



The 2005 Audi A6
Vehicle Introduction

Audi Academy

SELF-STUDY PROGRAM
COURSE NUMBER 991403

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Self-Study Program for the 2005 Audi A6



The 2005 Audi A6

– Introduction to the vehicle
– Body technology
– Passenger protection
– Air conditioning

Course Number: 991403



The 2005 Audi A6 Engine and Transmissions

– 3.2 V6 FSI
– 4.2 V8
– 3.0 V6 TDI Common Rail
– Automatic transmissions
– Manual transmissions

Course Number: 992403



The 2005 Audi A6 Running Gear

– Front axle technology
– Rear axle technology
– Steering system
– ESP
– Electromechanical parking

Course Number: 993403



The 2005 Audi A6 Electrical System

– Networking
– Bus topologies
– Convenience electronics
– Infotainment

Course Number: 994403

The Self-Study Program provides information on the fundamentals of the design and function of new vehicle models, new vehicle components or new technologies.

Reference



Note



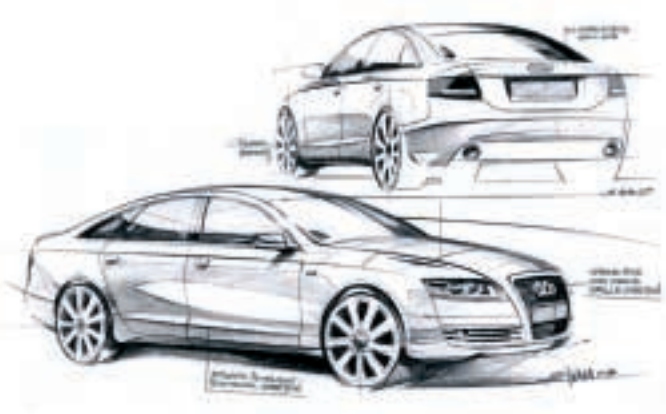
The Self-Study Program is not a Workshop Manual! Specified values serve only to make the information easier to understand and relate to the software version that was valid at the time the Self-Study Program (SSP) was created.

For maintenance and repair work, please make sure to use the current technical documentation.

The New Audi A6 – the Most Progressive Vehicle Takes the Lead

Design and performance are the main driving elements on its way to the top position. Furthermore, the new Audi A6 embodies the continuation of the familiar Audi brand values, sports appeal, progressiveness and intrinsic quality, which are evident in the fourth generation of this sporty business limousine.





"Vorsprung durch Technik" - this guiding principle is consistently maintained in the new 2005 Audi A6 through its innovative technologies.

The MMI operating system in the interior of the vehicle is the central control for the extensive functionalities. The driver-orientated cockpit design provides a perfect workplace, which is both stylish and sophisticated. The high functionality is emphasized by the customer-orientated features in the safety and convenience function areas.



Product Highlights

The product features, which support the 2005 Audi A6 on its way to the top, can be summarized as follows:

Performance

Power Trains

- New Direct Injection technology from motor racing
- quattro:
- Multitronic transmission in Frontrack models
- 6-stage Tiptronic in quattro models

Innovation

- Direct fuel injection
- Expanded ESP
- MMI as standard equipment
- Integrated driver cockpit
- Electromechanical parking brake
- Advanced key, adaptive light, LED brake lights, 2 zone climate control

Driving Dynamics

- New dynamic chassis with trapezoidal-link rear axle
  and redesigned four-link front axle
- Increased body stiffness + 35 %
- Larger tire diameter
- Servotronic now standard
- Wider tread widths, front +7 cm, rear +6 cm
- Excellent rear downforce for safe handling

Design

Quality

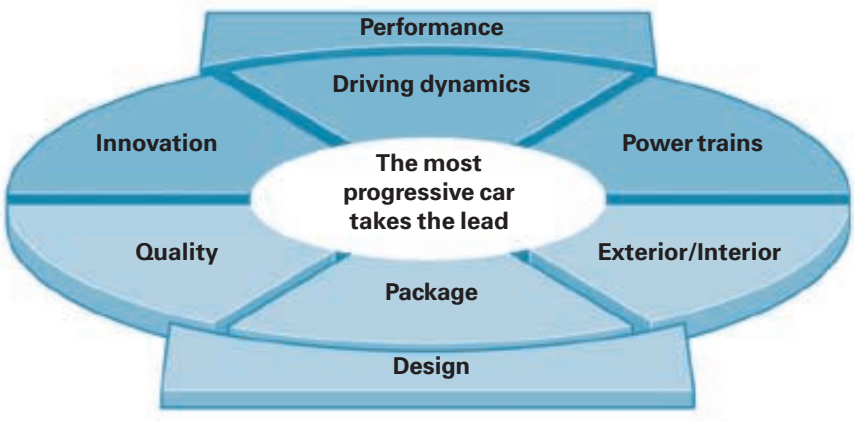
- Use of intrinsically valuable materials (aluminum, wood, leather)
- High-quality standard equipment (light-rain sensor, aluminum trim, active headrests in front, servotronic, EPB, fog headlights, ...)
- Highest safety standards (5 star Euro NCAP)
- Small gap widths, even joints

Package

- Premium vehicle dimensioning
- Rear knee room 8 cm
- Wider shoulder widths, front +23 mm, rear +6 mm
- Front headroom +7 mm
- Superior luggage compartment volume (546 l) for front-wheel and quattro models
- Wheelbase +9 cm

Exterior/Interior

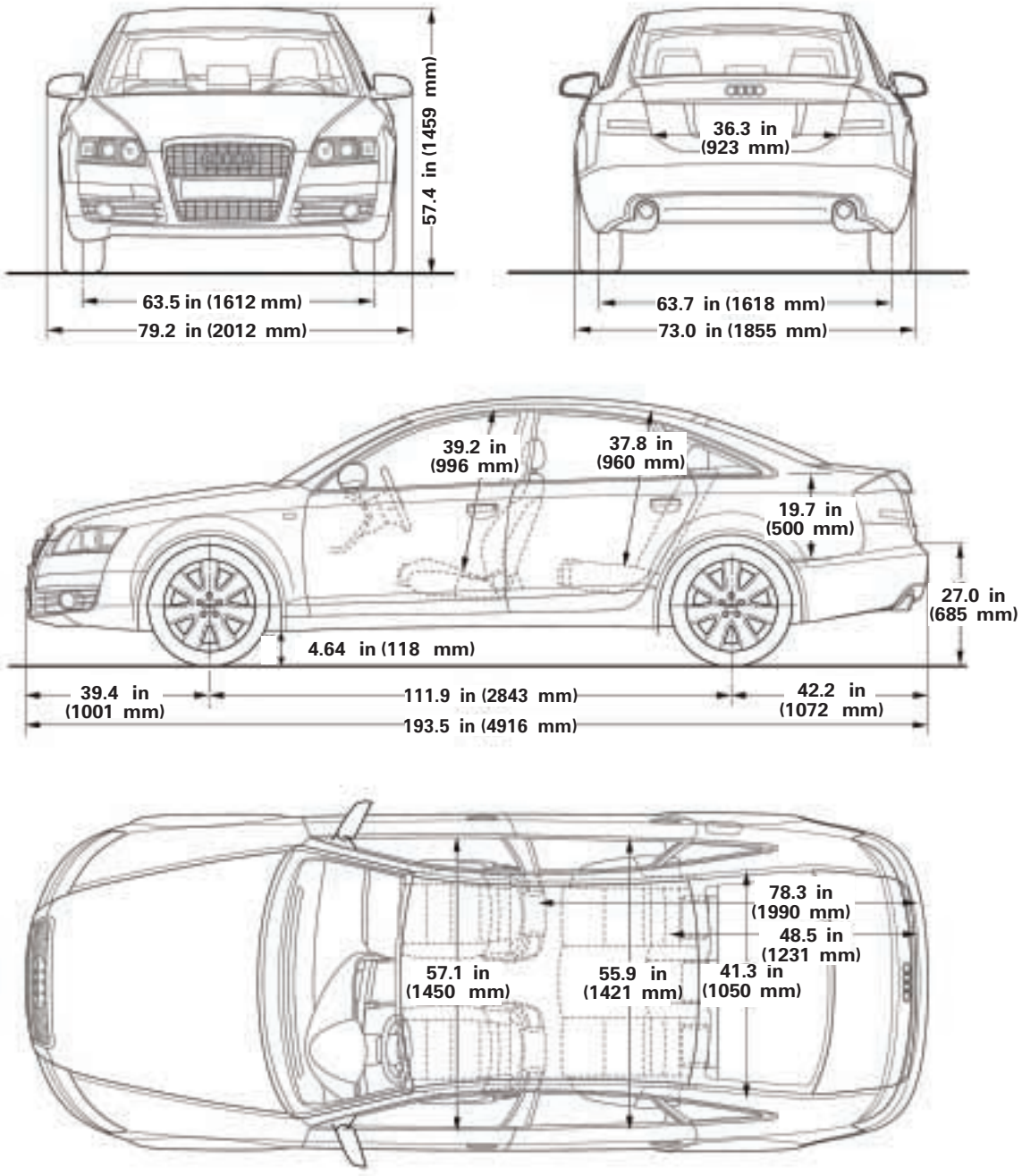
- Completely new line design (roofline, shoulder line, dynamic line)
- Dynamic joint matching
- Coupe-like shape
- Single frame front grills
- Dual exhaust look for front-wheel and quattro models
- Full exterior surface painted



Dimensions

The 2005 Audi A6 impresses with its imposing external dimensions.

The vehicle length has been increased to 4.92 m, which corresponds to an increase of 12 cm compared to its predecessor. The vehicle width has been increased by 4.5 cm to 1.86 m. The height of the new 2005 Audi A6 has been increased by 0.8 cm to 1.46 m. The new 2005 Audi A6 has grown. For the dimensions, please refer to the diagrams.



Body Shell / Connection Technology

The main objectives during the development of the new Audi A6 body design were the realization of high passive safety characteristics and improved rigidity values as a precondition for optimizing vibration damping characteristics.

In spite of the greater demands compared with the previous model, the body weight has been kept at the same level.



A further task during the body development process is to minimize the number of necessary body versions.

The 2005 Audi A6 uses four body shell versions:

– rigid rear panel
– with opening for loading
– without sliding sunroof
– with sliding sunroof

A standard rear section is used for the front-wheel drive and quattro vehicles.

In addition to classic resistance spot welding, the following connecting techniques are used on the new 2005 Audi A6 body shell:

– Spot welding bonding
– Punch riveting
– Clinching (hood & rear opening trunk)
– Laser soldering
– Laser welding
– as well as MIG soldering

These aluminum-steel connections are used on the following parts in the body:

– in the plenum chamber front panel
– sill reinforcement (with aluminum extruded section)
– rigid rear panel with rear shelf

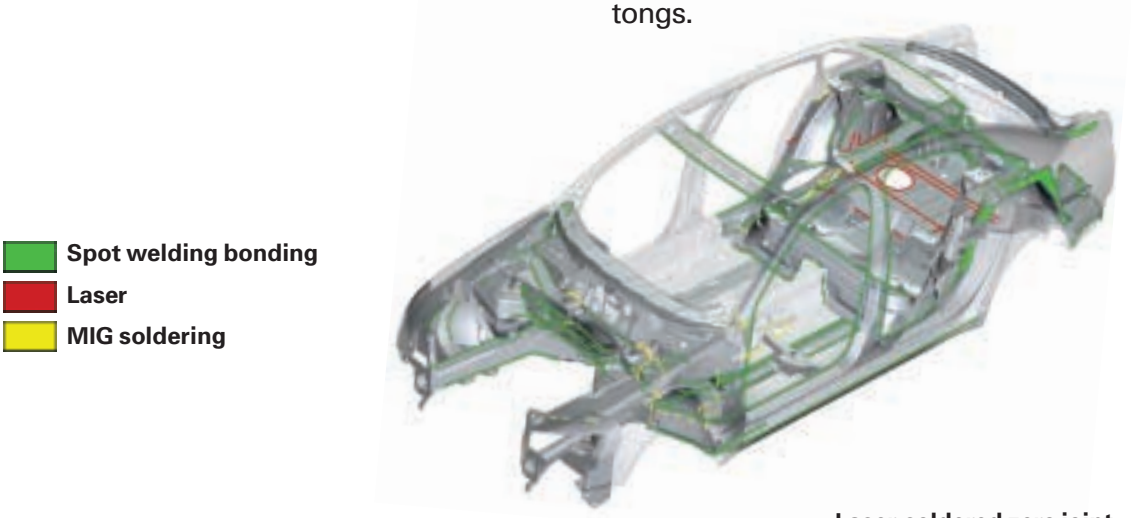
Spot welding bonding, using a high-strength structural adhesive, is used for particularly crash-relevant and rigidity determining connections (length of the bonded seam factor 3 compared with predecessor).

The Aluminum components are joined to the galvanized steel sheets by means of punch rivets and by bonding.

The roof and side panel frame are joined by laser-soldering.

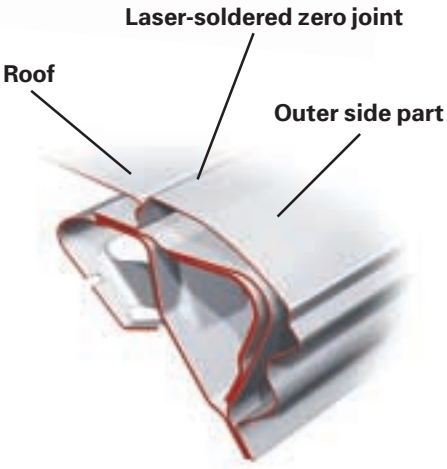
Hard to access components are joined by laser-welding.

The laser-welding head is smaller and thus has greater flexibility than comparable spot welding tongs.



In addition, the weight can be reduced by reducing the flange widths.

MIG soldering is used for closed sectional bars which are only accessible from one side, for example longitudinal floor members.



Materials

In addition to conventional deep-drawing steels, the following materials are used in the body structure of the 2005 Audi A6:

- High tensile sheet steel
- Special sheet steel
- Aluminum sheets
- Aluminum extruded sections and
- Plastic-ribbed deep-drawing steel component (hybrid component)



High-tensile steel sheets are used especially in areas which require strengthening and greater impact resistance.

Special steel sheets are also used in the body structure, e.g. front wheelhouse cross-member.

The engine hood and front fenders are made of aluminum.

In addition to the add-on parts in the shell, aluminum sheets are used in the structure for large-area components, which are not subject to excessive stress.

Large-volume aluminum extruded sections are used as sill reinforcements to stiffen the cell structure in the event of an offset or side crash.

The front roof frame is designed as a hybrid component in order to reduce the weight.



High tensile steels (180 - 300 N/mm²)

Dual-phase steels (340 - 500 N/mm²)

Weight percentage of high-tensile steel sheets
Total: 45%
Upper section: 42.3%
Lower section: 46.7%

Special steel (600 - 900 N/mm²)

Aluminum

Hybrid component

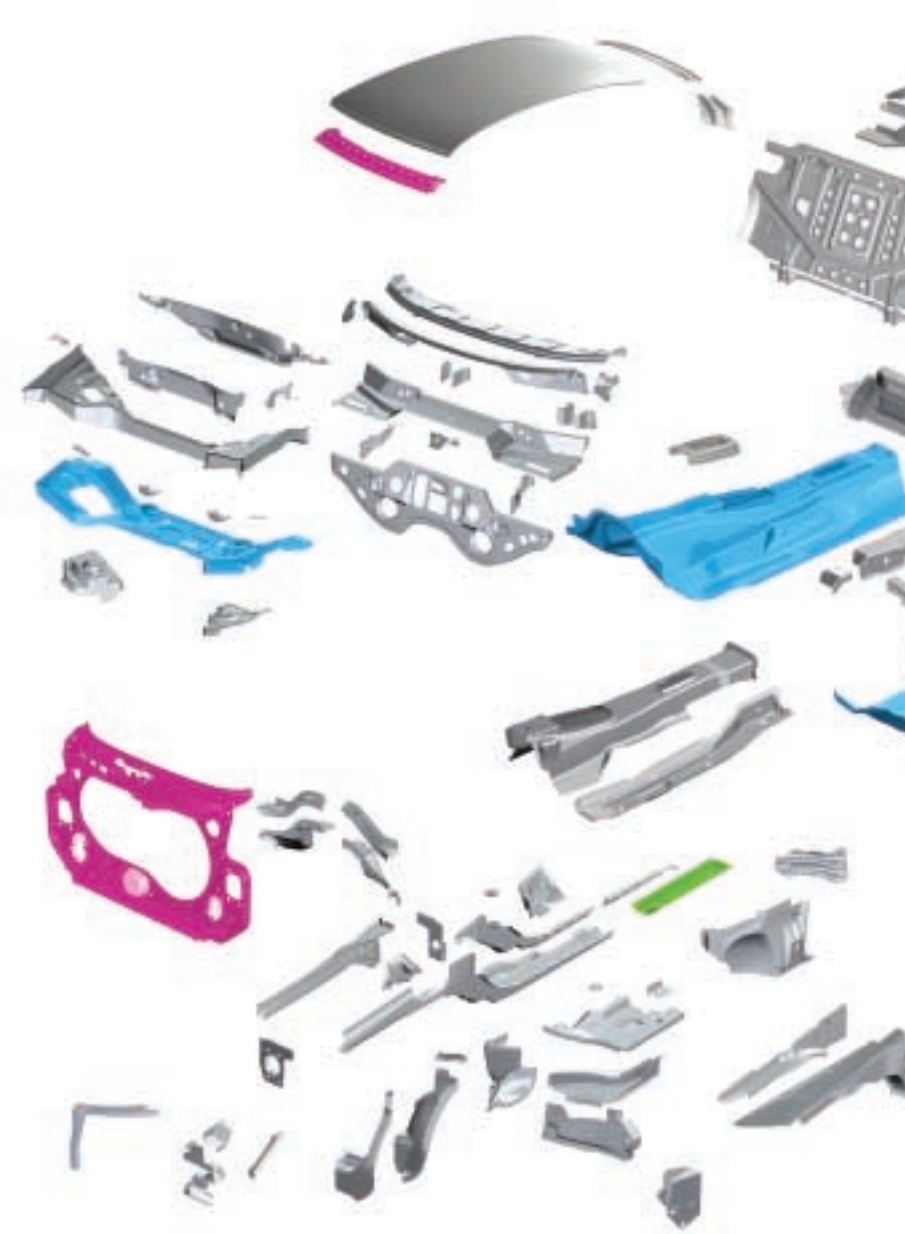
Blanks

Blanks with different wall thicknesses and material qualities are used to realize a stress-adapted material distribution for large-area components, which are subject to high stress.

Laser-welded blanks, so-called tailored-blanks, are used for:

- the front suspension strut cross member
- front floor panels
- inner side section
- rear longitudinal member
- and door inner panels

Tailored blanks
Tailored-rolled-blanks
Hybrid components

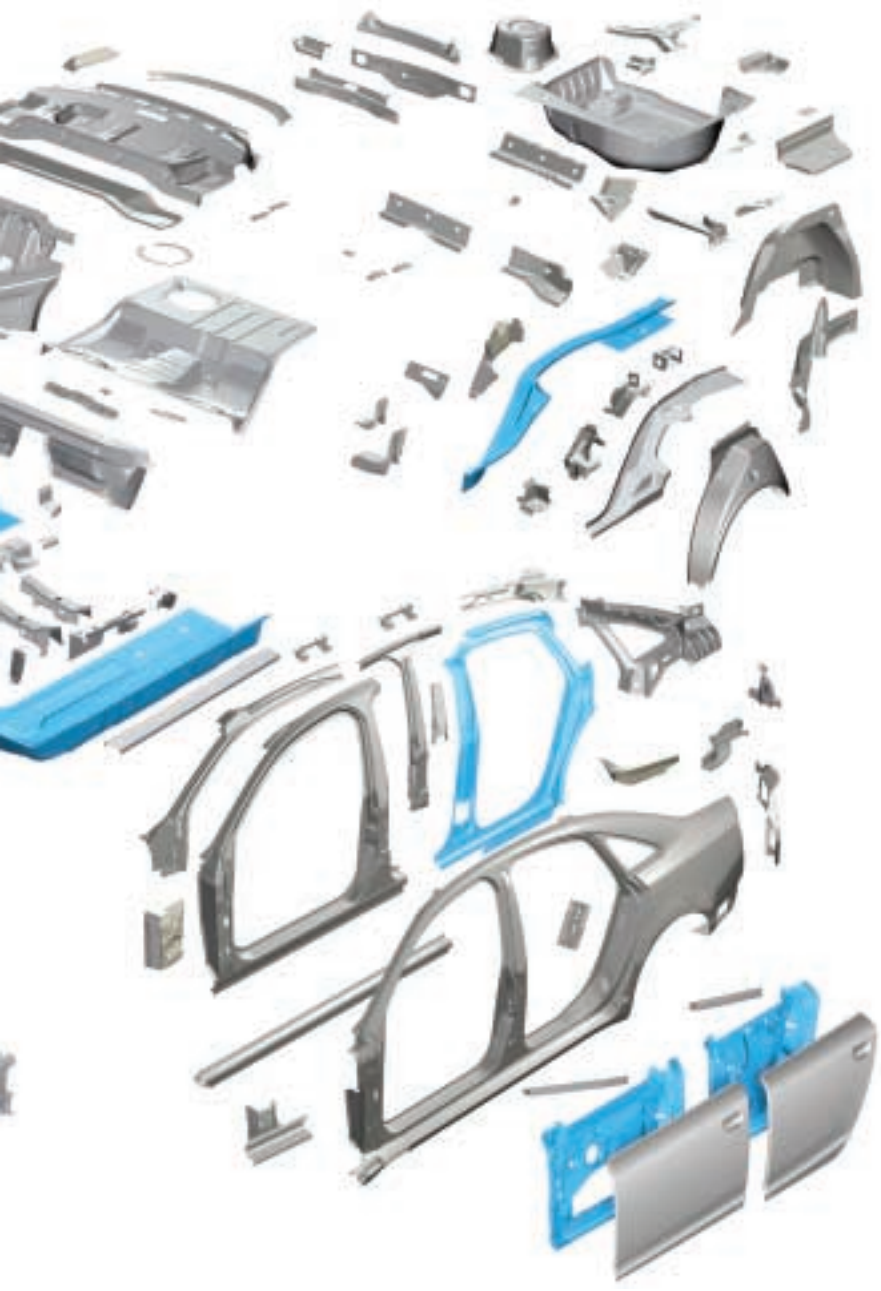


Tailored-rolled blanks, which have variable rolled wall thicknesses, have particular advantages.

They can be used to produce continuous material thickness transitions which meet the local stress conditions. This technique is used to optimize the front longitudinal member structure.

In total, a weight reduction of 17.6 lbs (8 kg) (without add-on parts) was realized through the material selection being adapted to the respective stress conditions.

An additional weight reduction of 19.8 lbs (9 kg) was realized by using blanks with different wall thicknesses.



Assemblies

Plenum Chamber

One application area for special steel is the suspension connection near the spring and shock absorber seat.

It was possible to reduce the wall thickness of the respective parts from .10 in (2.5 mm) to .06 in (1.4 mm).

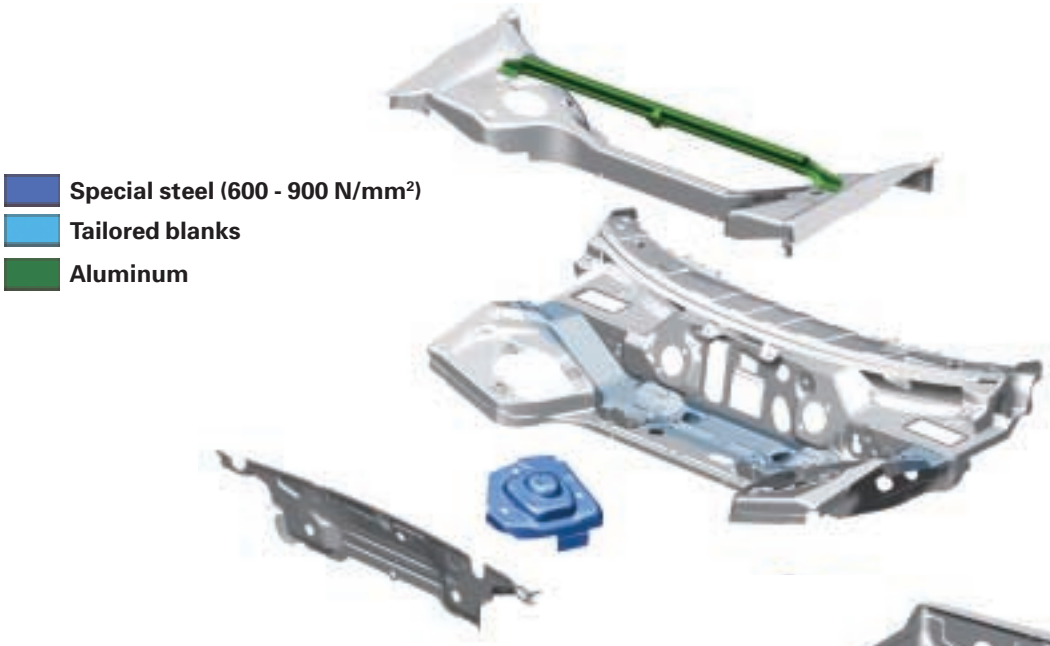
The resulting loss of local rigidity was offset by creating an optimized profile.

In addition, a tailored blank is fitted in the plenum chamber.

This ensures the highest possible energy absorption in the event of a crash.

At the same time, the necessary rigidity and stability are ensured during normal driving.

Transverse rigidity is ensured by a rolled sectional bar as an additional reinforcement.



Wheelhouse

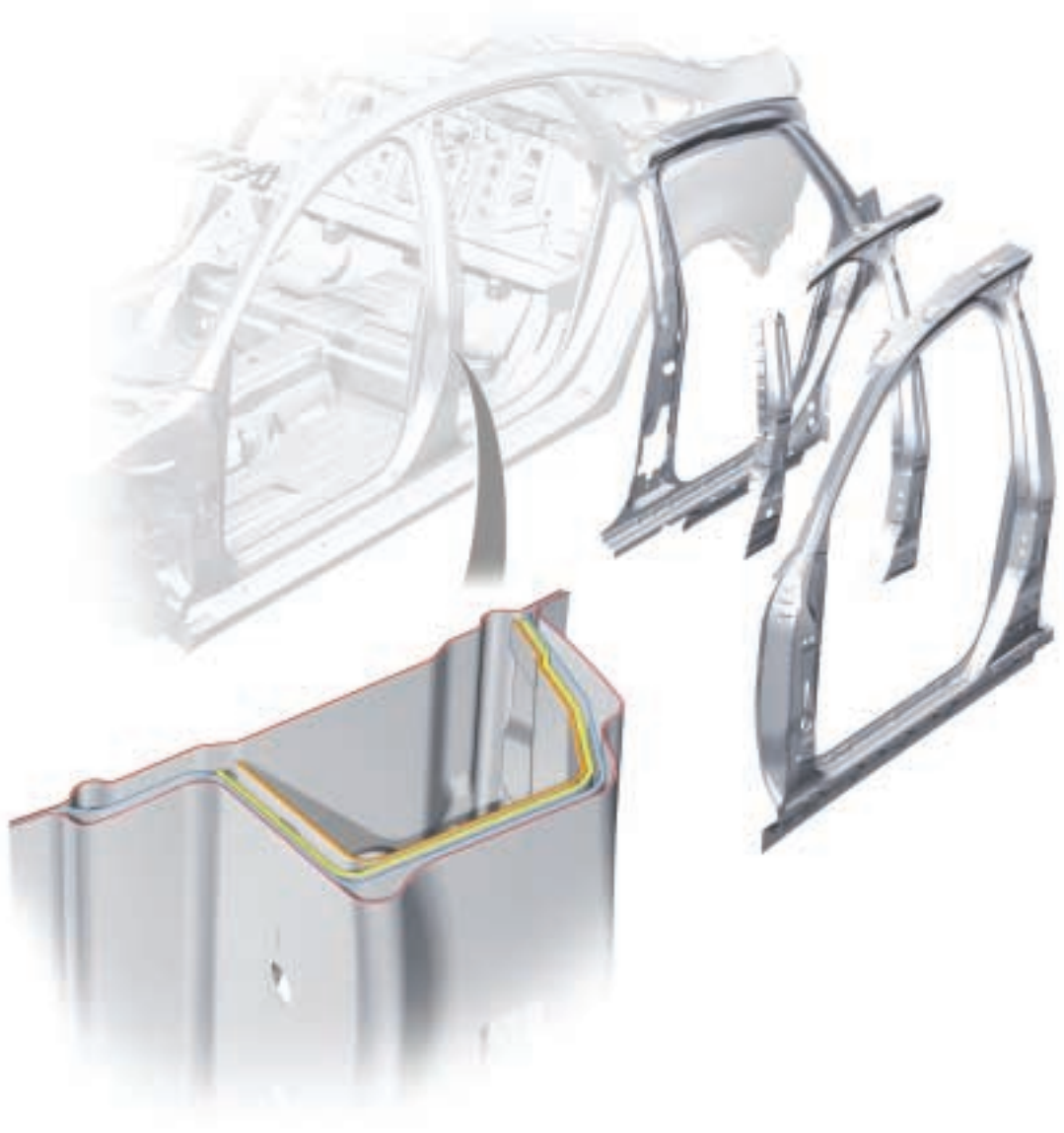
To ensure an optimum dissipation of the crash energy from the front of the car into the passenger compartment, special steel components were used in the area of the wheelhouse



B-pillar

Due to the increased requirements regarding the strength of the B-pillar, a combination of different materials is used.

– front inner side section (high tensile steels)
– rear inner side section, tailored blank (dual-phase steels, high tensile steels) t = .05 in (1.35 mm) and .03 in (0.8 mm)
– B-pillar reinforcement (dual-phase steels)
– B-pillar (dual-phase steels)



Bumpers

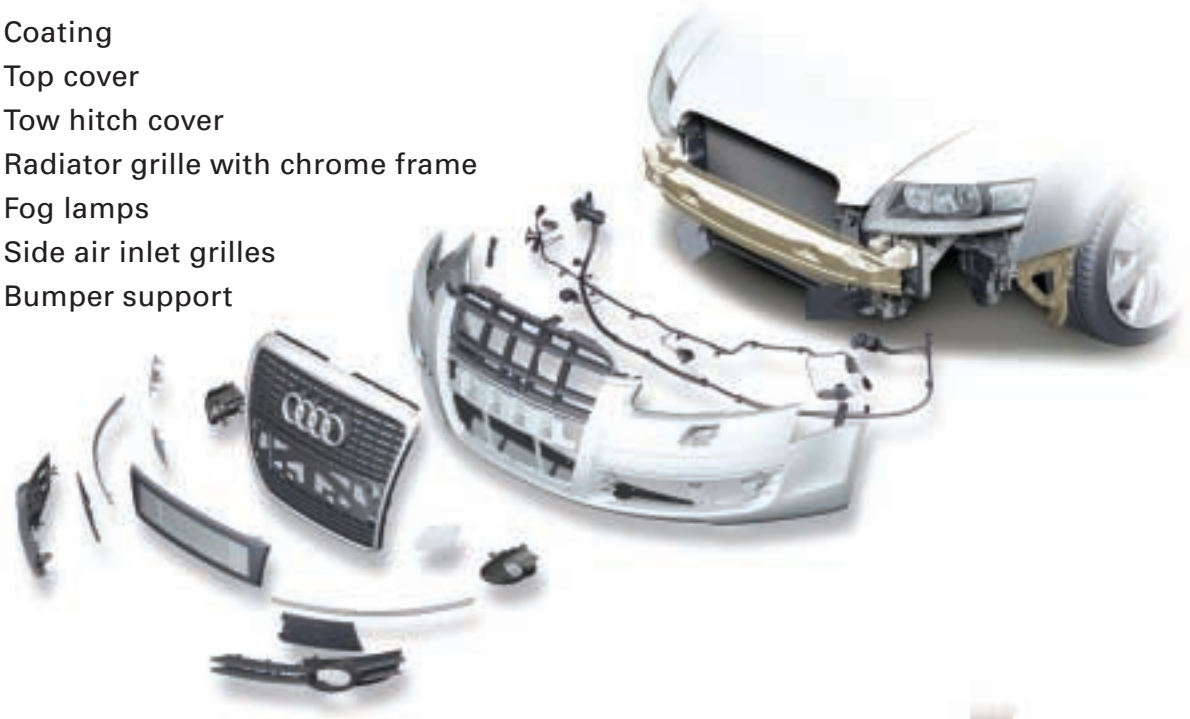
Front Bumper

The bumper on the new 2005 Audi A6 is painted in the color of the car.

It comprises the following components:

- Coating
- Top cover
- Tow hitch cover
- Radiator grille with chrome frame
- Fog lamps
- Side air inlet grilles
- Bumper support

The number plate in the radiator grille is integrated stylishly and harmoniously within the overall design.



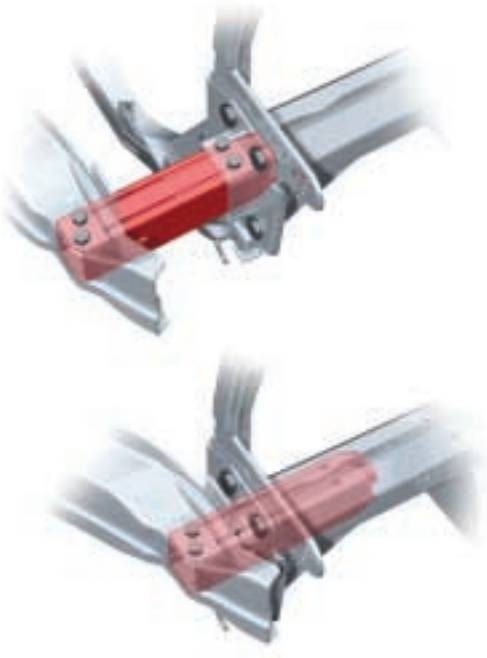
The bumper support comprises an open aluminum cross member, which is screwed on to the longitudinal member using newly developed shear boxes.

The shear box absorbs the crash energy from all centrical and slightly diagonal impacts through its shearing effect. Expensive damage to the welded vehicle structure behind it is thus avoided.

In the event of diagonal impacts, the impact energy is absorbed by the bumper buckling (folding) and deforming.

The seat for the tow hitch is integrated in the right-hand shear box.

The towing forces are guided centrically into the longitudinal member.



Rear Bumper

The rear bumper assembly comprises the coating, spoiler, tow hitch cover and closing part components. It is mounted on the vehicle by means of fixed guides on the body. The bumper support and the bracket for the bumper support are made of aluminum and are produced by extrusion molding.

Compared to the previous model, the joints on the 2005 Audi A6 have been noticeably reduced.

Due to a special adjusting/holding part below the rear light, the zero joint between the bumper coating and side part has been reduced to 0.03 in (0.8 mm).

A parking aid and a mechanically swiveling trailer coupling are available (optional).



Trailer Coupling

(Not for North American Market.) The newly developed trailer coupling fitted in the 2005 European A6 is equipped with a mechanically swiveling ball rod.

The ball rod swivels around a rotation axis, which is angled at 45° to the longitudinal axis of the vehicle.

The swivel angle between the swiveled-out towing position and the idle position behind the bumper is 180°.

The system is unlocked by means of a handwheel located in the trunk.

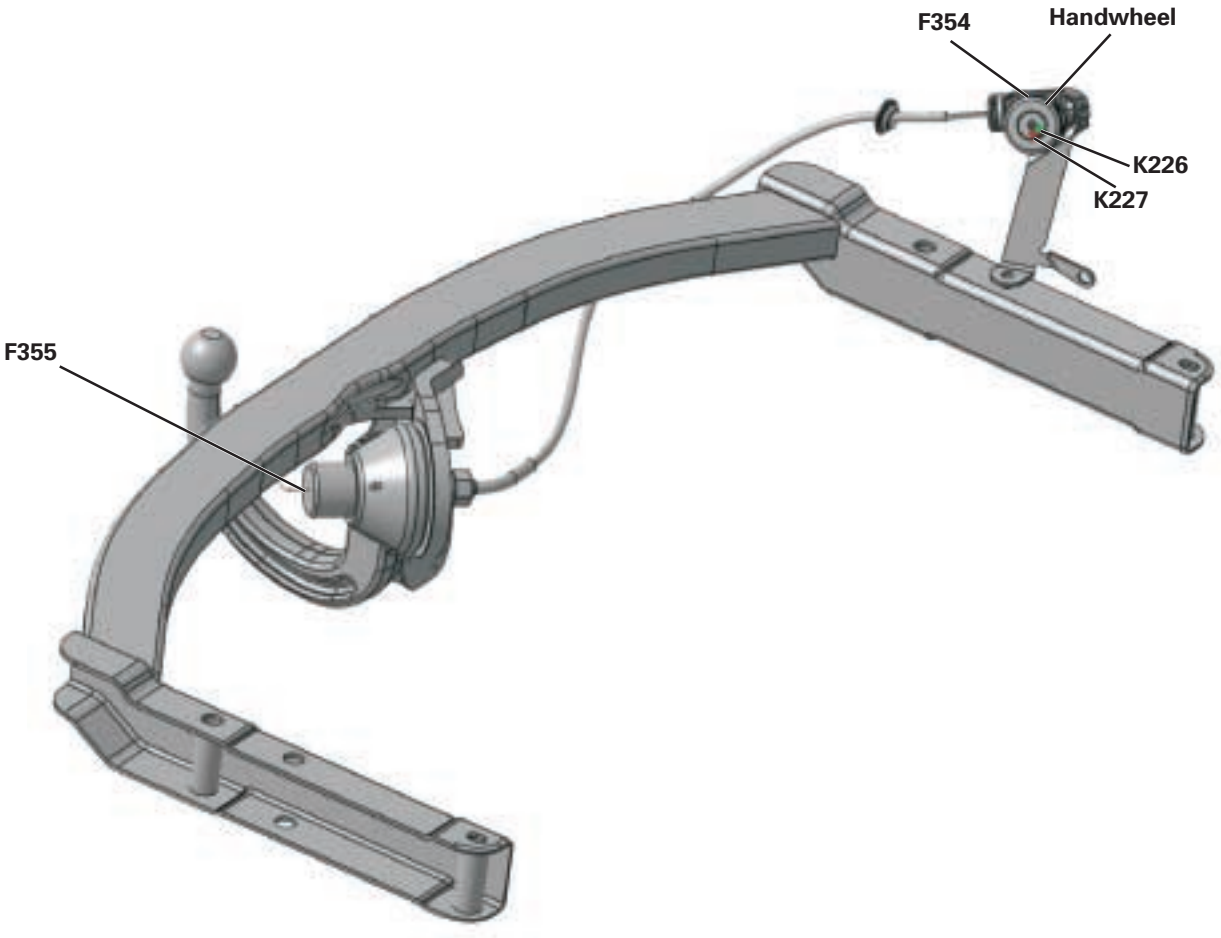




Control Module for Towing Sensor J345

Arrangement in the Vehicle

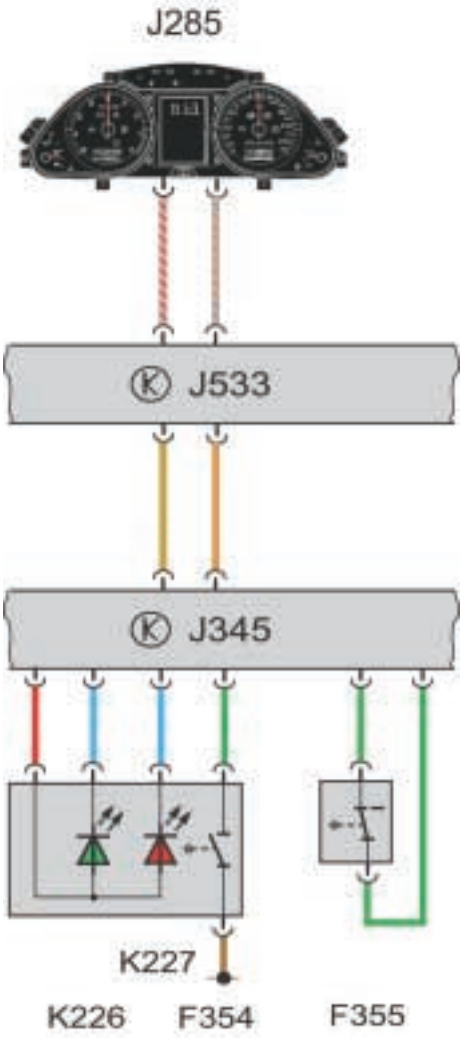
The basic function of the Control Module for Towing Sensor J345 is the task of detecting the locking status of the mechanically swiveling trailer coupling and indicating this to the driver.



On pulling the handwheel in the trunk, the Handwheel Contact Switch F354 is closed. On turning the handwheel, the locking bolt on the trailer coupling is unlocked mechanically by a Bowden cable and the Lock Bolt Contact Switch F355 opens.

After being unlocked, the trailer coupling can be swiveled out/in mechanically. After being swiveled, it is automatically locked by spring power. The contact switches return to their initial position. The control module cannot differentiate between a locked, swiveled-in trailer coupling and a locked, swiveled-out trailer coupling.

The locking state is indicated by two LEDs in the handwheel for the trailer coupling. When the green Trailer Coupling -Locked- Indicator Lamp (K226) lights up continuously, it indicates that the trailer coupling is swiveled in/out correctly.



The red Trailer Coupling -Unlocked- Indicator Lamp (K227) flashes when the trailer coupling is not locked. In addition, a message appears on the Control module with indicator unit in instrument panel insert J285.

When terminal 15 is switched off, the Trailer Coupling -Locked- Indicator Lamp (K226) switches off if the tailgate/trunk lid is closed or remains open for longer than 10 minutes. The Trailer Coupling - Unlocked-Indicator Lamp (K227) switches off if the tailgate/trunk lid is closed or remains open for longer than 20 minutes. The respective warning lamp switches on again when there is a control module wake-up or a CAN wake-up.



Passenger Protection

Particular attention was paid to a high protection potential in the event of an accident and the compatibility. Audi's policy of designing vehicles with high safety specifications is supplemented by scientifically gained knowledge of the actual accident and its effects.

For this, the AARU (Audi Accident Research Unit) examines crashes involving relatively new Audi vehicles.

The development team's task is to analyze and reconstruct accidents and to draw up potential improvements.

In addition to this, the AARU evaluates the relevant accident databases.

The 2005 Audi A6 uses dual stage driver and passenger front airbags. The gas generators for these airbags contain two separate igniters and the propellant is located in different compartments. If the Airbag control Module determines only a low severity crash has occurred, it deploys one of the igniters in the gas generator. The second igniter is triggered later in the crash sequence. This helps reduce the chance of injury from airbag deployment in low severity crashes.

The safety system in the 2005 Audi A6 comprises the following familiar components:

- Airbag Control Module
- Driver and front passenger airbags, two-stage
- Front side airbags
- Sideguards (head airbags)
- Sensors for side crash detection
- Front belt tensioners

Compared to its predecessor, the 2005 Audi A6 has the following new components:

- Crash sensors for the front airbag (upfront sensors for early frontal crash detection)
- Battery cut-off relay
- Sensors for side crash detection in the doors (pressure sensitive)
- Switches in the front belt locks
- PODS (Passive Occupant Detection System)

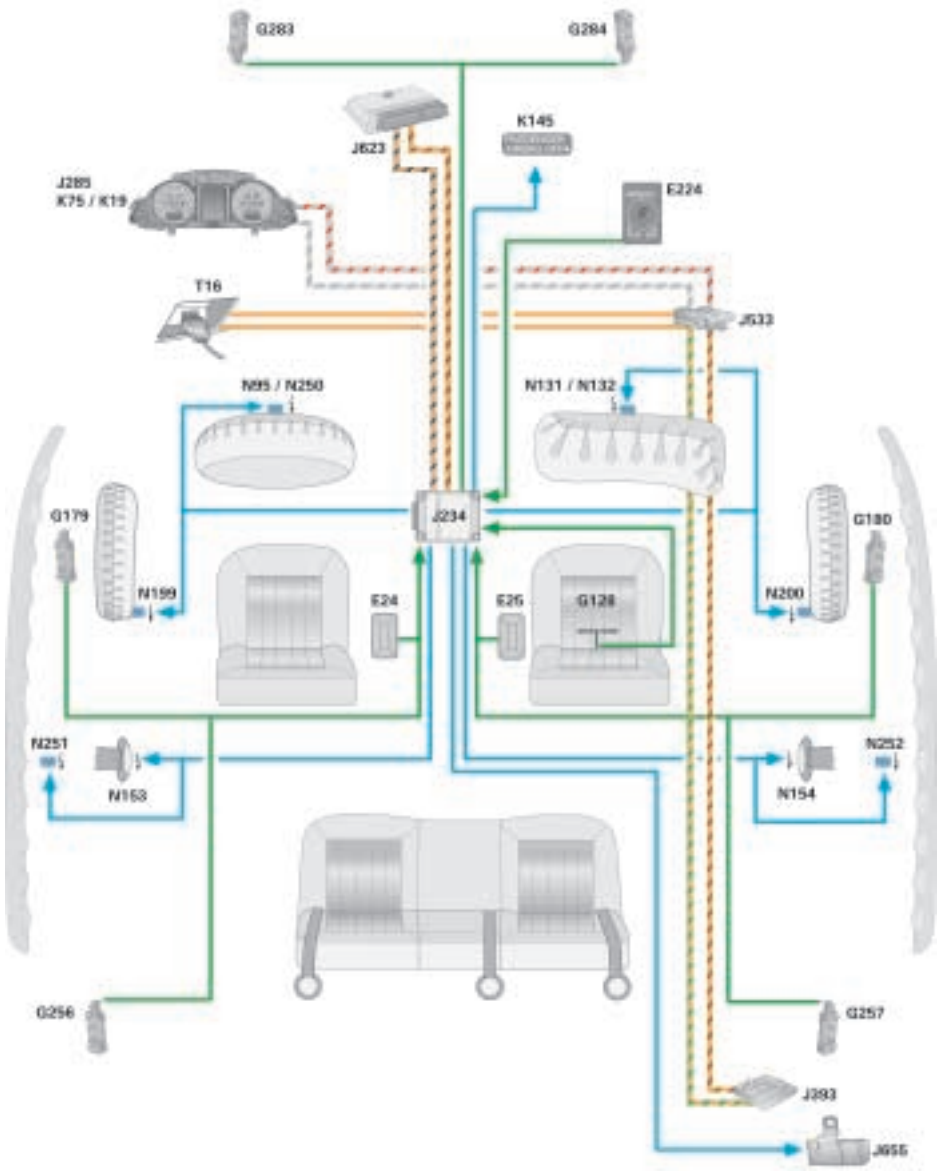
The safety system in the 2005 Audi A6 is rounded off by the active head restraints in the front seats.

Due to the different demands and legal provisions which car makers are subject to in the different markets, the equipment can vary for the US American market in particular. Systems used in other markets can be found in the Appendix of this Self-Study Program.



Note

Observe the respective safety instructions in the Repair Manual before carrying out any work on the airbag system!



Legend

E224	**Key switch for switching off passenger side airbag**
E24	**Left Seat Belt Switch**
E25	**Right Seat Belt Switch**
G128	**Seat Occupied Sensor, Passenger's Side**
G179	**Crash sensor for side airbag, driver's side**
G180	**Crash sensor for side airbag, front passenger side**
G256	**Left Rear Side Airbag Crash Sensor**
G257	**Right Rear Side Airbag Crash Sensor**
G283	**Drivers Front Airbag Crash Sensor**
G284	**Passengers Front Airbag Crash Sensor**
J234	**Airbag Control Module**
J285	**Control module with indicator unit in instrument panel insert**
J393	**Central control module for comfort system**
J533	**Data Bus On Board Diagnostic Interface**
J623	**Engine Control Module (ECM)**
J655	**Battery Switch-off Relay**
K19	**Seat Belt Warning Light**
K75	**Airbag Malfunction Indicator Lamp (MIL)**
K145	**Warning light for airbag off, passenger side (PASSENGER AIRBAG OFF)**
N95	**Driver's Side Airbag Igniter**
N250	**Igniter 2 for airbag, driver side**
N131	**Passenger's Side Airbag Igniter 1**
N132	**Passenger's Side Airbag igniter 2**
N153	**Driver's Seat Belt Tensioner Igniter 1**
N154	**Passenger's Seat Belt Tensioner Igniter 1**
N199	**Igniter for side airbag, driver's side**
N200	**Igniter for side airbag, passenger side**
N251	**Igniter for head airbag, driver side**
N252	**Front Passenger Head Airbag Igniter**
T16	**16-Pin Connector**

Airbag Control Module J234

The task of the airbag electronics is to detect vehicle deceleration and evaluate it so that a collision is reliably detected. The control module can detect frontal, side and rear crashes. In addition, the electronics also have the task of activating the respective restraint systems (airbags / belt tensioners) depending on the type of collision and its severity and activating the crash output procedures.

The airbag electronics have the following main tasks:

- Crash detection (front, side, tail)
- Defined triggering of the airbags, belt tensioners and battery cut-off
- Defined triggering of the second front airbag stage
- Evaluation of all input information
- Permanent monitoring of the entire airbag system
- Independent power supply via capacitor for a defined time (approx. 150 ms)
- Error indication via Airbag MIL
- Storage of error and crash information
- Notification of a crash event to other system components via drive CAN or discrete Crash output (conventional cabling)
- Activate belt warning

In addition to the internal sensors in the Airbag Control Module, external crash sensors are also used to detect vehicle deceleration during impact.

The electronics can only decide when and which safety components to activate after all the sensor information has been evaluated by the control module electronics.

If an Airbag Control Module is replaced, it must be coded and adapted to the specific vehicle.

These functions can only be performed by means of the Guided Fault Finding procedure using the Scan Tool online. The Service technician needs access (with password) to the "FAZIT" database at Audi.

If the coding or adaptation is not carried out in the correct manner, malfunctions can occur in other vehicle systems such as the ESP.



Airbag Malfunction Indicator Lamp (MIL) K75

The Airbag Malfunction Indicator Lamp (MIL), which is located in the control module with indicator unit in instrument panel insert J285, is triggered via the bus CAN.

If there is no data message from the Airbag Control Module, the malfunction indicator lamp is automatically switched on from the instrument panel insert.

Rear Crash Detection

In the event of a rear-end crash, the Airbag Control Module evaluates the information from the internal crash sensor as well as from the Drivers Front Airbag Crash Sensor G283 and the Passengers Front Airbag Crash Sensor G284. If their signals exceed a fixed value, the belt tensioners are ignited and the battery cut-off relay is activated.

Data Exchange

The Airbag Control Module is integrated within the drive CAN.

The Airbag Control Module transmits the following information on the drive CAN:

- Airbag Malfunction Indicator Lamp K75
- Activate belt warning
- Diagnosis data
- Crash signal
- Crash information for the actuator test
- ESP data
- Front passenger airbag disabled (for North American Market only)

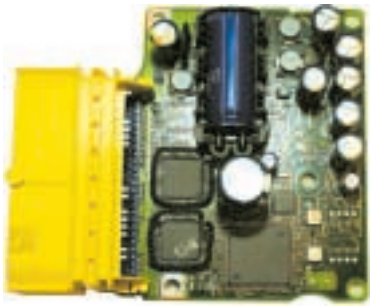
Sensors



Crash sensor (Airbag Control Module J234)

The acceleration sensors are arranged in such a way that both deceleration in the vehicle's longitudinal axis (x-axis) and deceleration in the vehicle's transverse axis (y-axis) are detected.

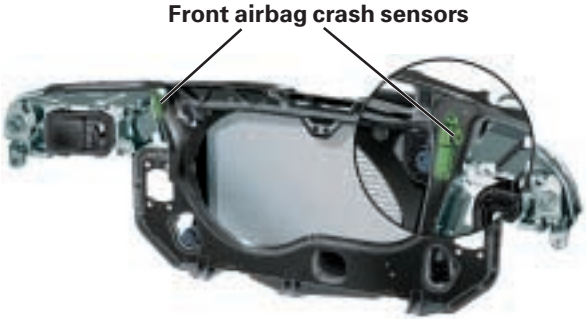
Safety switch (Airbag Control Module J234)



The mechanical safeing sensor in the Airbag Control Module for the 2005 Audi A6 has been replaced by a micromechanical acceleration sensor.

This sensor also detects the vehicle's deceleration in the direction of travel (x-axis) and sends this information to the control module electronics for a plausibility check.

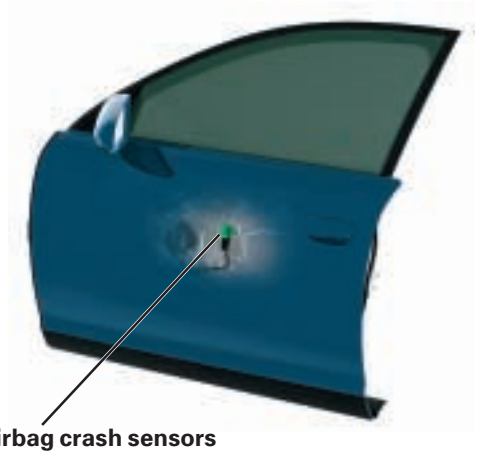
Drivers Front Airbag Crash Sensor G283 and Passengers Front Airbag Crash Sensor G284



The severity of the crash changes the signal, which the front airbag crash sensor sends to the Airbag Control Module. Depending on the signal, a threshold reduction is activated in the Airbag Control Module, which improves the crash detection function and thus enables the airbags to be ignited earlier.

A greater protective effect can be attained by triggering the airbags earlier.

Crash Sensor for Side Airbag, Driver's Side G179 and Passenger's Side G180



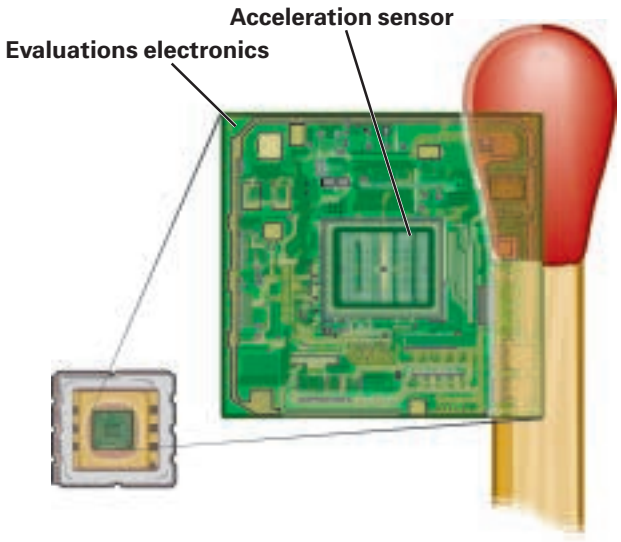
Pressure sensors are now used in both front doors.

The deformation of the vehicle in the event of a side crash causes a short-term increase in air pressure in the door. This pressure increase is detected by the sensor and is sent to the Airbag Control Module.

Left Rear Side Airbag Crash Sensor G256 and Right Rear Side Airbag Crash Sensor G257

(C-pillar)

Both crash sensors for side airbags G256 and G257, located near the C-pillar (left and right), are conventional acceleration sensors, similar to those used for the previous Audi A6 model.



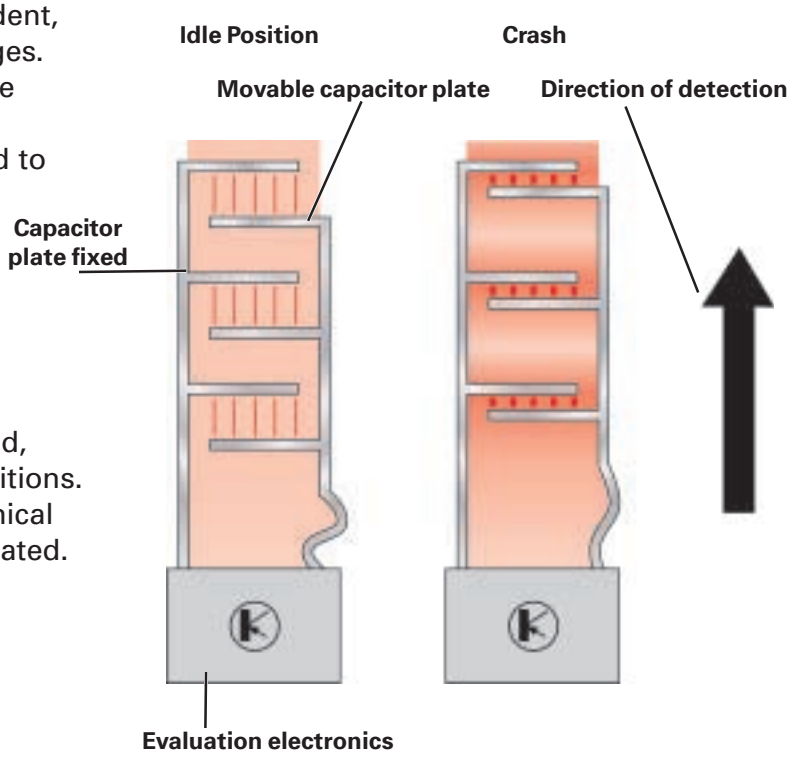
How the Crash Sensors Work

A crash sensor essentially comprises a housing, evaluation electronics and a micro-mechanical acceleration sensor.

Basically, the acceleration sensor is structured like a capacitor.

Some of the capacitor plates are fixed. The counterparts of these are movable and work like a seismic mass.

If the seismic mass is pushed into recording direction during an accident, the capacity of the capacitor changes. This information is evaluated by the evaluation electronics and is then digitally processed and transmitted to the Airbag Control Module.



Pressure sensors, on the other hand, react to a change in pressure conditions. The resistance of the micromechanical sensor unit is monitored and evaluated.

Belt Warning

The new 2005 Audi A6 has a belt warning function for both driver and passenger.

After switching on the ignition, the driver's belt lock switch and the front passenger's belt lock switch (in conjunction) with the Seat Occupied Sensor, Passenger's Side is evaluated by the Airbag Control Module. The control module recognizes whether the front passenger seat is occupied on the basis of the values from the Seat Occupied Sensor.

If the driver or front passenger has not fastened the seat belt, a warning is given by means of Seat Belt Warning Light K19 in the instrument panel insert and an acoustic signal.

Time Diagrams for the Seat Belt Warning

Optical and Acoustic Signals - Delayed Belt Fastened Operation

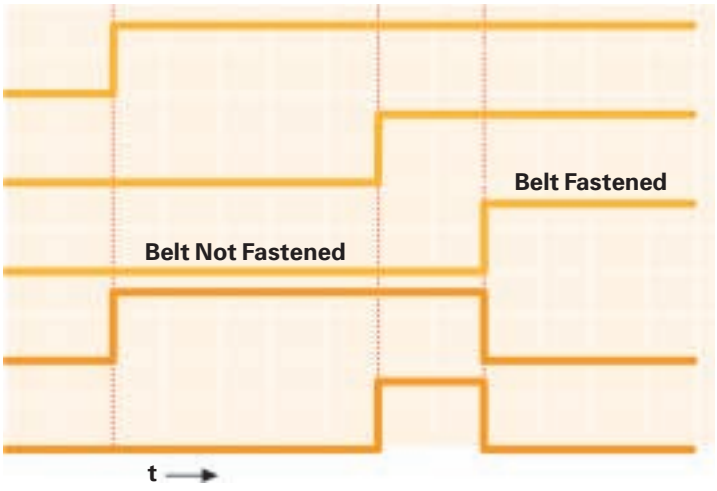
Terminal 15

v > 6.2 mph (10 km/h)

Fasten seat belt

Warning lamp for seat belt warning

Acoustic signal



Optical and Acoustic Signals - Seat Belt Not Fastened Operation

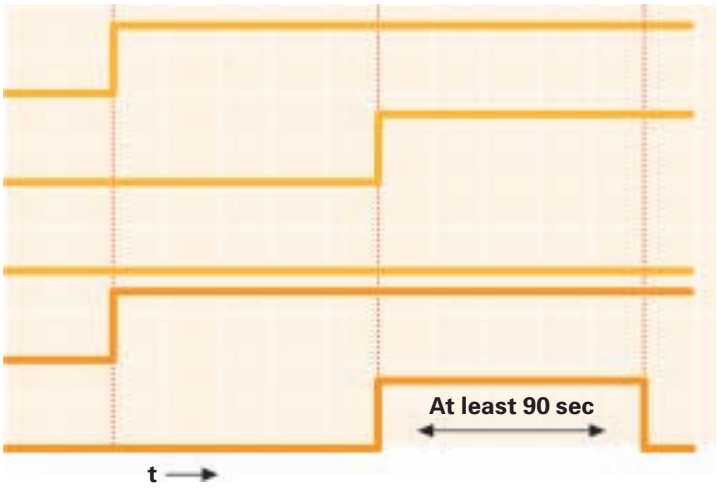
Terminal 15

v > 6.2 mph (10 km/h)

Fasten seat belt

Warning lamp for seat belt warning

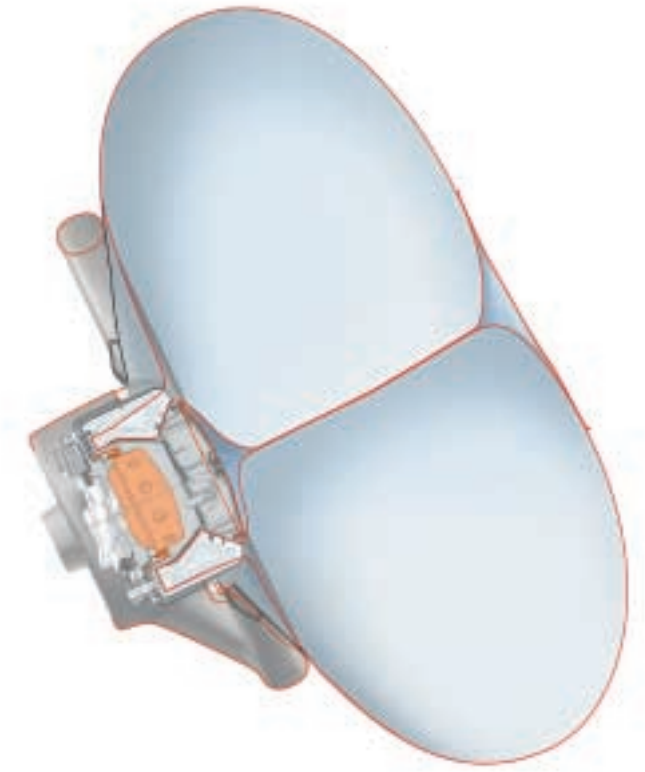
Acoustic signal



The warning is reactivated if the belt status is changed during "Tm. 15 on."

Airbag

Driver's Side Airbag Igniter N95 and Igniter 2 for Airbag, Driver Side N250



A dual-stage gas generator is used as the driver's airbag.

The radial opening of the airbag and the delayed ignition of the propelling charges reduce the loads acting on the driver when the car crashes.

Depending on the seriousness and type of accident, the time lapse between the two ignitions can be approx. 5 ms to 50 ms.

The radial opening and stepped actuation of the front airbag is particularly advantageous when there is no sufficient clearance between the steering wheel and the upper part of the body.

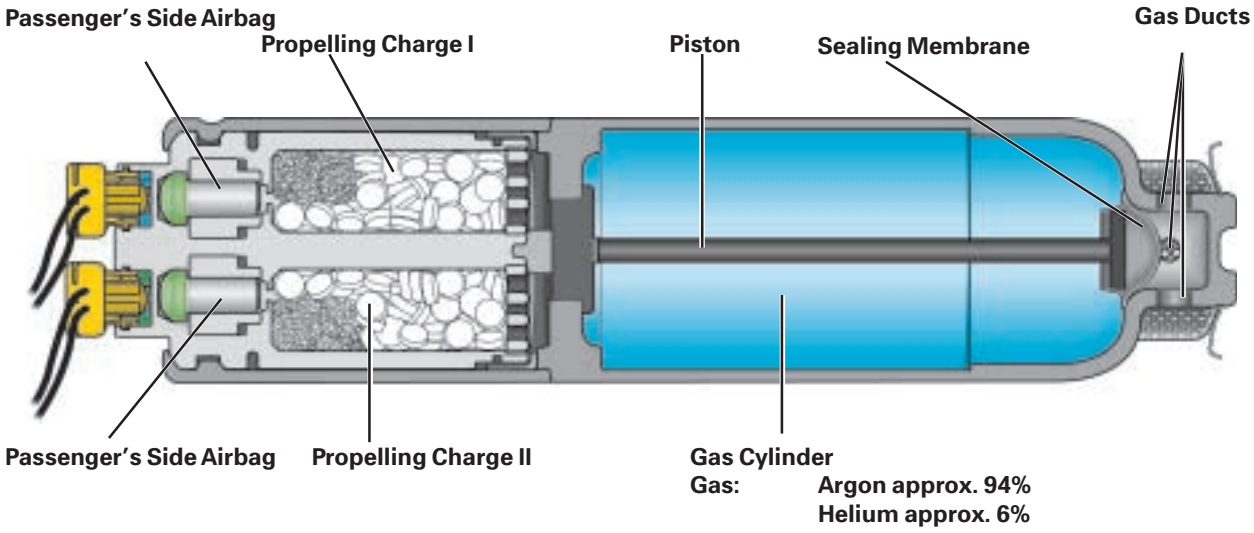
Both propelling charges are always ignited. This prevents one propelling charge remaining active after the airbag has been actuated.

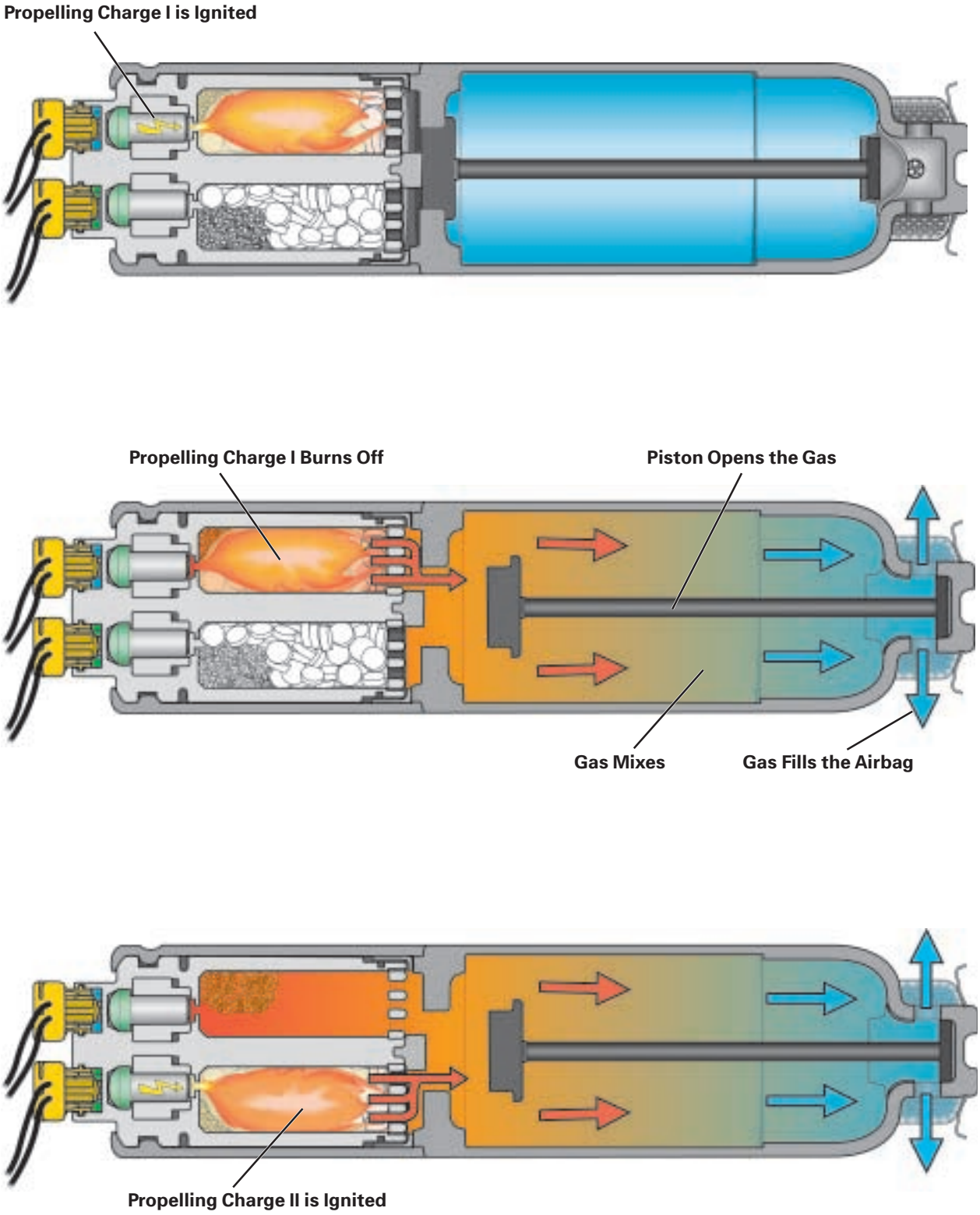
The gas generator in the driver's side airbag is bedded in a rubber ring. This minimizes any vibrations at the steering wheel, as the gas generator acts as a vibration damper.

Passenger's Side Airbag Igniter 1 N131 and Passenger's Side Airbag Igniter 2 N132

Like the driver's airbag, the passenger's airbag also comes with a dual-stage gas generator. In contrast to the driver's airbag, the gas generator in the front passenger airbag operates according to the hybrid gas technique. The gas generator comprises two pyrotechnical propelling charges and a compressed gas bottle. The Airbag Control Module ignites the first propelling charge. The pressure which is produced accelerates a piston, which opens the gas cylinder.

The escaping gas inflates and fills the airbag. The ignition of the second propelling charge supplies the airbag with an additional volume of gas.

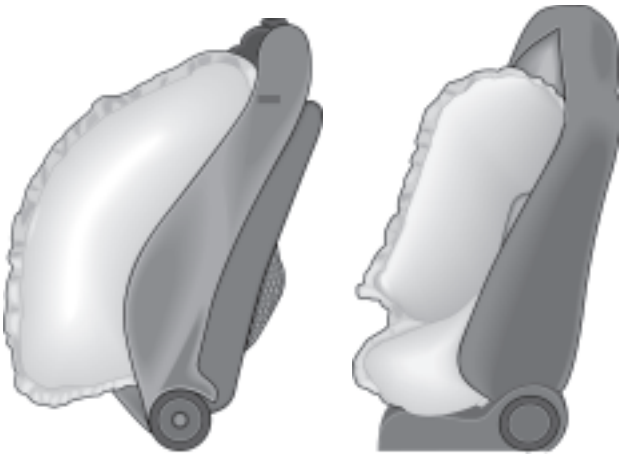



Propelling Charge I is Ignited
Propelling Charge I Burns Off
Piston Opens the Gas
Gas Mixes
Gas Fills the Airbag
Propelling Charge II is Ignited

Igniter for Side Airbag, Driver Side N199 and Igniter for Side Airbag, Passenger Side N200

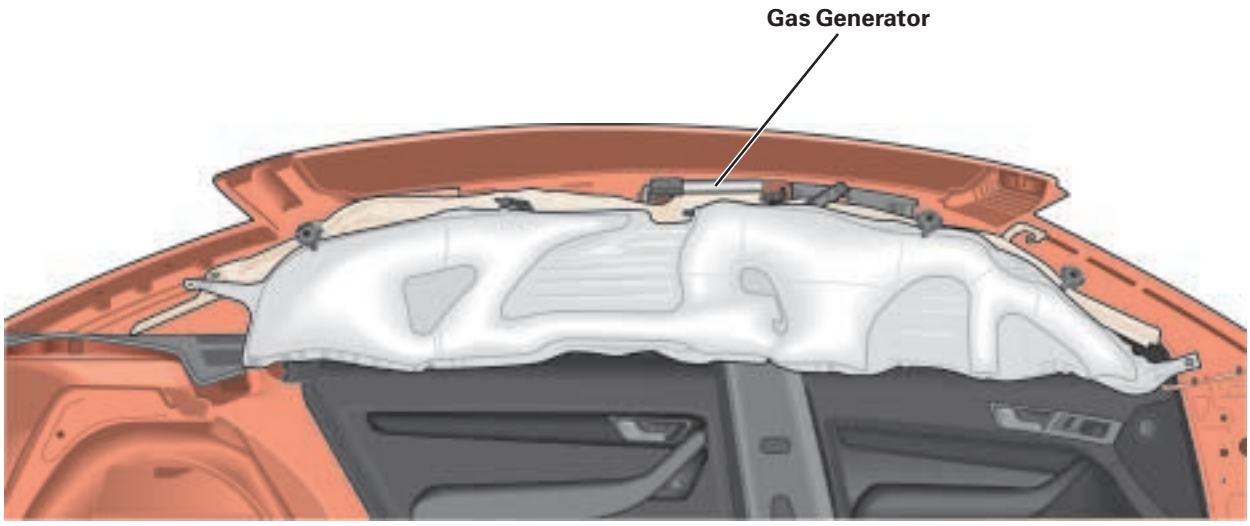
The side airbags have the same design and function as those fitted in other Audi models.

Vehicles for the North American market are equipped with side airbags (front), which are adapted to meet the specific market requirements.

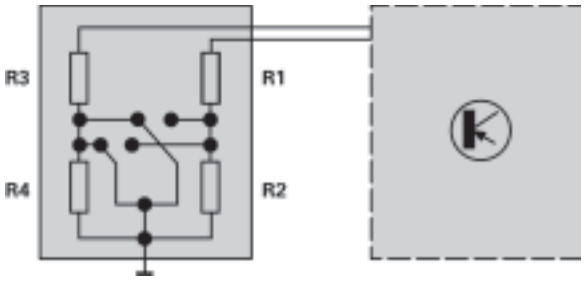


Igniter for Head Airbag, Driver Side N251 and Front Passenger Airbag Igniter N252 Sideguards

The policy for the sideguard, like all Audi vehicles, is to cover the entire side window area. New head airbags are used in the 2005 Audi A6. The hybrid gas generator is no longer fitted in the proximity C-pillar, but in the upper area of the B-pillar. The centric location of the gas generator ensures an even filling of the airbag. In addition, the extended gas tube is no longer required. As a result, not only has the total weight been reduced by approx. 50 percent, but installation space has also been created for adjacent components.



Key Switch for Switching Off Passenger Side Airbag E224
(Not for North American Market)



A key switch as shown in the adjacent block diagram is used to deactivate the front passenger airbag. Deactivation of the front passenger airbag is indicated by the warning light for airbag off, passenger side (K145) (PASSENGER AIRBAG OFF) lighting up.

The layout of the four resistors, of which two are always connected in series, ensures correct detection of the switch position.

If a faulty key switch is detected by the Diagnosis, an entry is made in the fault memory. This is also indicated by a flashing warning light for airbag off, passenger side.

Driver's Seat Belt Tensioners Igniter 1 N153 and Passenger's Seat Belt Tensioner Igniter 1 N154

The electrically triggered tensioner units operate according to the "ball and gearwheel" principle.

The belt tensioner units are triggered before the front airbags.

To prevent passengers from being subjected to excessive loads, the automatic belt systems are equipped with a belt force limiter.

At a certain load level, the force limiter gives and makes the belt longer, thus permitting the passenger to sink into the airbag, which has already opened.

In the event of a side crash with side airbag actuation, the corresponding belt tensioner is also triggered.

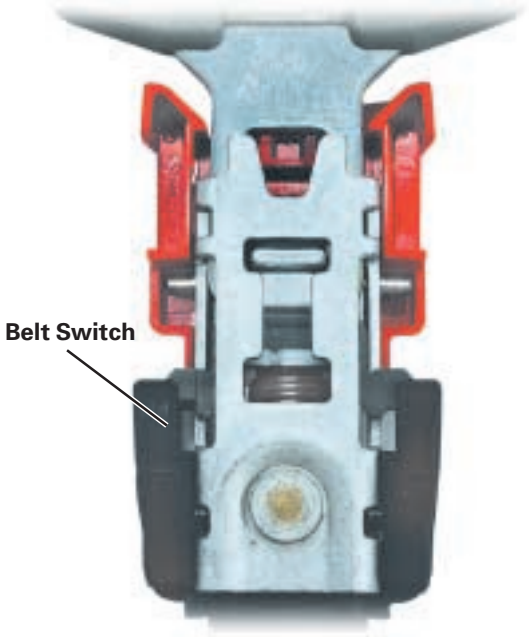
Left Seat Belt Switch E24 and Right Seat Belt Switch E25

A belt lock interrogation procedure is planned for the driver/front passenger belt lock. The switch position can be determined by means of a resistance measurement. The measured resistance value tells the Airbag Control Module whether the safety belt has been fastened.

Belt Switch, Belt Not Fastened



Belt Switch, Belt Fastened



Active Head Restraints

Active head restraints are used on the front seats in the 2005 Audi A6.

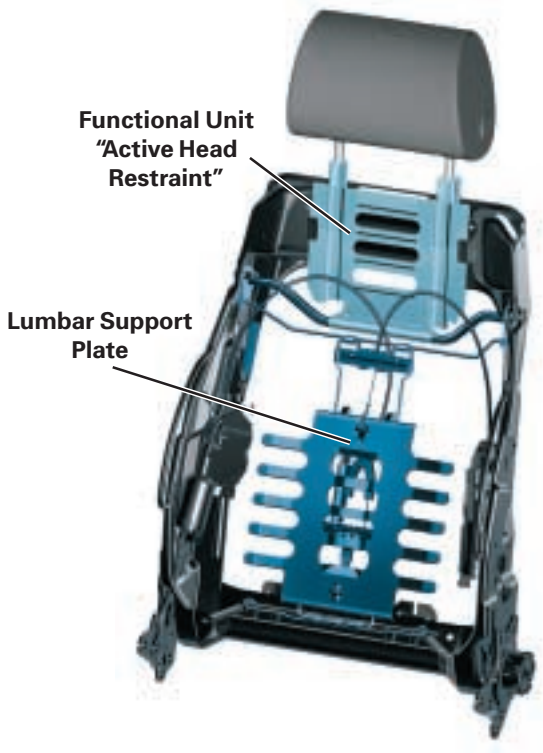
With this system, the head restraints move forward in the event of a rear-impact crash in order to reduce the distance between the head and the head restraints.

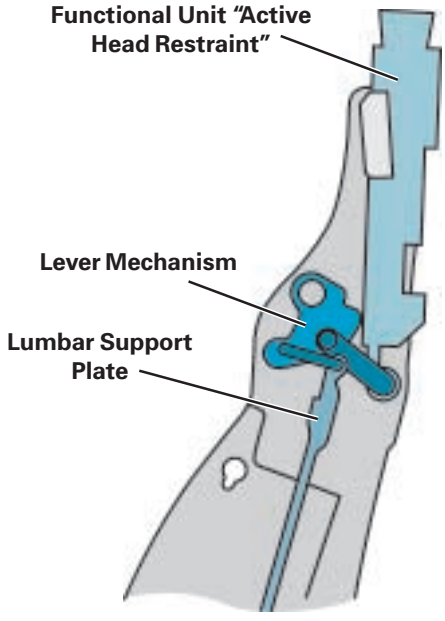
Reducing the relative acceleration between shoulder and head significantly reduces the risk of whiplash injuries.

During a rear-impact crash, the passenger is pressed against the backrest. This force is transferred via the backrest padding to the lumbar support plate in the backrest.

The lumbar support plate is linked to the "Active Head Restraint" functional unit in the backrest head via a lever mechanism. If the lumbar support plate moves backwards, the head restraint automatically moves forwards.

The head restraint system functions the same in both frontal and rear impact crashes.





Idle Position



Activated

Battery Switch-off Relay J655

The 2005 Audi A6 is equipped with a battery switch-off function in the event of a crash.

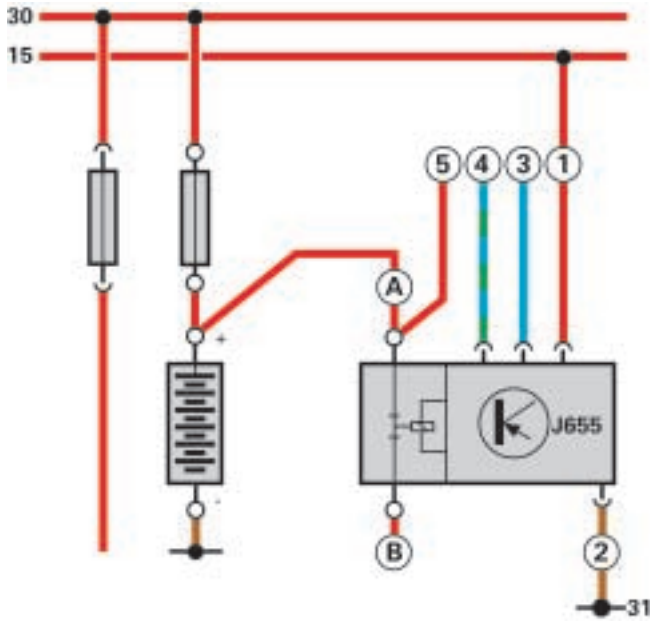
The pyrotechnic battery switch-off relay disconnects the starter and generator circuits from the vehicle's battery (located in the trunk) in the event of a crash. This avoids short-circuits. The battery switch-off relay is triggered by the Airbag Control Module.

The Airbag Control Module also monitors the battery switch-off relay circuits and stores faults if any have occurred.

The battery switch-off relay is activated every time an airbag is triggered and upon detection of a rear-end crash.

A battery switch-off relay which has triggered must always be replaced.

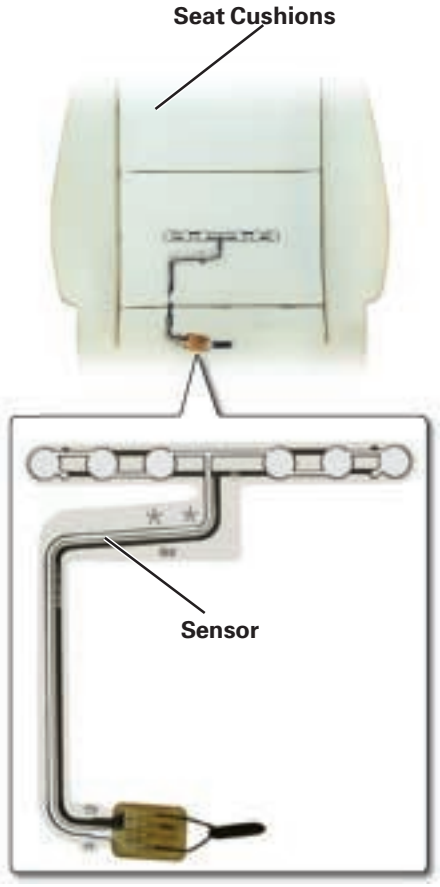




Pin	Terminal	Input / Output	Description
A	30	input (screw-type terminal)	Battery +
B	87	output (screw-type terminal)	Output and starter
1	15	input (clamp-type terminal)	Switched +
2	31	input (clamp-type terminal)	Chassis ground
3	Crash signal	input (clamp-type terminal)	Activation from Airbag Control Module J234
4	Diagnosis	Input and output (clamp-type terminal)	Diagnosis line from Airbag Control Module J234
5	30	output (screw-type terminal)	Output to Energy Management Control Module J644

Seat Occupied Recognition
(not for North American Market)

Seat Occupied Sensor, Passenger's Side G128 is a plastic foil, which covers the rear part of the front passenger seat. It consists of several individual pressure sensors. This ensures that the relevant part of the seat is sensed.



The Seat Occupied Sensor, Passenger's Side reacts to pressure and changes its resistance, depending on the load. If Seat Occupied Sensor, Passenger's Side G128 is subjected to a load greater than approx. 11 lbs. (5 kg), the Airbag Control Module detects "Seat occupied." As long as the front passenger seat is unoccupied, the Seat Occupied Sensor has a high resistance. If the seat is occupied, the resistance drops. If the resistance exceeds 480 ohms, the Airbag Control Module detects an interruption and sets a fault in the fault memory.

The Airbag Control Module uses the information from the Seat Occupied Sensor and the belt lock switch for the wearing belt detector.

Resistance of G128	Evaluation
Approx. 430 - 480 ohm	Seat not occupied
At 120 ohms and less	Seat occupied
Above 480 ohm	Error, interruption

Seat Occupied Recognition
(for North American Market)

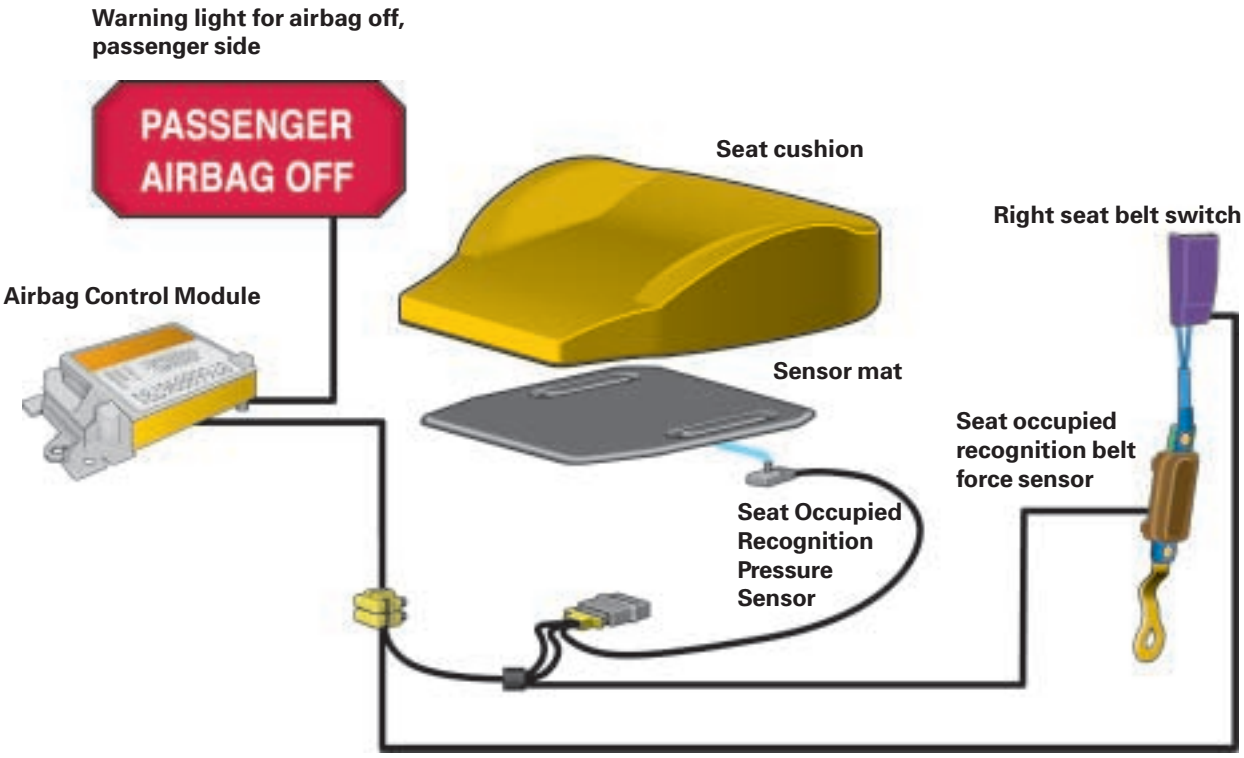
A separate system was developed in order to meet the legal requirements in the USA. The system is responsible for deactivating the passenger's front airbag in certain circumstances. This system is known as the Passive Occupant Detection System or PODS.

If the front passenger seat is unoccupied or if a child seat is detected, the front passenger airbag is switched off by the Airbag Control Module.

A deactivated front passenger airbag is indicated by the PASSENGER AIRBAG OFF warning light and a corresponding message in the instrument panel insert.

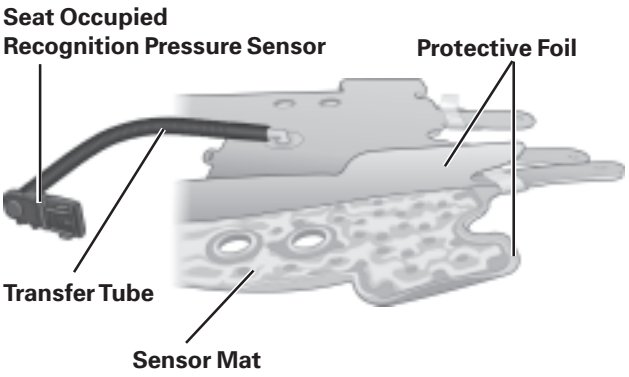
The system comprises the following components:

- Seat cushions
- Sensor mat
- Seat Occupied Recognition Pressure Sensor G452
- Seat Occupied Recognition Control Module J706
- Right Seat Belt Switch E25
- Seat Occupied Recognition Belt Force Sensor G453
- Warning light for airbag off, passenger side K145 (PASSENGER AIRBAG OFF)
- Airbag Control Module J234



Seat Occupied Recognition Pressure Sensor G452

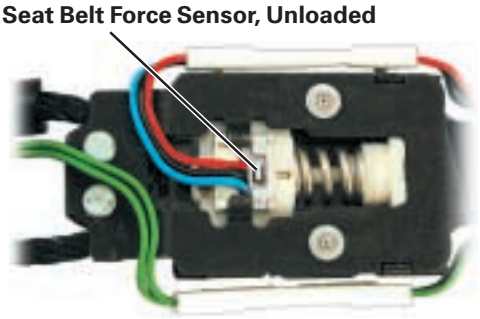
Seat Occupied Recognition Pressure Sensor G452 is connected to the mat for seat occupied recognition by means of a transfer tube. The sensor mat, which is filled with a silicone-like gel, is fitted below the seat cushion. If the front passenger seat is occupied, pressure is applied to the mat via the seat cushion.



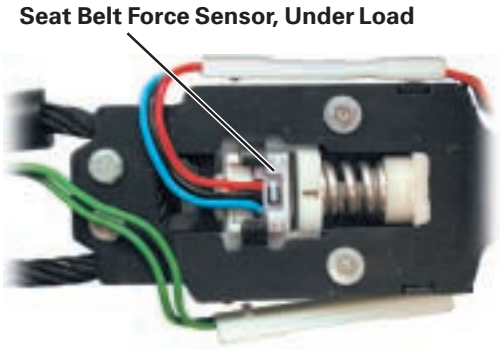
Seat Occupied Recognition Pressure Sensor G452 generates an analog voltage signal based on this pressure. The Seat Occupied Recognition Control Module supplies the pressure sensor with a voltage of 5 volts. The signal generated by the pressure sensor lies between approx. 0.2 and 4.3 volts, depending on the load on the seat. In other words, with a higher load, there is a lower voltage.

Seat Occupied Recognition Belt Force Sensor G453

The sensor element is located between the belt lock and the belt lock fastener, which is fixed to the seat frame. It consists of two movable parts. Both parts are held in their idle position by a defined spring.



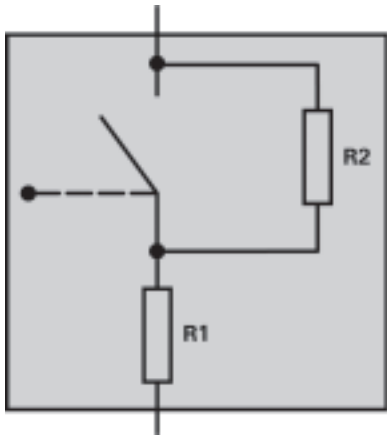
The Seat Occupied Recognition Belt Force Sensor operates by means of a hall sensor. On fitting the safety belt correctly, a tensile force is applied to the belt lock. The sensor measures the displacement distance of the parts to each other. The greater the tensile force, the greater the distance the parts are displaced.



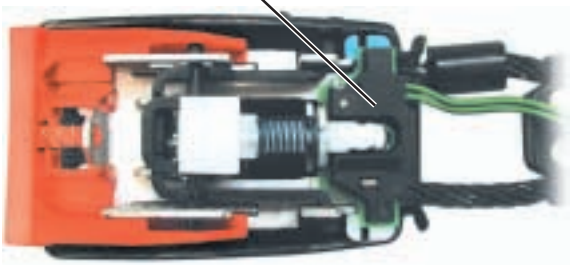
This changes the signal from the sensor. This information is evaluated by the Seat Occupied Recognition Control Module under the seat. A mechanical stop ensures that the sensor element is not torn apart in the event of a crash.

Left Seat Belt Switch E24 and Right Seat Belt Switch E25

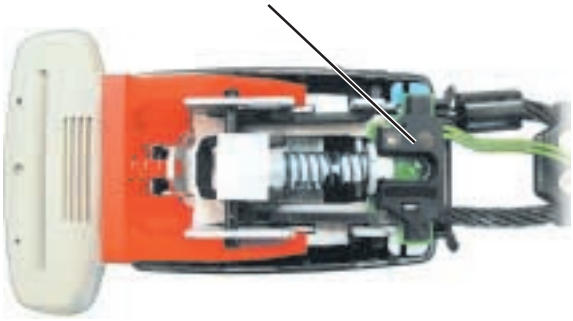
The seat belt switch is fitted directly in the belt lock. Two resistors are integrated within the switch. The measurement is effected via one or both of the resistors, depending on the switch position. The Airbag Control Module recognizes that the safety belt has been put on by means of the measured resistance.



Seat Belt Switch, Belt Not Fastened



Seat Belt Switch, Belt Fastened



Seat Occupied Recognition Control Module J706

The control module evaluates the signals coming from the Seat Occupied Recognition Pressure Sensor and the Seat Occupied Recognition Belt Force Sensor. The Seat Occupied Recognition Control Module uses the information it receives from the Seat Occupied Recognition Belt Force Sensor to monitor the tensile force acting on the safety belt. The voltage signal from the sensor mat can be used to specify the weight of the load on the front passenger seat.

If the load is under approx. 44 lb. (20 kg), and a very small or no belt force is discernible, the control module recognizes "child seat" and informs the Airbag Control Module and the Passenger Airbag Off warning light is illuminated. The front passenger airbag is disabled.

If the load on the seat is approx. 55 lb. (25 kg), for example, and the belt force exceeds a fixed value, the control unit recognizes that the safety belt is also pressing the child seat against the seat cushion. The control module recognizes "child seat" and the Airbag Control Module disables the front passenger airbag.

From a load of approx. 55 lb (25 kg) and a low belt force, the control module assumes that the seat is occupied by an adult and the front passenger airbag remains active.

The data from the sensors is continuously evaluated when the ignition is switched on. This ensures that the control module recognizes any seat occupancy changes and reacts accordingly.

When the vehicle is moving, the system no longer reacts spontaneously and only does so after a certain delay. This ensures that the front passenger airbag is not immediately deactivated when there is a load change on the seat while driving. The acceleration sensor in the control module informs the electronics that the vehicle is moving.

Seat Load	Belt Force	Recognition
Less than approx. 44 lb. (20 kg)	Very small/none	Child seat
E.g. 55 lb. (25 kg)	Very High	Child seat
Greater than approx. 55 lb. (25 kg)	Low	Adult

Data exchange between the Seat Occupied Recognition Control Module and other vehicle systems is effected via the Airbag Control Module (by means of the LIN bus). The Airbag Control Module is thus the master control unit and the seat occupied recognition control module (J706) is the slave. The Diagnosis function is affected via the Airbag Control Module.

The positions of the installed components are fixed and must never be changed.

This also applies to individual system components. The system, comprising the control module, pressure sensor, sensor mat, transfer tube, and seat cushion, is calibrated individually for each seat during production.

The wiring harness between the Seat Occupied Recognition Control Module J706 and pressure sensor is thus sealed at both ends in order to emphasize that they are not to be disconnected.

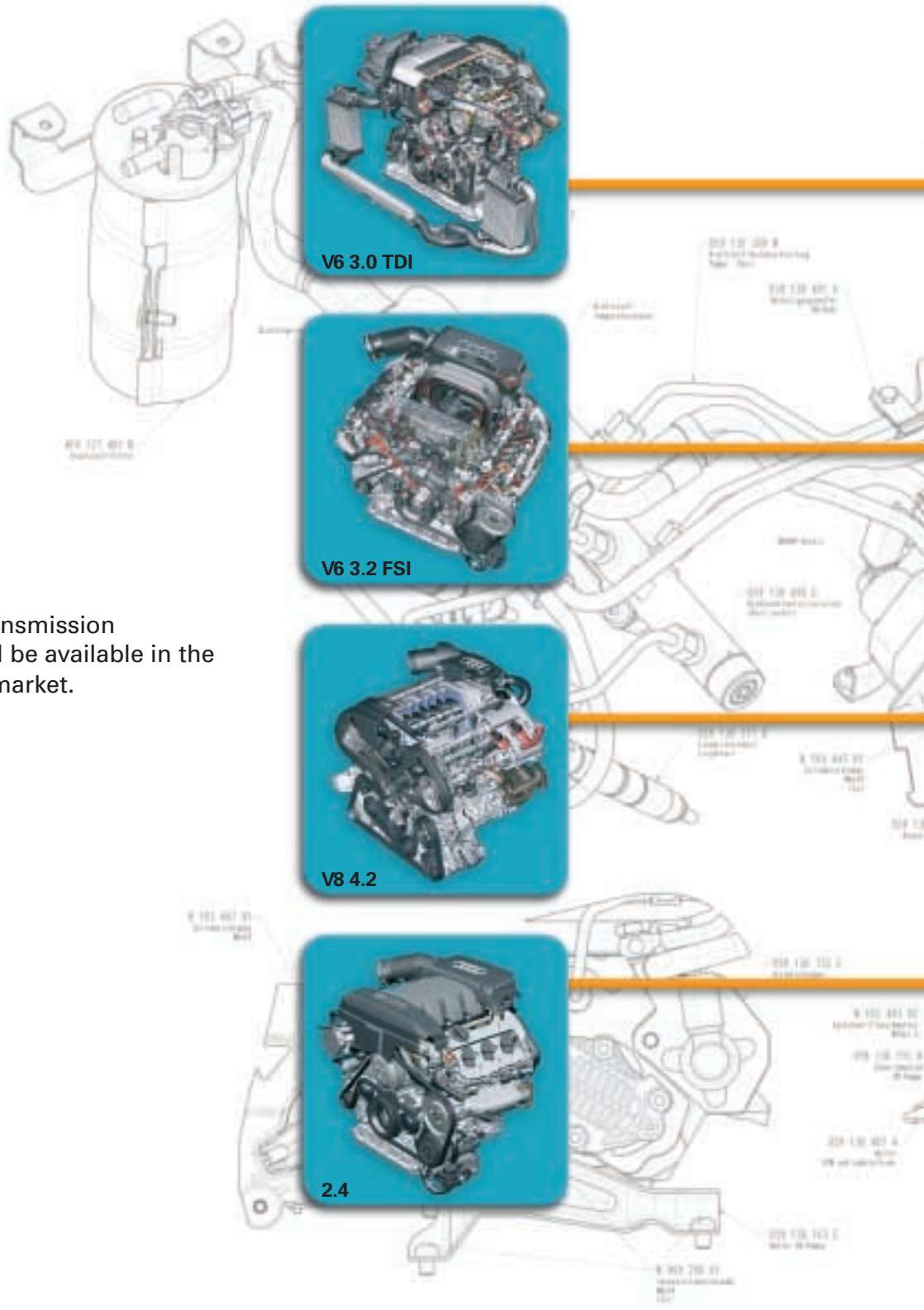
Likewise, the pressure mat is connected to the foam by means of a clip, which cannot be removed without destroying it.

All parts must be replaced together in the event of a defective component. Pre-calibrated Service kits are available for this.

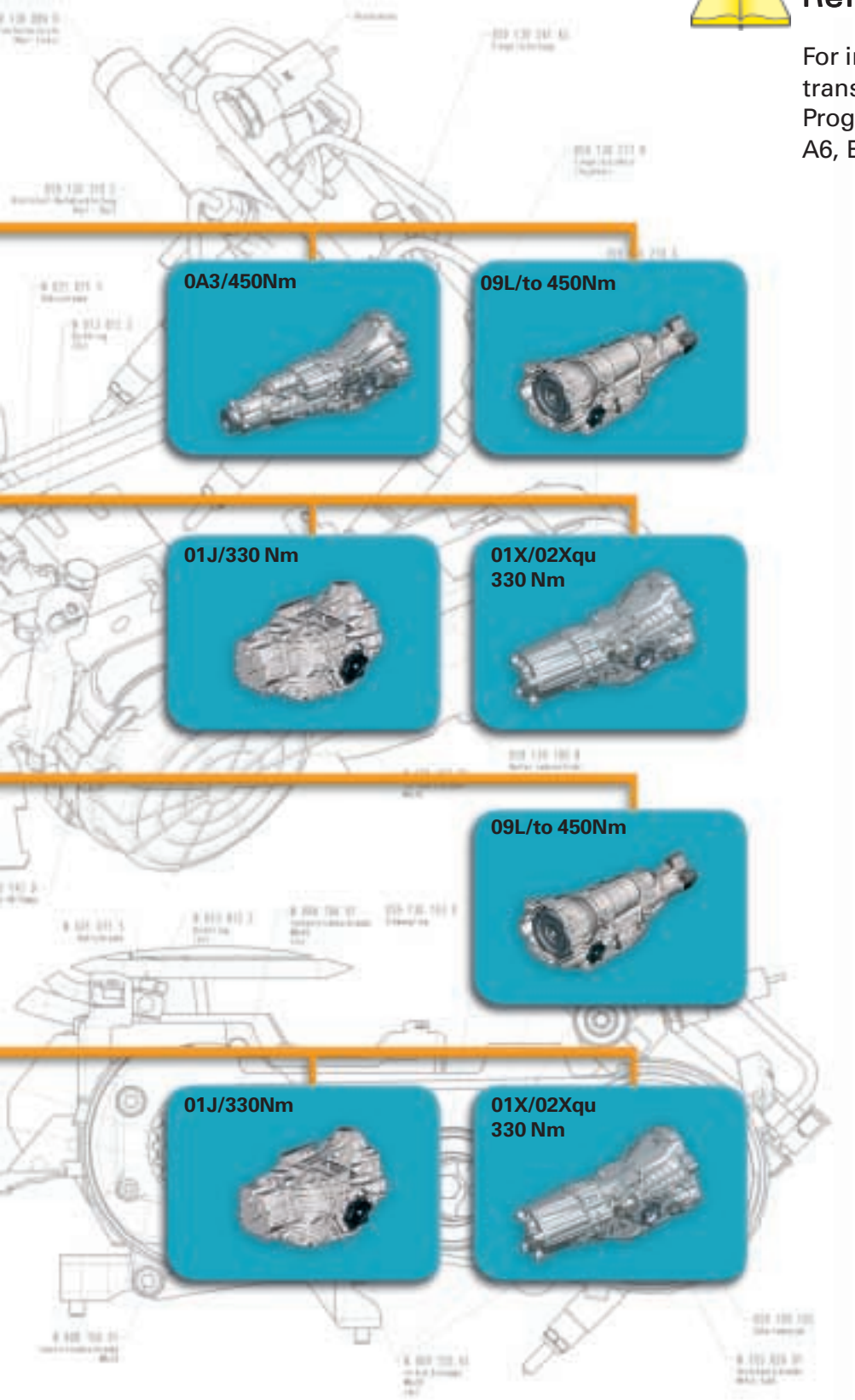
Components, which are not installed correctly, can cause malfunctions and the entire seat occupied recognition system can no longer operate reliably.

Characteristic maps in the control module electronics ensure that the aging of individual components is taken into account.

Overview of Available Engine / Transmission Combinations



Not all engine/transmission combinations will be available in the North American market.



Reference:

For information on the engines and transmissions, refer to Self-Study Program 992403 – The 2005 Audi A6, Engines and Transmissions.

Overview

At market introduction, the 2005 Audi A6 will be equipped with a steel spring chassis. There are three different types of running gear:

Normal chassis:	Designation 1BA
Sports-style running gear:	Designation: 1BE, vehicle trim is positioned .8 in (20 mm) lower than on the normal running gear
Bad road chassis:	Designation 1BR, vehicle trim position raised by .5 in (13 mm) compared to the normal chassis

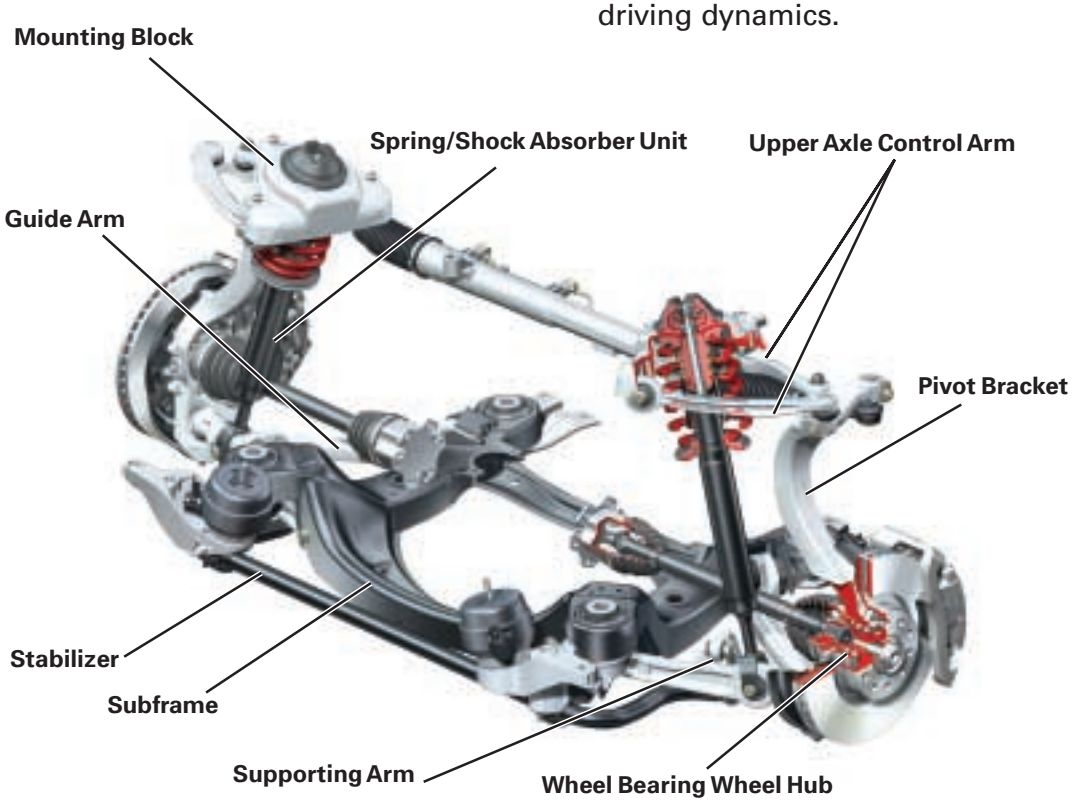
Not all suspension versions may be available in the North American Market.

Front Axle

The well-known four-link front axle also used in the new 2005 Audi A6.

Due to the geometric and kinematic modifications compared to the predecessor, all axle components, with the exception of the upper axle links and the wheel hubs (adopted from Audi A8L), are new parts.

In addition to improved spring and shock absorber settings, spring travel has been increased by 1.18 in. (30 mm). This results in a significant improvement in driving comfort and driving stability. With regard to the passenger compartment, the axle was moved forward by 3.27 in (83 mm). This provides better axle load distribution and has advantages from the point of view of driving dynamics.



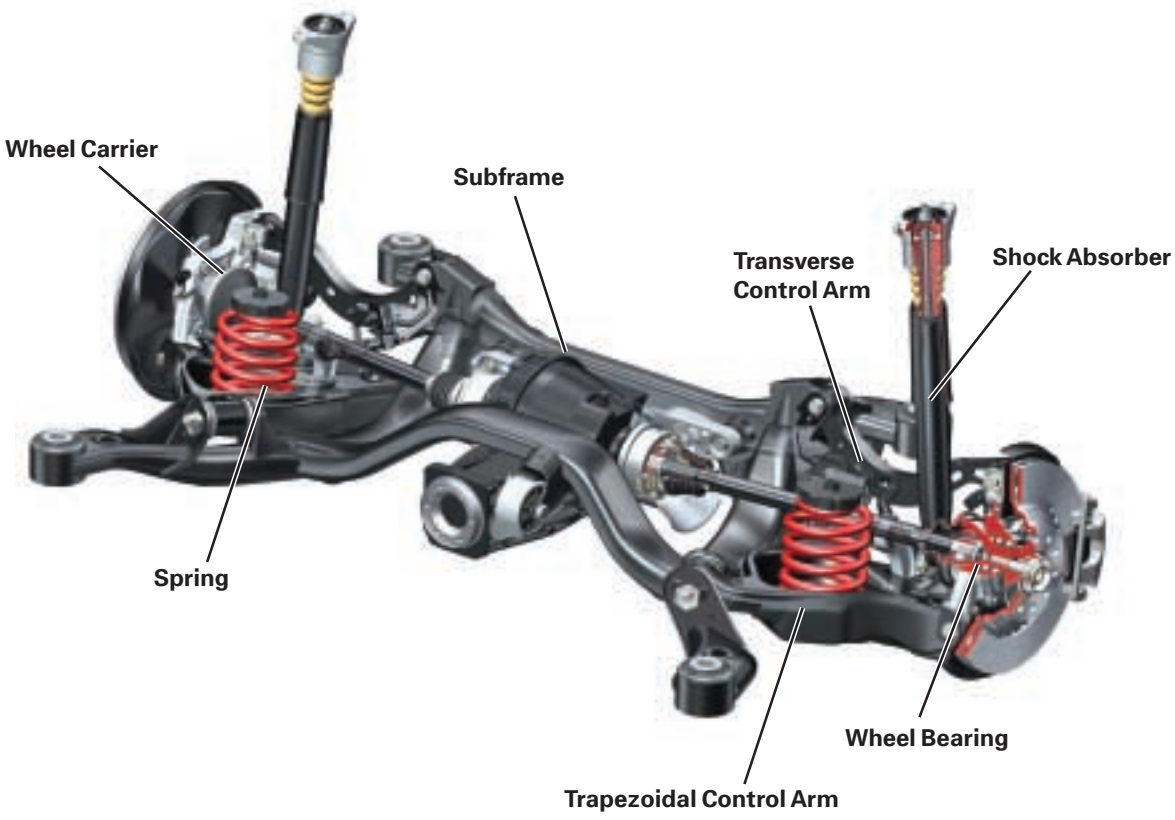
Rear Axle

The rear axle represents a further development of the trapezoid link axle.

Because of the geometric and kinematic changes compared with the predecessor vehicle and the use of the trapezoid link axle, all axle components are new parts.

The axle struts are now longer compared with the 2000 Audi A4 in order to guarantee a larger toe width.

Vehicles with the V8 TDI engine with quattro drive (not in the North American market), the rear axle track width will be reduced in order to fit wider tires. This will be realized by using modified wheel hubs and a greater wheel offset.



Wheel brake

Front-axle overview

Engine	3.2 V6 FSI	4.2 V8 MPI	(Non N.A. Market) 3.0 V6 TDI
Minimum wheel size	16"	17"	16"
Brake type	FNR-G 60 16"	FNR-G 60 17"	FNR-G 60 16"
Number of pistons	2	2	2
Piston diameter (mm)	60	60	60
Brake disc diameter (mm) x thickness (mm)	321 x 30 Ventilated	347 x 30 Ventilated	321 x 30 Ventilated

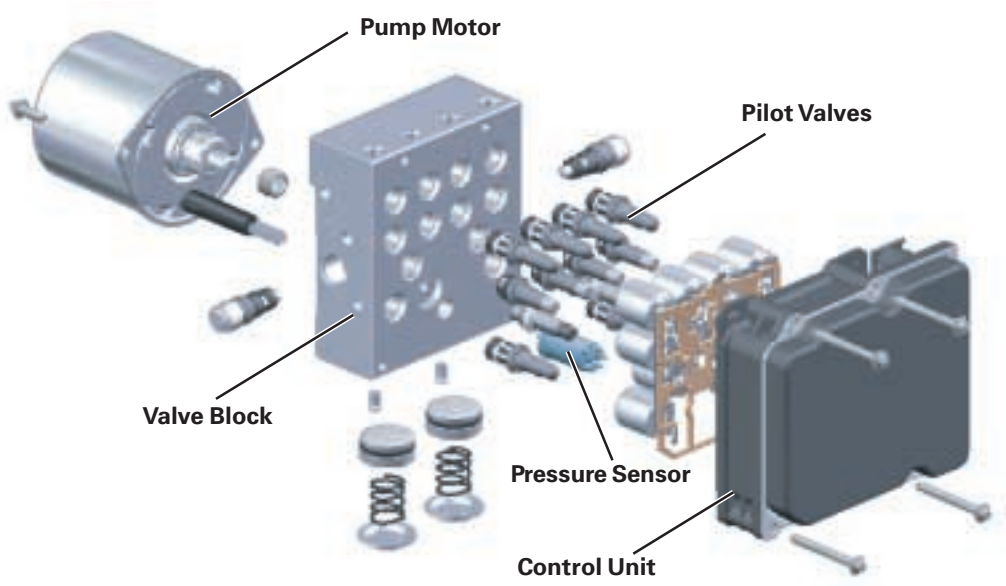
Rear-axle overview

Engine	3.2 V6 FSI	4.2 V8 MPI	(Non N.A. Market) 3.0 V6 TDI
Minimum wheel size	16"	16"	16"
Brake type	Colette II C41	Colette II C43	Colette II C41
Number of pistons	1	1	1
Piston diameter (mm)	41	43	41
Brake disc diameter (mm) x thickness (mm)	302 x 12 Not ventilated	330 x 22 Not ventilated	302 x 12 Not ventilated

ESP

The 2005 Audi A6 uses the Bosch 8.0 ESP system. It incorporates the sub-functions of BS, EBD, TCS, EDL and ESP. This is primarily the same as found in the Bosch 5.7 version used in the Audi A8L. For detailed information about this system, please see Self-Study Program 993403, The 2005 Audi A6, Running Gear.

The control module and hydraulic unit cannot be separated for repair. Different versions are used for the Front Track and quattro models.



Electromechanical Parking Brake - EPB

Following its initial introduction in the Audi A8L, the electromechanical parking brake (EPB) is now also used in the 2005 Audi A6.

The basic mechanical design, the boost factor levels and the general functionality are still the same. See Self-Study Program 993403, The 2005 Audi A6, Running Gear for complete details of this system.

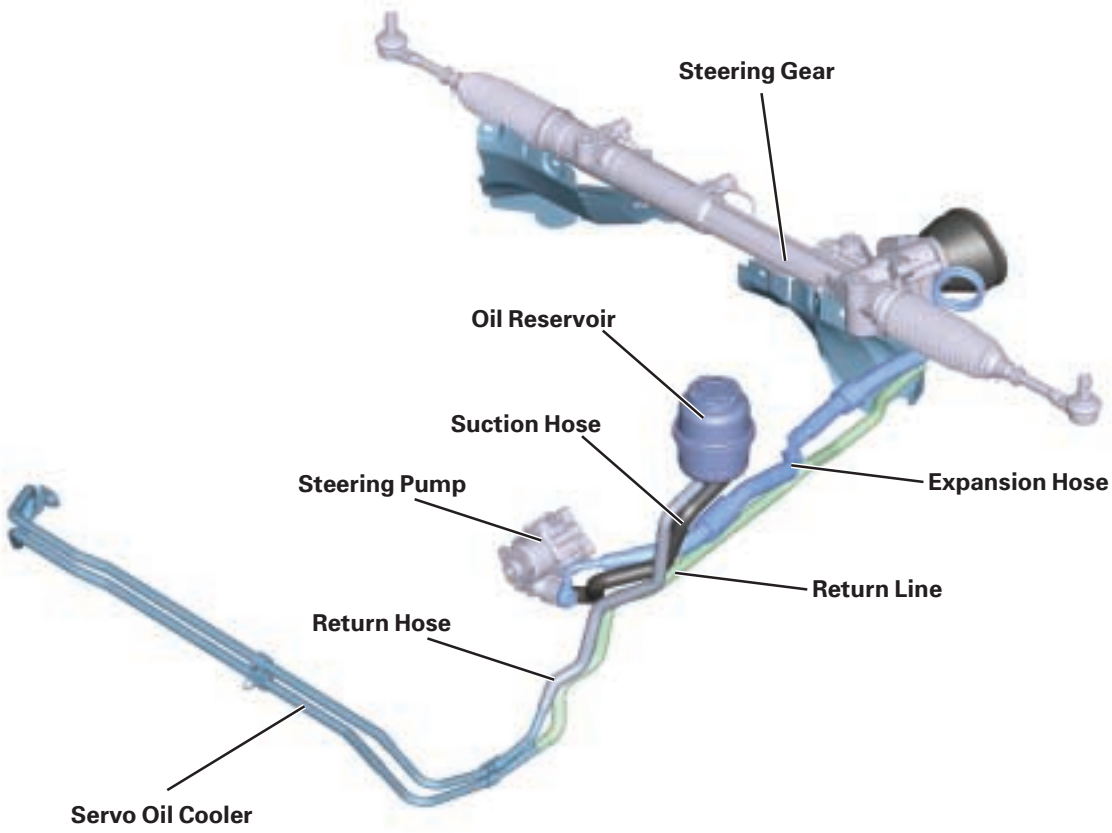


Steering System

The 2005 Audi A6 uses the Servotronic II steering system already in user on the Audi A8L. It is a conventional, hydraulically assisted rack and pinion servo steering system with speed dependant characteristics.

A mechanically, adjustable steering column is used in the basic model. Electrical adjustment is optional.

The 2005 Audi A6 also uses the same electrically controlled steering column lock as used on the A8L.



Tire Pressure Monitoring System

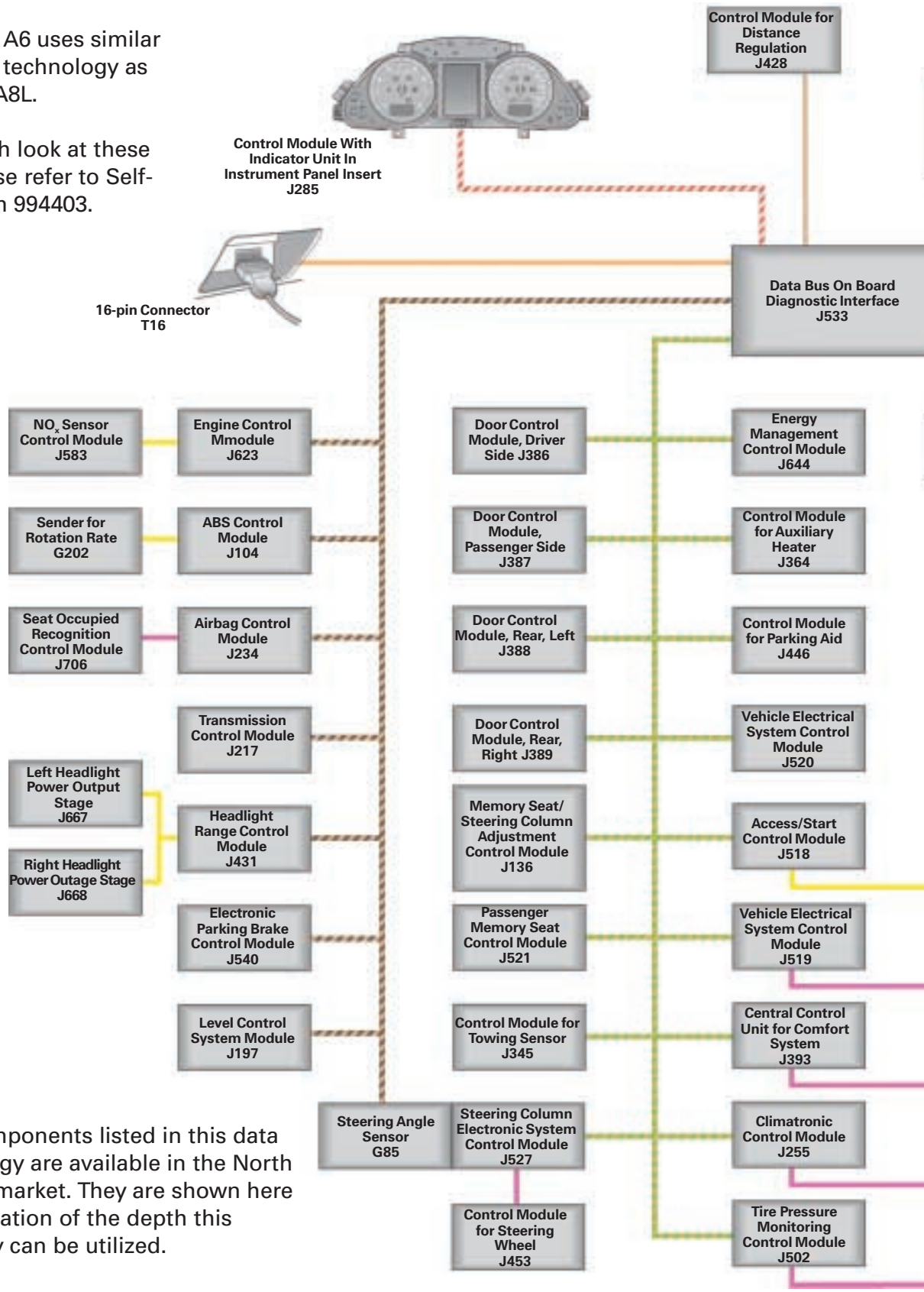
A new generation of the tire pressure monitoring system is available for the 2005 Audi A6.

From the point of view of functionality and design, the tire pressure monitoring system is modular in design and is significantly different from the systems used up until now at Audi.

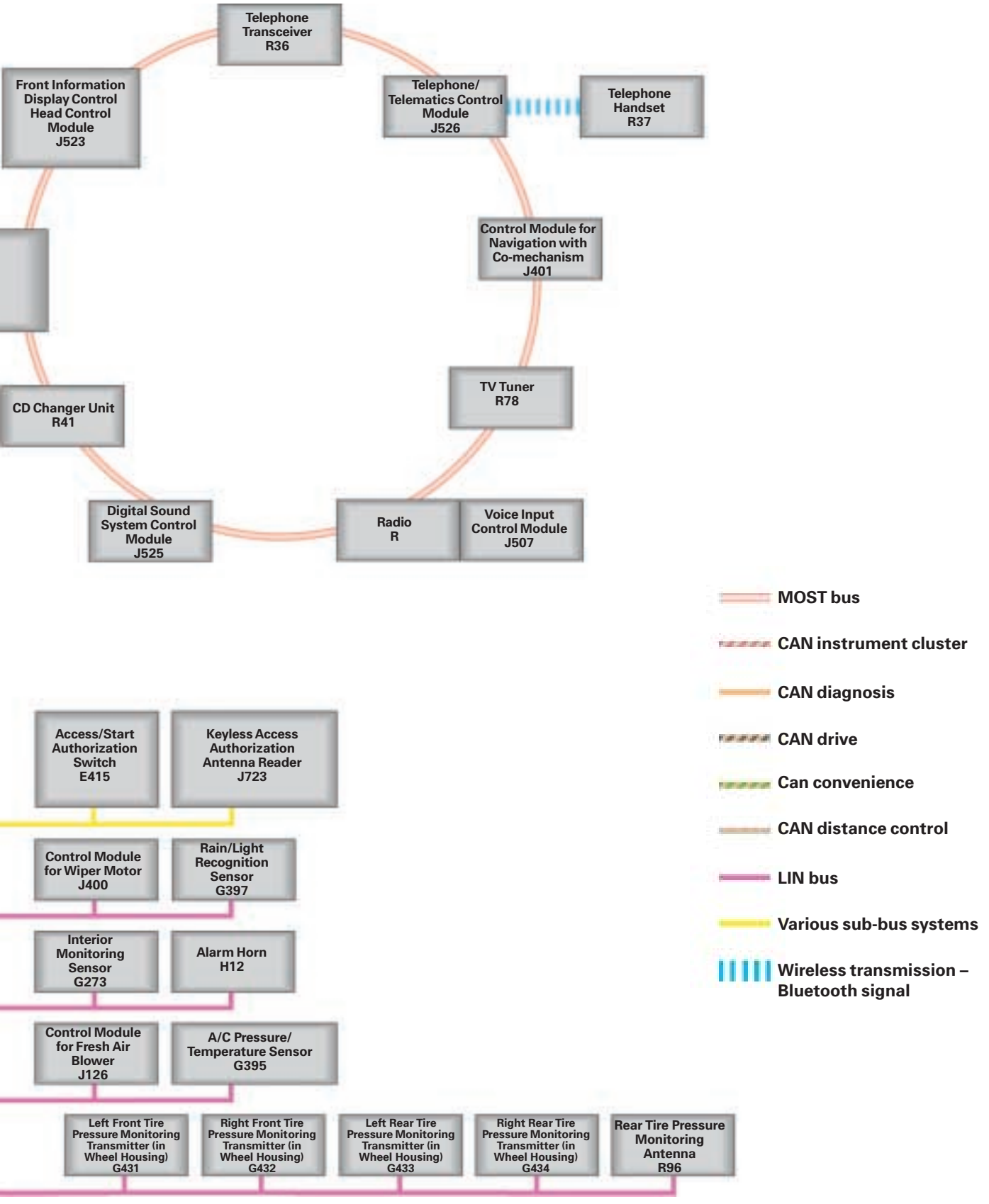
Data Bus Technology

The 2005 Audi A6 uses similar CAN-data bus technology as found on the A8L.

For an in-depth look at these systems, please refer to Self-Study Program 994403.



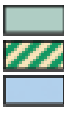
Not all components listed in this data bus topology are available in the North American market. They are shown here as an indication of the depth this technology can be utilized.


Telephone Transceiver R36
Front Information Display Control Head Control Module J523
Telephone/ Telematics Control Module J526
Telephone Handset R37
Control Module for Navigation with Co-mechanism J401
TV Tuner R78
CD Changer Unit R41
Digital Sound System Control Module J525
Radio R
Voice Input Control Module J507
MOST bus
CAN instrument cluster
CAN diagnosis
CAN drive
Can convenience
CAN distance control
LIN bus
Various sub-bus systems
Wireless transmission – Bluetooth signal
Access/Start Authorization Switch E415
Keyless Access Authorization Antenna Reader J723
Control Module for Wiper Motor J400
Rain/Light Recognition Sensor G397
Interior Monitoring Sensor G273
Alarm Horn H12
Control Module for Fresh Air Blower J126
A/C Pressure/ Temperature Sensor G395
Left Front Tire Pressure Monitoring Transmitter (in Wheel Housing) G431
Right Front Tire Pressure Monitoring Transmitter (in Wheel Housing) G432
Left Rear Tire Pressure Monitoring Transmitter (in Wheel Housing) G433
Right Rear Tire Pressure Monitoring Transmitter (in Wheel Housing) G434
Rear Tire Pressure Monitoring Antenna R96

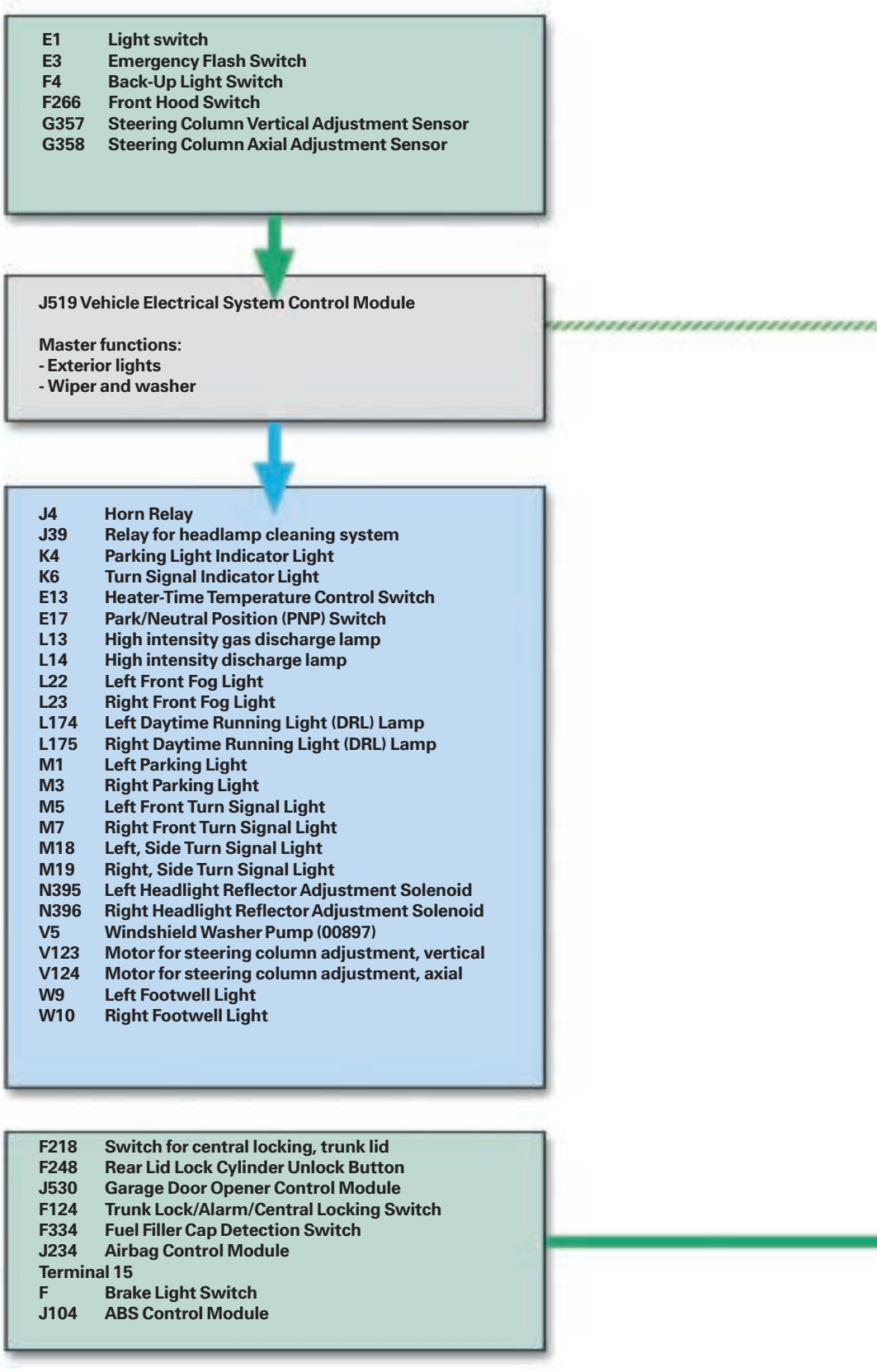
This overview shows the modules in the comfort system with their inputs/outputs.

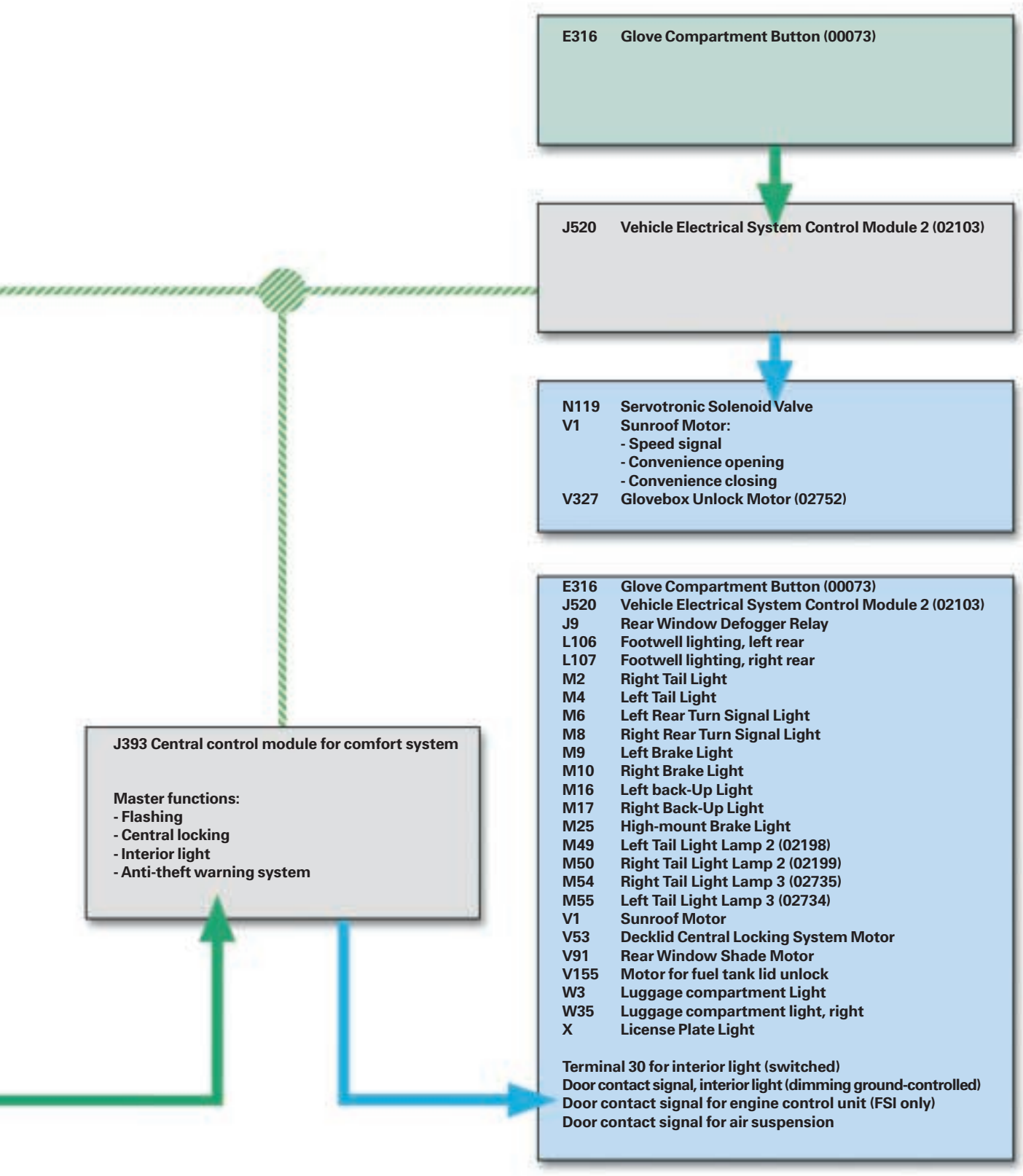
Here are all 3 control modules and their basic functions at a glance. For further details, please refer to Self-Study Program 994403, The 2005 Audi A6, Electrical System.

The overview only contains discretionary wired components. Components which communicate with the control modules via various bus systems are shown in the data-bus topology.



CAN Convenience
Inputs (source)
Outputs (receiver)




E316 Glove Compartment Button (00073)
J520 Vehicle Electrical System Control Module 2 (02103)
N119 Servotronic Solenoid Valve
V1 Sunroof Motor:
- Speed signal
- Convenience opening
- Convenience closing
V327 Glovebox Unlock Motor (02752)
E316 Glove Compartment Button (00073)
J520 Vehicle Electrical System Control Module 2 (02103)
J9 Rear Window Defogger Relay
L106 Footwell lighting, left rear
L107 Footwell lighting, right rear
M2 Right Tail Light
M4 Left Tail Light
M6 Left Rear Turn Signal Light
M8 Right Rear Turn Signal Light
M9 Left Brake Light
M10 Right Brake Light
M16 Left back-Up Light
M17 Right Back-Up Light
M25 High-mount Brake Light
M49 Left Tail Light Lamp 2 (02198)
M50 Right Tail Light Lamp 2 (02199)
M54 Right Tail Light Lamp 3 (02735)
M55 Left Tail Light Lamp 3 (02734)
V1 Sunroof Motor
V53 Decklid Central Locking System Motor
V91 Rear Window Shade Motor
V155 Motor for fuel tank lid unlock
W3 Luggage compartment Light
W35 Luggage compartment light, right
X License Plate Light
Terminal 30 for interior light (switched)
Door contact signal, interior light (dimming ground-controlled)
Door contact signal for engine control unit (FSI only)
Door contact signal for air suspension
J393 Central control module for comfort system
Master functions:
- Flashing
- Central locking
- Interior light
- Anti-theft warning system

Convenience Automatic Air Conditioning and Convenience Automatic Air Conditioning plus

The 2005 Audi A6 will still use an automatic climate control system with two-zone climate control as standard equipment. Both the basic and convenience versions now have a circulating air filtering system (extended function) in which the filter element has been integrated within the distributor housing. Both versions have a central nozzle with adjustable temperature in the instrument panel insert.

The control for the optional seat heating and ventilation is integrated within both variants of Climatronic Control Module J255.

Both versions of the automatic air conditioning system use the respective display on the multimedia interface as the display unit. In fact, they are still operated at the separate Climatronic Control Module J255.



The automatic air conditioning plus system also has two additional displays in Climatronic Control Module J255. Furthermore, it also has an indirect ventilation in the dashboard.

In addition, an air quality sensor for automatic fresh air/circulating air changeover is installed. The residual heat function makes it possible to use the engine heat when the vehicle is stationary.



Overview

The main characteristics of the air conditioning system in the 2005 Audi A6 are the low interior noise level, indirect ventilation and even temperature distribution.

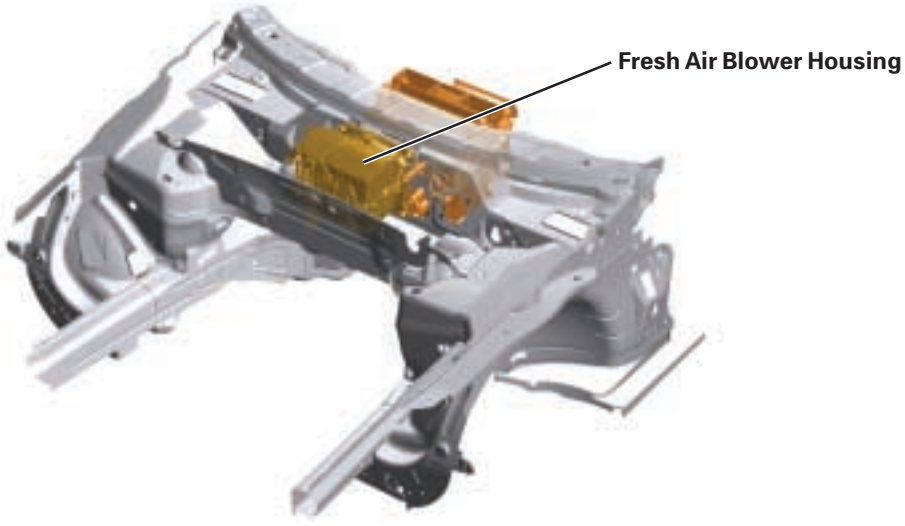
The temperature regulation of this system is now water-flow controlled instead of the airflow controlled system used in the previous A6 model.

Temperature regulation is accomplished using the Left Heat Regulating Valve N75, the Right Heat Regulating Valve N176 and Coolant Pump V50 as found in the current A8L.

The Fresh Air Blower is now located outside the passenger compartment.

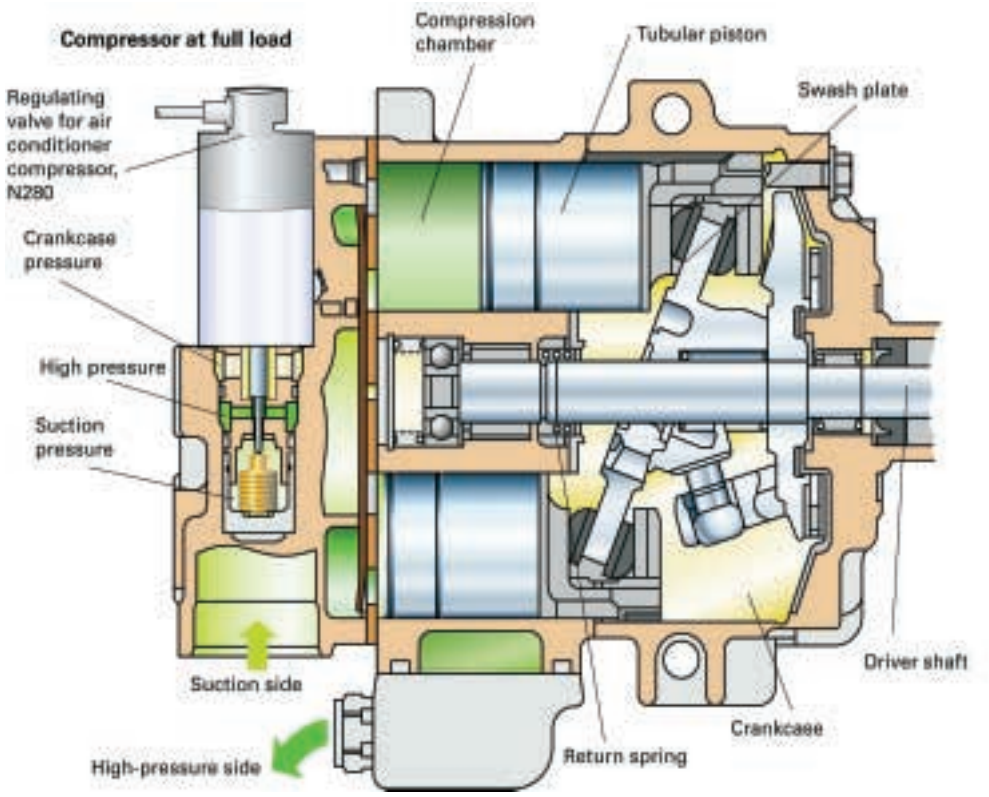
During the development process, particular attention was paid to weight and space-saving (but output-optimized) components.





The Climate control system uses a six-piston swash-plate compressor with A/C compressor Regulator Valve N280 and Evaporator Vent Temperature Sensor G263.

In six-cylinder engines, the compressor is belt driven while in eight-cylinder engines it is shaft driven.



A/C Compressor Regulation Valve, N280, has a plunger and a pressure element.

The suction pressure determines the position of the pressure element, and thereby the regulating travel of the plunger.

If a higher cooling performance is required, the operating and display unit activates the regulating valve.

This moves the plunger down and reduces the cross section of the join between the high pressure (dark green) and the crankcase pressure (yellow).

This results in the high pressure becoming dominant; it then moves the swash plate to a slanting position by means of the piston.

If a lower cooling performance is required, the cross section of the join (between high pressure and crankcase pressure) is increased.

This causes the pressures in the compression chamber and the crankcase to balance out.

This moves the swash plate towards a zero delivery position, with the help of the return spring.

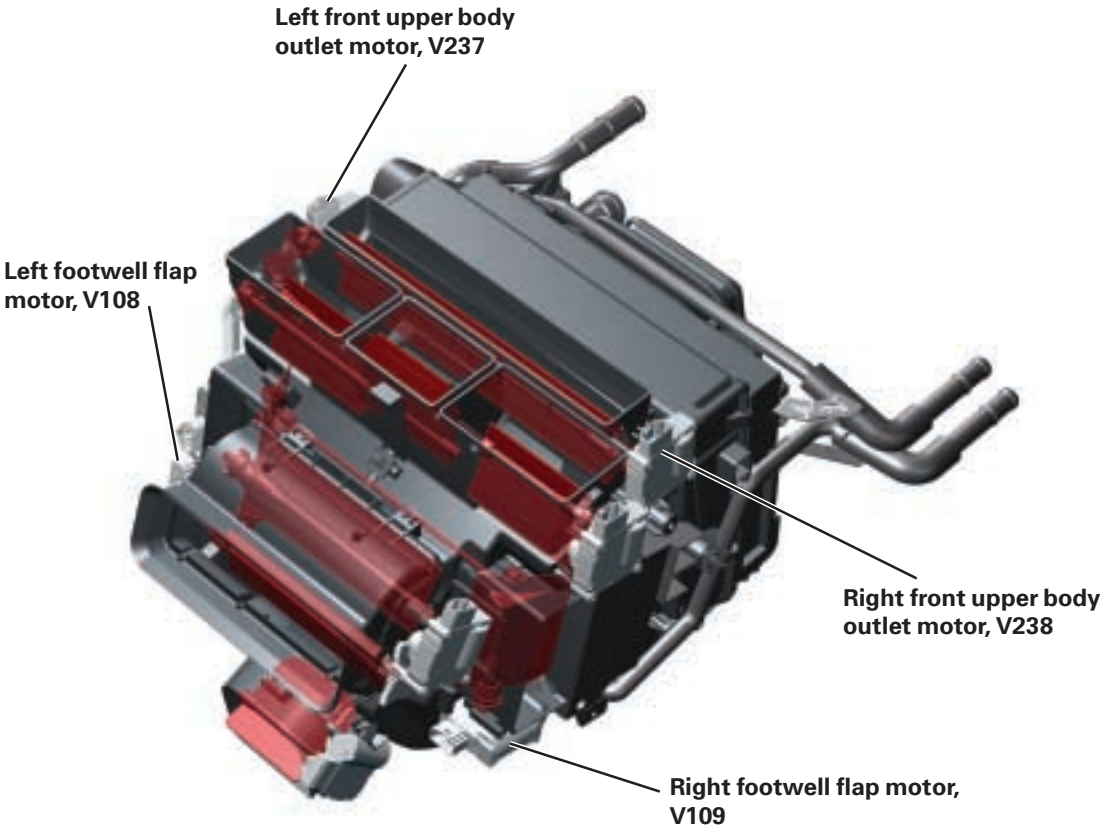
A signal ratio of 400 Hz enables the regulating valve, N280, to keep the push-rod in a “floating” state, thereby achieving optimum pressure regulation.

Control Motor Versions

The redesigned Climate Control System in the 2005 Audi A6 uses modified kinematics for the individual control motors.

Always note the exact part numbers when changing control motors. Otherwise, control motors which have the same housing, but different functions might be placed in the wrong position. As a result, the basic setting of the air conditioning system would not be possible. Attention must also be paid to the difference between the convenience automatic air conditioning and convenience automatic air conditioning plus versions when changing control motors.

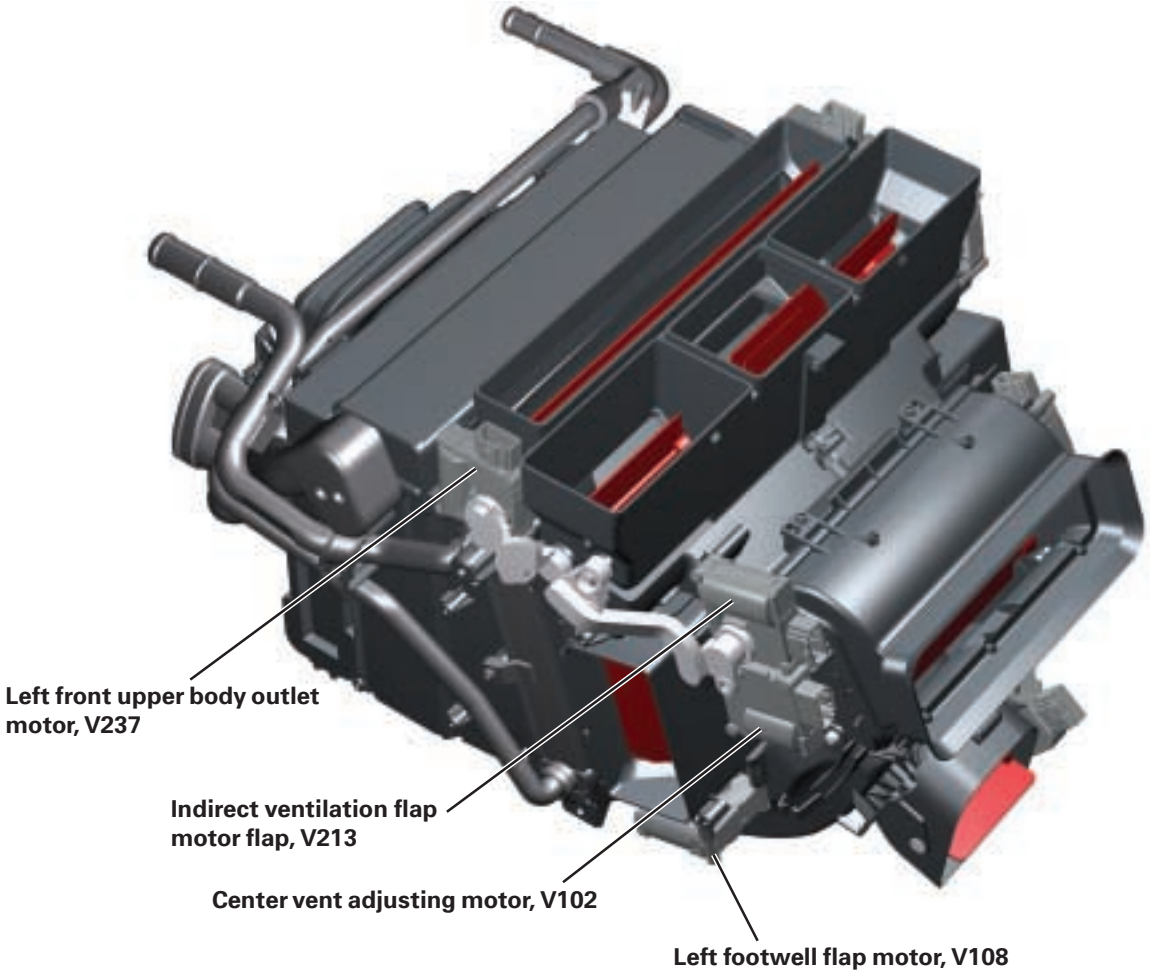
In the basic version, the control motors for the Left Front Upper Body Outlet Motor V237 are installed in the position of the Right Front Upper Body Outlet Motor V238, which is then no longer used. The same is true of the Left Footwell Flap Motor V108, which is then in the Right Footwell Flap Motor V109's position on the right. The reason for this is the steering rod shaft positioning of flaps in the basic version, where the respective left flap is controlled by the one on the right.



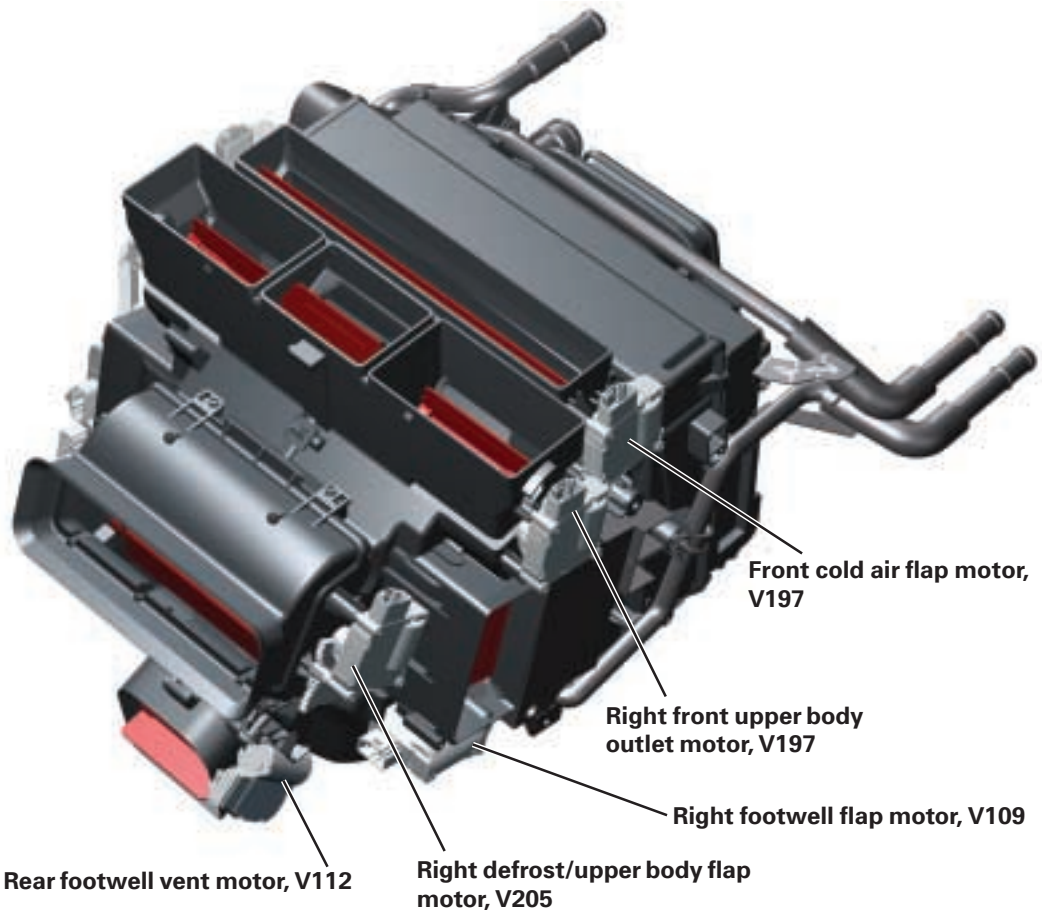
The Left and Right Front Upper Body Outlet Motors (V237 and V238) as well as the Left and Right Footwell Flap Motors (V107 and V108) are shown for flap positioning in the convenience version.

Control motors

Driver's side



Passenger's side

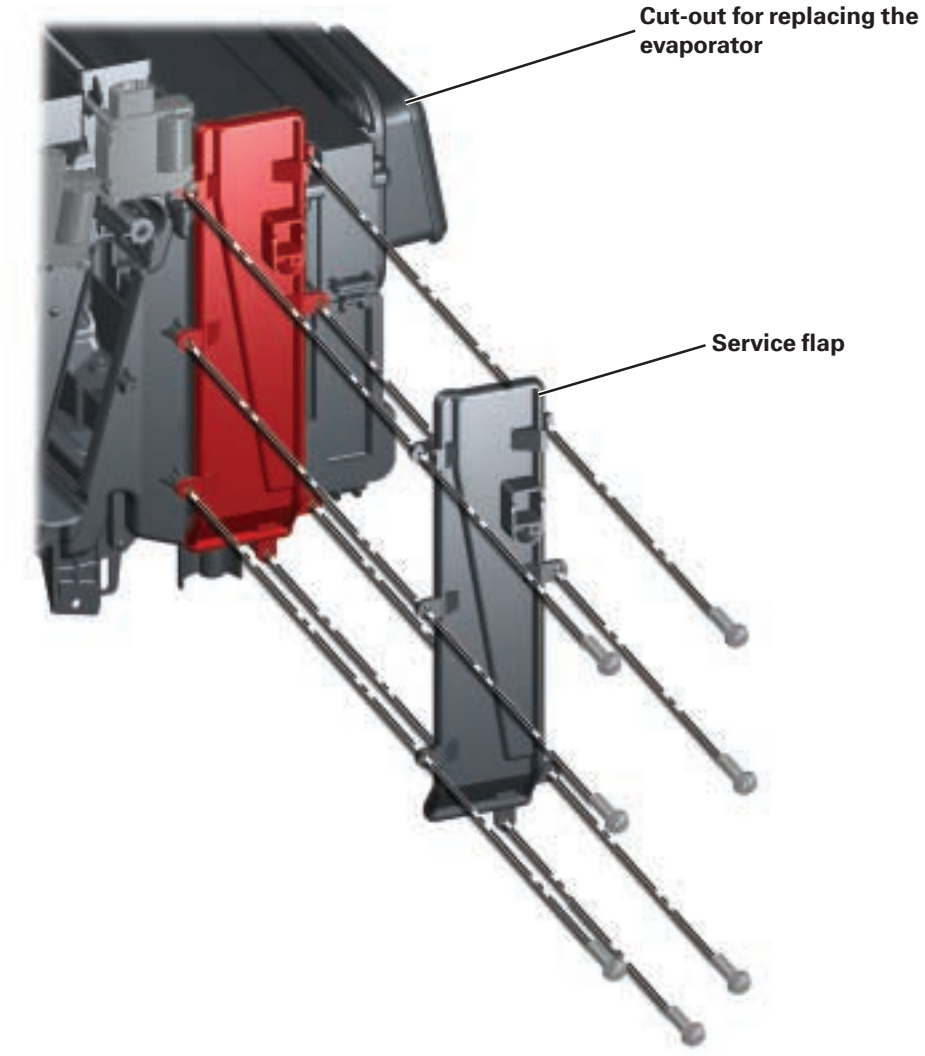


Replacing components

The air conditioning unit in the 2005 Audi A6 does not have to be completely removed from the vehicle to replace components. Functional units such as the evaporator or control motors, for example, are replaced in the vehicle. The evaporator, for example, will be available as a separate spare part in the scope of the Customer Service process.

The evaporator is replaced by splitting the air conditioning unit housing at the groove and pulling the evaporator out sideways.

After fitting the new evaporator, the air conditioning unit housing is closed by means of a service flap prepared for Customer Service procedures. This must be ordered as a separate spare part and is fixed to the air conditioning unit housing by means screws.



	Convenience automatic air conditioning	Convenience automatic air conditioning Plus	A6 Predecessor
Separate temperature distribution	X	X	X
Sun position sensor	X	X	X
Air quality sensor	–	X	X
Residual heat	–	X	–
Pollen filter / combination filter	X/–	–/X	–/X
Circulating air filter	X	X	–
Indirect ventilation	–	X	–
Rear compart. ventilation (middle)	X	X	X
Rear compartment ventilation (B-pillar)	–	X	–
Central air vent with adjustable temperature	–	X	–
Control concept	water-based	water-based	air-based

CAN networking

The air conditioning system in the 2005 Audi A6 is integrated within the convenience CAN (see table).

In addition to the air conditioning master control, Climatronic Control Module J255 is the master control unit for the distributed functions rear window heating, the optional seat heating and the optional, factory-fitted auxiliary heater.

Most of the necessary data messages are transmitted to Climatronic Control Module J255 by means of the CAN bus. The module also transmits messages via this data bus, which are used for the distributed functions at the other control modules.

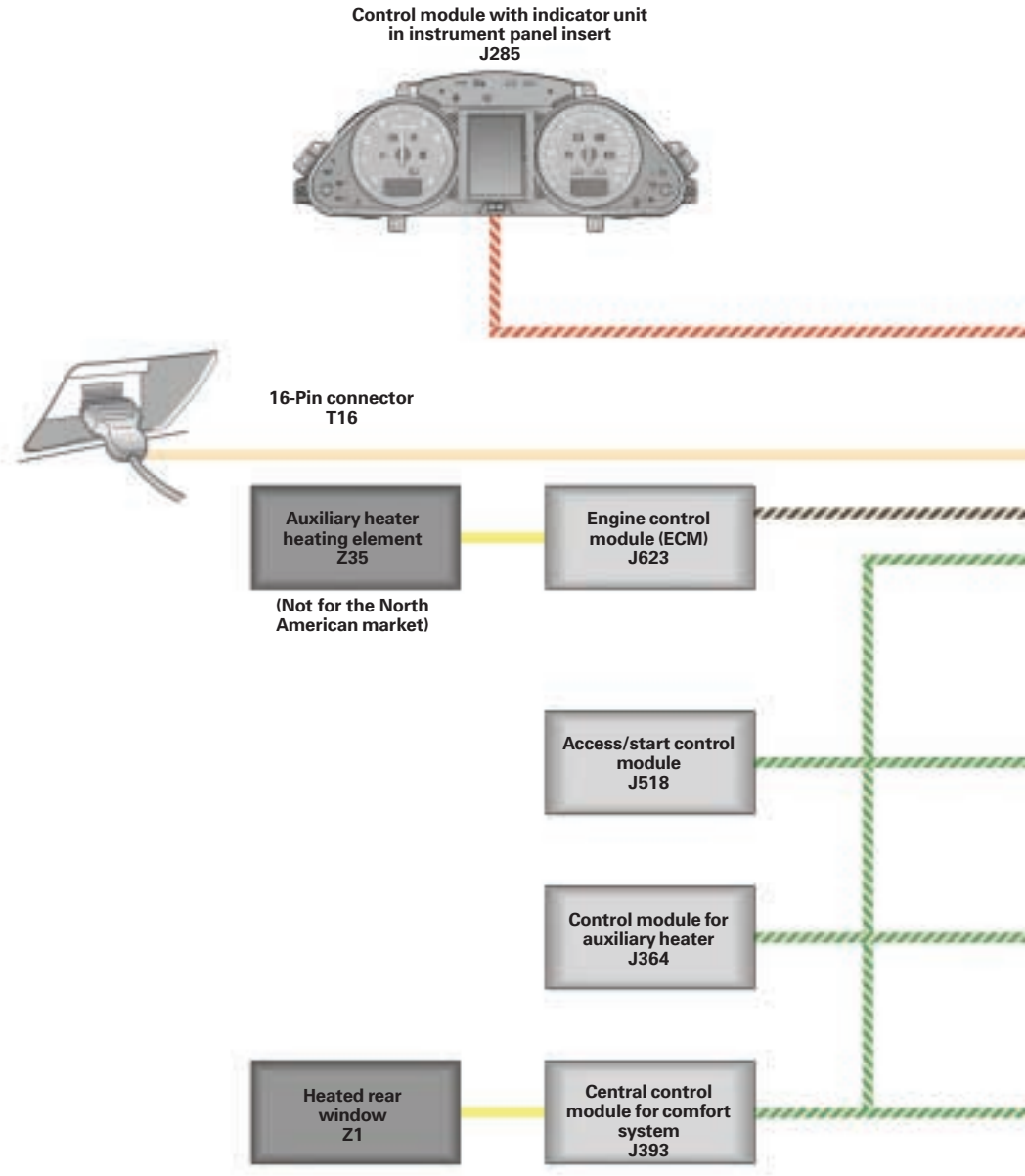
This data bus is also used for the analysis of the air conditioning system in the event of malfunctions, in conjunction with the Data Bus On Board Diagnostic Interface J533, CAN-Diagnosis and the corresponding Diagnosis tester.

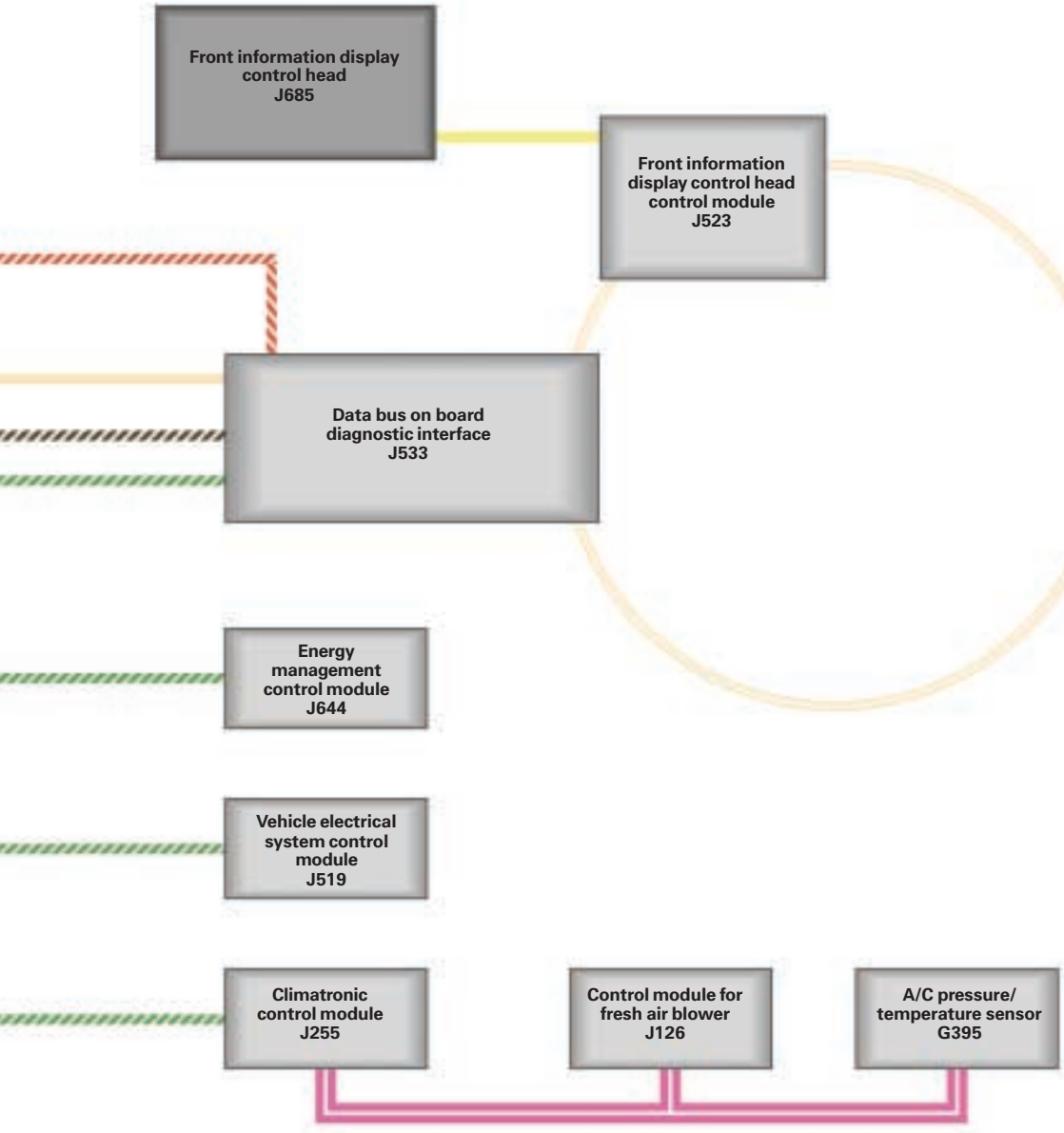
The personalization of the air conditioning settings is effected by importing the respective code identification message from the control module for access and start authorization J518. The Fresh Air Blower Control Module V2 is connected to Climatronic Control Module J255 via a LIN bus. The control module for solar operation (J355) of the optional solar sliding roof is connected directly to the Fresh Air Blower Control Module V2. Communication with Climatronic Control Module J255 is effected via Fresh Air Blower Control Module V2, which sends a LIN message to the Climatronic Control Module J255 when it receives voltage signals from the control module for solar operation (J355). This message is then forwarded to the central control module for comfort system (J393), which needs this information for the interior monitoring function.

Climate Control

The rear window heating is activated from Climatronic Control Module J255. A message is sent to the central control for comfort system J393 via CAN-Convenience. This actuates heated rear window Z1 and sends a CAN bus message to the Climatronic Control Module J255 that it has been switched on. The control module then activates the respective LED in the button.

The Climate Control system (both variants) in the 2005 Audi A6 uses the MMI display to display relevant information. The current MMI display switches over to the climate control menu on pressing the function switch on Climatronic control unit J255.




Front information display control head J685
Front information display control head control module J523
Data bus on board diagnostic interface J533
Energy management control module J644
Vehicle electrical system control module J519
Climatronic control module J255
Control module for fresh air blower J126
A/C pressure/ temperature sensor G395

In/output signals at Climatronic Control Module J255

CAN-Convenience output signals

Information on the status of the compressor	**... displays whether the compressor is switched on or off. Switched on means that the compressor is within the control range, in other words, a current of 300 – 800 mA is flowing through the compressor.**
Speed increase	**... is transmitted from the air conditioning system to the motor if the air conditioning system needs an increased heating or cooling capacity. This message is not related to the compressor status.**
Refrigerant pressure	**The air conditioning system reads the pressure sensor and sets the signal to CAN-Convenience. The determination of the refrigerant pressure occurs every 100 ms.**
Radiator fan control	**Subject to the required condenser cooling, the air conditioning system issues a "radiator fan control." This value can lie between 0 and 100 %. This value depends on the refrigerant pressure and the information on petrol / diesel engine from the Data Bus On Board Diagnostic J533.**
Power reduction of air conditioner compressor	**A reduction of the compressor power is possible by means of the externally controlled compressor. The aim here is that the Engine Control Module (ECM) J623 uses this information and only completely shuts down the compressor in critical situations.**
Compressor torque transmission	**The air conditioning system informs the Engine Control Module (ECM) J623 of the torque the compressor takes from the engine. Climatronic Control Module J255 considers the engine and compressor speed transmission ratio of the various engines. The necessary information on the number of cylinders is provided by the message from the Data Bus On Board Diagnostic Interface J533.**
Rear window heating	**This message signals to the Vehicle Electrical System Control Module J519 that the rear window heating is to be switched on and this module then takes over the power control of the rear window heating.**
Left/right sun sensor	**The amount of sunlight penetration measured by the sun sensor in W/m^2 is supplied by the CAN-Convenience.**
Seat heating	**This message transmits the different levels of seat heating left or right. In the versions without seat heating, level 0 is always transmitted.**
Auxiliary heating	**The auxiliary heating can be switched on directly from Climatronic Control Module J255 via the auxiliary heating BIT. Climatronic Control Module J255 transfers the decision on the activation of auxiliary heating or auxiliary ventilation via the "Auxiliary ventilation indicator light" bit.**

CAN-Convenience input signals

Vehicle speed	**The vehicle speed is used for the calculation "Setting the air congestion flap."**
Engine speed	**Start recognition - the program defines: "Engine off" as if n < 200 rpm (below starter speed) "Engine on" as if n > 500 rpm is read**
Terminal 58d	**Dimming value for the display and function lighting in %**
Terminal 58s	**Dimming value for the button lighting in %**
Outside temperature	**Climatronic Control Module J255 reads the temperature sensor for Fresh Air Intake Duct Temperature Sensor G89 and puts this unfiltered on the CAN-Convenience. The control module with indicator unit in instrument panel insert J285 reads the Outside Air Temperature Sensor G17 installed in the front of the car and puts the lowest of the two outside temperatures read on the CAN bus.**
Engine temperature	**The Engine Control Module (ECM) J623 provides this value on the CAN bus.**
Key information	**The control module with indicator unit in instrument panel insert J285 transmits a key number between "1" and "4" to Tm. 15. In Climatronic Control Module J255, the respective driver specific settings for each key number are saved and recalled. The last settings called up either in auxiliary heating mode or for incorrectly received key numbers are saved in key number "0."**
Compressor off	**Switches off the compressor from the Engine Control Module (ECM).**
Compressor power reduction	**Feedback message from Engine Control Module (ECM) J623**
Auxiliary heating / auxiliary ventilation	**If a CAN-compatible auxiliary heating is installed, Climatronic Control Module J255 is switched to auxiliary heating or auxiliary ventilation mode. The decision whether to activate the auxiliary heating or the auxiliary ventilation is made from Climatronic Control Module J255.**
Radiator fan control	**Actual value of the radiator fan control from Engine Control Module (ECM) J623**
Engine overheating advance warning	**If this message is transmitted on the CAN, the compressor with control valve N280 must be switched off, regardless of the engine temperature.**
Consumer switch-off	**Message from control unit for power management J644**
Feedback – Rear window heating	**Message on the successful activation of the rear window heating from central Control module for comfort system J393**

Analog input and output signals

The temperature sensor for Fresh Air Intake Duct Temperature Sensor G89 in the plenum chamber, the middle vent temperature sensor and the two vent temperature sensors, left G150 and right G151 are read as an analog voltage signal at the Climatronic Control Module J255.

Climatronic Control Module J255 receives a total of ten feedback reports from the individual flap positioning motors, the signals from Sunlight Photo Sensor G107, the signal from the Evaporator Vent Temperature Sensor for G263 as well as the sensor for air quality G238. The A/C Compressor Regulator Value N280 is controlled via a pulse width-modulated signal.

Additional air heater unit
(not for North American Market)

Depending on the equipment installed, an electric additional air heater unit is installed in some diesel versions of the new 2005 Audi A6. As with the Audi A6's predecessor, the operating principle of the additional air heater is ceramic PTC resistors and commutators, which are not only heated by an electric current, but also allow air to flow through them. The control of the additional air heater is transferred to the respective Engine Control Module (ECM) J623.

If additional heating is required, Climatronic Control Module J255 sends an appropriate message containing the required output level to CAN-convenience. This is converted into a message for the CAN-Drive by the Data Bus On Board Diagnostic Interface J533 and is picked up by the Engine Control Module (ECM) J623.

However, additional heating can only be provided if the generator's capacity utilization is not too high.



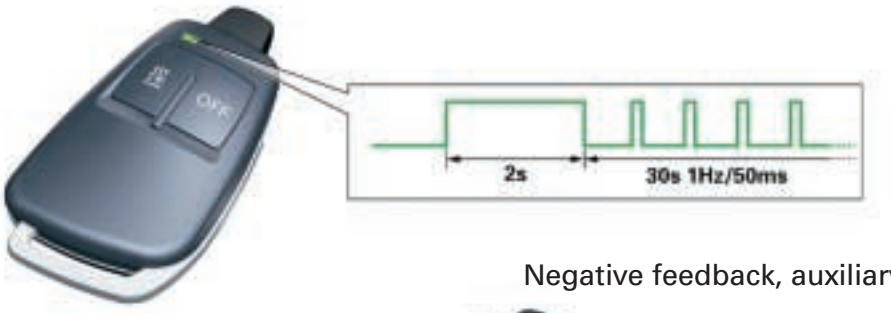
Auxiliary / additional heating

The auxiliary heating, which is available ex-works, is installed on the longitudinal member, front right under the headlight. It is incorporated into the CAN-Convenience via the control module for auxiliary heater J364 (see topology illustration). Climatronic Control Module J255 is the master control module for the auxiliary heating. The interior of the vehicle can be heated up much more quickly as a result of the integration of the auxiliary heating into the small heating circuit. The auxiliary heating can be programmed and activated via the multi-media interface by means of the preselection function.

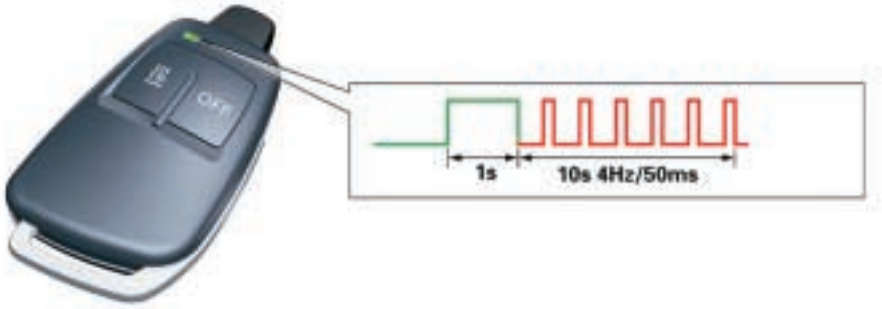
It can also be activated via the updated remote control.

Climatronic Control Module J255 decides on the auxiliary heating or auxiliary ventilation mode. Then, the respective symbol is shown as a function display on the control module indicator unit in instrument panel J285 after the respective message is received. The auxiliary heating basically runs in fresh air mode, whereby the blower is restricted to 40%.

Positive feedback, auxiliary heating active



Negative feedback, auxiliary heating not active



The new feature here is the bi-directional communication between the remote control for the auxiliary heating and the Auxiliary Heater Radio Receiver R64. The antenna for the radio receiver for auxiliary heating is installed as a module of the antenna system in the rear window. The range of the radio remote control is now up to 600 meters.

The user receives feedback on whether the activation of the auxiliary heating was successful or not via a LED which is integrated in the radio remote control.

Switch-on conditions:	Switch-off conditions:
No tank warning	Auxiliary heating active longer than 60 min
No crash signal from Airbag Control Module	VAS diagnosis tester function basic setting
No cut-off level from Energy mode Management Control Module	Heater units error in operational
No message "Transport mode active" from Energy Management Control Module J644	Tank warning during operation
	Crash signal during operation (in auxiliary heating mode)
	Cut-off level of Energy Management Control Module J644

In addition to the auxiliary heating with CAN networking, which is offered ex-works, a conventional auxiliary heating without CAN networking can be retrofitted in the customer service process. To do that, wiring terminal 15, as well as Climatronic Control Module J255, which has a separate input for this purpose, must be adjusted accordingly. More detailed information can be found on this in the respective installation manual.



Reference

Please refer to the respective operation manual for instructions on operating the optional auxiliary heating.



Note

The telestart antenna is fused separately.

A Defective fuse results in an appropriate fault memory entry.

Air conditioning diagnosis

The diagnosis options listed in the table are available via the diagnosis tester. For this purpose, the diagnosis on the CAN-Diagnosis and on the Data Bus On Board Diagnostic Interface J533 are performed in Climatronic Control Module J255.

All input and output signals of the Climatronic Control Module J255 can be diagnosed according to the following error types:

- Line interruption
- Short circuit after positive
- Short circuit after ground
- Block (control motors)
- Plausibility of data bus signals

The actuator test of the air conditioning system is now sequentially (complete performance of all actuator tests) and selectively (selection of individual actuator tests) possible. The following conditions must be met before the actuator test can be performed.

- no compressor switch-off condition active
- Vehicle speed < 3.1 mph (5 km/h)
- 300 / min < engine speed < 3000 / min

Otherwise, the message "Function unknown or cannot be performed at the moment" is displayed in the diagnosis tester. During the basic setting of the air conditioning system, all flap positioning motors are simultaneously moved to their limit positions.

These positions are then saved in Climatronic Control Module J255. During the basic setting, certain fault memory entries are deleted, with the exception of those identified during the basic setting. In addition, the activation of the compressor is only allowed after the basic setting. Up until then, Climatronic Control Module J255 remains in ECON mode, which cannot be deactivated. After the successful basic setting, the Climatronic Control Module J255 remains in ECON mode, which can now be deactivated at any time by means of the AUTO or ECON button.

Since the Climatronic Control Module J255 is component protected, the exchange of the component without vehicle-specific adaptions can cause restricted functionality.

In contrast to the current Audi A8L and Audi A3, during a recoding of a Climatronic Control Module J255, no information on the networking is taken from the Data Bus On Board Diagnostic Interface or the Engine Control Module (ECM). In the case of the 2005 Audi A6, the coding is performed completely by the entries at the diagnosis tester.



Special Tools for the 2005 Audi A6 Climate Control System

Ratchet spanner T40083



For removing actuating levers from Control Motors.

Puller T40072



For unbolting Control Motor actuating levers.

Suction nozzle with brush T40073/1 and hose T40073/2



For cleaning Control Motors housing after removing pollen filters..

Diagnosis



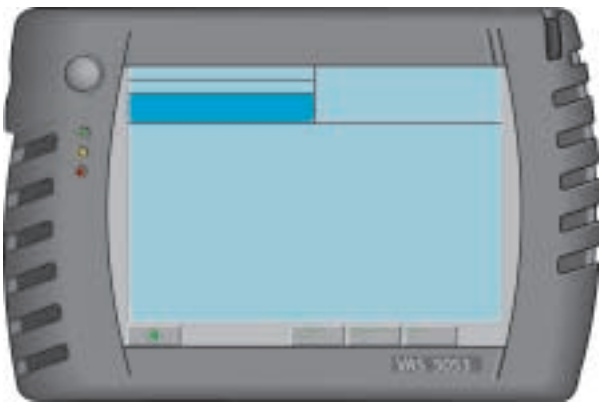
As in the case of the A8L, communication in the 2005 Audi A6 between the VAS tester and the vehicle is affected via CAN-Bus, CAN-Diagnosis.

An adaptation of components belonging to the immobilizer or interrogation of the radio code, is only possible when the tester is directly connected to the company's "FAZIT" database.

Reference

For further information on the topic:
VAS 5051 online connection; please refer to Self-Study Program, VAS 5051 on-line connectivity 998303.

VAS 5053 (Later availability)



The VAS 5053 tester was developed for vehicle acceptance and service procedures and for smaller repairs.

In addition to the "Self-diagnosis" function, excerpts from the ELSA and the "Guided functions" program will be available on the tester.

Due to its compactness, the VAS 5053 is suitable for portable use such as test drives. The data gathered during a test drive can be stored in the tester until it is printed out. The connection between the vehicle and VAS 5053 tester is established by means of a cable. In addition, the tester can be connected to the vehicle via the separate VAS 5053/20 wireless interface.

VAS 5051



The VAS 5051 tester will be replaced by the VAS 5051 B in 2004/2005. The hardware and design of the VAS 5051 have been revised and updated.

The 15" screen is the most noticeable feature of the VAS 5051 B.

The main objective of the revision was being able to use it on the existing cart and with the existing test cables.



VAS 5053/20

The VAS 5053/20 wireless Diagnosis interface permits wireless communication between the Diagnosis socket in the vehicle and the VAS 5051 B, VAS 5052 and VAS 5053 Diagnosis testers.



Knowledge Assessment

An on-line Knowledge Assessment (exam) is available for this SSP.

The Knowledge Assessment may or may not be required for Certification.

You can find this Knowledge Assessment at:

www.accessaudi.com

From the accessaudi.com homepage:

- Click on the “ACADEMY” Tab
- Click on the “Academy Site” Link
- Click on the ”CRC Certification” Link

For assistance, please call:

Audi Academy

Learning Management Center Headquarters

1-877-AUDI-LMC (283-4562)

(8:00 a.m. to 8:00 p.m. EST)

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