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## PARK DISTANCE CONTROL (PDC)

### INTRODUCTION

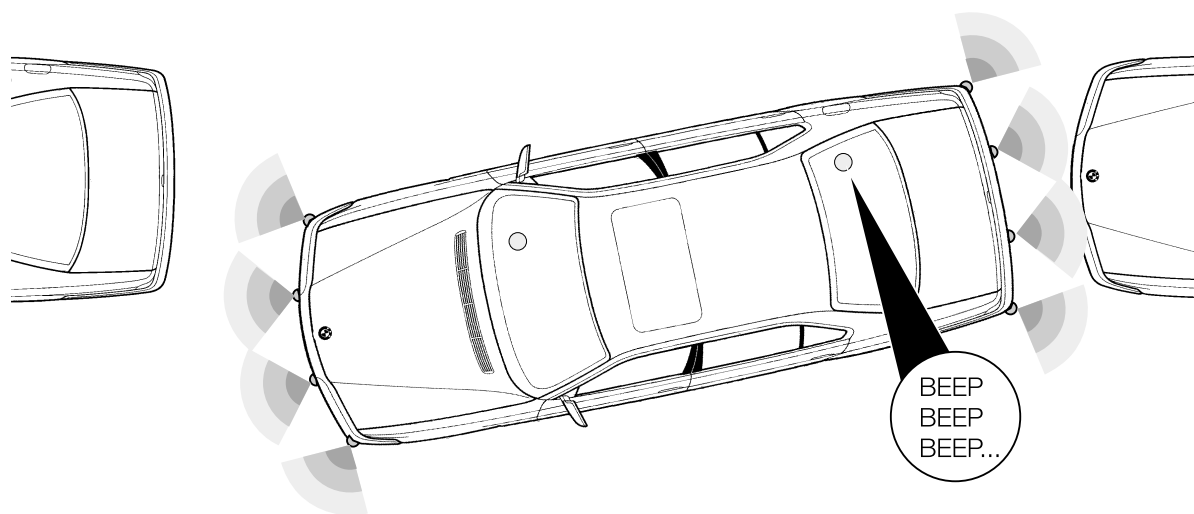
The Park Distance Control is a safety/convenience system that uses ultra-sonic sensors to detect the close proximity to other objects when maneuvering the vehicle in tight spaces (such as parallel parking or parking in a narrow garage).

The PDC monitors both the front and rear of the vehicle. The driver is warned, through an audible gong system, when the vehicle comes close to another object. As the object gets closer, the audible gong increases in frequency until a steady tone is produced.

As the distance to the object increase, the steady tone will return to a beep and stop when the vehicle moves away from the object.

The PDC is automatically switched "ON" when the ignition is switched on. However it does not become active until the vehicle is shifted into reverse.

The system can be manually switched "ON/OFF" with the console mounted switch.



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## PDC COMPONENTS

The PDC system consists of the following components:

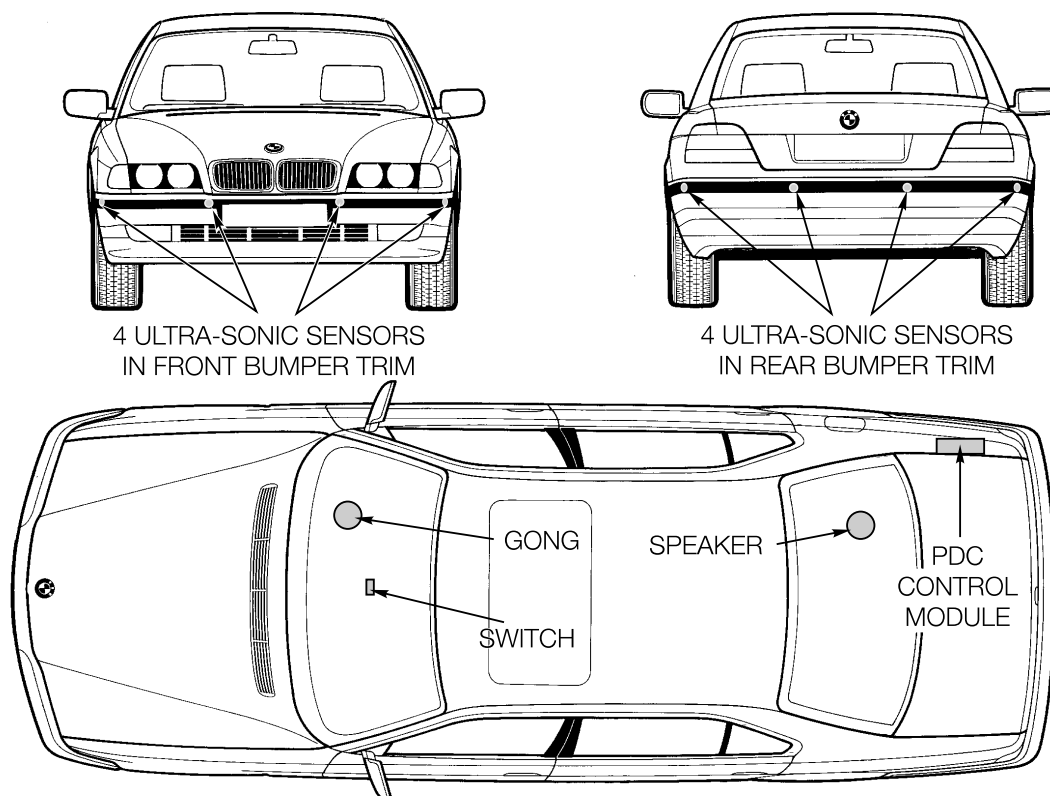
**PDC Control Module** - Mounted in the right side of the trunk behind the trim cover.

The PDC control module activates the ultrasonic sensors mounted in the bumper cover. After activation, the control module monitors the signals coming back through the sensors. Through this signal, the PDC is able to determine the distance to any objects close to the bumpers of the vehicle. As the vehicle comes close to an object, the PDC control module will activate the respective gong (front/rear) at a specific frequency tone.

The PDC control module is linked to the I/K-Bus for the following:

- Vehicle speed
- Transmission range selection
- Diagnosis

**Gong/Speaker** - The PDC control module activates a gong and a speaker to alert the driver of the detected object. The front mounted gong is the existing check control gong located under the glove box. The rear mounted speaker is located under the right side of the parcel shelf.





**PDC Switch** - Mounted in the center console or SZM below the IHKA control panel. The system can be switched "ON"/"OFF" at any time using the switch. The LED in the switch will flash simultaneously with the gong/speaker tones when the system detects an object

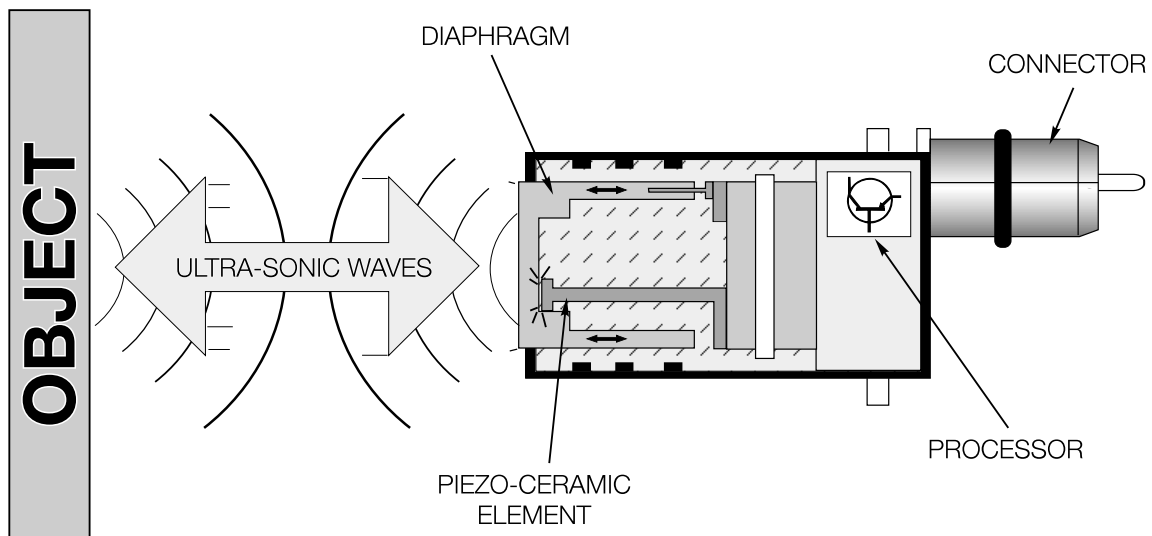
**Eight Ultra-sonic Sensors** - Four sensors each front and rear, mounted in the bumpers. The PDC sensors are small transmitter/receiver modules. They are specifically designed for automotive use. The sensors are limited to the following angles of monitoring:

- 90° on the horizontal plane
- 60° on the vertical plane

The vertical angle is reduced to avoid unintentional signalling on steep grades.

#### TRANSMITTING MODE

The control module sends a 40 KHz signal to the sensor. The control module activates the sensors in a specific sequence (firing order). The ceramic element in the sensor vibrates and produces an ultra-sonic sound wave that is sent out from the bumper.



#### RECEIVING MODE

If the wave contacts an object, the wave is bounced back to the sensor. The returning wave causes the ceramic element to vibrate creating an electrical signal to be fed back to the control module.

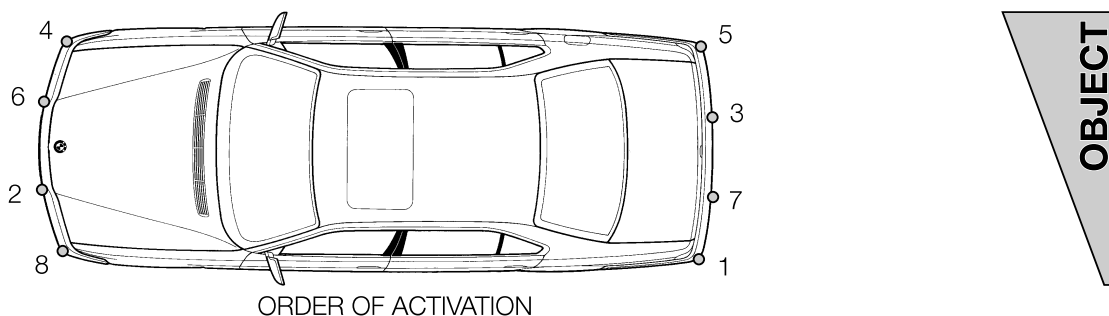
The control module determines the distance to the object by the time difference between the sent and received ultra-sonic wave signals. The complete send/receive cycle, for one sensor lasts approximately 30ms (milli-seconds).

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## SYSTEM OPERATION

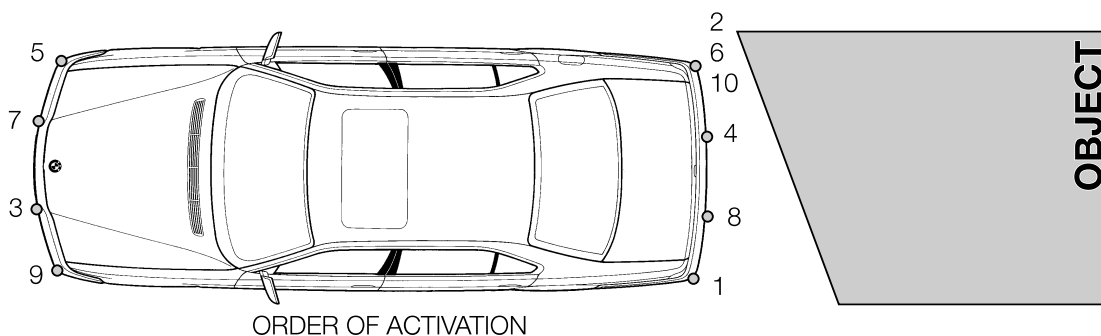
When KL15 is switched “ON”, the PDC system is switched “ON”, in the standby mode. The system performs a self-check of the ultrasonic sensors and control electronics.

When the transmission is shifted into reverse, the system is activated and the sensors are activated in the pre-determined order.



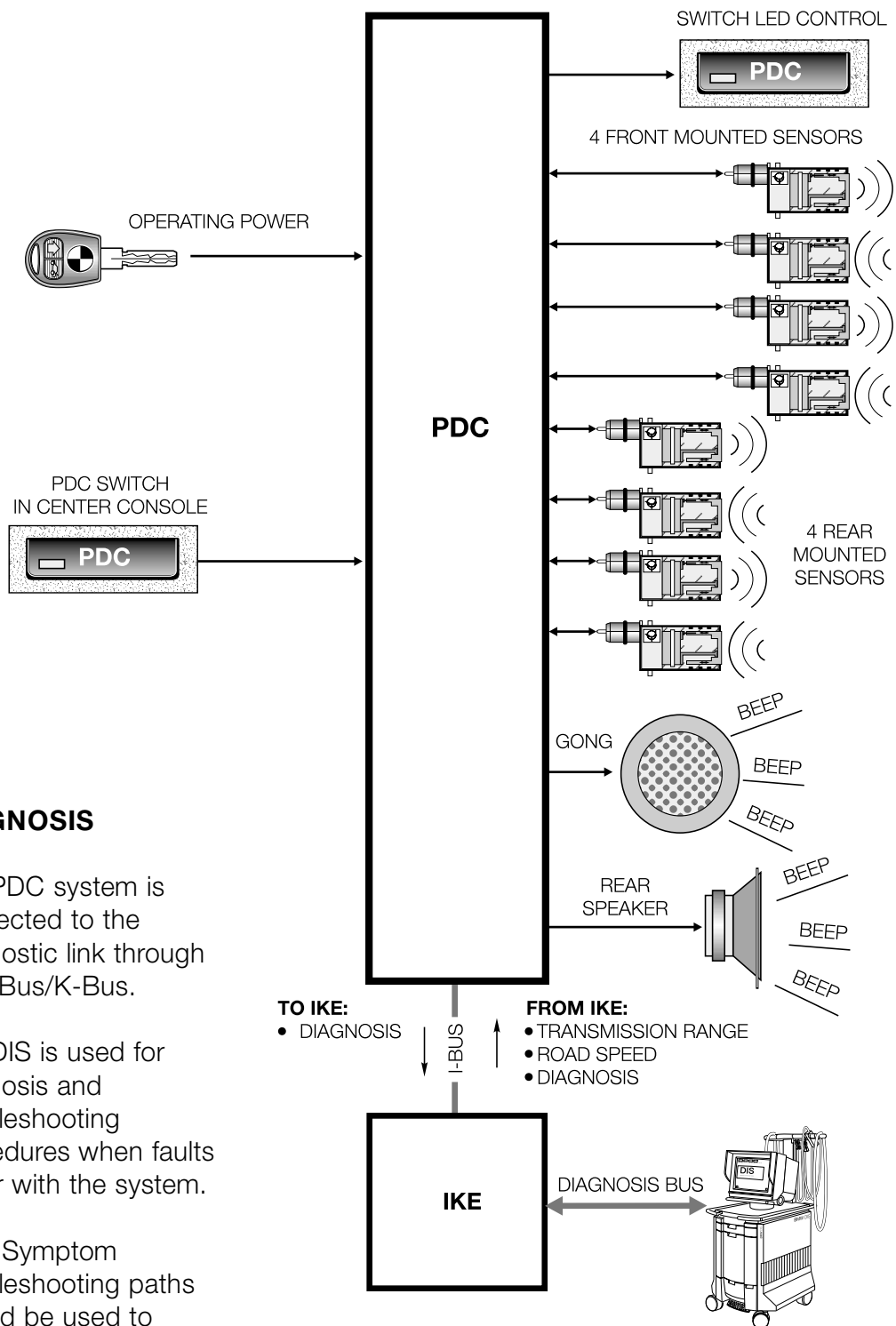
The system stays active up to approximately 20 MPH. Above this, the system reverts to the standby mode.

If an object is detected within the operating range of the sensors, the control module will activate the respective gong/speaker (front/rear). The sensor closest to the object will receive additional activations to determine if the object is getting closer.



As the distance to the object decreases to approx. 1½ feet, the control module increases the activation frequency of the sensor. The output frequency of the gong will increase linearly up to a distance of approx. ¾ of a foot. At this time the frequency will change to a constant tone.

As the distance to the object increases, the frequency of the sensor and gong activation decreases until the object is out of the monitoring range of the sensor.



**DIAGNOSIS**

The PDC system is connected to the diagnostic link through the I-Bus/K-Bus.

The DIS is used for diagnosis and troubleshooting procedures when faults occur with the system.

Fault Symptom troubleshooting paths should be used to troubleshoot failures with the PDC system.

**As Introduced**