

# TECHNICAL NEWSLETTER

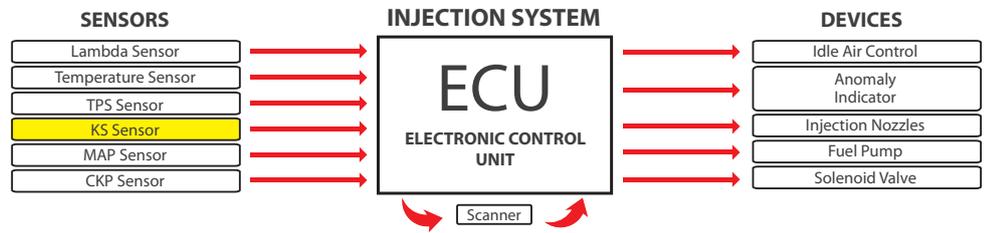
## Knock Sensor (KS)



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:

During operation of the engine, there may occur random combustions (knocks) that are popularly called "knocking". These knocks may impair the efficiency and the useful life of the engine, as they cause vibrations against the walls of the combustion chamber.

To reduce or eliminate these effects, it is necessary to reestablish normal conditions of the combustion chamber.

The knock sensor was created to solve this problem.

(1)



### PRINCIPLE:

The knock sensor is composed of a metallic mass and a piezoelectric ceramic that, when vibrating, generates an electrical sign. This sensor enables the ignition timing to be the closest possible to the ideal one, reaching greater power without prejudice to the engine.

Knock sensors capture (identify) the knock process and informs the Electronic Control Unit (ECU), which will gradually correct the ignition timing, avoiding an irregular combustion, providing better and more economic performance for the engines. In order to do that, the unit, with the help of the knock sensor, can identify and separate the knock from other sources of mechanical vibrations present in the engine.

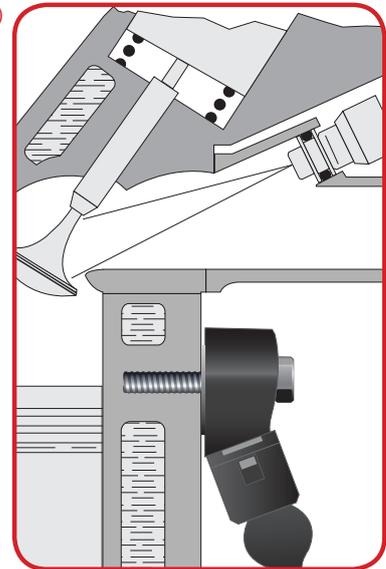
In order to avoid interference of external signals, the cable that connects the sensor to the ECU is shielded and formed by a grounded covering mesh.

### LOCATION:

The knock sensor is screwed in the engine block (2) at a position next to the combustion cylinders, so the knock in any cylinder is captured as soon as possible by the sensor.

4-cylinder engines usually have one sensor. 6- and 8-cylinder engines usually have 2 sensors.

(2)



### HOW TO TEST:

#### Test it with a scanner (engine on)

- 1- With the engine running and the scanner turned on, see the "Timing" or a similar parameter, when available;
- 2- Hit the block with a hammer near the sensor (not on the sensor);
- 3- Check the change (decrease) of the timing.

#### Test it with a multimeter (engine off)

- 1- Turn off the sensor connector;
- 2- Adjust the multimeter in the AC voltage;
- 3- Connect the multimeter to pins A and B of the sensor;

- 4 - With a small hammer, slightly hit the engine block, near the sensor;
- 5 - Is there any oscilation of the AC voltage (around 0.500 VAC)
- 6 - No, It is defective KS sensor.



#### REMINDER

Check the conditions of the electric wiring harness and if the connector is broken or not, the integrity of the braided shield, the tightening torque, and the polarity inversion. Make sure the electric system is reliable as to this information in order to avoid misdiagnoses.



#### WARNING:

- \* Synchronism: ensure the synchronism of the Top Dead Center (TDC) or of the ideal position of the manifold, as, in case of lack of synchronism, there may be a knock and the ECU may not correct the timing as it is out of the reading window.
- \* A change in the torque may affect the sign produced by the sensor. We recommend a torque between 2.0 and 2.5 Kgf.m (20 to 25 Nm)
- \* Do not use washers between the sensor and the engine block and/or the cylinder head.
- \* The contact surface of the sensor in touch with the engine should be clean. Often, the oxidation process of this surface can "smooth" the signal, changing its range and frequency, so the ECU can read it as a regular combustion and the ignition timing is not adjusted.
- \* When the engine presents operating failures evidenced as a knock failure, analyze it taking the following into consideration:

- The aging or wear of the mechanical components;
- High temperatures in the combustion chamber or failures in the thermostatic valve of the engine;
- Conditions of the radiator water or engine oil;
- Dirt or clay in the engine refrigeration fins;
- Ignition timing too fast or hot spark plug;
- Coal or hot points in the combustion chamber;
- Failures in the fuel injection system or gasoline with lower anti-knock power;
- Poor mixture or failure in the fuel pump, injection nozzles or pressure regulator.



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