Because the three-phase charging system is notably different from charging systems usually found in Honda motorcycles, this bulletin is provided to assist shop personnel with routine servicing and trouble-shooting. (The single-phase charging system is the most commonly used system, and for example, is used with 350cc Honda motorcycles; the E.T. charging system is used with certain smaller machines, for example, the CT-70.)

At present, the three-phase charging system is used with the CB-500 and 750.

The major difference is in the generator and voltage regulator system, that is, the charging system. Whereas previous Honda motorcycles used a permanent magnet alternator, or dynamo", the three-phase system uses an excited field alternator which operates similar to the type used in most contemporary automobiles. As the alternator field is excited externally, it is possible to control the field current and therefore the alternator output, thus regulating the electrical system voltage.

The 12 volt, 3-phase, Y-wound alternator has a field winding excited by battery voltage. Unlike most alternators, both the field and alternator output windings are stationary. Therefore, this alternator has no brushes or slip rings. A soft iron rotor, which is not a permanent magnet, revolves between the inner field windings and the outer alternator output windings.

The regulator consists of a tapped resistor, a relay coil, and two sets of contacts. The upper set of contacts (the contacts furthest from the relay coil) are normally closed; the lower contacts are normally open.

CIRCUIT DESCRIPTION

I. The charging system includes:

1. Excited field, 3-phase alternator
2. Rectifier
3. Battery
4. Voltage regulator
5. Distribution fuse
6. Total alternator load

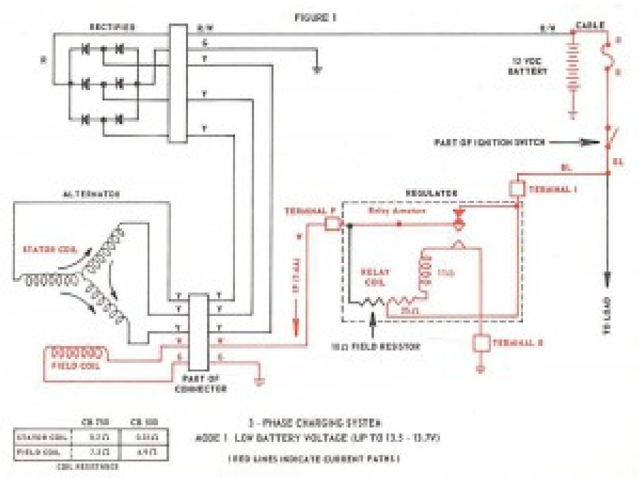
II. There are several factors that determine the output voltage of an alternator, but in the Honda 3-phase charging system there are only three variable factors that can change alternator output:

1. Speed of alternator
2. Field current
3. Total alternator load

An increase in alternator speed causes increased output voltage. Increased field current increases output voltage. A decrease in alternator load causes an increased output voltage.

III. The system has three modes of operation controlled by the voltage regulator:

MODE 1: The battery voltage is below normal, the ignition switch is closed (on).



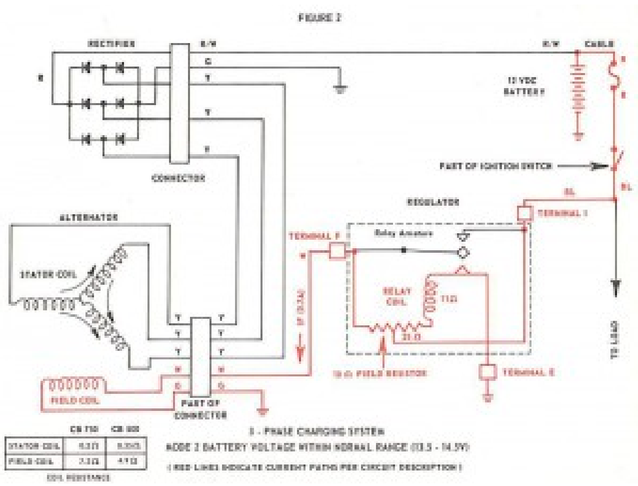
The current paths are:

a. From positive battery through fuse and upper contacts of regulator to field and then ground.

b. From battery positive through fuse and part of regulator resistor and relay coil to ground. The current through the relay coil does not produce a sufficiently strong magnetic field to move the relay armature and open the upper set of contacts.

In this mode the battery is directly connected to the field, causing maximum field current (1.6 amps). Maximum field current causes high alternator output voltage, thus a high battery-charging voltage.

MODE 2: The battery voltage is within normal range; the ignition switch is closed (on); the regulator's upper set of contacts are now open.



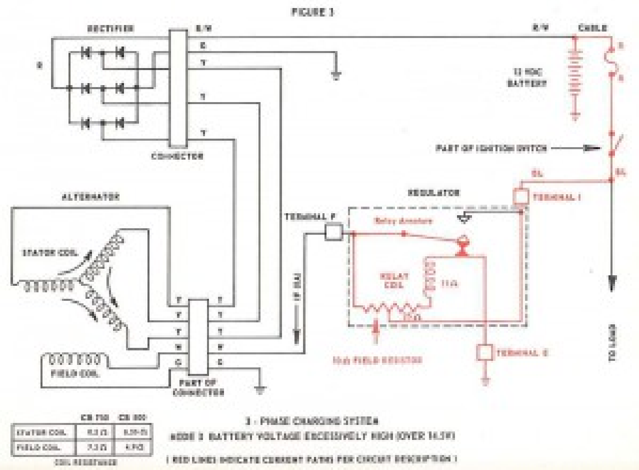
The current paths are:

a. From positive battery through fuse and field resistor to field and then ground. The additional resistance in the field circuit, as compared to first Mode, causes less current through the field (0.7 amps); therefore, there is a low alternator output voltage to the rectifier and a lower rectifier and battery voltage.

b. Second path is the same as the second path in first Mode, except that the current through the relay coil is greater and does provide a strong enough magnetic field to move the relay armature away from the upper stationary contact, but not strong enough to close the lower set of contacts.

The reason the relay coil current is greater than in the first Mode is because the battery voltage is higher.

MODE 3: Battery voltage is excessively high; ignition switch is closed (on). The regulator's lower set of contacts are now closed.



The current paths are:

a. From positive battery through fuse and field resistor, through the closed lower contacts of the regulator and then to ground. No current goes through the field (0 amps), and the alternator has no output; therefore, no rectifier output and consequently a lower battery voltage.

b. Same as second path in Mode 1 and 2, except the current through relay coil is so great due to excessively high battery voltage that the magnetic field of the relay coil is strong enough to move the relay armature to close the lower contacts of the regulator.