

TECHNICAL NEWSLETTER

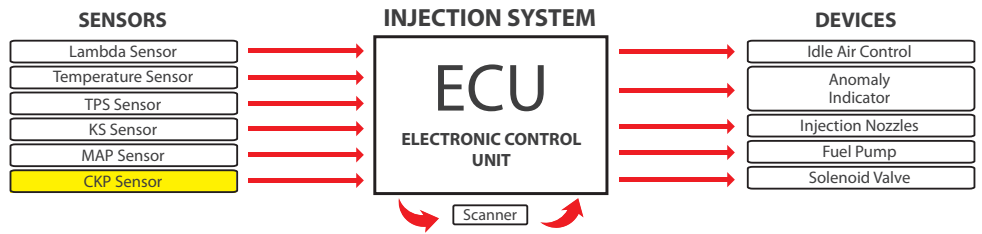
Crankshaft Position Sensor (CKP)



Worldwide Exporter
of Automotive Technology

ELECTRONIC CONTROL UNIT (ECU):

Through the sensors, the ECU monitors the system operation all the time and, through the actuators, it corrects its operation.



CONCEPT:

The crankshaft position sensor set is basically comprised of a spur gear or phonic wheel, permanent magnet, ferromagnetic core, coil, coil wires, braided shield, and sensor connector.

The sensor cable is entirely covered by a metal mesh referred to as braided shield. This mesh is linked to a grounding line and prevents electromagnetic interferences from disturbing the pulse pattern sent by the sensor.

PRINCIPLE:

The crankshaft position sensor sends an electrical signal to the injection module that allows synchronization of the system: injection timing, ignition timing, top dead center of the engine, etc.

This sensor, mounted with a permanent magnet and a coil, is connected to the phonic wheel and produces a magnetic flux which alternates between maximum, at wheel tooth position, and minimum, at bottom land.

This magnetic flux variation, due to movement of the teeth, is sufficient to generate electrical voltage, which varies according to engine rotation.

Its sign is deemed one of the vital signs to start the engine. If the crankshaft position sensor does not inform the ECU that the engine started spinning, the engine will not start!

LOCATION:

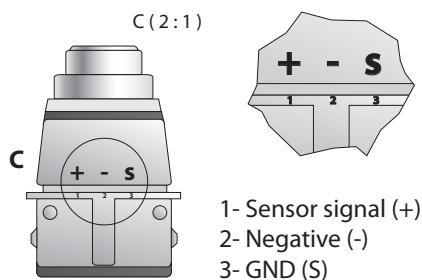
Some crankshaft position sensors are found in the front part of the engine, in the pulley, and others are already assembled on the engine flywheel.

As already mentioned above, the crankshaft position sensor depends on the phonic wheel to transmit its signal to the ECU, therefore, it is essential that the distance between the sensor and the spur gear is correct.

HOW TO TEST THE CRANKSHAFT POSITION SENSOR OF A CELTA 1.0 MPFI?

1 – Measure the electrical resistance of the coil of the crankshaft position sensor

- Disconnect the connector of the crankshaft position sensor from the harness;
- Select the multimeter to read the ohmic resistance (Ω).



- Analyze the electrical resistance in terminals 1 and 2 of the crankshaft position sensor;

- The resistance should be between 480 and 680 Ω (ohms).

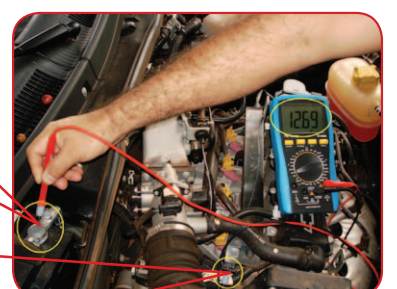
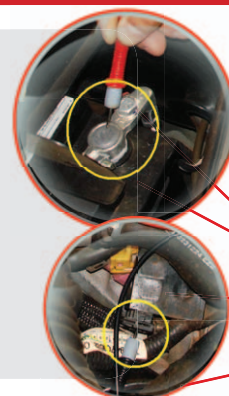


Note: Each injection system is provided with a crankshaft position sensor with a specific resistance value, which varies pursuant to the gauge and the number of turns of the coil.

2 – Check the grounding of the braided shield

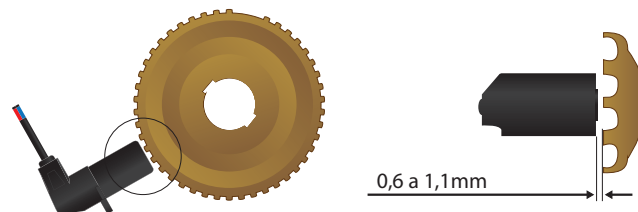
- Adjust the multimeter to the VDC scale;
- Check battery voltage;
- Connect one of the test leads of the multimeter to the wire connected to terminal 3 of the sensor (harness side);
- The operator should put the other test lead in contact with the battery positive terminal;
- Read the voltage;
- Voltage should be the same.

If there is no reading or in case of discrepancy, the operator should be more careful when verifying the wiring harness of the vehicle and do not blame the crankshaft position sensor.



3 – Adjust the distance between the sensor and the wheel

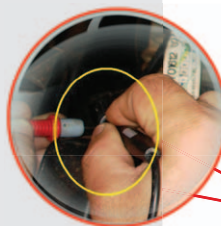
With the assistance of a frequency meter, check the gap between the sensor and the phonic wheel tooth. The gap should be between 0.6 mm and 1.1 mm. The sensor should also be positioned so that its “face” is parallel to the tooth face.



Only a minority of vehicles is provided with devices to adjust the position against a majority of them, in which they are fixed and do not allow this adjustment. Therefore, if the sensor does not meet the recommended value, the operator should verify if the mounting bracket is not damaged.

4th – Measure the alternating current voltage (sensor signal)

- Disconnect the connector of the crankshaft position sensor from the harness;
- Select the multimeter to read alternating current (AC);
- Turn on multimeter 1 and 2 of the crankshaft position sensor;
- Start the engine and cause the engine to run until reading is done;
- The result of the reading should be around 2 V.



WARNING:

Some problems may “hide” the failure and mislead the operator. For this reason, during diagnosis, some details should be noted:

- Incorrect fixation of the sensor;
- Electric cable (braided shield) of the damaged sensor;
- Phonic wheel missing teeth or bent;
- Accumulation of dirt between the sensor and the phonic wheel.

The most common defects in the sensor preventing the engine to run are:

- Disruption of the internal wire, which prevents pulse frequency;
- Disruption of the cable braided shield, allowing interference of external frequencies with the signals to the ECU and causing overflow in the exhaust system;
- Wiring harness in contact with the exhaust, causing short-circuit in internal wires with the shield, due to the melting of the cable insulator.

Consequences of a bad sensor:

- Engine failure;
- Engine does not “start” – generates no spark or injects fuel;
- Lack of engine power (not spinning).





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