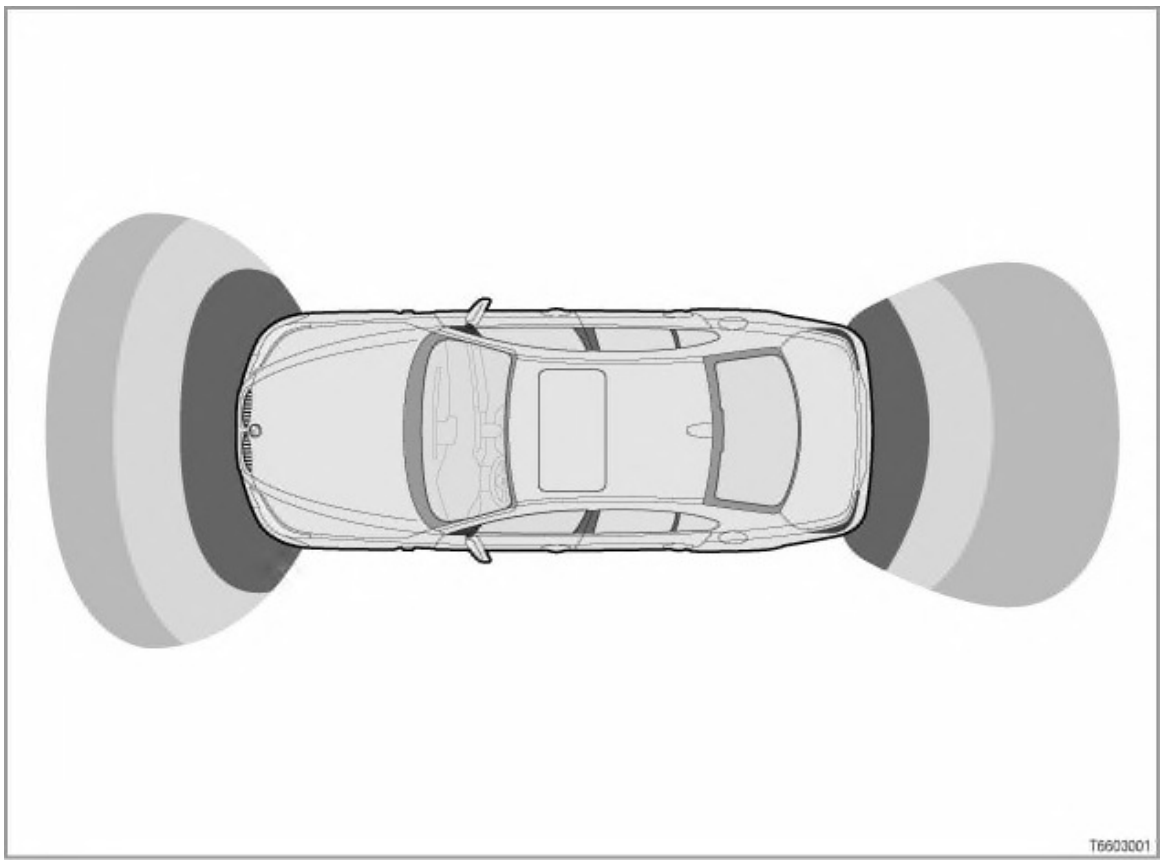
Park Distance Control

E60, E61, E63, E64



Introduction

Park Distance Control (PDC) is an item of special equipment (option 508). Park Distance Control (i.e.: parking-aid) supports the driver in manoeuvring in tight spaces.
For the BMW 5-Series (E60, E61) and the BMW 6-Series (E63, E64), the PDC was taken from the E65.
On the E60 PDC has the following new features:

- The PDC button is in the centre console switch cluster. The signal from the PDC button is transferred to the PDC control unit through the K-CAN.
- The signal from the reverse-light switch (reverse gear engaged) on vehicles with **manual transmission** is transferred from the light module to the PDC control unit via the K-CAN.
- Display form of the optical warnings on the Central Information Display (display image).

The PDC measures the distance to objects within its range with ultrasonic sensors.
[System overview ...]

The driver is warned of an object that could cause a collision as follows:

- Acoustic warning (via multi-audio system controller, M-ASK, and mid-range loudspeaker)
- Visual warning (via Central Information Display)

The PDC uses these two 2 warning functions to offer a degree of comfort for drivers who are hard of hearing or physically impaired.
A fault in the PDC is indicated by a Check-Control message.

Important: Responsibility remains with the driver at all times

PDC is unable to take the place of the driver's personal assessment of obstacles.
The ultrasonic sensors have a blind spot. Objects in this blind spot cannot be detected.
The ability to detect objects can stretch the physical limits of ultrasonic measurements (no or poor reflection of ultrasonic impulses, e.g. trailer tow bars or narrow objects).

Low objects that have already been indicated can "disappear", **before** a continuous tone sounds (e.g. a high kerbstone).
The evaluation of obstacles is thus the responsibility of the driver, even with PDC.

Brief description of components

PDC consists of the following components:

- **8 ultrasonic sensors**

  There are 4 ultrasonic sensors in each of the front and rear bumpers.

  The ultrasonic sensors emit ultrasonic impulses. These ultrasonic impulses are reflected by obstacles (echo impulses).

  The ultrasonic sensors receive and amplify these echo impulses. The amplified echo impulses are then converted into a digital signal. Each ultrasonic sensor has its own microprocessor, its own power supply and its own data connection to the PDC control unit.
  [more ...]

Important: Measuring range of ultrasonic sensors

The measuring range of the ultrasonic sensors is between approx. 25 centimetres and a maximum of approx. 200 centimetres. If the minimum distance that can be detected rises to an impermissible level, a fault message is entered in the fault memory.
Dirt contamination, moisture, ice and snow can cause an impermissible rise in the minimum distance that can be detected.

Note: Cleaning the ultrasonic sensors

To make sure the system remains fully operational, keep the ultrasonic sensors clean and free from ice. Do not clean by spraying high-pressure washers directly at the ultrasonic sensors. When cleaning, always maintain a minimum distance of at least 10 centimetres.

- **PDC button**

  The PDC button is in the centre console switch cluster. The signal from the PDC button is transferred through the K-CAN to the PDC control unit.

  The PDC button is used to manually switch the Park Distance Control system on and off. When the PDC is switched on, the function LED in the PDC button lights up.

  If a fault develops in the PDC, the function LED in the PDC button flashes.

- **PDC control unit**

  The PDC control unit controls the ultrasonic sensors for transmitting ultrasonic impulses. The PDC control unit also receives the digital signals from the individual ultrasonic sensors. By comparing the individual digital signals, the PDC control unit calculates the minimum distance between the ultrasonic sensor and the object.

  When an object is detected, an acoustic warning and a visual warning are given.
  [more ...]

The PDC control unit is connected to various other control units via the bus systems:

- **Multi-audio system controller / Car Communication Computer**

  The multi-audio system controller (M-ASK) or Car Communication Computer (CCC) emits the PDC acoustic warning through the mid-range loudspeakers.

- **Central Information Display**

  The visual PDC warnings are given in the Central Information Display (CID).

  In addition, information regarding a Check-Control message that may be present is shown.

- **Instrument cluster**

  A current Check-Control message is indicated by a symbol in the LCD display in the instrument cluster. Moreover, the instrument cluster also provides the exterior temperature and the kilometer reading for the PDC control unit.

  Ice and frost can cause an unexpected response from the ultrasonic sensors. The response characteristics

of the ultrasonic sensors changes depending on the exterior temperature.

If a fault is stored in the fault memory, the kilometer reading and the exterior temperature are also stored.

- **DSC control unit**

  The DSC control unit supplies the PDC with information about the roadspeed and distance travelled.

- **Electronic transmission control**

  On vehicles with automatic transmission, the electronic transmission control (ESG) supplies the signal that reverse gear is engaged.

- **Light module**

  On vehicles with manual transmission, the light module (LM) supplies the signal that reverse gear is engaged.

- **Car Access System**

  The CAS control unit supplies the PDC with the terminal status (e.g.. terminal 15).
  For vehicles from 03/2004, power is supplied to the PDC control unit through terminal 30g (active) instead of terminal 15.

- **Trailer module (AHM)**

  The trailer module sends a signal indicating whether or not the vehicle is towing a trailer. If a trailer is recognised, the acoustic and visual warnings for the rear bumper are deactivated.

System functions

PDC incorporates the following functions:

- Acoustic warnings
- Visual warnings
- Check Control

Acoustic warnings

The acoustic warnings are emitted by the M-ASK via the mid-range loudspeaker.

If an object is detected by 2 ultrasonic sensors, the loudspeaker closest to the object is actuated. The mid-range loudspeaker in the left/right-hand front doors or the mid-range loudspeaker on the left/right-hand sides of the rear shelf can be actuated.

If an object is detected by 3 ultrasonic sensors, the mid-range loudspeakers on the left and right-hand sides are actuated together.

The smaller the distance to the object, the faster the sequence of acoustic warning tones.

A distance of less than approx. 25 centimetres is indicated by a continuous tone.

The warning tone switches off as soon as the vehicle moves away from the object.

If the vehicle is moving directly towards a wall, the acoustic warning tone will be switched off after approx. 3 seconds so that it does not distract the driver. If the vehicle continues to approach the wall, the warning will be reactivated.

Effective range for acoustic warnings:

- approx. 60 centimetres for the ultrasonic sensors at the two corners of the front bumper
- approx. 70 centimetres for the two middle ultrasonic sensors in the front bumper
- approx. 60 centimetres for the ultrasonic sensors at the two corners of the rear bumper
- approx. 150 centimetres for the two middle ultrasonic sensors in the rear bumper

Visual warnings

The visual PDC warnings are given in the Central Information Display (CID). This is subject to the display in the CID being active.

The visual warnings are given earlier than the acoustic warnings.

The effective range is approx. 2 metres at the front and approx. 2.5 metres at the rear.

The graphic display is shown on the CID. The PDC control unit supplies the distance between the ultrasonic sensor and the object detected via the K-CAN.

The display on the CID is an overhead view of the vehicle with the effective ranges of the ultrasonic sensors.

The distance to objects detected is shown in the colours of traffic lights:

- Distance down to 100 centimetres: green
- Distance between 100 an 50 centimetres: yellow
- Distance less than 50 centimetres: red

The display appears as soon as the PDC is switched on (manually or automatically). The display overrides other displays in the CID. When the PDC is switched off again, the previous display automatically appears again in the Central Information Display.

Check Control

If a fault develops in the PDC, the function LED in the PDC button flashes.

In this situation, PDC cannot be switched on.

At the same time, a Check-Control message is displayed in the following form

- Symbol in the LCD display in the instrument cluster
- The following text appears in the status line of the Central Information Display:

  "PDC failure!"

  In the menu "BMW Service", the following text can be called up in the submenu "Check-Control messages":

  "Park Distance Control

  No acoustic warning available for Park Distance Control (PDC).

  Have the problem checked by BMW Service as soon as possible."

Conditions for switching on and off

PDC is switched on under the following conditions:

- PDC button pressed (PDC switched on manually)
- Reverse gear engaged (PDC switched on automatically)

PDC is switched off under the following conditions:

- PDC button pressed (PDC switched off manually)
- Ignition switched off (PDC switched off automatically
- After driving approx. 50 metres
- After exceeding a speed of 30 km/h

When a trailer is being towed, the acoustic and visual warnings for the rear bumper are deactivated.
For this to happen, the trailer must be electrically connected to the vehicle.

Problematic conditions for switching on and off

In borderline situations, PDC may give a warning even though there is no object within the effective range (reflection from the ground, e.g. on coarse gravel).

In borderline situations, it could happen that objects that are present are not detected (no or insufficient reflection due to geometric form).

Under the following conditions, it could happen that the PDC gives a warning, even though there is no object within the effective range:

- Ultrasonic sensor incorrectly located in its bracket
- Heavy rain

- Severe dirt contamination or icing of the ultrasonic sensors
- Ultrasonic sensors covered in snow
- Echo pulses caused by ground, e.g. extremely coarse road surface or high grass
- Very smooth walls in large, enclosed, rectangular spaces, e.g. in underground car parks (interference from earlier, reflected echo impulses)

Under the following conditions, the PDC may not recognise an obstacle that is present:

- Low objects or objects with corners and sharp edges (no reflection)
- If you drive alongside a wall while you are parking, the acoustic warning will be deactivated so long as you are moving parallel to the wall.

Operation

The visual warning (display) is switched on in the Central Information Display (CID) as follows:

- "Settings (i)" menu
- "Vehicle settings" menu
- "PDC" menu
- Activate "Display on"

Notes for service staff

Service staff should note the following points:

- General information: [more ...]
- Diagnostics: ---
- Encoding/programming: ---
- Car & Key Memory: ---

Japanese national version

So long as reverse gear is engaged, an acoustic signal (reversing gong) is given via the multi-audio system controller (M-ASK) and the mid-range loudspeaker.
The reversing gong is deactivated immediately if the PDC detects an object in the effective range and emits its own acoustic warning.

Subject to change.