Service Training

Self-study Programme 355

The EOS 2006

The Volkswagen Eos combines the characteristic flair of a cabriolet with the emotional design of a coupé. It is thus aimed at two different groups of buyers and builds on the tradition of cabriolet production at Volkswagen.
This very successful tradition started in 1949 with the first Beetle Cabriolet and continued in 1979 with the Golf Cabriolet and in 2003 with the New Beetle Cabriolet.

Unlike its predecessors, the Eos is not derived from another model, it is an independent development that unites the characteristics of different vehicle types and heads in a totally new direction in terms of roof technology.
Together with the values of quality, comfort, safety and engines, the Eos has a rounded, promising vehicle concept that sets new standards among its rivals.

Make sure you read self-study programme SSP 379 “EOS 2006 – Electrical System”.
You will need to read both programmes to gain an insight into the complex roof system and its operation.

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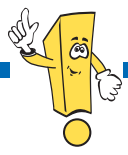
NEW



Important Note

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.

Contents

In Brief

The Volkswagen Eos Cabriolet-Coupé

The Eos is named after the Greek goddess of the dawn, who was the daughter of the Titans Hyperion and Theia. According to legend, the Titans, the oldest race of Greek deities, are the children of the first gods Gaia and Uranus, who originate from chaos.
Eos is the sister of the sun god Helios and the moon goddess Selene.
Eos rises out of the Oceanus every morning and travels ahead of Helios in his chariot as he rides across the sky to herald the new day.
Homer praises her beauty and her grace and describes her as a wonderful, beautiful and curly-haired goddess.

The Eos from Volkswagen combines the everyday and all-year round suitability of a coupé with the classic open-top driving characteristics of cabriolets without their disadvantages like, for example, high noise level.

The Eos is built at the Auto Europa plant in Palmela, Portugal.

Eos – The Coupé

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Being an independently developed cabriolet-coupé, the Eos has the following characteristics:

- Sporty design and handling
- Electrohydraulically operated, five-piece folding steel roof with integrated glass sliding sunroof
- Four full-sized seats
- High-level of interior comfort thanks to 12-way electrically adjusted seat with electrical easy-entry function
- Rear seat system with through-load option
- Generous boot volume when roof closed
- Extensive safety concept
  with driver, front passenger and head airbags and active rollover protection system
- High torsional stiffness
- Low level of wind noise
- High-end sound system from Dynaudio
- ParkPilot with boot lid assist and
- a wide range of engines.

Eos – The Cabriolet

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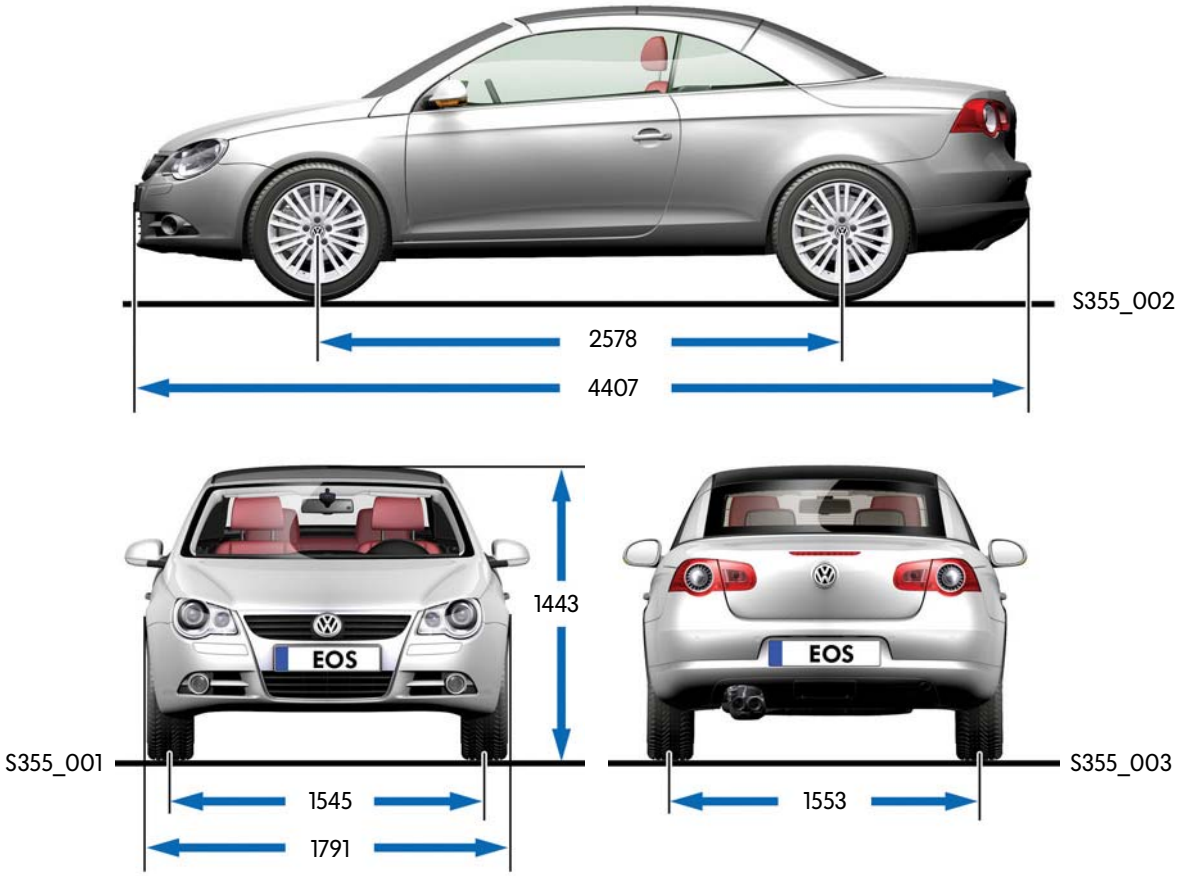
Technical data

Exterior dimensions and weights



Exterior dimensions

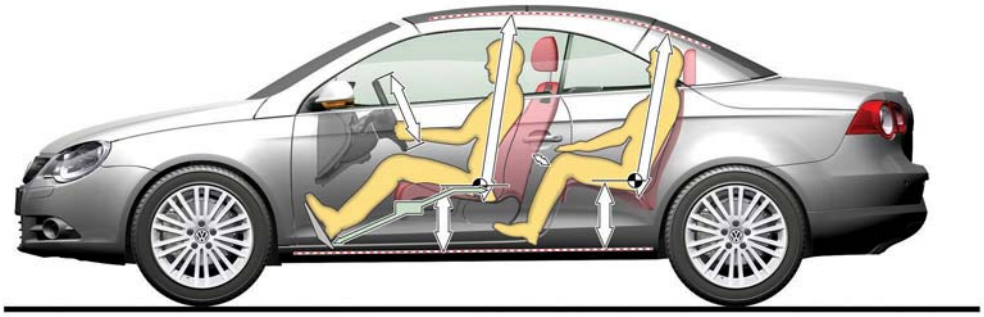
Length	4407mm
Width	1791mm
High with roof closed	1443mm
Wheelbase	2578mm
Track width at front	1545mm
Track width at rear	1553mm

Weights

Maximum weight	2090kg*
Curb weight	1713kg*
Cd value as coupé	0.315

* when equipped with 3.2l 185kW V6 engine

Interior dimensions



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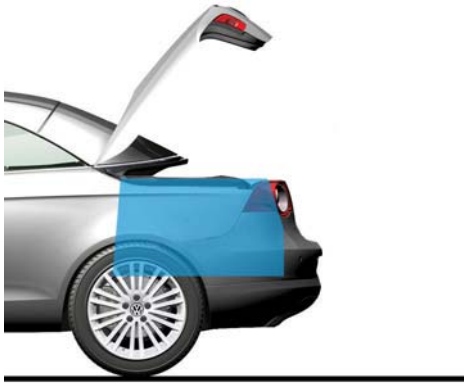

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Interior dimensions

Interior length	1684mm
Front shoulder width	1390mm
Front headroom	952mm
Rear shoulder width	1055mm
Rear headroom	909mm

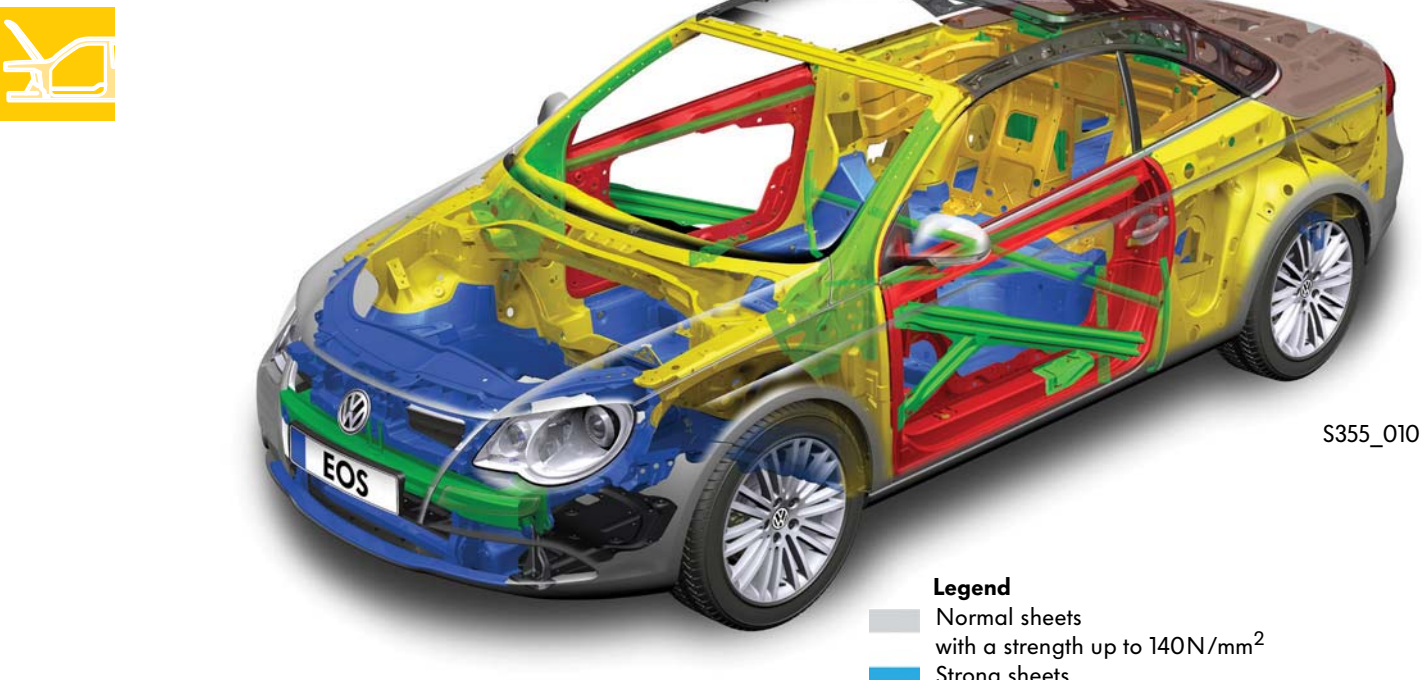
Other dimensions and data

Coupé boot volume	380l / 358l*
Cabriolet boot volume	205l / 183l*
Tank capacity	55l

* when equipped with 3.2l 185kW V6 engine

Body

Body structure



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Legend

- Normal sheets with a strength up to 140 N/mm^2
- Strong sheets with a strength from 180 to 240 N/mm^2
- High-strength sheets with a strength from 260 to 300 N/mm^2
- Highest-strength sheets with a strength from 300 to 420 N/mm^2
- Thermoformed sheets with a strength of over 1000 N/mm^2
- Plastic

A body with a high static and dynamic rigidity is the requirement for good vibration behaviour and excellent driving properties.
This is achieved by using high, higher and highest-strength sheet qualities as well as THERMOFORMED SHEETS in conjunction with modern joining methods like laser welding and structural adhesive joints. The use of thermoformed sheets, in particular, has increased the stability of the body without making it heavier.

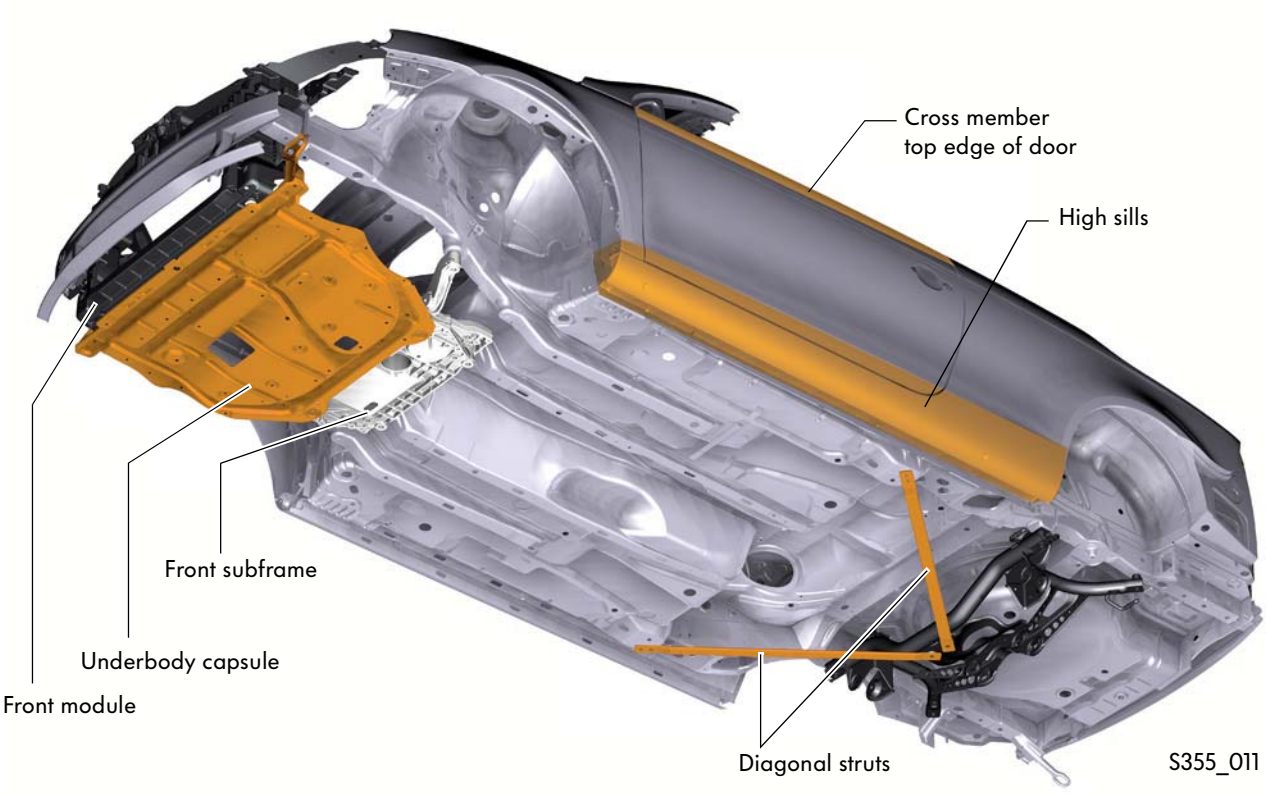
The following components are made from highest-strength sheets:

- Inner A-pillar
- Seat consoles
- Sills
- Rear longitudinal members

Highest-strength tubes are fitted in the upper area of the doors and under the rear seat bench.
Thermoformed sheets are used:

- in the front bumper cross-members
- in the A-pillar reinforcements and in the front windscreen frame
- in the door reinforcements

Special body-in-white measures



To also guarantee the excellent vibration behaviour of the cabriolet-coupé when the roof is open, extensive reinforcements were made to the body-in-white in addition to the use of the described sheet qualities.

In addition to the higher sills, the cross members on the upper edges of the doors and the reinforcement of the rear panel, they are mainly in the introduction of a supporting front underbody capsule made from aluminium and diagonal struts mounted in the rear area.

The underbody capsule and diagonal struts are bolted. The underbody capsule connects the front subframe to the longitudinal members.
Together with the diagonal struts, this creates an additional reinforcing level and thus increases the torsional rigidity of the whole body.

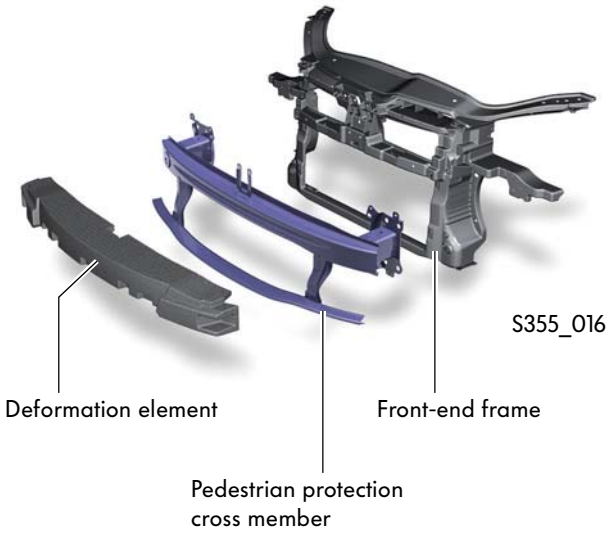
Body

Pedestrian protection

In the body development, greater focus has been placed on pedestrian protection in addition to occupant protection. The aim is to reduce the risk of injury to pedestrians and cyclists by means of constructive measures.

The Eos has a complete concept for the front end that comprises the following measures:

- Sufficient spacing from hard engine compartment parts under the bonnet
- Optimisation of hinges and interior sheets on the bonnet
- Lower risk of leg injuries

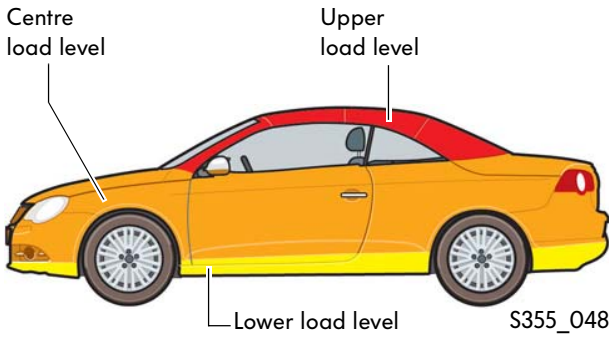


Reduction of leg injuries

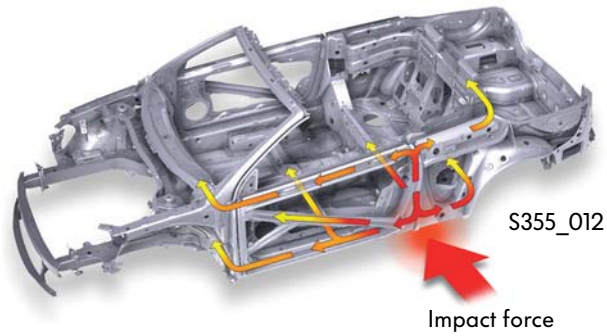
The Eos has an additional cross member for pedestrian protection that has a deformation element made from foam.
The deformation element absorbs a large proportion of the energy in a collision so that the risk of severe leg injuries is reduced.

Crash safety

In terms of car crash safety, we distinguish between three different load levels that have to absorb the forces in an accident.
The upper load level is formed by the roof, the middle load level is the side structure of the vehicle and the lower load level is the vehicle floor structure. On cabriolets, the forces caused by a collision mainly need to be absorbed by the centre and lower load level because the roof construction is, to a great extent, not part of the vehicle statics.

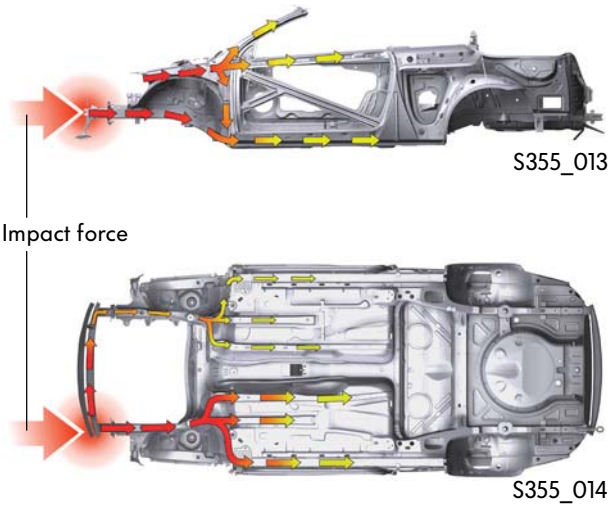


Absorption of force in side collision



The aim of all crash safety measures is to preserve the crash survival space inside the vehicle and provide maximum protection for the occupants in accidents. This is achieved by transferring the forces arising in the collision specifically to the vehicle structure. In this way, the degree of deformation at the point of impact is reduced as the forces affect a larger area.

Absorption of force in frontal collision



On the Eos, in frontal and side collisions, the forces are distributed broadly across the centre and lower load levels thanks to the reinforcing and stiffening measures on the side and floor structure so that maximum protection for occupants is guaranteed even when the roof is open.

Interior

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Front seats

Three different front seat versions are available for the Eos.
The standard equipment comprises a mechanical 8-way seat with a manual 2-way lumbar support. The next equipment version up is the mechanical 8-way seat with electrical 2-way lumbar support and manual easy-entry function.
The top of the range version is the electrical 12-way seat with electrical 4-way lumbar support and electrical easy-entry function. On this front seat, you can also adjust the seat tilt electrically.

Rear seat bench

S355_021

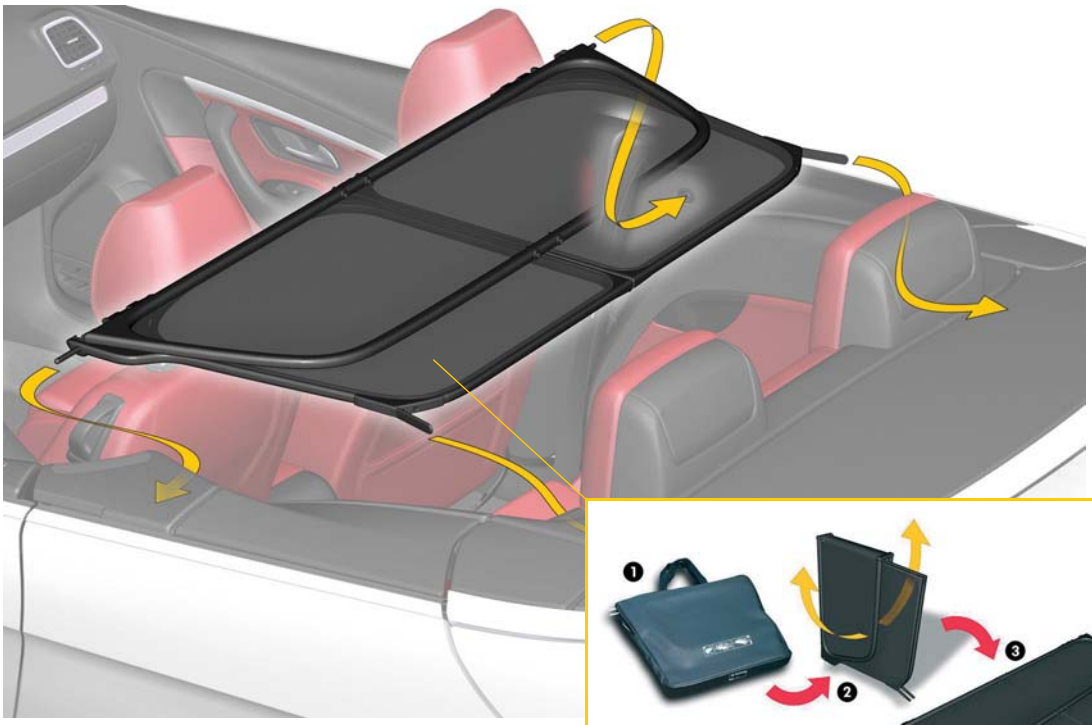
The rear seat bench in the Eos is produced in a new manufacturing process. The wire frame is foamed into the upholstery. The cover is glued to the upholstery. This method is called "IN SITU" manufacturing.

The rear seat bench has two pairs of Isofix anchors and three-point seat belts with belt force limiters as standard.

S355_036

A lockable through-load facility, which is also standard, allows you to transport skis, for example. Brackets for securing a first-aid kit are integrated in the lid of the through-load facility. Once the lid has been removed, you can reach the emergency boot release.

Wind deflector



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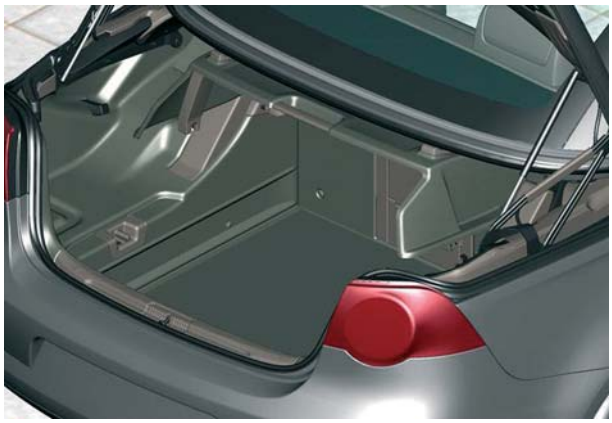
A wind deflector is available as an optional extra for the Eos. It folds into a small package with carrying handle allowing it to be stored away in the boot.

Once unfolded, the wind deflector fits into the mountings provided. It covers the rear seat bench completely up to the head restraints. Finally, the partition section folds up towards the front seats and locks into place.
The wind deflector reduces the formation of turbulence. It also helps keep the rear seat bench clean.

Unfolding wind deflector S355_019

Airflow with wind deflector S355_037

Boot



Boot space in coupé S355_022

S355_045

Luggage compartment cover

Warning stickers on sides of boot

S355_103

Warning sticker on luggage compartment cover S355_104

When you drive the Eos as a coupé, a generous boot with a volume of 380 litres is available.

If you want to drive with the roof open, the luggage cover needs to be closed beforehand to protect the cargo and, most importantly, the cabriolet roof from damage. The boot still has a volume of 205 litres when the roof is open and the luggage cover is closed.

The roof can only be opened when the luggage cover is locked in place. A microswitch checks if the cover is positioned correctly. If the luggage cover is not closed, a warning signal will sound and warning message will appear in the dash panel insert display to inform the driver about the problem.

Stickers on the left-hand and right-hand side of the boot and on the luggage cover inform you that nothing may be stowed there as the roof side members and roof mechanism use this space when the roof package is lowered.

CSC roof

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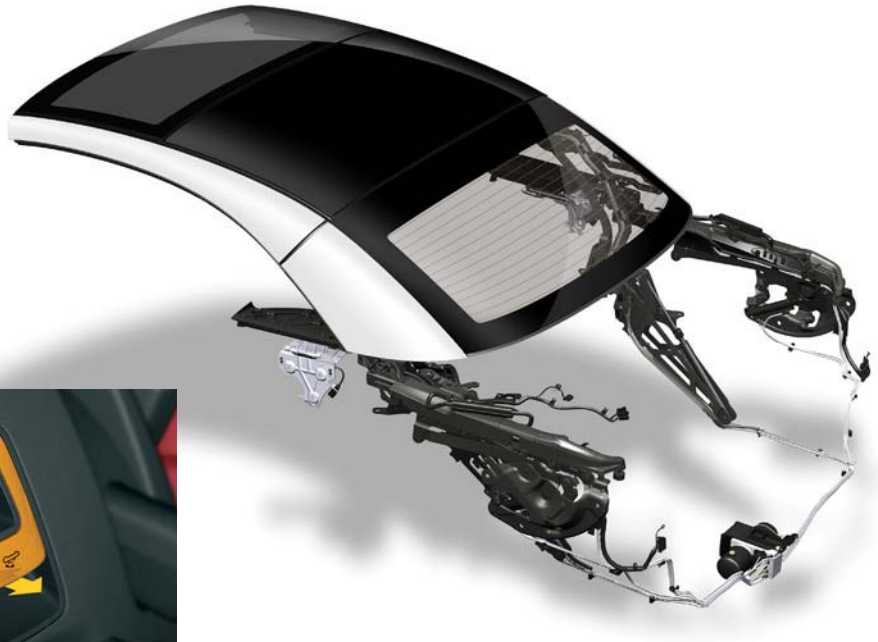


S355_008

CSC stands for Coupé Sunroof and Cabriolet roof. It is a multi-part folding roof made from steel sheet and represents a completely new development with its complicated electrohydraulic operation.

Since the roof has five parts, the A-pillar with the wind-protection frame could be made shorter than on other cabriolets. The windscreen therefore does not extend too far over the interior meaning the driver and front passenger are more in the open and climbing in and out is easier. An electrical glass sunroof integrated in the CSC roof with sliding headliner also provides ventilation and light when you are driving the car as a coupé.

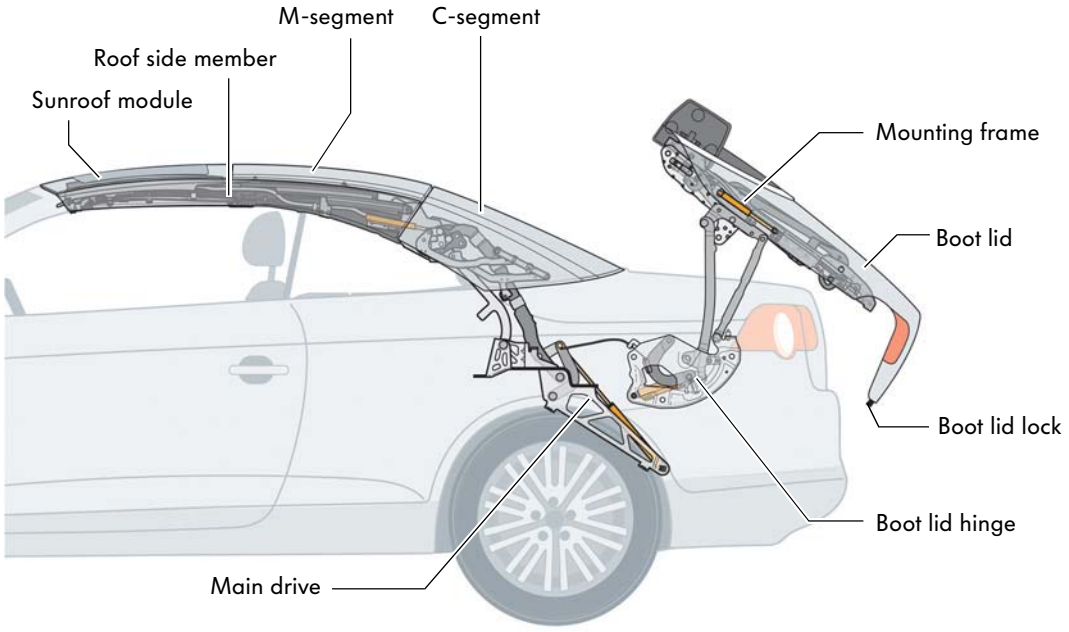
The CSC roof and the externally running sunroof are operated using a switch in the centre console. When the roof is operated, the CSC roof segments are placed one on top of each other in a sandwich and are stored in the boot.

To support the driver when the roof is retracted, the Eos Park Assist system is supplemented with the function of a boot lid assist. It monitors the area behind the Eos and ensures that the boot lid can move in its full range when the roof is opened.
The Park Assist is available as an optional extra.

You will find detailed information on the Eos onboard supply and electrics in self-study programme SSP 379 “EOS 2006 – Electrical System”.

Roof mechanism

CSC roof design



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The CSC roof is made up of five main modules or segments:

- The glass sunroof or ESS module for short (ESS stands for external sliding sunroof),
- the M-segment with the centre part of the roof frame and the electrical drive for the ESS module functions,
- the C-segment with the rear windscreen and
- the left-hand and right-hand main drive with the respective roof side members, the accompanying locks and two hydraulic cylinders for each.

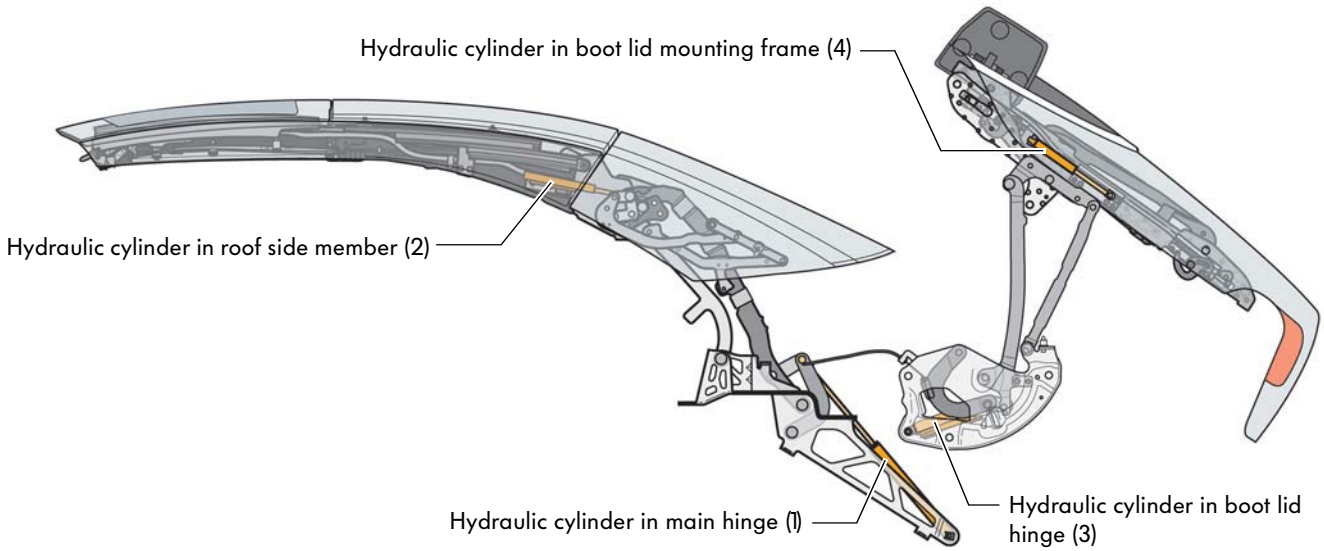
Together with the roof movement, the boot lid is opened and closed to store the roof in the boot. The movement of the boot lid with the necessary locking and unlocking processes is also carried out by hydraulic cylinders.

The boot lid mechanism is basically made up of the following components:

- the boot lid
- the boot lid hinges
- the mounting frame
- 2 hydraulic cylinders on each side of the car
- the boot lid lock.

All in all, the complete movement procedure to open and close the CSC roof is a complex interaction of individual movements in which the completion of one part of a step is often the requirement for the next step to be carried out. The system is supported by an extensive set of sensors that monitor the movement and the position of the CSC roof.

CSC roof drive



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All roof movements together with the unlocking or locking of the different components are made by the four hydraulic cylinders for the CSC roof as well as the four hydraulic cylinders for the boot lid mechanism. Only the glass sunroof is powered by an electric motor.
The following hydraulic cylinders are fitted on each **side of the car**:

- 1 hydraulic cylinder in main hinge of CSC roof (1)
- 1 hydraulic cylinder in side member of CSC roof (2)
- 1 hydraulic cylinder in boot lid hinge (3)
- 1 hydraulic cylinder in boot lid mounting frame (4)

When the roof is operated, different lids and flaps are opened or closed while the CSC roof is stowed away completely or closed again. These movements, like the locking and unlocking of roof components, are also carried out by a clever system of mechanical couplings with the help of rods and Bowden cables via the Eos hydraulic cylinder.

When the roof is operated, parts of the interior panelling also have to follow the movement of the roof. The whole mechanism of these components has been constructed without additional drives like electric motors, for example.

Tasks of the hydraulic cylinders

1. Hydraulic cylinders in main hinges

- Lowering the roof package into the boot or lifting the roof package out of the boot
- Performance of a desmodromic sideways swinging movement of the roof side members

2. Hydraulic cylinders in roof side members

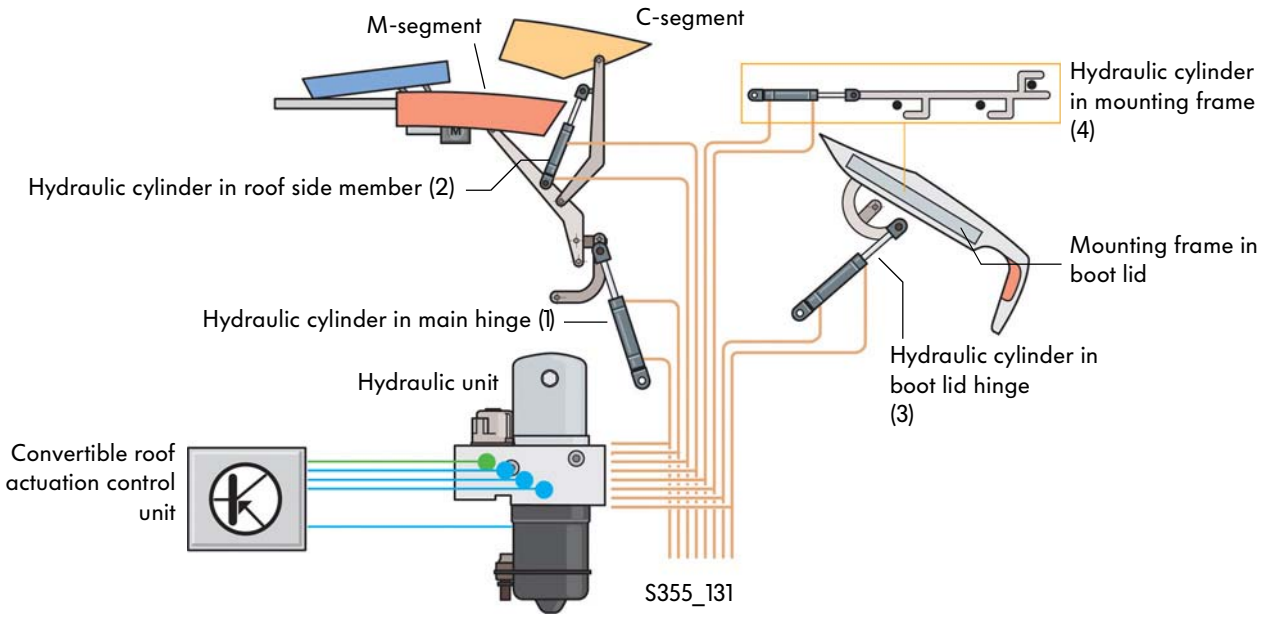
- Swinging the C-segment over the M-segment when opening the roof and swinging back the C-segment when closing the roof
- Locking and unlocking the roof side members on the A-pillars
- Locking or unlocking the C-segment on the M-segment

3. Hydraulic cylinders in the boot lid hinges

- Carrying out the swinging movement of the boot lid
- Opening and closing the roof side member flaps via cables

4. Hydraulic cylinders in mounting frame

- Locking and unlocking the mounting frame to/from the boot lid for roof movement
- Unlocking or locking the mounting frame from/to the body when roof completely open or closed
- Opening and closing the covering flaps using cables



External sliding sunroof

The name “External Sliding Sunroof” (ESS) refers to the sunroof running over the M-segment and not under the roof panel as usual. The glass sunroof is operated with the inner part of the roof switch. Depending on how long the switch is pressed, an automatic run or a manual run can be carried out.

S355_040

Sunroof operation

If you press the switch for longer than 0.5 seconds, an automatic run is started that moves the sunroof to ventilation position and stops there. Pressing the switch again for less than 0.5 seconds starts a second automatic run that opens the sunroof completely.

S355_039

If you press the switch for longer than 0.5 seconds when the sunroof is closed, a manual run is started. The sunroof opens manually for as long as the switch is pressed. Once it passes the ventilation position, the control unit switches to automatic mode and opens the sunroof completely.

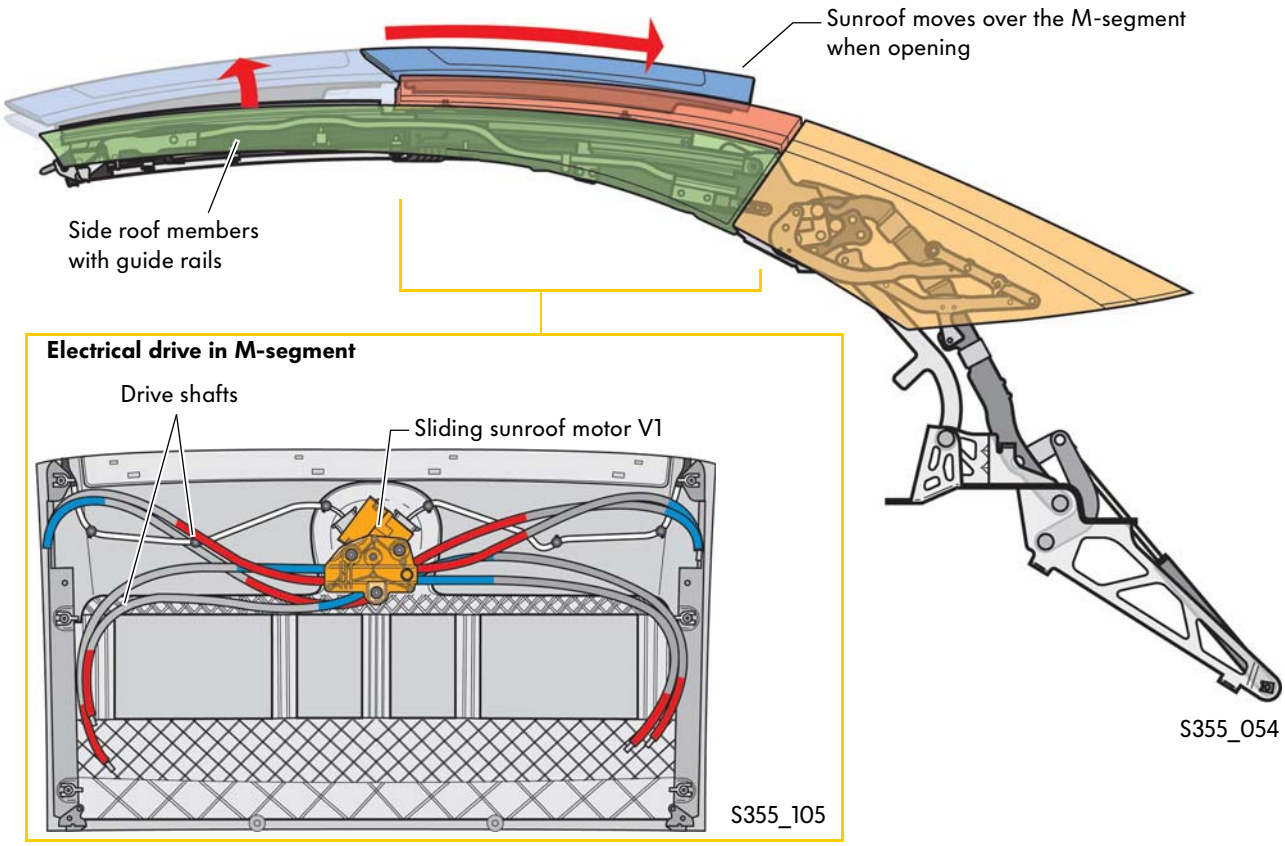
When closing the sunroof, there is also an automatic and manual mode.
In manual closing mode, you can also stop the sunroof in an intermediate position by letting go of the switch.

S355_117

S355_041

Design

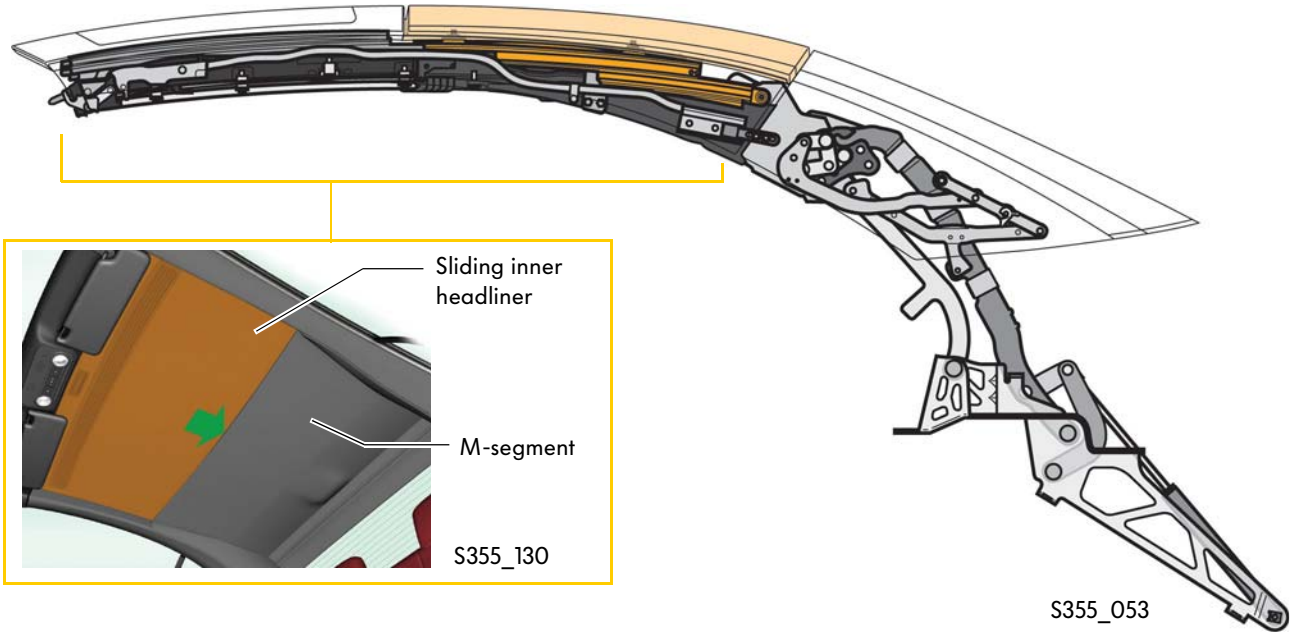
The main components of the sunroof module are the sunroof lid made from tinted glass and the sunroof mechanism with carrier sheets and mechanism gates. The guide rails and the mechanism gates for the sunroof are accommodated in the roof side members.



How it works

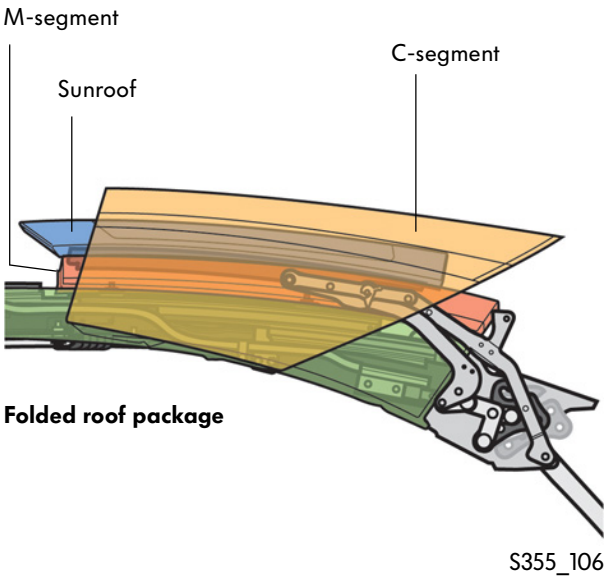
Unlike the other movements of the car roof and boot lid, the sunroof is not driven by hydraulic cylinders, but by an electric motor, the sliding sunroof motor V1. It is located centrally at the rear of the M-segment and is connected to the ESS module via two pairs of flexible shafts. One shaft pair moves the sunroof upwards to the ventilation position. The other pair of shafts opens the sliding inner headliner.

M-segment



The middle segment (M-segment) is made from steel and contains the electric motor for the sunroof as described. It is the central connecting point to the two roof side members. On the underside, the M-segment has space to hold the sliding inner headliner.

The M-segment is placed at the bottom of the folded roof package that is transported to the boot by the main drive. The sliding sunroof is on top of the M-segment and the C-segment is placed on top of that. The roof package is only moved by the main drive once the sunroof and C-segment have reached their final positions on top of the M-segment and the boot lid along with all necessary flaps have been opened.

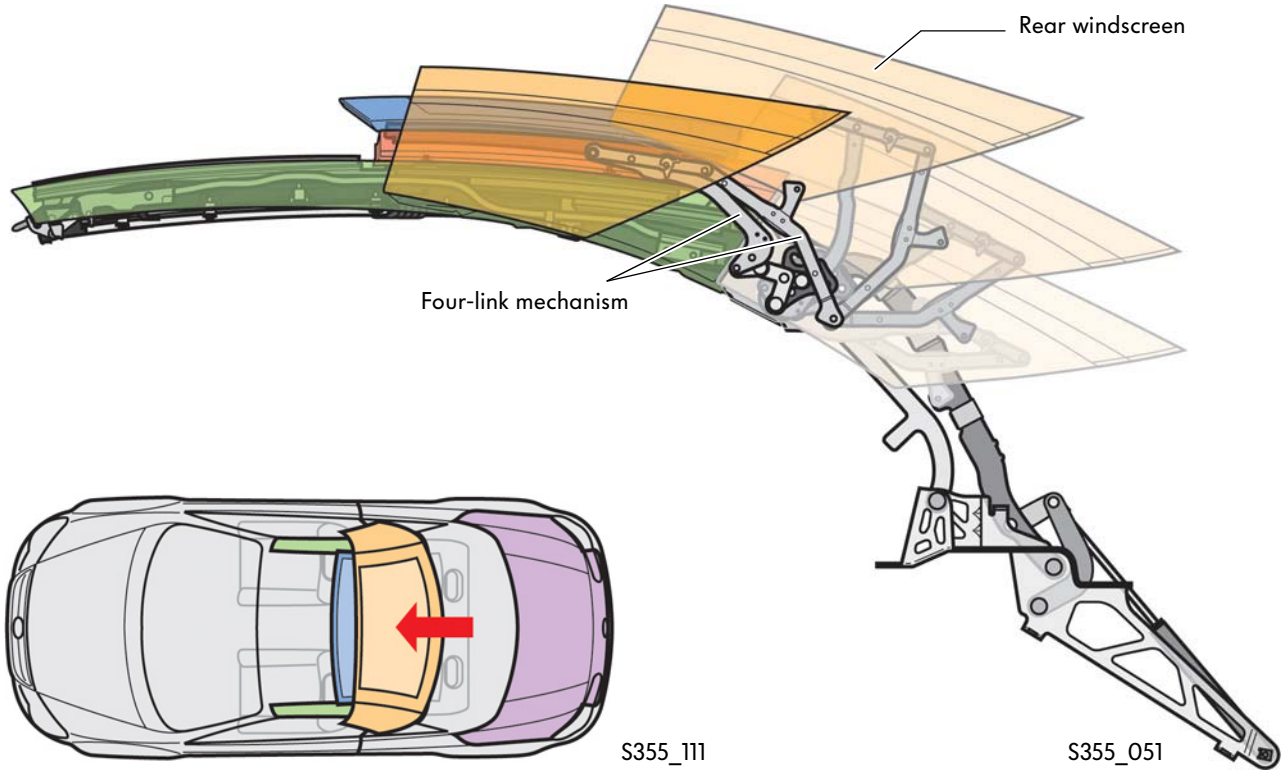


Folded roof package

C-segment

S355_116

The C-segment is made up of a rear windscreen frame and the heated rear windscreen. The segment is connected to the roof frame via a four-link mechanism. The C-segment is moved by two separate hydraulic cylinders one in the left-hand roof side member and one in the right-hand roof side member.



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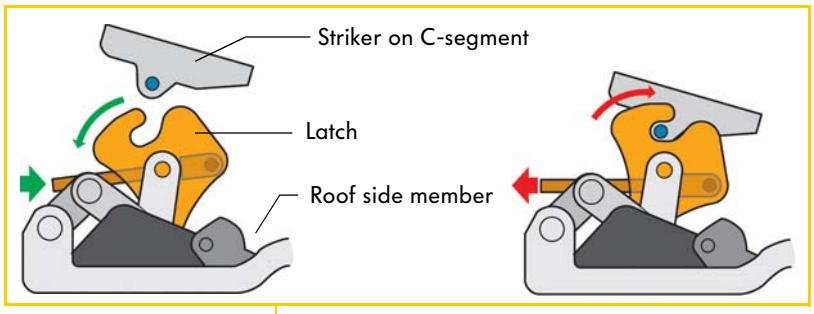
S355_051

How it works

While the sunroof opens, the hydraulic pump starts to work.
The roof control unit activates the hydraulic unit valves so that the following functions can be carried out independently of each other:

- The hydraulic cylinder in the boot lid mounting frame unlocks the C-segment in the lower section.
- The hydraulic cylinder in the roof side member unlocks the C-segment in the top section.
- The C-segment is then swung over the M-segment by the hydraulic cylinders in the roof side members.



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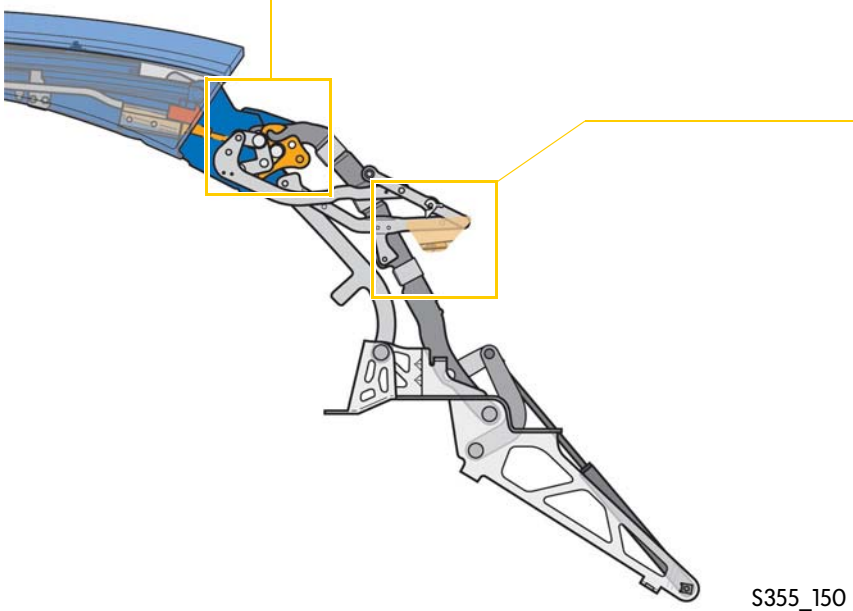
Latch in top section open/closed



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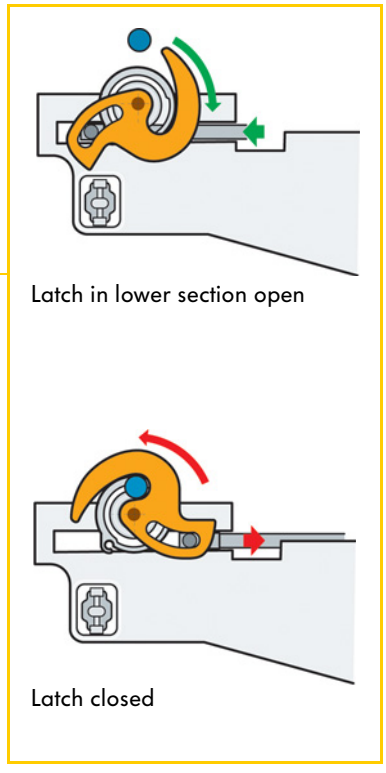

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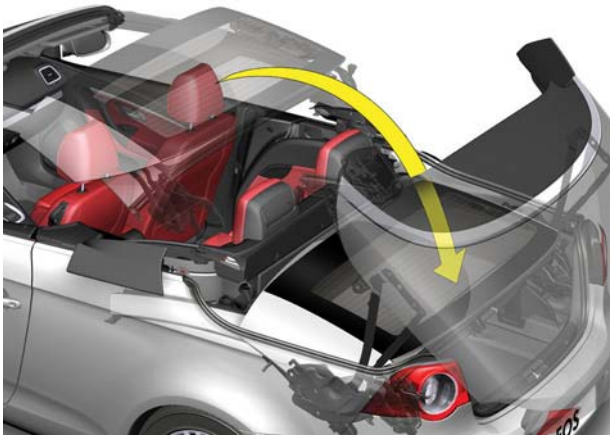
Main drive



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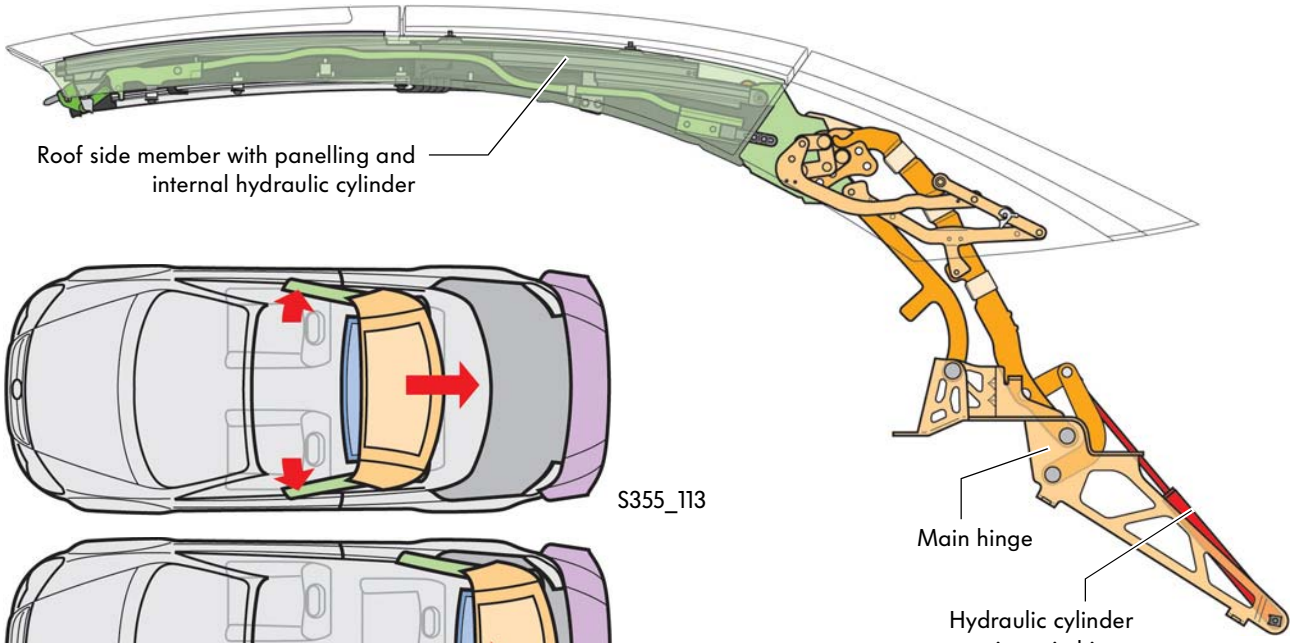
The main drive connects the CSC roof to the body and carries out the actual retraction and extension movement of the roof into and out of the boot. For a short while, it has to support the whole weight of the CSC roof.
The movement of the main drive is closely linked to the movements of the other roof components as well as the boot lid.

The main drive is basically made up of the following components and modules on each side of the car:

- the main hinge
- the hydraulic cylinder in the main hinge
- the roof side member incl. various guide rails, connecting rods and latches
- the hydraulic cylinder in the roof side member
- the roof side member panelling
- the sensors



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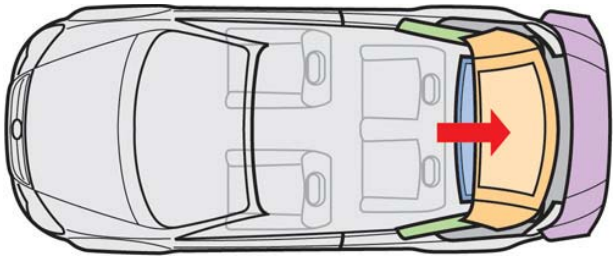
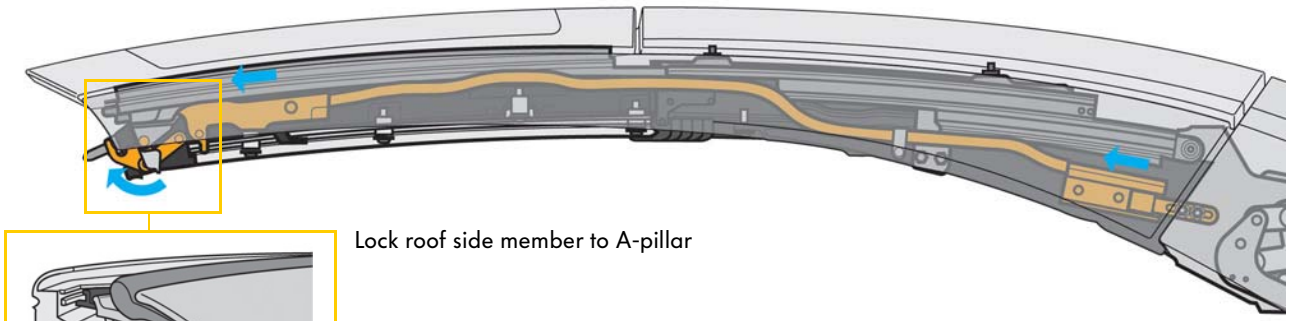


S355_114

How it works

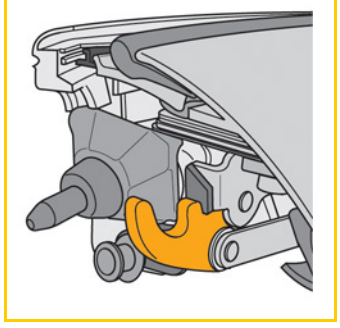
Before the roof package can be stored in the boot, the following sequence of interdependent movements needs to be carried out:

- While the C-segment is opened by the two hydraulic cylinders, the two latches holding the roof side members to the A-pillars are released desmodromically.
- The boot lid is moved to the open position by its hydraulic cylinders. The roof side member flaps are opened by this movement with the help of cables.

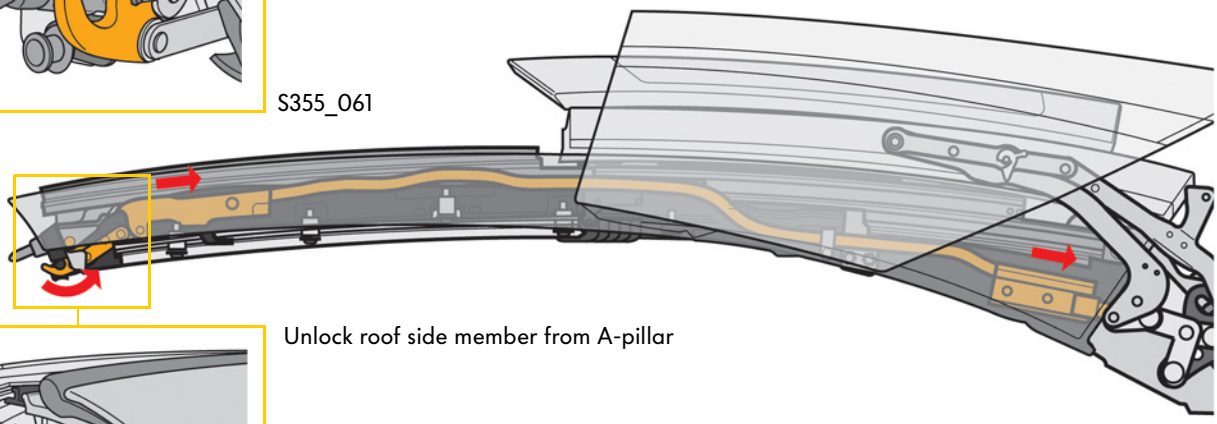


Lock roof side member to A-pillar

S355_107

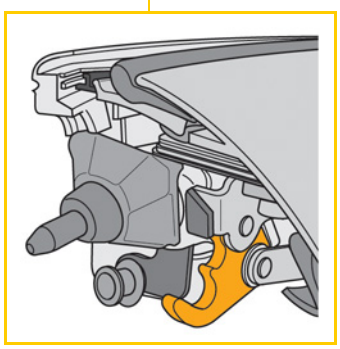


S355_061

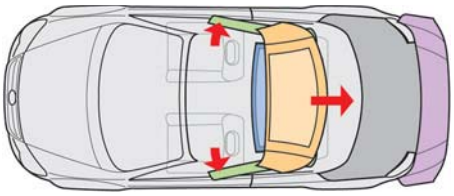


Unlock roof side member from A-pillar

S355_124



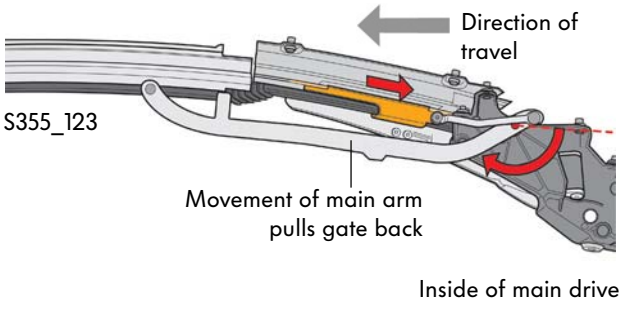
S355_060



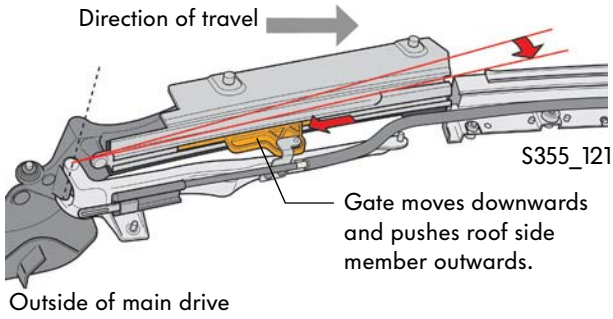
S355_062

The whole roof package is now moved by the hydraulic cylinders in the main hinge towards the boot. A mechanical coupling swings the roof side members outwards with this movement so that the roof side members can pass the roof side member flaps and fit into the space provided on the left-hand and right-hand side of the car.

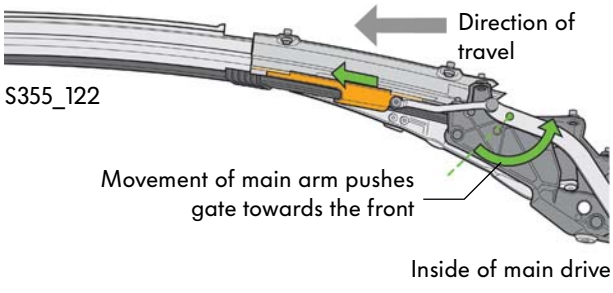
Roof side member movement during “open roof” process



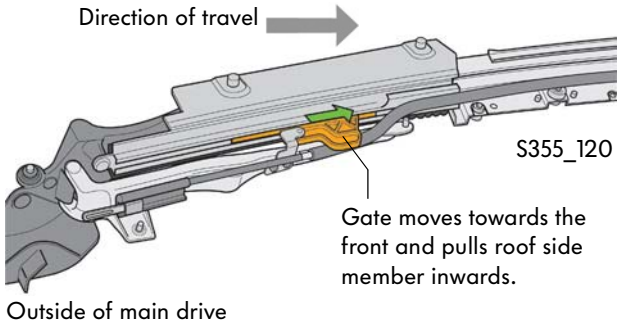
The spreading movement of the roof side members is achieved with a gate that is connected to the main arm of the main drive via a lever system. If the main drive swings towards the boot to store the roof package there, the gate in the roof side member is pulled to the rear. This pushes the roof side member outwards.



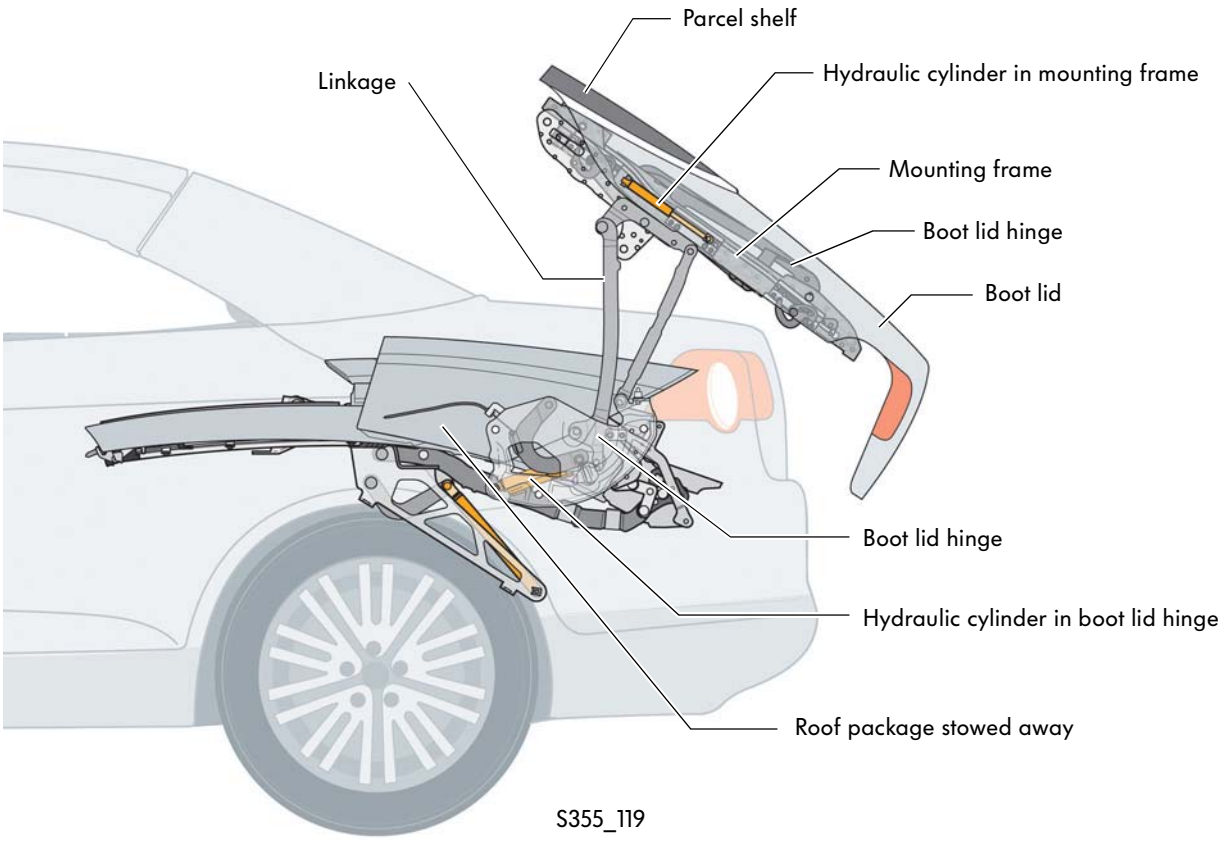
Roof side member movement during “close roof” process



If the roof package is raised out of the boot to close the roof, the gate is pushed to the front again inside the roof side member by the lever system. This movement swings the roof side members towards the inside again so that the roof side members can dock onto the A-pillars.



Boot lid



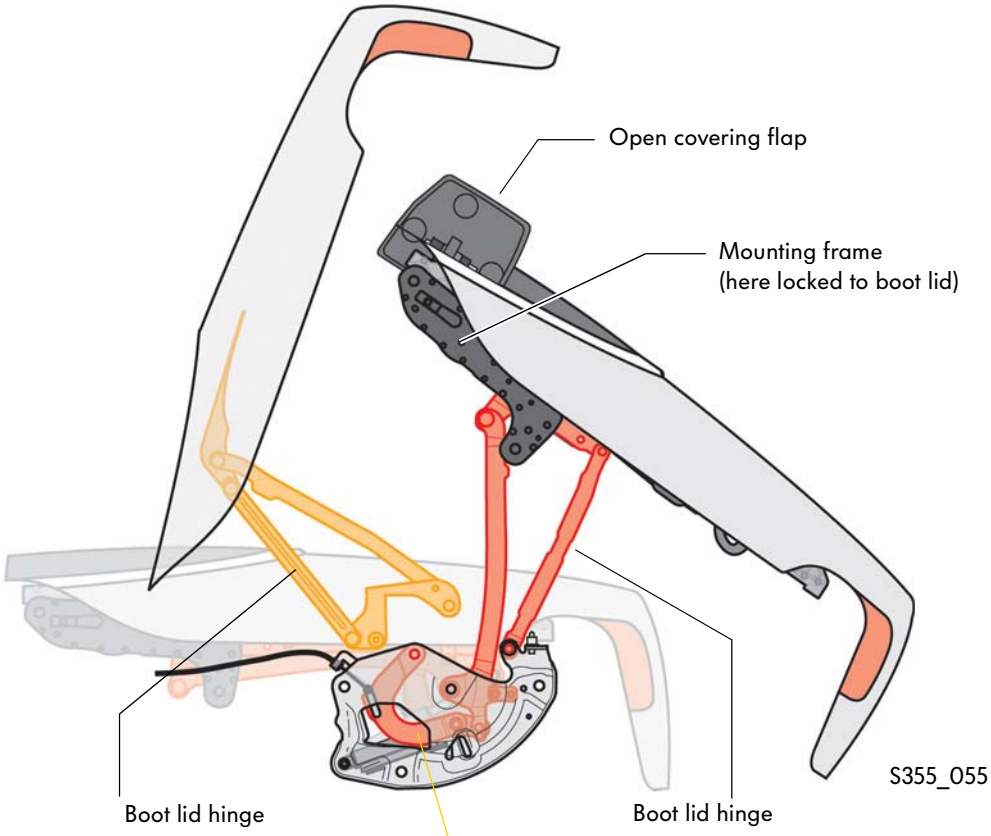
The boot lid is made up of the following components:

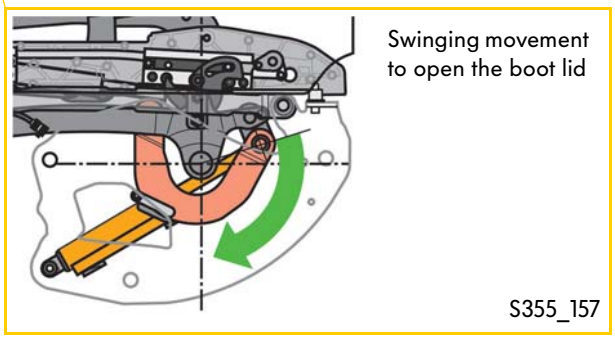
- Parcel shelf
- Boot lid
- Boot lid hinge with mounting frame and boot lid hinge

The essential feature of the boot lid movement is that the movement for normal opening of the boot lid is totally different to that for stowing away the CSC roof.

In order to store the roof package in the boot, the boot lid needs to open out over the tail as show in the diagram. This is possible thanks to the boot lid being connected to a mounting frame on each side.
A hydraulic cylinder is fitted on each side of the mounting frame.

The unit consisting of the boot lid and mounting frame is mounted on the body via the boot lid hinges. There is a hydraulic cylinder in each boot lid hinge.
The boot lid is connected to the mounting frame via the boot lid hinges.





When opened normally (to access boot), the boot lid swings about an axis close to the C-pillar towards the C-segment. To lower the roof into the boot (cabriolet roof operation), the boot lid has to swing upwards and backwards about an axis near the taillights to provide the necessary space. These two opposing movements are made possible by the two independent hinges.

Furthermore the covering flaps over the mounting frame mechanism are opened and closed.
The hydraulic cylinders in the boot lid hinges now carry out the movement of the boot lid and open or close the roof side member flaps with the aid of Bowden cables.

Body

How it works

If the CSC roof is opened or closed, the boot lid needs to be swung to the rear.
To make this possible, the hydraulic cylinder unlocks the mounting frame from the body using latches (a+b) and locks it to the boot lid with latch (c).
The boot lid can now be swung towards the rear by the hydraulic cylinder in the boot lid hinge.

Once the roof operation has been completed, the hydraulic cylinder locks the mounting frame again to the body using latches (a+b) and unlocks latch (c) on the boot lid.

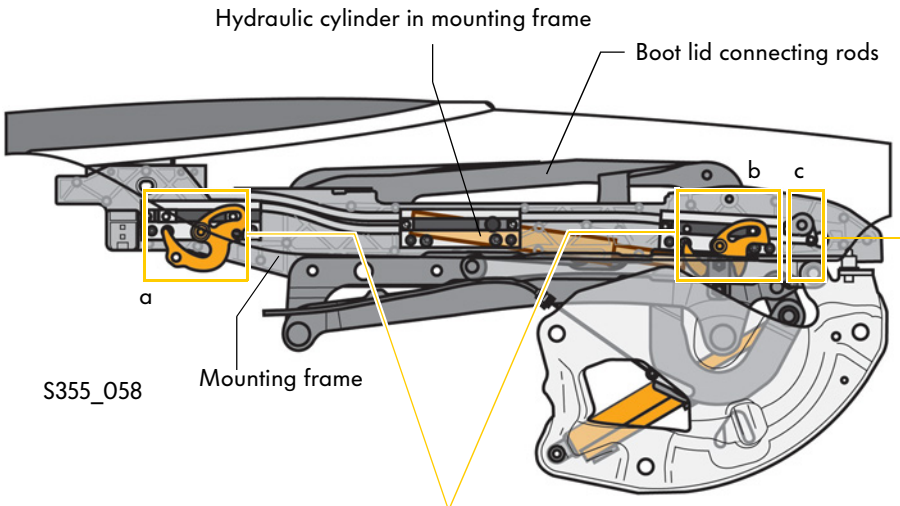
S355_057

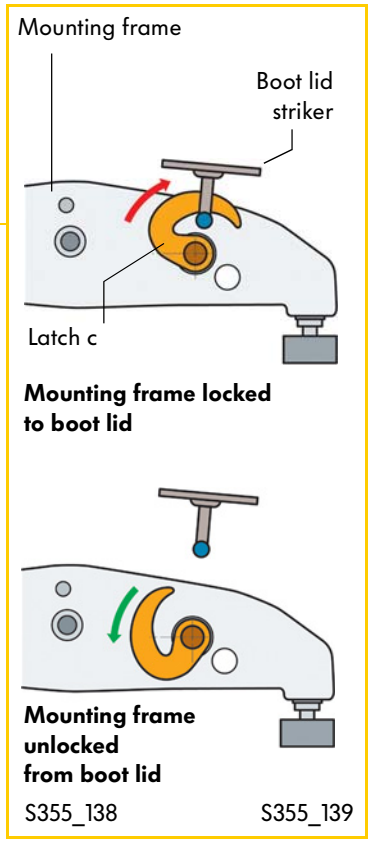
Boot lid during cabriolet roof operation

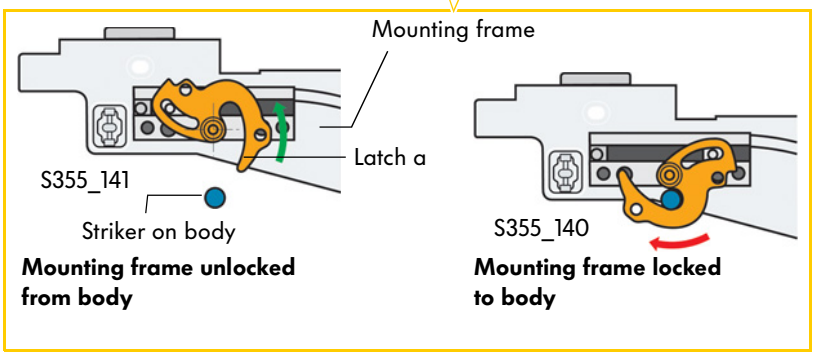
S355_056

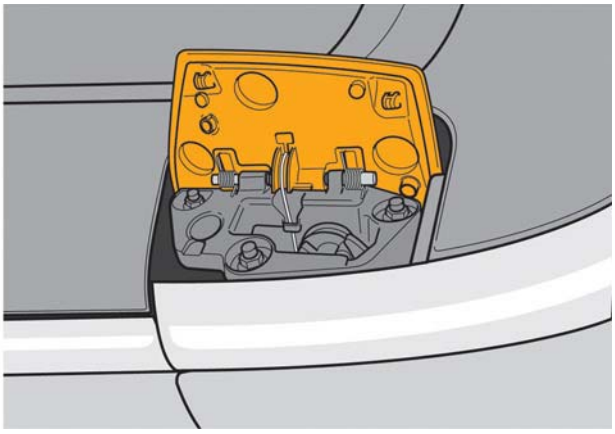
Boot lid during boot usage

The boot lid can now be opened again normally.
During roof operation, the boot lid cannot be opened.
When the roof is not being opened or closed, the boot lid can be opened normally, for example, to stow away luggage. The boot opens and closes manually — closing is supported by a power latching system.

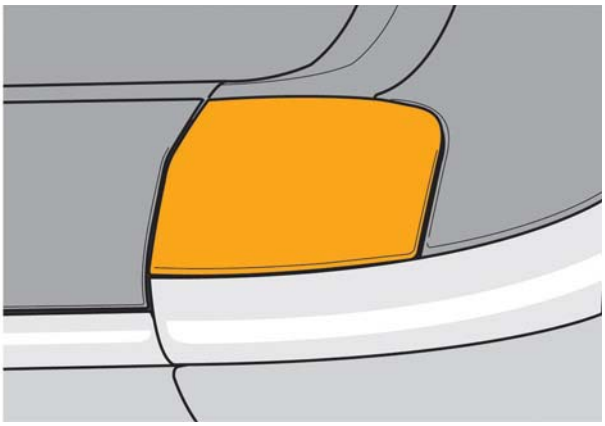








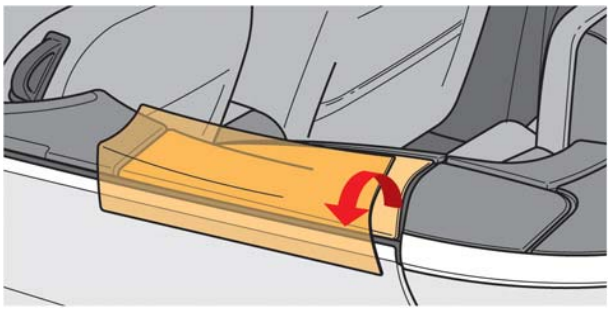
S355_127



S355_126

Covering flaps

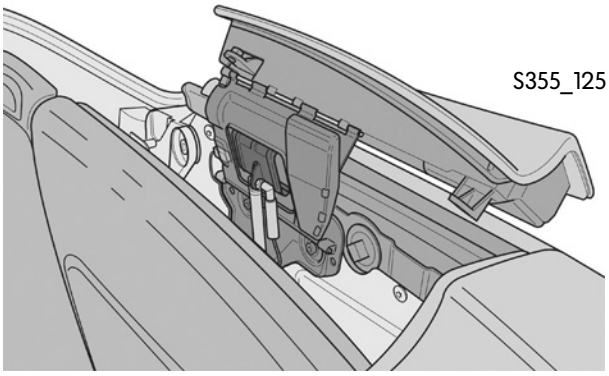
These flaps close the opening that is occupied by the C-segment latch to the boot lid when the roof is closed. The covering flaps are on the boot lid and are each operated by the hydraulic cylinders in the mounting frame via a Bowden cable.
If the roof is closed, the flaps will be in the “open” position. They are covered by the sliding interior panelling on the C-pillar. Once the roof is stored away, the covering flaps switch to the “closed” position when the boot lid closes.



S355_067

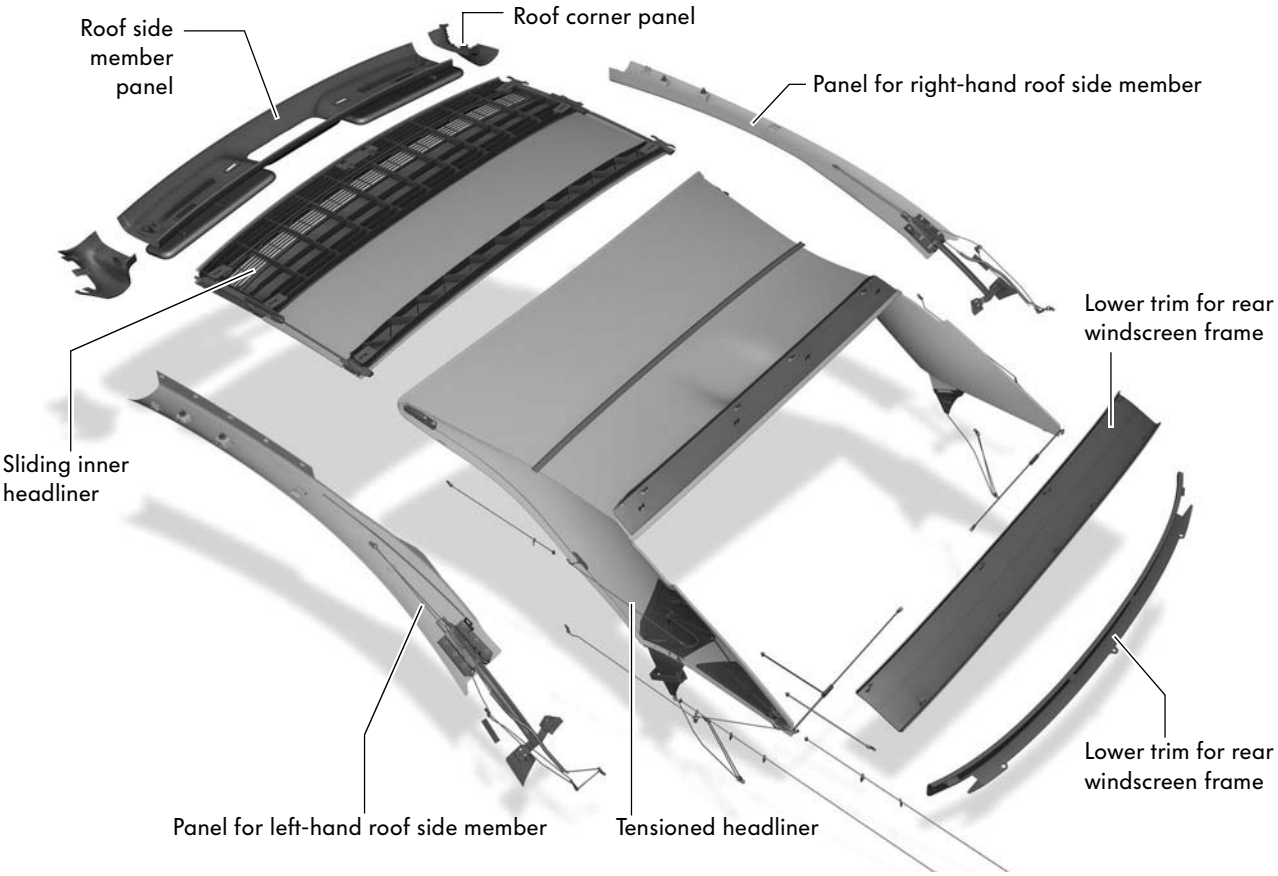
Roof side member flaps

The roof side member flaps close the space where the roof side members are stored when the roof package is stored in the boot. They each are driven by a Bowden cable due to the movement of the boot lid hinge. The position of the roof side member flaps is recorded by the roof sensor system via Hall sensors. This guarantees that the roof package is only stored away when the roof side member flaps are open.



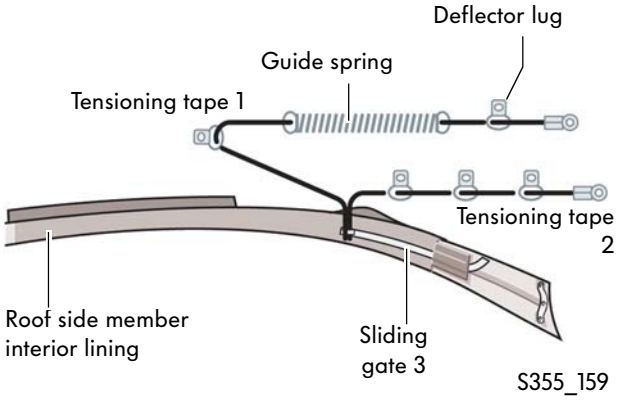
S355_125

Panels, flaps and covers



When the cabriolet roof is operated, numerous parts of the interior lining have to follow the movement of the roof.

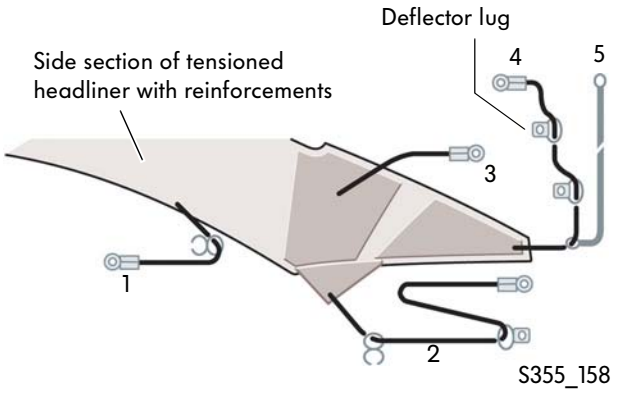
The tensioned headliner is folded together in the area of the C-pillars via a complex system of cables and deflector lugs. The interior panels of the roof side members are also shortened by cables and deflector lugs.



Sliding lining on roof side members

To store the CSC roof in the boot, the lining of the roof side member needs to be shortened during the opening process.
This is caused by sliding gate 3, which is operated by tensioning tapes 1 and 2.

Tensioning tape 1 pulls the lining together via slider 3 when the roof is opened. Tensioning tape 2 opens out the lining via slider 3 when the roof is closed. The tensioning tapes run through various lugs. Tensioning tape 1 is also fed through a guide spring.

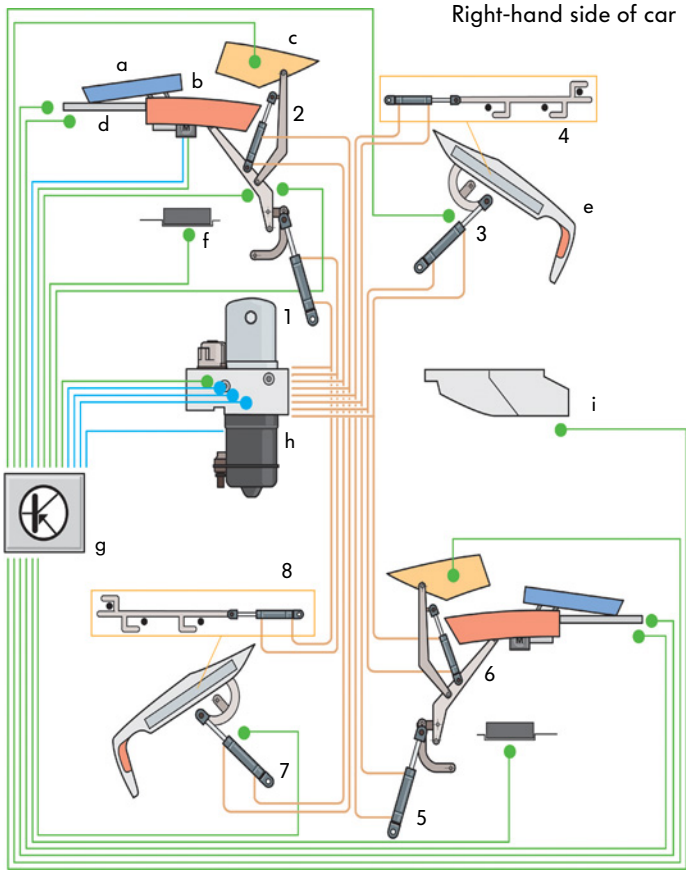


Moving tensioned headliner

The tensioned headliner is folded in a controlled method when the CSC roof is opened. The tensioning tapes 1, 2, 3 and 4 on each side of the car are used for this. Rubber cord 5 is used as a guide for tensioning tape 4.

Precise laying and fastening of the tensioning tapes is the requirement for perfect and lasting operation of the CSC roof.
Make sure you read the related repair literature before carrying out work on the tensioning tapes.

System control unit



Legend

Hydraulic cylinders:

1 in left-hand main hinge
2 in left-hand roof side member
3 in left-hand boot lid hinge
4 in left-hand boot lid mounting frame
5 in right-hand main hinge
6 in right-hand roof side member
7 in right-hand boot lid hinge
8 in right-hand boot lid mounting frame

a Sunroof module
b M-segment
c C-segment
d Roof side member
e Boot lid
f Roof side member flap
g Convertible roof actuation control unit
h Hydraulic unit
i Luggage compartment cover

Sensors
Actuators
Hydraulic line

Operation of the CSC roof is a complex interaction of roof hydraulics and roof sensors. The whole movement process of the roof except for the ESS module is carried out by 8 hydraulic cylinders as described that are operated in pairs by a hydraulic unit. They are operated via three solenoid valves and several mechanical valves in the hydraulic unitvalve block.

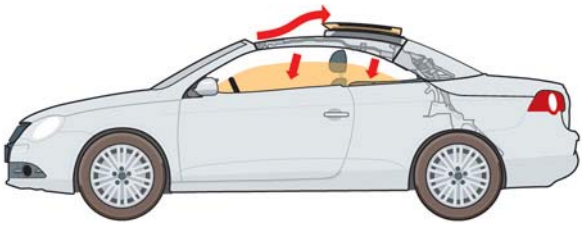
To allow the current positions of all moved components to be monitored by the roof control unit, the roof system has 12 Hall sensors. A microswitch in the boot checks the correct position of the luggage compartment cover.
A temperature sensor on the hydraulic pump monitors the temperature of the hydraulic fluid.

You will find detailed information on the Eos onboard supply and electrics in self-study programme SSP 379 “EOS 2006 – Electrical System”.

Overview of operation procedures

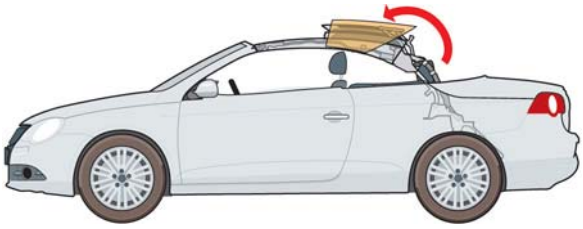
The following conditions need to be met so that the roof can be opened:

- Ignition on
- Battery voltage sufficiently high
- Boot closed
- Luggage compartment cover in boot locked correctly
- Enough space behind the car for boot lid to open
  (when equipped with Park Distance Control this is monitored by the Boot Lid Assist function.)
- Roof switch pressed
- Car travelling below 1km/h



Side windows and sunroof open S355_075

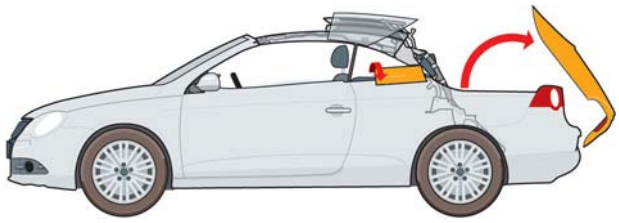
If these conditions are met, the side windows will first start to lower. This is necessary because the roof package would otherwise collide with the rear side windows when it is lowered. At the same time as the side windows move, the sunroof starts to open and move over the M-segment.



C-segment opens S355_076

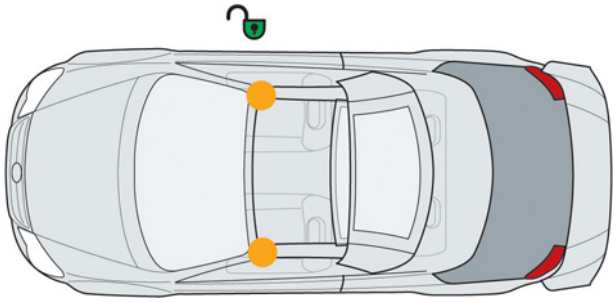
Once the side windows have passed a defined position, the movement procedure of the C-segment begins. Two sensors detect that the C-segment latches are unlocked at the top and bottom.
Another sensor signals that the C-segment has reached its end position for opening the roof.

Once the Boot Lid Assist (optional) has checked that there are no obstacles behind the car in the range of the boot lid movement, the unlocking of the mounting frame is signalled by two sensors in the latch bearings of the boot lid. At the same time, the boot lid is locked to the mounting frame.
The boot lid must be fully opened before the roof package can be lowered into the boot.
The boot lid can now swing towards the rear. The roof side member flaps open with this movement. A sensor on each flap monitors that the flaps are fully open.



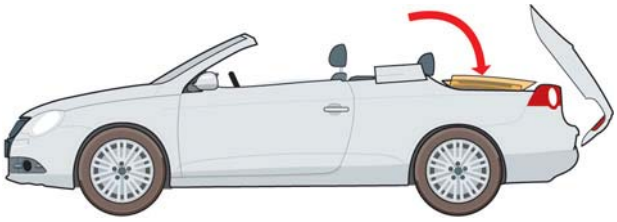
Boot lid and roof side member flaps open S355_077

Once the C-segment opens, the two roof side members are unlocked from the A-pillars. A sensor in each roof side member confirms that they are unlocked.

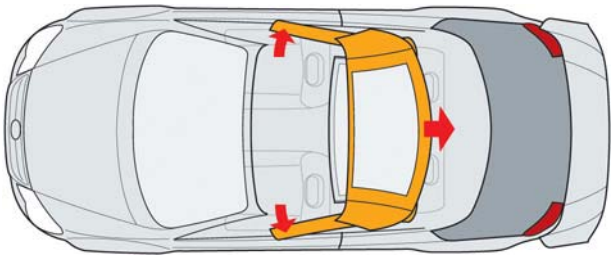


Unlock roof side members S355_143

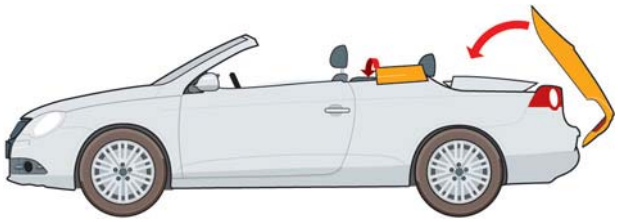
The main drive now swings the roof package to the rear. The roof side members also swing outwards. Two sensors in the cowl inform the roof control unit that the roof is no longer in the front end position. Once the roof package reaches its position in the boot, this will also be confirmed by a sender in the main drive. The roof control unit thus recognises that the roof is in the rear end position.



S355_079

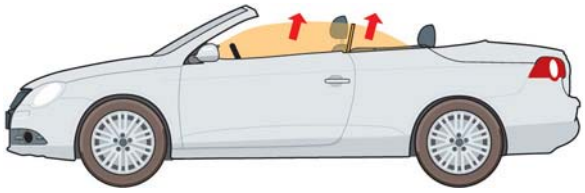


Roof package is stowed away S355_078



Boot lid and roof side member flaps close S355_080

If the feedback “roof package stored in boot” is not received within 8 minutes after leaving the A-pillar, the roof will be lowered automatically in steps. Depending on the roof position reached, it is lowered by the force of gravity in the “open” or “close” direction.



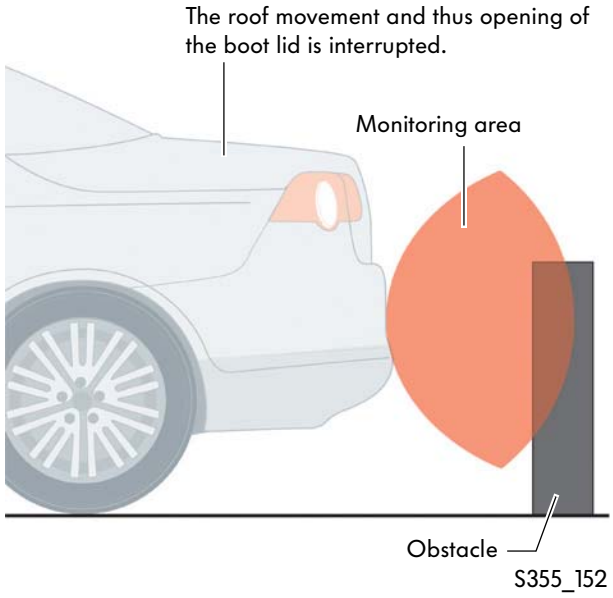
Side windows close S355_082

Once the roof package has reached its final position in the boot, the boot lid and the roof side member flaps start to close. Once the mounting frame is locked to the body and has been unlocked from the boot lid, the boot can be opened “normally” again.
Upon completion of the roof operation, the side windows are raised again.

Boot Lid Assist

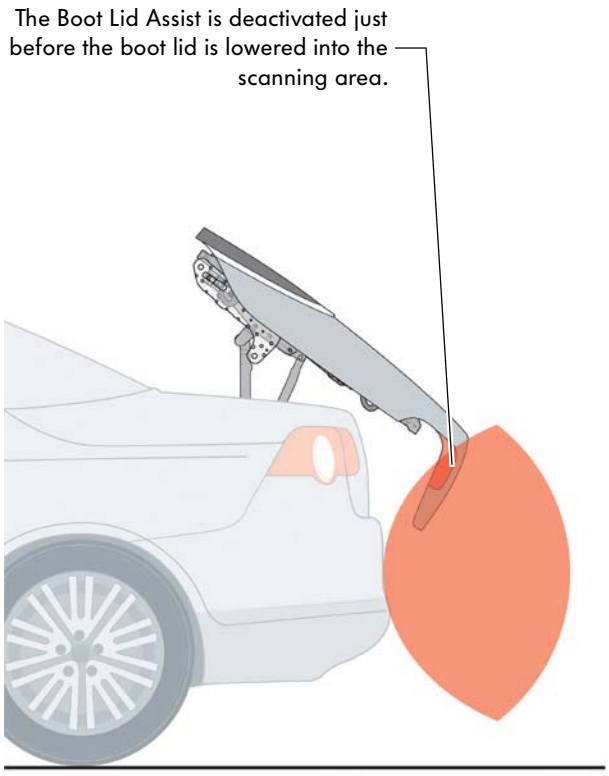
The Boot Lid Assist is a function that has been provided using the Park Distance Control components. It has the task of monitoring the area behind the car for obstacles that could block the movement of the boot lid as it opens.

The space requirement for boot lid movement is approx. 38cm. The Boot Lid Assist scans a range of 50cm.
Pressing the roof button activates the Boot Lid Assist function in the Park Distance Control system. If the system detects an obstacle, a constant tone sounds as a warning and a message appears in the dash panel insert display. The roof movement is interrupted. The procedure can, however, be continued despite the warning if you press the roof switch again.



S355_152

Just before the boot lid is lowered into the sensor scanning area, the Boot Lid Assist is deactivated as it cannot distinguish between the boot lid and a real obstacle. This means that if an obstacle appears after this point in time, for example, another vehicle pulls up close to the rear of the Eos while the boot is being opened for the roof package, it cannot be detected by the Boot Lid Assist.



S355_153

Airbag and restraint systems

S355_027

The extensive measures taken on the body to improve the passive safety are supplemented by the components for active safety. Due to the special requirements for cabriolets, there is also an active rollover protection system for when the roof is open in addition to the airbag and restraint system.

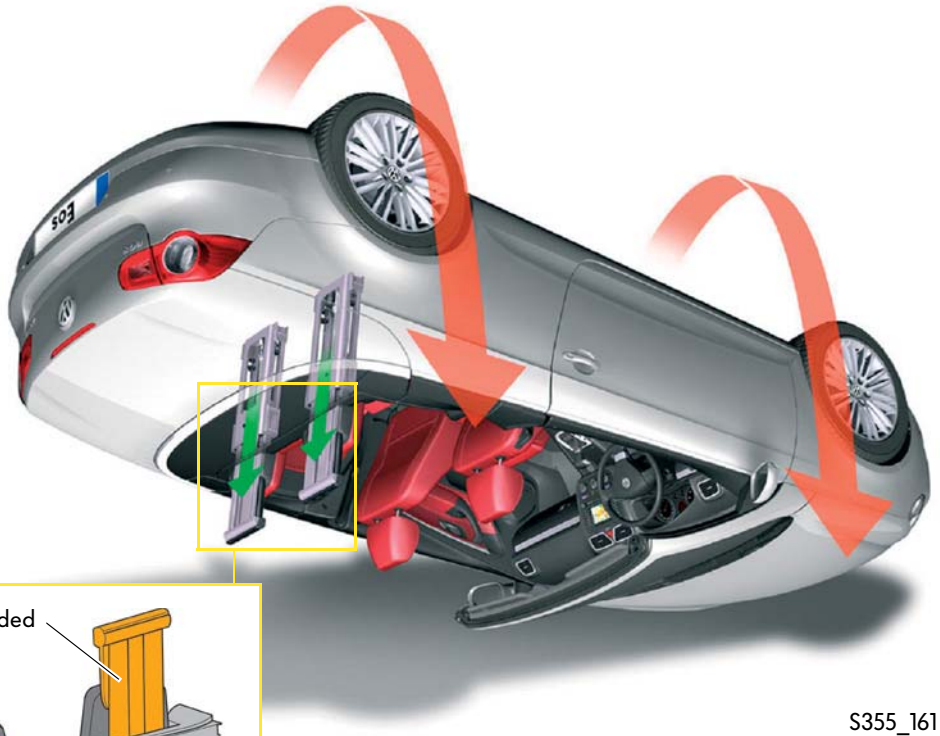
The Eos has single-stage airbags for the driver and front passenger as well as side and head airbags in the seat backrests. Each door has a pressure sensor to detect side collisions. The front passenger airbag can be deactivated with a key switch in the glove compartment.
The front seats have 3-point seat belts with belt force limiters and pyrotechnic belt tensioners. The two rear seats have 3-point belts with belt force limiters, but without belt tensioners.

The airbags and belt tensioners can only be activated for 150 ms after the power supply fails.

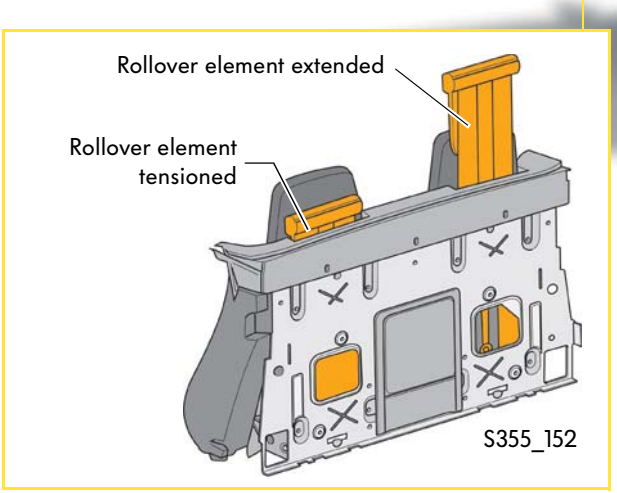
In accidents, in addition to the airbag and belt tensioner functions, the fuel pump is switched off in all engine versions above a threshold value defined in the airbag control unit. When equipped with the 3.6l engine, the system also automatically disconnects the two 6-volt batteries.

Occupant Protection

Rollover protection



S355_161

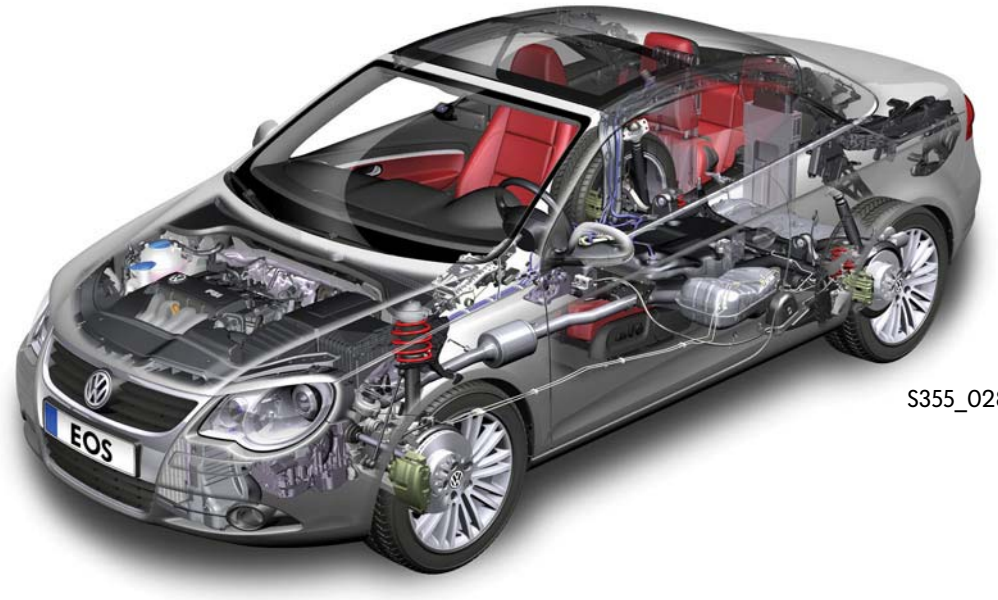


S355_152

Even when there is no roof, a cabriolet has to provide occupants with the maximum protection if the car rolls over. In the Eos, this is provided by an active rollover protection system in addition to the A-pillar reinforcements and the doors. Like the New Beetle Cabriolet, there is an active rollover element behind each of the head restraints on the rear seat bench. Together with the two A-pillars they secure the crash survival space if the car rolls over.

The rollover protection is triggered by the airbag control unit in severe front, side and rear collisions if the car rolls over or tilts extremely.

Eos engine range



S355_028

The 2006 Eos engine range includes four petrol engines with outputs ranging from 85kW to 184kW and a diesel engine delivering 103kW. The specific engines are:

- the 1.6l/85kW FSI engine
- the 2.0l/110kW FSI engine with 4-valve technology
- the 2.0l/147kW FSI engine with 4-valve technology and turbocharging
- the 3.2l/185kW V6 engine with multi-point injection
- the 2.0l/103kW TDI engine with 2-valve technology and diesel particulate filter

All of these engines have been further developed for use in the Eos.
All engines fulfil the EU4 emissions standard.
The TDI engine has a diesel particulate filter close to the engine.

You will find detailed information on the engines in the following self-study programmes:
SSP 296 “The 1.4l and 1.6l FSI engine with timing chain”
SSP 316 “The 2.0 l TDI engine”
SSP 322 “The 2.0 l FSI engine with 4-valve design”
SSP 334 “The fuel system in FSI engines”
SSP 337 “The 2.0l FSI engine with turbocharger”

The 1.6l/85kW FSI engine

The 1.6l/85kW FSI engine from the Golf Plus and Touran is available for the Eos. The following features have already been used in series production in these models.

Technical features

- Lambda-1 operation (homogeneous operation)
- There is no fuel pressure sender for low pressure G410. The required fuel quantity is determined from the coolant temperature, intake air temperature and oil temperature. The pulse control factor (PWM signal) for controlling the electrical fuel pump is then obtained using a map.
- The connecting tube between the cylinder head and exhaust gas recirculation valve has changed. The exhaust gases are diverted away from the throttle valve in the intake manifold. This prevents coking of the throttle valve to a great extent.

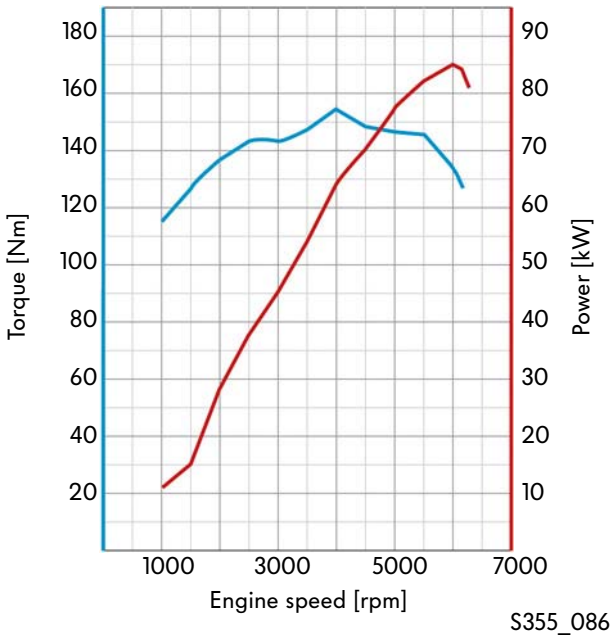
S355_084

- The engine control unit software has been adapted to the changes.

Technical data

Engine code	BLF
Type	4-cylinder in-line engine
Displacement	1598cm^3
Bore	76.5mm
Stroke	86.9mm
Valves per cylinder	4
Compression ratio	12:1
Maximum output	85kW at 6000 rpm
Maximum torque	155Nm at 4000 rpm
Engine Management	Bosch Motronic MED 9.5.10
Fuel	Super unleaded RON 95 (torque increase in mid rev range when Super unleaded RON 98 is used)
Exhaust gas treatment	Starter catalytic converter, main catalytic converter, Lambda control
Emissions standard	EU4

Torque and power diagram



S355_086

Do not run the car with Normal unleaded RON 91 because the ignition retardation will reach its control limit.

The 2.0l/110kW FSI engine with 4-valve technology

The 2.0l/110kW FSI engine from the Jetta and Passat Estate is available for the Eos. The following features have already been used in series production in these vehicles.

S355_083

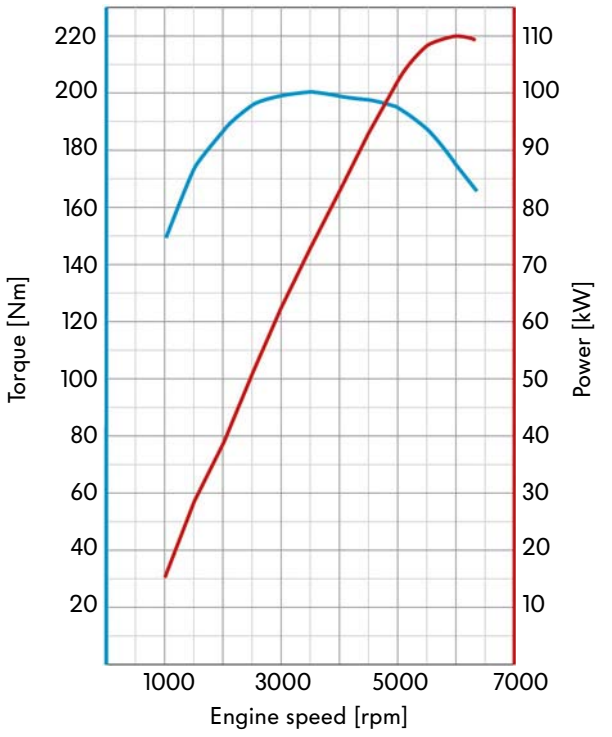
Technical features

- Homogeneous mode (Lambda 1)
- A Lambda probe before the catalytic converter
- There is no fuel pressure sender for low pressure G410. The required fuel pressure is determined from the required fuel quantity, coolant temperature, intake air temperature and oil temperature. The pulse control factor (PWM signal) for controlling the electrical fuel pump is then obtained using a map.
- The throttle valve is made from plastic. It uses a contact-free sensor (not a potentiometer). There is no need for water cooling.
- The engine control unit software has been adapted to the changes.

Technical data

Engine code	BVY
Type	4-cylinder in-line engine
Displacement	1984cm^3
Bore	82.5mm
Stroke	92.8mm
Valves per cylinder	4
Compression ratio	11.5:1
Maximum output	110kW at 6000 rpm
Maximum torque	200Nm at 3500 rpm
Engine management	Bosch Motronic MED 9.5.10
Fuel	Super unleaded RON 98 (Super unleaded at RON 95 with reduction in performance)
Exhaust gas treatment	Two starter catalytic converters and a three-way catalytic converter with Lambda control
Emissions standard	EU4

Torque and power diagram



S355_087

The 2.0l/147kW FSI engine with 4-valve technology and turbocharger

The 2.0l/147kW FSI engine with turbocharger is also used in the Golf GTI, the Passat and the Jetta. The following features have already been used in series production in these vehicles.

S355_091

Technical features

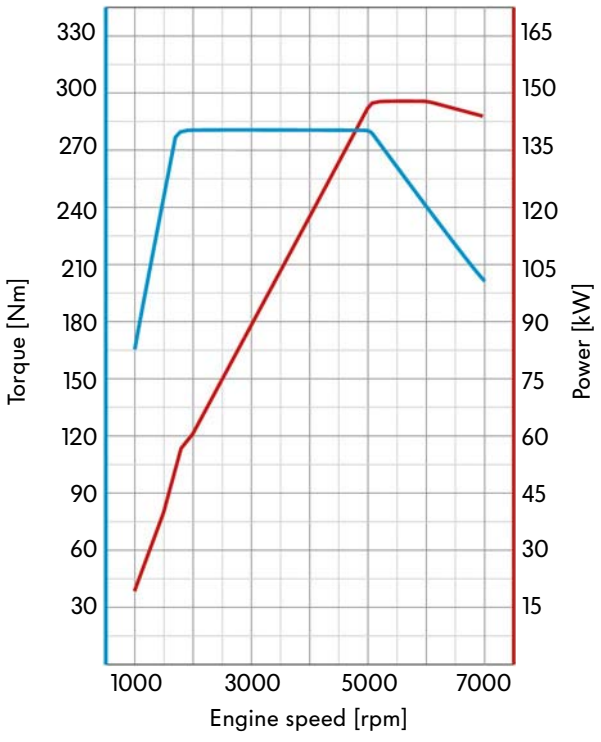
- Single-pipe exhaust system with starter and underbody catalytic converter mounted near engine
- Ethanol-resistant Hitachi high-pressure pump
- There is no fuel pressure sender for low pressure G410. The required fuel pressure is calculated in the same way as for the 2.0l/110kW FSI engine.
- Turbocharger with improved efficiency
- Grey cast iron piston with spherical recess
- Mechanical brake servo pump
- Continuously adjustable charge-air flaps

You will find further information on this engine in self-study programme SSP 337 “The 2.0l Turbo FSI Engine”.

Technical data

Engine code	BWA
Type	4-cylinder in-line engine
Displacement	1984cm³
Ignition sequence	1-3-4-2
Bore	82.5mm
Stroke	92.8mm
Valves per cylinder	4
Compression ratio	10.3:1
Maximum output	147kW at 5100 to 6000 rpm
Maximum torque	280Nm at 1800 to 5000 rpm
Engine management	Bosch Motronic MED 9.1
Camshaft timing adjustment	42° crank angle
Fuel	Super Plus unleaded RON 98 (Super unleaded RON 95 with slight reduction in performance)
Exhaust gas treatment	Two three-way catalytic converters with Lambda control
Emissions standard	EU4

Torque and power diagram



S355_090

The 3.2l/185kW V6 engine with 4-valve technology and multi-point injection

The top of the range engine for the Eos is the 3.2l V6 engine delivering 184kW (250hp) and producing a maximum torque of 320Nm.

S355_163

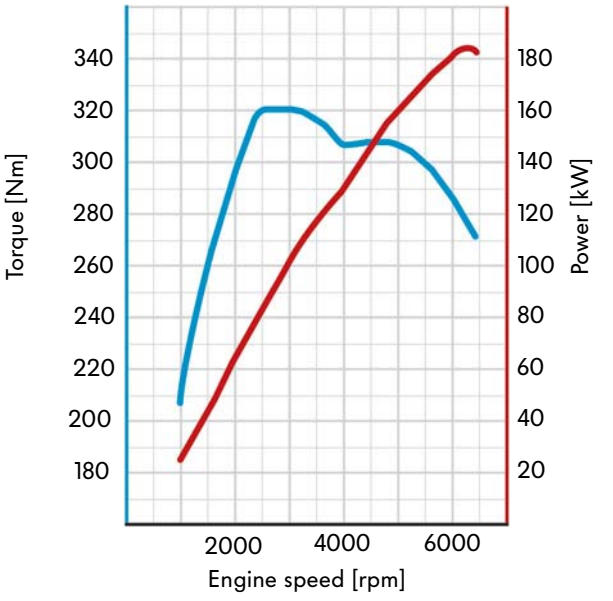
Technical features of engine management

- Bosch Motronic ME 7.1.1
- Plastic variable intake manifold
- Internal exhaust gas recirculation
- Non-return fuel system
- Secondary air inlet

Technical data

Engine code	BUB
Type	VR engine
Displacement	3189cm^3
Bore	84mm
Stroke	95.9mm
Valves per cylinder	4
Compression ratio	10.85:1
Maximum output	184kW at 6300 rpm
Maximum torque	320Nm at 2500up to 3000 rpm
Engine management	Bosch Motronic ME 7.1.1
Fuel	Super Plus unleaded at RON98 (Super unleaded at RON 95 with reduction in performance)
Exhaust gas treatment	Two three-way catalytic converters with constant Lambda control
Emissions standard	EU 4

Torque and power diagram



S355_151

The 2.0l/103kW TDI engine with 2-valve technology and diesel particulate filter

The 2.0l/103kW TDI engine with 2-valve technology and diesel particulate filter is also available for the Passat model year 2006.

Technical features

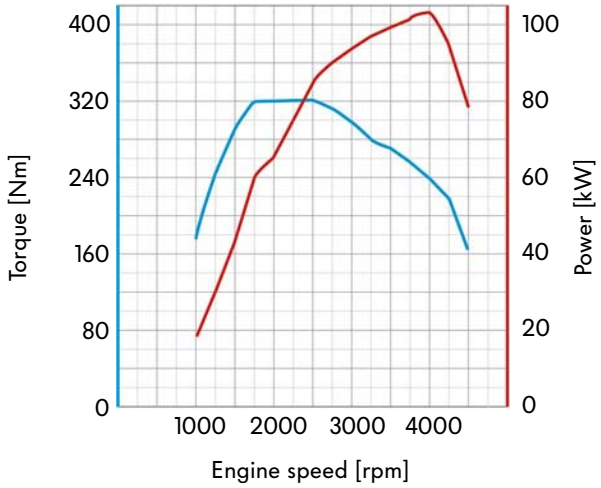
- 2-valve technology
- Catalytic-coated diesel particulate filter
- High-mounted turbocharger turned 180° to allow the diesel particulate filter to be placed close to the engine.
- Ceramic glow plugs

S355_085

Technical data

Engine code	BMM
Type	4-cylinder in-line engine
Displacement	1968 cm^3
Bore	81mm
Stroke	95.5mm
Valves per cylinder	2
Compression ratio	18 : 1
Maximum output	103 kW at 4000 rpm
Maximum torque	320Nm at 1750 rpm to 2500 rpm
Engine management	Bosch EDC 16 with unit injector system
Fuel	Diesel, min. 51CN
Exhaust gas treatment	Exhaust gas recirculation and diesel particulate filter
Emissions standard	EU4

Torque and power diagram



S355_088

You find information on the diesel particulate filter in self-study programme SSP 336 “The catalytic coated diesel particulate filter”.

Engine/gearbox combinations

	 6-speed manual 0AJ	 6-speed manual 02S	 6-speed manual 02Q	 6-speed Direct Shift Gearbox DSG 02E
 1.6l/85kW FSI engine	✓			
 2.0l/110kW FSI engine		✓		
 2.0l/147kW TSI engine			✓	✓
 3.2l/185kW V6 engine				✓
 2.0l/103kW TDI engine			✓	✓

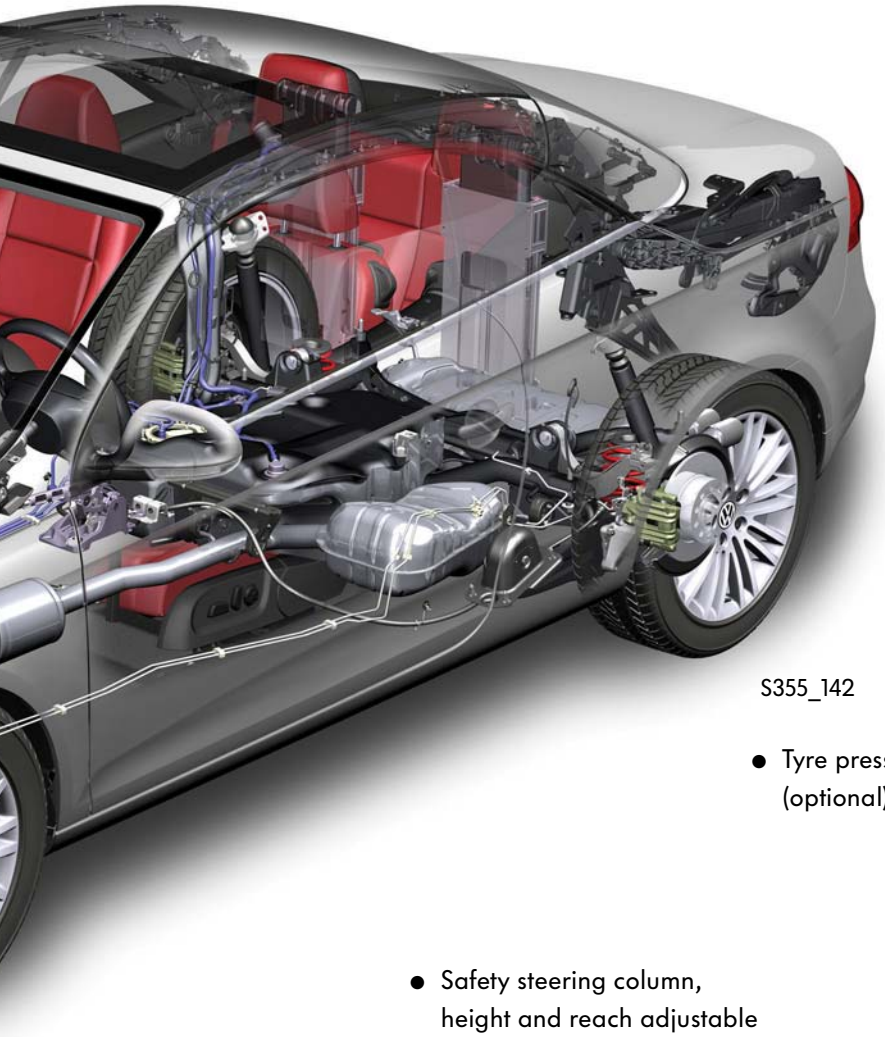
Chassis

The chassis is also configured for the special requirements of a cabriolet.
The Eos therefore has an enhanced strut front axle that is based on the Golf 2004 front axle.
The multi-link rear axle with aluminium hub carriers comes from the Passat 2006.

On the front and rear axle, we have made sure that the springs, dampers and the stabilisers have been configured for sportiness. The second-generation electromechanical power steering is supplemented with the counter-steer support function. It allows stable straight running in cross winds or on roads that are inclined sideways.

The brakes have been optimised and have hydraulic brake assist and ABS with ESP function as standard.

- Second generation electromechanical power steering
- ESP MK60 system from Continental Teves with hydraulic brake assist
- Lightweight strut axle using the McPherson principle



- Tyre Mobility Set

- Four-link rear axle with high transverse stiffness and decoupled longitudinal and transverse dynamics

S355_142

- Tyre pressure monitoring system (optional)

- Safety steering column, height and reach adjustable

You will find information on the chassis in self-study programme SSP 321 “The Golf 2004 – Chassis”.

Heating and air conditioning

The Eos can optionally be equipped with the Climatic system with semi-automatic control or with 2C-Climatronic.

S355_168

As the passenger compartment can either be relatively sealed from environmental influences (coupé) or exposed to them (cabriolet roof open) the air-conditioning system needs to be flexible.
The air-conditioning regulation has therefore been reconfigured for the Eos to increase driving comfort.

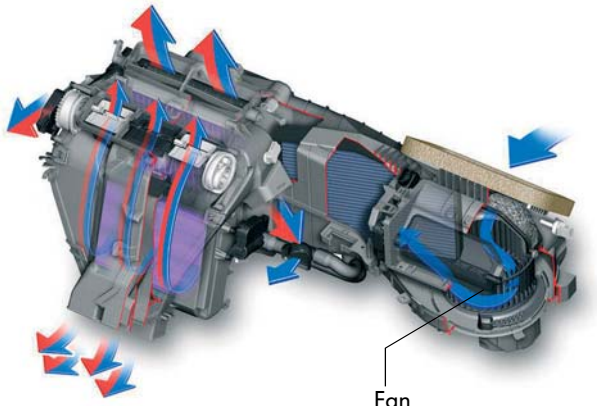
During development, the focus was placed on making manual adjustment after opening the roof unnecessary.
This was achieved by among other things:

- adapting the fan voltage,
- taking the greater sunlight intensity into consideration,
- adapting the air distribution in heating mode,
- adapting the compressor regulation and
- the behaviour of the Climatronic.

Compressor operation

When the Eos is driven as a cabriolet, the air-conditioning compressor only needs to be run if the required outlet temperature is below the intake air temperature. The intake air temperature is calculated from the measured outside temperature and a presumed increase of 3°C for the heat from the engine compartment.
When the roof is closed, the compressor also runs when the outlet temperature is above the intake air temperature to dry the air and thus reduces misting of the windows.

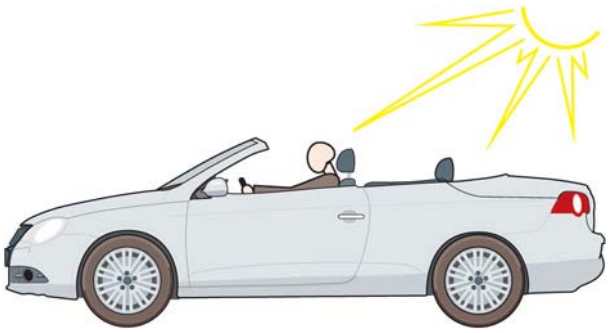
2C-Climatronic in the Eos



S355_033

Fan voltage

In cabriolet mode, the passengers are, of course, exposed to greater air turbulence. If the Climatronic is in cooling operation and automatic mode, the fan voltage is lowered from the basic level. If heating mode is required, this voltage level is lowered even further. In cooling mode, the fan voltage is also raised in relation to the speed. We have made sure that the level of noise produced by the fan is below the other airflow noises.

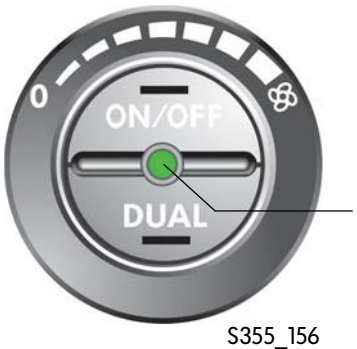


S355_155

Sun intensity

When the roof is open, all occupants are exposed to more intense sunlight from all sides. Therefore the values measured by the sun sensors in the instrument panel are used as a value for the air-conditioning regulation. The sunlight from the rear is also measured by a light-sensitive diode in the air-conditioning control panel.

The 2-zone air-conditioning control is also available when the roof is open even though a large temperature regulation range is not possible like in coupé mode. The sun intensity factor has a higher priority for control of the outlet temperature and fan voltage than in coupé mode.



Temperature sensor and light-sensitive diode in centre operating button of 2C-Climatronic

S355_156

Heating and Air Conditioning

Climatronic regulation behaviour

Pressing the “ON/OFF” button on the 2C-Climatronic control unit activates the automatic climate control. Since the occupants are exposed very quickly to the outside temperature conditions when the roof is opened, the automatic switch-over of the control logic from coupé to cabriolet has to be very fast. When closing the roof, the change-over of the control logic to coupé mode is more gradual.

In cabriolet mode, there is no airflow regulation nor automatic cold air functions. The inside temperature sensor value for regulation in cooling mode corresponds with the outside temperature. In heating mode, the control value is calculated proportionally from the value measured by the inside temperature sensor and the outside temperature.

S355_169

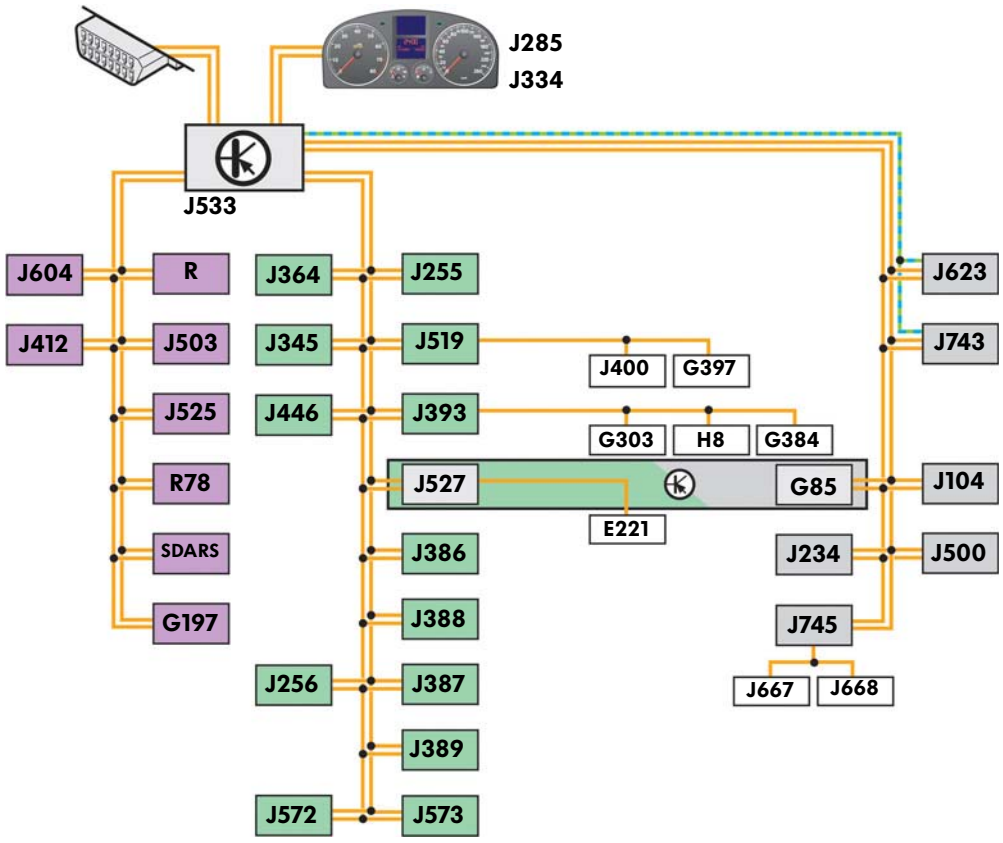
The settings that are present upon the respective switch-over from cabriolet or coupé mode are stored by the 2C-Climatronic system. When the system returns to this operating mode, the stored values are applied again.

Air distribution in heating mode

To create a feeling of warmth when the outside temperature is low and the roof is open, the heated air is almost exclusively supplied via the footwell and the passenger vents because the windscreen cannot fog in cabriolet mode. As the speed of the car increases, the passenger vents supply a greater amount of air compared with the footwell vents. This is because there would otherwise be over-proportional heating of the footwell due to the climate conditions inside the car in cabriolet mode (back pressure).
The air is only supplied to the defrost vents in automatic air-conditioning mode when the outside temperature is very low.

Onboard supply

The circuit diagram shows which control units and components in the onboard supply communicate with each other via the CAN data bus in the Eos.



S355_102

Legend

E221 Operating unit in steering wheel
G85 Steering angle sender
G197 Magnetic field sender for compass
G303 Interior monitor send and receive module 1
G384 Vehicle inclination sender
G397 Rain and light sensor
H8 Anti-theft alarm system horn
J104 ABS control unit
J234 Airbag control unit
J255 Climatronic control unit
J256 Convertible roof actuation control unit
J285 Control unit with display in dash panel insert
J334 Immobilizer control unit
J345 Trailer detector 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
J393 Convenience system central control unit
J400 Wiper motor control unit
J412 Mobile telephone operating electronics control unit
J446 Parking aid control unit
J500 Power steering control unit
J503 Control unit with display for radio and and navigation system
J519 Onboard supply control unit
J533 Data bus diagnostic interface
J525 Digital sound package control unit
J527 Steering column electronics control unit
J572 Driver side easy entry control unit
J573 Front passenger side easy entry control unit
J604 Auxiliary air heater control unit
J623 Engine control unit
J667 Power output module for left headlight
J668 Power output module for right headlight
J743 Mechatronic unit for direct shift gearbox
J74 Cornering light and headlight range control unit
R Radio
R78 TV tuner

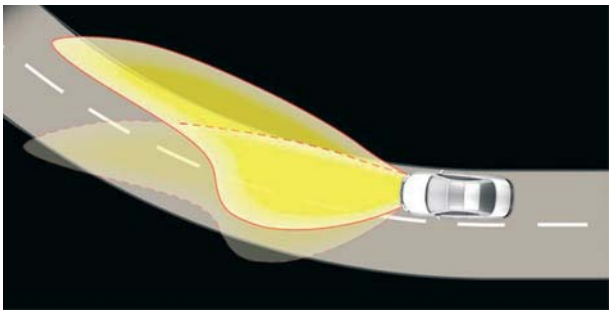
SDARS = **S**atelite **D**igital **A**udio **R**adio **S**ervices (digital audio satellite reception system)

Lights

Headlights

The headlights are equipped with the Advanced Frontlight System AFS including the Bi-Xenon cornering lights and automatic turn-off light for improved road illumination. The maximum swivelling angle of the cornering light is 15°. The turn-off light is aligned at approx. 80° to the car longitudinal axis. Both functions are activated by turning the steering wheel or switching on the turn signals.

S355_030



S355_132

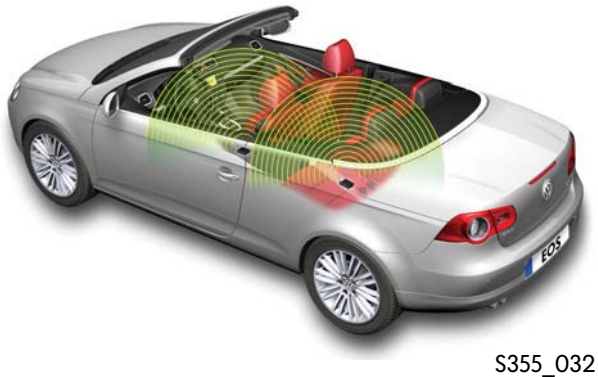
You will find more information on the cornering lights in self-study programme SSP 335 “Cornering Light System”.

Taillights

The taillights are divided by the boot lid. The reverse lights and the rear fog lights are located in the respective boot lid sections. The sidelight, brake and turn signal functions use LED technology on the Eos. The taillight, reverse light and rear fog light functions use normal bulbs.

S355_031

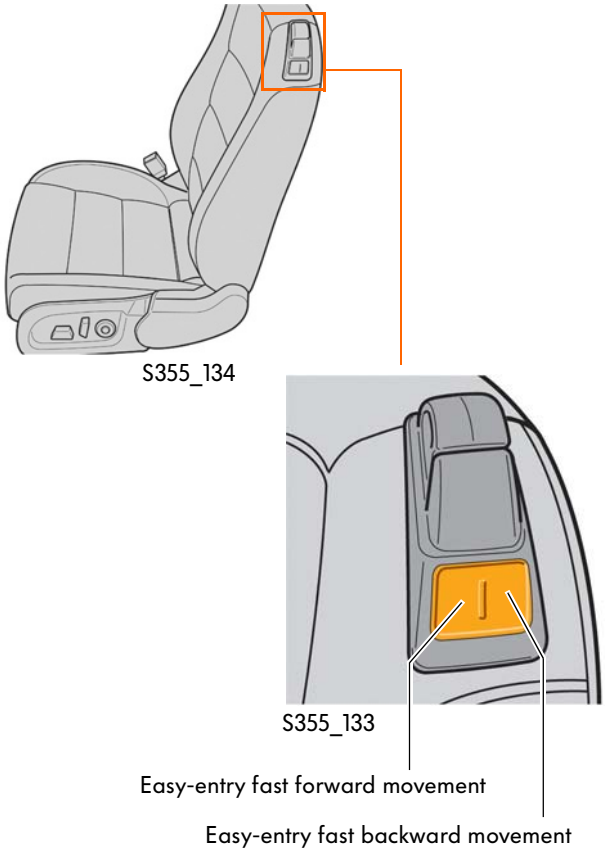
Interior monitoring



S355_032

The Eos interior monitoring system works when the roof is open and closed. It uses microwave technology and is therefore to a great extent not sensitive to movements outside the car, airstream or electromagnetic interference. If a child or dog, for example, is left briefly in the parked car, the interior monitoring system can be deactivated with a button in the storage compartment of the driver's door.

Electrical easy-entry function



S355_134

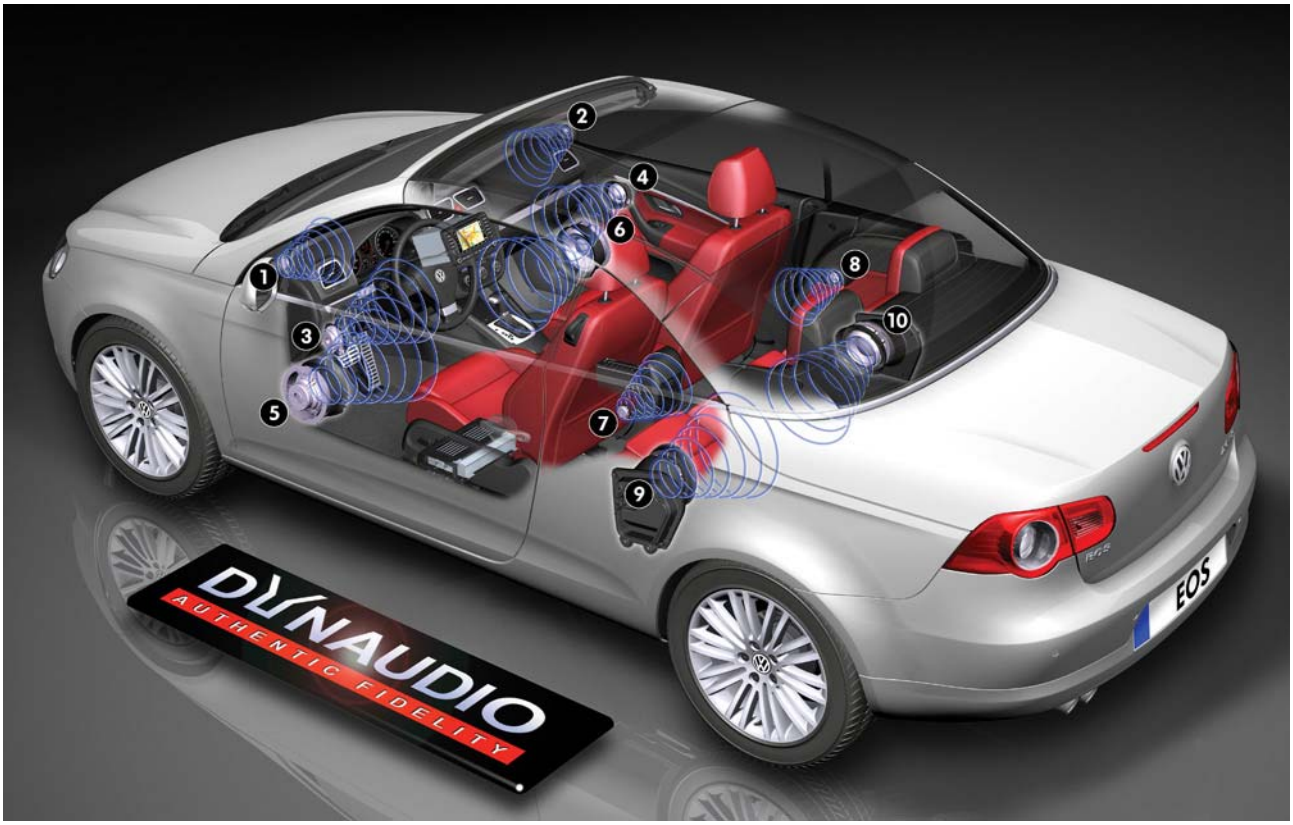
S355_133

The Eos sees an electrically activated easy-entry function being used for the first time. It has the function of moving the front seats electrically to make access to the rear seats easier. It is operated with a rocker switch on the top side of the seat backrest. Flicking the switch in one direction activates the easy-entry fast forward movement and in the other easy-entry fast backward movement.

You will find detailed information on the microwave technology used in the interior monitoring system and the electrical easy-entry function in SSP 397 "EOS 2006 – Electrical System".

Radio and Navigation

Sound system



S355_034

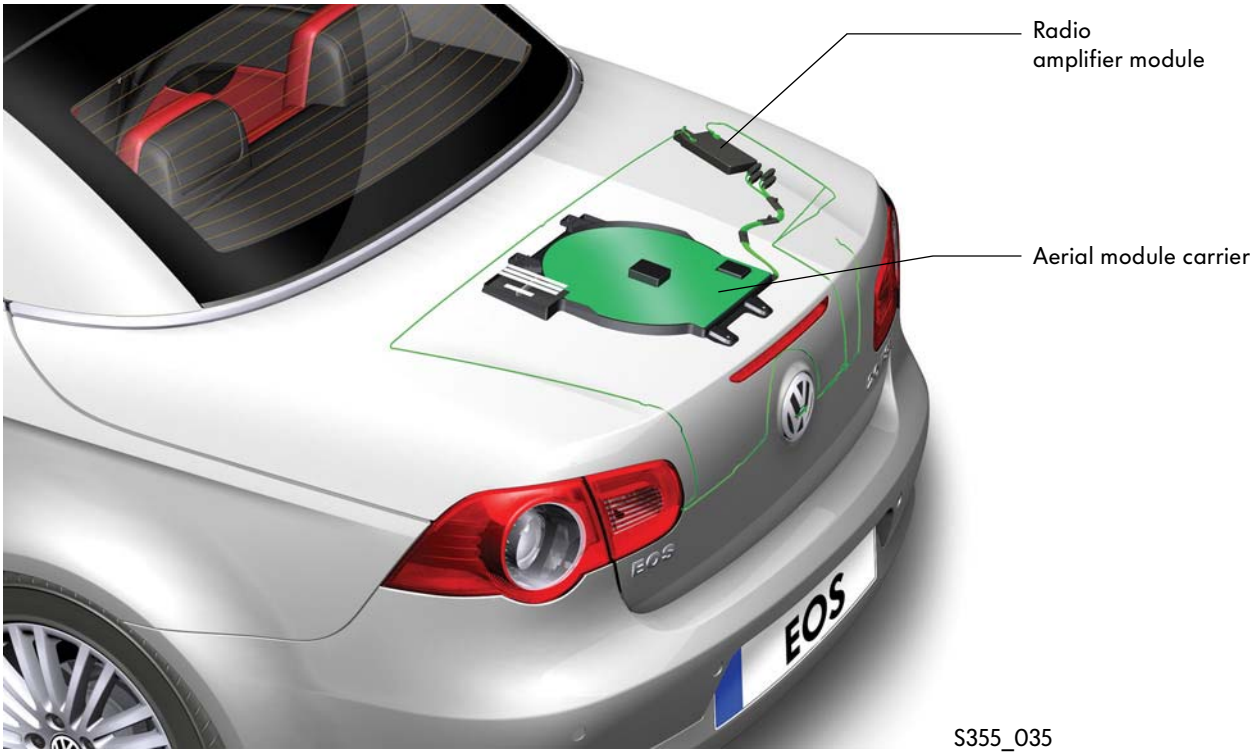
A wide range of radio and navigation systems are available for the Eos. It can be equipped with the RCD 300 together with either 2 20W speakers, 4 20W speakers or 8 speakers. As an alternative to the RCD 300, the RCD 500 with 4 20W speakers, 8 speakers or with the Dynaudio sound package can be selected. A 6-CD changer can be added to the Eos audio system.

The RNS 300 and the RNS MFD-DVD are available as navigation systems.

You will find more detailed information on these audio systems in the user's manual or self-study programme SSP 342 "Radio Systems".

Aerial concept

The Eos aerial system is integrated in the boot lid and is invisible from outside. To make this possible, the boot lid is mainly made from plastic to allow the radio waves to reach the aerial system.



S355_035

Design

The most striking part of the system is a plate-shaped aerial module carrier that is fitted in the centre under the outer skin of the boot lid.
It holds the aerial modules for:

- Telephone
  (GSM, Global System for Mobile Communications),
- SDARS
  (Satellite Digital Audio Radio Services) and
- GPS (Global Positioning System).

The radio amplifier module is accommodated on the right-hand side of the boot lid. It processes the signals from the AM/FM1 and the FM2 aerial wire and has two Fakra interfaces.
The remote start aerial (optional with auxiliary heating) is integrated in the radio amplifier module.

You will find detailed information on the Eos aerial system in self-study programme SSP 379 “EOS 2006 – Electrical System”.

Special tools

Name	Application
VAS 6205 Roof attachment device	Device for lifting off CSC roof
VAS 6365 Hinge supports	For holding roof in mounting position
VAS 6367 Support for side member	Holds the roof in closed position so the roof side members can be removed or fitted.
VAS 6368 Key for barrel screw	Adjusting tool for securing the roof side members
VAS 6369 Clamp for C-segment	Locks the folded roof package
VAS 6370 Gauge for guide rails	For adjusting the guide rails on the sliding sunroof
VAS 6371 Gauge for main bearing	For checking and adjusting the main bearings of the CSC roof
VAS 6372 Seal pliers	For sealing the tensioning tapes for the side member lining
VAS 6240-6 Straightening bracket set	
VAS 5007-27 Portal gauge	

Volkswagen Autoeuropa – Automóveis Ltda in Palmela S355_160

Auto Europa

"Volkswagen Autoeuropa – Automóveis Ltda." is now one of the most modern car plants in Europe. It covers a total area of 2,000,000 square metres. Of that, 1,100,000 square metres is used for production and 900,000 for an industrial park for suppliers and service providers.
The VW Sharan and the Seat Alhambra are produced there. Among other things, Palmela has a high-tech forging press department as well as an efficient bodyshop, paintshop and final assembly.
The "Volkswagen Autoeuropa – Automóveis Ltda." plant in Portugal has been operating since April 1995. It was set up in 1991 in an agreement between Volkswagen and Ford. The Palmela plant has been a hundred-percent subsidiary of Volkswagen AG since 1999.

In situ

This term is Latin and literally means "in original place" or "on site". If, for example, you observe a metabolism process "in situ", this means that you observe the processes in living cells. The opposite would be "in vitro". In this case, you would remove the cells and carry out the metabolism process in a test tube.
In relation to the Eos, the rear seat bench is produced "in situ", i.e. manufactured completely on a machine. As the wire frame is foamed into the upholstery, the rear seat bench no longer has to run through several different production stages in different locations.

Glossary

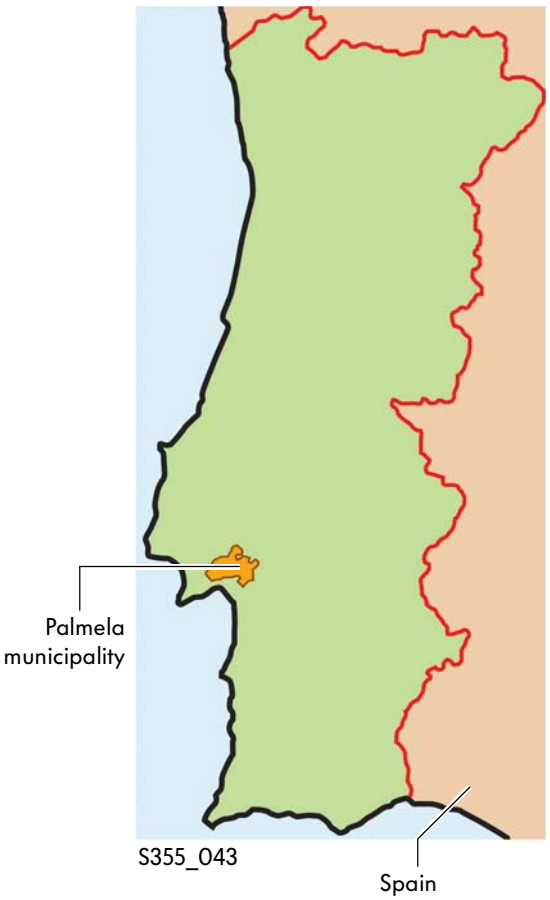
PALMELA

Palmela is a small town in the municipality of the same name in the district of Setúbal. This historical and very old town in the west of Portugal today has a population of around 16000.

THERMOFORMED SHEETS

In thermoforming (e.g. forging), the metal lattice is recrystalised during the shaping process. The recrystalisation prevents embrittlement and avoids a reduction in the tenacity of the workpiece as occurs during cold forming.

Portugal



Notes

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