Service Training





The 2010 Audi A5 Cabriolet

Self-Study Program 960193

Audi of America, LLC.

Service Training

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The Self-Study Program teaches the design and function of new vehicle models, automotive components, and technologies.

The Self-Study Program is not a Repair Manual!
The values given are only intended as a guideline. Refer to the software version valid at the time of publication of the SSP.

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

Reference



Note





440_111



440_112



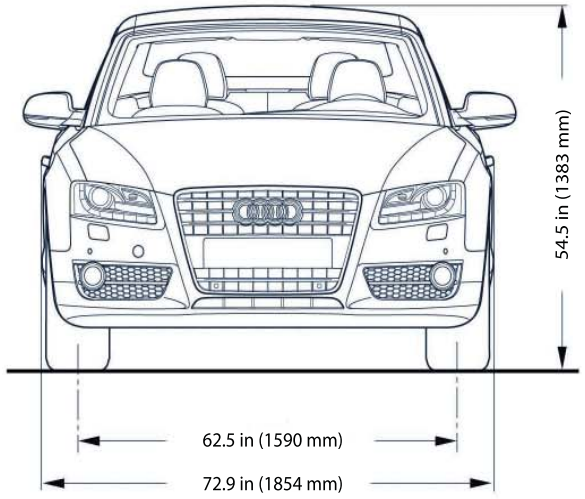
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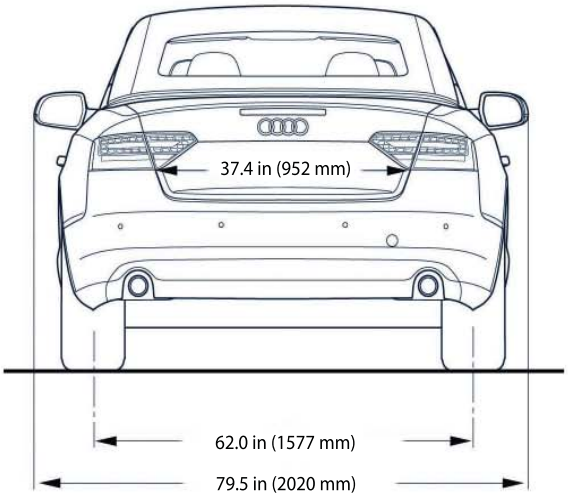
Dynamic, confident and stunning. The new A5 Cabriolet - built in the Audi Neckarsulm plant - is emotionally evocative. The four-seater combines a distinctly sporty character with the fascination of open-top driving, refined comfort and a great everyday utility.

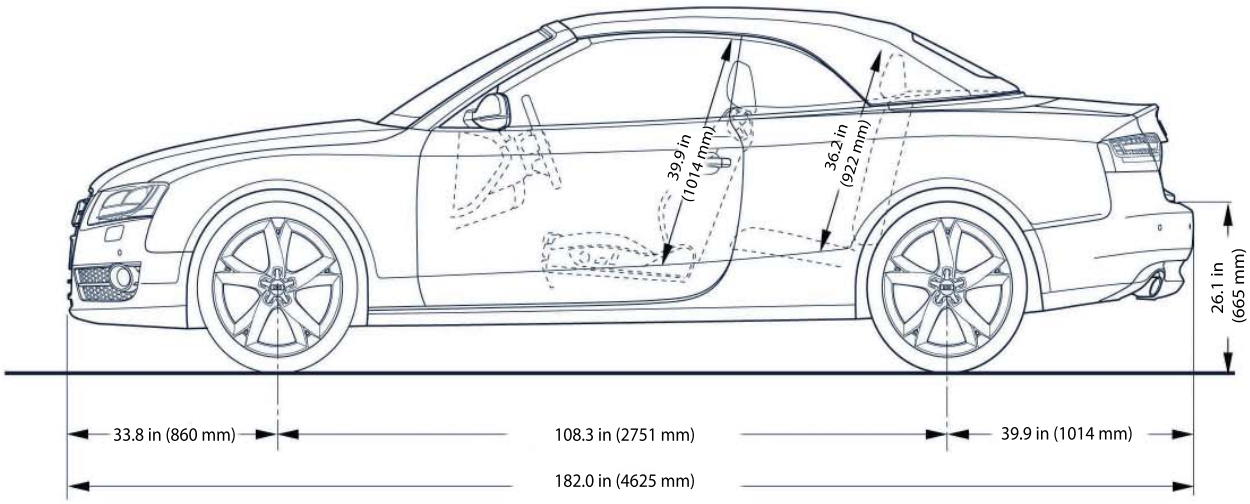
The A5 Cabriolet has an electro-hydraulically operated lightweight multi-layer “acoustic” fabric top that endows it with a silhouette of dynamic elegance. The acoustic capability of the top helps to reduce wind noise almost to the sedan level. The fully automatic top opens in just 15 seconds.

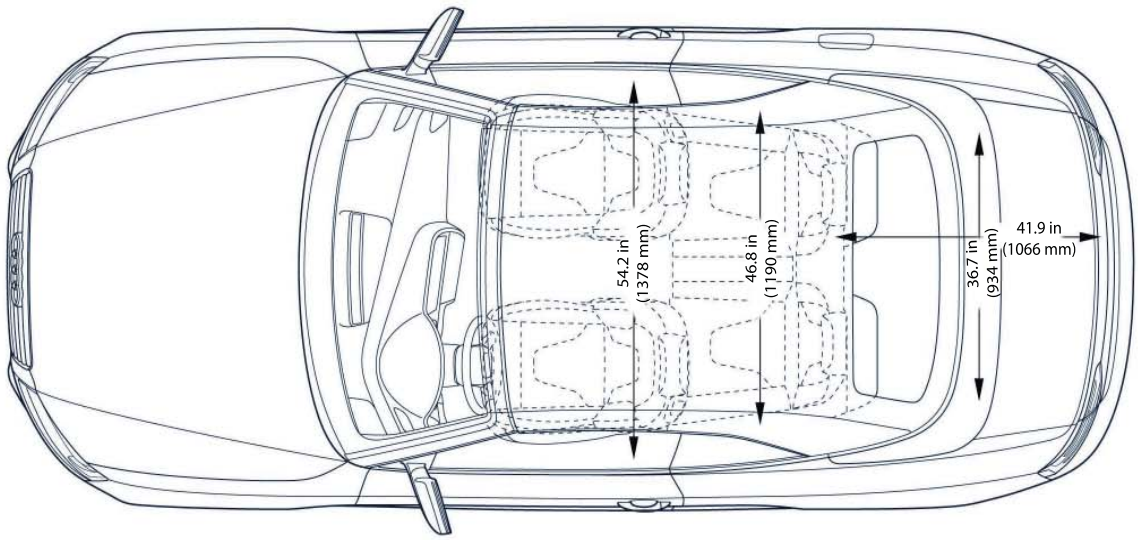
When opened, the Audi A5 Cabriolet top folds down so effectively that very little trunk space is used, leaving 11.30 cubic feet (320 liters) of unused storage volume. Clearly the best value in its field of competitors.

The soft top compartment lowers automatically when the top is opened. Equally useful is the fold-down rear seat backrest and the large pass-through between the luggage compartment and the interior, which increases the storage volume to a generous 26.49 cubic feet (750 liters.)


54.5 in (1383 mm)
62.5 in (1590 mm)
72.9 in (1854 mm)


37.4 in (952 mm)
62.0 in (1577 mm)
79.5 in (2020 mm)

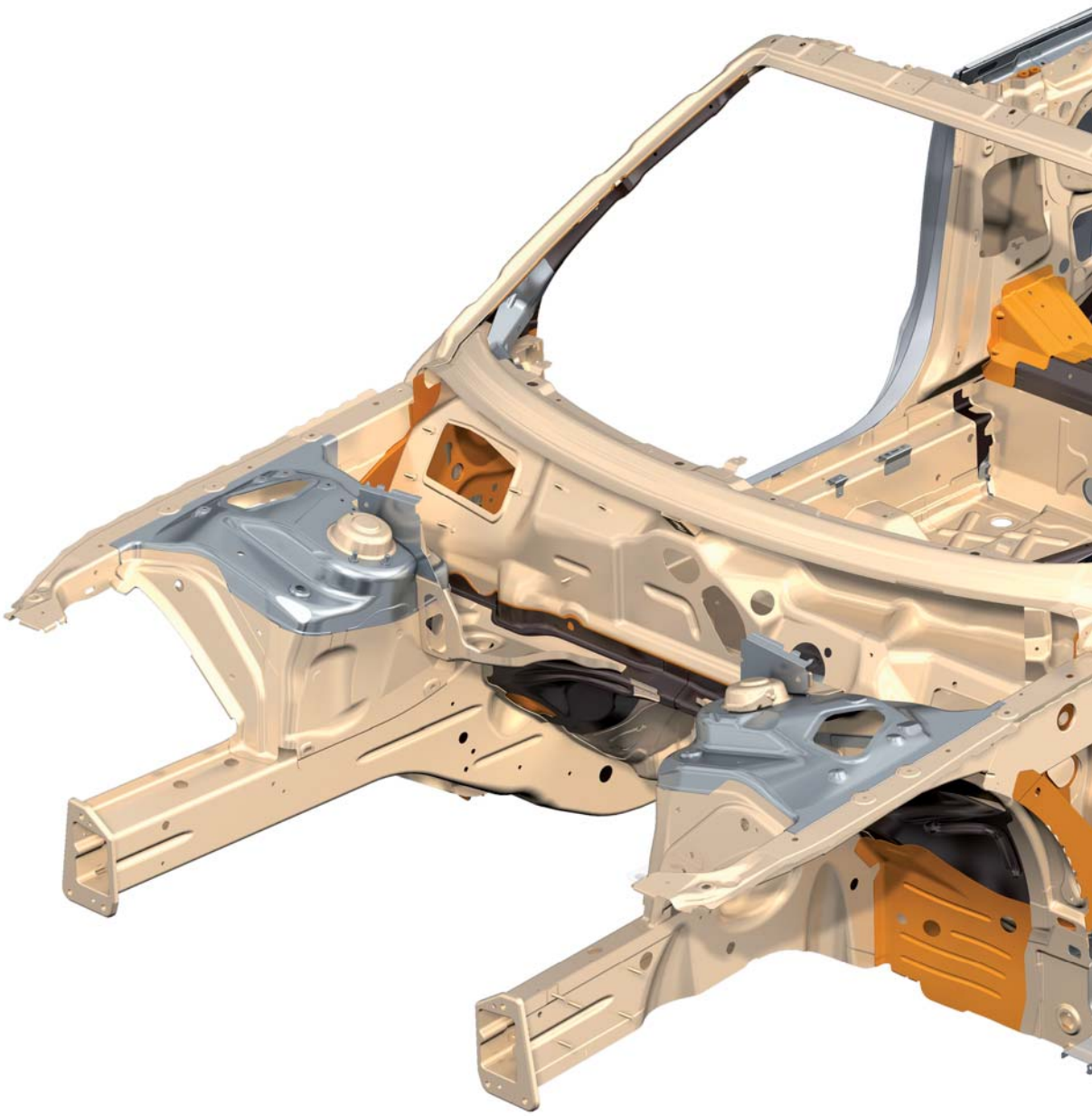

39.9 in (1014 mm)
36.2 in (922 mm)
26.1 in (665 mm)
33.8 in (860 mm)
108.3 in (2751 mm)
39.9 in (1014 mm)
182.0 in (4625 mm)

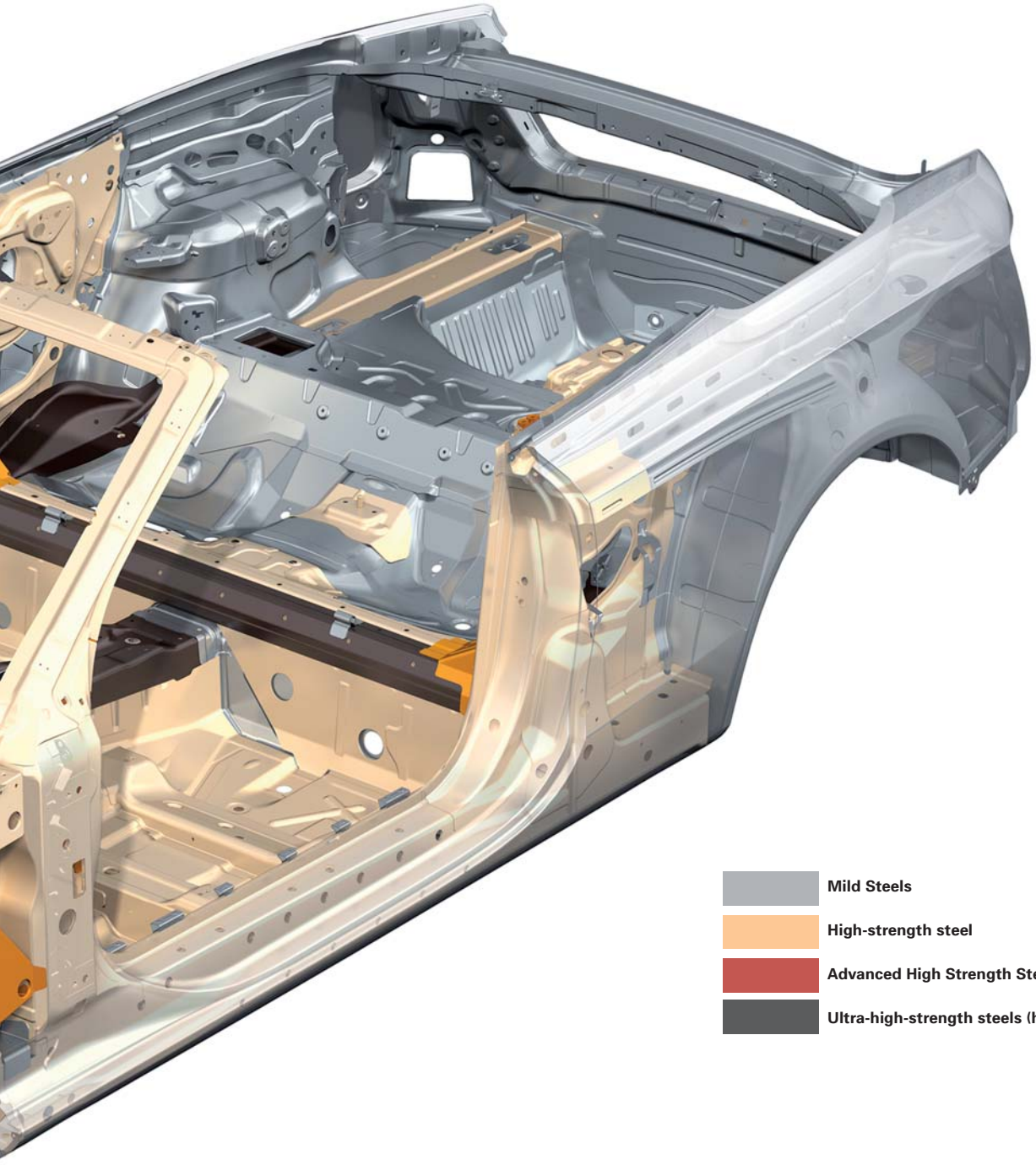

54.2 in (1378 mm)
46.8 in (1190 mm)
36.7 in (934 mm)
41.9 in (1066 mm)

440_113

Body structure

The Audi A5 Cabriolet has a rigid and crash-optimized body structure. It was developed on the basis of the A5 Coupe and meets lightweight design requirements thanks to the use of advanced high and ultra-high strength steel materials. Aluminium fenders are used to further minimize car body weight.





Mild Steels

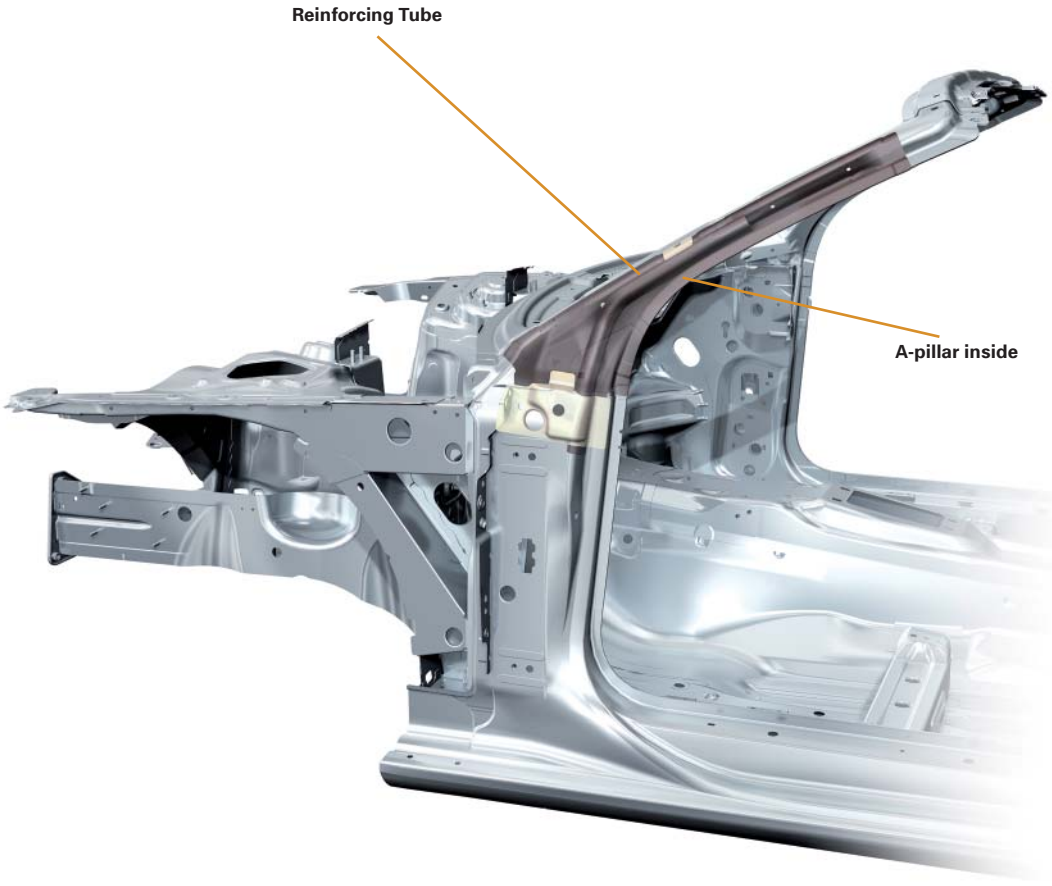
High-strength steel

Advanced High Strength Steels

Ultra-high-strength steels (hot-formed)

440_107

The A-pillar consists of an inner plate and a reinforcing tube, both made from ultra-high-strength hot-formed steel. The result is a highly rigid A-pillar structure which provides a high level of occupant safety in the event of a roll-over.



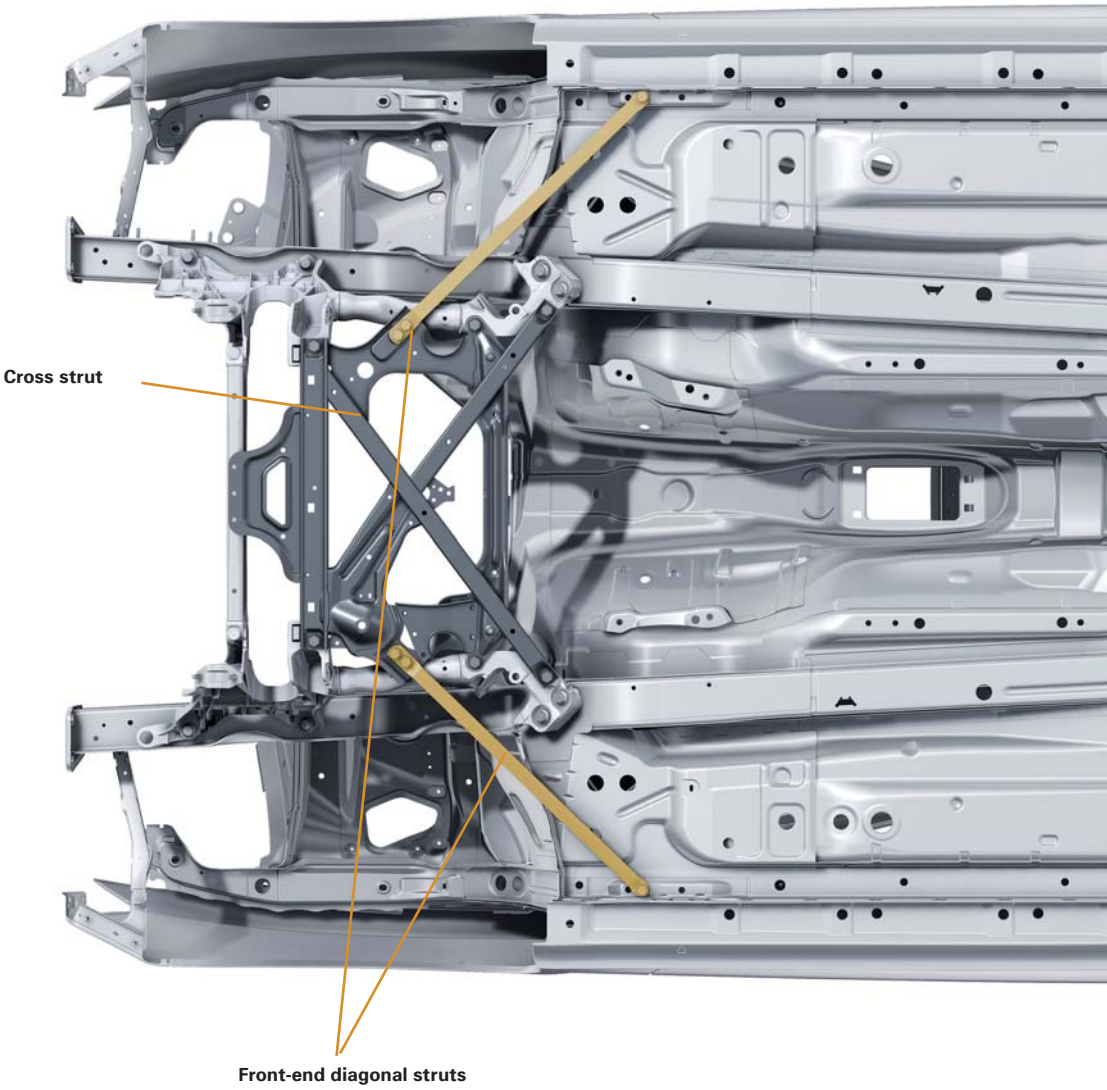
440_108

To meet the stringent Cabriolet specific strength requirements in the side member, sill and B-pillar areas, various additional reinforcements are used (compared to the Audi A5 Coupe). The rear seat cross-member in the A5 Cabriolet is also made from ultra-high-strength hot-formed steel.

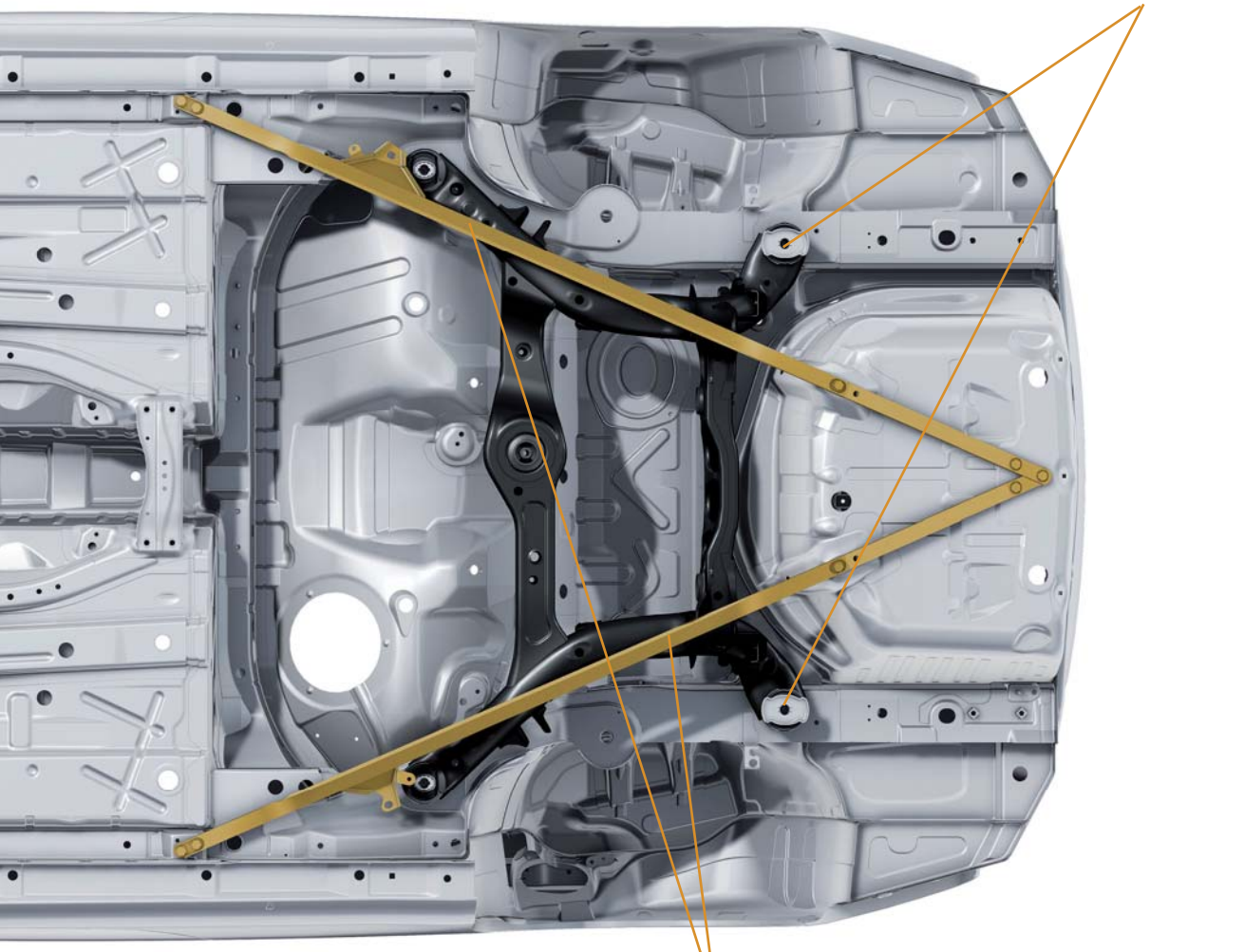


Overview

The standard suspension (1BA), the sports suspension (1BE) and the S line suspension system of quattro GmbH will be available for the A5 Cabriolet. The standard and sports suspension systems have the same vehicle ride height, but the sports suspension has a sportier spring and shock absorber characteristic. The ride height of models with the S line suspension system is 30 mm lower, and the set-up is even sportier. The shock absorber set-ups for the front and rear axles have been reconfigured compared to the Audi A5.



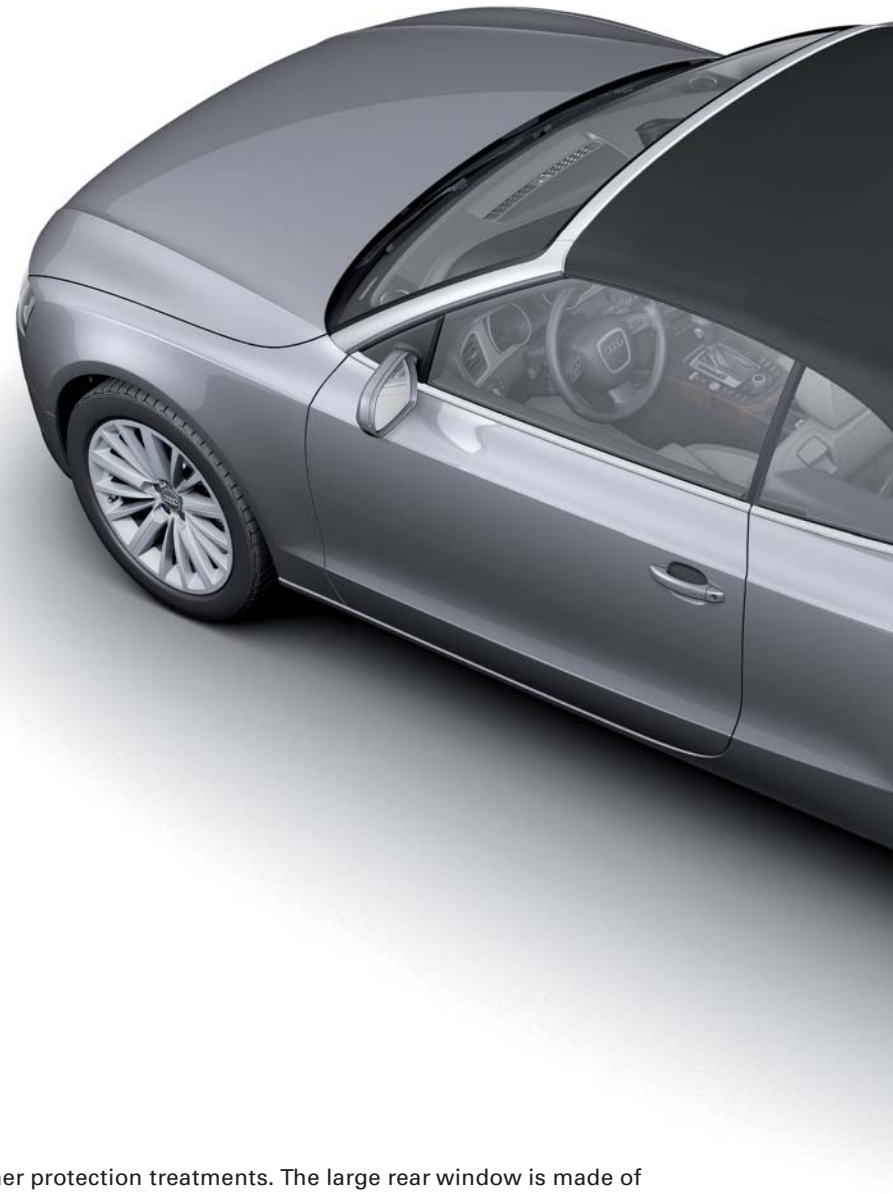
To increase the rigidity of the Cabriolet body, additional diagonal struts have been installed in the front and rear axle areas. The struts are attached directly to the car's body in the rear axle area. In the front axle area, the struts are bolted to the subframe cross strut on the inside. The cross strut has therefore, been geometrically revised. Two hydraulic bearings are used on the rear axle subframe.



440_110

Convertible Top

The top opens and closes automatically at speeds of up to 30 mph (50 kph). The new Audi A5 Cabriolet is also suitable for winter use due to thermal insulation and a heated rear window.



The top fabric is easy to maintain and requires no further protection treatments. The large rear window is made of scratch-proof mineral glass and offers good all-around visibility when the convertible top is up.



440_100

Reference

For convertible top care instructions, please refer to the Owner's Manual.

Convertible top box lid

The convertible top box lid is opened and closed by hydraulic cylinders in the hinge.

It is made from plastic and houses the antennas for the Infotainment system.

When opened, the convertible top is stowed under the convertible top box lid, where it is concealed from view and protected against the elements.



Wind deflector

The wind deflector reduces air turbulence inside the occupant cell and enhances ride comfort.

The wind deflector is inserted in the side trims behind the front seat and then moved into the upright position.

When the wind deflector is not in use, it is folded down and stowed in a protective sheath under the cargo area cover in the luggage compartment.

Note

The wind deflector can remain installed when the convertible top is up.

Variable position convertible top well

When the convertible top is opening, the convertible top well is lowered by a gas spring damper so that there is enough space to stow the convertible top.

When the convertible top is up, the convertible top well can be lifted to increase the luggage compartment area.

The convertible top well is locked in its upper position by an electric motor.



440_101

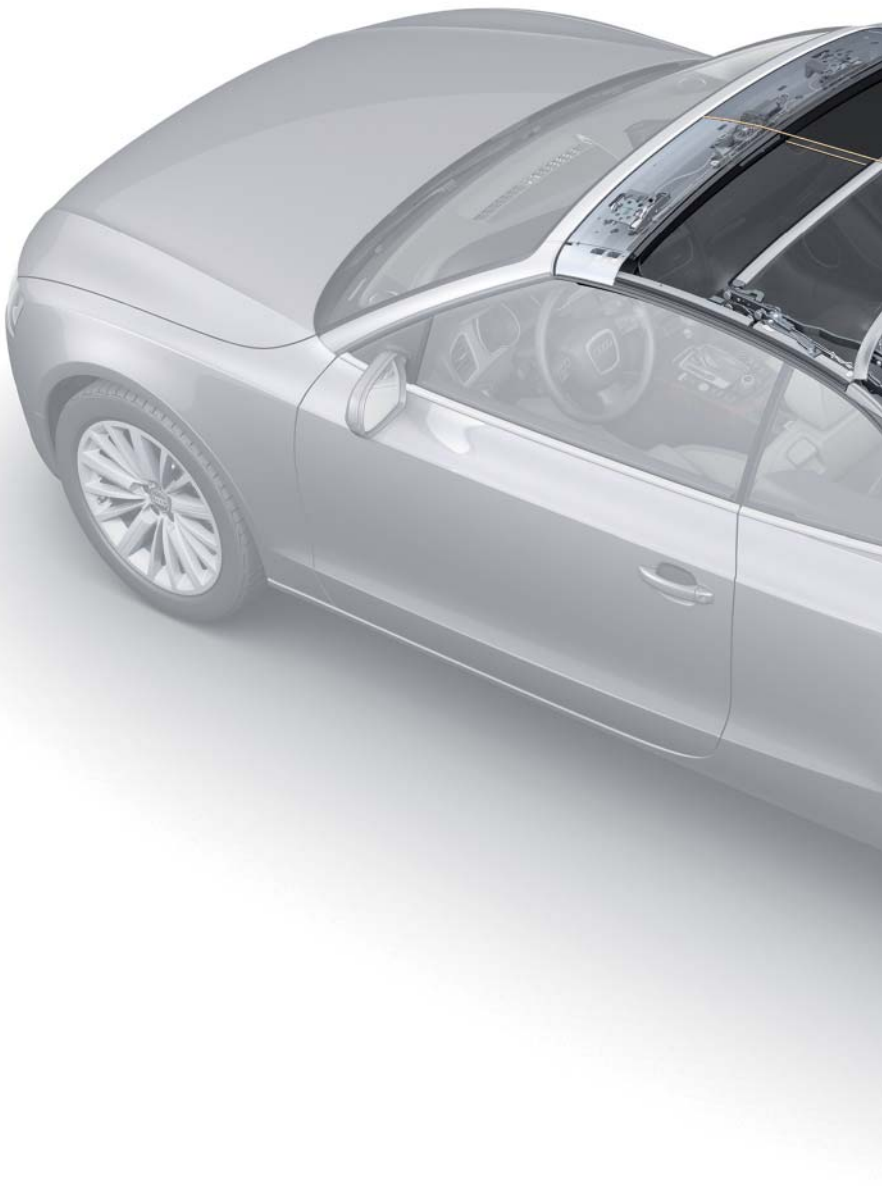
Note

The convertible top well cannot be lifted when the convertible top is stowed away.

Convertible top design

The convertible top cover is locked, clipped, riveted and bolted to the convertible top frame.

This efficient attachment system makes the convertible top cover easy to repair and service.



The electrically defrosted 3.15 mm tempered safety glass rear window is integrated in the soft top cover.



440_102

Note

The integrated glass rear window cannot be replaced separately from the fabric soft top.

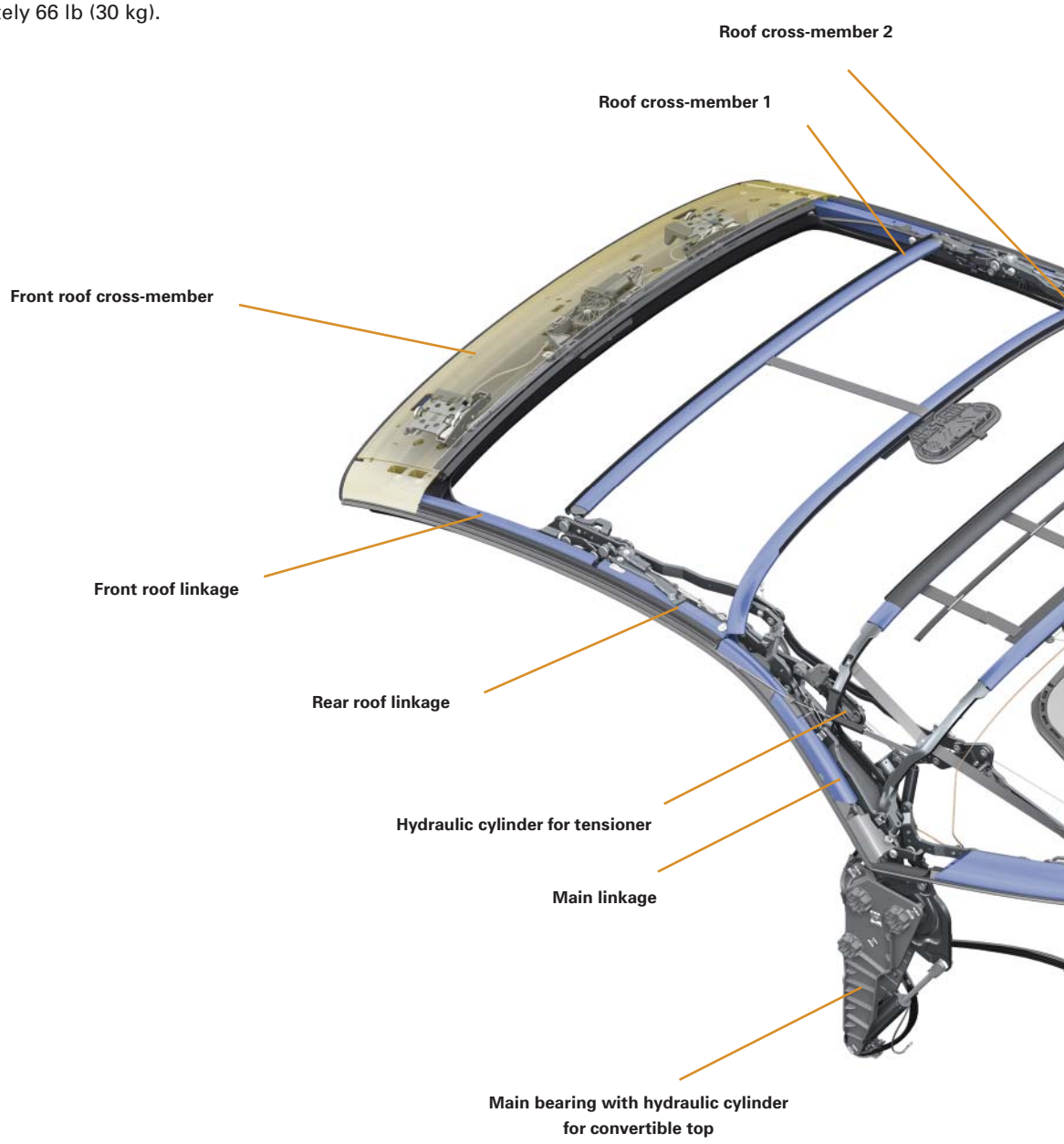
Convertible top frame

The convertible top frame is bolted to the car's body by left and right main bearings on a gauged mounting plate.

The mid-sections of the roof cross-members are extruded profiles made of aluminium and the front roof crossmember is made of magnesium.

By using this combination of different materials, the convertible top frame meets high standards for stability and strength.

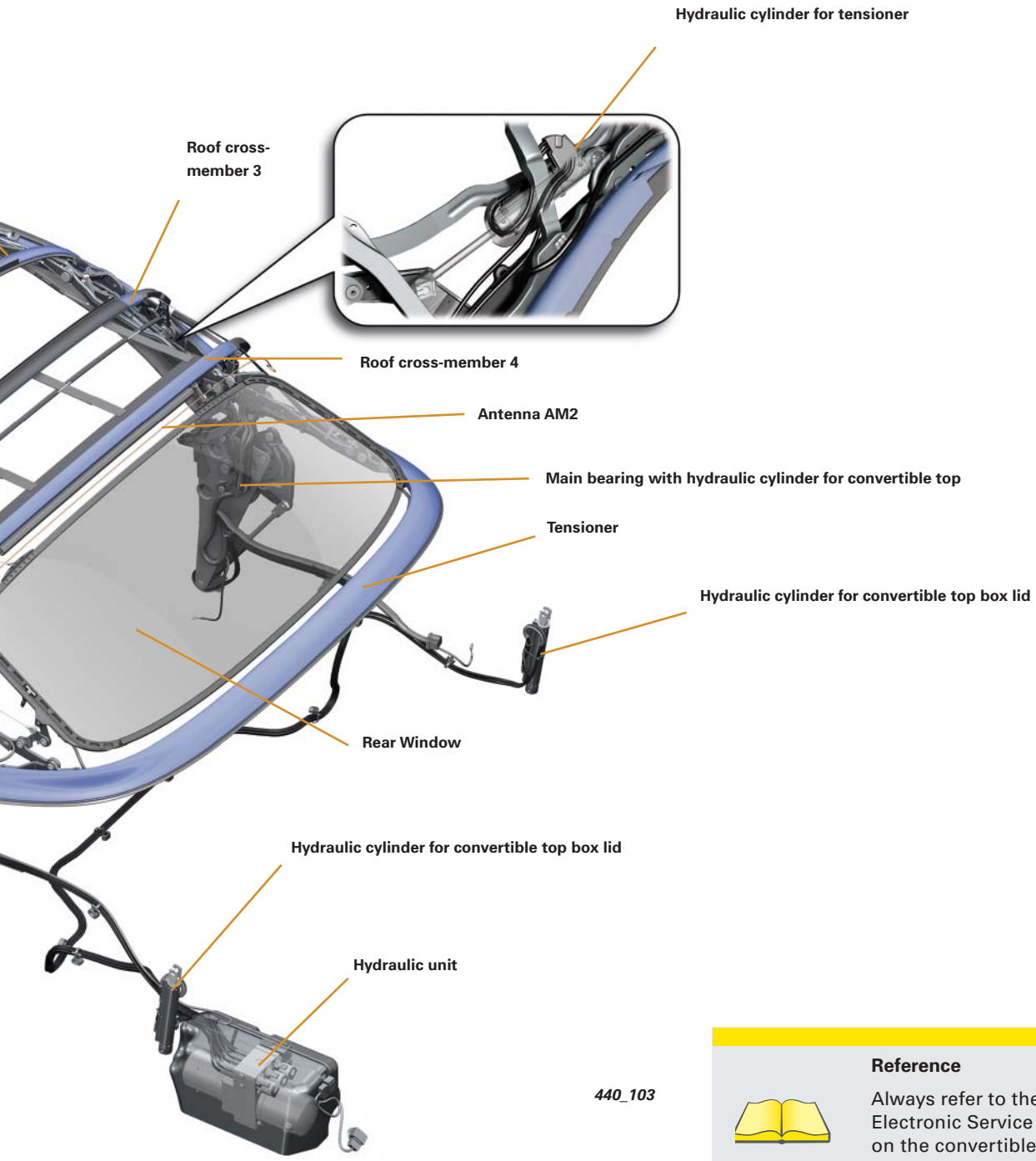
The frame weighs approximately 66 lb (30 kg).



There are grooves in the cross members in which the inner headliner and soft top cover are fastened with weatherstrips.

For assembly and disassembly, the headliner and convertible top cover can be pulled out and in at the sides.

The tensioner seats on the convertible top box lid and locks in an over-center position, allowing the hydraulic system to de-pressurize after closing.



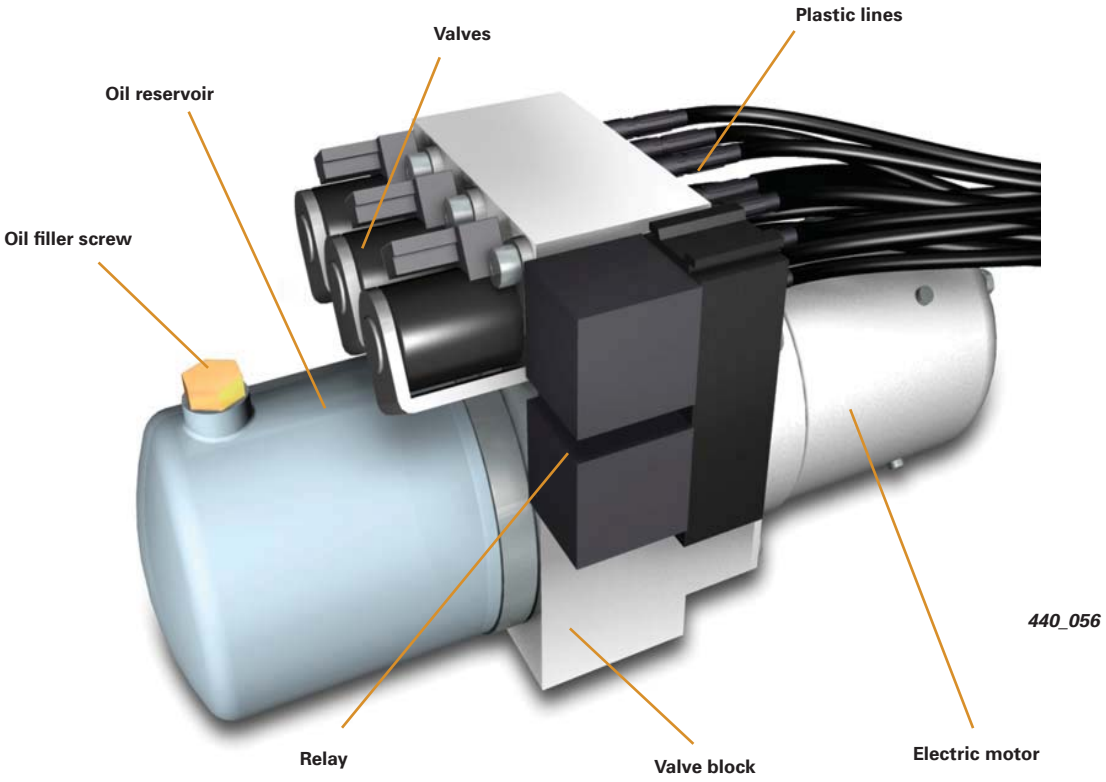
440_103

The hydraulic pump is installed in the luggage compartment at the rear left.

Reference

Always refer to the instructions in the Electronic Service Information when working on the convertible top.

Hydraulic unit



The hydraulic system consists of the electric motor, the pump housing, the oil reservoir and the valves.

The pump assembly is connected to the hydraulic cylinder by plastic lines.

Relays 1 and 2 are clipped on to the valve block, and switch the current for clockwise and counterclockwise operation of the pump.

While the convertible top is opening and closing, the pump runs and valves 1 - 3 control the flow of oil according to the required sequence of movements.

Reversing the pump is only necessary when closing the convertible top (to move the tensioner into the down position).

The pump pressure is limited to a maximum of 2611 psi (180 bar) by pressure limiting valves.

In the rest state, the oil is able to flow without pressure from the hydraulic cylinders into the oil reservoir. This makes emergency operation of the top possible.

Note

Many parts for repairs are supplied in kits. Always use all the parts in the repair kit when making repairs.

Bleeding the system

If repairs have been carried out on the hydraulic system, it is not necessary to bleed the system. The

hydraulic system bleeds itself automatically when it is actuated.

Hydraulic cylinders

Double-acting hydraulic cylinders are used.

They can be actuated from either side depending on the required sequence of movements and they act in both working directions.

Solenoid valves

Electromagnetically actuated 3/2 way valves (3 connections and 2 operating positions) are installed on the hydraulic unit.

When the valves are de-energized, the oil flows out of the cylinders and into the tank. When the valves are energized, the oil flows from the pump to the cylinders.

The valves are activated by Convertible Top Control Module J256.

Emergency operation is possible immediately after the valves have been de-energized.

When the valves are de-energized, the hydraulic system de-pressurizes and the convertible top collapses in a controlled manner.

Note

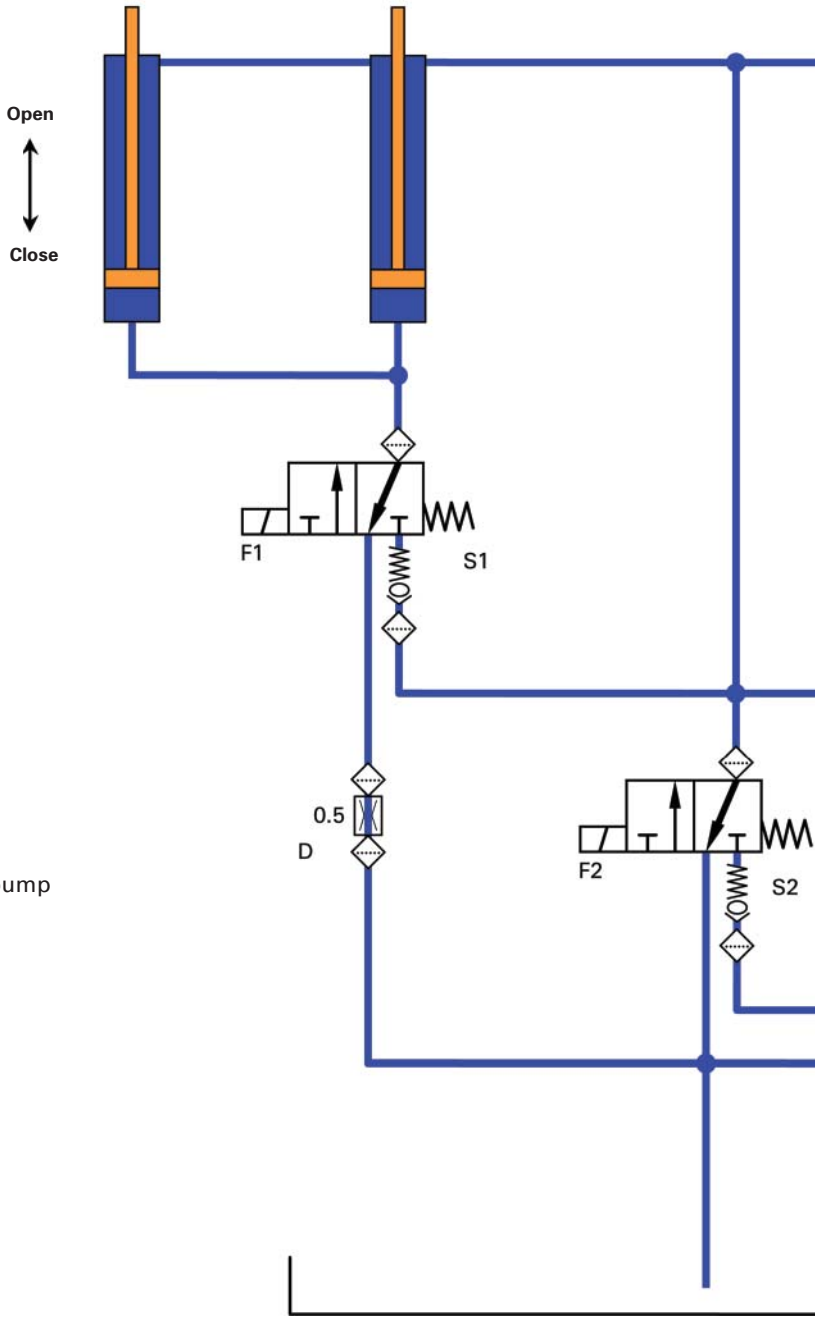


Refer to the instructions given in the current service literature.

Hydraulic circuit diagram

The circuit diagram represents the conditions "convertible top closed" and "system depressurised".

Hydraulic cylinder for convertible top box lid



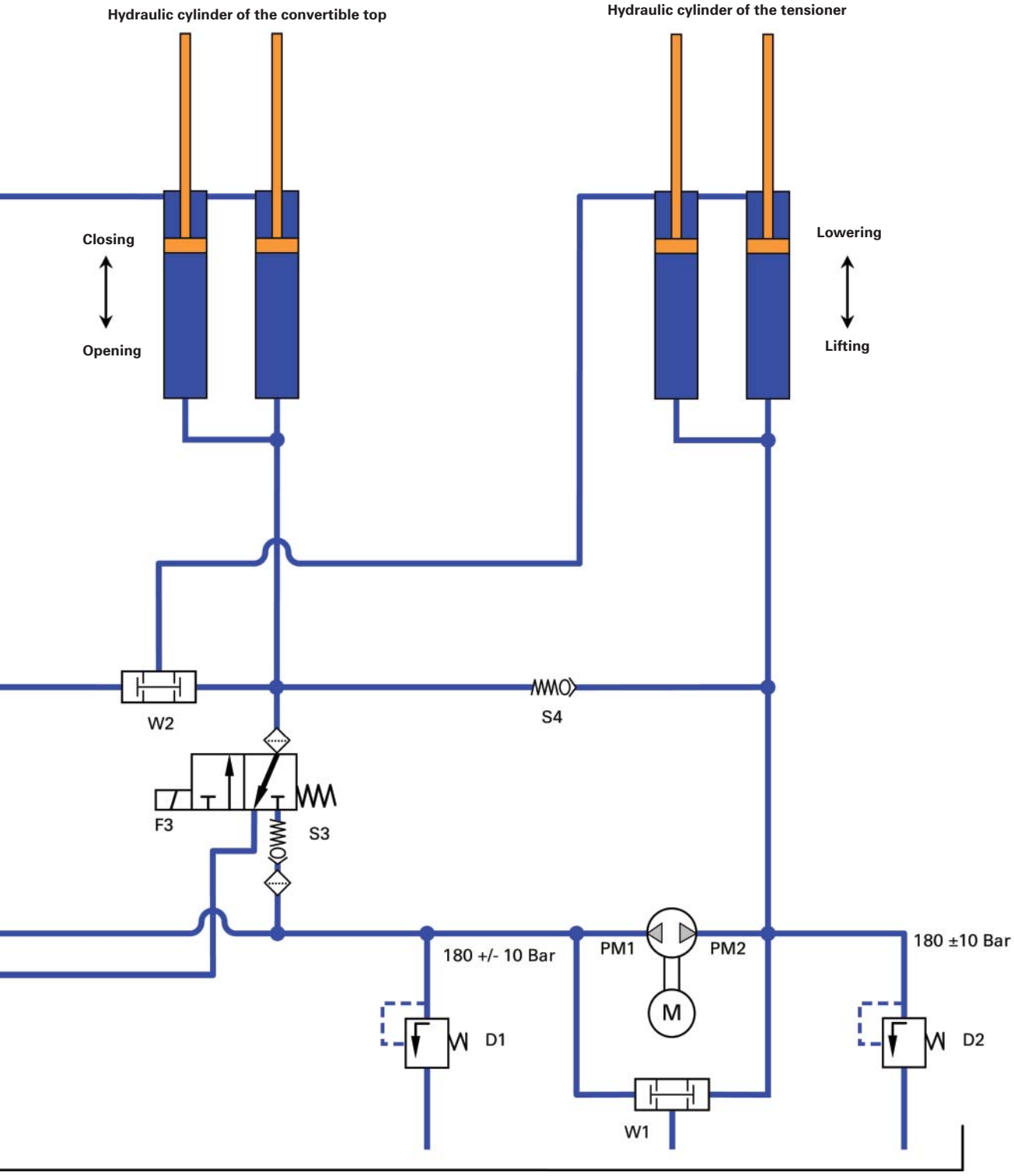
F1, F2, F3	3/2 way valve
D1, D2	Pressure limiting valve
PM1, PM2	CCW and CW operation of the pump
W1, W2	Two-way valve
S1, S2, S3, S4	Shut-off valve
M	Electric motor
D	Restrictor

Note

Refer to the instructions given in the current service literature.

Opening the convertible top

Lifting the tensioner:	PM1+valve2+valve3
Opening the convertible top box lid:	PM1+valve1+valve2+valve3
Opening the convertible top:	PM1+valve1+valve2
Closing the convertible top box lid:	PM1+valve2

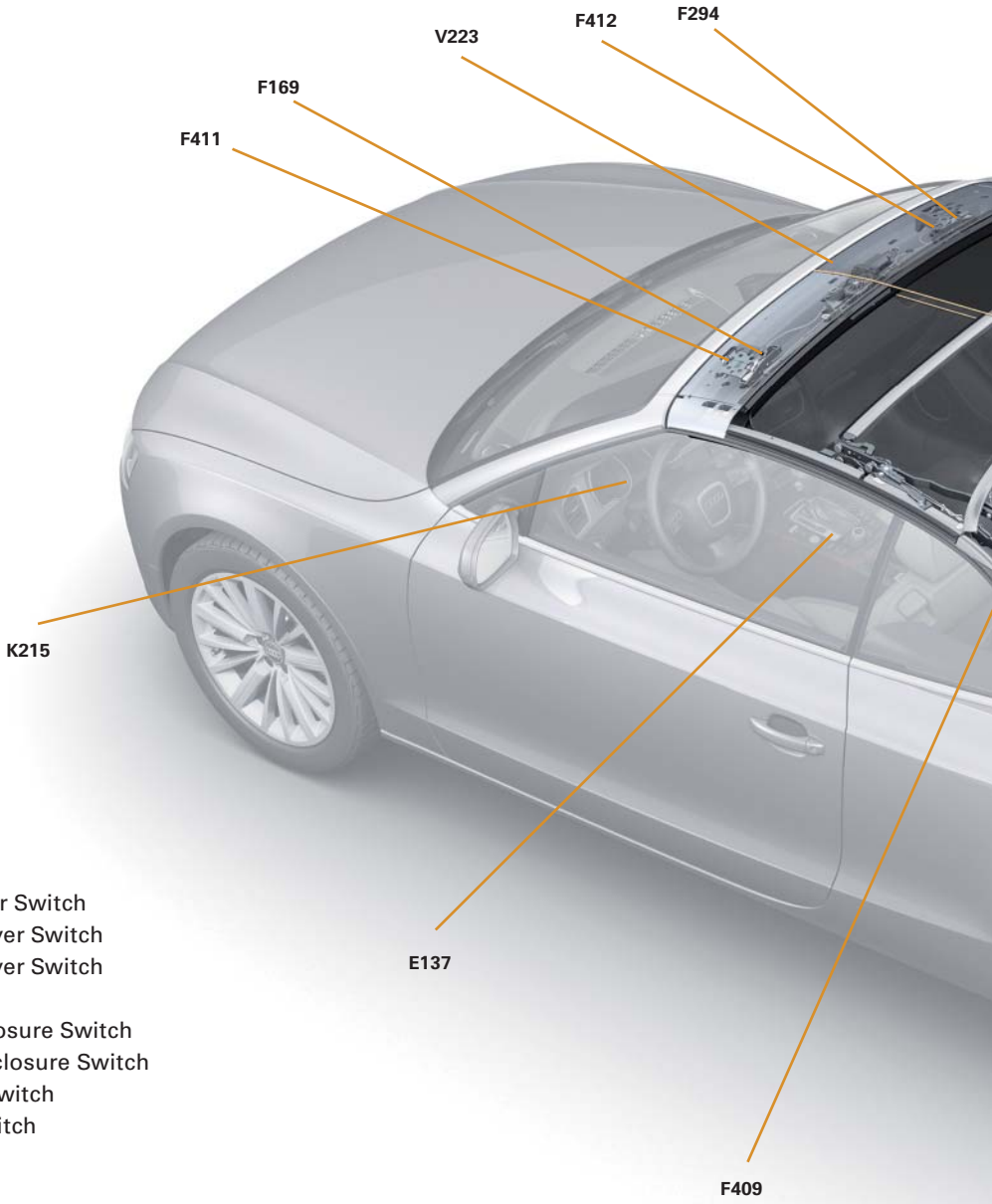


Closing the convertible top

440_104

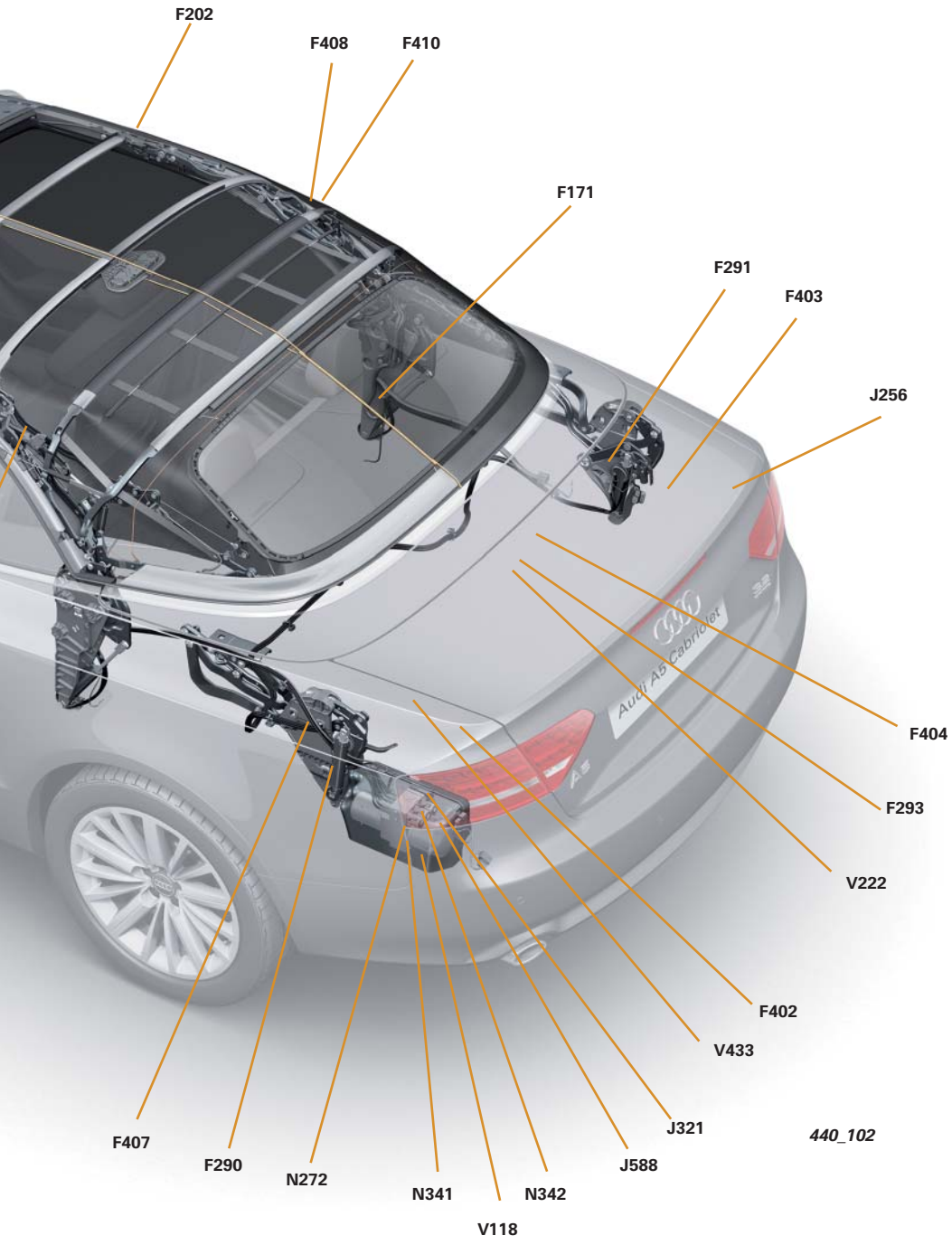
Opening the convertible top box lid:	PM1+valve1+valve2
Closing the convertible top:	PM1+valve1+valve3
Lowering the tensioner:	PM1+valve1+valve2+valve3
Stopping the movement:	Valve2+valve3
Lowering the tensioner:	PM2+valve3

Location of system components



Legend:

E137 Convertible Top Operation Switch
F169 Convertible Top Left Lock Switch
F171 Convertible Top Open Position Switch
F202 Convertible Top Closed Position Switch
F290 Left Convertible Top Compartment Cover Switch
F291 Right Convertible Top Compartment Cover Switch
F293 Right Convertible Top Compartment Cover Switch
F294 Convertible Top Lock Switch (open)
F402 Left Convertible Top Compartment Enclosure Switch
F403 Right Convertible Top Compartment Enclosure Switch
F404 Convertible Top Compartment Locked Switch
F407 Convertible Top Compartment Open Switch
F408 Upper Tensioning Bow Switch
F409 Left Tensioning Bow Switch
F410 Right Tensioning Bow Switch
F411 Left Convertible Top Closed Position Switch
F412 Right Convertible Top Closed Position Switch
J256 Convertible Top Control Module
J321 Convertible Top Hydraulic Pump Relay
J588 Convertible Top Hydraulic Pump Relay 2
K215 Convertible Top Operation Indicator Lamp
N272 Power Convertible Top Valve 1
N341 Power Convertible Top Valve 2
N342 Power Convertible Top Valve 3
V118 Convertible Top Hydraulic Pump
V222 Convertible Top Compartment Cover Locking Motor
V223 Convertible Top Locking Motor
V433 Left Convertible Top Compartment Enclosure Motor


F202
F408
F410
F171
F291
F403
J256
F404
F293
V222
F402
V433
J321
J588
N342
N341
N272
F290
F407
V118
440_102

Operating the convertible top

The convertible top is opened and closed by an electro-hydraulic system.

Before opening the convertible top, all objects should be removed from the convertible top box lid. This will prevent damage to the convertible top and the rear window.

Opening the convertible top

Requirements:

– Vehicle stationary or travelling less than 30 mph (50 kph)

– Ignition “on”

– Ambient temperature higher than 14 °F (-10 °C)

– Trunk lid closed

– Battery voltage OK

The opening cycle of the convertible top is started by lifting Convertible Top Operation Switch E137. The switch must remain pulled throughout the operating cycle. The convertible top operating cycle stops instantly when the switch is released. The cycle (opening or closing) can be restarted by pressing or lifting the switch as required.

Convertible top operating switch



440_024

Convertible Top Operation Indicator Lamp K215 informs the driver that a convertible top operating cycle is in progress. The lamp goes off after the operating cycle is completed. A flashing lamp signifies the convertible top cannot be operated.

K215 is located in the instrument cluster display and is activated by Instrument Cluster Control Module J285.

Convertible Top Operation Indicator Lamp K215



440_025

When the convertible top is opened, Convertible Top Control Module J256 lowers the side windows a defined distance, the variable position convertible top box is lowered and the convertible top box lid is unlocked.

The convertible top tensioner is moved into the upright position hydraulically and Convertible Top Operation Indicator Lamp K215 is activated.

The Vehicle Electrical System Control Module J519 deactivates the rear window defroster and the rear interior light; and the Comfort System Central Control Module disables the opening of the trunk lid.



440_026

The convertible top box lid is subsequently opened.

After the front top latches have been unlocked, Convertible Top Control Module J256 activates Convertible Top Hydraulic Pump V118.

The top is opened and stowed in the convertible top box.

During the operating cycle, the convertible top latches are closed again.



440_027

After the top is completely stowed in the convertible top box, the top box lid is closed again. K215 goes out as soon as the convertible top box lid is closed.

If the operating switch is still being lifted, the side windows will close.

After the completion of the cycle, J393 allows the trunk lid to be re-opened using the handle.



440_028

Closing the convertible top

Requirements:

– Vehicle stationary or travelling less than 30 mph (50 kph)
– Ignition "on"
– Trunk lid closed
– Battery voltage OK

The closing cycle is initiated by pressing and holding down Convertible Top Operation Switch E137. Closing is executed in the reverse order of opening.

First, the side windows are lowered to a defined level and the convertible top box lid is opened. Convertible Top Operation Indicator Lamp K215 informs the driver that an operating cycle has been started.

Comfort System Central Control Module J393 disable the trunk lid handle during the operating cycle.



440_029

Convertible Top Control Module J256 activates Convertible Top Hydraulic Pump V118. The top is lifted out of the convertible top box. At the same time, the convertible top latches are opened.

Once the convertible top is resting on the windshield frame, the top latches are locked and the tensioner is moved into the upright position. Next, the convertible top box lid is closed and the tensioner is moved into the down position. Convertible Top Operation Indicator Lamp K215 goes out. Vehicle Electrical System Control Module J519 is informed that the top is closed and the rear defrost function and interior light are enabled.



440_030

In some markets, if the operating switch is still being actuated, the side windows will be closed. Due to legal restriction In the North American market, the side windows can only be closed using Window Regulator Central Switch E643.



440_031

Convenience opening/closing

It is also possible to open or close the convertible top via the driver's door lock cylinder. To open the convertible top this way, the vehicle must first be unlocked using the remote control key. Then insert the key into the driver's door lock cylinder and turn it to the "Open" position. To start the convertible top operating cycle, turn the ignition key again to the "Open" position within two seconds, and hold it in this position.

To close the convertible top, lock the vehicle using the ignition key. Now turn the key back to the "Close" position within two seconds and hold it there.

If the convertible top is in an intermediate position (neither closed nor open), the convertible top operating cycle can be restarted by actuating the lock cylinder once and holding the lock in place.

If the vehicle is equipped with an optional advanced key, the convertible top can also be actuated using the remote control key. However, this function is only available if the remote control key is within the proximity of the vehicle. Please refer to the information given in the vehicle Owner's Manual.



440_032



440_033

Convertible top operation while driving

It is possible to open or close the convertible top at speeds up to 30 mph (50 kph.) An operating cycle cannot be initiated at speeds over 30 mph (50 kph.)

If the vehicle exceeds 30 mph (50 kph), the driver is warned audibly and visually. The operating cycle is terminated and the top stops at its current position. The operating cycle can be restarted after the vehicle speed drops below 30 mph (50 kph.)



440_034

Emergency operation

In the event of a malfunction, it is possible to close the convertible top by hand. The convertible top is opened in the reverse order of closing.

Emergency operation should, where possible, be performed by two persons.

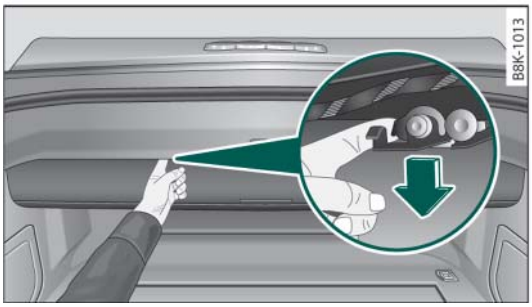
To decrease the pressure in the hydraulic system, Convertible Top Operation Switch E137 must be actuated (pressed or lifted) for longer than 3 seconds when the ignition is "off".

Closing the convertible top

Requirements:

- Emergency brake applied
- Side windows lowered
- Ignition "off"
- Ignition key removed
- No hydraulic pressure in the system

First, the convertible top box lid latch is released. The release lever for the convertible top box lid latch can be operated through a gap behind the trim. The release lever must be pulled down until the convertible top box lid disengages.

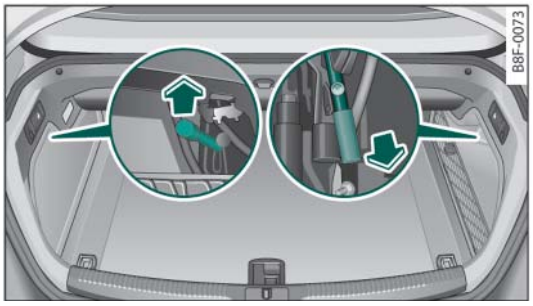


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The levers for unlocking the two convertible top box lid hinges are located behind the left and right boot linings. The levers must be operated in the direction of the arrow.

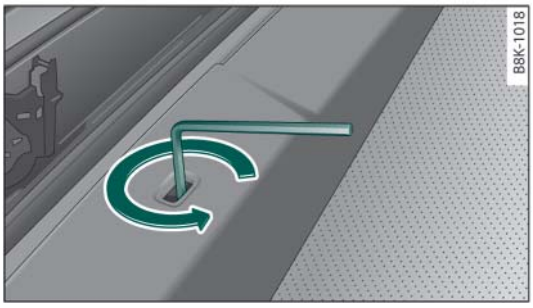
The special tool required for emergency operation is located on the sound insulation of Convertible Top Hydraulic Pump V118.

The convertible top box lid can now be raised slightly. To open the convertible top box lid completely, the luggage box lid must first be closed.



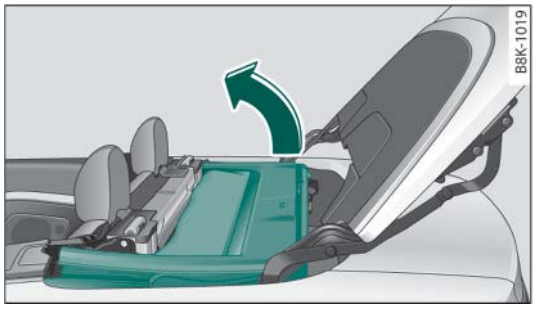
440_063

After removing the trim cap, the especial tool can be inserted. The convertible top latches can be opened by turning the special tool counterclockwise.



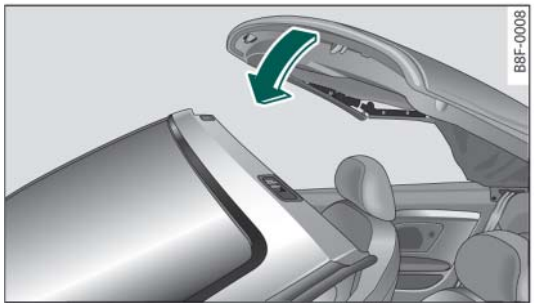
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The next step is to lift the convertible top out of the convertible top well.



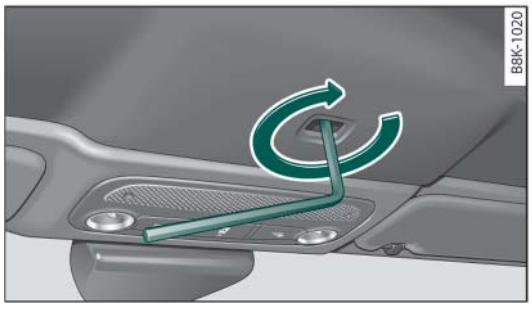
440_065

The convertible top is pushed forwards until it can be set down on the windshield frame.



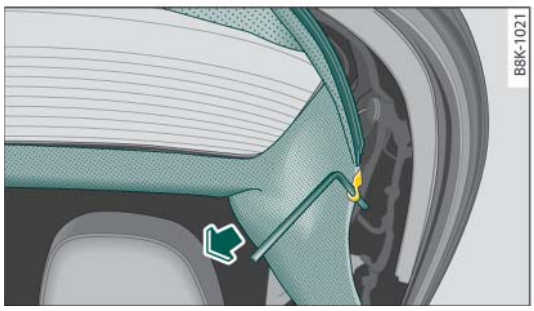
440_066

To unlock the convertible top latches, turn the special tool clockwise as far as it will go. Then remove the emergency release key.



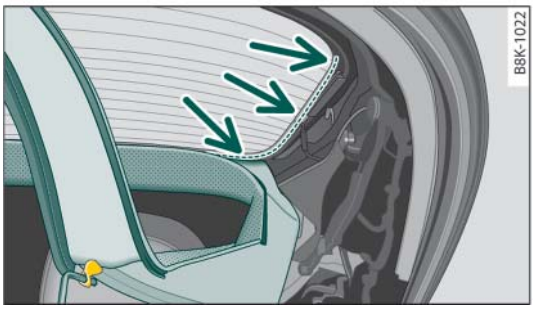
440_067

The inner headliner must be detached on each side, on the left and right in the rear window area. This is done by using the special tool to pull the two pull loops (yellow mark) attached to the inner headliner.



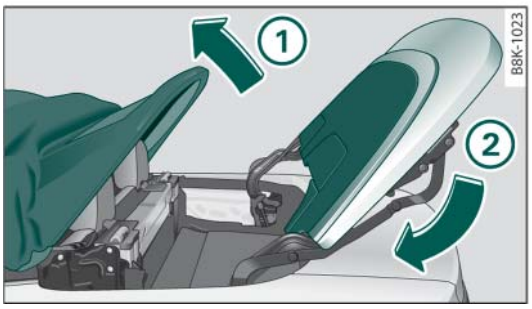
440_068

Approximately 12 in (30 cm) of the inner headliner should be detached in the area of the rear window as shown.



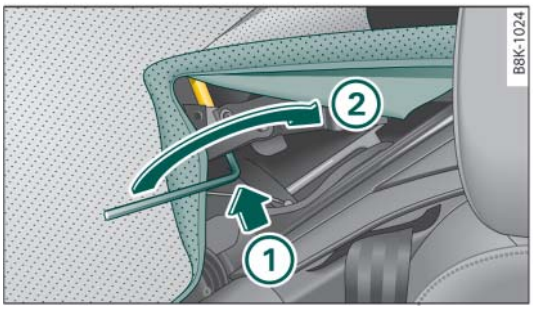
440_069

To be able to close the convertible top box lid, the tensioner must be moved into the upright position. Push the convertible top box lid forwards into its end position. Then set the tensioner down on the convertible top box lid.



440_079

To lock the tensioner, insert the short end of the special tool into the convertible top linkage (yellow mark). The tensioner is locked by pushing the special tool down.



440_080

Note

When operating the convertible top in an emergency, care must be taken to not reach into the convertible top linkage or other moving parts. Never drive the vehicle unless the convertible top is properly locked. There is always the danger that the top could be opened by a headwind. This could cause personal injury and damage the vehicle.

For more information about the emergency actuator and operating the convertible top, refer to the vehicle Owner's Manual.

Components of the convertible top control system

Convertible Top Operation Switch E137

The convertible top opening cycle can be started by pulling and holding the switch. Pressing the switch closes the convertible top.

The switch must be kept continuously actuated throughout the convertible top operating cycle. Releasing the switch causes the top operating cycle to stop immediately. A cycle can be resumed in any direction by actuating the switch again.

Convertible Top Operation Switch E137



440_024

Right Convertible Top Compartment Cover Switch F293
Convertible Top Compartment Locked Switch F404

Both of these switches (F293 and F404) are integrated directly in Convertible Top Compartment Cover Locking Motor V222.

If Right Convertible Top Compartment Cover Switch F293 is actuated, the Convertible Top Control Module allows the convertible top box lid to be opened hydraulically.

From the information supplied by Convertible Top Compartment Locked Switch F404 and Left and Right Convertible Top Compartment Cover Switches (F290/ F291), the Convertible Top Control Module recognizes that the convertible top box lid is closed and locked.

Right Convertible Top Compartment Cover Switch F293



440_078

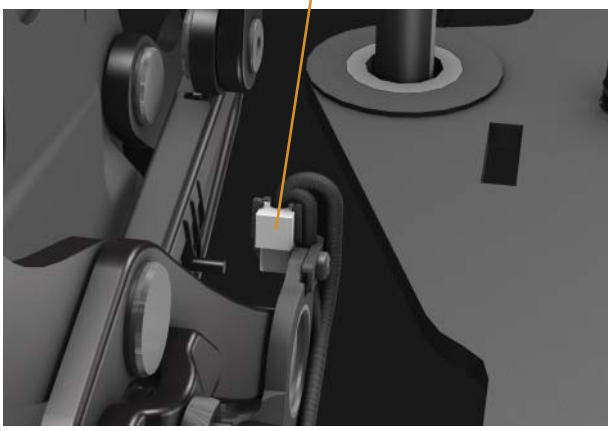
Convertible Top Compartment Locked Switch F404

Convertible Top Compartment Open Switch F407

When the convertible top box lid is fully open, one of the metal arms of the left convertible top box lid hinge is within the sensing range of F407. This information is sent to Convertible Top Control Module J256.

Convertible Top Control Module J256 shuts off the hydraulic system in order to open the convertible top box lid. In addition, the convertible top can now be opened or closed hydraulically.

Convertible Top Compartment Open Switch F407



In the figure the convertible top box lid is shown closed (switch not actuated).

440_046

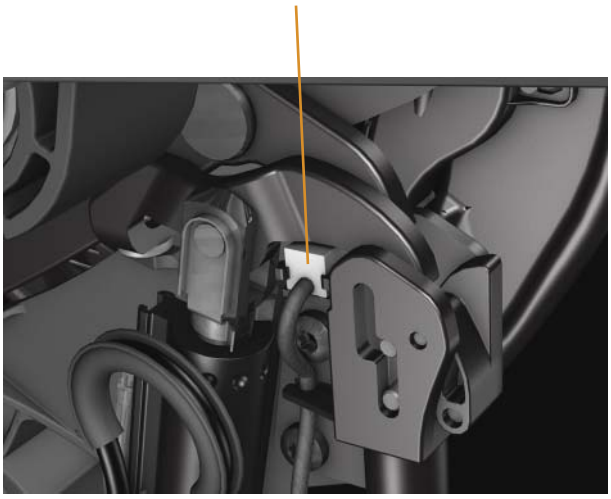
Left Convertible Top Compartment Cover Switch F290
Right Convertible Top Compartment Cover Switch F291

The left and right convertible top box lid switches are located on both convertible top box lid hinges. When the convertible top box lid is closed, a hinge arm moves into the sensing range of the switch in question.

If Convertible Top Control Module J256 recognizes that the convertible top box lid is closed, the convertible top box lid lock motor is activated when the convertible top is down. The convertible top box lid is locked.

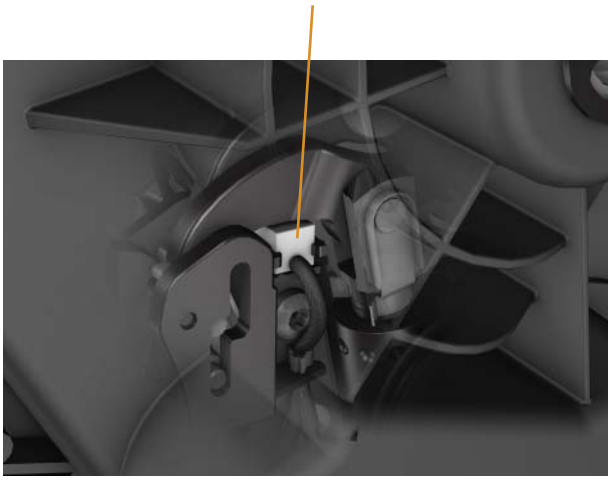
During the convertible top closing cycle, the tensioner can be moved into the down position.

Left Convertible Top Compartment Cover Switch F290



440_044

Right Convertible Top Compartment Cover Switch F291



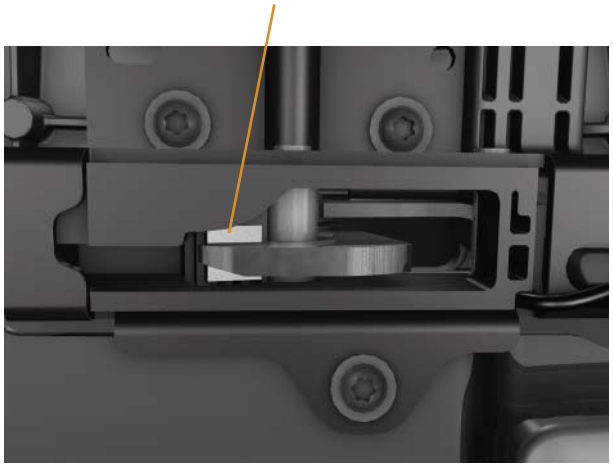
440_045

Left Convertible Top Closed Position Switch F411

F411 is located in the bottom part of the lock on the left windshield frame. When the catch on the top part of the lock on the left locks the convertible top, the switch recognizes this and sends a corresponding signal to Convertible Top Control Module J256.

Depending on the position of the latch, J256 recognizes: convertible top locked or not locked.

Left Convertible Top Closed Position Switch F411



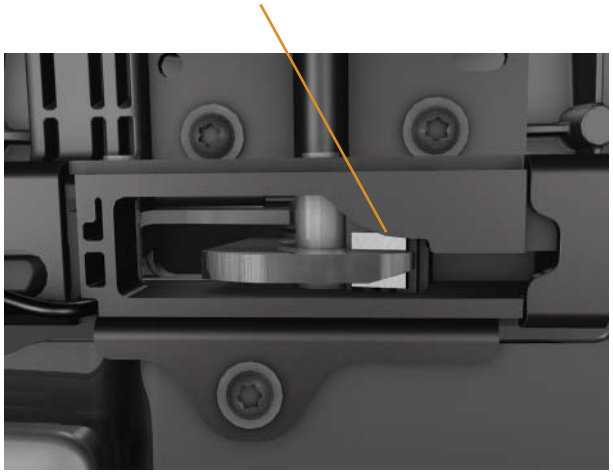
440_037

Right Convertible Top Closed Position Switch F412

The convertible top closed switch, right F412 is located on the right-hand side of the windscreen frame in the bottom part of the lock. Switch F412 detects when the latch on the right-hand top part of the lock engages the convertible top. The switch outputs a corresponding signal to the convertible top operation control unit J256. Depending on the position of the catch, the control unit recognizes: convertible top locked or not locked.

Convertible Top Control Module J256 requires the signal “Convertible top latches locked” signal in order to close the convertible top box lid during the convertible top closing cycle. The signal “convertible top latches not locked” is used so that the convertible top can be opened hydraulically.

Right Convertible Top Closed Position Switch F412

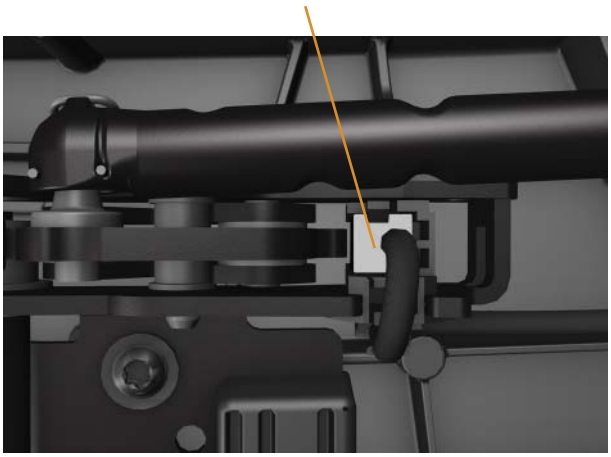


440_038

Convertible Top Left Lock Switch F169

F169 is located on the left top part of the lock. When the convertible top latch is closed, the lock mechanism moves into the sensing range of switch F169. Convertible top latch closed is detected.

Convertible Top Left Lock Switch F169



440_039

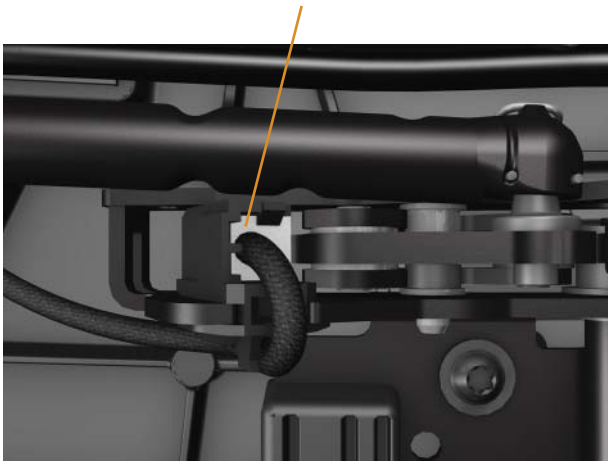
Convertible Top Lock Switch (open) F294

F294 is attached to the right top part of the lock. When the convertible top latch is opened, the lock mechanism moves into the sensing range of switch F294. Convertible top latch open is detected.

From the information provided by F169 and F294, Convertible Top Control Module J256 determines the position of the latches and the Convertible Top Locking Motor V223.

In combination with Left and Right Convertible Top Closed Position Switches (F411/F412) the control module can identify that the convertible top lock is “closed and locked.”

Convertible Top Lock Switch (open) F294



440_040

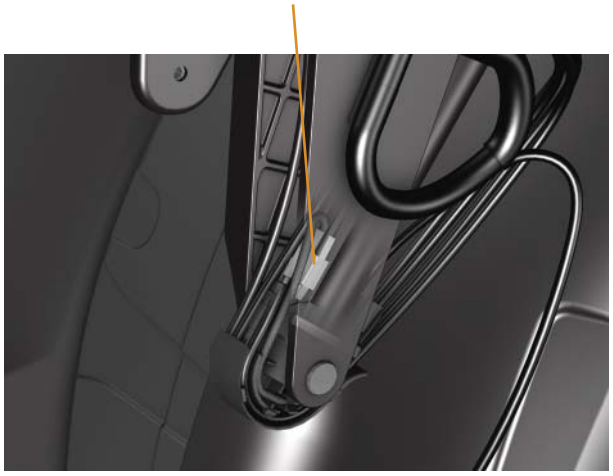
Convertible Top Open Position Switch F171

F171 is located on the right-hand convertible top main bearing and is clipped directly on to the hydraulic cylinder. From the signal supplied by switch F171, Convertible Top Control Module J256 determines whether or not the convertible top is stowed in the convertible top box.

If the convertible top is stowed in the convertible top box, then the piston rod of the hydraulic cylinder retracts completely and locating it exactly opposite the Hall sensor F171.

If the convertible top is stowed in the convertible top box, J256 can close the convertible top box lid.

Convertible Top Open Position Switch F171



440_055

Convertible Top Closed Position Switch F202

F202 informs Convertible Top Control Module J256 that the convertible top is in its front position. The convertible top front switch is located at the right-hand side of the convertible top on the front hinge.

When the convertible top is closed, a sheet-metal holder moves into the sensing range of the switch . Convertible top front is detected.

Convertible Top Control Module J256 locks the front convertible top latches.

Convertible Top Closed Position Switch F202



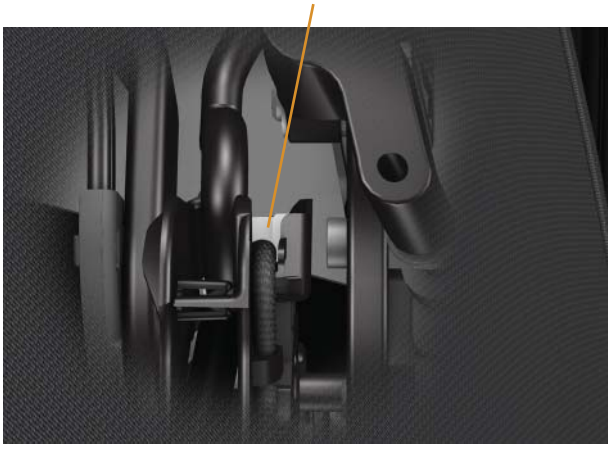
440_055

Upper Tensioning Bow Switch F408

F408 is fitted on the right-hand convertible top frame hinge. The switch moves upwards together with the tensioner. When the tensioner reaches its upper end position, a screw head is located directly opposite the tensioner up switch.

When Convertible Top Control Module J256 receives the corresponding signal from switch F408, the convertible top lock can be opened during the convertible top opening cycle, and the convertible top box lid can be closed during the convertible top closing cycle.

Upper Tensioning Bow Switch F408



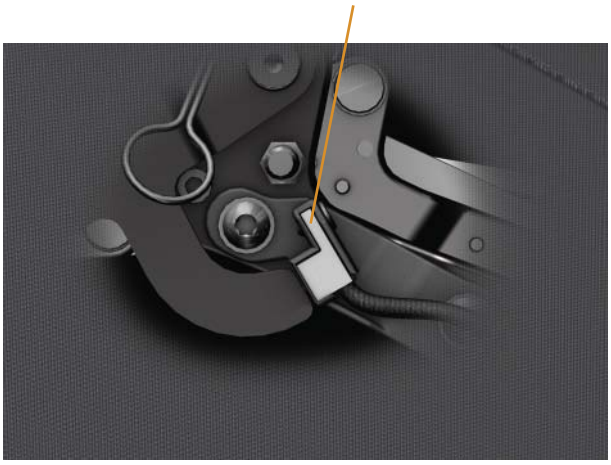
440_041

Left Tensioning Bow Switch F409
Right Tensioning Bow Switch F410

The left and right tensioner switches inform the Convertible Top Control Module J256 that the tensioner is in the rest position. In the rest position, the tensioner is set down on the closed convertible top box lid. The convertible top is closed.

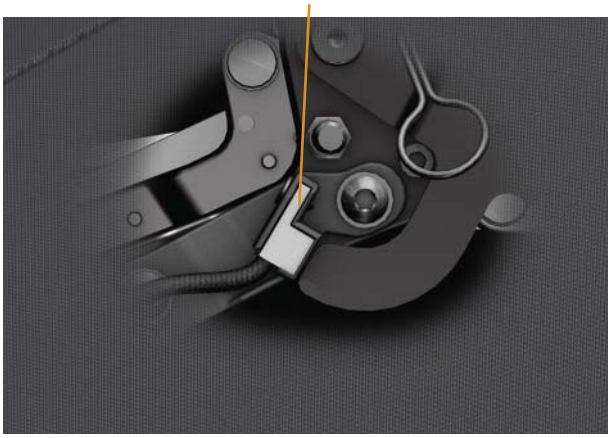
Convertible Top Control Module J256 utilizes the signals from F409 and F410 to complete the convertible top operating cycle.

Left Tensioning Bow Switch F409



440_043

Right Tensioning Bow Switch F410



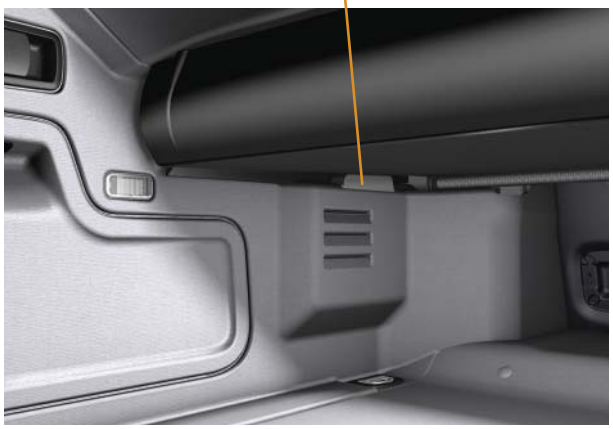
440_042

Left Convertible Top Compartment Enclosure Switch F402
Right Convertible Top Compartment Enclosure Switch F403

Switches F402 and F403 are attached to the left and right trunk side trim covers. When the convertible top well lowers, two metal plates attached to the convertible top well settle on the switch housing. Magnets in the switch housings hold the metal plates in position. The reed switches and the left and right convertible top enclosure switches are closed by applying the metal plates to the housing.

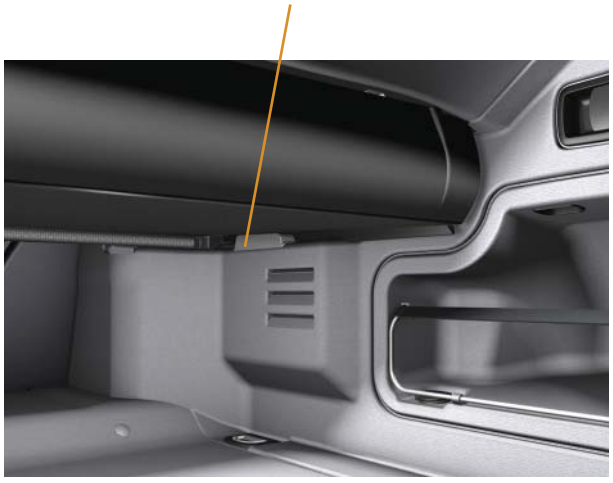
The convertible top cannot be opened until Convertible Top Control Module J256 recognizes the convertible top well has been lowered.

Left Convertible Top Compartment Enclosure Switch F402



440_057

Right Convertible Top Compartment Enclosure Switch F403



440_058

Convertible Top Hydraulic Pump V118

V118 is activated by Convertible Top Control Module J256 via Convertible Top Hydraulic Pump Relay J321 or Convertible Top Hydraulic Pump Relay 2 J588.

The pump is configured for both clockwise and counterclockwise operation.

The pump is located in the left side of the luggage compartment behind the trim panel.

Convertible Top Hydraulic Pump V118



440_051

Convertible Top Control Module J256

The convertible top can only be operated by the Convertible Top Control Module J256. J256 controls and monitors the individual convertible top operating cycles. It collects all the information supplied by the sensors and evaluates it, enabling it to control the actuators.

The control module is also responsible for diagnostics. If the diagnostics detect faulty components, or if the signals from the individual components involved in the convertible top operating cycle are not received at the right time, the convertible top operating cycle is stopped.

To avoid overloading the system, the control module monitors the running time of the convertible top. If the convertible top is closed after approximately 2 minutes of continuous operation, J256 shuts off the convertible top. The convertible top is disabled for approximately10 minutes.

If the convertible top is not in the “closed” condition after approximately 2.5 minutes of continuous operation, the control module will immediately stop the convertible top operating cycle. The convertible top cannot be operated again until a 20 minute cool-down period has elapsed.

If the convertible top is shut off in an intermediate position (neither closed nor open), J256 shuts off the power supply to valves N272, N341 and N342 after approximately 10 minutes. The hydraulic system de-pressurizes and the convertible top collapses in a controlled manner. Convertible Top Control Module J256 is located behind the right trim panel in the luggage compartment.

Convertible Top Control Module J256

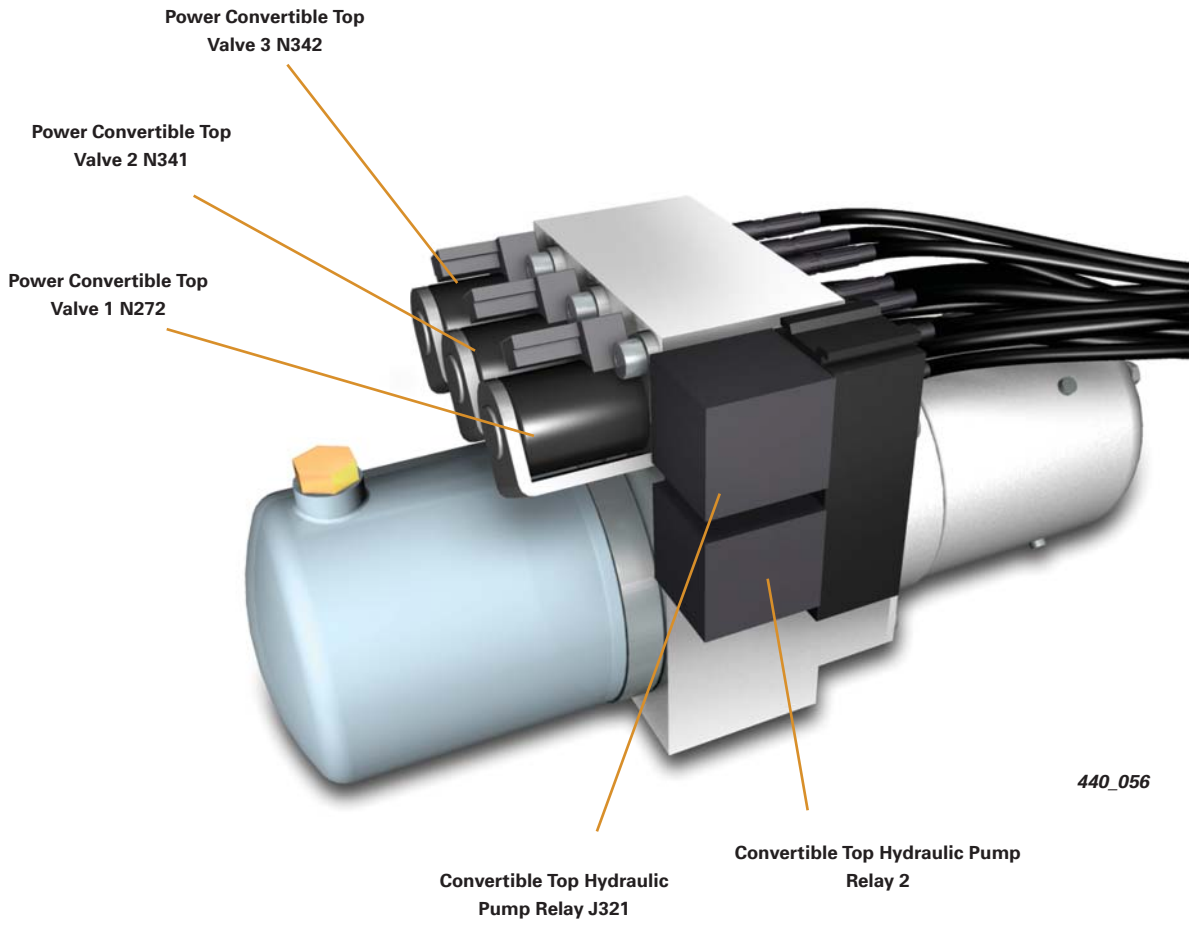


440_050

Convertible Top Hydraulic Pump Relay J321
Convertible Top Hydraulic Pump Relay 2
Power Convertible Top Valve 1 N272
Power Convertible Top Valve 2 N341
Power Convertible Top Valve 3 N342

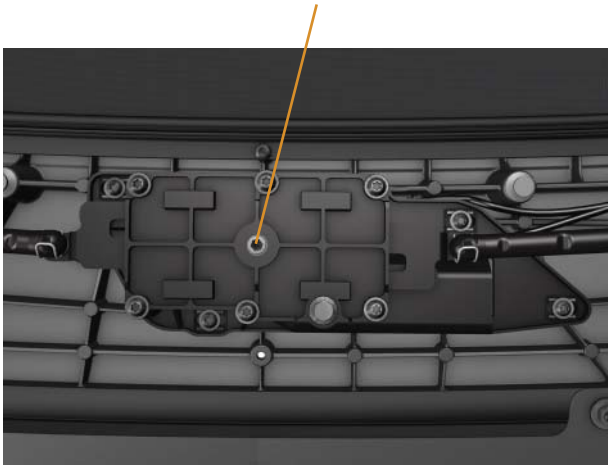
Convertible Top Control Module J256 activates Convertible Top Hydraulic Pump V118 via relays J321 and J588. Both relays are mounted to the pump and are enclosed by the pump sound insulation.

Hydraulic fluid flows into the corresponding hydraulic cylinder depending on the directional rotation of the pump and activation of Power Convertible Top Valves N272, N3431, and N341. The Power Convertible Top Valves are mounted on a flange of the pump.



Convertible Top Locking Motor V223
V223 actuates, via linkage, the two latches in the top parts of the lock, which are fitted in the forward roof section.

Convertible Top Locking Motor V223



440_052

Left Convertible Top Compartment Enclosure Motor V433

V433 unlocks a mechanism which lowers the convertible top well. Lowering of the convertible top well is damped by a gas-filled spring.

Motor V433 is located behind the left trunk lining.

Gas damper



440_054

Left Convertible Top Compartment Enclosure Motor V433

Convertible Top Compartment Cover Locking Motor V222

V222 locks and unlocks the convertible top box lid. Motor V222 is activated by Convertible Top Control Module J256.

It is mounted on the rear wall of the convertible top box.

Convertible Top Compartment Cover Locking Motor V222



440_053

Instrument Cluster Control Module J285

On the basis of information received from Convertible Top Control Module J256 via CAN, Instrument Cluster Control Module J285 activates Convertible Top Operation Indicator Lamp K215 and the display in the center of the instrument cluster.

After switching on the ignition, K215 comes on for two seconds and then goes off again.

The warning lamp also has the following functions:

– It lights up while the automatic convertible top is opening and closing.

– It flashes if one of the conditions for opening or closing the convertible top are not met and the convertible top operation switch is actuated.

– It lights up when the convertible top is not completely open or closed.



440_047_USA

Trunk lid

The convertible top can only be operated if the trunk lid is closed. During the convertible top operating cycle, Comfort System Central Control Module J393 disables opening of the trunk lid with the handle (soft touch). The trunk cannot be opened with the handle again until the convertible top operating cycle has been completed.



440_048

Display in the instrument cluster

If the trunk lid is not closed, the message “Please close rear lid“, appears on the center display of the instrument cluster.



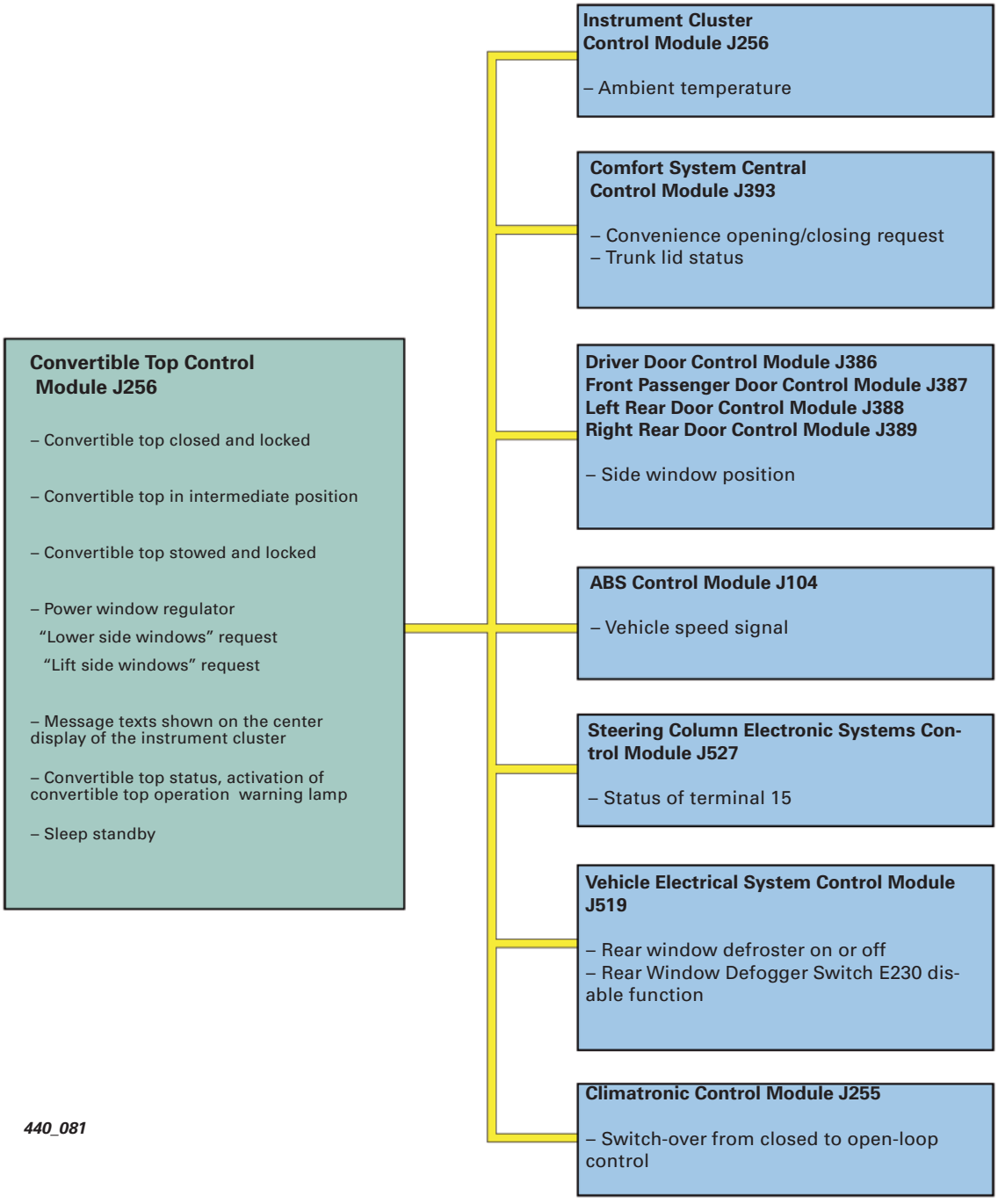
440_049_USA

Data exchange

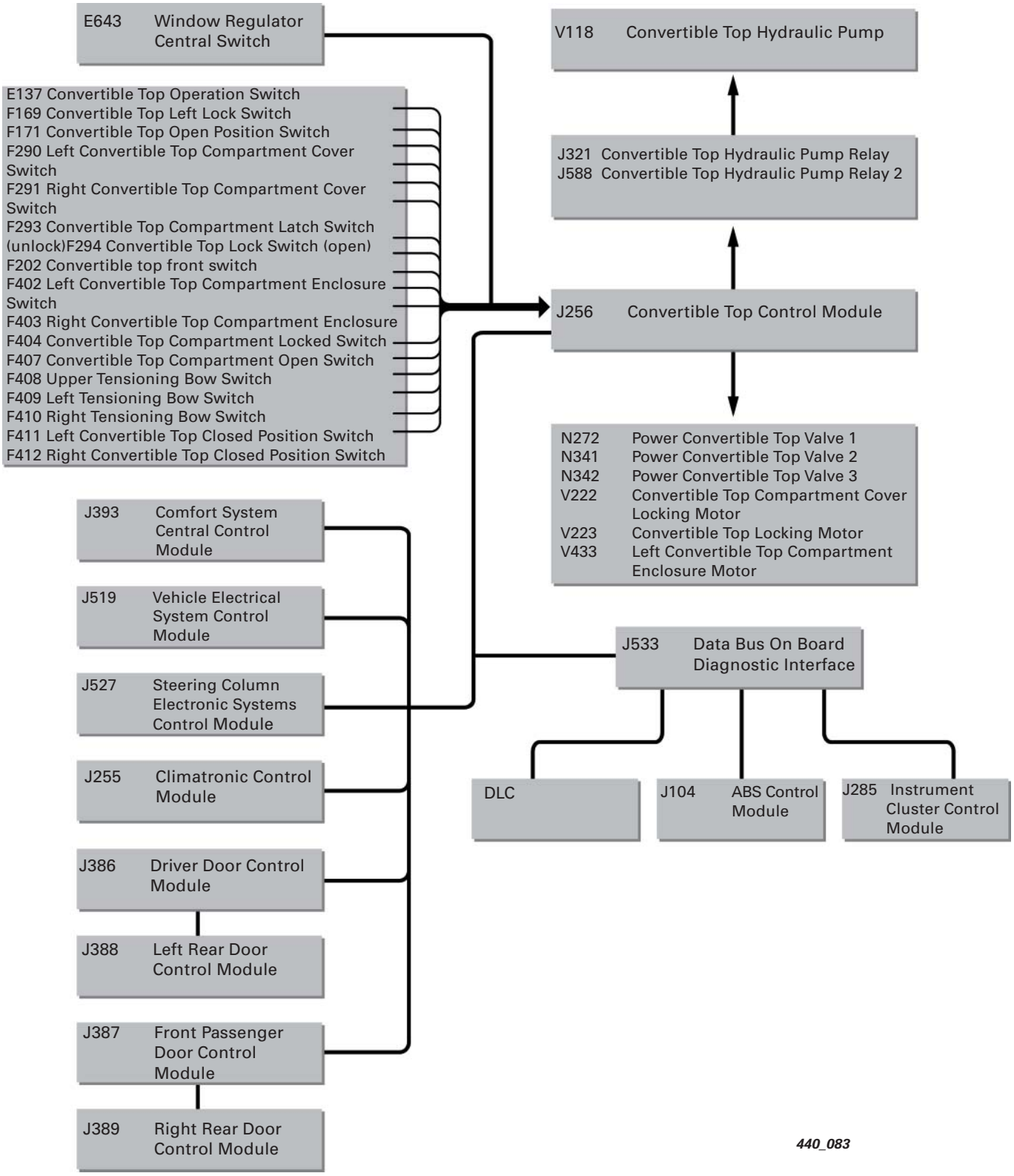
To ensure smooth operation, Convertible Top Control Module J256 requires information from the various sensors, relays and switches of the convertible top system. It also receives information from other relevant control modules. For example, a vehicle speed signal is supplied by ABS Control Module J104. Data is exchanged via the CAN data bus.

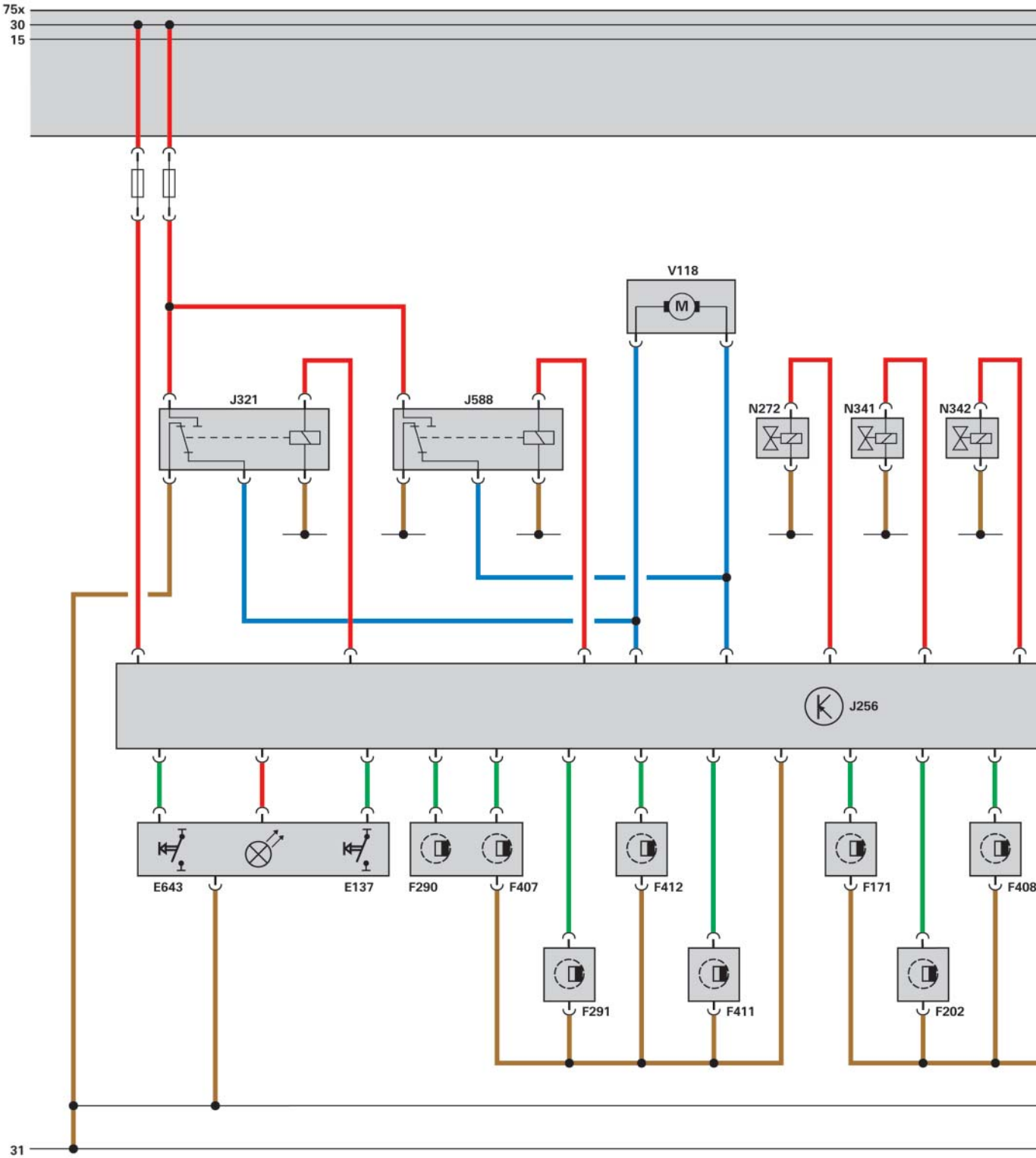
Convertible Top Control Module J256 is integrated in the Convenience CAN bus and sends/receives data on this bus. Data is exchanged between the various CAN data buses via Data Bus On Board Diagnostic Interface J533.

This overview shows, by way of example, the information that is exchanged via the CAN data bus.

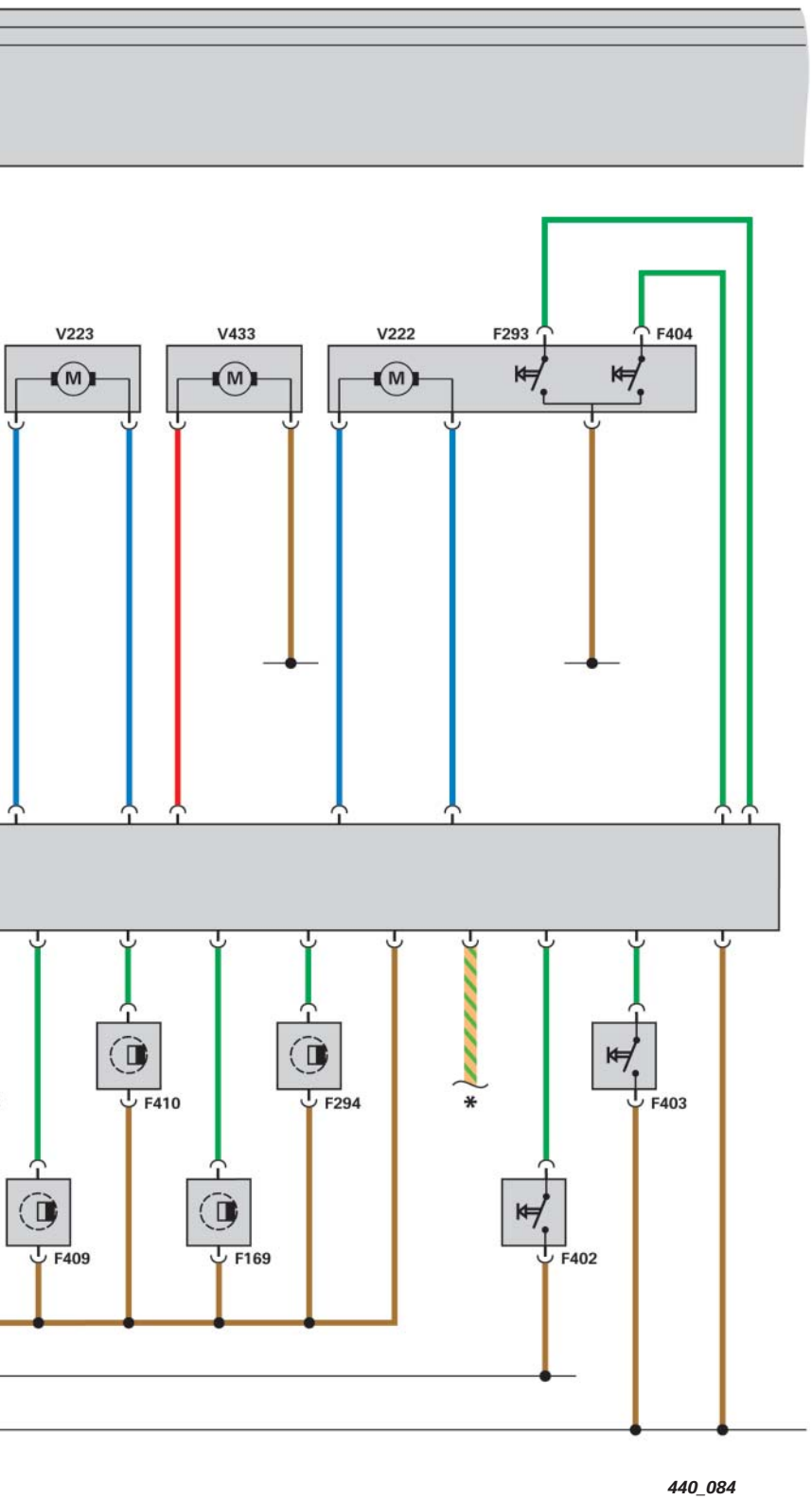


System overview




75x
30
15
V118
M
J321
J588
N272
N341
N342
J256
E643
E137
F290
F407
F412
F171
F408
F291
F411
F202
31

Convertible Top Control System



440_084

Legend:

E137	Convertible Top Operation Switch
E643	Window Regulator Central Switch
F169	Convertible Top Left Lock Switch
F171	Convertible Top Open Position Switch
F202	Convertible Top Closed Position Switch
F290	Left Convertible Top Compartment Cover Switch
F291	Right Convertible Top Compartment Cover Switch
F293	Convertible Top Compartment Latch Switch (unlock)
F294	Convertible Top Lock Switch (open)F402 Left Convertible Top Compartment Enclosure Switch
F403	Right Convertible Top Compartment Enclosure Switch
F404	Convertible Top Compartment Locked Switch
F407	Convertible Top Compartment Open Switch
F408	Upper Tensioning Bow Switch
F409	Left Tensioning Bow Switch
F410	Right Tensioning Bow Switch
F411	Left Convertible Top Closed Position Switch
F412	Right Convertible Top Closed Position Switch
J256	Convertible Top Control Module
J321	Convertible Top Hydraulic Pump Relay
J588	Convertible Top Hydraulic Pump Relay 2
N272	Power Convertible Top Valve 1
N341	Power Convertible Top Valve 2
N342	Power Convertible Top Valve 3
V118	Convertible Top Hydraulic Pump
V222	Convertible Top Compartment Cover Locking Motor
V223	Convertible Top Locking Motor
V433	Left Convertible Top Compartment Enclosure Motor
*	Convenience CAN

Occupant protection system in the Audi A5 Cabriolet

A major challenge when working with convertibles is to implement a highly effective occupant protection system. The extensive safety requirements included meeting current statutory legislation as well as passing consumer safety tests. Analyses of actual road accidents were also taken into account during the development of the occupant protection system.

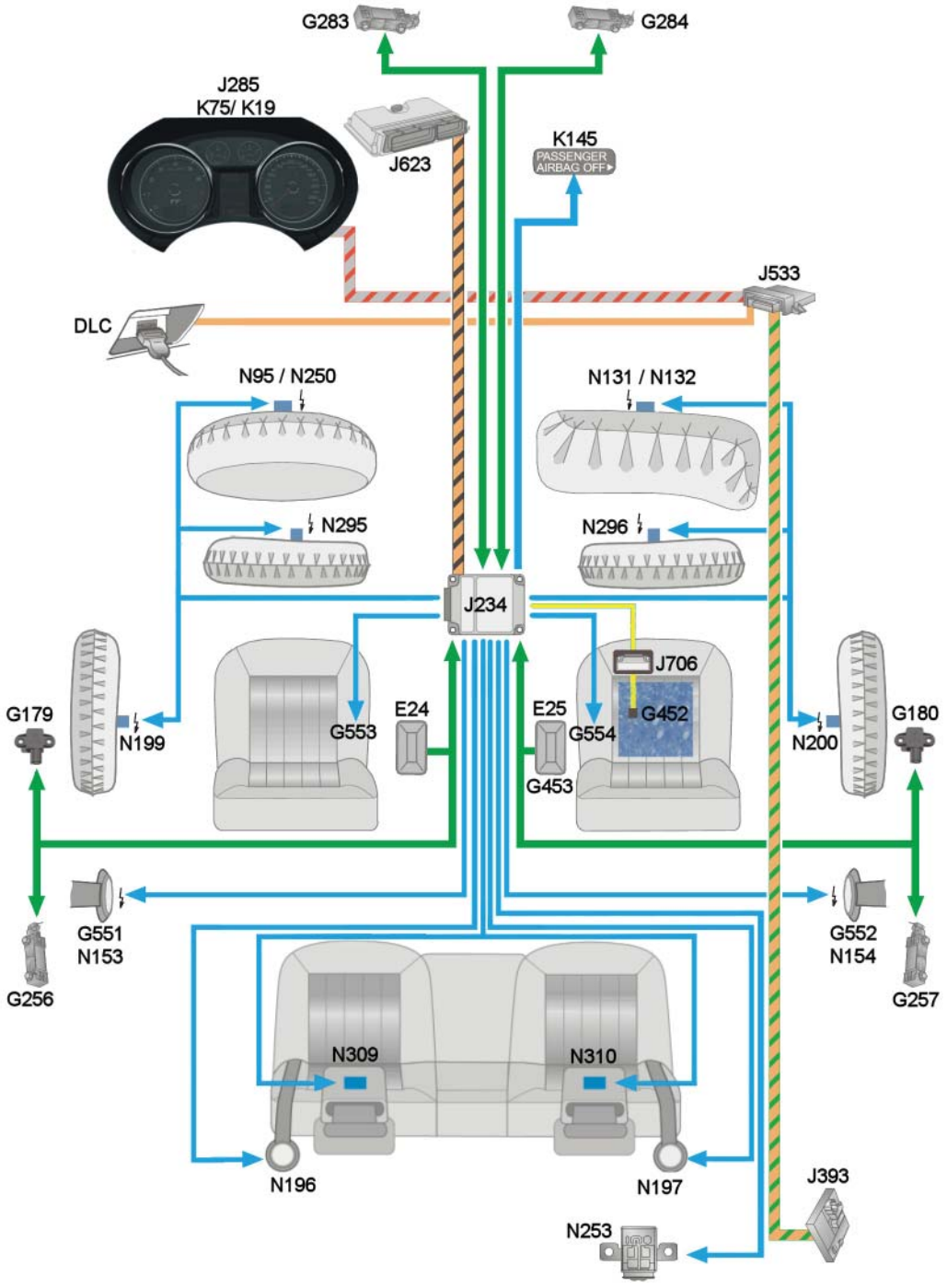
Depending on market requirements, the A5 Cabriolet will have the following components and features:

- Airbag Control Module
- Driver airbag, adaptive
- Front passenger airbag, adaptive
- Side airbags (head/thorax airbags)
- Front airbag crash sensors (upfront sensors)
- Door-integrated crash sensors for side impact detection
- Crash sensors for side impact detection on the C-pillars
- Front belt tensioners with adjustable belt force limiters
- Rear belt tensioner
- Battery Interrupt Igniter
- Seat belt reminder for driver and front passenger
- Seat belt switch, driver and front passenger side
- Seat occupancy sensor in the passenger seat
- Driver and passenger seat position sensors
- Roll-over protection system

Due to the different requirements and statutory regulations of markets (particularly the US market), equipment can vary.

Legend

DLC	Data Link Connector	J623	Engine Control Module
E24	Driver's Safety Belt Switch	J706	Seat Occupied Recognition Control Module
E25	Front Passenger's Safety Belt Switch		
G179	Driver's Side Airbag Crash Sensor	K19	Safety Belt Warning Lamp
G180	Front Passenger's Side Airbag Crash Sensor	K75	Airbag Malfunction Indicator Lamp
		K145	Front Passenger's Airbag Disabled Indicator Lamp
G256	Rear Side Airbag Crash Sensor (on driver's side)	N95	Driver's Airbag Igniter
G257	Rear Side Airbag Crash Sensor (on front passenger's side)	N131	Front Passenger's Airbag Igniter 1
		N132	Front Passenger's Airbag Igniter 2
G283	Driver's Front Airbag Crash Sensor	N153	Driver's Safety Belt Tensioner Igniter 1
G284	Front Passenger's Front Airbag Crash Sensor	N154	Front Passenger's Safety Belt Tensioner Igniter 1
G452	Seat Occupied Recognition Pressure Sensor	N196	Rear Safety Belt (driver's side) Tensioner Igniter
G453	Seat Occupied Recognition Safety Belt Force Sensor	N197	Rear Safety Belt (front passenger's side) Tensioner Igniter
G551	Driver's Belt Force Limiter	N198	Center Rear Seat Belt Tensioner Igniter
G552	Front Passenger's Belt Force Limiter	N199	Driver's Side Airbag Igniter
G553	Driver's Seat Position Sensor	N200	Front Passenger's Side Airbag Igniter
G554	Front Passenger's Seat Position Sensor	N250	Driver's Airbag Igniter 2
J706	Seat Occupied Recognition Control Module	N253	Battery Interrupt Igniter
		N295	Driver's Knee Airbag Igniter
J234	Airbag Control Module	N296	Front Passenger's Knee Airbag Igniter
J285	Instrument Cluster Control Module		
J393	Comfort System Central Control Module	N309	Driver Rollover Protection Solenoid
		N310	Front Passenger Rollover Protection Solenoid
J533	Data Bus On Board Diagnostic Interface		



440_114

Note

The diagrams and figures in the section on "Occupant protection" are intended to aid understanding.

Airbag Control Module J234

The main tasks of the electronics integrated in J234 are as follows:

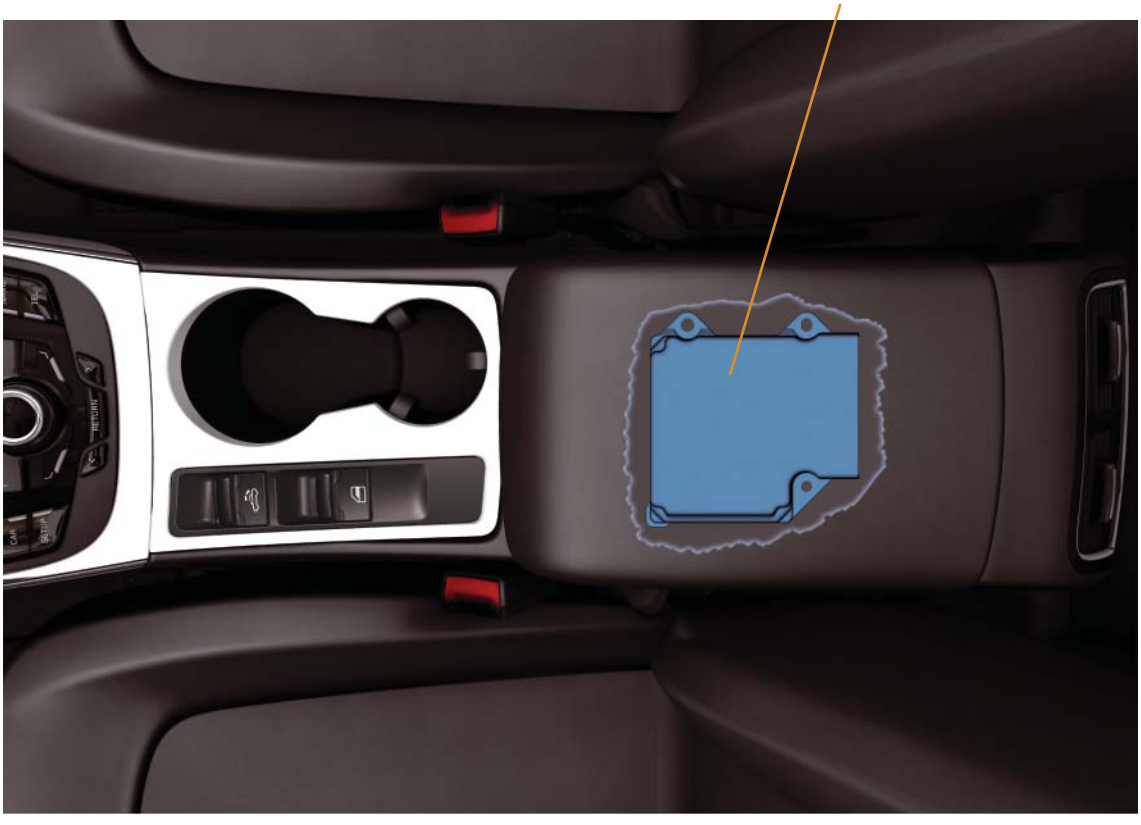
- Collision detection (front, side, rear, roll-over*)
- Evaluation of all input information
- Defined deployment of the belt tensioners, airbags and battery interrupter
- Activation of the roll-over protection system
- Control of the adaptive front airbags
- Control of the belt force limiter
- Control of the seat belt reminder
- Permanent monitoring of the complete airbag system
- Independent power supply via capacitor for a defined period (up to 200 ms)
- Fault indication via Airbag Malfunction Indicator Lamp
- Storage of fault and crash information
- Indication of a collision event to other system components via powertrain CAN
- Sending information for control of the automatic seat belt presenter

An additional sensor for detecting an impending roll-over is integrated in the airbag control module. Working in conjunction with other sensors integrated in the control module, the additional sensor determines the severity of the accident and, in the event of an impending roll-over, activates the rollover protection system, the battery interrupt igniter and the belt tensioners.

Furthermore, during a front or side impact with a high level of severity, the roll-over protection system is deployed as a precaution as soon as a belt tensioner or airbag is ignited. The roll-over protection system is also activated during a rear impact if the impact force is above the deployment threshold.

Data is exchanged between Airbag Control Module J234 and other vehicle systems via the powertrain CAN data bus.

Airbag Control Module J234 can only be replaced using a VAS Scan Tool and “Guided Fault Finding” or “Guided Functions”.



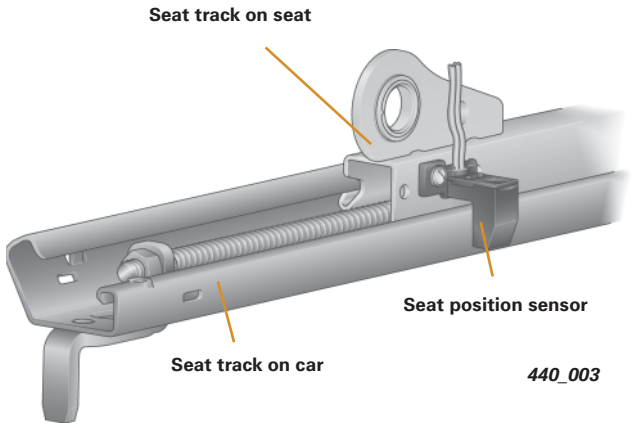
440_002

Driver Seat Position Sensor G533
Front Passenger Seat Position Sensor G554

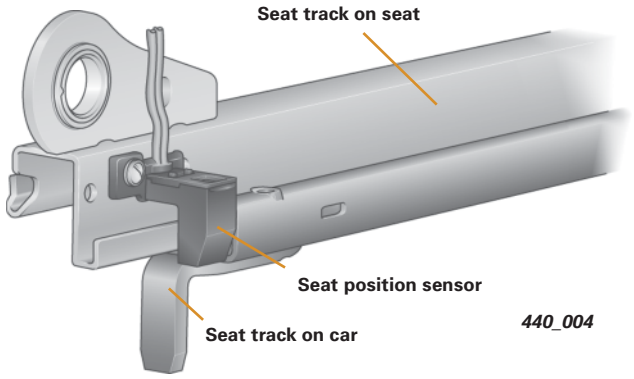
To determine the seat position of the driver and front passenger, the front seats are fitted with seat position sensors G553 and G554. The seat position detection sensors are Hall sensors, mounted on the inner seat tracks.

From the current draw of the seat position sensors, Airbag Control Module J234 determines whether the seat is located in the front third or rear two-thirds of its adjustment range.

If the seat is pushed backwards and the seat position sensor moves beyond the seat track mounted to the car, then its current draw will be approx. 5 - 7 mA. Airbag Control Module J234 identifies “seat back”.



If the seat is pushed forwards and the seat position sensor moves beyond the seat track mounted to the car, the current draw of the sensor will increase to approximately 12 - 17 mA. Airbag Control Module J234 identifies "seat forward



Airbag Control Module J234 uses the seat position information to activate adaptivity of the front airbags and the belt force limiter at the right moment. If the seat is located in the front third of its adjustment range, then the airbag control module can activate the relevant adaptive airbag igniter 2 earlier than if the seat were located in the rear two-thirds of its adjustment range.

Due to the earlier firing of the second igniter, the airbag is better adapted to the seating position of the occupant and allows persons with a low body mass to plunge into the airbag in a controlled fashion.

On the basis of the seat position, Airbag Control Module J234 also decides when belt force limiter igniters G551 and G552 are to be activated.

This allows the restraint systems to be adapted according to the accident situation and seat position.

Information on seat position is also required for positioning the automatic seat belt presenters.

Front airbags

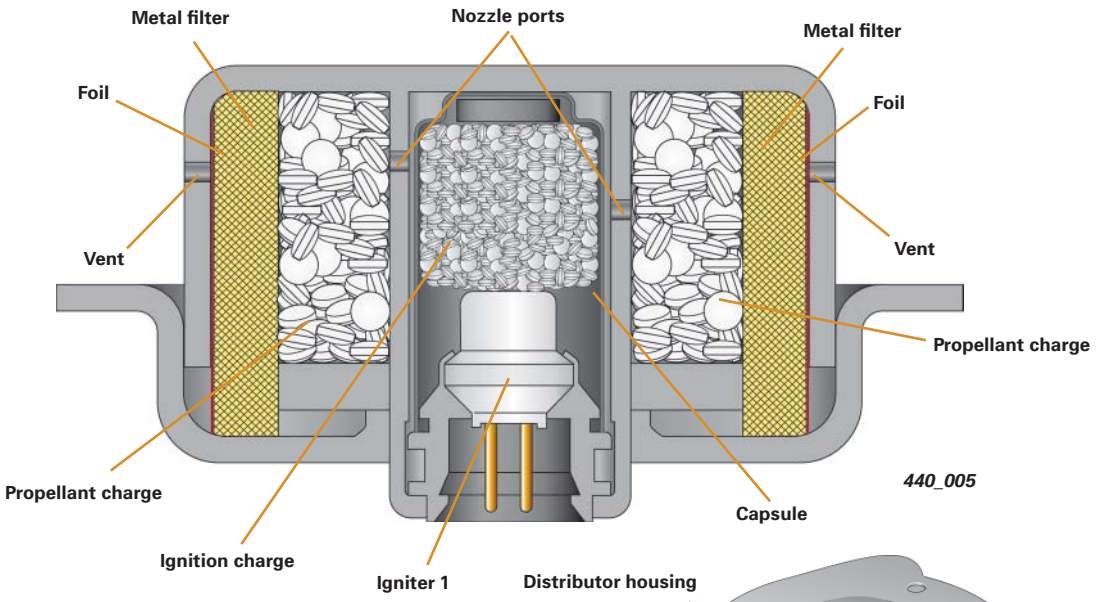
The Audi A5 Cabriolet is equipped world-wide with adaptive front airbags. A distinction is made between a hybrid gas generator on the front passenger side and a solid fuel generator on the driver side.

The different modes of operation of the gas generators are described below.

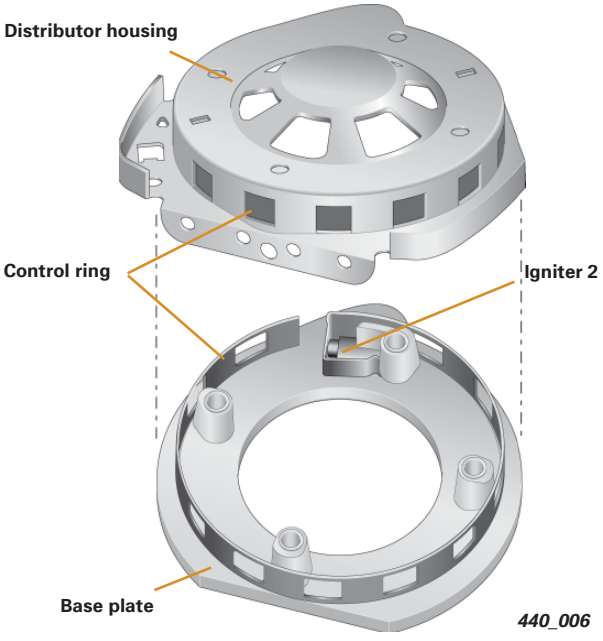
Driver Airbag
Driver Airbag Igniter N95
Driver Airbag Igniter 2 N250

The driver airbag is a single-stage solid fuel generator with an additional external igniter. N95 is activated by Airbag Control Module J234 and fires the ignition charge. The combustion of the ignition charge causes the pressure inside the capsule to increase to the point where the capsule bursts and the propellant charge is ignited through nozzle ports.

If the gas pressure produced by combustion of the propellant charge exceeds a defined value, then the foil opens the vents. The gas is thus free to flow unobstructed through the metal filter to the airbag. The airbag unfolds, and is inflated.



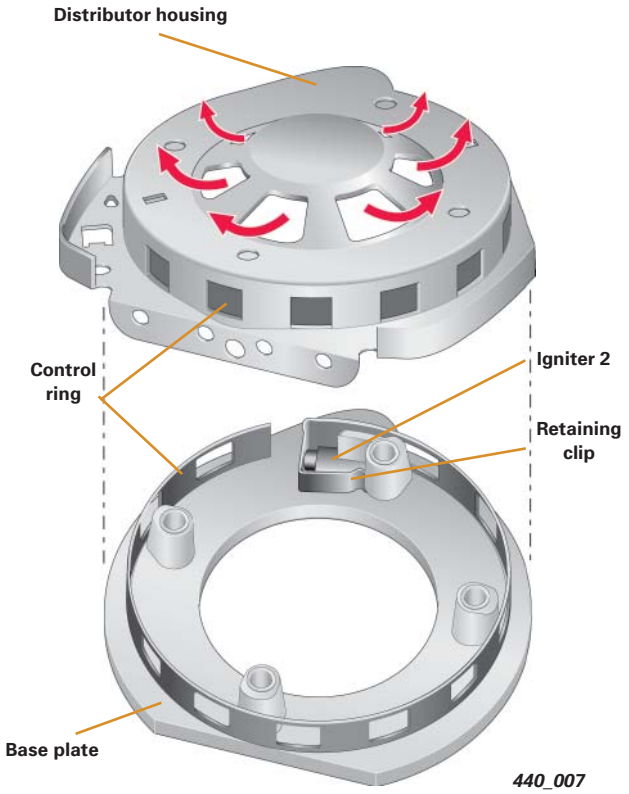
Driver side airbag igniter -2- N250 is located inside the airbag module. It is integrated in a unit consisting of the base plate, a control ring with orifices and the distributor housing.



The additional vents in the distributor housing are kept sealed by the control ring until igniter 2 is activated.

The gas flows directly from the gas generator into the airbag through the upper orifices in the distributor housing.

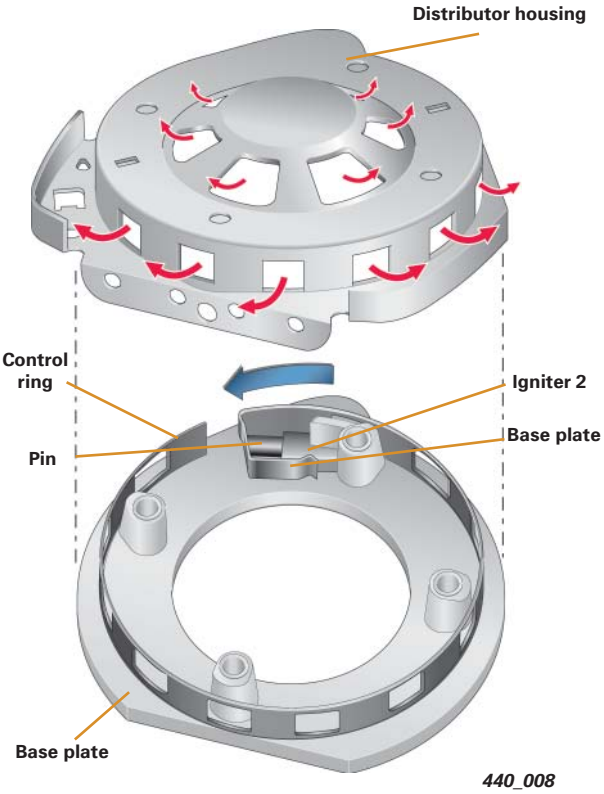
A retaining clip holds the control ring in its rest position. This prevents unwanted rotation of the control ring.



Depending on the severity of the accident and the driver's seat position, the airbag control module determines when igniter 2 N250 is activated. If igniter 2 is fired, the resulting gas pressure displaces a pin, causing the control ring to turn, opening the additional vents in the distributor housing.

Some of the residual gas from the gas generator can now vent directly into the atmosphere. In addition, the gas discharging from the airbag can escape into the atmosphere through the orifices in the distributor housing. As a result, the airbag is not inflated any further and thus "adapted" to the occupants.

The gas generators of the driver airbag module are oscillatingly mounted in a rubber ring (dependent on model). Thus, steering wheel vibration can be minimized.

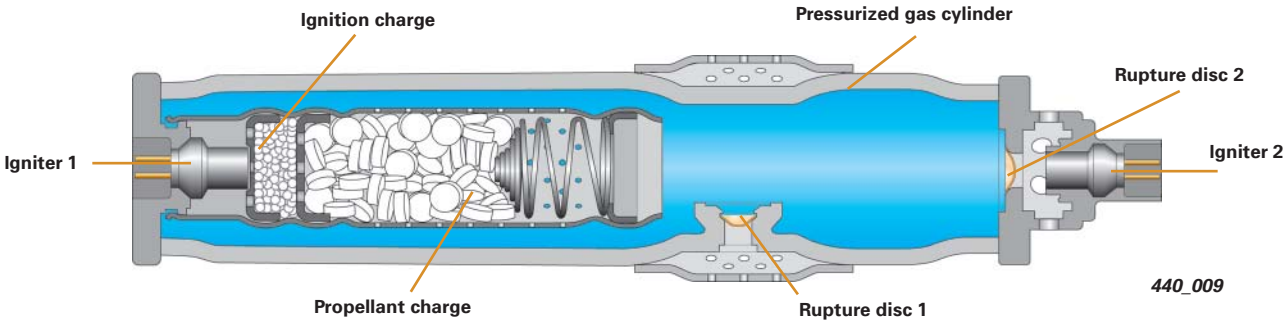


Front Passenger Airbag
Front Passenger Airbag Igniter 1
Front Passenger Airbag Igniter 2

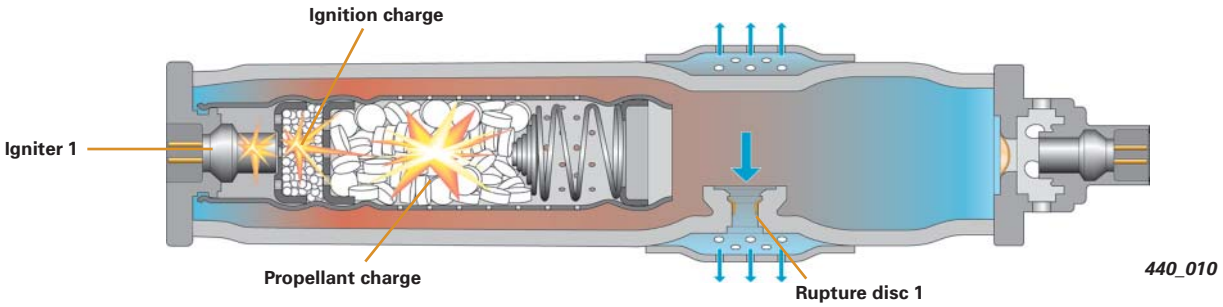
The front passenger airbag is a single-stage hybrid gas generator with a second vent and associated igniter. The pyrotechnic propellant charge, which is activated by the Airbag Control Module, is integrated directly in the pressurized gas bottle.

The pressurised gas bottle is filled with cold gas, a mixture of approx. 95 % argon and approx. 5 % helium pressurized to approx. 400 bar.

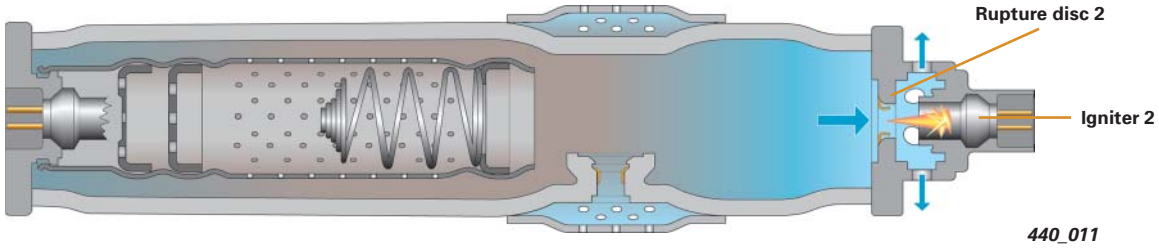
This type of gas generator facilitates varying degrees of inflation of the front passenger airbag.



The ignition charge fired by igniter 1 ignites the actual propellant charge. The pressure inside the pressurized gas bottle increases. If the gas pressure reaches a defined level, rupture disc 1 will burst. The gas mixture inflates and unfolds the airbag.



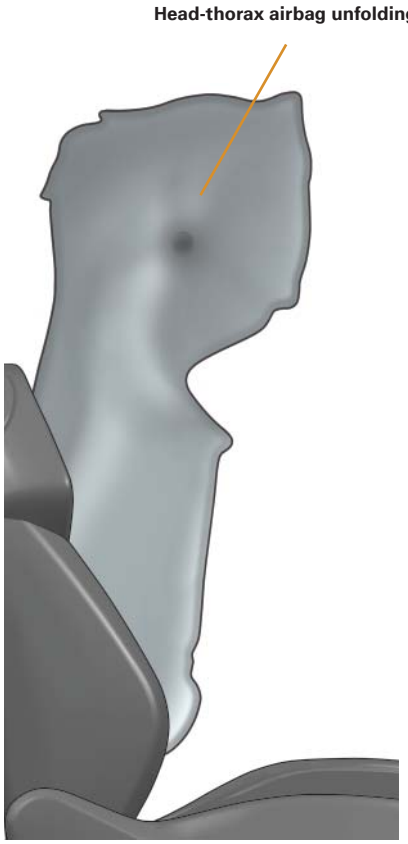
After a defined time elapses, the Airbag Control Module J234 activates igniter 2. Igniter 2 generates a controlled pressure pulse which causes rupture disc 2 to burst. Some of the residual gas discharged from the pressurized gas bottle now dissipates into the atmosphere, and not into the airbag.



Side Airbag
Driver Side Airbag Igniter N199
Front Passenger Side Airbag Igniter N200

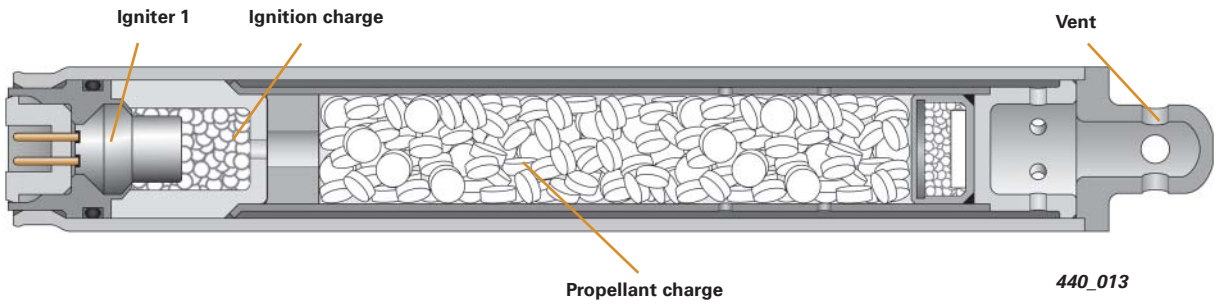
As with other Audi convertible models, head-thorax airbags are used as side airbags in the A5 Cabriolet. The airbag module is integrated in the front seat backrests. This ensures that the airbag is always well positioned in relation to the occupants, irrespective of the seat adjustment.

The airbag's design enables it to protect the occupant's head in addition to the body.



440_012

A pyrotechnic solid fuel generator has the task of inflating the airbag with gas when required. The igniter is activated electrically by the airbag control module, thereby igniting the ignition charge. The ignition charge in turn ignites the actual propellant charge. The evolving gas inflates and unfolds the airbag.



440_013

Belt Tensioners
Driver Seat Belt Tensioner Igniter 1 N153
Front Passenger Seat Belt Tensioner Igniter 1 N154
Left Rear Seat Belt Tensioner Igniter N196
Right Rear Seat Belt Tensioner Igniter N197

All four seats in the A5 Cabriolet are equipped with belt tensioners. The inertia-reel seat belts for the front occupants have band-driven belt tensioners. Ball-type tensioners are used for the rear occupants.

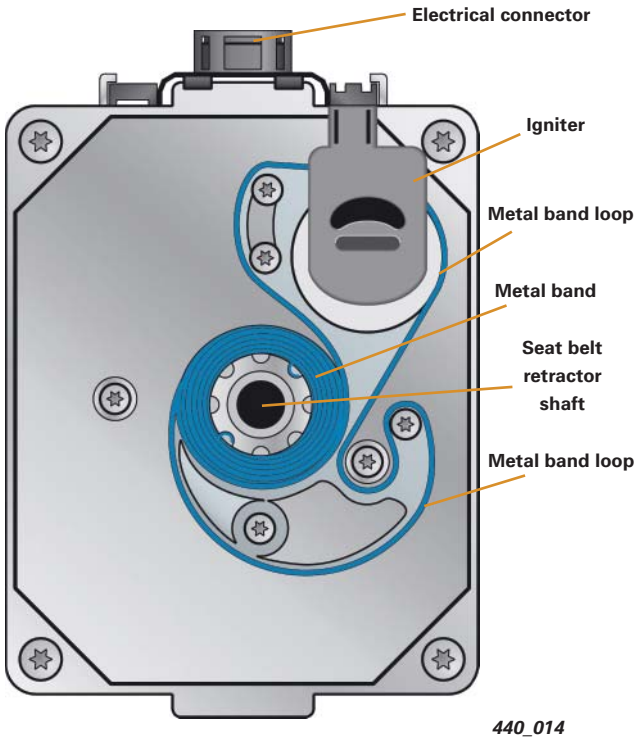
Band-driven belt tensioner

A metal band is wound around the seat belt retractor shaft.

Both open ends are connected to the seat belt retractor shaft. The closed end is looped around the belt tensioner igniter.

If the igniter is fired by the airbag control module, the loop of the metal band is enlarged as a result of the pressure which is produced. The movement of the metal band exerts a pull on the seat belt retractor shaft, which then starts to rotate and tensions the seat belt.

To reduce pressure losses, the housing and the housing cap surface (between which the metal band moves) are coated with a silicone film.



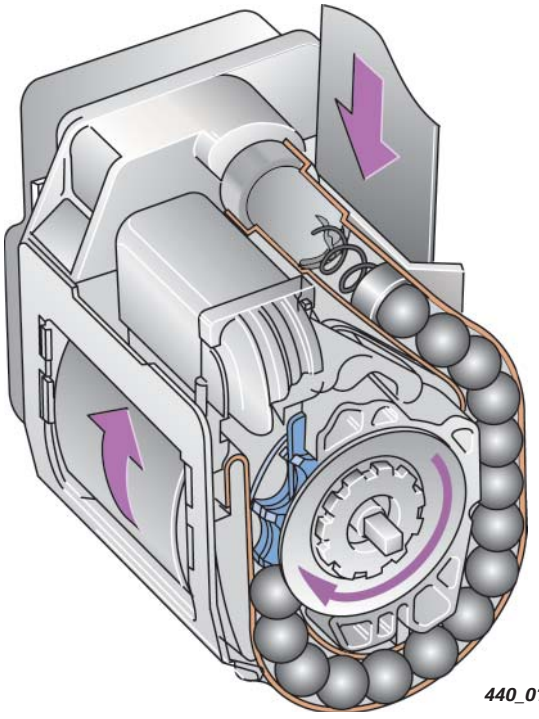
440_014

Ball belt tensioners

The belt tensioner is driven by balls, which run on bearings inside a feed tube. In the event of a crash, the propellant charge is ignited by the airbag control unit.

If the propellant charge is ignited, the expanding gases set the balls in motion and drive them into the ball receptacle via a sprocket.

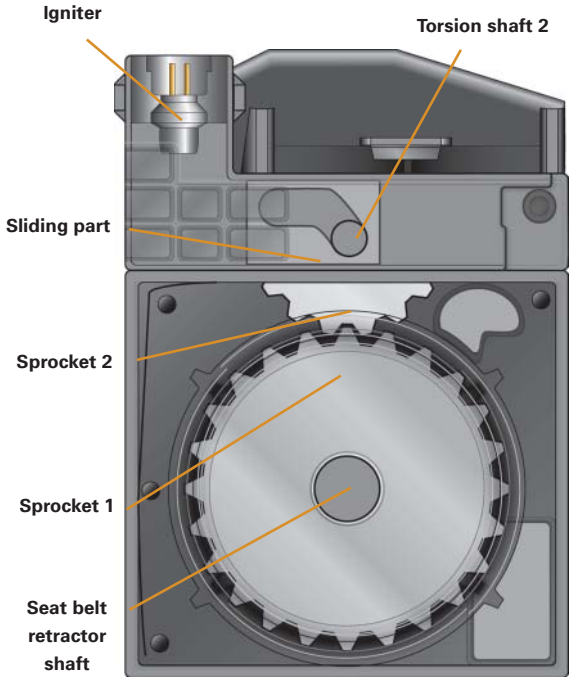
Since the seat belt retractor shaft is permanently connected to the sprocket, the retractor shaft is rotated by the balls and tensions the seat belt.



440_015

Driver Belt Force Limiter G551
Front Passenger Belt Force Limiter G552

The front inertia-reel seat belts have a dual-stage belt force limiter. In the event of a crash, the belt tensioners (band-driven belt tensioners) are ignited first. The belt tensioner retracts the seat belt as far as possible. The inertia-reel seat belt subsequently blocks the seat belt retractor shaft and, thereby, prevents the seat belt from unwinding, which would otherwise occur due to the forward motion of the occupants. If the occupant now moves further forwards due to deceleration, the belt force limiter will allow the seat belt to unwind in a controlled manner when a defined force is exceeded. The seat belt retractor shaft is configured as a torsion shaft and is connected to torsion shaft 2 via sprockets 1 and 2. Both torsion shafts are rotated (high seat belt force).



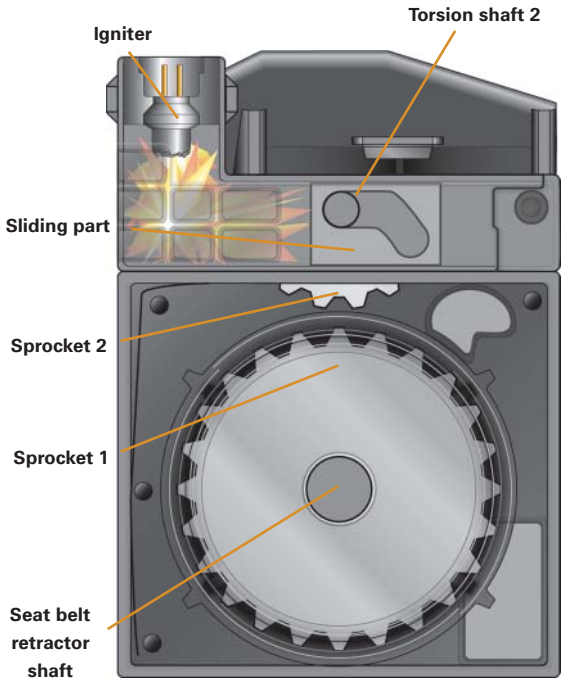
440_016

Depending on the severity of the accident and the driver's seat position, the airbag control module determines when the belt force limiter igniter is activated.

The second torsion shaft is decoupled. The seat belt retractor shaft now counteracts the seat belt unwinding force by itself (low seat belt force).

The belt tensioning functions, the belt force limiter and the front airbags are coordinated with each other to provide the occupants with a high level of protection.

In the event of a side or rear impact, the belt force limiter igniters are not activated.



440_017

Roll-over protection system
Driver Rollover Protection Solenoid N309
Front Passenger Rollover Protection Solenoid N310

To ensure that the occupants are protected even in a roll-over situation, the A5 Cabriolet is equipped with a roll-over protection system. In addition to the body reinforcement measures, the A5 Cabriolet also has an extendable roll-over protection system. In combination with the A-pillars and the activated roll-over protection system, a survival zone is created for the occupants.

The airbag electronics detect an impending roll-over by an additional sensor in the airbag control module. Working in conjunction with other sensors integrated in the control module, the airbag electronics determine the severity of the accident and deploy the roll-over protection system, the battery interrupter and the belt tensioner.

During a head-on or side-on impact with a high level of severity, the roll-over protection system is deployed as a precaution as soon as a belt tensioner or airbag is ignited. In the event of a rear impact, the battery interrupter and the roll-over protection system are activated in addition to the belt tensioners.



440_020

Function

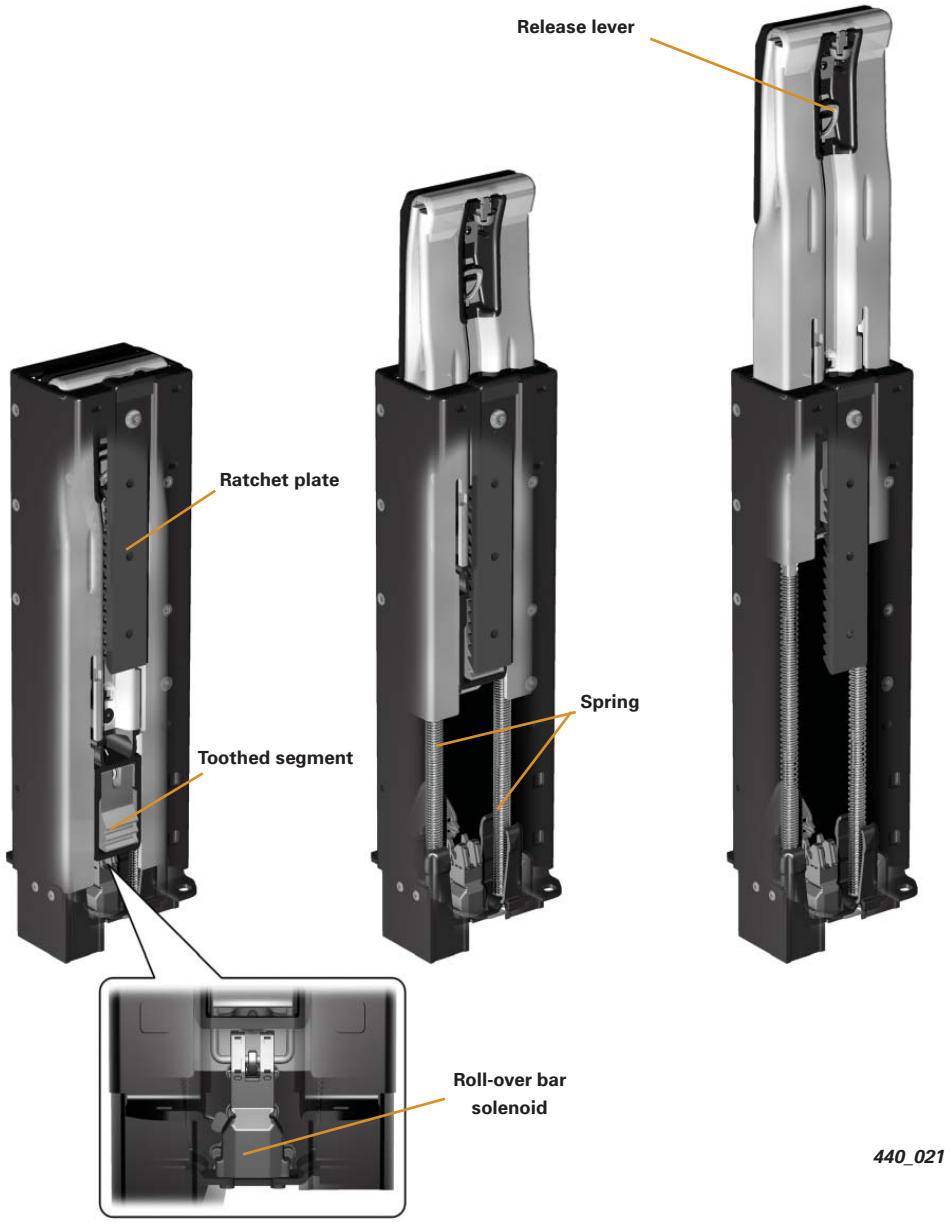
In the rest state, the roll-over bar solenoids N309 and N310 are de-energized and hold the roll-over protection system in the retracted position by means of a hook.

When the Airbag Control Module J234 detects a crash or an impending roll-over, the roll-over bar solenoids are energized and enable the roll-over protection system.

The roll-over protection system is extended within approx. 0.25 seconds by the pre-loaded spring.

After extending only approximately 6.6 in (170 mm), a ratchet plate prevents the roll-bars from being pushed back into their initial position.

An activated roll-over protection system can be released mechanically and returned to its initial position.

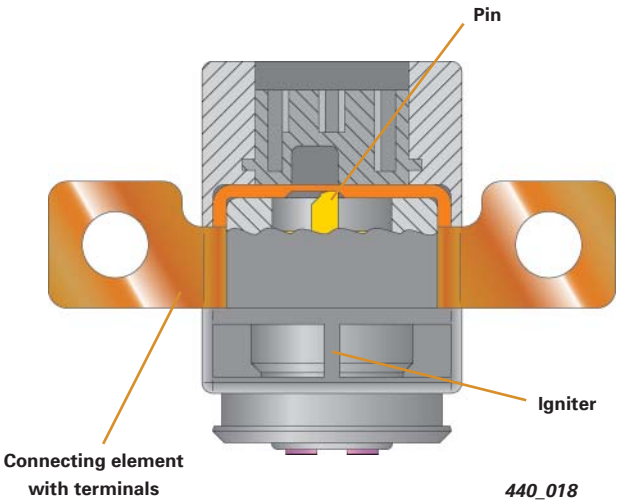


Battery Interrupt Igniter N253

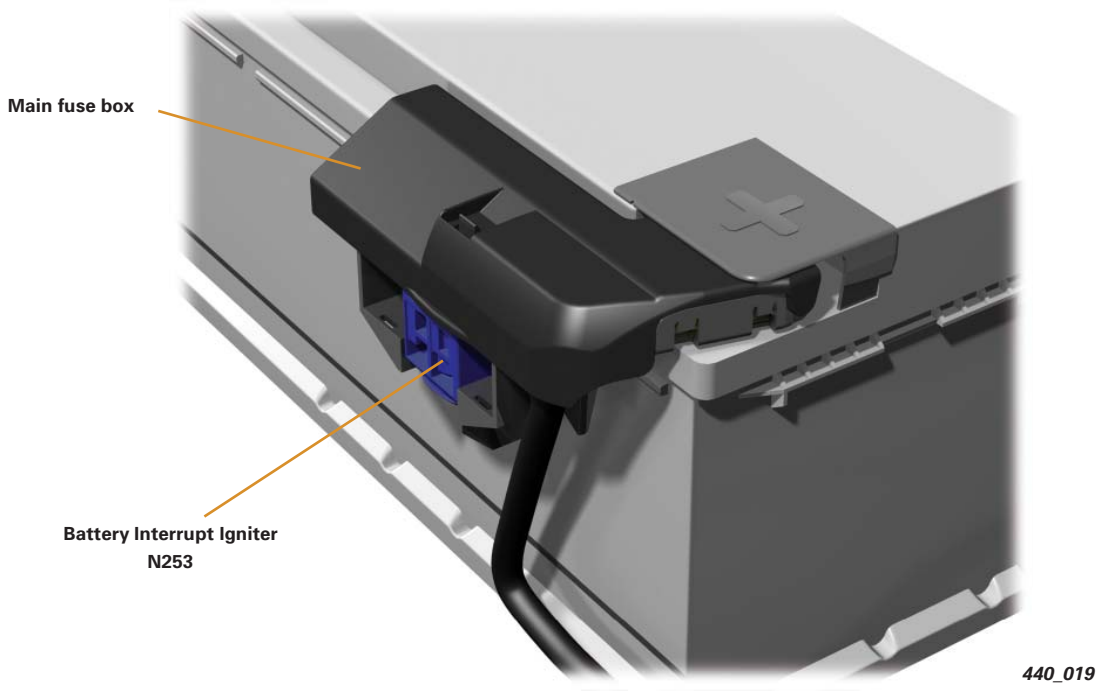
N253 has the task of breaking the connection between the vehicle battery, the starter and the alternator. The remaining onboard power supply is not disconnected from the battery, and therefore remains active.

It is a pyrotechnic component, which must be replaced after it has been activated. Whenever the airbag is deployed by the Airbag Control Module J234 the battery interrupter is automatically ignited as well. In the event of a rear impact, the belt tensioners, the roll-over protection system and the battery interrupter are activated. The battery interrupt igniter is also activated in the event of a roll-over.

If the pyrotechnic propellant charge is ignited, the resulting gas pressure displaces a pin on a piston and breaks the two connections.



The Battery Interrupt Igniter N253 is located in the main fuse box directly at the battery in the luggage compartment of the A5 Cabriolet.



Additional occupant protection systems (for specific markets)

To meet the statutory and specific requirements of several countries, the A5 Cabriolet may be equipped with additional systems.

– Seat occupied recognition sensor, front passenger side

– Knee airbags

– Seat belts with "child seat restraint" function (ALR) on front passenger and rear seats

Passenger Occupancy Detection System (PODS)

The passenger seat occupancy sensor system is also used on other Audi models, such as the Audi Q7. However, the components have been adapted to suit the Audi A5 Cabriolet.

The system essentially comprises the following components:

– Seat upholstery *

– Seat occupancy sensing mat *

– Seat Occupied Recognition Pressure Sensor G452 *

– Seat Occupied Recognition Control Module J706*

– Front Passenger Seat Belt Switch E25

– Seat Occupied Recognition Seat Belt Force Sensor

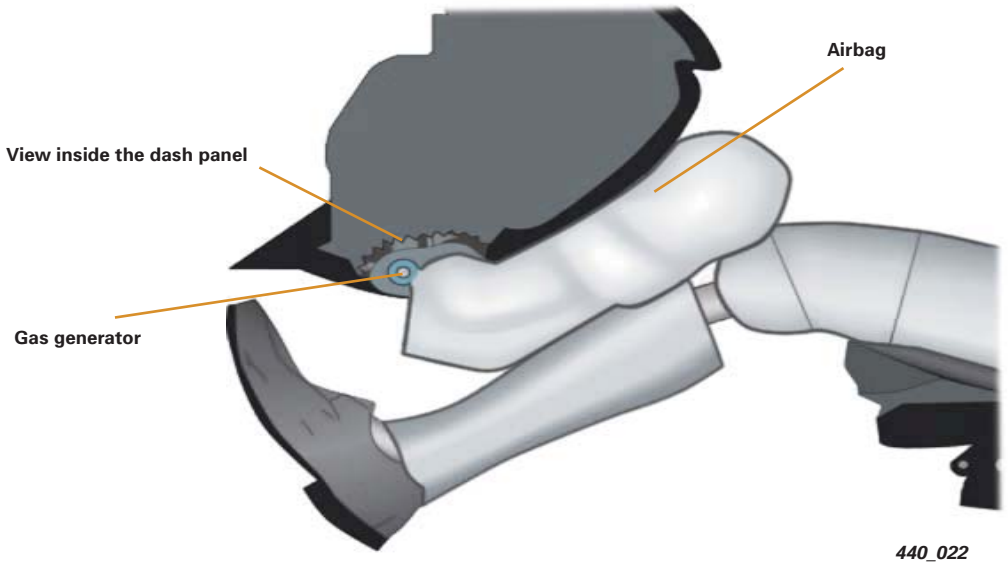
– Front Passenger Airbag Disabled Indicator Lamp K145 (PASSENGER AIRBAG OFF)

* These components are only available as a unit and cannot be ordered separately.

Driver Knee Airbag Igniter N295
Front Passenger Knee Airbag Igniter N296

On the driver side, the knee airbag is integrated in the footwell trim below the dash panel. On the passenger side, the knee airbag is located behind the glove box lid.

Hybrid gas generators are used.



440_022

Automatic Seat Belt Presenter

Introduction

The upper mounting positions of the front safety belts on the Audi A5 Cabriolet are lower and further back than those of the A5 coupe. The seat belts, therefore, are not as easily accessible for the driver or passenger.

To make the seat belts more convenient for the customers, the Automatic Seat Belt Presenter system has been developed. It extends the belt at the correct time and brings it into a position where the driver can easily take hold of the belt.

The system is installed as standard equipment.



440_070

Function of the Automatic Seat Belt Presenter

The seat belt presenter extends if ...

– the seat belt presenter is initially in the “retracted” position

and

– the seat belt is not buckled

and

– the corresponding door (see note 1) is closed and “terminal 15” is switched ON

or

– terminal 15 is switched ON and the corresponding door (see note 1) is closed

Additional condition for extension of the passenger-side seat belt presenter:

The PODS system must detect an occupied seat on the passenger side.

The seat belt presenter normally has an extension distance of approximately 7.8 in (200 mm). However, if the door control module receives a CAN message from the Airbag Control Module that the driver or passenger seat is in the front third of the longitudinal adjustment range, the belt is extended approximately 9.8 in (250 mm).

The seat belt presenter stops extending if ...

– the seat belt presenter has reached the “extended” position

or

– undervoltage or overvoltage is detected

or

– an open circuit, a short circuit or overloading is detected

The seat belt presenter retracts if ...

– the seat belt presenter has been in the “extended” position for 60 seconds

or

– the seat belt is buckled

or

– terminal 15 is switch OFF

or

– the corresponding door is opened

or

– jamming is detected when the seat belt presenter is extending

1) The driver-side seat belt presenter is for the driver’s door and the passenger-side seat belt presenter is for the passenger’s door.

Automatic Seat Belt Presenter

The seat belt presenter stops retracting if ...

– the seat belt presenter has reached the "retracted" position (see note 2)

or

– the mechanical limit stop is reached (see note 3)

or

– under- or overvoltage is detected

or

– an open circuit, a short circuit or overloading is detected

In NAR models, the passenger-side seat belt presenter is always extended if terminal 15 is switched ON when the vehicle doors are closed and the safety belt is not buckled. Outside of North America, this only happens if the seat occupancy sensor detects an occupied passenger seat.

The reason for this is that the North American system takes roughly 5 seconds to detect seat occupancy. The seat occupancy sensor for Rest-of-World models takes only just over a second.

If a vacant passenger seat is detected after 5 seconds have elapsed, and the driver-side seat belt is buckled or the driver door is opened within 5 seconds, then both seat belt presenters retract at the same time.. The driver-side seat belt presenter therefore waits for the passenger seat occupancy sensor and, if the passenger seat is unoccupied, retracts at the same time with the passenger-side seat belt presenter.

If none of the conditions for retracting the driver-side safety belt positioner is met after the 5-second delay has elapsed, and if a vacant front passenger seat is detected, then the passenger-side safety belt positioner waits on the driver-side safety belt positioner and subsequently retracts at the same time with the latter.

2) This is detected by means of a Hall sensor.

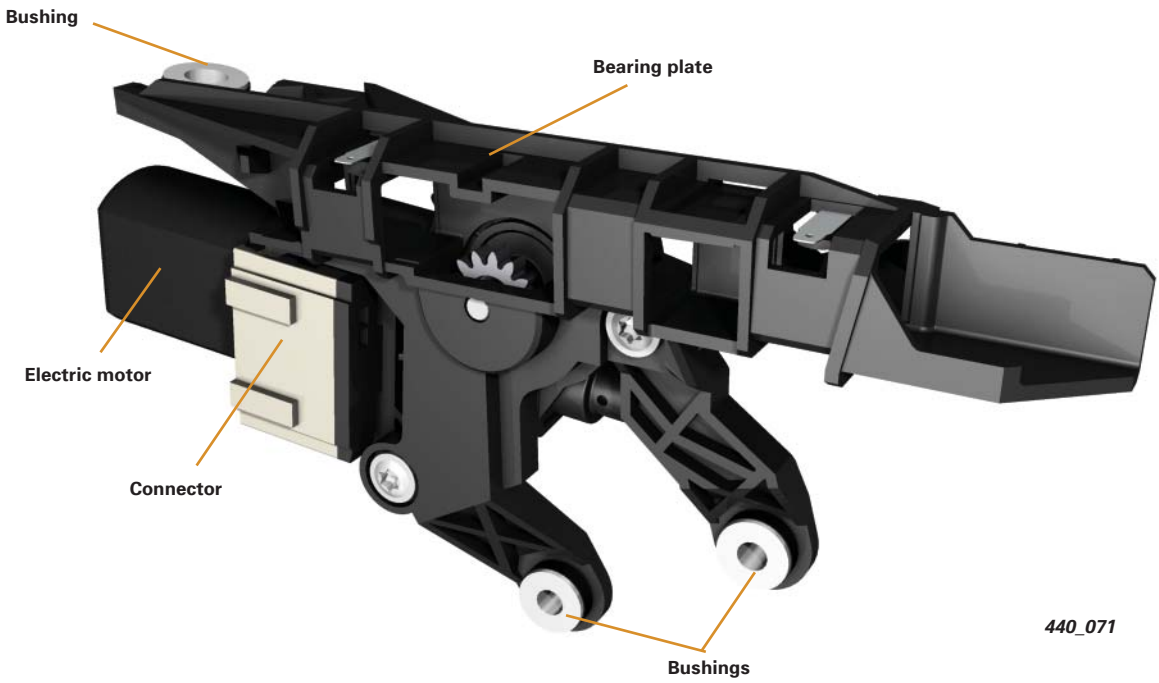
3) This case occurs only if the “retracted” end position is not detected by the Hall sensor.

Design

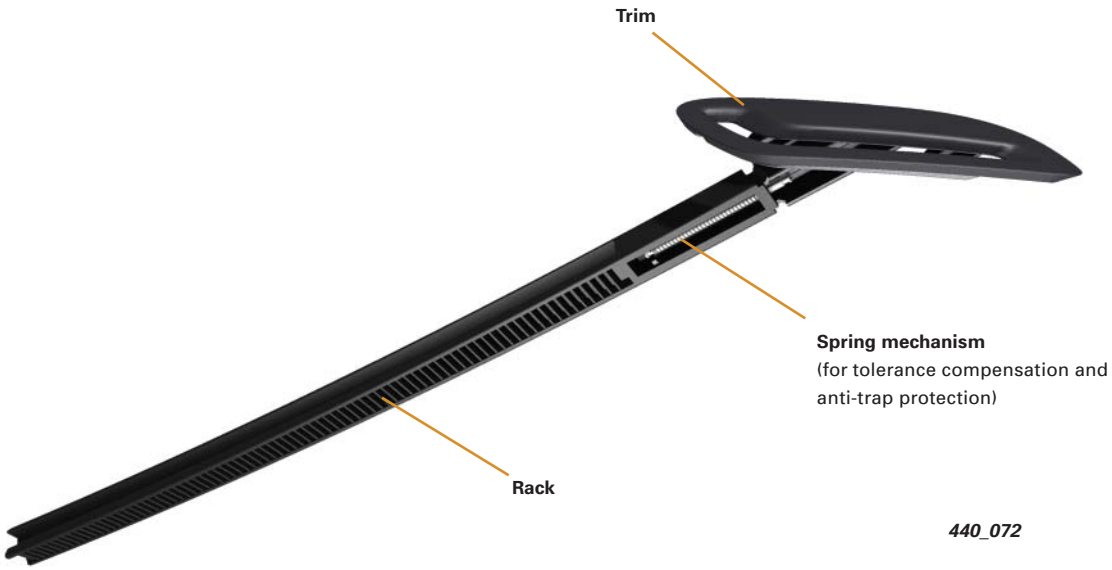
The Automatic Seat Belt Presenter consists of two components, which can be ordered separately:

1) The bearing plate and the drive unit

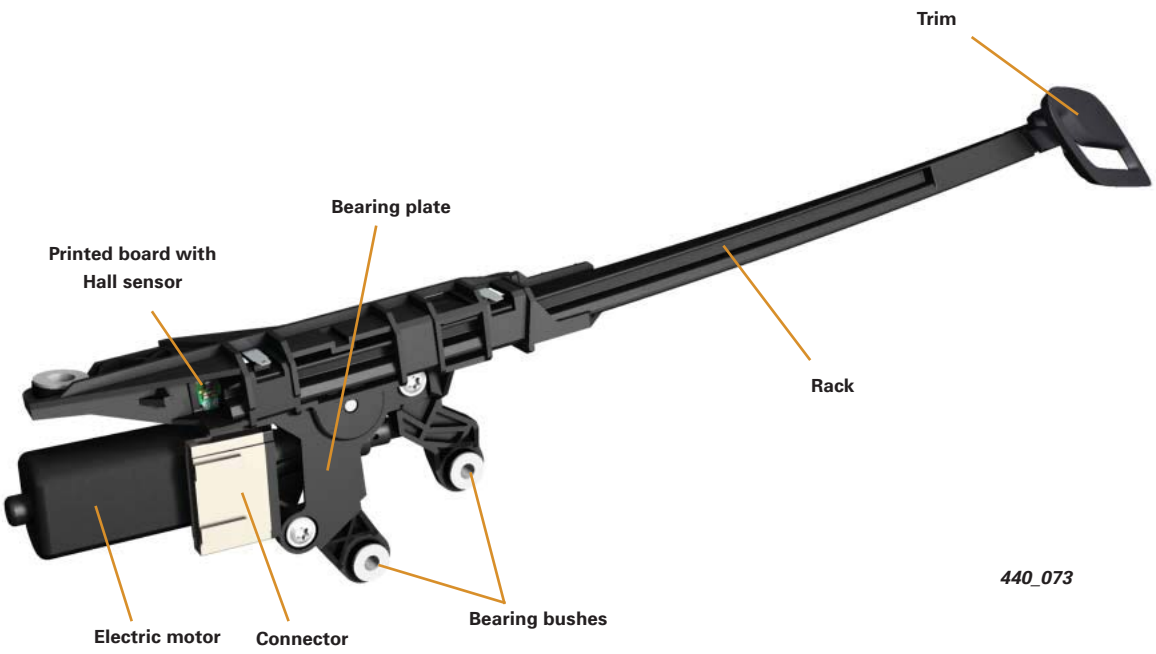
(including bearing bushings, connector and printed board with Hall sensor)



2) The rack and trim



The Automatic Seat Belt Presenter



Mechanical anti-trap protection

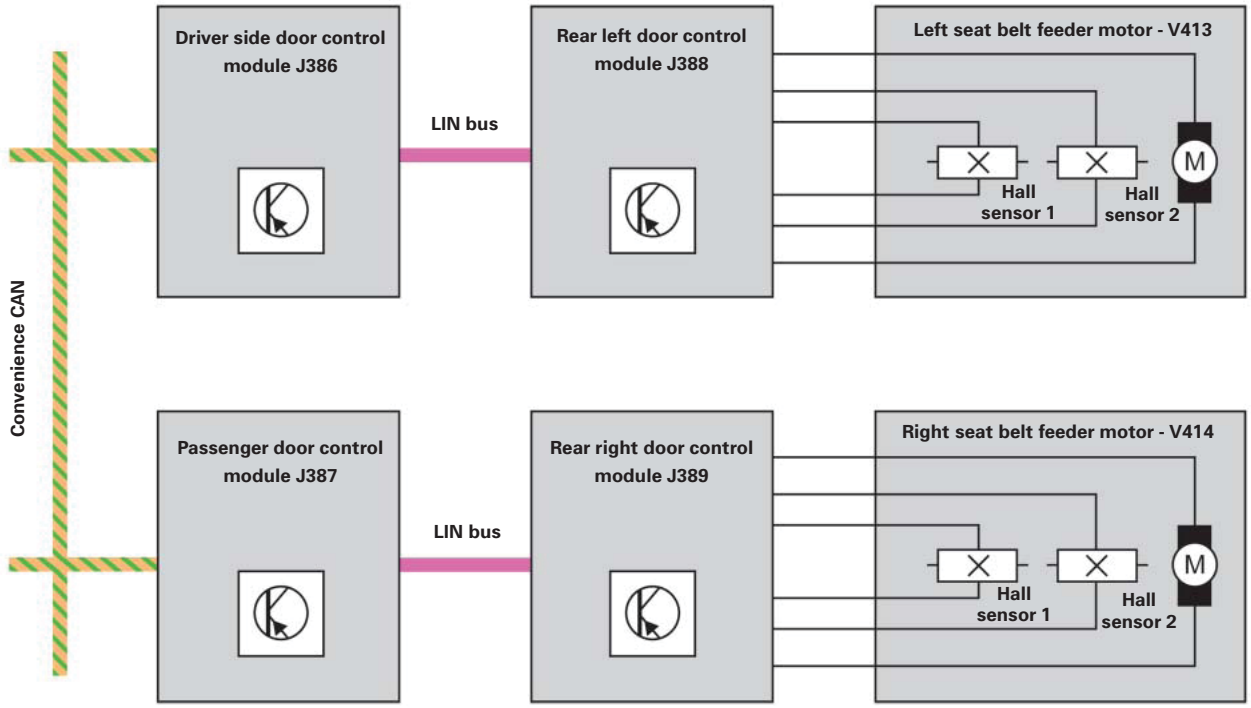
The seat belt feeder trim is connected to the rack by way of a spring mechanism. The mechanism is used as a means of tolerance compensation, and it ensures that the trim is always flush with the interior lining when the seat belt feeder is retracted.

It also serves an anti-trap protection function: If something becomes jammed between the trim and the interior lining while the seat belt feeder is retracting, the trapping forces are reduced to the same level as the spring forces.



Electrical function

In an A5 Cabriolet, four door control modules are always installed even though the vehicle has only two doors. Door control module J386 and J387 are installed in each door. A rear left door control module J388 and a rear right door control module J389 are also installed.



440_075

Door control module J388 and J389 have the following tasks in the A5 Cabriolet:

Left Rear Door Control Module J388

- Activation of the seat belt feeder motor
- Reading in the two Hall sensors of the seat belt feeder

Control module J388 performs the following additional functions:

- Activation of the window regulator motor
- Locking and unlocking the glove box

Right Rear Door Control Module J389

- Activation of the seat belt feeder motor
- Reading in the two Hall sensors of the seat belt feeder

Control module J389 performs the following additional functions:

- Activation of the window regulator motor

Hall sensors in the seat belt presenter motor

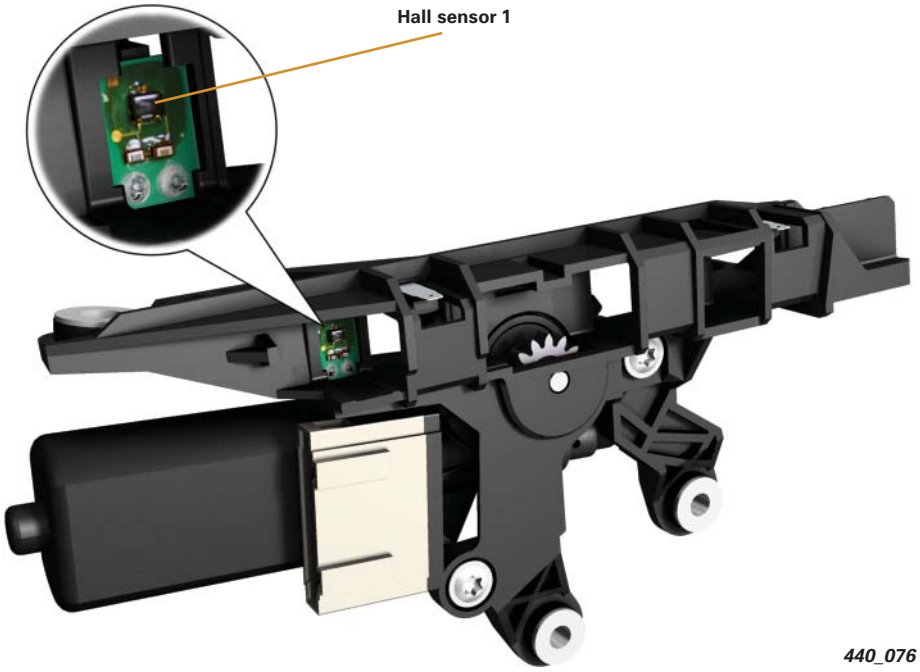
Two Hall sensors are integrated in each safety belt positioner unit.

Hall sensor 1:

Hall sensor 1 changes its output voltage when the seat belt presenter reaches its “retracted” end position during the retract sequence. A permanent magnet is integrated in the seat belt presenter rack. When the seat belt presenter reaches its end position, the magnetic field enters the sensing range of Hall sensor 1 and causes the sensor’s output voltage to change. The door control module responds to the change in output voltage by terminating the retract sequence of the seat belt presenter.

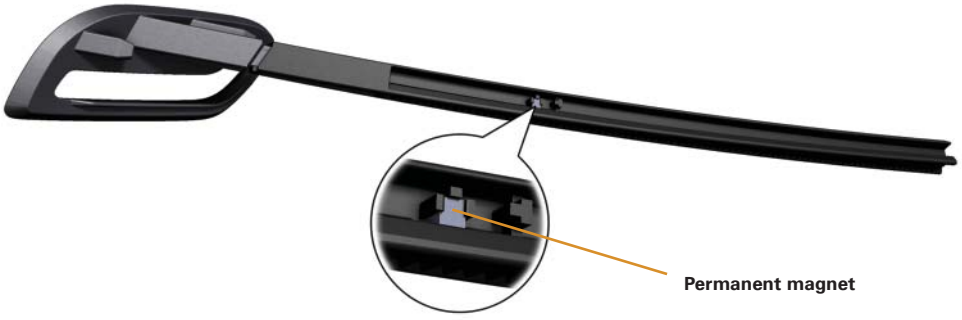
The change in the output voltage of the Hall sensor and the termination of the retract sequence take place before the seat belt presenter reaches its mechanical limit stop.

Safety belt positioner bearing plate



440_076

Safety belt positioner rack



440_082

Hall sensor 2

Hall sensor 2 is located directly inside the drive unit. When the seat belt presenter motor is turning, electrical signals are generated in Hall sensor 2 and evaluated by the corresponding door control module. From these signals, the door control module can determine the number of motor revolutions, and thereby locate the current position of the safety belt positioner. In this way, it is possible to determine when the seat belt presenter is in its “extended” end position.

The signals can also be used to detect a trapping situation. If Hall sensor 2 does not output a minimum number of electrical signals per unit of time during the extension cycle, a trapping situation is assumed.

The system responds to a trapping situation by retracting the seat belt presenter.

Diagnosis

Data blocks:

A data block is available in the rear door control module for the operation of the Automatic Seat Belt Presenter.

Adaptation:

No adaptation functions are available for the Electric Seat Belt Presenter.

Actuator diagnostics:

The seat belt presenter can be extended and retracted by using the actuator diagnostics function.

Coding (control modules in the A5 Cabriolet can only be coded using SVM):

The function can be activated or deactivated by coding the door control module accordingly. The coding also defines whether the seat belt presenter operates according to North American Region (NAR) or Rest Of World (ROW) specifications.

Basic setting:

No basic setting is necessary for the Automatic Seat Belt Presenter.

Neck level heaters on the Audi A5 Cabriolet

Neck heaters are optional with the Audi A5 Cabriolet for the front seats. Sports seats can also be ordered with a neck heater as an option.

Neck level heaters are currently unavailable in combination with standard seats.

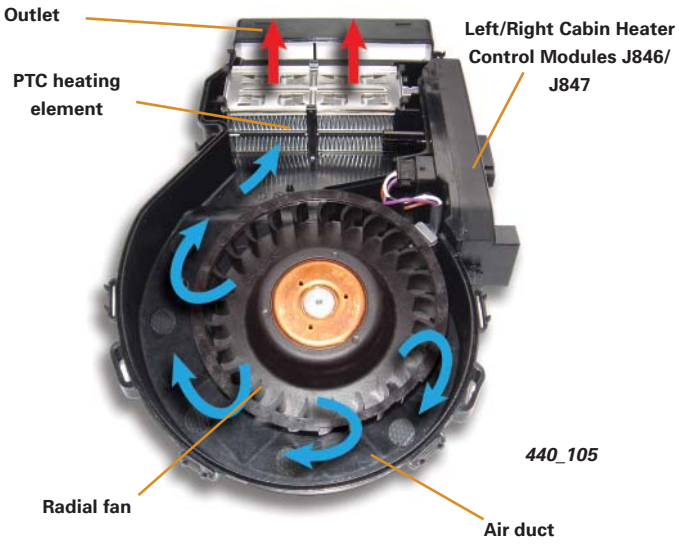
The neck level heaters have outlets at the top of the seat backrests which provide a flow of warm air directly to the head, neck and shoulders of both the driver and front passenger.

Furthermore, when the engine is running, the neck level heaters can be activated whether the convertible top is open or closed.

The neck level heater modules are mounted directly to the seat backrest frame. The modules consist of a fan, air duct, PTC heating element and outlet.



440_093



440_105

Note

The neck level heater control module for the driver and passenger seats are identical and are assigned according to the PIN assignments in the wiring harness.

The neck level heater can be operated using Left/Right Cabin Heater Switches E678/E679. These switches are located at the front on the outer seat lining, below the seat bolster. Three different settings can be selected with this switch.

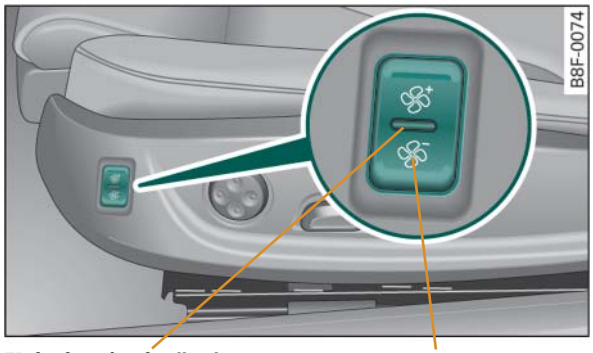
The neck level heater is activated by moving the switch up. Setting 3 is activated automatically directly after being switched on.

The lower settings are activated automatically in the order 3-2-1-0 by moving the switch down.

An LED in the switch indicates that the neck heater is activated.

Operating the neck level heater - the neck level heater can be activated and deactivated when the ignition is “on” (= terminal 15 ON). An LED provides feedback when the neck heater is switched on.

Activating the neck level heater - Left/Right Cabin Heater Fans V450 / V451 and the PTC element in the Left/Right Cabin Heater Control Modules J846 / J847 are only switched on when the engine is running.



440_094

Reference

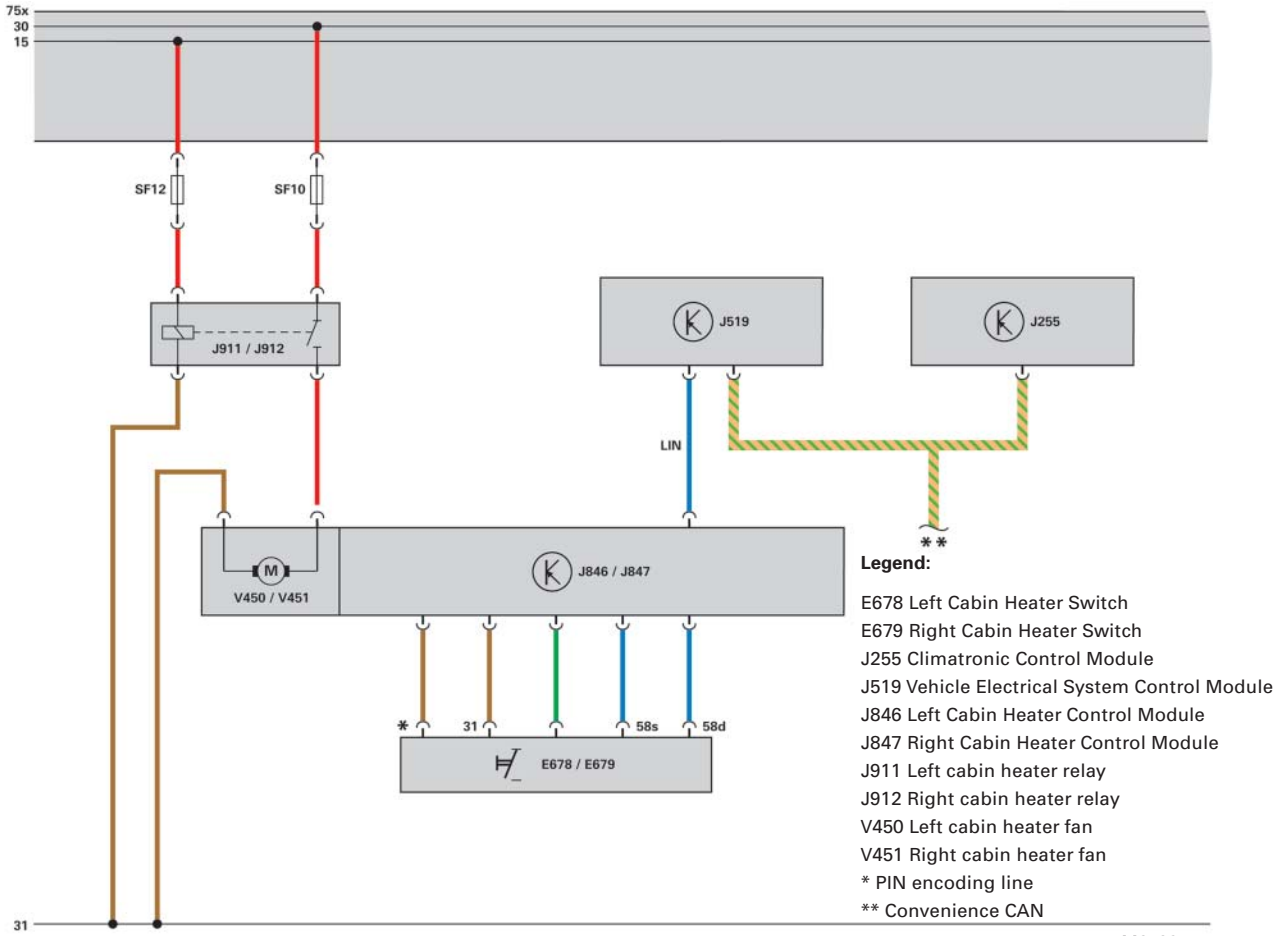
The air conditioning system of the A5 cabriolet is based on the A5 coupe.

For more information, please refer to Self-Study Program 997703, The 2008 Audi A5/S5 Vehicle Introduction

Vehicle integration of the neck level heaters

With a power draw of 20A per front seat module, the neck level heaters are high power consumers. For this reason, they can only be activated when the engine is running. Furthermore, Left/Right Cabin Heater Control Modules J846/ J847 must be power-enabled by the Climatronic Control Module J255 when the engine is running.

If the in-car power level drops to a critical level and no power enable has been issued by the Climatronic Control Module J255, then the neck level heater is deactivated. The LED comes on and indicates that the neck level heater has been switched on by the occupant, but nevertheless the Left/Right Cabin Heater Fans V450 / V451 remain deactivated.



440_095

Neck level heater performance data

The output of the neck heater varies according to convertible top status: when the convertible top is closed, output is reduced in each heater setting.

Heating output and fan speed are limited in each selected comfort setting; maximum output is 250 W per seat module.

Status: Engine running and convertible top open:

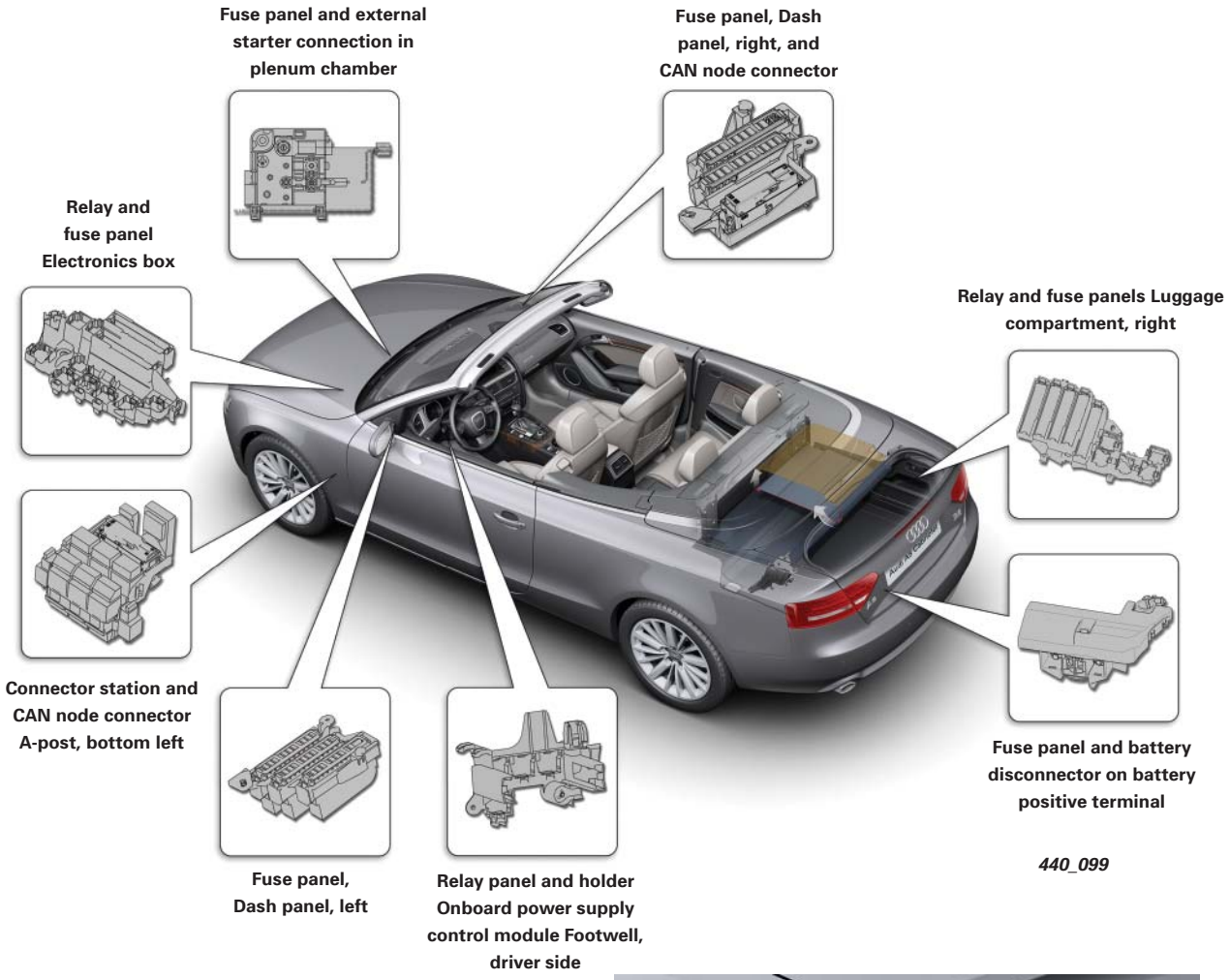
Comfort Setting	Heating Output	Fan Speed
Setting 1	100 W	1700 rpm
Setting 2	150 W	2200 rpm
Setting 3	250 W	2750 rpm

Status: Engine running and convertible top closed:

Comfort Setting	Heating Output	Fan Speed
Setting 1	43 W	1700 rpm
Setting 2	72 W	1900 rpm
Setting 3	100 W	2100 rpm

Fuses and relays

The electrical system of the A5 Cabriolet is basically the same as that of the 2009 Audi A4. This also applies to the installation locations of the fuseboxes and relay panels, the CAN node connectors and the control modules. The information regarding the gateway, battery monitor control module, alternator and external starter connection can also be taken from the 2009 Audi A4.



440_099

The outside lights of the A5 Cabriolet are identical to those of the A5 models. With the launch of the A5 Cabriolet, an additional LED variant is available for the rear lights.



440_096

Reference

For more information, please refer to Self-Study Program 99A703, The 2008 Audi A5/S5 Networking

Audi drive select

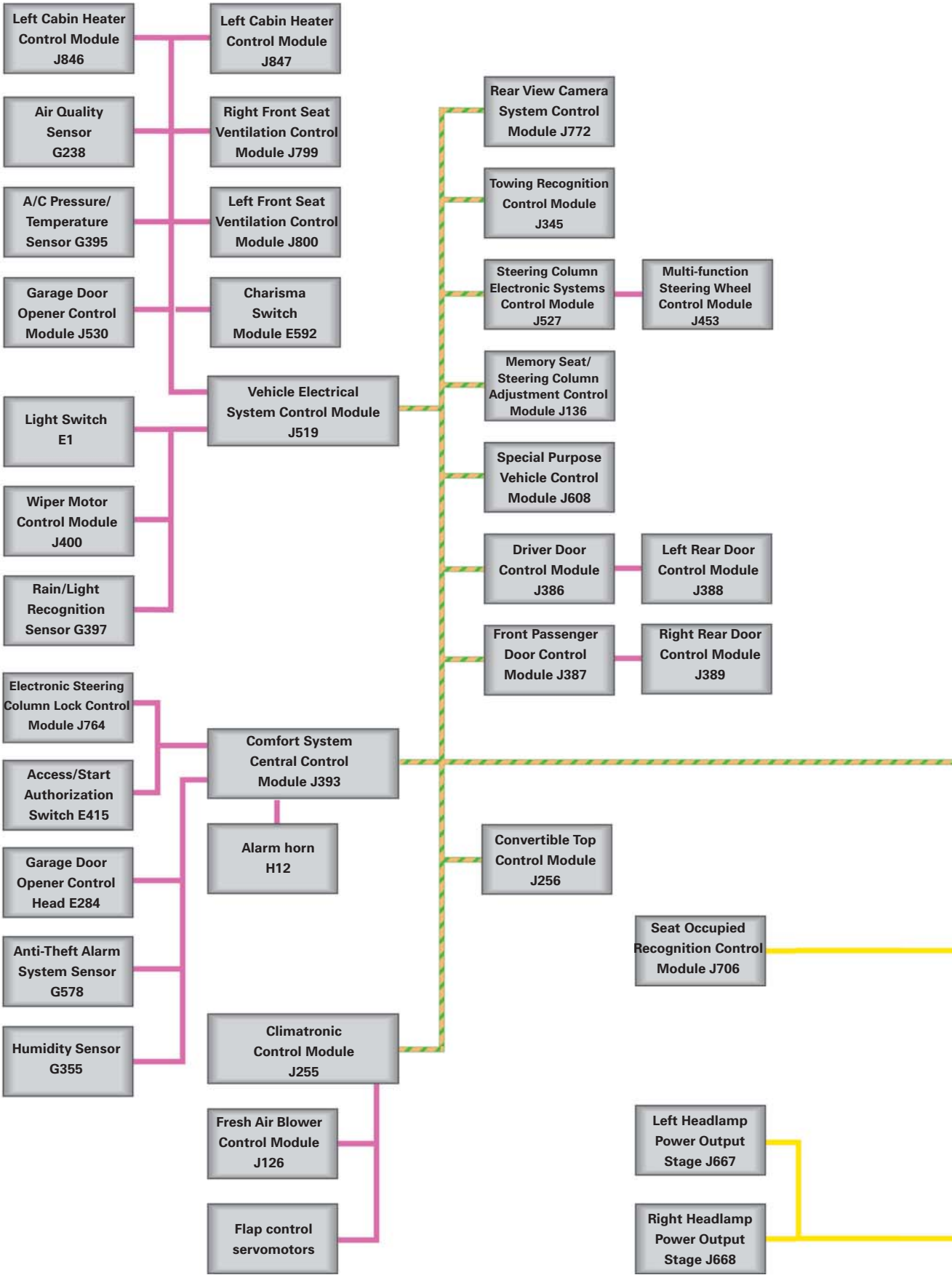
Like the Audi A5 and the 2009 A4, the A5 Cabriolet can be equipped with the innovative Audi drive select system, which is available as an option. Until now, systems such as the automatic transmission or damping control system could only be adjusted in the “Sport” setting.
Audi drive select provides one-touch reconfiguration of multiple systems: the engine, the automatic transmission, the damping control system, servotronic, the dynamic steering system and the sport differential. In this way, the car’s characteristics can be adapted entirely to personal preference. The behavior of these systems is controlled electronically and can be adjusted from comfortable to dynamic.
Audi drive select is also referred to internally and in the service literature as “Charisma”. The central element of the system is the Charisma switch module E592, which reads in the driver’s input and transfers this information to the Vehicle Electrical System Control Module J519.

Reference

For more information on the Audi drive select system, please refer to Self-Study Program 991803, the 2009 Audi A4 Vehicle Introduction.

	COMFORT	AUTO	DYNAMIC
Engine 	normal	normal	Sport mode
Automatic Transmission 	normal as usual in selector lever position “D”	normal as usual in selector lever position “D”	Sport program
Servotronic 	easy action	normal	firm
Dynamic Steering 	comfortable and indirect	sporty and direct	sporty and firm
Damping control system 	comfortable and soft	normal and sporty	firm
Sport differential 	low	medium	high

Networking - vehicles with infotainment CAN

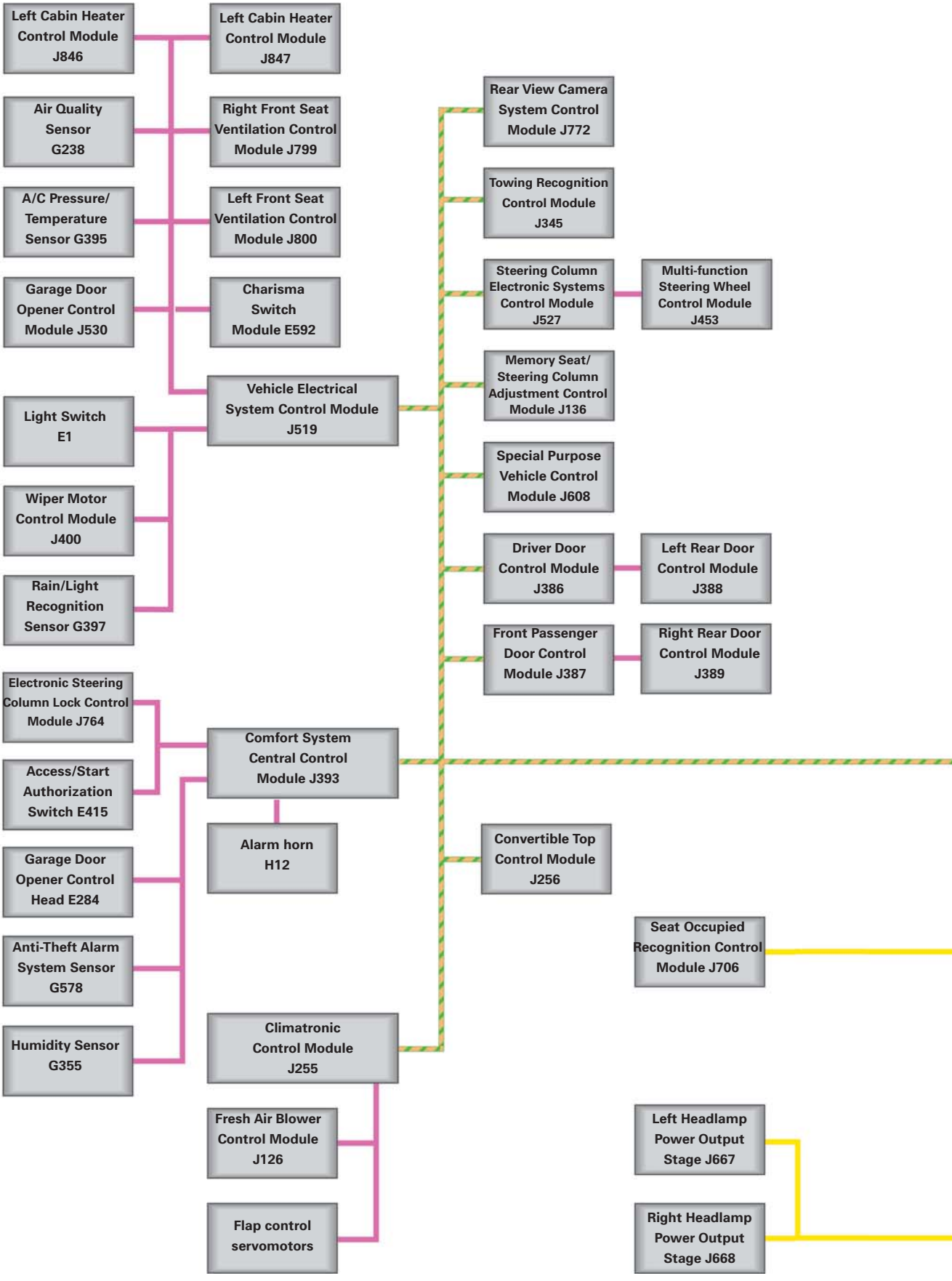


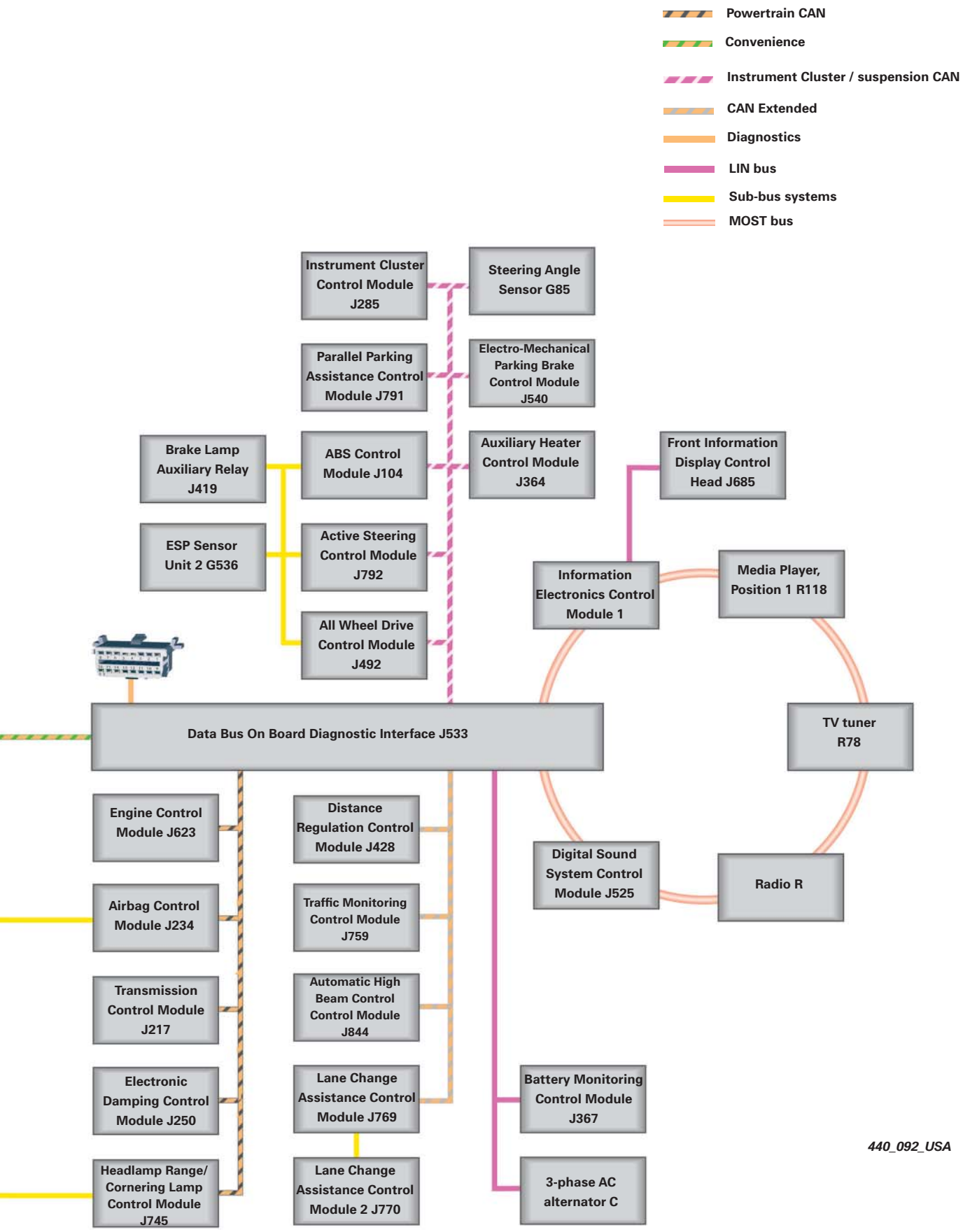


440_098

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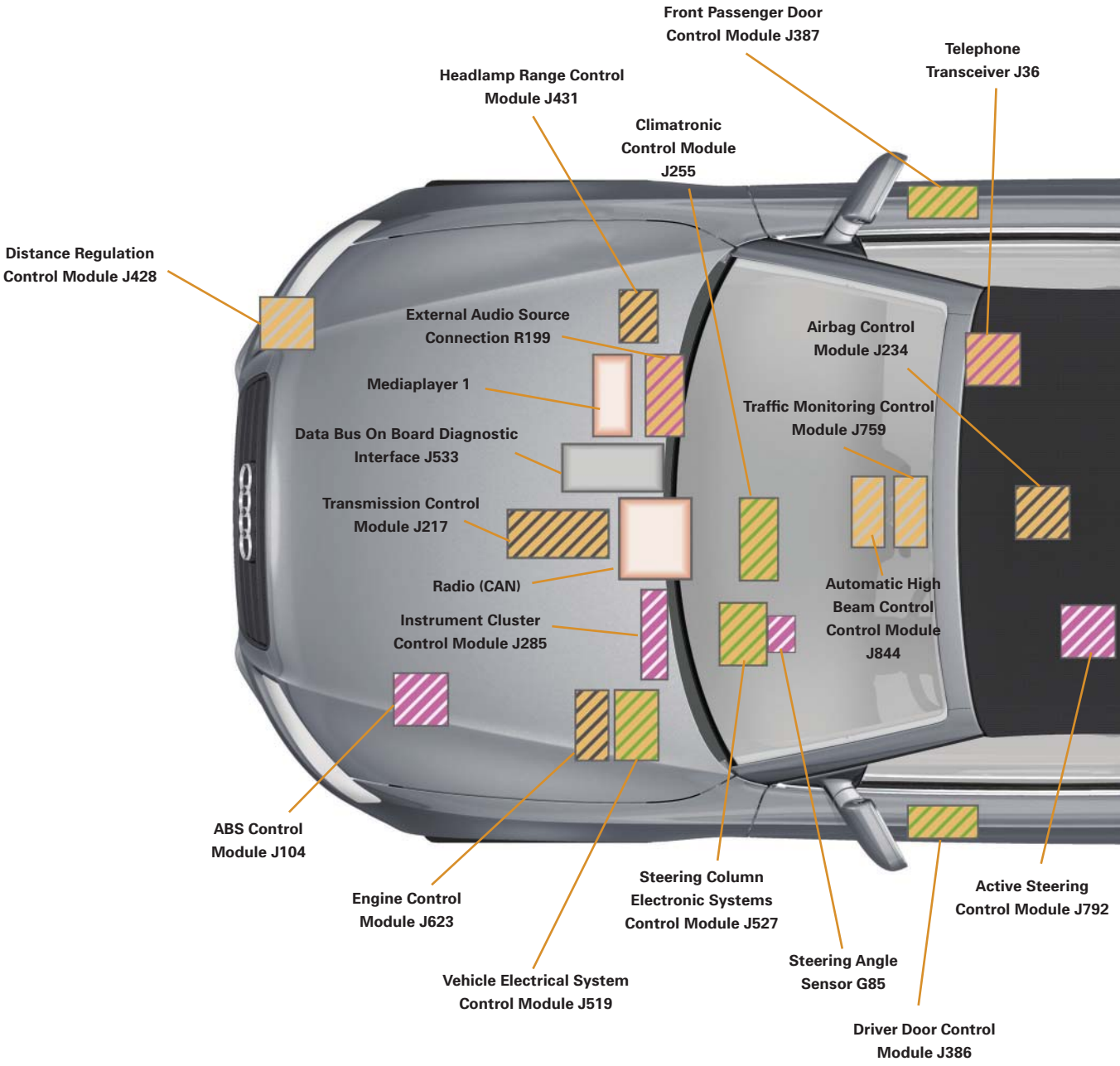
Networking - vehicles with MOST bus



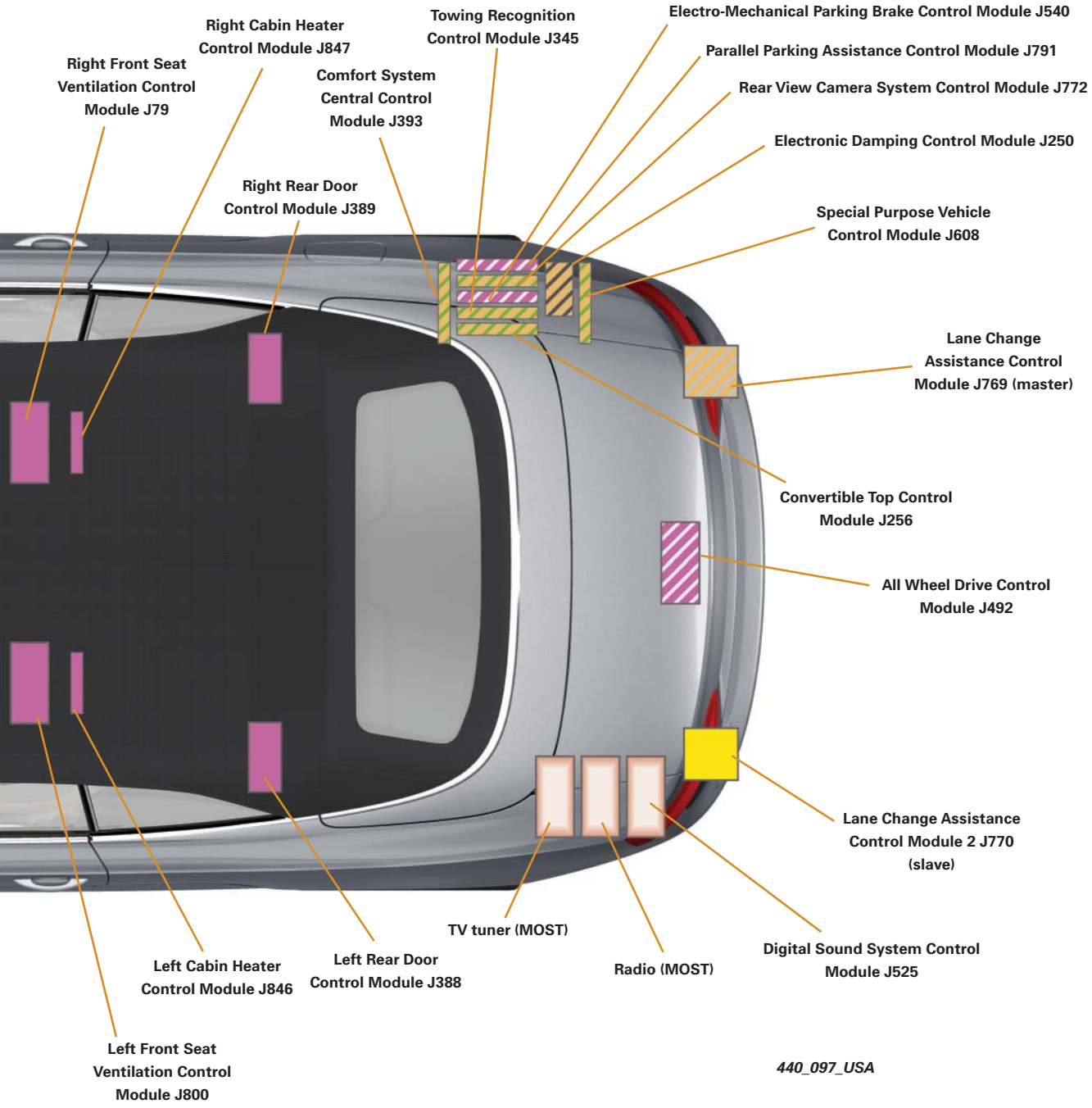

Powertrain CAN
Convenience
Instrument Cluster / suspension CAN
CAN Extended
Diagnostics
LIN bus
Sub-bus systems
MOST bus
Instrument Cluster Control Module J285
Steering Angle Sensor G85
Parallel Parking Assistance Control Module J791
Electro-Mechanical Parking Brake Control Module J540
Brake Lamp Auxiliary Relay J419
ABS Control Module J104
Auxiliary Heater Control Module J364
Front Information Display Control Head J685
ESP Sensor Unit 2 G536
Active Steering Control Module J792
Information Electronics Control Module 1
Media Player, Position 1 R118
All Wheel Drive Control Module J492
Data Bus On Board Diagnostic Interface J533
TV tuner R78
Engine Control Module J623
Distance Regulation Control Module J428
Digital Sound System Control Module J525
Radio R
Airbag Control Module J234
Traffic Monitoring Control Module J759
Transmission Control Module J217
Automatic High Beam Control Control Module J844
Electronic Damping Control Module J250
Lane Change Assistance Control Module J769
Battery Monitoring Control Module J367
Headlamp Range/ Cornering Lamp Control Module J745
Lane Change Assistance Control Module 2 J770
3-phase AC alternator C

440_092_USA

Installation overview - control modules



- Powertrain CAN user
- Convenience user
- Instrument Cluster / suspension CAN user
- CAN Extended user
- LIN bus user
- Sub-bus systems user
- MOST bus user


Right Front Seat Ventilation Control Module J79
Right Cabin Heater Control Module J847
Comfort System Central Control Module J393
Towing Recognition Control Module J345
Electro-Mechanical Parking Brake Control Module J540
Parallel Parking Assistance Control Module J791
Rear View Camera System Control Module J772
Electronic Damping Control Module J250
Right Rear Door Control Module J389
Special Purpose Vehicle Control Module J608
Lane Change Assistance Control Module J769 (master)
Convertible Top Control Module J256
All Wheel Drive Control Module J492
Lane Change Assistance Control Module 2 J770 (slave)
Digital Sound System Control Module J525
Radio (MOST)
TV tuner (MOST)
Left Rear Door Control Module J388
Left Cabin Heater Control Module J846
Left Front Seat Ventilation Control Module J800

440_097_USA

Radio and navigation systems

The Audi A5 Cabriolet is equipped as standard with the chorus radio system. The concert and symphony systems are optional.

Reference



For further information about the Radio systems refer to Self-Study Program 997703, The 2008 Audi A5/S5 Vehicle Introduction.

If a navigation system is ordered, the customer can choose between the MMI Navigation system and the MMI Navigation plus system. This is a 3rd generation MMI system.

Reference



For more information about the 3rd generation MMI system, please refer to Self-Study Program 994803, The 2009 Audi Q5 Vehicle Introduction.

Since proper speech recognition is not possible in a Cabriolet when the convertible top is down, the 3rd generation MMI system (MMI Navigation Plus) in the Audi A5 Cabriolet does not have telephone speech control or a speech dialogue system.

Antenna system

Most of the antenna's in the A5 Cabriolet are installed in the convertible top box lid. Dependent on trim level, two or five printed conductors are integrated in the antenna foil.

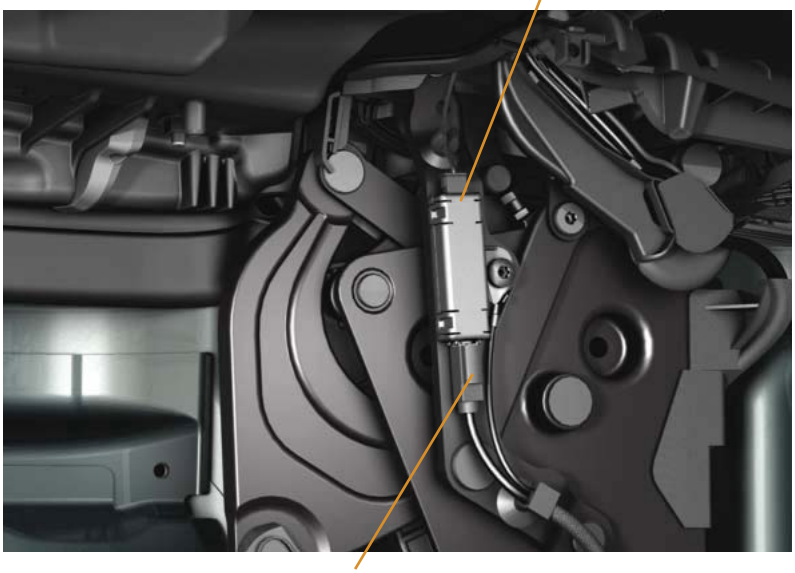
An additional antenna is housed in the convertible top frame. The trim moulding on the convertible top box itself also serves as an antenna.

To ensure equally good AM reception in the Audi A5 Cabriolet when the convertible top is up or down, two antennas are used for AM reception. The signals from both AM antennas are pooled in the antenna amplifier R24 and relayed to radio R via the AM/FM1 output.

Left antenna module

The left antenna module R108 is located on the left convertible top frame. It amplifies the signals from the AM2 antenna and relays them to antenna amplifier R24.

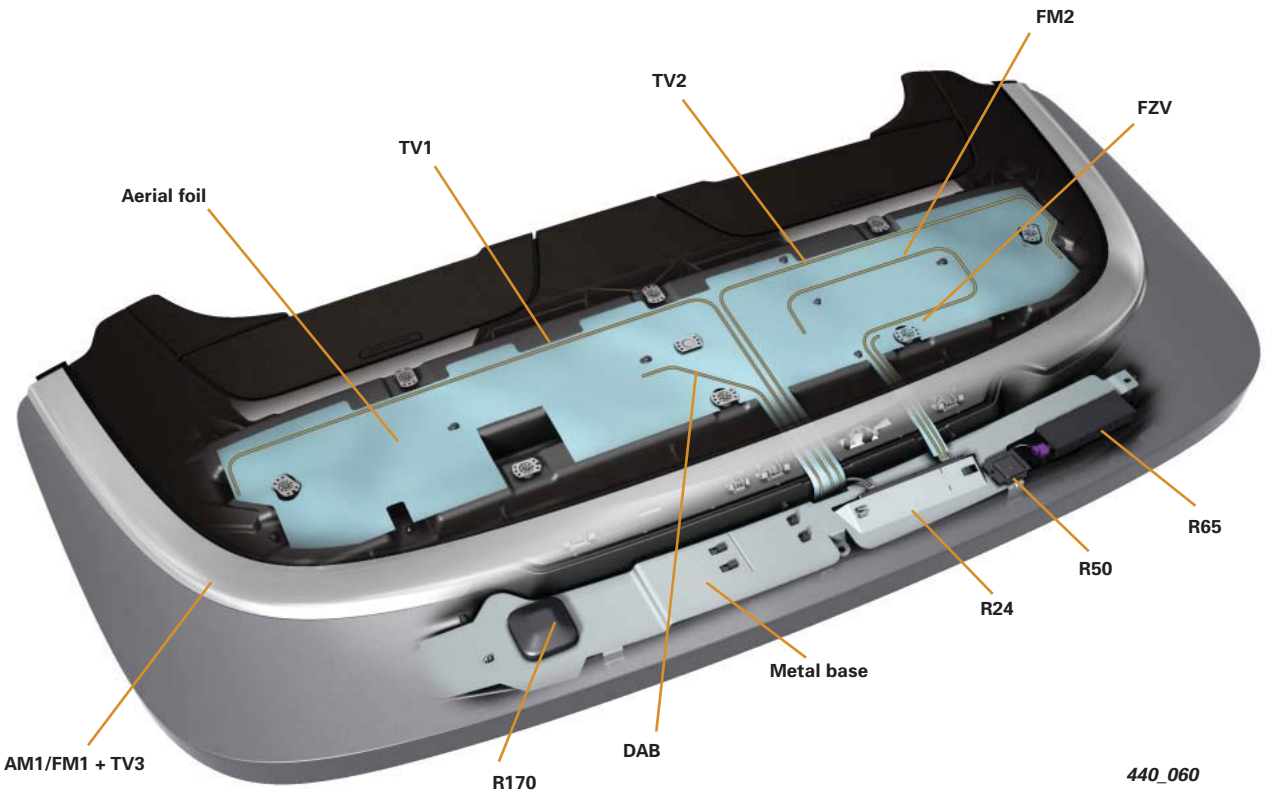
Antenna wire AM2 is routed transversely to the right in the convertible top frame (see Fig. 440_061 on page 81).



440_059

Top view of convertible top box lid

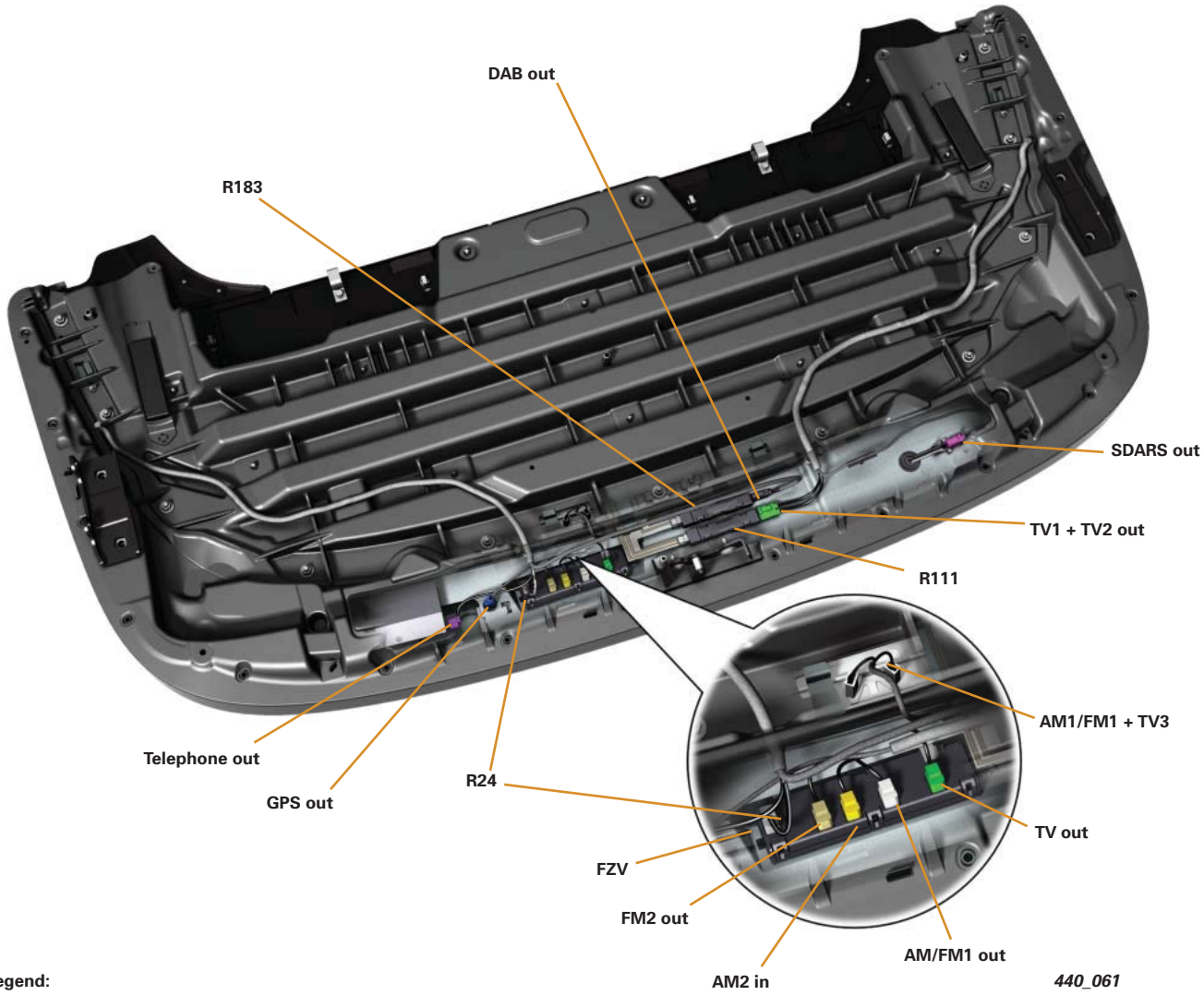
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Note

If the Audi A5 Cabriolet is not equipped with a TV or DAB tuner, the fitted antenna foil is smaller. Only the FM2 and CLS antennas are present on the foil.

Bottom view of convertible top box lid



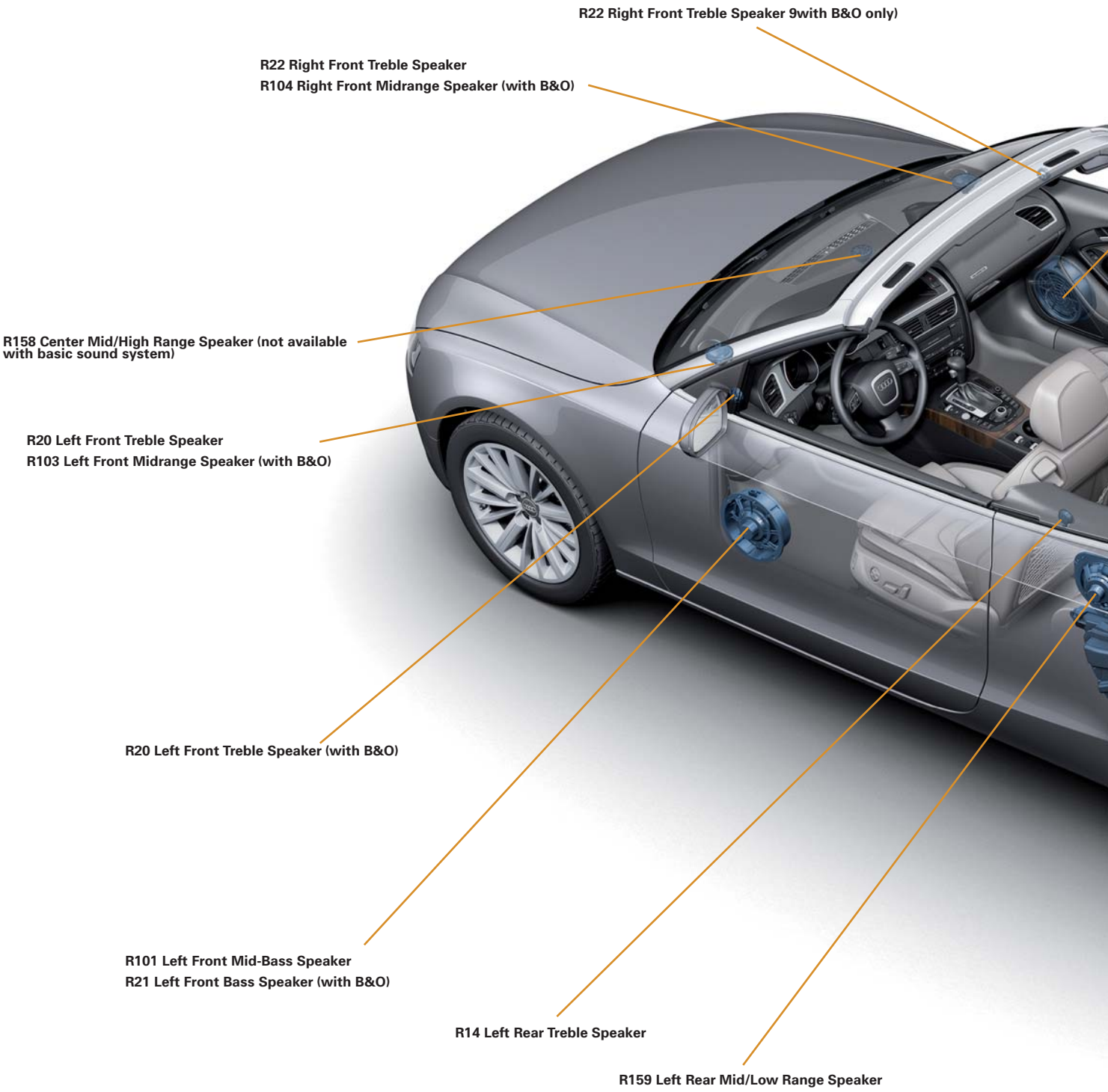
Legend:

FZV	Central locking antenna
R24	Antenna amplifier
R50	Navigation system antenna (GPS)
R65	Telephone antenna
R108	Left antenna module
R111	Antenna amplifier -2-
R170	Satellite antenna (SDARS)
R183	Digital radio antenna
R222	Radio and TV antenna
in	Amplifier input
out	Output from aerial/amplifier to terminal equipment

Overview of the sound systems

The A5 Cabriolet comes equipped with the Audi Sound System as standard equipment. The Premium Sound System by Bang & Olufsen is available as an option.

Almost all loudspeakers have been taken from the Audi A5 CoupÐ©. Subwoofer R157 is a modified version of the subwoofer used in the CoupÐ©. In the Audi A5 Cabriolet, it is located in the left side section.



The rear surround speakers otherwise standard with the Audi Premium Sound System have been deleted for space reasons. In exchange, the rear treble speakers in the Audi A5 Cabriolet are active (to create a surround effect).

The sound curves are equalized to achieve consistently high sound quality even when the convertible top is down.

If the A5 Cabriolet is equipped with a Premium Sound System by Bang & Olufsen, background noise is monitored by a microphone in the overhead module. The Digital Sound System Control Module J525 uses the information collected by the microphone to correct the output volume in dependence on frequency.



440_106

Notes

An on-line Knowledge Assessment (exam) is available for this Self-Study Program.
The Knowledge Assessment may or may not be required for Certification.
You can find this Knowledge Assessment at:
www.accessaudi.com

From the accessaudi.com Homepage:
– Click on the “ACADEMY” Tab.
– Click on the “Academy Site” Link.
– Click on the “CRC Certification” Link.

For Assistance, please call:

Audi Academy
Certification Resource Center (CRC)
1-877-283-4562
(8:00 a.m. to 8:00 p.m. EST)

Or you may send and email to:

audicrchelpdesk@touchstone-group.com

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