

**Service Training**



**Self-study Programme 423**

**The Golf 2009**



The Golf is more than just a car — 34 years after the launch of the first Golf and five years after the presentation of the Golf V, Volkswagen is continuing the unique automobile story of its most successful model.

Design, comfort, economy, safety and quality are the product highlights of the Golf 2009.

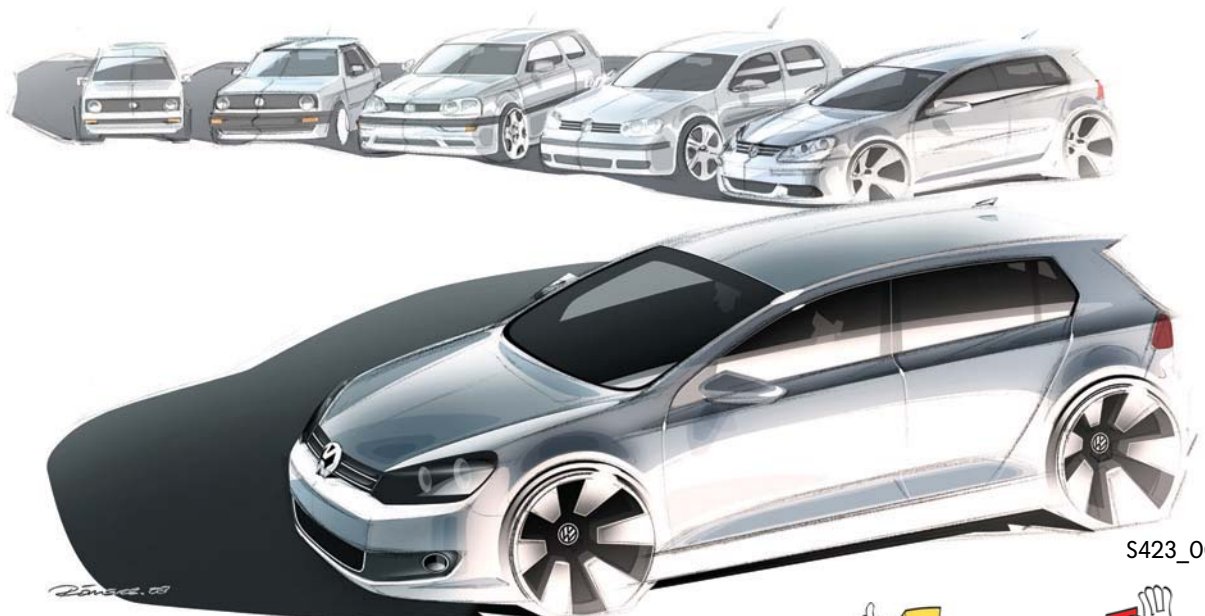
The powerful design of the Golf shows a clear form vocabulary with a high-quality, appealing and sporty appearance.

A knee airbag and daylight driving lights have been added to the standard safety equipment for the first time. The “Climatic” air-conditioning system and the multifunction display round off the convenience features in the entry-level version.

The use of turbo diesel engines with common-rail technology and other noise-reducing measures, for example, an acoustically enhanced front windscreen, makes this the quietest Golf since the birth of the range. The optimised TSI and TDI engines ensure low consumption and meet the limits of the valid EU5 exhaust emission levels.

As a result of the consistent use of the module strategy, the Golf uses a high proportion of existing and improved basic developments with particular attention having been paid to the function and design.

As a result, a high and sustained level of quality has been reached.



**The self-study programme shows the design and function of new developments.**  
The contents will not be updated.

For current testing, adjustment and repair instructions, refer to the relevant service literature.



**NEW**



**Important  
Note**



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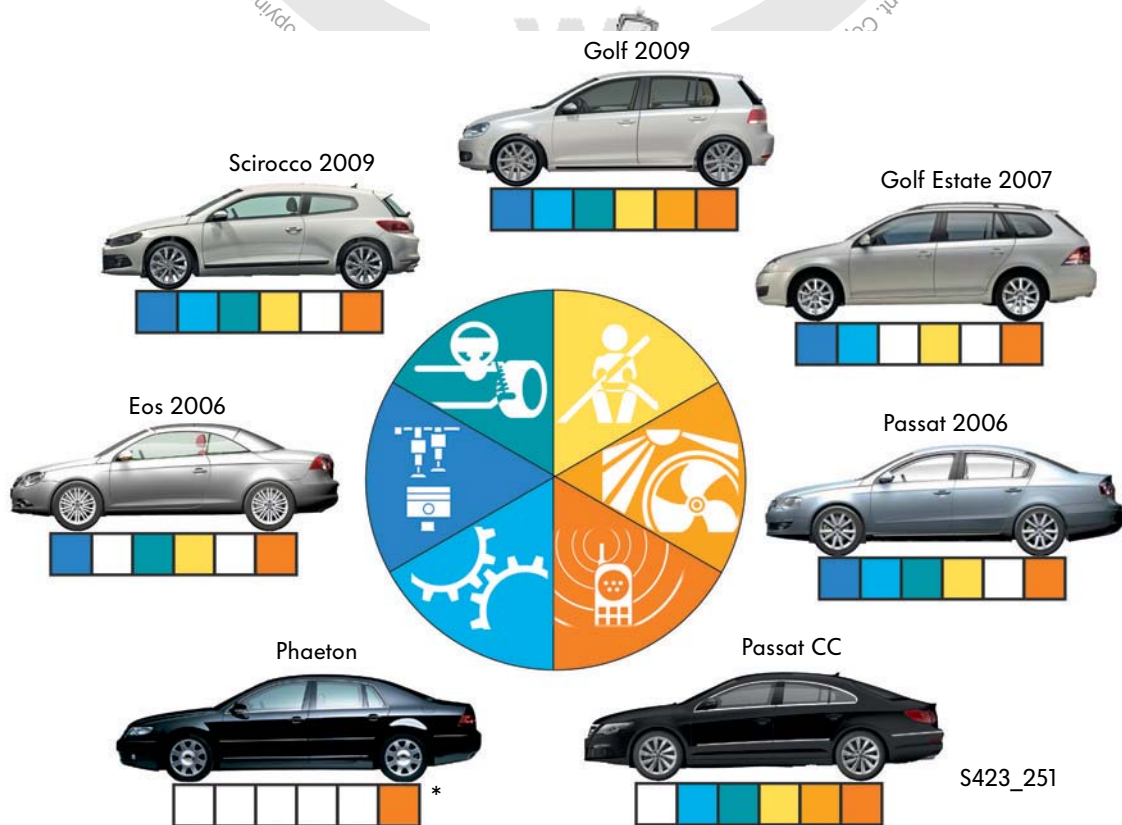


## Module strategy

Function units (modules) that have identical basic functions and designs are being fitted in current and future vehicle models to an ever-increasing extent.

Unlike same-platform parts, e.g. a floor pan from the Golf vehicle class, the use of modules crosses the vehicle classes. This means that, for example, the electronics for the RNS 510 and RNS 810 navigation systems have a high proportion of same parts in the Golf and Phaeton models. This includes the hard drive, the tuner, the DVD drive and the processor that are located in the housing behind the unit fascia. The onboard power supply with standard connectors is an important requirement for fitting in different models.





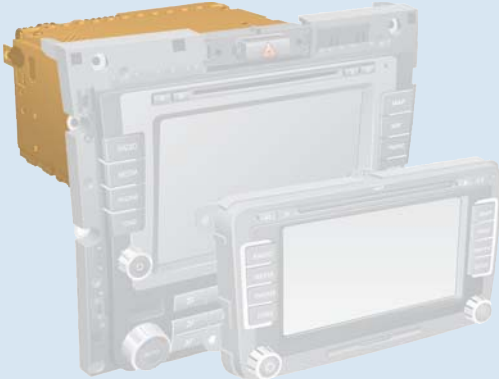
In the development of new systems, in production and in service, in particular when fault finding, diagnosing and when flashing control units, this strategy is advantageous for the modules shown below.



- Occupant protection  
(Module: Driver airbag)
- Heating and air conditioning  
(Module: Climatronic, model year 2009)
- Radio, navigation and telephone  
(Module: RNS 510 / RNS 810\*)
- Engines  
(Module: 1.4l 90kW TSI engine)
- Transmission  
(Module: Dual clutch gearbox DQ-200-7F)
- Chassis  
(Module: ACC Adaptive Chassis Control)



The RNS 510 and RNS 810 radio/navigation system is a good example as a module in infotainment. While the design of the unit front with its fascia and user interface is adapted, each unit has adapted software for different functions.

<b>Vehicle models</b>	<p style="text-align: center;"><b>Golf 2009</b></p>  <p style="text-align: right;">S423_247</p>	<p style="text-align: center;"><b>Phaeton</b></p>  <p style="text-align: right;">S423_245</p>
<b>Unit front with fascia and user interface</b>	<p style="text-align: center;"><b>RNS 510</b></p>  <p style="text-align: right;">S423_177</p>	<p style="text-align: center;"><b>RNS 810</b></p>  <p style="text-align: right;">S423_241</p>
<b>Software and functions</b>	<p>The RNS 810 has the following additional functions compared with the RNS 510.</p> <ul style="list-style-type: none"> <li>- Damper setting</li> <li>- Auxiliary heating controls</li> <li>- Solar ventilation</li> <li>- Wiper service position</li> </ul>	
<b>Module</b>	 <p>The housing module used on both vehicles with hard drive, tuner, DVD driver and processor forms the same-part scope.</p>	

# In Brief



## The Golf

The illustration shows important standard and optional equipment for the Golf. There may be differences between markets.

- Electromechanical power steering with double pinion
- Front window with acoustic enhancement
- New multifunction steering wheel (MFW), optional
- High-end sound system from DYNAUDIO, optional
- “Climatic” air conditioning
- Parallel parking system, optional
- Daylight driving lights
- Fog lights with turn-off lights, optional
- Multimedia Device Interface box (MDI), optional



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- Tilting sunroof, optional

- Reversing camera integrated in pivoting badge, optional

- Split folding rear bench backrest

- Optical parking system (OPS), optional

- New ESP generation with brake assist

S423\_083

- ACC Adaptive Chassis Control, optional

- Hill start assist, optional (standard with dual clutch gearbox)

- Knee airbag

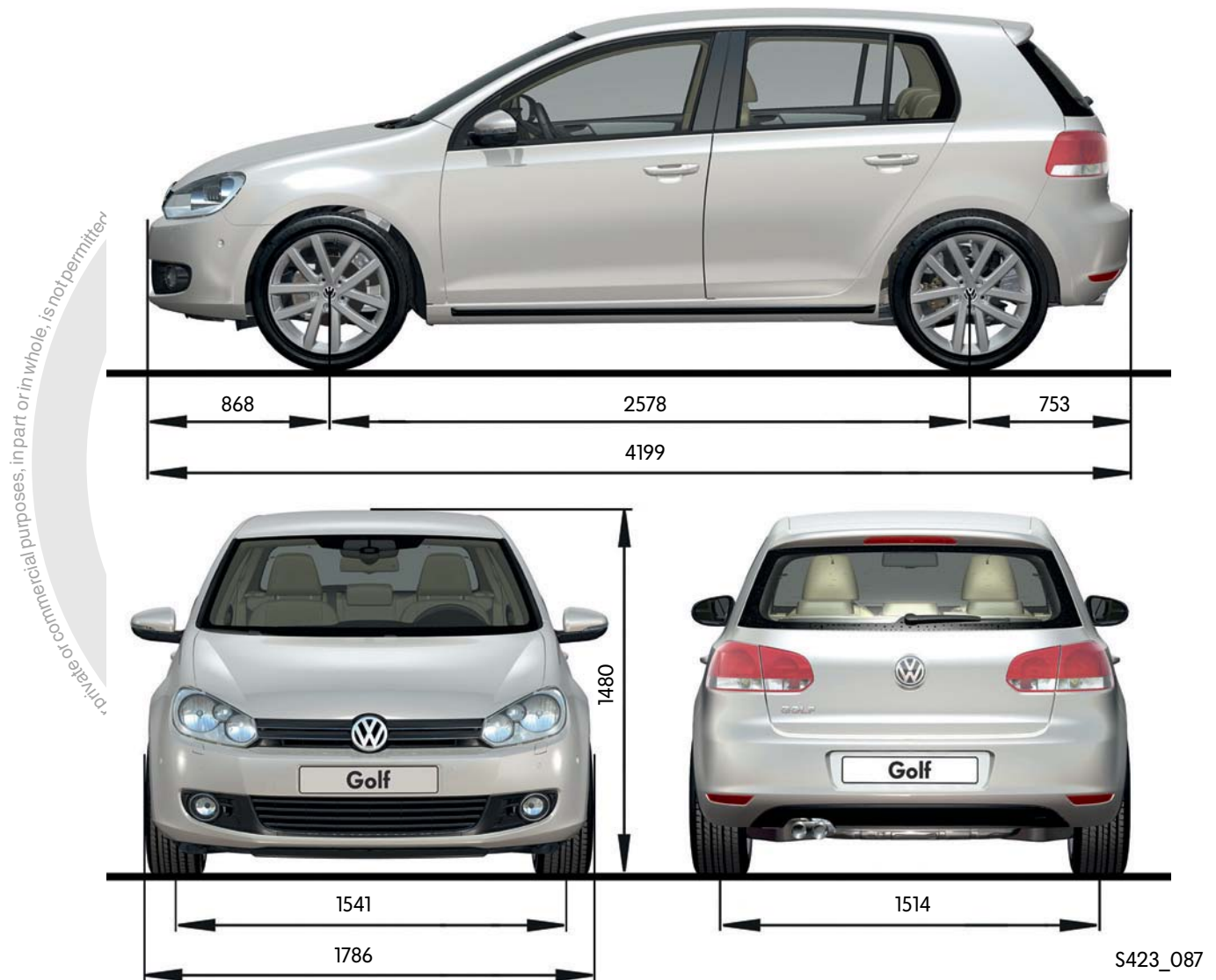
- UMPP telephone preparation, optional

# In Brief



## Technical data

### Exterior dimensions and weights



#### Exterior dimensions

Length	4199 mm
Width	1786 mm
Height	1479 mm
Wheelbase	2578 mm
Track width at front	1540 mm
Track width at rear	1513 mm

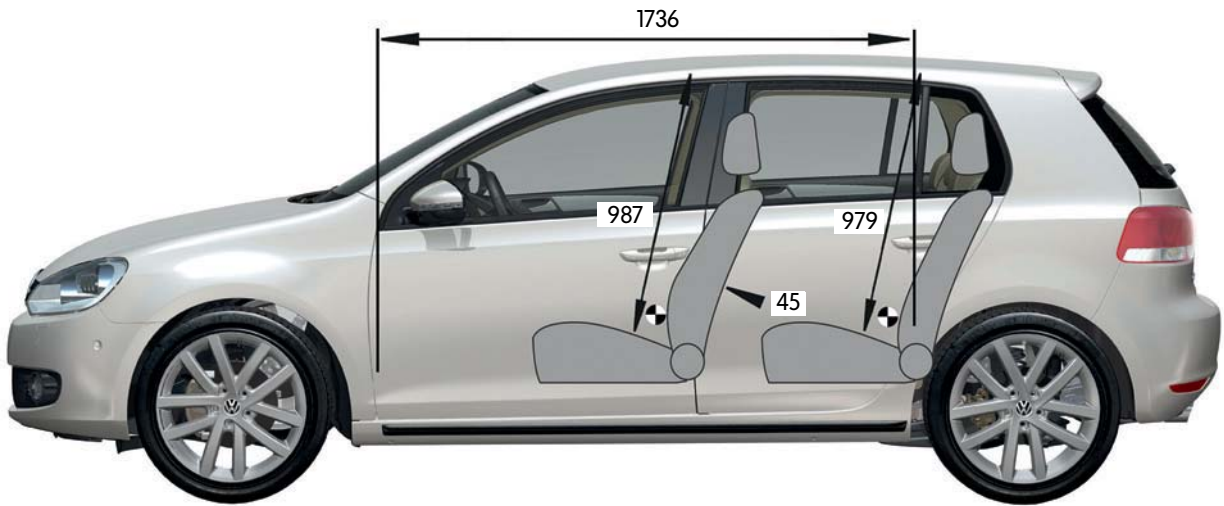
#### Weights/further data

Maximum weight	1750 kg*
Curb weight without driver	1144 kg*
Max. roof load	75 kg
Tank capacity	55 l
Drag coefficient	0.312 <sub>c<sub>w</sub></sub> *

\* when equipped with 1.4l / 59 kW MPI engine



## Interior dimensions



S423\_085



S423\_089

### Interior dimensions and volumes

Interior length	1736 mm
Luggage compartment volume	350 l
Luggage compartment volume with rear seat backrest folded down	1305 l

Front headroom	987 mm
Rear headroom	979 mm
Kneerom — 2nd seat row	45 mm

# Body

## Body structure

High- and highest-strength steels are used in order to meet the requirements for the vehicle structure. The use of die-quenched parts in the areas of the passenger cell that are subject to heavy loads has reduced the body weight and increased the stability of the passenger cell in crashes. The passenger cell represents the crash survival space for the occupants.

## Pedestrian safety

Deformation elements in the area of the bumper cross member ensure pedestrian protection.

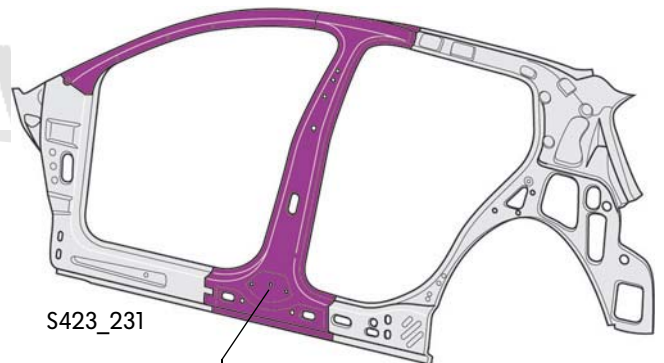
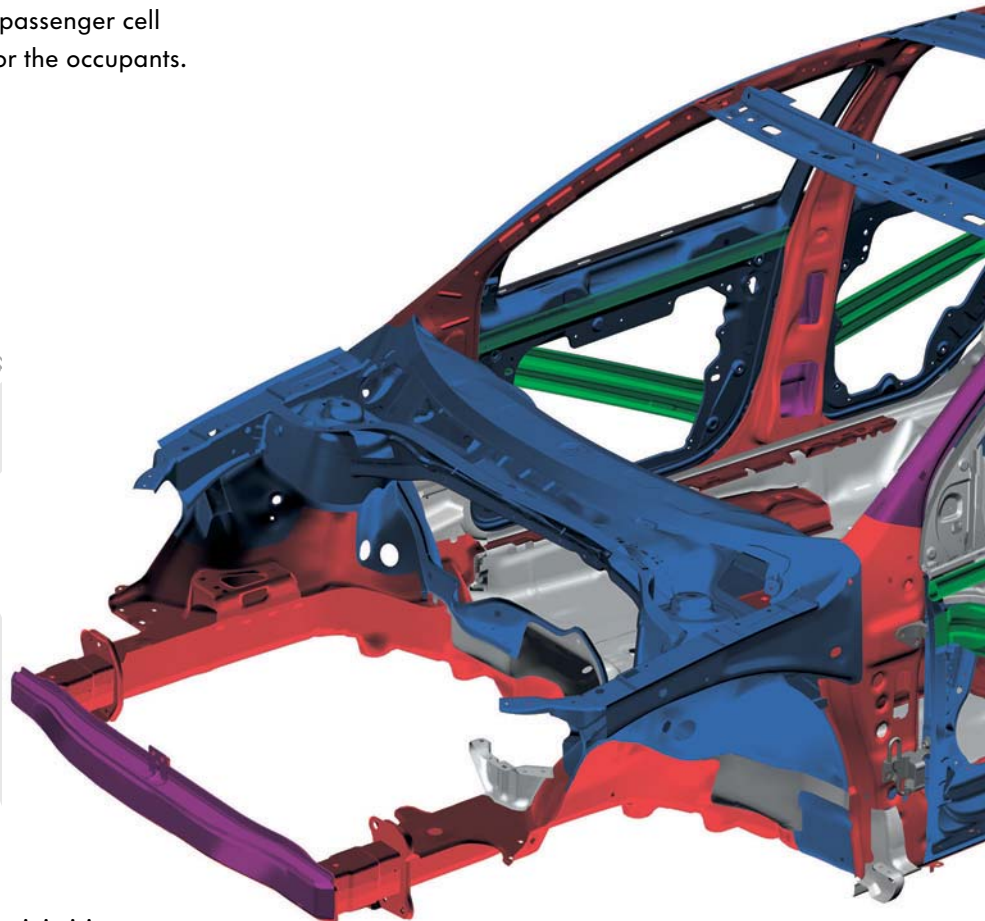
## Frontal crash

Particular attention was paid here to minimising intrusions (penetration of components) into the footwell.

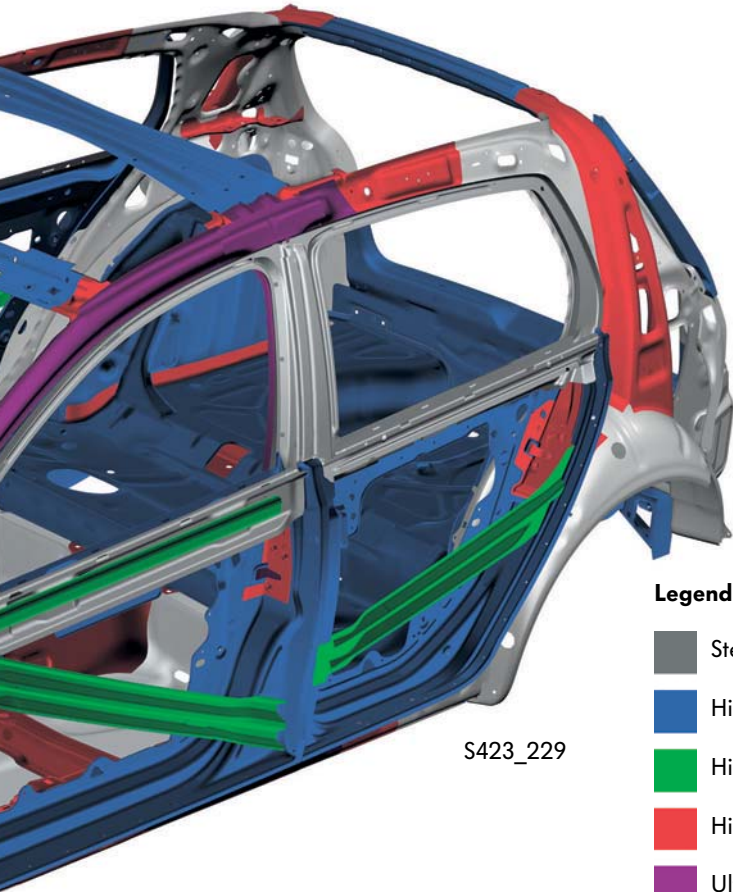
In conjunction with the standard knee airbag this results in a considerably smaller injury potential for the lower extremities.



You will find further information on the body structure in self-study programme 318 "The Golf 2004".



Highest-strength, thermoformed steel panels



## Rear-end collision

The rear-end crash requirements for the vehicle cover the stability of the passenger cell as well as the rear body structure.

The fuel system is protected in rear-end collisions by the rear-axle geometry as well as the placement of the fuel filler neck and the position of the tank in front of the rear-axle mounting.

The structure of the Golf VI in Europe thus also meets the stricter rear-end collision requirements of the US market.

### Legend

- Steel panels up to 140 MPa
- High-strength steel panels from 180 to 240 MPa
- Higher-strength steel panels from 260 to 320 MPa
- Highest-strength steel panels from 340 to 700 MPa
- Ultra-high-strength, thermoformed steel panels over 1000 MPa

## Side crash

In side collisions, the B-pillars and the doors are the most important structural components that, when combined, absorb the main load in a side collision. An efficient design in terms of weight and component scope has been created by using highest-strength materials. It permits maximum occupant protection without additional local reinforcements.

As a central load distributor, the B-pillar transmits the forces acting on the sill and up to the roof frame. The seat cross member provides additional stability in the passenger cell by providing support to the opposite side of the vehicle. In conjunction with the doors that are reinforced by diagonal impact members, the crash energy is reduced from an extremely high energy level.

In this way, both low penetration speeds and also low intrusions into the passenger compartment are achieved in side collisions. EuroNCAP

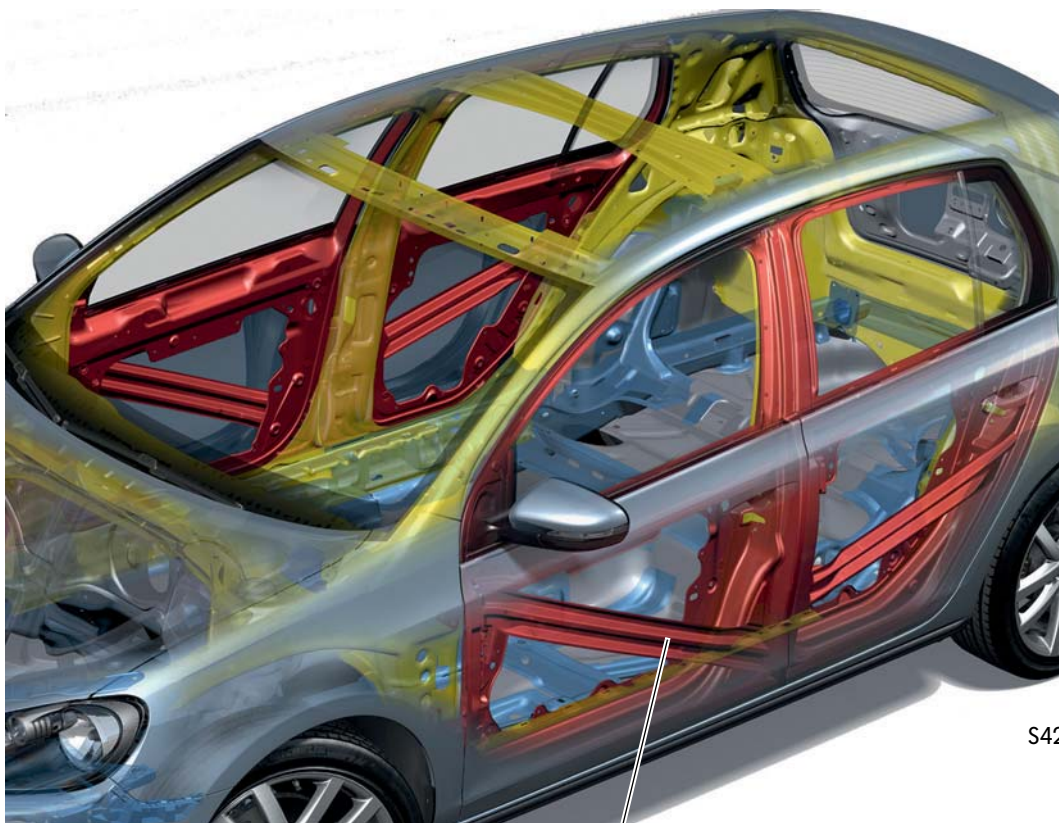


# Body

## Doors

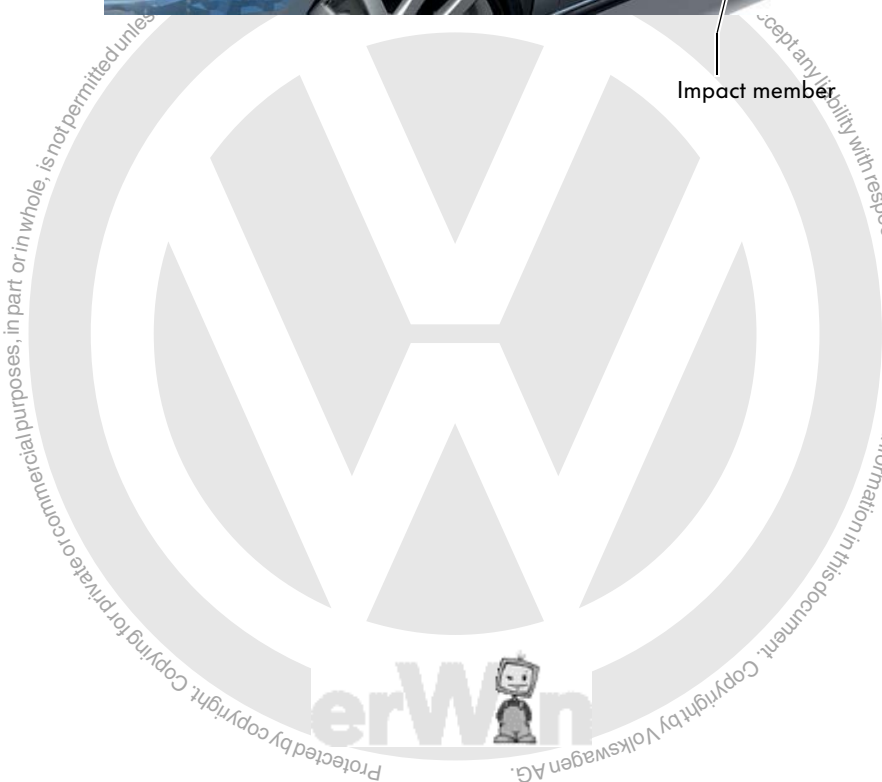
The doors have a conventional structure.

The basic door unit is a single part. An impact member is fitted in all doors.



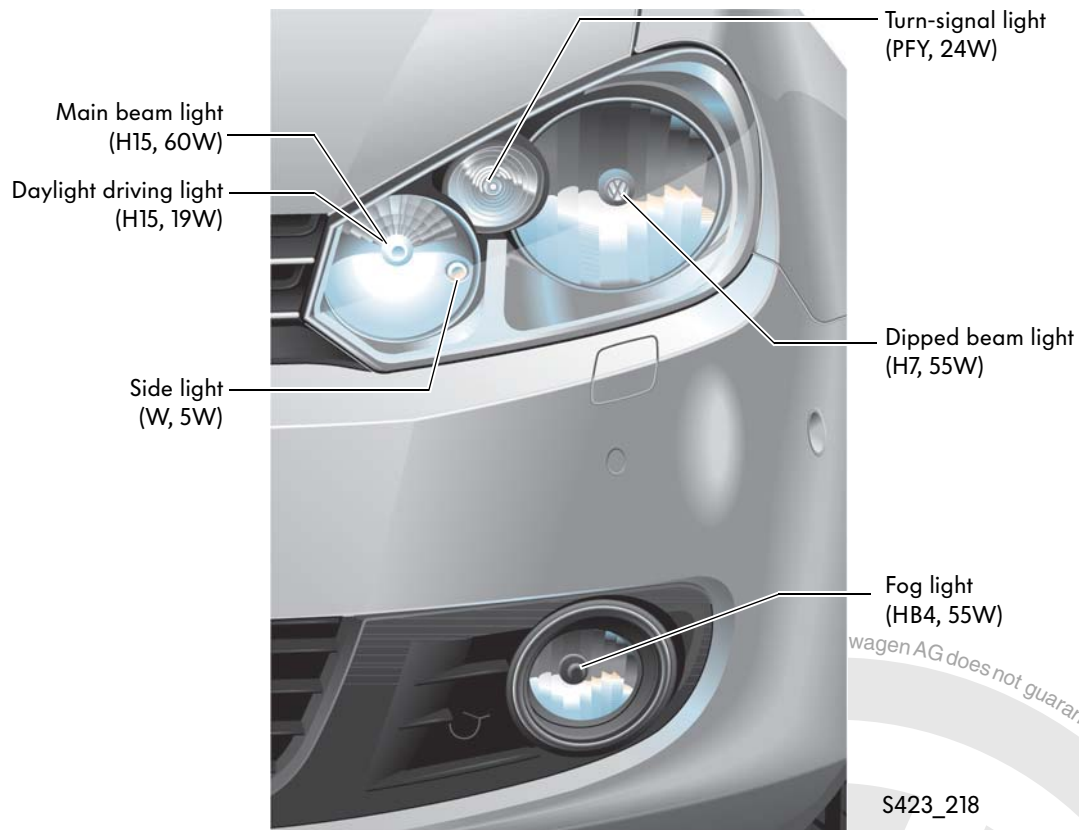
S423\_167

Impact member



# The front light concept

The headlights of the Golf 2009 have turn signals, side lights, dipped beam lights, daylight driving lights and main beam lights. The fog lights can be optionally integrated in the turn-off light function. The familiar one-touch system allows the bulbs to be released and removed in one action.



## Daylight driving lights



S423\_227

When the daylight driving lights are switched on, the daylight driving light is illuminated.

## Dipped beam



S423\_221

When the dipped beam lights are switched on, the dipped beam lights and the side lights are switched on.

## Side lights



S423\_223

When the side lights are switched on, the side lights are illuminated.

## Main beam



S423\_225

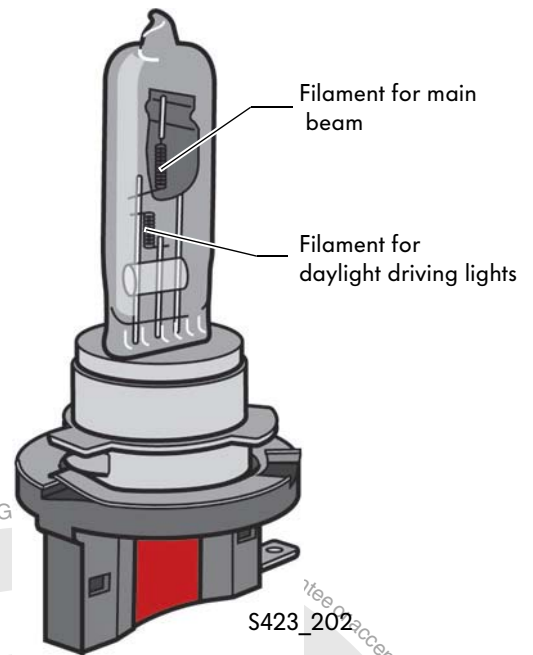
When the dipped beam lights are switched on, the dipped beam lights and the side lights are switched on.

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## Daylight driving lights

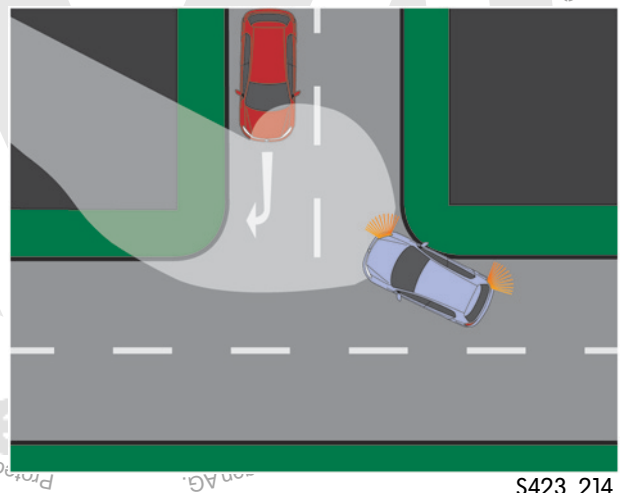
The new Golf has headlights with integrated daylight driving lights as standard. The daylight driving lights are switched on automatically when the ignition is switched on. For the driver, having the lights switched on automatically provides an additional convenience feature enhances safety.

The daylight driving lights use a dual-filament bulb that combines the main beam and daylight driving lights functions with the two different filaments. The two functions are never active at the same time.



## Turn-off light

On the new Golf, turn-off lights are optionally available for greater driving safety. This is achieved by the corresponding fog light (left or right) being switched on in addition during the turning procedure. The turn-off light is switched on when the steering wheel is turned and/or the turn signal activated to clearly illuminate the area you are turning into. The function is only active when the dipped/main beam lights are switched on, the engine is running and the car is travelling at speeds less than 40 km/h.



## The rear lights

The rear lights on the Golf 2009 are split in two.

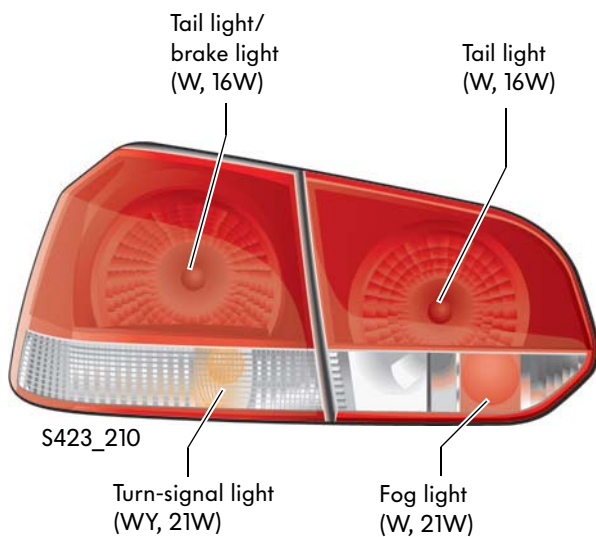
The tail lights, brake lights and turn signal are integrated in the section of the rear light mounted at the side. There is a single bulb for the tail light and for the brake light. The bulb is powered at 100 percent for the brake light and at 20 percent for the tail light.

The tail light is also powered at 20 percent for the side lights or parking lights. Only the bulbs in the side are illuminated in this case.

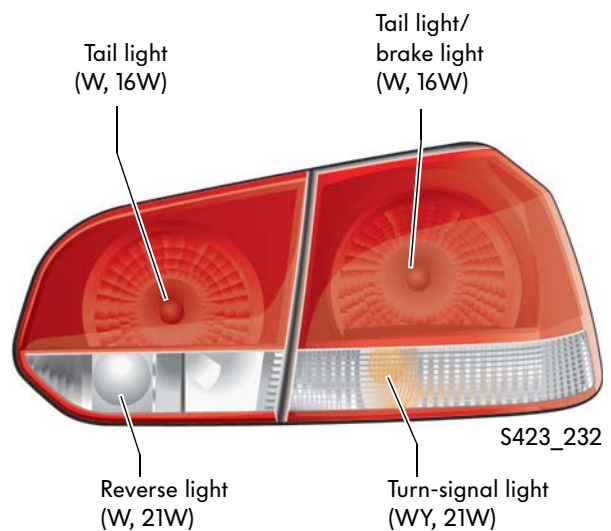
The section of the tail light on the tailgate holds the tail light, rear fog light and reversing light. The tail light bulb in the tailgate section of the light is constantly powered at 20 percent.

All bulbs are operated with the aid of a pulse width-modulated signal to obtain constant and even illumination.

### Rear light left



### Rear light right



The side light function is exclusively activated in the side light position of the rotary light switch. That means that, in other light positions and when the ignition key is removed, the side lights are no longer switched on automatically.



# Body

## Interior

### Front seats

The front seats in the Golf 2009 are either mechanically or electrically adjusted. The 4-door Golf has four seat versions:

- The fully mechanically adjusted front seat
- The mechanically adjusted front seat with mechanically adjusted 2-way lumbar support

One new feature here is that the rotary adjuster has been replaced by a lever. The adjustment travel is 110°.

- The mechanically adjusted driver's seat with electrically adjusted 4-way lumbar support
- The electrically adjusted driver's seat with electrically adjusted 4-way lumbar support (On this version, the front passenger seat is mechanically adjusted with electrically adjusted 4-way lumbar support)

On the 2-door Golf, there are no electrically adjusted seats. There is, however, an optional electrically adjusted 4-way lumbar support.

On the 2-door model, the front seats are equipped as standard with the "Easy-Entry" system with manual memory function.





S423\_185

## Rear seats

The Golf 2009 rear seats have a fixed seat bench with 3 seats. The rear backrest is asymmetrically split in the ratio 2:1 and can be folded down for optimum loading.

A through-load aperture is optionally available for the rear seat bench. The armrest and a flap behind it fold forward so that long, bulky objects can be pushed through from the luggage compartment.

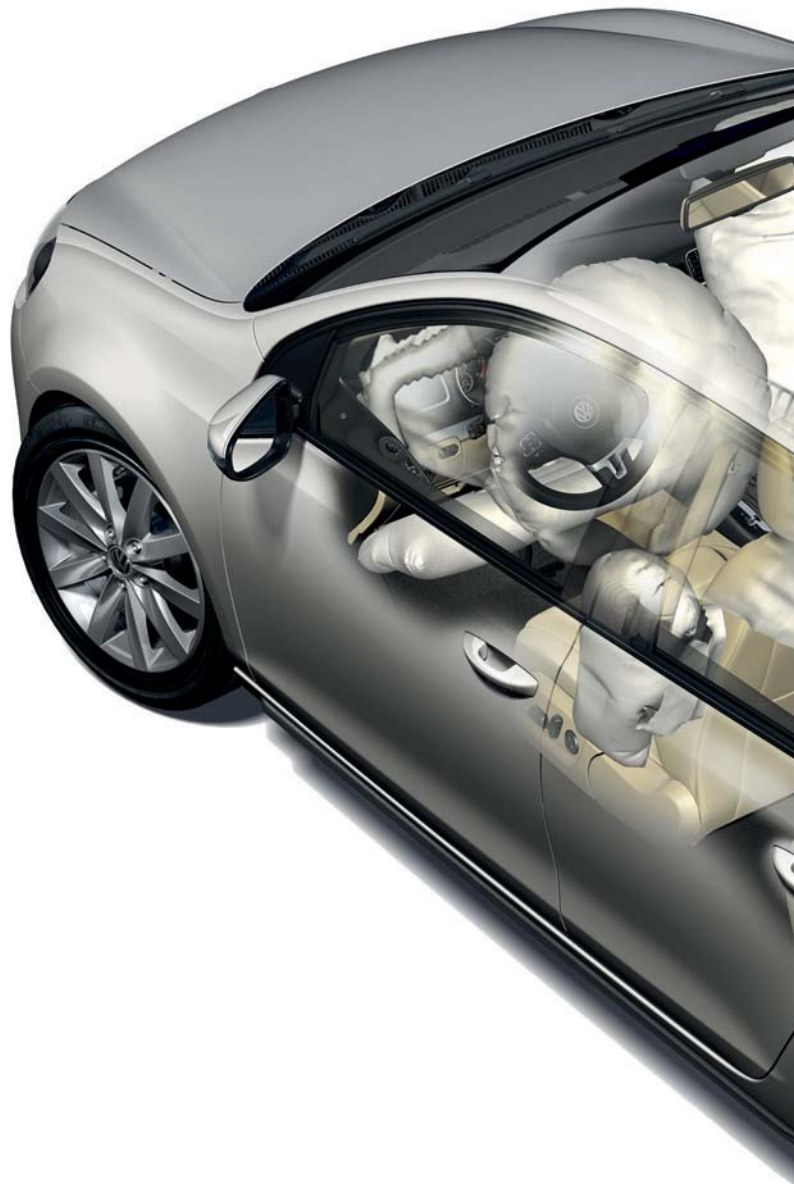
The rear seat bench has ISO fix child seat fittings on the outer seats.

# Occupant Protection

## Safety equipment

The Golf 2009 has the following safety equipment as standard:

- Driver airbag
- Front passenger airbag (with deactivation switch)
- Front side airbags
- Knee airbag on driver's side
- Head airbag for front and rear occupants
- Belt tensioners for the front seats



Rear side airbags combined with belt tensioners and belt fastening recognition for the rear seats are available as optional extras.

There are pressure sensors for side crash recognition in the front doors. Acceleration sensors are fitted in the area of the C-pillar.



The Golf is fitted with a knee airbag as standard on the driver's side.

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S423\_091

# Occupant Protection

## Rear belt warning display

The belt warning display indicates to the driver whether passengers in the rear seats have fitted their belts. This additional safety function tells the driver at the start of a journey and during the journey whether his passengers on the rear seats are wearing their seat belts.

The belt warning display is integrated in the dash panel insert and is active once the ignition is switched on.

If the seat belts on the rear seats are unfastened while the car is travelling at a speed above 25km/h after the fastened status has been recognised, an acoustic signal will sound and the belt warning display will flash for a maximum of 30 seconds.

If the belt is unfastened at a speed below 25km/h, only the icon for that belt lock will be displayed for 30 seconds. There is no acoustic signal nor does the belt warning display flash.



S423\_169



S423\_192

Passenger with fastened seat belt

No passenger

## Knee airbag

The knee airbag is located in the instrument panel below the kneeboard. It distributes and reduces the forces acting on the driver in a front collision.

In a crash, the 18-litre airbag inflates in front of the driver's knees in less than 20 milliseconds.

In conjunction with the seat belt and front airbag, it absorbs a substantial part of the energy to be reduced in the pelvis region.

The driver is subjected to the vehicle deceleration at an early stage via the upper thigh and the pelvis and is restrained.

Furthermore the knee airbag protects the driver's legs against a severe collision with the steering column and the instrument panel.




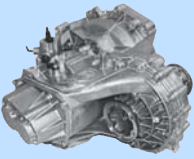
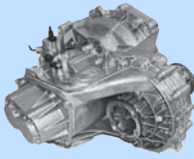
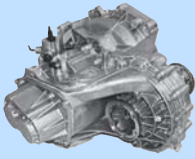

It counteracts injuries to the knee, shin and ligaments. In a diagonal collision, the feet have less chance of twisting sideways and are thus protected better against fractures or stretched ligaments.







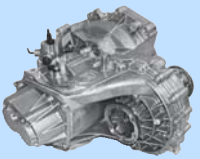
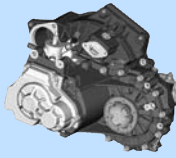




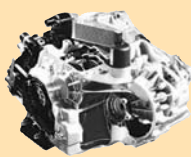
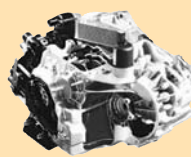
S423\_093

# Engines

## Engine/gearbox combinations

<p><b>Petrol engine</b></p>	<p><b>1.4 l/59 kW MPI engine</b></p>	<p><b>1.6 l/75 kW MPI engine</b></p>	<p><b>1.6 l/75 kW MPI engine with LPG</b></p>
<p><b>Diesel engine</b></p>			
<p><b>5/6-speed manual gearbox MQ200-5/6F 0AF/0AJ</b></p>	 <p><b>5-speed</b></p>	 <p><b>5-speed</b></p>	 <p><b>5-speed</b></p>
<p><b>5/6-speed manual gearbox MQ250-5/6F 0A4/02S</b></p>			
<p><b>6-speed manual gearbox MQ350-6F 02Q</b></p>			
<p><b>7-speed DSG direct-shift gearbox DQ-200-7F 0AM</b></p>			
<p><b>6-speed direct-shift gearbox DQ250-6F DSG 02E</b></p>			



<p><b>1.4 l/90 kW TSI engine with turbocharger</b></p> 	<p><b>1.4 l/118 kW TSI engine with dual-charging</b></p> 	<p><b>2.0l/81kW CR TDI engine</b></p> 	<p><b>2.0l/103kW CR TDI engine</b></p> 
 <p><b>6-speed</b></p>			
	 <p><b>6-speed</b></p>	 <p><b>5-speed</b></p>	
			
			
			



# Engines

## The 1.4l/59 kW MPI engine

The 1.4l/59kW engine is the entry-level engine. It has been used in various models since model year 2007 and is now featuring in the Golf.

### Technical features

- Toothed belt pulley on crankshaft with elliptic shape to reduce toothed belt vibrations
- Coated toothed belt
- Intake pipe with modular design
- Crankcase breather and ventilation system with diaphragm valve to regulate pressure in cylinder block
- Pre-warming for crankcase ventilation integrated in cooling system
- Exhaust manifold and three-way catalytic converter are combined in one module.

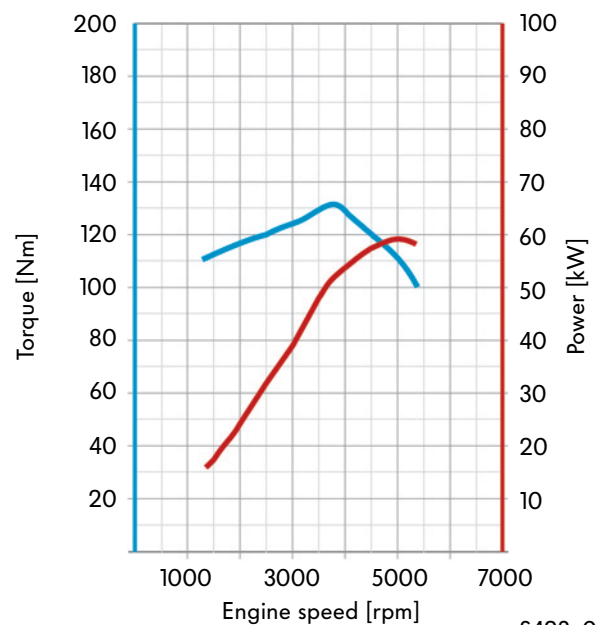


S423\_078

### Technical data

Engine code	CGGA
Type	4-cylinder in-line engine
Displacement	1390cm <sup>3</sup>
Bore	76.5mm
Stroke	75.6mm
Valves per cylinder	4
Compression ratio	10.5:1
Maximum output	59kW at 5000 rpm
Maximum torque	132Nm at 3800 rpm
Engine management	Magneti Marelli 4HV
Fuel	Super unleaded RON 95 (Normal unleaded RON 91 with slight reduction in performance)
Exhaust gas treatment	Starter catalytic converter, main catalytic converter, a broadband lambda probe before the starter catalytic converter and a step-type lambda probe after the main catalytic converter
Emissions standard	EU5

### Torque and output diagram



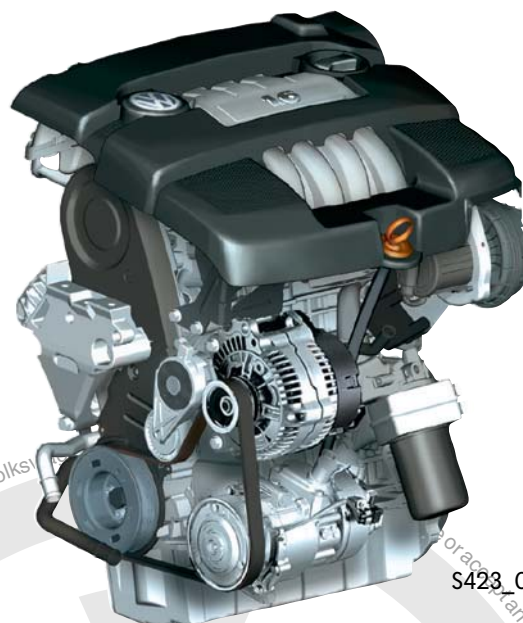
S423\_064

## The 1.6l/75 kW engine with 2-valve technology

The 1.6l/75 kW engine is based on the familiar 1.6l/75 kW engine with the code BSE, as used in the Golf 2004.

### Technical features

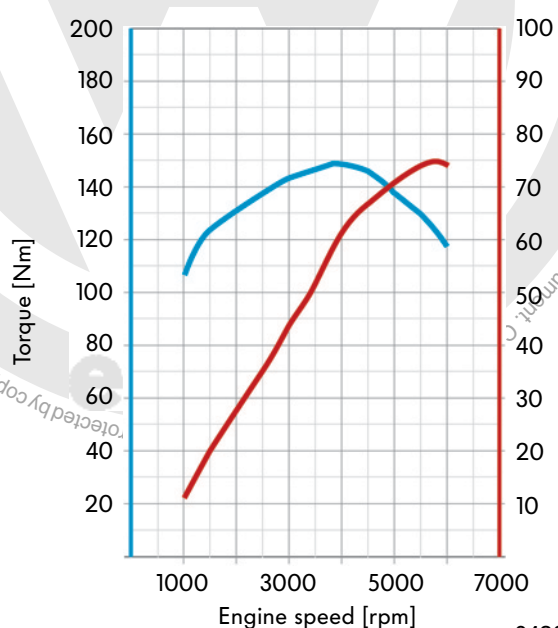
- 2-valve roller rocker arm
- Aluminium engine block with ribbed sump
- Secondary air system
- Plastic variable intake manifold
- Due to the greater function requirements placed on the engine control unit, a faster processor (40MHz clock rate instead of 24MHz) and larger RAM memory (from 4 to 8Mbit) have been fitted.



### Technical data

Engine code	BSE
Type	4-cylinder in-line engine
Displacement	1595 cm <sup>3</sup>
Bore	81mm
Stroke	77.4mm
Valves per cylinder	2
Compression ratio	10.3:1
Maximum output	75kW at 5600 rpm
Maximum torque	148Nm at 3800 rpm
Engine management	Simos 7PP
Fuel	Super unleaded RON 95 (normal unleaded at RON 91 with slight reduction in performance)
Exhaust gas treatment	Probe before catalytic converter: Linear lambda probe Probe after catalytic converter: Step-type lambda probe
Emissions standard	EU5

### Torque and output diagram



S423\_062



# Engines

## 1.4I/90kW TSI engine with turbocharger

This engine has already been used in other vehicle models and has been transferred to the Golf.

### Technical features

- Homogeneous mode (Lambda 1)
- Stratified high-pressure start
- Turbocharger with waste gate
- Dual-circuit cooling system
- Air-to-liquid charge-air cooling
- Intake pipe with air-to-liquid intercooler
- Regulated duo-centric oil pump
- Metal cartridge oil filter
- Fuel system regulated according to requirements
- High-pressure fuel pump with integrated pressure limiting valve



S423\_036

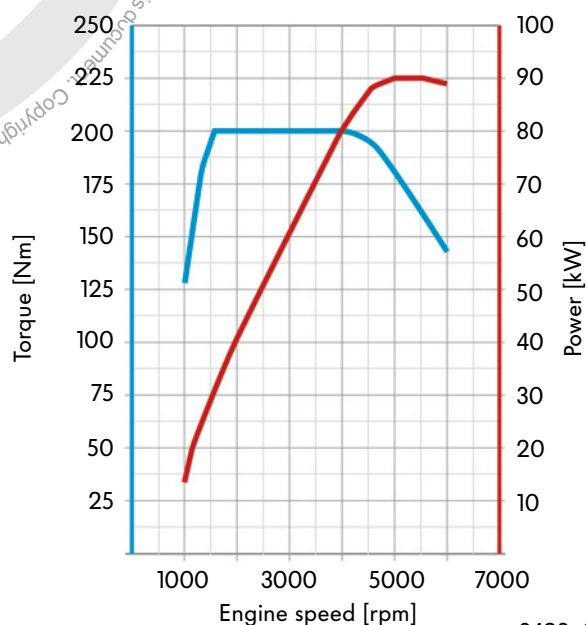


You will find further information on this engine in self-study programme no. 405 "1.4 I 90 kW TSI Engine with Turbocharger".

### Technical data

Engine code	CAXA
Type	4-cylinder in-line engine
Displacement	1390 cm <sup>3</sup>
Bore	76.5 mm
Stroke	75.6 mm
Valves per cylinder	4
Compression ratio	10:1
Maximum output	90 kW at 5000 to 5500 rpm
Maximum torque	200 Nm at 1500 to 4000 rpm
Engine management	Bosch Motronic MED 17.5.5
Fuel	Super unleaded RON 95
Exhaust gas treatment	Three-way catalytic converter, a broadband lambda probe upstream of the catalytic converter and step-type lambda probe downstream of the catalytic converter
Emissions standard	EU5

### Torque and output diagram



S423\_037

## 1.4I/118kW TSI engine with dual-charging

This engine has been transferred from the Scirocco without modifications.

### Technical features

- Homogeneous mode (Lambda 1)
- Stratified high-pressure start
- Turbocharger with waste gate
- Additional mechanical supercharger
- Intercooler
- Dual-circuit cooling system
- Fuel system regulated according to requirements
- High-pressure fuel pump with integrated pressure limiting valve
- Intake manifold flap change-over omitted
- Regulated duo-centric oil pump
- Metal cartridge oil filter



S423\_133

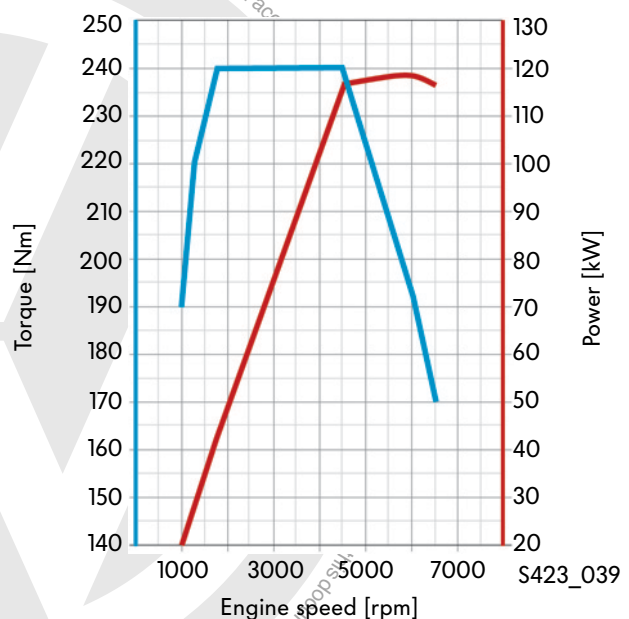


You will find further information on this engine in self-study programme no. 359 "The 1.4I TSI Engine".

### Technical data

Engine code	CAVD
Type	4-cylinder in-line engine
Displacement	1390cm <sup>3</sup>
Bore	76.5mm
Stroke	75.6mm
Valves per cylinder	4
Compression ratio	10:1
Maximum output	118kW at 5900 rpm
Maximum torque	240Nm at 1750 to 4500 rpm
Engine management	Bosch Motronic MED 17.5.5
Fuel	Super unleaded RON 95
Exhaust gas treatment	Three-way catalytic converter, a broadband lambda probe upstream of the catalytic converter and step-type lambda probe downstream of the catalytic converter
Emissions standard	EU5

### Torque and output diagram



# Engines

## The 2.0l/81kW CR TDI engine

The new 2.0l/81kW CR TDI engine with common rail injection system is being used for the first time in the Golf 2009.

It is a reduced-performance version of the 2.0l/103kW CR TDI engine.

### Technical features

- Common rail injection system with piezo injectors
- Diesel particulate filter with upstream oxidation catalytic converter
- Plastic intake pipe with swirl flap adjustment
- Throttle valve module with plastic throttle valve
- Electric exhaust gas recirculation valve
- Adjustable turbocharger with travel feedback
- Low-temperature exhaust gas recirculation cooling



S423\_041

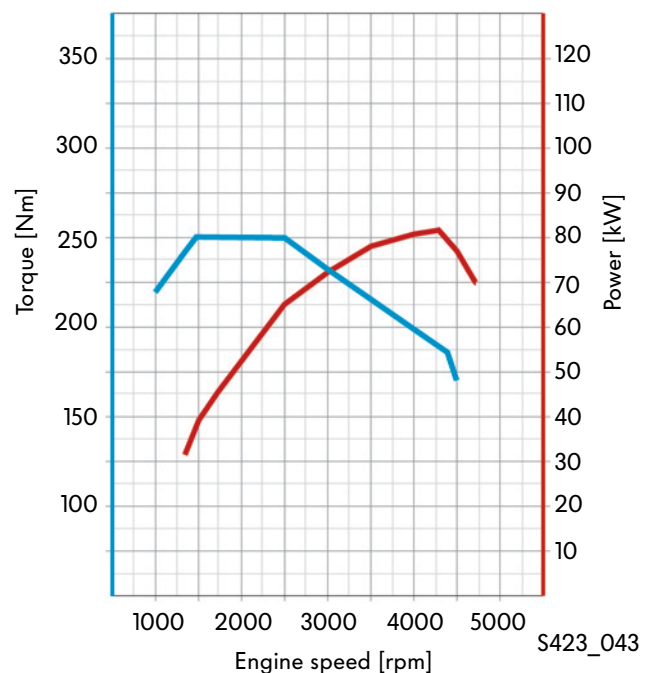


You will find further information on this engine in self-study programme no. 403 “The 2.0l TDI Engine with Common Rail Injection System”.

### Technical data

Engine code	CBDC
Type	4-cylinder in-line engine
Displacement	1968 cm <sup>3</sup>
Bore	81mm
Stroke	95.5mm
Valves per cylinder	4
Compression ratio	16.5:1
Maximum output	81kW at 4200 rpm
Maximum torque	250Nm at 1500 to 2500 rpm
Engine management	Bosch EDC 17 (common rail fuel injection system)
Fuel	Diesel, in accordance with DIN EN 590
Exhaust gas treatment	Exhaust gas recirculation, oxidation catalytic converter and diesel particulate filter
Emissions standard	EU5

### Torque and power diagram



S423\_043

## The 2.0l 103 kW CR TDI engine

The 2.0l/103kW CR TDI engine with common rail injection system was used for the first time in the Tiguan.

A balancer shaft module reduces vibrations and noise.

### Technical features

- Common rail injection system with piezo injectors
- Diesel particulate filter with upstream oxidation catalytic converter
- Plastic intake pipe with swirl flap adjustment
- Throttle valve module with plastic throttle valve
- Electric exhaust gas recirculation valve
- Adjustable turbocharger with travel feedback
- Low-temperature exhaust gas recirculation cooling
- Balancer shaft module



S423\_041

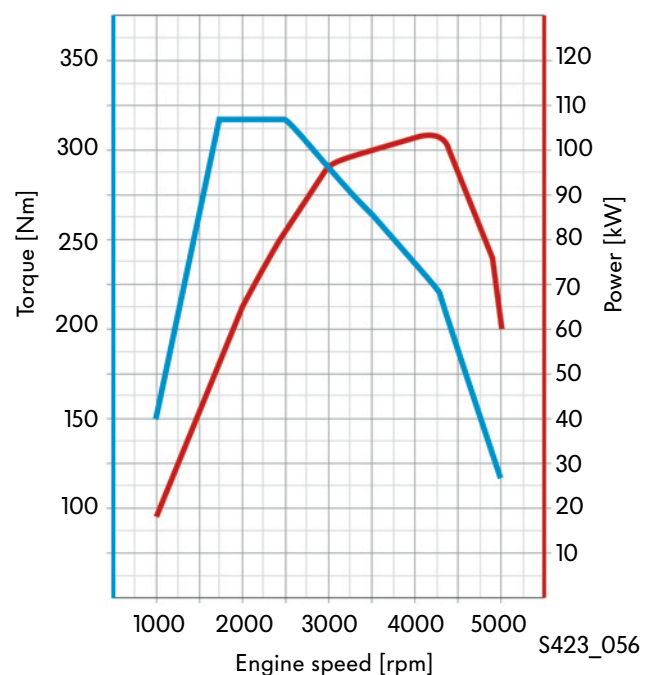


You will find further information on this engine in self-study programme no. 403 “The 2.0l TDI Engine with Common Rail Injection System”.

### Technical data

Engine code	CBAB
Type	4-cylinder in-line engine
Displacement	1968cm <sup>3</sup>
Bore	81mm
Stroke	95.5mm
Valves per cylinder	4
Compression ratio	16.5:1
Maximum output	103kW at 4200 rpm
Maximum torque	320Nm at 1750 to 2500 rpm
Engine management	Bosch EDC 17 (common rail fuel injection system)
Fuel	Diesel, in accordance with DIN EN 590
Exhaust gas treatment	Exhaust gas recirculation, oxidation catalytic converter and diesel particulate filter
Emissions standard	EU5

### Torque and power diagram



S423\_056

## System overview of liquid gas supply

For the first time, Volkswagen is offering the Golf 2009 with the 1.6l 75kW MPI engine and liquid gas drive straight from the factory. In gas operation, the engine reaches an output of 72kW. The engine is based on the Flex Fuel (E85) engine with the engine code: CCSA that is based on the technology from the 1.6l 75kW BSE engine. Liquid gas/autogas is also known as LPG. LPG stands for "Liquefied Petroleum Gas".

The normal petrol operation is maintained as usual. All components that are required for gas operation are assembled during production. The petrol engine can be switched to liquid gas operation without mechanical modifications. In addition to a liquid gas mixer, a tank is installed in the spare wheel well from which the gas is supplied to the converter. This component converts the gas from liquid to gaseous state and generates the pressure required to form the gas.

The additional gas control unit obtains all necessary parameters that are required for liquid gas operation from the engine control unit. These are:

- Engine load
- Injection time
- Engine speed
- Petrol/gas switch off during deceleration
- Coolant temperature

The following parameters are recorded by the gas control unit:

- Gas pressure in rail
- Gas temperature
- Gas level in tank
- Battery voltage

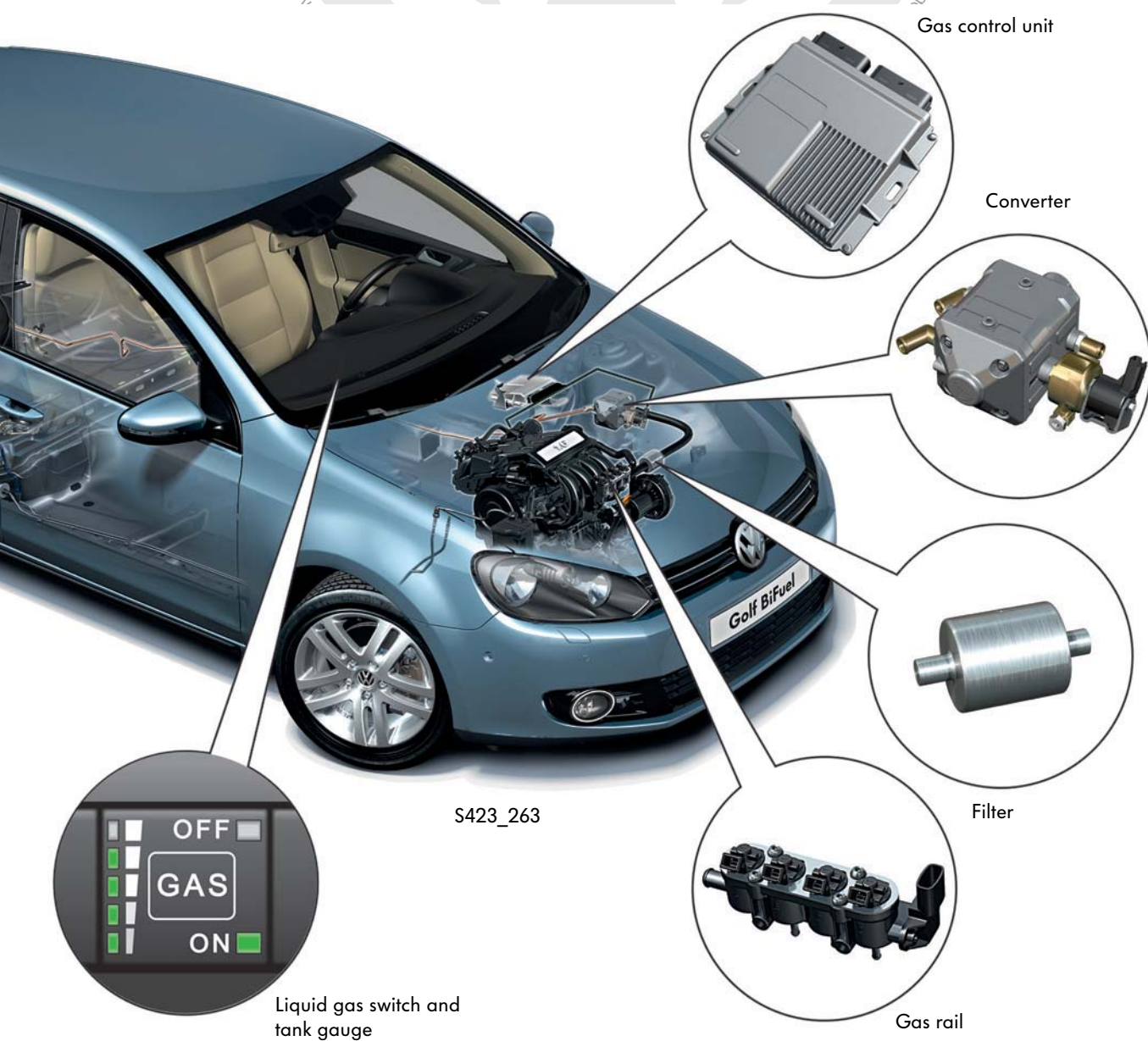
The engine is started in petrol mode. Once the necessary engine temperature has been reached, the gas control unit switches automatically to gas mode.








You will find further information on liquid gas in self-study program no. 427.

The liquid gas, whose pressure in the gas tank depends on the kind of composition (propane-butane ratio) and on the ambient temperature, is turned into vapour in the converter. The starting pressure is 1 bar above the pressure present in the intake manifolds.

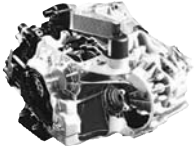

The liquid gas used is similar to the gas that we use in gas cigarette lighters. The gas is liquid at a pressure of at least 10 bar (at 20 to 30°C). It consists of a pure propane/butane mixture and is a high-octane fuel without lead additives (RON, research octane number from 101 to 111). The consumption depends on the propane/butane mixture ratio.



## Manual gearboxes – Overview

Manual gearbox	Technical features	See also SSP no.:
<p><b>5-speed manual gearbox MQ200-5F 0AF</b></p> 	<ul style="list-style-type: none"> <li>● Developed from 02T</li> <li>● Reinforced case</li> <li>● Gearbox adapted to modified mounting position</li> <li>● Without speedometer sender</li> <li>● CO2-optimised ratio</li> <li>● Torque capacity up to 170 Nm</li> </ul>	
<p><b>6-speed manual gearbox MQ200-6F 0AJ</b></p> 	<ul style="list-style-type: none"> <li>● Developed from 0AG gearbox</li> <li>● Adapted for 1.4l 90kW TSI engine, greater spacing between drive shaft and differential, sheet metal mounting replaced with cast mounting for greater torque, ground gear teeth</li> <li>● Axle drive reinforced</li> <li>● Without speedometer sender</li> <li>● CO2-optimised ratio</li> <li>● Torque capacity up to 200 Nm</li> </ul>	306
<p><b>5-speed manual gearbox MQ250-5F 0A4</b></p> 	<ul style="list-style-type: none"> <li>● Developed from 02J gearbox</li> <li>● Improved shifting</li> <li>● CO2-optimised ratio</li> <li>● Without speedometer sender</li> <li>● Torque capacity up to 250 Nm</li> </ul>	
<p><b>6-speed manual gearbox MQ250-6F 02S</b></p> 	<ul style="list-style-type: none"> <li>● Further development from 0A4</li> <li>● Longer shafts with additional bearings, additional gear pair, new longer aluminium housing lid</li> <li>● CO2-optimised ratio</li> <li>● Torque capacity up to 250 Nm</li> </ul>	306
<p><b>6-speed manual gearbox MQ350-6F 02Q</b></p> 	<ul style="list-style-type: none"> <li>● Developed from 02M gearbox</li> <li>● Changes to selector shaft, selector fork with stops in housing, new bearings</li> <li>● Without speedometer sender</li> </ul>	306

## Direct-shift gearbox– Overview

Direct-shift gearbox	Technical features	See also SSP no.:
<p><b>6-speed direct-shift gearbox DQ250-6F DSG 02E</b></p> 	<p>The 02E 6-speed direct-shift gearbox has a hydraulic dual clutch. It combines the advantages of a manual gearbox, for instance, high level of efficiency, robustness and sportiness, with the advantages of an automatic gearbox like user-friendliness, above all when changing gear.</p>	308
<p><b>7-speed DSG direct-shift gearbox DQ-200-7F 0AM</b></p> 	<p>The 0AM 7-speed direct-shift gearbox is a further development of the 02E 6-speed direct-shift gearbox. In contrast to the 02E, it works with a dry dual clutch and with separated oil systems for gearbox and mechatronics.</p> <p>The electric oil pump for the hydraulics is only operated by the control unit on demand unlike the 02E.</p> <p>This happens if the hydraulic pressure in the mechatronic unit falls below a certain value and the pressure therefore needs to be increased again to ensure functioning of the mechatronic unit.</p>	390



# Chassis

## Overview of chassis

The Golf 2009 chassis is based to a great extent on the chassis of the Golf 2004. The Golf can be equipped with standard suspension, sports suspension, heavy-duty suspension or with the Adaptive Chassis Control (ACC).

- Lightweight strut front axle using the McPherson principle

- Adaptive Chassis Control ACC

- New steering column concept (sheet metal steering column)

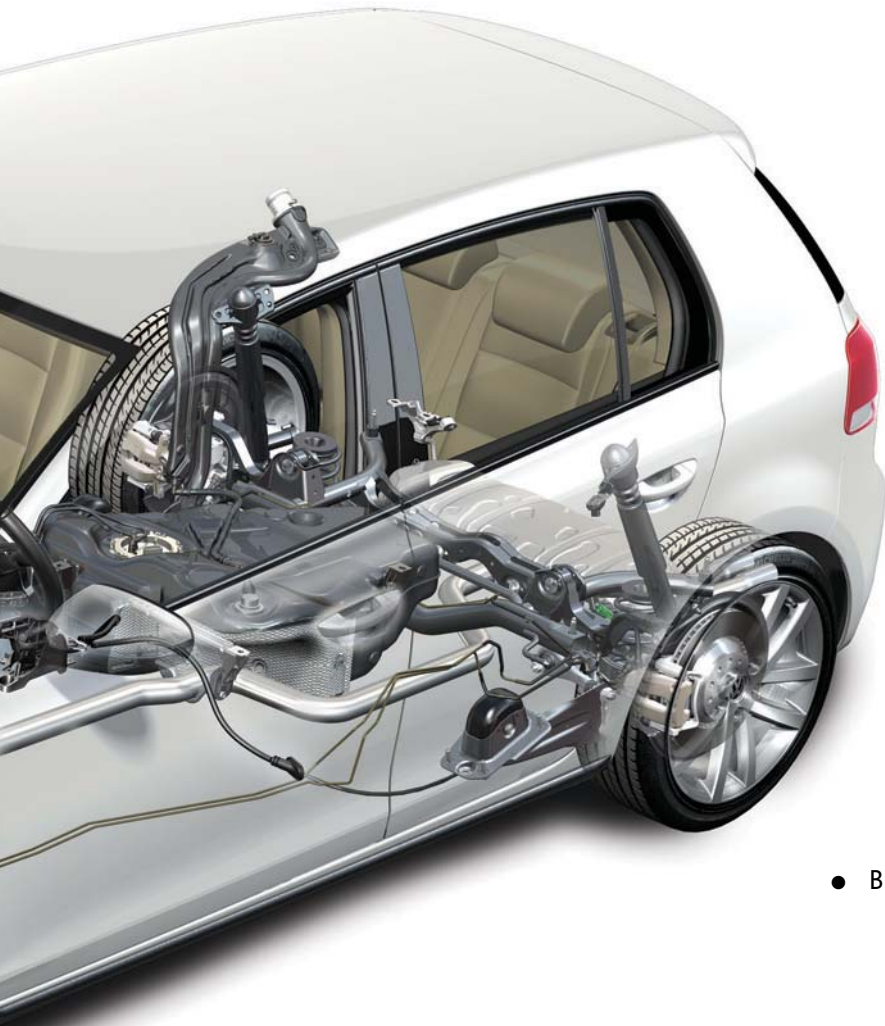
- Electromechanical power steering with double pinion, 3rd generation, with integrated steering angle sender

- Standing accelerator pedal, crash-optimised



for private or commercial purposes, in part or in whole, is not permitted.

- Four-link rear axle



S423\_187

- Breakdown set (Tire fit), standard

- New ESP generation MK60-EC system from Continental Teves with integrated sensor cluster



You will find further information on the Adaptive Chassis Control (ACC) in self-study programme SSP 406 "DCC Adaptive Chassis Control".



# Chassis

## ACC Adaptive Chassis Control

The Adaptive Chassis Control ACC adjusts the suspension to the road conditions and thus offers optimum ride comfort at all times.

Depending on the customer's requirements, the control programmes "Normal", "Sport" and "Comfort" can be selected using the ACC button in the centre console.

The damping is automatically adapted depending on the driving situation to stop the car pitching and rolling. In the "Sport" control programme, the steering is also given a more sporty feel.

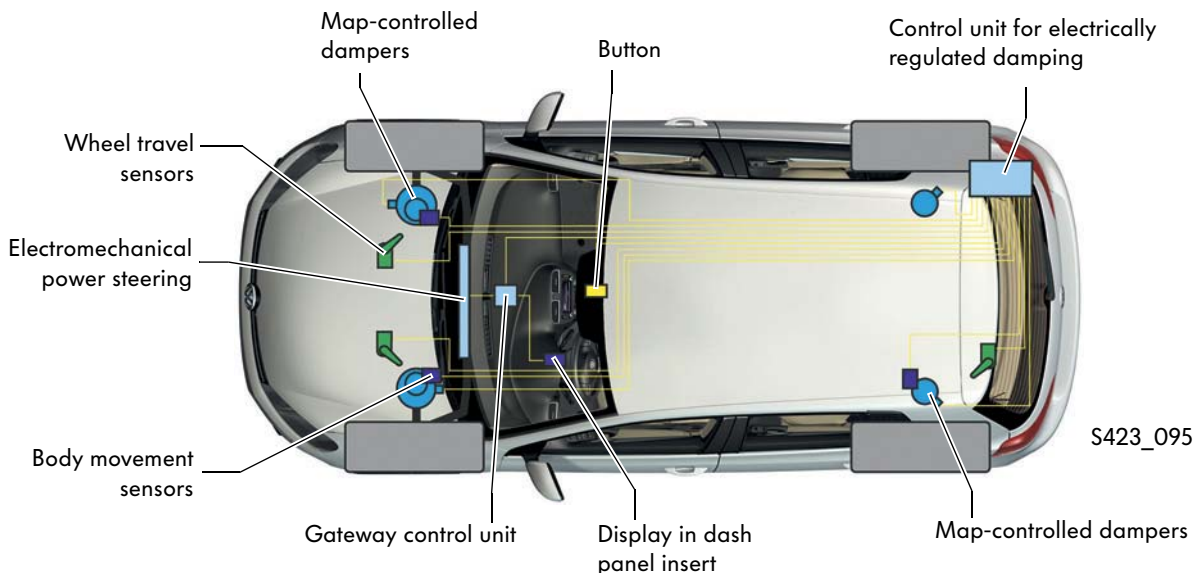


S423\_044



S423\_103

The components of the ACC Adaptive Chassis Control include four map-controlled dampers, a gateway control unit as an interface to the CAN data bus systems of the Golf, the control unit for electrically controlled damping, three sensors for measuring the wheel travel and three sensors for measuring the body movement. The "Normal", "Sport" and "Comfort" modes are indicated in the dash panel insert.

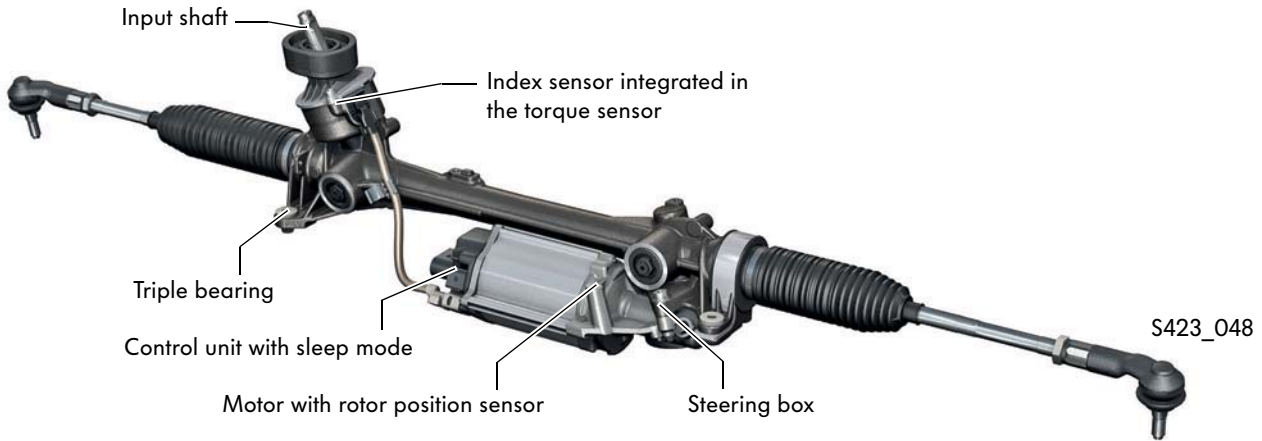


S423\_095



You will find detailed information on the Adaptive Chassis Control (ACC) in self-study programme SSP 406 "DCC Adaptive Chassis Control".

# Electromechanical power steering



The Golf uses the 3rd generation of the electromechanical power steering with double pinion from manufacturer ZF. The basic new features are:

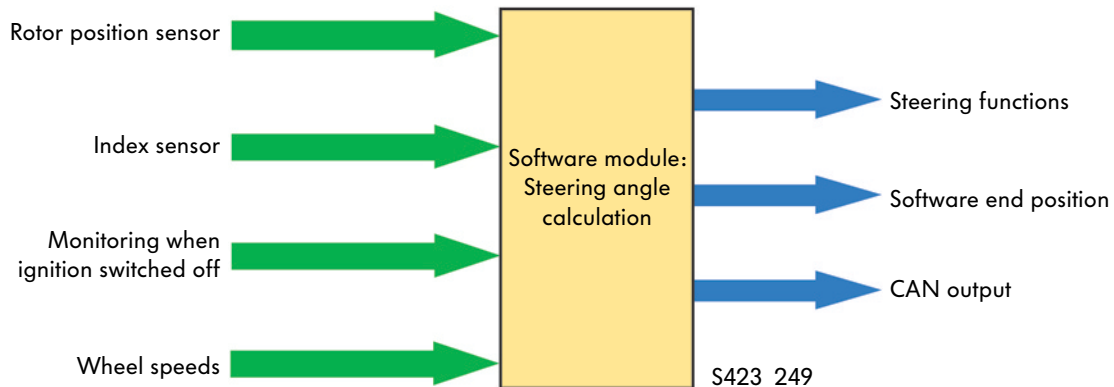
- Integration of the steering angle sensor in the steering so that the steering angle sensor on the steering column is not required
- Software expansion in control unit for steering angle sensor and Lane Assist, for example
- Triple bearing on the assembly carrier



## Determining the steering angle

In the third generation of the electromechanical power steering, the sensor signals obtained in the steering from the rotor position sensor and the index sensor are used to calculate the steering angle of the vehicle.

The steering angle determined is used for the internal steering functions and is also provided to other control units.

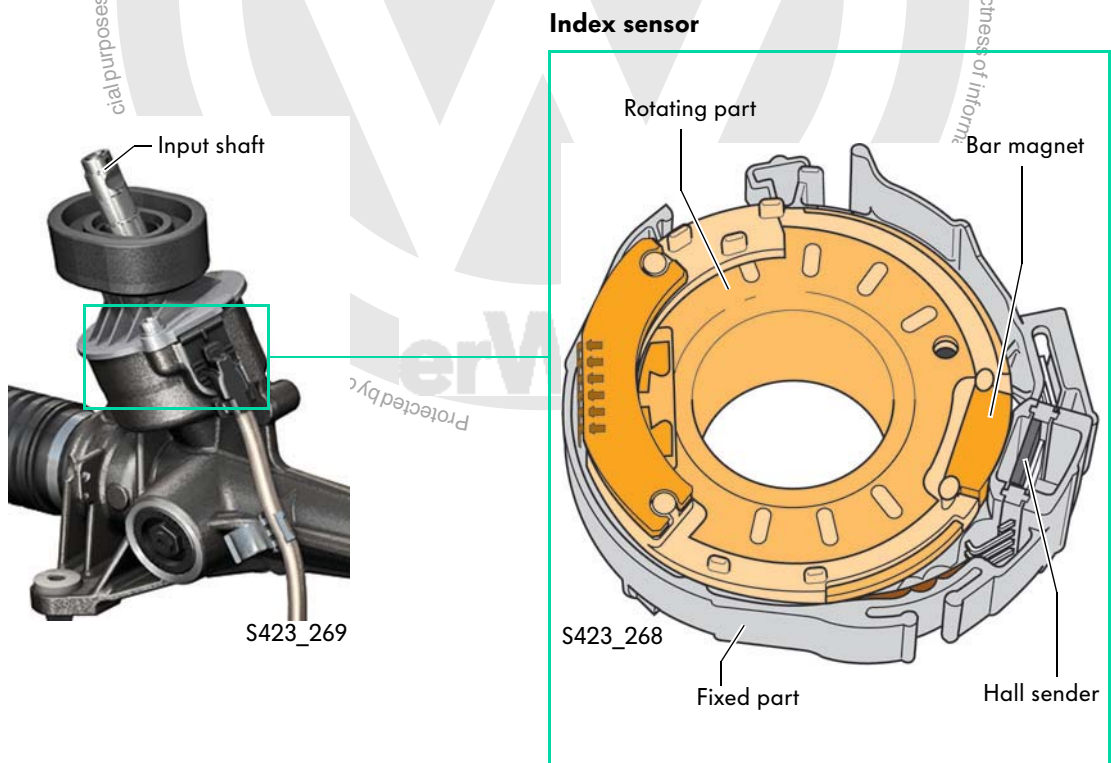


## Integrated steering angle sensor

On the input shaft, the index sensor (integrated steering angle sensor) is set at a defined angle as part of the torque sensor.

A bar magnet is fixed to a rotating part of the volute spring cassette. When the steering spindle rotates, it passes the scanning range of a Hall sensor, which is located on the part of the volute spring cassette that is fixed to the housing, once per steering wheel turn. The signal of the Hall sensor is triggered by the straight-ahead position of the steering wheel.

The index sensor is triggered three times as the steering spindle turns approx. 3.7 revolutions over the total steering angle range. The centre position of the steering wheel can thus be determined with this sensor, but not the clear centre position of the steering or straight-ahead running of the vehicle. This is determined by the high-resolution rotor position sensor and is made plausible by the wheel speeds.



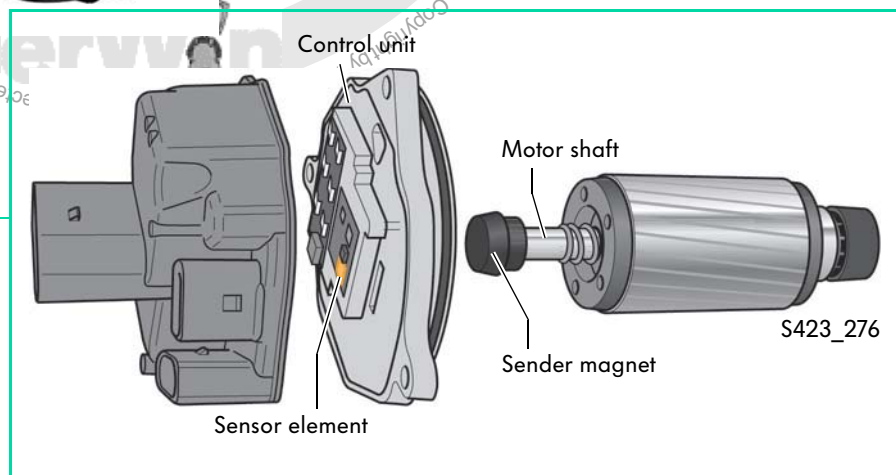
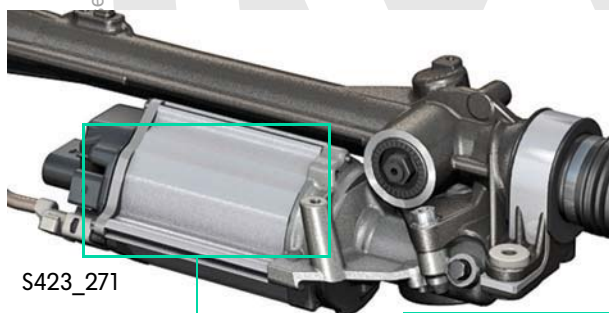
## Rotor position sensor

The rotor position sensor measures the position of the contact less free rotor every 180°.

The sensor element is in the control unit. The corresponding sender magnet is a magnetic disc and is at the end of the motor shaft.

The rotor position sensor detects the whole steering movement (right/left). The centre position of the steering and straight running of the vehicle is clearly established using the rotor position sensor, an index mark that is detected by the index sensor and using the information from the wheel speeds.

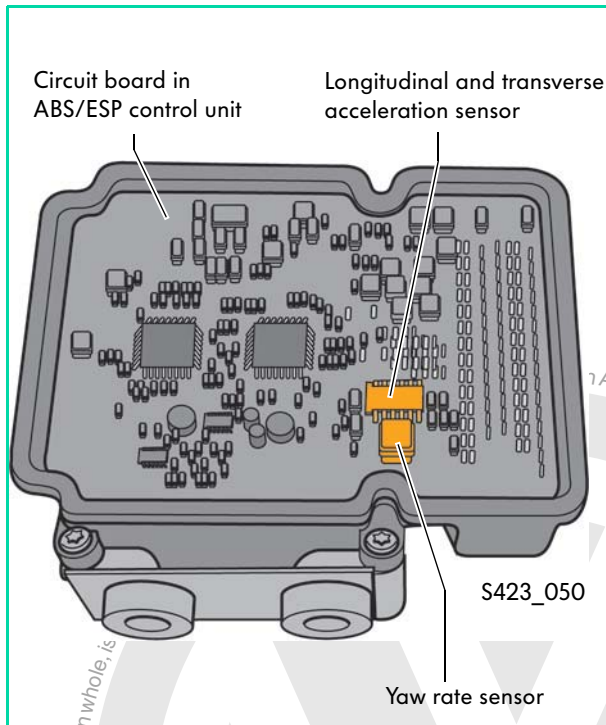
The requirements for immediate availability of the absolute steering angle information as well as the lowest possible stand-by current when the ignition is switched off (sleep mode) demand that the rotor position sensor is constantly monitored. A counting mechanism is integrated into the control unit that also constantly monitors the rotor position sensors when the ignition is switched off and automatically counts any turning movements detected (sleep mode counter). When you switch on the ignition, the counter is read out and the absolute steering angle is available again.



If the battery is replaced, the steering will need to be re-taught the centre position by being turned past the index mark and evaluating the wheel speeds.



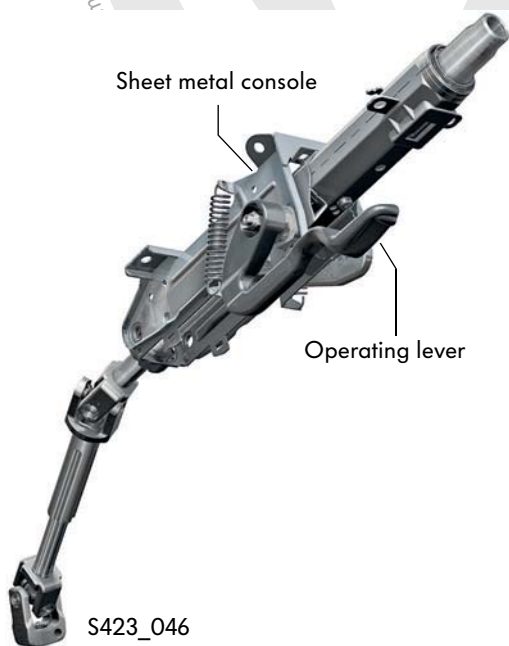
## ABS/ESP Mark 60 EC



The Golf has a new ESP unit from the MK 60 EC product range.

The new feature is that the previous sensor cluster that contains the yaw rate sensor as well as the longitudinal and transverse acceleration sensor is omitted. These sensors are now integrated on the circuit board in the ABS/ESP control unit.

## The steering column



The Golf has a new steering column that was used for the first time in the Scirocco.

The new steering column has the following features:

- Console and adjusting lever made from sheet metal
- Weight, cost and crash safety optimised
- Side adjusting lever
- Stepless longitudinal adjustment
- Height adjustment with 12-step teeth

## Multifunction steering wheel

A new multifunction steering wheel is used in the Golf 2009. The centre of the multifunction steering wheel (MFW) contains the familiar horn button and the integrated driver airbag unit. To the left and right of it, there are now 6 instead of 4 multifunction buttons. This has increased the user-friendliness. The Back option can be selected directly with a new button.

The new multifunction steering wheel has 12 multifunction buttons. You can use these buttons to control among other things:

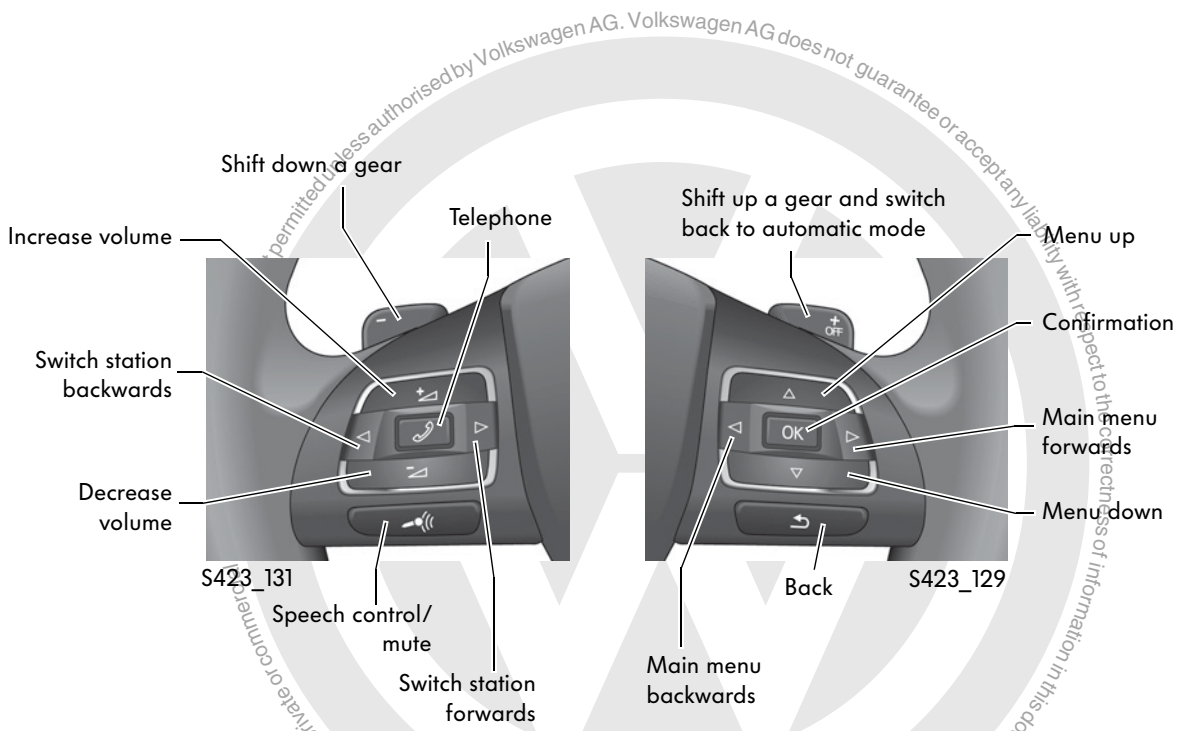
- The radio or navigation unit and
- the telephone



S423\_141

There is also the option of two extra controls in the form of shift paddles on the back of the multifunction steering wheel.

These paddles can be used to select specific gears on an automatic or DSG gearbox.



You will find more information on the multifunction steering wheel in self-study programme no. 417 "The Passat CC 2009".

# Convenience Electronics

## Reversing camera system

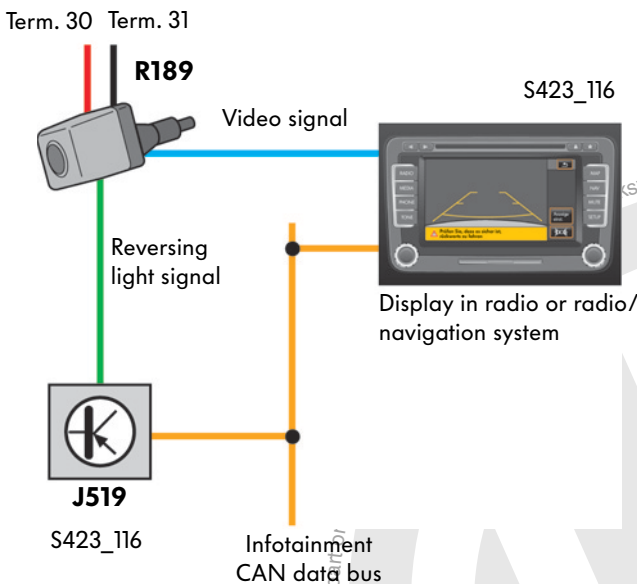
The reversing camera system supports the driver while reversing by displaying obstacles behind the vehicle on a screen.

The reversing camera system in the Golf consists of a reversing camera and a monitor screen (e.g. radio or radio/navigation system with reversing camera input). It is set up without a separate control unit.

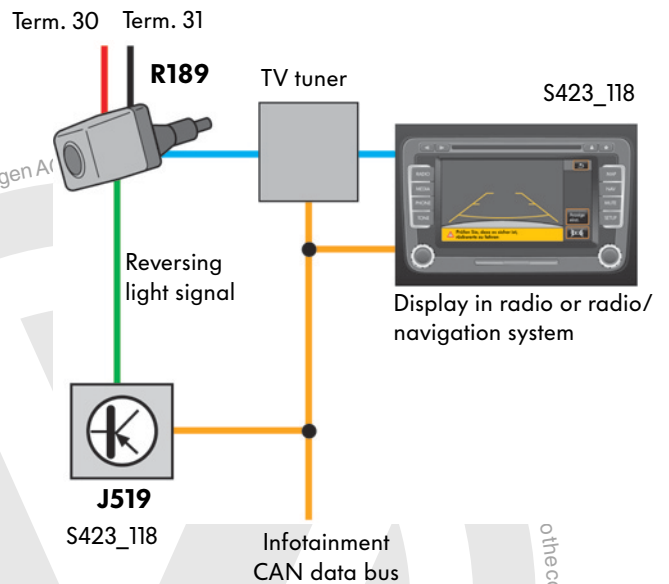
Depending on the equipment, there are two versions for transfer of the video signal from the reversing camera:

1. The reversing camera is connected directly to the radio or radio/navigation system.
2. If the car is equipped with a TV tuner (currently only for Japan), the camera is connected to one of the two analogue video inputs on the tuners and the camera signal is forwarded from their signal to the display device.

### Set-up without TV tuner



### Set-up with TV tuner



#### Legend

- J519 Onboard supply control unit
- R189 Reversing camera



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## Reversing camera



S423\_139

On the Golf 2009, the reversing camera is in the pivoting badge as on the Passat CC. The pivoting badge, which is used to manually open the tailgate, is also the mounting for the reversing camera.

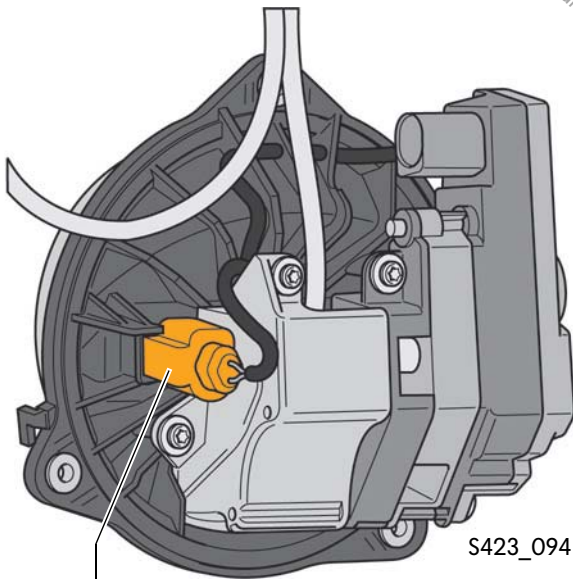
The camera is well protected against rain, dirt and tampering behind a protective cap inside the pivoting badge when reverse gear is disengaged.

When you select reverse gear, the camera is folded out electromechanically and the protective cap and the badge are opened. The camera covers the area behind the vehicle with its wide-angle lens.

When the reversing camera is extended, you cannot open the tailgate. This is prevented by the signal from the "Tailgate Open" microswitch being forwarded to the onboard supply control unit which deactivates this in this case (reverse gear selected).

If reverse gear is deselected, the reversing camera is retracted after 9 seconds.

The picture also remains on the screen during this period. If you require a different menu during these 9 seconds, it is possible to switch the screen over on the radio or radio/navigation system.



S423\_094

Connector for microswitch

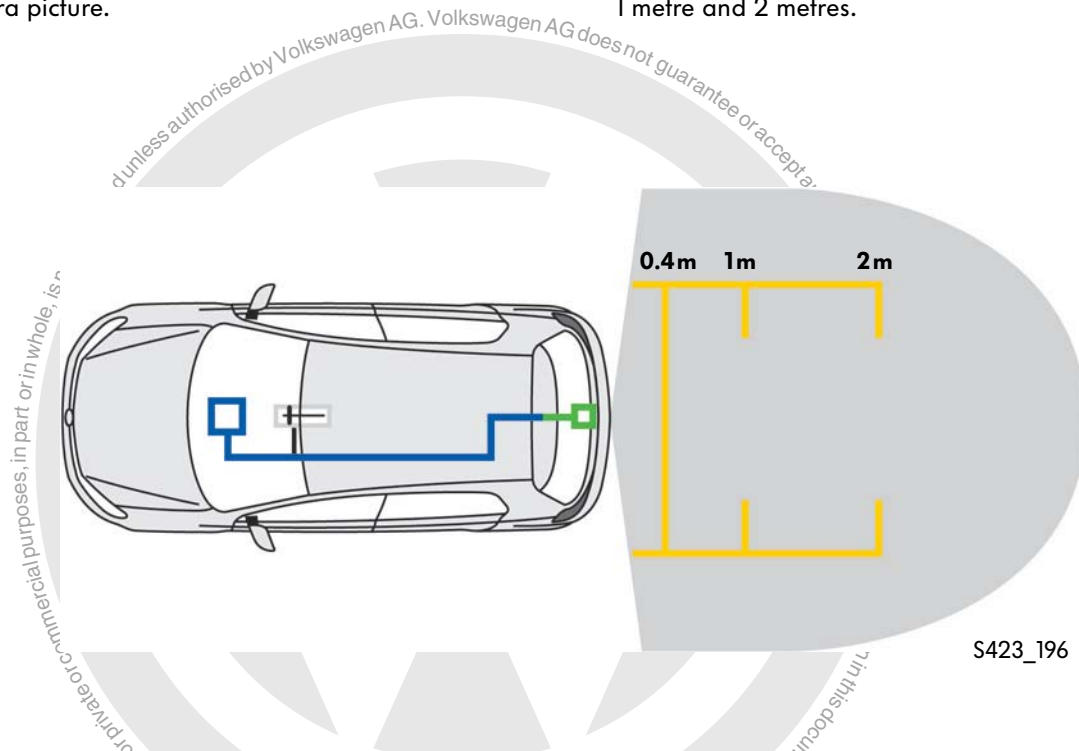


# Convenience Electronics

## Output on display unit

This version of the reversing camera system places only the static helper lines over the real camera picture.

The helper lines that run vertically to the direction of travel indicate the distances 0.4 metres, 1 metre and 2 metres.



The RCD 510 radio and the RNS 510 radio/navigation system are available for the Golf as display devices.



The camera is a wide-angle camera without image rectification. The picture of the area displayed on the display device is therefore distorted. The camera picture is mirrored so that it roughly corresponds with the view through the rear-view mirror.



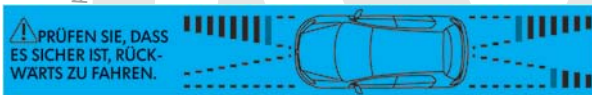
You will find further information on the design and function of the reversing camera system in self-study programme no. 407 "Reversing Camera System".

# Optical parking system



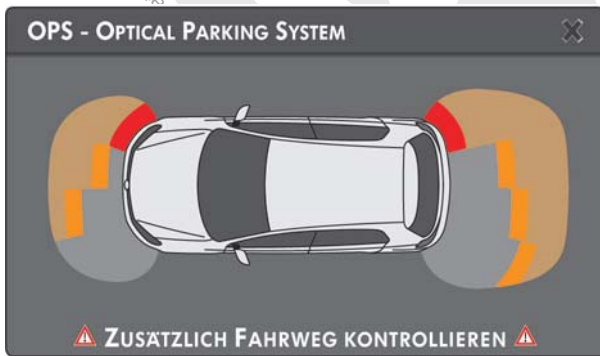
S423\_127

## Display of OPS image on RCD 310



S423\_136

## Display of OPS image on RCD 510, RNS 310 and RNS 510



S423\_138

The optical parking system (OPS) is a software extension of the parking aid. The driver is not just supported acoustically, but also optically. For the first time with the Golf 2009, the optical parking system is being used with 8 channels in the A-class segment.

The Golf has ultrasound sensors located around the front and rear when equipped with a Park Distance Control system.

This distance warning system warns you about objects in front of and behind the vehicle.

OPS is activated with the Park Distance Control (PDC). The parking aid control unit (PDC control unit) calculates the distance information according to sector and transfers it to the display device. The BAP operating and display protocol is used on the CAN data bus for this.

The scanning range is 120 cm at the front, 160 cm at the rear and 60 cm at each side. A red segment (not RCD 310) symbolises a distance less than or equal to 30 cm. OPS is supported by the RCD 310/510 radios and the RNS 310/510 radio/navigation systems.

The advantages of the optical parking system are:

- The position of the obstacles are displayed in relation to the vehicle position.
- It is possible to manoeuvre using the display.
- You can simply determine the current situation by looking at the display.



You will find more information on the optical parking system in self-study programme no. 417 "The Passat CC 2009".



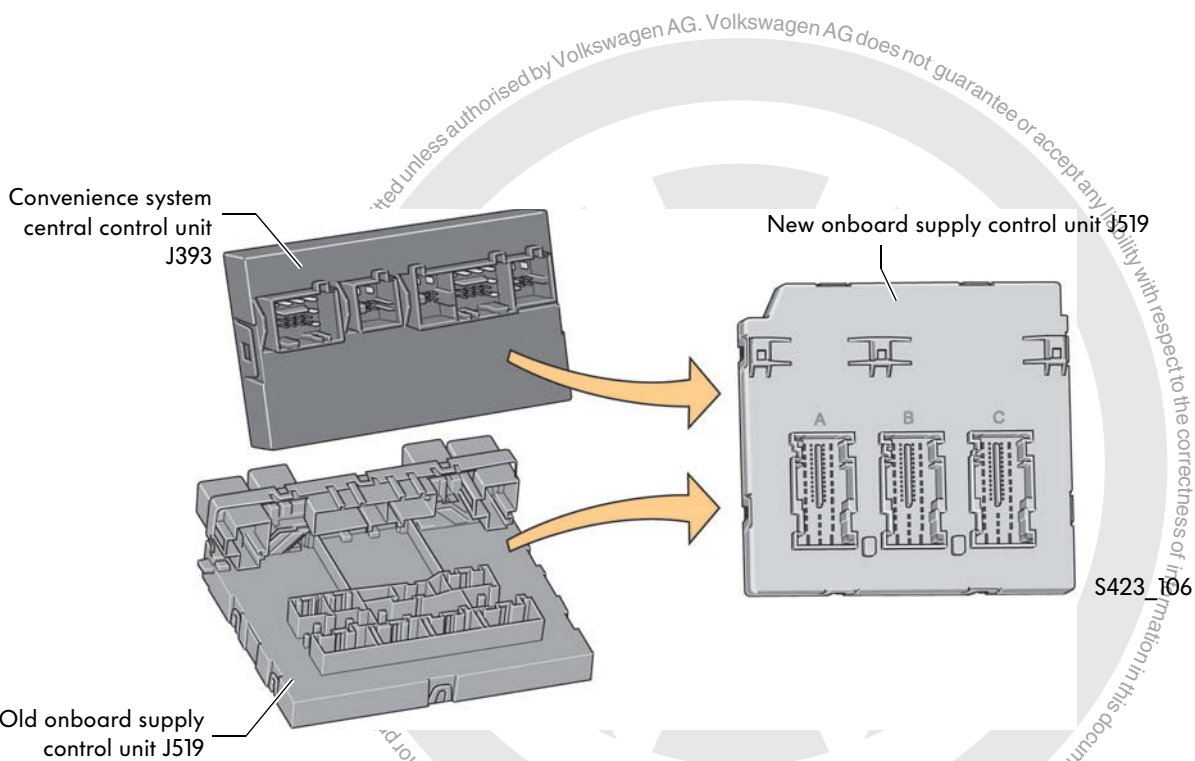
## The new onboard supply control unit

The newly developed onboard supply control unit J519 is being used for the first time in the Golf 2009.

The functions from the convenience system central control unit J393 have been added to the scope of this control unit. This includes the separate software module for the tyre pressure monitor (TPM) previously contained in the convenience system central control unit.

The control unit address is still 09.

The old control unit with 12 connections and the convenience system central control unit with 6 connections are thus no longer required. The new onboard supply unit is connected with just 3 connectors.

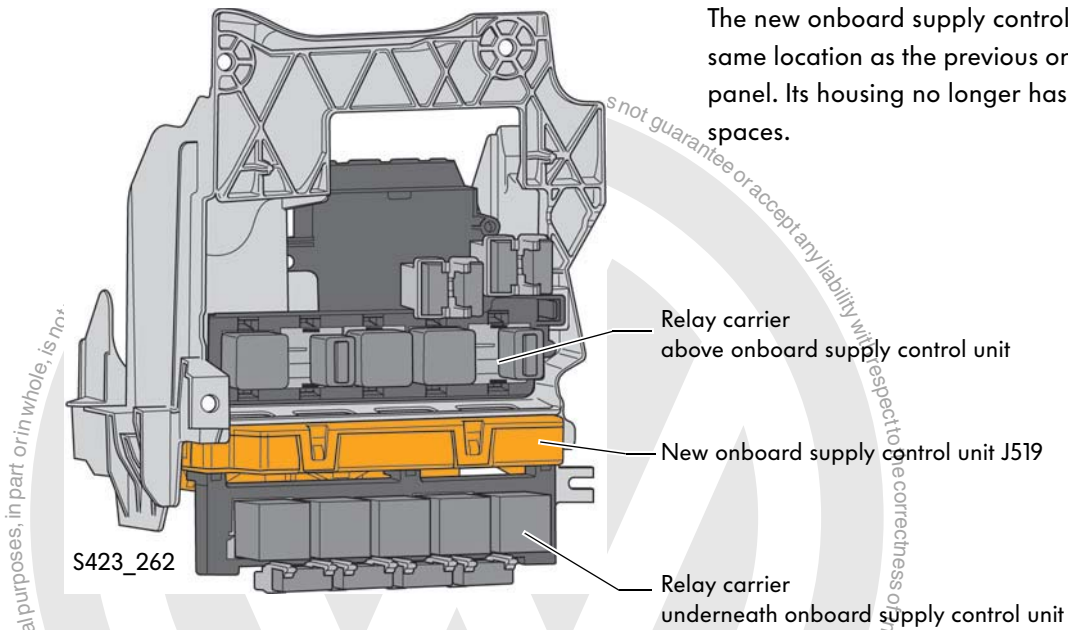


The new onboard supply control unit controls all bulbs via individual pulse-width modulated channels. It controls light loads of 600W.

Motor loads (closing doors, central locking, safe motors etc.) of up to 250W are possible.

The remote control aerial is integrated in the new onboard power supply control unit. It also receives the tyre pressure signals (tyre pressure monitor). The radio aerial is not a separate wire aerial, instead it is in the form of a circuit board aerial. Integration in the onboard power supply control unit also allows reception ranges of 30 - 50 metres.

## Location



The new onboard supply control unit is in the same location as the previous one: on left under dash panel. Its housing no longer has any relay plug-in spaces.

## Functions

In addition to taking over functions from the convenience system central control unit and the old onboard supply control unit, the new onboard supply control unit also has some new functions:



Functions of old onboard supply control unit	Functions of convenience system central control unit	New functions
<ul style="list-style-type: none"> <li>- Terminal control</li> <li>- Light control</li> <li>- Load management</li> <li>- Wiper control (via LIN)</li> <li>- Rain-light sensor control</li> <li>- Horn control</li> <li>- Control of front and rear windscreen heating</li> <li>- Customisation</li> </ul>	<ul style="list-style-type: none"> <li>- Control of interior monitoring, of inclination sensor and anti-theft alarm</li> <li>- Convenience close/open</li> <li>- Remote control (integrated aerial)</li> <li>- Central locking (control of locks, doors and tailgate)</li> <li>- Tyre pressure monitor (separate software module with diagnosis address)</li> <li>- Control of door control units</li> </ul>	<ul style="list-style-type: none"> <li>- Daylight driving lights</li> <li>- Turn-off light</li> </ul>

# Radio, Navigation and Telephone

## The radio systems in the Golf 2009

The RCD 210, RCD 310 and RCD 510 radios as well as the RNS 310 and RNS 510 radio/navigation systems are available for the Golf.

### RCD 210 radio

#### Technical features

- Monochrome display with a resolution of 122 x 36 pixels
- FM, TP and RDS reception via a single tuner
- TP button; stations that do not broadcast TP information will be displayed with "No TP".
- AM reception
- 24 memory slots for AM and FM stations each on two memory levels with 6 slots
- The autostore function fills the currently selected memory level with the 6 stations with the strongest reception
- "Initial Autostore" fills all 24 memory levels with receivable FM and AM stations
- Two or four loudspeakers with up to 20 watt output can be connected
- Treble, bass and balance sound adjustments
- Fader adjustment is only available with four loudspeakers
- Integrated CD drive
- Brightness of display backlight can be controlled independently of the dim signal for the vehicle interior lighting
- Driving school function with speed and turn signal display
- Service test mode



S423\_143

#### Combination and expansion possibilities

- UMPP telephone preparation (mono playback only)
- Compatible telephone hands-free systems from third-party manufacturers
- Volume reduction when vehicle is equipped with Park Distance Control
- Can be operated via multifunction steering wheel and displayed in dash panel insert
- VW CD changer or VW Individual iPod adapter or USB adapter
- Audio input interface (Aux-In)



Further information on the RCD 210 radio can be found in self-study programme no. 404 "The 2008 Tiguan".

## RCD 310 radio

### Technical features

- FSTN monochrome display with a resolution of 302 x 45 pixels (FSTN=Film-Super-Twisted-Nematic, a type of liquid crystal display)
- Twin-tuner for FM, TP and RDS reception with phase diversity
- Integrated DAB tuner (digital radio) (depending on equipment)
- Integrated CD drive
- Media support for MP3 and WMA audio data (with ID3 tag)
- Optical parking system (OPS)
- Air-conditioning system information
- RDS FM/AM Europe radio
- Two or four loudspeakers with up to 20 watt output can be connected
- GALA speed-dependent volume control
- Self-diagnosis and loudspeaker diagnosis
- TP button; stations that do not broadcast TP information will be displayed with "No TP".
- BAP operating and display protocol



S423\_145

### Combination and expansion possibilities

- UMPP telephone preparation
- Volume reduction when vehicle is equipped with Park Distance Control
- Support of display in dash panel insert via the BAP operating and display protocol as well as the DDP display data protocol
- External sound amplifier, Dynaudio
- Control via multifunction steering wheel (MFW) and multifunction display (MFD)
- External CD changer (without MP3 support)
- Audio input interface (AUX-IN)
- Media Device Interface (MDI)



Further information on the RCD 310 radio can be found in self-study programme no. 417 "The Passat CC 2009".



# Radio, Navigation and Telephone

## RCD 510 radio

### Technical features

- Touch-sensitive 6.5" TFT colour display with a resolution of 400 x 240 pixels
- Twin-tuner for FM, TP and RDS reception with phase diversity
- AM reception
- Two or four loudspeakers with up to 20 watt output can be connected
- Integrated 6-CD changer
- Integrated memory for TIM information (depending on equipment)
- Integrated DAB tuner (digital radio) (depending on equipment)
- SDARS tuner (SAT radio) (depending on equipment)
- Integrated SD memory card reader (SD=Secure Digital)
- Media support for MP3 and WMA audio data
- Audio input interface (AUX-IN)
- Interface for connecting a reversing camera on RCD 510 RVC (Rear View Camera) version
- Self-diagnosis and loudspeaker diagnosis
- Display of climate conditions (temporarily displayed information)
- Optical parking system (OPS)



S423\_147

### Combination and expansion possibilities

- External sound amplifier, Dynaudio
- Volume reduction when vehicle is equipped with Park Distance Control
- Support of display in dash panel insert via the BAP operating and display protocol as well as the DDP display data protocol
- UMPP telephone preparation
- Compatible, external telematics units
- Control via multifunction steering wheel
- External CD changer (without MP3 support)
- Media Device Interface (MDI)



Further information can be found on the RCD 510 radio in self-study programme no. 404 "The 2008 Tiguan".

## RNS 310 radio/navigation system

### Technical features

- 5" colour display (TFT) with a resolution of 400 x 240 pixels
- Operation via touch screen and rotary press knob
- Two or four loudspeakers with up to 20 watt output can be connected
- Twin-tuner for FM, TP and RDS reception with phase diversity
- Integrated CD drive for navigation, audio
- Media support for MP3 and audio CD
- Playback with display of title (mp3)
- Integrated SD memory card reader
- Map display in 2.5D in driver perspective
- Navigation function with map, integrated direction symbols and speech
- CD/SD navigation (European roads/motorways)
- SD navigation without inserted navigation CD
- Copy navigation data from CD to SD
- Linking of several countries on an SD card
- TMC function & TMC background reception (the current traffic messages are stored)
- Display of vehicle functions (clock, air conditioning and optical parking system)



S423\_195

### Combination and expansion possibilities

- Volume reduction when vehicle is equipped with Park Distance Control
- Controllable via multifunction steering wheel
- Audio input interface (Aux-In) on front of unit
- Support of display in dash panel insert via the BAP operating and display protocol as well as the DDP display data protocol
- Optionally combinable with Volkswagen sound and external sound amplifier, Dynaudio
- Audio playback from external sources, for example, CD players, iPods
- UMPP telephone preparation
- Media Device Interface (MDI)



The RNS 310 radio/navigation system is being used in the Golf 2009 for the first time.

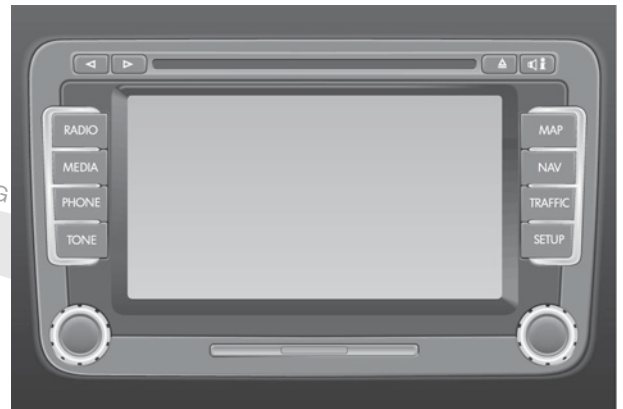


# Radio, Navigation and Telephone

## RNS 510 radio/navigation system

### Technical features

- Touch-sensitive 6.5" multi-colour display (MFD) with a resolution of 800 x 480 pixels
- Two or four loudspeakers with up to 20 watt output can be connected
- RDS, FM and AM Europe radio
- Twin-tuner for FM, TP and RDS reception with phase diversity
- SDARS tuner (depending on equipment)
- Integrated DVD drive for navigation, audio and video
- Integrated drive hard for storing navigation and audio data
- Integrated SD memory card reader
- Media support for MP3 and WMA audio data as well as video data
- Map display in 2D, 3D bird's eye view and topographical view
- Navigation function with map, split screen and speech
- TMC function (the current traffic messages are stored), dynamic navigation (Europe, North America)
- Off-road functions
- 3 user interfaces (styles) can be programmed, encoded at factory depending on model
- Display of climate conditions (temporarily displayed information)
- Optical parking system (OPS)



S423\_151

### Combination and expansion possibilities

- Controllable via multifunction steering wheel
- Volume reduction when vehicle is equipped with Park Distance Control
- Support of display in dash panel insert via the BAP operating and display protocol as well as the DDP display data protocol
- Optionally combinable with Volkswagen sound and DYNAUDIO as well as Volkswagen TV tuner
- Output of navigation symbols by the control unit in dash panel insert (Highline)
- Video or TV playback from external sources, for example, DVD player, reversing camera
- Decoupling of video signals for external display devices, for example, rear-seat entertainment (RSE)
- Audio playback from external sources, for example, CD players, iPods
- UMPP telephone preparation
- Media Device Interface (MDI)



You will find detailed information on the RNS 510 radio/navigation system in self-study programme no. 397 "2007 Radio/Navigation Systems".



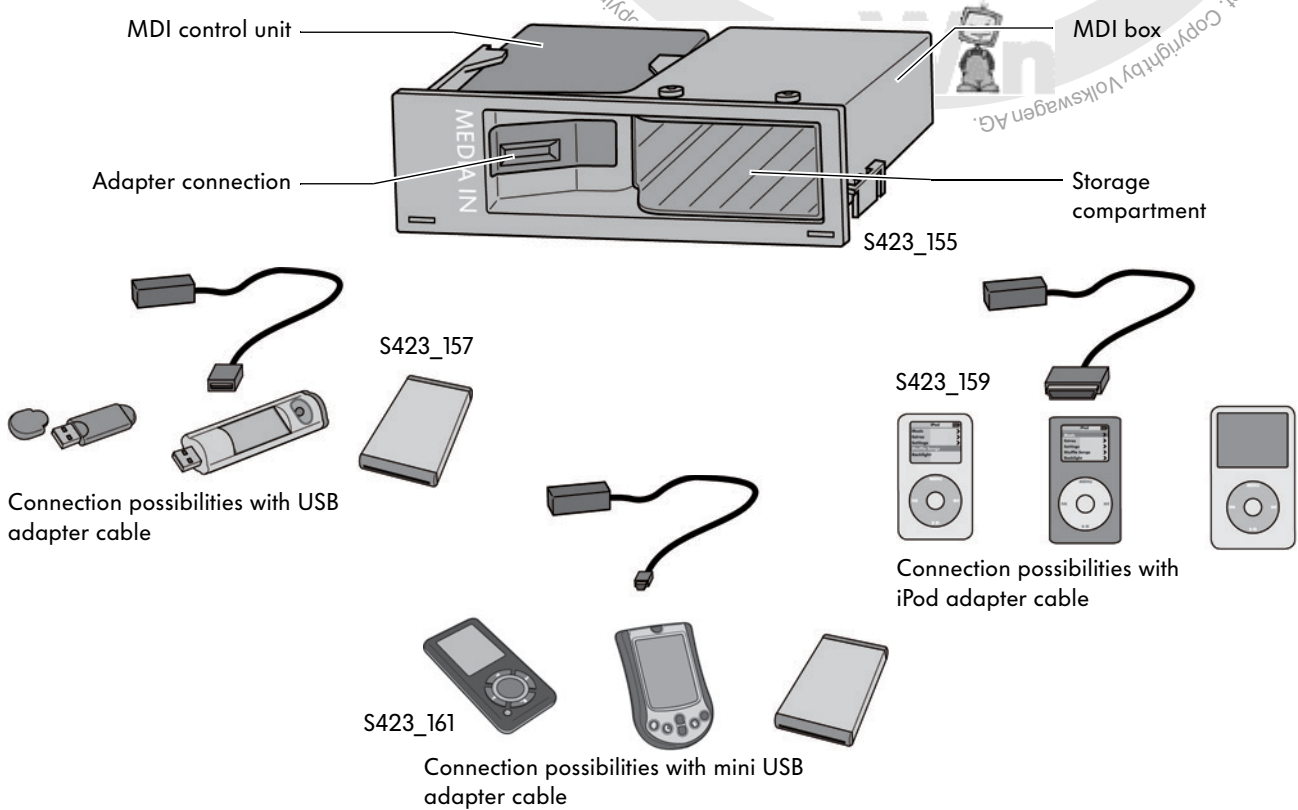
All radios and radio/navigation systems used by the Volkswagen brand use the convenience code.

# Media Device Interface

The Golf can be optionally equipped with the Media Device Interface box. The media device interface, or MDI for short, was fitted for the first time in the Passat CC.

The MDI enables you to connect mobile audio or multimedia devices to the infotainment system and display, control and playback their audio content over the vehicle loudspeaker system and infotainment monitors.

The MDI control unit is located in a plastic housing of the MDI box. The MDI box has space to hold your mobile multimedia devices safely without sliding around and it is the size of a single DIN slot. The MDI box fits into the compartment for the CD changer. They therefore cannot be combined as equipment options.



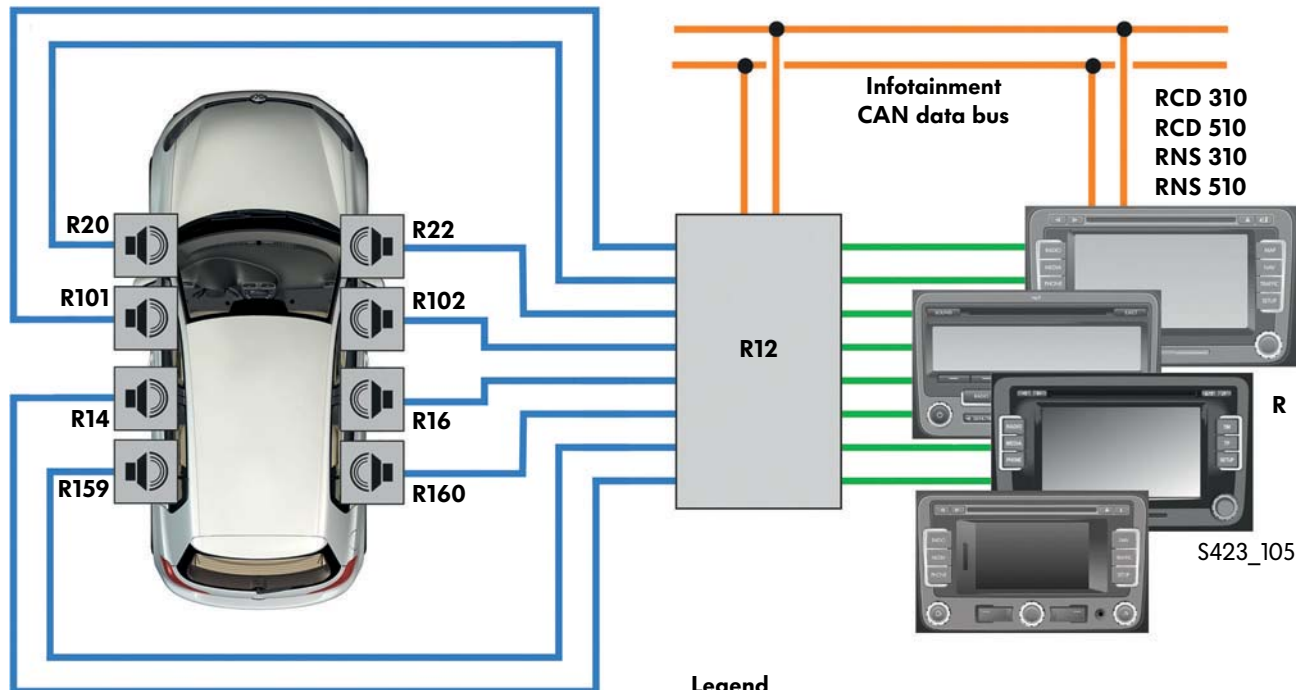
## Connection possibilities

The mobile device is connected, depending on the type, with special adapter cables that are connected to the central interface, i.e. the adapter connection. The following audio formats are currently supported and can thus be played back: MP3, WMA and OGG Vorbis (licence-free audio data compression codec). The AAC format that is also supported is the licensed format from Apple.

# Radio, Navigation and Telephone

## High-end sound system from DYNAUDIO

The DYNAUDIO brand is a guarantee of high-quality sound. This sound system was used for the first time in the A class segment in the new Scirocco and is now also available as an optional extra for the new Golf.



### Legend

- R Radio
- R12 Amplifier
- R14 Rear left treble loudspeaker
- R16 Rear right treble loudspeaker
- R20 Front left treble loudspeaker
- R22 Front right treble loudspeaker
- R101 Front left mid-range and bass loudspeaker
- R102 Front right mid-range and bass loudspeaker
- R159 Rear left mid-range and bass loudspeaker
- R160 Rear right mid-range and bass loudspeaker

The high-end DYNAUDIO sound system consists of four bass loudspeakers (mid-range and bass loudspeakers), which ensure precise and powerful bass with high pulse fidelity, and four treble loudspeakers, which ensure authentic music playback, transparency and precision.

The loudspeaker system is operated by a 300-watt digital power amplifier.

The system can be combined with the RCD 310 and RCD 510 radios and the RNS 310 and RNS 510 radio/navigation systems.

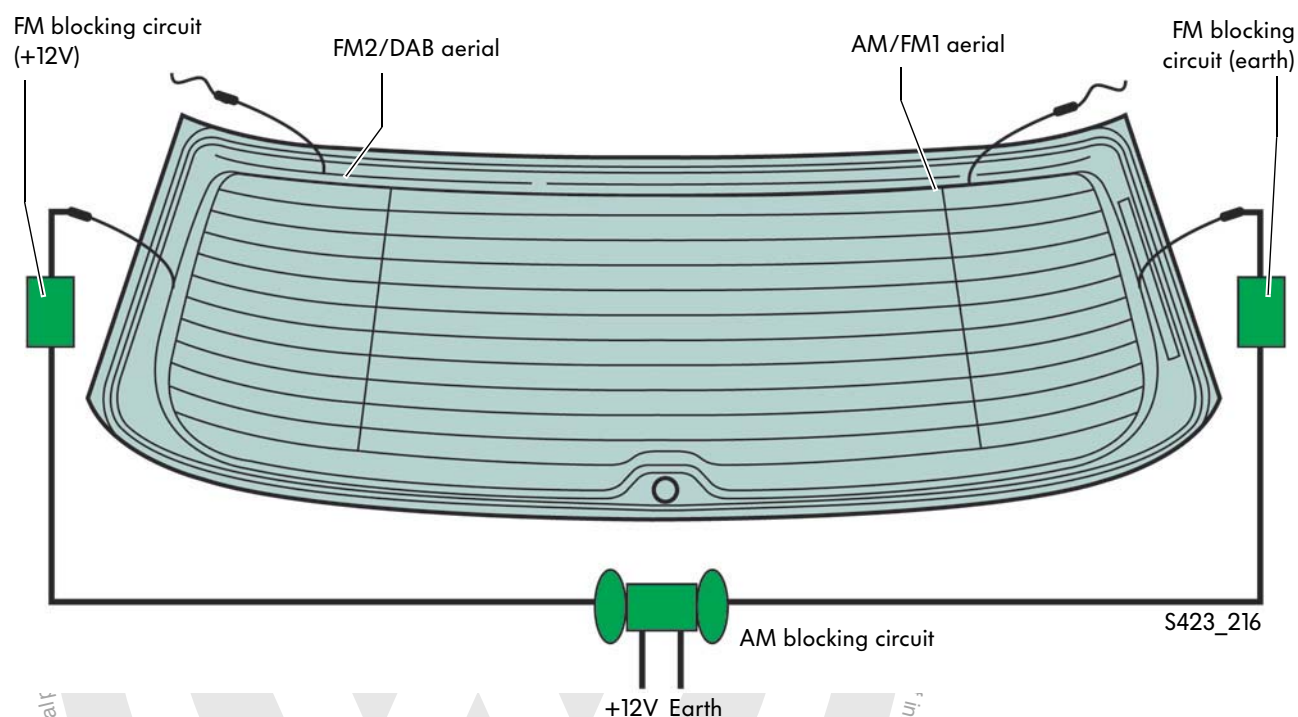
You will find more information on the DYNAUDIO sound system in the self-study programmes no. 342 "Radio systems 2006" and no. 419 "The Scirocco 2009".

## The aerial system in the Golf 2009

On the new Golf, several aerials (AM, FM1, FM2 und DAB) are integrated in the rear windscreen.

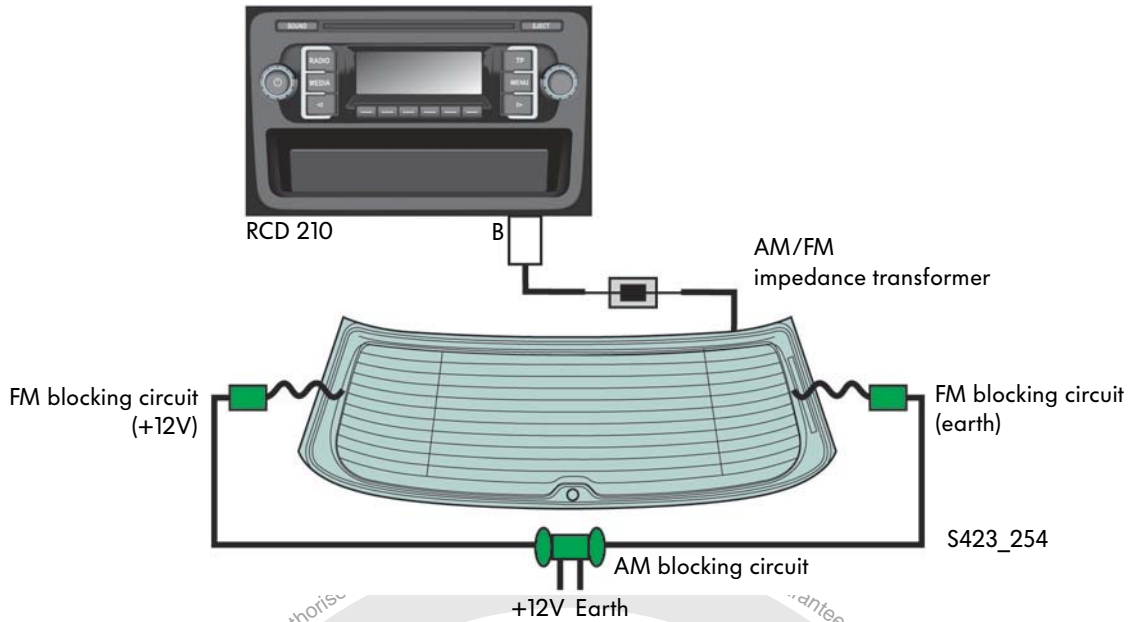
The aerials for navigation (GPS), telephone (GSM/UMTS), auxiliary heating (FFB) and SDARS are located in the roof aerial.

The connections to the aerial amplifiers are adapted to the vehicle equipment. Only the connections that are actually required by the infotainment components (radio with single or dual tuner, DAB) are available at the window. These different radio/tuner principles lead to different FM aerial systems being fitted in the vehicle. The FM blocking circuits are mounted at the side of the rear windscreen in the centre of the frame. The AM blocking circuit is under the rear windscreen next to the pivoting badge.

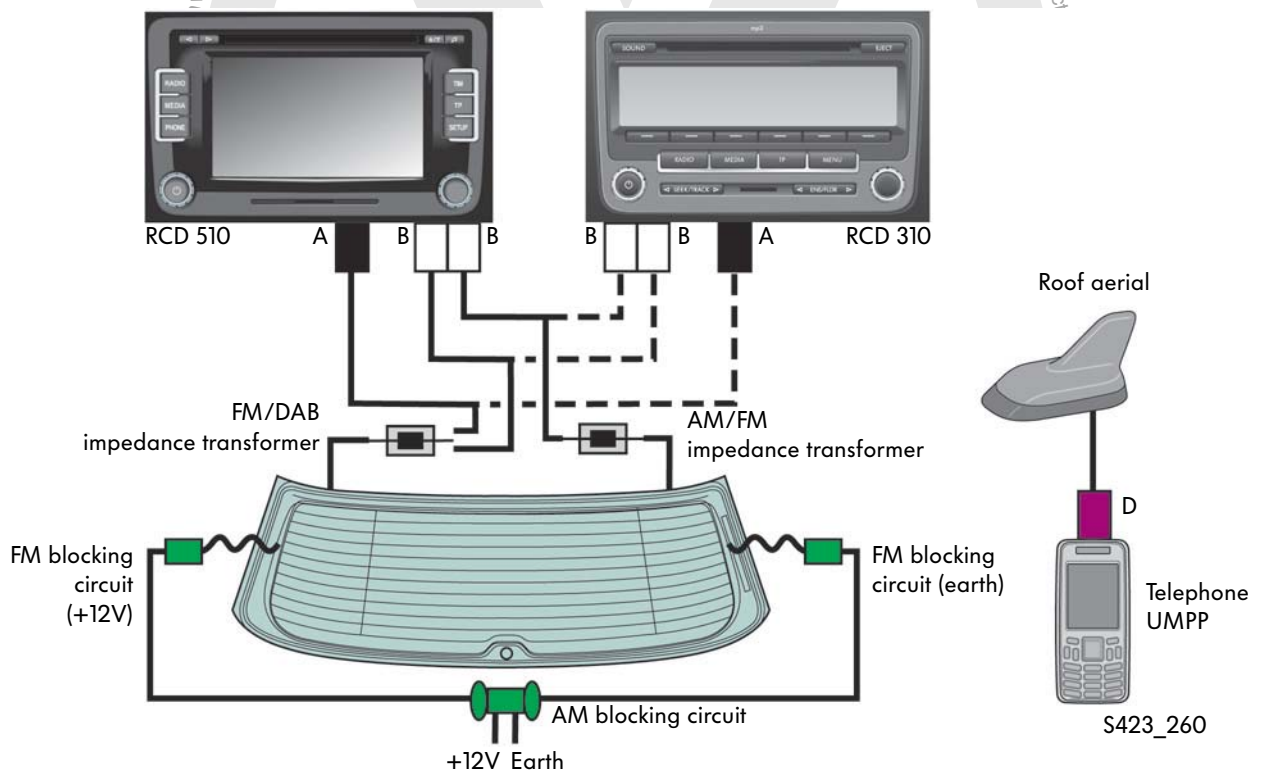


# Radio, Navigation and Telephone

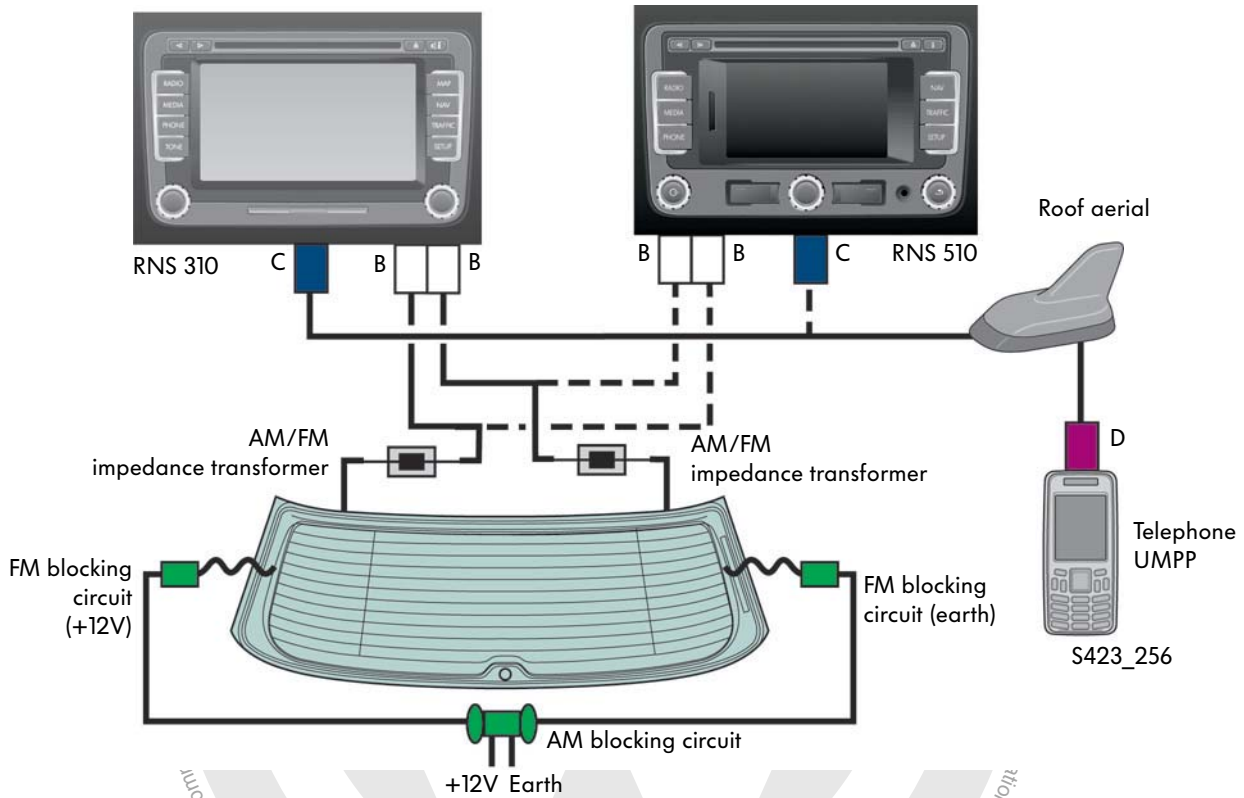
## Radio with single aerial



## Diversity aerial with telephone and DAB



## Radio/navigation system with diversity aerial and telephone



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# Radio, Navigation and Telephone

## UMPP telephone preparation

Two telephone preparations are used in the Golf 2009: UMPP with audio streaming and UMPP premium.

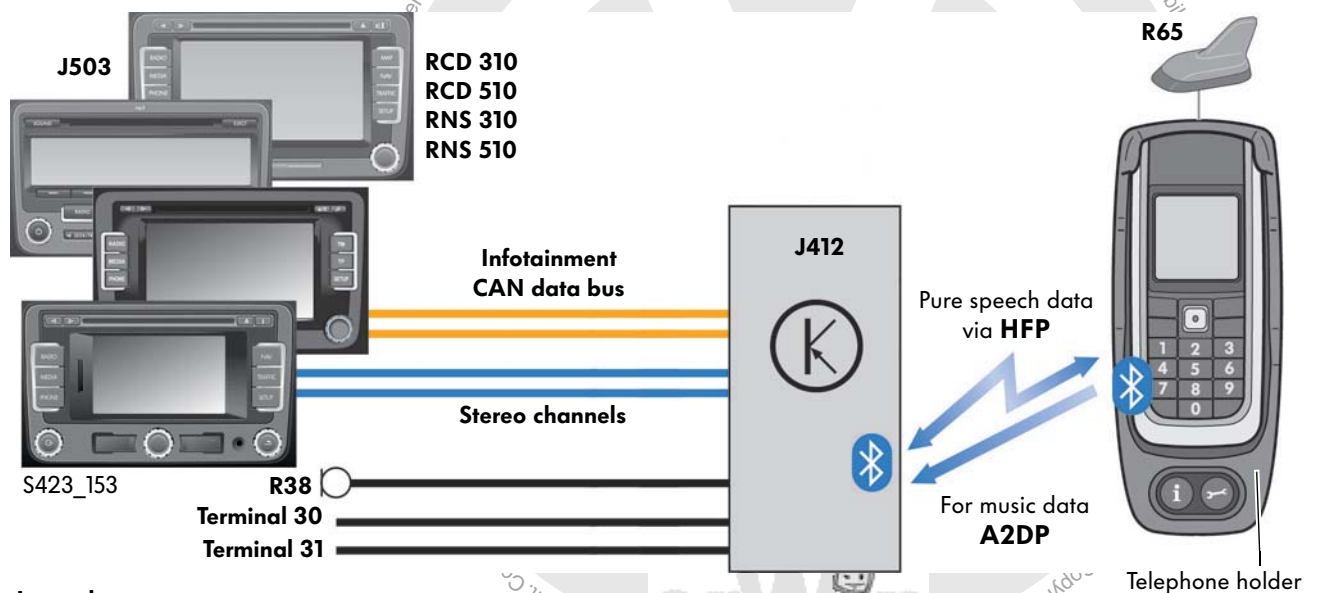
### UMPP (Bluetooth™ only) with audio streaming

Two Bluetooth™ profiles are used for the UMPP with audio streaming:

- HFP stands for hands-free profile and is a Bluetooth™ profile for the telephone audio/speech channel. It transfers speech data exclusively.
- The new Bluetooth™ A2DP audio streaming profile (Advanced Audio Distribution Profile) is used to transmit music files from the paired Bluetooth™ device in stereoquality to the UMPP control unit. Considerably higher quantities of data are transferred than with pure speech data.

#### Functions

- Control and display on mobile telephone
  - Hands-free facility and radio mute
  - Mobile phone is charged via the telephone holder (only when ignition is switched on)
  - Info and breakdown buttons on the mobile phone holder
  - CAN data bus interface to the infotainment CAN data bus
  - Data is transferred between the mobile telephone and the mobile telephone operating electronics control unit via Bluetooth™
  - UMPP is diagnosis-capable
- Follow-up time only when radio or radio/navigation system is switched



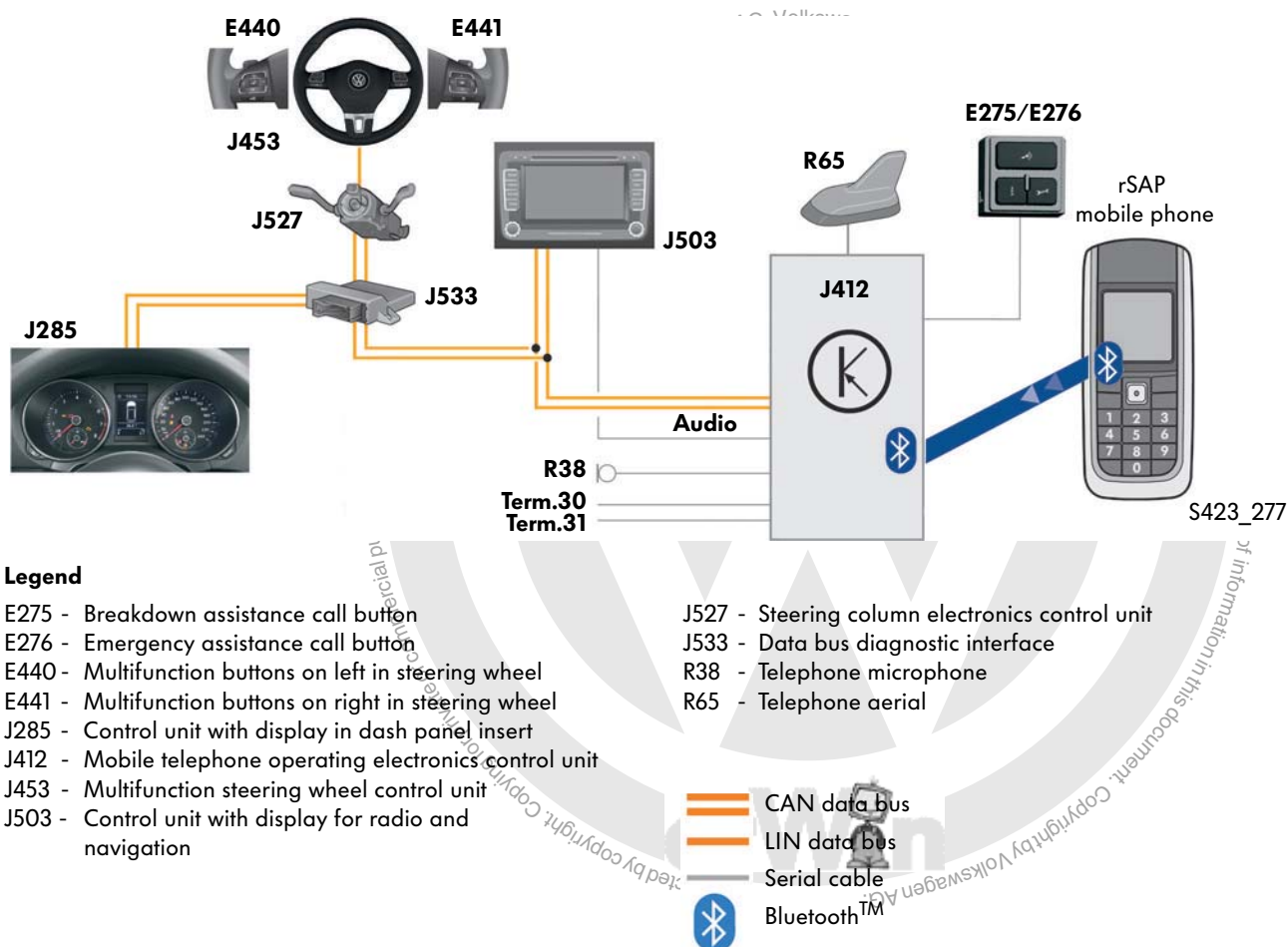
#### Legend

- J412 - Mobile telephone operating electronics control unit
- J503 - Control unit with display for radio and navigation
- R38 - Telephone microphone
- R54 - Mobile telephone
- R65 - Telephone aerial

## Premium phone preparation with Bluetooth™(rSAP)

### Functions

- Control via the multifunction steering wheel
- Display of telephone information in the Highline dash panel insert display
- Telephone data transfer and mobile link via Bluetooth™ transfer
- Hands-free system and audio mute
- GSM aerial directly on GSM telephone module
- UMPP is diagnosis-capable
- SIM data incl. telephone book available in universal mobile preparation
- Separate button module for information and breakdown calls as well as speech control
- Charging is only possible with a separate charging adapter using the 12V socket
- Follow-up time can be set to up to 60 minutes
- Exclusive support of mobile phones with rSAP Bluetooth profile
- Optional operation via touch screen devices like RNS 510 and RCD 510



# Heating and Air Conditioning

## Air conditioning

Two different types of air-conditioning system are fitted in the Golf that have also already been used in the Golf 2004:

- The standard semi-automatic heater and air conditioner “Climatic”
- The fully automatic “2C-Climatronic” heating and air-conditioning system



S423\_191

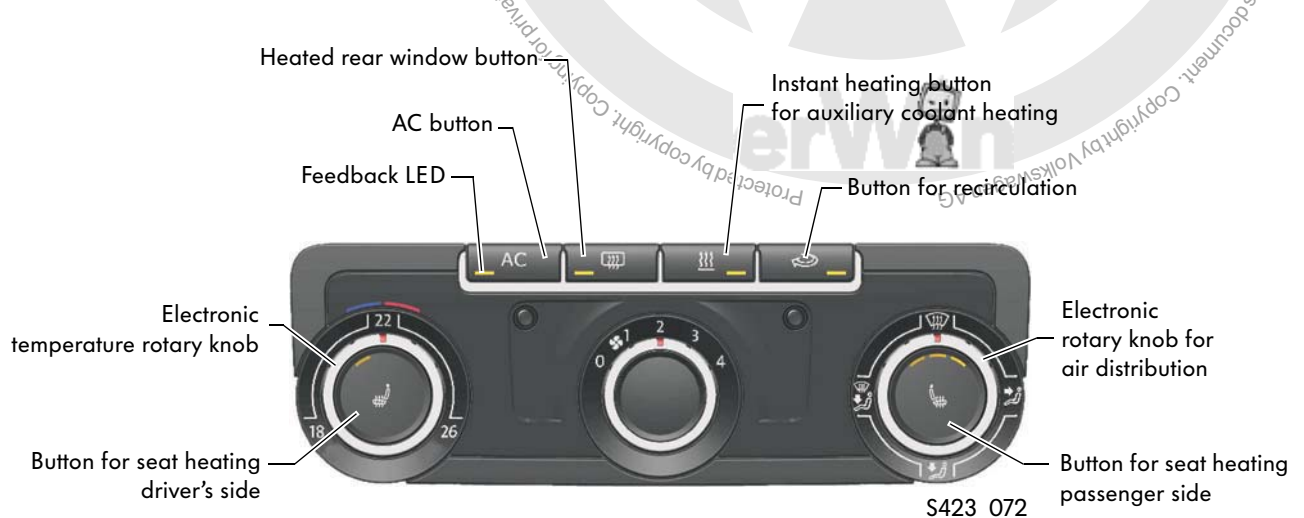
## The Climatic system

The vehicle interior forms one climate zone with Climatic.

The desired temperature is set on the electronic temperature rotary knob. The desired temperature is reached by adjustment of the temperature flap. Climatic is able to control the pre-set temperature by monitoring the vent and interior temperature. The air conditioning is switched on and off with the AC button.



S423\_097

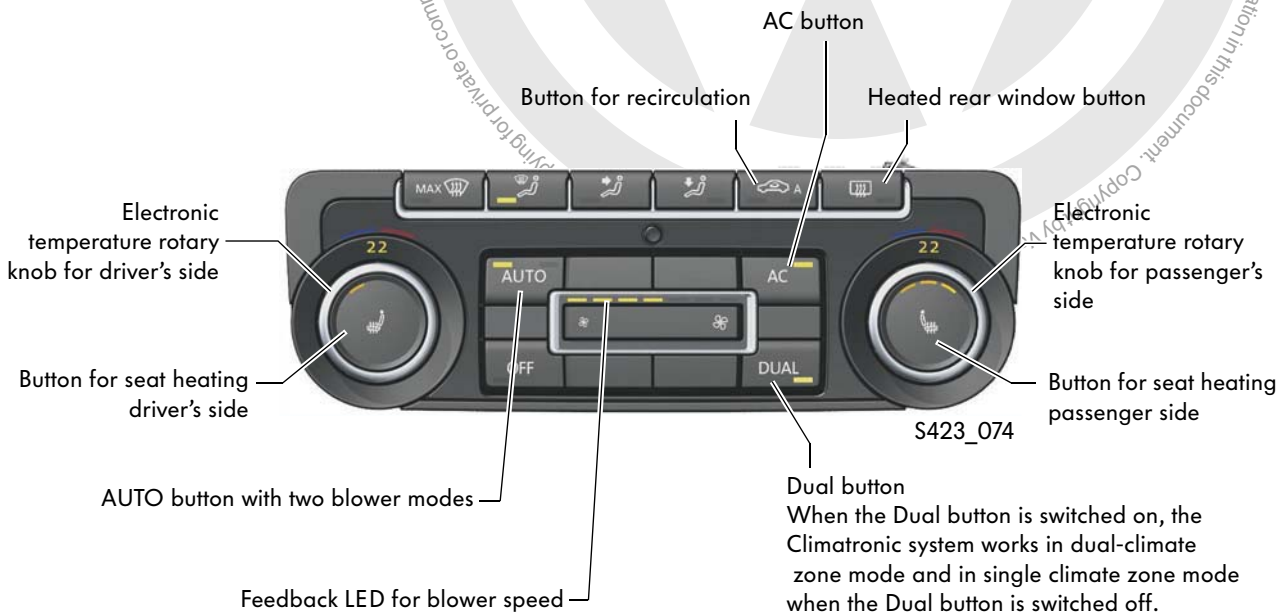


## The 2C-Climatronic system



In the 2C-Climatronic system, the interior is subdivided into two climatic zones. This means temperature preferences in a range from 18°C to 26°C can be set for the driver's and front passenger's side independently of one another. You should remember that the temperature difference between the climate zones may be up to a maximum of 4 degrees.

S423\_099



You will find further information on Climatic and Climatronic in self-study programmes no. 318 "The Golf 2004" and no. 339 "The Passat 2006".



The Golf 2009 is equipped with new elements for controlling the climate.



# Heating and Air Conditioning

## Automatic fresh-air blower control

You can choose between the two modes AUTO High and AUTO Low for the automatic fresh-air blower control. In these modes, not just the blower power is regulated automatically, but also the air distribution and temperature. You can switch between the modes by pressing the AUTO button.

In position AUTO = automatic mode, the air-conditioning control unit regulates the interior temperature using all input information quickly and comfortably to the required level and then holds it constant even when the external conditions change.

AUTO High	AUTO Low
<p>The AUTO High mode is an automatic mode with greater quantities of air. The target temperature should be reached as quickly as possible. AUTO High is configured especially when there is high risk of misting (high interior and/or external humidity) and for optimum ventilation of the rear passenger compartment. The right-hand LED of the AUTO button is illuminated in the AUTO High mode. The fresh air blower runs in the standard curve.</p>	<p>The AUTO Low mode is an automatic mode with smaller quantities of air. The Climatronic system gently regulates the preset interior temperature with acoustic comfort having priority. The left-hand LED of the AUTO button is illuminated in the AUTO Low mode. In AUTO Low mode, the fresh air blower speed is always a step lower than in AUTO High mode.</p>

## Automatic mode

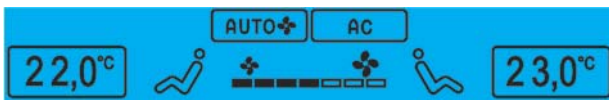
In automatic mode, Climatronic automatically adjusts the control motors of the air distribution flaps on the air-conditioning/heating system. The air flowing from the air-conditioning system has the set temperature and is directed to the windscreen, footwell or vents. The amount of air is controlled steplessly via the blower speed depending on whether a lot or little air is required to reach or maintain the comfortable temperature. The temperature of the air entering the vehicle is also measured continuously by the Climatronic system. The occupants use the value on both temperature knobs to set the level of the interior temperature to be regulated. Everything else is controlled automatically by the Climatronic system.

## Status display

The air-conditioning modules allow simple operation and a new kind of visualisation via the “climate control pop-ups”.

The temperature, air distribution and fan level are displayed on the screen of the RCD 310, RCD 510, RNS 310 and RNS 510 radio or radio-navigation systems.

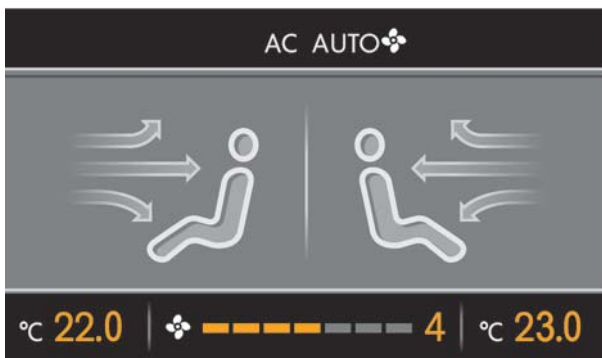
### Display on RCD 310



S423\_121

The LEDs in the control indicate that the respective function is active.

### Display on RCD 510, RNS 310 and RNS 510



S423\_119

In addition, the radio or radio/navigation system screen displays information on the Climatronic system. Therefore the temperature is displayed, for example, as a pop-up when you adjust the temperature.



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# Electrical System

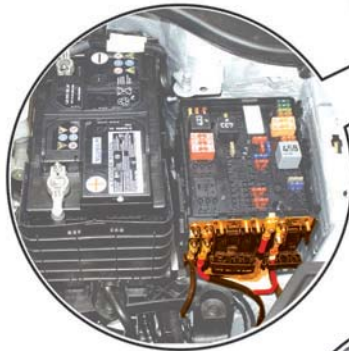
## The fuse boxes and relay positions in the vehicle electrical system

### The installation locations

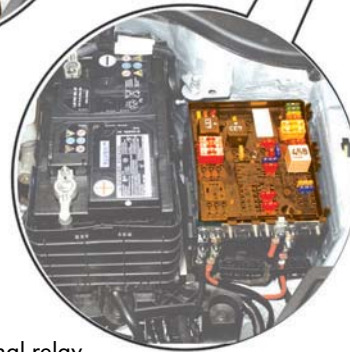
The battery is on the left-hand side of the engine compartment.



Fuse and relay box, left of engine compartment



Multi-fuse back-up fuse box, left of engine compartment



Additional relay carrier, under the fuse and relay box



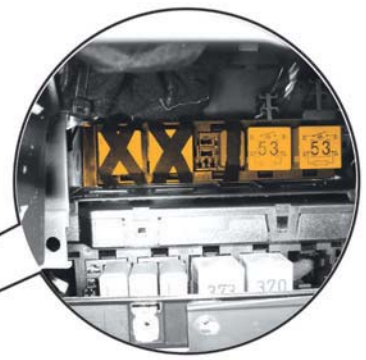
S423\_253



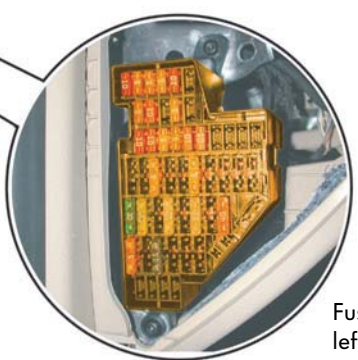
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Relay carrier  
above onboard supply control unit



Relay carrier  
underneath onboard supply control unit



Fuse box on,  
left of dash panel



# Electrical System

## Networking concept

The data bus diagnostic interface J533 forms the interface for communication between the following data bus systems:

- Powertrain CAN data bus
- Convenience CAN data bus
- Infotainment CAN data bus
- Combi CAN data bus
- Diagnostics CAN data bus

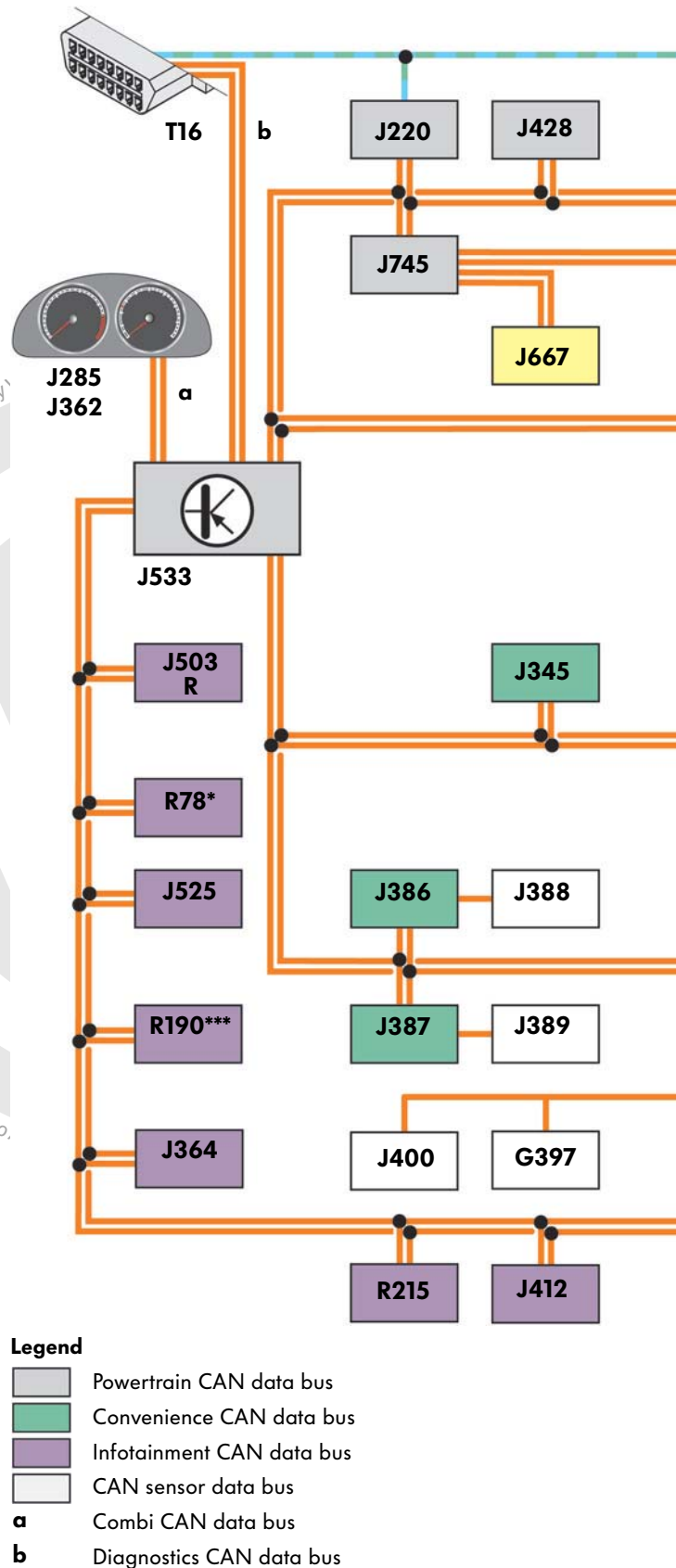
The following data bus system is connected downstream of the CAN data bus system as a sub-bus system:

- LIN data buses
- Cornering light CAN data bus



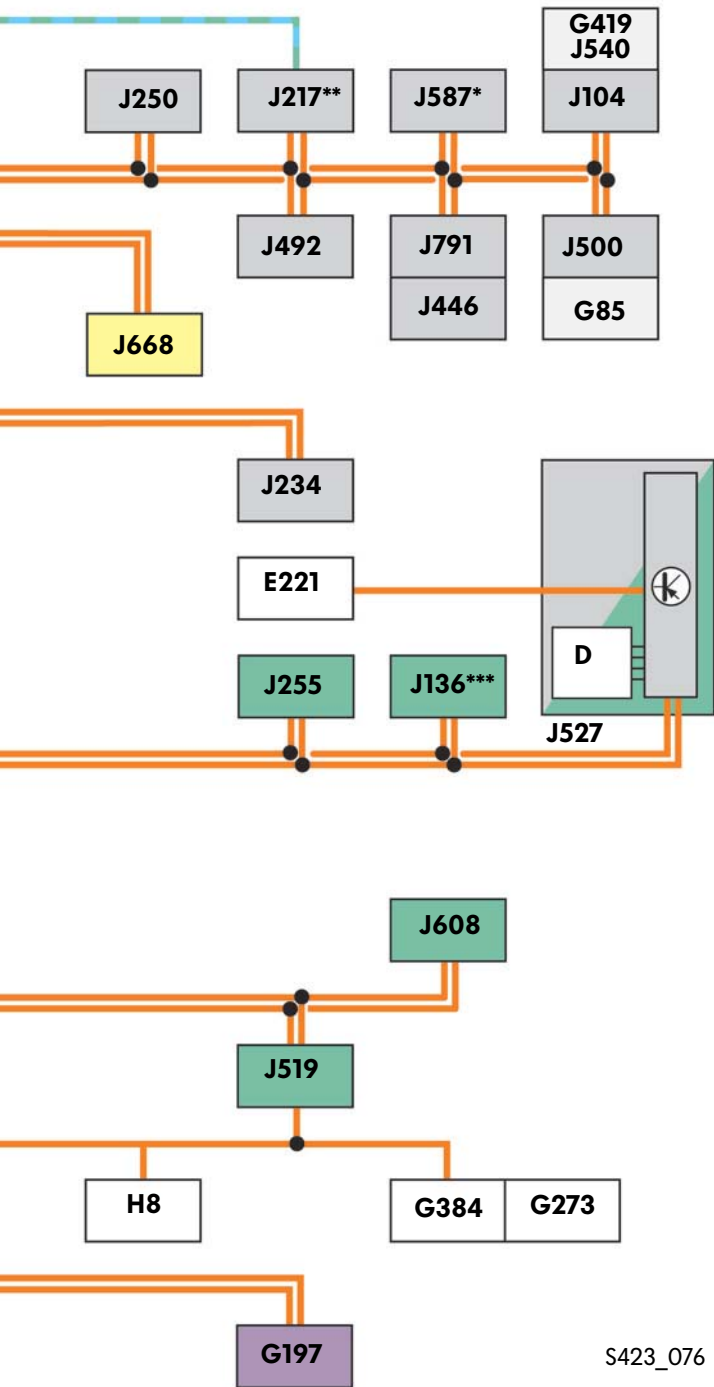
For the first time in the new Golf, the functions of the convenience system central control unit J393 have been taken over by the newly developed onboard supply control unit J519. The control unit address is still 09.

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### Transfer speeds

Powertrain CAN data bus:	500kbit/s
Convenience CAN data bus:	100kbit/s
Infotainment CAN data bus:	100kbit/s
Combi CAN data bus:	500kbit/s
Diagnosis CAN data bus:	500kbit/s
Cornering light CAN data bus:	500kbit/s
LIN data buses:	19.2kbit/s



**Legend**

- D Ignition/starter switch
- E221 Operating unit in steering wheel (multifunction steering wheel)
- G85 Steering angle sender
- G197 Magnetic field sender for compass
- G273 Interior monitoring sensor
- G384 Vehicle inclination sender
- G397 Rain and light sensor
- G419 ESP sensor unit
- H8 Anti-theft alarm system horn
- J104 ABS control unit
- J136\*\*\* Seat and steering column adjustment control unit with memory
- J217\*\* Automatic gearbox control unit
- J220 Motronic control unit
- J234 Airbag control unit
- J250 Control unit for electrically regulated damping
- J255 Climatronic (and Climatic) control unit
- J285 Control unit in dash panel insert
- J345 Trailer detector control unit
- J362 Immobilizer control unit
- J364 Auxiliary heater control unit
- J386 Driver door control unit
- J387 Front passenger door control unit
- J388 Rear left door control unit
- J389 Rear right door control unit
- J400 Wiper motor control unit
- J412 Mobile telephone operating electronics control unit
- J428 Adaptive cruise control unit
- J446 Parking aid control unit
- J492 Four-wheel drive control unit
- J500 Power steering control unit
- J503 Control unit with display for radio and navigation
- J519 Onboard supply control unit
- J525 Digital sound package control unit
- J527 Steering column electronics control unit
- J533 Data bus diagnostic interface
- J540 Electromechanical parking brake control unit
- J587\* Selector lever sensor control unit
- J608 Special vehicle control unit
- J667 Power output module for left headlight
- J668 Power output module for right headlight
- J745 Cornering light and headlight range control unit
- J791 Control unit for parallel parking assist
- R Radio
- R78 TV tuner
- R190 Digital radio satellite receiver\*\*\*
- R215 Interface for external multimedia devices
- T16 Diagnostic connection

- \* Only Japan
- \*\* With automatic gearbox only
- \*\*\* Only North American region (NAR)

- Cornering light CAN data bus
- LIN data bus
- CAN data bus line
- LIN data bus line
- Communications line

S423\_076



## Display of battery voltage in transport mode

The use of the new onboard supply control unit in the Golf allows the current battery voltage to be displayed in a simple manner.

The measuring point is directly on the battery pole clamps.

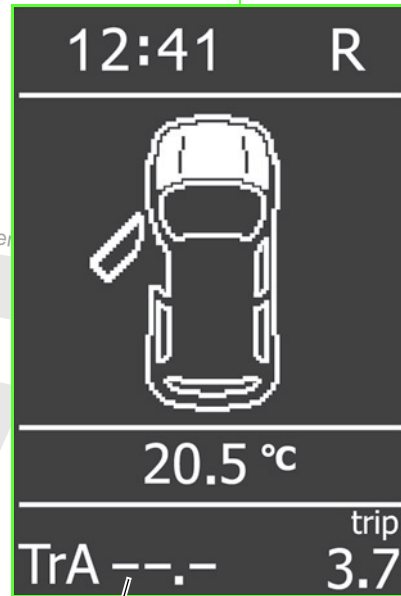


S423\_169



S423\_264

Display of battery voltage (12.3V)



S423\_266

Display when there is a fault

When transport mode is still active, the battery voltage is displayed without a measuring unit in two digits with one decimal place instead of the total mileage.

If the measured value is not transferred correctly, if it is not plausible or if there is another error related to this, only placeholders will be displayed.



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## AM

Amplitude modulation, electromagnetic wave used to transmit messages. In amplitude modulation, the amplitude of the high frequency is varied.

## BAP

The BAP operating and display protocol is used for communication between function control units and operating or display control units. BAP specifically separates the function from the display and the control.

## FM

Frequency modulation, electromagnetic wave used to transmit messages. In frequency modulation, the frequency of the carrier wave varies in step with the information signal. The amplitude remains constant.

## GPS

Global Positioning System, a satellite system set up by the US Department of Defense that aids navigation.

## GSM

Global System for Mobile communications Standard for digital mobile telecommunications networks that is also used for data transfer as well as text messages (SMS).

## Impedance transformer

An impedance transformer is an electronic amplifier that adjusts the impedance, i.e. the alternating current resistance of a source, for example, an aerial, to that of a consumer, for example, a radio.

## Pulse fidelity

Pulse fidelity is the property of a loudspeaker to follow a pulse-shaped output signal from an amplifier with as few delays, losses or distortion as possible and thus allow optimum reproduction.

## Convenience code

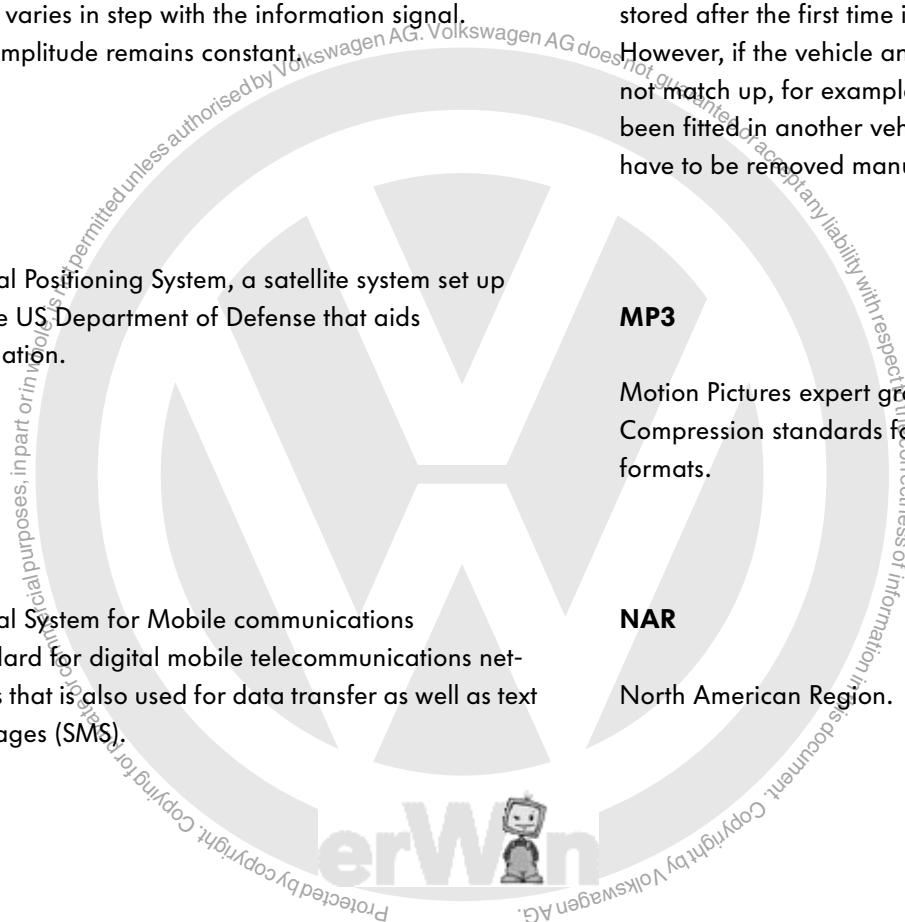
If the radio unit has been removed or the car battery disconnected, the anti-theft code does not need to be entered manually as the code number was stored after the first time it was entered in the car. However, if the vehicle and radio code numbers do not match up, for example, because the radio has been fitted in another vehicle, the electronic lock will have to be removed manually.

## MP3

Motion Pictures expert group layer 3 (MPEG Layer 3) Compression standards for video, audio and image formats.

## NAR

North American Region.



# Glossary

## LF

Low frequency

## RDS

Radio Data System

Standardised system for transferring non-audio additional information for radio e.g. station names, audio titles etc.

## rSAP

Remote SIM Access Profile

This profile allows the premium version of the mobile telephone operating electronics control unit to access the data on the GSM card of a mobile phone and to log onto the GSM network in its place.

## RSE

Rear Seat Entertainment provides multimedia entertainment for rear passengers. The main components are screens, a DVD player, an additional control unit, headphone connections and an additional video and audio input to which an external source, for example, a games console, can be connected. The DVD sound can also be played back over the radio system loudspeakers. To allow the driver and other passengers to listen to the radio while a DVD is playing, the rear seat entertainment and radio can, however, be operated independently of each other.

## SD

Secure Digital card

Small and robust memory cards, e.g. for digital cameras, MP3 players etc.

## SDARS

Satellite Digital Audio Radio Services

A digital radio standard for commercial satellite radio in North America

## TFT

Thin Film Transistor display  
(TFT display = flat screen).

## TMC

Traffic Message Channel

A digital service in radio for transmission of traffic messages

## UMPP

Universal mobile phone preparation.

## UMTS

Universal Mobile Telecommunications System is the third generation (3G) of mobile telecommunications standard with which considerably higher data transfer rates (384 kbit/s to 7.2 Mbit/s) are possible than with the GSM standard (9.6 kbit/s to 220 kbit/s). The fast data transmission forms the basis for countless new applications. Above all, it makes mobile use of the Internet possible.



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## USB

Universal Serial Bus

Universal serial interface between different computers and peripheral devices

## WMA

Windows Media Audio

Special audio format under Microsoft Windows.





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