The 2019 Audi A7 Introduction

eSelf-Study Program 990593

Audi Academy

Audi of America, LLC
Service Training
Created in the U.S.A.
Created 05/2018

Course Number 990953

Always check Technical Bulletins and the latest electronic service repair literature for information that may supersede any information included in this booklet.

eMedia

This eSSP contains video links which you can use to access interactive media.

Revision: Final - May 25, 2018

This self-study program teaches a basic knowledge of the design and functions of new models, new vehicle components or new technologies.
It is not a Workshop Manual. Any figures given here are for explanatory purposes only and refer to the data valid at the time of writing.
Content is not updated.
It is essential that you refer to the latest technical literature when carrying out maintenance and repair work.

Note

Reference

Introduction

The 2nd generation of the Audi A7 is a special example of the new Audi design language. Viewed from any perspective, the wider low-set grill and the athletic lines exude sportiness and progressiveness. Flared wheel arches accommodating up to 21 inch rims hint at Audi A7 quattro genes.

The full range of Audi connect services has been adopted from the Audi A8 to make the Audi A7 a fully networked Gran Turismo model in the Audi portfolio. With a total of 39 driver assist systems, the Audi A7 is a perfect companion on the road.

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Learning objectives of this eSelf-Study Program:

Once you have completed this eSelf-Study Program, you will be able to answer questions on the following topics:

- The engine available at market launch.
- 48 Volt electrical system.
- New running gear features.
- New power transmission features.
- New features of the infotainment systems.

Overview

The impressive appearance of the Audi A7 is due mainly to its dynamic and elegant character and a completely new interior design. Like the Audi A8, the Audi A7 is based on Mild Hybrid Electric Vehicle (MHEV) technology.

Engine

3.0 ltr. V6 TFSI engine with twin-scroll turbocharger

- Maximum power: 335 hp (250 kW)
- Maximum torque: 369 lb ft (500 Nm)

Driver assist sensors

Control Module for Adaptive Cruise Control J428 is installed in the top left corner of the grill. Laser Distance Regulation Control Module J1122 is installed in the top right corner of the grill.

Audi laser light

The Audi laser light is used and an auxiliary high beam supplementing the LED high beam. The laser spot is activated in addition to the LED high beam at road speeds over approximately 37 mph (60 km.h). This allows the high beam distance to be virtually doubled.

Displays and operation

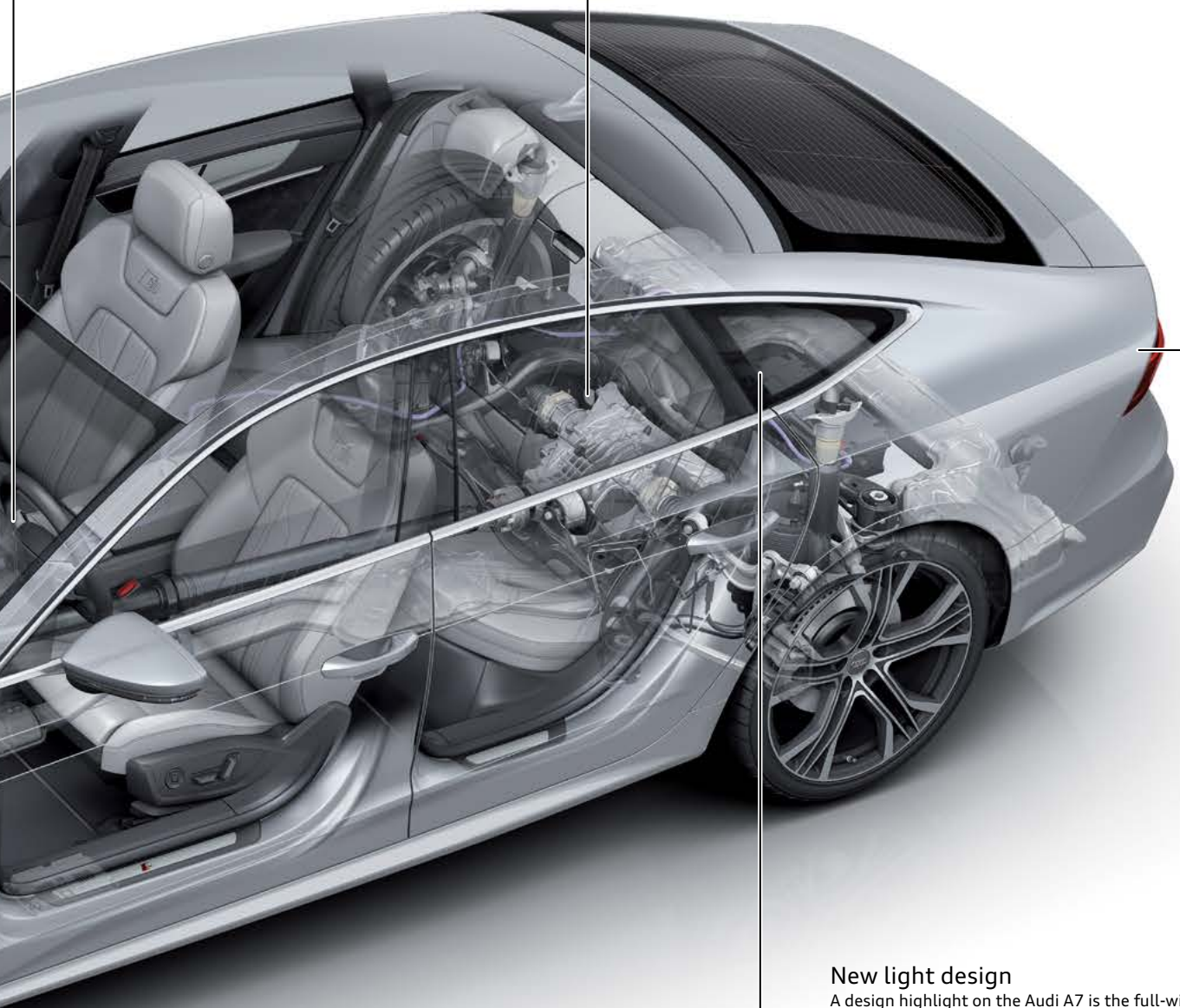
The operating and display concept on the Audi A7 uses an MMI touch response system with two touchscreens, a switch module (optional) and a light switch module with haptic and acoustic feedback. Also integrated are intelligent handwritten letter input with full-word and multi-finger recognition. An Audi virtual cockpit with full HD resolution and a head-up display are optionally available.

Power transmission

Power transmission on the Audi A7 is exclusively via an automatic transmission. New features include the following:

- quattro with ultra technology
- 7-speed dual clutch transmission 0HL
- New selector mechanism featuring shift-by-wire technology

For further information, refer to the section starting on page 26.



New light design

A design highlight on the Audi A7 is the full-width tail-light band.

Electrical system

The Audi MHEV technology is based on a newly developed 48 Volt main electrical system which also supplies power to the 12 Volt electrical subsystem. The 48 Volt electrical system is powered by a belt-driven starter generator (BSG) which is connected to the engine's belt drive. A lithium-ion battery, located underneath the luggage compartment floor, is used to store power.

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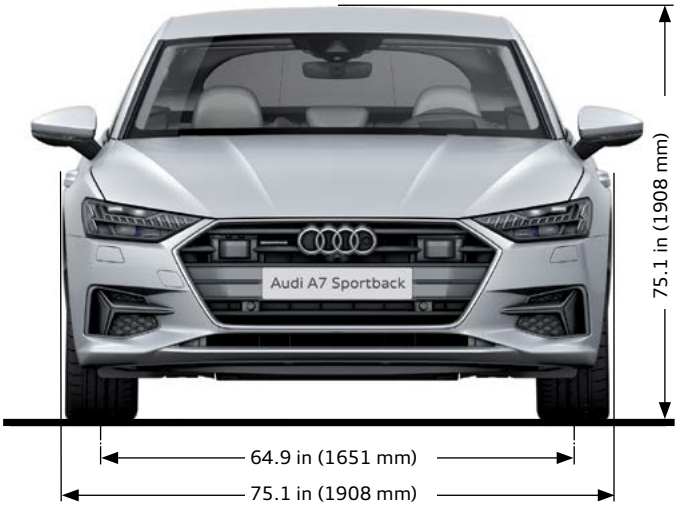
Dimensions



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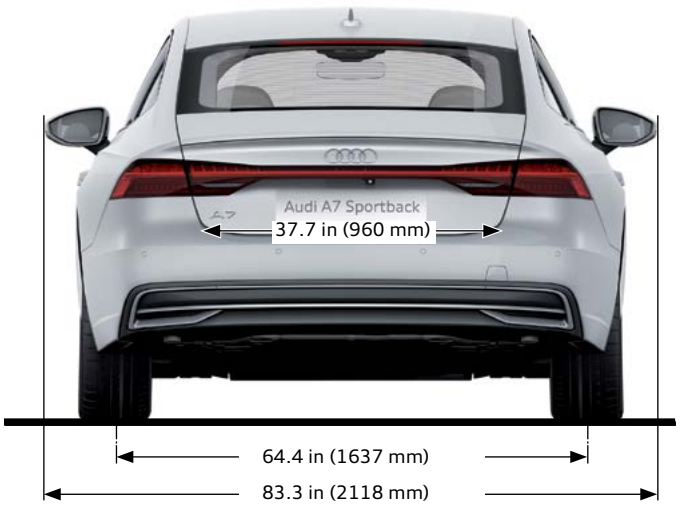

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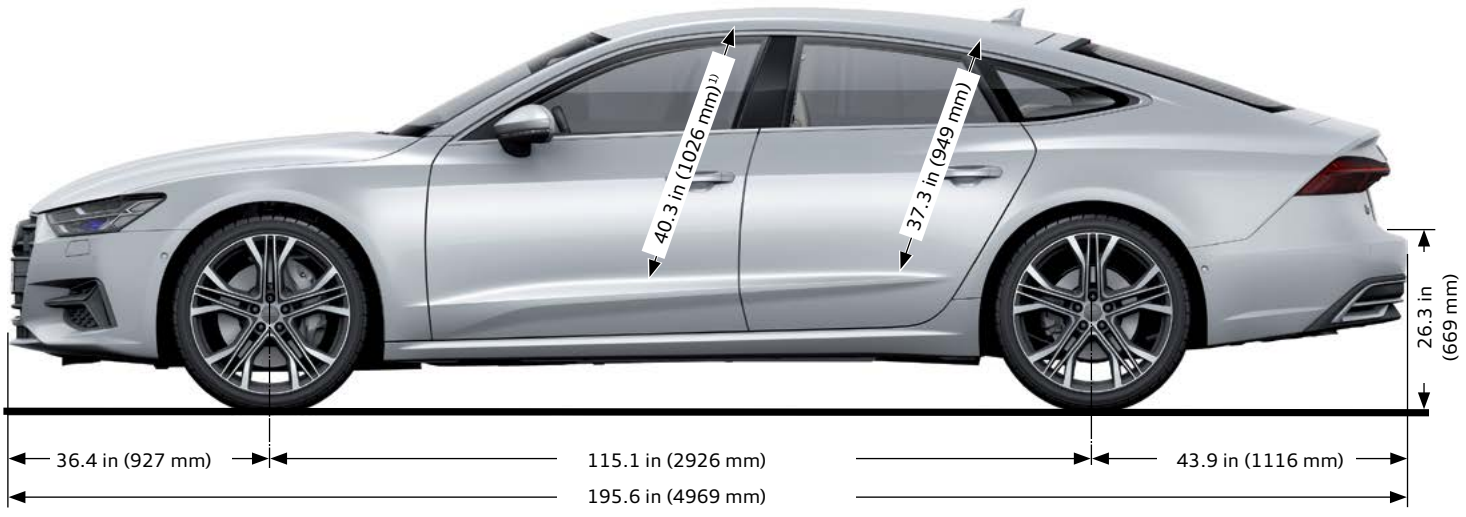

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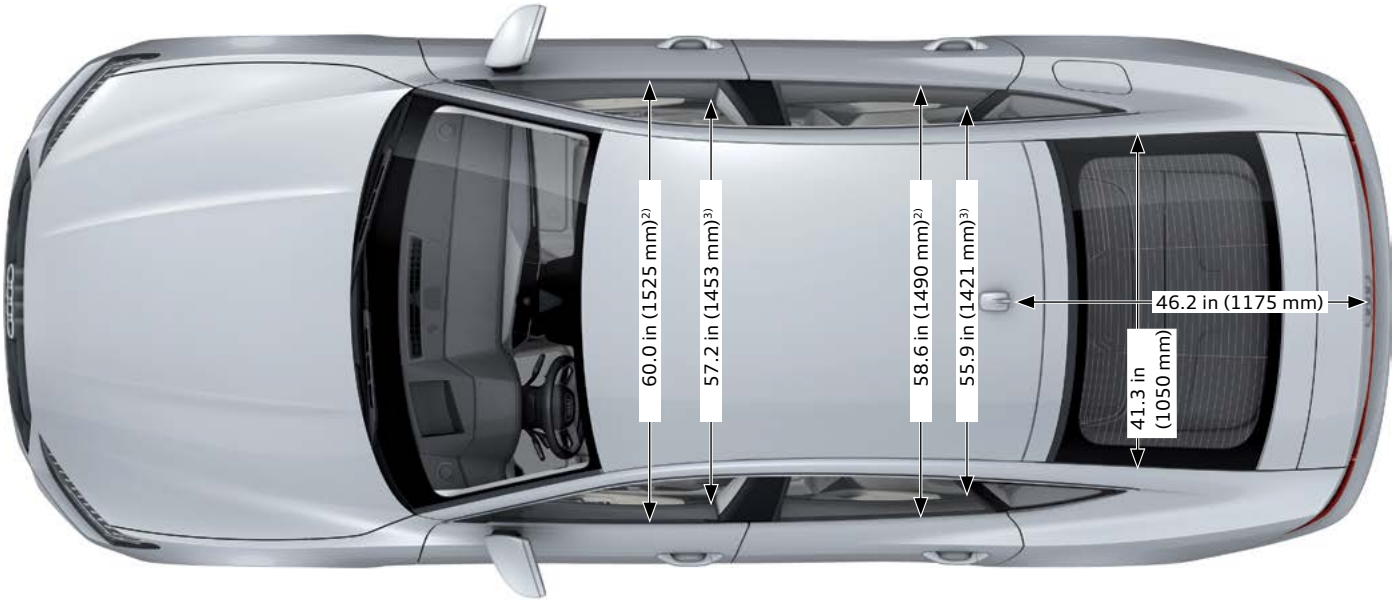

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Exterior dimensions and weights

Length	195.6 in (4969 mm)
Width (not incl. mirrors)	75.1 in (1908 mm)
Width (incl. mirrors)	83.3 in (2118 mm)
Height	55.9 in (1422 mm)
Front track	64.9 in (1651 mm)
Rear track	64.5 in (1637 mm)
Wheelbase	115.1 in (2926 mm)
Unladen weight	4001 lb (1815 kg)

Interior dimensions and other specifications

Front cabin width	60.0 in (1525 mm)2)
Front shoulder width	57.2 in (1453 mm)3)
Rear cabin width	58.6 in (1490 mm)2)
Rear shoulder width	55.9 in (1421 mm)3)
Load sill height	26.3 in (669 mm)
Luggage compartment capacity	18.8 cu ft (535 l)
Drag coefficient cw	0.27
Capacity of fuel tank	19.2 gal (73 l)

1) Maximum headroom
2) Elbow room width
3) Shoulder room width

All dimensions given refer to the unladen weight of the vehicle.

Body

Overview

Like its predecessor, the body of the Audi A7 is a composite construction using various materials. In addition to various grades of steel, die-cast aluminum is used for the front suspension turret and for the node castings on the rear roof frame. An aluminum reinforcement plate is located on the D-pillar.

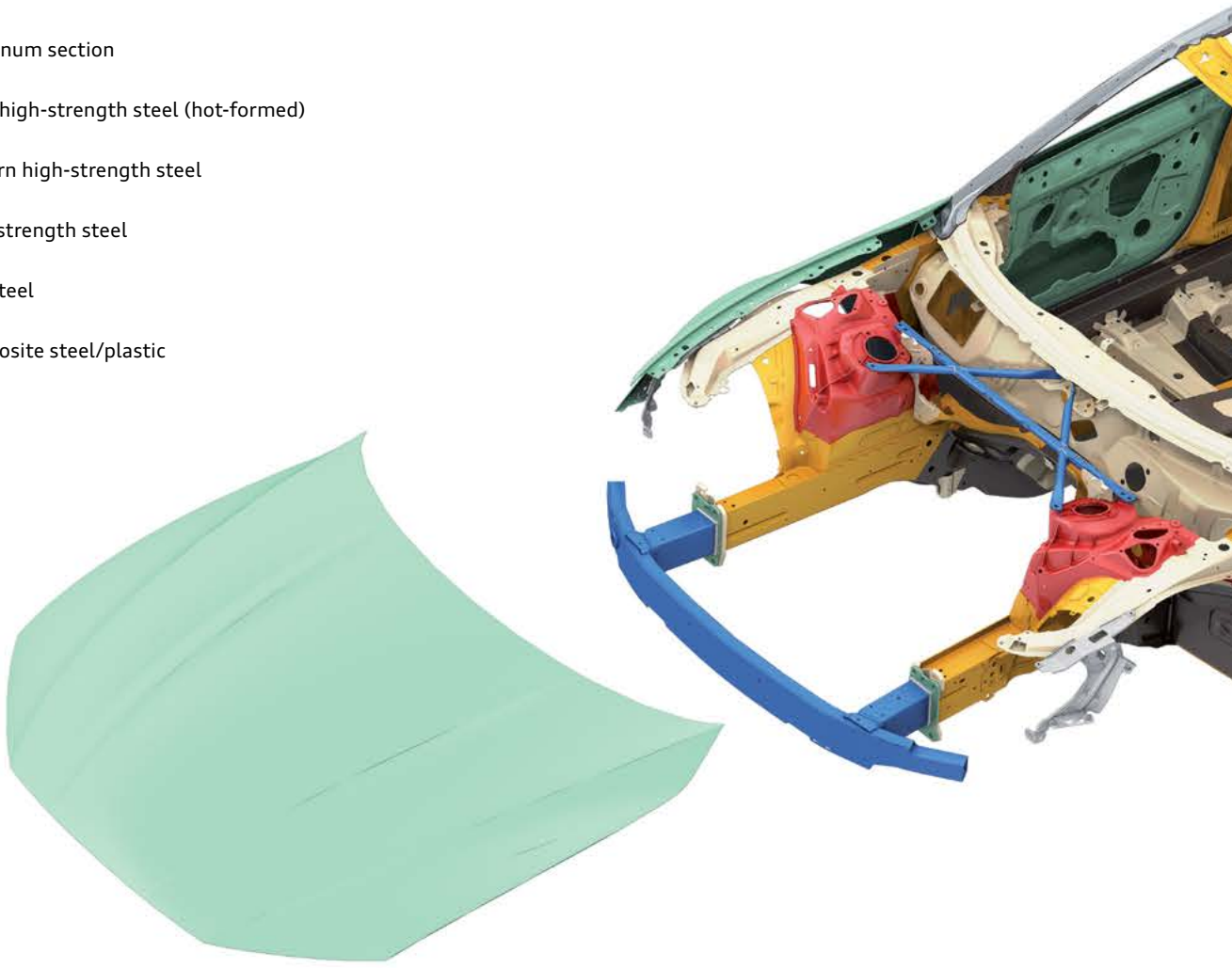
The bumper carriers with crash boxes, the body brace and the reinforcement struts on the underbody are manufactured from extruded aluminum profiles and the attachments from sheet aluminum.

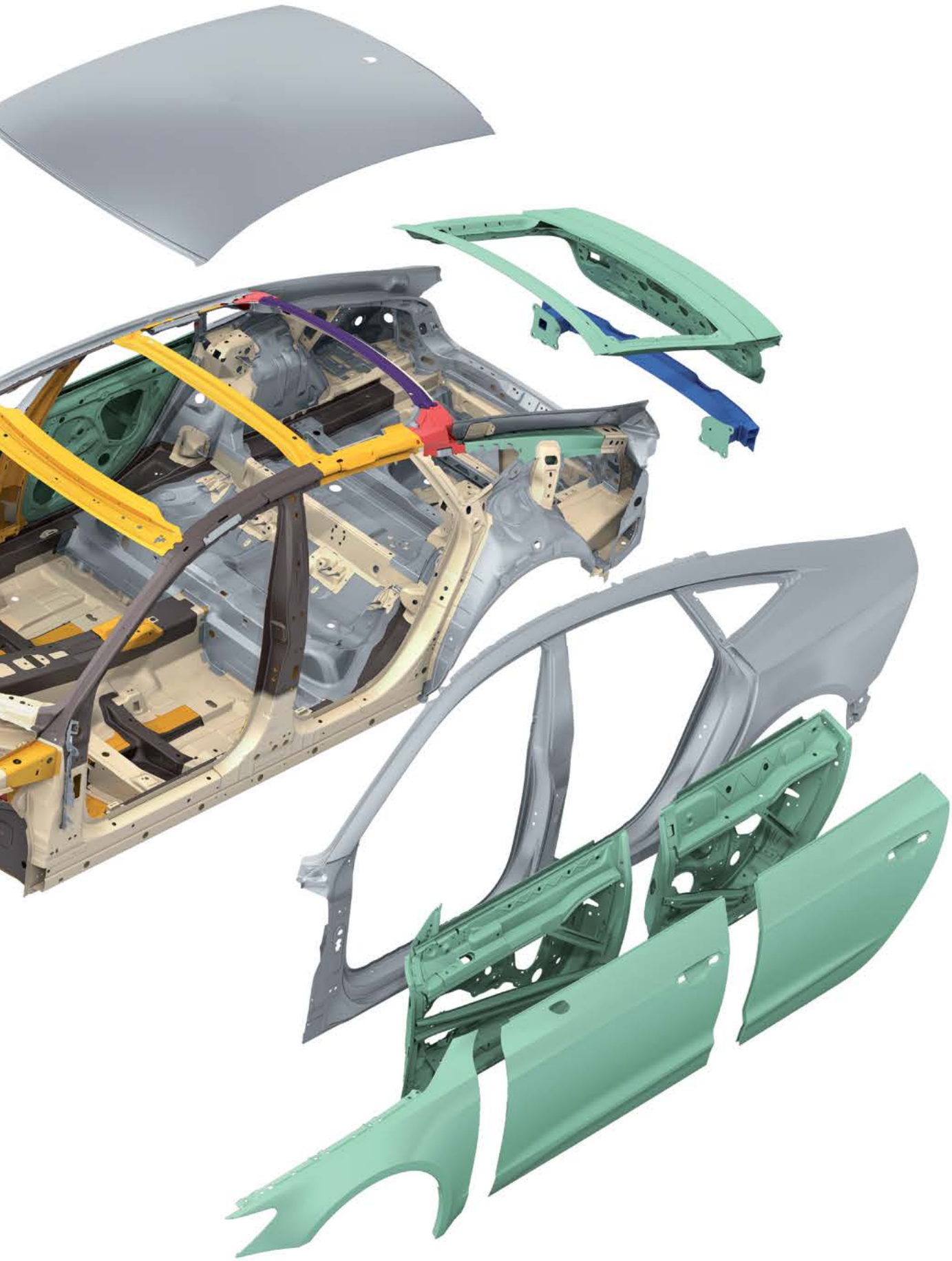
The upper shell of the rear roof frame is made of a new type of steel/plastic composite material.

The main joining technologies used are (for steel) spot welding and laser welding on the sill panels, laser soldering on the roof/water channel and (for steel aluminum composite materials) punch riveting with adhesive bonding.

Key:

- Sheet aluminum
- Die-cast aluminum
- Aluminum section
- Ultra-high-strength steel (hot-formed)
- Modern high-strength steel
- High-strength steel
- Soft steel
- Composite steel/plastic





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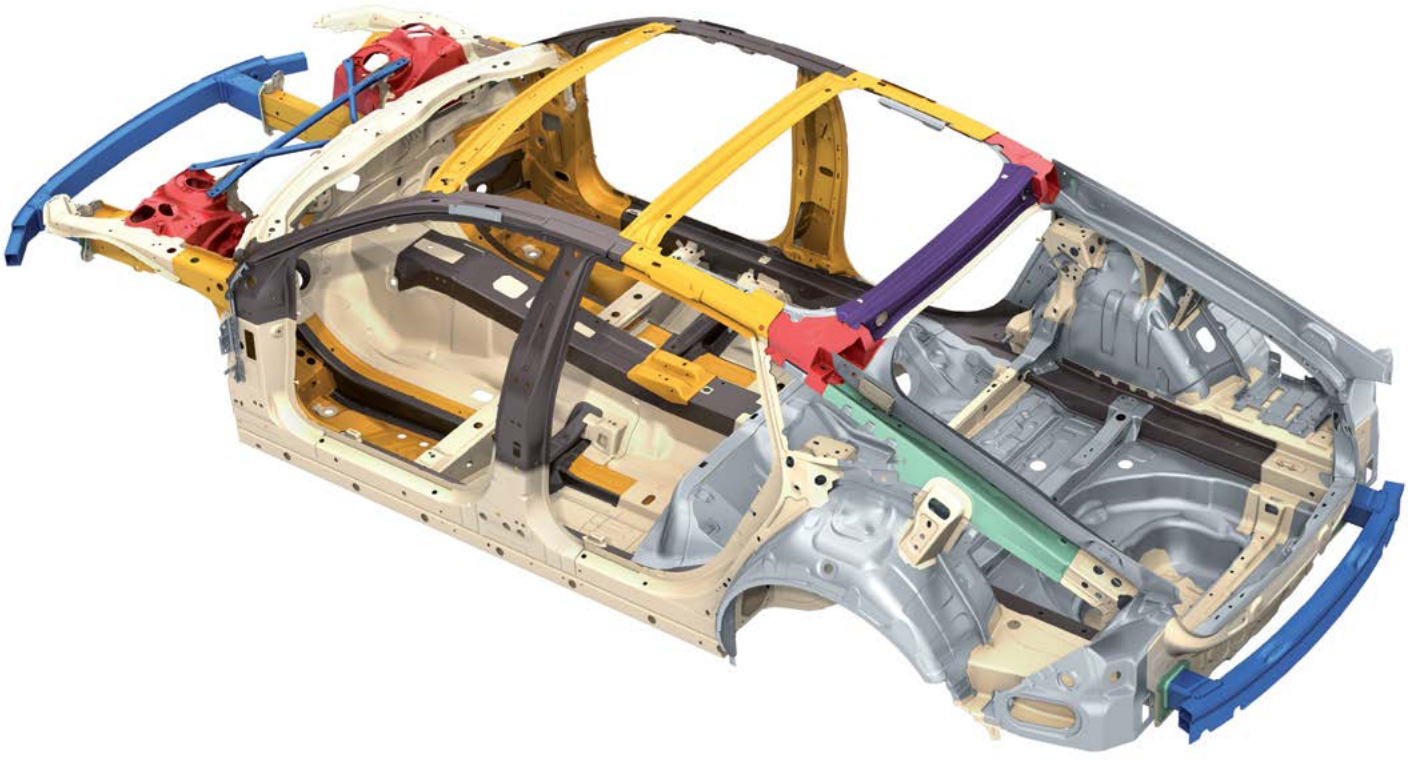
Body structure

The high torsional strength and crash safety of the body structure on the Audi A7 is achieved by the intelligent mixture of different high-strength to ultra-high-strength types of sheet steel.

Key:

- Sheet aluminum
- Die-cast aluminum
- Aluminum section
- Ultra-high-strength steel (hot-formed)
- Modern high-strength steel
- High-strength steel
- Soft steel
- Composite steel/plastic



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The number of ultra-high-strength hot-formed sheet steel parts in the passenger compartment has been increased. Some of these steel parts are hardened; others consist of tailored blanks with variable wall thicknesses.

They are used in the lower area of the bulkhead, the side members, the rear seat cross members, the top section of the tunnel, the rear longitudinal members, the B-pillars and the A-pillars.

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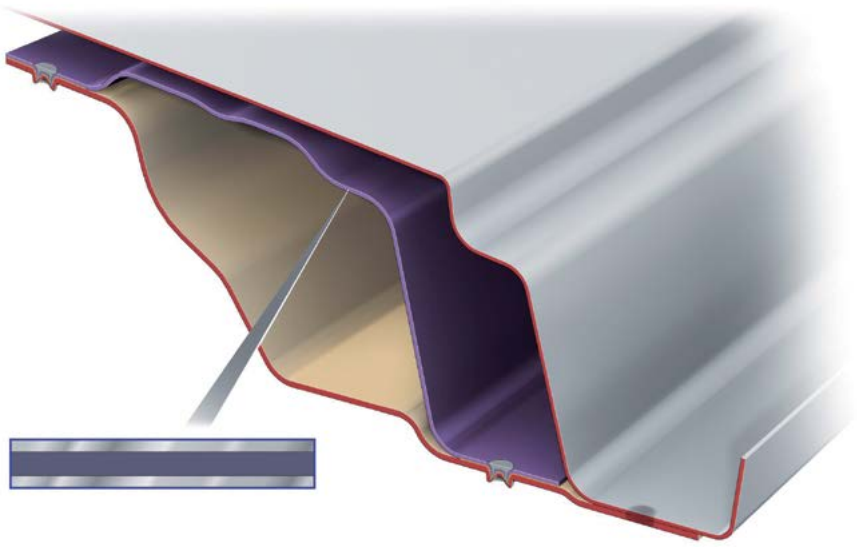
Composite steel/plastic material

One of the innovations and a special feature is the use of composite steel/plastic material for the top section of the rear roof cross member. In this material, a 0.4 mm thick plastic sheet is combined with 0.2 mm thick steel sheets to form a composite sheet. The rigidity and flexural strength is similar to comparable steel parts, while the weight is significantly lower.

In the production process, the semi-finished product is deep-drawn just like a regular steel sheet and the two halves of the roof cross member are joined by punch riveting and adhesive bonding. Punch rivets and additional adhesive are also used to join the aluminum cast nodes at the sides.



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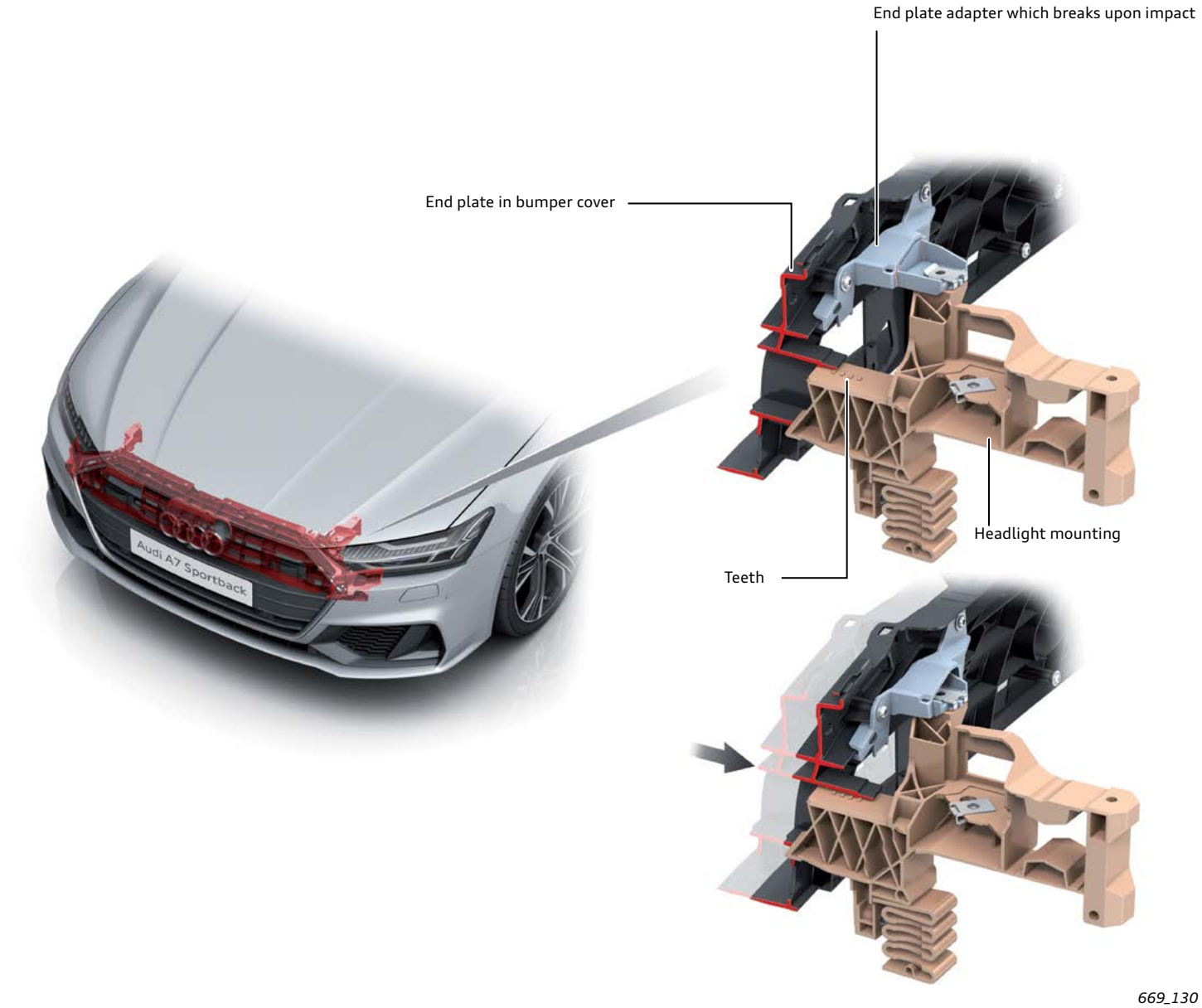
Body assembly

Front bumper

To minimize the risk of a pedestrian sustaining knee injuries in the event of a collision with the Audi A7, a mechanism is integrated in the end plate of the front bumper cover to prevent the bumper cover from springing back against the pedestrian's knee.

This mechanism pushes the end plate into the headlight mounting where it latches onto a set of teeth which hold it there. Because damage can occur to the detent mechanism (for example, if the teeth are blunt or broken), both parts must be replaced after an accident. Replacement is intended to ensure that the mechanism functions properly should another pedestrian accident occur.

The connection between the end plate and the headlight mounting is made by an end plate adapter which is designed to break on impact. This end plate adapter is the first part to break in small impacts, for example, when parking. In this case, the end plate does not latch onto the headlight mounting. The end plate and the headlight mounting can continue to be used; only the adapter has to be replaced.



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Instrument panel

The appearance and design of the A7 instrument panel is similar to the 2019 A8 but its structure is fundamentally different. The air outlets do not swivel electrically and do not have the movable covers. Because the trim on the passenger side surrounds the MMI screen and forms a single unit with the top panel, the procedure for disassembling the instrument panel is different to the Audi A8. Always follow the instructions in the most recent service literature.

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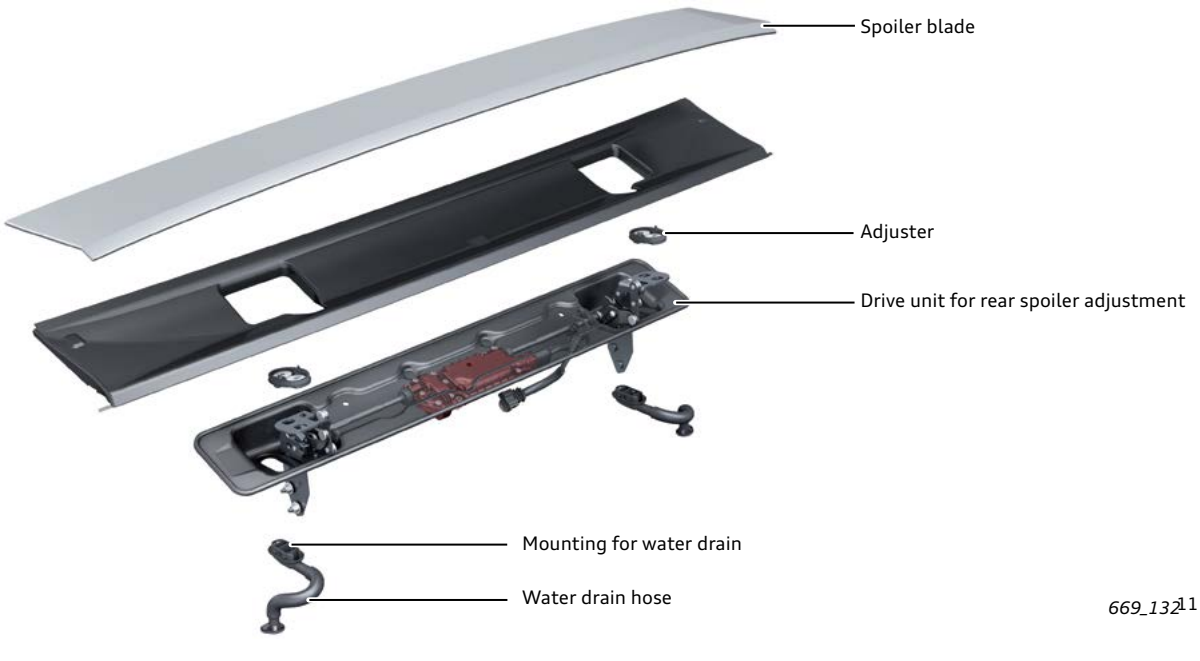
Rear spoiler

Like its predecessor, the Audi A7 has a retractable spoiler in the rear lid. At speeds above approximately 75 mph (120 km/h), Rear Spoiler Motor V52 automatically extends the spoiler blade. The spoiler is automatically retracted when the speed drops below approximately 50 mph (80 km/h). A button in Front Information Display Control Head 2 J1060 can also be used to operate the spoiler manually. To retract the spoiler at speeds up to 12 mph (20 km/h), the button in J1060 must be held until the spoiler is fully retracted. The following corresponding messages appear on the MMI display J685: "Press and hold to retract rear spoiler manually" and "The rear spoiler is retracted." At speeds above 12 mph (20 km/h) the button only needs to be pressed briefly.

Two Hall sensors monitor whether the spoiler has reached the end positions. One of the sensors measures the end position of the extended rear spoiler while the other counts the number of drive motor revolutions while the spoiler is being retracted.

Adjusters allow the height of the spoiler blade to be aligned vertically (z axis) in relation to the rear lid and side panel. Elongated holes are used for alignment in the longitudinal and transverse directions (x and y axes).

Drain hoses on the right and left ensure that water can be channeled out of the drive unit for the rear spoiler adjustment. Since molded hoses are used, the markings on both sides must align with each other when the hoses are installed on the mountings.



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Panoramic glass sunroof

The Audi A7 can be equipped with a panoramic glass sunroof which spans the entire width of the roof. A piece of glass trim is permanently installed in front of the moving sunroof panel.

The glass panel can either be tilted at the rear or it can slide open over the roof towards the rear. An electrically operated blind provides protection against bright sunlight.

The water drain hoses on the left and right are located at the rear end of the roof insert. A new feature is that, instead of being clipped into the sunroof frame, the water drain hoses are attached directly to the roof reinforcement at the top and the wheel housing at the bottom.

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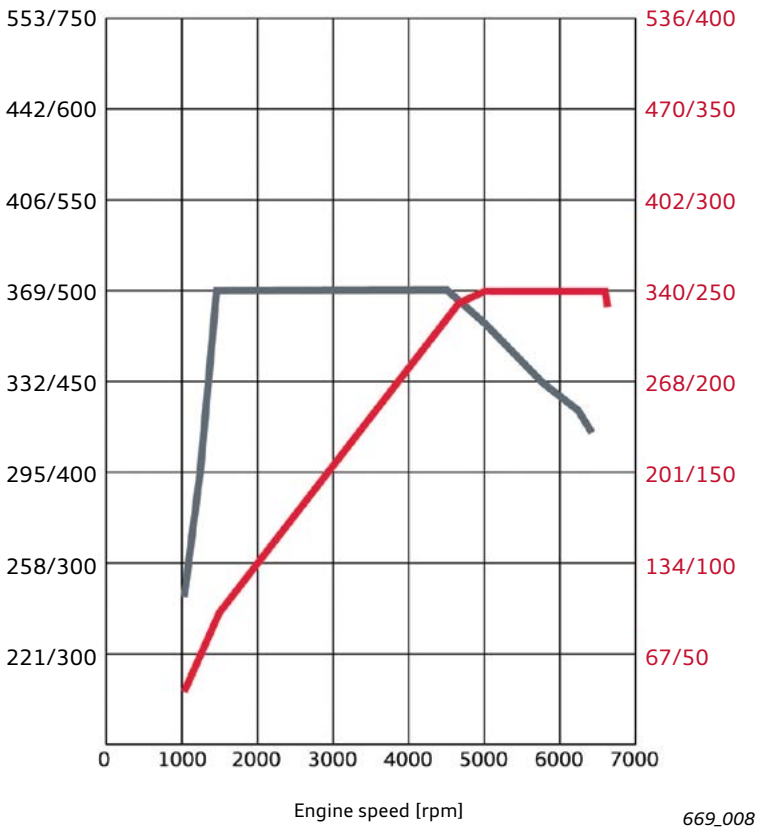
Engine

Torque/power curve

Engine with code DLZA

Power in hp/kW
Torque in lb ft/Nm



Features	Technical data
Engine code	DLZA
Type	V6 engine with 90° V angle
Capacity	183 cu in (2995 cc)
Stroke	3.5 in (89.0 mm)
Bore	3.32 in (84.5 mm)
Number of valves per cylinder	4
Firing order	1-4-3-6-2-5
Compression ratio	11.2 : 1
Power output at rpm	335 hp (250 kW) at 5000 – 6400
Torque at rpm	369 lb ft (500 Nm) at 1370 – 4500
Fuel	Premium unleaded
Turbocharging/supercharging	Twin-scroll turbocharger with wastegate
Engine management	Bosch MDG 1
Maximum injection pressure	3625.9 psi (350 bar)
Lambda/knock control	Adaptive oxygen sensor, adaptive knock control
Mixture formation	Direct injection
Emission control	2 close-coupled ceramic cat. conv. Oxygen sensor before & after cat. conv.
Emission standard	LEV3 / Tier3
Concept	Mild hybrid (48V)

Reference

For further information about the engine used, please refer to eSelf-Study Program 920173, The Audi 3.0l V6 TFSI EA839 Engine.

Engine/transmission combinations

3.0 ltr. TFSI engine 335 hp (250 kW) (DLZA) EA839 series	
7-speed dual clutch transmission 0HL DL382+ -7A	
Rear final drive 09R HL195.U1 M	
Optional equipment (S7) Rear final drive 0D3 — Sport differential HL195.T2 M	

Key to manufacturer code designation

Transmission

DL382+ -7A

Transmission type
D = Dual clutch transmission
A = Automatic planetary transmission

Orientation
L = Longitudinal

Development number
— indicating torque capacity, generation and position of front final drive

Number of speeds

Front-wheel drive / four-wheel drive
A = Four-wheel drive with separate transfer box/center differential or separate four-wheel drive coupling
Q = Four-wheel drive with integrated transfer box/center differential
F = Front wheel drive

Final drives

HL195.S3 M

Installation location
H = Rear

Orientation
L = Longitudinal

Crown wheel diameter in mm

Final drive type
S = Standard (open differential)
T = Torque Vectoring (sport differential)
U = ultra technology (quattro ultra)

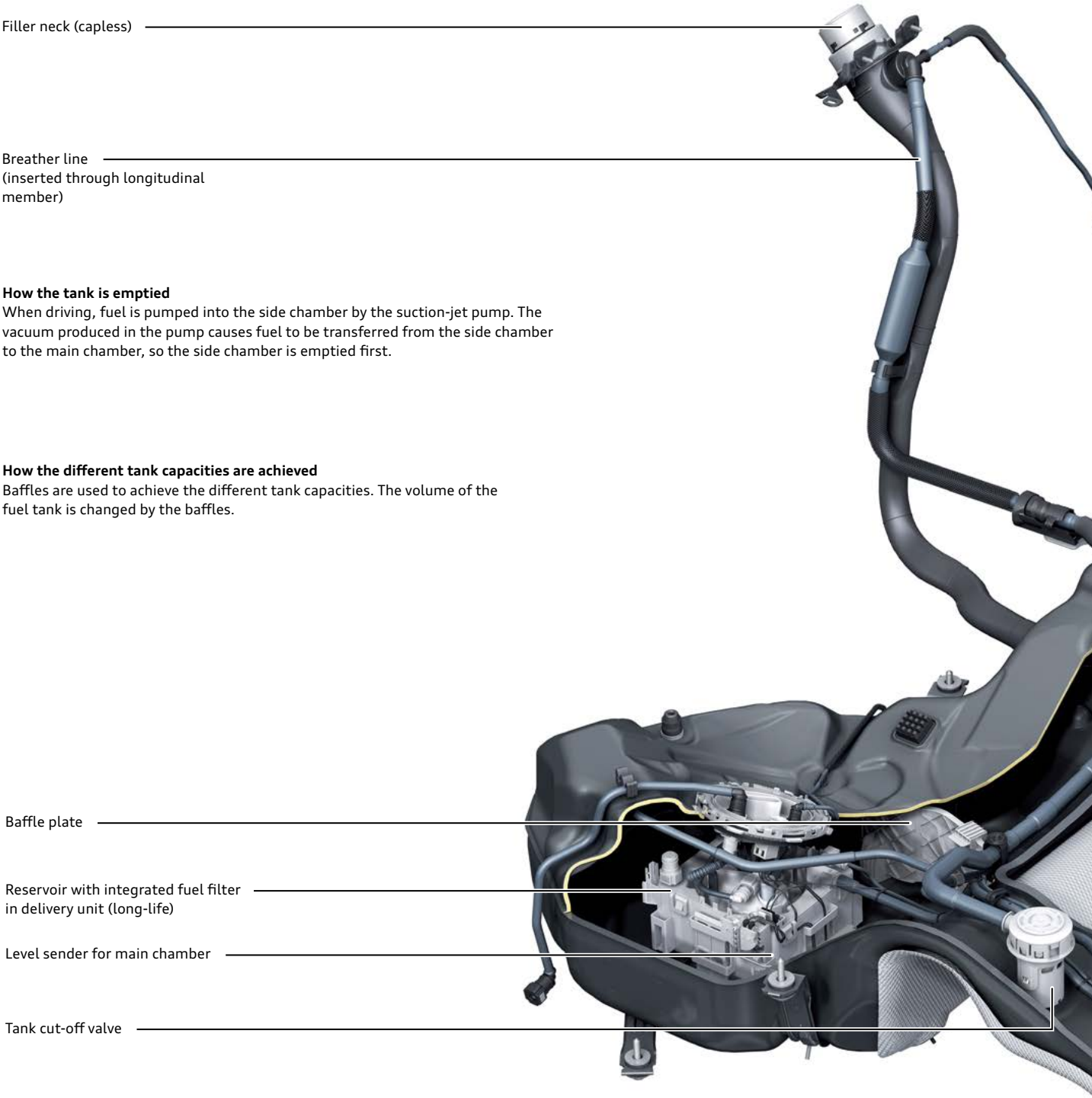
Version
1 = 1st generation
2 = 2nd generation
3 = 3rd generation

Manufacturer code:
M = Magna Powertrain

Fuel tank

The A7 has a 19.2 gal (73 l) fuel tank.

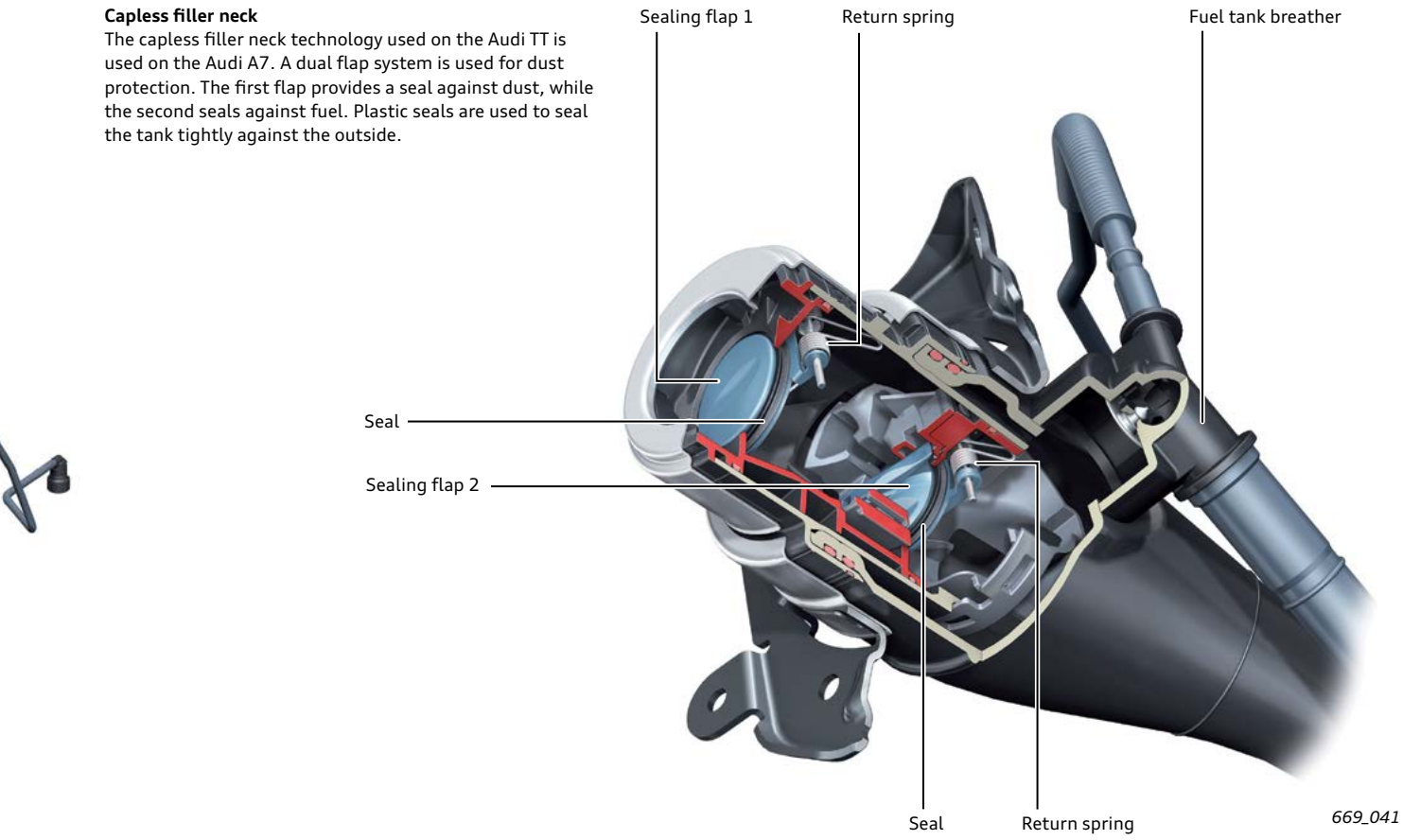
A tank cut-off valve is installed in the lower part of the tank. The end of the pipe from this valve is located in the upper part of the liquid trap. The TFSI tank requires several roll-over valves for ventilation.



How the tank is emptied
When driving, fuel is pumped into the side chamber by the suction-jet pump. The vacuum produced in the pump causes fuel to be transferred from the side chamber to the main chamber, so the side chamber is emptied first.

How the different tank capacities are achieved
Baffles are used to achieve the different tank capacities. The volume of the fuel tank is changed by the baffles.

Capless filler neck
The capless filler neck technology used on the Audi TT is used on the Audi A7. A dual flap system is used for dust protection. The first flap provides a seal against dust, while the second seals against fuel. Plastic seals are used to seal the tank tightly against the outside.



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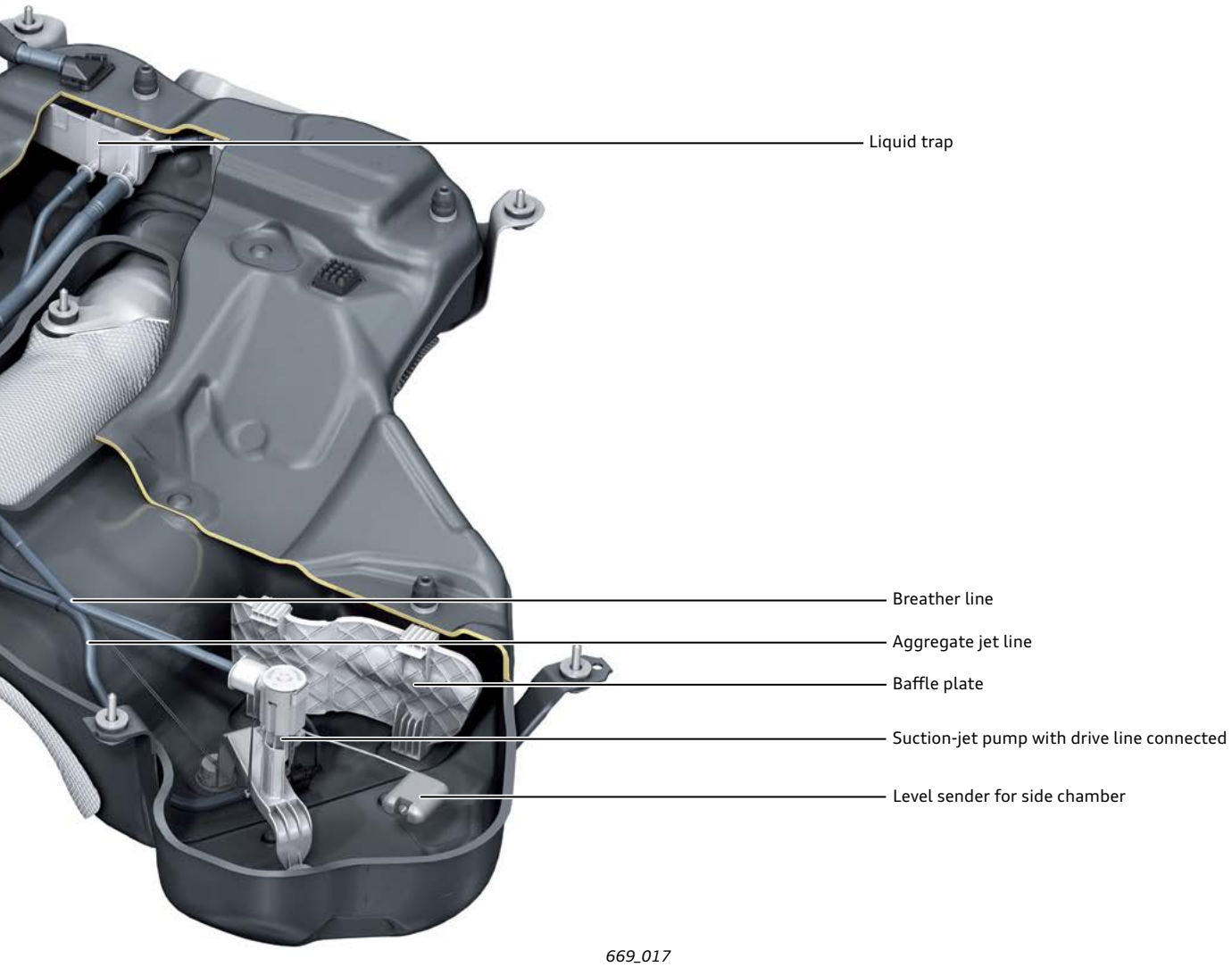

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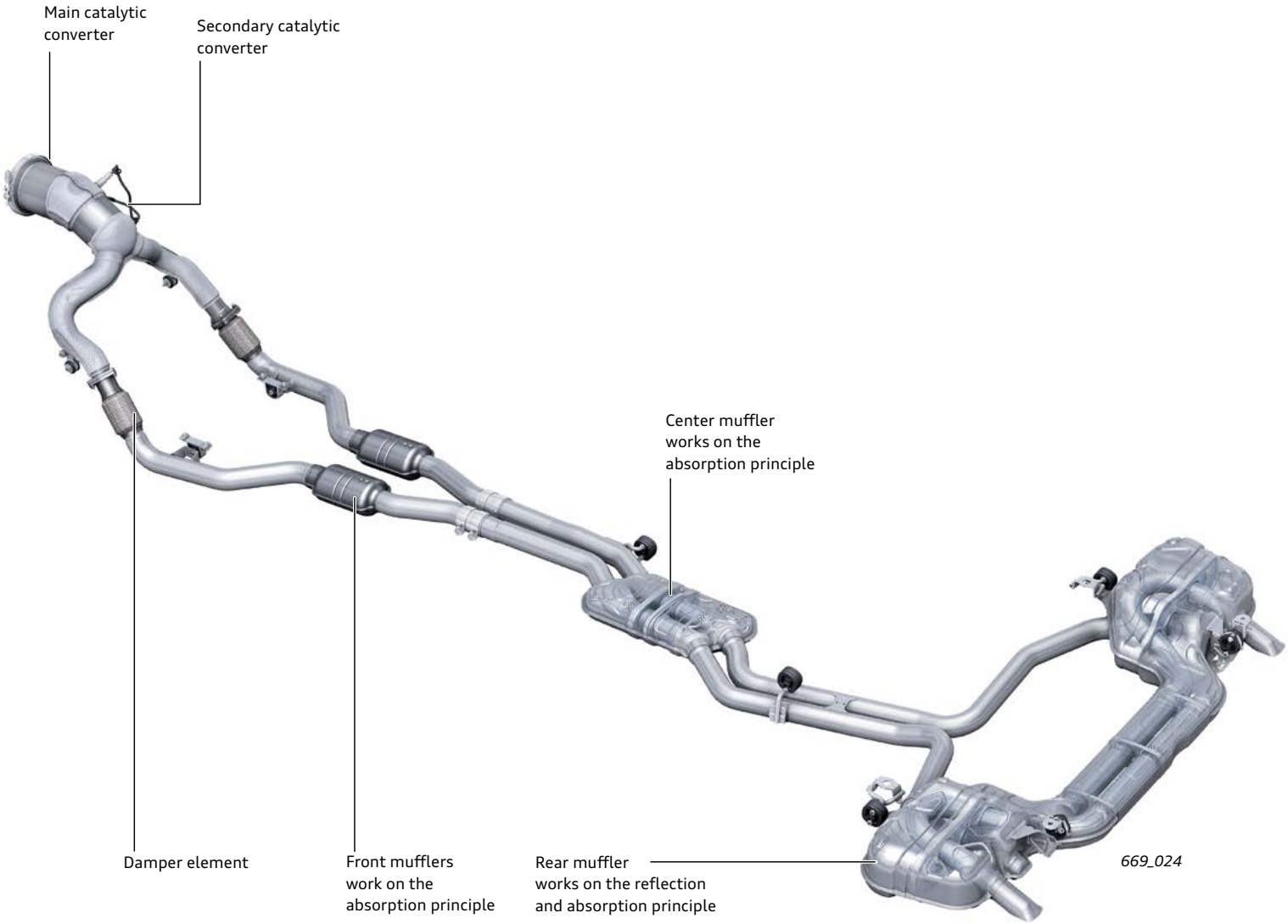
Exhaust system

3.0 ltr. TFSI engine

The gas flow paths are very short because the turbocharger module is located in the inner V. The catalytic converter is bolted directly to the turbocharger outlet. This allows the converter to achieve light-off very quickly after a cold start.

Catalytic converter module

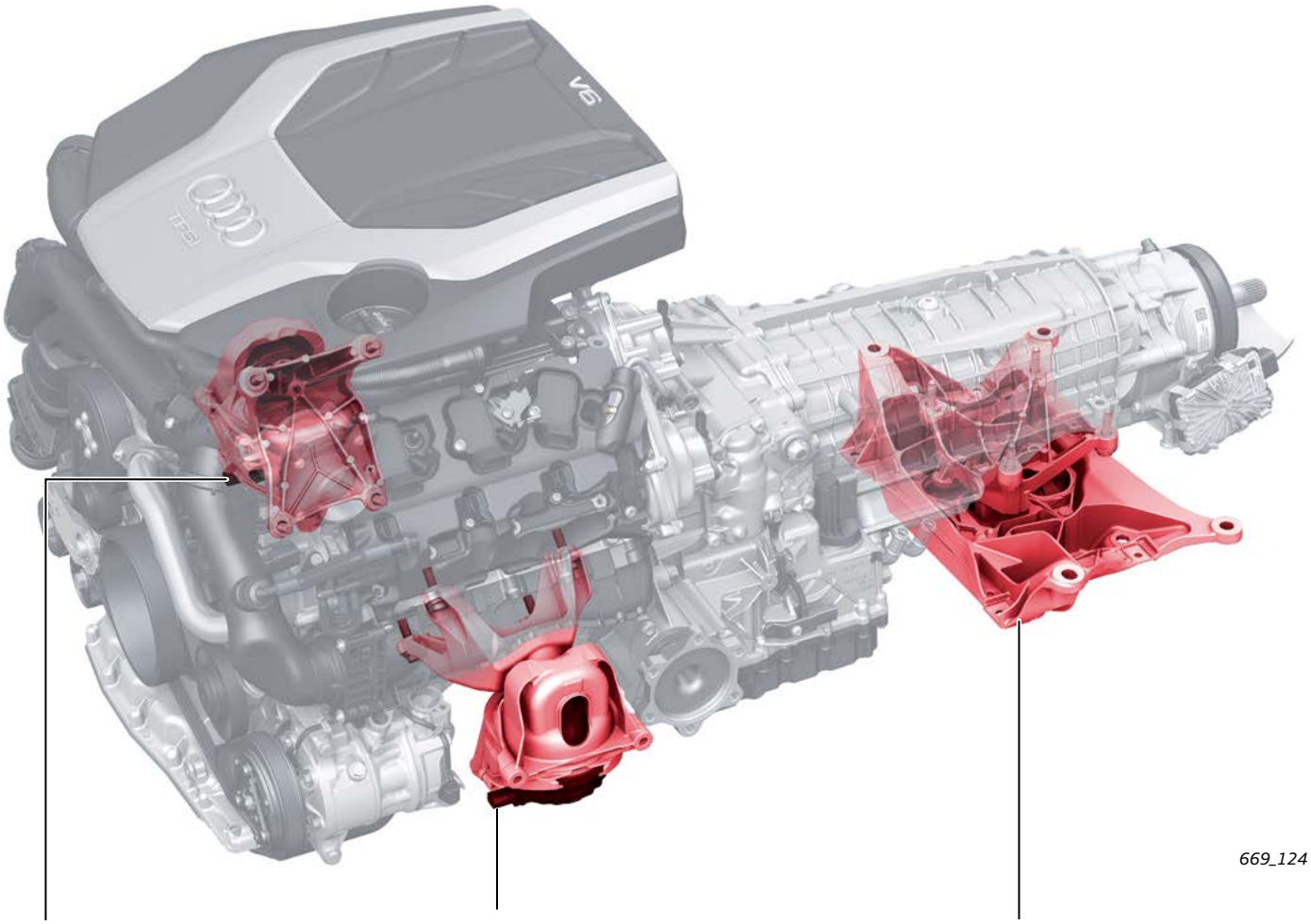
The module is flanged-mounted directly to the turbocharger, which houses the main and secondary catalytic converters. Both catalytic converters are ceramic-type catalytic converters.



Engine mounts

The engine of the A7 has a three-mount system. There are two switchable mounts on the engine and a hydraulic mount on the transmission.

This system achieves an extremely comfortable ride by switching the two engine mountings between soft (vehicle idling, current supply to mounting on) and hard (vehicle in motion, current supply to mounting off).



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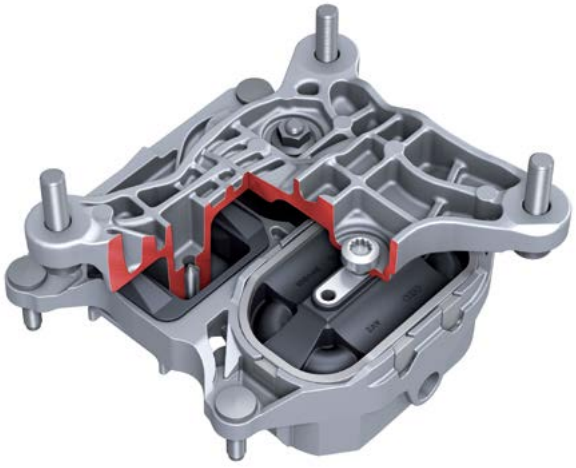
Right Electro-hydraulic Engine Mount Solenoid Valve N145

Left Electro-hydraulic Engine Mount Solenoid Valve N144

Hydraulic transmission mounting

Hydraulic transmission mount

The hydraulic transmission mount is installed at the rear section of the transmission and counteracts the drive forces.



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Engine mount diagnosis

The VAS Scan Tool is used to read measuring values of the current being supplied to the engine mounts.

Hydraulic engine mounting

Left Electro-hydraulic Engine Mount Solenoid Valve N144

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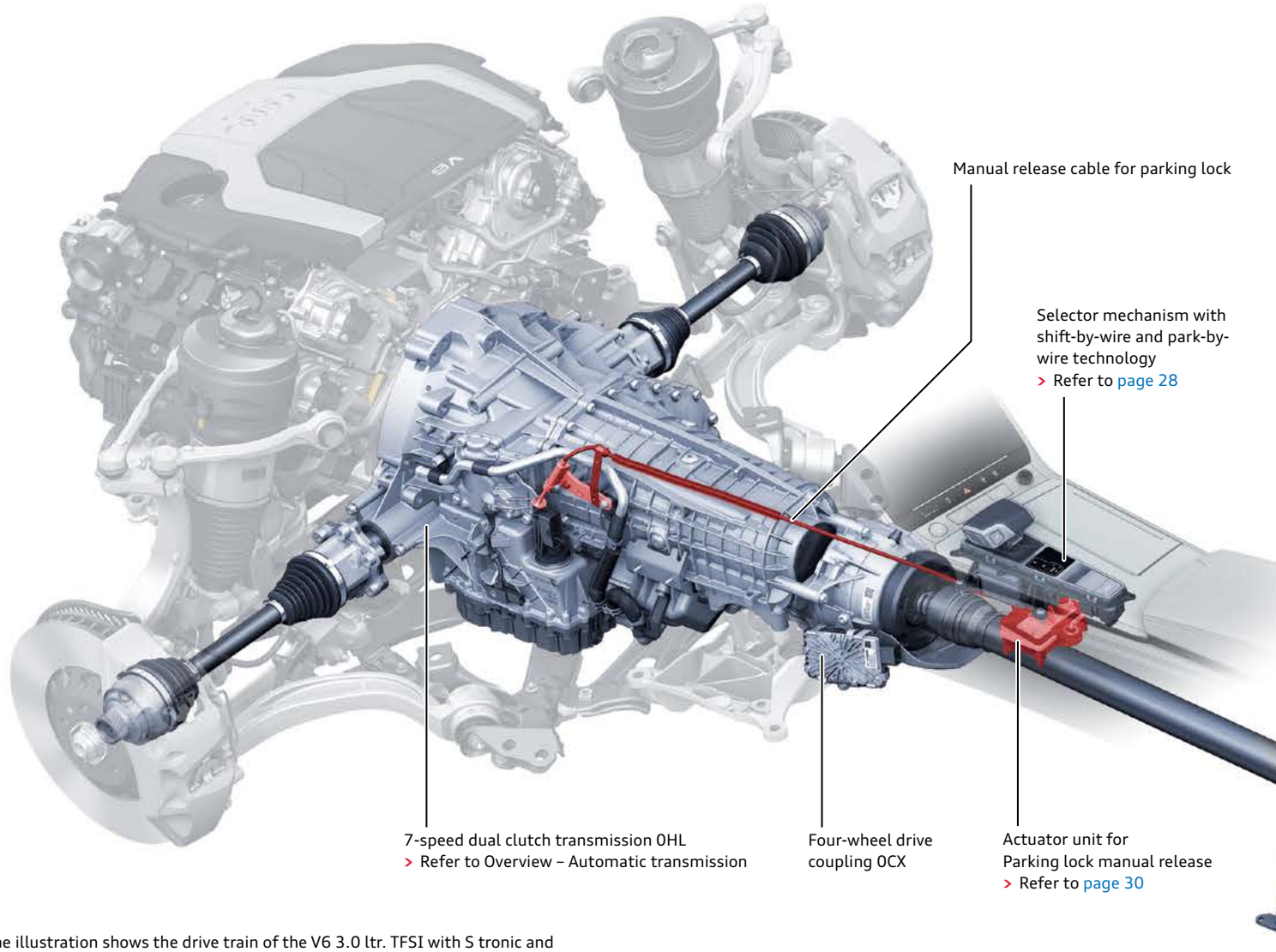
Power transmission

Overview

The power transmission system of the A7 has much in common with the latest Audi A4, Q5, and Q7. Please refer to the eSelf-Study Programs for those vehicles for further information.



The illustration shows the drive train of the V6 3.0 ltr. TFSI with S tronic and the quattro four-wheel drive system with ultra technology.

7-speed dual clutch transmission 0HL – S tronic

The 7-speed dual clutch transmission 0HL is new.

This is a new version of the DL382 transmission series for four-wheel drive featuring quattro with ultra technology. Specific measures have been implemented to raise the torque capacity. Refer to page 26.

To transmit this amount of torque to the rear axle, the 0HL transmission is used in combination with the four-wheel drive coupling 0CX and rear final drive 09R. Refer to page 26.

quattro with ultra technology

The quattro four-wheel drive system with ultra technology is new to this class of vehicles (C8 series). To extend the possible applications of this four-wheel drive system, it was designed for engine torques up to 369 lb ft (500 Nm).

The following four-wheel drive concepts are available on the Audi A7:

- quattro with ultra technology.
- quattro with self-locking center differential.
- quattro with sport differential.

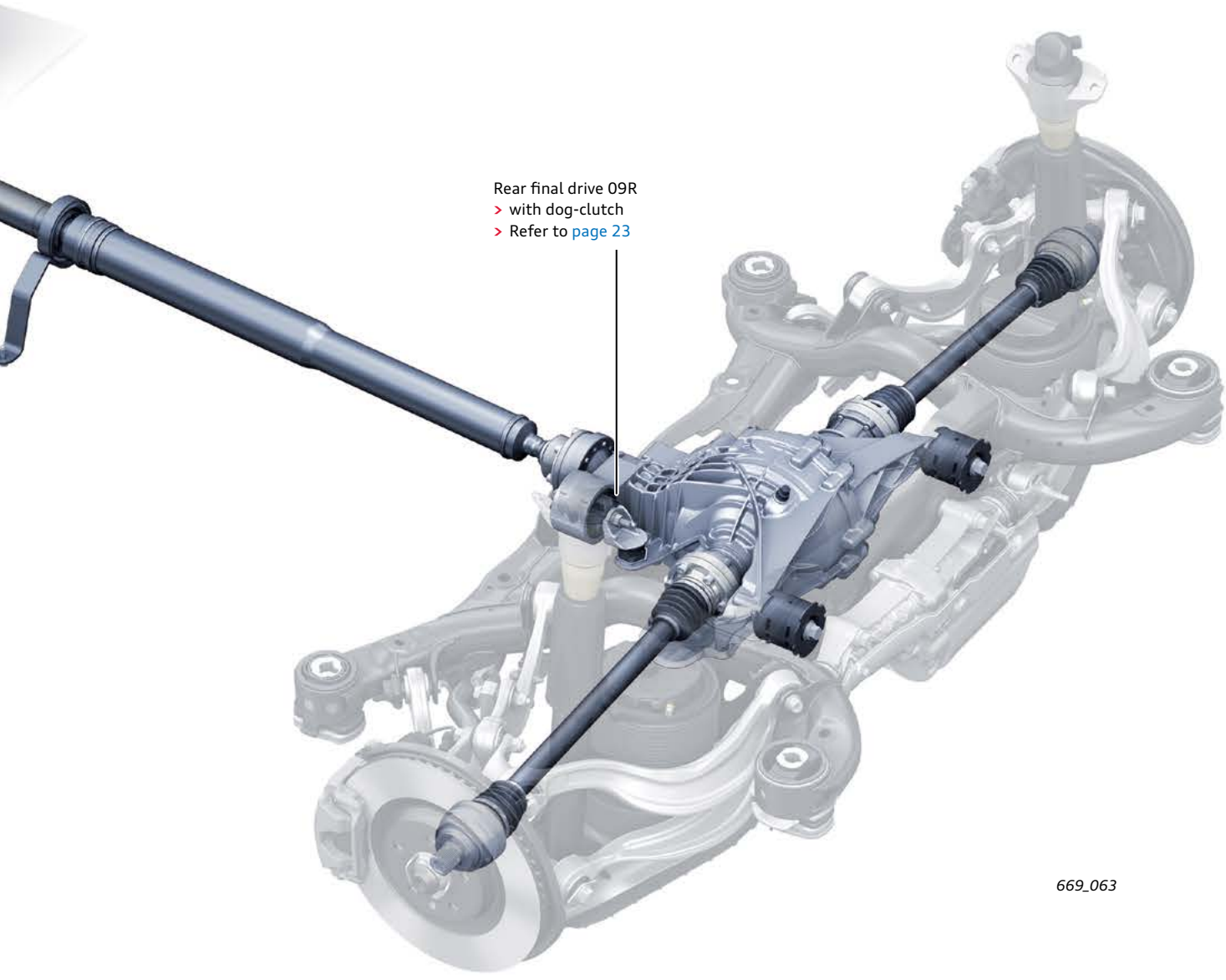
Front-wheel drive and hybrid drive versions are planned for future model releases.

Overview
Depending on engine selection, the following transmission options are available:

PR no. [1)]	Manufacturer designation	Service designation	Marketing designation	Drive version
G1C	DL382-7F	7-speed dual clutch transmission 0CK	S tronic	Front-wheel drive
G1D	DL382-7A	7-speed dual clutch automatic transmission (A7)	S tronic	quattro with ultra technology
G1G	AL552-8Q	8-speed automatic World-wide automatic transmission options 0D5 (S7)	tiptronic	quattro with self-locking center differential quattro with sport differential (optional)

Overview
Depending on the quattro concept and equipment choices, the following rear final drive versions are available:

PR no.	Manufacturer's designation	Service designation	Four-wheel drive version
GH1	HL195.S3 M	Rear final drive 0G2 (S7)	quattro with self-locking center differential
GH2	HL195.T2 M	Rear final drive 0D3 (S7 optional)	quattro with sport differential (optional)
GH4	HL165.U1 M	Rear final drive unit 0B0 (S7)	quattro with ultra technology



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Drive versions

quattro with ultra technology/four-wheel drive coupling

Four-wheel drive coupling 0CJ or 0CX is installed in the Audi A7 with quattro ultra, depending on the engine version. The basic design and operating principle of the two versions are identical. They differ exclusively in terms of the coupling torque which can be transmitted.

Four-wheel drive coupling 0CJ is rated for torque levels up to 590 lb ft (800 Nm).

Four-wheel drive coupling 0CX is rated for torque levels up to 885 lb ft (1200).

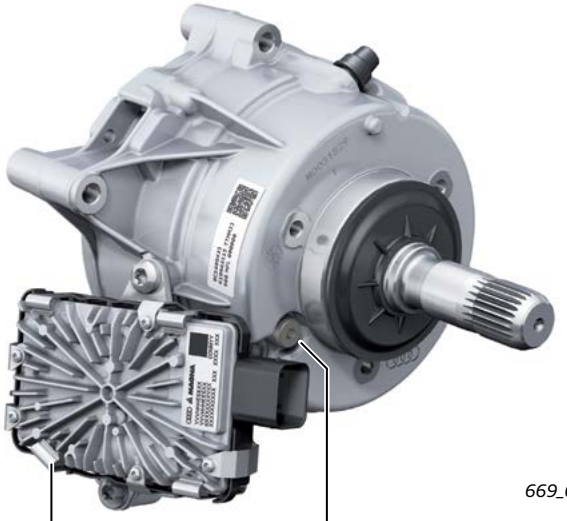
Four-wheel drive coupling 0CX has two additional clutch plate pairs to enable transfer of the higher torque level. Four-wheel drive coupling 0CX is slightly longer than four-wheel drive coupling 0CJ due to these changes.

All Wheel Drive Control Module J492 can display two different driver warning messages in the instrument cluster:

Four-wheel drive: fault. You can continue driving. Please contact dealership
Meaning: a malfunction has occurred. The customer can continue driving but should drive to a dealership soon to have the fault corrected. The four-wheel drive system may be unavailable.

Four-wheel drive: overheating. Please adapt driving style. See owner's manual
Meaning: the vehicle has been driven hard, causing the temperature of the four-wheel drive coupling to rise significantly. A more restrained driving style is required so that the coupling can cool down. Until then, the four-wheel drive system will be unavailable. When the temperature has dropped back down to normal, the driver message will disappear and the four-wheel drive system will be available again.

Four-wheel drive coupling 0CX
VTK120[1)]



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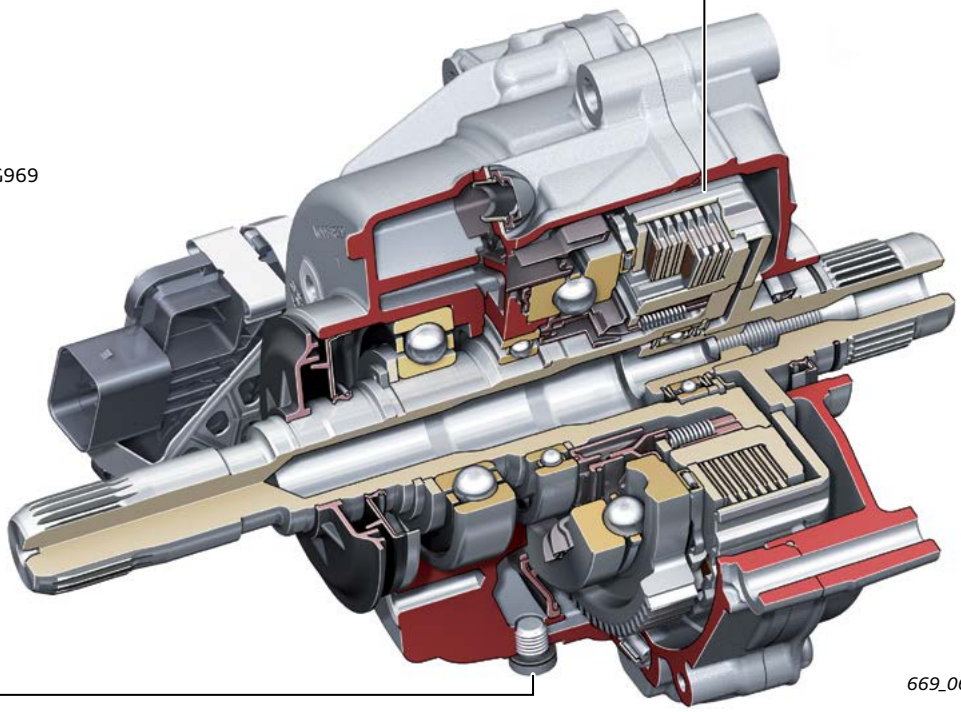
ATF filler and inspection plug
> Accessible after removal of vibration damper

All Wheel Drive Control Module
J492
with All Wheel Drive Clutch Actuator V622
and All Wheel Drive Clutch Position Sensor G969

Four-wheel drive coupling
with 7 pairs of plates



ATF drain plug

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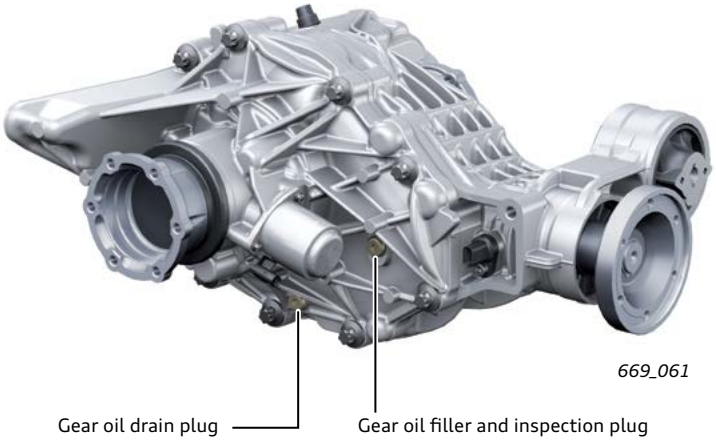
[1)] Manufacturer's internal designation: VTK120 = Coupling with 1200 Nm coupling torque – Four-wheel drive coupling 0CX
VTK080 = Coupling with 800 Nm coupling torque – Four-wheel drive coupling 0CJ

Reference
For further information about quattro with ultra technology, refer to the following eSelf-Study Program 990173, The 2018 Audi Q5 Introduction.

quattro with ultra technology/rear final drive

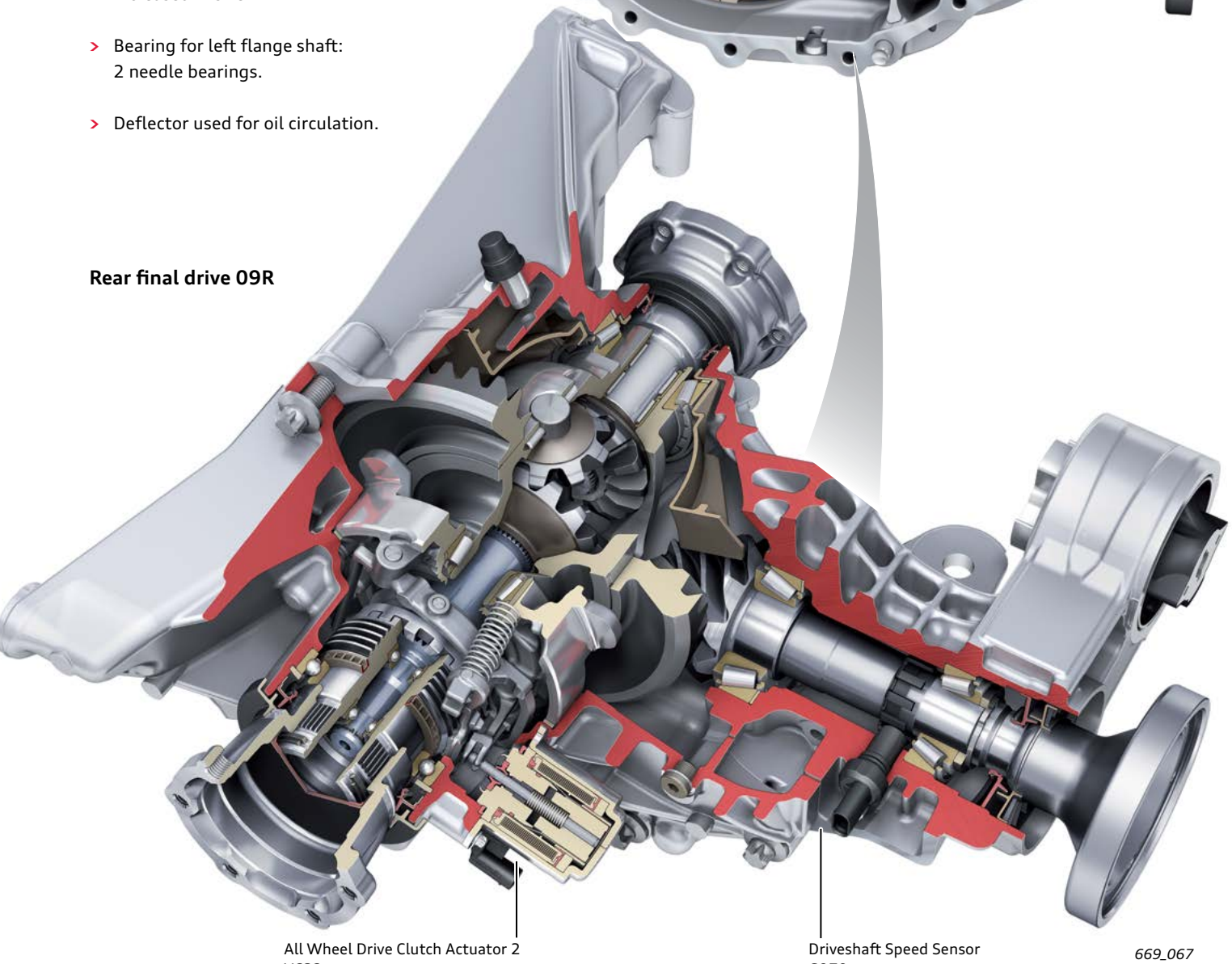
Rear final drive 0B0 or 09R is installed in the Audi A7 with quattro ultra, depending on the engine version. The basic design and operating principle of the two versions are identical. They differ exclusively in terms of the drive torque which can be transmitted.



The following are the main components which have been modified compared with final drive 0B0 to enable the higher level of drive torque to be transmitted by final drive 09R:

- Final drive gear set increased in size (crown wheel ⌀ 195 mm instead of ⌀ 165 mm on final drive 0B0).
- Differential increased in size (ball ⌀ 90 mm instead of ⌀ 80 mm on final drive 0B0).
- Dog-clutch increased in size (diameter, shafts, etc.).
- Bearings, flange shafts and housing increased in size.
- Bearing for left flange shaft: 2 needle bearings.
- Deflector used for oil circulation.

Rear final drive 09R



quattro with self-locking center differential

For engines developing more than 369 lb ft (500 Nm) of torque, the 8-speed automatic transmission 0D5 is installed in conjunction with a self-locking center differential.

In conjunction with rear final drive 0G2 (with standard differential), this four-wheel drive version is called **quattro with self-locking center differential**.

As an option, the 8-speed automatic transmission 0D5 (with self-locking center differential) can be combined with the sport differential (rear final drive 0D3).

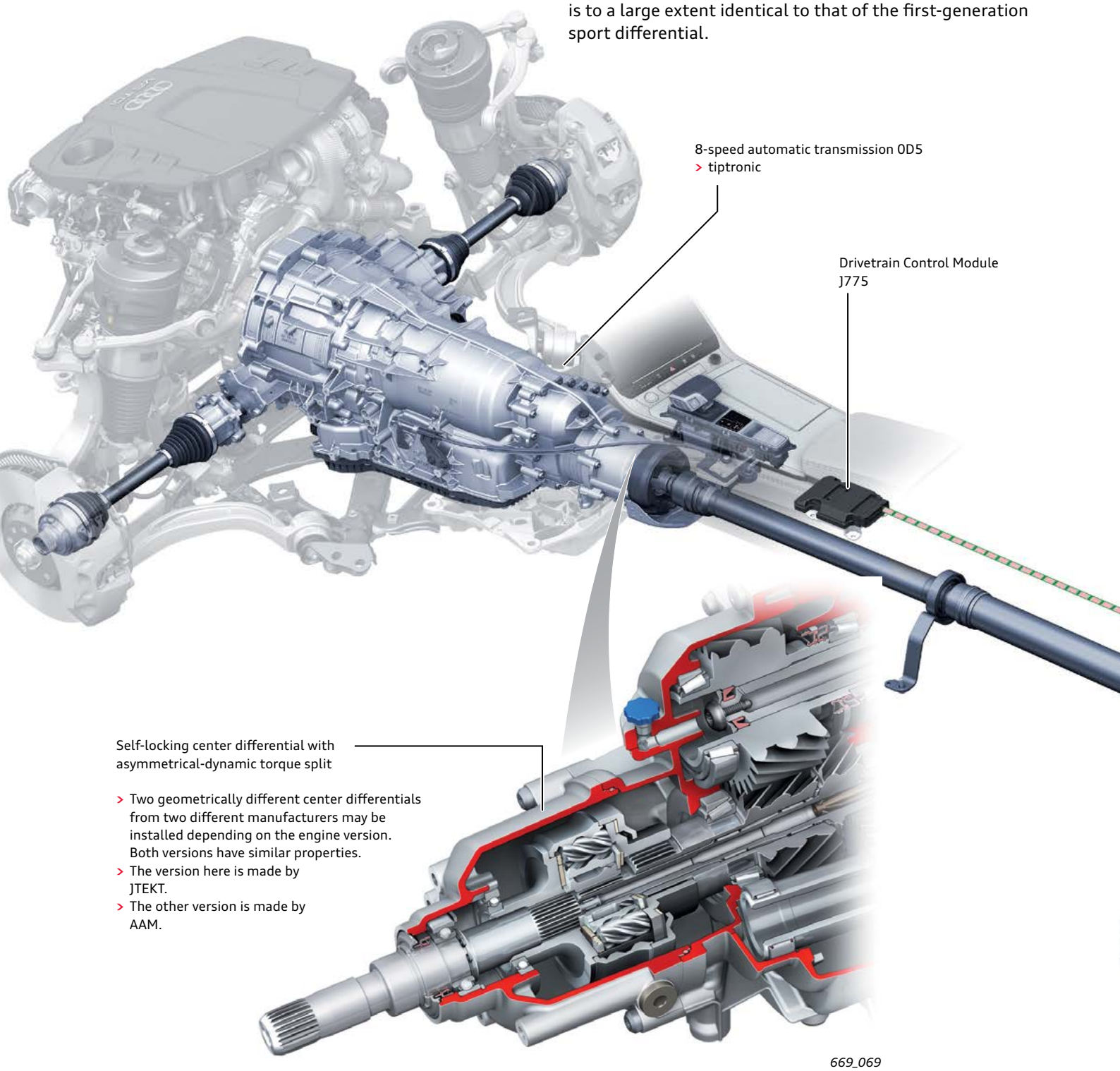
This four-wheel drive version bears the name **quattro with sport differential**.

quattro with sport differential

The 0D3/0BX sport differential is an evolutionary, second-generation unit based on the 0BF sport differential. The key modifications in sport differential 0D3 are:

- Final drive housing matched to the rear axle.
- Welded crown gear and various weight-saving measures
- New gear oil and ATF.
- Shortened sensors for more clearance to exhaust system.
- Dual control module concept in conjunction with J775 and J187.
- Renaming of the sport differential control module – previously J492, now J187.
- New Address word – previously 0022, now 0032.

The basic hardware of the sport differential (torque redistribution units, hydraulic control unit, sensors and actuators) is to a large extent identical to that of the first-generation sport differential.



669_069

Sport differential – Dual control module concept

The key modification in the second-generation sport differential is the dual control module concept.

In the case of the first-generation sport differential (sport differential 0BF/0BE), All Wheel Drive Control Module J492 is responsible for computing the redistribution of torque and controlling the actuators.

On the second-generation sport differential (sport differential 0D3/0BX), the redistribution of torque for the sport differential is computed by Drivetrain Control Module J775. J775 acquires information on driving status centrally, processes this and computes the value for the redistribution of torque. This value is then transmitted to the Differential Lock Control Module J187 via the FlexRay data bus. Using this information, J187 computes the drive voltage for the actuators and the required redistribution of torque. J187 is therefore purely responsible for performing the task.

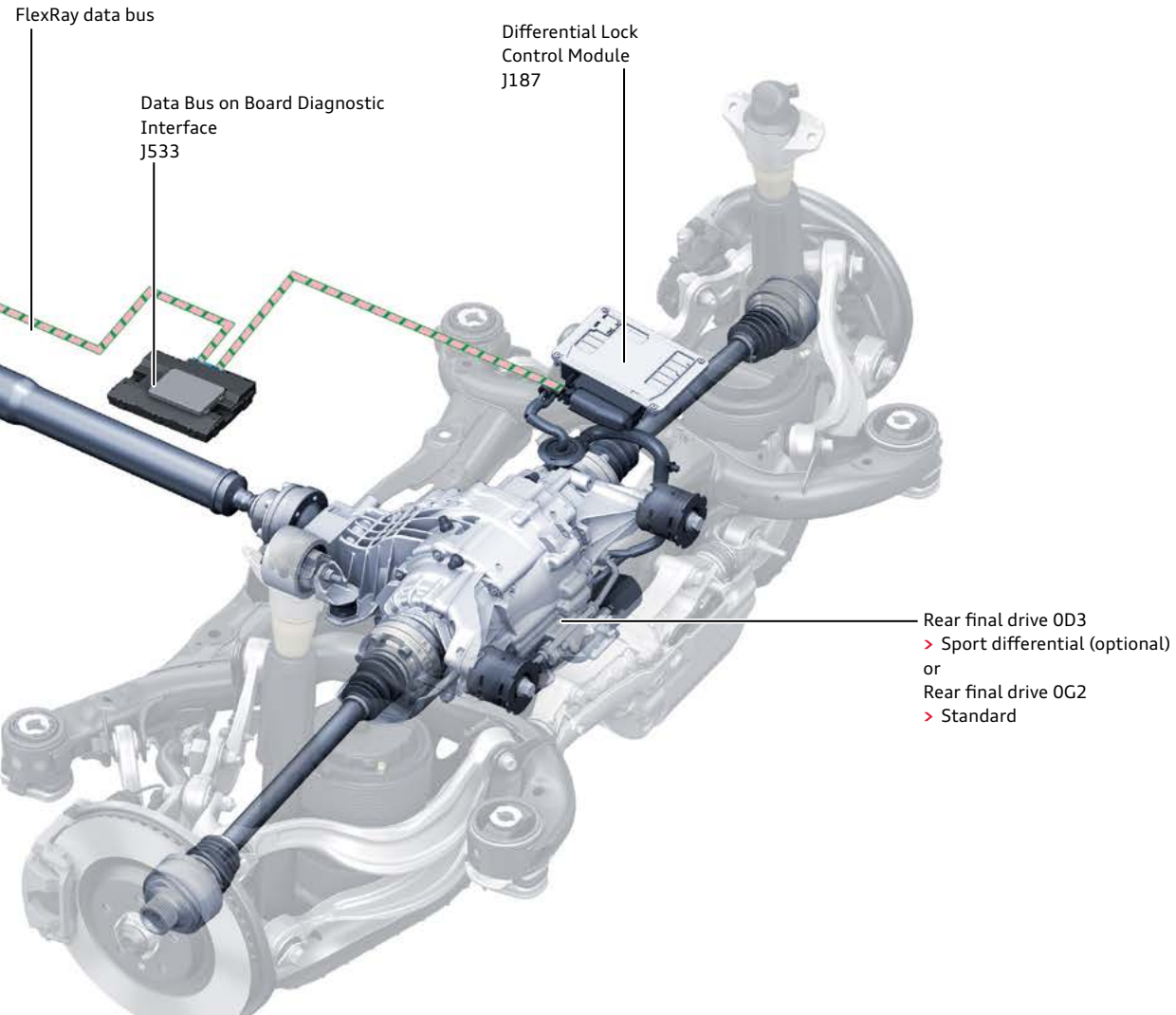
The dual control module concept enables torque to be redistributed with greater precision and speed than in the first-generation sport differential, ultimately improving dynamic control.

Torque distribution display: The driver can display the qualitative distribution of drive torque to the wheels in a graphic on the MMI screen. To do so, the following menu item must be selected: Car > Vehicle information > quattro

Transmission functions

The functions of the DL382 transmission
are virtually the same as in the 2017 A4 and 2018 Q5. More information can be found in the respective eSelf-Study Programs.

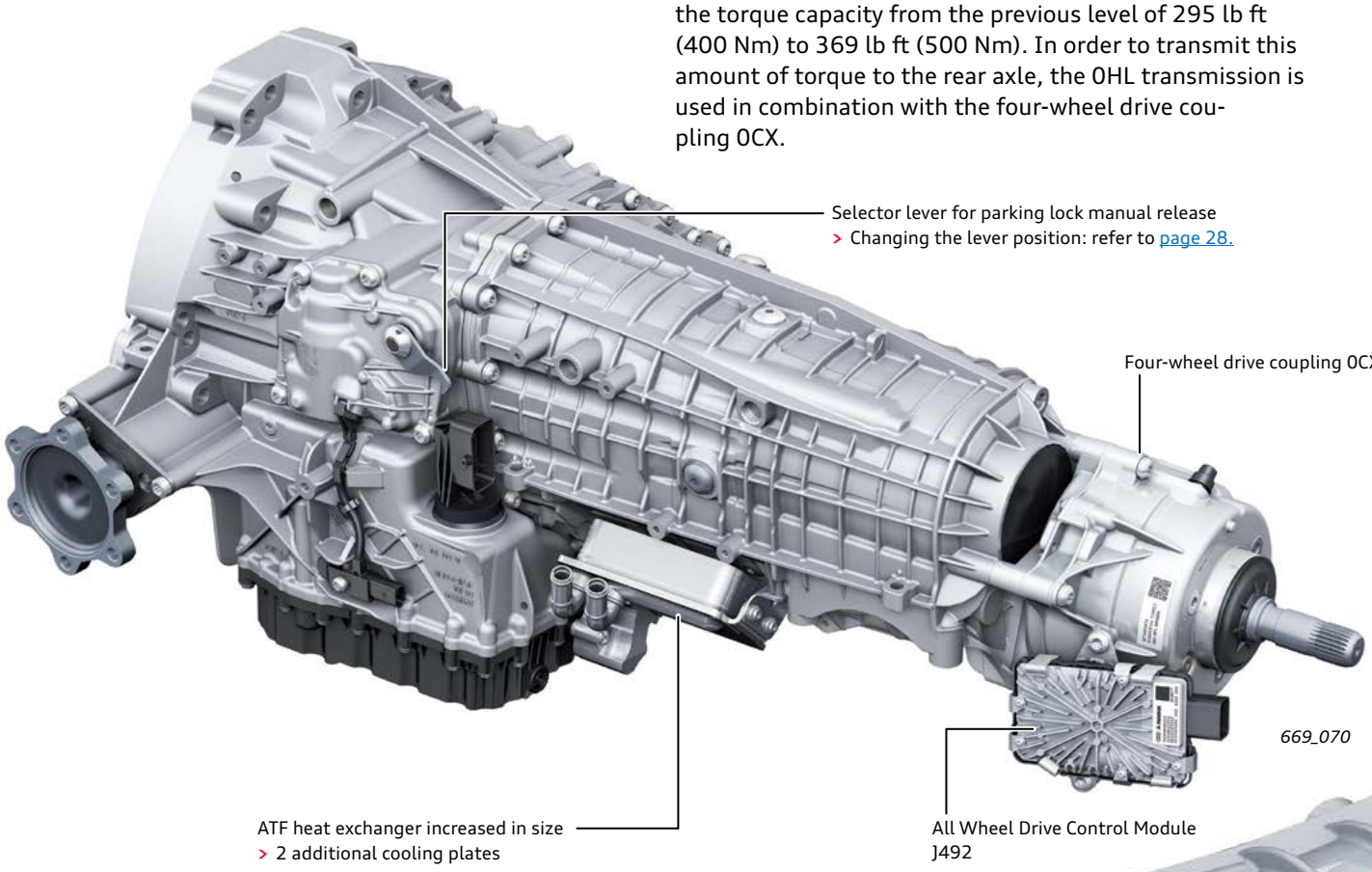
The functions of the AL552 transmission
are virtually the same as in the Audi Q7 and 2019 Audi A8.



669_068

7-speed dual clutch transmission 0HL

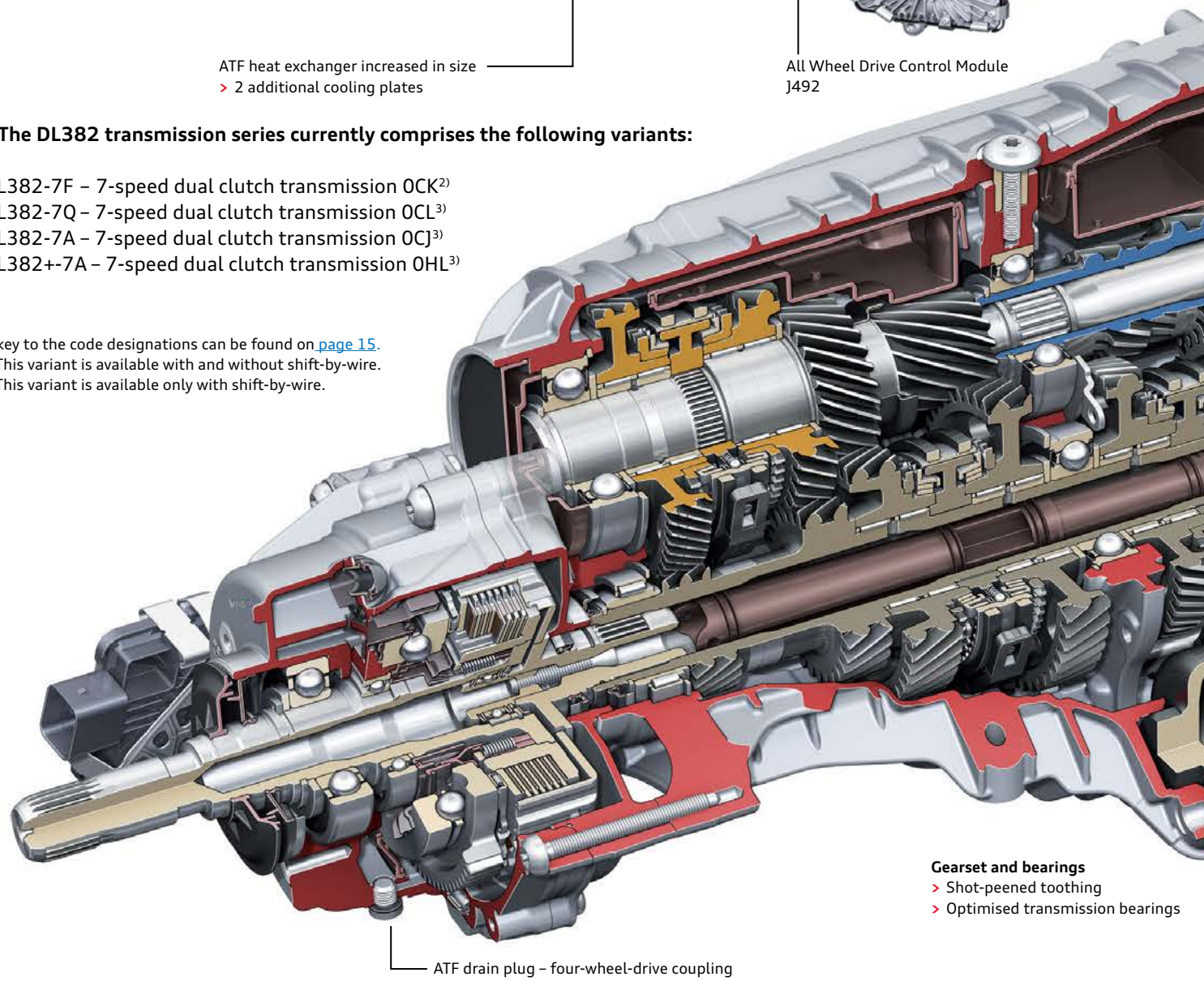
The 0HL transmission is a variant of the DL382 series[1]. Specific measures have been implemented in order to raise the torque capacity from the previous level of 295 lb ft (400 Nm) to 369 lb ft (500 Nm). In order to transmit this amount of torque to the rear axle, the 0HL transmission is used in combination with the four-wheel drive coupling 0CX.



[1] The DL382 transmission series currently comprises the following variants:

DL382-7F – 7-speed dual clutch transmission 0CK[2]
DL382-7Q – 7-speed dual clutch transmission 0CL[3]
DL382-7A – 7-speed dual clutch transmission 0CJ[3]
DL382+-7A – 7-speed dual clutch transmission 0HL[3]

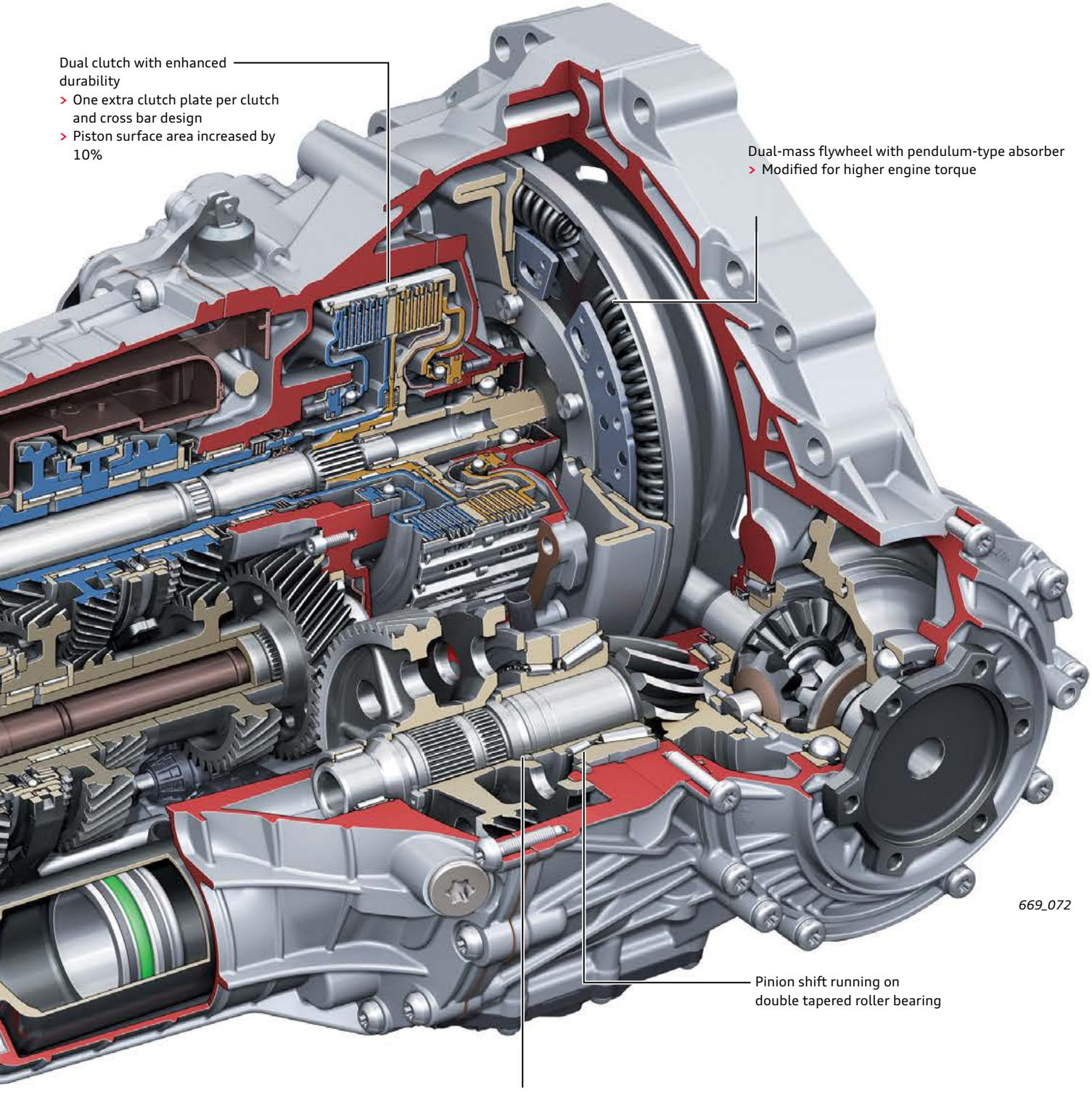
A key to the code designations can be found on page 15.
[2] This variant is available with and without shift-by-wire.
[3] This variant is available only with shift-by-wire.



Lubrication

The **0HL transmission** has two oil systems: an ATF system for the dual clutch and the electrohydraulic control unit, and an MTF system for the gear set and the front final drive. The ATF must be changed at specified intervals, but the MTF is designed to provide lubrication for the lifetime and does not require servicing.

The **four-wheel drive coupling 0CX** has a separate oil system with ATF. The ATF does **not** have to be changed and does not require servicing.



Selector mechanism

The Audi A7 uses the latest Audi selector mechanism design with full shift-by-wire (SBW) capability. This means that parking lock operation is also fully automatic. The term used for this is "park-by-wire" (PBW). There is no selector cable connecting the selector mechanism to the transmission.

With the introduction of this selector mechanism design to the C-series, all Audi models with longitudinal engines now use this technology and operating concept.

The selector mechanism has been completely redesigned for the C8 model range. It is much more compact, lighter and more cost-efficient while retaining the original functions.

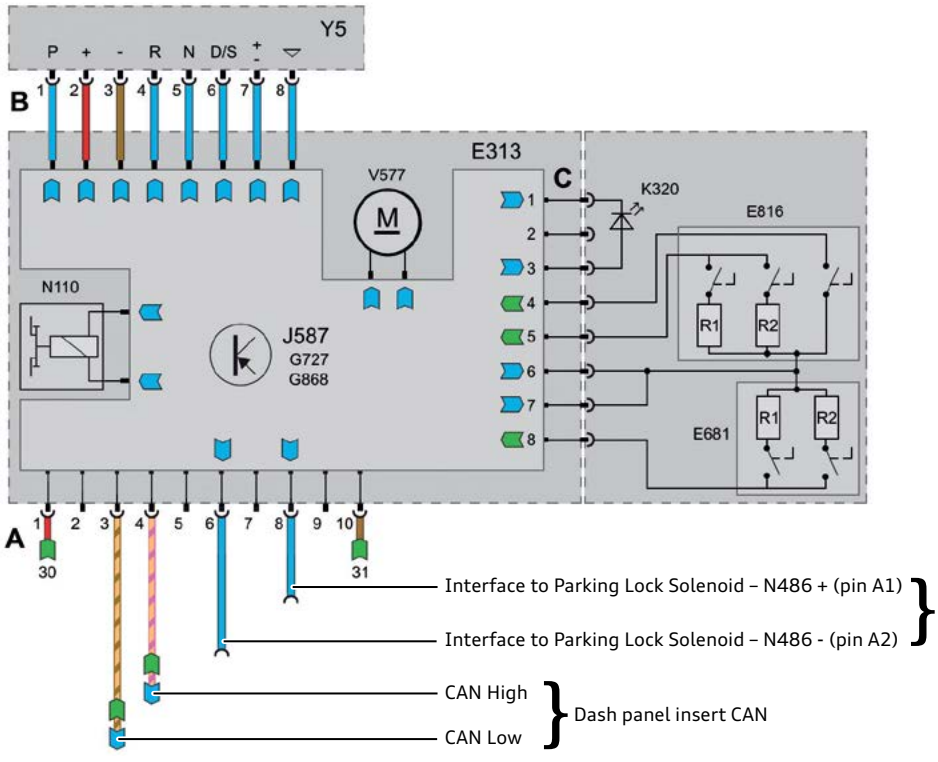
The new selector mechanism (E313) is a single unit with the following components:

- **J587** Selector Lever Sensor System Control Module
- **G868** Transverse Selector Lever Lock Sensor
- **G727** Selector Lever Position Sensor
- **V577** Transverse Selector Lever Lock Motor
- **N110** Shift Lock Solenoid

The complete unit must be replaced if one of these components is defective.

669_073

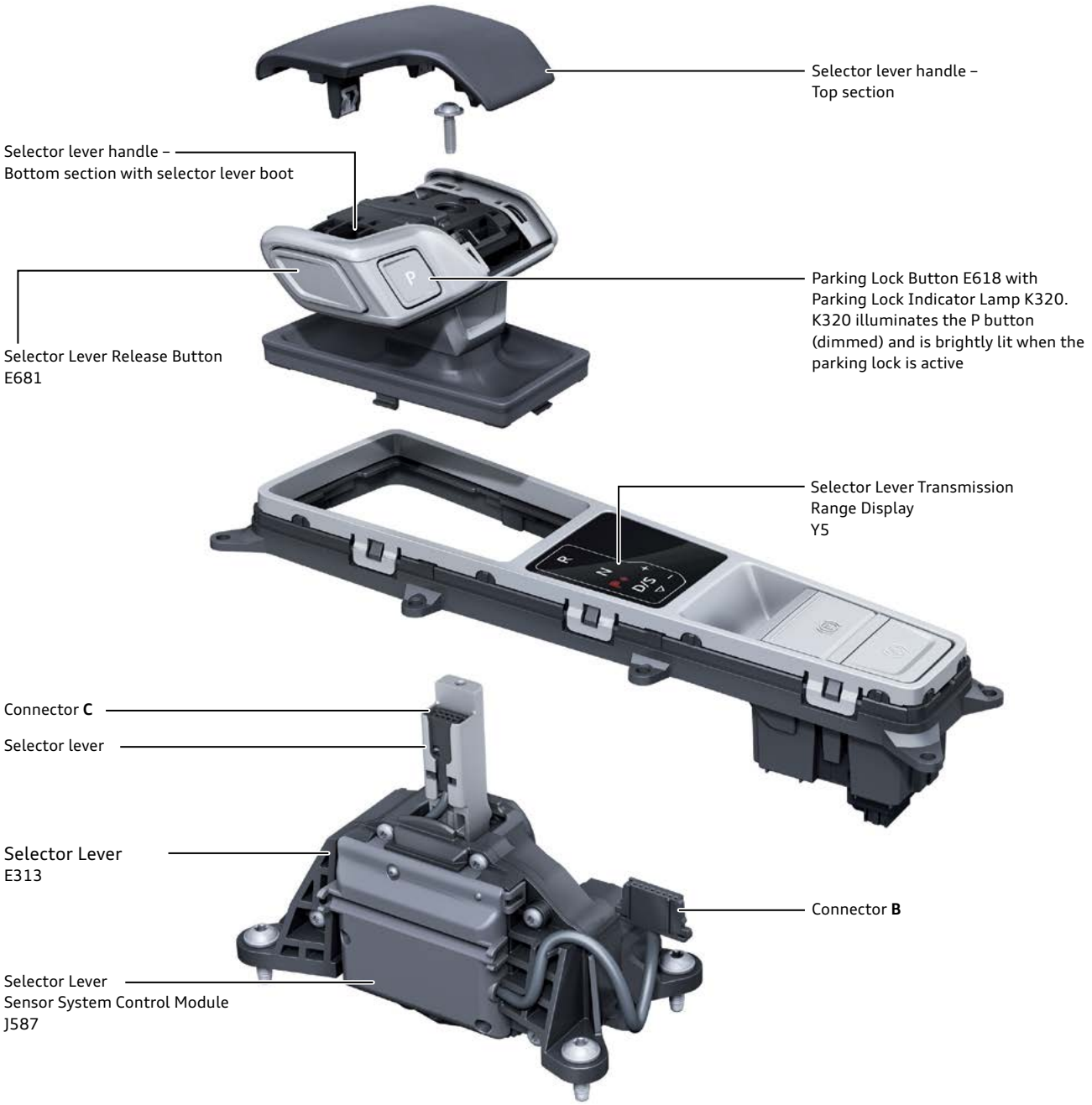
Function diagram – selector mechanism



Key:

E313 Selector Lever
E681 Selector Lever Release Button
E816 Parking Lock Button
G727 Selector Lever Position Sensor
G868 Transverse Selector Lever Lock Sensor
J587 Selector Lever Sensor System Control Module
K320 Parking Lock Indicator Lamp
N110 Shift Lock Solenoid
V577 Transverse Selector Lever Lock Motor
Y5 Selector Lever Transmission Range Display
A,B,C Connectors

669_074



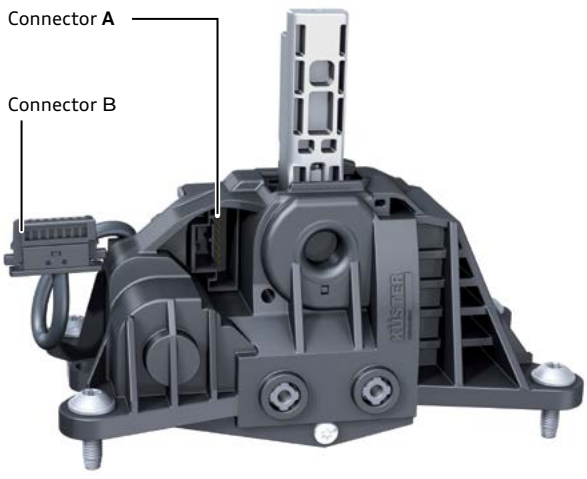
669_075

Selector mechanism versions

On vehicles with the 7-speed dual clutch transmission 0HL, Selector Lever Sensor System Control Module J587 has two additional interfaces for controlling the Parking Lock Solenoid N486. Refer to the function diagram in "669_074" page 28.

Information exchange

Data is exchanged between the selector mechanism and the transmission via the gateway. J587 communicates via the CAN dash panel insert; Automatic Transmission Control Module J217 communicates via the FlexRay with Data Bus On Board Diagnostic Interface J533.



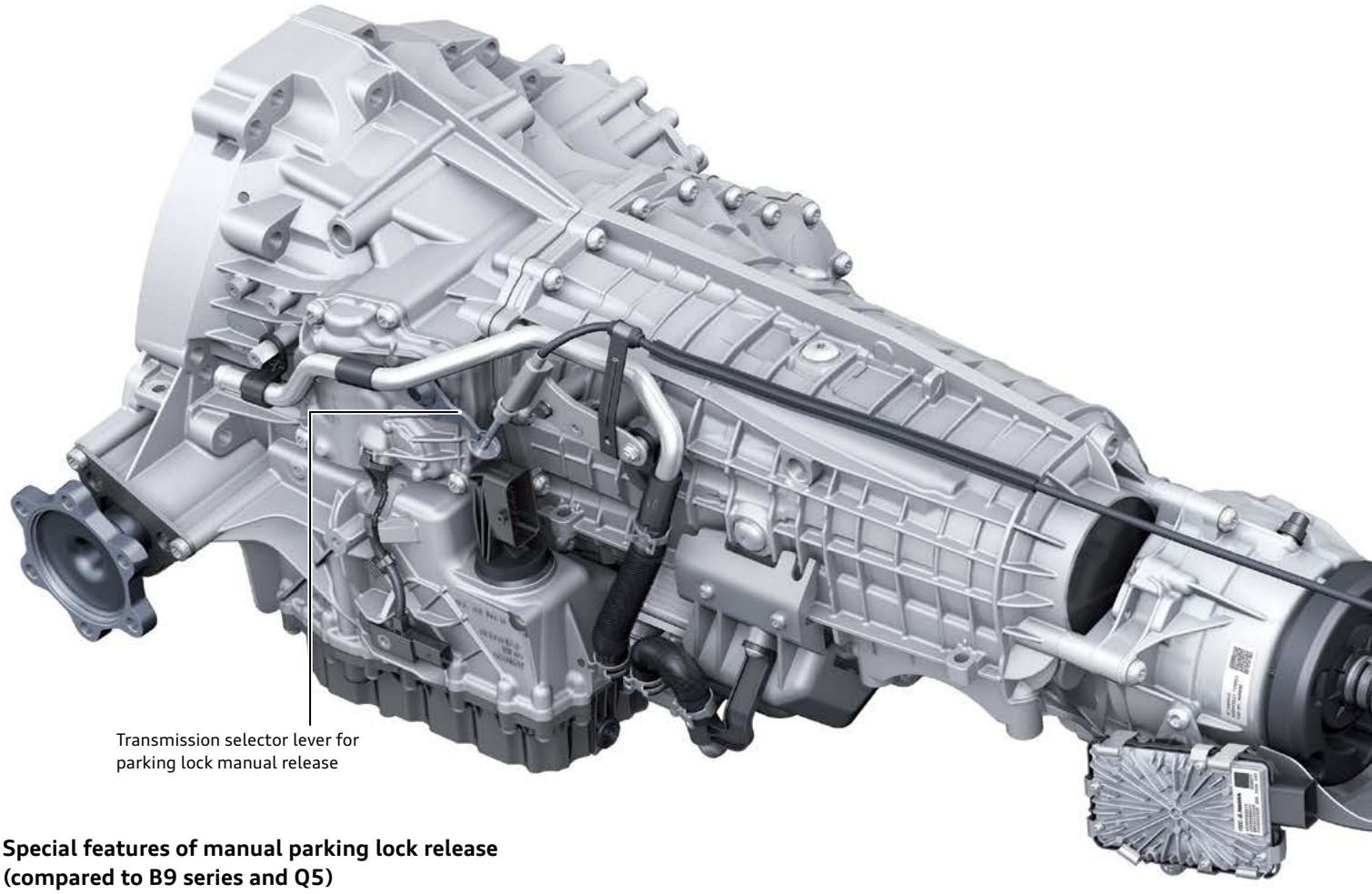
669_076

Parking lock manual release

The design and operating concept for the parking lock manual release mechanism have been largely adopted from the B9 series.

The design of the actuator unit and the wrench for the Audi A7 have been revised.

The new features and special characteristics are described below.

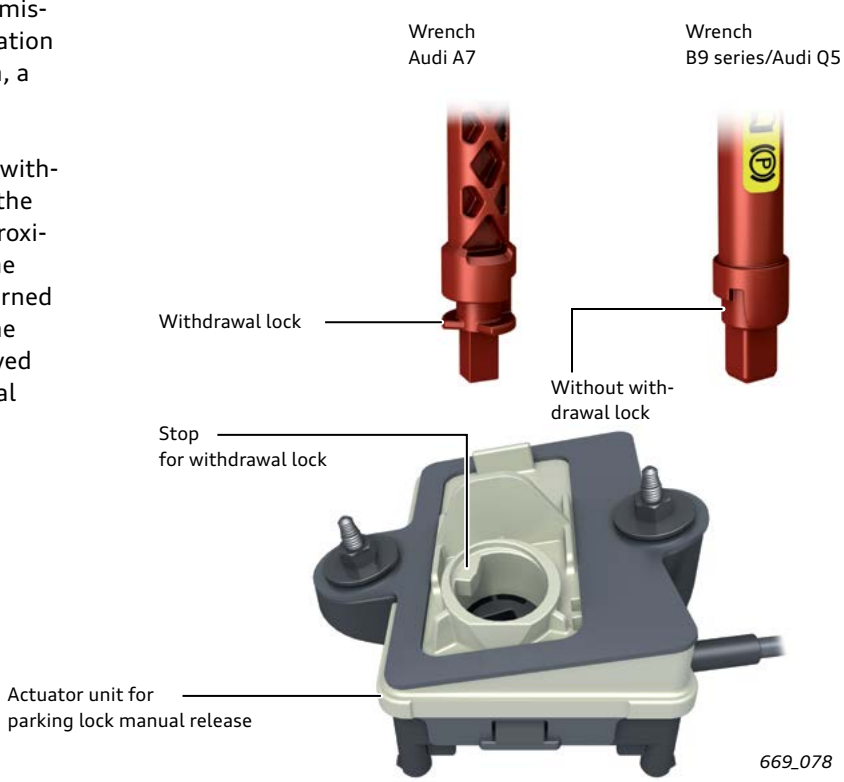


Special features of manual parking lock release (compared to B9 series and Q5)

The position of the manual release lever on the transmission has been changed. This has enabled the optimization of the cable guide for the manual release mechanism, a reduction in operating force.

The wrench for the manual release mechanism has a withdrawal lock. In conjunction with the adapted stop in the actuator unit, the wrench can only be withdrawn approximately 5 mm (in order to release the lock) while in the actuated position (P-OFF). The wrench can then be turned back and withdrawn (P-ON position). This prevents the possibility of the wrench unintentionally being removed completely in the actuated position and of the manual release mechanism springing back.

Note: Starting at the beginning of 2018, the manual release mechanism with withdrawal lock will also be installed in B9-series vehicles and in the Audi Q5.



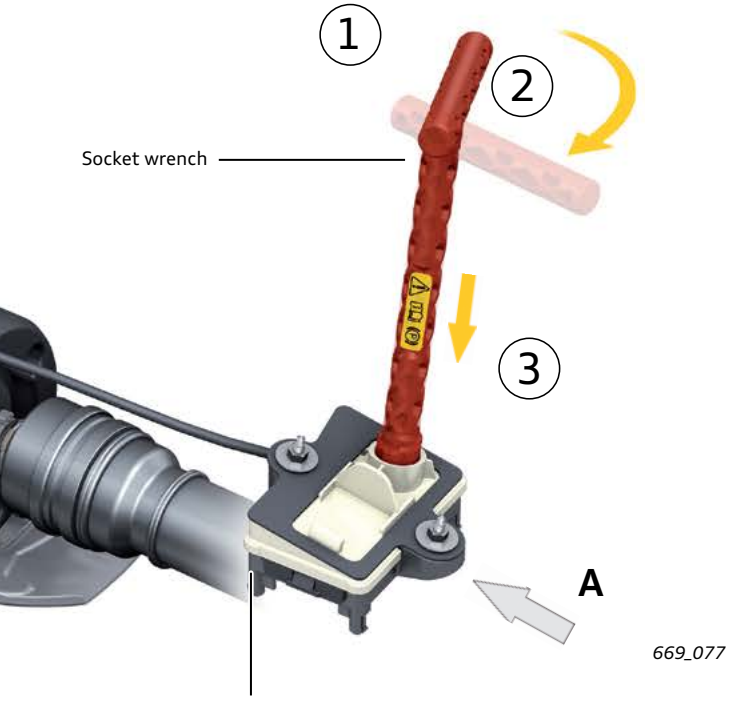
Installation location of the manual release mechanism

The actuator unit for the manual release mechanism is located under the cup holder in the center console.

The acutator unit can be accessed by removing the rubber mat and the cover.

Please note that the wrench must not be inserted vertically, but at an angle of approximately 13°. Refer to image "669_079" page 31.

669_080



669_077

669_079

View A

Manual release of parking lock (P-OFF position)

DANGER

Caution! Before actuating the parking lock the vehicle must be secured to prevent it from rolling away.

Make sure that the wrench and the stop in the actuator unit are undamaged.

Please observe the safety warnings in the Owner's Manual.

1. Insert the wrench into the actuator unit as shown.
2. Turn the wrench clockwise as far as the stop, then push it down about 5 mm to lock it into place at the stop.
3.

Deactivating the manual release mechanism (P-ON position)

Pull the wrench out as far as the withdrawal lock (approximately 5 mm) and, holding it firmly, turn it back as far as the stop. The socket wrench can now be removed.

Note: Do not under any circumstances turn the wrench only counter-clockwise because as this will damage the actuator unit and the wrench.

Running gear

Overview

The running gear for the Audi A7 has been completely redesigned compared to the previous model. The technology and control systems used are similar to the 2019 Audi A8 Versions are available with steel suspension and controlled or non-variable damping in addition to air suspension with electronic damping control.

The front and rear axles are based on a high-precision lightweight five-link design.

Progressive steering, included as standard vehicle equipment, reduces the amount of steering effort required. The dynamic four-wheel steering system introduced in the Audi A8 is available as an optional extra for the Audi A7 .

The brake system delivers superb performance even when a more dynamic driving style is adopted.

The 9th generation ESC system provides high-performance stability control for the vehicle.

669_138

The following suspension variants are available for the Audi A7:

Running gear with steel suspension and non-variable damping (1BA)

This is the standard running gear.

Sport running gear with steel suspension and non-variable damping (1BE)

This suspension system is optional. The springs, dampers and anti-roll bars are set up for dynamic handling. The ride height is approximately 10 mm lower than version 1BA.

Suspension with air springs and damping control (adaptive air suspension – 1BK)

This suspension system is optional for the Audi S7. The ride height in "Auto" mode (normal level) is approximately 10 mm lower than version 1BA (S7).

Axles and wheel alignment

Front axle

The front axle is based on the proven design principle of the five-link suspension. A particular emphasis was placed on the lightweight construction. The main components are constructed from aluminum. The underlying platform is the MLBevo system, which has already been used as a development base for the current A4, Q5, Q7 and A8 models.

669_139

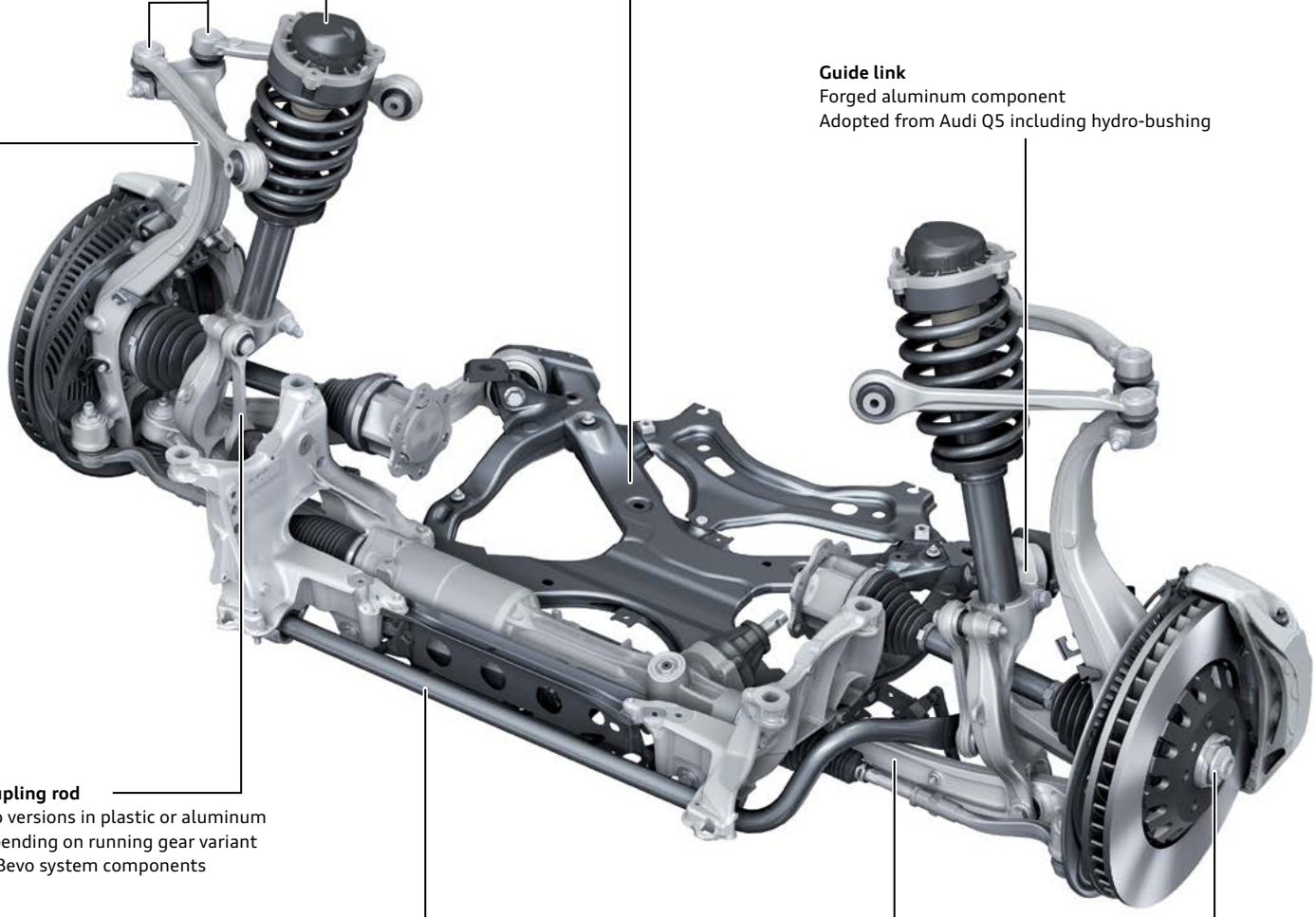
Upper transverse links
Forged aluminum component
Adopted from the Audi Q7
Bonded rubber bushing
(new component)

Wheel bearing housing
Forged aluminum component
Adopted from the Audi Q5

Shock absorber
Single and twin-tube versions with non-variable or controlled damping
Shock absorber mounting
MLBevo system component

Subframe
Three sections, base carrier sheet steel construction with cast aluminum support brackets adopted from Audi Q5 with modifications to anti-roll bar bolt attachment and rear connection of base frame.

Guide link
Forged aluminum component
Adopted from Audi Q5 including hydro-bushing



Coupling rod
Two versions in plastic or aluminum depending on running gear variant
MLBevo system components

Anti-roll bar
Tubular anti-roll bars

Track control link
Forged aluminum component
Basic part adopted from Audi Q7
Bonded rubber bushing
(new component)

Wheel bearing/wheel hub
Second generation wheel bearing
MLBevo system component

669_140

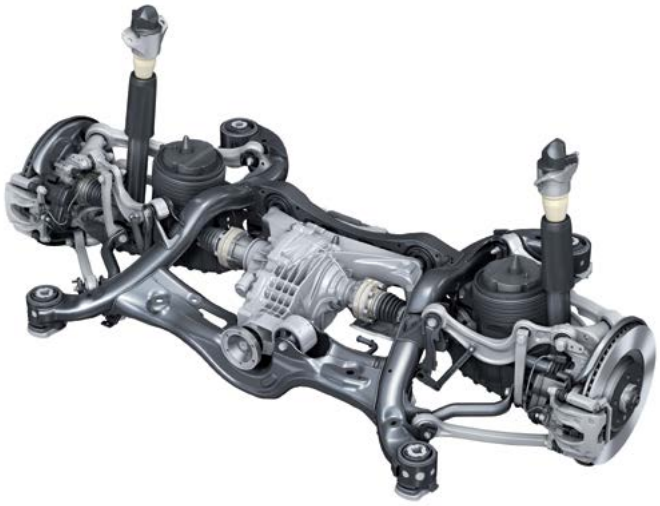
Rear axle

The trapezium link rear axle used in the previous model has been replaced by a new five-link axle. This is based on the MLBevo platform, which has already been used on the A4, Q5, Q7 and A8 models.

The geometric layout of the suspension links provides a separation in the absorption of longitudinal and lateral forces. Elastomer bushings with a mixture of high-damping materials and integrated spacer sleeves allow for a high degree of radial stiffness with a low roll rate.

The use of subframe bushings with hydraulic damping ensures the axle is well-isolated from the vehicle body.

The wheel bearings have been optimized to reduce friction, which helps to decrease rolling resistance.



669_141

Upper transverse link (rear)
Sheet-steel part
Adopted from the Audi Q7
Bearings (hub carrier end) adopted from Audi A8

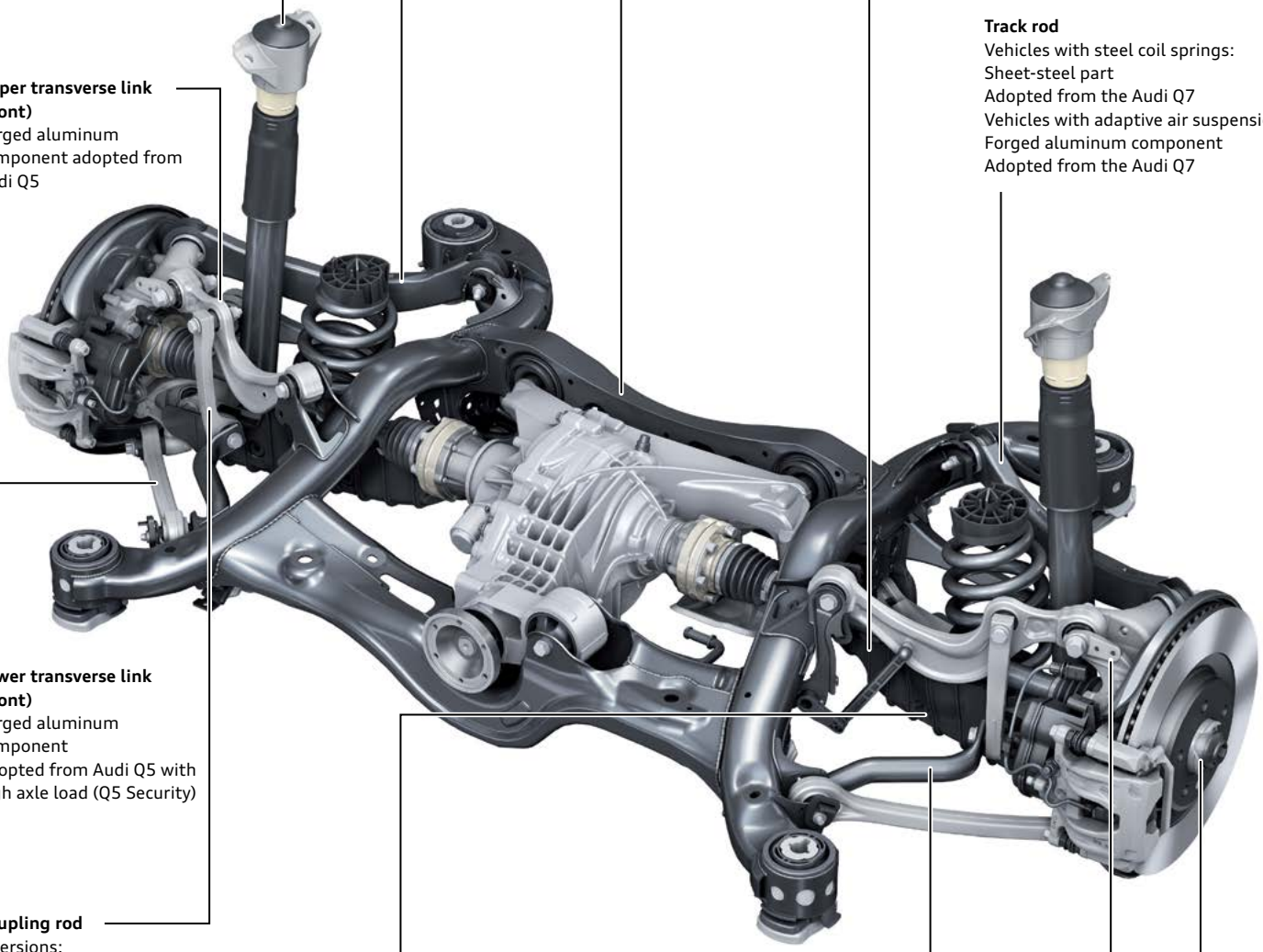
Shock absorber
Single-tube on 1BA and 1BE
Twin-tube on 1BL and 1BK

Upper transverse link (front)
Forged aluminum component adopted from Audi Q5

Subframe
Welded steel construction
Geometry adopted from Audi A8
Newly developed subframe mountings

Aero-deflectors for spring links
New component, similar in geometry to Audi Q5

Track rod
Vehicles with steel coil springs:
Sheet-steel part
Adopted from the Audi Q7
Vehicles with adaptive air suspension:
Forged aluminum component
Adopted from the Audi Q7



Lower transverse link (front)
Forged aluminum component
Adopted from Audi Q5 with high axle load (Q5 Security)

Coupling rod
2 versions:
Aluminum/plastic
Aluminum: adopted from Audi Q5
Plastic: new component

Lower control arm
Forged aluminum component
Adopted from the Audi Q5

Anti-roll bar
Tubular anti-roll bar
Geometry same as Audi Q5
Modified spring rate

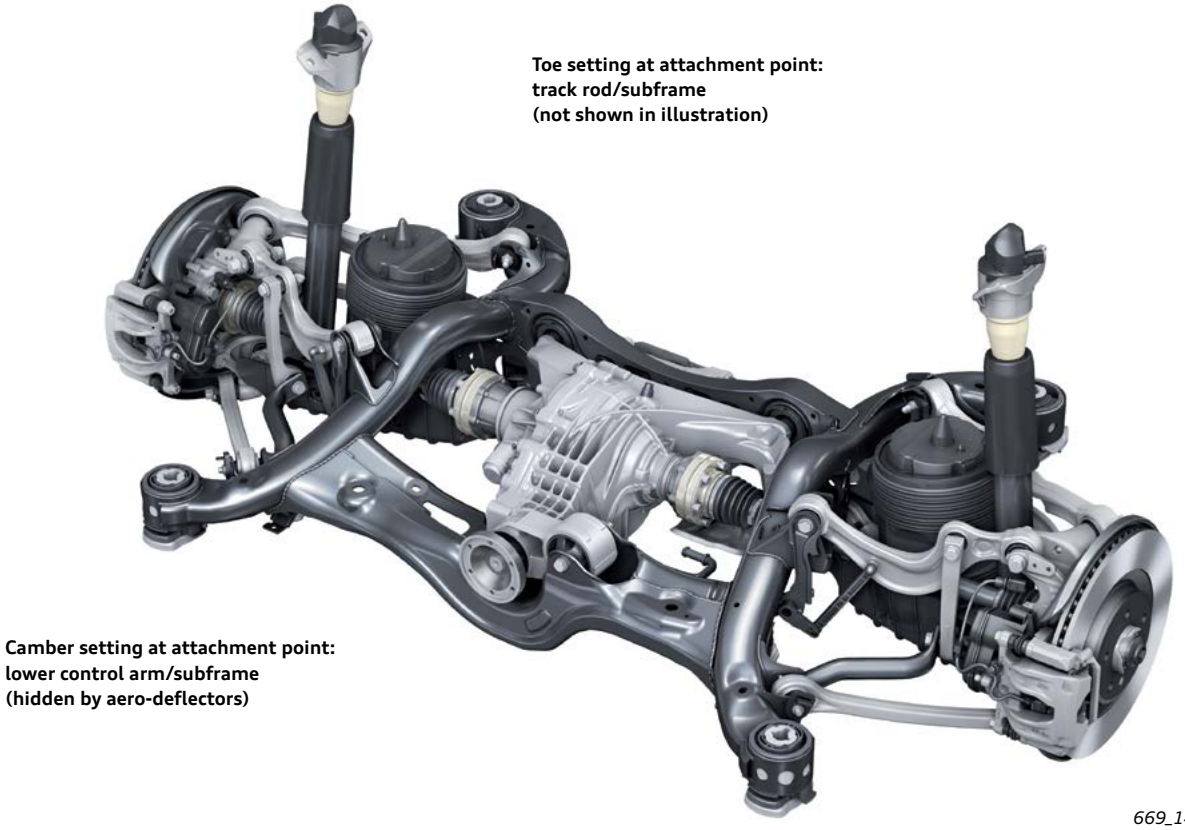
Hub carrier
Die-cast aluminum
Adopted from the Audi Q5

Wheel bearing/wheel hub
Adopted from the Audi Q5

669_142

Wheel alignment

The wheel alignment and adjustment procedures are the same as for the other MLBevo models. The adjustment points are also identical, for both the steel suspension and the adaptive air suspension.



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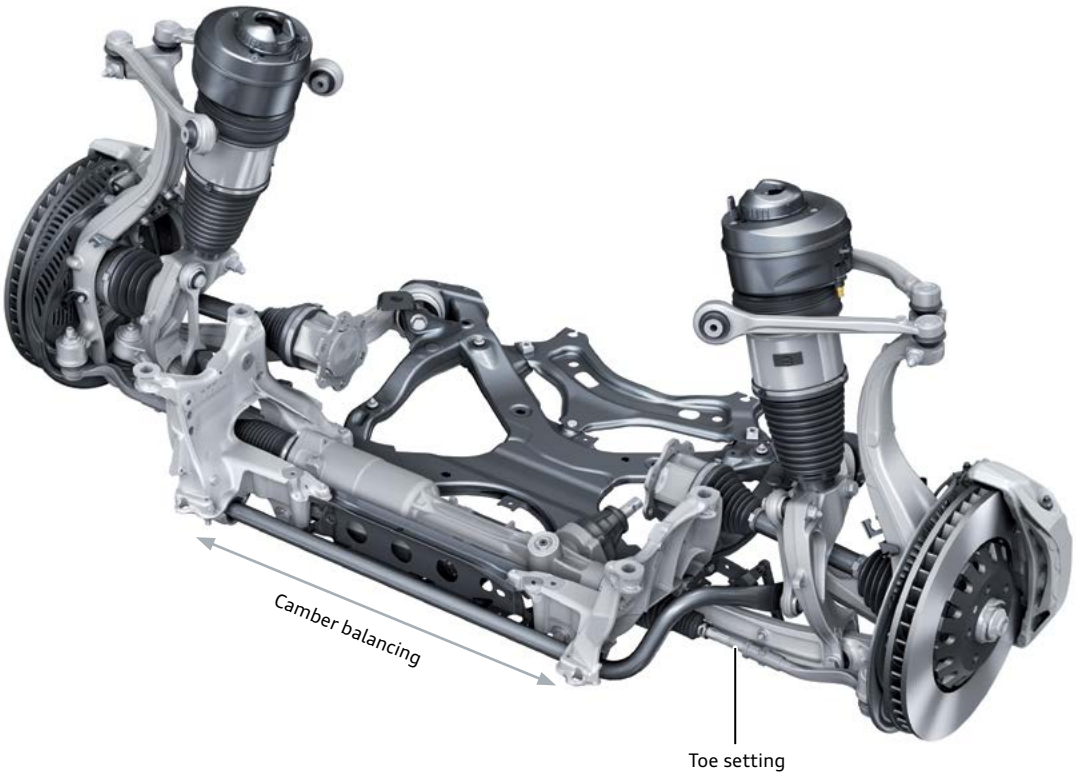


669_139

Note

Before beginning wheel alignment, it is necessary to check whether the steering adapter (on vehicles without dynamic four-wheel steering) or the rear axle steering unit is installed in the correct position on the subframe. If not, it may cause different variations in toe angle on each of the wheels when the suspension compresses and rebounds.

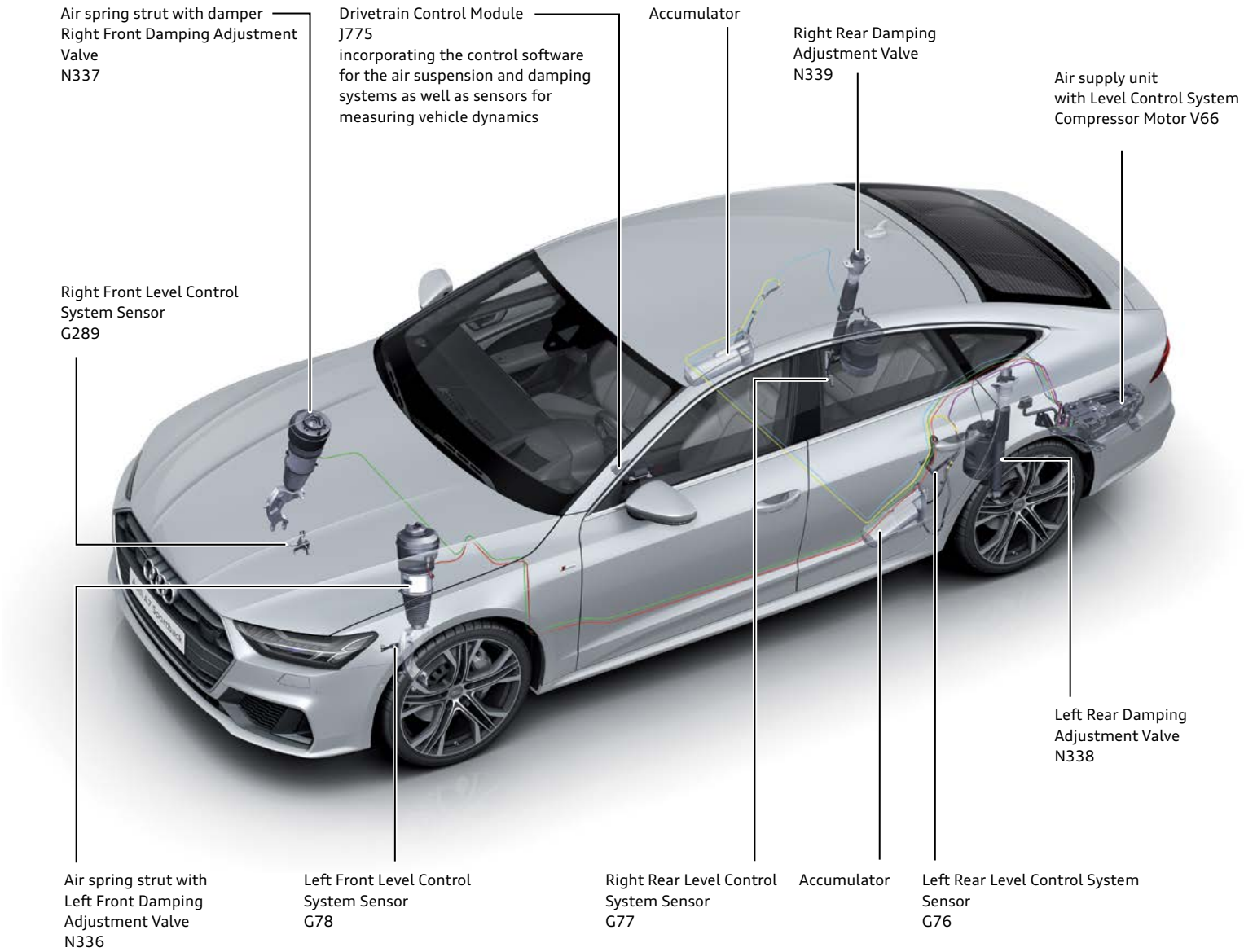
Adaptive air suspension (S7)

Design and function

The adaptive air suspension is optional for the Audi S7. The system has the same general layout as the adaptive air suspension system in the Audi Q5. Drivetrain Control Module J775 is also installed. In addition to the regulating software for the air suspension and damping, the control module has the sensor for registering vertical acceleration (upwards acceleration of the vehicle) as well as pitching and rolling moments (rotation about the vehicle's lateral and longitudinal axes). This eliminates the need for the body acceleration sensors installed in previous systems.

The measured values for the yaw rate (rotation about the vehicle's vertical axis) and the lateral acceleration are transmitted via FlexRay from the airbag control module to the regulating software.

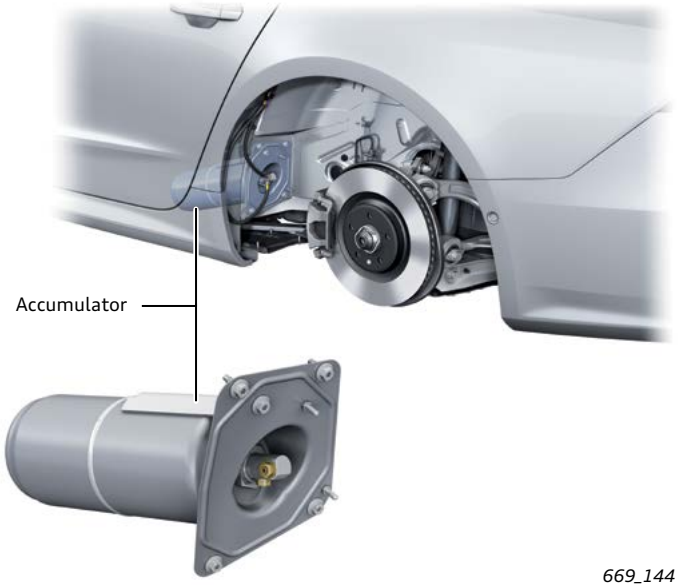
The compressor for the air supply unit is the same as on the Audi Q5 (2-stage without boost function). The solenoid valve block is also the same. The vehicle level sensors have also been adopted from the Audi Q5. Air intake is via the left wheel housing. Two aluminum accumulators with a total volume of approximately 1.1 gal (4.4 l) are used. These are installed in the rear area of the side sills. The maximum system pressure is approximately 261.0 psi (18 bar).



669_143

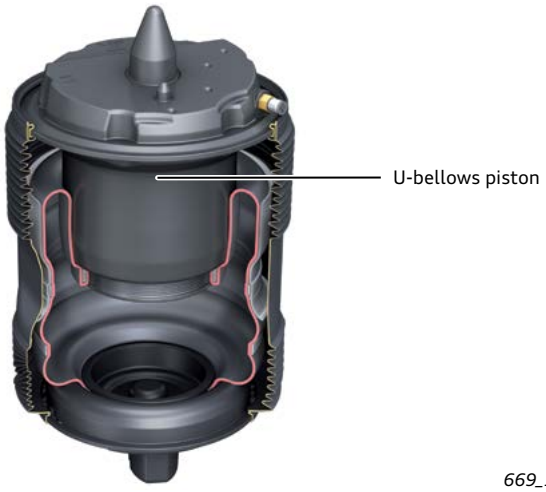
For the first time on an Audi model, the accumulators on the Audi S7 are located in the side sills. The accumulators, which are secured to retaining plates, are installed by pushing them into the sills from the rear wheel housings. The retaining plates are bolted to the end face of the sills in the wheel housings.

This design solution utilizes the otherwise empty space inside the sills efficiently and frees up space elsewhere on the vehicle.



669_144

The air springs on the rear axle are also new. The inside of the U-bellow pistons, whose geometrical form defines the spring characteristics, consists of activated charcoal. After shrinkage, the activated charcoal monoliths are adsorptive, that is, they bind air molecules on their surface. This increases the geometric volume in the air springs by about one third and increases the suspension comfort.



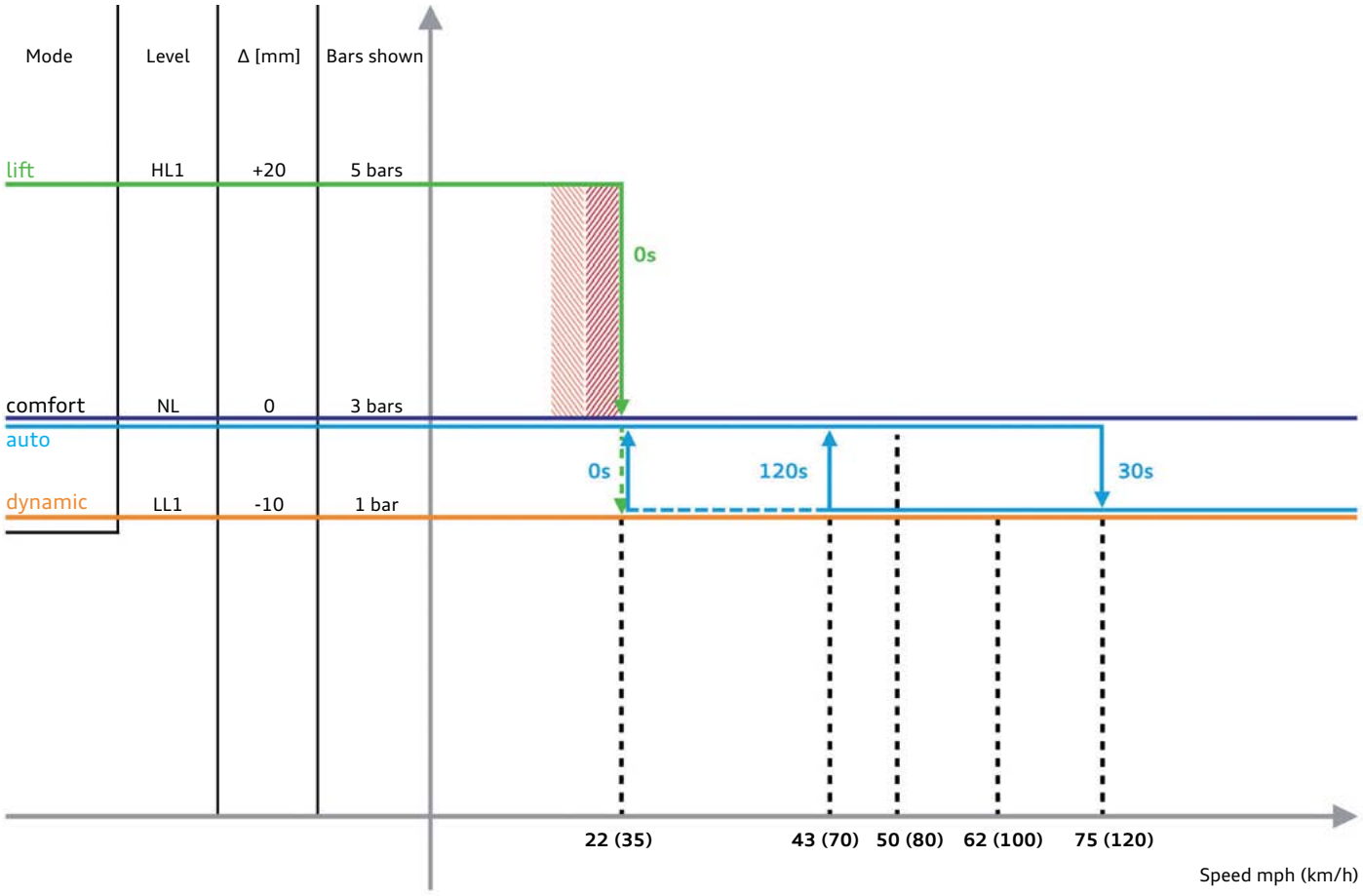
669_145

A further new feature is the design of the suspension turrets on the front axle. Where steel material has been used previously, plastic/aluminum hybrid components are now in use. The inner housing, which takes up the major proportion of the load, consists of aluminum, and is surrounded by plastic on the outside. This lightweight construction enables a weight reduction of approximately 3.0 lb (1.4 kg) per vehicle.

Residual pressure valves on the air connections of the suspension struts ensure a minimum pressure of 2 - 3 bar.

669_146

Control strategy



669_147

Key:

Hysteresis 3 mph (5 km/h)

Selection lock 3 mph (5 km/h)

HL1 = High level
NL = Normal level
LL1 = Low level 1

Drivers can adjust the suspension and damping characteristics on the Audi S7 to suit their personal preferences in the usual way using Audi drive select. Three different maps are available for this in the running gear control module.

Service operations

The service operations are the same as for the systems which are already used on other Audi models (Q5, Q7 and A8).

When transport mode is activated, high damping forces are applied in order to counteract movements of the vehicle initiated by the transporting vehicle.

The high level is selected in addition when shipping mode is activated, and controlled to ensure maximum ground clearance. These modes are automatically deactivated after the vehicle has been driven approximately 62 mi (100 km) or faster than 62 mph (100 km/h) if not previously done using the VAS Scan Tool.

Steering system

The A7 uses the same electromechanical power steering used in the 2018 Audi Q5. Progressive steering is standard. Dynamic four-wheel steering is optional.

669_149

The standard electromechanical version of the A7 steering system has a mechanically adjustable steering column. It has lengthwise movement of approximately 2.4 in (60 mm) and approximately 2.0 in (50 mm) of height movement.

An electrically adjustable steering column is optional. It has been adapted from the 2019 A8.

The steering column on vehicles with dynamic four-wheel steering are shorter to provide room for the dynamic steering actuator.

669_150

Two steering wheels are available for the Audi A7 .

The double-spoke leather steering wheel with 12 multi-function buttons is the standard version. For all steering wheels, the leather on the steering wheel and selector lever handle are matched to the preferred color of the dash panel top.

Steering wheels with paddle levers and/or steering wheel heating are optional.

The sportiest version, the sport contour leather steering wheel, has a more contoured rim and is flattened at the bottom. A heated steering wheel is optional.

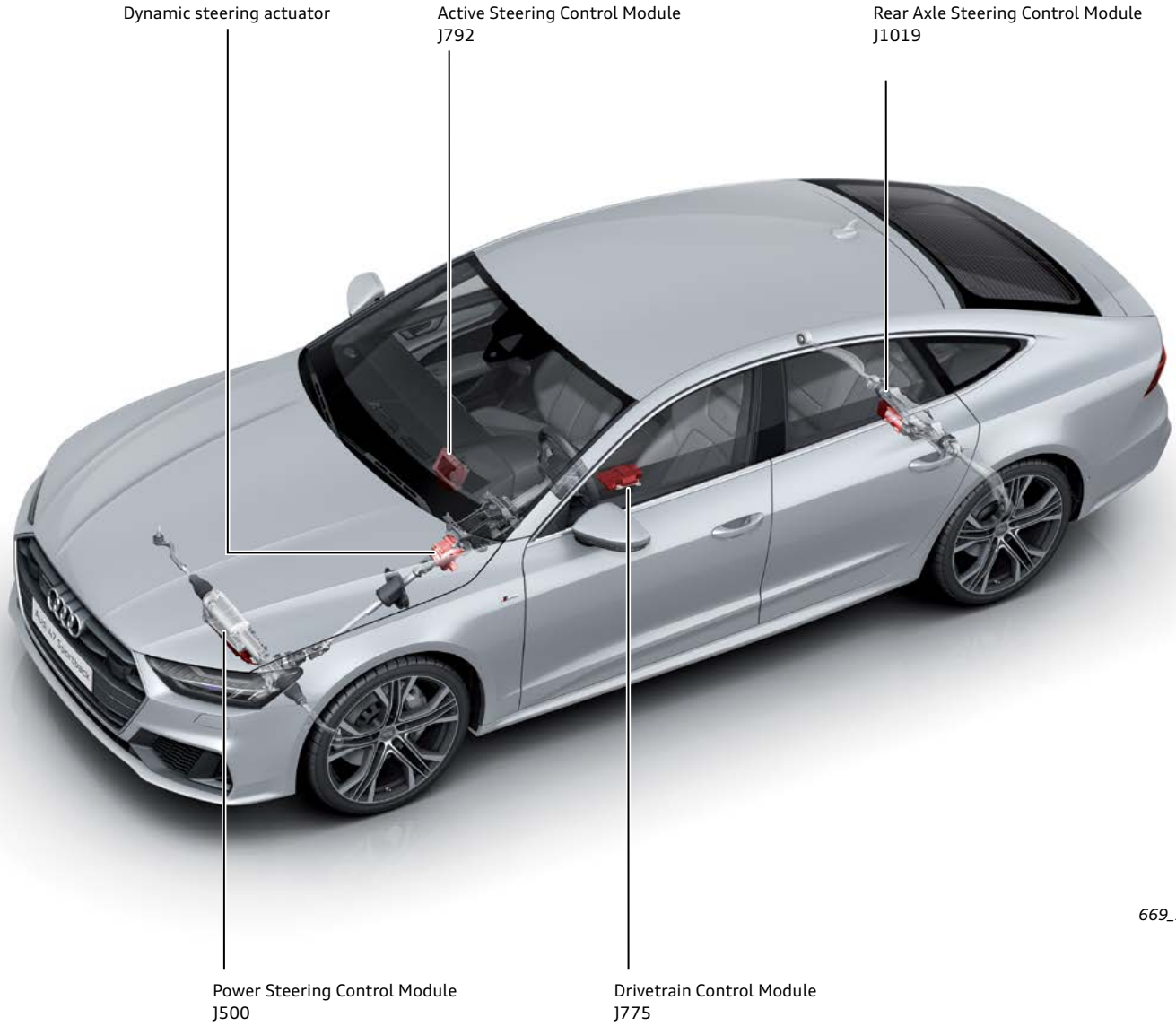
Sport contour leather steering wheel S7

Sport leather steering wheel with paddle levers A7

669_151

Dynamic four-wheel steering (S7)

The dynamic steering system of the S7 is optional. In terms of design, function, serviceability and operation, it is identical to the system of the 2019 A8.



Reference

For further information, please refer to eSelf-Study Program 960293, The 2019 A8 Running Gear and Suspension Systems.

Brake system

As with the current MLBevo models A8, Q7, Q5 and A4, the brakes on the front and rear axles of the Audi A7 have separate brake circuits ("black and white" system).

	Front axle	Rear axle
Engine	3.0l V6 TFSI (335 hp [250 kW])	3.0l V6 TFSI (335 hp [250 kW])
Minimum wheel size	18"	17"
Type of brakes	AKE fixed caliper brakes (30-36-38)	TRW EPBi 43
Number of pistons	6	1
Brake disc diameter	14.7 in (375 mm)	12.9 in (330 mm)
Brake disc thickness	1.4 in (36 mm)	0.8 in (22 mm)

669_153

AKE fixed caliper brakes on front axle

669_154

TRW EPBi 43 brakes on rear axle with electro-mechanical parking brake

The A7 uses an 8/9” brake servo. Because the A7 is equipped with a 48 volt electrical systems, a movement sensor is installed instead of a brake light switch. The PWM signal from this sensor is used to initiate recuperation.

669_155

The 2019 A7 uses the 9th generation ESC. Vehicles with ACC use a hydraulic pump with six pistons and have two additional sensors. Vehicles without AAC use a four piston pump.

The function, data communication, operation, driver information and service operations are the same as the ESC system of the 2019 A8. The new loose wheel detection/ warning system introduced on the Audi A8 is also used on the A7.

669_156

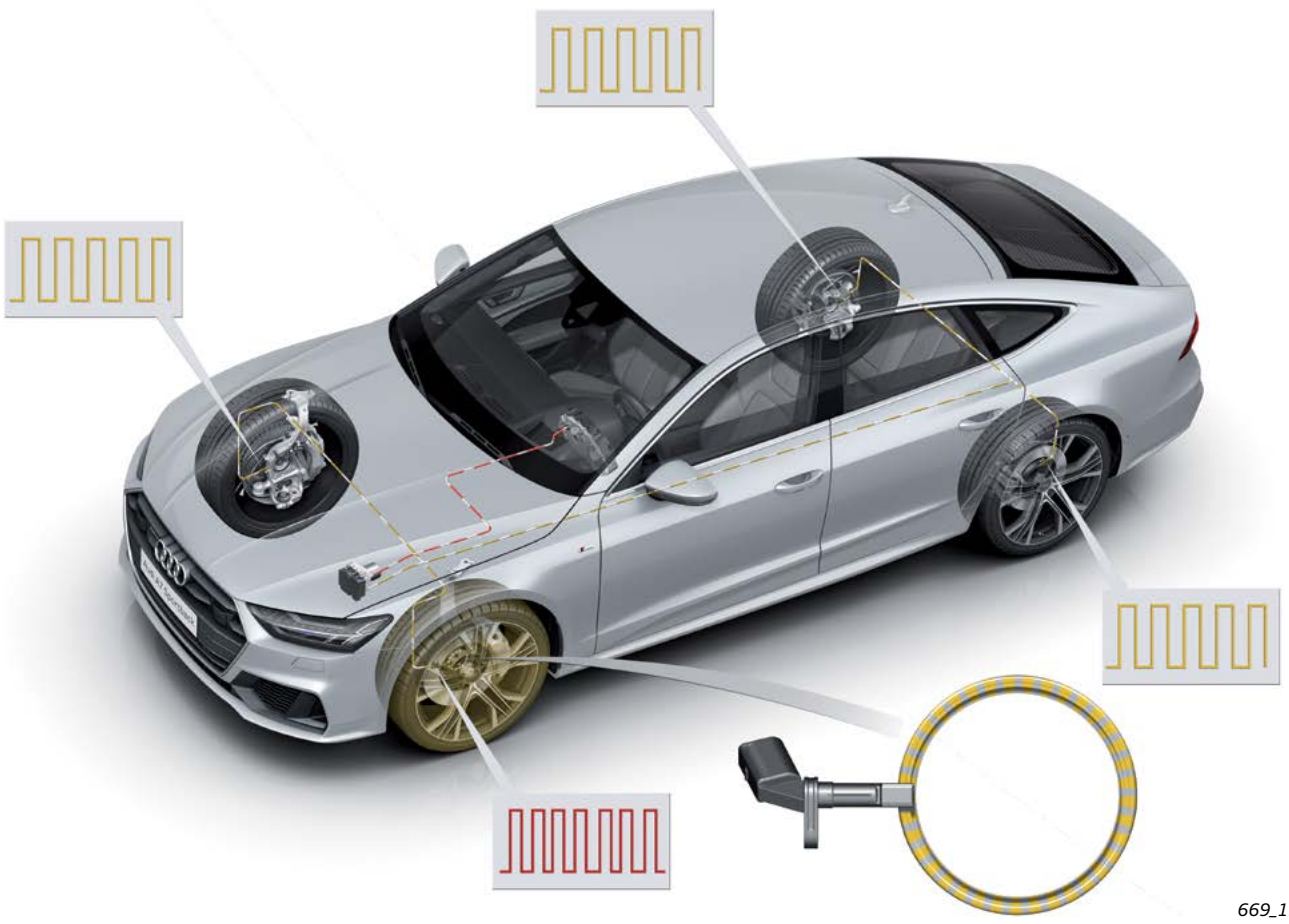
Reference

For further information, please refer to eSelf-Study Program 960293, The 2019 Audi A8 Running Gear and Suspension Systems.

Tire pressure monitoring

The A7 comes equipped with the standard tire pressure monitoring system.

The system has the same design and function as the system in the Audi Q7 and Audi A8.



669_158

The Tire Pressure Loss Indicator is an indirect measurement system. The values measured by the wheel speed sensors are used to calculate the tire circumferences and vibrations. The software is integrated in the ABS Control Module J104.

Reference

For further information, please refer to eSelf-Study program 960293 The 2019 A8 Running Gear and Suspension Systems.

Electrical system and electronics

Introduction

The electrical system and electronics of the 2019 are very similar to those of the 2019 A8.

Various CAN bus systems are used in the vehicle electrical system and network. The FlexRay bus system allows real-time data transfer between the running gear control modules and the driver assist system control modules. FlexRay allows all regulating systems to access the sensors.

In comparison to the previous bus architecture the band-width has grown by a factor of 20.

The electrical system of a typical sedan may consist of 1500 individual wires and weighs about 110 lb (50 kg). The weight of the electrical system in the A7 has been reduced despite the numerous new functions. This was done by using wire cross sections as small as possible. Further reduction was made by using an aluminum main battery cable.

The available HD matrix LED headlights are a statement of the new light design language of the Audi A7. Separated by narrow gaps, 12 light segments are next to each other and operate together digitally.

Audi offers two lighting interior packages for the Audi A7 :
- The contour lighting package.
- The contour ambient lighting package.

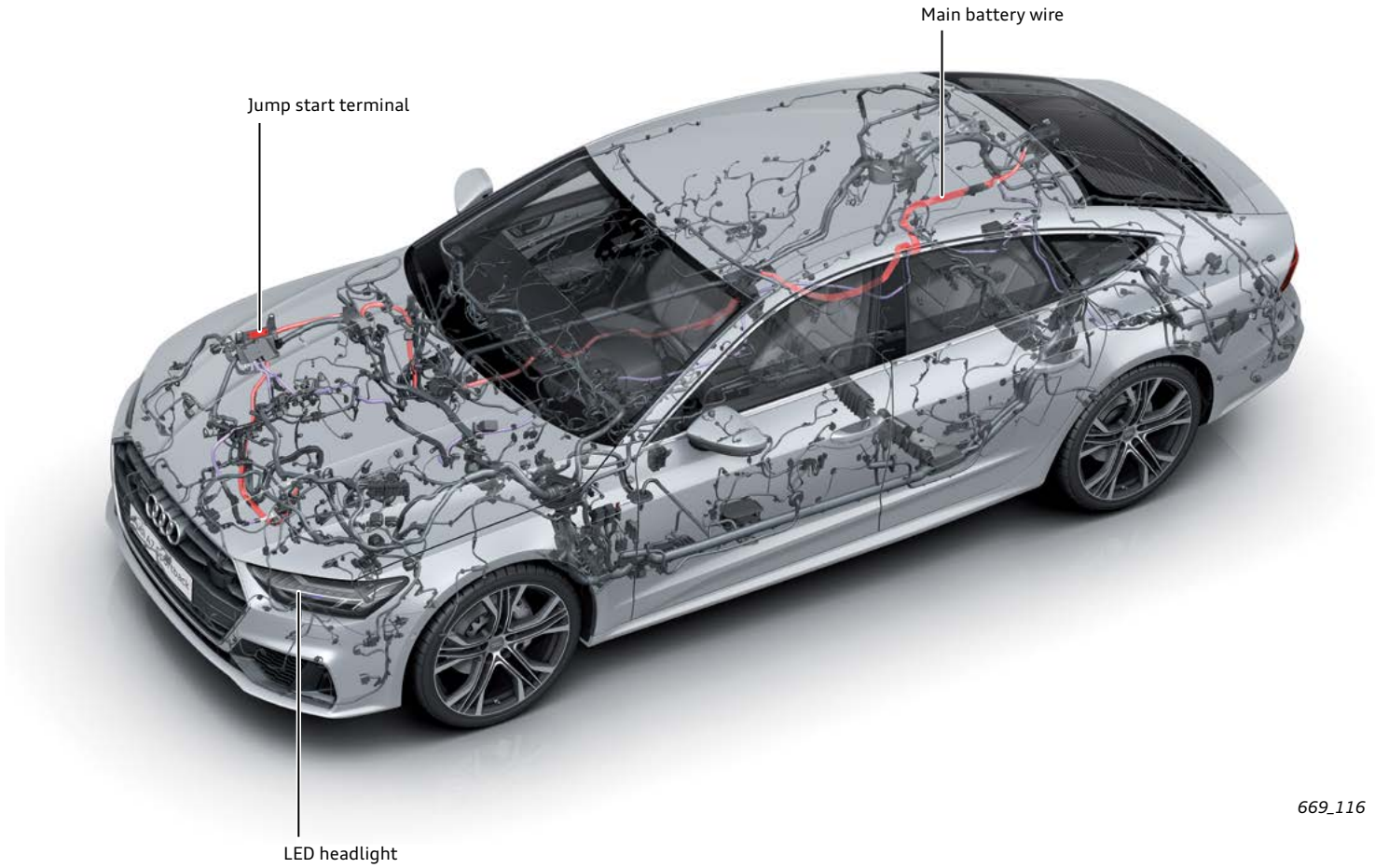
The ambient lighting in the instrument panel and the center console allows the architecture to "float". In the door, this increases the effect of space. Precise contour lighting runs along the center console and the door trim; the quattro badge is also illuminated.

The narrow and precise placement of the light bands traces the entire interior architecture, thereby underlining the entire interior concept.

The contour lighting can be set to 30 different colors and follows the color profiles in the Audi drive select driving dynamics system.

White light accents also shine from the bass speakers in the doors if the Bang & Olufsen Advanced Sound System with 3D sound is installed. Illuminated sill panel trim (standard with the design selection and S line sports package) round off the interior lighting program.

Overview of electrical system and vehicle electrics



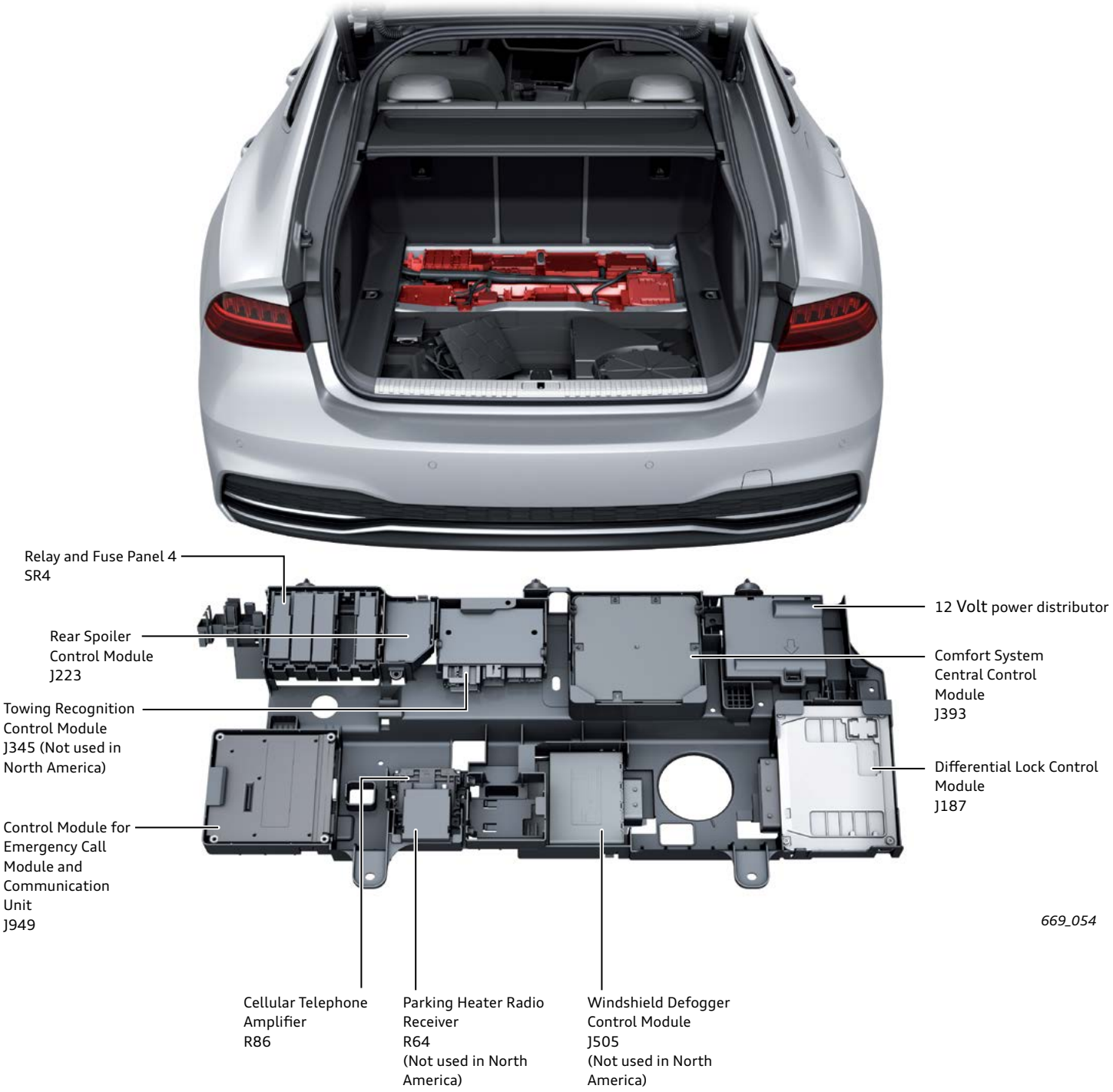
669_116

Control module rack

The installation of many control modules is now on a control module rack installed in the underbody of the luggage compartment. Depending on the options installed in the vehicle, the following modules may be located there:

- Relay and Fuse Panel 4 SR4.
- Rear Spoiler Control Module J223.
- Comfort System Central Control Module J393.
- A 12 Volt power distributor.
- Control Module for Emergency Call Module and Communication Unit J949.
- Cellular Telephone Amplifier R86.
- Differential Lock Control Module J187.

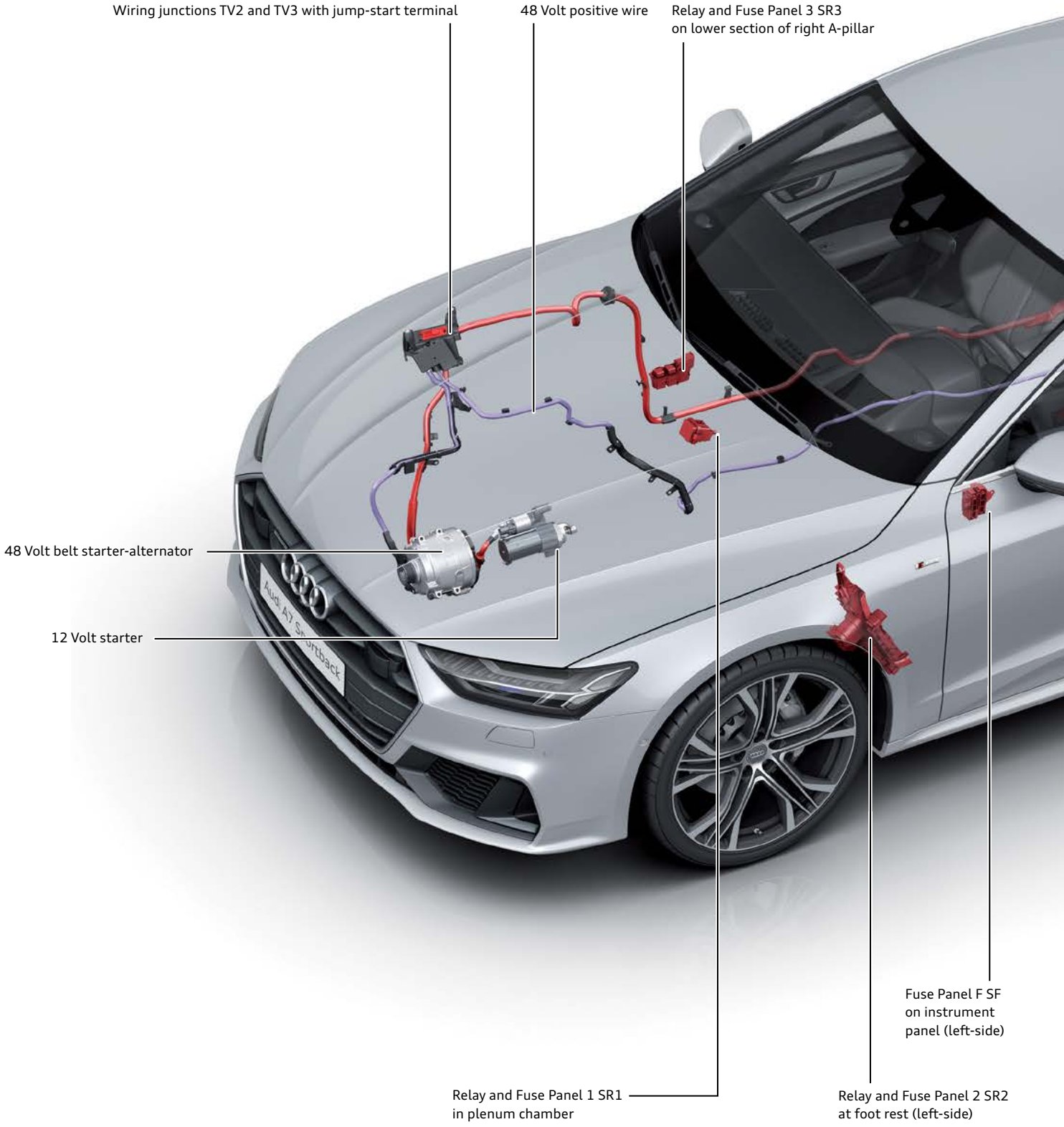
Installation location



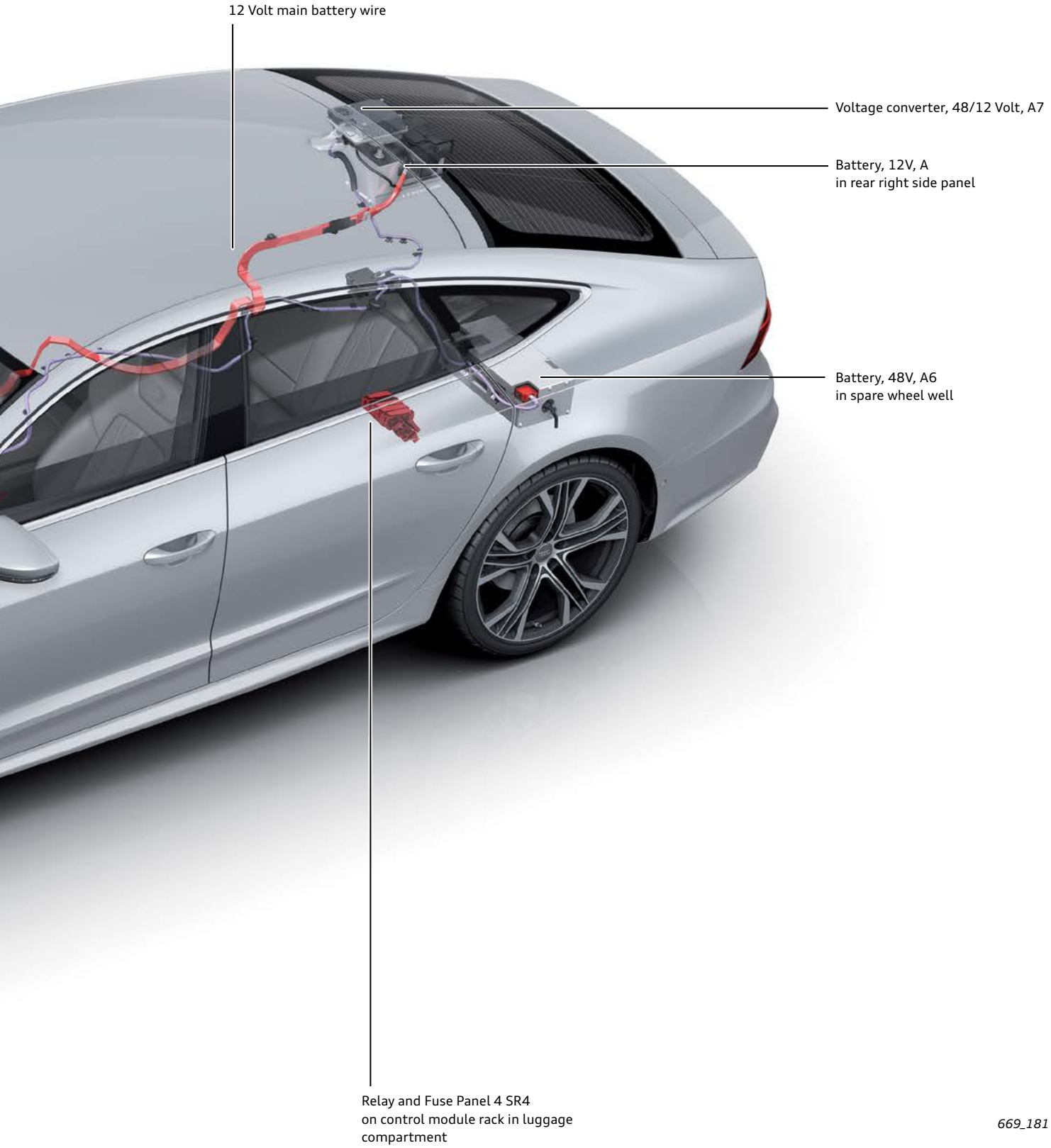
Electrical system

The A7 is equipped with both a 48 volt electrical system and a 12 Volt electrical system. The 48 volt electrical system is the main electrical system. The current is generated via the 48 volt belt starter-alternator when the engine is running.

The installation location and function of the batteries, voltage converter, 12 volt starter motor, and the 48 volt starter/alternator are identical to those of the 2019 A8.



Please refer to eSelf-Study Program 970293, The 2019 Audi A8 Electrics and Electronics for more detailed information about the descriptions and operation of the components listed on this page.

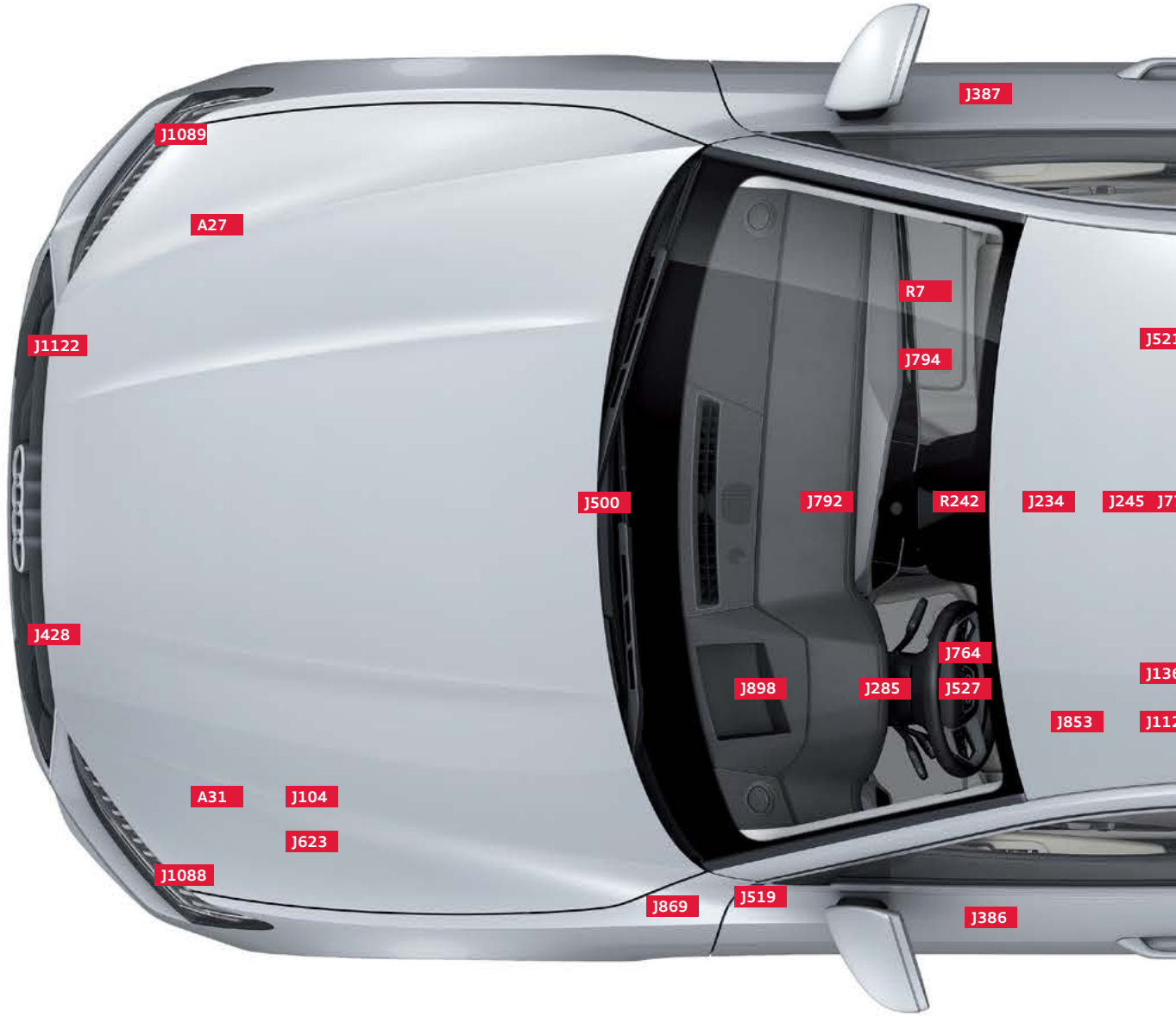


669_181

Networking

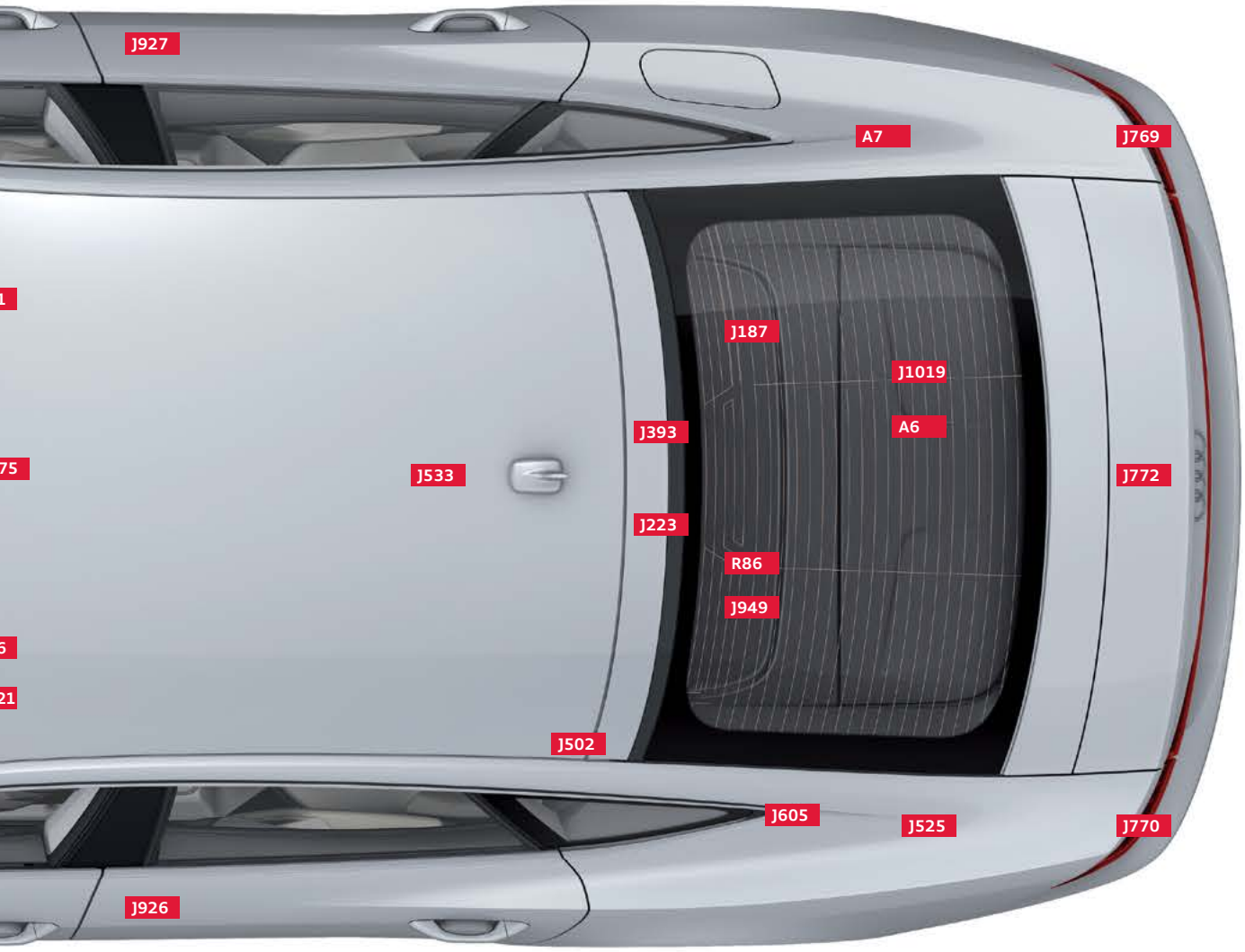
Installation location of control modules

Always refer to the current service literature for information about the installation location and service procedures for control modules as well as instructions for installation and removal.



Key:

A6	Battery, 48 V
A7	Voltage Converter (48 V/12V)
A27	Right LED Headlamp Power Output Module 1
A31	Left LED Headlamp Power Output Module 1
J104	ABS Control Module
J136	Memory Seat/Steering Column Adjustment Control Module
J187	Differential Lock Control Module
J223	Rear Spoiler Control Module
J234	Airbag Control Module
J245	Sunroof Control Module
J285	Instrument Cluster Control Module
J386	Driver Door Control Module
J387	Front Passenger Door Control Module
J393	Comfort System Central Control Module
J428	Control Module for Adaptive Cruise Control
J500	Power Steering Control Module
J502	Tire Pressure Monitoring Control Module
J519	Vehicle Electrical System Control Module
J521	Front Passenger Memory Seat Control Module
J525	Digital Sound System Control Module
J527	Steering Column Electronics Control Module
J533	Data Bus on Board Diagnostic Interface
J605	Rear Lid Control Module
J623	Engine Control Module
J764	Electronic Steering Column Lock Control Module

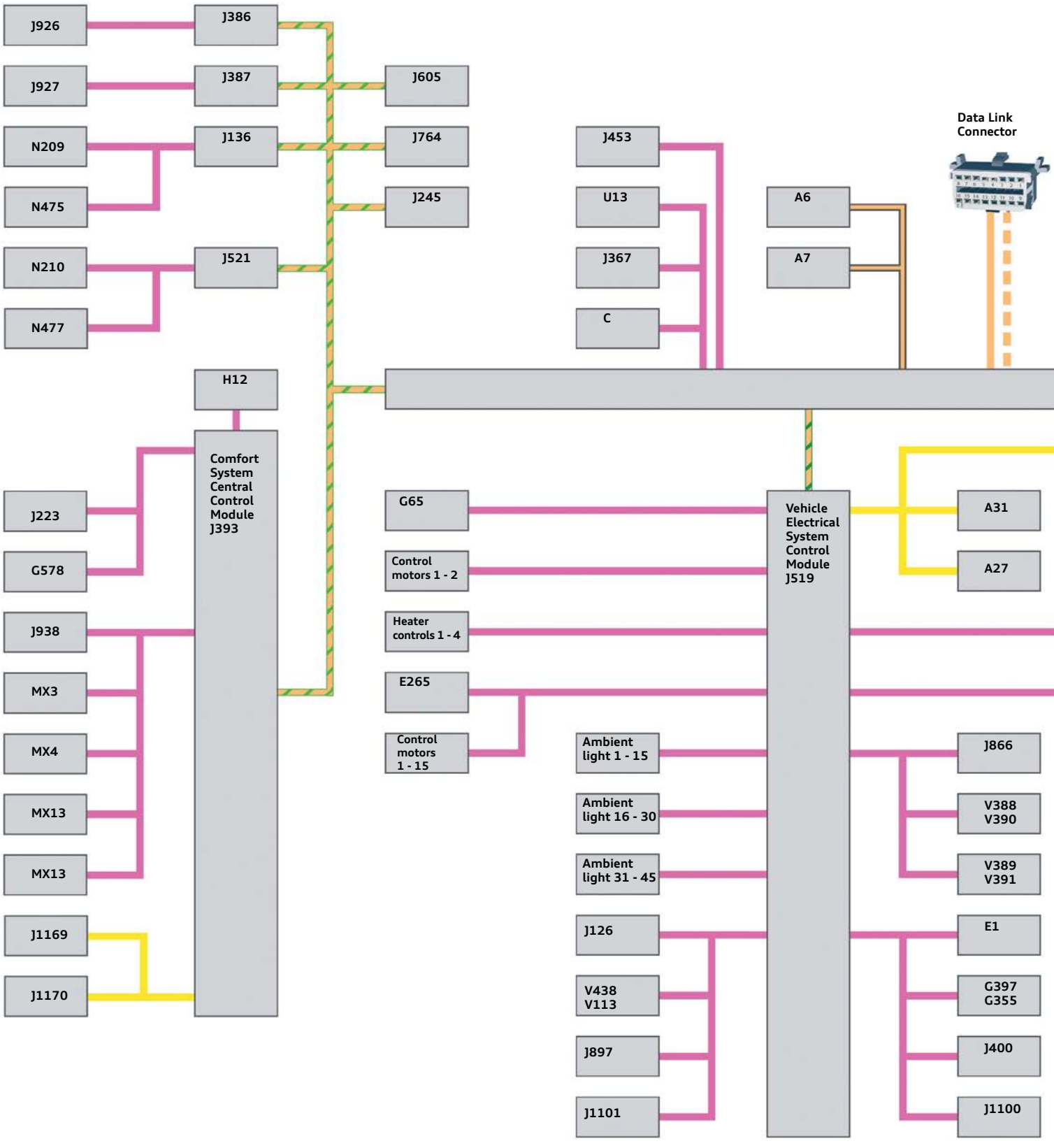


669_182

J769 Lane Change Assistance Control Module
J770 Lane Change Assistance Control Module 2
J772 Rearview Camera System Control Module
J775 Drivetrain Control Module
J792 Active Steering Control Module
J794 Information Electronics Control Module 1
J853 Night Vision System Control Module
J869 Structure Borne Sound Control Module
J898 Windshield Projection Head Up Display Control Module
J926 Driver Side Rear Door Control Module
J927 Passenger Side Rear Door Control Module
J949 Control Module for Emergency Call Module and Communication Unit
J1019 Rear Axle Steering Control Module
J1088 Control Module for Left Front Object Detection Radar Sensor
J1089 Control Module for Right Front Object Detection Radar Sensor
J1121 Driver Assistance Systems Control Module
J1122 Laser Distance Regulation Control Module

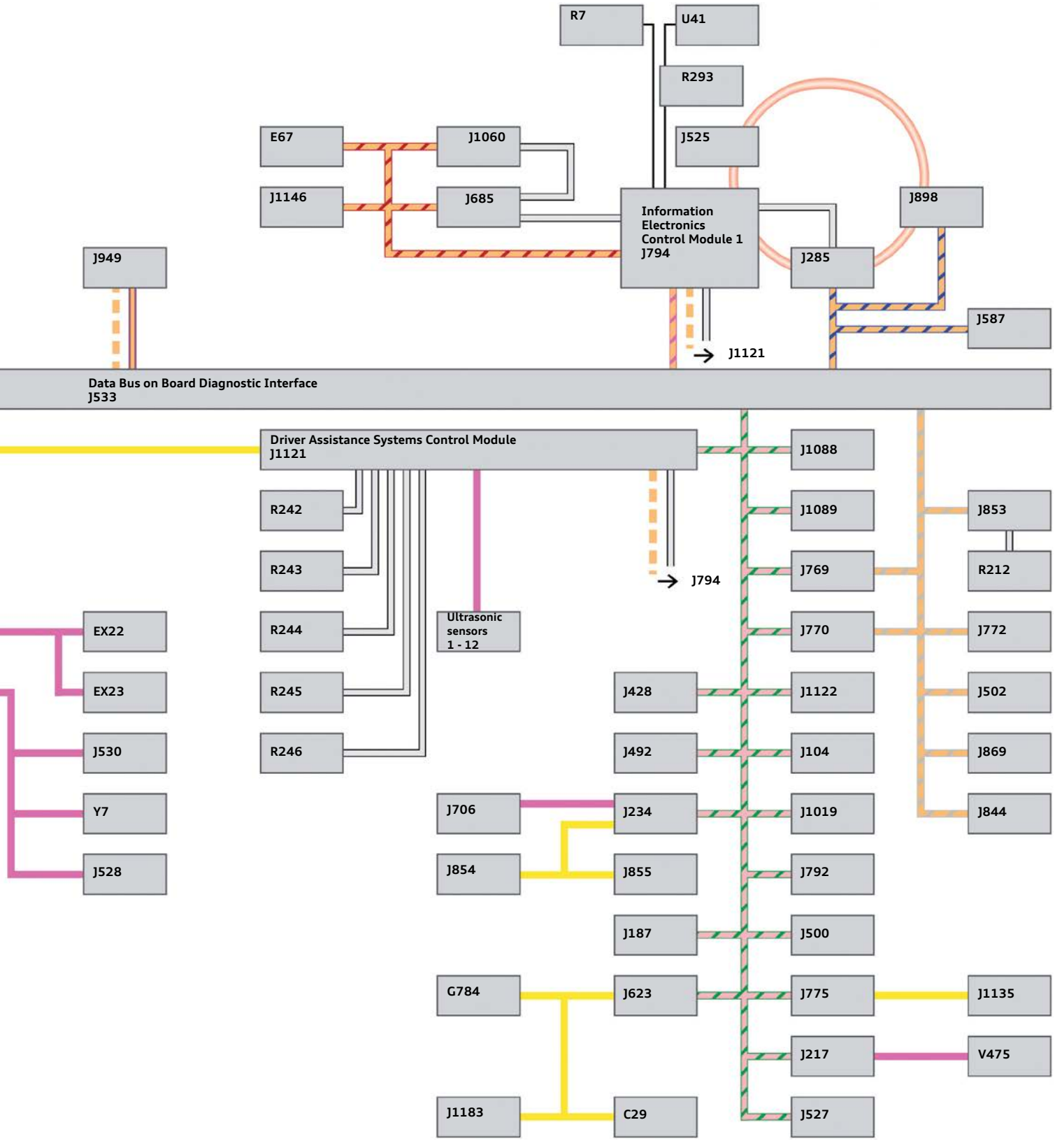
R7 DVD Player
R86 Cellular Telephone Amplifier
R242 Driver Assistance Systems Front Camera

Topology



Key:

- Convenience CAN
- Hybrid CAN
- Extended CAN
- Infotainment CAN
- Sub-bus systems/private CAN
- MOST bus
- LVDS
- Dash panel insert CAN
- Diagnostics CAN
- FlexRay
- Modular infotainment matrix CAN (MIB)
- LIN bus
- USB wires
- Ethernet connection
- Convenience CAN 2
- Connect CAN



669_121

The FlexRay topology does not mirror the actual configuration of the control modules. The order of the control modules in the MOST ring in this illustration is also not identical to the actual sequence.

Key:

A6 Battery, 48 V
A7 Voltage converter (48 V/12V)
A27 Right LED Headlamp Power Output Module 1
A31 Left LED Headlamp Power Output Module 1

C Alternator
C29 Starter Generator

E1 Light Switch
E67 Driver Volume Control
E265 Rear A/C Display Control Head
EX22 Switch Module in Instrument Panel, Center
EX23 Center Console Switch Module 1

G65 High Pressure Sensor
G355 Humidity Sensor
G397 Rain/Light Recognition Sensor
G578 Anti-Theft Alarm System Sensor
G784 Particulate Sensor

H12 Alarm Horn

J104 ABS Control Module
J126 Fresh Air Blower Control Module
J136 Memory Seat/Steering Column Adjustment Control Module
J187 Differential Lock Control Module
J217 Transmission Control Module
J223 Rear Spoiler Control Module
J234 Airbag Control Module
J245 Sunroof Control Module
J285 Instrument Cluster Control Module
J367 Battery Monitoring Control Module
J386 Driver Door Control Module
J387 Front Passenger Door Control Module
J400 Wiper Motor Control Module
J428 Control Module for Adaptive Cruise Control
J453 Multifunction Steering Wheel Control Module
J492 All Wheel Drive Control Module
J500 Power Steering Control Module
J502 Tire Pressure Monitoring Control Module
J521 Front Passenger Memory Seat Control Module
J525 Digital Sound System Control Module
J527 Steering Column Electronics Control Module
J528 Roof Electronics Control Module
J530 Garage Door Opener Control Module
J587 Selector Lever Sensor System Control Module
J605 Rear Lid Control Module
J623 Engine Control Module
J685 Front Information Display Control Head
J706 Passenger Occupant Detection System Control Module
J764 Electronic Steering Column Lock Control Module
J769 Lane Change Assistance Control Module
J770 Lane Change Assistance Control Module 2
J772 Rearview Camera System Control Module
J775 Drivetrain Control Module
J792 Active Steering Control Module
J844 Automatic High Beam Assist Control Module
J853 Night Vision System Control Module
J854 Left Front Seat Belt Tensioner Control Module
J855 Right Front Seat Belt Tensioner Control Module
J866 Power Adjustable Steering Column Control Module
J869 Structure Borne Sound Control Module
J897 Ionizer Control Module
J898 Windshield Projection Head Up Display Control Module
J926 Driver Side Rear Door Control Module
J927 Passenger Side Rear Door Control Module
J938 Power Rear Lid Opening Control Module
J949 Control Module for Emergency Call Module and Communication Unit
J1019 Rear Axle Steering Control Module
J1060 Front Information Display Control Head 2
J1088 Control Module for Left Front Object Detection Radar Sensor
J1089 Control Module for Right Front Object Detection Radar Sensor
J1100 Windshield Washer Pump Control Module
J1101 Fragrance Diffuser System Control Module
J1122 Laser Distance Regulation Control Module
J1135 Level Control System Compressor Electronics
J1146 Mobile Device Charger 1
J1169 Close Range Communication Control Module
J1170 Close Range Communication Control Module 2
J1183 NO_x Sensor Control Module 3

MX3 Left Tail Lamp
MX4 Right Tail Lamp
MX13 Center Tail Lamp

N209 Driver Lumbar Support Adjustment Valve Block
N210 Front Passenger Lumbar Support Adjustment Valve Block
N475 Valve Block 1 in Driver Seat
N477 Valve Block 1 in Front Passenger Seat

R7 DVD Player
R212 Night Vision System Camera
R242 Driver Assistance Systems Front Camera
R243 Front Peripheral Camera
R244 Left Peripheral Camera
R245 Right Peripheral Camera
R246 Rear Peripheral Camera
R293 USB Distributor

U13 Converter with Socket, 12 V-230 V
U41 USB Connection 1

V113 Recirculation Door Motor
V388 Driver Seat Backrest Blower Fan
V389 Front Passenger Seat Backrest Blower Fan
V390 Driver Seat Cushion Blower Fan
V391 Front Passenger Seat Cushion Blower Fan
V438 Fresh Air Door Motor
V475 Transmission Fluid Auxiliary Hydraulic Pump 1
Y7 Automatic Dimming Interior Rearview Mirror

A7 bus systems

The bus systems used in the Audi A7 or similar to the Audi A8. The only new feature is Connect CAN, which connects Control Module for Emergency Call Module and Communication Unit J949 to the gateway.

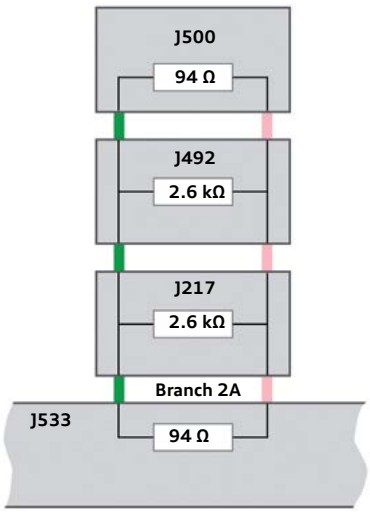
Bus system	Wire color	Configuration	Data transfer rate
Connect CAN		Electrical bus system	500 kbit/s

FlexRay

The FlexRay topology of the Audi A7 is identical to that of the Audi A8. However, All Wheel Drive Control Module J492 may also be connected at branch 2A.

Key:

J217 Transmission Control Module
J492 All Wheel Drive Control Module
J500 Power Steering Control Module
J533 Data Bus on Board Diagnostic Interface



669_183

Reference
For further information about FlexRay, refer eSelf-Study Program 970293, The 2019 Audi A8 Electrics and Electronics.

Control modules

Data Bus on Board Diagnostic Interface J533

Brief description

J533 (gateway) is installed under the rear seat. It is accessed with the VAS Scan Tool using Address word 0019.

J533 performs the following functions:

- Network system gateway.
- Controller for FlexRay bus.
- Diagnostic master.
- Energy manager for the 12 Volt electrical system.
- Energy manager for the 48 Volt electrical system.
- Interface for various connect services.

Special feature:

- The gateway manages the diagnostic firewall.

It is a node of the following data bus systems:

- Hybrid CAN.
- Convenience CAN.
- Convenience CAN 2.
- Infotainment CAN.
- Dash panel insert CAN.
- Extended CAN.
- Connect CAN.
- FlexRay.
- Diagnostics CAN.
- Ethernet.

It is not a node of:

- CAN modular infotainment matrix (MIB).
- MOST bus.

It is the LIN master for:

- J367 Battery Monitoring Control Module.
- C Alternator (12 Volt alternator).
- J453 Multifunction Steering Wheel Control Module.
- U13 Converter with Socket, 12 V-230 V.

669_184

Vehicle Electrical System Control Module J519 (BCM1)

Brief description

The tasks of J519 include reading in numerous sensors and actuators, the exterior lights and the wipers. Many integrated functions, such as the activation of the seat heating, are also implemented.

J519 also activates the air conditioning on the Audi A7. J519 can be accessed with the VAS Scan Tool using Address word 0009. Climate control functions are now accessed under this Address word.

J519 performs the following functions:

- Exterior lighting master.
- Interior lighting master.
- Diagnostic gateway for the light control modules.

Integrated functions:

- Parking.
  - Parking aid.
- Ambient lighting.
  - Activating the interior light modules.
- Climate control.

J519 is the only node of convenience CAN 2. In addition, it is connected to Driver Assistance Systems Control Module J1121 and the output modules for the headlights (output module 1 for headlight) via a private CAN.

In addition, the J519 is the master control unit for numerous LIN slaves.

Special feature:

The interior lighting modules of the ambient lighting and the climate control motors can be connected both as a LIN series or parallel on the corresponding LIN branch. It is important to remember this when performing fault finding. Always consult the correct current flow diagram for the vehicle in its corresponding equipment version.

669_185

Vehicle Electrical System Control Module
J519

Comfort System Central Control Module J393 (BCM2)

Brief description:

- Has diagnostic address 0046.
- Node of convenience CAN data bus.
- Has the following master functions:
  - Central locking system.
  - Immobilizer.
- LIN master for:
  - LIN1: Anti-Theft Alarm System Sensor G578, Rear Spoiler Control Module J223.
  - LIN2: Alarm Horn H12.
  - LIN3: Power Rear Lid Opening Control Module J938, tail lights.
- Has master function for both near field communication control modules:
  - Close Range Communication Control Module J1169.
  - Close Range Communication Control Module 2 J1170.

Further integrated functions

- Terminal management.
- Entry and start authorization.
- Central locking.
- Anti-theft alarm system.
- Activation of rear exterior lighting.
- Heated rear window.
- Turn signal control.
- Activation of rear roller blind.
- Rear lid release and luggage compartment lighting control.
- Tank filler flap locking.
- Power latching system for rear lid.
- Activation of sliding sunroof.
- Activation of sunroof sun blind.
- Electronic steering column lock.
- Sensor-operated rear lid opening.
- Tank sensor management.
- Unlocking of doors in an accident in which the crash sensor is activated.

669_055

Comfort System Central Control Module J393

Instrument cluster

Two different instrument clusters are used for the Audi A7:

- The analog instrument cluster, also known as the TOP instrument cluster.
- The Audi virtual cockpit.

The customer is able to personalize both versions in a personal profile. The profile used is then allocated to the vehicle key/Audi connect key (or Audi connect key card) currently in use.

When the vehicle is unlocked, the profile last active with the key used to unlock the vehicle is loaded and displayed on the instrument cluster.

Brief description

Instrument Cluster Control J285

- Equipment:
  - Always installed.
- Installation location:
  - In instrument panel.
- Address word:
  - 0017.
- Data bus communication:
  - Dash panel insert CAN node.
- MOST bus node.
  - Connected to Information Electronics Control Module 1 J794 via an LVDS wire.
- Special features:
  - Component protection system node.
  - The instrument cluster is not integrated in the immobilizer.
  - The number and color of the bar graph displays for coolant temperature and fuel level are the same for both instrument cluster types.

Analog instrument cluster

Audi virtual cockpit

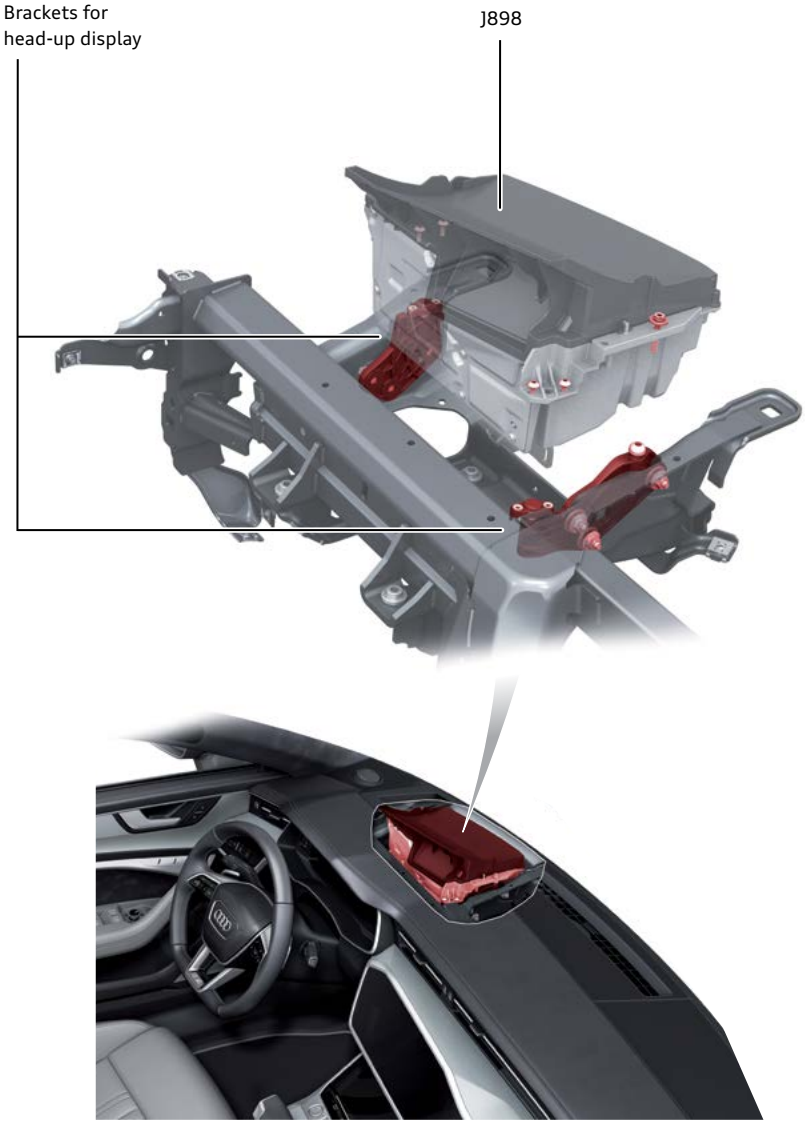
Windshield Projection Head Up Display Control Module J898

Windshield Projection Head Up Display Control Module J898 projects vehicle information into the driver's field of vision. The display seems to appear at a distance of about 6 ft (2 m) away from driver - it appears to be floating above the hood.

Special windshields are required on vehicles with the head-up display.

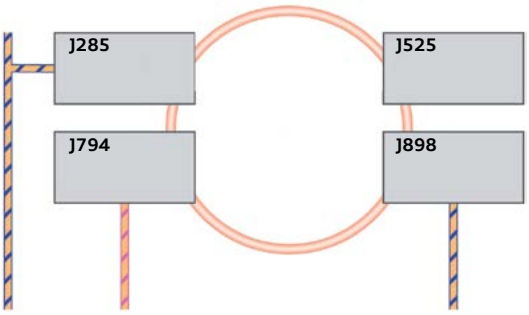
Brief description

- Address word:
  - 0082
- Incorporation in data bus systems:
  - J898 is both a node of the dash panel insert CAN and the MOST data bus.
- Special features:
  - J898 is not a participant of the immobilizer nor of the component protection system.
- Handling in service:
  - The windshield must be removed before J898 can be removed.
  - J898 is positioned in both outer brackets for head-up display; the brackets must not be removed during service.
  - No calibration board is used when J898 is renewed in service.



669_203

Order of MOST bus ring nodes



669_206

Key:

J285 Instrument Cluster Control Module
J525 Digital Sound System Control Module
J794 Information Electronics Control Module 1
J898 Windshield Projection Head Up Display Control Module

Wiring colors:

Infotainment CAN

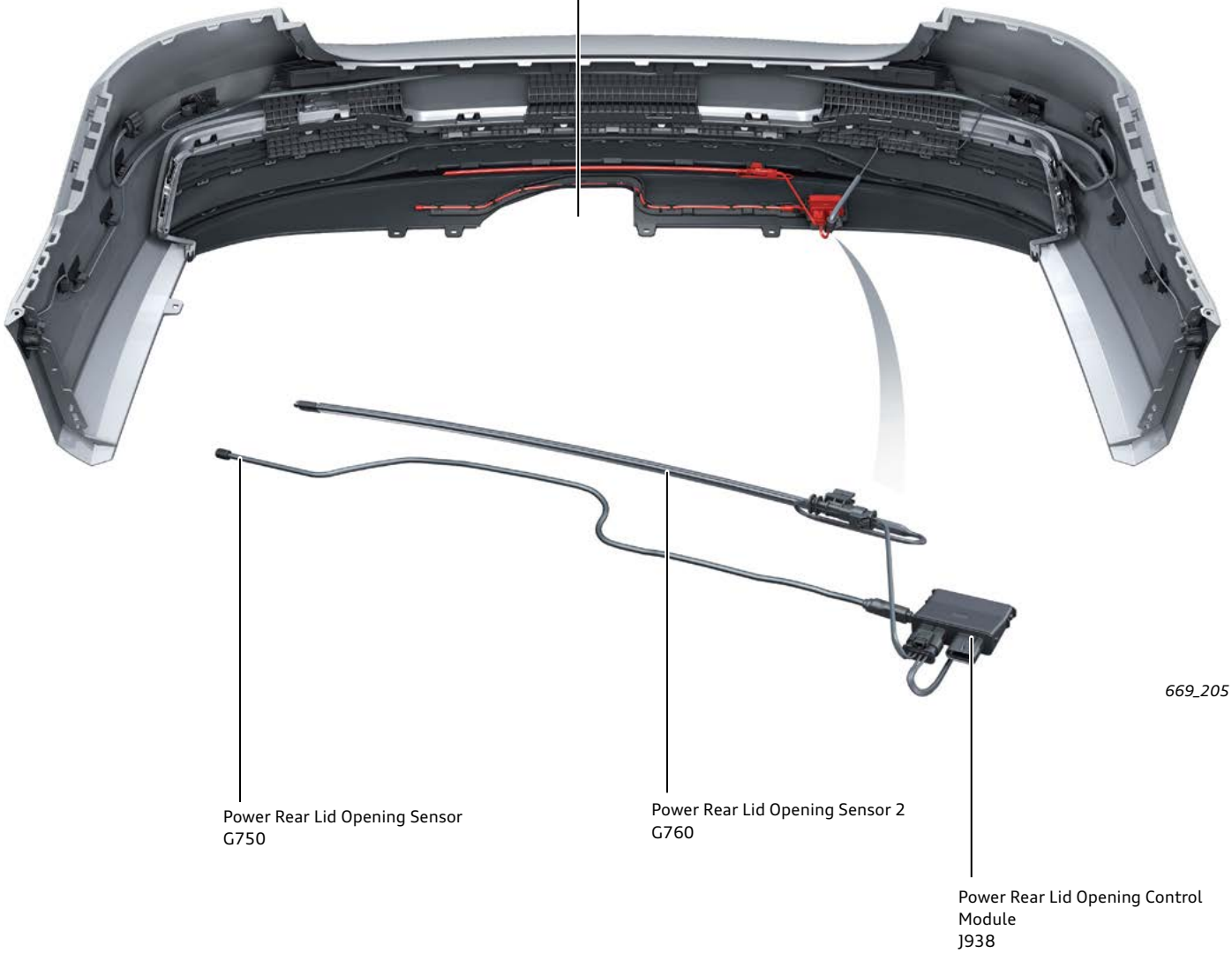
Dash panel insert CAN

MOST bus

Convenience key with sensor-operated rear lid opening

On Audi A7 vehicles equipped with the convenience key with sensor-operated rear lid opening, the customer can open and close the rear lid with a foot gesture.

Both sender wires run along the rear bumper horizontally.



Exterior lighting

Headlights

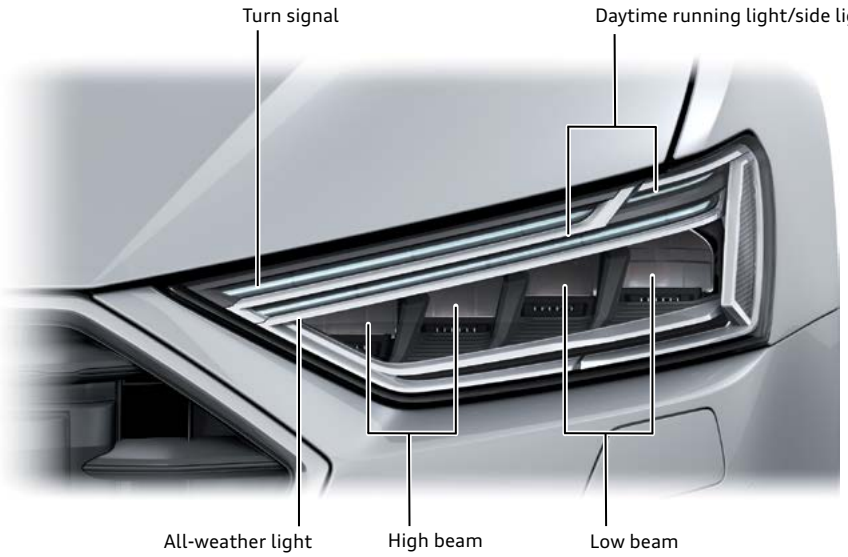
Three types of headlights are available for the 2019 A7. They are geometrically identical, but vary in both design and lighting functions.

The following versions are offered:

- LED headlights.
- Matrix LED headlights.
- Matrix LED headlights with laser high beams.

LED headlights (PR No.: 8IT + 8G1)

The illustration shows the left headlight in the European version.



669_186

Lighting functions

- Daytime running light.
- Side light.
- Low beam.
- High beam.
- All-weather light.
- Turn signal.
- Side marker light (not illustrated).

Special features of the lighting functions

If the switch is set to "side lights" or "OFF" and the vehicle exceeds a speed of 6 mph (10 km/h), the "AUTO" position is automatically selected. During a turning procedure, the daytime running lights are switched off.

Service

Both the control module installed on the outside of the headlight housing and the headlight range control motor can be replaced in the event of a defect. In the event of damage to the upper and inner headlight attachments, repair tabs can be attached to the headlight housing. It is not possible to replace individual lights.

Equipment

The LED headlights can be combined with the high beam assist as an option. A headlight washer system is also available optionally.

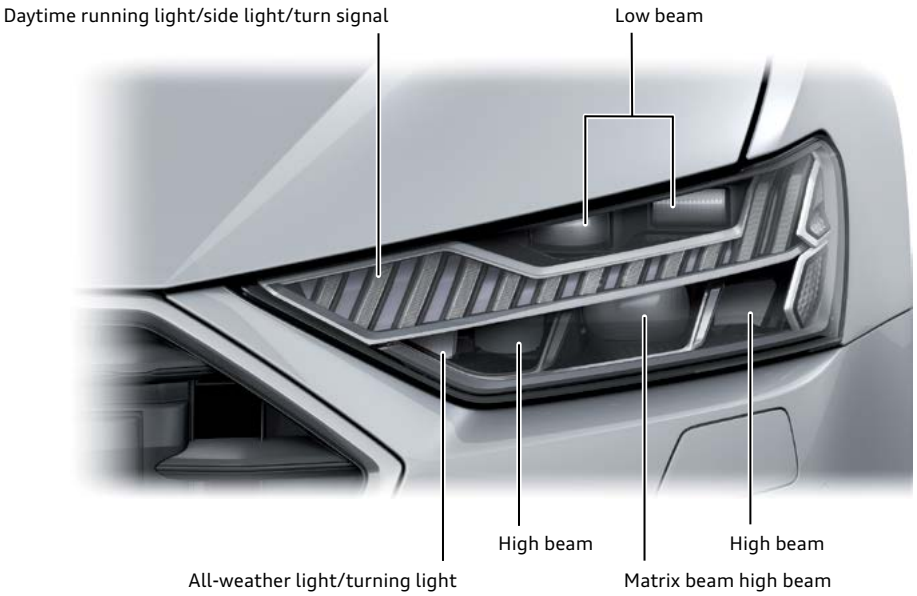
Headlight range adjustment

The LED headlights are equipped with automatic dynamic headlight range adjustment.

Note
Matrix beam functionality will not be available at launch.

Matrix LED headlights (PR No.: 8IT + 8G5)

The illustration shows the left headlight in the European version.



669_187

Lighting functions

- Daytime running light
- Side light
- Low beam
- Matrix beam high beam
- All-weather light
- Turning light
- Dynamic turn signal
- Highway light
- Side marker light (not illustrated)

Special features of the lighting functions

If the switch is set to "side lights" or "OFF" and the vehicle exceeds a speed of 6 mph (10 km/h), the "AUTO" position is automatically selected. The daytime running lights are switched off during the turn signal procedure, and the side lights are active in the turn signal dark phase and dimmed when the turn signals are active.

Service

The control module installed on the outside of the headlight housing, the fan, and the output module for matrix headlight can be replaced in the event of a defect. Because the output module for matrix headlight is located inside the headlight, the ESD (electrostatic discharge) mat VAS 6613 must be used if the module is replaced. It is not possible to replace individual lights.

Equipment

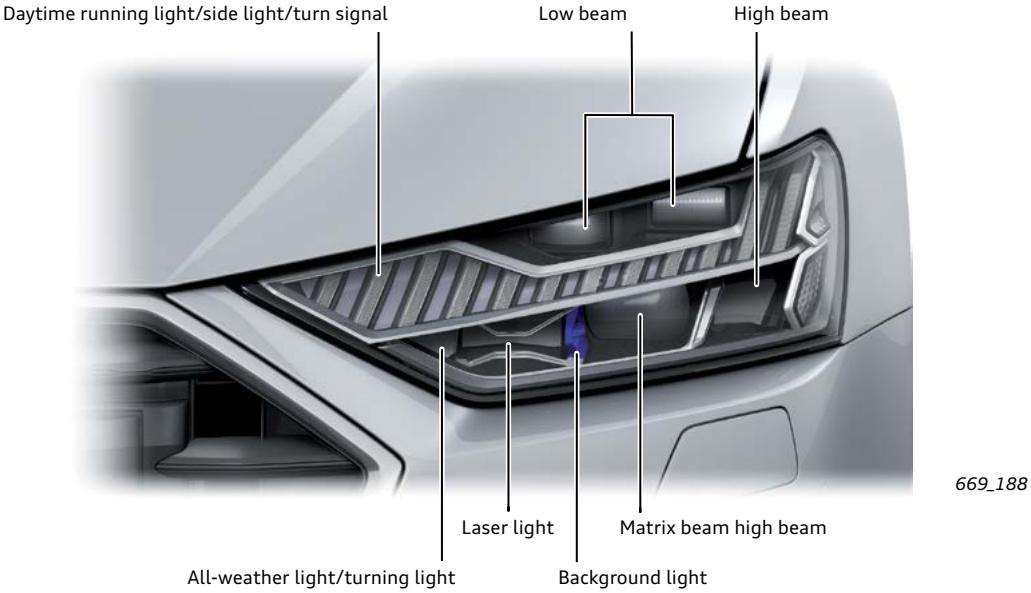
A headlight washer system is standard on vehicles with matrix LED headlights.

Headlight range adjustment

The matrix LED headlights are equipped with automatic dynamic headlight range adjustment.

Note
Matrix beam functionality will not be available at launch.

Matrix LED headlights with laser high beams (PR No.: 8IZ + 8G5) European version shown.



Lighting functions:

- Daytime running light.
- Side light.
- Background light.
- Low beam.
- Matrix beam high beam.
- Laser light.
- All-weather light.
- Turning light.
- Intersection light.
- Highway light.
- Dynamic turn signal.
- Side marker light (not illustrated).

Special features of the lighting functions

If the switch is set to "side lights" or "OFF" and the vehicle exceeds a speed of 6 mph (10 km/h), the "AUTO" position is automatically selected. The daytime running lights are switched off during the turn signal procedure.

The side lights are active in the turn signal dark phase and dimmed when the turn signals are active.

The blue background light is activated together with the daytime running lights and the side lights but is switched off during the turn signal procedure.

Service

The control module installed on the outside of the headlight housing, both fans, and the output module for matrix headlight can be replaced in the event of a defect. Because the output module for matrix headlight is located inside the headlight, the ESD (electrostatic discharge) mat VAS 6613 must be used if the module is replaced. It is not possible to replace individual lights.

Headlight range adjustment

The matrix LED headlights with laser high beams are equipped with automatic dynamic headlight range adjustment.

Equipment

A headlight washer system is standard on vehicles with matrix LED headlights.

Note
Matrix beam functionality will not be available at launch.

Light signature

This set of images shows the most important lighting functions of a set of matrix LED headlights with laser high beams.

The illustrations show the lighting functions of a set of headlights in the European version.

The laser high beams cannot be operated when the vehicle is stationary. The function is considered to be OK if there are no DTCs stored in the control module..

Daytime running lights *669_189*

Turn signals *669_190*

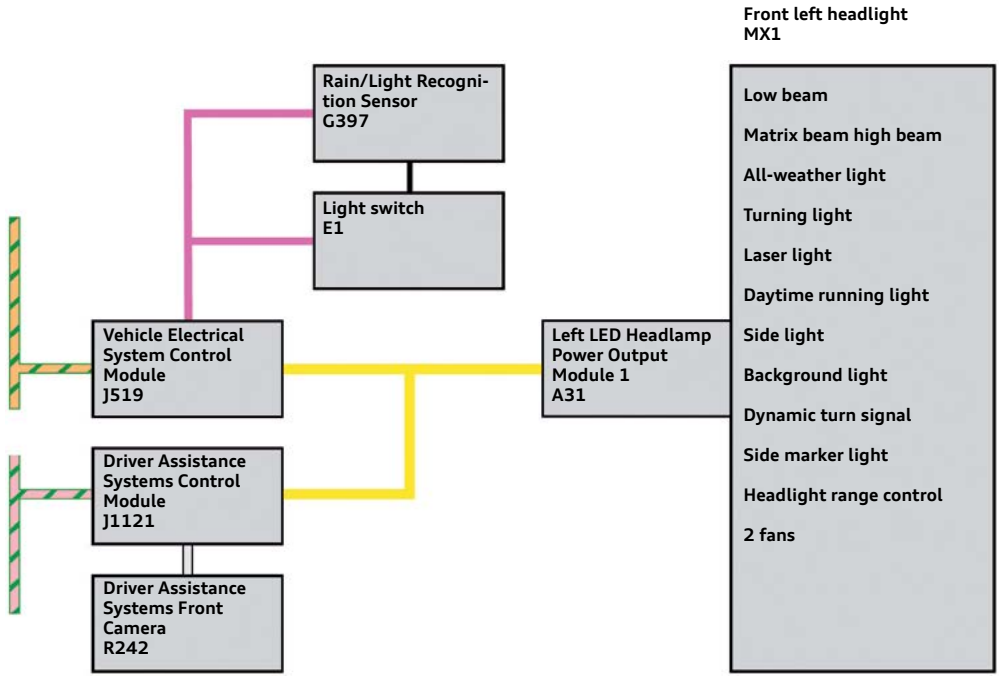
Low beams *669_191*

High beams *669_192*

High beams and laser high beams *669_193*

Activation of matrix LED headlights with laser high beams

Illustration for left headlight



669_194

Key:

- Convenience CAN 2
- FlexRay
- Sub-bus systems
- LVDS
- LIN bus

Activation

Vehicle Electrical System Control Module communicates with Left LED Headlamp Power Output Module 1 via a sub-bus system. These output modules activate all lighting functions, the headlight range control motors and, on the matrix headlights, the fan(s).

The control modules have self-diagnosis and can be accessed via Address words 00D6 and 00D7.

The illustration shows an example of the communication paths and the components involved. The activation process inside the headlight is not relevant for repairs and therefore not shown specifically.

High beam assist

Driver Assistance Systems Front Camera R242 and Driver Assistance Systems Control Module J1121 are responsible for the high beam assist function. If the camera detects oncoming vehicles or vehicles ahead, it passes this information on J1121.

J1121 calculates which LEDs in the matrix headlights need to be switched off to avoid blinding other road users. This information is sent to the output modules via the sub-bus system. On the LED headlights, only two conditions are possible: "high beams on" or "high beams off".

Calibrating matrix 2.0

Calibration of the matrix headlights is always required after the following work:

- Headlight position was changed (removed/installed, securing bolts loosened).
- Headlights were adjusted.
- Drivetrain Control Module J775 was recalibrated or replaced.
- Driver Assist Systems Control Module J1121 was replaced.
- Vehicle Level Sensors G76, G77, G78 or G289 have been replaced.
- The DTC memory has the entry “No or incorrect basic setting/ adaption”.

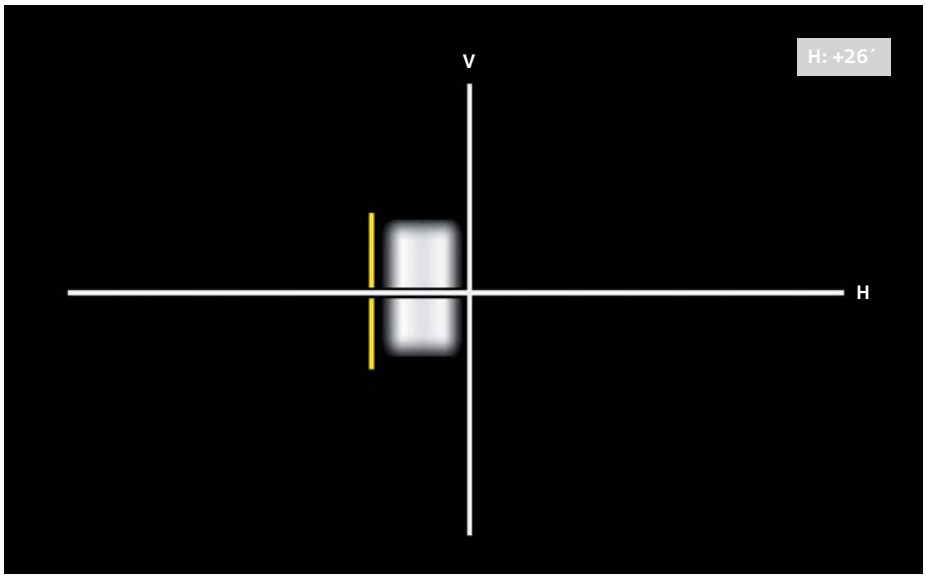
Aligning reference segment

As with the first generation of the matrix LED headlight, the reference segment is measured using the headlight adjustment unit VAS 621 001 as the first step of the calibration process.

The deviation value is then sent to Driver Assistance Systems Control Module J1121 with the help of the vehicle diagnostic tester. The yellow line on the image shows which edge the reference segment is being aligned to. In this example, a horizontal deviation of +26 minutes has been determined.

The matrix LED headlights on the Audi A7, as on the 2019 A8, are two-row matrix headlights. When the low beams are adjusted, the height of the matrix beam high beam module is also corrected due to the inner layout of the headlight. When the matrix beam high beams are then calibrated, it is sufficient to determine the horizontal deviation of the reference segment.

The illustration shows the reference segment of the left matrix LED headlight



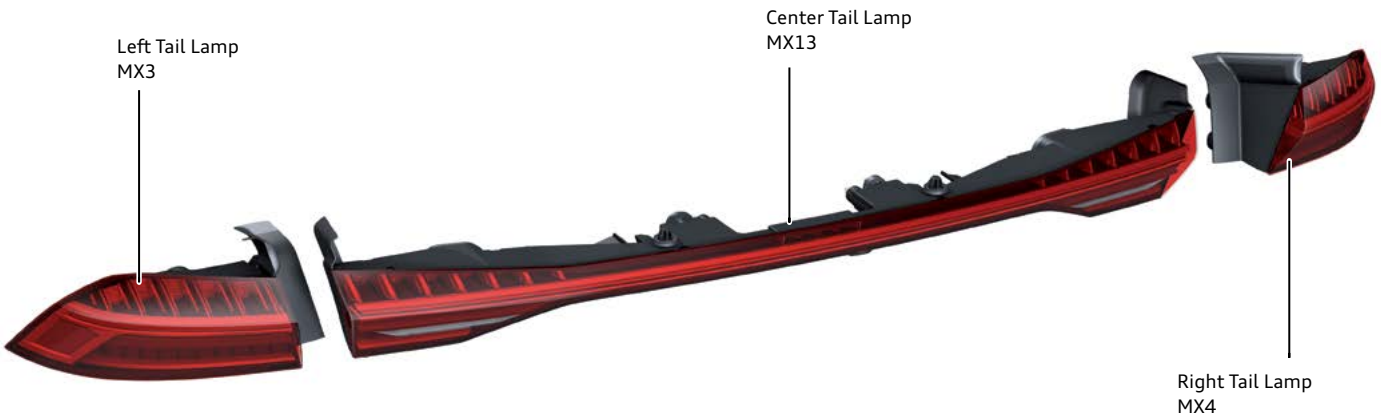
669_195

Note
Always refer to the latest electronic repair literature when doing repair and adjustment work.

Tail lights
General description

The tail lights on the 2019 A7 are in three sections; two tail lights at the left and right sides and a light unit which covers the entire width of the rear lid.

In addition to the three tail lights, the Audi A7 also has a high-level brake light. Only LED lights are used.



669_196

Versions

The tail lights appear in the following two versions:

- LED tail lights with dynamic turn signals.
  - PR no.: 8SP.
- LED tail lights with dynamic turn signals and dynamic tail light.
  - PR no.: 8SQ.

The tail light versions are geometrically identical.

On the dynamic tail lights, the LEDs are activated at different moments as part of the "coming/leaving home" function. This allows an impressive light pattern to be presented when the vehicle is opened or locked with the central locking system.

Activation

The tail lights are activated by Comfort System Central Control Module J393. On the 8SQ version, the tail lights are connected to J393 via a LIN data wire in addition to the discrete wires. The dynamic turn signal and dynamic tail light commands are sent via the LIN data wire.

Light signature

All lighting functions of the tail lights are shown in these images to provide an impression of how the rear lighting of the Audi A7 looks.

As can be seen in the two bottom images, the Audi A7 is equipped with two back-up lights but only one centrally located fog light.

Tail lights *669_197*

Tail lights and hazard warning lights *669_198*

Tail lights and brake lights *669_199*

Tail lights and back-up lights *669_201*

Tail lights and fog light *669_202*

Interior lighting

Audi offers three different interior lighting systems in the new Audi A7.

- Basic interior lighting (PR no. QQ0).
- Contour lighting package (PR no. QQ1).
- Contour ambient lighting package (PR no. QQ2).

The ambient lighting package is used in the instrument panel, the center console and the doors.

The quattro badge or the Audi rings (on front-wheel drive vehicles) are illuminated in the instrument panel.

The contour lighting can be set to 30 different colors and can follow the color profiles in the Audi drive select driving dynamics system.

669_056

Interior lighting systems

Basic interior lighting (PR no. QQ0)

The PR no. QQ0 is the basic equipment level. It features the following:

- In the headliner:
  Front roof module, rear interior lights, make-up mirrors in sun visors.
- In instrument panel and center console:
  Front footwell lighting, glove box light, illuminated center console storage compartment.
- In the doors:
  Illuminated interior door handles, door exit lighting.

Contour lighting package (PR no. QQ1)

In addition to the QQ0 equipment, the ambient lighting package (PR no. QQ1) also features:

- Ambient lighting in the instrument panel (driver side, center, passenger side).
- Door panel lighting in inside of doors.
- Door surround lighting integrated in all exterior door handles.

The ambient lighting QQ1 consists of white LED modules.

Instrument panel with QQ0 features

Contour ambient lighting package (PR no. QQ2)

In addition to the equipment in the QQ1 package, the multi-colored contour ambient lighting package (PR no. QQ2) also features:

- Illuminated door pockets front/rear.
- Contour lighting for front/rear doors.
- Ambient door panel lighting for front/rear doors.
- Ambient lighting for front center console.
- Contour lighting for front center console.
- Contour lighting with illuminated quattro badge or illuminated Audi rings (on front-wheel drive vehicles) in the dash panel on the passenger side.
- Ambient lighting in the instrument panel.

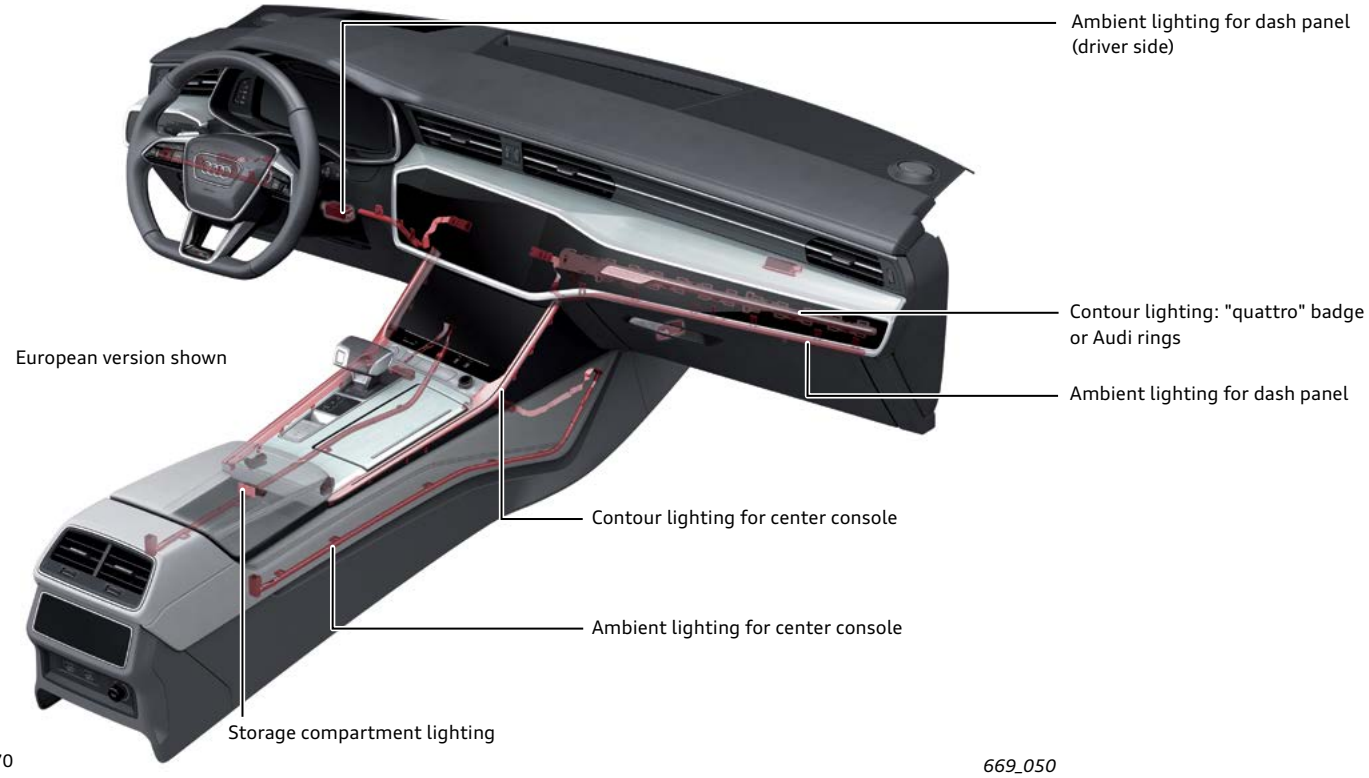
The color of all lighting exclusive to QQ2 can be adjusted. This is done separately for contour and ambient lighting.

The door pocket lighting can again be changed, but does not have capacitive sensor control.

Door trim with QQ2 features

669_049

Instrument panel with QQ2 features



669_050

669_051

- **Exit warning system**
  - On all four doors.
  - In a situation evaluated as potentially dangerous, the LEDs light up in red. In addition, the LEDs for the lane change warning assist system in the relevant exterior mirror are activated.
  - The exit warning system remains ready to give warnings for approximately three minutes after the ignition is switched off.

669_052

- **Illuminated bass speakers**
  - White light accents also shine from the bass speakers in the doors if the Bang & Olufsen Advanced Sound System with 3D sound is installed.

669_053

- **Luggage compartment lighting**
  - Two LED light strips are used to illuminate the luggage compartment on the Audi A7.

Climate control

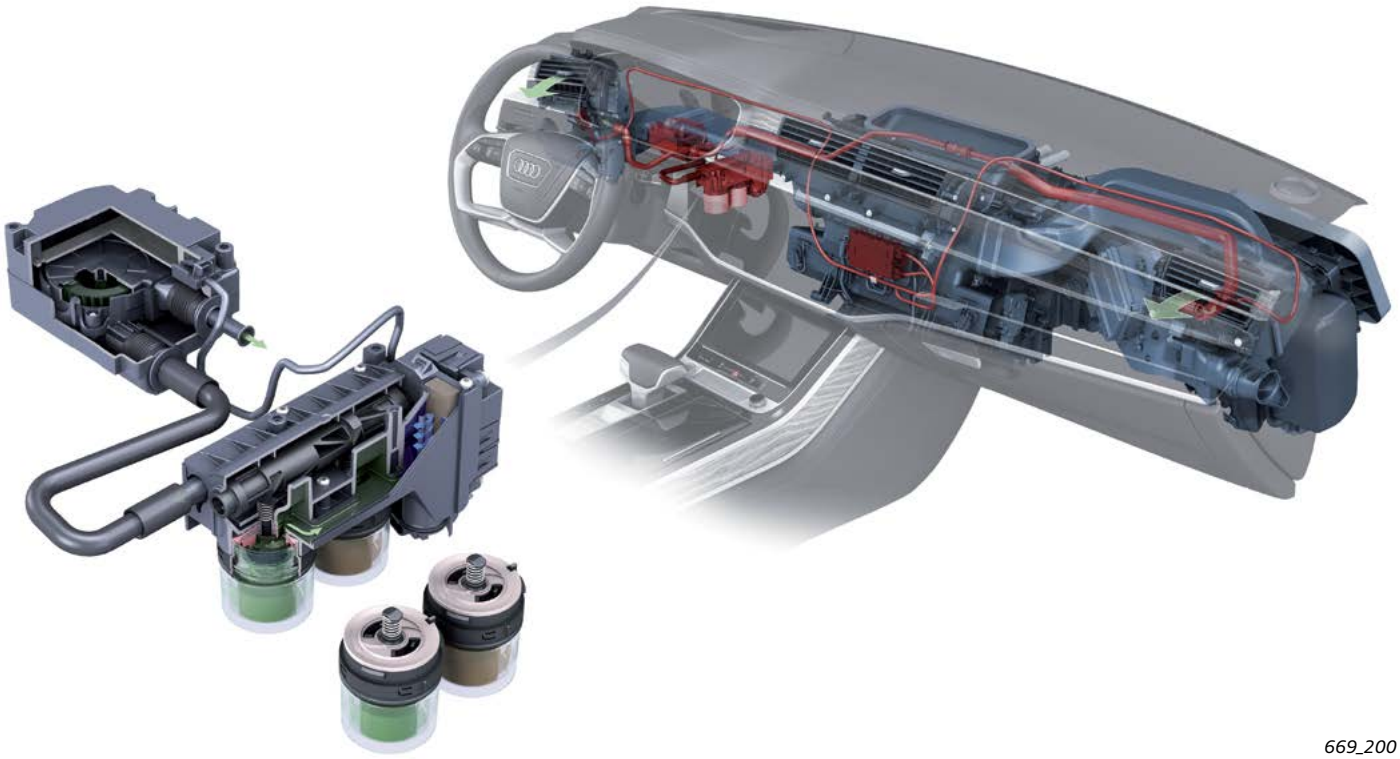
Overview

Fragrance diffuser system

As with the 2019 A8, the fragrance diffuser system with two different fragrance types is offered for the Audi A7. The fragrances are kept in cylindrical vials in Fragrance Diffuser System Functional Unit GX43. A small blower distributes the fragrance from the vial into the outer front air outlets. In addition to the fragrance type, four levels of intensity can be selected.

Air ionization system

An air ionization system is used to improve the air quality. The air ionization system works by negatively charging air particles to a limited extent. They are distributed in the vehicle interior via the side and front air outlets. These negatively charged ions attract dust and similar very small particles. As a result, the air in the vehicle interior is cleaner.



669_200

Back massage

A back massage function is offered for the front seats of the Audi A7.

The following seven massage programs can be selected.

- Wave
- Circles
- Stretch
- Rest
- Shoulder
- Activation
- Revitalization

Controls in front of vehicle

The climate control system of the 2019 A7 is managed by Vehicle Electrical System Control Module J519. Therefore, Climate Control Module J255 is not installed in the vehicle. Communication between J519 and the climate control components is done via a LIN bus system.

The occupant operation of the system is now done through two new touch pad devices installed in the center console. Climate control functions can also be accessed through the MMI via the CAR menu.

The MMI display can be used, depending on the options installed to select the following functions and their settings:

- Ionization
- Perfume
- Steering wheel heating
- Synchronization for driver/passenger side
- Climate control for rear passengers
- Climate control (A/C MAX, A/C OFF, A/C eco)

Overview of MMI display (climate control operation)

669_046

Climate controls in rear of vehicle

Depending on the equipment version, two different operating units may be available in the rear.

- 3-zone air conditioning:
  Rear operating unit with digital temperature display and buttons for seat heating.
- 4-zone air conditioning:
  Rear touch operating unit including air conditioner regulation and seat heating, permanently installed in the center console.

3-zone air conditioning

Rear A/C Display Control Head E265 is used to operate the 3-zone climate control for the rear passenger compartment of the A7.

The seat heating can be set on this operating unit in addition to the temperature and the blower speed.

669_114

4-zone air conditioning

The optional operating and display unit for Rear A/C Display Control Head E265 is equipped with a sensory surface and is operated by touch.

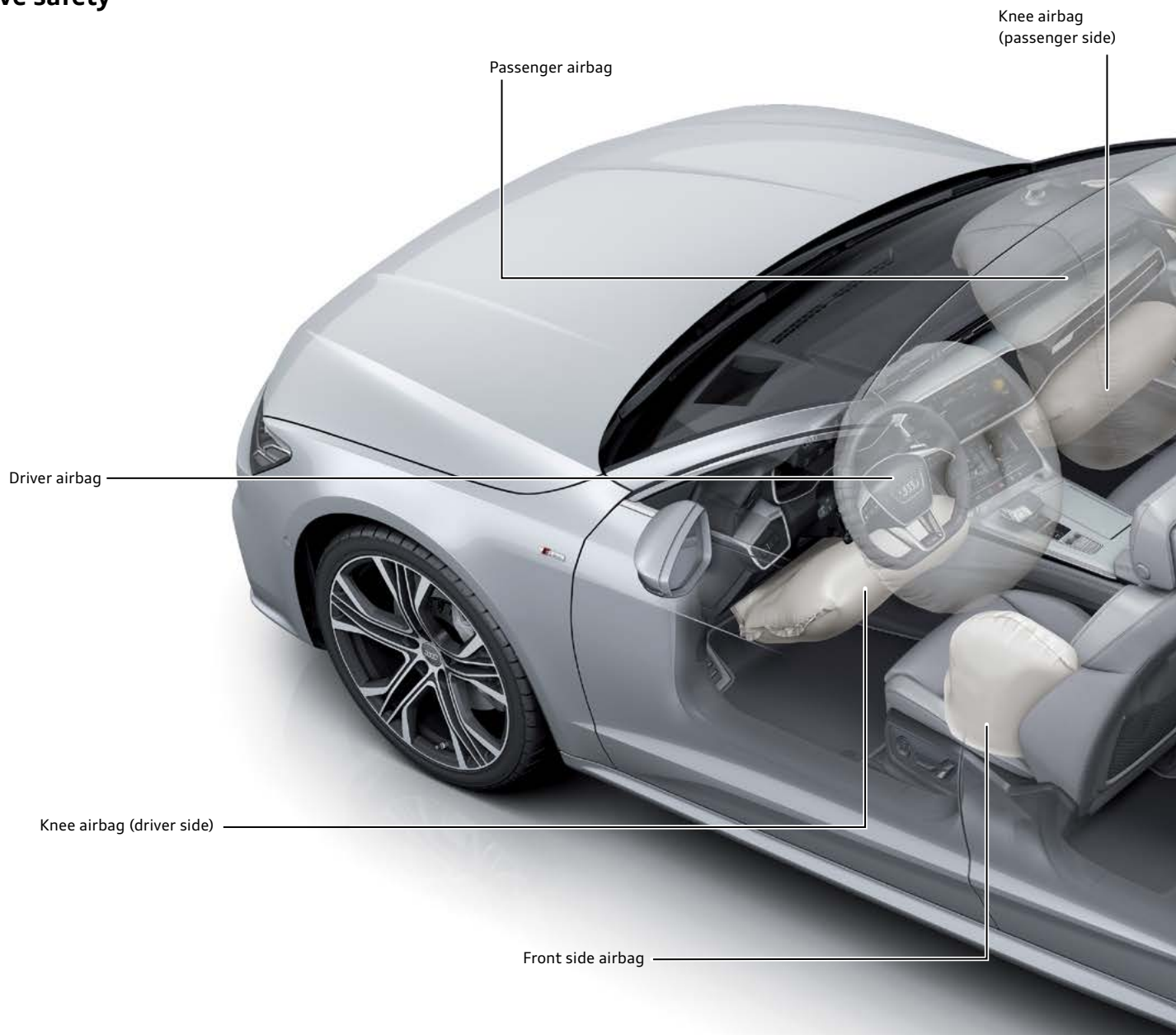
The following settings can be made:

- Temperature
- Blower speed
- Air distribution
- Automatic A/C
- A/C on/off
- Seat heating

669_115

Safety and driver assist systems

Passive safety

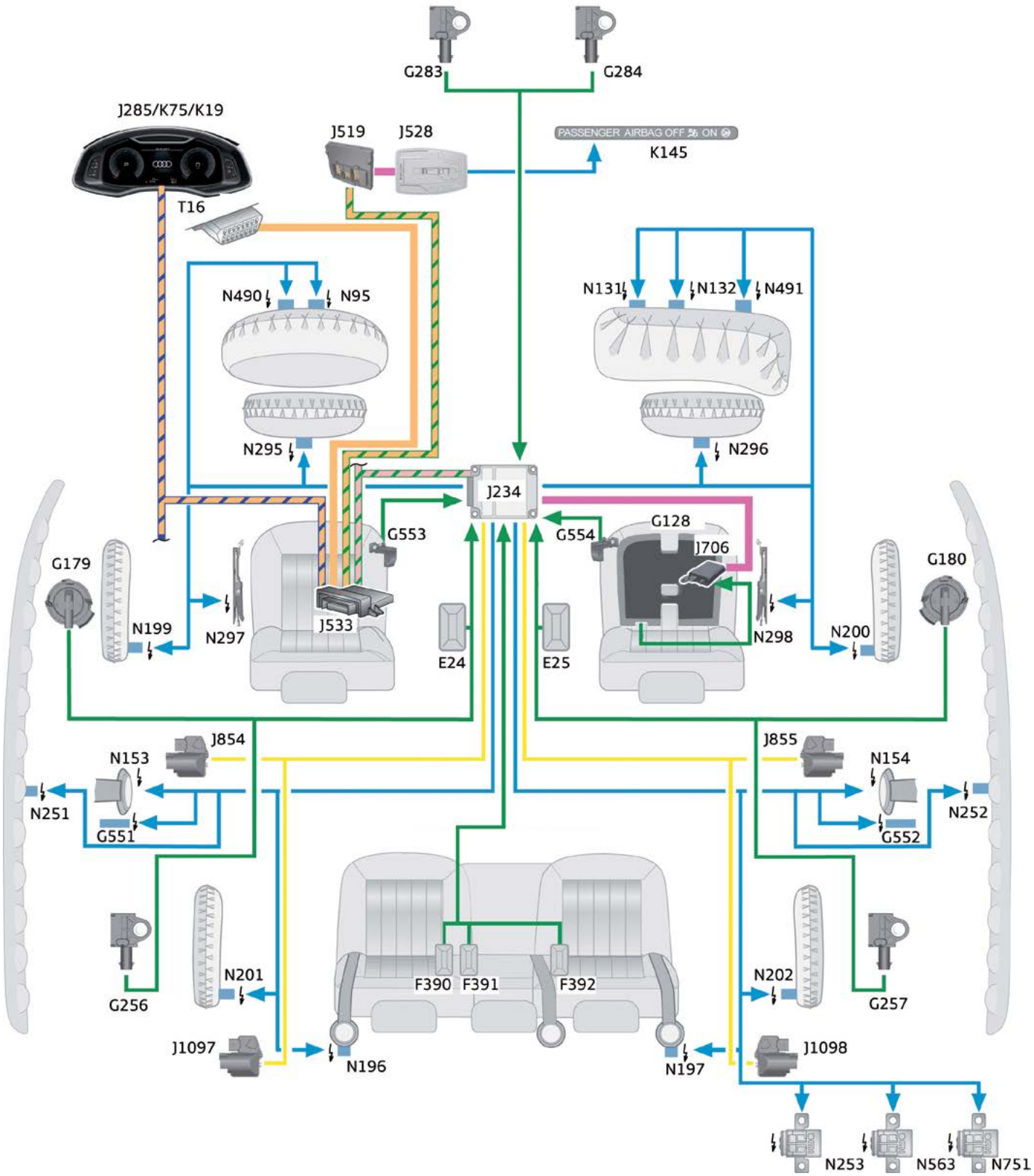


Components

- Airbag control module
- Adaptive driver airbag
- Adaptive passenger airbag (two-stage passenger airbag)
- Front side airbags
- Side airbags for seat row 2
- Curtain airbags
- Knee airbags
- Crash sensors for front airbags
- Crash sensors for side impact detection in doors
- Crash sensors for side impact detection in C-pillars
- Front belt retractors with pyrotechnic belt tensioners
- Front belt retractors with electric belt tensioners
- Front belt retractors with switchable belt force limiters
- Belt retractors for seat row 2 with pyrotechnic belt tensioners for driver and passenger side
- Belt retractors for seat row 2 with electric belt tensioners for driver and passenger side
- Front lap belt tensioners for driver and passenger sides
- Seat belt warning for all seats
- Seat-occupied recognition system in passenger seat
- Seat-occupied recognition system for seat row 2
- Front passenger airbag warning lamp (OFF and ON)
- Seat position detection for driver and passenger
- Battery isolator, 12 Volt electrical system
- Battery isolator, 48 Volt sub-system
- Battery isolator, high-voltage system

669_042

Note
The images in the "Passive safety" chapter are schematic diagrams and are provided to aid understanding.


G283
G284
J285/K75/K19
J519
J528
PASSENGER AIRBAG OFF ON
K145
T16
N490
N95
N131
N132
N491
N295
N296
J234
G553
G554
G128
J706
G179
G180
N199
N297
J533
E24
E25
N298
N200
J854
J855
N153
N154
N251
N252
G551
G552
N201
N202
G256
G257
F390
F391
F392
J1097
N196
N197
J1098
N253
N563
N751

669_043

Additional equipment

Equipment may vary due to the different demands and legal requirements that are made of vehicle manufacturers in the markets.

Key to diagram on page 76:

E24 Driver Seat Belt Switch
E25 Front Passenger Seat Belt Switch

F390 Driver Side Second Row Seat Belt Switch
F391 Center Second Row Seat Belt Switch
F392 Passenger Side Second Row Seat Belt Switch

G128 Passenger Seat Occupant Detection Sensor
G179 Driver Thorax Airbag Crash Sensor
G180 Front Passenger Thorax Airbag Crash Sensor
G256 Driver Side Rear Thorax Airbag Crash Sensor
G257 Passenger Side Rear Thorax Airbag Crash Sensor
G283 Driver Front Airbag Crash Sensor
G284 Passenger Side Front Airbag Crash Sensor
G551 Driver Belt Force Limiter
G552 Front Passenger Belt Force Limiter
G553 Driver Seat Position Sensor

J234 Airbag Control Module
J285 Instrument Cluster Control Module
J519 Vehicle Electrical System Control Module
J528 Roof Electronics Control Module
J533 Data Bus on Board Diagnostic Interface
J706 Passenger Occupant Detection System Control Module
J854 Left Front Seat Belt Tensioner Control Module
J855 Right Front Seat Belt Tensioner Control Module

J1097 Left Rear Seat Belt Tensioner Control Module
J1098 Right Rear Seat Belt Tensioner Control Module

K19 Seat Belt Indicator Lamp
K75 Airbag Indicator Lamp
K145 Front Passenger Airbag -Disabled- Indicator Lamp

N95 Driver Airbag Igniter
N131 Front Passenger Airbag Igniter 1
N132 Front Passenger Airbag Igniter 2
N153 Driver Seat Belt Tensioner Igniter 1
N154 Front Passenger Seat Belt Tensioner Igniter 1
N196 Driver Side Rear Seat Belt Tensioner Igniter
N197 Passenger Side Rear Seat Belt Tensioner Igniter
N199 Driver Thorax Airbag Igniter
N200 Front Passenger Thorax Airbag Igniter
N201 Driver Side Rear Thorax Airbag Igniter
N202 Passenger Side Rear Thorax Airbag Igniter
N251 Driver Head Curtain Airbag Igniter
N252 Front Passenger Head Curtain Airbag Igniter
N253 Battery Interrupt Igniter
N295 Driver Knee Airbag Igniter
N296 Front Passenger Knee Airbag Igniter
N297 Driver Seat Belt Tensioner Igniter 2
N298 Front Passenger Seat Belt Tensioner Igniter 2
N490 Driver Airbag Release Valve Igniter
N491 Front Passenger Airbag Release Valve Igniter
N563 High-Voltage Battery Interrupt Igniter
N751 Battery Interrupt Igniter, 48 Volt

T16 Data Link Connector

Wiring colors:

Diagnostics CAN
FlexRay
Input signal
Dash panel insert CAN
LIN bus
Output signal
Sub-bus system
Convenience CAN 2

Connection for Passenger Seat Occupant Detection Sensor G128

G128 is connected to Passenger Occupant Detection System Control Module J706 via a discrete wire. The control unit communicates with the Airbag Control Module J234 via a LIN bus wire.

Airbag Control Module J234

Airbag Control Module J234 is based on the same generation module used in the 2019 Audi A8.

669_044

Active safety

Audi pre sense

The 2019 A7 has the same pre sense functions as the 2019 A8.
The operational components have been adapted to the A7.

Intervention display

669_045

Reference
For further information about the Airbag Control Module, please refer to eSelf-Study Program 990493, The 2019 Audi A8 Introduction.

Driver assist systems

Introduction

This topic includes short descriptions of the five most important innovations in the 2019 Audi A7. All of these innovations made their début in the 2019 Audi A8. The innovations concern new hardware which continues to pave the way for autonomous driving, a new and innovative operating concept and new driver assist systems.

Further information on all the new features can be found on the following pages and more detailed information is available in eSelf-Study Program 990393, The 2019 Audi A8 Driver Assistance Systems.

Driver assist system innovations in the 2019 Audi A7

Driver Assistance Systems Control Module J1121

J1121 is the first step toward reducing the number of control modules for driver assist systems. With and eye on the major vision of autonomous driving, Audi is gradually moving away from a decentralized approach of several individual control modules to an approach with a powerful central computer. There are four versions of J1121 for the 2019 A7. The version installed depends on the driver assist systems in the vehicle.

Profile master for driver assist systems

The profile master is a new operating concept that specifies the activation conditions for the different driver assist systems. A total of eight driver assist systems participate in the profile master system. The customer can choose between three profiles: maximum, individual and basic. The maximum setting switches all participating systems on. With the individual setting, the customer decides which systems to activate and with basic, a maximum of two permanently specified systems are switched on.

Lane departure warning and adaptive cruise assist

ACC and Active lane assist “early” comprise a new system called Adaptive cruise assist.

The lane departure warning warns the driver if there is a risk of inadvertently leaving the current lane. However, the adaptive cruise assist offers the customer combined longitudinal and lateral guidance for the vehicle at speeds between 0 to 155 mph (0 to 250 km/h).

Laser Distance Regulation Control Module J1122

Laser Distance Regulation Control Module J1122 is a combination radar sensor and laser scanner. It replaces the two long range radar sensors that previously implemented the longitudinal regulation functions of adaptive cruise assist.

The laser scanner is installed at the front of the vehicle, has a scanning angle of approximately 145 degrees and can detect objects up to approximately 262 ft (80 m). A significant strength of the laser scanner is that its measurement precision is not dependent on the distance of the target object.

Intersection assist

The intersection assist helps the driver to avoid collisions with road users crossing the vehicle’s path. The intersection assist works between speeds of 0 to 19 mph (0 to 30 km/h). However, a brake application is only made at speeds of up to 6 mph (10 km/h). The intersection assist is very similar to the rear cross-traffic assist. The main difference is that the intersection assist performs its task in front of and not behind the vehicle.

Driver Assistance Systems Control Module J1121

Introduction

The 2019 Audi A7 will have a J1121 control module. This is because Audi pre sense front, which requires J1121 for its functions, has been specified as standard equipment .

Driver Assistance Systems Control Module J1121 is now the master control module for all driver assist systems for which calculations were previously performed by Driver Assistance Systems Front Camera R242.

The front camera still captures the area in front the vehicle. However, the images from the camera are processed by J1121.

J1121 has taken over the following functions:

- High beam assist.
- Camera-based traffic sign recognition.
- Lateral vehicle guidance (lane departure warning and lane guidance by the adaptive cruise assist).
- Emergency assist.

It remains the master control module for the following driver assist systems:

- Surround view cameras (Peripheral Camera Control Module J928 is no longer installed).
- Intersection assist (introduced in the 2019 Audi A8).

669_091

Driver Assistance Systems Control Module J1121 has another designated name. The second designation is zFAS control module. This comes from technical development and has established itself in general usage. zFAS is the abbreviation of the German term for "driver assist systems central control unit" (zentrales Steuergerät für Fahrerassistenzsystem).

Versions of the J1121

Four versions of J1121 are available. The version installed depends on which driver assist systems are chosen by the customer when the vehicle is ordered.

The J1121 in the 2019 Audi A7 has the same part number as that of the 2019 Audi A8: 4N0.907.107. The versions can only be differentiated by the index letters following the part number.

Control module version A/A0 *669_092*

Control module version C/D *669_093*

All location table for driver assist systems — Control module version

The following table shows which version of the control module is required (at least) by the different driver assist systems. The lowest version of the control unit is A0, the highest at the launch of the Audi A7 is version C. The higher versions are always backward-compatible, meaning that, version C is also suitable for all assist systems with an X in the columns for A0, A and B.

The following table includes a fifth version of J1121. This is version D, which also includes the software for the traffic jam pilot. The traffic jam pilot will be introduced at a later date.

Allocation table for driver assist systems regarding J1121 versions

Control module version	zFAS not required	Version A0	Version A	Version B	Version C	Version D
Parking system plus	X					
Back-up camera	X					
Audi side assist	X					
Exit warning system	X					
Rear cross-traffic assist	X					
Night vision assist	X					
Audi active lane assist		X				
High beam assist		X				
Emergency assist		X				
Camera-based traffic sign recognition			X			
Intersection assist				X		
Adaptive cruise assist				X		
Surround view cameras					X	
Curb warning					X	
Maneuver assist					X	
Parking pilot					X	
Garage pilot					X	
Traffic jam pilot						X

Note
The options listed in gray are not available at launch.

Profile master for driver assist systems

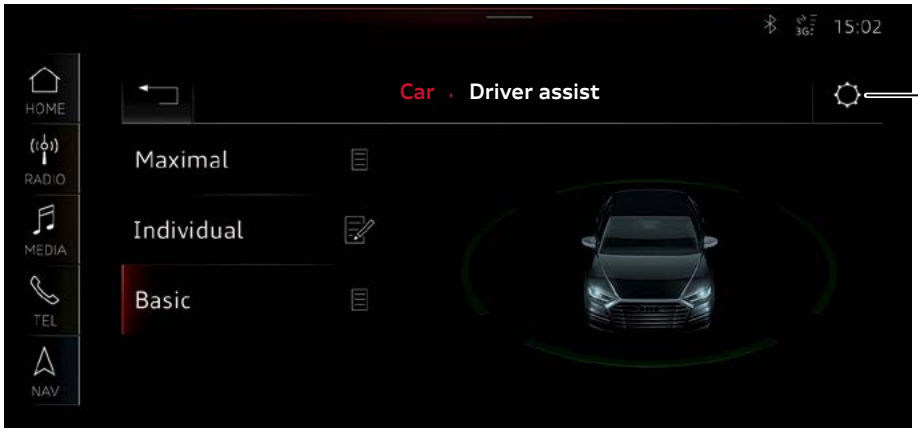
Some of the driver assist systems offered in the Audi A7 can be switched on and off in the profile master for driver assist systems. Other driver assist systems which the driver switches on and off specifically while the vehicle is moving continue to use the classic controls. These include, for example, the parking aid and the adaptive cruise assist.

Overview of all driver assist systems participating in the profile master system

- Lane change warning.
- Emergency assist.
- Rest recommendation.
- Exit warning system.
- Night vision assist.
- Distance warning.
- Intersection assist.
- Audi pre sense.

The three profiles for the profile master for driver assist systems

- Maximum:
  All systems in the vehicle participating in the profile master system are switched on.
- Individual:
  The customer can specify which individual driver assist systems are switched on.
- Basic:
  Only two systems are switched on: Audi pre sense and the emergency assist. If neither system is installed, the "Basic" profile is replaced with the "All off" profile.



This sprocket symbol allows all the driver assist systems installed in the vehicle to be configured. This does not apply to the systems participating in the profile master system.

669_094

Displaying the profile master for driver assist systems

The customer can access the profile master for driver assist systems in two different ways:

- By selecting the basic function "Car" and then "Driver assist systems" after pressing the home button.
- By pressing the profile master button, which is located in a row of buttons in the center console.

The profile master disappears from the display again after 5 seconds if the second method is used and if no touch input was detected on the upper touch display in that time.

Profile master button

669_095

Audi side assist

Description of function

The lane departure warning on the Audi A7 is an independent system. This function was previously known as Audi active lane assist with the steering input set to "late".

The lane departure warning warns the driver if the vehicle is at risk of leaving its current lane when the corresponding turn signal has not been activated. If the turn signal is not activated, the system assumes that the driver does not intend to leave the lane.

The lane departure warning can be given in three different ways:

- By steering input from the system towards the middle of the lane.
- By a steering wheel vibration (this warning can be switched off on the MMI).
- By coloring the lane demarcation line red in the function displays.

The lane departure warning is switched on and off on the lower touch display. If the lane departure warning is switched off, it can be seen as a red bar above the function's symbol. If the lane departure warning is switched off, it only applies for one Terminal 15 cycle. It is active again the next time the ignition is switched on, regardless of whether it was on or off when the ignition was switched off.

Lane departure warning switched on

669_096

Lane departure warning switched off

669_097

Lane departure warning - optical warning

In the two images below, the optical warning "vehicle is at risk of leaving the lane towards the right" is shown. The image below on the left shows the warning as it can be seen in the driver assist view; the image on the right shows how it appears in the speedometer.

669_098

669_099

Master control module

The master control module for the lane departure warning is Driver Assistance Systems Control Module J1121. Version A0 of J1121 is sufficient for this function.

Note

The steering assist button on the end of the turn signal lever is not relevant to the lane departure warning. It is only used to activate and deactivate the lane guidance system of the adaptive cruise assist.

Adaptive cruise assist

Description of function

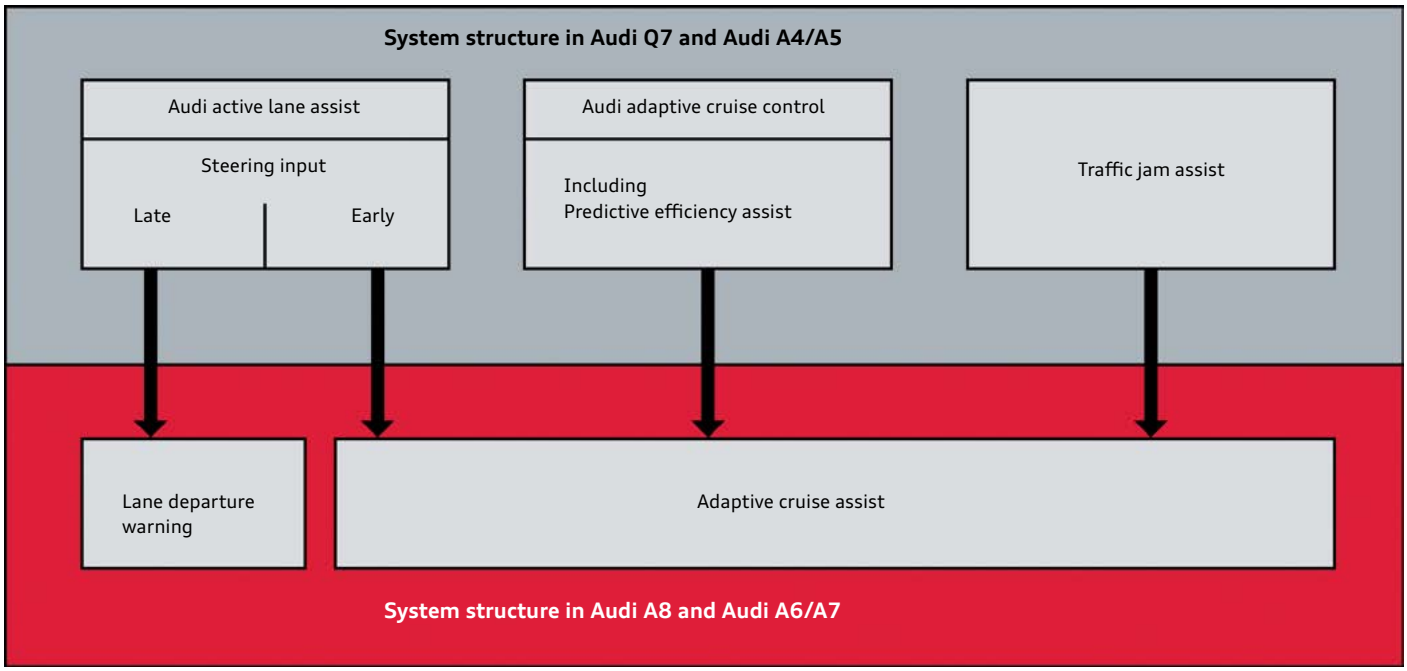
Adaptive cruise assist offers combined longitudinal and lateral guidance at speeds between 0 to 155 mph (0 to 250 km/h). Longitudinal guidance refers to accelerating and braking and lateral guidance refers to steering the vehicle. Because the longitudinal and lateral guidance has been merged in the adaptive cruise assist, the driver assist systems "Audi adaptive cruise control (ACC)" and "Audi active lane assist (AALA)" can not be ordered for the 2019 Audi A7.

The function of the Audi active lane assist with "early" steering input, the so-called "lane guidance", has been integrated into the adaptive cruise assist. The section with "late" steering input has become an independent system with the new designation "lane departure warning".

The lane guidance can be switched off on the adaptive cruise assist so that only longitudinal guidance remains active. If lane guidance is switched off, the vehicle behaves as it would previously have done when driving with adaptive cruise control. However, it is not possible to deactivate longitudinal guidance on the adaptive cruise assist when lane guidance is active at the same time.

Restructuring of the longitudinal and side regulating systems

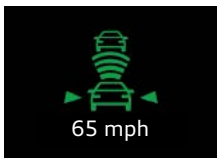
Audi has fundamentally restructured the functions of the Audi adaptive cruise control and the Audi active lane assist for the introduction of the new Audi C and D segment models. This has created the lane departure warning and the adaptive cruise assist. This restructuring is shown by the diagram below. It is a comparison of the systems in the Audi Q7 and Audi A4/A5 with those in the Audi A8 and Audi A6/A7 .



669_100

Displays and operation

There have been changes to the function symbols and displays for the vehicle side guidance systems. If lane guidance is active in the adaptive cruise assist, this is shown by green triangles on the left and right of the vehicle. If two white triangles appear, lane guidance is switched on but not active. If no triangles are visible, lane guidance is switched off.



669_101

669_102

The adaptive cruise assist is activated via the operating lever previously used for ACC. This operating lever can be used to set the desired speed and distance, as with ACC.

The steering assist button on the end of the turn signal lever is only used to switch lane guidance on and off. The lane departure warning has its own on/off button. This is located in the virtual row of buttons on the lower touch display.

669_103

Adaptive cruise assist operating lever

669_104

Turn signal lever with steering assist button.

Hardware and sensors

Both a long range radar sensor and a laser scanner are installed on the Audi A7 to implement the longitudinal regulation functions of the adaptive cruise assist.

Combining the strengths of two types of sensor means that the longitudinal regulation functions perform better than they would if two sensors of the same type were used.

669_105

Long range radar sensor

669_106

Laser scanner

Master control module

The master control module for the adaptive cruise assist function is Control Module for Adaptive Cruise Control J428. However, the adaptive cruise assist's basic functions (longitudinal and side regulating function) are implemented by different control modules. The master for longitudinal regulation functions is Control Module for Adaptive Cruise Control J428 and the master for side regulation functions is Driver Assistance Systems Control Module J1121.

Right Adaptive Cruise Control Sensor G259 and Control Module for Adaptive Cruise Control J428

The layout and functions of Right Adaptive Cruise Control Sensor and Control Module for Adaptive Cruise Control J428 correspond to those of the 2019 A8. Even though the locations are different than those of the A8, the adjustment process is not affected. For aesthetic reasons, the sensor has a trim cover similar to the randome of the laser scanner.

669_087

Right Adaptive Cruise Control Sensor G259 and Control Module for Adaptive Cruise Control J428

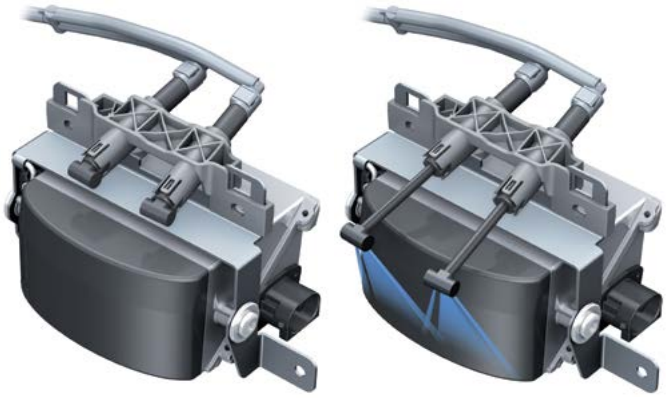
Laser Distance Regulation Control Module J1122

Laser Distance Regulation Control Module J1122 is installed on the right side of the grill next to the Audi rings and symmetrical to the radar sensor. There are no significant differences to the layout and function of the laser scanner on the 2019 A8. The servicing needs and adjustment process are identical.

The location of the scanner washer jets is new compared to the 2019 A8.

669_088

Laser Distance Regulation Control Module J1122



669_089

New position of washer jets for laser scanner when compared to the 2019 A8

Reference

For further information on the radar sensor and the laser scanner, please refer to eSelf-Study Program 990393, The 2019 Audi A8 Driver Assistance Systems.

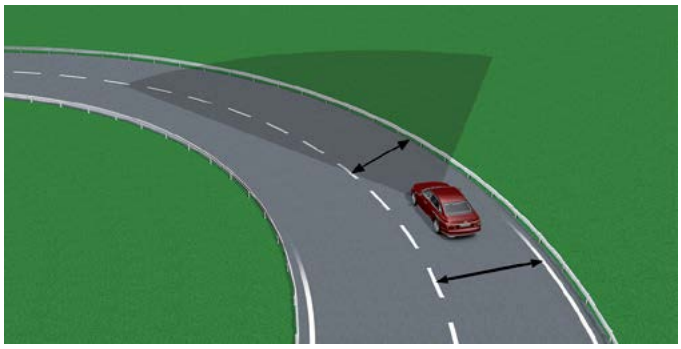
New lane guidance features

With the introduction of the adaptive cruise assist, the lane guidance is, for the first time, operational until the vehicle is stationary. This only applies if all the requirements for the lane guidance have been met. With Audi active lane assist, it is only available at 40 mph (65 km/h) and above.

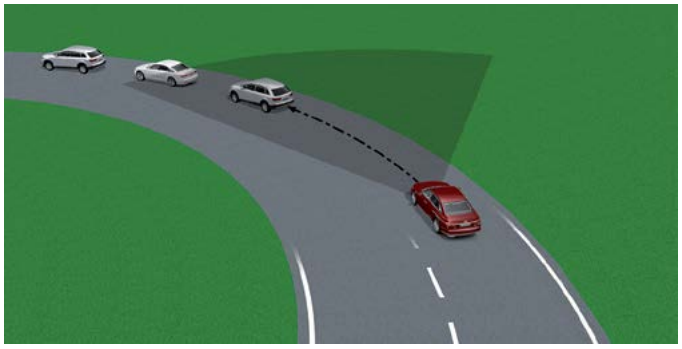
Because of the lowering of the activation speed to zero, Audi looked for further objects/structures which could also be used to facilitate a lane guidance system. The Audi active lane assist only allowed lane guidance on the basis of road markings.

The following objects/structures can now be used for lane guidance at low speeds:

- An Armco barrier following the course of the road.
- A transition from the road to the area surrounding the road which offers sufficient contrast.
- A curb following the course of the road.
- Vehicle(s) ahead.



669_107



669_108

Roads without a central lane markers

The system still assumes that the road has two lanes if its width exceeds a defined minimum. If this is assumed, lane guidance can be implemented on the basis of the detected right lane marking and a virtual center line. Calculating the progression of the virtual center line is done by Driver Assistance Systems Control Module J1121.

As an alternative to the right lane marking, lane guidance can also, at lower speeds, be performed using one of the structures specified above.

669_109

New predictive efficiency assist features

A new feature for predictive efficiency has been added to the 2019 A7. It gives the option for the vehicle's longitudinal guidance not only to regulate to a speed set by the driver, but also to adapt that speed automatically to the speed limits detected by the camera-based traffic sign recognition system. In addition, it is possible to adjust the vehicle's speed for an upcoming corner as well as to reduce the vehicle's speed before a traffic circle which will then be driven through. The focus of the function is a predictive driving style focused on fuel saving via longitudinal regulation.

On the Audi A7, the predictive efficiency assist can also adjust the speed when the vehicle is approaching an intersection with stop signs and all other requirements for this have been met. In this case, the system automatically reduces the vehicle's speed to 9 mph (15 km/h). Continuing to brake the vehicle remains the responsibility of the driver. As with the adaptive cruise assist, the entire predictive efficiency assist function is a driver assist system. The driver alone remains responsible for controlling the vehicle at all times.

Emergency assist

Description of function

The emergency assist is designed for situations in which the driver is affected by a medical emergency and is therefore no longer able to drive the vehicle.

The job of the emergency assist in this situation is to assume longitudinal and lateral guidance of the vehicle and then to brake the vehicle to a controlled stop in its lane. If the vehicle is approaching another road user too fast, the vehicle is braked more forcefully in an attempt to avoid an impending collision. If a collision can no longer be avoided, the system attempts to reduce the severity of the collision.

The emergency assist activates itself if the system does not detect any driver activity in a specified period of time. The driver activity is established from his/her steering behavior and the longitudinal guidance the vehicle is receiving: active acceleration and braking.

When the emergency assist is active, a sequence of measures is set in motion in the vehicle. These have been implemented to protect the driver and to keep the risk of collision as low as possible.

The following measures are initiated during the braking procedure:

- Activation of the hazard warning lights to warn other road users.
- Full tensioning of the seat belt during the process of braking to a final standstill.
- Automatic closure of the windows and the panoramic sunroof.

Once the vehicle has come to a stop, the following measures are initiated.

- Transmission position "P" is selected.
- Vehicle doors are unlocked.
- Interior lighting is switched on.
- An emergency call is made.

The second main job of the emergency assist is to take various measures to attempt to get an inactive driver to reassume the task of driving the vehicle. It could be the case that the driver is simply distracted and is no longer assuming the task of driving the vehicle as a result, even though he/she would have no problem doing so.

To do this, the system takes the following measures before and also during the braking procedure:

- Display of text notifications in the instrument cluster.
- Emitting acoustic signals.
- Giving a brake jolt.
- Giving a strong emergency brake jolt.
- Tensioning the driver's seat belt.
- Muting the infotainment system’s audio output.

If the driver is able to reassume the task of driving the vehicle, he/she can do so in the following ways:

- Actively taking over the steering again.
  -or-
- Pressing the brake pedal.
  -or-
- Pressing the accelerator pedal.

If the emergency assist detects that the driver is once again active, it deactivates itself and ends its longitudinal and lateral guidance.

The emergency assist can be activated more than once in one Terminal 15 cycle.

Intersection assist

Description of function

Intersection assist helps the driver to avoid collisions with road users crossing the vehicle's path. These road users can be normal vehicles, buses or lorries, but also cyclists or motorbike riders.

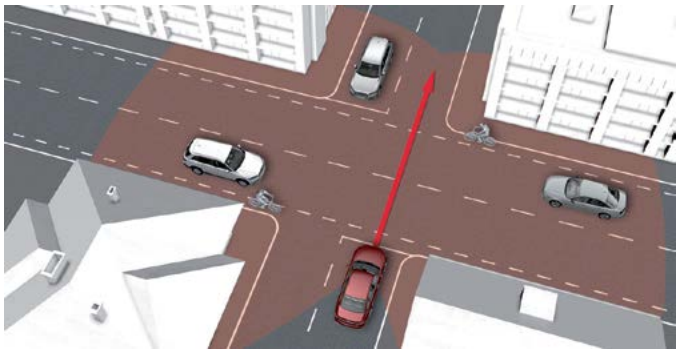
The intersection assist provides assistance in the following traffic situation:

The red vehicle (equipped with the intersection assist) is standing at an intersection and wishes to drive straight across it. To do so, the driver needs to pay attention to the traffic coming from both the left and right on the main road. On both sides, the crossing traffic consists of a car and a bicycle. If the driver of the red vehicle were now to move off, the intersection assist would activate and would, depending on the current estimation of the danger level, warn the driver or apply the brakes.

Intersection assist works at speeds between 0 and 19 mph (0 and 15 km/h).

The intersection assist is very similar to the rear cross-traffic assist. It corresponds to a front cross-traffic assist, but has been renamed to intersection assist.

If a cyclist or motorbike rider is detected by the system, the same warnings are given as with a vehicle.



669_113

Sensors

The vehicle requires two additional radar sensors for the intersection assist. These are located on the front left and right sides behind the front bumper. The front radar sensors are very similar to the two rear radar sensors.

In service, they are referred to as:

- Control Module for Left Front Object Detection Radar Sensor J1088.
  -and-
- Control Module for Right Front Object Detection Radar Sensor J1089.

Master control unit

The master control module for the intersection assist function is Driver Assistance Systems Control Module J1121. A minimum of control module version B is required.

Surround view cameras

The surround view cameras are now in their third generation. The first two generations of the surround view cameras required Peripheral Camera Control Module J928. The software for the 3rd generation surround view camera function is now integrated in Driver Assistance Systems Control Module J1121 along with the software for other driver assist systems. The surround view cameras require a J1121 control module of version C.

All four surround view cameras transmit their images to J1121 via shielded LVDS wires. J1121 then generates the vehicle view desired by the customer from the camera images. The vehicle view is transmitted to Information Electronics Control Module 1 J794 via two screened LVDS wiring pairs as a Full HD image. The image is shown on the upper touch display.

If the vehicle has both the parking system plus and the surround view cameras as optional equipment, 6th generation ultrasonic sensors are used to meet the requirements of the surround view camera system.

The data from these ultrasonic sensors can only be read by J1121 (version C). In this case, J1121 is the master control module for the surround view cameras and also the parking system plus.

If the vehicle has the parking system plus but not the surround view cameras as optional equipment, 5th generation ultrasonic sensors are used. The data from these can only be read by Vehicle Electrical System Control Module J519. In this case, J519 is the master control module for the parking system plus.

Assist systems for parking			Ultrasonic sensors		Master control module
Parking system plus	Back-up camera	Surround view cameras	5th generation	6th generation	
X	-	-	X	-	J519
X	-	-	X	-	J519
X	X	-	X	-	J519
X	X	-	X	-	J519
X	-	X	-	X	J1121

Possible combinations of different assist systems for parking at the launch of the Audi A7.

The installation position of the surround view camera in the exterior mirrors have been changed to extend their range. They are located further outwards in the exterior mirrors of the Audi A7 and no longer "look" vertically downwards, but are tilted outwards. This allows the side detection area to be enlarged, which allows the area around the vehicle to be detected better.

With the third generation of the surround view cameras, two more two dimensional vehicle views are available:

- Simultaneous view of the front left and front right wheels.
  -and-
- Simultaneous view of the rear left and rear right wheels.

A three dimensional view of the vehicle is available to customers for the first time with the third generation surround view cameras.

The viewing angle of the vehicle is not specified by the system, but can be freely chosen by the customer via the touchscreen. It is still possible to choose between three different preset viewing angles via three virtual buttons in the row of buttons.

Infotainment and Audi connect

Introduction and overview of versions

The Audi A7 features the MIB2+ version of the modular infotainment matrix infotainment system. Customers can choose between three MMI versions:

MMI radio plus, MMI navigation and MMI navigation plus.

All three versions are based on the 2+ High version of the modular infotainment matrix; MIB2+ High for short.

The MMI navigation and MMI navigation plus versions may be equipped with Audi connect, depending on the country. However, they differ regarding the services available.

The license period is three years after the vehicle's first registration. It can be renewed after this time has elapsed.

Depending on the country, the following Audi connect infotainment services may be available with MMI navigation:

- Navigation data update (4 times per year online or via SD card via myAudi portal)
- Online routing
- Individual news
- Online traffic information
- Twitter
- Weather
- Fuel prices
- Parking information
- Travel information
- Destination entry via myAudi app

MMI navigation plus may, depending on the country, have the following additional Audi connect infotainment services:

- Connected radio (no license period limits, but separate data package required)
- Google Earth
- Google POI search via speech control
- 3D city models
- Messages (text message dictation) and e-mail
- Traffic sign information
- Hazard alerts

If the vehicle is equipped with Audi connect vehicle-related services (IW3), the following services may be available, depending on the country:

- Audi emergency call (license period: 10 years)
- Online roadside assistance (license period: 10 years)
- Audi service request (license period: 10 years)
- Vehicle status report (for example, Mileage, fuel tank level, etc.)
  (license period: 3 years)
- Remote locking/unlocking (license period: 3 years)
- Parking position (license period: 3 years)

Reference
For further information on MIB2+, please refer to eSelf-Study Program 990293 The 2019 A8 Infotainment and Audi Connect Systems.

MMI navigation (I8V + 7UG)	MMI navigation plus (I8T + 7UG)
	
8.8" touch display with 1280 x 720 pixels	10.1" touch display with 1540 x 720 pixels
8.6" touch display with 1280 x 660 pixels	8.6" touch display with 1280 x 660 pixels
3D navigation system on SSD (7UG)	3D navigation system on SSD (7UG)
7" display in instrument cluster with driver information system (9S7)	Audi virtual cockpit (9S8)
AM/FM radio	AM/FM radio Connected radio (Internet radio)
Satellite radio (Sirius) (QV3)	Satellite radio (Sirius) (QV3)
Audi music interface with 2 USB sockets, 1 SDXC card reader and, depending on country, 1 SIM card reader (UF7)	Audi music interface with 2 USB sockets, 1 SDXC card reader and, depending on country, 1 SIM card reader (UF7)
Audi Sound System 9VD	Bang and Oulfsen 9VS
Bluetooth interface (9ZX)	Bluetooth interface (9ZX)
UMTS/LTE data module (EL3) including Audi connect (IT1/IT3)	UMTS/LTE data module (EL3) including Audi connect (IT1/IT3)
Emergency call & Audi connect vehicle-related services (IW3)	Emergency call & Audi connect vehicle-related services (IW3)
Optional equipment	
Single DVD drive (7D5) (Optional)	Single DVD drive (7D5) (Optional)
Audi music interface in rear with 2 USB sockets (UF8)	Audi music interface in rear with 2 USB sockets (UF8)
Audi smartphone interface (IU1)	Audi smartphone interface (IU1)
Audi phone box including wireless charging (9ZE)	Audi phone box including wireless charging (9ZE)
	Audi phone box, light (for wireless charging only) (9ZV)
Audi sound system (9VD)	
	Bang & Olufsen Premium Sound System with 3D sound (9VS) (Standard)
	Bang & Olufsen Advanced Sound System with 3D sound (8RF) (Optional)

MIB2+ High without navigation system

The Audi A7 features the MMI radio plus as standard. The system is an MIB2+ High. In this version, however, it does not have a navigation function or Audi connect.

Information Electronics Control Module 1 J794 is installed under the instrument panel in front of the glove box and cannot be seen by the customer.

The MMI radio plus has the following features as standard:

- Radio with phase diversity, FM dual tuner (very high frequency) and AM tuner (medium wave) and background tuner.
- Internal audio amplifier up to 180 W (9VD).
- Bluetooth interface for HFP and A2DP (9ZX).
- Speech dialogue system.
- 1 image output for Audi virtual cockpit.
- 1 image output for both touch displays (1280 x 720 and 1280 x 660 pixels).
- Audi music interface with 1 SDXC card reader and 2 USB sockets (UF7).
- GPS receiver for time.

The following additional equipment can be ordered:

- Functions integrated in J794:
  - Audi sound system (9VD).
- Functions in separate control units:
  - Single DVD drive (7D5).
  - Audi phone box (9ZE).

MMI display J685 without MMI navigation *669_208*

MIB2+ High with navigation system

The Audi A7 can be equipped with the MMI navigation or MMI navigation plus system. Both cases involve MIB2+ High devices.

The MMI display J685 has the same dimensions for the MMI navigation and MMI navigation plus versions. The active display, however, does not. It is possible to tell the two versions apart very easily by counting the number of menu items on the home screen.

The following equipment is standard:

- Radio with phase diversity, FM dual tuner (very high frequency) and AM tuner (medium wave) and background tuner.
- SiriusXM radio (QV3).
- Audi music interface with 1 SDXC card reader, 2 USB sockets (UF7).
- 3D navigation with data on SSD with improved 3D city center models (7UG).
- UMTS/LTE-enabled mobile network module, possible data transfer rates of up to 300 Mbit/s (EL3).
- Emergency call and Audi connect vehicle-related services (IW3).
- Internal audio amplifier, 80 W (8RM) or 180 W (9VD).
- Bluetooth interface (9ZX).
- Speech dialog system.
- 7" display in instrument cluster (9S7) or Audi virtual cockpit (9S8).

The following additional equipment/connect services can be ordered:

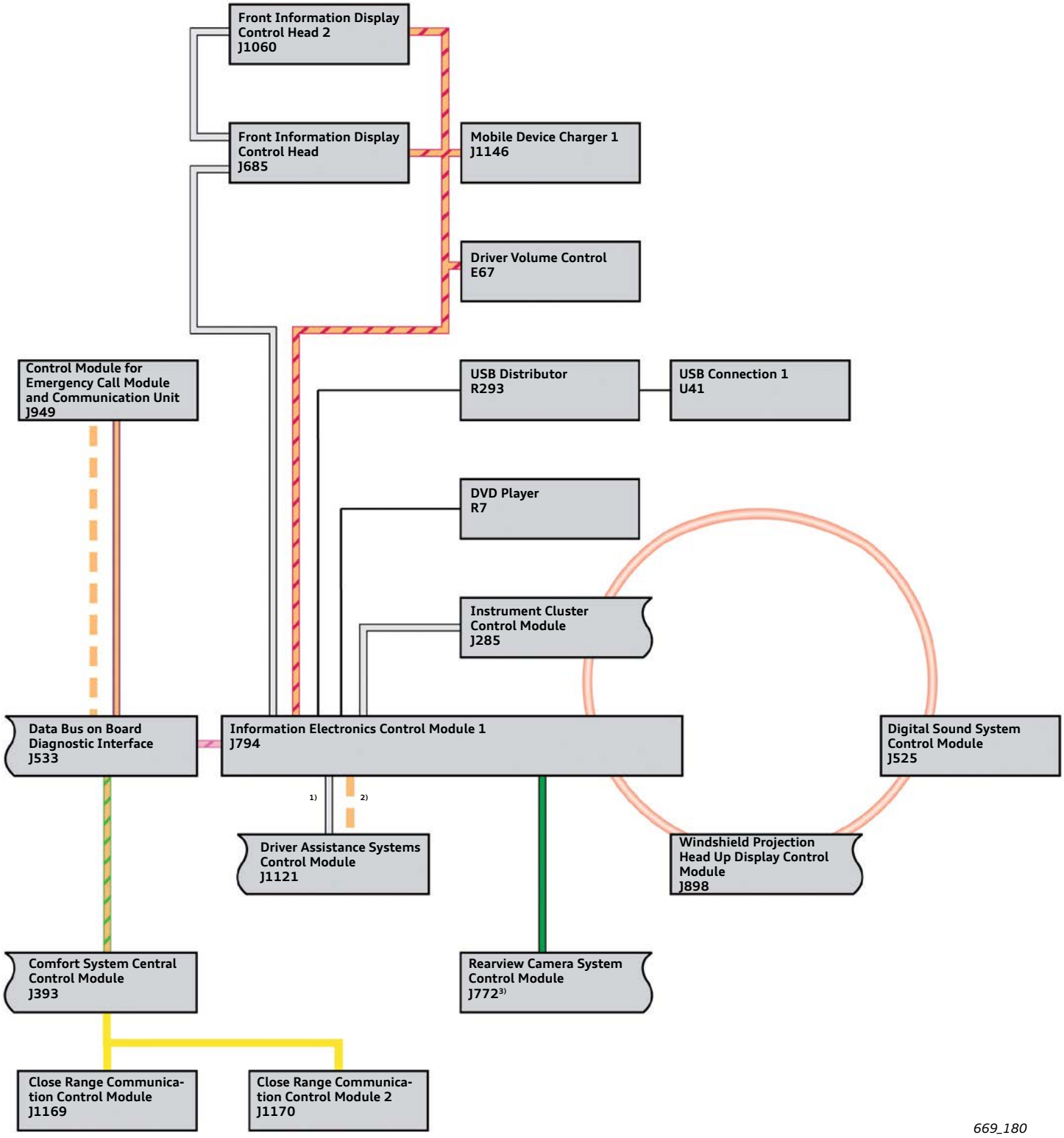
- Single DVD drive (7D5).
- Audi smartphone interface (IU1).
- Audi phone box including wireless charging (9ZE).
- Bang & Olufsen Premium Sound System with 3D sound and 705 W (9VS).
- Bang & Olufsen Advanced Sound System with 3D sound and 1820 W (8RF).

MMI display J685 with MMI navigation *669_163*

MMI display J685 with MMI navigation plus *669_164*

Networking

Topology



Key:

- Convenience CAN
- Infotainment CAN
- Modular infotainment matrix CAN (MIB)
- Sub-bus systems
- MOST bus
- LVDS
- USB wires
- Ethernet
- Composite video
- Connect CAN

1) Connection only present if surround view cameras installed
2) Only installed from control module version B forward
3) Not installed if surround view cameras installed

Touch display

Introduction

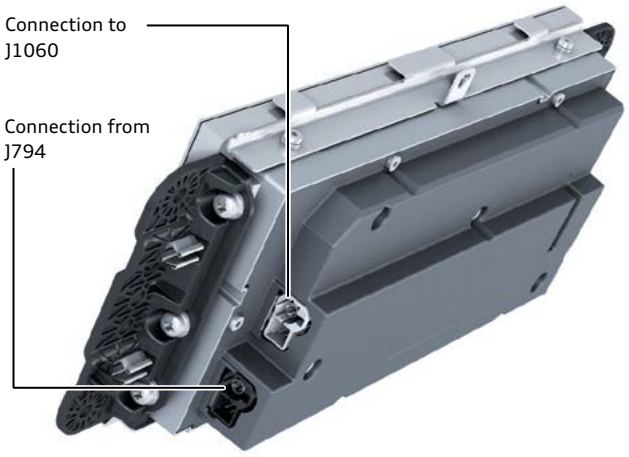
The 2019 A7 has two touch displays.

The upper display is for the MMI system; the lower display is used, among other things, for operating the climate control system.

The lower display is identical for all three MMI versions available (MMI radio plus, MMI navigation and MMI navigation plus).

The upper display can be installed in two different versions. However, the only difference is the dimensions of the display surface. The outer dimensions of the displays are the same.

Vehicles equipped with MMI radio plus or MMI navigation use the smaller display surface.



669_165

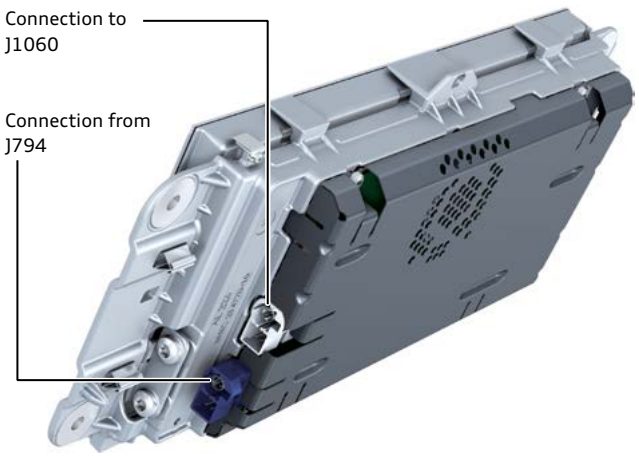
Front Information Display Conrol Head J685 (10.1 inch)

Technical features of the upper display
(MMI display J685)

With MMI navigation plus:
- 10.1 inch.
- 1540 x 720 pixels.
- LVDS connection from J794: black.

With MMI radio plus and MMI navigation:
- 8.8 inch.
- 1280 x 720 pixels.
- LVDS connection from J794: blue.

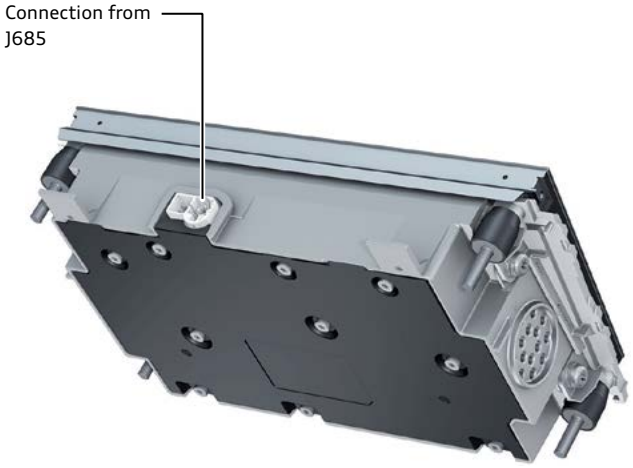
The color coding of the LVDS connection on Information Electronics Control Module 1 J794 to J685 is black for all display versions.



669_166

Front Information Display Conrol Head J685 (8.8 inch)

Technical features of the lower display
(Lower touch display J1060)
- 8.6 inch.
- 1280 x 660 pixels.



Front Information Display Control Head 2 J1060

669_207

Reference
For further information on the displays and operation, please refer to eSelf-Study Program 990293, The 2019 A8 Infotainment and Audi Connect Systems.

Control Module for Emergency Call Module and Communication Unit J949

Introduction

Control Module for Emergency Call Module and Communication Unit J949 (referred to as the connectivity box) will be introduced in the North American Region for the first time in the 2019 A7.

It is a new development which replaces the mobile network function of Data Bus On Board Diagnostic Interface J533 (gateway). The telephone module is "moved" from the connected gateway to the connectivity box. The connectivity box assumes the tasks related to communicating with the outside world. This affects, for example, the Audi connect vehicle-related services.

With the introduction of the connectivity box, the number of versions of the gateway is reduced and the customer also benefits from the increase in processing power.

Antenna connection

The GSM, UMTS and LTE standards are supported. Two external antennas are used for communication; they are located in the bumper (rear right) and on the roof. The antenna in the bumper (rear right) is usually used (Emergency Call Module Antenna R263). If this antenna's reception is poor in an emergency call situation, the connectivity box switches to the Roof Antenna R216.

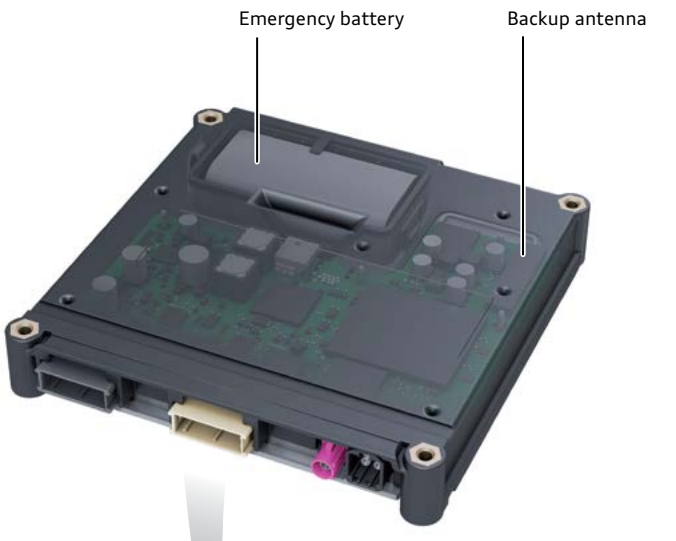
Design

The connectivity box is equipped with a backup antenna. It is installed inside the box and helps ensure communication in event the two external antennas fail.

An emergency battery is also installed in the connectivity box. It is charged during vehicle operation and is maintenance-free.

If the vehicle is equipped with the Audi connect vehicle tracking system, the connectivity box also has a shock sensor. This is a three axis acceleration sender which is able, when the vehicle is locked, to react accordingly to shaking movements along the three axes and to minor changes in pitch (> 0.25°).

The connectivity box is included in the component protection and is part of the immobilizer system.



669_168

Installation position

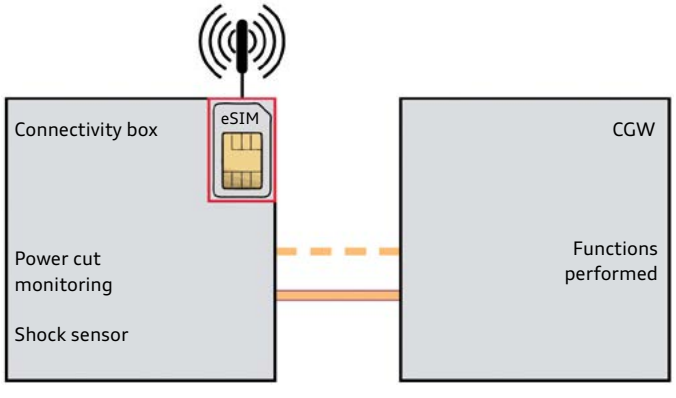
On the A7, the connectivity box is installed underneath the luggage compartment floor (front left). To avoid damage, the connectivity box is protected by impact resistant trim.

669_169

Data connection and diagnosis

The connectivity box is connected to J533 via the connect CAN. The maximum data transfer speed is 500 kbit/s. Both control modules are also connected via an Ethernet cable which is used to transmit all mobile network data.

The Address word is "0075 Emergency call module".



669_170

Key:

Ethernet

Connect CAN

Sound

The following sound systems are available for the Audi A7 :

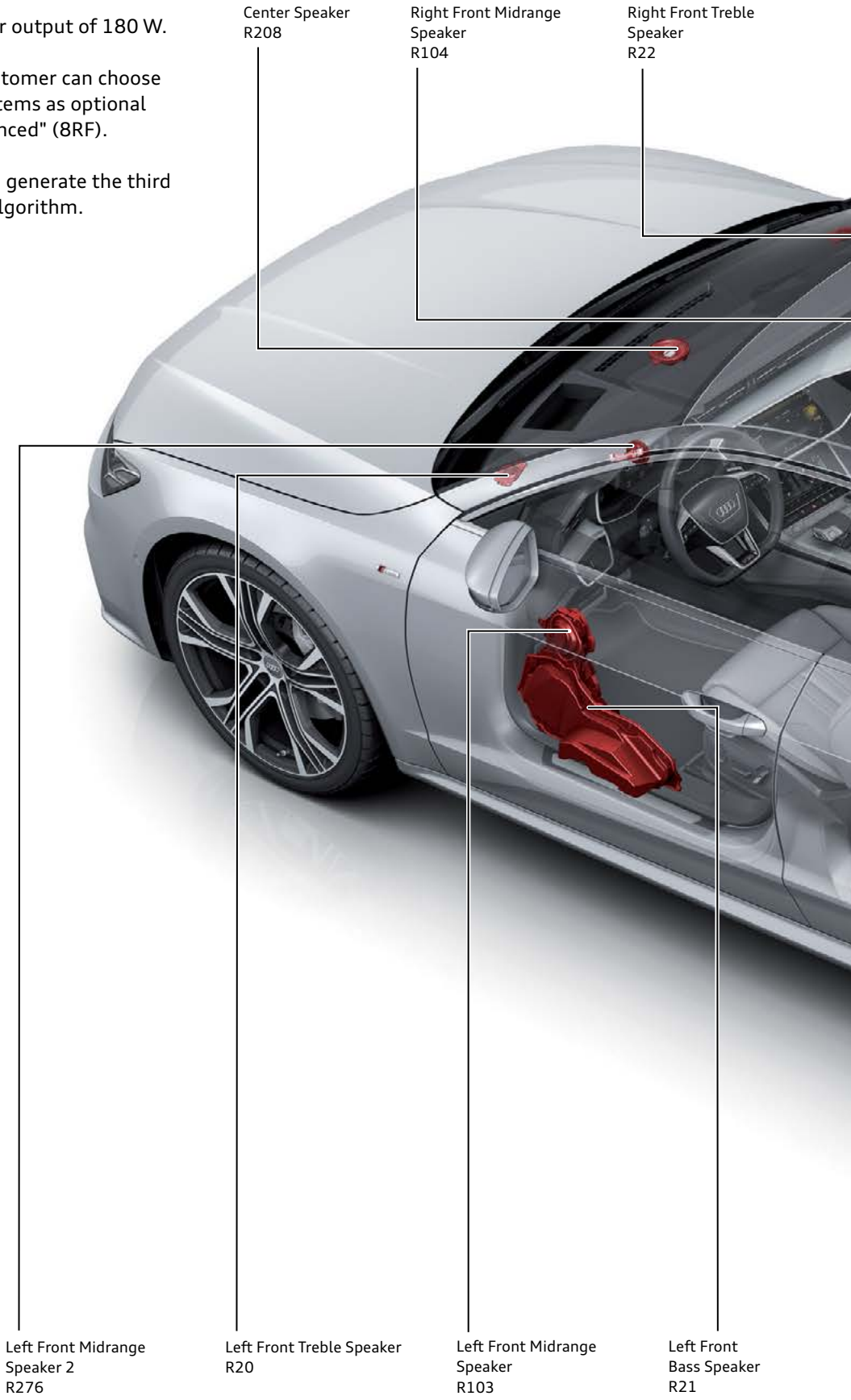
- Audi sound system (9VD).
- Bang & Olufsen Premium Sound System with 3D sound (9VS).
- Bang & Olufsen Advanced Sound System with 3D sound (8RF).

These can be combined with the MMI versions in different ways (refer to the overview of versions on page 92).

The Audi sound system has a total power output of 180 W.

With MMI navigation and above, the customer can choose between two Bang & Olufsen Sound systems as optional equipment: "Premium" (9VS) and "Advanced" (8RF).

Both Bang & Olufsen sound systems can generate the third dimension of 3D sound using a special algorithm.



Bang & Olufsen Premium Sound System with 3D sound (9VS)

The Bang & Olufsen Premium Sound System (9VS) provides the customer with a 15-channel sound system. It can reach a total power output of 705 W.

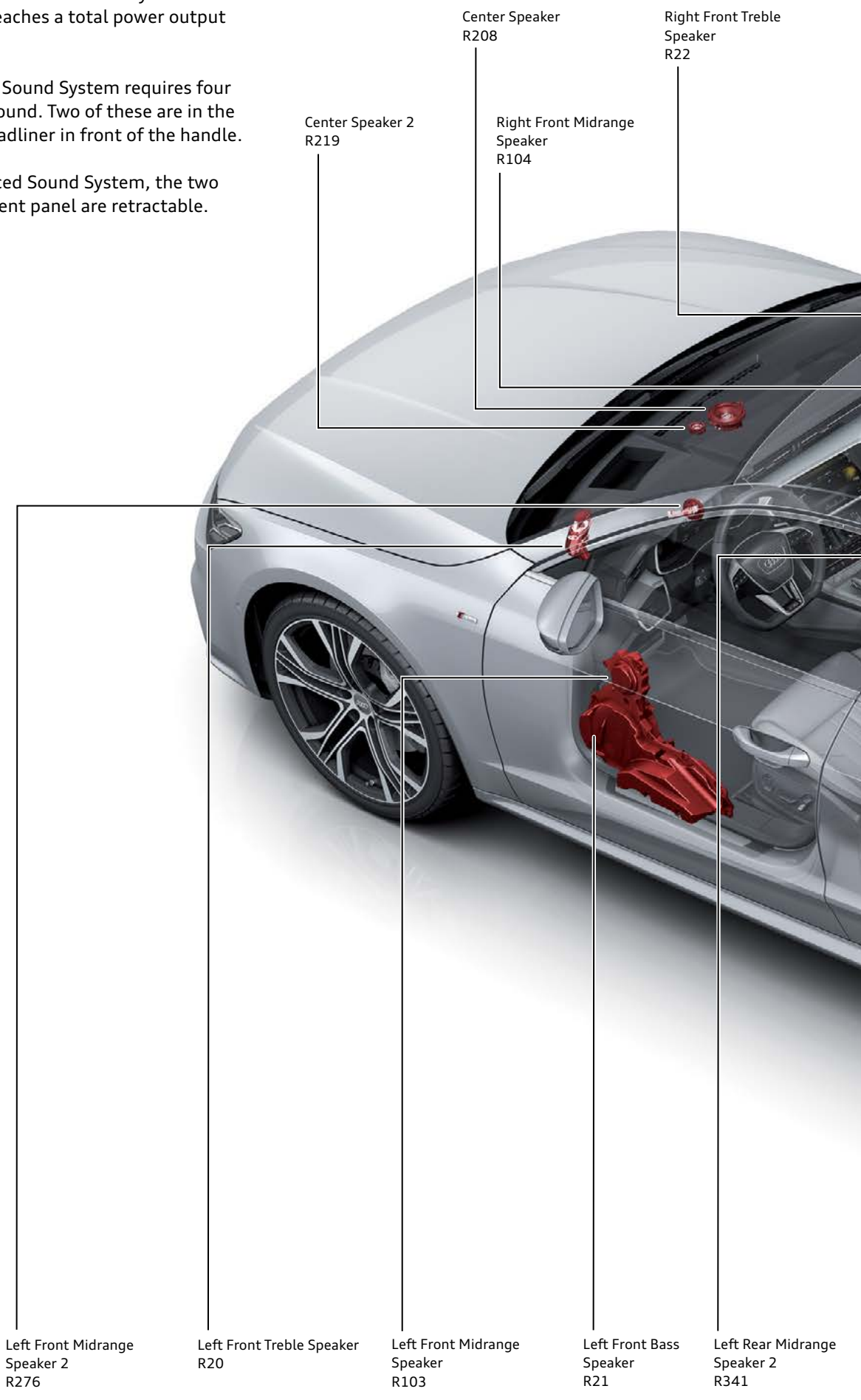
The premium sound system requires two speakers to generate the 3D sound. They are installed in the A-pillars.

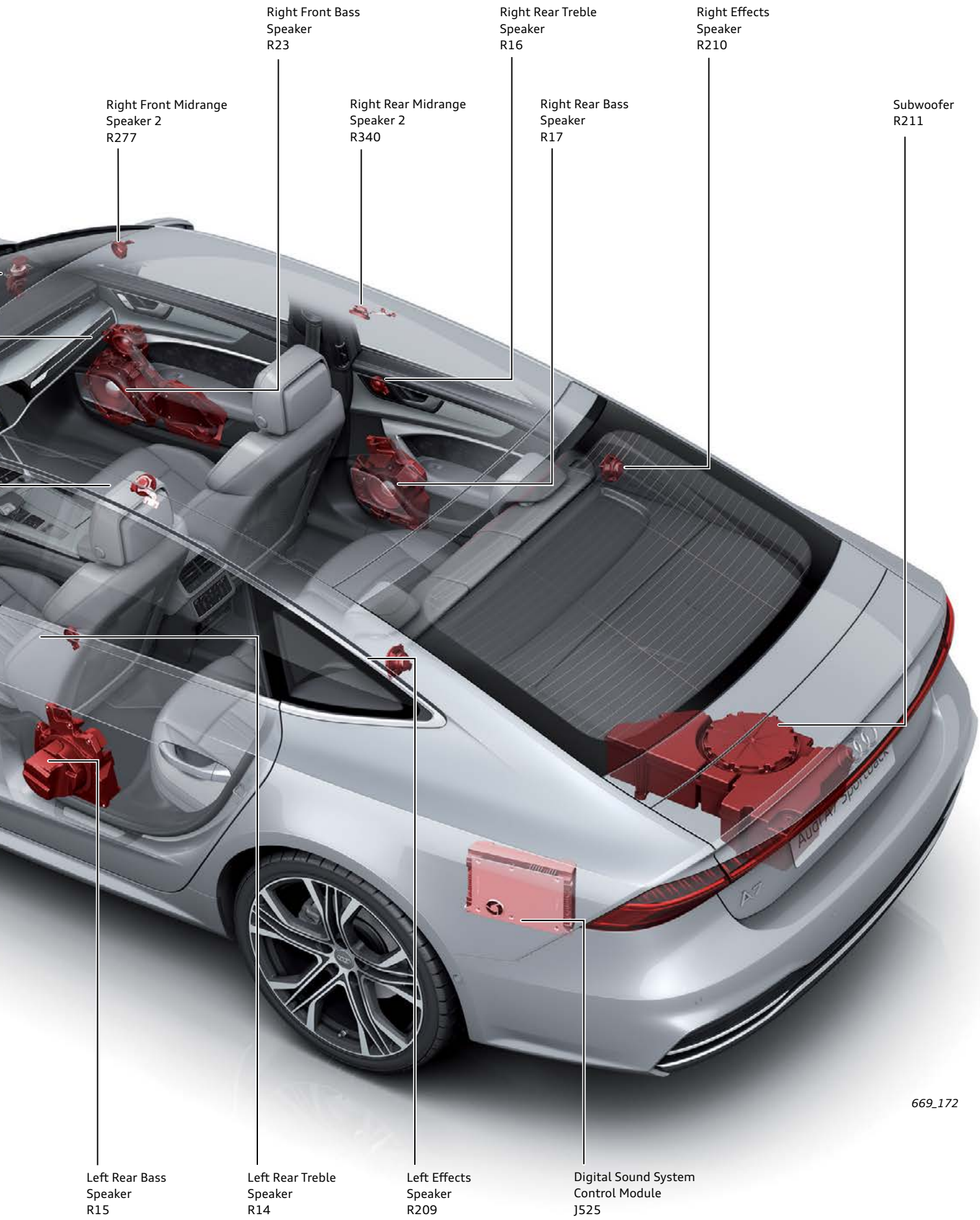
Bang & Olufsen Advanced Sound System with 3D sound (8RF)

The best sound quality experience for customers is provided by the Bang & Olufsen Advanced Sound System. This system has 19 channels and reaches a total power output of 1820 W.

The Bang & Olufsen Advanced Sound System requires four speakers to generate the 3D sound. Two of these are in the A-pillars and two are in the headliner in front of the handle.

On the Bang & Olufsen Advanced Sound System, the two treble speakers in the instrument panel are retractable.

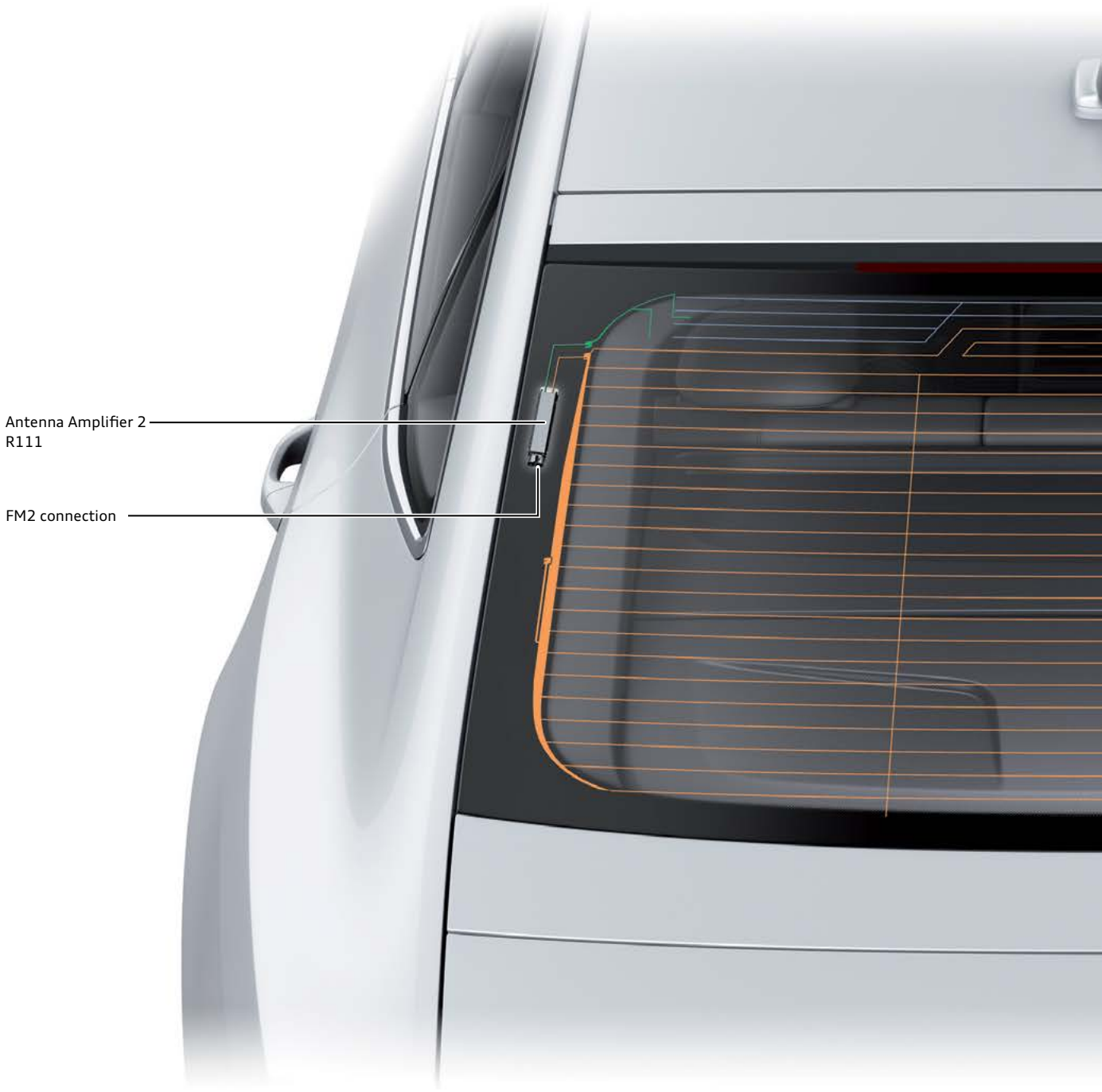


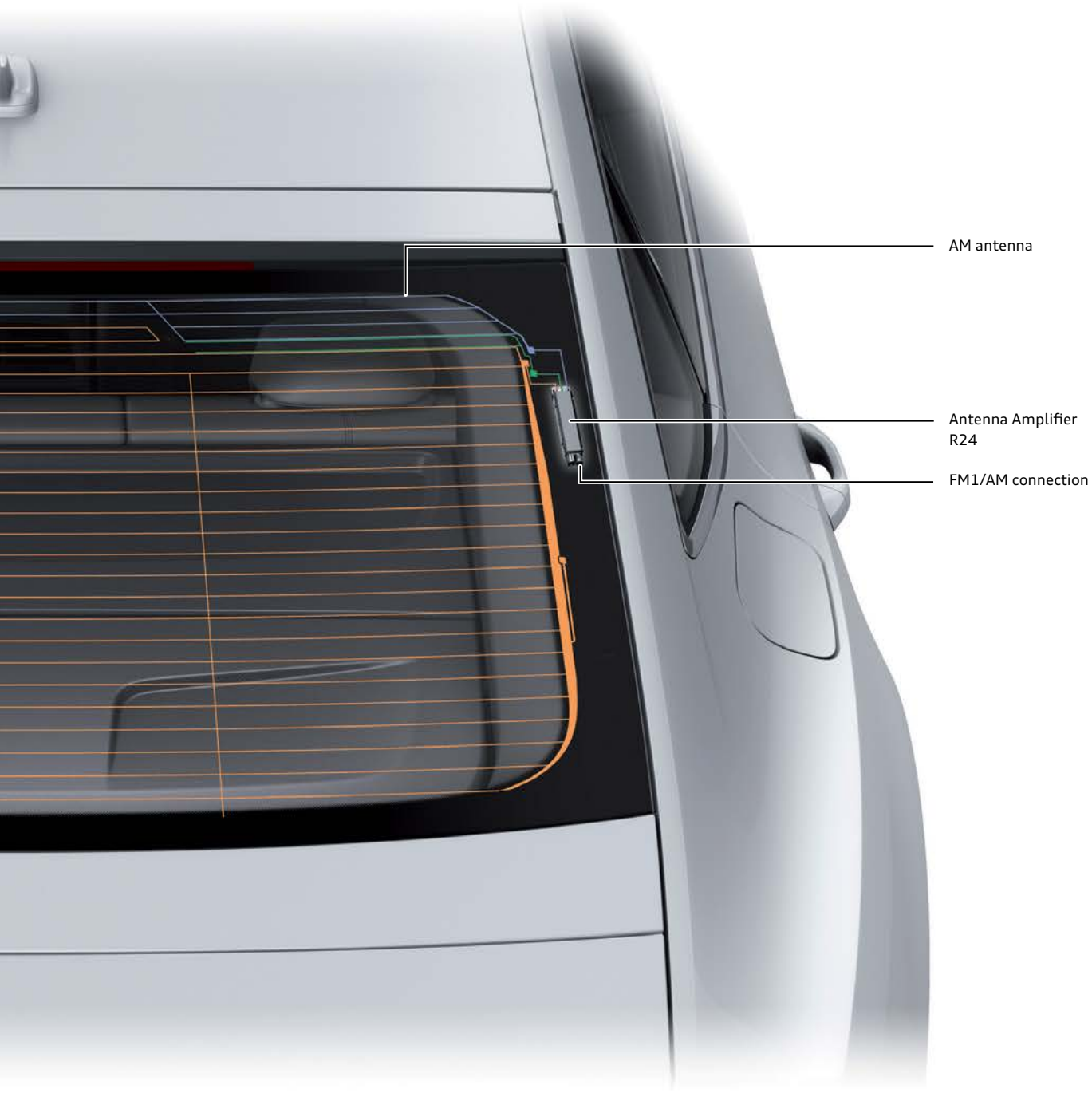

Right Front Bass Speaker R23
Right Rear Treble Speaker R16
Right Effects Speaker R210
Right Front Midrange Speaker 2 R277
Right Rear Midrange Speaker 2 R340
Right Rear Bass Speaker R17
Subwoofer R211
669_172
Left Rear Bass Speaker R15
Left Rear Treble Speaker R14
Left Effects Speaker R209
Digital Sound System Control Module J525

Antennas

Rear window antennas

The antennas for radio reception in the Audi A7 are integrated in the rear window.





669_173

Mobile phone antennas

The mobile phone antennas in the A7 are located on the roof, in the rear bumper and depending vehicle equipment, under the instrument panel.

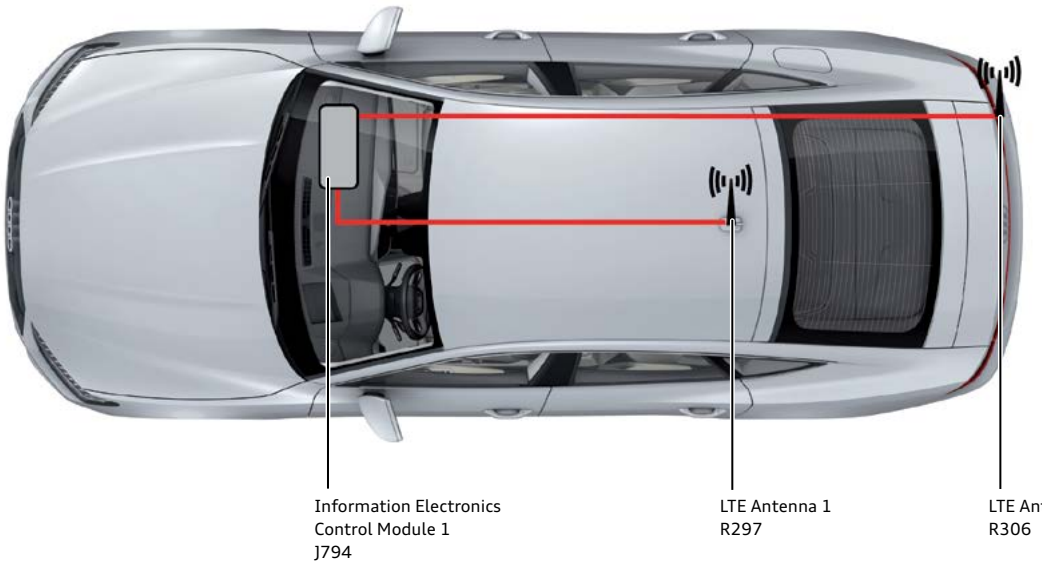
Mobile phone antenna for vehicles with Audi phone box

The Audi A7 can be equipped with the Audi phone box 9ZE as an optional extra. This is always connected to the LTE antenna 3 R330 which is positioned on the left in the rear bumper.

669_174

Mobile phone antennas for vehicles with Audi connect infotainment services only

If Audi connect infotainment services (IT1/IT3) are available for the vehicle but vehicle-related services are not, the mobile phone antenna connections are as shown below.

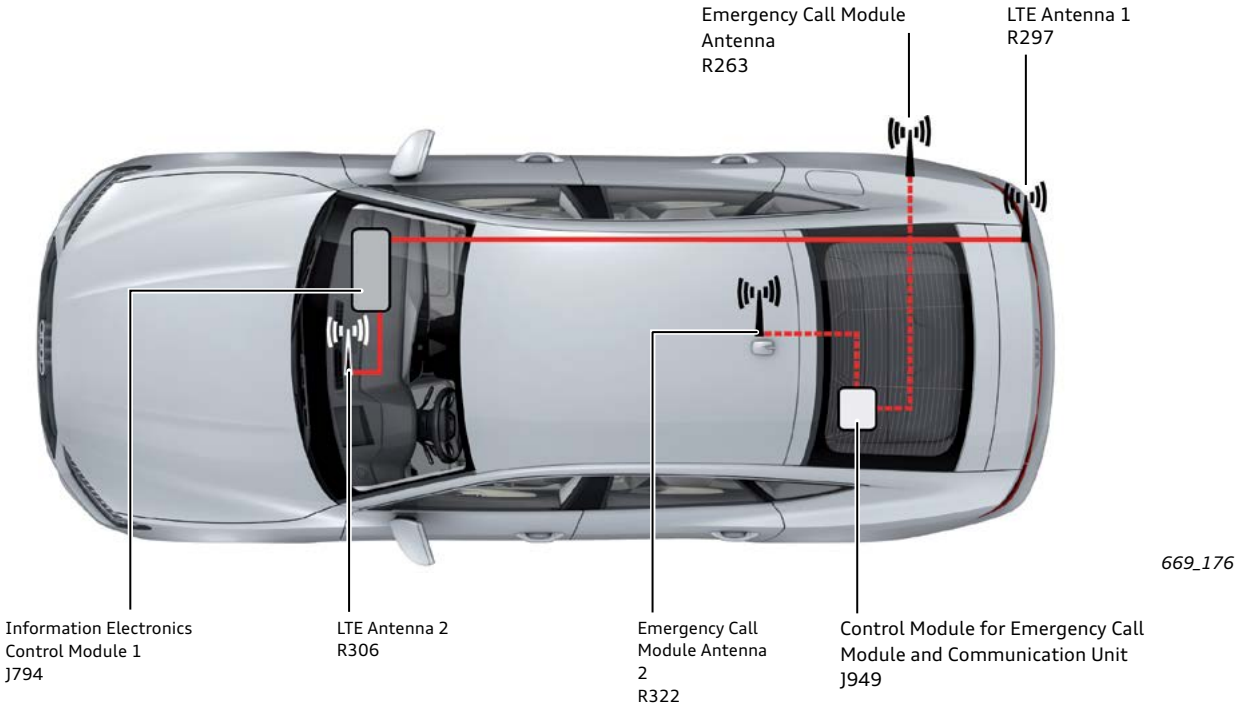


669_175

Mobile phone antennas for vehicles with Audi connect infotainment and vehicle-related services with Control Module for Emergency Call Module and Communication Unit J949

J949 is permanently connected to Emergency Call Module Antenna R263 (main antenna) and Emergency Call Module Antenna 2. In this case, the roof antenna is only used by J949.

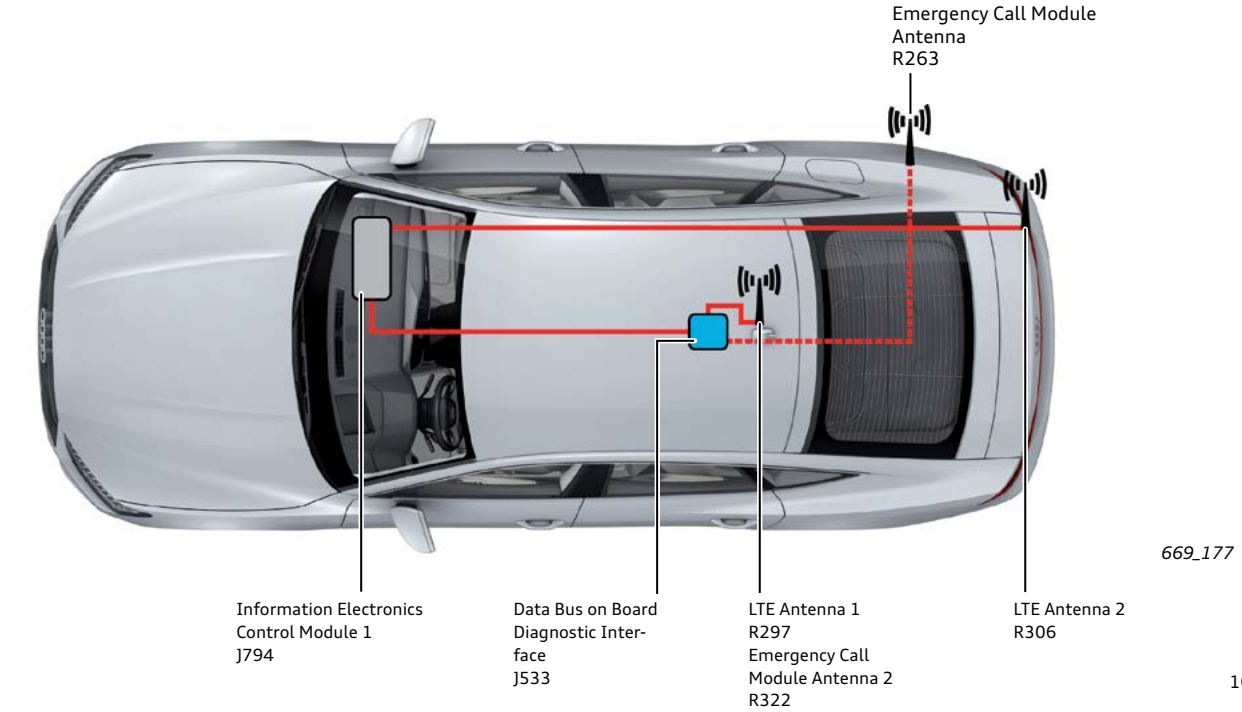
Information Electronics Control Module 1 J794 has an exclusive connection to two antennas: one in the rear bumper (LTE Antenna 1 R297) and one centrally under the instrument panel (LTE Antenna 2 R306).



Mobile phone antennas for vehicles with Audi connect infotainment and vehicle-related services without Control Module for Emergency Call Module and Communication Unit J949

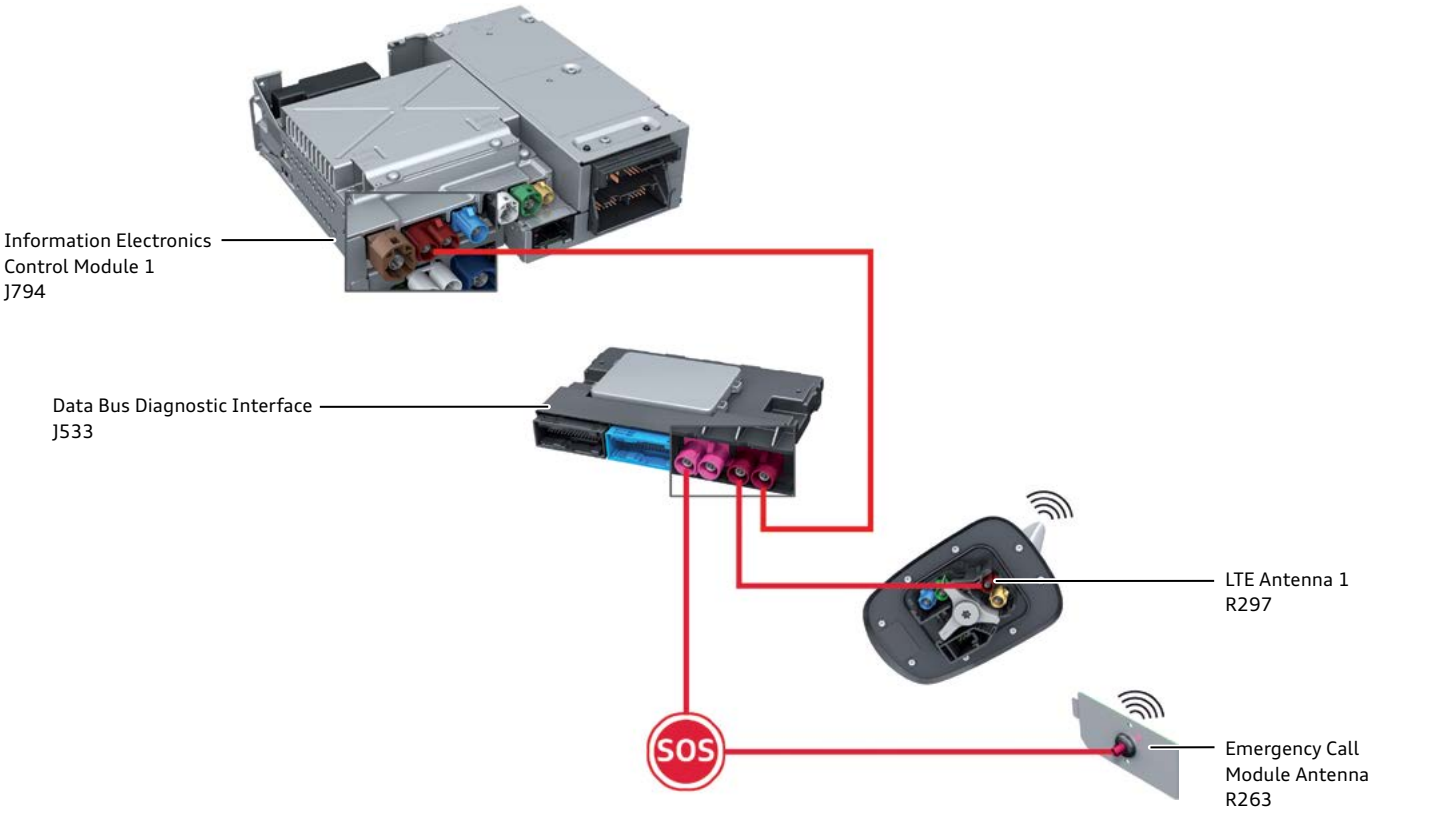
On this version, the telephone antenna on the roof is used both by Information Electronics Control Module 1 J794 and the Data Bus on Board Diagnostic Interface J533 (connected gateway).

An antenna splitter in J533 is used to switch between them. This switch-over function is described in the following.



Antenna splitter function in J533

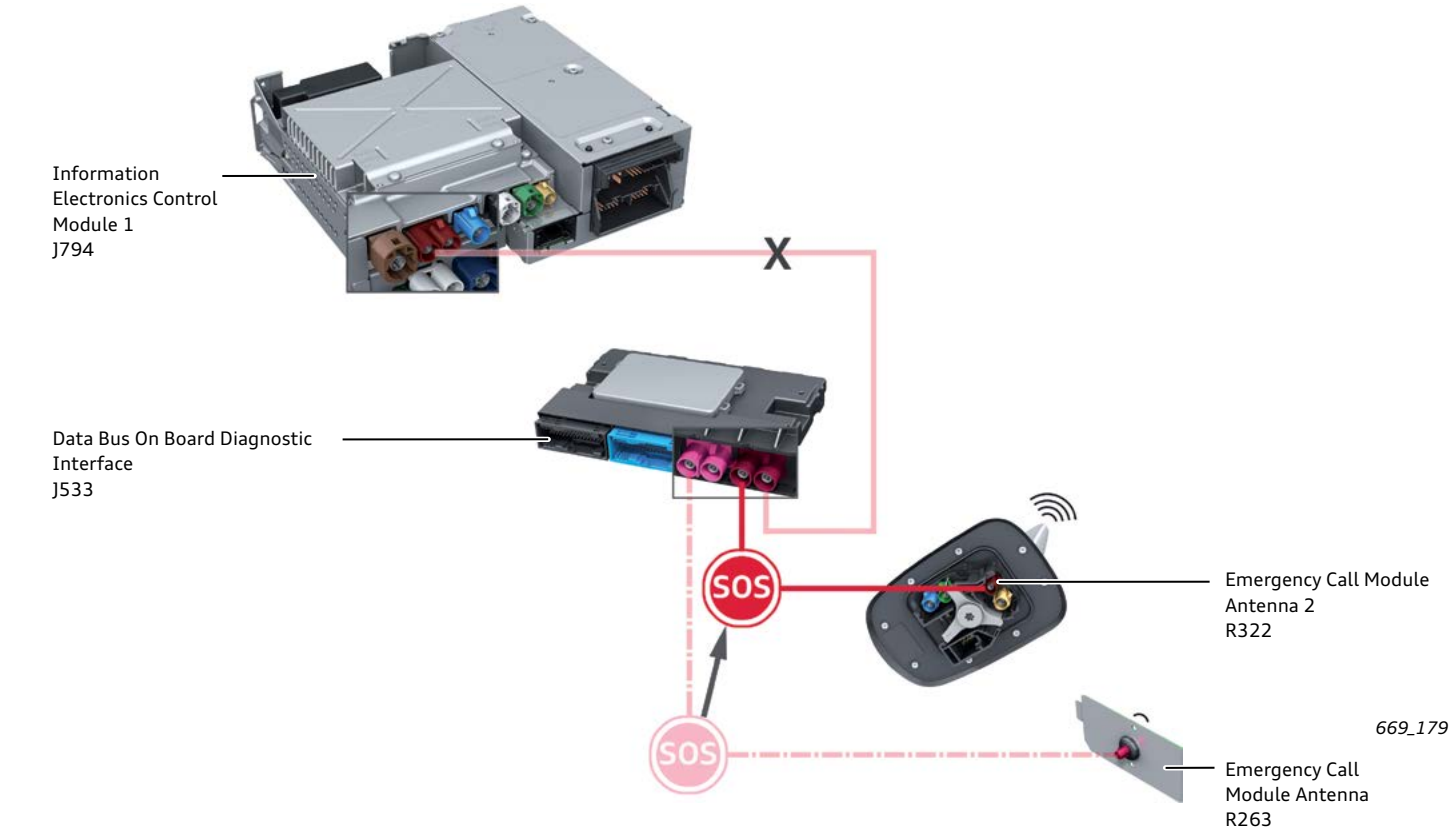
The signal from LTE Antenna 1 is usually sent to J794 via an antenna splitter in Data Bus On Board Diagnostic Interface J533. If Emergency Call Module Antenna J263 has sufficient reception, it will be used if an emergency call is required.



669_178

If the reception of Emergency Call Module Antenna R263 is insufficient when an emergency call is required, the antenna splitter switches over and J533 uses the signal from Emergency Call Module Antenna 2 R322.

The connection to J794 is ended and the emergency call is made via R322.



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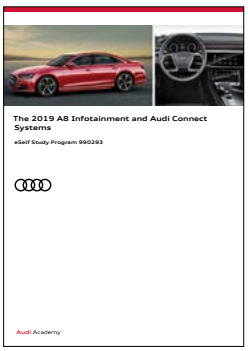
Inspection and maintenance

	3.0 ltr. TFSI engine
Engine oil change	TBD
Inspection	TBD
Pollen filter change interval	TBD
Air filter change interval	TBD
Brake fluid change interval	TBD
Spark plug change interval	TBD
Fuel filter change interval	–
Valve gear	Chain (maintenance-free)
ATF change interval	TBD
Read out ash deposit mass in diesel particulate filter (in km)	–
Air ionization system Vials in function unit for fragrance diffuser system GX43	TBD

Appendix

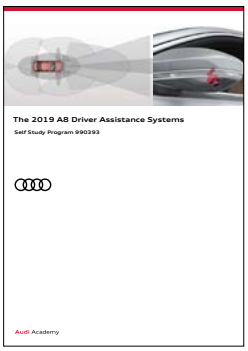
eSelf-Study programs

For further technical information on the Audi A7, please refer to the following eSelf-Study programs.

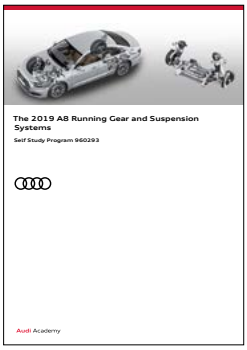


SSP 990293
The 2019 A8
Infotainment and Audi Connect Systems

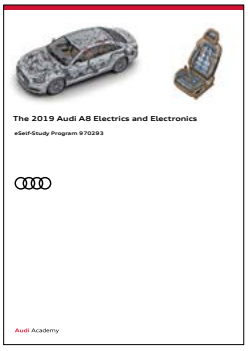
SSP 920173
The Audi 3.0l V6 TFSI EA839 engine



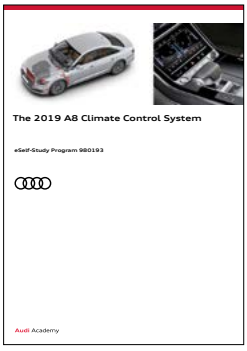
SSP 990393
The 2019 Audi A8
Driver Assistance Systems



SSP 960293
The 2019 Audi A8 Running Gear and Suspension Systems



SSP 970293
The 2019 Audi A8
Electrics and Electronics



SSP 980193
The 2019 Audi A8
Climate Control Systems

Knowledge assessment

An On-Line Knowledge Assessment (exam) is Available for this eSelf-Study Program.

The Knowledge Assessment is required for Certification credit.

You can find this Knowledge Assessment at: **www.accessaudi.com**

From the accessaudi.com Homepage:

› Click on the "App Links"

› Click on the "Academy site CRC"

Click on the Course Catalog Search and select "990593 - The 2019 Audi A7 Introduction"

Please submit any questions or inquiries via the Academy CRC Online Support Form which is located under the "Support" tab or the "Contact Us" tab of the Academy CRC.

Thank you for reading this eSelf-Study Program and taking the assessment.

990593

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