Self-Study Programme 477

Audi A1

Audi
Service Training

The Audi A1 is a true Audi – it is first premium automobile in the subcompact segment. The agile, sporty Audi A1 is perfect for use in big cities thanks to its compact dimensions and its excellent fuel economy. The main styling features can be seen in the body design. The pronounced, encompassing shoulder line flows from front to back and back to front, culminating in the grille at the front.
The “3 box design with rear spoiler atypical of small cars and the accentuated rear-end styling give the A1 a striking and distinctive appearance.

The Audi A1 also benefits from innovations taken from larger Audi models. In addition to its state-of-the-art engines, examples of what the A1 has to offer include a start-stop system, a brake energy recuperation system and an on-board computer with efficiency program. These technologies are complemented by an array of infotainment options otherwise exclusive to luxury-class models. The wide range of customisation options enables its young, urban target group in particular to express their own personal style.
The Audi A1 will be built at the Audi plant in Brussels, where a great deal has been invested in the modernisation of the production facilities in order to completely satisfy the most stringent of quality standards.

477_002

Learning objectives of this Self-Study Programme are:

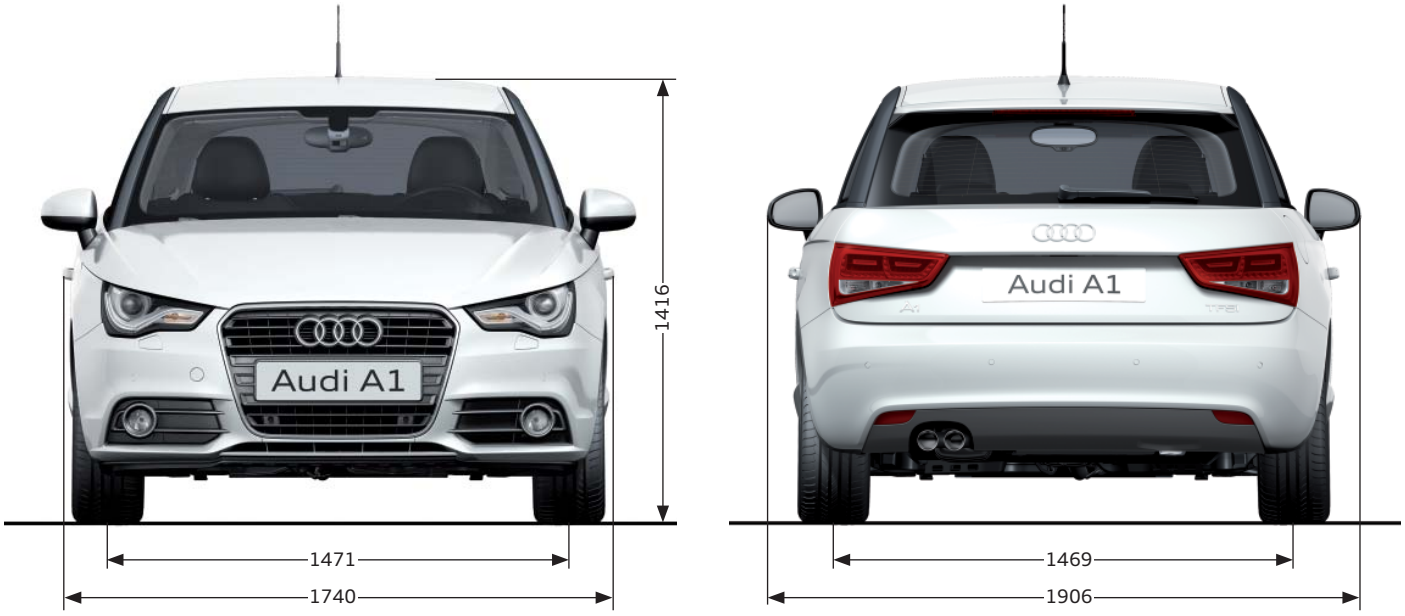
This Self-Study Programme provides you with information about the Audi A1 as a whole. Once you have worked your way through this Self-Study Programme, will you be able to answer the following questions:

- At which production plant is the A1 manufactured?
- In which parts of the vehicle are high- and ultra high-strength steels used?
- Which components have been installed for the purposes of occupant protection?
- Which engines with which gearboxes are used in the A1?
- Which components contribute to road safety?
- How are the electrical components distributed in the vehicle and where are they installed?
- Which infotainment components are installed in the vehicle and how are they operated?
- How do the air conditioning system and the air distribution system work?

Contents

Introduction

In brief



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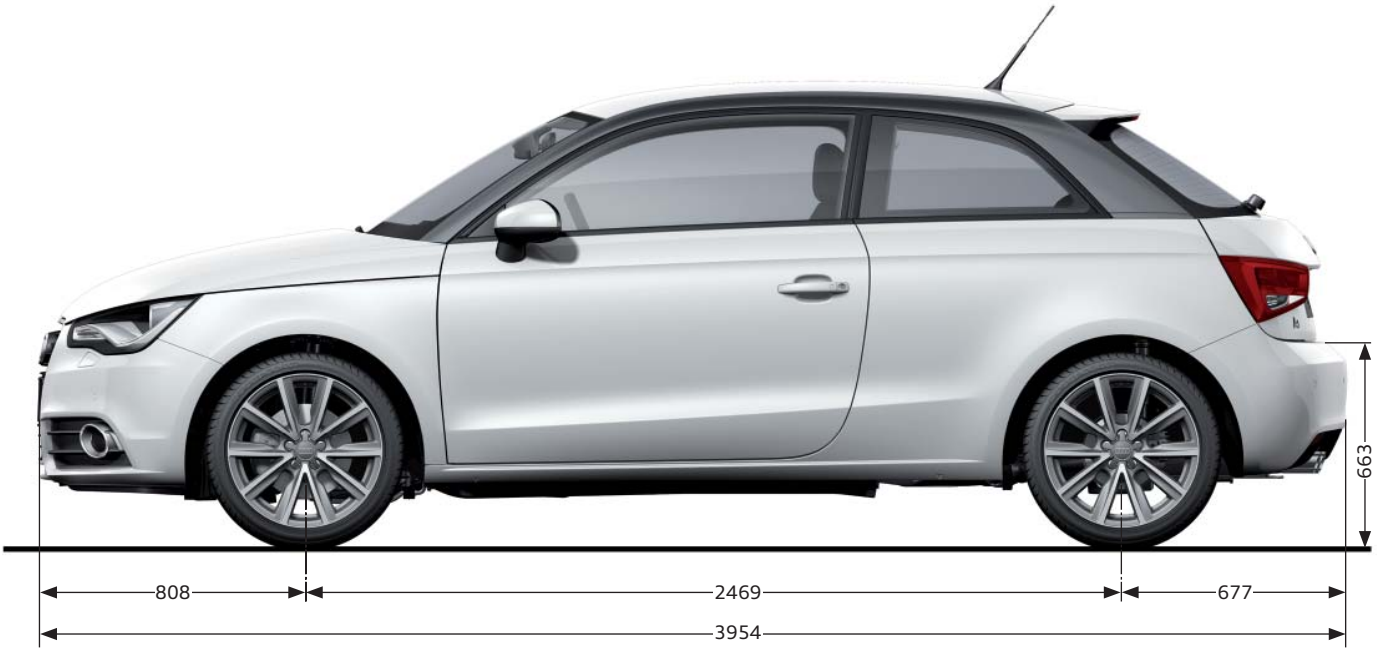

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The Self-Study Programme explains the basics of the design and function of new models, new automotive components or new technologies.
It is not a Repair Manual! Figures given are for explanatory purposes only and refer to the software version valid at the time of preparation of the SSP.
For further information about maintenance and repair work, always refer to the current technical literature.

Note

Reference

477_005

Length in mm	3954	**Inner width, front** in mm	1335
Width in mm	1740	**Inner width, rear** in mm	1266
Heightin mm	1416	**Headroom, front** in mm	1014
Track width, front in mm	1477	**Headroom, rear** in mm	925
Track width, rear in mm	1471	**Through-loading width** in mm	921
Wheelbase in mm	2469	**Load sill height** in mm	663
Trailer load in kg with brake and a gradient of 8 %	1200	**Boot capacity** in l	270/920[4]
Kerb weight in kg	[1] 1115 [2] 1200 [3] 1140	**Tank capacity** in l	45
Max. gross weight in kg	[1] 1490 [2] 1575 [3] 1590	**Drag coefficient** in c_w	0,33

[1] 1.2l TFSI
[2] 1.4l TFSI
[3] 1.6l TDI
[4] rear seat folded down

Body

Introduction

The body of the Audi A1 reflects the premium character of this subcompact-class Audi model.
During the development of the A1 body, Audi's design engineers devoted special attention to reducing CO_2 emissions. With a low weight of only 221 kg, the body structure a significant factor contributing to the car's high fuel economy. The use of alternative materials in zones critical to body rigidity not only enhances safety, but also makes the vehicle more environmentally friendly.

The low bodyshell weight of 221 kg has been achieved by using high-strength steels, which account for 67 % of the cell. No fewer than 11 % are hot-formed steels, which are used selectively in the A and B posts as well as in the footwell cross-members and the rear side members.
The high quality of the materials offers not only weight saving benefits, but also provides the basis for satisfying the most stringent of vehicle safety standards.

477_043

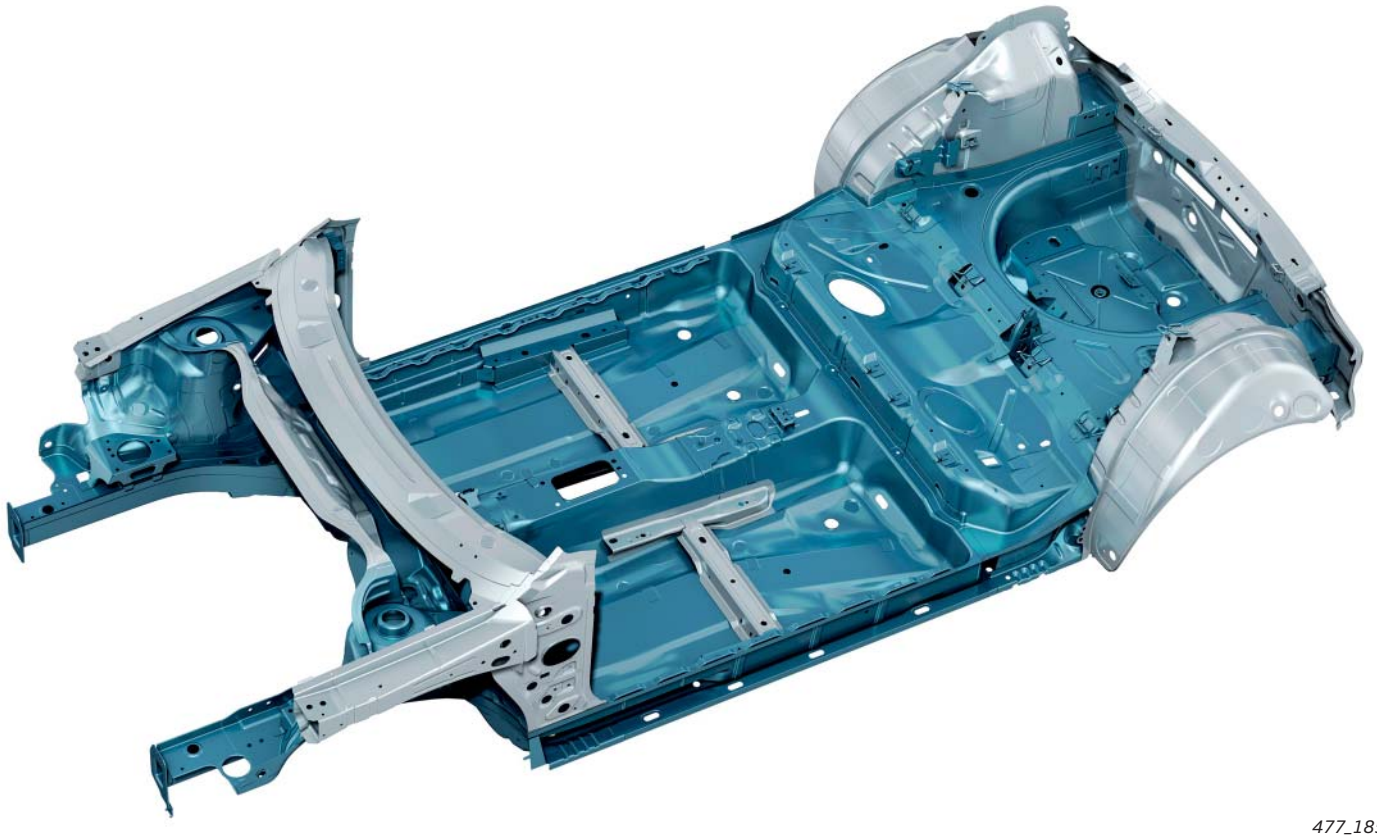
Legend:

- Soft steels 33 %
- High-strength steels 46 %
- Modern high-strength steels 5 %
- Ultra high-strength steels 5 %
- Ultra high-strength steels (hot formed) 11 %

A further criterion is that of body rigidity, and in this context the joining technology has an important role to play. In addition to the conventional spot-welded joints, 66 m of structural adhesive have been used. This has has made it possible to increase the spacings between the spot welds. One of the major advantages of the adhesive is that it seals the flanges, thereby enabling additional sealing measures to be reduced to a minimum.

The high rigidity of the body in combination with the use of expanded foam parts in the body structure, as well as the optimisation of local rigidities, are all factors contributing to the outstanding acoustics that underscore the pioneering role of the Audi A1 in this segment.

Floorpan assembly



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Legend:

Group platform

Audi specific parts

By using various steel grades, the parts colour-coded grey have been adapted to meet the expectations for a premium-class model in respect of safety in head-on collisions, side impacts and rear-end collisions. The high-strength B post is one of the core elements when it comes to effectively distributing the forces acting on the vehicle body.

It transmits the force of a side impact to the sill and to the roof supports. The seat cross members are designed to withstand the high loads which occur in a pole test and transfer the energy to the underbody.

Bonnet with pedestrian protection system

Two highly distinctive and unique components in this segment are the wrap-around bonnet and tailgate.

The bonnet has been enhanced for pedestrian protection and rigidity, thus ensuring excellent protection against head injury on impact with the bonnet and secondary impact with hard components in the engine compartment.
The two locks on the wrap-around bonnet significantly reduce the weight of the bonnet and represent the state of the art in pedestrian safety through their design and functionality.

Furthermore, the efficient bumper system design greatly reduces the risk of leg injury on impact with a pedestrian, despite the short front overhang. For this purpose, the aluminium bumper cross-member has been prominently embossed and the energy-absorbing pedestrian protection foam geometrically improved.

Bonnet locks

477_045

Pedestrian protection foam

Bumper cross member

477_047

Tailgate

The wrap-around tailgate is characteristic of the vehicle's design and underscores the progressiveness of the Audi brand. Featured previously on the Audi Q5 and Audi Q7, this tailgate accentuates the width of the vehicle and represents a step forward in rear lighting and rear spoiler design.
The attractive styling can also be attributed to the specific design of the hinges and inner paneling, as well as the lock and hinge reinforcements.

477_046

Roof contrast line

The roof contrast line not only provides the highlight of the new model series but also posed the greatest challenge in terms of manufacturing. An innovative way of integrating this design feature into the volume production process was developed in collaboration with the body shop, assembly and paint shop departments.

A high-quality paint transition between the roof and the roof contrast line was achieved by developing a roof joint strip with weight-saving benefits thanks to its extruded aluminium profile.

477_044

Panorama tilt sunroof

One of the body versions of the Audi A1 is the all-new tilt sunroof. The focus was on creating a very small package size that provided a dynamic, curvaceous and flat body silhouette without compromising on headroom.

The cutout is larger than that of a standard sunroof, creating a very airy and spacious interior feel for the occupants.

477_048

Note
The roof aerial is integrated in the roof spoiler on models with the panorama tilt sunroof.

Occupant protection

Introduction

On the following pages you will find a summary of the occupant protection system in the Audi A1.

The diagrams and images shown in the chapter entitled "Occupant protection" are schematic diagrams, which have been provided to aid comprehension.

The occupant protection system of the Audi A1 comprises the following components and systems:

- Airbag control unit
- Driver airbag (single-stage solid propellant generator)
- Front passenger airbag (single-stage hybrid gas generator)
- Front side airbags
- Head airbags
- Front airbag crash sensor (upfront sensor)
- Front crash sensors for side crash detection
- Rear crash sensor for side crash detection
- Front seat belt tensioner (ball type tensioner)
- Battery isolator (on vehicles with in-boot battery)
- Seat belt warning for all seats
- Seat belt tensioners on all seats
- Seat occupancy sensor in front passenger seat

The vehicle can also be fitted with a keyswitch with accompanying warning light for disabling the passenger airbag.

Legend:

E24 Driver side seat belt switch
E25 Front passenger side seat belt switch
E224 Airbag disabling switch, front passenger side (optional)
E258 Rear belt switch, driver side
E259 Rear belt switch, front passenger side

G128 Seat occupancy sensor, front passenger side
G179 Side airbag crash sensor, driver side (driver door)
G180 Side airbag crash sensor, front passenger side (front passenger door)
G256 Rear side airbag crash sensor, driver side
G283 Front airbag crash sensor, driver side

J234 Airbag control unit
J285 Control unit in dash panel insert
J533 Data bus diagnostic interface (gateway)

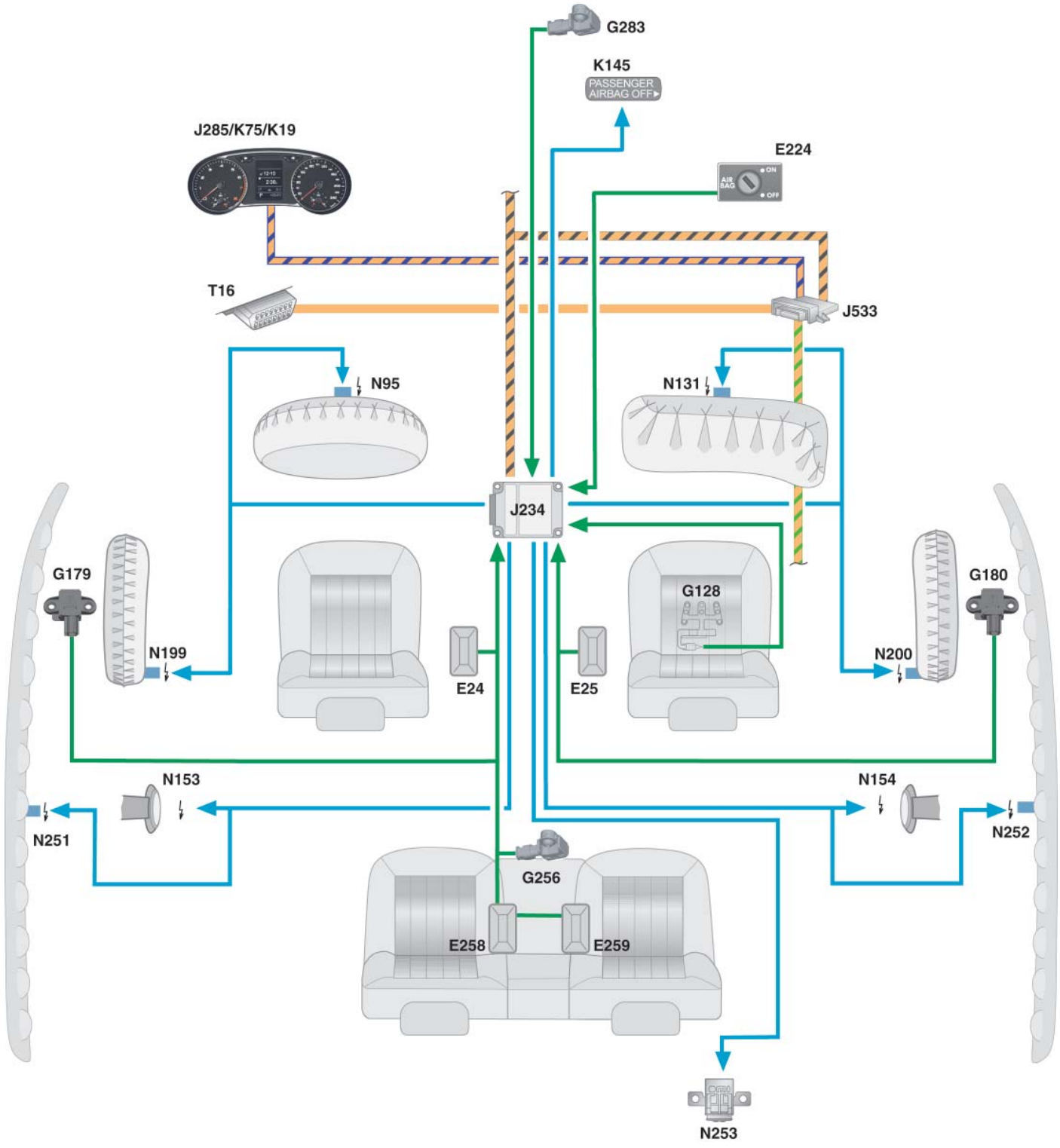
K19 Seat belt warning lamp
K75 Airbag warning lamp
K145 Passenger airbag off warning lamp, (PASSENGER AIRBAG OFF) (optional)

N95 Driver side airbag igniter
N131 Front passenger side airbag igniter 1
N153 Driver side airbag igniter 1
N154 Front passenger side seat belt tensioner igniter 1
N199 Driver side side airbag igniter
N200 Front passenger side side airbag igniter
N251 Driver side head airbag igniter
N252 Front passenger side head airbag igniter
N253 Battery isolation igniter (on vehicles with battery in boot)

T16 16 pin connector, diagnostic port

Reference
For further information about Audi restraint systems and the functions of the individual components, refer to Self-Study Programme 410 "Audi Occupant Protection – Passive Systems".

System overview



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Legend:

- Powertrain CAN
- Diagnostics CAN
- Dash panel insert CAN
- Input signal
- Convenience CAN
- Output signal

Crash sensors

Front airbag crash sensor, driver side G283

The front airbag crash sensor, driver side G283 is used in combination with the frontal impact detection sensors integrated in the airbag control unit J234. This sensor is an acceleration sensor; it measures the deceleration and acceleration of the vehicle in a longitudinal direction. This means that ignition of the seat belt tensioners and airbags can be adapted depending on the accident severity, thus affording the vehicle occupants better protection. Sensor G283 is installed centrally at the front end of the Audi A1.

477_026

Front airbag crash sensor, driver side G283

Side airbag crash sensor, driver side G179
Side airbag crash sensor, front passenger side G180

Side airbag crash sensors G179 and G180 are pressure sensors. They are built into the driver and front passenger doors. If door incurs deformation, a brief increase in air pressure will occur. This increase in pressure is measured by the sensor and indicated to airbag control unit J234.

477_027

Side airbag crash sensor, driver side G179

Rear side airbag crash sensor, driver side G256

The rear side airbag crash sensor, driver side G256 is an acceleration sensor; so is the front airbag crash sensor, front passenger side G283. Sensor G256 is attached to the "heel plate" inside the vehicle. Its task is to measure the vehicle's transversal acceleration and relay this information to airbag control unit J234.

477_006

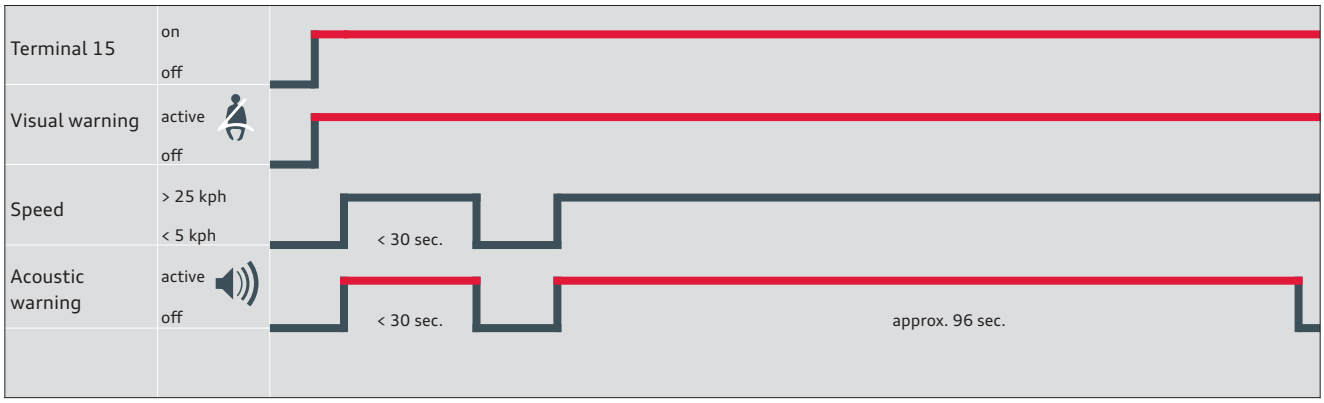
Rear side airbag crash sensor, driver side G256

Front seat belt warning

If the driver and/or front passenger is not wearing a seat belt, they are alerted to this by seat belt warning lamp K19 after the ignition is turned on.
Warning lamp K19 remains lit until the front occupants have put on their seat belts. When the vehicle exceeds a speed of 25 kph, the front occupants are also reminded to put on their seat belt by an audible signal.

If the vehicle decelerates to a speed of less than 5 kph within the first 30 seconds after the acoustic warning is given, the acoustic warning is muted. If the vehicle's speed again increases to above 25 kph, the acoustic warning resumes. If the first 30 seconds have elapsed since the start of the acoustic warning, the acoustic warning does not stop unless the seat belts are fastened.
The acoustic warning is limited to a total duration of 126 seconds. The acoustic warning also varies in volume and frequency.

Warning if seat belts are not fastened



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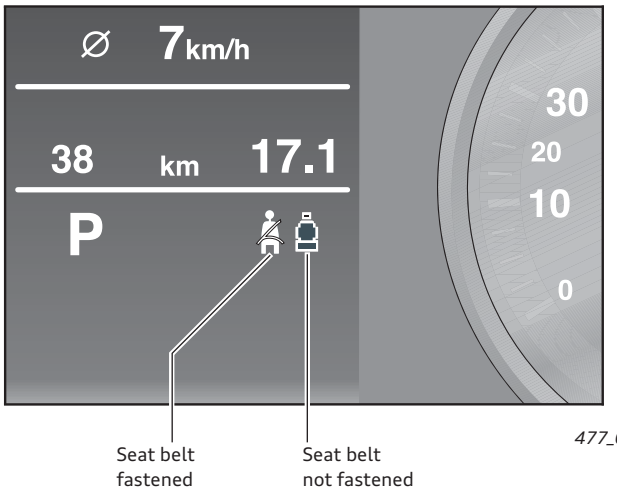
Rear seat belt warning

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 is informed about whether the seat belts are fastened by the rear seat belt switch, driver side W258 and by the rear seat belt switch, front passenger side E259.



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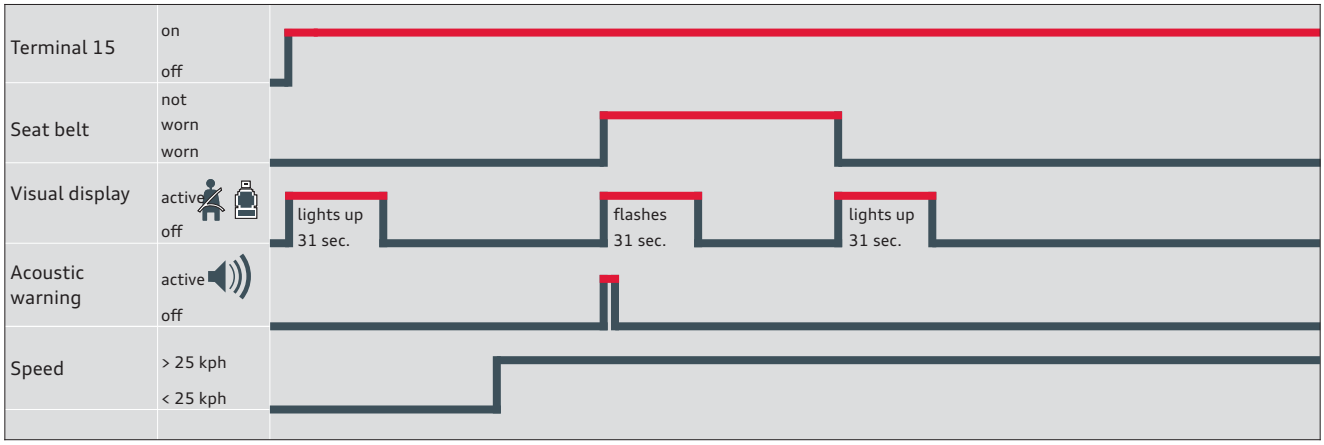
Rear seat belt warning



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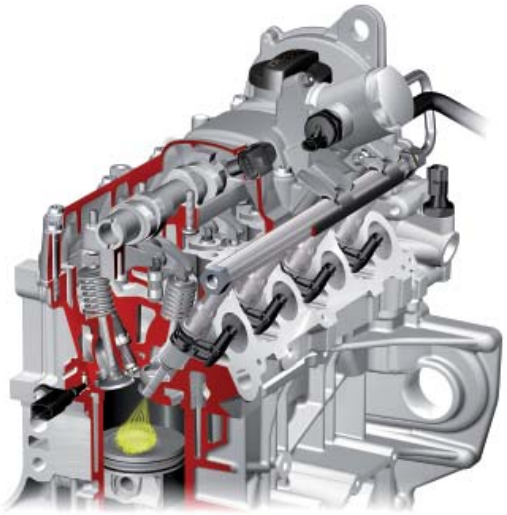
Engine

TFSI engines

1.2l TFSI engine – Technical features

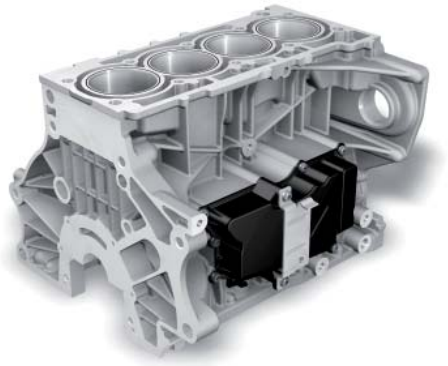


Two-valve cylinder head with inclined valves, each positioned at an angle of 12° relative to the vertical plane of the engine axis

One ignition transformer for all four cylinders

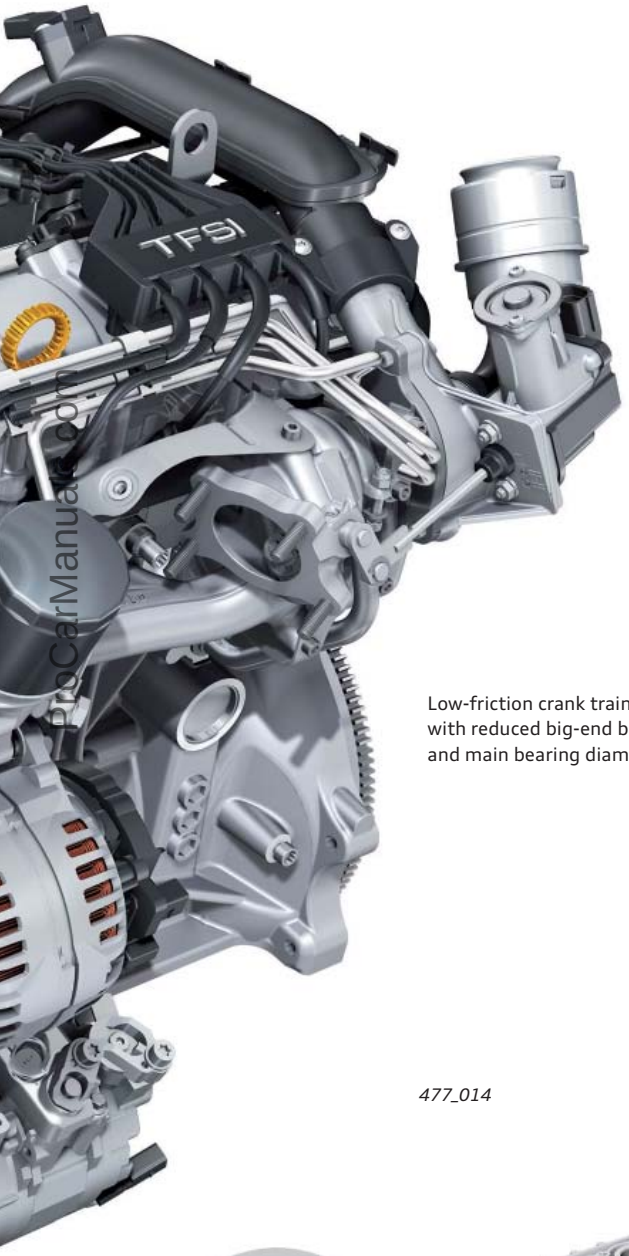
Service-friendly split lightweight timing case with covers made of plastic and magnesium

Reference
For further information about the design and functionality of the 1.2l TFSI engine, refer to Self-Study Programme 485 "Audi 1.2l TFSI Engine".



Crankcase breather with oil separator
integrated in the cylinder head

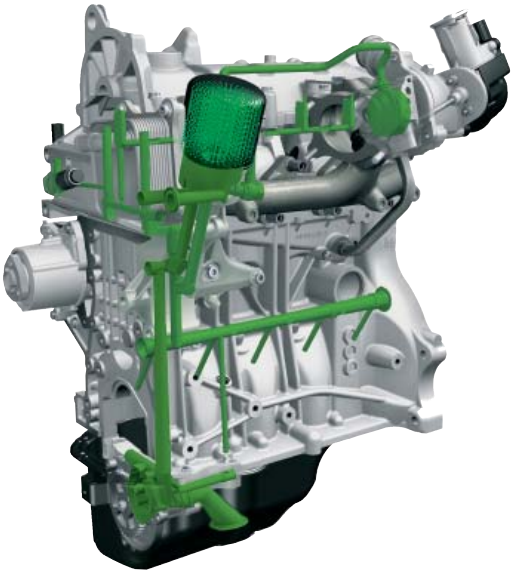
Integral turbocharger with electrically actuated wastegate.
Water-cooled charge air cooler integrated in the intake manifold.



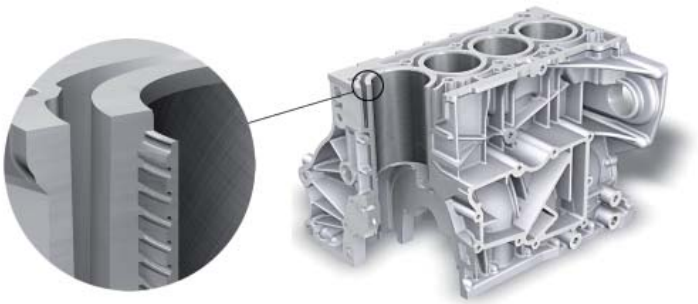
Low-friction crank train
with reduced big-end bearing
and main bearing diameters

Thermal management system
with actuable coolant pump

477_014



Volumetric flow-controlled oil circulation system
with gallery-pressure-controlled oil pump



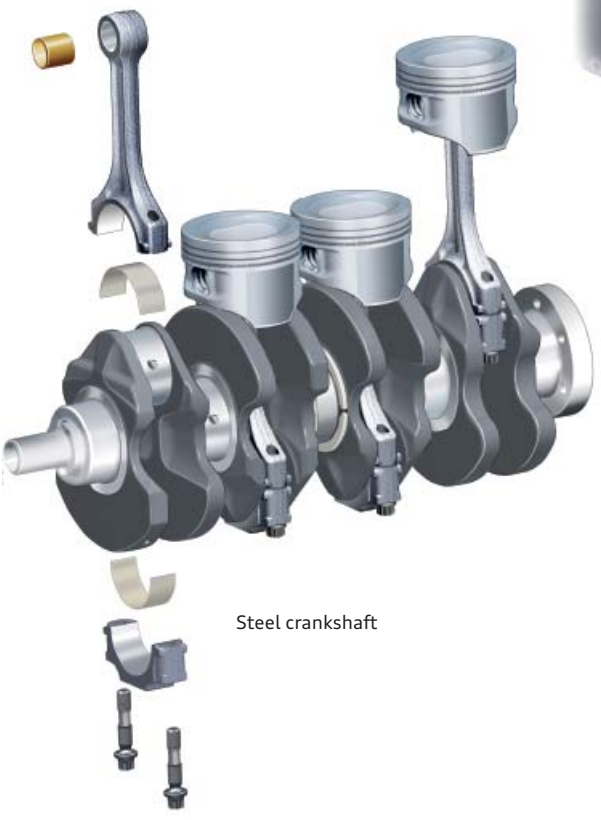
Aluminium cylinder block of open deck construction with
cast iron bushings

1.4l TFSI engine – Technical features

Demand-driven fuel system with fuel pump control unit

Four-valve cylinder head without intake manifold flaps

Maintenance-free chain drive (longlife)

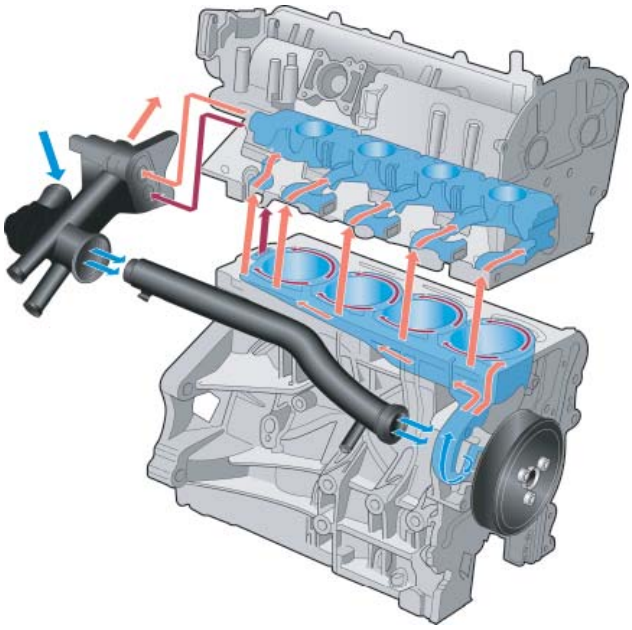


Steel crankshaft

Volume-flow-controlled duo-centric oil pump

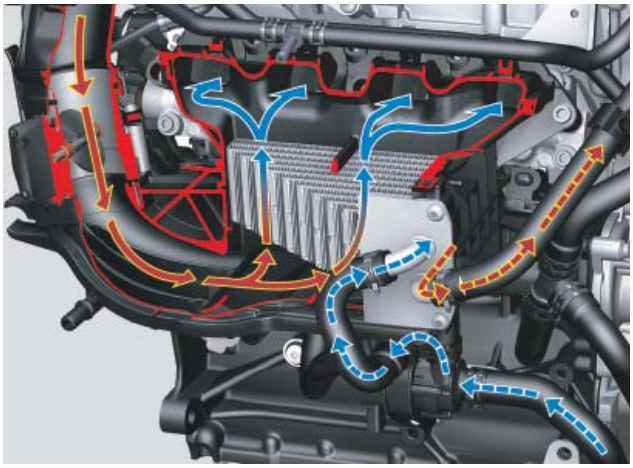
Reference
For further information about the design and functionality of the 1.4l TFSI engine, refer to Self-Study Programme 432 "Audi 1.4l TFSI Engine".

Continuously variable intake camshaft phasing

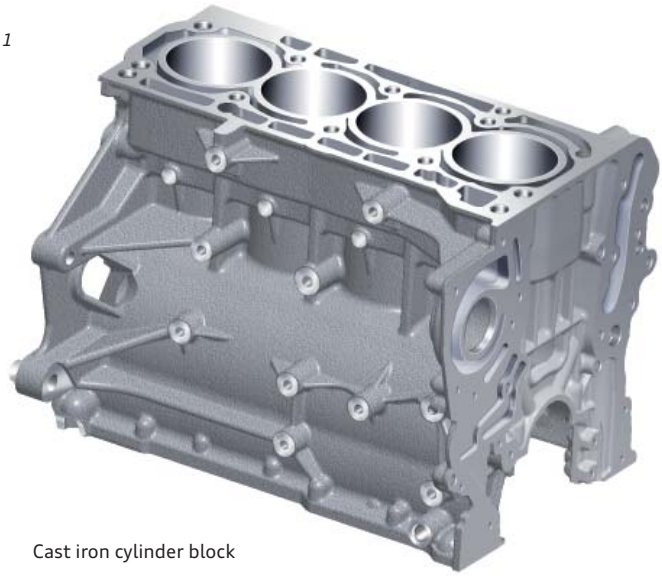


Two-part, thermostat-controlled cooling system for the cylinder block and cylinder head

477_011



Dual-circuit cooling system with separate engine cooling and charge-air cooling circuits and plastic intake manifold with integrated charge air cooler



Cast iron cylinder block

Specifications

Torque/power curves

1.2l TFSI engine

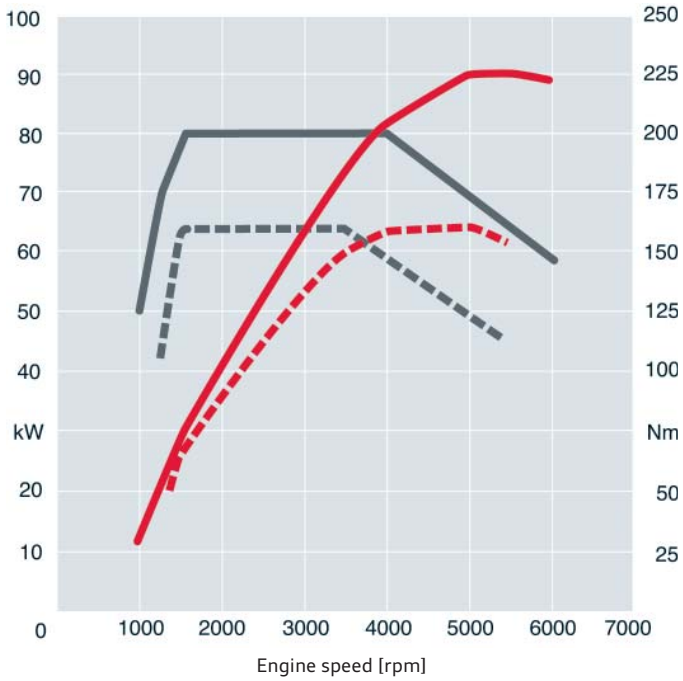
Power output in kW

Torque in Nm

1.4l TFSI engine

Power output in kW

Torque in Nm

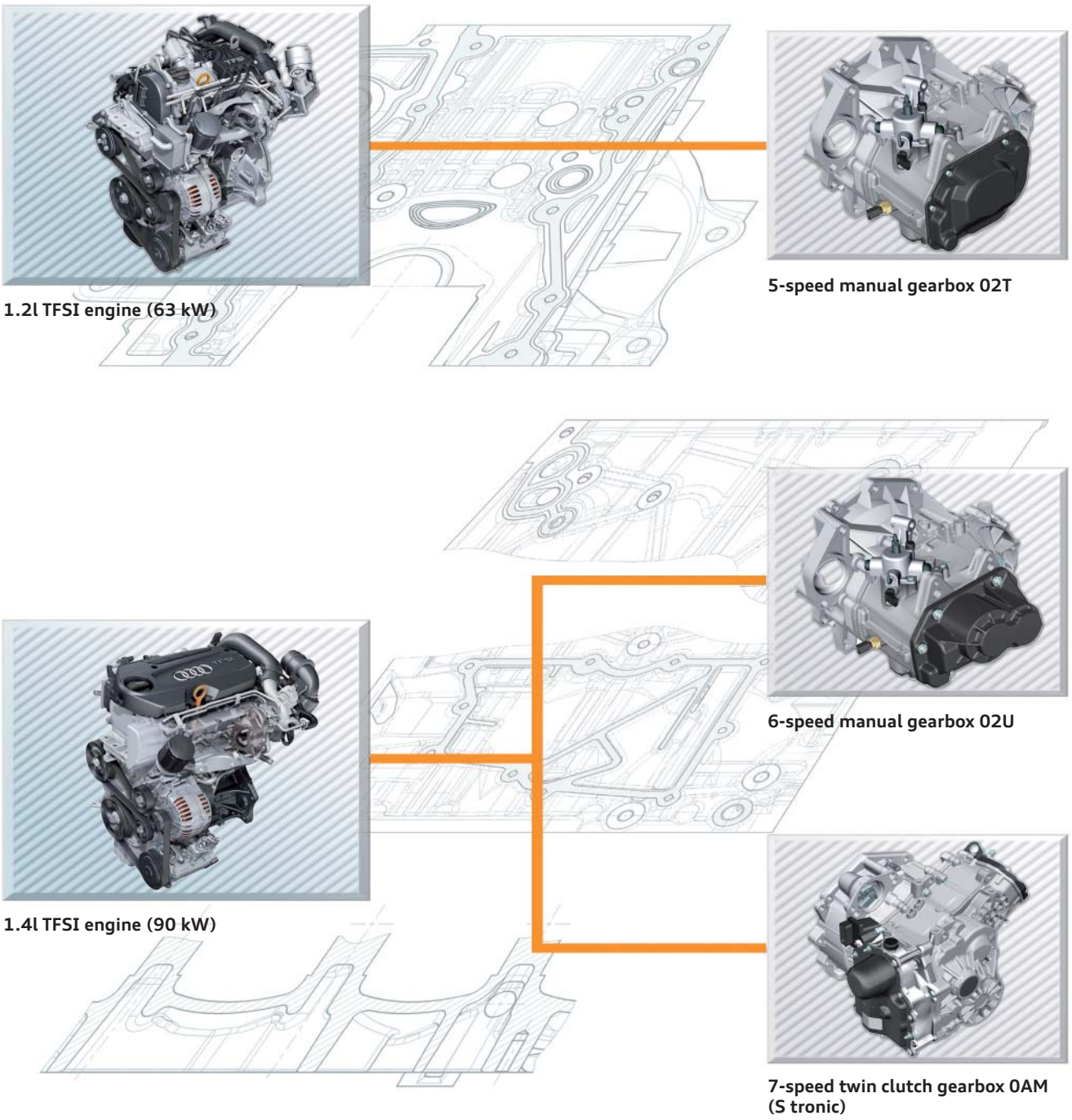


477_008

Engine code	**CBZA**	**CAXA**
Type	Four-cylinder two-valve inline engine	Four-cylinder four-valve inline engine
Displacement in cm^3	1197	1390
Power output in kW (HP)	63 (85) at 4800 rpm	90 (122) at 5000 rpm
Torque in Nm	160 at 1500 – 3500 rpm	200 at 1500 – 4000 rpm
Number of valves per cylinder	2	4
Bore in mm	71	76,5
Stroke in mm	75,6	75,6
Compression ratio	10:1	10:1
Powertrain type	Front wheel drive	Front wheel drive
Engine management	SIMOS 10	Bosch MED 17.5.20
Fuel	95 RON	95 RON
Exhaust emissions standard	EU 5	EU 5
CO_2 emission in g/km	118	122 / 119[1)]

[1)] Ordering option: without panorama tilt sunroof, BOSE Surround Sound and 18-inch cast aluminium wheels

Engine-gearbox combinations – TFSI engines

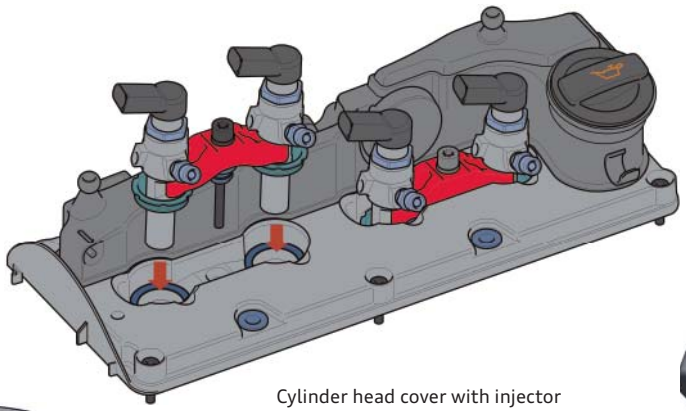


477_012

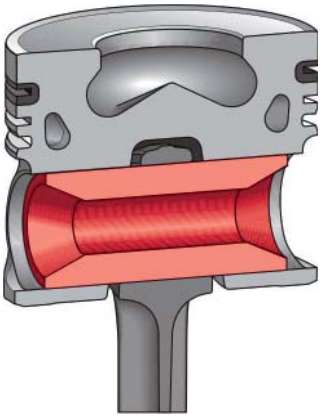
TDI engines

1.6l TDI engine – Technical features

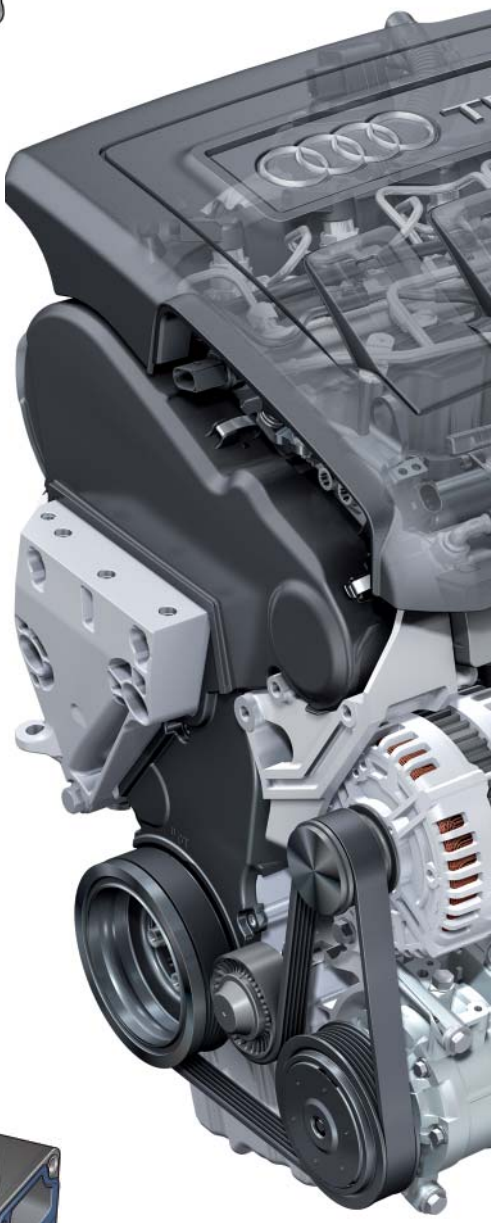
- The basic version is the 2.0l four-cylinder engine with common rail injection system and four valves per cylinder (103 kW)
- New common rail injection system from Continental
- Piezo-electric injectors capable of injection pressures of up to 1600 bar

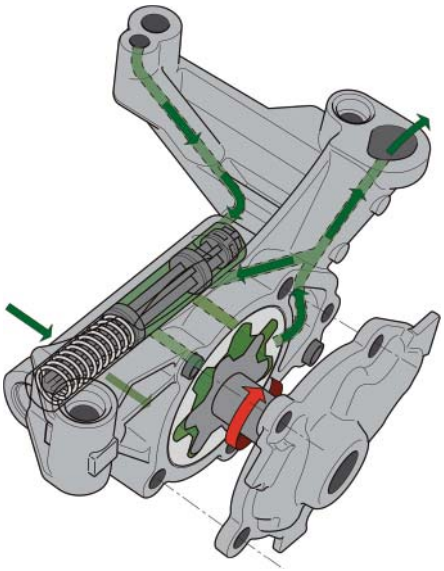


Cylinder head cover with injector clamping elements

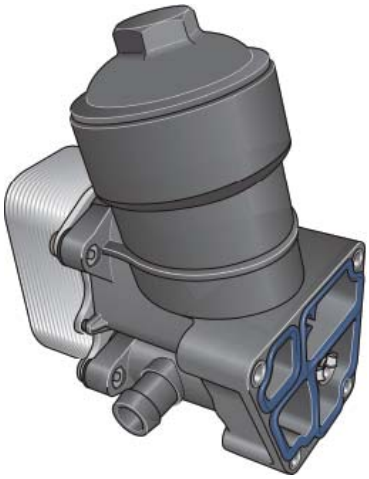


Pistons without gudgeon pin bushing due to low thermal load





Controlled duo-centric oil pump with integrated shut-off, hence no safety valve



Oil filter module with plastic filter housing and aluminium oil cooler

Reference
For further information about the design and functionality, refer to Self-Study Programme 442 "The 1.6l TDI Engine with Common Rail Injection System" (to be prepared by Audi).

Simos PRC2 common rail injection system

477_010

High-pressure pump with integral predelivery pump (77 kW) and fuel metering valve

Piezo-electric injectors capable of injection pressures of up to 1600 bar

Specifications

Torque/power curves

1.6l TDI engine (66 kW)

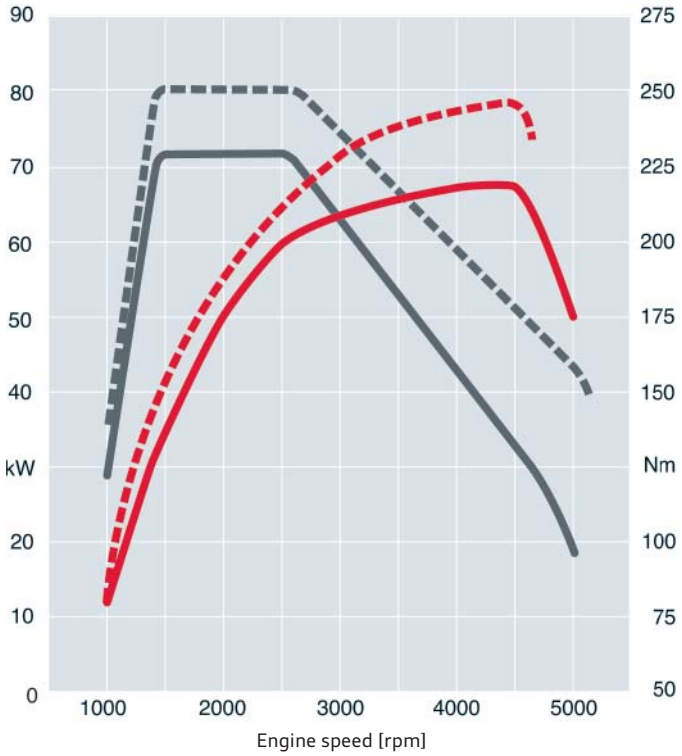
Power output in kW

Torque in Nm

1.6l TDI engine (77 kW)

Power output in kW

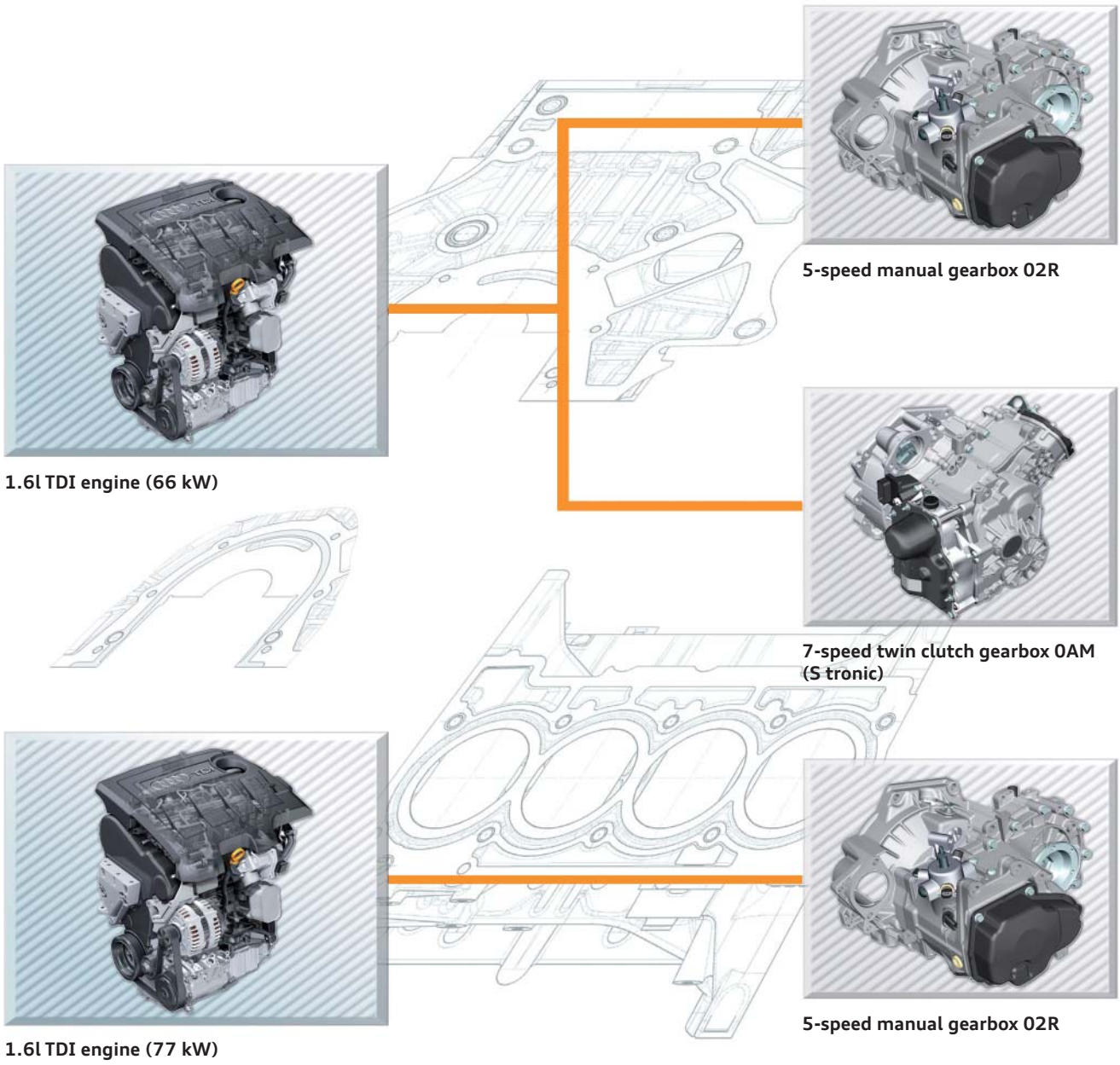
Torque in Nm



477_007

Engine code	**CAYB**	**CAYC**
Type	Four-cylinder four-valve engine	Four-cylinder four-valve engine
Displacement in cm^3	1598	1598
Power output in kW (HP)	66 (90) at 4200 rpm	77 (105) at 4400 rpm
Torque in Nm	230 at 1500 – 2500 rpm	250 at 1500 – 2500 rpm
Number of valves per cylinder	4	4
Bore in mm	79,5	79,5
Stroke in mm	80,5	80,5
Compression ratio	16,5:1	16,5:1
Powertrain type	Front wheel drive	Front wheel drive
Engine management	Simos PCR 2.1	Simos PCR2
Fuel	Diesel to EN 590	Diesel to EN 590
Exhaust emissions standard	EU 5	EU 5
CO_2 emission in g/km	99	103

Engine-gearbox combinations – TDI engines



1.6l TDI engine (66 kW)

5-speed manual gearbox 02R

7-speed twin clutch gearbox 0AM (S tronic)

1.6l TDI engine (77 kW)

5-speed manual gearbox 02R

477_013

Fuel tank

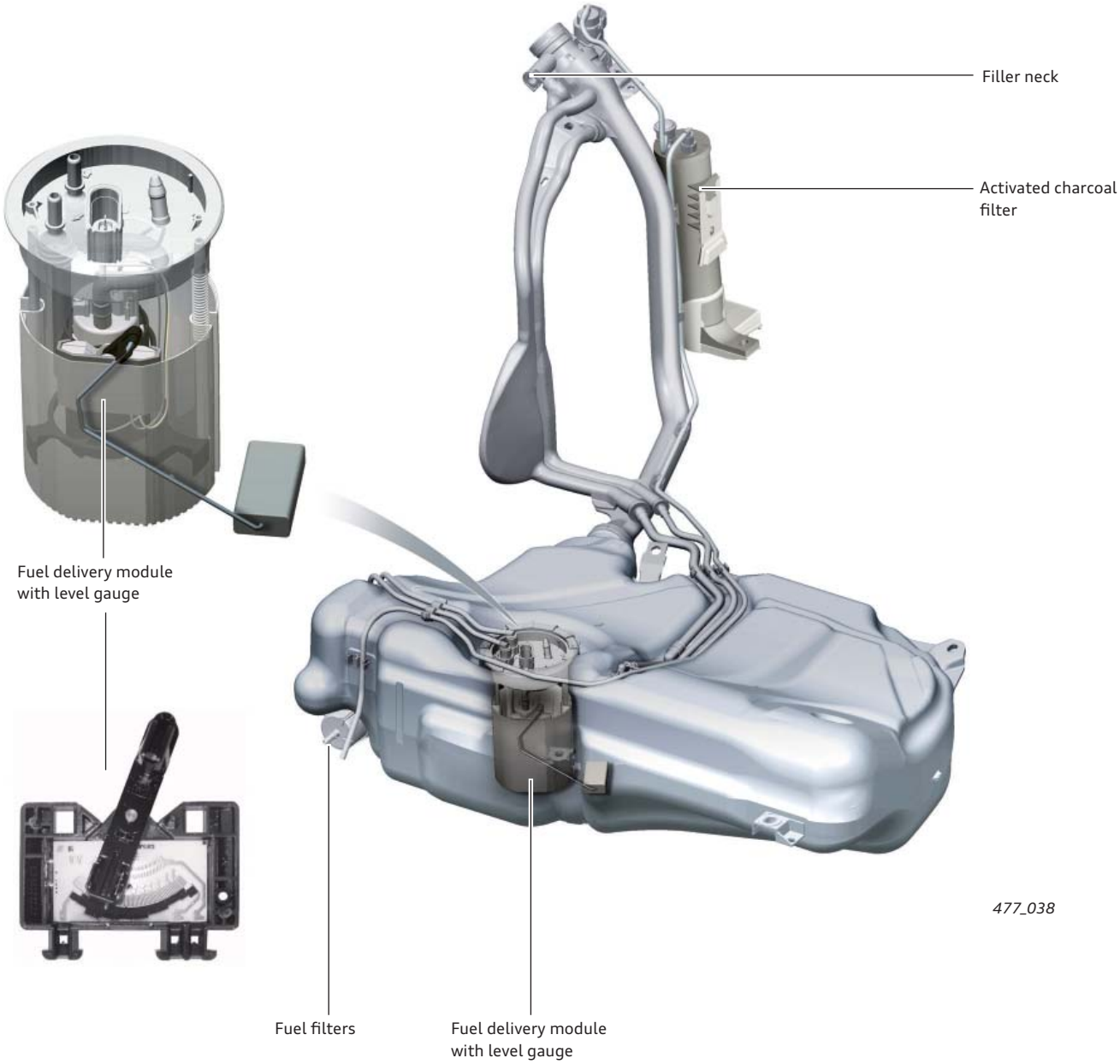
The blow-moulded fuel tank is located in a crash-safe position between the occupant cell heel plate and the rear axle.
It meets the stringent crash safety requirements, has a nominal capacity of 45 litres and is transversely mounted in the A1.
All TFSI engines employ an electronic demand-driven fuel pump which delivers only as much fuel as the engine momentarily requires.

The high-pressure pump of the 1.6l TDI engine developing 77 kW obtains its fuel via predelivery pump G6 running from the tank into the mechanical predelivery pump at a pressure of 0.5 bar. The fuel then flows directly into the high-pressure pump at a pressure of approx. 5 bar.
When the 66-kW version is launched, both TDI engines will feature a demand-driven fuel pump without a mechanical predelivery pump running to the high-pressure pump. Like the petrol version, this version has a fuel pump control unit J538 which is installed under the rear seat.

A three-wire thick film sensor[1)] is used for fuel level indication. The additional wire supplies redundant information that can be used to arithmetically eliminate the contact resistance which can occur due to aggressive fuels. Hence this contact resistance can no longer affect the accuracy of fuel level indication. The lever-type sensor is mounted to the base-supported swirlpot of the delivery unit.

[1)] see SSP 332 "Audi A3 Sportback", page 49

Overview

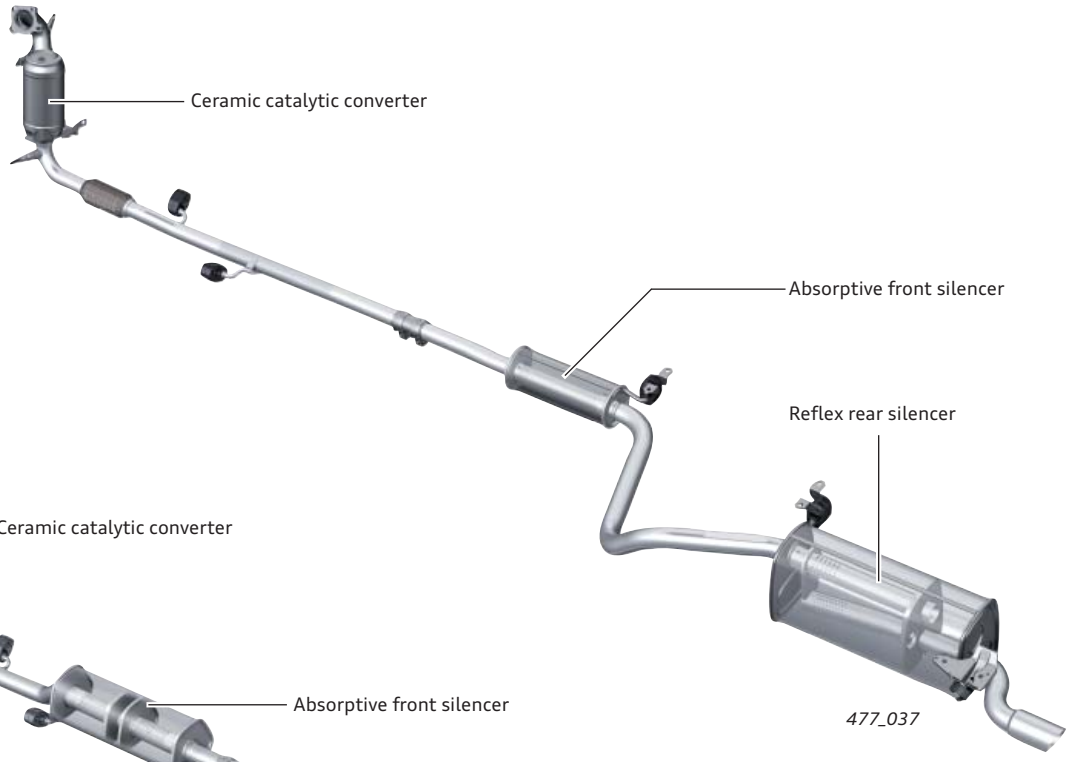


Exhaust system

The exhaust systems of the A1 have a high common parts ratio, despite the different acoustic requirements of each engine version. The rear silencers of the 1.2l TFSI engine and the 1.4l TFSI engine have identical housings, and have been adapted to the engine-specific acoustics by internal modifications only.

The intermediate pipes of the 1.2l TFSI engine, 1.4l TFSI engine and 1.6l TDI engine have identical diameters. The wall thickness of the exhaust pipes and the silencers can be optimised for low weight by using high-grade stainless steel, without adversely affecting corrosion protection.

1.2l TFSI engine (63 kW)



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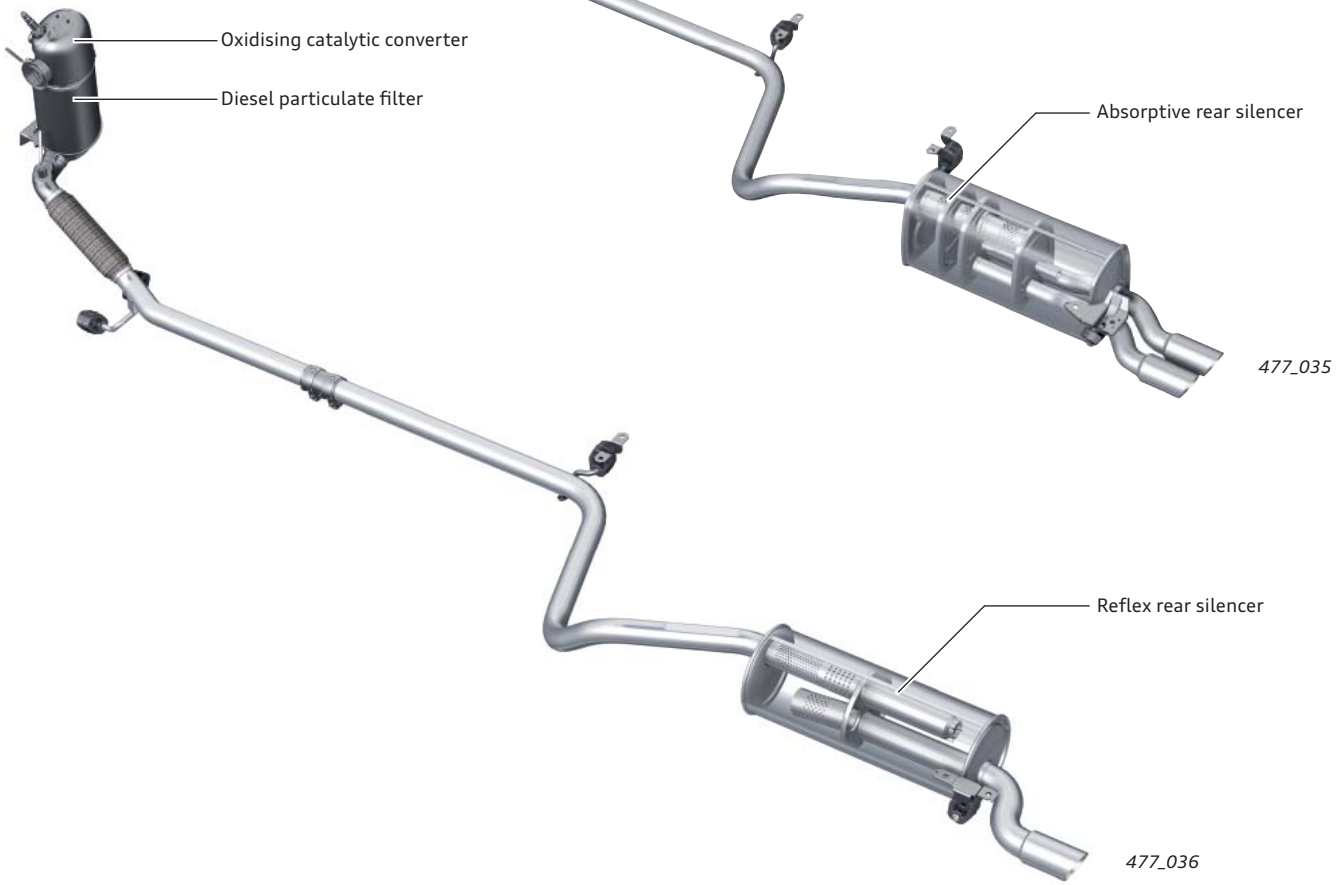
1.4l TFSI engine (90 kW)

1.6l TDI engine (66 / 77 kW)



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477_036

Gearbox

Manual gearbox

The manual gearboxes in the Audi A1 are sourced from the Volkswagen Group. They are noted for their high quality, low weight and high efficiency, and have proven to be highly effective in the Audi A2, A3 and Audi TT. The gearbox was modernised and adapted as appopriate for installation in the Audi A1.

The start-stop function is used in combination with the following engines:

- 1.2l TFSI engine (63 kW)
- 1.4l TFSI engine (90 kW)
- 1.6l TDI engine (66 kW, 77 kW)

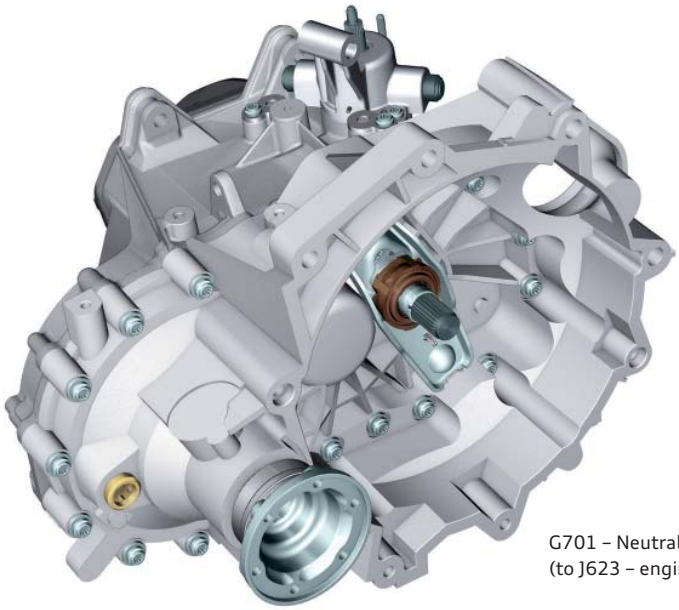
The neutral position sender G701 is installed in combination with the start-stop function. G701 ensures that the engine is only started if – in addition to further criteria – the gearbox is in the neutral position.

G701 is available in two versions:

- G701 – installed in gearboxes 02T, 02U and 0A8 – generates a PWM signal for the engine control unit (part number 02T 906 207 A)
- G701 – installed in 02R gearbox – generates a voltage signal for the engine control unit (part number 02T 906 207)

Pay attention to the correct asignments when replacing parts.

5-speed manual gearbox 02T (MQ200-5F)



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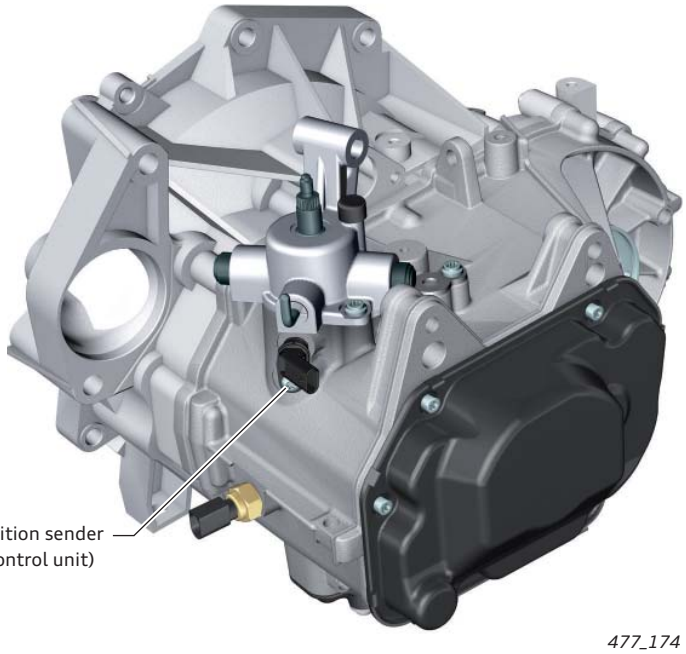

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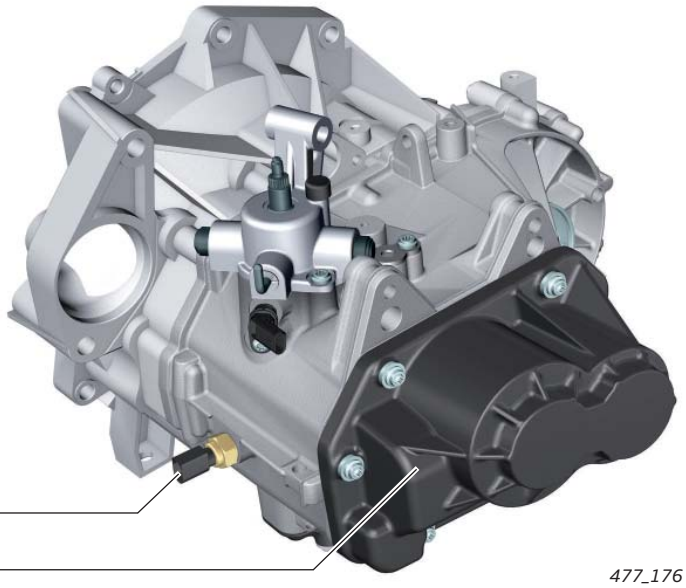
6-speed manual gearbox 02U (MQ200-6F)

Gearboxes 02T and 02U identical in terms of their basic design. The only difference is that a 6th gear has been added to the 02U gearbox.

The 02T gearbox is installed in combination with the 1.2l TFSI engine (63 kW) and has the manufacturer code MQ200-5F. The vehicle reaches its top speed in 5th gear.

The 02U gearbox is installed in combination with the 1.4l TFSI engine (90 kW). It has the manufacturer code MQ200-6F. The vehicle reaches its top speed in 5th gear.

Further information on the 02T and 02U gearboxes can be obtained by watching the iTV programme of 23.09.2009 regarding the near-identical 0AJ gearbox.



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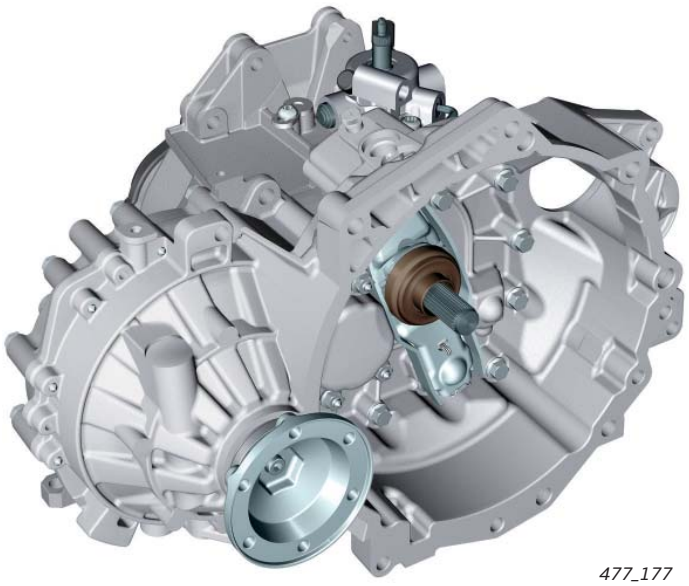
5-speed manual gearbox 02R (MQ250-5F)



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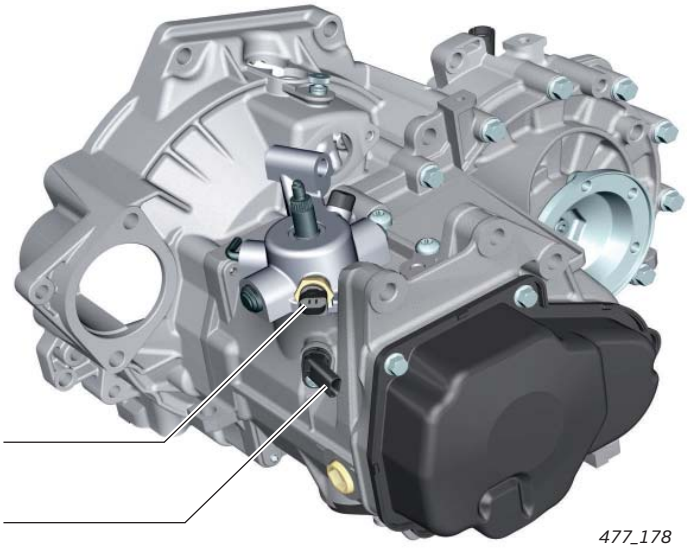
The 02R gearbox is installed in combination with the 1.6l TDI engines (66 kW and 77 kW). It has the manufacturer code MQ250-5F. The 66-kW model reaches its top speed in 4th gear and the 77-kW model in 5th gear.

Further information on the 02T and 02U gearboxes can be obtained by watching the iTV programme of 22.09.09 regarding the near-identical 0AJ gearbox.



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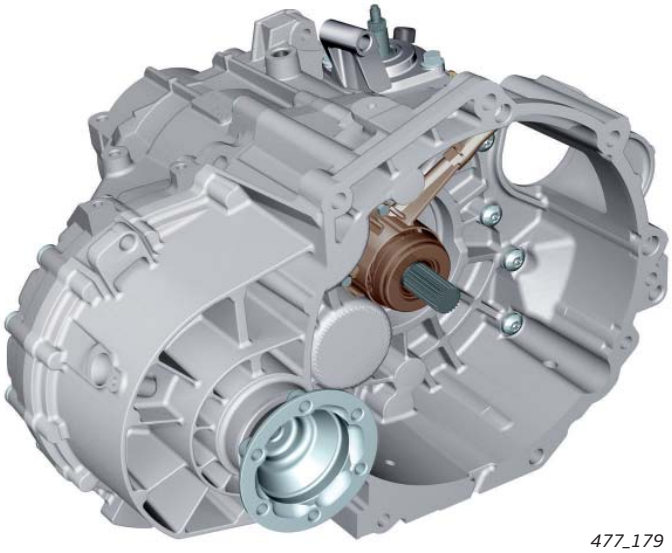
6-speed manual gearbox 0A8 (MQ350-6F)



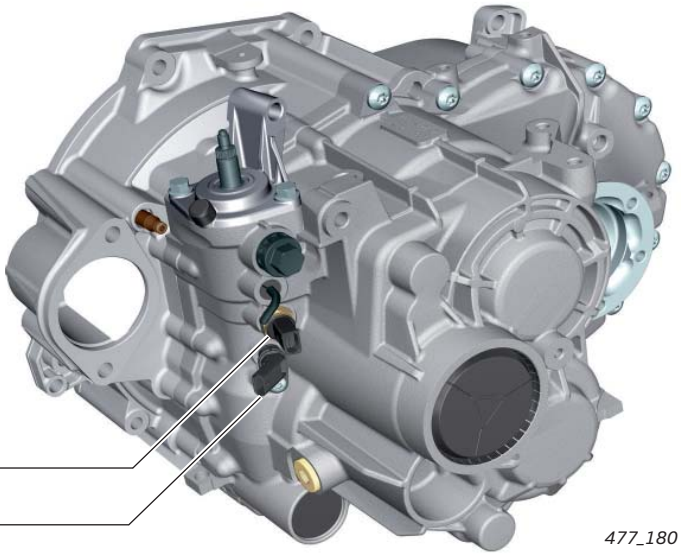
477_179

Breakdown of the manufacturer code:
e.g. MQ350-6F

M	manual gearbox
A	Automatic gearbox
D	Twin clutch gearbox
V	Variable gearbox
Q	Transversal installation
L	Longitudinal installation
350	Nominal torque capacity
6	Number of gears
F	Front wheel drive
A	All-wheel drive

The 0A8 gearbox has the manufacturer code MQ350-6F. The 0A8 gearbox is intended for high-performance engines and will be launched at a later date.

For further information about the 0A8 gearbox, refer to SSP 205 which covers the first gearbox of the 02M series.



477_180

Automatic gearbox

7-speed twin clutch gearbox 0AM (S tronic)

Audi A1 customers can also enjoy the advantages of the S tronic gearbox. S tronic 0AM combines sportiness, dynamism and driving comfort with excellent overall efficiency in an exemplary fashion.

The design features, dry twin clutches and engine-independent oil supply make for particularly high efficiency. This has a very positive effect on the fuel economy of the A1.

The start-stop function is used in combination with the 1.4l TFSI engine (90 kW), providing a further reduction in urban cycle fuel economy.

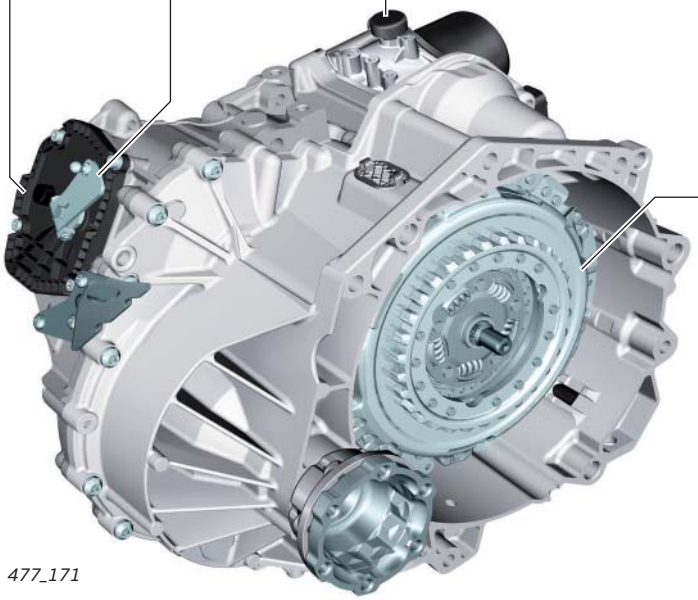
The 0AM gearbox permits unlimited use of the start-stop function because of its engine-independent oil supply. The only component that has been modified for the start-stop function is the flywheel ring gear. The flywheel ring gear has been uprated for common starting processes.

The 1.6l TDI engine does not have a start-stop function. The start-stop function will not initially be available for this version because the general vehicle concept is different.

The 0AM gearbox can be optionally combined with the following engines:

- 1.4l TFSI engine (90 kW)
- 1.6l TDI engine (66 kW)

With both engines, the vehicle reaches its top speed in 6th gear. The 0AM gearbox has the manufacturer code DQ200-7F. You will find a description of the 0AM gearbox in Self-Study Programme SSP 390.



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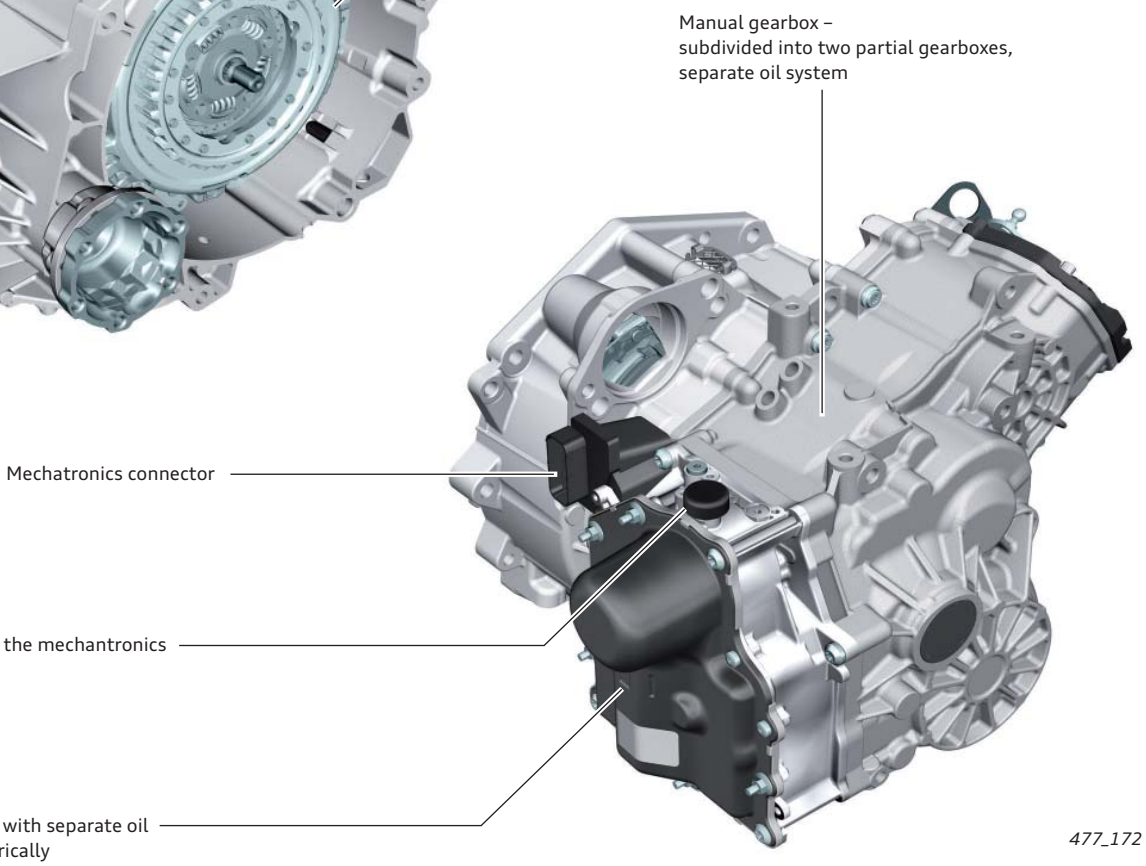


477_172

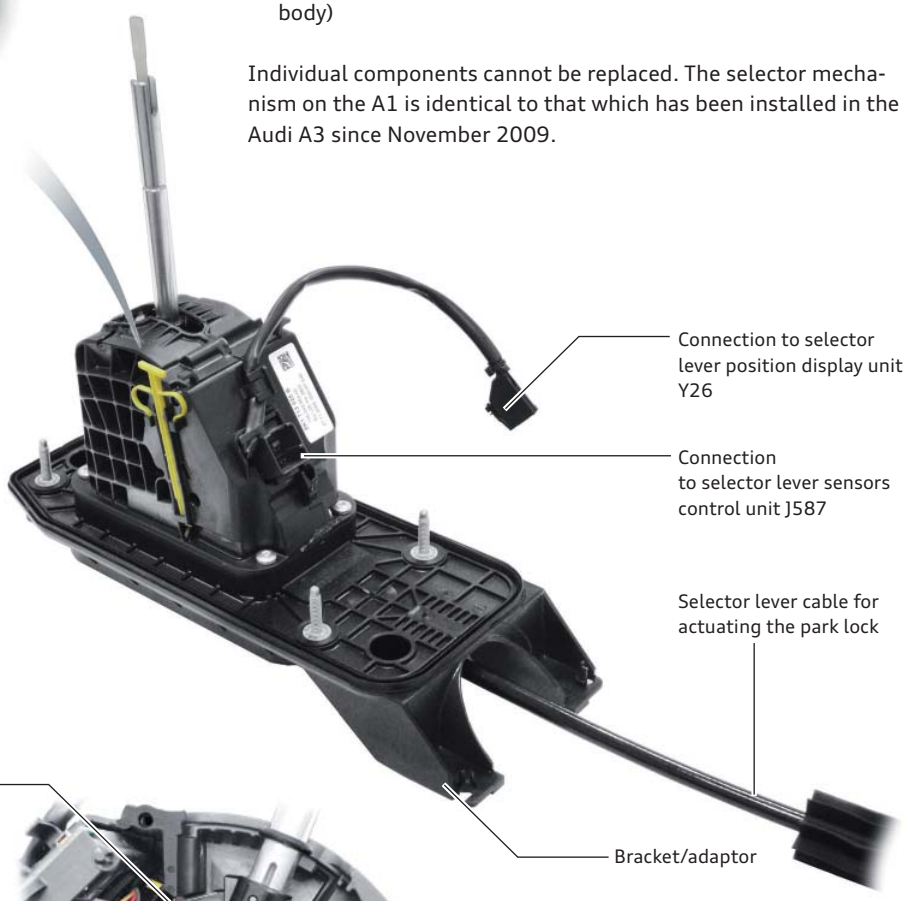
S tronic selector mechanism (selector lever E313)

The selector mechanism is a compact unit and comprises the following components:

- J587 Selector lever sensors control unit with tiptronic switches
- F319 Selector lever locked in P switch
- N110 Selector lever lock solenoid
- Selector cable (for actuating the park lock)
- Emergency actuator
- Bracket/adaptor (link between selector mechanism and car body)

Individual components cannot be replaced. The selector mechanism on the A1 is identical to that which has been installed in the Audi A3 since November 2009.

The emergency actuator allows gears to be selected from selector position P in the event of malfunctioning of the P lock or loss of power.



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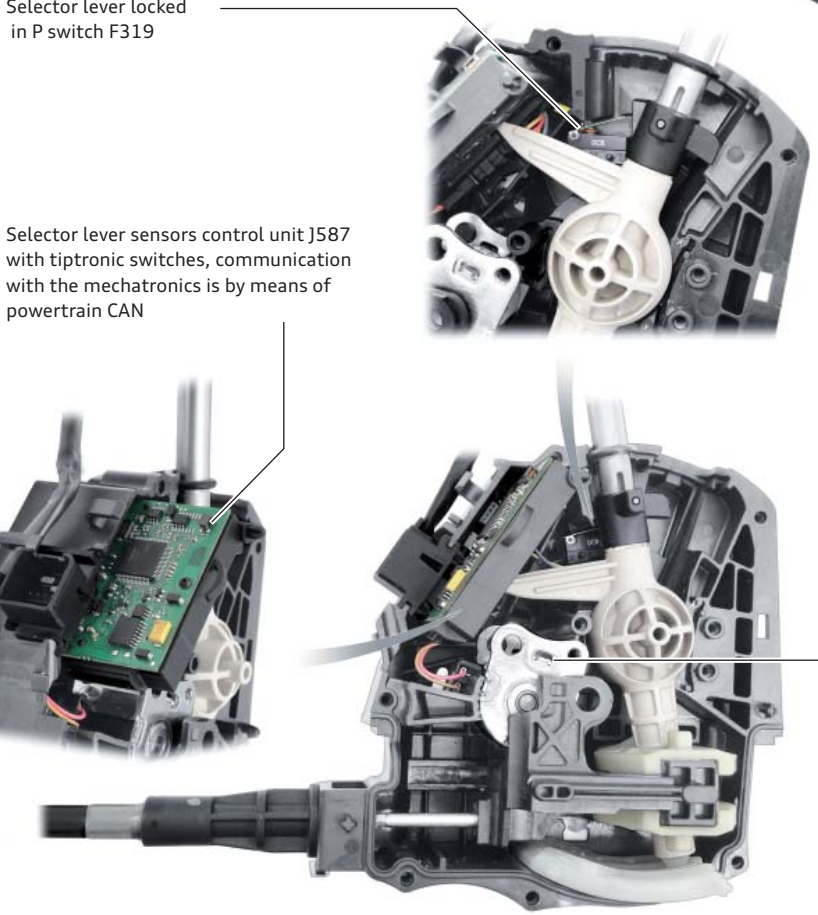

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You will find general descriptions of the selector mechanism functions in SSP 386.

Chassis

Overview

The development goal was to achieve handling characteristics which reflect our brand value of "sportiness". A good balance was found between driving dynamics and driving comfort. Major factors are the low vehicle gross weight, combined with an excellent axle load distribution of 61 – 62 % to the front axle, the large track width, the direct steering ratio and the ESP system with electronic transversal lock adapted to the A1.

Three different chassis versions are available for the Audi A1:

- a standard chassis (basic version)
- a sports chassis with a more sporty spring and damper set-up; ride height is identical to the standard version
- a heavy-duty chassis with 15 mm higher ride height (standard equipment in some markets).

477_186

Axles

The front suspension of the Audi A1 is based on a proven principle – McPherson strut axle with lower wishbones and rear link arm. Rear suspension is provided by a torsion beam axle which is notable for its compact design and low weight.

The axles are rated for a maximum tyre size of 18 inches. The large front are rear track widths of 1477 mm and 1471 mm respectively as well as the vehicle's low centre of gravity have a very beneficial effect on agility.

Front axle

The toe-in curve is configured kinematically for slight roll understeer. A large caster angle (5.2°) in combination with a large kingpin offset (33.2 mm) are used to ensure good straight-line stability.

Springs/dampers
- Linear coil springs with progressive polyurethane auxiliary springs
- Twin-tube gas-filled hydraulic dampers

Anti-roll bar
- Solid-steel anti-roll bar

Anti-roll bar coupling rod
- Steel part
- Connected to the damper and anti-roll bar by ball couplings

Swivel bearing
- Steel casting
- Mounts the damper via a clamping device
- An optimal 1:1 ratio is achieved by directly connecting the anti-roll bar to the damper via a coupling rod

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Transverse control arm
- Single-shell shaped steel part with low weight and high rigidity
- Precise steering response is achieved by connecting the transverse control arm to the swivel bearing by a ball joint
- The nonlinear characteristic of the rear transverse control arm bearing provides good roll comfort by maintaining low rigidity during small bearing movements, thereby ensuring good response.

Axle carrier
- One-piece shell construction made from high-strength steel
- It greatly enhances body rigidity by providing for a very good force flow
- An integrated transverse control arm effectively absorbs the transverse forces acting on the wheel

Wheel bearing/wheel hub
- Second-generation wheel bearing unit
- With integrated wheel hub and pulse wheel for the wheel speed sender

Rear axle

The rear axle is a major factor influencing the dynamic response and driving stability of the vehicle. An important design criterion is the self-steering behaviour of the axle when subjected to external forces. The rear axle of the Audi A1 was designed with the aim of achieving agile and sporty handling.

The vehicle displays virtually neutral handling when driven to within its dynamic limits. A slight increase in toe-in during compression helps to ensure a neutral response with a slight tendency towards understeer when cornering. The excellent anti-dive geometry associated with this design concept has been further enhanced by the use of elevated guide bearings. The car's impressive handling can also be attributed to the newly developed guide bearings.

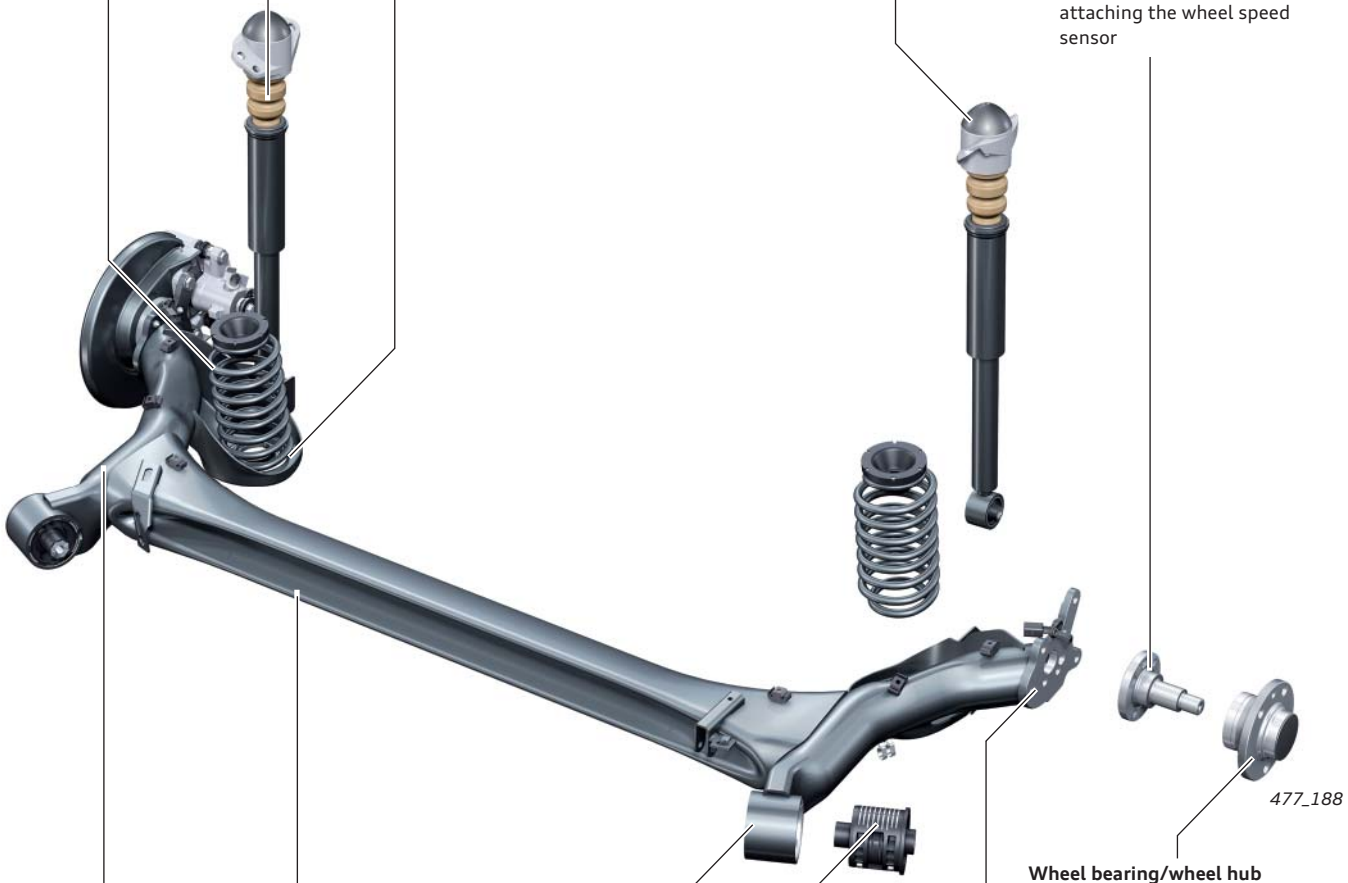
Dampers/auxiliary springs
– Twin-tube gas-filled hydraulic dampers with progressive rate polyurethane auxiliary springs

Springs
– High-strength linear coil springs with pigtailed ends

Spring disc
– The lower spring disc and axle damper mountings are made of sheet steel and welded to the trailing arms

Upper damper bearing
– Polyurethane damping element housed in an aluminium casing

Swivel bearing
– Forged steel part
– Connected to the axle plates by four screws
– With mounting hole for attaching the wheel speed sensor



477_188

Wheel bearing/wheel hub
– Second-generation wheel bearing unit
– With integrated wheel hub and pulse wheel for the wheel speed sender
– Connected to the swivel pin and attached by a central nut

Trailing arms
– Made from thin-walled tubes shaped by internal high pressure (hydroforming)

Buide bearings
– New development

Axle beam
– High-strength torsion tube

Bushings
– Clinched bushings for mounting the guide bearings

Axle plates
– For mounting the swivel pin
– Made of thick sheet steel and welded to the trailing arms
– Are reworked (milled) mechanically to set the correct toe and camber values

Chassis alignment and configuration

Front axle

The individual toe values on the left and right-hand sides of the front axle can be set independently of each other at the track rods. The camber setting can be corrected by shifting the subframe transversely. The camber settings on the left and right-hand sides of the axle cannot be adjusted individually.

Rear axle

Due to the design concept, there are no setting points on the rear axle. The correct toe and camber values are obtained by reworking the axle plates during the manufacturing process.

Brake system

Wheel brakes

To ensure that the brake system also meets the exacting demands on sporty handling, the Audi A1 generally comes equipped with vented disc brakes at the front and solid disc brakes at the rear.

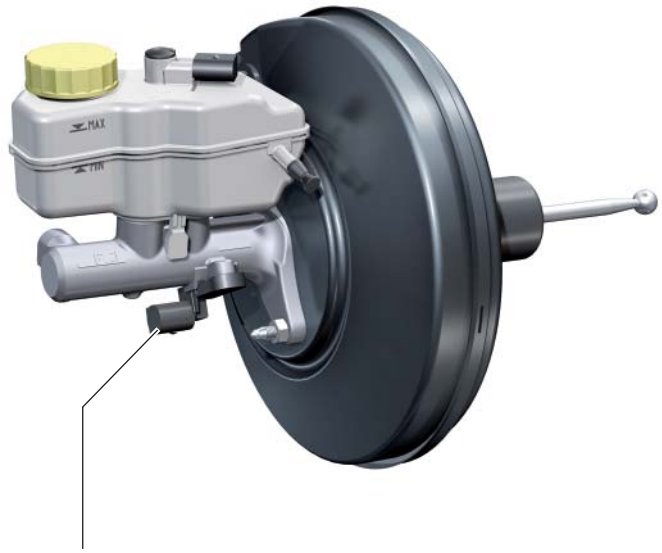
14 and 15 inch brake systems are used depending on engine type. This brake system delivers outstanding braking performance.

Brake system	14 inch	15 inch
Engine output	up to 66 kW	over 66 kW
Front wheel brake		
	FSIII 54/22/14“ Brake disc: Ø 256 x 22 mm	FN3 54/25/15“ Brake disc: Ø 288 x 25 mm
Rear wheel		
	C38 HR-A 14“ Brake disc: Ø 230 x 9 mm	C38 HR-A 14“ Brake disc: Ø 230 x 9 mm

Brake servo and master brake cylinder

10 inch brake servos are used on all left hand drive models. Equivalent 7/8 inch tandem brake servos are used on right hand drive models because their installation space is different to that of left hand drive models.

Both brake servos are fitted with a tandem master brake cylinder (22.2 mm in diameter) in order to achieve dynamic, short brake pedal travel. As with the Aud A3 and Audi TT models previously, a contactless brake light switch is used in the Audi A1.



Brake light switch F

477_192

Brake light switch

The brake light switch is a Hall sensor. A magnetic ring (permanent magnet) is attached to the master brake cylinder piston. When the brake pedal is pressed, the magnetic ring passes over the switching point of the Hall sensor.
The sensor electronics produce two redundant signals: the brake light signal and the brake test signal. The engine control unit J623 reads in both signals over discrete wires, while the ABS control unit J104 uses a single discrete wire to read in the brake light signal. A repair kit for replacing the sensor is also available for the Audi A1.

Electronic Stabilisation Program ESP

An ESP system of the latest generation is used on the Audi A1: the ESP 8.2 from Bosch. A major new feature is that the transverse acceleration sensor G200, the longitudinal acceleration sensor G251 and the yaw rate sensor G202 are integrated in control unit J104.

The ABS, ASC, EDL, ESP and electronic transverse lock functions are standard equipment. The Hill Hold Assist function is standard on models with automatic transmision and optional on models with manual transmission.

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"ESP OFF" button

The ASC function can be deactivated by pushing the "ESP OFF" button. Stabilising ESP adjustments are not made until significantly higher wheel slip values occur. This provides better traction on loose surfaces.
The "ESP OFF" warning lamp continuously indicates that the ESP system is off. The ESP function is fully reactivated after turning the ignition off/on or restarting the vehicle.

477_222

Wheel speed sensor

Active sensors which operate on the magnetoresistive principle are used. The change in the sensor's electrical resistance when a magnetic field is applied is evaluated.
The magnetic field, which changes periodically as a function of wheel speed, is generated by a sensor ring consisting of permanent magnets with alternating polarity. This ring is integrated in the wheel bearing seal.
The speed signals are recorded by the ABS control unit J104 in the form of pulse-width-modulated (PWM) signals.

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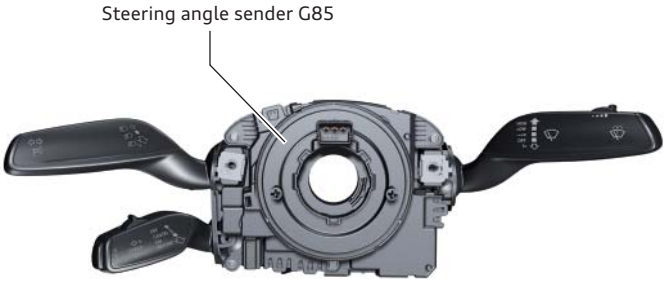
Steering angle sender

Steering angle sender G85 is integrated in the steering column switch module as a separate unit. It sends the steering angle signals to the ABS control unit J104 via the powertrain CAN bus.
The sender is comprised of an optical sensor and a Hall sensor. The double acquisition of measurement data ensures that the sender does not "lose" its orientation if the terminal 30 signal is lost (e.g. by disconnecting the car battery). When terminal 30 becomes available again, the sender recognises automatically if the steering wheel is in the 0° – 360° turning angle range or in the 361° – 720° turning angle range. No calibration is required.
It is necessary to calibrate the ESP control unit after replacing the sender.



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Key ESP service work

- The control unit and hydraulic unit are not separable in service workshops.
- The control unit can be encoded online using the SVM database.
- After replacing the control unit, it is necessary to calibrate the senders for brake pressure, transverse acceleration, longitudinal acceleration and yaw rate, as well as the steering angle sender.
- No road tests or system tests are required.

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Brake application: foot pedal and hand lever

The foot pedals have been optimised for weight and are modular in design. Like the clutch pedal and accelerator lever, the clutch and accelerator/brake module mounting brackets are made of fibre-reinforced plastic.
The steel brake pedal is notable for its shell construction designed to minimise weight.
The parking brake is operated in the conventional way using the handbrake lever on the centre console.

477_196

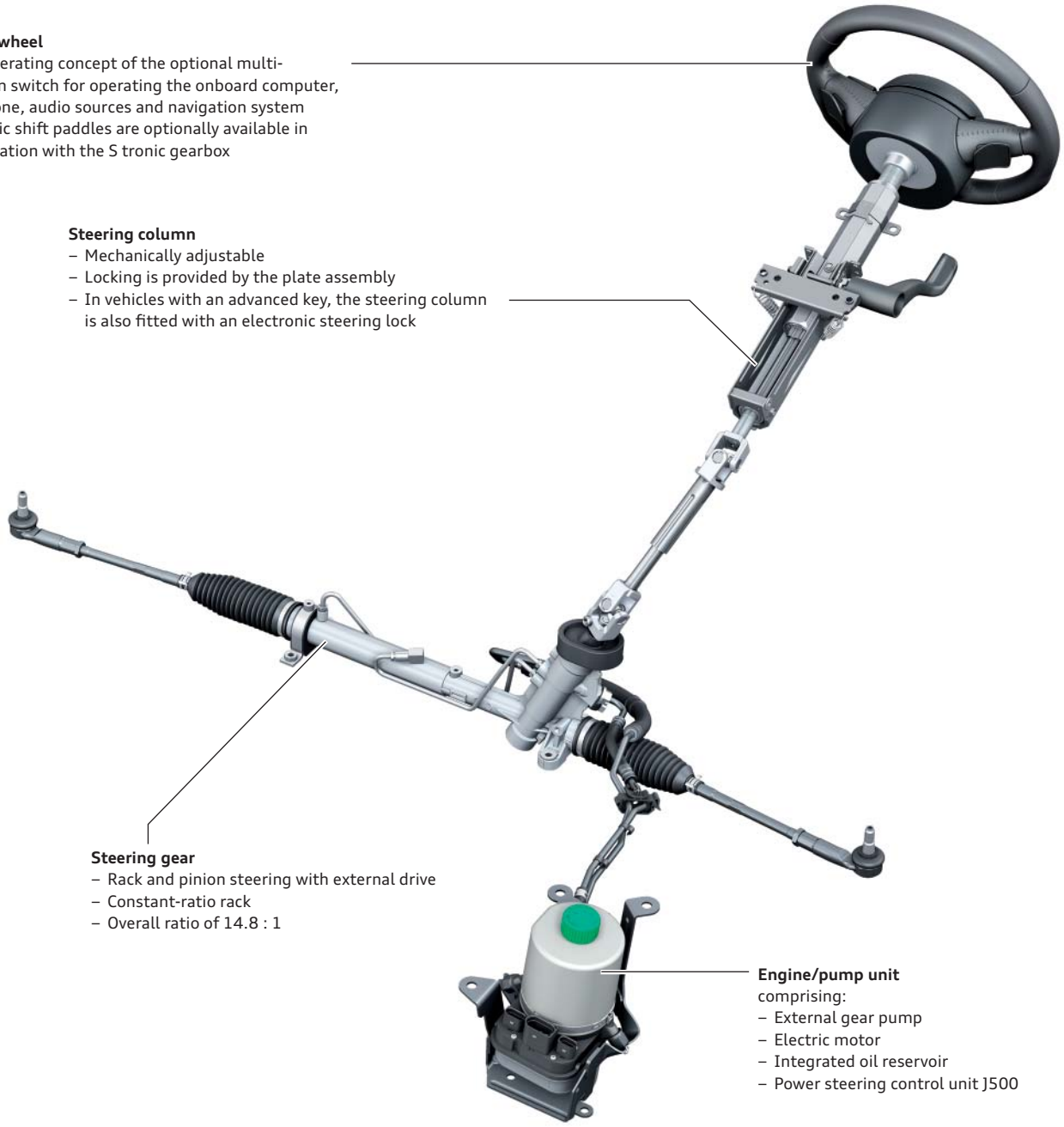
Steering system

The Audi A1 is equipped with an electro-hydraulic power steering system. Its general design and functional principle are identical to those of the steering system previously introduced in the Audi A2. Oil pressure is produced by an electric motor driven pump. The power steering is adapted to the driving conditions on the basis of a characteristic map which controls the speed of the electric motor, and thereby the hydraulic flow rate, depending on vehicle speed and steering angle speed.

The demand-driven engine-pump unit provides an outstanding steering feel at all operating points. Unlike a conventional hydraulic power steering system, energy is input at the same time.

Steering wheel
- New operating concept of the optional multi-function switch for operating the onboard computer, telephone, audio sources and navigation system
- Tiptronic shift paddles are optionally available in combination with the S tronic gearbox

Steering column
- Mechanically adjustable
- Locking is provided by the plate assembly
- In vehicles with an advanced key, the steering column is also fitted with an electronic steering lock



Steering gear
- Rack and pinion steering with external drive
- Constant-ratio rack
- Overall ratio of 14.8 : 1

Engine/pump unit
comprising:
- External gear pump
- Electric motor
- Integrated oil reservoir
- Power steering control unit J500

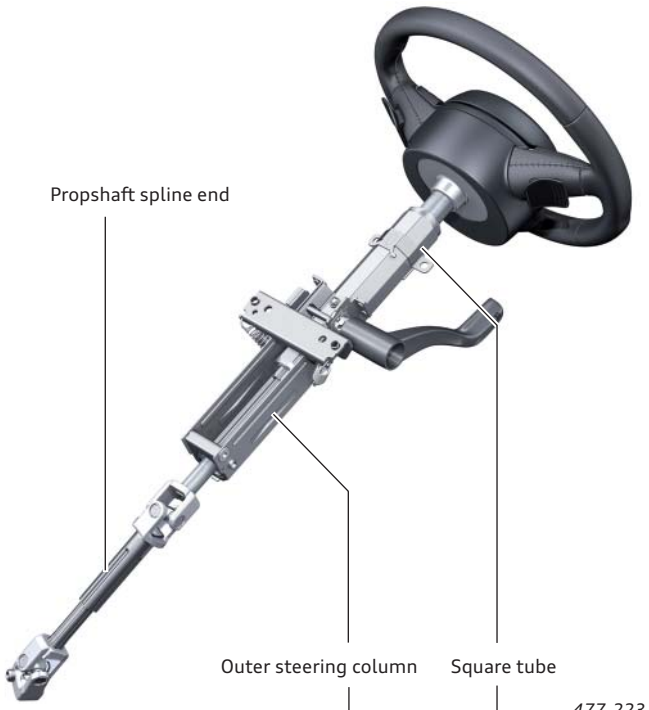
477_197

Steering column

The steering column is mechanically adjustable for rake and reach (30 mm each way) The square tube in the outer steering column can be adjusted for rake and reach after releasing the excentric plate locking mechanism using the adjustment lever.

In the event of a collision, the relative movement of the steering gear towards the interior of the vehicle is checked by the spline end of the prop shaft. When the driver's torso impacts the steering wheel, the square tube is pushed into the outer steering column. Embossings on either side of the steering column tube produce a defined resistance counteracting the longitudinal motion of the square tube. This technical solution predetermines the force required to push in the steering wheel in the event of a collision.

Vehicles with an advanced key do not have ignition starter D. Mechanical locking of the steering column lock is provided by a locking unit attached by clips to the steering column electronics control unit J527 as a modular unit. This locking unit is comprised of the control unit J764, the electric drive and the locking pin actuating mechanism. When activated, the locking pin is pushed into a slot in the locking system connected to the steering shaft, thereby locking the steering column. The electrical control system is described in the chapter "Advanced key".



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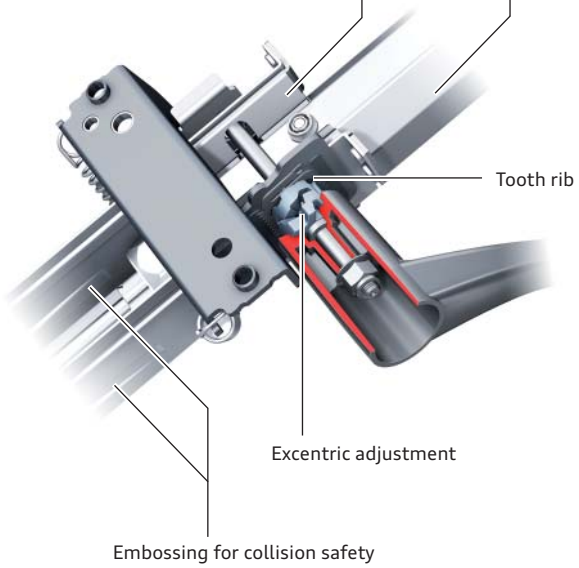

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Engine-pump unit

The power steering control unit J500 uses the powertrain CAN bus for communication purposes. The control unit receives information on vehicle road speed from the dash panel insert control unit J285 and information on steering angle speed from the steering angle sender G85.

As the vehicle's speed increases, the speed of the electric motor decreases and power assistance is reduced. This enables good road contact to be maintained and ensures that the steering system operates at optimal energy efficiency. At high steering angle rates, pump speed is increased in order to provide the required volumetric flow.

477_224

Steering wheels

Overview

		 Sports steering wheel, 3-spoke design	 Leather-bound sports steering wheel, 3-spoke design	 Multi-function sports steering wheel, 3-spoke design	 Multi-function sports steering wheel, 3-spoke design including shift paddles
Attraction	**HS**	Standard	Option	Option	-
Attraction	**S tronic**	Standard	-	Option	Option
Ambition	**HS**	-	Standard	Option	-
Ambition	**S tronic**	-	Standard	Option	Option

Key servicing work for the new steering system

- The engine-pump unit can only be replaced as a complete unit in service workshops.
- The oil reservoir on the removed engine-pump unit can be replaced separately.
- The oil level can be checked through a service flap in the left-hand wheel arch.
- The steering column, propshaft and universal joint assembly cannot be separated in service workshops and is only replaceable as a complete unit, if necessary.
- The steering gear cannot be repaired; track rods, track rod ends and gaiters can be replaced separately.

Wheels and tyres

Overview

In addition to the requirements relating to design and safe handling, the focus of development was on ecological aspects in particular. Special emphasis was placed on lightweight wheel design and minimising tyre rolling resistance.
Run flat tyres of size 215/45 R16 (AOE[1)]) and all-weather tyres are optional. The complete winter wheels with size 185/60 R15 and 195/50 R16 tyres are suitable for snow chains.

A run-flat winter tyre of size 195/50 R16 (AOE[1)]) is available. 7.5Jx18 alloy wheels with size 225/35 R18 W tyres are available in combination with the S Line sports suspension.
The "Tire Mobility System" is standard.


1


2


4


5


6


3


7

Basic 15“ wheel Attraction	**Optional 15“ wheels**	**Basic 16“ wheel Ambition**	**Optional 16“ wheel**	**Optional 17“ wheels**
6.5J x 15 ET34 1 and 6J x 15 ET29 steel wheel with full cap 205/55 R15 and 185/60 R15	6.5J x 15 ET34 2 alloy wheel, finished in brilliant silver 205/55 R15	7J x 16 ET34 4 alloy wheel, finished in brilliant silver 215/45 R16	7J x 16 ET34 5 alloy wheel, finished in brilliant silver 215/45 R16	7.5J x 17 ET36 6 alloy wheel, (flow formed[2)]) polished 215/40 R17
Winter wheel	6.5J x 15 ET34 3 alloy wheel, polished 205/55 R15	**Winter wheel**		7.5J x 17 ET36 7 alloy wheel, (flow formed finished in brilliant silver with bolted rim flange 215/40 R17
6J x 15 ET29 steel wheel with full cap 205/55 R15 and 185/60 R15 (winter tyres)		6J x 16 ET30 alloy wheel, finished in brilliant silver 195/50 R16 (winter tyres)		

[1)] AOE denotes Audi-specific tyres extended run flat capability and well-balanced ride comfort. In the event of tyre failure or puncture, the run-flat tyre gives a range of 30 km and has a maximum allowable speed of 80 kph.

[2)] Flow forming is a special production process which combines the advantages of the forging process and the casting process. The rim well surface of the cast blank wheel is compacted in a warm state. This process offers great scope for design, together with low weight and high component strength.

Tyre pressure indicator

The tyre pressure indicator will also be available as an option for the Audi A1. The run-flat tyres option is only available for vehicles equipped with a tyre pressure indicator.

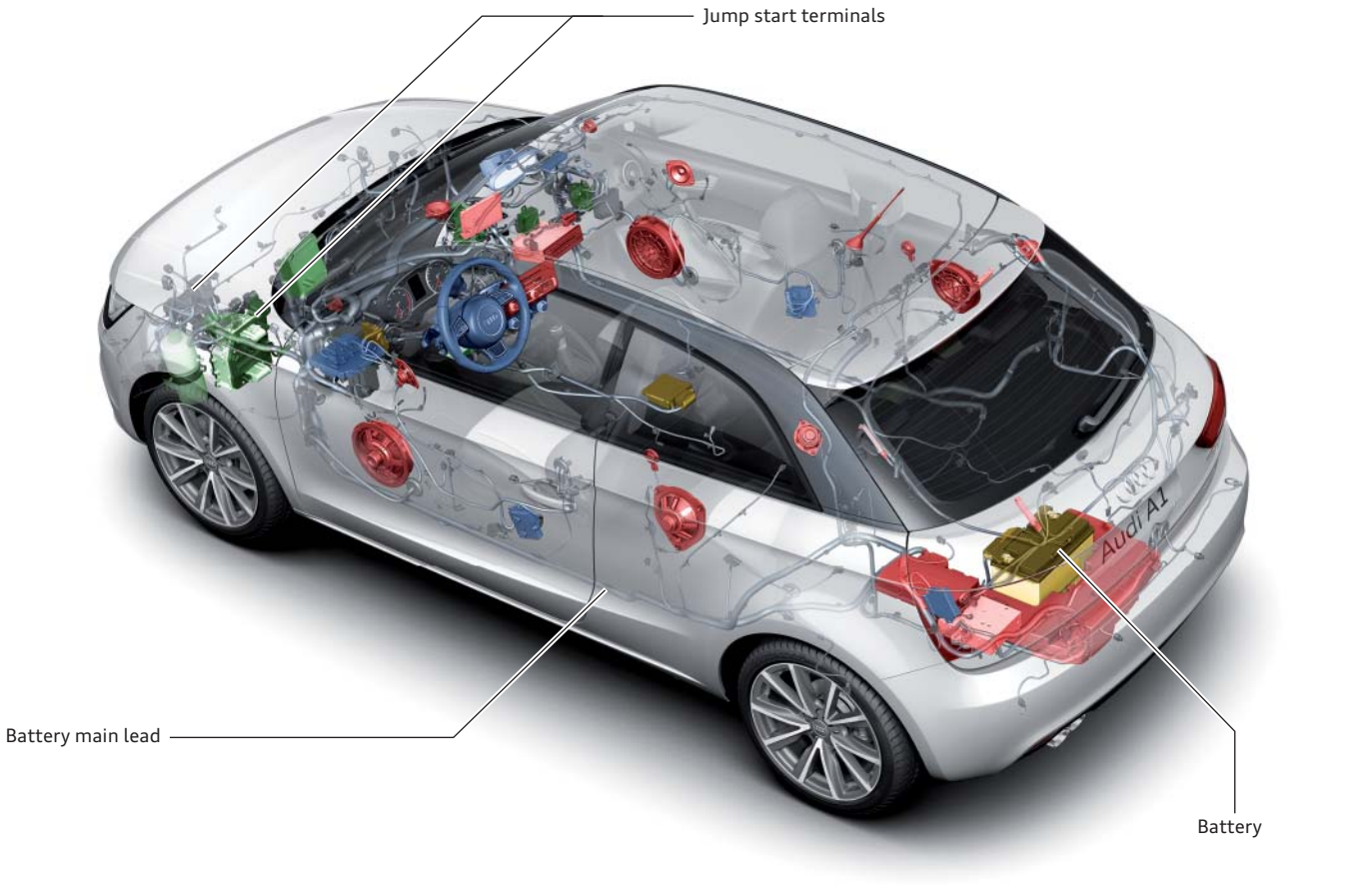
Electrical system

Power supply

Jump start terminals

The jump start terminals of the Audi A1 are located in the engine bay at the front left. There is a grounding bolt near the left suspension strut tower.

The positive terminal is located on the main fuse holder and is protected by a cover. The jump start terminals can also be used for charging the car battery.



477_200

Battery main lead

Because the battery is installed in the boot, the lead has to be routed through the vehicle from the positive terminal into the engine bay.

For weight reasons, the main battery lead is made of aluminium. It is connected to the battery's positive pole via the battery isolator.

Battery

The battery in the Audi A1 is housed in the boot. The A1 with 1.2l TFSI engine is an exception. In this model, the battery is located in the engine bay on the left-hand side. A1 models are delivered with or without a start-stop system depending on engine-gearbox combination. The energy management system and brake energy recuperation function are exclusive to models with a start-stop system.
AGM batteries are used on all these models due to the increased number of start cycles and charge/discharge cycles. AGM batteries (Absorbant Glass Mat) are filled with an electrolyte absorbed into a mat of fine glass fibres.

These batteries are noted for their leak-proofing, long cycle life, good cold start performance, low self-discharge and freedom from maintenance.

The following batteries are used on the Audi A1:

Standard batteries	AGM batteries (on models with start-stop)
▸ 61 Ah/330 A	▸ 58 Ah/360 A
▸ 70 Ah/340 A	▸ 68 Ah/380 A
▸ 80 Ah/380 A	▸ 75 Ah/420 A

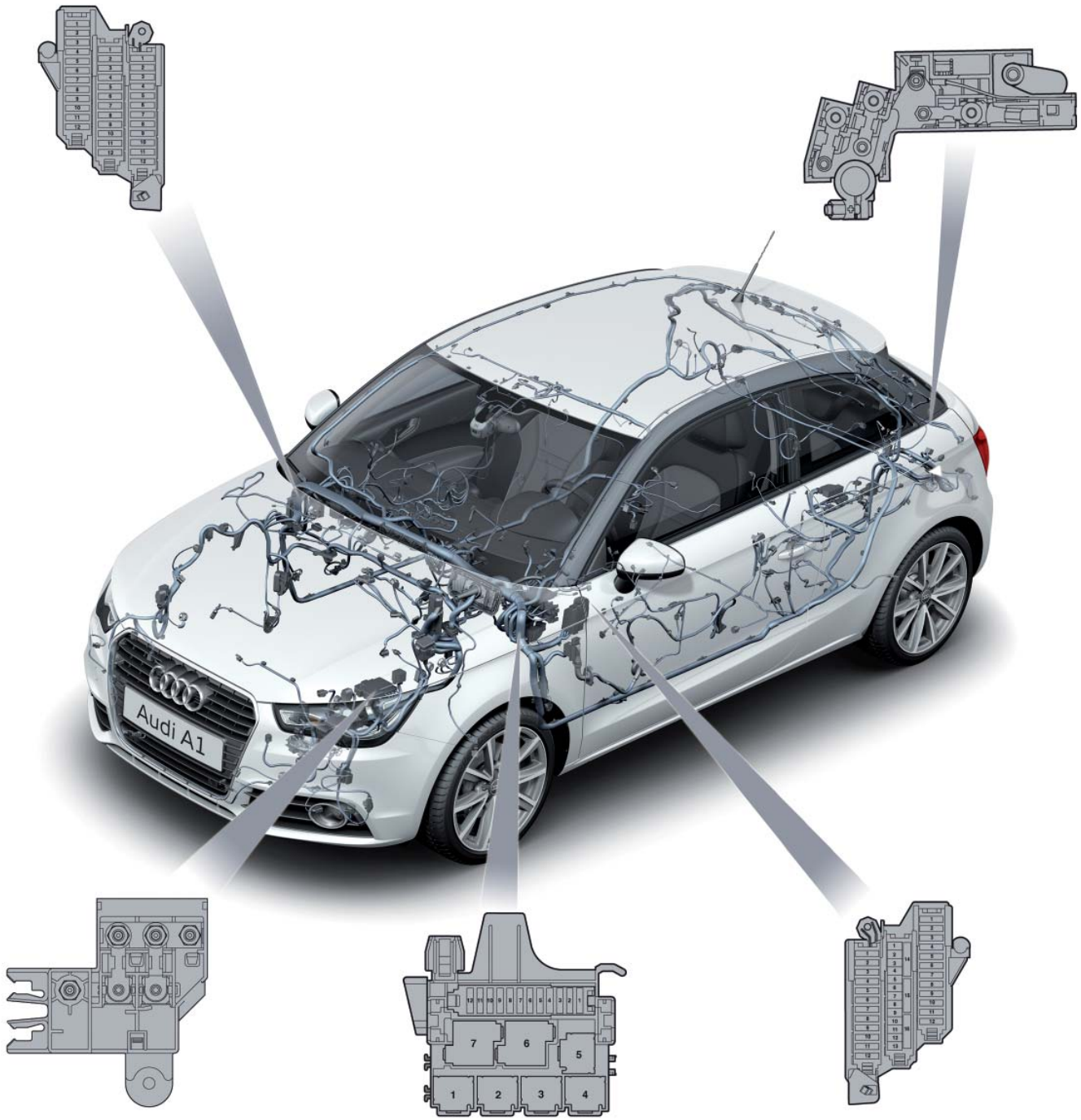
Fuses and relays

Fuse holder on the passenger side dash panel

Designation in current flow diagram: "SD" - these fuses can be accessed by the customer after removing the side dash panel cover

Fuse holder at the battery positive pole (for models with in-boot battery only)

Designation in current flow diagram: "SA" - the battery isolator (which disconnects the main battery lead in the event of a crash) is installed here



Fuse holder in the engine bay

Designation in current flow diagram: "SB" - these fuses cannot be accessed by the customer; on models where the battery is housed in the engine bay, the fuse holder is located directly over the battery's positive terminal

Fuse and relay holder in the driver side footwell

Designation in current flow diagram: "SF" - these fuses cannot be accessed by the customer

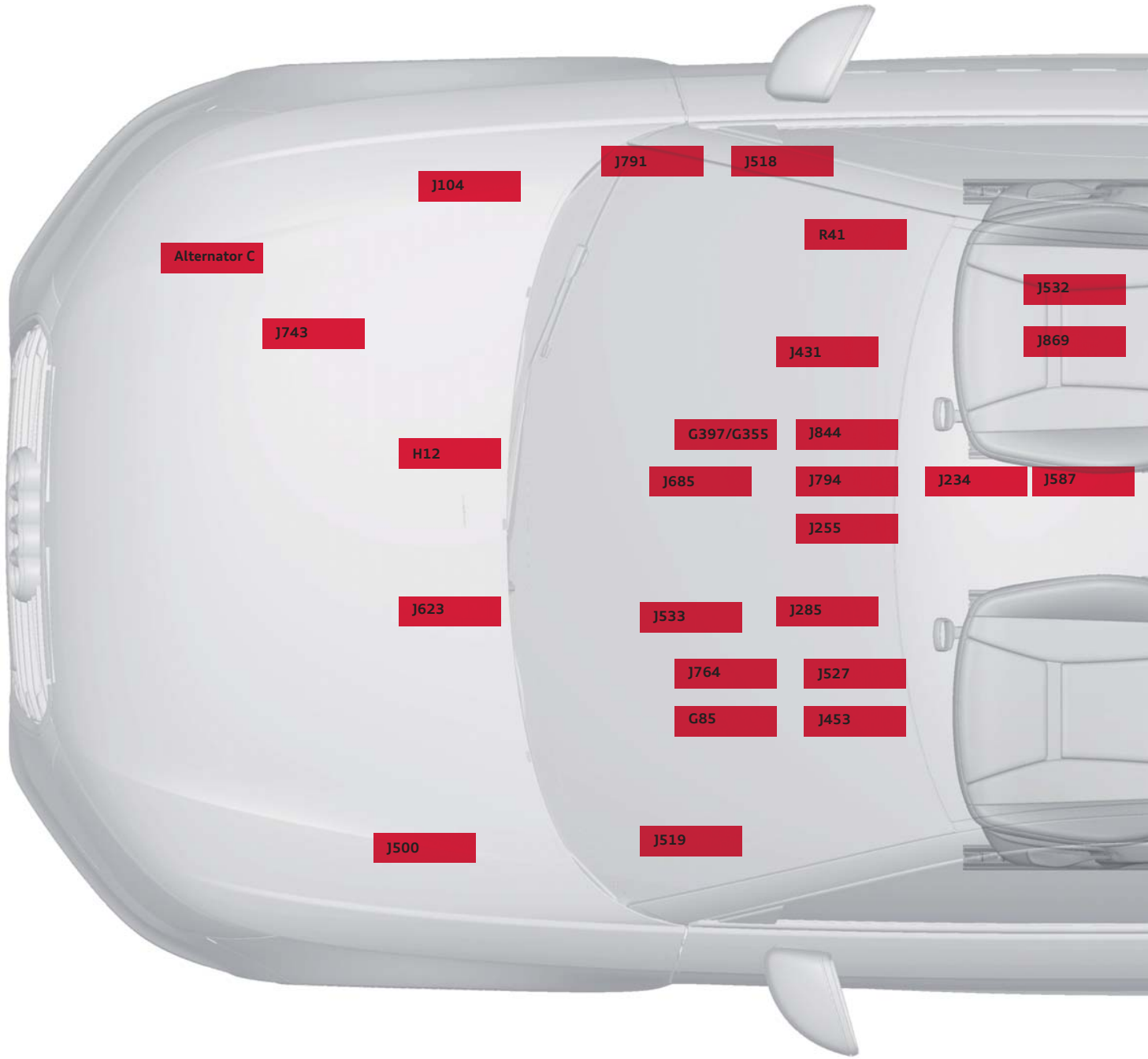
Fuse holder on the driver side dash panel

Designation in current flow diagram: "SC" - these fuses can be accessed by the customer after removing the side dash panel cover

Installation locations of the control units

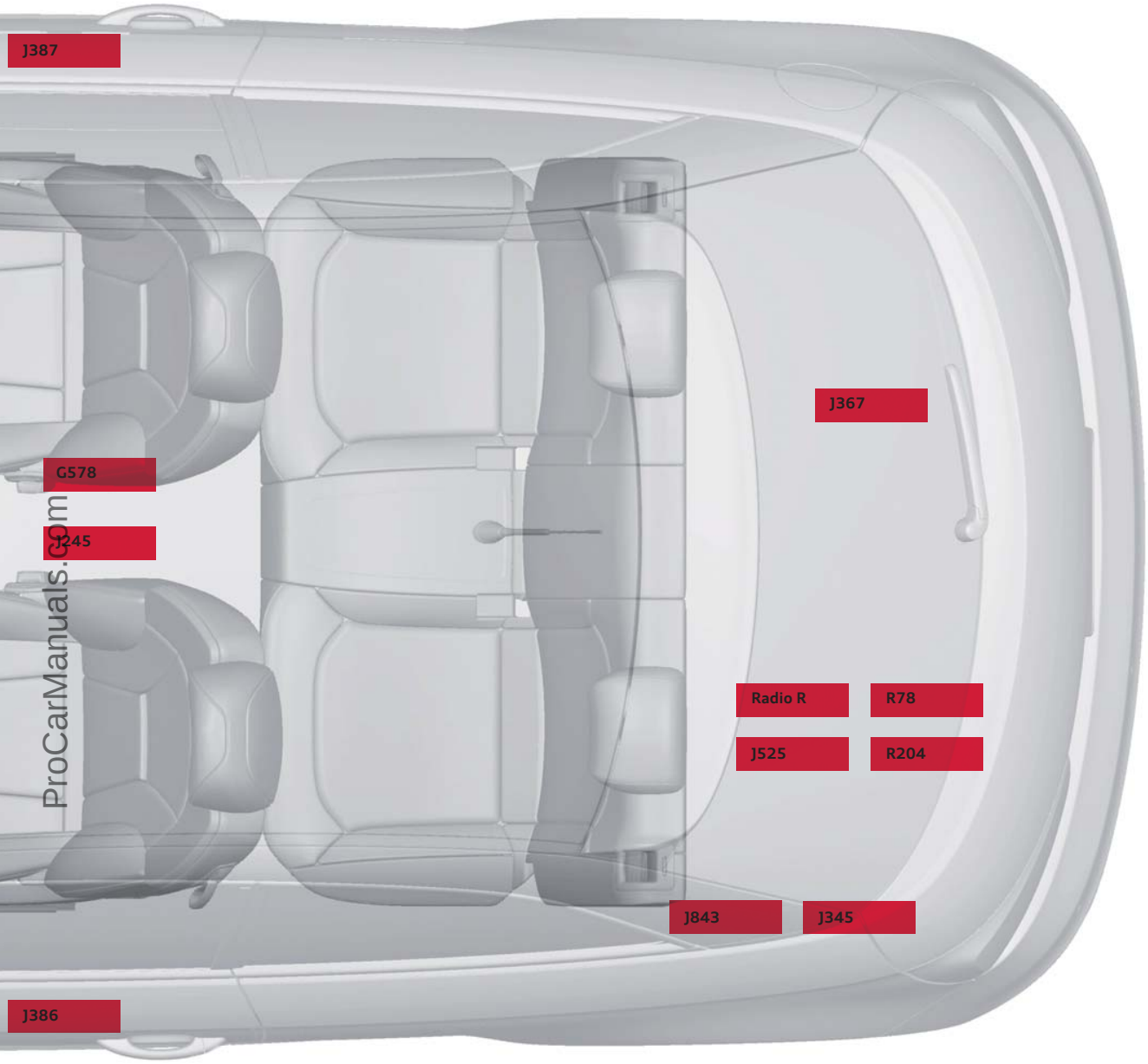
Some of the control units shown in the overview are optional and/ or country-specific equipment.

Refer to the current service literature for details of controls unit positions as well as instructions for installation and removal.



Legend:

C Alternator
G85 Steering angle sender
G355 Humidity sensor
G397 Rain and light detector sensor
G578 Anti-theft alarm sensor
H12 Alarm horn
J104 ABS control unit
J234 Airbag control unit
J245 Sliding sunroof control unit
J255 Climatronic control unit
J285 Control unit in dash panel insert
J345 Trailer detector control unit
J367 Battery monitor control unit
J386 Door control unit, driver side
J387 Door control unit, front passenger side
J431 Headlight range control, control unit
J453 Multfunction steering wheel control unit
J500 Power steering control unit
J518 Entry and start authorisation control unit

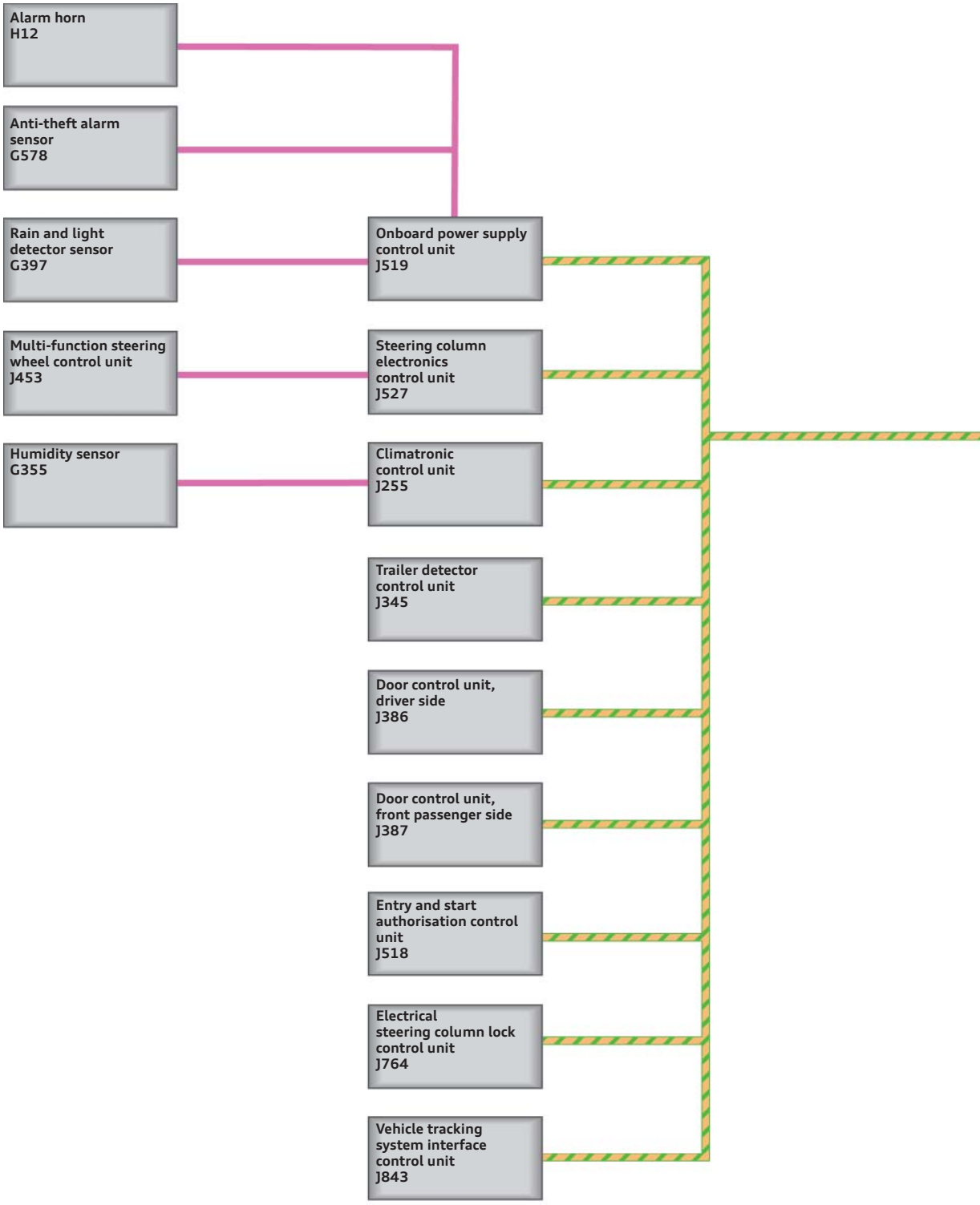


477_162

J519 Onboard power supply control unit
J525 Digital sound package control unit
J527 Steering column electronics control unit
J532 Voltage stabilizer
J533 Data bus diagnostic interface
J527 Selector lever sensors control unit
J623 Engine control unit
J685 MMI display
J743 Twin clutch gearbox mechatronics
J764 Electrical steering column lock control unit
J791 Audi parking system control unit
J794 Information electronics control unit 1
J843 Vehicle tracking system interface control unit
J844 Headlight assistant control unit
J869 Structure-borne sound control unit
R Radio
R41 CD changer
R78 TV tuner (Japan only)
R204 TV card reader (Japan only)

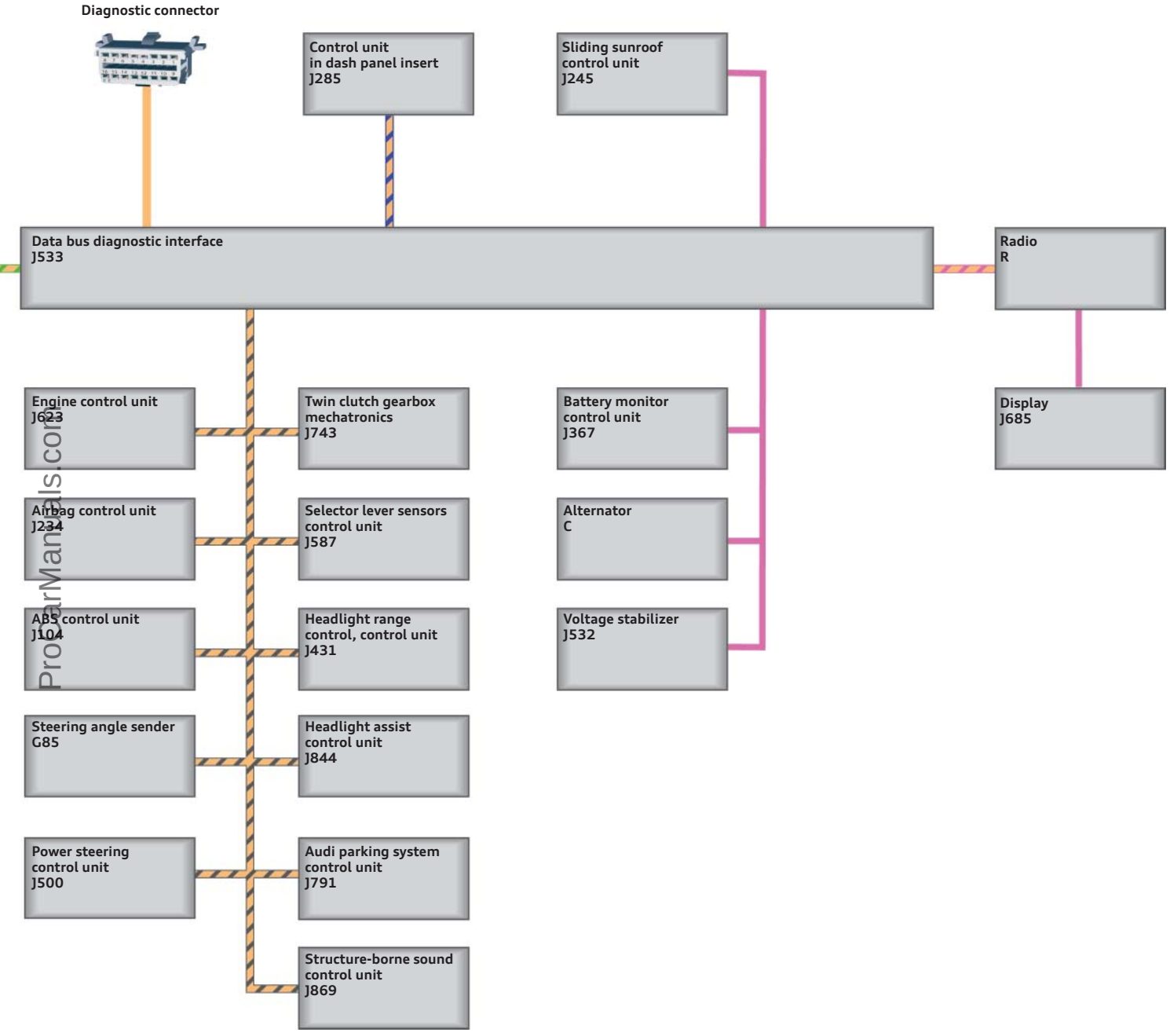
Topology

Models with infotainment CAN



The diagram shows the topology of a model version with an extensive equipment specification.

Some of the control units shown here are optional and/or country-specific equipment.



477_154

Convenience CAN

Infotainment CAN

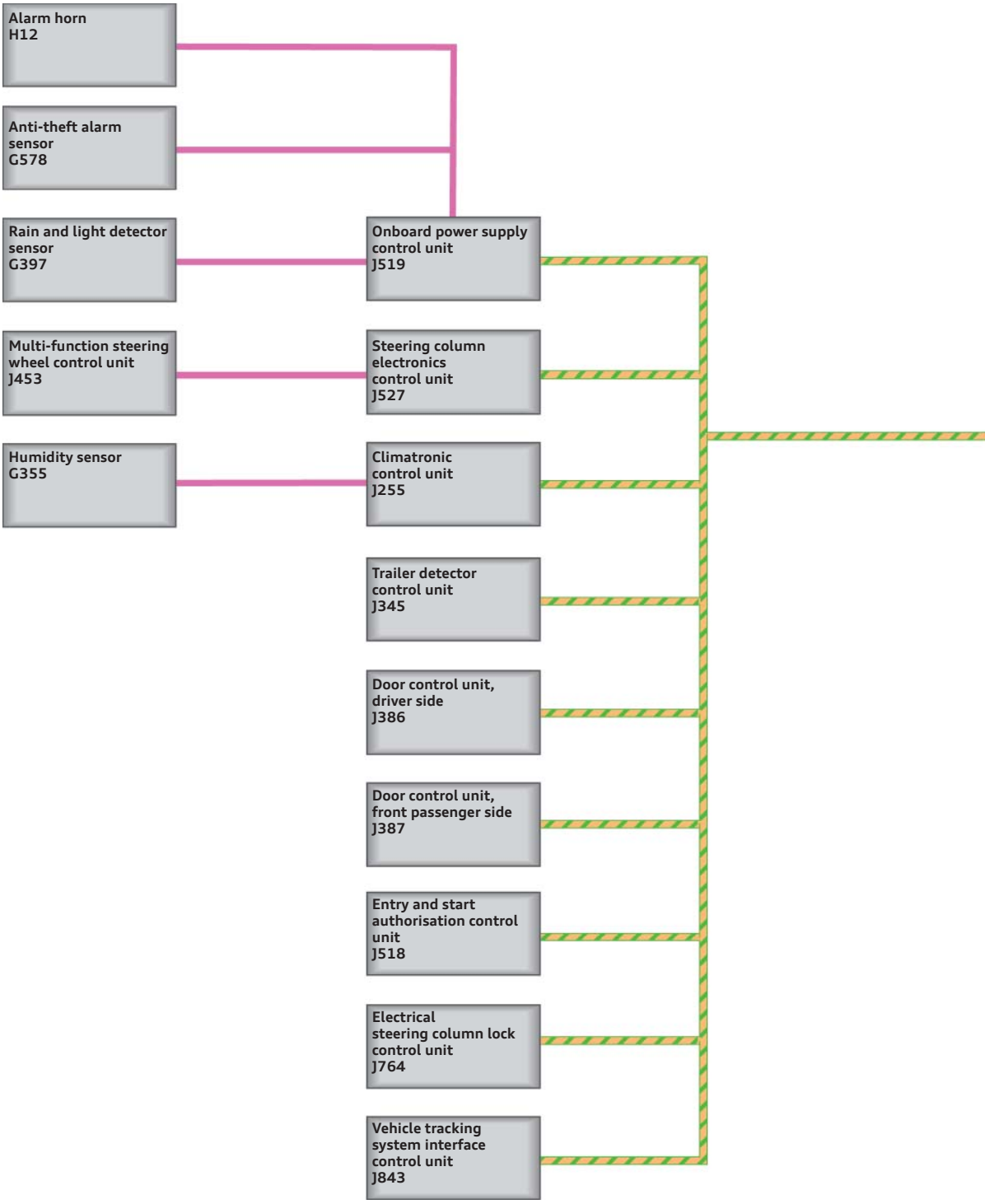
Powertrain CAN

LIN bus

Dash panel insert CAN

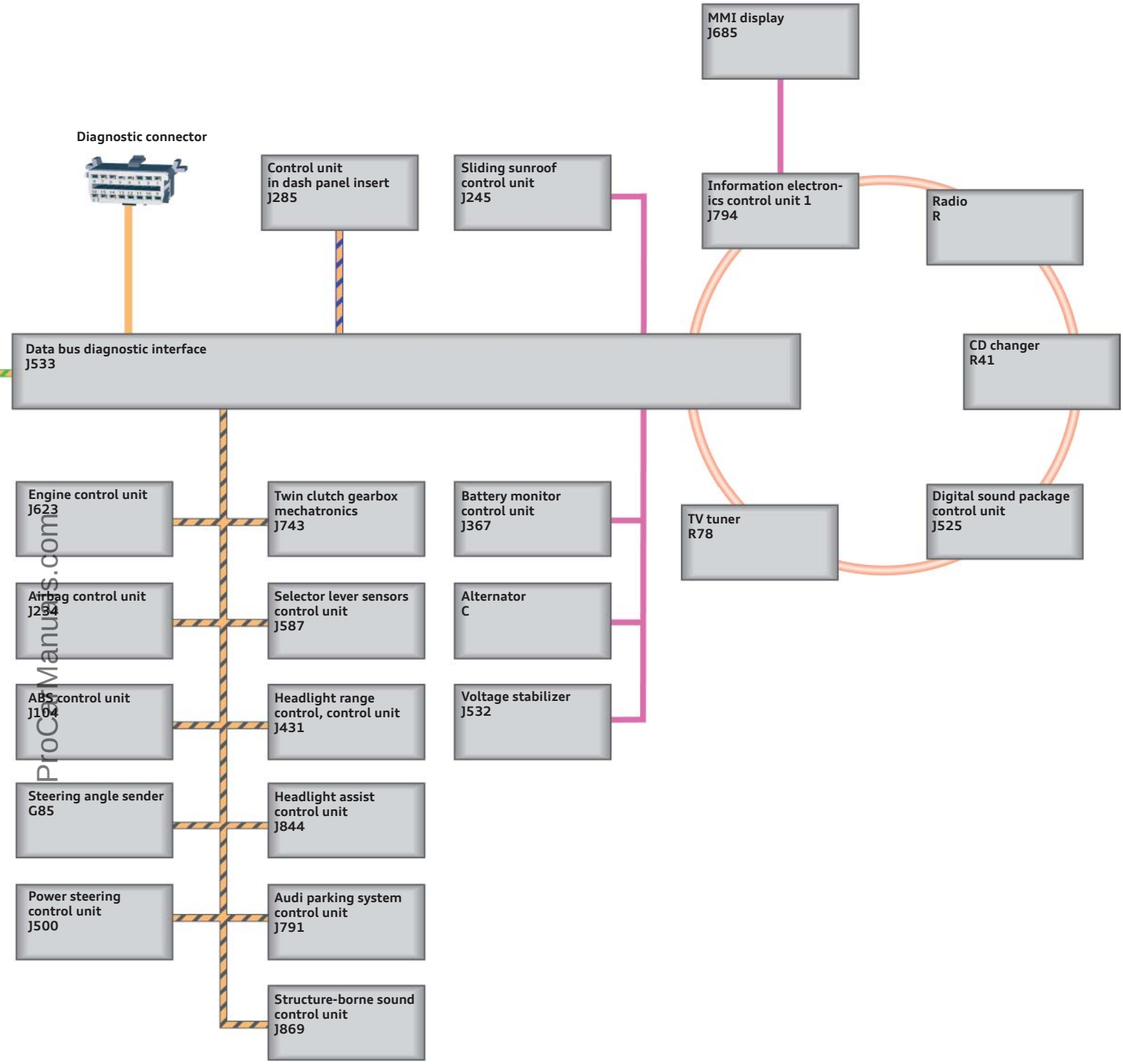
Diagnostic CAN

Models with MOST bus



The diagram shows the topology of a model version with an extensive equipment specification.

Some of the control units shown here are optional and/or country-specific equipment.



477_155

Convenience CAN

Powertrain CAN

Dash panel insert CAN

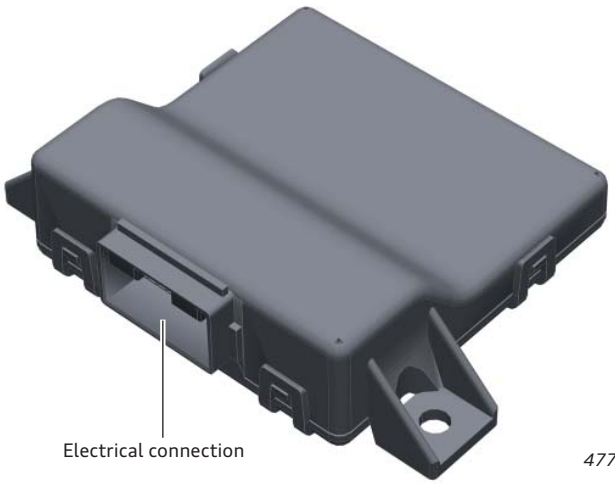
MOST bus

LIN bus

Diagnostic CAN

Data bus diagnostic interface J533 (gateway)

In the case of the Audi A1, a distinction is made between two versions of the data bus diagnostic interface: a version for models with infotainment CAN and a version for models with MOST bus system.



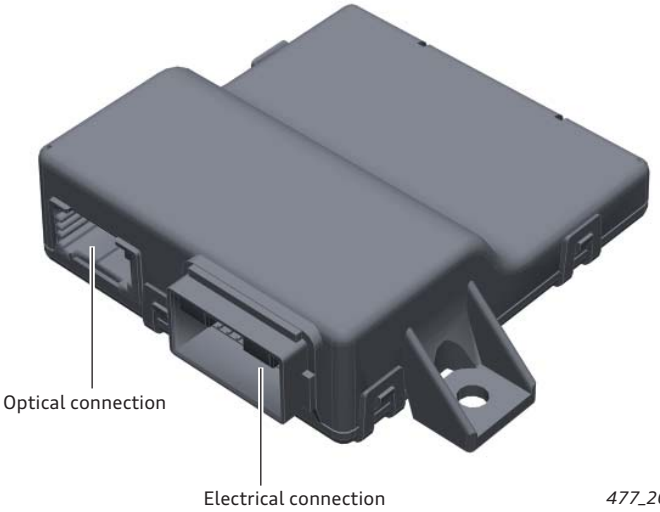
477_202

The following applies to models with infotainment CAN:			
Description	Data bus diagnostic interface J533		
Installation location	Dash panel, driver footwell		
Bus systems	**Convenience CAN**	100 kbit/s	Single-wire capable
	Powertrain CAN	500 kbit/s	Not single-wire capable
	Dash panel insert CAN	500 kbit/s	Not single-wire capable
	Infotainment CAN	100 kbit/s	Single-wire capable
	Diagnostics CAN	500 kbit/s	Not single-wire capable
	LIN bus	20 kbit/s	Single-wire bus system
Tasks	▸ Networking gateway ▸ Diagnostic interface ▸ Transport mode (energy-optimised state for transportation or long periods of non-use) ▸ Wake up monitor (monitors bus standby mode or bus wake-up mode) ▸ Supplying data to the onboard computer with efficiency program ▸ Energy management (only applicable to models with a start-stop system and brake energy recuperation function) LIN master for: ▸ Battery monitor control unit J367 ▸ Alternator C ▸ Voltage stabilizer J532 ▸ Slide/tilt sunroof control LIN gateway for sliding sunroof control unit J245		
Diagnostic address	19		
Functions of J533 in the vehicle diagnostic tester	▸ Read fault memory ▸ Passive current measurement without current probe[1)] ▸ Actuator test, alternator voltage[1)] ▸ Actuator diagnostics, selective[2)] ▸ Encoding ▸ Read measured data ▸ Activate / deactivate Transport mode ▸ Adapt battery[1)] ▸ Check battery[1)] ▸ Replace control unit ▸ Read history data[1)] ▸ Read data bus standby mode ▸ Battery monitor – J367, update programmimg[1)] ▸ Read control unit data ▸ J533 - activate component protection		

[1)] These functions are only available for models with a start-stop system and brake energy recuperation function, since these are the only ones which come equipped with an energy management system.
For this reason, it is only necessary to adapt the replacement batteries on these models.

[2)] Selective actuator diagnostics can only be performed on vehicles equipped with a sliding sunroof.

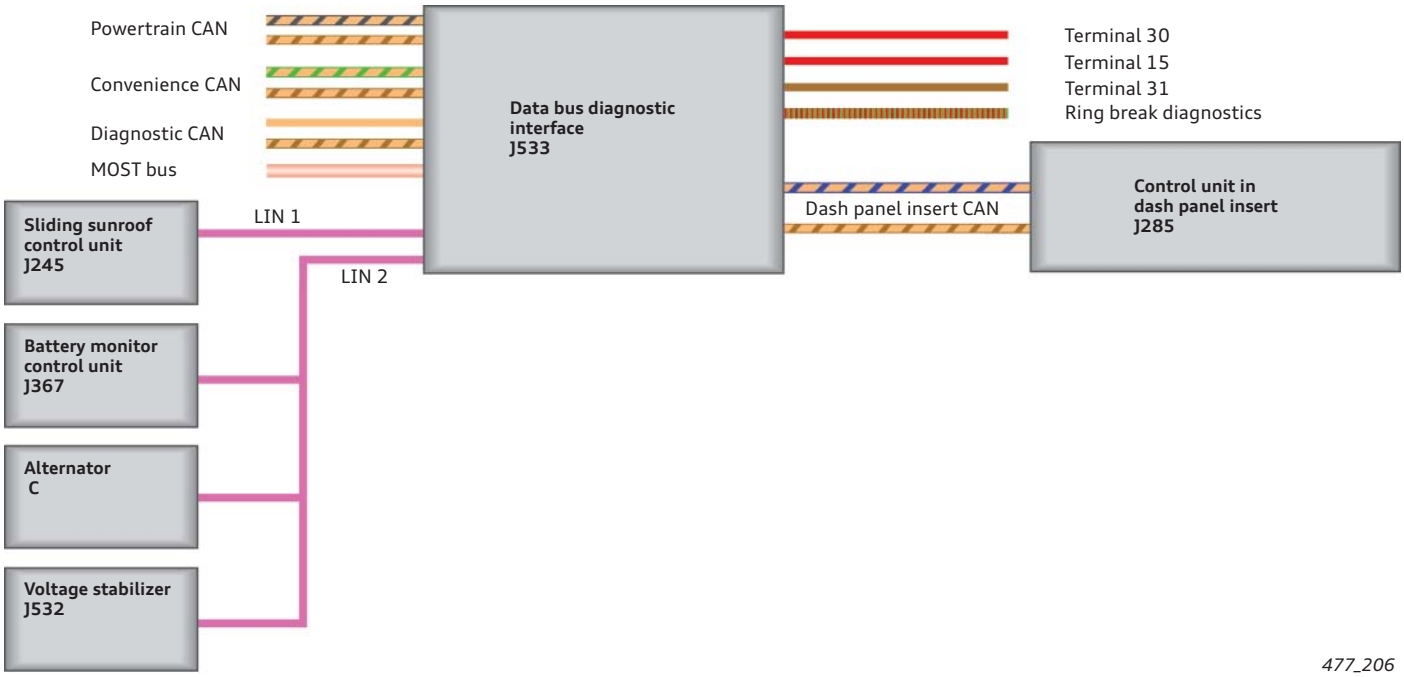
The version for models with a MOST bus can be distinguished by its two separate terminals.
The items listed in the table apply to models with a MOST bus system, and differ or are supplementary to those for models equipped with the infotainment CAN.



477_204

The following applies to models with MOST bus:			
Bus systems (divergent)	**MOST bus** (in place of infotainment CAN)	**22 Mbit/s**	**Ring structure (open circuit results in failure)**
Tasks (supplementary)	Diagnostic master for MOST bus system		
Functions of J533 in the vehicle diagnostic tester (supplementary)	▸ Ring break diagnostics ▸ Optical fibre break diagnostics with 3 dB attentuation ▸ Reset MOST bus open circuit counter ▸ Check optical power reserve		

Circuit diagram of the data bus diagnostic interface J533 (with MOST bus)



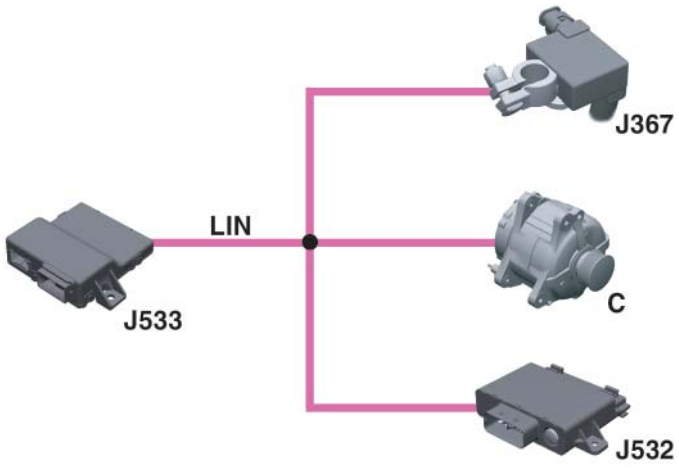
477_206

Since the instrument cluster CAN in the Audi A1 has a transceiver with wake-up capability, it was possible to dispense with a wake-up line like in the Audi A3 ’04.
If the dash panel insert is to be woken up without switching terminal 15 "on", e.g. to display the time and mileage in the dash panel insert when opening the driver's door, this can be accomplished by sending a bus signal across the dash panel instrument CAN.

For the sake of completeness, the CAN High and CAN Low lines are shown in this circuit diagram. For the sake of simplicity, only the CAN High lines are shown in other diagrams, e.g. topology.

Energy management

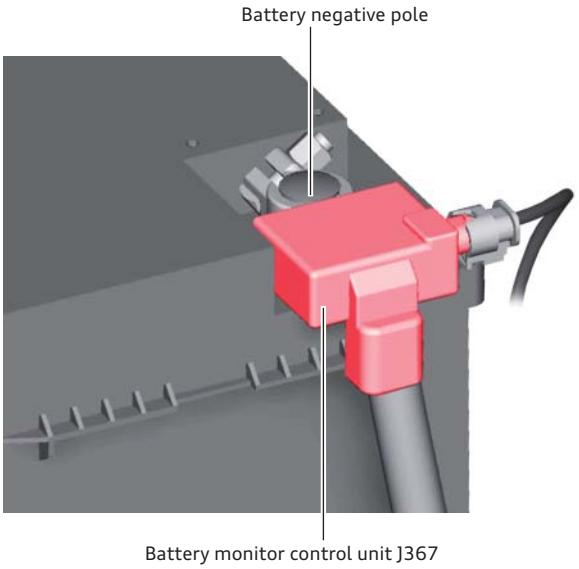
Audi A1 models with a start-stop system and brake energy recuperation function have an energy management system. Its functions are performed by the data bus diagnostic interface J533 in conjunction with the battery monitor control unit J367, the alternator C and the voltage stabilizer J532.



477_207

Battery monitor control unit J367

In short	
Description	Battery monitor control unit J367
Installation location	attached to the negative pole of the car battery
Tasks	Measurement of: ▸ Charging and discharge currents of the car battery ▸ Battery voltage ▸ Battery temperature
Diagnostic address	None, LIN slave, measured data and diagnostics via data bus diagnostics interface J533 (gateway)

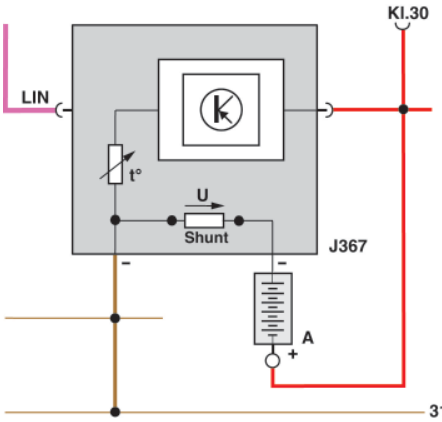


477_208

Battery current measurement
The battery current is measured at the battery's negative pole. All electrical current at the battery's negative pole flows through J367, or, rather through the shunt resistor. The shunt resistor has a resistance in the milliohms range.
The drop in voltage at the shunt resistor is proportional to the electrical current. The electrical current flowing into and out of the battery can be calculated from this.

Battery voltage measurement
The battery voltage is determined by measuring the voltage at the battery's positive pole. For this purpose, a measuring lead runs from the positive pole to the battery monitor control unit J367.

Battery temperature measurement
An NTC temperature sensor integrated in J367 is used for measuring the battery temperature. Since the NTC temperature sensor is attached directly to the battery, it can be used to reliably determine the battery's temperature.



477_209

Legend:

A	Battery
J367	Battery monitor control unit
Shunt	measuring resistor

Note
In the case of models equipped with an energy management system, the battery is tested using the vehicle diagnostic tester. After fitting a new battery, the battery has to be adapted. On models without an energy management system, the battery is tested using battery tester VAS 6161.

Alternator C

Audi A1 models can be equipped with an energy management system, resulting in two different alternator types.

Models without energy management system

Alternators with a multi-function regulator are installed on models without an energy management system. These alternators have three terminals: the bolted B+ terminal and a double connector with "L" and "DFM" terminals.

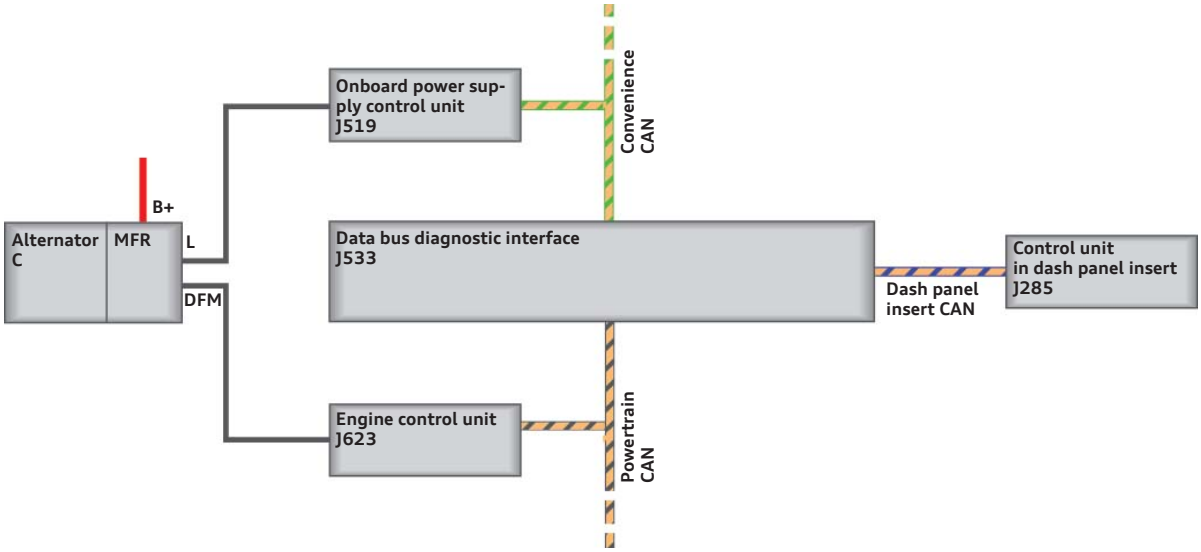
Depending on the ambient temperature, the multi-function regulator adjusts the voltage to between 13.5 volts (high temperature) and 15 volts (low temperature). The default voltage is 14.3 volts.

The multi-function regulator receives the "terminal 15 on" signal from the onboard power supply control unit J519 via terminal "L". This signal is drawn to ground in a defined fashion by the multi-function regulator when the alternator is stationary, and the onboard power supply control unit J519 sends a CAN bus signal "charge indicator light on" to the control unit in dash panel insert J285.

As soon as the alternator is running fast enough to deliver power, the regulator connects terminal "L" to 12 volts and the onboard power supply control unit sends the "charge indicator light off" CAN bus command to the control unit in dash panel insert J285. If the "L" lead is broken, the alternator does not activate until an engine speed of about 3000 rpm is attained.

The "DFM" terminal is connected to the engine control unit J623 and indicates the alternator load level by means of a PWM signal. The engine control unit utilises the signal for idle speed stabilisation at high alternator load levels.

The alternator is tested by measuring the electrical current using the current probe in the vehicle diagnostic tester.



477_249

Models with energy management system:

The alternator on a model with an energy management system comes fitted with a LIN regulator. These alternators have two terminals: the bolted B+ terminal, as well as a double connector in which only pin 1 is assigned to the LIN line, and pin 2 remains unassigned. The data bus diagnostic interface J533 sends LIN messages to the LIN regulator. Depending on the status of the onboard power supply, these LIN messages specify voltage values of between 12.2 volts and 15 volts, which the regulator then sets. If these voltage values are not set, e.g. because of a broken LIN line, the regulator detects this and sets a constant alternator voltage of 14.3 volts on expiration of a pre-defined interval.

The charge indicator light comes on at "terminal 15 on" and is deactivated by a bus signal from J533 as soon as the alternator begins to deliver charge voltage.

The alternator is tested by internal assessment of the alternator by the energy management system in J533. On models equipped with a LIN alternator, fault memory entries and history data can be read out for the alternator.

477_250

Note

Irrespective of alternator version, the dipped-beam headlight must be switched on during the alternator test. Care must also be taken to ensure that the headlights are not covered by protective mats during the alternator test (this can cause the headlights to overheat).

Voltage stabilizer J532

On models with a start-stop system, a greater load is placed on the battery due to the increased number of start cycles and the battery voltage dips below 12 volts during the start cycle.
To avoid any loss of comfort during start cycles, a voltage stabiliser J532 (DC-DC converter) is fitted on all models equipped with a start-stop system. This unit generates from the onboard power supply a stable supply voltage for selected energy consumers during a start cycle.

477_210

The voltage stabiliser is available in two versions:

- Version 1: 200 watts with one output (max. 200 watts or 16.7 amperes)
- Version 2: 400 watts with two outputs (max. 2x 200 watts or 2x 16.7 amperes)

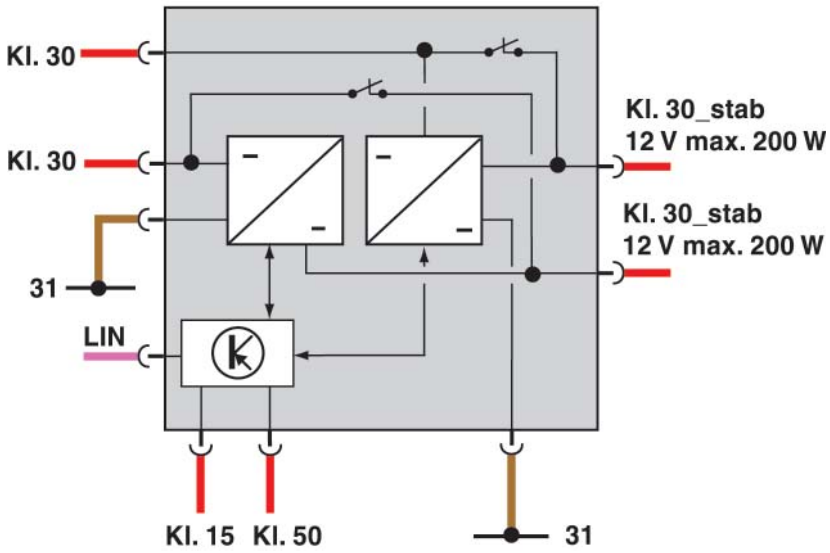
Depending on specification, the following energy consumers are connected to the 200 watt voltage stabiliser:

- Control unit in dash panel insert J285
- ABS control unit J104
- Anti-glare interior rear-view mirror Y7
- Radio R
- Information electronics control unit 1 J794
- CD changer R41
- MMI display J685
- TV tuner R78

The 400 watt version is used on models fitted with an Audi sound system. On these models, the radio is connected to the second stabilised output.
The digital sound package control unit J525 is not connected to the voltage stabiliser. This control unit has its own internal voltage stabiliser.

In short	
Description	Voltage stabilizer J532
Installation location	under the passenger seat
Tasks	To stabilise the voltage during the start cycle for selected components
Diagnostic address	None, LIN slave, measured data and diagnostics via data bus diagnostics interface J533 (master)

Schematic diagram of the 400 watt voltage stabiliser



477_211

Inputs:

- 2x terminal 30
- 2x terminal 31
- 1x terminal 15
- 1x terminal 50

Outputs:

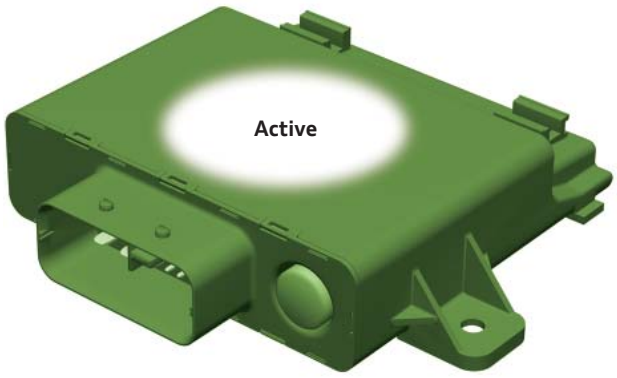
- 2x terminal 30_stabilised
- LIN bus terminal for diagnostics and status signals

Mode of operation

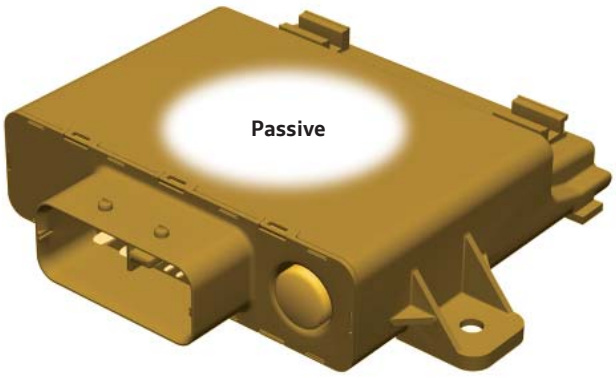
The voltage stabiliser basically distinguishes between two different states: "Active" and "Passive".

Active state
When the ignition is turned "on" (voltage is present at the terminal 15 input), the voltage stabiliser switches to the overriding "Active" state. A distinction is made between "Ready" and "Stabilise" within the "Active" state.

Passive state
When the ignition is "off" (no voltage is present at the terminal 15 input), the voltage stabiliser is in the "Passive" state. The terminal 30 input and terminal 30_stabilised output are galvanically connected at low resistance in the "Passive" state (continuity).



477_212



477_213

Ready state
Terminal 30 is still galvanically connected to the output at low resistance. The status indicated via the LIN line is "Ready".

Stabilise state
During the start cycle (voltage is present at the terminal 50 input), the voltage stabiliser changes state from "Ready" to "Stabilise". If the voltage present at the terminal 30 input dips below 12 volts after the starting cycle commences, the unit begins stabilising and maintains a constant voltage of 12 volts at terminal 30_stab. Voltage stabilisation is performed regardless of whether the start cycle was initiated by the start-stop system or by the ignition key. The status indicated via the LIN bus is "Stabilise".

Change of status
At the end of the start cycle (voltage is still present at the terminal 15 input), the voltage stabiliser reverts to the "Ready" state provided it is in a fault-free condition. When the ignition is turned "off" (no voltage is present at the terminal 15 input), the voltage stabiliser switches to the "Passive" state.
In the event of overheating or if a fault condition occurs (voltage is present at the terminal 15 input), the unit switches to the "Fault" state.

Fault state
The stabilising function is disabled in this state. The input (terminal 30) and output (terminal 30_stab) are galvanically connected at low resistance if possible. The status indicated via the LIN bus terminal is "Fault".

After the cessation of overheating or termination of the fault condition, the unit switches to the "Active" state. When the ignition is turned "off" (no voltage is present at the terminal 15 input), the voltage stabiliser switches to the "Passive" state.

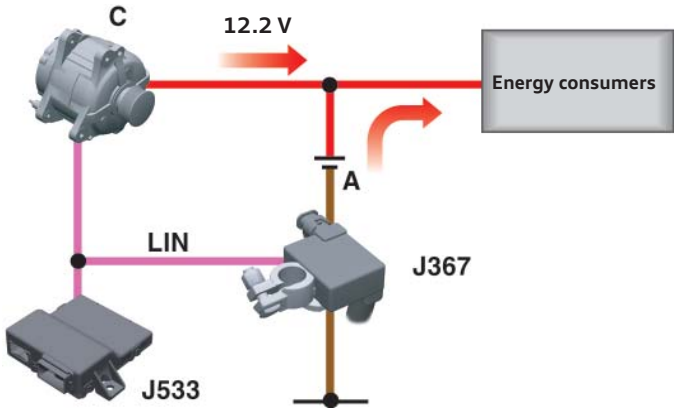
Brake energy recuperation

Recuperation (Latin: "recuperare" = to recover or to restore) is generally understood as the use of kinetic energy during vehicle deceleration. This means that energy is recovered "free of charge" during the braking and overrun phases and buffered in the car battery.

Functional principle
The recuperation function is a key component of the electrical energy management system in the data bus diagnostic interface J533. With regard to brake energy recuperation, a distinction is made between two operating modes.

Driving under throttle: Battery is discharged

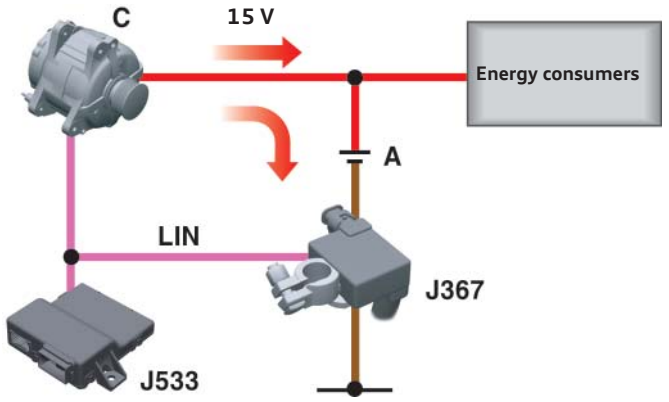
When driving under throttle, the output voltage of the alternator is reduced to below the battery voltage (12.2 V) and the alternator delivers less power. This also lessens the load on the engine as well as reducing fuel consumption and hence also CO_2 emissions. During this time, the battery supplies the onboard power supply.



477_214

Overrun mode: Battery is charged

Unlike during the phases under throttle, the alternator voltage is increased, thereby recharging the battery during the overrun phases of the engine.



477_215

Legend:

A Battery
C Alternator
J367 Battery monitor control unit
J533 Data bus diagnostic interface

Recuperation requires certain conditions relating to:

- Battery temperature
- Load on the onboard power supply
- Battery state
- Engine load
- Coolant temperature
- Air conditioning system status
- Lighting status

In addition, neither the Production mode nor the Transport mode may be activated.

Alternator test
The following must be tested before performing the actual alternator test:

- Attachment of the terminal clamps
- Ribbed V-belt tension
- Alternator attachment
- Terminal 30 connection to alternator
- Ground connections

Since the brake energy recuperation mode can also be active when the engine is idling, the lights must be switched on when testing the alternator so that the test results cannot be falsified by the recuperation cycle. When the lights are switched on, the alternator generates a charging voltage of at least 13.5 volts.

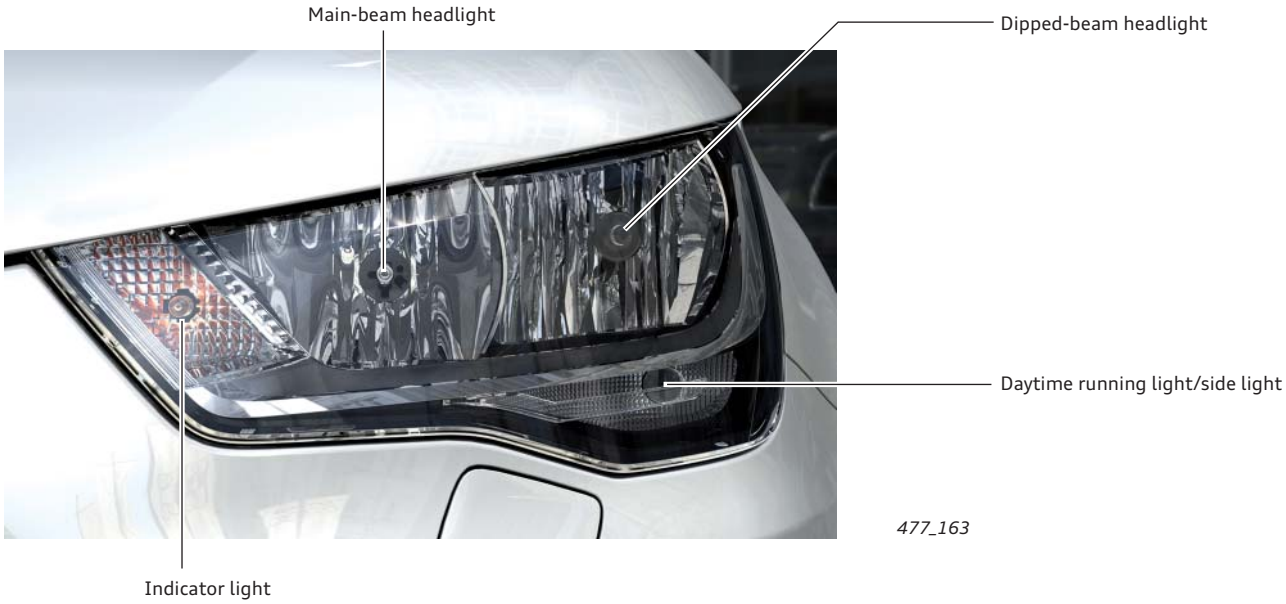
Exterior lighting

Headlights

In the case of the Audi A1, a distinction is made between two headlight versions:

- Halogen headlight
- Xenon headlight

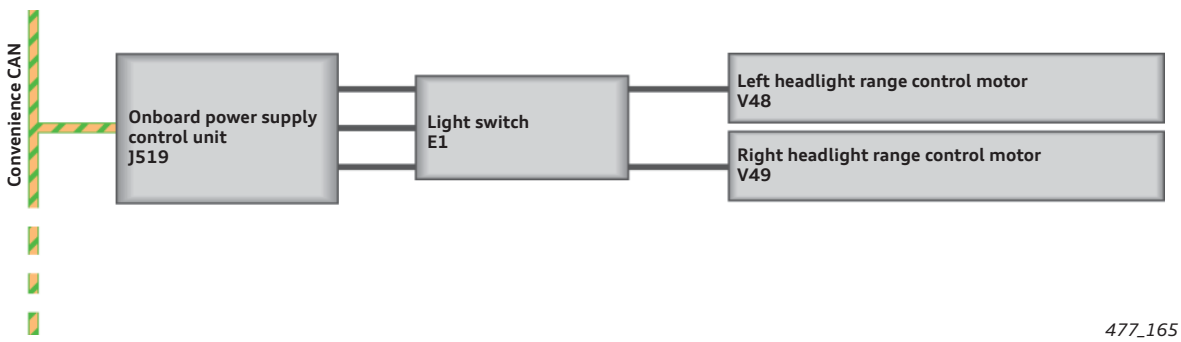
Halogen headlight



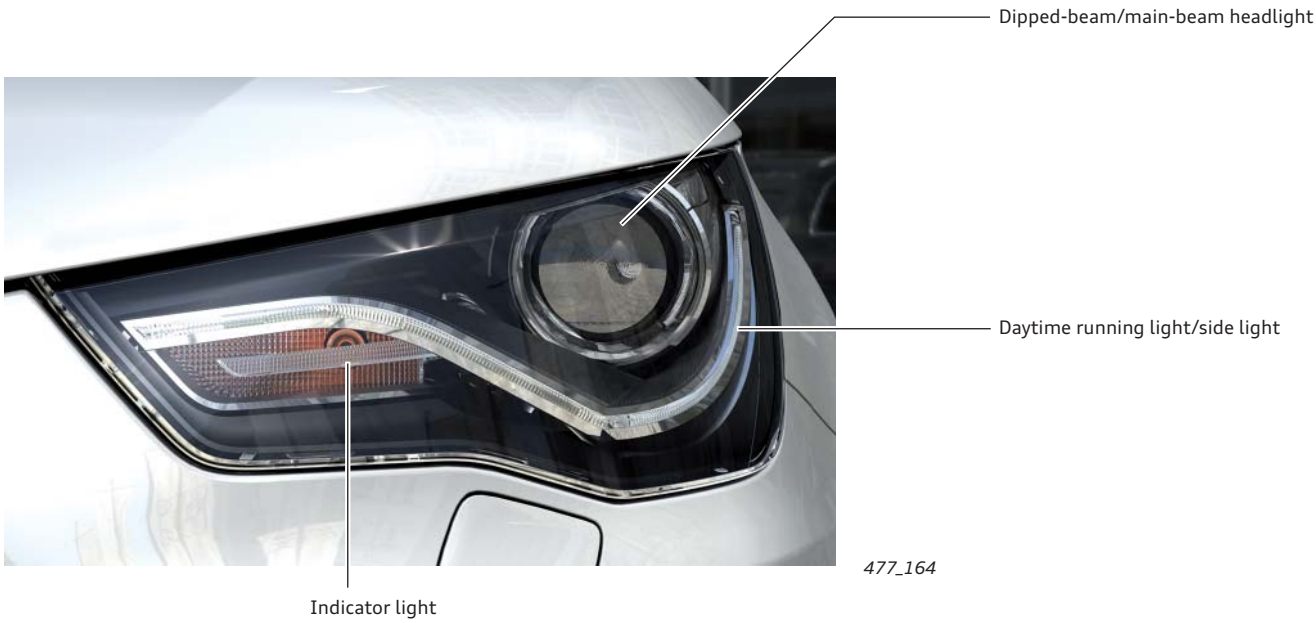
Light functions	Light sources used	Output
Daytime running light **Side light**	P21W bulb (dimmed to 90 %) (dimmed to 40 %)	21 watts
Dipped-beam headlight	Bulb H7	55 watts
Main-beam headlight	Bulb H1	55 watts
Indicator light	Bulb H21W	21 watts
Fog lights (integrated in the bumper, not shown)	Bulb H11	55 watts

The 21 watt bulb is operated at 90% capacity for the daytime running light in order to extend its service life. The same light source is used for the side light, in which case it is operated at a reduced capacity of 40%. In the case of the halogen headlight, the daytime running light is not dimmed when indicating. To adapt the headlights (for driving in countries where traffic drives on the opposite side of the road), certain regions of the headlight lenses have to be covered over with a non-transparent adhesive strip.

Models with halogen headlights have a manual headlight range control system. The knurled wheel for adjusting the headlight range is integrated in a light switch adjacent to the knurled wheel for adjusting the instrument lighting. The onboard power supply control unit is a convenience CAN user and the light switch is discretely connected to the onboard power supply control unit. The light switch activates both headlight range adjustment control motors via discrete wiring.



Xenon headlight



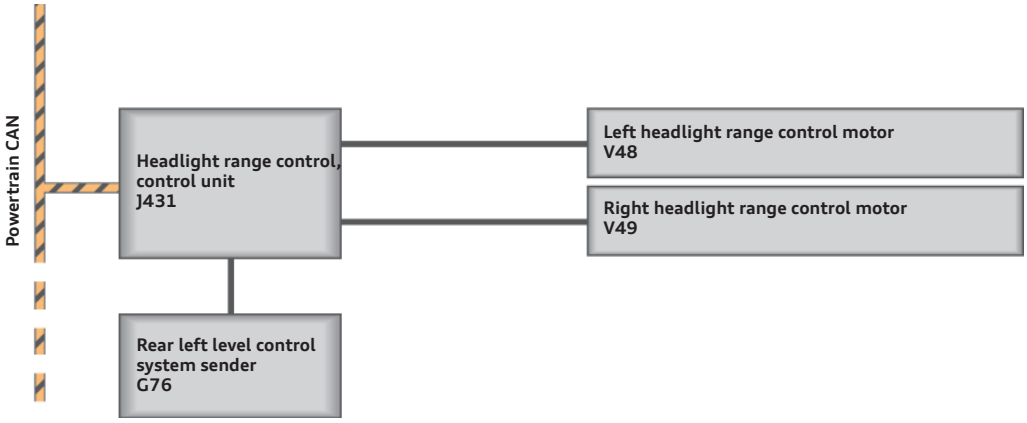
477_164

Light functions	Light sources used	Output
Daytime running light **Side light**	2 LEDs with synthetic optical fibres (dimmed to 25 %)	approx. 10 watts
Dipped-beam headlight **Main-beam headlight**	Gas discharge lamp D3S	35 watts
Indicator light	Bulb PY24W	24 watts
Fog light (integrated in the bumper, not shown)	Bulb H11	55 watts

Both LEDs are operated at 100% capacity for the daytime running light. The same light source is used for the side light, when it is operated at a reduced capacity of 25 %. In the case of the xenon headlight, the daytime running light is dimmed when indicating.

The headlights have to be adapted for driving in countries where traffic drives on the opposite side of the road. This is done using the vehicle diagnostic tester (address word 55 - Headlight range control<Functions<Trip mode).

Models with xenon headlights have a dynamic headlight range control system. The headlight range control, control unit J431 is a powertrain CAN user. It is connected to the rear left level control system sender G76 by discrete wiring. Control unit J431 activates servomotors V48 and V49 via discrete wiring, depending on ride height and the motion of the vehicle.



477_166

Tail lights

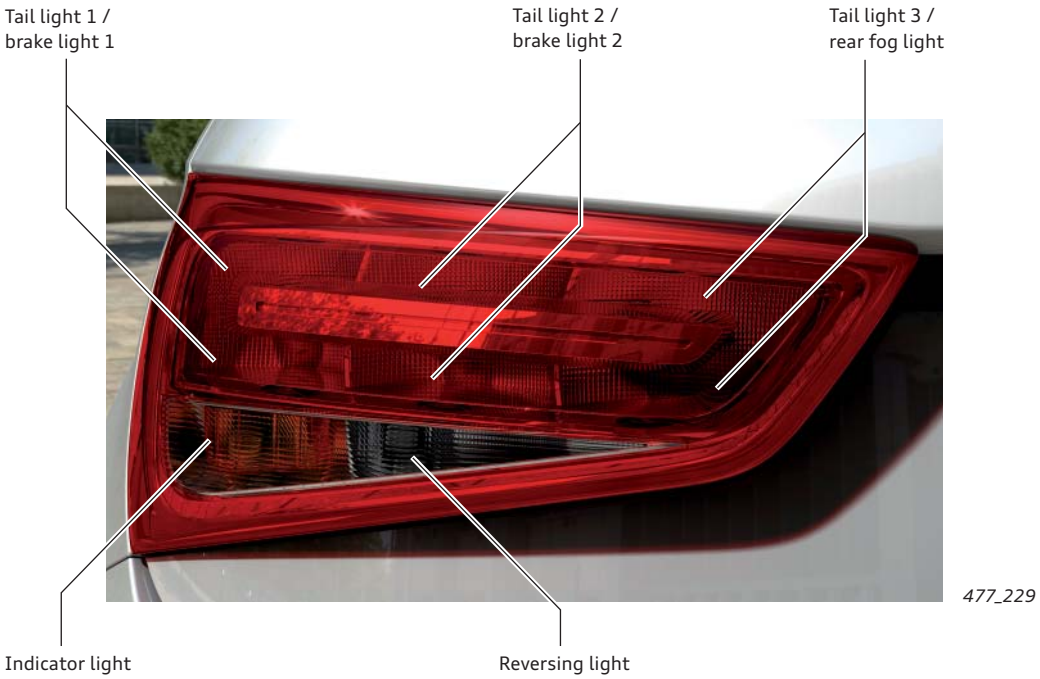
When it comes to the rear lights of the Audi A1, a distinction is made between:

- Basic tail lights
- LED tail lights

Basic tail lights

The basic tail lights are combined with the halogen headlights. All lighting functions are performed by bulbs.

In some cases, the same light source is used for two lighting functions (either dimmed or fully illuminated).



477_229

Light functions	Light sources used	Activation	Output
Tail light 1 **Brake light 1**	Bulb P21W	dimmed to 20 % 100 %	 21 watts
Tail light 2 **Brake light 2** (not when rear fog light is active)	Bulb P21W	dimmed to 20 % 100 %	 21 watts
Tail light 3 **Rear fog light**	Bulb P21W	dimmed to 15 % 100 %	 21 watts
Indicator light	Bulb W16W	100 %	16 watts
Reversing light	Bulb W16W	100 %	16 watts

In the case of the basic tail light, the parking light is identical to the tail light 1 function. When the rear fog light is active, the tail light 2/brake light 2 function is deactivated in order to maintain the statutory minimum distance of 100 mm between both functions.

Lighting functions with the tailgate open

When the tailgate is opened, the reversing light bulb and tail light 3/rear fog light function in the basic tail light are deactivated. For safety reasons, all other lighting functions remain active even when the tailgate is open.

LED tail lights

The LED tail lights are combined with the xenon headlights. Apart from the indicator light and the reversing light, all lighting functions are performed by LEDs. In all, 54 LEDs are used per tail light.

Lighting functions with the tailgate open

When the tailgate is opened, the reversing light bulb in the LED tail light is disabled. For safety reasons, all other lighting functions remain active even when the tailgate is open.

Light functions	Light sources used	Activation	Output
Tail light	21 LEDs	100 %	approx. 3.4 watts
Brake light **Brake light** (not when rear fog light is active)	33 LEDs 11 LEDs	100 % 100 %	approx. 5.8 watts approx. 4.1 watts
Rear fog light	9 LEDs	100 %	approx. 4.0 watts
Indicator light	Bulb W16W	100 %	16 watts
Reversing light	Bulb W16W	100 %	16 watts

Tail light:
21 LEDs surround the brake light chambers.

Tail light and brake light:
In addition to the 21 LEDs of the tail light, all 33 LEDs in both brake light chambers are activated.

Reversing light:
by 16 watt bulb

Indicator light:
by 16 watt bulb

477_243

477_239

Tail light and rear fog light:
In addition to the 21 LEDs of the tail light, 9 LEDs in the inner brake light chamber are activated for the rear fog light function.

Tail light, rear fog light and brake light:
In addition to the 21 LEDs of the tail light, 9 LEDs in the inner brake light chamber are activated for the rear fog light function. If the rear fog light is active and the vehicle is braked at the same time, a portion of the brake light (13 LEDs) is deactivated, with the result that the brake light is operated with only 11 LEDs in order to maintain the statutory minimum distance of 100 mm between both functions.

477_240

477_241

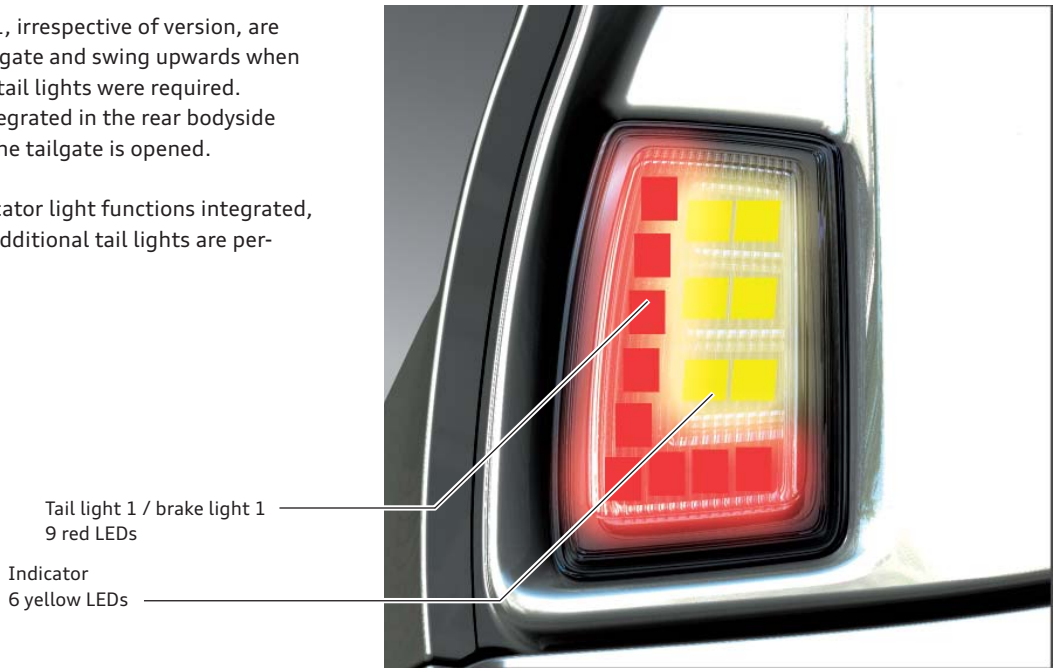
Activation
All light functions as well as the basic and LED tail lights are activated by the onboard power supply control unit J519.

When the brake light is operated in combination with the rear fog light, the LEDs are partially deactivated by the LED tail light itself.

Additional tail lights

Since the tail lights on the Audi A1, irrespective of version, are integrated in the wrap-around tailgate and swing upwards when the tailgate is opened, additional tail lights were required. These additional tail lights are integrated in the rear bodyside sections and are not visible until the tailgate is opened.

The tail light, brake light and indicator light functions integrated, for reasons of road safety, in the additional tail lights are performed by LEDs.



477_242

Light functions	Light sources used	Activation	Output
Tail light **Brake light**	9 LEDs	dimmed to 13 % 100 %	 2.3 watts
Indicator light	6 LEDs	100 %	2.7 watts

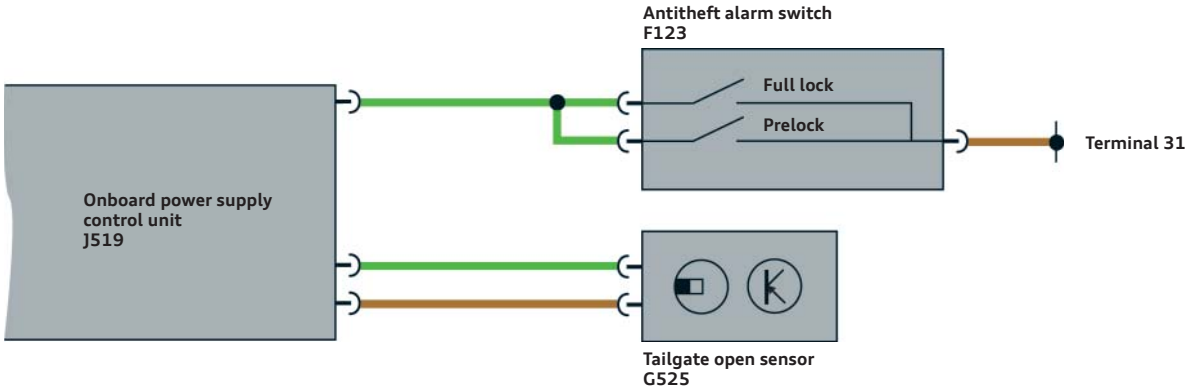
Activation

When the tailgate is opened, the additional tail lights are activated by the onboard power supply control unit J519 in addition to the tail lights in the tailgate. To reliably detect an open tailgate, the antitheft alarm switch F123 and the tailgate open sensor G525 are evaluated.
The antitheft alarm switch F123 comprises two microswitches integrated in the tailgate lock. The tailgate open sensor G525 is a Hall sensor which is integrated in the rear lock plate cover.

The onboard power supply control unit not only evaluates the operating states of both switches, but also monitors the time between the signals generated by both switches.

If there is too much time lag between both signals when closing the tailgate, the additional tail lights are not deactivated for safety reasons.

Circuit



477_235

Control unit in dash panel insert J285

The dash panel insert in the Audi A1 comes in two different versions:

- Basic version without driver information system
- Deluxe version with driver information system

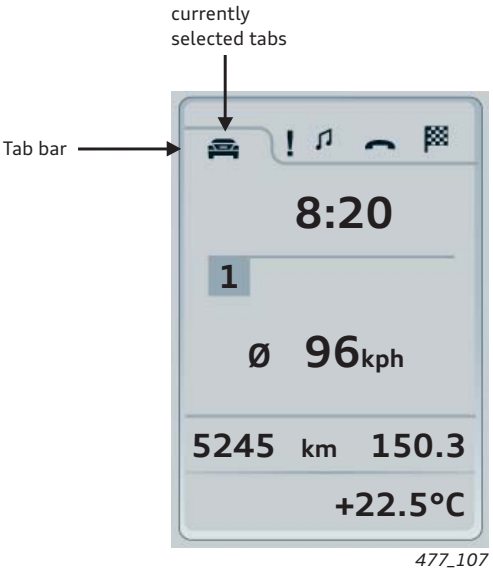
The deluxe version with driver information system has a black-white centre display with a resolution of 110 x 166 pixels.

477_104

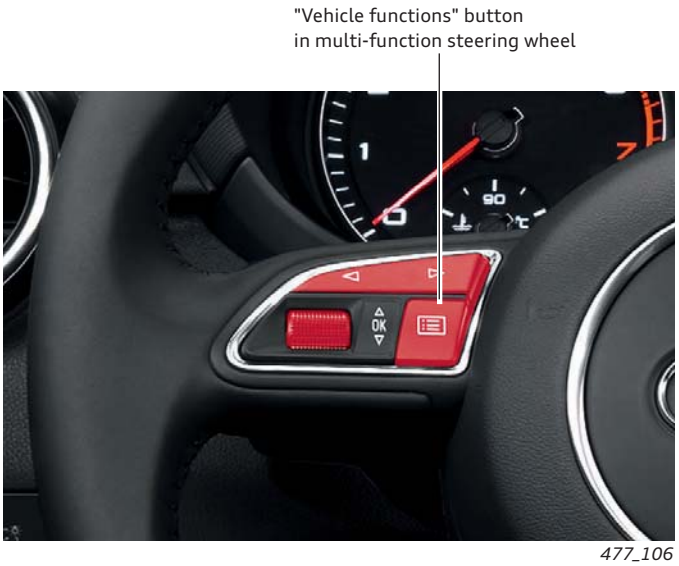
Tab concept of the driver information system

The various contents of the driver information system can be displayed by selecting the relevant tab.
The dash panel insert of the Audi A1 uses the tab concept first introduced in the Audi A8 '10.

Operation
Depending on the vehicle's specification, the driver information system display is operated either using the shift paddles in the windscreen washer stalk or using the controls on the optional multi-function steering wheel.



477_107



477_106

Efficiency program

The so-called efficiency program helps the driver to maintain a fuel-efficient driving style. The fuel economy information provided by onboard computer level 1 (short-term memory) and the information provided by other control units is used for this purpose. This information is processed accordingly and displayed to the driver in the driver information system. Each Audi A1 model with a driver information system has the efficiency program.

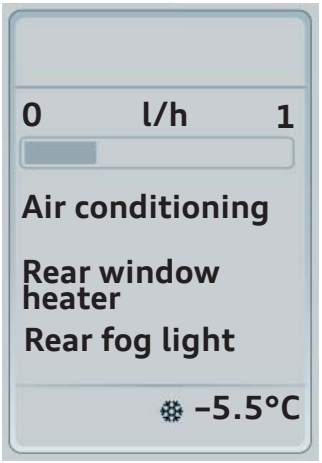
The efficiency program can be found in the **Vehicle functions** menu, which can be opened by pressing the "Vehicle functions" button in the left-hand spoke of the multi-function steering wheel.

By displaying the three main additional energy consumers (the greatest consumer of additional energy comes first), the efficiency program informs the driver which energy consumer to deactivate in order to achieve the greatest fuel saving. A scale also shows the driver the extra fuel consumed by all additional energy consumers.

In certain driving situations, specific fuel-saving options are indicated to the driver. These options are displayed automatically and disappear again when one of the controls on the windscreen wiper stalk or on the multi-function steering wheel is operated.

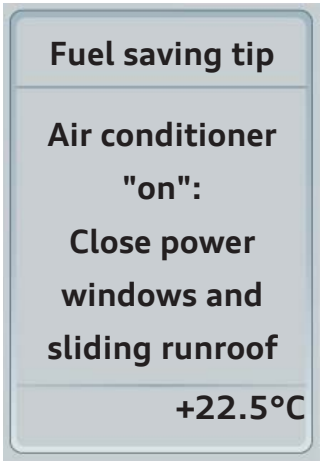
477_105

Display of average and current[1] fuel consumption



477_109

Display of the three main additional energy consumers



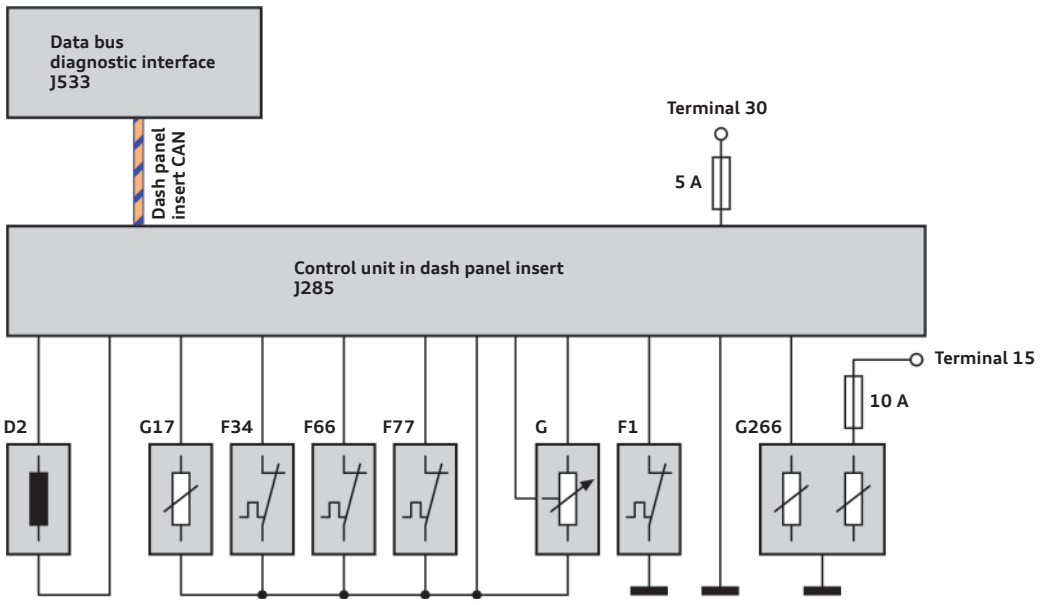
477_110

Temporary display of fuel saving tips

[1] When the vehicle is stationary, the units of the current fuel consumption display change from l/100 km to l/h.

Connected components

The display shall all lines and components connected to the dash panel instrument control unit J285.



477_078

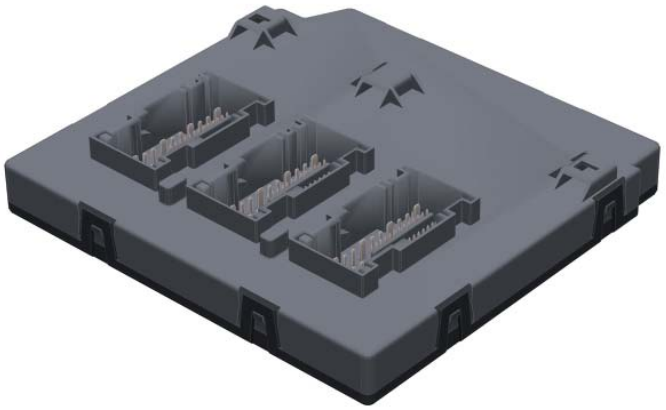
Legend:

D2 Immobiliser reader coil
F1 Oil pressure switch
F34 Brake fluid level warning contact
F66 Low coolant level indicator switch
F77 Washer fluid warning contact
G Fuel gauge sender
G17 Ambient temperature sensor
G266 Oil level/oil temperature sensor

Onboard power supply control unit J519

The new onboard power supply control unit J519 of the Audi A1 includes almost the complete software that is distributed among the onboard power supply control unit J519 and the convenience system central control unit J393 in other Audi models.

There is no independent convenience control unit J393 in the Audi A1. The new onboard power supply control unit J519 of the Audi A1 will also be installed in the A3, TT and R8 Audi models from model year 2010.



477_111

Installation location

The onboard power supply control unit J519 in the Audi A1 is located on the relay panel in the driver footwell area.

477_112

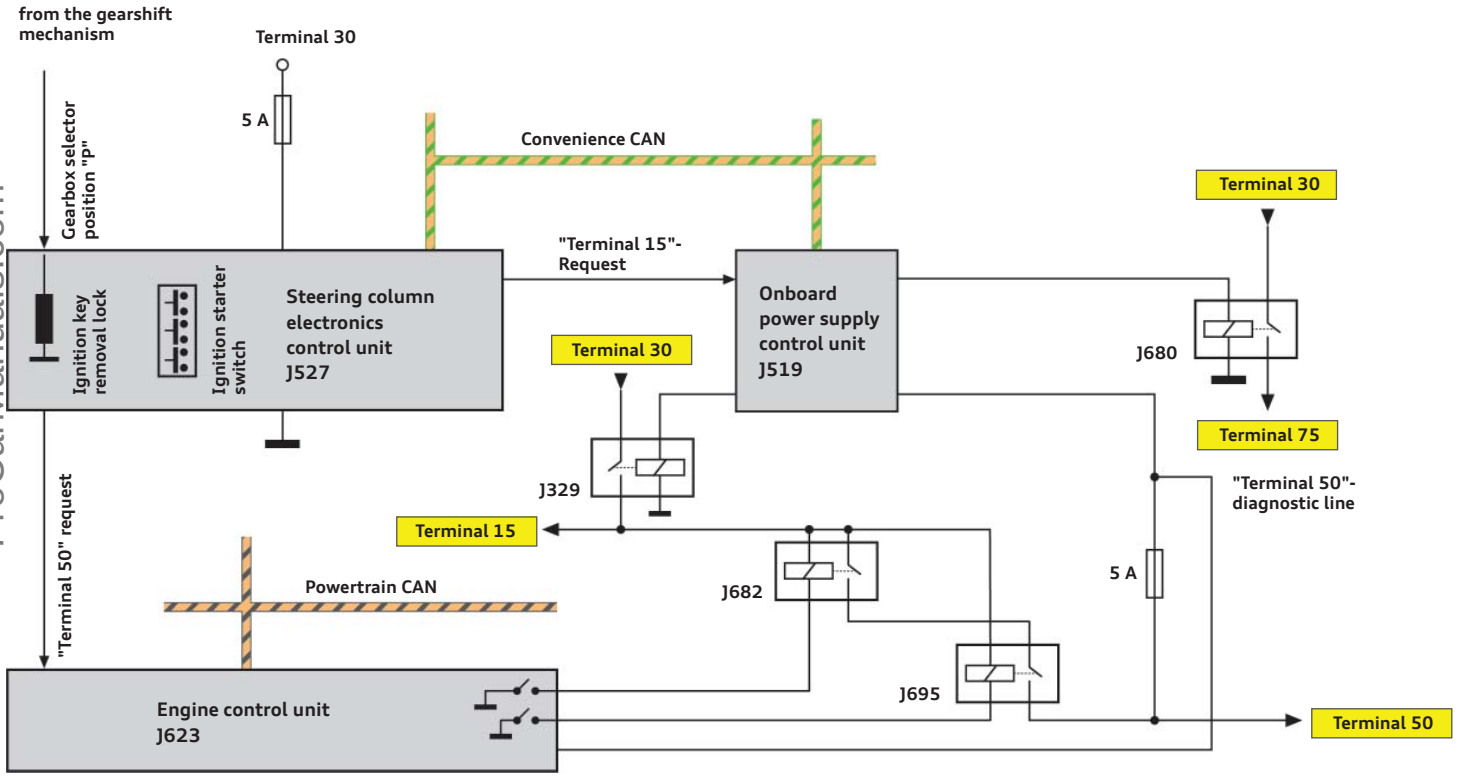
Terminals on the onboard power supply control unit J519	
Control unit power supply	▸ Four separately fused "terminal 30" inputs ▸ Three "terminal 31" wires
Bus lines	▸ Two convenience CAN lines ▸ LIN bus line to antitheft alarm sensor G578 and to alarm horn H12 ▸ LIN bus line to rain and light detector sensor G397
Inputs	
Switches and buttons	▸ Rotary light switch ▸ Brake light switch ▸ Reversing light switch (on models with manual gearbox only) ▸ Contact switch in the handbrake ▸ Switch in the tailgate lock ▸ Hazard warning flasher switch ▸ Bonnet switches 1 and 2 ▸ Rear window heater switch ▸ Handle button (Softtouch) in the tailgate
Sensors and signal lines	▸ "Terminal 30" reference voltage ▸ "Terminal 31" reference voltage ▸ Potentiometer for instrument lighting brightness adjustment ▸ Rear window breakage sensor (in combination with the optional antitheft alarm) ▸ Hall sensor for tailgate open/closed detection ▸ "Wake-up" signal of the entry and start authorisation control unit J518 ▸ "Terminal 15" request ▸ "Terminal 50" for terminal control diagnostics ▸ Door contact signal for the interior light module ▸ Read in "terminal 61" (alternator pre-excitation - only on models without start-stop system) ▸ Read in "NO contact" signal (discrete wire from control unit J764)
Outputs	
Relays	▸ Fuel pump relay ▸ "Terminal 75" relay ▸ "Terminal 15" relay ▸ Windcsreen wiper enabling relay ▸ Windscreen wiper switching relay (speeds 1 and 2) ▸ Rear window heater relay ▸ Headlight washer system relay ▸ Signal horn relay
Lamps and LEDs	▸ Lamps in the left and right halogen or BiXenon headlights ▸ Left and right fog rear lights ▸ Left and right rear fog lights ▸ Lamps in the left and right tail lights ▸ Lamps in the left and right additional tail lights ▸ Third brake light ▸ License plate light ▸ Front footwell lights (with optional lighting package only) ▸ Left and right boot lights ▸ Function LED in rear window heater button ▸ Function LED in hazard warning flasher button
Actuators	▸ Motor in tailgate lock ▸ Actuator element for locking the fuel tank flap ▸ Wash water pump
Signal wiring, terminals and supply voltages	▸ Enable signal to seat heater (load management) ▸ switched "terminal 30" ▸ switched "terminal 31" wire (for wiper motor) ▸ "terminal 58s" (locating light) ▸ Power supply of the Hall sensor for tailgate open/closed detection

Terminal control system for vehicles without advanced key

In an Audi A1 without the optional advanced key, the steering column electronics control unit J527 is the terminal control system master.

Terminal control is implemented as follows:

- Control unit J527 reads in ignition starter switch D
- Control unit J527 applies the current terminal signals to the CAN bus
- For safety reasons, the "terminal 15" request is still sent to the onboard power supply control unit via a discrete wire
- For safety reasons, the "terminal 50" request is still sent to the engine control unit via a discrete wire
- The onboard power supply control unit J519 activates the "terminal 15" and "terminal 75" relays
- The engine control unit activates both "terminal 50" relays
- For diagnostic reasons, both the engine control unit and the onboard power supply control unit read in terminal 50



477_081

Legend:

J329 Terminal 15 voltage supply relay
J680 Power supply relay 1, terminal 75
J682 Power supply relay, terminal 50
J695 Starter motor relay -2-

Advanced Key

The **Advanced Key** is optional for the Audi A1. If the car is equipped with the optional advanced key, the following two control units are additionally installed:

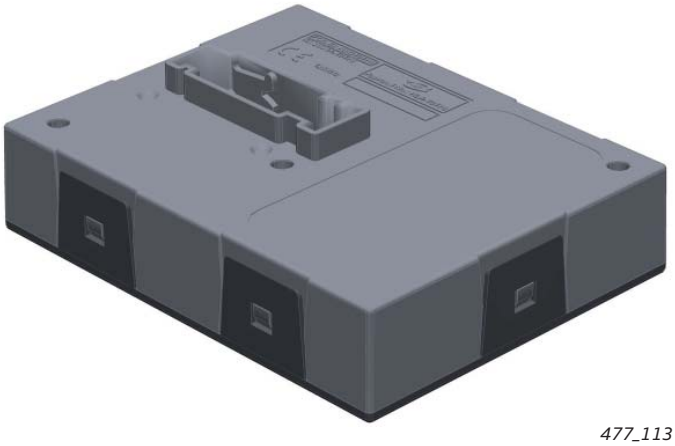
- Entry and start authorisation control unit J518
- Electrical steering column lock control unit J764

Entry and start authorisation control unit J518

Connected components:
In the Audi A1, four aerials are connected to the electrical steering column lock control unit J764.

- Driver side aerial for entry and start authorisation R134
- Rear bumper aerial for entry and start authorisation R136
- Interior aerial -1- for entry and start authorisation R138
- Interior aerial -2- for entry and start authorisation R139

Control unit J518 still reads in the driver side exterior door handle contact sensor G605. No exterior door handle contact sensor is fitted in the Audi A1 on the passenger side. To IR remote control must be used to open the car from the front passenger side.



477_113

Installation location
The electrical steering column lock control unit J764 is located behind the glove compartment.

477_114

Unlock vehicle via driver side exterior door handle

Grabbing the driver side exterior door handle wakes up the entry and start authorisation control unit, which, in turn, activates the aerials for entry and start authorisation in a staggered fashion. The aerials send a message to the car key.
The car key measures the strength of the various individual aerial signals it receives.

These signals are then sent to the onboard power supply control unit in addition to the data relevant to the immobiliser. The onboard power supply control unit receives this message via the central locking aerial.

Based on the data transmitted, the onboard power supply control unit can determine whether the car key is located within the permitted proximity of the driver's door outside the vehicle. If so, unlocking of the car doors is initiated by corresponding signals sent across the convenience CAN bus. In addition, the actuating element in the fuel tank flap is activated in order to unlock the fuel tank flap.
Car keys that have not been adapted to the car in question do not respond to the messages sent by the entry and start authorisation control unit.

Lock vehicle via driver side exterior door handle

When the locking sensor in the driver's exterior door handle is touched, the entry and start authorisation control unit activates the aerials for entry and start authorisation in a staggered fashion. The aerials send a message to the car key.

The car key measures the strength of the various individual aerial signals it receives and indicates this to the onboard power supply control unit. The onboard power supply control unit receives these messages via the central locking aerial.

Based on the data transmitted, the onboard power supply control unit can determine whether the car key is located within the permitted proximity of the driver's door outside the vehicle. If so, locking of the car doors is initiated by corresponding signals sent across the convenience CAN bus. In addition, the actuating element in the fuel tank flap is activated in order to lock the fuel tank flap.
Car keys that have not been adapted to the car in question do not respond to the messages sent by the entry and start authorisation control unit.

Open the tailgate by pushing the handle

Grabbing the handle in the tailgate wakes up the onboard power supply control unit, which, in turn, activates the entry and start authorisation control unit J518. Control unit J518, in turn, activates the aerials for entry and start authorisation in a staggered fashion. The aerials send a message to the car key.
The car key measures the strength of the various individual aerial signals it receives. Then it sends this information to the onboard power supply control unit together with data relevant to the immobiliser.

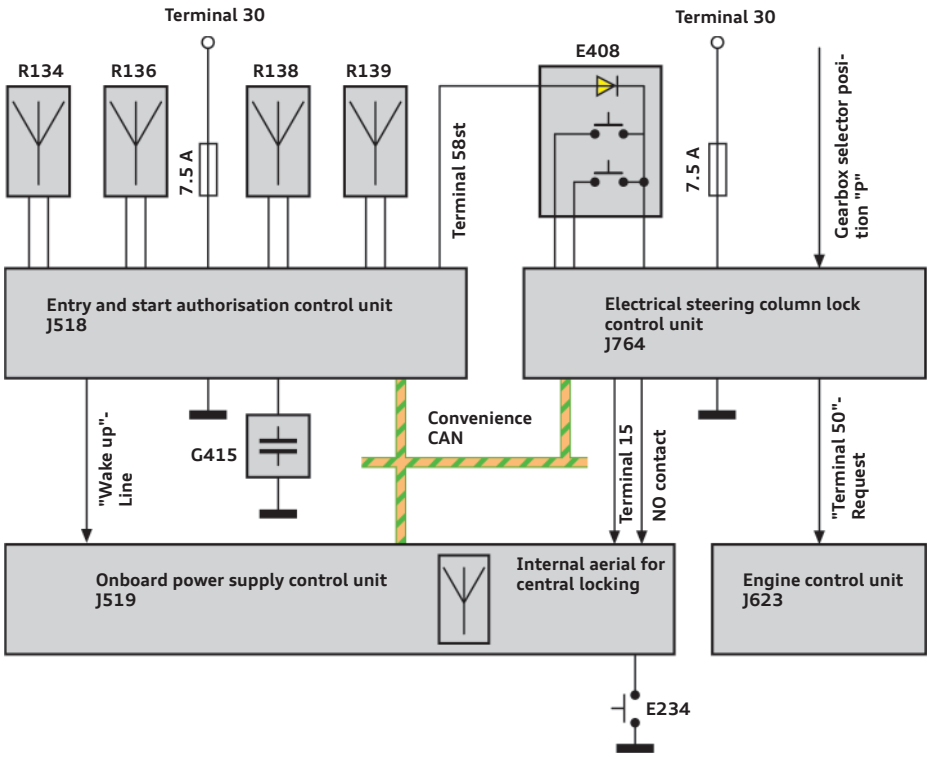
The onboard power supply control unit receives these messages via the central locking aerial. Based on the key information transmitted, the onboard power supply control unit can determine whether the car key is located within the permitted proximity of the tailgate.
If so, the tailgate is unlocked by activation of the motor in the tailgate lock.
Car keys that have not been adapted to the car in question do not respond to the messages sent by the entry and start authorisation control unit.

"Wake up" line

To avoid waking up the convenience CAN line every time the sensor in the driver side exterior door handle is stimulated, the entry and start authorisation control unit J518 has a discrete "wake up" line routed to the onboard power supply control unit.

By using this line, the onboard power supply control unit J519 wakes up only the entry and start authorisation control unit J518. The convenience CAN bus is subsequently woken up only if the onboard power supply control unit receives a response to the car key adapted to the vehicle.

Function diagram



477_080

Legend:

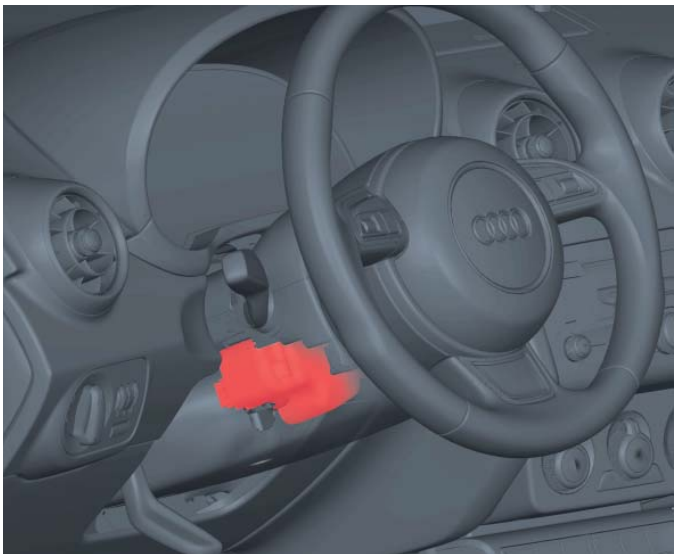
E234 Tailgate handle release button
E408 Entry and start authorisation button
G415 Exterior door handle touch sensor, driver side
R134 Driver side aerial for entry and start authorisation
R136 Rear bumper aerial for entry and start authorisation
R138 Interior aerial -1- for entry and start authorisation
R139 Interior aerial -2- for entry and start authorisation

Electrical steering column lock control unit J764

As the master of the terminal control system, the control unit J764 reads in the entry and start authorisation button E408 (start-stop button). For safety reasons, the operation of the combined start-stop button is evaluated by two separate microswitches which are actuated when the button is pressed. The button locating lighting is activated by the entry and start authorisation control unit J518.

The discrete signal "gear selector in position P" is generated by the gear shift gate and is required for the steering column lock function.

In addition, the status of the NO contact and the "terminal 15" request is sent to the onboard power supply control unit J519 as a discrete signal and the "terminal 50" request is sent to the engine control unit J623 as a discrete signal.



477_115

Locking the steering column

The electrical steering column is locked if the ignition has been turned off and the driver's door is subsequently opened. If the driver's door was already open when turning off the ignition, the steering column is locked when the vehicle is closed.

In vehicles with automatic transmission, as an additional condition for locking the steering column, a check is made to determine whether the gear selector lever is in the P position.

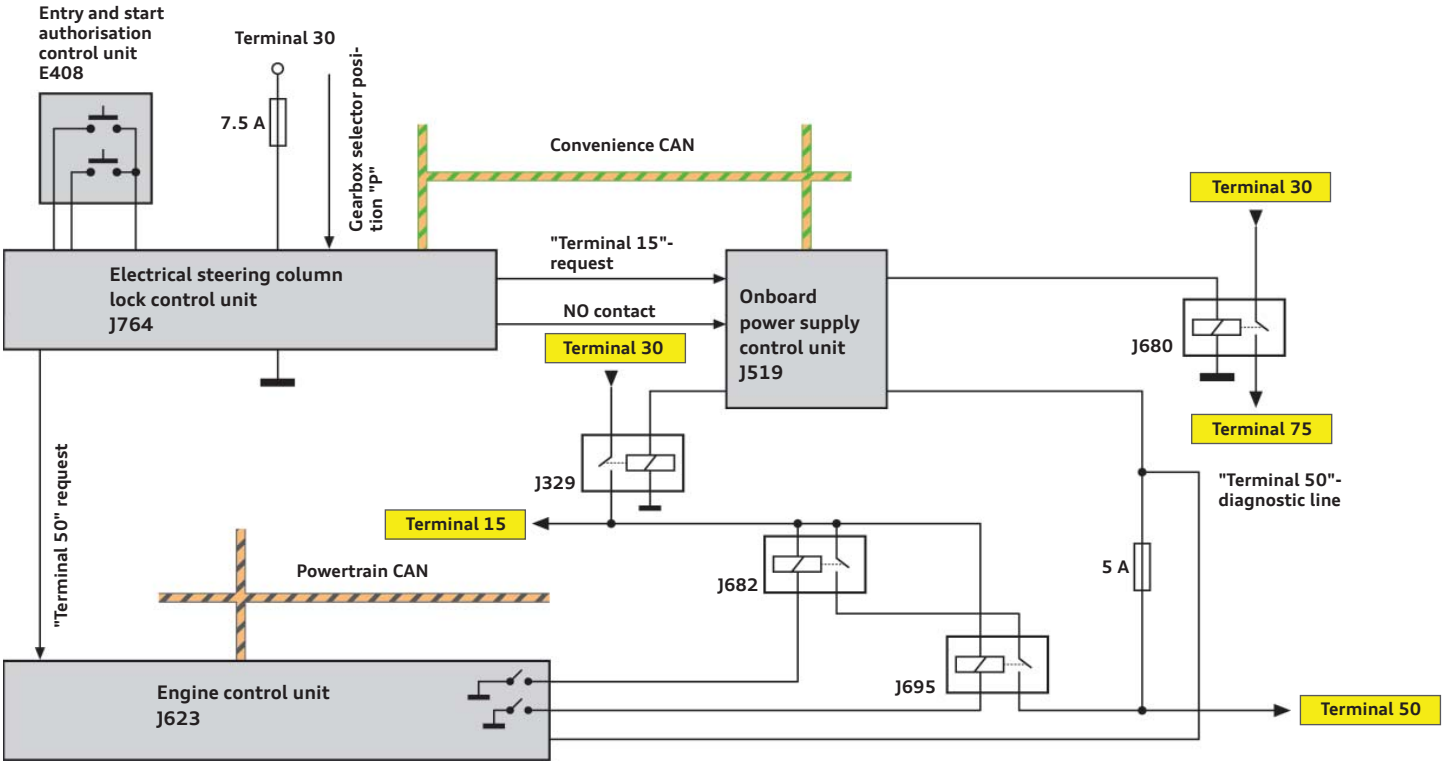
For this purpose, a discrete wire leads from the selector gate to the electrical steering column lock control unit J764. In addition, the vehicle must not be moving when the steering column lock is applied. Control unit J764 receives a signal indicating the vehicle's current speed from the ABS control unit J104 via CAN bus.

Terminal signal for advanced key

On an Audi A1 equipped with the optional advanced key, terminal control is implemented as follows:

- The entry and start authorisation button E408 is read in by the electrical steering column lock control unit J764.
- Control unit J764 applies the current terminal signals (NO contact, "terminal 15" and "terminal 50") to the convenience CAN bus
- For safety reasons, the "terminal 15" request and the NO contact signal are still sent to the onboard power supply control unit via a discrete wire
- For safety reasons, the "terminal 50" request is still sent to the engine control unit via a discrete wire
- The onboard power supply control unit J519 activates the "terminal 15" and "terminal 75" relays
- The engine control unit activates both "terminal 50" relays
- For diagnostic reasons, both the engine control unit and the onboard power supply control unit read in terminal 50

Function diagram



477_079

Legend:

J329 Terminal 15 voltage supply relay
J680 Power supply relay 1, terminal 75
J682 Power supply relay, terminal 50
J695 Starter motor relay -2-

The ignition lock is not installed in combination with the advanced key option.

No ignition lock is fitted in an Audi A1 equipped with the advanced key option. In vehicles equipped the advanced key, a mark can be found at the position where the ignition lock is located in vehicles without the advanced key.
Behind this mark is an emergency transponder coil which allows the vehicle to be started if it cannot be started in the normal fashion using the advanced key.

This is, for example, the case in the following situations:

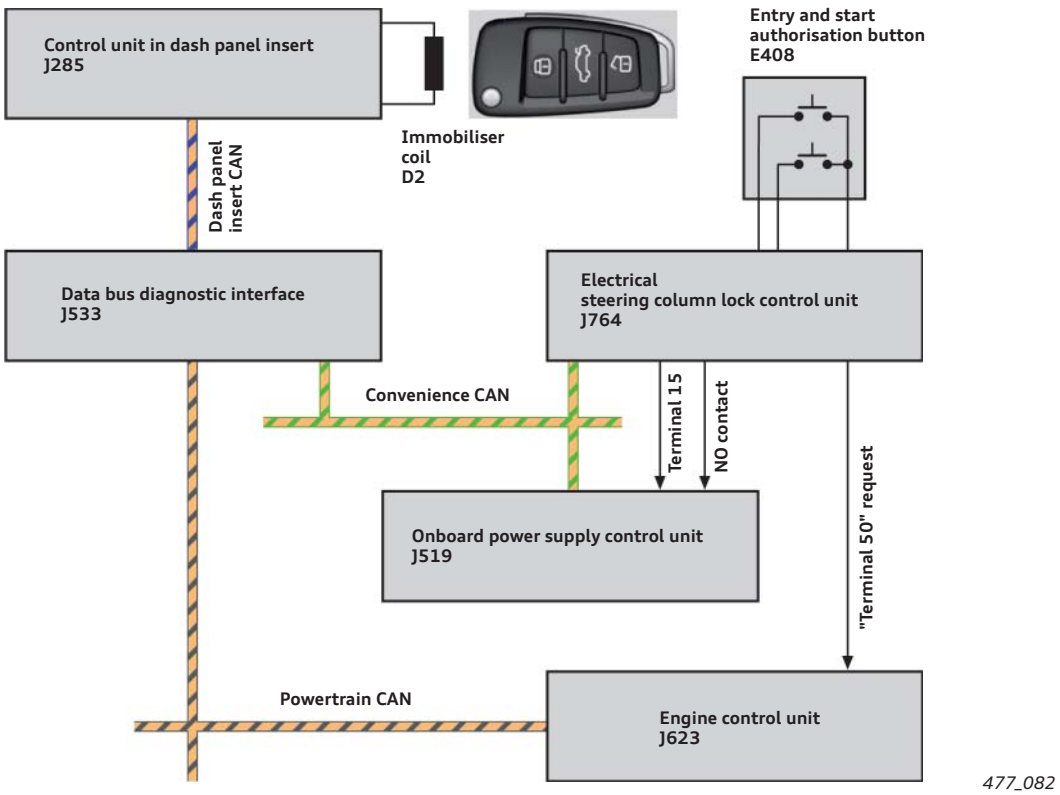
- The car battery is flat
- One of the aerials for entry and start authorisation cannot be activated
- The entry and start authorisation control unit is faulty
- HF radio communication between the car key and the central locking aerial R147 is impaired by interference

In emergency situations such as these, a message indicating that no car key has been detected appears in the dash panel insert after pushing the entry and start authorisation button E408. After this message appears, the customer has a few seconds in which to start the vehicle by holding the ignition key in the marked position, without again pushing the entry and start authorisation button E408.

Once this time expires, the vehicle can still be started by pushing the entry and start authorisation button again while holding the key in the marked position.

477_108

Function diagram



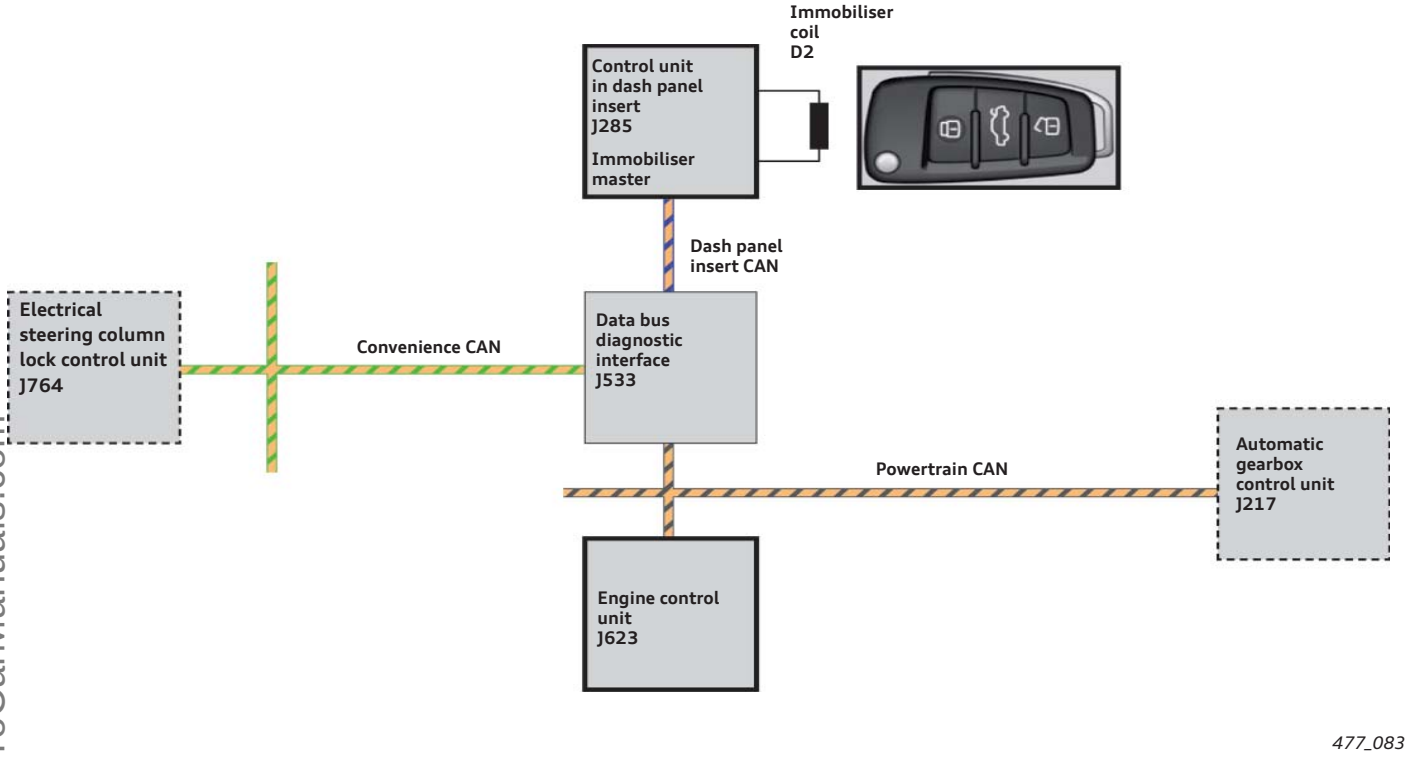
477_082

Immobiliser

A fourth-generation immobiliser system is used on the Audi A1. The immobiliser master is the dash panel insert, which for this reason has two diagnosis addresses:

- 17 – Dash panel insert
- 25 – Immobilizer UDS

Overview



Legend:

Component is integrated in the immobiliser system and is always installed

Component is integrated in the immobiliser system if the latter is installed in the A1

Component is not integrated in the immobiliser system

Door control units

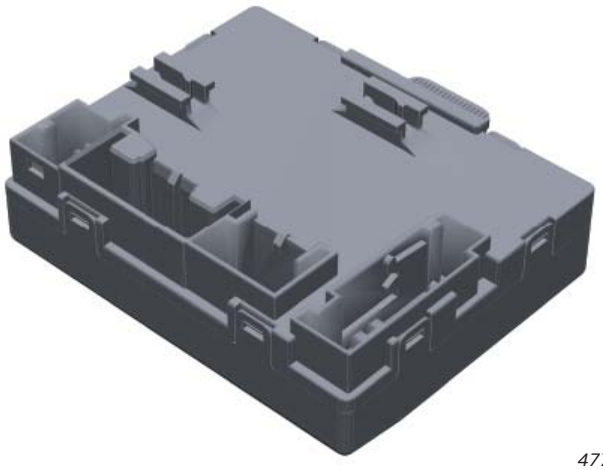
Door control units, driver side J386 and front passenger side J387

In the case of the front control units, a distinction is made between the driver side (J386) and the front passenger side (J387). The control unit and the window lifter motor can be replaced separately.

The front door control units come in two versions: a maximum version and a minimum version. The version is indicated by the part number:

- B – Minimum version
- A – Maximum version

The maximum version is installed only if the optional door mirror fold-away function is installed.



477_116

Terminals on the driver side door control unit J386 (maximum version)	
Control unit power supply	▸ A "terminal 30" wire fused with a 10 A fuse ▸ A "terminal 30" wire fused with a 30 A fuse for the power windows ▸ Four "terminal 31" wires
Bus lines	▸ Two convenience CAN lines
Inputs	
Buttons, switches and components	▸ Driver side window lifter button ▸ Front passenger side window lifter button ▸ Button for detecting "door lock operated with key" in the door lock ▸ Button for detecting "door closed" in the door lock ▸ Button for detecting "door safed" in the door lock ▸ Central locking button ▸ Antitheft alarm button ▸ Mirror adjustment switch
Outputs	
Actuators	▸ of both adjusting motors for the mirror glass in the door mirror ▸ Door mirror fold-away motor (optional) ▸ Indicator light in door mirror ▸ Mirror heater ▸ Window lifter motor ▸ Safe function motor in door lock ▸ Locking motor in door lock ▸ Safe LED in driver door ▸ LED in interior door handle (with optional lighting package only) ▸ LED for door up-light (with optional lighting package only) ▸ "Terminal 58s" (switch lighting) is provided in various operating elements ▸ Function LED in antitheft alarm button (with optional antitheft alarm only) ▸ Function LED in central locking button ▸ Active door reflector (with optional lighting package only)

Heating and air conditioning

Introduction

Three different air conditioning systems are used on the Audi A1:
- Heating and ventilation system
- Manual air conditioning system
- Automatic air conditioning system

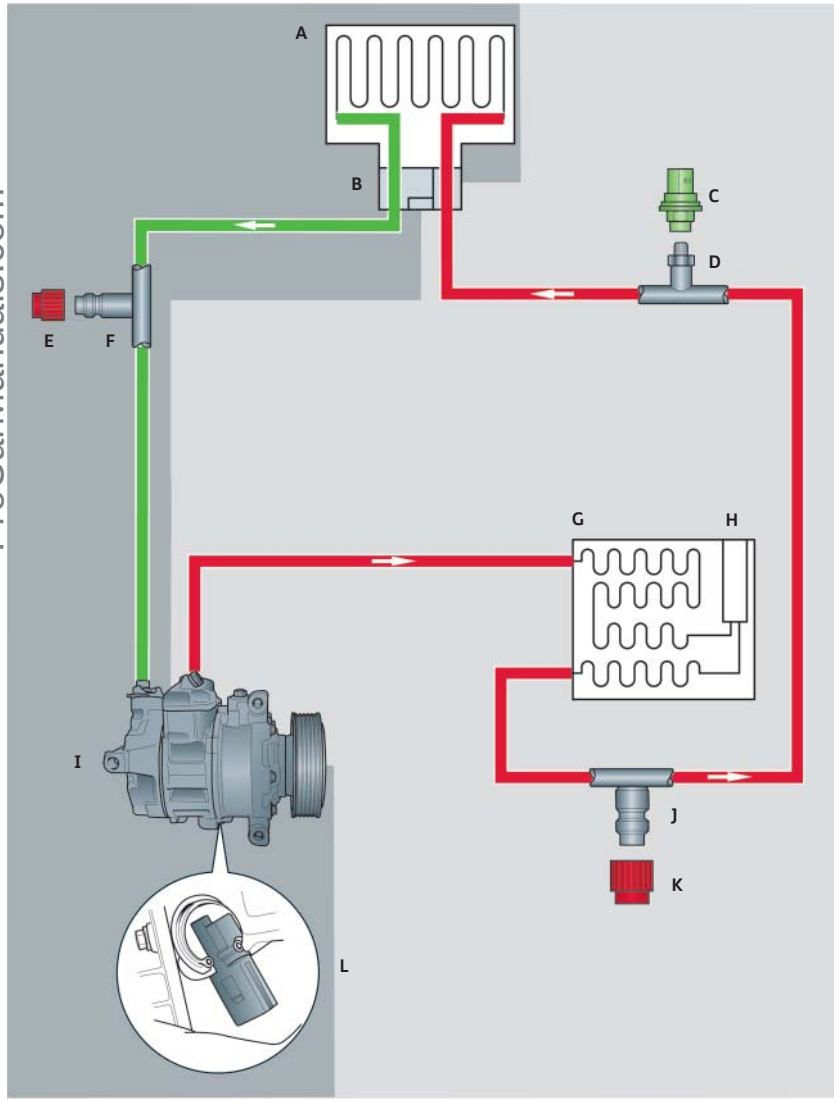
All versions have a manual air recycle function. The air recycle function is deactivated automatically:
- when the ignition is turned off (terminal 15 off)
- by switching manually to the Defrost setting

There is no auxiliary heating function for the Audi A1, and hence no fuel-operated auxiliary heater.

On models with a seat heater, the customer can choose between two heat settings. If the customer operates the seat heater in heat setting 2 after switching on, the seat heater automatically goes from heat setting 2 to 1 after about 15 minutes.

Different makes of air conditioning compressor can be installed on the Audi A1. All compressors are belt driven. The type of belt pulley overload cut-out is manufacturer-specific.

Refrigerant circuit



Low pressure zone

High pressure zone

The refrigerant circuit in the Audi A1 is filled with the well-known refrigerant type R134a.

High-pressure sensor G65 (C) sends its data by PWM signal to the Climatronic control unit J255 or to the manual air conditioning system control unit J301.

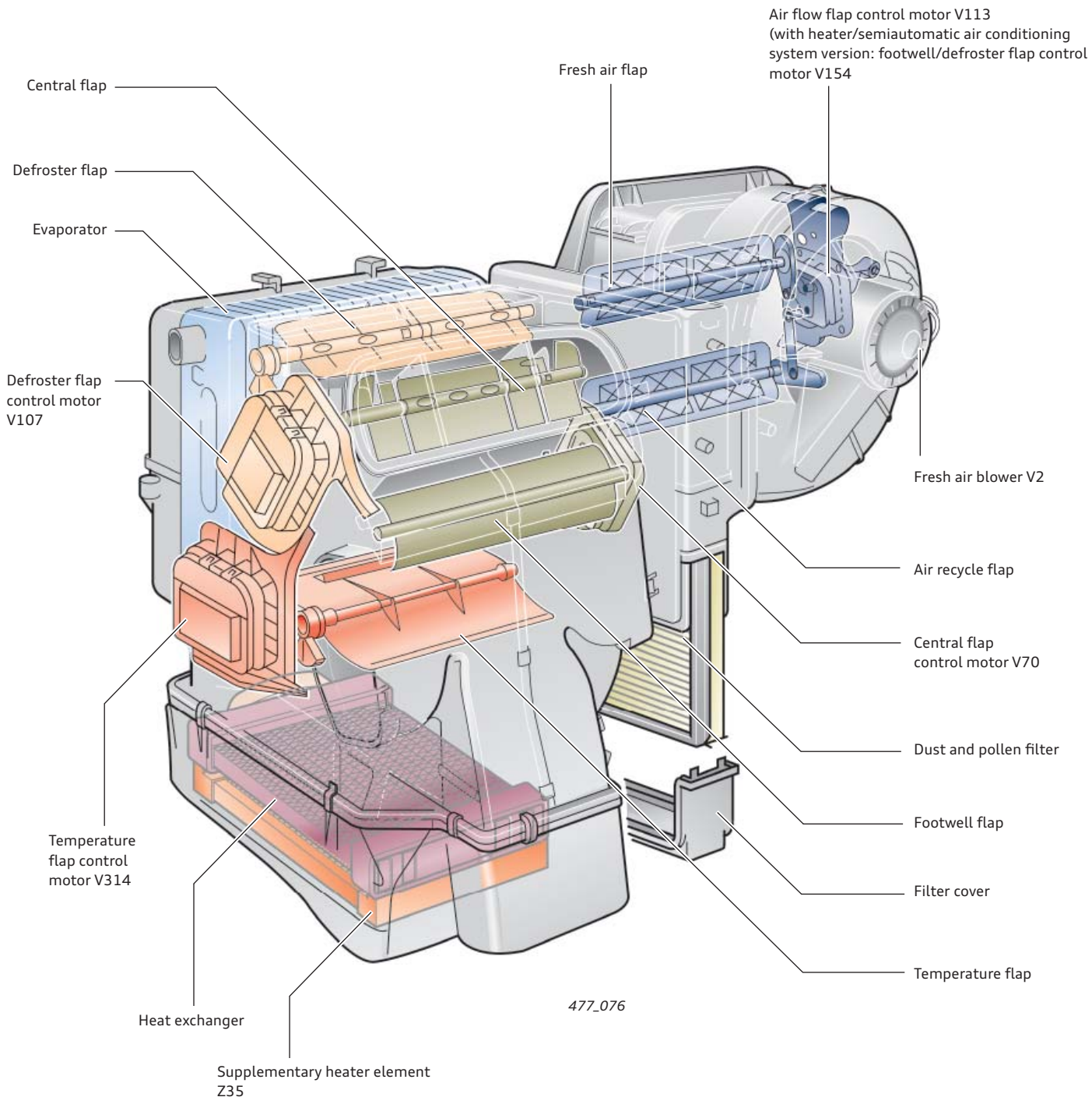
The fluid reservoir (H) houses the drier cartridge. To change the drier, further attachments (such as the bumper cover) have to be removed. A detailed description of this procedure can be found in the Workshop Manual.

477_058

Legend:

A	Evaporator
B	Expansion valve
C	High pressure sensor G65
D	Connection with valve
E	Sealing cap
F	Service connection, low pressure side
G	Condenser
H	Fluid reservoir (with drier cartridge)
I	Compressor
J	Service connection, high pressure side
K	Sealing cap
L	Air conditioning compressor regulating valve N 280

Heating and air conditioner housing



The dash panel must be removed in order to remove the temperature sensors. In the automatically controlled air conditioning system, these are:

- G263 (evaporator outlet temperature sensor)
- G191 (vent temperature sender, centre)
- G192 (vent temperature sender, footwelll)

The dust and pollen filters are configured as a combination filter for the automatic air conditioning system.

The supplementary heater element Z35 is fitted in all diesel versions. For further information, refer to page 77 of this SSP.

Heating and ventilation system

The heating and ventilation system has rotary switches for manual adjustment of temperature, blower speed and air distribution. The manual air recycle button can be used for switching between air recycle mode and fresh air mode.

Temperature and air distribution can be adjusted mechanically via flexible shafts.

The heater control unit J65 is not diagnosable and therefore does not have an address word in the vehicle diagnostic tester.

In the case of diesel engines, the heater has a supplementary heater element Z35. The heater element is activated as soon as the engine control unit J623 receives a ground signal from the heater control unit J65. For this purpose, a switch in the heater control unit J65 closes as soon as the rotary temperature switch is turned to a high heat setting.

477_149

In all three possible air conditioning systems (J65, J301 and J255), the control panel is a separate component located beneath the control unit. The buttons for the seat heater or rear window heater are, therefore, not read in via the respective control unit (J65, J301 or J255), but are connected directly to the onboard power supply control unit J519.

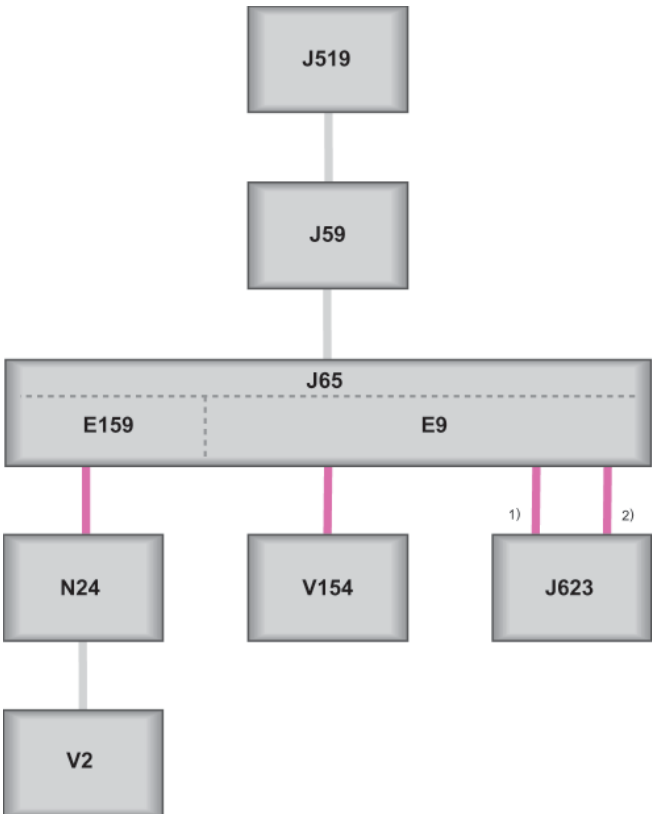
Connected components

Legend:

E9	Fresh air blower switch
E159	Fresh air/air recycle flap switch
J59	X contact relief relay
J65	Heater control unit
J519	Onboard power supply control unit
J623	Engine control unit
N24	Fresh air blower series resistor with overheating cut-out
V2	Fresh air blower
V154	Fresh air/recycle air flap control motor

1) Request electrical auxiliary heater (PTC) in diesel-engined models

2) Request mapped cooling (mapped cooling signal)



477_086

Manual air conditioning system

The manual air conditioning system control unti J301 also has three rotary switches for manual adjustment of temperature, blower speed and air distribution. The manual air recycle button can be used for switching between air recycle mode and fresh air mode; cooling mode can be switched on and off using the AC button.

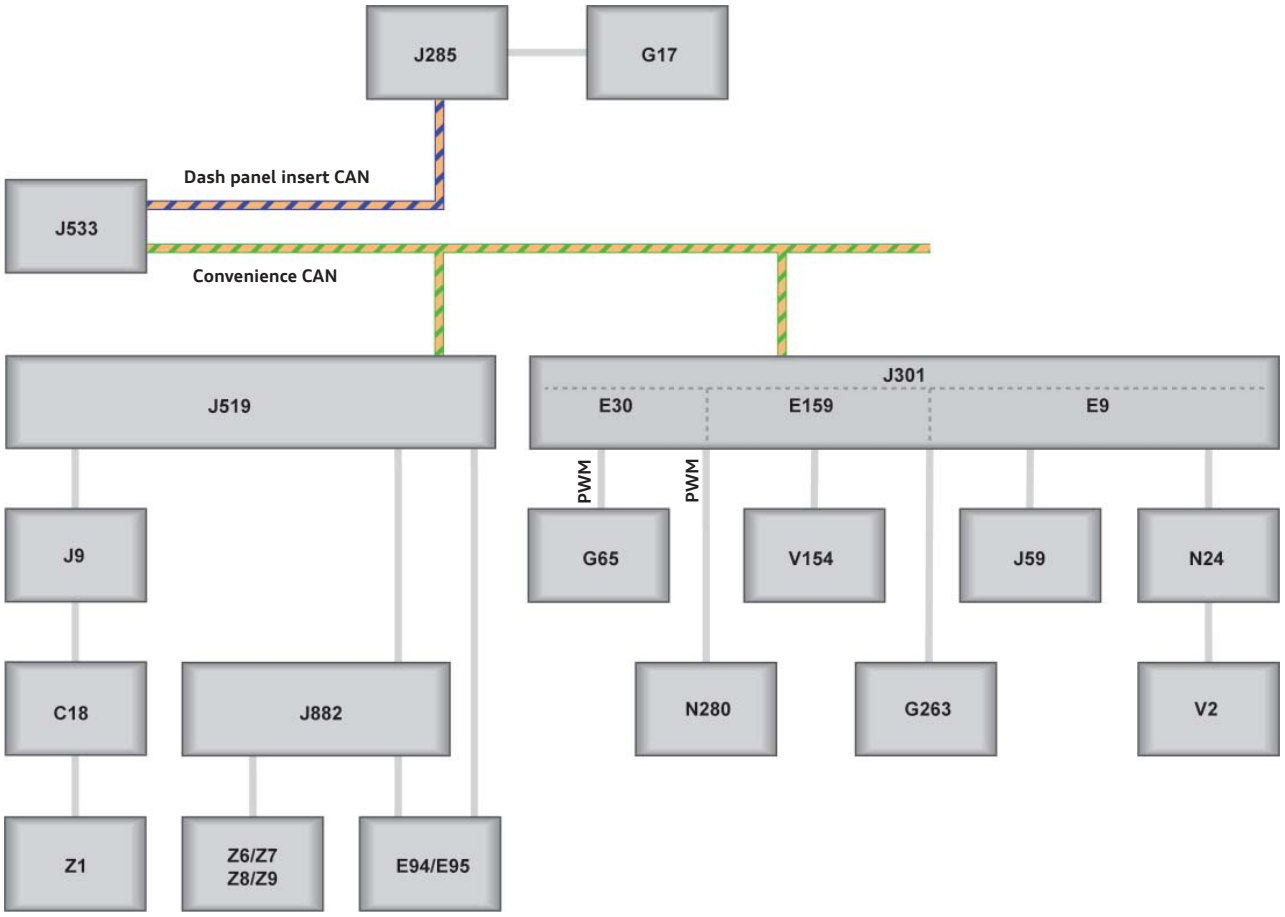
The manual air conditioning system cools only if the blower is switched on – AC operation is not possible in blower setting 0.

The manual air conditioning system J301 communicates with the onboard power supply control unit J519 and the control unit in dash panel insert J285 via CAN data bus. On A1 models equipped with a supplementary heater element Z35, the "Heat" signal is also sent to the engine control unit J623 via data bus.

477_059

On models equipped with a start-stop function, the stop function is inhibited if the manual air conditioning system control unit J301 is in heating mode.
The manual air conditioning system control unit J301 can be accessed in the vehicle diagnostic tester under address word 08.

Connected components



477_085

Legend:

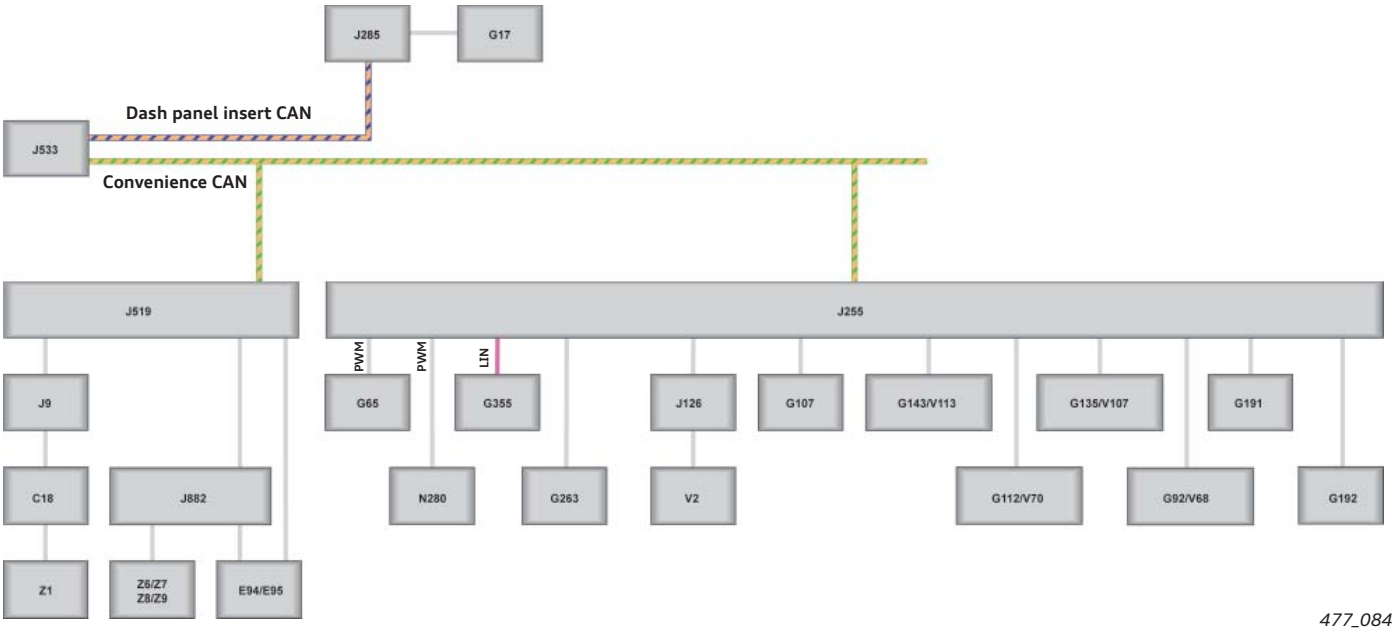
C18 Windscreen aerial suppression filter
E9 Fresh air blower switch
E30 Air conditioner switch
E94 Heated driver seat regulator
E95 Heated front passenger seat regulator
E159 Fresh air/air recycle flap switch
G17 Ambient temperature sensor
G65 High pressure sensor
G263 Evaporator outlet temperature sender
J9 Heated rear window relay
J59 X contact relief relay
J285 Control unit in dash panel insert
J301 Air conditioning system control unit
J519 Onboard power supply control unit
J533 Data bus diagnostic interface
J882 Seat heater control unit
N24 Fresh air blower series resistor with overheating cut-out
N280 Air conditioning compressor regulating valve
V2 Fresh air blower
V154 Fresh air/recycle air flap control motor
Z1 Heated rear window
Z6 Heated driver seat
Z7 Heated driver seat backrest
Z8 Heated front passenger seat
Z9 Heated front passenger seat backrest

Automatic air conditioning system

The automatic air conditioning system in the Audi A1 is configured as a single-zone air conditioning system. It has the same operating logic as the Climatronic control unit J255 in the Audi TT.
The Climatronic control unit J255 can be accessed in the vehicle diagnostic tester under address word 08.
Only models equipped with an automatic air conditioning system have humidity sender G355. It is located on the base of the rear-view mirror. The data on humidity level in the immediate vicinity of the windscreen allows early countermeasures to be taken to prevent misting of the windscreen.
The power-on signal for the supplementary heater element Z35 is sent to the engine control unit via the CAN data bus.
On models with a start-stop function, the "stop" function can, depending on the setting of the Climatronic control unit J255, be inhibited, e.g. by activating the defrost function or by increasing the interior temperature to a certain level.

477_074

Connected components



477_084

Legend:

C18 Windscreen aerial suppression filter
E94 Heated driver seat regulator
E95 Heated front passenger seat regulator
G17 Ambient temperature sensor
G65 High pressure sensor
G92 Temperature flap control motor potentiometer
G107 Sunlight photosensor
G112 Central flap control motor potentiometer
G113 Air flow flap control motor potentiometer
G135 Defroster flap control motor potentiometer
G143 Air recycle flap control motor potentiometer
G191 Vent temperature sender, centre
G192 Vent temperature sender, footwell
G263 Evaporator outlet temperature sender
G355 Humidity sensor
J9 Heated rear window relay
J126 Fresh air blower control unit
J255 Climatronic control unit
J285 Control unit in dash panel insert
J519 Onboard power supply control unit
J533 Data bus diagnostic interface
J882 Seat heater control unit
N280 Air conditioning compressor regulating valve
V2 Fresh air blower
V68 Temperature flap control motor
V107 Defroster flap control motor
V113 Air recycle flap servomotor
Z6 Heated driver seat
Z7 Heated driver seat backrest
Z8 Heated front passenger seat
Z9 Heated front passenger seat backrest

Heater element for supplementary air heater

The heater element for supplementary air heater Z35 is fitted on all diesel-engined A1 models in order to heat the interior more quickly.
The heater element has a maximum output of 1000 W which is distributed across three heat settings The heat settings are switched collectively by the onboard power supply, if required.
The heater element for supplementary air heater Z35 is only briefly operated at maximum output (directly after heating is requested).
On models equipped with a plain heating and ventilation system, a switch is integrated in the heater control unit J65. If this switch is closed by turning the temperature switch towards "warm", the ground signal for activating the heater element for supplementary air heater Z35 is switched through to the engine control unit J623.
On models equipped with a manual or automatic air conditioning system, the power-on command for the heater element for supplementary air heater Z35 is sent via data bus as a signal.

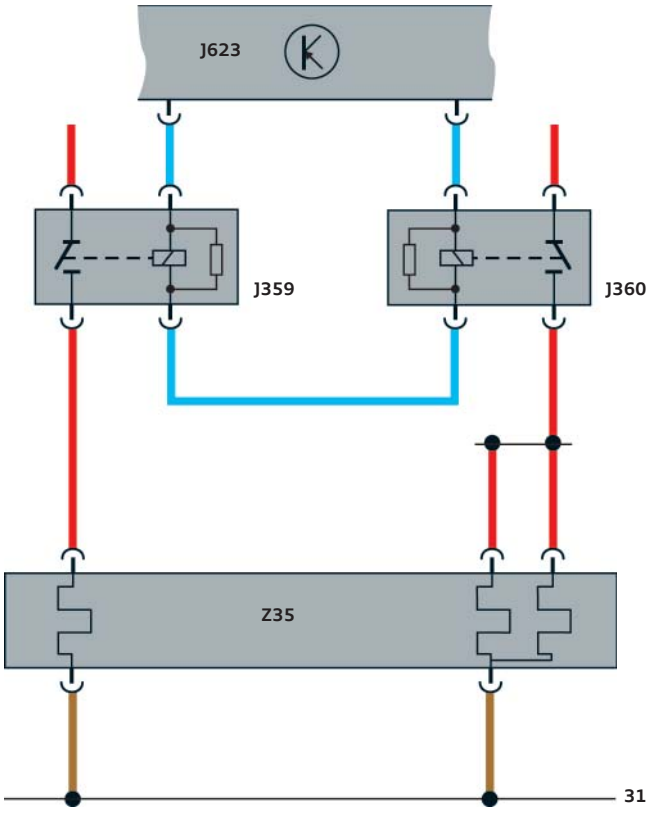
477_238

Heater element for supplementary air heater Z35 (partially stripped)

Circuit

The heater element for supplementary air heater Z35 is powered by two relays:

- J359 Low heat output relay
- J360 High heat output relay



477_231

Total output is distributed to three heating circuits as follows:

Heat setting	Effect/ heat output	Relays J359	Relays J360
0	Z35 OFF	OFF	OFF
1	low	ON	OFF
2	medium	OFF	ON
3	maximum	ON	ON

Legend:

ON Relay switched
OFF Relay not switched

Infotainment

For its tech-savvy target group, the Audi A1 leaves nothing to be desired. The customer can choose from between the standard chorus radio system and MMI Navigation plus.
To fulfill its customers' every wish, Audi offers a broad variety of equipment options and accessories for the Audi A1.

Even after delivery, customers can still "upgrade" their Audi A1 with retrofit infotainment components.
The navigation system is such an example: if a customer cannot decide whether he/she needs a navigation system when ordering the car, he/she has the option of ordering the car prewired for navigation with the Connectivity Package. If the customer decides at a later date that he/she wants to have the navigation function after all, he/she can have the navigation function activated by an Audi dealer and only has to pay the remainder.

Overview of versions

The Audi A1 is available with five infotainment versions. The chorus radio is standard in Europe. The concert radio and MMI Navigation plus are optional.

If the concert radio is selected, it can be ordered together with the Connectivity Package or the Navigation package. In both equipment versions, the concert radio includes several additional functions, such as the Audi music interface.

The difference between the Connectivity Package and the Navigation Package is that the customer can have the navigation function activated at a later date if the concert radio is ordered with the Connectivity Package. The navigation function can be activated at an Audi dealership, where the customer also receives the required SD card and navigation data.

Key standard and optional equipment is listed in the following table.

chorus radio (Europe only)	**concert radio**
	
	
Basic equipment	
3.1“ monochrome display with a resolution of 132 x 46 pixels	6.5“ TFT colour monitor with a resolution of 400 x 240 pixels
	Car menus
AM/FM radio with single tuner	AM/FM radio with phase diversity
	TP memo (while driving)
CD drive (MP3)	CD drive (MP3, AAC, WMA)
	1 SD card reader (for SDHC cards up to 32 GB in size)
	AUX In socket
Basic Sound or Basic Plus Sound (2 or 4 channel, depending on country)	Basic Plus sound system (4 x 20 watts)
Options	
	Bluetooth interface for HFP and A2DP (9ZX)
	Universal mobile phone prewiring (9ZF)
	Digital radio DAB
	CD changer (MP3)
	Audi Sound System
	BOSE Surround Sound

concert radio with Connectivity Package	concert radio with Navigation Package	MMI Navigation plus
		
		
6.5“ TFT colour monitor with a resolution of 400 x 240 pixels	6.5“ TFT colour monitor with a resolution of 400 x 240 pixels	6.5“ TFT colour monitor with a resolution of 800 x 480 pixels
Car menus	Car menus	Car menus
Prewired for navigation	2D navigation system with SD card	3D hard drive navigation system
AM/FM radio with phase diversity	AM/FM radio with phase diversity	AM/FM radio with phase diversity and background tuner
TP memo (while driving)	TP memo (while driving)	TP memo
CD drive (MP3, AAC, WMA)	CD drive (MP3, AAC, WMA)	DVD drive (Audio/Video, MP3, AAC, WMA, MPEG4)
2 SD card readers (for SDHC cards up to 32 GB in size)	2 SD card readers (for SDHC cards up to 32 GB in size)	2 SD card readers (for SDHC cards up to 32 GB in size)
		Jukebox with approx. 20 GB of internal memory
Audi music interface (AMI)	Audi music interface (AMI)	Audi music interface (AMI)
Basic Plus sound system (4 x 20 watts)	Basic Plus sound system (4 x 20 watts)	Basic Plus sound system (4 x 20 watts)
Bluetooth interface for HFP and AMI (9ZX)	Bluetooth interface for HFP and AMI (9ZX)	Bluetooth interface for HFP and AMI (9ZX)
Speech dialogue system	Speech dialogue system	Premium speech dialogue system
Universal mobile phone prewiring (9ZF)	Universal mobile phone prewiring (9ZF)	Universal mobile phone prewiring (9ZF)
Digital radio DAB	Digital radio DAB	Digital radio DAB
CD changer (MP3)	CD changer (MP3)	CD changer (MP3)
Audi Sound System	Audi Sound System	Audi Sound System
BOSE Surround Sound	BOSE Surround Sound	BOSE Surround Sound
		TV tuner (Japan only)

chorus radio (Europe only)

The chorus radio comes fitted together with the Basic or Basic plus sound system, depending on country. The single tuner for FM/AM reception is supplied with the required signals by the roof aerial. The radio R is integrated in the infotainment CAN bus.

The radio has the following features:

- AM/FM Single Tuner
- RDS reception with TP
- CD audio drive (MP3)
- Monochrome 3.1“ display (black/white)
- 6 softkeys
- 24 station memory (12 presets for FM stations and 12 presets for AM stations)
- Output: 2 x 20 watts or 4 x 20 watts (depending on country)
- Speed sensitive volume control (GALA)

Front panel of chorus radio *477_020*

Diagnostics

The radio R can be addressed with the address word "56 – Radio". The radio is encoded by the Software Version Management system.

Adaptation channels are available for making individual adjustments. These are:

Channel 03 – This channel can be used to set the operating time for manual power-on (after turning the ignition off) to between 1 minute and 99 minutes.
Channel 22 – This channel can be used to reset the sound settings to the mid-position.
Channel 45 – This channel can be used to activate or deactivate an acknowledgement beep. This beep sounds after pushing one of the control buttons.

Rear panel panel of chorus radio *477_071*

Two different actuator tests are available:

1) The first actuator test can be used for checking the loudspeakers by outputting a test beep.
2) The second actuator test activates the display for performing a visual check.

concert radio (Radio Media Center)

The concert radio on the Audi A1 is an integral component of the infotainment platform with the internal designation "Radio Media Center" (RMC).
Depending on specification, the Radio Media Center combines nearly all the hardware functions of a modern infotainment system - from the radio tuner with phase diversity to the navigation control unit - in a single housing. The housing of the RMC is equivalent to that of a 1-DIN device. Like the information electronics control unit 1 of the MMI (main unit), the RMC also acts as a central control function for the infotainment system.

The RMC features the multiple award winning MMI control logic and therefore embraces the Audi philosophy of making the operation of a system as intuitive as possible.

The RMC can provide various languages for menu guidance and speech dialogue. If a different language is preferred, the default language can be changed using the language CD. The language CD is supplied with the vehicle (depending on market).
The RMC currently supports the following languages:

Europe	America	Rest of World
▸ German ▸ English (UK) ▸ French (EU) ▸ Spanish (EU) ▸ Italian ▸ Portuguese (EU) ▸ Dutch ▸ Russian (cyrillic) ▸ Czech ▸ Polish	▸ English (US) ▸ French (CAN) ▸ Spanish (US) ▸ Portuguese (BRA)	▸ English (UK, male)

Note
Depending on country, certain restrictions may apply regarding speech control.
For example, Polish is available for navigation output only.

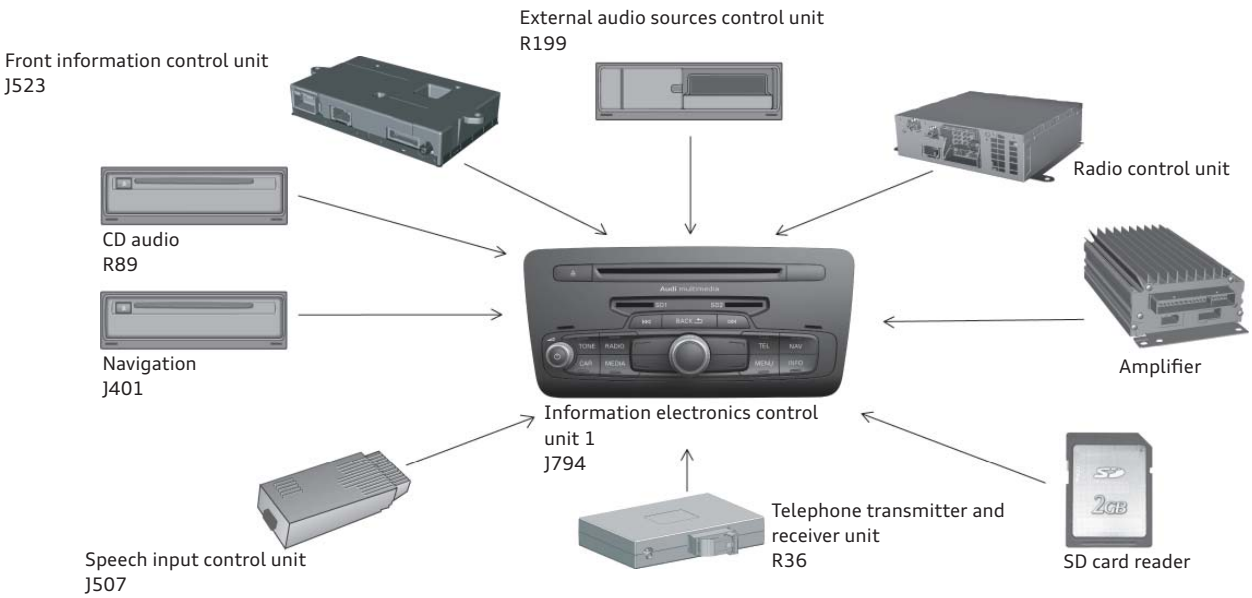
Depending on version, the designation of the Radio Media Center is
- R (radio control unit)
- J794 (Information electronics control unit 1)

Two different bus system versions are used in the RMC. The basic version of the RMC (radio only) is connected to the infotainment CAN bus. The RMC is configured as a MOST bus control unit if, for example, the Audi Sound System or the digital radio is fitted. In this case, the RMC is also the master control unit for the MOST bus.

Depending on what infotainment features are installed in the Audi A1, the functions of the following control units and media drives are combined in the RMC.

- Front information control unit J523
- Radio control unit R (optionally available with digital radio DAB)
- CD single drive R89
- Navigation control unit J401
- Telephone transmitter and receiver unit R36
- Speech input control unit J507
- External audio sources control unit R199
- Digital sound package control unit J525
- SD card reader

Grouped control units in the RMC



477_077

Versions of the Radio Media Center

The Radio Media Center is configured either as a CAN control unit or as a MOST control unit. In the CAN version, the central control unit for RMC has the designation "Radio control unit R"
In the MOST version, there are two hardware version series.
One series is the "radio version" and the other is the "navigation version".
The RMC has the designation "Information electronics control unit 1 J794".

The following table shows the basic series of the RMC versions. The CAN version is available in one version only. With the MOST version, there are various types of control unit hardware depending on specification.

Data bus interface	RMC CAN	RMC Most	
Device type	Radio	Hardware version: radio	Hardware version: navigation
Front view			
Rear view			
Service designation	Radio control unit R	Heater Information electronics 1 J794	Heater Information electronics 1 J794
Diagnostic address	56-Radio	5F-Information electronics	5F-Information electronics

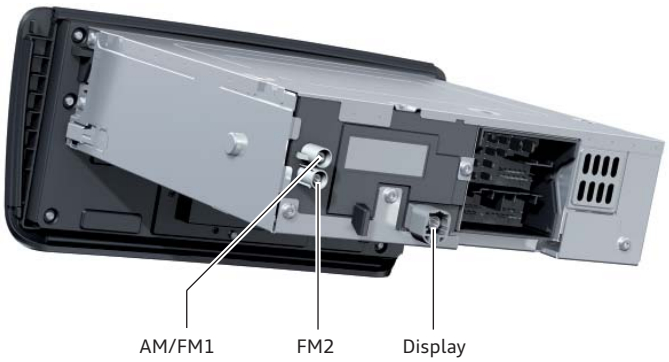
concert radio with CAN bus

If the concert radio is ordered for the Audi A1 without optional equipment, then the vehicle has a CAN infotainment system. The concert radio can then be accessed using the diagnosis address world "45-Radio". In this case, the concert radio has the designation "Radio control unit R".

The concert radio, in the CAN bus version, has the following features:

- A radio twin tuner with phase diversity for FM (very high frequency) as well as a single tuner for MW (medium wave)
- A single CD drive which supports MP3, WMA and AAC files
- 1 SD card reader (for SDHC cards up to 32 GB in size)
- 1 AUX IN connection
- 1 internal amplifier rated for 4 x 20 watts
- Car menu

Front RMC with CAN bus *477_070*



Rear RMC with CAN bus *477_068*

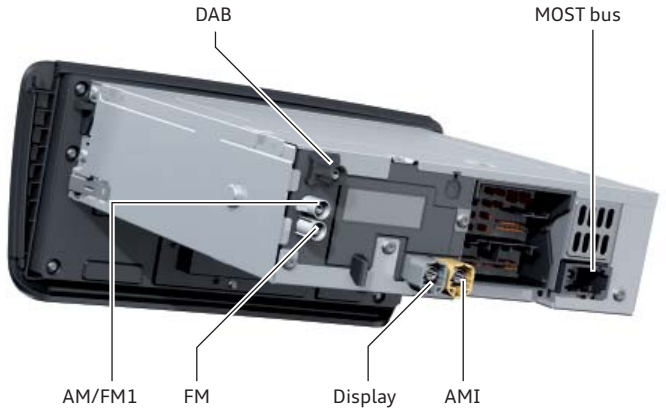
concert radio with MOST bus

If a concert radio is fitted on the Audi A1 in combination with a supplementary option, the vehicle has a MOST bus for the infotainment system.
There are two basic hardware versions of the RMC with MOST bus. They can be distinguished by the number of SD card readers.
A radio version can be distinguished by a single SD card reader, a version with navigation system and two SD card readers.

The RMC with MOST bus has the service designation "Information electronics control unit 1 J794". However, the rear panels of both control unit versions can only be distinguished by the GPS aerial connecting plug.

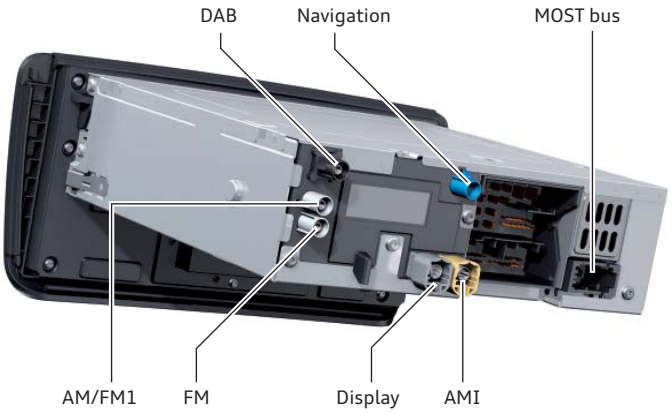
The RMC in the MOST bus has the same tasks as the MMI main unit. It is, therefore, also the master for the MOST bus system. The data bus diagnostic interface J533 also serves as the diagnosis master for the RMC.
The key difference between the RMC and the MMI in terms of their system configuration is that the RMC does not have a separate radio control unit in the MOST bus. Here, the radio control unit is integrated in the information electronics control unit 1 J794.

Trim of RMC radio version *477_070*



Rear panel of RMC radio version *477_156*

Trim of RMC with navigation *477_184*



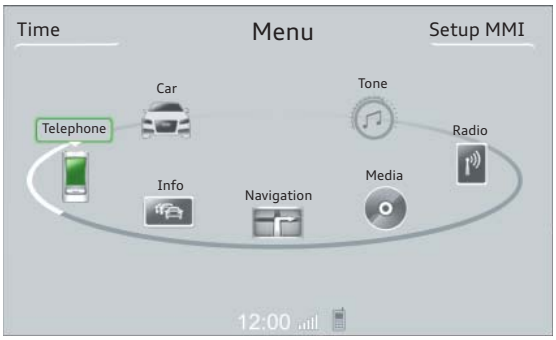
Rear panel of RMC with navigation *477_092*

Functions of the concert radio

Several functions of the RMC are described in greater detail below.

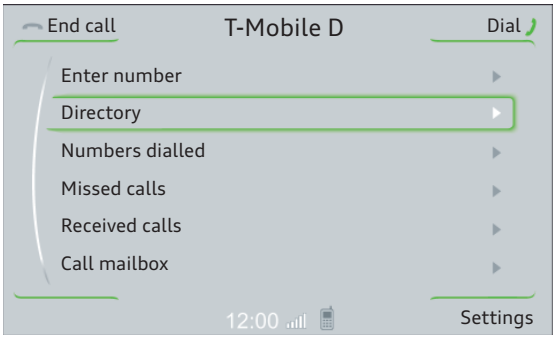
Menu display

The main menu of the Radio Media Center has a so-called wizard menu, as previously used in the MMI3G plus system. In all other menus, lists are used for making all further selections.



477_093

Main menu



477_094

List menu

Radio

All RMC versions come fitted with an analog radio twin tuner with phase diversity. In the case of the concert radio with navigation, an additional tuner is installed for RMC reception. The system has a station tracking function in combination with the optional digital radio tuner (DAB). When the vehicle leaves the reception range of DAB station, the system automatically switches to the same station in the FM band if such a station is available.

The concert radio has a dynamic channel list function. The channel list is updated by one of the two FM tuners. This takes place when the other tuner has sufficiently good FM reception.

The navigation version of the RMC has a third tuner which exclusively serves TMC reception.

A single tuner is integrated in the DAB radio. In this case, a channel list is only compiled automatically if no DAB source is active. If DAB is the other audio source, updating of the list has to be initiated manually.

477_095

Radio waveband selection

477_096

Radio channel search

477_145

Dynamic channel list

Navigation

The navigation system has a two-dimensional birdview map display. In the Setup menu it is referred to as the 3D map. Various map add-ons can be activated in the "Setup" menu. These include manoeuvring lists and detailed maps of road intersections. This information is displayed in split screen mode. Depending on country, it is also possible to call up the current maximum speed or usual national recommended speeds.

The navigation system is also able to display two alternative routes.
The mapping material is stored on an SD card. Today, for example, a 4 GB-SDHC card is used for the European variant.

The Radio Media Center with navigation is the first Audi navigation system which does not have a gyrosensor (rotation angle sensor) integrated in the control unit. The information electronics control unit 1 J794 receives the highly accurate gyro data from the ESP control unit via the data bus. This gyro data includes, for example, the yaw rate of the vehicle.

477_097

Maneouvres list

477_098

Detailed intersection map

477_100

Display of usual national speed limits

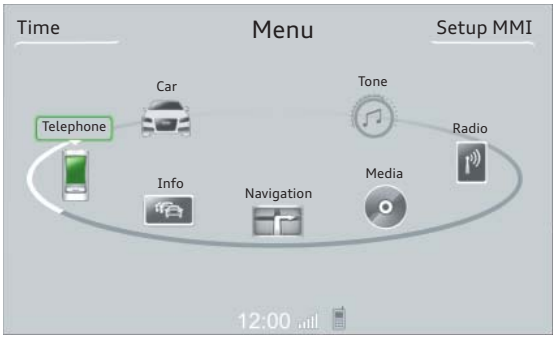
477_099

Alternative routes

Note
The concert radio with navigation function has the internal designation Ready4Nav.

Telephone

The RMC is optionally available with either a Bluetooth hands-free set (Bluetooth interface 9ZX) or with universal mobile phone prewiring (UHV/9ZF). Compared with the Bluetooth hands-free set, the universal mobile phone prewiring has an additional mounting for the mobile phone adapter cradle together with an exterior aerial and aerial booster (depending on market).



477_093

Menu with telephone function

Connecting mobile phones

With both versions, the mobile phone is connected to the RMC by Bluetooth. Up to eight mobile phones can be connected to the RMC. A profile is automatically generated for the first four mobile phones and the contacts from the mobile phones are transferred. Ifr contacts have been created in the vehicle for these four mobile phones, a selection window opens when another mobile phone is connected.
To save the in-car mobile phone contacts, the user can select which profile is to be deleted. Alternatively, use of the mobile phone can also be restricted. This means that the telephone numbers from the connected mobile phone are only stored until the next time the system is started. In addition, no local contacts can be created.

The RMC can manage up to 2000 mobile phone contacts. In turn, up to five telephone numbers and two addresses can be used per contact.

477_102

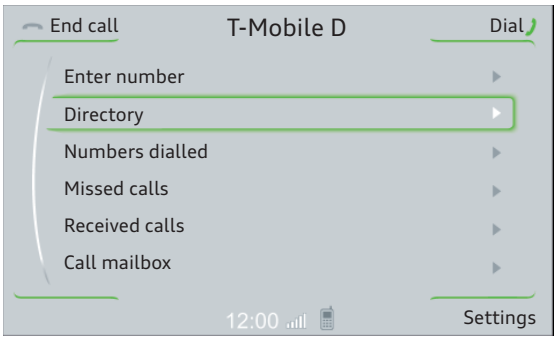
Menu display "Replace contacts"

Reference
Information on approved mobile phones can be found in the "Mobile devices database".
This database can be accessed on the internet at www.audi.com/bluetooth.

Directory

The Radio Media Center RMC has an internal directory which can be used to manage the contacts transferred from the mobile phone and the contacts created locally in the vehicle.
If a mobile phone is connected to the RMC, the directory can be selected in the Telephone menu.

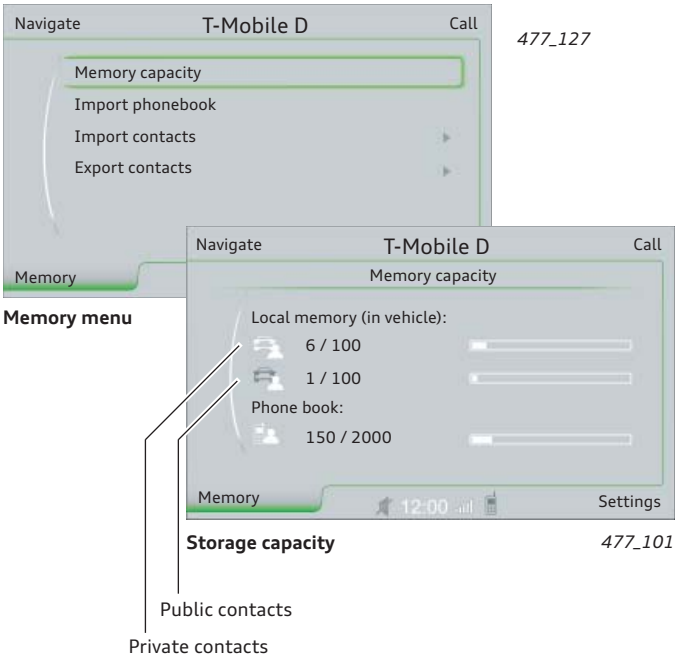
The directory has capacity for four mobile phones, and hence four profiles. Each profile can manage up to 2000 entries from a connected mobile phone and 100 entries made locally in the vehicle. The four mobile phones with an active profile have a maximum capacity of 5000 entries.



477_094

Directory in Telephone menu

The memory utilisation of the mobile phone currently connected can be displayed in the directory menu via the "Memory" function (softkey at the bottom left) after confirming the menu option "Storage capacity". The display for "Local memory (in vehicle)" indicates how many local entries are private or public.
Private means that these entries are only visible when the telephone assigned to the profile is connected. Public contacts, on the other hand, are always visible irrespective of which mobile phone is connected.

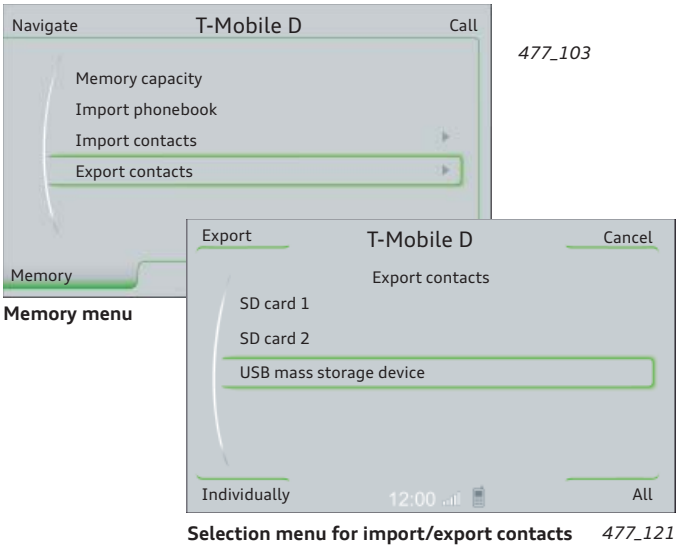


477_127

Memory menu

Storage capacity *477_101*

With the Radio Media Center, local contacts to be entered via the operating unit or imported from an SD card or USB storage medium.
It is also possible to import so-called vCards, which can be generated using Microsoft Outlook for example. Stored contacts can also be exported to an SD card or USB storage medium as a vCard.



477_103

Memory menu

Selection menu for import/export contacts *477_121*

Media

Depending on specification, the Radio Media Center has the following drives and connectivity options:

- CD single drive
- SD card reader (2x for navigation versions)
- Audi music interface
- CD changer
- Bluetooth interface for Bluetooth audio streaming

Full drives are indicated by the appropriate symbol in white. The symbols are explained below.

1 Memory card reader
2 CD drive
3 CD changer (optional)
4 Apple iPod via Audi music interface (optional)
5 Audi music interface with connected USB mass storage device or external audio/video input (optional)
6 Bluetooth audio player (optional)

477_118

Possible audio sources

Cover display

The RMC can display both track information and a music cover embedded in the file when playing back audio files from SD cards, USB mass storage devices and CD drives.
A cover can only be displayed if the following requirements are met:

- Cover must be embedded in the file
- The cover image size must not exceed 500 x 500 pixels
- Valid image formats are JPG, JPEG, PNG, BMP, TIFF or GIF
- The display of track information must be activated in RMC

477_120

Cover display

Reference
Further information on supported file formats can be found in the operating manual.

Audi music interface (AMI)

The RMC with optional Audi music interface has a connecting plug and provides connectivity via Bluetooth. The connecting plug can be found in the glove compartment of the Audi A1. For example, it can be used to play back audio files from a USB mass storage device. It is also possible to play videos using an AV adaptor cable. The AV adaptor cable is available through Audi Original Accessories. Images can only be output in the RMC when using this adaptor cable.

AV adaptor cable *477_128*

Bluetooth interface

The Bluetooth interface can be used for Bluetooth audio streaming in the Radio Media Center. This is the same Bluetooth interface as that used for connecting the mobile phone.

Bluetooth profiles A2DP (Advanced Audio Distribution Profile) and AVRCP (Audio Video Remote Control Profile) are supported. Bluetooth profile A2DP is responsible for transmitting the stereo signal and AVRCP is responsible for controlling the player.

Depending on which functions a connected Bluetooth audio player supports, the audio player can be controlled using the AVCRP profile. The AVCRP profile can also be used to show additional information on the Radio Media Center display. Examples include: Artist, Album and Play time

477_130

Display with connected Bluetooth audio player

The RMC allows a mobile phone to be simultaneously connected via HFP (Hands Free Profile) and an audio player via A2DP. The RMC also supports the simultaneous connection of HFP and A2DP profiles for a mobile phone with integrated audio player. Whether a simultaneous connection is possible or not depends on the mobile phone in question.

Parallel connection via HFP and A2DP *477_129*

Reference
Information on approved Bluetooth audi players can be found in the "Mobile devices database".

Speech dialogue system

The speech dialogue system of the RMC can be used to conveniently operate numerous functions of the infotainment system. It is always installed when a telephone hands-free set or navigation system is fitted.
The following systems can be speech-operated:

- Telephone
- Navigation
- Radio
- Media
- Info

With the speech dialogue system, any telephone number from the directory can be called without having to previously generate a speech entry. It is sufficient to enter the command "Call", followed by a first name and surname as well as the desired category (business/private/land line/mobile). The navigation function to a defined navigation destination can also be started with "Navigate to", followed by a first name and surname. A navigation destination can be entered by full text input of town/city, street and house number.

The voice processor integrated in the speech dialogue system generates spoken language from the written word (the town/city and street name from the navigation system and the proper name from the directory). Speech output is provided by an "artificial voice". No recorded texts are played, rather the voice synthesizer reads the relevant information. This process is also refererd to as "text-to-speech". This enables traffic messages in the Info menu to be read even if it is only available in a written form.

In Europe, for example, the speech dialogue system can be switched to various languages using a language CD. The currently supported languages are listed on page 81.

An "Individual speech training" function is available so that the speech control system can be better adapted to the driver's voice. "Individual speech training" can be activated in the "Setup MMI" menu. 40 predefined terms and number combinations have to be repeated.

Reference
The individual commands can be found in the vehicle's operating manual or can be output by the speech dialogue system when using the "Help" command.

Operating unit

The operating unit for the concert radio is a component part of the RMC in the Audi A1. An RMC in other Audi models can be equipped with a separate operating panel, which is referred to as multimedia operating unit E380.

The three possible keystroke combinations for customer service are explained below.

System reset

To restart (reset) the Radio Media Center, the following buttons must be briefly pressed at the same time:

- Turn-push button
- Softkey at top right:
- BACK

Keystroke combination for system reset *477_131*

Engineering menu

The Engineering menu is used, for example, for software updates. To access the menu, the following buttons must be pressed and held down:

- BACK
- TONE

Keystroke combinations for the Engineering menu *477_132*

Screenshot

In the RMC it is possible to make a screenshot of the screen currently displayed. The screenshot is then saved to the inserted SD card or to a connected USB mass storage device. The four softkey buttons flash as feedback that the screenshot has been stored. To make a screenshot, the following buttons must be pressed in succession and held down:

- Back button
- Forward button

Keystroke combination for screenshot *477_133*

Concert radio display

(front information display unit J685)

The concert radio has a 6.5-inch TFT colour screen with ¼ VGA resolution. This is equivalent to 400 x 240 pixels. In the Audi A1, the display is located at the top centre of the dash panel and can be folded in and out manually.
The screen is connected to the RMC by a 4 pin connector. Two of the four lines can be used for transferring images via LVDS, and one line can be used for data transfer via LIN bus. The four line is a ground wire. The display is powered via a separate connector.

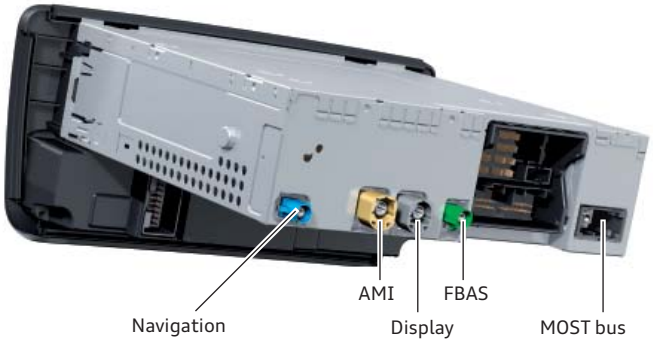
Display folding mechanism *477_122*

MMI Navigation plus

The MMI Navigation plus system of the Audi A1 is based on the Navigation plus system of the Audi A8 ’10 and is the 3rd generation of the MMI system. The internal designation is MMI3G plus.

For the Audi A1, the front panel of the information electronics control unit 1 has been integrated into the operating unit. The chrome bezel of the operating unit distinguishes it visually from the concert radio (RMC).

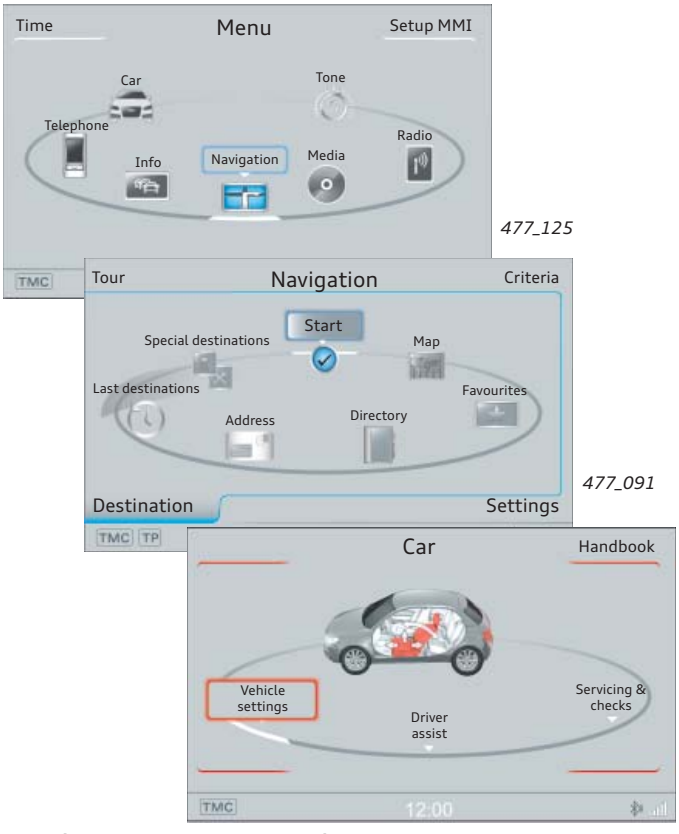
Information electronics control unit 1 J794 in the MMI *477_073*



Rear panel of the J794 in the MMI *477_072*

The MMI Navigation plus system in the Audi A1 has the following features:

- Wizard menus
- 60 GB hard drive with approx. 20 GB for Jukebox
- 3D navigation with 3D city models
- DVD drive
- 2 SD card readers (for SDHC cards up to 32 GB in size)
- Premium speech dialogue system
- Audi music interface
- Radio control unit with phase diversity
- 4 channel amplifier (integrated in the radio control unit)
- 6.5 inch TFT screen with a resolution of 800 x 480 pixels
- Joystick function of turn-push button
- Audi music interface
- Bluetooth interface for
  - hands-free set
  - Audi streaming



477_125

477_091

Wizard menus in MMI Navigation plus *477_051*

Reference
For further information about the 3rd generation MMI system, refer to Self-Study Programmes 456 "The Audi A8 ’10" and 435 "The 3rd Generation Audi MMI System".

Operating unit

In the Audi A1, the multimedia operating unit E380 of the MMI system is an integral part of the front panel of the information electronics control unit 1 J794 (main unit). The operating unit is nevertheless an independent control unit and is connected to the main unit by multiple contact connectors.

The three possible keystroke combinations for customer service are explained below.

477_072

System reset

To restart (reset) the MMI, the following buttons must be briefly pressed at the same time:

- Turn-push button
- Softkey at top right
- TONE

Keystroke combination for MMI system reset *477_151*

Engineering menu

The Engineering menu is used, for example, for software updates. To access the menu, the following buttons must be pressed and held down:

- BACK
- TONE

Keystroke combinations for the MMI menu *477_150*

Screenshot

In the MMI it is possible to make a screenshot of the screen currently displayed. The screenshot is then saved to the inserted SD card or to a connected USB mass storage device. The four softkey buttons flash as feedback that the screenshot has been stored. To make a screenshot, the following buttons must be pressed in succession and held down:

- Back button
- Forward button

Keystroke combination for MMI screenshot *477_152*

MMI Navigation plus display

(front information display unit J685)

The MMI has a 6.5 inch TFT colour screen with VGA resolution, which is equivalent to 800 x 480 pixels. The display is located at the top centre of the dash panel and can be folded in and out manually. The screen is connected to the information electronics control unit 1 J794 by a 4 pin connector. Two of the four lines can be used for transferring images via LVDS, and one line can be used for data transfer via LIN bus. The four line is a ground wire. The display is powered via a separate connector.

Display J685 *477_183*

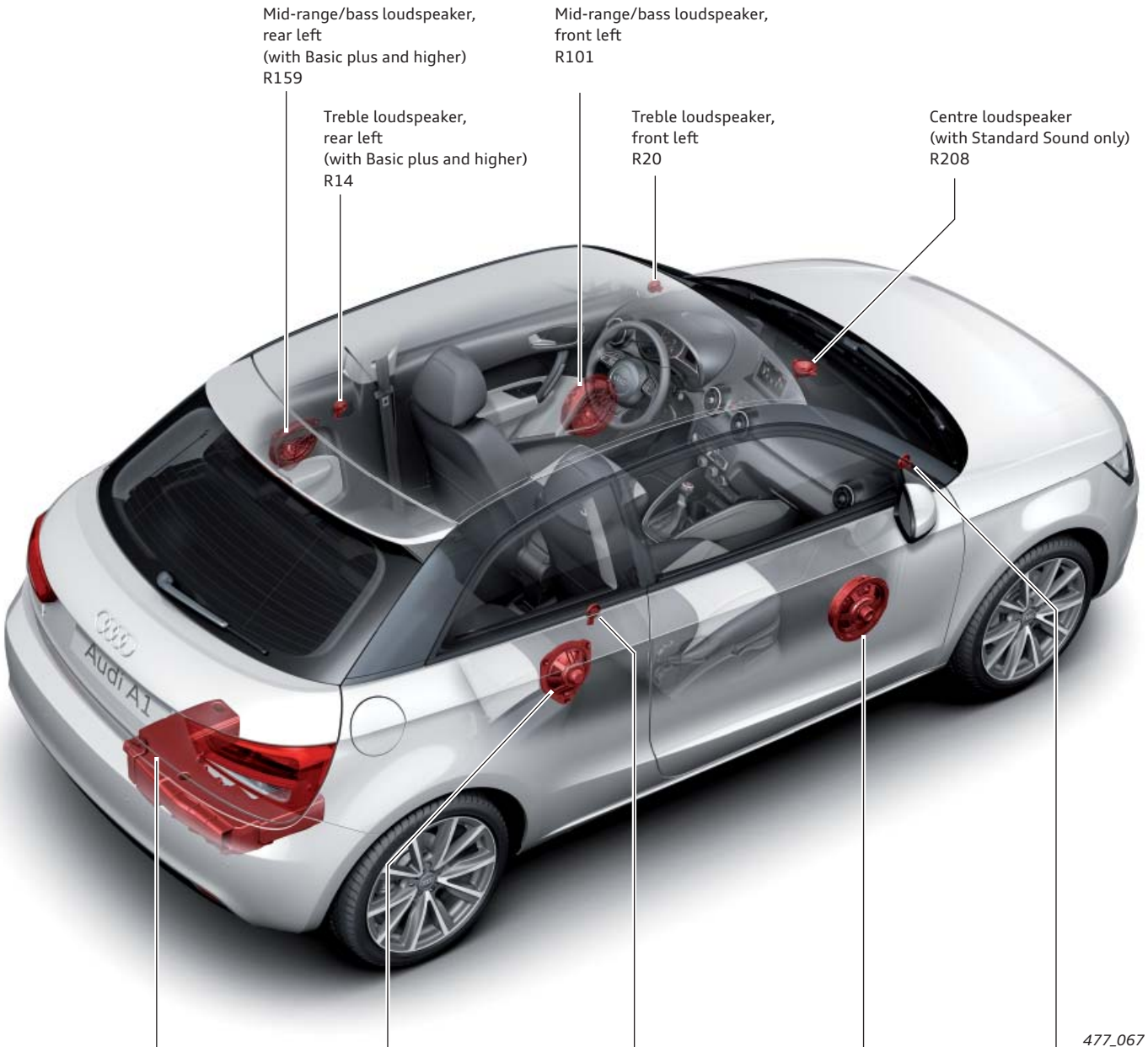
Sound systems

The Audi A1 is available with three different sound systems. Depending on country, either the Basic sound system or the Basic plus sound system is fitted. Four or eight loudspeakers are installed. They are supplied with 2 x 20 watts or 4 x 20 watts by the radio. The concert radio and MMI Navigation plus come with the Basic plus sound system.

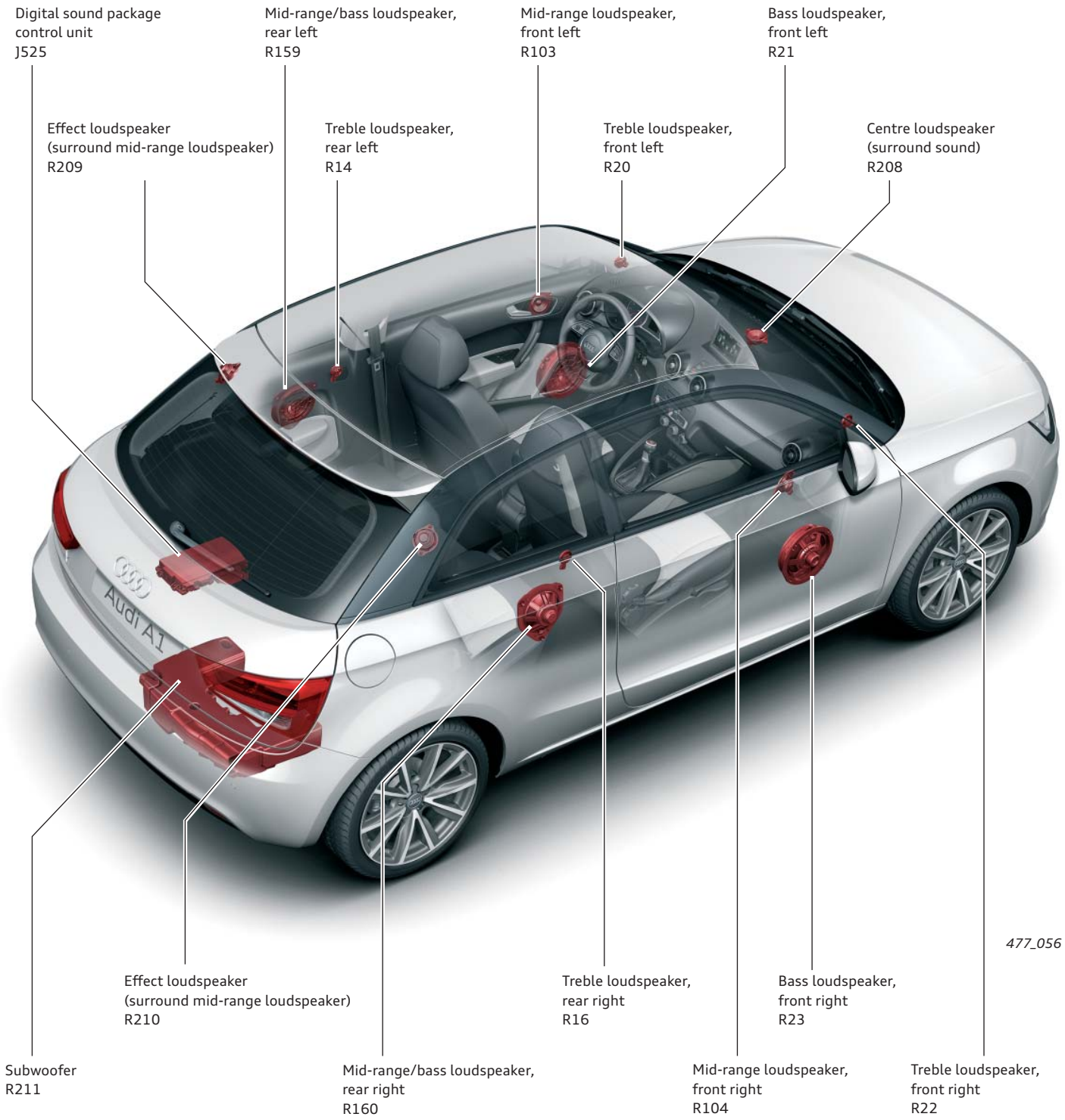
The optional Audi sound system (service designation: Standard Sound) is equipped with 10 loudspeakers. The power amplifier integrated in the radio control unit (with MMI Navigation plus) or in the RMC drives the loudspeakers via six channels with a total output of 180 watts.

The BOSE Surround Sound system provides excellent sound quality. The separate BOSE amplifier (digital sound package control unit J525) distributes its total output of 465 watts to the 14 loudspeakers. With BOSE Surround Sound, the two subwoofers in the front doors are visually enhanced by indirect lighting in the speaker grilles. The LEDs installed for this purpose are driven by the front door control units.

Audi A1 Basic and Standard Sound systems



Audi A1 with BOSE Surround Sound

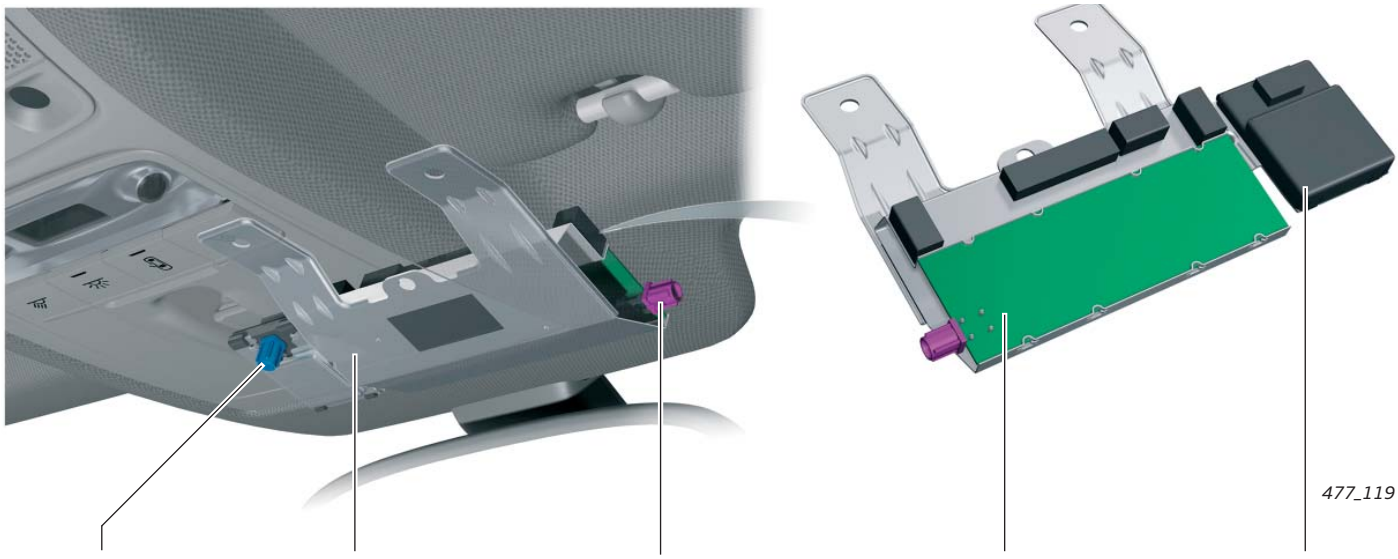


Aerial systems

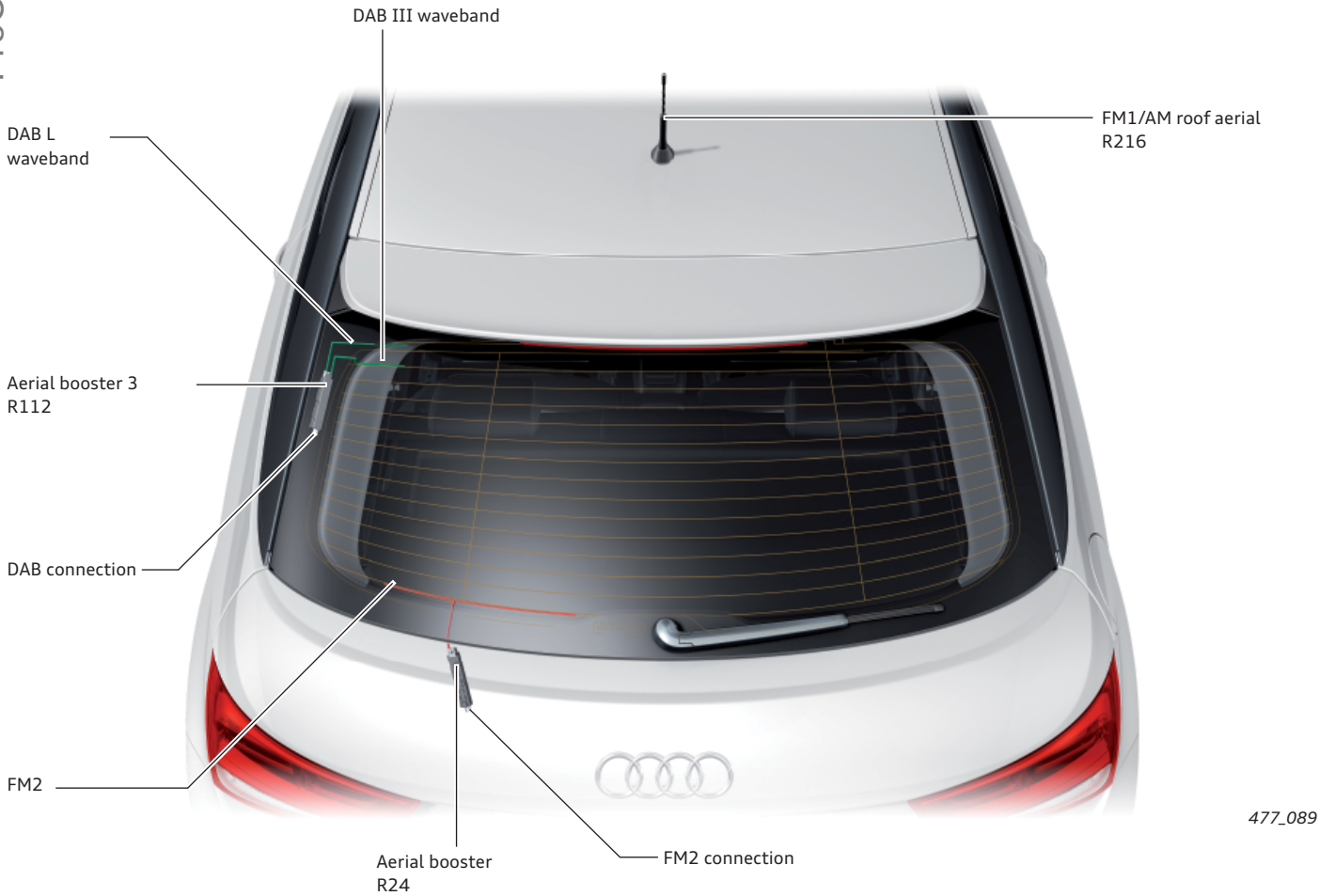
Depending on specification, the Audi A1 has differently configured aerial systems. The version with chorus radio comes exclusively with a roof aerial for AM/FM reception. If other infotainment systems are fitted, additional aerials are integrated in the windscreen and rear window.

No roof aerial is fitted if the vehicle is equipped with the optional panorama tilt sunroof. In this case, the aerials for AM/FM reception are integrated in the roof spoiler.

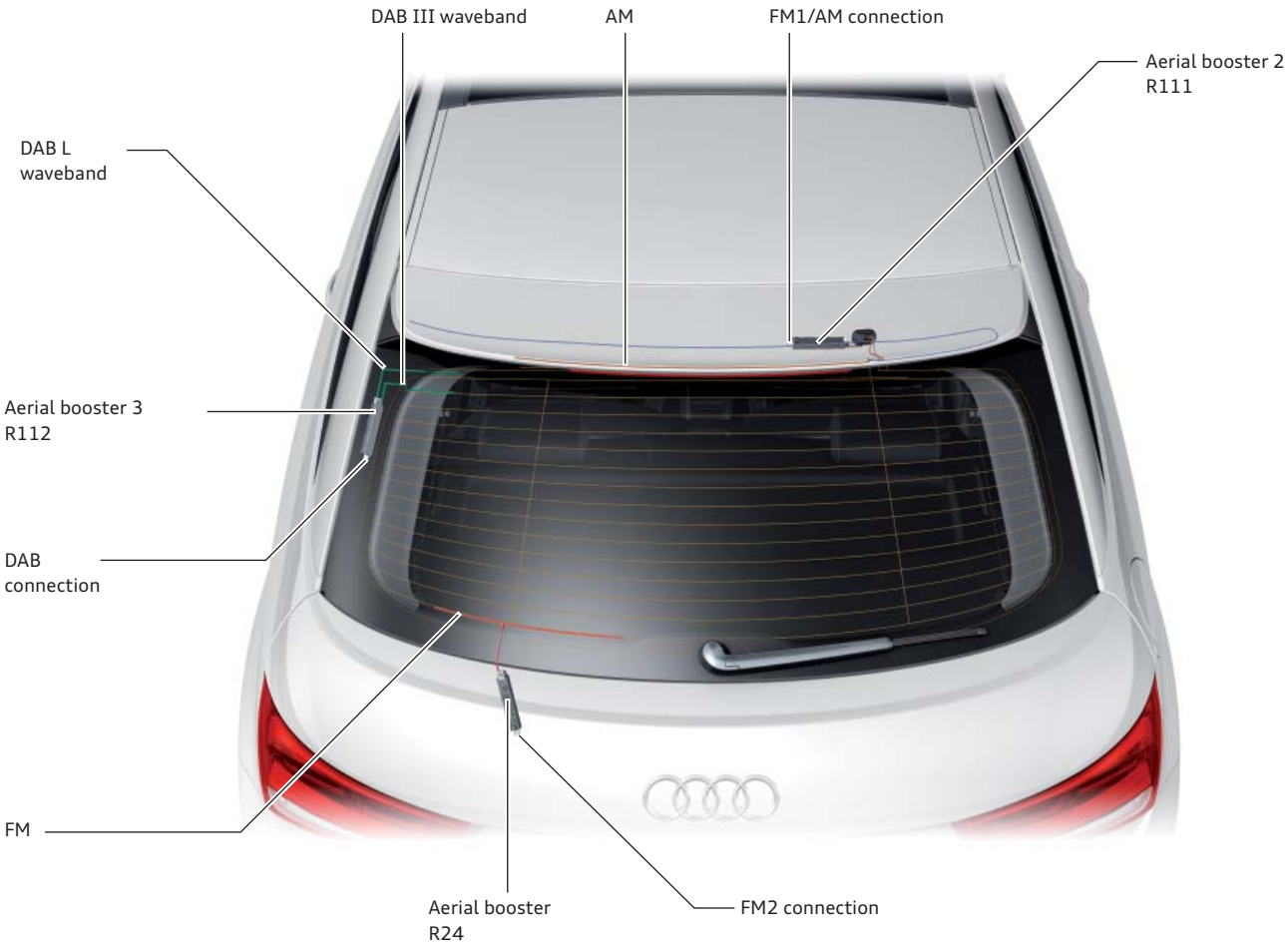
Aerials behind the windscreen



Overview of aerials in rear end with roof aerial



Overview of aerials in rear end with panorama tilt sunroof

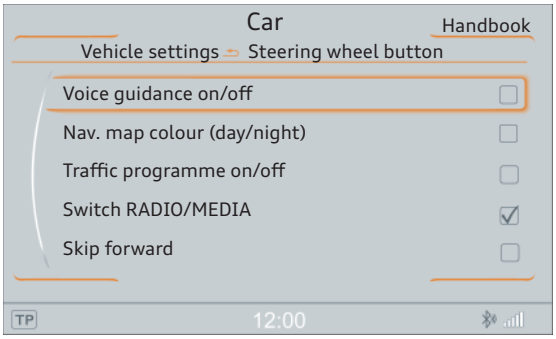


477_088

Programmable button on multi-function steering wheel

The multi-function steering wheel of the Audi A1 has an individually programmable button, the so-called joker button. The menu option "Steering wheel button" can be found in the Car menu via "Vehicle settings". One of the five displayed functions can be selected in this menu.

Joker button *477_134*



477_135

Menu for programming the joker button

Service

In-service product activation

WE all know the story: you buy a new PC program, rush home to install it on your PC and then ...
Today, many software products have to be activated by the manufacturer after installation. The user has to either contact the manufacturer by phone or visit the manufacturer's website in order to activate his/her software. In the case of PC operating software, among other things, information is exchanged regarding the hardware in use and/or the software previously used. In addition, the user requires a licence number or a pin code. Manufacturers have began taking these measures to ensure that their products are compatible with the hardware in use.

Likewise, more and more Audi products now require activation. The Audi A1, for example, can be ordered with the a concert radio with the Connectivity Package (the so-called Ready4Nav). If the customer decides to activate the navigation function, he/she has to purchase an update package from his/her Audi dealer.
This package consists of two components:

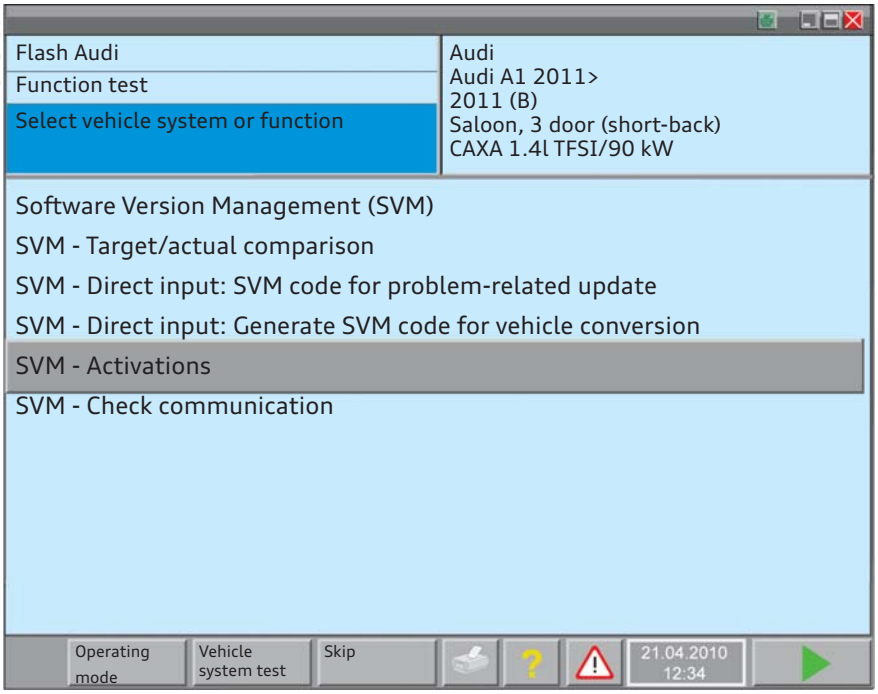
1) An activation document for the navigation function
2) The current navigation data (stored on an SD card), including an activation document for activating the usage rights for the navigation card

An activation document serves as proof of right of use and contains three numbers:

1) Activation code
2) Activation number
3) Pin code

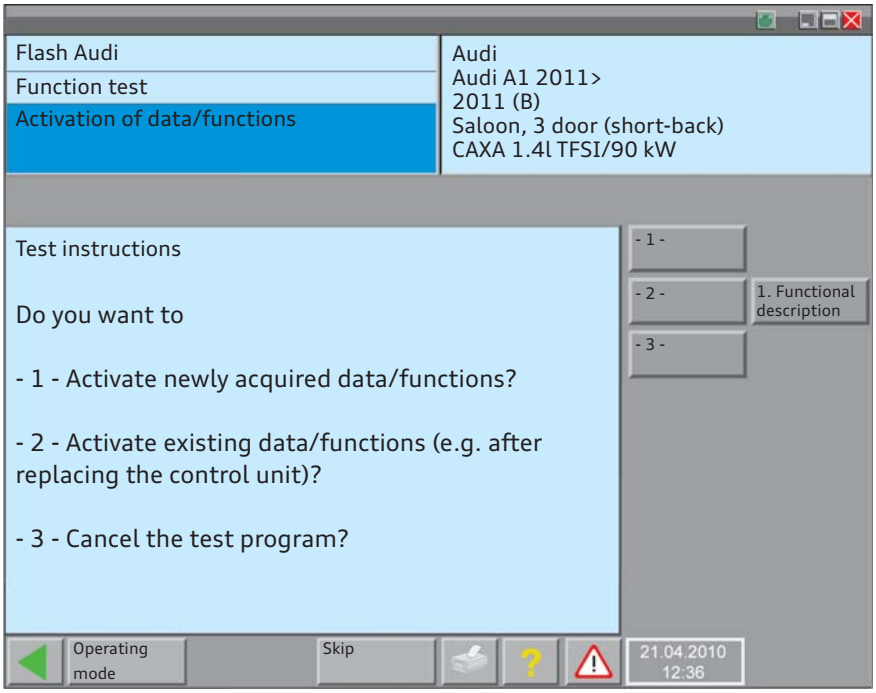
The usage rights are valid for exactly one vehicle and are not transferrable.

Products can only be activated by an Audi dealer using the vehicle diagnostic system. An online connection to the Software Version Management (SVM) system is required for this purpose. The required test program, "SVM – Activations", is available in the "Flash Audi", "Guided functions" and "Guided fault finding" functions. The program should preferably be used via "Flash Audi".



477_169

This program can be used, firstly, to activate a new product and, secondly, to reimport (activate) existing data or functions. To run the program, the relevant service employee's GEKO User ID also has to be entered.

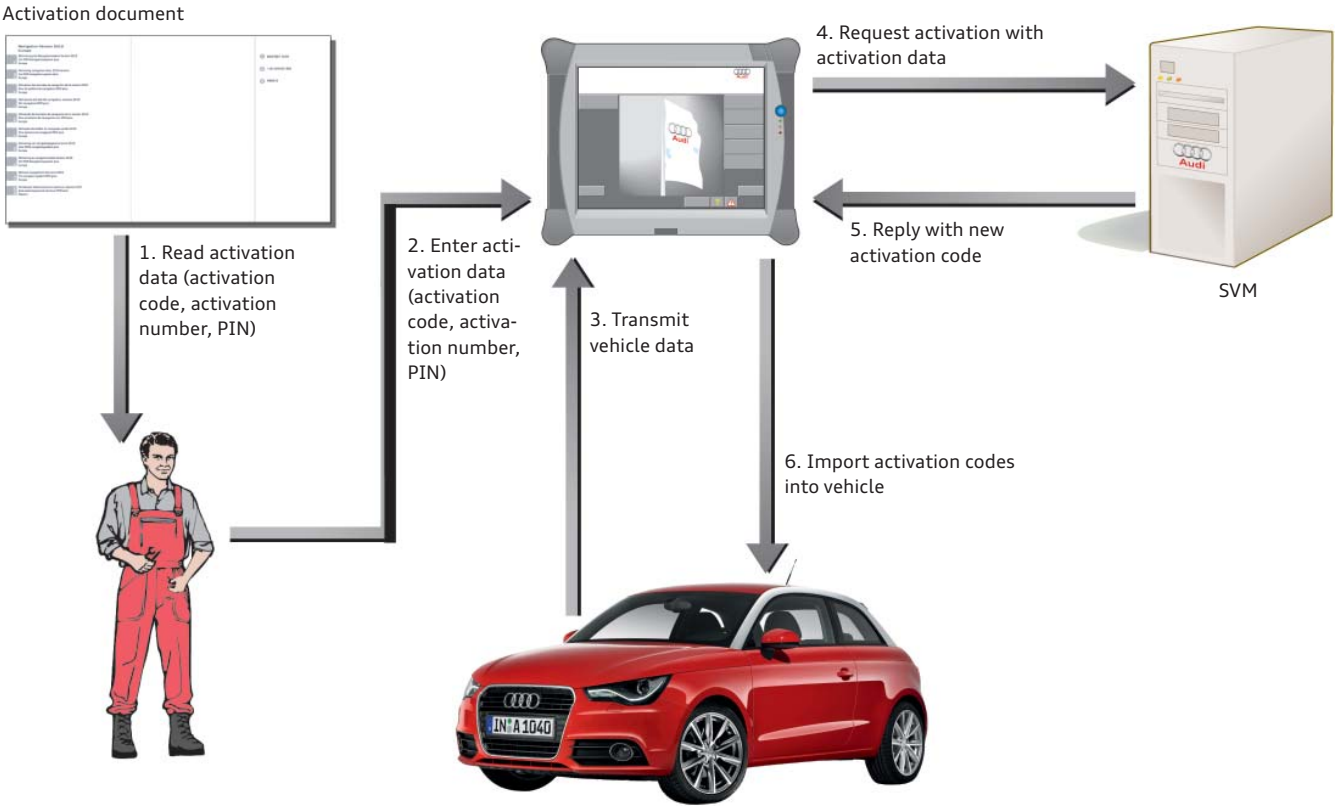


477_168

Procedure for activating a new product.

The procedure for activating a new product is shown schematically below. For reasons of simplicity, the process of accessing the guided program of the vehicle diagnostic tester is not explained. After starting the program, the test program "1 – Activate newly acquired data/functions" must be selected (see Fig. 477_168 on page 99).

The description of the procedure begins after GEKO User has logged in.



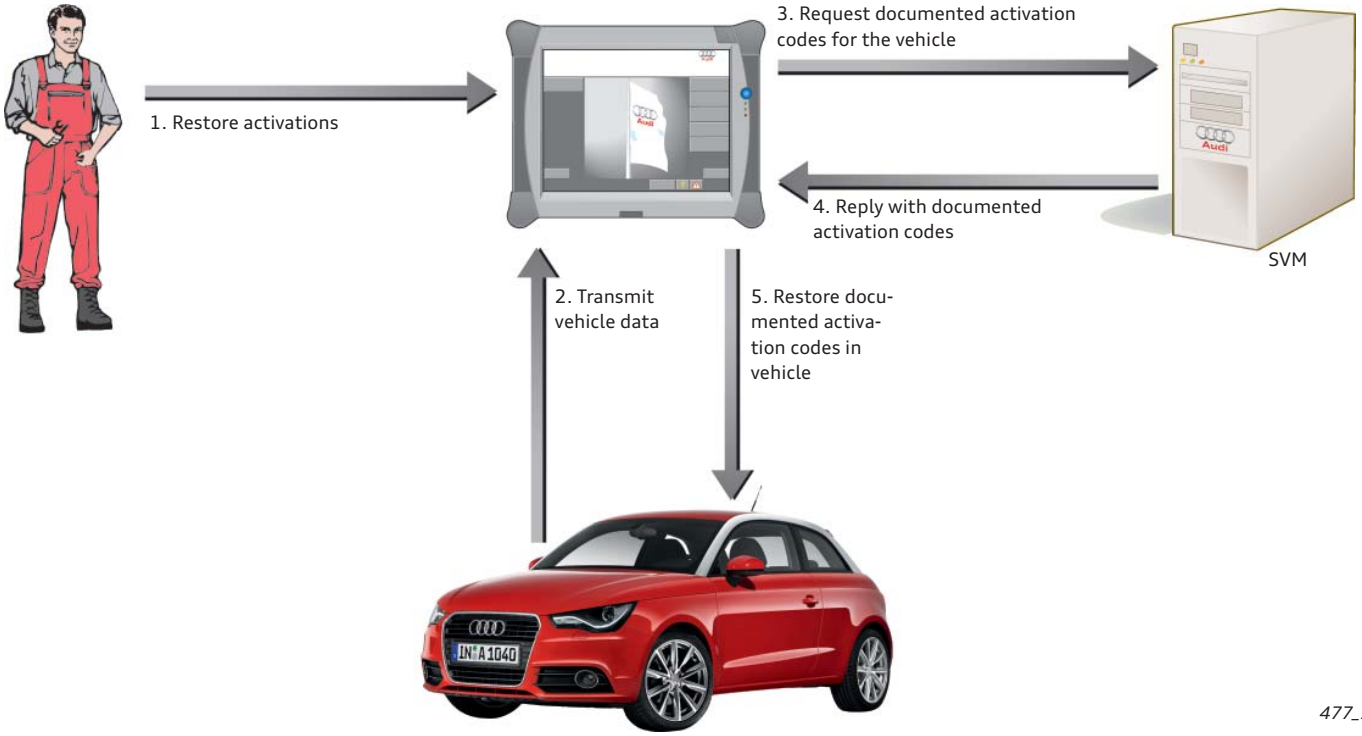
477_181

To activate the navigation function for the concert radio in the Audi A1, this activation sequence has to be performed twice. The first time is to activate the navigation function and the second time is to activate the usage rights for the navigation data.

Procedure for restoring activations after repairs

If an control unit is replaced on which data/functions have already been activated, the activation must be restored. This is done by running the test program "SVM – Activations" after automatic encoding and configuration have been completed. This is automatically included in the test plan when the "Replace control unit" program is run.
After starting the program, the test program "2 – Activate existing data/functions" must be selected to restore the activations (see Fig. 477_168 on page 99).

The procedure for restoring the activated status of a control unit after repair work is described below. For reasons of simplicity, the process of accessing the guided program of the vehicle diagnostic tester is not explained. The description of the procedure begins after GEKO User has logged in.



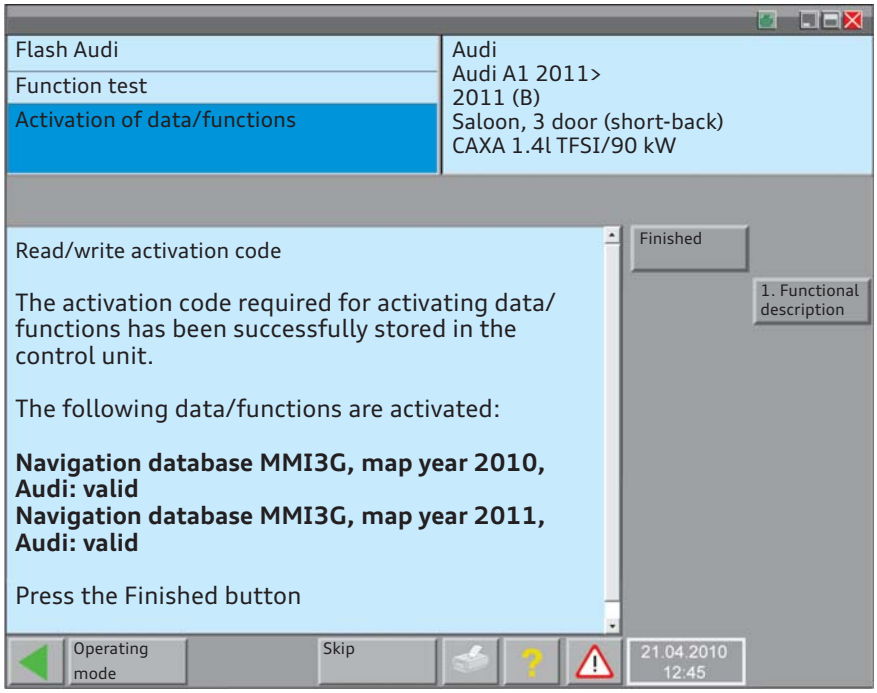
477_182

When an activation is restored, no further activation data has to be entered. This activation data has already been stored in the SVM during initial activation.

Display upon completion of activation

After an activation has been successfully completed, the display of the vehicle diagnostic tester provides feedback on the data or functions now activated. After a navigation data update, for example, the system displays which map years are valid for the vehicle.

This activation process must also be performed for control units on which functions have already been activated at the factory. This is the case with the A1, for example, when the information electronics control unit 1 J794 (RMC) is replaced with the navigation function.



477_167

Note
After activating a current navigation map, all previous versions can be used by the navigation system. If, for example, the map for 2011 has been activated in MMI3G, the 2009 and 2010 versions are still supported.

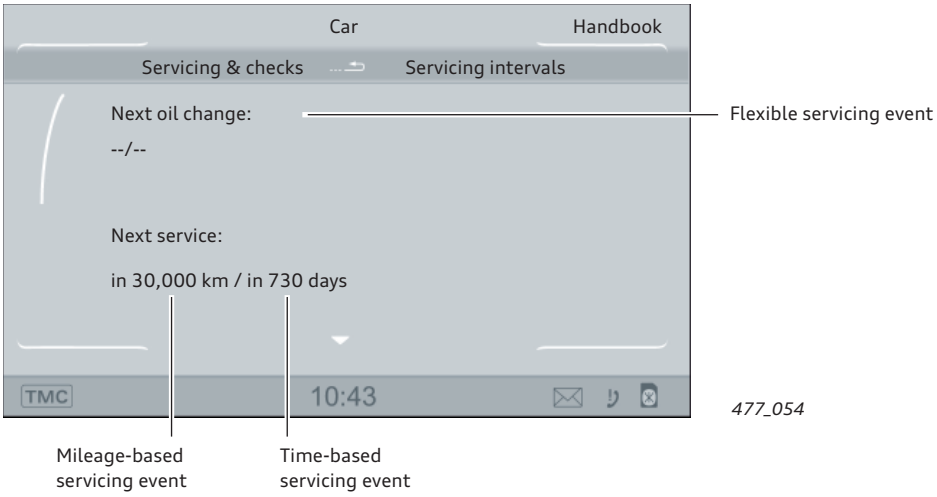
Inspection and maintenance

When model year 2011 is launched (from production week 22/2010 onwards), the time-based servicing events will be revised for all Audi models.

The following servicing work is displayed separately:

- The oil change as a flexible servicing event dependent on the individual driving profile.
- Mileage-based servicing events due after a multiple of 30,0000 km.
- Time-based servicing events always due after the expiration of defined time intervals, e.g. the first brake fluid change after three years.

Example of a service interval display in the MMI



477_054

The value in the field for the time-based servicing events is now 730 days (2 years) for a new vehicle and is updated daily. The field for the mileage-based servicing events now displays 30,000 km for new vehicles and is counted down in increments of 100 km.

In new vehicles, the field for the next oil change (flexible servicing event) is initially blank. This has to be calculated from the driving profile and load, and is not displayed until 500 km have been covered.

Overview of servicing intervals

	Audi A1 1.2l TFSI 63 kW	Audi A1 1.4l TFSI 90 kW	Audi A1 1.6l TDI CR 66 kW	Audi A1 1.6l TDI CR 77 kW
Oil change interval	Flexible, 15,000 – 30,000 km / 2 years			
Service interval	30,000 km / 2 years			
Air filter	90,000 km / 6 years	90,000 km / 6 years	90,000 km / 6 years	90,000 km / 6 years
Spark plugs	60,000 km / 4 years	60,000 km / 4 years		
Fuel filters	lifetime	lifetime	60,000 km / 4 years	60,000 km / 4 years
Timing drive chain	lifetime	lifetime		
Timing drive toothed belt			210,000 km	210,000 km
Brake fluid	Change for the first time after 3 years (depending on market), and thereafter every 2 years			
Dust and pollen filter	30,000 km / 2 years			

Note
The specifications in the current service literature always apply.

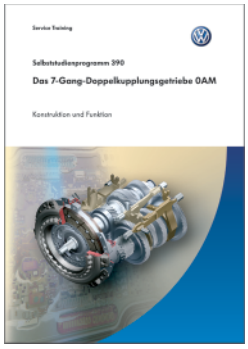
Summary

The A1 is a true Audi – it is both the premium option and one of the sportiest automobiles in the subcompact class. It comes with powerful, highly efficient engines and an agile chassis, and delights with an emotional design and excellent build quality. The A1 has a wide range of advanced technologies on board; its infotainment system, in particular, sets a new benchmark in this class. As a newcomer in the compact segment, the A1 appeals primarily to young, lifestyle-oriented customers, offering them virtually unlimited scope for individual design.

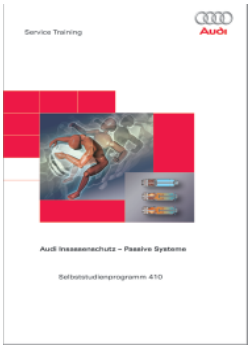
One thing is particularly important: the A1 is, in every respect, more than the sum of all its parts.

Self-Study Programmes

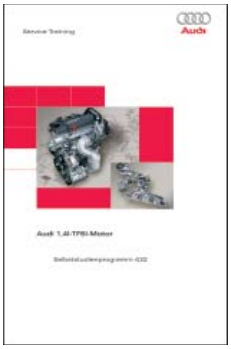
This Self-Study Programme summarises all you need to know about the Audi A1. You will find further information about the subsystems mentioned in this document in our other Self-Study Programmes.



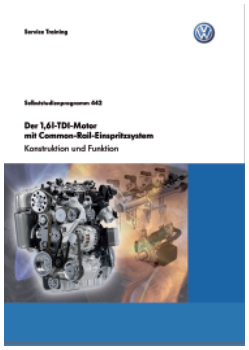
477_248



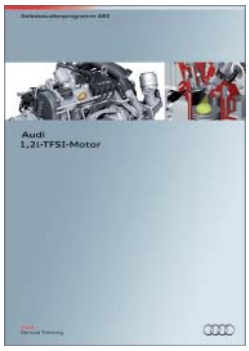
477_246



477_244



477_247



477_245

SSP 390	**The Seven-Speed Dual-Clutch Gearbox 0AM**, order number: 000.2811.85.20
SSP 410	**Audi Occupant Protection – Passive Systems**, order number: A07.5S00.41.20
SSP 432	**The Audi 1.4l TFSI Engine**, order number: A08.5S00.48.20
SSP 442	**The 1.6l TDI Engine with Common Rail Injection System**[1)], order number: 000.2812.22.20
SSP 485	**The Audi 1.2l TFSI Engine**, order number: A10.5S00.78.20

[1)] to be prepared by Audi

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