the count tally on a piece of paper.

Have your helper hold the roll of wire. It is important to get the coils tight and neat. When winding the first level of wrap use a Popsicle stick or similar to pack the coils together on the bottom of the form. The first layer sets the form for all of the layers above. If you don't get the first layer neat and tight the entire coil will be loose and sloppy.

With your helper holding the roll of magnet wire, pull against each other with the magnet wire tight as a piano string. The stress on the wire causes it to form around the coil form very nicely. Never let off of the pressure until the coil has 65 turns and the winding starts on the next lamination.

The Existing Magneto coil obtains its ground from a terminal that has a strap leading to one of the stator fastening bolts. Conveniently there is an extra terminal for you to solder your magnet wire. If you have an ohmmeter handy you can locate this grounded terminal. This will be the start of the first coil. Magnet wire must be stripped by scraping the enamel insulation off with an X-acto knife.

Here is a test probe pointing at the ground terminal

11 Start winding your coils and remember to alternate CW and CCW from one coil to the next.
12 When you have finished winding the last coil bring your wire over to an unused terminal and cut it to length. Scrape off the enamel and solder it into the terminal. **Do not use the terminals that you will need to hook the original magneto coil up to.**

The stator, with the new windings

13 Honda has tucked 2 unused pink wires inside the wire harness that exits the stator assembly. If you slide the white tubing back you will find them. Pull them down and tuck them into the white tubing so that they are long enough to reach the terminal on the stator. You will want to solder both pink wires to the terminal that is electrically connected to the output end of your last coil. This is the output to the regulator and lights.
14 After you have carefully soldered the pink wires in you can re assemble the stator assembly to its frame and carefully install it into the engine. Use caution every step of the way to be sure that all wiring is free and not being pinched. Tighten the screws securely. DO NOT USE LOCTITE.

The stator with the new windings installed back into the bike.

15 The pink wires provided by Honda are too short to be useful. Splice on 2 feet of 20 AWG wire to these leads to lengthen them (choose a color similar if possible). Cut one wire an inch shorter than the other so that the splices will not be rub against each other. The goal here is to neatly splice these wires and solder them. It's a good idea to insulate the splices with heat shrink tubing. The new longer wires will slide into the black tubing with the magneto wires. Cut the lighting coil wires about 5 inches longer than the factory magneto wires and place some small heat shrink tubing over them as they exit the factory engine harness. You may want to terminate them with a Molex 2 pin toy car connector so that you can disconnect the engine harness and remove the engine from the frame without cutting any wires.

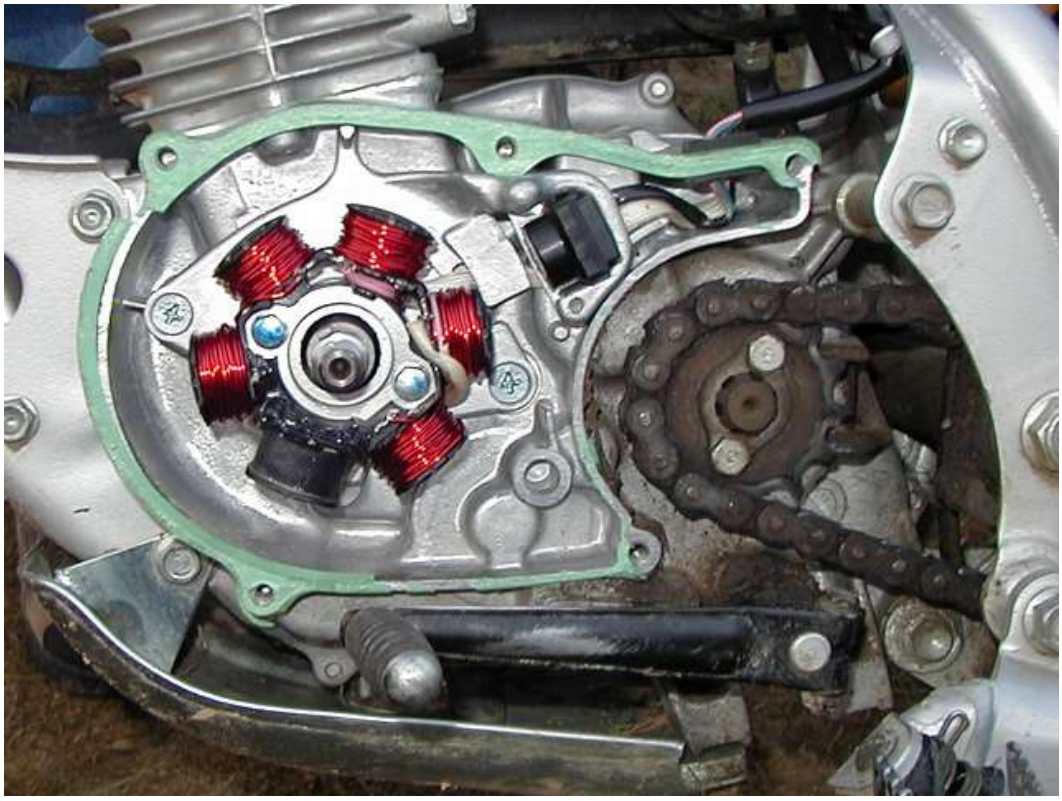
16 You may be asking yourself, "Why are there 2 wires coming from the alternator" Use of 2 wires keeps the voltage drop across the wires low. 55 to 75 watts (roughly 4.0 to 5.5 AMPS!) at 14V will be running through these wires. You want all the power available to the bulb and not wasted as heat in the wiring.

17 At this point you now have your wiring up into the frame. You will join both alternator wires together on the mating Molex connector. Use 14 or 16-awg wire from the mating connector to the regulator and the lights. The ground for the light and regulator can be picked up at the ground bolt on the frame for the kill switch and CDI box.

The Regulator is a "Shunt" type regulator. The regulator is connected from the alternator wire to ground. The alternator you have just built is capable of producing in excess of 48V when the engine is wound up. The halogen bulb is rated at 15V max. 48V would easily destroy the bulb. The Shunt regulator reduces the voltage by shunting excess current not used by the headlight

bulb to ground (frame). If your bulb burns out or you disconnect the bulb with a switch the shunt regulator is forced to absorb all of the energy produced by the alternator. It will get hot and eventually burn out. If you plan to switch the light off be sure the regulator is on the bulb side of the switch and not the alternator side.

It is hard to find a place to mount the regulator on the bike. I mounted my regulator inside the plastic headlight frame.



In case the last picture was not good enough for you