

Park distance control (PDC)

The park distance control assists the driver when parking and manoeuvring and helps to avoid damage to the car when parking into tight spaces or at blind spots.

The system monitors the distance between the car and an obstacle on the basis of the ultrasonic echo sounder method.

For this purpose, there are 4 ultrasonic transducers integrated in the front and rear bumpers, thus making it possible to monitor the area in front and behind the vehicle.

The control unit cyclically measures the distances between each transducer and any obstacle.

The distance between the car and the nearest object is signalled proportionally to the driver as he approaches it by way of the corresponding tone generator (front or rear). The less the distance to the obstacle, the faster the tone sequence. A distance of below 20 cm is indicated by a continuous tone. In order to distinguish between them, the tone pitch at the front and at the rear differs.

In order to avoid a long persistent continuous tone, the acoustic signal is switched off when driving alongside a wall. However, the distance warning is reactivated if the car continues to approach the obstacle.

The electronic control unit monitors correct operation of all ultrasonic transducers and tone generators. Deviations from normal operation are stored in the defect code memory.

Diagnosis takes place via the I-bus.

The park distance control system basically consists of following components:

- PDC control unit
- 4 ultrasonic transducers in rear bumper
- Rear tone generator (loudspeaker)
- 4 ultrasonic transducers in front bumper
- Front tone generator (BC gong)
- PDC button

Switch-on conditions:

- Pressing the PDC button or
- Engaging reverse gear

Switch-off conditions:

- Pressing the PDC button or
- Switching off the ignition or
- After covering a distance of approx. 55 m or
- After a speed of 35 km/h has been exceeded

The rear transducers are deactivated when pulling a trailer.

The PDC receives information via the I-bus as to whether reverse gear is engaged or whether a trailer is to be pulled.

When the system is activated, the indicator lamp in the PDC button lights up. It goes out when the system is switched off.

If there is a fault in the system it is indicated to the driver when he attempts to activate the PDC by the indicator lamp flashing and - when the PDC button is depressed - by a continuous tone. The system can then not be switched on.

Components

Ultrasonic transducer

The transducers operate as transmitters and receivers.

The maximum measuring range is limited:

- Rear centre transducers: 20 - 150 cm
- Rear corner transducers: 20 - 60 cm
- Front centre transducers: 20 - 70 cm
- Front corner transducers: 20 - 60 cm

If the minimum detectable distance increases impermissibly, this situation is stored as a defect code in the

defect code memory. It may be attributed to dirt accumulation, wet conditions, ice, snow. Before starting extensive troubleshooting, take care to ensure that the transducers are fitted correctly in their retaining fixtures and are clear of dirt etc.

PDC button

The park distance control can be switched on and off manually with the PDC button.

When active, an indicator lamp integrated in the switch lights as a function indicator.

The lamp flashes if a transducer or tone generator is defective.

Front tone generator

The BC gong serves as the front tone generator.

It is connected to the PDC by means of a line link.

Rear tone generator

A loudspeaker which is driven by a certain frequency serves as the rear tone generator.

It is connected to the PDC by means of a line link.

System-related features

Despite the PDC, estimating obstacles is still the responsibility of the driver particularly when detection of obstacles reaches the physical limits of ultrasonic measurement.

Despite optimum preconditions, system-related problems may still occur. It is possible, for instance, that a non-existent obstacle is signalled or a real obstacle is not signalled.

In unfavourable cases, it is possible that the PDC signals a non-existent obstacle in following situations:

- During heavy rain
- In the case of extreme dirt accumulation, icing on the transducers or if they are covered with snow.
- Ground echos on rough road surfaces, grass
- In large closed rectangular rooms with smooth walls (e.g. underground car-parks)
- If the transducers are not fitted correctly in their retaining fixtures, if they are dirty or iced up

In unfavourable cases it is possible that the PDC does not detect an obstacle in following situations:

- Low obstacles with corners and sharp edges
- If the car is driven alongside a wall when parking the acoustic signal is switched off for this period of time, also if the vehicle approaches an obstacle - located further away - at a different angle.
- If the obstacle is located exactly between two transducers.