Service Training





The 2006 Audi A6 Avant

Self-Study Program 995503

Audi of America, Inc.
Service Training
Printed in U.S.A.
Printed 06/2005
Course Number 995503

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The Self-Study Program provides introductory information regarding the design and function of new models, automotive components or technologies.

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

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

Reference



Note





S995503_11



S995503_12



S995503_13

2006 Audi A6 Avant

The 2006 Audi A6 Avant introduces an unmatched blend of design, function, and driving enjoyment.

The 2006 Avant combines classic upscale design cues of the Audi line-up with progressive design elements like its high shoulder line, narrow windows, coupe-like roofline, and tapered rear panels.

The vehicle's visibly unique proportions demonstrate Audi's continued unrivaled design achievements.

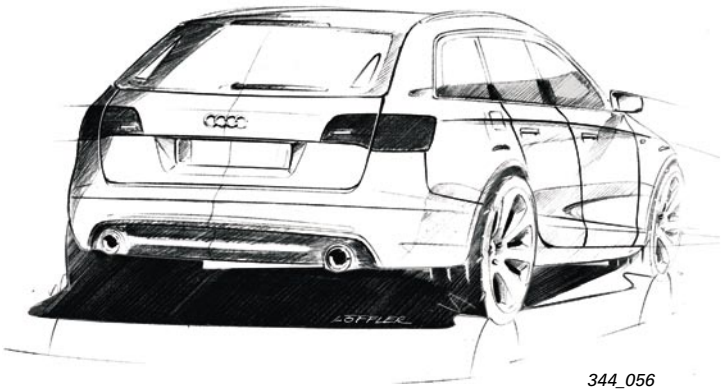
This Self-Study Program focuses on several new features found on the 2006 Audi A6 Avant.

Standard and optional features include:

- Power Tailgate
- Adaptive Cruise Control
- Dual-Stage Airbags
- 3.2 V6 Engine
- Adaptive Air Suspension



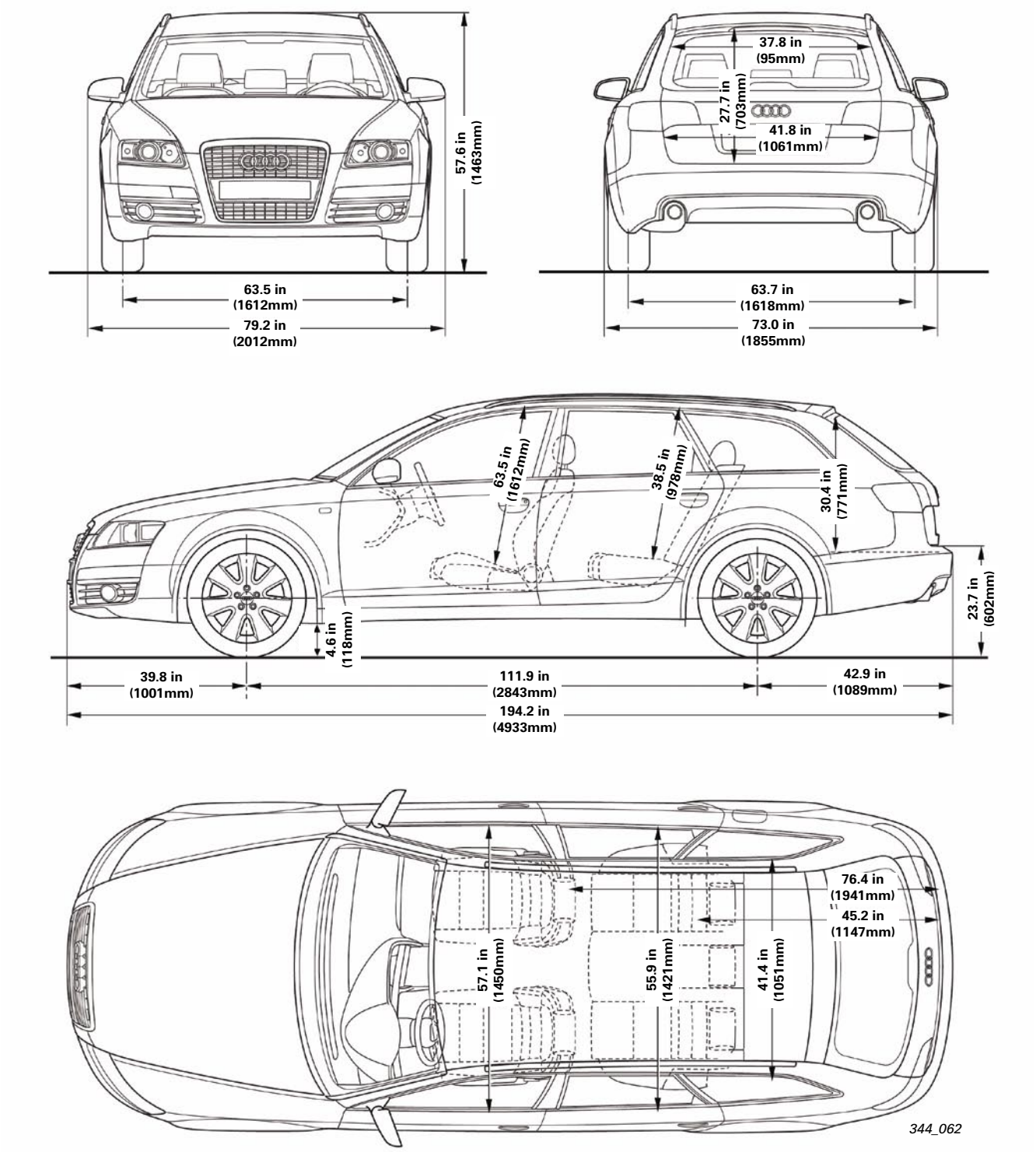
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344_056

Overview

Dimensions of the 2006 Audi A6 Avant.



3.2 V6 FSI Overview

The 3.2 V6 FSI was first introduced in the North American market in the 2005 Audi A6 Sedan.

All camshafts feature continuously variable timing and are driven by a chain at the rear of the engine. The camshaft adjusters are locked until sufficient oil pressure is developed after starting the engine.

The 3.2 V6 FSI was developed to meet the following goals:

- Reduced fuel consumption
- Increased performance
- Sporty and agile response while maintaining a high level of comfort
- Powerful, sporty V6 sound

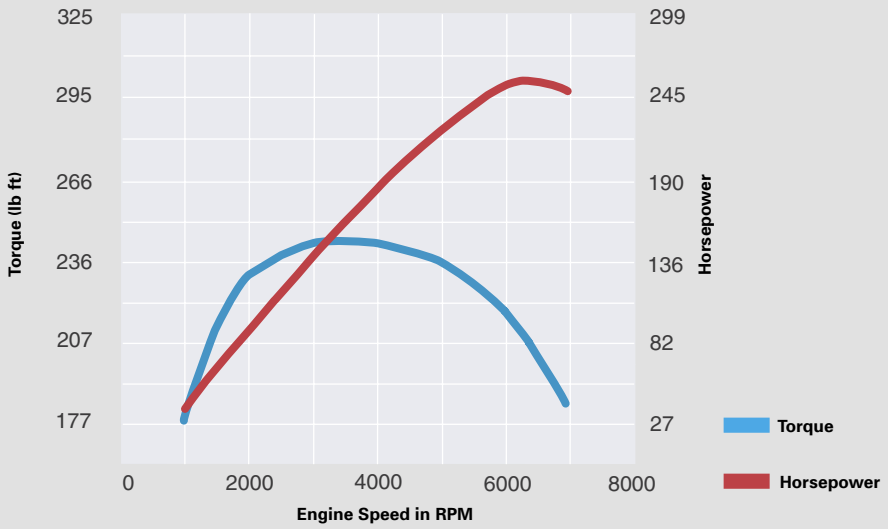
The 3.2 V6 FSI includes the following features:

- Light-weight crankcase made of an aluminum/silicon/copper alloy
- Light-weight plastic variable length intake manifold
- Cylinder head with roller rocker arms
- Front-mounted auxiliary components driven by Poly V belts
- Continuously adjustable intake and exhaust camshafts
- Siemens engine management with EPC (Electronic Power Control)



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Technical Data



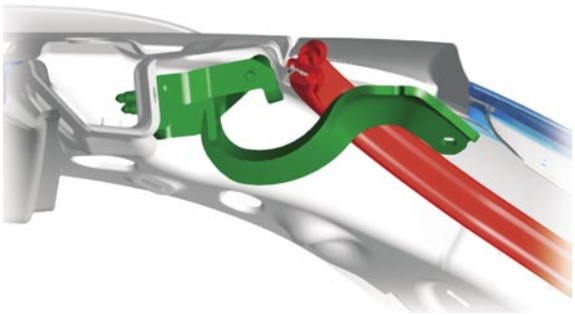
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Specifications	
Code	**AUK**
Type	90° V6 engine
Displacement	191 cu in (3123 cc)
Maximum output	255 hp (188 kW) at 6500 rpm
Maximum torque	243 hp (330 Nm) at 3250 rpm
Engine speed	7200 rpm
Bore	3.33 in (84.5mm)
Stroke	3.65 in (92.8mm)
Compression ratio	12.5:1
Weight	Approximately 374 lb (169.5 kg)
Firing order	1-4-3-6-2-5
Ignition gap	120°
Engine management	Siemens with EPC
Engine oil	SAE 0W 30
Emission standard	LEV I

Tailgate Hinge

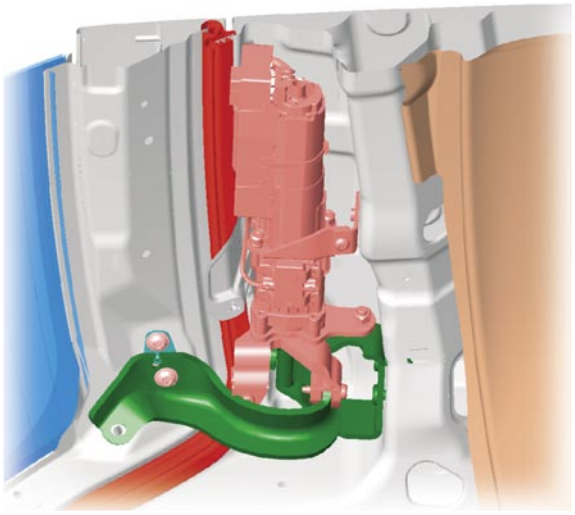
The 2006 Audi A6 Avant features a new inner tailgate hinge design.

When the tailgate is closed, the hinge is concealed behind the trim panel and is not visible from the interior.



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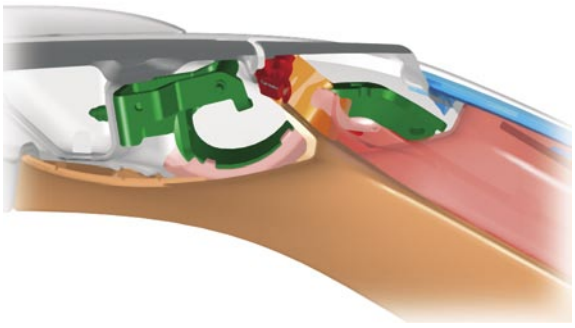
The hinge is mounted to the upper roof crossrail behind the tailgate seal and inside the passenger compartment.



344_046

This new tailgate hinge design provides the following advantages:

- improved anti corrosion characteristics
- improved sealing
- internal wiring
- no grommets required to seal holes in the body
- larger cargo area
- compatible with power tailgate design



344_048

Enhanced Safety System

The 2006 Audi A6 Avant uses dual stage driver and passenger front airbags. The gas generators for these airbags contain two separate igniters and propellant located in separate compartments.

If the Airbag Control Module J234 determines 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 2006 Audi A6 Avant safety system includes the following components that are the same as the sedan:

- Airbag Control Module J234
- Driver and front passenger airbags, dual stage
- Front side airbags
- Sideguards (head airbags)
- Sensors for side impact detection
- Front belt tensioners
- Crash sensors for the front airbag (front sensors for early front 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)
- Active head restraints in the front seats.

Note

Please reference the electronic service information prior to performing any airbag system repairs!



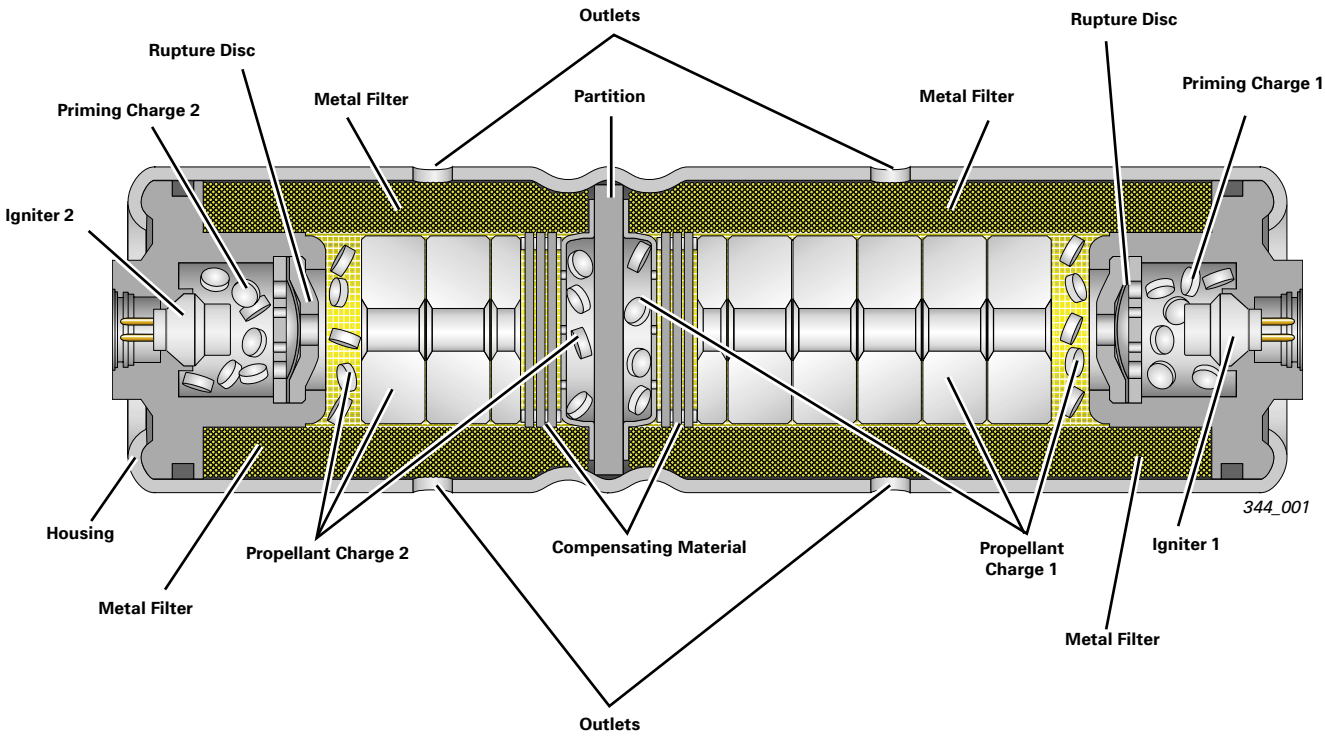
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Front Passenger Airbag

The system includes:

– Front Passenger's Airbag Igniter 1 N131
– Front Passenger's Airbag Igniter 2 N132

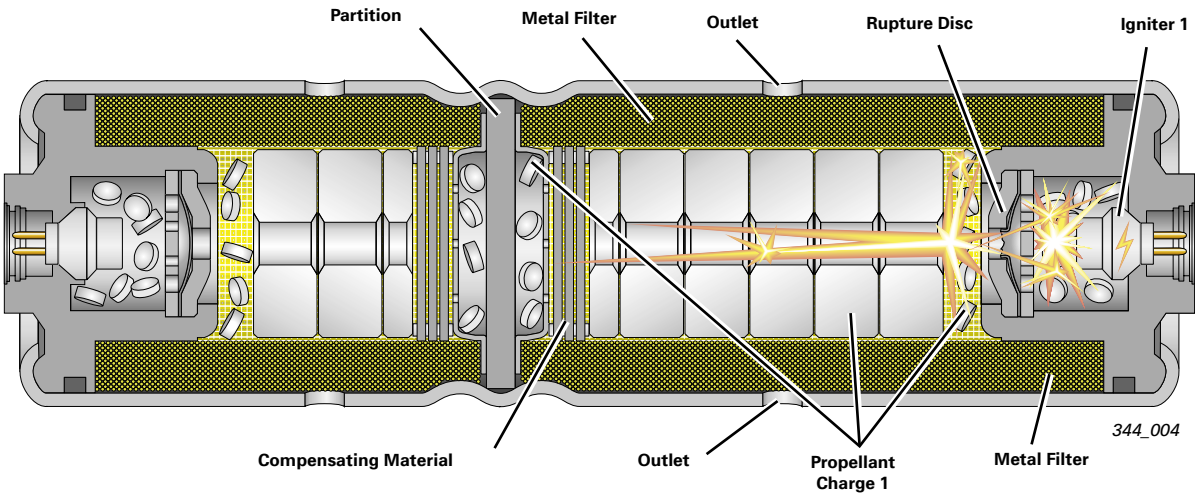
The front passenger airbag consists of a housing with two pyrotechnic gas generators that are separated by a partition. The propellant charge consists of both solid and hollow tablets.



Front Passenger's Airbag Igniter 1 N131 Operation

During a front impact collision, the Airbag Control Module J234 electrically triggers igniter 1 by igniting priming charge 1.

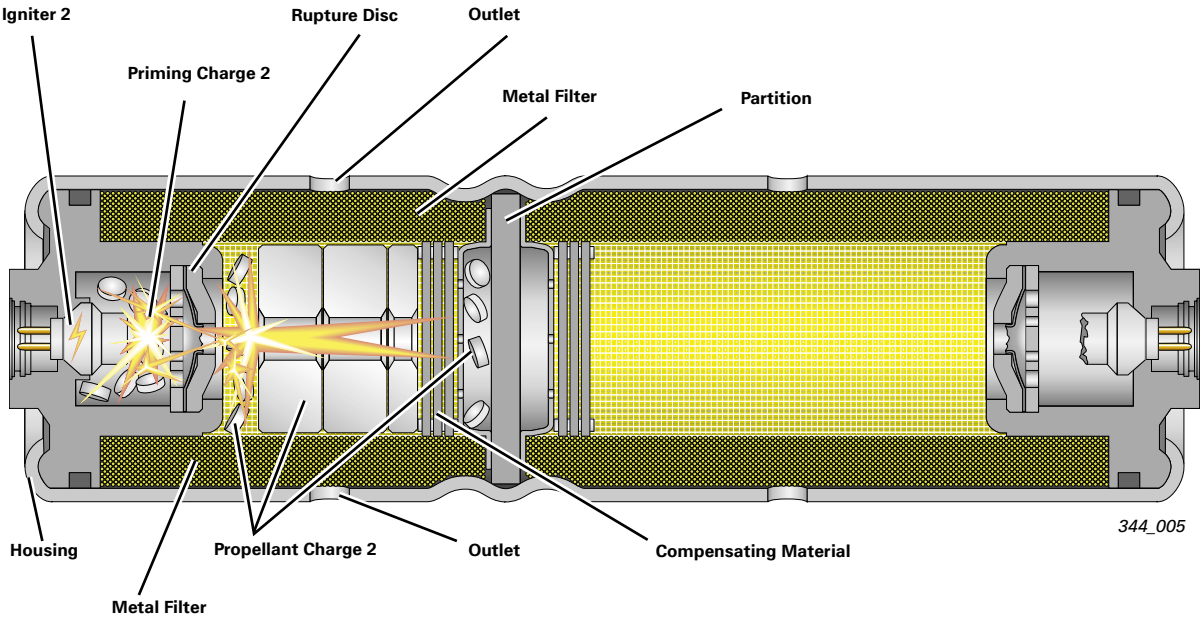
The resulting pressure forces the flame through the rupture disc igniting propellant charge 1. The hollow propellant tablets ignite quicker than the solid tablets. The metal filter cools and treats the expanding gas before it passes through the outlets to the airbag. N131 partially inflates the airbag.



Front Passenger's Airbag Igniter 2 N132 Operation

The Airbag Control Module J234 controls the time interval between the activation of Front Passenger's Airbag Igniter 1 N131 and Front Passenger's Airbag Igniter 2 N132 depending on the type and severity of the collision. N132 inflates the airbag completely.

N131 and N132 are functionally identical.

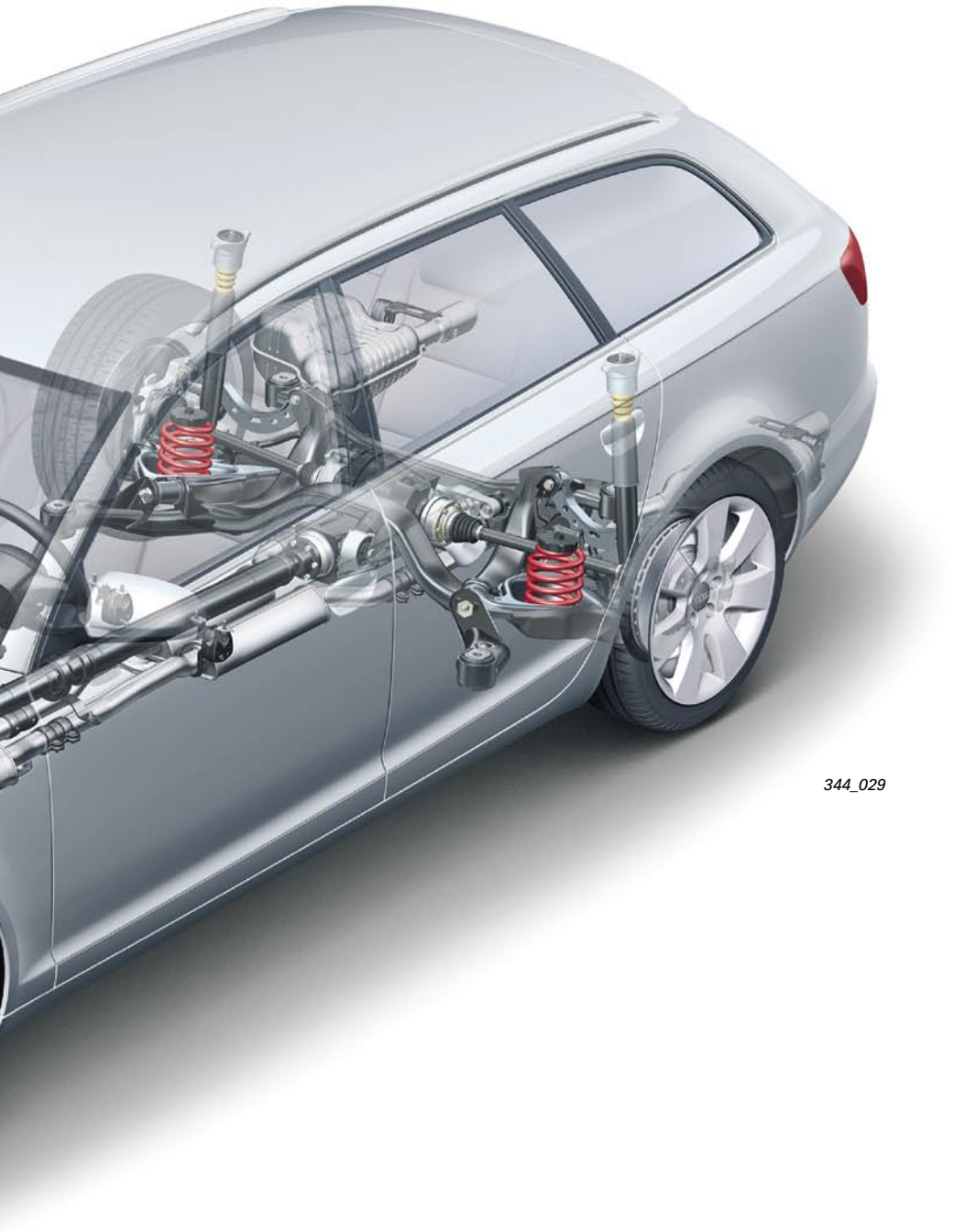


Available Suspension

The 2006 Audi A6 Avant comes with a steel spring suspension as standard equipment. The Avant suspension system is similar in design to the A6 sedan with modifications to the springs, dampers, and anti-roll bars.

Adaptive air suspension is an option on the 2006 Audi A6 Avant.

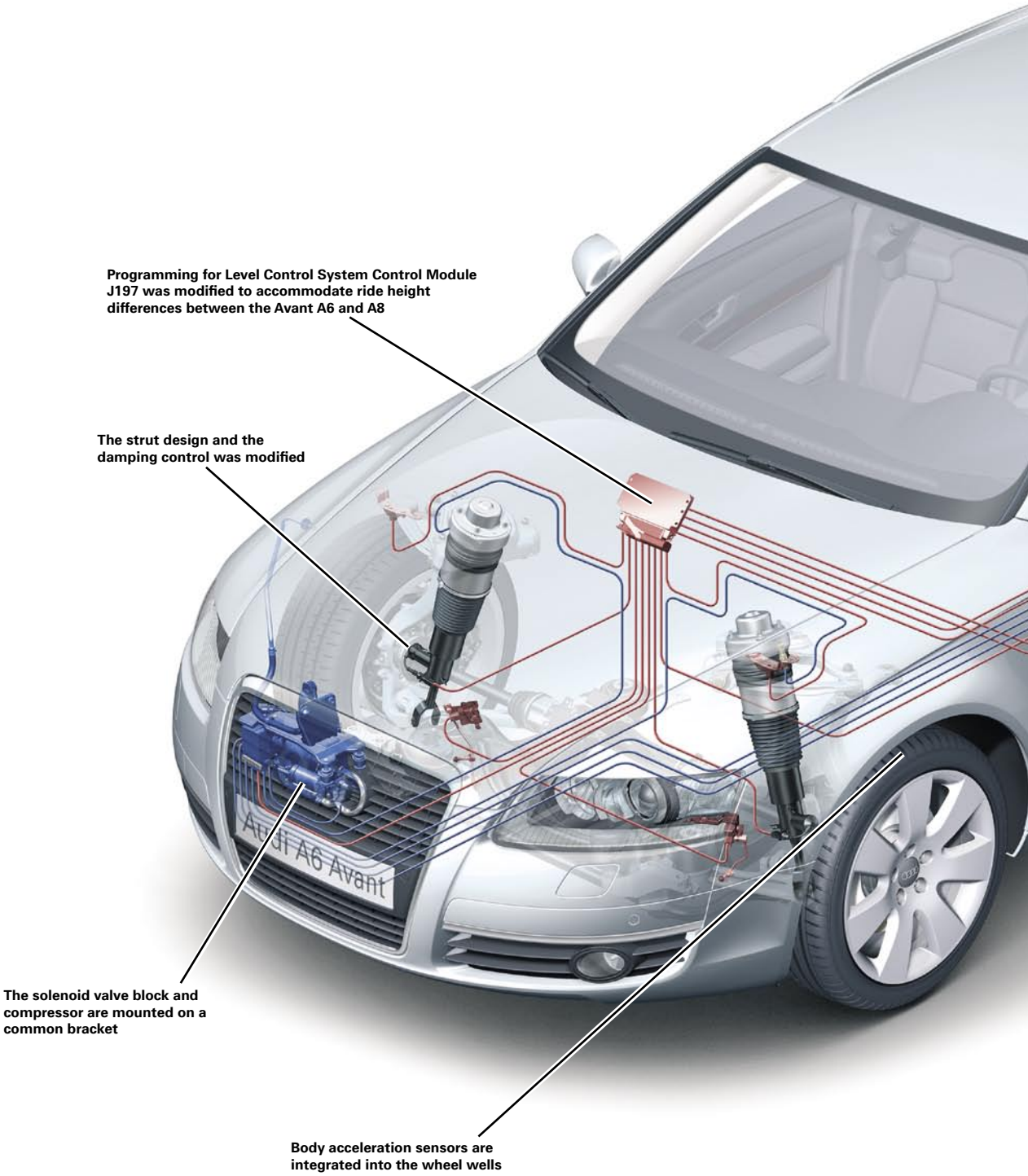


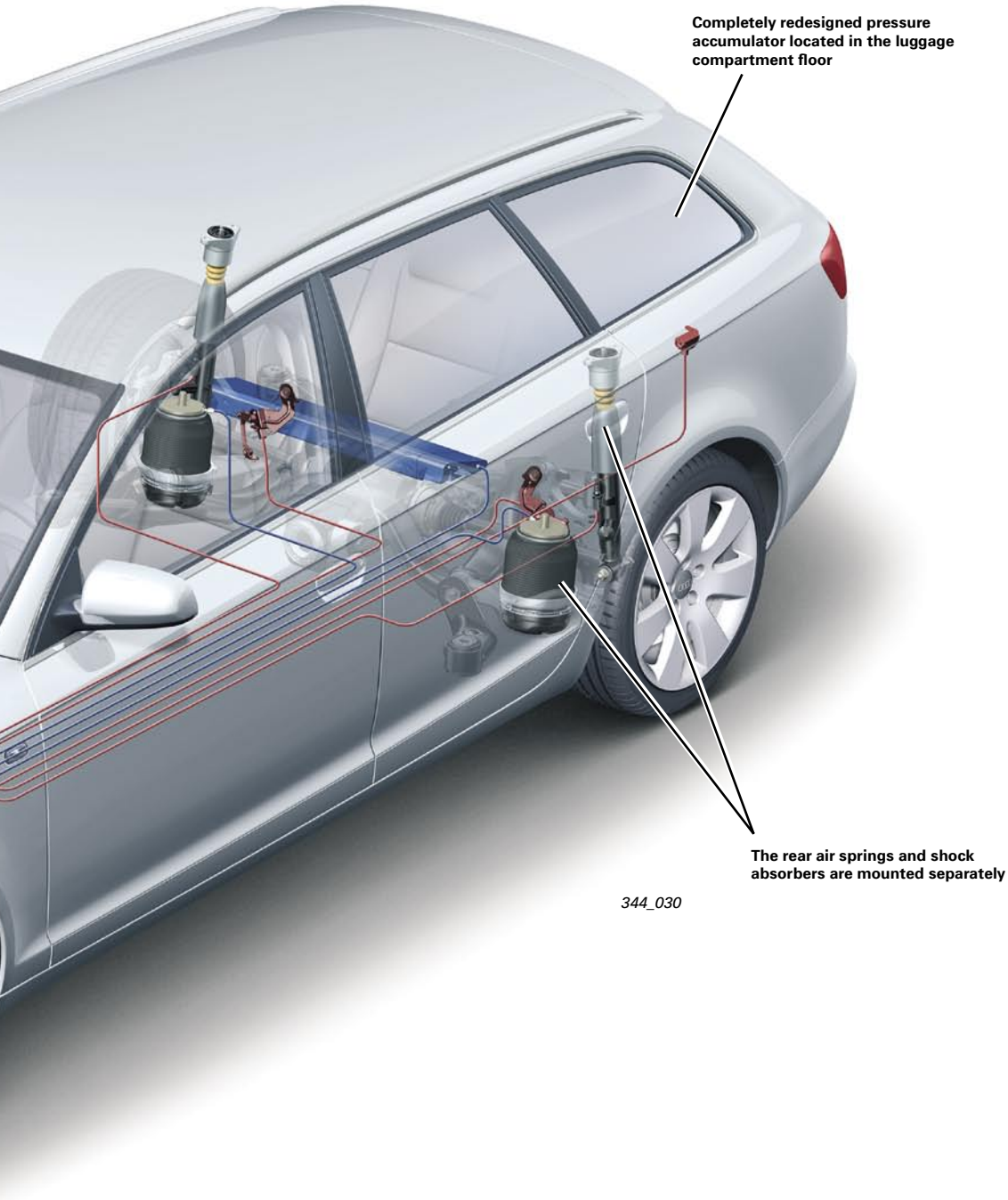


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Adaptive Air Suspension

The 2006 Audi A6 Avant can be equipped with an optional adaptive air suspension system. This system is similar in function to the A8 adaptive air suspension system. Differences that exist between the A8 and Avant A6 systems are highlighted in this illustration.




Completely redesigned pressure accumulator located in the luggage compartment floor
The rear air springs and shock absorbers are mounted separately

344_030

Struts and Shock Absorbers

The struts and shock absorbers on the 2006 Audi A6 Avant have continually adjustable damping.

Both the front struts and the rear shocks are different than those on the A8. The electrically activated damping valve is located on the exterior of the strut or shock tube.

Front Suspension



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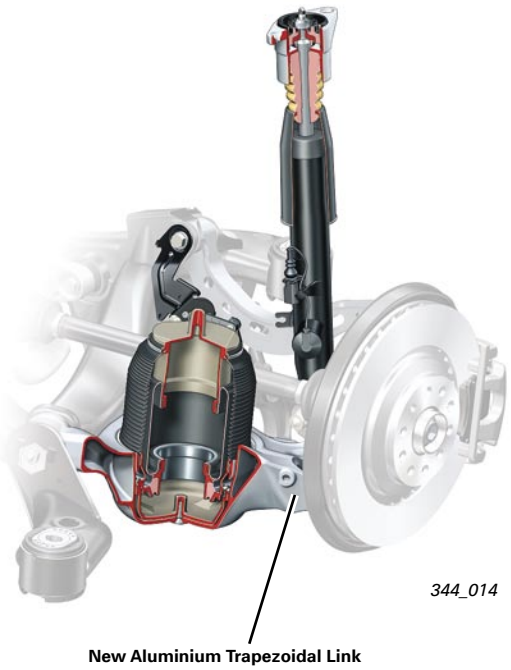
Separately Mounted Rear Air Springs and Shocks

This configuration optimizes luggage compartment space and allows a lower luggage compartment floor.

A new aluminium trapezoidal link was developed for this system.

A protective boot shields the entire air spring assembly from road dirt and debris. The protective boot on the air spring can be replaced separately. Unlike the A8, the A6 Avant does not have a separate air reservoir at each shock absorber.

Rear Suspension

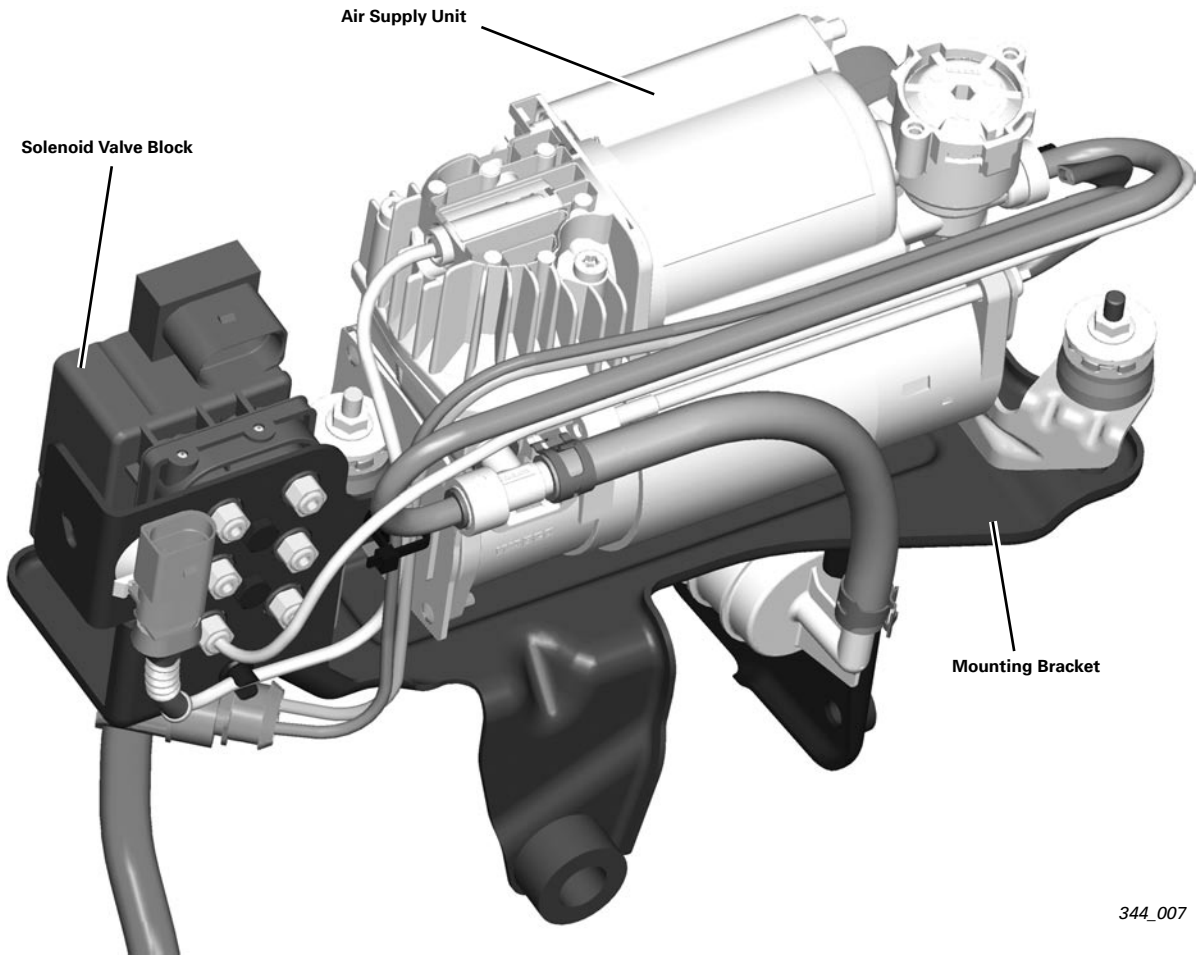


344_014

Air Supply Unit and Solenoid Valve Block

The air supply unit and the solenoid valve block are identical in design and function to those of the allroad quattro and A8. The location of the Air Supply Unit on the A6 Avant is behind the front grille.

Both the Air Supply Unit and the Solenoid Valve Block are mounted on a common bracket, in the engine compartment behind the grille.



Ride Heights

The 2006 Audi A6 Avant ride height modes are the same as the A8. However, the actual ride heights are different. The following conditions apply to the 2006 Audi A6 Avant system.

In “dynamic” mode, the car’s ride height is lowered by 0.59 in (15mm) compared to “automatic” mode.

In “lift” mode, the car body is raised by 0.59 in (15mm) compared to “automatic” mode.

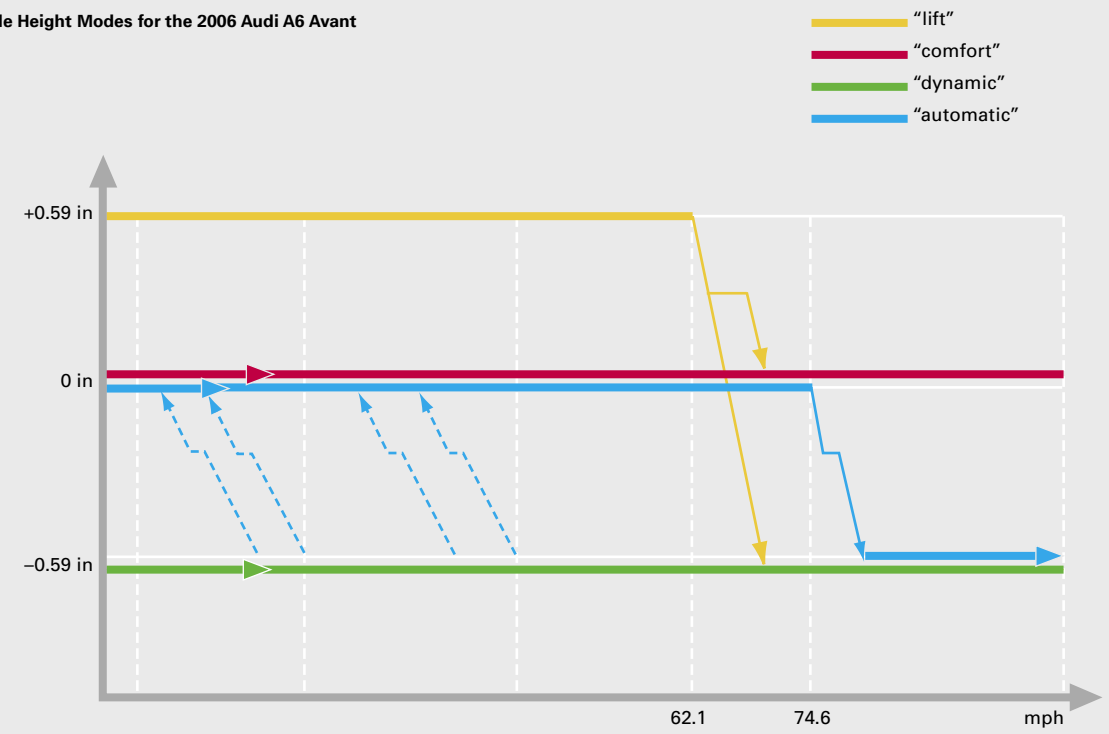
The suspension is lowered by 0.59 in (15mm) at highway speeds in “automatic” mode. Unlike the A8, there is no reduction in ride height in “dynamic” mode.

The activation and deactivation criteria for all modes are the same as the A8.

Reference

For more information, please reference the current operating instructions and SSP 994303 “Adaptive Air Suspension”.

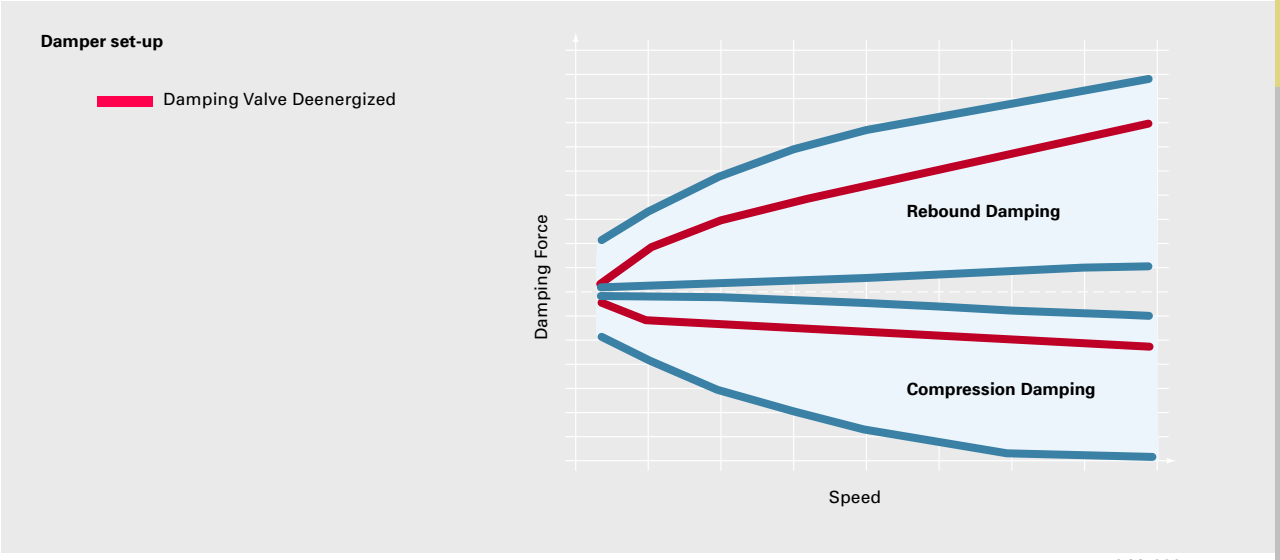
Ride Height Modes for the 2006 Audi A6 Avant



344_032

System Default Mode

If the strut/shock electrical control system is not active, a default damping setting is automatically implemented. The default damping operates the same as a conventional, non-controlled, shock absorber.

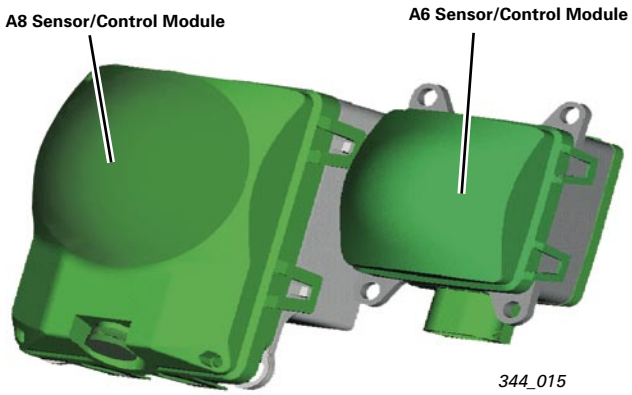


344_020

Enhancements and Modifications

The 2006 Audi A6 Avant incorporates the following modifications into the adaptive cruise control system as opposed to the system found on the A8:

– The dimensions and weight of the sensor and control module have been reduced

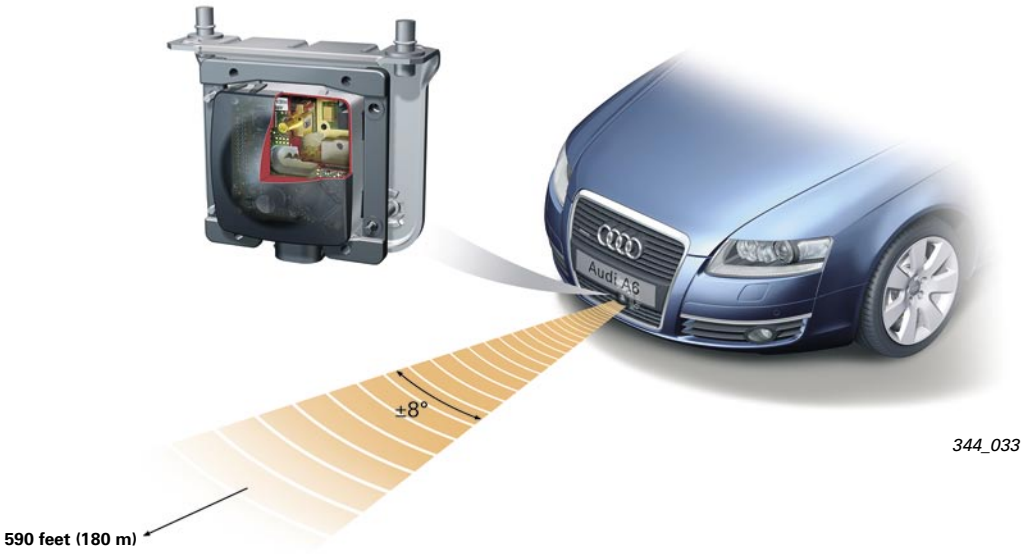


344_015

The number of transceivers in the sensor was increased from three to four.

This allows for:

– increase of the beam angle from 8° to 16°
– increased sensor range from 490 ft (150 m) to 590 ft (180 m)

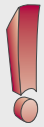


344_033

A heater has been added to the bumper in front of the adaptive cruise control sensor to prevent the build-up of snow or ice on the bumper in front of the sensor in wintry conditions.

The heater is powered by the adaptive cruise control module and is activated based on ambient temperature.

The response of the adaptive cruise control system during acceleration and braking can now be adjusted to the driver's preferences by selecting a driving setting in addition to the distance setting. Three driving modes can now be selected.
For additional information, please reference the vehicle owner's manual.



Note

Please reference the electronic service information for repair and adjustment procedures.

Electronic Stabilization Program (ESP)

The Bosch 8.0 ESP system used on the 2006 Audi A6 Avant is the same as the system found on the A6 sedan. However, the Avant system has several new features. The clock speed of the control module has been increased from 48 MHz to 60 MHz to make these added features possible.

Enhanced Brake Assistant

When moving forward in vehicles equipped with Adaptive Cruise Control, the adaptive cruise control system continuously monitors objects within the range of the sensor. The object detection feature remains active even if adaptive cruise control has been deactivated.

The system evaluates the number, position and speed of objects detected, the distance to the objects detected, and vehicle speed. If a “potential hazard” is detected, the brake system is pressurized and the brake assistant is activated.

Enhanced Understeer Correction

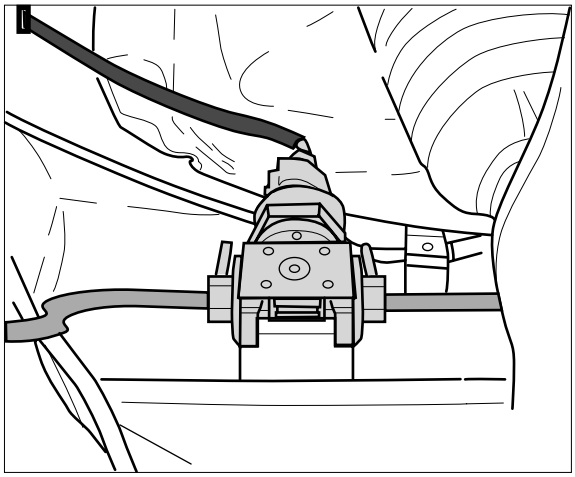
Understeer while cornering is improved by applying the brakes to the inside wheels.

However, if the cornering speed of the vehicle is too high, this will not be sufficient. If this occurs, all four wheels are braked and engine torque is simultaneously reduced. A slightly higher brake pressure is applied to the inside rear wheel to reduce the road speed of the vehicle and stabilize the vehicle.

Enhanced Braking

Two additional pressure sensors in the lines between the ESP module and the front brake calipers provide direct measurement of brake pressure, particularly at low brake pressures.

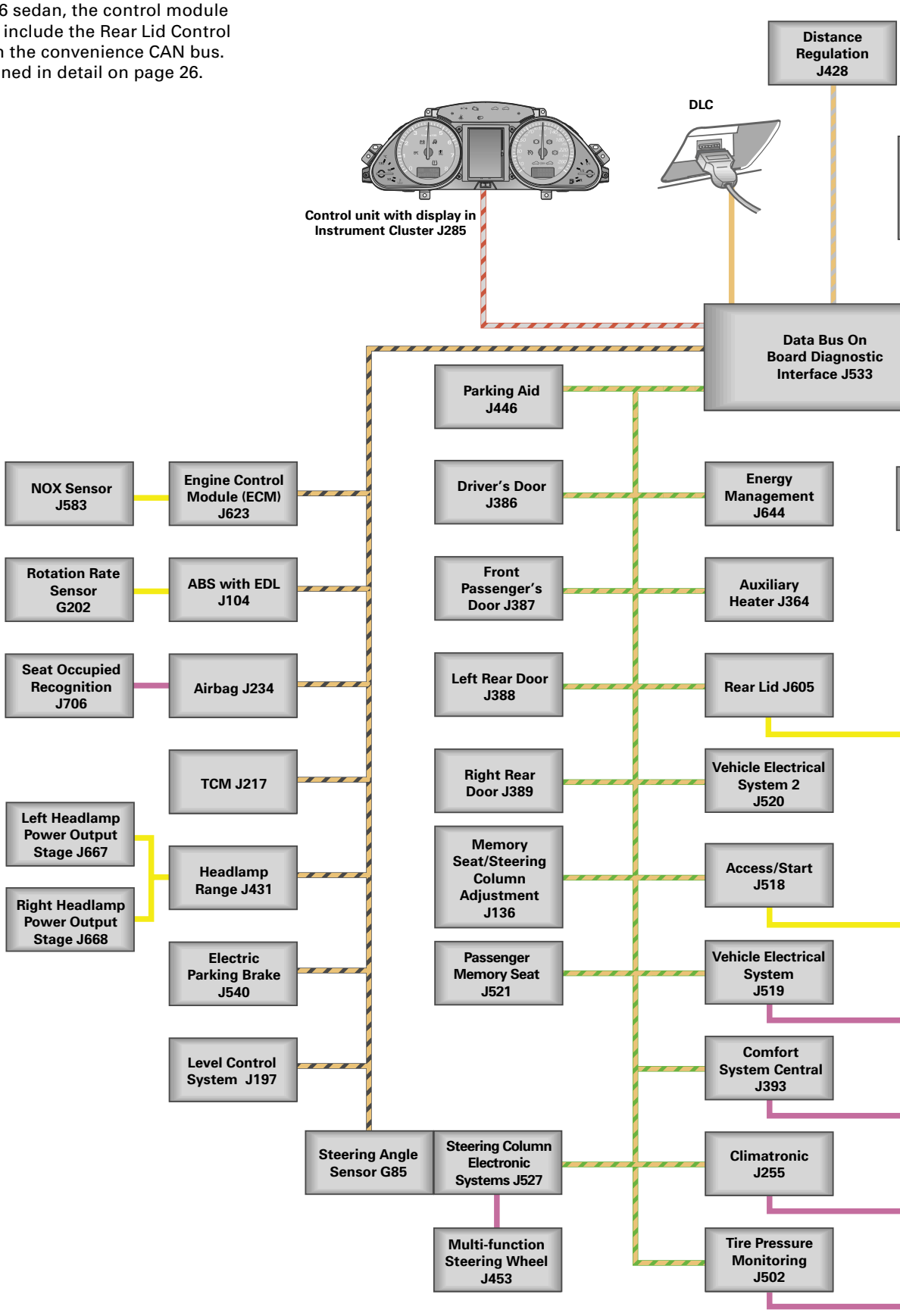
Using this data, ESP controls the build-up of brake pressure precisely resulting in shorter reaction times.

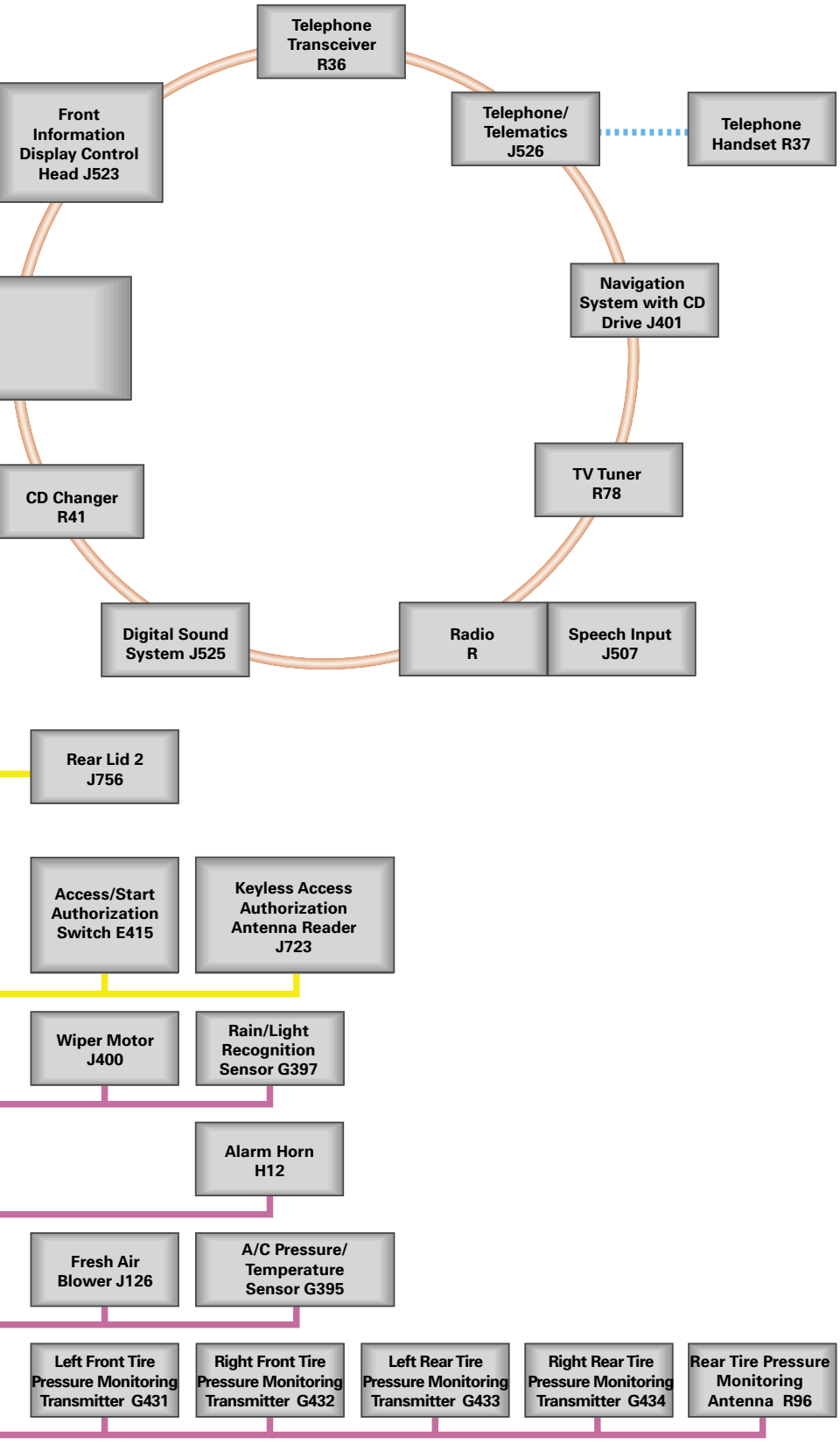


344_041

Control Module Network

In comparison with the A6 sedan, the control module network was extended to include the Rear Lid Control Modules J605 and J756 in the convenience CAN bus. These modules are explained in detail on page 26.




Telephone Transceiver R36
Front Information Display Control Head J523
Telephone/ Telematics J526
Telephone Handset R37
Navigation System with CD Drive J401
CD Changer R41
TV Tuner R78
Digital Sound System J525
Radio R
Speech Input J507
Rear Lid 2 J756
Access/Start Authorization Switch E415
Keyless Access Authorization Antenna Reader J723
Wiper Motor J400
Rain/Light Recognition Sensor G397
Alarm Horn H12
Fresh Air Blower J126
A/C Pressure/ Temperature Sensor G395
Left Front Tire Pressure Monitoring Transmitter G431
Right Front Tire Pressure Monitoring Transmitter G432
Left Rear Tire Pressure Monitoring Transmitter G433
Right Rear Tire Pressure Monitoring Transmitter G434
Rear Tire Pressure Monitoring Antenna R96
MOST bus
Instrument cluster CAN-bus
Diagnosis CAN-bus
Powertrain CAN-bus
Convenience CAN-bus
Adaptive cruise control CAN-bus
LIN bus
Various subbus systems
Wireless transmission –Bluetooth signal

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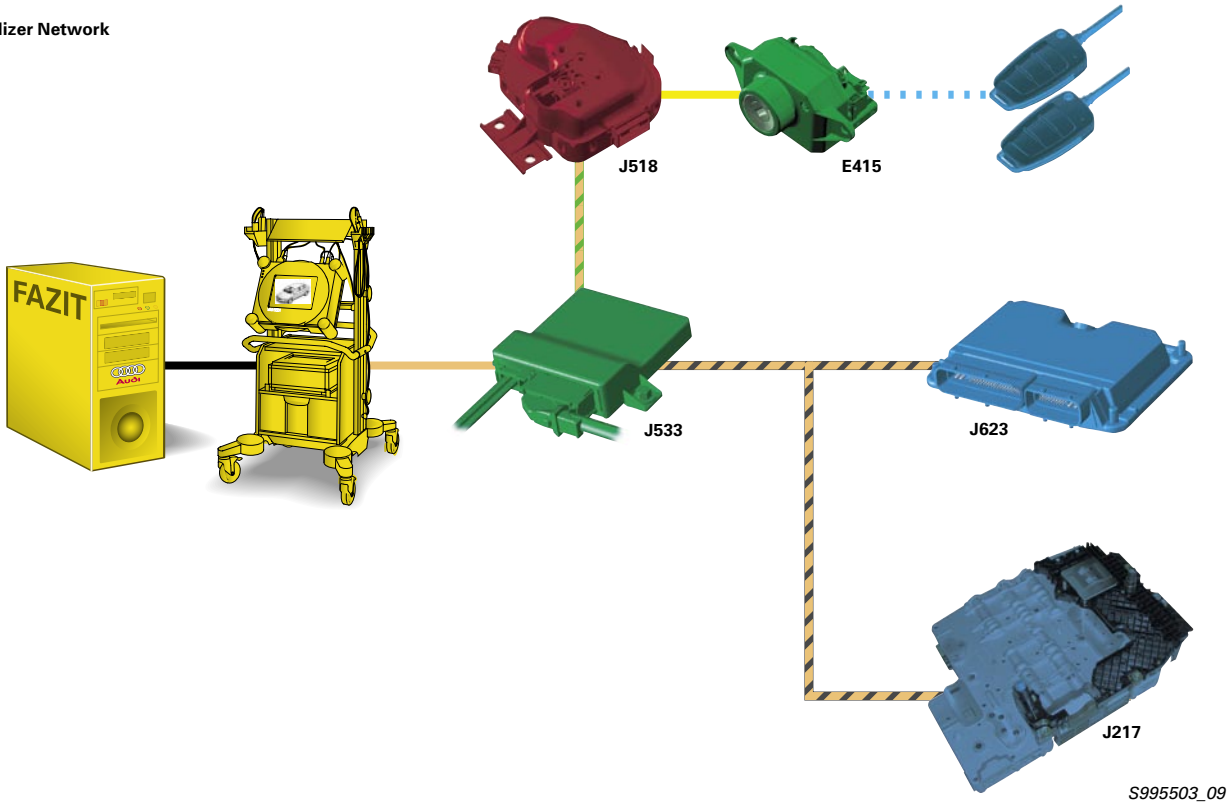
Automatic Transmission Immobilizer

The 2006 Audi A6 Avant automatic transmission is integrated into the immobilizer system. Beginning with model year 2006, the automatic transmissions in the A6 sedan and in the A8 will also have this immobilizer feature.

The Transmission Control Module (TCM) J217 is integrated in the valve body of the transmission (Mechatronics). Because transmission activation depends on the TCM, this installation position enhances vehicle theft protection.

The immobilizer is designated as an “Immobilizer 4” system.

Immobilizer Network



S995503_09

Legend

E415 Access/Start Authorization Switch

J217 Transmission Control Module (TCM)

J518 Access/Start Control Module

J533 Data Bus On Board Diagnostic Interface

J623 Engine Control Module (ECM)

Component NOT integrated into immobilizer

Component integrated into immobilizer

Master Control Module

PC/Mainframe

Authorization

The authorization of the Transmission Control Module (TCM) J217 is similar to the procedure for authorizing the Engine Control Module (ECM) J623.

The Immobilizer System must recognize the Transmission Control Module as being valid for the vehicle before start authorization is permitted.

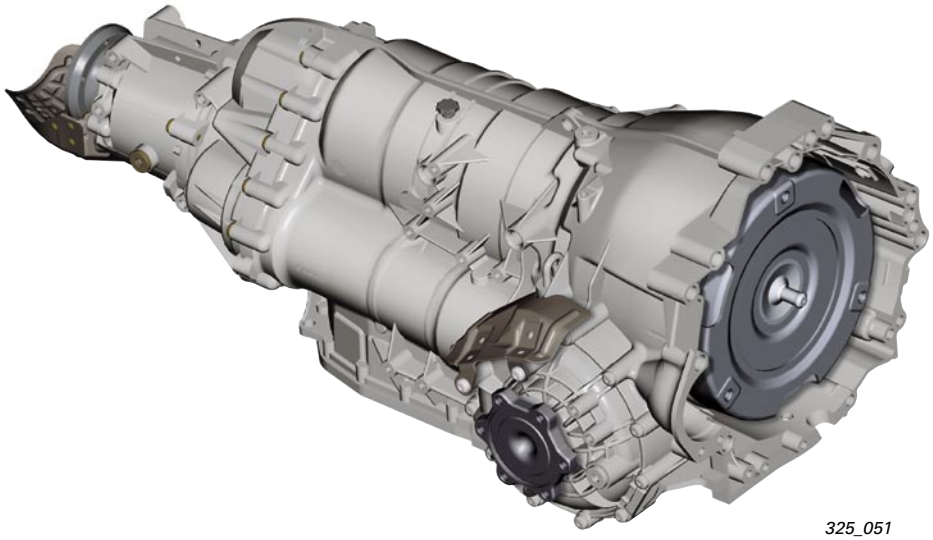
Authorization Rejection

If the Transmission Control Module (TCM) J217 is not authorized, but the Engine Control Module (ECM) J623 is authorized, the engine can be started as usual.

However, TCM J217 will detect the authorization rejection of the Transmission Control Module and activate an upside down selector lever position indicator in the center display.

If TCM J217 is replaced with a new TCM but not adapted to the Immobilizer System of the vehicle, the transmission will operate in an emergency mode. The vehicle speed will be limited to 12 mph (20 km/h).

If a transmission control module is installed from another vehicle, no operation will be allowed. The selector lever can be moved to a gear position, but no transmission of power to the drive wheels will be allowed.



325_051

Power Tailgate

Introduction

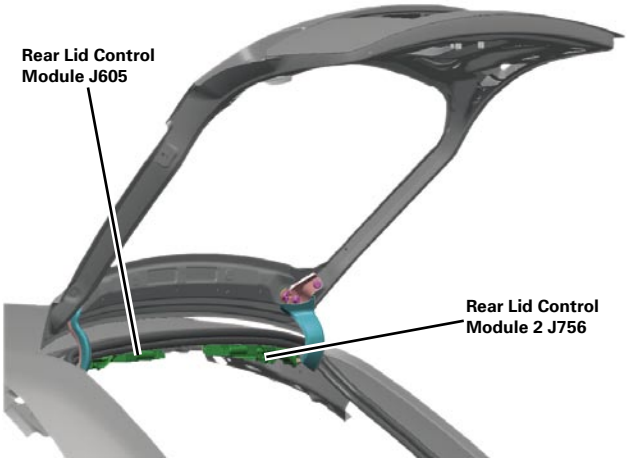
For customer convenience, a power tailgate is optional on the 2006 Audi A6 Avant. The power opening and closing is achieved by two electric motors with integrated control modules; one mounted on each hinge.

Rear Lid Control Modules J605 and J756

Both electric motors have a gear reduction drive, a magnetic coupling, measuring sensors and an electronic control module. Rear Lid Control Module J605 (with Motor V375) is mounted on the driver's side and is connected to the Convenience CAN-bus. It functions as a master control module for Rear Lid Control Module 2 J756 mounted on the passenger side.

Rear Lid Control Module 2 J756 (with Motor V376) reacts or provides information only to Rear Lid Control Module J605.

The control modules communicate with each other via a proprietary Valeo single line bus.



344_034

Power Opening

The power tailgate is activated by:

– pressing the center button on the remote control
– pulling up on the release button on the driver's door
– pressing the handle on the tailgate

The opening cycle can be stopped by repeating any one of these actions. Repeating the action again will allow the opening action to continue.

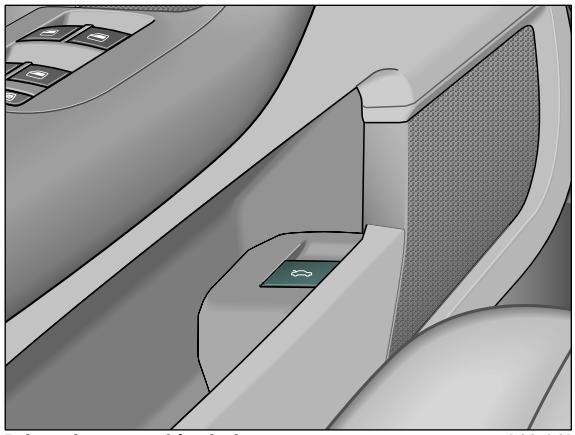


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Remote key

Memory Open Limit Position

The tailgate can be programmed to stop at a partially open position. To set the open position at any position between fully open and 45°, stop the tailgate at the desired position then press and hold the "close" button on the inside of the tailgate for at least 5 seconds.



Release button on driver's door *344_043*

Power Closing

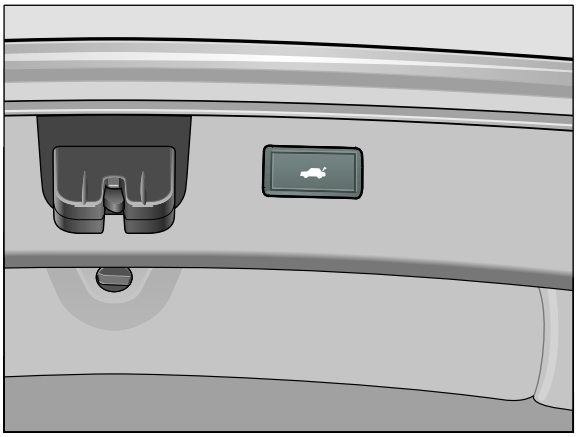
For safety reasons, the automatic tailgate closing cannot be activated by the remote key.

Tailgate closing can only be activated using the tailgate "close" button or the tailgate handle. Closing can also be paused by repeating either of these actions.

However, pressing the "close" button or the tailgate handle again will not cause the tailgate to resume closing, but will instead cause it to open.



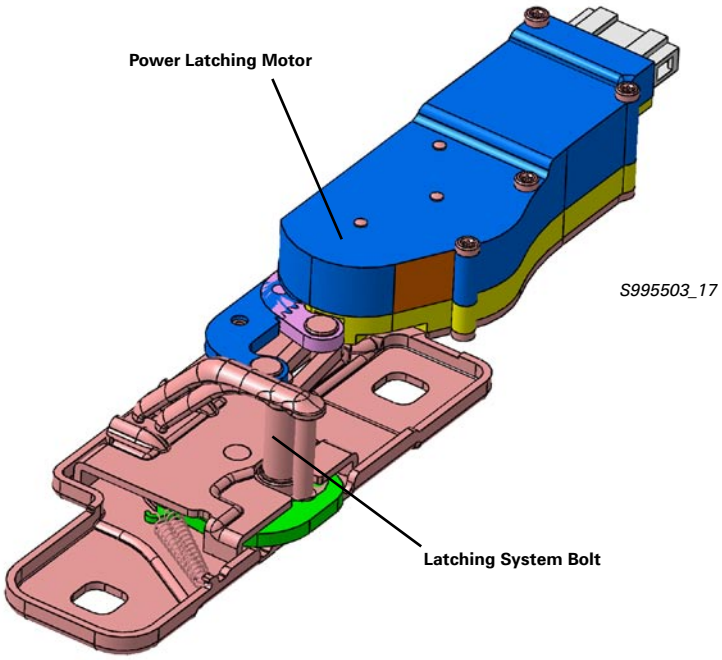
Handle on the tailgate *S995503_16*



"Close" button in the tailgate *344_045*

Power Trunk Closing Latch

All 2006 Audi Avants equipped with the optional automatic tailgate opening feature are also equipped with a power latching system. The task of the power latching system is to pull the tailgate into its end position against the pressure of the seals during the closing movement.



The tailgate is pulled tightly closed by the movement of the latching bolt when the tailgate latch engages it.

Two sensors detect the position of the bolt and send a signal to the Comfort System Central Control Module J393.

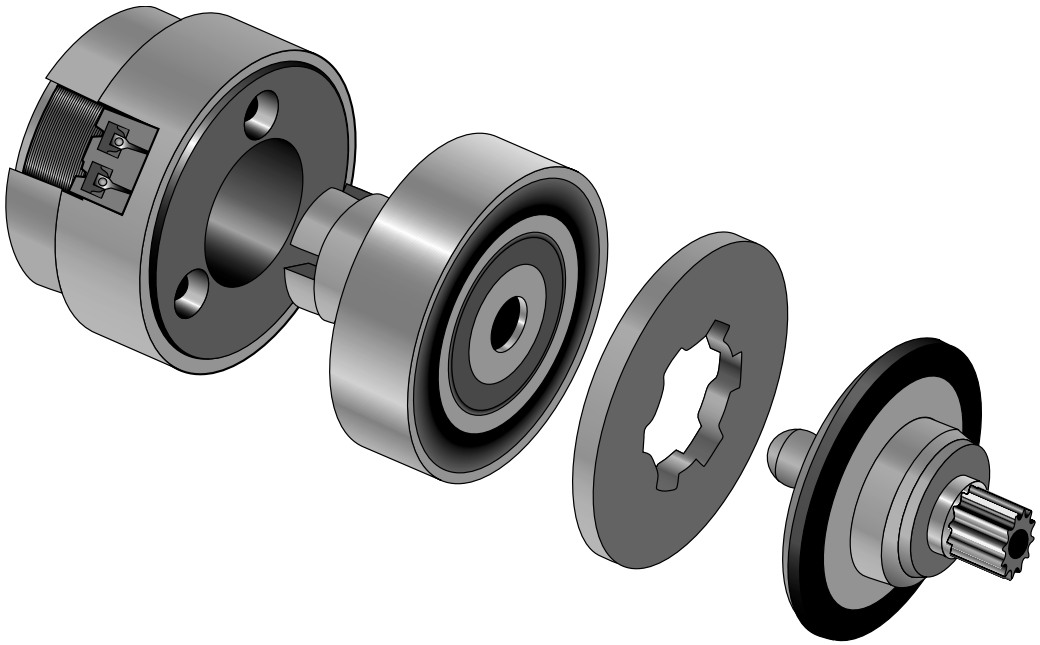
During automatic opening of the tailgate, the power latching bolt moves into its upper end position when the tailgate reaches an opening angle of 12°.

Magnetic Coupling

The torque to open and close the tailgate is transmitted from the electric motor to the tailgate hinges through a magnetic coupling.

The magnetic coupling consists of a permanent magnet and an electromagnet. When the tailgate is opening, the electromagnet intensifies the magnetic effect of the permanent magnet providing the force necessary to allow the electric motor's torque to lift the tailgate.

The force of the permanent magnet alone can hold the tailgate in an open position against its weight and against the pressure of the gas-filled spring. When the tailgate is opened or closed manually, the electromagnet produces a magnetic field to neutralize the magnetic effect of the permanent magnet, allowing the magnetic coupling to release and the tailgate to move freely.



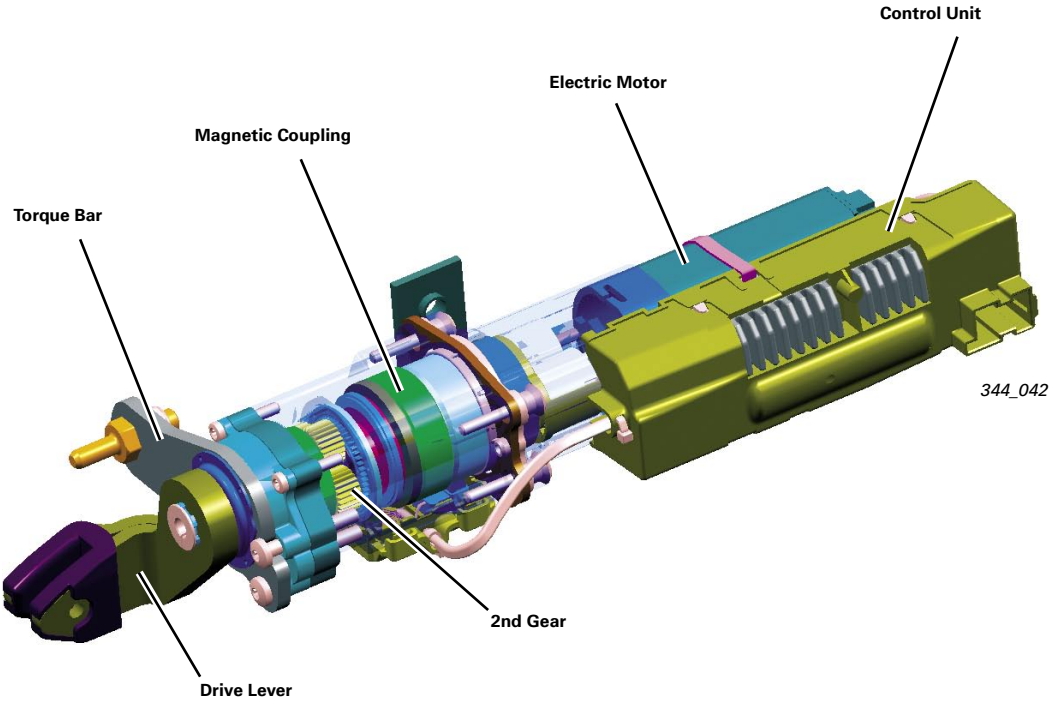
344_031

Manual Tailgate Operation

If the tailgate is opened or closed manually from a partially open position, the holding torque is deenergized and the “Manual” mode is activated.

This manual movement is detected by Hall sensors. The control modules then energize the couplings to the “freewheel” mode. When manual movement stops, the couplings are deenergized after approximately one second and the tailgate holds its position.

A second method of operating the tailgate manually is by opening the closed tailgate using the tailgate handle button. The couplings will be energized to the “freewheel” mode. This is maintained for approximately 1/2 second after releasing the tailgate handle button. If no movement is detected, the couplings will again be energized and the tailgate will open.



Speed Control

The torque needed to open and close the tailgate depends on several factors including vehicle incline, ambient temperature, and tailgate position.

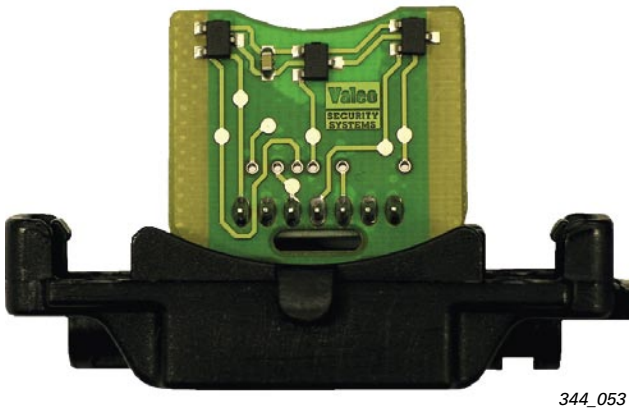
To allow for these conditions, a speed regulator in the control module adjusts the motor speed based on a default speed specification. Motor speed is controlled by a high-frequency PWM signal that controls the motor current.

Sensors

Tailgate speed is monitored by a Hall sensor on the left tailgate drive. A Hall sensor on the right tailgate drive detects when “manual” mode is required.

Three small Hall sensors on the left side monitor the direction of tailgate movement and the tailgate position.

The Hall sensors are also used for pinch protection using a speed/distance detection system. If an obstruction detected, the drive stops. If an obstruction is detected while closing, the tailgate reopens approximately 4°.



344_053

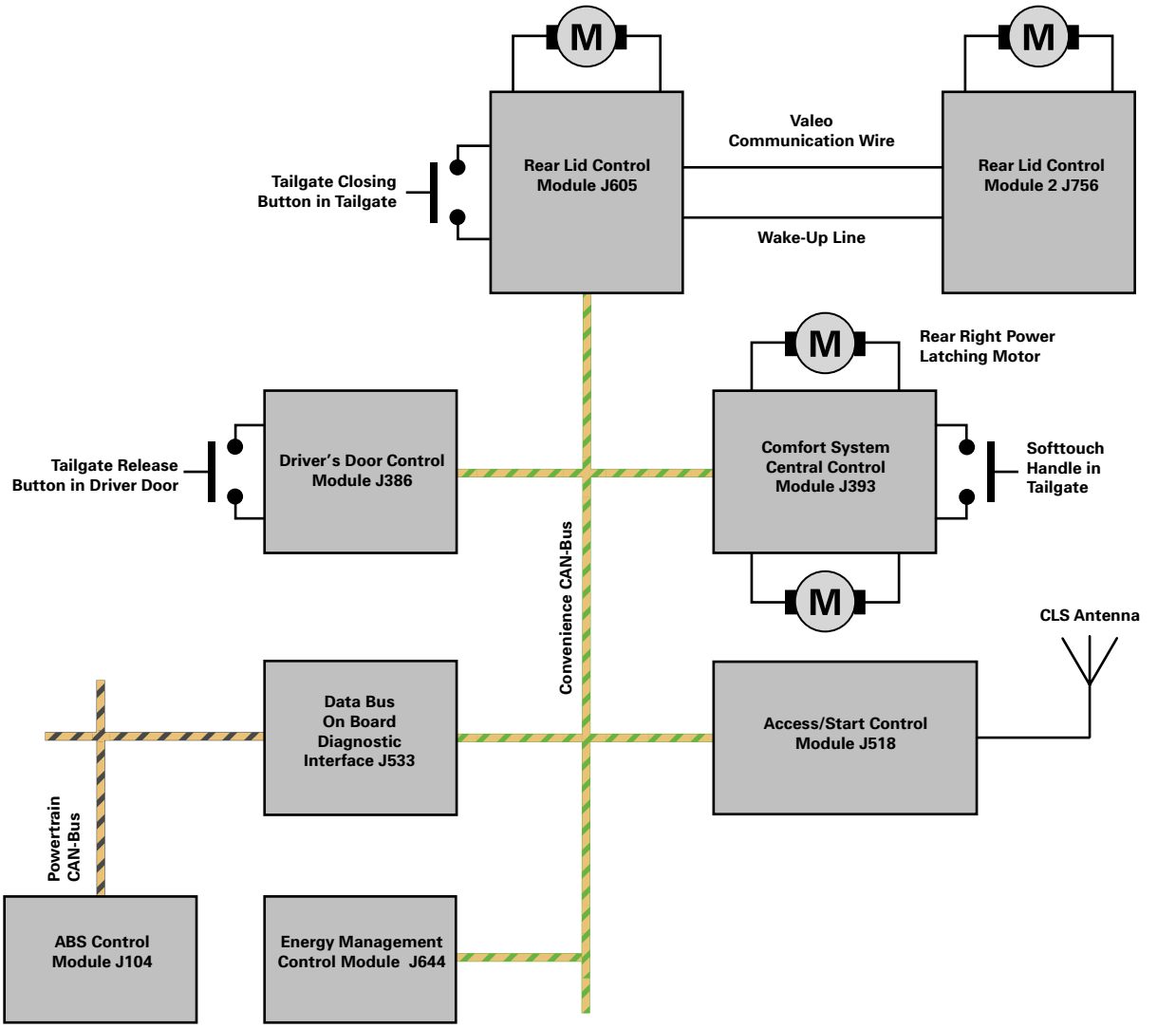
Circuit board with tailgate direction of movement and position Hall sensors

Deactivation of the Power Tailgate

The following system faults deactivate the power tailgate:

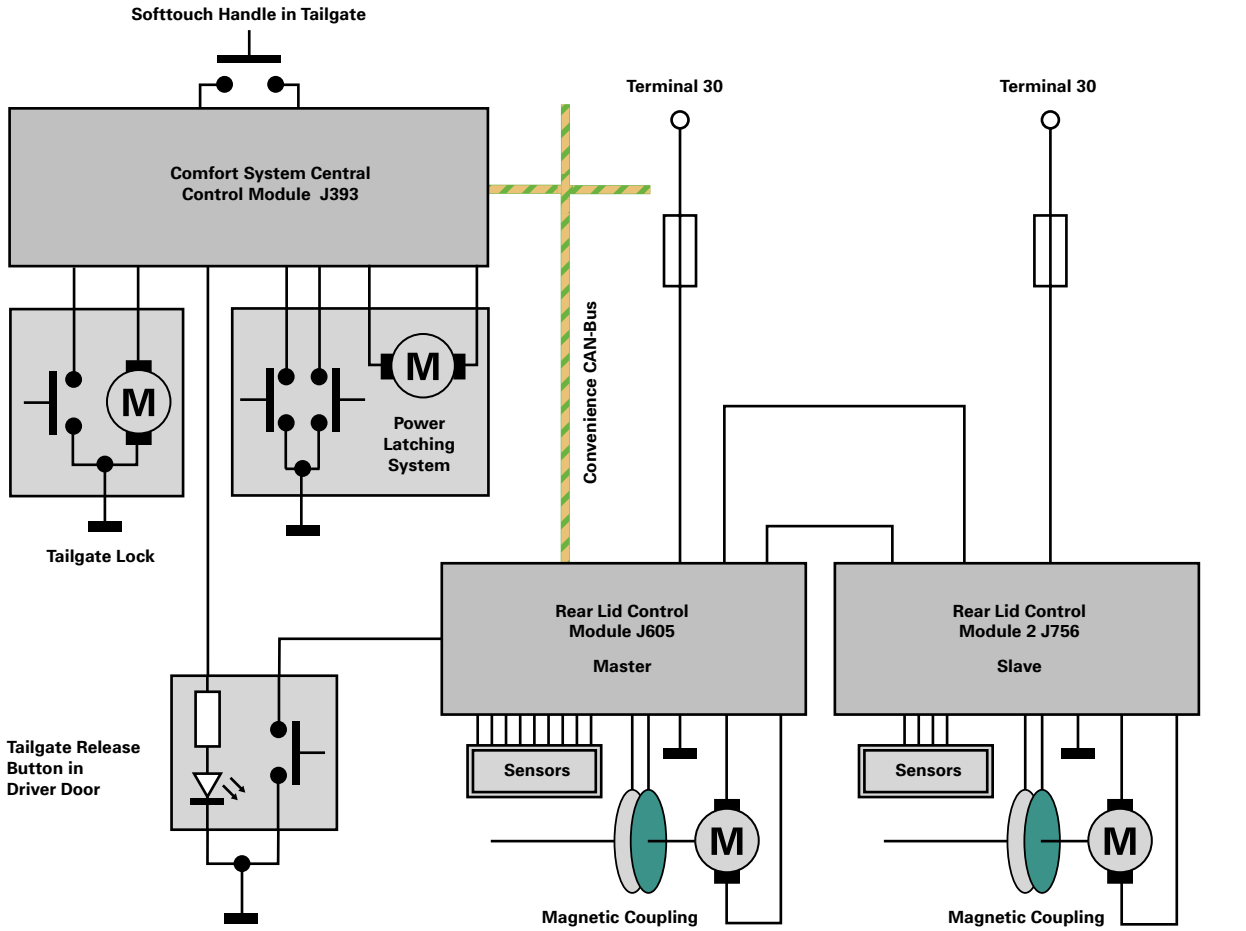
- No CAN communication with Driver’s Door Control Module J386
- No CAN communication with Comfort System Central Control Module J393
- No CAN communication with Access/Start Control Module J518
- Components protection in Comfort System Central Control Module J393 active
- The tailgate power latching system does not run when the tailgate is open or the power latching system provides no feedback to the Comfort System Central Control Module J393
- The power tailgate will not operate when vehicle movement is detected from a wheel speed sensor
- The power tailgate will not operate when the vehicle has entered battery shut off stage 2

Tailgate Control Module Network



S995503_10

– The Rear Lid Control Module J605 receives the vehicle speed signal from the ABS with EDL Control Module J104. For safety reasons, the power tailgate opening and closing functions are deactivated at vehicle speeds above 2 mph

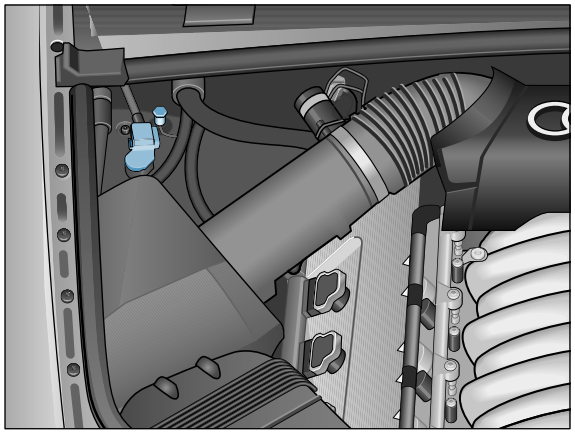


- The Rear Lid Control Module master J605 communicates with the Rear Lid Control Module 2 slave J756 via a Valeo proprietary single-wire bus
- Through the wake-up line, J605 can wake up J756.This occurs when the convenience CAN-bus is reactivated while in Sleep Mode, or when the interior tailgate release button is pressed while the convenience CAN-bus is in Sleep Mode. J756 wakes up J605 if manual operation of the tailgate is detected
- The power latching motor has two sensors that monitor the two end positions of the power latching system and signal the Comfort System Central Control Module J393 when the end position is reached

Remote Battery Charging Terminals

To provide a more service-friendly vehicle, the remote battery charging terminals are located in the engine compartment on the 2006 Audi A6 Avant.

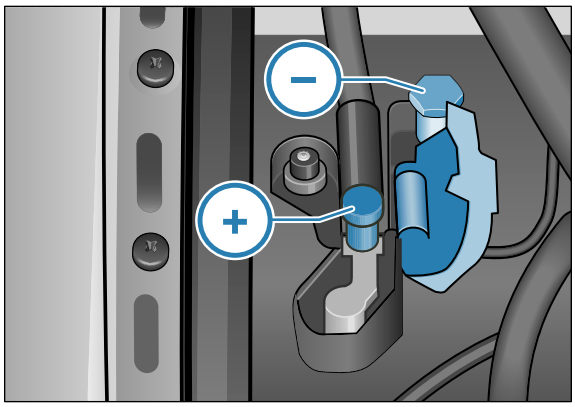
The remote battery charging terminals are located above the right strut tower. The positive pole is protected by a red plastic cover. There are no remote battery charging terminals in the luggage compartment.



344_023

Moving the remote battery charging terminals to the engine compartment prevents accidental direct remote charging of the battery.

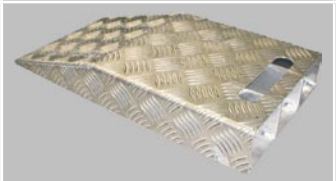
Direct charging prevents the Energy Management Control Module J644 from monitoring the battery's state of change. This can cause J644 to shutdown loads even though the battery has an acceptable charge.



344_024

New Special Tools

The following new special tools are required for service of the 2006 Audi A6 Avant.

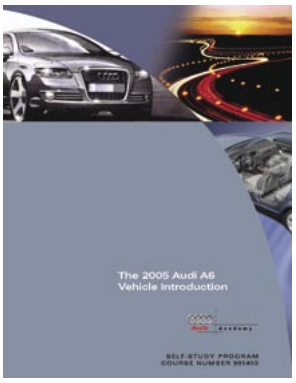
Designation	Tool	Application
T 40082/1-6 Spring Blocker for Air Springs	 344_018	The spring blockers for the A8 will not work on the A6. Using spring blockers on the A6 front axle means that replacement of the upper transverse rods is no longer required.
T 40081 Ramp	 344_016	When the air suspension system is completely depressurized, the vehicle ground clearance is too low to allow the use of a jack or hoist. Driving the vehicle onto the ramps allows the use of a car jack or an auto-hoist.
VAS 1598/53	 S995503_018	A new test adapter for the air spring control module.

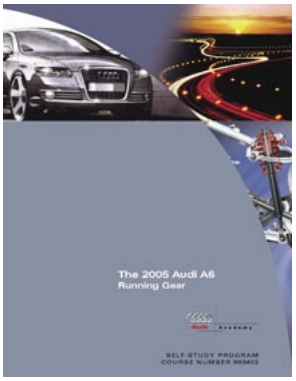
Other 2006 Audi A6 SSPs

The 2005 Audi A6 Vehicle Introduction

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

Course number: 991403





The 2005 Audi A6 Running Gear

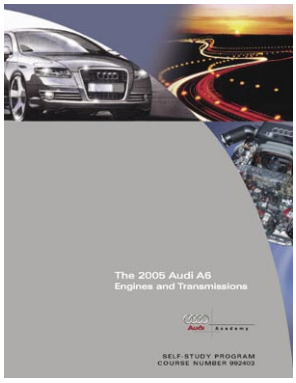
- Front axle technology
- Rear axle technology
- Steering system
- ESP
- Electric Parking Brake

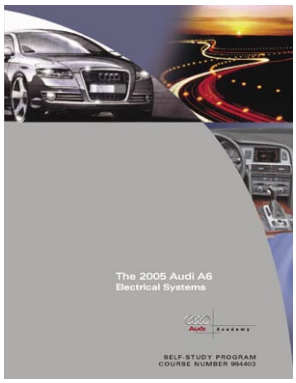
Course number: 993403

The 2005 Audi A6 Engines and Transmissions

- 3.2 V6 FSI
- 4.2 V8
- Automatic transmissions

Course number: 992403





The 2005 Audi A6 Electrical System

- Networking
- Bus topologies
- Convenience electronics
- Infotainment

Course number: 994403

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

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