

Service.



Self-Study Programme 273

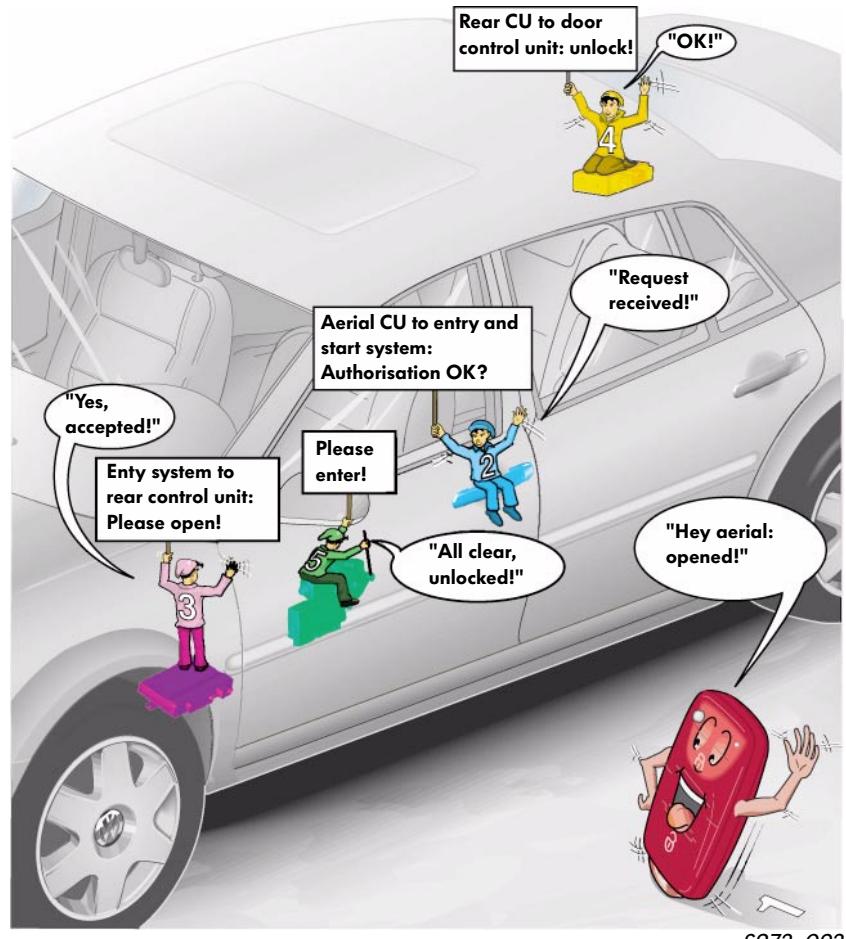
Phaeton

Convenience and Safety Electronics

Design and Function



Open sesame - thanks to a new system for entry and start authorisation, the Phaeton can be accessed without actively using a key (1). The opening request is detected via an aerial in the outer door handle (2) and authorisation is identified via a control unit (3). The opening request is detected via an aerial in the outer door handle (2) and authorisation is identified via a control unit (3).



S273_093

Further information about the Phaeton can be found in the following Self-Study Programmes:

- Self-Study Programme 250: The Phaeton - W12 - Engine Management
- Self-Study Programme 270: The Phaeton
- Self-Study Programme 271: The Phaeton - Heating and Air Conditioning System
- Self-Study Programme 272: The Phaeton - Onboard Power Supply
- Self-Study Programme 274: The Phaeton - Infotainment System
- Self-Study Programme 275: The Phaeton - Air Suspension with Dynamic Damping
- Self-Study Programme 276: The Phaeton - Automatic Proximity Control
- Self-Study Programme 277: The Phaeton - Running Gear

NEW



Important Note

This Self-Study Programme explains the design and function of new developments.
The contents are not updated.

Please always refer to the relevant Service Literature for all inspection, adjustment and repair instructions.

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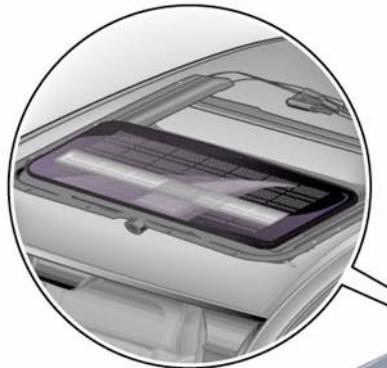
Test your knowledge 76



Introduction

This Self-Study Programme provides you with an overview of the complex convenience and safety electronics in the Phaeton. It provides information, for instance, about:

- the new solar sliding/tilting roof with road speed-dependent wind deflector



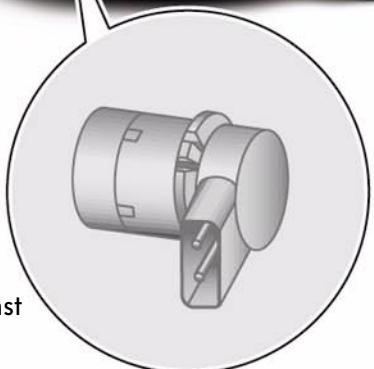
- the new windscreen wiper system with two separate, electronically controlled motors

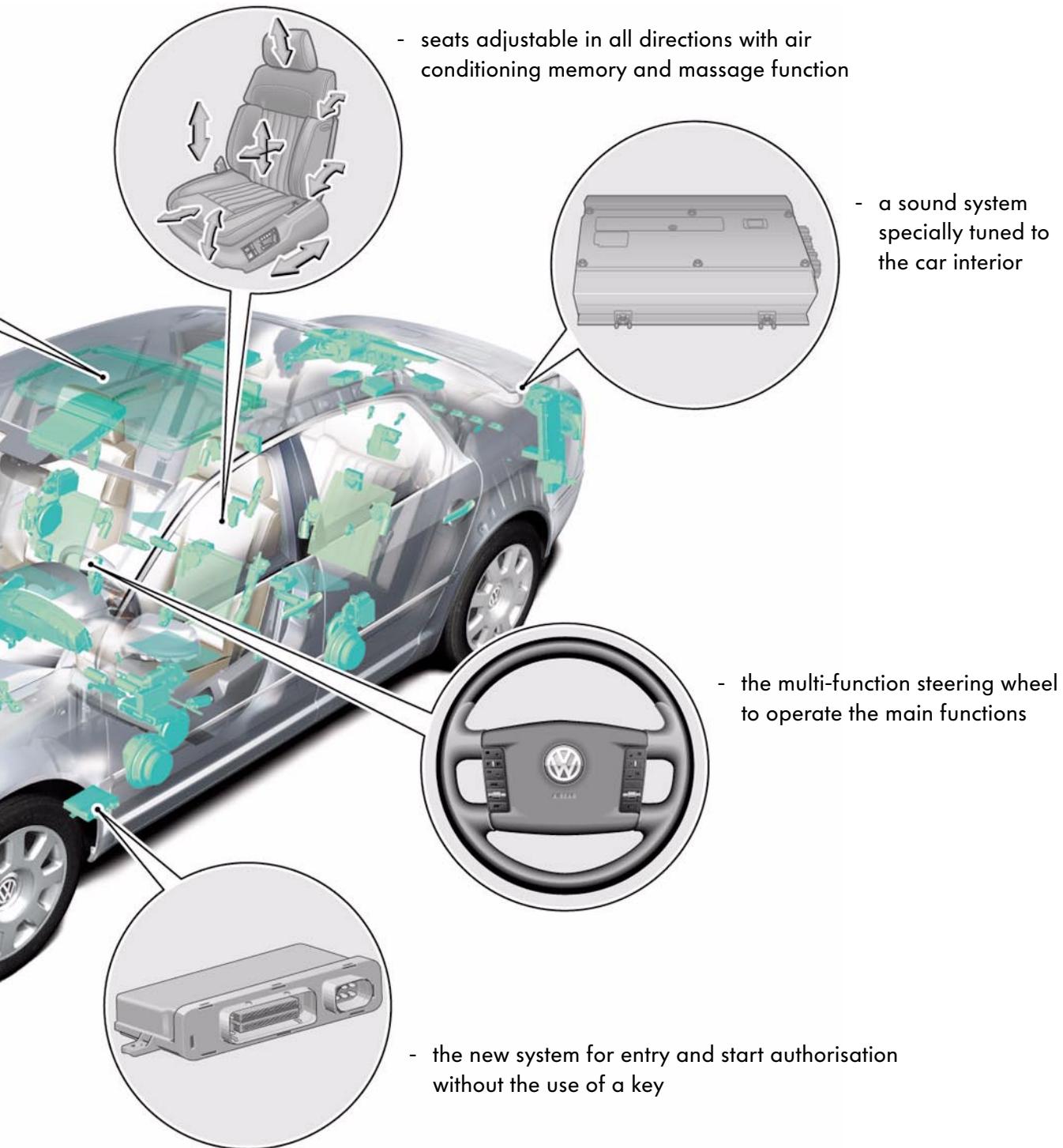


- the new orientation light for safe entering and exiting in the dark



- a parking aid that warns against obstacles not only visually, but also acoustically





- seats adjustable in all directions with air conditioning memory and massage function

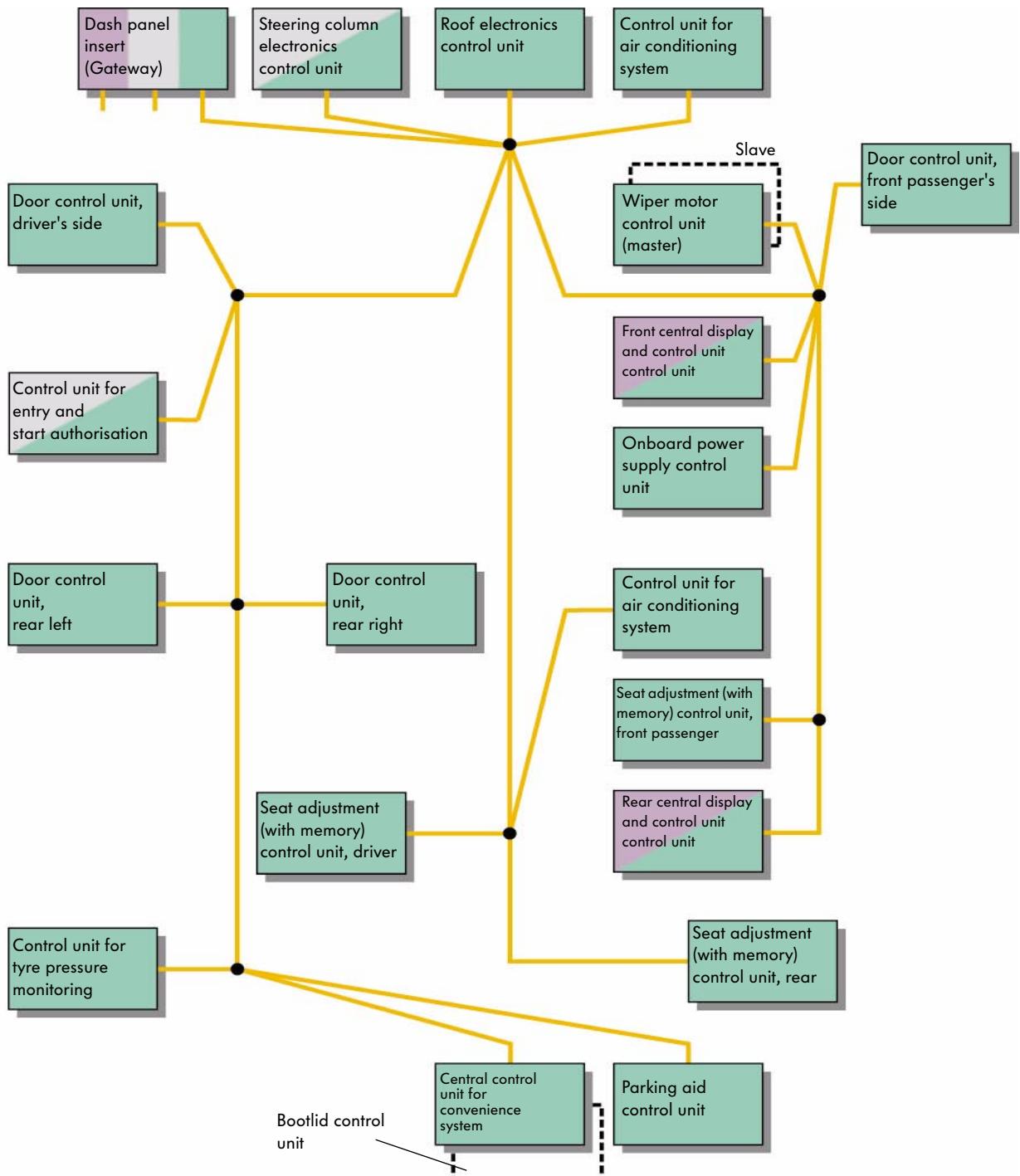
- a sound system specially tuned to the car interior

- the multi-function steering wheel to operate the main functions

- the new system for entry and start authorisation without the use of a key

Introduction

System overview of convenience and safety electronics



Legend

S273_045

- Drive Train CAN bus
- Convenience CAN bus
- Infotainment CAN bus
- CAN databus

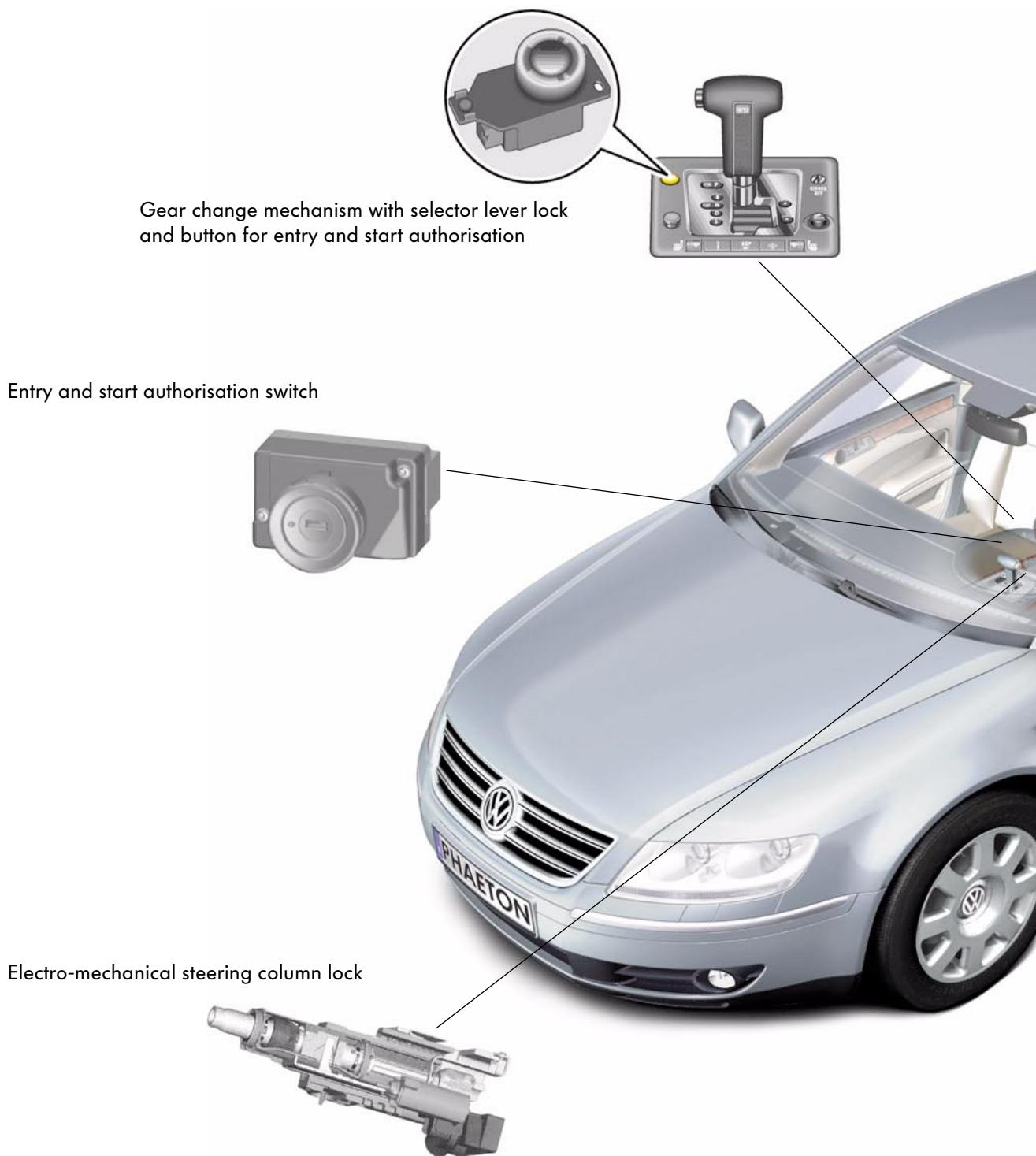


Component	Designation in current flow diagram	Address word for self-diagnosis	Other information
Onboard power supply control unit	J 519	09	SSP 272
Roof electronics control unit	J 528	38	SSP 273
Gateway in dash panel insert	J 533/J 285	19/17	SSP 273
Bootlid control unit	J 605	via 46	SSP 273
Convenience system central control unit	J 393	46	SSP 273
Entry and start authorisation relay	J 518	05	SSP 273
Climatronic control unit	J 255	08	SSP 271
Steering column electronics control unit	J 527	16	SSP 273
Parking aid control unit	J 446	76	SSP 273
Tyre pressure monitor control unit	J 502	65	SSP 270
Seat adjustment (with memory) control unit, driver	J 136	36	SSP 273
Seat adjustment (with memory) control unit, front passenger	J 521	06	SSP 273
Seat adjustment (with memory) control unit, rear	J 522	66	SSP 273
Door control unit, driver's side	J 386	via 46	SSP 273
Door control unit, front passenger's side	J 387	via 46	SSP 273
Door control unit, rear left	J 388	via 46	SSP 273
Door control unit, rear right	J 389	via 46	SSP 273
Wiper motor control unit (master)	J 400	68	SSP 273
Windscreen wiper control unit, front passenger's side (slave)	J 584	via 68	SSP 273
Control unit, front information display and operating unit	J 523	07	SSP 274
Rear information display and operating unit control unit	J 524	27	SSP 274

Entry and start authorisation

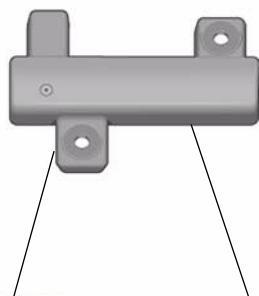
Complete overview

The adjacent diagram provides an overview of the components involved in the system for entry and start authorisation.

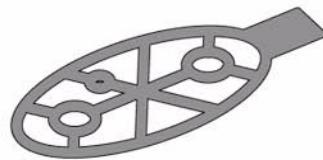




Rear aerials in the bumper



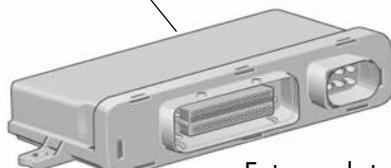
Interior aerials



Outer door handles with electronics



Ignition key with
radio-wave remote control



Entry and start authorisation relay

S273_090

Entry and start authorisation

When suitable equipment is available, the convenience functions for the entry and start authorisation system (**KeylessStart Exit and Security System**) make it possible to lock and unlock the vehicle and to switch the engine on and off by radio-wave remote control without actively using the ignition key.

The system is offered in two equipment variants:

- Basic equipment (standard equipment)
- Convenience equipment (optional)



Overview of equipment variants

Components	Basic equipment	Convenience equipment
Entry and start authorisation switch	X	X
Terminal control (Terminal 15SV, 15, 75, 50)*	X	X
Immobiliser (Immobiliser III)	X	X
Radio-wave remote control (RRC) for central locking	X	X
Electro-mechanical steering column lock activation (ESL)	X	X
Button for entry and start authorisation		X
Interior and exterior aerials		X
Central locking button in the outer door handles		X
Proximity sensors		X
Transponder for Immobiliser III and entry and start authorisation	X	X
Anti-theft alarm system		X
Interior monitor		X

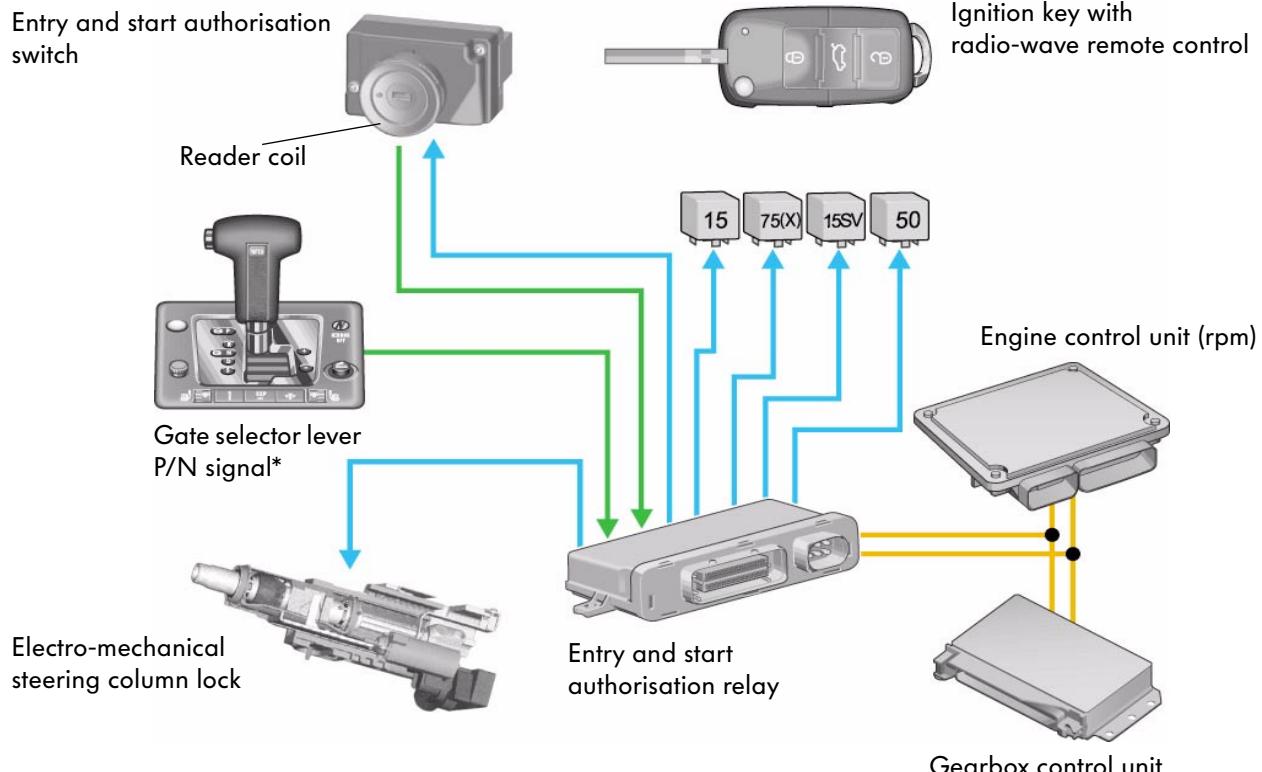
*Terminal 15SV: Power supply of electrical equipment required for start

Terminal 15: Power supply ignition "on"

Terminal 75x: Power supply/relay relay

Terminal 50: Power supply starter/solenoid

Basic equipment components



* Clutch pedal switch for manual gearbox

S273_055

Basic equipment for vehicle entry and starting the engine

The vehicle is unlocked using the unlocking button on the ignition key with radio-wave remote control (RRC). To unlock the steering column, the ignition key must be inserted into the entry and start authorisation switch. By means of the immobiliser (coil) in the entry and start authorisation switch, a request is sent to the entry and start authorisation relay for ignition key authorisation. If the control unit makes a positive identification, the steering column is unlocked.

Turning the ignition key in the entry and start authorisation switch switches Terminals 15, 75(X) and 15SV. Further turning (Terminal 50 on) starts the engine, providing the following conditions are met:

- P/N signal (automatic gearbox)
- Clutch applied (manual gearbox).

If there is radio interference, or the vehicle or ignition key battery has discharged, the vehicle may be entered using the mechanical emergency lock cylinder in the driver's door or in the bootlid.



Entry and start authorisation

Ignition key with radio-wave remote control

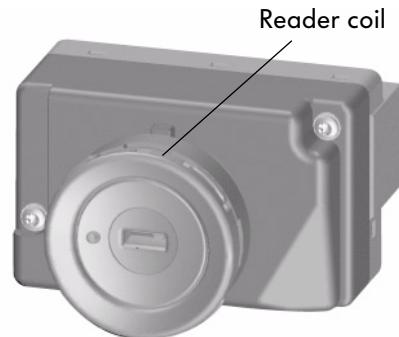
The radio-wave remote control functions in the usual way: to unlock the vehicle door, the unlock button must be pressed on the radio-wave remote control. The control unit for entry and start authorisation evaluates the radio signals. The convenience system central control unit activates the standard functions for the central locking system.



S273_050

Immobiliser (Immobiliser III)

The immobiliser also functions as before together with the entry and start authorisation switch, which carries the reader coil, and the engine control unit.



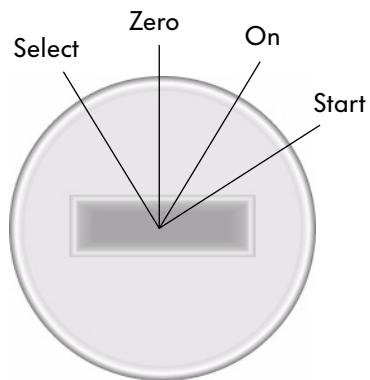
S273_048

Entry and start authorisation switch

Entry and start authorisation switch

The operating concept for the entry and start authorisation switch has been very slightly changed. The positions are:

- Off = ignition/engine off
- Zero = Automatic reset of the ignition key after switching on the engine
- On = ignition on
- Start = engine on



S273_047

Switch positions for entry and start authorisation

Electrical release disable control unit

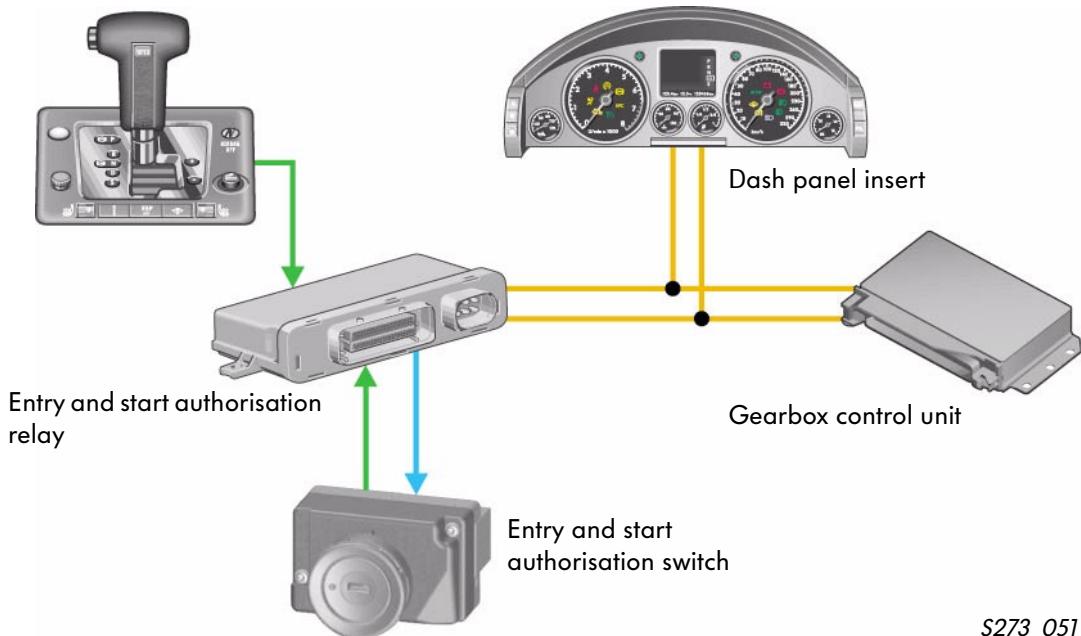
The electrical release disable control unit ensures that the ignition key cannot be inadvertently removed from the entry and start authorisation switch.

The ignition key cannot be removed while

- the ignition is on (Terminal 15 on)
- if the gate selector lever for the automatic gearbox is not in P position.



Gate selector lever P signal



S273_051



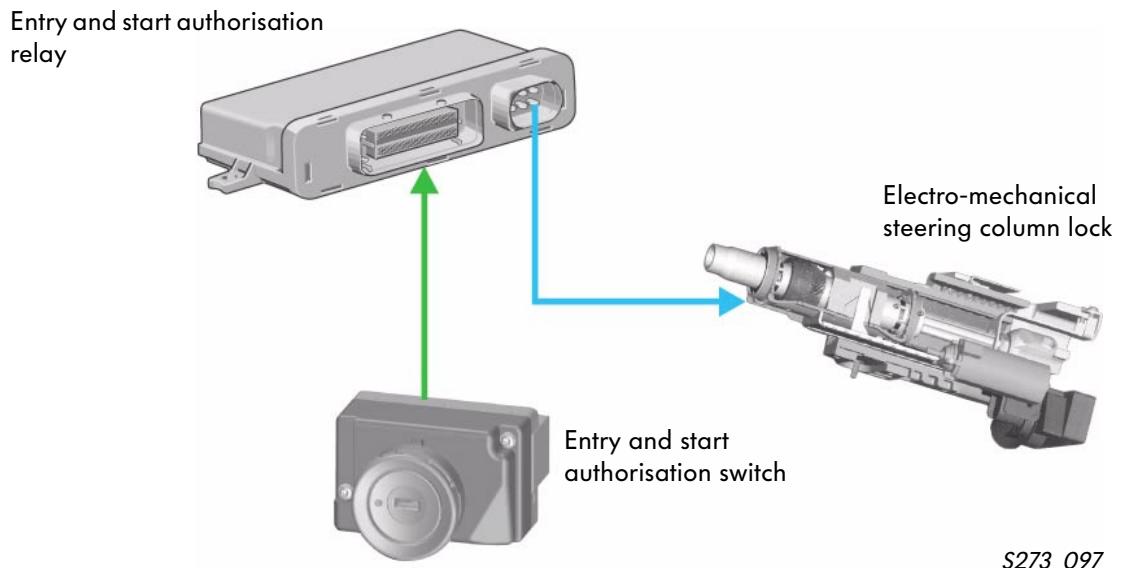
Each key fits mechanically into the entry and start authorisation switch and can be turned.
Once the ignition key has been authorised (transponder), it is enabled by the immobiliser (IM III).

Entry and start authorisation

Electro-mechanical steering column lock (ESL)

This is an electro-mechanical version of the conventional mechanical steering column lock, which means that it has an electrical interface to the entry and start authorisation relay and a mechanical interface to the steering column.

The ESL is encoded and activated by means of the entry and start authorisation relay. When the key is inserted or withdrawn, the steering column is locked or unlocked by means of the entry and start authorisation relay. The steering column is supplied with voltage for this procedure only, otherwise the ESL has no voltage (deenergised). The ignition can only be activated when the steering column is unlocked.



S273_097

Soft start

The soft start is initiated via the drive train CAN databus between the entry and start authorisation relay and the engine control unit.

If the start position (Terminal 50 on) in the entry and start authorisation switch is flicked, the starter stays in the ON position until the engine is running. To protect the starter and avoid unnecessary noise, the start position of the starter is only activated until the engine has reached idling speed even if the starter is activated for a longer period of time.

The engine control unit receives this message from the engine speed sender and transmits the information to the entry and start authorisation relay, giving the command to shift the starter out of position (Terminal 50 off).

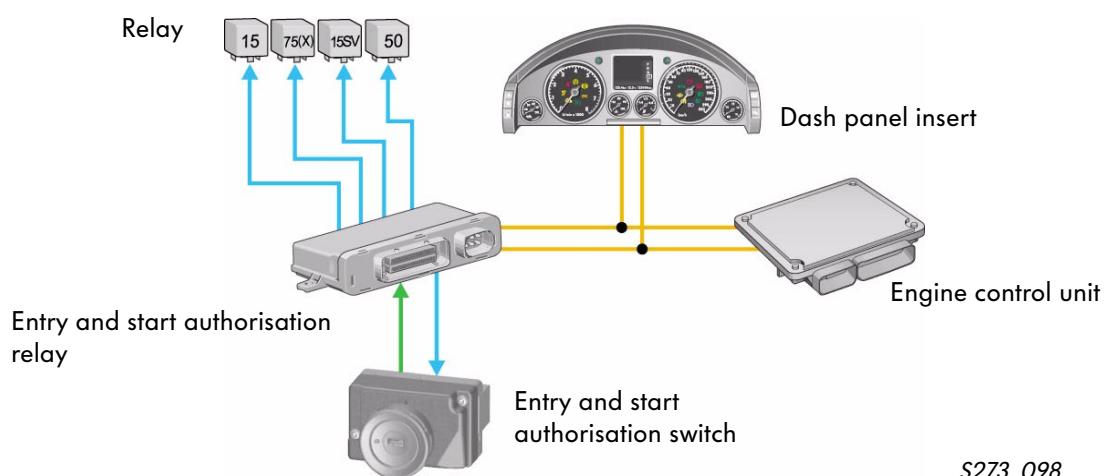


The entry and start authorisation relay switches the following relays:

- Relay Terminal 15: voltage supply
- Relay Terminal 15 SV: voltage supply
- Relay Terminal 75X: voltage supply
- Relay Terminal 50: voltage supply

Emergency start

If the onboard power supply battery has discharged, an emergency start is possible when the engine is not running by means of the battery management control unit and the entry and start authorisation relay.



S273_098



Please refer to Self-Study Programme 272 of "The Phaeton - Onboard Power Supply" for more detailed information about battery management.

Entry and start authorisation

Additional convenience equipment functions

Thanks to the additional convenience equipment functions, the ignition key with radio-wave remote control (RRC) is required to open and lock the vehicle, but it no longer needs to be activated.

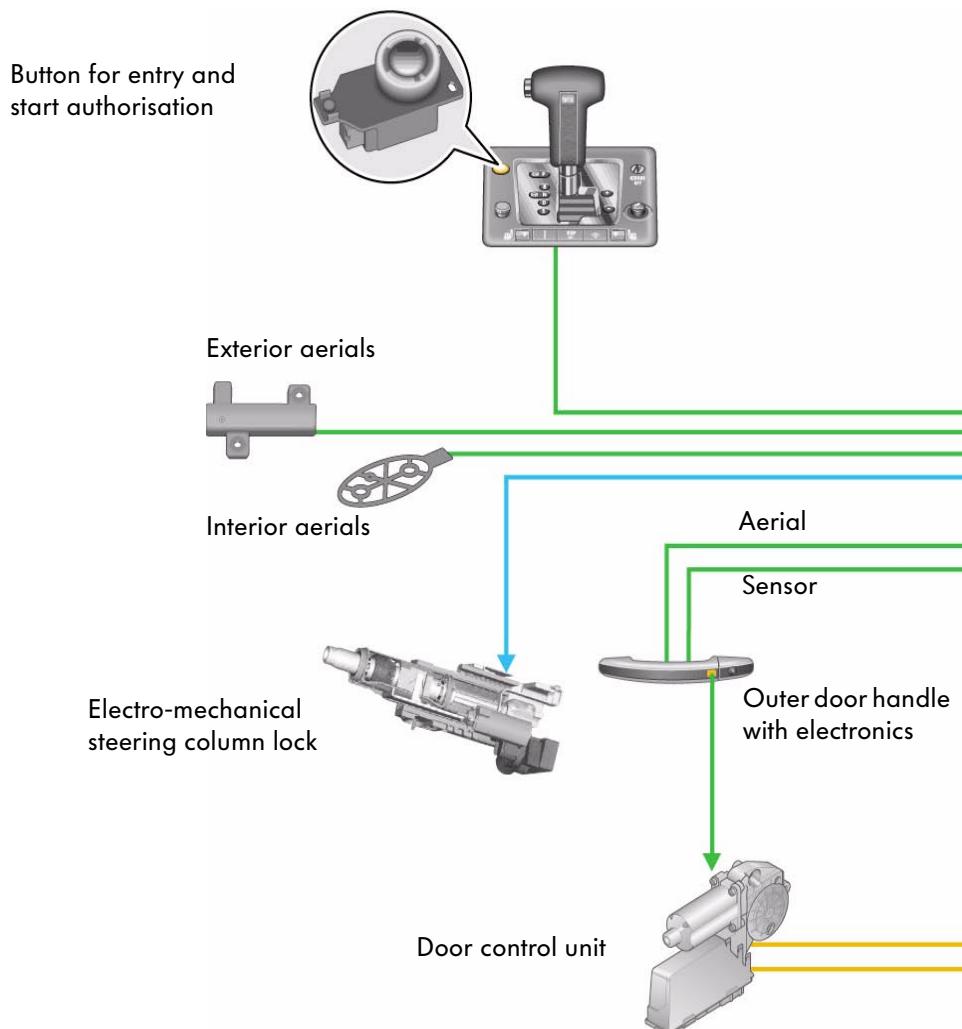
The engine can also be started and switched off without actively operating the ignition key using the authorised transponder.



The additional functions of the convenience equipment are as follows:

- Opening the vehicle without actively operating the ignition key with the authorised transponder
- Starting the engine by means of a button for entry and start authorisation without actively operating the ignition key with the authorised transponder
- Locking the vehicle without actively operating the ignition key with the authorised transponder

Convenience equipment components



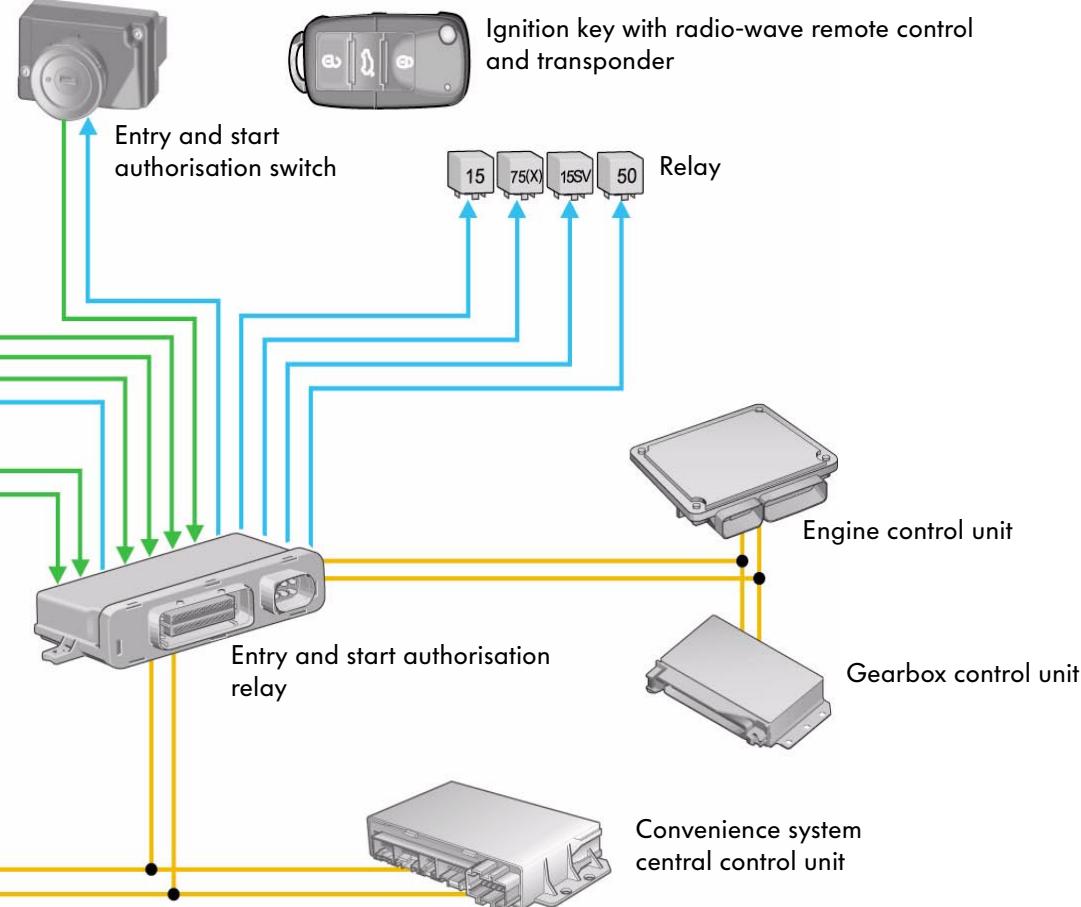
Entering the vehicle using the convenience equipment

If the user approaches the vehicle with an authorised ignition key, touching the outer door handle with the entry and start authorisation relay transmits an inductive request to the transponder in the ignition key via the exterior aerial in the door handle. If the control unit recognises the ignition key as authorised for entry, it transmits this information to the convenience system central control unit. The convenience system central control unit gives the door control unit the command to unlock the requested vehicle door. The door control unit unlocks the vehicle door.



It is possible to enter the car using any door, opening either a single door or all of the doors, depending on the coding.

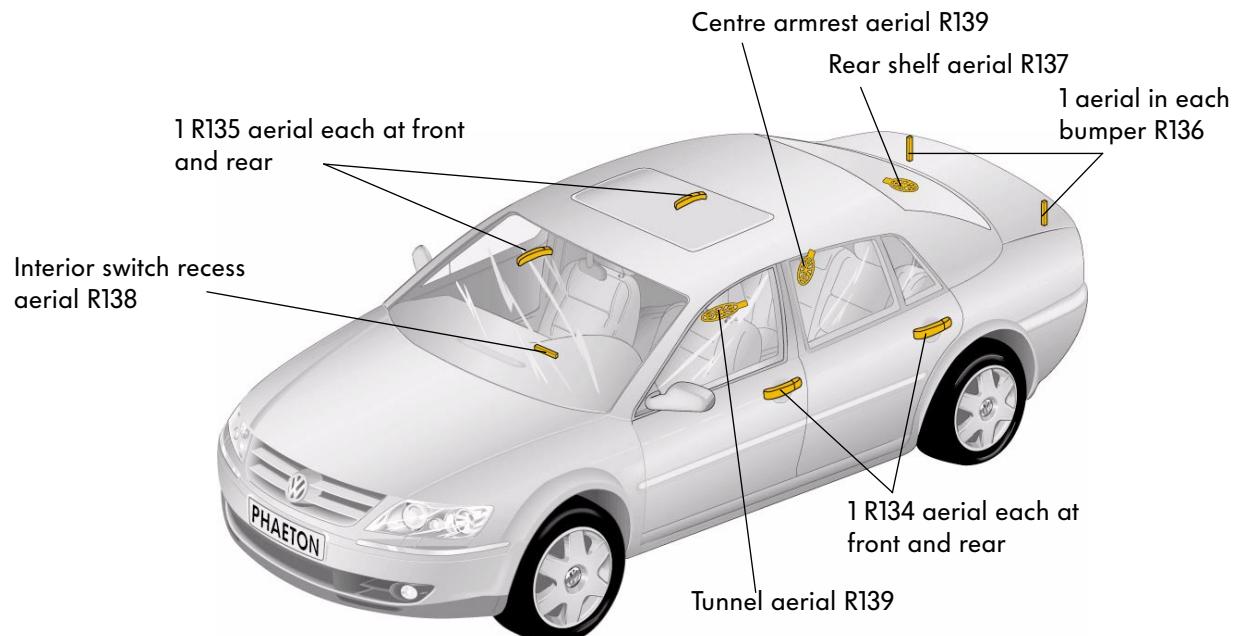
If the control unit for entry and start authorisation fails to function, the vehicle door can be unlocked via the emergency lock cylinder in the door lock on the driver's side. The bootlid can be unlocked by means of the emergency lock cylinder in the bootlid (concealed in the VW emblem).



S273_101

Entry and start authorisation

Aerials



S273_102

Interior aerials

The interior aerials detect an ignition key with authorised transponder in the vehicle interior for the starting cycle, vehicle operation and locking procedure.

The interior aerial range extends without interruption throughout the entire vehicle interior.

The detection range for the interior aerials does not overlap with the detection range for the exterior aerials.

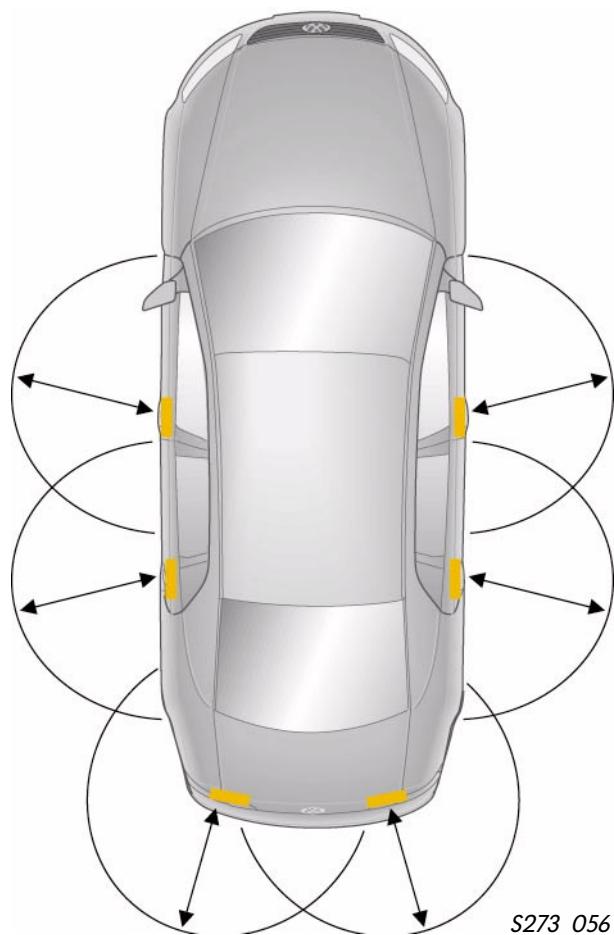
Exterior aerials

The exterior aerials detect an ignition key with authorised transponder for the locking and unlocking procedure. The position of the ignition key with authorised transponder can be allocated specifically to the driver's side, front passenger's side or to the bootlid.

The exterior aerials have a range of approximately 1.50 m radiating from the place at which they each operate - vehicle doors and bootlid - at a height of 0.1 m to 1.8 m.



Exterior aerial detection range



Entry and start authorisation

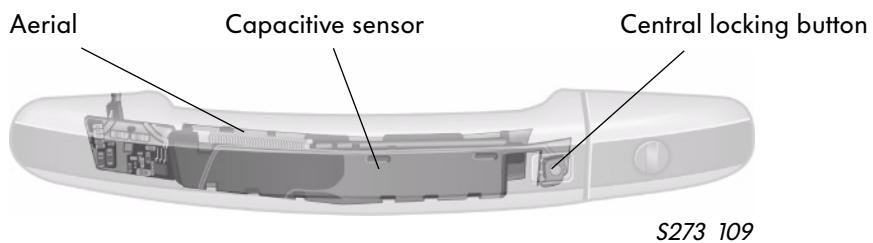
Outer door handles with electronics

If convenience equipment is fitted, the aerials, sensors and central locking buttons are located in all outer door handles and may be used to open and close the vehicle doors without actively using the ignition key with radio-wave remote control:



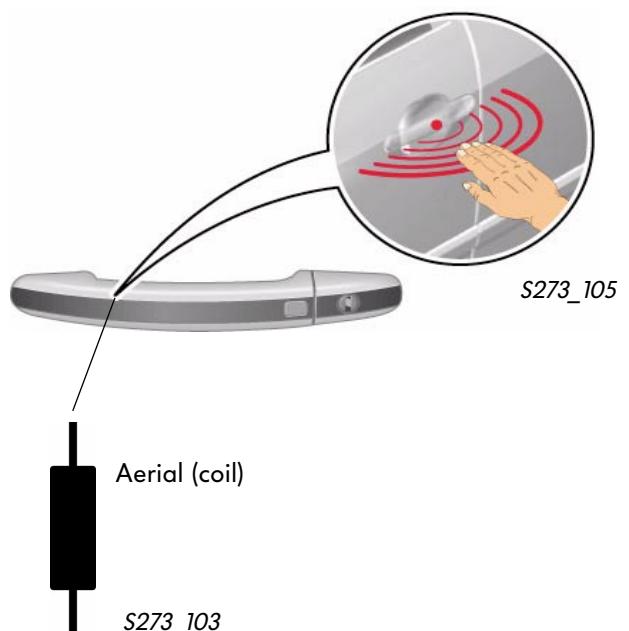
- one aerial on each of the driver's side and front passenger's side for entry and start authorisation R134, R135*
- one sensor on each vehicle door for contact on the driver's side G415, G417 and front passenger's side G416, G418
- one button on each vehicle door for central locking on the driver's side E369, E371 and front passenger's side E370, E372.

*The aerials in the outer door handles should be regarded as a single aerial per vehicle side (front and rear).



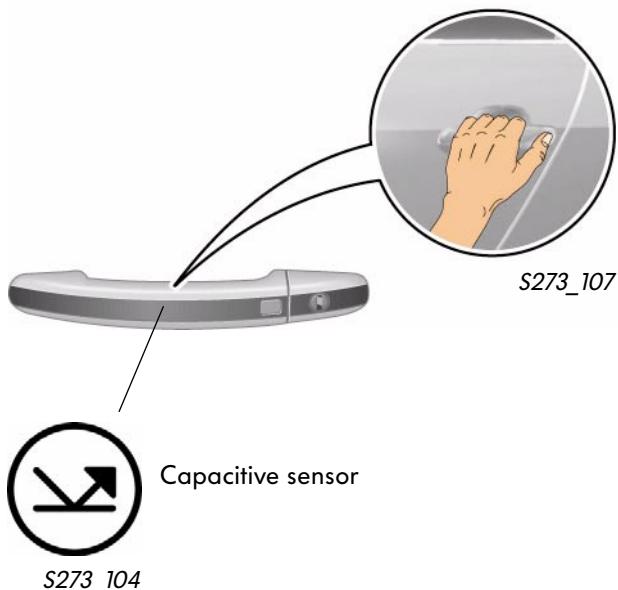
Driver's side and front passenger's side aerials for entry and start authorisation

By means of the aerial in the ignition key with radio-wave remote control and authorised transponder, an encoded signal is transmitted to the aerial in the outer door handle, thus inducing voltage in the aerial. This message is transmitted to the entry and start authorisation relay, which in turn evaluates the signal.



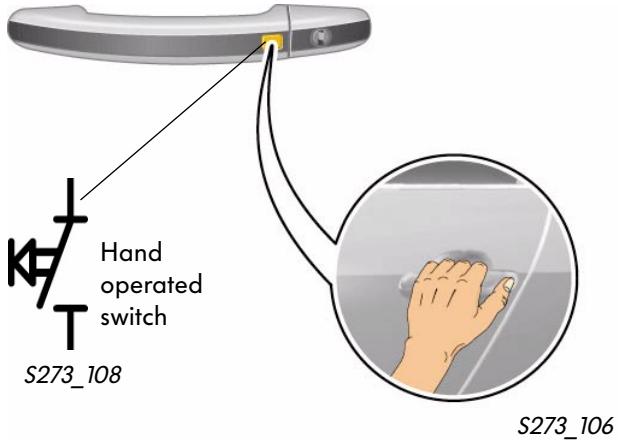
Sensors for contact on the driver's side and front passenger's side

If a hand approaches the outer door handle, the capacitance of the sensor in the outer door handle changes. The entry and start authorisation relay recognises the change in the capacitance of the sensor as proximity to the outer door handle or as a request to enter the vehicle.



Buttons for central locking on the driver's side and front passenger's side

Pressure on the central locking button initiates an inductive request through the entry and start authorisation relay to the ignition key with radio-wave remote control and transponder. If the ignition key is recognised as authorised and outside the vehicle but within the range of the vehicle, the command is enabled to lock the vehicle.



Entry and start authorisation



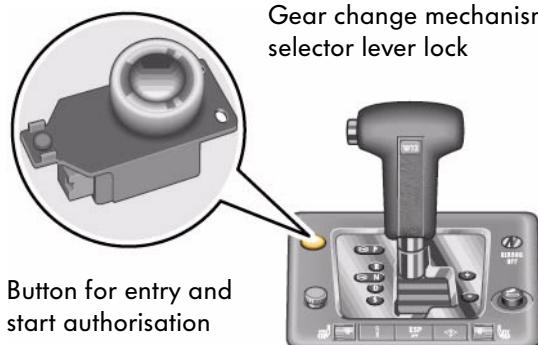
Starting the engine without an ignition key

For this function the ignition key with authorised transponder need not be inserted into the entry and start authorisation switch. It must, however, be located inside the vehicle interior in order to initiate an inductive request via the interior aerials when the button for entry and start authorisation is moved to the first engaging position.

The ignition key gives an encoded response to the entry and start authorisation relay. If the ignition key is identified as authorised, the electro-mechanical steering column lock (ESL) is unlocked and the NO contact activated when the first stage of the button for entry and start authorisation is activated. If the button is then moved to the first engaging position, the ignition is switched on.

Switching off the engine without an ignition key

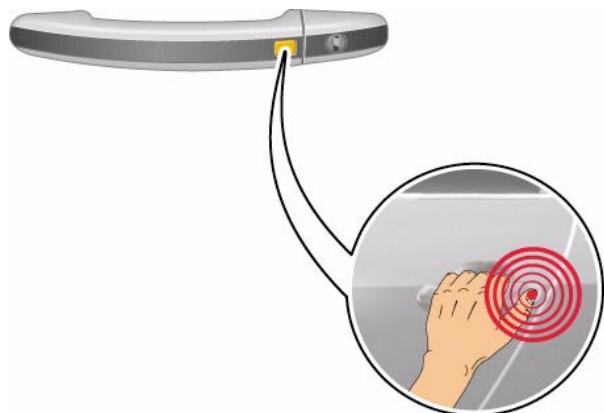
The engine can also be turned off with the button for entry and start authorisation. To do this, move the button for entry and start authorisation to the second engaging position by pressing it once.



S273_099

Locking the vehicle without an ignition key

Activating a central locking button (fitted to all outer door handles) initiates a request for a valid ignition key with authorised transponder in the exterior of the vehicle. The ignition key transmits a response to the entry and start authorisation relay. Once the ignition key has been positively identified, the vehicle door is locked via the convenience system central control unit.



S273_100



If the vehicle is locked and a second ignition key with authorised transponder is still located in the vehicle interior, the latter is disabled for start authorisation and the vehicle is locked!

Learning-in the system for entry and start authorisation

As the system contains the immobiliser,

- the entry and start authorisation relay,
- electro-mechanical steering column lock (ESL)
- the ignition key with radio-wave remote control and
- the engine control unit

have to match one another. This is carried out at the end of the production line or during servicing using the VAS 5051 Diagnostic Testing and Information System.



In order to provide better anti-theft protection it is only possible to change just one of the four components; otherwise the system must be subjected to a learn-in process if new components are fitted.



The system for entry and start authorisation has self-diagnostic capability via the addresses

- 05 Control unit for entry and start authorisation and
- 25 Immobiliser III (diverted to 05).

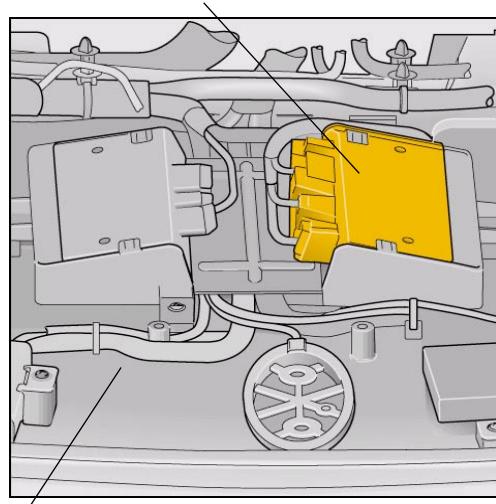
Convenience system central control unit

The convenience system central control unit monitors and controls the following functions:

- central locking
- unlocking the fuel filler flap
- window regulators
- interior monitor
- anti-theft alarm system
- tilt sensor
- rear lighting
- bootlid light
- control unit activation for the bootlid
- rear window heater (refer to Self-Study Programme 272 "The Phaeton Onboard Power Supply")
- bootlid lock control with automatic closing



Convenience system central control unit



S273_029

Central locking (CL) system

The central logic of the central locking system for the doors and bootlid is stored in the convenience system central control unit. The functions are triggered by the entry information and the commands are transmitted to the door control units and the bootlid control unit.

In the case of vehicles with standard equipment, the central locking is activated as before by using the button on the ignition key with radio-wave remote control. In the event of a fault the vehicle can be locked and unlocked by using a mechanical emergency lock cylinder in the driver's door.

Functional sequence

The door control units provide information via the convenience CAN databus.

The convenience system central control unit evaluates this information and controls the central locking functions. The door control units evaluate the messages from the convenience system central control unit and activate the motors for the central locking.

In the convenience equipment of the system for entry and start authorisation, the convenience system central control unit receives the central locking command from the entry and start authorisation relay.

Operating units for the central locking system

- Radio-wave remote control
- Lock/Unlock button in all doors
- Driver's door lock cylinder (emergency locking)
- System for entry and start authorisation (optional)



S272_082

Emergency functions

Communication between the convenience system central control unit and the door control unit takes place via the CAN databus. If the CAN messages cannot be received by the door control units (for example if the convenience system central control unit is defective), the following emergency functions are initiated:

- After five messages have not been received, all door control units detect that no further messages are being transmitted by the central control unit.
- The driver's door control unit assumes control of central locking.
- All other door control units react to the messages from the driver's door control unit.
- The signals from the driver's door lock cylinder, as well as those from the lock/unlock button become command signals and the operating units of the other doors cease to work.
- When operated, the lock cylinder takes priority over the button.
- If the CAN connection to the driver's door is interrupted, the door can only be activated manually by means of the lock cylinder; the lock/unlock button does not function.



Behaviour in a crash

Information about a crash is transmitted via the CAN databus. A signal is transmitted from the convenience system central control unit to unlock the central locking.

Convenience system central control unit

Unlocking the fuel filler flap

The fuel filler flap is unlocked if:

- there is a request made by means of a CAN message from the driver's side door control unit,
- the vehicle road speed is below the preset speed threshold and
- the vehicle has not been locked from outside.



S273_067

Power regulators

All window regulators have decentralised electric control and, for safety reasons, have a roll-back function when the window regulator motor has been learned-in. The convenience system central control unit generates the CAN signals for the convenience opening and closing functions.

Interior monitor (IM)

The IM in the roof module is activated and deactivated by means of the convenience system central control unit per CAN databus. Each IM operating state is transmitted back to the convenience system central control unit, including the alarm signal, if the IM has been triggered. The driver can deactivate the IM once for this cycle between switching off the ignition and activating the ATA via the front central display and operating unit (CDC).



S273_089

Anti-theft alarm system (ATA)

The anti-theft alarm system function is integrated in the convenience system central control unit. The information necessary for activation and deactivation is provided by the entry and start authorisation relay. Communication takes place via the convenience CAN databus.

Activating the ATA

When the vehicle is locked with the radio-wave remote control, this status is transmitted via the CAN databus and the ATA is activated. The ATA can also be activated by actuating the emergency locking cylinder. In the convenience version of the Entry and Start Authorisation system, when locking the vehicle, the ATA is activated using the locking button in the outer door handles. If Terminal 15 is engaged or the driver's door opened, the ATA is not activated.

Deactivating the ATA

Authorised access is transmitted by a radio-wave remote control key via the CAN databus, causing deactivation. If the vehicle is entered by means of the mechanical emergency lock cylinder (if there is interference to radio communication or the radio-wave remote control key battery has discharged), Terminal 15 must be engaged at the latest after 15 seconds, otherwise the ATA will be deactivated.



Convenience system central control unit

Tilt sensor

The tilt sensor ensures that the vehicle cannot be towed away without authorisation.

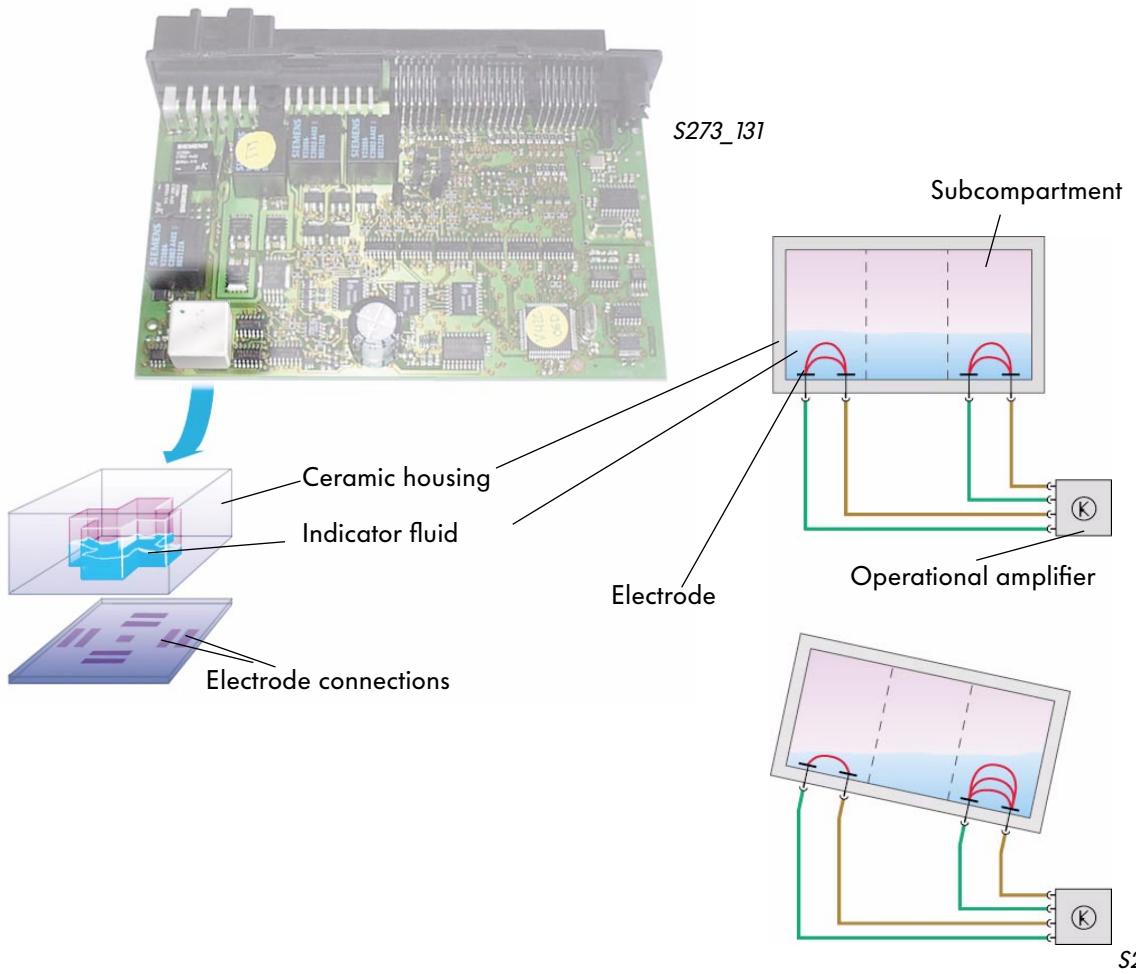
The tilt sensor mechanism is based on what is known as the conductometric technique. It determines the change in resistance if there is a change in the volume of a viscous, electrically conductive liquid.



Electrodes arranged at different positions project out of this liquid. Electrodes arranged at different positions project out of this liquid.

If the position of the sensor changes (if the vehicle is raised on one side), then the distribution of the fluid in the chambers also changes. When the level of the fluid in the compartments changes, the resistance determined across the electrodes in the chambers also changes.

The change in the position of the tilt sensor caused by inclining the vehicle to one side changes the resistance. This is stored and activates the anti-theft alarm system. This is stored and activates the anti-theft alarm system.



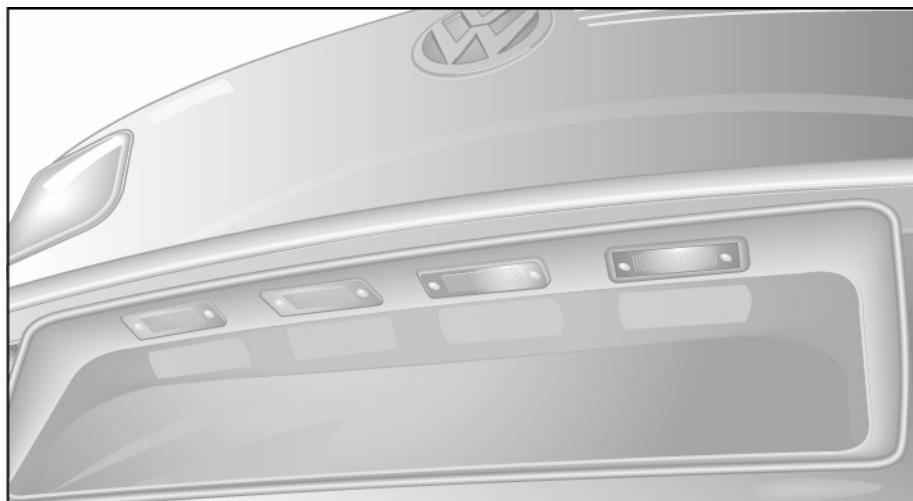
Rear lighting

The convenience system central control unit controls the following lighting functions:

- Right/left rear and marker light
- Left/right brake light
- 3rd brake light
- Left/right reversing light
- Rear fog light
- Number plate light
- Rear courtesy light or self-illuminating number plate
- Boot light



Number plate lighting



S273_129

Automatic closing

The automatic closing motor ensures that the bootlid is securely closed as soon as a rotary latching contact is energised.

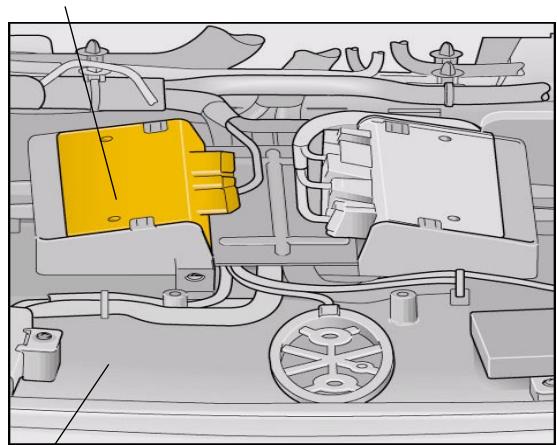
Convenience system central control unit

Bootlid control unit

The bootlid control unit controls the complete bootlid opening and closing procedure and is assigned as a slave to the convenience system central control unit. It receives its information via a serial interface from the convenience system control unit and transmits its status and diagnostic messages back via the same interface.



Bootlid control unit



S273_060

Exterior button

With basic equipment:

- The central locking is unlocked = press the button to open
- The central locking is locked = button activation is ignored

With convenience equipment:

- The central locking is unlocked = press the button to open
- The central locking is locked = pressing the button triggers authorisation; in the event of a positive result the bootlid is opened.

For both types of equipment the exterior button for the bootlid is deactivated if the speed threshold is exceeded.

It is enabled when a vehicle door is opened.



S273_064

Emergency lock cylinder

Bootlid exterior button



The convenience system central control unit and bootlid have self-diagnostic capability using the VAS 5051 Diagnostic Testing and Information System via address word 46.

The bootlid is opened

either by means of

- the bootlid switch on the inner side of the driver's door under the speed threshold of 6 km/h,
- or the bootlid radio-wave remote control button (RLR),
- or the exterior bootlid button (concealed in the VW emblem).

Switch for bootlid, driver's door



S273_065



The bootlid is closed

manually in the basic version,

- manually

and with convenience equipment (with hydraulics) by using

- the button in the bootlid,
- the radio-wave remote control or
- the switch on the inner side of the driver's door,
- and the exterior switch in the VW emblem.

The bootlid can only be shut if the bootlid has been learned-in (end position learned-in).

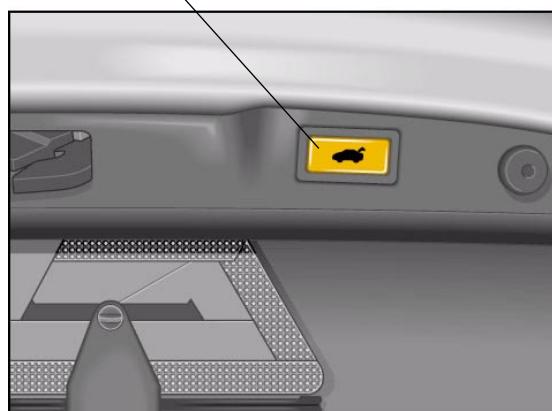
Refer to the current Service Literature for information on how to carry out the learn-in process.

Bootlid radio-wave remote control button (RLR)



S273_083

Bootlid interior button



S273_063

Pinch protection function

A force limitation mechanism for the hydraulic pump clearly identifies any likelihood of anyone trapping a hand etc. when opening and closing the bootlid.



Danger: During self-diagnosis "basic setting", there is no pinch protection function!

Roof module

Various electrical components are integrated in the roof module which are not all part of the same function system. Various electrical components are integrated in the roof module which are not all part of the same function system. For this reason not all components are controlled by the roof electronics control unit; some are controlled via separate control lines.

Components activated directly by the roof module:

- Interior lighting
- Interior lighting control
- Control for Terminal 30G
- Garage door opener
- Interior monitor (IM)
- Electronically controlled interior rear-view mirror with memory function (optional)
- Rain sensor
- Light sensor (optional)
- Humidity sensor and windscreens temperature sensor
- Control for sliding/tilting roof (refer to chapter entitled "Sliding/tilting roof").

Not directly activated by the roof module:

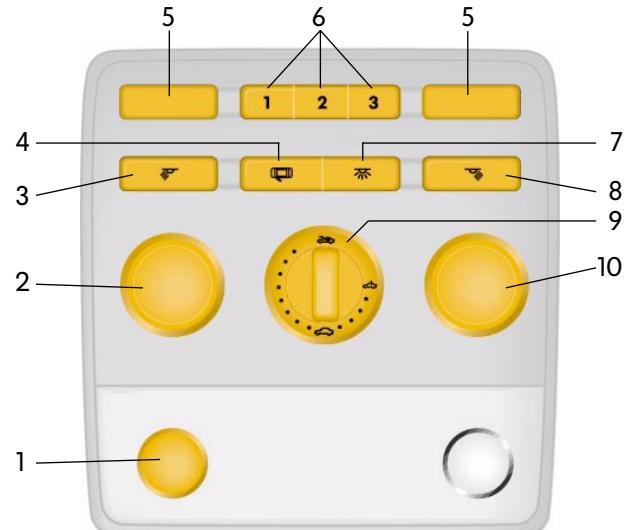
- Indirect dash panel lighting - via the onboard power supply control unit
- Instrument lighting - via the onboard power supply control unit
- Hands-free microphone - via the car phone/telematics control unit



The humidity sensor and windscreens temperature sensor are assigned to the climate control system and are described in Self-Study Programme 271.

Front roof module

- 1 Hands-free microphone driver's side
- 2 Driver's side reading light
- 3 Driver's side reading light On/Off
- 4 Interior light automatic function On/Off
- 5 Sensors for interior monitor (optional)
- 6 Actuation of garage door opener (optional)
- 7 Actuation of interior light On/Off
- 8 Actuation of reading light front passenger On/Off
- 9 Rotary switch sliding/tilting roof (optional)
- 10 Front passenger reading light

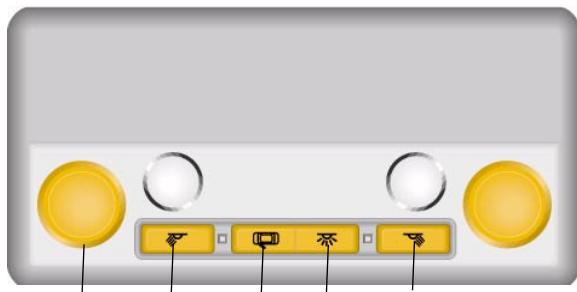


S273_015



Rear roof module

- 1 Rear left reading light
- 2 Rear left reading light On/Off
- 3 Interior light automatic function On/Off
- 4 Actuation of interior light On/Off
- 5 Rear right reading light



S273_074

Roof module

Interior lighting

The interior light plus the driver's and front passenger reading lights and their switches are integrated in the roof module.

The roof module assumes control of the interior lights in the vehicle. The necessary information is transmitted via the convenience CAN databus as shown in the following example:

- Rotary latch contact (door open)
- NO contact (ignition key inserted)
- Terminal 15 (ignition "on")
- Anti-theft alarm system (ATA) triggered
- Crash signal (crash intensity).



Interior lighting control

Switching the voltage supply for the interior lights, the reading lights and the vanity mirror lights is part of the interior lighting control.

To control the following lighting, the necessary information for the control units concerned is also provided by the roof module via the convenience CAN databus.

- The footwell lighting is dimmed and switched on and off by means of the seat control units as soon as the interior light in the roof module is switched on or off manually or automatically.
- The door exit warning lights are switched on undimmed by means of the door control units when doors are open.
- The door courtesy lights are switched on if a door is opened, an unlocking command exists, the ATA alarm is active or the automatic driving light control* has been activated.
- The inner door handle lighting is switched on if a command is sent to the roof module via the convenience system central control unit to lock the vehicle. The interior door handle lights are activated via the door control units. The intensity of the inner door handle lighting is controlled via Terminal 58d. If Terminal 15 is on, it is activated at full brightness.

* For more detailed information on the automatic driving light control system please refer to the chapter entitled "Automatic driving light control" in this Self-Study Programme.

Control for Terminal 30G

Terminal 30G is switched via the roof module and supplies the voltage for the glove box and vanity mirror lights. A pulse width modulated signal (PWM signal) is generated in the roof module.

Terminal 30G switches on under the following conditions:

- Terminal 15 is switched on and
- the run-on period for the supply switched on has not expired.

Terminal 30G switches off under the following conditions:

- after Terminal 15 has been switched off, if no interior light or reading light has been switched on for 30 seconds,
- an hour after Terminal 15 has been switched off and the interior light or reading light has been switched on,
- after an hour if Terminal 15 has been switched off and an interior light or reading light is switched on,
- immediately after all the conditions for switching off the dimmed front interior light have been met.

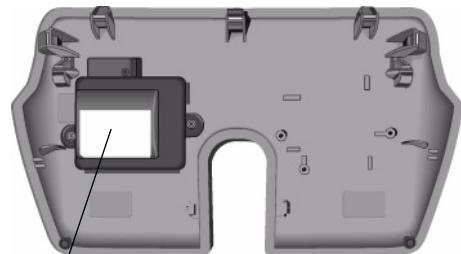


Roof module

Garage door opener

The garage door opener is supplied as an option. Up to three different garage door openers can be activated by means of the roof module. The driver must be responsible for learning-in the function of the garage door opener, as the function can vary depending on the manufacturer.

The garage door opener is only active if Terminal 15 is switched on. After Terminal 15 is switched off it remains active for a run-on period of 10 minutes. The run-on period is interrupted if a door is opened.



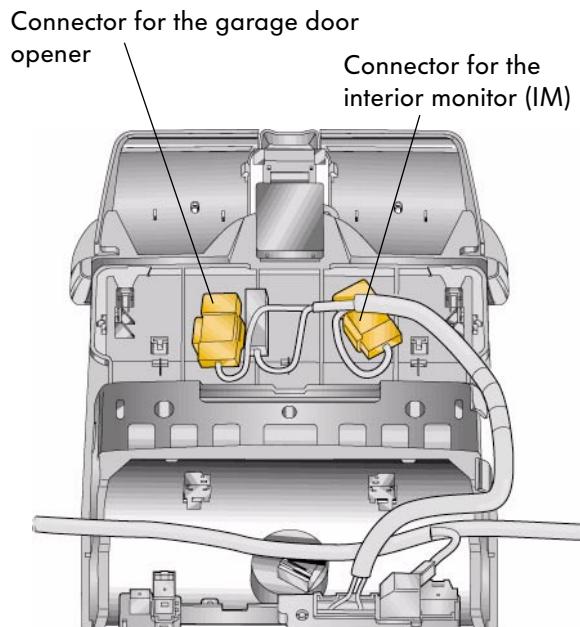
S273_115

Garage door opener in the front roof module

Interior monitor (IM)

The interior monitor (IM) is controlled via the roof electronics control unit. The sensor technology is integrated in the roof module. The information necessary for control is transmitted by the convenience CAN databus.

The roof electronics control unit detects any tripping via the IM sensors and transmits this by means of the convenience CAN databus. The convenience system central control unit receives this information and triggers the functions of the anti-theft alarm system (ATA).



S273_080

Activating the IM

The IM is activated via the convenience system central control unit (anti-theft alarm system master).

Deactivating the IM

Deactivating the IM depends on deactivating the anti-theft alarm system (ATA) by unlocking the central locking system.

It is possible to switch off just once and bring about subsequent locking via the front central display and control unit (CDC).

Sensors for interior monitor (IM)



S273_089

Front roof module



For more detailed information about the anti-theft alarm system (ATA) please refer to the chapter entitled "Convenience system central control unit".

Roof module

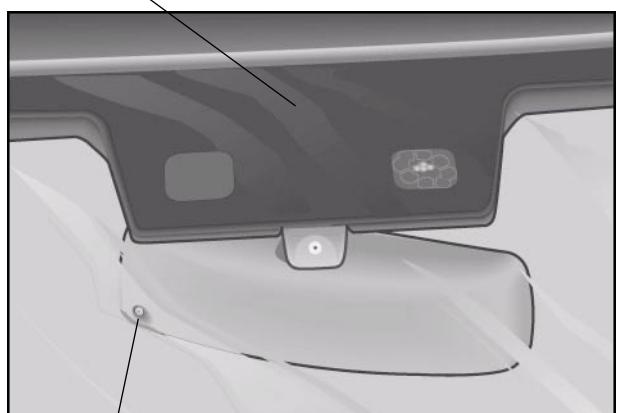
Electronically controlled interior rear-view mirror with memory function

The use of **Electronic PhotoChromic (EPC)** gel inside the automatic anti-dazzle interior mirror (**electronically controlled** interior rear-view mirror) allows it to automatically change the reflection when the light sensor detects an impinging bright light. By

- engaging reverse gear,
- switching on the interior light and
- deactivating the electronically controlled function through the button on the bottom of the mirror,

the roof electronics control unit adjusts the interior rear-view mirror for maximum brightness. Information about the selected reverse gear is received via the CAN databus.

Front roof module



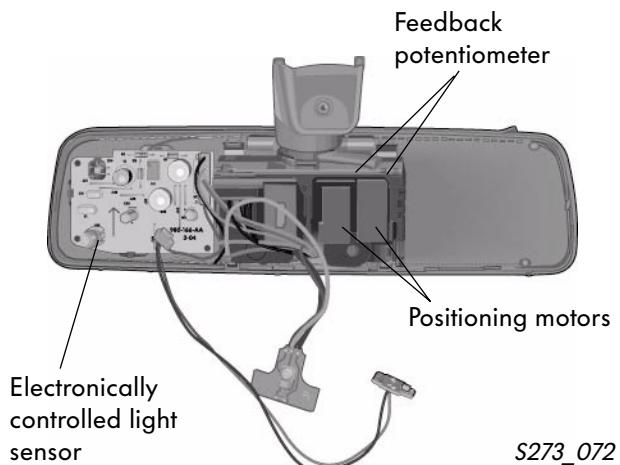
S273_075

Electronically controlled light sensor

Interior rear-view mirror memory function

Basic adjustment for the interior rear-view mirror is carried out manually. The position of the interior rear-view mirror is recorded by two feedback potentiometers (x, y axis) and stored in the roof module. This stored information is transmitted via the convenience CAN databus to the seat control unit on the driver's side.

Where there is appropriate equipment, in order to adjust the stored interior rear-view mirror position assigned to a memory button, the roof module receives the command from the driver's side seat control unit via the convenience CAN databus. This position is adjusted by means of two positioning motors in the mirror housing.



S273_072

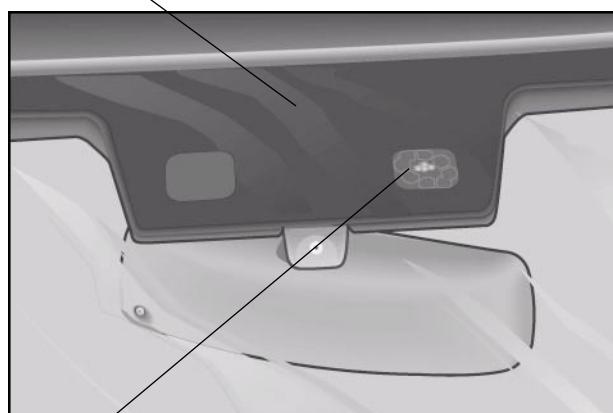
 For further information on the electronically controlled interior rear-view mirror please refer to Self-Study Programme 200 "The Golf '98".

Rain sensor

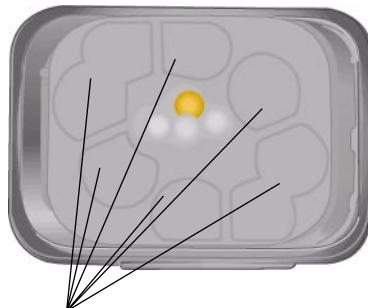
The rain sensor is supplied with voltage by the roof electronics control unit. Signals output by the rain sensor are sent in the form of commands to the wiper motor control unit via the convenience CAN databus.

The rain sensor is activated by means of the "Intermittent" and "Automatic" positions on the steering column switch (also refer to the chapter entitled "Wiper module").

Front roof module



S273_075



S273_071

Sensitive surfaces of the rain sensor



The roof module is capable of self-diagnosis through the VAS 5051 Diagnostic Testing and Information System using address word 38 ("Roof electronics").

Roof module

Sliding/tilting roof (STR)

The sliding/tilting roof (STR) is supplied with dimensions of 520 x 900 mm and with two equipment variants:

- solar roof
- glass roof

Solar roof version

The solar cell power output of 24 watts is used by activating the ventilator fan for the interior ventilation even if the ignition is not switched on.



S273_073

Operating the sliding/tilting roof (STR)

The sliding/tilting roof (STR) is operated by means of the rotary switch on the roof module after it is by the convenience system central control unit. The roof electronics control unit outputs the signals to the sliding/tilting roof to enable the sliding/tilting roof and convenience opening and closing. Evaluation of the STR switch also takes place in the sliding/tilting roof.

The STR function is enabled:

- when the ignition is switched on (Terminal 15 on),
- for a run-on period of 10 minutes after the ignition is switched off (Terminal 15 off),
- as long as no door is opened. If the driver's door is opened within the run-on period, the sliding/tilting roof enable function is cancelled.



For further information about the sliding/tilting roof please refer to Self-Study Programme 270 "The Phaeton".

Glass roof version

For the glass roof version, the roof module has two additional buttons at the front on the rotary switch to operate the roller blind.

In the glass roof version the sliding headliner is activated electrically by a separate motor.



S273_086

Rotary switch in the front roof module with E 437 button for roller blind/sunroof

Convenience opening and closing function

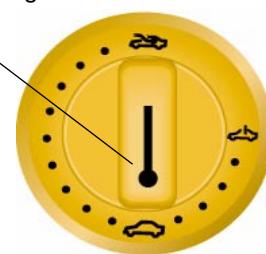
Convenience operation allows the electric windows and a fitted sliding/tilting roof (STR) to be fully opened and closed. The function is configured via the front central display and control unit (CDC). The STR is not enabled by the convenience system central control unit until after the window regulators have reached the end position (if this convenience function is configured). The function is only active while it is being activated.

Emergency closing function

The "emergency closing" function is triggered by pressing the dot in the middle of the rotary switch. The sliding/tilting roof immediately travels to zero position with increased holding power.



Emergency closing



S273_088



The sliding/tilting roof is capable of self-diagnosis through the VAS 5051 Diagnostic Testing and Information System using address word 38 (roof electronics).

Roof module

Automatic driving light control

The automatic driving light control extends the previous number of functions on the rotary light switch.

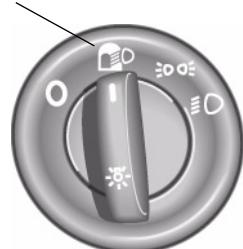
Firstly, the automatic driving light control (ALC) has a safety function. If the rotary light switch is positioned on the "automatic driving light control" function (tunnel light symbol), the entire vehicle lighting is switched on automatically at a brightness relative to the ambient light levels as detected by light sensors. The light sensors are read by the roof module.

The automatic driving light control switches the following lighting on:

- dipped beam
- tail light
- courtesy lights
- number plate lights

The tunnel light symbol is visible on the speedometer for a few seconds when the automatic driving light control is switched on.

Symbol for tunnel light



S273_004

Rotary light switch with "automatic driving light control" function



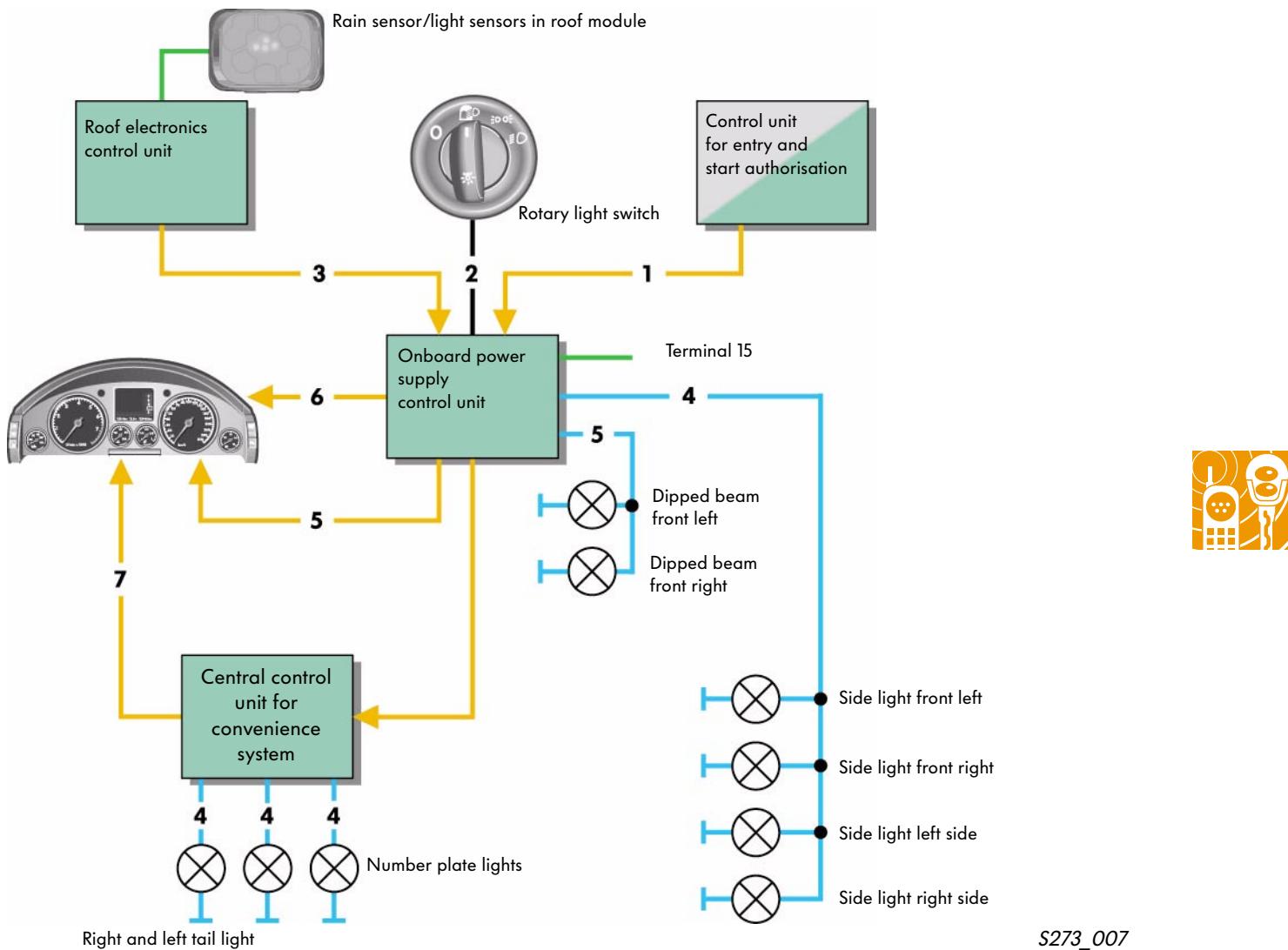
The lighting function that is activated by means of the rotary light switch always takes priority over the light function automatically selected by the automatic driving light control!



S273_005

 For simple faults such as processor failure, a defective sensor or an open circuit, the entire vehicle lighting is always switched on.

System overview



- 1 Terminal 15 on
- 2 Automatic driving light control
- 3 Light (dipped beam) on
- 4 Tail light (parking light) on
- 5 Dipped beam on
- 6 Front right or left dipped beam defective
- 7 Rear left and right parking light and number plate lighting defective



An additional circuit in the onboard power supply control unit ensures that the side lights and dipped beams can be switched on and off even if the µC fails!

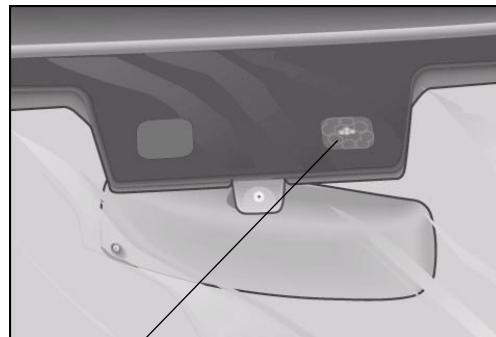
Roof module

Sensor

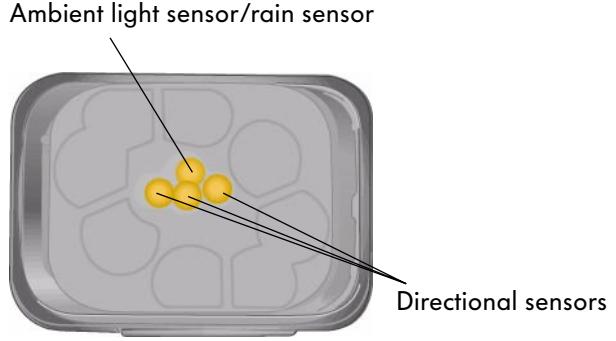
The sensor comprises the following functions:

- rain sensors and
- light sensors (optional)

The sensor is mounted on the windscreen (top centre) and linked electrically to the roof module.



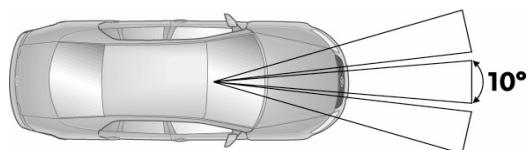
S273_075



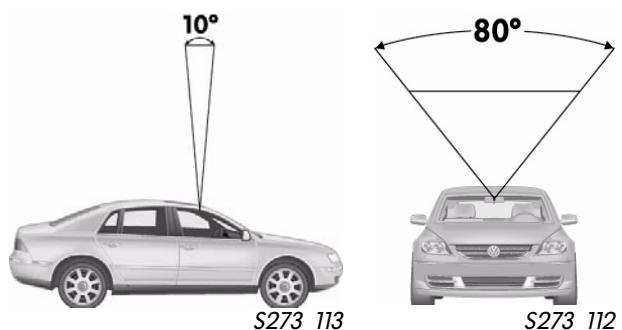
S273_111

The light sensor technology consists of the following components:

- Three directional sensors with a viewing direction horizontal to the vehicle with a beam width of 10° for each sensor
- An ambient light sensor with viewing direction vertical to the vehicle and with a beam width of 10° and 80° to the side.



S273_006



S273_113

S273_112

 The ambient light sensor also works as a rain sensor.

Conditions for switching on

When the vehicle enters a tunnel, the vehicle lighting is immediately switched on. It is switched off again with a time delay of 5 seconds after leaving the tunnel (this avoids flashing the lights by constantly switching on and off).

By contrast, the vehicle lighting is not activated when passing bridges and travelling through short underpasses or in fog, as the horizontally arranged light sensor - in contrast to the vertically arranged light sensor - is able to detect light. In such cases the vehicle lighting must always be adjusted manually as required.

Rain sensor function

If it rains, the vehicle lighting is activated after 10 seconds by a rain sensor using infrared detection. It is deactivated again if no further rain is detected for 200 seconds.

The rain sensor also detects how severe the rain is and automatically activates the windscreen wipers and regulates the rate at which they wipe (refer also to the chapter entitled "Windscreen wiper module").



Roof module

Orientation lighting

The convenience functions of orientation lighting assist the vehicle occupants by automatically switching on the vehicle lighting when they enter and leave the vehicle.

The entire interior lighting is switched on via the radio-wave remote control for up to four minutes after the vehicle doors are unlocked. This function is cancelled again when:

- the maximum time for this function has expired
- the orientation lighting is switched off via the CDC "Settings" menu
- the ignition is switched on.



S273_013



S273_019

The orientation lighting switches the entire interior lighting off with a delay after occupants leave the vehicle when:

- the ignition is switched off,
- the vehicle lighting was switched on beforehand for at least three seconds,
- after opening a vehicle door, the system detects that all vehicle doors have been closed again,
- the vehicle doors are opened and closed again, as long as the orientation lighting is still activated and the battery protection time of 180 seconds has not yet elapsed.

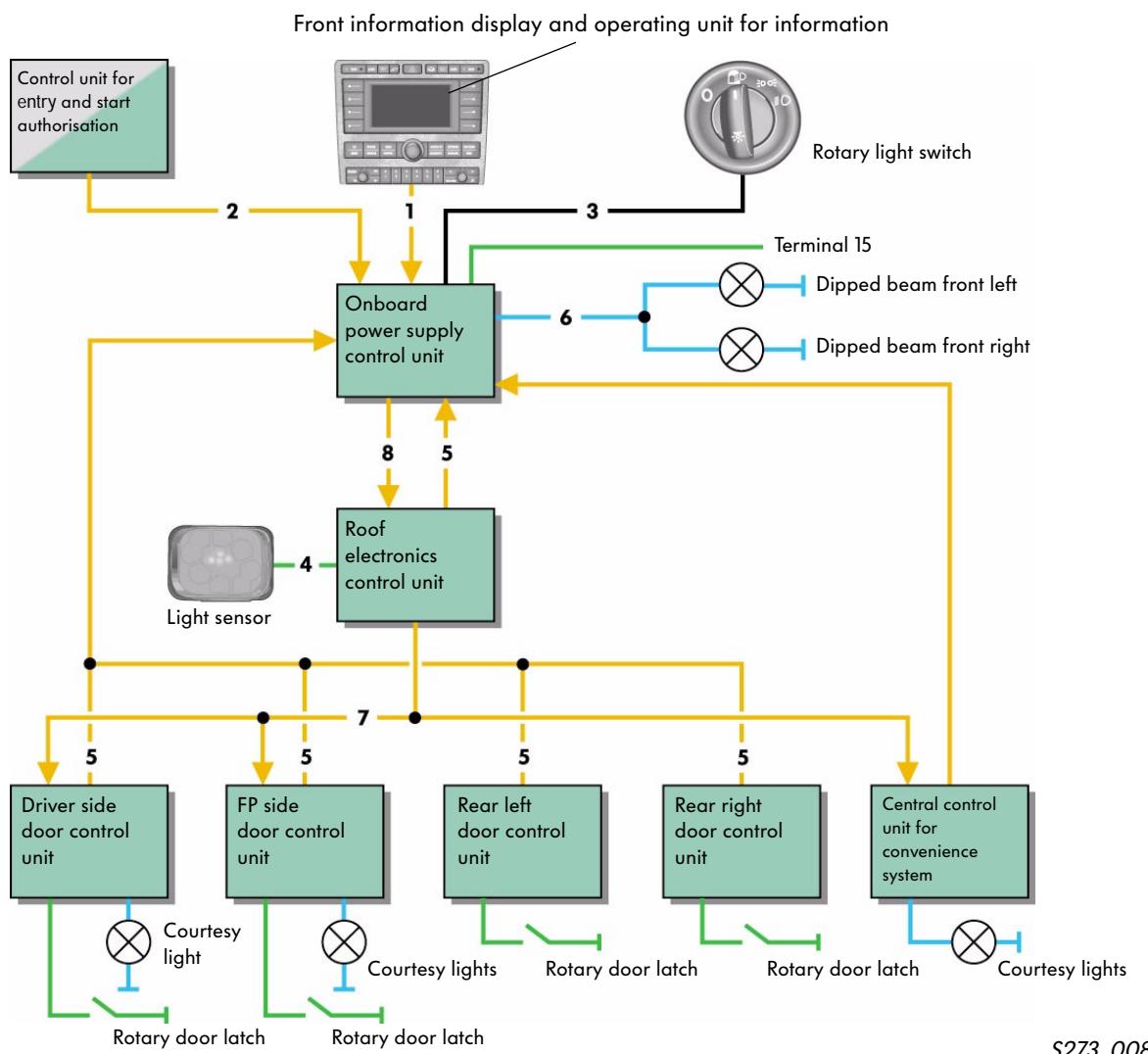
The status of the interior lighting is not affected by the function of the orientation lighting.

The last value for the orientation lighting in each case is stored in the onboard power supply control unit and used if the CAN signals fail.

If there is no light sensor fitted, the lights will also be switched on during the day!



System overview of orientation lighting



- 1 Orientation lighting activated
- 2 Terminal 15 off
- 3 Rotary light switch was switched on beforehand (dipped beam)
- 4 Light sensor reports darkness, rotary light switch is set to automatic driving light control
- 5 Door open, rotary latch contact
- 6 Automatic driving light control active, switch on dipped beam

- 7 Courtesy lighting for outer door handle
- 8 Orientation lighting active



Automatic driving light control is capable of self-diagnosis through the VAS 5051 Diagnostic Testing and Information System using address word 49.



Roof module

Windscreen wiper module

The windscreen wiper module is a new development. It offers:

- a dual motor wiper system without wiper linkage (small crankshaft drive)
- minimum noise from the wiper blades at turning points due to reduced wiper motor speed
- uniform wiping quality depending on road speed and wind pressure
- intermittent wipe controlled according to vehicle road speed
- wiper blade protected by alternating park position in the up or down direction
- lowered wiper arm park position outside range of vision (heated).

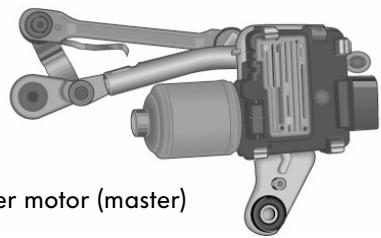
V217

Front passenger's side wiper motor (slave)



V216

Driver's side wiper motor (master)



S273_125

Activating the wiper module

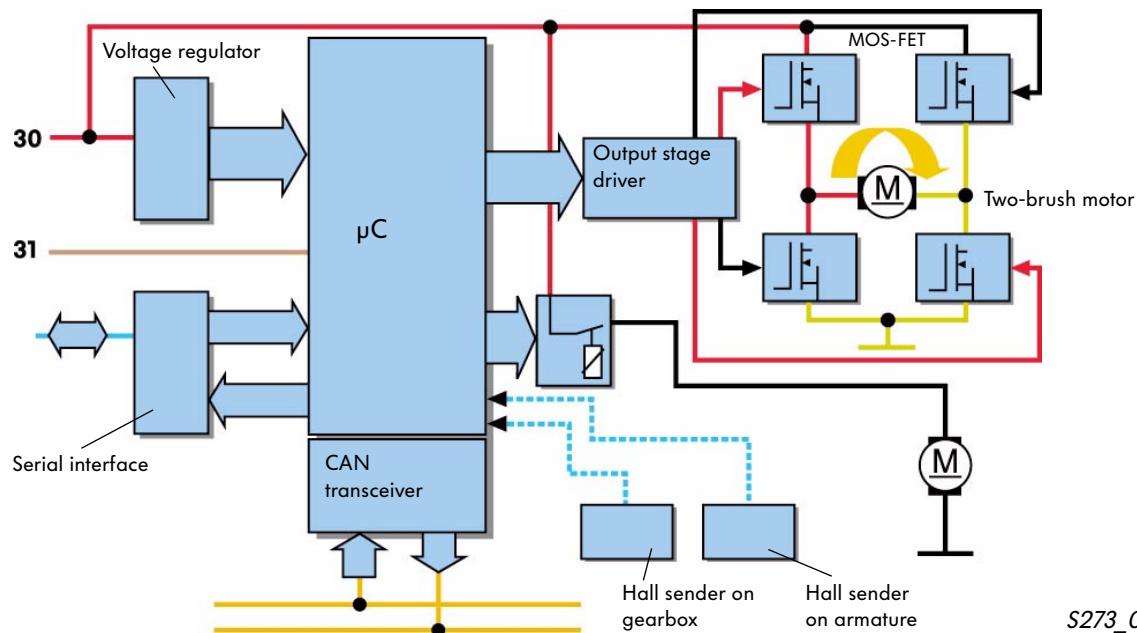
The control electronics for the speed-regulated two-brush wiper motor is integrated in the gearbox cover and activates the wiper motor. The wiper motor on the driver's side (master) receives the wiping requests via a CAN interface.

The wiper motor on the driver's side (master) receives the wiping requests via a CAN interface.

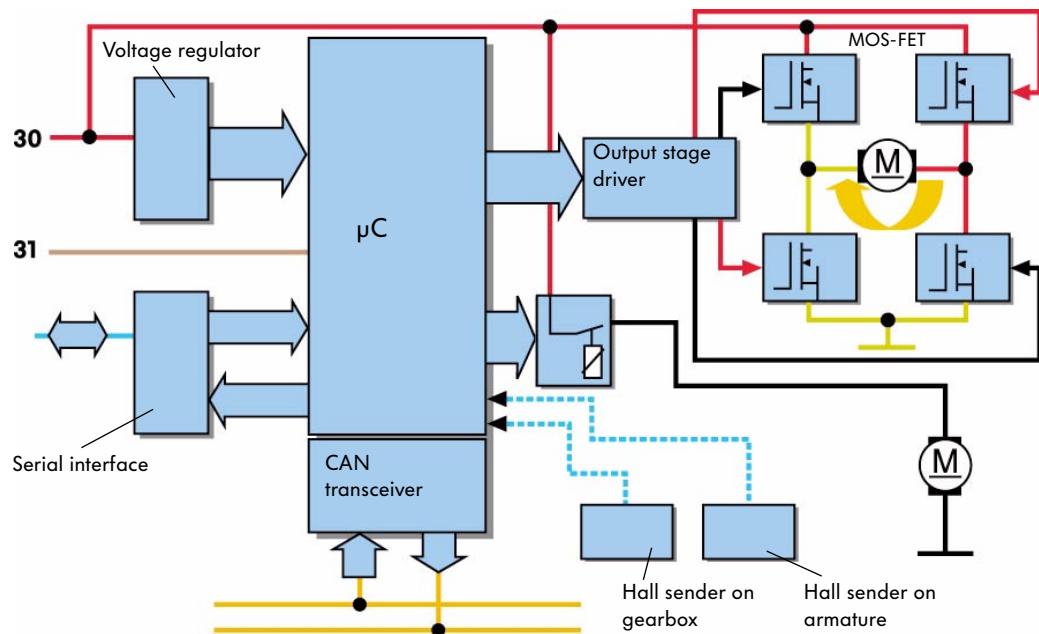
The driver's side wiper module (master) on the other hand activates the windscreen washer pump directly.

Wiper motor (master)

The wiper arm is moved up and down by reversing the wiper motor (master). To achieve this, the motor terminal voltage changes poles in the reverse positions. To regulate the wiper speed, the motor speed and position of the wiper arm are measured by Hall senders on the armature and gearwheel.



S273_069



S273_070



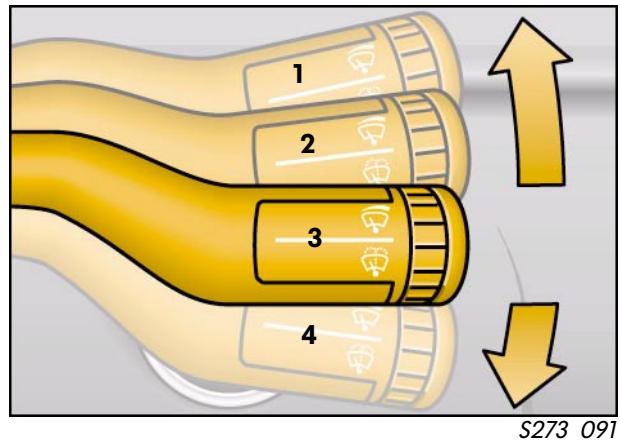
Roof module

Switch positions and intervals

The Phaeton has the following switch positions:

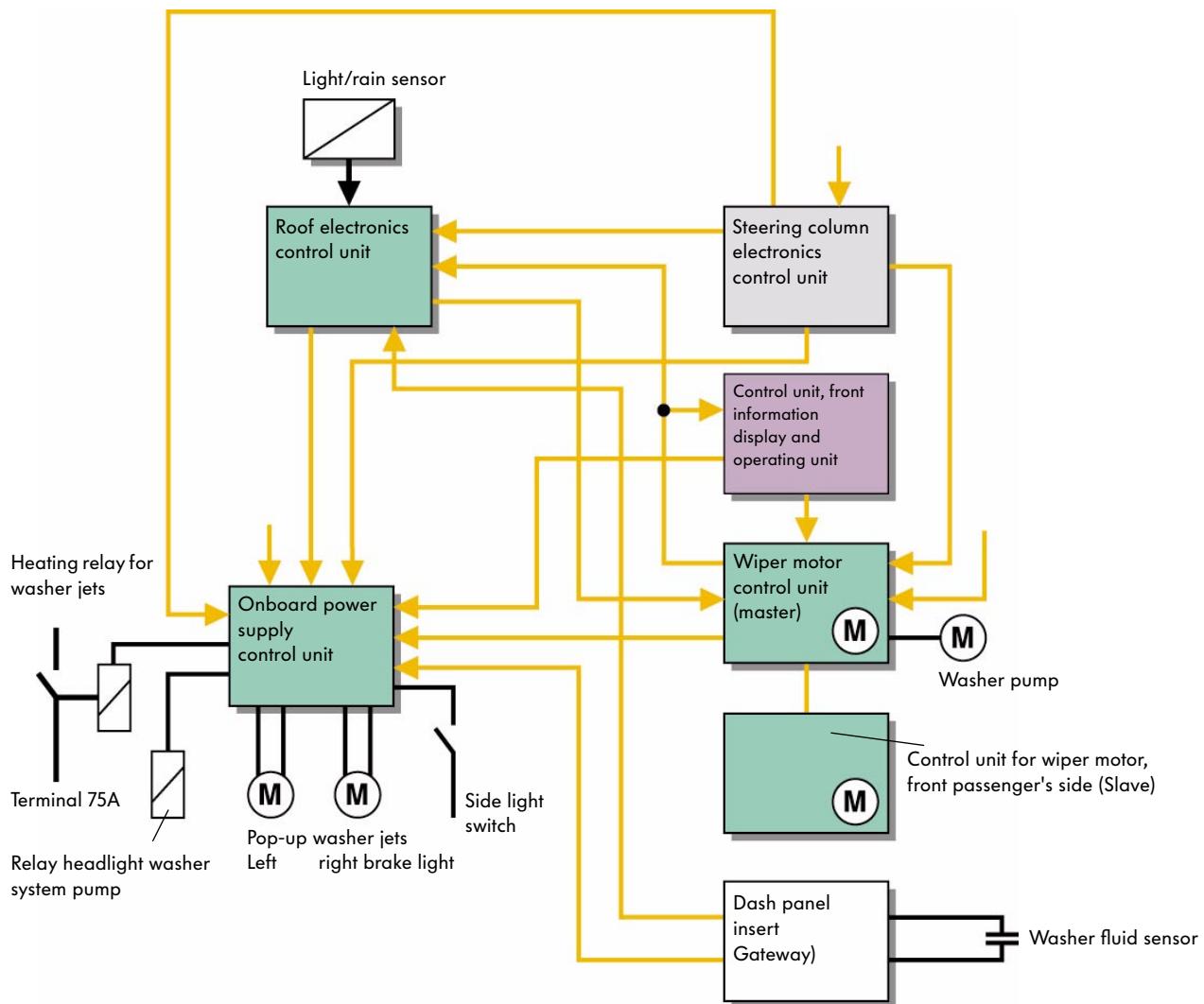
- 1 Continuous wipe Stage 2
- 2 Intermittent wipe Stage 1 (rain sensor active)
- 3 Wipe function off
- 4 Flick wipe

In the intermittent position it is possible to activate the wipers at three different speeds, depending on the level of wetness on the windscreen.



To renew the wipers, the wiper arms must be moved to a vertical position via the front central display and control unit (CDC)! Please do not remove the wipers independently!

Wiper park position, heated



S273_009

Multi-function steering wheel

In the interior of the multi-function steering wheel, in addition to the horn, there are two button panels for activating frequently used functions.

The left button panel serves the functions of the automatic proximity control (APC) with cruise control system (CCS). Infotainment system functions are operated using the right button panel.

Left button cluster

- + CCS: Current speed increased in steps of 10 km/h
- SET: Stores current speed as a desired speed in steps of 1 km/h and activates the APC or CCS
- RESUME: Activates the APC or CCS at the most recently selected required speed
- - CCS: Reduces the desired speed in steps of 10 km/h
- CANCEL: Switches the APC or CCS to standby mode and stores the desired speed
- Rotary wheel: Adjusts the APC distance
- ON/OFF: Activates the APC or CCS after starting the engine



On the side at the rear of the button module there is an additional button for switching off the button illumination.



For further information on the functions of the left button panel and on the subject of automatic proximity control (APC) with cruise control system (CCS) please refer to Self-Study Programme 276 "The Phaeton - Automatic Proximity Control".

The steering wheel buttons are connected to the control unit for steering column electronics which transmits data via the convenience CAN databus to the dash panel insert or the control unit, and the front display and control unit (CDC). The gateway in the dash panel insert manages the data interchange between the convenience CAN databus and the drive train CAN databus.



S273_068

 For further information on the functions of the right button panel and on the subject of "Infotainment" please refer to Self-Study Programme 274 "The Phaeton - Infotainment System".



The multi-function steering wheel is capable of self-diagnosis through the VAS 5051 Diagnostic Testing and Information System using address word 16.

Right button panel

- + Vol: Increases the volume of all audio functions
- Car phone receiver, Initiates or terminates telephone connections
- Announces the most recent navigation information
- - Vol: Reduces the volume of all audio functions
- Menu selection: Swaps between onboard computer, car phone and Infotainment
- Press/rotate thumbwheel: Menu selection (by turning the thumbwheel) and selection confirmation (by pressing the thumbwheel)
- ESC: Fades-in the previous display on the display in the dash panel insert or stops a procedure that is running



On the side at the rear of the button module there is an additional button for switching off the steering wheel heating.

Sound system

For the Phaeton there is a choice between the 8-channel standard sound system or the 12-channel Premium sound system (optional).

The 8-channel sound system comprises

- 10 loudspeakers (190 W) and an analogue amplifier

The 12-channel sound system comprises:

- 12 loudspeakers (270 watts) and
- a digital amplifier

Components and fitting locations*

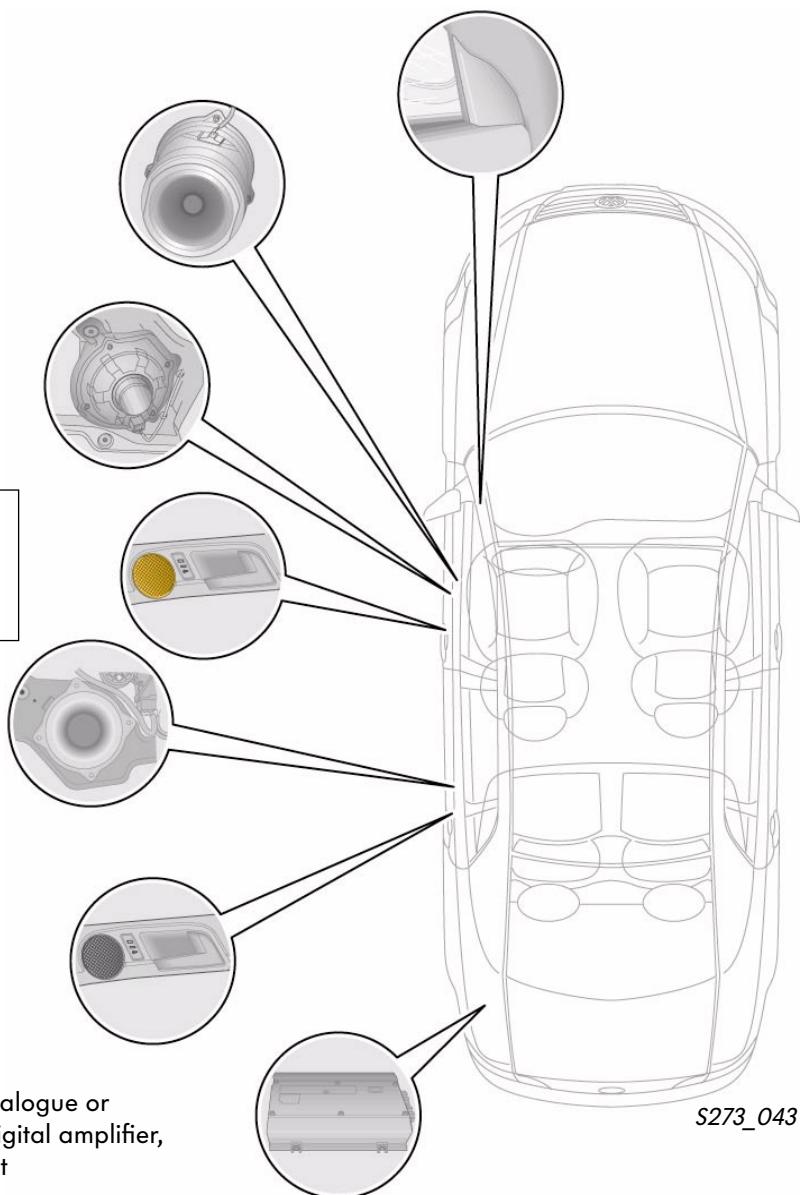
Mid-range/tweeter,
inner door actuation,
front door (12-channel sound system only)

Woofer,
device carrier panel,
rear door

Mid-range/tweeter,
inner door actuation,
rear door

8-channel analogue or
12-channel digital amplifier,
on left in boot

Tweeter,
in the mirror triangle

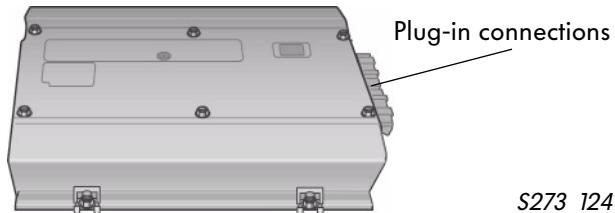


*The loudspeaker fitting locations apply to both the left and right side of the vehicle.

Amplifier

The 12-channel digital amplifier offers the following extended range of functions compared with the analogue amplifier:

- generate various room modes (pop, classical, jazz) and other effects (space, echo)
- optimised effect for each individual seat
- vehicle-specific settings (fabric/leather seats; right/left-hand drive models)



S273_124

J525
Digital sound package control unit

Both types of amplifier also generate the alert tones for the parking aid acoustic warning (also refer to the chapter entitled "Parking aid").



It is possible to identify whether an 8-channel analogue amplifier or a 12-channel digital amplifier is fitted in the vehicle by the colours of the plug-in connections for the amplifier: if they are grey and green, then it is an analogue amplifier; digital amplifiers have black plug-in connections. Please refer to the current Workshop Manual for further information about the sound system.



The sound system is capable of self-diagnosis through the VAS 5051 Diagnostic Testing and Information System using address word 47.

Sound system

Car phone

The fixed-network car phone is fitted in the front passenger's armrest. The car phone is operated by means of

- the receiver,
- the front control unit and central display and control unit (CDC) or
- Multi-function steering wheel

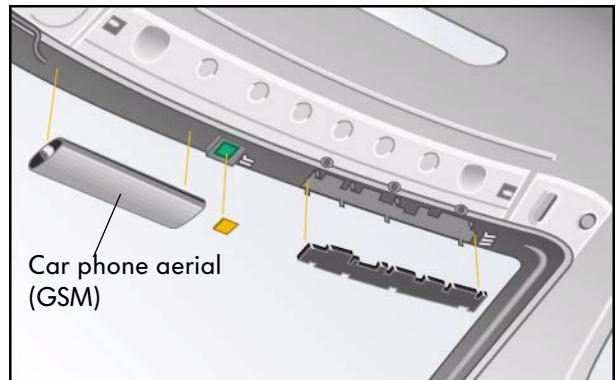
The hands-free microphone fitted on the driver's side in the roof module is used for transmission.



Car phone in front passenger armrest

S273_119

The car phone aerial (GSM) is integrated invisibly in the upper area of the rear window (also refer to the chapter entitled "Aerials". This means that aerials on the roof or bootlid are no longer necessary.

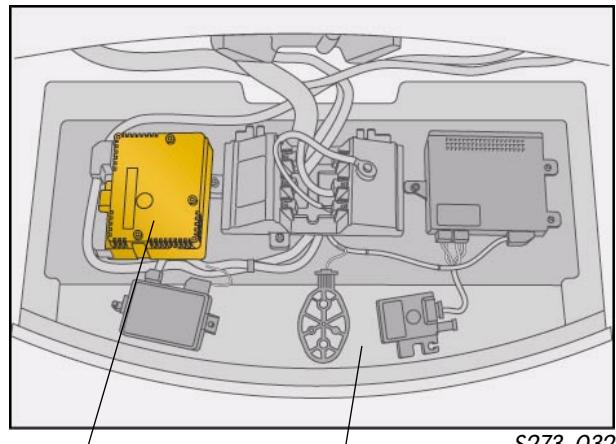


S273_034

The car phone control unit is fitted on the rear shelf in the boot.



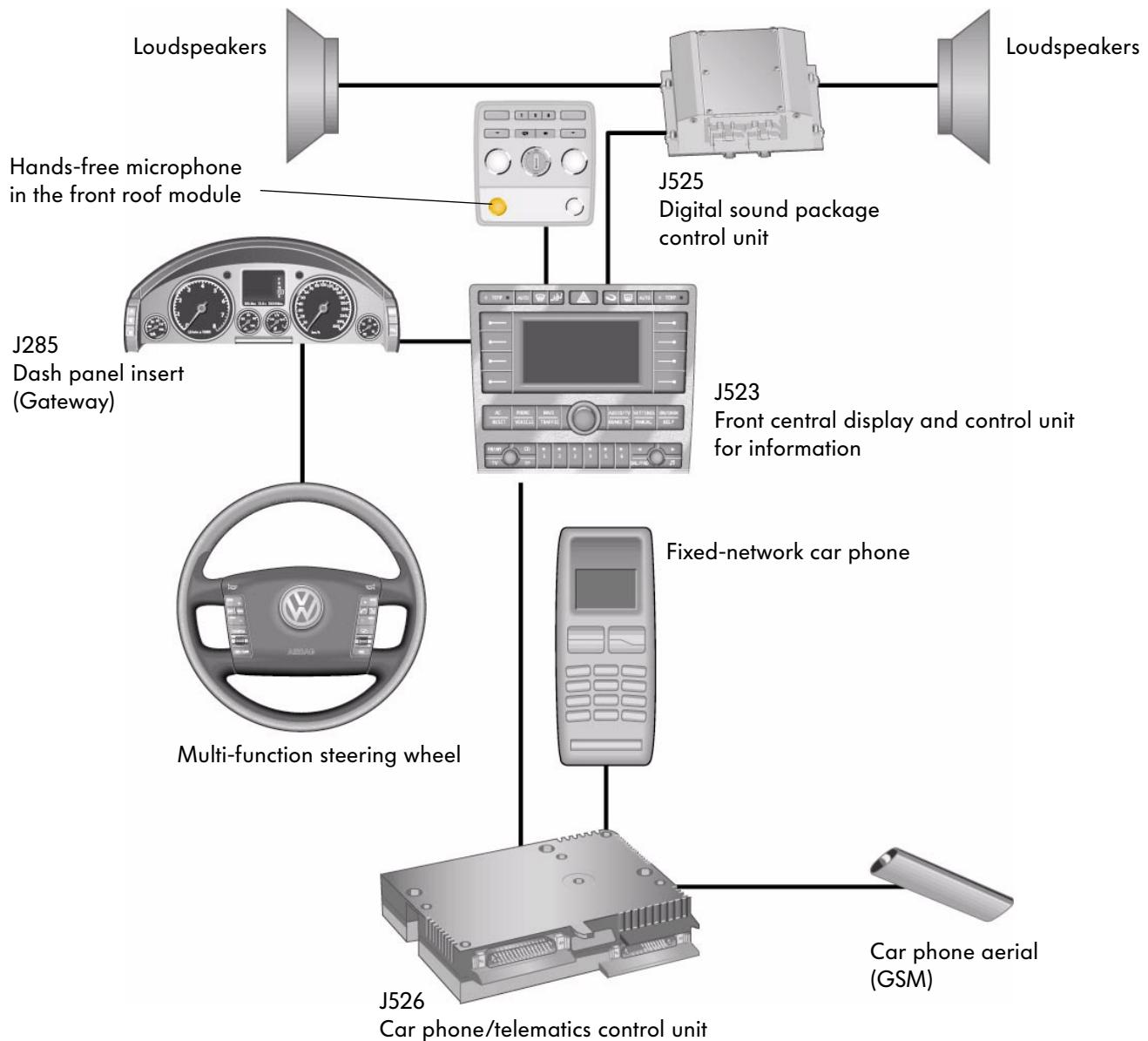
For further information on how to operate the car phone, please refer to Self-Study Programme 274 "The Phaeton - Infotainment System".



Car phone/
telematics control unit

S273_032

Overview of car phone system



The car phone system is capable of self-diagnosis through the VAS 5051 Diagnostic Testing and Information System using address word 77.



Sound system

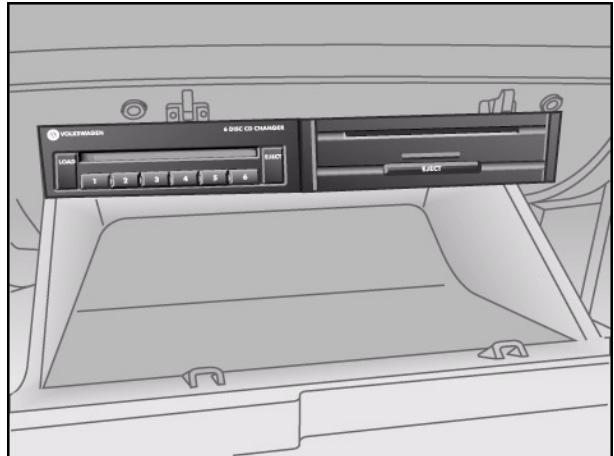
Navigation system

The CD player for the navigation system is fitted in the glove box. To use the system, the navigation CD must be inserted in the player.

The navigation CD player can also receive the Infotainment system CD. Or it can be used to display information, for example, in other languages.

The navigation system is operated via the front central display and control unit (CDC), and also via the rear CDC if the car is equipped accordingly.

A particularly large map section can be displayed in full screen mode on the 7" screen.

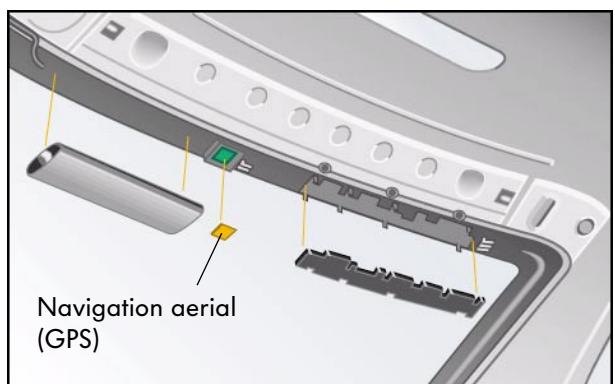


R41 CD changer and J401 navigation system S273_036
with CD drive control unit in the glove box



Map section in the CDC display S273_039

The navigation aerial (GPS) is invisibly integrated under glass in the upper part of the rear window.



S273_034

 The navigation system is capable of self-diagnosis through the VAS 5051 Diagnostic Testing and Information System using address word 37.

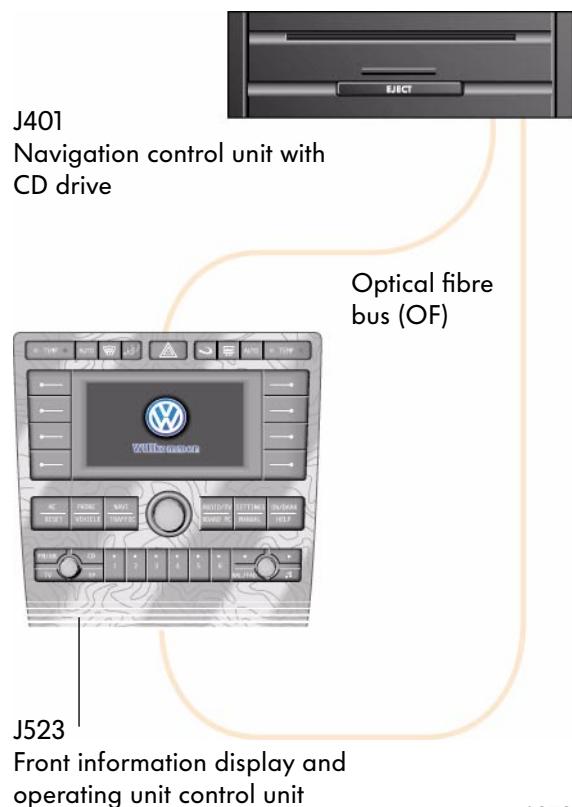
Optical bus

The front and rear information display and operating unit control units and the navigation control unit intercommunicate via an optical databus to display a digital map.

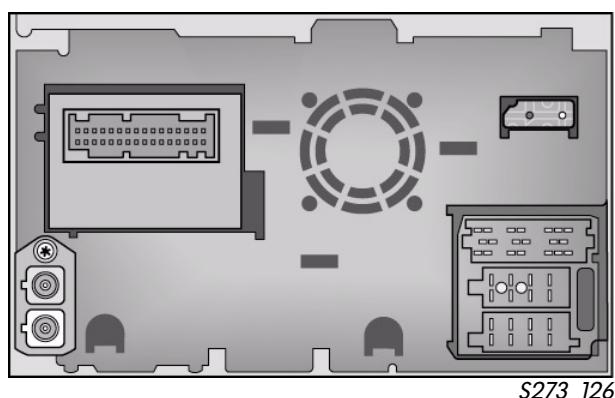
Optical fibre bus

The control units are connected in a ring by means of an optical fibre bus (OF). The optical fibre bus must be handled with extreme care:

- do not kink or crush the optical fibre cable,
- do not bend the FO cable at bending radii of less than 25 mm,
- do not remove the protective cap until just before installation,
- if the protective cap is missing, you may have to renew the optical fibre cable.

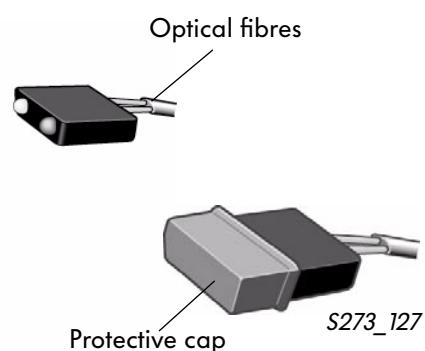


S272_091



J 401

Navigation system control unit with connector for optical bus



S273_127

Sound system

CD changer

The 6-disc CD changer is located next to the navigation computer in the glove box.

At least one CD must be loaded in the CD changer to play an audio CD. When a CD slot is occupied, it is indicated by an illuminated LED above the relevant station button.



S273_037

The CD changer is operated via the audio unit in the front central display and control unit (CDC).



S273_038

TV tuner

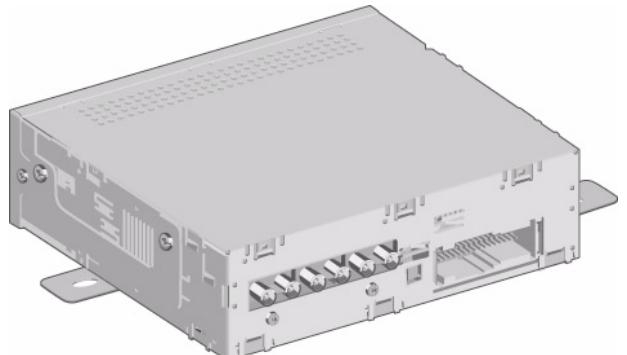


The TV tuner is fitted on the right on the rear shelf in the boot.

The TV aerials are invisibly integrated in the upper part of the rear window.

For safety reasons, while the vehicle is travelling occupants only have access to sound and not to an image on the CDC screen.

The TV function is operated via the audio unit in the front central display and control unit (CDC).



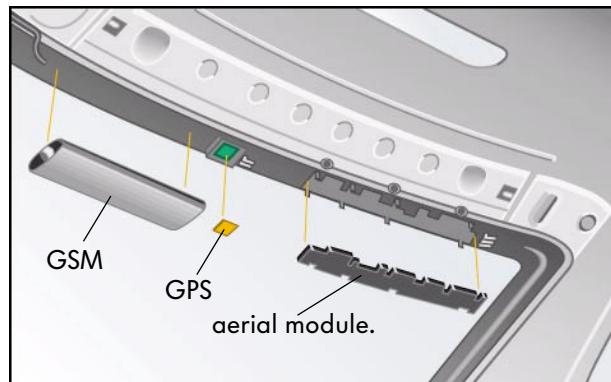
S273_128

Aerials

The following aerials are fitted invisibly in the upper border of the rear window:

- car phone aerial (GSM*)
- navigation aerial (GPS*)
(combined in one housing),
- aerial module.

* GSM = Global System for Mobile communication
GPS = Global Positioning System



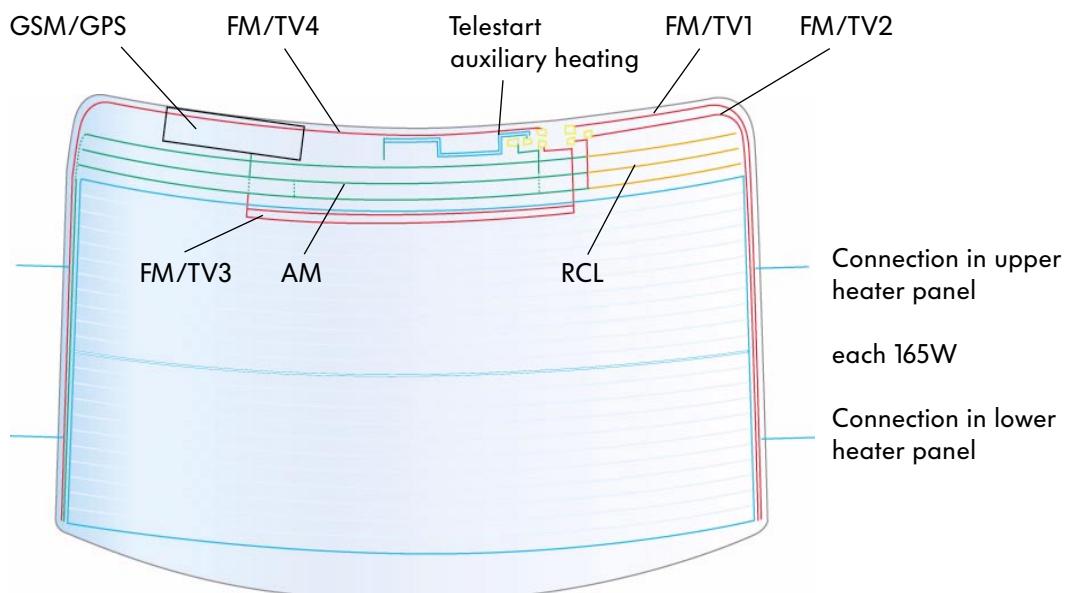
S273_034

The following are integrated into the aerial module:

- diversity aerial,
- aerial booster for the four radio aerials (FM 1-4, AM),
- four aerial boosters for the active TV aerials (1-4),
- Telestart aerial for the auxiliary heating (passive),
- passive aerial for remote central locking (RCL).

All aerial conductors are invisibly concealed in the upper area of the rear window. All aerial conductors are invisibly concealed in the upper area of the rear window.

The car phone aerial (GSM) and the navigation aerial (GPS) are also fitted in a module in the upper border of the rear window. However, it is not linked to the conductors in the rear window.



S273_081

Seats

The following front seat options are available:

- 12-way seat
- 18-way seat (optional).

Depending on the type of equipment, both seat variants contain a wide range of functions such as

- seat adjustment
- memory functions
- seat ventilation and heating
- massage
- easy-entry function

12-way seat

The 12-way seat offers the following options for electrical adjustment:

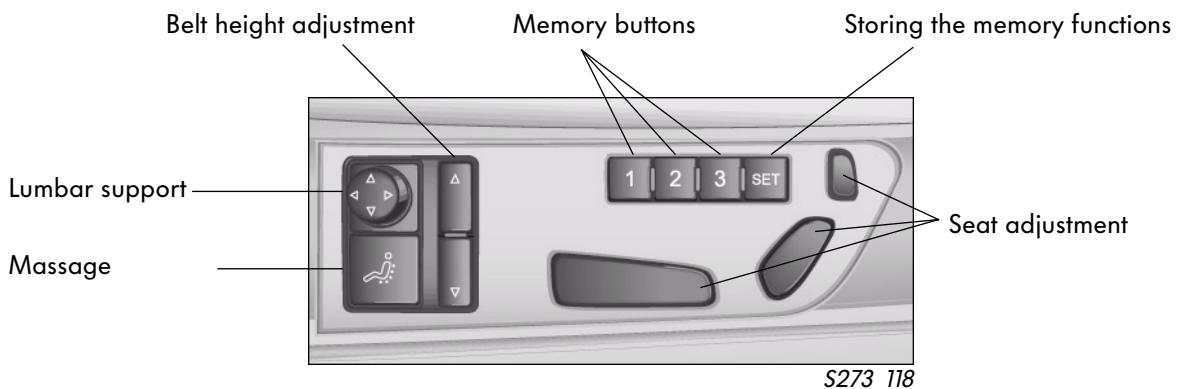
- 1 Longitudinal adjustment
- 2 Belt height adjustment
- 3 Backrest adjustment
- 4 Inclination adjustment
- 5 4-way lumbar support (up/down; front/back)



S273_078

12-way seat controls

The seats are operated by means of buttons located on the side of the front seat.



12-way seat motors

The adjacent figures provides an overview of the seat adjustment motors fitted in the 12-way seat:

- 1 Motor for longitudinal adjustment
- 2 Motor for height adjustment
- 3 Motor for backrest adjustment
- 4 Motor for inclination adjustment
- 5 Motor for horizontal lumbar support
- 6 Motor for vertical lumbar support
- 7 Seat control unit for memory



S273_122



Seats

18-way seat (optional)

In addition to the functions on the 12-way seat, the 18-way front seats has the following functions:

- 1 electric recline adjustment
- 2 extendible seat cushion
- 3 head restraint adjustment

All memory functions, the seat heater, ventilation and massage functions are contained in the 18-way seat.

Non-perforated leather is available as an option for the seats; in this case, the seat ventilation function is not fitted.

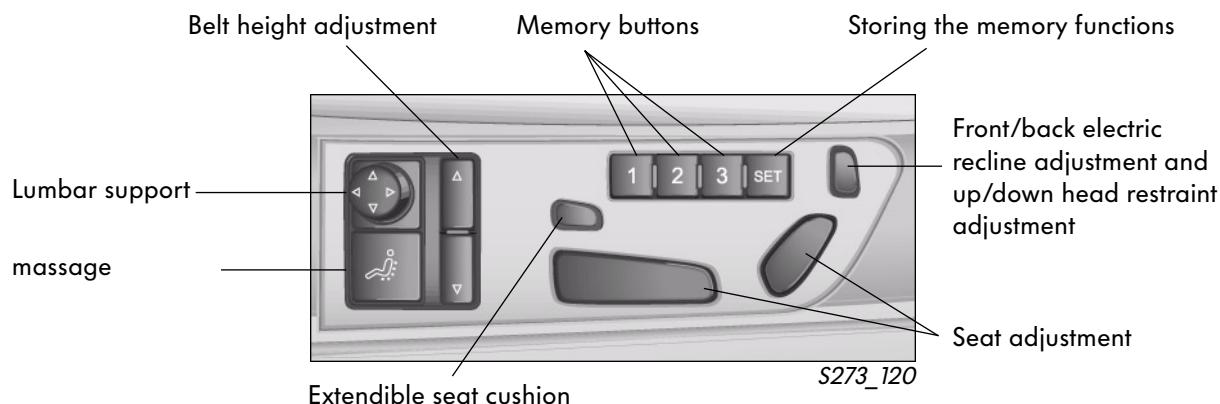


S273_079



18-way seat controls

In addition to the seat adjustment functions available in a 12-way seat, the 18-way seat has an extendible seat cushion.



18-way seat motors

The adjacent figure provides an overview of the additional motors fitted for seat adjustment in the 18-way seat:

- 1 Electric recline adjustment
- 2 Extendible seat cushion
- 3 Head restraint adjustment
- 4 Seat control unit for memory



S273_021

Seats

Rear seats

The rear seats may be supplied optionally as a single rear bench seat designed for three people or as individual seats for two people.

Rear bench seat

The rear bench seat is available in two equipment variants:

- Rear bench seat: with side airbags and manually adjustable head restraints (seat heater optional)
- Rear bench seat "plus": with electric 6-way lumbar support adjustment in the outer seats, ventilation, massage, seat heater, manually adjustable head restraints and seat occupancy detection (the head restraints rise automatically when the seat is occupied and the seat heater is enabled).

The controls for the rear bench seat function are located on the side of the seats.

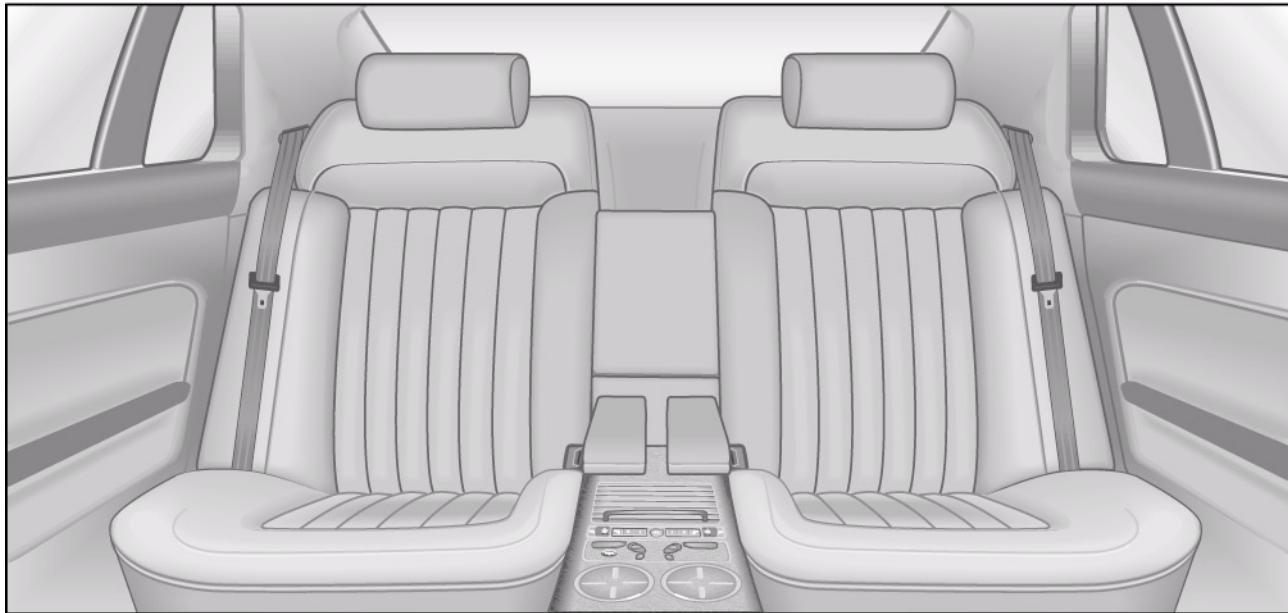
Individual seats

In addition to the rear bench seat functions, the two individual seats offer the following electrical 10-way auxiliary functions:

- extendible seat cushion, seat tilt, the height of the head restraints and adjustment of the 4-way lumbar support (up/down; front/back),
- memory function,
- Easy-Entry function (the seats move back 10 cm automatically when the door is opened) and
- seat occupancy detection (see above).

The individual seats are only fitted in combination with 18-way front seats.

Individual seats



S273_130

Controls for adjusting the front passenger's seat

The controls for the individual rear seats are located in the rear central console.

In the version that has individual rear seats, it is possible to adjust the front passenger's seat from the rear compartment. This enables rear seat passengers to obtain more leg-room and makes it easier to exit the vehicle.



S273_026



Seats

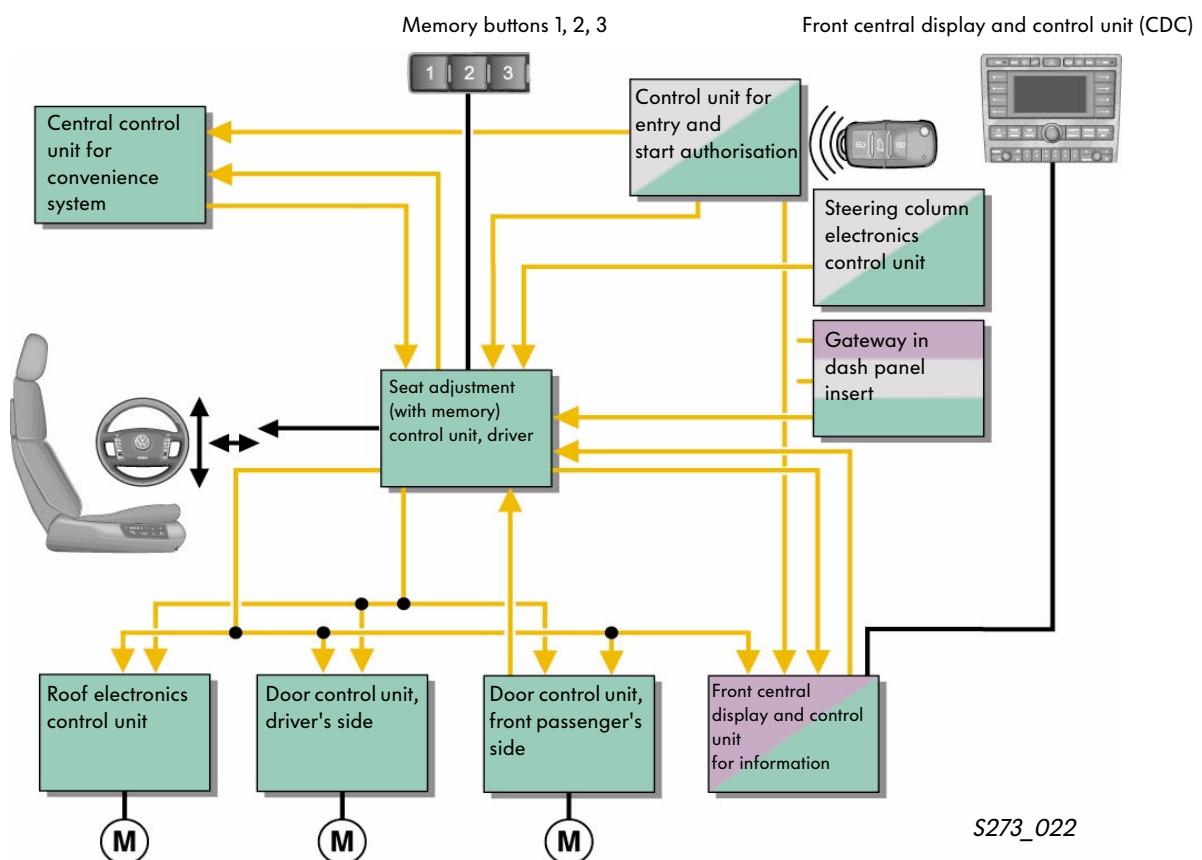
Memory functions

The following functions can be stored electrically using the memory functions (optional in 12-way seat, standard in 18-way seat):

- individual seat adjustments
- the position of the steering column with easy-entry function for the steering column
- the position of the seat belts (height adjustment)
- the settings for the interior and exterior mirrors

In addition to the 12-way seat memory functions, the 18-way seat has electric adjustments for the head restraints, extendible seat cushion and the recline.

System overview of memory functions



Seat heater and ventilation

The seat heater integrated in the seat works together with a fan to feed air at the right temperature evenly through the perforated leather via air ducts.

The seat heater and storage of the memory position are regulated by the seat control unit. The required heater and ventilation positions are set by means of the seat heater potentiometer. If the driver's side seat heater is active, the steering wheel is heated simultaneously.

If the onboard power supply is overloaded, the steering column heater and the seat heater and ventilation are switched off by the onboard power supply control unit.



S273_116

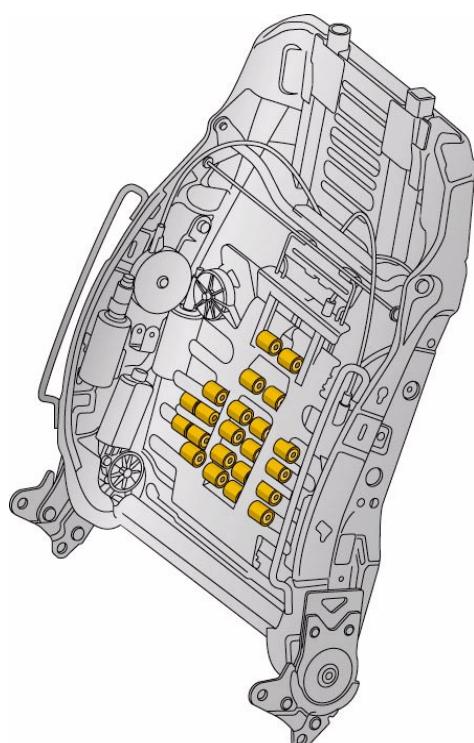
Massage function (optional)

The massage to relieve back muscles works mechanically through the 4-way lumbar support. Once it has been activated using the button on the seat, the lumbar support vibrates in all directions for 10 minutes.

In addition, the horizontal lumbar support moves fully forwards.

To adjust the intensity of the massage, the horizontal lumbar support can be moved back manually.

The seat control unit assumes all the electric seat convenience functions, including entering information for all buttons and switches located on the seat.



S273_027



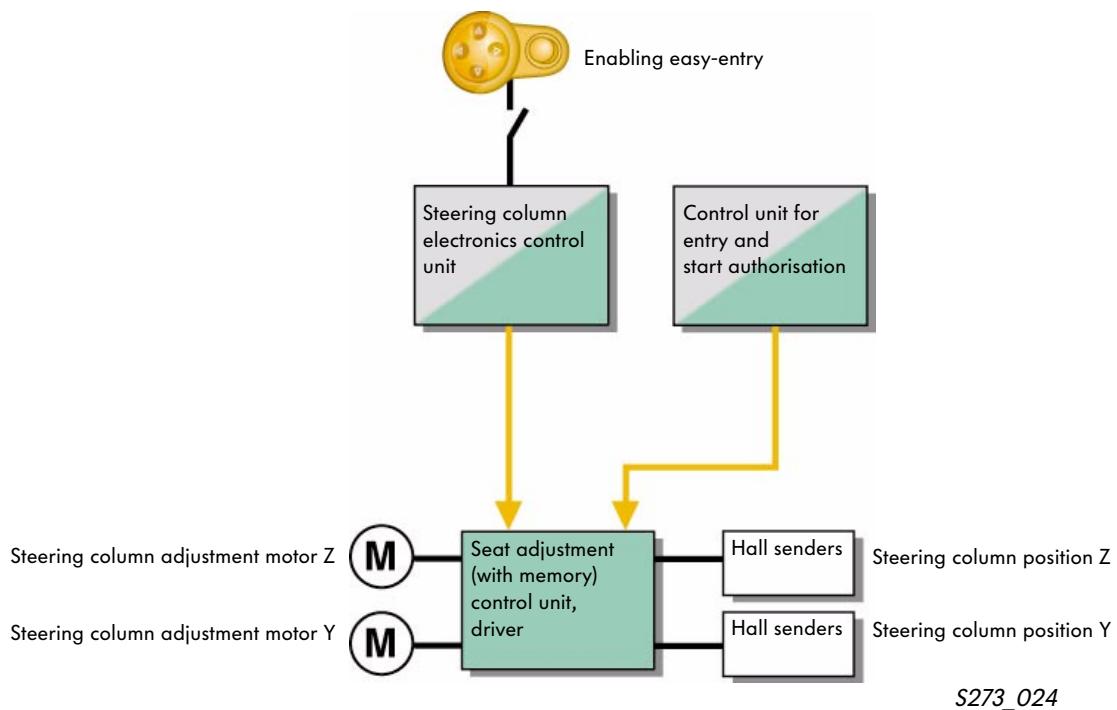
Seats

Easy-Entry function

This function is activated by means of the switch on the steering column module, regardless of the user profile. This moves the steering column electrically into the maximum upper and front position (park position) to allow the driver to enter and exit comfortably.

When the ignition key is turned (Terminal 15 on), the steering column is returned to the stored position. While the engine is being started, the steering column movements are interrupted.

Information relating to the switch is transmitted over the convenience CAN databus. When the ignition key is withdrawn, the current steering column position is stored and it returns to the park position. When the ignition key is switched on (Terminal 15 on), the steering column is returned to the last stored position.



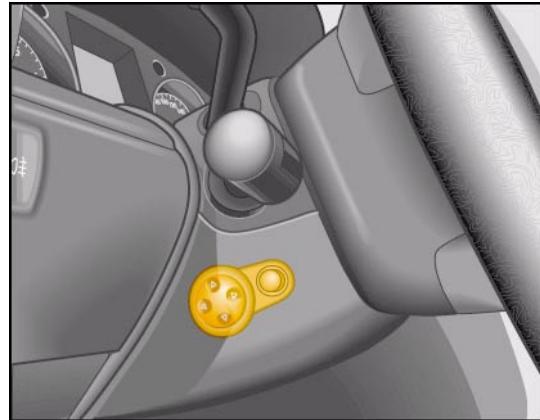
S273_024



For further information about the seats and their functions, please refer to Self-Study Programme 270 "The Phaeton".

Adjusting the steering column

The request to adjust the steering column is made via the convenience CAN databus and is processed by the driver's side seat memory. When a command is given to make an adjustment, the steering column is moved in the required direction until the request is reset or the soft stop is reached.

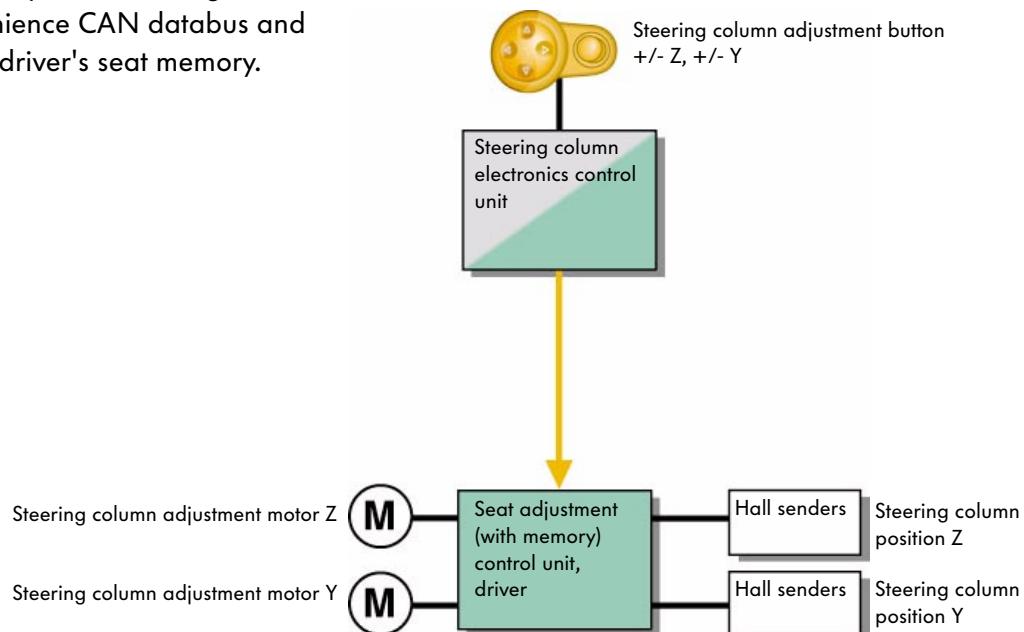


S273_025

Detecting the position of the steering column and belt height

The same function request is used to adjust the height of the belt as to adjust the seats.

The command to adjust the steering column is sent to the convenience CAN databus and processed by the driver's seat memory.



S273_023



The seats have self-diagnostic capability using the VAS 5051 Diagnostic Testing and Information System with the address words 06 (front passenger), 36 (driver) and 66 (rear).

Parking aid

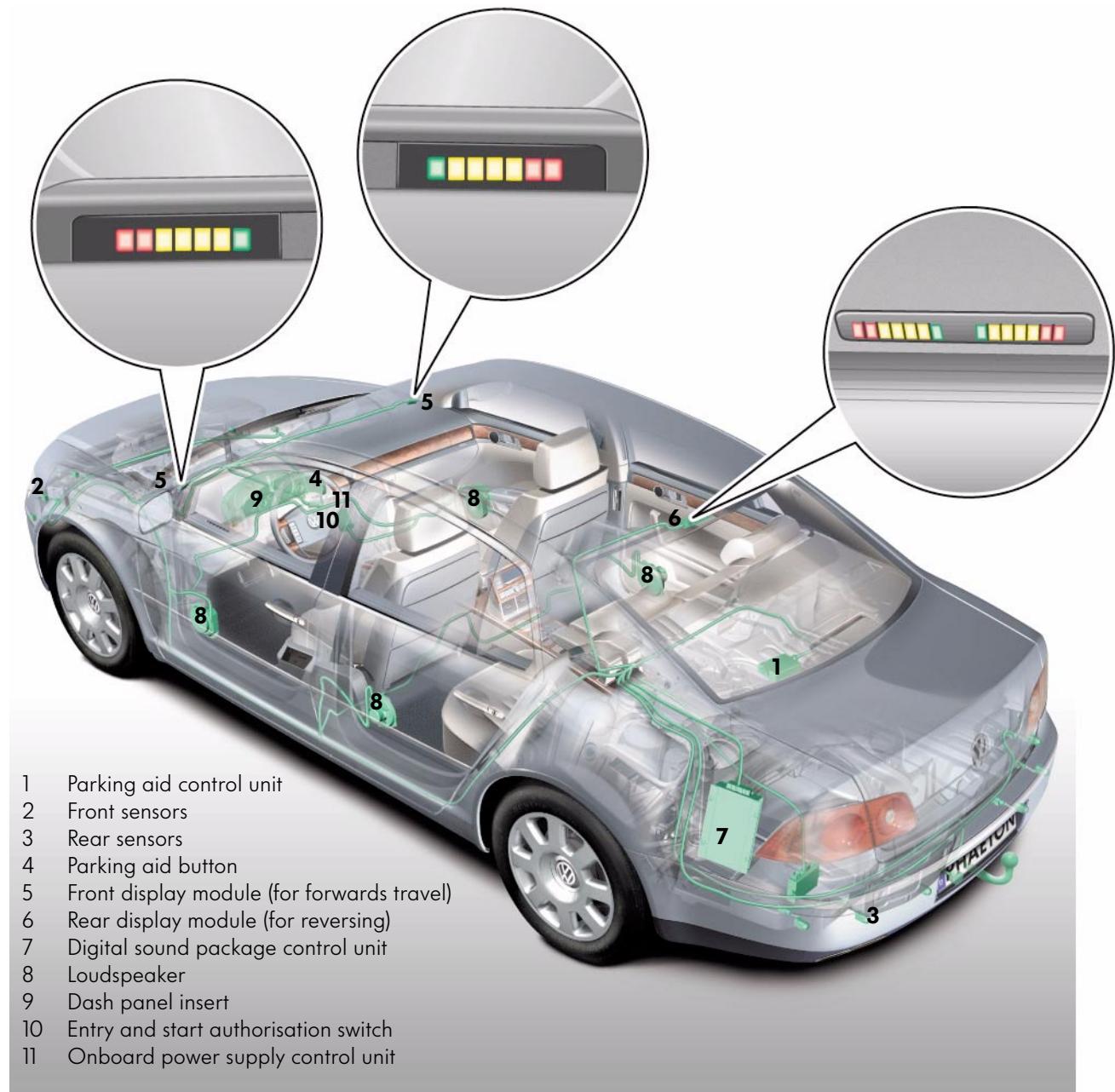
The parking aid is intended to assist the driver when manoeuvring. It is based on well-known ultrasound technology. The sensors are hardly visible and are fitted in the bumper.

The system has the following new features:

- six sensors at front and six at rear,
- obstacle detection on the left and right,
- display modules at the front and rear and
- visual and acoustic warnings.

The acoustic signal is sent on the convenience CAN databus and received by the digital sound package control unit (DSP), processed and then played back over the loudspeaker.

System overview



S273_014

Parking aid function

The parking aid is activated automatically when the ignition is turned on. It can be deactivated manually using the button on the dash panel insert. The green segment in the display modules indicates that the system is ready.



Parking aid button on the dash panel insert

S273_117

Warnings in the module are indicated:

- visually between 130 cm and 50 cm by means of LEDs **2** to **4**,
- visually and acoustically (slow intermittent tone) between 50 cm and 40 cm by means of LED **5**,
- visually and acoustically (rapid intermittent tone) between 40 cm and 25 cm by means of LED **6**,
- visually and acoustically (continuous tone) between 25 cm and 0 cm by means of LED **7**.

Tone frequencies are different at the front and at the rear.

The system is active, when

- the ignition is on (Terminal 15 on),
- the speed is < 15 km/h,
- reverse or neutral gear was selected (system active at front and rear),
- the gate selector lever is in position "D" or "S" (system active at front only) and
- a trailer is detected (system is deactivated at rear).

The system is not active, when

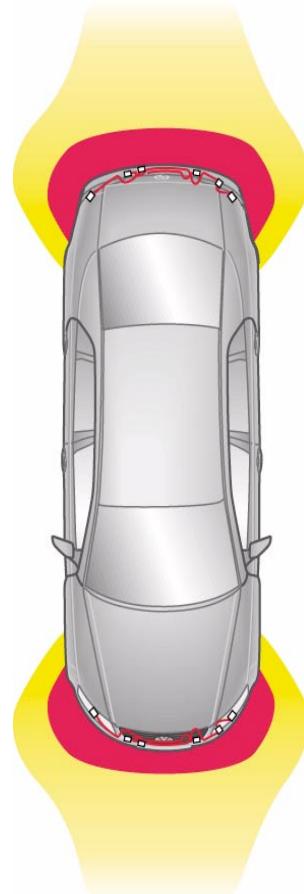
- the speed is > 15 km/h,
- the handbrake is on (system is deactivated after 2 seconds),
- the gate selector lever is in position "P".

LEDs in the display module



S273_012

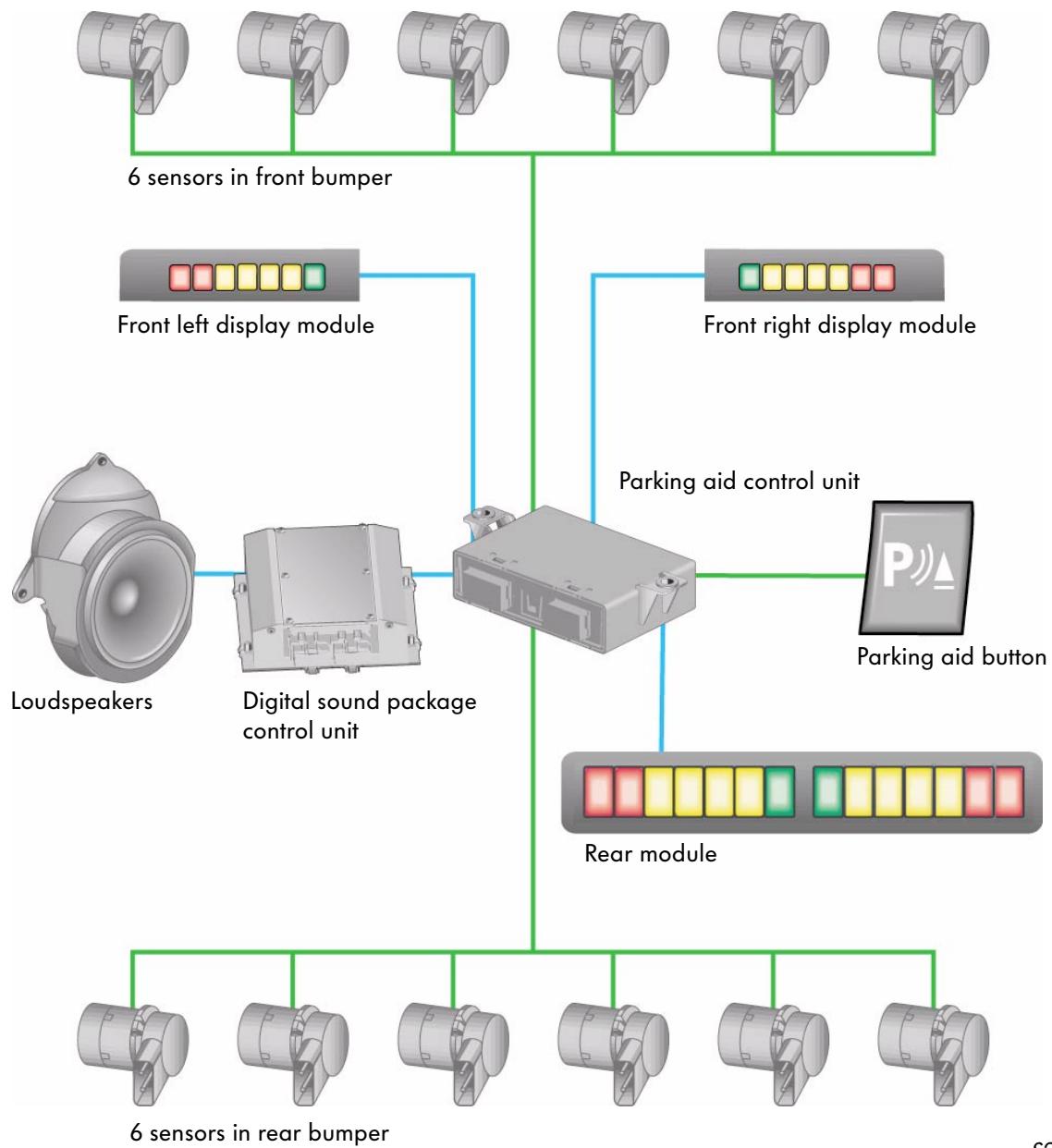
Detection ranges



S273_011

Parking aid

Overview of the parking aid



S273_010



The parking aid is capable of self-diagnosis through the VAS 5051 Diagnostic Testing and Information System using address word 76.



Test your knowledge

1. In the convenience and safety electronics there are several control units networking with several CAN databus systems. Decide which control units communicate simultaneously with the convenience CAN databus and with the Infotainment CAN databus.

- a) Steering column electronics control unit
- b) Parking distance control unit
- c) Front information display and operating unit control unit
- d) Rear information display and operating unit control unit
- e) Entry and start authorisation relay

2. Which positions are there on the entry and start authorisation switch?

- a) Off
- b) On
- c) Zero
- d) Start
- e) Assistance driving light

3. How many exterior aerials are there in the convenience equipment of the systems for entry and start authorisation?

- a) 4
- b) 6
- c) 8



4. In which ways can the bootlid be closed hydraulically?

- a) The bootlid can be closed with the radio-wave remote control.
- b) The bootlid can be closed with the button in the bootlid.
- c) The bootlid can be closed with the switch on the inside of the driver's door.
- d) The bootlid can be closed with the exterior button in the VW emblem.

5. If there is a power failure, the bootlid can be opened...

- a) ...using the interior button in the bootlid...
- b) ...using the radio-wave remote control...
- c) ...using the emergency lock cylinder in the VW emblem in the bootlid...
- d) ...using the switch on the inner side of the driver's door.

6. Which statement about the windscreen wiper module is correct?

- a) The module comprises a single motor wiper system with wiper linkage.
- b) The module comprises a dual motor wiper system without wiper linkage.



Test your knowledge

7. Where is the GPS aerial fitted invisibly?

- a) The GPS aerial is fitted in the upper part of the rear window.
- b) The GPS aerial is fitted in the bootlid.
- c) The GPS aerial is fitted on the roof.

8. According to which principle do the parking aid sensors function?

- a) They are optical sensors.
- b) They use ultrasound.
- c) The sensors work with radar.

9. The parking aid warnings are indicated...

- a) ...visually
- b) ...by sense of touch
- c) ...acoustically.





Answers:

1. c, d 2. a, b, c, d 3. b 4. a, b, c, d 5. c 6. b 7. a
8. b 9. a, c.



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