

# YAMAHA SINGLES

Flywheel magnetos supply ignition current for most models; a few models, such as AT1, have battery ignition systems. Part I of this chapter discusses troubleshooting and operating principles of battery ignition systems; Part II contains similar treatment of magneto systems. Refer to Chapter Five for individual tune-up procedures.

## AT1-TYPE CHARGING SYSTEM

This type system is equipped with a combination starter/generator (Figure 198, next page). This unit functions as a motor for engine starting, and as a generator when the engine is running. Figure 199 is a circuit diagram of a typical starter/generator system.

### Checking Generator Output

To check output of the generator, proceed as follows.

1. Disconnect the white wire from terminal A.
2. Disconnect the green wire from terminal F.
3. Connect terminal E to terminal F with a jumper.

4. Connect the positive lead of a voltmeter to terminal A; connect the negative lead to ground.

5. Start the engine and run it at 1,800 rpm. Do not run the engine at a higher speed, as this will damage the coil and other electrical components.

6. If the voltmeter indicates 10 volts or more, the generator is in good condition.

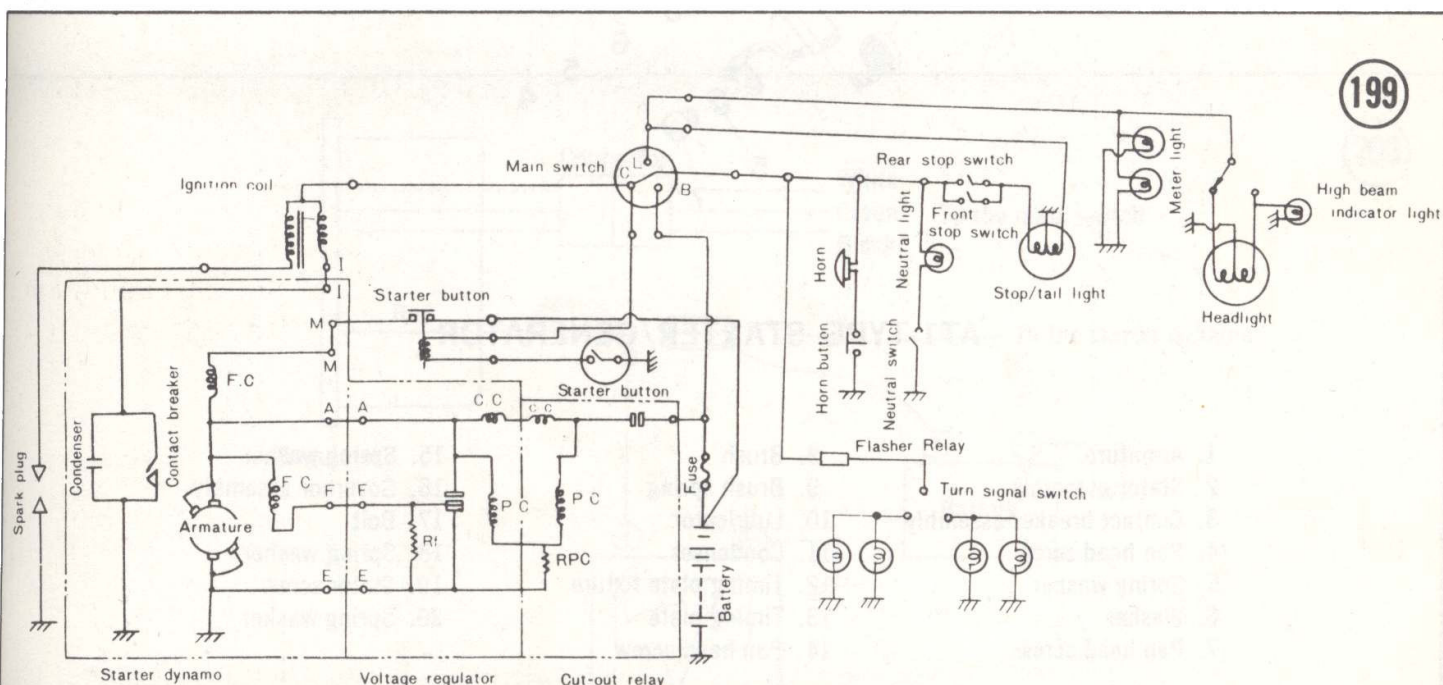
### Checking the Yoke

Before checking the yoke, clean it with a rag to remove carbon dust, oil, and other foreign material.

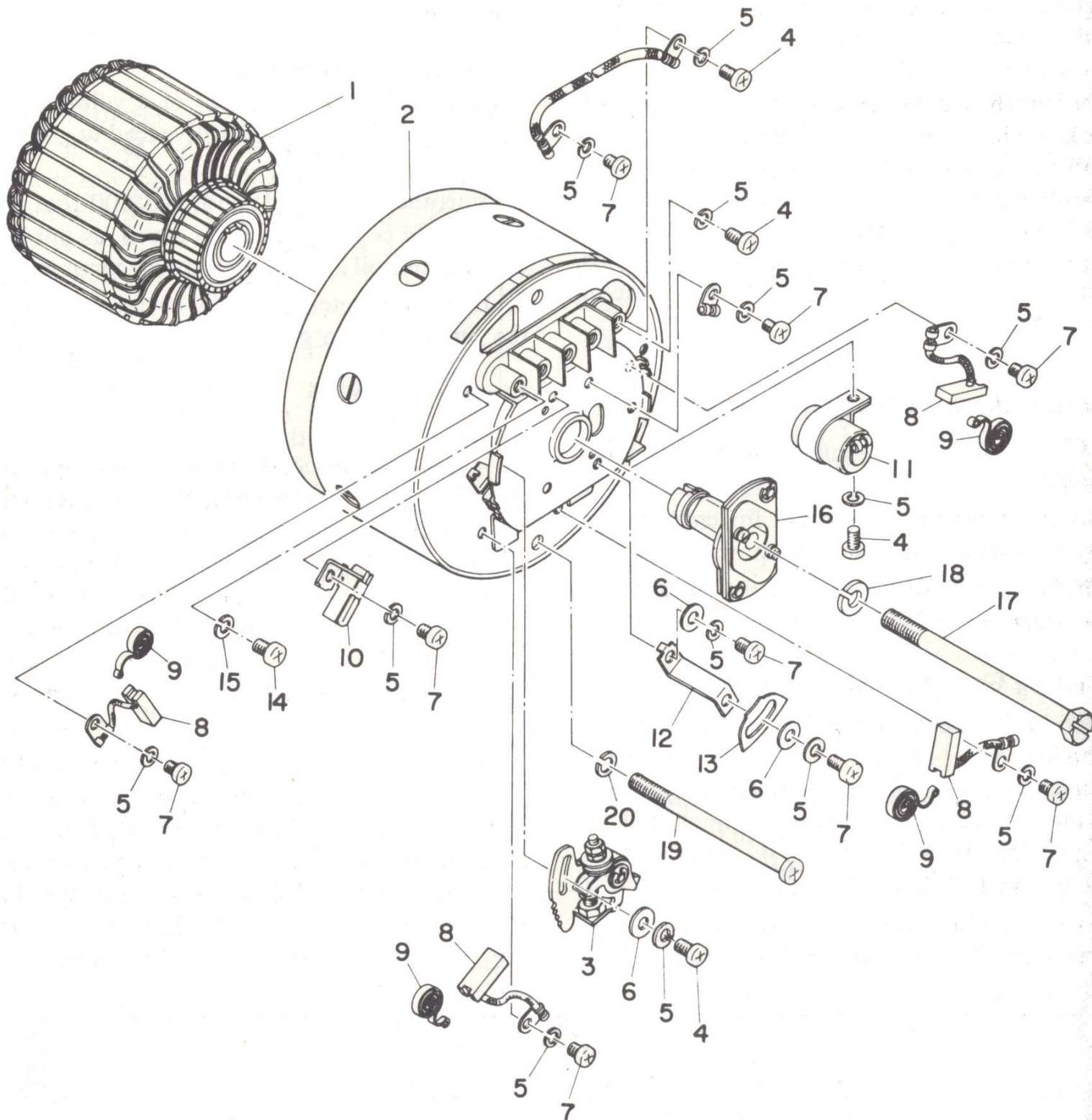
1. With the yoke removed, use an ohmmeter to be sure the positive brush is not shorted to ground.

2. Use the ohmmeter to determine continuity between terminals M and A, and between terminals A and F. If there is no continuity, and coil connections are good, replace the coil.

3. Poor brush condition is one of the most frequent causes of generator trouble. Remove the brushes and check them carefully. Each brush must contact the commutator with at least three-quarters of its contact surface.



AT1-TYPE CHARGING SYSTEM CIRCUIT



### AT1-TYPE STARTER/GENERATOR

- |                             |                          |                       |
|-----------------------------|--------------------------|-----------------------|
| 1. Armature                 | 8. Brush                 | 15. Spring washer     |
| 2. Stator assembly          | 9. Brush spring          | 16. Governor assembly |
| 3. Contact breaker assembly | 10. Lubricator           | 17. Bolt              |
| 4. Pan head screw           | 11. Condenser            | 18. Spring washer     |
| 5. Spring washer            | 12. Timing plate fixture | 19. Stator screw      |
| 6. Washer                   | 13. Timing plate         | 20. Spring washer     |
| 7. Pan head screw           | 14. Pan head screw       |                       |



If brushes and commutator are rough, misalignment of the armature and crankshaft may be the cause. Check the tapered bore of the armature and smooth it if any burrs are found. If either brush is worn beyond the minimum length mark, replace both brushes. When you replace brushes, be sure that the positive brush lead doesn't touch the brush holder or the edge of the breaker plate. Also be sure the negative brush lead doesn't touch the positive brush spring.

### Checking the Armature

1. Clean the armature of oil, dust, and foreign material.
2. If the commutator is only slightly rough, it may be polished with fine sandpaper.

If the commutator is out-of-round, burned, or too rough to polish, remove it, and turn it on a lathe. Do not turn it to a diameter of less than 1.5 inches (38 millimeters).

3. If the commutator has high mica, undercut the mica segments with a broken hacksaw blade or mica undercutting tool. Be sure that there is no thin mica edge next to the commutator segments. The mica should now be undercut 0.02 to 0.032 inch (0.5 to 0.8 millimeters).

4. Use an ohmmeter or armature growler to determine that no commutator segment is

shorted to the shaft. If any short circuit exists, replace the armature.

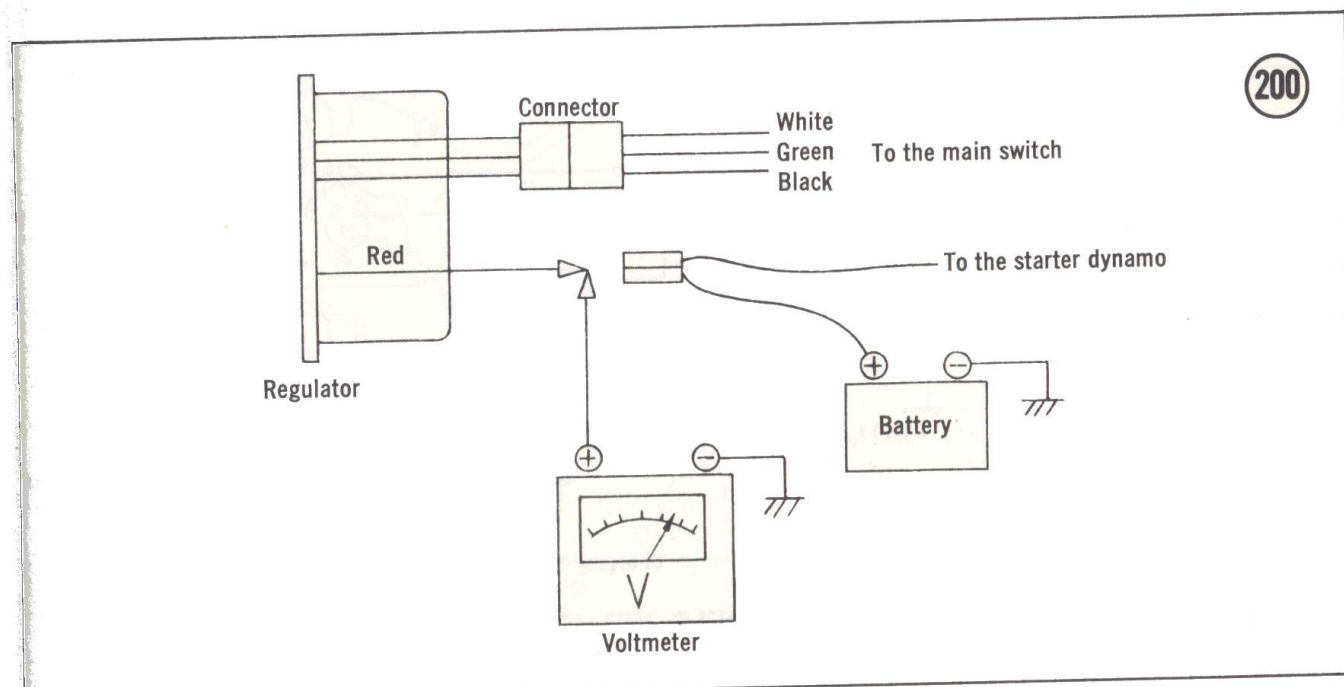
### Checking the Voltage Regulator

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

**NOTE:** Do not attempt to make the following adjustments unless you have a voltmeter of known accuracy.

To measure no-load voltage, disconnect the red wire from the regulator, then connect voltmeter probe to that wire. Ground the negative lead of the voltmeter. Start the engine and allow it to run at 2,500 rpm. **Figure 200** illustrates the connection. If the voltmeter does not indicate 15.8 to 16.5 volts, adjust the regulator output voltage with the adjustment screw on the regulator.

To measure cut-in voltage of the cutout relay, disconnect the wire from terminal A on the generator. Connect the positive lead of the voltmeter to terminal A; ground the negative lead. Start the engine, and slowly increase its speed as you observe the voltmeter. The cutout relay should close between 12.5 and 13.5 volts.



Under normal circumstances, the cutout relay will rarely, if ever, need adjustment. If the contacts are pitted or worn, dress them with fine emery cloth before adjustment.

CHOKE COIL

Some models are equipped with a choke coil in the night lighting circuit. As engine rpm increases, so does the frequency of the output of the lighting coils in the magneto. Inductance of the choke coil tends to maintain the current to the lights at a more constant level.

No maintenance on the choke coil is required. If its condition is doubtful, check it for continuity and insulation from ground with an ohmmeter.

WIRING

Figure 201 is a typical wiring diagram for machines without self-starters. There is some variation between the various models, such as in front brake stoplight switches and turn signals.

Table 38 lists the various wire colors and circuits within the wiring harness.

MAIN SWITCH

Service on the main switch is limited to checking for continuity of the various circuits. Table 39 lists conditions under which various elements in the switch should make contact.

Table 38 WIRING CIRCUIT COLORS

Circuit	Color
Charging circuit (day)	Green
Charging circuit (night)	Green/red (90cc yellow)
Battery	Red
Ground	Black
Front stoplight	Green/yellow
Rear stoplight	Yellow
Taillight	Dark blue
Headlight/meter light	Dark blue
Neutral indicator	Light blue
Horn	Pink
Rectifier	White
Right turn	Dark green
Left turn	Dark brown
Flasher relay	Brown/white
Ignition coil	Orange
Starter switch	Blue/white
Starter circuit	Light green

Table 39 MAIN SWITCH CIRCUIT CONTINUITY

Position	Terminals connected
0 (off)	Black-switch body
I (day)	green-white red-brown
II (night)	yellow-white white-blue red-brown