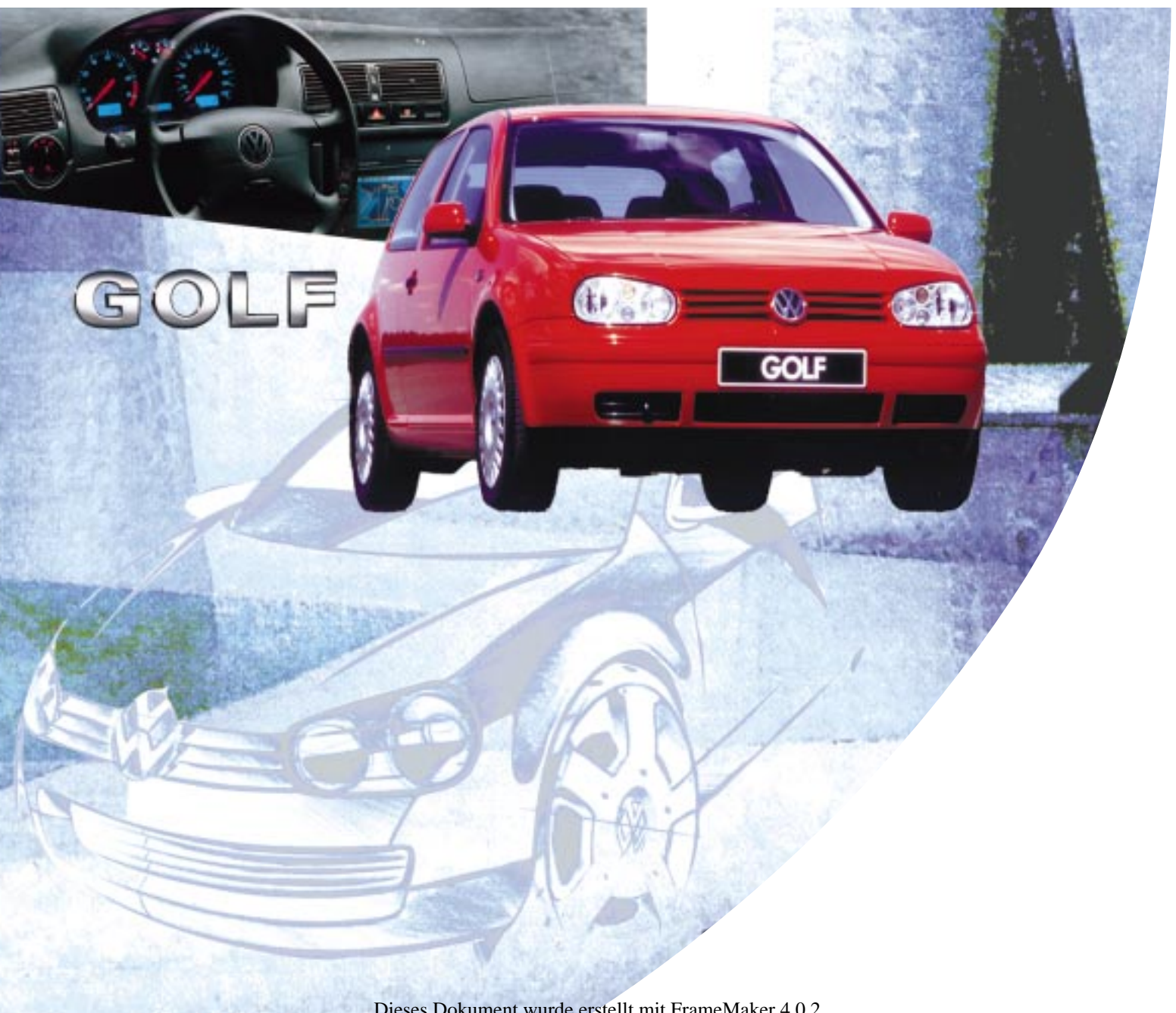




# Golf '98

## Construction and operation

Self-Study Programme No. 200



## Dear Reader,

The Self-Study Programme series has been keeping you informed about the construction and operation of Volkswagen and Audi technology for the past 24 years .

In conjunction with the launch of the new Golf, we have taken the opportunity to revise slightly the layout of our Self-Study Programme.

- In keeping with the times, the style of our Self-Study Programmes is now friendlier and more easily distinguishable.

- The contents are based on the workshop manuals.
- The chapter entitled “Servicing” informs you about changes in our servicing procedures.

We hope that the Self-Study Programme will provide you with useful information and assistance in your daily work.

**With kind regards of your Self-Study Programme Team K-VK-12**



**ONE  
for ALL?**

**ALL for ONE!**

**You can find your new  
Golf in the middle of  
the Self-Study Pro-  
gramme.**

**New**



**Important  
Note**



**This Self-Study Programme is  
not a Workshop Manual.**

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



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- Occupant protection, anti-theft measures



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# NEWS • NEWS • NEWS • NEWS • NEWS • NEWS •



The new model **GOLF** looks like a Golf and again sets new standards.



It is the evolutionary development of the classless Golf design. It reflects a high technical standard and is therefore superior to the competition.

## ... Safety

The safety structure of the new Golf has been specially optimised against side impact and in the driver footwell area.

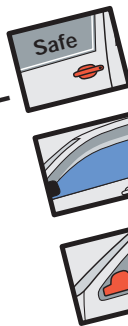


## For the sake of the environment:

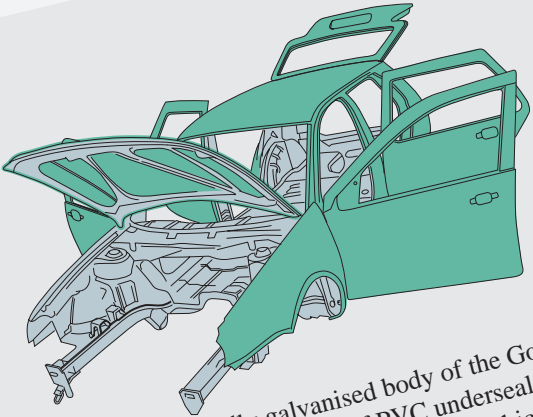
Over 90% of the new Golf is recyclable at the end of its long useful life, thus conserving valuable resources for the benefit of generations to come.



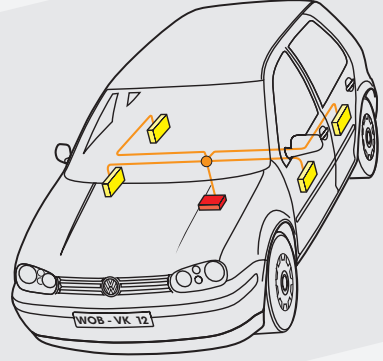
## Convenience system



The convenience system has a decentralised layout.



The fully galvanised body of the Golf saves about 4 kg of PVC underseal and extends the useful life of the vehicle by 30%.



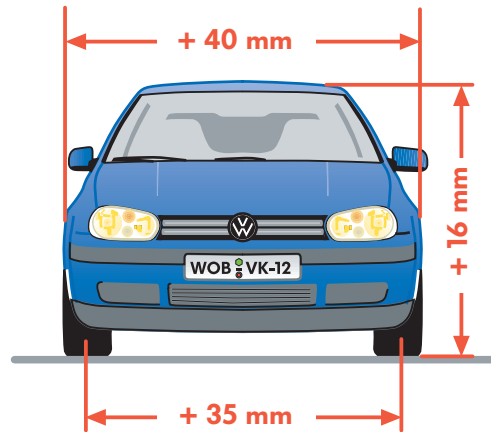




## Vehicle dimensions

the “+ dimensions” in the drawing are comparative values with the predecessor model

Width	1735 mm
Height	1439 mm
Track width, front	1513 mm



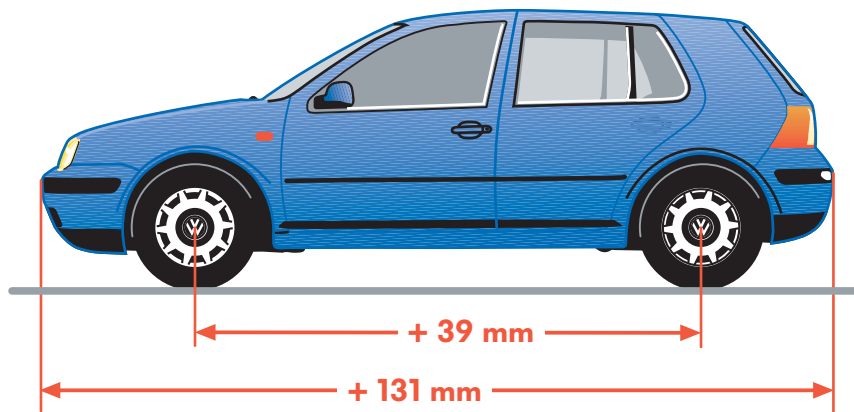
Aerodynamic drag = Drag coefficient x Frontal area, projected surface area

$c_d$  x  $A \text{ m}^2$

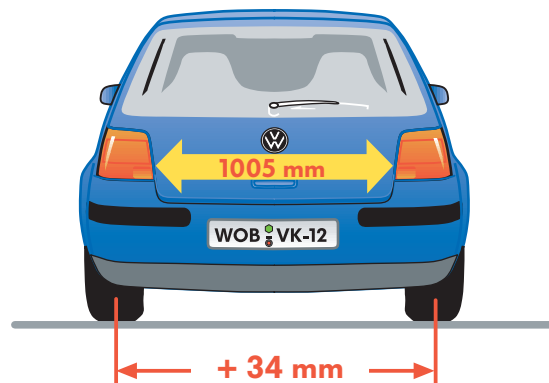
$0.65 \text{ m}^2 = 0.31$  x  $2.1 \text{ m}^2$

Length 4149 mm

Wheelbase 2511 mm



Rear track width	1494 mm
Through-loading width	1005 mm
Tank capacity	55 litres



# An all-new Golf



## Environmental protection

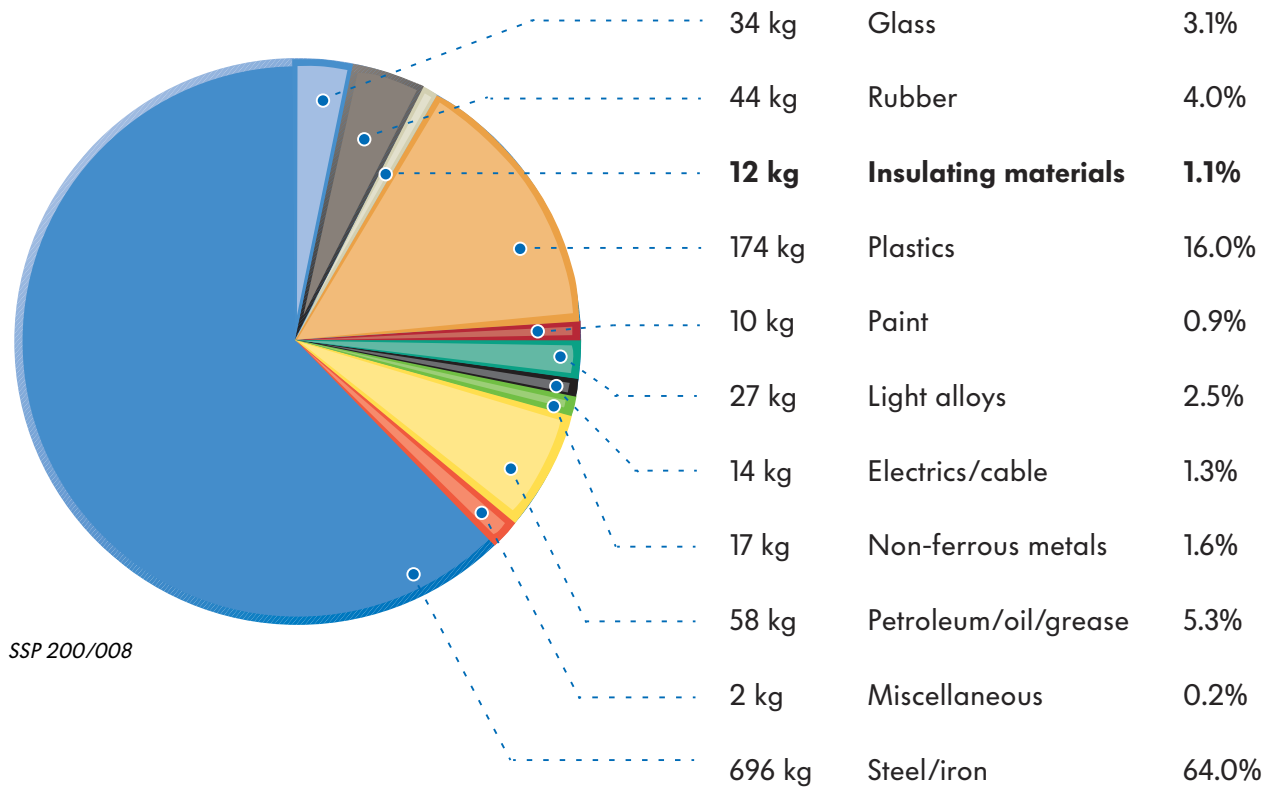
The Volkswagen Group is making eco-efficient, progressive technologies available world-wide. It employs these technologies throughout the life cycle of its products and beyond.

## Recycling at a high level

In stripping centres the parts removed from scrap cars are sorted into clean material streams according to type and then recycled. In many cases, plastics, metals and insulating materials can even be made into the original product again.

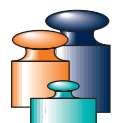


The overview below shows what materials are used in the Golf:



SSP 200/008

**1088 kg Total weight**



On the following pages we will explain to you our eco-friendly policy on raw materials using insulating materials as an example.



## Recycling

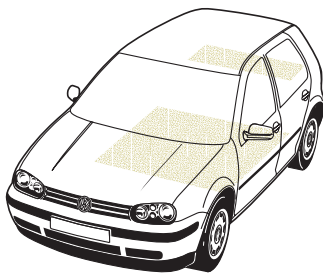
### Principle:

- Avoidance comes before reduction
- Reduction comes before recovery
- Recovery comes before disposal

Renewable raw materials are used every vehicle. Their recyclability is a major factor. The raw materials which are made into components are processed and recycled.



## Recycled insulating materials



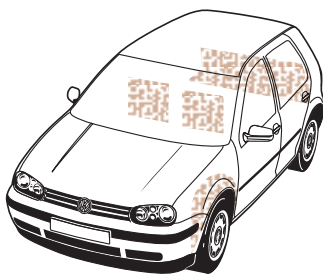
Cotton fibre fleece in insulating mats and luggage compartment floor coverings



For example, the **cotton fibre fleece** used in insulating mats is a recycle of garment cuttings.

Waste fibre recovery is industry's contribution to reducing the burden on waste disposal sites.

## Trims and covers made from renewable materials



0.5 kg flax fibre - moulding material used for the tailgate trim

0.8 kg flax fibre - moulding material for seat backrest cover

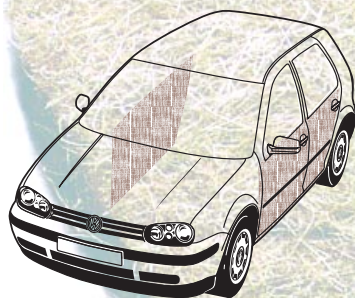
2.1 kg flax fibre moulding material used for the wheelhouse trim



**Flax fibre moulding material** is contained in trim panels and covers.

The straw left over from the linseed harvest was burnt for many years. However, approximately 25% of fibre component can be used as a basic material for fibre mouldings. The quality of the fibres need not meet the high standards of the textile industry, but it does satisfy the high quality standards for trim panels.

Flax fibres are highly workable and have excellent material properties.



1.5 kg wood fibre moulding material in the doors and side panels



**Wood fibre moulding material** is used for trim panels. The basis of wood fibre moulding materials are the pine woodchips left over from the production of wooden beams and boards in sawmills.

Wood fibre moulding material meets the requirements of the automobile industry. These include: low weight, low emissions, high strength and non-splintering properties.

SSP 200/009

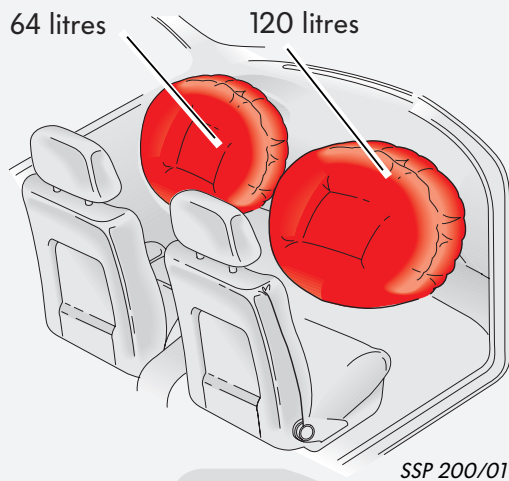
# An all-new Golf

## Occupant protection

There is more to occupant protection than the airbag, belt tensioner and stable side protection. Most of the impact energy is absorbed by the car body. Achieving such a high standard of safety means paying special attention to detail.

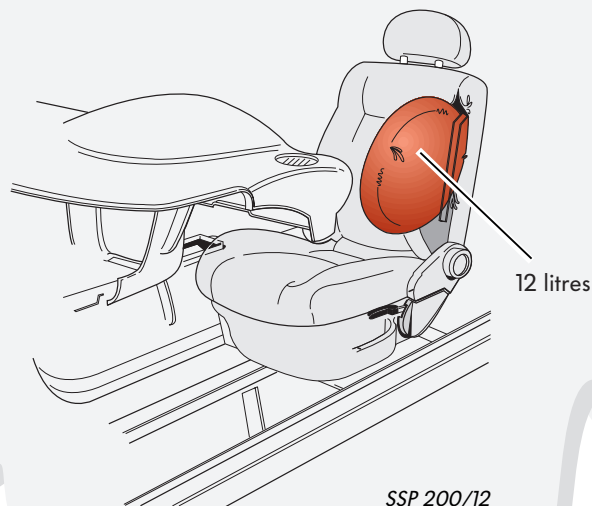
### The full-size airbags

for the driver and front passenger sides are almost twice the size they were before.



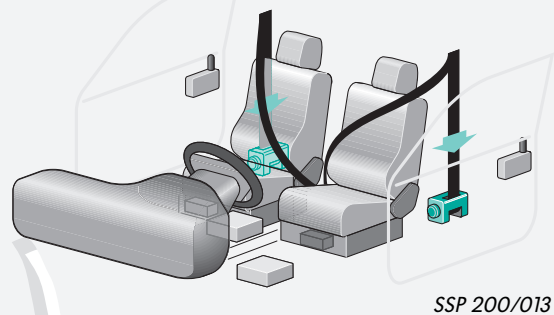
### The side airbags

for the driver and front passenger.



### The front seat belts

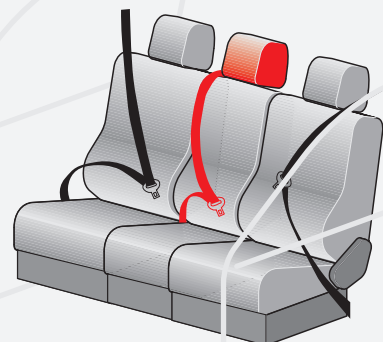
have two pyrotechnical belt tensioners which operate according to the same principle as the rotary-piston engine.



You can read about the design and function of this seat belt tensioner in Self-Study Programme No. 192.

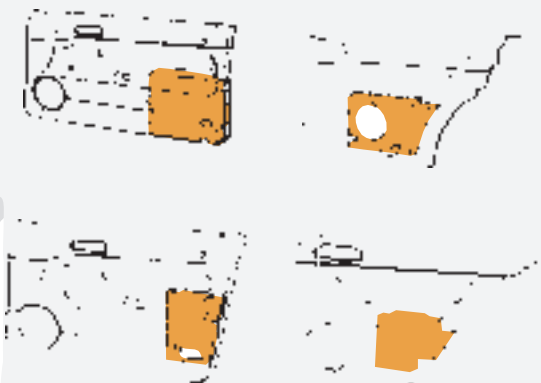
### A 3-point seat belt and a 3rd head restraint

are available for the rear middle seat. The rear seat belts do not have belt tensioners.



### The paddings

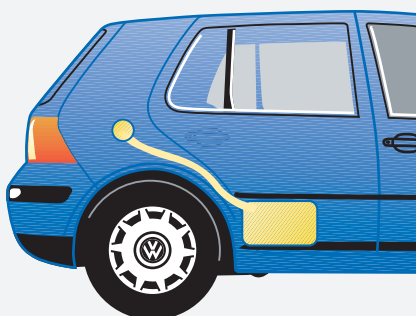
are integrated in the door and side trims. They protect the pelvis and rib areas of occupants during a side impact.



SSP 200/015

### The fuel tank

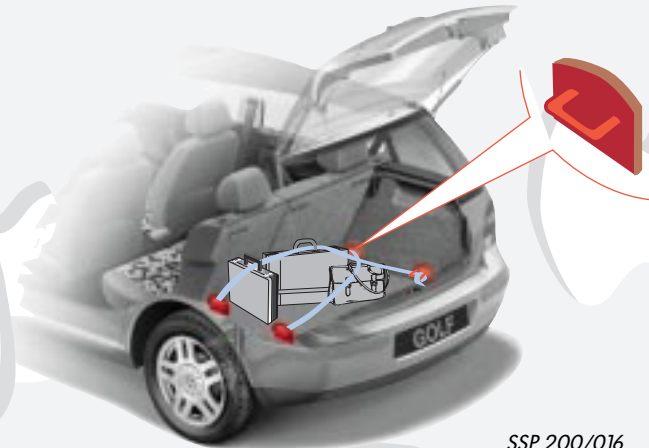
is now located in front of the rear axle for added safety in a rear collision.



SSP 200/017

### Lashing eyes

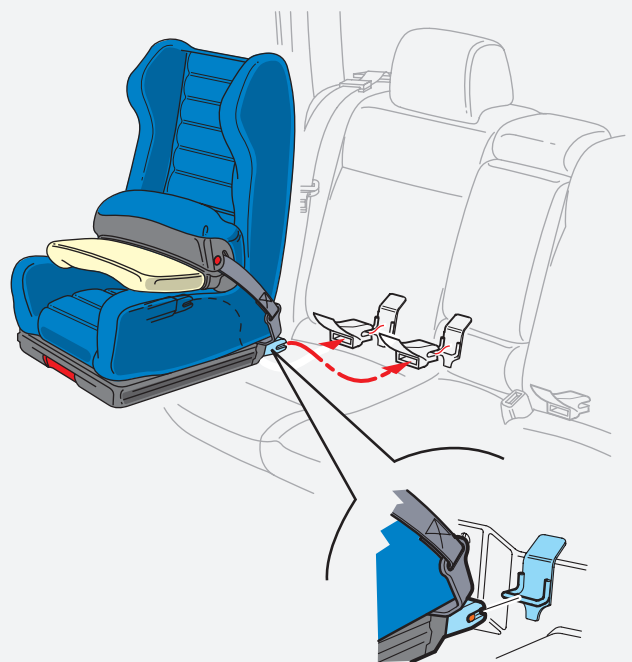
The four lashing eyes in the luggage compartment enable luggage to be secured safely.



SSP 200/016

### The child safety seat fastening system

Welded on the vehicle body are retaining eyelets to which child safety seats equipped with the ISOFIX fastening system can be easily secured.



SSP 200/018

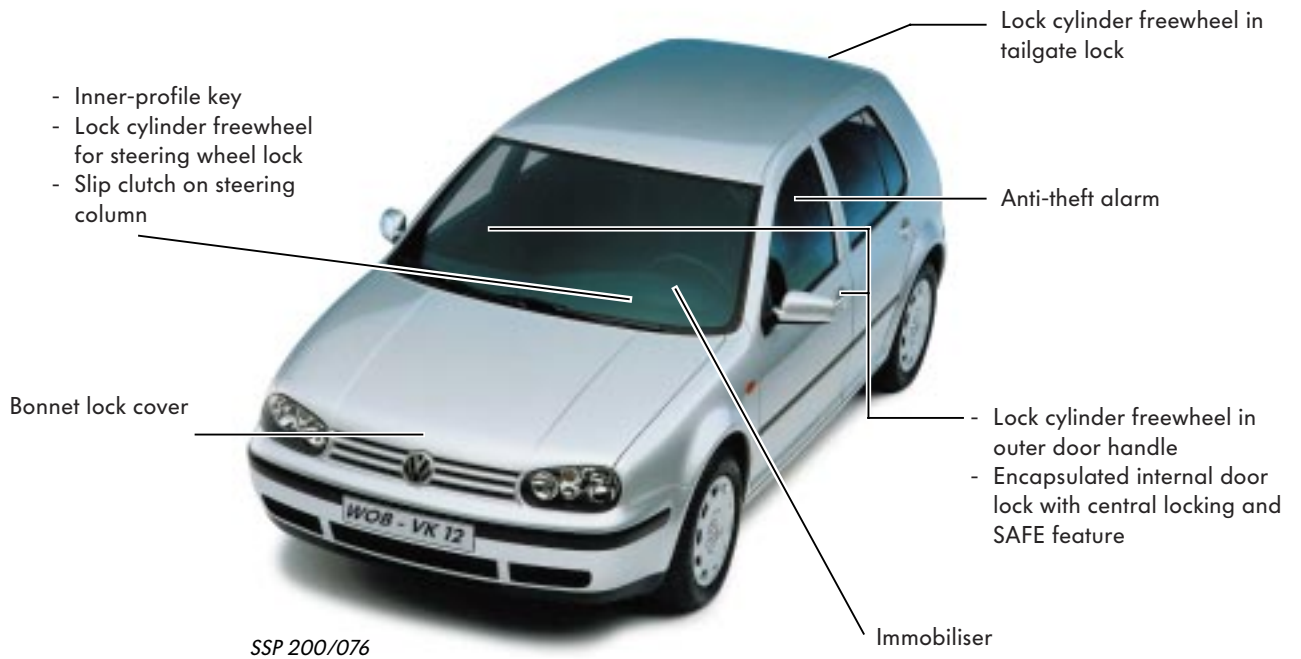


# An all-new Golf



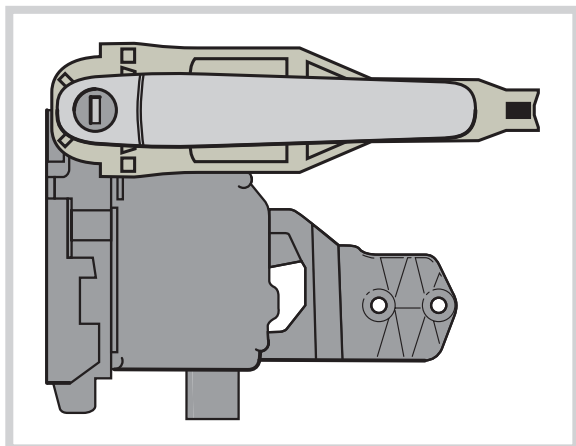
## Anti-theft measures

A number of measures have been taken to provide more effective theft protection.

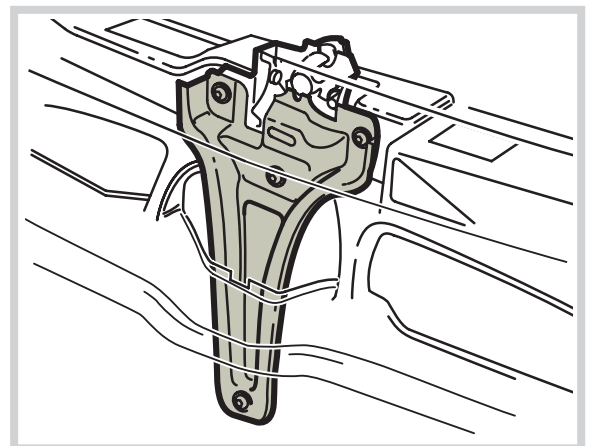


The door lock is encapsulated and there is a metal reinforcement around the door lock. These measures prevent would-be thieves piercing a hole through the bodyshell in this area and levering open the door handle.

The bonnet lock cover makes breaking open the bonnet more difficult.



SSP 200/077

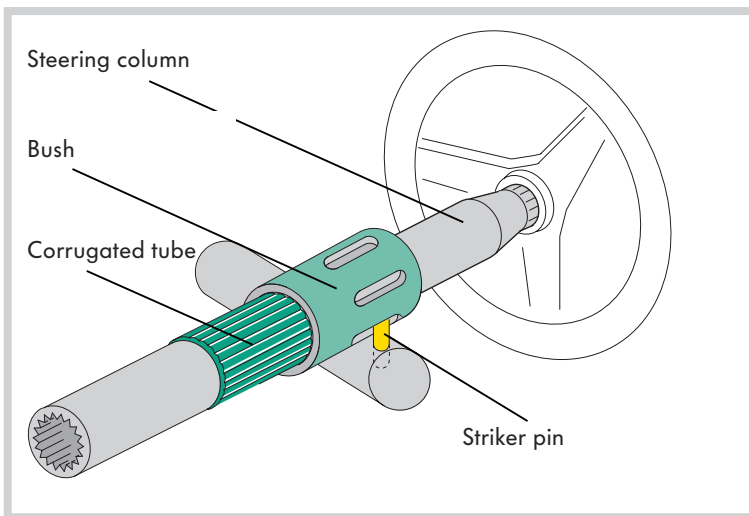


SSP 200/078

## Anti-theft measures

### The steering system

The striker pin of the ignition lock can no longer be sheared off. This makes it impossible to steer the vehicle.



A corrugated tube is located on the steering column. A bush with oblong holes is press-fitted on it. The steering column and the bush joined by an interference fit via the corrugated tube.

#### This is how it works:

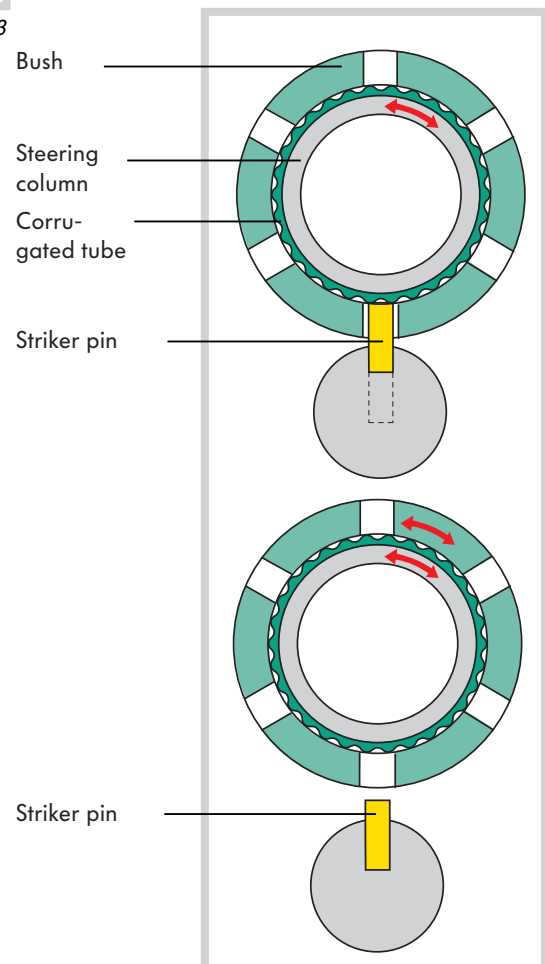
SSP 200/073

The striker pin of the ignition lock engages in the oblong holes of the bush when the ignition key is removed from the ignition. If an attempt is made to turn the steering wheel by applying a force of approx. 150 Nm, the corrugated tube will be friction-locked between the steering column and bush.

It is not possible to steer the vehicle or shear off the locking pin.

Inserting the ignition key in the ignition withdraws the striker pin from the oblong holes of the bush.

The vehicle can again be steered since the corrugated tube and the bush now rotate with the steering column.



SSP 200/074



# An all-new Golf



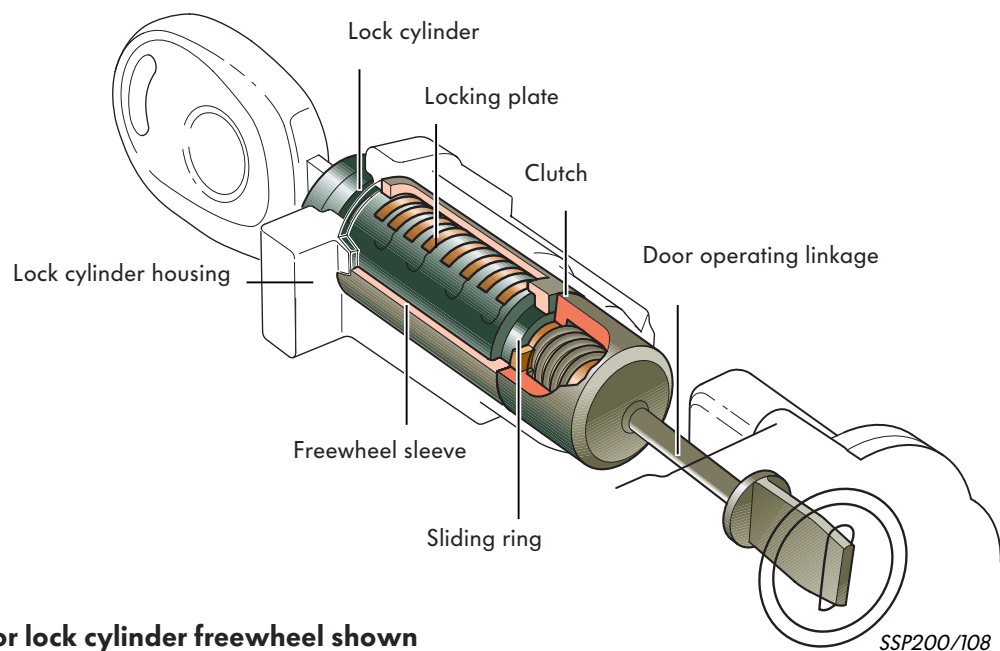
## Anti-theft measures

### The lock cylinder freewheel

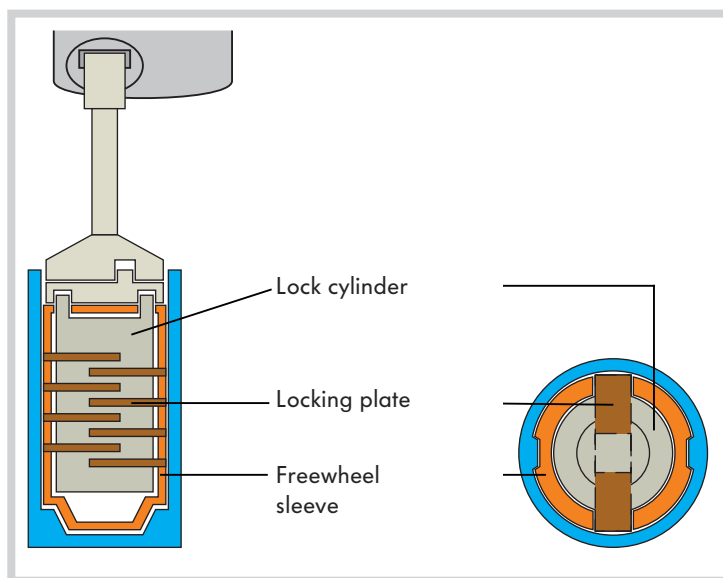
is integrated in the front doors, tailgate and ignition lock.

It prevents these locks being forced and limits the damage caused by an attempted break-in.

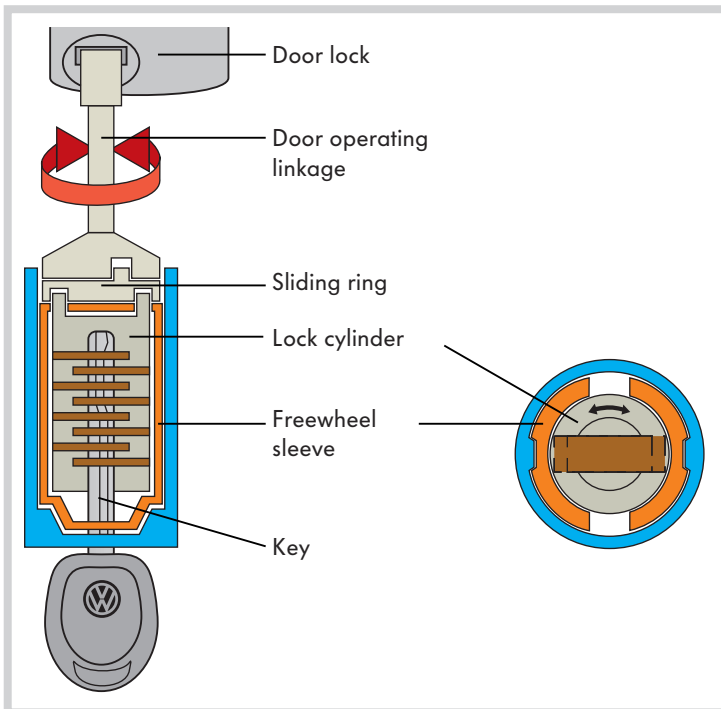
The lock-cylinder unit comprises the following components:



### Function of door lock cylinder freewheel shown below using a door lock as an example

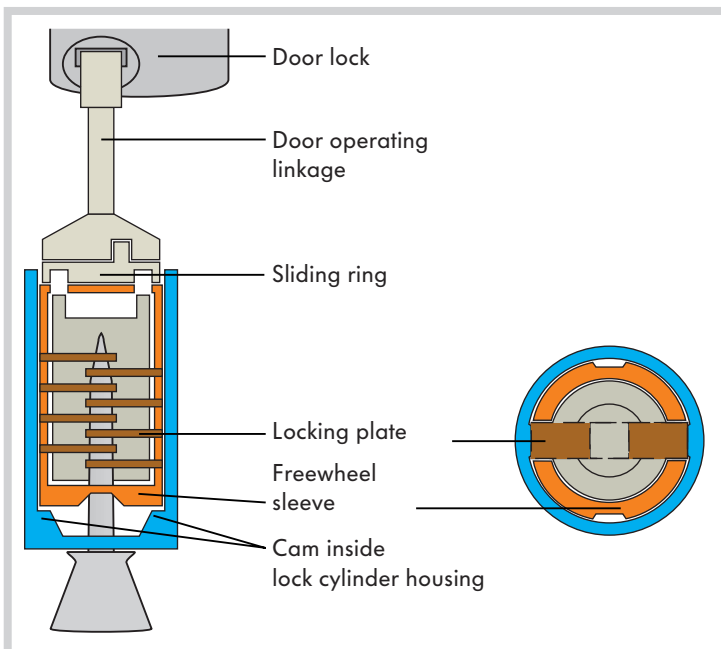


When the key is not inserted in the ignition, the locking plates engage in the freewheel sleeve.



SSP 200/132

Inserting the matching key in the ignition draws the locking plates into the lock cylinder. When the ignition key is turned, the lock cylinder in the freewheel sleeve rotates and opens the door lock via the sliding ring and the door operating linkage.



SSP 200/133

If the wrong ignition key is used or another tool, the locking plates remain in the freewheel sleeve. When the lock cylinder is turned, the freewheel sleeve is also rotated. The freewheel sleeve and the sliding ring are moved by two cams inside the lock cylinder housing. In the process, the lock cylinder is disconnected from the sliding ring. The lock cylinder turns without the sliding ring or the door operating linkage. The door lock is not opened.

The lock cylinder freewheel and the encapsulated internal door lock minimise damage caused by an attempted break-in.

# An all-new Golf

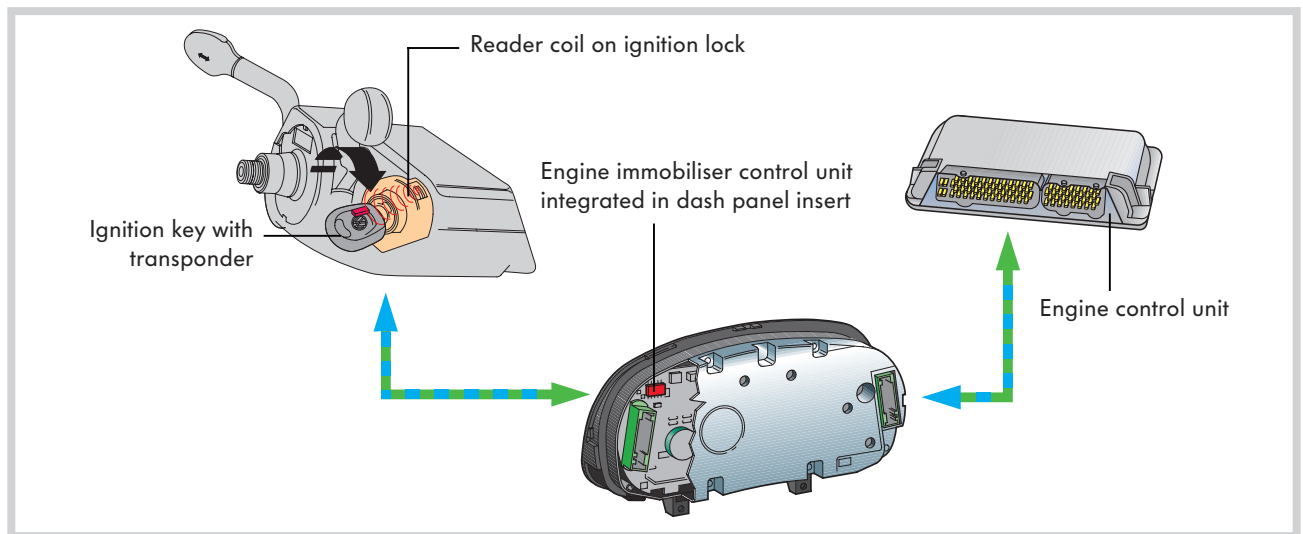
## Anti-theft measures

### Immobiliser

This is an electronic theft deterrent. It is activated when the ignition is turned on. The immobiliser prevents unauthorised persons from operating the car by intervening in the engine control unit.

The differences between the 2nd generation immobiliser and the previous generation are as follows:

- The immobiliser control unit is integrated in the dash panel insert.
- In addition to the fixed code, the engine immobiliser control unit transmits a self-varying code to the transponder integrated in the vehicle ignition key.



SSP 200/064

After the ignition is turned on, the transponder sends a fixed code to the engine immobiliser control unit. If this code is correct, a self-varying code is generated in the engine immobiliser control unit by a random generator. The self-varying code is transmitted to the transponder inside the vehicle ignition key. This starts a series of secret arithmetic operations in the transponder and the engine immobiliser control unit.

If these arithmetic operations produce identical results, the vehicle key is recognised as the correct one. As before, a check is performed to see if the self-varying code of the engine immobiliser control unit and the engine control unit match. If they match, the vehicle is ready to operate.

The advantage of these secret arithmetic operations is that the calculated self-varying code cannot be decoded. In addition, the vehicle ignition keys cannot be copied.



## Anti-theft measures

### Anti-theft alarm

This monitors the doors, the bonnet, the tailgate and the ignition lock.

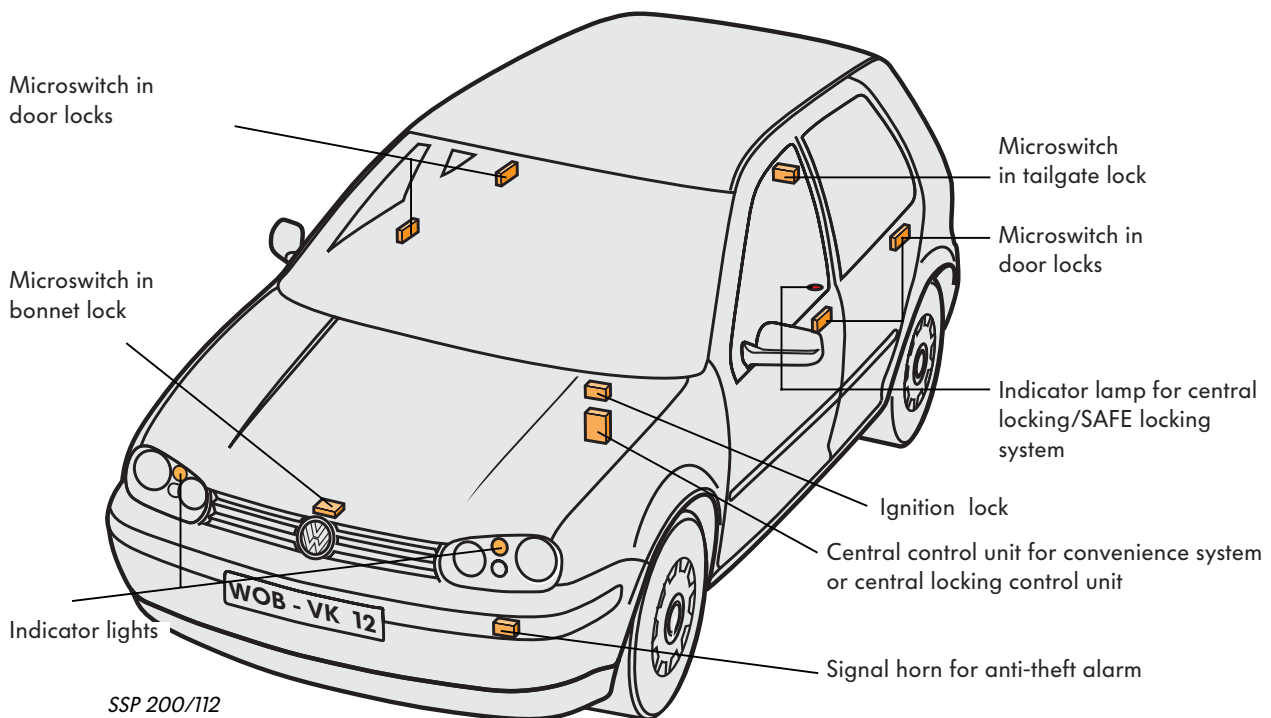
The function can be integrated in two different control units:

#### In the central locking control unit

on vehicles without electric windows

#### In the central control unit for the convenience system

on vehicles with electric windows



The anti-theft alarm is switched on when the vehicle is locked once with the ignition key. To lock the vehicle without switching the anti-theft alarm on, the vehicle must be locked twice within a period of 5 seconds.

If the vehicle is broken into in one of the monitored areas, a signal is sent to the control unit and the alarm is tripped. The alarm is reproduced audibly by activating the signal horn for the anti-theft alarm and visually by activating all the indicator lights.

Depending on the car's specification, the self-diagnosis can be performed using

- address word 35 in the central locking control unit or
- address word 46 in the convenience system central module.



# Body

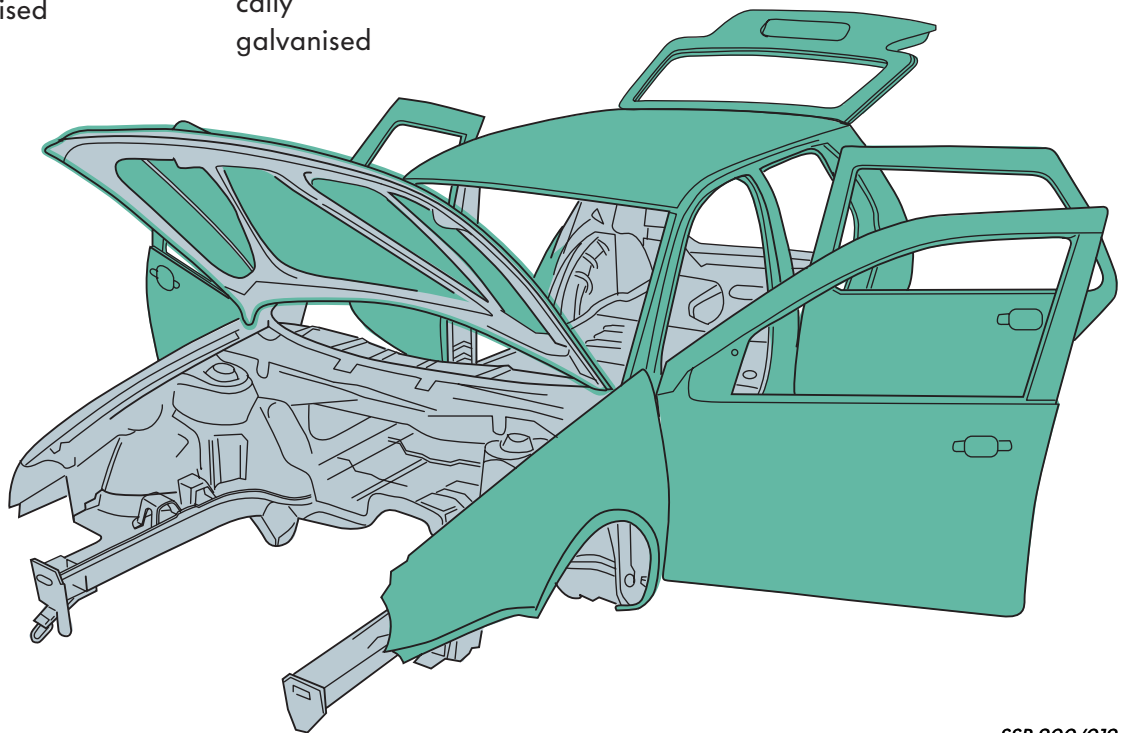
## The fully galvanised body

The new Golf has a fully galvanised body and therefore offers greater protection against corrosion (12-year anti-corrosion perforation warranty).

In the past, only body areas of the Golf prone to corrosion were galvanised. Now, for the first time, all body parts are either hot-dip galvanised or electrolytically galvanised.

hot-dip galvanised

electrolytically galvanised



SSP 200/019

All parts which are externally visible are hot-dip galvanised.

All outer skin panels are electrolytically galvanised

Rough surface

Smooth surface

Zinc coating approx. 10µm thick

Zinc coating approx. 8µm thick

Does not change shape easily.

Changes shape easily.

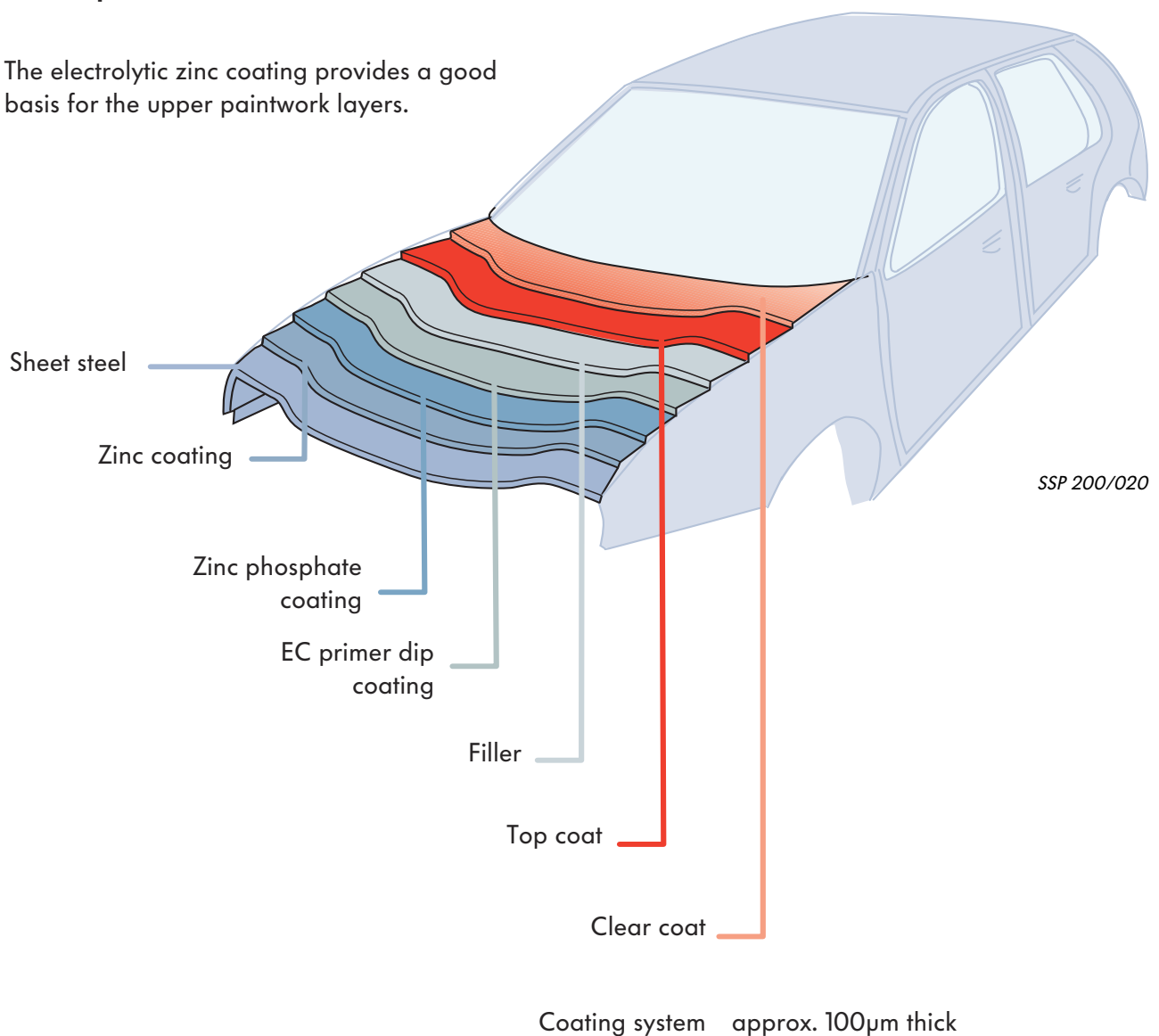
## The paintwork structure

The paintwork is specifically structured to increase body corrosion protection even more.



### Vehicle paintwork structure

The electrolytic zinc coating provides a good basis for the upper paintwork layers.



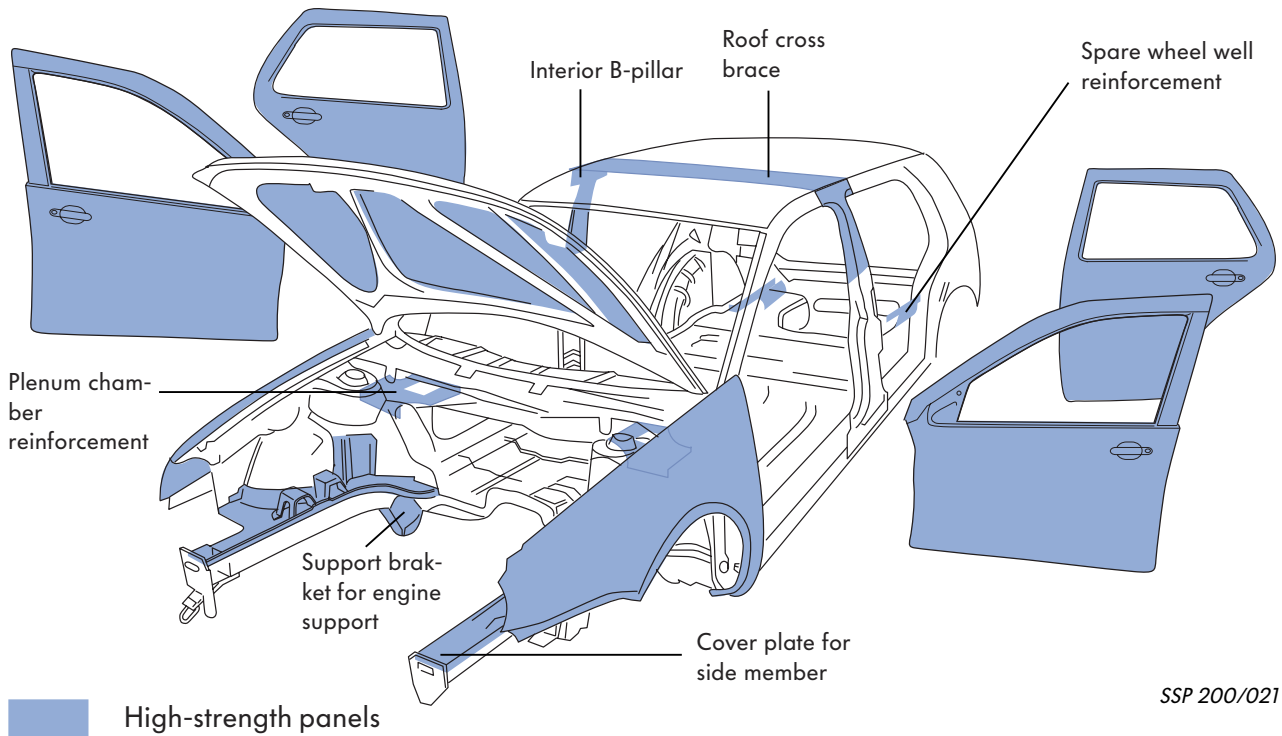
# Body

## High-strength panels

They are specially alloyed thin panels which achieve high strength as a result of subsequent heat treatment.

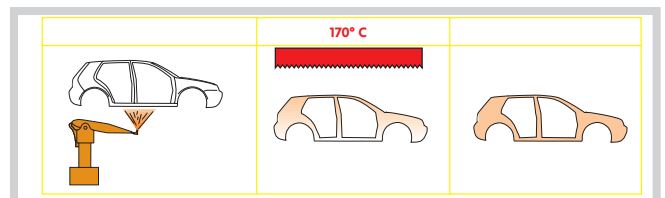
Therefore, it is possible to use panels which

are thinner than deep-drawn panels yet they are just as strong. A great deal of weight is saved in this way.



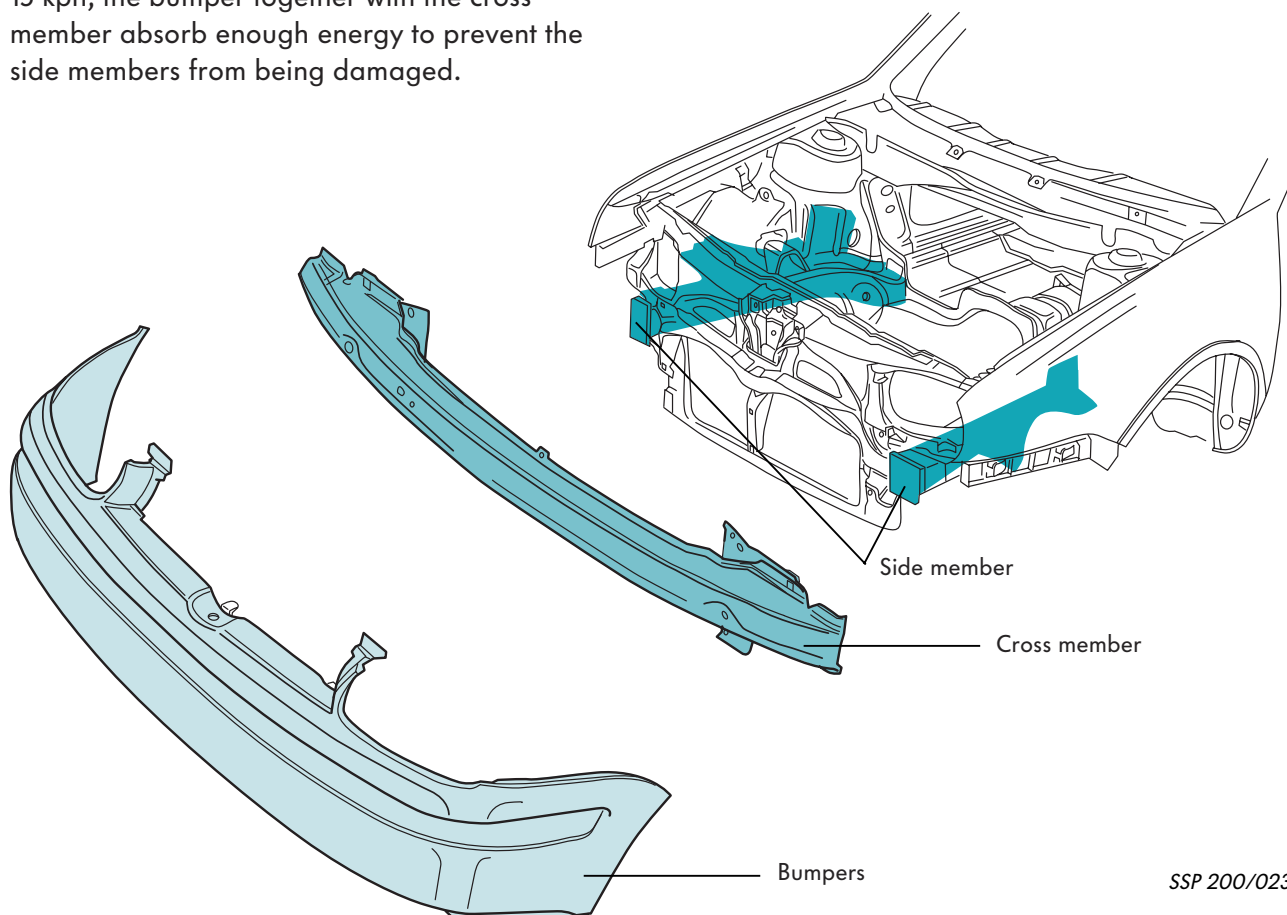
## Thermal post-treatment

This is a welcome “side-effect” of the stove enamelling process during which the body is heated to approximately 170°C anyway. The advantage of this effect is that the body panels, made of a relatively soft material, only achieve their ultimate strength once the shaping process has been completed.



## Front bumper

In a frontal collision at speeds of up to approx. 15 kph, the bumper together with the cross member absorb enough energy to prevent the side members from being damaged.



SSP 200/023

## Rear bumper

The rear bumper has been enlarged. As a result, a low-speed rear collision does not cause damage to the body side section.

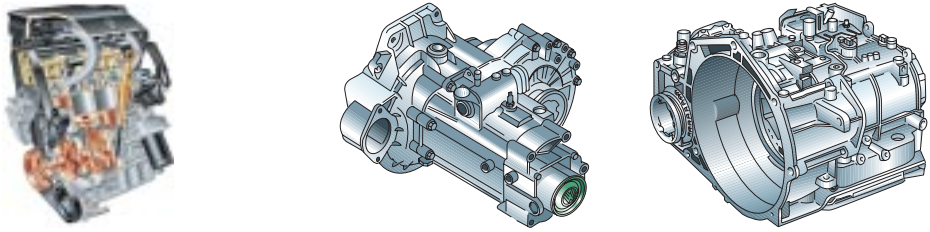

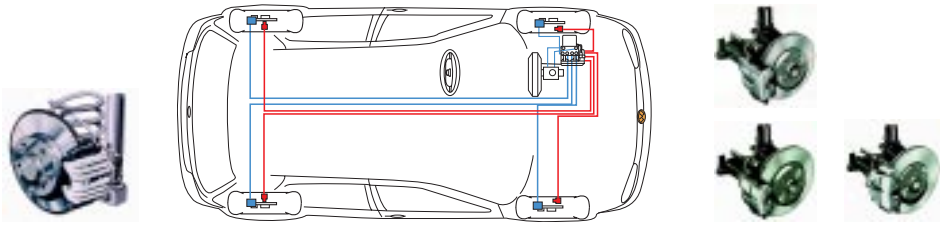

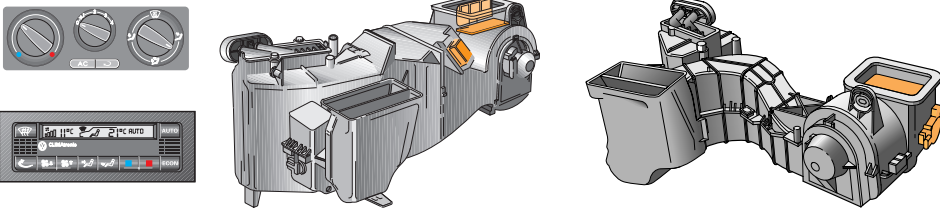
These measures will reduce repair costs.




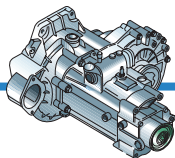

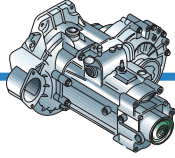
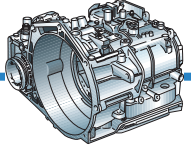

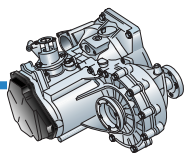
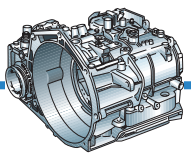

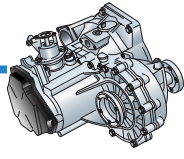
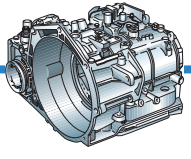

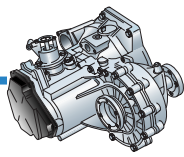
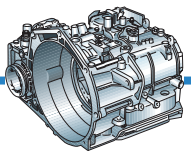

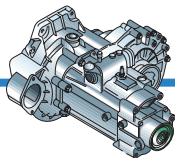

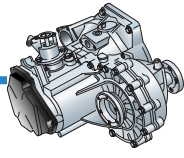
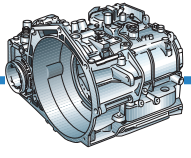

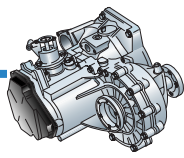
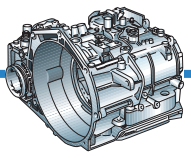
SSP 200/123

## Technical platform

Like the Audi A3 and the Skoda Octavia, the new Golf is based on the A-platform. The platform components are therefore almost identical from a technical aspect.

<p><b>Engines</b></p>			
<p><b>Running gear</b></p>			
<p><b>Braking system</b></p>			
<p><b>Electrical system</b></p>			
<p><b>Heating/ air-conditioning system</b></p>			

## Engine-gearbox combinations

Engine	Gearbox		5-speed manual gearbox		4-speed automatic gearbox
			02K	02J	01M
	1.4-ltr. 4V	55 kW			
	1.6-ltr.	74 kW			
	1.8-ltr. 5V	92 kW			
	1.8-ltr. 5V Turbo	110 kW			
	2.3-ltr. V5	110 kW			
	1.9-ltr. SDI	50 kW			
	1.9-ltr. TDI	66 kW			
	1.9-ltr. TDI	81 kW			



# Engines

## German emissions standard

In Germany, a new emissions standard has been in force since July 1997. This standard, referred to as Emission Stage D3, specifies lower emission limits.

Customers driving a vehicle which meets this emissions standard are eligible for government tax benefits.

The table below shows the relationships between the engines and the D3 emissions standard as well as EU II.

Engine	Engine code	Gearbox	Emission Stage		Measures	Engine management
			D3	EU II		
1.4-ltr. 55kW	AHW	manual		x		Magneti Marelli 4AV
	AKQ	manual	x		Primary catalytic converter	
1.6-ltr. 74kW	AEH	manual	x		Software update	Simos 2
		automatic		x		
	AKL	automatic	x		Two primary catalytic converters	
1.8-ltr. 92kW	AGN	manual	x		Software update	Bosch Motronic 3.8.5
		automatic		x		
1.8-ltr. 110kW	AGU	manual	x		Software update	Bosch Motronic 3.8.3
		automatic			Trimetallic catalytic converter	
2.3-ltr. 110kW	AGZ	manual	x		Secondary air injection	Bosch Motronic 3.8.3
		automatic				
1.9-ltr. SDI 50kW	AGP	manual		x		Bosch Electronic Diesel Control
1.9-ltr. TDI 66kW	ALH	manual	x		Variable turbine geometry	Bosch Electronic Diesel Control
		automatic			Enlarged oxidation catalytic converter	
	AGR	manual		x	Cooler for exhaust gas recirculation (auto gearbox only)	
1.9-ltr. TDI 81kW	AHF	manual		x		Bosch Electronic Diesel Control
		automatic				



## 1.4-ltr. 4V engine (55 kW)



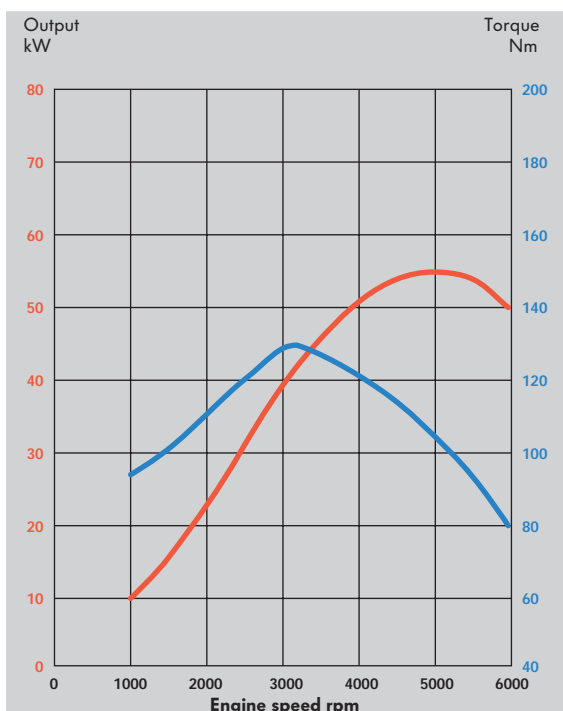
SSP 200/054

The 1.4-ltr. 4V engine is a new development and has the following special features:

- Aluminium engine block
- Static high-voltage distributor



You can find more detailed information on this engine in Self-Study Programme No. 196.



SSP 200/053

Displacement:	1390 cm <sup>3</sup>
Compression ratio:	10.5 : 1
Output:	55 kW at 5000 rpm
Torque:	128 Nm at 3300 rpm
Engine management:	Magneti Marelli 4AV
Fuel:	Premium unleaded (95 RON)

The engine may also be run on regular unleaded fuel (91 RON), but with reduced max. power.

# Engines

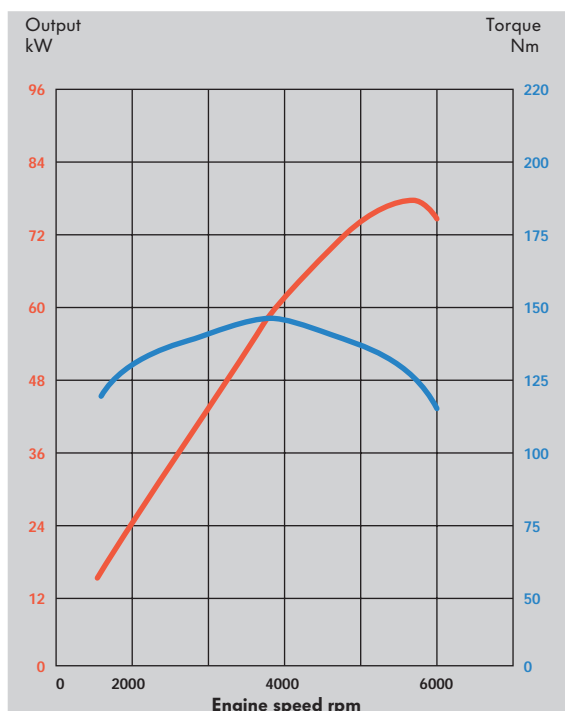
## 1.6-ltr. engine (74 kW)



SSP 200/045

The 1.6-ltr. 4-cylinder in-line engine has the following special features:

- Aluminium engine block with internal vent pipe
- Press-fitted cast iron cylinders
- Plastic twin-path intake manifold
- Static high-voltage distributor
- Pressure switch for power steering
- Clutch pedal switch



SSP 200/046

Displacement:	1595 cm <sup>3</sup>
Compression ratio:	10.2 : 1
Output:	74 kW at 5600 rpm
Torque:	145 Nm at 3800 rpm
Engine management:	Simos 2
Fuel:	Premium unleaded (95 RON)

The engine may also be run on regular unleaded fuel (91 RON), but with reduced max. power.

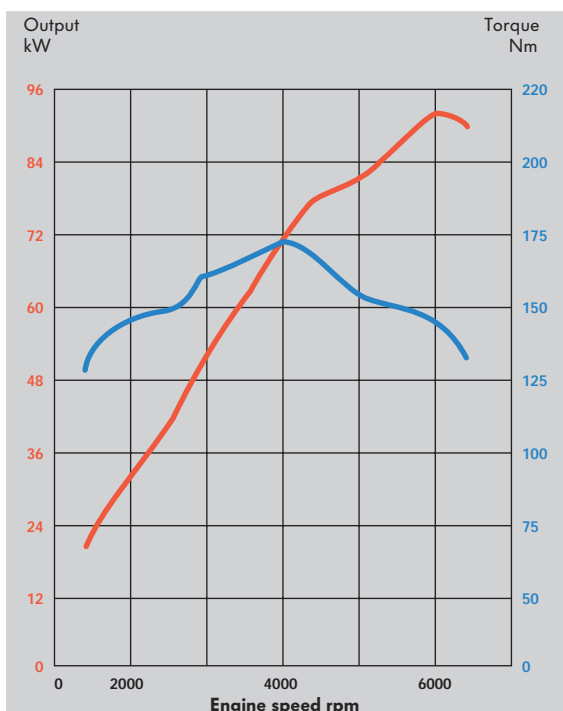
## 1.8-ltr. 5V engine (92 kW)



SSP 200/061

The 1.8-ltr. 4-cylinder in-line engine with five valves per cylinder has the following special features:

- Variable valve timing
- Plastic twin-path intake manifold
- Static high-voltage distributor
- Hot film air mass meter with reverse flow detection
- Pressure switch for power steering
- Clutch pedal switch



SSP 200/055

Displacement:	1781 cm <sup>3</sup>
Compression ratio:	10.3 : 1
Output:	92 kW at 6000 rpm
Torque:	170 Nm at 4200 rpm
Engine management:	Motronic 3.8.5
Fuel:	Premium unleaded (95 RON)

The engine may also be run on regular unleaded fuel (91 RON), but with reduced max. power.

# Engines

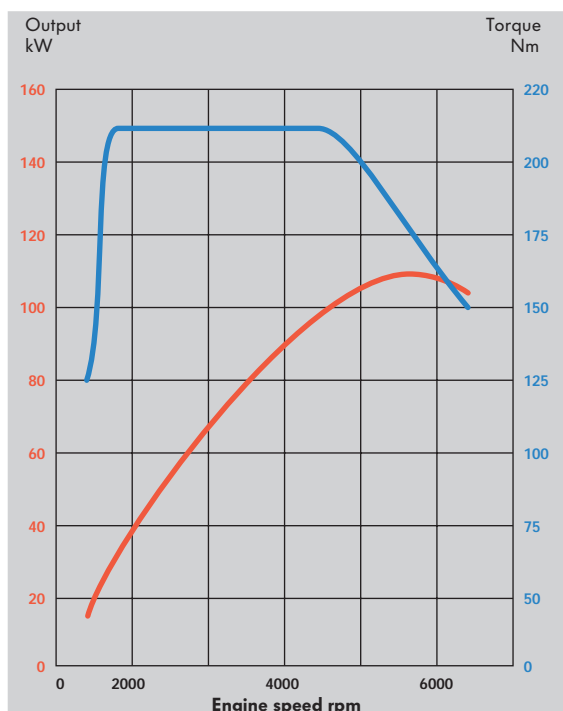
## 1.8-ltr. 5V turbo engine (110 kW)



SSP 200/062

The 1.8-ltr. 4-cylinder in-line engine with five valves per cylinder and turbocharger has the following special features:

- Static high-voltage distributor with individual ignition coils
- Pressure switch for power steering
- Clutch pedal switch

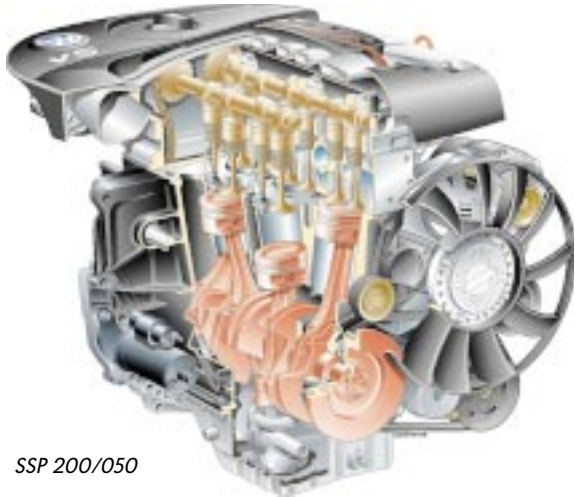


SSP 200/063

Displacement: 1781 cm<sup>3</sup>  
Compression ratio: 9.5 : 1  
Output: 110 kW at 5700 rpm  
Torque: 210 Nm at 1750 rpm  
Engine management: Motronic 3.8.3  
Fuel: Premium unleaded (95 RON)

The engine may also be run on regular unleaded fuel (91 RON), but with reduced max. power.

## 2.3-ltr. V5 engine (110 kW)



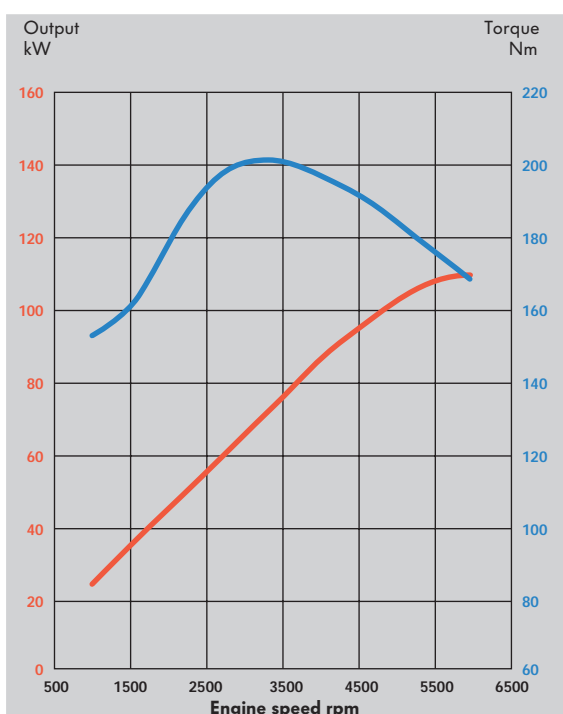
SSP 200/050

The 2.3-ltr. 5-cylinder V-engine is a derivative of the VR6 engine in terms of its design. It has the following special features:

- Twin-path intake manifold
- Hot film air mass meter with reverse flow detection
- Static high-voltage distributor with 5 individual ignition coils
- Pressure switch for power steering
- Clutch pedal switch



The construction and function of this engine are described in Self-Study Programme No. 195.



SSP 200/052

Displacement:	2326 cm <sup>3</sup>
Compression ratio:	10.0 : 1
Output:	110 kW at 6000 rpm
Torque:	205 Nm at 3200 rpm
Engine management:	Motronic 3.8.3
Fuel:	Premium unleaded (95 RON)

The engine may also be run on regular unleaded fuel (91 RON), but with reduced max. power.

# Engines

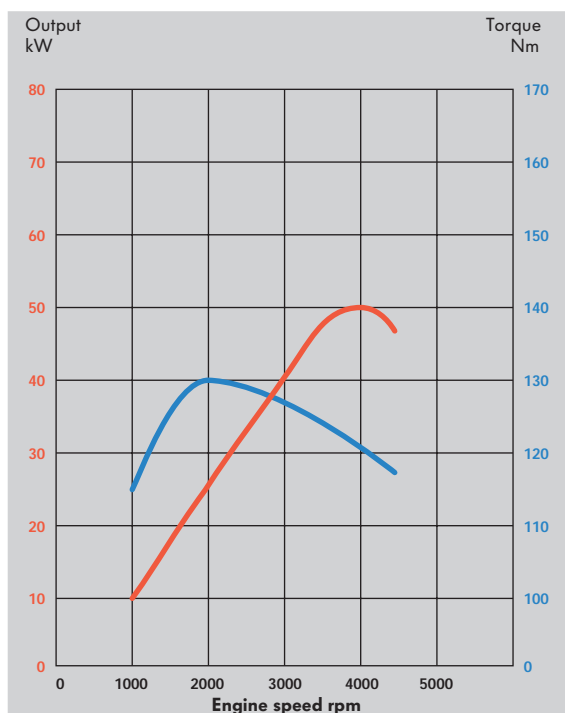
## 1.9-ltr. SDI engine (50 kW)



SSP 200/065

The 1.9-ltr. 4-cylinder in-line engine is a naturally aspirated diesel with direct injection. It has the following special features:

- Two-stage EGR valve
- Electrically controlled intake manifold flap
- Preset injection pump with adjustable rib belt wheel
- Vertical oil filter

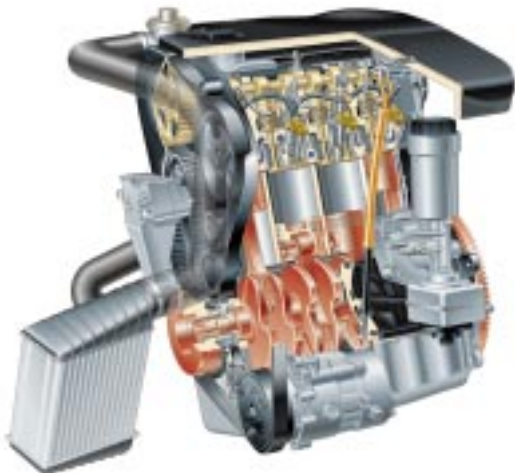


SSP 200/059

Displacement:	1896 cm <sup>3</sup>
Compression ratio:	19.5 : 1
Output:	50 kW at 4000 rpm
Torque:	130 Nm at 2200 rpm
Mixture preparation	Direct injection with electronically controlled distributor injection pump
Fuel:	45 CN diesel

The engine may also be run on biodiesel.

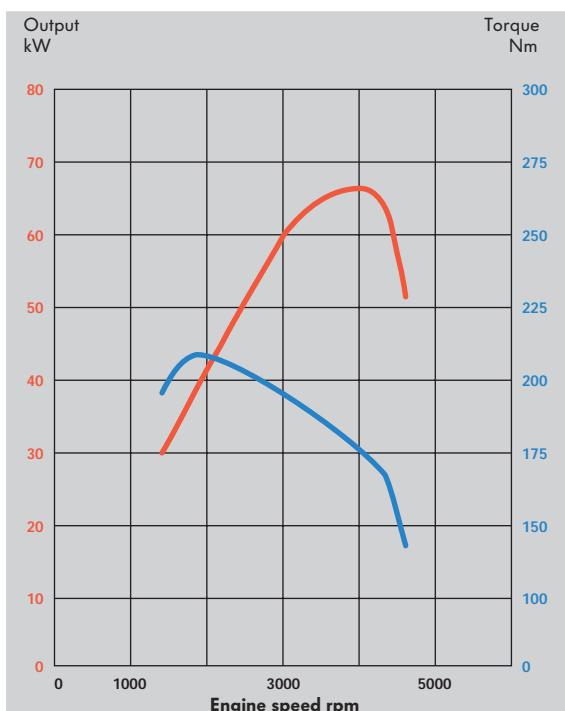
## 1.9-ltr. TDI engine (66 kW)



SSP 200/051

The 1.9-ltr. turbocharged diesel engine with intercooler has the following special features:

- Preset injection pump with adjustable rib belt wheel
- Lightweight valve gear
- Vertical oil filter with replaceable paper insert
- Intake manifold flap



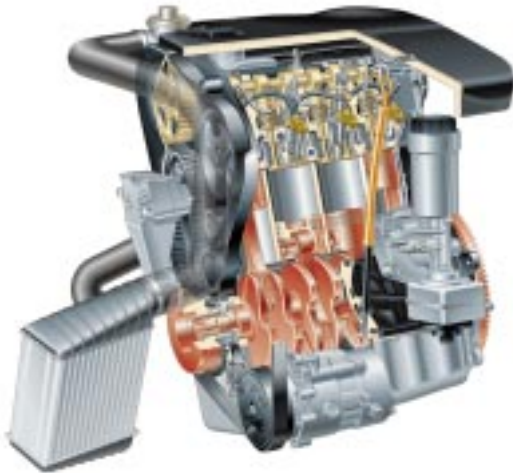
SSP 200/057

Displacement:	1896 cm <sup>3</sup>
Compression ratio:	19.5 : 1
Output:	66 kW at 3750 rpm
Torque:	210 Nm at 1900 rpm
Mixture preparation	Direct injection with electronically controlled distributor injection pump
Fuel:	45 CN diesel

The engine may also be run on biodiesel.

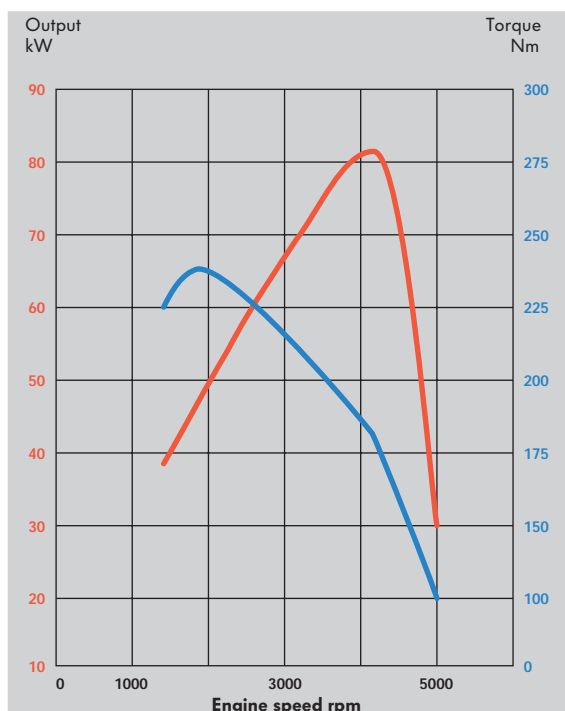
# Engines

## 1.9-ltr. TDI Engine (81 kW)



SSP 200/051

This 1.9-ltr. TDI engine has a higher power output than the 1.9-ltr. TDI engine developing 66 kW because of its variable turbine geometry.



SSP 200/058

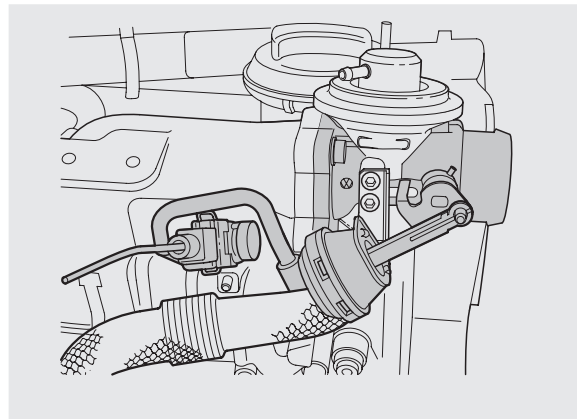
Displacement: 1896 cm<sup>3</sup>  
 Compression ratio: 19.5 : 1  
 Output: 81 kW at 4150 rpm  
 Torque: 235 Nm at 1900 rpm  
 Mixture preparation: Direct injection with electronically controlled distributor injection pump  
 Fuel: 45 CN diesel

The engine may also be run on biodiesel.



## The intake manifold flap

In the 1.9-ltr. TDI engine, a flap is integrated in the intake manifold. This flap stops engine vibrations when it is turned off.



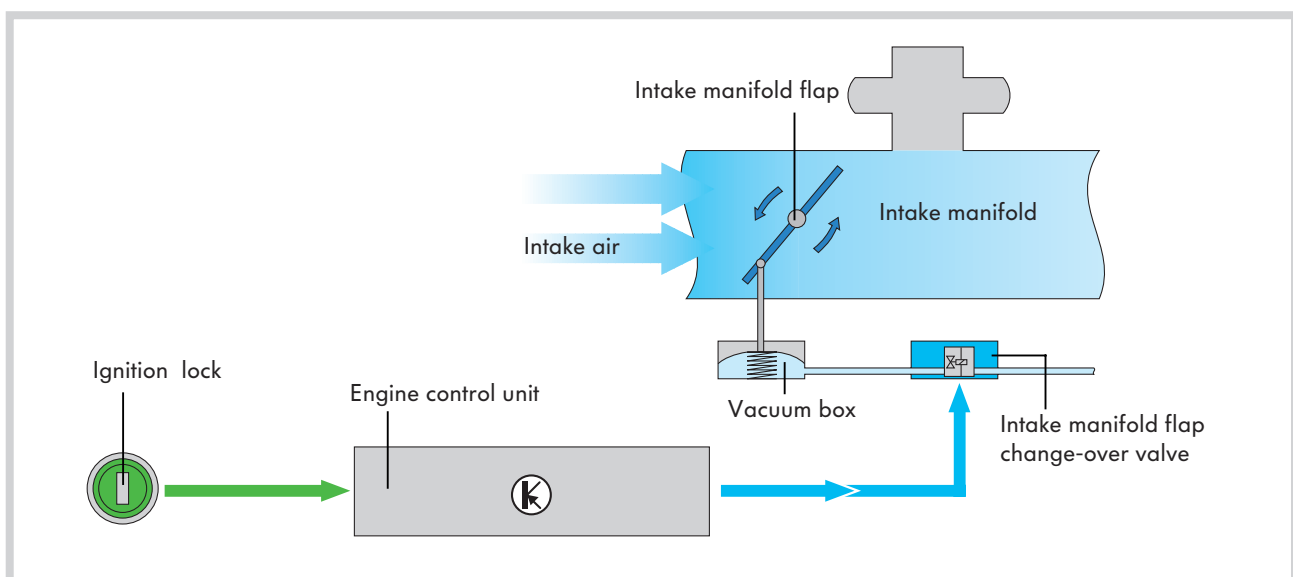
SSP 200/113

Diesel engines have a high compression ratio. They tend to vibrate when turned off due to the high compression pressure of the intake air.

The intake manifold flap shuts off the air supply when the engine is switched off. This minimises the quantity of air compressed and ensures the engine runs out smoothly.

### This is how it works:

When the engine turned off, the engine control unit sends a signal to the intake manifold flap change-over valve. The change-over valve then switches the partial pressure for the vacuum box, and the vacuum box closes the intake manifold flap.



SSP 200/114

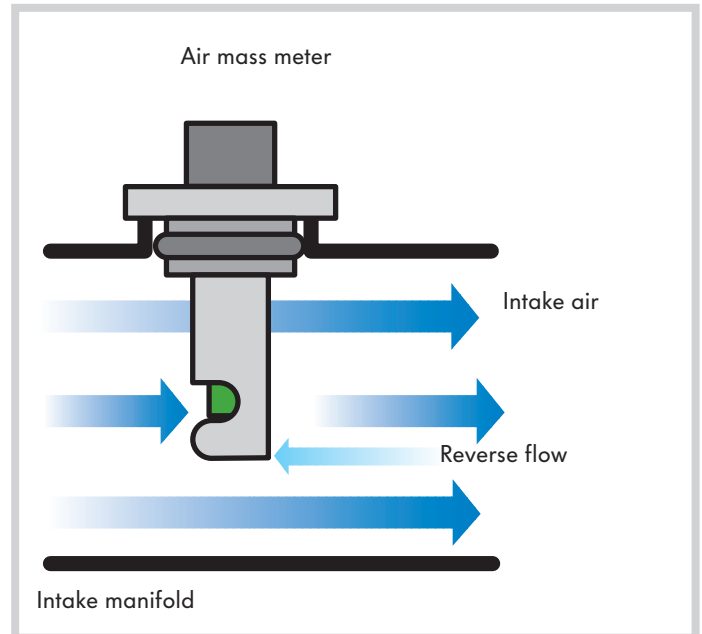


# Engines

## The hot-film air mass meter with reverse flow detection

Some engines have a hot-film air mass meter with reverse flow detection. An optimal mixture composition is essential for low exhaust emissions and high engine power output, both of which are heavily dependent on metering the intake air mass accurately.

The opening and closing action of the valves produces a reverse flow in the intake air mass inside the intake manifold. The hot-film air mass meter with reverse flow detection detects the returning air mass. It then generates a signal and sends it to the engine control unit. This ensures highly accurate air mass metering.

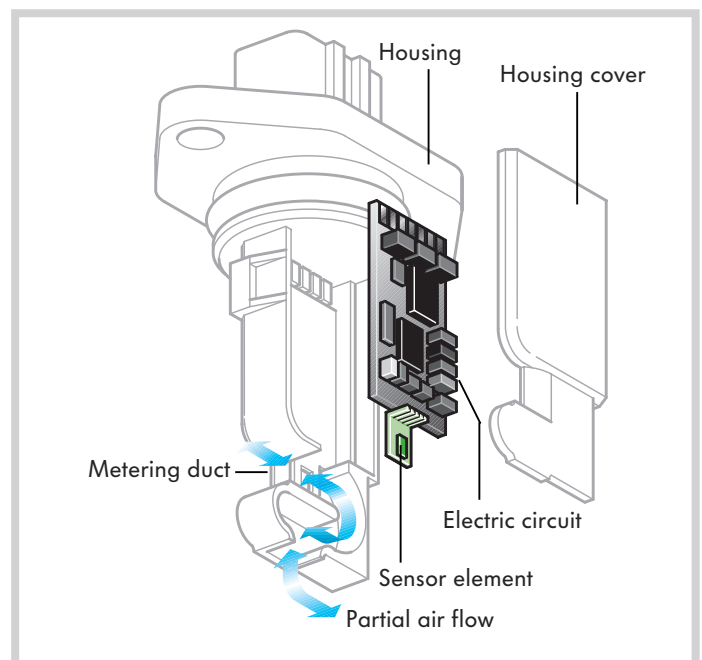


SSP 200/098

## The design

The electric circuit and the sensor element of the air mass meter are accommodated in a compact plastic housing.

Located at the bottom end of the housing is a metering duct into which the sensor element protrudes. The metering duct extracts part of the intake and return air flows and routes this partial flow past the sensor element. The signal which the sensor element generates is processed by the electric circuit and sent to the engine control unit.



SSP 200/099



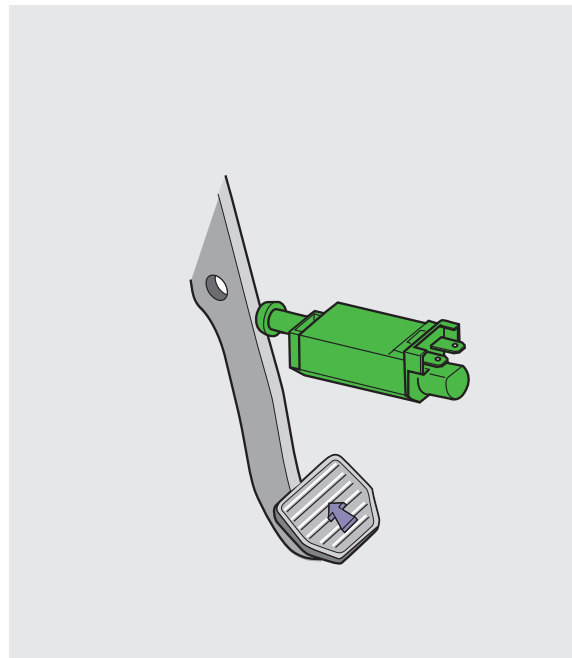
You can find detailed information in Self-Study Programme No. 195.

## The clutch pedal switch

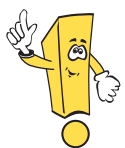
is located at the foot controls. It supplies the “Clutch operated” signal to the engine control unit.

### Signal utilisation when clutch is operated:

- In vehicles equipped with a TDI or SDI engine, the quantity of fuel injected is reduced. This prevents engine vibrations when a gearshift is performed.
- In vehicles with a cruise control system, the cruise control function is disabled.



SSP 200/096

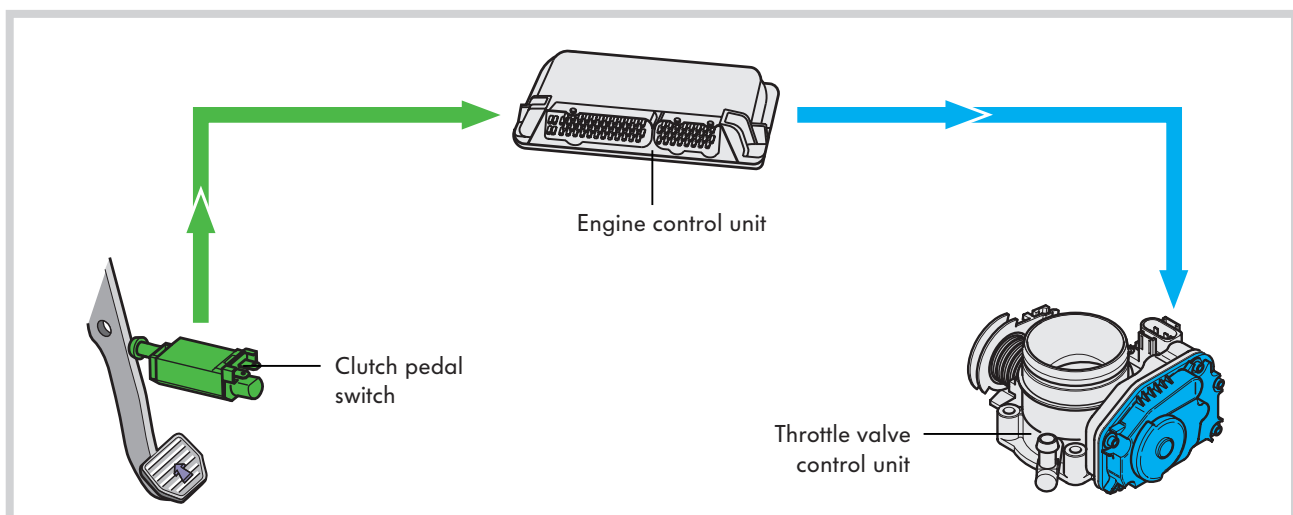


In petrol-engined vehicles (upwards of 74 kW), the throttle closing damper function is disabled.

### This is how it works:

The clutch pedal switch informs the engine control unit when the clutch is operated. The engine control unit then disables the throttle closing damper function.

The throttle valve closes more quickly and this prevents a short-term increase in revs caused by excess air.



SSP200/115



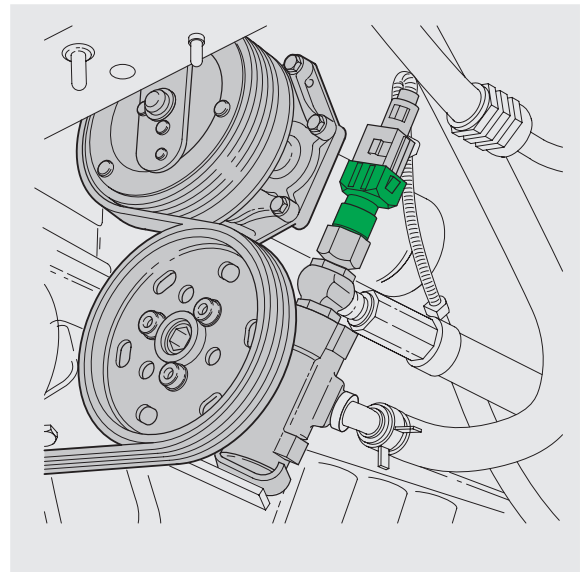
# Engines

## Pressure switch for power steering

This is located on the vane pump. It informs the engine control unit when the vane pump is under a heavy load.

The vane pump is driven by the engine by the ribbed V-belt.

At full steering lock the vane pump is required to produce a high pressure. A greater load is also placed on the engine, and idling speed may drop sharply. Using the signal sent by the pressure switch, the engine control unit is able to recognise the engine load state in good time and adjust the engine idling speed accordingly.

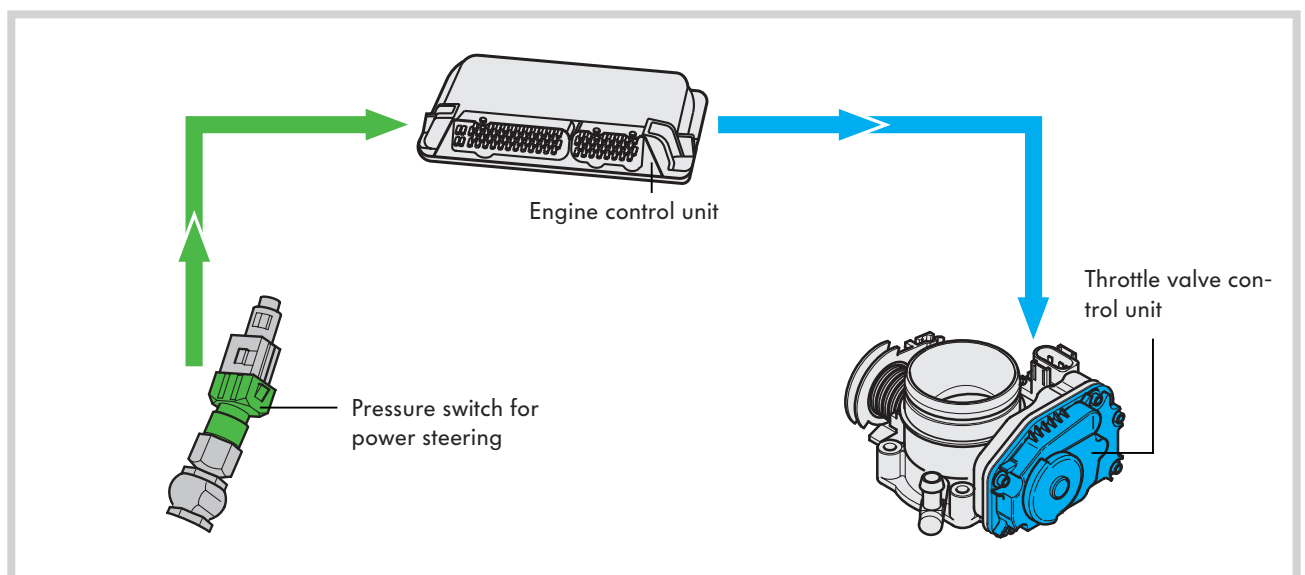


SSP 200/095

### This is how it works:

The pressure switch for the power steering informs the engine control unit when there is a high pressure inside the vane pump.

The engine control unit activates the throttle valve positioner which opens the throttle valve by a certain angle. Engine idling speed is maintained.

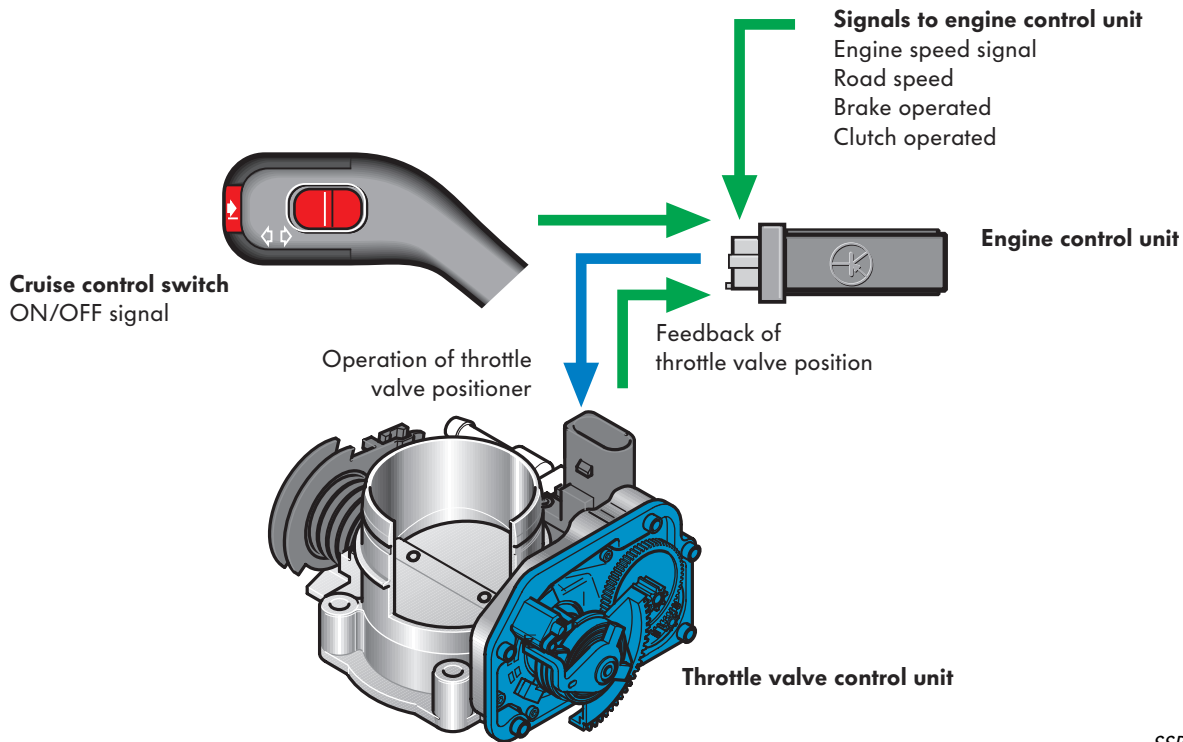


SSP 200/118

## Cruise control system

This controls the road speed according to the driver's wishes without the driver actually having to operate the accelerator pedal. The cruise control system (CCS) was previously controlled by an independent control unit and the throttle valve was actuated by a vacuum box.

The cruise control system is now controlled by the engine control unit. The throttle valve is actuated by the throttle valve control unit.



SSP 200/097

### This is how it works:

Switching the cruise control system ON tells the engine control unit to maintain the current road speed. The engine control unit then activates the electric motor of the throttle valve gear and actuates the throttle valve according to

the vehicle's current speed. To regulate the cruising speed, the engine control unit requires the sensor signals shown in the diagram above.



You can find detailed information in Self-Study Programme No. 195.



# Power transmission

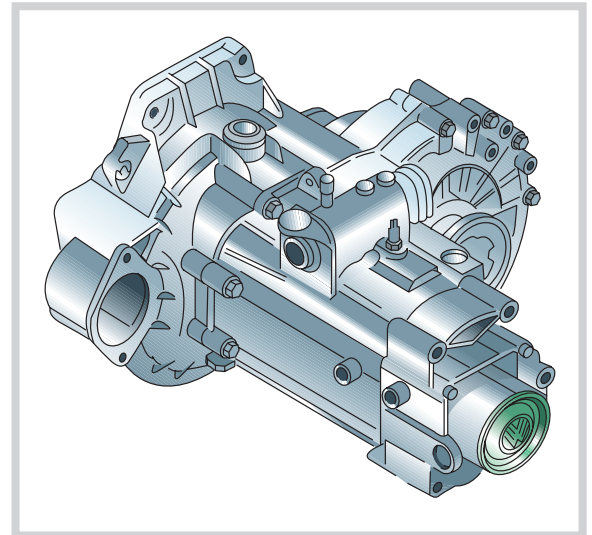
## The gearbox

Two manual gearboxes and one automatic gearbox are used in the new Golf. All gearboxes have a pendulum support and are attached to the engine oil sump by bolts. This reduces the transmission of vibrations from

the engine-gearbox assembly to the body. The manual gearboxes have hydraulic clutch control.

### 5-speed manual gearbox 02K

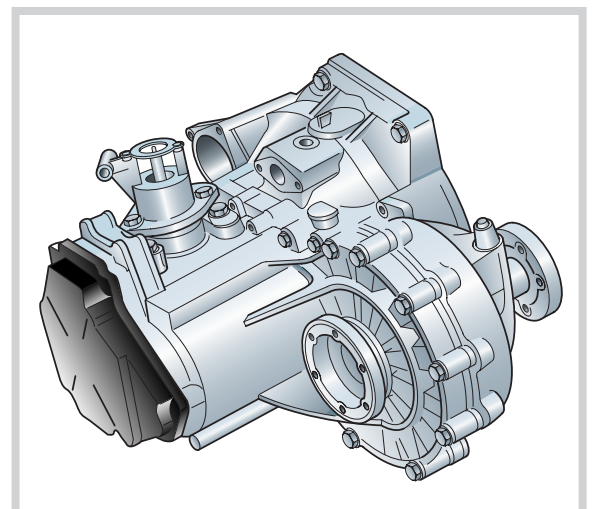
is an advanced development of the 5-speed manual gearbox 020.



SSP 200/070

### 5-speed manual gearbox 02J

is an advanced development of the 5-speed manual gearbox 02A.

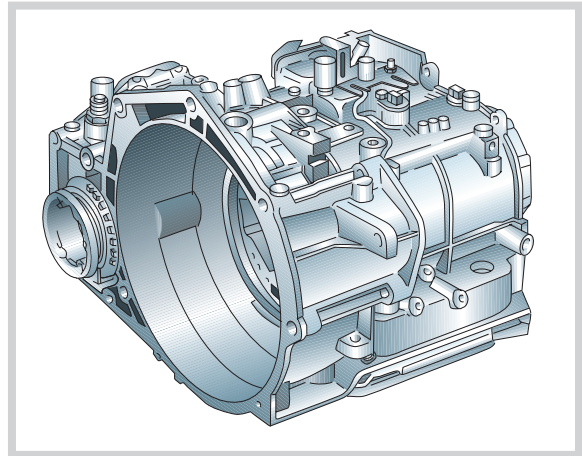


SSP 200/071



## The 4-speed automatic gearbox 01M

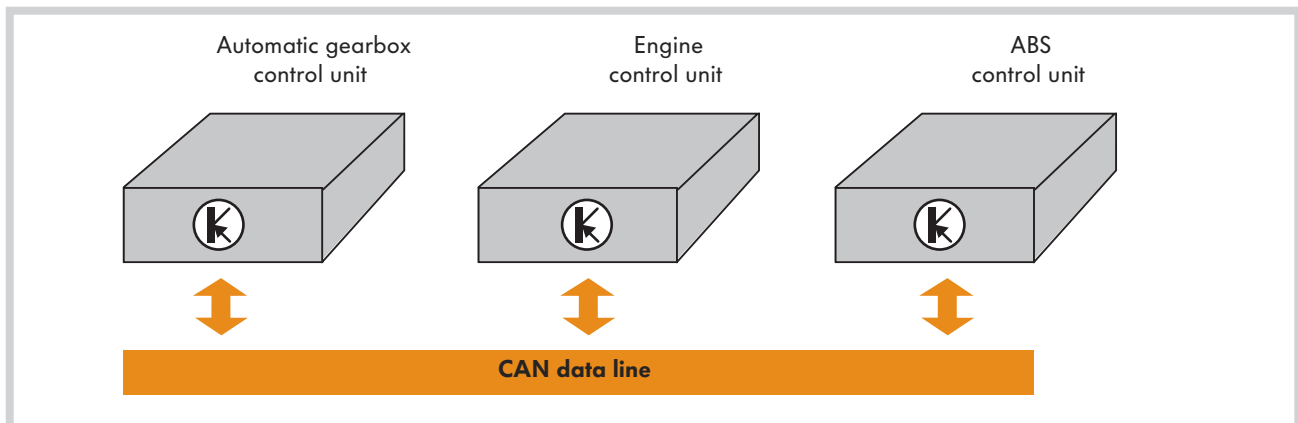
This is now networked with a CAN databus.  
Final drive is via two tripod roller joint shafts.



SSP 200/072

## CAN databus

In the new Golf, the engine control unit, automatic gearbox control unit and ABS control unit are linked by CAN data lines.



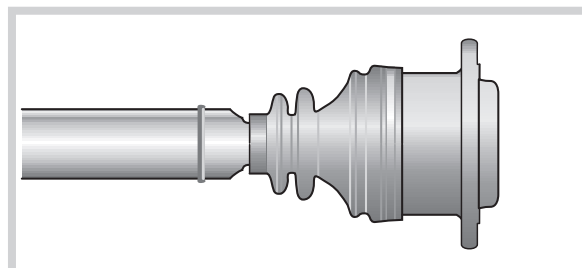
SSP 200/106



You can find detailed information on the CAN databus in Self-Study Programme No. 186.

## Tripod roller joint shafts

The tripod roller joint shafts prevent vibrations and noise from being transmitted from the engine-gearbox assembly to the body.



SSP 200/124



# Running gear

The running gear, which comprises a suspension strut axle, double wishbones and a torsion beam rear axle, is based on the same principle as the predecessor model.

The interaction of the running gear components, for example, the newly designed front and rear axles with large wheels and power steering, results in a comfortable ride. All the wheel hubs have a five-hole pattern for securing the wheels.

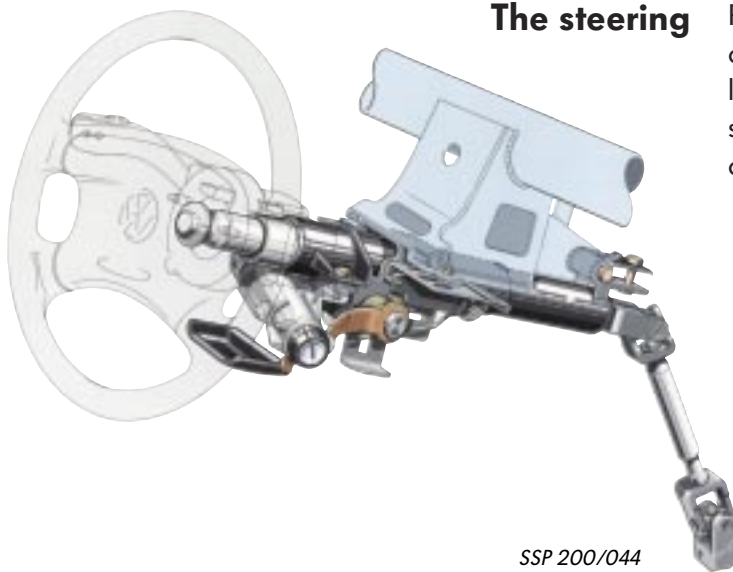


SSP 200/047

The following features will be explained to you on the next pages:

- The steering
- The front axle
- The torsion beam rear axle
- The braking system
- The front and rear brakes
- The ULW tyres
- The light-alloy wheel.





## The steering

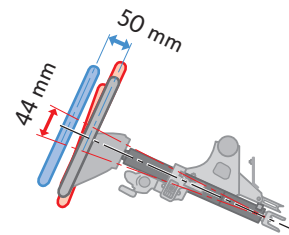
Power steering is fitted as standard. The steering assembly is rigidly attached to the subframe and locked in place to prevent the steering gear from slipping on the subframe. Both track rods are adjustable.

### Reach adjustment

The steering column can be adjusted manually by 50 mm fore and aft.

### Rake adjustment

The steering column can be adjusted by 44mm in height.



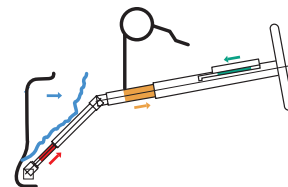
### The steering column attachments

The upper end of the steering column is attached to the central tube by two 8 mm hexagon bolts. Shear pins are no longer needed. The lower end is attached to the steering gear by a universal joint.



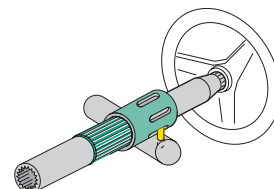
### The crash concept

The deformation distance of the steering system during a crash is 250 mm. The steering column angle is 24°. The direction in which the airbag inflates is therefore better matched to the driver's position.

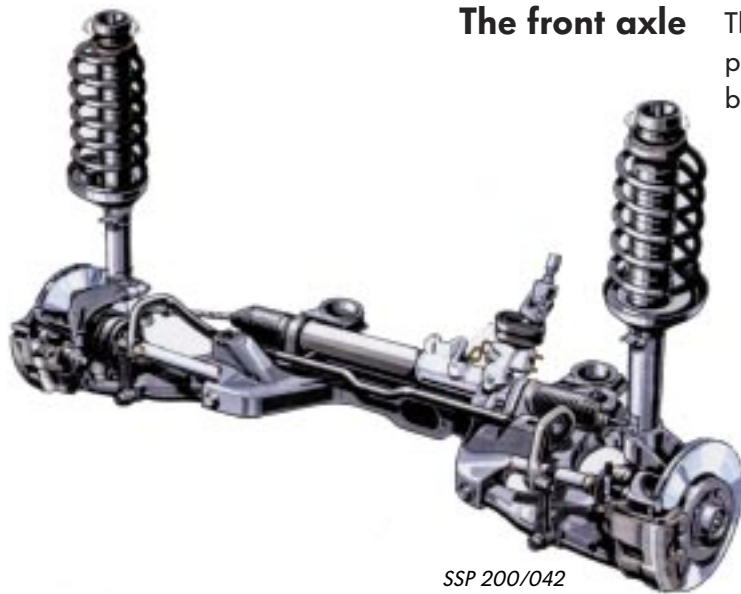


### Steering system anti-theft device

The mechanical anti-theft device on the steering assembly prevents the striker pin from shearing off at the steering wheel lock.



# Running gear



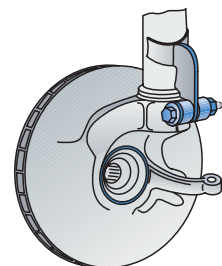
SSP 200/042

## The front axle

This is based on the proven principle of the suspension strut axle with double wishbones. It has been optimised and adapted to the new Golf.

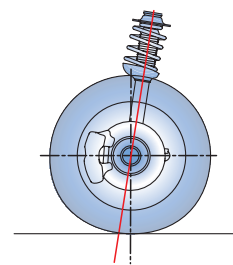
## The single bolt clamp

The suspension strut is mounted in the wheel bearing housing and clamped with a bolt. A special tool is required to remove the suspension strut (Spreader 3424)



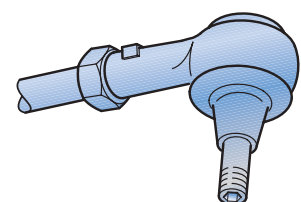
## The caster

The standard power steering permits a larger caster. This improves directional stability.

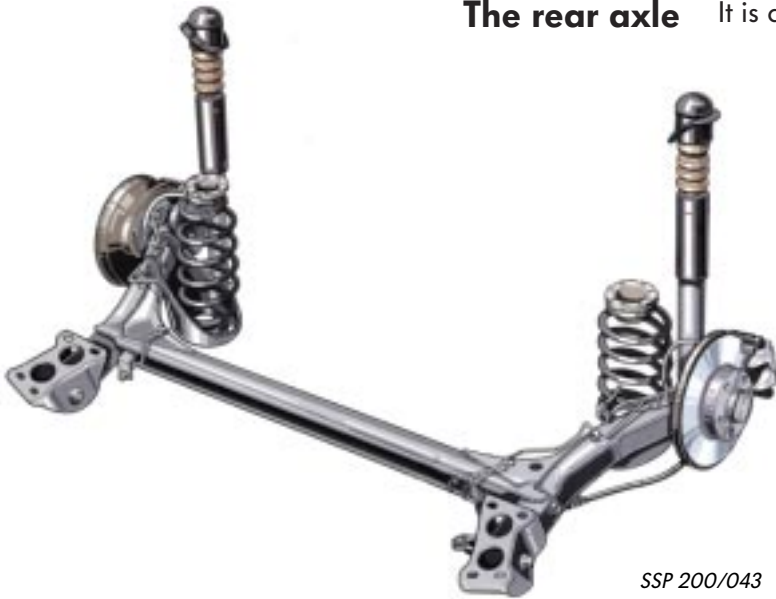


## The track rod end

The self-locking effect is eliminated by modifying the conical shape of the track rod end. To slacken the nut, use a hexagon socket wrench to counter-hold the track rod end.



**The rear axle** It is a torsion beam axle with anti-roll bar.



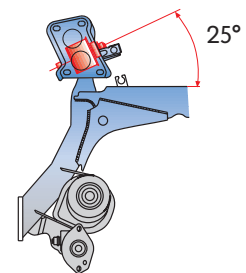
### Separate spring and shock absorber mountings

The shock absorbers and springs are located separately, giving a through-loading width of over one metre. There is less tyre noise in the interior because the dampers are secured by bolts in the wheel housing.



### Rear axle mountings

The large-size rear axle mountings are positioned at an angle of 25° to the transverse axis of the vehicle. This reduces the self-steering effect of the rear axle.



### Wheel bearings

The double ball bearings of the rear axle require no adjustment. The axial play is determined by the tightening torque of the axle nut.



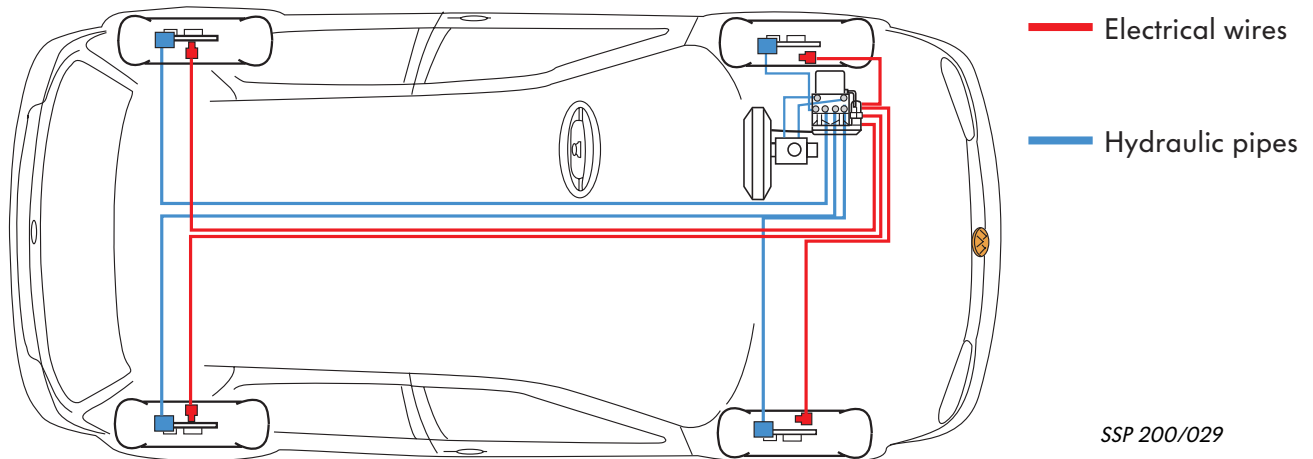
SSP 200/037 a-c

# Running gear

## The braking system

The new Golf is equipped with the Mark 20 IE anti-lock braking system and electronic brake pressure distribution (EBPD) as standard. It has a diagonally-split dual-circuit design.

The new Golf has disc brakes at the front and rear; the front disc brakes are ventilated.



### The anti-lock braking system

prevents the wheels from locking when braking. This means that the driver can retain vehicle manoeuvrability even in extreme situations.

### Electronic brake pressure distribution

allocates brake pressure to the front and rear wheels by means of solenoid valves in the ABS unit. The operating range of the EBPD ends at the ABS cut-in point.

### The electronic differential lock

is an automatic starting control system. The EDL automatically brakes wheels which spin when setting off on slippery surfaces. The differential transfers the input torque to the wheel which is gripping the road. The EDL is effective up to 80kph.

### The engine braking control

prevents the driven wheels from lock up on slippery surfaces when the driver lifts his foot off the accelerator pedal quickly. The ABS sensor recognises when the driven wheels are on the verge of locking up. The ABS control unit then sends a command to the engine control unit over the CAN databus. The engine control unit increases engine speed momentarily to enable the wheels to rotate freely again. This retains vehicle manoeuvrability.

The EBC operates across the entire engine speed range.

EBC is only available on the 66kW TDI and the 81kW TDI models.

## Front brake



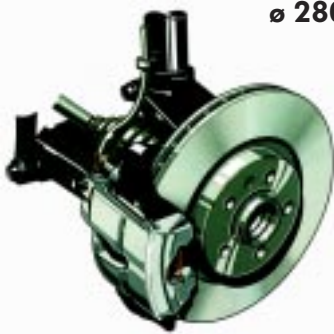
## Rear brake



ø 256 x 22 mm

SSP 200/025

55 KW  
50 KW-SDI  
74 KW



ø 280 x 22 mm

SSP 200/026

66 KW-TDI  
81 KW- TDI  
92 KW



ø 288 x 25 mm

SSP 200/027

110 KW

ø 232 x 9 mm



SSP 200/028



Brake servo: left-hand drive vehicles (ø 10" )

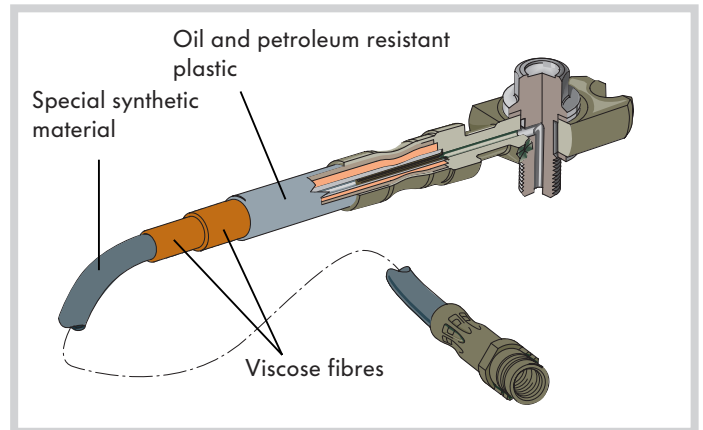
Since there is less space in right-hand drive vehicles, a tandem brake servo (ø 7" / 8") is used.

# Running gear

## Brake hoses and brake pipes

### The brake hoses

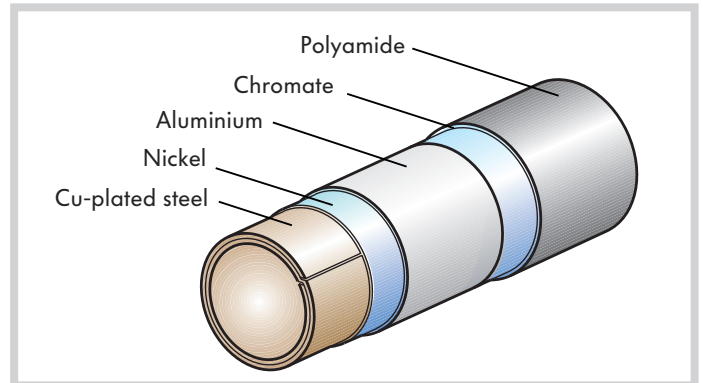
link up the moving parts of the braking system. The brake fluid absorbs the bulk of the water through these hoses. Brake hoses are made of four layers. The innermost layer is now made of a special synthetic material which reduces water absorption.



SSP 200/030

### The brake pipes

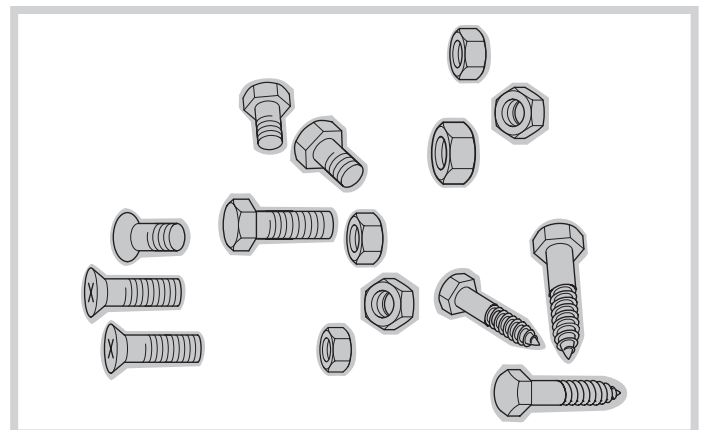
are made of precision-bent steel pipes. They are protected against corrosion by several coatings.



SSP 200/032

### Dacrometised bolts

All exterior bolts in the braking system are dacrometised. This coating, which contains zinc-aluminium powder, protects the bolts against corrosion.



SSP 200/031



You can find further information in Self-Study Programme No. 160.

## Ultra Light Weight tyres

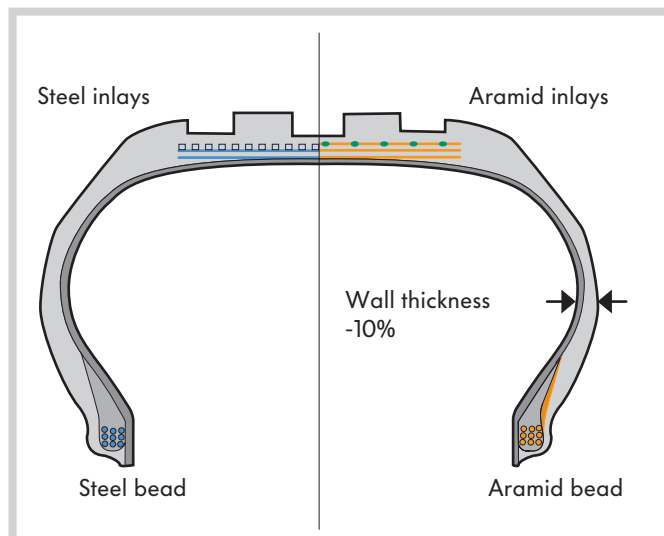
The new Golf is only equipped with Dunlop ULW tyres in combination with light alloy rims and tyres of size 175/80 R 14 88 H.

### Tyre design

Instead of the steel inlays used in steel cord tyres, ULW tyres have aramid inlays. Aramid is a synthetic material which weighs six times less but has 10 times more tensile strength than steel. The outer wall thickness of the ULW tyre is 10% less than that of a steel cord tyre. The result is a weight saving of 3 kg compared to conventional steel cord tyres.

### Steel cord concept

### ULW concept

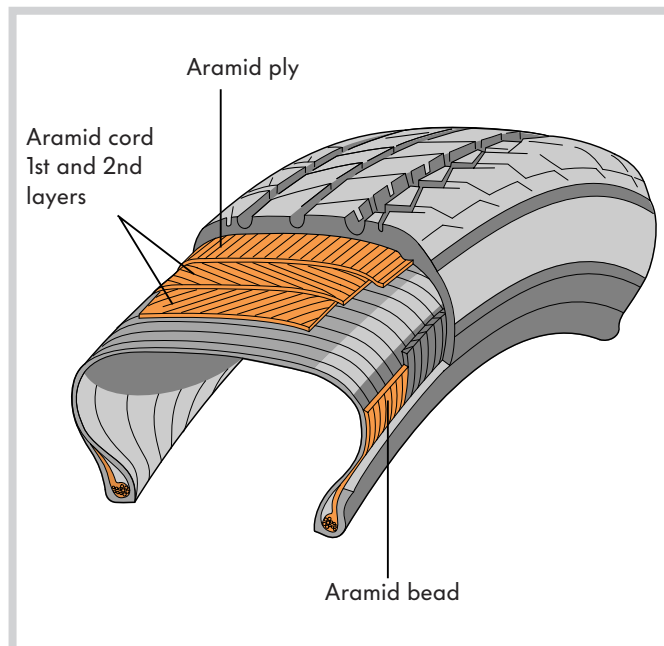


SSP 200/080

### Advantages of ULW tyres

The low weight of the ULW tyre means that fewer unsprung masses have to be moved. This saves fuel and reduces pollutant emissions. The control frequency of the ABS system is higher, because the rotating wheel masses are small. A shorter stopping distance can then be achieved on road surfaces with a low friction coefficient.

The ULW tyre is manufactured from pure crude oil products which can be sorted into clean material streams for recycling. The use of aramid makes the tyres better suited to retreading. This is because aramid is a non-corrosive material.



SSP 200/105



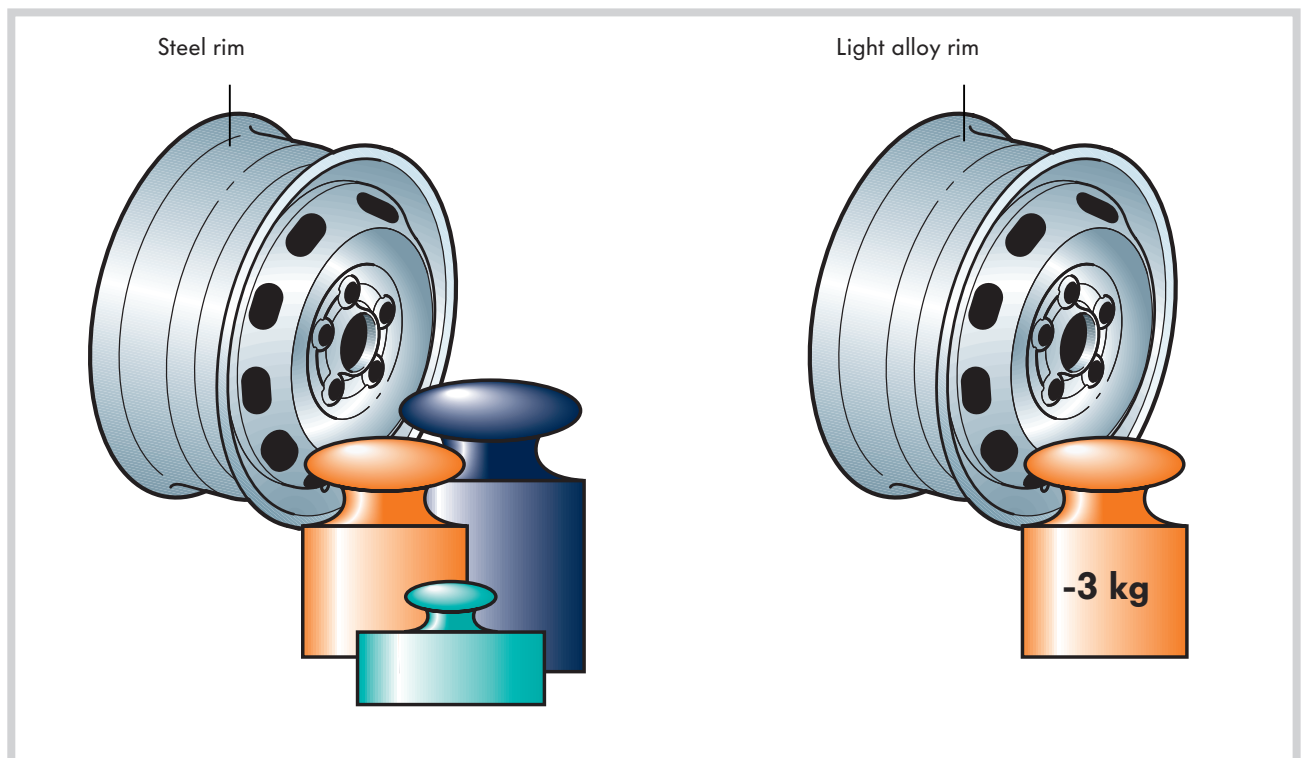
# Running gear

## The light alloy rim

In the development departments of the automobile industry, the top priority is to reduce the weight of conventional components. The traditional material of steel is gradually being replaced by alternative materials such as aluminium, magnesium and synthetic materials.

The new Golf has light alloy rims in combination with size 175/80 R14 ULW tyres. These rims consist of an aluminium-magnesium-manganese alloy. The alloy can be cold-formed, is corrosion resistant and lightweight.

The alloy rim is approx. 3 kg lighter than the steel rim through the use of this material.




SSP 200/090




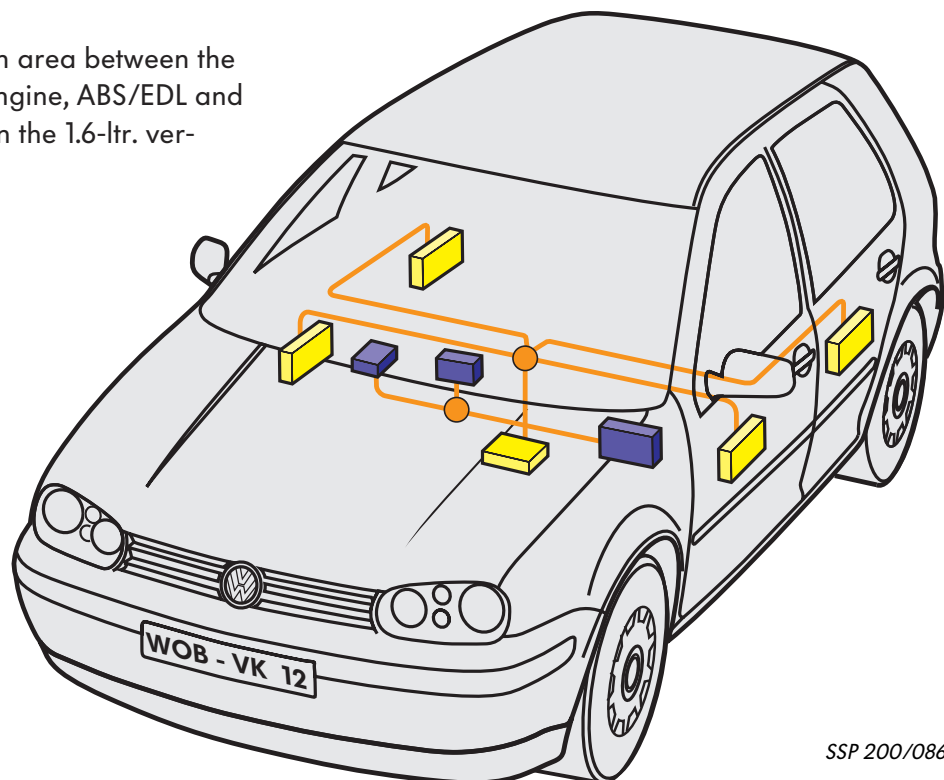
## Controller Area Network databus

The demands on vehicle safety, ride comfort, exhaust emissions and fuel economy are constantly rising. To meet these demands, a large volume of data has to be exchanged between the control units. The CAN databus can transmit large data streams within the shortest possible space of time.

If it wasn't for the CAN databus, a separate wire would be required to convey every item of information between each of the control units. To keep the electrics/electronics as simple and compact as possible, Volkswagen uses the Bosch CAN databus.

 CAN in the convenience system between the central control unit and the door control units

 CAN in the drive train area between the control units for the engine, ABS/EDL and automatic gearbox on the 1.6-ltr. version and upwards.



SSP 200/086



You can find detailed information in Self-Study Programme No. 186.

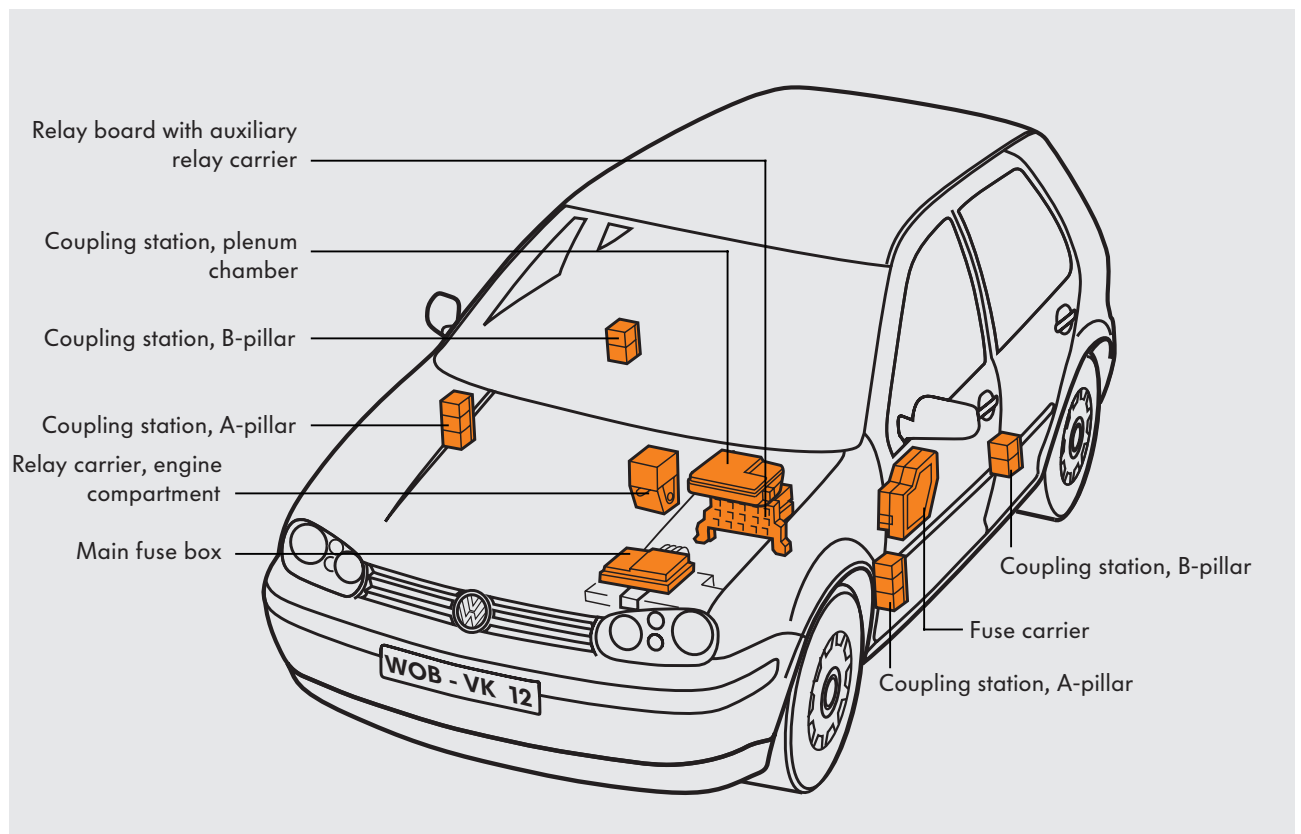
# Electrical system

## The vehicle electrical system

has a decentralised layout, i.e. the component parts of the system are situated at different fitting locations within the vehicle. This is

necessary due to the increase in the amount of electrics/electronics used in the new Golf.

The fitting locations for the component parts are shown in the drawing below.









SSP 200/085

The wiring harness is dependent on the vehicle specifications. It is custom-made according to the vehicle identification number (VIN).



Use Wiring Harness Repair System VAS 1978 to carry out repair work on the wiring harness.

## The components of the decentralised vehicle electrical system

	<p><b>Main fuse box</b></p> <p>These fuses prevent overloading of the main consumers connected directly behind the battery, e.g. alternator, engine control unit, passenger compartment and cooling fan 2nd stage.</p>
	<p><b>Coupling station in plenum chamber</b></p> <p>Integrated in the coupling station in the plenum chamber are the plug connectors between the passenger compartment and the engine compartment.</p>
	<p><b>Relay board with auxiliary relay carrier</b></p> <p>Located on the relay board are the relays for the basic equipment and three fuses for optional extras. For installing optional extras, there are additional relays and fuses on the auxiliary relay carrier.</p>
	<p><b>Fuse box</b></p> <p>These fuses protect the individual electric circuits against overload.</p>
	<p><b>Relay carrier in engine compartment</b></p> <p>The relays for low and high heating output for TDI diesel engines are arranged on this relay carrier.</p>
	<p><b>Coupling stations, A and B pillars</b></p> <p>Integrated in these coupling stations are the plug and socket combinations for the electrical components in the doors.</p>

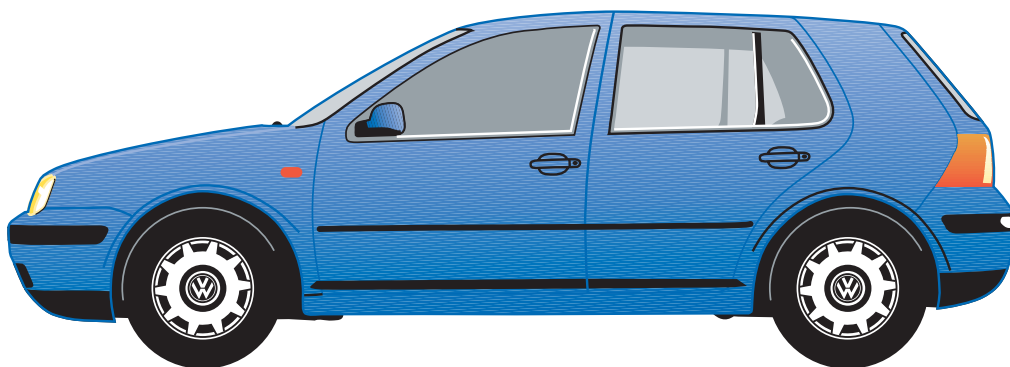
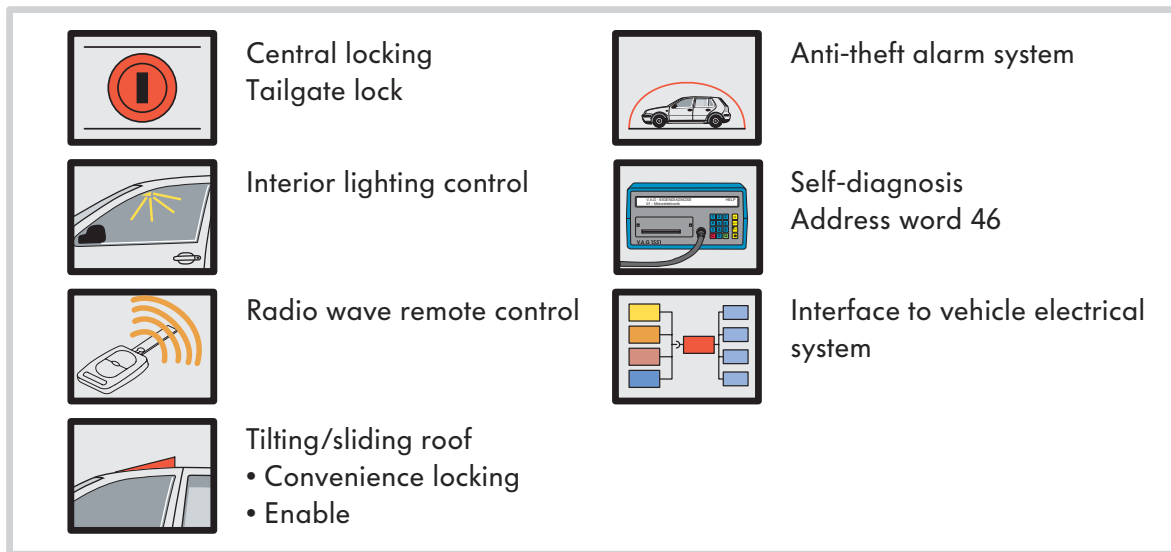


# Electrical system

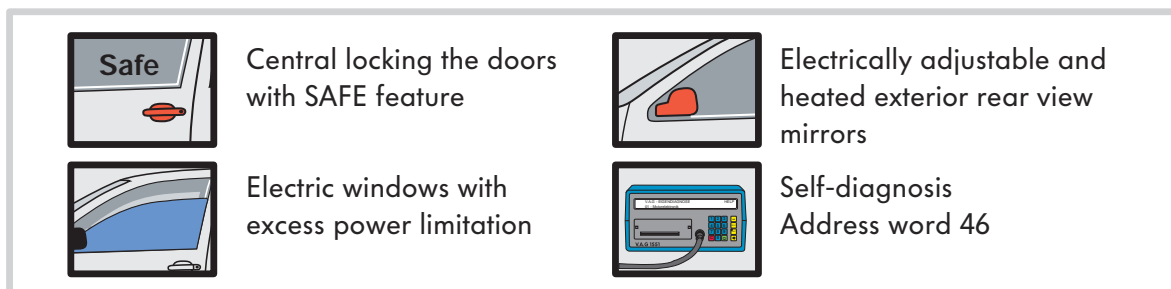
## The convenience system

assumes the functions shown in the diagram below. It has a decentralised layout, which means that the individual functions are shared among several control units.

### Functions of the central control unit



### Functions of the door control units




SSP 200/088


## The convenience system

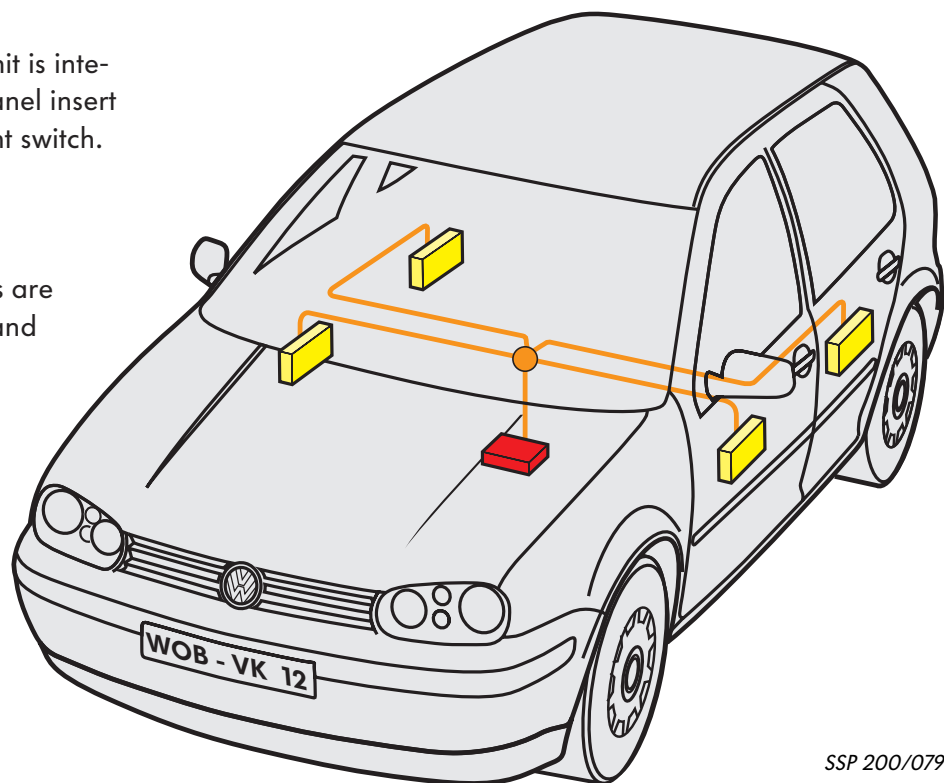
is only available in combination with electric windows. To optimise their operation, the central control unit and the door control units are connected via the CAN databus.

If the convenience system fails, each door can be locked and unlocked mechanically.

### Convenience system with central control unit and four door control units

 The central control unit is integrated in the dash panel insert behind the rotary light switch.

 The door control units are located on the front and rear electric window motors.



SSP 200/079

### Self-diagnosis

Self-diagnosis can be performed by using address word 46.



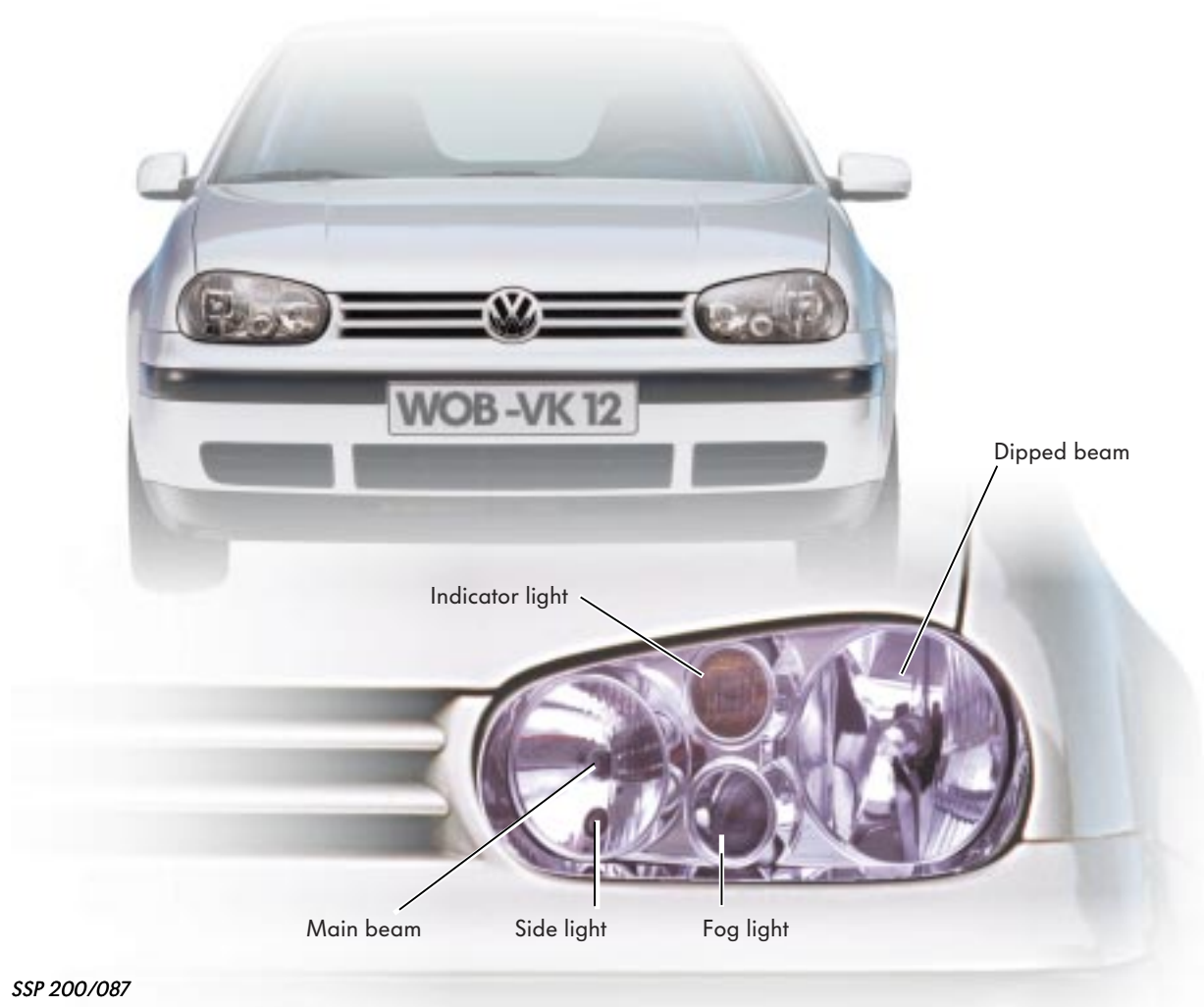
You can find detailed information in Self-Study Programme No. 193.



# Electrical system

## The new headlights

have a different design. The cover glasses are transparent and the new shape of the reflectors ensures better light dispersion.



SSP 200/087



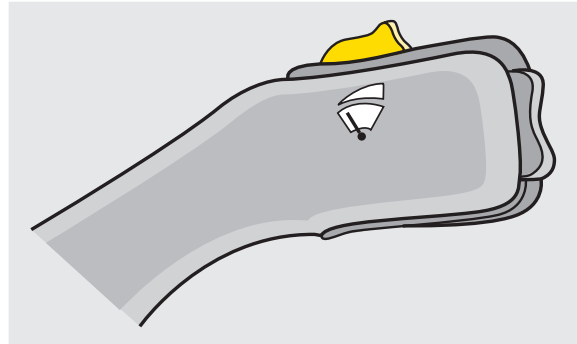
When changing from driving on the right to driving on the left, the headlight beams must be adapted using masking tape. Please refer to the relevant Service Literature for detailed information.

## The adjustable wiper interval

Four wiper intervals can be preset using a pre-selector switch.

Each setting is automatically adapted to the road speed. The higher the road speed, the shorter the wiper interval.

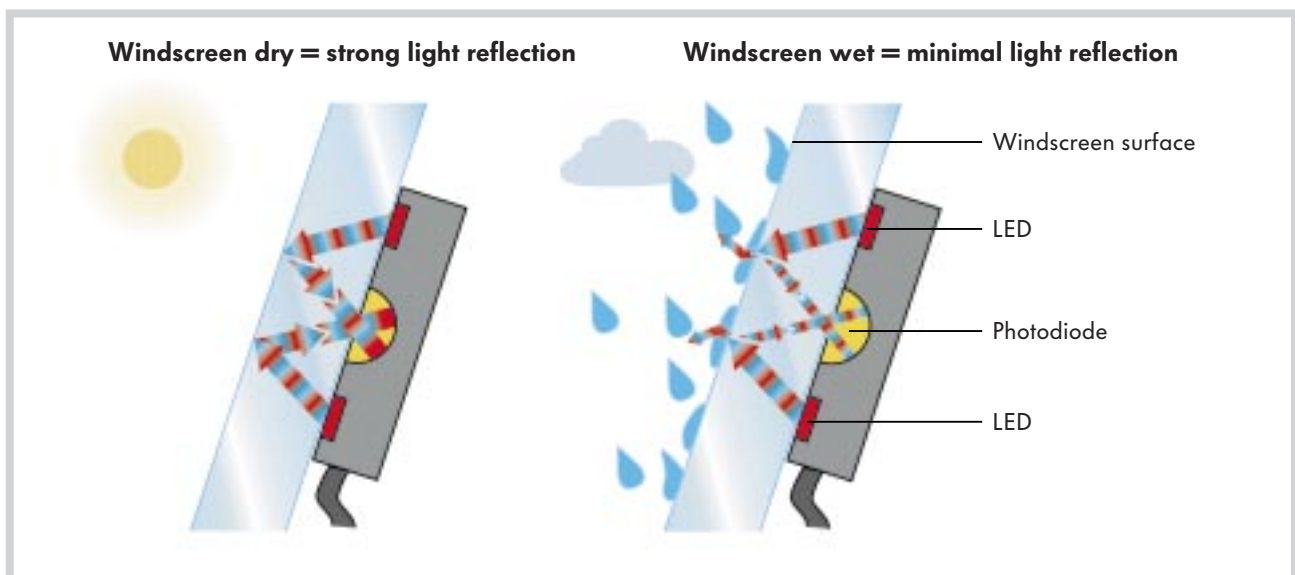
Wiper interval =  
Time to wipe window + pause



SSP 200/093

## The rain sensor

is located at the base of the interior rear-view mirror. It detects rainfall and automatically switches the wiper on in the intermittent setting.



SSP200/082

The rain sensor emits a light beam through LEDs. When the windscreen is dry, the entire light beam is reflected by the windscreen surface. If the windscreen is wet, the light beam emitted by the rain sensor is refracted differently.

As a result, less light is reflected by the windscreen surface. Light refraction is dependent on rainfall intensity. The rain sensor sends a signal to the relay for the automatic intermittent wash/wipe system and the windscreen washers are switched on.

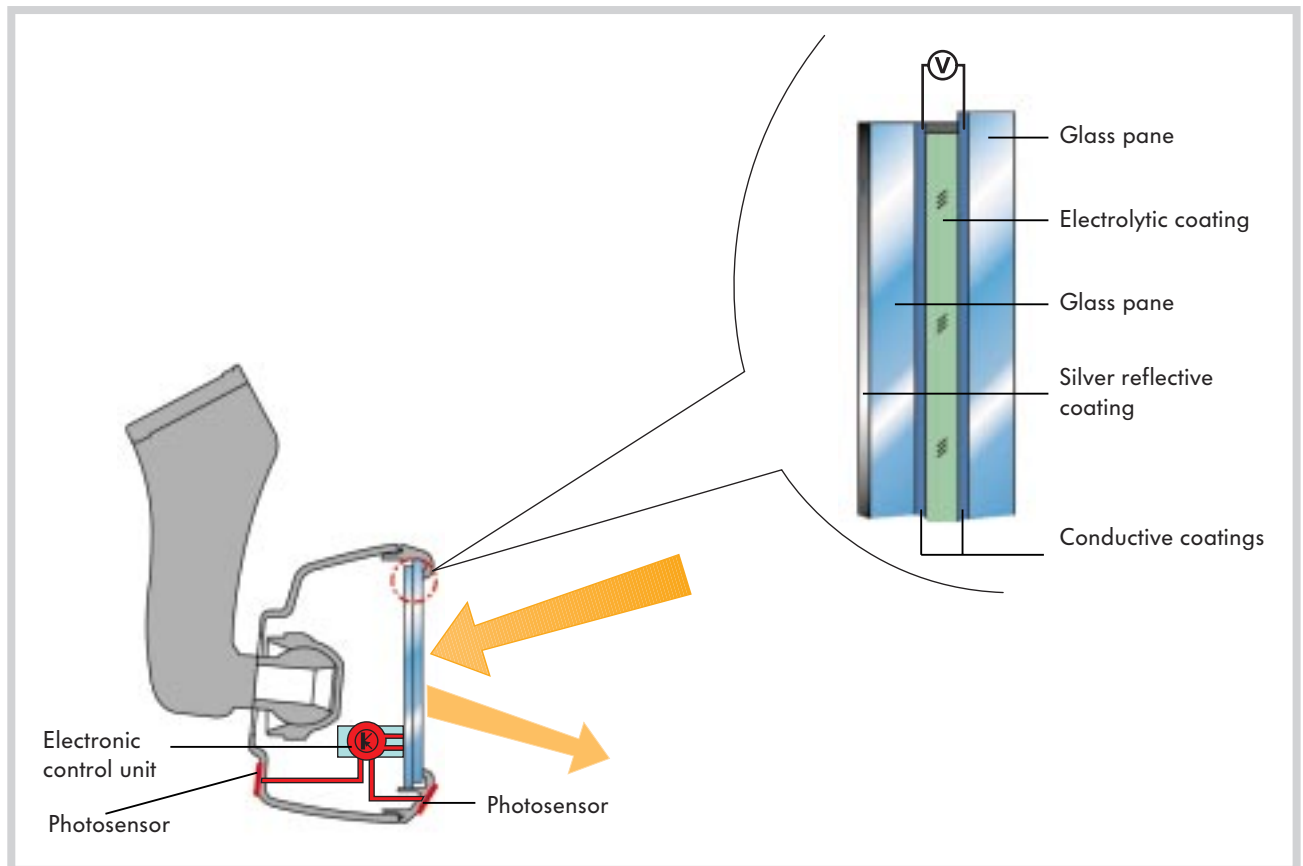


# Electrical system

## The automatic anti-dazzle interior mirror

has a continuous dimming function which prevents the driver from being dazzled by vehicles behind.

The anti-dazzle interior mirror consists of a mirror element and an electronic control unit with two photosensors.



SSP 200/081

### This is how it works

The electronic control unit detects incident light from the front and rear by means of the photosensors. If the light incidence on the side of the mirror facing the rear is greater than from the front, the electronic control unit applies a voltage to the conductive coating.

The applied voltage changes the colour of the electrolyte. The higher the voltage, the darker the electrolyte. Incident light is no longer reflected so strongly.

When reverse gear is engaged, the mirror dimming function is deactivated. The mirror can now be used to, say, reverse out of a dark garage into the light.



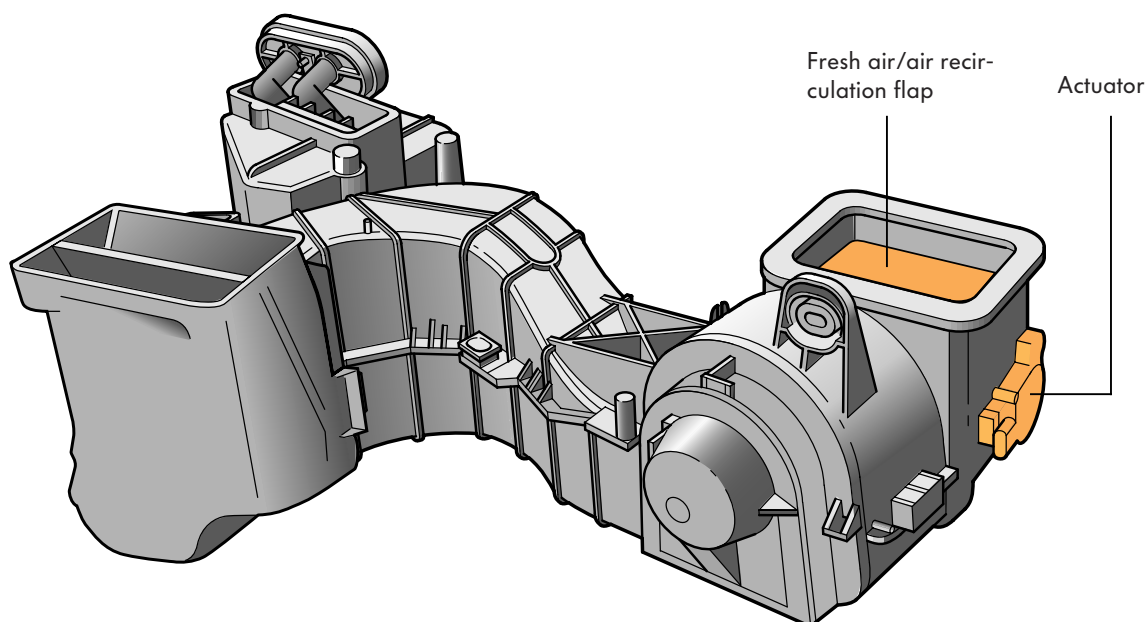
# Heating, air-conditioning system

Three alternative heating and air-conditioning packages are available for the Golf:

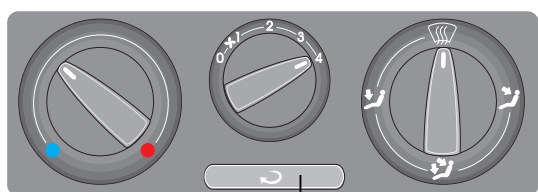
- Heater only
- Manually-operated heater and air conditioner
- Electronically-operated heater and air conditioner (CLIMAtronic)

## Heating

In contrast to the predecessor model, a fresh air/air recirculation mode is possible in the new Golf. The main shut-off flap is therefore no longer required.



SSP 200/039



SSP 200/038

Air recirculation mode

The fresh air / air recirculation flap is operated by an actuator. All other flaps are adjusted by Bowden cables.

In defrost mode, the air recirculation mode is deactivated mechanically. This also prevents moist air inside the vehicle from condensing on the windscreen.

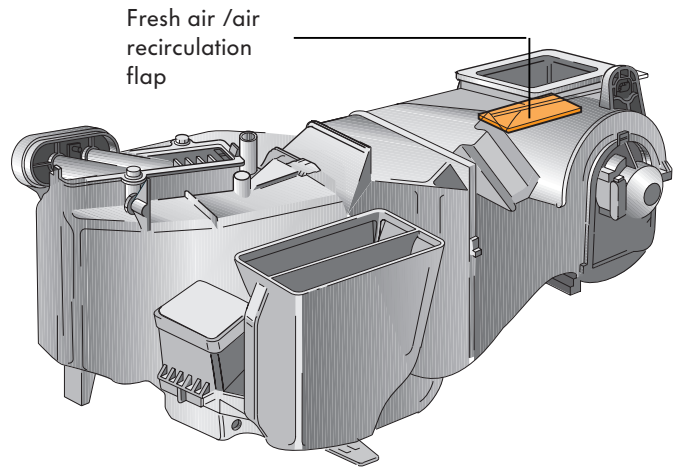


# Heating, air-conditioning system

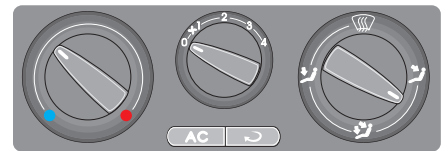
## The manual air-conditioning system

If a manual air-conditioning system is fitted, the climate inside the vehicle is controlled by the driver.

The fresh air / air recirculation flap is now operated by an electric motor. All other flaps are adjusted by Bowden cables.



SSP 200/040

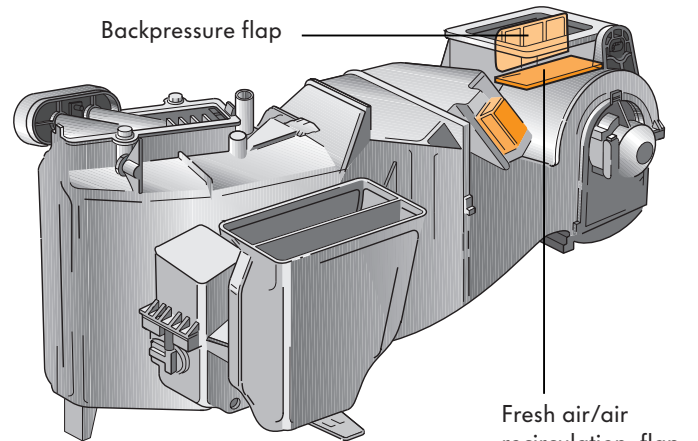


## CLIMAtronic

When CLIMAtronic is fitted, the climate inside the vehicle is controlled automatically.

CLIMAtronic is controlled in the same way as the system fitted in the Passat 97.

Temperature and air flow rate control have been adapted to the interior dimensions of the Golf.



SSP 200/041



The fresh air / air recirculation flap together with the backpressure flap are driven by a common electric motor.

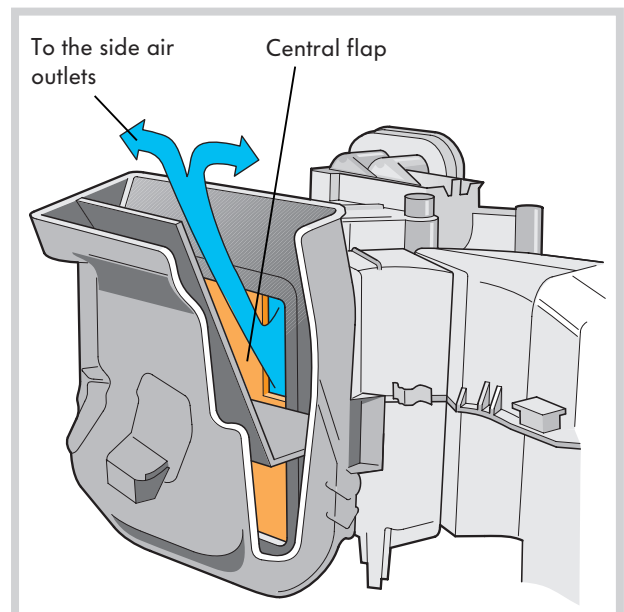
## Air distribution box and central flap

The air distribution box distributes the air flow to the middle and side air outlets. It is located directly behind the central flap and is fitted in combination with the heater and the air conditioner.

### Defrost mode

When defrost mode is activated, the central flap closes. A small air flow is ducted to the side air outlets through the opening in the central flap. At the same time, the middle air outlets are closed.

In this way, the side windows inside the passenger compartment are demisted quickly.

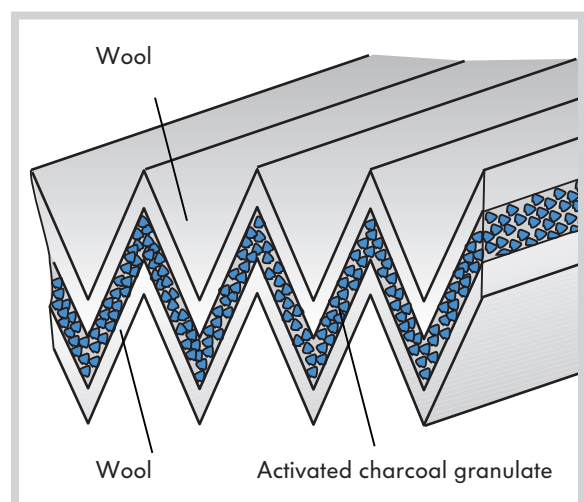


SSP 200/034

## Activated charcoal dust and pollen filter

The newly developed filter differs from previous dust and pollen filters in that it now comprises a combination of wool and an activated charcoal granulate layer.

The wool filters out dust and pollen particles, while the activated charcoal reduces odour and gaseous pollutants. The surface of the activated charcoal binds or changes the chemical composition of gaseous substances to make them safe. The large part of the harmful substance of ozone, for example, is converted into harmless oxygen.



SSP 200/035

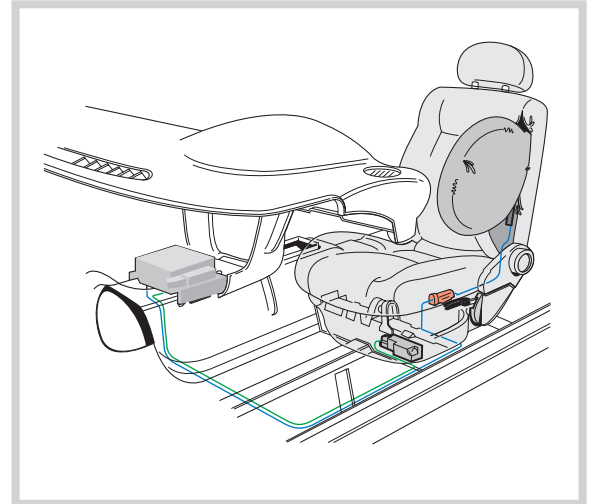


# Service

## Body

### Removing seats

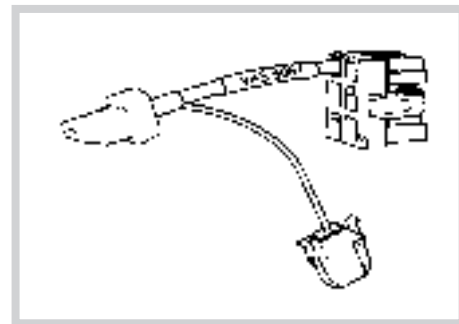
When removing one of the front seats, the side airbag can be triggered by anybody who is electrostatically charged. Therefore, before unplugging the connectors briefly touch the door striker pin or the vehicle body panel to get rid of any electrostatic charge.



SSP 200/109

### Adapter for side airbag VAS 5061

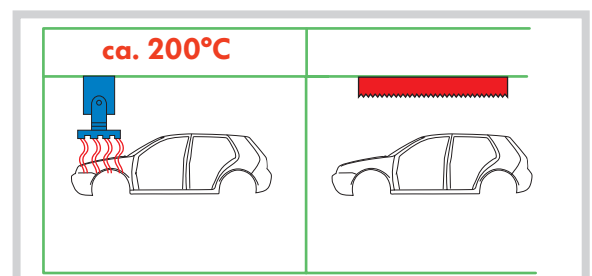
After unplugging the connectors below the seat, plug in the adapter to re-close the earth circuit of the airbag system.



SSP 200/110

### Repairing high-strength panels

After a panel has been beaten to remove a dent, it has a greater rigidity against dents. The panel is more resilient and greater force is required. The material may fracture if subjected to excessive stress.

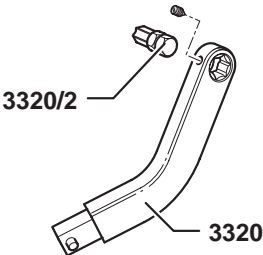

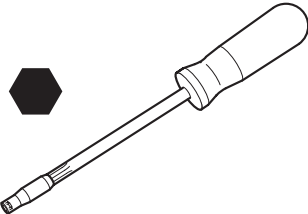
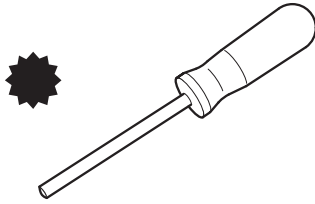
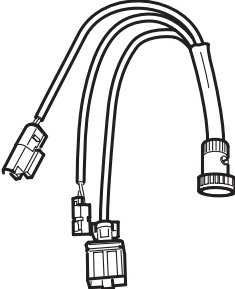


SSP 200/111

If the material is heated too rapidly and to an excessively high temperature (approx. 200°C) with a drying radiator during a partial respray, the panel will deform.



The new special tools and workshop equipment are shown below.

Tool number and designation		Use
<b>3320/2</b> Socket insert		For adjusting the door
<b>T 10006</b> Disengaging tool		For disengaging the brake servo linkage from the brake pedal
<b>T 10010</b> Socket wrench		For fitting the positioning element of the central locking system in the tailgate
<b>T 10011</b> Socket wrench		For fitting the door lock
<b>VAS 5056/2</b> Adapter cable set		For airbag auxiliary tester VAS 5056

SSP 200/134a-e



# Notes

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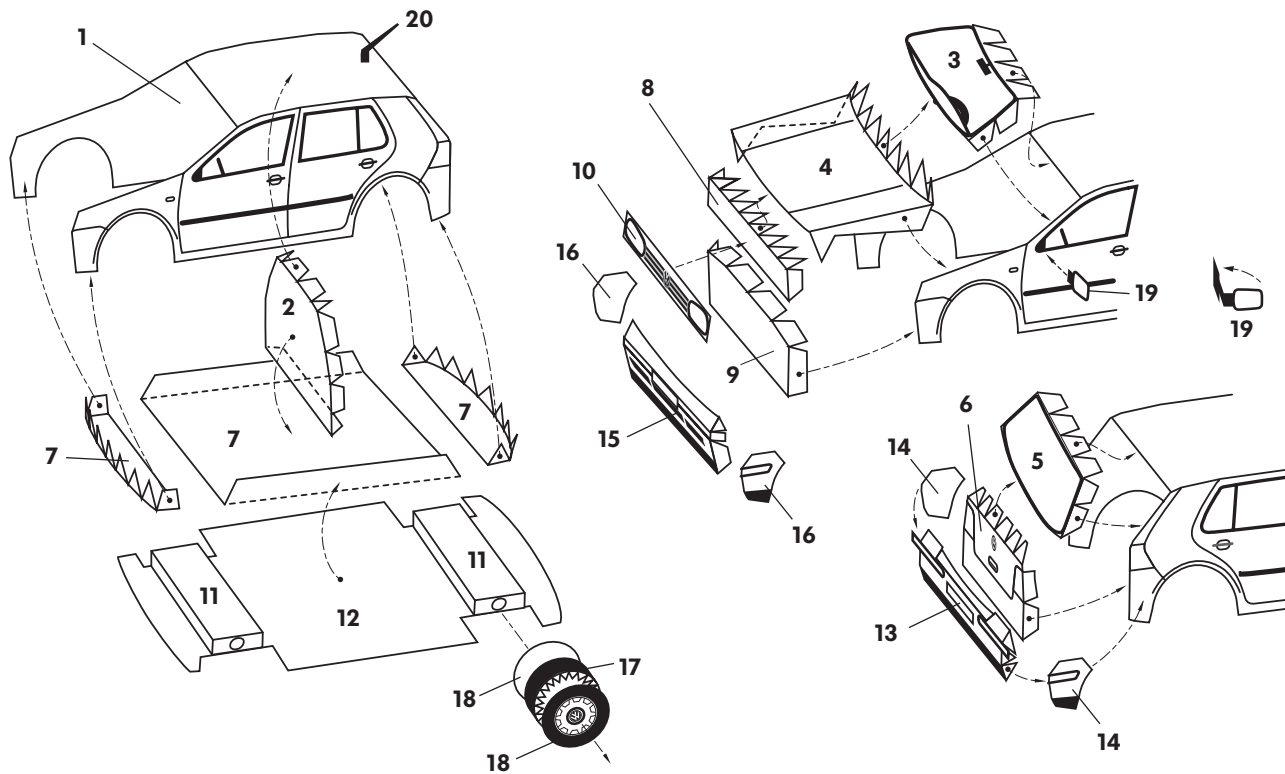
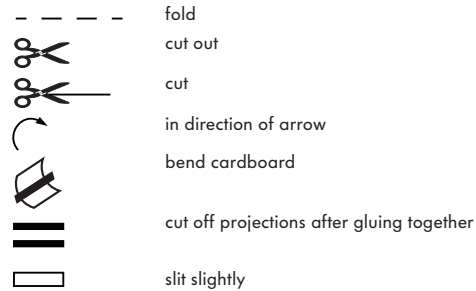
# Assembly instructions for VW GOLF 98

## General notes:

It is better to cut out all parts in the order in which they are fitted.

Slightly slit all fold lines on the flat section using a blunt cutter, fold them up and then coat with adhesive.

Carefully coat all folds with adhesive and allow them to set slightly. Then press the parts together firmly between thumb and index finger.



### The body (part 1)

To assemble the body, cut out small triangles between roof and body side section on each side at the front and rear. Then fold these triangles inwards and use them as tabs for gluing the roof and body side section.

### The rear end parts 5,6)

Once the rear end has been glued together for a few minutes, coat the outer ends of the indicator lights, fold them and press them into the desired position. You can shape adjustments in this way.

### The front section (parts 3, 4)

Glue the windscreen. Glue the bonnet from the inside to the lower side section of the windscreen. Then glue the bonnet to the side sections of the body.

### The anti-roll bar (part 2)

Glue the anti-roll bar level with the central roof pillar. Press the outer sides firmly against the anti-roll bar to help maintain the basic shape of the model. Now place the model on a level surface to see if all parts have been inserted straight. Any unevenness can now be corrected by pulling parts apart at the adhesive bond or by applying light pressure.

### The floorpan sections (part 7)

Glue the floorpan sections to the underside of the body to stabilise the model.

### The front section reinforcements (parts 8,9)

Bend slightly and glue in place as shown in the drawing.

### The axles (parts 11)

Glue the axles on the

### Floorpan (part 12).

Now you can glue the entire floorpan assembly into the model from below.

### The tyres (parts 17, 18)

are to be shaped. To do this, pull the tread downwards over an edge (e.g. table edge) before joining the wheel halves in order to soften the cardboard so it is easier to shape. Now coat the inner surfaces of the wheel halves with glue, allow the glue to set slightly and glue on the tread around the outer circumference of the wheel. Use the serrations on each side of the tread to affix the tread. Now glue the wheels on the axle, making sure that the centre of the wheel coincides with the axle marking.

Now assemble the bumpers.

### The rear bumper (part 13)

must be folded beforehand and glued on the

### Side sections (parts 14)

After allowing the glue to evaporate, glue the bumper together with the side sections on the body. Using a cutter; now carefully press the upper edge of the bumper upwards so that it finally takes shape.

### The front bumper (part 15)

should also be folded beforehand and glued on the

### side sections (parts 16).

Then glue the bumper on the body.

### The mirrors (parts 19)

Precut the mirrors to roughly the correct shape beforehand, then fold them along the marking and glue as shown in the drawing. Now cut out the mirror contour. Using a sharp cutter, carefully cut a slot at the marking in the black triangle on the side window. Now glue the mirror in this slot.

### The roof aerial (part 20)

Also attach the roof aerial to the model.



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