

Time for a break
recommendation

Audi - New driver assist systems in 2011

- ▶ Park assist
- ▶ Ambient display
- ▶ Time for a break

Introduction

The miscellaneous systems designed to assist the driver in parking situations have now been given a significant innovative boost. A new generation of park assist steering systems will be available for the first time in the new A6 platform models. A short time later, this innovative system will also be launched in the Audi Q3. Thanks to continuous product improvement, drivers can now enjoy the benefits of assisted parking into ever-smaller parking spaces.

If the vehicle has manoeuvred into a short parking space with the aid of park assist steering, the driver does not have to worry about getting out of the parking space later on. This, of course, also applies in situations where the vehicle has been "blocked in" by other vehicles. With the launch of the new generation of park assist steering, drivers can now rely on the system to help them get out of parking spaces. This assistance is available for parking spaces that are parallel to the road, so-called parallel parking spaces.

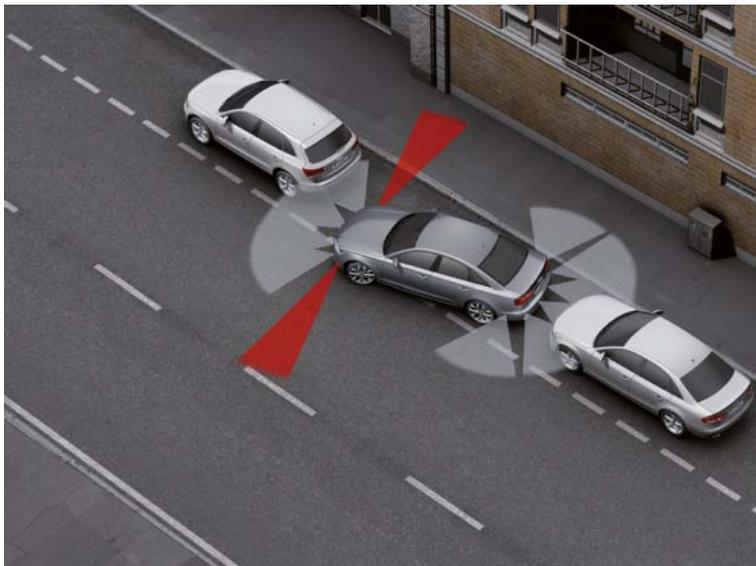
Another new feature is park assistance for manoeuvring into parking spaces at an angle of 90° to the road, so-called perpendicular parking spaces. The system also provides assistance in these situations.

Park assist steering helps the driver to identify suitable parking spaces. Finally, the system assists parking by taking over the steering movements.

The driver is still in control of accelerating, braking and changing gear.

The visual parking aid has also been improved. Thanks to the lateral ultrasound sensors of the park assist steering system, it is now possible in many cases to graphically display detected obstacles around the vehicle's periphery on the MMI screen. Detected obstacles are displayed in the form of white or red bars which move within sectors.

The closer the vehicle is to the obstacle, the closer the bar is to the vehicle on the display.



600_001

Audi park assist

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► The Self Study Programme teaches a basic knowledge of the design and functions of new models, new automotive components or new technologies.

It is not a Repair Manual! Figures are given for explanatory purposes only and refer to the data valid at the time of preparation of the SSP.

For further information about maintenance and repair work, always refer to the current technical literature.



Note



Reference

Audi park assist

Overview

The new Audi A7 Sportback was launched in November 2010. The A7 Sportback was the first model of the revised C series. A new feature of this seventh generation is the transition from hydraulic to electromechanical steering. The key reason for making this change is the higher energy efficiency of the electromechanical steering system. It not only improves fuel economy but also reduces pollutant emissions.

With the launch of the electromechanical steering system, driver assist systems with corrective steering are now available in the new C-series models. The A7 Sportback is, therefore, the second Audi model to feature park assist steering. The saloon and Avant versions of the new Audi A6 will follow suit a short time later. The system in question is the Generation 2.0 park assist steering system, officially known as "park assist steering".

Park assist steering was first offered in the Audi A3 '09.

The system initially assisted the driver with reversing into parallel parking spaces in a single manoeuvre. Soon after, it was replaced by the Generation 1.5 park assist steering system which supported multiple-stage parking manoeuvres into parallel parking spaces. This made it possible to park in even smaller parking spaces.

	Park assist steering Generation 1.0	Park assist steering Generation 1.5	Park assist steering Generation 2.0
	Audi A3 from week 22/08	Audi A3 from week 45/09	Audi A7 from week 44/10
Parking in parallel parking spaces single-stage	✓ Vehicle length + 1.4 m	✓ Vehicle length + 1.4 m	✓ Vehicle length + 1.4 m
Parking in parallel parking spaces multiple-stage	✗	✓ Vehicle length + 1.1 m	✓ Vehicle length + 0.8 m
Leaving parallel parking spaces	✗	✗	✓
Parking in perpendicular parking spaces	✗	✗	✓
Leaving perpendicular parking spaces	✗	✗	✗
Number of ultrasound sensors	8 parking aid sensors 2 park assist steering sensors	8 parking aid sensors 2 park assist steering sensors	8 parking aid sensors 4 park assist steering sensors

The Generation 2.0 system supports parking in parallel parking spaces which are just 0.8 m longer than the parking vehicle. The Generation 2.0 system also supports parking in parallel parking spaces at an angle of 90° to the road, so-called perpendicular parking spaces. The driver is also assisted when leaving the parking space. This function is available when leaving parallel parking spaces that are at least half a metre longer than the vehicle.

Despite the assistance which the system provides in various parking situations, the driver must always keep in mind that even park assist has its limitations.

Assistance with parallel parking

The Generation 2.0 Audi parking system assists reversing into parallel parking spaces. Parallel parking spaces are parking spaces which are parallel to the road.

The system support comprises the following steps:

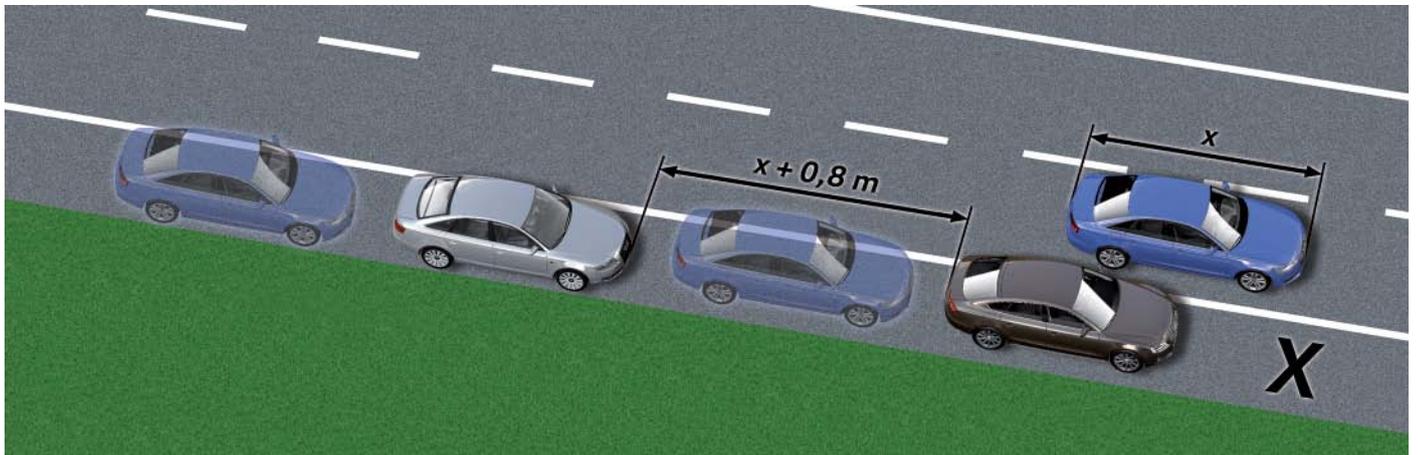
1. Measurement of parking spaces on passing
2. Display of suitable parking options via the dash panel insert
3. Execution of all steering movements during the parking manoeuvre

However, the driver is still in control of accelerating, braking and selecting the appropriate gear.

Suitable parking spaces are only detected on passing if the vehicle is travelling at a speed of less than 40 kph.

Suitable parking spaces are offered by the system if they are between two vehicles or behind a vehicle. The system does not support parking in front of a parked vehicle.

The system classifies a parking space between two vehicles as suitable if it is at least 0.8 m longer than the vehicle ($x + 0.8$ m).



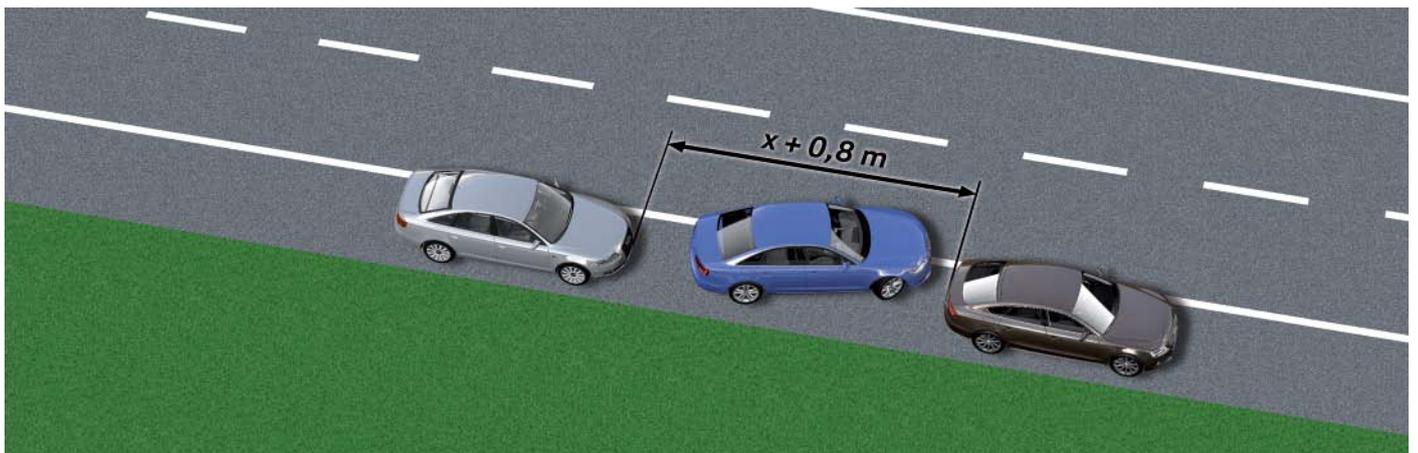
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Manoeuvring into short parking spaces

The Generation 1.0 park assist steering system helps the driver to reverse park the vehicle in a single manoeuvre. For this purpose, the parallel parking space must be at least the length of the vehicle plus 1.4 m.

The Generation 1.5 system, with its ability to perform multiple-stage parking manoeuvres, reduced the minimum parking space length to the length of the vehicle plus 1.1 m.

The Generation 2.0 system has now reduced the minimum parking space length to the length of the vehicle plus 0.8 m. This was achieved by reducing the continuous tone range of the parking aid from 30 cm to 20 cm. This reduction allows the vehicle to park closer to the vehicles in front and behind. This feature is used only in parking spaces which are between 0.8 m and 1.1 m larger than the vehicle. In larger parking spaces, the continuous tone range remains at 30 cm.

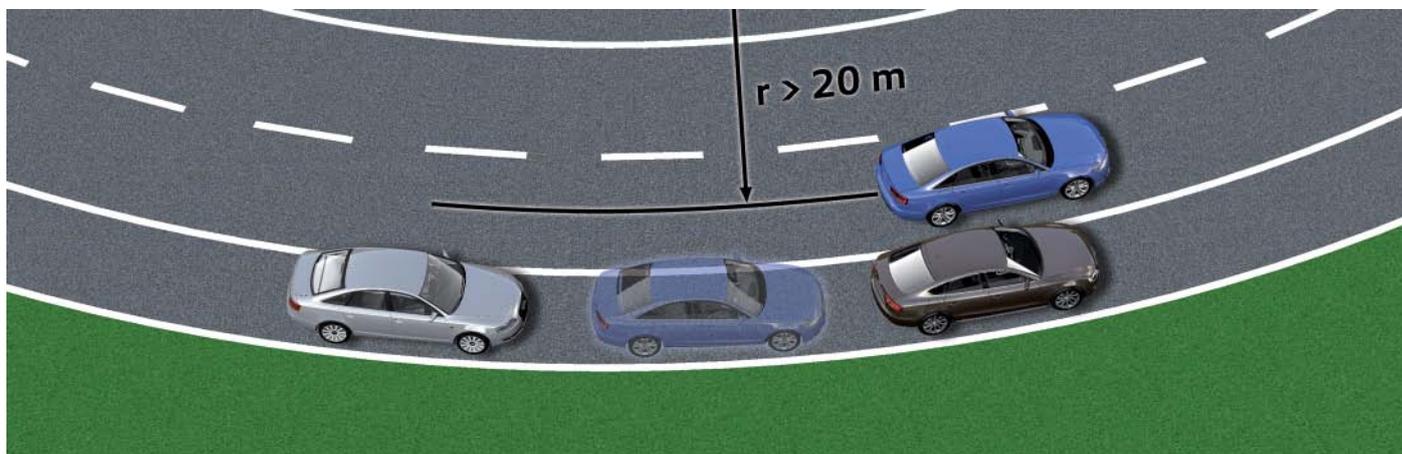


600_004

Parallel parking in corners

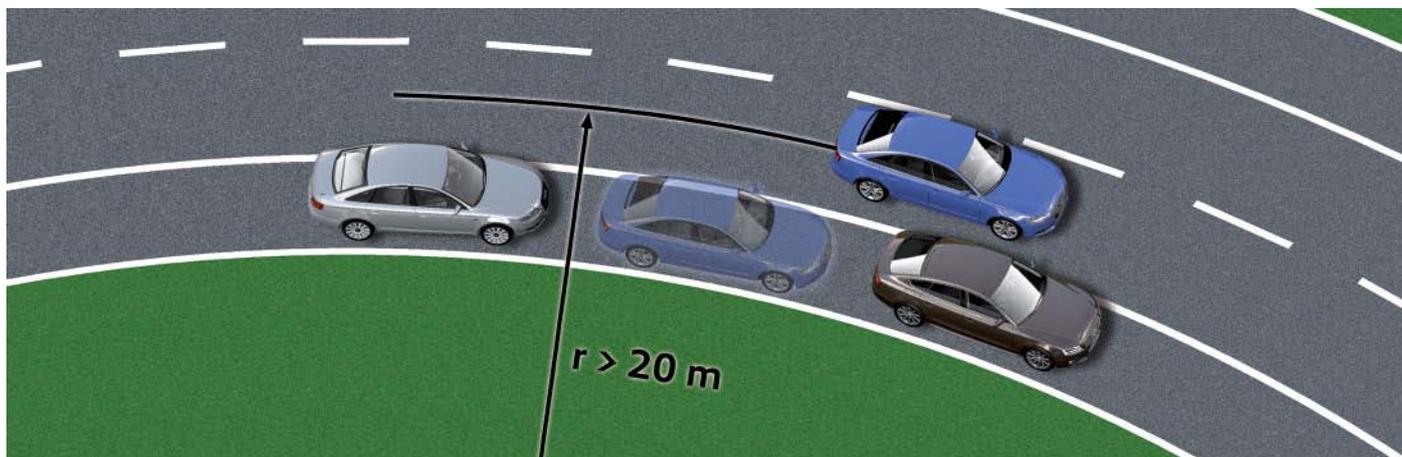
Park assist also offers parking assistance for parallel parking spaces in corners. It does not matter whether the parallel parking space is in a left or right-hand corner.

The Generation 2.0 system reduces from 40 m to 20 m the minimum corner radius down to which park assistance is provided by the system.



600_005

Parallel parking space in a left-hand corner



600_006

Parallel parking space in a right-hand corner

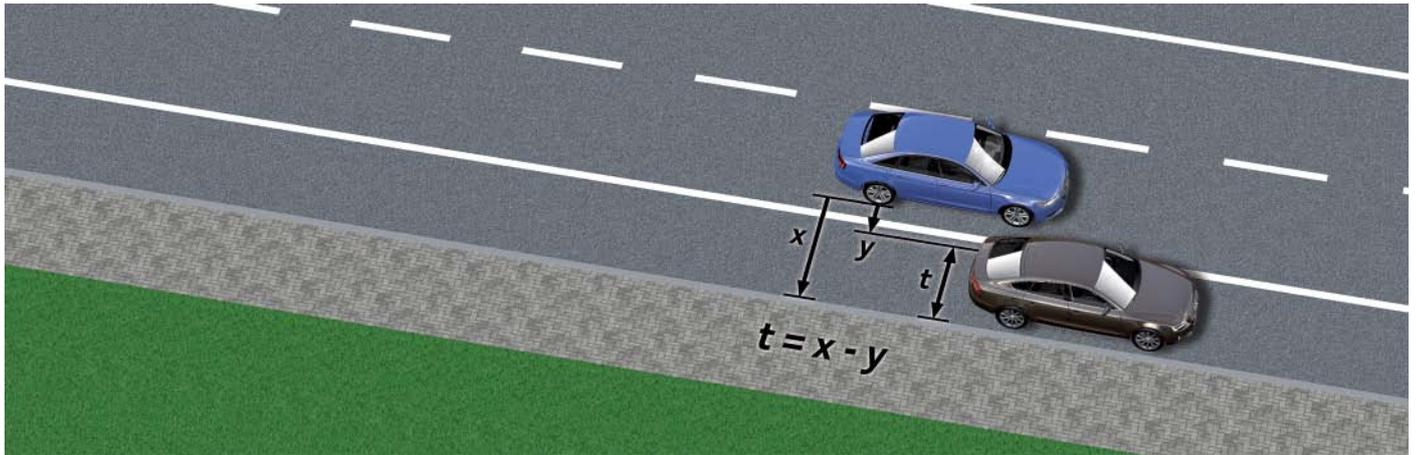
Parking relative to a kerb

The following examples of five actual situations show how the parking results obtained with park assist can vary. In all five cases the system has detected a kerb.

A factor that has a major bearing on the parking results is how close the already parked vehicle is to the kerb. This distance is referred to as parking space depth t .

Determining the depth of the parking space

The park assist system with its ultrasound sensors detects - on passing - a kerb and an obstacle, which is interpreted as a parked vehicle.



600_007

The ultrasound sensors have measured a distance x to the kerb. On passing the parked vehicle, the system has measured a distance y to this vehicle. The parking space depth t is now using the formula:

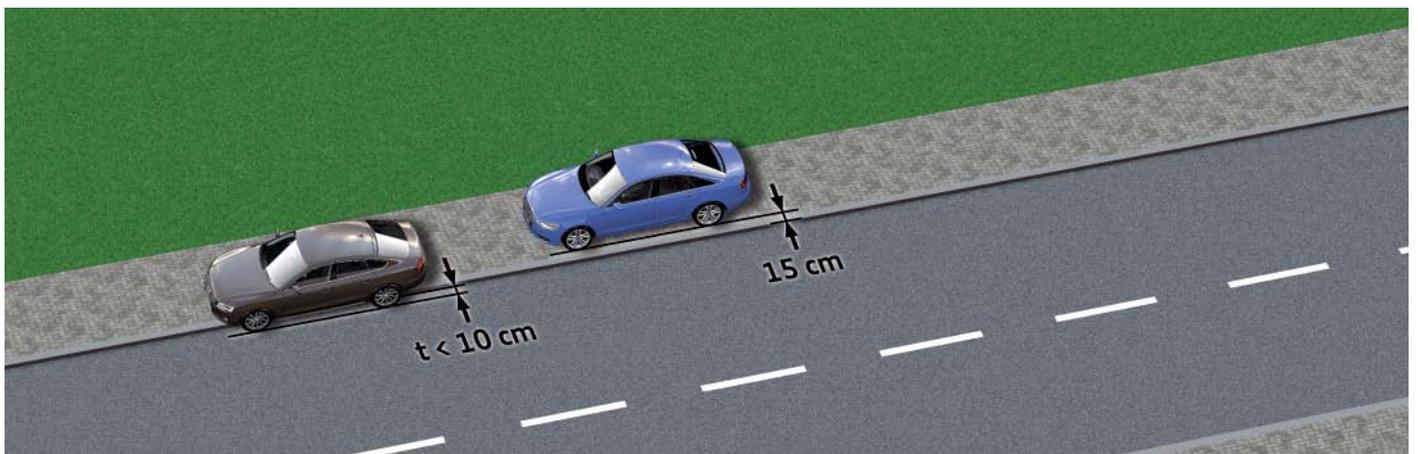
$$t = x - y$$

A positive value for t means that the parked vehicle is at least partially parked on the road, as the distance to the kerb is greater than the distance to the vehicle. A negative value for t would mean that the parked vehicle is parked completely on the kerb, as the kerb is closer than the parked vehicle.

Situation 1:

In situation 1, t has a value of between 0 cm and 10 cm. Park assist interprets from this value that the vehicle is parked largely on the road, but still has at least two of its wheels on the road.

Based on the calculated parking space depth of between 0 cm and 10 cm, park assist decides to park completely on the kerb. It aims for a clearance of 15 cm to the kerb edge.

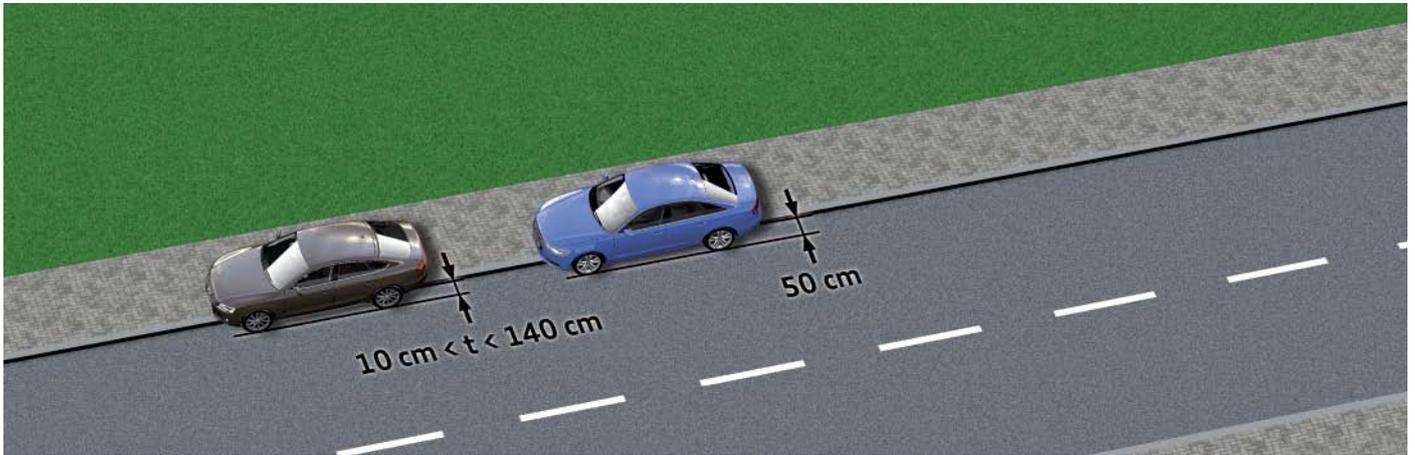


600_008

Situation 2:

In situation 2, a parking space depth of between 10 cm and 40 cm is calculated in the same way as in situation 1. Given this parking space depth, park assist will position the vehicle so that the

distance between the outer face of the tyre and the kerb is approximately 50 cm.

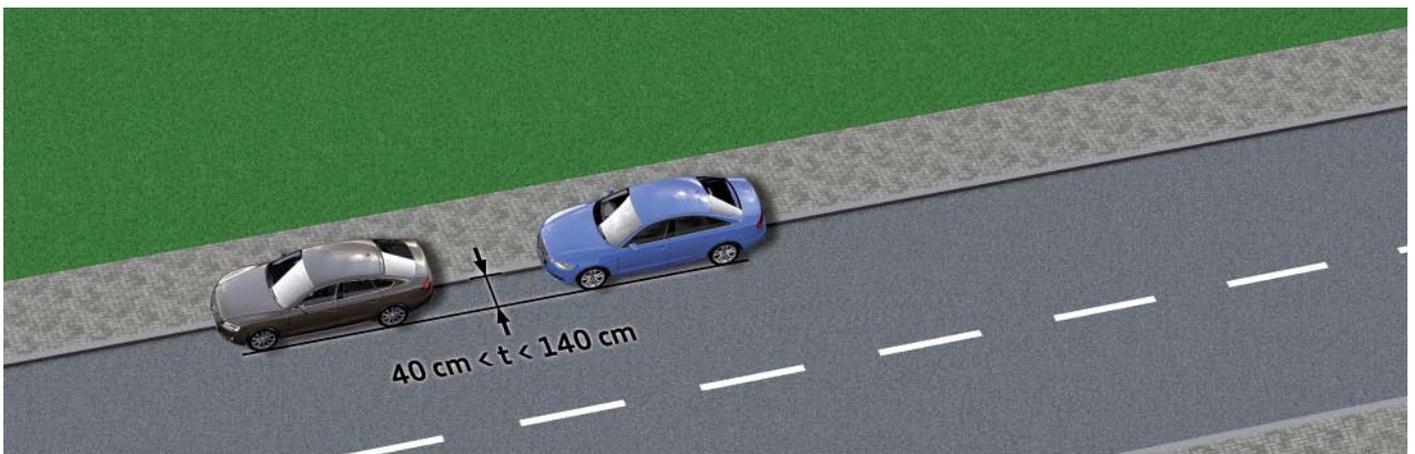


600_009

Situation 3:

In situation 3, park assist has calculated a parking space depth of between 40 cm and 140 cm. While driving by, the system detected a vehicle which it can park behind.

In this case, park assist utilises the vehicle in front, and not the kerb, as its point of reference.



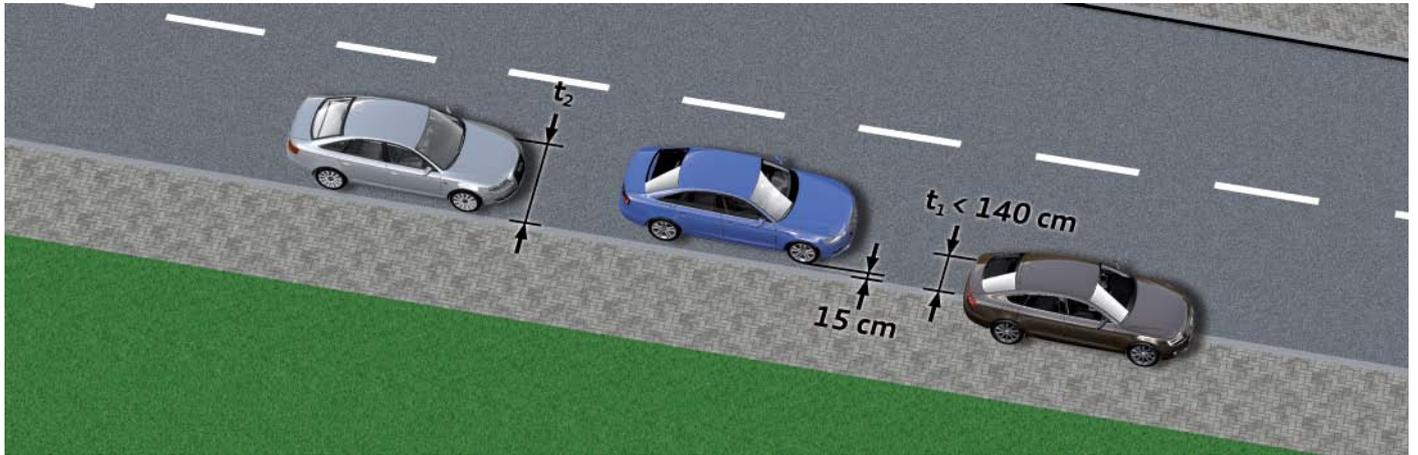
600_010

Situation 4:

In situation 4, park assist has calculated for the brown A7 Sportback a parking space depth t_1 of less than 140 cm.

A parking space depth of t_2 was previously calculated in the case of the silver A6 saloon. The parking space depth t_2 indicates that the

silver A6 saloon is not parked on the kerb. In this situation, the park assist system parks the vehicle parallel to the kerb at a distance of 15 cm from the kerb.

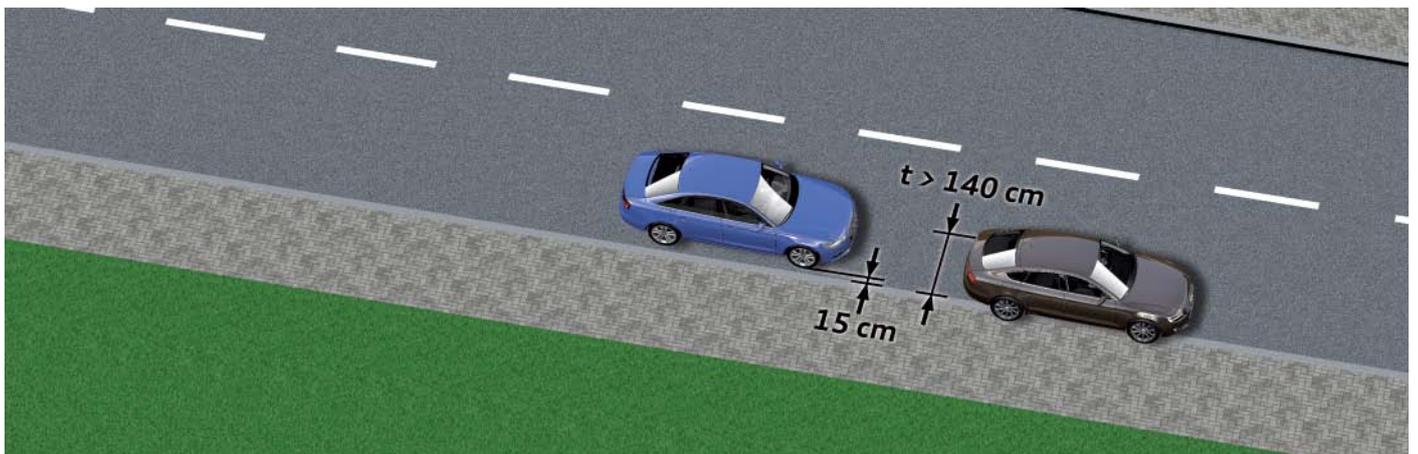


600_011

Situation 5:

In situation 5, park assist has calculated a parking space depth t of greater than 140 cm. In this case, the vehicle would park on the road at a distance of 15 cm from the kerb.

It does not matter if the previously parked vehicle is parked completely on the road or, as in the diagram shown below, several centimetres over the kerb. Park assist does not have this information, as that cannot be acquired by the ultrasound sensors.



600_012

Parking against a wall

Park assist is able to differentiate between large obstacles, such as walls or building enclosures, and smaller obstacles, such as kerbs.

If high obstacles are detected, park assist positions the vehicle parallel to this obstacle at a distance of approximately 30 cm from it. In this case, the vehicle is not aligned to other parked vehicles.



600_013

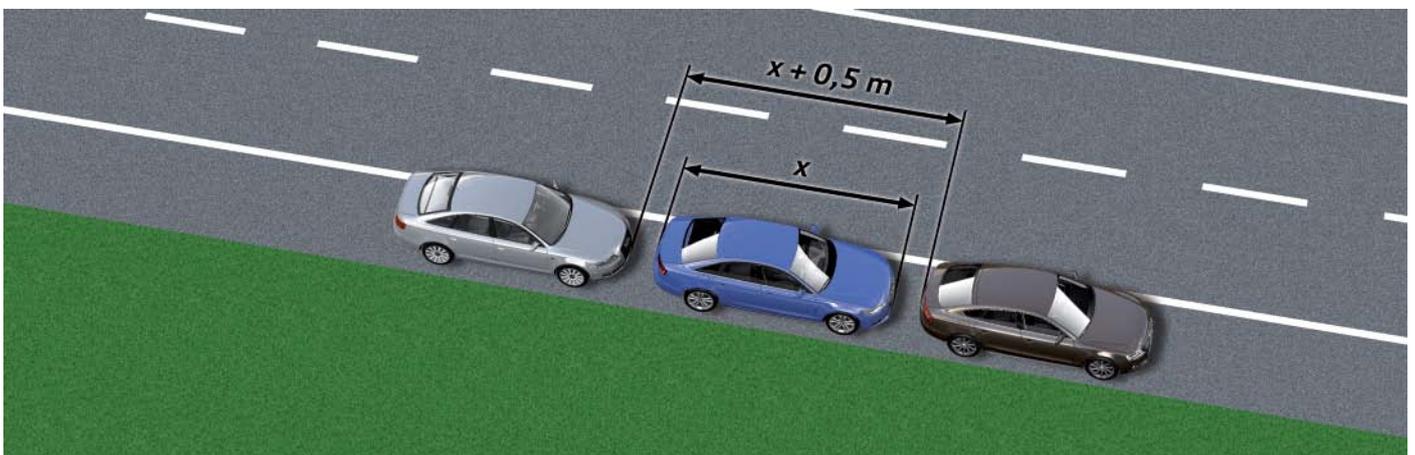
Assist function for parallel parking

The Generation 2.0 park assist steering system also supports leaving parallel parking spaces. However, the new park assist system does not support leaving perpendicular parking spaces.

A prerequisite for assisted unparking is that the parking space is at least half a metre longer than the vehicle leaving the parking space ($x + 0.5$ m).

Unpark assist is available only if the vehicle has not yet moved more than two metres since turning on the ignition.

The objective of the unpark assist function is to manoeuvre the vehicle into a position from which the driver can leave the parking space by applying the steering lock set by the system. This is achieved by multiple-stage manoeuvring. Failing this, the assist function ends.



600_014

Operation and displays

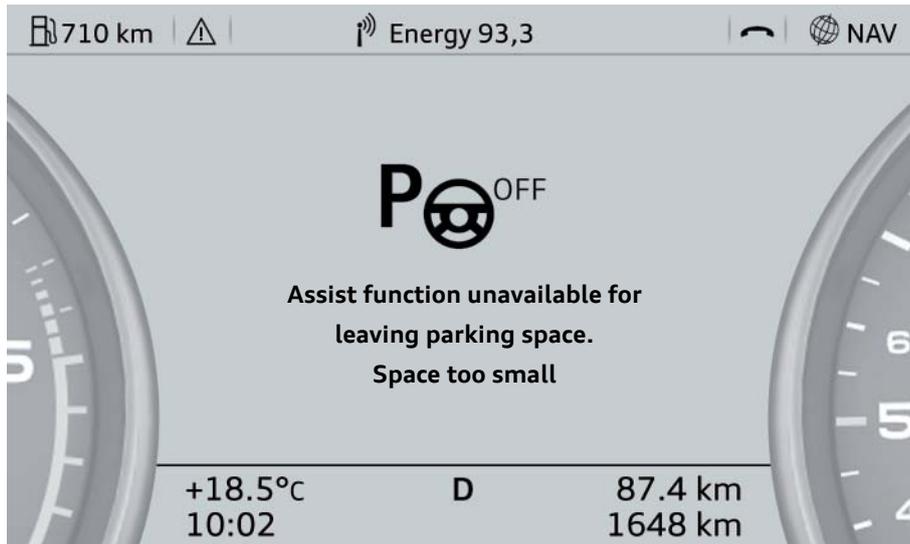
The unpark assist function can be activated by pressing the park assist steering button E581 after the following events:

- ▶ turning on the ignition

or

- ▶ successfully parking the vehicle with park assist

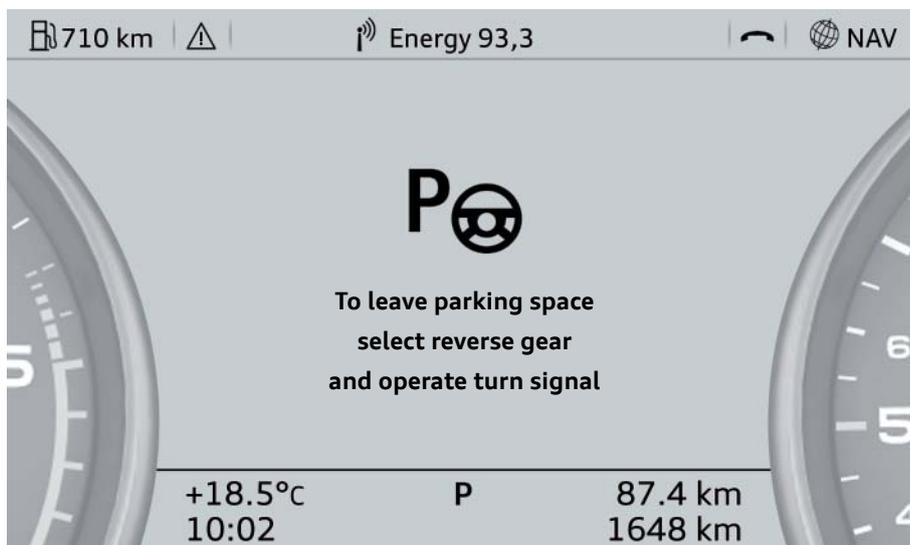
After activating the unpark assist function, the system, using its parking aid sensors, checks if the clearances to the vehicles in front and behind are large enough. If this is not the case, the system cancels the assist function and notifies the driver via the driver information system.



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If the requirements for unpark assistance are met, the system instructs the driver to operate the appropriate turn signal and select reverse gear. To unpark the vehicle when facing left, the left turn signal must be operated.

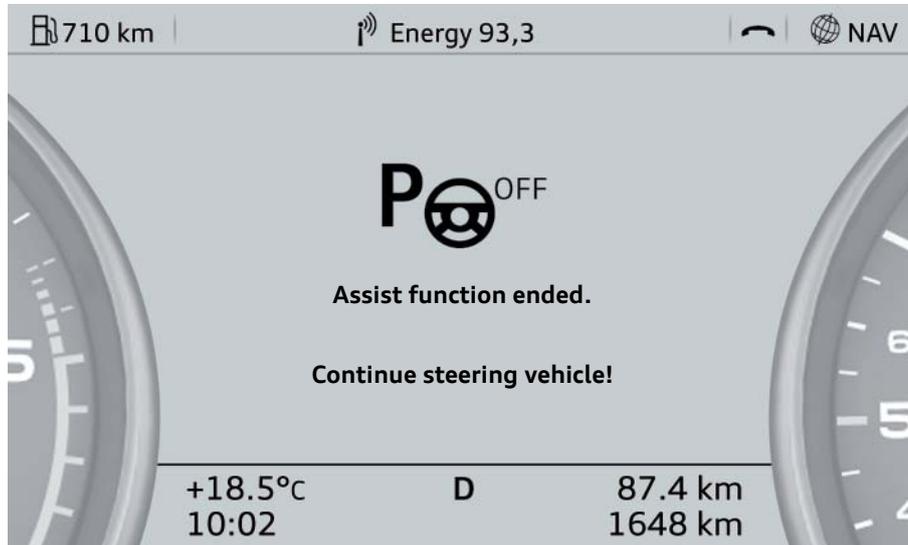
Accordingly, the driver must operate the right turn signal to unpark the vehicle when facing right.



600_016

The system then helps the driver to manoeuvre the vehicle out of the parking space. The system uses the same familiar graphics as the parking aid system. The driver is instructed to move forwards or backwards and to select the necessary gears. The driver controls accelerating and braking, while the system takes over steering the vehicle.

The assist function ends when the vehicle is in a suitable position in the parking space. The driver is informed of this via the driver information system.



600_017

Park assistance for perpendicular parking

The Generation 2.0 park assist steering system provides assistance when reversing into perpendicular parking spaces. Perpendicular parking spaces are parking spaces at an angle of 90° to the road.

The system support comprises the following steps:

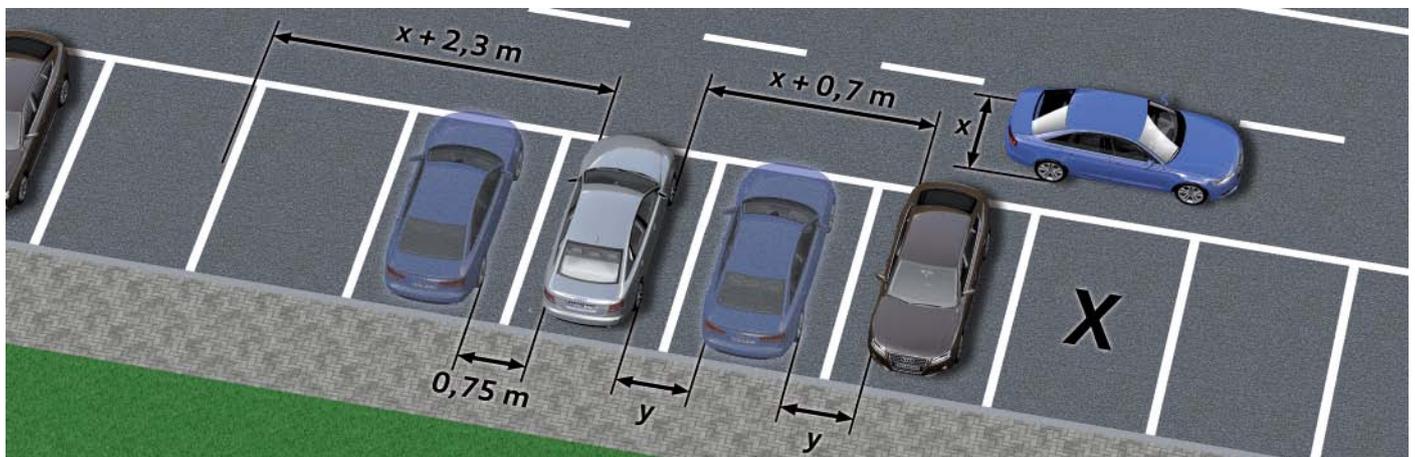
1. Measurement of parking spaces on passing
2. Display of suitable parking options via the dash panel insert
3. Execution of all steering movements during the parking manoeuvre

Suitable parking spaces will be detected on passing if the vehicle is travelling at a speed of less than 20 kph.

The driver also controls the clutch, brake and accelerator pedals during assisted manoeuvring into perpendicular parking spaces.

As already described with reference to parallel parking, the parking space can be between two vehicles, but also behind or adjacent to a vehicle. The system does not support parking in front of a parked vehicle.

The system classifies a parking space between two vehicles as suitable if its width is at least that of the vehicle $x + 0.7$ m. In this case, park assist parks the vehicle midway between both vehicles at a distance y from each.



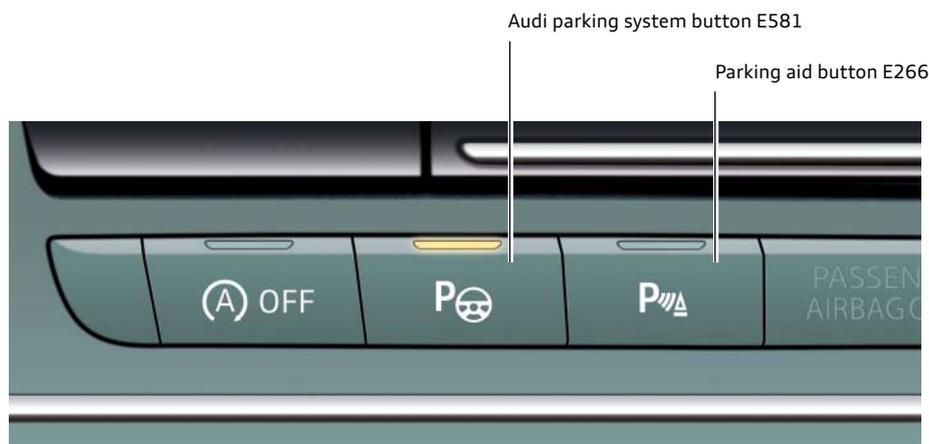
600_018

If the measured width of the parking space exceeds the width of the vehicle by at least 2.3 m ($x + 2.3$ m), this is interpreted by the system as follows:
The vehicle is parked adjacent to a vehicle, and not between two vehicles.

In this case, the vehicle is parked parallel to the adjacent vehicle at a distance of 0.75 m from it.

Operation and displays

Parking aid can be activated in perpendicular parking spaces by pressing the parking aid button E581 twice.



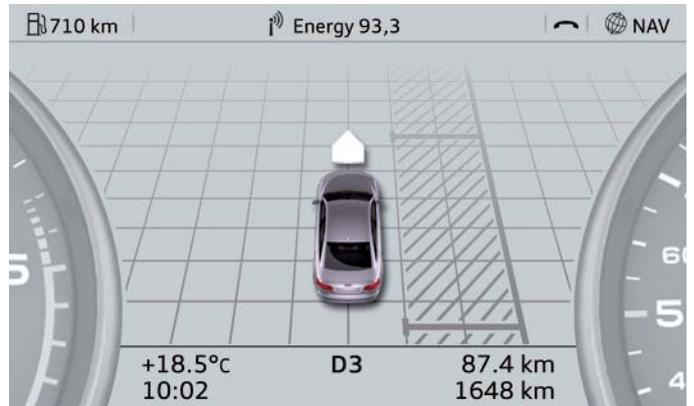
600_019

Driver guidance during a parking manoeuvre into a perpendicular parking space

A parking manoeuvre into a perpendicular parking space is described below. The perpendicular parking space is on the left-hand side of the road. The vehicle is a left-hand-drive model.

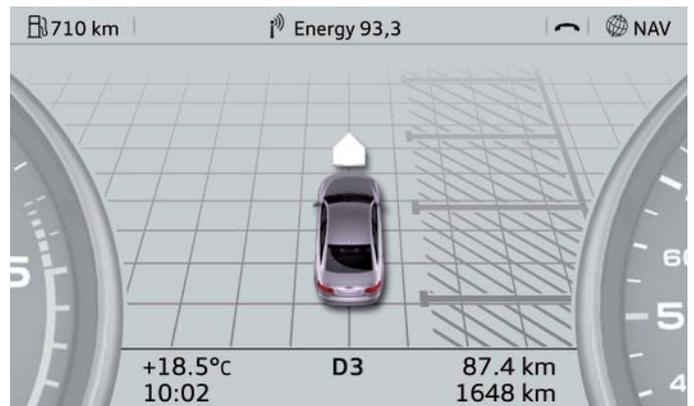
In this case, the driver is guided through the assisted parking manoeuvre via the driver information system.

1. Press the park assist steering button E581 once. The park assist display in the driver information system is then activated. Parallel parking spaces are initially displayed on the right-hand side of the road. The display also indicates:
No suitable parallel parking spaces are presently available on the right-hand side of the road.



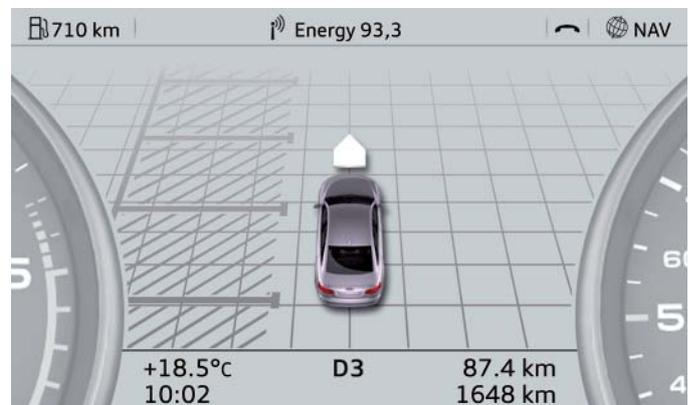
600_020

2. Press the park assist steering button E581 again. The perpendicular parking spaces on the right-hand side of the road are now shown. The display also indicates:
No suitable parallel parking spaces are presently available on the right-hand side of the road.



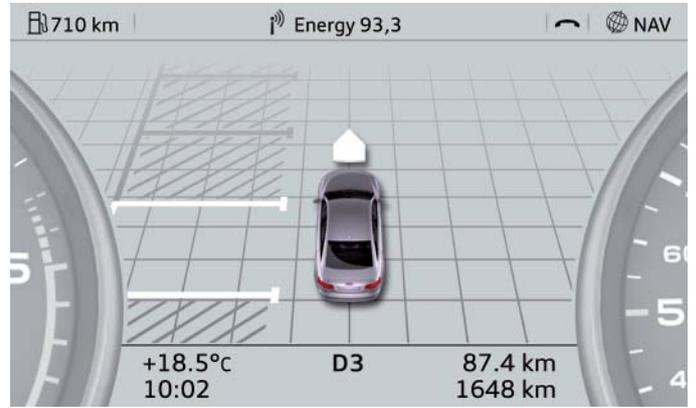
600_021

3. The driver has detected an available perpendicular parking space on the left-hand side of the road. Hence, the driver operates the left-hand turn signal. The display now displays suitable perpendicular parking spaces on the left-hand side of the road. The parking aid has not yet detected a suitable perpendicular parking space on the left-hand side of the road.



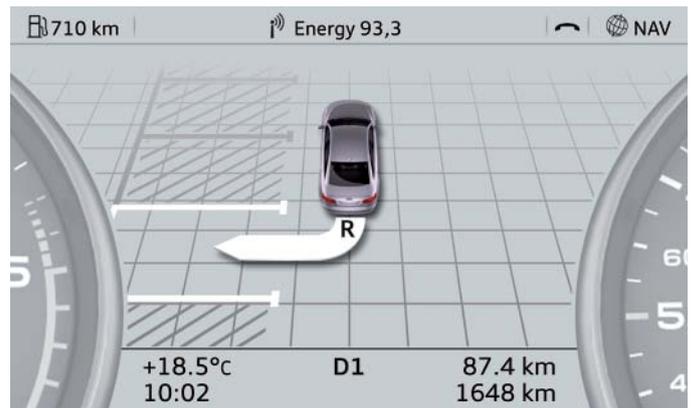
600_022

4. The vehicle has now passed the perpendicular parking space detected by the driver. Park assist classifies the measured perpendicular parking space as suitable, and the display changes over to the driver information system. The arrow in front of the vehicle indicates that the driver must continue straight ahead although a suitable perpendicular parking space has been detected by the system.



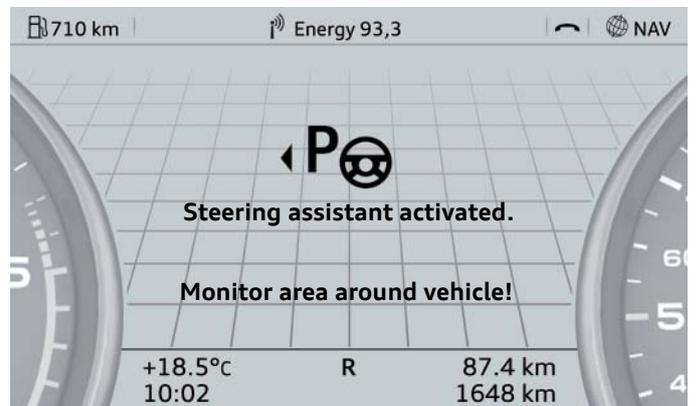
600_023

5. If the vehicle has reached a suitable position for the parking manoeuvre, the following display appears.



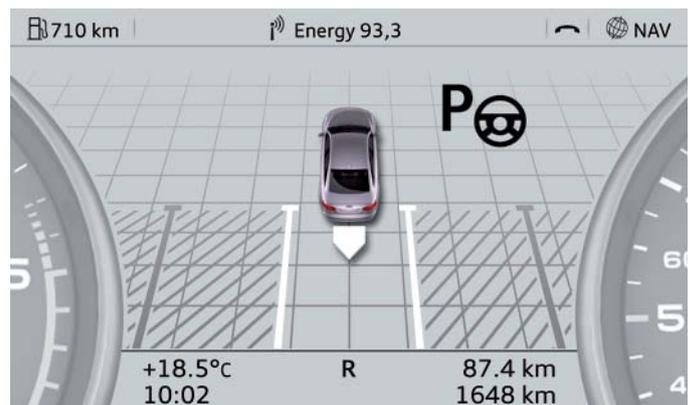
600_024

6. The driver now brakes. Once the vehicle has come to a stop, the driver selects reverse gear. Shortly after, the display indicates that the assist function has been activated.



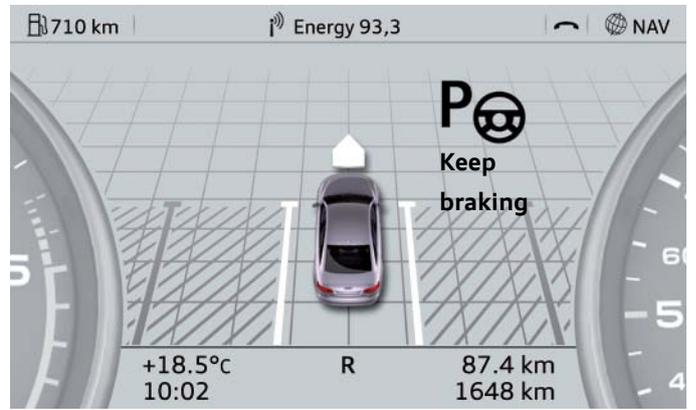
600_025

7. Park assist now takes over the steering movements. The driver still controls accelerating and braking. The vehicle now reverses. As soon as park assist has manoeuvred the vehicle into the parking space, the following display appears.



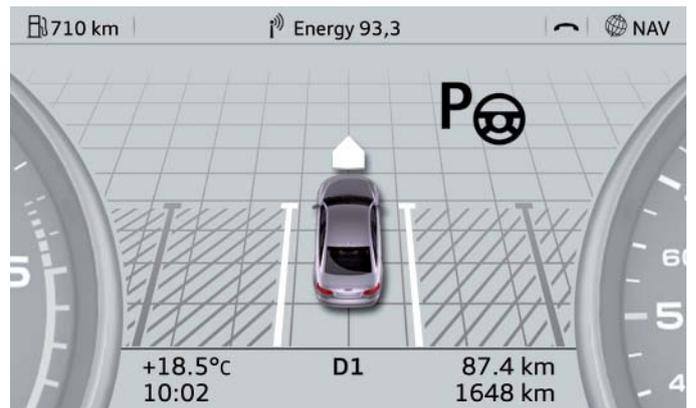
600_026

8. If the vehicle in the parking space has reached a position where the driver should again move forwards, this display appears. The driver is instructed to brake and select reverse gear.



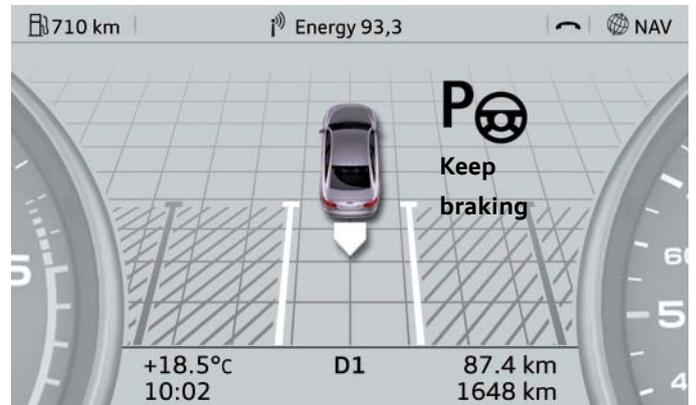
600_027

9. The graphic display again changes after reverse gear is selected.



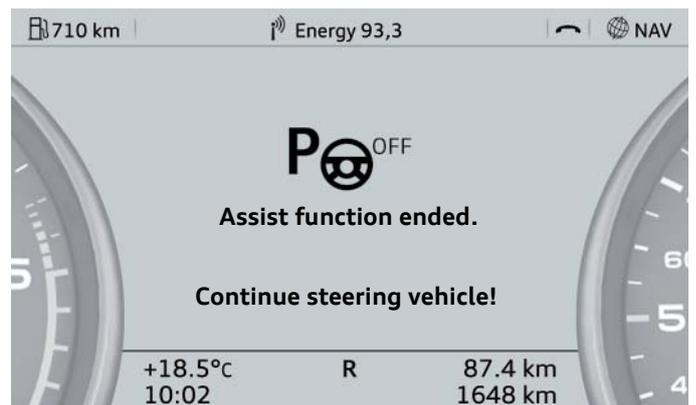
600_028

10. Once the vehicle is in a position where another reversing movement can begin, this is indicated by the following graphic.



600_029

11. If the vehicle has reached a suitable parking position on completion of this reversing manoeuvre, the assist function ends. If this is not the case, another forward-reverse manoeuvre is performed. This process is repeated until until the vehicle is in a suitable parking position. On completion of the parking manoeuvre, the following graphic appears.



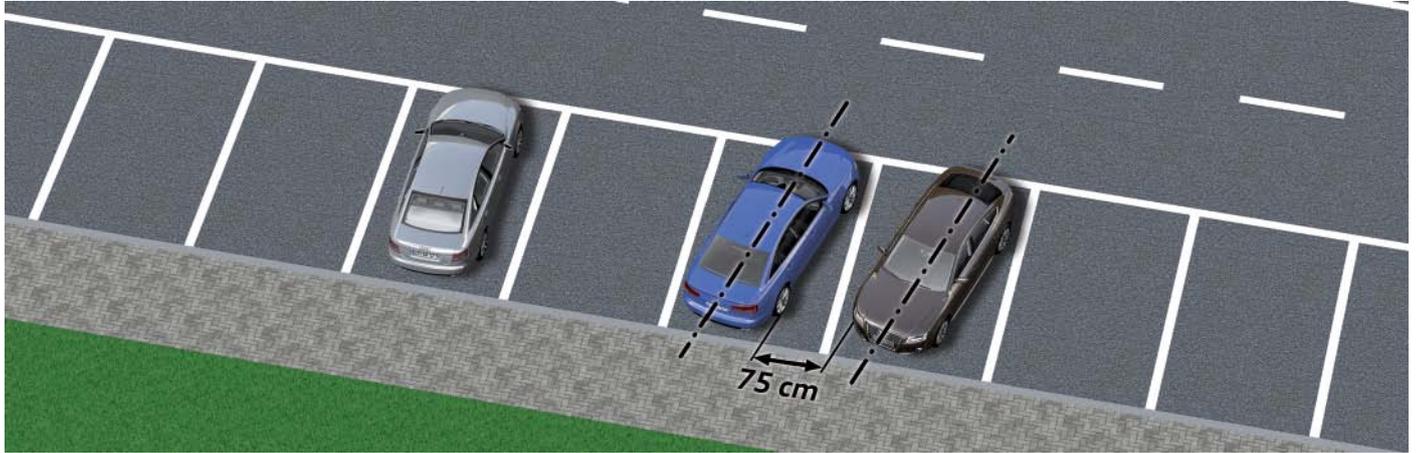
600_030

Perpendicular parking adjacent to vehicles parked at an angle

Parking adjacent to a vehicle parked at an angle

If, when measuring perpendicular parking spaces, the system determines that the available parking space can be used by more than one vehicle, park assist utilises an adjacent vehicle as its point of reference. If the reference vehicle is parked at an angle, the

vehicle with park assist will also park at an angle. The park assist system parks the vehicle parallel to the reference vehicle at a distance of 75 cm from it.

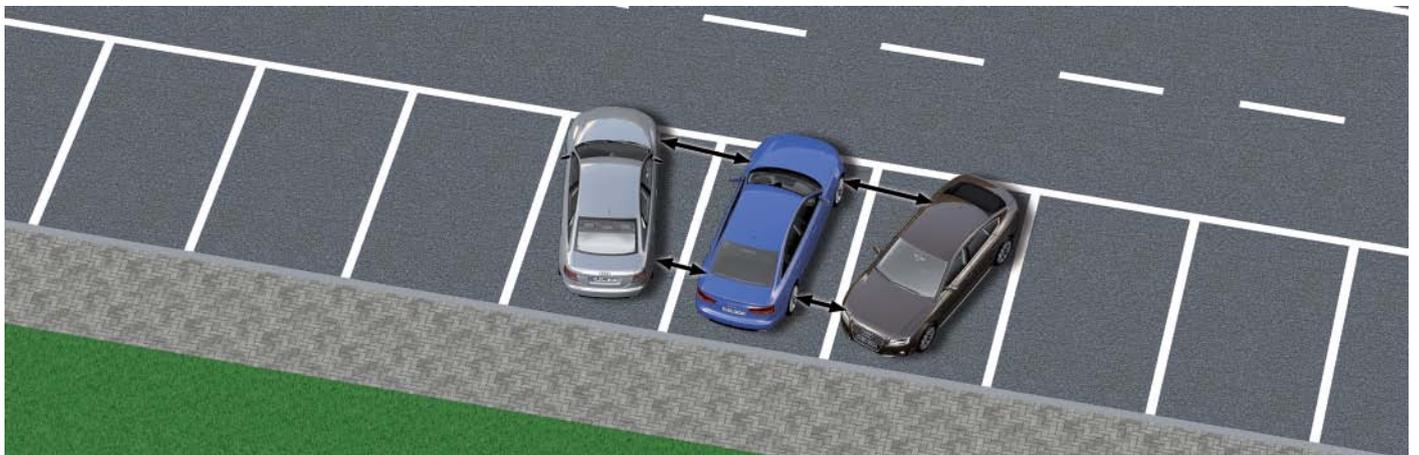


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Parking between two vehicles parked at an angle

If a vehicle with park assist parks between two vehicles, the vehicle utilises the two adjacent vehicles as its points of reference. If the two vehicles are parked at an angle, the vehicle with park assist will also park at an angle. The aim of park assist is to position the

vehicle midway between two adjacent vehicles so that there is an equal amount of space on each side for the occupants to exit the vehicle.



600_032

Conditions for the activation and cancellation of park assist

Park assist is not available under the following conditions:

- ▶ ESP has been deactivated with the ESP button.
- ▶ A trailer is attached to the vehicle.
- ▶ Park assist is faulty.

Park assist is cancelled under the following conditions:

- ▶ The ESP system is active.
- ▶ The driver intervenes in the steering movements of the park assist system.
- ▶ The maximum parking speed of 7 kph has been exceeded.
- ▶ The function has been deactivated with the park assist steering button.
- ▶ The time limit for the parking manoeuvre (6 minutes) has expired.

Ambient display

Introduction

The new additional function "ambient display" is available on A6 / A7 models from model year 2012 onwards. Ambient display is available to the driver if the vehicle has the optional park assist feature. The ambient display function cannot be ordered separately.

Ambient display is an advancement on the Optical Parking System (OPS). Unlike the OPS, the ambient display function shows the vehicle's complete periphery. The display is based partly on directly measured data and partly on computed data.



600_033

The ambient display also shows the vehicle's travel envelope, which reflects the path the vehicle will travel at the current steering angle. By visualising the travel envelope, it is easier to differentiate between critical obstacles and non-critical obstacles. Obstacles are considered non-critical as long as they are completely outside the travel envelope.

The ambient display appears on the MMI display. The ambient display appears when parking aid is activated. The ambient display disappears when the parking aid is terminated or when the driver selects different display content.

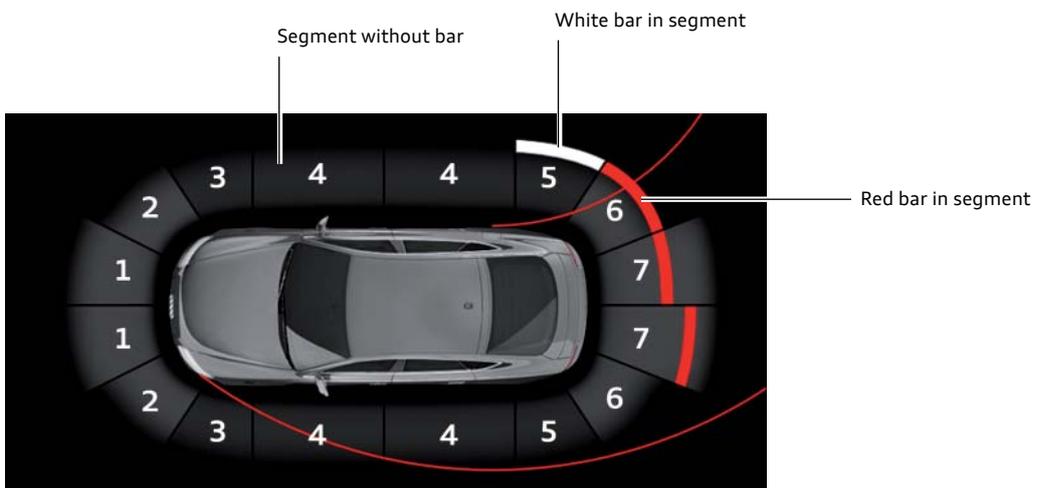
Sectors and bars

Obstacles are represented in the form of bars on the ambient display. The area within which the bars move is referred to as a sector. In all, the vehicle environment is subdivided into 16 sectors.

Each bar represents an area of approximately 15 cm within the sector. The front two sectors (1) represent a measurement range of approximately 120 cm. Accordingly, a bar can be represented in 8 different positions in this sector. The rear two sectors (7) represent a measurement range of approximately 160 cm.

The bars move towards the vehicle when it approaches an obstacle and move away from the vehicle when it moves away from an obstacle.

All other 12 sectors (2, 3, 4, 5, 6) represent a range of approximately 90 cm with six different bar positions.



600_034

White and red bars

The bar in a sector is shown in white when a detected obstacle is classified as non-critical. An obstacle is classified as non-critical if it is momentarily outside the travel envelope.

The bar is coloured red if the obstacle is classified as critical. This is the case if the obstacle is at least partially inside the travel envelope.

The bar can be red for the following reasons:

- ▶ The sector in which the red bar is located is outside or intersects with the travel envelope.

or

- ▶ The obstacle is inside the continuous tone range.

Acoustic signal of the parking aid

The following acoustic signals are issued by the parking aid after an obstacle has been detected and when approaching an obstacle:

The front warning buzzer H22 generates the acoustic signal for displayed obstacles in sectors 1, 2, 3 and 4, and the rear warning buzzer H15 for obstacles in sectors 5, 6 and 7.

Depending on sector, a continuous tone sounds as of an obstacle distance of 30 cm or 20 cm. In the case of the front and rear

sectors (1, 2, 6 and 7), a continuous tone sounds at distances of less than 30 cm. In the case of the lateral sectors (3, 4 and 5), a continuous tone sounds at distances of less than 20 cm.

An acoustic signal is issued via the warning buzzer only when the bars are red. Obstacles represented by white bars are currently regarded as non-critical, which is why no acoustic warning is given at this time.

Travel envelope display

The dynamic travel envelope display is reserved for vehicles with MMI Navigation plus. Models equipped with the Radio Media

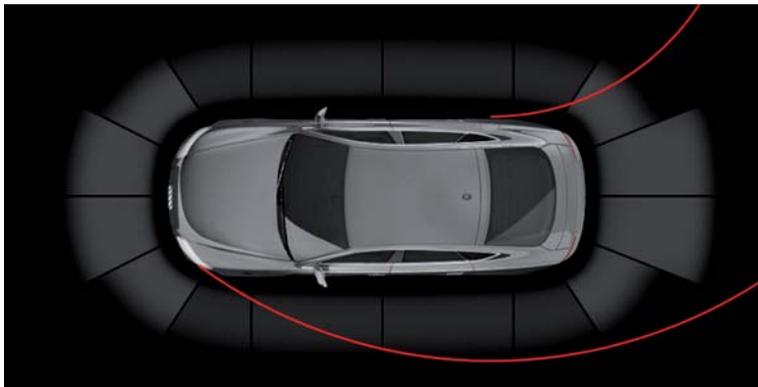
Center (RMC) cannot display travel envelopes, as the RMC does not have the graphic capability.

If the vehicle is moving forwards, the dynamic travel envelope is displayed for forwards travel.



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If reverse gear is selected, a dynamic travel envelope is displayed for reversing.



600_036

No dynamic travel envelope is displayed in the following cases:

- ▶ Gear selector currently in position "P"
- ▶ Electromechanical parking brake activated
- ▶ Loss of CAN messages with content required for calculation of the dynamic travel envelope

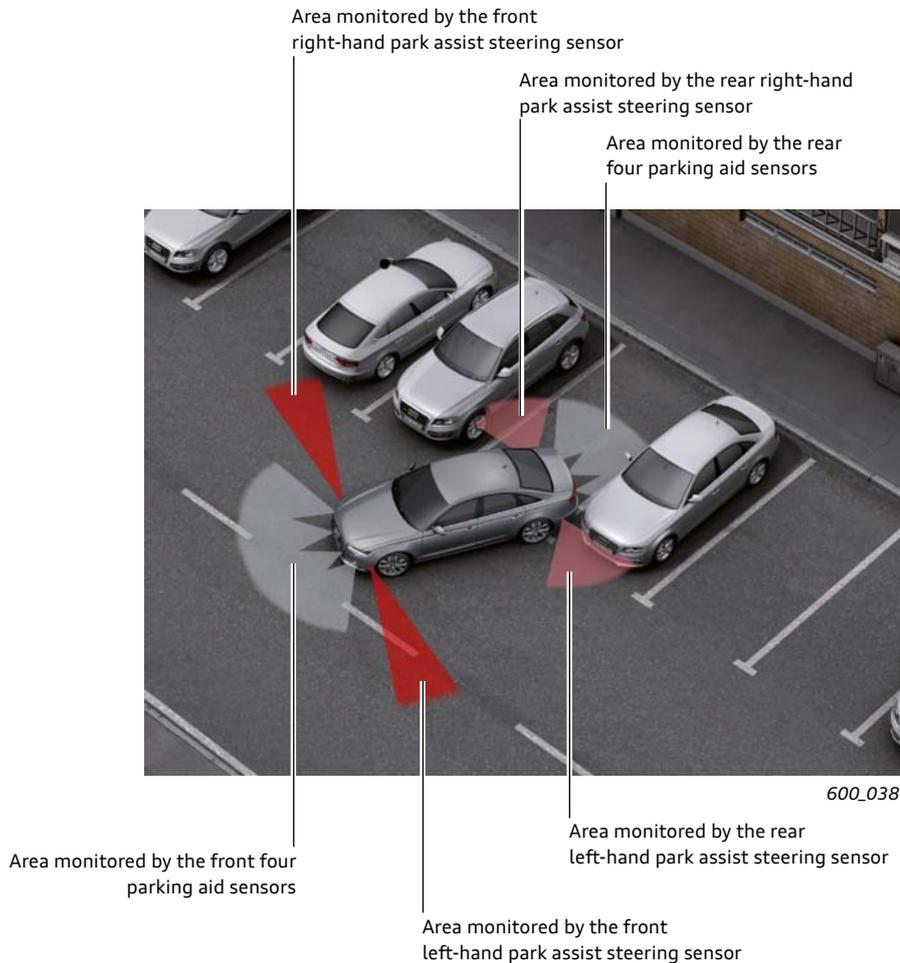


600_037

Sensing ranges of the ultrasound sensors

A vehicle equipped with the optional park assist feature with ambient display has twelve ultrasound sensors. These are:

- ▶ front four parking aid sensors
- ▶ rear four parking aid sensors
- ▶ front two park assist steering sensors
- ▶ rear two park assist steering sensors



The monitoring ranges of the rear four parking aid sensors overlap to create a continuously monitored area behind the vehicle. Likewise, the front four parking aid sensors monitor a continuous area in front of the vehicle.

The park assist steering sensors on each side of the vehicle produce two non-overlapping monitored areas. Between these areas is a large area which cannot be directly monitored. Information on obstacles on either side of the vehicle can, therefore, only be provided if the vehicle is moving and the area has already been scanned fully by the lateral ultrasound sensors. This is the only way in which the system can calculate and display the current position of lateral obstacles.

The displays of the side sectors always have to be computed, while the displays of the front and rear four sensors are generated directly from actual measurements.

After turning on the ignition, therefore, only obstacles currently detected by the front and rear four ultrasound sensors can be displayed when the vehicle is stationary. Display of obstacles on the left and right-hand sides of the vehicle stays disabled until the areas have been scanned on passing by the side park assist steering sensors.

The calculated lateral sectors are successively displayed in the direction of travel while the vehicle is moving. Incidentally, lateral obstacles are monitored even if the parking aid has not been activated by the customer. This enables the system to display obstacles between the two lateral monitored areas straight after it is activated.

System response to failure of system components

The system's response to faults has changed with the introduction of the new ambient display function.

If, for example, a rear parking aid sensor fails, the system reacts as follows:

- ▶ The front sensors retain their parking aid function.
- ▶ The fault symbol is displayed in the area of the rear sectors.
- ▶ Display of the travel envelope is deactivated.
- ▶ The ambient display is deactivated (the lateral sectors disappear from the display).
- ▶ All bars are now red; white bars are no longer displayed.
- ▶ When the system is activated, a fault indicator tone sounds and the function LED in the button begins to flash.



600_039

The system responds accordingly if one of the front sensors fails.



Note

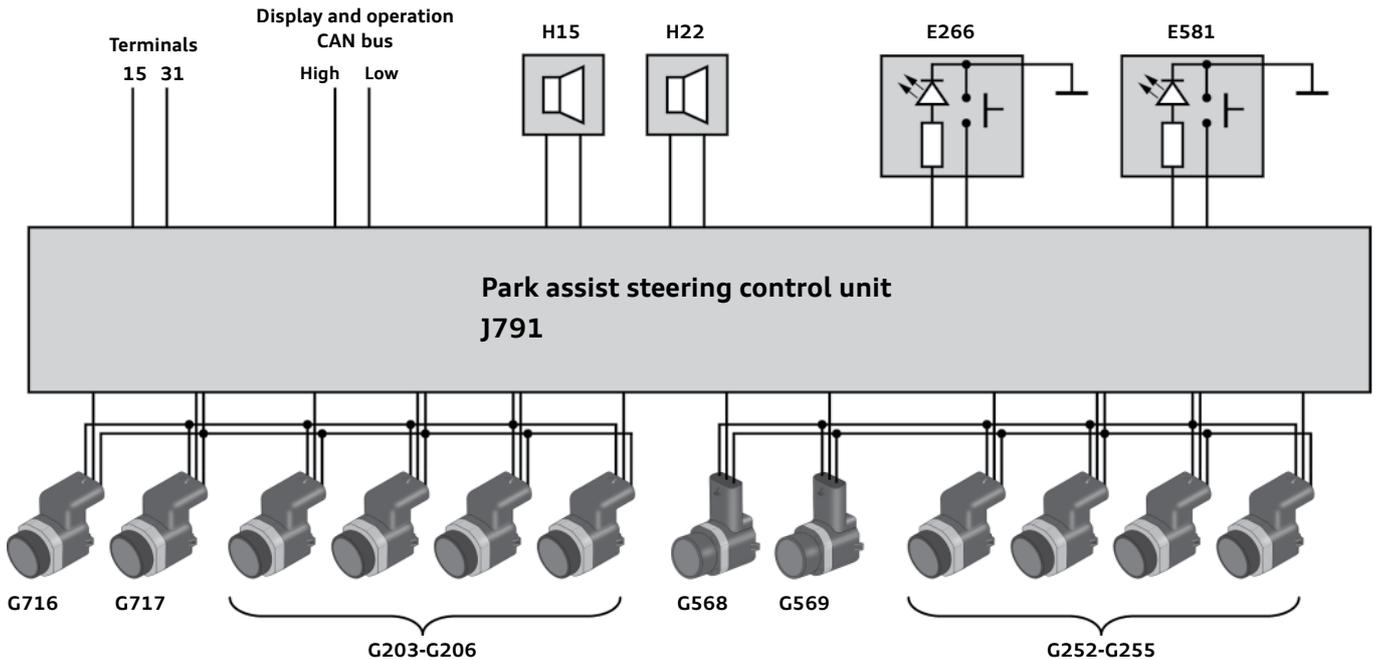
To ensure that parking aid and park assist with ambient display are fully functional, the ultrasound sensors must be kept clean and free of snow and ice.

System design

The audible and visual parking aid functions and park assist are integrated in the park assist steering control unit J791. Control unit J791 is a display and operation CAN user.

The control unit is a "terminal 15" control unit and does not have a separate "terminal 30" line. It reads in the two buttons for parking aid E266 and park assist steering E581 and activates the two function LEDs in the buttons. It also activates the front and rear parking aid warning buttons (H15 and H22).

The twelve ultrasound sensors are also connected to control unit J791. They are supplied with voltage by J791, and the control unit exchanges data with the sensors. Among other things, measurement and diagnostic signals are sent to the control unit via the data lines.



600_040

Key:

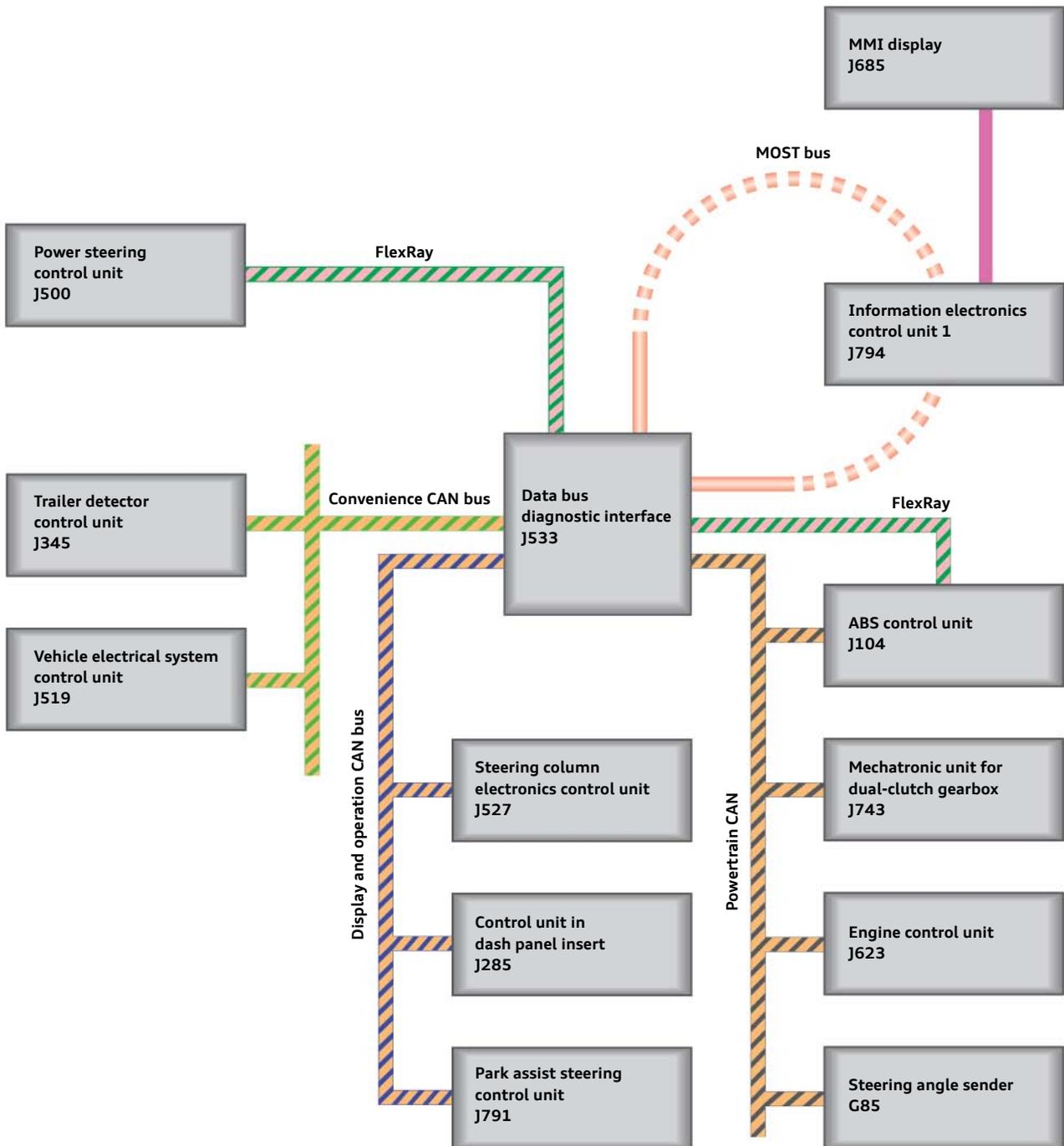
E266	Parking aid button	G255	Front left park assist sender
E581	Park assist steering button	G568	Front left park assist steering sender, left-hand side of vehicle
G203	Rear left park assist sender	G569	Front right park assist steering sender, right-hand side of vehicle
G204	Rear centre left park assist sender	G716	Rear left park assist steering sender
G205	Rear centre right park assist sender	G717	Rear right park assist steering sender
G206	Rear right park assist sender	H15	Rear park assist warning buzzer
G252	Front right park assist sender	H22	Front park assist warning buzzer
G253	Front centre right park assist sender	J791	Park assist steering control unit
G254	Front centre left park assist sender		

Networking structure

The networking structure represents control units participating in the parking aid and park assist functions.

This structure refers to an Audi A6 saloon '12 with dual-clutch gearbox.

Tasks of the various control units:



600_042

Park assist steering control unit J791

- ▶ includes the function software of the parking aid and park assist
- ▶ reads in the parking aid and park assist buttons
- ▶ activates the function LEDs in both buttons
- ▶ reads in the 12 ultrasound sensors
- ▶ activates the front and rear park assist warning buzzers
- ▶ instructs the MMI which bars of the ambient display are to be displayed in red or white
- ▶ computes the travel path for the parking manoeuvre
- ▶ supplies the steering assist control unit J500 with position-dependent nominal steering angles for the parking manoeuvre
- ▶ requests the necessary displays in the vehicle information system during the parking manoeuvre
- ▶ diagnoses the components of the parking aid and park assist systems
- ▶ saves the customer settings in the MMI to the number of the key in use

Control unit in dash panel insert J285

- ▶ guides the customer through the assisted parking manoeuvre by means of graphics in the driver information system

Steering column electronics control unit J527

- ▶ reads in the turn signal stalk and places the information onto the CAN bus

Power steering control unit J500

- ▶ activates the steering assist motor V187 as specified by the park assist steering
- ▶ reads in the steering torque sender G269

Information electronics control unit 1 - J794

- ▶ offers the customer options for setting the parking aid system

Installation location of control unit J791

The park assist steering control unit J791 in the Audi A6 Avant '12 is housed in the luggage compartment on the right-hand side behind the trim. Like the other control units here, it is clipped into the control unit holder.

MMI display J685

- ▶ represents the ambient display according to the specifications of the park assist steering control unit J791

ABS control unit J104

- ▶ computes the current vehicle speed and places this information onto the CAN bus

Mechatronic unit for dual-clutch gearbox J743

- ▶ places the current position of the gear selector lever onto the CAN bus

Engine control unit J623

- ▶ deactivates the automatic start-stop function as long as the parking aid or park assist steering is active

Steering angle sender G85

- ▶ places the current steering angle onto the CAN bus

Trailer detector control unit J345

- ▶ informs park assist whether a trailer is currently attached to the vehicle

If a trailer is detected, the rear park assist sensors are deactivated, while the visual display shows a trailer and the park assist steering can no longer be activated.

Onboard power supply control unit J519

- ▶ reads in the ambient temperature sensor G17

Parking aid takes this information into account, since the ambient temperature affects the propagation speed of sound waves. This temperature effect can be compensated in control unit J791 if the ambient temperature is a known variable.



600_043

Rest recommendation

Introduction

Audi introduces a new driver assistance system: the rest recommendation. The rest recommendation utilises various vehicle information to assess the driver's attention level. If the system determines that the driver's attention is decreasing, the driver

information system recommends that the driver take a break. The driver is also alerted to the rest recommendation by an acoustic signal.

Function

The rest recommendation function software is integrated in the data bus diagnostic interface J533. Control unit J533 is ideal for the rest recommendation since all bus systems are connected to it. Thus, it is easy to access various vehicle information sent in the form of bus messages.

The rest recommendation function computes an index from the various vehicle information. Taking this index as a basis, the system makes an assessment of the driver's attention level. If the index exceeds a threshold value, a rest recommendation is given.

The key variable for the rest recommendation is the steering angle or steering angle speed. If a driver is attentive, slight countersteer movements can be observed continuously while driving. These movements serve, among other things, to smooth out surface unevenness and keep the vehicle on course.

If no countersteer movements are made for a certain period of time and then a more pronounced countersteer movement is detected, this indicates to the system that the driver's attention is decreasing. The more frequently this behaviour is observed, the greater the index and the sooner the rest recommendation will be given.

In addition to the signal from the steering angle sender G85, other vehicle operating parameters are taken into account when calculating the index.

These include:

1. Time of day and trip duration
2. Vehicle dynamics
 - ▶ Parallel and perpendicular acceleration
 - ▶ Yaw rate
 - ▶ Vehicle speed
3. Various operating and control options
 - ▶ Operation of the control stalk
 - ▶ Use of controls on the multifunctional steering wheel
 - ▶ Use of the controls in the driver's door (including window lifters and mirror adjusters)
 - ▶ Pedal movements (clutch, brake and accelerator pedals)



Note

The rest recommendation function is available in vehicles equipped with a driver information system (DIS). The function cannot be ordered separately.

Resetting the index value (index reset)

If one of the following three events occurs, the index value is again reset to zero:

1. If the following two events occur when the vehicle is stationary ($v = 0$ kph):

- ▶ the driver's door is opened

and

- ▶ the driver's seat belt buckle is released

These events occur, for example, after a change of driver.

2. After the vehicle has been stationary ($v = 0$ kph) for 15 minutes.

This event could, for example, occur during a traffic jam.

3. If the bus goes into idle status after turning off the ignition.

Rest recommendation display

A rest recommendation comprises two elements:

- ▶ visual display in the driver information system

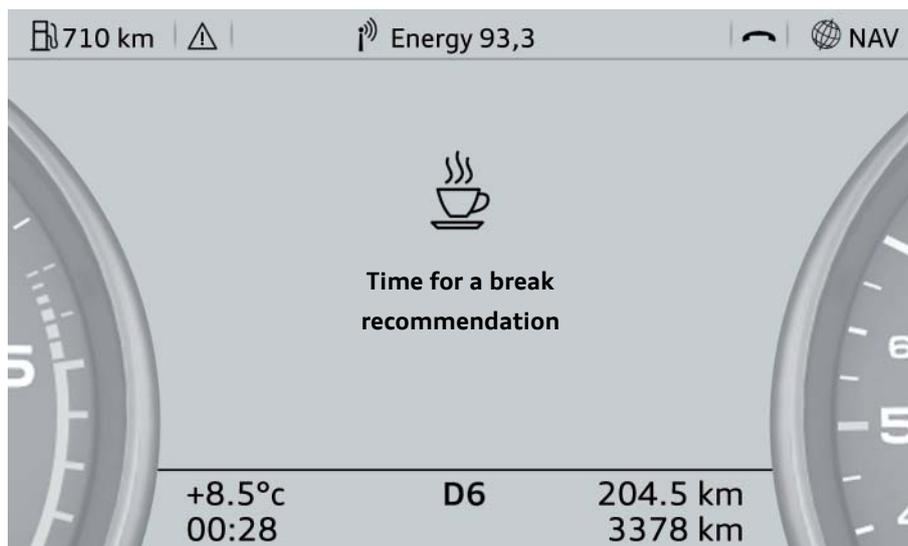
and

- ▶ an acoustic signal from the instrument cluster (gong)

After a rest recommendation has been given, it can be repeated no more than once. This recommendation cannot be given sooner than 15 minutes after the first rest recommendation. A prerequisite for the second alert is that the current index is again above the predefined threshold value.

A new alert cannot be given unless the index has previously been reset to zero.

A rest recommendation cannot be given any earlier than about 20 minutes after the start of a trip. At the time of display, the vehicle must be travelling at a speed of between 65 kph and 200 kph. The time of indication is determined by when an index threshold value is reached. The index starts at zero on commencement of the trip.

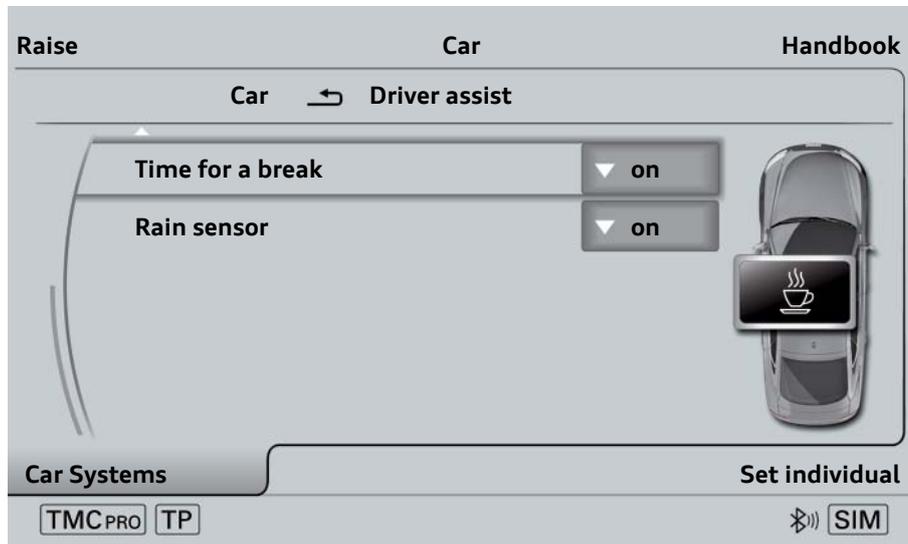


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Operation

The rest recommendation function activates itself automatically after the driver turns on the ignition. A condition for this is that the rest recommendation function is set to "on" in the corresponding MMI menu.

The MMI setting active at "ignition off" is saved and reactivated the next time the ignition is turned on. The setting cannot be customised using the ignition key.



600_045



Note

No setting menu is available in vehicles which have the chorus radio. In this equipment version, the function can be deactivated by service personnel using the diagnostic tester.

Diagnostics

The following diagnostic options regarding to the rest recommendation are available in the databus diagnostic interface J533:

Data blocks:

- ▶ Time of last rest recommendation
- ▶ Index of last rest recommendation (on a scale from 1 to 9)
- ▶ Current index (on a scale from 1 to 9)

Actuator test:

- ▶ Display of a rest recommendation in the vehicle

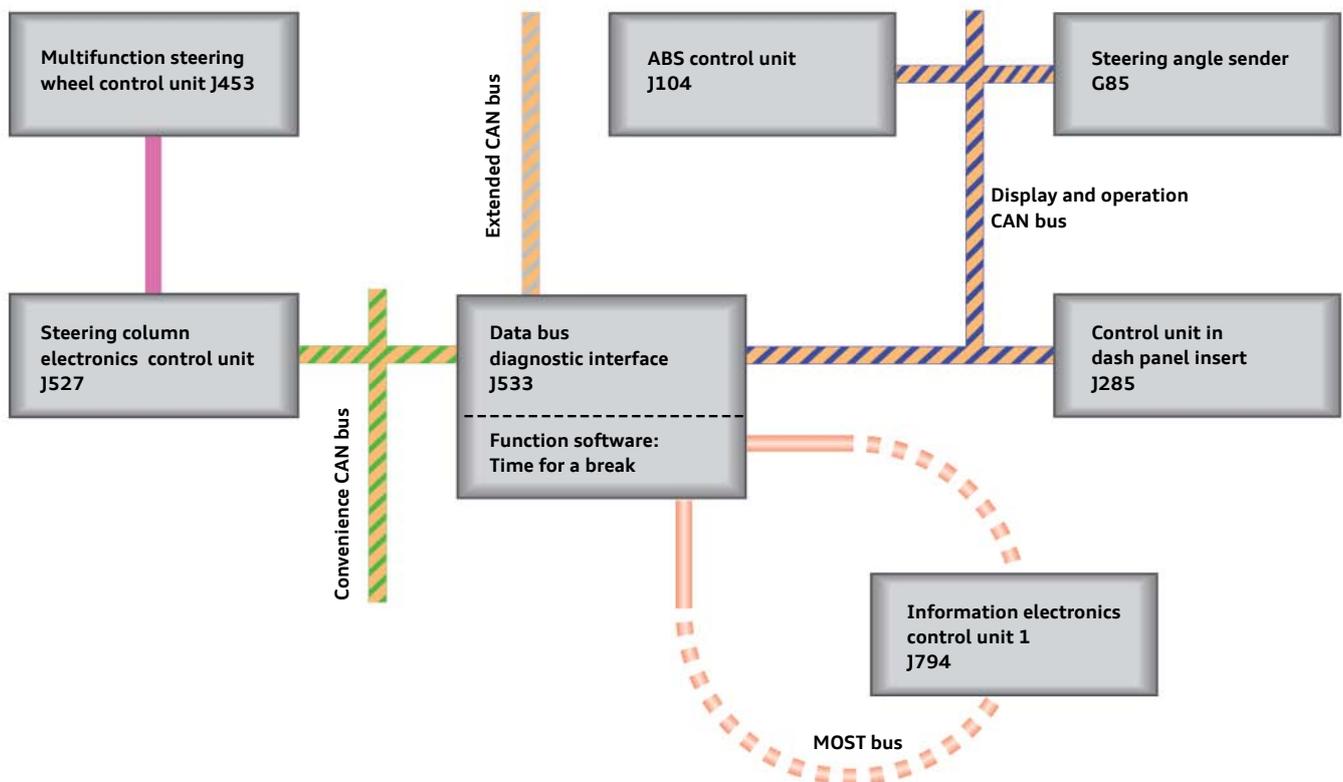
Fault memory entries:

- ▶ Restricted availability of function
- ▶ Function unavailable

Networking

The overview shows the control units which participate in the rest recommendation. They either supply data, represent system displays or facilitate the input of customer data.

The rest recommendation will be featured for the first time in the B8 series. For this reason, the overview corresponds to the topology of an Audi A4 '12.



600_046

Data bus diagnostic interface J533

The function software for the rest recommendation is integrated in the control unit J533.

Steering angle sender G85

Places the current steering angle onto the CAN bus. The steering angle is the key variable used by the system to assess the driver's condition.

Control unit in dash panel insert J285

Displays the rest recommendation via the driver information system and issues an audible signal when requested. Displays the current time.

Information electronics control unit 1 - J794

The customer can activate and/or deactivate the rest recommendation via control unit J794. However, the settings are stored in the databus diagnostic interface J533.

Multifunction steering wheel control unit J453

When one of the controls on the multifunction steering wheel is operated, control unit J527 is notified. J527, in turn, places this information onto the CAN bus.

Steering column electronics control unit J527

If a control stock is operated, J527 places the information onto the CAN bus.

ABS control unit J104

Places the current vehicle speed, perpendicular acceleration and yaw rate onto the CAN bus.

Test your knowledge

For any of the following questions one or more answers may be correct.

Question 1: Which of the following statements regarding parallel parking with the Generation 2.0 park assist steering system is/are true?

- a) Parallel parking spaces are detected up to a passing speed of 40 kph
- b) A parallel parking space must be at least 1.1 metres longer than the vehicle
- c) Parallel parking spaces are offered up to a minimum curve radius of 40 m
- d) In the process of parking in a parallel parking space, the system generally avoids parking the vehicle on the kerb

Question 2: Which of the following statements regarding activation of the Generation 2.0 park assist steering system is/are true?

- a) To be able to utilise park assist steering, the driver must press the park assist steering button E581
- b) Even if the customer has not activated park assist steering, the system measures parking spaces in passing if the maximum permissible passing speed is not exceeded
- c) The customer can use the assist function for parking in perpendicular parking spaces by pressing park assist steering button E581 twice
- d) Park assist steering can also be activated with the parking aid button E266

Question 3: Which of the following statements regarding perpendicular parking is/are true?

- a) Perpendicular parking spaces are at an angle of 90° to the road
- b) A perpendicular parking space must be at least the width of the vehicle + 0.8 m wide before park assist will offer it
- c) In left-hand drive models the system only supports parking manoeuvres into perpendicular parking spaces on the right-hand side of the vehicle. In right-hand drive models, the system only supports parking in perpendicular parking spaces on left-hand side of the vehicle
- d) Perpendicular parking spaces are detected up to a passing speed of 20 kph

Question 4: Which of the following statements regarding unpark assist is/are true?

- a) The parking space must be at least 0.7 m longer than the vehicle
- b) Unpark assist is only available for parallel parking spaces
- c) Unpark assist is not available if the vehicle is parked on a kerb
- d) The customer activates unpark assist by selecting reverse and then releasing the electromechanical parking brake

Question 5: Which of the following statements regarding the Generation 2.0 park assist steering system is/are true?

- a) A new feature of the Generation 2.0 version is that the system supports leaving parking spaces
- b) The system supports parking into parallel parking spaces which are only 0.5 m longer than the vehicle
- c) The system also supports parking into perpendicular parking spaces
- d) The system uses 10 ultrasound sensors

Question 6: Which of the following statements regarding the ambient display is/are true?

- a) The continuous tone range of the acoustic parking aid is set by default to 30 cm
- b) The ambient display function is only available in combination with park assist steering
- c) The ambient display shows a dynamic travel envelope, provided that the conditions for this have been met
- d) There is a separate ultrasound sensor for each sector displayed

Question 7: What causes a bar in the sector to be displayed red in the visual display?

- a) The obstacle is higher than 30 cm
- b) An obstacle has been detected within the dynamic travel envelope
- c) If the system assumes that the obstacle is a wall
- d) The obstacle is inside the continuous tone range

Question 8: How does the system give rest recommendations?

- a) Via the driver information system
- b) The steering wheel vibrates three times
- c) By an audible signal (gong)
- d) By activating a warning lamp in the dash panel insert

Question 9: Which of the following statements regarding the rest recommendation is/are true?

- a) A rest recommendation is given if the index has exceeded a threshold value
- b) The rest recommendation is available as a separate option
- c) The customer can set the rest recommendation to "early", "medium" or "late" via the MMI
- d) The driver information system displays the rest recommendation until the customer turns it off

Question 10: Which information is used to calculate the index for the rest recommendation?

- a) Time of day
- b) Pedal movements (clutch, brake and accelerator pedals)
- c) Whether rainfall has been detected or not
- d) Vehicle speed

Solutions: 1) a; 2) abc; 3) ad; 4) b; 5) ac; 6) bc; 7) bd; 8) ac; 9) a; 10) abd

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AUDI AG
I/VK-35
service.training@audi.de

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