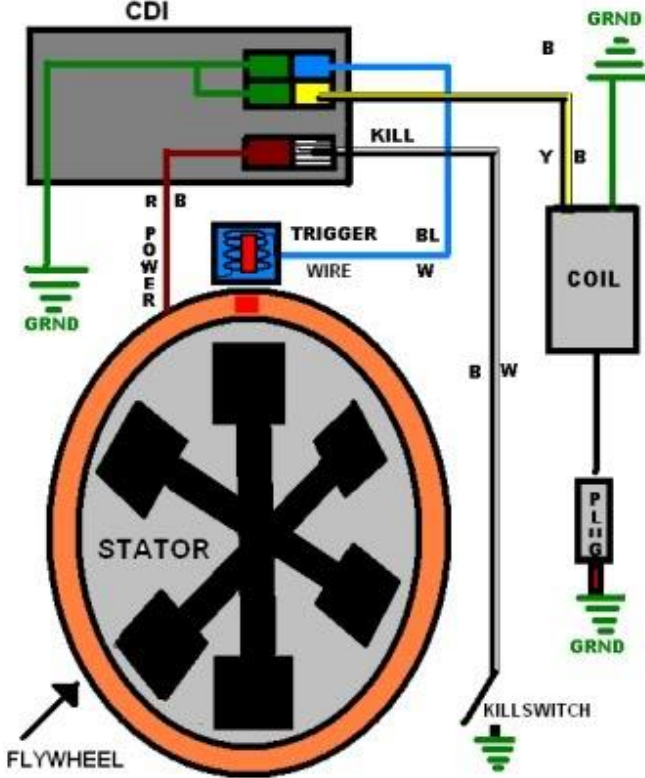


Below is a schematic of a typical scooter electrical set up as far as the stator, CDI, rectifier/regulator go along with the other items running on the electrical system;



### SPARK PATH

- 1: Stator sends energy via the red/black wire to the CDI to be stored
- 2: Magnet in flywheel causes coil in sensor to send impulse along trigger wire causing CDI to release energy to the coil
- 3: Coil steps up the voltage and sends it to the spark plug causing an arc across the electrode
- 4: The killswitch grounds the coil stopping the spark
- 5: The ignition switch uses the killswitch wire on many units to stop the engine, therefore if the killswitch wire is removed, the bike can be kickstarted and the engine will run because it generates its own spark even with the ignition switch off.

This is the 6 coil stator common on most 50cc scooter but also can be found on a 150cc too. The wire colors listed are very common but may vary. Stators come in different sizes ranging from the 6 coil mentioned above to the 18 coil versions on most 250cc scooters.

**8 coil stator**



**11 coil stator**



**18 coil stator**



**Stator pick up coil**



**The stock 6-coil stator is actually a very simple device. There are 6 total windings with 5 of them dedicated to the charging of the battery and to the lights auto choke, etc. while the 6<sup>th</sup> winding wrapped in the white wrapping is dedicated to the CDI voltage which supplies voltage to the spark plug coil for the engine to run.**

**The voltage windings on the 6 coil single phase stator send AC voltage out generally through the yellow and white wire with black or green being a ground. Take note that these 3 wires are totally isolated from ignition system and even if they are unplugged the engine will run as long as the other wires are plugged in and the stator is properly working.**

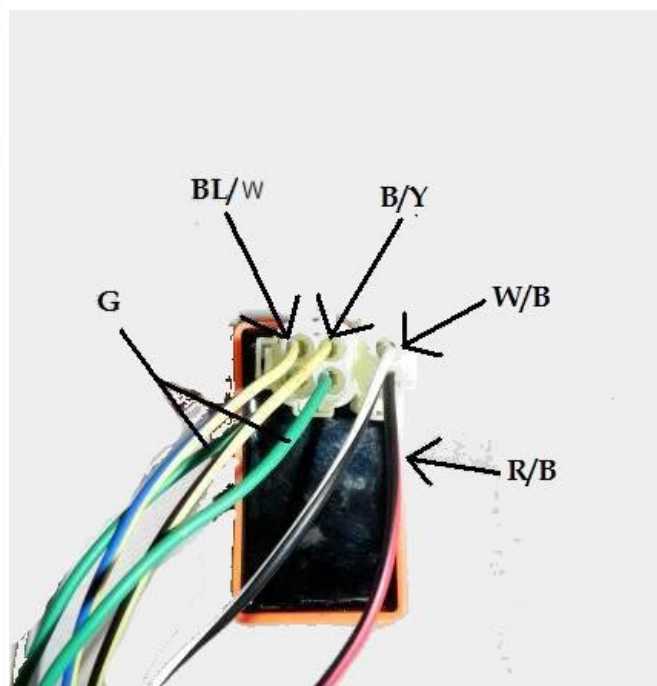
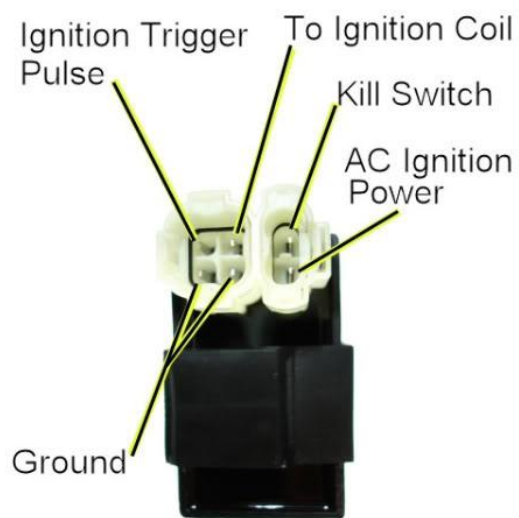
**The single white wrapped winding sends voltage through the red/black wire to the CDI while the blue/white wire is the pick-up coil wire that tells the CDI when to fire at the correct time to the coil which produces a spark at the spark plug.**

**Generally speaking this is the wire colors of most 50, 125 and 150cc Chinese scooters but they may be different on some but the principal is the same.**

**Generally speaking all stators are the same in function and larger stators with more coils have more capacity with more numerous coils.**

As mentioned the stator supplies voltage to the CDI and there are two basic kinds of CDI's, the AC powered CDI and the DC powered CDI.

Below pictured is the typical AC powered CDI found on lots of scooters. Each terminal is labeled and the wire colors are typical of most scooters but they may vary also.



R/B = red/black

W/B = white/black

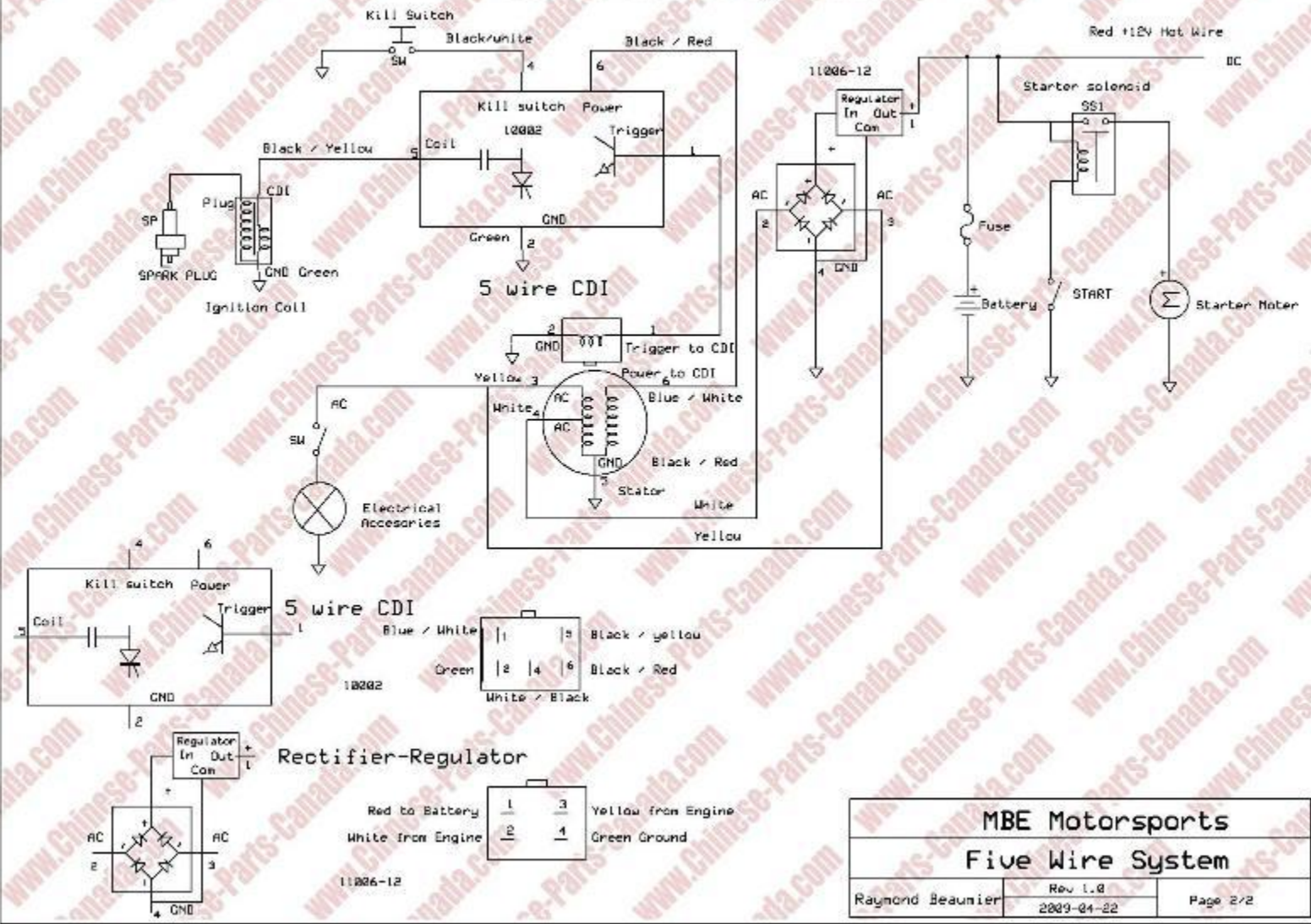
B/Y = black/yellow

BL/W = blue/white

G = green

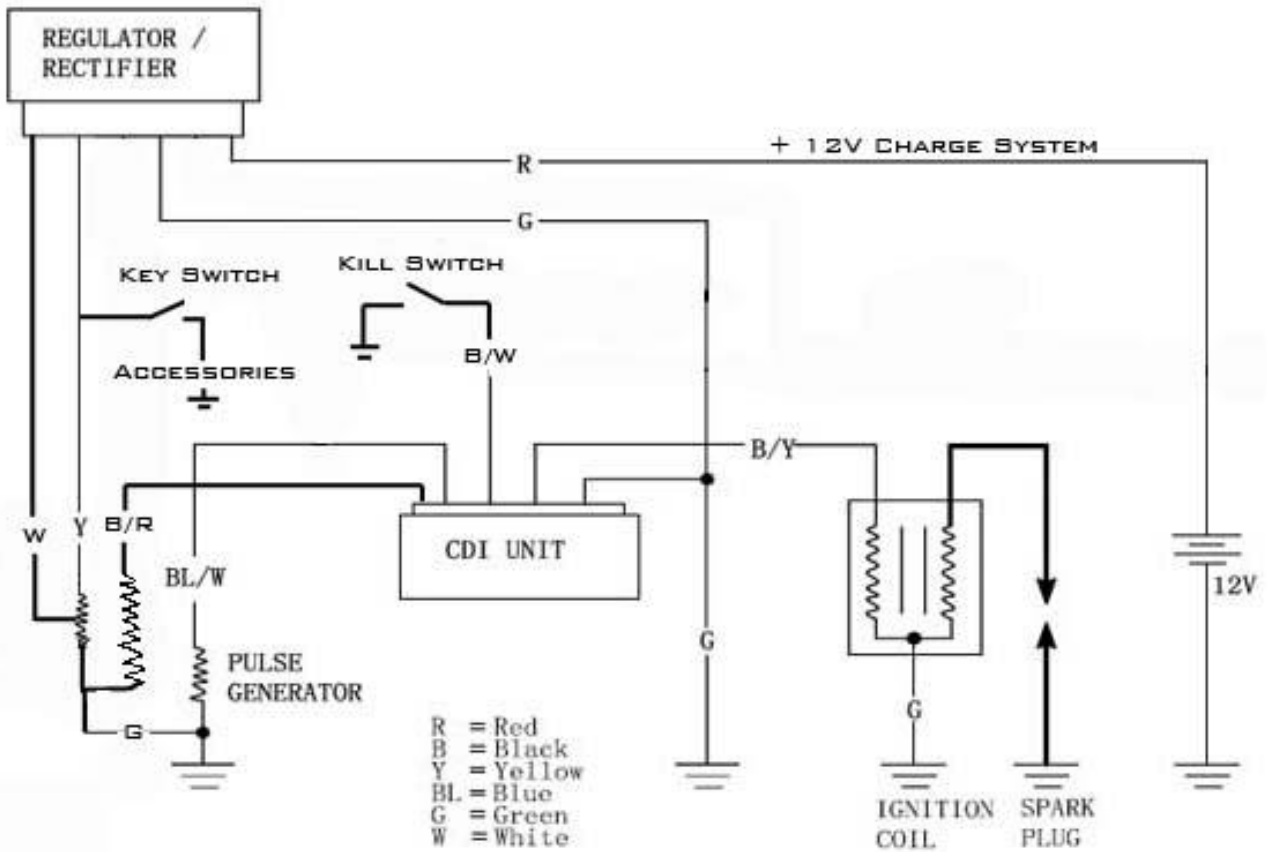
Here is a wiring diagram of the typical 5-wire CDI system on a lot of scooters which in most instances is an AC powered system.

## Five Wire System



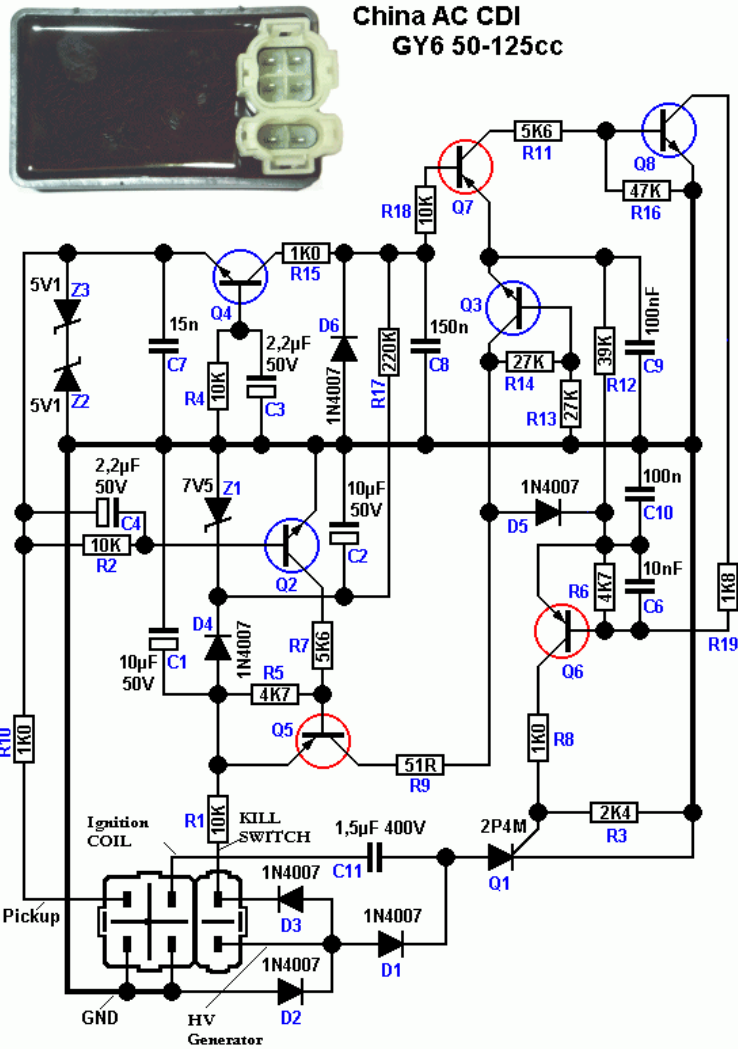
<b>MBE Motorsports</b>		
<b>Five Wire System</b>		
Raymond Beaunier	Rev 1.0 2003-04-22	Page 2/2

Here is another diagram of the same 5-wire CDI system and its features.

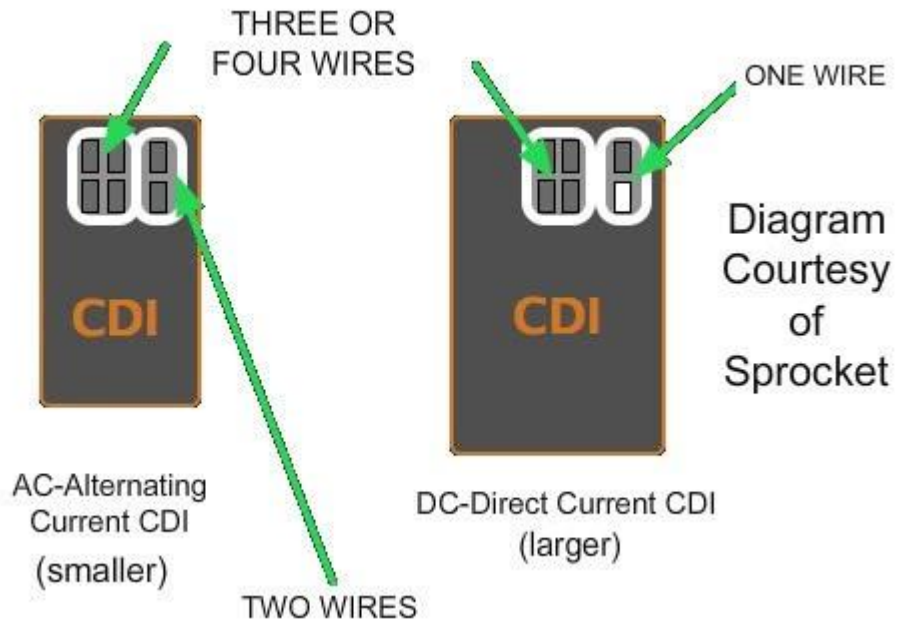


On the 5-wire AC powered system the scooter is shut off by grounding out the CDI when the ignition switch is in the "off" position by closing the black/white to green circuit. The "engine off" switch located on the handlebar on most scooters does the same thing, when pressed it closes the black/white to green circuit thus stopping the spark to the spark plug.

Below is a diagram of the most common AC powered CDI that is on a lot of scooters.



Now comes the DC powered CDI and how does one know the difference? Below is a diagram that explains the basic difference as far as what to look for on the CDI itself.



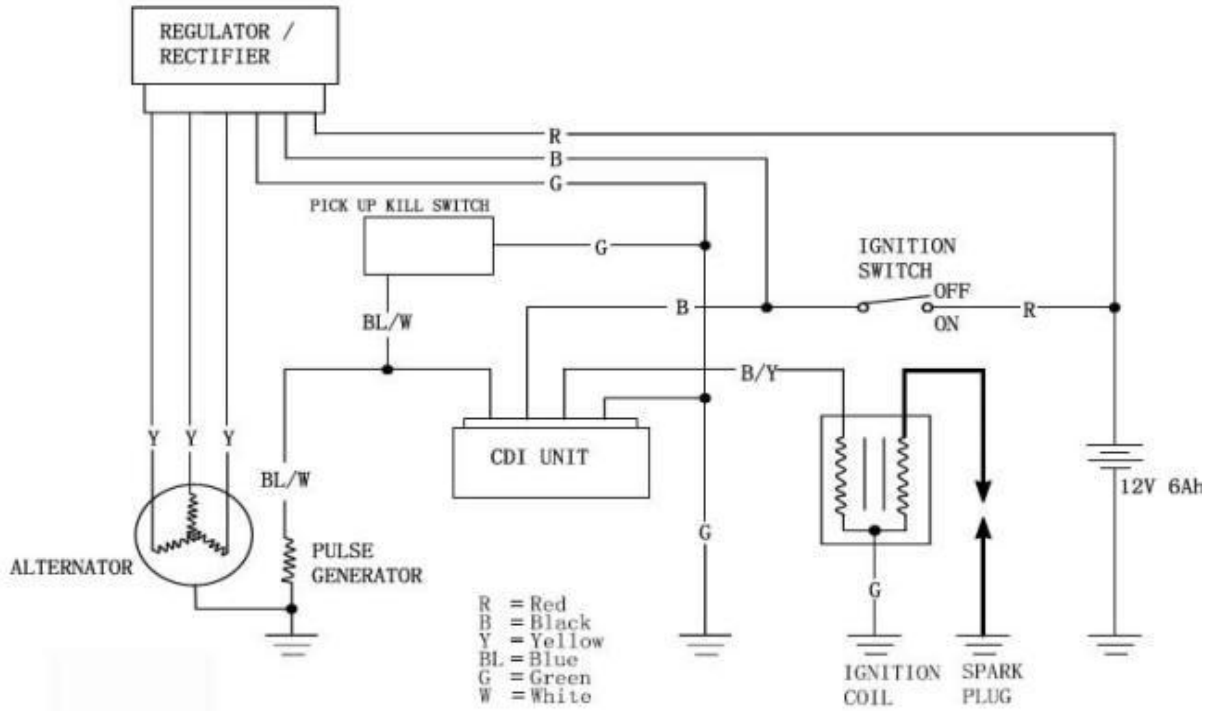
The picture below is an example of one of the noticeable differences of a AC versus a DC powered CDI







Here is another 4-wire DC powered CDI diagram and one can clearly see how the CDI gets its power source.

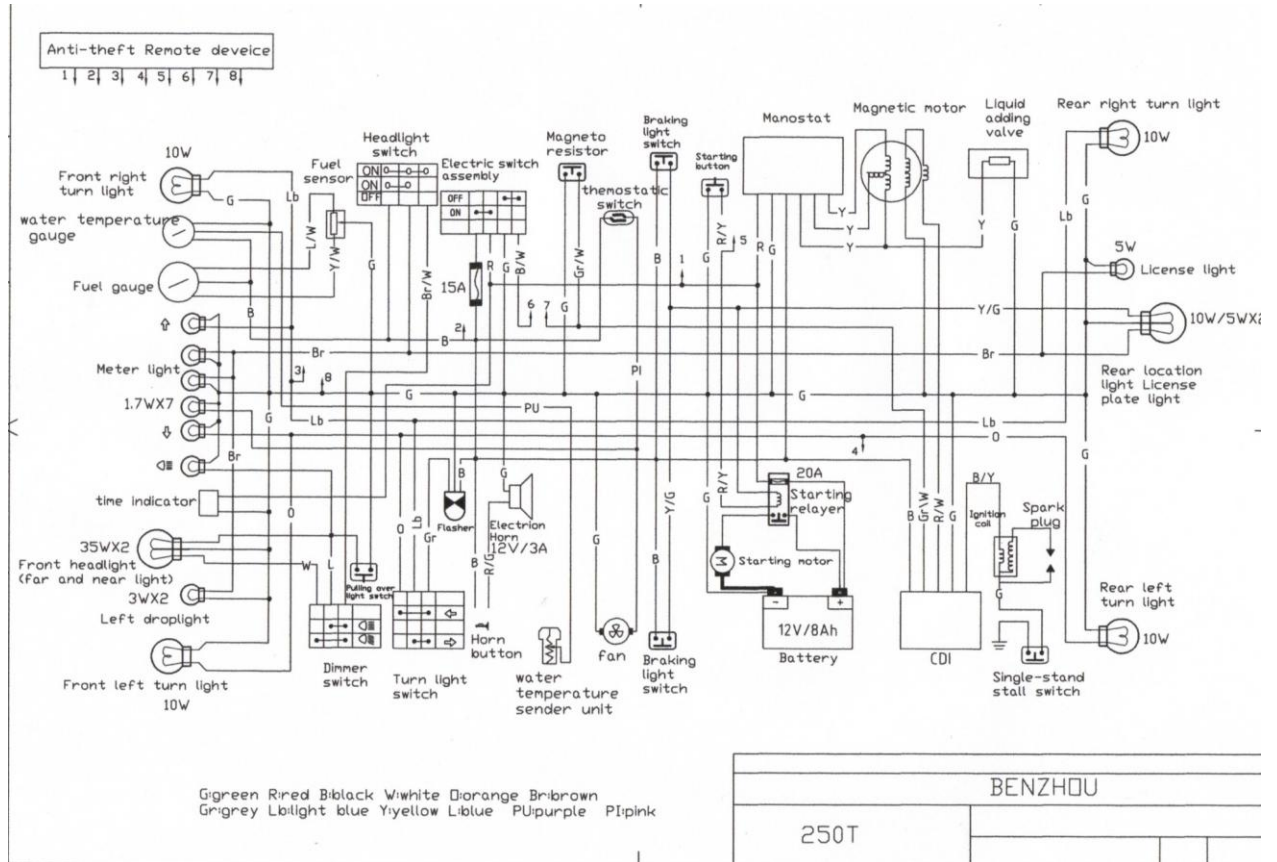


4-wire DC powered CDI

Common DC powered CDI



But as always there are some scooters that are different and here is a diagram of a DC powered CDI with the 5-wire pin out system which is common on a lot of 250cc and some 150cc scooter.



**DC powered 5-wire system on Roketa 250B scooter.**





To summarize the difference in an AC versus a DC powered CDI its simple;

**AC-CDI – The CDI module obtains its voltage solely from the current produced by the stator and is one of the most widely used basic systems in small engines.**

**AC-CDI- on the two plug part of the unit will always have 2 wires generally a black/red= stator power and a white/black = engine kill.**

**AC-CDI – scooter engine will run without a battery or on a dead battery.**

**DC-CDI- The DC-CDI module is powered by the battery so an additional DC/AC inverter circuit is needed in the module to step up the voltage from 12vdc to a range of 400-600vdc.**

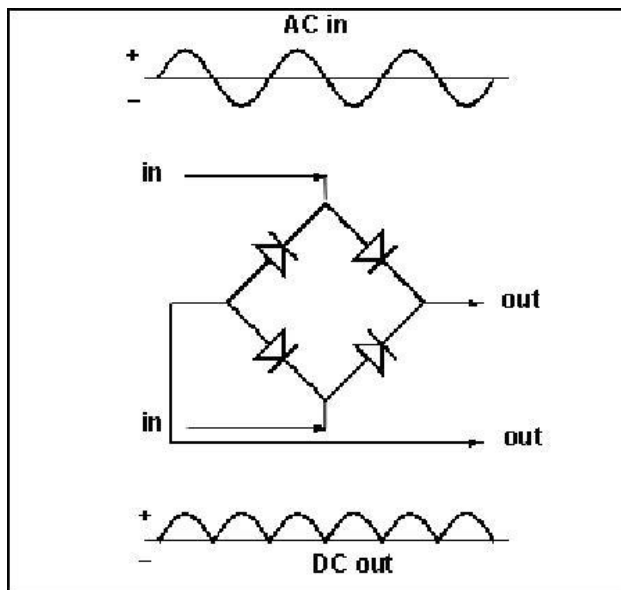
**DC-CDI – is a larger unit due to the additional circuit and engines running with a DC-CDI set-up have a more precise timing and generally start better when the engine is cold.**

**DC-CDI- on most scooters is a 4 wire set-up but has been known to have a 5 wire set-up also, the sure way to know is to check its power source.**

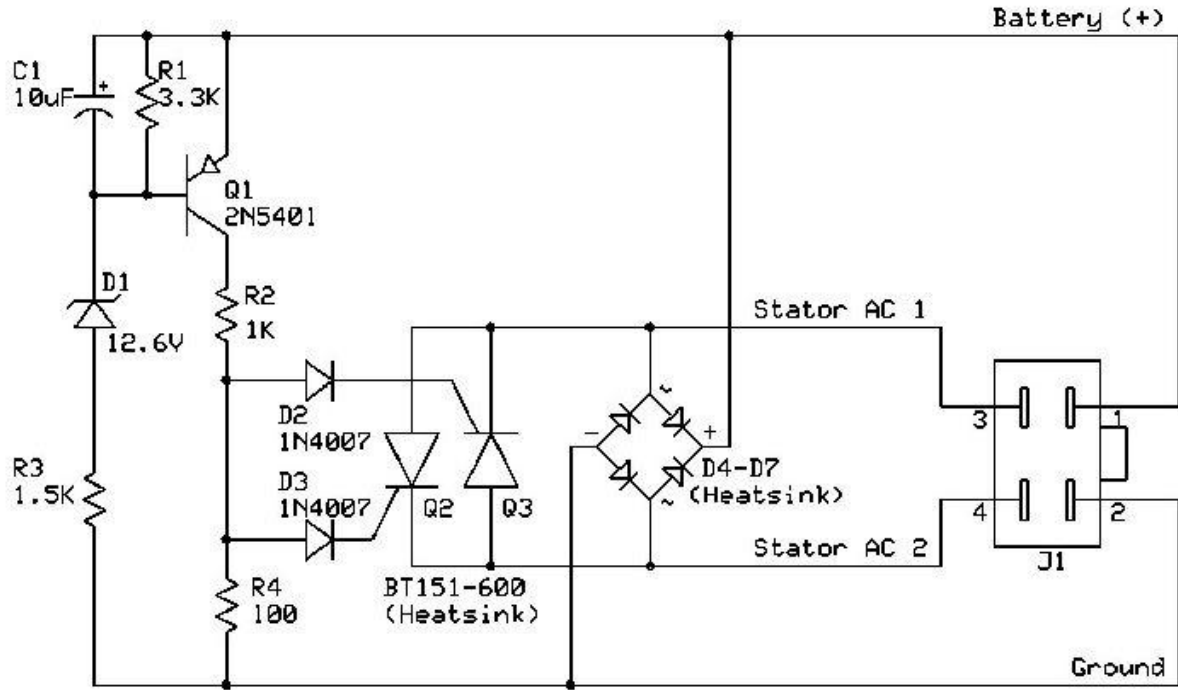
**So now we move on to the rectifier and you might ask:**

## What is a Rectifier?

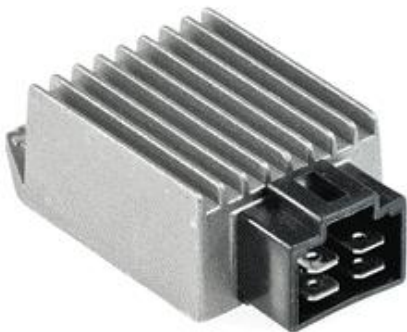
**A rectifier is a device used primarily in alternators that permits electrical current to flow in one direction only and converting the AC output of an alternator into DC voltage for battery charging.**



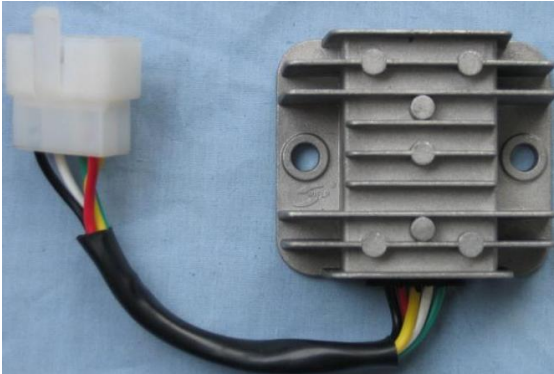
On diagrams and schematics one can see this electrical unit labeled as a rectifier, regulator or even a rectifier/regulator (R/R) and it is just that and performs a dual task rectifying the AC current to DC and regulating the output of the stator. Below is a diagram of a simple unit a single phase 4-pin R/R:



**Common 4-pin R/R on 50 and 150cc scooters:**



**Common 5-pin R/R for 150 and 250cc scooters:**



**Common 6-pin R/R**

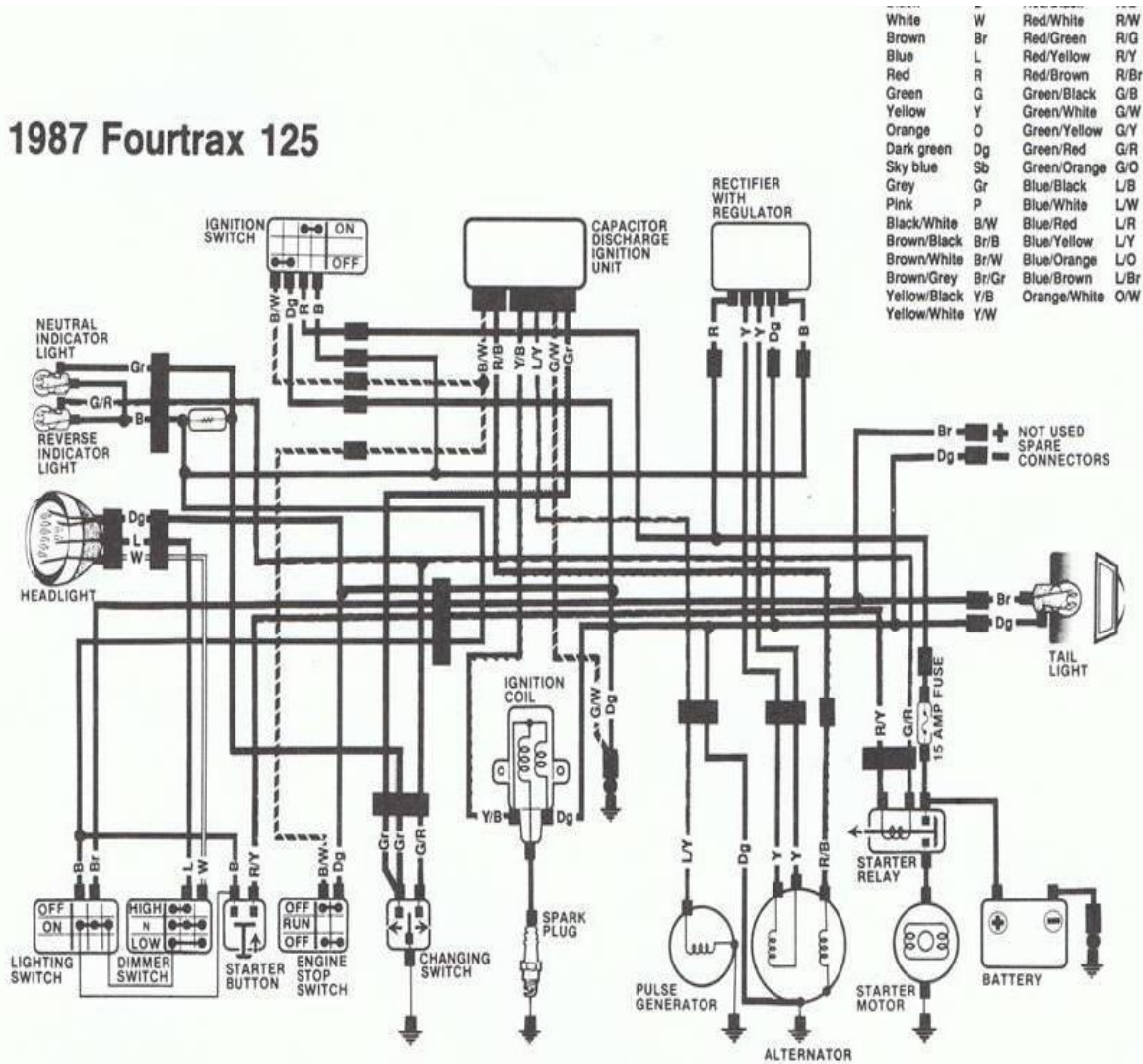


**Common 7- R/R**



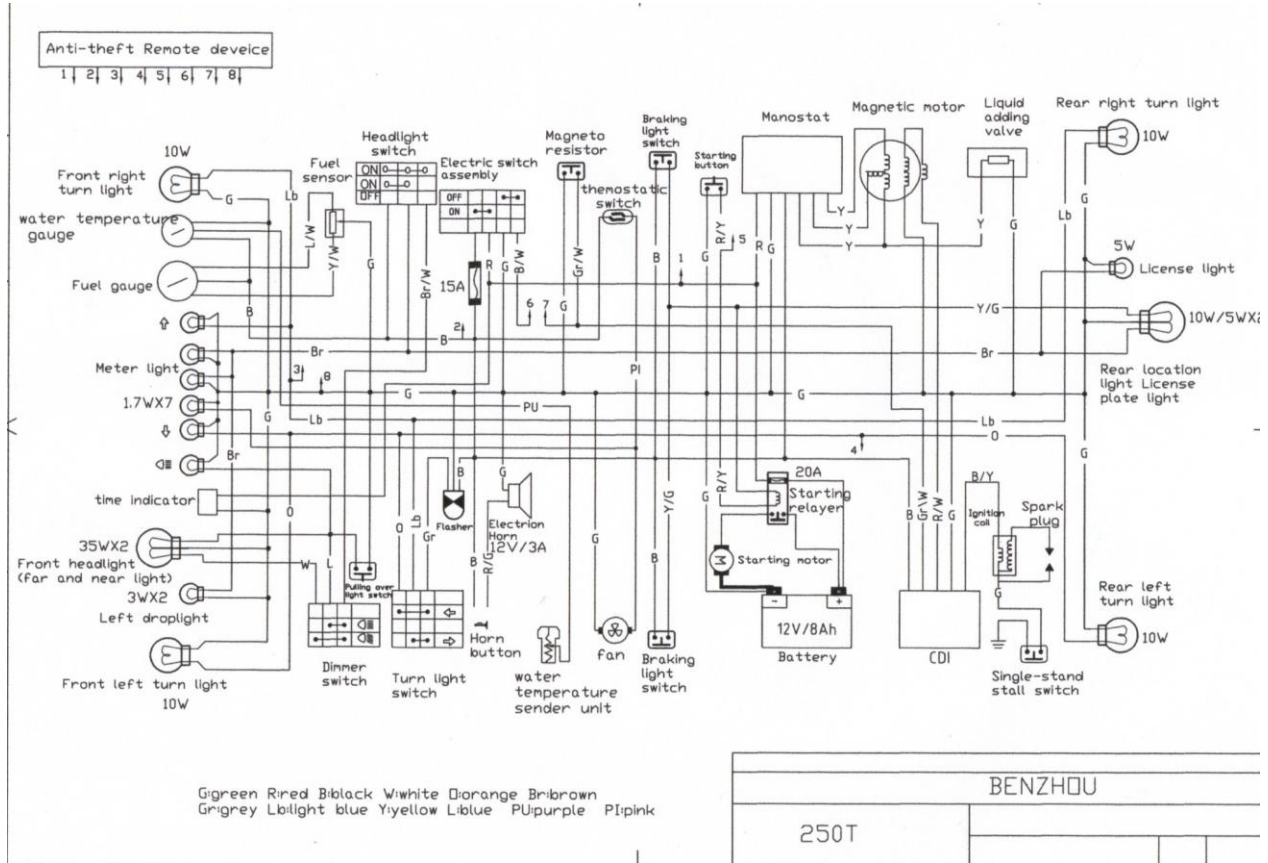
Wiring diagram 5-wire R/R

1987 Fourtrax 125



Both the 4-wire and 5-wire regulators above are on what is called single phase stators and have two AC inputs from the stator.

**Diagram for the 6-wire R/R (regulator is labeled manostat)**



Take note on the above diagram the 3 yellow wires coming from the stator and the 6-wire R/R like the following 7-wire R/R are both on what is called 3-phase stators which are more common on larger stators with more coils such as the 11 and 18 coil stators.



Below is the pin out of the 7-wire R/R and the 11 coil stator with wiring diagram:

