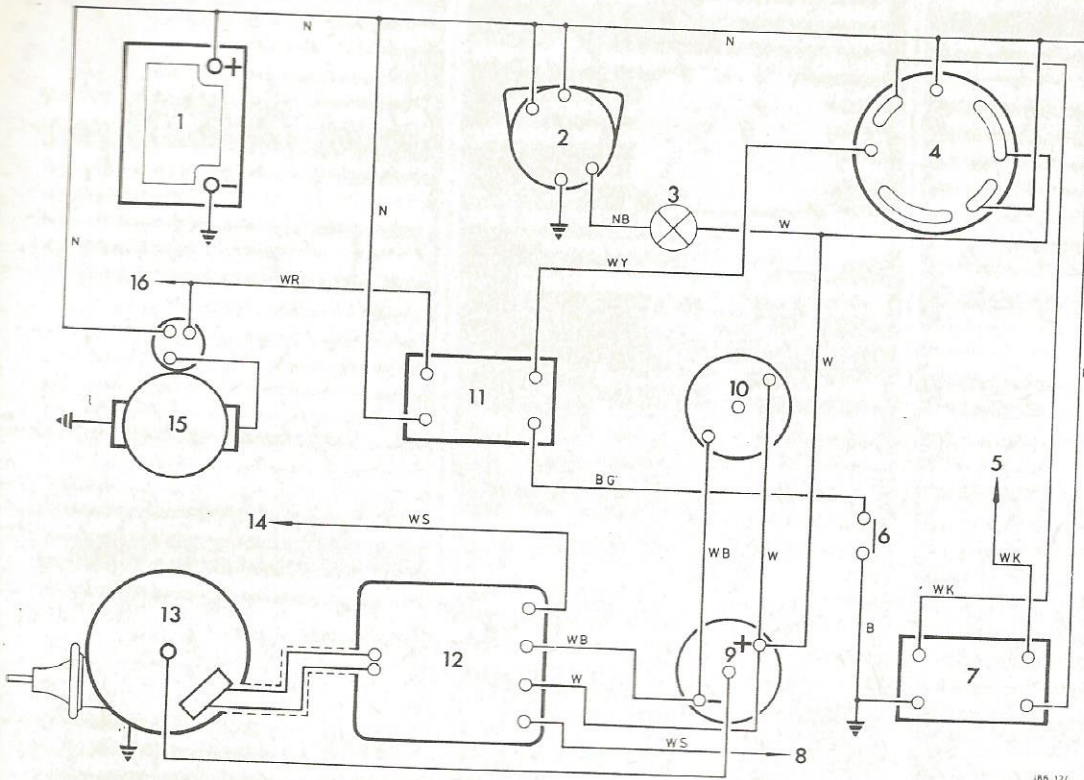


IGNITION, ALTERNATOR AND STARTER SYSTEMS



KEY TO DIAGRAM

1. Battery
2. Alternator
3. Warning light
4. Ignition switch
5. To fuse No. 12
6. Automatic gearbox safety switch
7. Ignition protection relay
8. To tachometer
9. Main HT coil
10. Auxiliary coil
11. Starter relay
12. Amplifier
13. Distributor
14. To ECU
15. Starter motor
16. To ECU

Checking for Excessive Voltage Drop in the Starter Circuit

If the previous test has proved that the battery and the battery connections are satisfactory, a moving coil voltmeter (0 — 20 volt range) should be used to determine whether there is excessive voltage drop in the circuit.

NOTE: During the voltmeter checks, the starter should crank the engine, without starting it.

Petrol engines: The low-tension circuit of the ignition coil should be disconnected between the coil and distributor.

Test 1

Checking the Battery Terminal Voltage Under Load Conditions

Connect the voltmeter across the battery terminals and operate the starter switch. The reading should be about 10.0 volts, and for diesel engines (12 volt systems), 9.0 volts. Proceed to Test 2.

A low voltage reading would indicate excessive current flow in the circuit. The starter should be removed for bench testing.

NOTE: If the solenoid operates intermittently during the test or the engine is cranked at a low or irregular speed, there is insufficient voltage at the solenoid operating winding terminal or the solenoid is faulty.

To check the switching circuit for high resistance, connect the voltmeter between the solenoid operating winding terminal and earth (commutator end bracket).

When the switch contacts are closed the reading on the voltmeter should be slightly less than the reading in Test 1. A satisfactory reading will indicate that there is a negligible voltage drop in the circuit and that the fault is in the solenoid.

If the reading is appreciably lower than in Test 1, check the switching circuit for high resistance or faulty connections.

Test 2

Checking the Starter Terminal Voltage Under Load Conditions

Having ascertained the battery voltage under load, the voltage across the starter is checked with the voltmeter connected between the starter input terminal and earth (commutator end bracket). When the operating switch is closed, the reading should be not more than 0.5 volt below that obtained in Test 1.

If the reading is within this limit, the starter circuit is satisfactory. If there is a low reading across the starter, but the voltage at the battery is satisfactory, it indicates a high resistance in the cable or at the solenoid contacts. Proceed to Test 3.

Test 3

Checking the Voltage Drop on the Insulated Line

The voltage drop on the insulated line is then checked with the voltmeter connected between the starter input terminal and the battery (insulated) terminal.

When the operating switch is open, the voltmeter should register battery voltage. When the operating switch is closed, the voltmeter reading should be practically zero.

A high voltmeter reading indicates a high resistance in the starter circuit. All insulated connections at the battery, solenoid and starter should be checked. Proceed to Test 4.

Test 4

Checking the Voltage Drop Across the Solenoid Contacts

To check the voltage drop across the solenoid contacts, connect the voltmeter across the two main solenoid terminals. Crank the engine.

A zero or fractional reading on the voltmeter indicates that the high resistance deduced in Test 3 must be due either to high resistance starter cables or soldered connections.

A high reading (similar to that in Test 3) indicates a faulty solenoid or connections.