

Electrical Troubleshooting Procedure





ELECTRICAL SYSTEM

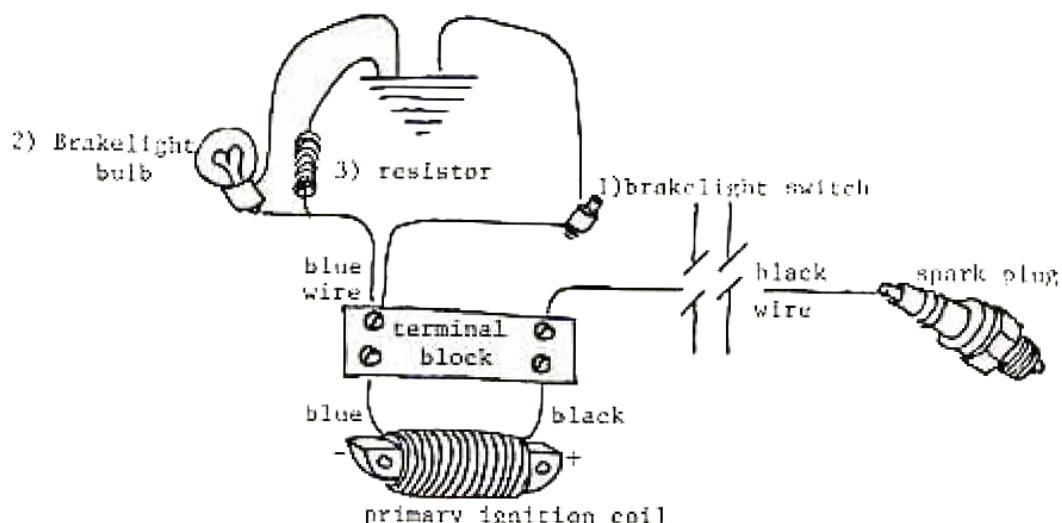
The electrics on a Garelli moped control two functions: creating a spark at the plug electrode and controlling the lights. Therefore, you may encounter the following electrical system problems.

- I. NO SPARK
- II. ERRATIC SPARK
- III. INTERMITTENT SPARK
- IV. PROBLEMS WITH HEADLIGHT, TAILLIGHT, AND HORN

These first three will all prevent the engine from running or running well. Problems in the lighting system (headlight, taillight, or horn) will not interfere with engine performance. It is important to understand references to the taillight mean the taillight circuit itself and do not include the brakelight (though they are housed behind the same lens).

The brake light system is operated off the ground side of the ignition coil. The ignition coil can ground itself by three means. First, through the brakelight switches, second through the stop light filament and third through the brakelight resistor. When the brake levers are in their normal positions, not being applied, the ignition coil reaches ground through the switches. Once the brakes are applied, pulling one or both of the brake levers, the path to ground is opened forcing the ignition to reach ground through the brakelight filament which in turn causes the bulb to come on.

THREE WAYS TO GROUND



NOTICE: In the event the brakelight is not in working order or blown, ignition will reach ground through the third path, the resistor. If there is a poor ground under the rear fender, anytime the brakes are applied the engine will die. On the older model bikes the resistor was not used, therefore, anytime the brakelight bulb is blown and the brakes are applied the engine will die.



HOW TO TROUBLE SHOOT

Always take time to diagnose the problem before attempting a repair. Given lots of experience a symptom will automatically suggest a specific problem and cure. However, most of us are just as likely to start repairing a healthy component as we are to luck onto the faulty one. Therefore, I recommend following this diagnostic procedure systematically on every bike suffering electrical problems. Best of all it is quick and requires no tools or meters and will locate where the problem is without any guessing.

WHERE TO BEGIN

Start work at the terminal block, most easily accessible by removing the four screws that retain the right engine cover (as you sit on the bike). Gently tug the wiring harness from under the foot rest cover to reveal the terminal block.

The black wire (originating at the low tension ignition coil within mag) goes via the kill switch to the high tension coil from which the spark plug wire emerges.

The blue wire (originating at the low tension ignition coil within mag) goes via the brakelight switches to the brakelight bulb.

The yellow wire (originating at the lighting coil within the mag) goes via the horn to the left handlebar switch and from there via red to the headlight and via grey to the taillight.

TEST PROCEDURE

I. NO SPARK

1) Go to terminal block, disconnect the blue wire and ground it to the engine cases. If when you turn the engine over with the spark plug held to the outside of the engine it sparks, the problem is in the brake-light system. Either the brake switches, brakelight bulb, or the blue wire running under the rear fender. --- (SEE III TO DETERMINE WHICH)

2) If still no spark disconnect the blue wire and ground it to the engine cases, and take the black wire from the mag (via jumper wire) directly to the high tension coil (the clips on both ends). This eliminates kill switch.

3) If neither of these procedures produce a spark next try a coil from another bike.

4) Supposing a new coil yields no spark, it is time to check that the mag is putting out current. This can be done quite simply without special tools or meters. Insure the blue wire is grounded to engine cases and hold the black wire against the edge of the magneto. Turn the engine over as if to start and a healthy spark should appear between the black wire



and the outside edge of the mag. This indicates the points are opening and the low tension ignition coil, condensor, and mag are putting out current (it does not guarantee the points are gapped correctly or in time).

So by following this procedure you are left with only the magneto components to trouble shoot by symptoms. The following list should assist.

POSSIBLE PROBLEMS IN MAGNETO

(Arranged in approximate frequency of occurrence)

- 1) Points not opening (adjust)
- 2) Point backing plate corroded (replace)
- 3) Condensor defective (replace)
- 4) Yellow wire from points to condensor worn thru (replace yellow wire)
- 5) Primary ignition coil wires, black wire (+), blue wire (-) worn thru by rubbing crank shaft behind stator plate. (replace wires)
- 6) Mag backing plate cracked allowing points to flutter (replace backing plate)
- 7) Woodruff key sheared (replace woodruff key)
- 8) Failure of primary ignition coil (using VOM set on OHM, check for continuity, besides visual inspection for damaged wires.)
- 9) Defective rotor (substitute; if necessary replace)

Make appropriate repairs to mag and recheck the brakelight system (blue wire) and high tension coil system (black wire) if such repairs do not create spark at plug.

This entire diagnostic procedure, excluding magneto repairs, if you get in the habit of performing it should take from five to ten minutes. Because of its quickness and because it requires no experience in diagnosing symptoms, I recommend you perform it before work begins on any bike that comes in with no spark.

II. ERRATIC SPARK

The erratic spark (a spark which when you check is sometimes there and sometimes absent) is most difficult to diagnose by procedure and all I can recommend is to follow the testing method to eliminate brakelight system and kill system and begin substitution of magneto components. This advice only applies to bikes that pass a visual inspection. If kill switch is broken or near broken, if either taillight ground wire, or ground wire under footrest are not making good contact (paint should be scraped off to reveal metal) then these repairs should precede magneto work.

III. INTERMITENT SPARK

An intermitent spark (bike starts runs well. dies then immediately restarts), usually means brakelight system fault (spark stops when brakes applied). It is easy to check switches and blue wire leading to taillight. Simply go to terminal block, notice two blue wires, join blue wire from mag. One of these goes to brake switches and the other travels under fender to brakelight. By disconnecting one and checking for spark then substituting the other you can determine which is at fault.



Variation of the intermittent spark (bike runs dies and restarts shortly thereafter) is symptomatic of impending failure of the high tension coil, low tension coil or condensor. In the case of electrical parts what is happening is that as the component heats up, the insulation can break down causing the coil to short out. As soon as it cools off it is possible that it will again have continuity (to be able to pass current). Testing such components is complicated by this intermittent breakdown and unless a continuity test can be performed while system is overheated and not functioning the only recourse is replacement by trail and error.

NOTE: An engine may also exhibit the behavior of running, stopping and restarting, quite independent of an electrical problem. Most likely this is indicative of piston seizure or carburetion problems. See carburetion trouble shooting chart.

IV. LIGHTING SYSTEM

Problems within the headlight, taillight, (not including brakelight) and horn will not affect the ignition system but nonetheless component failure may require trouble shooting. Obviously if a particular component fails then replacement is in order.

Should the entire system ever fail to operate begin by checking the lighting coil output. Loosen the yellow wire at terminal block and hold to outside edge of mag. Turning the engine over as if to start should yield a healthy spark. Starting the engine and checking the output with a VOM meter (hooking lead to yellow and lead to ground, set meter on 10 VOM AC scale) the coil should put out from four volts at idle speeds to six volts at high rpm's. If you do have output, but no lights, a faulty switch can exhibit this symptom.

Suppose however, headlight and taillight are both out. Before checking bulbs start the bike and check the horn with the light switch off. If horn works with light switch off and will not work with the switch on then the red wire from switch to headlight is grounding or the grey wire from switch to taillight is grounding. The short should be located along these wires and repaired.

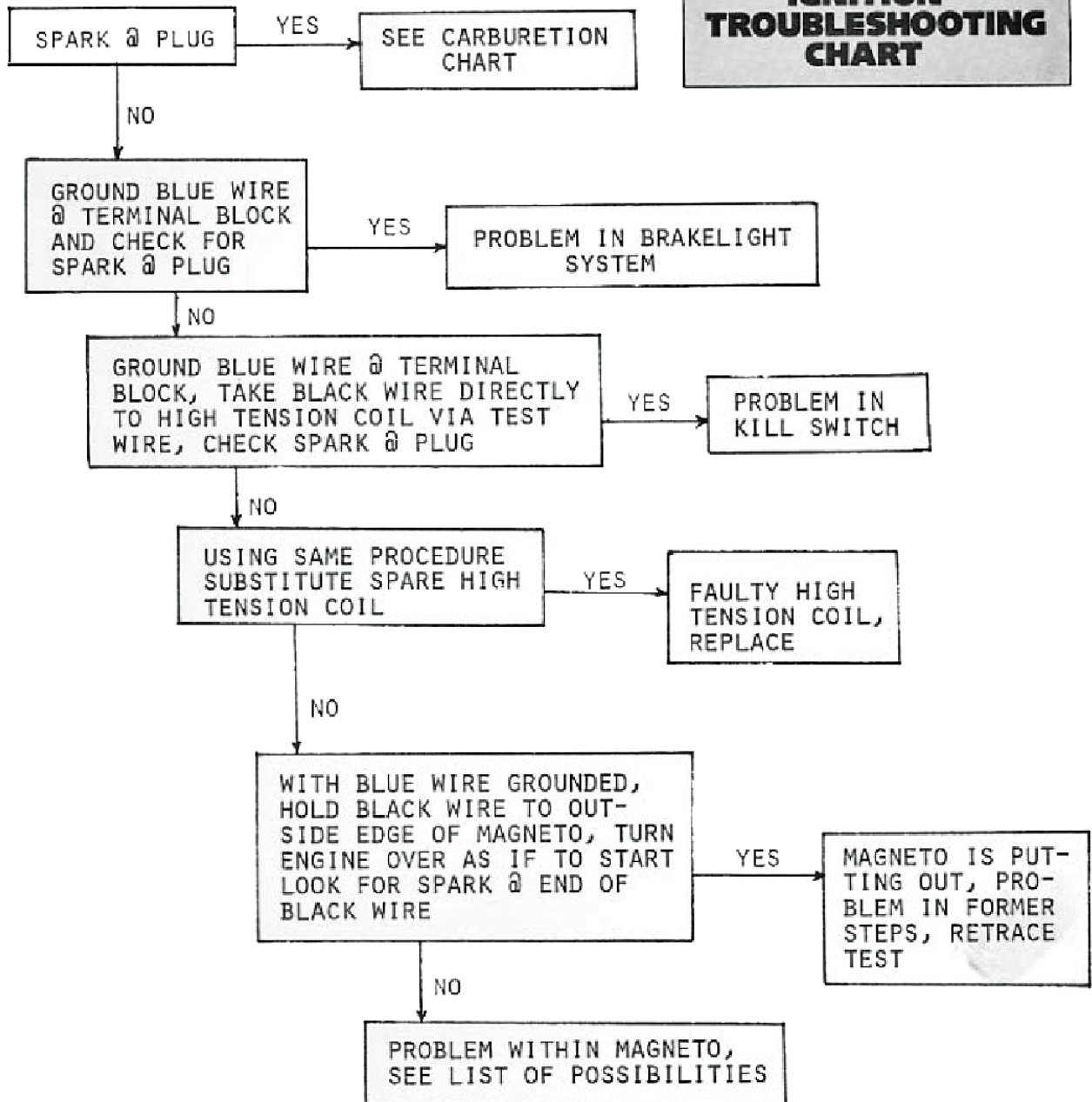
REVIEWING STEPS

- 1) If horn, headlight, or taillight fail separately try individual component replacement.
- 2) If taillight and headlight fail check horn with headlight switch off and with switch on to test for break in red or grey wire.
- 3) If headlight, taillight, and horn all fail begin by checking output of yellow wire at terminal block, proceed to switch.



AGRATI-GARELLI CORP. OF AMERICA

IGNITION TROUBLESHOOTING CHART



(Arranged in approximate frequency of occurrence)

- 1)Points not opening (adjust)
- 2)Point backing plate corroded (replace)
- 3)Condensor defective (replace)
- 4)Yellow wire from points to condensor worn thru (replace yellow wire)
- 5)Primary ignition coil wires, black wire (+), blue wire (-) worn thru by rubbing crank shaft behind stator plate. (replace wires)
- 6)Mag backing plate cracked allowing points to flutter (replace backing plate)
- 7)Woodruff key sheared (replace woodruff key)
- 8)Failure of primary ignition coil (using VOM set on OHM, check for continuity, besides visual inspection for damaged wires.)
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CARBURETION TROUBLESHOOTING CHART

STAGE II

