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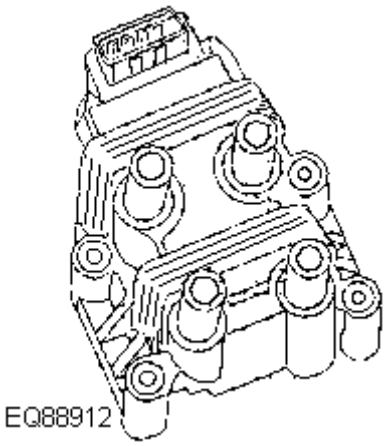


Checking the Primary Ignition system (T2)

Test 1A: General

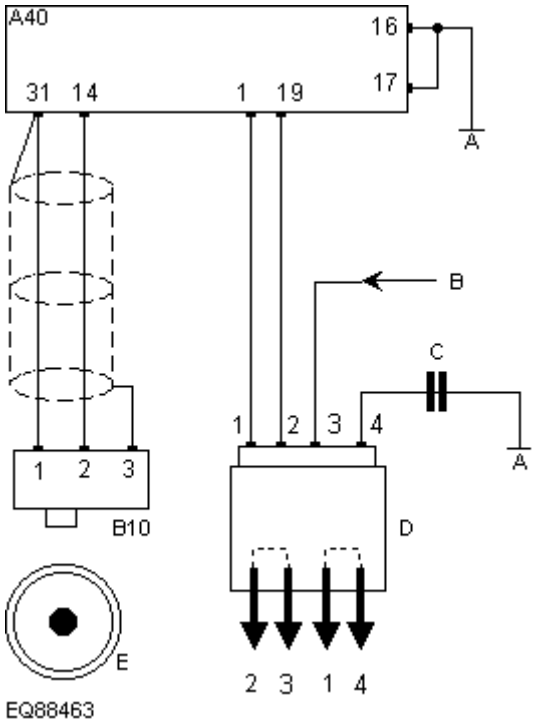
1. Inspect the ignition coil terminals for good clean connections. Poor contact and corrosion are common reasons for an inaccurate signal.
2. Clean away accumulations of dirt and the residue from a maintenance spray. The residue will attract dirt, and often leads to bleeding of the HT current to ground
3. Inspect the coil for signs of tracking, particularly around the coil tower area.

Test 1B: Checking the primary ignition control signal and circuit with a Scantool

1. Attach a suitable Scantool to the Data Link Connector (DLC).
2. Select the Scantool Datastream function in order to monitor component switching.

Note: If the engine is a non-runner, go to the actuation function.

3. Start the engine, run it at various speeds and monitor each primary ignition signal.
4. The instrument will display a duty cycle that will vary according to engine speed (Refer to the table in measurement values).
5. Turn **off** the engine.
6. Select the Scantool component actuation function and briefly actuate each ignition coil with the Scantool. The component should operate. Listen for a clicking sound.



Drawing Key:

A. Ground

Test 2A: Checking the primary ignition signals

1. This test is best carried out with a BOB connected between the loom and the ECM (see Warnings, N° 3); alternatively the test instrument may be connected to the coil connector.
2. An oscilloscope is best used to display the primary voltage and waveform, although a dwell meter may be used to determine basic coil switching.
3. This Distributorless Ignition System (DIS) features a double ended ignition coil (to fire two sparkplugs), an internal amplifier and an ECM output signal to the coil (-). The double ended coils are integrated into a single coil pack.
4. Four cylinder engines:
   a. Coil N° 1 is connected to cylinders N° 1 and 4
   b. Coil N° 2 is connected to cylinders N° 2 and 3
5. Six cylinder engines:
   a. Coil N° 1 is connected to cylinders N° 1 and 5
   b. Coil N° 2 is connected to

B. Supply from FP relay : t5 (: t4 Citroen)
C. Suppressor (some models)
D. Ignition coil (DIS type)
E. Flywheel

cylinders N° 2 and 4
c. Coil N° 3 is connected to cylinders N° 3 and 6

6. Connect the negative oscilloscope or dwell meter probe to ground.
7. Connect the positive oscilloscope or dwell meter probe to one of the two coil negative (-) terminals.
8. Test each coil circuit individually. After testing the first coil circuit, repeat the tests upon each of the remaining coil circuits.
9. Go to test 2B for engine non-runner tests.
10. Go to test 2C for engine running tests.

Test 2B: Engine non-runner tests

1. Crank the engine on the starter motor.
2. The instrument should display a primary waveform (oscilloscope) or a duty cycle reading (dwell meter).
3. The oscilloscope should display a well defined primary waveform with primary voltage peaks > 300 V. Peaks < 300 V may be due to defective coil primary windings.
4. Please note that duty cycle figures are for guidance only and do vary between different vehicles of the same model.
5. Go to test 2D for evaluation of waveform and circuit tests

Test 2C: Engine Running Tests

1. Run the engine at idle and various speeds. Record the duty cycle values, primary voltage peak level and the dynamic voltage drop, see waveform
2. A typical duty cycle value is 5-10%.The duty cycle in % will increase in value as the engine rpm is raised

   Note: The duty cycle figures are for guidance only and do vary between different vehicles - sometimes between vehicles of the same model.

3. The duty cycle in ms will not change much in value as the engine rpm is raised.
4. If the dynamic voltage drop is high (usually over 2.5 volts) coupled with a low primary voltage peak and a higher than normal dwell % (at idle), the result may be poor starting and a misfire under load. **Go to test 2E**.
5. If the dynamic voltage drop is high (usually over 2.5 volts) but the primary voltage peak and dwell % values are OK, then the amplifier is probably OK. The amplifier is an integral part of the ECM on this model and renewing the ECM just because the dynamic voltage drop is too high may not result in a better reading.
6. Compare the values obtained at the first coil with the values obtained at each of the other coils.
7. If the sets of figures are not identical check the primary resistances for each coil. Widely differing resistance values could be responsible for widely differing duty cycle values.
8. If the primary resistance for each coil is similar, the ignition amplifier module is suspect.

Test 2D: Evaluation of Primary Waveform or Signal

Good primary waveform or signal

1. The primary ignition (including the Primary Trigger) is providing an acceptable signal. The fault is not related to the ignition primary circuit.

Poor primary waveform or signal

1. Check the Primary Trigger for a good signal (see relevant Primary Trigger tests).
2. Turn **on** the ignition.

   Note: In certain systems, some supplies are switched by the fuel pump circuit and unavailable until the engine is running. In this instance, bypass the fuel pump relay.

3. Check for voltage to the coil positive (+) terminal.
    1. No voltage, check the wiring back to the supply.
4. Check for voltage to each coil negative (-) terminal.
    1. No voltage, remove the wire to the coil (-) terminal and recheck. Still no voltage, check the coil primary resistance, the coil is suspect.
    2. Voltage at nbv level, check for a short to ground between the appropriate coil (-) terminal and the ECM coil driver pin
5. Detach the ECM multi-plug (see Warnings, N° 3); turn **on** the ignition, and check for nbv at the appropriate ECM driver pin.
    1. No voltage. Check for continuity between the appropriate coil terminal and the ECM driver pin.
6. If the wiring is satisfactory, check all ECM voltage supplies and ground connections.
7. If tests find no faults, the ECM is suspect, however a substitute ignition coil should be tried before renewing the ECM.

Test 2E: High Voltage Drop in Primary Circuit

1. Check the ECM ground connections (refer to ECM Supplies and Ground tests).
2. Check that wiring connections from devices such as a radio suppressor or a burglar alarm have not been fitted to the coil primary (-) terminal
3. If the ground and wiring are satisfactory, yet the primary peak voltage and the dwell % at idle are particularly high, the ECM is suspect.

Test 3A: Checking the ignition coil resistance

1. Detach the ignition coil low tension wiring connectors and the HT leads from the coil towers.
2. Connect in turn the probes of an ohmmeter between the supply terminal (+) and each (-) terminal and measure the coil primary resistance (refer to the table in measurement values).
3. Connect the probes of an ohmmeter between each pair of coil towers and measure the coil secondary resistance (refer to the table in measurement values).

Test 3B: Checking continuity of circuit

1. Check for continuity of the signal wiring between each ignition coil terminal (-) and the ECM.