



Audi A6 '11

The history of luxury Audi saloon cars began with the Audi 100 in the late 60s. Today, the legend of its creation still symbolises the revolutionary innovative spirit behind the Audi brand. With its classic, straightforward design, the Audi 100 was a 70s style icon. As such, it laid the foundations for a model series firmly rooted in the so-called C segment, which spawned many legendary models. One such model was the aerodynamic world champion of the 80s and its derivative, the Avant, with its unusual, elegant tail. Another was the type C5, a 90s classic with its taut lines and soft rear contours.

Meanwhile, the Audi 100 had become the Audi A6 in the interests of a harmonised nomenclature. Yet one thing remains unchanged to this day - the stylistic vocabulary common to all Audi models: timeless, innovative design combining elegance and sportiness. Cutting-edge technology packaged in an attractive, trendsetting design.

The new Audi A6 '11 remains true to this tradition. It bears the internal designation C7: the seventh generation of the C segment. Like its predecessor, the latest offspring is designed to inspire. The Audi A6 '11 stands for more safety and comfort, contemporary sportiness, fuel economy, higher agility and low weight through lightweight design, high-performance engines and forward-looking design. The Audi A6 '11 is a business saloon designed for comfort and sporty elegance. It combines sophisticated design with high quality, sporty handling and everyday usability. It brings to the business segment technologies and comfort features previously exclusive to the luxury class. Intelligent lightweight design creates new possibilities and, in particular, makes for high efficiency. The Audi A6 '11 saloon unifies innovations from all of Audi's main fields of expertise. It meets the requirements of various customer groups, and therefore is set to surpass the successes of the preceding model.



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Learning objectives of this Self Study Programme:

This Self Study Programme provides you with general information about the Audi A6 '11. Once you have worked your way through this Self Study Programme, you will be ready to answer the following questions:

- ▶ From which materials is the body assembled?
- ▶ Which engine-gearbox combinations are installed?

- ▶ How is 'seat occupied' indication implemented for the rear seat row?
- ▶ Which type of steering is used on the Audi A6 '11?
- ▶ Which sound systems are integrated?
- ▶ Which aspects of the air conditioning system have changed?

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The Self Study Programme teaches a basic knowledge of the design and functions of new models, new automotive components or new technologies.

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

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



Note



Reference

Introduction

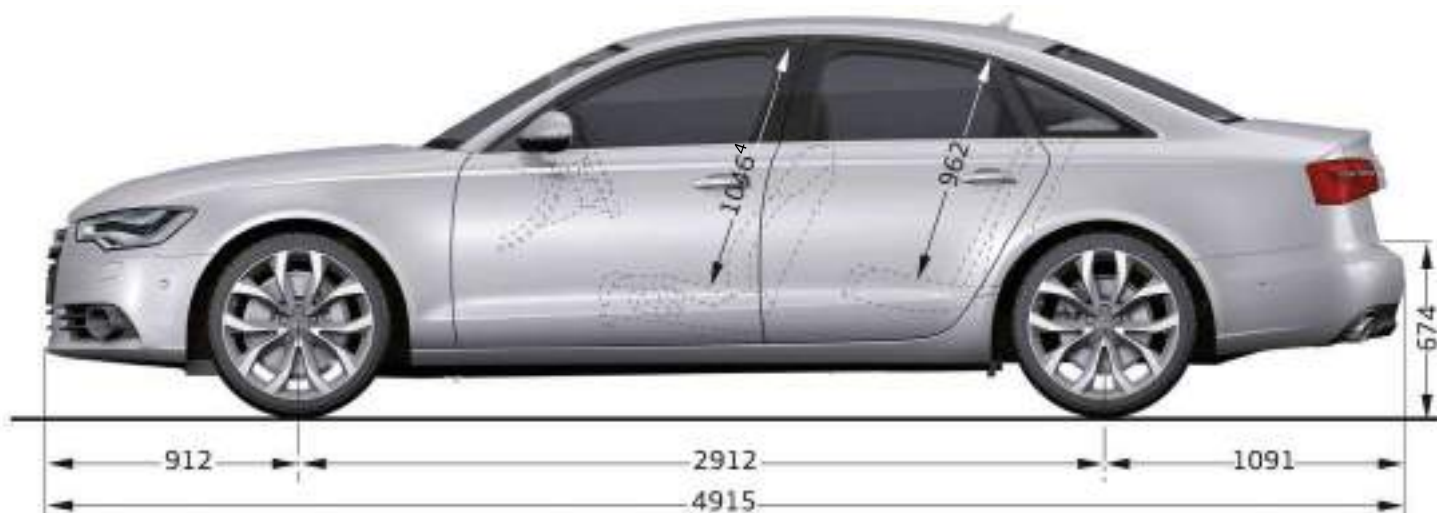
In brief



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486_016



486_017

¹⁾ Width, shoulder room

²⁾ Width, elbow room

³⁾ Vehicle height including roof aerial is 1468 mm.

⁴⁾ Maximum headroom

All dimensions are given in millimetres and refer to the unladen weight of the vehicle.



486_018

Length in mm	4915	Interior width, front in mm	1460
Width in mm	1874	Inner width, rear in mm	1429
Height in mm	1455	Headroom, front in mm	1046
Track width, front in mm	1627	Headroom, rear in mm	962
Track width, rear in mm	1618	Through-loading width in mm	949
Wheelbase in mm	2912	Load sill height in mm	674
Trailer load in kg with brake and a gradient of 8 %	1800	Boot capacity in l	530/995
Kerb weight in kg	1575	Tank capacity in l	65 (optional: 75)
Max. gross weight in kg	2155	Drag coefficient in c_w	0.26

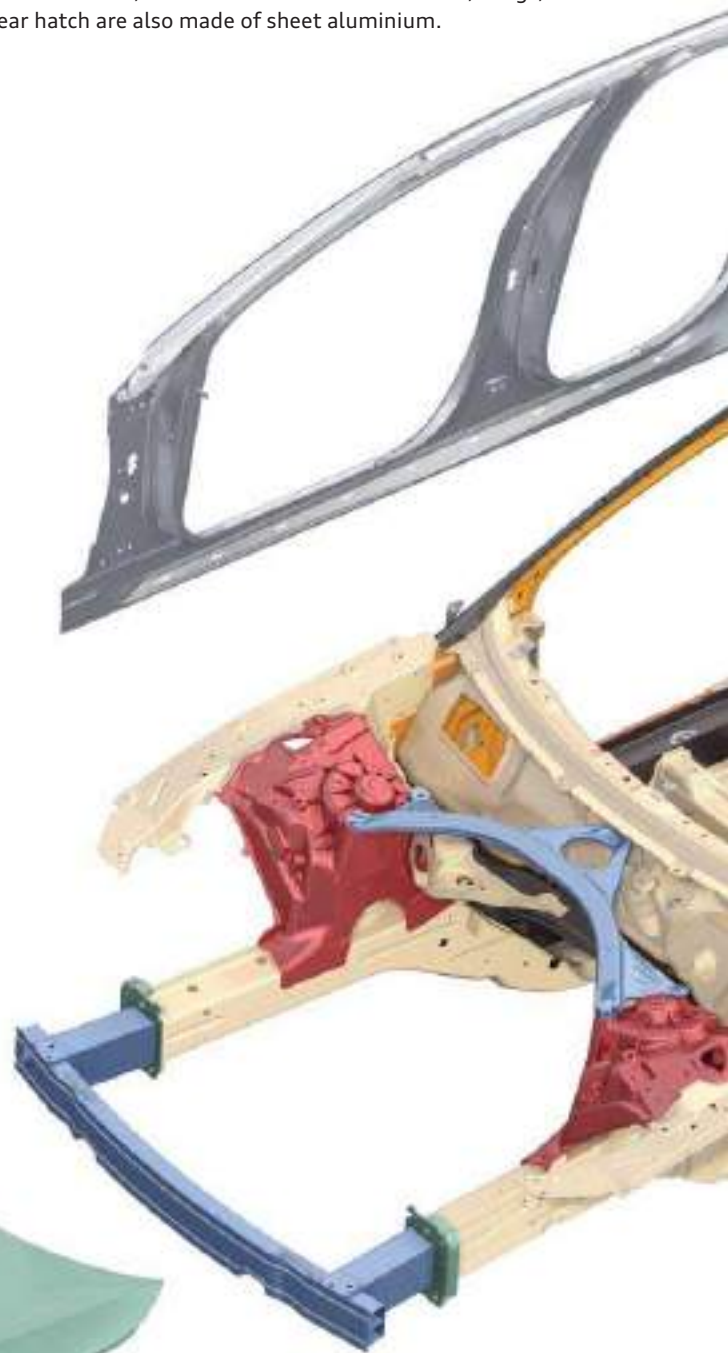
Body

Overview









The body of the Audi A6 '11 shares the same platform as the Audi A7 Sportback, which is of hybrid construction. The sheet-steel parts are of high strength steel and ultra high strength steel. The die-cast aluminium strut mountings previously featured on the Audi A7 Sportback are used at the front end of the vehicle.

Like in the Audi A6 '05, the parcel shelf in the Audi A6 '11 is made of sheet aluminium.

On the Audi A6 '11, attachments such as the bonnet, wings, doors and rear hatch are also made of sheet aluminium.



Legend:

- | | | | |
|--|-----------------------------|---|---|
|  | Mild steels |  | Ultra-high-strength steels (hot-formed) |
|  | High-strength steels |  | Sheet aluminium parts |
|  | Modern high-strength steels |  | Cast aluminium parts |
|  | Ultra-high-strength steels |  | Extruded aluminium sections |



486_019



Reference

For further information about the strut mounting as well as the B-post and the side members, refer to Self Study Programme 478 "Audi A7 Sportback".

Occupant protection

Introduction

The occupant protection system in the Audi A6 '11 is similar to that in the Audi A7 Sportback in terms of its equipment and functions. Of course, the individual components have been adapted to suit the Audi A6 '11. A new feature is the belt warning system for the rear passengers.

For further information about the occupant protection system and associated component parts, refer to Self Study Programme 484 "Audi A7 Sportback Occupant Protection, Infotainment, Air Conditioning".

The illustrations and images shown in this chapter are schematic diagrams provided to aid understanding.



Additional equipment

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

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



Reference

For detailed information about the occupant protection system and associated component parts, refer to Self Study Programme 484 "Audi A7 Sportback Occupant Protection, Infotainment, Air Conditioning".

Components

The occupant protection system in the Audi A6 '11 comprises the following component parts and systems:

- ▶ Airbag control unit
- ▶ Adaptive driver and front passenger airbags
- ▶ Front side airbags
- ▶ Head airbags
- ▶ Front airbag crash sensors
- ▶ Crash sensors for side impact detection in the doors
- ▶ Crash sensors for side impact detection in the C posts
- ▶ Front inertia-reel seat belts with pyrotechnic belt tensioners and active belt force limiters
- ▶ Battery isolator
- ▶ Seat belt warning for all seats
- ▶ Seat belt tensioners on all seats
- ▶ Seat occupancy sensor in front passenger seat
- ▶ Driver and front passenger seat position recognition

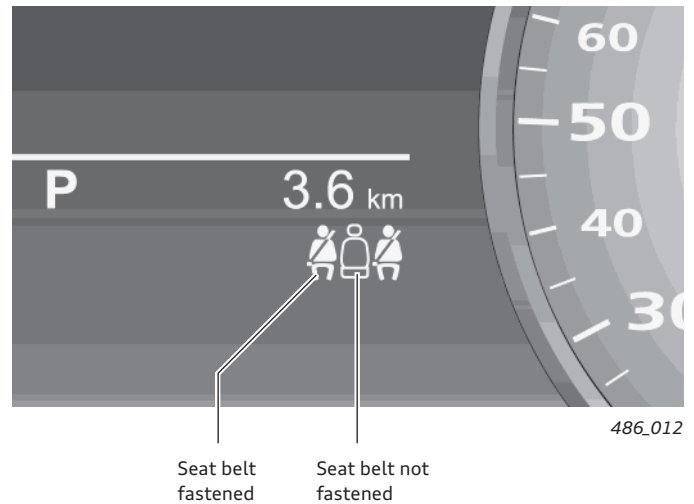


Rear seat belt reminder

After turning on the ignition, the status of the seat belts (fastened/not fastened) is indicated on the centre display of the dash panel insert for 31 seconds.

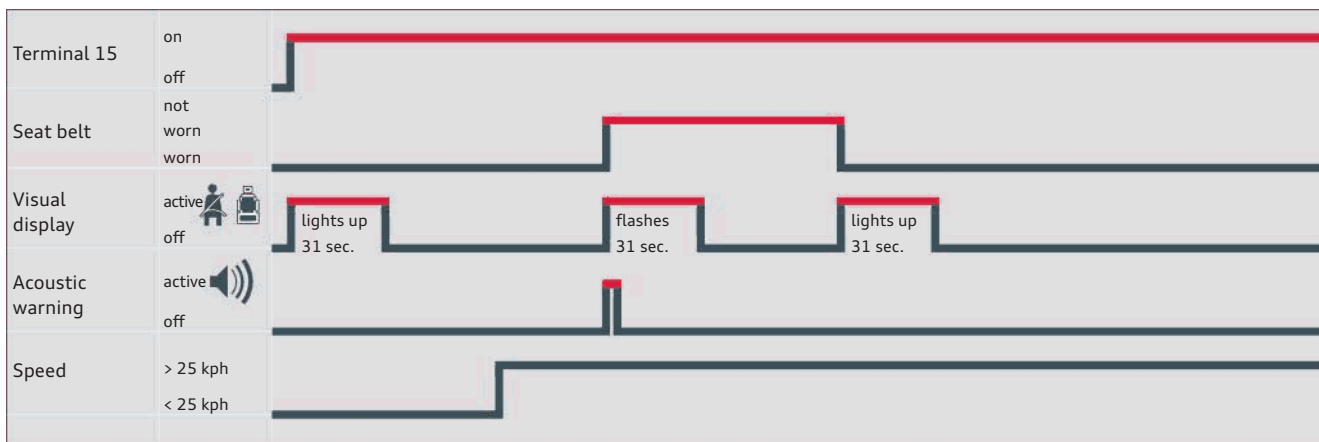
Every change in status is indicated for a further 31 seconds. If a rear passenger removes his/her seat belt while the vehicle is travelling at a speed of greater than 25 kph, an acoustic warning sounds once and the relevant indicator on the centre display begins flashing for 31 seconds.

The airbag control unit J234 receives information on whether the seat belts are fastened from the rear belt switches, driver side E258, front passenger side E259 and centre E609.



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Rear seat belt reminder



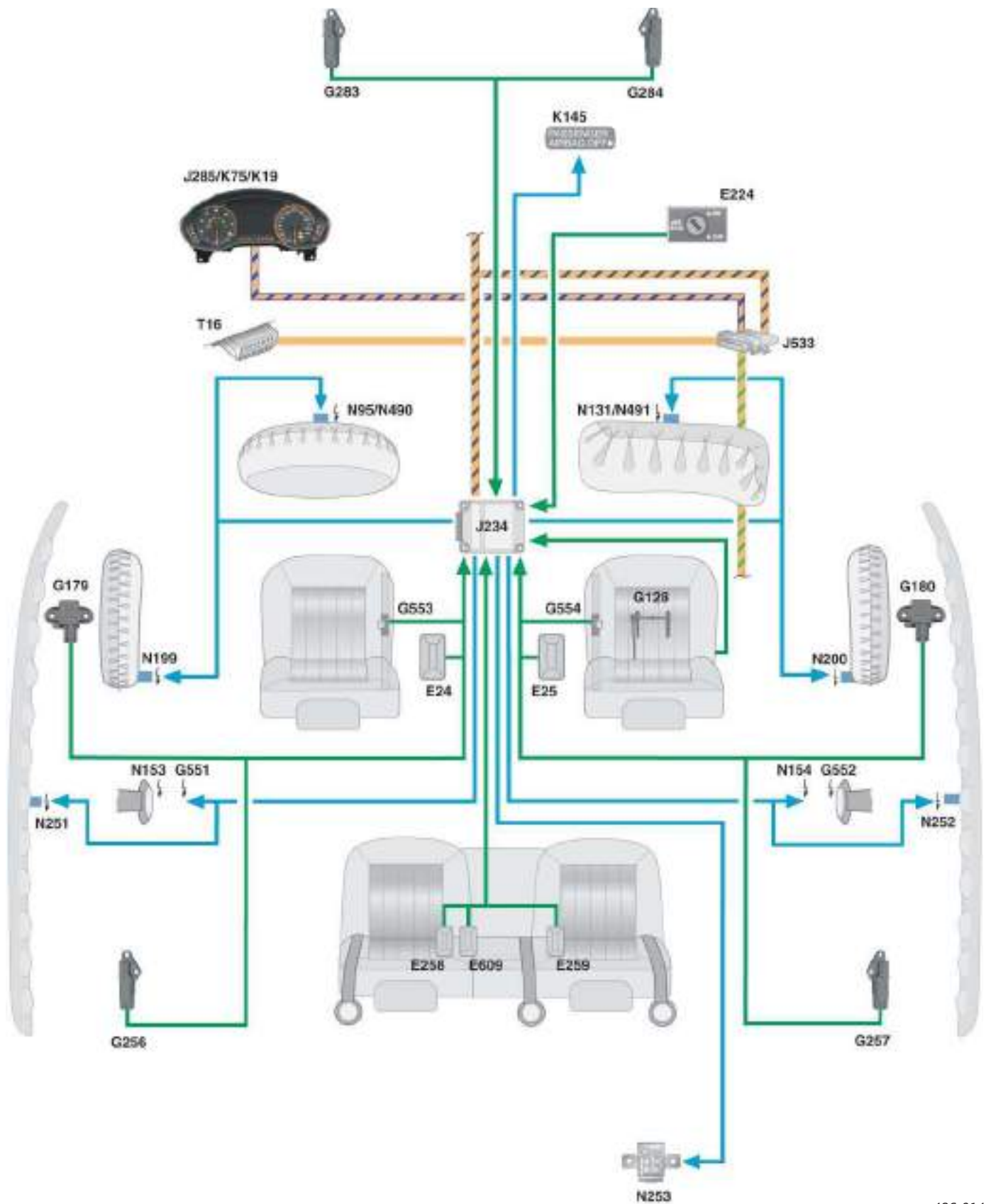
486_013

Legend of figure on page 11:

E24	Seat belt switch, driver side	J234	Airbag control unit
E25	Seat belt switch, front passenger side	J285	Control unit in dash panel insert
E224	Airbag disabling switch, passenger side (optional)	J533	Data bus diagnostic interface (gateway)
E258	Rear belt switch, driver side	K19	Seat belt reminder warning lamp
E259	Rear belt switch, front passenger side	K75	Passenger airbag off
E609	Seat occupied sensor, front passenger side	K145	Passenger airbag off warning lamp (PASSENGER AIRBAG OFF) (optional)
G128	Seat occupancy sensor, front passenger side	N95	Driver side airbag igniter
G179	Side airbag crash sensor, driver side (driver door)	N131	Front passenger side airbag igniter 1
G180	Side airbag crash sensor, front passenger side (front passenger door)	N153	Driver side seat belt pretensioner 1
G256	Rear side airbag crash sensor, driver side (C post)	N154	Front passenger side belt pretensioner 1
G257	Rear side airbag crash sensor, driver side (C post)	N199	Side airbag igniter, driver side
G283	Front airbag crash sensor, driver side (left front end)	N200	Side airbag igniter, front passenger side
G284	Front airbag crash sensor, front passenger side (right front end)	N251	Head airbag igniter, driver side
G551	Belt force limiter, driver side	N252	Head airbag igniter, front passenger side
G552	Belt force limiter, front passenger side	N253	Battery isolation igniter
G553	Seat position sensor, driver side	N490	Driver airbag relief valve igniter
G554	Seat position sensor, front passenger side	N491	Front passenger airbag relief valve igniter
		T16	16 pin connector, diagnostic port

System overview

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



486_014

Legend:

Powertrain CAN bus

Convenience CAN bus

Input signal

Display and operation CAN bus

Diagnostics CAN bus

Output signal

Engines

Petrol engines

3.0l V6 TFSI engine

Technical features

- ▶ Charging by Roots blower
- ▶ Thermal management with active coolant pump
- ▶ Start-stop system and recuperation
- ▶ Mixed friction can occur during restarts due to the start-stop function so the bearing bushes are coated with an additional wear-resistant layer
- ▶ Friction-reduced chain gear with:
 - ▶ modified camshafts
 - ▶ camshaft adjusters designed for reduced leakage
- ▶ Dual-stage volume-controlled oil pump
- ▶ Chain tensioners designed for reduced oil flow
- ▶ Structure-honed cylinders to reduce oil consumption and wear
- ▶ Reduced prestress on the third piston ring land
- ▶ Adapted belt drive (minus the power steering pump)
- ▶ Flow-enhanced high pressure injectors
- ▶ Reduced valve spring forces

2.8l V6 FSI engine

Technical features

- ▶ Thermal management with active coolant pump
- ▶ Start-stop system and recuperation
- ▶ Mixed friction can occur during restarts due to the start-stop function so the bearing bushes are coated with an additional wear-resistant layer
- ▶ Friction-reduced chain gear with:
 - ▶ modified camshafts
 - ▶ camshaft adjusters designed for reduced leakage
- ▶ Dual-stage volume-controlled oil pump
- ▶ Chain tensioners designed for reduced oil flow
- ▶ Structure-honed cylinders to reduce oil consumption and wear
- ▶ Reduced prestress on the third piston ring land
- ▶ Adapted belt drive (minus the power steering pump)
- ▶ Flow-enhanced high pressure injectors



486_003



486_001



Reference

For further information about the design and operation of the 3.0l V6 TFSI engine, refer to Self-Study Programme 437 "Audi 3.0l V6 TFSI Engine with Roots Blower". Information on the 2.8l V6 FSI engine can be found in Self-Study Programme 411 Audi 2.8l and 3.2l V6 FSI Engines with Audi Valvelift System".

Specifications

Torque-power curve

3.0l V6 TFSI engine with engine code CGWB

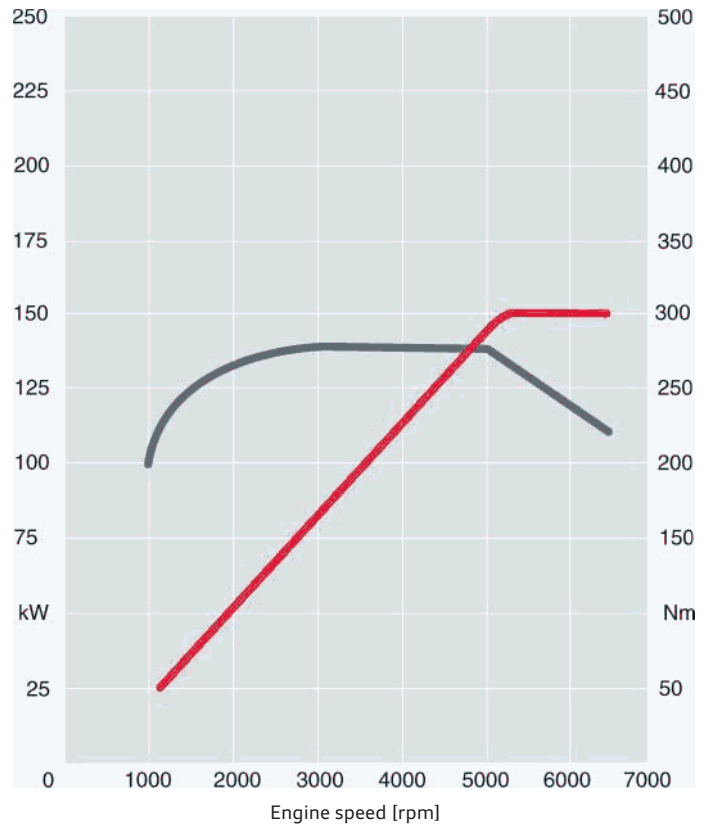
— Power in kW
— Torque in Nm



486_002

2.8l V6 TFSI engine with engine code CHVA

— Power in kW
— Torque in Nm



486_134

Engine code	CGWB	CHVA
Type	Six cylinder V engine with 90° V angle	Six cylinder V engine with 90° V angle
Displacement in cm ³	2995	2773
Power output in kW (hp) at rpm	220 (300) at 5250 – 6500	150 (204) at 5250 – 6500
Torque in Nm at rpm	440 at 2900 – 4500	280 at 3000 – 5000
Number of valves per cylinder	4	4
Bore in mm	84.5	84.5
Stroke in mm	89	82.4
Compression ratio	10.5 : 1	12 : 1
Powertrain type	S tronic quattro	<ul style="list-style-type: none"> ▶ Front wheel drive ▶ multitronic with front wheel drive ▶ S tronic quattro
Engine management	Simos 8	Simos 8.1
fuel	Premium unleaded (sulphur-free) 95 RON	Premium unleaded (sulphur-free) 95 RON
Emissions standard	EU V	EU V
CO ₂ emission in g/km	190	187

2.0l TFSI engine

Technical features

- ▶ Charging by exhaust turbocharger
- ▶ Start-stop system and recuperation
- ▶ Four-valve cylinder head with a camshaft phaser on the intake side and Audi Valvelift System on the exhaust side
- ▶ Adapted belt drive (minus the power steering pump)
- ▶ Engine management by timing chain
- ▶ Intake manifold with flaps
- ▶ Volume-controlled oil pump
- ▶ Improved high-pressure injectors



486_007



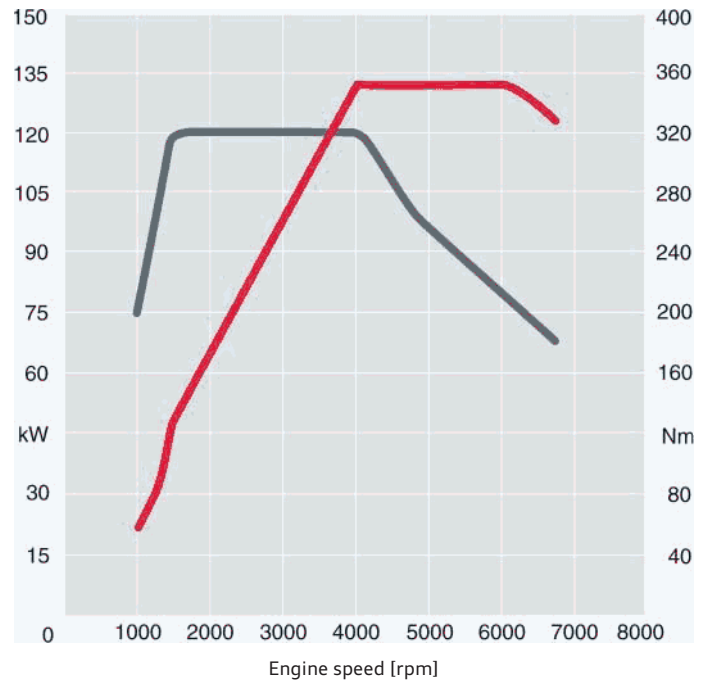
Reference

For further information about the design and operation of the 2.0l TFSI engine, refer to Self-Study Programme 436 "Modifications to the chain-driven 4-cylinder TFSI engine".

Specifications

Torque-power curve

— Power in kW
— Torque in Nm



486_008

Engine code	CDNB
Type	Four-cylinder inline engine
Displacement in cm ³	1984
Power output in kW (hp) at rpm	132 (180) at 4000 – 6000
Torque in Nm at rpm	320 at 1500 – 3900
Number of valves per cylinder	4
Bore in mm	82.5
Stroke in mm	92.8
Compression ratio	9.6 : 1
Powertrain type	<ul style="list-style-type: none"> ▶ Front wheel drive ▶ multitronic with front wheel drive
Engine management	Bosch MED 17.1
fuel	Premium unleaded (sulphur-free) 95 RON
Emissions standard	EU V
CO₂ emission in g/km	149 (front wheel drive)

Diesel engines

3.0l V6 TDI engine (second generation)

Technical features

- ▶ Common rail injection system with exhaust turbocharging
- ▶ Dual-flow superposed intake manifold with only one central swirl flap in lieu of the previous six swirl flaps
- ▶ Piezoelectric injection system with injection pressures up to 2000 bar
- ▶ Dual-piston high pressure pump (CP4.2)
- ▶ High pressure fuel pump driven by auxiliaries chain
- ▶ Chain drive reduced from four to two simplex chains
- ▶ Oil circuit with dual-stage flow controlled vane cell pump
- ▶ Cooling system as cylinder head and cylinder block cooling circuit
- ▶ Compact exhaust recirculation system of modular design (EGR valve, EGR cooler and bypass valve in module)
- ▶ Active EGR cooler without thermostat control and auxiliary coolant pump
- ▶ Advanced particulate filter regeneration with three post-injections and aluminium titanate as new diesel particulate filter substrate



486_005



Reference

For further information about the design and operation of the 3.0l V6 TDI engine, refer to Self-Study Programme 479 "Audi 3.0l V6 TDI Engine (second generation)".

Specifications

Torque-power curve

Engine with code CDUC

— Power in kW
— Torque in Nm



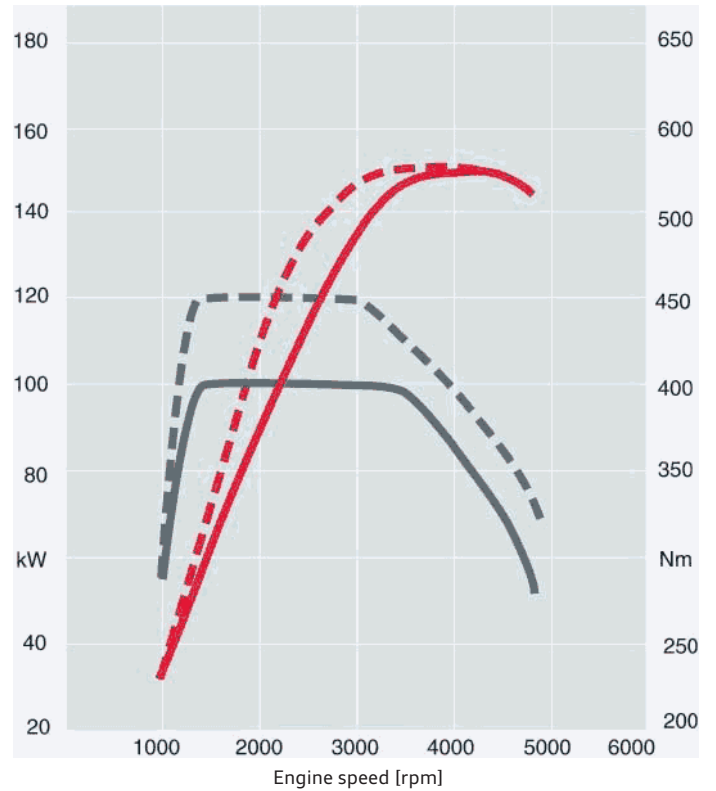
486_006

Engine with code CLAB

— Power in kW
— Torque in Nm

Engine with code CLAA

- - - Power in kW
- - - Torque in Nm



486_075

Engine code	CDUC	CLAB, CLAA
Type	Six cylinder V engine with 90° V angle	Six cylinder V engine with 90° V angle
Displacement in cm ³	2967	2967
Power output in kW (hp) at rpm	180 (245) at 4000 – 4500	150 (204) at 3750 – 4500 (front wheel drive) 150 (204) at 3250 – 4500 (quattro)
Torque in Nm at rpm	500 at 1400 – 3250	400 at 1250 – 3500 (front wheel drive) 450 at 1250 – 3000 (quattro)
Number of valves per cylinder	4	4
Bore in mm	83	83
Stroke in mm	91.4	91.4
Compression ratio	16.8 : 1	16.8 : 1
Powertrain type	S tronic quattro	<ul style="list-style-type: none"> ▶ Front wheel drive ▶ multitronic with front wheel drive ▶ S tronic quattro
Engine management	Bosch EDC 17	Bosch EDC 17
fuel	Diesel to EN 590	Diesel to EN 590
Maximum injection pressure in bar	1800	2000
Emissions standard	EU V	EU V
CO₂ emission in g/km	158	137 (front wheel drive) 149 (quattro)

2.0l TDI engine

Technical features

- ▶ Common rail injection system with exhaust turbocharging
- ▶ Electromagnetic injectors
- ▶ Engine management by timing chain
- ▶ Injection system with injection pressures of up to 1800 bar
- ▶ Two balancer shafts
- ▶ Adapted belt drive (minus the power steering pump)
- ▶ Intake manifold with swirl flap adjustment
- ▶ Electrical exhaust gas recirculation valve
- ▶ Low temperature EGR cooling
- ▶ Particulate filter with separate, integrated oxidising catalytic converter
- ▶ Start-stop system and recuperation



486_009



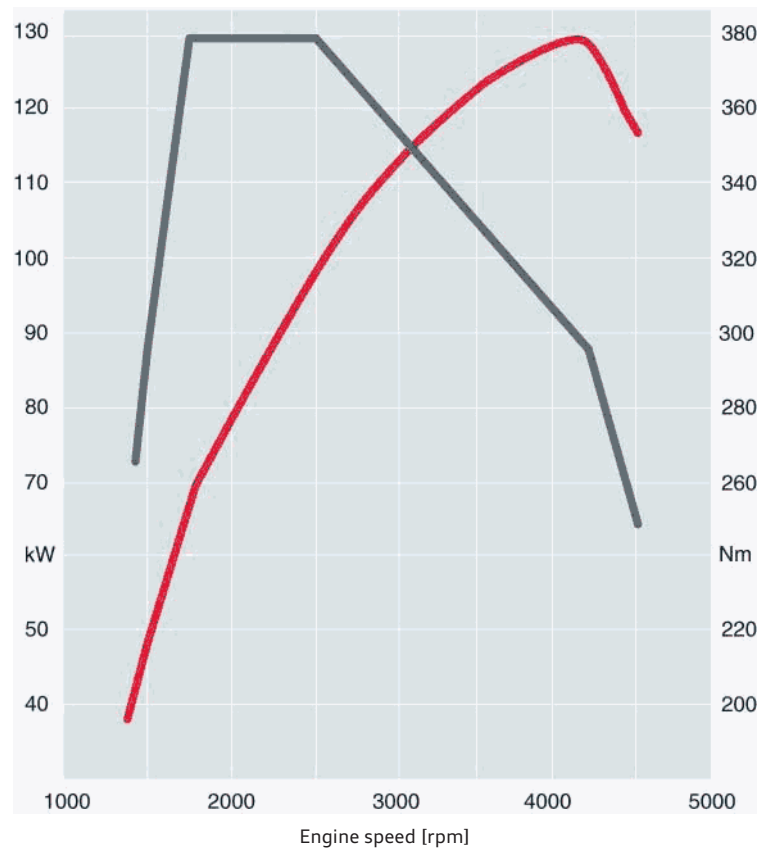
Reference

For further information on the design and operation of the 2.0l TDI engine, refer to Self Study Programme 420 "The 2.0l TDI Engine with Common Rail Injection System" and Self Study Programme 442 "The 1.6l TDI Engine with Common Rail Injection System".

Specifications

Torque-power curve

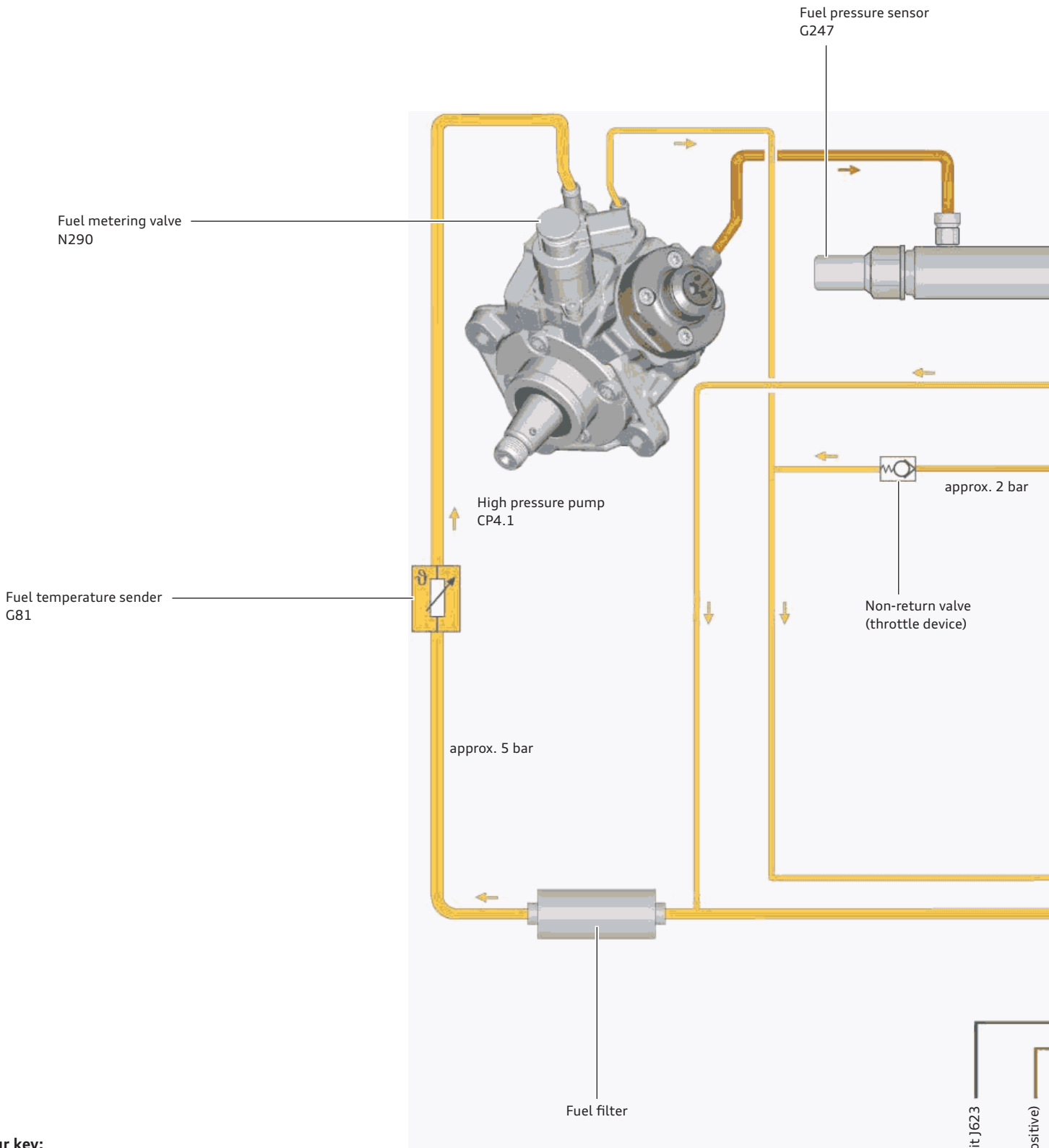
— Power in kW
— Torque in Nm



486_010

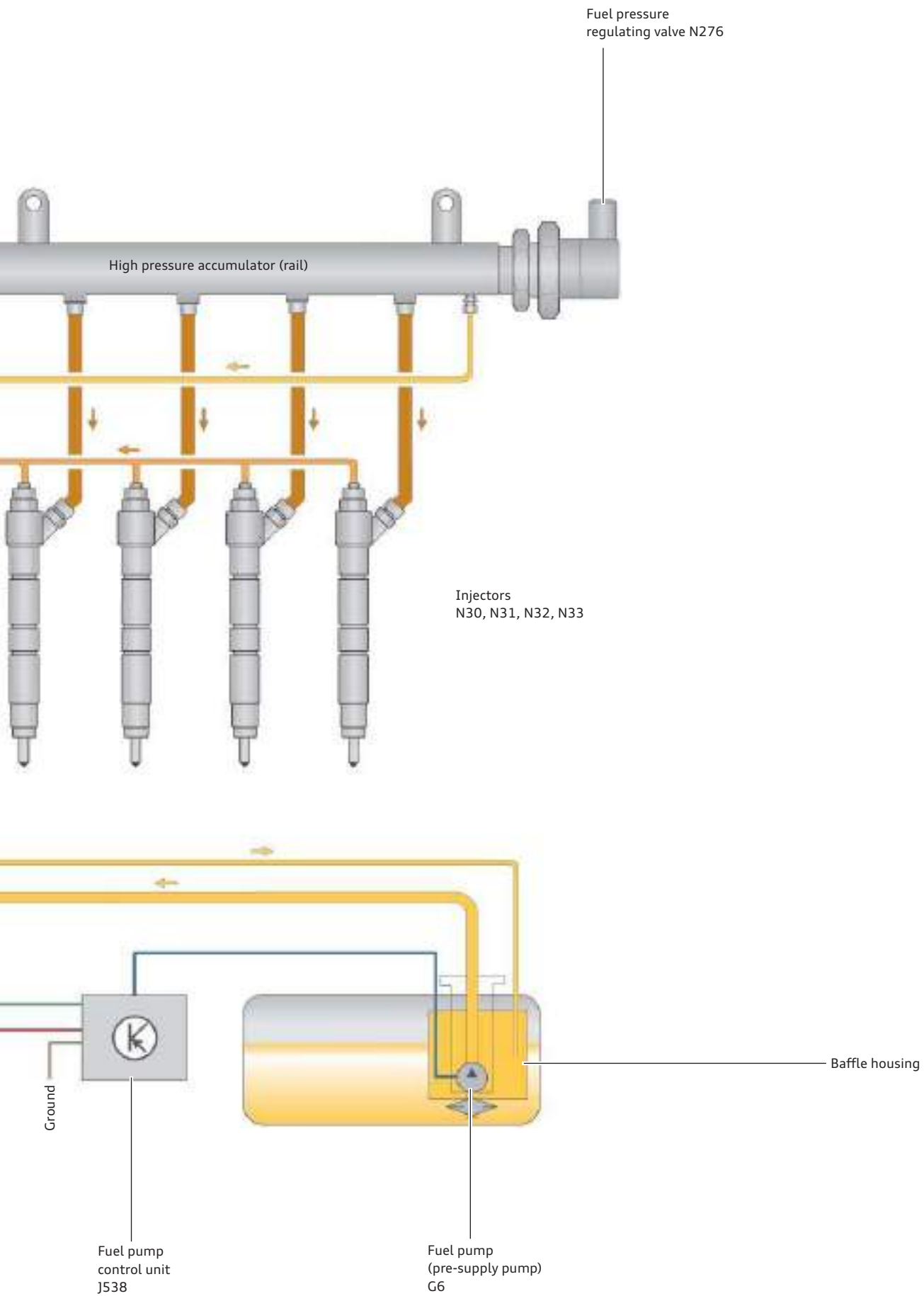
Engine code	CGLC
Type	Four-cylinder inline engine
Displacement in cm ³	1968
Power output in kW (hp) at rpm	130 (177) at 4200
Torque in Nm at rpm	380 at 1750 – 2500
Number of valves per cylinder	4
Bore in mm	81.0
Stroke in mm	95.5
Compression ratio	16.5 : 1
Powertrain type	<ul style="list-style-type: none"> ▶ Front wheel drive ▶ multitronic with front wheel drive
Engine management	Bosch EDC 17 CR
fuel	Diesel to EN 590
Maximum injection pressure in bar	1800
Emissions standard	EU V
CO₂ emission in g/km	129

Fuel system on the 2.0l TDI engine



Colour key:

- Fuel high pressure 230 – 1800 bar
- Fuel return pressure from the injectors approx. 2 bar
- Fuel supply pressure approx. 5 bar



486_133

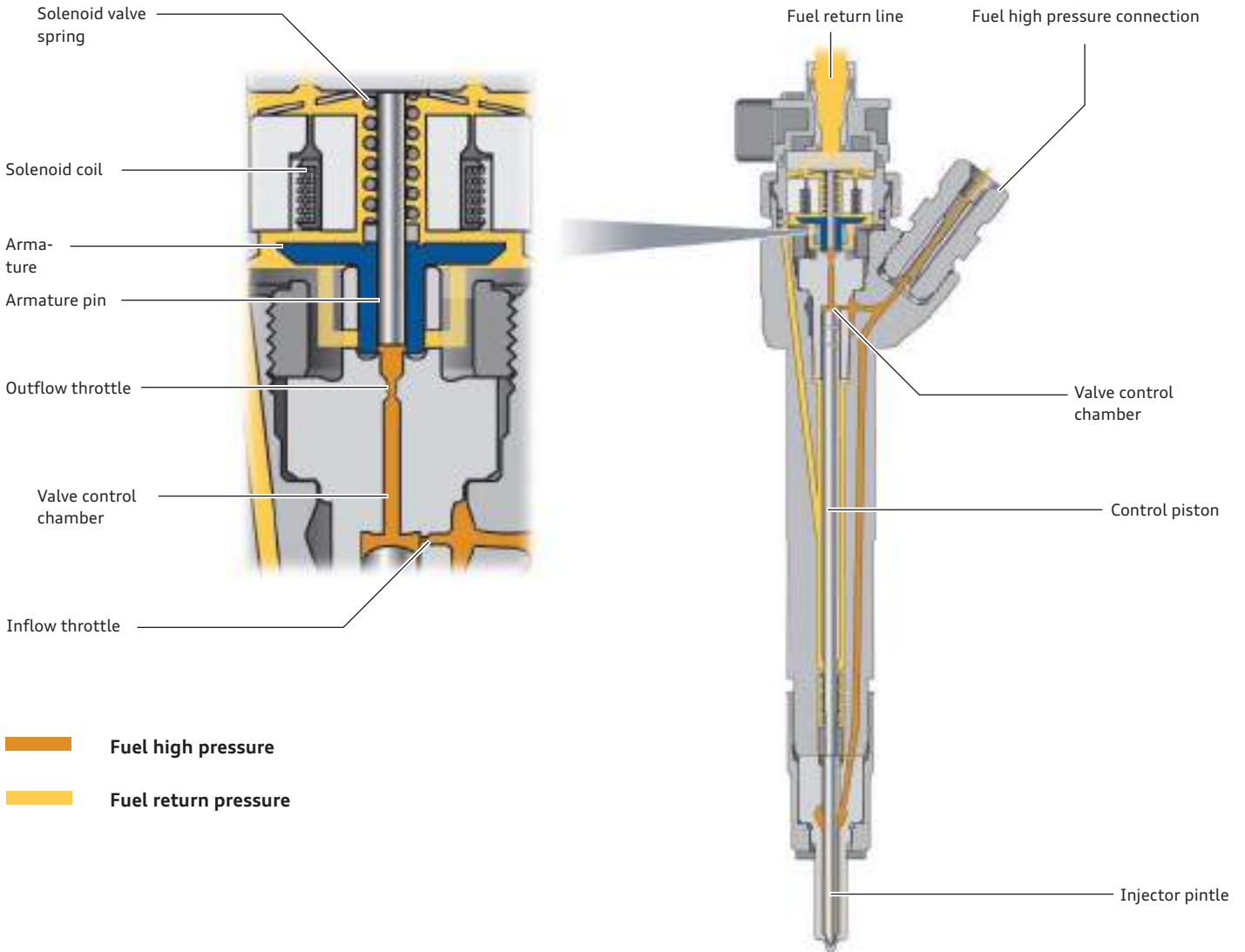
Injectors on the 2.0l TDI engine

The new injectors on the 2.0l TDI engine are controlled by a solenoid actuator. They replace the injectors with piezoelectric actuator previously fitted on the 2.0l TDI engine.

Bosch has developed an injector using solenoid technology which meets the requirements for high injection pressures and is capable of multiple injections per working cycle.

The advantage of solenoid controlled injectors is that they are easier to manufacture than injectors with piezoelectric actuators. Two injectors each with an outer clamping element are integrated in the cylinder head cover.

Design and operation



486_024

Injector closed

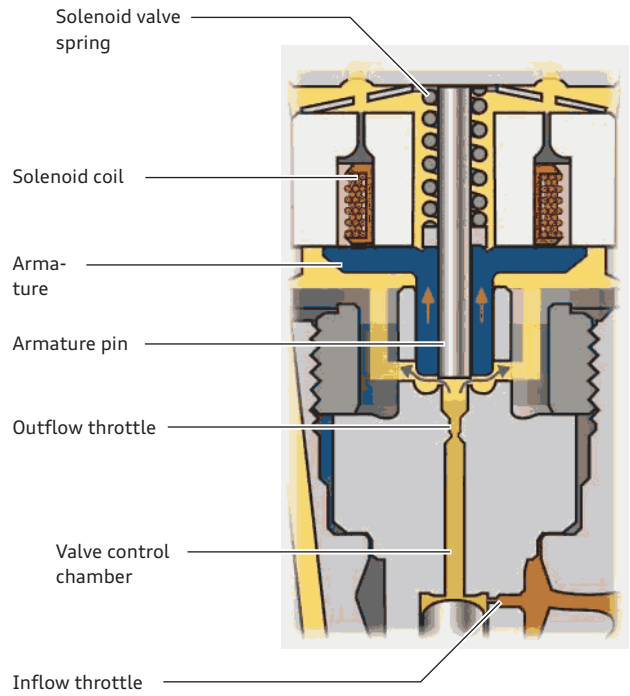
The injector is closed in the rest position. The solenoid valve is not activated. The solenoid armature is pushed into its seat by the force of the solenoid spring and seals the valve control chamber off from the fuel return line.

Fuel high pressure is present in the valve control chamber. Due to the larger surface pressure ratio of the control piston surface in relation to the injector pintle, the injector pintle is pressed down into its seat and closes the injector.

Commencement of injection

The injection cycle begins when the solenoid coil is activated by the engine control unit. As soon as the magnetic force exceeds the closing force of the solenoid spring, the solenoid armature moves upwards and opens the outflow throttle.

The fuel under high pressure in the vacuum control chamber flows into the fuel return line through the open outflow throttle. The fuel pressure inside the valve control chamber decreases. The inflow throttle prevents rapid pressure equalisation between the fuel high pressure area and the valve control chamber. The injector pintle is lifted by the fuel pressure acting upon it and the injection cycle commences.



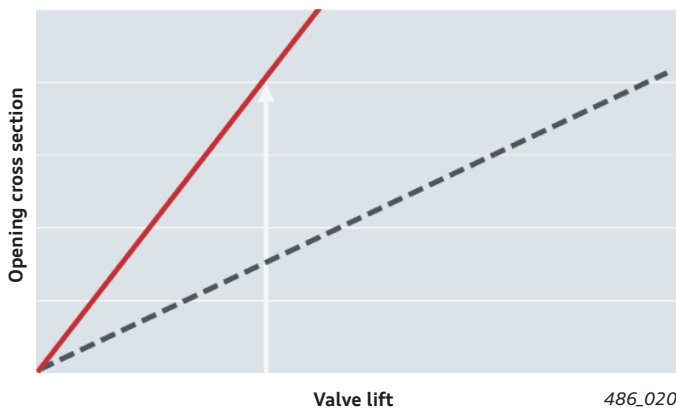
486_135

Pressure equalised solenoid valve

To increase the injection pressure and injection rates, Bosch developed a pressure equalised valve in which the hydraulic forces are absorbed within the diameter of the valve seat by a stationary armature. A valve of this type has three times the opening cross section of previous valves while achieving the same amount of lift, and, therefore, requires much less lift. Due to the large valve opening cross section, the high pressure hydraulics can be designed to use optimal fuel injection rate characteristic curves.

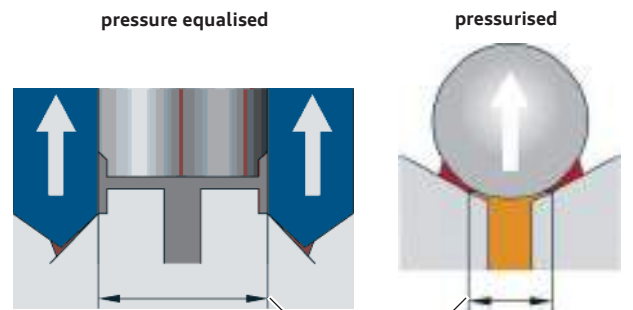
The small valve lift allows very short operating times, and thus improved multi-injection capability, to be achieved. Unlike a ball valve injector, the valve with armature pin does not have to be sealed against the rail pressure and therefore requires less locking force. The lower locking force required by the valve with armature pin allows the valve seat to have a larger cross section.

Comparison of valve opening cross sections



486_020

- pressure equalised
- - - pressurised



486_021

486_022

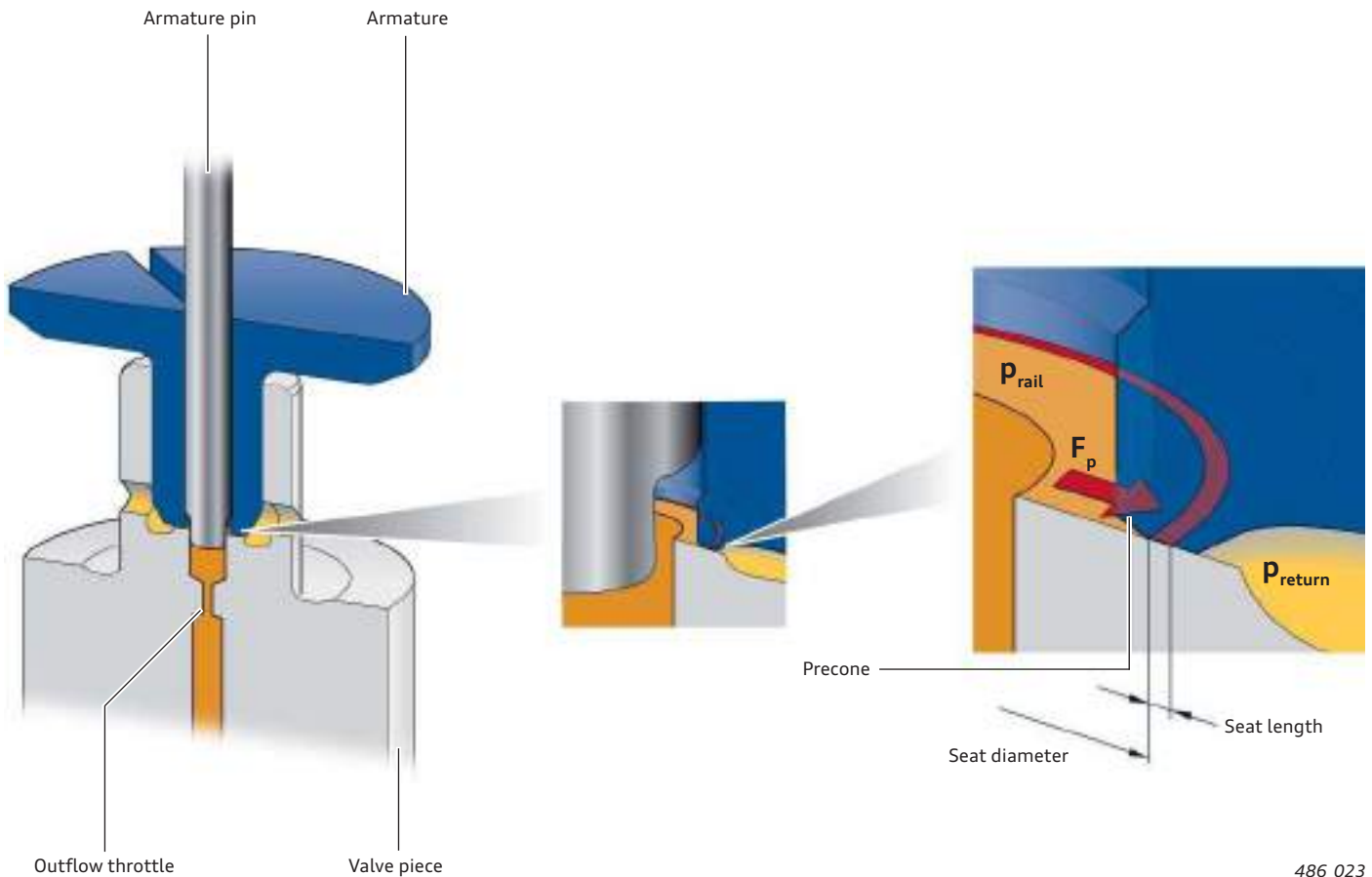
Valve opening cross section

Pressure equalisation

Pressure equalisation works only if there is perfect linear contact in the seat area and the valve seat is located centrally above the outflow throttle.

The moving valve element is sleeve shaped and, as an armature, also serves as a part of the magnetic circuit. For wear protection, the armature is coated in the seat area. The inner bore of the armature is sealed by the armature pin.

The two-piece construction allows high variability in terms of the design of the seat geometry. This was used to reinforce the armature in the seat area within the diameter of the valve guide, creating a precone in front of the actual seat edge. Within the adapted annular surface, the system pressure can exert an opening force upon the valve through the precone on the armature.



486_023

Legend:

P_{rail}	Fuel high pressure, 230 – 1800 bar
P_{return}	Fuel return pressure, approx. 2 bar
F_p	Force exerted on the seat by pressure acting on the precone

Non-return valve

A nonreturn valve with a flow restricting effect is used in place of a pressure retaining valve in the return line from the solenoid fuel injectors. The flow restricting effect generates a return pressure of approx. 2 bar. This equalises pressure variations in the injectors during opening and closing. This allows fuel injection rates to be kept within narrow bounds and emissions limits to be better met.



Note

After replacing the injectors, a correction value must be entered in the "Guided Functions" under the menu item "Read/adapt correction values for fuel injectors".

Engine/gearbox combinations

Gearbox designations:

- OB1 6-speed manual gearbox
- OB5 7-speed dual clutch gearbox – S tronic
- OAW multitronic



Power transmission

Overview

The power transmission concept of the Audi A6 '11 is identical to that of the Audi A7 Sportback. The final drive has been moved forward in all gearboxes (see SSP 392 and 409). quattro models have a splined propshaft (see SSP 478). The propshaft is fitted on the rear axle drive like on the B8 (Audi A4 '08, Audi A5, Audi Q5), see SSP 409.

As previously on the Audi RS5 and Audi A7 Sportback, driving dynamics are enhanced by torque vectoring (see SSP 478).

The automatic gearboxes are integrated into the engine's innovative thermal system. This increases the efficiency of the gearboxes. Depending on engine version, the ATF operating temperature is reached more quickly by heat input. Overheating of the ATF is avoided by heat dissipation (see page 30). As implemented for the first time on the Audi A8 '10, the automatic gearboxes of the Audi A6 '11 are able to utilise the predictive route data supplied by the navigation system (see SSP 457).



486_073

multitronic OAW

The OAW multitronic gearbox is available for front wheel drive vehicles. A Sport program and a tiptronic mode with eight speed settings ensure a sporty driving experience. These can be changed with the paddles on the steering wheel or with the selector lever. The start-stop system is supported as standard. The clutch pressure supply system, the hydraulic control unit and the gearbox software have been optimised for this purpose.

The OAW multitronic gearbox will be combined with the following engines:

- ▶ 2.0l R4 TFSI engine
- ▶ 2.0l R4 TDI engine
- ▶ 2.8l V6 FSI engine
- ▶ 3.0l V6 TDI engine

Rear-axle transmission

Standard:

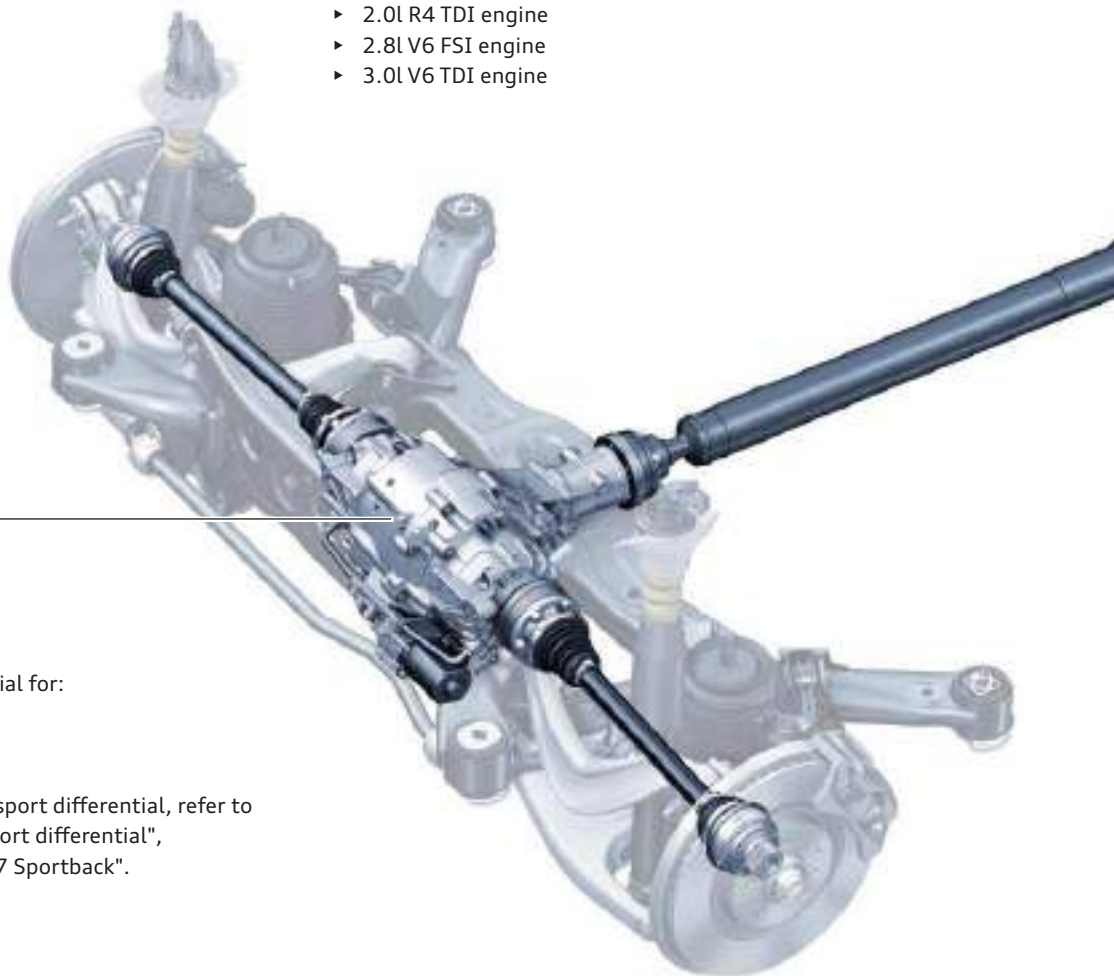
Rear axle differential OBC

Optional:

Rear axle drive OBF with sport differential for:

- ▶ 3.0l V6 TFSI engine
- ▶ 3.0l V6 TDI engine

For further information about the OBF sport differential, refer to the iTV broadcast "Audi quattro with sport differential", Parts 1 – 4, as well as SSP 478 "Audi A7 Sportback".



Reference

The drive concept of the Audi A6 '11 is identical to that of the Audi A7 Sportback and also, in many respects, to that of the B8 series (Audi A4 '08/A5). For information about the axle position and the new sealing and assembly concept of the axle flange for the rear axle differential, refer to SSPs 392 and 409 as well as Audi iTV programme "Audi A5 Power Transmission" (broadcast 02.2010). This information also applies to the Audi A6 '11 and represents basic knowledge of this topic.



486_072

7-speed dual clutch gearbox OB5 – S tronic

The 7-speed dual clutch gearbox was introduced for the first time on the Audi Q5 in 2008. This is explained in detail in SSP 429. The gearbox used on the Audi A6 '11 is identical to the Audi A7 Sportback version described in SSP 478. The start-stop system is now supported as standard. The software has been optimised for this purpose.

The 7-speed dual clutch gearbox OB5 S tronic will initially be used in combination with the following engines:

- ▶ 2.8l V6 FSI engine
- ▶ 3.0l V6 TFSI engine
- ▶ 3.0l V6 TDI engine

6-speed manual gearbox OB1

The 6-speed manual gearbox OB1 is used for engines developing up to 400 Nm of drive torque. The gear recognition sensor G604 is new (see page 32). The start-stop system is supported as standard.

The 6-speed manual gearbox OB1 is combined with the following engines:

- ▶ 2.0l R4 TFSI engine
- ▶ 2.0l R4 TDI engine
- ▶ 2.8l V6 FSI engine
- ▶ 3.0l V6 TDI engine



486_074

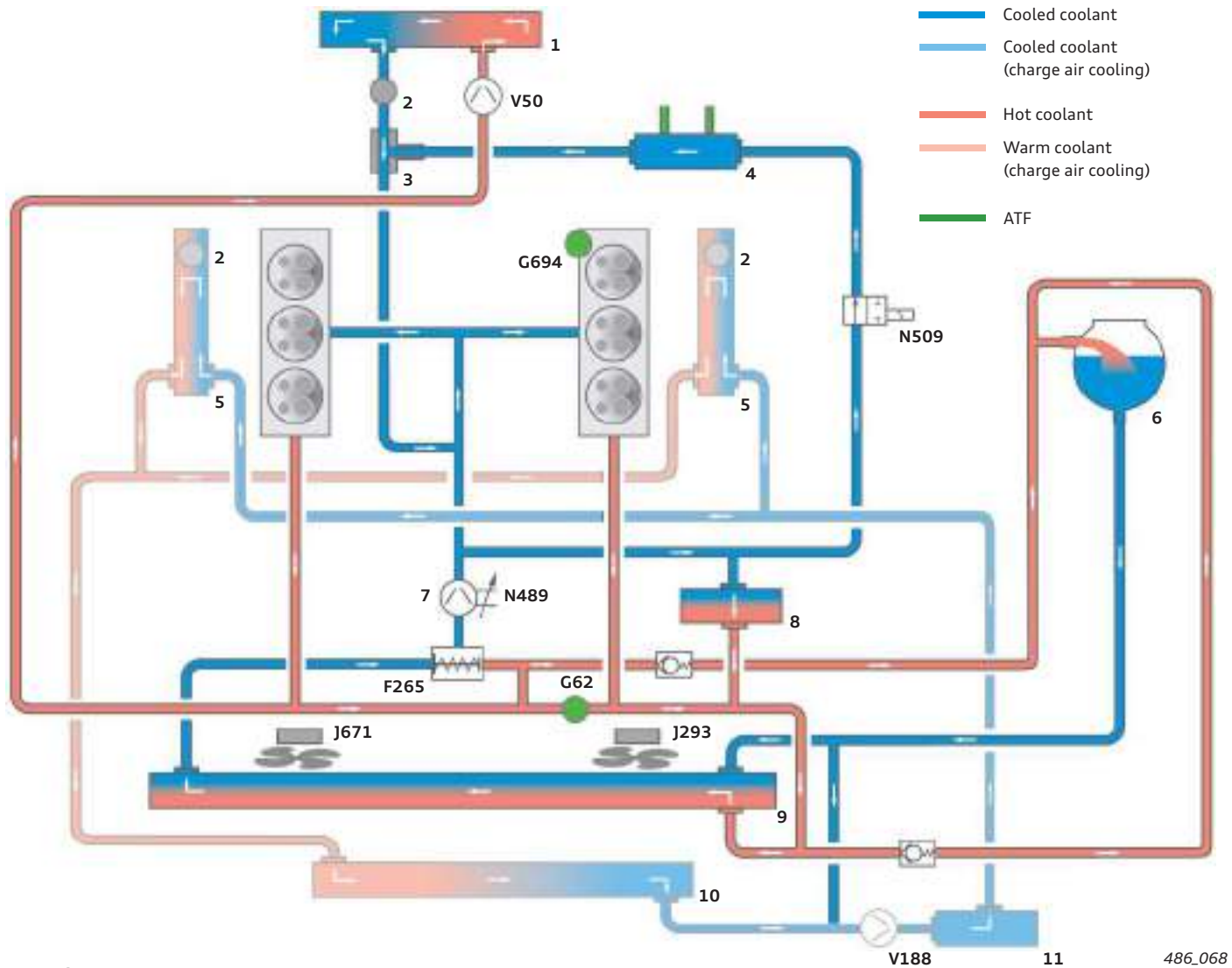
ATF heating/cooling

On models with the following engines, the innovative thermal management system facilitates both ATF cooling and heating.

- ▶ 2.0l R4 TDI engine
- ▶ 3.0l V6 TDI engine
- ▶ 2.8l V6 FSI engine
- ▶ 3.0l V6 TFSI engine

The software for the innovative thermal management system is installed in engine control unit J623. The ATF temperature is indicated to the software by the gearbox control unit J217. The innovative thermal management system controls heating and cooling of the ATF. For this purpose, the engine control unit instructs the gearbox control unit to open or close the gearbox oil cooling valve N509.

The coolant circuit of the 3.0l V6 TDSI engine is shown here for explanatory purposes:



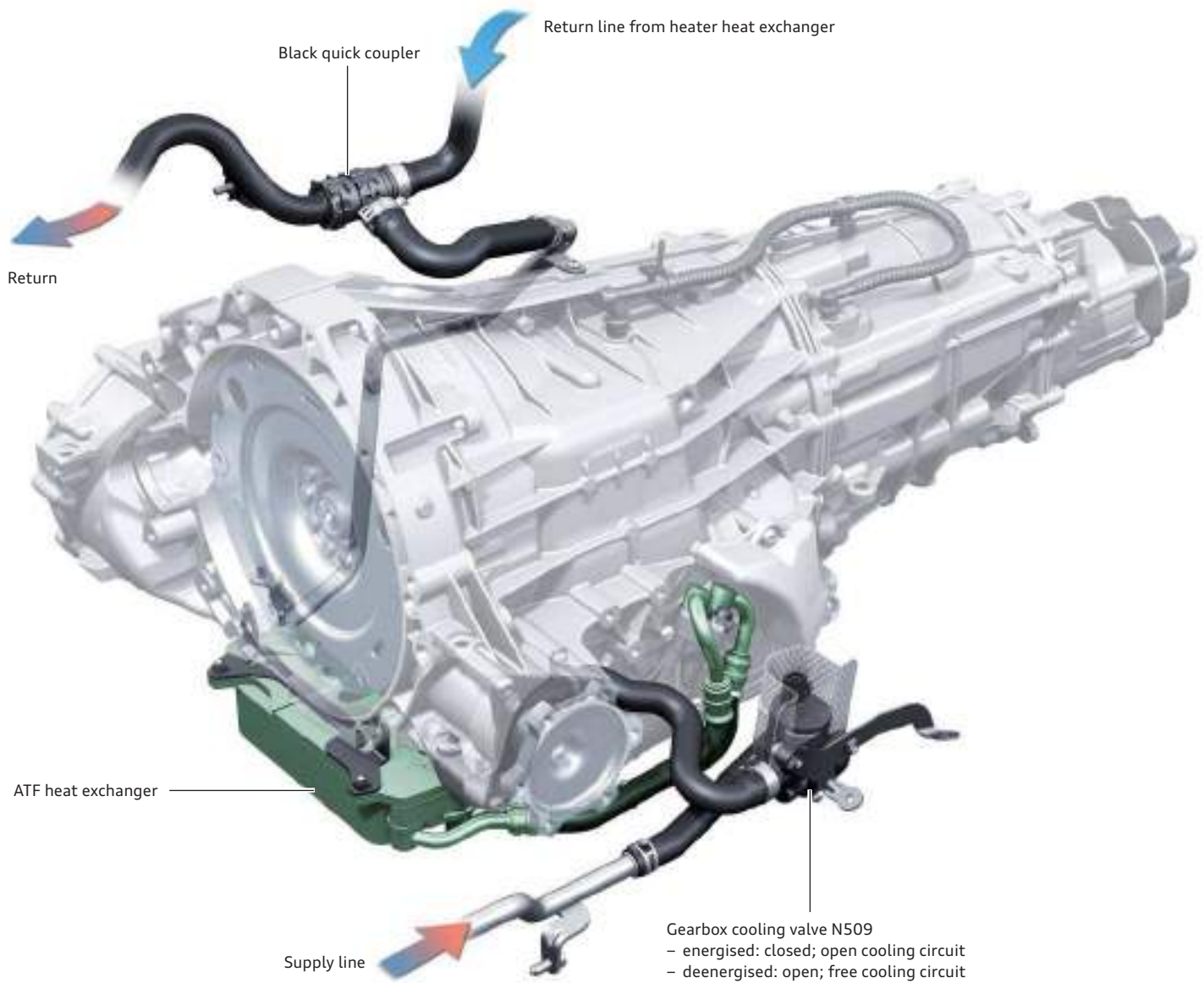
Legend:

- G62** Coolant temperature sender
- G694** Temperature sender for engine temperature control
- F265** Mapped engine cooling thermostat¹⁾
(initial opening temperature: 87 °C)
- J293** Radiator fan control unit¹⁾
- J671** Radiator fan control unit 2¹⁾
- N489** Cylinder head coolant valve^{1), 4)}
- N509** Gearbox oil cooling valve ²⁾
- V50** Coolant circulation pump³⁾
- V188** Charge air cooling pump¹⁾

- 1** Heater heat exchanger
- 2** Vent screw
- 3** Quicker coupler, black⁵⁾
- 4** ATF heat exchanger
- 5** Charge air cooler
- 6** Coolant expansion tank
- 7** Active coolant pump
- 8** Engine oil cooler
- 9** Radiator
- 10** Low temperature radiator
- 11** Auxiliary low temperature radiator

¹⁾ activated by the engine control unit J623
²⁾ activated by the gearbox control unit J217
³⁾ activated by the Climatronic control unit J255
⁴⁾ actuates the coolant pump

⁵⁾ On models with a 2.8l V6 FSI engine, a grey quick coupler with throttle is located in this position (see page 31).



486_069

Operating states

1. Start phase

If the engine is started cold, the engine control unit J623 instructs the gearbox control unit J217 to close valve N509. The cooling circuit for the ATF heat exchanger is thereby interrupted. First of all, the active coolant pump is deactivated. The criteria for activation are ambient temperature, engine temperature, engine speed and heat requested by Climatronic. The innovative thermal management system decides when the coolant pump is to be activated by valve N489.

2. Heating of the ATF

If the coolant pump is active, the innovative thermal management system compares the engine temperature measured by the engine temperature control temperature sender G694 with the ATF temperature. As soon as the ATF temperature is 5 °C below the rising engine temperature, the engine control unit instructs the gearbox control unit to open valve N509. The circuit for the ATF heat exchanger is enabled. The ATF is heated.

3. Normal operation

If the gearbox control unit indicates an ATF temperature of approximately 84 °C to the engine control unit, the engine control unit instructs the gearbox control unit to close valve N509 again. The cooling circuit for the ATF heat exchanger is therefore interrupted. The ATF has reached the desired operating temperature and is neither being heated nor cooled. This applies up to an ATF temperature of approximately 105 °C.

4. Cooling of the ATF

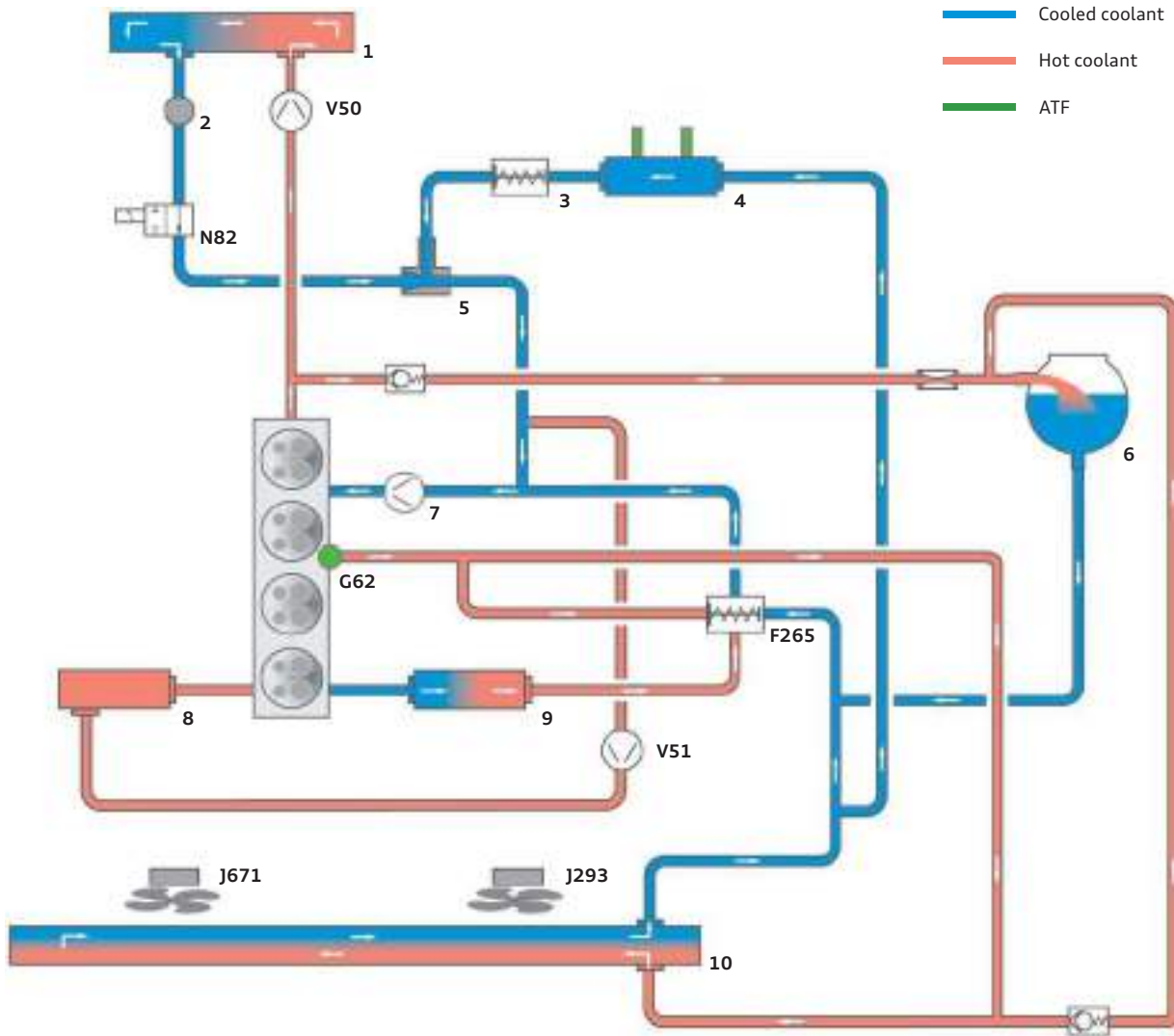
If the ATF temperature exceeds 105 °C, the engine control unit instructs the gearbox control unit to open valve N509. The circuit for the ATF heat exchanger is enabled. The ATF is cooled by the 85 °C coolant. If the ATF has reached a temperature of approximately 90 °C, the conditions for normal operation are again met. The engine control unit instructs the gearbox control unit to again close the gearbox oil cooling valve N509.

ATF cooling

The ATF on models with a 2.0l R4 TFSI engine is not heated.

Upwards of a coolant temperature of approx. 80 °C, the ATF heat exchanger cooling circuit is integrated into the engine cooling circuit by the coolant thermostat.

The quick coupler with throttle (5) assists flow through the ATF heat exchanger. It works like a suction jet pump. This saves the use of an additional coolant pump.



486_067

Legend:

- G62** Coolant temperature sender
- F265** Mapped engine cooling thermostat¹⁾
(commencement of opening: approx. 95 °C)
- J293** Radiator fan control unit¹⁾
- J671** Radiator fan control unit 2¹⁾
- N82** Coolant shutoff valve²⁾
- V50** Coolant circulation pump²⁾
- V51** Coolant run-on pump¹⁾

- 1** Heater heat exchanger
- 2** Vent screw
- 3** ATF coolant thermostat
(commencement of opening: ca. 80 °C)
- 4** ATF heat exchanger
- 5** Quick coupler with throttle, grey
- 6** Coolant expansion tank
- 7** Coolant pump
- 8** Exhaust turbocharger
- 9** Engine oil cooler
- 10** Radiator

¹⁾ activated by the engine control unit J623

²⁾ activated by the Climatronic control unit J255

Quick coupler with throttle

The quick coupler with throttle is grey and used on models with a 2.0l R4 TFSI engine or 2.8l V6 FSI engine.

A black quick coupler without throttle is fitted on models with a 2.0l R4 TDI engine, 3.0l V6 TDI engine or 3.0l V6 TFSI engine.

ATF coolant thermostat

The ATF coolant thermostat is integrated in the coolant return line of the ATF heat exchanger. A slot in the valve seat ensures a continuous trickle flow of coolant. If the coolant temperature increases, the wax in the thermocouple heats up and expands. As a result, the valve seat opens via the lift pin at a temperature of above 80 °C, and the coolant circuit is opened.

Direction of flow

When installing the ATF coolant thermostat, the direction of flow must always be observed. This is indicated by an arrow on the housing.

If the black quick coupler without throttle is fitted instead of the grey quick coupler with throttle on models with 2.0l R4 TFSI engine or 2.8l V6 FSI engine, the cooling capacity of the ATF heat exchanger is reduced. This can result in higher ATF temperatures.

Fitting the coolant thermostat in the wrong position will adversely affect temperature regulation and impair ATF cooling. If the slot in the valve seat is clogged, the continuous trickle coolant flow will be interrupted. The thermocouple is not heated to the required degree. The valve seat remains closed and the ATF is not cooled.

In case of any complaints about excessively high ATF temperatures, check the coolant circuit and the oil circuit to the ATF cooler, as well as the coolant thermostat.

Quick coupler with throttle, grey



ATF coolant thermostat



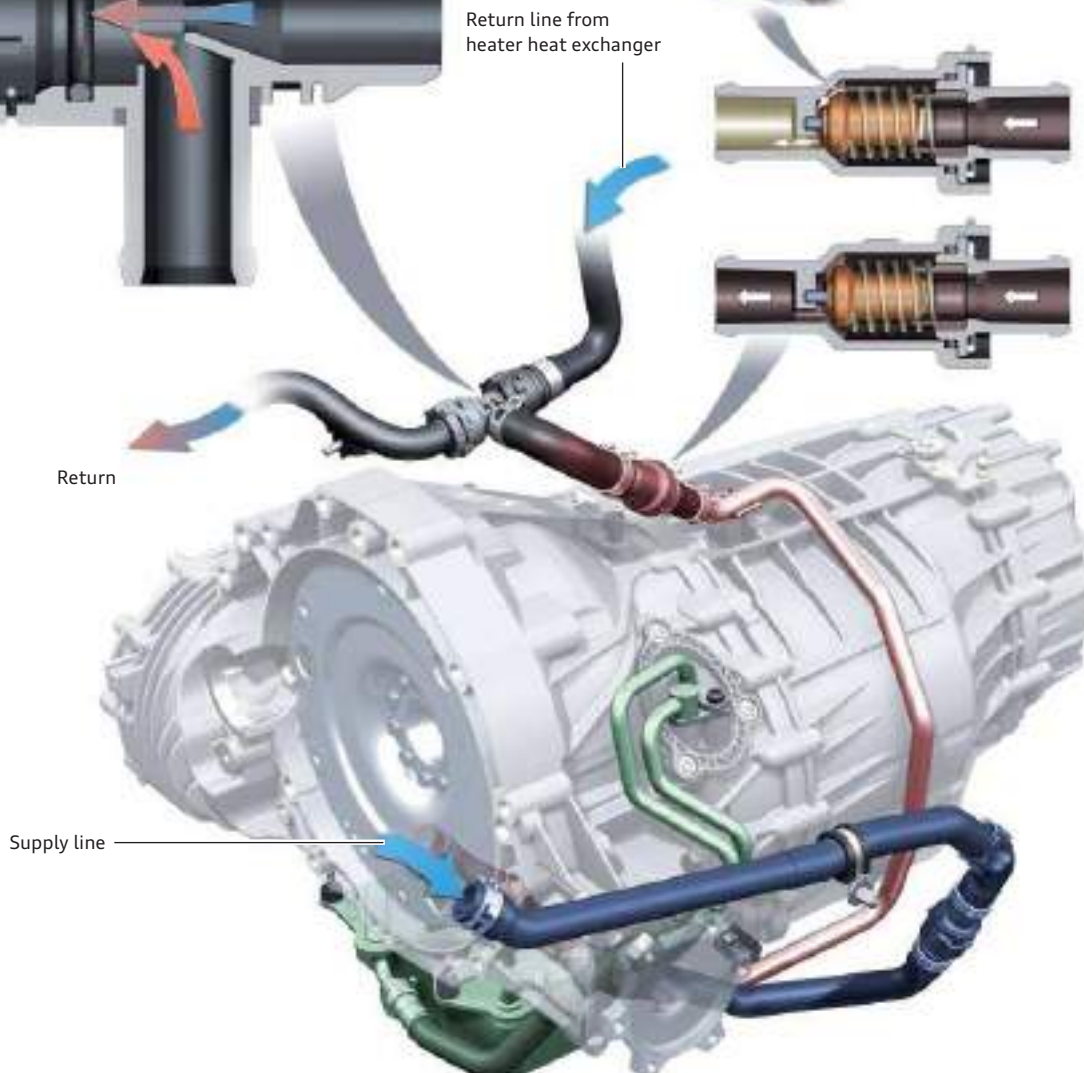
Thermocouple with lift pin



closed



open



Gear recognition sensor G604

The gear recognition sensor G604 is used in 6-speed manual gearbox OB1 for the first time with the Audi A6 '11.



Gear recognition sensor G604

Shift cylinder

Contour for locking bushes



486_071

Functional principle

In the neutral position of the selector shaft, the gear recognition sensor G604 is located directly over the centre member of the diaphragm. This strengthens the magnetic field of the sensor considerably. The electronics can thus recognise the neutral position.

When a gear is selected, the diaphragm section responsible for the gear is located under the sensor.

The diaphragm sections assigned to each of the gears have different contours. The magnetic field in the sensor is thus deflected in different directions. In this way, the electronics can detect which gear is selected.

If the shift cylinder diaphragm is damaged, the gears can no longer be assigned clearly.

Tasks

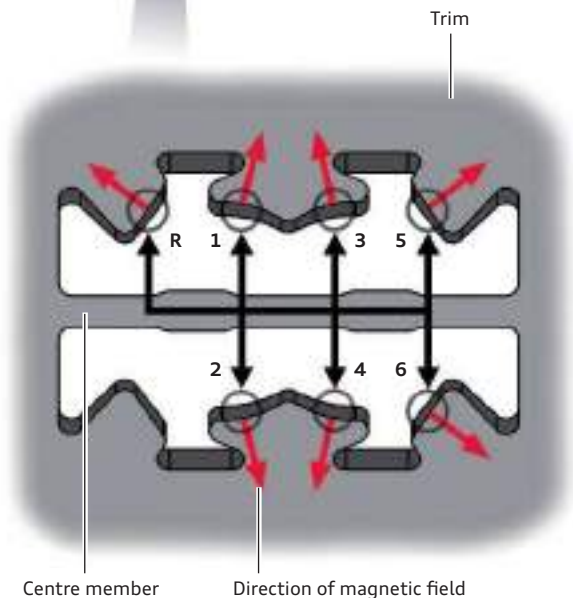
The gear recognition sensor G604 assumes the previous functions of the gear recognition switch F208¹⁾ and the gearbox neutral position sender G701. It supports the following functions and control units:

- ▶ Activation of the reversing lights
- ▶ Auto-dimming interior rearview mirror/external mirror and external mirror fold-back function
- ▶ ParkAssist
- ▶ Trailer control unit
- ▶ Hill Start Assist (electrical parking brake)
- ▶ Audi hold assist (ESP)
- ▶ Recognition of neutral position for start-stop function

New features:

- ▶ Direct recognition of selected gear
- ▶ Gear recognition for the gearshift indicator (the selected gear does not, however, appear on the driver information system display until the clutch has closed)
- ▶ Enhanced shift comfort

¹⁾ was originally reversing light switch F4, see SSP 392.



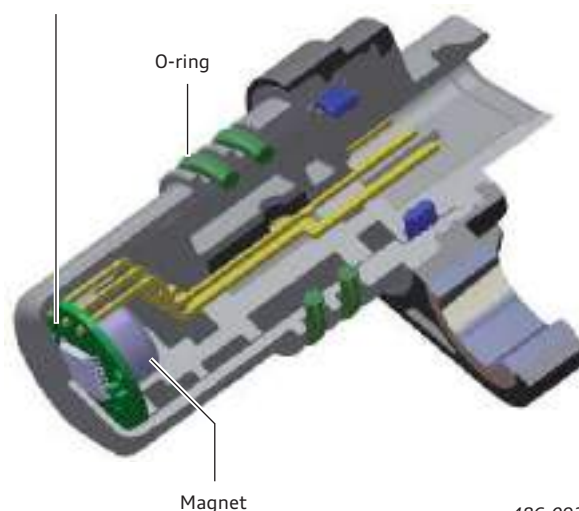
Design of the sensor

Four Hall sensors are mounted on the PCB of the sensor. A permanent magnet is located behind the PCB. The strength and direction of the magnetic field are influenced by the shift cylinder diaphragm.

The four Hall sensors enable the sensor electronics to evaluate the direction and strength of the magnetic field and assign this to a gear position. The gear position is transferred to the engine control unit J623 as a pulse width modulated (PWM) signal.

A defined pulse width is assigned to each shift position. The signals are processed by the engine control unit J623 and sent to the powertrain CAN bus as a message.

PCB with 4 Hall sensors



486_093

Enhanced shift comfort

The selected gear is now indicated quickly and directly to the engine control unit J623. It no longer has to be computed from the engine speed and vehicle speed. This has its advantages. When the clutch closes, engine speed can now be adapted to the synchronous speed depending on the speed of the vehicle. This allows a significant improvement in shift comfort.

For example, when shifting down from fourth into third gear on models with a 2.8l V6 FSI engine, engine speed is initially reduced to idle speed after fourth gear is disengaged. As soon as third gear is determined to be engaged and the clutch starts to close, engine speed is increased by the engine control unit up to the synchronous speed corresponding to third gear. Closing of the clutch is detected by the clutch position sender G476.

Diagnostics

Diagnostics are performed by the engine control unit J623. The gear information is validated for the forward gears when the clutch is closed and while vehicle speed is stable relative to engine speed. The information for reverse gear is validated by the ESP signal "reversing". The neutral position is validated when the vehicle is stationary, the clutch is closed and the engine is idling.

If a gear is explicitly recognised after a loss of signal, the event memory entry is set to "sporadic". Apart from supporting the start-stop function, all tasks of the sensor are now executed. The start-stop function is not supported until the next driving cycle.

Loss of signal or an entry into the event memory of the engine control unit has the following effects:

- ▶ Start-stop function is not available
- ▶ Gear recognition for the gearshift indicator is delayed because it is computed from the engine speed and the vehicle speed.
- ▶ Electronic parking brake is not released automatically when driving away
- ▶ Audi hold assist is not available (see SSP 392)
- ▶ Reversing lights and park assist systems are not functional
- ▶ Shift comfort is reduced
- ▶ Event memory entries are made in the following control units:
 - ▶ Control unit in dash panel insert J285
 - ▶ Onboard power supply control unit J519
 - ▶ Special vehicle control unit J608

Measured values

- ▶ **Gear position sensor, raw value:** Duty factor of PWM signal
 - ▶ Neutral position 85.5 % – 86.5 %
 - ▶ 1st gear 37.5 % – 38.5 %
 - ▶ 2nd gear 53.5 % – 54.5 %
 - ▶ 3rd gear 69.5 % – 70.5 %
 - ▶ 4th gear 29.5 % – 30.5 %
 - ▶ 5th gear 45.5 % – 46.5 %
 - ▶ 6th gear 61.5 % – 62.5 %
 - ▶ Reverse 13.5 % – 14.5 %
 - ▶ Intermediate position¹⁾ 77.5 % – 78.5 %
 - ▶ Internal sensor error 21.5 % – 22.5 % > replace sensor
- ▶ **Gear position sensor, current value:**
the gear currently recognised by the sensor, but still not set to "valid" status
- ▶ **Gear position sensor, last valid value:**
the last gear evaluated as valid by the sensor
- ▶ **Gear position sensor, gear position valid:**
the gear recognised by the sensor and set to "valid" status

¹⁾ Neither the neutral position nor a selected gear is detected.

Chassis

Introduction

One of the main development goals for the suspension of the Audi A6 '11 was to surpass the high standard of the previous model with regard to driving dynamics and driving comfort. This goal was achieved through systematic development of proven suspension systems.

The electromechanical power steering makes a major contribution to increasing efficiency and allows innovative driver assistance systems to be implemented. Excellent steering response has been achieved through the positioning the steering ahead of the front axle and the corresponding electrokinematic set-up. This, in combination with the direct steering ratio, gives the vehicle significantly better agility.

The dynamic steering option (to be introduced at a later date) will allow variable steering gear ratios to be achieved, as well as corrective steering inputs to assist the ESP system where necessary.

In design terms, the Audi A6 '11 employs the same powertrain concept as that first realised on the Audi A5, with the wheel drive positioned ahead of the differential to provide a large wheelbase and small front overhang. The resultant, more evenly balanced weight distribution – compared to the previous model, front axle load has been reduced by about 80 kg – also contributes to neutral handling.

In the basic trim, the A6 '11 is offered with a steel sprung suspension and conventional damping. adaptive air suspension (aas) is optional.

Both the steel and air spring suspension versions are available in combination with front wheel drive or quattro.



486_076

Suspension versions

Production control number (PR number)	Designation	Technical implementation	Ride height ¹⁾	Availability
1BA	Standard suspension	steel springs	0 (basic ride height)	standard
1BE	sports chassis	steel springs	-20 mm	Option
1BV	S Line sport suspension by quattro GmbH	steel springs	-30 mm	Option
1BR	Heavy duty suspension	steel springs	+13 mm	Option
1BK	adaptive air suspension	air suspension	depends on setup selected in Audi drive select	Option
1BS	adaptive air suspension for rough road markets	air suspension		Option

¹⁾ The ride height of the standard suspension is taken as the base height for comparison purposes.

Axles

Front axle

The design and functional principle of the front axle are identical to those of the Audi A7 Sportback. On the Audi A6 '11, too, the bearing pedestal supporting the upper wishbone has been integrated in the bodyshell.

In addition to saving weight and increasing rigidity, this also reduces the fitting tolerances of the upper wishbones. The service and diagnosis operations are identical to those of the Audi A7 Sportback.



486_077

Rear axle

The basis for the development of the rear axle was the trapezoid-link front suspension already used on Audi models A4 '08, A7 Sportback and A8 '10. Springs and shock absorbers are spatially separated from one another,

thus providing a large through-loading width and a flat load floor. The service and diagnosis operations are identical to those of the Audi A7 Sportback.



486_078

Chassis alignment and configuration

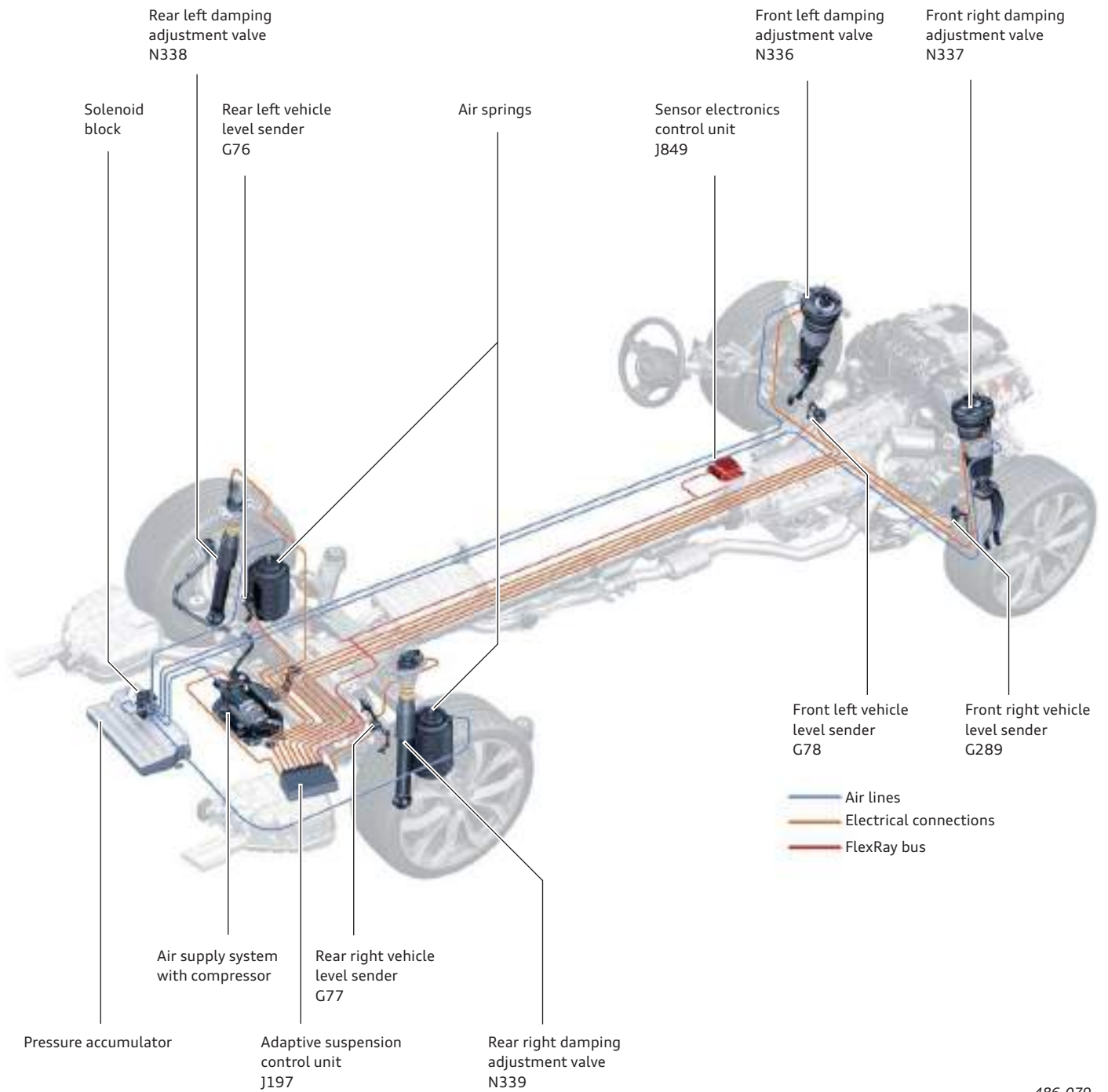
The chassis and configuration procedures as well as the corresponding set points are identical to those of Audi models A4 '08, A7 Sportback and A8 '10.

adaptive air suspension (aas)

Overview

The design, functional principle and service operations of the adaptive air suspension system of the Audi A6 '11 are largely similar those of the Audi A7 Sportback. Two different suspension systems are optionally available. The adaptive air suspension with production control number 1BK is the basic system.

The 1BS suspension developed specially for use on rough roads is available for certain markets. There are differences between both system in terms of the software control programs. The system components are identical.



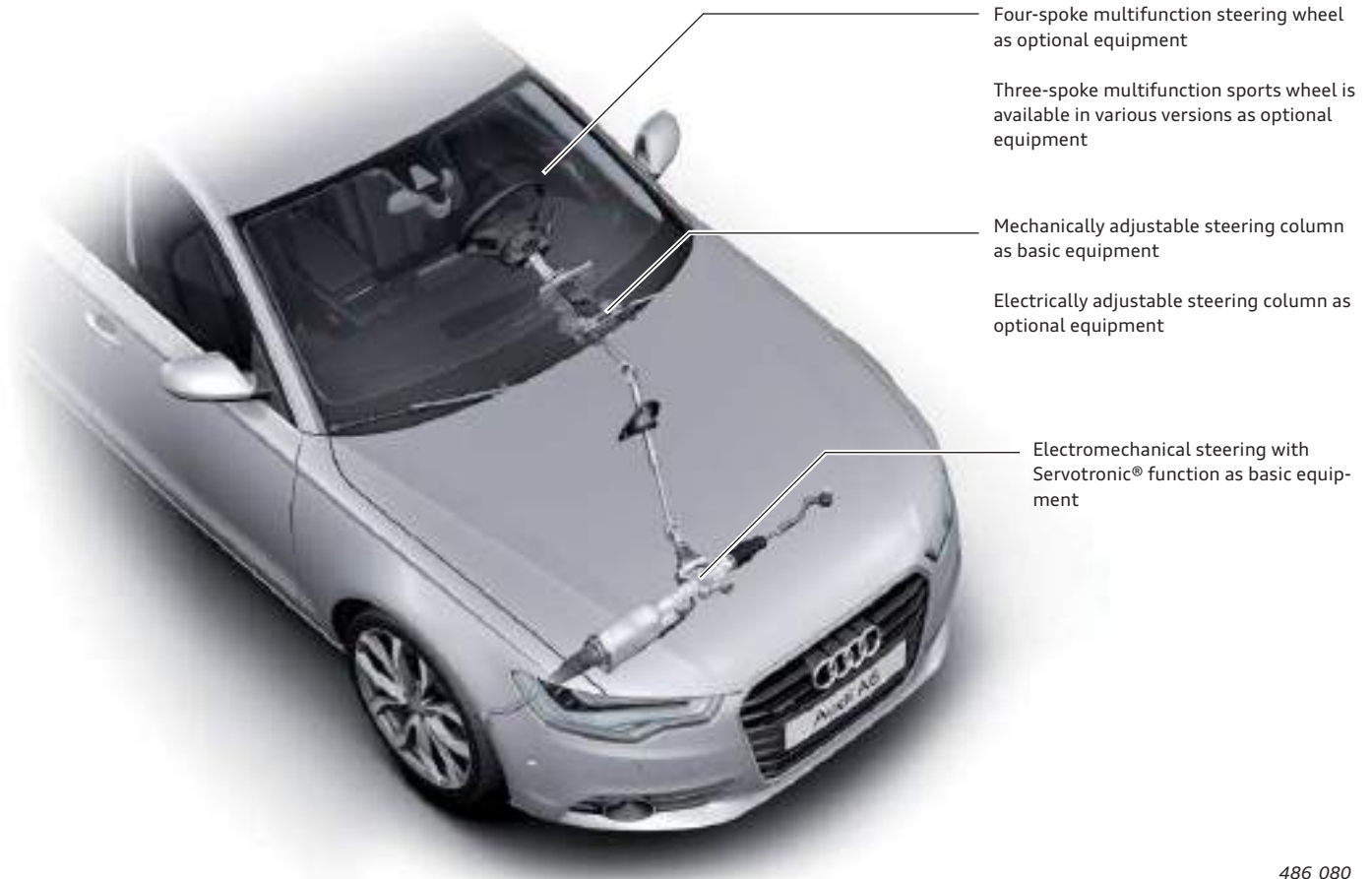
486_079

Steering system

Overview

The main innovation in the steering system of the Audi A6 '11 is the use of an electromechanical steering system. In terms of design and functional principle, it is identical to the steering system of the Audi A7 Sportback. The same applies to the service operations. The Servotronic® function is, therefore, standard equipment. The steering column is mechanically adjustable in basic trim. An electrically adjustable steering column is optional. An electrically adjustable steering column is optional.

In basic trim, the vehicle comes equipped with a four-spoke multifunction steering wheel. A three-spoke multifunction sports wheel is optionally available in various versions. In terms of design and functional principle, the steering columns and the steering wheels are identical to those of the Audi A7 Sportback. The service and diagnosis operations are also identical.



486_080

Dynamic steering

Dynamic steering will be available shortly for the Audi A6 '11 and the Audi A7 Sportback shortly after the launch of the Audi A6 '11. In design and function, it is identical to the system known from the A4 '08 and A8 '10. The service operations are also identical.



Brake system

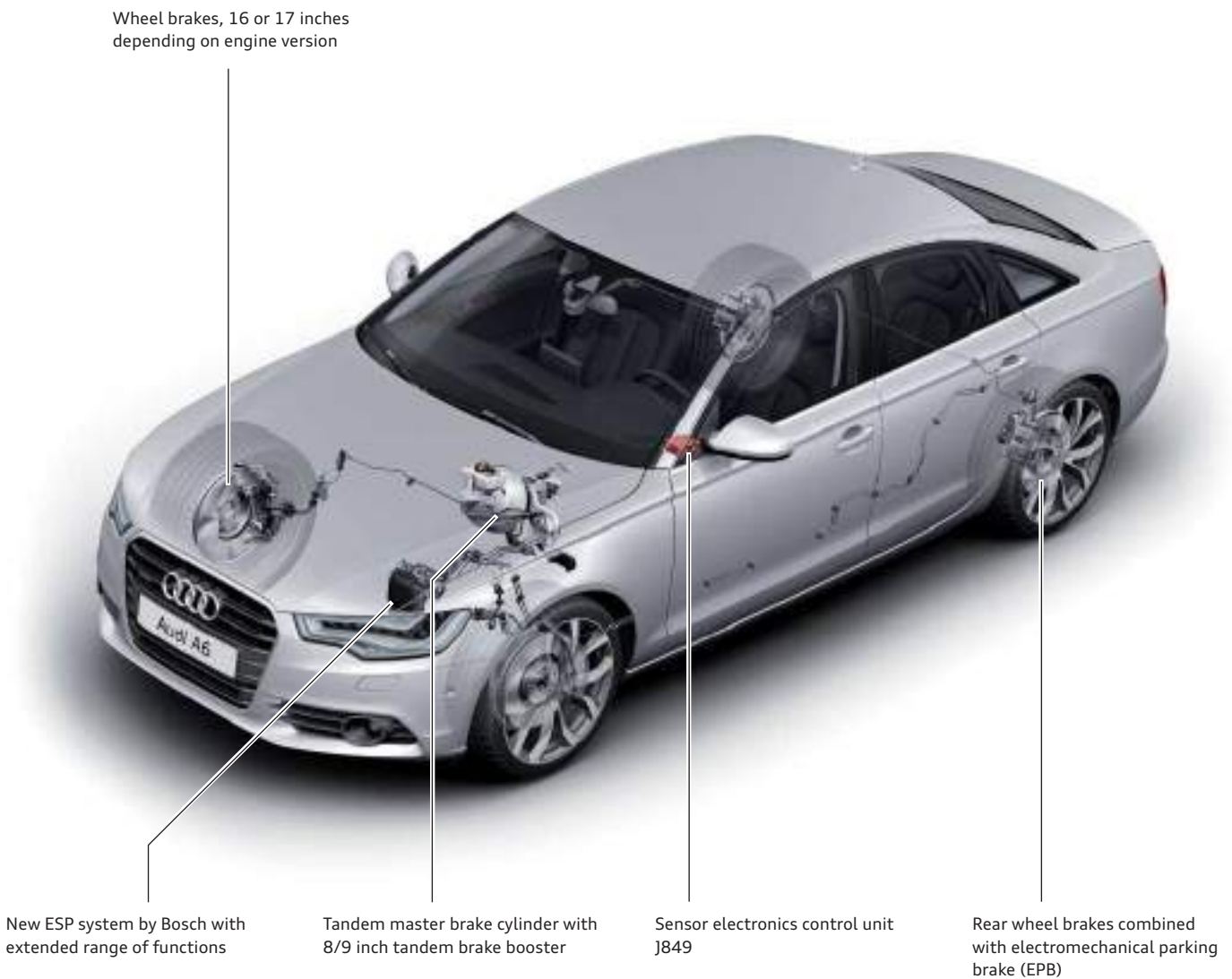
Overview

The brake system of the Audi A6 '11 is a more advanced version of the current brake systems used on Audi A4 '08 models, as well as those of the Audi A8 '10. Both 16 and 17 inch systems will be used at start of production. The electromechanical parking brake (EPB) functions as a parking brake.

In terms of design, function and service operations, the brake system is identical to that of the Audi A7 Sportback.

A high-performance ESP system by Bosch with an extended range of functions provides a high standard of safety. As implemented previously on the Audi A8 '10 und Audi A7 Sportback, the sensor electronics control unit J849 supplies the information on vehicle dynamics which is required to compute the control operations.

The service and diagnosis operations for the brake system and the sensor electronics control unit J849 are identical to those for the Audi A7 Sportback.



486_082

Wheel brakes

16 and 17 inch brake systems are used depending on engine power.

This brake system delivers outstanding braking performance.

Front wheel brake

Depending on engine version, three different brake systems are used on the front axle.



486_083

Engine type	2.0l R4 TFSI - 132 kW 2.8l V6 FSI - 150 kW 2.0l R4 TDI - 130 kW 3.0l V6 TDI - 150 kW	3.0l V6 TDI - 180 kW	3.0l V6 TFSI - 220 kW
Brake type	TRW FBC 60 16"	TRW FBC 60 17"	Teves FNR 42 AL
Minimum wheel size	16 inch	17 inch	17 inch
Number of pistons	1	1	2
Piston diameter	60 mm	60 mm	42 mm
Brake disc diameter	320 mm	345 mm	356 mm

Rear wheel

Depending on engine version, two different brake systems are used on the rear axle.



486_084

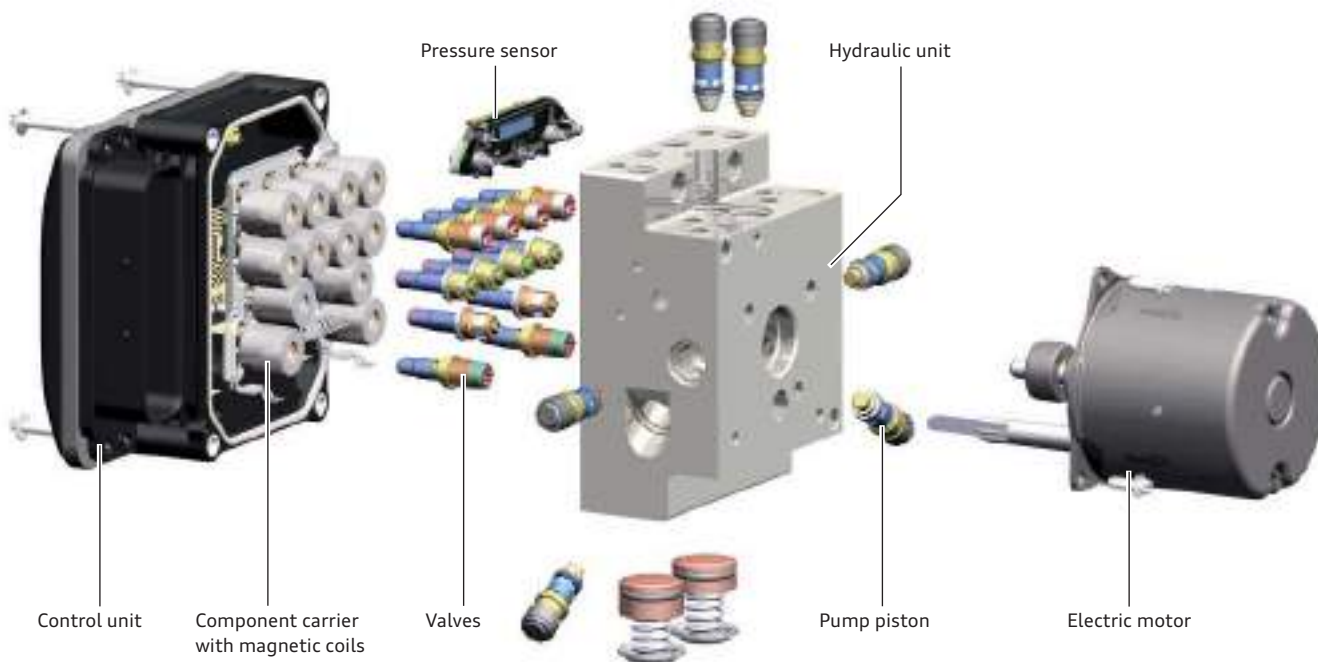
Engine type	2.0l R4 TFSI - 132 kW 2.8l V6 FSI - 150 kW 2.0l R4 TDI - 130 kW 3.0l V6 TDI - 150 kW	3.0l V6 TFSI - 220 kW 3.0l V6 TDI - 180 kW
Brake type	CII 43, EPB 16"	CII 43, EPB 17"
Minimum wheel size	16 inch	17 inch
Number of pistons	1	1
Piston diameter	43 mm	43 mm
Brake disc diameter	300 mm	330 mm

ESP

As previously on the Audi A7 Sportback, the 9th generation ESP Premium system is used on the Audi A6 '11. The functions have been extended for use of the dynamic steering system. Control unit J104 determines the corrective steering inputs needed in order to stabilise the vehicle. For this purpose, the values measured by the wheel speed sender, the steering angle sender, the sensor electronics control unit and the rotor position sensor of the dynamic steering actuator are processed. If the situation requires, the control unit J104 "instructs" the active steering control unit J792 to make corrective steering inputs irrespective of the driver's steering operation.

The service and diagnosis operations are identical to those of the Audi A7 Sportback. As implemented previously on the Audi A7 Sportback, the quattro version of the Audi A6 '11 features the innovative torque vectoring system, while the front wheel drive version comes with an electronic transverse lock.

The control unit can be disconnected from the hydraulic unit and replaced separately in service workshops. The condition for this is that the disassembly/assembly work is performed at an ESD protected workplace using workshop equipment VAS 6613.



486_085



Reference

For detailed information about the dynamic steering system, refer to Self Study Programme 402 "Dynamic Steering in the Audi A4 '08". For detailed information about ESP Premium, refer to Self Study Programme 480 "Audi A7 Sportback Suspension".

Tyre pressure indicator

The Audi A6 '11 is also offered with the familiar second generation tyre pressure indicator. The system is fitted as standard on this model world-wide.

The system is identical to those already in use on other Audi models in terms of its design, function, operation and driver information, as well as its scope of servicing and diagnostics.













486_086

Wheels and tyres

Depending on engine type, size 7.5J x 16 ET37 wheels fitted with 225/60 R 16 tyres or size 8.0J x 17 ET39 wheels fitted with 225/55 R 17 tyres are the basis for the new Audi A6 '11. The highlight is the 20-inch forged aluminium wheel (10) of bicolor design. The multi-spoke wheel is finished in anthracite and polished across the design surface. 16, 17 and 18 inch winter wheels with winter tyres suitable for use with snow chains are available in the same design as the wheels fitted with summer tyres.

As an option, the 8.5J x 19 ET45 (8) wheel is also available with run-flat tyres (AOE).

In Germany the Audi A6 '11 comes as standard with the "Tyre Mobility System" (TMS). A space-saving run-flat tyre in size 4.5J x 20 with T145/60 R 20 tyres is optional. Comfort and specifically tyre resistance have been improved by all-new tyres in all available sizes.

1	2	4	5	6	8	10	
							
							
Basic 16" wheel and 16" winter wheel	Basic 17" wheel	Optional 17" wheel	Optional 18" wheel	Optional 19" wheel	Optional 19" wheel	Optional 20" wheel	
7.5J x 16 ET37 alloy wheel, finished in brilliant silver 225/60 R16	8.0J x 17 ET39 alloy wheel, finished in brilliant silver 225/55 R17	8.0J x 17 ET39 alloy wheel, finished in brilliant silver 225/55 R17	8.0J x 18 ET39 alloy wheel, finished in brilliant silver 245/45 R18	8.0J x 18 ET39 alloy wheel, finished in brilliant silver 245/45 R18	8.5J x 19 ET45 alloy wheel (flow form cast) finished in brilliant silver 255/40 R19	8.5J x 20 ET45 forged alloy wheel, finished in anthracite partially polished 255/35 R20	
	1	2	4	5	6	8	
	17" winter wheel			18" winter wheel	19" winter wheel¹⁾		10
	7.5J x 17 ET37 alloy wheel, finished in brilliant silver 225/55 R17 (winter tyres)			7.5J x 18 ET37 alloy wheel, finished in brilliant silver 225/50 R18 (winter tyres)	7.5J x 19 ET33 alloy wheel (flow form cast) finished in brilliant silver 235/45 R19 (winter tyres)		
		3			7	9	

¹⁾ only for models equipped with ceramic brake

adaptive cruise control (ACC)

ACC will also be available as an option for the Audi A6 '11. The dual radar sensor system previously introduced in the Audi A8 '10 and Audi A7 Sportback is now also used on the Audi A6 '11. The design, functions, operation and service operations are identical to those of the systems in the Audi A8 '10 and Audi A7 Sportback.



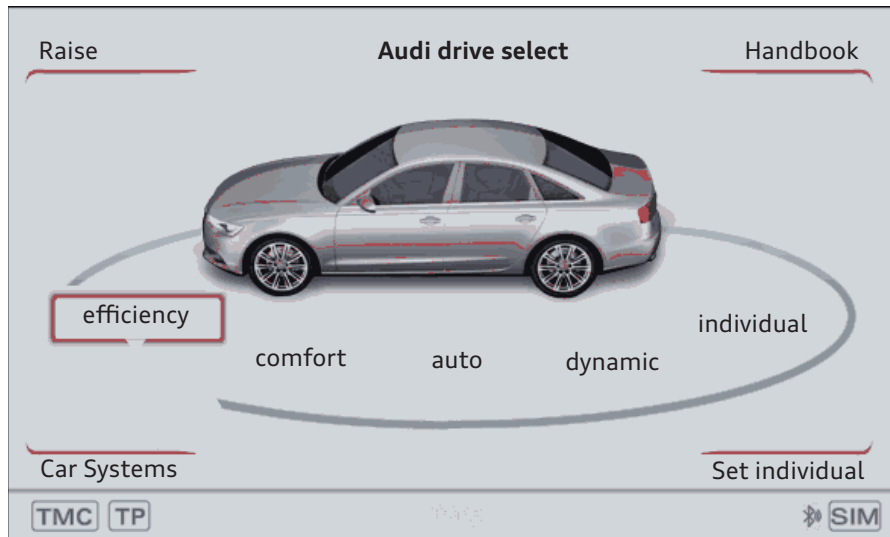
Radar sensors

Electrical system

Audi drive select











The Audi A6 '11 is equipped with the Audi drive select system. As featured on other Audi models, Audi drive select has four operating modes: comfort, auto, dynamic and individual. For the first time, the Audi A6 '11 features yet another operating mode – **efficiency**.

The Audi drive select system is configured in the MMI. The display has been enhanced to include the efficiency mode. The efficiency mode configures the vehicle for fuel efficiency and helps the driver to save fuel.



486_127

Controllable systems

<p>Accelerator/engine Variable characteristic</p> 	<p>Servotronic Variable steering torque</p> 	<p>Dynamic steering Variable steering ratio</p> 	<p>Sport differential Variable transverse distribution</p> 
<p>Curve light Variable swivelling action</p> 			<p>adaptive air suspension Variable ride height and damper rate</p> 
<p>Audi pre sense Variable deployment program</p> 	<p>Air conditioning Reduced operation</p> 	<p>Automatic gearbox Variable shift program</p> 	

486_128

The figure shows the systems in the full specification model.

The trim level dictates which systems are configurable by Audi drive select. As standard, the engine and steering systems on the Audi A6 '11 are controllable by Audi drive select. Optionally, the characteristics of the automatic gearbox, air suspension, dynamic steering, sport differential, curve light, reversible belt tensioners and air conditioning system can be modified by drive select.

In the Audi A6 '11 the last mode setting as well as the settings within individual mode are saved and assigned to the remote control key. The following table summarises the characteristics of each mode.

		efficiency	comfort	auto	dynamic
	Engine	balanced Reduced torque and power	balanced	balanced	sparty
	Automatic gearbox	Selector position "E" optimised for fuel efficiency	Selector position "D" balanced	Selector position "D" balanced	Selector position "S" sparty
	Air suspension	balanced normal ride height with ride height reduction for motorway driving	comfortable normal ride height	balanced normal ride height with ride height reduction for motorway driving	sparty low ride height
	Steering	balanced	comfortable	balanced	sparty
	Dynamic steering	balanced and direct	comfortable and indirect	balanced and direct	sparty and direct
	Sport differential	balanced	balanced	agile	sparty
	Curve light	balanced	comfortable	balanced	sparty
	Reversible seat-belt pretensioners	standard	standard	standard	Adapted deployment threshold
	Air conditioning	reduced	comfort oriented	comfort oriented	comfort oriented



Reference

For information about the control strategy of the air suspension system, refer to Self Study Programme 480 "Audi A7 Sportback – Suspension".

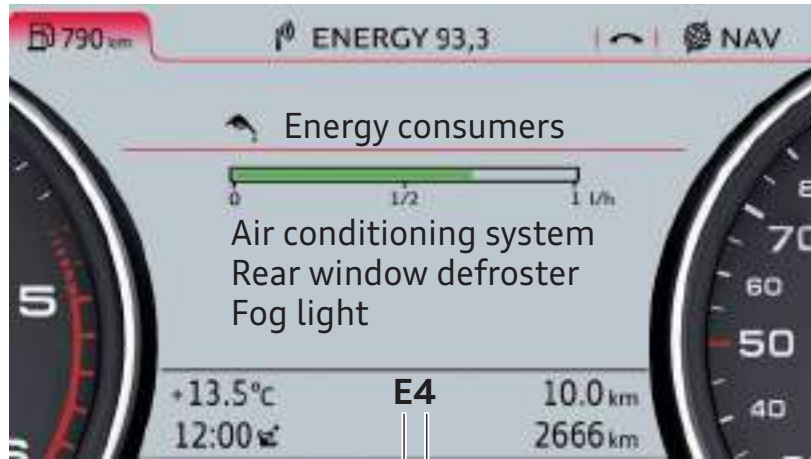
efficiency mode:

In efficiency mode, engine torque and engine power output are reduced. The gearshift characteristic of the automatic gearbox is adapted for optimum fuel efficiency, i.e. upshifts are executed earlier and downshifts later. The air conditioning system operates at a reduced level¹⁾.

In efficiency mode the air suspension, power steering, dynamic steering, curve light and reversible seat-belt tensioners systems use the same characteristic as in auto mode. The sport different, on the other hand, uses the same characteristic as in comfort mode.

Due to the effects of reduced power and torque on vehicle performance, the instrument cluster has a permanent feature which indicates to the driver that the vehicle is running in efficiency mode.

When the vehicle is running in efficiency mode, this is indicated at the bottom of the instrument cluster by an "E" preceding the current selected gear. The other instructions (drive program and gear recommendation) differ depending on whether the vehicle has an automatic gearbox or a manual gearbox.



486_129

Driving programme

Selected gear

Display options for an automatic gearbox.

- comfort mode and auto mode: e. g.: **D4**
- dynamic mode: e. g.: **S4**
- efficiency mode: e. g.: **E4**
- Shift gate on selector lever: e. g.: **M4**

Display options for a manual gearbox.

- comfort, auto and dynamic modes: e. g.: **4**
- efficiency mode: e. g.: **E4**
- Upshift recommendation: e. g.: **4 > 5**

For safety reasons, accelerator pedals with a kick-down function have also been fitted on vehicles with a manual gearbox. When the accelerator pedal reaches the kick-down position, maximum available torque is provided. The efficiency mode is reactivated for the engine and gearbox control unit as soon as the accelerator pedal leaves the kick-down position. The display in the instrument cluster remains unchanged.

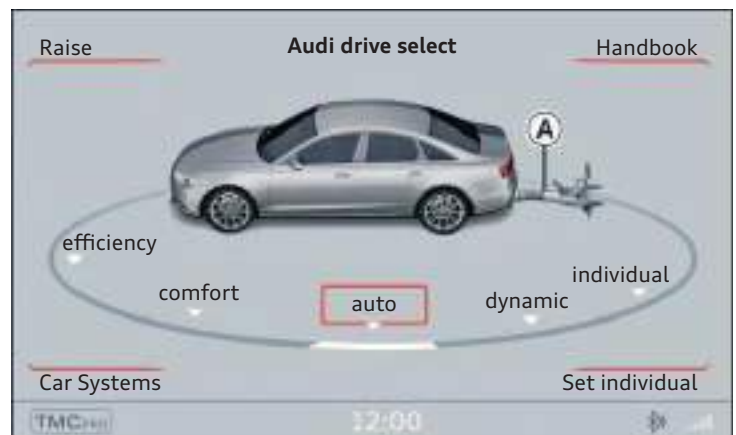
The efficiency mode is not freely configurable in the individual menu. When efficiency mode is selected, the cruise control system responds by reducing acceleration on resumption of the previously set speed. The distance control system requests less nominal acceleration as soon as efficiency mode has been selected.

Trailer mode

If a trailer is automatically detected or if the customer selects trailer mode manually, the Audi drive select menu will display a towbar (A).

During trailer operation:

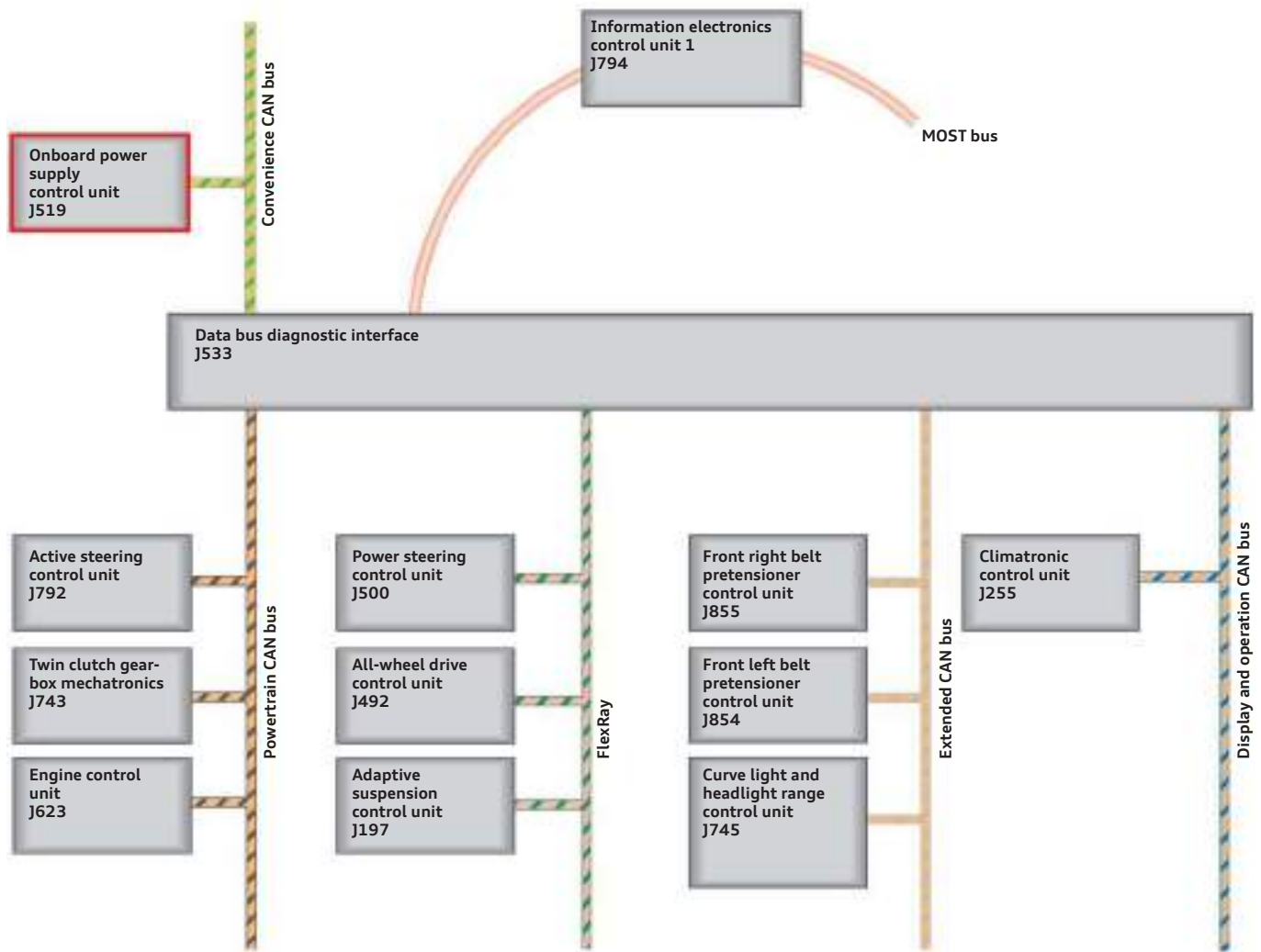
- ▶ efficiency mode is not selectable
- ▶ the sport differential is configured for agility in dynamic mode.



486_131

¹⁾ For detailed information about climate control in efficiency mode, refer to page 68 of this Self Study Programme.

System integration



486_132

The onboard power supply control unit J519 performs the centralised function of Audi drive select. Information electronics control unit 1 reads in the driver input information and transfers this information to the onboard power supply control unit via the MOST bus, the data bus diagnostic interface (gateway) and the convenience CAN bus.

The onboard power supply control unit generates the relevant commands from this information and sends these commands to the gateway via the CAN bus. The gateway distributes these commands via the extended CAN bus, the powertrain CAN bus, the display CAN bus and the FlexRay bus to the control units participating in Audi drive select.

Vehicle electrical system

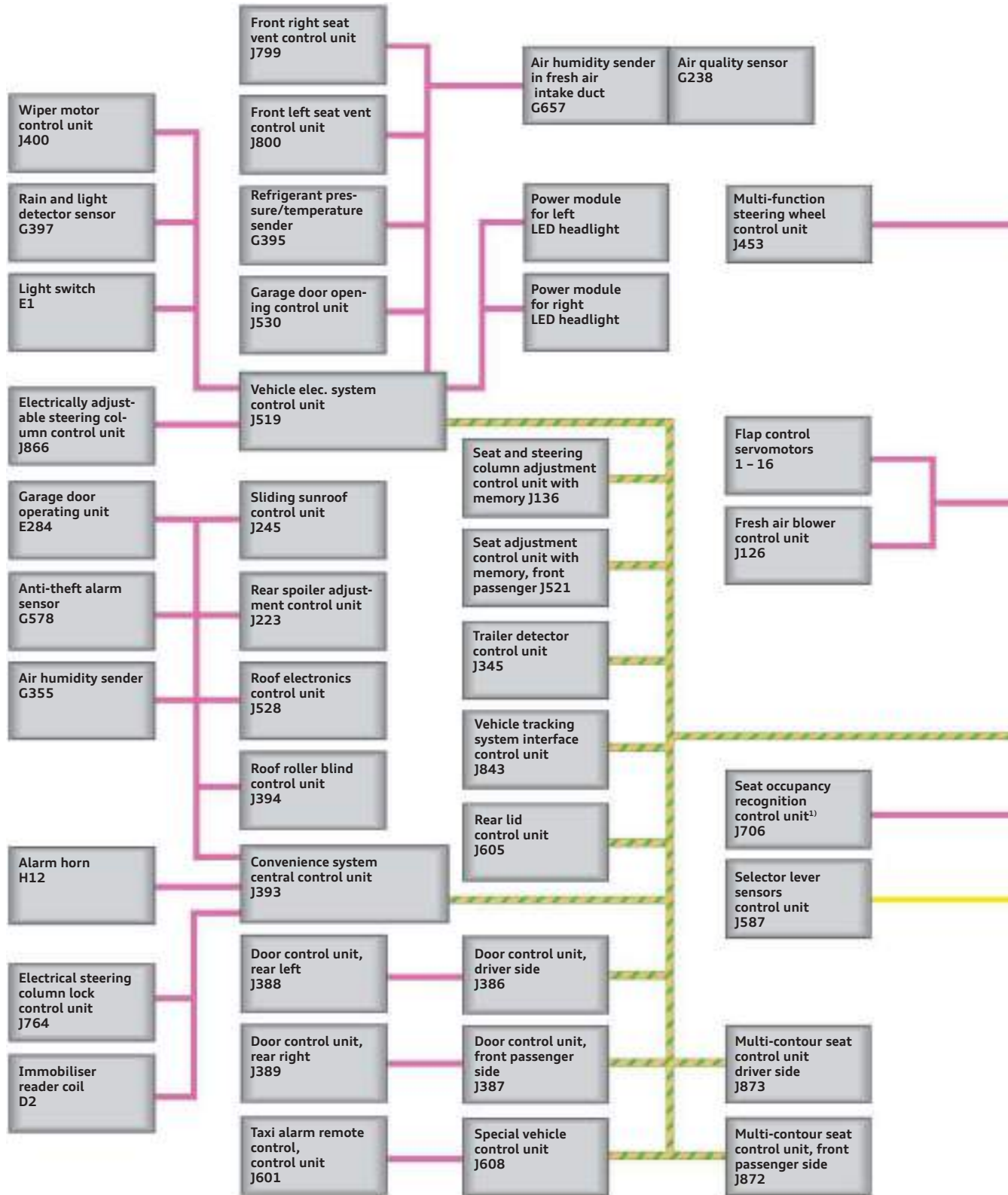
The Audi A6 '11 is the next representative of the C7 series, coming as it does after the Audi A7 Sportback. The electrical systems on both vehicle are identical apart from a few exceptions. Information on the vehicle electrical system, networking, the convenience electronics as well as the control units and their fitting locations, please refer to the Self Study Programmes of the Audi A7 Sportback.

Various systems, such as dynamic steering, the efficiency mode of Audi drive select or the Audi parking system, will be introduced at the launch of the Audi A6 '11 and will also be available for the A7 Sportback from then onwards.

The topology of the control units on the following pages summarises the systems available in the Audi A6 '11. The diagram on pages 46 and 47 shows the topology of a vehicle with full specification. Some of the control units shown here are optional and/or country-specific equipment.

The lighting system of the Audi A6 '11 is different to that of the Audi A7 Sportback. For a description of the design and function of the exterior lighting of the A6 '11, refer to page 48 of this Self Study Programme

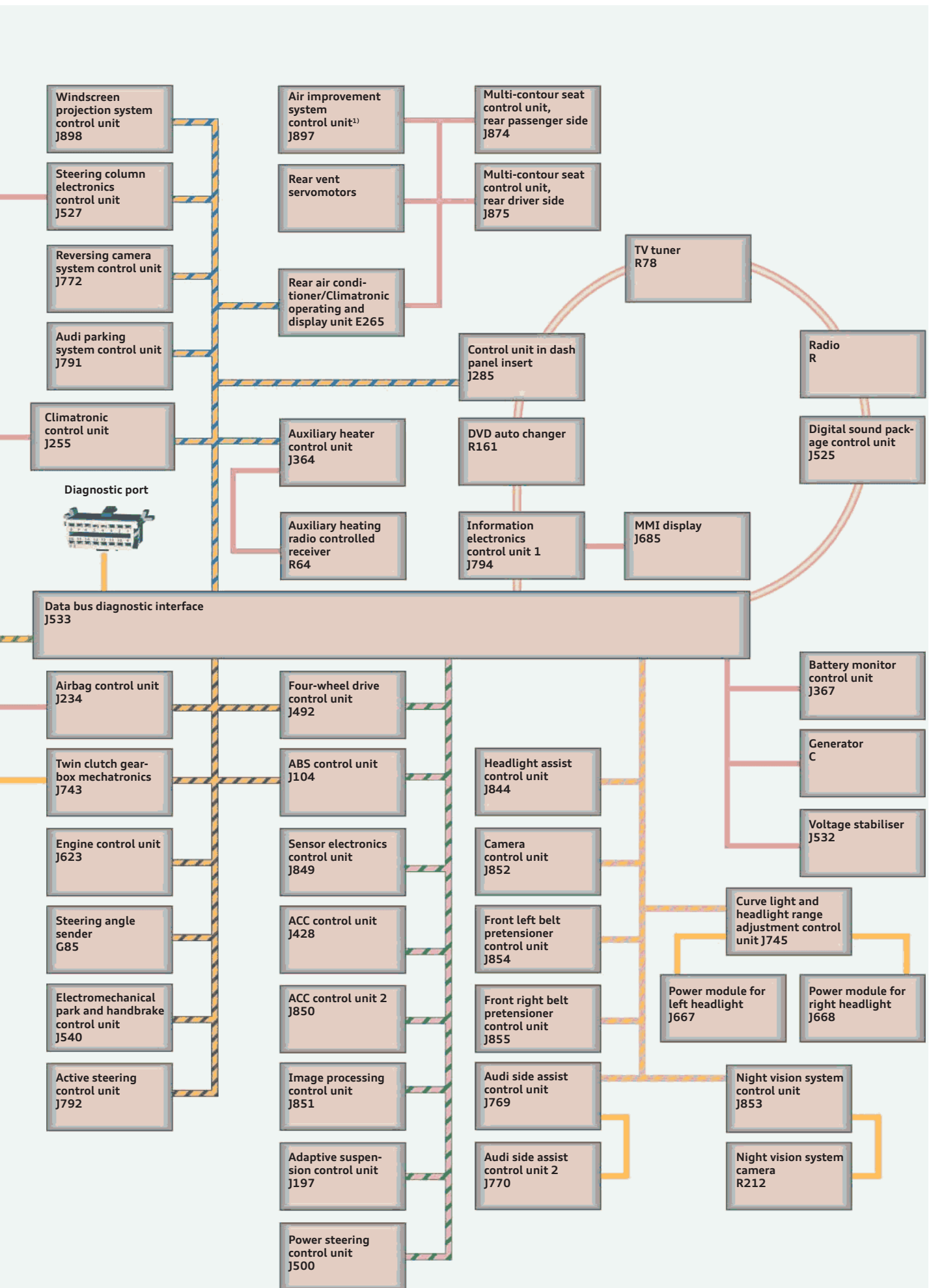
Topology



Legend:

- Powertrain CAN
- Convenience CAN
- Extended CAN
- Display and operation CAN
- Diagnostics CAN
- FlexRay
- MOST bus
- LIN bus
- Sub-bus systems

¹⁾ specific markets only



Exterior lighting

Light switch

Summary	
Designation	Light switch E1
Installation position	Dash panel, driver side
Tasks	To indicate the driver's preferred light setting to the onboard power supply control unit
Diagnostic address	None, LIN slave, measurement values and diagnostics via onboard power supply control unit J519 (master)

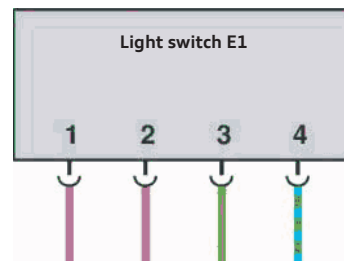


486_048

Electrical connections and circuit

All signals from the switches, buttons and controls integrated in the light switch are read in by the onboard power supply control unit via the LIN line. In addition, the commands for the switch lighting and the warning lamps of the individual functions are sent to the light switch by the onboard power supply control unit. The redundancy line is connected to ground via an electronic circuit inside the switch and serves to validate the switch position.

In the event of a short circuit or open circuit in the LIN line or redundancy line, the emergency light function is activated by the onboard power supply control unit ("dipped beam on") and a diagnostic trouble code is entered in the fault memory of the onboard power supply control unit.



486_094

Terminals:

- Pin 1 LIN (to onboard power supply control unit J519)
- Pin 2 Terminal 30
- Pin 3 Terminal 31
- Pin 4 Redundancy line (to onboard power supply CU J519)

Rotary switch

The rotary switch has four settings:

- 0 Lights off
in some countries the daytime running lights are switched on automatically at "terminal 15 on"
- AUTO The automatic daytime running lights are switched on and off depending on the light sensor (this position is also a prerequisite for the "headlight assist", "intelligent light system" and "coming home / leaving home" functions)



Parking light



Dipped beam



486_095

Control panel

The control panel on the left-hand side of the light switch accommodates up to three touch switches:

- ▶ The upper button can be used to activate either the fog lights (vehicles with halogen headlights) or the all-weather lights (vehicles with bi-xenon or LED headlights).
- ▶ The middle button can be used to activate the night vision assist system.
- ▶ The bottom button is used for switching on the rear fog light.

Due to different equipment specifications and national legislation, control panels differ and do not necessarily have a full complement of touch switches. Only the touch switches for the rear fog light are available on all Audi A6 '11 models.



486_096

Symbols of the touch switches



Fog lights (on vehicles with halogen headlights)



Night vision assist



All-weather light (on vehicles with bi-xenon headlights or LED headlights)



Rear fog light

Rotary control

On the right hand side of the light switch there is a maximum of two rotary controls:

- ▶ Windscreen projection button E736 (head-up display position control) (optional)
- ▶ Switch and instrument lighting control E20 (always fitted)



486_097

Headlight range control adjuster E102

The control for manual headlight range adjustment is installed on the right-hand side adjacent to the light switch on Audi A6 '11 models with halogen headlights.

The control sends its signals directly to both headlight range control servomotors in the headlights.

E102 is not installed in combination with the optional bi-xenon and LED headlights. An automatic headlight range control system is used here.



486_040

E102



Reference

For a description of the design and function of night vision assist system, refer to Self Study Programme 462 "Audi A8 '10 Night Vision Assist". For further information on the head-up display, refer to Self Study Programme 482 "Audi A7 Sportback Head-up Display and Speed Limit Indicator".

Headlight

The Audi A6 '11 is offered with three headlight versions:

- ▶ Halogen headlight
- ▶ Bi-xenon headlight
- ▶ LED headlight

The bi-xenon headlights are available in the following versions:

- ▶ Bi-xenon
- ▶ Bi-xenon with adaptive light (AFS) and "intelligent light system".

Within the headlight version, a distinction is made between the ECE¹⁾ and the SAE²⁾ version in order to meet the various statutory requirements for the lighting systems in the various individual countries.

These two versions differ in terms of the illuminants used or in terms of the drives used by the various light functions.

Halogen headlight



Light functions	Illuminants used	Power
Parking light	Bulb W5W	5 watts
Daytime running light	Bulb H15	15 watts
Turn signal ECE ¹⁾	Bulb PY21W	21 watts
Turn signal SAE ²⁾	Bulb 3457A-S8	30 watts
Dipped beam	Bulb H7	55 watts
Main beam	Bulb H15	55 watts
Fog light (integrated in the bumper, not shown)	Bulb H7	55 watts
coming home / leaving home	Bulb H7 and H15	55 watts and 15 watts
Sidemarker lights ²⁾	3 LEDs	approx. 2 watts

On models with halogen headlights, the fog lights are integrated in the bumper with the result that these models cannot be fitted with adaptive cruise control (ACC) since the installation space for the ACC sensors is occupied by the fog lights.

The daytime running lights and the fog lights are activated for the coming home / leaving home function on models with halogen headlights.

¹⁾ ECE = for the European market

²⁾ SAE = for the North American market

Halogen headlight – component parts

Headlight parts such as caps, repair tabs, screws and vents are replaceable on all headlight versions of the Audi A6 '11. In the halogen headlight, the component parts shown here can be replaced.

To replace the headlight range control servomotor, the headlight housing must be cut open and then re-sealed with a repair cover and seal.



486_031

Activation mechanism

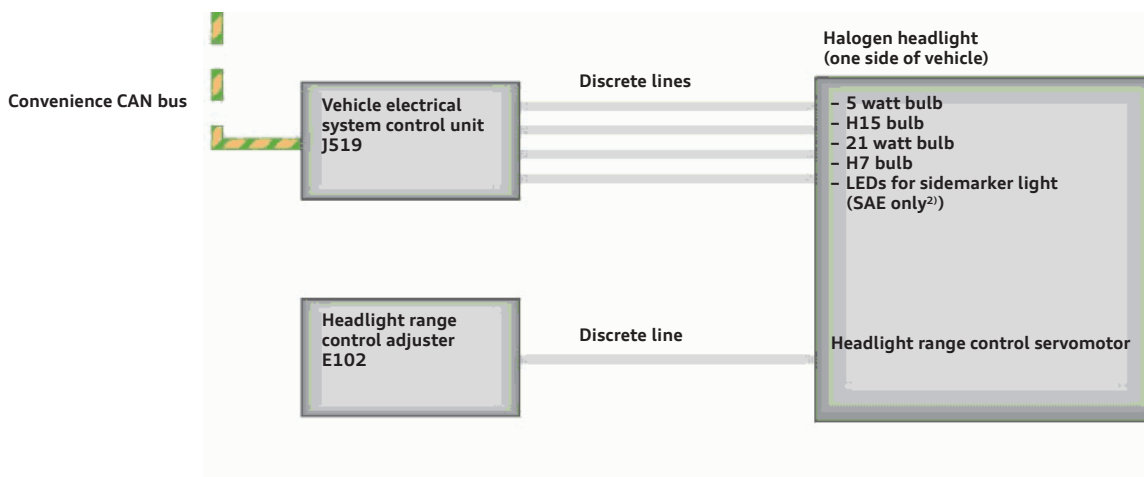
The individual illuminants are activated discretely by the onboard power supply control unit J519.

The headlight range control servomotors are activated directly the headlight range control adjuster E102.

Adaptation for driving on the opposite side of the road

The halogen headlights are adapted for driving on the opposite side of the road by affixing a non-transparent film to the headlight lens. The film is available from parts dealers.

Schematic diagram of the activation mechanism



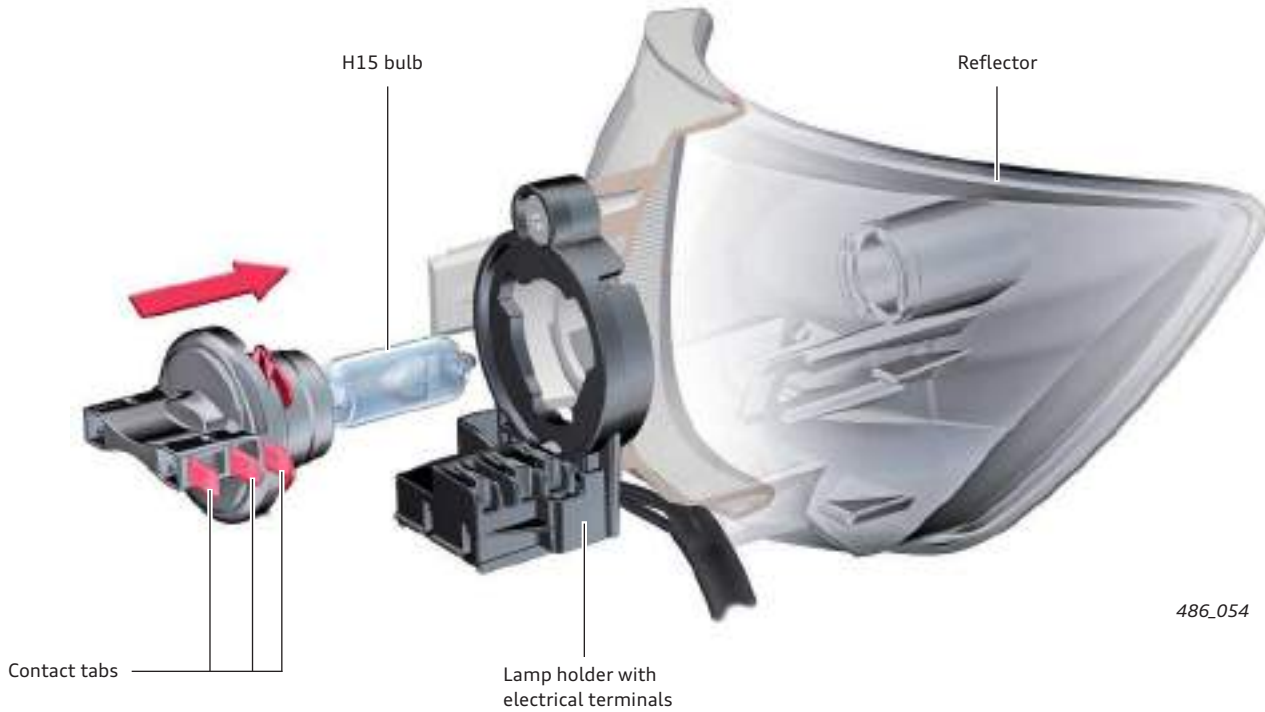
486_098

H15 bulb

In the halogen headlight, an H15 bulb is used for the daytime driving light and main beam functions.

The H15 bulb is a two-filament bulb with a 15 watt filament (daytime driving lights) and a 55 watt filament (main beam).

Three tab contacts projecting from the base of the H15 bulb serve, firstly, to establish the contact and, secondly, as a mechanical stop when inserting the bulb.



A quarter turn clockwise is enough to secure and contact the H15 bulb. No clips or clamps are needed to attach the H15 bulb.

The H15 bulb can be inserted with a simple twist motion. This eases handling, given the increasingly narrow working space inside headlight housings.



Bi-xenon headlight



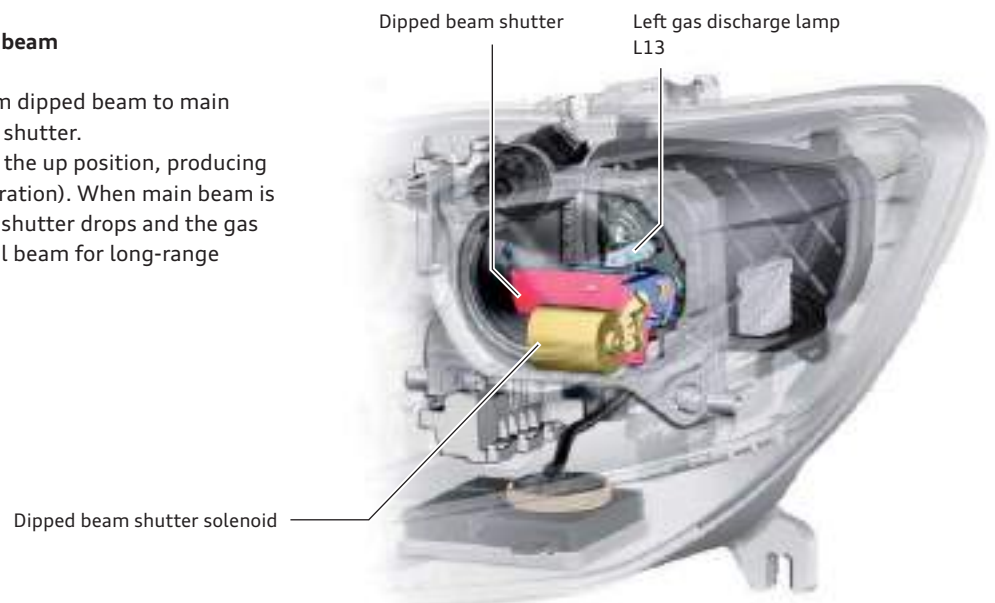
Light functions	Illuminants used	Power
Parking light ECE ¹⁾	2x 2 LEDs dimmed (via 2 plastic optical fibres)	not specified
Parking light SAE ²⁾	2x 3 LEDs dimmed (via 2 plastic optical fibres)	not specified
Daytime running light	2x 3 LEDs (via 2 plastic optical fibres)	not specified
Turn signal ECE ¹⁾	PSY24W bulb	24 watts
Turn signal SAE ²⁾	PSY24W bulb	24 watts
Dipped beam	Gas discharge lamp D3S	35 watts
Main beam		
All-weather light ^{1), 3)}	Bulb H7	55 watts
coming home / leaving home	2x 2 LEDs and gas discharge lamp D3S	not specified
Sidemarkers lights ²⁾	3 LEDs	approx. 2 watts

The all-weather light function is available for vehicles with bi-xenon headlights or LED headlights. On these models, the installation space for the ACC sensors is free, allowing adaptive cruise control (ACC) to be implemented.

The parking lights are used in combination with the dipped beam for the coming home / leaving home function.

Switching from dipped beam to main beam

The bi-xenon headlight is switched from dipped beam to main beam by means of a solenoid-actuated shutter. In its normal position, the shutter is in the up position, producing an asymmetric dipped beam (see illustration). When main beam is selected, the solenoid is activated, the shutter drops and the gas discharge lamp produces a symmetrical beam for long-range visibility.



¹⁾ ECE = for the European market

²⁾ SAE = for the North American market

³⁾ Due to statutory requirements, no all-weather light function is available for the SAE version of the bi-xenon headlight. Therefore, no bulb is fitted in this position in the SAE version.

486_066

Bi-xenon headlight – component parts

In the bi-xenon headlight, the component parts shown here can be replaced.

The LEDs and the plastic optical fibres for the parking light / daytime running light functions are not replaceable on the Audi A6 '11.



Activation mechanism

The daytime running light / parking light control unit, the gas discharge lamp control unit, the H7 bulb and the 24 watt bulb are activated discretely by the onboard power supply control unit J519.

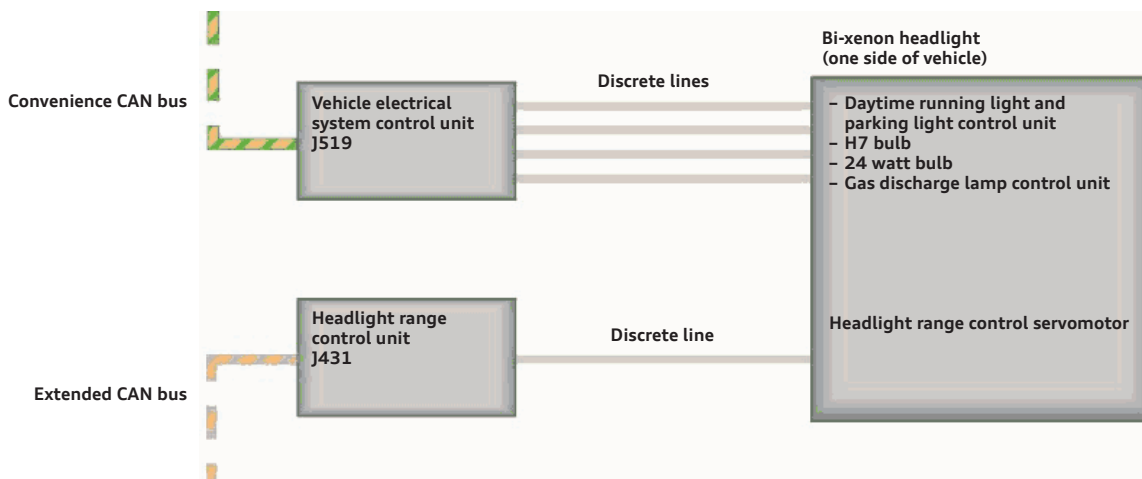
The headlight range control system is activated discretely by the headlight range adjustment control unit J431.

Adaptation for driving on the opposite side of the road

Headlights can be adapted for driving on the opposite side of the road via the MMI. In the "CAR" menu, the setting "Lights for driving on left" or "Lights for driving on right" can be selected under the menu option "Exterior lighting".

This adjustment is made by lowering the light level via the headlight range control servomotors.

Schematic diagram of the activation mechanism



Bi-xenon headlight with adaptive light



Light functions	Illuminants used	Power
Parking light ECE ¹⁾	2x 2 LEDs dimmed (via 2 plastic optical fibres)	not specified
Parking light SAE ²⁾	2x 3 LEDs dimmed (via 2 plastic optical fibres)	not specified
Daytime running light	2x 3 LEDs (via 2 plastic optical fibres)	not specified
Turn signal ECE ¹⁾	PSY24W bulb	24 watts
Turn signal SAE ²⁾	PSY24W bulb	24 watts
Country road light	Gas discharge lamp D3S	35 watts
Motorway light ¹⁾		
Main beam		
Town light ¹⁾		
All-weather light ¹⁾		
Cornering light	Bulb H7	55 watts
Intersection light ^{1), 3)}		
coming home / leaving home	2x 2 LEDs and gas discharge lamp D3S	not specified
Sidemarker lights ²⁾	3 LEDs	approx. 2 watts

The all-weather light function is available for vehicles with bi-xenon headlights and adaptive light. On these models, the installation space for the ACC sensors is free, allowing adaptive cruise control (ACC) to be implemented.

The all-weather light is produced here by the gas discharge lamp. In this headlight version, the H7 bulb is used only for the static cornering light.

In the SAE version, the light functions of motorway light, town light, all-weather light and intersection light are not permitted. Consequently, the full potential of the headlight is not utilised in this version.

The parking lights are used in combination with the dipped beam for the coming home / leaving home function.

¹⁾ ECE = for the European market

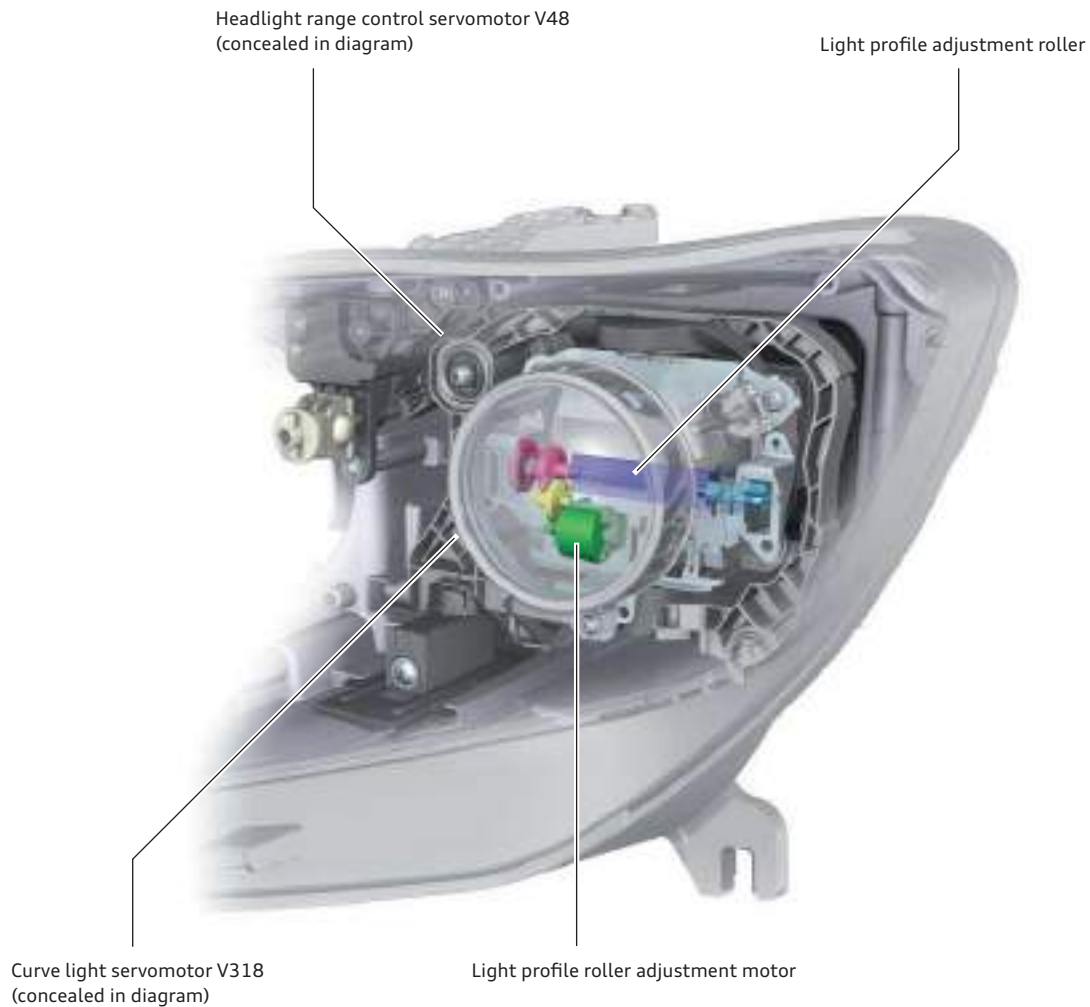
²⁾ SAE = for the North American market

³⁾ only for models equipped with a navigation system

Implementation of different light functions

In bi-xenon headlights with adaptive light, a rotating roller is fitted in the headlight between the gas discharge lamp and the lens. The roller has different contours around its circumference. The various light profiles can be implemented by rotating the roller with an adjustment motor.

The complete projection module consisting of the gas discharge lamp, roller and lens can be moved in a horizontal and vertical direction by two other servomotors. The vertical motion allows headlight range adjustments to be made. The horizontal swivel function is utilised for the curve light.



486_035



Note

It is not possible to list and describe in this Self Study Programme all applicable statutory regulations and exemptions (which are subject to ongoing change). At the time of going to press of this SSP, for example, variable light distribution and adaptation of the light-dark boundary to the ambient conditions were not permitted by law in South Korea, Japan, USA, Canada, China and "Rest of Asia". Furthermore in these countries, the adaptive light is currently limited to dynamic swivelling without town and motorway light functions.



Reference

For a description of the light functions of the bi-xenon headlight and the bi-xenon headlight with adaptive light, refer to Self Study Programme 481 "Audi A7 Sportback Onboard Power Supply and Networking".

Bi-xenon headlights with adaptive light – component parts



Activation mechanism

The daytime running light / parking light control unit, the gas discharge lamp control unit, the H7 bulb and the 24 watt bulb are activated discretely by the onboard power supply control unit J519.

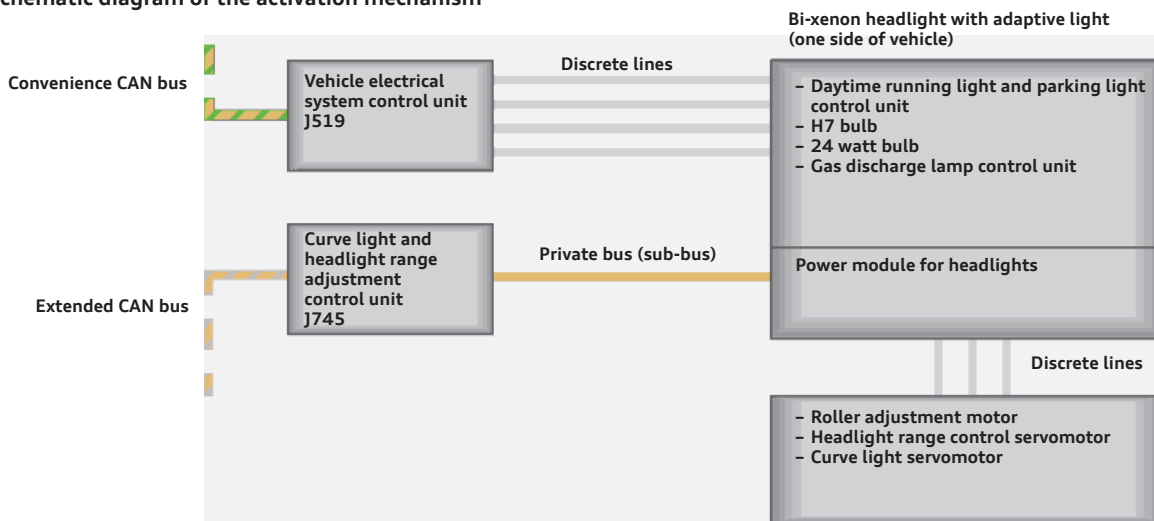
The curve light and headlight range adjustment control unit activates the power module for the headlights via a private CAN bus. This module activates the roller adjustment motor, the headlight range control servomotor and the curve light servomotor via discrete lines.

Adaptation for driving on the opposite side of the road

Headlights can be adapted for driving on the opposite side of the road via the MMI. In the "CAR" menu, the setting "Lights for driving on left" or "Lights for driving on right" can be selected under the menu option "Exterior lighting".

The headlights are changed over by turning the roller through 180°. In this way, the headlights can be changed over completely from left-hand to right-hand driving, i.e. asymmetric illumination of the road is changed over to the other lane. On models with a navigation system, this changeover can be performed automatically when crossing the border into a country where the traffic drives on the opposite side of the road.

Schematic diagram of the activation mechanism



486_100

Bi-xenon headlights with adaptive light and "intelligent light system"

The design and component parts are identical to those of the bi-xenon headlights with adaptive light.

The "intelligent light system" function also requires the camera control unit J852 in order to monitor the actual traffic situation, i.e. oncoming vehicles, vehicles ahead and built-up areas.

This allows the headlights to "float" between dipped beam and main beam by continuous adjustment of the roller, rather than switching over in an entirely speed-dependent manner.

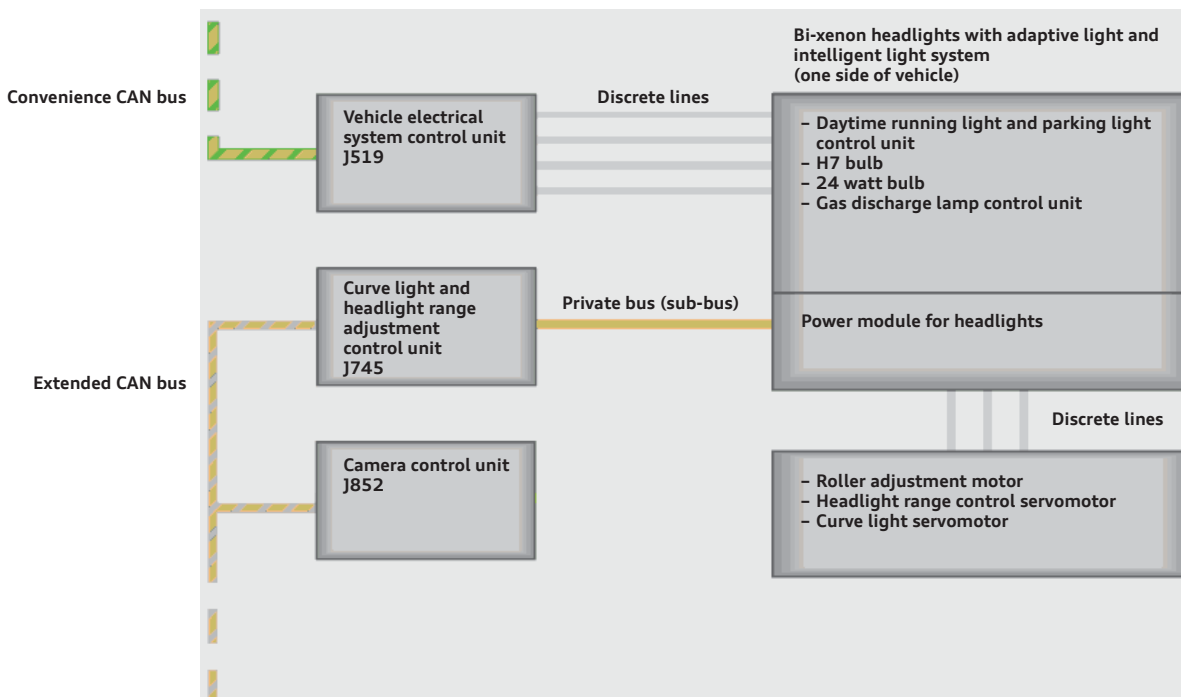
Summary

Designation	Camera control unit J852
Installation position	on the windscreen, above the base of the interior rear-view mirror
Tasks	<ul style="list-style-type: none"> ▶ Intelligent light system ▶ Audi lane assist
Diagnostic address	85



486_101

Schematic diagram of the activation mechanism



486_102



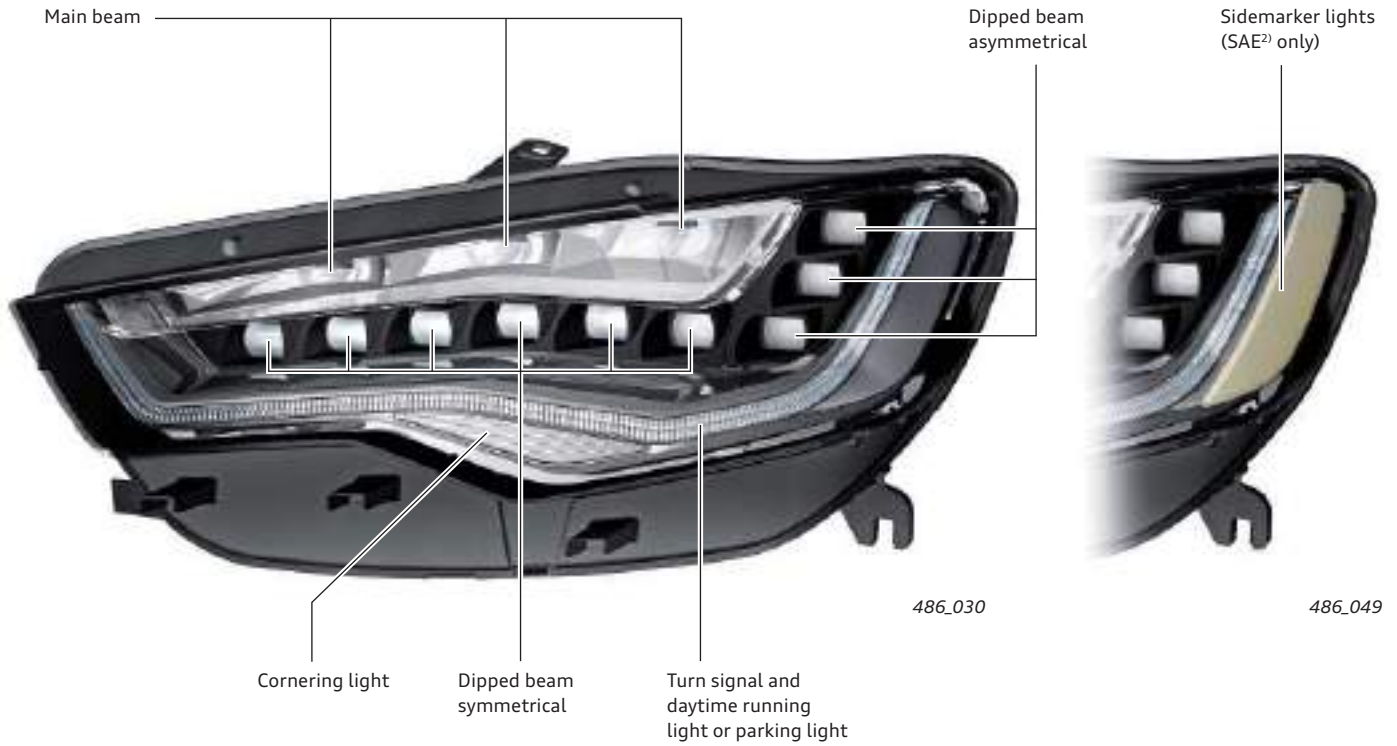
Reference

For a description of the design and function of "intelligent light system", refer to Self Study Programme 461 "Audi A8 '10 Driver Assistance Systems".

LED headlight

The LED headlight of the Audi A6 '11 uses LEDs for all light functions. An LED headlight accommodates a total of 54 LEDs (or 57 in the SAE²⁾ version) together with the accompanying heat sinks. A fan integrated in the headlight prevents the electronic components from overheating.

Reflectors or projection modules are used depending on light function. Thick wall technology is used for daytime running lights, parking lights and turn signals in order to ensure that these light functions have a homogeneous appearance.



LED headlight – light functions

Light functions	Illuminants used
Parking light	24 LEDs (white, dimmed)
Daytime running light	24 LEDs (white)
Turn signal ECE ¹⁾ (activated by power module 2)	24 LEDs (yellow)
Turn signal SAE ²⁾ (activated by power modules 2 and 4)	2x 12 LEDs (yellow)
Dipped beam	14 LEDs (5 dual-LED chips and 4 single LEDs)
Main beam	12 LEDs (1 4-LED chip, in addition to dipped beam)
Motorway light	14 LEDs (5 dual-LED chips and 4 single LEDs)
Cornering light (one side)	4 LEDs (1 4-LED chip, in addition to dipped beam)
All-weather light (both sides)	4 LEDs (1 4-LED chip, in addition to dipped beam (reduced by 2 LEDs))
Tourist light (for driving on opposite side of road)	6 LEDs
coming home / leaving home	14 LEDs (5 dual-LED chips and 4 single LEDs)
Sidemarker lights ¹⁾	3 LEDs (white, with yellow reflector lens)

The all-weather light function is available for vehicles with LED headlights. On these models, the installation space for the ACC sensors is free and adaptive cruise control (ACC) is available.

In the SAE version, the 24 LEDs are subdivided into two groups of 12 LEDs for the turn signals and are activated by power modules 2 and 4. The reason for this is the higher current applied to the LEDs due to statutory requirements.

¹⁾ ECE = for the European market

²⁾ SAE = for the North American market



486_103

Daytime running light / parking light

The daytime running light and parking light are produced by 24 white LEDs. They are activated by a pulse width modulated (PWM) signal. The LEDs are dimmed for the parking light function.



486_104

Turn signal

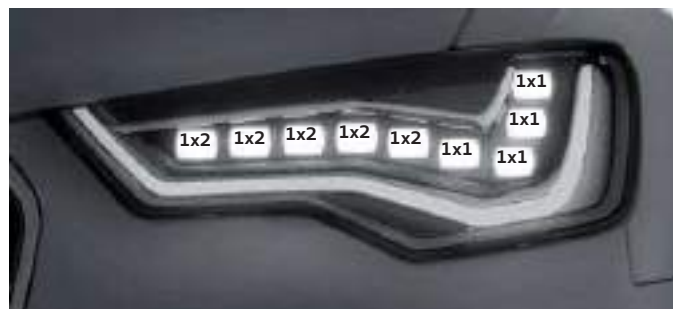
The turn signal is produced by 24 yellow LEDs. When a turn signal is activated, the LEDs of the daytime running lights are switched off.



486_105

Dipped beam

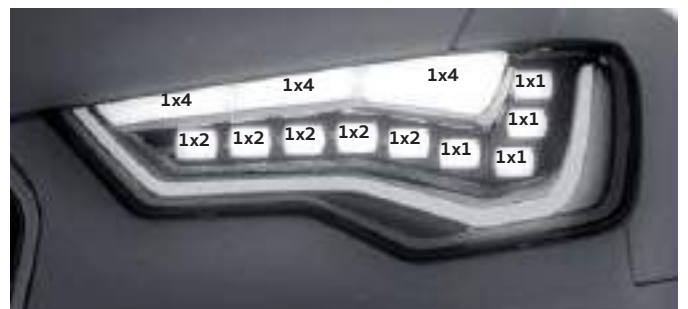
The dipped beam is produced by nine projection modules with a total of 14 LEDs. The LEDs of the daytime running lights are dimmed to parking light level.



486_106

Main beam

For the main beam function, three 4-LED chips are activated in addition to the LEDs of the dipped beam and the parking lights. The main beam can be activated with the main beam stalk or by the main beam assist function.



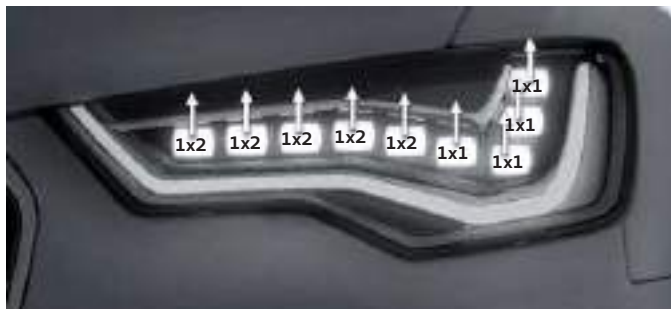
486_107

¹⁾ ECE = for the European market

²⁾ SAE = for the North American market

Motorway light

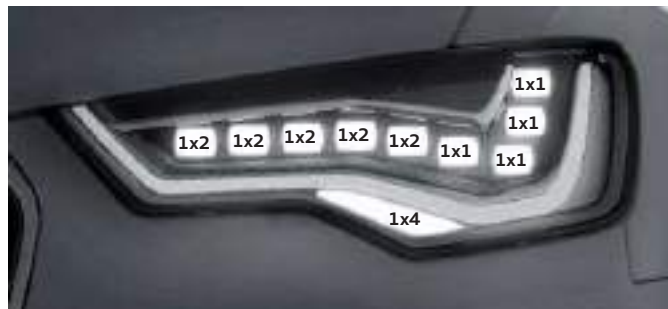
For the motorway light, the light-dark boundary of the dipped beam is raised by the headlight range adjustment servomotor. The motorway light is activated when the speed is higher than 110 kph for an extended period of time or immediately if 140 kph is exceeded.



486_108

Cornering light

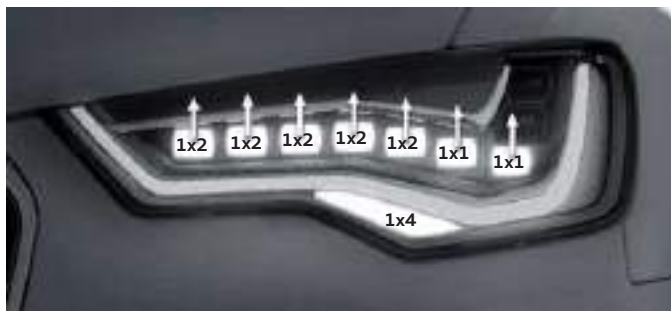
For the cornering light, a 4-LED chip below the parking lights is activated in addition to the dipped beam function. These LEDs have a reflector which illuminates the side area of the vehicle when turning a corner. A prerequisite for this is that either a turn signal is activated and the vehicle is travelling at a speed of less than 40 kph or heavy steering lock is applied at a speed of less than 70 kph.



486_109

All-weather light

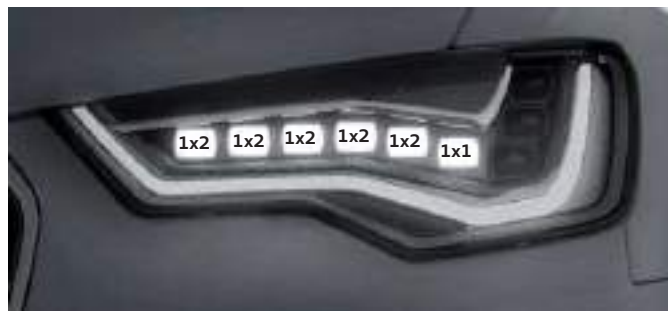
For the all-weather light function, which is activatable by a button in the light switch, 7 of the 9 dipped beam modules are powered and raised slightly by the headlight range control system. In addition, the dipped beam LEDs on both sides are activated. The upper two dipped beam LEDs stay switched off. This means that, when driving in the fog and rain, light reflection against water droplets is reduced and self-dazzling is prevented.



486_110

Tourist light

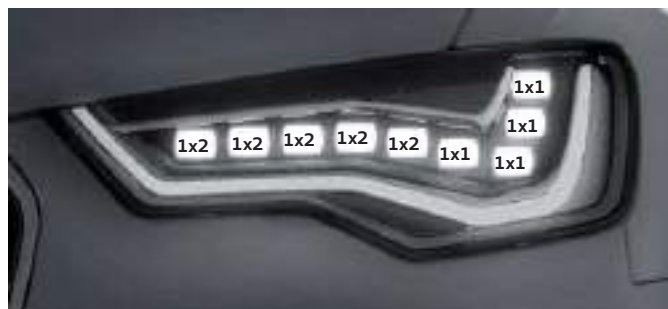
The purpose of the tourist light (adjustable via the MMI) is to prevent dazzling of oncoming traffic when driving in countries in which the traffic drives on the opposite side of the road to one's home country. The dipped beam function is used for this purpose, and the three LEDs for the asymmetric part of the dipped beam stay switched off.



486_111

coming home / leaving home

The dipped beam is used for the coming home / leaving home functions. These functions are activated either when the driver exits the vehicle by opening the driver door or when the central locking is unlocked with the remote control key. Prerequisites for this are that the light switch is in the "AUTO" position, the rain and light detector sensor detects "dark" and both functions are enabled in the MMI (lights "on" when leaving / lights "on" when unlocking).



486_112

²⁾ SAE = for the North American market

LED headlight – component parts

In the LED headlight, the component parts shown here can be replaced.

LED clusters or individual LEDs are not replaceable on the LED headlight of the Audi A6 '11.

Power module 2 for left LED headlight (parking light/daytime running light, turn signal) A32



Power module 3 for left LED headlight (cornering light) A33

Power module 4 for left LED headlight (SAE only²⁾) (turn signal 2) A34



Left headlight fan V407

Power module 1 for left LED headlight (dipped beam, main beam, motorway light) A31

Left headlight range control servomotor V48



The illustration shows the SAE²⁾ version of the LED headlight

486_034

Activation mechanism

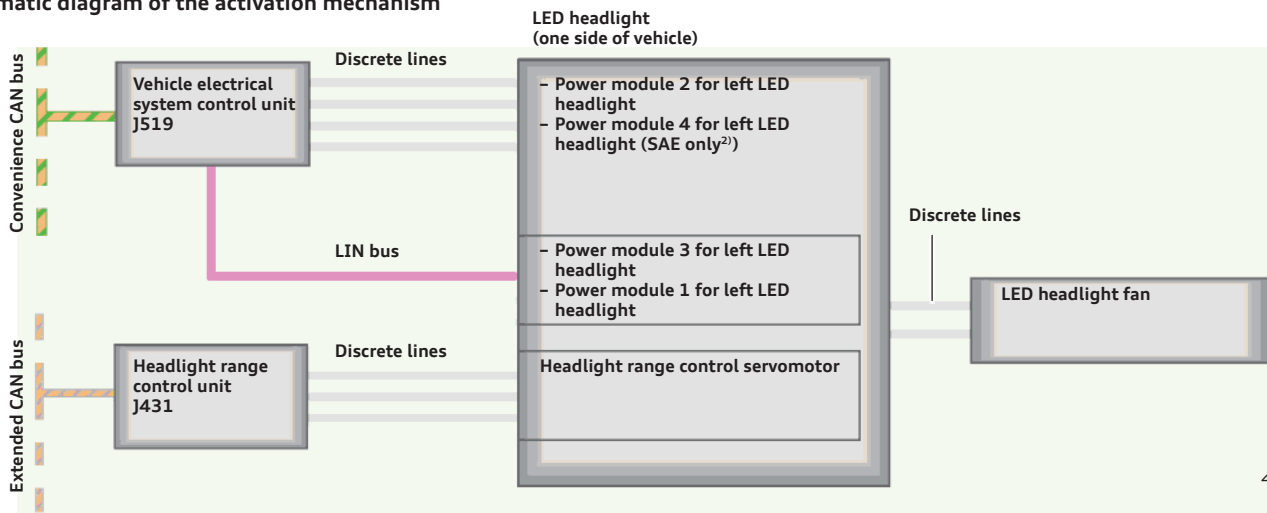
Power modules 2 and 4 are activated by the onboard power supply control unit J519 via discrete lines. Power modules 1 and 3 are LIN slaves of the onboard power supply control unit J519. Power module 1 A31 controls the fan in the LED headlight via discrete lines. The fan is activated at "terminal 15 on" and runs continuously until terminal 15 is deactivated again.

Adaptation for driving on the opposite side of the road

Headlights can be adapted for driving on the opposite side of the road via the MMI. In the "CAR" menu, the setting "Lights for driving on left" or "Lights for driving on right" can be selected under the menu option "Exterior lighting".

This adjustment is made by deactivating LEDs (see figure on page 61).

Schematic diagram of the activation mechanism



486_113



Note

ESD protection must be ensured during all work on the headlights, particularly when replacing internal components. Workshop equipment VAS 6613 is available for this purpose.

Tail lights

The tail lights of the Audi A6 '11 are basically available in two different versions:

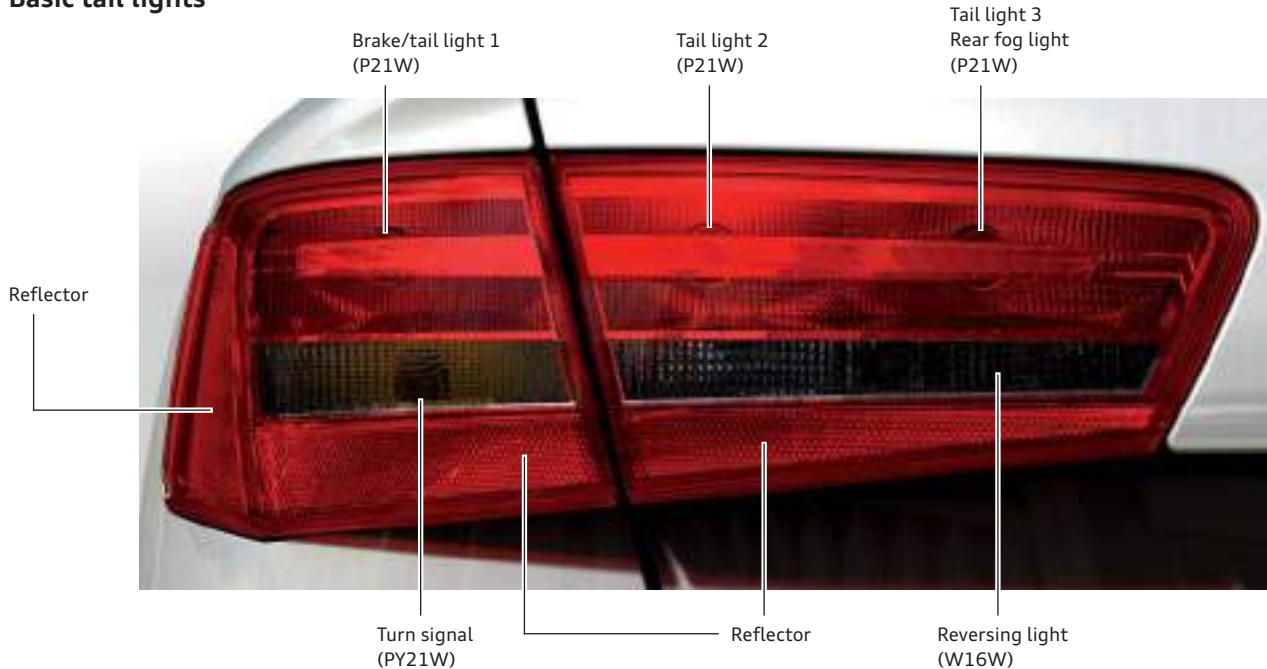
- ▶ Basic tail lights
- ▶ LED tail lights

The basic tail lights are only available in the ECE¹⁾ version, the LED tail lights in the ECE¹⁾ version and SAE²⁾ version.

The tail lights of the Audi A6 '11 consist of two parts per side of the vehicle: a light module in the side wall and another in the boot lid.

The P21W bulbs are activated by a pulse width modulated signal generated the convenience system central control unit J393, this signal differing according to light function.

Basic tail lights



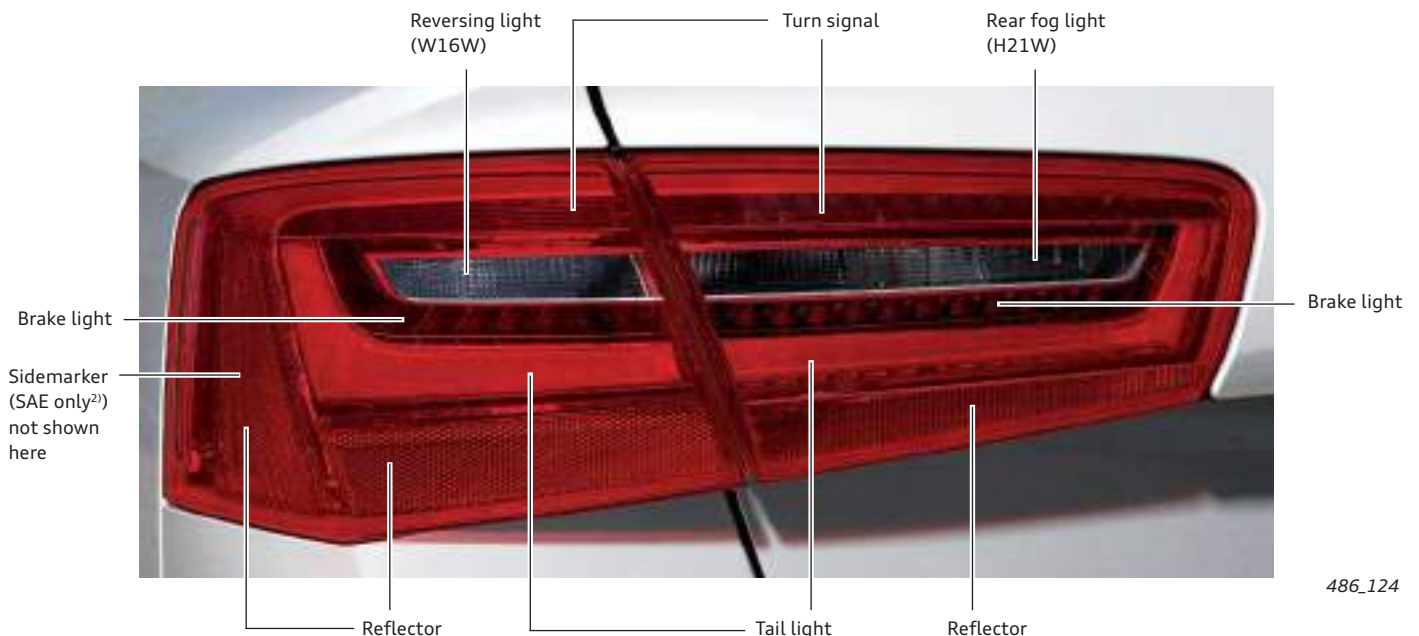
486_125

LED tail lights

All functions utilise LED technology. The sole exceptions are the reversing light, which has a 16 watt bulb, and the rear fog light, which has a 21 watt halogen bulb.

The tail lights come in two different versions - an ECE¹⁾ version and an SAE²⁾ version. In the SAE²⁾ version, the LEDs are red only, and are activated differently to the ECE¹⁾ lights due to statutory requirements.

Externally, the lights are identical. The tail light functions are activated by the convenience system central control unit J393. LEDs or electronics of the tail lights cannot be replaced. It is only possible to replace the two bulbs after removing each light



486_124

LED tail lights in night design

ECE¹⁾

Tail light

The tail light in both versions is produced by a total of 30 LEDs, there being 12 LEDs in the side light and 18 in the boot lid light.



486_116

SAE²⁾

The LEDs are also fitted with a fibre optic cable in order to create the impression of a continuous light strip from all perspectives. The only difference between this and the ECE version: the side-marker.



486_117

Brake light and tail light

In the ECE version, the brake light is produced by activating 25 LEDs - 10 in the side light and 15 in the boot lid light.



486_118

In the SAE version, the brake light is produced by 45 LEDs in all.



486_119

Turn signal and tail light

When a turn signal flashes, 10 yellow LEDs in the side light and 18 LEDs in the boot lid light are lit.



486_120

In the SAE version, the turn signal is produced by 45 LEDs, which are also used for the brake light function.



486_121

¹⁾ ECE = for the European market

²⁾ SAE = for the North American market

ECE¹⁾

Rear fog light, tail light and brake light

The rear fog light is produced by using a 21 watt halogen bulb in the boot lid light. If braking is applied while the rear fog light is active, only the LEDs for the brake light in the side light are activated in both versions.



486_122

SAE²⁾

This measure allows a clear distinction to be made between both light functions, while also assuring the statutory minimum distance between the brake light functions and the fog light function.



486_123

Light functions not shown

Reversing light

A 16 watt bulb is used for the reversing light. The reversing light function is implemented only the side light.

Emergency braking signal³⁾

In an emergency braking situation, the brake light initially flashes at a frequency of 3 Hertz until the vehicle comes to a standstill, after which the warning flashers are activated.

The trigger for an emergency braking signal need not always have to be the driver pressing the brake pedal, but can also be actuating the parking brake or a corresponding command from the cruise control system.

High-level brake light

Irrespective of tail light version, all Audi A6 '11 models have a high-level brake light at the top edge of the rear window. This light comprises a total of 18 LEDs and assists the brake light function.

However, other requirements also have to be met at the time of triggering, e.g. a driving speed of over 60 kph, a pre-defined brake pressure or deceleration value (depending on the coefficients of friction between the road and the tyres), ABS engagement at a minimum of two wheels, one of which at least must be a front wheel.

If these criteria are met, the ABS control unit J104 sends an emergency braking signal via the data bus. The convenience system central control unit J393 receives this signal and then activates the tail lights accordingly. At present, this function cannot be tested using standard workshop equipment.

Light functions	ECE version ¹⁾	SAE version ²⁾
Tail light	30x LED	30x LED and 2x LED for sidemarker
Brake light	25x LED	45x LED and 2x LED for sidemarker
Turn signal	20x LED (yellow)	45x LED and 2x LED for sidemarker
Rear fog light	1x H21W, 21 watts	1x H21W, 21 watts
Reversing light	1x W16W, 16 watts	1x W16W, 16 watts
High-level brake light	18x LED	18x LED
Sidemarker light (SAE only ²⁾)	-	2x LED

¹⁾ ECE = for the European market

²⁾ SAE = for the North American market

³⁾ not approved for use in all countries.

Air conditioning

Versions of the air conditioning system

The interior air conditioning of the Audi A6 '11 is based on the technology of the Audi A7 Sportback. It was designed with the aim of enhancing comfort while simultaneously reducing energy consumption and weight. Audi offers Audi A6 '11 customers a choice of two or four zone automatic air conditioning.

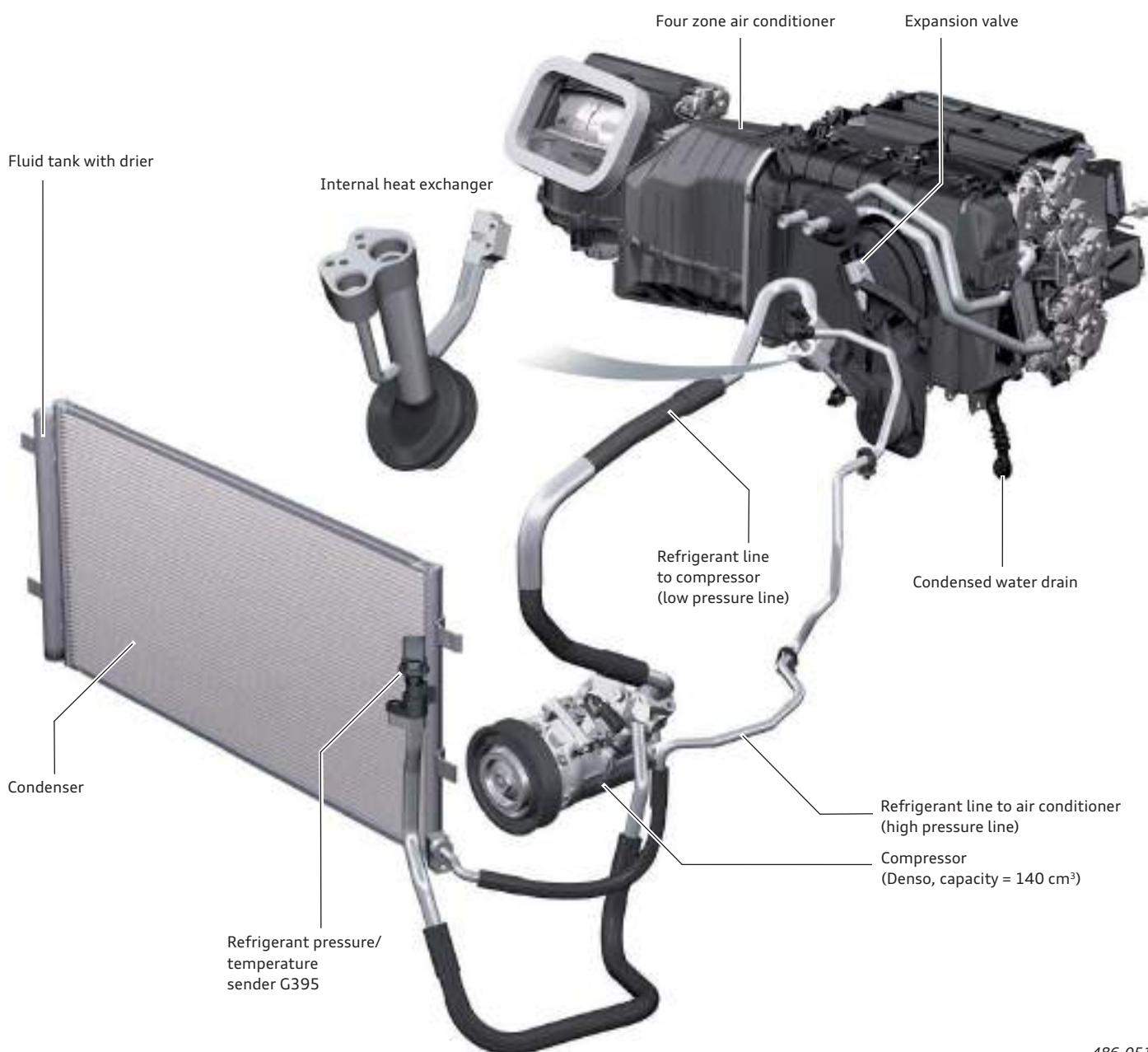
The Audi A6 '11 has as standard a two zone automatic air conditioning system, with separate temperature controls as well as central air flow and distribution control.

Four zone automatic air conditioning is optional. With this system, the rear passengers can set air outlet temperatures, air flow and distribution to suit their personal preferences.

Refrigerant circuit

The refrigerant circuit has only one evaporator, even in vehicles with four-zone automatic air conditioning.

The system has an internal heat exchanger and is controlled by means of an expansion valve.



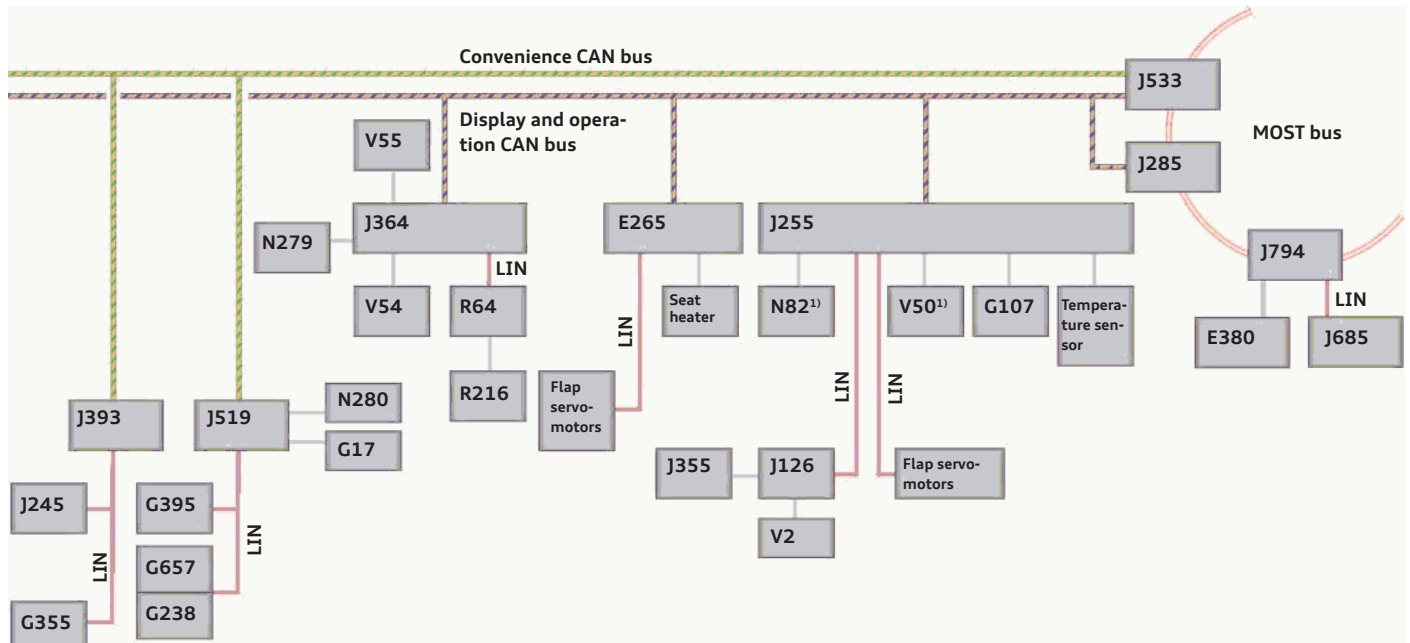
486_051

Topology

The network structure of the air conditioning system is based on that of the Audi A7 Sportback. The air conditioning system requires humidity sensors G355 and G657 for humidity management. Sensor G355 is used inside the occupant cell as a dew sensor for detecting incipient fogging of the windows as well as measuring the relative humidity - a parameter relevant to comfort.

AC compressor output can thus be reduced as required. The air humidity sensor in fresh air duct G657 is used to measure the energy content of the intake ambient air. The air conditioning system is able to take in air with a lower energy content, thus reducing the load and power consumption of the refrigerant circuit.

Topology of the air conditioning system of a vehicle for ECE markets



486_052

Legend:

E265 Rear air conditioner/Climatronic operating and display unit	J519 Vehicle electrical system control unit
E380 Multimedia system operating unit	J533 Data bus diagnostic interface (gateway)
G17 Ambient temperature sensor	J685 Front information display unit
G107 Sunlight photosensor	J794 Information electronics control unit 1
G238 Air quality sensor	N82 Coolant shutoff valve
G355 Air humidity sender	N279 Heater coolant shut-off valve
G395 Refrigerant pressure/temperature sender	N280 Air conditioning compressor regulating valve
G657 Air humidity sender in fresh air intake duct	R64 Auxiliary heating radio controlled receiver
J126 Fresh air blower control unit	R216 Roof aerial
J245 Sliding sunroof control unit	V2 Fresh air blower
J255 Climatronic control unit	V50 Coolant run-on pump
J285 Control unit in dash panel insert	V54 Metering pump
J355 Solar operation control unit	V55 Recirculation pump
J364 Auxiliary heater control unit	
J393 Convenience system central control unit	

¹⁾ not installed in models with optional seat heater



Reference

For further information about the design and functions of the air conditioning system, refer to Self Study Programme 484 "Audi A7 Sportback Occupant Protection, Infotainment, Air Conditioning".

efficiency mode

In the Audi A6 '11, the customer can select the efficiency mode in the MMI via Audi drive select. The air conditioning system is then configured for optimal fuel economy. In efficiency mode, the AC mode "eco" is automatically activated.

When the AC mode "eco" is activated, the air conditioning system switches over to an energy-optimised operating range within temperature thresholds compatible with the occupants. The air conditioning system operates at a reduced level.

Within the temperature range from approx. $-5\text{ }^{\circ}\text{C}$ to $+20\text{ }^{\circ}\text{C}$, the system attempts to set the interior climate desired by the occupant without the supplementary heater or with reduced additional heating and/or with low compressor output, or with the compressor entirely switched off.

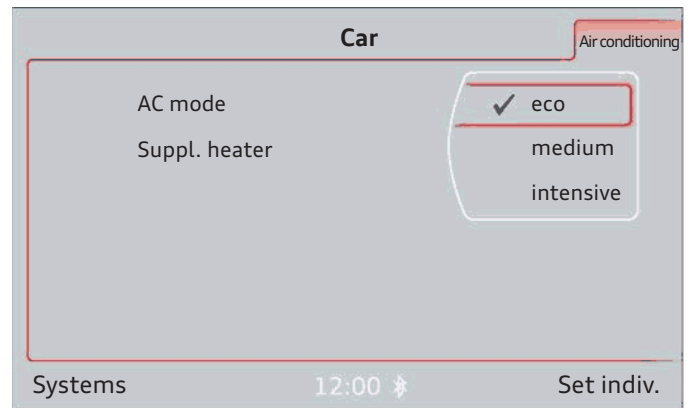
Deselecting the AC mode "eco"

If desired, the customer can change the AC mode via the MMI (see figure on right). If the customer exits the automatically activated AC mode "eco" in efficiency mode, the air conditioning system is reconfigured for optimal comfort and thus leaves the consumption-optimised state.

The AC modes can be implemented differently depending on country.

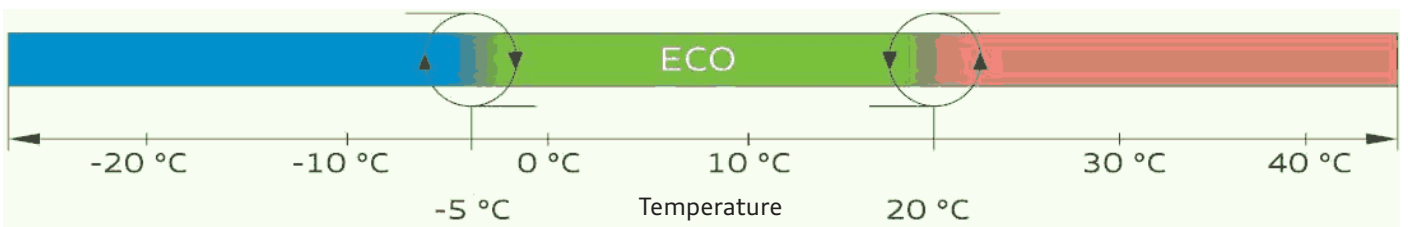
Effects on the air conditioning system

- ▶ Switching to the AC mode "eco"
- ▶ AC compressor and supplementary heater is set to reduced output or deactivated if the ambient conditions permit (for example, at a moderate ambient temperature of $+15\text{ }^{\circ}\text{C}$ and a relative humidity level of 30 %)
- ▶ When the engine is shut off by the start-stop system, the limits for the permissible air outlet and interior temperature values (comfort) are extended so that the engine starts later, resulting in longer stop phases and potentially higher fuel economy.
- ▶ The Innovative Thermal Management (ITM) system primarily controls heating of the gearbox (and therefore, secondarily, heating of the vehicle interior)



486_053

Effects of AC settings when efficiency mode is activated



Default settings at low temperatures

- ▶ Supplementary heater activated
- ▶ Compressor deactivated
- ▶ The functional range of the start-stop system is limited by the air conditioning system

AC mode "eco"

- ▶ Supplementary heater may be inactive
- ▶ Compressor may be inactive
- ▶ The functional range of the start-stop system is limited by the air conditioning system (longer stop phases)

Default settings at high temperatures

- ▶ Supplementary heater deactivated
- ▶ Compressor activated
- ▶ The functional range of the start-stop system is limited by the air conditioning system

Limits of consumption-optimised AC operation

Limits are all driving situations in which driving safety is potentially limited or manual deselection of the AC mode "eco" by the driver. Examples of these situations are:

- ▶ Imminent windscreen fogging when it starts to rain (relative humidity is near 100 %)
- ▶ Activation of Defrost mode by the driver

- ▶ Deselection of the AC mode "eco": when the driver switches to either "medium" or "intensive" mode, the AC system leaves the energy-optimised operating range even if the efficiency mode stays activated ("efficiency" in Audi drive select)



Note

In efficiency mode, the customer might experience a reduction in comfort. For example, the AC compressor or the supplementary heater may be deactivated with the result that the interior cannot be optimally air conditioned in all ambient conditions.

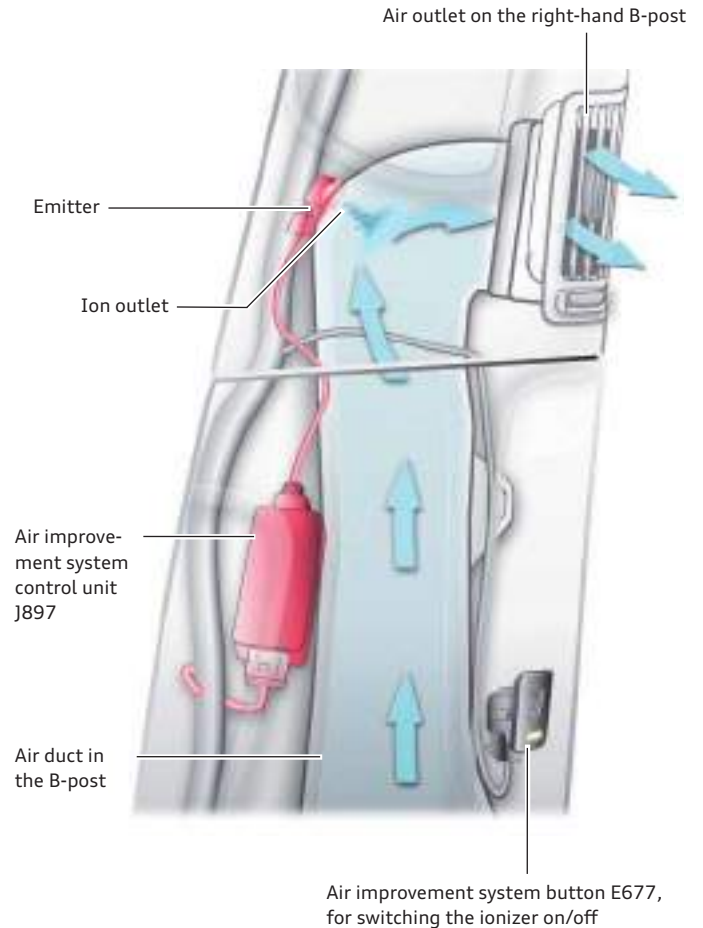
Air improvement system

The air improvement system has previously been available in the Audi A8 L for the Chinese market. This equipment option will also be available in the long-wheelbase version of the Audi A6 '11 for the Chinese market. The air improvement system consists of an ionizer, which is fitted in the B-post air duct on the right-hand side of the vehicle.

The task of this system is to improve air quality in the vehicle interior. The system is odour free and tasteless.

Air improvement system control unit J897

An ionizer is an air purifier designed to enhance the well-being of the vehicle occupants. An electrical current is induced between two electrodes by applying a high voltage with a very low current. The current crosses the air gap between the two electrodes and ionizes the molecules in the air flowing between the electrodes. This process produces negatively charged ions (anions). The higher the proportion of negatively charged ions in the vehicle interior, the fresher, cleaner and better the air, and the higher the comfort factor for the vehicle occupants.



486_065

Technical features

The ionizer can be activated and deactivated by the customer. The operating state is indicated by an LED in the button. The system only has an "optimal" setting, i.e. it can only be switched on or off. It cannot be regulated in stages.

The ionizer is a LIN user of the rear air conditioner/Climatronic operating and display unit E265. Communication via this LIN bus is important since the ionizer, for example, cannot be switched on as long as the B-post air duct outlet is closed.

The ionizer cannot be diagnosed directly in the vehicle diagnostic tester using an address word. The following errors are output by LIN to the rear air conditioner/Climatronic operating and display unit E265 and can then be read out using the vehicle diagnostic tester:

- ▶ Faults in the power supply
- ▶ Faulty LIN-based communication with the rear air conditioner/Climatronic operating and display unit E265
- ▶ A sticking button
- ▶ Faulty LED (short circuit to ground)
- ▶ Faults in the encapsulated high-voltage generator



Note

The high-voltage part of the ionizer is encapsulated and must not be opened in service workshops. This ensures that the mechanic does not come into contact with the high-voltage part.

Infotainment

Overview of versions

The infotainment systems from the Audi A7 Sportback are used in the Audi A6 '11. Depending on country, either the MMI Radio or the MMI Radio plus is fitted as standard in the Audi A6 '11. The MMI Radio plus, MMI Navigation and MMI Navigation plus systems are optional.

The basic sound system is fitted as standard in the Audi A6 '11 with MMI Radio. The Audi sound system is used with MMI Radio plus or higher. The Bose Surround Sound and the Bang & Olufsen Advanced Sound System are optional.

MMI Radio (Europe only)



MMI Radio plus



Basic equipment

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

Options

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



Reference

For details of the infotainment system in the Audi A6 '11, refer to Self Study Programme 484 "Audi A7 Sportback Occupant Protection, Infotainment and Air Conditioning", page 26 ff.

MMI Navigation

MMI Navigation plus



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

Sound systems

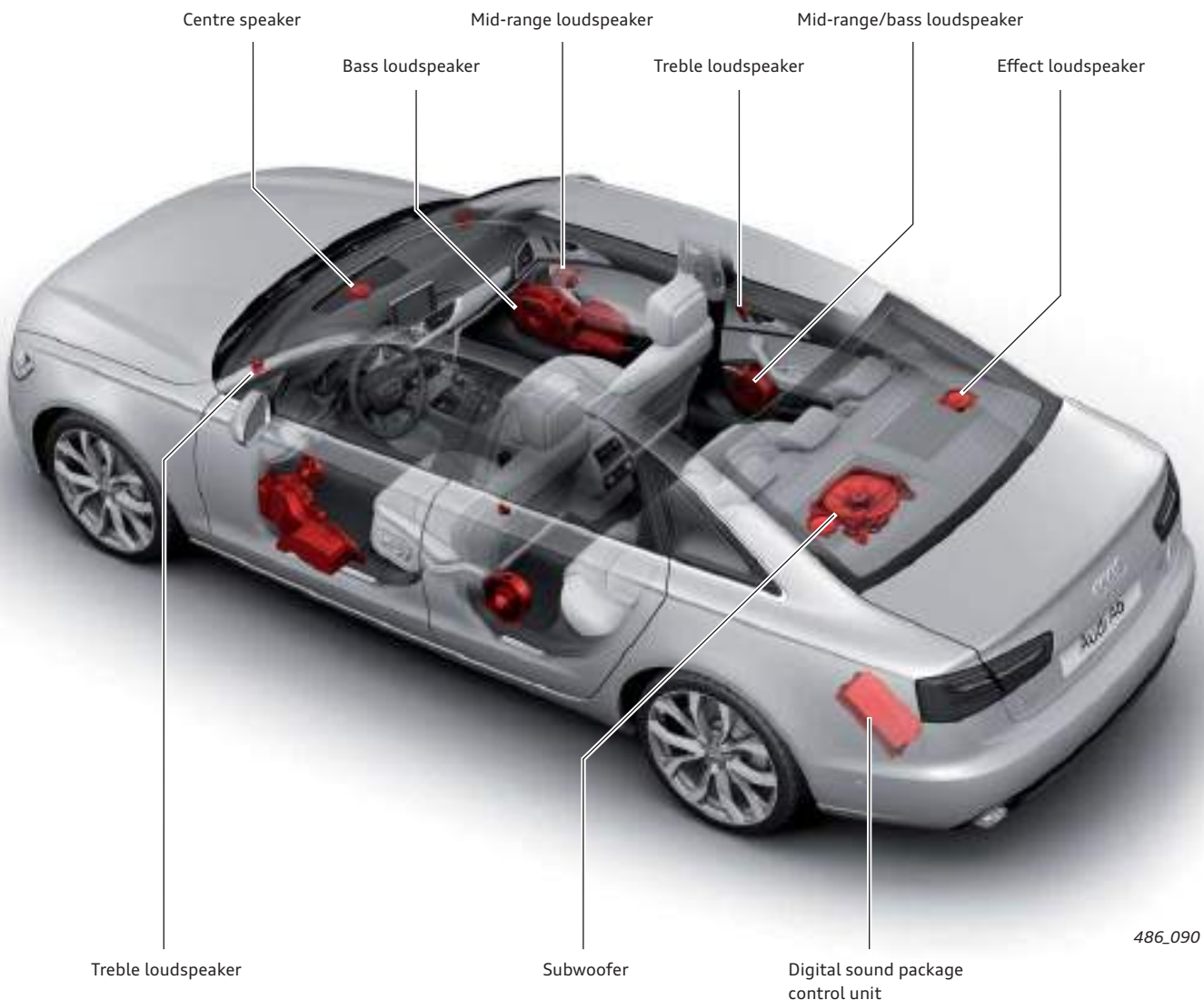
The sound systems in the Audi A6 '11 offers a very special kind of listening pleasure. Even in the standard trim, the basic sound system, eight loudspeakers are fitted. If the optional Audi sound system is ordered, there are 10 loudspeakers with a total power output of 180 watts.

Bose Surround Sound is available as an option for discerning audiophiles. The total power output of 630 watts is distributed to 14 loudspeakers by a separate audio amplifier.

The Bang & Olufsen Sound System guarantees absolute listening pleasure. The system has a total power output of approximately 1300 watts. The Audi A6 '11 accommodates a total of 15 specially designed loudspeakers and two separate audio amplifiers. The loudspeakers are connected to the audio amplifier as follows:

- ▶ Digital sound package control unit J525
 - ▶ Four tweeters (dash panel and rear doors)
 - ▶ Two centre loudspeakers (dash panel)
 - ▶ Two mid-range loudspeakers (front doors)
 - ▶ Two effect loudspeakers (parcel shelf)
- ▶ Digital sound package control unit 2 J787
 - ▶ Two bass loudspeakers (front doors)
 - ▶ Two mid-range/bass loudspeakers (rear doors)
 - ▶ Subwoofer (parcel shelf)

Overview of Bose Surround Sound loudspeakers



486_090

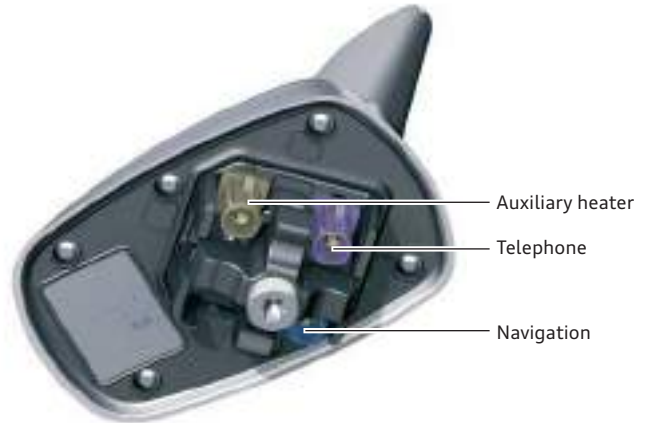
Aerial systems

Several aerials are integrated in the rear window of the Audi A6 '11. The aerials for navigation, telephone, auxiliary heater or satellite telephone (North America) are integrated in the roof aerial.

**Roof aerial R216
(North America)**

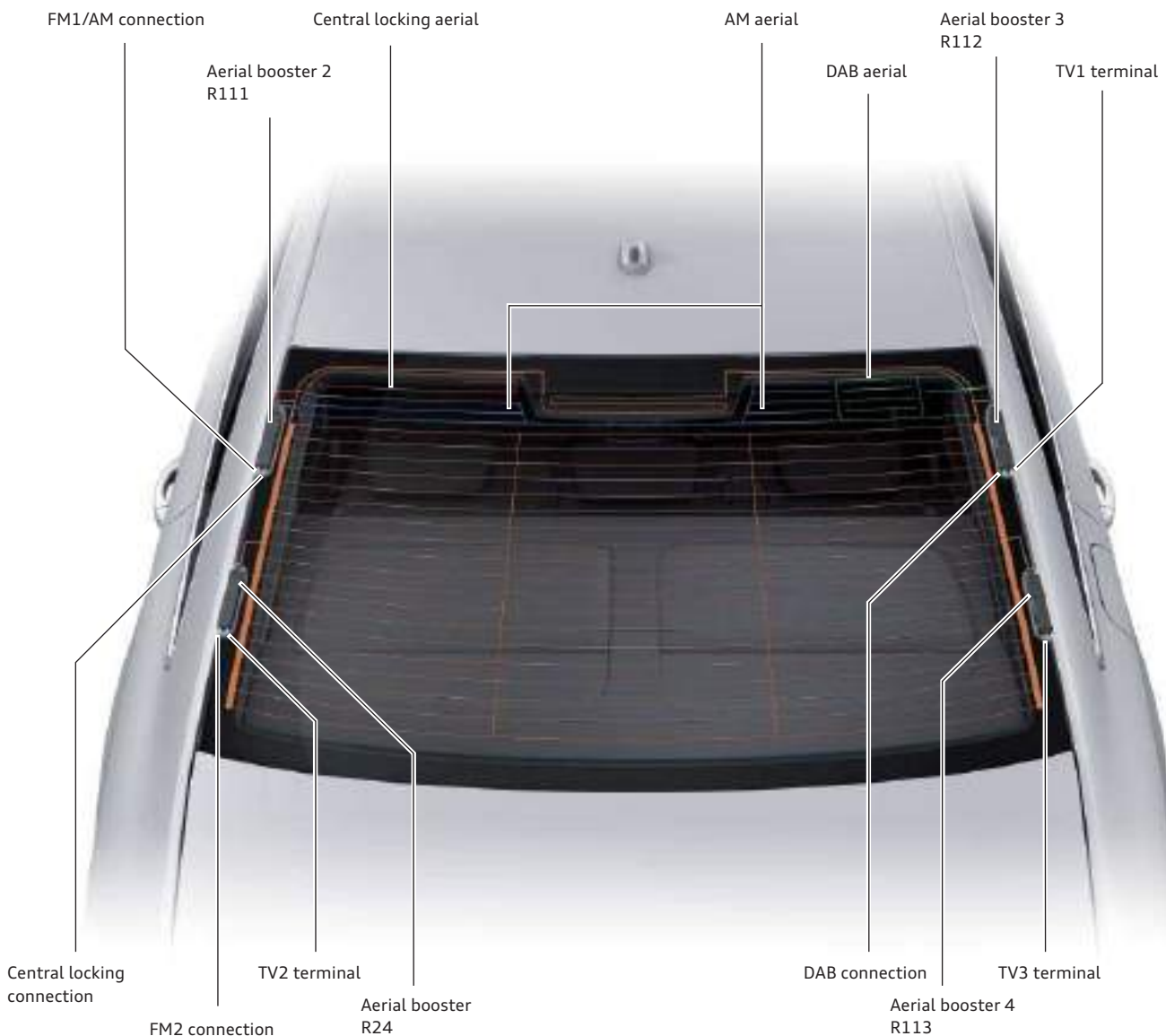


**Roof aerial R216
(Europe/rest of world)**



486_091

Overview of rear window aerials with boosters



486_092

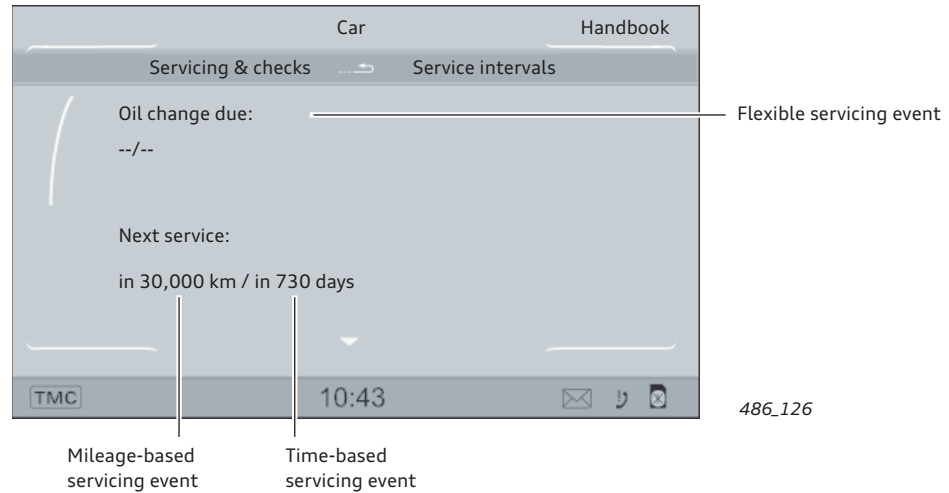
Service

Inspection and maintenance

The following servicing work is displayed separately:

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

Example of a service interval display in the MMI



On new vehicles, the field for the next oil change due (flexible servicing event) is initially blank. A servicing interval computed from the driving profile and engine load is displayed after approx. 500 km have been covered. The display "Oil change due" then changes to "Next oil change".

The value in the field for the mileage-based servicing events now displays 30,000 km for new vehicles and counts down in increments of 100 km.

The value in the field for the time-based servicing events is now 730 days (2 years) for new vehicles and is updated on a daily basis (upwards of a total mileage of approx. 500 km).

Overview of service intervals

	Audi A6 '11 2.0l TFSI 180 kW	Audi A6 '11 2.8l FSI 150 kW	Audi A6 '11 3.0l TFSI 204 kW	Audi A6 '11 2.0l TDI 130 kW	Audi A6 '11 3.0l TDI 150 kW / 180 kW
Oil change interval	max. 30,000 km / 2 years (depending on market)				
Service interval	30,000 km / 2 years				
Dust and pollen filter	30,000 km / 2 years				
Brake fluid	The first change is after 3 years (depending on market), then every 2 years				
Air filter	90,000 km				
Spark plugs	90,000 km / 6 years	90,000 km / 6 years	90,000 km / 6 years		
Fuel filter	Lifetime	Lifetime	Lifetime	60,000 km	60,000 km
Timing drive chain	Lifetime				
Gear oils					
▶ multitronic				60,000 km	
▶ 6-speed manual gearbox				Lifetime	
▶ 7-speed dual clutch gearbox					
▶ ATF ¹⁾				60,000 km	
▶ MTF ²⁾				Lifetime	

¹⁾ ATF = Automatic Transmission Fluid

²⁾ MTF = Manual Transmission Fluid



Note

The specifications in the current service literature always apply.

Self Study Programmes

For further information about the technology in the Audi A6 '11, refer to the following Self Study Programmes.



486_056



486_057



486_058



486_059

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

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

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

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



486_060



486_061



486_062

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

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

SSP 484 Audi A7 Sportback Occupant Protection, Infotainment and Air Conditioning, order number: A10.5S00.77.20

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