Audi A3 (type 8Y)

Self-study programme 680

For internal use only

Audi Service Training

Contents

Assist systems

Infotainment and Audi connect

Inspection and maintenance

This self-study programme provides basic information on the design and function of new vehicle models, new 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.
In the glossary at the end of this self-study programme you will find an explanation of all terms which are shown in *italics* and indicated by an arrow ↗.


Note


Reference

Introduction

Introduction

The Audi A3 is the premium compact car from the brand with the four rings. In its fourth generation, it impresses with its sporty design and many innovations from the luxury class.

At the same time, it offers improved comfort inside and more functions. Its wide range of models offers something for a wide range of target groups – from aspiring young professionals to couples and young families right through to those coming up to retirement. What all these people have in common is their enthusiasm for design and technology.

The product strengths of the Audi A3 lie particularly in the areas of design and the infotainment and drive systems.

- Design: The new Audi A3 is dynamic and expressive like never before.
  Both on the exterior and in the interior, it has revolutionary features and offers many options for personalisation. The highlight is the digital daytime running lights.
- Infotainment:
  With functions on demand and the MIB3, the newest luxury class technologies have made their way into a compact class model. The offers are digital, flexible and networked.
- Drive system:
  The new Audi A3 unites sporty performance with excellent efficiency. The wide range of models meets the requirements of various customers - from the sporty driver to the environmentally-conscious customer.

Light

Headlights have LED technology as standard equipment and matrix LED headlights with digital daytime running lights are optionally available.

Infotainment system

The newest infotainment system generation MIB3 with natural language interaction. Bang & Olufsen Sound System with virtual 3D sound is optionally available.

Displays and operation

The digital instrument cluster (10.25”) and the touch display (10.1”) with acoustic feedback are available as standard. A 12.3” Audi virtual cockpit plus with sport and dynamic layout and a windscreen head-up display are optionally available.

Running gear

Electromechanical power steering is standard equipment. Progressive steering and Audi drive select are optionally available.

Driver assist

Surround view cameras with TopView, lane departure warning with rear cross-traffic assist, Audi pre sense front, Audi pre sense rear and Audi pre sense basic are available.

Engines

At market launch, all engines are direct injection units with turbocharging. According to the emissions requirements of the markets, both the TDI and the TFSI engines are fitted with particulate filters.

Body

The torsional rigidity and the crash safety have been improved by the use of die-quenched panels and ultra-high strength (hot-formed) steel.

Air conditioning

A 3-zone automatic air conditioner is available as an option alongside the 2-zone automatic air conditioner and a manual air conditioner.

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Dimensions

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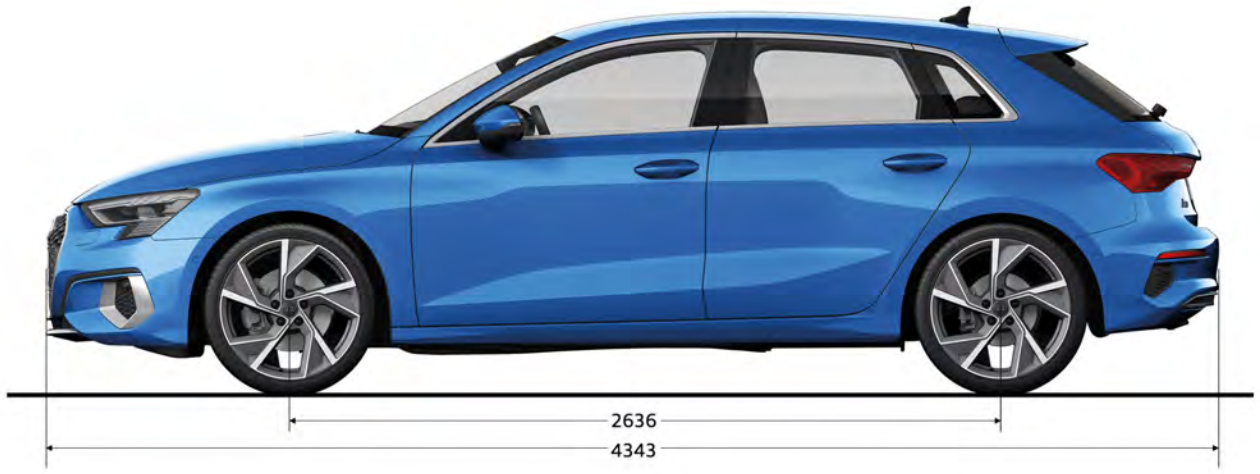

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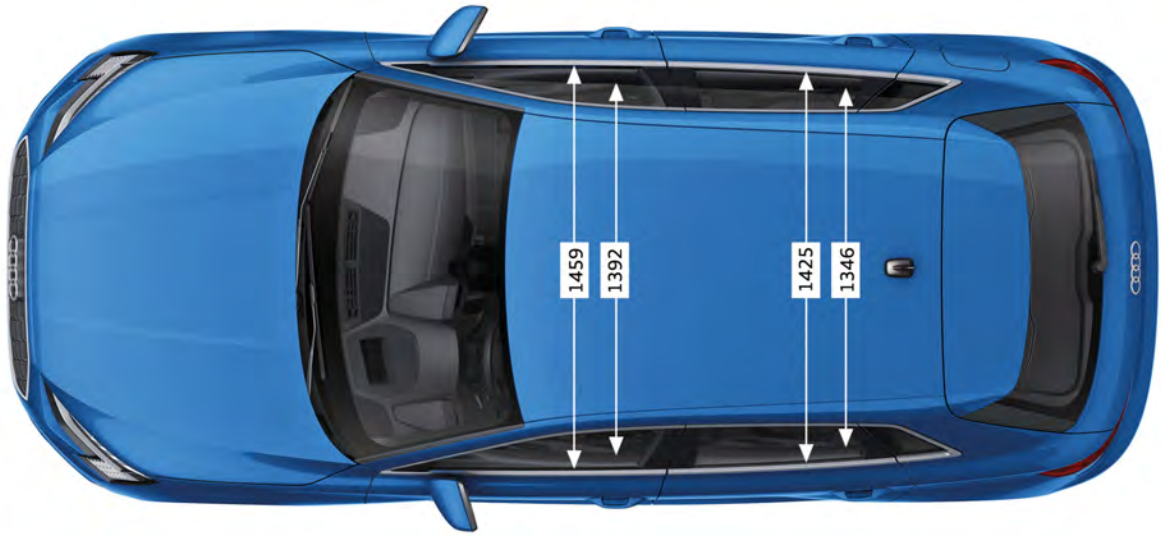

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Exterior dimensions and weights		Interior dimensions and other specifications	
Length in mm	4343	Front shoulder width in mm	1392
Width (not incl. mirrors) in mm	1816	Front cabin width in mm	1459
Width (incl. mirrors) in mm	1984	Front seat height in mm	1028
Height in mm	1425	Rear shoulder width in mm	1346
Front track in mm	1554	Rear cabin width in mm	1425
Rear track in mm	1525	Rear seat height in mm	955
Wheelbase in mm	2636	Luggage compartment capacity in ltr.	380 – 1200
Unladen weight in kg	1355 – 1485		

Body

Introduction

The basis for the new Audi A3 (type 8Y) is provided by the underbody from the modular transverse matrix (MQB37 W). The body is available as a four-door model, either with a full roof or a panoramic sunroof. The vehicle can also be fitted with a roof rail as optional equipment.

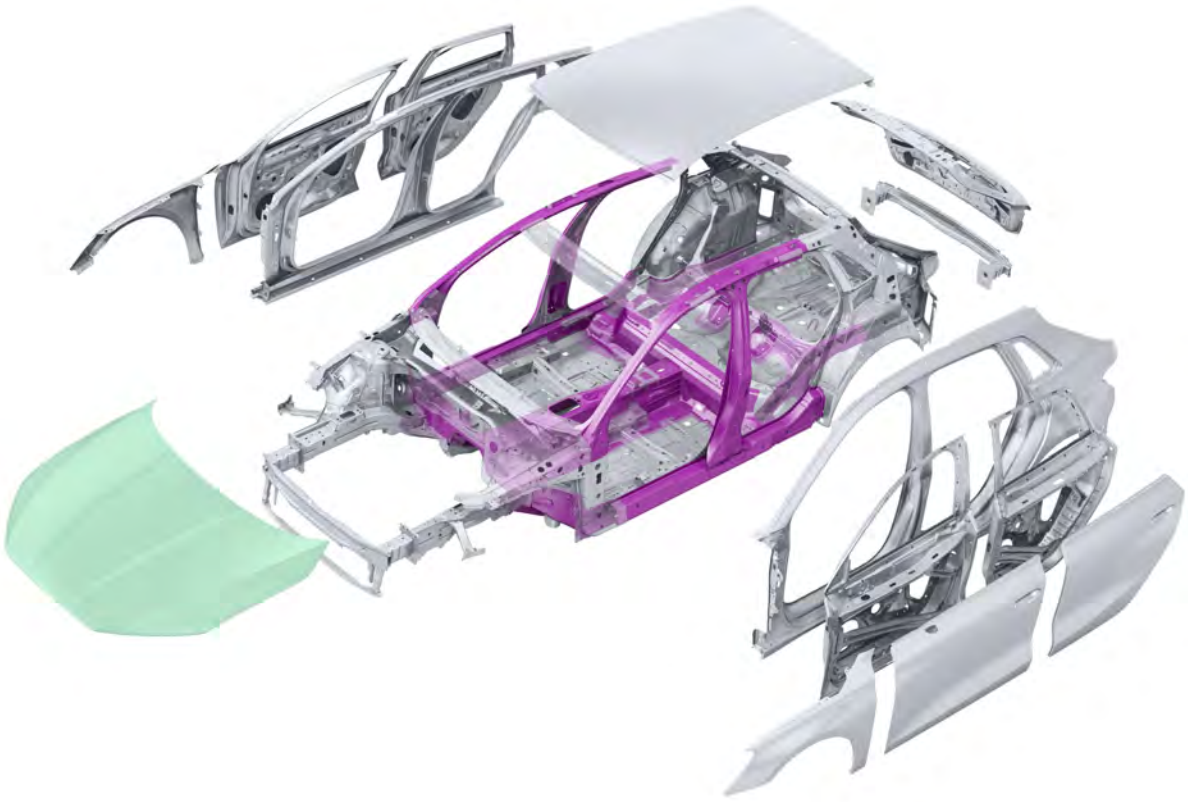
The body includes a frame structure of several ultra-high strength components formed by the tunnel, the upper and lower footwell cross members and the side members (sill panels). The ultra-high strength heel plate provides additional support at the side.

Die-quenched panels and ultra-high strength steel (hot-formed) are also used for the body structure. Thanks to these components, particularly the ultra-high strength hot-formed components, it was possible to increase the torsional rigidity and crash safety of the Audi A3 body.

Outer skin

- Front wings
- Doors
- Rear lid
- Side panels
- Roof

These components are made of steel on the Audi A3. The bonnet is made of aluminium.



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Key:

- Conventional steel
- Ultra-high-strength steel (hot-formed)
- Sheet aluminium

Joining techniques

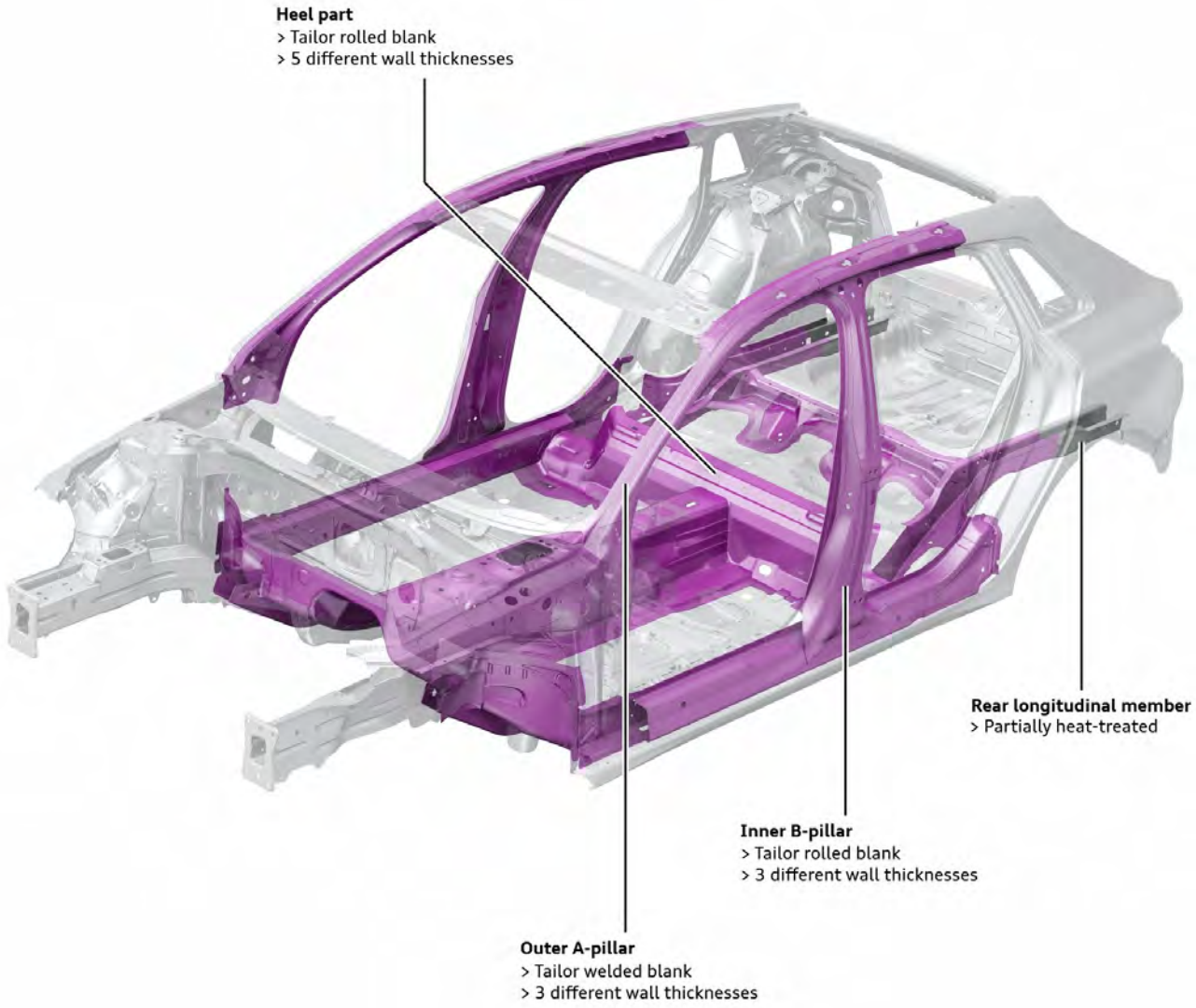
The main joining method used for the construction of the Audi A3 (type 8Y) body is resistance spot welding. Resistance spot welding is combined with a high-strength bonding process in the body zones where stringent requirements apply to vibration comfort and passive safety. The following joining techniques are also used:

- MAG welding
- Projection welding
- Laser welding for steel
- Laser soldering/brazing
- Plasma soldering/brazing
- Seaming
- Bonding
- Clinching
- Punch riveting
- Flow-drill screws
- Pop rivets

Ultra-high strength hot-formed components

Hot-formed components form the high-strength, crash-safe backbone of the Audi A3 occupant cell. They strengthen the transition from the front section of the vehicle to the interior, the front zone of the roof frame, the B-pillars, the side members (sill panels) and parts of the floor. They account for 29 % of the body structure.

The use of ultra-high strength hot-formed steels means that body repairs can only be accomplished by adopting special repair methods suited to the properties of the material in question. If significant heat is applied in the welding area, this changes the material's microstructure, permanently weakening the rigidity and structure of the component. For this reason, MAG shielded arc welding must only be used for section repairs on these high-quality steels in isolated cases and in precisely specified areas described in the workshop literature.



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Key:

Conventional steel

Ultra-high-strength steel (hot-formed)

Tailor welded blank technology

The outer A-pillars (top) are manufactured using tailor welded blank technology. This involves individual metal plates of different thicknesses which are welded together.

Tailor rolled blank technology

On the Audi A3 (type 8Y), the heel part and the inner B-pillars are manufactured using tailor rolled blank technology. These are flexibly rolled plates. Variations in thickness are produced by controlled opening and closing of the gap between the rollers. These variations in thickness not only save weight but also create defined crumple zones which provide protection in the event of an accident.

Partial hardening/tempering

Components such as the rear longitudinal member, which have to be capable of absorbing and dissipating the forces that occur in the event of a crash, are partially hardened and tempered in accordance with the specifications. The heated zones give the component its high-strength or ultra-high strength properties in the specified area.

Body assembly

Front bumper

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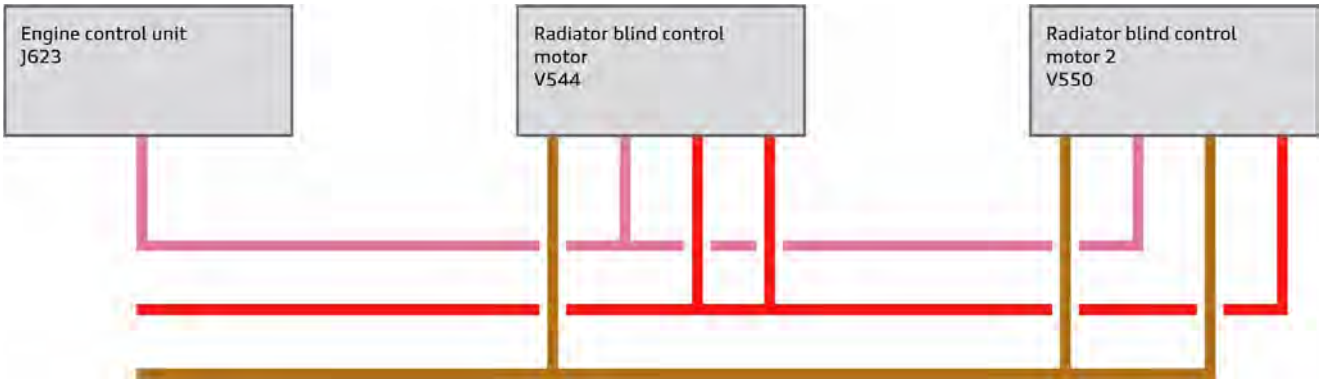
The construction of the front bumper on the Audi A3 (type 8Y) essentially corresponds to that of other current Audi models. The impact bar made of hot-formed and hardened steel is bolted to the two longitudinal members (bottom) together with the lock carrier made of glass fibre-reinforced plastic. Connecting the lock carrier to the longitudinal members (top) creates additional rigidity.

The bumper cover is inserted into guides on both sides. It is clipped and bolted on at two locations. Three upper bolts and three lower bolts secure the bumper cover to the lock carrier. The lock carrier cover closes the space between the bumper cover and the lock carrier and incorporates the operating lever for the arrester.

The Audi A3 (type 8Y) has an active radiator blind with certain engine versions. This is divided into an upper and a lower unit. The upper radiator blind is fitted in the lock carrier. As the lower radiator blind is in the impact bar, it is positioned slightly further forward.

The radiator blind control motor V544 and the radiator blind control motor 2 V550 are activated via LIN by the engine control unit J623. The control motors are addressed via pin 3. Pin 3 is at positive on radiator blind control motor V544 and at earth on radiator blind control motor 2 V550.



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Key:

- LIN bus
- Positive wire
- Earth wire

Reference
For further information on the radiator blind, please refer to SSP 632, "Audi Q7 (type 4M)".

Rear bumper

680_103

The impact bar on the rear of the Audi A3 (type 8Y) is also made of die-quenched steel. As on the front impact bar, special deformation elements are used to absorb energy in the event of a crash. The towing bracket assumes the functions of the impact bar for vehicles on which it is fitted.

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The bumper cover is secured in side mountings, bolted to the side panel (one bolt on each side) and secured on both sides with a locking element, as on the previous model (type 8V). The side rear lights must be removed to access this locking element.

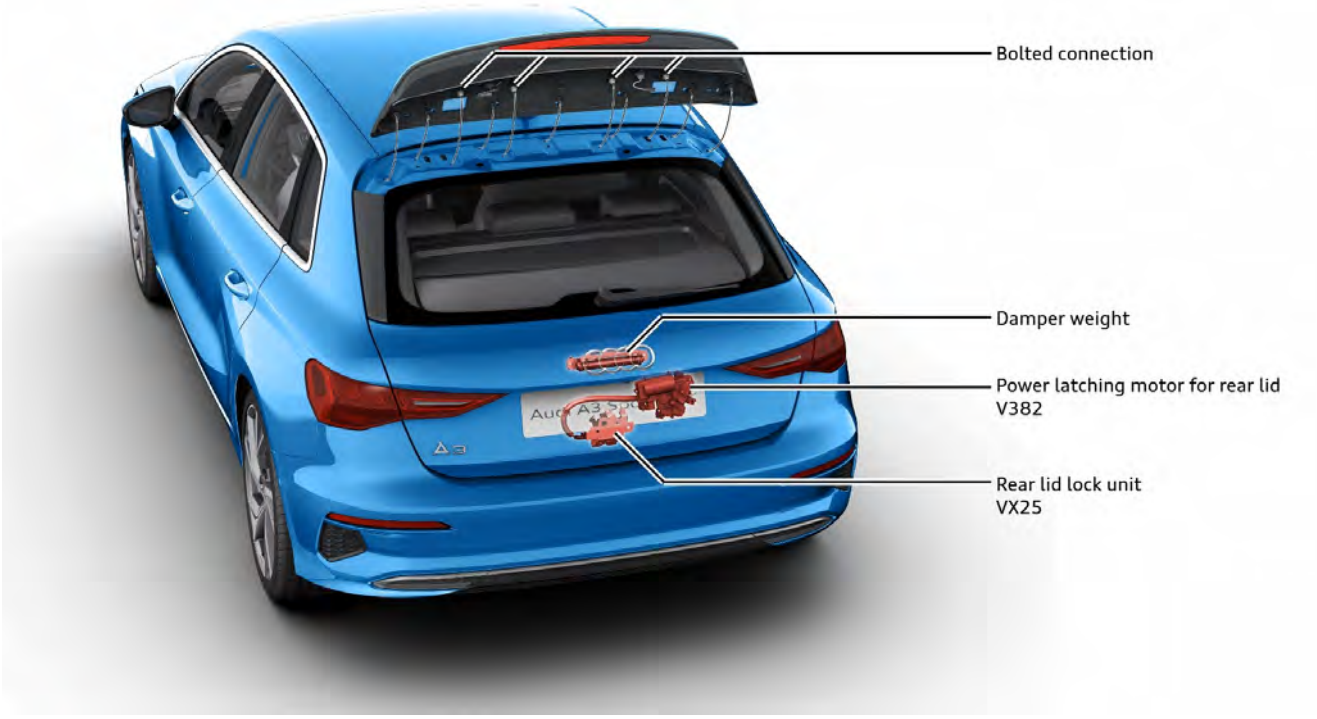
The bumper cover is secured to the cross panel with four nuts from the vehicle interior. Two bolts secure the cover at the bottom.

If the vehicle is equipped with the advanced convenience key, the four RSAD boxes are also clipped into the side mountings on the vehicle body, both at the front and the rear.

The optional rear lid power opening control unit J938 may also be fitted in a retainer in the bumper cover. The two sensor wires (rear lid power opening sender G750 and rear lid power opening sender 2 G760) are then also engaged in the bumper cover.

In addition, the radar sensors (Blind Spot Monitor control unit J1086 and Blind Spot Monitor control unit 2 J1087) may be bolted to the bumper cover if corresponding equipment is fitted.

Reference
Further information on the RSAD boxes can be found in SSP 680, refer to chapter “Convenience electronics”.



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With the type 8Y, an electrically operated rear lid is available as an option in the Audi A3 for the first time. As on other Audi models, the power latching motor for rear lid V382 is also fitted in addition to the two spindle drives (rear lid drive unit VX69 and rear lid drive unit 2 VX77).

A vibration damper is fitted in the rear lid on vehicles with 2.0 ltr. TDI engine with 85 kW and manual gearbox.

Unlike on the basic version, the S line rear spoiler has a more strongly contoured edge, giving the vehicle a more sporty appearance. The high-level brake light, the FM/TV aerial and the AM aerial are integrated in the spoiler on both versions. The side spoilers (known as aerodynamic trim panels) are below the roof spoiler and are longer compared to the previous model. This not only improves the aerodynamics; it also keeps the rear window cleaner than in the past.

Reference
For more information on the vibration damper, please refer to SSP 670, "Audi A6 (type 4A)".

Rear doors

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680_106

The Audi A3 (type 8Y) is fitted with electric windows as standard, both in the front and rear doors. The door control units J386 and J387 are always fitted in the front doors. They are responsible for activating the front window regulators, front door locks, exterior mirrors and the various lighting units in the front doors. They also read in the status of the window regulator switches, door lock and interior locking button. There are two different versions in the rear doors:

1. If the vehicle is not fitted with a lighting package (PR no. QQ1 or QQ2), electronics are integrated in the window regulator motor which receive the status of the local window regulator switch via a discrete wire and from the window regulator switch in the driver's door via LIN. On this version, the rear door locks are directly connected to the onboard supply control unit J519.
2. On vehicles with lighting package (PR no. QQ1 or QQ2), the rear door control units J926 and J927 are fitted in the rear doors. They are connected to the front door control units via LIN and control the rear door locks, the rear window regulators and the white lighting in the rear doors. If the vehicle is equipped with QQ2, the onboard supply control unit directly activates the contour lighting and the background lighting of the fabric door panels in all doors with RGB LEDs.

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The Audi A3 (type 8Y) can be equipped with an optional panoramic 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 is opened on the outside of the vehicle. It can either be tilted at the rear or it can slide open over the roof towards the rear. A manually operated blind provides protection against bright sunlight. As the panoramic sunroof is bonded in the body's roof opening, it plays a major part in achieving body rigidity. No water drain hoses are required for the panoramic sunroof in the Audi A3. The geometry of the roof surfaces and roof insert was designed so that water can be drained off towards the rear via the roof or directed towards the A-pillars.

680_109

Dash panel

680_111

The cockpit of the Audi A3 (type 8Y) is very driver-oriented. This is achieved, on the one hand, by setting the MMI touch display at a significant angle towards the driver. On the other hand, the position of the dash panel vents on the driver side directly to the right and left of the dash panel insert and fitted high up provides an additional visual emphasis of the driver side. This effect is strengthened by the air outlets on the front passenger side, which are integrated deeper in the dash panel.

Even without the classic chrome insert, the interior of the vehicle gives a high-quality, progressive and tidy impression. Thanks to the black high-gloss trim, the width of the touch display is visually extended and the display appears to transition seamlessly to the air conditioner controls in the center console. The two-part application strip on the front passenger side is available in different colors and can be combined with an insert in various designs, such as wood, aluminium or carbon.

The interior of the Audi A3 has been upgraded by the use of new contrast stitching. Its use depends on the interior lines. The manufacturer's decorative stitching in a cross-stitched pattern on the front passenger side of the dash panel and on the door armrest makes for a particularly strong effect.

The Audi A3 also features a layered structure for the dash panel which must be taken into account when dismantling and assembling.

Note
Please note the correct sequence when removing and installing components in the vehicle interior. Additional information can be found in the up-to-date service literature.

Seats/massage function

Standard seat

380_235

Sports seat

680_148

There are a large number of seat options on the Audi A3 (type 8Y). The standard seat and the advanced sports seat versions are available. Pronounced side bolsters provide better lateral support in corners on the advanced sports seat. The more dynamic optics are further strengthened by the integrated head restraint.

Optional equipment for both seat versions may include:

- Seat heating
- Electrical seat adjustment
- Electromechanical 2-way lumbar support
- Pneumatic lumbar massage

The standard seat is available in various different fabrics and in fabric/leatherette and leather/leatherette combinations. The advanced sports seat is also available in a leatherette/Alcantara combination or fully in Fine Nappa leather.

A new feature of the Audi A3 is the availability of seat fabrics manufactured using recyclable materials. This plays its part in achieving more efficiency and sustainability. PET bottles are made into polyester fibres: fabrics are made from plastic bottles which can no longer be filled up. To do this, the bottles are washed, sorted, and processed into PET flakes. Having them in this form makes them easier to transport. The secondary raw material produced is ground up and heated. The melted plastic is then made into threads using injection moulding; these are subsequently woven into fibres. This process is sustainable and saves resources as the polyester does not have to be extracted from a raw material (oil).

Sports seat with massage function

680_236

On the previous version of the Audi A3 (type 8V), the seat massage was still performed via the electromechanical lumbar support. On the new Audi A3 (type 8Y), it is implemented via a pneumatically adjustable lumbar support. The technology and functions correspond to the massage function in the current Audi A4 (type 8W); three lumbar support pockets are filled and emptied alternately depending on the massage programme selected. The control unit for driver multicontour seat J873 and the control unit for front passenger multicontour seat J872 are responsible for activating the compressor and the valves. J873 and J872 are 2 LIN slaves of onboard supply control unit J519. The control units for multicontour seat contain the valves and monitor the pressure in all three pockets using one pressure sensor each. The pressure sensors are also located in the control unit. The compressor for multicontour driver seat V439 and compressor for multicontour front passenger seat V440 are engaged in a bracket in the respective seat pan. Diagnosis is performed via the LIN master. For this reason, diagnostic address 0009 (Electronic central electrics) is used. Electrically adjustable seats are required for the seat massage function in the Audi A3. Air pockets in the side bolsters are not available in the Audi A3 (type 8Y).

Power units

Petrol engines

Torque/power curve

1.0l TFSI engine EA211evo with engine code DLAA

680_075

Power in kW

Torque in Nm

1.5 ltr. TFSI engine EA211evo with engine code DPCA

680_076

Power in kW

Torque in Nm

Features	Technical data	
Engine code	DLAA	DPCA
Type	3-cylinder in-line engine	4-cylinder in-line engine
Capacity in cm³	999	1498
Stroke in mm	76.4	85.9
Bore in mm	74.5	74.5
Number of valves per cylinder	4	4
Firing order	1-2-3	1–3–4–2
Compression ratio	11.5	10.5
Power output in kW at rpm	81 at 5500	110 at 5000 - 6000
Torque in Nm at rpm	200 at 2000 - 3000	250 at 1500 - 3500
Turbocharging	Variable-geometry turbocharger with E-positioner	Variable-geometry turbocharger with E-positioner for bypass flap
Maximum injection pressure in bar	350	350
Emission control	Two-catalytic converter system with close-coupled catalytic converter including integrated PPF (4-way catalytic converter) and underbody catalytic converter, broadband Lambda probe before catalytic converter, non-linear Lambda probe after catalytic converter	Catalytic converter, Lambda probe, petrol particulate filter
Emission standard	EU6 AP	EU6 AP/DG
Concept	With DQ200-7F mild hybrid 48V With MQ200 6F recuperation & start/stop	With DQ200-7F mild hybrid 48V With MQ200 6F recuperation & start/stop

Reference
For further information, please refer to SSP 658, "Audi 1.5l TFSI engine EA211evo series".

2.0 ltr. TDI engine, EA288evo series – transverse-mounted

Torque/power curve

2.0 ltr. TDI engine EA288evo with code DSUD

680_068

Power in kW
Torque in Nm

2.0 ltr. TDI engine EA288evo with code DSRB

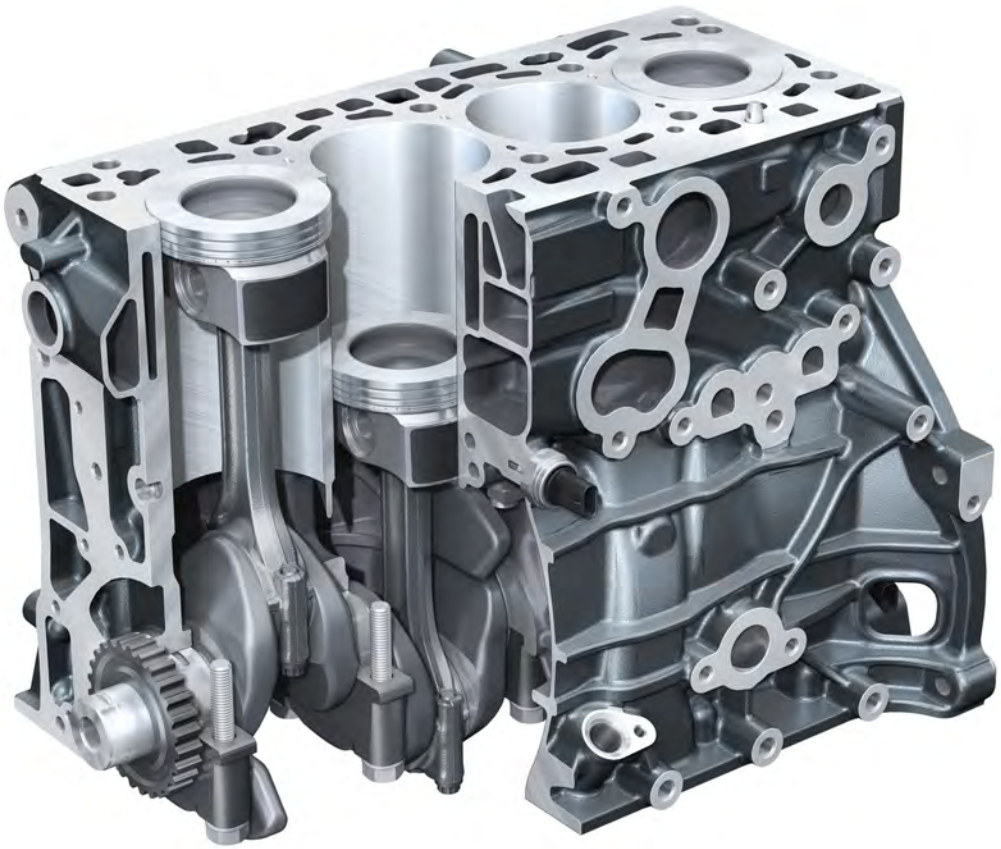
680_069

Power in kW
Torque in Nm

Features	Technical data	
Engine code	DSUD	DSRB
Type	4-cylinder in-line engine	4-cylinder in-line engine
Capacity in cm³	1968	1968
Stroke in mm	95.5	95.5
Bore in mm	81.0	81.0
Number of valves per cylinder	4	4
Balance shaft	No	Yes
Firing order	1–3–4–2	1–3–4–2
Compression ratio	16.00	16.00
Power output in kW at rpm	85 at 2750 - 4250	110 at 3000 - 4200
Torque in Nm at rpm	300 at 1600 - 2500	360 at 1600 - 2750
Turbocharging	Variable-geometry turbocharger with E-positioner	Variable-geometry turbocharger with E-positioner
Maximum injection pressure in bar	2200	2200
Emission control	Diesel oxidising catalytic converter with SCR-coated diesel particulate filter, underbody SCR catalytic converter and twin dosing	Diesel oxidising catalytic converter with SCR-coated diesel particulate filter, underbody SCR catalytic converter and twin dosing
Emission standard	EU6 DG	EU6 DG
Concept	Recuperation & start/stop	Recuperation & start/stop

Crankcase

On the 85 kW and 110 kW engines, the crankcase is manufactured from grey cast iron. The version with 147 kW, which will be introduced at a later time, will have a crankcase made of aluminium. This aluminium housing is also used with the Audi EA288evo longitudinal platforms. With the grey cast iron housing, the efficient crankshaft drive with steel pistons is used, as on other models. There is no balance shaft on the 85 kW version. The 110 kW version of the Audi A3 uses a balance shaft.



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Vacuum pump

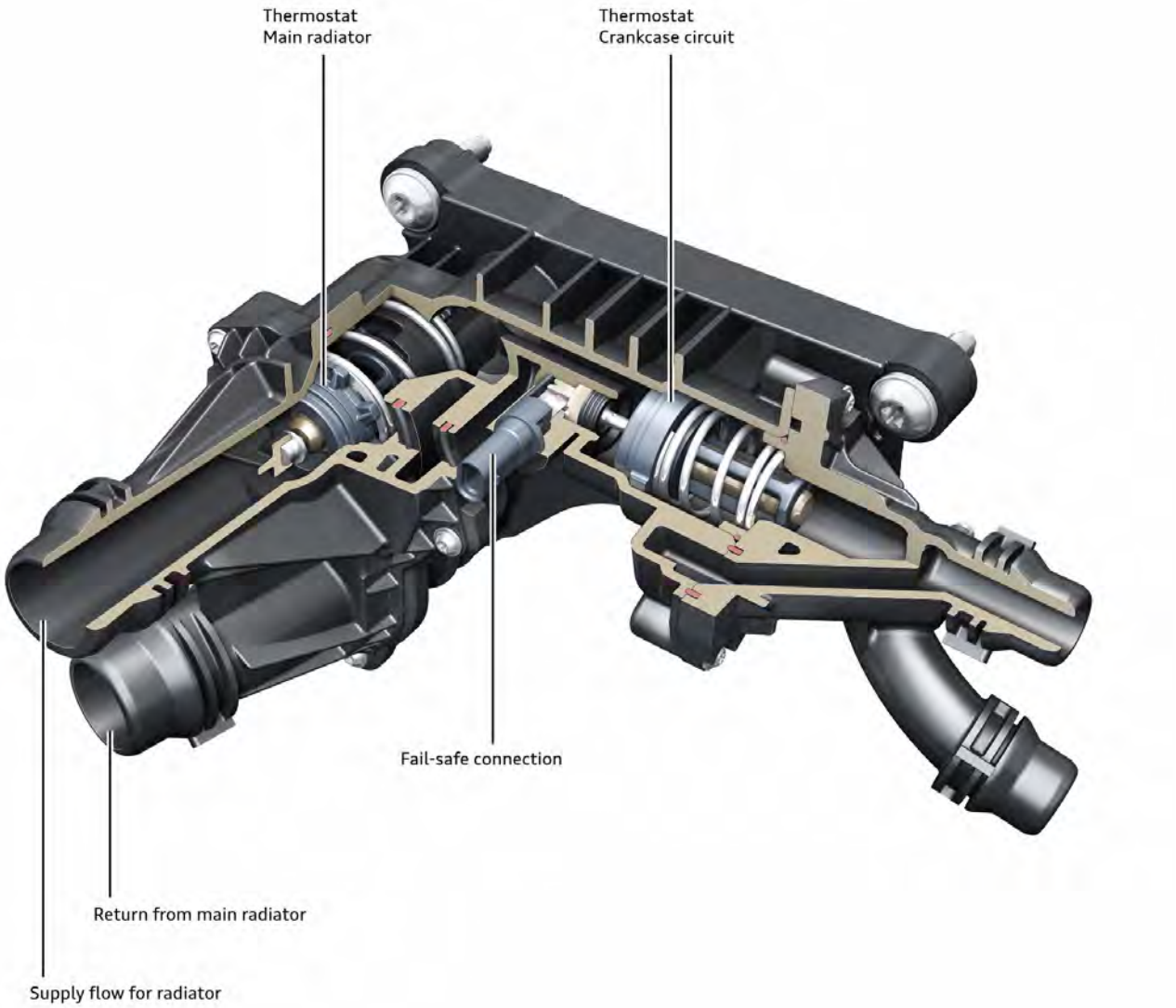
Because an electric brake servo is used, no hydraulic vacuum pump is fitted.

Reference
For further information, please refer to SSP 671, "Audi 2.0 ltr. 4-cylinder TDI engine, EA288evo series".

Cooling

As on the longitudinal engine, the transverse engine has two different cooling circuits with different temperature levels. In the low-temperature cooling circuit, which is responsible for charge air cooling, SCR metering valve 1 is also cooled.

The high-temperature cooling circuit is responsible for cooling the engine. This involves the coolant flowing through the crankcase and the cylinder head in parallel. A coolant regulator is fitted to regulate the coolant flow. It utilises two thermostats (applies to 85 kW and 110 kW version). One of the thermostats activates the circuit for the crankcase (105 °C) and the other the circuit for the cylinder head (95 °C). Friction losses are reduced because the cylinder block is heated up more quickly. The lower temperature in the cylinder head allows for better cooling of the combustion chambers.



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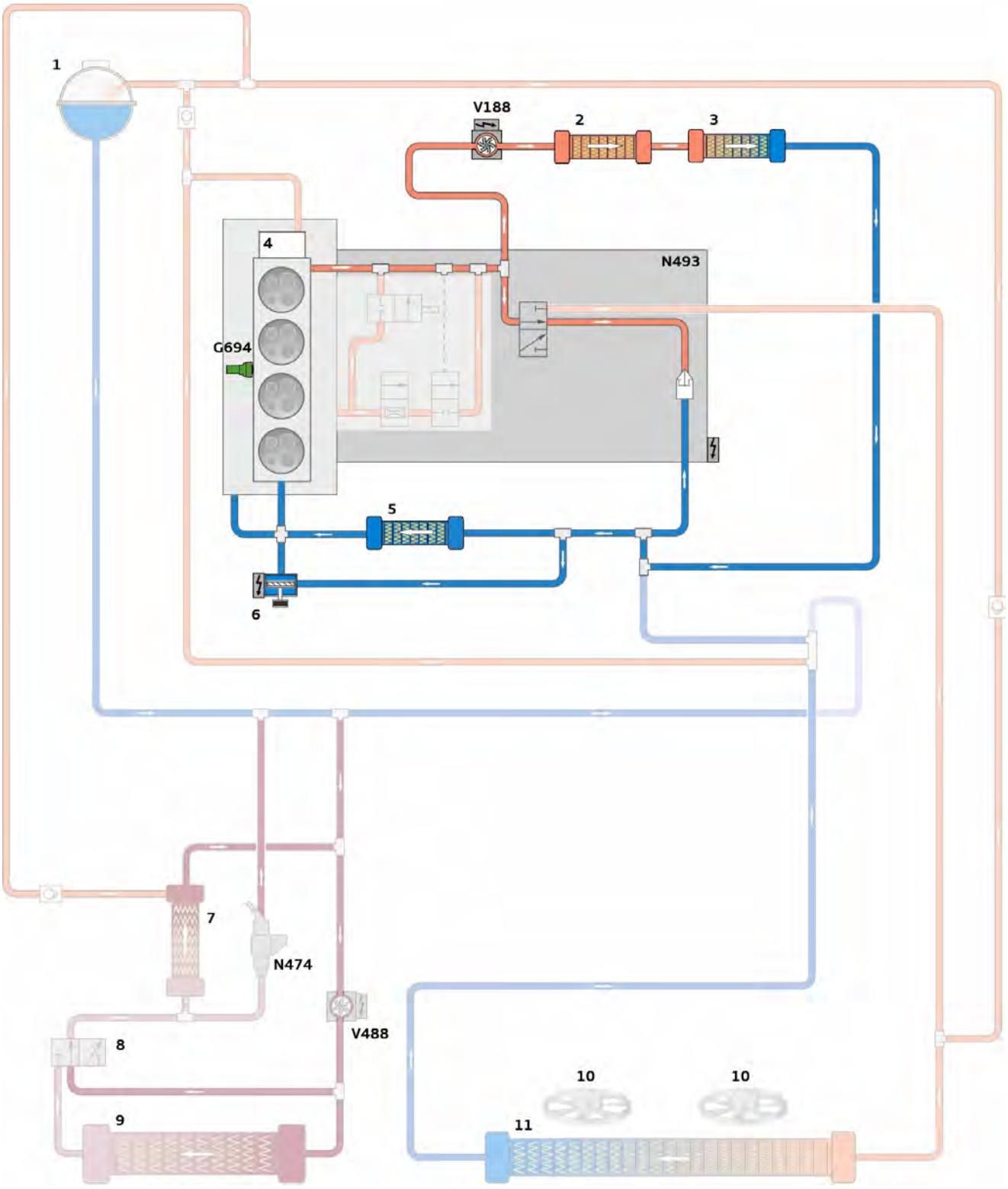
Cooling system overview



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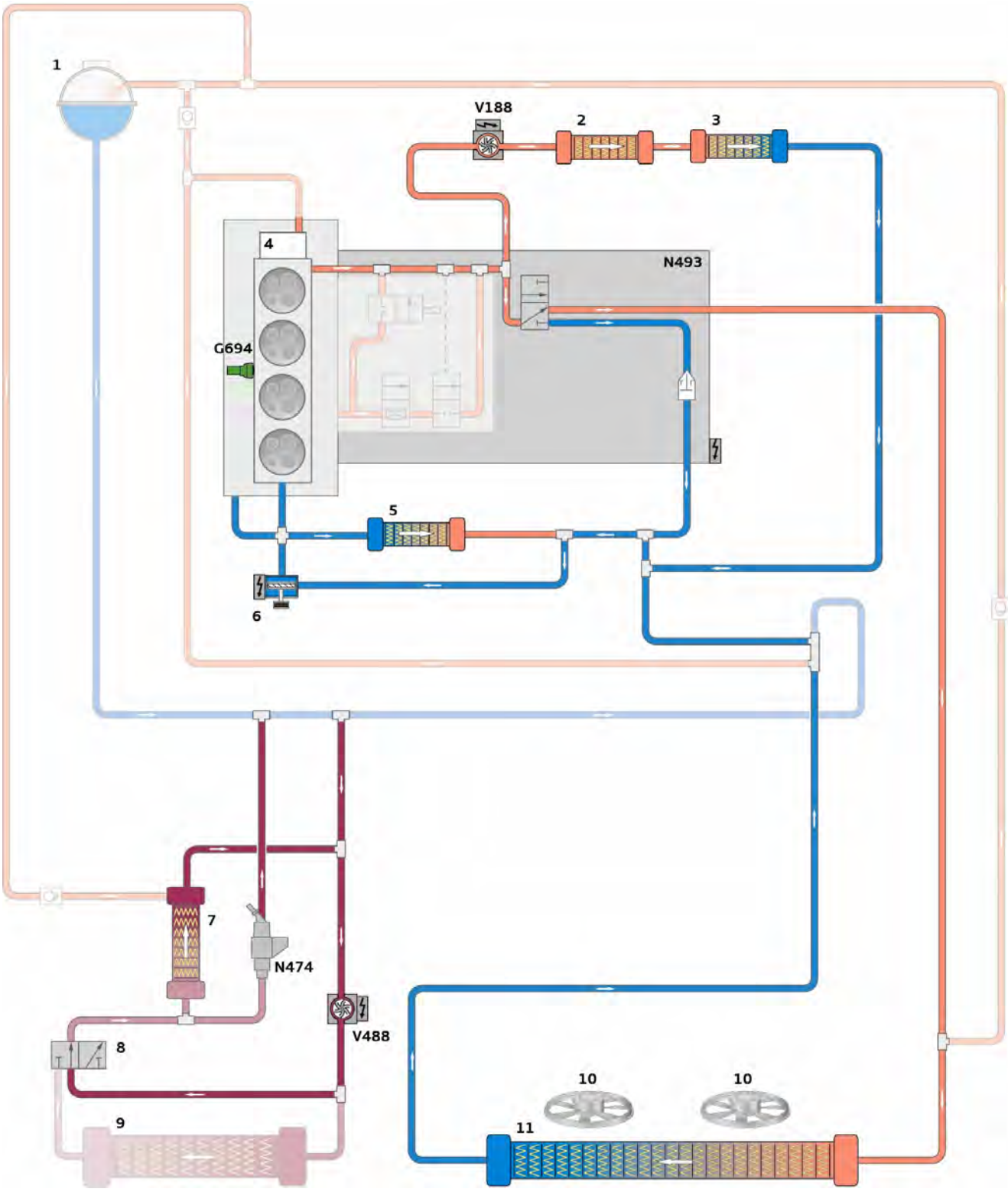
Key:

1	Coolant expansion tank
2	Low-pressure exhaust gas recirculation cooler
3	Heat exchanger
4	High-pressure exhaust gas recirculation valve
5	Engine oil cooler
6	Switchable coolant pump

7	Charge air cooler integrated in intake manifold
8	Thermostat for low-temperature coolant circuit
9	Cooler for low-temperature coolant circuit
10	Fan
11	Radiator
G694	Temperature sender for engine temperature regulation
N474	Injector for reducing agent
N493	Actuator for engine temperature regulation
V188	Charge air cooling pump
V488	Auxiliary pump for heating
	Cooled coolant
	Warm coolant
	Charge air cooling

When the engine is started cold, the main coolant pump is covered. Charge air cooling pump V188 generates circulation. This pump directs the coolant through the low-pressure exhaust gas recirculation cooler and then through the heat exchanger. It flows back via the engine oil cooler. At this operating point, the coolant flows through the cooler in the opposite direction to usual. Circulating the coolant in the cylinder head protects it if the coolant partially boils.



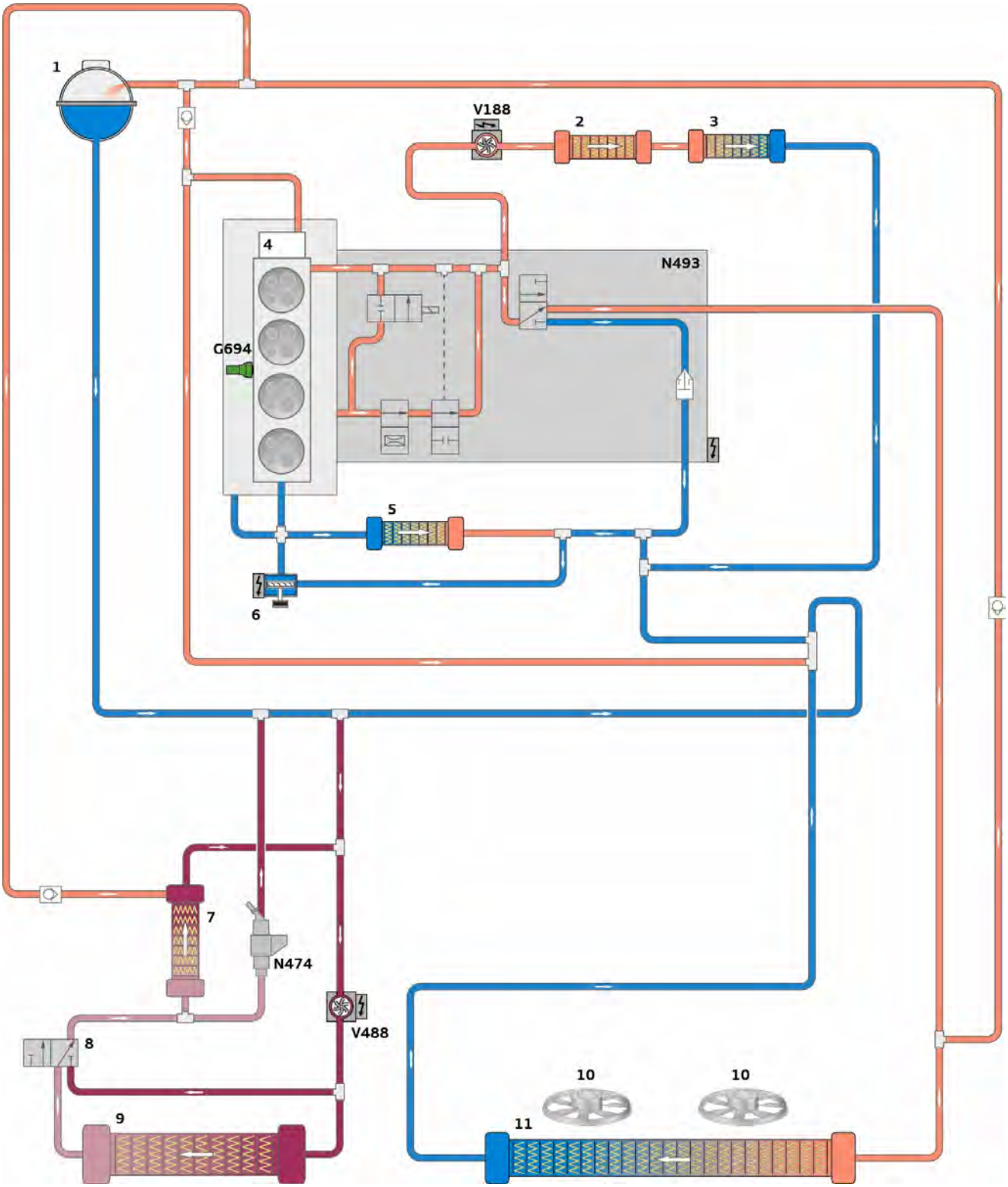
680_081

Key:

1	Coolant expansion tank
2	Low-pressure exhaust gas recirculation cooler
3	Heat exchanger
4	High-pressure exhaust gas recirculation valve
5	Engine oil cooler
6	Switchable coolant pump

7	Charge air cooler integrated in intake manifold
8	Thermostat for low-temperature coolant circuit
9	Cooler for low-temperature coolant circuit
10	Fan
11	Radiator
G694	Temperature sender for engine temperature regulation
N474	Injector for reducing agent
N493	Actuator for engine temperature regulation
V188	Charge air cooling pump
V488	Auxiliary pump for heating
	Cooled coolant
	Warm coolant
	Charge air cooling

As soon as the coolant has reached a temperature of 95 °C, the main coolant pump starts transporting coolant. This results in an increased volume flow. Because of the increased volume flow, a non-return valve is pushed open in the actuator for engine temperature regulation N493. This ensures that the large amount of coolant does not have to be pumped via the charge air cooling pump V188. The thermostat for the main radiator also opens at 95 °C, ensuring that the coolant in this area is already held at the optimum temperature.



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Key:

1	Coolant expansion tank
2	Low-pressure exhaust gas recirculation cooler
3	Heat exchanger
4	High-pressure exhaust gas recirculation valve
5	Engine oil cooler
6	Switchable coolant pump

7	Charge air cooler integrated in intake manifold
8	Thermostat for low-temperature coolant circuit
9	Cooler for low-temperature coolant circuit
10	Fan
11	Radiator
G694	Temperature sender for engine temperature regulation
N474	Injector for reducing agent
N493	Actuator for engine temperature regulation
V188	Charge air cooling pump
V488	Auxiliary pump for heating
	Cooled coolant
	Warm coolant
	Charge air cooling

When the power unit reaches its operating temperature, full system regulation becomes active. Another thermostat opens in the actuator for engine temperature regulation N493; this releases the volume flow via the crankcase. The charge air cooling also starts its work. As the charge air cooling is located in its own low-temperature cooling circuit, it can, depending on the operating point of the power unit, start charge air cooling significantly prior to the cylinder head reaching 95 °C. The cooling system is now able to keep the power unit at the optimum temperature at each operating point.

Injection system

General information

In the Audi A3 (type 8Y), injectors using the NCS system (needle closing sensor) are used in an Audi for the first time. Thanks to a Piezo sensor fitted in the injector, different injector characteristics can be measured very precisely. This allows the engine control unit J623 to implement an even more precise injection strategy.

Injection system

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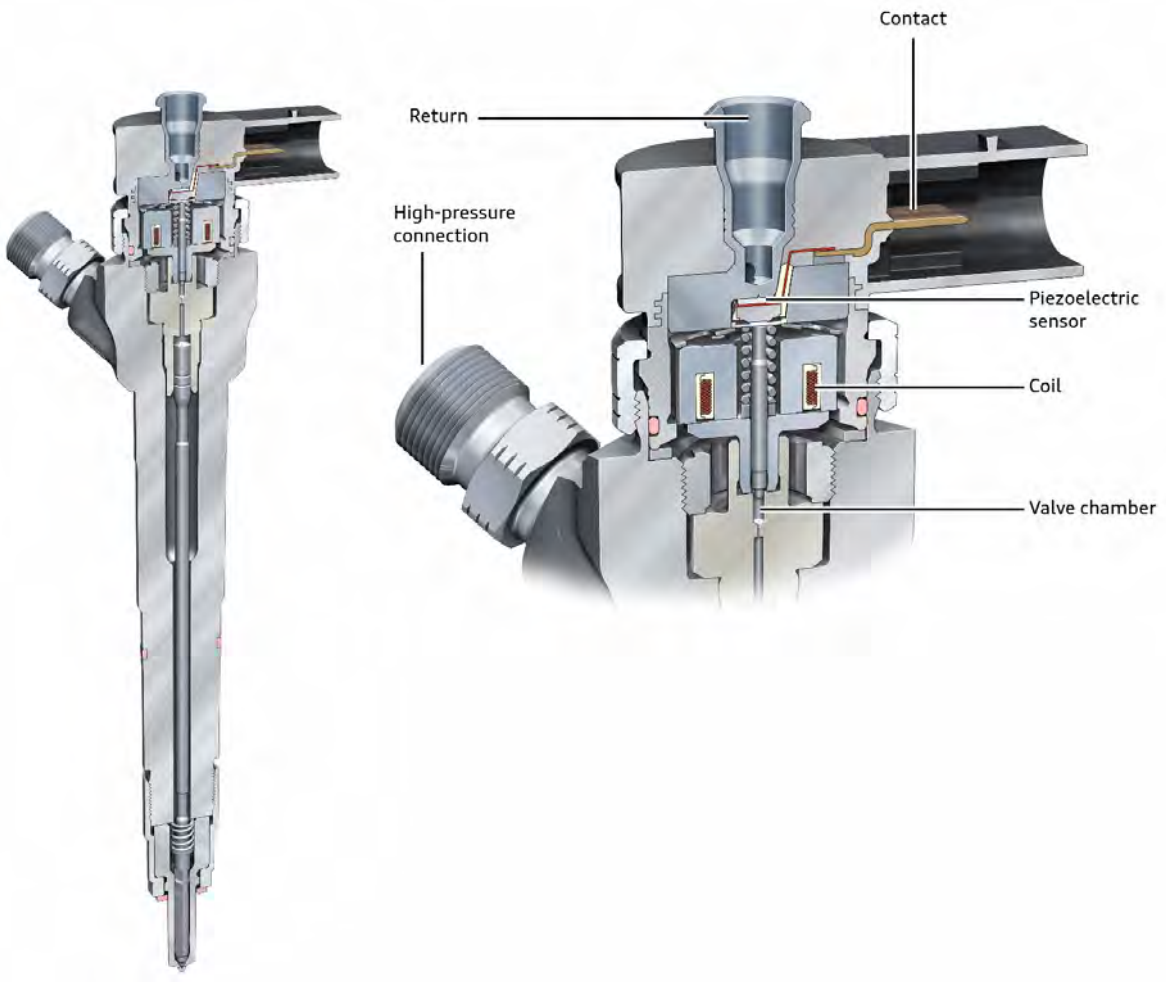

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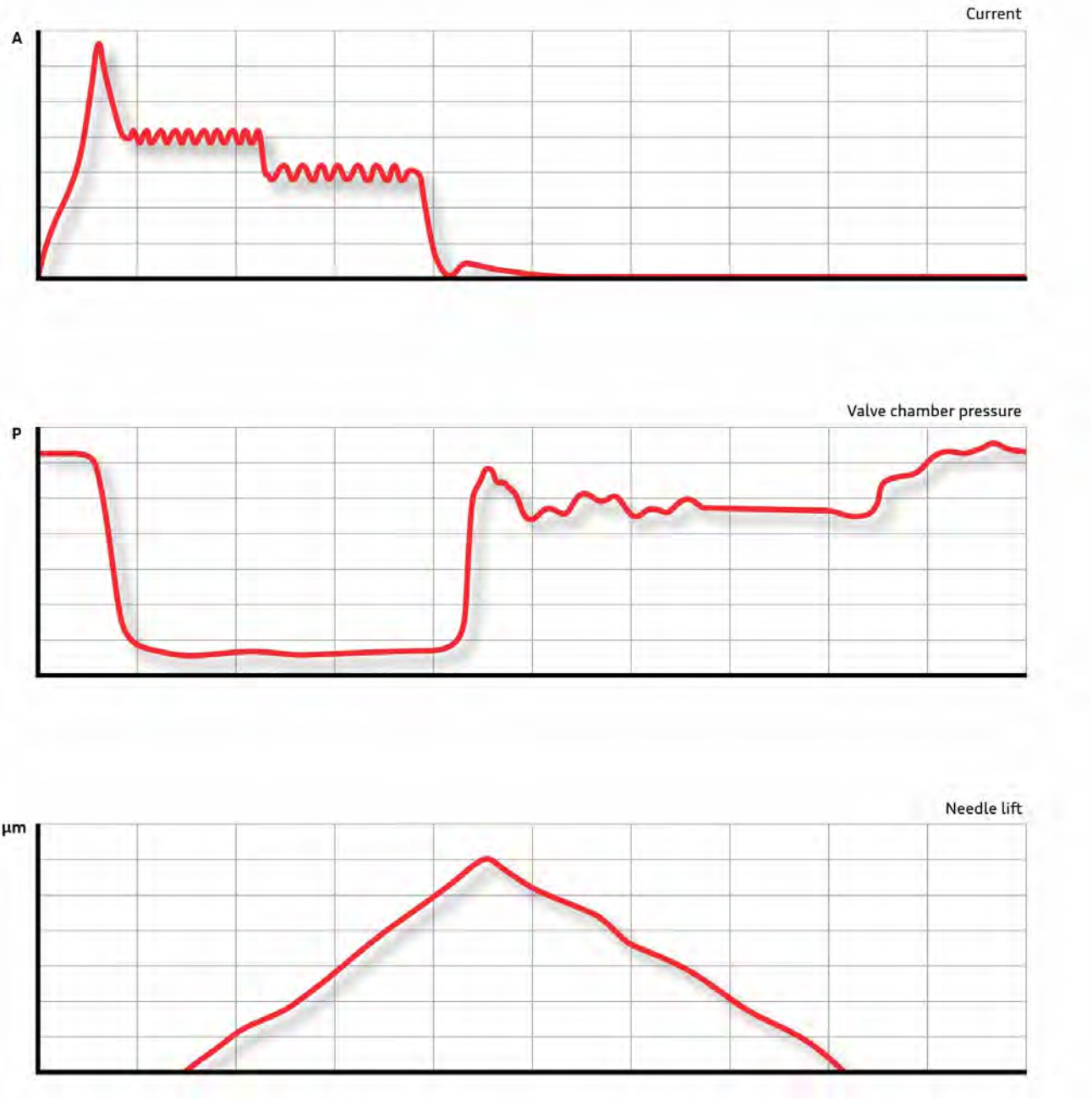
How it works

Using the valve chamber pressure, which is proportional to the signal from the piezoelectric sensor, the characteristics of the injector needles relevant to the injection strategy can be determined: needle opening, needle dead center and needle closing.

The injection process is initiated when the solenoid in the injector head is activated. The time between electrical activation and the injector needle actually opening is detected by the piezoelectric sensor based on the falling pressure in the control chamber and the resulting drop in voltage at the sensor. At the time of the drop in voltage, the injector needle begins to rise and the injection process begins. The voltage increases again if the valve chamber pressure also increases. This point in time is referred to as needle dead center. When the injector needle is closed and the injection process therefore complete, the valve chamber pressure increases again according to the sensor voltage. This is the signal to close the needle. This allows the precise period of time in which fuel is injected into the cylinder to be determined.

Manufacturing tolerances in the production of injectors lead to the speed of the switching operation being different on different injectors. These deviations, which affect the injection quantity, can be corrected with the help of the data recorded by the sensor and evaluated by the engine control unit J623. This function allows the entire injection system to be more precisely controlled/ adapted and makes an even more efficient injection strategy possible.



680_006

SCR system (selective catalytic reduction)

Design

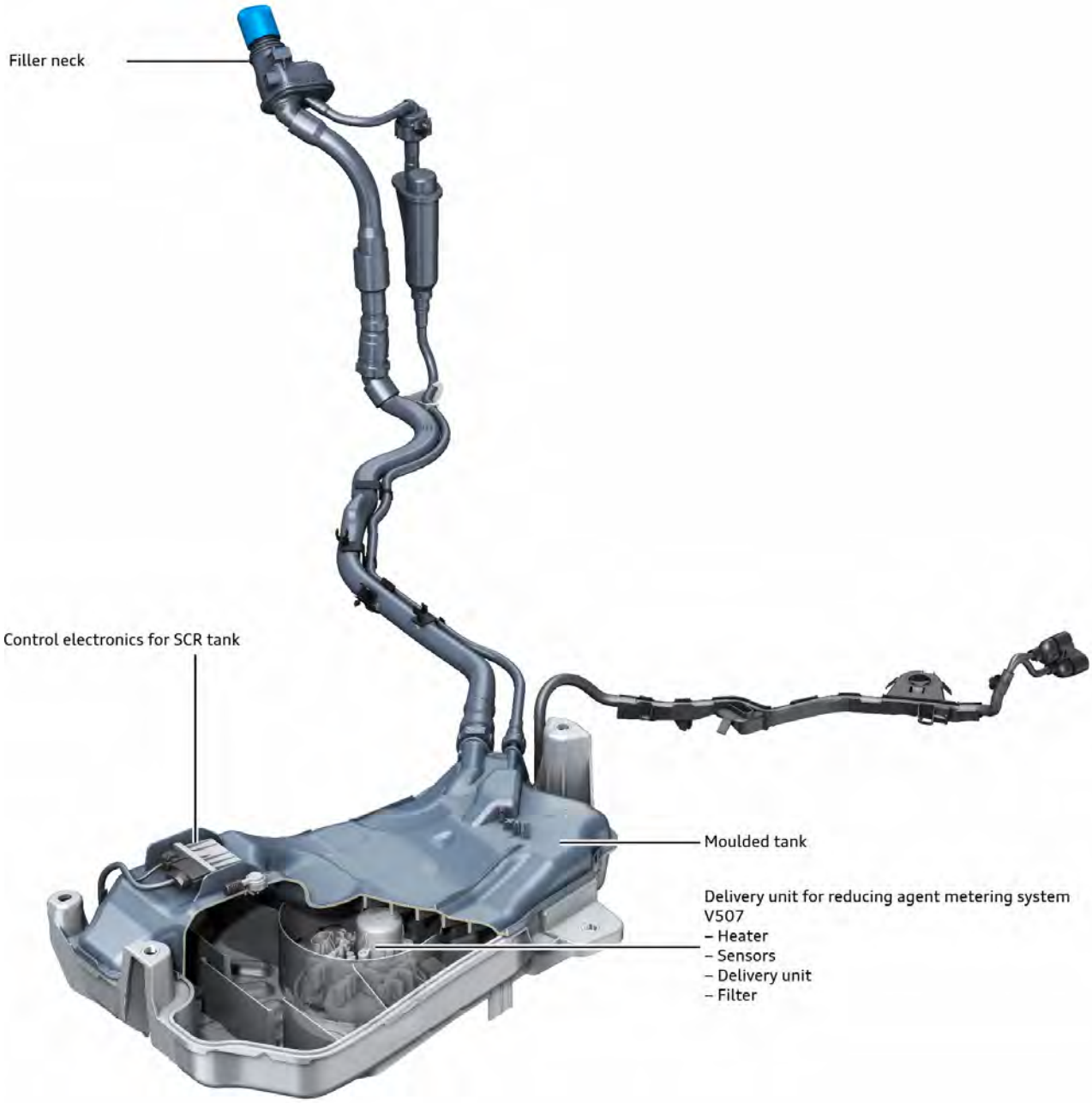
The capacity of the SCR tank is 12 litres on vehicles with multi-link rear suspension. Vehicles with torsion beam axle have a 13 litre SCR tank. The SCR tank consists of a moulded tank and a unit containing the delivery pump, quality sensor, heater, filter and temperature sensor. A service vent is fitted in the filler neck. The delivery unit can be renewed separately in service.

Remaining range display

In previous vehicle models, the first warning message in the driver information system was shown at a remaining range of 2,400 km and below. This threshold has been reduced to 2,000 km. At a remaining range of 1,000 km and below, the message also includes the information that it will no longer be possible to start the engine after 1,000 km.

Replacing SCR tank

As the quality sensor is adapted to AdBlue which conforms to certain standards (32.5 % urea solution, 67.5 % water) when the vehicle is manufactured, this must also be taken into account when the SCR tank is replaced. A Guided Function to do this is available in the vehicle diagnostic tester. This allows the sensor to work even more precisely and the use of poor quality AdBlue® to be avoided.



680_084

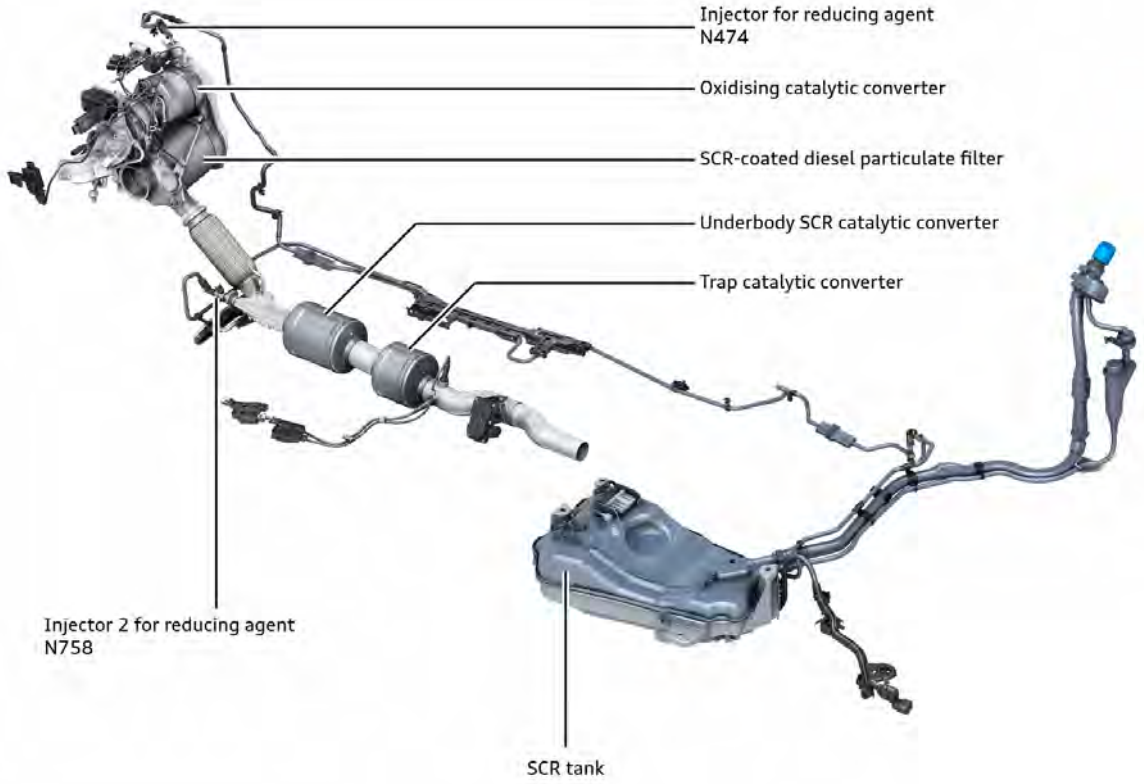
Exhaust gas after-treatment

Twin dosing

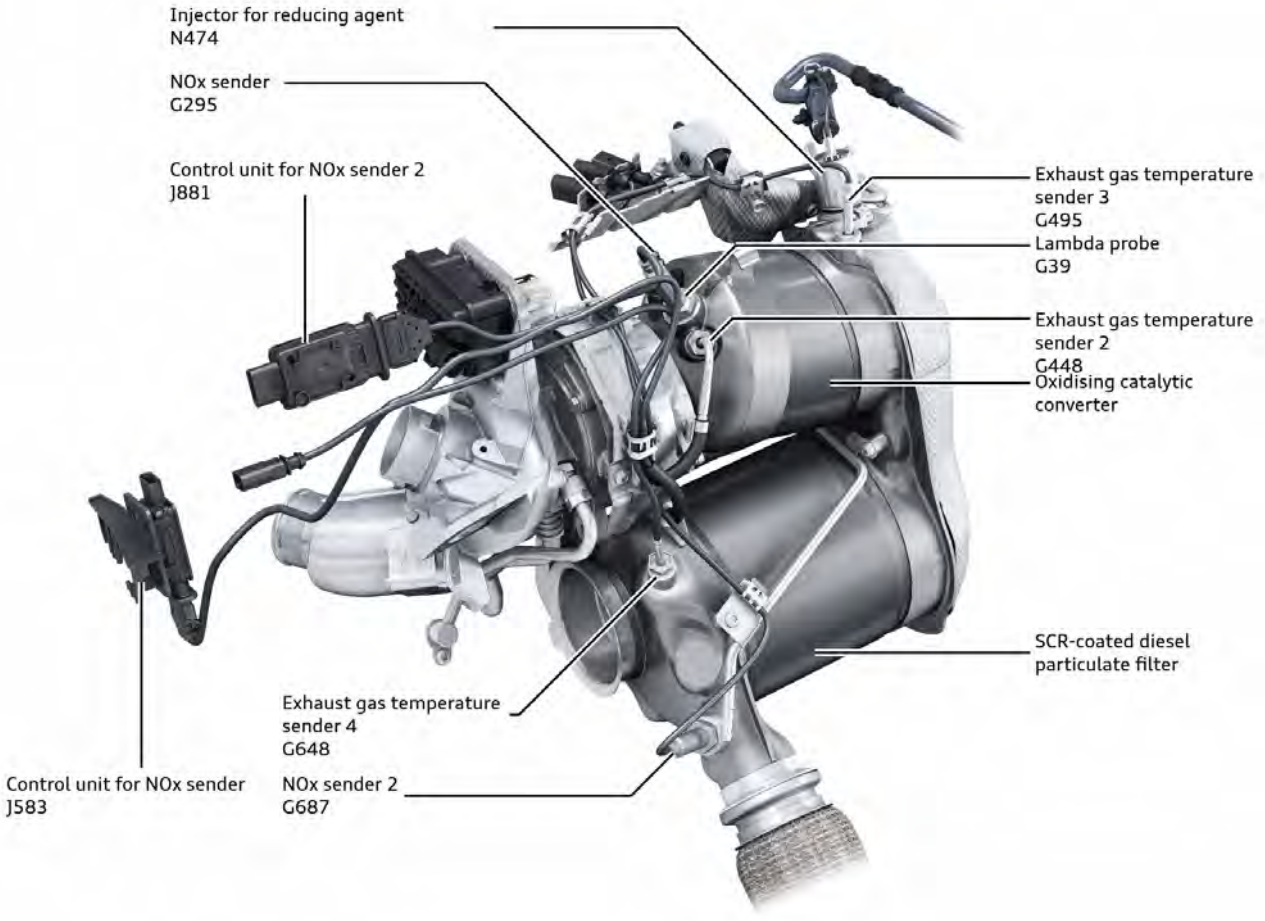
On the Audi A3 (type 8Y), the twin dosing system in the exhaust system is being used for the first time by Audi. Twin dosing refers to AdBlue being injected into the exhaust system at different locations. The first injection takes place, as usual, in the close-coupled SCR-coated diesel particulate filter. The second injection occurs in the underbody in a second SCR catalytic converter. This has a copper-zeolite coating and is designed, as with the first injection, to reduce the nitrogen oxide further with the help of AdBlue. Injecting AdBlue at two different locations allows nitrogen oxide to be reduced at significantly higher temperatures. This results in lower nitrogen oxide emissions at high loads. This technology allows the emissions figures required by the newest Euro 6d standard to be met.

How it works

The SCR system is supplied by the pump for reducing agent V437. The supply line is divided using a Y-piece so that both reducing agent valves can be supplied. Electrical actuation is achieved by connecting both reducing agent valves to the same positive wire. Earth for each of the valves is activated by the engine control unit via a separate earth wire. When which valve is actuated depends chiefly on the exhaust gas temperatures. More nitrogen oxide is released at higher exhaust gas temperatures. This means that the NOx senders measure a higher value. As a result, more reducing agent is injected. Usually the two valves are activated at different times. This allows the dose for each valve to be determined precisely.



680_083



680_085

Exhaust systems

Exhaust systems for petrol engines

This section describes the exhaust systems of the petrol engine versions described in this SSP.

Because of the emission standards which have to be met, the exhaust systems are fitted with close-coupled petrol particulate filters. These filters are known as 4-way catalytic converters. They are particulate filters with a catalytic coating.

To determine the filter load and the emission quality, a pressure sensor and two Lambda probes are fitted in the exhaust systems.

Reference
For more detailed information, refer to SSP 558, "Close-coupled Petrol Particulate Filter".

Exhaust system for 1.0 ltr. TFSI engine

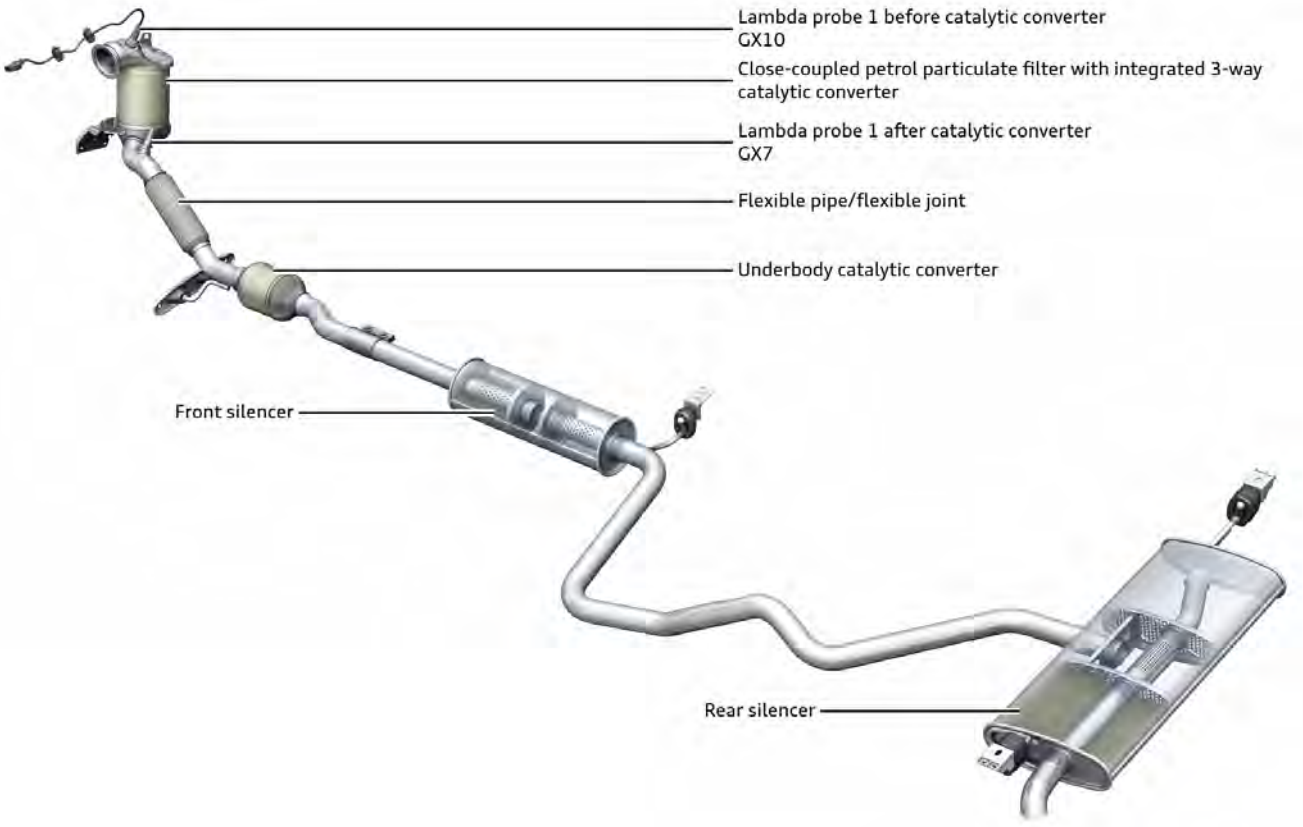
The silencers are a mixed construction regarding their functions.

Front silencer

- Absorption
- Reflection
- Expansion

Rear silencer

- Absorption
- Reflection



680_077

Exhaust system for 1.5 ltr. TFSI engine

The silencers are a mixed construction regarding their functions.

Front silencer

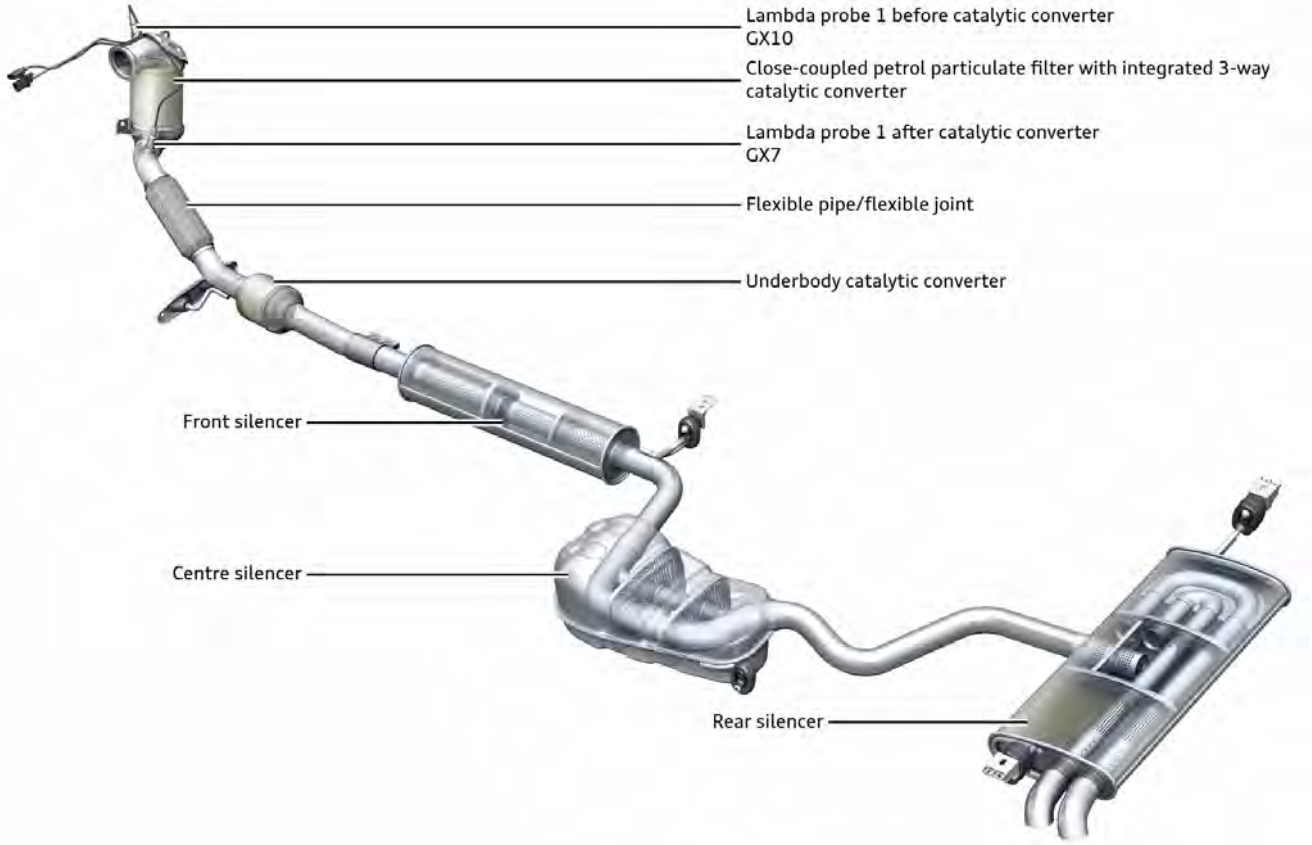
- Absorption
- Reflection
- Expansion

center silencer

- Helmholtz resonator

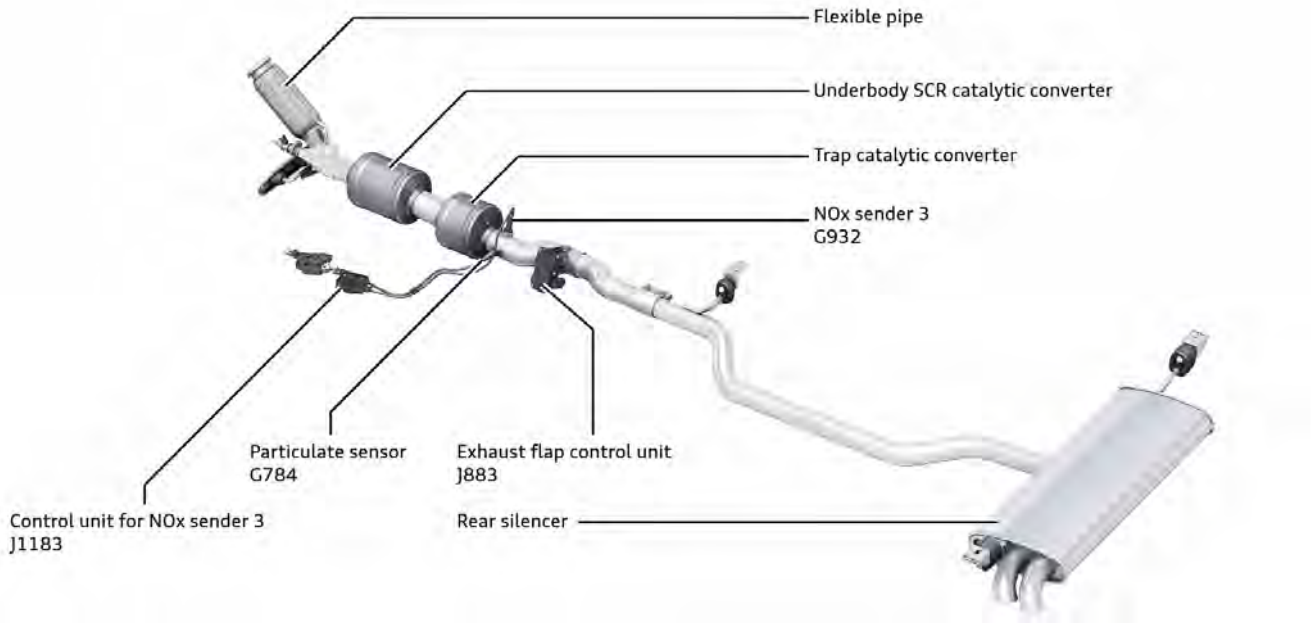
Rear silencer

- Absorption
- Reflection



680_078

Exhaust systems for diesel engines



680_004

After the emission control module, the exhaust system consists of a flexible pipe, the underbody SCR catalytic converter and a trap catalytic converter. The exhaust flap control unit J883 is located further along the route taken by the exhaust gas. A rear silencer is fitted at the end of the exhaust system to minimize the noises.

Tank systems

The capacity of the tank depends on the tank version, which in turn depends on the rear axle fitted in the vehicle. For example, the capacity of the tank on a vehicle with front-wheel drive is approximately 50 litres.

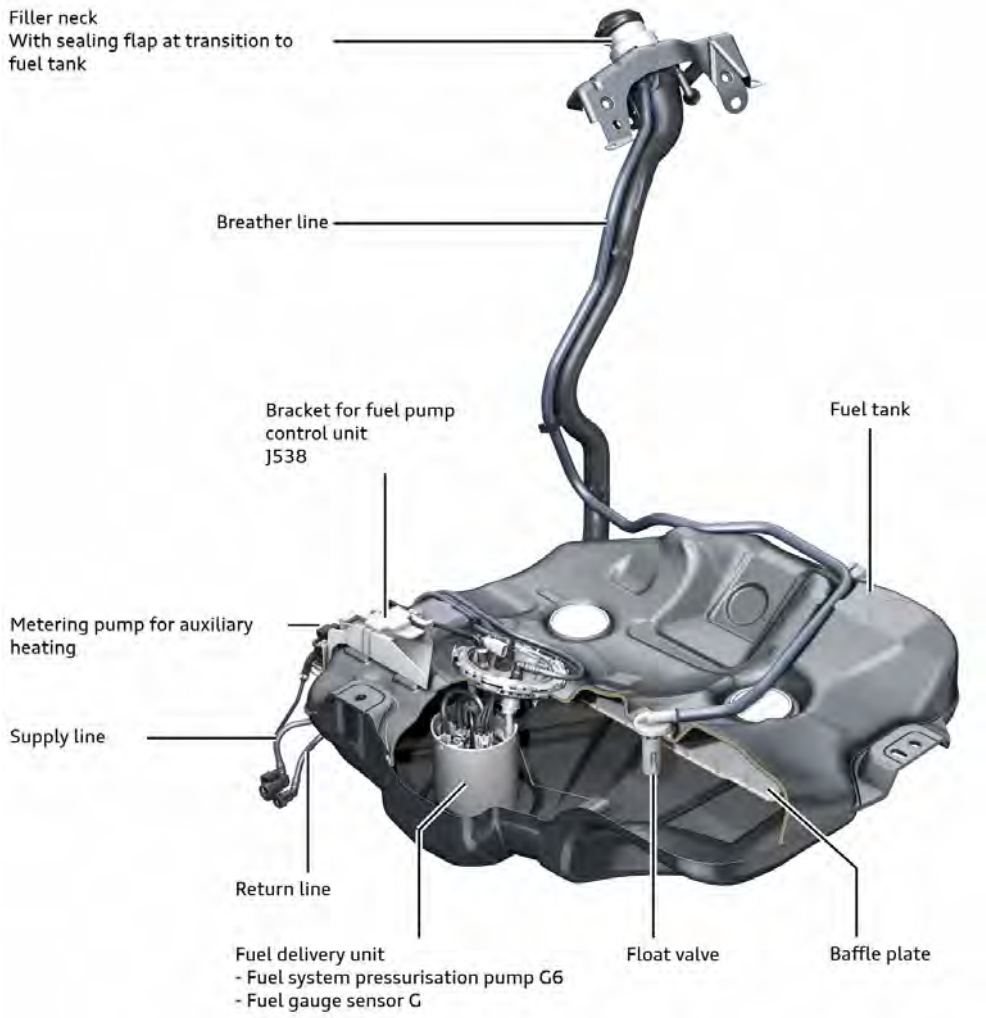
The moulded tank, which is made of plastic, contains the fuel delivery unit and the fuel tank filler and breather system.

The electric fuel pump and the fuel gauge sender are integrated in the fuel delivery unit. The delivery unit is accessible from the inside of the vehicle. The fuel pump control unit is secured in a bracket on the outside of the tank and can also be accessed from inside the vehicle via the service opening.

The moulded tanks have different shapes depending on which rear axle is fitted on the vehicle. There are also differences between petrol and diesel engines because the technology for the tank breather system is different. On the tank systems for petrol engines, the tank breather system is also different, depending on the country version or emissions standard. For example, a fuel system diagnostic pump V144 is also used in North America and China to check the leak-tightness of the fuel system. There are also differences if the vehicle is equipped with an auxiliary heater.

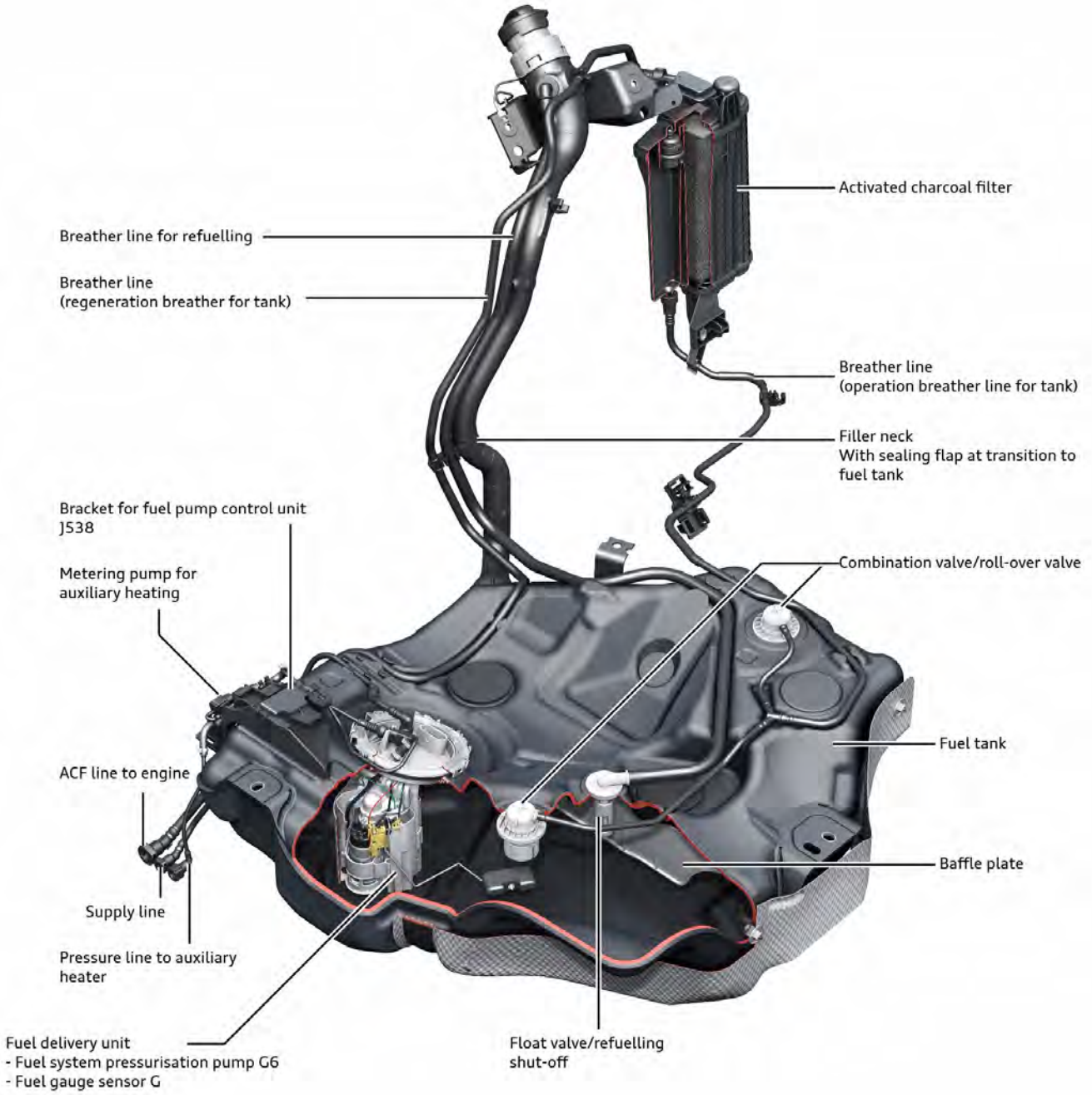
If necessary, it is possible to renew the fuel delivery unit and the fuel gauge sender.

Fuel tank for diesel engine



680_079

Fuel tank for petrol engine



680_080

Engine/gearbox combinations

Petrol engines	1.0 ltr. TFSI, EA211evo series 81 kW	1.5 ltr. TFSI, EA211evo series 110 kW
		
Engine code[1)]	DLAA	DPCA, DFYA
Gearbox		
Gearbox series/ manufacturer code[2)]	0AJ MQ200-6F	0C9 (in combination with DPCA) MQ281-6F
Gearbox		
Gearbox series/ manufacturer code[2)]		0CW DQ200-7F

Diesel engines	2.0 ltr. TDI, EA288evo series 85 kW	2.0 ltr. TDI, EA288evo series 110 kW
		
Engine code[1)]	DSUD	DSRB
Gearbox		
Gearbox series/ manufacturer code[2)]	0C9 MQ281-6F	0GC DQ381-7F

The engine/gearbox combinations shown here may not be offered in all markets. The list offers no guarantee of completeness.

[1] Some engines of the various series are offered with different power outputs and are allocated correspondingly to power output designations. This takes e.g. country-specific power variations into account. The engines are distinguished from each other by the engine code.

[2] **Key to manufacturer code designation**

e.g.: MQ281-6F

A Automatic planetary gearbox

M Manual gearbox

D Dual clutch gearbox

Q Transverse installation

281 Development number (indicates, for example, torque capacity, generation and position of front final drive)

6 Number of gears

F Front-wheel drive

Q/A quattro four-wheel drive

Power transmission

Overview

At market launch, the following gearboxes are used on the Audi A3 (type 8Y), depending on the market-specific engine/gearbox combination:

- 6-speed manual gearbox 0AJ (MQ200-6F)
- 6-speed manual gearbox 0C9 (MQ281-6F)
- 7-speed dual clutch gearbox 0CW (DQ200-7F)
- 7-speed dual clutch gearbox 0GC (DQ381-7F)

At market launch, the Audi A3 Sportback will only be available with front-wheel drive.

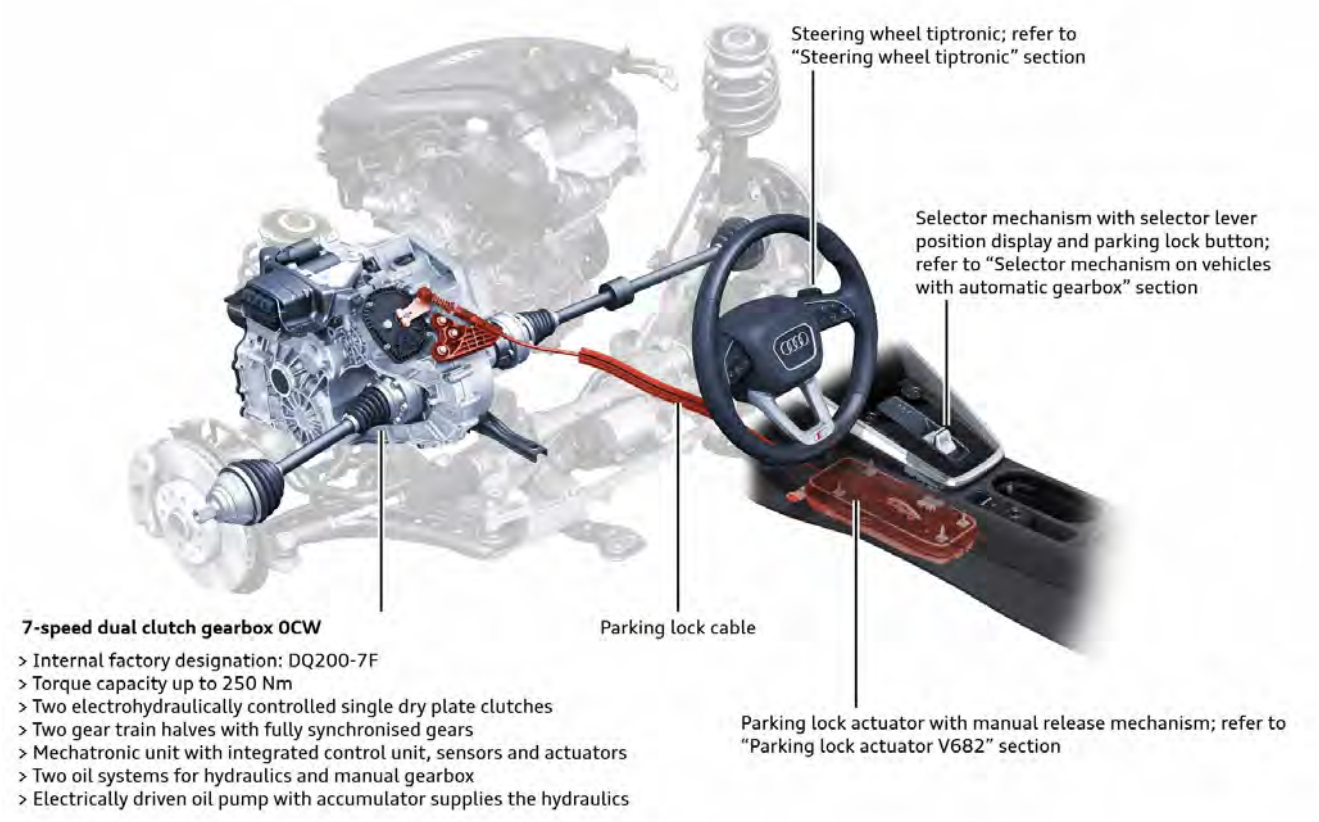
With the exception of the newly developed 6-speed manual gearbox 0C9, all gearboxes are familiar, proven units from the VW Group.

Gearshifts in the manual gearboxes are performed via cables; the clutches are actuated hydraulically.

The construction principle of the dual clutch gearbox 0CW has been used by Audi since 2008 for models with transverse-mounted engine and an engine torque of up to 250 Nm.

The dual clutch gearbox 0GC has been in use for the models Audi A3 (type 8V) and Audi Q2 (type GA) since model year 2017. In the Audi A3 (type 8Y), it is fitted in vehicles with an engine torque greater than 250 Nm.

The Audi A3 (type 8Y) features a new selector mechanism design for vehicles with automatic gearbox. In addition, the mechanism for the electromechanical parking lock has a new design for a more comfortable driving experience. To avoid altering the construction of the current gearboxes, a separate parking lock actuator is fitted in place of the previous selector mechanism. The parking lock lever on the gearbox is actuated as before via the parking lock cable.



680_157

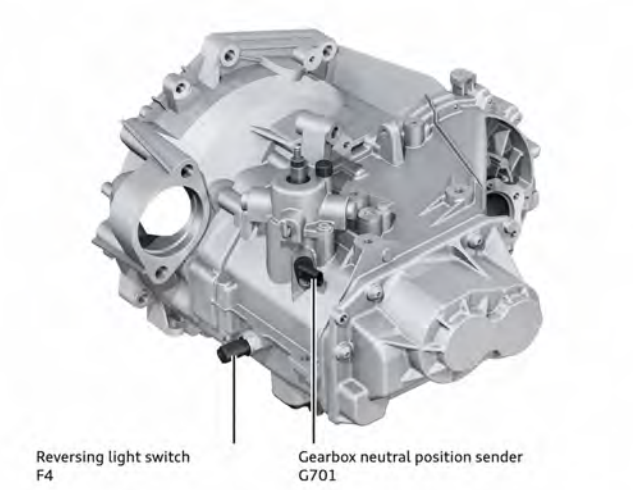
Reference
For detailed information about the technology of the 0CW gearbox, refer to SSP 390, "The 7-speed Double-clutch Gearbox 0AM".

6-speed manual gearbox 0AJ

- Factory designation: MQ200-6F
- Torque capacity up to 200 Nm
- Single dry plate clutch with hydraulic actuator
- Fully synchronised gears

› Reversing light switch F4
› Gearbox neutral position sender G701 for start-stop function

Reference
The construction concept of this gearbox corresponds to that of gearbox 02T and is explained in SSP 237, "Manual gearbox 02T".



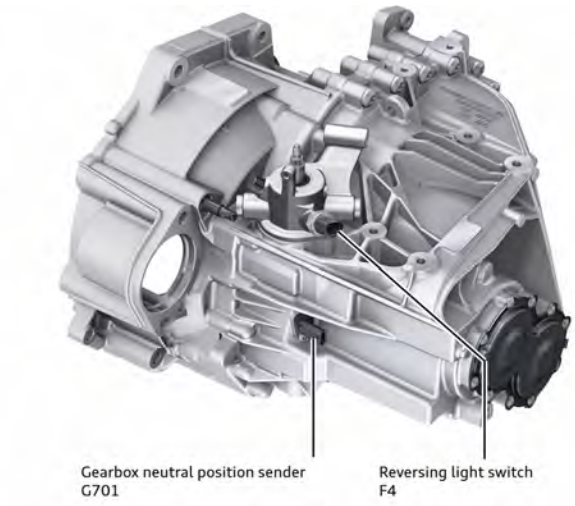
680_158

680_154

6-speed manual gearbox 0C9

The MQ281 gearbox series represents a new development and replaces the MQ250 gearbox series.

› Factory designation: MQ281-6F
› Torque capacity up to 340 Nm
› Single dry plate clutch with concentrically positioned slave cylinder with hydraulic actuation
› Low churning loss due to low oil level (1.5 litres)
› Low-friction fixed-and-floating bearing arrangement for the shafts
› Fully synchronised gears, including reverse gear
› Maximum gear spread: 7.89
› Reversing light switch F4
› Gearbox neutral position sender G701 for start-stop function



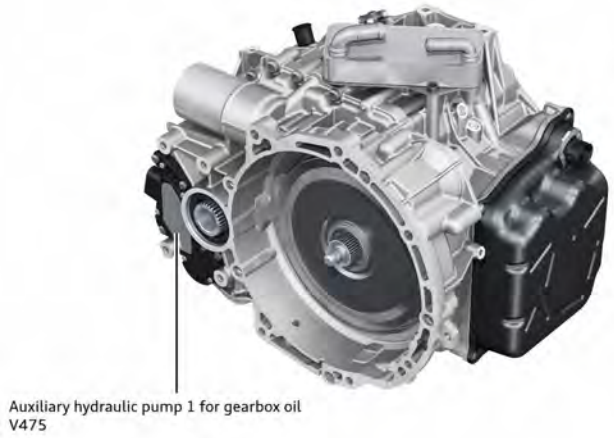
680_159

680_131

Reference
Detailed information on the 0C9 gearbox can be found in "6-speed manual gearbox 0C9 – Oil circuit" and the web-based training "The 6-speed manual gearbox 0C9".

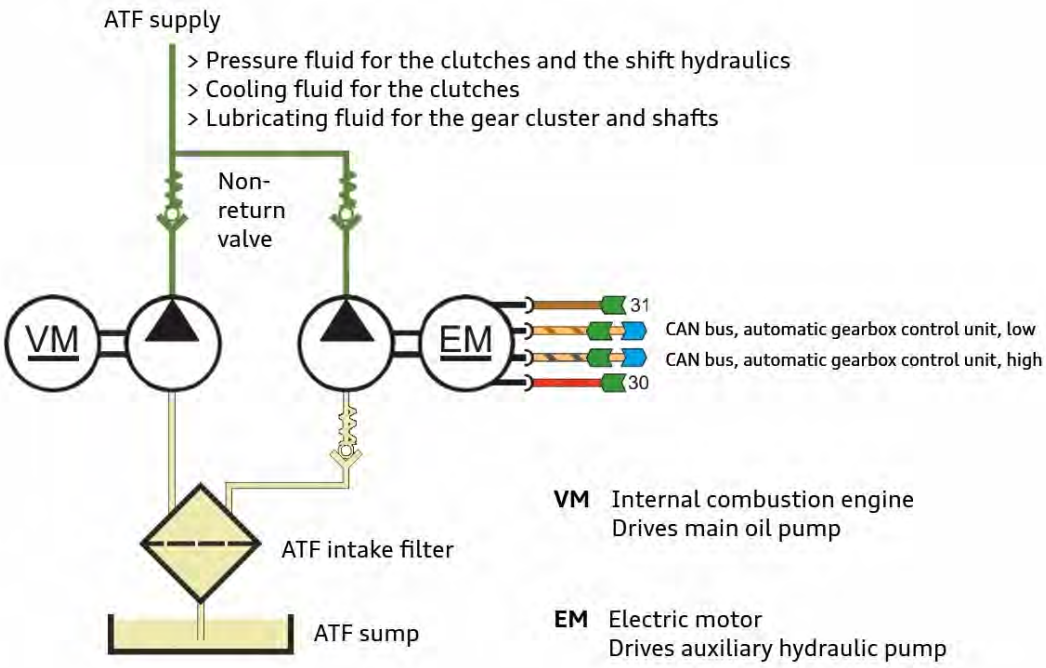
7-speed dual clutch gearbox 0GC

- Factory designation: DQ381-7F
- Torque capacity up to 420 Nm
- Two electrohydraulically controlled, oil-cooled multi-plate clutches
- Two gear train halves with fully synchronised gears
- Mechatronic unit with integrated control unit, sensors and actuators
- One joint oil system for hydraulics and gearbox
- Temperature regulation of oil system by means of thermal management
- Permanent, mechanically driven oil pump supplies the hydraulics, gearbox lubrication and cooling together with auxiliary hydraulic pump 1 for gearbox oil V475.



680_156

The electrically driven auxiliary hydraulic pump 1 for gearbox oil V475 assists the main ATF pump (which is mechanically driven by the combustion engine) as necessary in supplying the system with ATF.



680_160

Note
As of week 22/2018, the automatic gearbox pressure regulating valve 4 N218 and the changeover valve, which is actuated hydraulically by N218 to change the flow of the auxiliary hydraulic pump between pressure, cooling and lubricating fluid supply (as described in SSP 654, "Audi Q2 (Typ GA)"), is no longer used.

Reference
For further information about the technology of the 0GC gearbox, refer to self-study programmes 556 “The 7-speed dual clutch gearbox 0GC” and SSP 654, "Audi Q2 (Typ GA)".

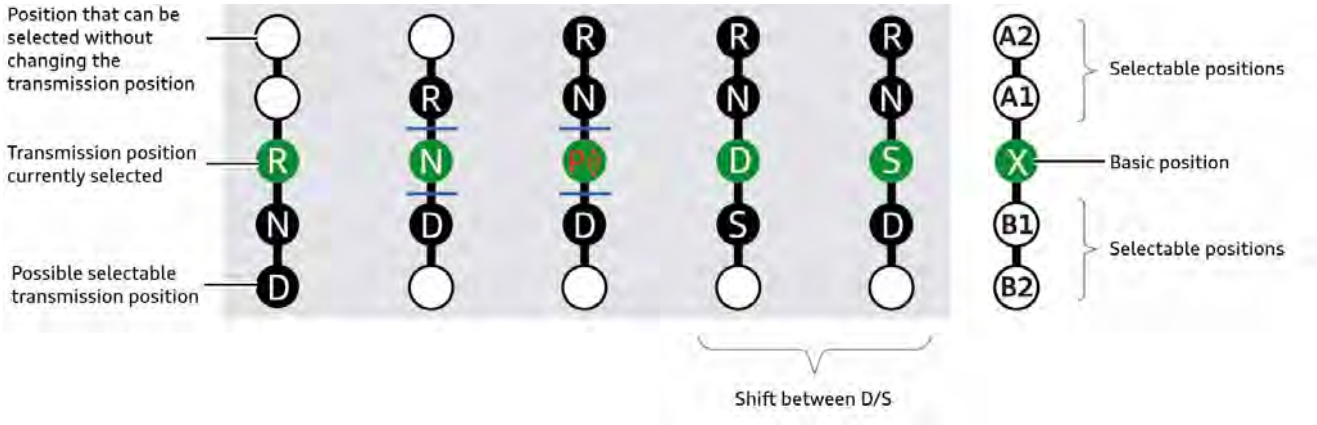
Selector mechanism on vehicles with automatic gearbox

680_171

From the basic position X, the selector lever can be moved to two positions in each direction (A1, A2 or B1, B2). The selector lever springs back into the basic position X every time after it is moved. There is no tiptronic gate. Gears are now shifted manually using the steering wheel tiptronic (standard equipment); SSP 680, "Steering wheel tiptronic".

On the selector lever position display, positions “R”, “N” and “D/S” light up in white after the ignition is switched on. The red illuminated “P” symbol in the parking lock button and the red gear change direction arrows indicate when the parking lock is engaged. When a position is selected, the symbol is displayed in red and the “P” symbol in white. The gear change direction arrows are no longer displayed.

Shift schematic



680_174

Transmission position locks

The transmission position locks are en-tirely software-based functions. To be able to select position “N”, the driver only needs to press the brake pedal with the ignition on. To be able to select positions “D” or “R”, not only must the ignition be on and the brake applied, but the engine must be running as well. This ensures that ATF is circulated and that the func-tions of the gearbox are available.

Rocking the vehicle backwards and for-wards to free it

If the selector lever lock is disengaged, it is possible to shift between “D” and “R” within a period of 5 seconds at speeds
< 10 km/h without applying the brake
(depending on market specifications). This makes maneuvering easier and makes it possible to free the vehicle by rocking it backwards and forwards. This function is not permitted in China, for ex-ample.

Lock for position “R” > 10 km/h

Locking software prevents reverse gear from being engaged at speeds
> 10 km/h. Every time position “R” is se-lected, a tone sounds from the instru-ment cluster, and a large white “R” ap-pears on the display. If the driver at-tempts to select position “R” at speeds above 10 km/h, the gearbox remains in position “N” or “S”. A corresponding mes-sage is displayed in the instrument clus-ter.

Steering wheel tiptronic

As there is no longer a tiptronic gate for the selector mechanism of the automatic gearbox, the steering wheel tiptronic is now standard equipment.

680_195

In tiptronic mode (also referred to as manual mode “M”), the paddle levers can be used to change gears manually. The D/S symbol lights up in the selector lever position display Y5, and the gear indicator M 1 – 7 appears in the instrument cluster.

Using the paddle levers in “D”/“E” - temporary tiptronic mode

With the selector lever in position “D” and Audi drive select set to “E” mode, operating the paddle levers puts the gearbox in tiptronic mode for a limited period of time, even if the vehicle is coasting. If the vehicle remains in a normal, constant driving state for a period of approx. 8 seconds[1], the gearbox reverts back to transmission position “D” or “E”.

The countdown from about 8 seconds[2] is stopped in the following cases:

- Dynamic driving style
- Cornering
- Overrun

Using the long pull + function switches temporary tiptronic mode immediately into transmission position “D” or “E”.

Using the paddle levers in “S” - sustained tiptronic mode

As there is no longer a tiptronic gate, a new method has been introduced for setting sustained tiptronic mode. Now, if the paddle levers are operated when the gearbox is in transmission position “S”, the vehicle will remain in tiptronic mode. Sustained tiptronic mode can be cancelled at any time by moving the selector lever in the direction of “D/S” or using the long pull + function.

Long pull + function

The gearbox can immediately be switched from manual mode “M” back to transmission position “D” or “S” by operating the Tip+ paddle lever for longer than 1 second[3].

Long pull - function

When the Tip- paddle lever is operated for longer than 1 second[4], the gearbox shifts into the lowest possible gear.

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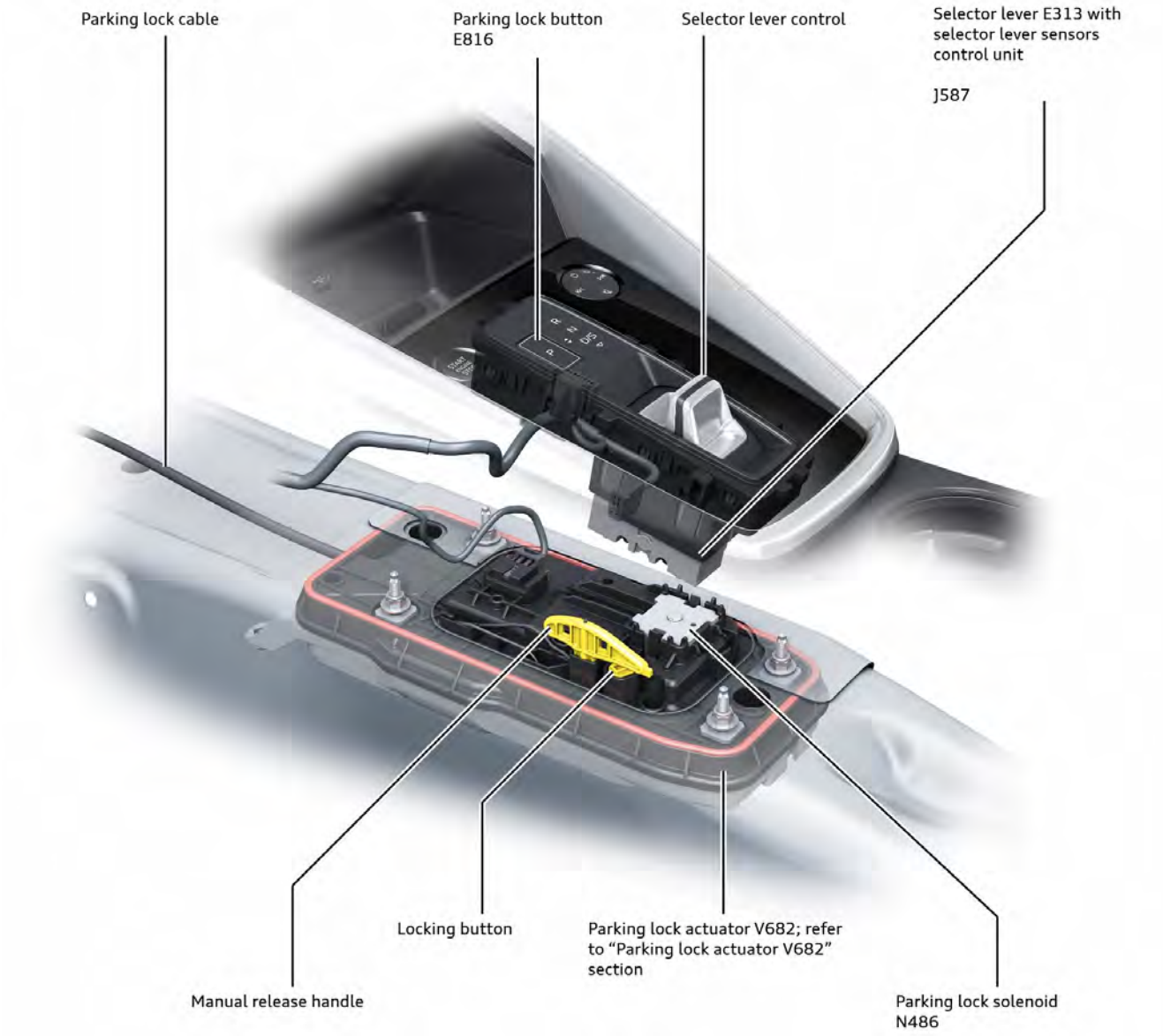
[1] The stated values are approximate and are provided without obligation. They may vary depending on the vehicle version.
[2] The stated values are approximate and are provided without obligation. They may vary depending on the vehicle version.
[3] The stated values are approximate and are provided without obligation. They may vary depending on the vehicle version.
[4] The stated values are approximate and are provided without obligation. They may vary depending on the vehicle version.

How the parking lock works

The parking lock indicator lamp K320 is integrated in the parking lock button E816. The button has three circuit elements. Plausible operation is detected if two of these circuit elements are actuated when the button is pressed. The signal is sent via the LIN bus to the selector lever sensors control unit J587, which transmits it via the CAN bus to the gearbox control unit; see SSP 680, "Function diagram".

The gearbox control unit acts as the master to send the command to the parking lock actuator V682 to engage the parking lock (P ON). If there is a fault in the parking lock button, the Auto-P function is enabled.



680_196

The following criteria affect activation of the parking lock:

- The vehicle speed[5]
  - If it is below 0.5 km/h, the parking lock can be engaged immediately.
  - At speeds from 0.5 km/h to 3 km/h, the electromechanical parking brake is activated first to protect the parking lock; the parking lock is then engaged when the vehicle has stopped moving.
  - At speeds over 3 km/h, the parking lock cannot be engaged, and a notification appears in the instrument cluster.
- The gradient of the road[6]
  - If it is less then 5 %, the brake electronics first brake the vehicle hydraulically. Then the parking lock is engaged and the brakes are released again.
  - If it is greater than 5 %, the electromechanical parking brake is applied additionally before the parking lock is engaged. The electromechanical parking brake can then be released by the driver.

[5] The stated values are approximate and are provided without obligation. They may vary depending on the vehicle version.

[6] The stated values are approximate and are provided without obligation. They may vary depending on the vehicle version.

Taking into consideration the vehicle speed and the gradient of the road, the parking lock is engaged (P ON):

- By operating the parking lock button.
- By the Auto-P function:
  - When the ignition is switched off in transmission position “D”, “S”, “R”, “E” or “M” and the vehicle is stationary.
  - When the vehicle exit concept requires the parking lock to be engaged. This happens, for example, when the vehicle is stationary, the brakes are not applied, the driver’s seatbelt is not fastened and the driver door is opened.
- By the Backup-P function:
  If the parking lock actuator V682 is unable to apply the parking lock within 1.5 seconds, the gearbox control unit directs control unit J587 to deactivate the current supply to the parking lock solenoid N486. The Backup-P function is then activated, and the parking lock is applied; see SSP 680, "Parking lock actuator V682". An entry is made in the event memory.

The parking lock remains deactivated (P OFF) – car wash function:

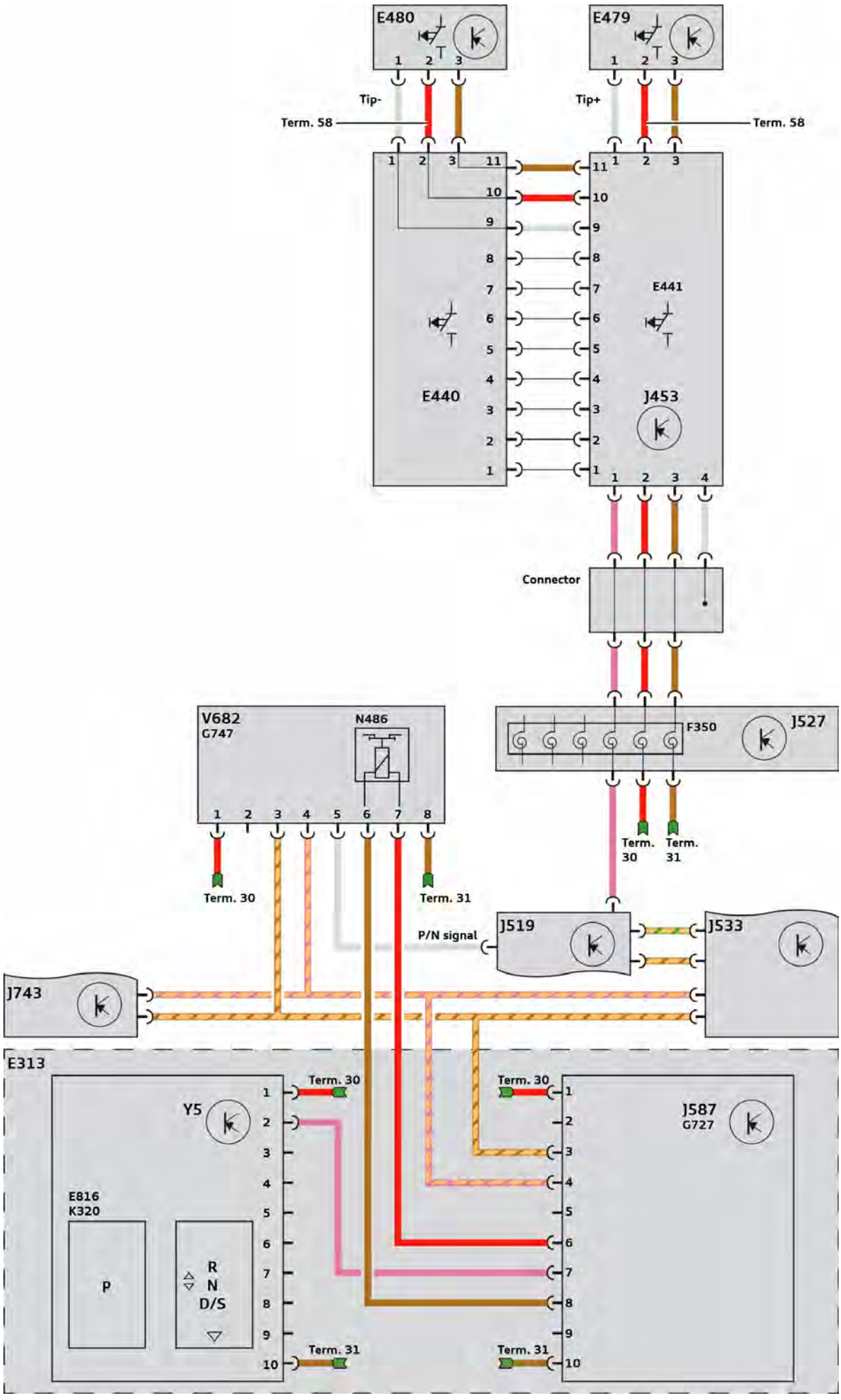
When the ignition is switched off with transmission position “N” selected, a countdown of approx. 30 minutes starts, during which time the parking lock remains deactivated. After approx. 30 minutes[7], the parking lock is engaged automatically.

The countdown is interrupted if the ignition is switched on or the vehicle begins to move.

Function diagram

The function diagram shows the circuits between the selector mechanism, the parking lock actuator and steering wheel tiptronic.

[7] The stated values are approximate and are provided without obligation. They may vary depending on the vehicle version.


E480
E479
Tip-
Tip+
Term. 58
Term. 58
E441
E440
J453
Connector
V682
G747
N486
F350
J527
Term. 30
Term. 31
Term. 30
Term. 31
P/N signal
J519
J533
J743
E313
Y5
Term. 30
Term. 30
J587
G727
E816
K320
P
R
N
D/S
Term. 31
Term. 31

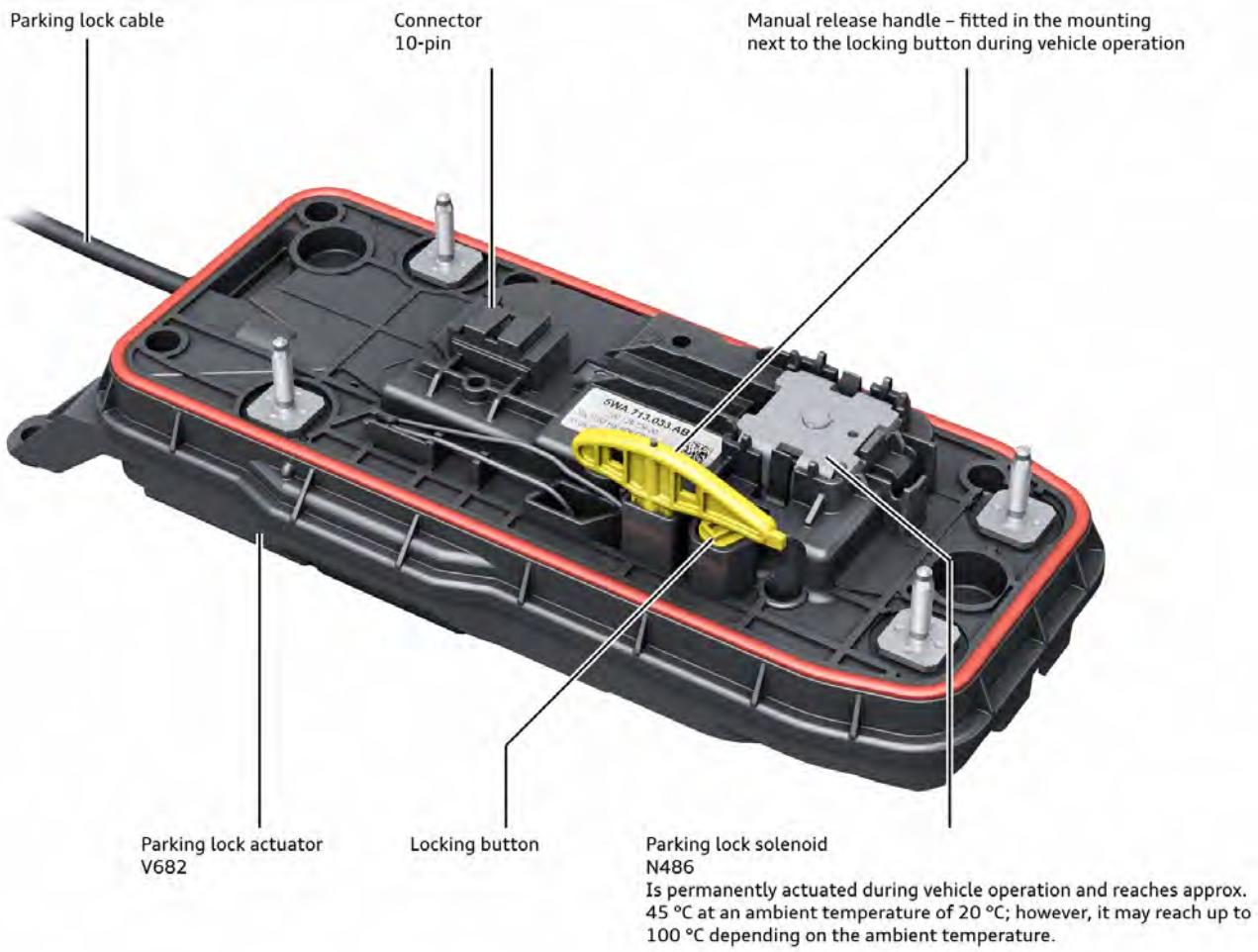
680_132

Key:

E313	Selector lever
E440	Multifunction buttons on left in steering wheel
E441	Multifunction buttons on right in steering wheel
E479	Tiptronic switch (shift up)
E480	Tiptronic switch (shift down)
E816	Parking lock button
F350	Coil connector
G727	Selector lever position sender
G747	Parking lock sender
J453	Multifunction steering wheel control unit
J519	Onboard supply control unit
J527	Steering column electronics control unit
J533	Data bus diagnostic interface
J587	Selector lever sensors control unit
J743	Mechatronic unit for dual clutch gearbox
K320	Parking lock indicator lamp
N486	Parking lock solenoid
V682	Parking lock actuator
Y5	Selected range display
	Earth wire
	Positive wire
	Discrete wire
	LIN bus
	CAN bus, automatic gearbox control unit, high
	CAN bus, automatic gearbox control unit, low
	Convenience CAN, high
	Convenience CAN, low

Parking lock actuator V682

For a more comfortable driving experience in this class, the Audi A3 (type 8Y) is fitted with a fully automatic parking lock. To avoid altering the construction of the parking lock on current automatic gearboxes, a separate parking lock actuator was developed. The parking lock lever on the gearbox is actuated as before via the parking lock cable.



680_175

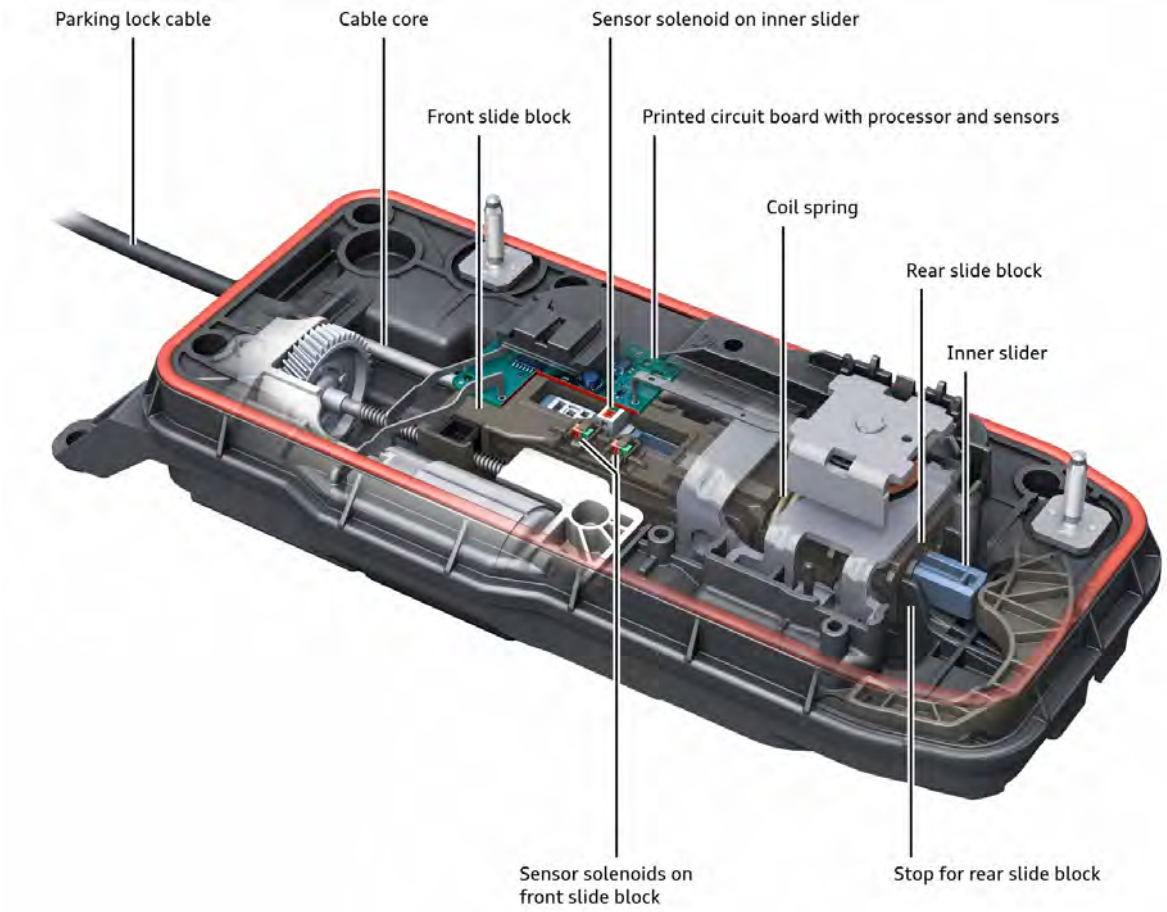
Construction and function – parking lock engaged (P ON)

In position “P ON”, the rear slide block is positioned at the stop. It interlocks with the inner slider. The cable core is engaged in the inner slider; it is therefore also in position “P ON”. The inner slider is moved by the front and rear slide blocks.

A coil spring is fitted between the front and rear slide blocks. During regular vehicle operation, it is compressed between the two slide blocks; it relaxes immediately after the ignition is switched off when the parking lock is engaged (refer to image "680_064”).

The Hall senders on the circuit board register the positions of the front slide block and the inner slider using the solenoids. Parking

lock actuator with the vehicle stationary, ignition off, coil spring not compressed and parking lock engaged (P ON).



680_064

Construction and function – disengaging and engaging the parking lock

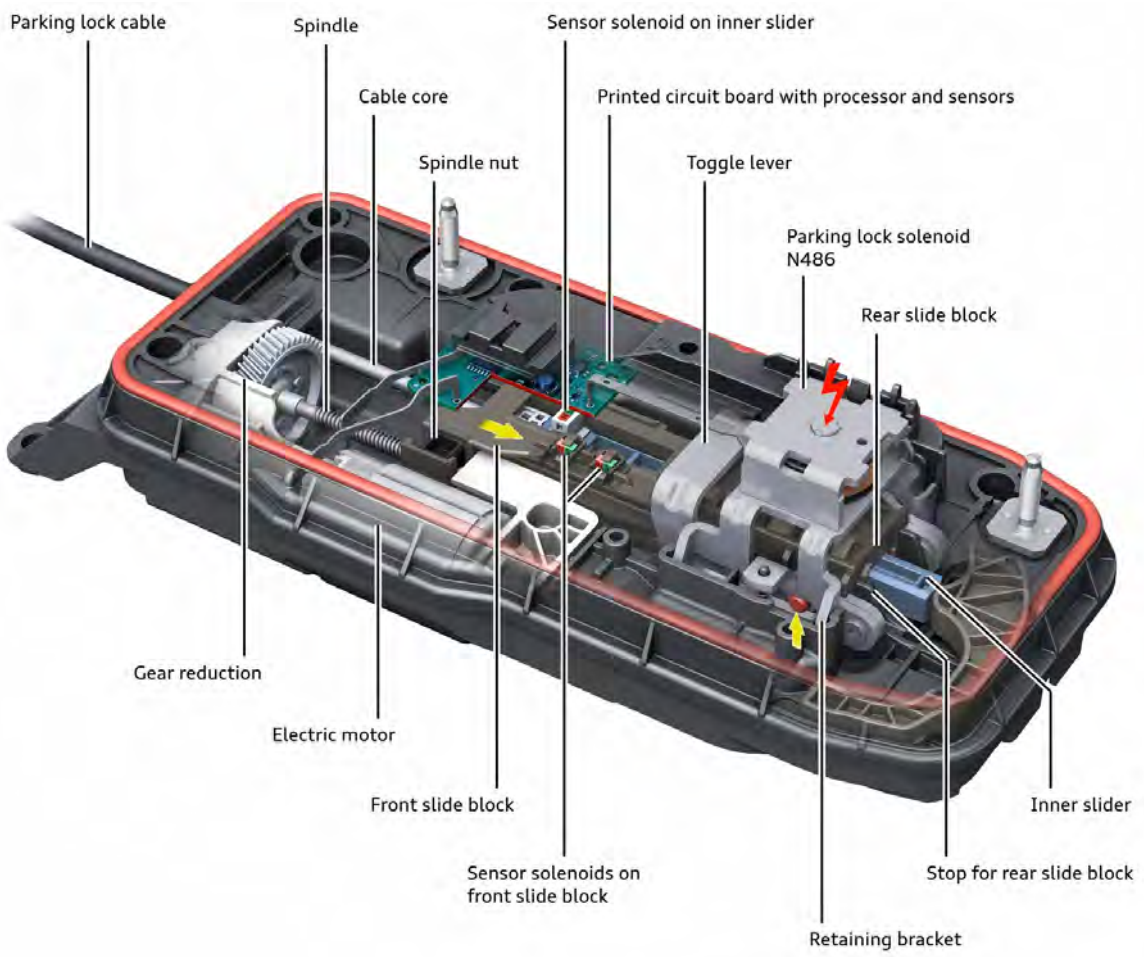
Step 1 - Compressing the coil spring

When the ignition is switched on, the electric motor powers the spindle drive so that it moves the front slide block towards the rear. This causes the coil spring to be compressed against the rear slide block which is positioned at the stop. When the coil spring is fully compressed, the kinematics of the toggle mechanism (refer to image "680_177") cause the retaining bracket to be pressed against the parking lock solenoid N486. The electric motor detects that the coil spring is fully compressed due to the steep increase in the current draw (block commutation detected).

In this position, the selector lever sensors control unit J587 sends current through solenoid N486, thereby allowing it to hold the retaining bracket in position. The electric motor is now switched off.

As long as there is a current supply to N486, the retaining bracket keeps the toggle lever in place using the locking pins, and the two slide blocks are held together. The coil spring remains compressed as a result. This constellation remains in place for the entire time that the vehicle is driven; it provides the basis for the Backup-P function with which the parking lock can be applied mechanically in the event of a system fault, (refer to image "680_110").

The parking lock remains engaged (in position P ON) while the coil spring is being compressed.

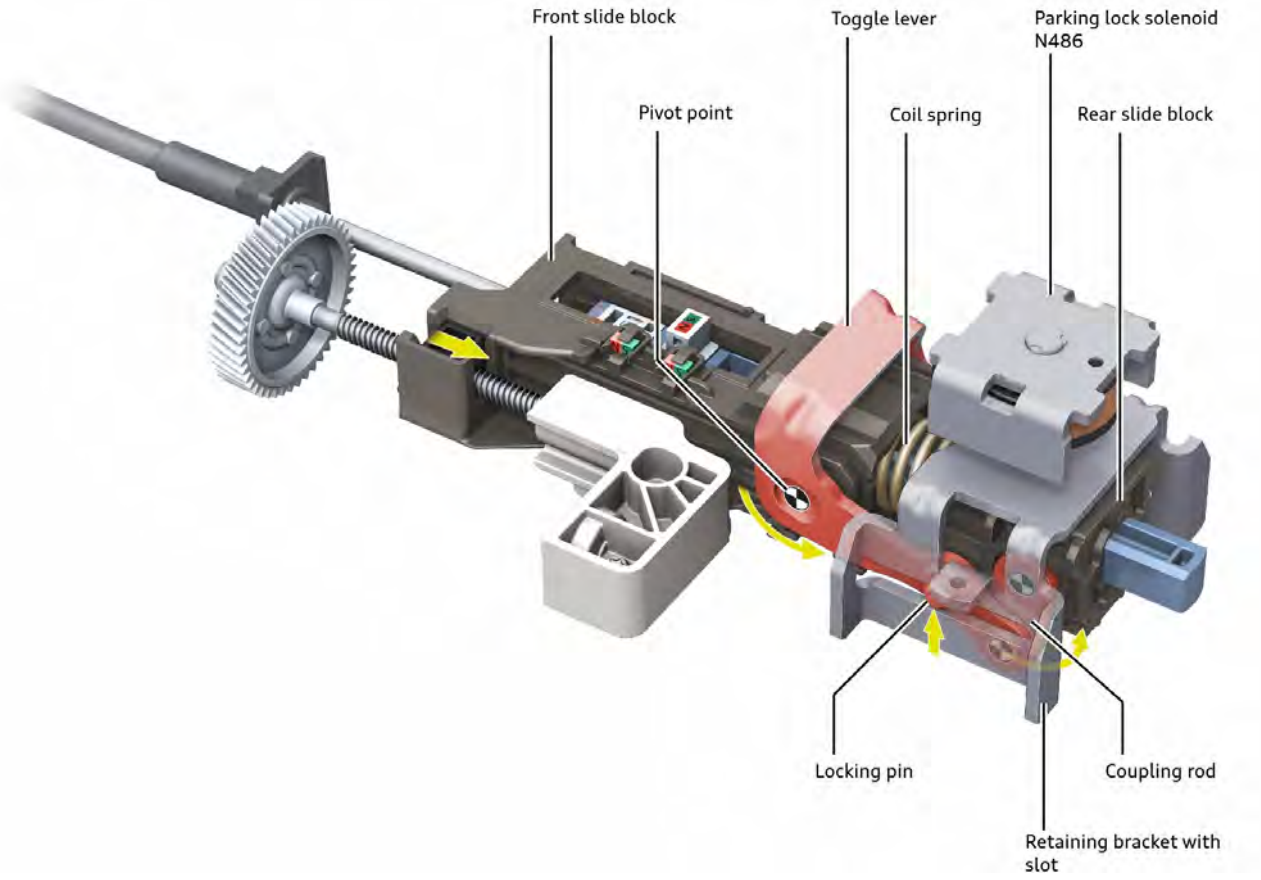


680_176

Kinematics - toggle lever

The toggle lever is mounted on a pivot joint to the front slide block which is connected to the rear slide block via a coupling rod on each side.

There are locking pins on both sides of the toggle lever. As soon as the front slide block moves towards the rear, the locking pins push the retaining bracket upwards towards the parking lock solenoid.



680_177

Step 2 - Disengaging the parking lock (P OFF)

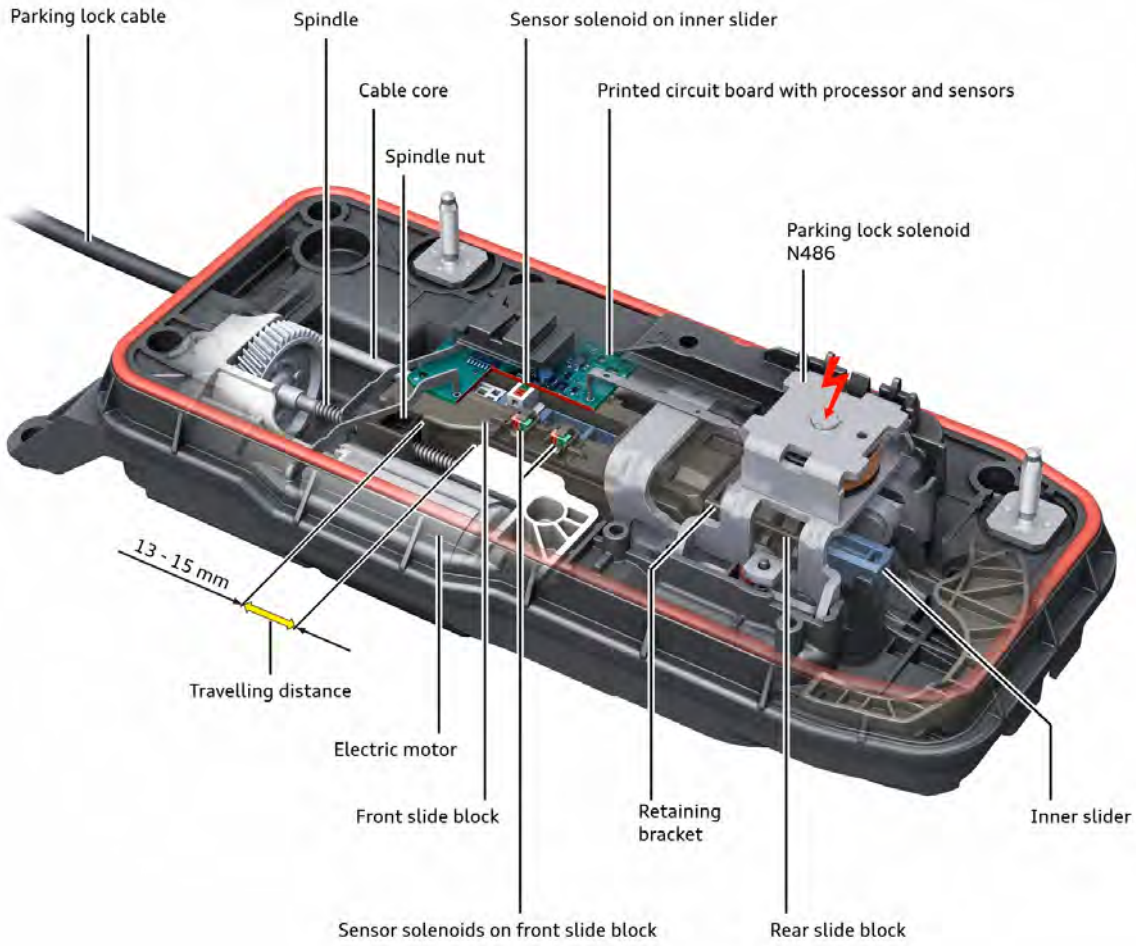
When the selector lever is moved to position “D”, “R” or “N”, the parking lock is disengaged. To do this, the electric motor moves the slide blocks (currently held together) forwards with the inner slider by approx. 13-15 mm. When this happens, the parking lock cable core presses the parking lock lever on the gearbox from “P ON” to “P OFF”. The parking lock solenoid N486 remains energised during this process.

Step 3 - Engaging the parking lock (P ON)

To re-engage the parking lock, the electric motor moves the slide blocks (connected to one another) backwards with the inner slider by approx. 13-15 mm. Refer to initial position – parking lock engaged (P ON) (refer to image "680_176”).

After the ignition is switched off, the parking lock solenoid N486 is switched off and the front slide block relieves the tension on the coil spring. To reduce noise, it is slowed by the electric motor, (refer to image "680_064”). The Hall senders on the circuit board register the positions of the front slide block and the inner slider using the solenoids.

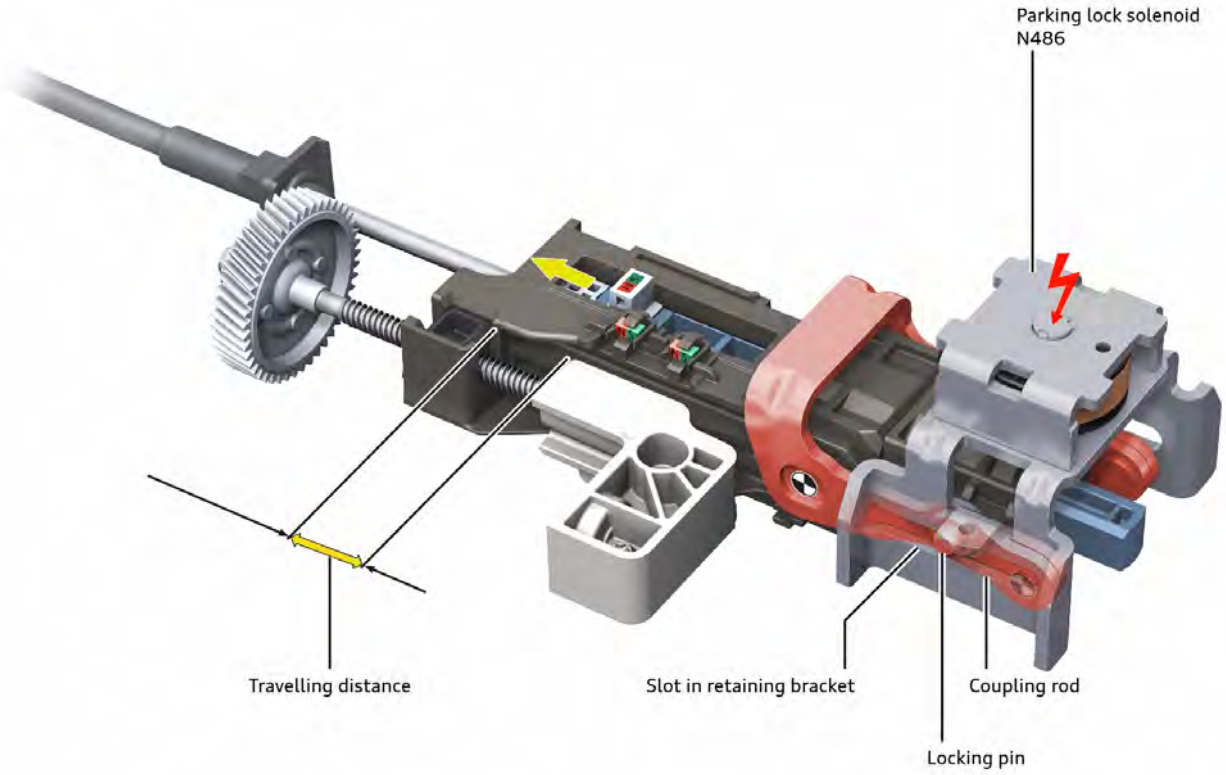
Parking lock disengaged (P OFF)



680_178

Kinematics - toggle mechanism: Retaining bracket in upper position

When disengaging the parking lock, the retaining bracket is held in the upper position by solenoid N486. The locking pins slide forwards horizontally in the slot on the retaining bracket and hold the toggle lever in position. This keeps the two slide blocks pressed together along with the coil spring compressed between them.



680_065

Backup-P function

The Backup-P function allows the parking lock to be engaged manually if the power supply fails, if there are problems in the CAN bus communication or if the electric motor does not function properly. In order to be able to activate the Backup-P function, the coil spring is compressed after the ignition is switched on; (refer to image "680_176"):

Step 1 - Compressing the coil spring

If the parking lock actuator is unable to apply the parking lock within 1.5 seconds after receiving the command from the gearbox control unit, the gearbox control unit directs the selector lever sensors control unit J587 to switch off the parking lock solenoid N486.

As soon as N486 is de-energised, the retaining bracket is no longer held in place and releases the locking pins. This removes the obstruction holding the two slide blocks together, allowing them to move apart.

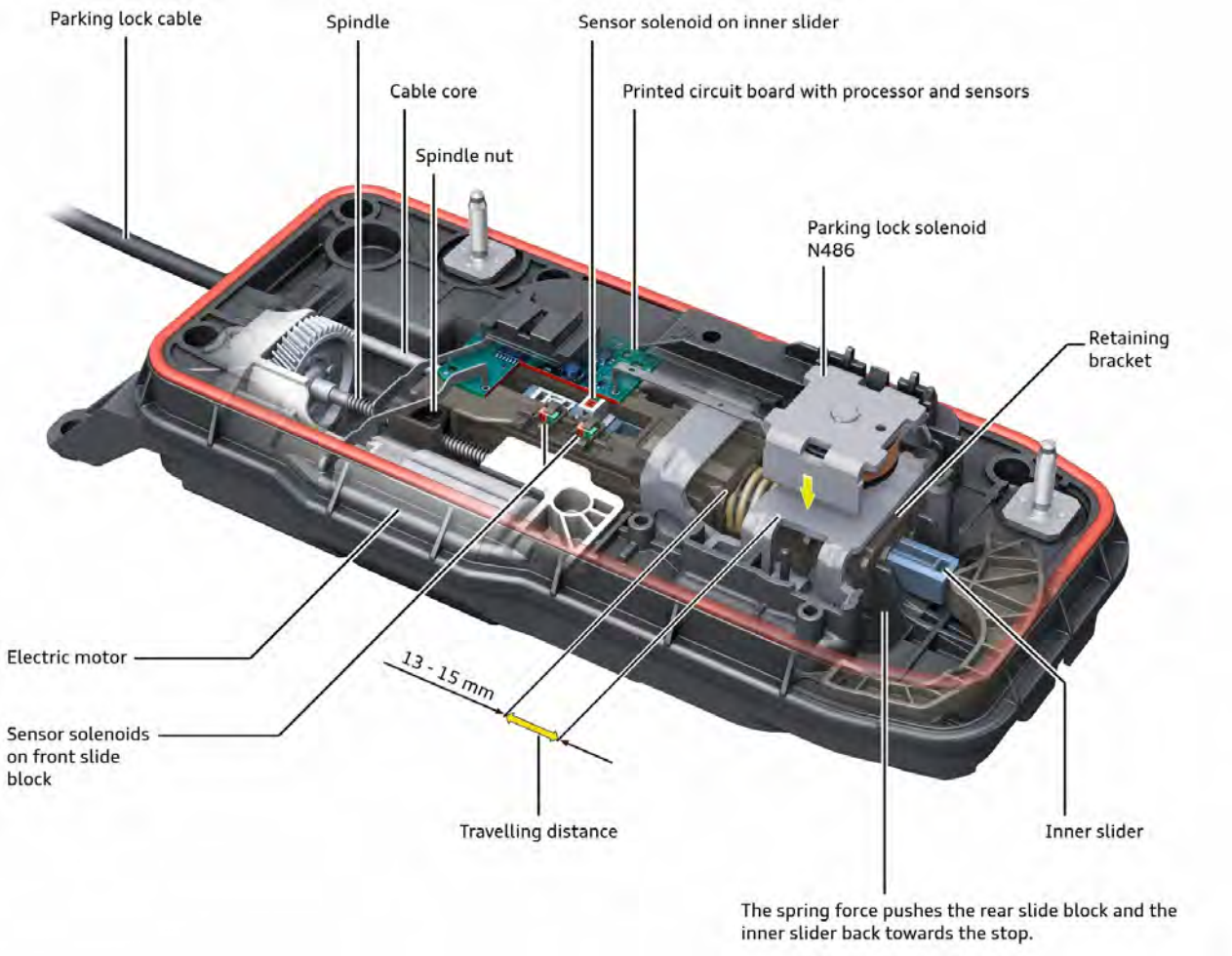
As the front slide block can no longer be moved due to the system fault and therefore remains in position, the compressed coil spring presses against the front slide block. The spring force pushes the rear slide block, and with it the inner slide and the parking lock cable core, towards the rear. As a result, the parking lock lever is pulled into the “parking lock engaged” position (P ON).

The parking lock has then been engaged by entirely mechanical means.

The yellow indicator lamp appears in the instru-ment cluster with the message:

Vehicle may roll away! P cannot be selected. Please apply parking brake. See owner's manual.

In addition, a corresponding entry is made in the event memory of the gearbox control unit.



680_110

Disengaging and engaging the parking lock with relaxed coil spring

If the parking lock solenoid N486 malfunctions or if there are relevant mechanical defects in the kinematics of the toggle lever, the coil spring for the Backup-P function cannot be compressed.

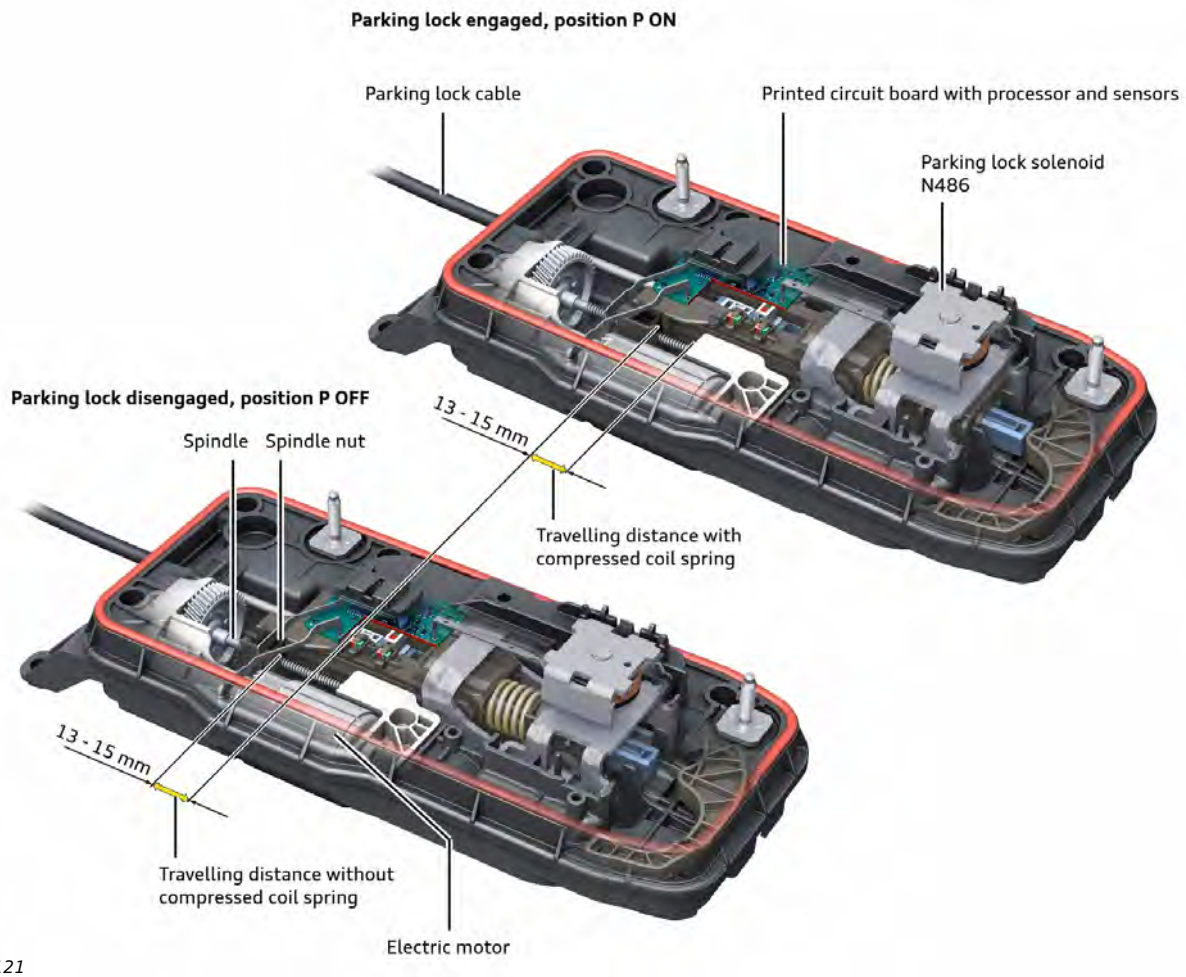
The parking lock actuator V682 detects this system fault based on the sensor signals and self-diagnosis and changes the position of the travel area to correspond to the situation. This allows the actuator to engage and disengage the parking lock (P ON/P OFF) even if the coil spring is not compressed.

If the coil spring cannot be compressed, the Backup-P function is not available. If additional faults occur, e.g. a malfunction of the electric motor, the parking lock can no longer be disengaged or engaged automatically; instead, this is only possible using the manual release mechanism.

For this reason, the yellow indicator lamp appears in the instrument cluster with the message:

Gearbox malfunction: you can continue driving. See owner's manual

In addition, a corresponding entry is made in the event memory of the gearbox control unit.



680_121

Parking lock manual release

The manual release mechanism disengages the parking lock when it is necessary to keep the parking lock in the P OFF position for a longer period of time; it should be actuated in the following situations:

- Whenever the vehicle needs to be towed.
- If the parking lock cannot be released electro hydraulically due to a malfunction.
- If the vehicle cannot be maneuvered or moved due to insufficient on-board electrical power (e.g. in the workshop).

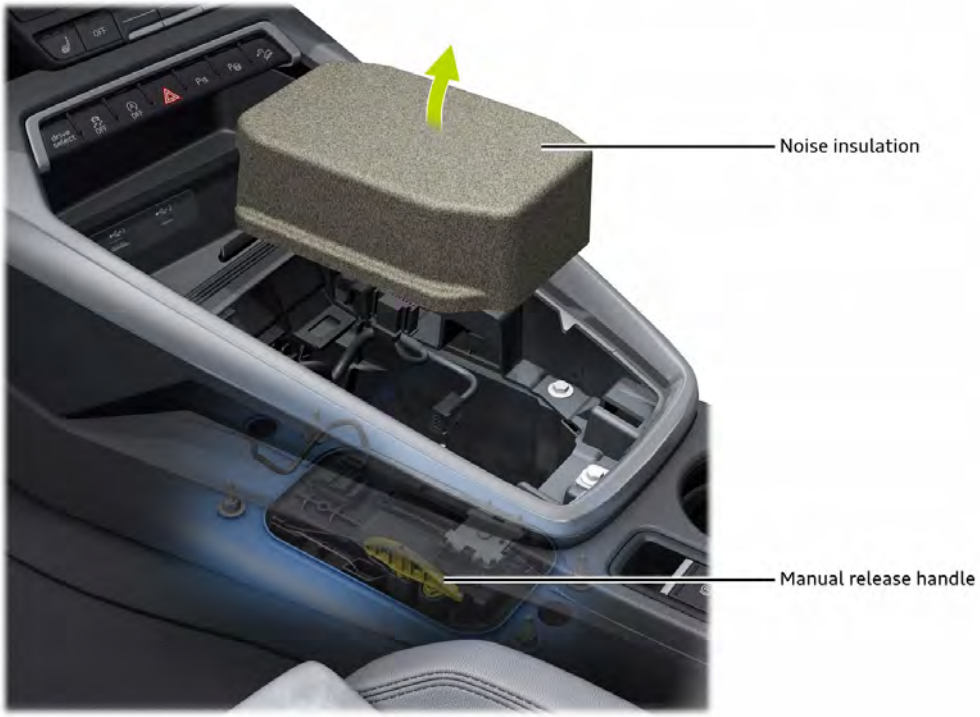
If it is no longer necessary to hold the parking lock in the P OFF position, it should be released again and moved back into the P ON position, (refer to image "680_237").

After carrying out work on the components of the manual release mechanism, the mechanism must be checked as specified in the Workshop Manual to ensure that it functions properly.

Note
Before the manual release mechanism for the parking lock is operated, the vehicle must be secured to prevent it from rolling away.

680_172

To use the manual release mechanism, the insert containing the selector mechanism must be removed from the center console together with the noise insulation, as described in the Workshop Manual.



680_173

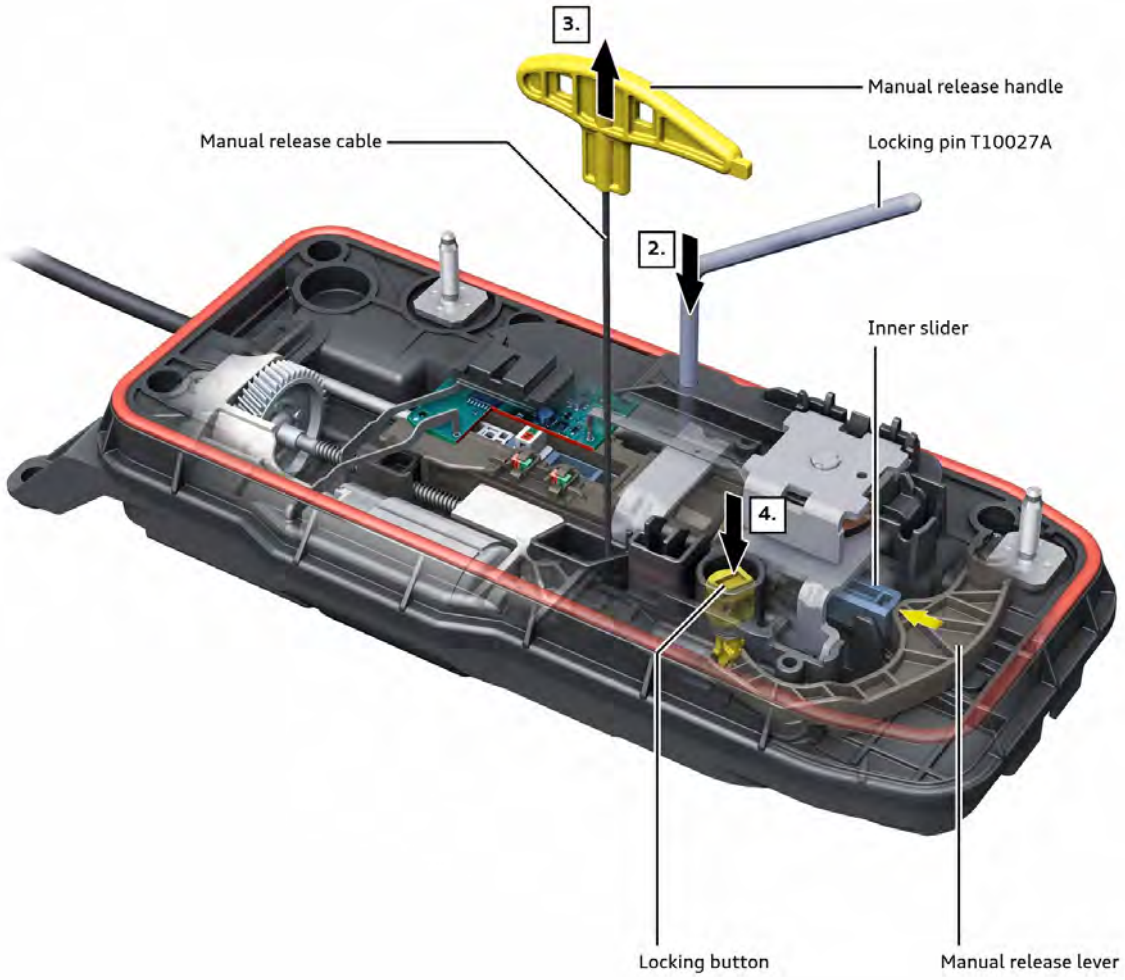
Manually releasing the parking lock - position “P OFF”

1. Remove the insert with the selector mechanism and the noise insulation; (refer to image "680_173”).
2. Insert the locking pin T10027A as shown into the opening as far as it will go. This locks the front slide block in place, and the coil spring is compressed when the parking lock manual release mechanism is operated. This is necessary so that the parking lock can be re-applied when the manual release mechanism is no longer in use.
3. Pull the manual release handle straight upwards as far as the stop. This causes the manual release lever to press the inner slider into the “parking lock disengaged” (P OFF) position and compress the coil spring.
4. With the manual release handle pulled upwards, press the locking button down and then release the tension on the manual release mechanism. The lateral force exerted on the locking button by the manual release lever keeps the button in position.

The parking lock is now disengaged permanently.

The yellow indicator lamp appears in the instru-ment cluster with the message:

Vehicle may roll away! P cannot be selected. Please apply parking brake



680_237

Disengaging the parking lock manual release - position “P ON”

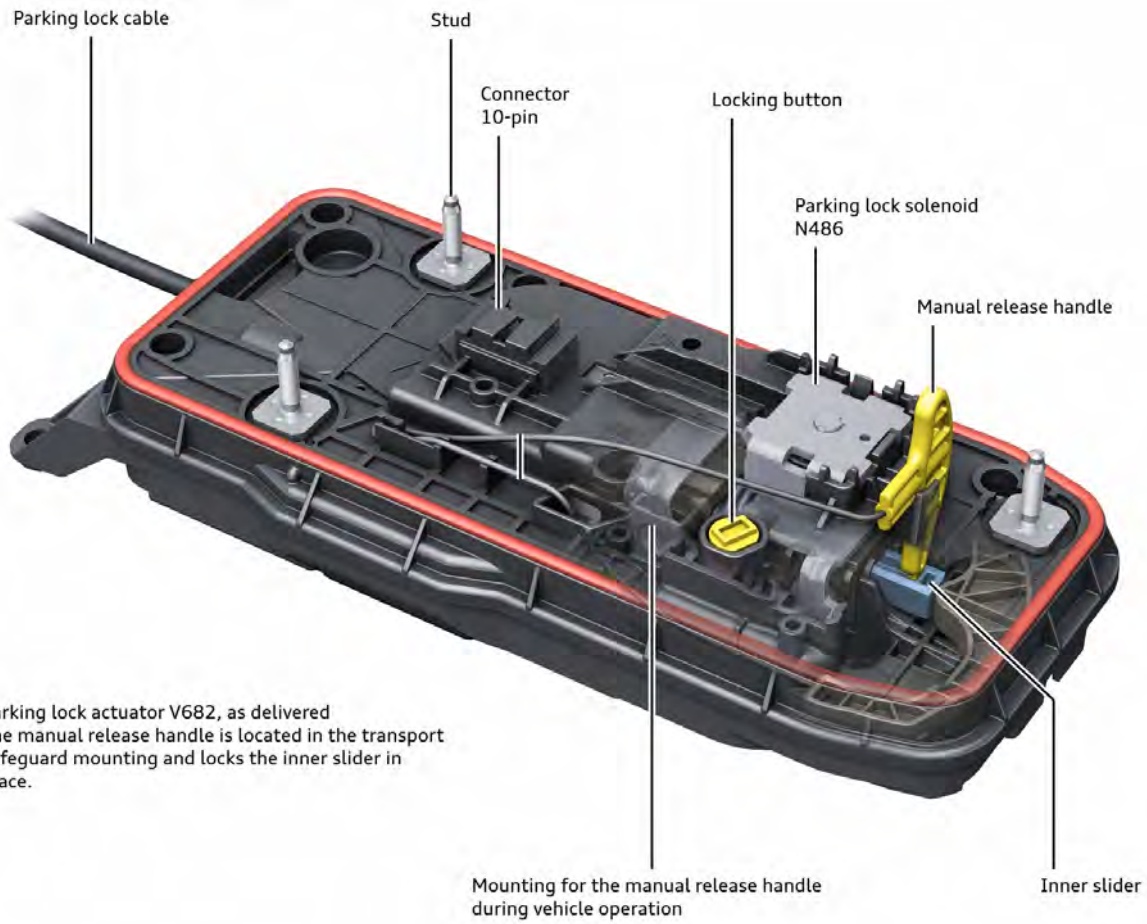
When the locking pin T10027A is inserted, it is possible to manually re-apply the parking lock (P ON). By pulling the manual release mechanism again, the locking button springs upwards and unblocks the manual release lever. Now the compressed coil spring presses the rear slide block against the stop on the housing (as for the Backup-P function), and the parking lock is re-applied (P ON). After this, place the manual release handle in the mounting next to the locking button and remove the locking pin T10027A.

Note
If you do not insert the locking pin T10027A, the parking lock can be re-applied via the parking lock button E816 by switching the ignition off and on again repeatedly (provided there is sufficient onboard power available). If switching the ignition off and on does not work, the electrical connector for the parking lock actuator must be unplugged and plugged back in.

Adjusting the parking lock cable

When the parking lock actuator V682 is delivered, the manual release handle is fitted in the housing as a transport safeguard (as shown); it locks the inner slider in the “P ON” position. The core of the parking lock cable, which is attached to the inner slider, is therefore also in the “P ON” position.

This should be the case when the parking lock cable is fitted and adjusted, as described in the Workshop Manual. When this work is completed, the manual release handle must be returned to the mounting provided for storage; SSP 680, "Parking lock actuator V682". If the manual release handle remains in the position for the transport safeguard, it will be sheared off and damaged the first time the parking lock is disengaged.

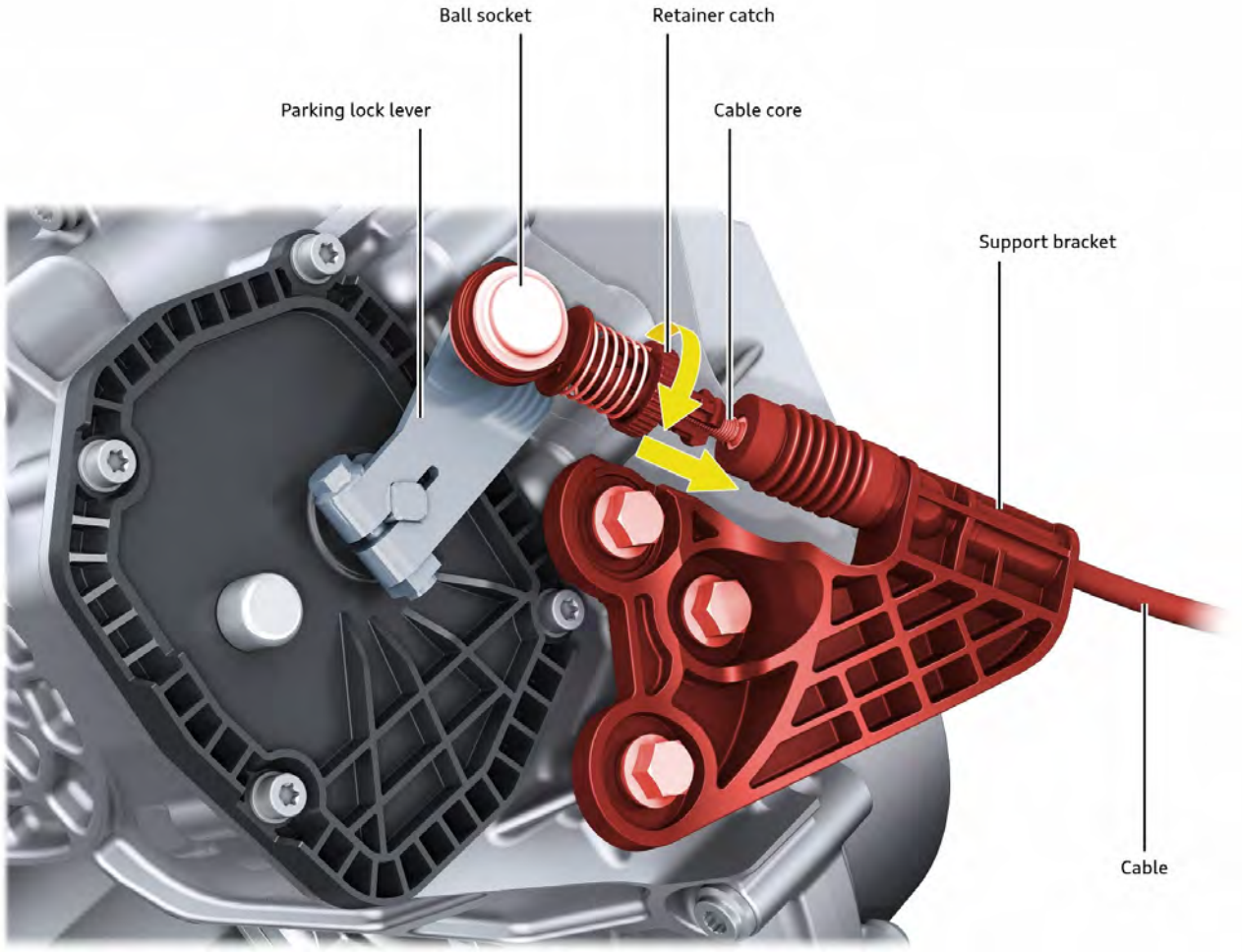


680_180

Note
If the manual release handle was removed from the transport safeguard mounting before the parking lock cable was adjusted, the actuator must first be connected electrically, and the ignition must be switched on. When the ignition is switched on and (where applicable) the parking lock button is pressed, the actuator adjusts itself to the position “P ON”. The cable can then be adjusted with the ignition on.

The parking lock cable must be adjusted with the parking lock engaged. This is shown here using the 7-speed dual clutch gearbox 0CW as an example. Due to the position in which the inner slide is locked, the core of the parking lock cable is also in the “parking lock applied” position (P ON), (refer to image "680_180”).

With this constellation in place, the support bracket for the parking lock cable is bolted to the gearbox, and the ball socket is pressed onto the ball of the parking lock lever. The expanding nut is then secured in place on the thread of the cable core with the help of the retainer catch and the coil spring.



680_179

Functions influencing gearbox control system

Functions available for the Audi A3 (type 8Y) which affect the gearbox control system include e.g. the launch control, the start/stop system, Audi drive select and the coasting function. These functions operate in a similar way to those in modular transverse matrix (MQB) vehicles. Information on these functions can be found in the Owner's Manual.

Service

Towing the vehicle

- On vehicles with automatic gearbox, operate the manual release mechanism for the parking lock
- Max. towing speed 50 km/h[8]
- Max. towing distance 50 km[9]

Note
Note the other descriptions and information on the topic of tow-starting and towing a trailer in the Owner's Manual.

[8] The stated values are approximate and are provided without obligation. They may vary depending on the vehicle version.
[9] The stated values are approximate and are provided without obligation. They may vary depending on the vehicle version.

Gearbox warning/indicator lamps

If the red gearbox warning lamp appears in the instrument cluster, the driver is instructed not to drive any further.

If the yellow gearbox indicator lamp appears in the instrument cluster, it is generally possible to continue driving the vehicle. A corresponding driver message informs the driver of what to do.

For detailed and up-to-date information, please refer to the Owner's Manual.

Diagnosis

The electrical/electronic components as well as the control operations of the automatic gearboxes can be diagnosed. The diagnostic results can be called up via the address code 0002 using the vehicle diagnostic tester.

Running gear

Overall concept

Improving an already very good product is a challenging task. With regard to the running gear on the Audi A3 (type 8Y), this was achieved by adopting proven components from the previous model (type 8V) and many detailed changes, but also by using new components and systems implemented for the first time with this model.

A particular focus was placed on lightweight construction, with the axle components partly being made of aluminium. The updated electromechanical brake servo function familiar from the Audi A3 e-tron (type 8V) is now fitted as standard equipment. The offer also includes running gear with damping control. This includes the third-generation adaptive chassis control system already used on the Audi Q2 (type GA). A wide selection of wheels in sizes ranging from 17” to 19” offers scope for customisation. The range of available steering wheels is similarly extensive.

680_201

The following running gear versions are available for the Audi A3 (type 8Y):

Basic running gear

The basic running gear is fitted as standard. It is equipped with steel suspension and conventional dampers.

Sports running gear

The sports running gear is available as an option. Compared to vehicles with standard running gear, models with sports running gear have a 15 mm lower ride height and a dynamic suspension setup.

Heavy-duty running gear

The heavy-duty running gear is optionally available for specific markets with poor-quality roads. The ride height is 15 mm higher than that of the standard suspension system. The heavy-duty running gear will be introduced at a later date.

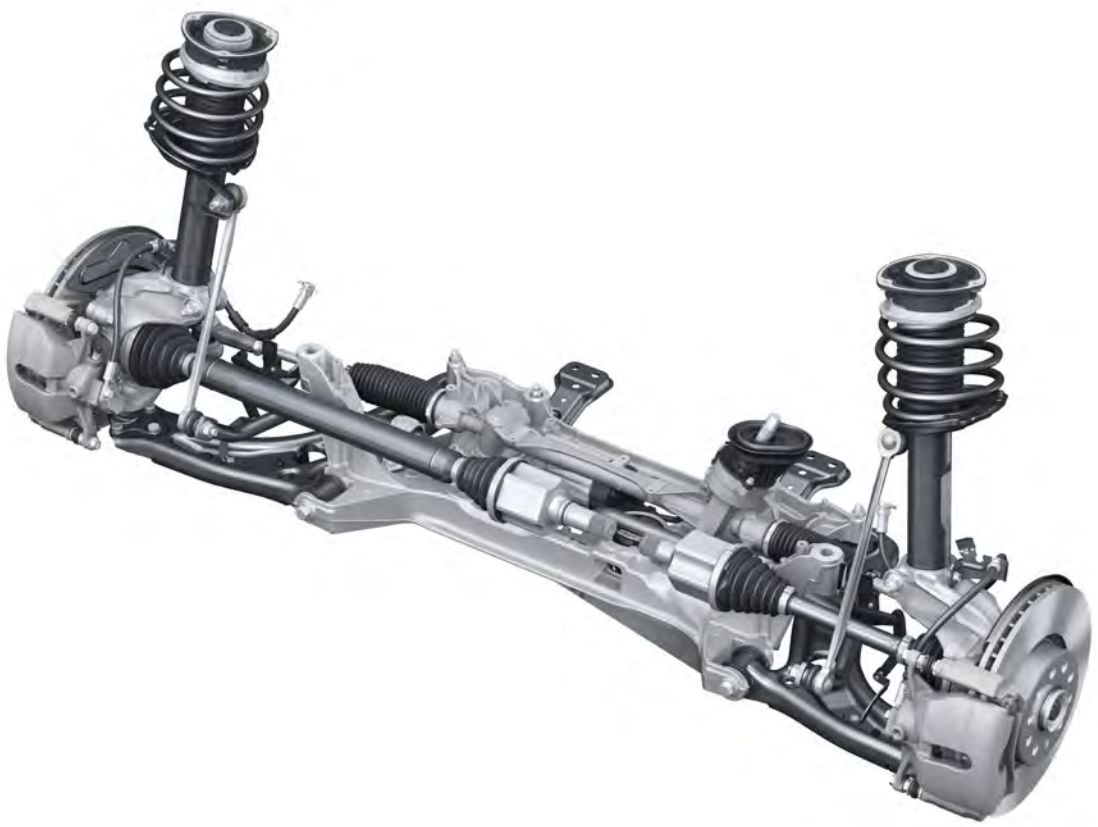
Running gear with electronic damping control

This suspension system is also available as an option for models with engine outputs of 103 kW and higher. It is based on the adaptive chassis control system which is already used on other Audi models (Q2 and Q3). The ride height is 10 mm lower than that of the standard suspension system.

Axles

Front axle

The MacPherson front axle has been adopted from the previous model.



Rear axle

On vehicles with front-wheel drive and engine outputs below 110 kW, the lightweight and compact torsion beam axle which already featured on the previous model is used.

680_203

Vehicles with front-wheel drive and engine outputs of 110 kW and above are fitted with the multi-link suspension introduced on the previous model. On vehicles with diesel engines, the subframes are decoupled from the vehicle body by bonded rubber bushes; on vehicles with petrol engines they are bolted on rigidly.

680_204

Wheel alignment

The wheel alignment and adjustment procedures are the same as for the previous model. The adjustment points are also identical.

680_205

Note
For detailed information on the design and function, please refer to SSP 612, "Audi A3 ’13 Suspension".

Electronic damping control (DCC)

Design and function

The Audi Q2 (type GA) was the first Audi model with transverse-mounted engine (based on the MQB matrix) to be equipped with electronic damping control (DCC; Dynamic Chassis Control). Having been implemented on the Audi Q3 (type F3), the third generation of the system is now being used on the Audi A3. The modifications primarily affect the electronically controlled damping control unit J250. A new processor and a new CAN controller are used, and the output stages for actuation of the damper valves have been modified. Modifications to the connectors and the housing made it possible to reduce weight. The control algorithms were adapted to the A3.

Operation and driver information

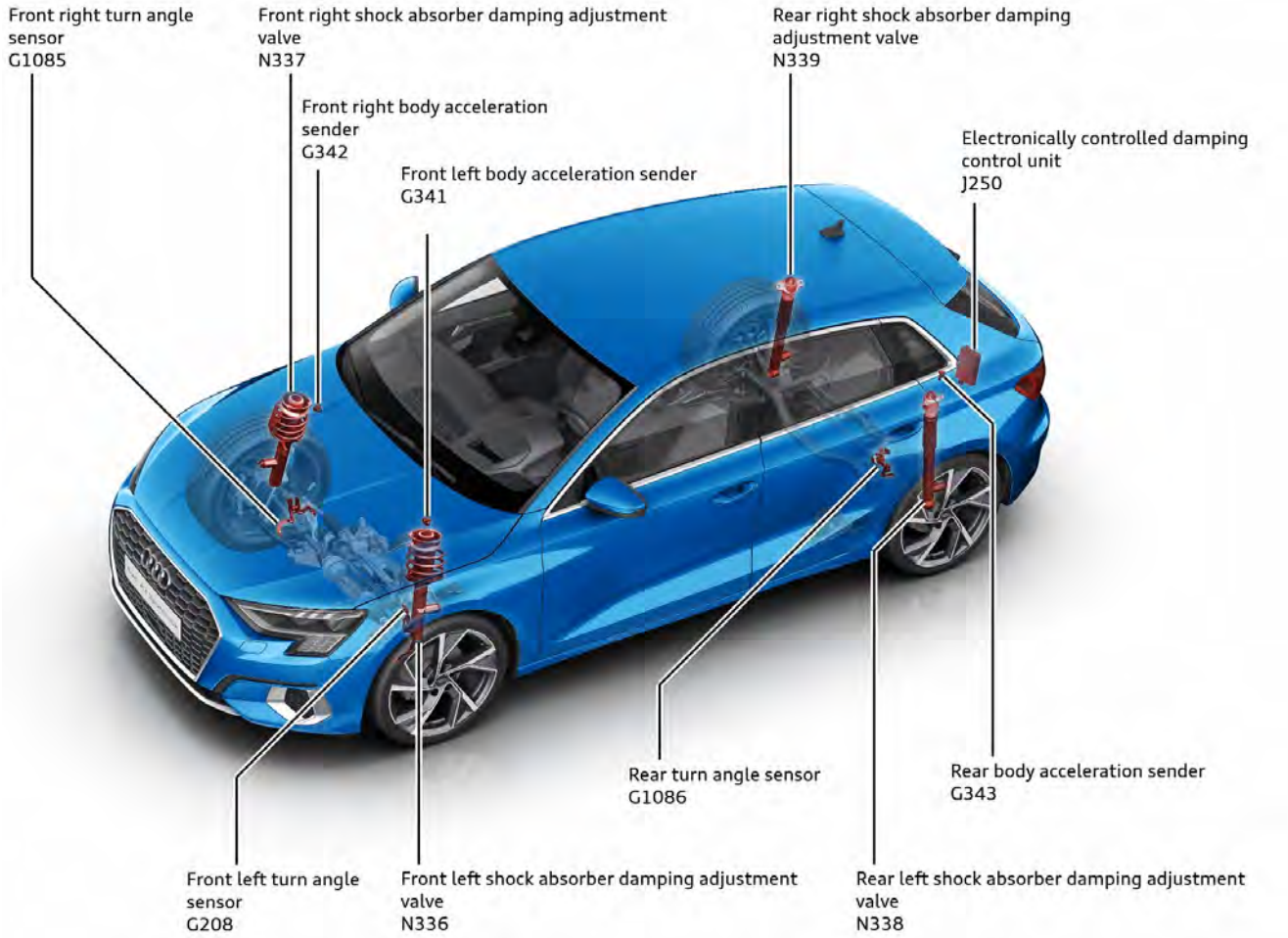
The driver can adjust the degree of damping (dynamic, balanced or comfortable) in Audi drive select on the Audi A3.

Service operations

After renewing a vehicle level sender or the control unit, a basic setting of the system must be performed. Compared to the systems on the Audi Q2 and Q3, the procedure for this has been simplified considerably. The vehicle level senders are now referred to as turn angle sensors.

680_206

Digital vehicle level senders are used. These require one onboard supply line fewer than analogue senders and a corresponding reduction in the number of pins on the control unit.


Front right turn angle sensor G1085
Front right shock absorber damping adjustment valve N337
Front right body acceleration sender G342
Front left body acceleration sender G341
Rear right shock absorber damping adjustment valve N339
Electronically controlled damping control unit J250
Rear turn angle sensor G1086
Rear body acceleration sender G343
Front left turn angle sensor G208
Front left shock absorber damping adjustment valve N336
Rear left shock absorber damping adjustment valve N338

680_207

Steering system

The electromechanical power steering (EPS) is a new development. Modifications have been made to the steering rack, steering pinion, motor, housing and thrust pieces; this also helped to reduce weight. The progressive steering is available as an option. The steering forces can be adjusted in three levels (ranging from dynamic to comfortable) in Audi drive select, as is customary. The steering system is identical to the one on the previous model with regard to its layout, function, operation; it is also serviced in the same manner.

680_208

Three-spoke leather steering wheels with a diameter of 365 mm are used. Vehicles with automatic gearbox are equipped with tiptronic operating levers as standard.

In their basic specification, steering wheels feature high-gloss black trim and a chrome-plated frame. The optional steering wheel versions are available with various multifunction buttons and a flat-bottomed rim.

Steering wheels from the S line package also have the S diamond on the center spoke (customers can choose between a round or flat-bottomed rim). Further differentiating features in the S line package are the microdot leather in the grip area and the color-contrasting stitching.

Vehicles equipped with the adaptive cruise assist come with three-spoke steering wheels with a diameter of 375 mm and a center clip in chrome look (with a galvanized surface). These steering wheels include the hands-off detection feature introduced on the Audi e-tron (for layout and function, refer to SSP 675, "Audi e-tron (type GE)"). The hands-off detection feature is also used on S line steering wheels.

Standard steering wheel from “Basic” equipment line, for vehicles with manual gearbox, rounded steering wheel rim and basic mul-tifunction buttons.

680_209

Optional steering wheel from “Basic” and “design selection” equipment lines, for vehicles with automatic gearbox, flat-bottomed steering wheel rim and multifunction buttons (maximum specification).

680_210

Steering wheel from “S line” equipment line, for vehicles with automatic gearbox, multifunction buttons (maximum specification) and hands-off detection.

680_211

Brake system

The vehicles/engine versions offered at the time of the market launch (SSP 680, Power units) have 16” front brakes and 15” rear brakes.

For the parking brake, the third-generation electromechanical parking brake (EPB) already in use on the Audi Q2 (type GA) and Q3 (type F3) models and on the previous model is fitted. Thanks to the use of the electromechanical brake servo as standard, it was possible to fit smaller EPB actuators. The EPB regulating software is integrated in the ABS control unit (J104).

The brake circuit features a diagonal split. The brake pad wear detection and indicator system is standard equipment in various markets (e.g. for both the ECE and Chinese markets). Wear is measured at the inner brake pads of the front brake calipers.

	Front axle	**Rear axle**
Minimum wheel size	16"	15"
Type of brakes	TRW PC 57 floating caliper brake	Continental FNc-M42 floating caliper brake
Number of brake pistons	1	1
Brake disc diameter	312	272
Brake disc thickness	25	10

Brake for front axle

680_213

Brake for rear axle with EPB

680_212

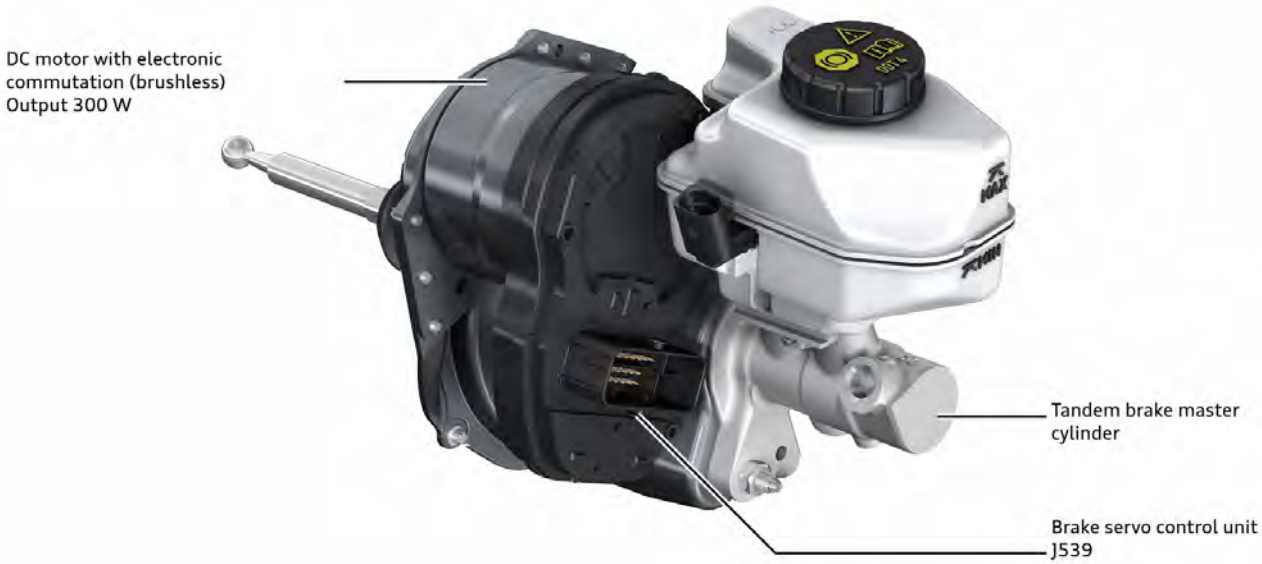
Electromechanical brake servo

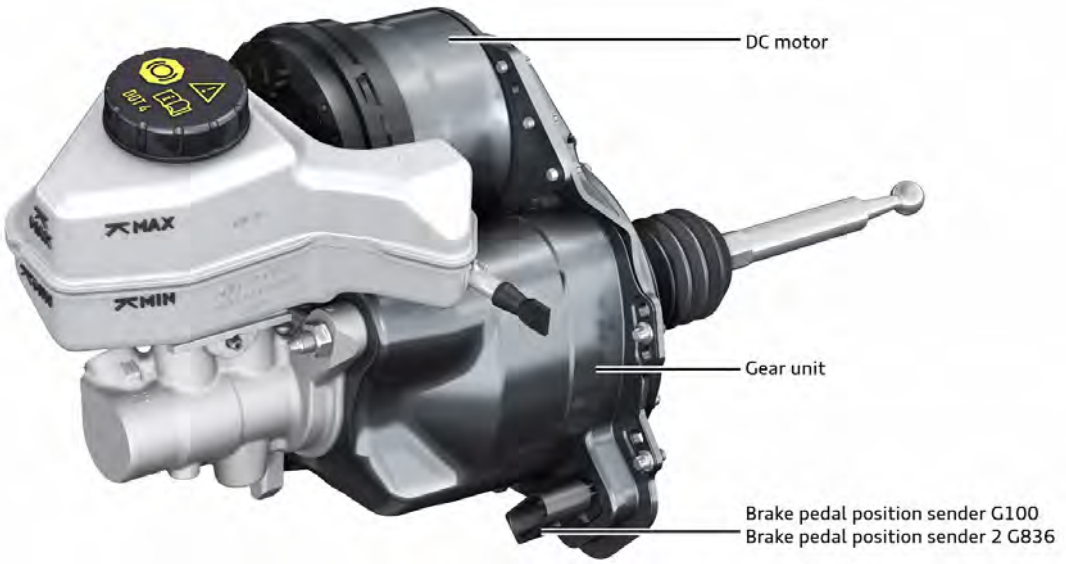
Design and function

An electromechanical brake servo of the 2nd generation is fitted as standard. A key benefit of this system is that it offers dynamic advantages when building up pressure compared to conventional vacuum-based systems. The faster build-up of brake pressure represents a considerable safety gain due to the shorter braking distances which result. In addition to this, greater play between the brake pistons and brake pads reduce the residual braking torque values (quicker reduction of braking force/torque) and improve braking comfort.

The general layout and the functional principle are essentially the same as the first-generation electromechanical brake servo already used in the Audi A3 e-tron. Power transmission has been converted to spindle drive instead of pinion drive.

As no recuperation is performed in combination with blended braking on vehicles with conventional drive systems, an active accumulator is not necessary. The electromechanical brake servo supplies brake pressure for external requirements from other applications/systems (e.g. ACC, parking brake function). For the parking brake function, the brake pressure is built up by the electromechanical brake servo and the final “locking” is performed by the EPB. This means that smaller EPB actuators can be used than on the previous model.



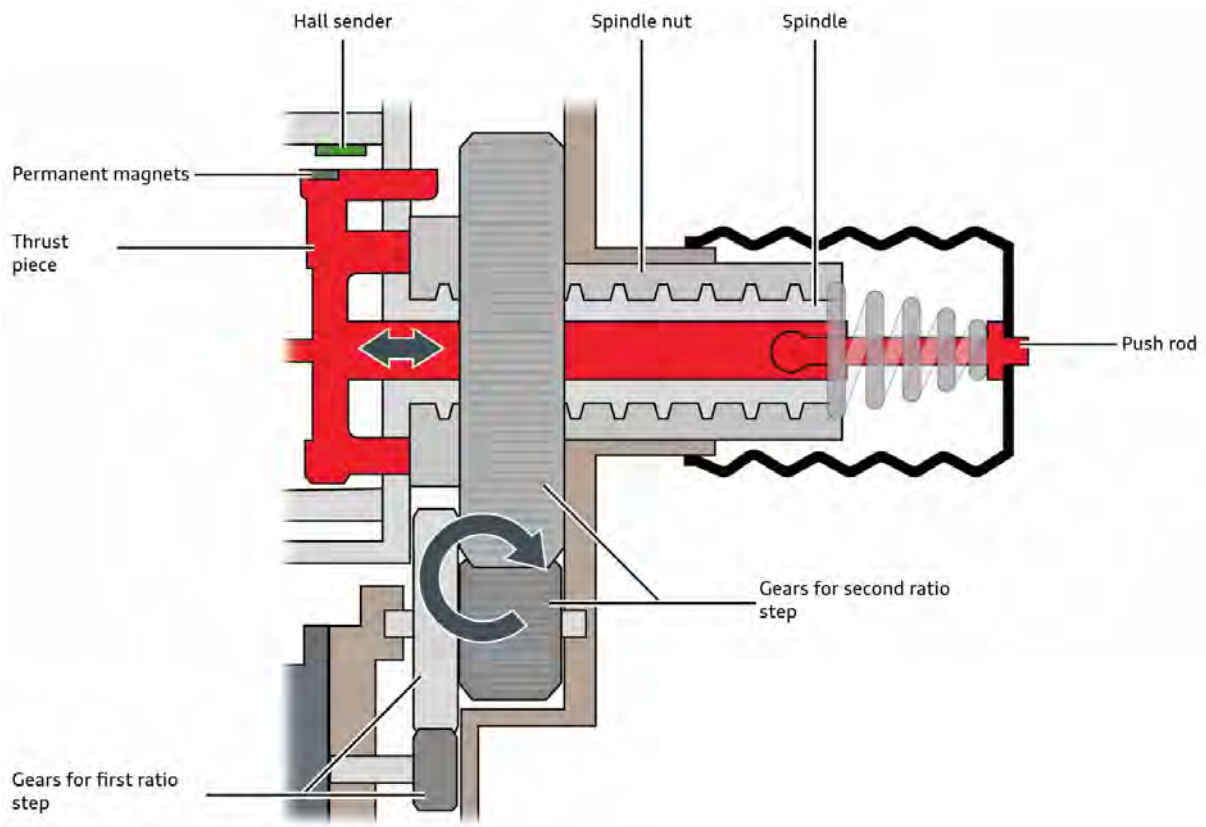


680_215

The spindle drive is driven by a DC electric motor which drives the spindle nut via two ratio steps. Depending on the direction in which the motor and spindle nut are moving, the spindle is moved in the direction of the brake master cylinder or in the opposite direction. After the spindle makes contact at the thrust piece, the spindle is pressed forward further to support the braking force applied by the driver, or braking pressure/braking force is built up independently (without the influence of the driver).

The distance travelled by the thrust piece is measured by the brake pedal position sender, which is designed on the principle of redundancy. To do this, the position of the permanent magnets, which are arranged in set positions in the thrust piece, is detected by Hall elements. The measured values are continuously evaluated by the brake servo control unit.

A rotor position sensor (motor position sender for brake servo G840) also continuously detects the position of the electric motor's rotor. This information is important for the control unit so that it can calculate the exact timing of the change in direction of the energising current (commutation) for the field coils arranged in set positions in the motor housing.



680_216

Service operations

In servicing work, the electromechanical brake servo can only be renewed as a complete unit (including the control unit).

After renewing the unit or whenever the brake circuits have been opened, the brake system must be bled according to the instructions in the Workshop Manual. The brake pressure is then built up in the brake circuits using the basic setting “Brake bleed”, with residual bleeding being performed again at the individual brake calipers by the mechanic.

The basic settings “Movement test” and “Pressure test” can be used to check whether it is necessary to bleed the brake system. Both of these basic settings also need to be performed after renewing the control unit (which means renewing the entire electromechanical brake servo unit).

In the movement test, the electromechanical brake servo is activated and the distance travelled by the thrust piece until the electric motor reaches a specified torque is evaluated. The mechanical function can be checked using this basic setting.

ESC

On the Audi A3, the ESC Mk100 system already fitted on the previous model (type 8V) is used. The hydraulic unit now has larger internal storage chambers (5 cm^3 instead of 3 cm^3); the rest of the layout, the functions and the servicing requirements are the same as those of the ESC on the previous model (type 8V).

ESC unit Mk100

680_217

Wheels and tyres

An extensive range of wheels and tires in sizes between 16” and 19” are available for customizing the Audi A3. Run-flat tires are not available.

The Tire Mobility System (TMS) is part of the standard equipment. A temporary spare wheel is available optionally. A jack is included for vehicles with a temporary spare wheel or with winter wheels ordered from the factory.

Standard wheels	Optional wheels	Winter wheels
		
8,0J x 17[10] Cast aluminium wheel 225/45 R17	8,0J x 18[11] Flow-forming Cast aluminium wheel 225/40 R18	8,0J x 18 Flow-forming Cast aluminium wheel 225/40 R18U
		
8,0J x 17[12] Cast aluminium wheel 225/45 R17		6,5J x 17[13] Cast aluminium wheel 205/50 R17
		
7,0J x 16[14] Cast aluminium wheel 205/55 R16		6,5J x 16[15] Steel wheel with wheel trim 205/55 R16

The optional wheels listed in the table are only available in the “Basic” and “S line” equipment lines. The illustrated wheels and categories to which they are assigned correspond to the range available in the German market at the time of the market launch. The surface appearance of the wheels illustrated here (colors, gloss level etc.) may in some cases differ from the actual surfaces.

[10] Exclusive to S line
[11] Exclusive to S line
[12] Exclusive to advanced
[13] Winter wheels compatible with snow chains
[14] Basic
[15] Winter wheels compatible with snow chains

Optional wheels		
		
8,0J x 18 Flow-forming Cast aluminium wheel 225/40 R18	8,0J x 18 Flow-forming Cast aluminium wheel 225/40 R18	
		
8,0J x 18 Flow-forming Cast aluminium wheel 225/40 R18	8,0J x 18 Flow-forming Cast aluminium wheel 225/40 R18	8,0J x 19 Flow-forming Cast aluminium wheel 235/35 R19
		
8,0J x 17 Cast aluminium wheel 225/45 R17	8,0J x 18 Flow-forming Cast aluminium wheel 225/40 R18	8,0J x 19 Flow-forming Cast aluminium wheel 235/35 R19
		
8,0J x 17 Cast aluminium wheel 225/45 R17	8,0J x 18 Flow-forming Cast aluminium wheel 225/40 R18	8,0J x 19 Flow-forming Cast aluminium wheel 235/35 R19

The optional wheels listed in the table are available in all equipment lines. The illustrated wheels and categories to which they are assigned correspond to the range available in the German market at the time of the market launch. As on the previous model (type 8V), approval of 19" wheels is linked to specific requirements. The surface appearance of the wheels illustrated here (colors, gloss level etc.) may in some cases differ from the actual surfaces.

Tire pressure loss indicator

The tire pressure loss indicator is fitted as standard in the Audi A3; it is the same as on the previous model with respect to its functions, displays and operation.

Electrics and electronics

12 Volt power supply

12 Volt battery, jump-start terminals, fuse and relay carriers

Battery and jump-start terminals

The battery on the Audi A3 (type 8Y) is fitted in the engine compartment. Depending on the equipment and engine version, EFB, EFB+ and AGM batteries may be used. Audi A3 vehicles with auxiliary heater, PR number 9M1 and PR number 9M9, are fitted with an AGM battery. The positive battery terminal and the earth stud on the plenum chamber partition panel are used to jump-start the vehicle or charge the 12 Volt battery.

PR no.: 9M1 = auxiliary heater

PR no.: 9M9 = auxiliary heater with remote control

Batteries used in the Audi A3:

- EFB
  59 Ah/320 A
- EFB+
  70 Ah/420 A
- AGM
  68 Ah/380 A
  75 Ah/420 A

EFB and EFB+

An EFB (enhanced flooded battery) is a heavy-duty wet cell battery. The positive plate inside the vehicle battery is coated with an additional polyester textile layer. This provides the active earth connection of the vehicle battery with additional traction on the plate. These vehicle batteries have a higher cycle stability than that of conventional batteries.

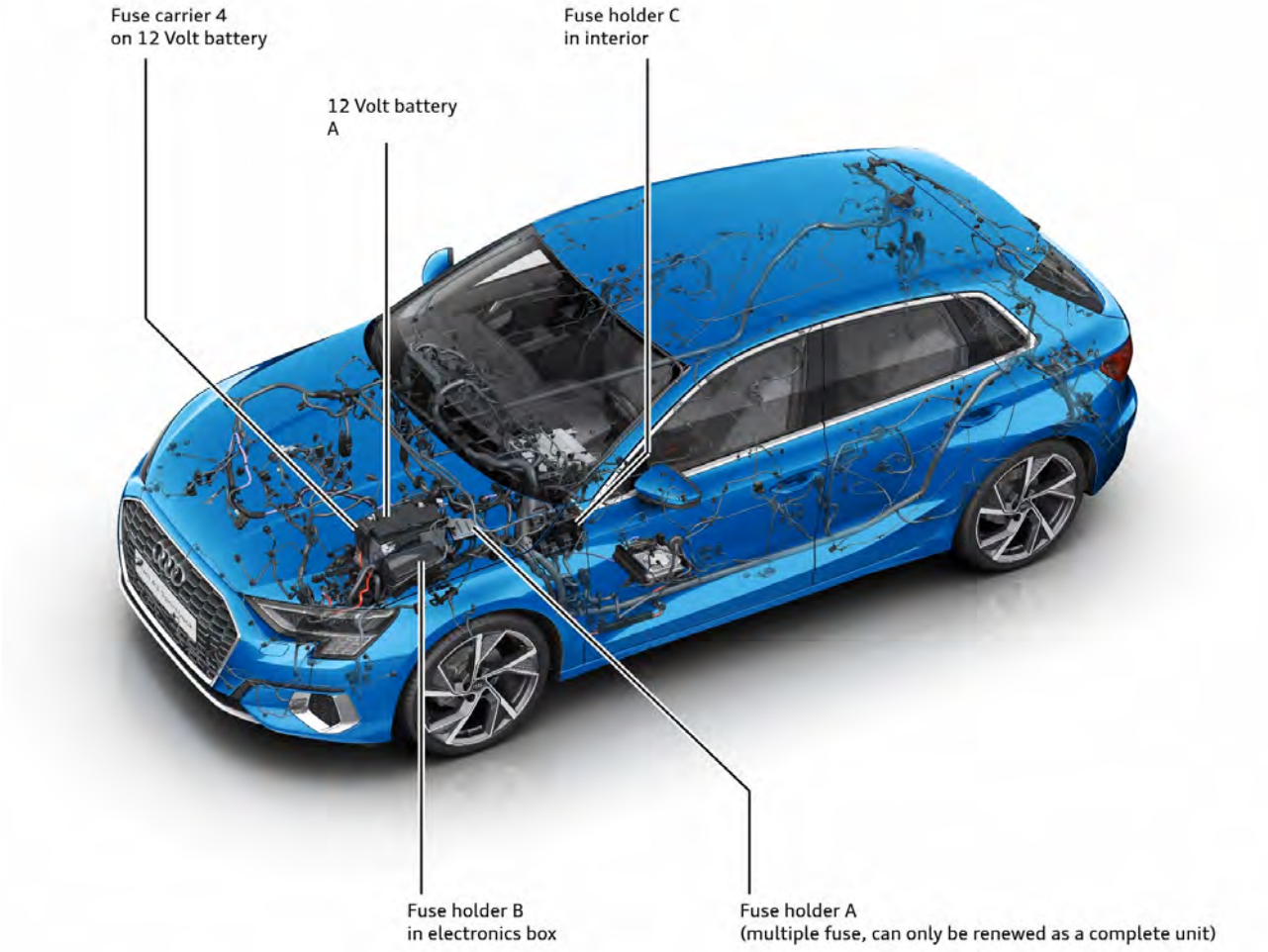
An EFB+ is an EFB that has been optimised for cold starting diesel engines. Both of these batteries are charged in the exact same way as standard batteries.

AGM battery

In AGM (absorbent glass mat) batteries, the electrolyte of the vehicle battery is absorbed in a fibreglass mesh. In addition to their higher cycle stability, AGM batteries are also less susceptible to leaks. This is particularly important for batteries fitted inside the vehicle. When charging, it is important to follow the charger's operating instructions and, if necessary, to select the program for AGM vehicle batteries.

Fuse and relay carriers

The fuse and relay carriers are located in the front of the vehicle on the Audi A3. The fuses in the engine compartment electronics box and the fuses located behind the dash panel on the left side of the vehicle are also accessible to the driver and are therefore also described in the Owner's Manual. The fuse carriers are in the same location on left-hand drive and right-hand drive vehicles. The fuses in the passenger compartment are therefore accessible behind the storage compartment on left-hand drive vehicles and behind the glove box on right-hand drive vehicles.



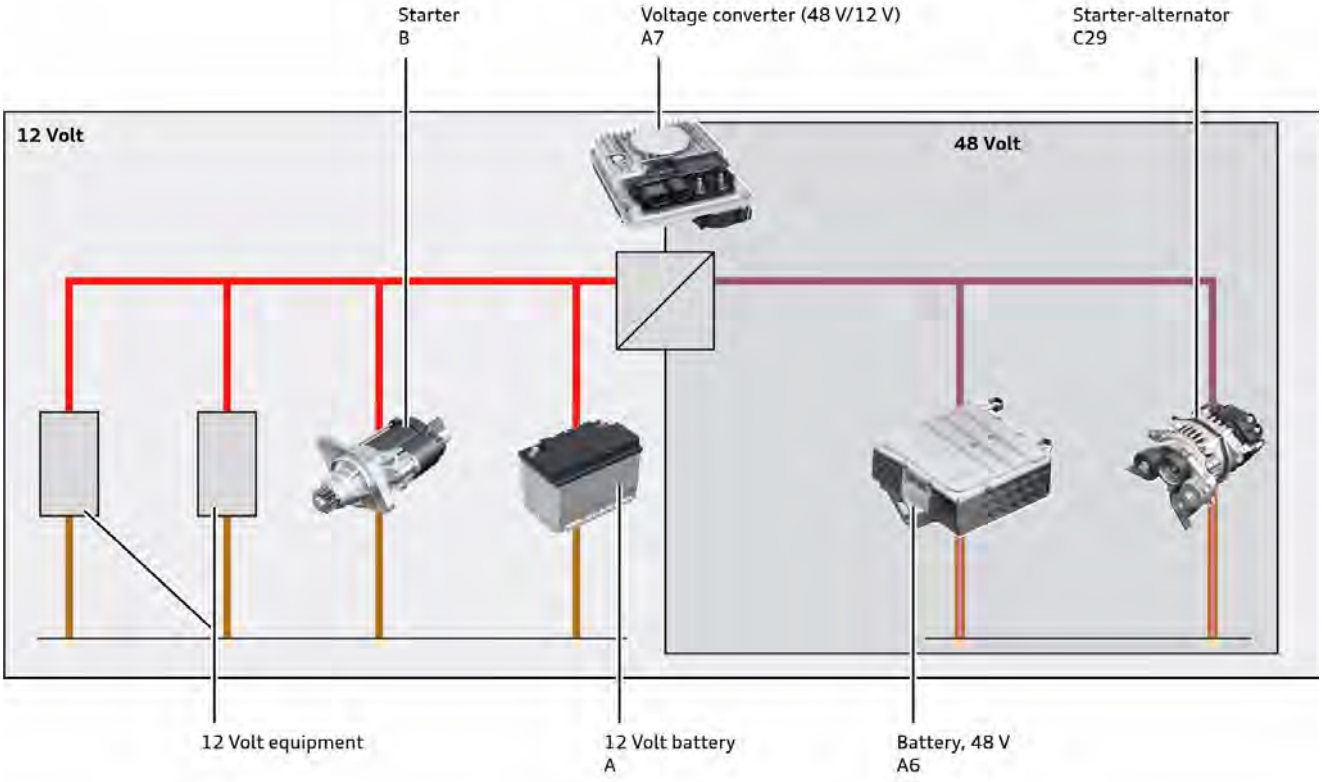
680_099

48 Volt main electrical system

Audi A3 vehicles with PR number 0K4 are designed as MHEVs (Mild Hybrid Electric Vehicles). The MHEV technology integrates a 48 Volt lithium-ion battery, a voltage converter and a 48 Volt belt-driven starter-alternator in a 48 Volt onboard electrical supply.

PR no. 0K4 = MHEV hybrid drive system

Schematic diagram



680_143

48 Volt belt-driven starter-alternator

As the name implies, this component has two functions. When operated as an alternator, it provides the electrical system with electrical energy and charges the 48 Volt battery. Its electric motor function is used to start the combustion engine when the engine oil temperature is above 45 °C. It is also able to support the combustion engine in certain driving situations. This means that the belt-driven starter-alternator provides part of the power output required to overcome driving resistance, thereby relieving the load on the combustion engine.

Thanks to the connection via the poly V-belt, an engine start using the starter-alternator is very quiet and almost completely free of vibrations. The 48 Volt belt-driven starter-alternator is air-cooled. It is connected to the engine control unit J623 via a sub-bus data wire. In addition, it uses the hybrid CAN and can be reached at diagnostic address 00CC using the diagnostic tester. As on any belt-driven starter-alternator, a special tensioner is used to ensure that the poly V-belt has a large wrap angle around the drive pulley of the starter-alternator.

48 Volt lithium-ion battery

The main components inside the housing of a lead battery are the battery cells, the separators, the cell connectors and the electrolyte. In contrast, the lithium-ion battery houses additional components such as an internal battery control unit and a relay. The control unit inside the battery takes part in the vehicle communication via the hybrid CAN. The diagnostic address on the vehicle diagnostic tester is 0021. Using this relay, the positive terminal stud can be “switched off”. In this case, when the relay is open, there is no voltage at the terminal stud. The relay inside the battery is closed as soon as terminal 15 is active. The relay is opened when terminal 15 is deactivated or when the airbag control unit J234 sends a crash signal. The 48 Volt battery is fitted under the seat on the right side and is protected from mechanical damage by a metal housing. It has a capacity of 13.8 Ah and is actively cooled by an internal fan.

48 V/12 V voltage converter

The voltage converter operates bidirectionally. This means that, on the one hand, the 48 Volts generated by the alternator are converted into 12 Volts to charge the 12 Volt battery. On the other hand, the process is reversed under certain conditions, and 48 Volts are generated from 12 Volts. This occurs e.g. when an external charger is connected to the vehicle via the 12 Volt jump-start terminals. The voltage converter has a capacity of 2.5 kW and is actively cooled by a fan attached to the outside of the housing. Its diagnostic address is 00C4, and like the battery and the belt-driven starter-alternator, it uses the hybrid CAN.

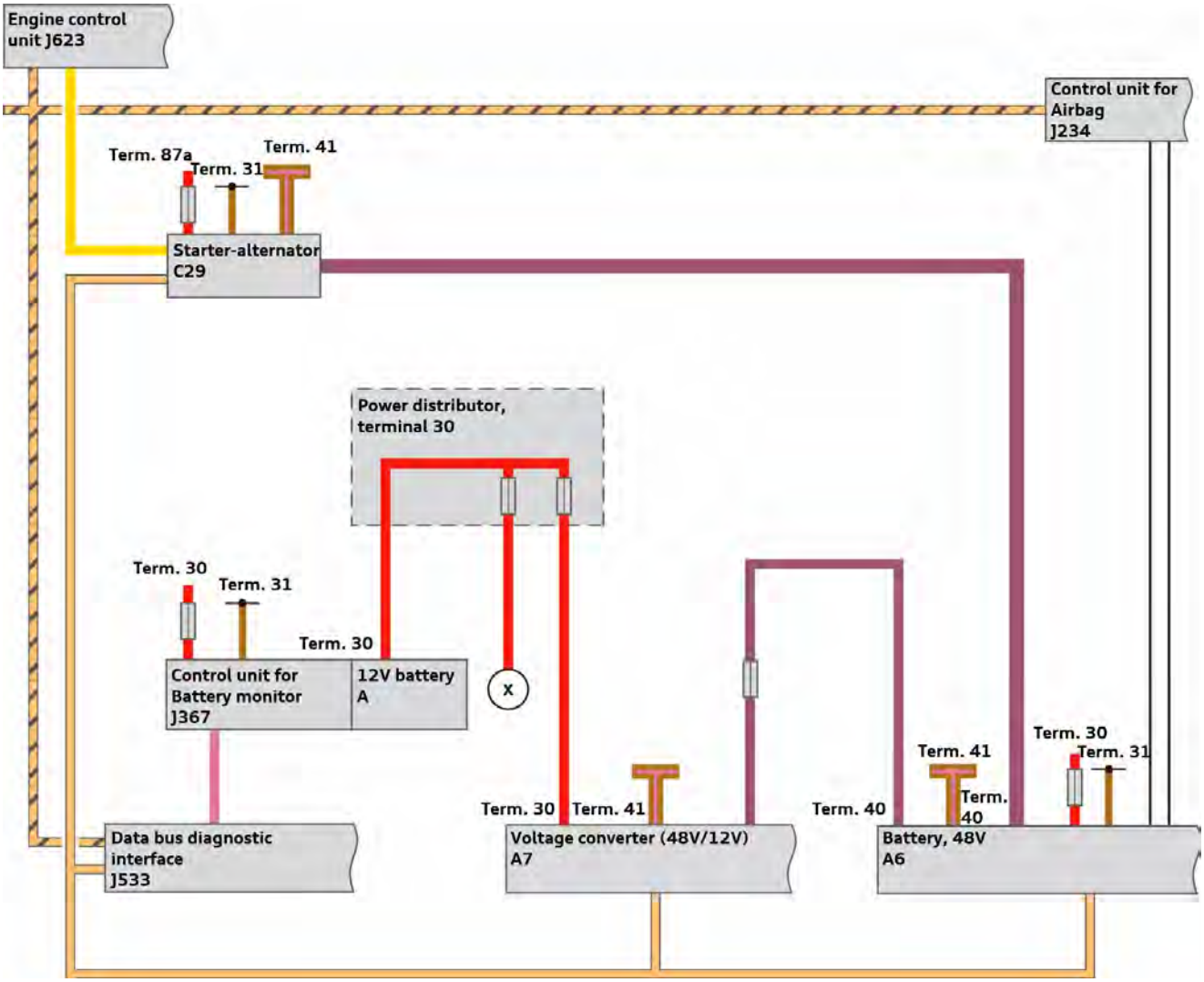
12 Volt battery

This battery is a lead-acid battery. It is fitted on the left side of the engine compartment. The battery monitor control unit J367 is attached to its negative battery terminal. When the battery is renewed, the battery data must be sent to the energy management, which is fitted in the data bus diagnostic interface J533. The 12 Volt battery supplies the onboard electrical system with energy and is charged by the belt-driven starter-alternator via the voltage converter while the engine is running. It can be charged directly using a 12 Volt charger. It is important to ensure that this is always done for vehicles in the showroom or for the duration of workshop visits.

12 Volt pinion starter

The starter is a 12 Volt pinion starter. It is used to start the combustion engine at engine oil temperatures of less than 45 °C. The pinion starter meshes its pinion with the starter ring gear on the engine flywheel.

System diagram

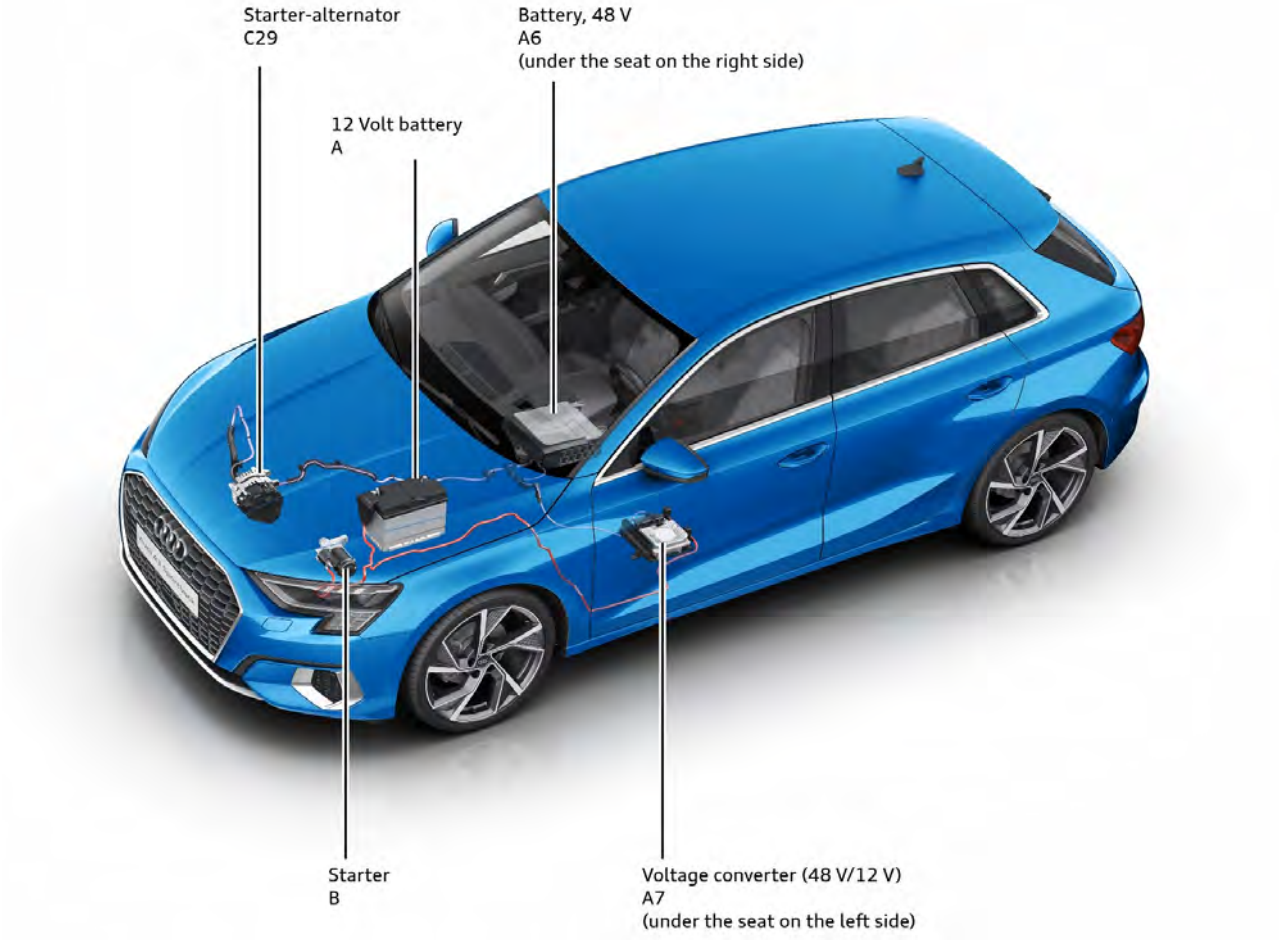


680_144

Key:

- Hybrid CAN
- Powertrain CAN FD (flexible data rate)
- LIN bus
- Sub-bus systems (private CAN)
- Ⓧ To the 12 Volt equipment
- Discrete signal wires
- 48 Volt direct current, positive side
- 48 Volt direct current, negative side
- 12 Volt direct current, positive side
- 12 Volt direct current, negative side

Components and connections in the vehicles



680_149

Mild hybrid functions

The most significant innovation in the continued development of the engine range in the Audi A3 family is the mild hybrid technology with a modern, high-efficiency engine management and 48 Volt lithium-ion battery. These vehicles can be identified by the PR number 0K4 in the vehicle data. Mild hybrid technology makes it possible to implement certain functions that can help provide a more comfortable driving experience as well as reduce vehicle emissions.

Advanced start/stop function

The combustion engine can already be switched off while the vehicle is slowing to a halt and at speeds <20 km/h.

Coasting

At speeds between 40 km/h and 160 km/h, the gearbox can operate in coasting mode, and the combustion engine can be switched off. The vehicle can then coast for up to 40 seconds. The predictive efficiency assist, which is an integral part of the engine management system, determines whether coasting mode is possible and for how long.

Comfortable start

The belt-driven starter-alternator makes it possible to start the engine with minimal noise and vibration.

Advanced engine start strategy (change of mind)

The combustion engine can be restarted with the help of the belt-driven starter-alternator even though the engine has not yet come to a complete standstill. A typical example is the situation at set of traffic lights. The driver approaches a red light and applies the brakes. The start/stop system switches off the engine. Before the engine has come to a standstill, the traffic lights turn green, and the driver presses the accelerator. The engine can be restarted using the belt-driven starter-alternator.

Recuperation

During braking and overrun phases, electrical energy can be recuperated and stored in the 48 Volt lithium-ion battery; the battery is charged by the belt-driven starter-alternator. The belt-driven starter-alternator is not required in normal driving and acceleration phases. The batteries are not being charged, and the electrical system is supplied during this time with electrical energy stored in the batteries. The load on the combustion engine is reduced, as it does not need to drive the belt-driven starter-alternator. Fre-quent and long recuperation cycles are possible due to the additional 48 Volt battery which, as a lithium-ion battery, has a very high degree of cycle stability.

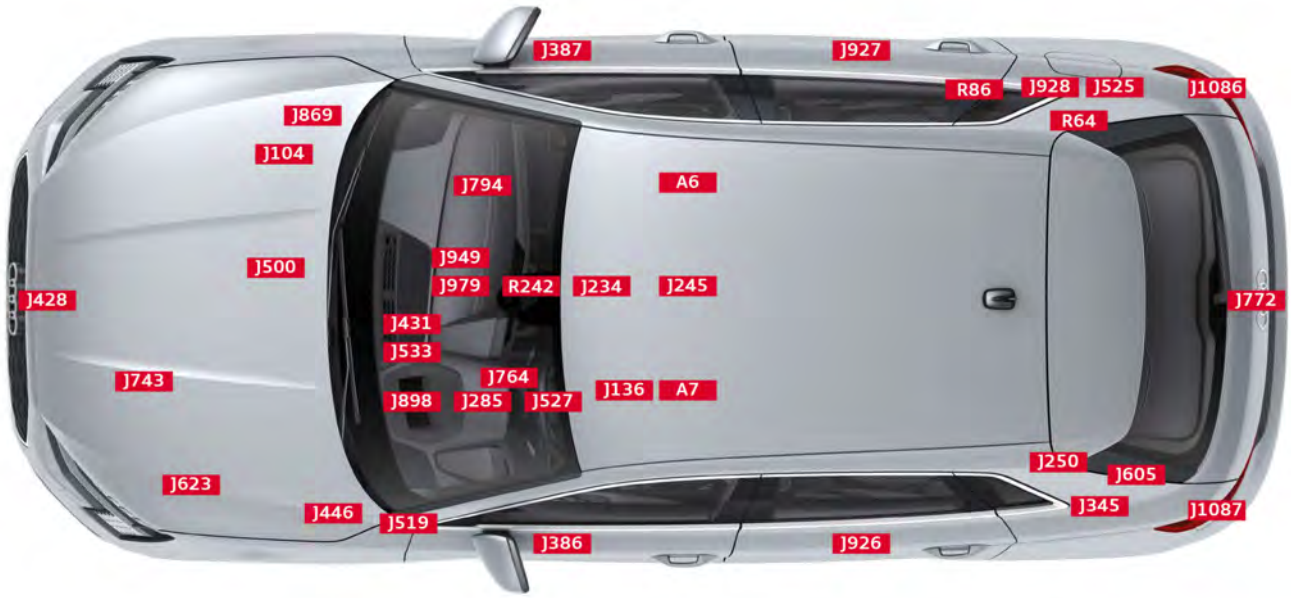
Support for the combustion engine

The belt-driven starter-generator can assist the engine by operating as an electric motor and generating part of the required power output. As a result, the engine does not need to generate as much power, and less fuel therefore needs to be injected.

Networking

Fitting locations of control units

Some of the control units shown in this overview are optional and/or country-specific equipment. For reasons of clarity, not all con-trol units fitted in the vehicle can be shown here. Refer to the current service literature for details of the exact control unit fitting locations, as well as instructions for installation and removal. A left-hand drive vehicle is shown in the illustration.



680_150

Key:

A6	Battery, 48 V
A7	Voltage converter (48 V/12 V)
J104	ABS control unit
J136	Seat and steering column adjustment control unit with memory
J234	Airbag control unit
J245	Sliding sunroof adjustment control unit
J250	Electronically controlled damping control unit
J285	Control unit in dash panel insert
J345	Trailer detector control unit
J386	Driver door control unit
J387	Front passenger door control unit
J428	Adaptive cruise control unit
J431	Headlight range control unit
J446	Parking aid control unit

J500 Power steering control unit
J519 Onboard supply control unit
J525 Digital sound package control unit
J527 Steering column electronics control unit
J533 Data bus diagnostic interface
J605 Rear lid control unit
J623 Engine control unit
J743 Mechatronic unit for dual clutch gearbox
J764 Control unit for electronic steering column lock
J772 Reversing camera system control unit
J794 Control unit 1 for information electronics
J869 Control unit for structure-borne sound
J898 Control unit for head-up display
J926 Rear driver side door control unit
J927 Rear passenger side door control unit
J928 Control unit for overhead view camera
J949 Emergency call module control unit and communication unit
J979 Heater and air conditioning system control unit
J1086 Blind Spot Monitor control unit
J1087 Blind Spot Monitor control unit 2
R64 Remote control receiver for auxiliary heater
R86 Aerial amplifier for mobile telephone
R242 Front camera for driver assist systems

Bus systems

The following bus technologies are used in the Audi A3 (type 8Y):

- Standard CAN (high-speed, 500 kbit/s)
- CAN FD (2 Mbit/s) – NEW!
- Sub-CAN systems (high-speed, 500 kbit/s)
- LIN (19.2 kbit/s)
- LVDS (abbreviation for “low voltage differential signalling”, the maximum data rate of an LVDS interface depends on the cable quality. Data transfer rates of 200 Mbit/s to several Gbit/s are possible)
- Ethernet (100 Mbit/s) - NEW!

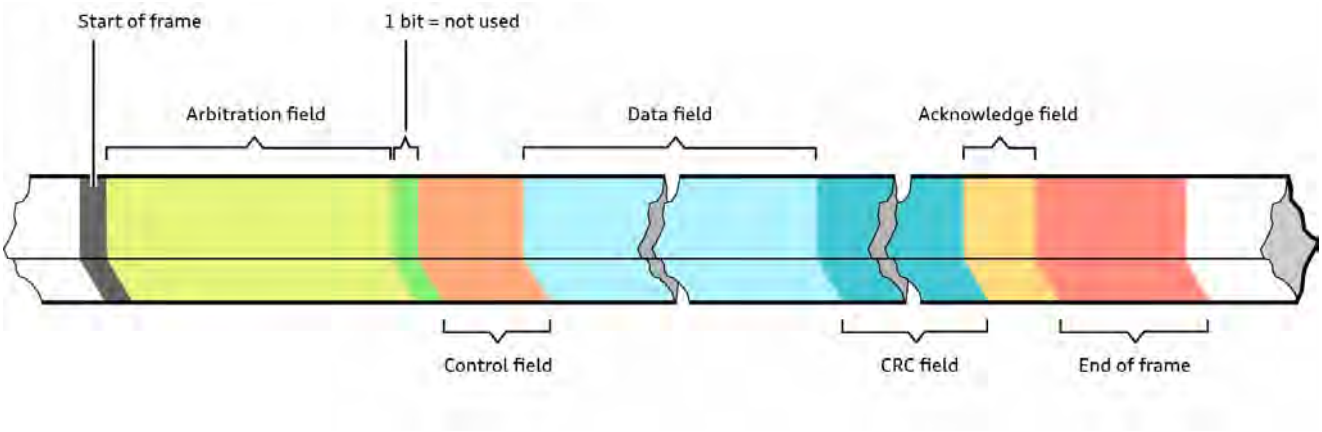
CAN FD

With the Audi A3 (type 8Y), a new advancement in CAN technology, the CAN FD, is implemented in Audi vehicles. FD stands for “flexible data rate”. This technology makes it possible to achieve higher data transfer rates than with previous CAN technology (standard CAN).

The CAN FD provides two significant advantages:

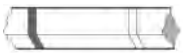
- Bit rate in the data field increased from 500 kbit/s to 2 Mbit/s
- Payload increased to max. 64 bytes

CAN data protocol structure

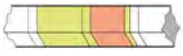


680_187

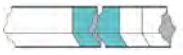
Key:

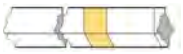

The start of frame marks the beginning of the data protocol.


The data protocol priority is stated in the arbitration field.


The control field gives the number of bits contained in the data field.


The data field transmits the information.


The CRC field provides transmission error detection.

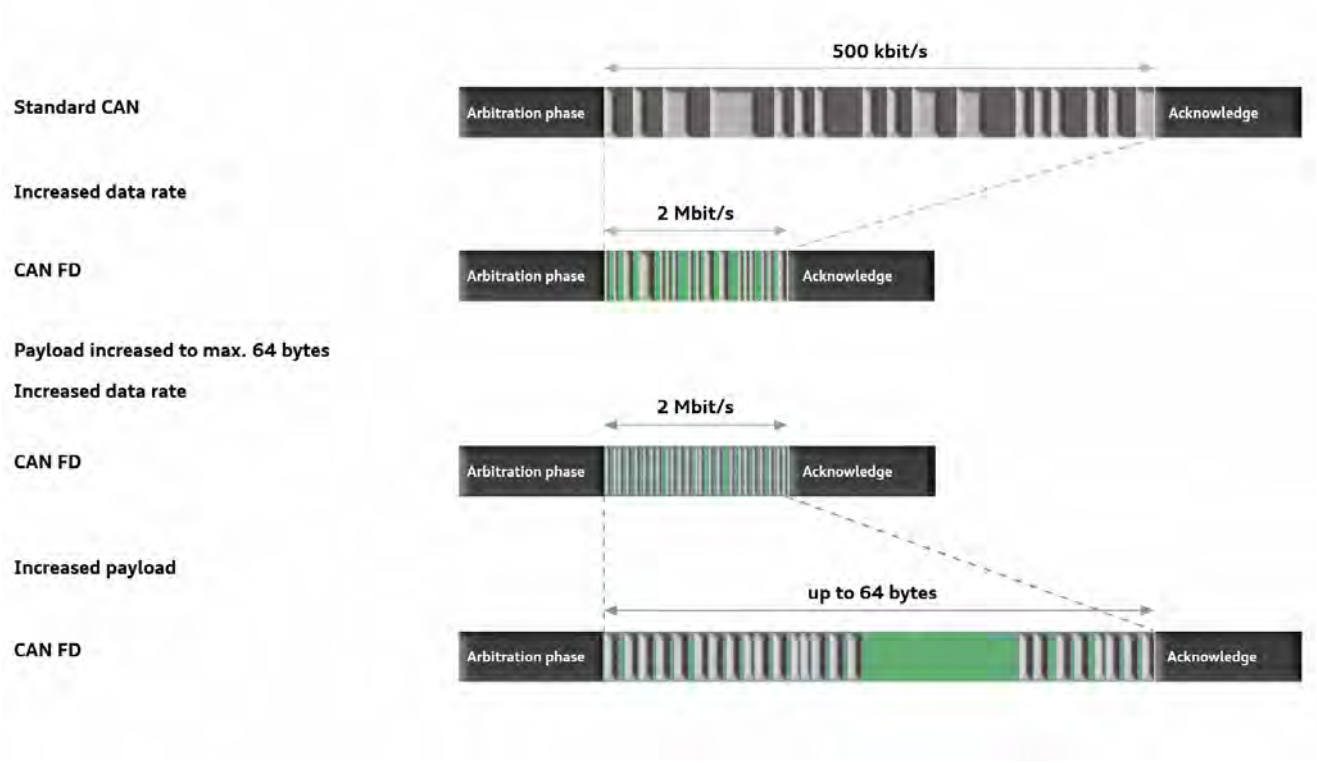

In the acknowledge field, the recipient confirms to the sender that the data have been received correctly.


The end of frame concludes the data protocol.

CAN FD

Bit rate in the data field increased from 500 kbit/s to 2 Mbit/s

› The higher bit rate in the data field is configured in the CAN controller and cannot be modified during operation.
› The bit rate in the arbitration field and the data field can be configured to equal speed.



680_188

Modifications to the control units:

› CAN transceiver must be suitable for higher bit rates (2 Mbit/s)
› CAN controller must be CAN FD compatible
› Software must be capable of handling larger transmissions

CAN FD-compatible controllers can send and receive both standard CAN as well as CAN FD transmissions. Standard CAN controllers can neither send nor receive CAN FD frames. CAN FD control units can also be implemented in standard CAN systems without modifying the hardware.

In the Audi A3 (type 8Y), the CAN FD technology is used for the following CAN bus systems:

› Diagnostics CAN FD
› Powertrain CAN FD
› Running gear CAN FD
› Driver assist systems CAN FD

Implications for service:

It is possible to repair CAN FD wiring. Please observe the current information in the service literature regarding repairs to CAN bus wiring.

Ethernet data bus

Ethernet is a local, cable-based data network capable of much higher data transfer rates (100 Mbit/s bidirectionally per branch) compared to previous network technologies. Ethernet is therefore suitable for transmitting large amounts of data, such as audio and video files. This type of data transmission is used in the Audi A3 (type 8Y) e.g. between the data bus diagnostic interface J533 (gateway) and the control unit 1 for information electronics J794, and between the adaptive cruise control unit J428 and the front camera for driver assist systems R242 (also refer to the control unit typology on the following pages).

Automotive Ethernet network

Ethernet technology typically uses four cables to transmit data. For automotive applications, a standard has been implemented which is tailored to the requirements of vehicle construction. This technology uses two unshielded twisted single pair cables, which has a lower weight and lower cost than the four-cable technology. This technology is also referred to as BroadR-Reach or 100BASE-T1.

Topology

A cable is only ever connected to two control units. This results in a point-to-point connection for two control units, or a star network typology for multiple control units (multiple point-to-point connections) where the gateway switches between the other control units. Switching allows e.g. direct communication between control units J949 and J794. Signals from other bus systems can also be transmitted by the gateway to other control units via Ethernet. For example, the status of the central locking system is sent by the onboard supply control unit J519 via the convenience CAN to the gateway, and from there via Ethernet to the J794.

Examples of this typology in the Audi A3 (type 8Y)

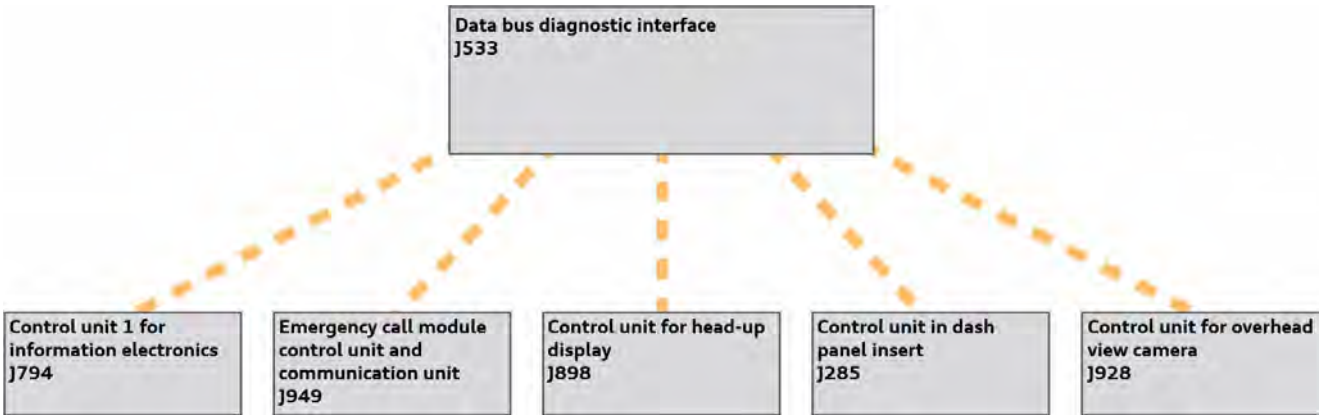
Example: Point-to-point connection

680_192

Key:

Ethernet

Example: Star network typology



680_189

Key:

Ethernet

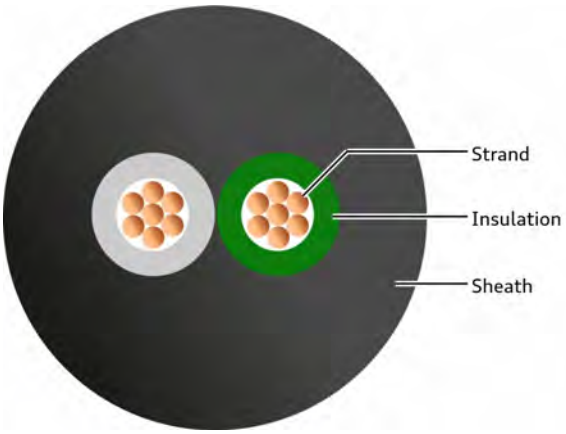
Data transfer rate

Two control units connected to one another can simultaneously send and receive data at a rate of 100 Mbit/s. The maximum data throughput for one branch is therefore 200 Mbit/s.

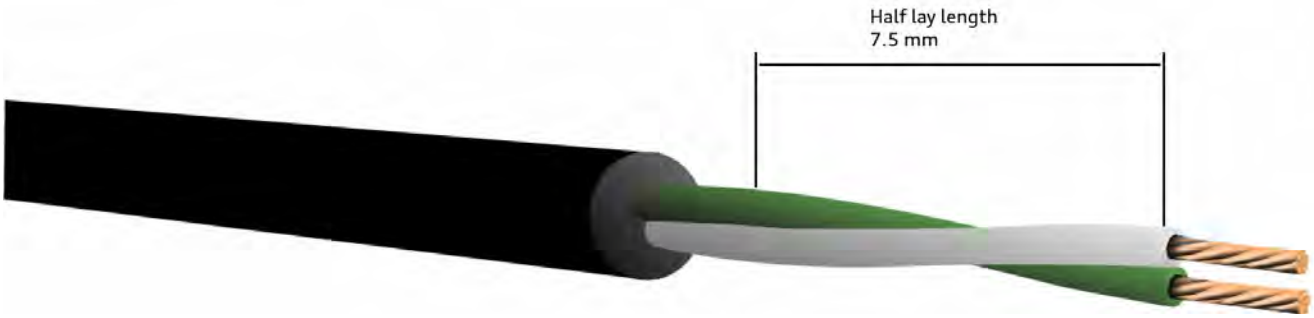
Cable construction/Ethernet

Both shielded cables (in non-dry areas) and unshielded cables (not permitted in non-dry areas) are used in the Audi A3 (type 8Y).

The copper-magnesium alloy strands are 0.13 mm^2 in diameter and have white and green insulation. In the shielded version, the two wires are protected from external influences with a polypropylene sheathing. The lay length is 15 mm.



680_190



680_191

Connectors

The Ethernet cables use conventional connector housings and contacts.

Wiring repairs

The repair concept for the Ethernet cables was not finalised at the time when this self-study programme was written. Please use the current information in the service literature in ELSA.

Fault finding

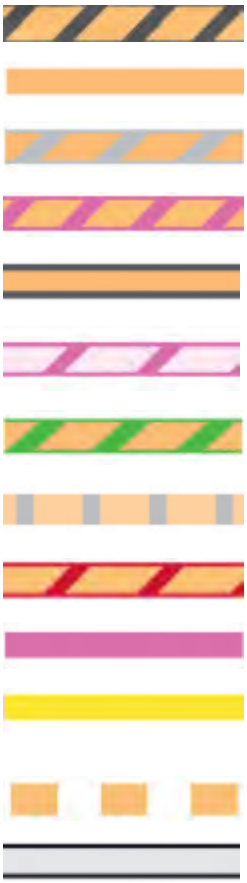
The following event memory entries are defined in the data bus diagnostic interface J533 (gateway):

- "Ethernet data bus branch X no communication":
  The communication partner in question is not responding. In this case, the voltage supply as well as the cable must be checked.
- "Data bus, missing message":
  The communication partner in question is not sending a cyclical message when requested. In this case, the voltage supply and the cable can be presumed to be intact.

Topology of the control units

The topology in the following illustrations shows all control units which may be connected to the various bus systems. Some control units are the result of optional or country-specific equipment. Control units marked “OR configuration” are never both fitted in a vehicle; only one of them is fitted according to the vehicle equipment. The illustrations are intended as an overview of the various data transmission paths between the control units. They are not a substitute for the relevant current flow diagrams. In the illustrations, you will also find information on the bus termination resistors for each of the CAN bus control units.

Key to figures 680_161 and 680_170:



Powertrain CAN FD (flexible data rate)

Diagnostics CAN FD (flexible data rate)

Driver assist systems CAN FD (flexible da-ta rate)

Infotainment CAN

Hybrid CAN

Running gear CAN FD (flexible data rate)

Convenience CAN

CAN bus, automatic gearbox control unit

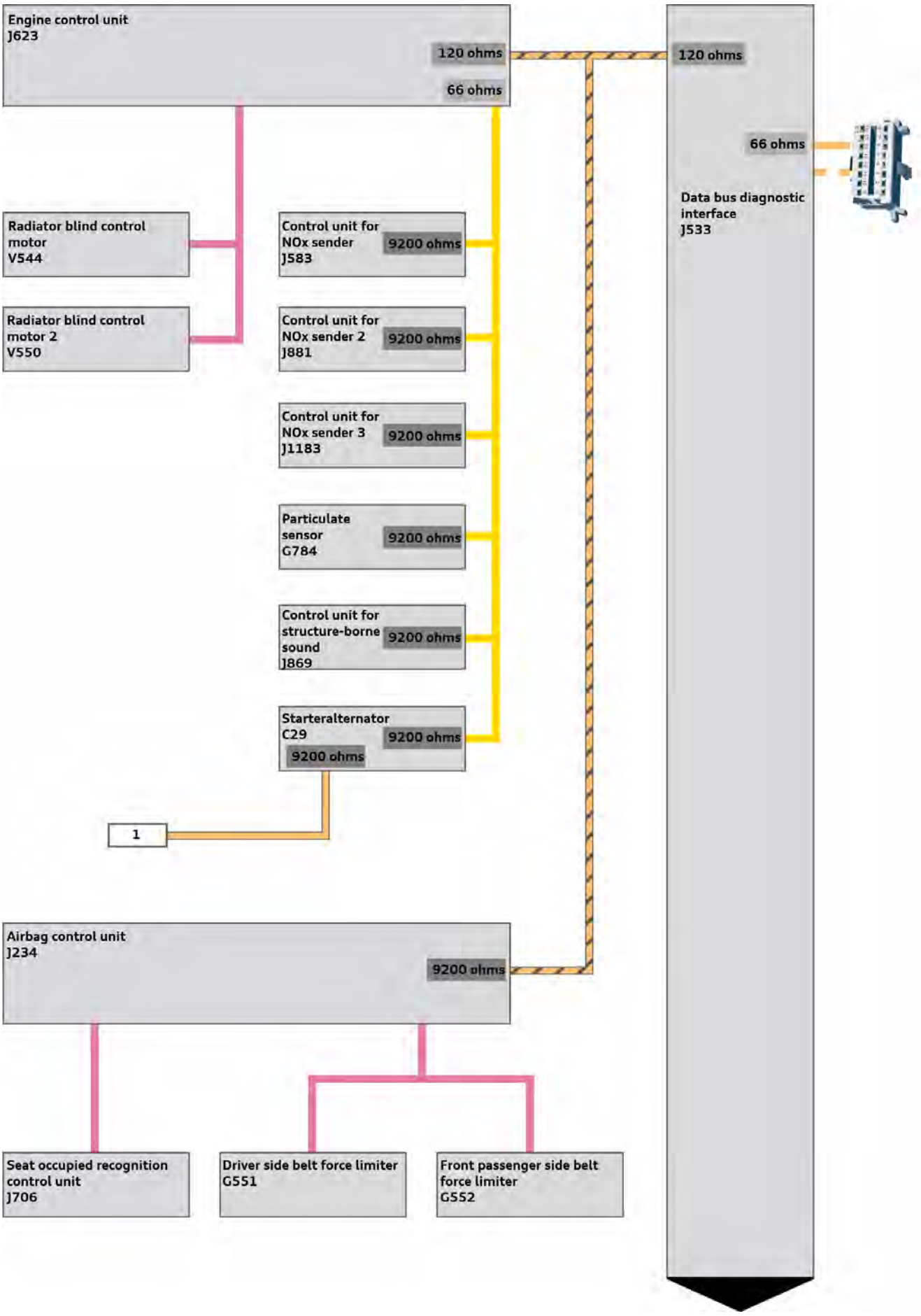
Information electronics 1 CAN

LIN bus

Sub-bus systems

Ethernet

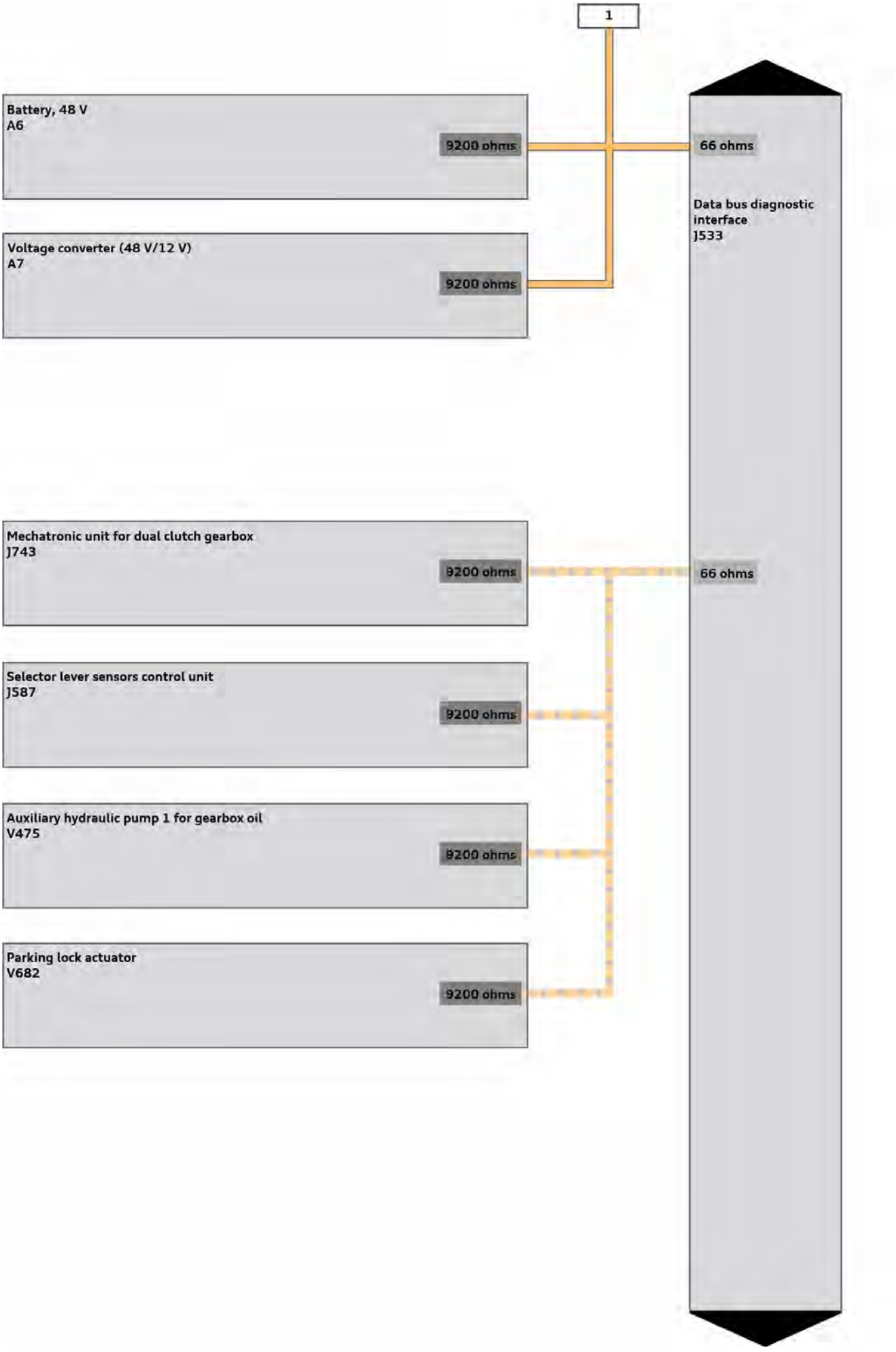
LVDS


Engine control unit
J623
120 ohms
66 ohms
120 ohms
66 ohms
Data bus diagnostic interface
J533
Radiator blind control motor
V544
Radiator blind control motor 2
V550
Control unit for NOx sender
J583
9200 ohms
Control unit for NOx sender 2
J881
9200 ohms
Control unit for NOx sender 3
J1183
9200 ohms
Particulate sensor
G784
9200 ohms
Control unit for structure-borne sound
J869
9200 ohms
Starteralternator
C29
9200 ohms
9200 ohms
1
Airbag control unit
J234
9200 ohms
Seat occupied recognition control unit
J706
Driver side belt force limiter
G551
Front passenger side belt force limiter
G552

680_161

Key:


Powertrain CAN FD (flexible data rate)
Diagnostics CAN FD (flexible data rate)
Hybrid CAN
LIN bus
Sub-bus systems
Ethernet

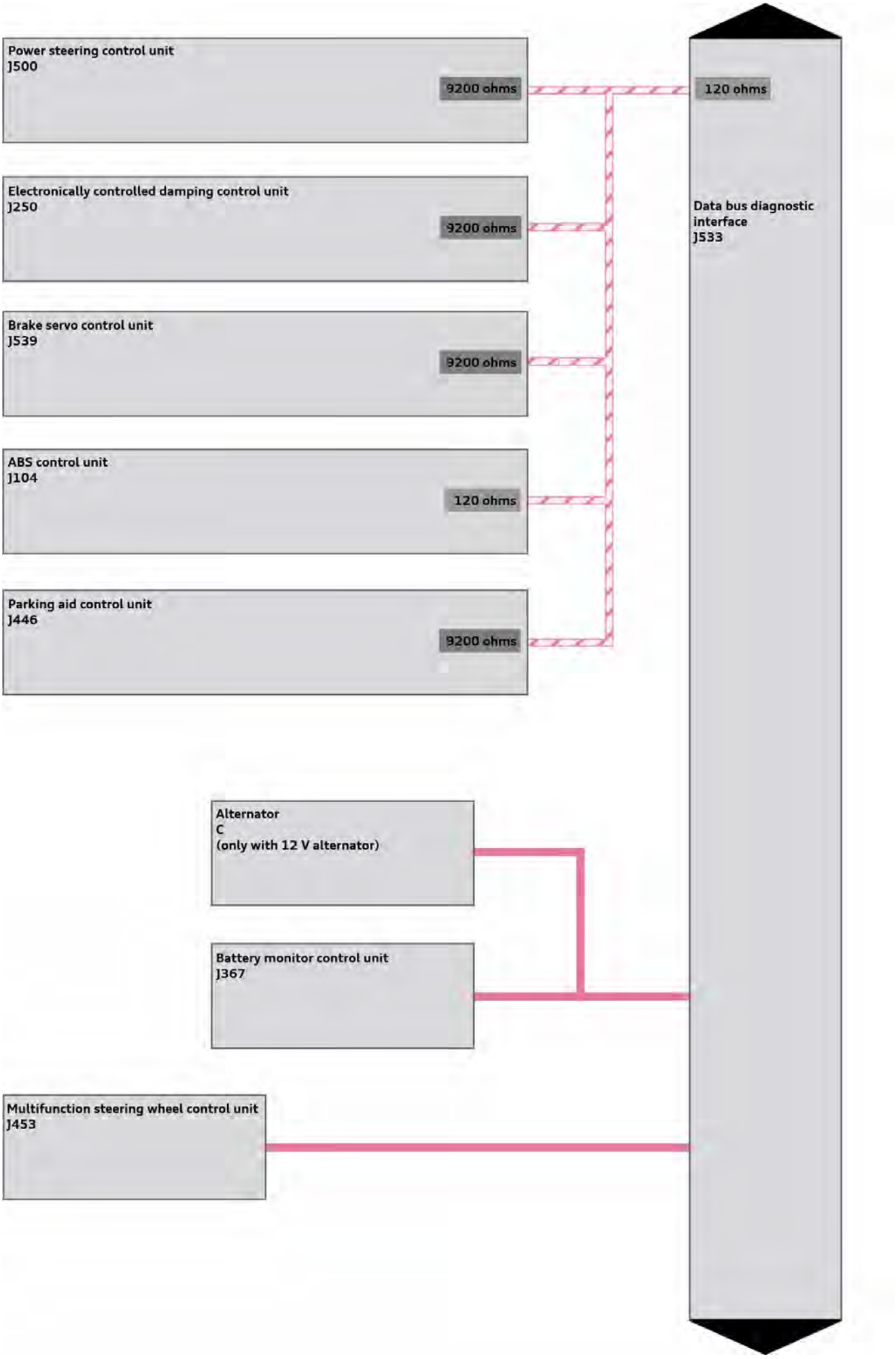

1
Battery, 48 V
A6
9200 ohms
Voltage converter (48 V/12 V)
A7
9200 ohms
66 ohms
Data bus diagnostic interface
J533
Mechatronic unit for dual clutch gearbox
J743
9200 ohms
66 ohms
Selector lever sensors control unit
J587
9200 ohms
Auxiliary hydraulic pump 1 for gearbox oil
V475
9200 ohms
Parking lock actuator
V682
9200 ohms

680_162

Key:

Hybrid CAN

CAN bus, automatic gearbox control unit

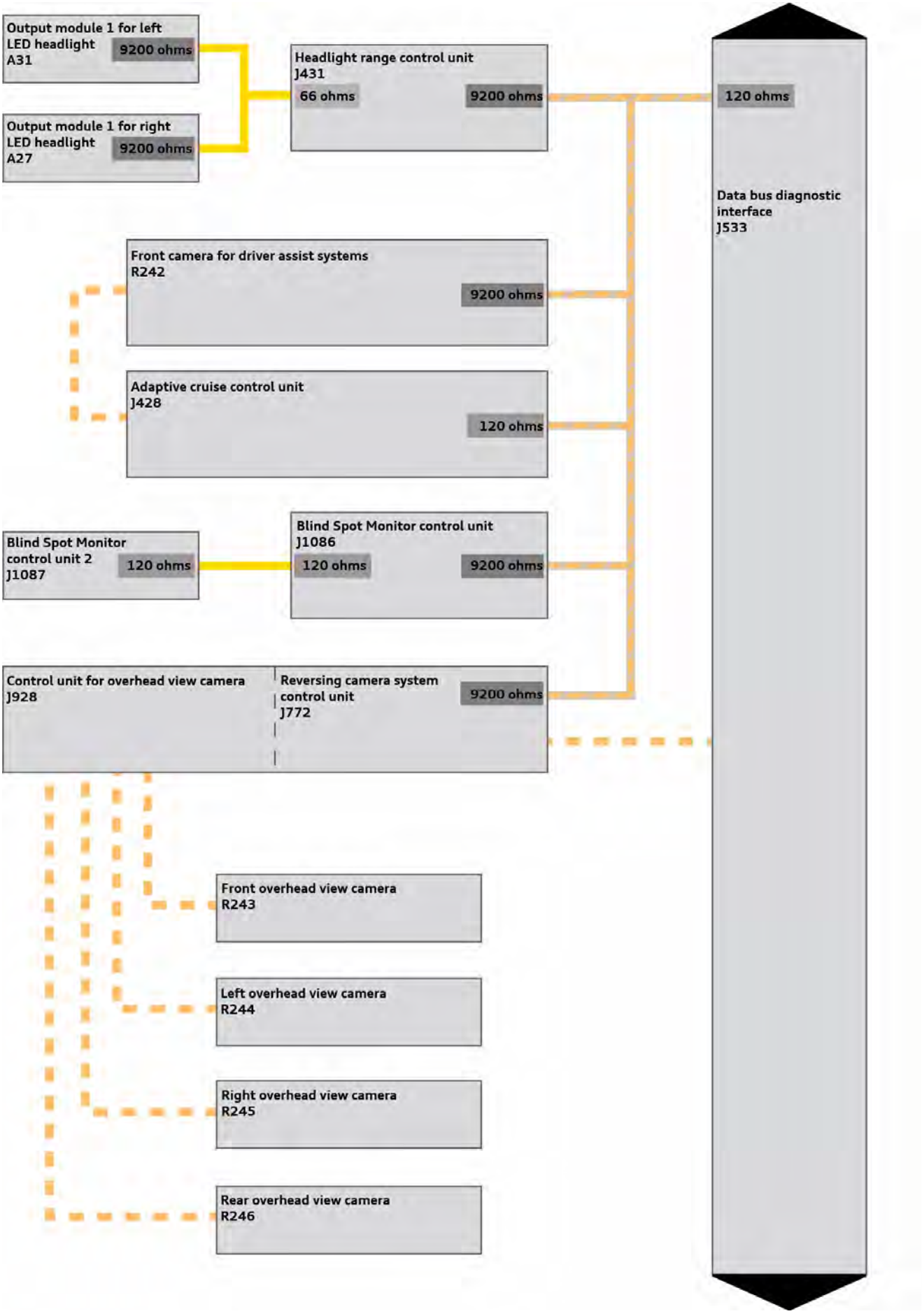

Power steering control unit
J500
9200 ohms
Electronically controlled damping control unit
J250
9200 ohms
Brake servo control unit
J539
9200 ohms
ABS control unit
J104
120 ohms
Parking aid control unit
J446
9200 ohms
120 ohms
Data bus diagnostic interface
J533
Alternator
C
(only with 12 V alternator)
Battery monitor control unit
J367
Multifunction steering wheel control unit
J453

680_163

Key:

Running gear CAN FD (flexible data rate)

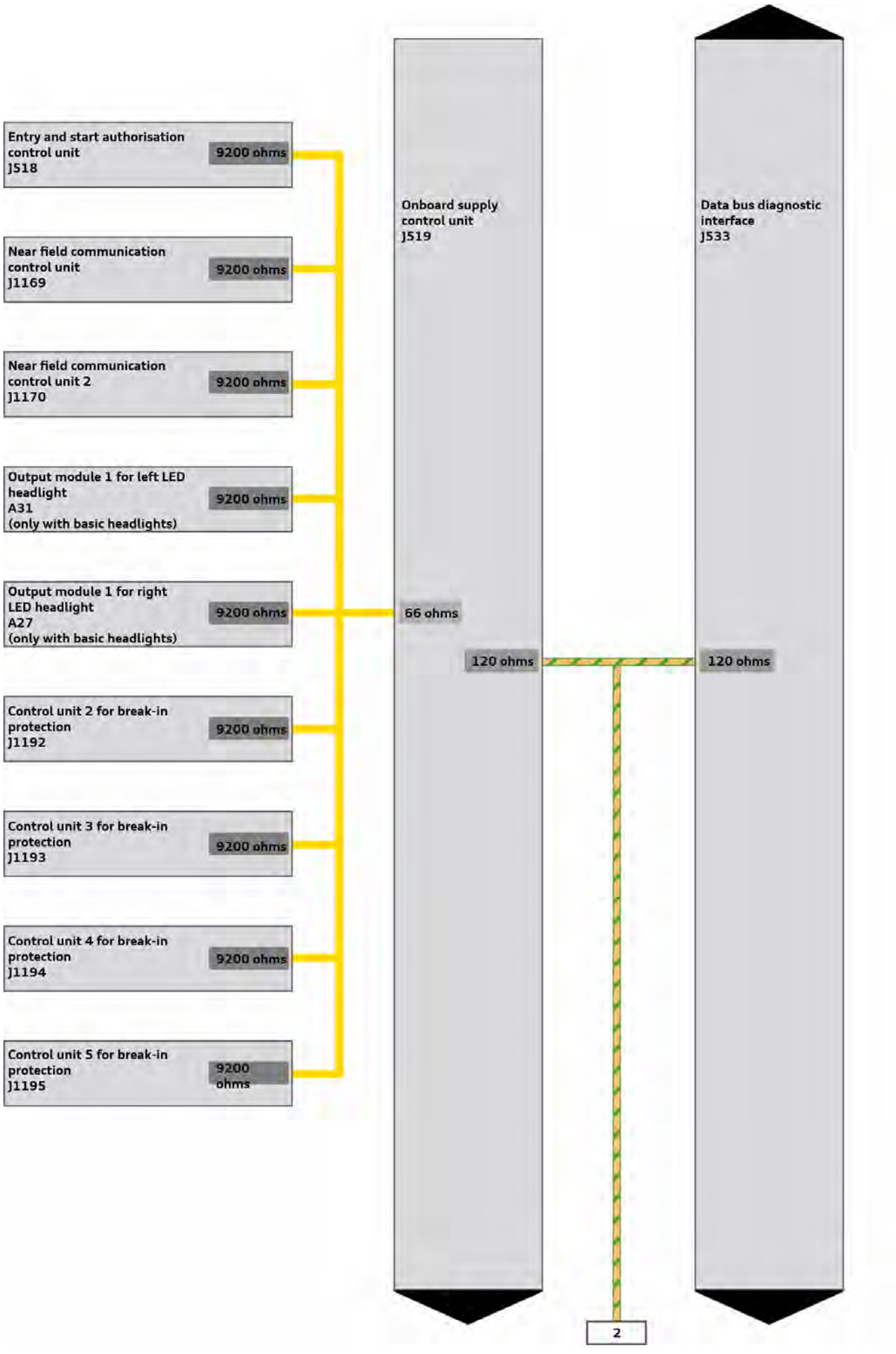
LIN bus


Output module 1 for left LED headlight A31
9200 ohms
Output module 1 for right LED headlight A27
9200 ohms
Headlight range control unit J431
66 ohms
9200 ohms
120 ohms
Data bus diagnostic interface J533
Front camera for driver assist systems R242
9200 ohms
Adaptive cruise control unit J428
120 ohms
Blind Spot Monitor control unit 2 J1087
120 ohms
Blind Spot Monitor control unit J1086
120 ohms
9200 ohms
Control unit for overhead view camera J928
Reversing camera system control unit J772
9200 ohms
Front overhead view camera R243
Left overhead view camera R244
Right overhead view camera R245
Rear overhead view camera R246

680_164

Key:


Driver assist systems CAN FD (flexible da-ta rate)
Sub-bus systems
Ethernet

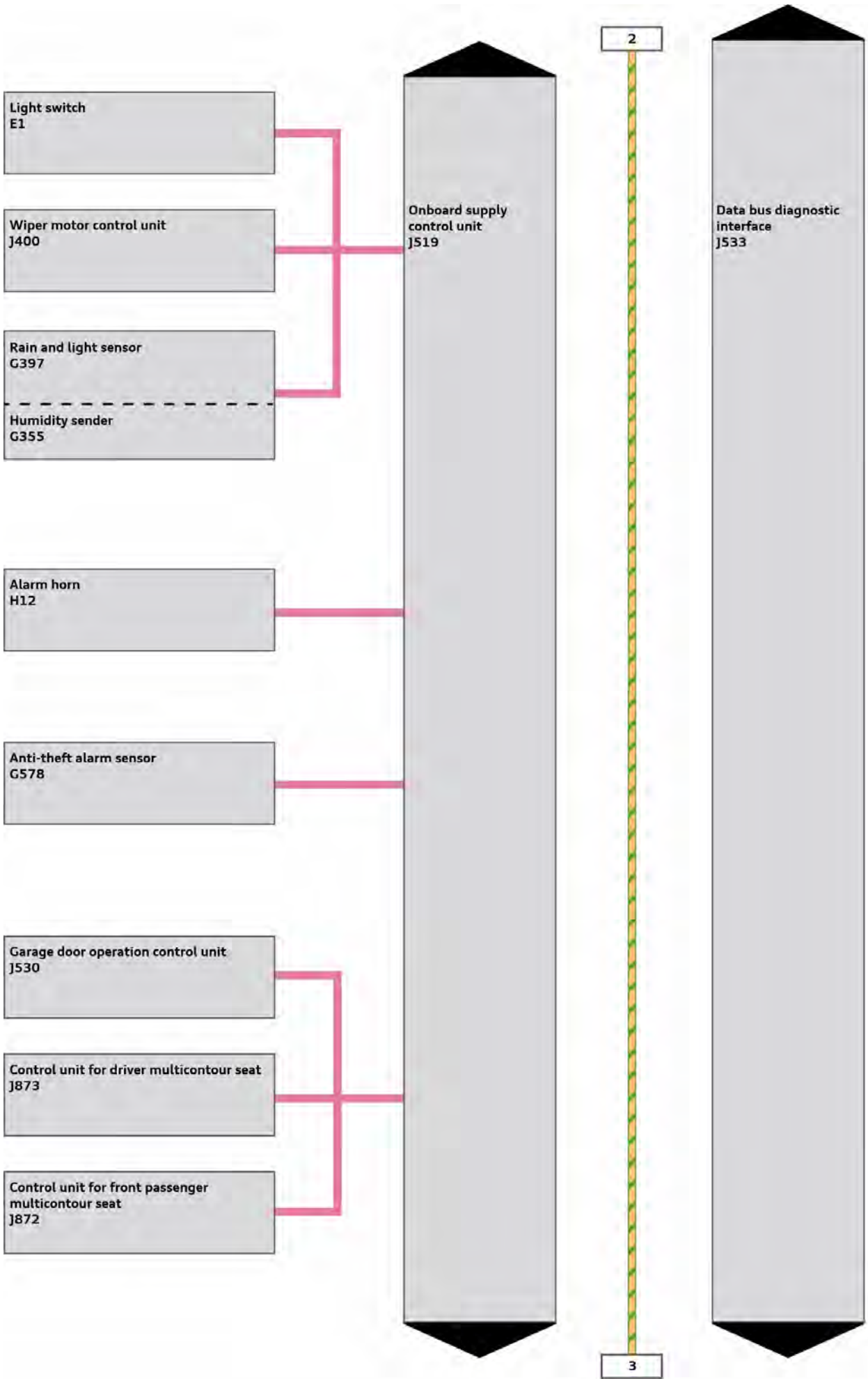

Entry and start authorisation control unit J518
9200 ohms
Near field communication control unit J1169
9200 ohms
Near field communication control unit 2 J1170
9200 ohms
Output module 1 for left LED headlight A31 (only with basic headlights)
9200 ohms
Output module 1 for right LED headlight A27 (only with basic headlights)
9200 ohms
Control unit 2 for break-in protection J1192
9200 ohms
Control unit 3 for break-in protection J1193
9200 ohms
Control unit 4 for break-in protection J1194
9200 ohms
Control unit 5 for break-in protection J1195
9200 ohms
Onboard supply control unit J519
66 ohms
120 ohms
Data bus diagnostic interface J533
120 ohms
2

680_165

Key:

Convenience CAN

Sub-bus systems

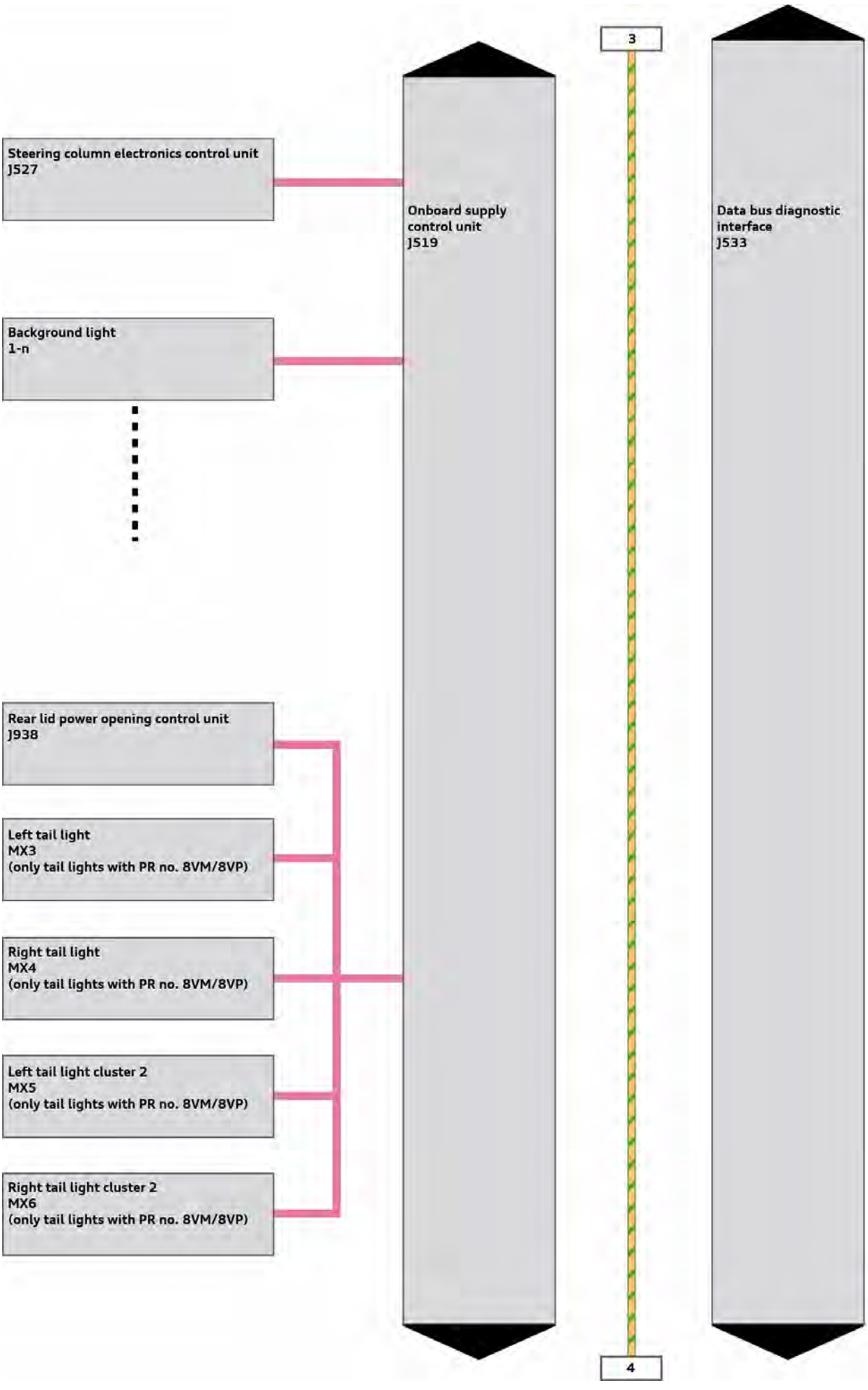

Light switch
E1
Wiper motor control unit
J400
Rain and light sensor
G397
Humidity sender
G355
Alarm horn
H12
Anti-theft alarm sensor
G578
Garage door operation control unit
J530
Control unit for driver multicontour seat
J873
Control unit for front passenger multicontour seat
J872
Onboard supply control unit
J519
2
3
Data bus diagnostic interface
J533

680_166

Key:

Convenience CAN

LIN bus

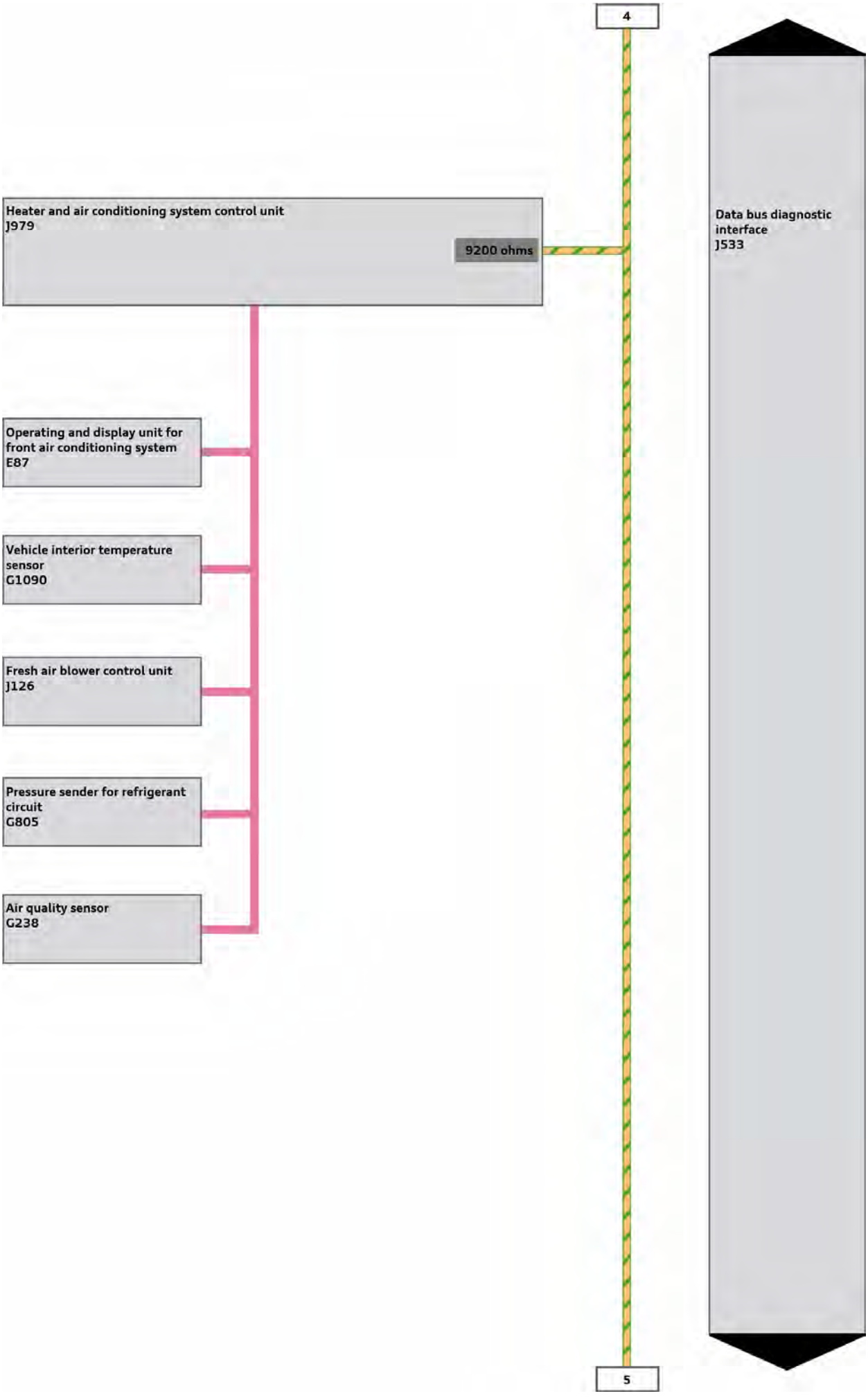

Steering column electronics control unit
J527
Onboard supply
control unit
J519
3
Data bus diagnostic
interface
J533
Background light
1-n
Rear lid power opening control unit
J938
Left tail light
MX3
(only tail lights with PR no. 8VM/8VP)
Right tail light
MX4
(only tail lights with PR no. 8VM/8VP)
Left tail light cluster 2
MX5
(only tail lights with PR no. 8VM/8VP)
Right tail light cluster 2
MX6
(only tail lights with PR no. 8VM/8VP)
4

680_167

Key:

Convenience CAN

LIN bus

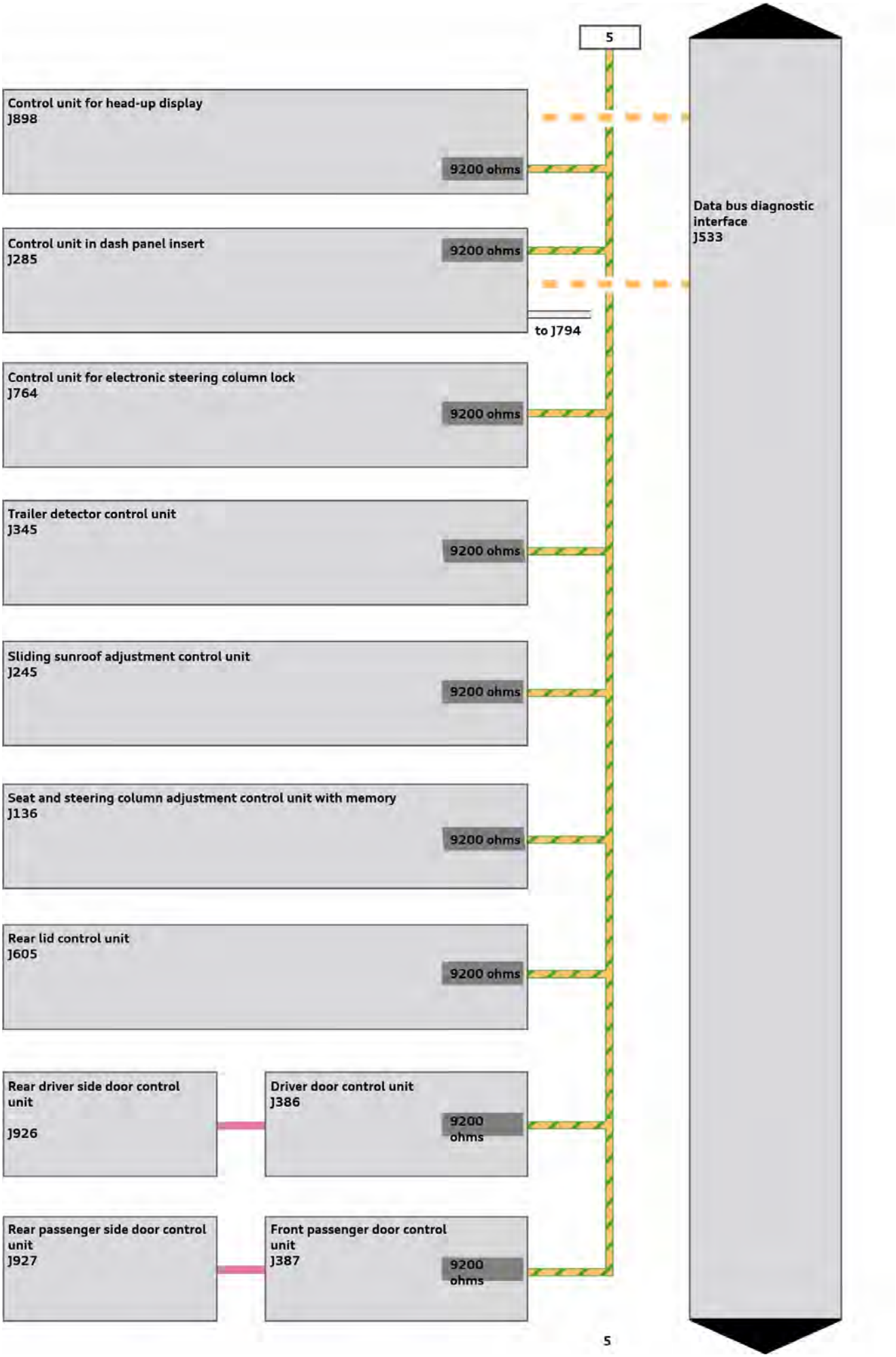

4
Heater and air conditioning system control unit
J979
9200 ohms
Data bus diagnostic interface
J533
Operating and display unit for front air conditioning system
E87
Vehicle interior temperature sensor
G1090
Fresh air blower control unit
J126
Pressure sender for refrigerant circuit
G805
Air quality sensor
G238
5

680_168

Key:

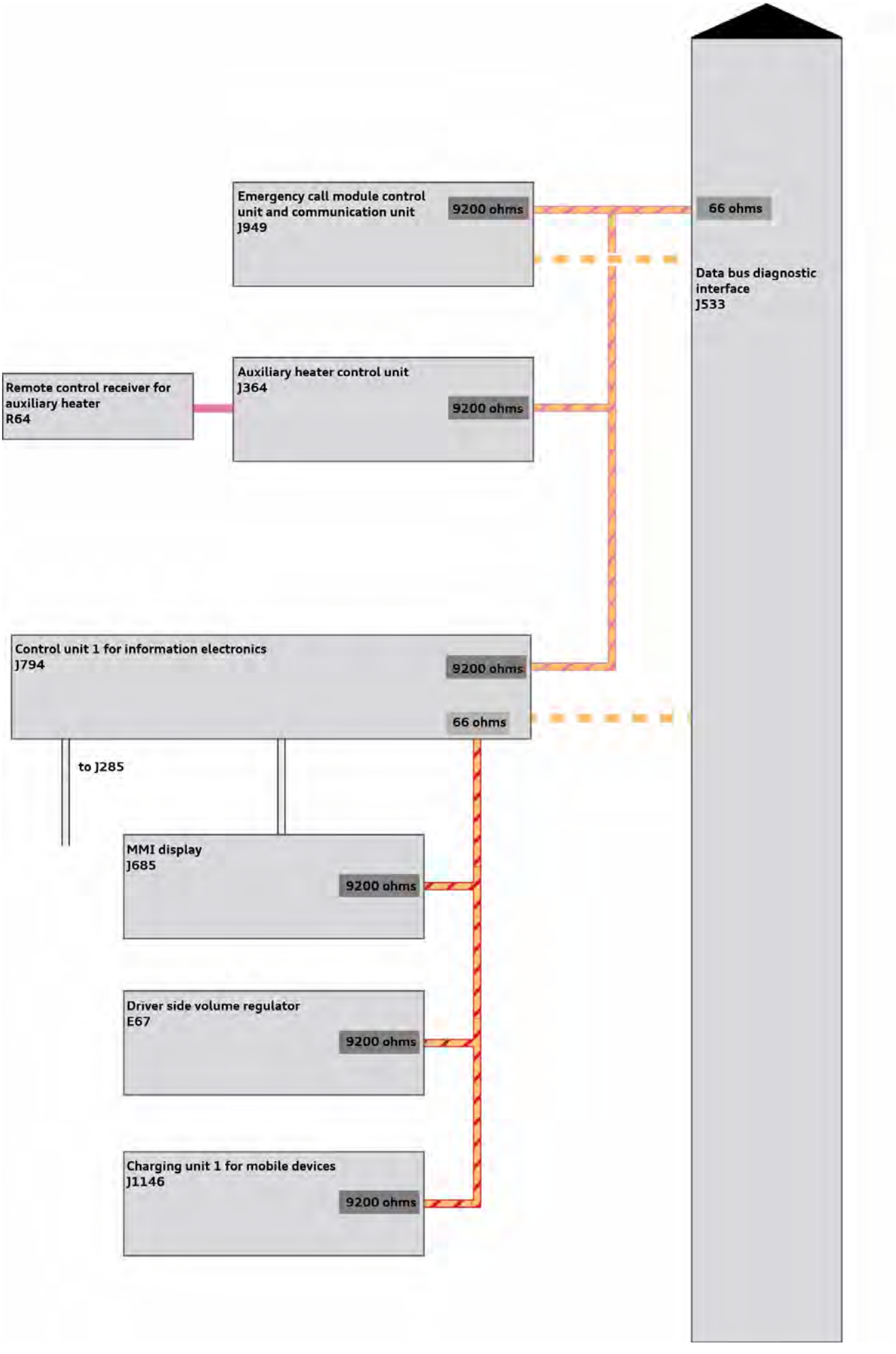
Convenience CAN

LIN bus


5
Control unit for head-up display
J898
9200 ohms
Control unit in dash panel insert
J285
9200 ohms
to J794
Control unit for electronic steering column lock
J764
9200 ohms
Trailer detector control unit
J345
9200 ohms
Sliding sunroof adjustment control unit
J245
9200 ohms
Seat and steering column adjustment control unit with memory
J136
9200 ohms
Rear lid control unit
J605
9200 ohms
Rear driver side door control unit
J926
Driver door control unit
J386
9200 ohms
Rear passenger side door control unit
J927
Front passenger door control unit
J387
9200 ohms
Data bus diagnostic interface
J533
5

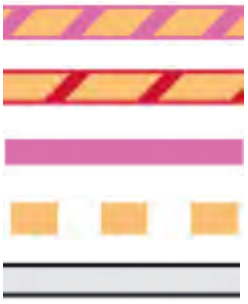
680_169

Key:


Emergency call module control unit and communication unit J949
9200 ohms
66 ohms
Data bus diagnostic interface J533
Remote control receiver for auxiliary heater R64
Auxiliary heater control unit J364
9200 ohms
Control unit 1 for information electronics J794
9200 ohms
66 ohms
to J285
MMI display J685
9200 ohms
Driver side volume regulator E67
9200 ohms
Charging unit 1 for mobile devices J1146
9200 ohms

680_170

Key:



Infotainment CAN

Information electronics 1 CAN

LIN bus

Ethernet

LVDS

Exterior lighting

Light switch

The light switch on the Audi A3 (type 8Y) is designed as a light switch module, as has been the case since initial implementation on the Audi A8 (type 4N). However, the component is still designated as “light switch E1” in the service literature.

This measure has several consequences:

- Changed design
- Changed operating concept
- Changed electrics

Light switch on Audi A3 (type 8Y)

680_135

Operating concept

AUTO is activated automatically when terminal 15 is activated. Various lighting functions can be selected when button **1** is pressed.

- AUTO - The automatic headlights adjust to their surroundings automatically. On some country-specific versions, the daytime running lights, tail lights and number plate lights switch on permanently.
- Dipped beam - The dipped beam headlights can be switched on as soon as terminal 15 is active.
- Marker lights - The marker lights can be switched on at speeds below 10 km/h.
- OFF - All lighting functions can be switched off at speeds below 10 km/h. If the vehicle exceeds a speed of 10 km/h, AUTO is activated automatically.

Button **2** can be used to activate the all-weather lights (applies to vehicles with all-weather lights).

Button **3** switches the rear fog light on.

The function selected is briefly displayed to the driver in a pop-up on the instrument cluster.

Electrical system

The light switch in the Audi A3 (type 8Y) is a LIN slave of the onboard supply control unit J519. It only requires three wires: two for the power supply and the LIN wire to J519.

Transmitting the selected switch position via voltage-controlling is now a thing of the past.

680_136

Key:

LIN bus

Positive wire

Earth wire

Headlights

Versions

There are four different headlight versions on the Audi A3 (type 8Y):

- Basic headlights with LED technology (ECE[16] and SAE[17])
- LED headlights (ECE[18] and SAE[19])
- Matrix LED headlights (ECE[20] and SAE[21]) without matrix beam function in the USA as approval not yet granted
- Tinted matrix LED headlights (ECE[22] and SAE[23]) without matrix beam function in the USA as approval not yet granted

Basic headlights: PR no.: 8EX + 8VA (SAE 8EX + 8VM)

8EX = LED headlights

8VA = Tail lights with bulbs

8VM = LED tail lights with dynamic turn signals

The illustration shows the left headlight in the ECE[24] version.

[16] ECE = for the European market
[17] SAE = for the North American market
[18] ECE = for the European market
[19] SAE = for the North American market
[20] ECE = for the European market
[21] SAE = for the North American market
[22] ECE = for the European market
[23] SAE = for the North American market
[24] ECE = for the European market

680_137

Lighting functions

- Daytime running light **1**
- Marker light **1**
- Dipped beam headlight **2**
- Main beam headlight **3**
- Turn signal **4** (bulb PWY24W)
- Side marker light **5** (not illustrated, SAE only[25])

Equipment

The basic headlights can be combined with the main beam assist as an option.

Special features of the lighting functions

All lighting functions with the exception of the turn signals are performed by LEDs. On the ECE[26] version of the basic headlights, the daytime running lights are dimmed to marker light level when the turn signal is activated. On the SAE[27] version, the daytime running lights are deactivated during the turn signal procedure.

Entry/exit lighting (coming home/leaving home)

The entry/exit lighting illuminates the area around the vehicle when the driver unlocks the vehicle and after the ignition has been switched off and the driver's door has been opened. The entry/exit lighting only takes effect when the light switch is in the AUTO position. When it is dark, the function activates the dipped beams, the marker lights and the tail lights. On the SAE[28] version, the side marker lights are also activated. When it is light, only the daytime running lights in the headlights are activated when the vehicle is unlocked (entry lighting). At the time this self-study programme was written, no function for activating the rear lights had been implemented. Exit lighting when it is light is not planned.

Headlight range control

The basic headlights on the Audi A3 are equipped with automatic static headlight range control. The vehicle level is calculated via a sender on the rear axle. The headlight range control motors can be replaced.

Light for driving on the right/left side of the road

The headlights are designed for driving on the right or left side of the road and do not have to be converted for driving in other countries.

Activation/service

The turn signal bulbs are activated directly by the onboard supply control unit J519. The LEDs for the other functions are activated by the output modules A27 and A31. The two output modules receive commands regarding the individual lighting functions and the headlight range control from the onboard supply control unit J519 via a sub-bus system (also referred to as a private CAN). The turn signal bulbs and the output modules integrated in the headlight housings can be renewed in the event of a fault. In the event of damage to the upper and inner headlight attachments, repair tabs can be attached to the headlight housing.

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[25] SAE = for the North American market
[26] ECE = for the European market
[27] SAE = for the North American market
[28] SAE = for the North American market

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

8IT = LED headlights

8VM = LED tail lights with dynamic turn signals

The illustration shows the left headlight in the ECE[29] version.

680_138

Lighting functions

- Daytime running light **1/1b**
- Marker light **1/1b**
- Turn signal **5**
- Dipped beam headlight **2**
- Main beam headlight **3**
- All-weather light **4**
- Turning light **4**, one-side
- Motorway light **2**, raised via headlight range control
- Static cornering light **4**, one-side
- maneuvering light (**2** + **4**), when reverse gear is selected and it is dark
- Side marker light **6**, not illustrated, SAE only[30]

Equipment

The LED headlights on the Audi A3 can be combined with the main beam assist and a headlight washer system as options.

Special features of the lighting functions

All light functions are performed by LEDs. On the LED headlights, the daytime running lights are deactivated when the turn signals are active, both in the ECE[31] and the SAE[32] version. The lower section (**1b**) remains active but is dimmed to the level of the marker light. The turning light is active at speeds between 0 km/h and 40 km/h when the turn signals are active. The maneuvering light is activated when reverse gear is selected if the light sensor detects darkness at the same time. The static cornering light is controlled via the steering angle and is active at speeds between 0 km/h and 70 km/h.

Entry/exit lighting (coming home/leaving home

The entry/exit lighting illuminates the area around the vehicle when the driver unlocks the vehicle and after the ignition has been switched off and the driver's door has been opened. The entry/exit lighting only takes effect when the light switch is in the AUTO position. When it is dark, the function activates the dipped beams, the marker lights and the tail lights. On the SAE[33] version, the side marker lights are also activated. When it is light, only the daytime running lights in the headlights are activated when the vehicle is unlocked (entry lighting). At the time this self-study programme was written, no function for activating the rear lights had been implemented. Exit lighting when it is light is not planned.

Headlight range control

The LED headlights on the Audi A3 are equipped with automatic dynamic headlight range control. The vehicle level is calculated via one sender on the front axle and one on the rear axle. The headlight range control motors can be replaced.

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[29] ECE = for the European market

[30] SAE = for the North American market

[31] ECE = for the European market

[32] SAE = for the North American market

[33] SAE = for the North American market

Light for driving on the right/left side of the road

The headlights are designed for driving on the right or left side of the road and do not have to be converted for driving in other countries.

Activation/service

The LEDs in the LED headlights are activated by the output modules A27 and A31. The two output modules receive commands regarding the individual lighting functions and the headlight range control from the headlight range control unit J431. The information is exchanged via a sub-bus system (also referred to as a private CAN or an AFS CAN). The output modules fitted on the outside of the headlight housings can be replaced in the event of a fault. It is not possible to replace individual lights. In the event of damage to the upper and inner headlight attachments, repair tabs can be attached to the headlight housing.

Matrix LED headlights (PR No.: 8IY + 8G4 + 8VP or 8JT + 8G4 + 8VP)

8IY = LED headlights with lens

8JT = LED headlights with lens and darkened screen (only available on the launch edition at the time of writing this SSP)

8G4 = Matrix beam

8VP = LED tail lights with dynamic turn signals and animated (specially presented) light functions

The illustration shows the left headlight in the ECE[34] version.

680_139

Lighting functions

- Dynamic marker light/daytime running light **1**
- Dynamic turn signal **5**
- Dipped beam headlight **2**
- Matrix beam main beam **3**
- All-weather light **4**
- Turning light **4**, one-side
- Intersection light **4**
- Motorway light **2**, raised via headlight range control
- Dynamic cornering light **3**, maximum brightness is shifted to center of corner
- maneuvering light (**2** + **4**), when reverse gear is selected and it is dark
- Side marker light **6** (not illustrated, SAE only[35])

[34] ECE = for the European market

[35] SAE = for the North American market

Equipment

The matrix LED headlights on the Audi A3 are equipped with a headlight washer system.

Special features of the lighting functions

All light functions are performed by LEDs. On the LED headlights, the daytime running lights are deactivated when the turn signals are active, both in the ECE[36] and the SAE[37] version. The turning light is active at speeds between 0 km/h and 40 km/h when the turn signals are active. The maneuvering light is activated when reverse gear is selected. The static cornering light is controlled via the steering angle and is active at speeds between 0 km/h and 70 km/h. The matrix main beam on the Audi A3 (type 8Y) is in a single row.

Entry/exit lighting (coming home/leaving home)

The entry/exit lighting illuminates the area around the vehicle when the driver unlocks the vehicle and after the ignition has been switched off and the driver's door has been opened. The entry/exit lighting only takes effect when the light switch is in the AUTO position. When it is dark, the function activates the dipped beams, the marker lights and the tail lights. On the SAE[38] version, the side marker lights are also activated. When it is light, only the daytime running lights in the headlights are activated when the vehi-cle is unlocked (entry lighting). At the time this self-study programme was written, no function for activating the rear lights had been implemented. Exit lighting when it is light is not planned.

Headlight range control

The LED headlights on the Audi A3 are equipped with automatic dynamic headlight range control. The vehicle level is calculated via one sender on the front axle and one on the rear axle. The headlight range control motors can be replaced.

Light for driving on the right/left side of the road

The headlights are designed for driving on the right or left side of the road and do not have to be converted for driving in other countries.

Activation/service

The LEDs in the LED headlights are activated by the output modules A27 and A31. The two output modules receive commands regarding the individual lighting functions and the headlight range control from the headlight range control unit J431. The information is exchanged via a sub-bus system (also referred to as a private CAN or an AFS CAN). The output modules fitted on the outside of the headlight housings can be replaced in the event of a fault. It is not possible to replace individual lights. In the event of damage to the upper and inner headlight attachments, repair tabs can be attached to the headlight housing.

Light classes/BCI code

What are light classes?

LEDs of the same type may have production tolerances in their power/brightness characteristic curve. Some batches of LED require slightly more power to achieve the same brightness, others slightly less. To be able to take this into account, the LEDs are usually divided into up to four light classes. To be able to set the correct current value, the control unit needs to know which light classes the LEDs in the headlights have, which can vary by headlight. The information on the light class (the BCI code) is located on a sticker fitted either on the headlight housing or the control units. BCI stands for brightness class information. If a control unit or an LED module is renewed, the control unit must be informed of the BCI code. This is done in the ODIS test program. As the sticker may be obscured by the lock carrier or other vehicle components when the headlight is installed, we recommend noting the BCI code (which will be required later) before you install the headlight.

[36] ECE = for the European market
[37] SAE = for the North American market
[38] SAE = for the North American market
[39] ECE = for the European market
[40] ECE = for the European market
[41] SAE = for the North American market
[42] ECE = for the European market
[43] SAE = for the North American market
[44] ECE = for the European market

Tail lights

General description

The lighting on the rear of the Audi A3 (type 8Y) is achieved by four tail lights. One tail light is installed in the left and one in the right side panel. Two further tail lights are housed in the rear lid. Lights with bulbs or LED technology may be used depending on the vehicle equipment.

Versions

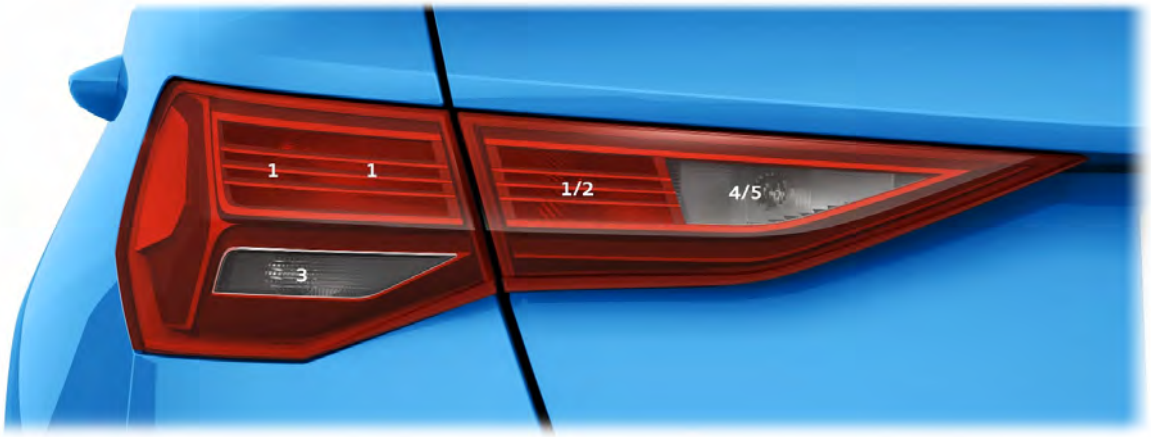
The tail lights appear in the following versions:

- Basic tail lights (ECE[39] only)
- LED tail lights with dynamic turn signals (ECE[40]) and SAE)[41]
- LED tail lights with dynamic turn signals and animated (specially presented) light functions (ECE[42] and SAE[43])

Basic tail light (PR no.: 8VA)

8VA = Tail lights with bulbs

The illustration shows the tail lights on the left side of the vehicle in the ECE[44] version.



680_140

Lighting functions

- Tail light **1**
- Brake light **2**
- Turn signal **3**
- Reversing light **4**
- Rear fog light **5**

Activation/special features

All tail light functions are provided by bulbs and activated by the onboard supply control unit J519.

The rear fog light and the reversing light are only on one side. The fog light is always on the side nearest the center of the road. The reversing light is in the opposite light. On left-hand drive vehicles, this means that the rear fog light is in the left rear lid tail light and the reversing light is in the right rear lid tail light. On right-hand drive vehicles, the opposite is true.

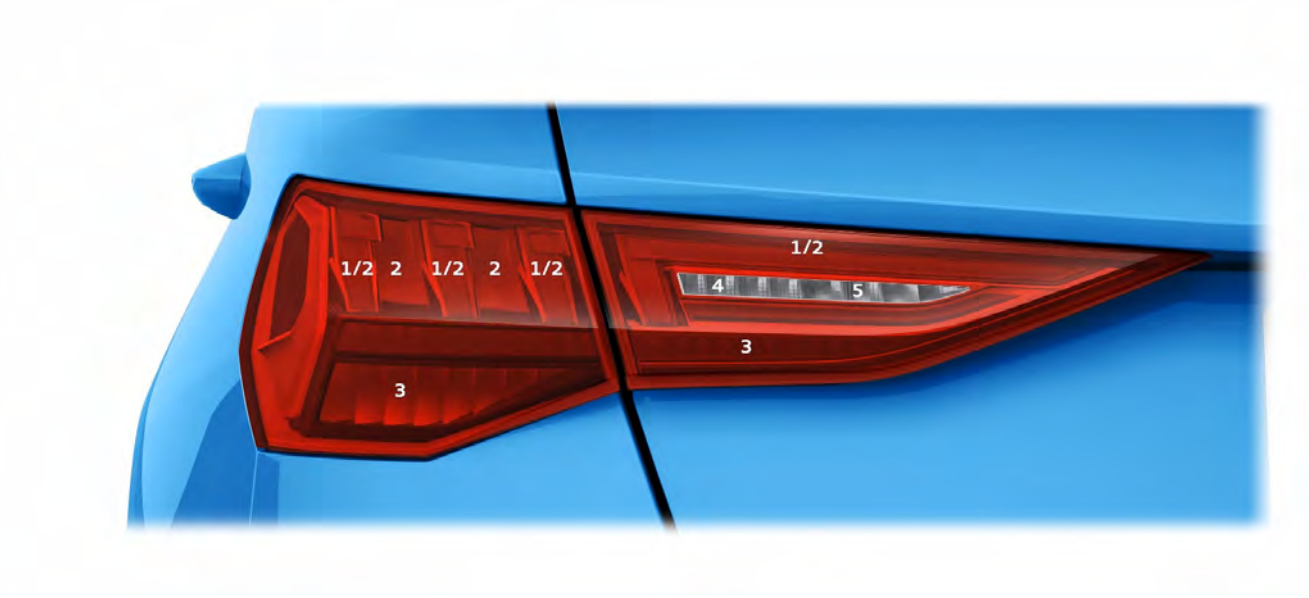
Both the rear fog light and the reversing light are dimmed to 70% of their power when the rear lid is opened. The heat from the bulbs would otherwise be given off directly upwards onto the plastic cover for the tail light and could damage the lights. The basic tail lights are always fitted together with the basic headlights. On the basic tail lights, all the bulbs can be changed individually.

[45] ECE = for the European market

LED tail lights (PR no.: 8VM)

8VM = LED tail lights with dynamic turn signals

The illustration shows the tail lights on the left side of the vehicle in the ECE[45] version.



680_141

Lighting functions

- Tail light **1**
- Brake light **2**
- Dynamic turn signal **3**
- Reversing light **4**
- Rear fog light **5**

Activation/special features

All lighting functions use LED technology. All lighting functions of the tail lights are activated by the onboard supply control unit J519.

The turn signal LEDs are activated from inside to outside at different times (dynamic turn signals).

The rear fog light and the reversing light are on both sides on this tail light version. No lighting functions are deactivated when the rear lid is opened. The tail light LEDs cannot be renewed.

LED tail lights (PR no.: 8VP)

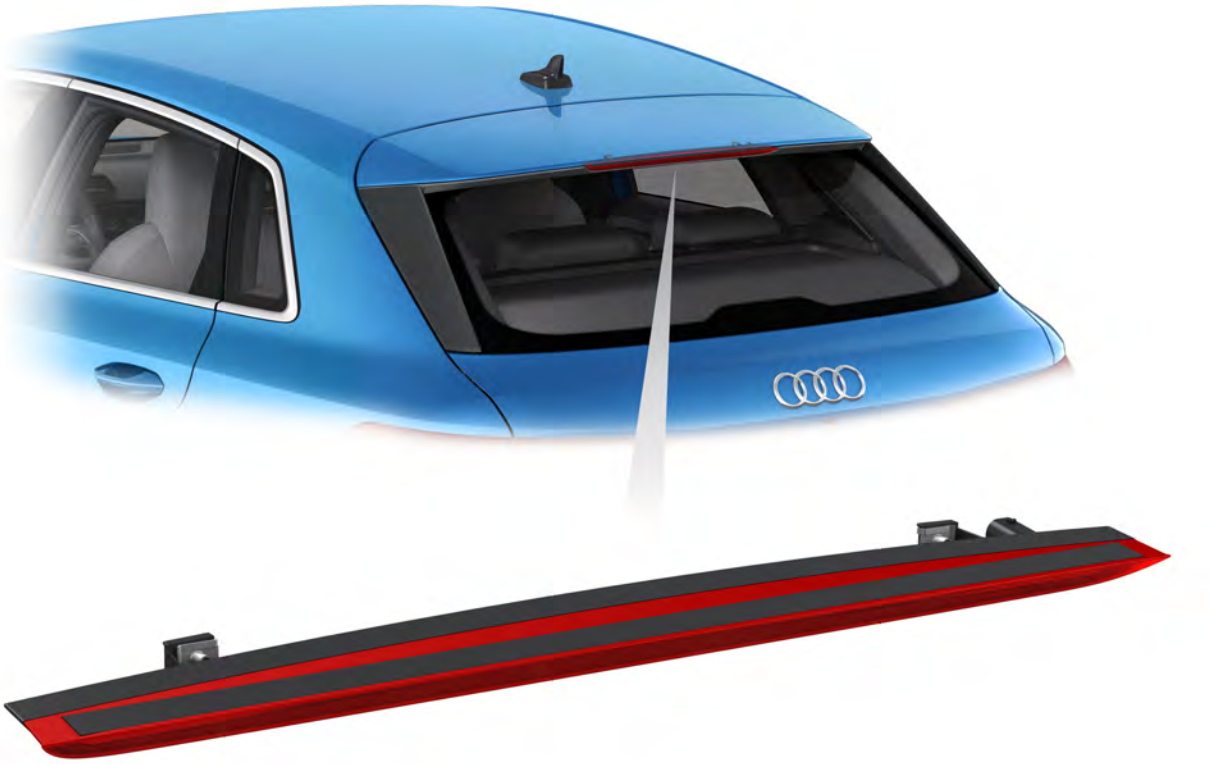
8VP = LED tail lights with dynamic turn signals and animated (specially presented) light functions

Lighting functions

The lighting functions are identical to those on the 8VM version, with one exception. On the 8VP version of the LED tail lights, dynamic tail lights are used. This means that this lighting function is dynamically activated/deactivated when it is switched on/off. This involves the LEDs being activated at different times.

High-level brake light

The high-level brake light is integrated into the rear spoiler and provides additional brake lighting via 18 LEDs. Its total power is 2.2 W. It is not possible to replace individual parts of the high-level brake light. It must be replaced as a complete unit in the event of a fault.

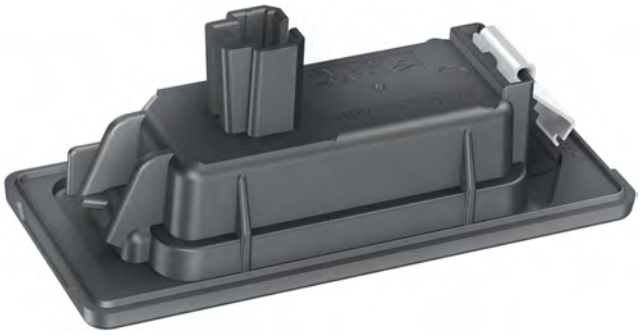


680_142

Number plate lights

Regardless of the tail light version, the number plate lights on the Audi A3 (type 8Y) utilise LED technology and have two LEDs each. Like the high-level brake light, they are activated by the onboard supply control unit J519. The two number plate lights are clipped into the rear lid itself.

680_145



680_146

Convenience electronics

Interior lighting

As in the past, there are four PR numbers available for the interior lighting:

- QQ0: without additional interior lighting = standard lighting
- QQ1: with additional interior lighting = background lighting package
- QQ2: with additional interior lighting = contour/background lighting package, multi-coloured
- QQ5: with additional lighting (illuminated make-up mirrors)

In combination with the contour lighting, the background lighting package underlines the horizontal alignment of the interior and emphasises the high-quality application area on the dash panel at the same time.

Special interior lighting features in the Audi A3 (type 8Y):

- On the basic interior lighting package, bulbs are fitted in the roof modules.
- The glove box light is an ordinary light bulb on all interior lighting equipment packages.
- The door warning lights are passive (reflectors only).
- The cup holders are not illuminated on any equipment version.
- The reading lights are capacitive on QQ1 and QQ2.
- There are different versions of the entry lights and footwell lighting:
  - QQ0: no entry lights or footwell lighting
  - QQ1: entry lights and footwell lighting at front only – white LEDs
  - QQ2: entry lights and footwell lighting at front and rear – white LEDs
- A right luggage compartment light (using LED technology) is fitted on all vehicles. A left luggage compartment light is also fitted on vehicles with the storage package QE1.

Interior lighting on the Audi A3 (type 8Y) using PR number QQ2 (contour/background lighting package) as an example

680_199

Instrument clusters

The Audi A3 is only fitted with digital instrument clusters. The standard equipment is a 10.25” digital instrument cluster. A 12.3” instrument cluster is fitted on vehicles with PR number 9S9. Both versions are complemented by a standard 10.1” center display with MMI touch.

With functions on demand, customers can add to the instrument cluster displays and access additional content. In this way, customers can upgrade, for example, a digital instrument cluster to an Audi virtual cockpit at any time.

Reference
For further information about the different instrument clusters, refer to SSP_673, "Audi Q3 (type F3)".

Multi-function steering wheels

Depending on the equipment, various steering wheels are available for the Audi A3. All of them are offered in a sporty three-spoke design.

The basic version of the steering wheel does not have any multi-function buttons.

There are two multi-function versions: a mid-range version and the high version. On the high version, the multi-function buttons correspond to those on MLB platform Audi vehicles. The 12.3” Audi virtual cockpit instrument cluster is always fitted on vehicles with the high version.

The steering wheels can be equipped with an optional heated rim on which the temperature is regulated by an NTC sender located in the foam of the rim.

Reference
Further information on the multi-function steering wheels can be found in SSP 680, "Steering system".

Central locking

General information

Thefts of vehicles with keyless systems are well known to the public. The actual theft is usually achieved using the so-called relay technique. This involves extending the radio signal from the remote control key, making it possible to steal the car.

Audi has continued to develop the convenience key function and added additional security features. For example, customers can manually deactivate the “Open with convenience key” function before leaving Audi models with convenience key.

The Audi A8 (type 4N) was the first vehicle in which an additional sensor was integrated in the vehicle key. If the vehicle key is not moved for a long period, the convenience system central control unit J393 decides, using the information “key moved” or “key not moved”, whether the function “open” should be allowed or disallowed.

On the Audi A3 (type 8Y), this function has been enhanced so that the key is completely deactivated after a specified period of time. The vehicle can then no longer be started.

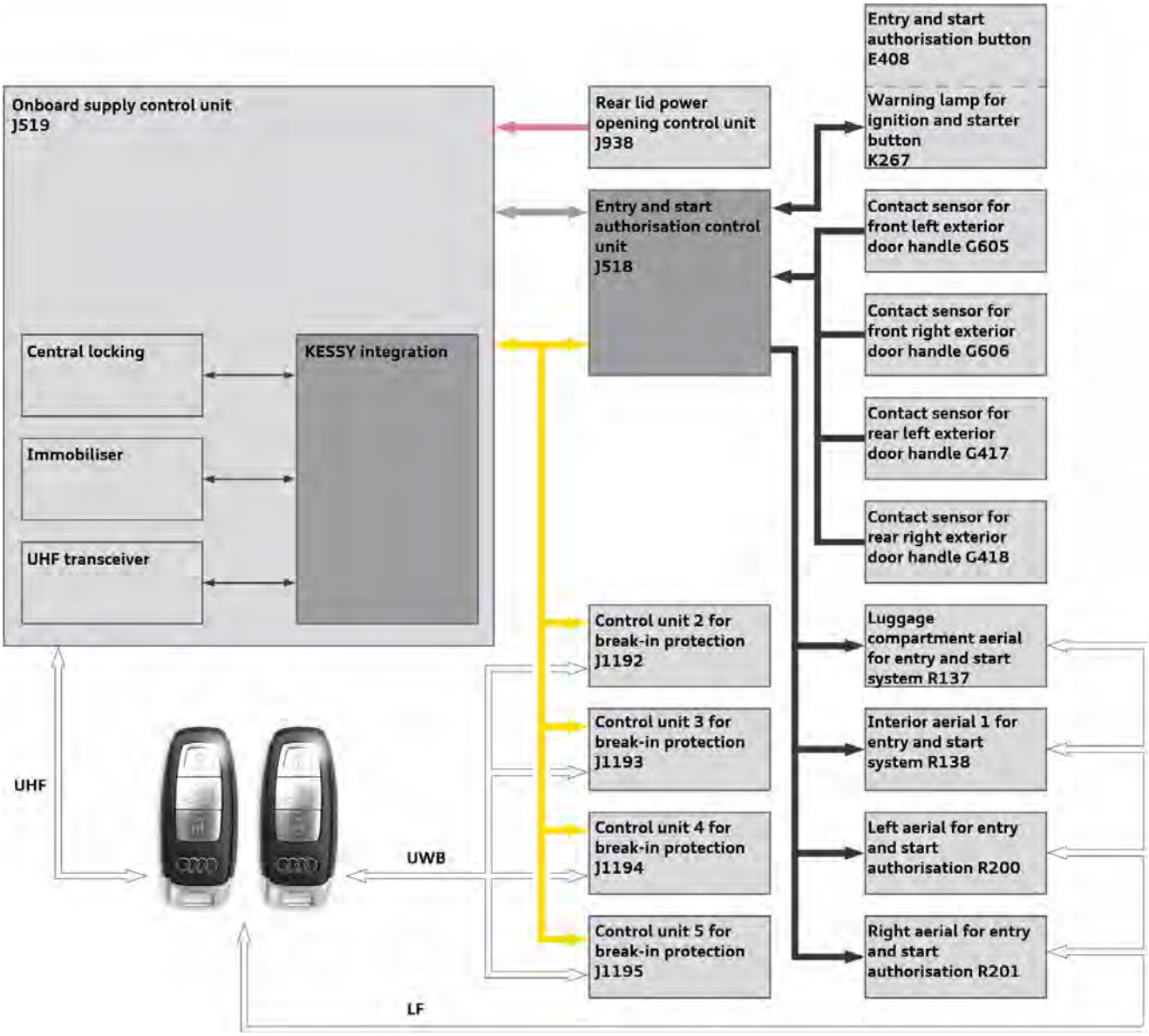
RSAD UWB on the Audi A3 (type 8Y)

The Audi A3 (type 8Y) is the first vehicle which measures the distance between the ignition key and the vehicle. This is done by measuring the time a signal takes to travel in the gigahertz frequency. This function is available as optional equipment. The function “Open with convenience key” is only possible and permitted within a defined distance. There is no communication between the key and the vehicle outside the defined area.

The technology is called RSAD UWB. This stands for **R**elay **S**tation **A**ttack **D**etection via **U**ltra **W**ide **B**and. At Audi, RSAD modules are referred to as “control units for break-in protection”. These are control units 2 - 5 for break-in protection (J1192 - J1195). They send UWB signals. The distance between the sender and the receiver is determined using the signal travel time and stored in the ignition key.

Put simply, the system measures the time between sending the signal and receiving the response. The time measured is referred to as the time of flight (ToF). If the time measured (a few nanoseconds) is multiplied by the propagation velocity of the radio waves (almost the speed of light), the result is the distance between the vehicle and the key, correct to within a few centimetres.

Convenience key



680_126

Key to figures 680_161 and 680_170:

- KESSY system component
- Discrete wire
- Wake-up wire
- LIN bus
- Sub-bus systems
- Radio signals

LF 125 kHz
Low **f**requency

UHF 315 or 433 MHz

Ultra **h**igh **f**requency
UWB 4 - 6 GHz **U**ltra **w**ide **b**and

The onboard supply control unit J519 is the central locking system master on the Audi A3 (type 8Y) The entire control system for the central locking functions (including the RSAD control system) is located in the onboard supply control unit.

The entry and start authorisation control unit J518 communicates both with the onboard supply control unit J519 and the four control units for break-in protection J1192 - J1195 via a sub CAN.

J518 also performs the usual tasks:

- Reading in the signals from the capacitive sensors in the door handles
- Activating the entry and start authorisation aerials
- Wake function for the onboard supply control unit J519 via a discrete wire
- Activating the warning lamp for ignition and starter button K267
- Reading in the button signals from entry and start authorisation button E408

The electronics for the UWB technology are only present in the ignition key of vehicles with PR numbers 5F1, 5F4 or 5F8. However, the UWB distance measurement is not automatically used on these vehicles in all cases. If a vehicle is simply locked with the remote control, no UWB query is made.

On vehicles with UWB distance measurement, the central locking system sends signals in the following frequency ranges:

- If the vehicle is locked or unlocked via the remote control, the key sends its signal in the UHF frequency at either 315 MHz or 433 MHz, depending on the vehicle and country.
- If the central locking system is operated using the convenience key functions, the four aerials (R137, R138, R200, R201) communicate at a frequency of 125 kHz.
- The communication between the four control units for break-in protection and the ignition key takes place in the UWB frequency at either 4 GHz or 6 GHz (frequencies depend on the country).

Operation chart

The operation chart uses rough steps to describe the process of opening the vehicle using the convenience key chronologically, taking the driver's door as an example.

Opening door using convenience key = reaching into door handle, e.g. driver's door	
Audi A3 (type 8Y) with convenience key and PR number 5D1/5D4/5D8 **(= without control units for break-in protection)**	**Audi A3 (type 8Y) with convenience key and PR number 5F1/5F4/5F8** **(= with control units for break-in protection)**
Wake up J518 and J519, then activate entry and start authorisation aerials to detect keys Signals/frequency: 125 kHz	Wake up J518 and J519, then activate entry and start authorisation aerials to detect keys Signals/frequency: 125 kHz
Communication 1 between J519 and ignition key to exchange cryptological signatures Signals/frequency: 315 MHz or 433 MHz	Communication 1 between J519 and ignition key to exchange cryptological signatures Signals/frequency: 315 MHz or 433 MHz plus UWB distance measurement between ignition key and control units for break-in protection (result of distance measurement is located in key at end of process) UWB signals/frequency: 4 GHz or 6 GHz

Opening door using convenience key = reaching into door handle, e.g. driver's door	
Communication 2 between ignition key and J519; the signature of the key is sent along with the positional values measured (which side of the vehicle the key is on) Signals/frequency: 315 MHz or 433 MHz	Communication 2 between ignition key and J519; the signature of the key is sent along with the positional values measured (which side of the vehicle the key is on) plus The key also sends the encrypted result of the UWB distance measurement.
J519 checks: › Whether key signature is OK (key adapted to vehicle) › Whether position provided by positional values is OK (key on driver side of vehicle)	J519 checks: › Whether key signature is OK (key adapted to vehicle) › Whether position provided by positional values is OK (key on driver side of vehicle) › Whether the UWB distance measurement results in a distance between key and vehicle that is too large
If the checks are successful, J519 approves the desired central locking function	

Diagnostic addresses of control units for break-in protection

Diagnostic address	Name of control unit	Fitting location
811E	Control unit 2 for break-in protection J1192	Bumper (front left corner)
811F	Control unit 3 for break-in protection J1193	Bumper (front right corner)
8120	Control unit 4 for break-in protection J1194	Bumper (rear left corner)
8121	Control unit 5 for break-in protection J1195	Bumper (rear right corner)

Reference
Further general information on the process followed by the convenience key and its functions can be found in SSP 638, "Audi Q7 (type 4M) Convenience electronics".

Control unit for head-up display J898

The Audi A3 (type 8Y) can be equipped with an optional head-up display (HUD). The control unit for head-up display J898 projects warnings and selected information onto the windscreen so that they appear in the driver's extended field of vision.

The driver can change the following system settings via the MMI menu:

- Setting the height of the image
- Correction of image rotation
- Display brightness
- Visualised display content

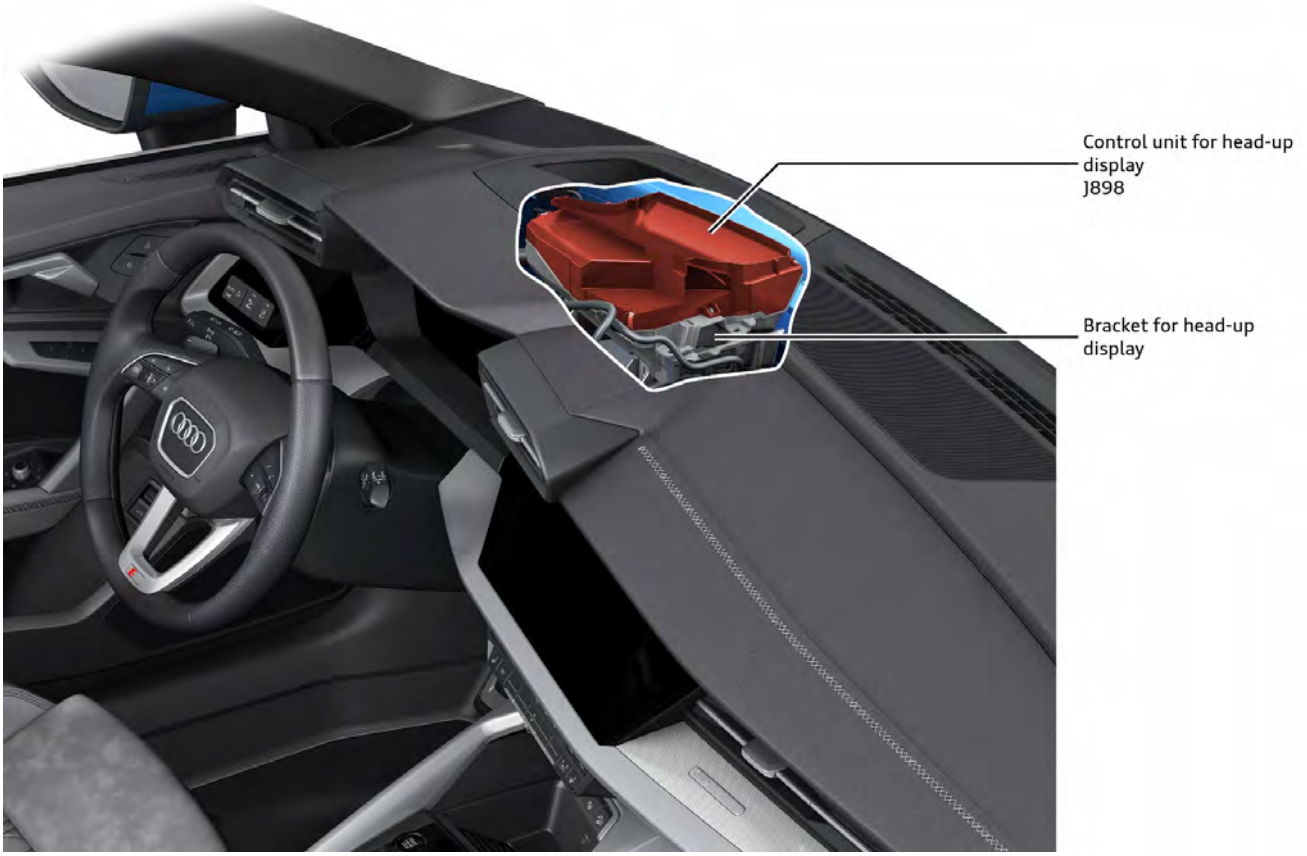
On the Audi A3 (type 8Y), the head-up display communicates with the vehicle diagnostic tester via diagnostic address 0082.

The head-up display J898 is a convenience CAN node. The head-up display is also connected to the data bus diagnostic interface J533 via Ethernet. The Ethernet connection is required so that large amounts of data, such as the detailed intersection maps (or navigation maps), can be transmitted quickly.

Software updates (flashing) are possible both via CAN and Ethernet.

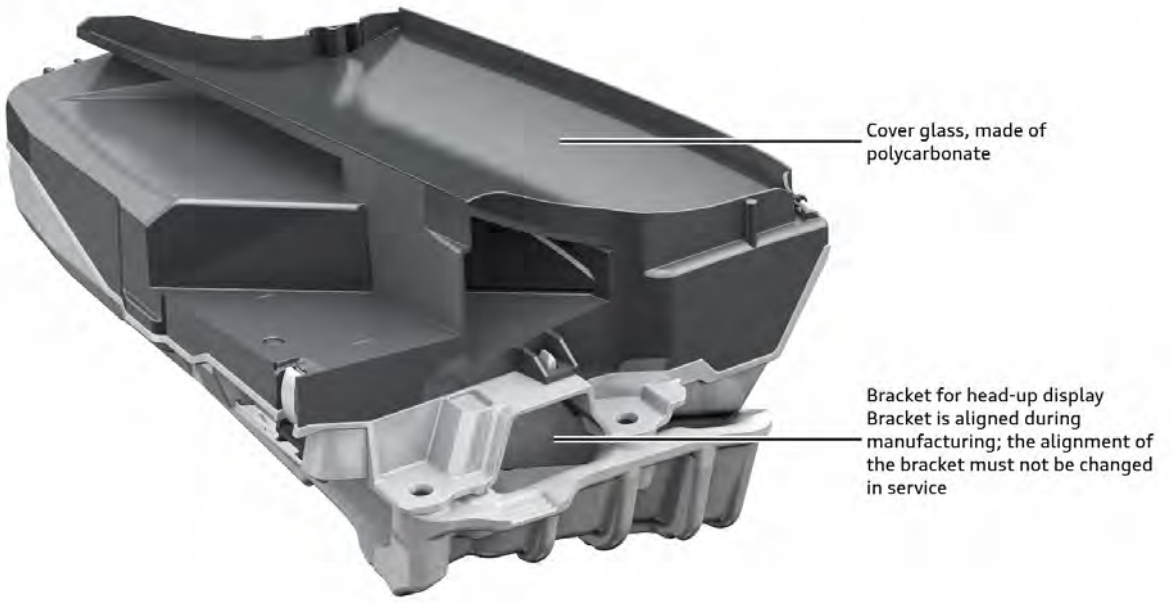
The control unit for head-up display on the Audi A3 (type 8Y) can be removed and installed via the opening for the instrument cluster (with the instrument cluster removed). This simpler service procedure is possible because the head-up display module on the Audi A3 (type 8Y) is significantly smaller than the control units for head-up display J898 used in the past, for example on MLBevo vehicles.

Control unit for head-up display J898 in installation position in vehicle



680_133

Control unit for head-up display J898 with bracket for head-up display



680_134

Because of the new folding technology of the mirrors in the head-up display and the reduced height, a smaller image height and width results for the driver. At approx. 2.20 m, the projection distance of the image corresponds to that of all other head-up displays in current Audi vehicles.

Dual assignment of signals

Very bright light sources are required for head-up displays. Powerful LEDs are used to achieve this. As a result, regular operating currents of I ≥ 1 A can occur. To ensure that the current rating of the connector pins is not exceeded, the control unit is supplied with power via 2 pins each for terminal 30 and terminal 31.

PIN	Signal	Signal name
1	Terminal 31	Earth
2	Terminal 31	Earth
3		
4	ETH-	Ethernet data wire (negative)
5	ETH+	Ethernet data wire (positive)
6	Terminal 30	Terminal 30
7	Terminal 30	Terminal 30
8		
9	CAN-L	CAN bus Low
10	CAN-H	CAN bus High

Preparation for head-up display

Audi A3 (type 8Y) vehicles equipped with head-up display have the PR number KS1. As the control unit for head-up display J898 can be removed and installed via the instrument cluster opening for the first time in the Audi A3, a preparation for head-up display will also be available.

If an Audi A3 has the PR number KS4, the vehicle is ready for a head-up display. At the factory, the dash panel, for example, then already has the recess for the future head-up display and the windscreen has the requisite wedge-shaped construction.

PR numbers

PR numbers	Description
KS0	Without head-up display
KS1	Head-up display
KS4	Ready for head-up display

List of equipment provided with PR number KS4

- Dash panel with opening for head-up display
- Trim to close dash panel opening for head-up display
- HUD bracket on module cross member of dash panel (aligned at factory)
- Corresponding wiring harness (secured in place)
- Windscreen for head-up display (with wedge angle)

The most important part of PR number KS4 is the HUD bracket, which is aligned at the factory, on the module cross member of the dash panel. The bracket can only be installed during the production process, as the gauge required is only available at the factory. Only with the help of the gauge is it possible to make adjustments to the alignment of the bracket to compensate for the most minute deviations in the dimensions of the vehicle body (in the area of the A-pillars, for example) or deviations on the module cross member resulting from tolerances.

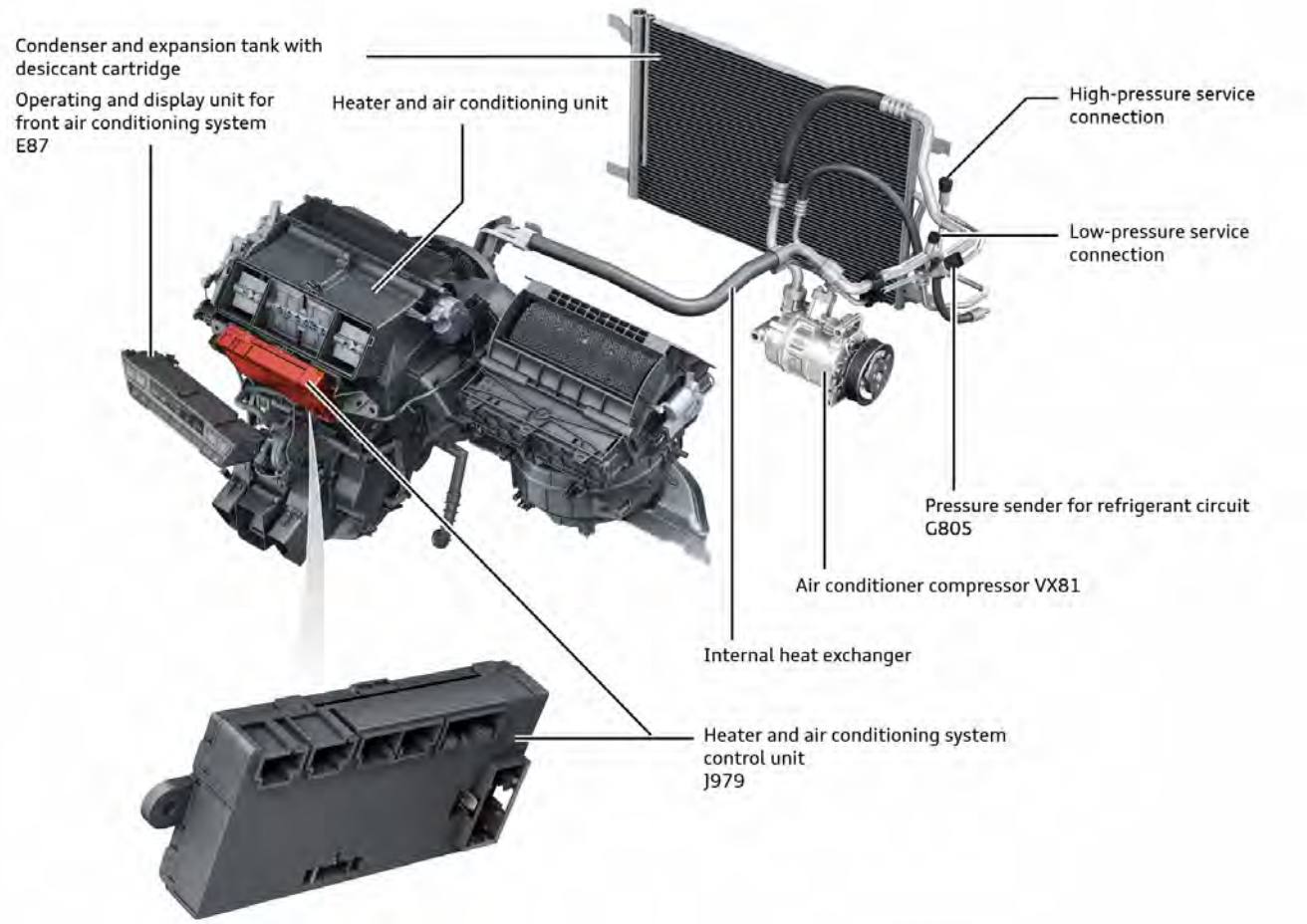
There are no plans to introduce such a gauge in service and it would also not be possible to reliably install a HUD bracket there.

Because of the precise measurements and the adjustment options available to the driver in the MMI, the head-up display does not have to be calibrated in service after the control unit for head-up display J898 or the windscreen has been renewed.

It is only possible to retrofit a head-up display on Audi A3 (type 8Y) vehicles with PR number KS4. It is not possible to retrofit a head-up display on vehicles equipped with KS0.

Air conditioning

Air conditioning circuit with heater and air conditioning system control unit J979



680_062

On the Audi A3 (type 8Y), the heater and air conditioning system control unit J979 is now fitted separately in the dash panel rather than in its previous location in the air conditioner operating unit. It is operated via the operating and display unit for front air conditioning system E87. All measurement parameters are transmitted from sensors to the heater and air conditioning system control unit J979. The flaps in the heater and air conditioning unit and the blower speed are controlled in accordance with the pre-selected temperatures, the temperature differences between outside and inside the vehicle, the selected air distribution, whether eco or normal operation is activated, etc. Equally, the refrigerant flow rate and expansion dimensions and therefore the cooling output of the air conditioner are regulated by the air conditioner control unit. The refrigerant compressed in the air conditioner compressor VX81 is cooled in the condenser and guided on the high-pressure side to the expansion valve in the heater and air conditioning unit, where its pressure is dissipated. It can then absorb heat from the passenger compartment as it has cooled significantly. It is then routed back on the low-pressure side to the air conditioner compressor via the internal heat exchanger.

Heater and air conditioning system control unit J979

680_107

Dash panel with operating and display unit for front air conditioning system E87

A 3-zone automatic air conditioner will be available on the Audi A3 (type 8Y) for the first time, in addition to the 2-zone version.

680_063

Operating and display unit for front air conditioning system E87

Controls for 2-zone/3-zone automatic air conditioner

680_066

- Button for A/C on/off, ECO mode and maximum output
- Button for adjusting blower speed (low to high) for both front seats
- Air distribution button (top, center and footwells)
- Temperature selection buttons (left and right front seats)
- Automatic air conditioner button
- Button for synchronizing air conditioner settings (left and right front seats)
- Windscreen defrost mode button
- Rear window heating button
- Seat heating buttons (left and right)
- A/C off button
- Air recirculation mode button (manual/automatic)

Controls for 1-zone manual air conditioner

680_067

- Air conditioner button
- Temperature selection button
- Button for adjusting blower speed (low to high)
- Air distribution button (windscreen, center and footwells)
- Windscreen defrost mode button
- Air recirculation mode button
- Rear window heating button
- Seat heating buttons (left and right)

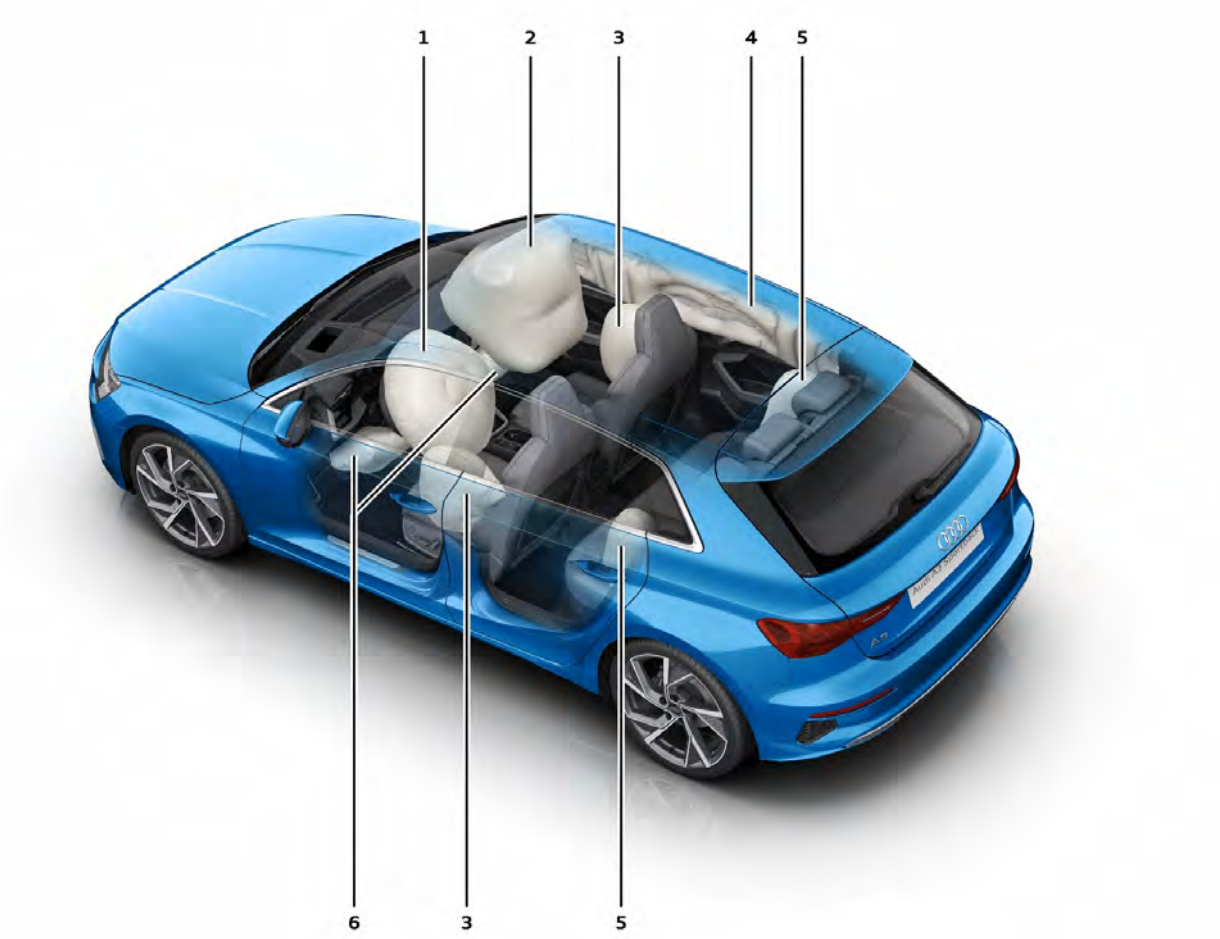
Controls for 3-zone automatic air conditioner

At the rear of the center console, in the center there are two adjustable chest vents; rear passengers have the option of adjusting the temperature using a knurled wheel or a -/+ button.

Passive safety

Airbags in vehicle

The following pages provide an overview of the occupant protection system in the Audi A3 (type 8Y).



680_011

Key:

1 Driver airbag
2 Passenger airbag
3 Front side airbag, driver and passenger sides
4 Curtain airbag, driver and passenger sides
5 Side airbag for seat row 2, driver and passenger sides
6 Knee airbag for driver and passenger side

Components

Depending on the country-specific version and vehicle equipment, the passive occupant and pedestrian protection system in the Audi A3 (type 8Y) may be comprised of the following components and systems:

Components

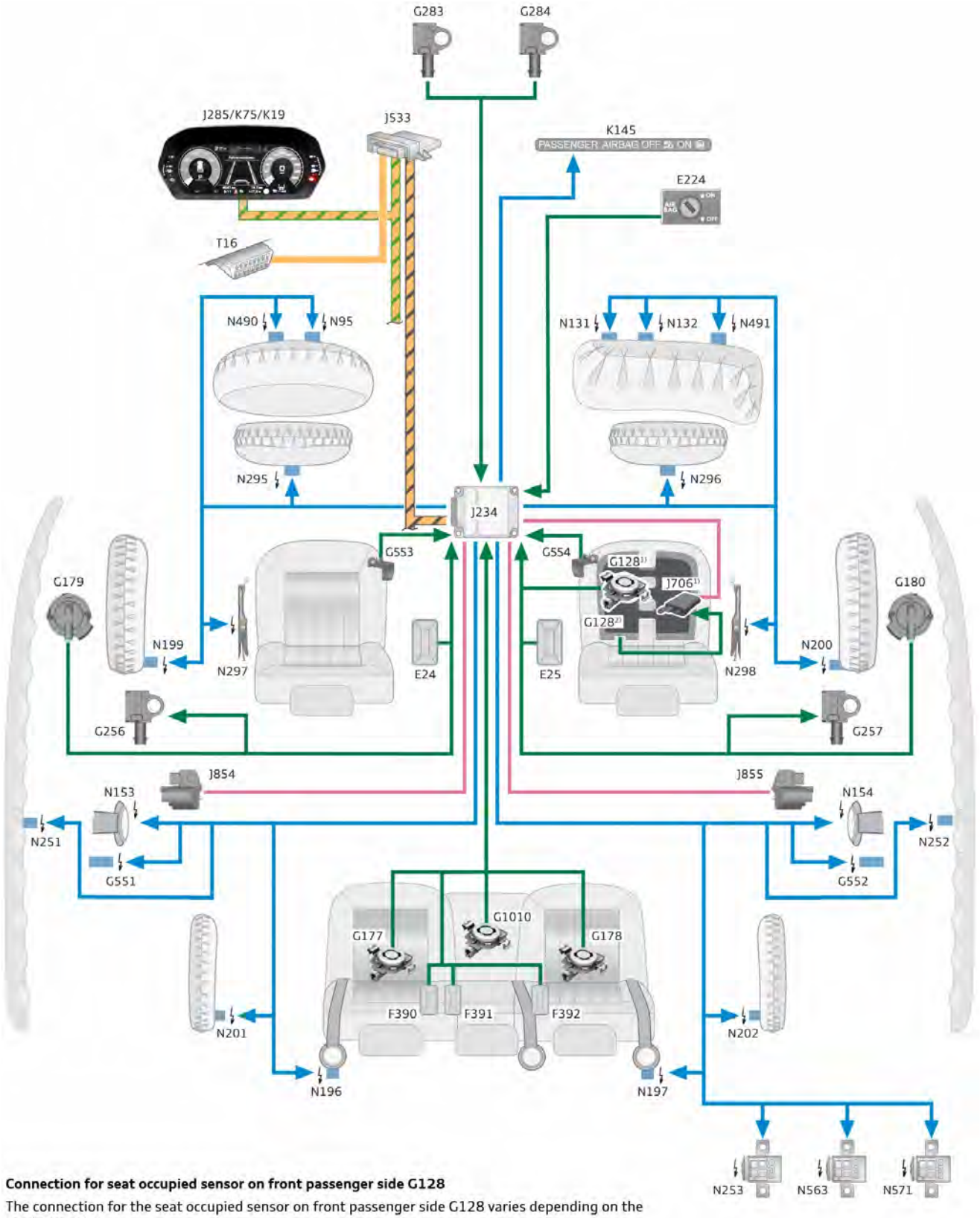
Depending on the country-specific version and vehicle equipment, the passive occupant and pedestrian protection system in the Audi A3 (type 8Y) may be comprised of the following components and systems:

- Airbag control unit
- Adaptive driver airbag
- Adaptive passenger airbag (two-stage)
- 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
- 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
- Key-operated switch to deactivate airbag on front passenger side
- Front passenger airbag warning lamp (OFF and ON)
- Seat position detection for driver and passenger
- Battery isolator, 12 Volt electrical system
- Battery isolator, high-voltage system (on vehicles with high-voltage battery)
- Battery isolator, 48 Volt sub-system (on vehicles with 48 Volt battery)

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

System overview

The system overview shows the components for all markets. Keep in mind that this constellation is not possible in a production model.



Connection for seat occupied sensor on front passenger side G128

The connection for the seat occupied sensor on front passenger side G128 varies depending on the market version.

[1] **In vehicles for the North American region (NAR):**

The seat occupied sensor on front passenger side G128 is connected to the seat occupied recognition control unit J706 via a discrete wire. The control unit communicates with the airbag control unit J234 via a LIN bus wire.

[2] **In vehicles for rest of world (ROW):**

The seat occupied sensor on front passenger side G128 is connected directly to the airbag control unit J234 via a discrete wire. A seat occupied recognition control unit J706 is not fitted.

680_012

Additional equipment

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

Key:

E24	Driver side belt switch
E25	Front passenger side belt switch
E224	Key operated switch to deactivate airbag on front passenger side
F390	Belt switch for seat row 2, driver side
F391	Belt switch for seat row 2, middle
F392	Belt switch for seat row 2, passenger side
G128	Seat occupied sensor on front passenger side
G177	Rear seat occupied sensor on driver side
G178	Rear seat occupied sensor on passenger side
G179	Side airbag crash sensor on driver side
G180	Side airbag crash sensor on front passenger side
G256	Rear side airbag crash sensor on driver side
G257	Rear side airbag crash sensor on passen-ger side
G283	Front airbag crash sensor for driver side
G284	Front airbag crash sensor for front passenger side
G551	Driver side belt force limiter
G552	Front passenger side belt force limiter
G553	Driver side seat position sensor
G554	Front passenger side seat position sensor
G1010	Rear seat occupied sensor, centre
J234	Airbag control unit
J285	Control unit in dash panel insert
J533	Data bus diagnostic interface (gateway)
J706	Seat occupied recognition control unit
J854	Control unit for front left belt tensioner
J855	Control unit for front right belt tensioner
K19	Seat belt warning system warning lamp
K75	Airbag warning lamp
K145	Warning lamp for airbag deactivated on front passenger side (both ON and OFF status of passenger airbag is indicated)
N95	Airbag igniter on driver side
N131	Airbag igniter 1 on front passenger side
N132	Airbag igniter 2 on front passenger side
N153	Driver seat belt tensioner igniter 1
N154	Front passenger seat belt tensioner ignit-er 1
N196	Rear belt tensioner igniter on driver side
N197	Rear belt tensioner igniter on passenger side
N199	Side airbag igniter on driver side
N200	Side airbag igniter on front passenger side
N201	Rear side airbag igniter on driver side
N202	Rear side airbag igniter on passenger side

N251	Driver side curtain airbag igniter
N252	Front passenger side curtain airbag ignit-er
N253	Battery isolation igniter
N295	Driver side knee airbag igniter
N296	Front passenger side knee airbag igniter
N297	Rear belt tensioner igniter 2 on passen-ger side (lap belt tensioner)
N298	Igniter for front passenger side seat belt tensioner 2 (lap belt tensioner)
N490	Igniter for exhaust valve for driver airbag
N491	Igniter for exhaust valve for front passen-ger airbag
N563	High-voltage battery isolation igniter (on vehicles with high-voltage battery)
N751	Battery isolation igniter, 48 V (on vehicles with 48 Volt battery)
T16	16-pin connector (diagnostic connection)
	Diagnostics CAN FD (flexible data rate)
	LIN bus
	Convenience CAN
	Powertrain CAN FD (flexible data rate)
	Input signal
	Output signal

Airbag control unit J234

Terminal 30 at airbag control unit J234

The airbag control unit J234 is a terminal 30 control unit on the Audi A3 (type 8Y). The airbag control unit J234 is wired to terminal 30. Terminal 15 is also wired to the airbag control unit as a signal wire. In addition, the airbag control unit J234 receives information on the status of terminal 15 from the data bus diagnostic interface J533 (gateway) via CAN bus.

The airbag system can be triggered on the Audi A3 (type 8Y) in the following two cases:

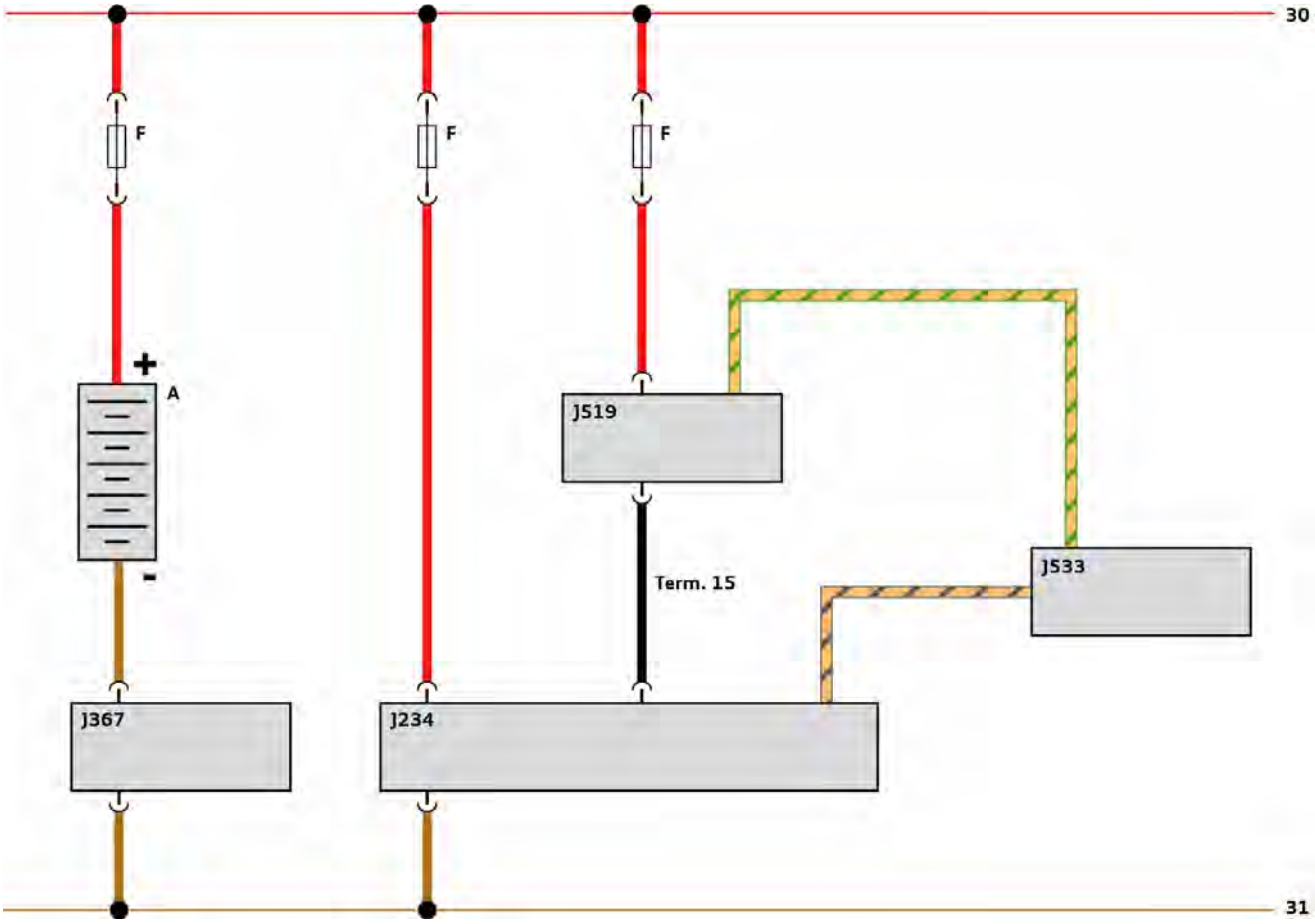
- **Case 1:** If a collision which meets the criteria for deployment occurs when the ignition is switched on (terminal 15 on) or the engine is running.
- **Case 2:** If the ignition is switched off while the vehicle is moving and the vehicle continues to travel at a speed of at least 3 km/h and a collision which meets the criteria for deployment occurs in this situation. If the residual speed is below 3 km/h, the airbag system will not be triggered.

A capacitor is integrated in the control unit J234. If terminal 30 is disconnected, this capacitor enables the various pyrotechnic components (e.g. airbags, belt tensioners) to be deployed during a limited period of time.

Diagnosis

The diagnostic address of the airbag control unit J234 is “15 – Airbag”. The control unit generation (system designation) is “Airbag VW40” and can be retrieved in Guided Fault Finding under “Control unit identification”.

Function diagram



680_010

Key:

A	Battery
J234	Airbag control unit
J367	Battery monitor control unit
J519	Onboard supply control unit
J533	Data bus diagnostic interface
Term. 15	Terminal 15 signal wire
F	Fuse
30	Permanent live
31	Earth
	Powertrain CAN FD (flexible data rate)
	Convenience CAN

Active safety

Audi pre sense settings

Changing settings for Audi pre sense advance warning

The advance warning function of Audi pre sense front can be set or switched off in the MMI. The following settings are available:

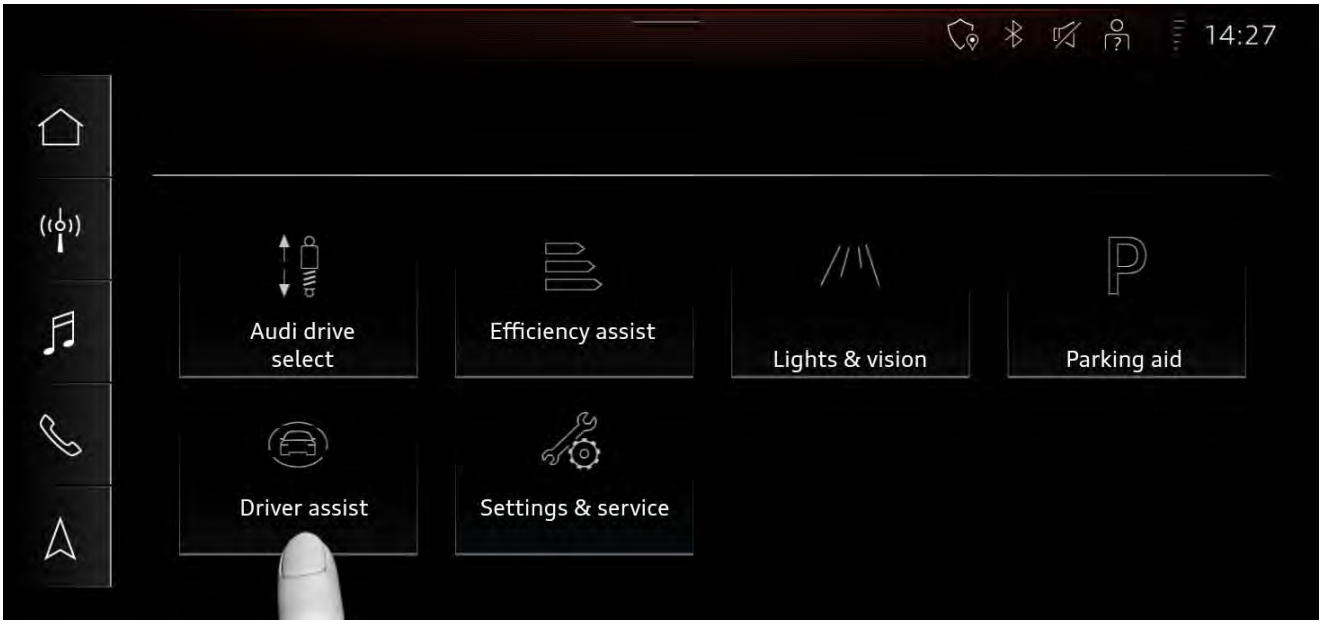
Off	The visual and acoustic advance warning is switched off.
Early	The visual and acoustic advance warning is given earlier.
Medium	This is the standard setting for the visual and acoustic advance warning.
Late	The visual and acoustic advance warning is given later.

› The “early”, “medium” or “late” setting for the advance warning remains active until another selection is made in the MMI.
› If the advance warning has been set to “off”, it is switched back on again the next time the ignition is switched on. In this case, the system reactivates the setting which was active before the advance warning was switched off (last mode).

Home screen

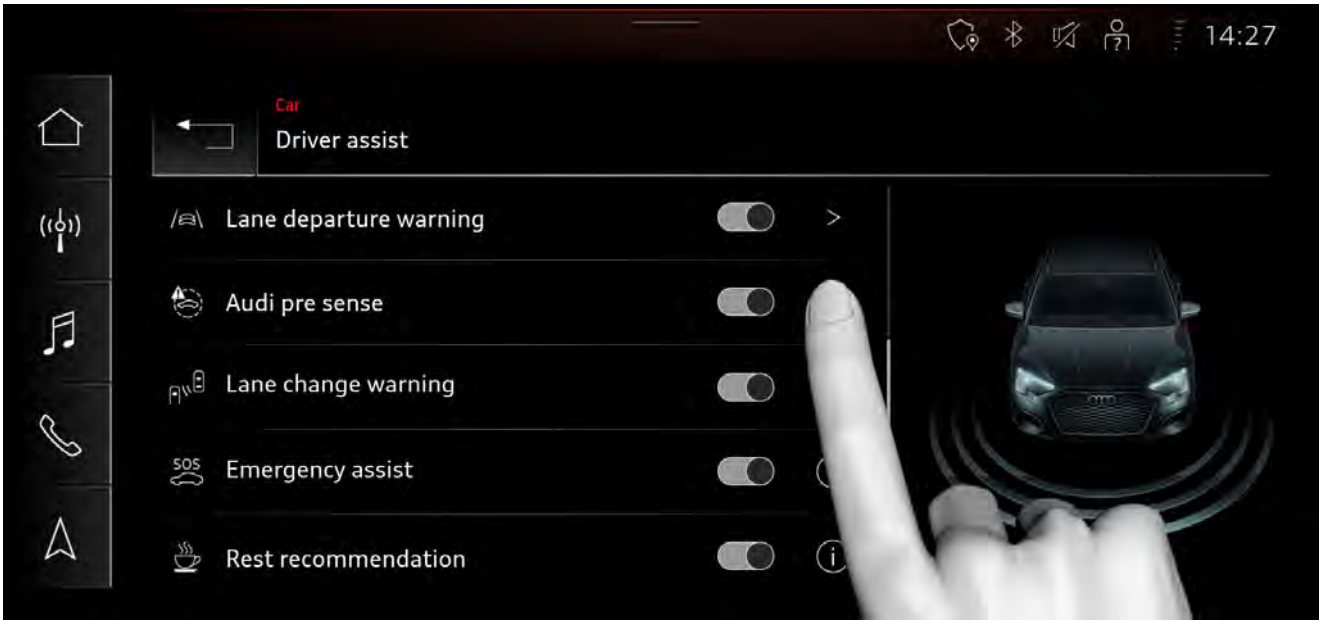
680_046

Car / Driver assist



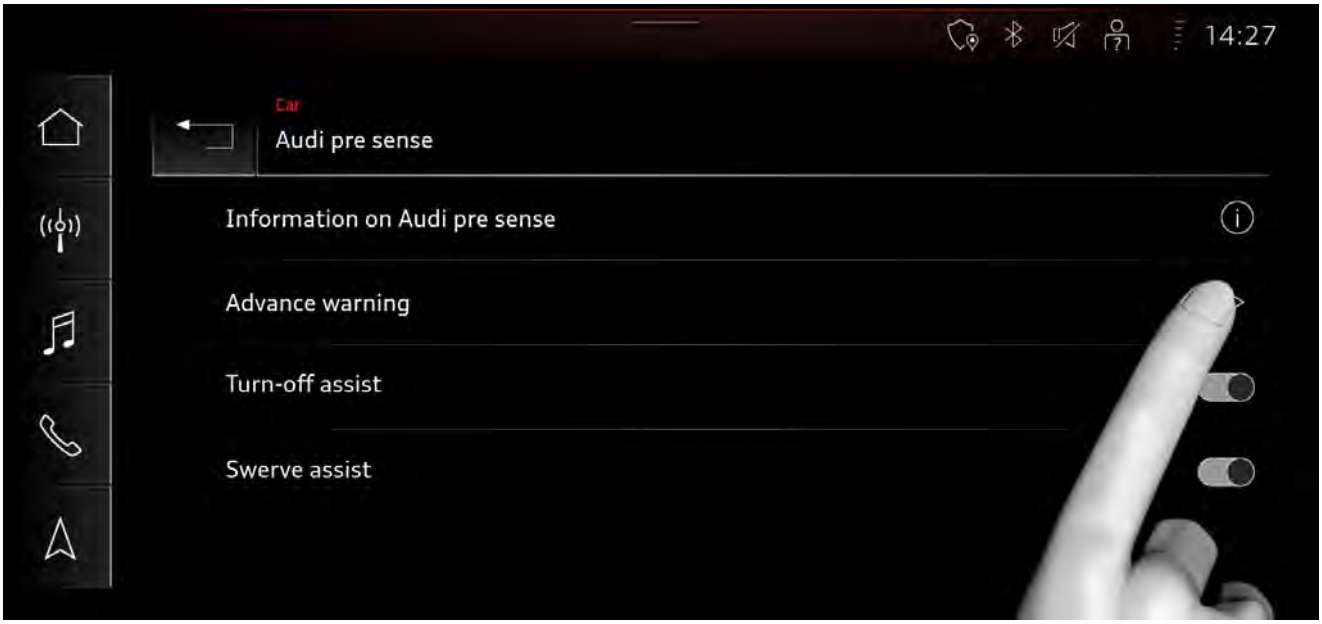
680_007

Car / Driver assist / Audi pre sense



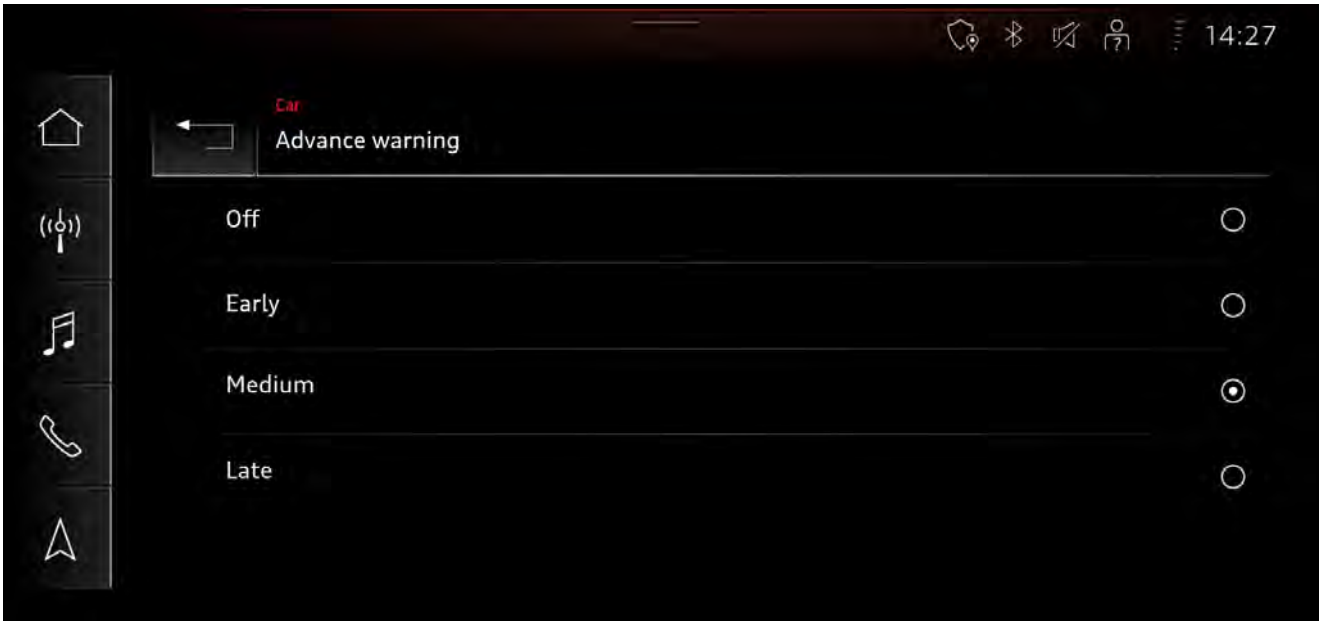
680_047

Car / Driver assist / Audi pre sense / Advance warning



680_048

Car / Driver assist / Audi pre sense / Advance warning / Settings



680_049

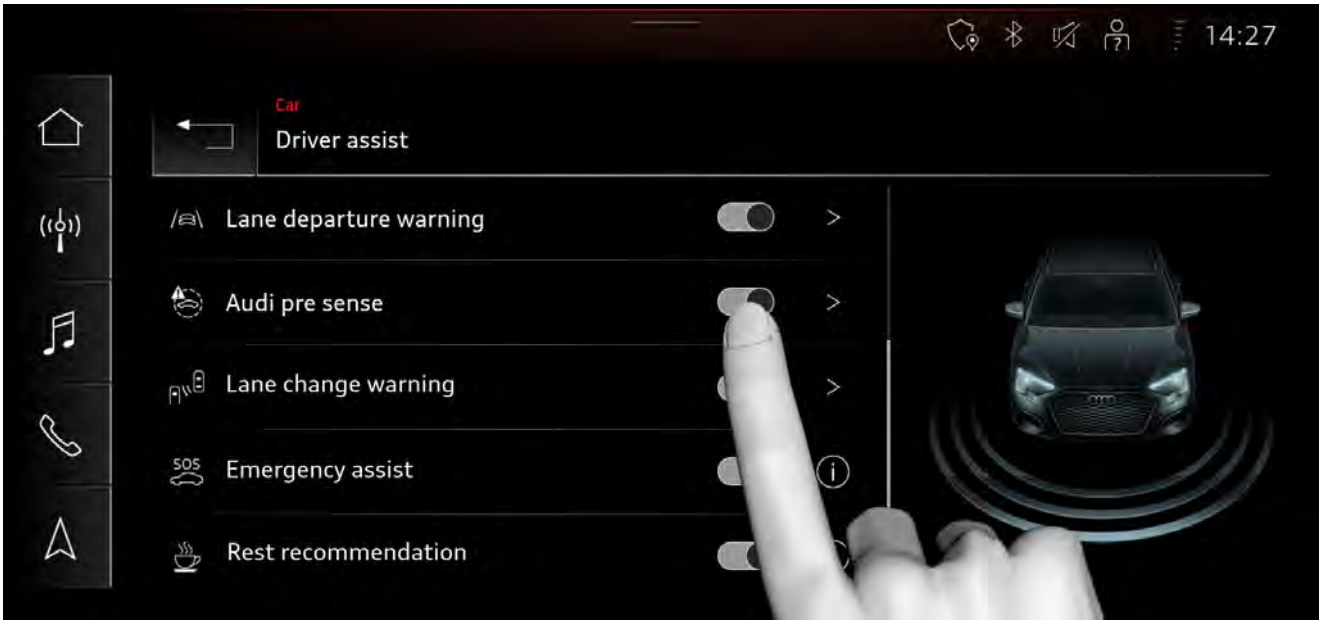
Switching Audi pre sense off

Audi pre sense can be switched off in the MMI. Doing so switches off all functions of Audi pre sense front and rear, the swerve assist and the turn-off assist.

Switching Audi pre sense on

If Audi pre sense has been switched off, it can be switched back on in the MMI. All functions of Audi pre sense are reactivated. When the ignition is switched off and on again, Audi pre sense is switched back on automatically if it has been switched off.

Car / Driver assist / Audi pre sense / Advance warning / Switching on or off



680_050

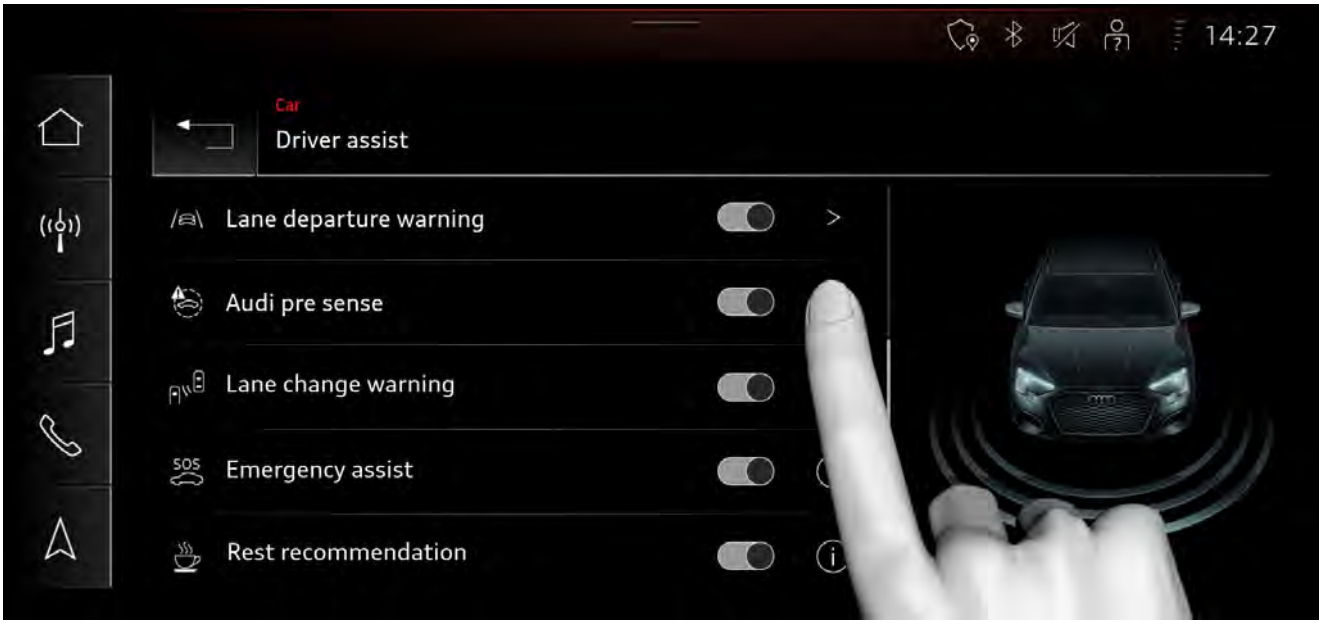
Switching the turn-off assist/swerve assist on or off

The Audi pre sense turn-off assist and swerve assist can be switched off separately in the MMI. When they are switched off, the turn-off assist and swerve assist remain switched off until they are reactivated in the MMI.

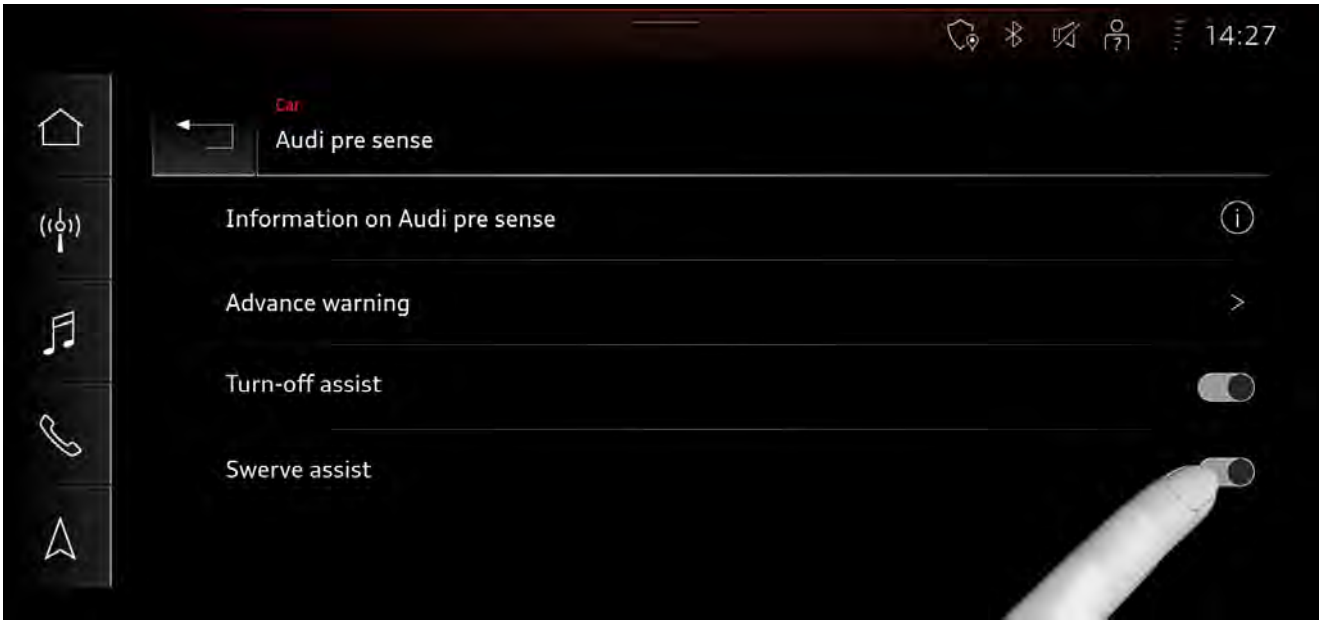
Note

- On vehicles manufactured up to week 33/2020, the Audi pre sense swerve assist must be actively switched back on in the MMI if it was switched off separately. Up to this date, if it has been switched off, the pre sense swerve assist is not switched back on when the ignition (terminal 15) is switched off and on again.
- On vehicles manufactured from week 34/2020 onwards, if it was deactivated separately in the MMI, the Audi pre sense swerve assist is switched back on automatically when the ignition (terminal 15) is switched off and on again.
- The pre sense turn-off assist is expected to be available from week 34/2020. For this reason, starting from when it is introduced, if it has been switched off the pre sense swerve assist is switched back on automatically when the ignition (terminal 15) is switched off and on again.

Car / Driver assist / Audi pre sense



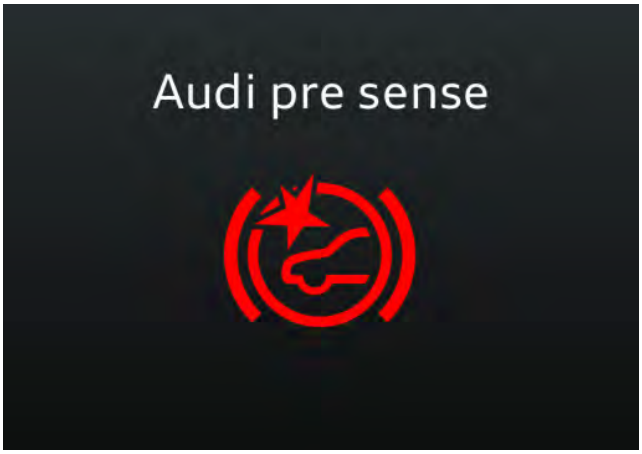
680_051



680_052

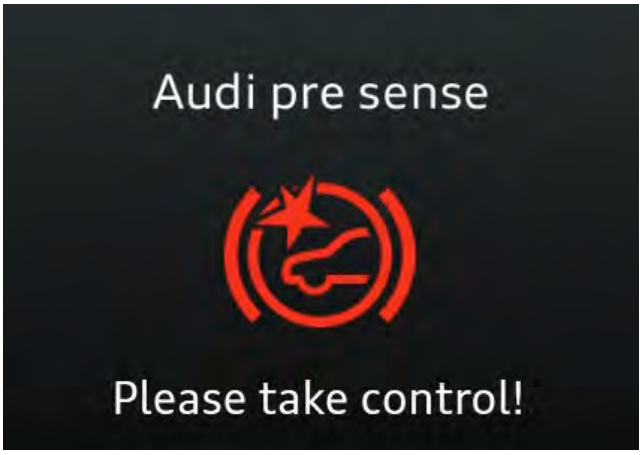
Audi pre sense displays

This warning appears when the visual advance warning is given by Audi pre sense or when Audi pre sense is intervening. An acoustic signal may also be given.



680_053

This warning appears when the driver should actively take control of the vehicle (e.g. by braking). An acoustic signal is also given.

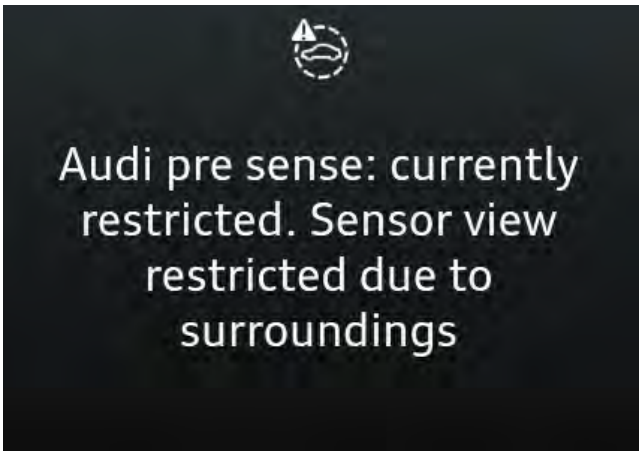


680_054

This driver message is displayed if functions of Audi pre sense are impaired. This may be due to a faulty sensor, for example. An acoustic signal is also given.

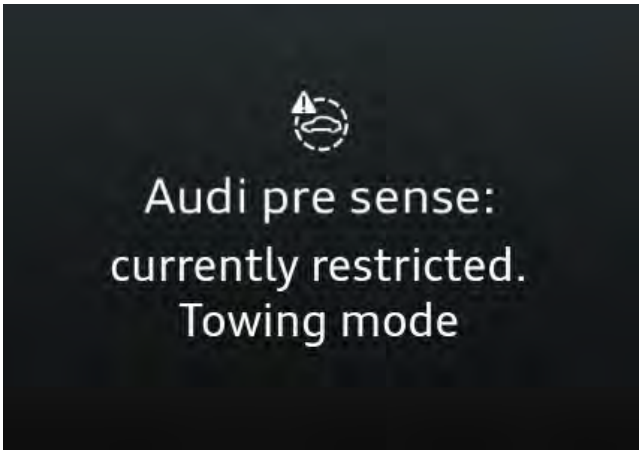
680_055

This driver message is displayed if the visibility of the radar sensor is impaired by leaves, snow, heavy spray, dirt, etc. An acoustic signal is also given.



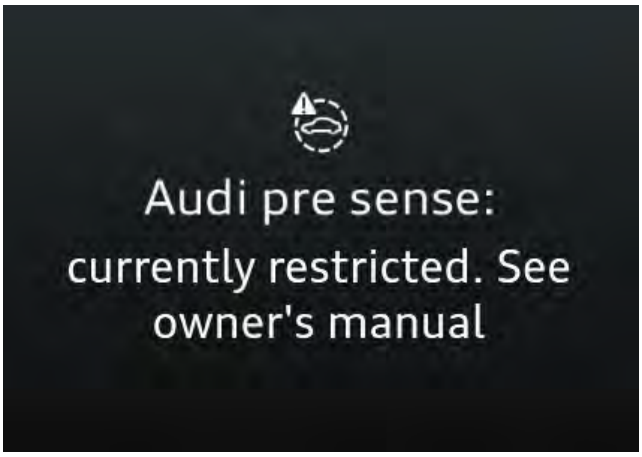
680_056

This driver message is displayed for Audi pre sense rear if a trailer is hitched to the vehicle and this has been identified by the vehicle. An acoustic signal is also given.



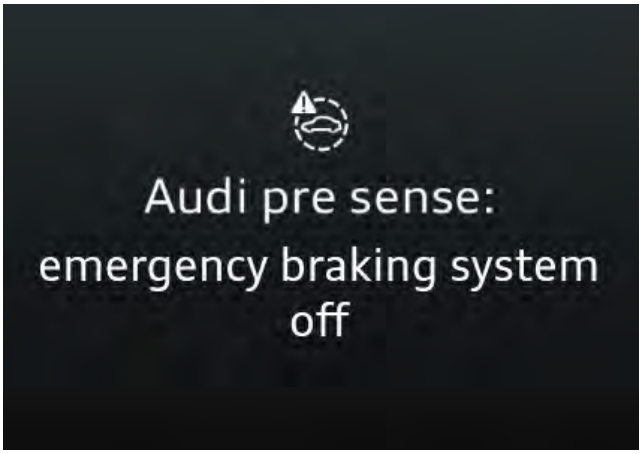
680_057

This driver message is displayed in the event of temporary failure of subsystems such as the electronic stabilization control (ESC).



680_058

This driver message is displayed if functions of Audi pre sense or the ESC have been switched off or if the system is not ready.



680_059

The symbol that indicates that the emergency braking system is restricted or switched off will be changed in general from white to yellow on all Audi A3 (type 8Y) vehicles that are manufactured from week 25/2020 onwards.

Note
The front camera for driver assist systems and the radar sensor are initialized automatically after the ignition is switch-ed on. For this reason, Audi pre sense front and the pre sense turn-off assist and swerve assist may not be available for up to 20 seconds after the ignition is switched on. The fact that they are not available is indicated by the initialization lamp in the instrument cluster.

Up to week 24/2020

680_060

From week 25/2020 onwards

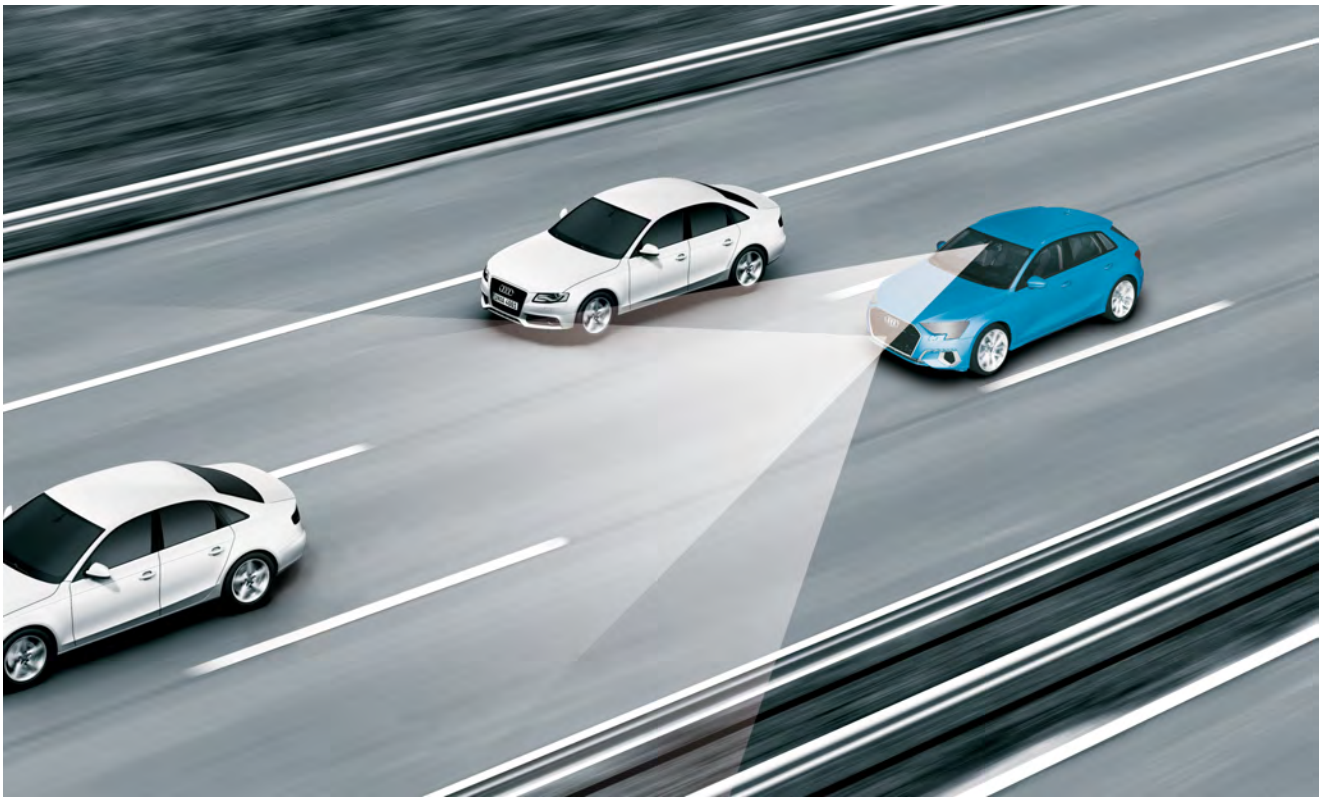
680_061

Audi pre sense

Audi pre sense is able to initiate measures to protect the occupants and other road users in certain critical situations, within the system's limitations. The vehicle and its occupants are prepared for a potentially imminent collision. This is made possible by the networking of various systems in the vehicle. The systems send data continuously to the data bus. Other control units are able to receive and evaluate this information and take appropriate action. Depending on the vehicle equipment, the following Audi pre sense functions may be fitted in the Audi A3 (type 8Y):

- Audi pre sense basic
- Audi pre sense rear
- Audi pre sense front
- Audi pre sense turn-off assist
- Audi pre sense swerve assist

Audi pre sense front with front camera for driver assist systems and radar sensor



680_013

Note
Please note that Audi pre sense acts within the system's limitations and cannot always prevent collisions from occurring. It serves to assist the driver and it can reduce the severity of a collision. Please also note that not all objects can be detected by the radar sensor or front camera in all situations. The individual functions of Audi pre sense are described in greater detail below.

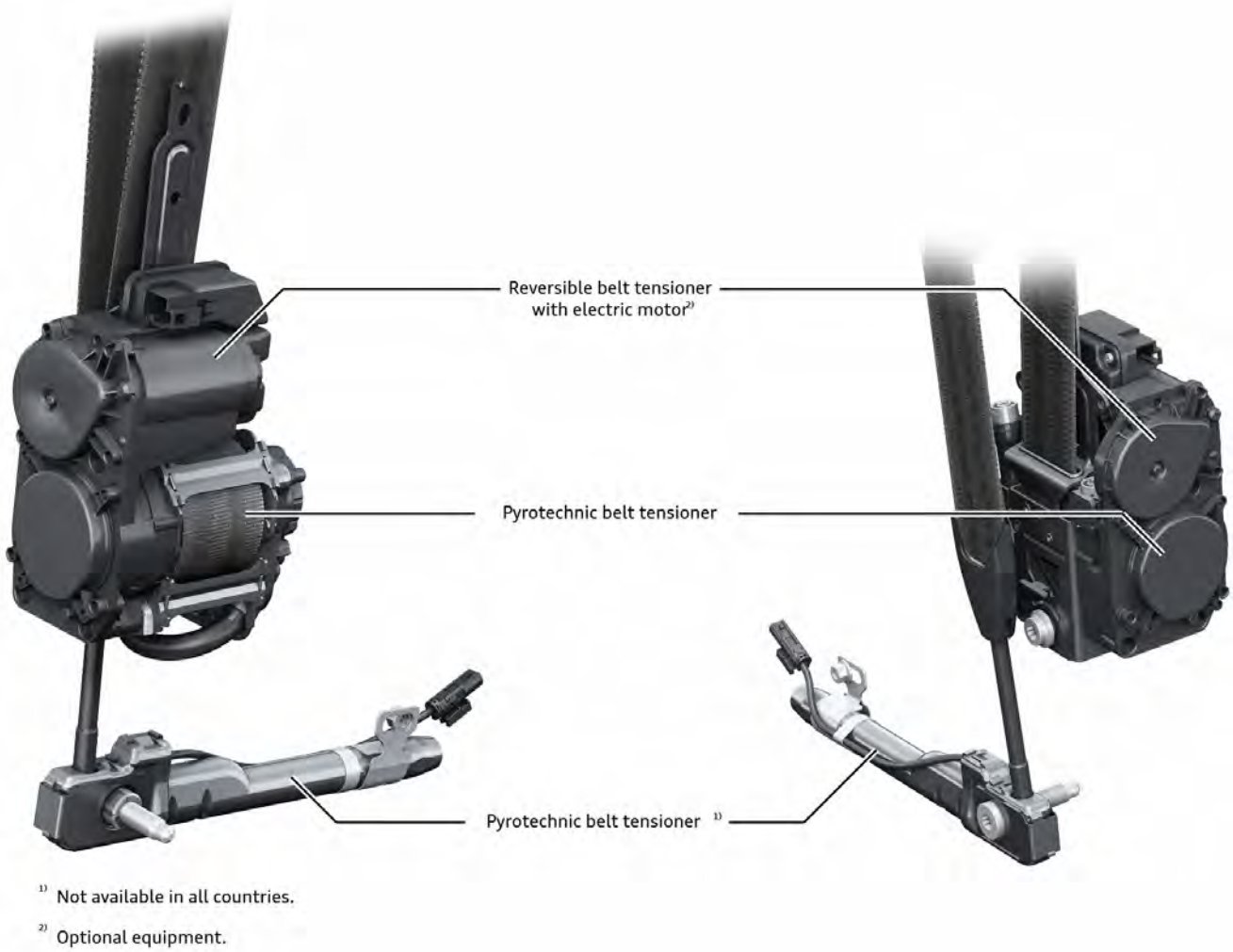
Audi pre sense basic

If the vehicle is equipped with Audi pre sense basic, the front automatic belt retractors are fitted with an electric reversible belt tensioner in addition to the pyrotechnic belt tensioner. Reversible tensioning of the seat belts reduces the forward displacement of the front occupants in a collision. The following actions can be initiated by Audi pre sense basic:

- Display of an Audi pre sense intervention in the instrument cluster
- Partial tensioning of the electric reversible front belt tensioners
- Full tensioning of the electric reversible front belt tensioners
- Closing of the panoramic sunroof[46]
- Closing of the side windows with a gap remaining
- Activation of the hazard warning lights[47]

[46] Optional equipment.

[47] Not available in all countries.



1) Not available in all countries.

2) Optional equipment.

680_014

System characteristics of the reversible belt tensioners

- If an accident does not occur after a reversible tensioning of the seat belts (partial or full tensioning), the belts are released again. The reversible belt tensioners are therefore ready to deploy again.
- If a seat belt is not fastened, this seat belt is not partially or fully tensioned.
- If the front passenger airbag is switched off, the seat belt is not partially or fully tensioned on the front passenger side.
- The reversible belt tensioners, the control unit for front left belt tensioner J854 and the control unit for front right belt tensioner J855 are connected to the airbag control unit J234 as LIN control units.
- Partial or full tensioning of the reversible belt tensioners can take place at speeds upwards of approximately 30 km/h, both in terms of the longitudinal and transverse dynamics.
- The reversible belt tensioners cannot be deactivated via the MMI. This means that the reversible belt tensioners are deployed when the conditions are met even if Audi pre sense is switched off.

How it works - longitudinal dynamics

Hazard braking

If the brake pressure reaches a defined level during a hazard braking maneuver, the reversible belt tensioners are **partially tensioned** by Audi pre sense basic. For this purpose, the airbag control unit J234 evaluates the signals which the ABS control unit J104 puts on the data bus. A message indicating that Audi pre sense is intervening appears in the instrument cluster. No acoustic signal

is given. Depending on the situation, the ABS control unit J104 may trigger activation of the hazard warning lights[48].

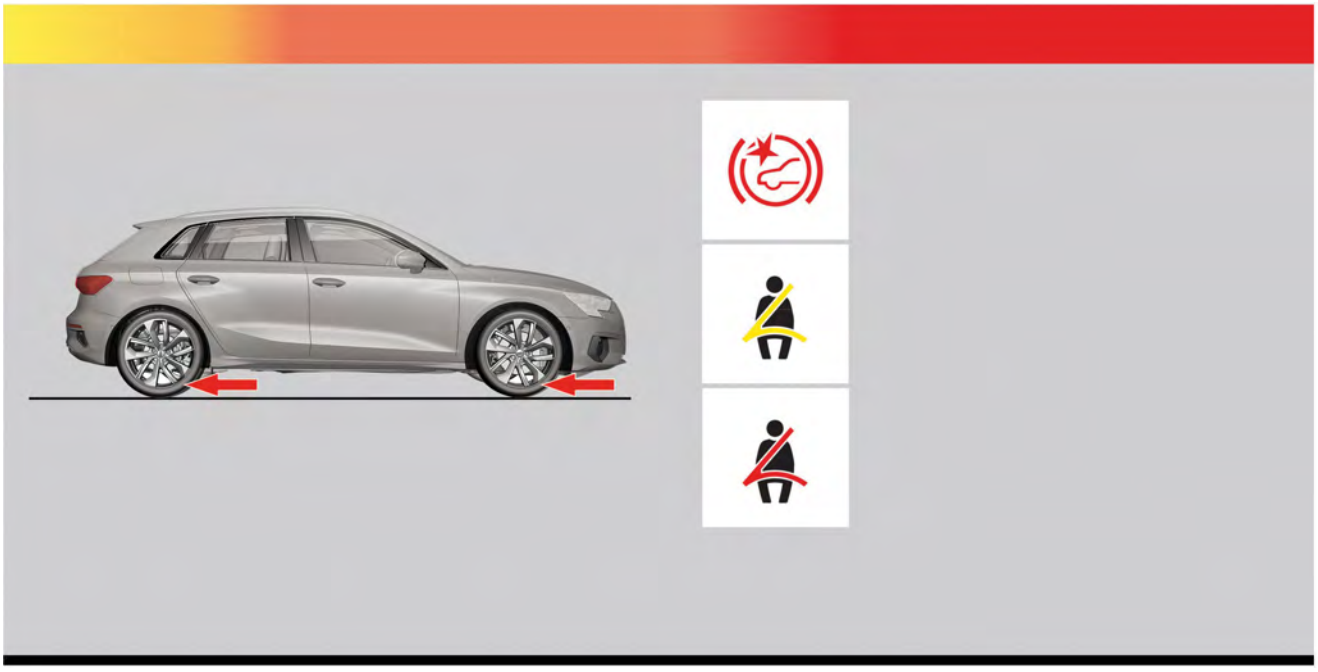
Emergency braking

During an emergency braking maneuver, the reversible belt tensioners are **fully tensioned**. For this purpose, the airbag control unit J234 evaluates the signals which the ABS control unit J104 puts on the data bus. A message indicating that Audi pre sense is intervening appears in the instrument cluster. No acoustic signal is given. Depending on the situation, the ABS control unit J104 may trigger activation of the hazard warning lights[49]. An emergency braking maneuver is distinguished using the following three criteria.

- An emergency braking maneuver is present if the ABS control unit J104 detects that the brake pressure has reached a specific value within a defined period of time. If the conditions are met, the reversible belt tensioners are **fully tensioned** by Audi pre sense basic.
- An emergency braking maneuver is also present if the above-mentioned conditions are not met but the ABS control unit J104 has detected an emergency braking maneuver based on the pedal change rate (the time it takes to switch from the accelerator pedal to the brake pedal). If the conditions are met, the reversible belt tensioners are **fully tensioned** by Audi pre sense basic.
- In addition, an emergency braking maneuver is also present if the electromechanical parking brake is applied when the vehicle is moving forwards at approximately 30 km/h or higher. Audi pre sense basic then triggers full electric tensioning of the reversible belt tensioners. In this case, no Audi pre sense message is shown in the instrument cluster. The seat belts are released again under the following conditions:

  - If the button for the electromechanical parking brake is released.
  - If the vehicle comes to a standstill.
  - If the driver accelerates significantly, thereby overriding the emergency braking of the electromechanical parking brake.

Audi pre sense basic procedure - longitudinal dynamics



680_015

Key:

	Visual advance warning and/or intervention display		Partial tensioning		Full tensioning

[48] Not available in all countries.

[49] Not available in all countries.

- If the electronic stabilization control (ESC) has been set to “sport” or “off” using the button for TCS and electronic stabilization program E256, the seat belts are **not partially tensioned**.
- If Audi drive select has been set to “dynamic” using the switch for driving mode selection E592, the seat belts are **not partially tensioned**.
- With regard to the longitudinal dynamics, the vehicle must not be moving in reverse when the reversible belt tensioners are deployed.

680_016

How it works - transverse dynamics

If the vehicle oversteers or understeers, the ESC will attempt to stabilize the vehicle. If the vehicle becomes highly unstable due to physical limitations, the airbag control unit J234 triggers **partial tensioning** of the electrical reversible belt tensioners. A message indicating that Audi pre sense is intervening appears in the instrument cluster. No acoustic signal is given. If it is no longer possible for the vehicle to be stabilized, the electric reversible belt tensioners are fully tensioned. In addition, during **full tensioning** or partial tensioning, the side windows are closed with a gap remaining and the panoramic sunroof[50] is closed. As long as the vehicle is unstable, the hazard warning lights[51] are switched on for up to 15 seconds during full or partial tensioning.

Audi pre sense basic procedure - transverse dynamics

680_017

Key:

	Visual advance warning and/or intervention display		Partial tensioning		Full tensioning
	Closing of the side windows with a gap remaining		Closing of the panoramic sunroof		Hazard warning lights

System characteristics - transverse dynamics

- If the electronic stabilization control (ESC) has been set to “sport” or “off” using the button for TCS and electronic stabilization program E256, the seat belts are **not partially tensioned**.
- If Audi drive select is set to “dynamic”, the seat belts are **not partially tensioned**.
- If the ESC is set to “sport” or “off”, the seat belts are only **partially tensioned** if the vehicle has become highly unstable and the driver is actively braking.

[50] Optional equipment.

[51] Not available in all countries.

Audi pre sense rear

The following actions can be initiated by Audi pre sense rear:

Fitting location

For Audi pre sense rear to be implemented, the vehicle must be equipped with the lane change warning function. The lane change warning uses two mid-range radar sensors that can detect objects within a range of between approximately 0 and 70 m behind the vehicle. The Blind Spot Monitor control unit J1086 is fitted in the rear bumper on the right-hand side of the vehicle. The Blind Spot Monitor control unit 2 J1087 is fitted in the rear bumper on the left-hand side of the vehicle. The Blind Spot Monitor control unit 2 J1087 is connected to the Blind Spot Monitor control unit J1086 (master control unit) as a slave control unit via a private CAN (also referred to as a sub-bus system). The Blind Spot Monitor control unit J1086 is connected to the driver assist systems CAN FD (flexible data rate)[54]. Each control unit forms a unit together with a radar sensor. Audi pre sense rear uses the control units and radar sensors for the lane change warning.

Fitting locations of radar sensors

680_018

680_147

How the system works

The radar sensors continuously monitor the traffic following the vehicle, even when the lane change warning is not activated. Control units J1086 and J1087 evaluate the signals they receive, process them and thereby determine the distance to following vehicles that are within the detection range. The vehicle's own speed is known thanks to the information supplied by the ABS control unit J104. The Blind Spot Monitor control unit J1086 and the Blind Spot Monitor control unit 2 J1087 use this information to calculate the speeds of the following vehicles. The following information is therefore available to Audi pre sense rear[55]:

- Distance to following vehicles
- Speed of following vehicles
- Speed of own vehicle

If a lane change assist control unit detects a critical pre sense rear situation, the Blind Spot Monitor control unit J1086 sends various information to the data bus diagnostic interface J533 (gateway). A critical situation is defined as a situation in which a following vehicle could collide with the rear end of the vehicle unless further action is taken by the driver of the following vehicle. The data bus diagnostic interface J533 transmits these signals to the airbag control unit J234. This control unit decides on the basis of available information which actuators to activate and distributes this information to different control units, such as the sliding sunroof control unit J245[56]. In critical situations, Audi pre sense rear initiates the following actions, which can be divided into two phases:

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[52] Not available in all countries.

[53] Optional equipment.

[54] Further information on bus systems with flexible data rate is provided in SSP 680, "Networking", “Bus systems”.

[55] The following vehicles must be within the detection range of the radar sensors.

[56] Optional equipment.

Phase 1

First, the rear turn signals are switched on and flash rapidly for approximately 3 seconds[57]. This flashing cycle is known as a RECAS (rear end collision avoidance system) warning. Due to the high frequency at which the turn signals are activated, humans see these signals as flashes of light. The flashing is designed to alert the driver in the following vehicle to the current situation and prompt him/her to take appropriate action, such as initiating braking. The time when the RECAS warning is activated depends on the severity of the critical situation and the relative speed[58] of the following vehicle. The onboard supply control unit J519 activates the RECAS warning.

If the driver in the following vehicle reacts during this phase (e.g. brakes or takes evasive action) and the Blind Spot Monitor control units J1086 and J1087 no longer detect a critical situation, then no further action (e.g. closing of the side windows) is taken.

680_019

Phase 2

If the situation remains critical, the side windows and the panoramic sunroof[59] are closed (a gap is left in the case of the side windows).

[57] Not available in all countries.

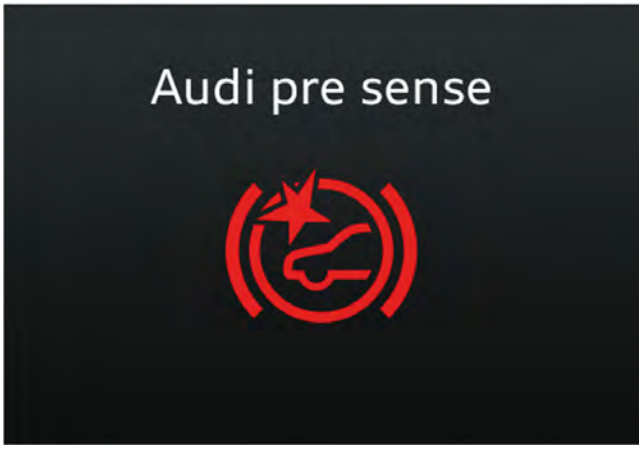
[58] The relative speed is the difference in speed between the driver's own vehicle and the following vehicle.

[59] Optional equipment.

680_020

Approximately one second after the side windows and panoramic sunroof[60] are closed, a display in the instrument cluster indicates that Audi pre sense is intervening.

Audi pre sense display



680_021

If the vehicle behind continues to draw closer and the risk of a rear collision continues to increase, the reversible belt tensioners are tensioned either partially or fully, depending on the vehicle speed (partially at higher speeds and fully at lower speeds). The reversible belt tensioners are not tensioned if the driver's own vehicle exceeds a certain speed. The front reversible belt tensioners are connected to the airbag control unit J234 via a LIN bus system.

[60] Optional equipment.

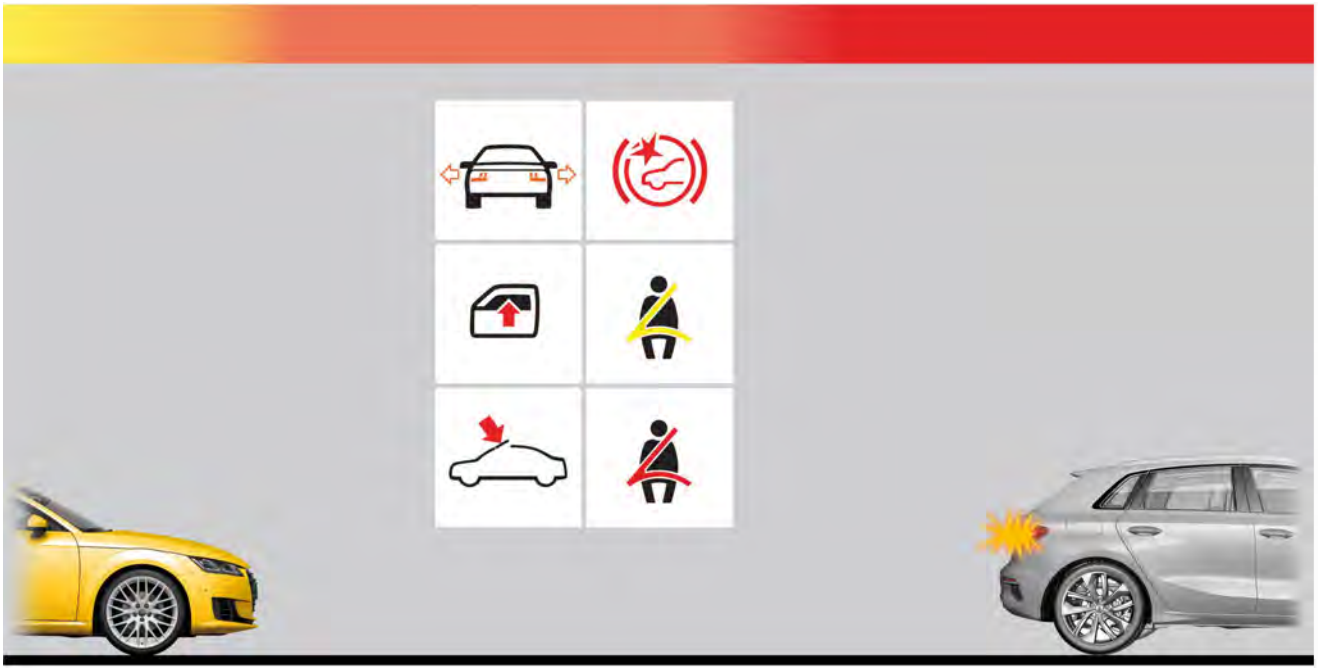
The names of the reversible belt tensioners are:

- Control unit for front left seat belt tensioner J854
- Control unit for front right seat belt tensioner J855

System characteristics of Audi pre sense rear

- On vehicles with a factory-fitted towing bracket, Audi pre sense rear is not active when a trailer is detected.

Audi pre sense rear procedure



680_022

Key:

	RECAS warning		Closing of the side windows with a gap remaining		Closing of the panoramic sunroof
	Visual advance warning and/or intervention display		Partial tensioning		Full tensioning

Audi pre sense front

Audi pre sense front can support the driver by taking various actions in the case of a potential frontal collision. The following actions can be initiated by Audi pre sense front:

- Visual advance warning
- Acoustic advance warning
- Pre-charging of the brake system
- Reconfiguration of the hydraulic brake assist system
- Acute warning using jolt of the vehicle's brakes
- Automatic braking up to emergency braking intensity
- Targeted braking
- Closing of the panoramic sunroof[61]
- Closing of the side windows with a gap remaining
- Partial tensioning of the electric reversible belt tensioners
- Full tensioning of the electric reversible belt tensioners
- Display of an Audi pre sense intervention in the instrument cluster
- Prompt for the driver to take control of the vehicle

[61] Optional equipment.

Fitting location

The vehicle requires the following for Audi pre sense front:

- Right adaptive cruise control sender G259 and adaptive cruise control unit J428[62]
- Front camera for driver assist systems R242

The adaptive cruise control sender and the adaptive cruise control unit are fitted in the center of the front bumper. The front cam-era is fitted in the base of the interior mirror.

680_023

[62] Radar sensor for ACC/adaptive cruise assist

How it works

Audi pre sense front uses the right adaptive cruise control sender G259, the adaptive cruise control unit J428 and the front camera for driver assist systems R242. The radar sensor[63] is a mid-range radar sensor that is also responsible for ACC (Audi adaptive cruise control)/adaptive cruise assist. At long range, the radar sensor is able to detect objects up to a distance of 180 m in front of the vehicle with a maximum aperture angle of 6°. At close range, it is able to detect objects up to 40 m in front of the vehicle with a maximum aperture angle of 100°. This allows objects further in the distance to be identified better when driving on the motorway, for example. When driving in urban areas, objects that are closer can be identified better. The radar sensor and the control unit form a unit together (ACC unit). The ACC unit can only be renewed as a whole. Audi pre sense front can react to vehicles that are moving in the same direction, have stopped or are stationary, as well as pedestrians[64] and cyclists[65] who are on or crossing the road. The radar sensor and the front camera continuously monitor the area in front of the vehicle. Audi pre sense front is active even if ACC is not installed or is not active. The front camera for driver assist systems is connected to the adaptive cruise control unit J428 via an Ethernet connection. The front camera for driver assist systems and the adaptive cruise control unit J428 are on the driver assist systems CAN FD (flexible data rate)[66]. The front camera sends the data that it has recorded to the adaptive cruise control unit J428. The adaptive cruise control unit fuses the data. The data fusion allows a model of the vehicle's surroundings to be created. The adaptive cruise control unit J428 evaluates the signals it receives, processes them and thereby determines the distance to:

- Stationary vehicles/vehicles travelling in front
- Pedestrians[67] and cyclists[68] who are on or crossing the road

The vehicle's own speed is known thanks to the information supplied by the ABS control unit J104. The adaptive cruise control unit J428 uses this information to calculate the speeds of the vehicles in front and of pedestrians[69] and cyclists[70]. The following information is therefore available to Audi pre sense front:

- Speed of own vehicle
- Distance to stationary vehicles/vehicles travelling in front
- Speed of vehicles travelling in front
- Rate of acceleration/deceleration of vehicles travelling in front
- Distance to pedestrians[71] and cyclists[72] who are on or crossing the road
- Speed of pedestrians[73] and cyclists[74] who are on or crossing the road
- Rate of acceleration/deceleration of pedestrians[75] and cyclists[76] who are on or crossing the road

The master control unit (adaptive cruise control unit J428) evaluates the information and transmits corresponding signals on the data bus. Other bus nodes receive the signals and are able to take appropriate action. As mentioned above, Audi pre sense front also uses the information from the front camera for driver assist systems R242. The additional information from the front camera allows the classes and widths of the vehicles in front to be identified better, as well as pedestrians[77] and cyclists[78]. Audi pre sense front only reacts to vehicles when they are travelling in front in the same direction, have stopped or are stationary. The Audi pre sense turn-off assist is an exception to this. In the case of the Audi pre sense turn-off assist[79], the system also reacts to oncoming traffic.

Response to vehicles

The following requirements must be fulfilled in order for the system to be able to intervene:

- Audi pre sense can react to vehicles which are travelling in the same direction, have stopped or are stationary.
- Audi pre sense front does not react to crossing or oncoming traffic. The Audi pre sense turn-off assist is an exception to this. In the case of the Audi pre sense turn-off assist[80], the system also reacts to oncoming traffic.
- Audi pre sense front is active at speeds of approximately 5 km/h and above.
- Audi pre sense front can warn against other vehicles at speeds of up to 250 km/h.
- Audi pre sense front can initiate braking at speeds of up to 250 km/h.

Advance warning phase

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[63] Right adaptive cruise control sender G259 and adaptive cruise control unit J428

[64] Not available in all countries.

[65] Not available in all countries.

[66] Further information on bus systems with flexible data rate is provided in SSP 680, "Networking", "Bus systems".

[67] Not available in all countries.

[68] Not available in all countries.

[69] Not available in all countries.

[70] Not available in all countries.

[71] Not available in all countries.

[72] Not available in all countries.

[73] Not available in all countries.

[74] Not available in all countries.

[75] Not available in all countries.

[76] Not available in all countries.

[77] Not available in all countries.

[78] Not available in all countries.

[79] Further information on the Audi pre sense turn-off assist is provided on "SSP_680_023".

[80] Further information on the Audi pre sense turn-off assist is provided on "SSP_680_023".

If the vehicle approaches another vehicle which is travelling in the same direction, has stopped or is stationary at a speed between approximately 5 and 250 km/h, resulting in a critical situation, the instrument cluster can give the driver acoustic and visual advance warnings when certain limits are exceeded. Depending on the situation, advance warnings can be given across the full speed range. The system is able to alert the driver to vehicles travelling in front at higher speeds compared to the speeds at which it can alert the driver to stationary vehicles. The warnings are given within a specific timeframe, before the last opportunity for braking or taking evasive action to avoid a collision and before the actual collision occurs. The timing of the warnings depends on the driver's activity level. Depending on steering, pedal and turn signal inputs, the system classifies the driver as active or inactive and, consequently, as attentive or inattentive. If the driver is classed as attentive, the warnings are issued later than for a driver classed as inattentive. At the same time, the ABS control unit J104 pre-charges the brake system and reconfigures the parameters for the hydraulic brake assist system so that the hydraulic brake assist system reacts to pedal inputs from the driver with increased sensitivity.

Acute warning phase

If the driver does not respond to the warnings, however, the ABS control unit J104 gives an acute warning using a brake jolt. A visual warning is shown in the instrument cluster at the same time. The brake jolt is a very brief but clearly noticeable application of the brakes which is not directly intended to slow the vehicle down. Its purpose is to bring the driver's attention back to the traffic situation and indicate to the driver that an immediate reaction is required in order to prevent an impending collision. The brake jolt occurs within a certain timeframe that depends on whether the driver has been classified as attentive or inattentive, before the last opportunity for braking or taking evasive action to avoid a collision.

Automatic braking phase

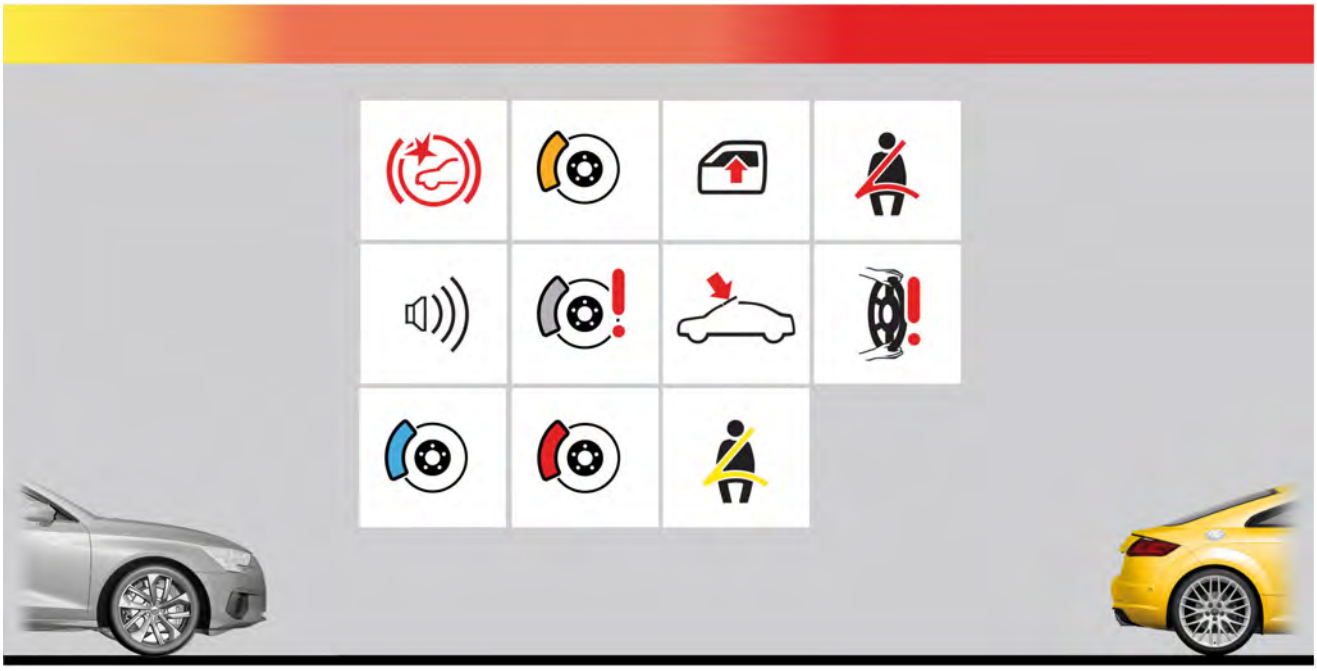
If the driver fails to respond to the brake jolt or only takes his/her foot off the accelerator, the ABS control unit J104 applies the brakes automatically[81]. Depending on the speed at which the vehicle is travelling, braking may increase progressively to the maximum level (emergency braking). Depending on the situation, the ABS control unit J104 may trigger activation of the hazard warning lights[82]. The following additional actions may be triggered according to the situation:

- Closing of the panoramic sunroof[83]
- Closing of the side windows with a gap remaining
- Partial tensioning of the electric reversible belt tensioners
- Full tensioning of the electric reversible belt tensioners
- Display of an Audi pre sense intervention in the instrument cluster
- Prompt for the driver to take control of the vehicle

Note
The prompt for the driver to take control of the vehicle is issued if the vehicle has been braked to a stop automatically or with assistance. The prompt for the driver to take control of the vehicle takes the form of a visual display in the instrument cluster and additional acoustic signals. It is designed to alert the driver to the fact that he/she must actively take control of the vehicle (e.g. by braking). If the driver fails to take control of the vehicle, the system will release the brakes and the vehicle may start to move (e.g. if the vehicle has an automatic gearbox).

[81] Not available in all countries.
[82] Not available in all countries.
[83] Optional equipment.

Audi pre sense front procedure - automatic response to vehicles



680_026

Key:

	Visual advance warning and/or intervention display		Acoustic signal		Pre-charging of the brake system
	Reconfiguration of the hydraulic brake assist system		Acute warning using jolt of the vehicle's brakes		Automatic braking up to emergency braking intensity
	Closing of the side windows with a gap remaining		Closing of the panoramic sunroof		Partial tensioning
	Full tensioning		Prompt for the driver to take control of the vehicle		

Assistive braking phase

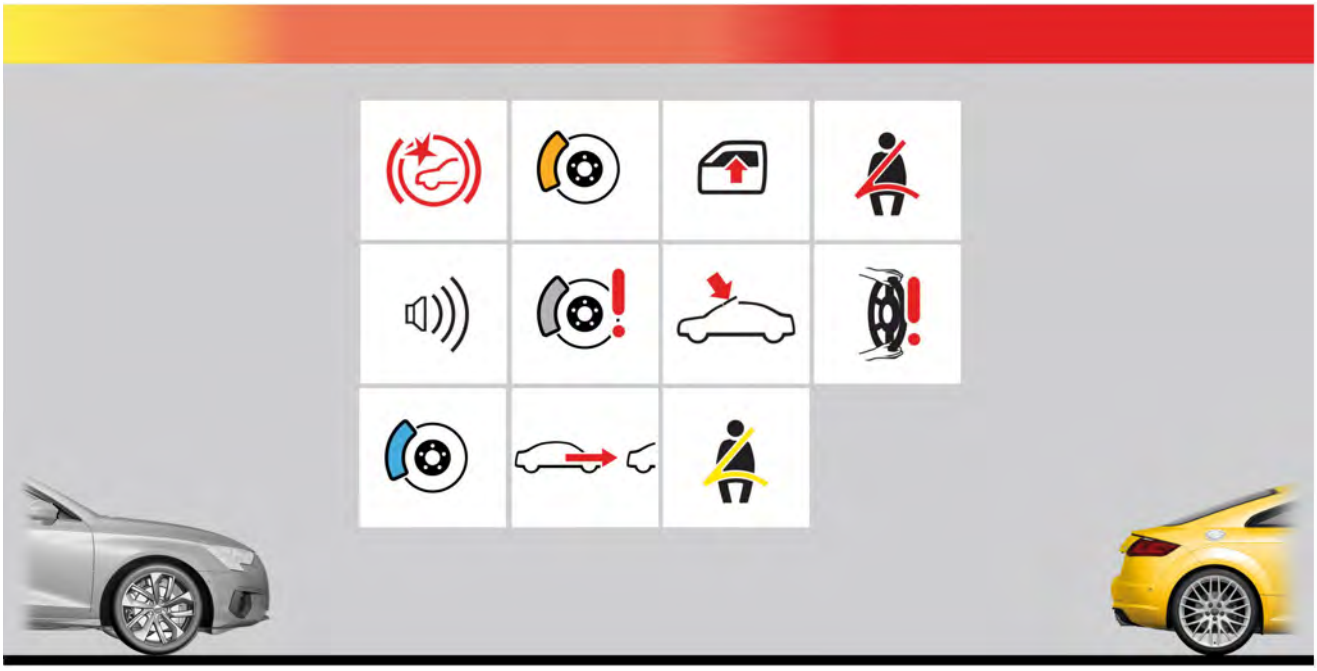
If the driver applies the brakes, a targeted braking maneuver can be performed in all of the phases described above (pre-charging of the brake system, reconfiguration of the hydraulic brake assist system, advance warning, acute warning, automatic braking). During the targeted braking maneuver, Audi pre sense front calculates whether the driver is braking sufficiently to be able to avoid a collision. If this is not the case, the braking can be increased as required according to the situation, up to the maximum level if necessary. Depending on the situation, the ABS control unit J104 may trigger activation of the hazard warning lights[84]. The following additional actions may be triggered according to the situation:

- Closing of the panoramic sunroof[85]
- Closing of the side windows with a gap remaining
- Partial tensioning of the electric reversible belt tensioners
- Full tensioning of the electric reversible belt tensioners
- Display of an Audi pre sense intervention in the instrument cluster
- Prompt for the driver to take control of the vehicle

Note
The prompt for the driver to take control of the vehicle is issued if the vehicle has been braked to a stop automatically or with assistance. The prompt for the driver to take control of the vehicle takes the form of a visual display in the instrument cluster and additional acoustic signals. It is designed to alert the driver to the fact that he/she must actively take control of the vehicle (e.g. by braking). If the driver fails to take control of the vehicle, the system will release the brakes and the vehicle may start to move (e.g. if the vehicle has an automatic gearbox).

[84] Not available in all countries.
[85] Optional equipment.

Audi pre sense front procedure - assistive response to vehicles



680_027

Key:

	Visual advance warning and/or intervention display		Acoustic signal		Pre-charging of the brake system
	Reconfiguration of the hydraulic brake assist system		Acute warning using jolt of the vehicle's brakes		Targeted braking
	Closing of the side windows with a gap remaining		Closing of the panoramic sunroof		Partial tensioning
	Full tensioning		Prompt for the driver to take control of the vehicle		

Response to pedestrians/cyclists

The following requirements must be fulfilled in order for the system to be able to intervene:

- Audi pre sense front can react to pedestrians[86] and cyclists[87] who are in the same lane or are starting to move into it.
- Audi pre sense front is active at speeds of approximately 5 km/h and above.
- Audi pre sense front can warn against pedestrians[88] and cyclists[89] at speeds of up to 85 km/h.
- Audi pre sense front can initiate braking at speeds of up to 85 km/h.

Advance warning phase

When the vehicle is travelling at a speed between approximately 5 and 85 km/h and pedestrians[90] or cyclists[91] are in the same lane or are starting to move into it, resulting in a critical situation, the instrument cluster can give the driver visual and acoustic advance warnings. The warnings are given within a specific timeframe, before the last opportunity for braking or taking evasive action to avoid a collision and before the actual collision occurs. The timing of the warnings depends on the driver's activity level. Depending on steering, pedal and turn signal inputs, the system classifies the driver as active or inactive and, consequently, as attentive or inattentive. If the driver is classed as attentive, the warnings are issued later than for a driver classed as inattentive. At the same time, the ABS control unit J104 pre-charges the brake system and reconfigures the parameters for the hydraulic brake assist system so that the hydraulic brake assist system reacts to pedal inputs from the driver with increased sensitivity.

Automatic braking phase

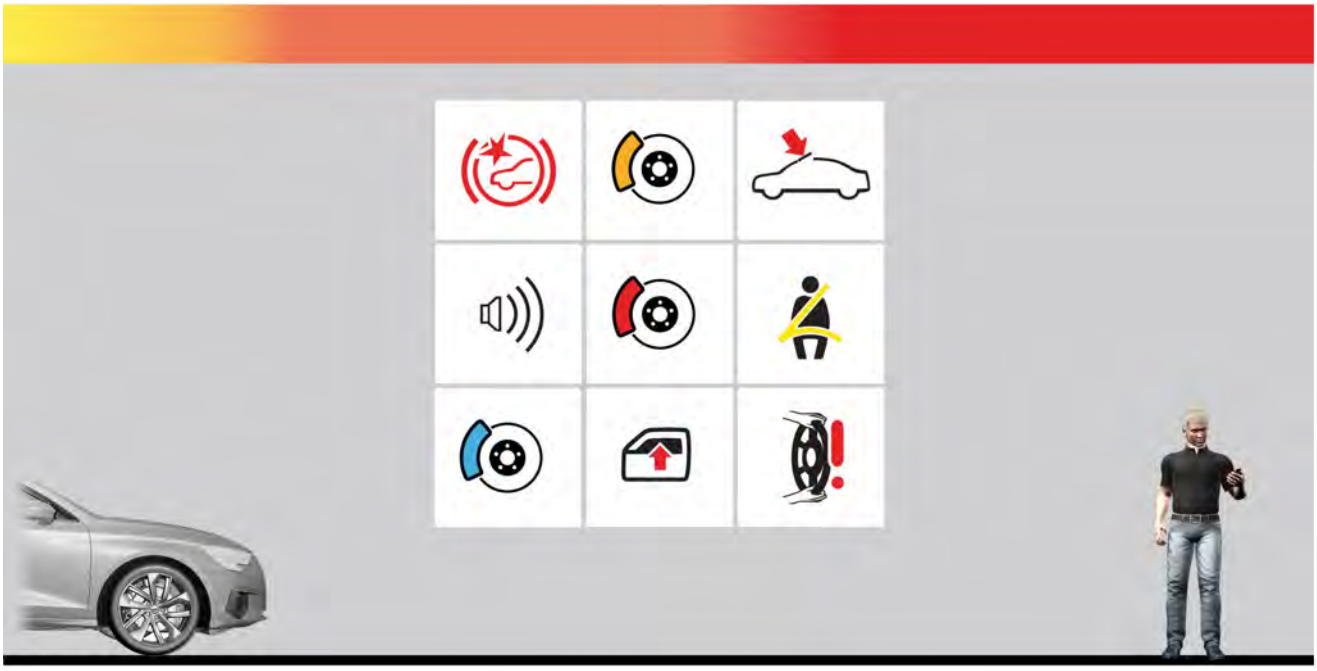
If the driver fails to react or only takes his/her foot off the accelerator, the ABS control unit J104 applies the brakes automatically[92]. Depending on the speed at which the vehicle is travelling, braking may increase progressively to the maximum level (emergency braking). Depending on the situation, the ABS control unit J104 may trigger activation of the hazard warning lights[93]. The following additional actions may be triggered according to the situation:

- Closing of the panoramic sunroof[94]
- Closing of the side windows with a gap remaining
- Partial tensioning of the electric reversible belt tensioners
- Display of an Audi pre sense intervention in the instrument cluster
- Prompt for the driver to take control of the vehicle

Note
The prompt for the driver to take control of the vehicle is issued if the vehicle has been braked to a stop automatically or with assistance. The prompt for the driver to take control of the vehicle takes the form of a visual display in the instrument cluster and additional acoustic signals. It is designed to alert the driver to the fact that he/she must actively take control of the vehicle (e.g. by braking). If the driver fails to take control of the vehicle, the system will release the brakes and the vehicle may start to move (e.g. if the vehicle has an automatic gearbox).

[86] Not available in all countries.
[87] Not available in all countries.
[88] Not available in all countries.
[89] Not available in all countries.
[90] Not available in all countries.
[91] Not available in all countries.
[92] Not available in all countries.
[93] Not available in all countries.
[94] Optional equipment.

Audi pre sense front procedure - automatic response to pedestrians/cyclists



680_028

Key:

	Visual advance warning and/or intervention display		Acoustic signal		Pre-charging of the brake system
	Reconfiguration of the hydraulic brake assist system		Automatic braking up to emergency braking intensity		Closing of the side windows with a gap remaining
	Closing of the panoramic sunroof		Partial tensioning		Prompt for the driver to take control of the vehicle

Assistive braking phase

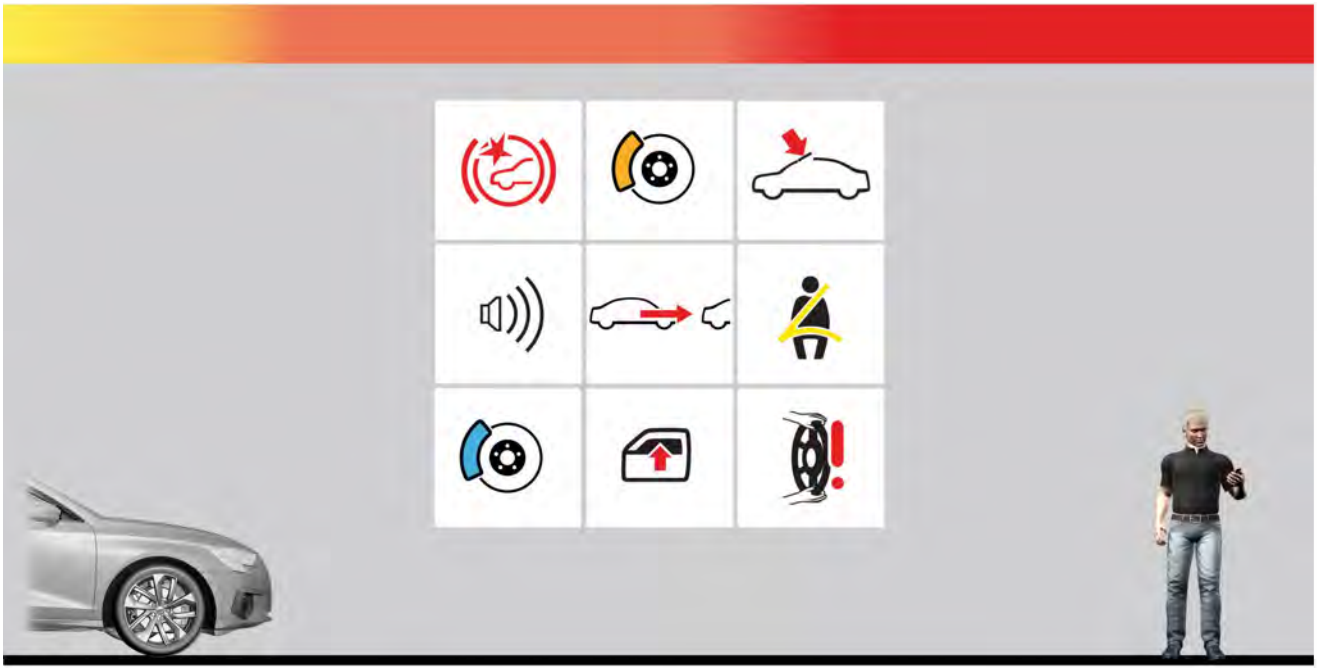
If the driver applies the brakes, a targeted braking maneuver can be performed in all of the phases described above (pre-charging of the brake system, reconfiguration of the hydraulic brake assist system, advance warning, automatic braking). During the targeted braking maneuver, Audi pre sense front calculates whether the driver is braking sufficiently to be able to avoid a collision. If this is not the case, the braking is increased as required according to the situation, up to maximum level if necessary. Depending on the situation, the ABS control unit J104 may trigger activation of the hazard warning lights[95]. The following additional actions may be triggered according to the situation:

- Closing of the panoramic sunroof[96]
- Closing of the side windows with a gap remaining
- Partial tensioning of the electric reversible belt tensioners
- Display of an Audi pre sense intervention in the instrument cluster
- Prompt for the driver to take control of the vehicle

Note
The prompt for the driver to take control of the vehicle is issued if the vehicle has been braked to a stop automatically or with assistance. The prompt for the driver to take control of the vehicle takes the form of a visual display in the instrument cluster and additional acoustic signals. It is designed to alert the driver to the fact that he/she must actively take control of the vehicle (e.g. by braking). If the driver fails to take control of the vehicle, the system will release the brakes and the vehicle may start to move (e.g. if the vehicle has an automatic gearbox).

[95] Not available in all countries.
[96] Optional equipment.

Audi pre sense front procedure - assistive response to pedestrians/cyclists



680_029

Key:

	Visual advance warning and/or intervention display		Acoustic signal		Pre-charging of the brake system
	Reconfiguration of the hydraulic brake assist system		Targeted braking		Closing of the side windows with a gap remaining
	Closing of the panoramic sunroof		Partial tensioning		Prompt for the driver to take control of the vehicle

System characteristics of Audi pre sense front

- During automatic braking, the braking behavior of the vehicle may be different than usual when a trailer is being towed due to the change in mass and the change in the braking and stabilization behavior.
- If an emergency braking maneuver is initiated by the vehicle, Audi pre sense front can help reduce the vehicle's speed by up to 50 km/h.
- Depending on the situation, the ABS control unit J104 may trigger activation of the hazard warning lights (emergency braking warning)[97].
- With Audi pre sense front, if the driver takes clear evasive action, accelerates or brakes during the different phases of the collision warning or a braking intervention, the current actions of Audi pre sense front (e.g. advance warning) are suppressed or cancelled.
- If Audi pre sense is switched off in the MMI, the warning and braking functions of Audi pre sense front and the pre sense turn-off assist and swerve assist are also switched off.
- The front camera for driver assist systems and the radar sensor are initialized automatically after the ignition is switched on. For this reason, Audi pre sense front and the pre sense turn-off assist and swerve assist may not be available for up to 20 seconds after the ignition is switched on. The fact that they are not available is indicated by the initialization lamp in the instrument cluster.

If the front camera for driver assist systems R242 is unable to provide reliable data due to poor visibility and lighting conditions such as darkness or fog

- pre sense front cannot react to stationary vehicles.
- pre sense front cannot react to pedestrians[98]/cyclists[99].
- the pre sense swerve assist cannot react to stationary vehicles. However, it can react to vehicles travelling in front.
- the pre sense turn-off assist cannot react to vehicles.

Audi pre sense turn-off assist

Note
The Audi pre sense turn-off assist is expected to be available from week 34/2020 onwards.

The Audi pre sense turn-off assist can provide assistance when turning off. The following actions can be initiated by the Audi pre sense turn-off assist:

- Automatic emergency braking
- Display of an Audi pre sense intervention in the instrument cluster (visual and acoustic)

Fitting location

The vehicle requires the following for the Audi pre sense turn-off assist:

- Right adaptive cruise control sender G259 and adaptive cruise control unit J428
- Front camera for driver assist systems R242

[97] Not available in all countries.
[98] Not available in all countries.
[99] Not available in all countries.

680_023

How it works

This description of the pre sense turn-off assist applies to a situation in which a vehicle that is driving on the right-hand side of the road is turning left. In a situation where the vehicle is driving on the left, the function would assist the driver when turning right. The radar sensor and the front camera for driver assist systems continuously monitor the traffic in front of the vehicle. The front camera for driver assist systems sends the data that it has recorded to the adaptive cruise control unit J428. The adaptive cruise control unit fuses the data and can instruct other systems to take action depending on the situation. The data fusion allows a model of the vehicle's surroundings to be created.

Procedure when own vehicle is turning left

The driver of vehicle **1** wants to turn left. The following conditions are evaluated in order for the turn-off assist to provide the driver with assistance when turning left:

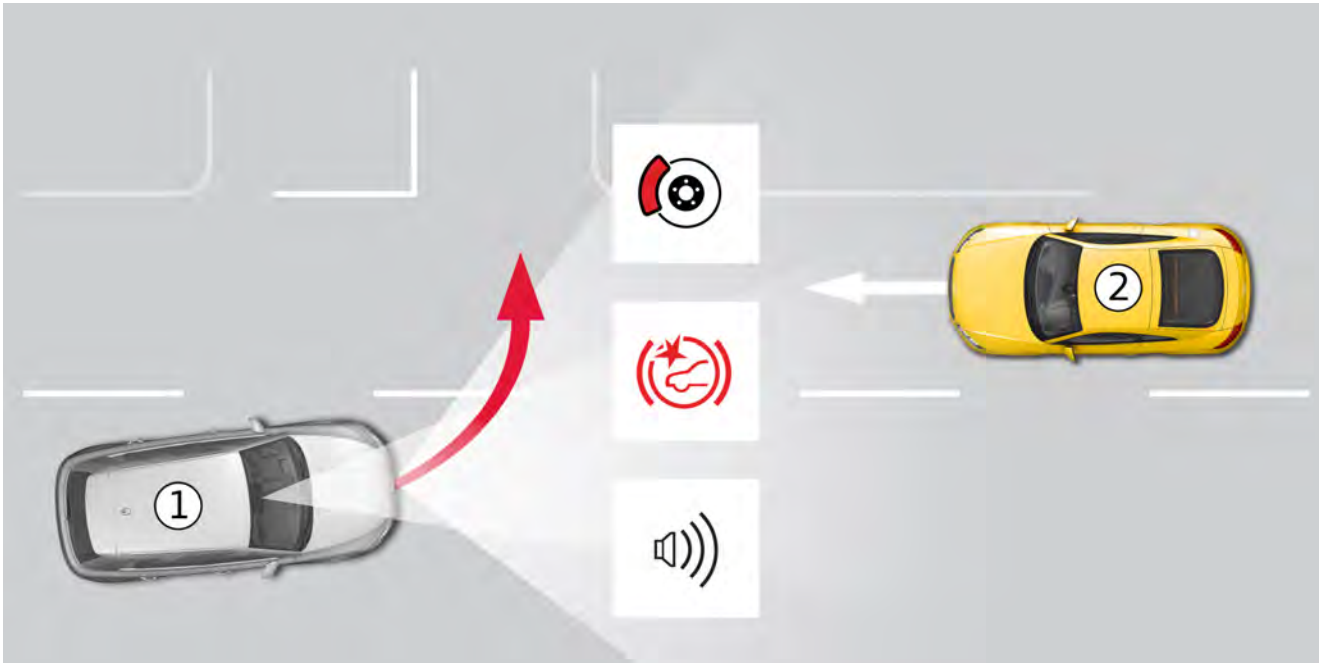
- Own speed (approx. 15 km/h)
- Steering angle
- Actuation of turn signal
- Position of accelerator pedal

The adaptive cruise control unit evaluates the above-mentioned conditions and decides automatically whether the driver plans to turn left. The above conditions do not all need to be occurring for a decision to be made.

For the Audi pre sense turn-off assist, the speed of the vehicle **1** must only be approximately 15 km/h.

The front radar sensor and the front camera continuously monitor the traffic in front of the vehicle **1**, as described in “How it works”. As soon as a left-turn maneuver is identified, they also monitor the oncoming traffic. If the adaptive cruise control unit J428 identifies that the planned turn-off maneuver would result in a critical situation with the oncoming traffic **2**, this is identified by the adaptive cruise control unit using the speed senders of the ABS control unit J104. In this case, the adaptive cruise control unit instructs the ABS control unit J104 to perform an automatic emergency braking maneuver. The emergency braking maneuver brings the vehicle **1** to a standstill. A message indicating that Audi pre sense is intervening appears in the instrument cluster and an acoustic warning is also given.

Audi pre sense turn-off assist procedure



680_024

Key:

	Automatic braking up to emergency braking intensity		Visual advance warning and/or intervention display		Acoustic signal

System characteristics of the Audi pre sense turn-off assist

› The pre sense turn-off assist is only available at speeds of up to approximately 15 km/h when the vehicle itself is turning off.
› On vehicles that are driven in right-hand traffic, the system only works when turning left.
› On vehicles that are driven in left-hand traffic, the system only works when turning right.
› A visual and acoustic warning are given when the pre sense turn-off assist is intervening.

Switching the pre sense turn-off assist off/on

If Audi pre sense is switched off, the pre sense turn-off assist is also switched off. The pre sense turn-off assist can also be switched off separately in the MMI menu.

Reference
Further information on switching Audi pre sense on/off can be found in SSP 680, "Audi pre sense settings".

Audi pre sense swerve assist

The Audi pre sense swerve assist can provide the driver with assistance when he/she is swerving to avoid colliding with another vehicle from behind.

The following actions can be initiated by the Audi pre sense swerve assist:

Note
The Audi pre sense swerve assist only provides the driver of the vehicle with steering assistance if he/she actively carries out the swerving maneuver by swerving himself/herself (steering movements).

- Steering torques to assist the driver (steering interventions)
- Application of the brakes on individual wheels
- Display of an Audi pre sense intervention in the instrument cluster (visual and acoustic)

Fitting location

The vehicle requires the following for the Audi pre sense swerve assist:

- Right adaptive cruise control sender G259 and adaptive cruise control unit J428
- Front camera for driver assist systems R242

680_023

How it works

This description of the pre sense swerve assist uses an example where the driver of the vehicle wants to drive around another vehicle on the left. The pre sense swerve assist behaves in a similar way when driving around another vehicle on the right. The radar sensor and the front camera for driver assist systems continuously monitor the traffic in front of the vehicle. The front camera for driver assist systems sends the data that it has recorded to the adaptive cruise control unit J428. The adaptive cruise control unit fuses the data and can instruct other systems to take action depending on the situation. The data fusion allows a model of the vehicle's surroundings to be created.

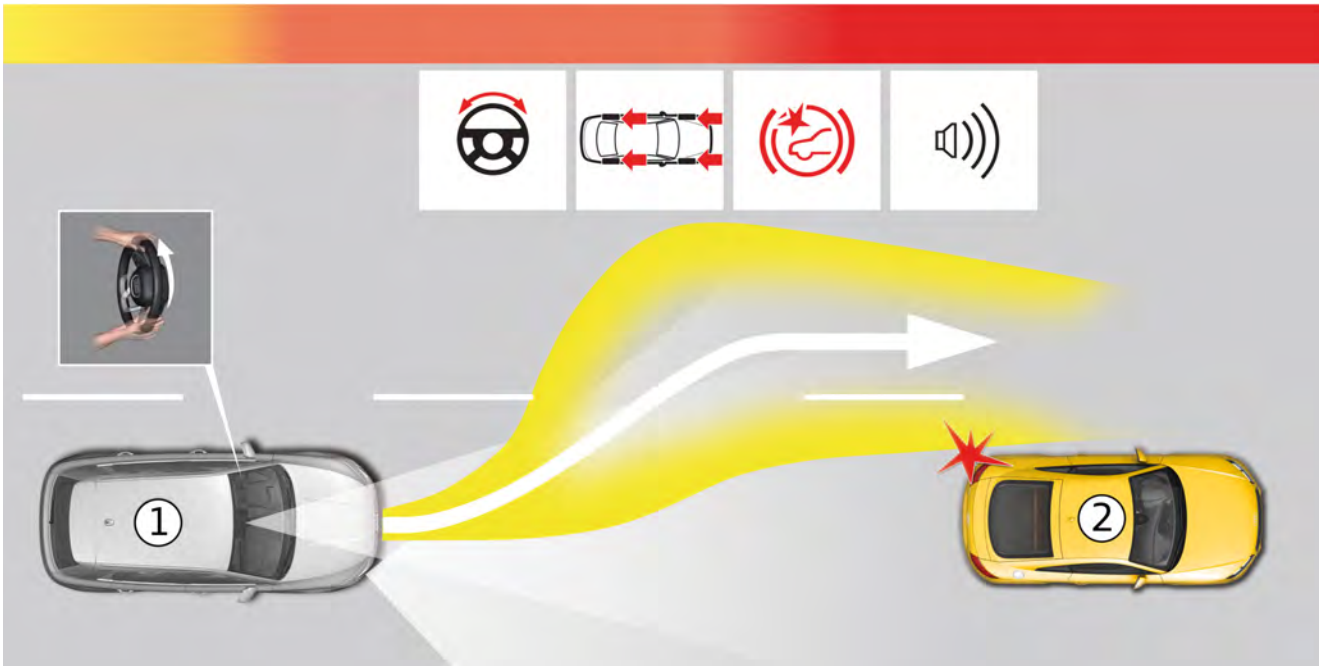
Swerving maneuver

The driver of vehicle **1** wants to swerve to avoid vehicle **2**, which is travelling in front. The radar sensor and the front camera continuously monitor the traffic in front of the vehicle **1**, as described in “How it works”. Before the swerve assist can intervene, Audi pre sense front must have already identified a critical situation and the following actions must have already been performed:

- Visual advance warning
- Acoustic advance warning
- Pre-charging of the brake system
- Reconfiguration of hydraulic brake assist system
- Acute warning using a brake jolt

The swerve assist calculates a suitable evasion line based on information such as the vehicle’s own speed and the lane in which the vehicle ahead is travelling. If the vehicle **1** deviates too far from the evasion line within certain limits, the swerve assist will try to guide the vehicle **1** past the other vehicle **2** along the evasion line by providing steering assistance (after the acute warning has been given). In addition, the vehicle **1** can be stabilized further through application of the brakes on individual wheels. The swerve assist can only provide the driver of the vehicle **1** with assistance if he/she actively carries out the swerving maneuver by steering himself/herself. A message indicating that Audi pre sense is intervening appears in the instrument cluster and an acoustic warning is also given. The swerve assist will not provide assistance if the last possible opportunity to avoid a collision has passed.

Audi pre sense swerve assist procedure



680_025

Key:

	Supporting steering torque		Application of the brakes on individual wheels		Visual advance warning and/or intervention display
	Acoustic signal				

System characteristics of the Audi pre sense swerve assist

› The swerve assist is active starting from when the acute warning (brake jolt) is given.
› The swerve assist is not active after the last possible opportunity to avoid a collision has passed.
› The swerve assist does not provide assistance unless the driver is actively steering the vehicle.
› The swerve assist is available at speeds of between approximately 40 and 150 km/h.
› The swerve assist can help the driver to drive around another vehicle on the left or right.

Switching the pre sense swerve assist on/off

If Audi pre sense is switched off, the pre sense swerve assist is also switched off. The pre sense swerve assist can also be switched off separately in the MMI menu.

Note
› On vehicles manufactured up to week 33/2020, the Audi pre sense swerve assist must be actively switched back on in the MMI if it was switched off separately. Up to this date, if it has been switched off, the pre sense swerve assist is not switched back on when the ignition (terminal 15) is switched off and on again.
› On vehicles manufactured from week 34/2020 onwards, if it was deactivated separately in the MMI, the Audi pre sense swerve assist is switched back on automatically when the ignition (terminal 15) is switched off and on again.

Reference
Further information on switching Audi pre sense on/off can be found in SSP 680, "Audi pre sense settings".

Assist systems

New features of the driver assist systems

There is a wide range of driver assist systems available in the Audi A3 (type 8Y) – even more than the already large range available in the Audi Q3 (type F3). The Audi Q3 (type F3) was introduced at the end of 2018 and, like the Audi A3 (type 8Y), is based on the modular transverse matrix (MQB).

Many of the driver assist systems from the Audi Q3 (type F3) have been transferred to the Audi A3 (type 8Y) without any changes to their function. Other systems had to be altered due to changes to legal regulations. However, there are also some driver assist systems for which the functionality has been extended or which were not offered at all in the Audi Q3 (type F3). The new features of the individual driver assist systems are described in detail in the next part of this self-study programme.

Driver assist systems available in the Audi A3 (type 8Y)	System available for the first time in an Audi A3	Part of driver assist package (PR number: PCE)
Assist systems for parking		
Rear parking aid		(X)
Parking system plus		X
Park assist		X
Reversing camera		
Surround view cameras	X	
Assist systems that provide longitudinal and/or lateral guidance		
Lane departure warning	X	
Speed limiter	X	
Cruise control system		
Adaptive cruise control (ACC)		(X)
Adaptive cruise assist	X	X
Predictive efficiency assist	X	X
Emergency assist		X
Assist systems that use the rear radar sensors		
Lane change warning		
Rear cross-traffic assist		
Exit warning system	X	
Other assist systems		
Traffic sign recognition		X
Main beam assist		X

Note
The driver assist package can only be ordered in combination with an automatic gearbox and the MMI navigation plus (both optional equipment). The driver assist systems offered in the driver assist package may differ from the package described here depending on the market.

Lane departure warning and adaptive cruise assist

Changes to the vehicle safety assessment by Euro NCAP

The lane departure warning is a safety-related assist system that is taken into account in the Euro NCAP assessment. Fitting this system as standard in European Union countries increases the overall score in the assessment of the new model. The overall score obtained is used to determine the number of stars awarded to the model for its safety.

As of recently, the following two conditions must be met for the lane departure warning to actually result in a higher score:

1. It must not be possible to switch the lane departure warning off easily and therefore to potentially switch it off accidentally. This would be the case if the option to switch it off were on the first level of the MMI. Another example would be if the system could be switched off by briefly pressing a button. Both of these actions could easily occur accidentally, which would result in a driver assist system designed to improve safety being deactivated for the current driving cycle.
2. It must not be possible to switch the lane departure warning off permanently. For this reason, when the system is switched off, the setting must only apply for the current driving cycle. The system must be switched back on again after the ignition has been switched off and on again.

The operating concept which defines how the two lateral guidance functions (lane departure warning and lane center guidance) are switched on and off has been revised in light of the new requirements.

Lane departure warning

680_112

The lane departure warning is always switched on after the ignition has been switched on. Pressing the button on the end of the turn signal lever for at least 3 seconds changes the status of the lane departure warning. It is switched off if it was on before, and vice versa.

Another method of switching the lane departure warning on or off is available in the driver assist menu of the MMI. The status of the system can be changed under “Lane departure warning”.

In addition, the steering wheel vibration can be switched on or off. Unlike the on/off setting for the lane departure warning itself, this setting is stored and continues to apply after the ignition (terminal 15) has been switched off and on again.

Lane center guidance of the adaptive cruise assist

The lane center guidance of the adaptive cruise assist can also be switched on or off using the button on the end of the turn signal lever. To do so, the button must be pressed briefly. The active system status at the time when the ignition is switched off is stored and reactivated in the next driving cycle. By contrast, the lane center guidance cannot be switched on and off via the driver assist menu in the MMI.

The lane center guidance can only be active when the longitudinal guidance of the adaptive cruise assist is also active. However, the longitudinal guidance can be used without the lane center guidance.

680_113

Lane center guidance display in the instrument cluster

The lane center guidance is switched on and active.

The lane center guidance can no longer assist the driver due to the system's limitations. The driver must take control of steering the vehicle again.

The lane center guidance is switched on but not active.

Possible reasons for this may be that no hands have been detected on the steering wheel, the lane is too wide or too narrow, or no lane markings have been identified.

The lane center guidance is switched off.

Emergency assist

First and second generation emergency assist

There are now several generations of the Audi emergency assist. The individual generations differ in terms of the number of specific actions that the active emergency assist takes before, while and after braking to a standstill.

The first generation of the emergency assist was introduced to market in 2016 with the launch of the Audi Q2 (type GA). In this generation the driver is shown warning messages in the instrument cluster while the vehicle is braking to a standstill and acoustic warnings are issued. In addition, attempts are made to prompt the driver to take control of driving the vehicle with brake jolts. The hazard warning lights are activated to draw the attention of those nearby to the hazardous situation.

The much more comprehensive second generation of the emergency assist was introduced with the Audi A8 (type 4N) in 2017. This generation was also used in all other models that were developed on the basis of the MLBevo generation 2, as well as in the Audi e-tron (type GE). This generation of the emergency assist can be deactivated by the customer. It is no longer dependent on an active assist system with lateral guidance in order for it to be activated, as it was on the Audi Q2. An emergency call is made a few seconds after the vehicle has been braked to a standstill.

Third generation emergency assist in the Audi A3 (type 8Y)

The Audi A3 (type 8Y) is fitted with the third generation of the emergency assist which brings several familiar features of the emergency assist in vehicles based on the MLBevo generation 2 into vehicles built on the modular longitudinal matrix (MQB).

The following features have been added compared to the first generation of the emergency assist:

- Interior lights are activated
- Vehicle doors are unlocked
- Volume of infotainment system audio is lowered
- Emergency assist can be switched on and off in the MMI
- Gearbox position "P" is selected
- An emergency call is made
- Measures are taken to protect the vehicle occupants
- Horn is operated

Conditions for activation of the third generation emergency assist

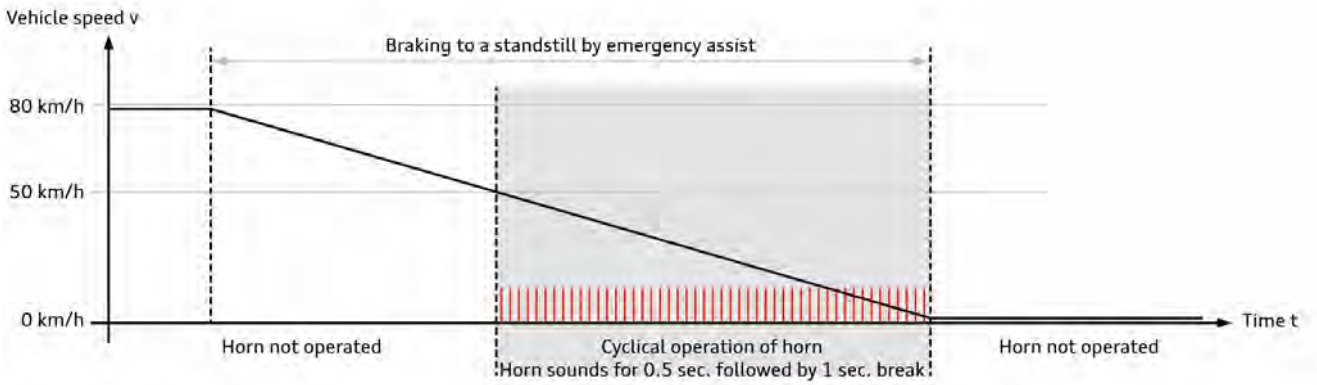
The emergency assist in the Audi A3 (type 8Y) can be activated under the following two conditions:

1. **When driving with active adaptive cruise assist (ACA) and active lane centre guidance**
   If the capacitive steering wheel does not detect hands on the steering wheel for a period of 10 seconds, the ACA displays a driver message in the instrument cluster. If the driver does not react to this within 15 seconds, a warning tone sounds and a red warning message with the instruction to take over the steering appears. If no hands are detected on the steering wheel in the following 8 seconds, the emergency assist is activated.
   When driving with the adaptive cruise assist, the emergency assist can be activated over the entire speed range up to a maximum of 250 km/h.
   If the vehicle is fitted with the ACA, a capacitive steering wheel is always also installed. The capacitive steering wheel is used to detect whether or not at least one of the driver's hands is on the steering wheel. This feature is known as hands-off detection.
2. **When the lane departure warning is switched on and ready to give warnings**
   In this case, the emergency assist is activated if, within a period of 180 seconds, the lane departure warning has intervened in the steering twice and no hands were detected on the steering wheel during these interventions.
   In this case, the emergency assist can only be activated by the lane departure warning starting from a speed of 65 km/h as the lane departure warning itself is only active upwards of this speed.
   If the ACA is also fitted in the vehicle, the hands-off detection uses the capacitive steering wheel. If the ACA is not fitted, the hands-off detection uses the familiar procedure which involves evaluating the data from the steering torque sensor.

The emergency assist is not offered for vehicles with a manual gearbox. It is only available in vehicles with an automatic gearbox. In many markets the emergency assist can be ordered as part of the driver assist package (PR number: PCE). In these markets it cannot be ordered separately.

Integration of the horn in the emergency assist warning concept

With the third generation, the horn has been integrated into the warning concept of the emergency assist for the first time. When the emergency assist is active and braking to a standstill, the horn is operated cyclically once the vehicle's speed drops below 50 km/h. The horn sounds for half a second at a time with breaks of one second in between. The horn is no longer operated once the vehicle has reached a standstill.



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Driver assist systems that use the rear radar sensors

Several driver assist systems that require the two rear radar sensors for their functions are offered in the Audi A3 (type 8Y).

These are the following three driver assist systems:

- Lane change warning (previously called lane change assist)
- Rear cross-traffic assist
- Exit warning system

Lane change warning

The lane change warning is activated when the vehicle speed exceeds approximately 15 km/h, provided that the system is set to "on" in the driver assist menu of the MMI. It is deactivated again when the speed drops below approximately 10 km/h. The system issues a warning when it assumes that the driver intends to change lane as the indicator has been switched on and another road user is either in the blind spot or approaching quickly from behind in the neighbouring lane. The lane change warning issues a warning by flashing the warning light in the corresponding exterior mirror.

If the turn signal has not been switched on in the situation described above, the driver is informed of the current situation by the warning light lighting up continuously and less brightly. The brightness of the light is less intense at the information level so that it does not distract the driver from looking ahead.

In terms of its function, the lane change warning is the same as the lane change warning in the Audi Q3 (type F3). The additional functions of the lane change warning available in vehicles based on the MLBevo generation 2 (such as the turn-off assist or assistance when driving out of parallel parking spaces or when merging) are not available in the Audi A3 (type 8Y).

Rear cross-traffic assist

The rear cross-traffic assist in the Audi A3 (type 8Y) is based on the rear cross-traffic assist in the Audi Q3 (type F3). The main difference between the two systems is that the rear cross-traffic assist in the Audi A3 (type 8Y) can be activated in all gear positions. In the Audi Q3 (type F3) it can only be activated in “N” and “R”.

680_119

Exit warning system

The Audi A3 (type 8Y) is the first MQB model made by Audi that offers the exit warning system in addition to the lane change warning and the rear cross-traffic assist. This is because the rear radar sensors that were previously used on the MQB have been replaced by a new generation of sensors that are designed to be supplied with power by terminal 30. The previous rear radar sensors were only designed to be supplied by terminal 15.

Having moved the rear radar sensors to terminal 30 enables the exit warning system to offer the same functions as the familiar exit warning system in the MLBevo vehicles.

This applies to the following functions in particular:

1. The exit warning system is still available for 180 seconds after the ignition has been switched off.
2. The exit warning system is already available for 180 seconds once the vehicle has been unlocked and a door has been opened before the ignition is switched on.

For the first time in the Audi A3 (type 8Y), the system also gives an acoustic warning when a collision risk is identified. This replaces the activation of a light strip in the relevant door. However, the visual warning given by flashing the warning light in the exterior mirror several times at a high level of brightness that is familiar from other models is still implemented.

Rear radar sensors

The two rear radar sensors are fitted on the left and right of the rear bumper.

680_120

The new rear radar sensors monitor an area of up to 70 m behind the vehicle in order to identify approaching vehicles at an early point in time. The area monitored to the side at the rear of the vehicle covers up to 50 m and is particularly important for the rear cross-traffic assist. However, this area is also required in order to monitor the blind spot for the lane change warning.

The rear radar sensors work at a frequency of 24 GHz.

Park assist

The park assist in the Audi A3 (type 8Y) is based on the system in the Audi Q3 (type F3). The park assist aids the driver in the familiar parking scenarios by taking over the steering. All of the tasks related to longitudinal guidance of the vehicle, such as accelerating and braking, as well as selecting the gear, remain the responsibility of the driver.

Overview of the familiar parking scenarios:

- Reversing into a parking space parallel to the road
- Reversing into a parking space perpendicular to the road
- Driving forwards into a parking space perpendicular to the road after driving past it
- Driving forwards into a parking space perpendicular to the road when heading directly into the space
- Driving forwards out of a parking space parallel to the road: maneuvering the vehicle in the parking space until the vehicle has reached a position that allows the driver to drive easily out of the parking space

New parking scenarios

The park assist in the Audi A3 (type 8Y) aids the driver in two new parking scenarios.

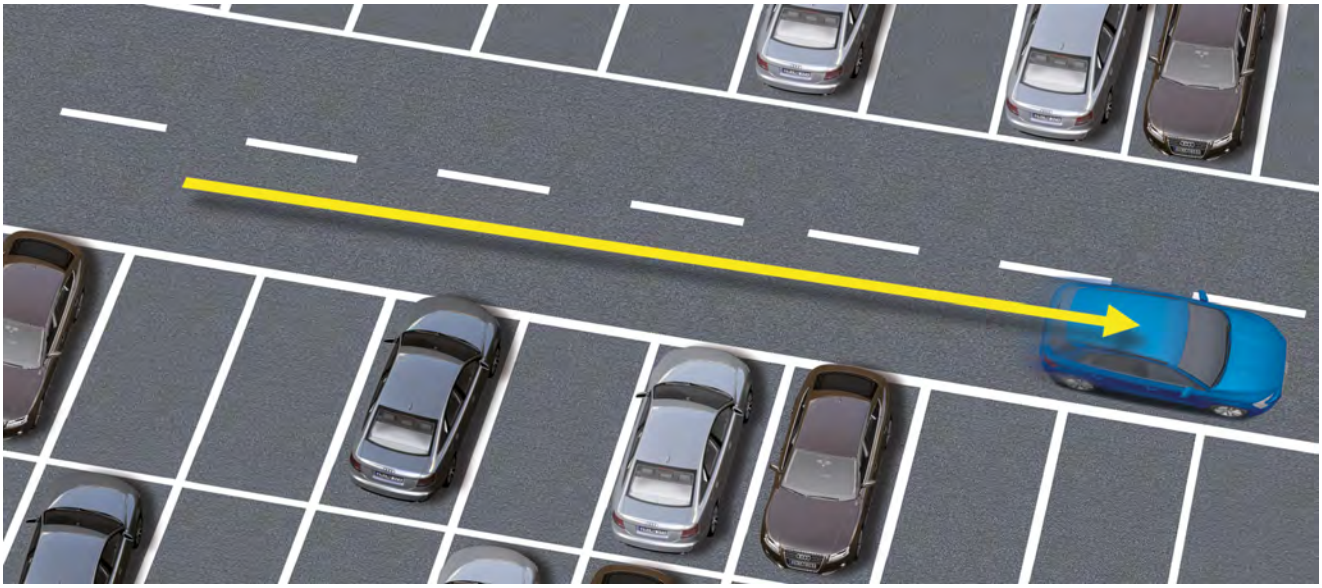
These are:

1. Reversing into a parking space parallel to the road after the driver has begun reversing towards the parking space but not completed the parking maneuver
2. Reversing into a parking space perpendicular to the road after the driver has begun reversing towards the parking space but not completed the parking maneuver

The park assist can now help the driver with the required corrections.

This self-study programme describes the procedure for reversing into a parking space perpendicular to the road as an example. The principle for reversing into a parking space parallel to the road is the same.

It is important to note that, in the new parking scenarios, the park assist must be activated with the reverse gear already engaged. This is done via a button that appears on the MMI screen.



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The driver drives past the parked vehicles and sees a free parking space perpendicular to the road that he/she wishes to park in. The driver brakes.

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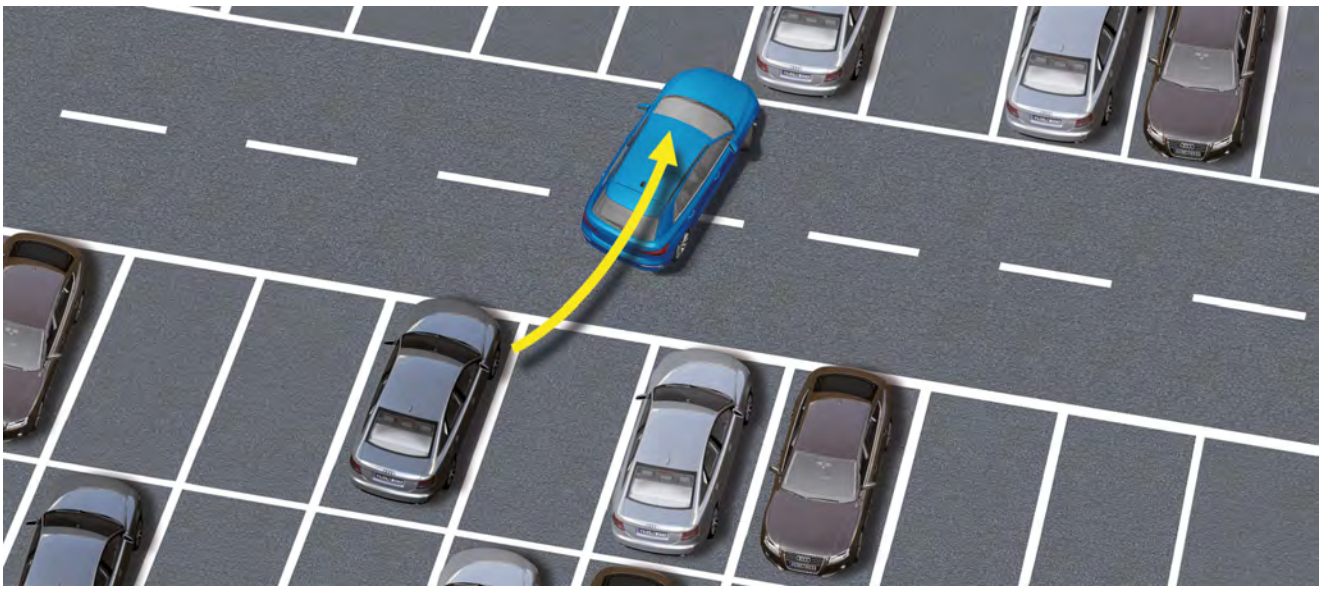
After engaging reverse gear, the driver drives into the parking space. He/she stops in the parking space in such a way that a correction is necessary.



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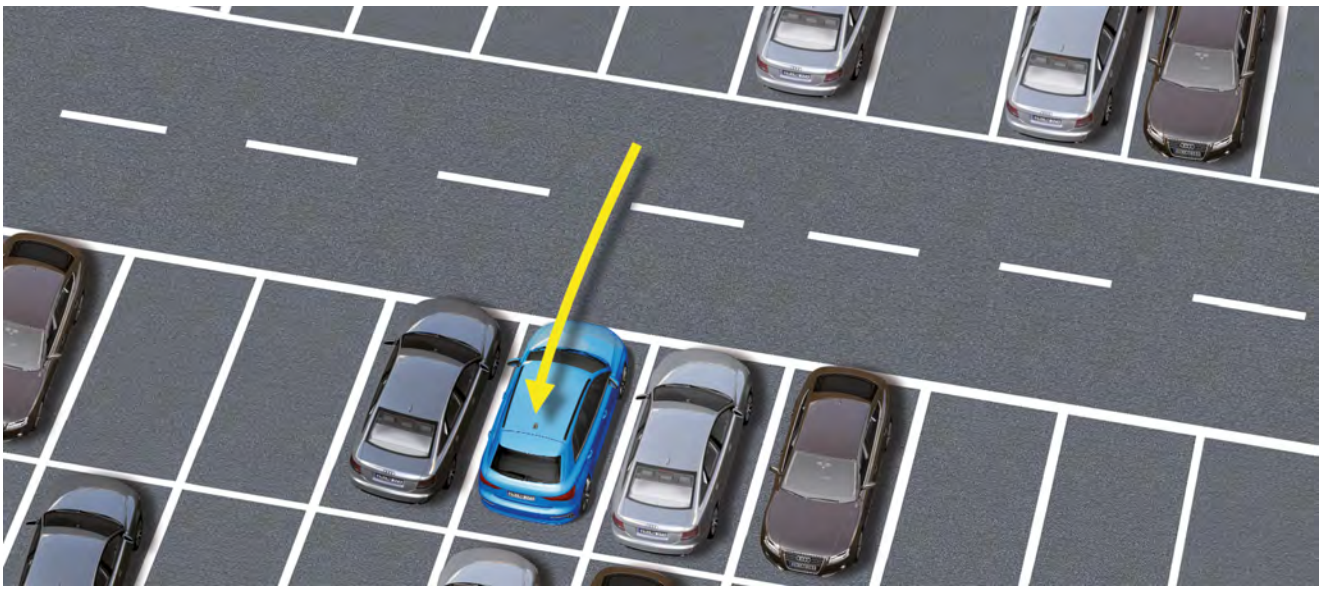
The driver activates the park assist, engages forward gear and drives forwards again. The steering is taken over by the park assist.



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The driver engages the reverse gear as requested by the park assist and drives into the parking space. The vehicle is now stopped in the correct position in the parking space.

Infotainment and Audi connect

Introduction and overview of versions

The infotainment system in the Audi A3 (type 8Y) is an MIB3 (third generation modular infotainment matrix) system comparable to the system from the product upgrade of the Audi A4 (type 8W). As the Audi A3 is, however, constructed using the modular transverse matrix, there are some differences between the systems. These and other features of the Audi A3 infotainment system are described in this chapter.

The Audi A3 is always equipped with an MIB3 High system. However, the customer can choose between the following two versions:

- MMI radio plus
- MMI navigation plus

Depending on the country, the MMI radio plus may be equipped with retrofit options so that customers can decide whether to use additional functions later. These retrofit options are referred to as “functions on demand” (FOD). Depending on the country, customers are offered activation options for different periods of time.

MMI radio plus with MMI touch (I8Y)	**MMI navigation plus with MMI touch (I8Y + 7UG)**
	
Standard equipment	
10.1” MMI touch display	10.1” MMI touch display
10.25” digital instrument cluster (7J2)	10.25” Audi virtual cockpit (9S1)
	3D navigation system on SSD (7UG)
AM/FM radio	AM/FM radio
DAB digital radio (QV3)[100]	DAB digital radio (QV3)[101]
Audi music interface with 1x USB-C and 1x USB-A	Audi music interface with 1x USB-C and 1x USB-A
Audi connect emergency call & service including vehicle control services (IW3)[102]	Audi connect emergency call & service including vehicle control services (IW3) [103]
	Audi connect infotainment basic services (IT4)
Bluetooth interface (9ZX)	Bluetooth interface (9ZX)
Basic plus sound system (8RL)	Basic plus sound system (8RL)
Optional equipment for retrofitting (functions on demand) (FP1)[104]	
Navigation system pre-installation (7UZ)	
Audi connect pre-installation (IT6)	
Audi smartphone interface pre-installation (IU2)	Audi smartphone interface pre-installation (IU2)
Optional equipment	
	Audi connect infotainment plus services (IT3)
Audi virtual cockpit plus (9S9)	Audi virtual cockpit plus (9S9)

[100] Standard equipment, depending on country
[101] Standard equipment, depending on country
[102] Standard equipment, depending on country
[103] Standard equipment, depending on country
[104] FP1 only applies to countries with functions on demand, otherwise: 7Q0 (without navigation system), IT0 (without connect activation), IU0 (without Audi smartphone interface activation) and QV0 (without DAB).

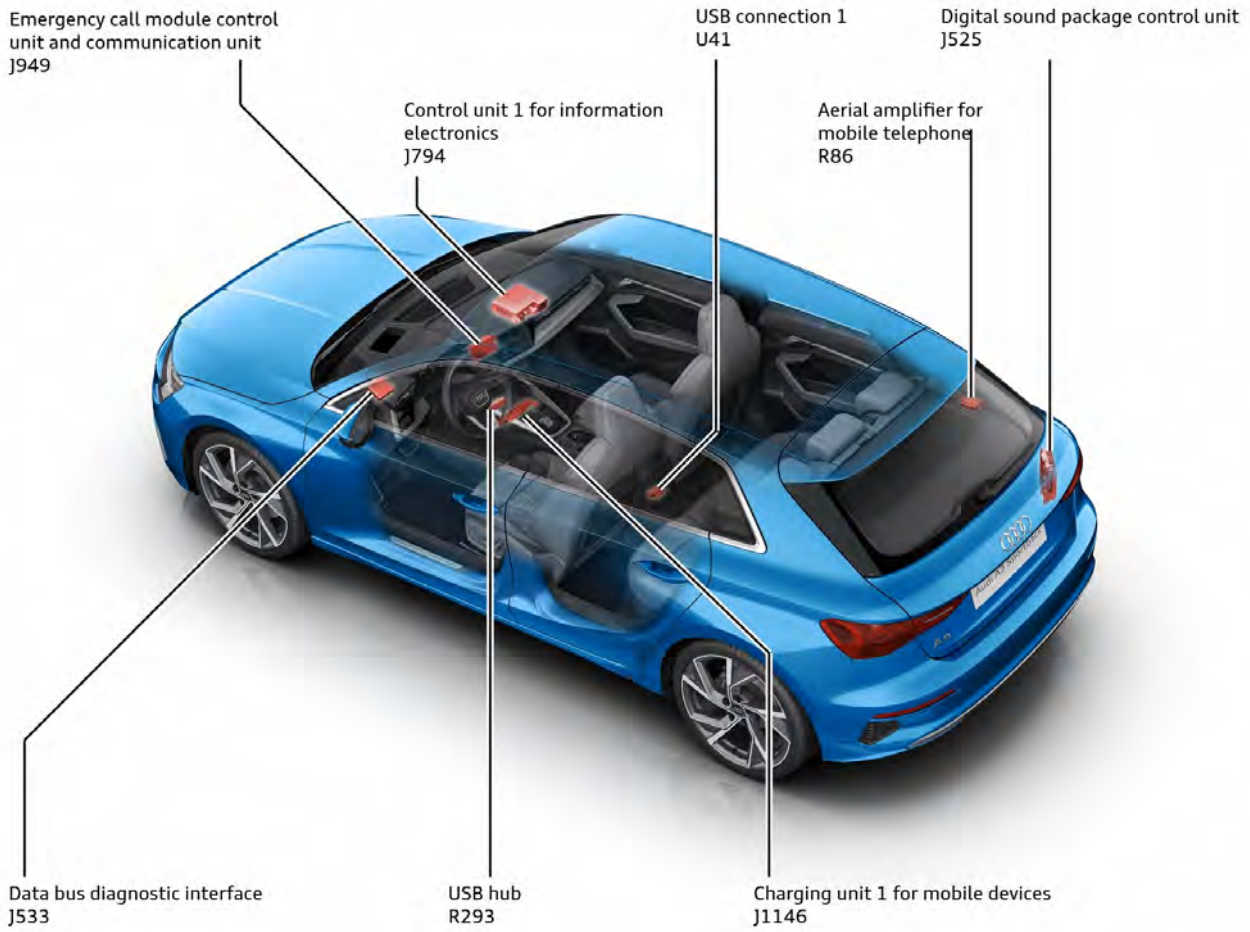
MMI radio plus with MMI touch (I8Y)	MMI navigation plus with MMI touch (I8Y + 7UG)
Audi smartphone interface (IU1)	Audi smartphone interface (IU1)
Audi phone box (9ZE)[105]	Audi phone box (9ZE)[106]
Audi phone box light (9ZV)[107][108]	Audi phone box light (9ZV)[109][110]
Audi sound system (9VD)	Audi sound system (9VD)
Bang & Olufsen Premium Sound System with 3D sound (9VS)	Bang & Olufsen Premium Sound System with 3D sound (9VS)
Digital radio or Sirius XM (QV3)[111]	Digital radio or Sirius XM (QV3)[112]
2x USB-C charging sockets in rear (7B9)	2x USB-C charging sockets in rear (7B9)
	TV tuner (QV1) (Japan only)
Audi connect key (2F1)[113]	Audi connect key (2F1)[114]

Reference
For more information on MIB3, please refer to self-study programme 679 “Audi MIB3”.

[105] If an Audi phone box is fitted, two smartphones can be connected via handsfree profiles at the same time using the Bluetooth interface.
[106] If an Audi phone box is fitted, two smartphones can be connected via handsfree profiles at the same time using the Bluetooth interface.
[107] If an Audi phone box is fitted, two smartphones can be connected via handsfree profiles at the same time using the Bluetooth interface.
[108] Can only be ordered in conjunction with the Audi smartphone interface (IU1)
[109] If an Audi phone box is fitted, two smartphones can be connected via handsfree profiles at the same time using the Bluetooth interface.
[110] Can only be ordered in conjunction with the Audi smartphone interface (IU1)
[111] DAB only offered for countries outside the European Union, Sirius XM for the North American market
[112] DAB only offered for countries outside the European Union, Sirius XM for the North American market
[113] Can only be ordered in conjunction with the convenience key
[114] Can only be ordered in conjunction with the convenience key

Infotainment system fitting locations

The illustration shows the most important infotainment system control units. The equipment may vary depending on the market.



680_086

MMI versions

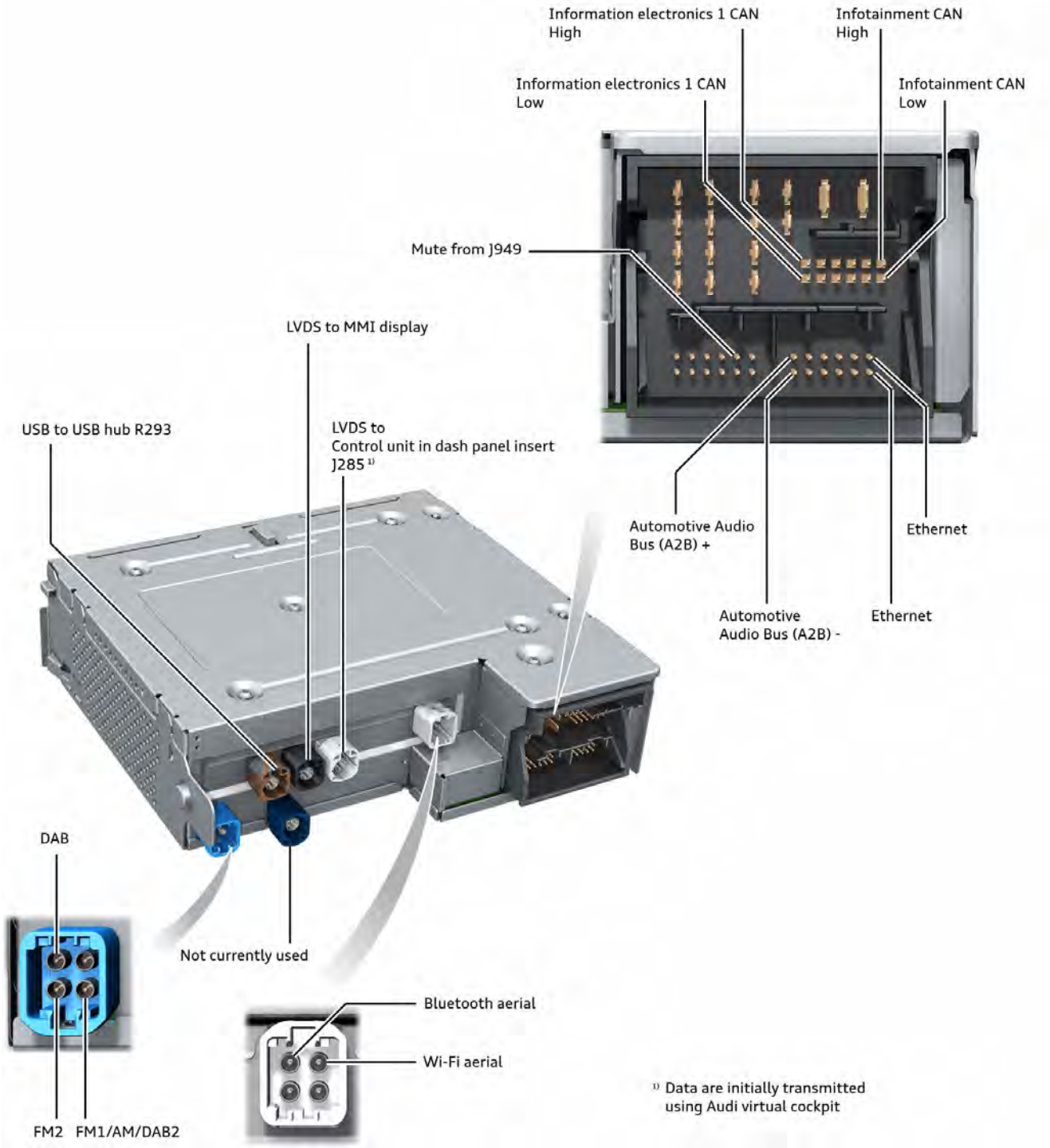
The Audi A3 (type 8Y) is always equipped with an MIB3 High. Despite this, there are two MMI versions for customers: the MMI radio plus and the MMI navigation plus. Although both versions of control unit 1 for information electronics J794 are identical on the outside, the MMI versions vary due to different software components.

The PR number for both versions is I8Y. They can be differentiated using the following combination:

- MMI radio plus I8Y + 7UZ or I8Y + 7Q0 (for countries without FOD)
- MMI navigation plus I8Y + 7UG

J794 is seated behind the glove box and has the diagnostic address word 005F – information electronics 1.

The following illustration shows the hardware with the maximum equipment. Some connections may not be present in certain markets. Because of the optional TV tuner, the MOST bus connection is additionally present in Japan.



680_087

MMI radio plus

The MMI radio plus can easily be identified via the missing navigation tile in the main menu.

680_088

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)
- DAB digital radio (depends on market) or Sirius XM for Canada (QV3)
- Image output with 1540 x 720 pixels for MMI display
- Image output with 1280 x 480 pixels for digital instrument cluster (7J2)
- Internal audio amplifier with up to 80 W (8RL)
- Bluetooth interface for HFP and A2DP (9ZX)
- Basic speech dialogue system
- Audi music interface with 1x USB-C and 1x USB-A connection
- Audi connect emergency call & service including vehicle control services (IW3) (depends on market)
- Functions on demand (FP1) (depends on market) with
  - Navigation system pre-installation (7UZ)
  - Audi connect pre-installation (IT6)
  - Audi smartphone interface pre-installation (IU2)

The following optional equipment can be fitted in the vehicle:

- Audi virtual cockpit plus (9S9) with 1920 x 720 pixels
- Audi smartphone interface (IU1)
- Audi phone box (9ZE)
- Audi phone box light (9VZ)
- Audi sound system via internal audio amplifier with 180 W (9VD)
- Bang & Olufsen Premium Sound System with 3D sound and 680 W (9VS)
- Digital radio or Sirius XM for USA (QV3)

MMI navigation plus

The MMI navigation plus can easily be distinguished from the MMI radio plus via the navigation tile in the main menu.

680_089

The MMI navigation plus has the following features as standard:

- Radio with phase diversity, FM dual tuner (very high frequency) and AM tuner (medium wave)
- DAB digital radio (depends on market) or Sirius XM for Canada (QV3)
- Image output with 1540 x 720 pixels for MMI display
- Image output with 1280 x 480 pixels for Audi virtual cockpit (9S1)
- 3D navigation function with SSD for navigation data (7UG)
- Speech dialogue system
- Audi music interface with 1x USB-C and 1x USB-A connection
- Audi connect emergency call & service including vehicle control services (IW3) (depends on market)
- Audi connect basic services (IT4)
- Functions on demand (FP1) (depends on market) with
  - Audi smartphone interface pre-installation (IU2)

The following optional equipment can be fitted in the vehicle:

- Audi virtual cockpit plus (9S9) with 1920 x 720 pixels
- Audi smartphone interface (IU1)
- Audi phone box (9ZE)
- Audi phone box light (9VZ)
- Audi sound system via internal audio amplifier with 180 W (9VD)
- Bang & Olufsen Premium Sound System with 3D sound and 680 W (9VS)
- Digital radio or Sirius XM for USA (QV3)
- TV tuner (QV1) (Japan only)

Note
The MMI radio plus and the MMI navigation plus with Bluetooth preparation support the connection of a smartphone via handsfree profiles. If an Audi phone box is fitted as optional equipment, two smartphones can be connected to the MMI at the same time via handsfree profiles.

MMI display

The same touch display is always fitted in the Audi A3 (type 8Y), regardless of which MMI version the vehicle is equipped with. The MMI display (display unit for front information display and operating unit control unit J685) has a screen size of 10.1" and a resolution of 1540 x 720 pixels.

The MMI is again chiefly operated via the MMI display on the MIB3 system. Using the MMI, the user can set acoustic feedback for an action performed on the display. The confirmation tone is played via the four vehicle loudspeakers in the front doors. If the vehicle is equipped with the Audi sound system or the Bang & Olufsen Premium Sound System, the front center loudspeaker is also used.

The MMI display can also be operated via the control unit 1 for information electronics J794 in the Audi A3. It is therefore diagnosed via address word 005F. The transmission of images from J794 to J685 takes place via the usual LVDS connection; the other data are exchanged via the CAN bus (control unit 1 for information electronics).

680_090

Driver side volume regulator E67

A new volume control with the designation "MMI control panel" is fitted in the Audi A3. It is integrated in the center console and provides all the functions of the previous volume regulator.

The four-way field provides the driver and front passenger with an intuitive way of controlling the volume by moving a finger in a circle on the control.

Furthermore, the following functions can be controlled by tapping the surface:

- Right/left: Next/previous track, radio station, etc.
- Down: Activate/deactivate mute function
- Up: Switch MMI on/off

The MMI control panel is connected to the infotainment control unit J794 via CAN bus for control unit 1 for information electronics and is diagnosed via diagnostic address 005F.

680_091

System reset

A system reset is triggered by pressing and holding the top of the MMI control surface. It is important to keep holding until the start screen is shown on the MMI display.

USB connections

Audi music interface/Audi smartphone interface

The Audi A3 (type 8Y) is always equipped with the Audi music interface. It has two USB connections, 1x USB-A and 1x USB-C. The two USB connections will be of type C in the future. The designation for both connections in service is “USB hub R293”. These con-nections are located in the front center console and are designed both for data transfer and charging.

These are identical in terms of the possible data transmission rate; however, they differ in terms of their charging capacity.

- Type A: up to 2.1 A
- Type C: up to 3.0 A

Customers can order the Audi smartphone interface as an option (IU1). This enables them to connect their smartphone to the MMI to transfer content to the MMI display. At the time this document was published, data for the Audi smartphone interface are only transmitted using a USB cable.

USB hub R293 is diagnosed via control unit 1 for information electronics J794. The diagnostic address is therefore 005F.

680_092

680_185

Charging sockets in rear

USB sockets are available in the rear as optional equipment; these consist of two USB-C sockets, each with 3 A charging capacity. They are not connected to the MMI and are only designed for charging. Their designation in service is “USB connection 1 U41”.

680_093

Sound

Basic plus sound system (8RL

The Audi A3 (type 8Y) is equipped with the basic plus sound system (8RL) as standard, regardless of which MMI version is installed (MMI radio plus or MMI navigation plus).

The basic plus sound system has a total of six loudspeakers: four mid-range and bass loudspeakers located in the front and rear doors and two treble loudspeakers fitted in the A-pillars. The basic plus sound system achieves an output of 80 W.

Audi sound system (9VD

The Audi sound system (9VD) can be fitted as optional equipment. This sound system has ten loudspeakers and an output of 180 W. Compared to the standard basic plus system, this equipment version also has a center loudspeaker in the dash panel, two treble loudspeakers for the rear passengers and a subwoofer in the luggage compartment (left-side).

680_094

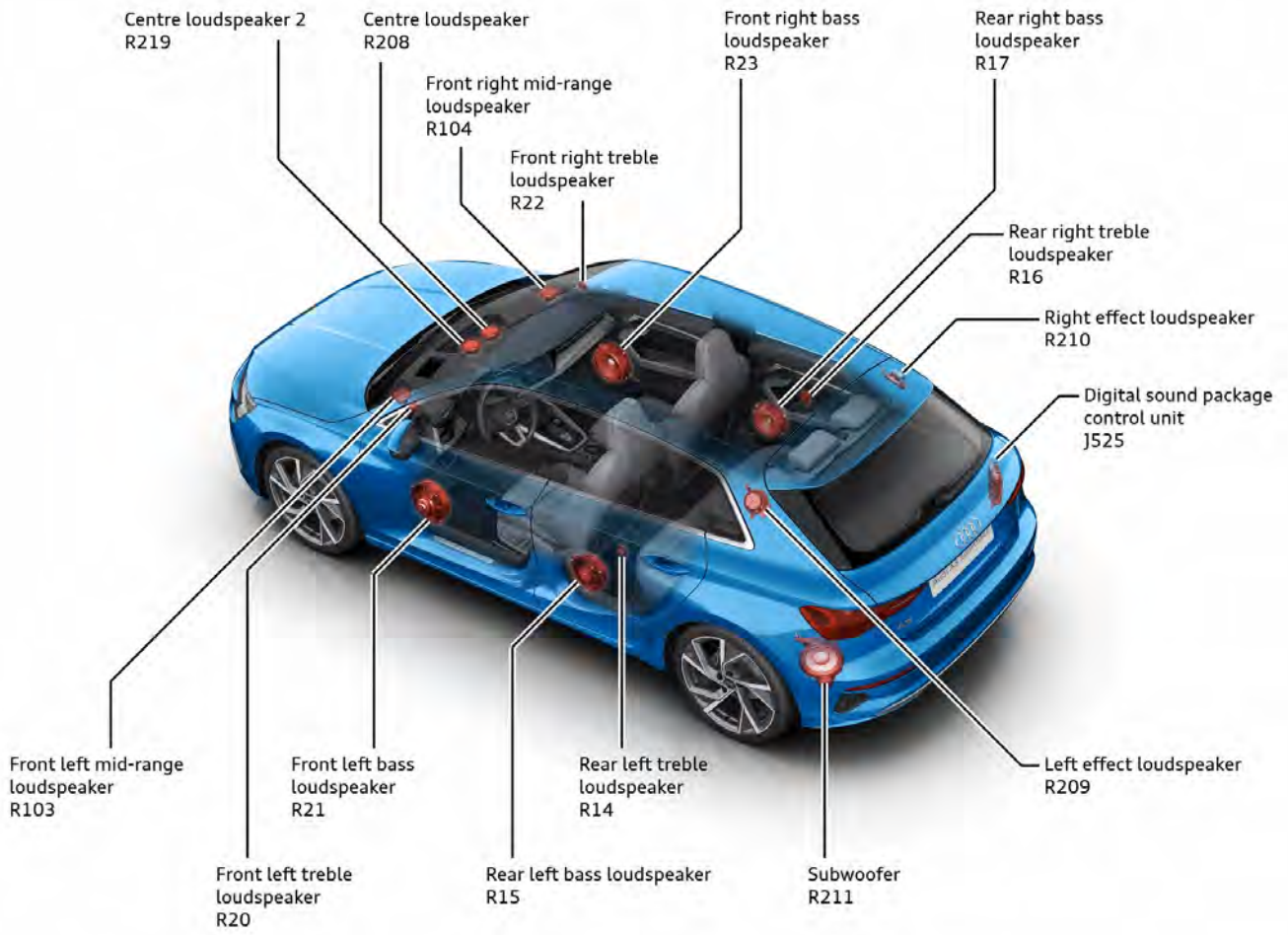
Bang & Olufsen Premium Sound System (9VS)

The optional Bang & Olufsen Premium Sound System offers customers the best sound experience with its 15 loudspeakers and 680 W.

Positioning the four mid-range loudspeakers in the dash panel allows the sound to be reflected off the windscreen. This, combined with the sound from the two effect loudspeakers in the C-pillars, creates virtual 3D sound.

The external amplifier (digital sound package control unit J525) has an output of 680 W which it distributes to the 15 loudspeakers via 16 channels. The audio signal is transmitted via a specially developed bus system; the Automotive Audio Bus (A2B).

Digital sound package control unit J525 is a slave of control unit 1 for information electronics J794; the data are exchanged via A2B. J525 does not have its own address word and is therefore diagnosed via address word 005F.



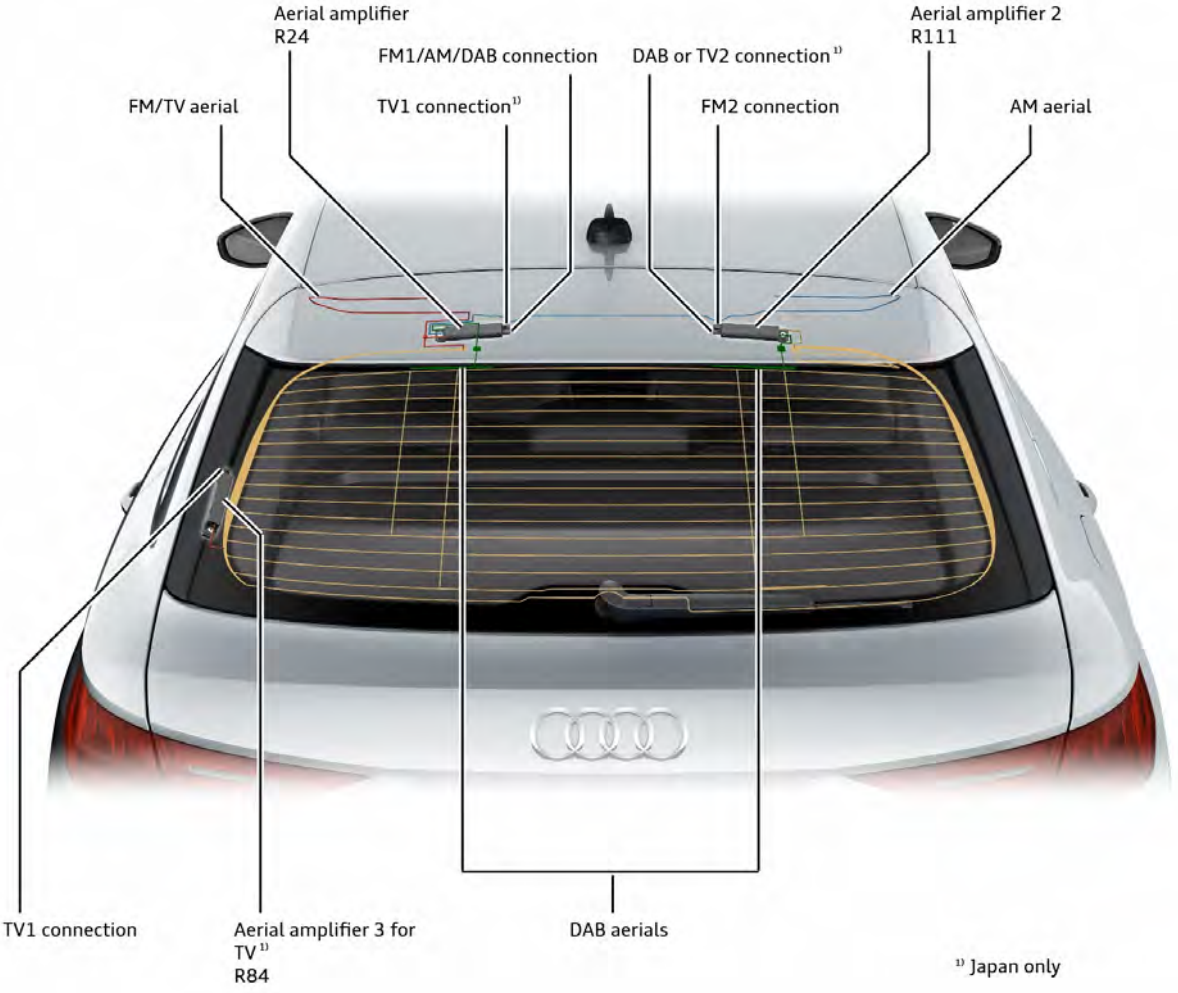
680_095

Aerials

The radio aerials in the Audi A3 (type 8Y) are distributed on the rear window and rear spoiler. The mobile phone aerials are located on the roof and under the rear bumper. There is also a Wi-Fi aerial under the dash panel (right-side) and a Bluetooth aerial under the dash panel (left-side).

Depending on the vehicle equipment, the Audi A3 may have up to three aerial amplifiers. Whether the amplifiers and their connections are fitted depends on exactly what equipment is fitted in the vehicle.

Depending on the country of delivery, the equipment on offer may vary. The illustration shows the maximum number of radio aerials which may be fitted in the rear window and spoiler.

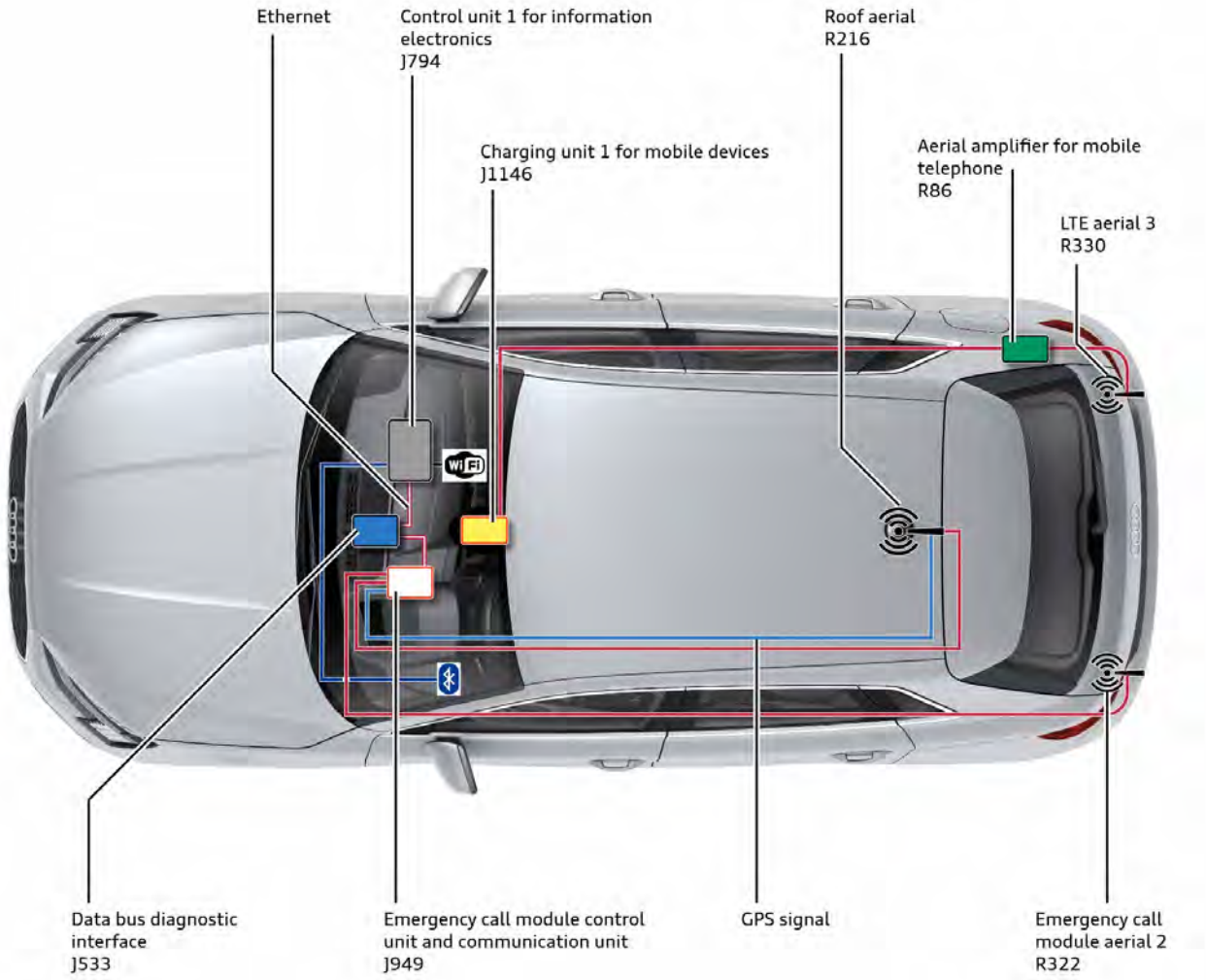


680_096

Mobile phone aerials

The Audi A3 may be equipped with up to three LTE aerials. The aerial on the roof and the aerial under the rear bumper (left-side) are responsible for transmitting mobile network data to the emergency call module control unit and communication unit J949. The aerial under the rear bumper (right-side) is fitted if the vehicle is equipped with the optional Audi phone box (9ZE).

The illustration shows the maximum number of mobile network aerials which may be fitted. They may vary according to equipment and country.



680_097

Emergency call module control unit and communication unit J949

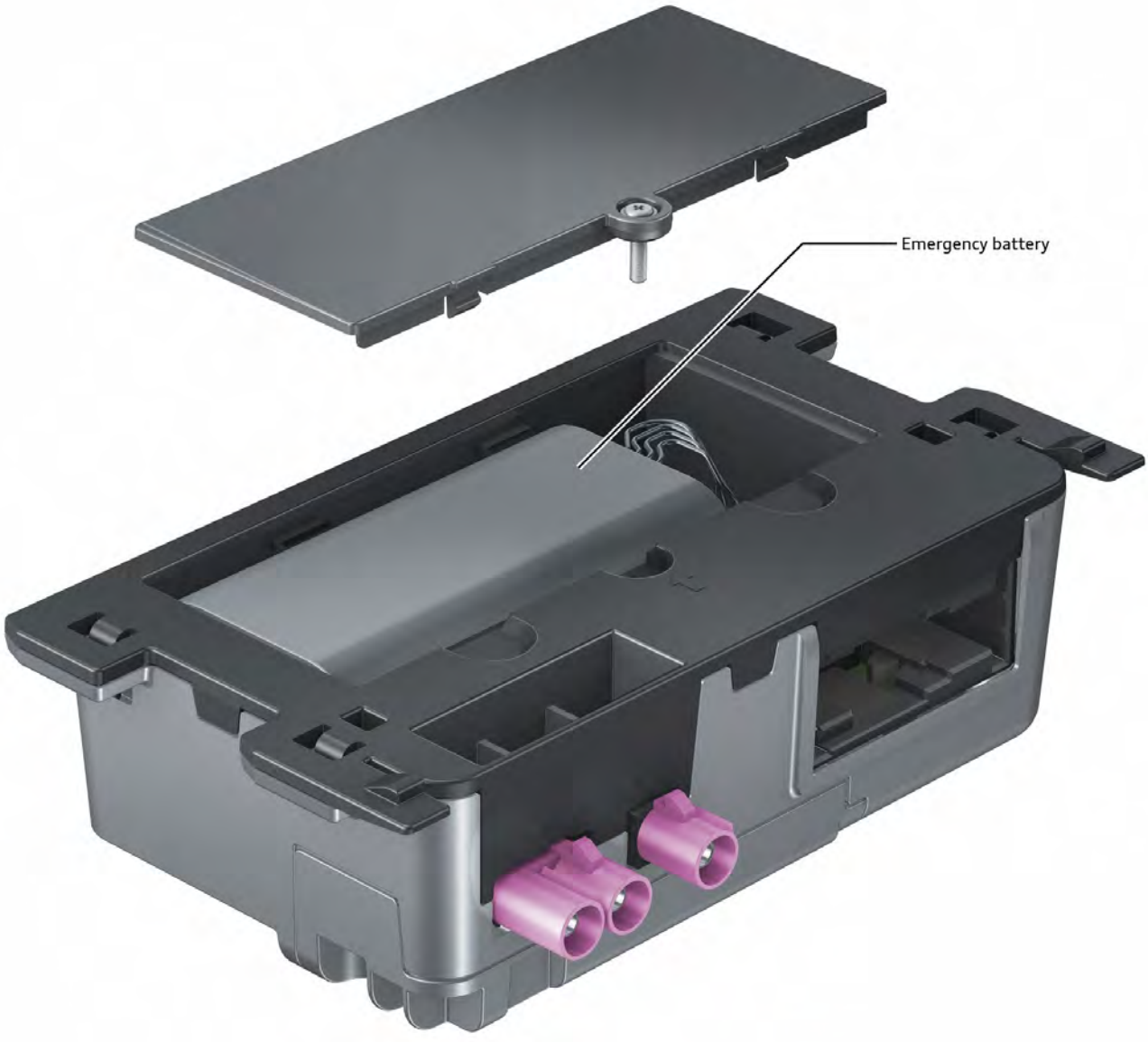
The Audi A3 (type 8Y) is equipped with the emergency call module control unit and communication unit J949. It is located behind the MMI display.

J949, which has the internal designation OCU (Online Communication Unit) on MQB vehicles, is the central interface for mobile network communication in the vehicle. The mobile network module integrated in the OCU also transmits the mobile network data to control unit 1 for information electronics J794 via Ethernet. Providing the Audi connect vehicle-related services is solely the task of J949.

The eCall service, which is a legal requirement in the EU, is also provided by this control unit. To increase the availability of this service, the OCU has an integrated back-up aerial and a maintenance-free emergency battery.

The GPS module is another important component which is integrated in the OCU. The OCU determines the vehicle position, which is transmitted to the gateway J533/the infotainment control unit J794.

There are three FAKRA connections on J949. The GPS aerial and the LTE aerial from the roof are connected to the double connection. The second LTE aerial is connected to the third FAKRA connection. The 36-pin connection is used for the power supply and data transmission, along with other tasks.



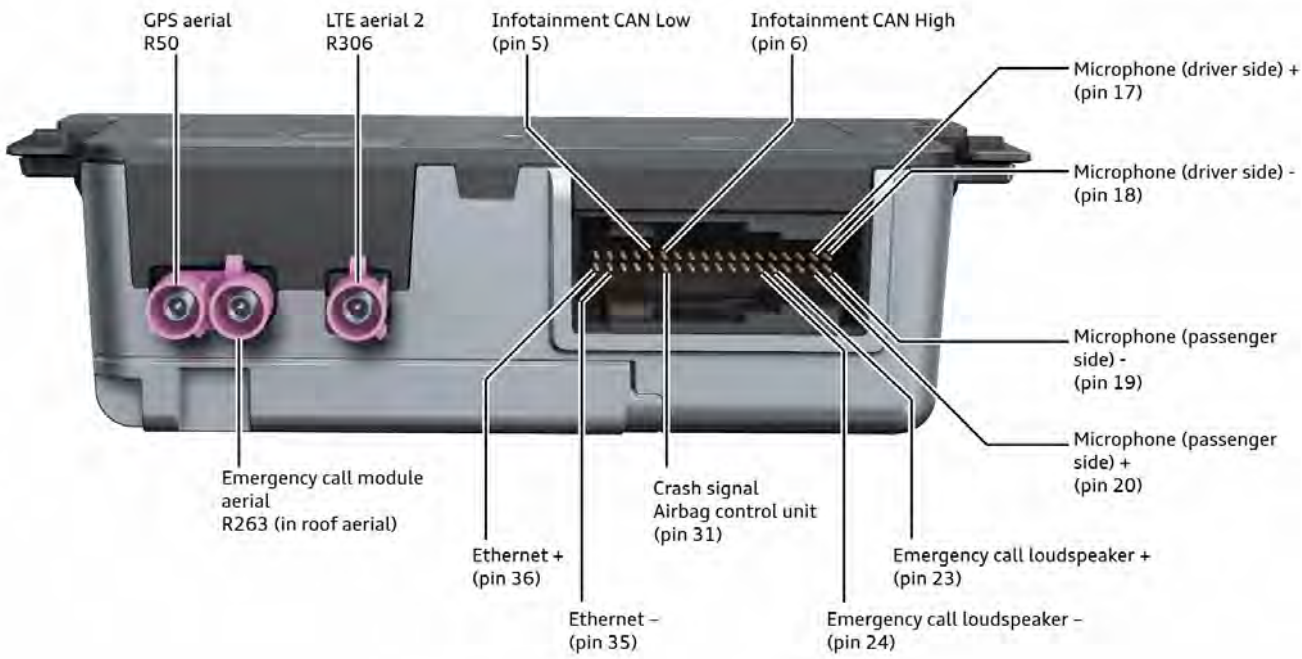
680_098

Two microphones are connected to J949. Microphone functions:

- Handsfree: Both microphones
- Emergency call and breakdown call: Both microphones
- Voice control: Driver side only

Their service designations are front left microphone R140 and front right microphone R141. They are connected differently to J949 depending on whether the vehicle is left-hand drive or right-hand drive. Precise information on the pin assignment can be found in the corresponding current flow diagram.

The emergency call module control unit and communication unit J949 is connected to the gateway via the infotainment CAN bus and Ethernet. Diagnosis can be performed via the infotainment CAN using address 0075.



680_186

Note
Because the data bus diagnostic interface J533 does not provide any vehicle-related services, the Audi A3 is considered to have a normal gateway, unlike the product upgrade of the Audi A4 (type 8W).

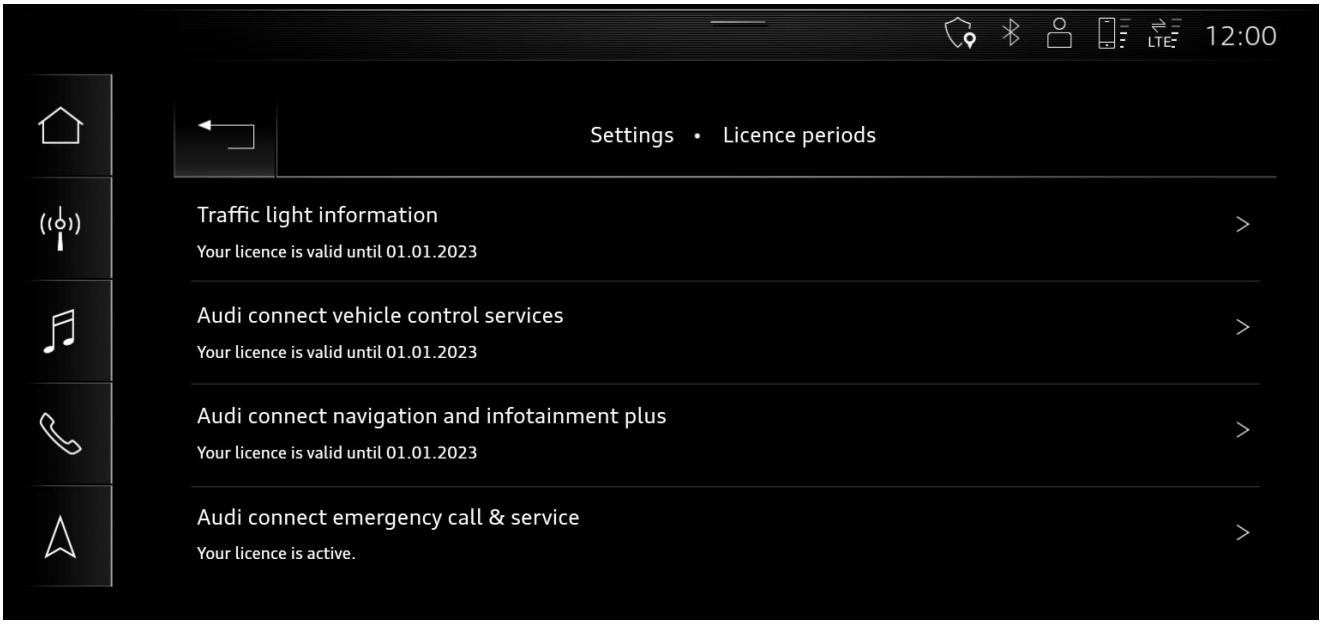
Note
Both the OCU and the connectivity box from the product upgrade of the Audi A4 (type 8W) have the same master list designation: emergency call module control unit and communication unit J949. However, they are fundamentally different control units and cannot be compared directly.

Audi connect (depending on country)

In contrast to the previous model, the Audi A3 (type 8Y) always has Audi connect vehicle-specific services (IW3). Depending on the market, these are available as standard equipment with the MMI radio plus. If MMI navigation plus is fitted in the vehicle, a selection of Audi connect basic infotainment services (IT4) are also available. These can be added to with the optional Audi connect infotainment plus services (IT3).

The Audi A3 offers a further connect innovation; the optional Audi connect key (2F1). This service, which is already available in models from higher segments, allows a smartphone to be turned into a car key.

The licence period varies depending on the service; customers can check this on the MMI via Settings > General > Licence information.



680_100

Audi connect vehicle-specific services

The vehicle-specific services include:

- Emergency call
- Roadside assistance
- Audi service request
- Vehicle status report
- Remote locking/unlocking
- Car finder

Audi connect infotainment services

The basic package of Audi connect infotainment services (IT4) includes:

- Online traffic information
- Online traffic sign information
- Hazard alerts
- Fuel prices
- Parking information
- Point of interest (POI) search
- Travel information
- Online news
- Weather

The Audi connect plus package (IT3) includes:

- Navigation with Google Earth
- Extended 3D city views
- POI search with speech control
- Online radio
- Amazon Alexa integration

Inspection and maintenance

Service interval display

The following service intervals are displayed:

- Oil change service
- Mileage-based service events
- Time-based service events

Example of the service interval display on the MMI display of the Audi A3

680_071

On new vehicles, the next oil change due field is initially blank. An interval calculated on the basis of the driving style and engine load can only be displayed after about 500 km has been driven.

The value displayed in the mileage-based service events field is 30,000 km for new vehicles and is counted down in 100 km blocks.

The field for the time-based service events shows the date the next service is due (up to two years in advance). Thirty days before the service event is due, the number of days until the service event is due are shown in the instrument cluster and the MMI.

Resetting the service interval display

It is very important to reset the service interval display after a service event using the vehicle diagnostic tester.

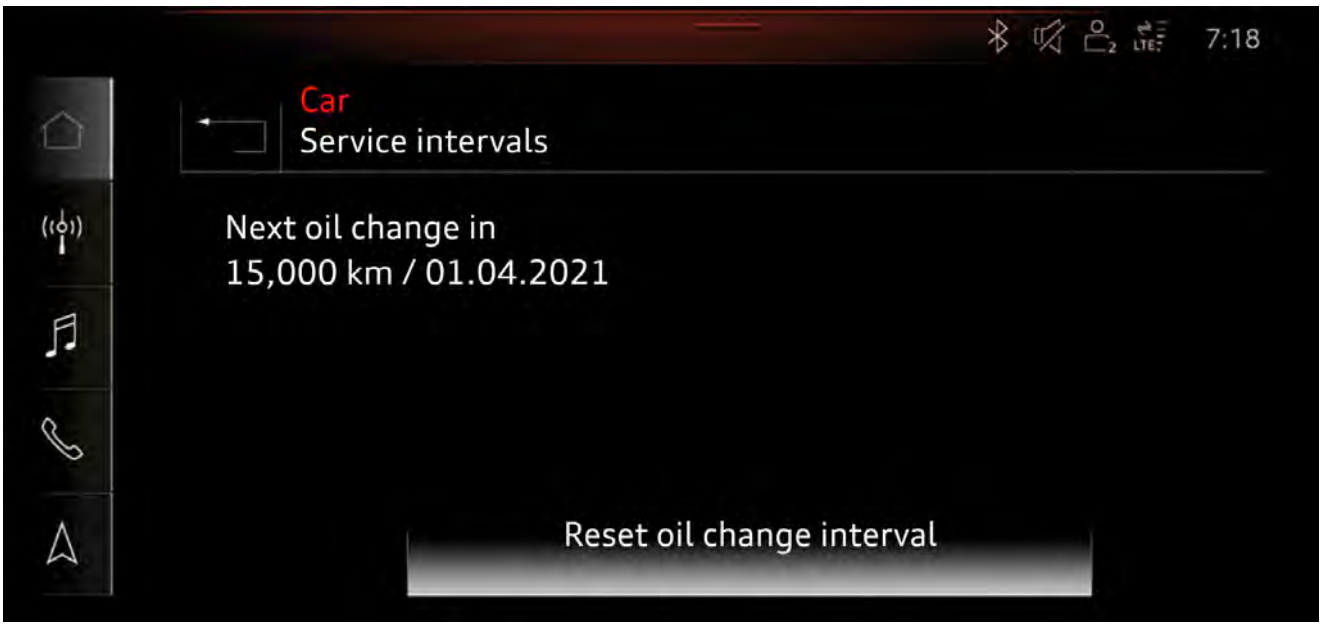
The following is then shown on the service interval display: Oil change (flexible service event for markets with service interval extension):

After resetting, the mileage last reached is displayed. A new, updated display is shown after a distance of about 500 km has been covered. The time display shows a service date which is due in two years.

Example: Oil change is due at 27,000 km.

680_072

Oil change (fixed interval – depends on market):



680_073

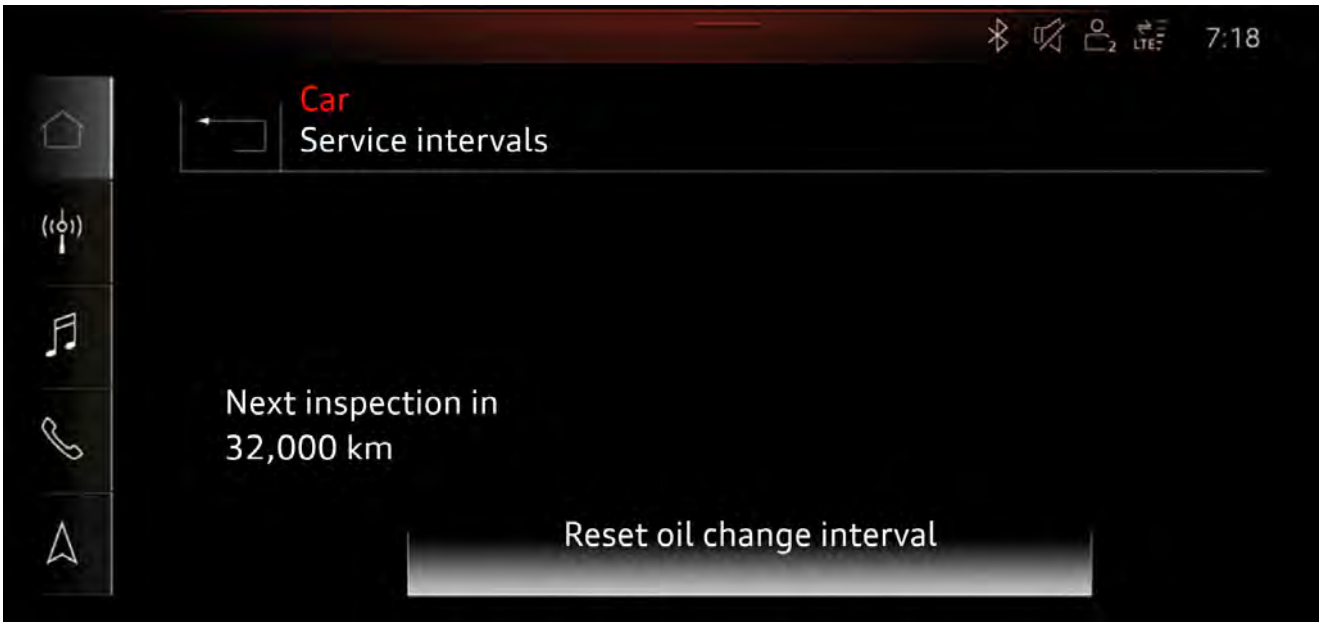
The fixed interval figures are shown again after they are reset (mileage intervals depend on the market).

Mileage-based service event:

As the mileage-based service event is always at a fixed mileage, multiples of 30,000 km are displayed here (30,000, 60,000, 90,000 ... km).

This display may vary if the inspection is not performed in 30,000 km cycles.

Example: The inspection has been performed at 28,000 km (2,000 km “early”).



680_074

Time-based service event:

The time-based service event is always set to another two years.

Resetting oil change interval manually:

The oil change interval can be reset manually. In markets with service interval extension, the oil change interval is then set to a fixed interval.

Note
It is not permitted to “miss out” service events. The information provided in the up-to-date service literature applies. Maintenance intervals are displayed when the maintenance tables are created.

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