1. CHARGE LIGHT ON CONTINUALLY:

The charging circuit components which may be causing the non-charging problem are:
1. The Alternator Rotor.
2. The Regulator.
3. The Alternator Stator.
4. The Diode Board.

ROTOR CIRCUIT TESTS:
The Charge light is illuminated from the Battery 12v+, through the Ignition Switch, Charge light, Regulator (D+ & DF) and the Alternator Rotor to earth. However, any short to earth on the Rotor side of the Charge light will cause the light to remain lit continually and prevent the Alternator from charging the Battery.

WARNING: Do NOT remove the front engine cover without first disconnecting a battery terminal. This is because the Diode Board has a metal heatsink connected to the +12v which can be shorted to earth by removal of the front cover.

TEST A:
To determine if there is an earth short on the Rotor side of the Charge light which is causing the problem, remove the front engine cover to access the Alternator and perform the following test:
1. Switch On the Ignition (engine not running) and observe that the Charge light is lit.
2. Disconnect the D- earth wire (Brown wire) from the Rotor brush connection.
3. The Charge light should go out - if it does so, then there is NO earth fault on the Rotor side of the Charge light.
4. However, the other thing to consider in the Rotor circuit is that the Rotor has gone short-circuit. This will prevent the Alternator from charging. Lift one brush clear of the Rotor sliprings and then measure the resistance across the sliprings - the Rotor resistance should be around 3 ohms.

TEST B:
If the Charge light does NOT go out when the D- earth wire (Brown wire) from the Rotor brush connection is disconnected, perform the following test:
1. Switch On the Ignition (engine not running) and observe that the Charge light is lit.
2. Disconnect the DF wire (Blue/Black wire) from the insulated Rotor brush connection.
3. The Charge light should go out - if it does, there is an earthing fault in the DF insulated connection or in the Rotor.

TEST C:
If the Charge light does NOT go out when the DF wire (Blue/Black wire) is disconnected from the insulated Rotor brush connection, perform the following test:
1. Switch On the Ignition (engine not running) and observe that the Charge light is lit.
2. Disconnect the DF wire (Blue/Black wire) from the Regulator DF terminal.
3. The Charge light should go out - if it does, there is an earthing fault in the DF Blue/Black wire to the Rotor.

TEST D:
If the Charge light does NOT go out when the DF wire (Blue/Black wire) is disconnected from the from the Regulator DF terminal, perform the following test:
1. Switch On the Ignition (engine not running) and observe that the Charge light is lit.
2. Disconnect the D+ wire (Blue wire) from the Regulator D+ terminal.
3. The Charge light should go out - if it does, there is an earthing fault in the Regulator.

TEST E:
If the Charge light does NOT go out when the D+ wire (Blue wire) is disconnected from the Regulator D+ terminal, perform the following test:
1. Switch On the Ignition (engine not running) and observe that the Charge light is lit.
2. Disconnect the D+ wire (Blue wire) from the Regulator D+ terminal AND disconnect the D+ wire (Blue wire) from the Diode Board.
3. The Charge light should go out - if it does, there is an earthing fault in the Diode Board.

TEST F:
If the Charge light does NOT go out when the D+ wire (Blue wire) is disconnected from the Regulator D+ terminal AND the Diode Board D+ terminal, perform the following test:
1. Switch On the Ignition (engine not running) and observe that the Charge light is lit.
2. Disconnect the D+ wire (Blue wire) from the Rotor side of the Charge light holder.
3. The Charge light should go out - if it does, there is an earthing fault in the D+ wire itself from the Regulator or the Diode Board.

TEST G:
If the Charge light does NOT go out when the D+ wire (Blue wire) is disconnected from the Rotor side of the Charge light holder, then the holder is earthed on the Rotor side.

REGULATOR TESTS:
In case the Regulator is faulty and preventing the Alternator from charging, perform the following tests:

TEST A:
1. Disconnect the D+ and DF wires from the Regulator and join these wires temporarily together so as to bypass the Regulator completely.
2. Start the engine and see if the Charge light goes out - if so, the Regulator is likely faulty.

STATOR TESTS:
In case the Stator is faulty and preventing the Alternator from charging, perform the following tests:

WARNING: Do NOT remove the front engine cover without first disconnecting a battery terminal. This is because the Diode Board has a metal heatsink connected to the +12v which can be shorted to earth by removal of the front cover.

TEST A:
1. Disconnect the Stator U, V, W and Y leads after noting down where they are connected to the Diode Board.
2. Measure the resistance between each stator winding (U, V & W) and the Y connection. The Stator windings U, V and W should have a resistance of around 0.65 ohms each. All windings should show the same reading.

TEST B:
1. Disconnect the Stator U, V, W and Y leads after noting down where they are connected to the Diode Board.
2. Switch On the Ignition (engine not running).
3. With the engine running at about 2000 rpm and your voltmeter set to read around 30v AC [Note AC not DC], measure the voltage across each Stator winding (U, V and W) to earth - you should see over 12v on each winding and the voltage should be the same for each winding.

DIODE BOARD TESTS:
See the link below for an article by Rob Frankham on how to test this component. First check that all the wires have been correctly connected before you start removal and testing particularly the 'Y' earth connection. Keep a note of what wire is connected where:

http://www.frankhams.freeserve.co.uk/te ... _board.htm

2. CHARGE LIGHT DOES NOT ILLUMINATE:

The Charge light is illuminated from the Battery 12v+, through the Ignition Switch, Charge light, Regulator (D+ & DF) and the Alternator Rotor to earth.

TEST A:
To determine if there is an open circuit on the Rotor side of the Charge light which is causing the problem, remove the petrol tank to access the Regulator and perform the following test:
1. Switch On the Ignition (engine not running) and observe that the Charge light is not lit.
2. Disconnect the D+ wire (Blue wire) from the Regulator D+ terminal and connect the wire to earth.
3. The Charge light should illuminate - if it does, the break is further on towards the Rotor.
4. The Charge light should illuminate - if it does NOT, the break is back towards the Charge light. Check the Charge light bulb is not blown or the bulb holder connections.

TEST B:
If the Charge light illuminates when the D+ wire (Blue wire) is disconnected from the Regulator D+ terminal and earthed, perform the following test:
1. Switch On the Ignition (engine not running) and observe that the Charge light is not lit.
2. Disconnect the DF wire (Blue/Black wire) from the Regulator DF terminal and connect an earth to the Regulator DF terminal.
3. The Charge light should illuminate - if it does, the break is further on towards the Rotor.

TEST C:
If the Charge light illuminates when an earth is connected to the Regulator DF terminal, remove the front engine cover to access the Alternator and perform the following test:

WARNING: Do NOT remove the front engine cover without first disconnecting a battery terminal. This is because the Diode Board has a metal heatsink connected to the +12v which can be shorted to earth by removal of the front cover.

1. Switch On the Ignition (engine not running) and observe that the Charge light is not lit.
2. Disconnect the DF wire (Blue/Black wire) from the insulated Rotor DF brush connection and connect this wire to earth.
3. The Charge light should illuminate - if it does, the break is further on into the Rotor.

TEST D:
If the Charge light illuminates when an earth is connected to the Rotor DF wire, perform the following test:
1. Switch On the Ignition (engine not running) and observe that the Charge light is not lit.
2. Disconnect the D- wire (Brown wire) from the earthed Rotor brush connection and connect an earth to this brush connection.
3. The Charge light should illuminate - if it does then the earth connection to the brush is faulty.
4. The Charge light should illuminate - if it does NOT then the path through the Rotor is faulty - check that the brushes are making contact with the slip ring, the slip rings are clean and the Rotor resistance is approximately 3 ohms.

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Typical Airhead Charging Circuit

REFERENCES:
A. Airhead Charging Circuit - http://bmwmotorcycletech.info/trbleshootALT.htm
B. Testing the Diode Board - http://www.frankhams.freeserve.co.uk/te ... _board.htm
C. Bosch Charging Systems - http://www.buchanan1.net/charge.shtml
D. Testing Voltage Regulators - http://bmwmotorcycletech.info/testingvo ... lators.htm
E: Rotor, Stator & Brushes - http://bmwmotorcycletech.info/altbrushrotor.htm
Ced.

Typical readings of a 'good' charge circuit:

Ignition Off - Voltage 12v - Charge Light 'Off'.
Ignition On (engine not started) - Voltage 12v - Charge Light 'On full'.
Ignition On (engine cranking over) - Voltage 10v - Charge Light 'On dimmed'.
Ignition On (engine idling) - Voltage 12.5v - Charge Light 'On dimmed/flickering'.
Ignition On (engine 2500 rpm) - Voltage 14.0v - Charge Light 'Off'.