

# Automotive Electronics

## **Parking made easy – Parking assistance systems from Bosch**



**BOSCH**

Invented for life



# Improved overview makes child's play of parking

Backing into a parking space is stressful, and it is rarely a simple matter to reverse into a gap without correcting. Most motorists would agree with this, at least if pressed! Fewer and smaller parking spaces and the hectic nature of today's driving habits are the main reasons for this. Parking and maneuvering is made even more hazardous by vehicles which are difficult to see and coated bumpers which do not forgive the slightest driving error.

Bosch can help here, with its ultrasonic-based parking assistance systems. They make safe and comfortable parking and maneuvering possible.

## **The Parking Aid: for sure and certain reversing into parking spaces and maneuvering**

Bosch took the first step towards simple parking with the Parking Aid. This monitors the close-up area in front of and/or behind the vehicle by means of ultrasonic sensors inconspicuously integrated into the bumpers.

A graduated warning system which announces distances ranging from about 250 cm to 25 cm (about 100

to 10 inches) uses an optical and/or acoustic signal to inform you of how close you are to an obstacle. This enables you to safely estimate how far you can maneuver even without a direct view. So you can make efficient use of even the smallest parking spaces. Dents and ugly scratches on your expensive vehicle as well as the annoyance involved are now a thing of the past. The Parking Aid thus pays for itself the very first time it avoids damage to your vehicle.



With the Parking Aid you can avoid scrapes and dents on your vehicle



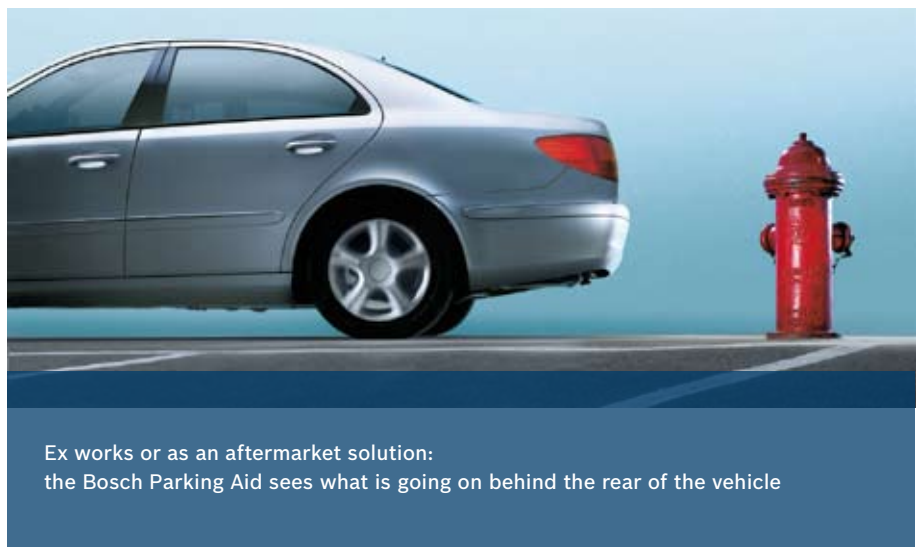
The new Park Pilot generation can be supplied as a rear-end-only or as a front-and-rear system

#### **The Parking Aid: assistance function as an option**

In the meantime our Parking Aid is not only widely installed in top-of-the-range vehicles but is also increasingly establishing itself at the mid-price and economy end of the scale. So the Parking Aid is offered as optional equipment on over 50 percent of all car models in Europe, either as a system safeguarding just the rear or as a combination for both front and rear of the vehicle.

#### **The Park Pilot: the aftermarket version of the system**

Alongside the factory-fitted Parking Aid, Bosch also offers an aftermarket solution of the same high quality: the so-called Park Pilot System. Thanks to its tried-and-proven technology, the new Park Pilot generation can be fitted in virtually any vehicle. Independently of brand and model, the coatable sensors can be retrofitted rapidly and without much trouble or expense.



Ex works or as an aftermarket solution:  
the Bosch Parking Aid sees what is going on behind the rear of the vehicle

# Parking quickly and comfortably

On the basis of its many years' experience in the field of progressive parking aids, Bosch has developed a new parking assistance system with which you can comfortably reverse even into tight parking spaces along the side of the street.

## **Parking Assistant: High tech – low price**

The Bosch Parking Assistant employs the tried-and-proven ultrasonic technology of the Parking Aid. A further sensor on each side of the front bumper – that's all it needs to put an end, once and for all, to frustrating and unsuccessful attempts to reverse into a parking space.

## **Stress-free reversing into any parking space**

Whether you prefer to show your sporty skill at reversing manually into a space or enjoy the comfort of an automated system – the Bosch Parking Assistant always offers the suitable solution, preventing unpleasant or stressful situations from arising in the first place. While you are driving at a moderate speed, ultrasonic sensors are scanning the roadside. As soon as the Parking Assistant identifies a suitable parking space long enough for the car, you will be immediately informed. You now activate the Parking Assistant at the push of a button and initiate the parking maneuver. In fractions of a second, the system calculates the best possible way into the parking space.

## **The new comfort dimension: “hands-free” parking**

On vehicles with Electric Power Steering (EPS), the car automatically parks with great precision and within a few seconds even in tight spaces (Park Steering Control, PSC). The Assistant takes over all the steering movements required. Your hands are free, you can concentrate on the traffic and control the parking maneuver via the accelerator and brake pedals. You can interrupt the automatic maneuver at any time with a slight touch of the steering wheel.

For vehicles with traditional hydraulic power steering, Bosch offers a modified type of the Parking Assistant based on the same ultrasonic sensor technology. Instead of taking over the steering maneuvers, this version of the Parking Assistant provides you clear instructions on steering-wheel position and the necessary stop and switching points through a display, thus guiding you into the perfect parking position (Park Steering Information, PSI).

Enough space?  
Parking-space  
measurement  
helps simplify  
the search for  
somewhere to  
park.





Room in the smallest space: thanks to the possibility of multiple steering moves, the Bosch Parking Assistant can use parking spaces which are only 80 cm longer than your vehicle.



The next generation of the Bosch Parking Assistant will be able to park your car in diagonal parking spaces as well as parallel ones.

#### On the way to fully-automatic parking

With the fully developed Parking Aid and the Parking Assistant for parallel parking the innovation potential of ultrasonic sensor systems is by no means exhausted. Bosch engineers are working intensively on new trail-blazing developments.

In the very near future our Parking Assistant will be expanded by the addition of a function for pulling out of a parking space, too. Here a display will instruct the driver how to position the vehicle in order to drive out of the parking space safely. The steering maneuvers will be taken over by the Parking Assistant with the well-proven support of the Electric Power Steering. It will also soon be possible to park automatically in diagonal parking spaces. In future, Bosch will transfer the parking maneuver completely to the electronic assistant: without any activity on the part of the driver it will guide the car fully-automatically, quickly, comfortably and safely into the parking space.

# System know-how

## for driving assistance using the ultrasonic method

### Simple system structure

The convincing feature of the Bosch Parking Assistant is its simple structure: all ultrasonic-based functions make use of identical, cost-favorable sensors which always have the same installation requirements. The modular control-unit concept also permits broad scalability with virtually identical hardware – one ultrasonic control unit for all functions.

This allows the various systems and functions to be combined with one another and integrated into the system with great simplicity. For automobile manufacturers this means considerable cost savings – particularly in comparison to radar-based or even optical systems.

### Platform concept for innovative functions

One example for the cost-favorable implementation of an innovative function based on our tried and tested ultrasonic technology is our so-called Side View Assist (SVA), a blind spot assistant, which can be combined with all Bosch parking functions.

Side View Assist monitors the areas beside and diagonally to the rear of the vehicle up to a distance of four meters. The system identifies vehicles located in the driver's blind spot and displays them immediately: an unobtrusive symbol close to the side mirror lights up, warning the driver of the potential danger.

Side View Assist filters the objects identified according to their relevance: vehicles overtaken, oncoming traffic and road infrastructure such as crash barriers are not displayed since they do not represent a danger.

The system is activated as soon as the vehicle begins to move at walking pace. It is thus particularly suitable for use in city traffic as well.



Side View Assist reduces the risk of accident during lane changes by warning the driver



Our ultrasonic sensors have proved their worth in millions of applications



Virtually invisible integration into the bumpers

### Ultrasonic sensors: tried and tested high-performance technology

Ultrasonic sensors work on the pulse-echo principle used, for example, by bats in flight. The sensors transmit short ultrasonic impulses which are reflected by obstacles. The echo signals are registered by the sensors and evaluated by a central control unit.

Our networked control unit communicates directly with the vehicle bus and passes the distance information on to the driver as an acoustic and/or optical signal, e.g. via the built-in audio or navigation system. We can also integrate customer-specific software modules into the control unit.

Modern diagnosis methods monitor the function of the system continuously so that the driver can rely on the system at all times.

### Features of our sensors

- ▶ Tried and tested, rugged and reliable ultrasonic technology for maximum efficiency
- ▶ Operating frequency: ~48 kHz
- ▶ Detection range: 25 to 400 cm (about 10 to 160 inches) (for special functions)
- ▶ Opening angle: 120° horizontal, 60° vertical
- ▶ Function range: -40°C to +85°C
- ▶ Power supply: < 500 mA (transmit)
- ▶ Operating voltage: 8 V (regulated)

### Modular system concept provides for a wide range of versions

The detection properties of our two to twelve-channel systems (rear and front-and-rear solutions) can be individually applied in accordance with the customer's wishes. The sensor characteristics can also be parameterized for vehicle-specific adaptation of the detection field and the suppression of ground reflections.

The various connector geometries of our compact sensors permit a wide range of holder-fitting concepts for extremely simple installation even in unfavorable locations and in cramped spaces.

In order to fulfill the specific design requirements of our customers, we offer our sensors with a variety of different membrane surfaces: coatable, coated, anodized or chrome-plated.

Our ultrasonic-based system solutions enable our customers to realize functions that are precisely tailored to the vehicle concerned. To ensure this, we provide development and application services as well as technology of the highest quality which has proved itself in millions of instances all over the world. In future, too, we will continue to set standards by the continuous further development of sensors, systems and functions which offer the driver added value which can be experienced live.

**Robert Bosch GmbH**  
Automotive Electronics  
Body Electronics

Postfach 16 61  
71226 Leonberg  
Germany

[www.bosch-einparkhilfe.de](http://www.bosch-einparkhilfe.de)  
[www.bosch-einparkassistent.de](http://www.bosch-einparkassistent.de)

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