SURE-FIRE FAULT FINDING

January 31, 2007

NO SPARK

Check battery has power.
Switch on headlamp, this should stay bright for at least one minute.

BATTERY IS OK, BUT STILL NO SPARK - CHECK FOR POWER TO THE IGNITION MODULE

Using a test bulb or voltmeter/multimeter, check for a good power feed into the ignition module.
The power feed is the wire coming from the ignition or kill switch.
Measure between this ignition feed wire and ground, with the ignition switched on.
If using a multimeter/voltmeter set the meter selector switch to "DC Volts" on the 0-15 Volts or 0-20 Volts range. Some digital multimeters are auto-ranging, so need only to be set to "DC Volts".

For positive ground electrics, connect the meter's positive (red) test probe to frame ground and the negative (black) test probe to the ignition feed wire, where it connects to the ignition module.

For negative ground electrics, connect the meter's negative (black) test probe to frame ground and the positive (red) test probe to the ignition feed wire, where it connects to the ignition module.

The voltage reading here should be compared with the voltage across the battery terminals.
A fully charged battery will typically read around 12.7 Volts, but there will inevitably be some voltage drops across wiring, ignition/kill switch, connections (including earth).
Therefore the voltage reading at the ignition module will be a little lower than that across the battery.
A significantly lower reading than the battery voltage indicates a fault in the ignition/kill switch or a bad electrical connection in the ignition circuit. A simple way to verify this is to connect the ignition module feed wire directly to the battery, bypassing the normal feed from the ignition/kill switch or wiring harness.
If the ignition now produces good sparks, there is a fault in the ignition/kill switch or ignition circuit.

A better way to test for a good power feed to the ignition module is to use a stop lamp or indicator bulb, in addition to the test meter. This draws a similar current to the ignition system and gives a visual indication of available power.
Connect the test bulb between the frame (ground) and the ignition feed wire. Switch the ignition on, the bulb should glow brightly. If the bulb is dim or varies in brightness, try moving the wiring, fuseholder, handlebars, etc., to locate the area of the faulty connection. The bulb will change in brightness (or even go out) when the problem area is found.

IGNITION MODULE HAS POWER - MANUAL TRIGGER TEST

The Sure-Fire ignition module features a simple self-test facility for producing sparks without turning the engine. For the self test:

1. First, switch the ignition off
2. Pull the plug caps off the spark plugs
3. Remove the spark plug(s)
4. Push the removed spark plugs into the plug caps
5. Ensure that the spark plug(s) are grounded (making contact) with the cylinder head.For this test to work, the spark must have a good electrical path to engine ground.
6. If necessary, remove the contact-breaker cover to gain access to the ignition trigger assembly and wiring.
7. On the trigger assembly, loosen the two connector terminal block screws and remove the two wires (Yellow-Black and White-Black)
8. Switch the ignition on

9. Take the two trigger wires (Yellow-Black and White-Black), touch together and open, approximately once per second.Each time you make and break these wires there should be a spark at the plug(s).
10. When test is finished switch ignition off
11. Reconnect wires to trigger, observing correct polarity
12. Refit contact-breaker cover
13. Refit spark plug(s) and cap(s)

The alternative to step 3 above is to use another spare set of good spark plug(s) for this test, which saves having to remove the existing ones.

Note: the minimum cranking speed for the Sure-Fire ignition module is typically 100rpm, therefore sparks will not be produced if the ignition is triggered slowly by hand.

For twins/triples: all plugs should spark at the same time.
If only one plug produces sparks, check the ignition coil, lead, cap and plug.
On twins/triples, the ignition coils are connected in series, i.e. in a chain, linked from plus to minus.
If one coil fails and develops a short to the case it can stop the other coil(s) after it in the chain from working.
Sometimes a coil has a short to its case, but still produces sparks. This can also prevent the other coil(s) from working.
This is a common problem where the casing of a Lucas coil has been crushed by over-tightening of the clamp.
This can cause the windings inside to touch the case, and the fault often shows up when the coil is warm.
This is best resolved by replacing the coil(s), but a temporary cure can sometimes be effected by insulating the case from the clamp.

If there are no sparks, check battery, switch, earthing, wiring, connections & ignition module.
Continuous sparks without turning the engine indicates a poor supply to the ignition; check battery (bad cell), switch, earthing, & connections.

MANUAL TRIGGER TEST OK - NO SPARKS ON CRANKING

Visually Check the condition of the trigger assembly, including the printed circuit board, pickup coils and connector terminal block. Look for loose or damaged parts. Using a multimeter, check for continuity through the trigger. Set the meter selector switch to 'ohms' (Ω) on a low scale (e.g. x1, x10 or 200). On the underside of the trigger board, Connect the meter probes (either way around) across each pickup coil in turn, across the two solder joints.
The resistance reading should be 55ohms ±10% @ 20° C. If either coil gives a high or low reading (or is open circuit) then there could be a broken winding inside the coil. If both coils give the correct reading, measure the total trigger resistance by connecting the meter probes across the connector terminal block. This can be done by touching the probes onto the two metal tags on the back of the terminal block, by pressing the probes hard into the two terminal screws or by inserting the probes into the wire openings. The total resistance reading should be 110ohms ±10% @ 20° C.
Keeping the probes connected to the terminal block (or underside of the board), run your fingers around the pickup coils.
If the resistance reading changes there could be a faulty pickup coil or bad connection.

CHECKING THE MAGNETIC ROTOR

Each of the two magnets should hold the weight of the rotor when placed against a piece of steel. Each magnet should have a similar strength. The magnet polarity can be checked, using a compass. Bringing the compass up towards the outer face of the rotor should make the south end of the needle point towards each magnet in turn.

SPARKS ON CRANKING BUT ENGINE WILL NOT RUN

Check the polarity of the wires from the ignition module to the trigger.
The Yellow-Black wire connects to the left-hand terminal on the connector block (marked Y-B on the printed circuit board).
The White-Black wire connects to the right-hand terminal on the connector block (marked W-B on the printed circuit board).

If these wires are swapped the ignition will still produce sparks, but the ignition timing will be very retarded. It will also retard even further with increasing engine speed.

CONTINUOUS SPARKING, WITHOUT CRANKING THE ENGINE

This indicates a poor supply to the ignition. Check battery for one or more bad cells.
Also, a bad battery with a battery charger connected.
A high resistance in the wiring or earth, due to a bad electrical connection, poor earth or bad ignition switch contacts.
Check for a good earth from the engine case to the frame and battery. Plastic coated frames must have a good earth connection to the engine case.
An incorrect type of ignition coil is fitted, i.e. one with a very low primary resistance (CDI or DIGITAL type). This will draw a very high current and produce a large voltage drop across the wiring circuits.
This can cause the ignition unit to turn off and on, producing a series of sparks.
Sometimes this can occur very rapidly, so that a buzzing is heard.

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