Service Training

Audi Q7

Self-study programme 361

The Audi Q7

In superior fashion, the Audi Q7 combines sportiness and versatility, advanced technology and premium-class luxury.

On the road, it excels with the driving performance and dynamics of a sports car, while redefining the possibilities of its class off-road. A vehicle which visually display all its qualities and meets its promise in technological terms, on any road and under any conditions.

Audi Q7 – the high-performance SUV from the creator of quattro.

The very design of the Audi Q7 sets new standards. Characteristic of the typical Audi dynamism are the swooping curve of the roofline and the distinctive relationship between the high waistline and narrow window area. The dynamic sweep of the front section and the powerful rear with the sharply sloping D-pillars provide a coupe-like profile. Equally characteristic elements of the current Audi styling are the shoulder line and dynamic line which define the side section.

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Contents

Introduction 4

Body 8

Passenger protection 12

Engine 34

Running gear 44

Electrical system 50

Air conditioning system 54

Infotainment 68

The self-study programme provides basic information on the design and function of new vehicle models, new vehicle components or new technologies.

The self-study programme is not intended as a workshop manual.
The specified values only serve for better understanding and relate to the software versions applicable at the time the SSP was compiled.

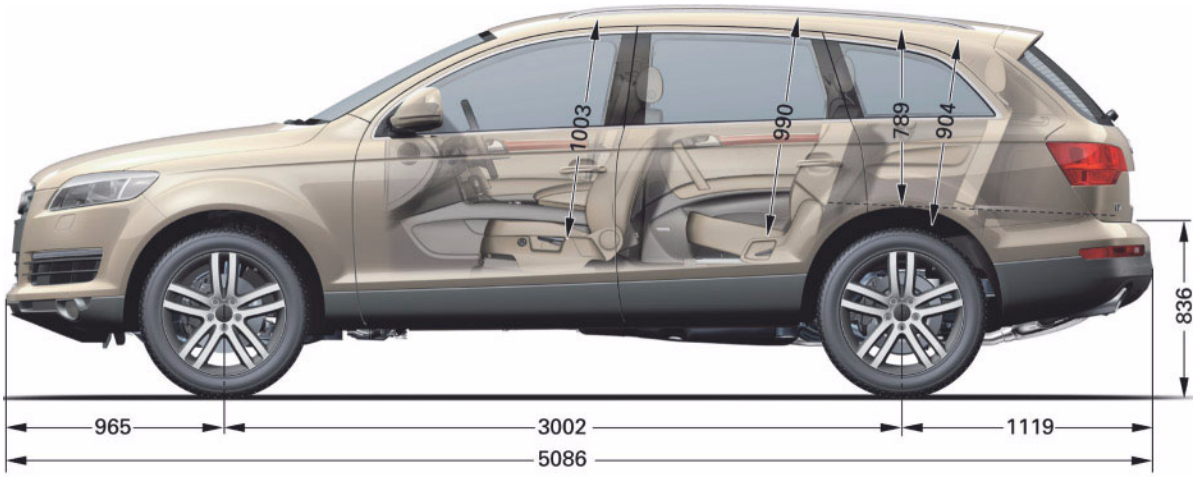
For maintenance and repair operations it is essential that you refer to the current technical literature.

Note

Note

In a nutshell

Some Audi Q7 dimensions.



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		5-seater	6/7-seater
Admissible total weight in kg	4.2l FSI 3.0l TDI	2895 2950	3065 3120
Unladen weight without driver in kg	4.2l FSI 3.0l TDI	2240 2295	2270 2325
Drag coefficient Cw	0.37		
Tank capacity in litres	100		
Trailer weight, braked (on 12 % uphill gradient) in kg		3500	3200
Nose weight in kg		140	130
Combination weight (12 %) in kg	4.2l FSI 3.0l TDI	6495 6550	6365 6420
Admissible roof load in kg	100		

Interior dimensions

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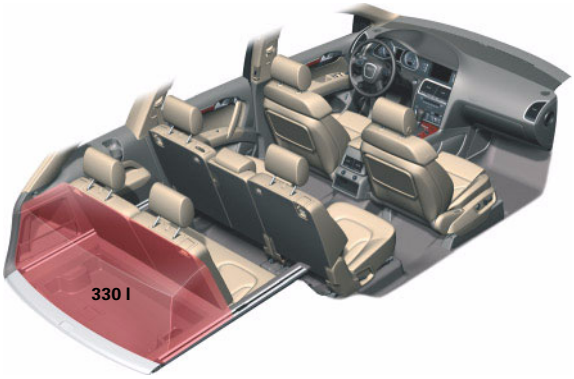
Luggage compartment volume



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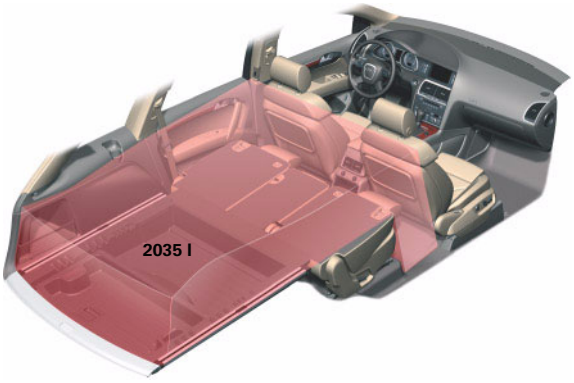

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Body

The body of the Audi Q7 has been newly developed by Audi and is not based on a predecessor SUV model.

During the development process, the most significant properties and characteristic values were initially defined. For example:

- body weight
- torsional and bending values
- crash performance
- scheduled development time
- scope of simulation and prototype development
- planned insurance category

Significant features of the Audi Q7 body shell are a high overall rigidity as well as optimised local bending and torsional values at the body nodes and force application areas.

Bodyshell

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The development

- of an open sky system,
- an optional third seat row,
- a tailgate with integrated rear lights, which wraps around to the rear side panel,

were further important features.

The focus was on combining these elements with the typical Audi high quality expressed, for instance, in the dimensional accuracy of the body parts, the narrow gap widths and surface finish.

The self-supporting, lightweight steel body of the Audi Q7 is built in four bodyshell versions:

- Normal roof
- Normal roof with three seat rows
- Panorama roof (open sky system)
- Panorama roof (open sky system) with three seat rows

The Audi Q7 with three seat rows is equipped with an additional cross-piece in the spare wheel well area for attachment of the seat belts. On the versions with the panorama roof, the cross-pieces at the B and C-pillars are dispensed with. Their function is fulfilled by the open sky module.

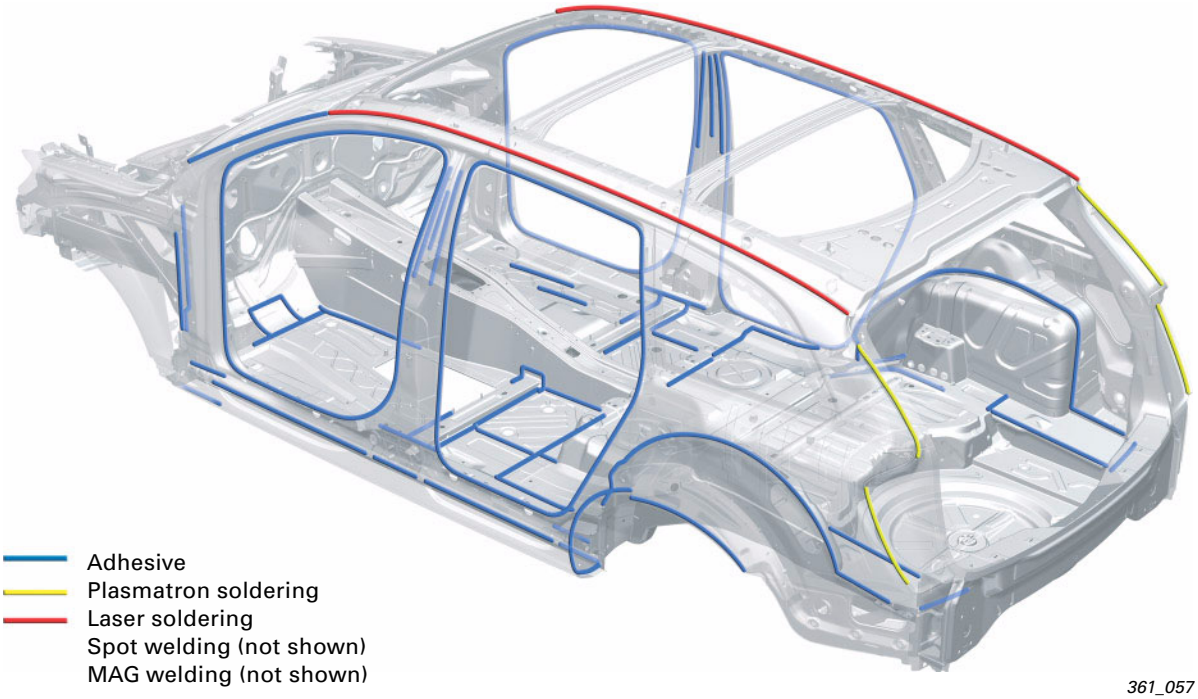
Joining techniques

In order to meet the high demands with regard to body rigidity, crash safety and optimised production processes, the following joining techniques are employed on the Audi Q7:

- Spot welding
- Spot weld bonding
- MAG welding
- Laser soldering
- Plasmatron soldering

The joining technique most frequently employed for areas subject to high loads is spot weld bonding using a structural adhesive.

The bonded joints, with a length of 79815 mm, comprise 5403 spot welds. The total length of the laser-soldered joints (seamless joints between roof and side frame) amounts to 4420 mm. As with the Audi A3 Sportback and the Audi A6 Avant '05, the side panel and the rain channel are joined using plasmatron soldering. Like laser soldering, this technique ensures a high-quality and a virtually invisible seam. The length of the left and right joints amounts to 1438 mm. The length of the MAG welded joints, used in areas which are inaccessible using welding tongs, amounts to 15272 mm.



Adhesive
Plasmatron soldering
Laser soldering
Spot welding (not shown)
MAG welding (not shown)

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Materials

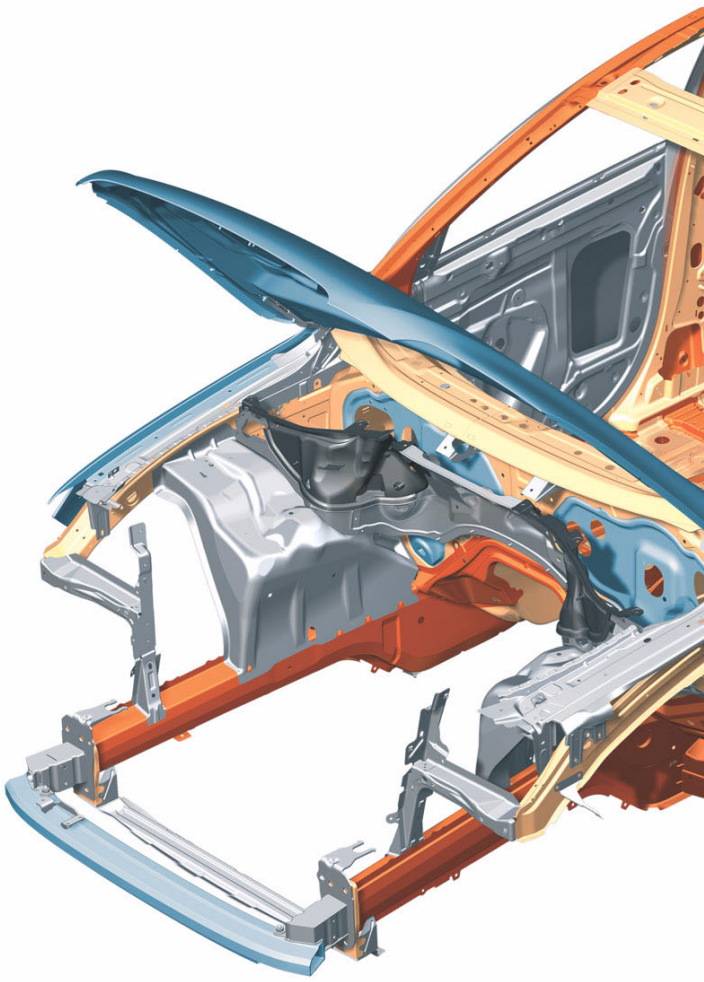
In addition to the joining techniques employed, selection of the correct materials is vital for achieving both crash safety and body rigidity. Depending on loading and weight, the most suitable material is determined for each component.

The proportions of the individual materials used are as follows:
- Standard steels 36 %
- High-strength steels 26 %
- Higher-strength and super high-strength steels 32 %
- Aluminium 6%

The wing panels, bonnet and tailgate are made of aluminium, making them some 22 kilogrammes lighter than their steel counterparts. The weight was further reduced through the use of various semi-finished products*. With tailored rolled blanks, for example, the wall thicknesses can be adapted to withstand differing component loading. The reinforcements for the rear longitudinal members and the floor cover panel are made from tailored rolled blanks.

* Semi-finished products: Pre-processed materials for the manufacture of parts and components

The sill tube consists of a rolled section because the manufacturing tolerances are lower in this case than for an extruded tube, enabling smaller wall thicknesses. In order to meet pedestrian protection requirements, plastic parts are used in the plenum chamber/bulkhead area.

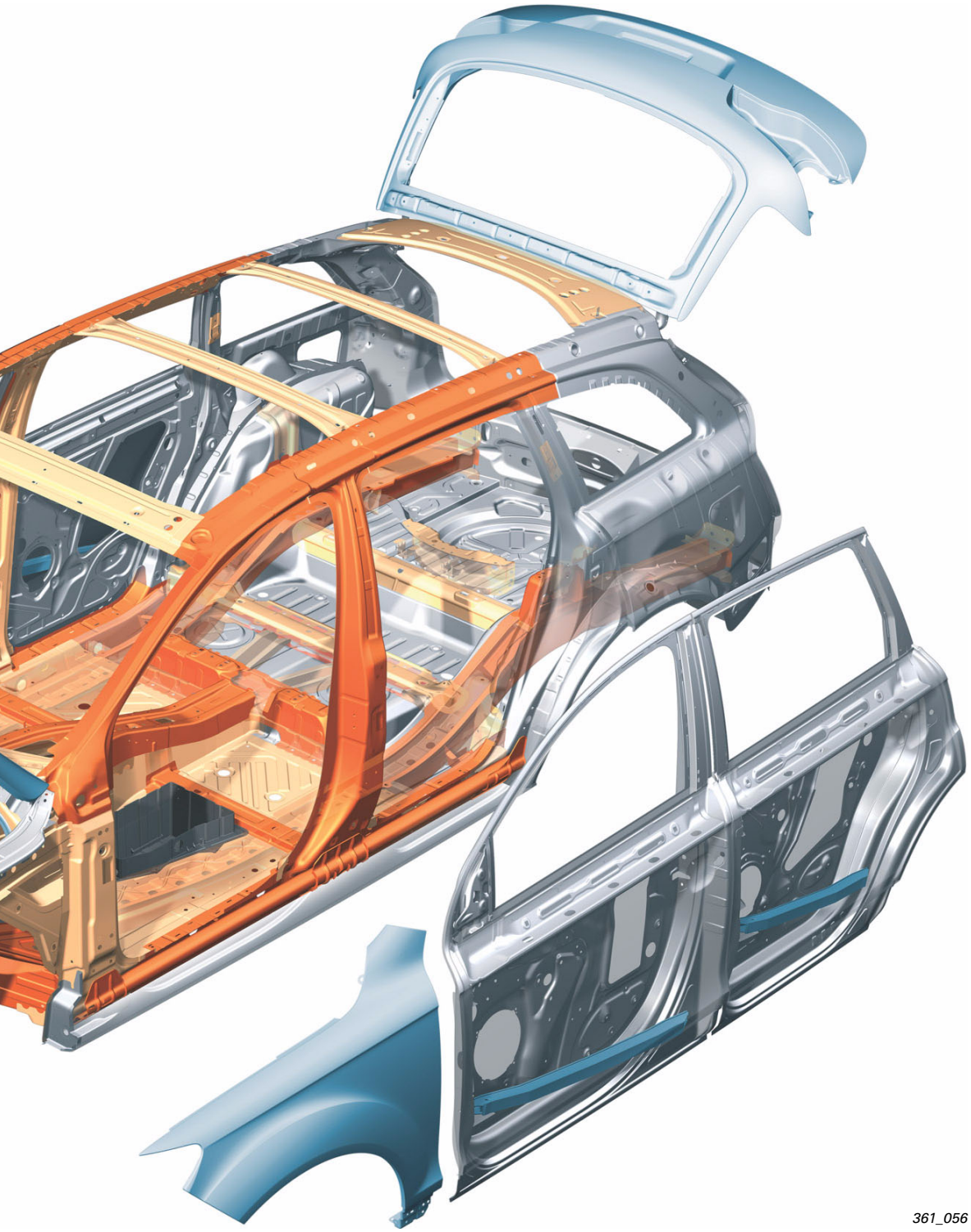


Standard steels

High strength steels

Higher-strength and super high-strength steels

Aluminium



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Seat concept

The Audi Q7 seats up to seven occupants. As standard, the Audi Q7 is equipped with five seats.
The Audi Q7 can optionally be fitted with electrically-adjustable seats for the driver and front passenger.
A memory function is also available for the front seats. The backrests of the driver and front passenger seats have been ergonomically designed such as to reduce to distance between the occupant's head and the head restraint. The headrest must be adjusted correctly for this purpose. The seats in the second seat row can be individually adjusted longitudinally and offer occupants the most generous leg room in this vehicle class.
Where the Audi Q7 is equipped with a third seat row, the second seat row features an easy-entry function and longitudinal seat adjustment. In the 6-seater equipment version, comfort seats are optionally available for the second seat row.

Audi Q7 with seven seats

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Audi Q7 with six seats

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Audi Q7 with five seats

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Note

Please refer to the owner's manual for information on operation of the vehicle seats.

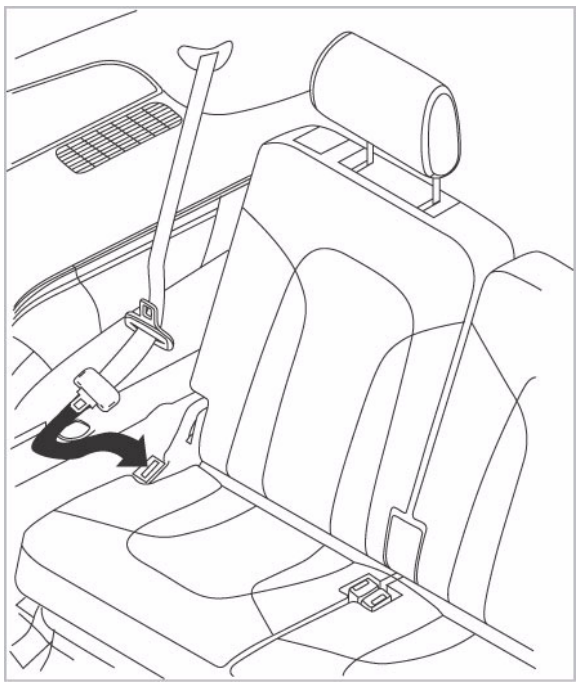
The head restraints of the second seat row do not prevent the backrests from folding. When the head restraints of the second seat row are lowered, the backrests do not fully reach the load floor position. When folding down the backrests of the third seat row, the head restraints lower automatically, making it easier to fold down the backrests.
If the seats in the second and third seat roads are unoccupied, the head restraints can be lowered by hand in order to improve rearward visibility.

The easy-entry function on the second seat row is operated via a lever next to the head restraint. The backrest folds forwards to a certain angle. The seat base also moves in the direction of travel. The easy-entry function enables the occupants to enter and exit the third seat row.

361_051

Attachment of the seat belts to the seats of the third seat row is achieved via additional belt buckles. The advantage is that the seatbelts can be removed from the seats as required. The seat belts are retracted and the latch plates can be inserted in the D-pillar trim. In this manner, the seat belts are protected against damage during loading of the luggage compartment when the backrests are folded down. The central belt buckles are attached to the vehicle floor.

Persons above a height of 160 cm are prohibited from being seated in the third seat row.



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Passenger protection in the Audi Q7

Owing to its wide range of use, the Audi Q7 represented a special challenge for the development team: A high degree of passenger protection during both on-road and off-road operation. In meeting these requirements, the Audi Q7 fits seamlessly into the high safety level of the current Audi model range.

The passenger protection system of the Audi Q7 comprises the following components and systems:

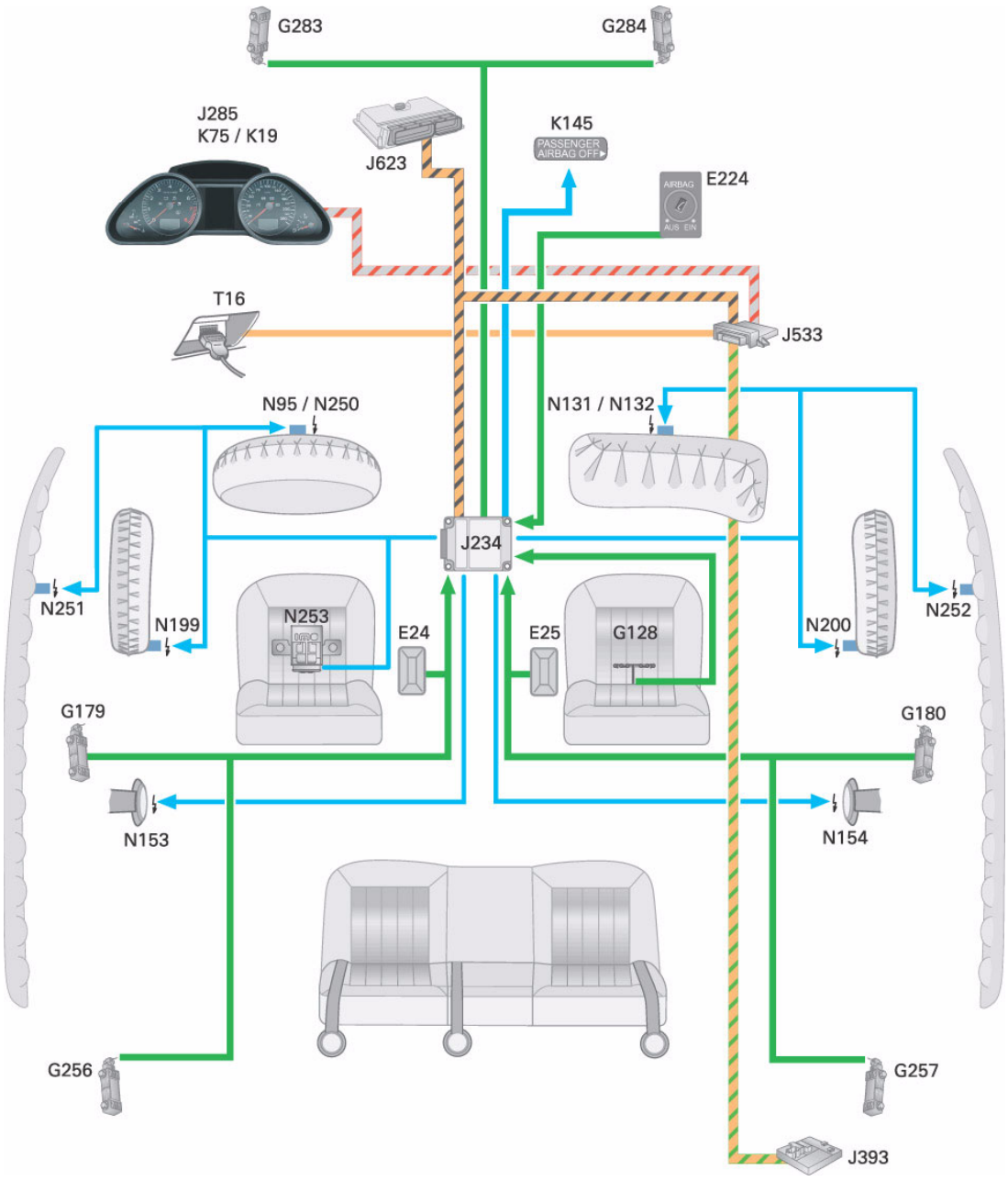
- Airbag control unit
- Driver and front passenger airbag, dual stage
- Front side airbags
- Sideguards (curtain airbags)
- Crash sensors for front airbag, the so-called upfront sensors for frontal impact detection
- Crash sensors at the B-pillars for side impact detection
- Crash sensors at the C-pillars for side impact detection
- Front belt tensioners
- Battery isolation igniter
- Switch in front-seat belt buckles
- Seat occupied sensor in front passenger seat

Side airbags for the second seat row and a key operated switch for deactivation of the front passenger airbag with the corresponding warning lamp are also available as optional equipment.

Owing to the various requirements and statutory regulations placed upon vehicle manufacturers by the markets, the equipment versions may vary, particularly with regard to the US market.

Key

E24	Driver side belt switch
E25	Front passenger side belt switch
E224	Key operated switch to deactivate front passenger side airbag
G128	Seat occupied sensor, front passenger side
G179	Side airbag crash sensor on driver side (B-pillar)
G180	Side airbag crash sensor on front passenger side (B-pillar)
G256	Rear side airbag crash sensor on driver side (C-pillar)
G257	Rear side airbag crash sensor on passenger side (C-pillar)



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G283 Front airbag crash sensor for driver side (front end, left)
G284 Front airbag crash sensor for front passenger side (front end, right)

J234 Airbag control unit
J285 Control unit in dash panel insert
J393 Convenience system central control unit
J533 Data bus diagnostic interface (gateway)
J623 Engine control unit

K19 Seat belt warning system warning lamp
K75 Airbag warning lamp
K145 Front passenger side airbag deactivated warning lamp (PASSENGER AIRBAG OFF)

N95 Driver side airbag igniter
N250 Driver side airbag igniter 2
N131 Front passenger side airbag igniter 1
N132 Front passenger side airbag igniter 2
N153 Driver seat belt tensioner igniter 1
N154 Front passenger seat belt tensioner igniter 1
N199 Side airbag igniter on driver side
N200 Side airbag igniter on front passenger side
N251 Driver side curtain airbag igniter
N252 Front passenger side curtain airbag igniter
N253 Battery isolation igniter

T16 Connector, 16-pin (diagnostic connection)

Airbag control unit J234

The purpose of the electronics integrated in the airbag control unit is to detect vehicle deceleration or acceleration and to evaluate it so as to detect a vehicle impact. In order to detect vehicle deceleration or acceleration during an impact, external sensors are used in addition to the sensors installed inside the control unit. The electronics in the control unit detect a crash based alone on the information received from the sensors. Only once all the sensor information has been evaluated by the control unit electronics can the electronics decide when and which safety components should be activated.

The airbag control unit is able to detect frontal, side and rear impacts.

A further task of the airbag control unit is to activate the relevant restraint systems (belt tensioners or belt tensioners and airbag) depending on the type and severity of the impact as well as signalling the crash to other vehicle systems.

The airbag electronics have the following main tasks:

- Crash detection (front, side, rear)
- Defined triggering of the belt tensioners, airbags and battery isolation igniter
- Defined triggering of the second front airbag stage
- Evaluation of all input information
- Permanent monitoring of the complete airbag system
- Independent power supply via a capacitor for a defined time (approx. 150 ms)
- Fault display via a failure warning lamp
- Storage of fault and crash information
- Communication of a crash to the other system components via the drive CAN or discrete crash output (conventional wiring)
- Activation of seat belt warning system

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For information on which components must be replaced following an accident, please refer to the applicable Workshop Manual in ELSA. An airbag control unit can only be replaced with the aid of an online-capable VAS 5051 or VAS 5052. The guided fault-finding or guided function applications must be used for this purpose. The airbag control unit must be coded and adapted to the relevant vehicle. If coding or adaption is not performed correctly, this may result in malfunctions in other vehicle systems, e.g. the ESP.

Data exchange

The airbag control unit is connected to the drive CAN.

The airbag control unit transmits the following information via the drive CAN:
- Activation of warning lamp K75
- Activation of seat belt warning system
- Diagnostic data
- Crash signal
- Crash information for the control element test
- ESP data
- Front passenger airbag activated/deactivated status (display in dash panel insert)

The airbag control unit evaluates the following information from the data bus:
- Dimming for the front passenger side airbag deactivated warning lamp (Passenger Airbag Off)

The information that a crash has occurred is used by other control units in order to unlock a locked central locking system, cut off the fuel supply, activate the hazard warning lights etc.

Airbag warning lamp K75

Activation of the airbag warning lamp, which is located in the dash panel insert J285, is performed via the CAN bus. In the absence of a data message from the airbag control unit, the warning lamp is switched on automatically by the dash panel insert.

Rear impact recognition

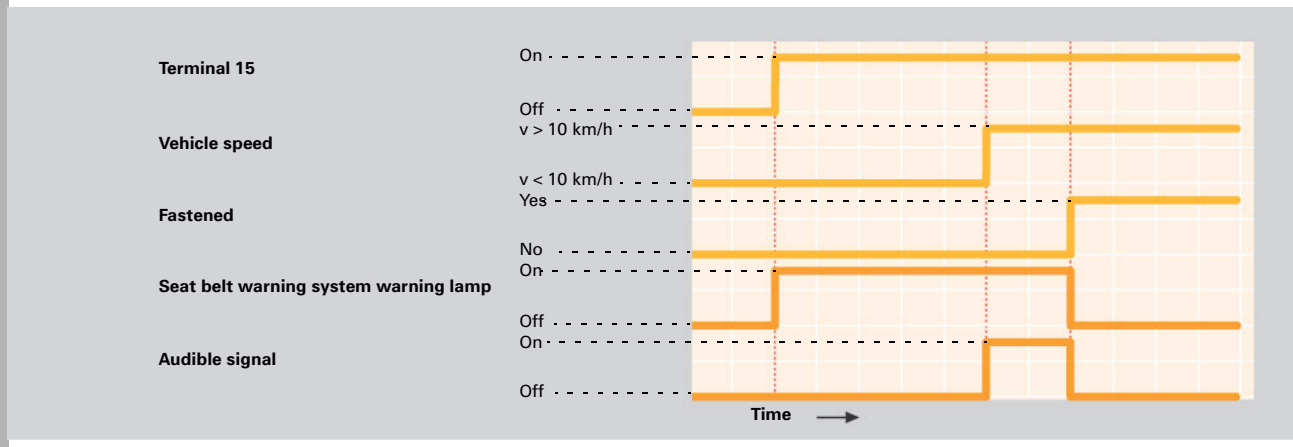
During a rear impact, the vehicle is strongly accelerated in the direction of travel. The crash sensors in the airbag control unit and the crash sensors G283 and G284 detect this vehicle acceleration and transmit the relevant signals to the airbag electronics. The airbag electronics evaluate the information. If the sensor signals exceed a specified value, the belt tensioners are triggered and the battery isolation igniter is activated.

Seat belt warning system

The Audi Q7, like the Audi A6 ´05 for example, features a seat belt warning function for the driver and front passenger.
When the ignition is switched on, the airbag control unit evaluates the information from the driver and front passenger belt buckle switches as well as information from the front passenger side seat occupied sensor. The airbag control unit detects whether the front passenger seat is occupied or not based on the resistance values of the front passenger side seat occupied sensor. If the driver or front passenger have not fastened their seat belts, they are alerted via the seat belt warning system warning lamp K19 in the dash panel insert and an audible signal.

Timing diagrams for the seat belt warning system

Visual and audible signals – seat belts are fastened late



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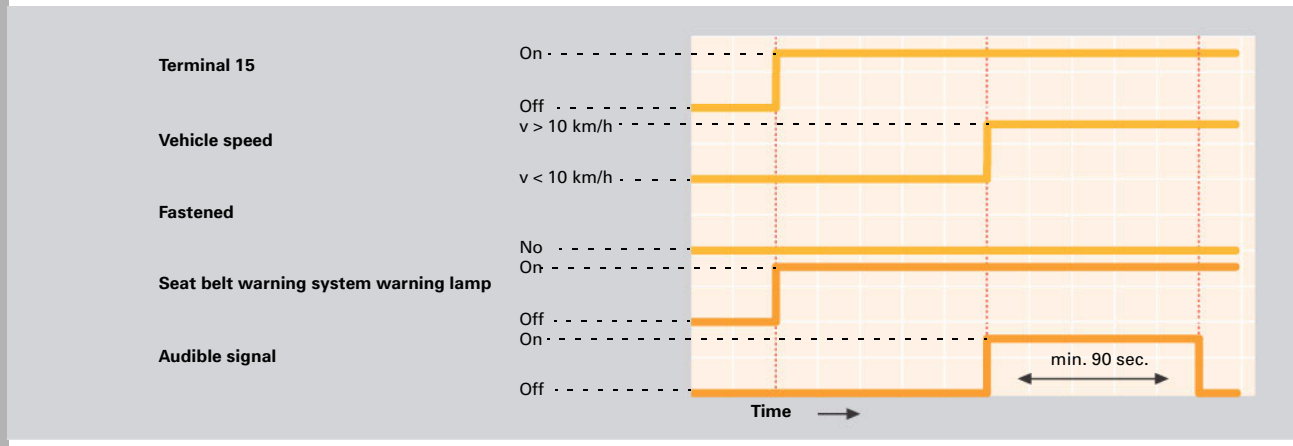
Visual and audible signals – seat belts not fastened



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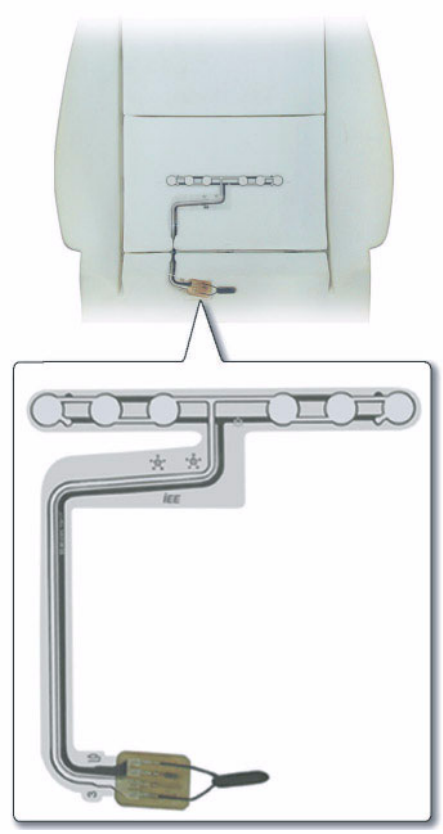
The warning is reactivated if the seat belt status changes during "terminal 15 on".

Seat occupied sensor, front passenger side G128

The front passenger side seat occupied sensor consists of a plastic film incorporating several individual pressure sensors. The front passenger side seat occupied sensor is located in the front passenger seat, between the seat cover and padding. The seat occupied sensor extends across the rear part of the front passenger seat and is positioned such that the relevant area of the seat surface is monitored.

Depending on the load, the resistance value of the front passenger side seat occupied sensor is modified. When the front passenger seat is not occupied, the resistance value of the front passenger side seat occupied sensor G128 is high. As the load increases, the resistance value falls. Above a load of approx. 5 kg, the airbag control unit detects "seat occupied".

The airbag control unit requires the information from the front passenger seat occupied sensor G128 and from the belt buckle switches for the seat belt warning system.



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Resistance value of G128	Evaluation
approx. 430 Ohm and higher	Seat not occupied
approx. 140 Ohm and lower	Seat occupied

Belt switch

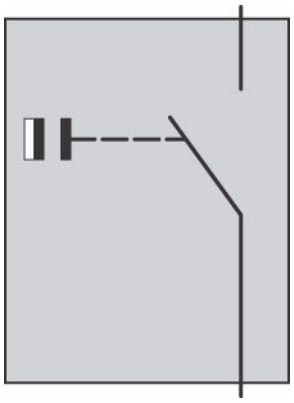
Driver side belt switch E24
Front passenger side belt switch E25

(In the driver and front passenger side belt buckles)

Information as to whether or not the driver and front passenger have fastened their seat belts is required by the "seat belt warning system" function. In order for the airbag control unit to receive this information, the belt switches E24 and E25 are integrated in the belt buckles for the front seats. The switches fitted are reed switches. The reed switches switch from "switch open" to "switch closed" through the action of an external magnetic field. The magnet 1 in the so-called spring thorn is located near the reed switch when the latch plate is not inserted, i.e. the reed switch is closed.

When the latch plate is inserted in the belt buckle, the spring thorn is moved.
The magnet 1 in the spring thorn no longer acts upon the reed switch, i.e. the reed switch is open.

Based on the measured resistance value, the airbag control unit recognises whether the seat belt is fastened or not.



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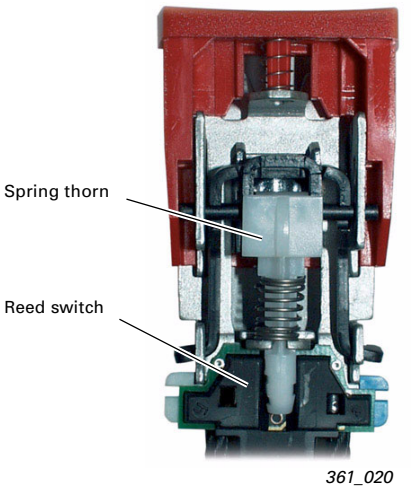

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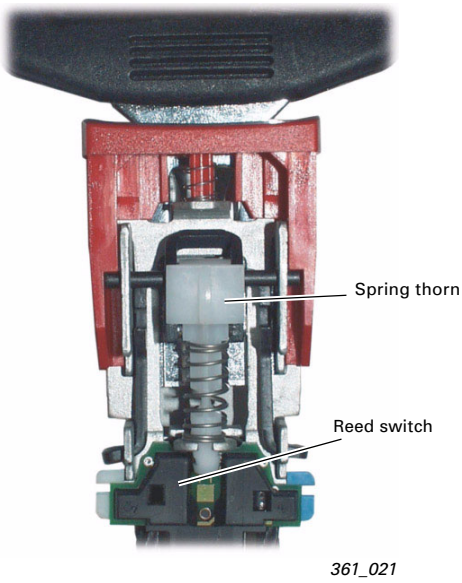

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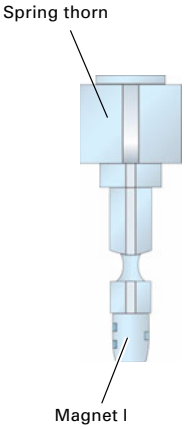

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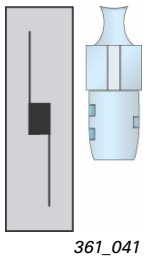

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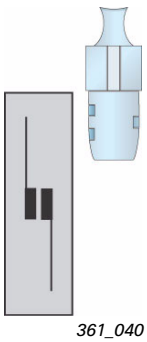
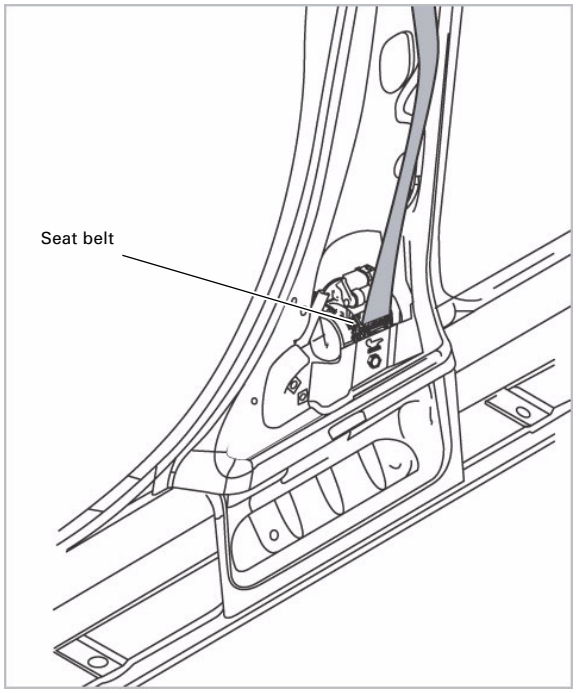


361_040

Driver seat belt tensioner igniter 1 - N153
Front passenger seat belt tensioner igniter 1 - N154

The front seats of the Audi Q7 is equipped with the proven compact tensioners. The belt tensioners work according to the "ball gear" principle (not USA) and are triggered electrically by the airbag control unit. During a crash, the belt tensioners are activated before the front airbags. To prevent excessive loads to the occupants, the belt reels are equipped with belt force limiters. Above a specified load level, these force limiters slacken the belt, allowing the occupant to move forwards into the already deployed airbag.

In the event of a side impact with side airbag triggering, the relevant belt tensioner is also triggered. In the event of a rear impact, the belt tensioners are also activated, depending on the severity of the impact.



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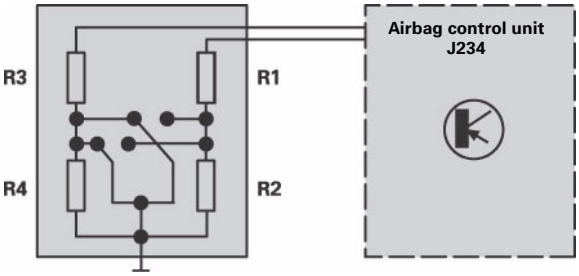
Key operated switch to deactivate front passenger side airbag E224

The key operated switch to deactivate front passenger airbag E224 and the corresponding front passenger side airbag deactivated warning lamp K145 (PASSENGER AIRBAG OFF) are required in order to deactivate the front passenger airbag. An illuminated front passenger side airbag deactivated warning lamp K145 (PASSENGER AIRBAG OFF) indicates to the occupants that the front passenger airbag is deactivated.

The control unit unequivocally recognises the switch position by means of the arrangement of four resistors which are connected in-line, pair-wise.

If the airbag control unit detects a faulty key operated switch, a fault memory entry is made and the front passenger side airbag deactivated warning lamp K145 (PASSENGER AIRBAG OFF) begins to flash.



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Airbag

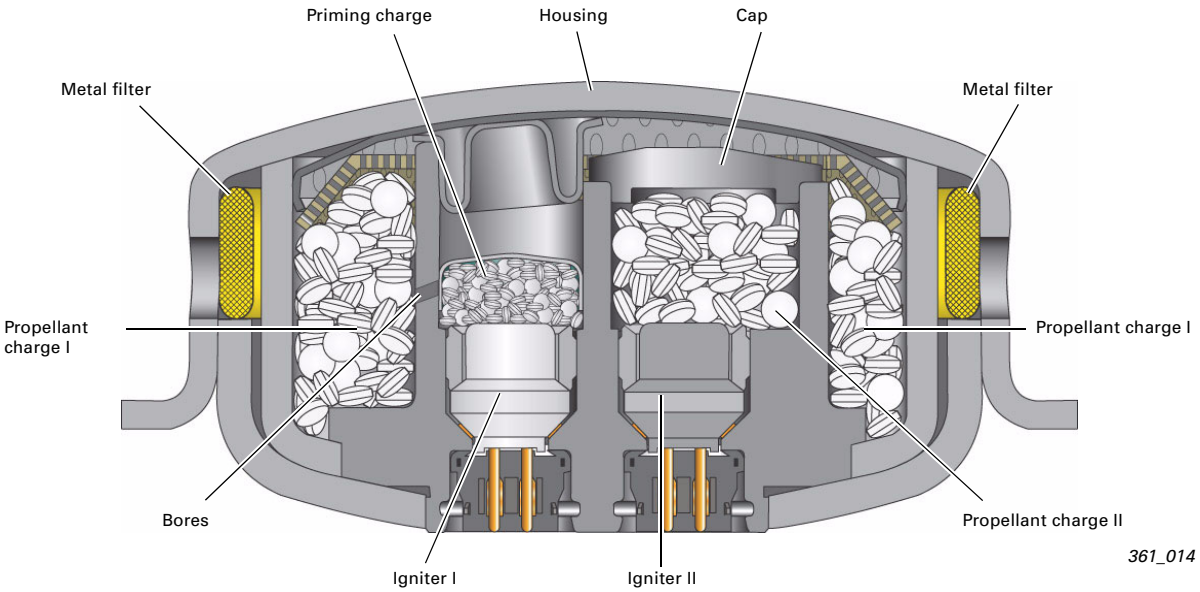
The front airbags on the driver and front passenger sides are equipped with two-stage gas generators. Depending on the nature and severity of the accident, the airbag control unit sets a time delay between the two ignitions (from approx. 5ms to 30 ms). The loads which the driver and front passenger are exposed to during a crash can be reduced by means of a delayed ignition of the propellant charges.

Both propellant charges are ignited in all cases. This prevents a propellant charge from remaining active following airbag deployment.

Driver airbag

N95 Driver side airbag igniter I
N250 Driver side airbag igniter II

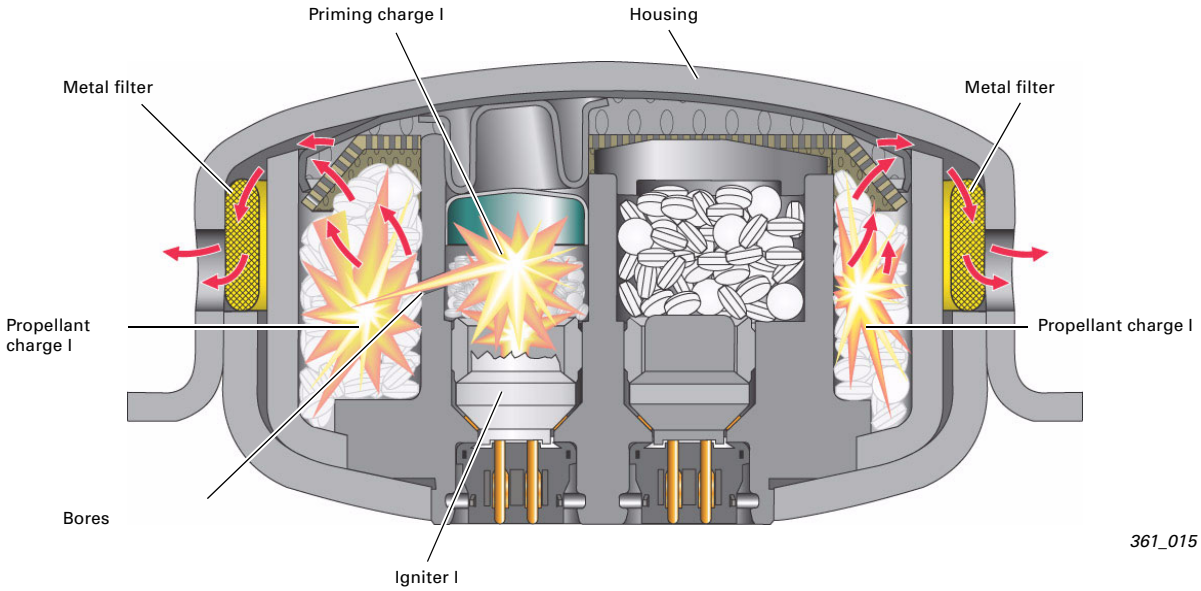
The gas generator in the driver airbag works using two pyrotechnic propellant charges.



The driver's airbag gas generator is flexibly mounted in a rubber ring.
This minimises any vibration at the steering wheel.
The gas generator acts as a vibration damper.

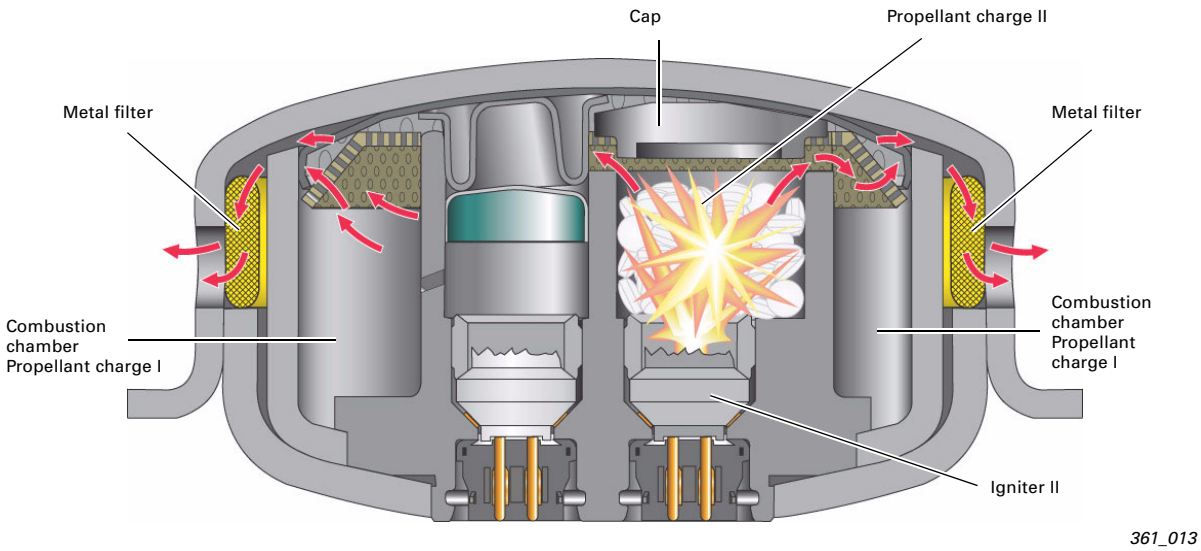
Driver side airbag igniter I - N95

The electrical igniter I, which is activated by the airbag control unit, ignites the priming charge I. This ignites the actual propellant charge I via the bores. When the gas pressure generated through combustion of the propellant charge I exceeds a specified threshold, the housing of the gas generator becomes deformed, opening up a passage to the airbag via the metal filter. The airbag is deployed.



Driver side airbag igniter II - N250

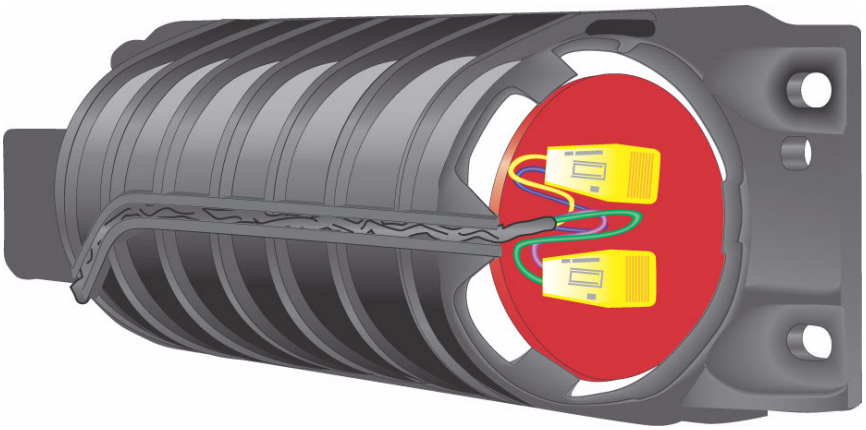
Following a defined delay, the airbag control unit energises the second electrical igniter, which directly ignites the second propellant charge. At a certain pressure, the generated gas lifts up the cap of the second stage and flows into the airbag via the combustion chamber of the first stage.



Front passenger airbag

N131 Front passenger side airbag igniter I
N132 Front passenger side airbag igniter II

The front passenger airbag module housing is made of plastic.



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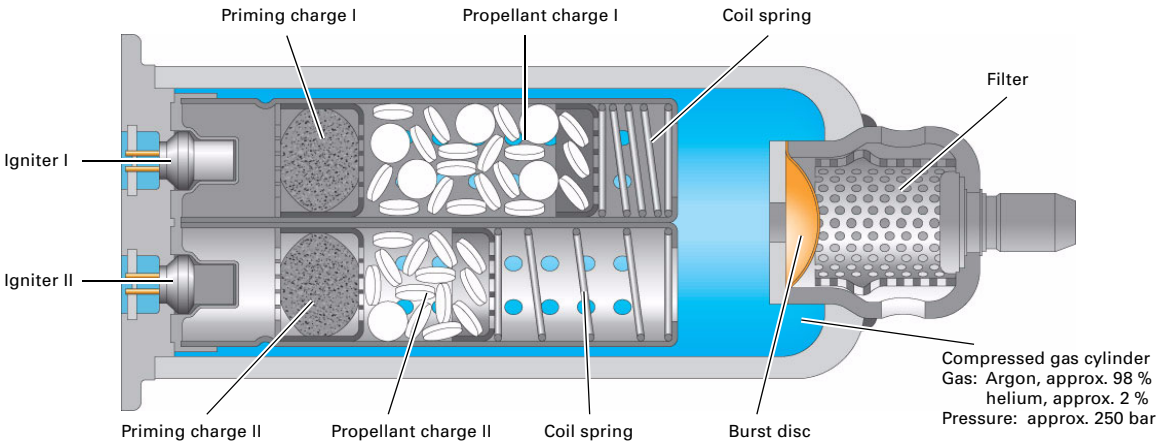
A two-stage hybrid gas generator is used on the passenger side. Two pyrotechnic propellant charges are contained in a compressed gas cylinder, which is activated separately by the airbag control unit. The so-called cold gas in the compressed gas cylinder is under a pressure of approx. 250 bar and is a mixture of argon (approx. 98 %) and helium (approx. 2 %). The airbag volume is approx. 140 litres.

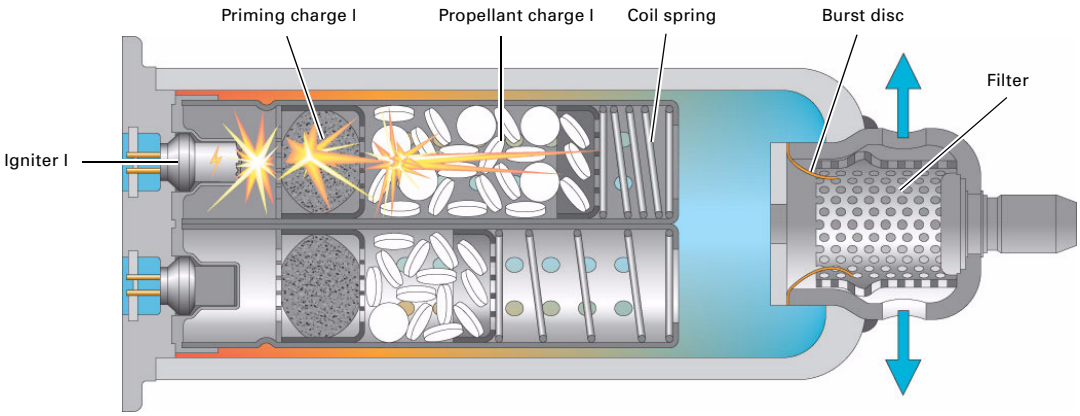
The coil springs ensure that the propellant charge tablets are held in position (pretension).



361_002

Front passenger side airbag igniter I - N131

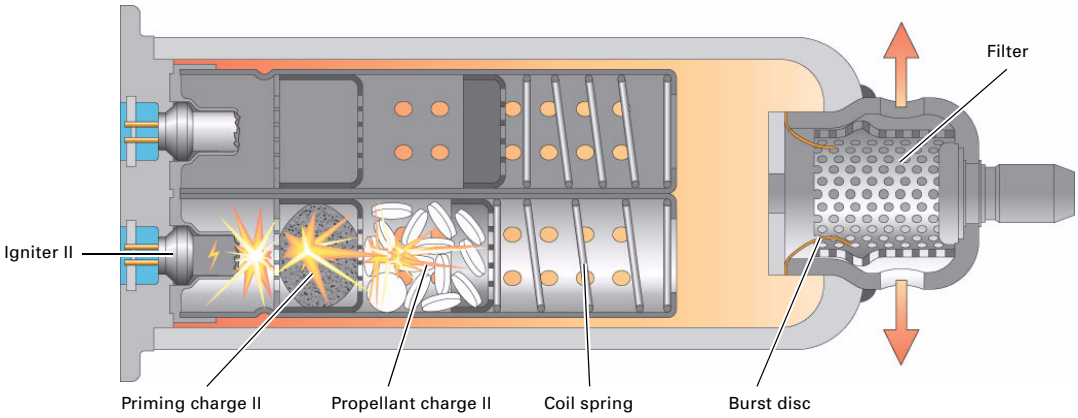
The airbag control unit energizes the igniter I and the priming charge I is ignited. This in turn ignites the actual propellant charge I. The combustion gas generated increases the pressure in the compressed gas cylinder until the burst disc breaks at a predetermined pressure value. The gas mixture reaches the airbag via the metal filter and it is deployed.



361_003

Front passenger side airbag igniter II - N132

The operating principle of the second stage is identical to that of the first. An additional volume of gas is supplied to the airbag through combustion of the second propellant charge. There is no further increase in pressure inside the airbag during the second stage.



361_004

Side airbags

N199 Side air bag igniter on driver side
N200 Side air bag igniter on front passenger side
N201 Rear side airbag igniter on driver side
N202 Igniter for rear side airbag on passenger side

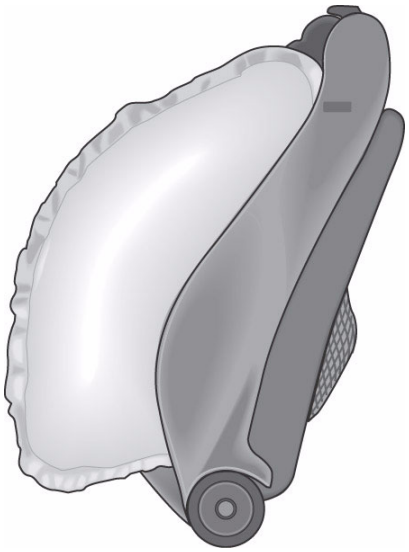
The side airbags for the first seat row are the same as the modules installed in other Audi models in terms of design and function. However, they have been adapted to the passenger compartment concept of the Audi Q7. For the first time, so-called "soft-cover modules" have been used for the side airbags on the second seat row. With these modules, the usual plastic casing has been replaced by a fabric cover. In addition to its low weight, the advantage of this cover is better integration into the backrest due to its soft surface.

In some markets, the side airbags for the second seat row are optional equipment.

If the airbag control unit J234 detects a side impact which fulfils the triggering criteria, it energises the relevant side airbag igniter.
Only the side airbags on the vehicle side where the impact has occurred are activated.

In the first seat row, the gas generators used are tubular pyrotechnic gas generators; in the second seat row, hybrid gas generators are used.

First seat row side airbags



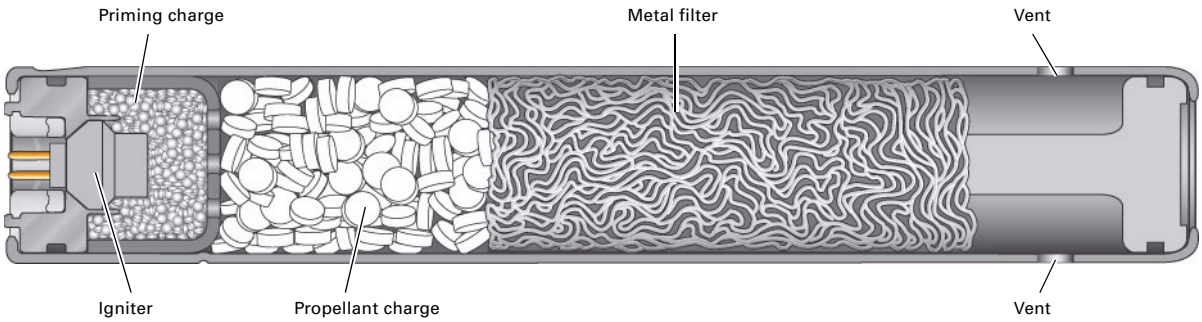
361_006

Second seat row side airbags

361_005

Side airbag igniter on driver side N199
Side airbag igniter on front passenger side N200

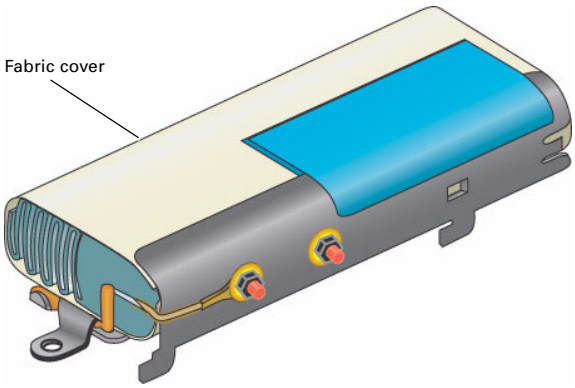
The relevant side airbag igniters are energised by the airbag control unit. The priming charge then ignites the propellant charge. The combustion gas generated flows through the metal filter into the airbag. The airbag is deployed.



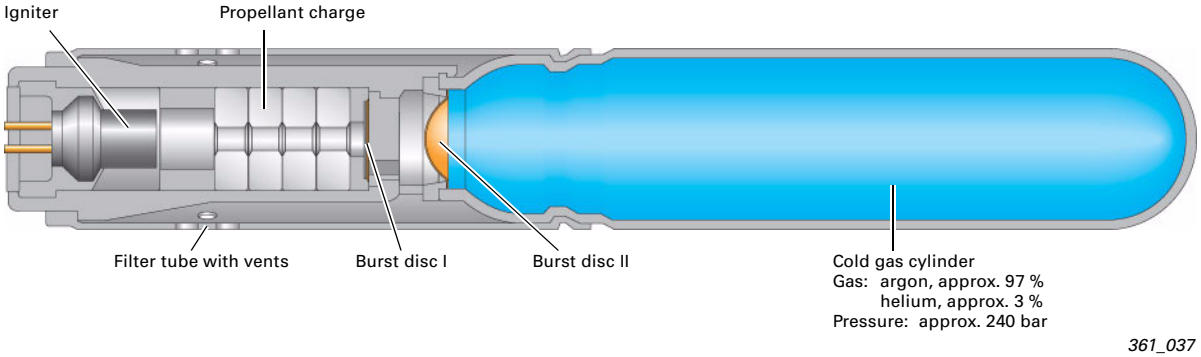
361_022

Rear side airbag igniter on driver side N201
Rear side airbag igniter on front passenger side N202

The propellant charge is ignited by the igniter. The generated gas breaks both burst discs and becomes mixed with the cold gas contained in the cold gas cylinder. The gas mixture flows through the metal filter into the airbag, deploying it.



361_066



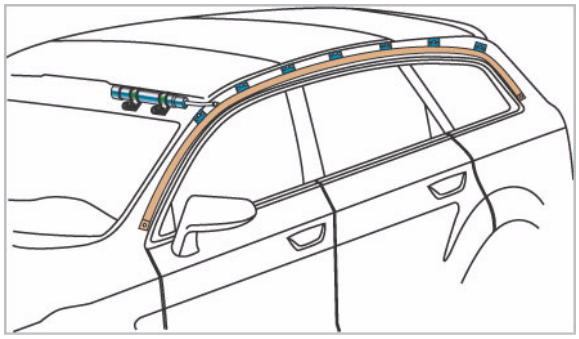
361_037

Curtain airbag
(sideguard)

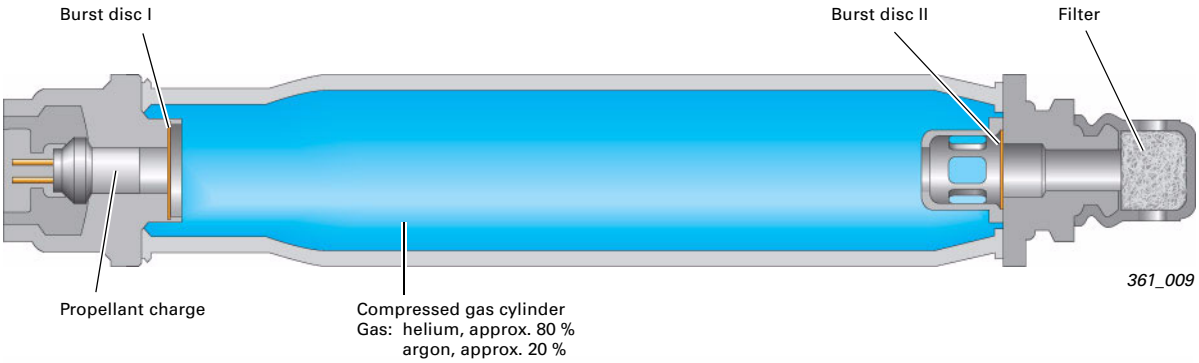
Driver side curtain airbag igniter N251
Front passenger side curtain airbag igniter N252

In order to better protect occupants in the event of a side impact, the curtain airbag covers virtually the complete side window area from the A to the D-pillar. In the case of these modules, the hybrid gas generator is installed in the front roof area. The airbag is filled via a gas lance. A cold gas mixture of helium (approx. 80 %) and argon (approx. 20 %) is used, which is stored at 300 bar in a compressed gas cylinder. When the airbag control unit ignites the propellant charge, burst disc I breaks due to the pressure generated. The pressure in the compressed gas cylinder increases. When a certain pressure is reached, the gas breaks burst disc II and penetrates into the airbag via the filter and the gas lance.

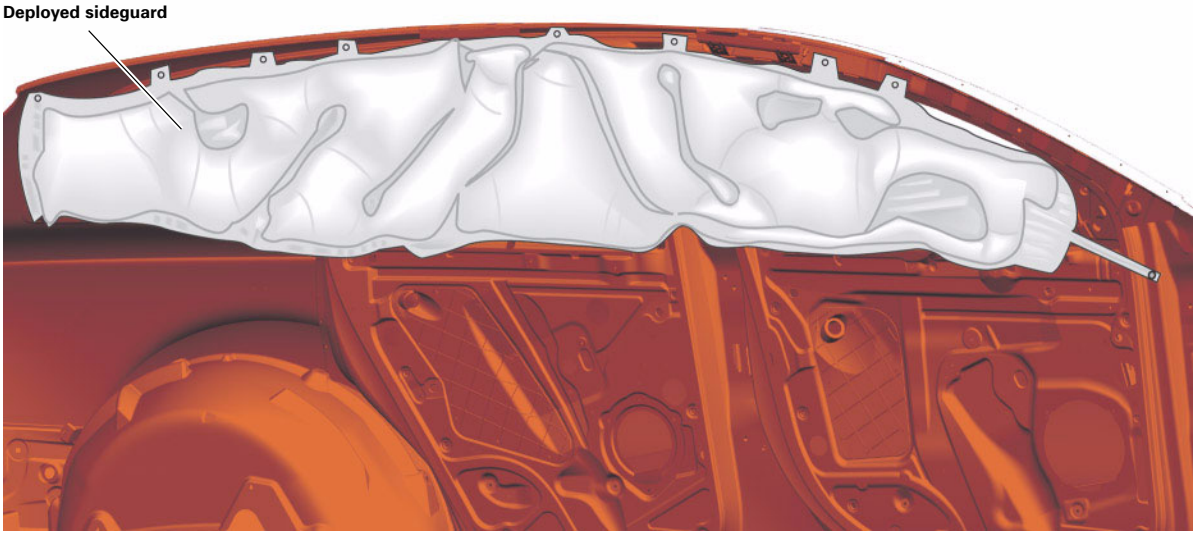
The airbag volume is approx. 40 litres.



361_010



361_009



361_011

Battery isolation igniter N253

The battery isolation igniter serves to disconnect the starter and alternator cable from the vehicle battery in the event of a crash. Activation is performed by the airbag control unit. Whenever an airbag or belt tensioner is triggered, the battery isolation igniter is also activated. When the pyrotechnic propellant charge is ignited, the gas pressure generated pushes the pin, which is attached to a piston, breaking the connection between the two terminals.

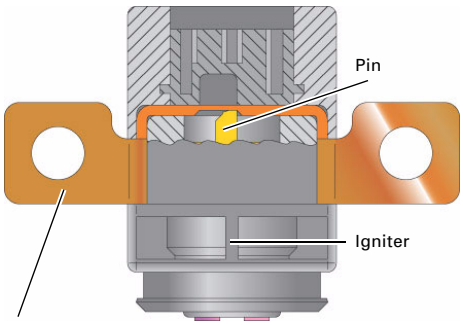
The battery isolation igniter must be replaced following activation.

Diagnostic monitoring is performed by the airbag control unit J234.

In the Audi Q7, the battery isolation igniter N253 is installed in an electrics box beneath the front left seat.

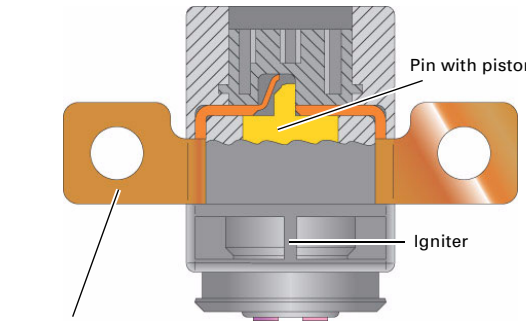
361_033

Battery isolation igniter



361_023

Battery isolation igniter activated



361_024

Supplementary passenger protection system features for the North American market

In order to meet the statutory and market-specific requirements for the US market, the Audi Q7 is equipped with a special seat occupied sensor for the front passenger seat and a roll-over detection system.

Roll-over

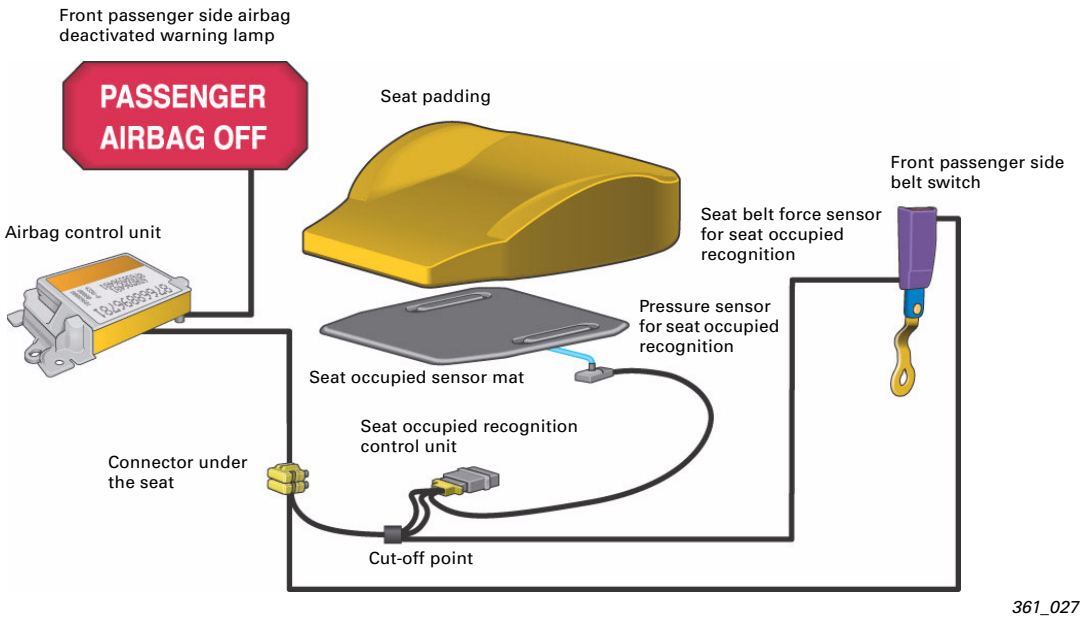
An additional sensor for roll-over detection has been integrated into the airbag control unit J234.
If vehicle roll-over is detected, the belt tensioners and curtain airbags are activated.

Front passenger side seat occupied sensor

If the airbag control unit J234 receives the information that the front passenger seat is not occupied or that a child seat is installed, the airbag control unit switches off the front passenger airbag.
A deactivated front passenger airbag is indicated to the occupants via illumination of the front passenger side airbag deactivated warning lamp (PASSENGER AIRBAG OFF) and a message in the dash panel insert.

The system essentially comprises the following components:

- Seat padding
- Seat occupied sensor mat
- Pressure sensor for seat occupied recognition G452
- Seat occupied recognition control unit J706
- Front passenger side belt switch E25
- Seat belt force sensor for seat occupied recognition G453
- Front passenger side airbag deactivated warning lamp K145 (PASSENGER AIRBAG OFF)
- Airbag control unit J234



361_027

The positions of the components installed are specified and must on no account be changed. Neither may individual system components be exchanged. Please proceed exactly in accordance with the instructions contained in the applicable Workshop Manual and the guided fault-finding.

Seat occupied recognition control unit J706

The seat occupied recognition control unit J706 evaluates the signals from the pressure sensor for seat occupied recognition G452 and seat belt force sensors for seat occupied recognition G453. The signal from the seat belt force sensor for seat occupied detection provides information on how high the tension force is on the seat belt. Based on the signal from the pressure sensor for seat occupied recognition, the seat occupied recognition control unit determines the load on the front passenger seat. If the load is below approx. 20 kg and a very low or no belt force at all is detected, the presence of a child seat is identified by the seat occupied recognition control unit and communicated to the airbag control unit. The front passenger airbag is deactivated by the airbag control unit. If the load on the seat is e.g. 25 kg and the belt force exceeds a specified value, the seat occupied recognition control unit recognises that additional pressure is being applied by the child seat onto the seat cushion via the seat belt. The control unit recognises a the presence of a child seat and the airbag control unit deactivates the front passenger air bag. Above a load of approx. 25 kg and a low belt force, the seat occupied recognition control unit assumes that the seat is occupied by an adult and the front passenger airbag remains activated.

When the ignition is switched on, the sensor information is evaluated continuously. This ensures that the seat occupied recognition control unit detects and reacts to any changes in seat occupancy. In order to prevent the load changes occurring during driving operation from resulting in immediate deactivation of the front passenger airbag, the system operates with a certain delay during driving. An acceleration sensor installed in the seat occupied recognition control unit communicates vehicle movements to the electronics.

Seat load	Belt force	Recognition
Less than approx. 20 kg	Very low or none	Child seat
E.g. 25 kg	Very high	Child seat
More than approx. 25 kg	Low	Adult

Data exchange between the airbag control unit J234 and the seat occupied recognition control unit J706 is performed via the LIN bus. Diagnostic monitoring is performed by the airbag control unit.

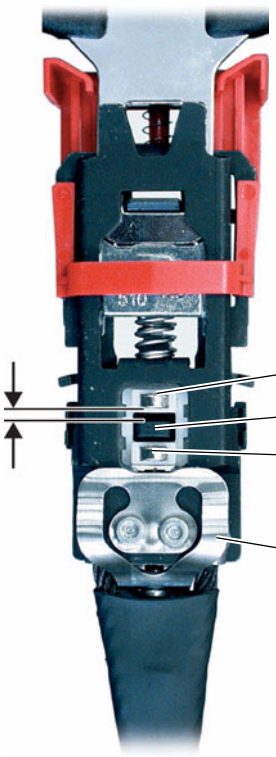
Seat belt force sensor for seat occupied recognition G453

The seat belt force sensor for seat occupied recognition is integrated in the front passenger seat belt buckle. It basically consists of two parts which move in relation to one another and a Hall sensor, which is located between the magnets I and II.
A calibrated spring holds the parts in the initial position. In this position the magnets I and II do not act on the Hall sensor. When the seat belt is correctly fastened, a tensile force is applied at the belt buckle.

The distance between the Hall sensor and magnets I and II changes. The action of the magnets on the Hall sensor and consequently the voltage signal of the Hall sensor also changes. The higher the tensile force on the belt buckle, the more the parts move towards one another. The seat occupied recognition control unit receives this information and evaluates it.

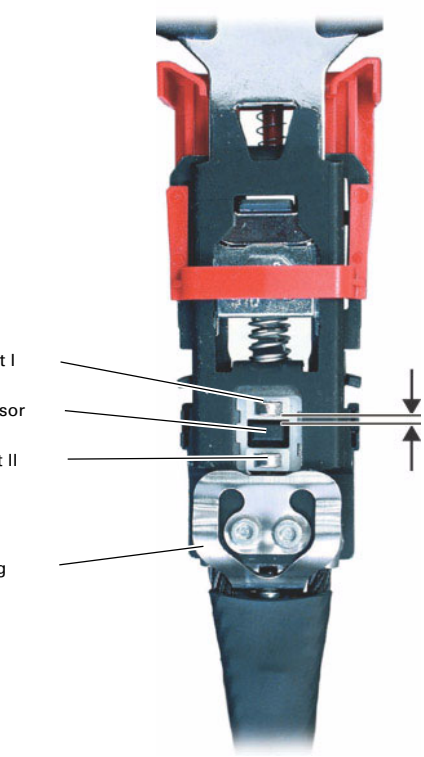
A mechanical stop ensures that the sensor element is not torn apart in the event of a crash.

Initial position



361_038

Tensile force applied



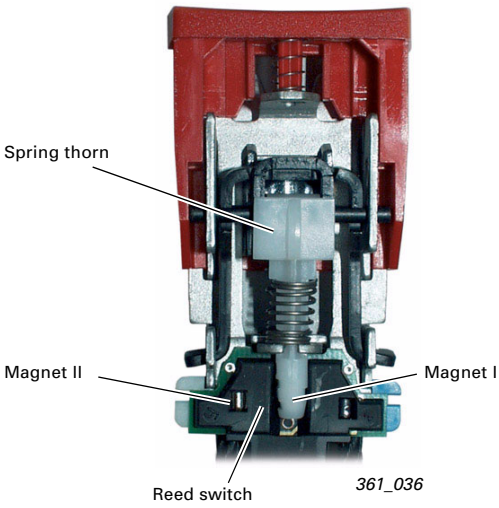
361_039

Belt switch

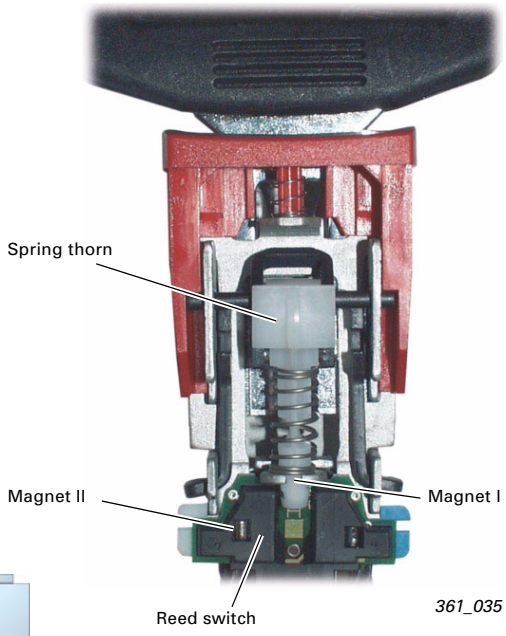
Driver side belt switch E24
Front passenger side belt switch E25

The belt switches (reed switches) are installed in the belt buckles of the front seats. As long as the latch plate is not inserted in the belt buckle, magnets I and II act on the reed switch. The magnetic forces of the two magnets cancel each other out. The reed switch is open.

The magnet I is located at the tip of the moveable spring thorn. The magnet II is permanently attached to the housing, as is the reed switch. When the latch plate is inserted in the belt buckle, the spring thorn moves with the magnet I. The magnet II alone acts on the reed switch. The reed switch is closed.



361_036



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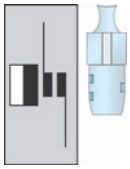
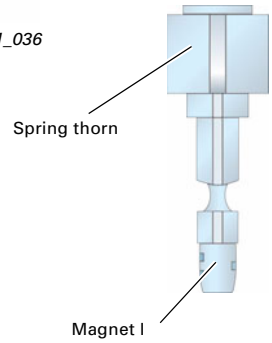
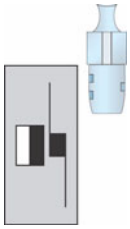
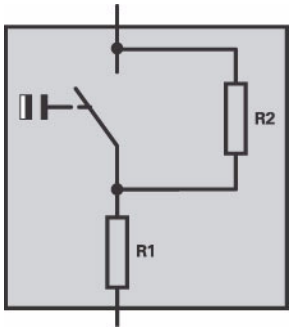

361_043



361_034


361_042

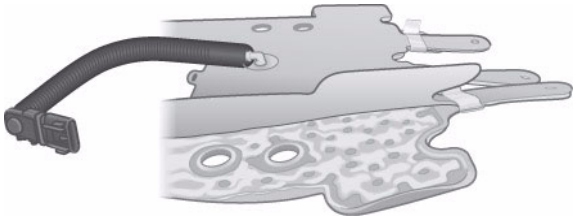
Two resistors are integrated in the circuit. Depending on the position of the reed switch, measurement takes place via one or both resistors. Based on the measured resistance value, the airbag control unit recognises whether the seat belt is fastened or not.



361_029

Pressure sensor for seat occupied recognition G452

The pressure sensor for seat occupied recognition G452
and the seat occupied sensor mat are integrated in a single component. The seat occupied sensor mat is filled with a silicone-like gel and is located under the seat padding of the front passenger seat. When the front passenger seat is occupied, the pressure in the seat occupied sensor mat changes. This pressure change is detected by the pressure sensor for seat occupied recognition and is communicated in the form of a voltage signal to the seat occupied recognition control unit J706. Depending on the load, the voltage ranges between 0.2 V (high load) and 4.8 V (low load). The seat occupied recognition control unit supplies the pressure sensor with a voltage of 5 V.



361_028

Note

The replacement part (service kit) seat occupied sensor (USA) is pre-calibrated; the components must always be installed together.

The service kit consists of:
- Seat occupied recognition control unit J706
- Pressure sensor G452,
- Seat-occupied sensor mat,
- Seat padding,
- Wiring harness between seat occupied recognition control unit J706 and pressure sensor G452.

The pressure hose and the seat occupied sensor mat must never be kinked during assembly.

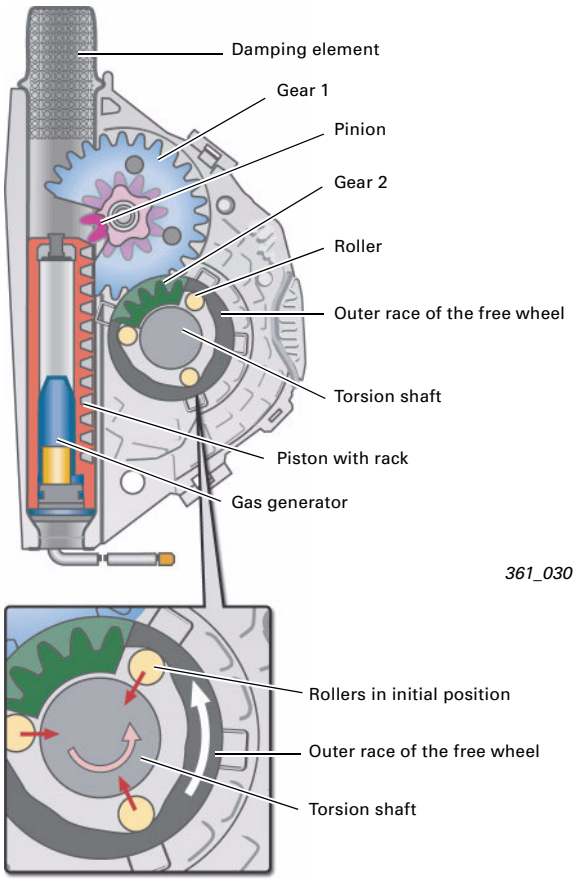
Driver seat belt tensioner igniter 1 - N153
Front passenger seat belt tensioner igniter 1 - N154

In the Audi Q7 for the North American market, belt reels with newly-developed belt tensioners, so-called rack-and-pinion belt tensioners, are used for the driver and front passenger. For the second seat row, the familiar ball gear belt tensioners are used on the outer seats.

Triggered electrically by the airbag control unit, the pyrotechnic propellant charge drives a piston with an integral rack. This, in turn, is connected to the torsion shaft (belt shaft) via gears and a free-wheel. The vertical movement of the rack is converted into a rotary motion via the gears. The rack drives the gears I and II via the pinion. The gear II and the outer race of the free-wheel for the torsion shaft are permanently attached to each other. When the outer race is turned, the rollers are pressed inwards until the outer race and torsion shaft engage positively. The torsion shaft then turns and belt tensioning begins. Tensioning ends as soon as the piston with the rack reaches the damping element or the counterforce exerted by the seat belt exceeds the force of the propellant charge.

During normal operation, the belt reel is isolated from the tensioner unit by the free-wheel.

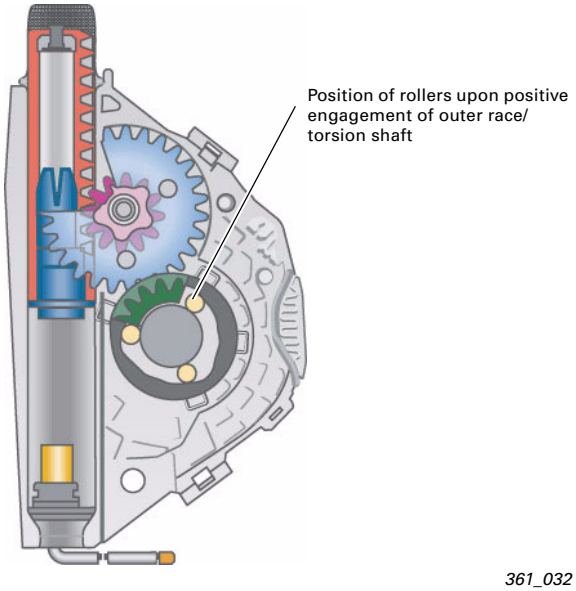
Initial position



361_030

361_031

After triggering



361_032

Engine/gearbox combinations

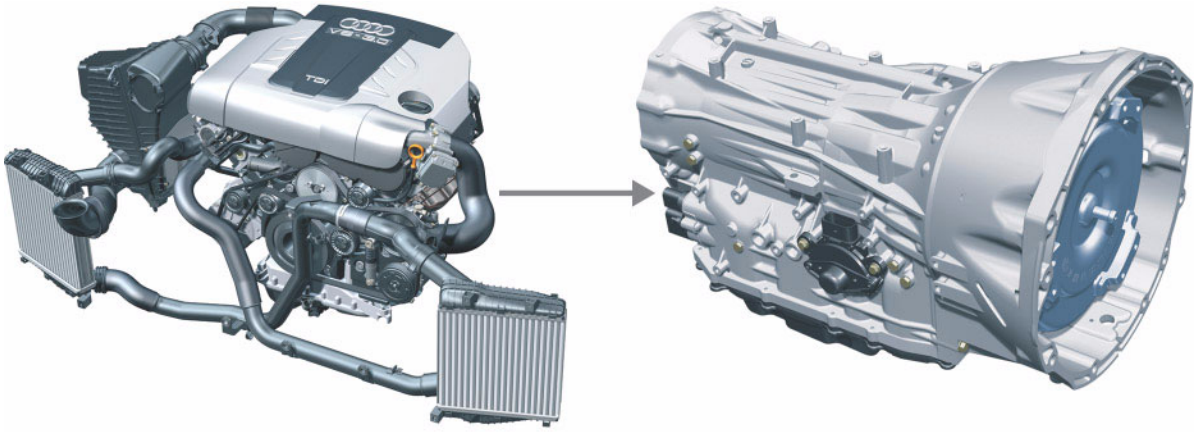
For the market introduction of the Audi Q7, only the 3.0l V6 TDI and the 4.2l V8 FSI engines will be available in conjunction with the (09D) 6A 6-speed automatic gearbox.

Note

For the design and function of the power transmission, please refer to the self-study programme SSP 363 Audi Q7 - Gearbox.

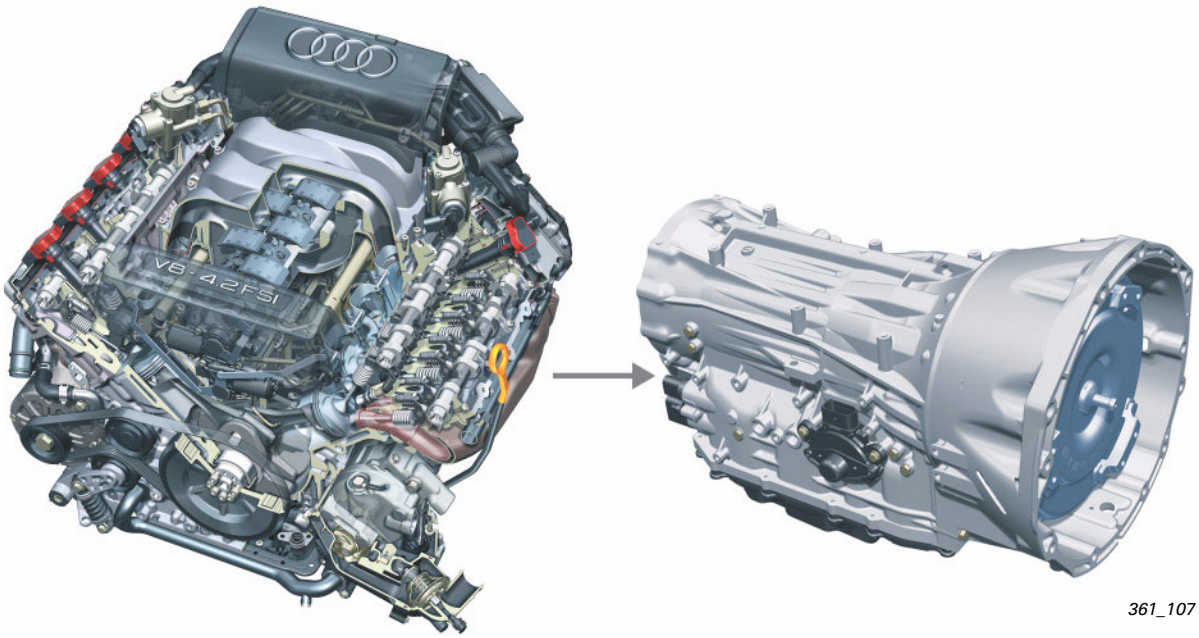
3.0l V6 TDI common rail injection engine

AL 750 6A 6-speed automatic gearbox



4.2l V8 FSI direct injection petrol engine

AL 750 6A 6-speed automatic gearbox

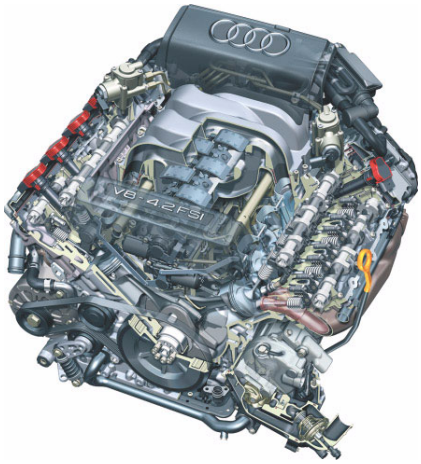


361_107

Two petrol engines featuring FSI technology and a common rail diesel engine in conjunction with the ML 400 6-speed manual gearbox and the AL 420 and AL 750 6-speed automatic gearboxes will also be available at a later date.

4.2l V8 FSI

The engine number is located in the inner V of the engine block at the left cylinder head.



361_126

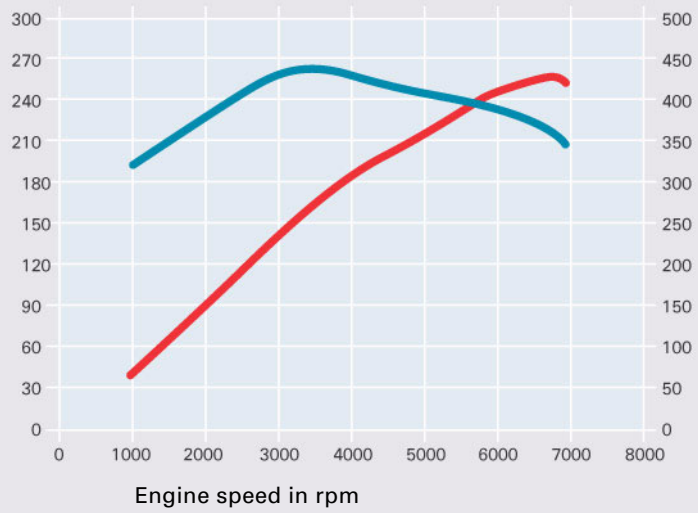
Technical features

- Chain drive on the power take-off side
- Selective FSI petrol direct injection
- Individual pencil ignition coils
- 2 primary and 2 main catalytic converters
- 4 Lambda probes

Torque / power curve

Torque in Nm

Power output in kW



361_047

Technical data

Engine code letters	**BAR**
Design	V8 petrol engine, 90° V angle
Capacity	4163 cm^3
Output	257 kW (350 PS) at 6800 rpm
Torque	440 Nm at 3500 rpm
Bore	84.5 mm
Stroke	92.8 mm
Compression	12.5:1
Distance between cylinders	90 mm
Weight	approx. 198 kg
Firing order	1 - 5 - 4 - 8 - 6 - 3 - 7 - 2
Engine management	Bosch Motronic MED 9.1.1
Exhaust gas recirculation system	Internal exhaust gas recirculation
Exhaust-emission control	2 primary catalytic converters, 2 main catalytic converters
Emission standard	EU 4

3.0l V6 TDI Common Rail

Technical features

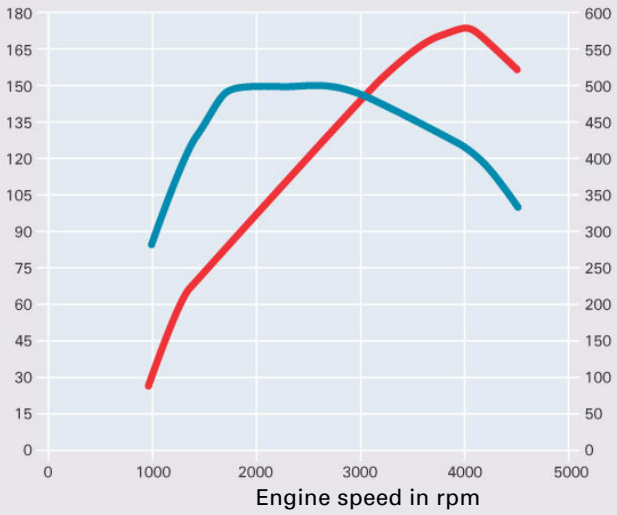
- Chain drive on the power take-off side
- Common rail injection system with 1600 bar injection pressure
- 8-hole piezo injectors
- Turbocharger with variable turbine geometry
- Steel glow plugs
- Diesel particulate filter

361_110

Torque / power curve

Torque in Nm

Power output in kW



361_048

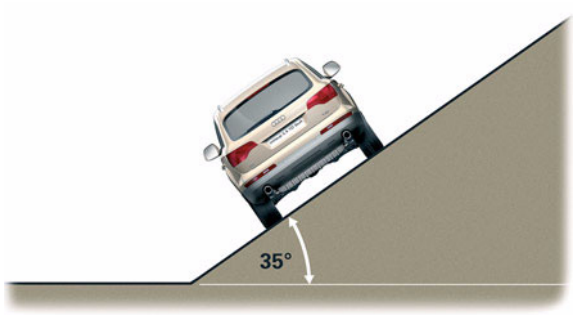
Technical data

Engine code letters	**BUG**
Design	V6 diesel engine, 90° V angle
Capacity	2967 cm^3
Output	171 kW (233 PS) at 4000 rpm
Torque	500 Nm from 1750 to 2750 rpm
Bore	83 mm
Stroke	91.4 mm
Compression	17.0:1
Distance between cylinders	90 mm
Weight	approx. 221 kg
Firing order	1 - 4 - 3 - 6 - 2 - 5
Engine management	Bosch EDC 16 CP
Exhaust gas recirculation	Cooled exhaust gas recirculation, switched
Exhaust-emission control	Oxidation catalytic converter, Lambda probe, particulate filter
Emission standard	EU 4

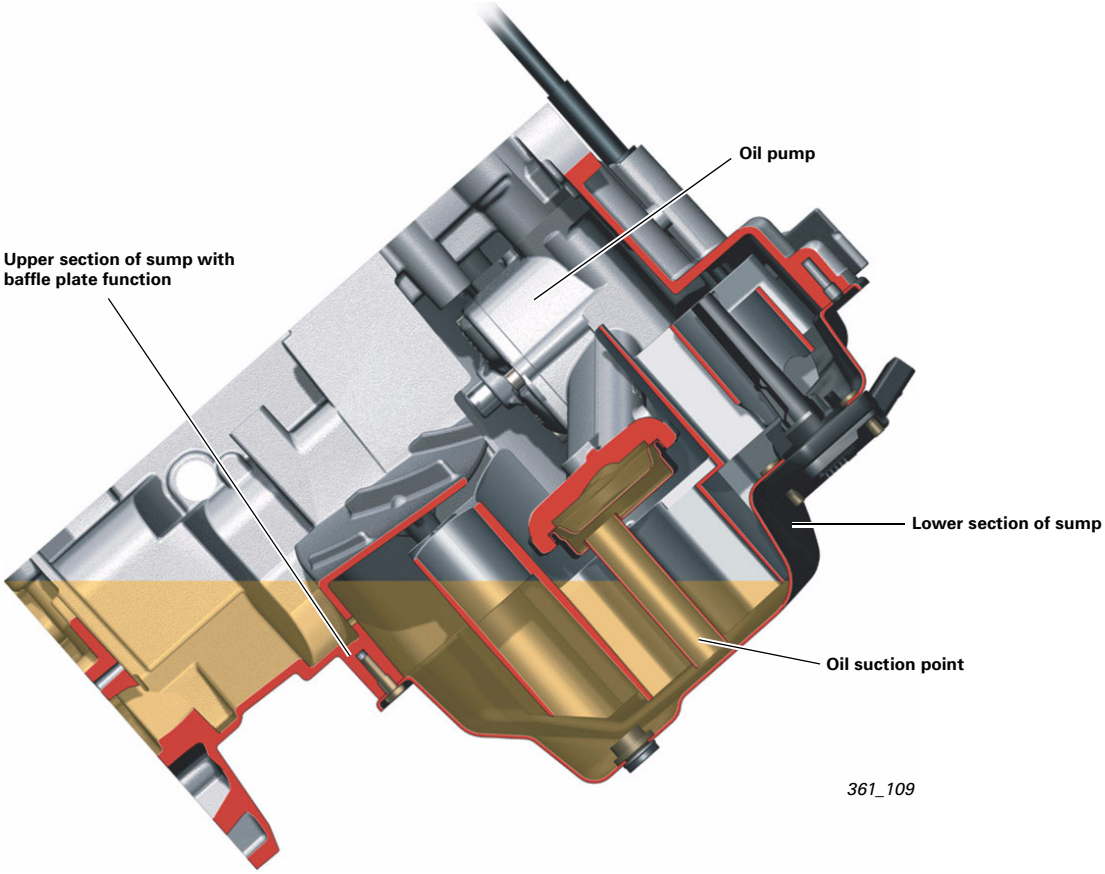
3.0l V6 TDI modifications

Lateral inclination

The oil supply in the engine must be ensured during extreme off-road situations.
For this reason, in the case of the Q7, the oil sump and oil suction pipe have been designed and modified so that sufficient oil can be supplied to the pump even in the case of extreme lateral inclination of the vehicle. Additional baffle plates are integrated in the upper section of the sump in order to retain the oil. Owing to a deeper sump lower section, the oil suction pipe always remains submerged in the oil.



361_108



361_109

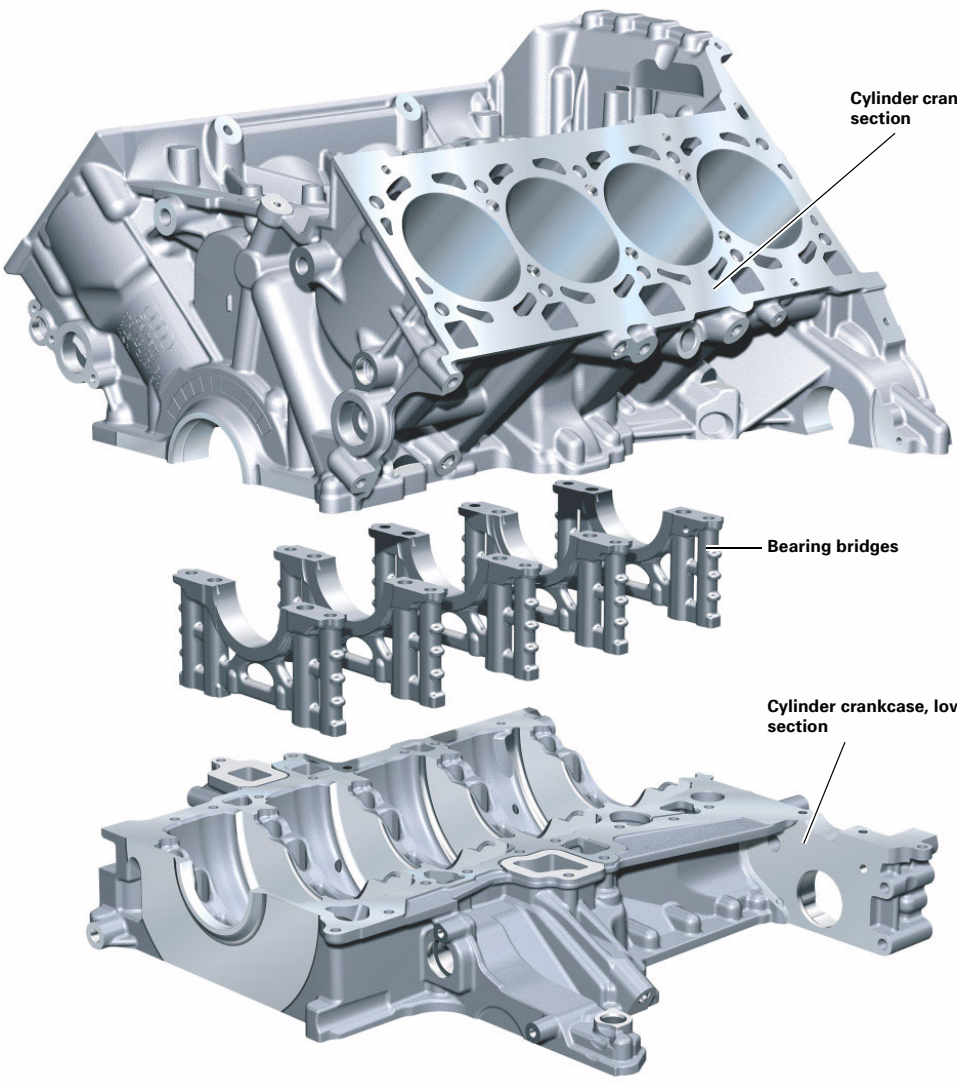
Note

Extraction of the engine oil is not permitted on this engine.

4.2l V8 FSI

Crankcase

With a length of 430 mm and a width of 520 mm, the 90° V cylinder crankcase is very compact. The bore diameter is of 84.5 mm and the distance between cylinders is 90 mm. Cylinder liners have been dispensed with in order to achieve a wall thickness of 5.5 mm between the cylinders. The finish-machining of the aluminium cylinder barrels is performed by means a three-stage honing and erosion process.



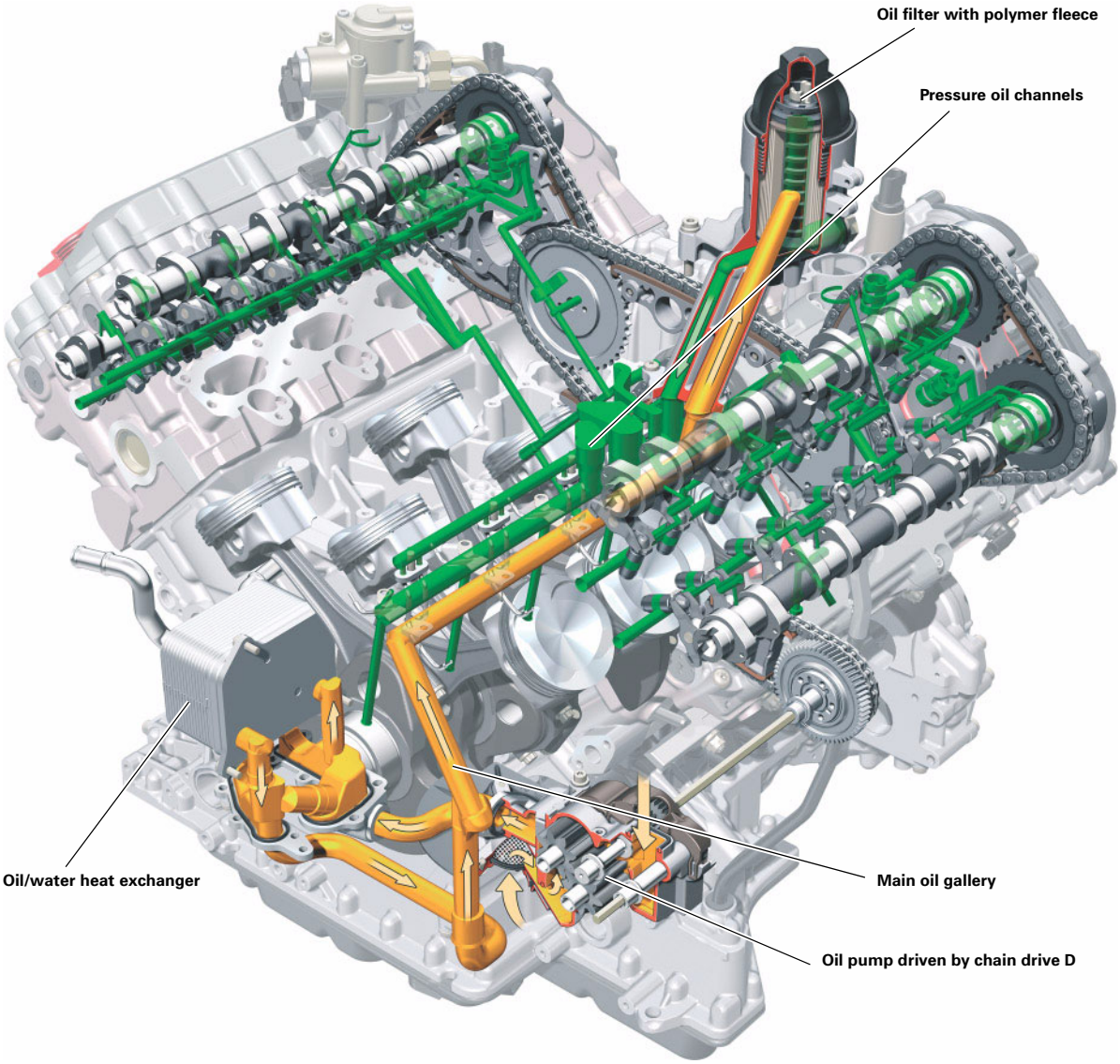
361_120

Note

For information on design and function, please refer to the self-study programme SSP 377.

Oil circuit

The oil supply is based on a classic wet-sump concept. It has been possible to reduce the delivery rate of the oil pump through optimisation of the crankshaft bearings. For this reason, the oil remains in the sump for longer, improving degassing. In order to ensure a low oil temperature, an oil/water heat exchanger is used, which is located on the oil sump in front of the engine.
The oil filter module is maintenance-free and is installed in the inner V of the engine. The filter element is easy to replace without special tools. It is made of a polymer fleece.

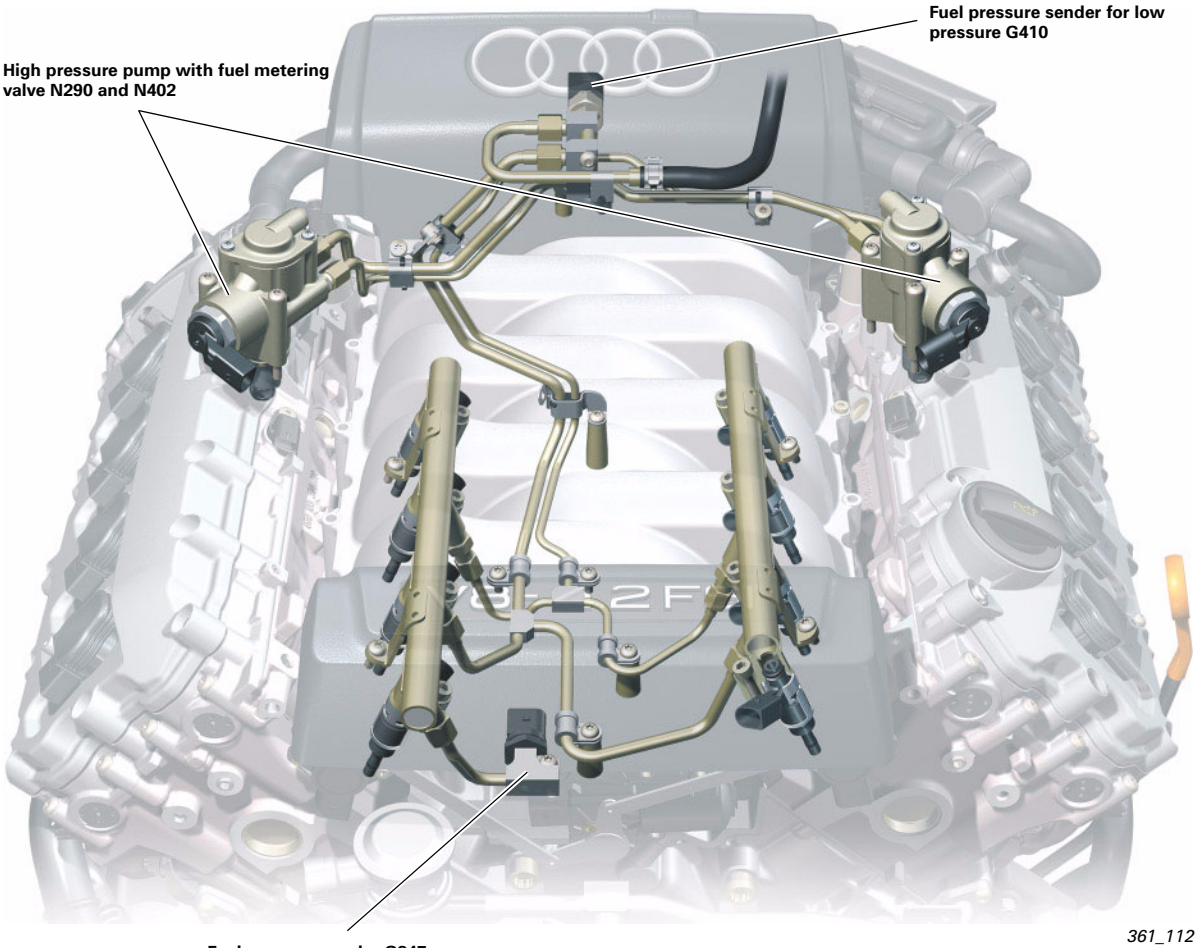


361_111

Fuel system

Two demand-controlled single-plunger high-pressure pumps are used in the fuel system, which are driven by a double cam on each of the inlet camshafts.
In comparison with a constant delivery pump, the drive power is reduced depending on the rail pressure.

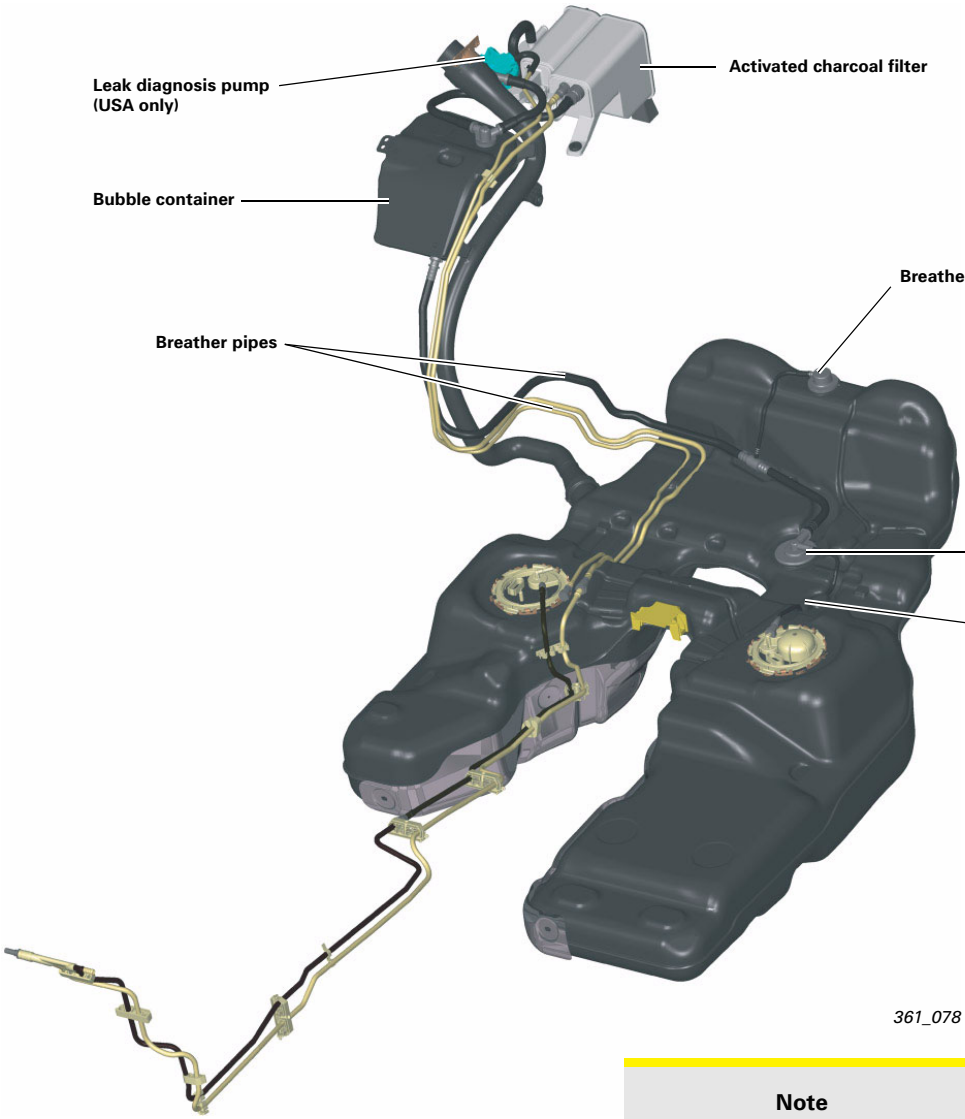
The operating pressure is between 30 and 100 bar.



361_112

Fuel tank

In terms of the tank bladder, the fuel tank is the same component for petrol and diesel engines. Its useful volume is approx.103 l. The main differences are to be found in the fuel tank breather system and the inside of the fuel tank.
Further differences, such as the tank leak diagnosis system are dependent on the use of the vehicle in the various countries.
An appropriately designed fuel tank breather system ensures easy refuelling and prevents the fuel tank from leaking following vehicle roll-over.
Fuel filling level measurement is the same for petrol and diesel engines. In this case, magnetically passive position sensors (MAPPS) are used. One sensor is fitted in each chamber.



Note

The operating principle of the MAPPS is described in detail in the self-study programme SSP 282.

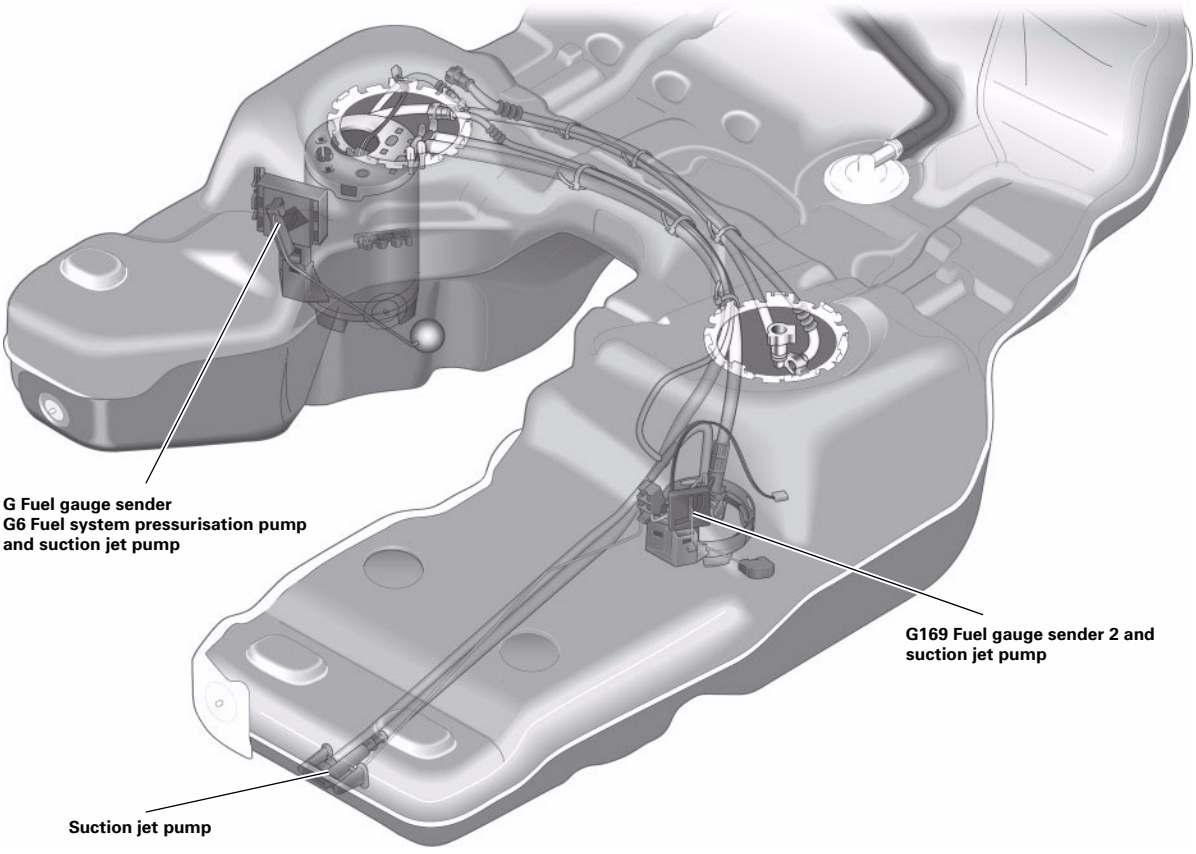
Petrol engine

Here, a fuel delivery unit is fitted in the fuel tank. It is located in the right main chamber. In order to also deliver fuel from the left chamber, the delivery unit drives two suction jet pumps, which pump the fuel into the delivery unit. The fuel system pressurisation pump G6 is controlled by the fuel pump control unit J538 and generates a pressure of between 3.5 and 5.5 bar. The fuel filter is installed in the left flange connection. The active charcoal filter is located behind the fuel filler neck.

Diesel engine

Here, a fuel delivery unit is fitted in each chamber. Each fuel delivery unit drives a suction jet pump in the other chamber.

Inside view of tank – petrol engine



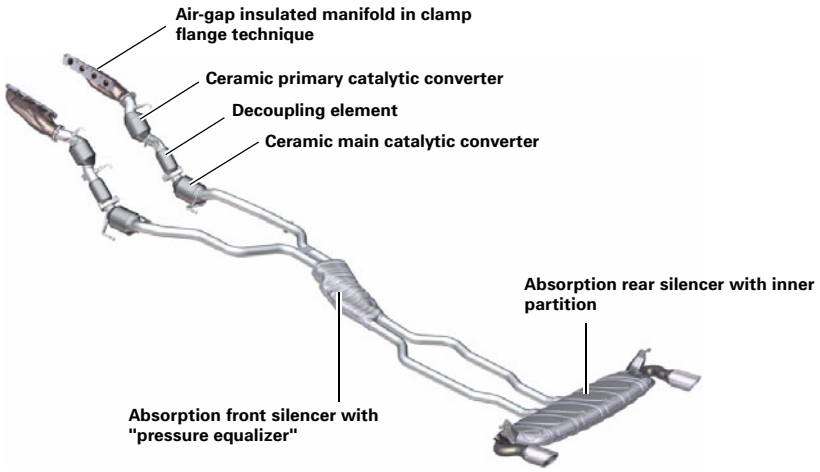
361_081

Exhaust system

4.2l V8 FSI engine

The complete exhaust system from the cylinder heads to the tailpipes is designed as a dual-branch system.

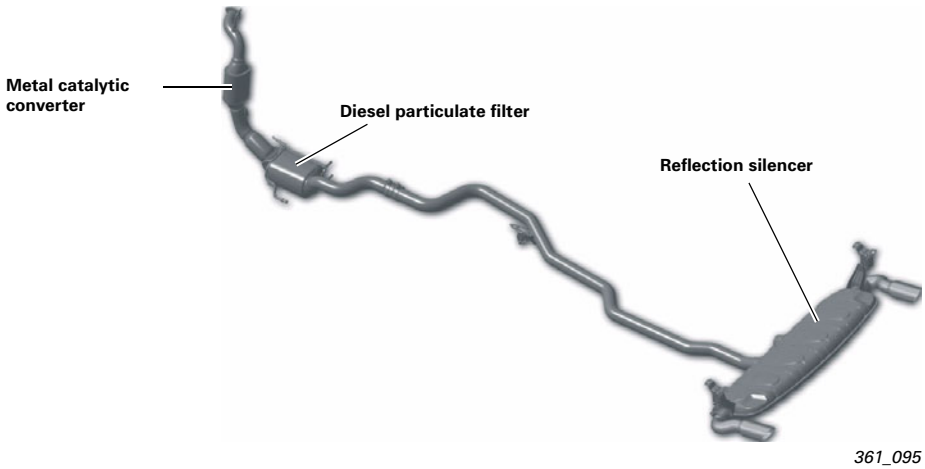
Air gap insulated manifolds in the clamp flange technique are bolted onto the cylinder heads. These optimize flow characteristics, ensuring quick heating of the catalytic converters.
The metal oxidation catalytic converters reach operating temperature very quickly thanks to their design and proximity to the engine. The broadband and transition Lambda probes are located upstream and downstream of the primary catalytic converters respectively.
The two ceramic catalytic converters are located near the underbody.
The front silencer is a shared component. It is designed as an absorption-type silencer and features a "pressure equalizer" between the two exhaust branches, which has a positive impact on engine power output and torque.
The absorption-type front silencer is also a shared component. However, it contains an internal partition for the exhaust branches.



361_124

3.0l V6 TDI engine

With this engine, the exhaust system downstream of the turbocharger is designed as a singe-branch system. Cast manifolds are bolted to the cylinder heads, which route the exhaust gas into the common turbocharger. A metal catalytic converter is fitted downstream of the turbocharger. The maintenance-free diesel particulate filter is located in the underbody area. The rear silencer is designed as a reflection silencer.



361_095

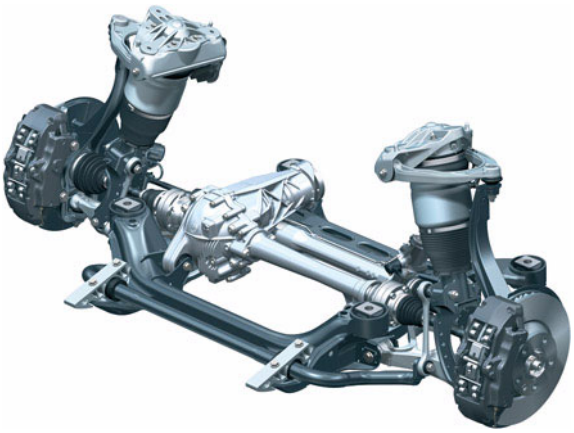
Overview

The running gear also excels through its all-rounder qualities. Steel-spring suspension and twin tube shock absorbers are set up for sporty driving properties and high comfort, even during off-road use. The optionally available adaptive air suspension with an electronically controlled damper system represents the perfect synthesis of decidedly sporty handling characteristics and the highest ride comfort.

362_001

Front axle

A double wishbone axle is used. The design principle has been adopted from the VW Touareg. The springs, shock absorbers, anti-roll bars and lower wishbones have been modified.



361_128

Rear axle

A double wishbone axle with split upper wishbones is used. The design principle has been adopted from the VW Touareg. The mounting bracket, wheel bearings and wishbones are identical components. The increased track width, which has been extended by 14 mm, is achieved by means of a modified wheel carrier.

362_075

Brake system

	Front axle	Rear axle	
Engine	V8 petrol engine, V6 FSI and TDI	V8 petrol engine	V6 FSI and TDI
Minimum wheel size	18"	18"	18"
Brake type	Brembo aluminium fixed caliper	Brembo aluminium fixed caliper	Brembo aluminium fixed caliper
Number of brake pistons	6	4	4
Brake piston diameter (mm)	30/34/38	28/32	28/30
Brake disc diameter (mm)	350	358	330

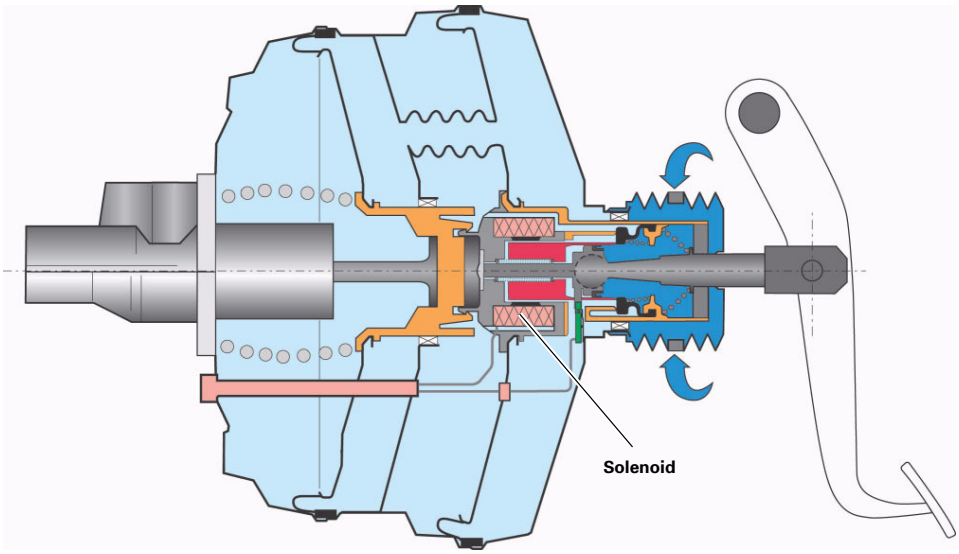
Internally ventilated brake discs are used on the front and rear axles. The brake pads feature brake pad wear monitoring.
The parking brake is a foot-operated servo drum brake.

362_036

362_037

Brake system

An active brake servo is used for the first time. Through electrical activation of a proportional magnet in the brake servo, brake pressure can be generated without actuation of the pedal by the driver. An admission pressure is generated on the suction side of the ESP pump. This enables the ESP pump to generate braking pressure very rapidly. The rapid brake pressure generation is required for certain ESP control interventions.



362_045

ESP

Owing to the large brake fluid volume in the brake system of the Audi Q7, a new TEVES ESP assembly with the designation Mk25E1 is used.

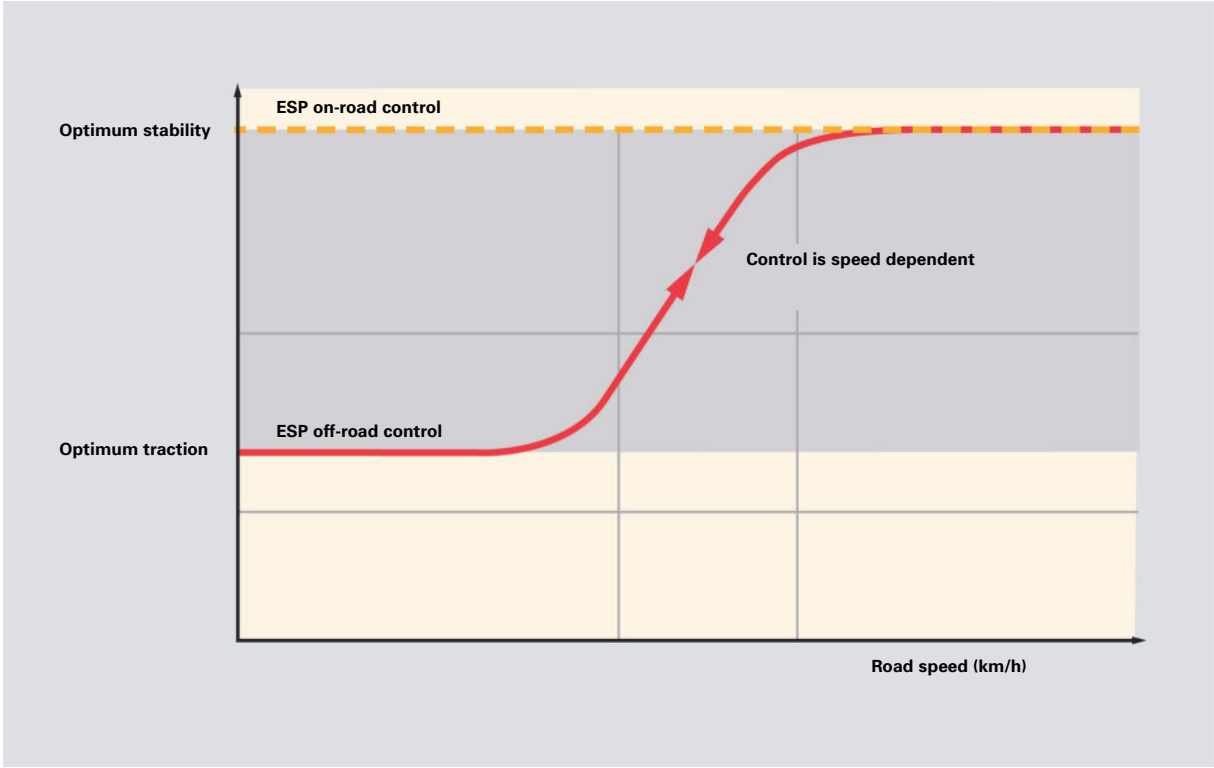
Active Hall sensors are used to detect the wheel speeds. The operating principle is the same as that of the sensors already used in the Audi A8 ´03.

In the Audi Q7, the familiar dual sensor is used for detecting lateral acceleration, yaw velocity and longitudinal acceleration. The sensor is installed in the front passenger footwell.

362_052

362_080

ESP



362_057

Some new functions are implemented with the new ESP. The "off-road" mode is particularly worthy of mention. The basic function of this mode is to optimise the ESP/ASR/EDS and ABS interventions with respect to traction and braking on loose surfaces (off-road).

362_058

The mode is activated by briefly pressing (< 3 s) on the ESP button.

362_059

Steering system

A conventional hydraulic steering system with a vane pump, rotary slide valve and a rack-and-pinion steering gear with a variable ratio is used. The Servotronic function is equipped as standard. The Servotronic II familiar from the current Audi A8 ´03 is used (see SSP 285). Activation of the Servotronic solenoid valve is performed by the onboard supply control unit J520.

The design and function of the steering wheels have been adopted from the Audi A6 ´05. The range comprises three-spoke and four-spoke steering wheels. These are optionally available with leather trim, multifunction buttons, Tiptronic and heated steering wheel rim.

362_064

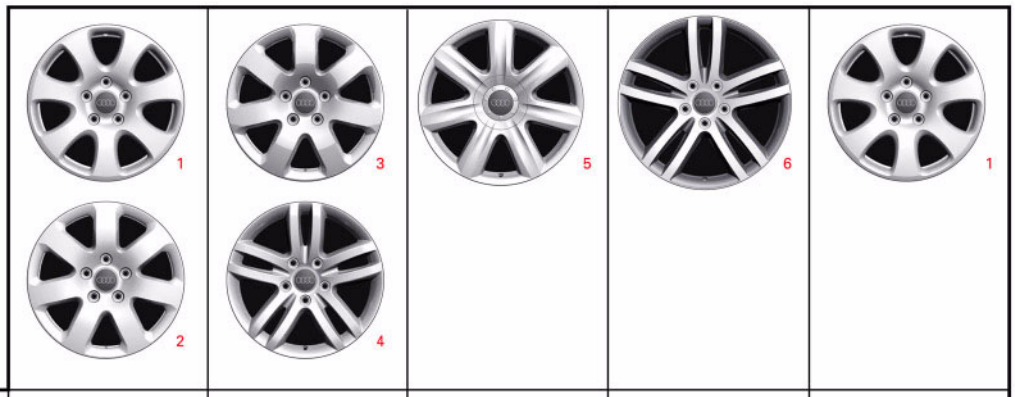
362_069

A mechanically-adjustable steering column is available as basic equipment. The plate-clamp system is the same as on the steering columns of the Audi 8 and Audi A6 ´05 (see SSP 285). The steering columns for the Audi Q7 are also equipped with an electric steering column lock.

362_034

An electric steering column is available as optional equipment. The electric drives have been adopted from the steering column of the Audi A8 ´03.

Wheels and tyres



Engine	Basic wheels	Optional wheels, 18"	Optional wheels, 19"	Optional wheels, 20"	Winter wheels
6-cylinder	7.5J x 18 ET 53 (1) Forged light-alloy wheel, varnished 235/60 R 18	8J x 18 ET 56 (3) Forged light-alloy wheel, polished 255/55 R 18 8.5J x 18 ET 58 (4) Forged light-alloy wheel, varnished 255/55 R 18	8.5J x 19 ET 62 (5) Forged light-alloy wheel, varnished 265/50 R 19	9J x 20 ET 60 (6) Forged light-alloy wheel, polished, two-colour 275/45 R 20	7.5J x 18 ET 53 (1) Forged light-alloy wheel, varnished 235/60 R 18
8-cylinder	8J x 18 ET 56 (2) Forged light-alloy wheel, varnished 255/55 R 18 (available as optional equipment for 6-cylinder)				

362_035

Tyre pressure monitoring system

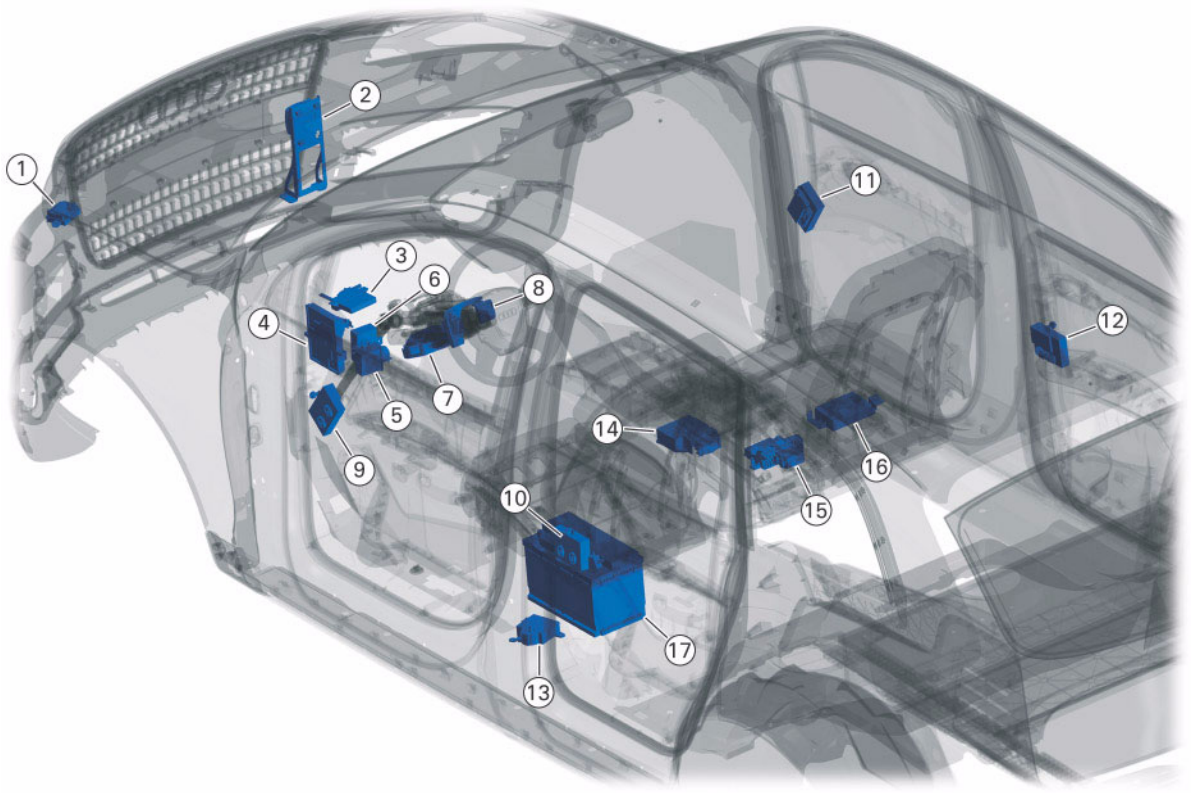
A tyre pressure monitoring system is optionally available for the Audi Q7. Its design and operating principle are the same as those of the Audi A6 ´05 (see SSP 324).

361_127

Installation overview of control units

Note

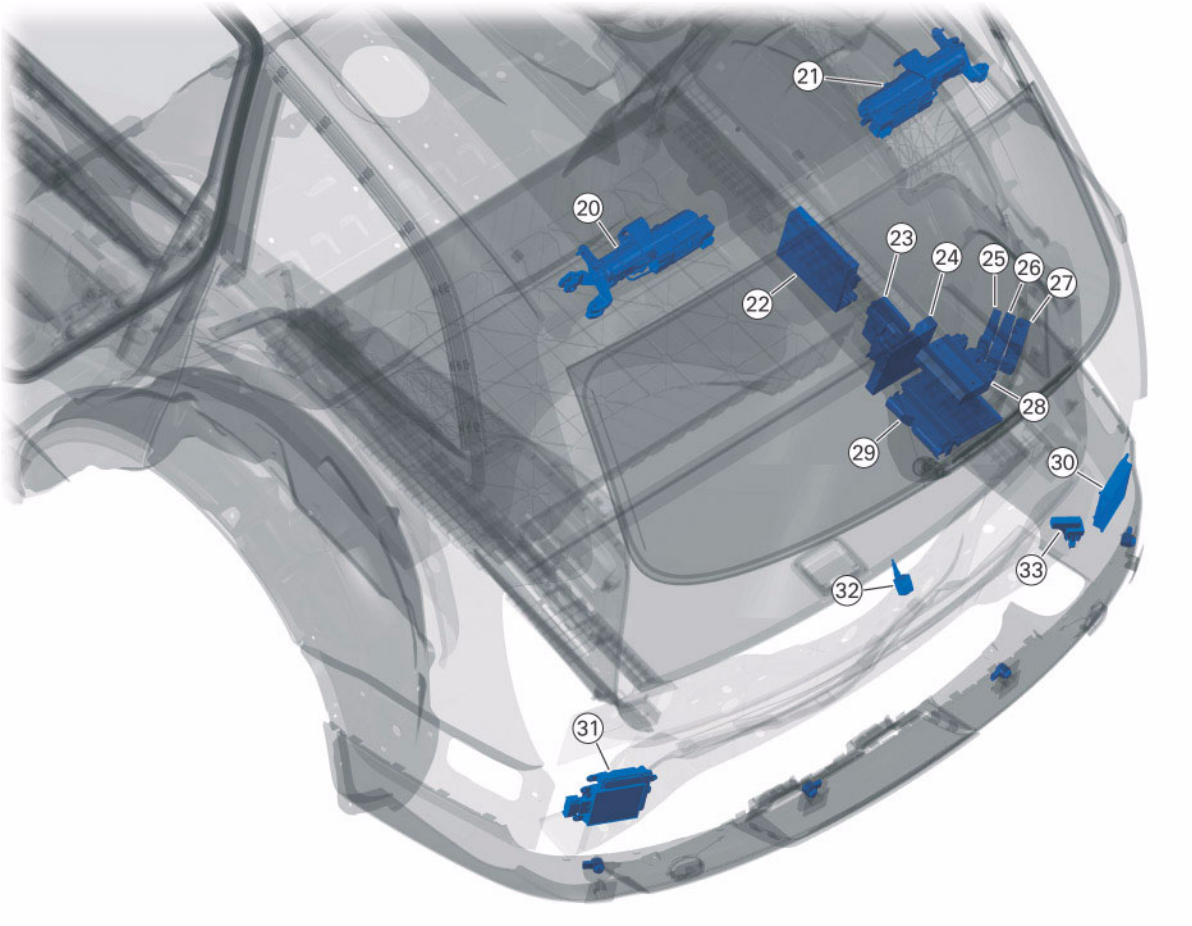
For more information on the electrical system, please refer to the self-study programme SSP 364 Audi Q7 – Electrics.



364_004

Key

1 Garage door operation control unit J530
2 Adaptive cruise control unit J492
3 Data bus diagnostic interface J533
4 Onboard supply control unit J519
5 Control unit for headlight range J431
6 Tyre pressure monitor control unit J502
7 Entry and start authorisation control unit J518
8 Steering column electronics control unit J527
9 Driver door control unit J386
10 Rear left door control unit J388
11 Front passenger door control unit J387
12 Rear right door control unit J389
13 Energy management control unit J644
14 Airbag control unit J234
15 Onboard supply control unit 2 J520
16 Front passenger seat adjustment with memory control unit J521
17 Battery A



364_005

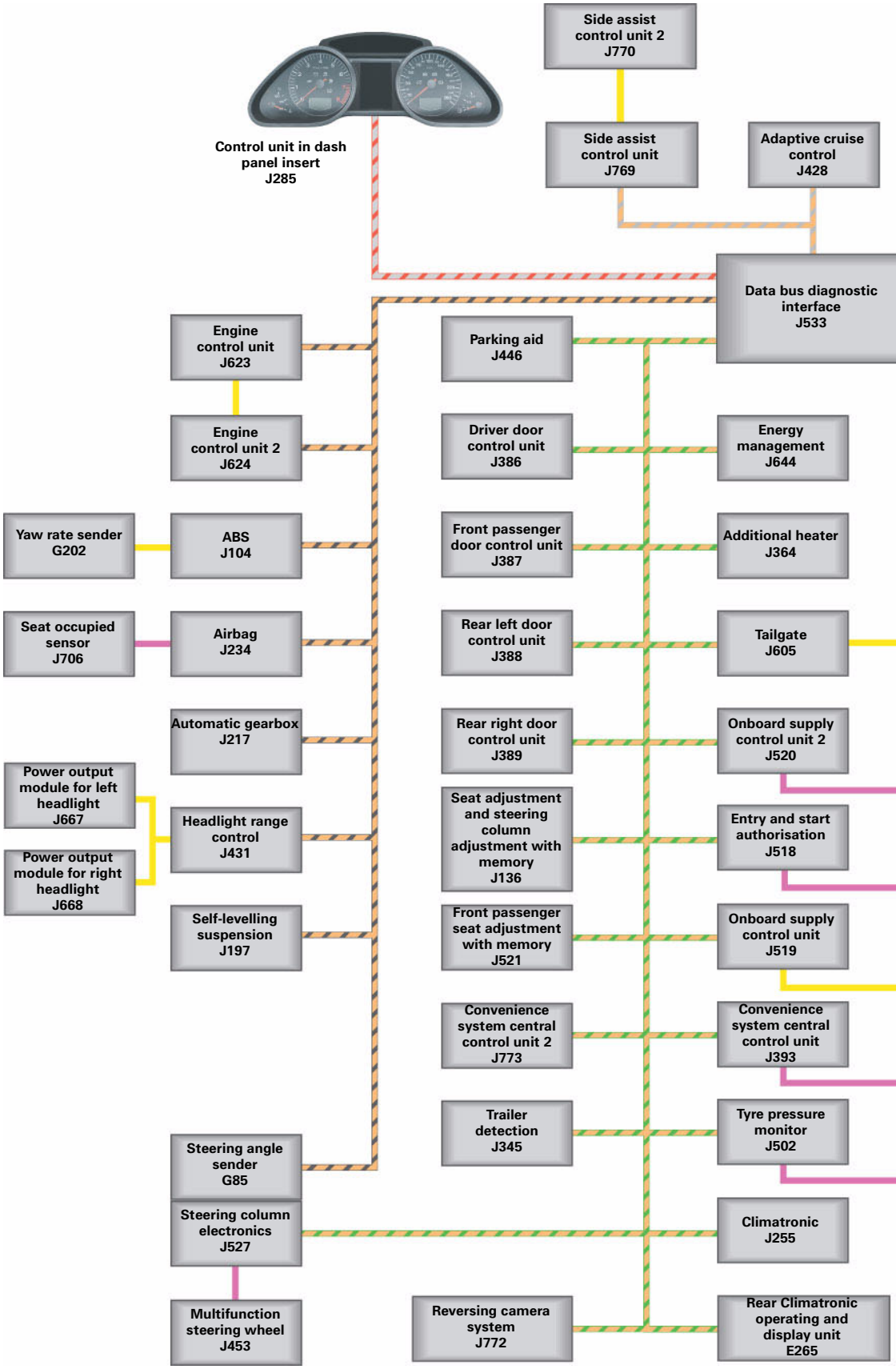
Key

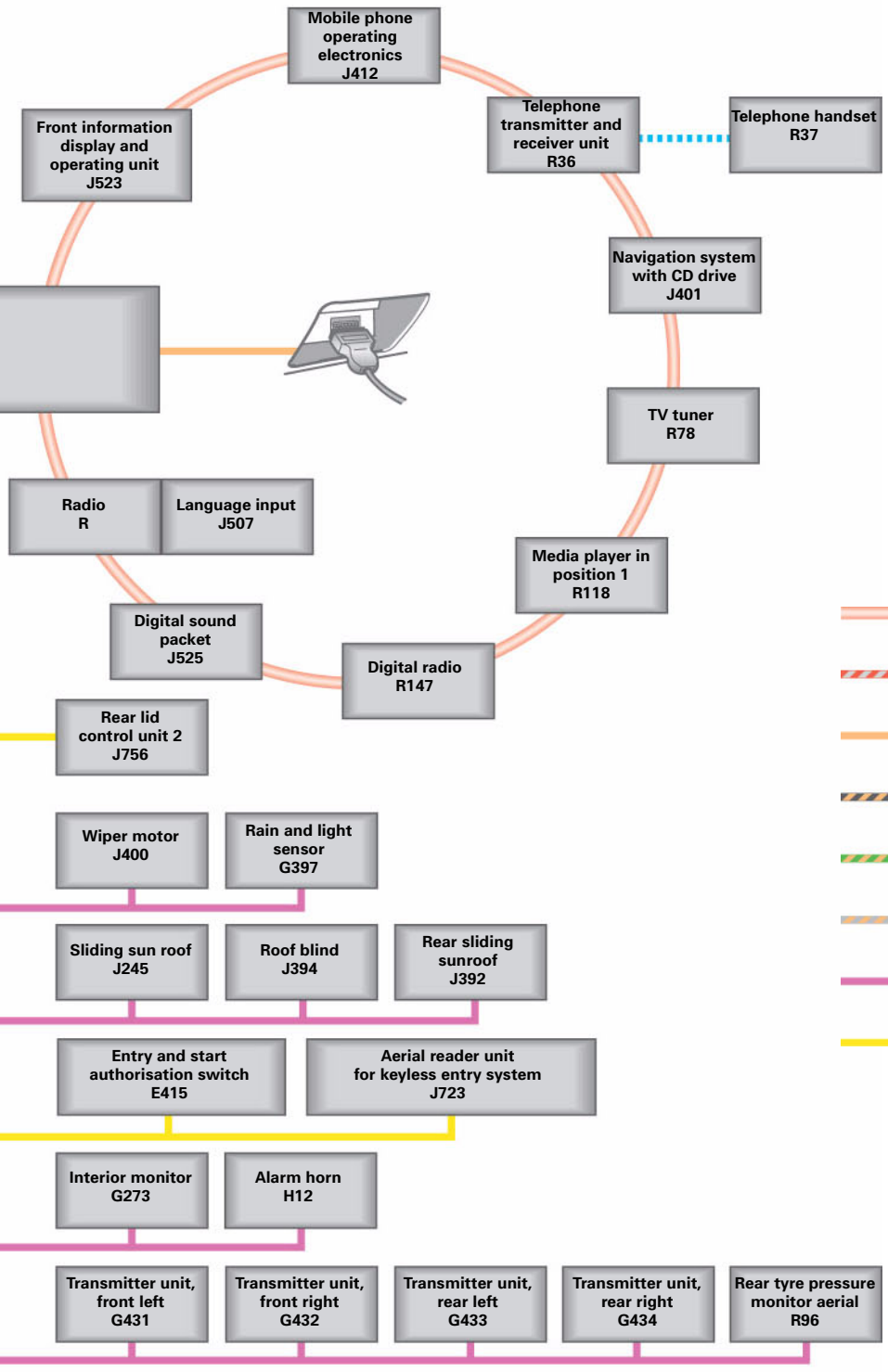
20 Rear lid control unit J605
21 Rear lid control unit 2 - J756
22 Reversing camera system control unit J772
23 Convenience system central control unit J773
24 Convenience system central control unit J393
25 Auxiliary heater control unit J364
26 Aerial reader unit for keyless entry system J723
27 Parking aid control unit J446
28 Trailer detector control unit J345
29 Adaptive suspension control unit J197
30 Side assist control unit J769
31 Side assist control unit 2 - J770
32 Reversing camera R189
33 Radio controlled clock receiver J489

Note

For information on the driver assistance systems, please refer to the self-study programme SSP 375Audi Q7 - New Driver Assistance Systems.

Networking


Side assist control unit 2 J770
Control unit in dash panel insert J285
Side assist control unit J769
Adaptive cruise control J428
Data bus diagnostic interface J533
Engine control unit J623
Parking aid J446
Engine control unit 2 J624
Driver door control unit J386
Energy management J644
Yaw rate sender G202
ABS J104
Front passenger door control unit J387
Additional heater J364
Seat occupied sensor J706
Airbag J234
Rear left door control unit J388
Tailgate J605
Automatic gearbox J217
Rear right door control unit J389
Onboard supply control unit 2 J520
Power output module for left headlight J667
Power output module for right headlight J668
Headlight range control J431
Seat adjustment and steering column adjustment with memory J136
Entry and start authorisation J518
Self-levelling suspension J197
Front passenger seat adjustment with memory J521
Onboard supply control unit J519
Convenience system central control unit 2 J773
Convenience system central control unit J393
Trailer detection J345
Tyre pressure monitor J502
Steering angle sender G85
Steering column electronics J527
Climatronic J255
Multifunction steering wheel J453
Reversing camera system J772
Rear Climatronic operating and display unit E265


Mobile phone operating electronics J412
Telephone transmitter and receiver unit R36
Telephone handset R37
Front information display and operating unit J523
Navigation system with CD drive J401
TV tuner R78
Radio R
Language input J507
Media player in position 1 R118
Digital sound packet J525
Digital radio R147
Rear lid control unit 2 J756
Wiper motor J400
Rain and light sensor G397
Sliding sun roof J245
Roof blind J394
Rear sliding sunroof J392
Entry and start authorisation switch E415
Aerial reader unit for keyless entry system J723
Interior monitor G273
Alarm horn H12
Transmitter unit, front left G431
Transmitter unit, front right G432
Transmitter unit, rear left G433
Transmitter unit, rear right G434
Rear tyre pressure monitor aerial R96
MOST bus
Dash panel insert CAN
Diagnostics CAN
Drive CAN
Convenience CAN
Adaptive cruise control CAN
LIN bus
Various secondary bus systems

364_006

Overview

The new Audi Q7 is equipped with an air conditioning system as standard. Three different air conditioners are available:

Air conditioner (basic)

361_069

Deluxe automatic air conditioner

361_071

Four-zone deluxe automatic air conditioner

361_118

The systems can be identified by means of the different air conditioner operating units. The basic air conditioner does not feature an automatic function. The deluxe automatic air conditioner and the four-zone deluxe automatic air conditioner are equipped with sun-position dependent control, separate temperature and air distribution for the driver and front passenger sides, and indirect ventilation. Air conditioning of the rear passenger compartment is achieved via air vents in the B-pillars, and also in the C-pillars in the case of the four-zone system. The refrigerant circuit is a further development based on the air conditioning system already successfully implemented in the VW Touareg.

Note

The electrics and operation of the air conditioning system are based on the Audi A6 '05. The Climatronic control units J255 are also based on the Audi A6 '05 and have been further developed for use in the Audi Q7.

The optionally available four-zone deluxe automatic air conditioner features an additional air conditioner unit in the rear passenger compartment. The components of the rear air conditioner unit are easily accessible behind the left side trim in the luggage compartment. The rear air conditioner unit has been adopted without modifications from the VW Touareg.

Note

The refrigerant circuit is described in detail in the self-study programme SSP 301.

Refrigerant circuit

General

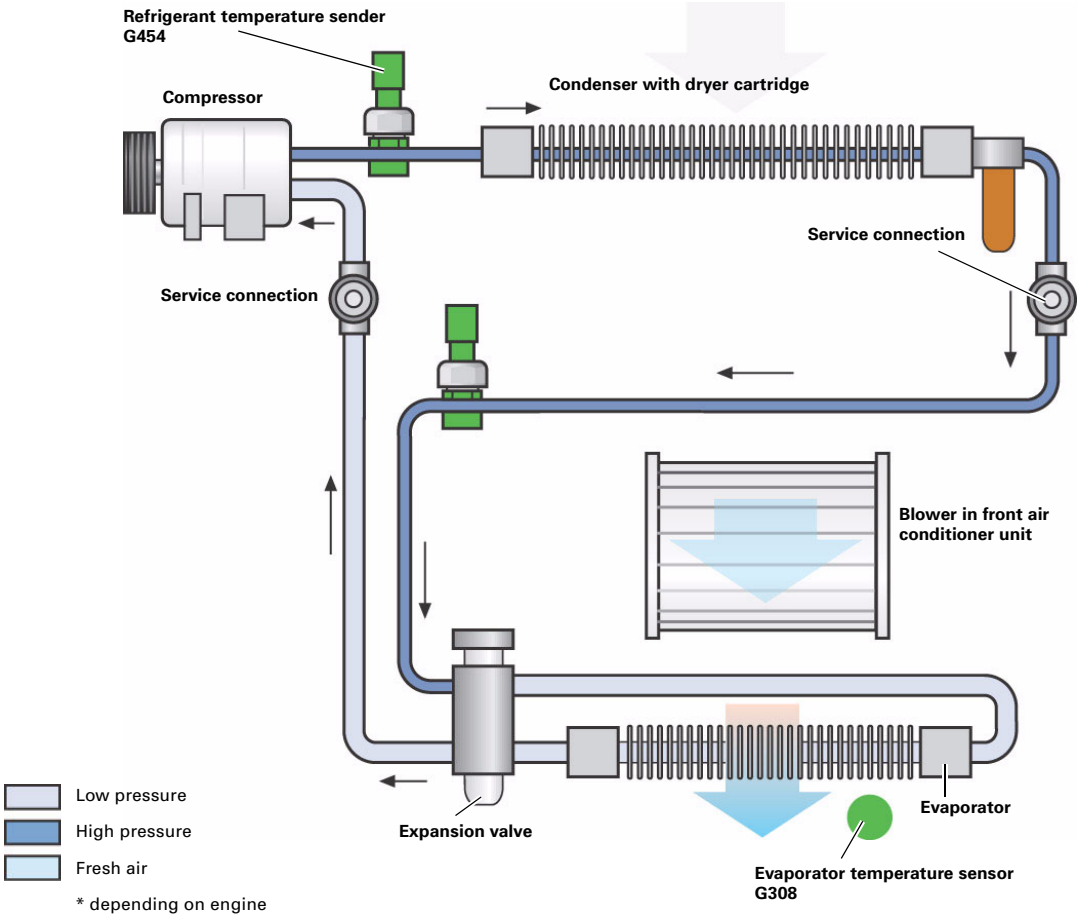
The refrigerant circuits of the three systems are identical to those in the VW Touareg.

The air conditioner units are supplied by a common compressor. In four-zone systems, the rear air conditioner unit additionally features a heat exchanger and an evaporator. The systems are equipped with a dust and pollen filter in the front air conditioner unit. The rear air conditioner unit only draws in already filtered interior air.

The familiar R134a refrigerant is used. The refrigerant and refrigerant oil capacities are different for two and four-zone systems.

Refrigerant circuit of both the two-zone systems

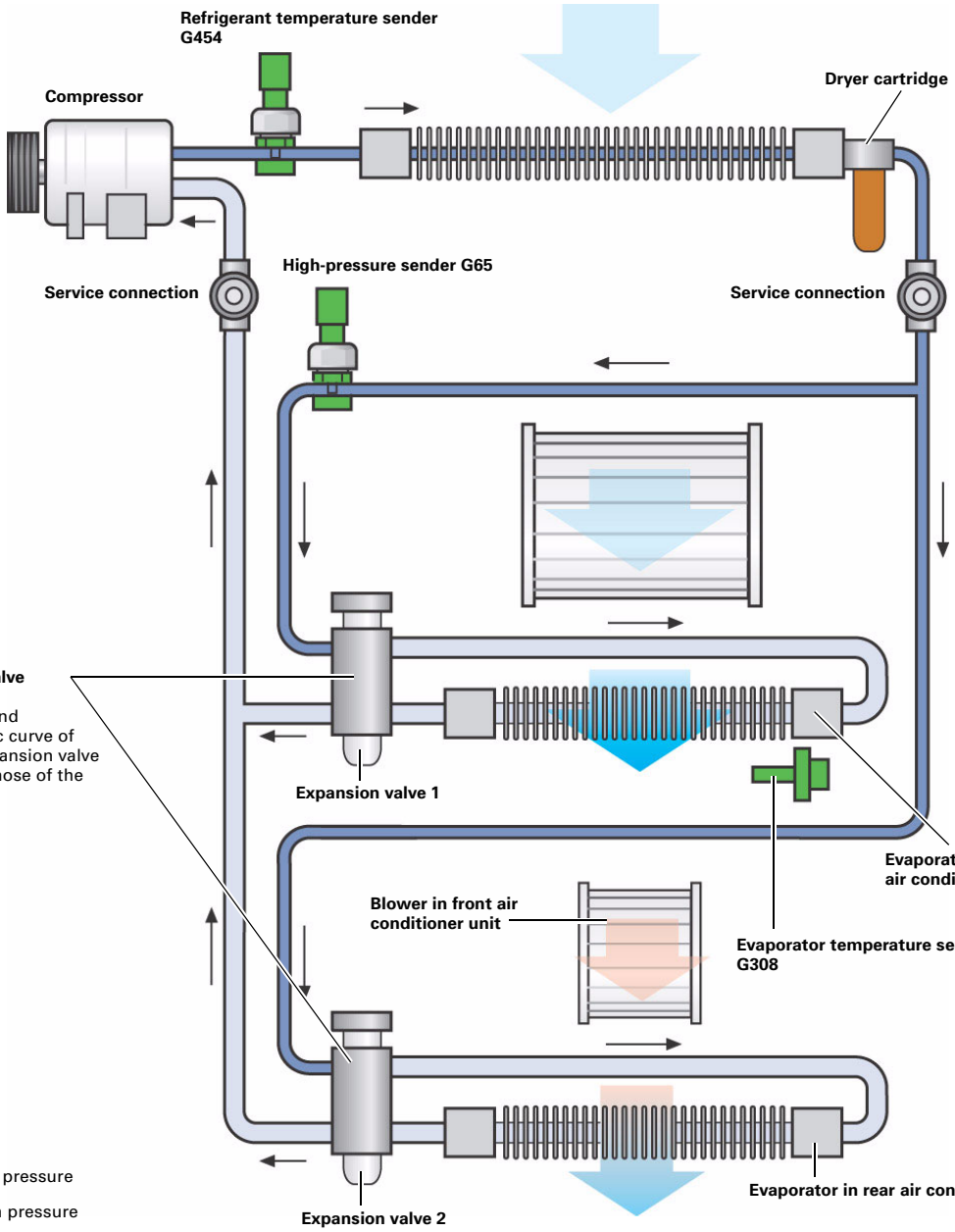
In terms of design and function, the systems are the same as those familiar from the VW Touareg. Depending on the engine version, the refrigerant temperature sender G454 is installed. It is not used on all engine versions. The sender detects the temperature of the refrigerant and transmits it to the Climatronic control unit J255.



361_116

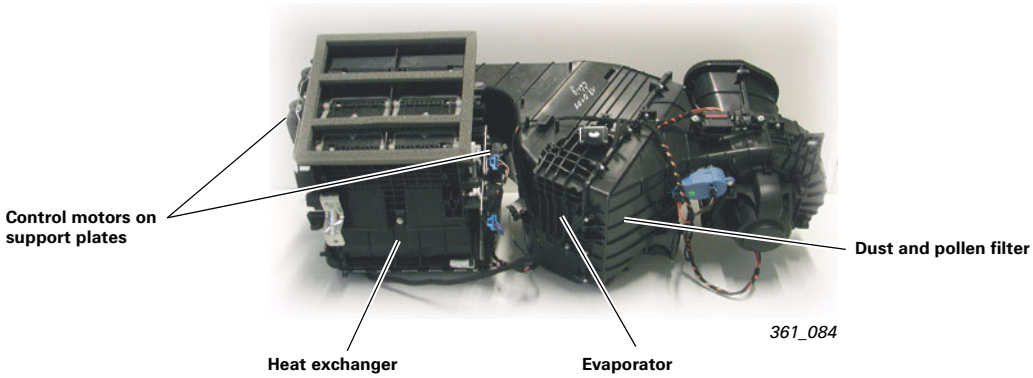
Refrigerant circuit of the four-zone deluxe automatic air conditioner

The two evaporators of the four-zone air conditioner are integrated in parallel into the refrigerant circuit. They are both supplied by a single externally-controlled compressor. In the case of a V6 TDI engine, the compressor is driven via a muli-V belt and in the case of a V8 FSI engine, via a drive shaft.
The receiver is integrated in the condenser and contains the dryer cartridge. Currently, this can be replaced without removing the condenser when the refrigerant circuit is empty. The receiver is installed on the right side of the condenser.



Front air conditioner unit

The front air conditioner unit is the same in design and function as that of the VW Touareg. However, additional control motors have been fitted. All three air conditioners are air-controlled systems.



Most of the control motors can be replaced with the dash panel in place; the specific repair operations are described in the Workshop Manual.

Air distribution in the front passenger compartment

Fresh air is drawn in via the blower on the right side of the vehicle in the area of the plenum chamber.
The air passes through the dust and pollen filter and the evaporator, which is located immediately adjacent to the pollen filter.
In order to achieve independently-controllable air outlet temperatures for the driver and front passenger sides, separately adjustable temperature flaps are used in the deluxe automatic air conditioner and four-zone deluxe automatic air conditioner.
The position of the temperature flaps determine the volume ratio at which cold evaporator air and heated air from the heat exchanger are mixed. This enables different air outlet temperatures to be set for the front occupants.
In the case of the basic air conditioner, both temperature flaps are permanently attached to one another by means of a shaft. The air outlet temperature at the front vents is the same on both the driver and front passenger sides.

The table shows the number and designations of the various control motors for the three air conditioner versions. In the basic air conditioner version, the control motors perform various functions:

	Control motors	No.	Air conditioner (basic)	Automatic air conditioners	
				2-zone and 4-zone automatic air conditioners **Front**	4-zone automatic air conditioner **Rear**
1	Left footwell flap	V108X	X Controls the L and R footwell flaps	X	
2	Temperature flap, left	V158X	X Controls the L and R temperature flaps, is installed on right of air conditioner unit	X	
3	Defrost flap	V107	X	X	
4	Side vent, left	V299	X Controls the L and R side vents and the flaps of the L and R centre vents		
5	Centre vent, left	V110		X	
6	Centre vent, right			X	
7	Side vent, right	V300		X	
8	Temperature flap, right	V159		X	
9	Footwell flap, right	V109		X	
10	Recirculated air flap	V113	X Base without potentiometer	X	
11	Temperature flap, rear right	V314			X
12	Air flow flap, rear right	V240			X
13	Air flow flap, rear right	V239			X
14	Temperature flap, rear left	V313			X
15	Shutoff flap at B-pillar and footwell, left	V212			X
16	Directional vent, rear left	V315			X
17	Directional vent, rear right	V316			X
18	Shutoff flap at B-pillar and footwell, right	V211			X

A potentiometer is installed in each control motor. The air recirculation flap control motor V113 is an exception. The potentiometer for air recirculation flap control motor G143 is only installed in the control motor V113 in the case of the two deluxe automatic air conditioners. Consequently, in vehicles equipped with a basic air conditioner, the control motor V113 can only be moved from one end stop to the other.
Fault detection is not possible without the potentiometer.

Rear air conditioner unit

The rear air conditioner unit is located under the side trim at the left of the luggage compartment. The blower motor draws in the air to be cooled directly from the passenger compartment.
During auxiliary heater and residual heat operation, the rear air conditioner unit remains switched off.

Flaps of the rear air conditioner unit

The rear air conditioner unit has two temperature and two air flow flaps. These permit adjustment of the two separate climate zones for the rear occupants. The required outlet temperatures on the right or left rear passenger compartment sides are achieved through the mixture of cold air from the rear evaporator and warm air from the rear heat exchanger.

Rear air conditioner unit service position

The rear air conditioner unit can be brought into a service position. Both the refrigerant pipes and coolant hoses remain connected for this purpose, neither of the circuits are opened.
In the service position, the rear heat exchanger and rear fresh air blower, for example, can be replaced.

Operating units

Air conditioner operating unit (basic)

With the basic air conditioner version it is possible to control the temperature, blower volume and air distribution via rotary controls. The system has no automatic recirculated air mode, no sun-position control and no indirect ventilation option.
The heated front seats (optional equipment) can be adjusted in 3 stages, as in the Audi A6 '05.

361_068

Deluxe automatic air conditioner

The controls of the deluxe automatic air conditioner are the same as those in the Audi A6 '05. The air conditioner control unit software has been adapted to the passenger compartment dimensions of the Audi Q7.
Various automatic air conditioner settings can be saved. The saved data is assigned to the respective vehicle keys.

361_071

The following data is saved:

- Specified temperature, driver and front passenger sides
- Air distribution, driver and front passenger sides
- Heated seat settings for driver and front passenger sides
- Air flow (blower volume)

Four-zone automatic air conditioner

The rear Climatronic operating and display unit E265 beneath the rear vent in the centre console is the same as the one in the Audi A8 ´03. All the familiar functions are identical.

In the Audi Q7, the rear air conditioner unit is used for the rear passenger compartment in the case of the four-zone automatic air conditioner.

361_071

Self-diagnosis

The Climatronic control unit J255 and the rear Climatronic operating and display unit E265 are equipped with a fault memory. If faults occur in the monitored sensors and components, these are stored in the fault memory of the relevant control unit together with an indication of the type of fault. The fault memories are non-volatile memories and thus independent of the power supply.

The two control units can be accessed via the address words:

08 Control unit for Climatronic J255
28 Rear Climatronic operating and display unit E265

Rear air conditioner operating unit

361_118

Air distribution

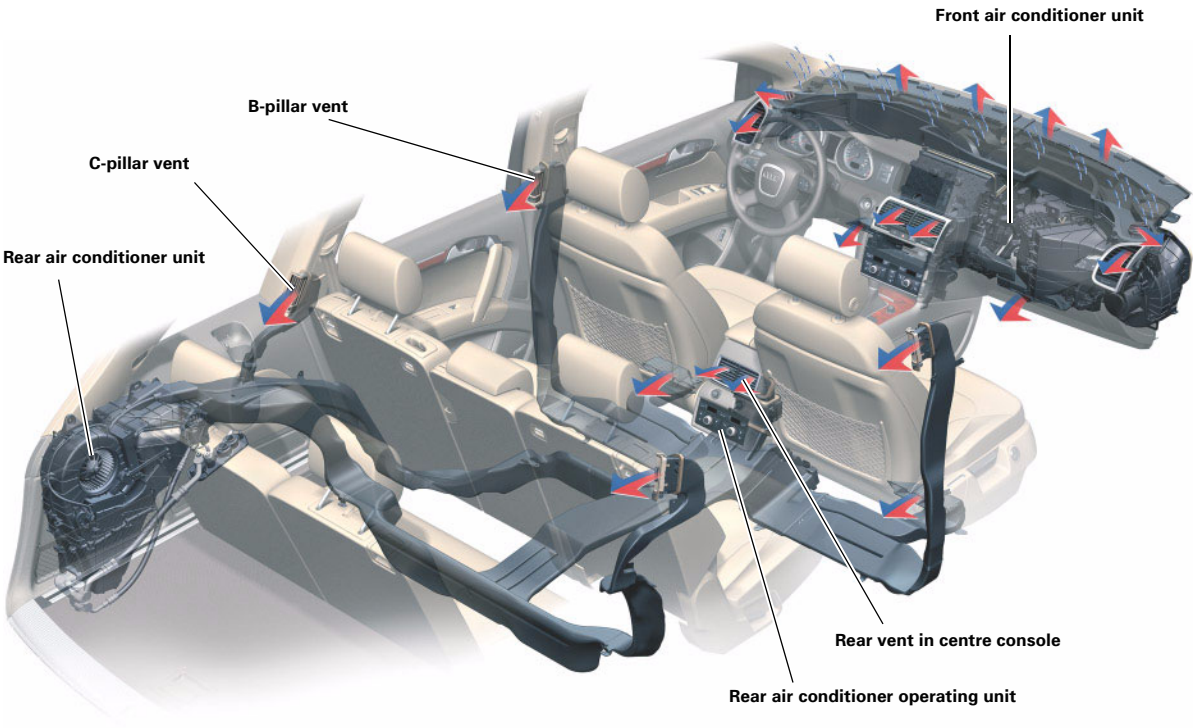
In the front passenger compartment, air distribution is the same for the basic air conditioner and the deluxe automatic air conditioner; the differences lie in the design of the air conditioner units and the flap control of the two versions.

In the case of the deluxe automatic air conditioner, the air is routed from the front air conditioner unit to the vents in the dash panel, the front vents in the centre console and to the vents in the left and right B-pillars. The passengers in the third seat row only receive the air from the front of the passenger compartment.

In the case of the four-zone automatic air conditioner, the occupants in the second and third seat rows are supplied with air by the rear air conditioner unit. The rear air conditioner unit supplies climatised air to the vents in the B and C-pillars. With the four-zone automatic air conditioner, the rear vents in the centre console are also supplied with air by the rear air conditioner unit.

Overview: Example of air routing (four-zone deluxe automatic air conditioner)

The illustration shows the air distribution in the vehicle interior with an optional four-zone deluxe automatic air conditioner.



361_119

Residual heat function

The residual heat function is only available with the two automatic air conditioning systems. Following activation, the residual heat function operates for a maximum of 30 minutes. Activation is performed via the ON/OFF button, which must be pressed for longer than 1 second with the ignition in the OFF position. Activation can be performed either from the rear Climatronic operating and display unit J265, or from the Climatronic control unit J255.

With the residual heat function, the vehicle interior can be heated with warm air when the engine is switched off.
For this purpose, the coolant is circulated via the pumps V50 (coolant circulation pump) and/or the water pump V36, depending on the engine version.
In this manner, warm air enters into the passenger compartment via the heat exchanger at a reduced blower output.

With the optional factory-installed auxiliary heater, the passenger compartment can be heated independently of the coolant temperature.

Electric coolant pumps

Depending on the engine version, coolant circulation is achieved using various pumps. When the engine is running, the engine coolant pump is assisted by these electrically-driven pumps.

In vehicles equipped with an 8-cylinder engine or a 6-cylinder diesel engine, the coolant circulation pump V50 is installed. In vehicles with a 6-cylinder petrol engine, the water pump V36 is used.
Vehicles equipped with a 6-cylinder petrol engine and an auxiliary heater are equipped with both electric coolant pumps (V36 and V50).

Note

In the event of poor heater output, the function and performance of the electric coolant pumps in the coolant circuit must be checked. The engine coolant pump and the electric coolant pumps V36 and V50 may work against one another, preventing sufficient coolant flowing to the heat exchanger.

Sensors and actuators

High-pressure sender G65

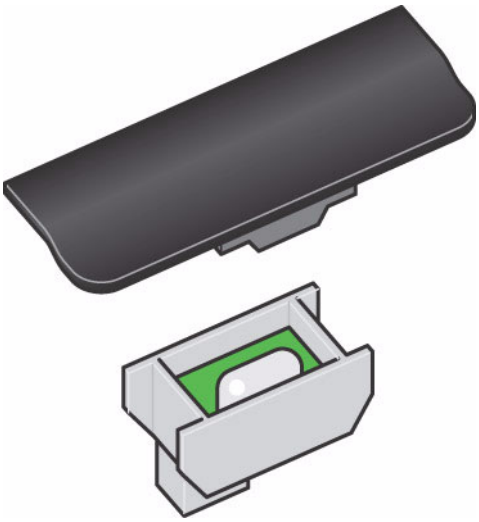
In the Audi Q7, the high pressure sender generates a pressure-dependent pulse width modulation signal. The high pressure sender G65 is not connected to the LIN bus in this model.

Possible fault memory entries include:
– Upper/lower limit exceeded/not reached
– Open circuit
– Short circuit to positive/earth
– Defective

The fault "upper limit exceeded" is only stored if the refrigerant pressure is greater than 31 bar and then remains above 27 bar for 5 seconds.

Sunlight penetration photo sensors G107 and G134

As with the A6 '05, a passive photo sensor is installed in the dash panel behind the windscreen, which determines the sunlight penetration at the right and left-hand sides of the vehicle. The sensor regulates the blower voltage and the temperature is lowered on one side.
In the event of failure of one photo sensor, the value from the functioning side is adopted for the defective side. Should both photo sensors fail, a predetermined substitute value is used.



361_123

Ambient temperature sensor

For evaluation of the ambient temperature, two sensors are used in the deluxe automatic air conditioner and the four-zone deluxe automatic air conditioner.

Ambient temperature sensor G17
The measured value from the ambient temperature sensor G17 is evaluated by the control unit J285 in the dash panel insert and transmitted to the Climatronic control unit J255 via the convenience CAN data bus.

Fresh air intake duct temperature sensor G89
This is evaluated by the Climatronic control unit J255.

The ambient temperature sensor G17 is installed in the front end section.
The fresh air intake duct temperature sender G89 is located in the intake housing of the air conditioner unit.

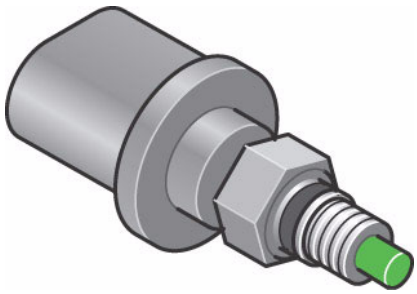
The Climatronic control unit J255 always evaluates the lower of the two ambient temperature values. In the event of failure of one of the sensors, the other ambient temperature value is adopted. Should both ambient temperature sensors be defective, a substitute value of 10 °C is permanently assumed.

Refrigerant temperature sender G454

The sender is installed in the high-pressure line, near the compressor. Its purpose is to determine the refrigerant temperature and to transmit it to the Climatronic control unit J255.

Together with the current refrigerant pressure, ambient temperature and coolant temperature values, the Climatronic control unit J255 is able to diagnose gradual coolant loss. For this purpose, further conditions, such as engine idling speed must be available.
A REFRIGERANT LOSS fault entered in the fault memory remains static, not sporadic. The fault memory entry is stored until the value detected by the sender G454 returns to within the required range. This can be achieved, for instance, by sealing the refrigerant circuit and refilling the refrigerant.

Installation of the sender depends on the engine version. In vehicles with V6 MPI and V6 FSI engines, the sender is not used.



361_114

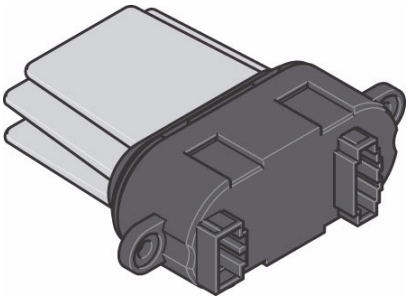
Note

The refrigerant temperature sender G454 connection is not equipped with a valve. The sender must therefore only be removed when the refrigerant circuit is empty.

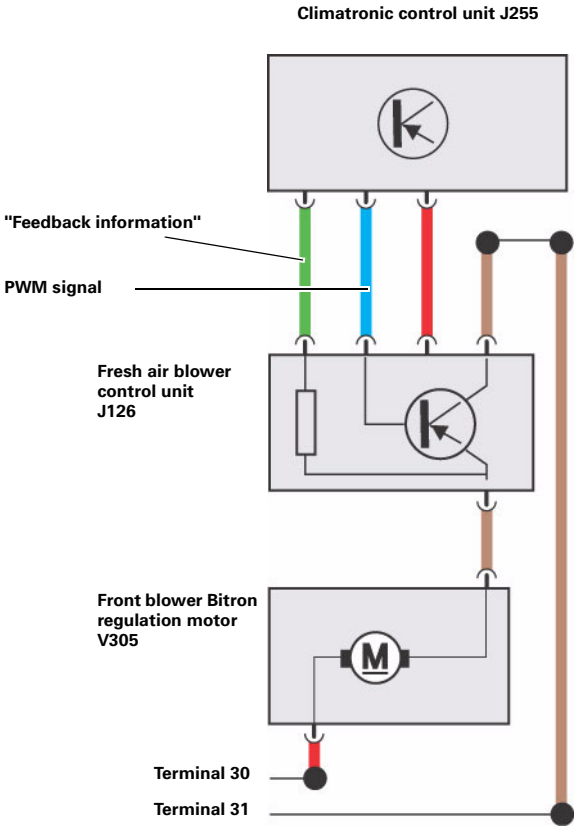
Fresh air blower control unit J126

The fresh air blower control unit J126 controls the blower speed in the deluxe automatic air conditioner and the four-zone deluxe automatic air conditioner. In the manual system, a series resistor is installed in its place.

The sender is activated by the Climatronic control unit J255 via an analogue signal.



361_113

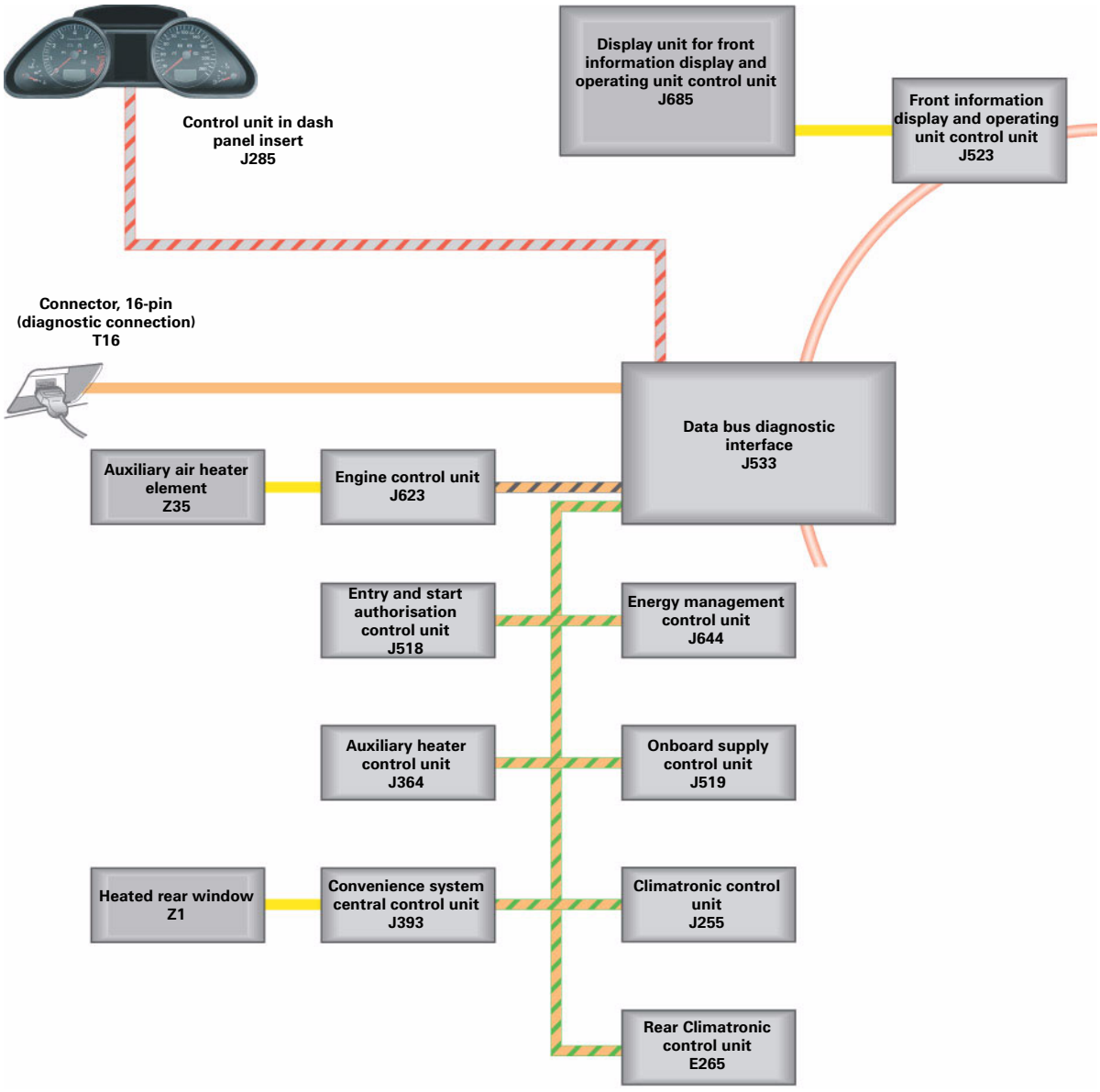


361_115

Networking

The Climatronic control unit J255 is connected to the convenience CAN bus, It is the master control unit for the distributed functions of the heated rear window, the optional heated seats, the additional heater in the case of diesel engines, as well as the optional, factory-installed auxiliary heater.

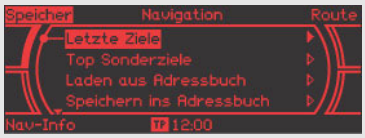
The Climatronic control unit J255 does not control any modules connected to the LIN bus. The fresh air blower control unit J126 and the high pressure sender G65 are not connected to the LIN bus. Serial data telegrams (PWM signals) are used.



361_096

Overview of Audi Q7 infotainment systems

	MMI basic	MMI basic plus	
Standard equipment			
Display	Monochrome 6.5" screen 	Monochrome 6.5" screen 	
Operating unit	4-button operating unit 	4-button operating unit 	
Display and operating unit control unit	In conjunction with CD changer under the centre armrest, otherwise in the dash panel – incl. radio module – incl. audio single-CD drive – incl. 4x20W amplifier for 8 loudspeakers	In conjunction with CD changer under the centre armrest, otherwise in the dash panel – incl. radio module – incl. audio single-CD drive	
Amplifier	Integrated in the display and operating unit control unit	7-channel DSP sound system with 180 W total output, in rear right of luggage compartment for 11 loudspeakers	
Radio	Radio with aerial diversity, integrated in the display and operating unit control unit	Radio with aerial diversity and TP Memo, integrated in the display and operating unit control unit. The TP-Memo function is selectable via the radio setup on the 4-button operating unit.	
CD drive	Integrated in the display and operating unit control unit	Integrated in the display and operating unit control unit	
Navigation system	–	–	
Optional extras			
CD changer	CD changer in dash panel	CD changer in dash panel	
Digital radio	Digital radio in rear right of luggage compartment	Digital radio in rear right of luggage compartment	
Preparation for mobile phone	Preparation for Bluetooth mobile phone integrated in centre armrest – incl. telephone voice control – incl. 8-button operating unit	Preparation for Bluetooth mobile phone integrated in centre armrest – incl. telephone voice control – incl. 8-button operating unit	
BOSE amplifier	–	BOSE 6000 amplifier with – BOSE Audio Pilot – 10-channel amplifier with 275 W total output – 14 loudspeakers	
Navigation system	–	–	
Telephone - permanent installation	–	–	
Voice control system	–	–	
TV reception	–	–	

	MMI basic plus with CD navigation	MMI
	Monochrome 6.5" screen 	7" colour screen 
	8-button operating unit 	8-button operating unit 
	Under the centre armrest – incl. radio module – incl. navigation module – incl. single-CD drive for navigation system or audio CD	In the dash panel behind the glove compartment
	7-channel DSP sound system with 180 W total output, in rear right of luggage compartment for 11 loudspeakers	7-channel DSP sound system with 180 W total output, in rear right of luggage compartment for 11 loudspeakers
	Radio with aerial diversity and TP Memo, integrated in the display and operating unit control unit	Radio with double tuner, aerial diversity and TP Memo, in rear right of luggage compartment
	CD changer in dash panel	CD changer in dash panel
	CD navigation integrated in the display and operating unit control unit	–
	–	–
	Digital radio in rear right of luggage compartment	Digital radio in rear right of luggage compartment
	Preparation for Bluetooth mobile phone integrated in centre armrest – incl. telephone voice control	Preparation for Bluetooth mobile phone integrated in centre armrest
	BOSE 6000 amplifier with – BOSE Audio Pilot – 10-channel amplifier with 275 W total output – 14 loudspeakers	BOSE 6000 amplifier with – BOSE Audio Pilot – 10-channel amplifier with 275 W total output – 14 loudspeakers
	–	DVD navigation in rear right of luggage compartment
	–	Permanently installed telephone, incl. cordless handset
	–	Voice control system in the K box
	–	Country-specific analogue TV receiver or hybrid TV receiver (digital and analogue)

Infotainment

The infotainment system familiar from the A6 '05 is used in the Audi Q7. The system has been adapted to the interior of the Audi Q7 in several respects.

Standard sound system

The front information display and operating unit control unit J523 comprises a 4x20W amplifier, which directly drives the 8 loudspeakers, including a treble loudspeaker and a mid-range/bass loudspeaker in each of the 4 doors.

DSP sound system

The optional Standard sound system features an external 8-channel DSP amplifier, the control unit for the digital sound system J525, which is integrated in the MOST bus. It drives the front three-way systems, the 2-way systems in the rear doors as well as the middle loudspeaker integrated in the dash panel. This equipment version dispenses with the 4x20 Watt amplifier module in the front information display and operating unit control unit J523. The DSP sound system is standard equipment for the basic plus and high MMI versions.

BOSE sound system

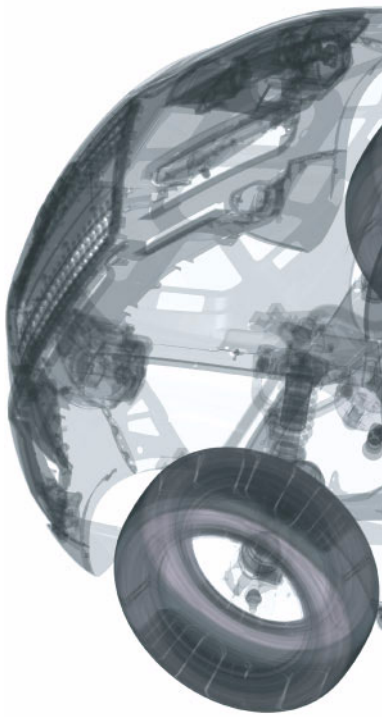
A BOSE sound system is installed in the Audi Q7, the technology of which is based on the Bose sound system in the current Audi A6 Avant '05.
In order to improve the acoustics for the 3rd seat row, 2 additions have been made.
An additional subwoofer is installed in the spare wheel well. The subwoofer and the middle loudspeaker are driven in mono by the same output stage. In order to drive the subwoofer with sufficient output, two output stage channels are integrated in the amplifier. The middle loudspeaker is protected against damage due to the high amplifier bass output by means of a series-connected capacitor in the middle loudspeaker. This operates similarly to a high-pass filter in treble loudspeakers.

Furthermore, the two surround loudspeakers in the D-pillars are driven separately. Consequently, the surround loudspeakers can be driven using either stereo or surround signals. The settings are carried out via the "surround level" function in the MMI. The stereo sound can be individually adapted in this manner. The digital sound package control unit J525 features 9 loudspeaker outputs in the BOSE sound system option in the Audi Q7. It is optionally available for the MMI basic plus and MMI versions.

Drives

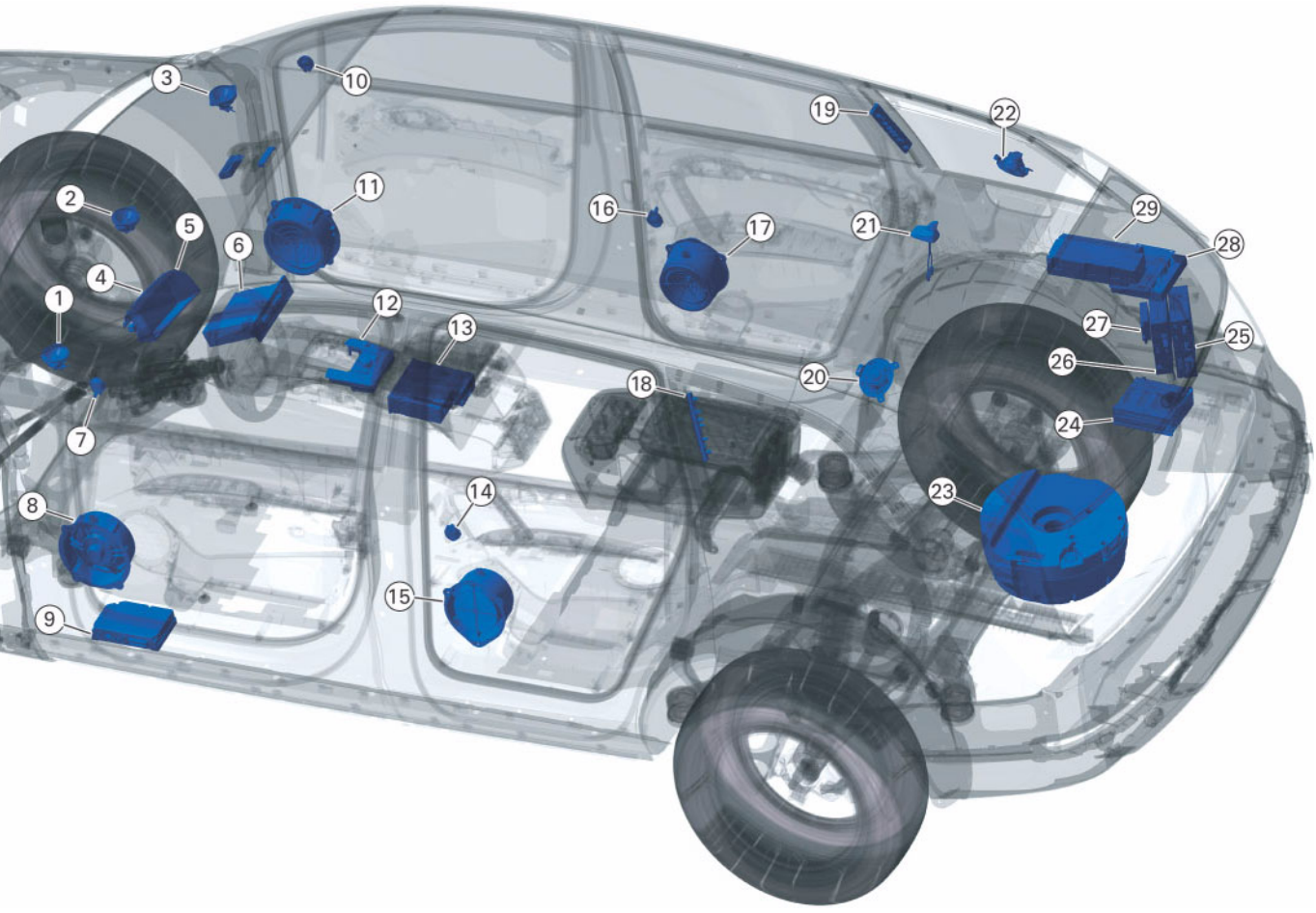
The optional CD changer is installed in the dash panel. In the case of the MMI basic, the front information display and operating unit control unit J523 with integrated single-CD drive is then installed under the centre armrest.

If no optional CD changer is installed, the front information display and operating unit control unit J523 with integrated single-CD drive is installed at the fitting location of the CD changer in the dash panel.



Key

1 R103 Front left mid-range loudspeaker
2 R158 Centre treble/mid-range loudspeaker
3 R104 Front right mid-range loudspeaker
4 J685 Display unit for front information display and operating unit control unit
5 J523 Front information display and operating unit control unit
6 R118 Media player in position 1
7 R20 Front left treble loudspeaker
8 R21 Front left treble loudspeaker
9 R36 Telephone transmitter and receiver unit
10 R22 Front right treble loudspeaker
11 R23 Front right bass loudspeaker
12 E380 Multimedia system operating unit
13 R119 Media player in position 2
14 R14 Rear left treble loudspeaker
15 R159 Rear left mid-range and bass loudspeaker
16 R16 Rear right treble loudspeaker
17 R160 Rear right mid-range and bass loudspeaker
18 R1113 Aerial amplifier 4
19 R24 Aerial amplifier
20 R105 Rear left mid-range loudspeaker (BOSE only)
21 R52 Telephone and navigation system aerial
22 R106 Rear right mid-range loudspeaker (BOSE only)
23 R148 Middle loudspeaker (subwoofer) (BOSE only)
24 J401 Navigation system control unit
25 R Radio
26 R78 TV tuner
27 R86 Aerial amplifier for mobile telephone
28 R146/R147 Satellite radio/digital radio
29 J525 Control unit for digital sound package



361_122

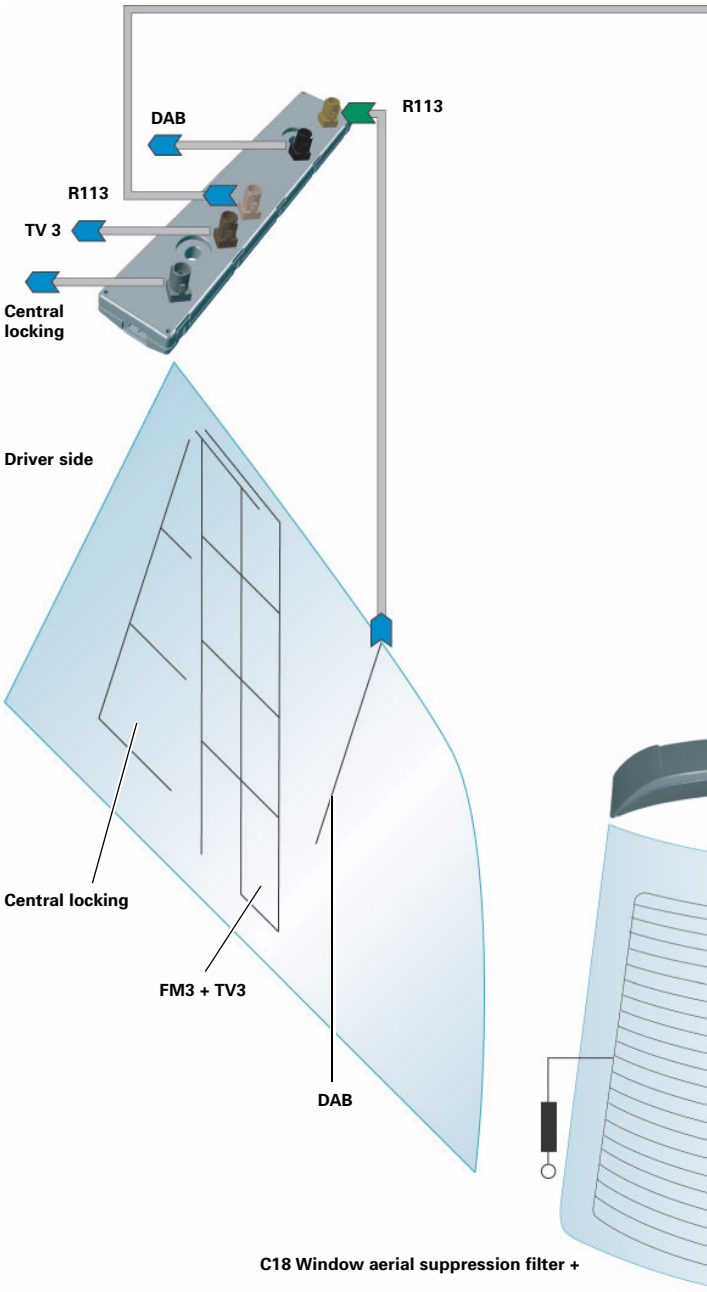
Aerial system

In the Audi Q7, the aerials are vapour-deposited on the rear and side windows and installed in the rear spoiler. The amplifiers for the various systems are installed at the right of the rear window, in the C-pillars and in the rear spoiler. They are responsible for signal reception of the radio-controlled central locking, radio, TV and auxiliary heater radio receiver. Improved reception has been achieved by moving the AM aerial into the rear spoiler. Only the modules required for the relevant equipment options fitted are installed.

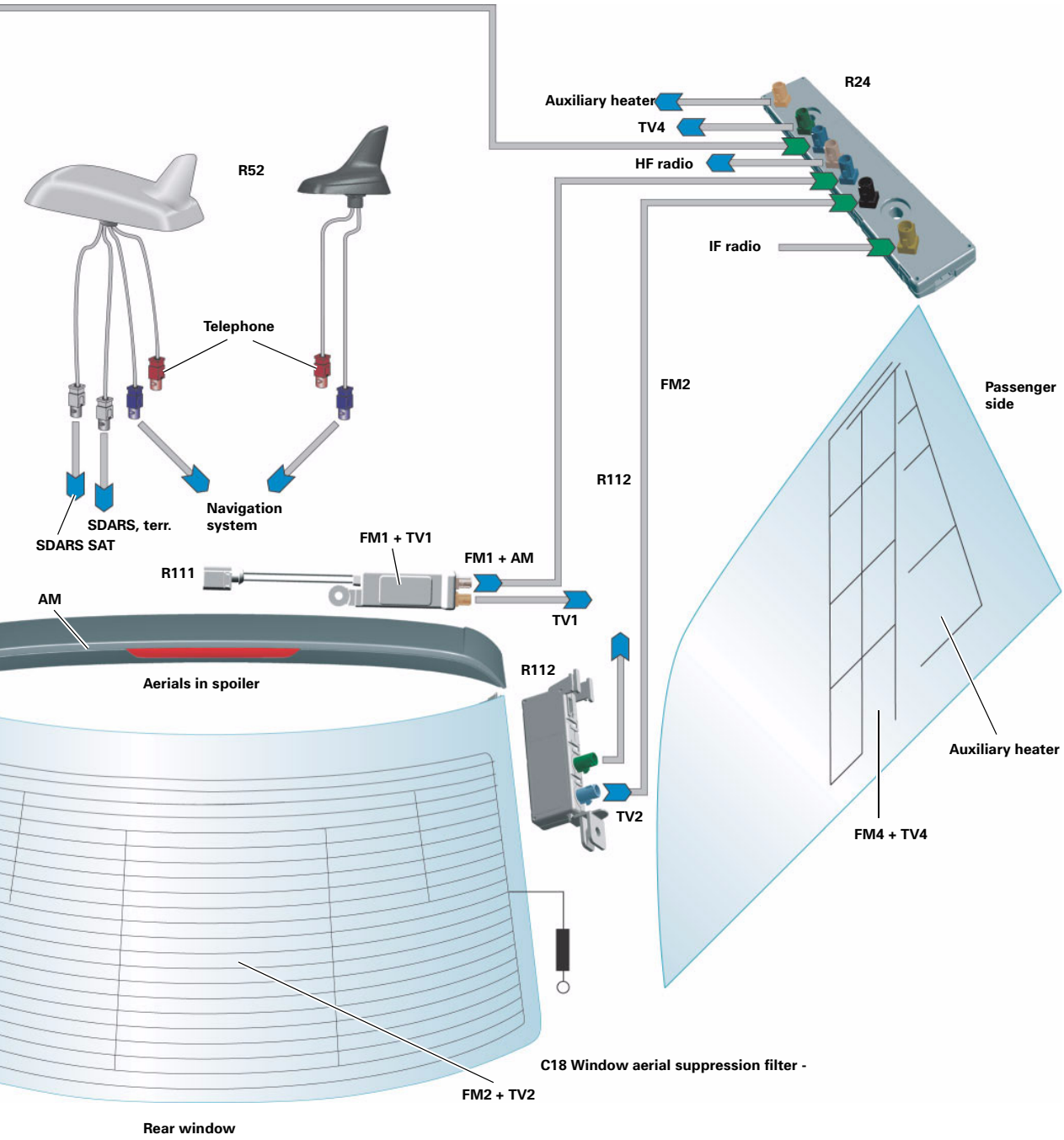
The amplifier for analogue radio is installed in the right C-pillar. The other aerial amplifiers for FM/AM are all connected to this amplifier via coaxial cables.

The voltage supply of all aerial amplifiers is performed directly at the aerial amplifier R24 via terminals 30 and 31. All the amplifiers are switched on and off by the analogue radio via a switched DC voltage on the HF radio line.

The aerials for navigation, telephone and digital satellite radio for North America (SDARS) are integrated in the roof aerial.



Aerial	Function
Aerial amplifier R24	Aerial amplifier for analogue radio (FM, MW, LW) Aerial amplifier for auxiliary heater Aerial amplifier for TV aerial 4
Radio, telephone and navigation system R52	Telephone aerial Aerial for navigation system Aerial for digital satellite radio (SDARS, North America only)
Aerial amplifier 2 R111	Aerial amplifier for analogue radio (FM 1, MW, LW) Aerial amplifier for TV aerial 1
Aerial amplifier 3 R112	Aerial amplifier for analogue radio (FM 2) Aerial amplifier for TV aerial 2
Aerial amplifier 4 R113	Aerial amplifier for analogue radio (FM 3) Aerial amplifier for TV aerial 3 Aerial amplifier for digital terrestrial radio (DAB) Aerial amplifier for central locking system


R24
Auxiliary heater
TV4
HF radio
IF radio
R52
Telephone
FM2
Passenger side
R112
SDARS, terr.
SDARS SAT
Navigation system
FM1 + TV1
FM1 + AM
R111
TV1
AM
Aerials in spoiler
R112
Auxiliary heater
TV2
FM4 + TV4
C18 Window aerial suppression filter -
FM2 + TV2
Rear window

364_067

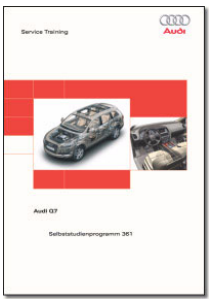
Notes

Self-study Programmes on the Audi Q7

The following Self-study Programmes are applicable to the Audi Q7:

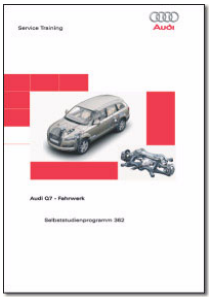
- SSP 361 Audi Q7
- SSP 362 Audi Q7 - Running Gear
- SSP 363 Audi Q7 - Power Transmission
- SSP 364 Audi Q7 - Electrics
- SSP 375 Audi Q7 - New Driver Assistance Systems

SSP 361 Audi Q7



- Body
- Passenger protection
- Engine
- Running gear
- Electrical system
- Air conditioning
- Infotainment

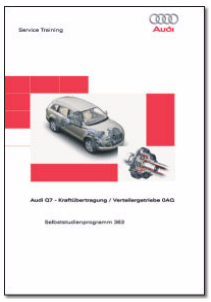
Order number: A04.5S00.14.20



SSP 362 - Audi Q7 - Running Gear

- Front axle
- Rear axle
- Brake system ESP
- Steering systems

Order number: A05.5S00.15.20

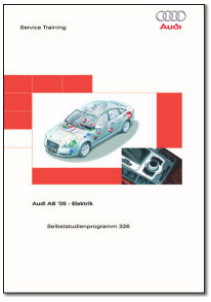


SSP 363 - Power Transmission

- Automatic gearbox
- Manual gearbox
- Torsen differential
- Rear wheel drive

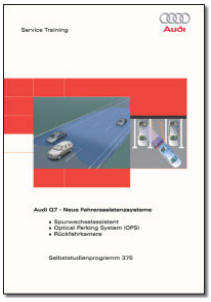
Order number: A05.5S00.16.20

SSP 364 - Electrics



- Networking
- Bus topologies
- Convenience electrics
- Infotainment

Order number: A04.5S00.09.20



SSP 375 Audi Q7 - New Driver Assistance Systems

- Audi side assist
- Optical parking system (OPS)
- Reversing camera (rear-view)

Order number: A05.5S00.21.20

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361

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