FUNCTION:

ABS (Anti-lock Braking System) or Wheel Speed Sensors, are mounted in the hub of the wheels and detect the rotational speed of each of them, transferring this information to the ABS control unit. If the ABS control unit detects a substantial drop in speed in one or more wheels, which could cause them to lock, it swiftly intervenes by modulating the braking pressure of each wheel individually. This prevents the wheels from locking and guarantees safe braking, allowing the driver to retain control of the vehicle.

The ABS sensors provide information not only for the system itself, but also for such other systems as the gearbox, satellite navigation systems, the TCS or ASR (Traction Control Systems), chassis control systems, the ESP (Electronic Stability Program) system or the incline control system, which likewise make use of it. Given the constant development of such sensors, there are today various different designs depending on precision, size and robustness requirements.

FAE divides these sensors into 2 major groups:

**Passive ABS sensors. For toothed wheels.**
- Inductive ABS.

**Active ABS sensors. For wheels with magnetic coding/toothed wheels.**
- Hall ABS.
- Hall ABS with magnetic coding ring.
- Magneto-resistive ABS.

**Passive ABS sensors. For toothed wheels (INDUCTIVES).**

Passive ABS sensors are typically larger, and do not begin to function until the wheel reaches a set minimum rotational speed. They comprise a coil wound around a magnetic core and a permanent magnet. The magnetic flow generated between the teeth and troughs of the wheel induce a sinusoidal output voltage proportional to the speed of the variations detected by the sensor. The voltage varies in accordance with the speed of rotation and the gap separating the toothed wheel, in both frequency and amplitude. These variations allow the following to be derived from the signal:

**Active ABS sensors. For toothed/magnetic coder wheels.**

Active ABS sensors are so named because they require an external power input in order to operate. The response obtained from the sensor is a squared signal, the frequency being proportional to the rotational speed of the wheel. The amplitude of the signal does not depend on speed, while the detection technology allows for readings from 0 km/h.
TECHNICAL INFORMATION

Hall ABS

These sensors are highly accurate and must be installed with great precision. They use a semiconductor sensor coupled to an electronic circuit protecting the sensor from possible voltage spikes, and a permanent magnet.

The operational principle is based on the so-called Hall effect, which comprises the generation of a voltage (the Hall voltage) transversal to the direction of the current in a conductor, when the action of a magnetic field is applied perpendicularly to it.

Hall ABS with magnetic coder ring

This shares the same principle as the toothed wheel, although the variation in the magnetic field is caused by the change in polarity of a sectionally magnetised wheel (coder disc). No permanent magnet is fitted, thereby reducing the size of the sensor. Space can be saved by fitting the magnetic ring within the wheel bearings.

Magneto-resistive ABS

Magneto-resistive sensors are scarcely sensitive to their position, which means that they can be positioned relatively far from the coder disc, and still transmit a reliable signal. These sensors allow a highly precise signal to be detected.

The sensor is mounted above a magnetic coder, its resistive properties varying in accordance with the magnetic field presented to it. As a result of the variation in the internal resistance of the centre, the velocity and direction of rotation can be established.

VISUAL APPEARANCE AND REASONS FOR SENSOR FAILURE.

The outer body, connector and cables must be checked, together with the bushings, to ascertain they are in good condition. Also check whether the detector reveals any cracks, dents or impacts which could have damaged it.

It should be borne in mind that in general a visual inspection is not sufficient to establish whether the part is functioning correctly or not, although it will help to make an initial diagnosis.

1- Cracks or breaks. Tension caused by mechanical stress.
2- Deformation and denting. Overheating of the sensor.
3- No signal. Cable broken by friction or excessive vibration, short-circuits, internal sensor breakage caused by mechanical or thermal stress.

SENSOR FAILURE SYMPTOMS.

- The ABS indicator lights up.
- Wheels lock during normal braking (only on cars with an electronic braking distributor).

SENSOR MAINTENANCE.

The wheel speed sensors are the components subjected to the greatest loads within the braking regulation system. They prevent the wheels from skidding and are responsible for ensuring stable vehicle road performance.

Check the specific sensor values during each service or every 25,000 km. Replace if the functional checks are no longer within the specified threshold values.
The ABS control pilot should no longer light up. 

Test route. Check the anti-lock system again. If necessary, delete the error code displayed.

- Replace the sensor attachment.
- Unplug the electrical connection. Never pull at the sensor conductors directly.
- Remove the old ABS sensor.
- Clean the connection and the location where the new ABS sensor will be fitted.

**ASSEMBLY:**
- Install the new ABS sensor and secure it in accordance with the vehicle manufacturer’s guidelines.
- Join up the electrical connection cables.
- Fit all the bushings in their specific location. If any bushings are not installed in place, then the cable could rub against a rotating element, causing wear and tear and subsequent breakage. The cables should never be twisted during assembly.
- Replace the tightness seal every time a sensor is changed. The seals may not remain tight if they are used or worn.

Test route. The ABS control pilot should no longer light up.

**INSTRUCTIONS SENSORES REVOLUCIONES RUEDA - ABS**

Los productos FAE tienen la tecnología para reemplazar y adaptarse a los equivalentes de origen. Por razones de seguridad y para conseguir un rendimiento óptimo, todos los trabajos de mantenimiento y de reparación deben ser efectuados únicamente por personal con formación de acuerdo con las directivas del fabricante del vehículo, siguiendo las instrucciones de montaje de la pieza FAE y/o de origen. Cualquier montaje realizado por personal no formado que representa un problema en el funcionamiento de la pieza y/o del vehículo no será responsable de FAE.

Para el montaje y desmontaje de los sensores se respetarán las directivas del fabricante del vehículo. Prestar atención a las fichas de datos de seguridad de los fabricantes de vehículos.

**DESMONTAJE:**
Según el modelo del vehículo, FAE recomienda limpiar a fondo la ubicación del sensor ABS y el enchufe antiguo, utilizando un limpiador de frenos, no utilizar nunca aire comprimido para eliminar el polvo de freno. Cualquier clase de polvo que se respire es nocivo para la salud. Los sensores activos pueden ser dañados por descargas electrostáticas. Por ello no deben tocarse nunca los contactos eléctricos cuando se manipulen sensores activos.

- Soltar la fijación del sensor.
- Desenchufar la conexión eléctrica. Nunca deberá tirarse directamente de los conductores del sensor.
- Retirar el sensor ABS antiguo.
- Limpiar la conexión y el lugar de montaje del sensor ABS nuevo.

**MONTAJE:**
- Colocar el sensor ABS nuevo y fijarlo de acuerdo con las directivas del fabricante del vehículo.
- Unir los cables de la conexión de enchufe eléctrico.
- Montar todos los pasamuros en su ubicación específica. Si algún pasamuro no está colocado en su sitio, puede provocar el roce del cable con algún elemento de rotación que produciría el desgaste y posterior rotura del mismo. No deben retirarse los cables durante el montaje.
- Sustituya la junta de estanqueidad cada vez que cambie un sensor. Las juntas pueden no realizar su función de hermeticidad si están usadas o desgastadas.

De ser necesario, borrar el código de error presente. Volver a comprobar el sistema antibloqueo. Recomendado de prueba. Ya no se debería encender el piloto de control del ABS.