



Audi A7 Sportback

Occupant protection
Infotainment
Air conditioning

The process of developing a new vehicle involves numerous crash tests. These are initially run in a virtual environment on the computer and finally on the actual car at the Audi safety centre. The engineers of AUDI AG not only evaluate the results of our own in-house tests, but also actual accidents recorded by the accident researchers and scientists at the Audi Accident Research Unit (AARU).

The AARU was founded in 1998 and is working with police and doctors to develop as exact a knowledge of accidents as possible. Using this information we are constantly working to improve our tests. The focus of Audi vehicle safety is people. Because they have the responsibility for protecting something very valuable, only our most exceptional staff are entrusted with the safety of our vehicles.



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We deliver on our promise of "Vorsprung durch Technik" everywhere you look in an Audi – for example in the MMI® Multi Media Interface with retractable fold-away screen. You can use the MMI® to operate a variety of in-car media, the navigation system and other comfort and convenience functions.

The Google Earth map in the MMI Navigation plus system is a new feature. The photo-realistic display gives you an even clearer view and makes getting to your destination even simpler. Another great feature of the optional MMI Navigation plus system is the WLAN hotspot. Occupants can simultaneously connect up to eight devices - such as a laptop, Apple iPad or Netbook - to the Internet via the WLAN module integrated in the vehicle and by UMTS. Follow your intuition – and you will reach your goal.

Another feature of the new Audi A7 Sportback is that of consistency. The elegant exterior design carries over into the high-end interior. The interior concept of the Audi A7 Sportback cossets the driver and the passengers, giving them a feeling of complete security. The comfortable seats are finished in high-grade materials and provide excellent support.

The Audi A7 Sportback is optionally available with leather comfort seats including a memory function. Depending on version, these seats have a seat heater, seat ventilation and multi-level massage function. There is nothing more inspiring than a moment of tranquility.



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Occupant protection

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► The Self Study Programme explains the basics of the design and function of new models, new automotive components or new technologies.

It is not a Repair Manual! Figures given are for explanatory purposes only and refer to the data valid at the time of preparation of the SSP.

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



Note



Reference

Occupant protection

Introduction

The objective: to develop an occupant protection system that seamlessly integrates the high safety standard of the Audi fleet. It is a matter of course that the Audi A7 Sportback should meet all current statutory requirements for occupant protection systems. The Audi A7 Sportback is also expected to pass consumer tests with flying colours.

The main focus during the development phase was to maximise the car's potential to protect its occupants in real-life accident situations.

The occupant protection system of the Audi A7 Sportback consists of the following components and systems:

- ▶ Airbag control unit
- ▶ Adaptive driver and front passenger airbags
- ▶ Front side airbags
- ▶ Head airbags
- ▶ Front airbag crash sensors
- ▶ Crash sensors for side impact detection in the doors
- ▶ Crash sensors for side impact detection in the C posts
- ▶ Front inertia-reel seat belts with pyrotechnic belt tensioners and active belt force limiters

The vehicle can optionally be equipped with rear side airbags and/or a keyswitch for deactivating the front passenger airbag with accompanying warning lamp.

The illustrations and images shown in the chapter entitled "Occupant protection" are schematic diagrams and are provided to aid understanding.

- ▶ Battery isolator
- ▶ Seat belt reminder for driver and front passenger
- ▶ Seat belt switch, driver and front passenger sides
- ▶ Seat occupancy sensor in front passenger seat
- ▶ Driver and front passenger seat position recognition

Due to the different statutory provisions and requirements to which car makers are subject in the various markets, equipment is subject to change. This applies to the US American market in particular.

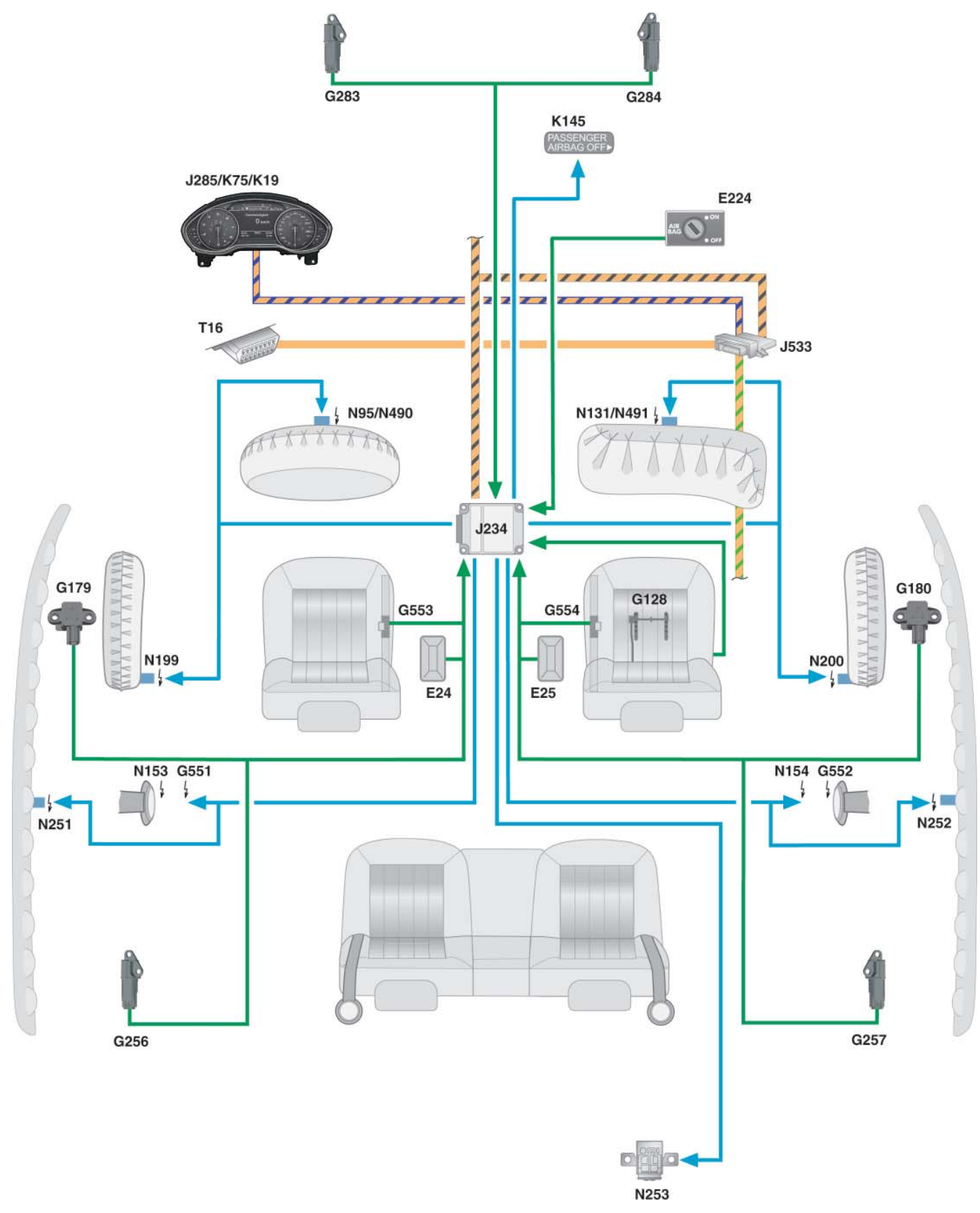
Legend:

- E24 Driver side seat belt switch
- E25 Front passenger side seat belt switch
- E224 Airbag disabling switch, passenger side (optional)
- G128 Seat occupancy sensor, front passenger side
- G179 Side airbag crash sensor, driver side (driver door)
- G180 Side airbag crash sensor, front passenger side (front passenger door)
- G256 Rear side airbag crash sensor, driver side (C post)
- G257 Rear side airbag crash sensor, driver side (C post)
- G283 Front airbag crash sensor, driver side (left front end)
- G284 Front airbag crash sensor, front passenger side (right front end)
- G551 Belt force limiter, driver side
- G552 Belt force limiter, front passenger side
- G553 Seat position sensor, driver side
- G554 Seat position sensor, front passenger side
- J234 Airbag control unit
- J285 Control unit in dash panel insert
- J533 Data bus diagnostic interface (gateway)

- K19 Seat belt reminder warning lamp
- K75 Passenger airbag off
- K145 Passenger airbag off warning lamp (PASSENGER AIRBAG OFF) (optional)
- N95 Driver side airbag igniter
- N131 Front passenger side airbag igniter 1
- N153 Driver side seat belt pretensioner 1
- N154 Front passenger side belt pretensioner 1
- N199 Side airbag igniter, driver side
- N200 Side airbag igniter, front passenger side
- N251 Head airbag igniter, driver side
- N252 Head airbag igniter, front passenger side
- N490 Driver airbag relief valve igniter
- N491 Front passenger airbag relief valve igniter
- N253 Battery isolation igniter
- T16 16 pin connector, diagnostic port

System overview

The system overview shows, by way of example, the possible equipment available for a vehicle for the German market.



Legend:

- Powertrain CAN bus
- Convenience CAN bus
- Input signal
- Display and operation CAN bus
- Diagnostics CAN bus
- Output signal

Airbag control unit J234

The task of the electronics integrated in the airbag control unit is to record and evaluate the deceleration and acceleration of the vehicle in such a way that a vehicle collision is detected.

External sensors are used in addition to the sensor in the control unit for recording the deceleration or acceleration of the vehicle during a collision. The electronics in the airbag control unit require information from all sensors in order to be able to detect an accident.

Only after all the sensor information has been evaluated by the control unit electronics can the electronics decide when and which safety components are to be activated.

The corresponding restraint systems, belt pretensioners and airbags are activated depending on the nature and severity of the collision. The crash event is indicated to other vehicle systems, too. The so-called "safety switch" (second crash sensor for head-on collision detection) is no longer required thanks to systematic further development of the hardware and software in the airbag control unit.

Basically, the airbag electronics have the following principal tasks:

- ▶ Crash recognition (front, side and rear)
- ▶ Defined deployment of the belt tensioners, airbags and battery isolator
- ▶ Defined deployment of front airbag adaptivity
- ▶ Defined deployment of the adaptive belt force limiters
- ▶ Evaluation of all input information
- ▶ Continuous monitoring of the complete airbag system
- ▶ Independent power supply via capacitors for a defined duration (approx. 150 ms)
- ▶ Fault indication via airbag warning lamp
- ▶ Storage of fault and crash information
- ▶ Indication of a crash event to other system components via powertrain CAN bus
- ▶ Activation/deactivation of the seat belt reminder

Data exchange

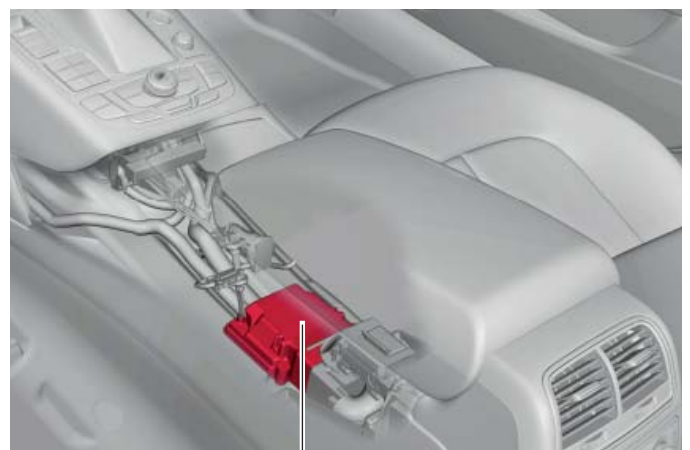
The airbag control unit J234 exchanges information with the other vehicle systems via the powertrain CAN data bus. Data is exchanged on a continuous basis. Among other things, the airbag control unit sends the following information:

- ▶ Airbag warning lamp K75 on/off
- ▶ Status of seat belt buckles
- ▶ Diagnostic data
- ▶ Crash signal/crash severity
- ▶ Crash information for the final control test
- ▶ Seat position
- ▶ Status of front passenger airbag

Among other things, the airbag control unit evaluates the following information:

- ▶ Dimming function for passenger airbag off warning lamp (PASSENGER AIRBAG OFF)
- ▶ Vehicle stationary or driving
- ▶ Collision forecast¹⁾
- ▶ Speed relative to objects¹⁾

¹⁾ with Adaptive cruise control/Audi side assist only

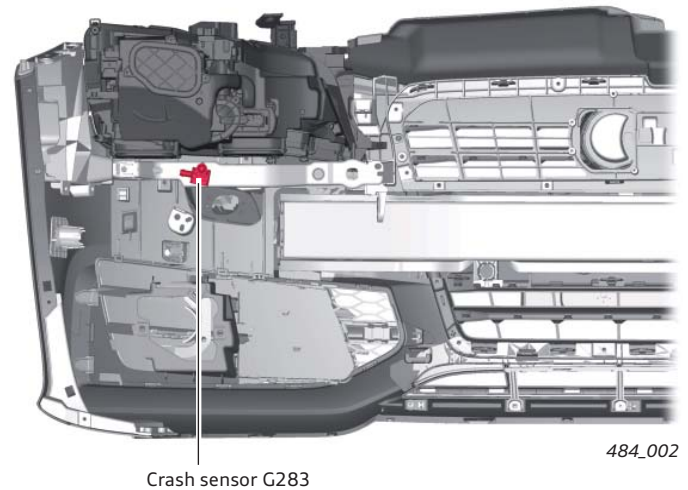


Airbag control unit J234

Sensors

Front airbag crash sensor, driver side G283 and front airbag crash sensor, front passenger side G284

The front airbag crash sensors G283 and G284 are utilised in combination with the sensor integrated in the airbag control unit J234 for detecting a head-on collision or rear collision. These acceleration sensors measure the vehicle's deceleration and longitudinal acceleration during an accident. Thus, ignition of the belt pretensioners, belt force limiters and airbags can be adapted to the accident situation depending on the severity of the accident. Adapted deployment of the occupant protection system provides the occupants with better protection. The sensors G283 and G284 on the Audi A7 Sportback are integrated in the front end below the headlights.



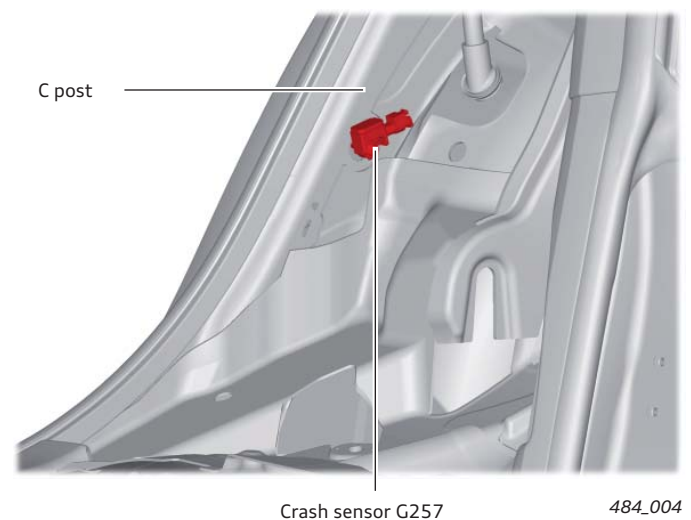
Side airbag crash sensor, driver side G179 and side airbag crash sensor, front passenger side G180

The side airbag crash sensors G179 and G180 are pressure sensors. With the rear side airbag crash sensors G256 and G257 and the side crash sensor integrated in the airbag control unit, a side impact can be detected from the left or right. Sensors G179 and G180 are integrated in the front doors on the left and right. If a door incurs deformation, a brief increase in air pressure will occur. The corresponding sensor measures this increase in pressure and transfers the information to the airbag control unit J234.



Rear side airbag crash sensor, driver side G256 and rear side airbag crash sensors, front passenger side G257

The side airbag crash sensors G256 and G257 are acceleration sensors. The sensors G256 and G257 are installed in the vicinity of the left and right C posts. Their task is to record the transverse acceleration of the vehicle and to relay this information to the airbag control unit J234.



Seat position sensor, driver side G553 and seat position sensor, front passenger side G554

To be able to determine the seat position on the Audi A7, the driver and front passenger seats are equipped with seat position sensors G553 and G554. These sensors are Hall sensors. Based on the power consumption of the seat position sensors, the airbag control unit J234 detects whether the seats are located in the front third of the seat adjustment range or in the rear two thirds.

The airbag control unit utilises this information to activate the adaptivity function of the belt force limiters and front airbags at the right moment.

If the seat is in the front third of its adjustment range, the airbag control unit J234 can activate the adaptive airbag igniter earlier than when the seat is in the rear two thirds of its adjustment range.

Thanks to the phased ignition of release valve igniters N490 and N491, airbag deployment is better adapted to the situation and allows occupants with a small body mass to plunge into the airbag in a controlled manner. Belt force limiter igniters G551 and G522 are also activated in a phased manner, thus adapting the restraint systems to the accident situation and seat position accordingly.

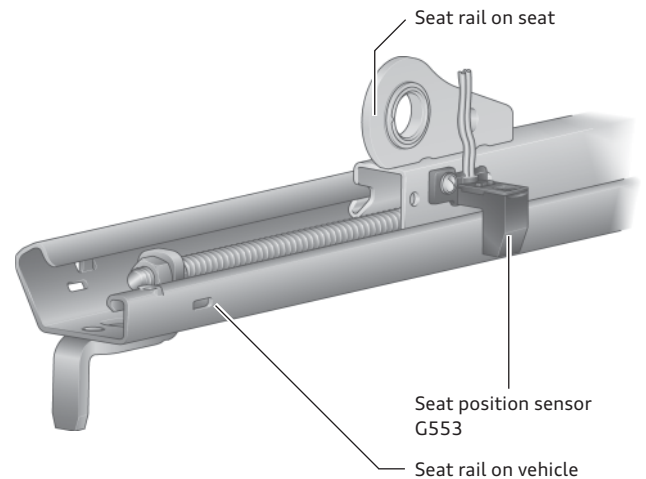
As before:

a properly adjusted seat, correct seating position and a correctly fastened seat belt are the most important requirements for effective occupant protection.

Seat position detection

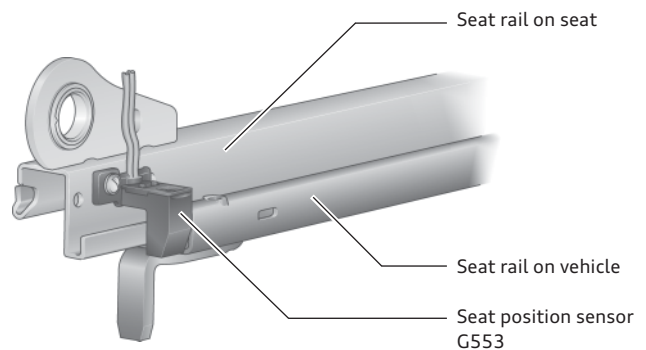
The seat position detection sensors work in concert with the seat rails on the tunnel side.

If the seat position detection sensor is located above the seat rail attached to the vehicle, its power consumption is approx. 5 – 7 mA. The airbag control unit J234 detects that the seat is in the rear position.



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If the seat is pushed forwards and the seat position sensor moves beyond the seat rail attached to the vehicle, the power consumption of the sensor increases to approx. 12 – 17 mA. The airbag control unit J234 detects that the seat is in the forward position.



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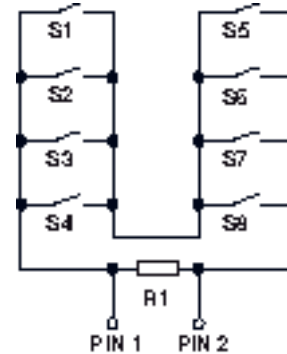
Passenger side seat occupancy sensor G128

The passenger side seat occupancy sensor G128 is a plastic film with integral 2x 4 pressure sensors. The resistance of the individual sensors changes under load. The system recognises an occupied seating position only if two pressure sensors are triggered simultaneously. One pressure sensor from sensors S1 – 4 and one pressure sensor from sensors S5 – 8.

The position of the seat occupancy sensor on the seat moulding is pre-defined in order to monitor the relevant area of the seat swab.

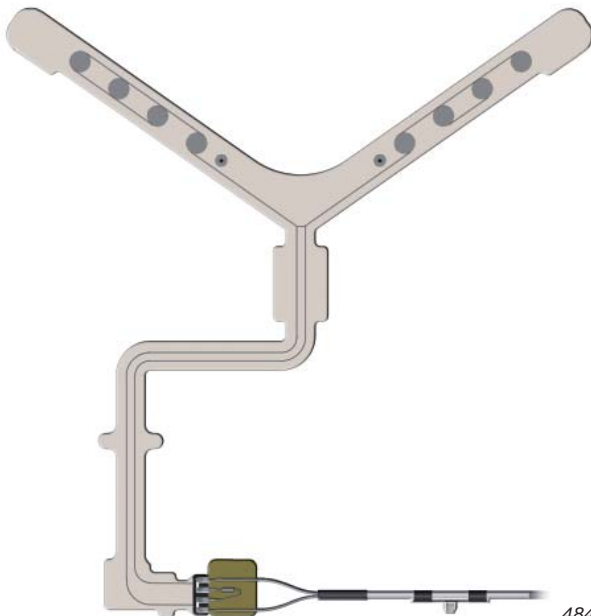
The airbag control unit J234 utilises the information supplied by the seat occupancy sensor and belt lock switch for seatbelt fastening detection.

Resistance	State
< 120 ohms	Seat occupied
420 – 490 ohms	Seat not occupied
> 2400 ohms	Fault



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Multicontour seat sensor G128



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Normal and sport seat sensor G128

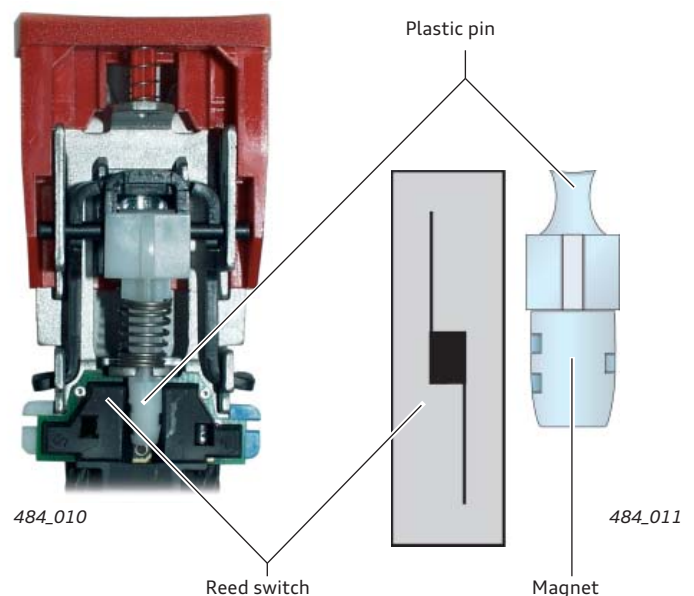


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Seatbelt switch, driver side E24 and seatbelt switch, passenger side E25

Seatbelt switch, driver side E24 and seatbelt switch, front passenger seat E25 are further components of the seat belt reminder system. These switches (reed switches) are integrated in the front seatbelt buckles.

If the seatbelt buckle is not engaged (belt tongue not inserted), the reed switch is closed. In this position, a magnet built into the tip of a plastic pin acts upon the reed switch. If, on the other hand, the belt tongue is inserted into the seatbelt buckle, the reed switch is open. The inserted belt tongue lifts the plastic pin. Thus, the magnet no longer acts upon the reed switch and the switch opens. The airbag control unit J234 determines whether the seatbelts are fastened or not by measuring the resistance.



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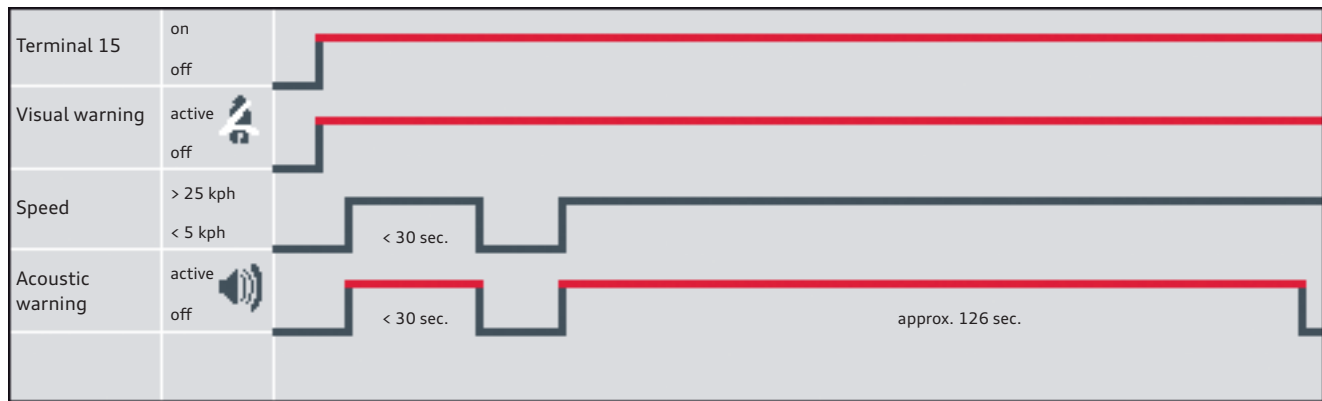
Front seat belt reminder

If the front occupants are not wearing their seat belts, they are alerted to this by the seat belt reminder warning lamp K19 after the ignition is turned on.

Warning lamp K19 comes on if the driver and/or front passenger has not fastened his/her seatbelt. When the vehicle exceeds a speed of 25 kph, the front occupants are also reminded to put on their seat belt by an acoustic signal.

If the acoustic warning has started and the vehicle decelerates to a speed of less than 5 kph within the first 30 seconds, the acoustic warning is suppressed. If the vehicle's speed increases again to above 25 kph, the acoustic warning resumes. If the first 30 seconds have elapsed since the start of the acoustic warning, the acoustic warning does not stop unless the seat belts are fastened. The total duration of the acoustic warning is limited to 126 seconds. The acoustic warning also varies in volume and frequency.

Seat belts not fastened warning



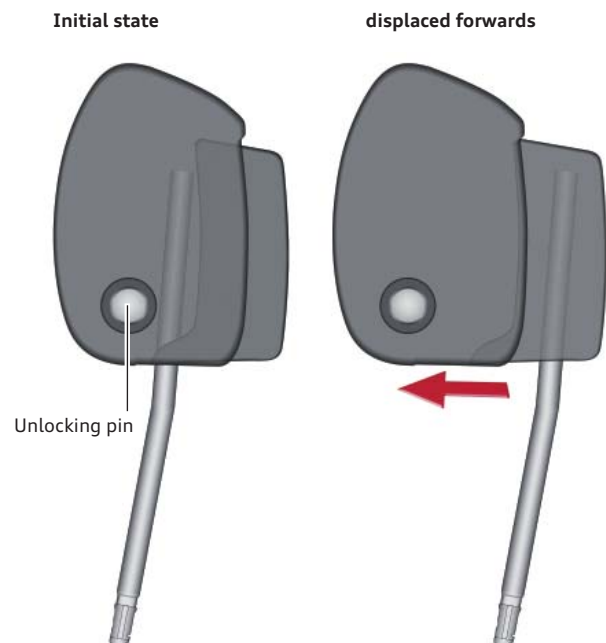
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Front head restraints

For individual positioning of the head restraint, it is possible to set the head restraint vertically and horizontally.

To move the head restraint into the upper position, the entire head restraint must be pushed forwards. To adjust the head restraint downwards, the lateral unlocking button must be pressed. Three locking positions are available for vertical adjustment of the head restraint.

For horizontal adjustment of the head restraint, the front part of the head restraint can be moved. The head restraint can be pushed back together by pressing the lateral unlocking button. Six locking positions are available for horizontal adjustment.



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Airbags

Front airbags

Driver side airbag igniter N95 and driver airbag relief valve igniter N490

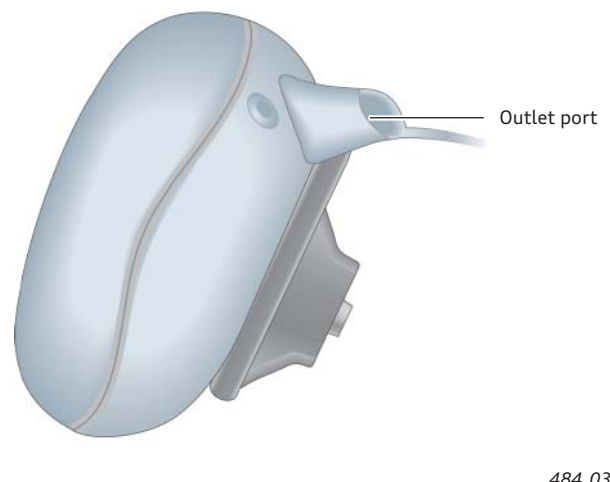
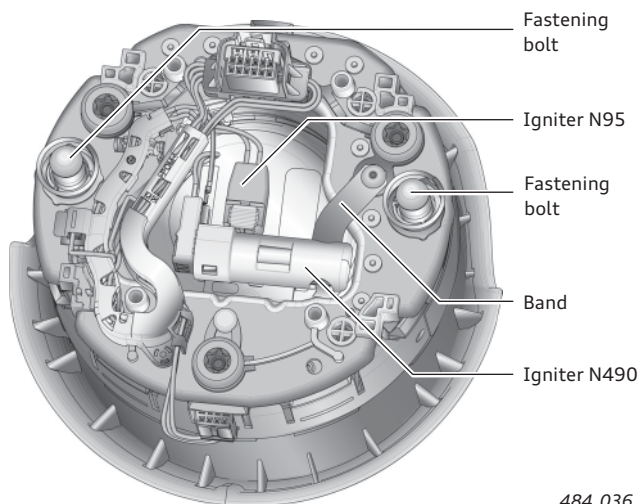
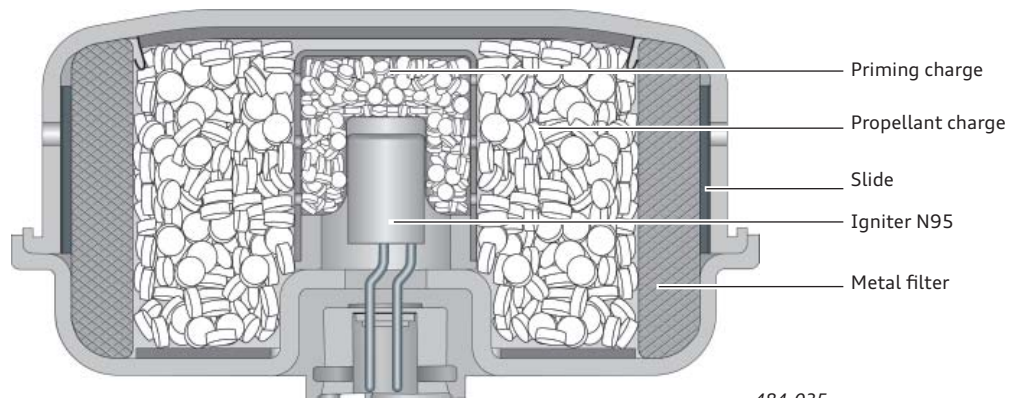
The Audi A7 Sportback is equipped with adaptive driver and front passenger airbag modules. However, the driver and front passenger airbag modules have different gas generators. The driver side airbag module, for example, has a solid propellant generator.

The front passenger side airbag module, on the other hand, has a hybrid gas generator. Both gas generators are single-stage generators. Both airbag modules have similar adaptivity functions. The adaptivity function of the driver airbag module is described below.

Driver airbag

The driver side airbag igniter module N95 activated by the airbag control unit J234 ignites the priming charge, thereby igniting the actual propellant charge. If the gas pressure resulting from ignition of propellant charge exceeds a predetermined value, a tab opens the outlet ports allowing the gas to pass through the metal filter and into the airbag. The airbag unfolds and is inflated. An additional igniter for airbag adaptivity (driver airbag relief valve igniter N490) is attached to the back of the airbag module. The airbag also has an extra snoutlike outflow port.

The igniting propellant charge inside the airbag keeps this outflow port closed. Depending on the force of impact and the driver's seating position, the airbag control unit J234 activates the driver airbag relief valve igniter, which severs the metal strip, thereby opening the outlet port. The airbag is, thus, "adapted" for the occupants according to the situation. The gas generators of the front airbag modules are mounted oscillatingly in a rubber ring. This reduces vibration transmission to the steering wheel.



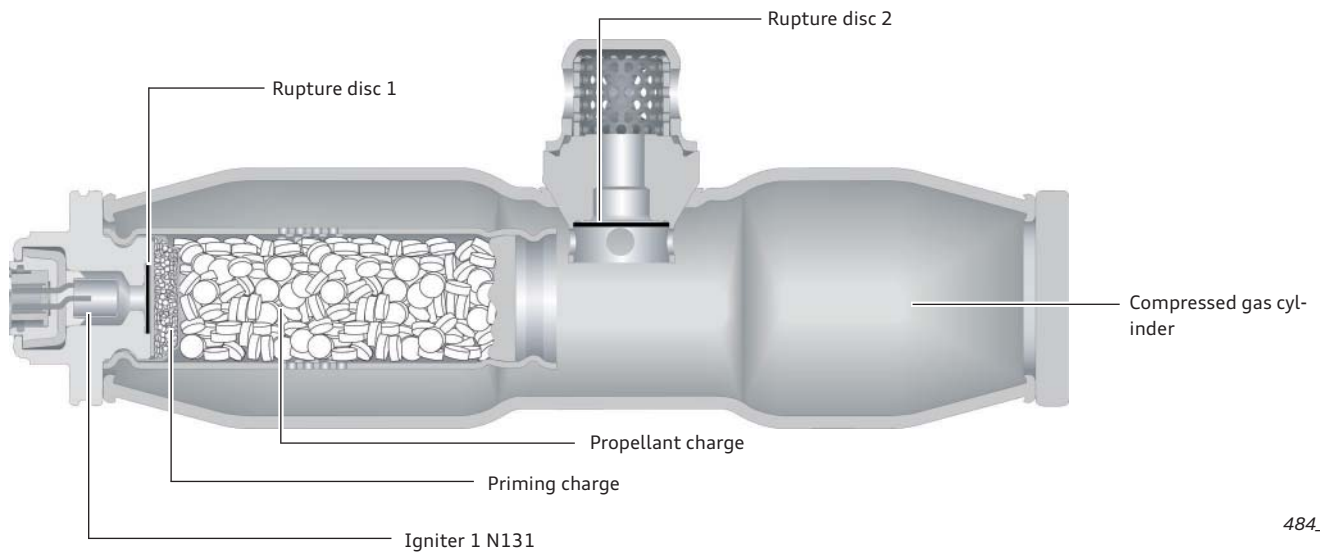
Note

The driver airbag module is attached to the steering wheel by clips. Refer to ELSA for further information.

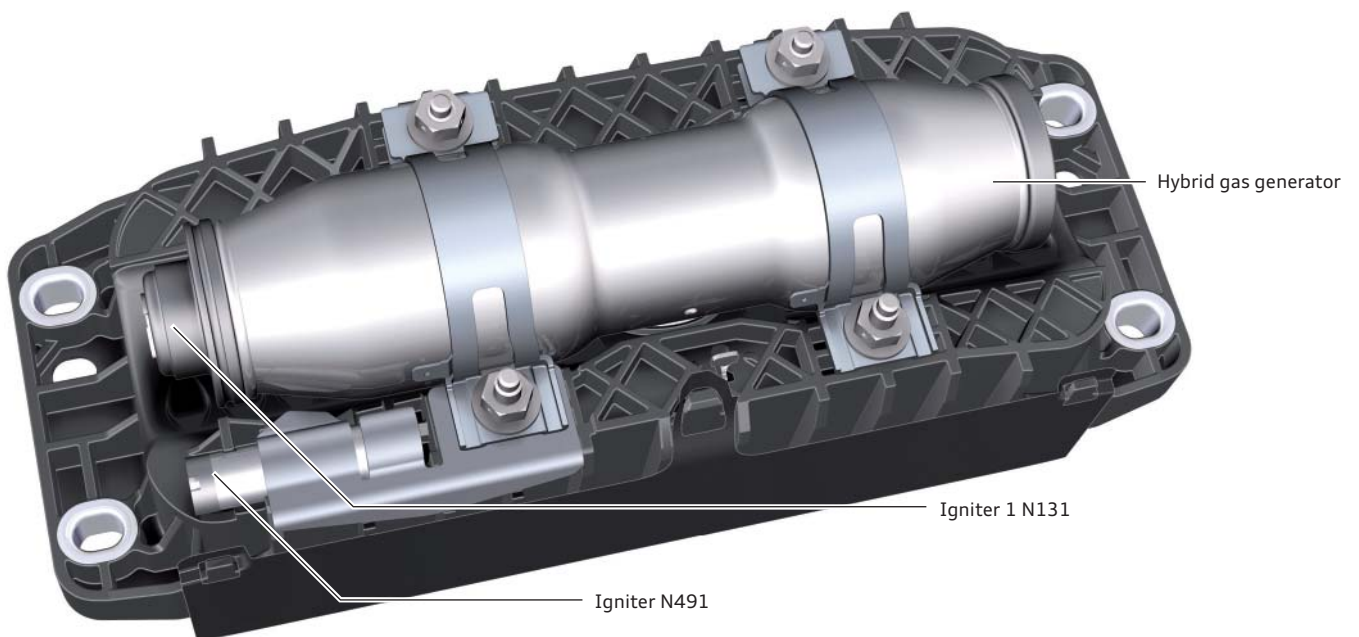
Front passenger airbag
Front passenger side airbag igniter N131 and
front passenger airbag relief valve igniter N491

As mentioned previously on page 11, the airbag module on the front passenger side has a single-stage hybrid gas generator. The airbag control unit J234 activates front passenger side airbag igniter 1 N131. The flame of igniter 1 breaches rupture disc 1 and ignites the priming charge, which in turn ignites the actual propellant charge.

The ignition of the propellant charge causes the pressure in the compressed gas cylinder to increase until rupture disc 2 breaks. The gas mixture unfolds and inflates the airbag. The adaptivity function on the front passenger side is similar to that on the driver side and is described on page 11.



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Front side airbags

Side airbag igniter, driver side N199

Side airbag igniter, front passenger side N200

The side airbag modules have solid propellant generators for inflating the side airbags with gas.

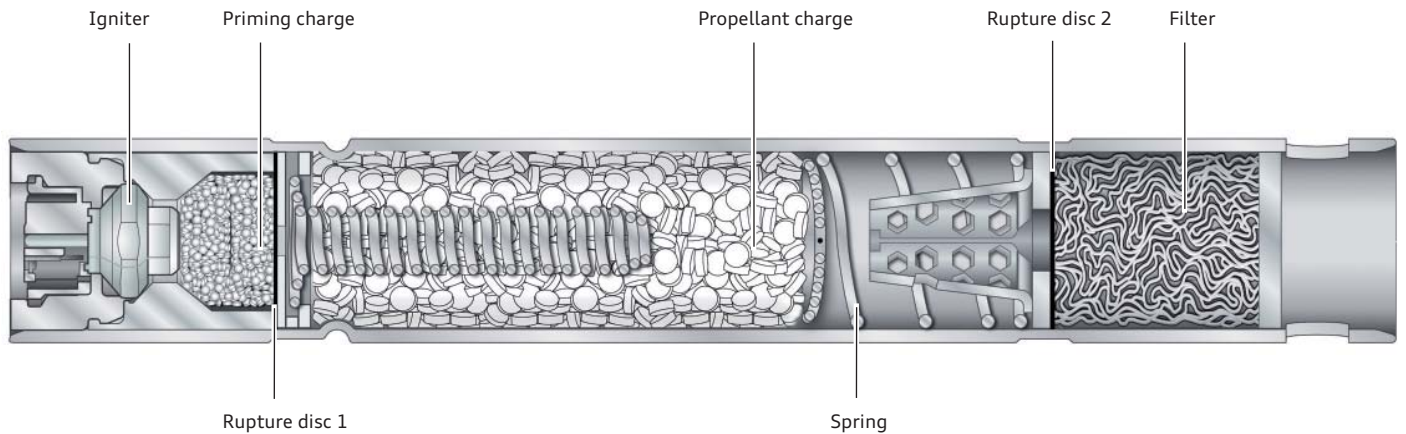
If a side impact necessitating the deployment of a side airbag is detected, the airbag control unit J234 energises side airbag igniter N199 or N200. This ignites the priming charge. The resulting gas pressure breaks the rupture disc 1 and ignites the propellant charge. Rupture disc 2 breaks when a predetermined pressure level is exceeded. The gas that is produced unfolds and inflates the airbag.

The gas generators are used for the front and rear side airbag modules.



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Design



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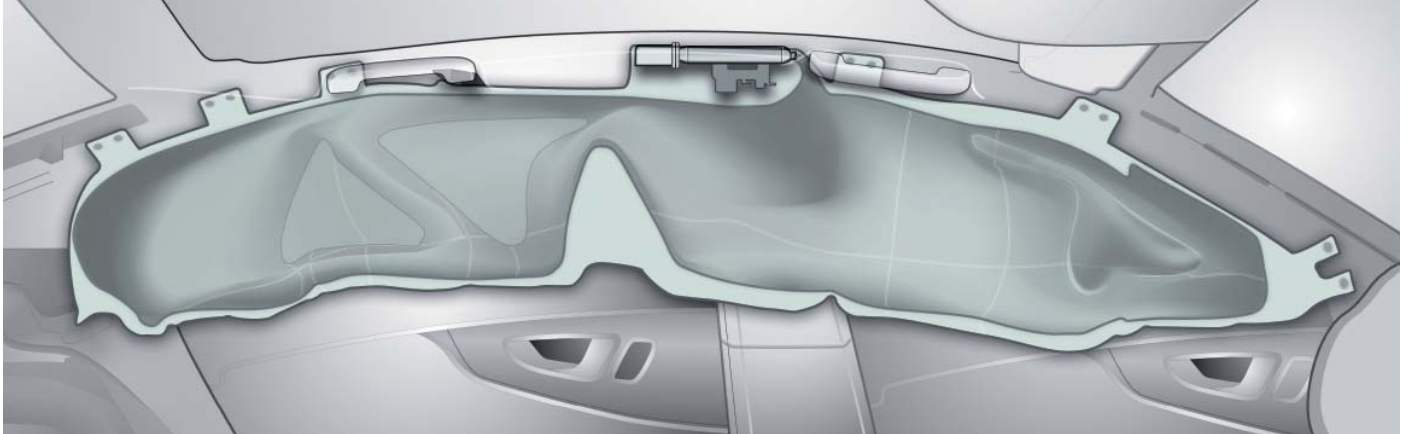
Head airbags

Driver side head airbag igniter N251 and front passenger side head airbag igniter N252

The head airbags on the Audi A7 Sportback are located on the left and right hand sides behind the roof trim.

Their range of action extends from the A post to the D post and, therefore, covers almost the entire side window area.

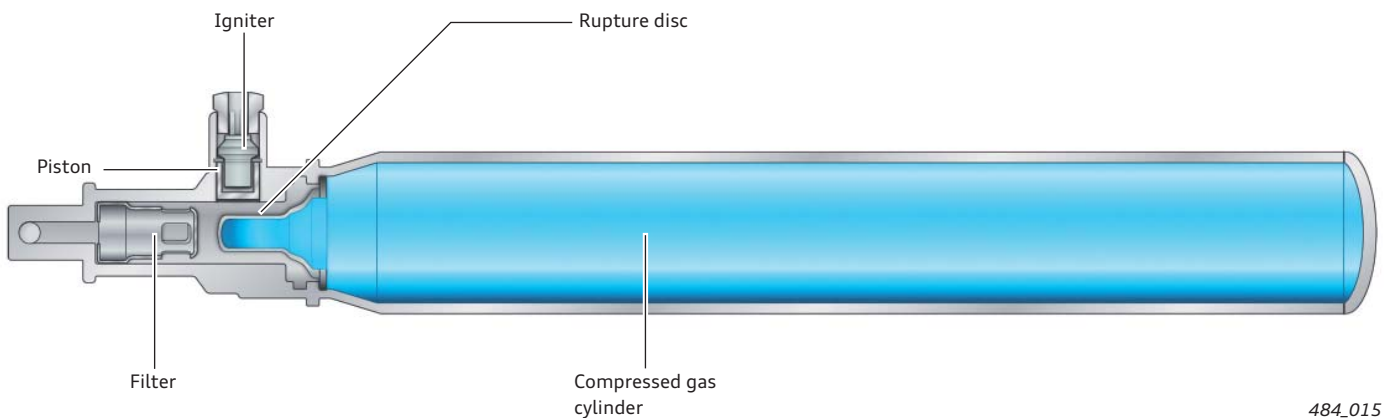
Installed in this way, the head airbags are able to afford the occupants better protection in the event of a side impact.



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The head airbag igniters N251 and N252 are activated by airbag control unit J234. The gas pressure produced in the igniter displaces a piston which in turn shears off the rupture disc. The compressed gas emerging from the compressed gas cylinder can now flow into the airbag. The airbag unfolds and is inflated.

With these gas generators, the pyrotechnic igniters only have the task of opening the compressed gas cylinder. The gas generators for the head airbags on the Audi A7 Sportback are located in the vicinity of the B post transition to the roof frame.



484_015

Seat belts

Front inertia-reel seatbelts

Depending on equipment level, the Audi A7 Sportback comes fitted with two different types of inertia-reel seatbelt for the driver and front passenger.

In the basic trim, the inertia-reel seatbelts have, among others, the following functions:

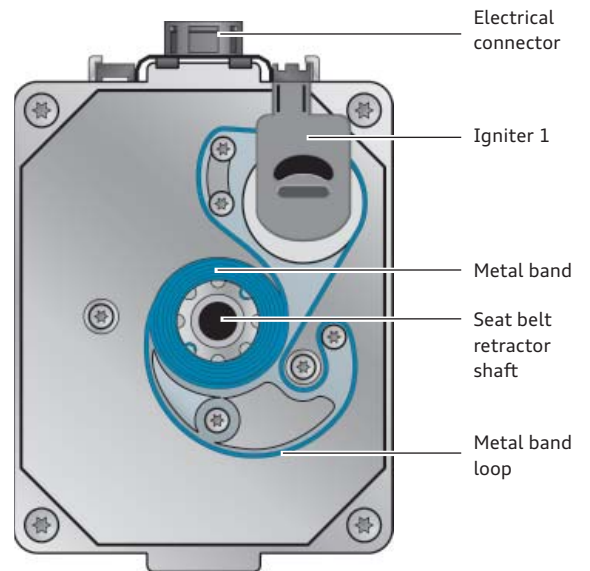
- ▶ pyrotechnic seat belt pretensioner,
- ▶ adaptive belt force limiter.

Front belt pretensioner

Driver side belt pretensioner igniter 1 N153 and front passenger side belt pretensioner igniter 1 N154

In the basic trim, the front seats are fitted with pyrotechnic band type belt pretensioners. A metal band is wound around the seat belt retractor shaft. Both open ends of the band are connected to the seat belt retractor shaft. The closed end is looped around the belt pretensioner igniter.

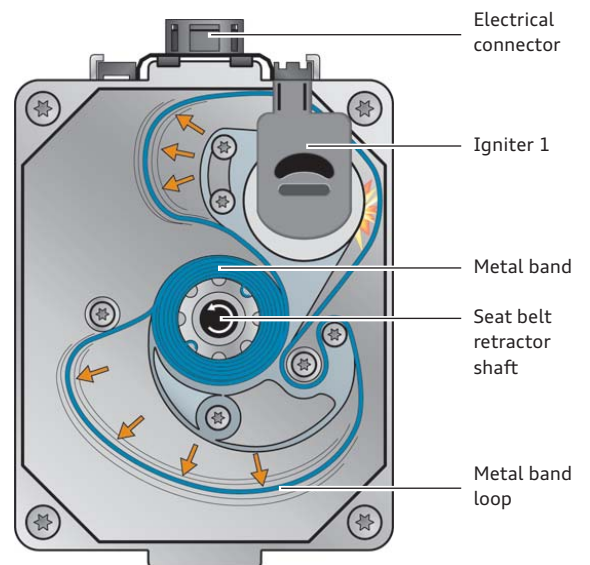
If the vehicle is equipped with the optional Audi pre sense system, it is fitted with inertia-reel seat belts with reversible seat belt pretensioners and corresponding control units.



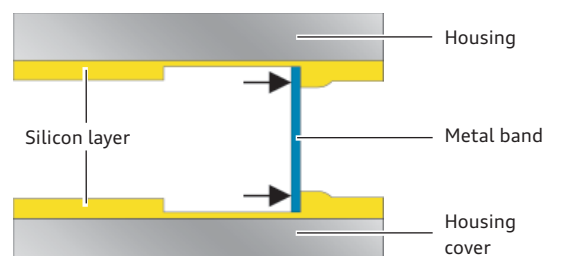
When the belt pretensioner igniter 1 N153 or N154 is ignited by the airbag control unit J234, the resultant pressure causes the loop of the metal band to expand.

The movement of the metal band exerts a pull on the seat belt retractor shaft, which thereupon begins to rotate, tensioning the seat belt.

This enables "belt slack" (play between the seat belt and the body) to be reduced. The retractor stops tensioning the seat belt when the counterforce on the seat belt is greater than the force exerted by the pretensioner.



The surface of the housing and the housing cover between which the metal band moves are coated in a layer of silicon. When the metal band moves, it thrusts a part of this silicon layer ahead of itself and thereby ensures that a tight seal is maintained. Pressure losses are thus reduced.



Adaptive belt force limiter

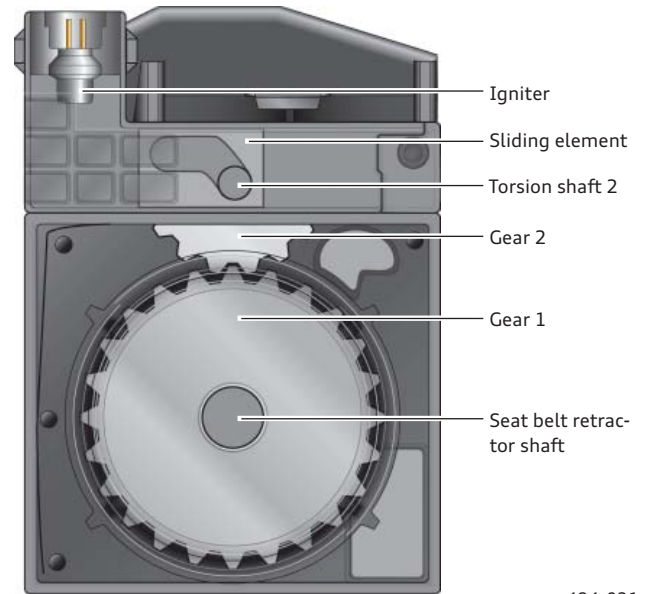
Belt force limiter, driver side G551 and belt force limiter, front passenger side G552

The front inertia-reel seatbelts have adaptive two-stage belt force limiters.

In the event of a deployable collision, the belt pretensioners are ignited first. The belt pretensioner retracts the seat belt as far as possible. The inertia-reel seatbelt blocks the seat belt retractor shaft and prevents the seat belt from unreeling, which otherwise would occur due to the forwards motion of the occupants.

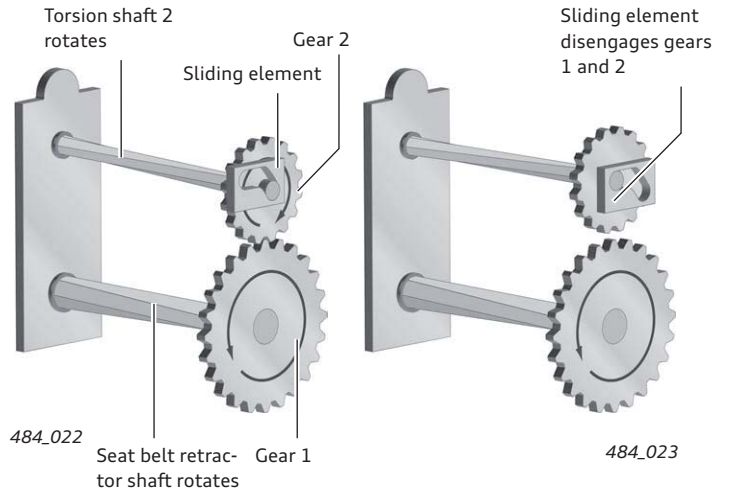
If the occupant moves forwards due to the deceleration, the belt force limiter allows allow controlled unreeling of the seat belt as of a predetermined force level.

The load which the seat belt exerts on the occupants is thus reduced.



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The seat belt retractor shaft is designed as a torsion shaft and is coupled with torsion shaft 2 via gears 1 and 2. Both torsion shafts are rotated (high belt force level).



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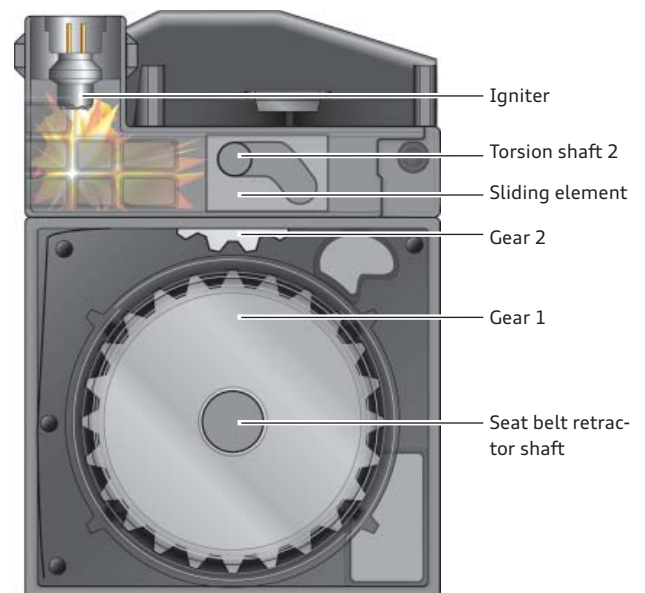
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Depending on impact severity and seating position, the airbag control unit J234 decides when to activate the belt force limiter igniters G551 and G552.

The resultant gas pressure displaces a sliding element which decouples the second torsion shaft from the seat belt retractor shaft. The seat belt retractor shaft now counteracts by itself the force which the seat belt exerts (low force).

To afford the occupants better protection, the belt tensioning function, the belt force limiting function and the front airbags are phased.

The belt force limiter igniters are not activated in the event of a side impact or rear collision.



484_024

Front inertia-reel seat belts in combination with Audi pre sense

If the vehicle is ordered with the optional Audi pre sense system, the following functions are integrated in the front inertia-reel seat belts:

- ▶ Reversible belt pretensioner with control unit
- ▶ Pyrotechnic belt pretensioner
- ▶ Adaptive belt force limiter

Reversible belt pretensioners

Front left belt pretensioner control unit J854 and front right belt pretensioner control unit J855

The front left and right belt pretensioner control units J854 and J855 are integrated in the vehicle network via an extended CAN bus and the data bus diagnostic interface J533.

The belt pretensioner control units activate the connected reversible seat belt tensing motors based on the information provided via the data bus.

There different force levels are available depending on situation:

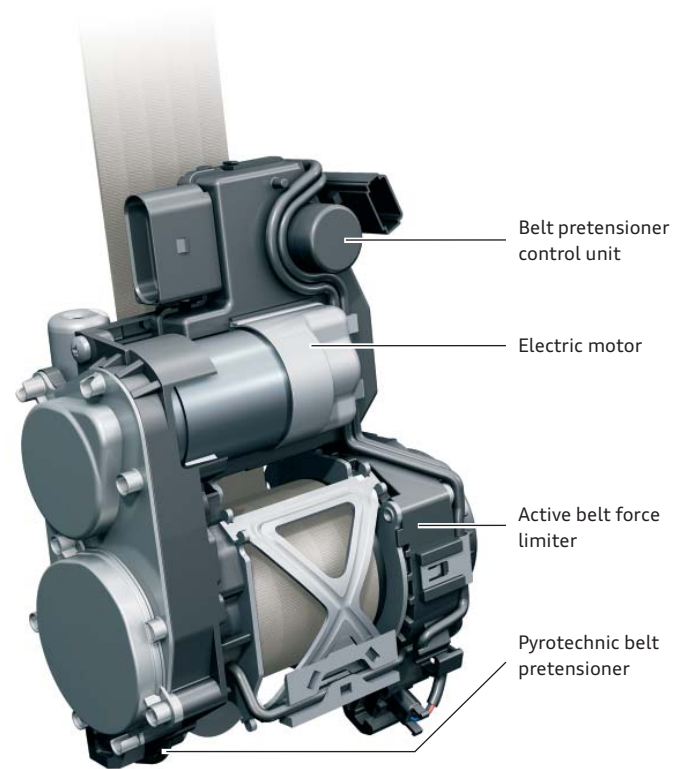
1. Low force level = belt slack reduction
2. Medium force level = pre-tensioning
3. High force level = full tensioning

In addition:

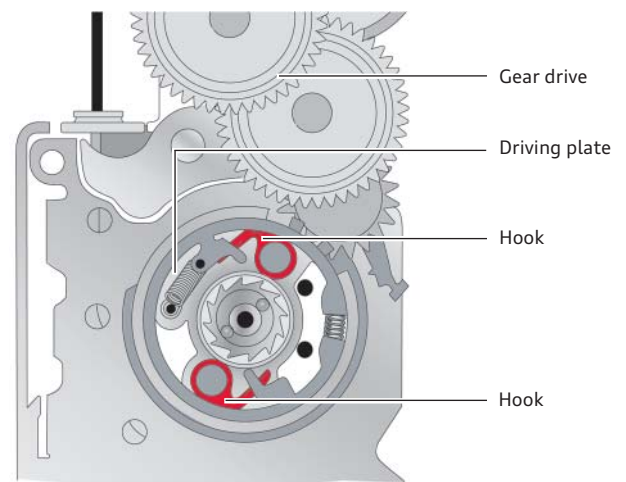
In the event of a head-on collision, the airbag control unit J234 decides which belt pretensioners are needed (pyrotechnic or reversible) based on the severity of the impact.

Accordingly, the control unit J234 sends a data signal.

The front belt pretensioner control units J854 and J855 initiate reversible full tensioning of the seat belts based on the data signals.



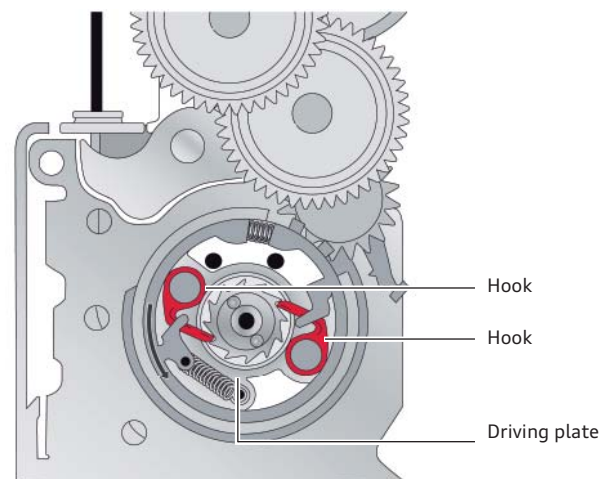
484_025



484_026

When the electric motor begins to turn, the driving plate is driven via a gear drive. Two extending hooks connect the driving plate to the seat belt retractor shaft, retracting the seat belt.

If the electric motor stops or reverses slightly, the hooks are able to retract again a release the seat belt retractor shaft.



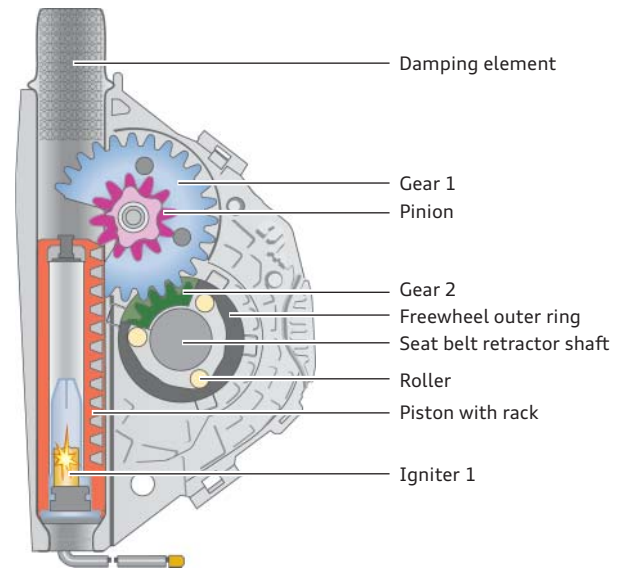
484_027

Front pyrotechnic belt pretensioners in combination with Audi pre sense

Driver side belt pretensioner igniter 1 N153 and front passenger side belt pretensioner igniter 1 N154

These pyrotechnic belt pretensioners are of rack-and-pinion design.

The signal from the airbag control unit J234 ignites belt pretensioner igniter 1 N153 or N154. The build-up of pressure causes the piston coupled to the rack to move upwards. The rack turns gears 1 and 2 via the pinion.

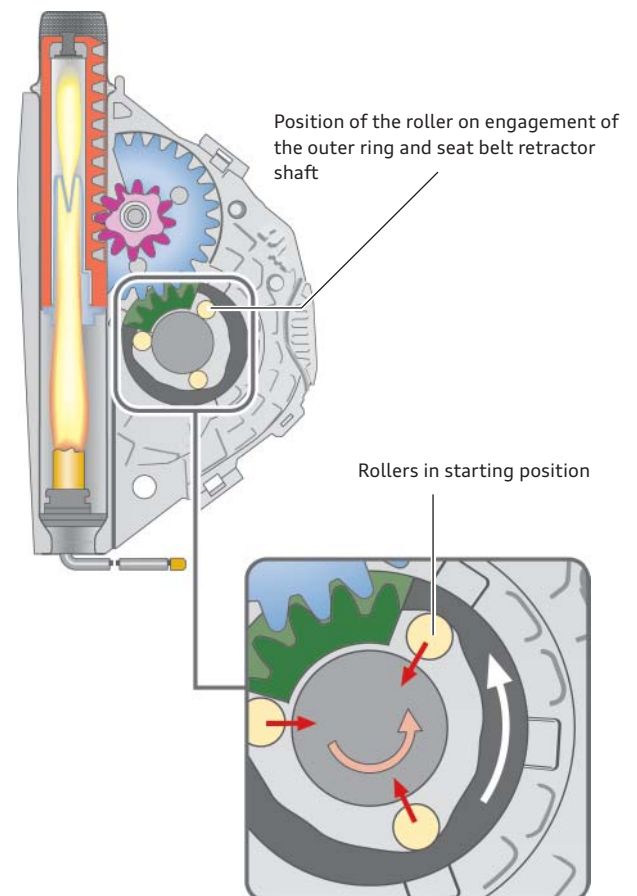


484_028

activated

Gear 2 is permanently connected to the outer ring of the belt retractor shaft freewheel. When the outer ring turns, the rollers are thrust inwards until they lock into place between the outer ring and the seat belt retractor shaft. Traction is thus established between the outer ring and the seat belt retractor shaft. The rotational movement is now transmitted to the seat belt retractor shaft and the process of retracting the seat belt begins.

The retractor stops tensioning the seat belt when the counterforce on the seat belt is greater than the force exerted by the pretensioner.



484_029

Adaptive belt force limiters in combination with Audi pre sense

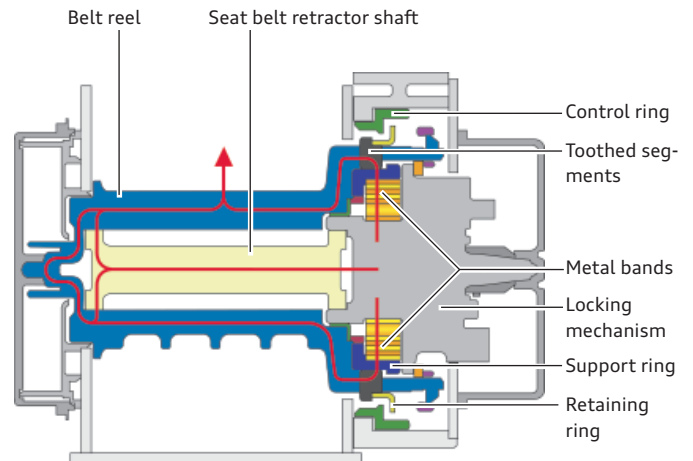
Belt force limiter, driver side G551 and belt force limiter, front passenger side G552

The front inertia-reel seat belts have two-stage belt force limiters. In the event of a deployable head-on collision, the pyrotechnic belt pretensioners are ignited first. The locking mechanism blocks the seat belt retractor shaft and prevents the seat belt from unreeling, which would otherwise occur due to the forward motion of the occupants.

To limit the load which the seat belt exerts on the occupants, the seat belt retractor shaft and a belt winder permit controlled unreeling of the seat belt.

The force which the seat belt counteracts is distributed as follows:

1. From the seat belt reel via the retractor shaft to the locking mechanism. The seat belt retractor shaft, acting as a torsion bar, begins to rotate.
2. From the belt reel to the locking mechanism via the toothed segment, support ring and metal bands. The metal bands are connected to the support ring and the locking mechanism. The metal bands are retracted.



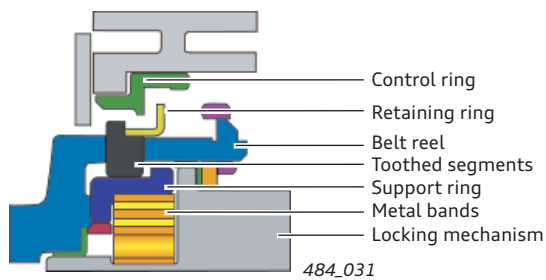
484_030

Depending on impact severity and longitudinal seating position, the airbag control unit J234 activates the belt force limiter igniters G551 and G552.

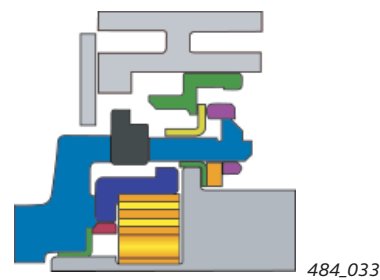
The resultant gas pressure displaces the piston and causes the control ring to rotate. This displaces the retaining ring and disengages the toothed segments from the support ring. The belt winder is decoupled. The torsion bar now counteracts by itself the force which the seat belt exerts.

To afford the occupants a good level of protection, the belt tensioning function, the belt force limiting function and the front airbags are phased.

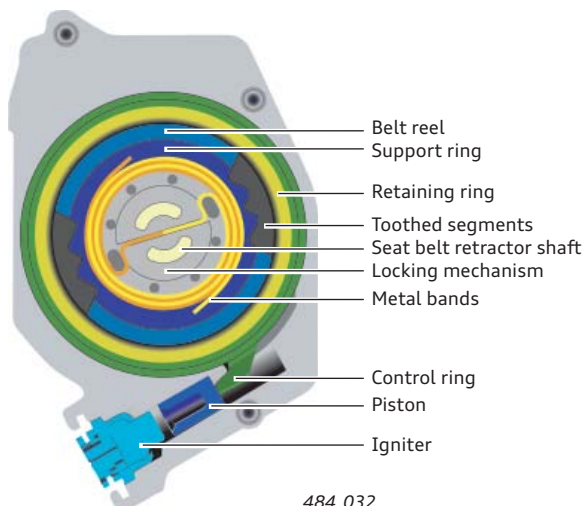
The belt force limiter igniters are not activated in the event of a side impact or rear collision.



484_031



484_033



484_032



484_034

Additional notes on the occupation protection system for specific markets

Please note that, due to country-specific regulations, the equipment specification of the Audi A7 Sportback is subject to change.

The following equipment is affected:

- ▶ Seat occupancy detector, front passenger side
- ▶ Knee airbags
- ▶ Rear belt pretensioners (band type pretensioners)
- ▶ Seat belts with "child seat locking" function (front and rear passengers)
- ▶ Rollbar

Rollbar

Depending on country specification, two additional sensors are integrated the airbag control unit J234 for the purposes of rollover detection. The ABS control unit J104 reads in additional information in order to provide higher rollover detection sensitivity.

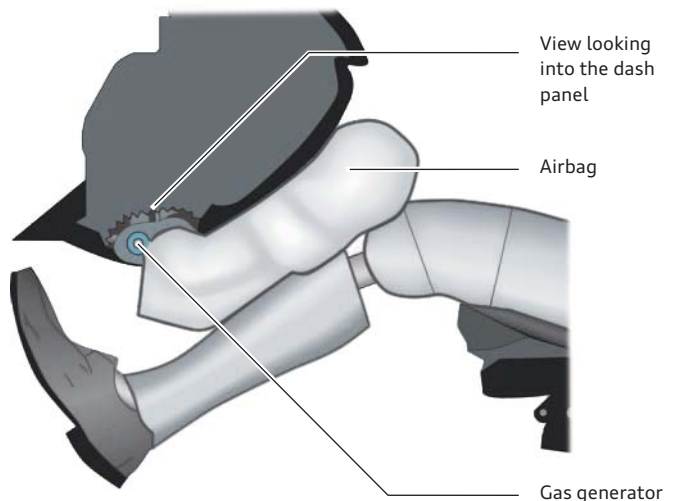
The airbag control unit does not necessarily require this information. It has the ability to independently detect a rollover. If a rollover is detected, the belt pretensioners and the head airbags are deployed.

Knee airbags

Knee airbag igniter, driver side N295

Knee airbag igniter, front passenger side N296

As with other Audi models too, the Audi A7 Sportback may, depending on country specification, come equipped with knee airbags. The knee airbag is located in the footwell trim below the dash panel on the driver's side. The knee airbag is installed below the glove compartment flap on the front passenger side. The knee airbags are also activated in combination with the front airbags. The ignited knee airbags allow the occupants to decelerate with the vehicle earlier. Hybrid gas generators are used as gas generators.



484_044

Seat occupancy detector, front passenger side

Seat occupancy recognition control unit J706 and passenger side seat occupancy sensor G128

In some markets the Audi A7 Sportback comes equipped with a special seat occupancy recognition system for the front passenger seat. The task of this seat occupancy recognition system is to indicate the occupancy status of the seat to the airbag control unit J234.

Two occupancy states can be recognised:

1. Seat not occupied or child seat fitted.
2. Seat occupied by an adult.

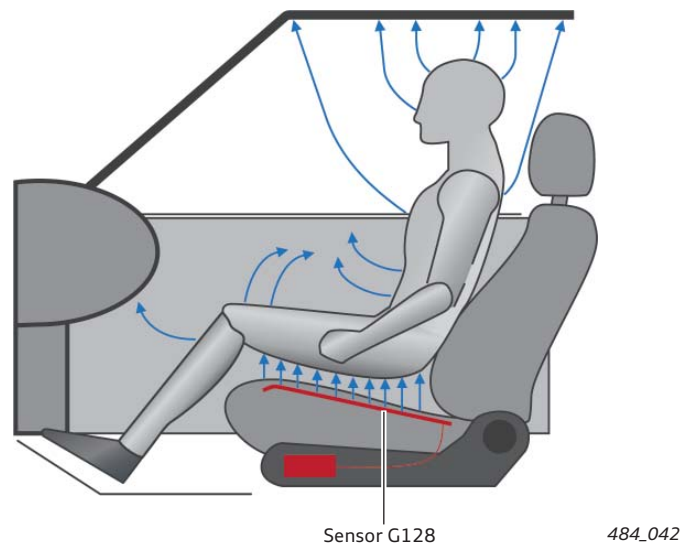
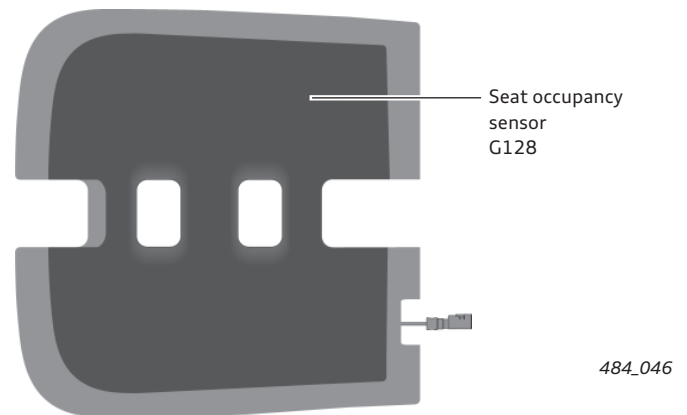
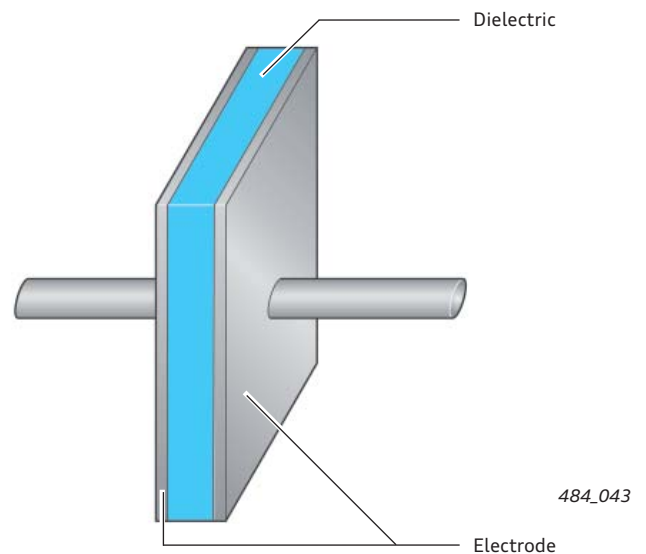
Passenger side seat occupancy sensor G128

The passenger side seat occupancy sensor G128 is a capacitive sensor and, put simply, acts as a capacitor. The capacitor comprises two plates (electrodes) and an insulator (dielectric), which is sandwiched between these plates. When a voltage is applied to one of the electrodes and the other electrode is connected to the battery's negative terminal, the capacitor begins to accumulate energy. Capacitance is measured in units called farads. The capacitance of a capacitor can be altered by varying the size of the electrode plate or the dielectric.

With this seat occupancy recognition system, the first electrode plate is the passenger side seat occupancy sensor G128 and the second electrode plate is the chassis. The size of these components is not variable. The dielectric consists of the seat cover, the atmosphere and the trim parts. It is therefore variable. When an adult is seated in the front passenger seat, the dielectric between the sensor G128 and the body changes due to this person's fluid content. The capacitance changes accordingly. If a child seat is placed on the front passenger seat, the dielectric, and hence the capacitance, changes again. The change in capacitance is much smaller compared to an adult.

The seat occupancy sensor G128 is integrated in the seat cover above the seat cushion. Note that there are different seat types and therefore also different seat occupancy sensors.

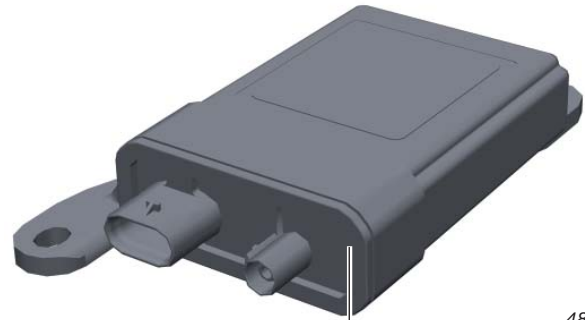
This determines whether the front passenger front airbag and front passenger knee airbag are activated or deactivated. If the components are deactivated, the PASSENGER AIRBAG OFF warning lamp K145 comes on to inform the occupants.



Seat occupancy recognition control unit J706

The seat occupancy sensor G128 is connected to the seat occupancy recognition control unit J706 by a coaxial cable. In principle, the control unit J706 is a unit of measurement for seat occupancy recognition. It detects the change in the capacitance of the seat occupancy sensor G128 and, thus, can determine if the seat is vacant, occupied by a child seat or an adult. The capacitance of the seat occupancy sensor is measured cyclically by the seat occupancy recognition control unit.

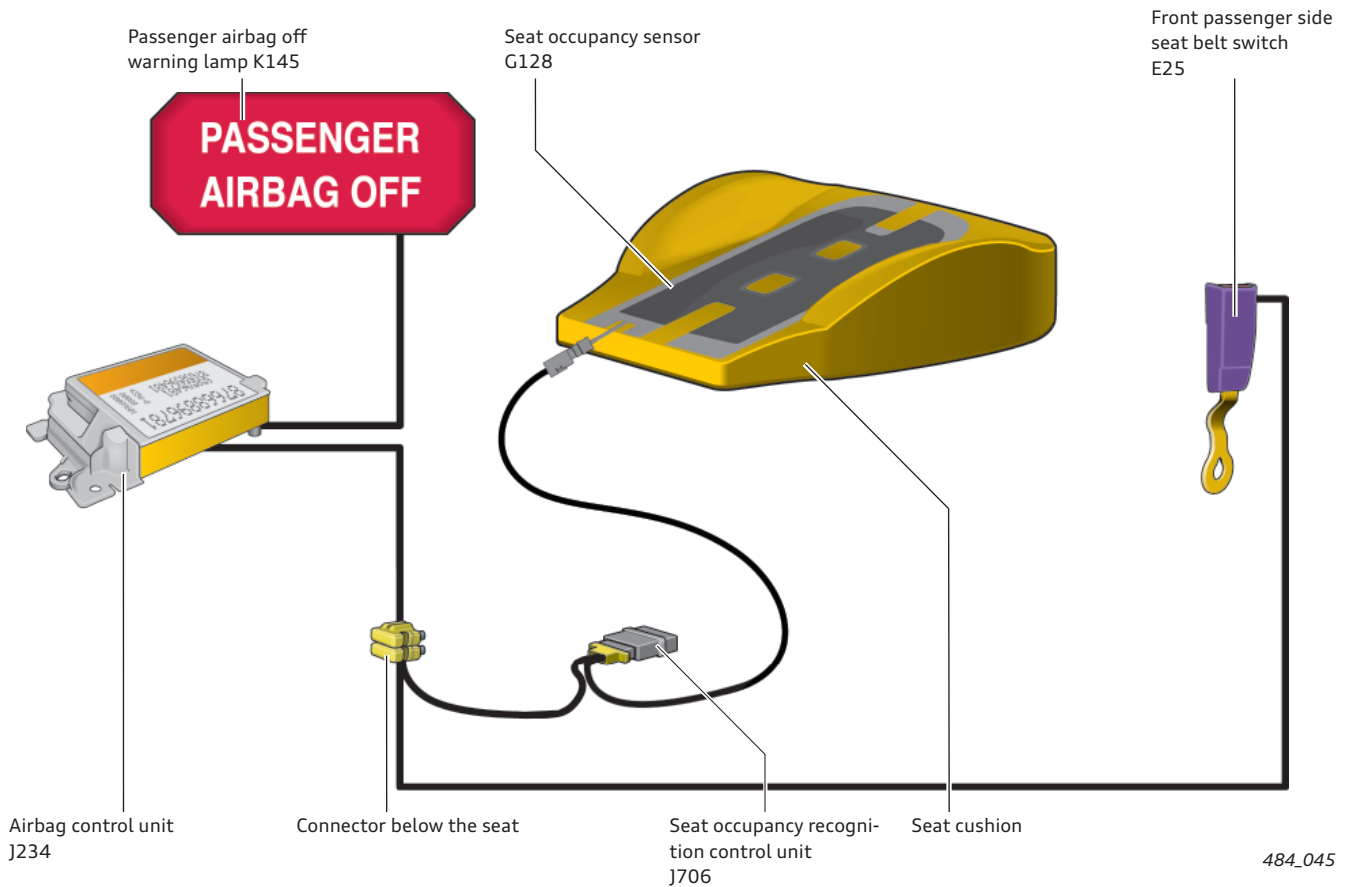
The airbag control unit J234 obtains this information from the seat occupancy recognition control unit J706 via a LIN interface. The airbag control unit activates or deactivates the front passenger airbag and the front passenger knee airbag on the basis of this information. The PASSENGER AIRBAG OFF warning lamp K145 is also activated.



484_047

Seat occupancy recognition control unit J706

The seat occupancy recognition control unit J706 is installed under the front passenger seat. Note that there are different seat types and therefore also different seat occupancy recognition control units. The software in the control units is adapted specially to the seat.



484_045



Note

When repairing the seat occupancy recognition system, always refer to ELSA, Guided Fault Finding and the Electronic Parts Catalogue (ETKA).

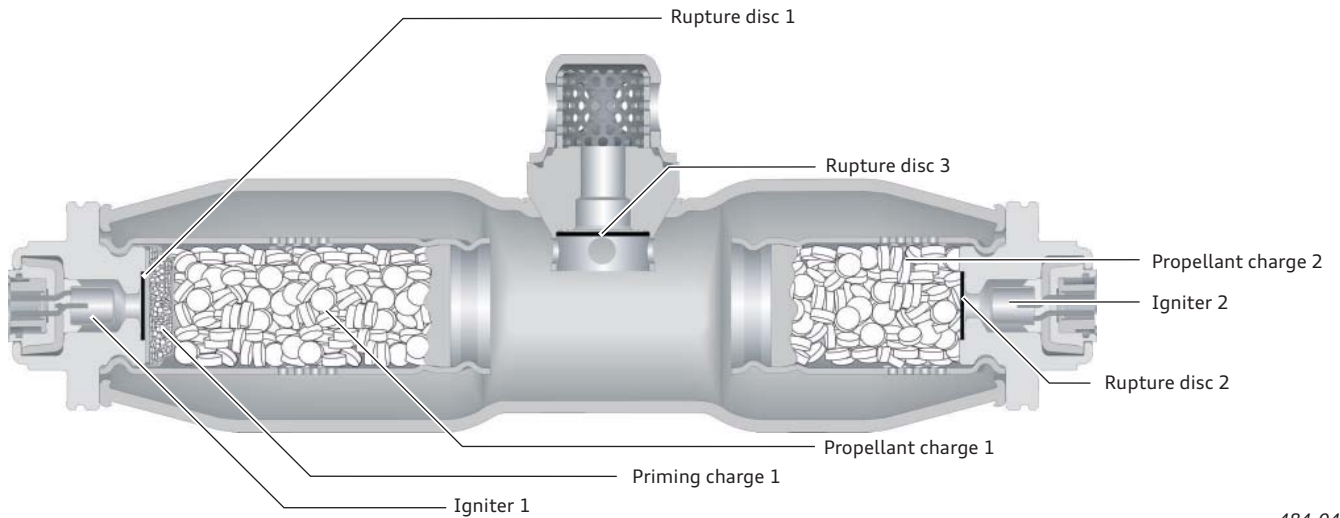
Front passenger airbag

Front passenger side airbag igniter 1 N131, front passenger side airbag igniter 2 N132 and front passenger airbag relief valve igniter N491

The Audi A7 Sportback comes equipped with an adaptive front passenger airbag module in all markets. A hybrid gas generator with two pyrotechnic propellant charges for inflating the airbag with gas may be fitted depending on country specification. The adaptivity function of the front passenger airbag module is identical to that of the driver side airbag module and is described on page 11.

Depending on the accident situation, the airbag control unit J234 determines interval at which the front passenger side airbag igniter 2 N132 is ignited after the driver side airbag igniter 1 N131.

Hybrid gas generator with two pyrotechnic propellant charges



484_040

Audi pre sense

The Audi A7 Sportback is optionally available with Audi pre sense. The customer can choose from four versions:

- ▶ Audi pre sense basic
- ▶ Audi pre sense front inclusive of Audi pre sense basic
- ▶ Audi pre sense rear inclusive of Audi pre sense basic
- ▶ Audi pre sens front, pre sense rear and pre sense basic (Audi pre sense plus)

Audi pre sense cannot prevent accidents from occurring. Its purpose is to alert the driver to hazardous situations and to assist the driver within the scope of its physical limits.

Audi pre sense basic

Belt slack reduction function

The front left and right belt pretensioner control units J854 and J855 reduce the so-called "belt slack" under the following conditions:

- ▶ Front seat belts are fastened
- ▶ Vehicle is travelling forwards at greater than 15 kph
- ▶ Vehicle is travelling forwards at less than 15 kph (for longer than 10 seconds).

The seat belts are subsequently released again.

Longitudinal dynamics function

If the driver brakes heavily while moving forwards and if the brake pressure reaches a defined level within a set period of time, the belt pretensioner control units J854 and J855 electrically pre-tension or fully tension the seat belts as required. The ABS control unit J104 may also activate the hazard warning flashers. Depending on the situation, forwards movement of the occupants can be reduced to approx. 10 cm. by electrical tensioning of the seat belts.

Transverse dynamics function

If the vehicle oversteers or understeers, the Electronic Stability Program (ESP) is activated and the seat belts are electrically pre-tensioned.

If the vehicle exceeds its physical limits and, consequently, can no longer be stabilised, the seat belts are electrically fully tensioned. In addition, the side windows and the tilt/slide sunroof¹⁾ are closed (if open).

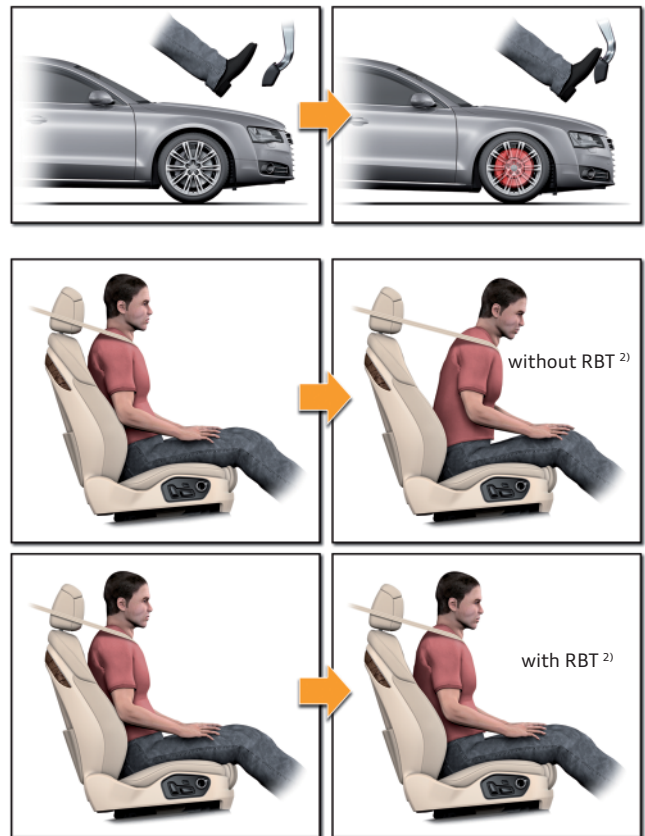
If no accident occurs in any of the driving situations described here, the seat belts are released again and the hazard warning flashers are deactivated (if activated).

¹⁾ Optional equipment

²⁾ Reversible belt pretensioner

The Audi pre sense system was made possible by networking a variety of systems. The control units concerned continuously exchange information with one another via the vehicle's data bus systems.

The Audi pre sense system on the Audi A7 Sportback works in much the same way as the Audi pre sense system on the Audi A8 '10. The illustrated vehicles with Audi pre sense are Audi A8 '10 models.



484_106

Depending on the set-up in Audi drive select and whether ASR/ESP is on or off, the seat belts are electrically tensioned according to the driving situation.



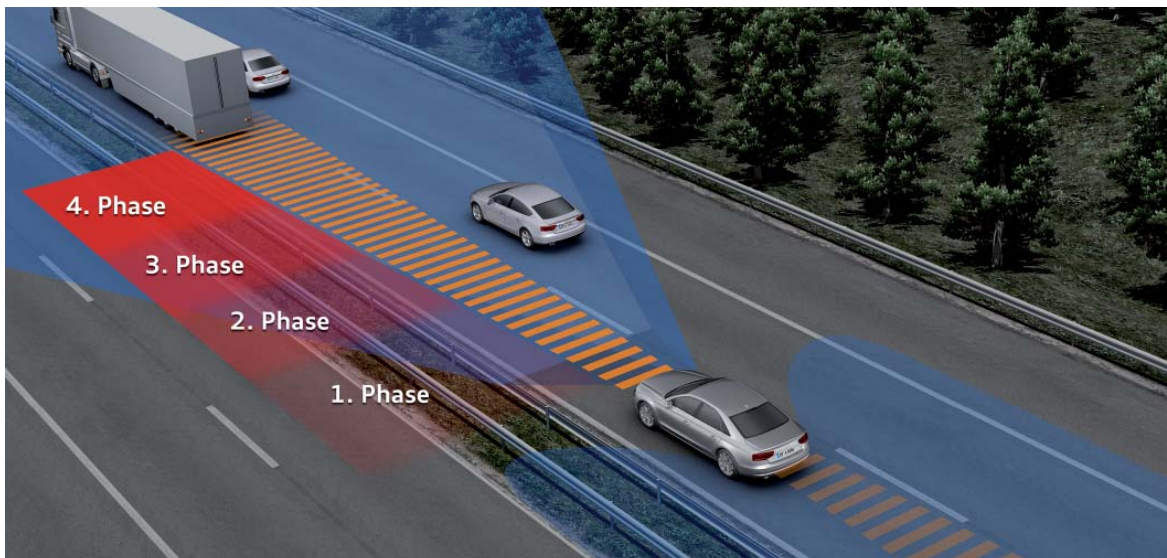
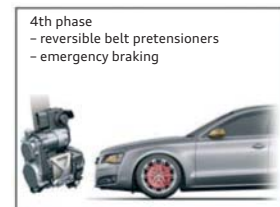
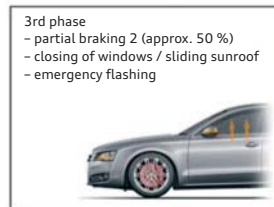
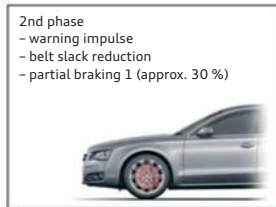
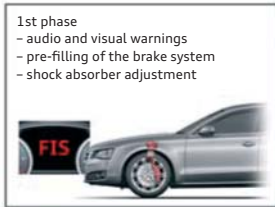
Reference

For more detailed information about Audi pre sense, refer to Self Study Programme 456 "Audi A8 '10" and Audi iTV.

Audi pre sense front

Audi pre sense front is only available in combination with the optional adaptive cruise control (ACC) system. ACC comes as a package with Audi braking guard and Audi pre sense basic. Even when ACC is off, the wheel sensors continue to monitor the traffic ahead and send the information they gather to the ACC control unit J428.

This control unit evaluates the data and places any relevant information onto the data bus. Other control units can receive and evaluate the messages and take appropriate action.

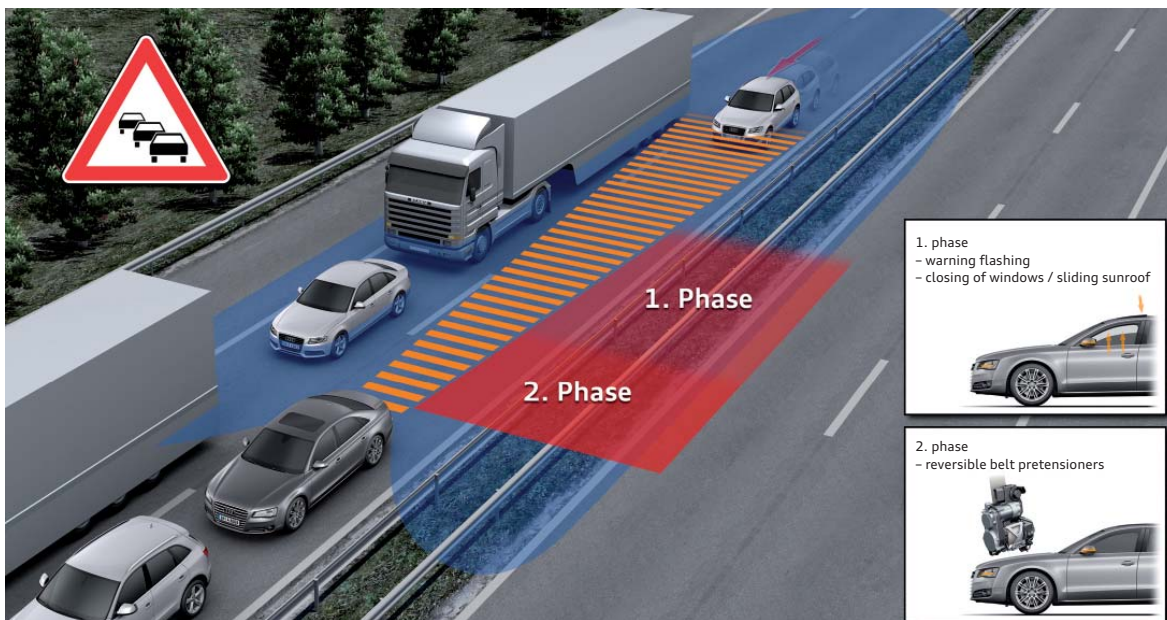


484_107

Audi pre sense rear

With Audi side assist, it is also possible to analyse following traffic. The wheel sensors of the Audi side assist system continuously feed the Audi side assist control unit J769 with information. The control unit J769 evaluates this information and places any relevant information onto the data bus.

The control unit J769 even sends data when Audi side assist is off. The Audi side assist system for the Audi A7 Sportback comes with Audi pre sense rear and Audi pre sense basic.



484_108

Infotainment

Introduction

The Audi A7 Sportback is available with two radio systems and two navigation systems. Depending on country, standard equipment is either MMI Radio oder MMI Radio plus. In China, Japan and Korea, the A7 Sportback is available only with MMI Navigation plus.

The MMI systems

- ▶ Radio,
- ▶ Radio plus and
- ▶ Navigation

are based on the Radio Media Center platform. They are similar, functionally, to the concert radio with MOST bus on the Audi A1. The MMI Navigation plus system is based on the system of the same name on the Audi A8 '10.

The following table shows the main equipment features and optional equipment.

MMI Radio (Europe only)

MMI Radio plus



Basic equipment

6.5" TFT colour display with 400 x 240 pixel resolution	6.5" TFT colour display
Remote control panel with 6 station keys	Remote control panel
	Driver information system
AM/FM radio with phase diversity	AM/FM radio with phase diversity
	Digital satellite radio (Canada only)
TP memo (while driving)	TP memo (while driving)
CD drive (MP3, WMA)	CD drive (MP3, WMA)
	Two SD card readers
	AUX In (not applicable)
Basic sound system (4 x 20 watts)	Audi Sound System (10 x 150 watts)
	Bluetooth interface (with USB)
	Speech dialogue system
	Audi music interface

Options

	Universal mobile phone interface
	Audi music interface
	Digital radio (DAB)
	CD changer
	Bose Surround Sound System
	Driver information system dash panel insert
	Provision for Rear Seat Entertainment



Note

In countries where Bluetooth is banned, no Bluetooth related functions are available in Audi vehicles.

MMI Navigation

MMI Navigation plus

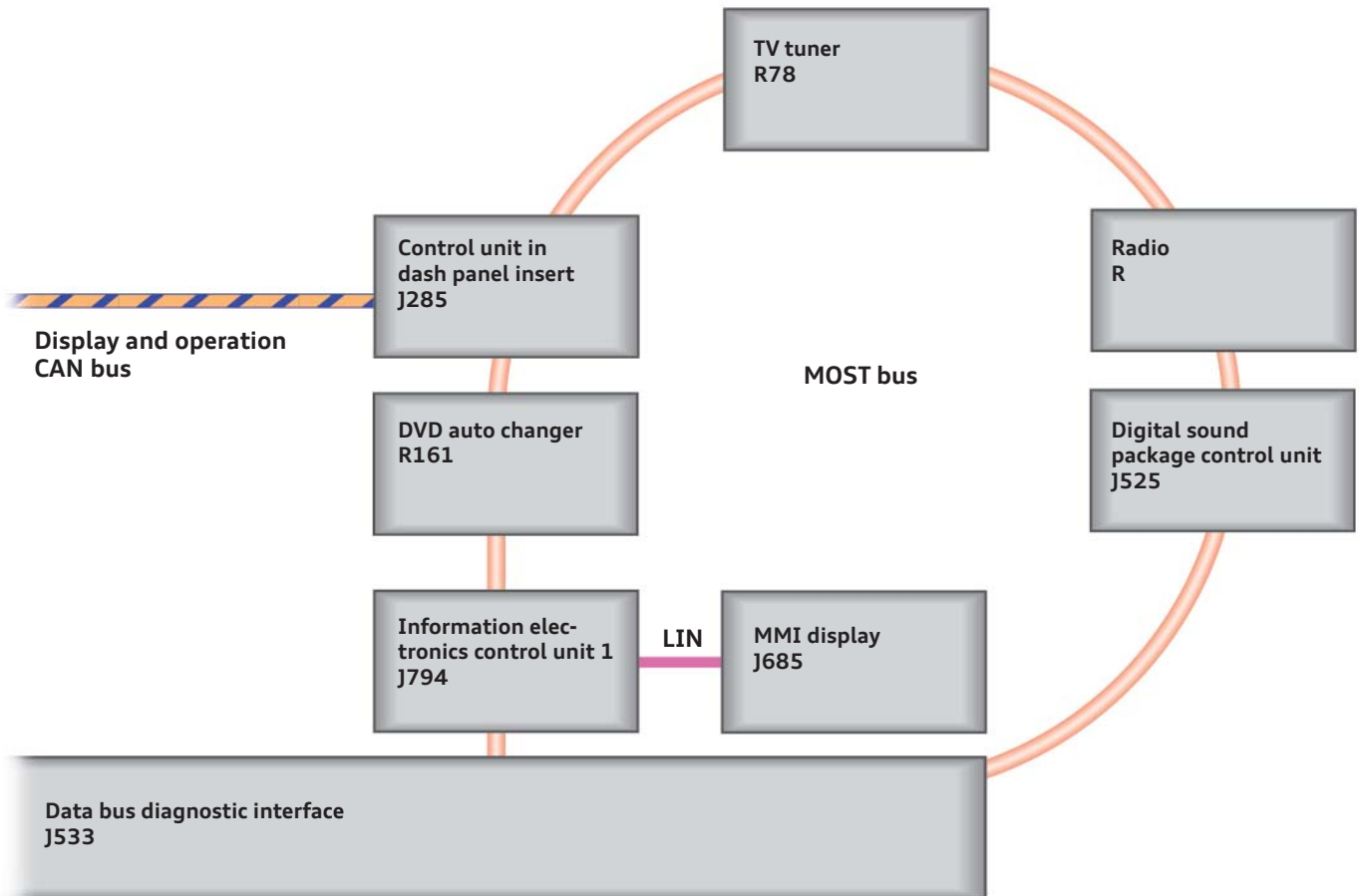


Display with 400 x 240 pixel resolution	6.5" TFT colour display with 400 x 240 pixel resolution	8.0" TFT colour display with 800 x 480 pixel resolution
Control panel with 6 station keys	Remote control panel with 6 station keys	Remote control panel with MMI touch
Driver information system with monochrome screen	Driver information system with monochrome screen	Driver information system with 7" colour screen in the dash panel insert
	2D navigation system with SD card	3D hard drive navigation system
AM/FM radio with phase diversity	AM/FM radio with phase diversity	AM/FM radio with phase diversity and background tuner
Digital satellite radio SDARS (available in USA and Canada only)		Digital satellite radio SDARS (available in USA and Canada only)
TP memo (while driving)	TP memo (while driving)	TP memo
CD drive (MP3, WMA, AAC, WAV)	CD drive (MP3, WMA, AAC, WAV)	DVD drive (Audio/Video, MP3, AAC, WMA, MPEG4)
	Two SD card readers	Two SD card readers
		Jukebox with approx. 20 GB of internal memory
AUX In (not applicable to AMI)	AUX In (not applicable to AMI)	AUX In (not applicable to AMI)
180 watts	Audi Sound System (180 watts)	Audi Sound System (180 watts)
Bluetooth interface (9ZX)	Bluetooth interface (9ZX)	Bluetooth interface (9ZX)
Speech dialogue system	Speech dialogue system	Premium speech dialogue system
Audi music interface (availability is market dependent)	Audi music interface (availability is market dependent)	Audi music interface (availability is market dependent)
Universal mobile phone prewiring (9ZF)	Universal mobile phone prewiring (9ZF)	Universal mobile phone prewiring (9ZF)
		BTA Bluetooth car phone (availability is market dependent, includes Audi Online Services and WLAN hotspot)
		Handset for BTA
	Audi music interface	Audi music interface
	Digital radio (DAB)	Digital radio (DAB/DAB+/DMB)
	CD changer	CD changer
		DVD auto changer
	Bose Surround Sound	Bose Surround Sound (standard in Japan)
		Bang & Olufsen Advanced Sound System
Driver information system with 7" colour screen in the dash panel insert	Driver information system with 7" colour screen in the dash panel insert	TV tuner
Provision for Rear Seat Entertainment (9WQ)	Provision for Rear Seat Entertainment (9WQ)	Provision for Rear Seat Entertainment (9WQ)

Topology

The control units in the infotainment system of the Audi A7 Sportback interchange data via the MOST bus. This allows very high data transfer rates to be achieved, for example for transferring audio data.

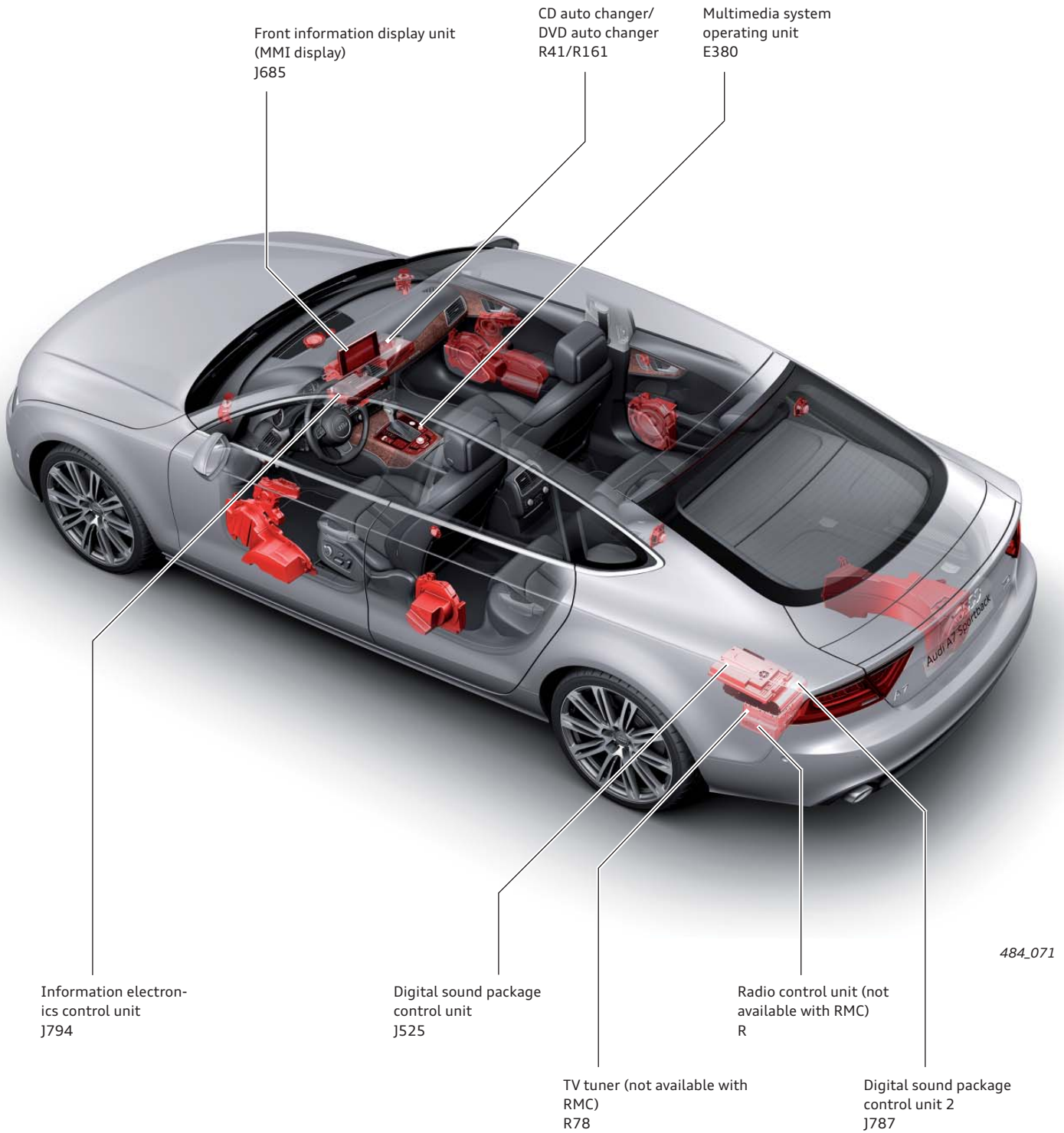
The picture signals from the TV tuner, reversing camera or DVD auto changer are transmitted as FBAS signals to the information electronics control unit 1 J794 via analogue video lines.



484_103

Installation locations of the infotainment control units

The control units of the infotainment system on the Audi A7 Sportback are installed in different positions. The following diagram shows the possible installation locations of all infotainment control units in an Audi A7 Sportback with MMI Navigation plus.



Radio Media Center (RMC)

Die infotainment versions of the Audi A7 Sportback (MMI Radio, MMI Radio plus and MMI Navigation) belong to the Radio Media Center infotainment platform.

Depending on equipment level, the Radio Media Center combines nearly all the hardware functions of a modern infotainment system in a single housing. These range from the radio tuner with phase diversity to the navigation control unit. The housing of the RMC is equivalent to that of a 1-DIN device. Like the information electronics control unit 1 of the MMI (main unit), the RMC is also the central controller for the infotainment system.

The main difference between the RMC and the third generation MMI system is that no separate radio control unit is integrated in the RMC. The functions of the radio are integrated in the information electronics control unit 1 J794. In the case of the RMC, J794 has an additional audio amplifier.

The following three versions of the RMC are used on the Audi A7 Sportback:

- ▶ MMI Radio
- ▶ MMI Radio plus
- ▶ MMI Navigation

The diagnostic address of the information electronics control unit 1 J794 in the RMC is "5F – Information electronics 1".



Front panel of J794 for MMI Radio

484_066

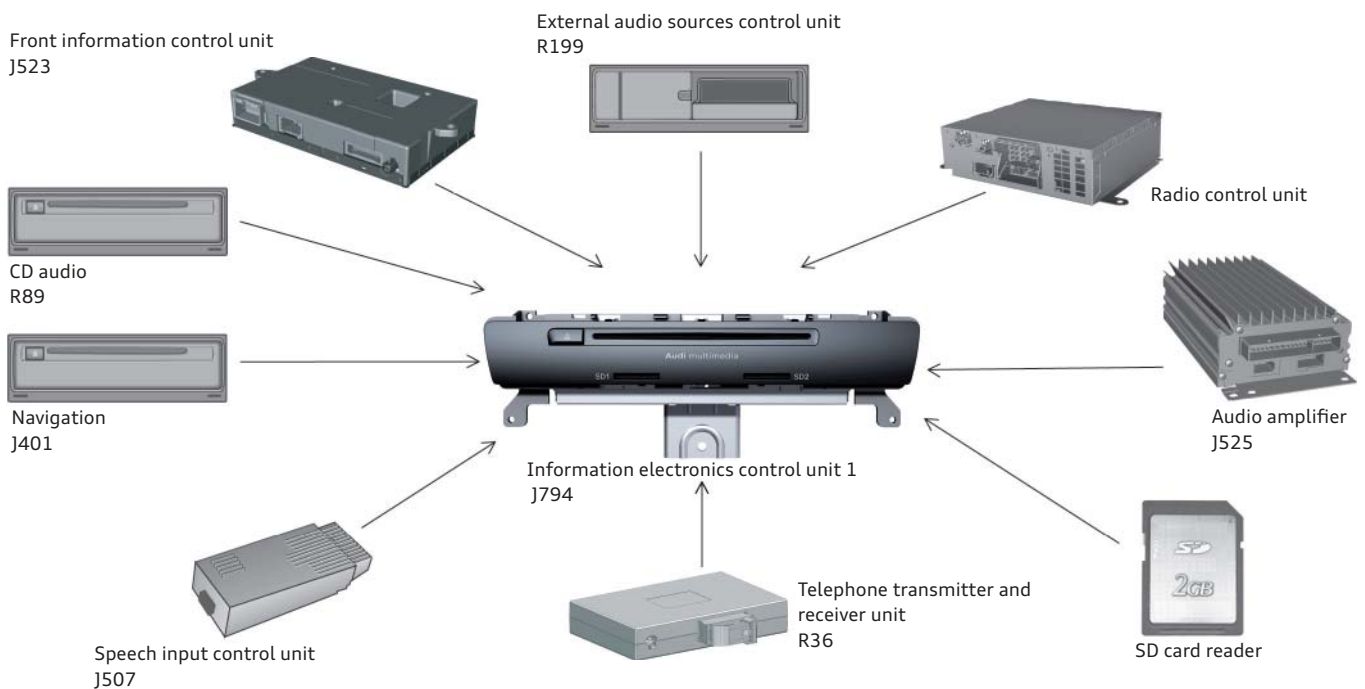


Front panel of J794 for MMI Radio plus and MMI Navigation

484_067

Grouped control units in the RMC

The following diagram shows which control units and functions are grouped together in control unit J794 of the Radio Media Center.



484_073



Reference

For more detailed information about the Radio Media Center, refer to Self Study Programme 477 – Audi A1.

MMI Radio (RMC)

The MMI Radio of the Audi A7 Sportback has a similar configuration and functions to the concert radio with MOST bus on the Audi A1.

The MMI Radio of the A7 Sportback has the following equipment features:

- ▶ 6.5-inch colour display with 400 x 240 pixel resolution
- ▶ Control panel with six freely assignable radio station keys
- ▶ FM dual tuner with phase diversity (for FM), as well as a single tuner for MW (medium wave) and LW (long wave) in Europe
- ▶ TP memo
- ▶ Single CD drive
- ▶ Integrated amplifier with 4 x 20 watts RMS power output
- ▶ Car menu

Like all versions of the RMC, the MMI Radio has an analogue radio dual tuner with phase diversity.

The FM channel list is updated by one of the two FM tuners.

The TP-Memo function stores traffic messages of the selected TP channel while driving. If the FP function is active and EON channels are selected, traffic messages of an EON TP channel are recorded. In AM mode traffic messages of a TP channel are stored regardless of which channel is currently selected if the TP function is active.

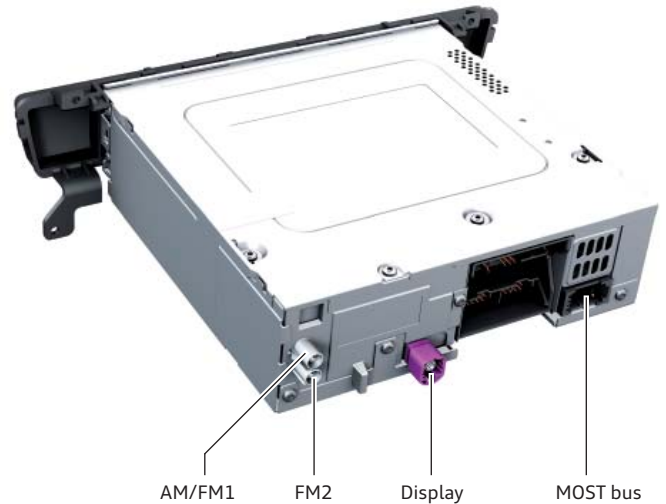
If TP is active but a different output source has been selected, the traffic messages of a TP channel are recorded regardless of which channel is being received. This is the case during CD use, for example. If no TP channel is selected, the RMC automatically searches for a channel and records the traffic messages.

The CD drive of the MMI Radio is configured for audio playback and, in addition to audio CDs, it supports CDs containing audio files with the endings *.mp3 oder *.wma.



Front panel of J794 for MMI Radio

484_066



Front panel of J794 for MMI Radio

484_072

MMI Radio plus (RMC)

Compared to MMI Radio, MMI Radio plus has the following different and/or additional features:

- ▶ Two SD card readers
- ▶ Integrated six-channel amplifier for Audi Sound with 180 watts power output
- ▶ Bluetooth interface
- ▶ Speech dialogue system
- ▶ Driver information system with monochrome screen in the dash panel insert
- ▶ Digital satellite radio (available in USA and Canada only)
- ▶ AUX In on centre console
- ▶ Compatibility with optional equipment, e.g. DAB etc.

With MMI Radio plus and higher, the CD drive and the SD card reader support playback of audio files with the following endings:

- ▶ *.mp3
- ▶ *.wma
- ▶ *.aac
- ▶ *.wav

The metadata in MP3, WMA and AAC files (album, track, artist, etc.) and the embedded album cover can also be displayed.

Bluetooth interface

The MMI Radio for the Audi A7 Sportback comes with a Bluetooth interface. This interface enables the RMC to be used for the hands-free telephone and for audio streaming. The Bluetooth HFP profile is used for the hands-free telephone and A2DP for audio streaming. The AVRCP profile is used to control audio player connected via Bluetooth. The scope of the control options is dependent upon the device in use.

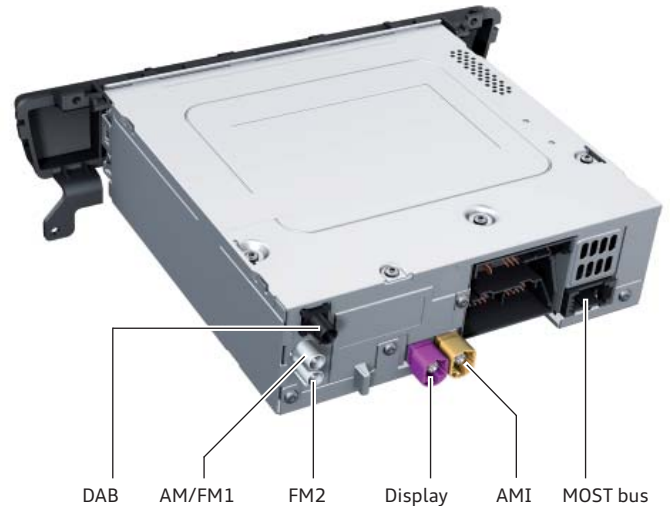
Speech dialogue system

MMI Radio plus comes with an integrated speech dialogue system, which can be used, among other things, for the hands-free telephone or for selecting a radio channel. The main functions of the RMC can be operated by voice control (e.g. find contact in directory, dial number, etc.).



Front panel of J794 for MMI Radio plus

484_067



Back panel of J794 for MMI Radio plus

484_074



Reference

Further information on supported file formats can be found in the operating manual.

MMI Navigation (RMC)

The MMI Navigation infotainment system has a navigation function in addition to the features of MMI Radio plus. The navigation map is stored on an SD card. In Europe, for example, a 4GB SDHC card is used. The navigation system operates only with the SD card inserted.

The navigation system uses a 2D map display and can be configured to display maps in 3D birdview. Other special features of the navigation system include a manoeuvres lists and detailed intersection maps. This information is displayed in split screen mode.

Speech dialogue system

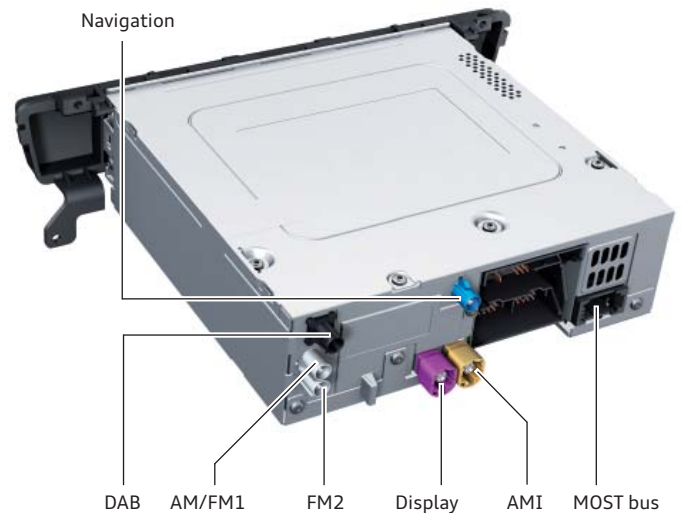
Trip destinations can be entered using the speech dialogue system.

The voice processor integrated in the speech dialogue system generates spoken language from the written word (proper name from the directory or the town/city and street name from the navigation system). This allows speech inputs to be entered directly as complete words. In addition, spoken language can be used in the navigation system for speech output during route guidance. This process is also referred to as "text-to-speech".



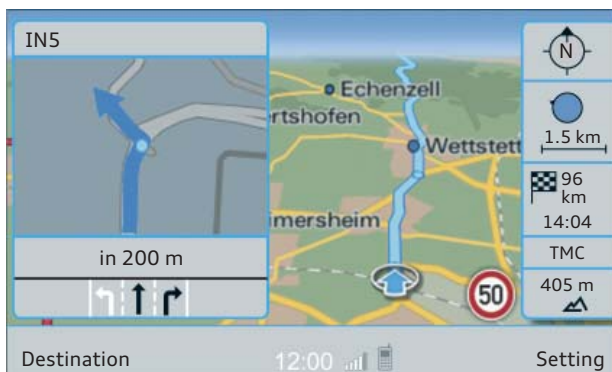
Front panel of J794 for MMI Navigation

484_067



Back panel of J794 for MMI Navigation

484_075



Detailed intersection map

484_077



Manoeuvres list

484_076

MMI Navigation plus

The MMI Navigation plus system is identical to the system of the same name on the Audi A8 '10. It is a third generation MMI system. The internal designation is MMI3G plus. The following features are standard on the Audi A7 Sportback:

- ▶ 60 GB hard drive with approx. 20 GB for Jukebox
- ▶ 3D navigation with 3D city models
- ▶ DVD drive
- ▶ Two SD card readers (for SDHC cards up to 32 GB in size)
- ▶ Premium speech dialogue system
- ▶ Radio control unit with phase diversity
- ▶ Six-channel amplifier with 180 watts power output (integrated in the radio control unit)
- ▶ 8.0 inch TFT screen with 800 x 480 pixel resolution
- ▶ Driver information system with 7-inch colour screen in the dash panel insert
- ▶ MMI touch
- ▶ Bluetooth interface for:
 - ▶ hands-free telephone (HFP)
 - ▶ audio streaming (A2DP)

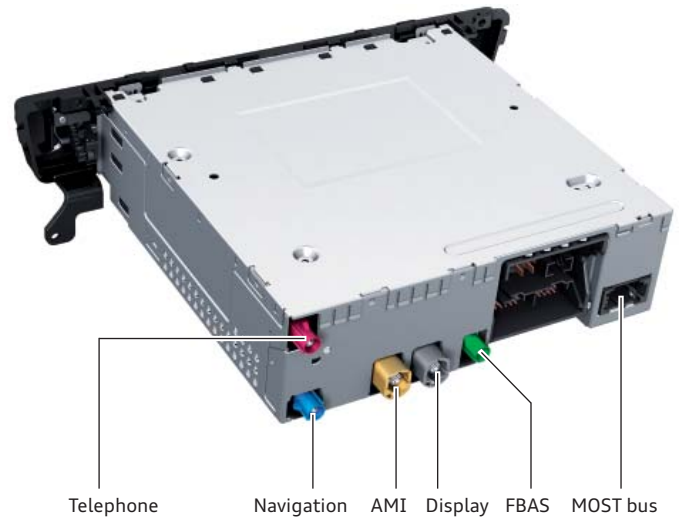
Depending on market, the Audi A7 Sportback also has the following standard equipment features:

- ▶ Audi music interface
- ▶ Audi Online Services
- ▶ Digital satellite radio tuner (available in USA and Canada only)



Front panel of J794 for MMI Navigation plus

484_069



Back panel of J794 for MMI Navigation plus

484_078

New features of MMI Navigation plus (mainly in Europe)

Google Earth map

The 3D map display can be expanded to include satellite mapping via Google Earth.

The 3D satellite map display is produced by combining the 3D map display with the existing 3D topographical display. This function is only available in combination with the Bluetooth car phone and an active data link.

WLAN hotspot

The Audi A7 Sportback has a WLAN hotspot in combination with the optional Bluetooth car phone. Rear passengers with suitable devices can use the WLAN hotspot to surf the Internet, retrieve data or e-mails or, for example, to conveniently and securely download the latest apps for the iPad.

Bluetooth car phone

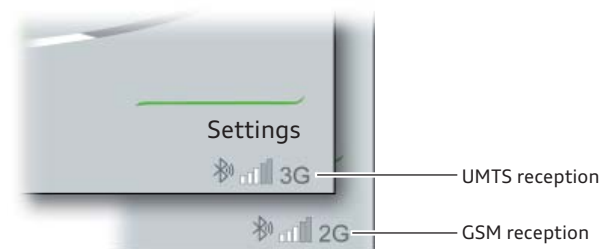
The Bluetooth car phone is fitted with an UMTS¹⁾ module. This allows the telephone to dial into the GSM or UMTS networks. When a network link is active, this is indicated at the bottom right of the display. 2G is displayed for GSM network and 3G for UMTS network.



3D satellite map

484_079

Network connectivity display



484_081

¹⁾ The Universal Mobile Telecommunications System (UMTS) is a third generation (3G) mobile communications standard which provides for significantly higher data transfer rates (up to 7.2 Mbit/s with HSDPA (High Speed Downlink Packet Access) and up to 384 kbit/s without) than the second generation (2G) mobile communications standard, the GSM Standard (up to 220 kbit/s with EDGE and max. 55 kbit/s without).



Reference

For more detailed information about MMI Navigation plus, refer to Self Study Programme 456 "Audi A8 '10".

Google Earth mapping (mainly in Europe)

A "normal" 3D map or a 3D map with Google Earth can be selected for MMI Navigation plus in the "Settings" menu of the navigation system.

If the Google Earth variant is active, the satellite maps are loaded directly from the Internet (currently from Google Earth). This satellite map is combined with the navigation map on the hard drive to produce a 3D satellite map.

The prerequisites for use of Google Earth maps are:

- ▶ MMI Navigation plus
- and
- ▶ Bluetooth car phone online (9ZW)
- and
- ▶ a data-capable SIM card

Loading Google Earth maps

The following requirements must be met in order to load mapping material from Google Earth:

- ▶ a data capable SIM card inserted in the card reader
- or
- ▶ a mobile phone with data-capable SIM card connected by SIM Access Profile (SAP)
- and
- ▶ a configured data link

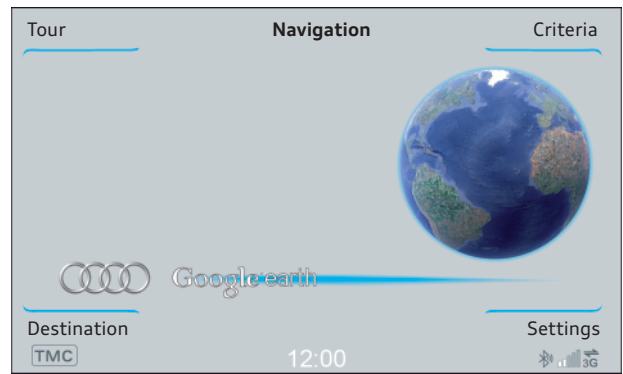
Also, in the "Settings" menu of the navigation system

- ▶ Map type must be set to "Position 3D"
- and
- ▶ Map display must be set to "Google Earth".

If these requirements are met, the information electronics control unit 1 J794 always loads the satellite map for the current location and the expected route. The loaded data packets are cached on the hard drive. The data packets required for the current map view are then unpacked and displayed.

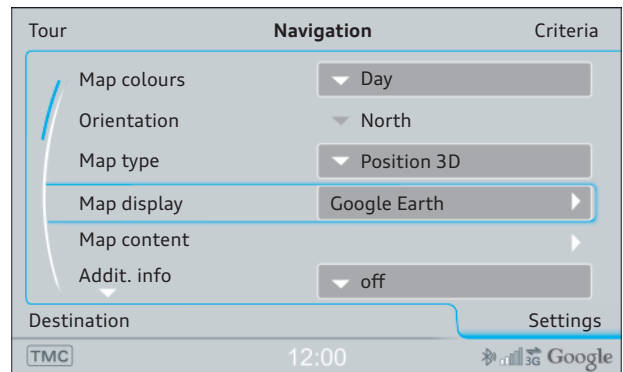
If enough data packets are stored for a certain route because, say, the user travels this route on a daily basis, a 3D satellite map can be displayed even without an active link to Google Earth.

If there is not enough data in the cache to display a map of adequate quality on the MMI screen, the system informs the user and switches to the standard map.



Google Earth home page

484_082



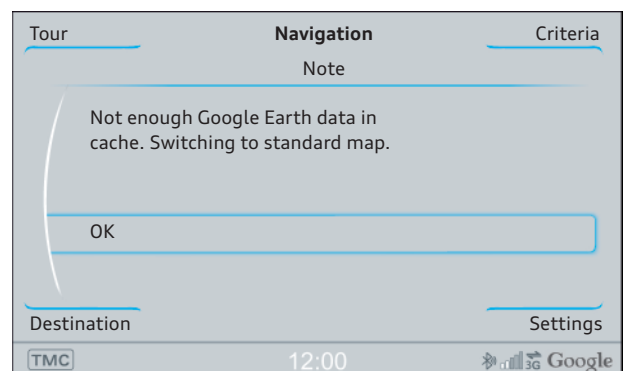
Settings for Google Earth

484_083



3D satellite map

484_079



This message is displayed if too little data is available

484_084



Note

To download Google Earth maps and use the WLAN hotspot, it is recommended to purchase a data flat-rate for the SIM card.

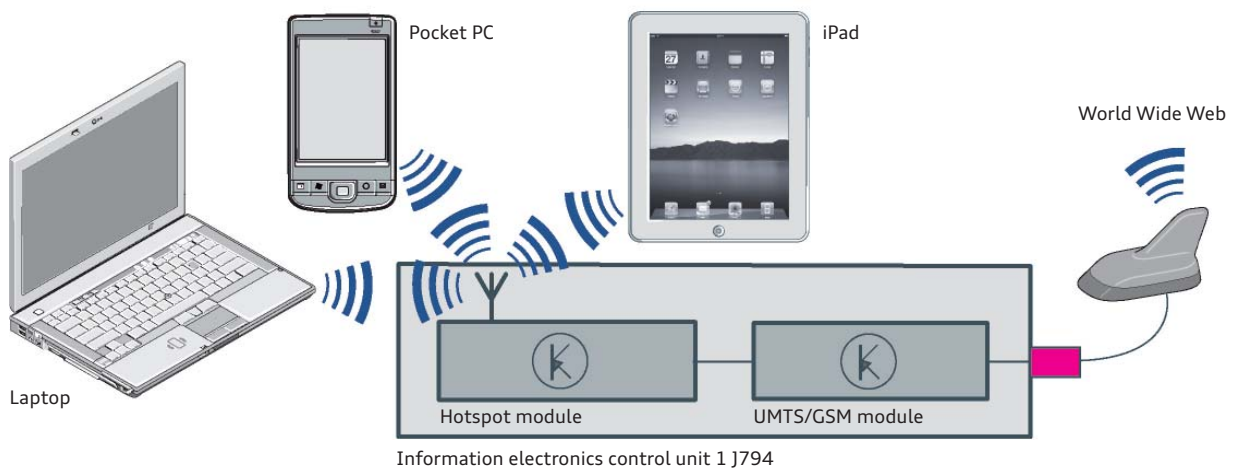
WLAN hotspot (mainly in Europe)

What is a WLAN hotspot?

A WLAN is a wireless local area network. In some countries the term Wi-Fi, meaning wireless fidelity, is used. Wi-Fi provides a wireless link between multiple devices and a local area network.

A hotspot is a location which offers public Internet access via a wireless network. Unlike a regular WLAN network, the devices usually do not have to be linked to one another or networked. They are linked separately to the hotspot. Like most public hotspots, Audi also uses the IEEE802.11b/g wireless standard for transmitting data.

Schematic diagram of a WLAN hotspot



484_085

WLAN on the Audi A7 Sportback

The optional Bluetooth online car phone is required to implement the WLAN hotspot. It transforms the Audi A7 Sportback into a full-fledged office on wheels. Up to eight devices (e.g. iPads, laptops, PDAs, etc.) can be linked to the hotspot. The reception range is confined to the interior of the vehicle.

The WLAN hotspot is installed with the following equipment combination:

- ▶ MMI Navigation plus
- and
- ▶ Bluetooth car phone online (9ZW)

The WLAN module required for the WLAN hotspot is integrated in the information electronics control unit 1 J794. The hotspot can also be used for connecting suitable devices via WLAN.

The UMTS module connects the device to the Internet via the vehicle's external aerial. The UMTS module is built into the information electronics control unit 1 J794. Up to 7.2 Mbit/s of data can be exchanged via UMTS.

The following Internet connectivity requirements must be met:

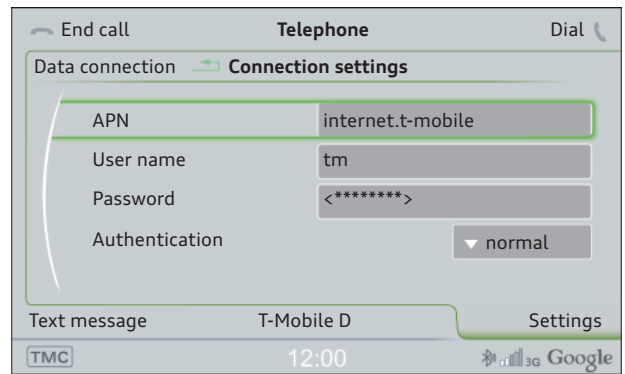
- ▶ a data capable SIM card inserted in the card reader
- or
- ▶ a mobile phone with data-capable SIM card connected by SIM Access Profile (SAP)
- and
- ▶ a configured data link

Setting up a data link to the Internet

When a data link is set up for the first time, it is configured automatically. If this fails, the following values must be entered manually in the telephone submenu "Data connection" under "Connection settings":

- ▶ APN (access point)
- ▶ User name
- ▶ Password
- ▶ Authentication

The customer receives this data from his/her mobile telephone network provider.



"Connection settings" menu

484_086

Connecting a WLAN device

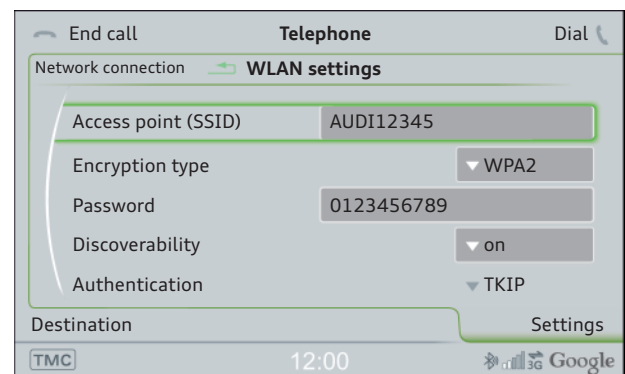
To connect the device, the car phone must be in operation. To connect a WLAN device to the hotspot for the first time, the following values must be entered in the device:

- ▶ Access point (SSID)¹⁾ – name of WLAN network
- ▶ Encryption type – WEP, WPA or WPA2²⁾
- ▶ Password
- ▶ Discoverability "on"

These values can be changed individually in the "WLAN settings" submenu. Likewise, the same values have to be entered in the WLAN device.

The "WLAN settings" submenu can be accessed via the following menu options:

- ▶ Telephone
- ▶ Settings
- ▶ Connections
- ▶ Network connection (WLAN)
- ▶ WLAN settings



"WLAN profile" menu

484_087

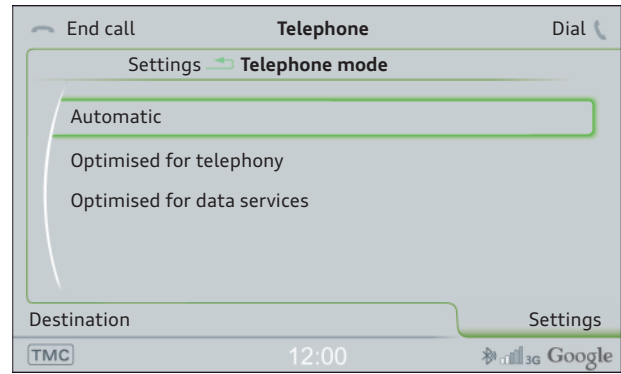
¹⁾ SSID (Service Set Identifier) = freely variable network name, up to 32 characters long

²⁾ WEP (Wired Equivalent Privacy), WPA (WLAN Protected Access) or WPA2 = encryption standards for WLAN

Setting options for data services

The user can select between three different types of telephone usAGE in the telephone submenu "Settings" - "Telephone mode". WITH these settings; it is possible to optimise the system for the reception of data if a UMTS network is predominantly available.

To have the best possible reception for Google Earth maps and Internet use, the setting "Optimised for data services" must be activated in the telephone menu under the submenu "Telephone mode".



"Telephone mode" menu

484_088

Optimised for data services

When the "Optimised for data services" setting is activated, the car phone will try to use the mobile telephone network provider's UMTS network (3G).

If this is not possible, the GSM network (2G) will be used. There may be some restrictions on telephone calls. This is due to the fact that the car phone has to search more frequently for UMTS signals in areas with poor UMTS reception.

Optimised for telephony

When "Optimised for telephony" is activated, only the GSM network (2G) is used. In the GSM network, simultaneous calling and data reception may result in reduced data transfer rates. These can differ depending on which mobile phone network is used.

Automatic

The factory default setting "Automatic" dials either into the UMTS network (3G) or GSM network (2G), depending on network coverage.

Recommendation for users:

- ▶ If the customer mainly uses the Internet connectivity, i.e. data services, he/she should activate the "Optimised for data services" setting.
- ▶ If the customer mainly uses the telephony function and is often in areas without UMTS reception, it is recommended that the "Optimised for telephony" setting be activated.
- ▶ When using data services, it is recommended to buy a data flat-rate with a provider.



Reference

For further information about setting up the data and network connections, refer to the MMI operating manual.

Operating unit

(multimedia system operating unit E380)

Two versions of the multimedia system operating unit E380 are installed on the Audi A7 Sportback. The operating unit with six mechanical radio channel buttons is fitted as standard. The operating unit with MMI touch is standard with MMI Navigation plus. The MMI touch system on the Audi A7 Sportback has the same functions as on the Audi A8 '10.

The operating units have been redesigned for the Audi A7 Sportback. Furthermore, the number of buttons has been reduced. In comparison with the operating unit on the Audi A8 '10, the new operating units no longer have the following buttons:

- ▶ INFO
- ▶ TONE

Although there are no separate buttons for the Info and Tone menus, these functions are still available in the main menu. This is regardless of the MMI version installed in Audi A7 Sportback.

As before, the operating unit is connected to the information electronics control unit 1 J794 via a serial RS232 port.

Operating unit E380 is diagnosed via the information electronics control unit 1 J794.

The operating unit is also responsible for activating the display kinematics of the MMI display.



484_090

Operating unit with mechanical station buttons



484_089

Operating unit with MMI touch

Button combinations for service personnel

The modified operating unit also has modified button combinations for the system reset functions and for activating the Engineering menu. The button combinations are identical for all versions of the multimedia system operating unit installed in the Audi A7 Sportback.

System reset

To restart (reset) the MMI system, the following buttons must be briefly pressed at the same time:

- ▶ Turn-push button
- ▶ Softkey at top right
- ▶ MENU

Engineering menu

The Engineering menu can be used, for example, for a software update. To access the menu, the following buttons must be pressed one after the other and held down:

- ▶ CAR
- ▶ BACK



Button combination for system reset

484_092



Button combinations for the Engineering menu

484_093

MMI display

(front information display unit J685)

Two different displays are used on the Audi A7 Sportback. They differ from one another in terms of their size and resolution. The display is connected to the information electronics control unit 1 J794 by a 4 pin connector.

Two of the four lines are used for transferring images via LVDS and one line for transferring data via LIN bus. The fourth line is a ground wire.

The display is supplied with electrical power via a separate connector.

The various features of the display are listed below.

6.5 inch MMI display

The 6.5 inch display is a TFT colour screen with $\frac{3}{4}$ VGA resolution. This is equivalent to 400 x 240 pixels. It comes in combination with the following MMI versions:

- ▶ MMI Radio
- ▶ MMI Radio plus
- ▶ MMI Navigation



484_095

8.0 inch MMI display

The 8.0 inch display is a TFT colour screen with VGA resolution. This is equivalent to 800 x 480 pixels. It comes exclusively with MMI Navigation plus.



484_094

Swivel mechanism of the MMI display

The swivel mechanism of the display on the Audi A7 Sportback is a new development. Compact fitting dimensions are achieved by using a cable pull drive.

The swivel mechanism consists of the following parts:

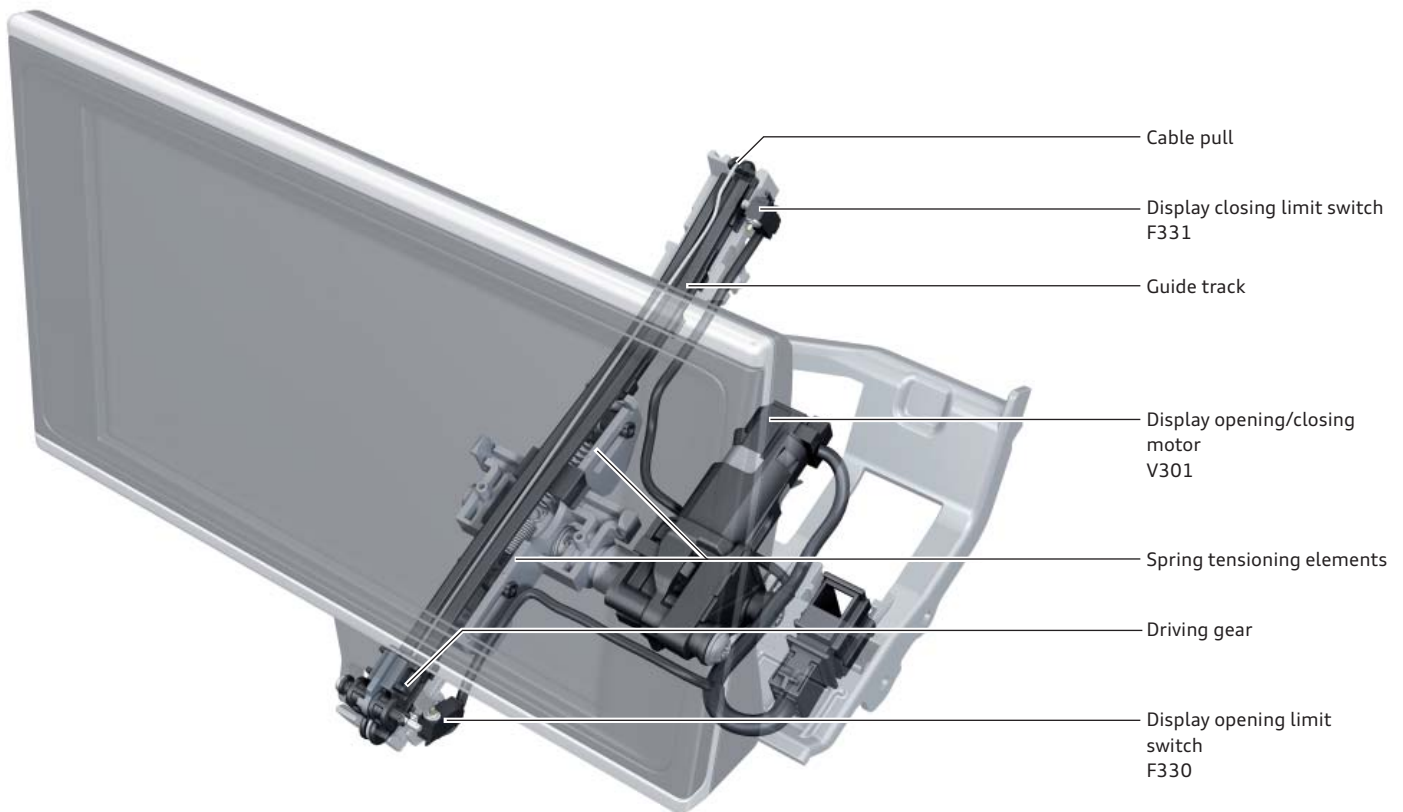
- ▶ Display opening/closing motor V301
- ▶ Display opening limit switch F300
- ▶ Display closing limit switch F331
- ▶ Cable pull
- ▶ Spring tensioning elements
- ▶ Guide track
- ▶ Driving gear

Activation mechanism

The motor and both limit switches are activated and evaluated by the multimedia system operating unit E380.

The swivel mechanisms of the 6.5 inch display and the 8.0 inch display have different driving gears.

Design



484_096

Functional principle

When the display is opening, an electric motor drives the pulley, with the result that the cable is retracted below the driving gear and unreeled above the driving gear. The driving gear moves down. The display mount is firmly attached to the driving gear and, thus, is swivelled downwards, opening the display.

The electric motor stops the moment the shuttle actuates the display opening limit switch F330. The spring in the tensioning element ensures that the cables remain taut. The pre-tension of the springs also prevents any rattling noise when the display is open.

Safety timeout

If the display unit switch E506 is actuated ten times within one minute, a safety timeout will be activated for one minute. The MMI display remains in the momentary end position during this time. This precaution serves to protect against overloading of the swivel mechanism.

Service position

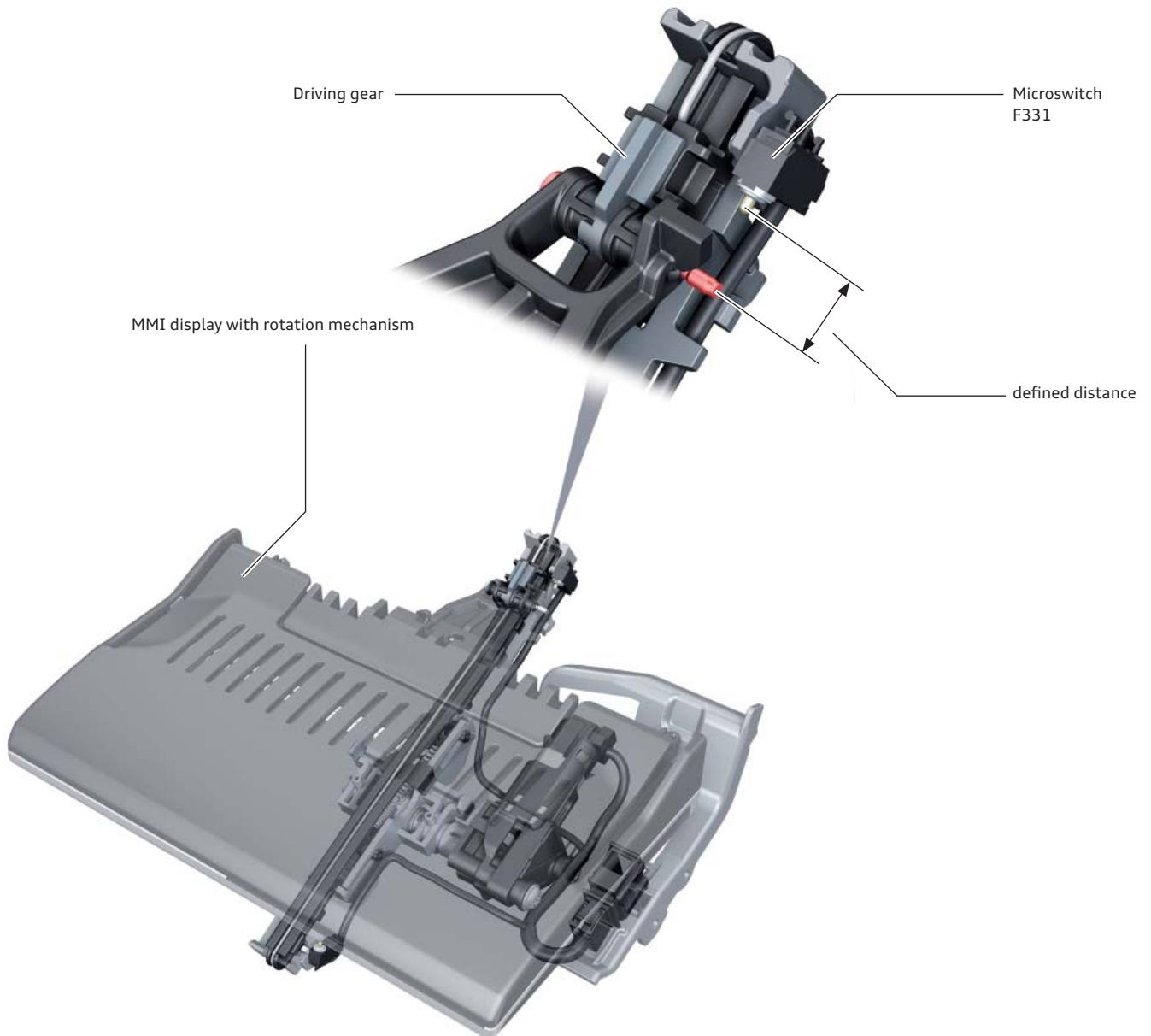
The swivel mechanism has a service position into which the display must be moved prior to removal. In the process, the driving gear is moved to within a defined distance of the microswitch (F331). This prevents damage to the microswitch F331 during removal of the 8.0 inch display.

Diagnostics

The diagnosis function of the swivel mechanism and the display unit button E506 are started using information electronics control unit 1 J794.

The diagnosis is, therefore, made using address word 5F – Information electronics 1.

The display is moved into the service position using the vehicle diagnostic tester and the Guided Fault Finding function.

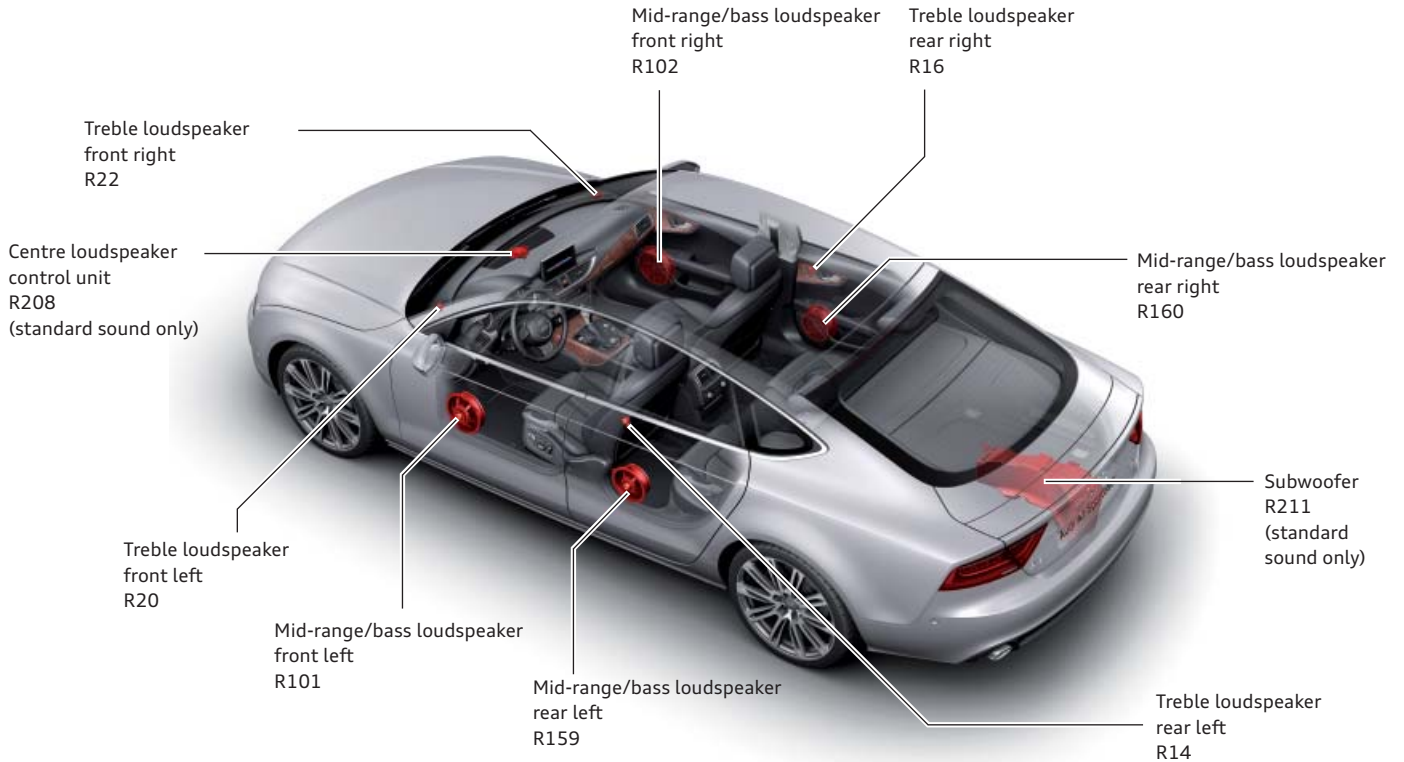


Sound systems

The Audi A7 Sportback is fitted as standard with two loudspeakers per door. The audio amplifier supplies these eight loudspeakers with a total of 80 watts RMS output power. With MMI Radio plus and higher, the Audi sound system has a total power output of 180 watts.

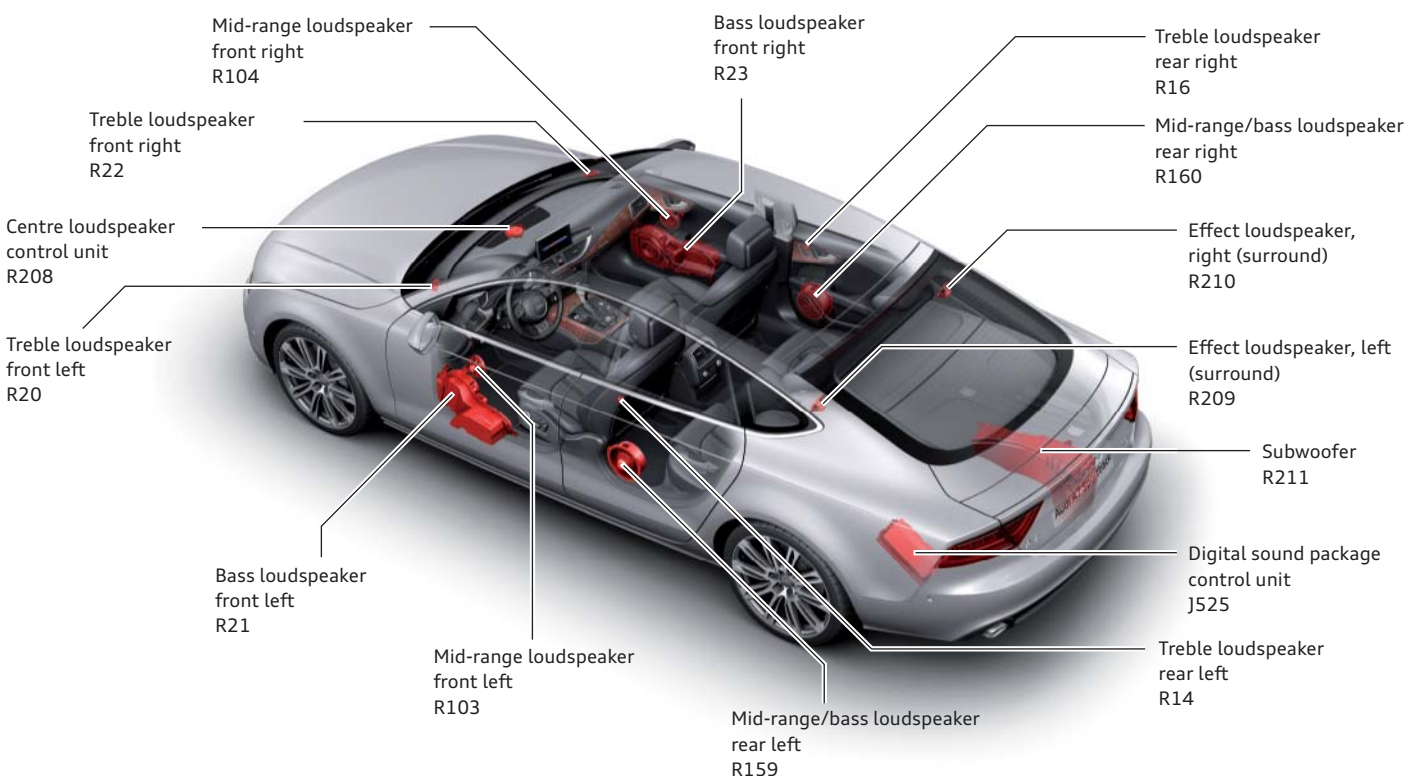
This power is distributed to ten loudspeakers. The Bose Surround Sound System is optional. The separate Bose amplifier distributes 630 watts of power to a total of 14 loudspeakers.

Audi A7 Sportback with Basic and Standard sound systems



484_098

Audi A7 Sportback with Bose Surround Sound

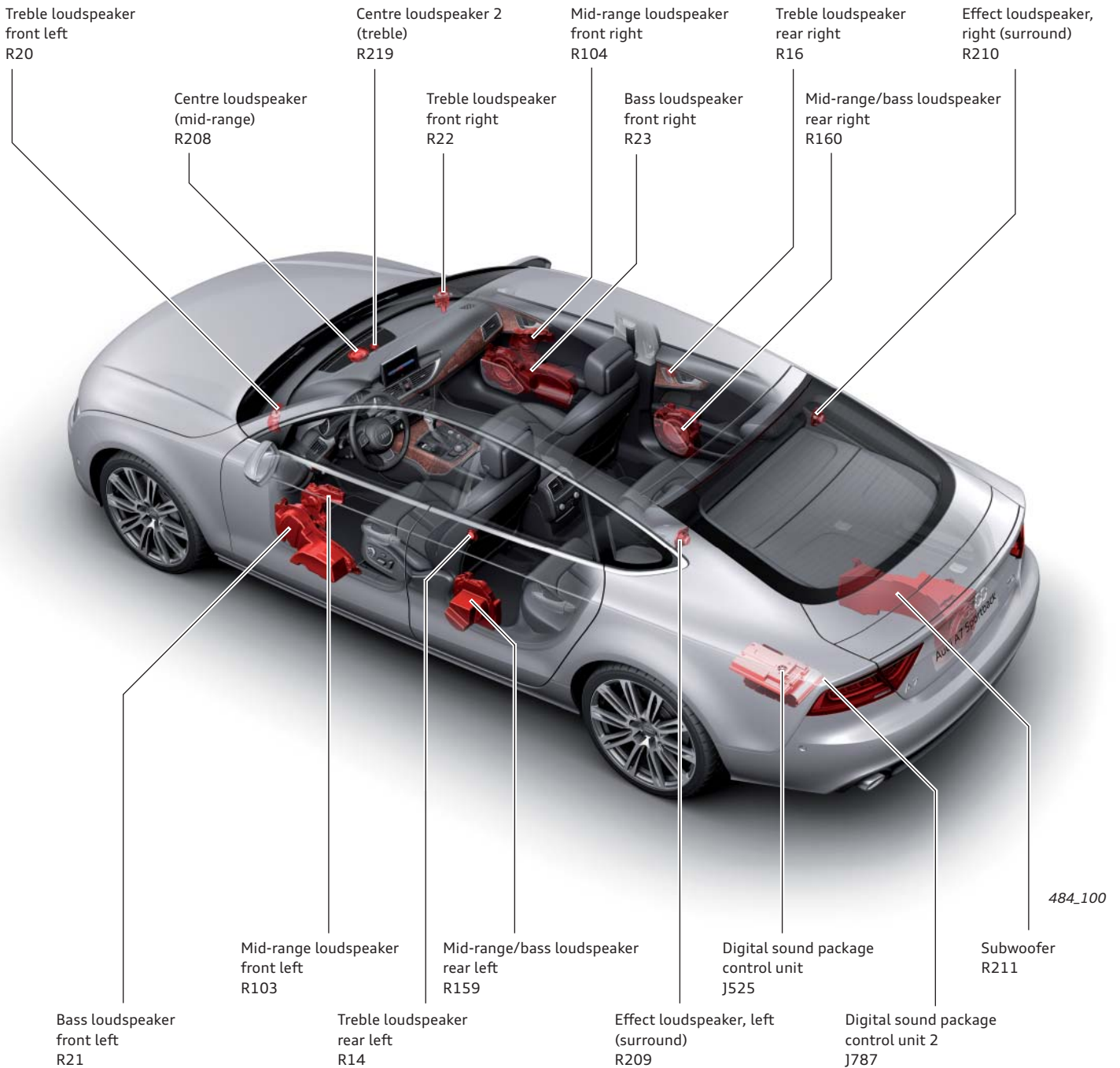


484_099

Audi A7 Sportback with Bang & Olufsen Advanced Sound System

The Bang & Olufsen Advanced Sound System uses 15 loudspeakers and two amplifiers. They create a sense of space resembling the ambience of a concert hall.

Both amplifiers supply the loudspeakers with 1300 watts total RMS output power. Retractable tweeters in the dash panel set the stage for a perfect production.



Aerials overview

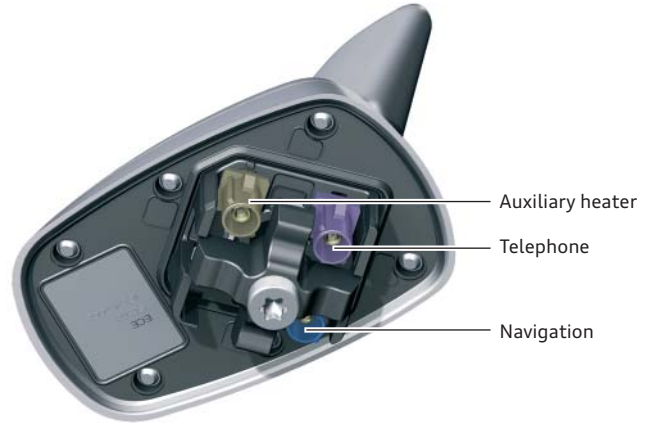
The aerials on the Audi A7 Sportback are distributed on the rear window and the roof aerial. The rear window aerial boosters are housed in the boot lid. The in-car booster terminals are adapted to the equipment level.

Only the aerials which are actually needed are installed. Furthermore, there are different boosters in models with and without insulating glass.

Roof aerial R216 (North America)

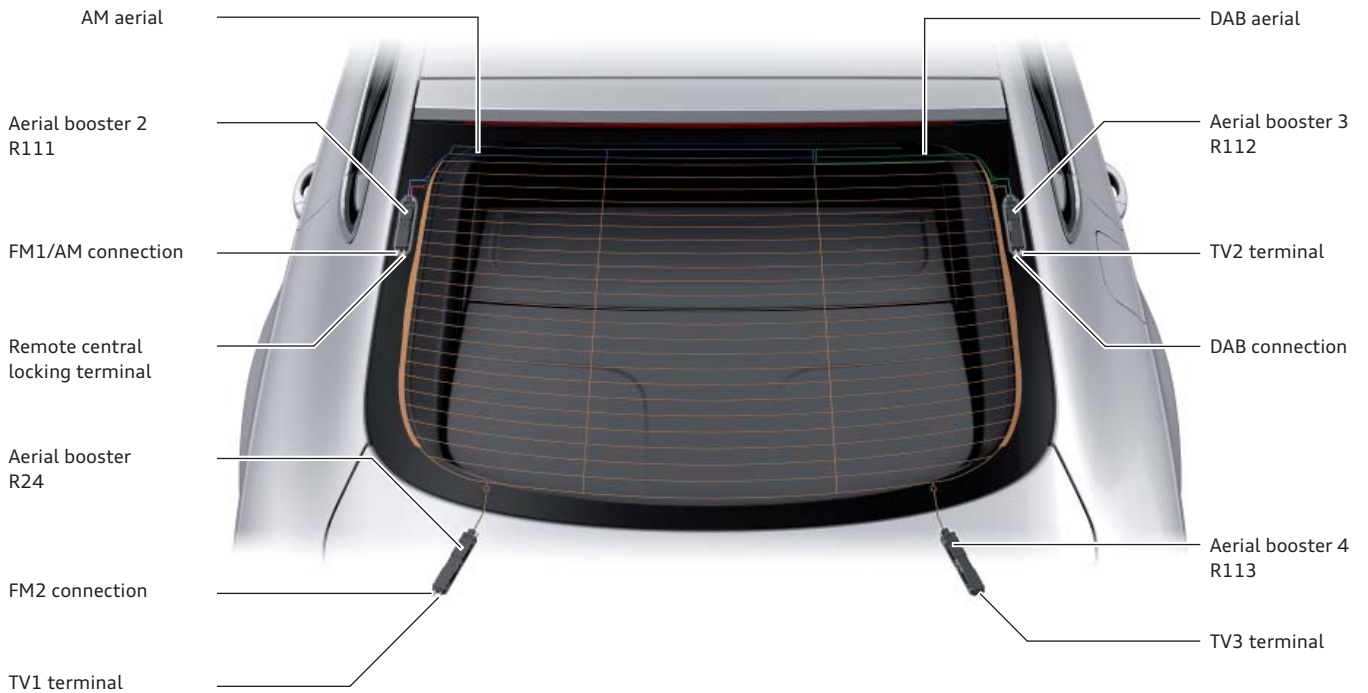


Roof aerial R216 (Europe/rest of world)



484_101

Overview of rear window aerials with boosters



484_102

Air conditioning

Introduction

Versions of the air conditioning system

Energy efficient air conditioning systems are used on the Audi A7 Sportback. The entry-level Audi A7 Sportback has an automatic front air conditioning system with separately controllable temperature zones.

The system has two humidity senders – the humidity sender in the fresh air intake duct G657 and the air humidity sender G355. In the automatic front air conditioning system with separately controllable temperature zones, rear ventilation is provided by outlets in the centre console.

As an option, the customer can order a front and rear air conditioning system with a second control panel in the cabin.

In addition to the automatic front air conditioning system, the four zone air conditioning system has a rear air conditioner/Climatronic operating and display unit E265 with the following functions:

- ▶ Temperature adjustment
- ▶ Blower adjustment
- ▶ Separate rear left and right air distribution adjustment

To provide air conditioning in the rear, the four zone air conditioning system has air outlets in the B posts. The four zone air conditioning system has further deluxe options:

- ▶ Automatic recirculation control by air quality sensor G238
- ▶ Residual heat function
- ▶ Separate footwell temperature control
- ▶ Glove compartment cooling system
- ▶ Three different air conditioning modes: soft, medium and intensive

Dual zone air conditioning system (basic air conditioning system)

Climatronic control unit J255



Rear upper body vent

Four zone air conditioning system (deluxe air conditioning system)

Climatronic control unit J255



Rear air conditioner/Climatronic operating and display unit E265

Operation

Climatronic control unit J255 for the dual zone air conditioning system

The Climatronic control unit of the dual zone air conditioning system has two temperature control knobs for adjusting the temperature of the two front climate zones. Depending on country specification, the control knobs indicate the temperature either in degrees Celsius or degrees Fahrenheit.

The control knob for setting the blower speed is located in the centre – there is only one common blower speed for both temperature zones.



484_048

Control knob with temperature scale according to country specification

Climatronic control unit J255 for the four zone air conditioning system

The functions can be activated/deactivated by pushing the buttons. The control knob is used for adjusting temperature, blower speed and air distribution in the front two climate zones.

The diode in each button is lit when the function is activated. The front climate settings are indicated on the Climatronic control unit display and, for several seconds, on the MMI display. The air conditioning can be adjusted separately for the driver and front passenger sides. In addition, the front passengers can adjust the rear cabin settings or synchronise all four zones with the driver's climate zone setting.



484_049

Seat heating/ventilation adjustment buttons

Residual heat

In the four zone air conditioning system the "Residual heat" function can be activated when the ignition is "off" by pressing and holding the blower speed setting button. The residual heat of the cooling water is used for heating the interior of the occupant cell. The coolant run-on pump V50 continuously circulates the hot water through the heating system. The "Residual heat" function is deactivated automatically after approximately 30 minutes.

Rear air conditioner/Climatronic operating and display unit E265

In the four zone air conditioning system both rear climate zones can be controlled by the rear air conditioner/Climatronic operating and display unit E265.

In vehicles with a four zone air conditioning system, a seat heater can be ordered as an option for both front seats.





Rear seat heater with three settings

484_050

Equipment

The two air conditioning systems available for the Audi A7 Sportback differ from one another in terms of their equipment and, thus, in terms of the comfort they afford the occupants.

Function or component	Automatic front air conditioning system	Automatic front and rear air conditioning systems with a second control panel in the cabin
		
Temperature zones	Twin temperature zones, for driver and front passenger	Four temperature zones, for driver, front passenger and rear left/right passengers
Blower zones	A single blower zone in the cabin	Four blower zones, for driver, front passenger and rear left/right passengers
Air distribution zones	Twin temperature zones, for driver and front passenger	Four air distribution zones, for driver, front passenger and rear left/right passengers
Indirect ventilation	yes	yes
Rear ventilation in the centre console	yes	yes
Air outlets in the B posts	no	yes
Sunlight photosensor G107	yes	yes
Air humidity sensor G355	yes	yes
Air humidity sensor in fresh air duct G657	yes	yes
Air quality sensor G238	no	yes
Dust and pollen filter	yes	yes, with activated charcoal
Climatronic control unit J255	yes, without display	yes, with display
Rear air conditioner/Climatronic operating and display unit E265	no	yes, with display
Residual heat function	no	yes
Glove compartment cooling system	no	yes

Air conditioner

The air conditioner is based on that of the Audi A8 '10. The servomotors differ in terms of their number and position on the air conditioner. The air conditioner of the two zone air conditioning system has a different number of servomotors to that of the four zone system. Both air conditioners have two condensed water circuits which join the centre tunnel at the side.

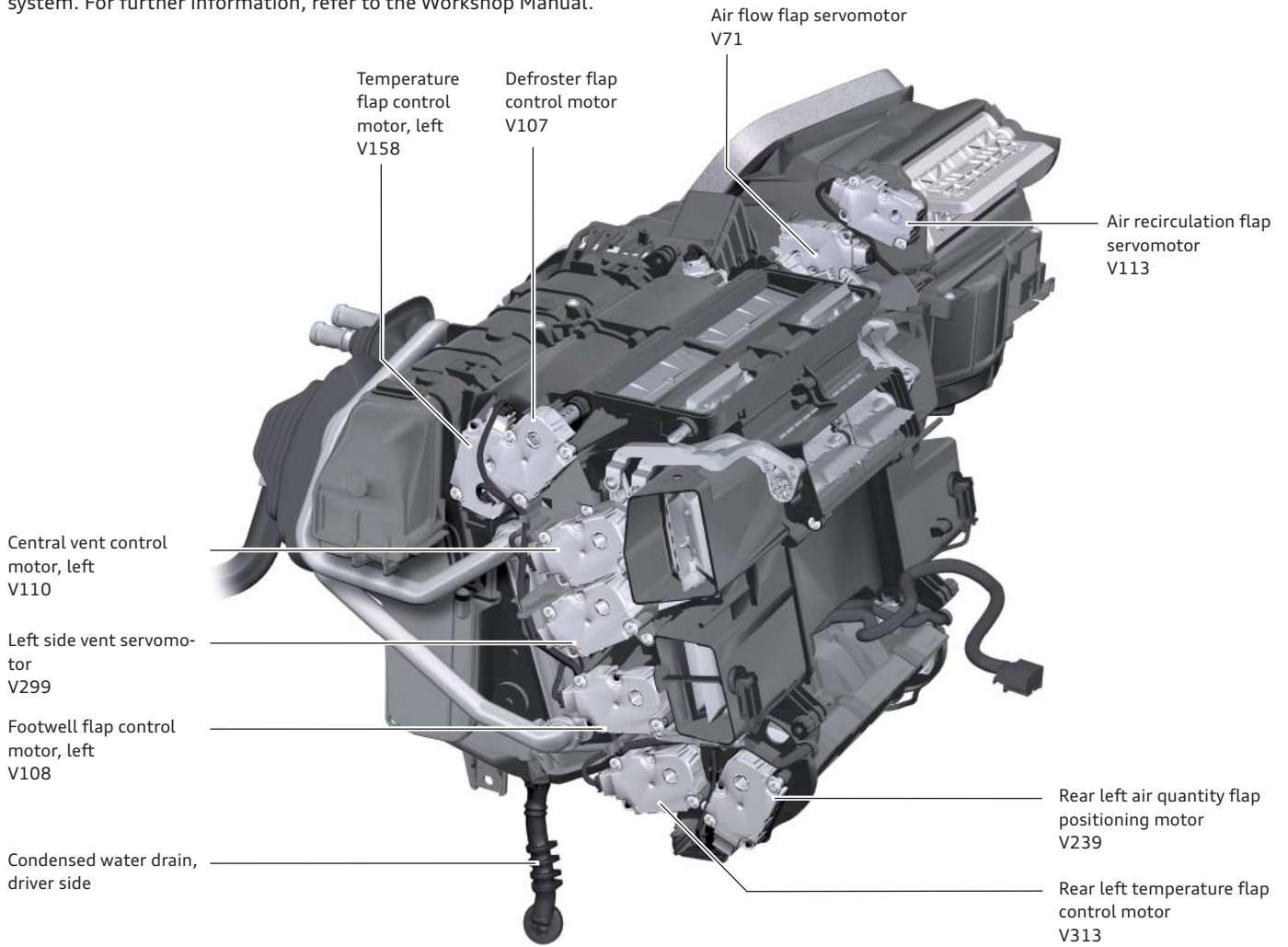
The servomotors themselves are all identical in design and assigned to the flaps in the standard configuration.

The following components can be replaced without removing the dash panel:

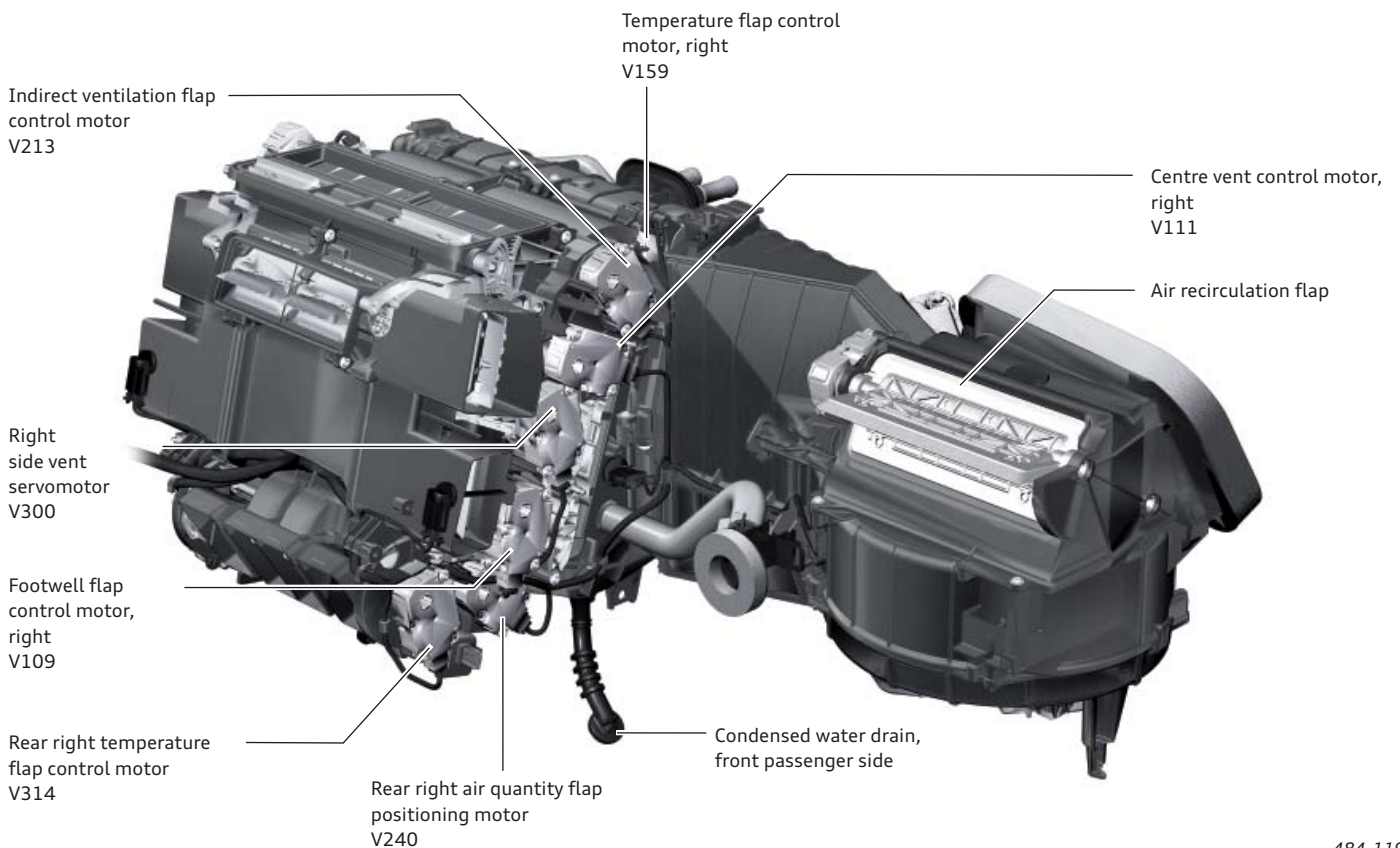
- ▶ Heater heat exchanger
- ▶ Servomotors
- ▶ Fresh air blower V2 with fresh air blower control unit J126
- ▶ Dust and pollen filter
- ▶ Temperature sensors
- ▶ Evaporator sensor

Configuration (four zone air conditioning system)

The layout of the components of the basic (dual zone) air conditioning system differs from that of the deluxe air conditioning system. For further information, refer to the Workshop Manual.



484_118



484_119

Refrigerant circuit

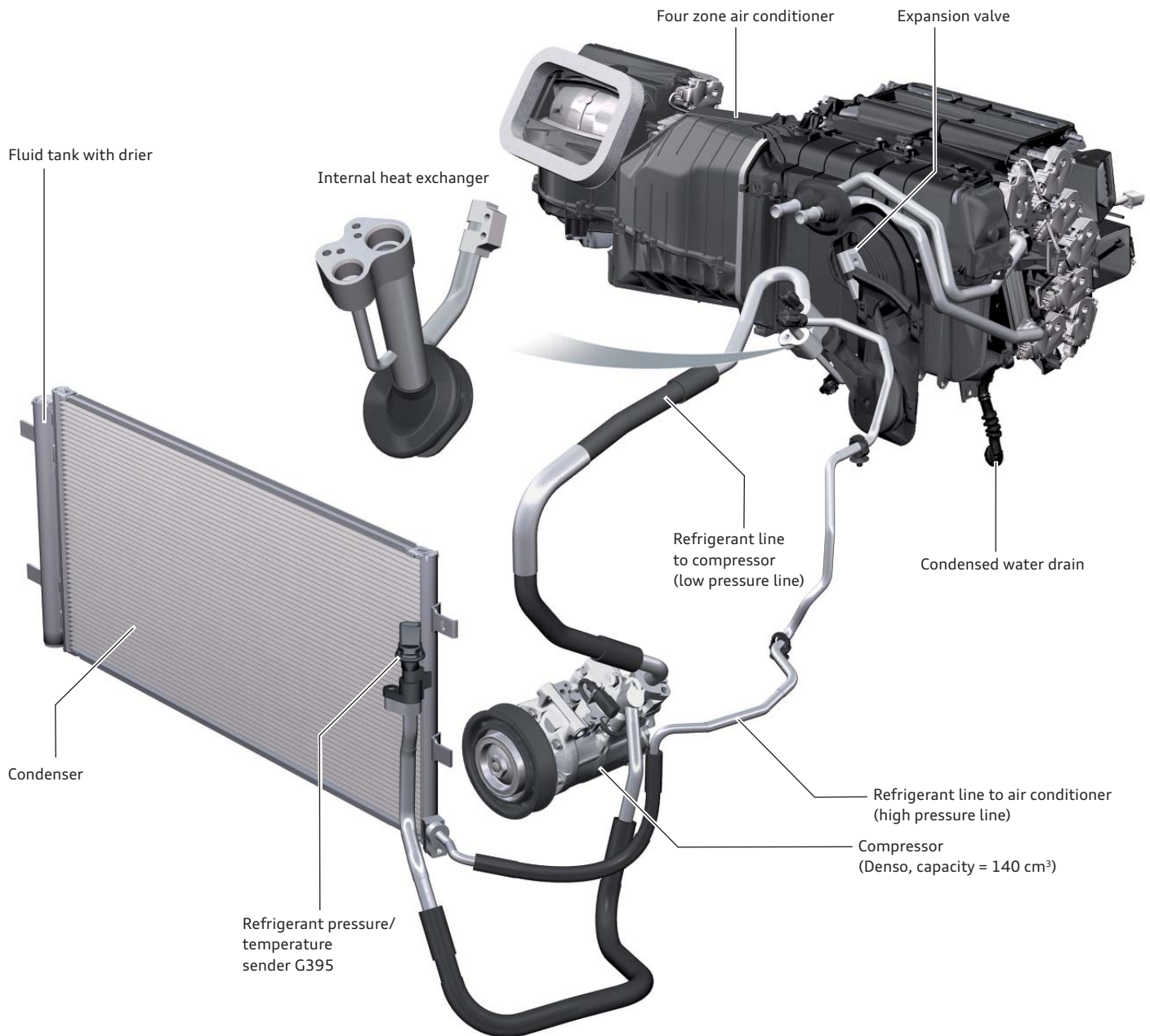
The refrigerant circuit on the Audi A7 Sportback has only a single evaporator (in the front air conditioner) – even if the vehicle comes equipped with a four zone air conditioning system.

The air conditioning system on the Audi A7 Sportback uses R134a refrigerant.

The Audi A7 Sportback has an efficient refrigerant circuit with an internal heat exchanger designed to maximise fuel economy and minimise CO₂ emissions.

To flush the refrigerant circuit (for repair work), no additional adaptor is required for bypassing the refrigerant reservoir. To flush the refrigerant circuit, the drier cartridge is removed from the fluid reservoir on the condenser. The fluid reservoir is then re-sealed. The refrigerant circuit is now closed again and the system can be flushed. On completion of flushing, the drier cartridge is replaced.

Overview



484_057

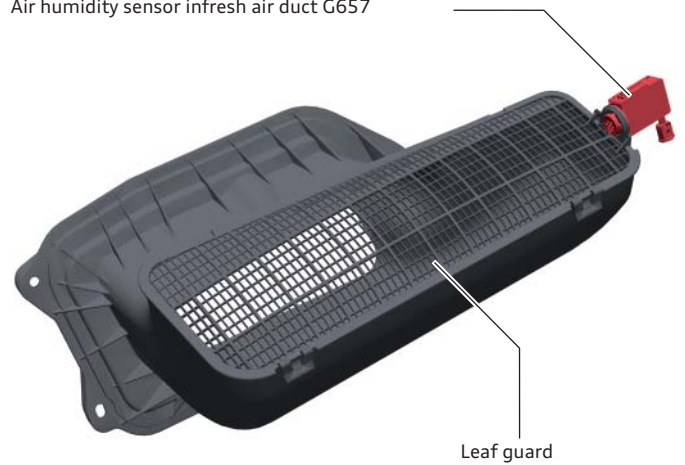
Note

During operation of the air conditioning system, the PAG oil is distributed through the refrigerant circuit. When replacing components of the refrigerant circuit, care must be taken to ensure that the necessary quantity of PAG oil is retained in the system. After replacing the condenser or evaporator, the refrigerant circuit must be refilled with approx. 10 cm³ of refrigerant oil.

Air humidity sensor infresh air duct G657

The Audi A7 Sportback with dual zone air conditioning system has an air humidity sender in the fresh air intake duct G657 which determines the temperature and the moisture content of the air flow. The measurement data is sent by LIN bus to the onboard power supply control unit J519 and evaluated here. The information is transferred by data bus to the Climatronic control unit J255, which calculates from the measurement data the current relative humidity of the inducted fresh air.

Air humidity sensor infresh air duct G657



484_051

Legend:

- 1 Air humidity sensor
- 2 Temperature sensor
- 3 Air quality sensor (via G238)

Air humidity sensor infresh air duct G657
in the dual zone air conditioning system



484_059

In the four zone air conditioning system, the air humidity sender in the fresh air intake duct G657 is combined with the air quality sensor G238. Thus, the system also has an automatic air recirculation control system.

The air quality sensor G238 requires about two minutes from turning the ignition on to configure the system.

Air humidity sensor infresh air duct G657
with air quality sensor G238 in the four zone air conditioning system



484_060

Auto addressing of servomotors

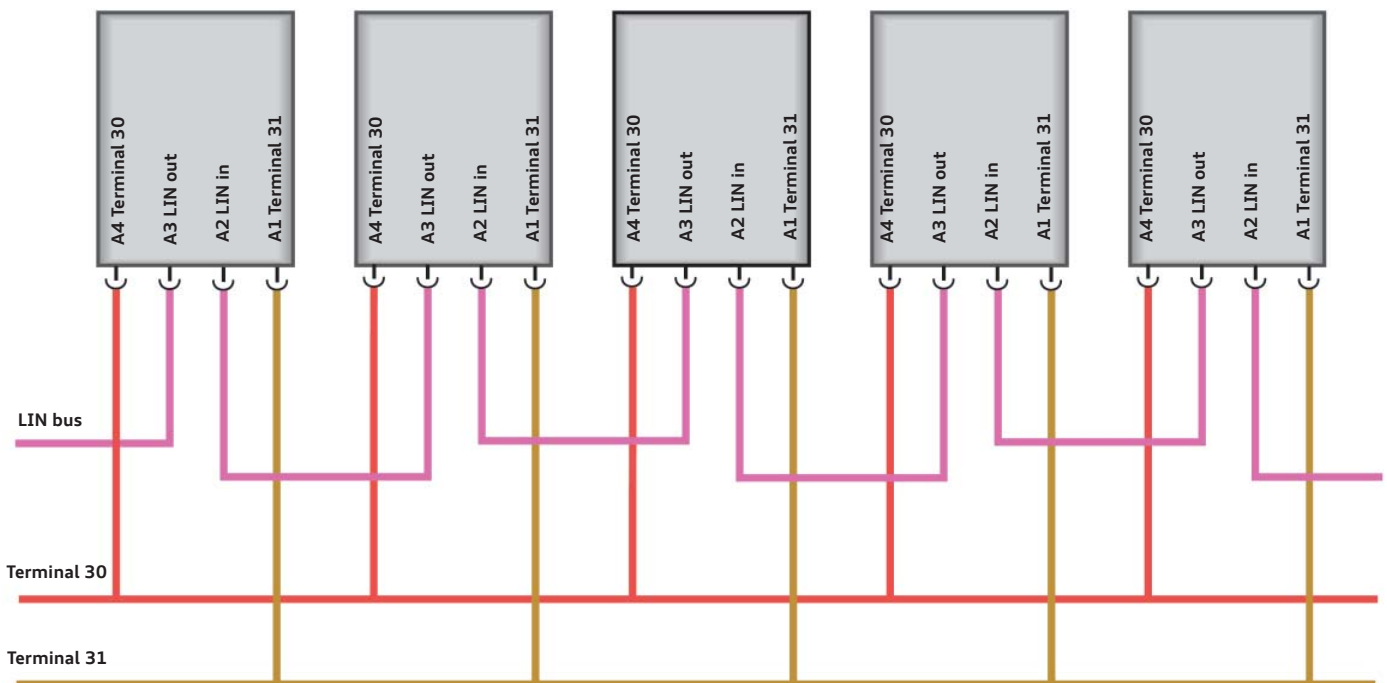
The servomotors of the air conditioning system on the Audi A7 Sportback are adapted and activated via data lines. The servomotors are connected in series by LIN bus and connected to the Climatronic control unit J255 or to the rear air conditioner/Climatronic operating and display unit E265. The servomotors are automatically addressed and, thus, assigned to the flaps by address code via the addressing command in the standard configuration of the air conditioner.

If a fault occurs in the servomotor, this can be indicated via the vehicle diagnostic tester by DTC entry in the fault memory.

If the LIN line is interrupted in a servomotor, the faulty servomotor and the servomotors connected in series downstream will be indicated as faulty.

If the servomotors are in the wrong order, e.g. if two or more servomotor connectors are interchanged, the individual servomotors retain their respective functions until the next auto addressing cycle. If the positions of two servomotors are interchanged on completion of repair work, the servomotors will not function properly with the old address assignment at the new installation location. During the next auto addressing cycle, however, these servomotors will be assigned to the wrong flaps in the standard configuration because the connectors are in the wrong order (in the wiring loom).

LIN bus series connection of the flap control servomotors



484_117

Auxiliary air heater element Z35

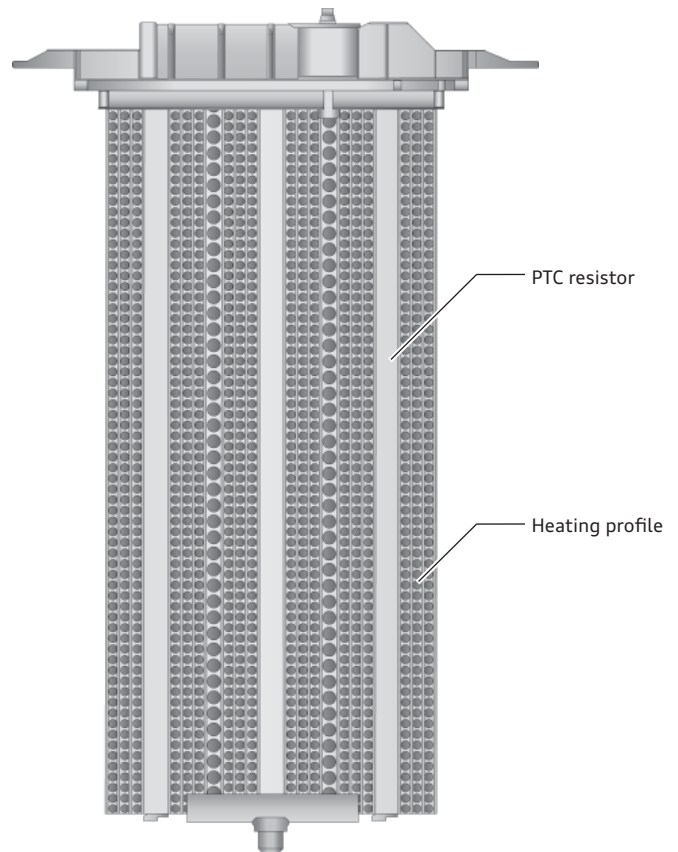
The supplementary heater element Z35 for diesel engines is activated for the engine control unit J623.

When the engine is cold and the engine cooling circuit is delivering little heat energy, the cabin air is heated by the supplementary heater element.

The maximum total power output of 1000 W is divided into three heat settings: The heat settings are switched via two relays:

- ▶ J359 - low heat output relay
- ▶ J360 - high heat output relay

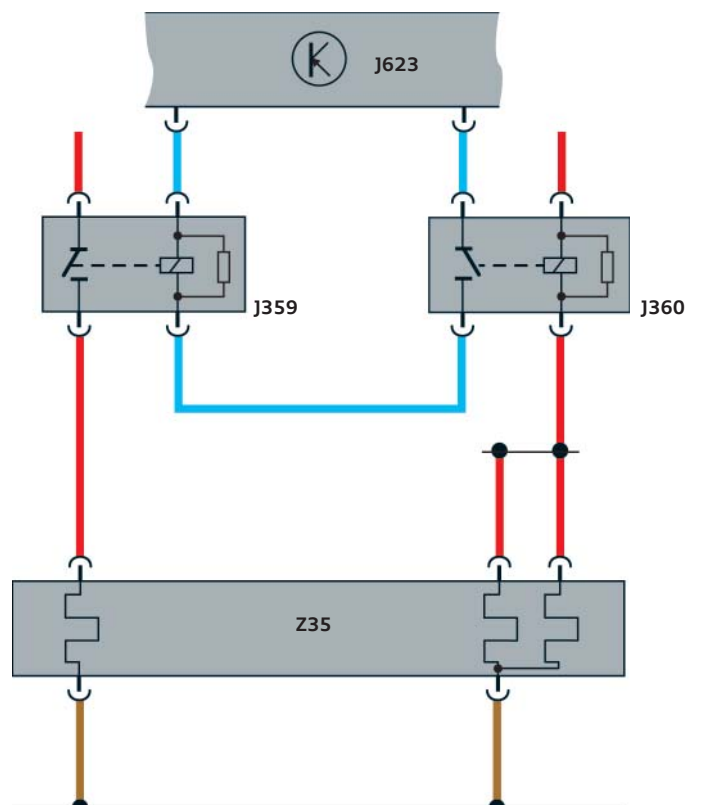
Diesel models are equipped with this supplementary heater element. The supplementary heater element Z35 is currently not installed in diesel models equipped with the optional auxiliary heater.



484_104

Function diagram

- J359 Low heat output relay
- J360 High heat output relay
- J623 Engine control unit
- Z35 Heater element for supplementary air heater



484_105

Auxiliary heater

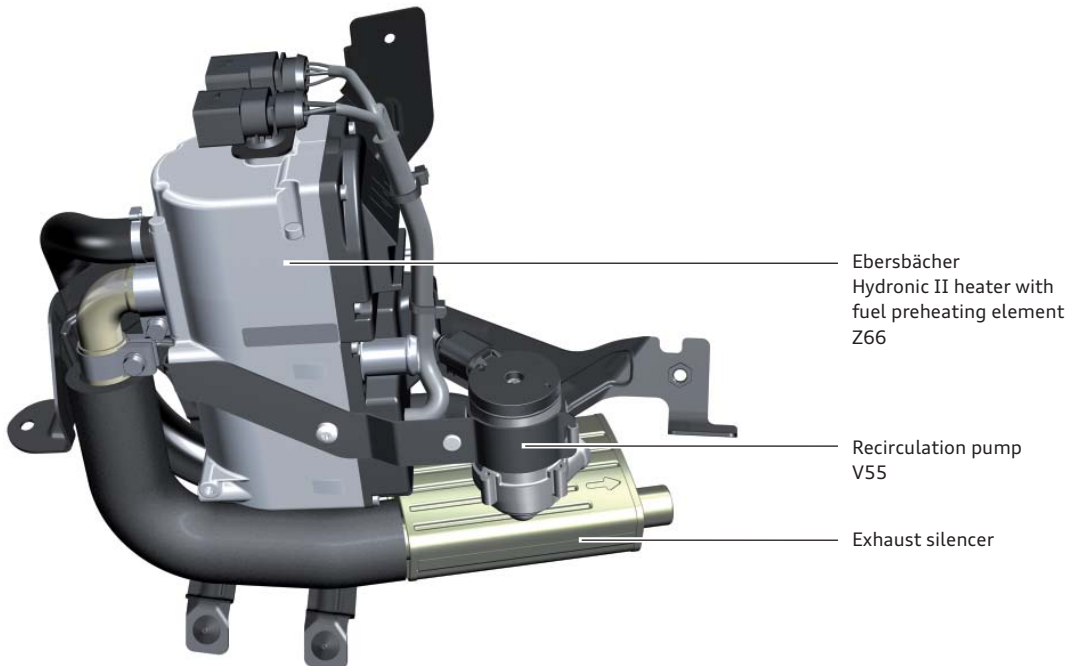
The Audi A7 Sportback can be equipped with an optional auxiliary heating/ventilation system. At low temperatures, the auxiliary heater warms up the cabin and de-ices the windows without the engine running.

At high temperatures, the auxiliary ventilation system provides fresh air and, thus, lowers the cabin temperature. The auxiliary heater can be programmed from inside the vehicle via MMI or from the outside via remote control. The auxiliary ventilation function cannot be programmed. Auxiliary heating is programmed and the Climatronic control unit J255 decides whether to select auxiliary heating mode or auxiliary ventilation mode based on temperature.

The programmed time corresponds to the departure time at which the vehicle is to be air-conditioned.

The system has two different heating modes:

- ▶ “Defrost” mode for primary de-icing of the front windows
- ▶ “Warm” mode for additional cabin heating



484_113

Remote control

The auxiliary heater can be activated in different ways using the auxiliary heating/ventilation system remote control.

Immediate activation

The auxiliary heating/ventilation system can be activated for up to 60 minutes immediately after the data has been successfully transferred to the auxiliary heater control unit J364.

Set timer

To program the desired departure time (which is possible up to a week in advance), the hour, minute and weekday must be entered consecutively. 50 minutes before the programmed date, the Climatronic control unit J255 determines the heating time required to air-condition the cabin. Heating time varies according to the selected heating mode. When "Defrost" mode is selected, the front windows are defrosted. If "Warm" heating mode is selected, the cabin is heated up after the windows have been defrosted.



484_115

Fault messages on the remote control display

Various fault messages can be indicated on the display of the auxiliary heater remote control.

- ▶ System fault = fault in the auxiliary heater system
- ▶ Low fuel = less than 10 litres of fuel are left in the tank
- ▶ Low battery charge
- ▶ No data transfer is possible with the additional heater control unit J364

For further information, refer to the Workshop Manual or the instruction manual.

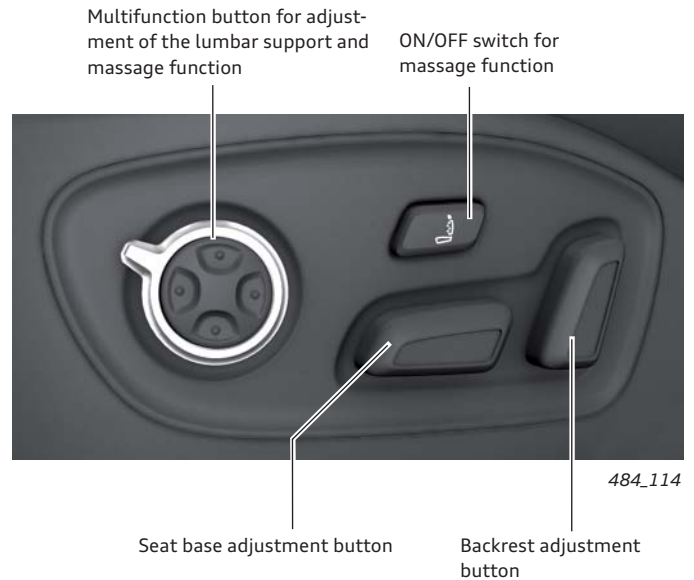
Seat system

The Audi A7 Sportback is offered with various seat versions. In addition to a basic seat version and a deluxe seat version, a sport seat version is available for sporty drivers. Basic seats are optionally available with active seat ventilation and deluxe seats with seat ventilation and/or massage functions. These three different seat versions are reserved for the front seats only.

Seat adjustment controls

The adjustment controls are located on the side of all electrically adjustable seats. In all Audi A7 Sportback models, the lumbar support is set electrically using the lumbar support button. Models with electrical seat adjustment have additional buttons for longitudinal and vertical seat adjustment. Comfort seats with a massage function have a combined button for adjustment of the lumbar support and the various massage functions. There is an additional button on the seat which can be used to directly activate and deactivate the selected massage function.

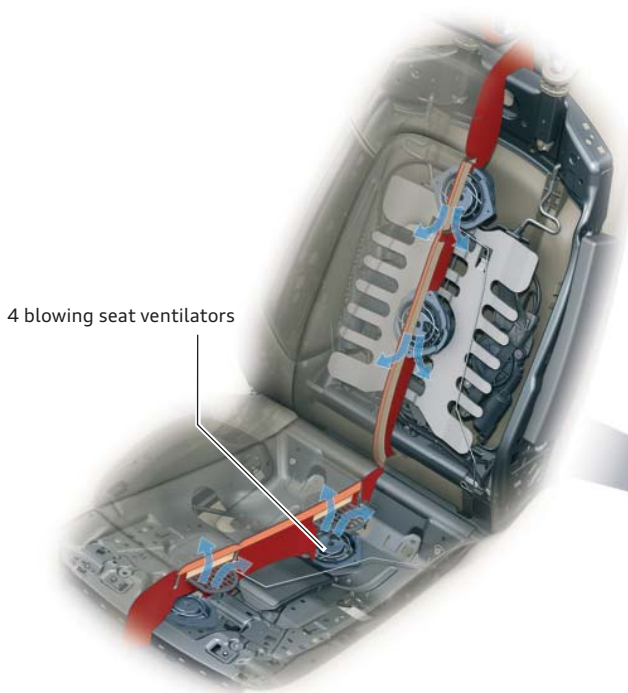
There is currently no active seat ventilation system for the rear occupants and no massage option for the rear seats, but nevertheless the cabins of all Audi models have a uniform appearance. Models with seat ventilation, therefore, have front and rear seats upholstered in perforated leather.



Basic seats

The basic seats can be adjusted manually or electrically. They have electrically adjustable mechanical lumbar supports and can optionally be equipped with seat ventilation. Each basic seat with seat ventilation has two ventilator fans in the backrest and seat base.

The basic seats come fitted with the blowing seat ventilation system previously used on the Audi A4 '08. The cooling effect takes place in the backrest and seat base. The side bolsters are not ventilated.

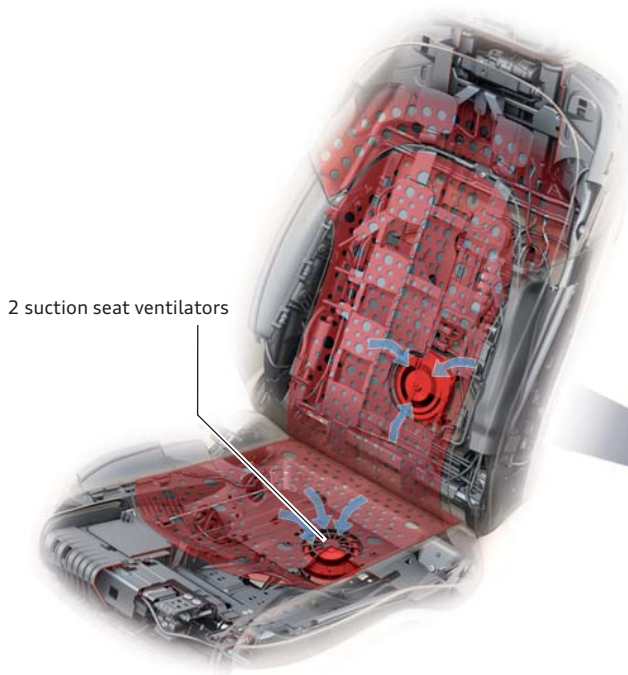


484_109

Comfort seats

The comfort seats are multicontour seats with a pneumatic lumbar support, as well as pneumatic seat width and backrest width adjusters. Each basic seat with seat ventilation has two ventilator fans in the backrest and in the seat base. The multicontour seats use the suction seat ventilation system from the Audi A8 '10.

The optional massage system offers additional comfort, with five different massage programmes and five different massage intensity levels. The cooling effect takes place in the backrest and seat base. The side bolsters are not ventilated.



484_110

Sport seats

The sport seats can, depending on equipment level, be adjusted manually or electrically provided with an electric lumbar support. All sport seats are without ventilation and without pneumatic comfort features.



484_111

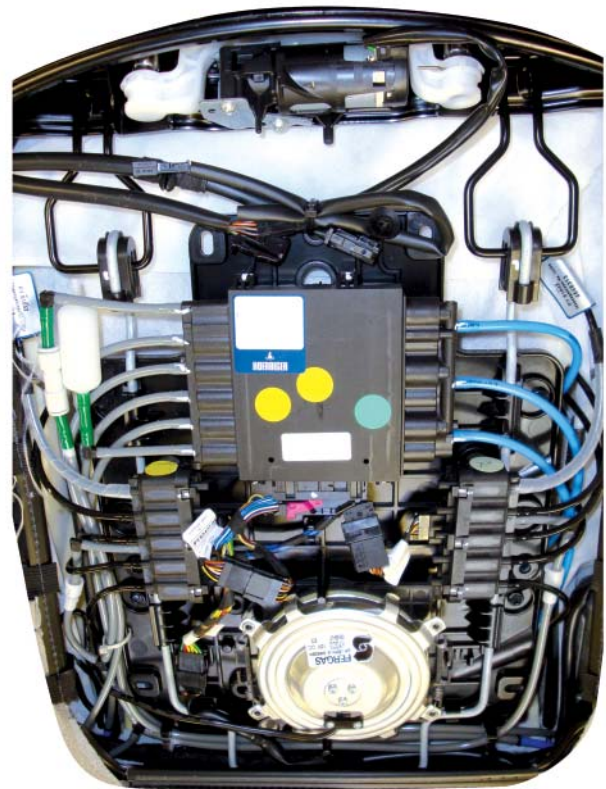
Repairing pneumatic lines in comfort seats

A pneumatic repair set VAS 6618 comprising pneumatic lines and line connectors is available for repairing the pneumatic lines of the comfort seats on the Audi A7 Sportback. It includes various coupling elements.

Separable connector sleeves are used for locating faults in the event of leaks in the pneumatic system. Non-separable line connectors are used for finish repair.

Rules for the repair of pneumatic lines in seats:

- ▶ Pneumatic lines must not be disconnected directly from components.
- ▶ Original replacement parts are delivered with short stubs to which the pneumatic lines are connected using special line connectors.
- ▶ Pneumatic lines and line connectors must be protected from contamination during repair work. Contamination of the coupling points can cause leaks.
- ▶ It is **not** permitted to heat the pneumatic lines for joining to the line connectors. Pneumatic lines must be repaired in a dry state (without lubricant) using line connectors.
- ▶ The length of pneumatic lines must not be altered during repair work. Repaired pneumatic lines are subject to a length tolerance of ± 10 mm.



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Pneumatic repair set VAS 6618

The pneumatic repair set VAS 6618 comprises the following tools:

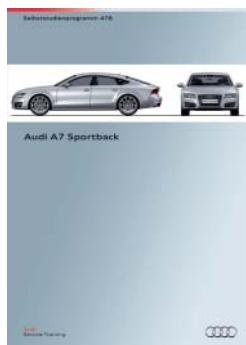
- ▶ two pairs of assembly pliers
- ▶ four separable quick connectors for lumbar support
- ▶ four separable quick connectors for side bolster
- ▶ twelve separable quick connectors for massage
- ▶ one pressure equalisation vessel
- ▶ various hoses, adaptors and couplings



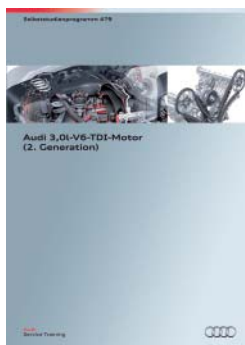
484_122

Self Study Programmes

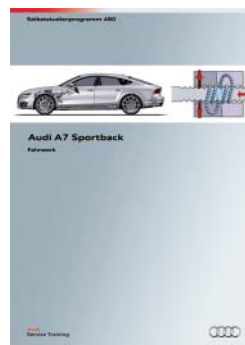
For further information about the technology of the Audi A7 Sportback, refer to the following Self Study Programmes.



484_056



484_058

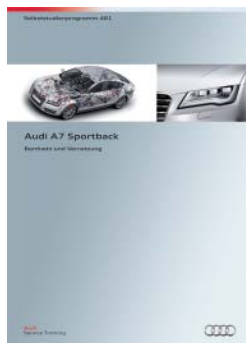


484_124

SSP 478 Audi A7 Sportback, order number: A10.5S00.71.20

SSP 479 Audi 3.0l V6 TDI engine (second generation), order number: A10.5S00.72.20

SSP 480 Audi A7 Sportback Chassis, order number: A10.5S00.73.20



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SSP 481 Audi A7 Sportback Onboard Power Supply and Networking, order number: A10.5S00.74.20

SSP 482 Audi A7 Sportback Head-up Display and Speed Limit Indicator, order number: A10.5S00.75.20

SSP 483 Audi A7 Sportback Convenience Electronics and Audi active lane assist, order number: A10.5S00.76.20

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