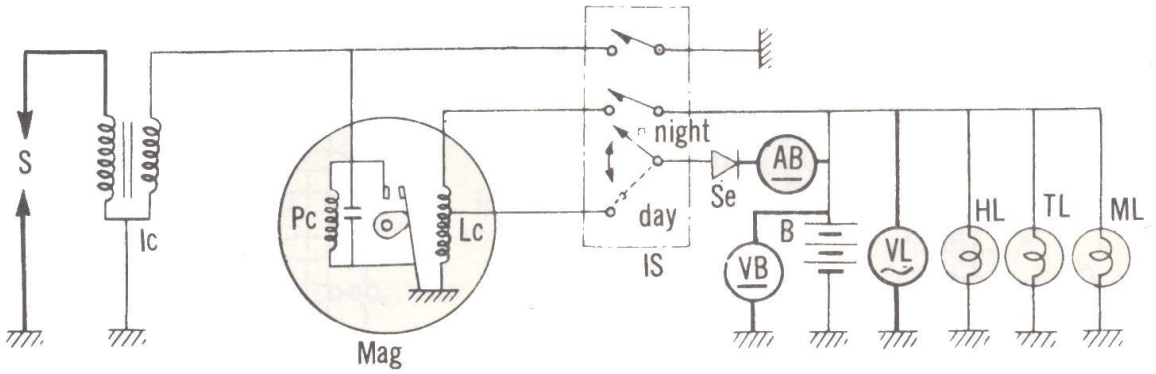


Mag	Flywheel magneto	AB	D.C. ammeter (Charging current inspection)
LC	Lamp coil	VL	A.C. voltmeter (Ignition voltage inspection)
SE	Selium rectifier	VB	D.C. voltmeter (Battery voltage inspection)
B	Battery	S	Three-prong tester (Spark gap inspection)
HL	Headlamp	PC	Primary coil
TL	Tail lamp	LC	Lamp coil
ML	Speedometer lamps	IS	Ignition switch

2. Measure resistance between either primary terminal and the secondary high voltage terminal. Resistance should be in the range of 5,000 to 11,000 ohms.

If a coil tester is available, connect the coil to the tester and use a 6-volt battery as a power source. Use the 3-prong gap to test coil performance. The coil should produce a quarter-inch spark. If there is reason to suspect that the coil may be breaking down under load, continue the test for five minutes.

STARTER/GENERATOR

Some models are equipped with a combination starter/generator instead of the flywheel magneto. The unit operates as a generator when the engine is running, and as a starting motor when it is stopped. Associated with the starter/generator are a cutout relay, voltage regulator, and starter relay. **Figure 147** is a schematic diagram of the associated circuitry. Refer to this diagram during the following discussion.

Starter Relay

The starter relay is enclosed within the voltage regulator unit. When the starter switch is pressed, the relay coil is energized, and closes the relay contacts. Current then flows from the battery, through the relay contacts, and finally through the series field winding of the starter/generator.

Cutout Relay

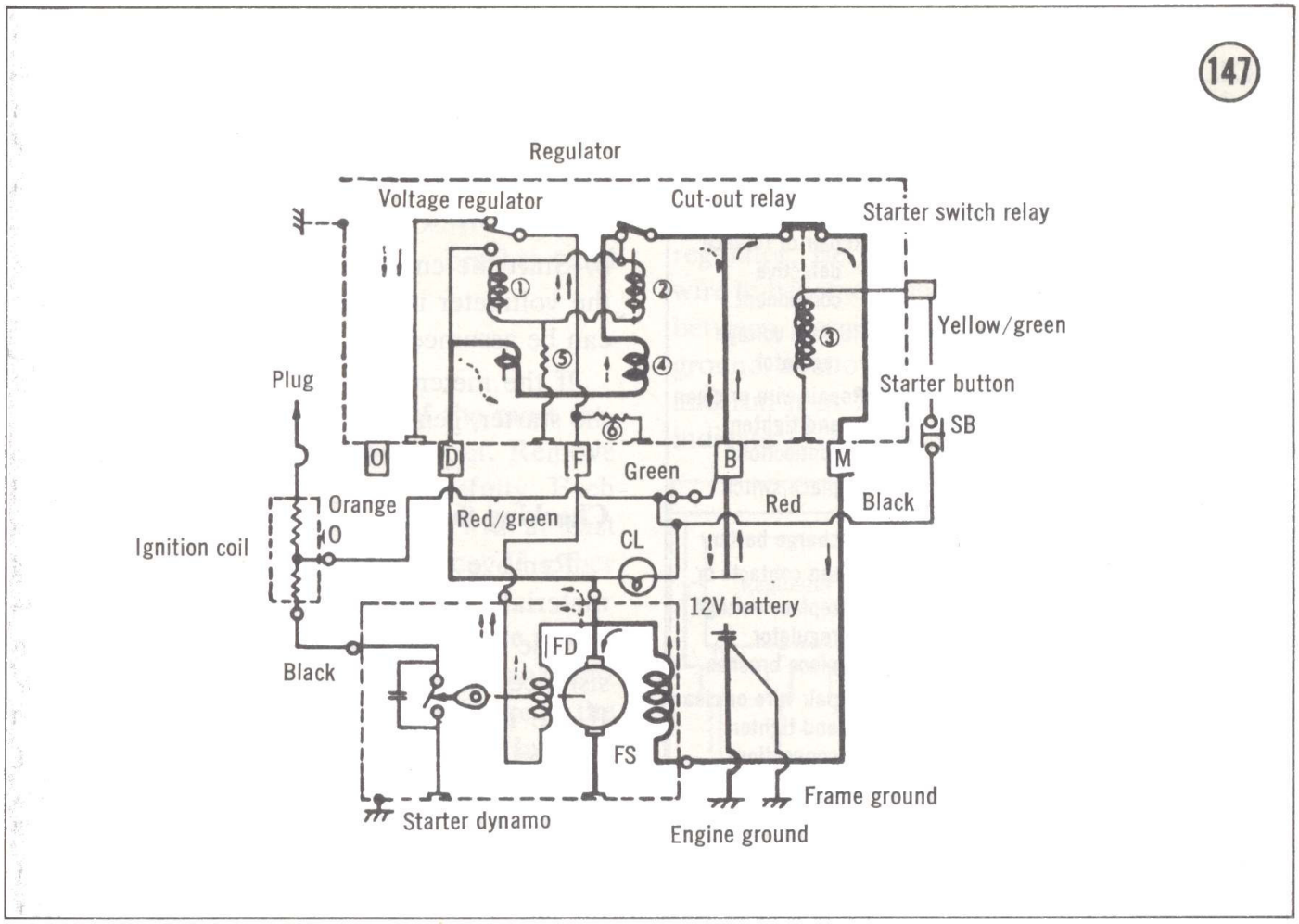
When the engine is off, or running at low speed, the battery must be disconnected from the generator to prevent it from discharging. The cutout relay performs this function. As engine speed increases, output voltage of the generator increases to a value sufficient to charge the battery. When this occurs, a voltage sensing coil in the cutout relay causes the cutout relay contacts to close, and thus permit current to flow from the generator to the battery and external loads. As the engine slows down, generator output decreases, and current tends to flow from the battery to the generator. A second coil in the cutout relay senses this reverse current and allows the contacts to again open, thereby disconnecting the battery and generator.

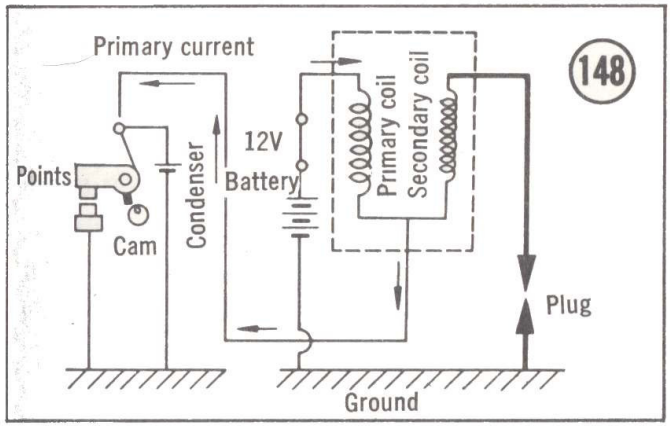
Voltage Regulator

Varying engine speeds and electrical loads affect generator output. The voltage regulator maintains output voltage at a constant level by controlling the field current in the generator.

Ignition Operation

Figure 148 depicts the ignition system on these machines. When the breaker points are closed, current flows from the battery through the primary winding of the coil, thereby building a magnetic field around the coil. The breaker cam





rotates with the crankshaft, and the points are set to be opened by the breaker cam when the piston reaches firing position.

As the points open, the primary current is interrupted, causing the magnetic field to collapse. As the magnetic field collapses, a very high voltage (approximately 15,000 volts) is induced in the secondary winding of the ignition coil. This high voltage is sufficient to jump the spark plug gap.

The condenser serves primarily to protect the points. Inductance of the ignition coil primary tends to keep a surge of current flowing through the circuit even after the points have opened. The condenser stores this surge and thereby prevents arcing and burning of the points.

Starter/Generator Troubleshooting

Malfunctions within the starter/generator system ca nbe divided into three main categories.

a. Starter does not work properly.
b. Generator output is too low, resulting in an undercharged battery.
c. Generator output is too high, resulting in an overcharged battery.

Starter Troubleshooting

Table 28 lists symptoms, probable causes, and remedies for starter malfunctions.

Generator Troubleshooting

In the case of charging system malfunctions, it is necessary to determine whether the generator or the regulator is at fault. To determine which, refer to **Figure 149**, then proceed as follows.

Table 28 STARTER TROUBLESHOOTING SUZUKI SINGLES

Symptom	Probable Cause	Remedy
Starter does not work	Low battery	Recharge battery
	Worn brushes	Replace brushes
	Internal short	Repair or replace defective component
	Relay inoperative	Replace voltage regulator
	Defective wiring or connections	Repair wire or clean and tighten connections
	Defective switch	Replace switch
Starter action is weak	Low battery	Recharge battery
	Pitted relay contacts	Clean contacts or replace voltage regulator
	Brushes worn	Replace brushes
	Defective wiring or connections	Repair wire or clean and tighten connections
	Short in commutator	Replace commutator
Starter runs continuously	Stuck relay	Dress contacts or replace voltage regulator

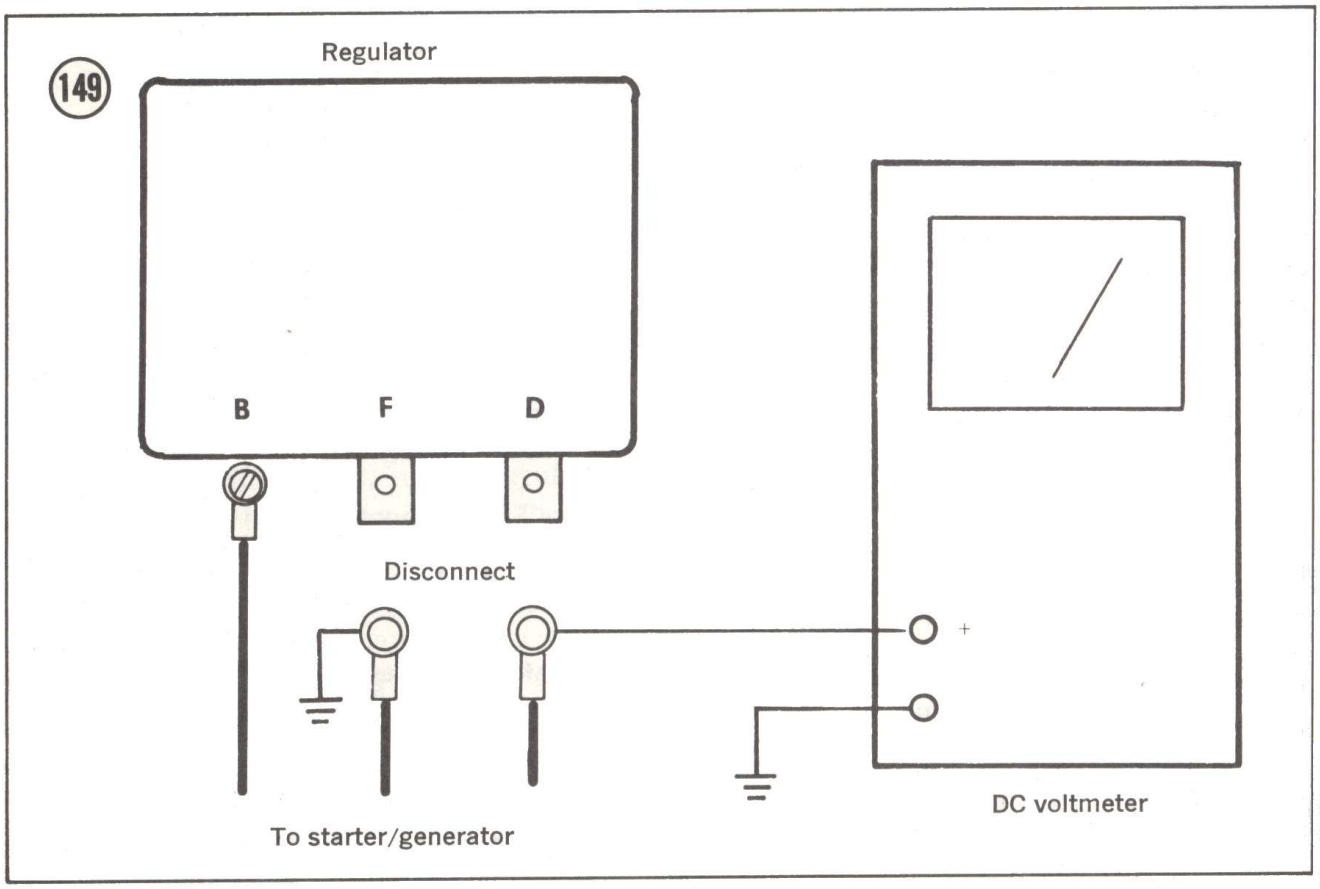
1. Disconnect wires from terminal D and F of the regulator.
2. Connect the wire which you removed from terminal F to a good ground. Connect an accurate voltmeter (0-20 VDC) between the wire removed from terminal D and ground.
3. Start the engine and run it at 2,500 rpm. If the voltmeter indicates more than 15.1 volts, it can be assumed that the generator is OK.

If the meter indication was not as specified, the starter/generator is faulty.

Checking the Stator

Remove the yoke and clean it of all foreign material.

1. Use an ohmmeter to measure insulation resistance between the positive brush and ground. If the meter indicates continuity, check for a short circuit at the brush holder or terminal D. Note that the negative brush holder is not insulated.
2. Measure the resistance between terminals F and D. Field coil resistance should be from 5 to 8 ohms.



3. Set the ohmmeter to its highest range. Measure insulation resistance between terminal F and a good ground. Insulation resistance should be essentially infinite.

If the readings obtained in Steps 2 or 3 are not as specified, replace the stator. If the stator assembly is good, check the brushes and armature.

Checking the Brushes

Poor brush condition is one of the most frequent causes of low generator output. Remove the brushes and examine them carefully. Each brush must contact the commutator with at least three-quarters of its contact surface. If either brush is worn excessively, replace both.

If the brushes and the commutator are rough, misalignment of the armature and crankshaft may be the cause. Check the tapered bore of the armature and smooth it if there are any burrs.

When you replace the brushes, be sure that the positive brush lead doesn't touch the brush holder or the edge of the breaker plate. Also be sure that the negative brush lead doesn't touch the positive brush spring.

Checking the Armature

1. Clean the commutator of oil, dust, and foreign material.

2. If the commutator is rough or covered with carbon dust, polish it with fine sandpaper. If a light polishing does not clean up the surface, remove the armature and turn the commutator in a lathe. Do not reduce the commutator diameter by more than 0.08 inch (2 millimeters). Be sure to remove all traces of emery dust.

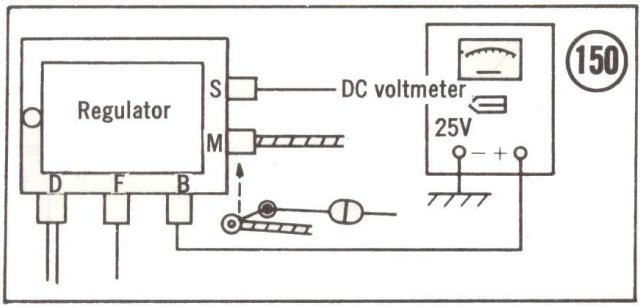
3. Undercut the mica segments between the commutator segments with a hacksaw blade to a depth of 0.02 to 0.04 inch (0.5 to 1.0 millimeter). Remove dust from between segments.

4. Use an ohmmeter or armature growler to determine that no commutator segment is shorted to the shaft. If any short exists, replace the armature.

Checking the Regulator

Varying engine speeds and electrical loads affect generator output. The regulator controls the generator output, and also disconnects the battery from the generator whenever the generator output voltage is less than that of the battery, thereby preventing battery discharge through the generator.

Disconnect the wire from terminal B at the regulator. Be careful that you don't allow this wire to become grounded. Connect the voltmeter between terminal B on the regulator and ground, as shown in **Figure 150**. Start the engine and run it at 2,500 rpm. The voltmeter should indicate 15.1 to 16.3 volts.



Observe the contacts on the cutout relay as you slowly increase the engine speed. The contacts should close when the voltmeter indicates 12.5 to 13.5 volts.

Adjusting the Voltage Regulator

CAUTION

Disconnect the battery before removing the regulator cover. Do not make any adjustments with the battery in place.

Remove the regulator cover and adjust by bending the adjustment spring. Bending the spring downward raises the voltage setting. The voltage regulator can be identified by its two contact points.

The cutout relay can be identified by a single set of contacts which are normally open. The relay rarely, if ever, needs adjustment. Usually all that is required is to dress the contacts lightly to remove any corrosion or light pitting. Should adjustment be required, bend the spring retainer up or down as required. Lowering the spring retainer raises the voltage setting.