

Jeep Scrambler/CJ 1977-82

American Motors Solid State Ignition (SSI) System

AMC introduced Solid State Ignition (SSI) as a running change on some 1977 Canadian models. It is standard equipment on all 1978 and later American Motors built engines.

The system consists of a sensor and toothed trigger wheel inside the distributor, and a permanently sealed electronic control unit which determines dwell, in addition to the coil, ignition wires, and spark plugs.

The trigger wheel rotates on the distributor shaft. As one of its teeth nears the sensor magnet the magnetic field shifts toward the tooth. When the tooth and sensor are aligned, the magnetic field is shifted to its maximum, signaling the electronic control unit to switch off the coil primary current. This starts an electronic timer inside the control unit, which allows the primary current to remain off only long enough for the spark plug to fire. The timer adjusts the amount of time primary current is off according to conditions, thus automatically adjusting dwell. There is also a special circuit within the control unit to detect and ignore spurious signals. Spark timing is adjusted by both mechanical (centrifugal) and vacuum advance.

A wire of 1.35 resistances is spliced into the ignition feed to reduce voltage to the coil during running conditions. The resistance wire is bypassed when the engine is being started so that full battery voltage may be supplied to the coil. Bypass is accomplished by the I-terminal on the solenoid.

SECONDARY CIRCUIT TEST

1. Disconnect the coil wire from the center of the distributor cap.

Twist the rubber boot slightly in either direction, then grasp the boot and pull straight up. Do not pull on the wire, and do not use pliers.

2. Hold the wire $\frac{1}{2}$ in. (13mm) from a ground with a pair of insulated pliers and a heavy glove. As the engine is cranked, watch for a spark.
3. If a spark appears, reconnect the coil wire. Remove the wire from one spark plug, and test for a spark as above.

WARNING

Do not remove the spark plug wires from cylinder 3 on the 4-150, or cylinder 3 or 5 on a 1977-79 6-258 or 1 or 5 on a 1980 and later 6-258, or cylinders 3 or 4 of an 8-304, when performing this test, as sensor damage could occur!

4. If a spark occurs, the problem is in the fuel system or ignition timing. If no spark occurs, check for a defective rotor, cap, or spark plug wires.

5. If no spark occurs from the coil wire in Step 2, test the coil wire resistance with an ohmmeter. It should be 7,700-9,300 Ω at +75°F (24°C) or 12,000 Ω maximum at +93°F (34°C).

COIL PRIMARY CIRCUIT TEST

1. Turn the ignition On. Connect a multimeter to the coil positive (+) terminal and a ground. If the voltage is 5.5-6.5 volts, go to Step 2. If above 7 volts, go to Step 4. If below 5.5 volts, disconnect the condenser lead and measure. If the voltage is now 5.5-6.5 volts, replace the condenser. If not, go to Step 6.
2. With the multimeter connected as in Step 1, read the voltage with the engine cranking. If battery voltage is indicated, the circuit is okay. If not, go to Step 3.
3. Check for a short or open in the starter solenoid I-terminal wire. Check the solenoid for proper operation.
4. Disconnect the wire from the starter solenoid I-terminal, with the ignition On and the multimeter connected as in Step 1. If the voltage drops to 5.5-6.5 volts, replace the solenoid. If not, connect a jumper between the coil negative - terminal and a ground. If the voltage drops to 5.5-6.5 volts, go to Step 5. If not, repair the resistance wire.
5. Check for continuity between the coil negative - terminal and *D4*, and *D1* to ground. If the continuity is okay, replace the control unit. If not, check for an open wire and go back to Step 2.
6. Turn ignition Off. Connect an ohmmeter between the + coil terminal and dash connector *AV*. If above 1.40 Ω , repair the resistance wire.
7. With the ignition Off, connect the ohmmeter between connector *AV* and ignition switch terminal *I1*. If less than 0.1 Ω replace the ignition switch or repair the wire, whichever is the cause. If above 0.1 Ω , check connections, and check for defective wiring.

COIL TEST

See Figure 1

1. Check the coil for cracks, carbon tracks, etc., and replace as necessary.
2. Connect an ohmmeter across the coil + and - terminals, with the coil connector removed. If 1.13-1.23 Ω @ 75°F (24°C), the coil is okay. If not, replace it.



Fig. 1: Disconnecting the wiring from the coil

CONTROL UNIT AND SENSOR TEST

1. With the ignition On, remove the coil high tension wire from the distributor cap and hold $\frac{1}{2}$ in. (13mm) from ground with insulated pliers. Disconnect the 4-wire connector at the control unit. If a spark occurs (normal), go to Step 2. If not, go to Step 5.
2. Connect an ohmmeter to *D2* and *D3*. If the resistance is 400-800 Ω (normal), go to Step 6. If not, go to Step 3.
3. Disconnect and reconnect the 3-wire connector at distributor. If the reading is now 400-800 Ω , go to Step 6. If not, disconnect the 3-wire connector and go to Step 4.
4. Connect the ohmmeter across *B2* and *B3*. If 300-800 Ω repair the harness between the 3-wire and 4-wire connectors. If not, replace the sensor.
5. Connect the ohmmeter between *D1* and the battery negative terminal. If the reading is 0 (0.002 or less), go to Step 2. If above 0.002 Ω , there is a bad ground in the cable or at the distributor. Repair the ground and retest.
6. Connect a multitester across *D2* and *D3*. Crank the engine. If the needle fluctuates, the system is okay. If not, either the trigger wheel is defective, or the distributor is not turning. Repair or replace as required.

IGNITION FEED TO CONTROL UNIT TEST

Do not perform this test without first performing the Coil Primary Circuit Test.

1. With the ignition On, unplug the 2-wire connector at the module. Connect a multitester between *F2* and ground. If the reading is battery voltage, replace the control unit and go to Step 3. If not, go to Step 2.
2. Repair the cause of the voltage reduction: either the ignition switch or a corroded dash connector. Check for a spark at the coil wire. If okay, stop. If not, replace the control unit and check for proper operation.
3. Reconnect the 2-wire connector at the control unit, and unplug the 4-wire connector at the control unit. Connect an ammeter between *C1* and ground. If it reads 0.9-1.1 amps, the system is okay. If not, replace the module.